CHANGE NOTICE

THESE ARE SUPERSEDING OR SUPPLEMENTARY PAGES TO SAME PUBLICATION OF PREVIOUS DATE

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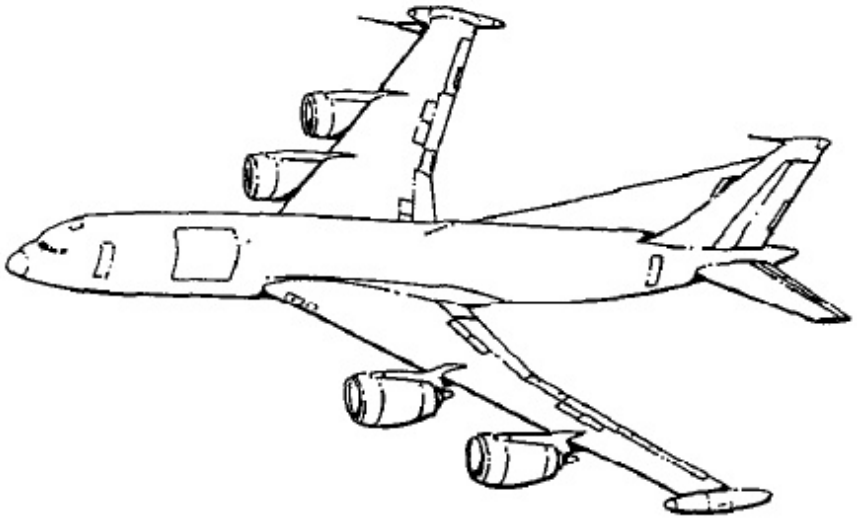
A1-E6AAA-NFM-200

SUPPLEMENTAL NATOPS FLIGHT MANUAL NAVY MODEL E-6A AIRCRAFT



ISSUED BY AUTHORITY OF THE CHIEF OF NAVAL OPERATIONS AND UNDER THE DIRECTION OF THE COMMANDER, NAVAL AIR SYSTEMS COMMAND

NATEC ELECTRONIC MANUAL

MISSION SYSTEMS

INDEX

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON, D.C. 20350

15 April 1994

LETTER OF PROMULGATION

1. The Naval Air Training and Operating Procedures Standardization (NATOPS) Program is a positive approach toward improving combat readiness and achieving a substantial reduction in the aircraft mishap rate. Standardization, based on professional knowledge and experience, provides the basis for development of an efficient and sound operational procedure. The standardization program is not planned to stifle individual initiative, but rather to aid the commanding officer in increasing the unit's combat potential without reducing command prestige or responsibility.

2. This manual standardizes ground and flight procedures but does not include tactical doctrine. Compliance with the stipulated manual procedure is mandatory except as authorized herein. In order to remain effective, NATOPS must be dynamic and stimulate rather than suppress individual thinking. Since aviation is a continuing, progressive profession, it is both desirable and necessary that new ideas and new techniques be expeditiously evaluated and incorporated if proven to be sound. To this end, commanding officers of aviation units are authorized to modify procedures contained herein, in accordance with the waiver provisions established by OPNAVINST 3710.7, for the purpose of assessing new ideas prior to initiating recommendations for permanent changes. This manual is prepared and kept current by the users in order to achieve maximum readiness and safety in the most efficient and economical manner. Should conflict exist between the training and operating procedures found in this manual and those found in other publications, this manual will govern.

3. Checklists and other pertinent extracts from this publication necessary to normal operations and training should be made and carried for use in naval aircraft.

BRENT M. BENNITT
Rear Admiral, U.S. Navy
Director, Air Warfare Division

INTERIM CHANGE SUMMARY

The following Interim Changes have been canceled or previously incorporated in this manual:

INTERIM CHANGE NUMBER(S)	REMARKS/PURPOSE
1 thru 6	Previously Incorporated

The following Interim Changes have been incorporated in this Change/Revision:

INTERIM CHANGE NUMBER(S)	REMARKS/PURPOSE

Interim Changes Outstanding – To be maintained by the custodian of this manual:

INTERIM CHANGE NUMBER	ORIGINATOR/DATE (or DATE/TIME GROUP)	PAGES AFFECTED	REMARKS/PURPOSE

SUMMARY OF APPLICABLE TECHNICAL DIRECTIVES

Information relating to the following recent technical directives has been incorporated in this manual.

CHANGE NUMBER	DESCRIPTION	DATE INC. IN MANUAL	VISUAL IDENTIFICATIO
AVC 4248	Revise Drogue Door Handle and Crank Labels (ECP 236)	15 Feb 92	New Label
AVC 4172	Replace Both PA Control Computer and IFPM Computer (CP-970/USQ) With (CP-1999/USC-13(V)); Also Delete Two Power Supplies (PP-6223), (Rockwell ECP 339-1R4)	15 Feb 92	Label on Front Each Compute
AFC 40	Addition of External Power Receptacles (ECP 268)	15 Apr 1995	

Information relating to the following applicable technical directives will be incorporated in a future change.

CHANGE NUMBER	DESCRIPTION	VISUAL IDENTIFICATION

RECORD OF CHANGES

Change No. and Date of Change	Date of Entry	Page Count Verified by (Signature)

E-6A Supplemental NATOPS Flight Manu

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CHAPTER 24 — REEL SYSTEMS — PREFLIGHT, OPERATION, AND POSTFLIGHT

FOLDOUTS

LIST OF ABBREVIATIONS AND ACRONYM

A

ACO. Airborne communications officer.

ACS. Airborne communications supervisor.

ACU. Auxiliary coupler unit.

ANDVT. Advanced narrowband digital voice terminal.

APU. Auxiliary power unit.

AVE. Air vehicle equipment.

B

BTU. Basic terminal unit.

C

CCU. Communications control unit.

CHGR. Battery charger.

CLR. Clear.

CM. COMSEC module.

CSU. Crew station unit.

D

DKU. Display/keyboard unit.

E

EAM. Emergency action message.

ECP. Emergency command precedence.

EGW. Ethylene glycol water.

ELCU. Electrical load control unit.

EMP. Electromagnetic pulse.

EOM. End of message.

ERCS. Emergency rocket communications system.

F

FSK. Frequency shift keying.

FTS. Frequency time standards.

H

HERO. Hazards of electromagnetic radiatio ordnance.

HF. High frequency.

I

ICS. Intercommunications system.

IFPM. In-flight performance monitor.

IFT. In-flight technician.

K

KG. Key generators.

KEK. Key encryption key.

L

LCS. Liquid cooling system.

LMP. Local maintenance panel.

LOS. Line of sight.

LTWA. Long trailing wire antenna.

M

MCU. Maintenance control unit.

MDF. Main distribution frame.

ME. Mission equipment.

MI. Mode initiate (ANDVT); message indicator (KG-33)

MSU. Maintenance station unit.

N

NB. Narrowband.

NBPS. No-break power supply.

P

PA. Power amplifier.

PACS. Power-amplifier control system.

PIC. Parallel interface circuits.

PS. Power supply.

PTT. Push-to-talk.

R

RT. Receiver-transmitter.

S

SDSU. Standard distribution switching unit.

SEC. Secure.

SOI. Special operating instructions.

SRCU. Split remote control unit.

SSB. Spit system breaker.

SSTY. Solid state teletypewriter.

STWA. Short trailing wire antenna.

T

TD. Transmitter-distributor.

TDM. Time division multiplexer.

TEK. Traffic encryption key.

TMPS. TACAMO message processor subsystem.

TTY. Teletype.

U

UHF. Ultra high frequency.

UPS. Uninterrupted power supply.

V

VLF. Very low frequency.

W

WB. Wideband.

PREFACE

SCOPE

The NATOPS flight manual is issued by the authority of the Chief of Naval Operations and under the direction of Commander, Naval Air Systems Command in conjunction with the naval air training and operating procedures standardization (NATOPS) program. This manual contains information on the E-6A special missions systems and procedures for their safe and effective operation. However, it is not a substitute for sound judgment. Compound emergencies, available facilities, adverse weather or terrain, or considerations affecting the lives and property of others may require modification of the procedures contained herein. Read this manual from cover to cover. It's your responsibility to have a complete knowledge of its contents.

APPLICABLE PUBLICATIONS

The following applicable publications complement this manual:

A1-E6AAA-GAI-100 (General Aircraft Information)
A1-E6AAA-NFM-000 (Flight Manual)
A1-E6AAA-NFM-800 (Emergency Data Card)

HOW TO GET COPIES

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UPDATING THE MANUAL

To ensure that the manual contains the latest p dures and information, NATOPS review confer are held in accordance with the current OPNAV 3710.7.

CHANGE RECOMMENDATIONS

Recommended changes to this manual or other TOPS publications may be submitted by anyo accordance with the current OPNAVINST 3710.7

NATOPS/TACTICAL CHANGE RECOMMENDATION
OPNAV 3710/6 (4-90) S/N 0107-LF-009-7900

DATE _____

TO BE FILLED IN BY ORIGINATOR AND FORWARDED TO MODEL MANAGER

FROM (Originator)	Unit
TO (Model Manager)	Unit

Complete Name of Manual/Checklist	Revision Date	Change Date	Section/Chapter	Page	Paragraph

Recommendation (be specific)

☐ CHECK IF CONTINUED ON BACK

Justification

Signature	Rank	Title

Address of Unit or Command

TO BE FILLED IN BY MODEL MANAGER *(Return to Originator)*

FROM	DATE

TO

REFERENCE

(a) Your Change Recommendation Dated _____

☐ Your change recommendation dated _____ is acknowledged. It will be held for action of the review conference planned for _____ to be held at _____

☐ Your change recommendation is reclassified URGENT and forwarded for approval to _____ by my DTG _____ .

/S/ _____ MODEL MANAGER	_____ AIRCRAFT

Routine change recommendations are submitted directly to the model manager on OPNAV 3710/6 (4-90) shown herein. The address of the model manager of this aircraft is:

Officer in Charge
Naval Training Support Unit
7641 Mercury Road
Tinker AFB, OK 73145-8705
Commercial: (405) 739-3200
DSN: 339-3200

Change recommendations of an URGENT nature (safety of flight, etc.,) should be submitted directly to the NATOPS advisory group member in the chain of command by priority message.

YOUR RESPONSIBILITY

NATOPS flight manuals are kept current through an active manual change program. Any corrections, additions, or constructive suggestions for improvement of its content should be submitted by routine or urgent change recommendation, as appropriate, at once.

NATOPS FLIGHT MANUAL INTERIM CHANGES

Flight manual interim changes are changes or corrections to the NATOPS flight manuals promulgated by CNO or NAVAIRSYSCOM. Interim changes are issued either as printed pages, or as a naval message. The interim change summary page is provided as a record of all interim changes. Upon receipt of a change or revision, the custodian of the manual should check the updated interim change summary to ascertain that all outstanding interim changes have been either incorporated or canceled; those not incorporated shall be recorded as outstanding in the section provided.

CHANGE SYMBOLS

Revised text is indicated by a black vertical line in either margin of the page, adjacent to the affected text, like the one printed next to this paragraph. The change symbol identifies the addition of either new information, a changed procedure, the correction of an error, or a rephrasing of the previous material.

WARNINGS, CAUTIONS, AND NOTES

The following definitions apply to "WARNINC "CAUTIONs", and "Notes" found through the manu

WARNING

An operating procedure, practice, or condition, etc., that may result in injury or death if not carefully observed or followed.

CAUTION

An operating procedure, practice, or condition, etc., that may result in damage to equipment if not carefully observed or followed.

Note

An operating procedure, practice, or condition, etc., that is essential to emphasize.

WORDING

The concept of word usage and intended meani which has been adhered to in preparing this Manual as follows:

"Shall" has been used only when application o procedure is mandatory.

"Should" has been used only when application o procedure is recommended.

"May" and "need not" have been used only wi application of a procedure is optional.

"Will" has been used only to indicate futurity, ne to indicate any degree of requirement for appli tion of a procedure.

PART VIII

Mission Systems

CHAPTER 18

Communication Central Common Equipment

18.1 GENERAL DESCRIPTION

TACAMO communication system AN/USC-13(V)XX is an airborne message handling terminal consisting of communication radios and associated control, monitoring, and processing equipment. The communications system contains four major assemblies: communications central AN/USC-14(V) (comm central); radio set group OZ-1/USC-13(V) (receiver/transmitter group); amplifier-coupler group OG-127D/USC-13(V), after AVC 4172, OG193/USC-13(V), (VLF power amplifier coupler); and antenna control-indicator group OE-159(V)/USC-13(V) (antenna group).The antenna group (OE-159) is comprised of antenna OE-412/USC-13(V) (LTWA) and antenna OE-411/USC-13(V) (STWA). The system is installed in two areas of the E-6A special mission compartment. The midcabin area contains the comm central equipment. The aft cabin area contains the R/T racks, the power amplifier, and the antenna reel equipment.

18.1.1 Modes of Operation. The TACAMO communications system is capable of receiving, transmitting, storing, originating, and relaying different types of messages. These messages may be transmitted and received in a number of different modes and frequency ranges. The VLF modes of operation used are: plain or secure FSK, secure MSK and CSK, and plain CW-FSK. The HF modes of operation include: plain or secure upper and lower sideband voice, plain or secure FSK upper and lower sideband data, plain or secure AM, and plain CW. The UHF modes include secure PSK, plain or secure FSK NB, plain or secure FSK WB, and plain LOS voice.

18.1.2 Hazard Areas

18.1.2.1 Radiation Hazards

Do not transmit on the ground unless cleared to radiate. Refer to A1-E6AAA-GAI-000 for HERO information.

WARNING

- To avoid shocking personnel working on the aircraft external skin surfaces, coordinate with groundcrew prior to initiating test or ground transmission.
- During ground operations, to prevent possible ignition of fuel vapor, do not transmit on HF or UHF radios within 200 feet of equipment being refueled or defueled.
- Do not transmit during connect/disconnect aerial refueling operations.

18.1.2.2 Noise Hazard Areas

WARNING

- All personnel in aft compartment during equipment operations shall wear hearing protection.
- All personnel entering lower compartments during flight shall wear hearing protection.
- During flight, at least one person per lower compartment shall maintain intercommunication with the flight deck. High-noise level in lower compartments during flight could prevent hearing emergency signals.

18.1.3 Electromagnetic Pulse Hardening. The EMP protection built into the E-6A aircraft, ensures all mission essential equipment has at least a 32 dB safety margin to EMP induced upset to increase the probability of mission completion. This protection exists during ground operation, in-flight operation, in-flight refueling and LTWA/STWA extended modes. The EMP hardening is at two levels. The first level, fuselage hardening, is accomplished by closure of all apertures and decoupling of all conductive penetrations of the aircraft pressurized fuselage. Most electronic equipment requiring EMP protection is in the pressurized area. The second level, internal hardening, protects the mission equipment with overall shielding on interconnecting wiring, on RF-tight consoles, and on equipment enclosures. Some EMP suppression terminal modules are also used.

18.1.4 Mission Crew Responsibility. Equipment responsibility is arranged according to the operator seat positions. The seat position locations are shown in FO-1. Seat positions one through four, referred to in this manual, are comm central seat positions and should not be confused with aircrew ditching station numbers. The primary responsibilities assigned to each operator are:

1. Seat One position — The TACAMO message processor subsystem.

2. Seat Two position — The teletype subsystem and the UHF satellite radios. The UHF radios include UHF-3 (except LOS control), UHF-4, and UHF-5.

3. Seat Three position — The VLF subsystem, and monitoring the in-flight performance monitor subsystem. The VLF subsystem includes the VLF receive, VLF transmit, frequency time standard (including power supply), and the oscilloscope.

4. Seat Four position — The HF subsystem (HF-2, HF-3, HF-4, and HF-5), the cassette tape recorders, the emergency rocket communication system (ERCS — UHF-6), UHF-3 LOS control, and the NBPS.

5. Seat Five position (ACO) — The ACO monitors message traffic operations and is not tasked with system equipment operation.

6. IFT — Interior walkaround, test equipment/onboard spares/ publications, and VLF PA-coupler.

7. Reel operators — Both the long and short trailing wire antenna.

18.2 EQUIPMENT LOCATION

18.2.1 Mission Avionics Antenna Identification. The E-6A aircraft mission antennas accommodate the VLF, HF, and UHF frequency ranges in the transmit and receive mode of operation. Refer to Figure 18-1 for mission antenna locations.

A flush mounted VLF receive antenna is located just forward of the vertical stabilizer. The VLF transmit antennas consist of a long and short trailing wire located in the aft mission compartment.

HF antennas include: HF-2, -3, -4, and -5. HF-2 is used for receive only. HF-3, HF-4, and HF-5 probe antennas are used for both transmit and receive operations.

The UHF antenna system consists of transmit and receive antennas for LOS voice and satellite operation. The UHF transmit system uses UHF-4 through -8 antennas. UHF-4 antenna and UHF LOS antenna are for LOS voice transmission and reception used with UHF-3 transceiver. UHF-5, -6, and -7 antennas can be automatically or manually selected by the transmit antenna control in comm central. The UHF-8 antenna can only be manually selected.

The UHF satellite receive antennas consist of UHF-9 through -13. The satellite receive antennas are automatically selected using inputs from the aircraft inertial reference system, or manually selected using the receive antenna control panel. Two dedicated antennas are used for ERCS reception.

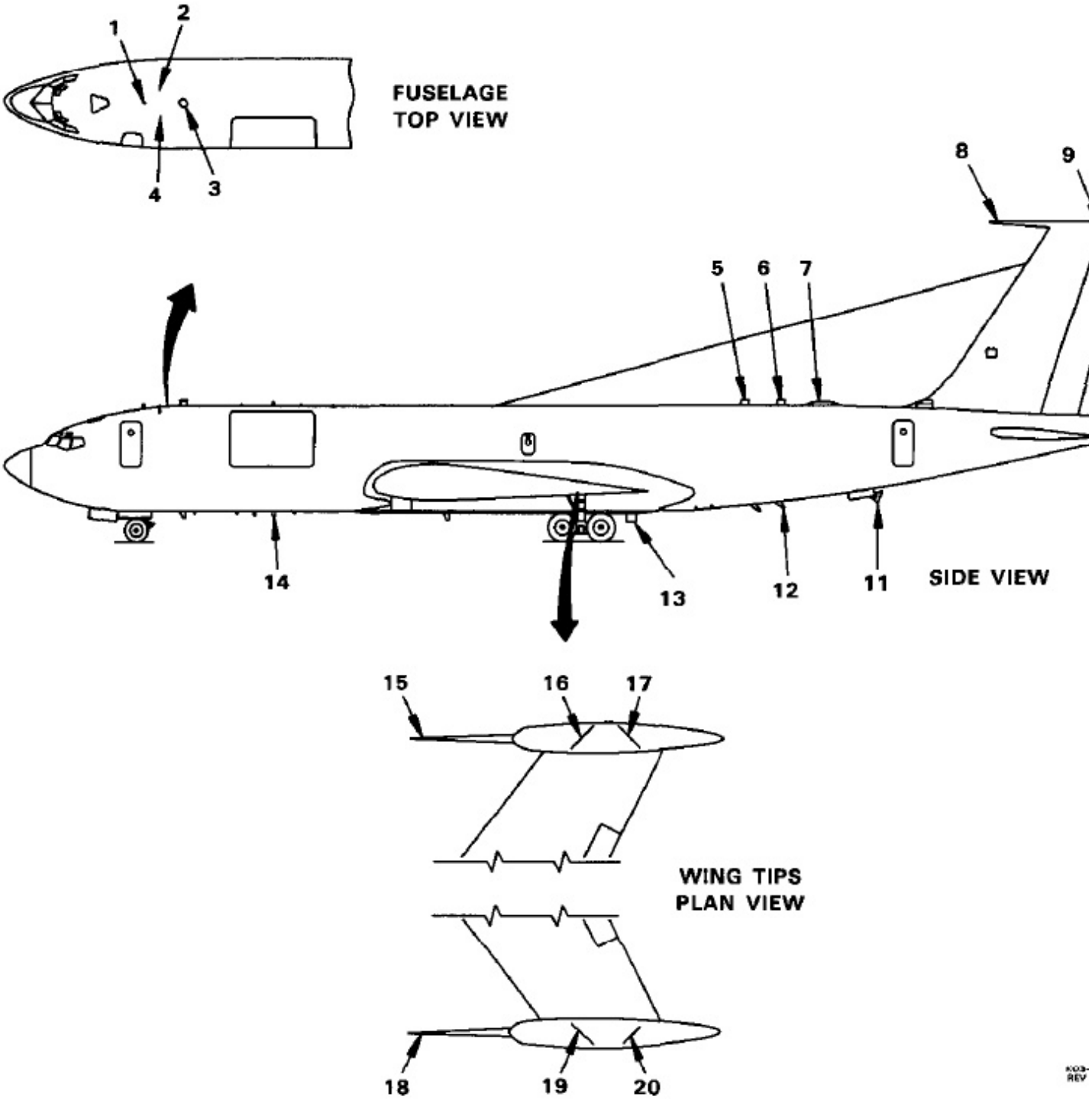


Figure 18-1. Mission Antenna Locations (Sheet 1 of 2)

18.2.2 Interior Mission Equipment. TACAMO communications systems contains the following major equipment assemblies: comm central AN/USC-14(V) including the ACO station and C-1 rack, radio set group (R/T racks) OZ-1/USC-13(V), power-amplifier coupler group OG-127D/USC-13(V), after AVC 4172, OG193/USC-13(V), and the antenna group containing the antenna OE-412/USC-13(V) (LTWA) and antenna OE-411/USC- 13(V) (STWA).

CAUTION

The maximum cabin temperature is 90° F for startup and continuous ground operation of all avionics cooled by the draw-through cooling system. Refer to "Hot Day Cabin Cooling," A1-E6AAA-NFM-000, Chapter 16.

NO.	ITEM	STATION NO. LOCATION	TYPE
1	UHF SATCOM 6	350	Blade
2	UHF SATCOM 7	386	Blade
3	UHF SATCOM 8	410	Cross Dipole
4	UHF SATCOM 5	386	Blade
5	UHF SATCOM 10	1050	Cross Dipole
6	UHF ERCS 2	1134	Cross Dipole
7	VLF/LF Receive	1250	Ferrite Loop
8	HF Fin Probe 4	Fin Top Forward	Probe
9	HF Vert Fin Cap 2	Fin Top Aft	Cap
10	VLF Short Wire	1715	Wire
11	VLF Long Wire	1260	Wire
12	UHF ERCS 1	1150	Blade
13	UHF LOS (UHF-3 RX)	960 + 10	Blade
14	UHF LOS 4 (UHF-3 TX)	570	Blade
15	HF Wing Pod 5	R Pod Forward	Probe
16	UHF SATCOM 9	R Pod Forward	Back Dipole
17	UHF SATCOM 11	R Pod Aft	Back Dipole
18	HF Wing Pod 3	L Pod Forward	Probe
19	UHF SATCOM 12	L Pod Forward	Back Dipole
20	UHF SATCOM 13	L Pod Aft	Back Dipole

Figure 18-1. Mission Antenna Locations (Sheet 2 of 2)

18.2.3 Comm Central. Comm central equipment is located in two consoles installed in the central area of the aircraft. The consoles are arranged in a V-shape with two operators per section. This allows the ACO to observe operation of all four operator stations (two per console). The equipment is grouped in the bays (FO-2 through FO-5) to allow each operator to operate their assigned equipment while seated. A desk-high shelf runs the length of each console. The shelf provides a working surface that holds keyboards, printers, telegraph hand keysets, and other equipment necessary for operation. The comm central equipment description and operation information is found in Chapters 18 through 22.

18.2.4 Airborne Communications Officer. The ACO has a side console located on the wall adjacent to the station seat. The console provides for storage, communications access, an oxygen station, and lighting control. Refer to Figure 18-2 for the console provisions.

18.2.5 Receiver/Transmitter Group. The R/T group (FO-6) is in the equipment area just aft of comm central and forward of the VLF amplifier-coupler. The R/T group consists of four bays arranged so that bays 1 and 2 face starboard and bays 3 and 4 face port. Each bay contains electronic mounting shelves that support modular equipment. The equipment includes: HF and

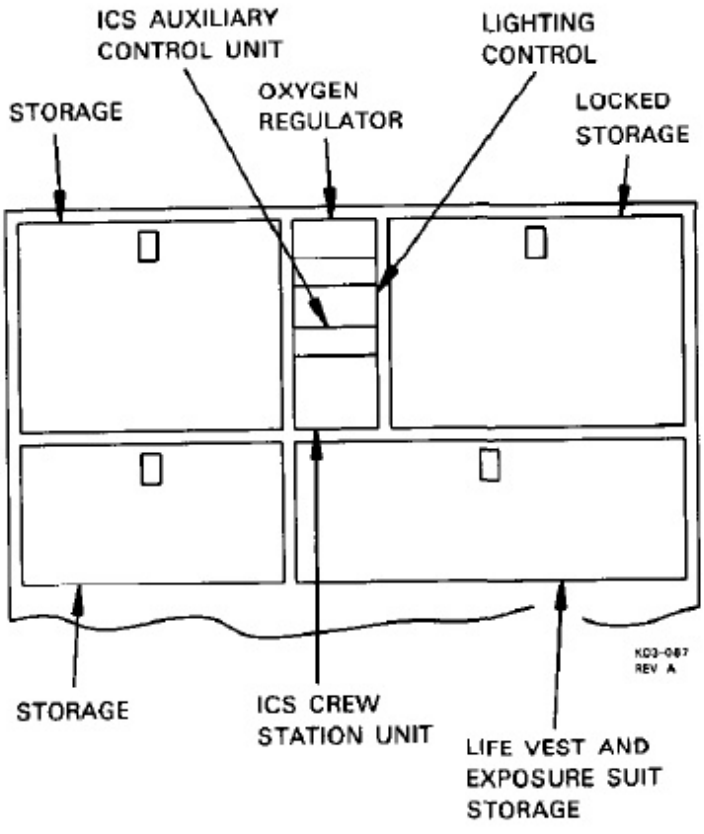


Figure 18-2. ACO Station

UHF radio components, filters, 60 Hz power converters, VLF receivers, and data modems. Most units requiring operator attention are remotely controlled from comm central.

18.2.6 C1 Cabinet. The C1 cabinet is located at the forward end of comm central, next to the crew rest area partition. The cabinet consists of two bays with separate doors. Each bay contains electronic mounting shelves that support modular equipment. The equipment housed in the bays includes: time division multiplex card cages, message processor, and TTY components (refer to FO-7).

18.2.7 Power Amplifier-Coupler Group. The PA-coupler group is located in the equipment area just aft of the R/T racks. It contains the PA and antenna-coupler for the VLF transmission system. It amplifies the driver input from the VERDIN modulator and couples its output to the STWA. The PA-coupler group description and operation is discussed in Chapter 23.

18.2.8 VLF Antenna Group. The long-wire and short-wire antennas comprise the antenna group. Both antennas are located in the aft mission compartment. Each antenna assembly contains electrical, hydraulic, and mechanical components that control extension and retraction of the two trailing wire antennas, located on reels. The VLF antenna group description and operation is discussed in Chapter 24.

18.3 POWER DISTRIBUTION

Aircraft and mission equipment electrical power is provided by eight engine driven, synchronous, 75 KVA, 115v, 400 Hz, three-phase generators. Each of the four engines drives two generators. The generators are numbered 1 through 8, starting from the port side to the starboard side of the aircraft. The mission power distribution subsystem utilizes engine generated power and distributes it. It consists of distribution panels and inputs to: the 60 Hz static converters, dc power supplies, chargers, and control units. The overall aircraft to mission power distribution is represented by Figure 18-3.

To provide VLF transmission without disturbing aircraft and other mission equipment, the power system is separated by a SSB into two distribution systems during VLF transmission: AVE bus and ME bus. The AVE bus power is supplied by generators 1, 3, and 5.

The ME bus power is supplied by generators 2, 4, 6, 7, and 8. The VLF PA-coupler and the long-wire reel 60 hp motor loads are on the ME bus. The aircraft and all other ME are on the AVE bus. Whe VLF power amplifier is not in use, the split sy breaker can be closed and the loads shared by all generators. The breaker is controlled from the engineers station. There is an auxiliary gene breaker that allows transfer of generator 5 power the air vehicle bus to the mission bus if the mi bus is lacking power. With the split system bre closed, air vehicle bus 7 is powered by generat When the split system breaker is open, air vehicl 7 is powered by generator 3 through the transfer re

With proper power management, the E-6 air can maintain full mission capability (full VLF t mission power) with any one of the follo generator losses:

1. Loss of any single generator
2. Loss of both generators from any one engine
3. Loss of any two generators on the mission bu

The aircraft has an APU with a generator rat 60 KVA. The APU can accommodate a mission onics preflight, excluding the VLF PA-coupler 60-hp reel motor operation. This allows gr power independence when operating at remote b The APU also provides aircraft air-conditio (bleed air) while operating on the ground. The cannot be used when the aircraft is airborne. APU generator cannot be used with engine gener or with ground power.

The aircraft has four external power recept (1A, 1B, 2A, 2B) for connection of ground pow the aircraft electrical system. External power rec cle 1A is the master receptacle and must be whenever a ground power source is connected t aircraft. With the split system breaker closed, a gr power source connected to 1A can provide pow all air vehicle and mission equipment buses. Ext power receptacle 1B provides power to the mi equipment buses; the split system breaker mus open to apply external power to 1B. Receptacle and 2B are only used during full power checks o VLF system, which requires a special ground p source capable of producing 360 kVA of elec power with four external power cables.

18.3.1 P67 Panel. The P67 mission circuit bre panel is divided into three subpanels: -1, -2 an (Figure 18-4). The panel protects and distributes mary 400 Hz, 115 vac and 28 vdc from bus 1 a Refer to Figure 18-5 for equipment served by the c breakers on the P67 panels.

18.3.2 400 Hz Distribution Panels. The two 400 Hz distribution panels (Figure 18-6) contain circuit breakers and switches for primary power distribution. Power distribution through the panels is shown in Figure 18-7. Power to the panels comes directly from tie bus 5 (via P67-2) without going through mission distribution bus 5.

18.3.3 28 Vdc Distribution Panels. Two 28 vdc distribution panels (Figure 18-8), located between seats 2 and 3, are used to distribute 28v power in comm central and the R/T rack. Some of the power distributed is supplied by the mission 28v bus through P-67 panels. Other circuits that require continuous power if primary (aircraft) power is lost are supplied by the NBPS (refer to Figure 18-9).

18.3.4 No-Break Power Supply. A NBPS is used to supply 28 vdc power to two circuit breakers on the 28 vdc distribution 1 panel and to eight circuit breakers on the 28 vdc distribution 2 panel. The power distribution and circuit breakers for the NBPS are identified in Figure 18-10. The no-break power is used to maintain certain equipment operation without interruption in the event of the loss of primary (aircraft) input power. A 28-vdc power supply normally provides power to the no-break power system. Back-up emergency power is provided for up to 30 minutes by a 24v battery. The battery will provide 17 amps for the 30-minute period with the voltage no lower than 21 vdc at the end of the period.

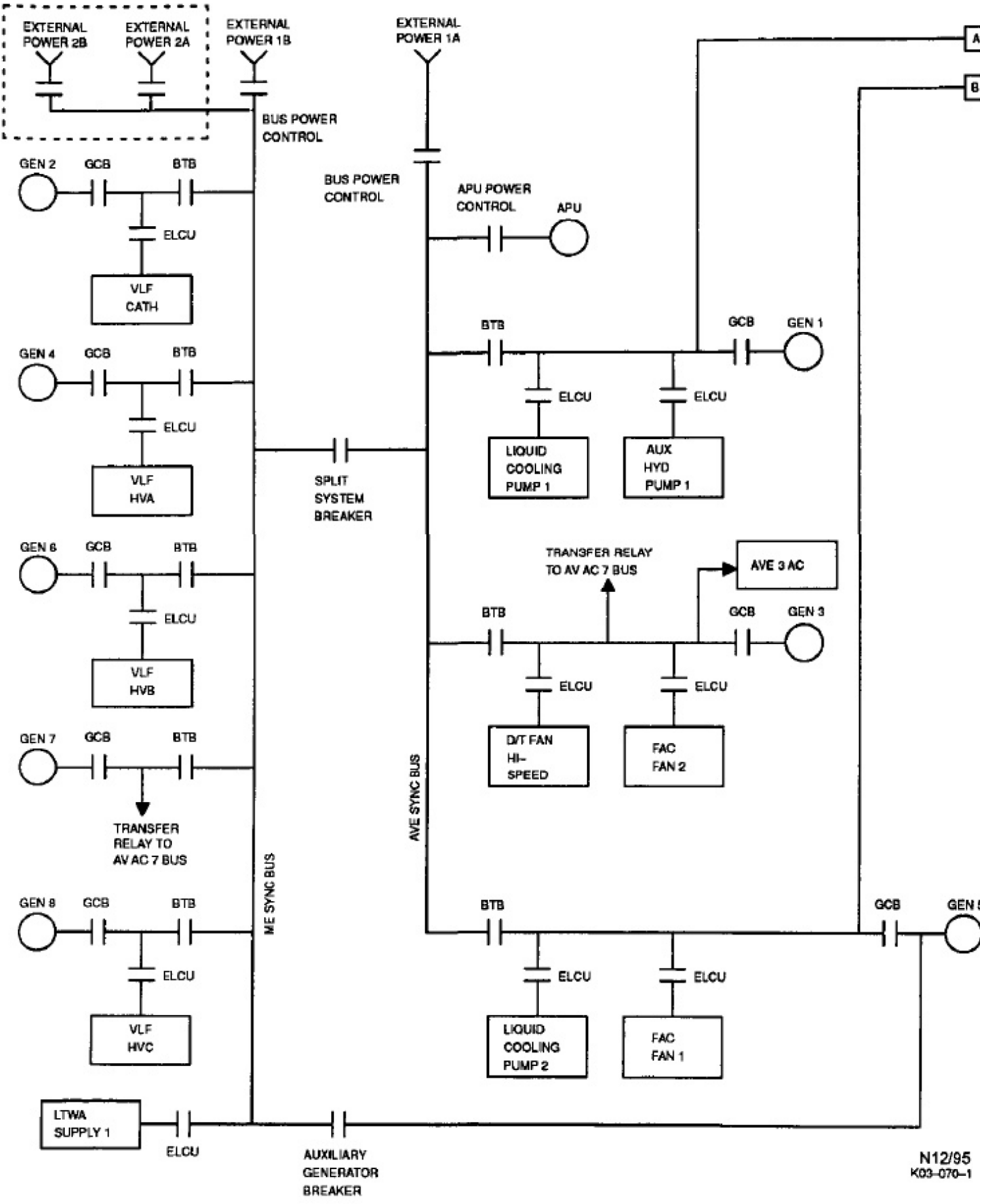


Figure 18-3. Aircraft/Mission Power Distribution (Sheet 1 of 2)

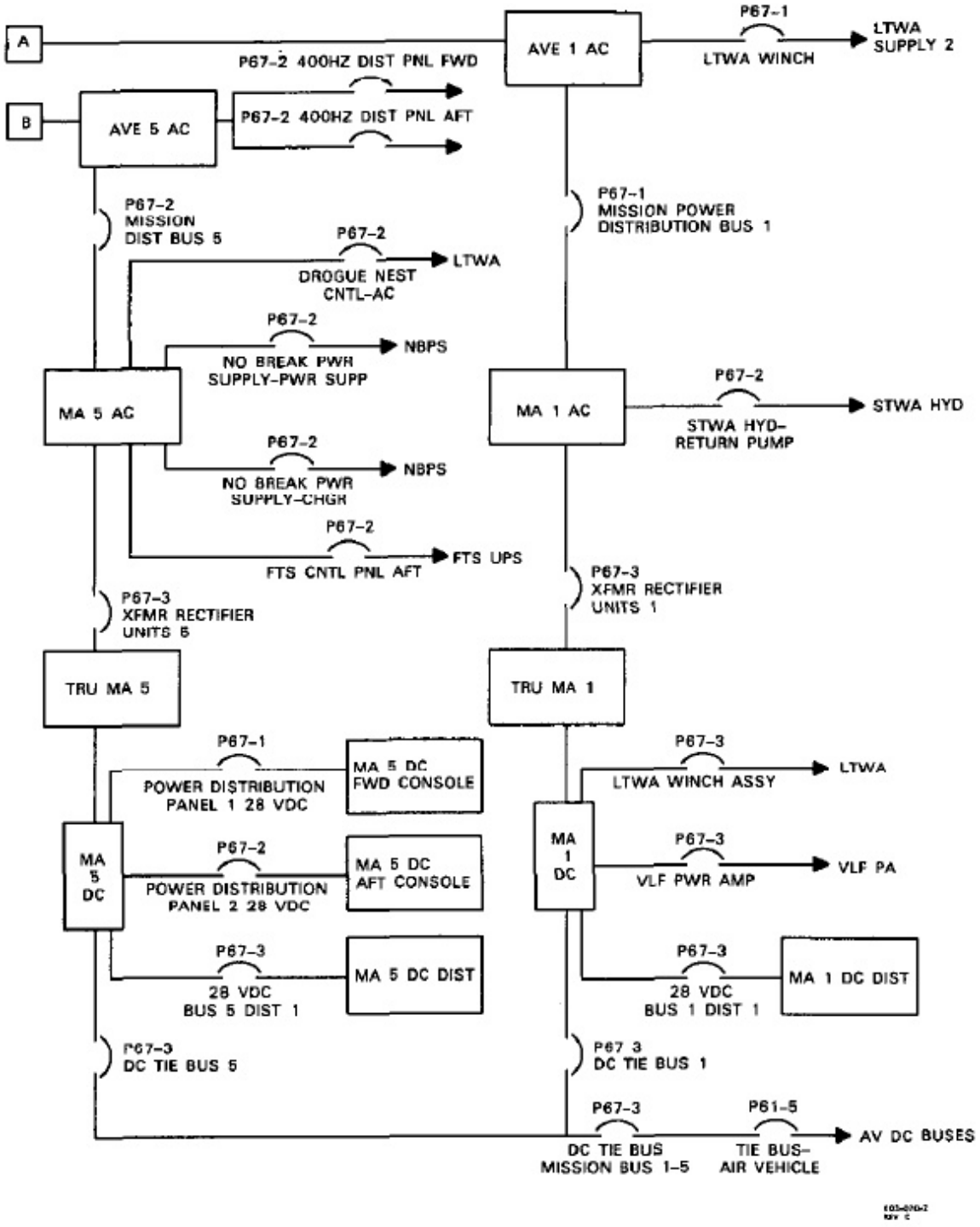


Figure 18-3. Aircraft/Mission Power Distribution (Sheet 2 of 2)

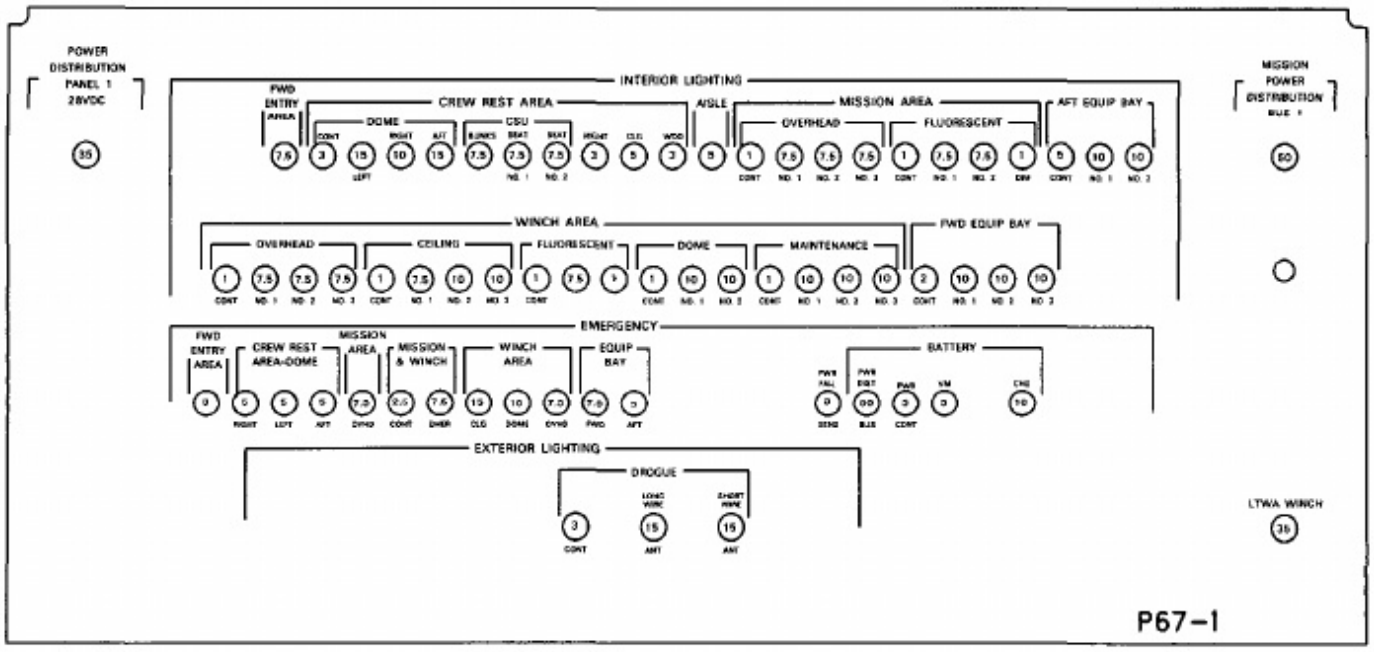


Figure 18-4 P67 Power Panels (Sheet 1 of 3)

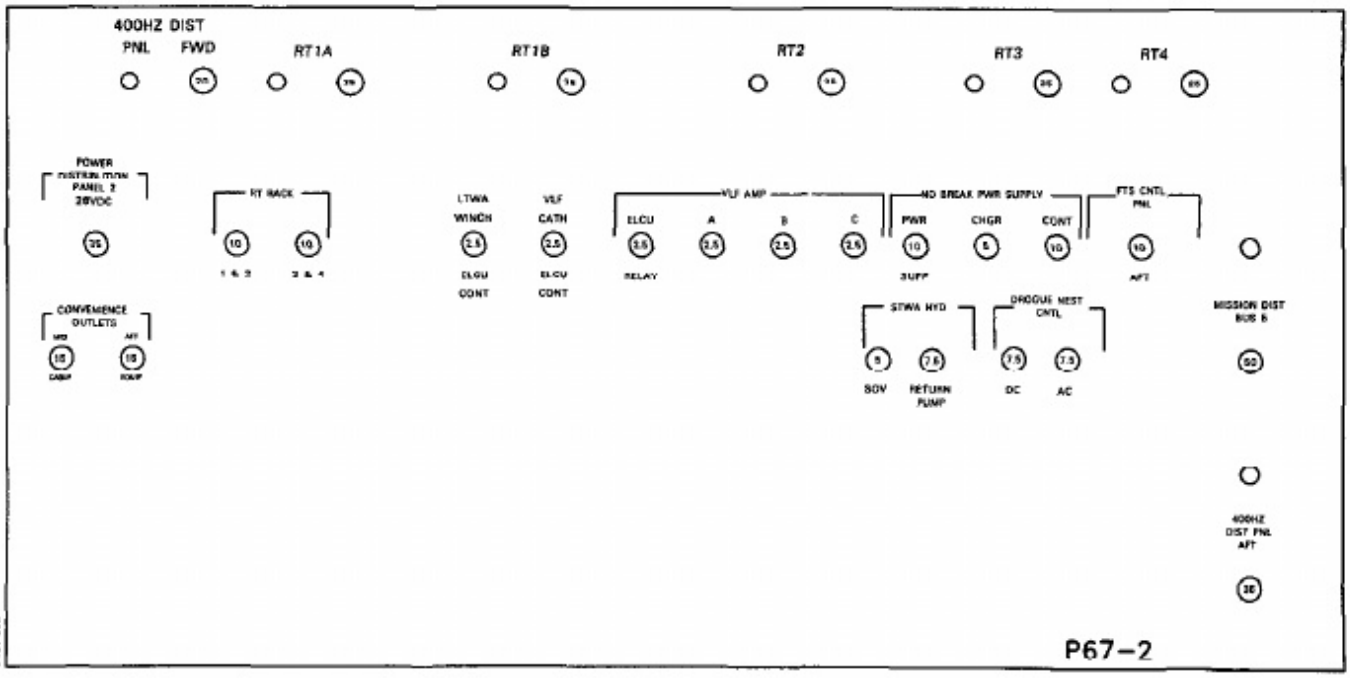
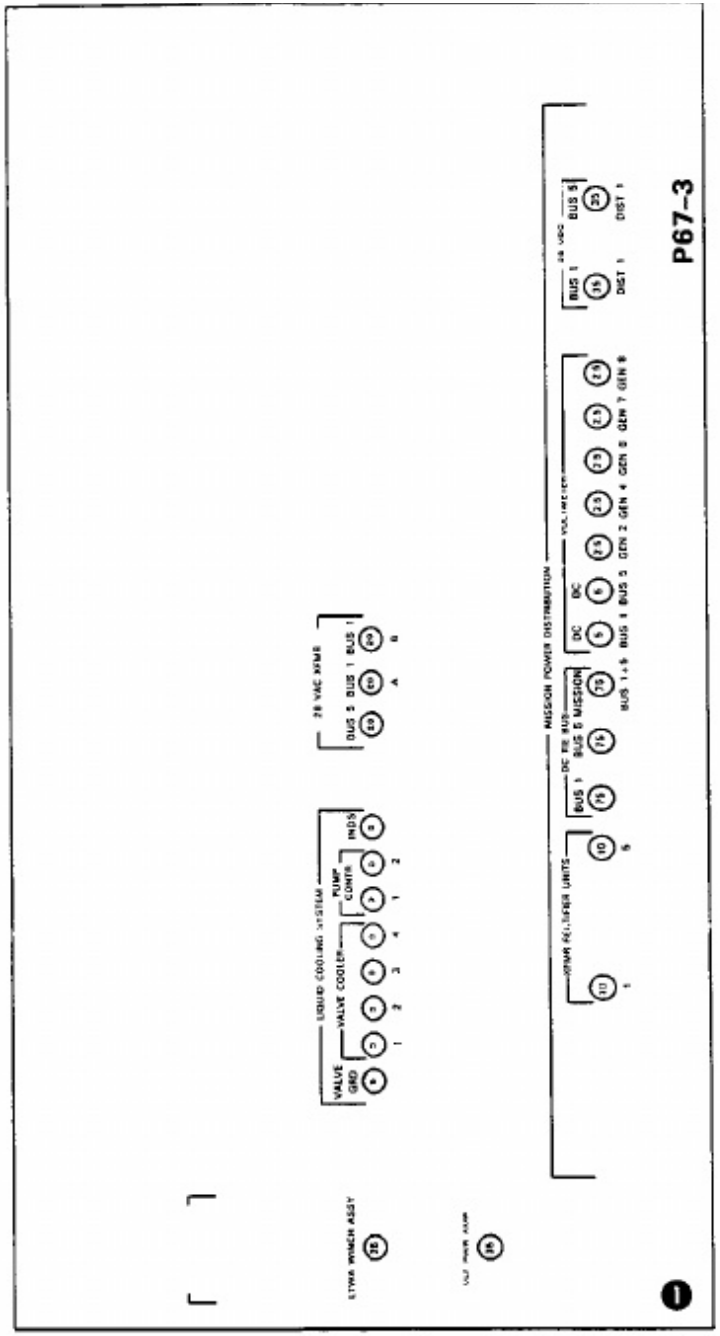


Figure 18-4. P67 Power Panels (Sheet 2 of 3)



❶ See Figure 2-22 for circuit breaker panel ocation.

Figure 18-4. P67 Power Panels (Sheet 3 of 3)

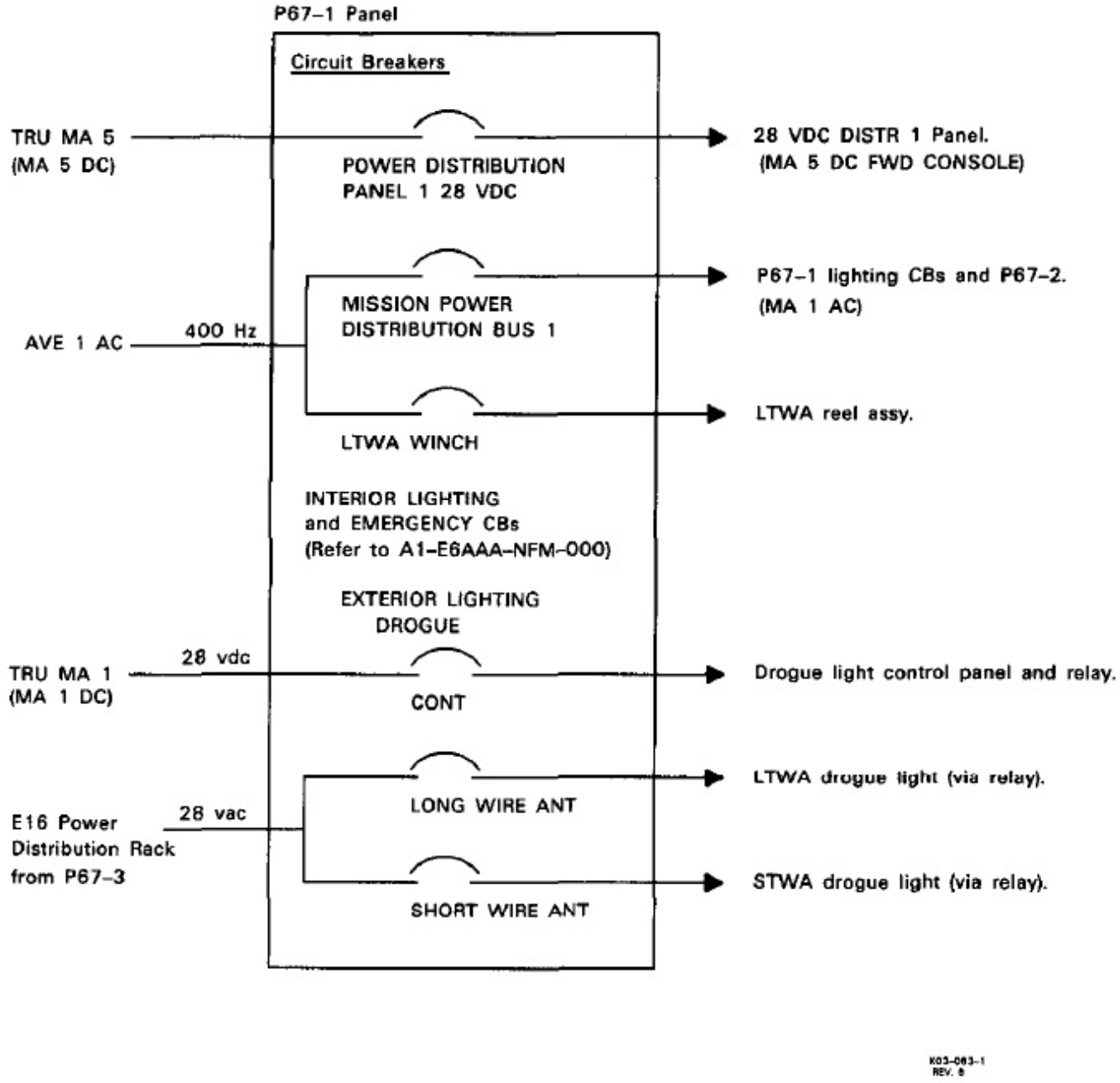


Figure 18-5. P67 Panel Power Distribution (Sheet 1 of 5)

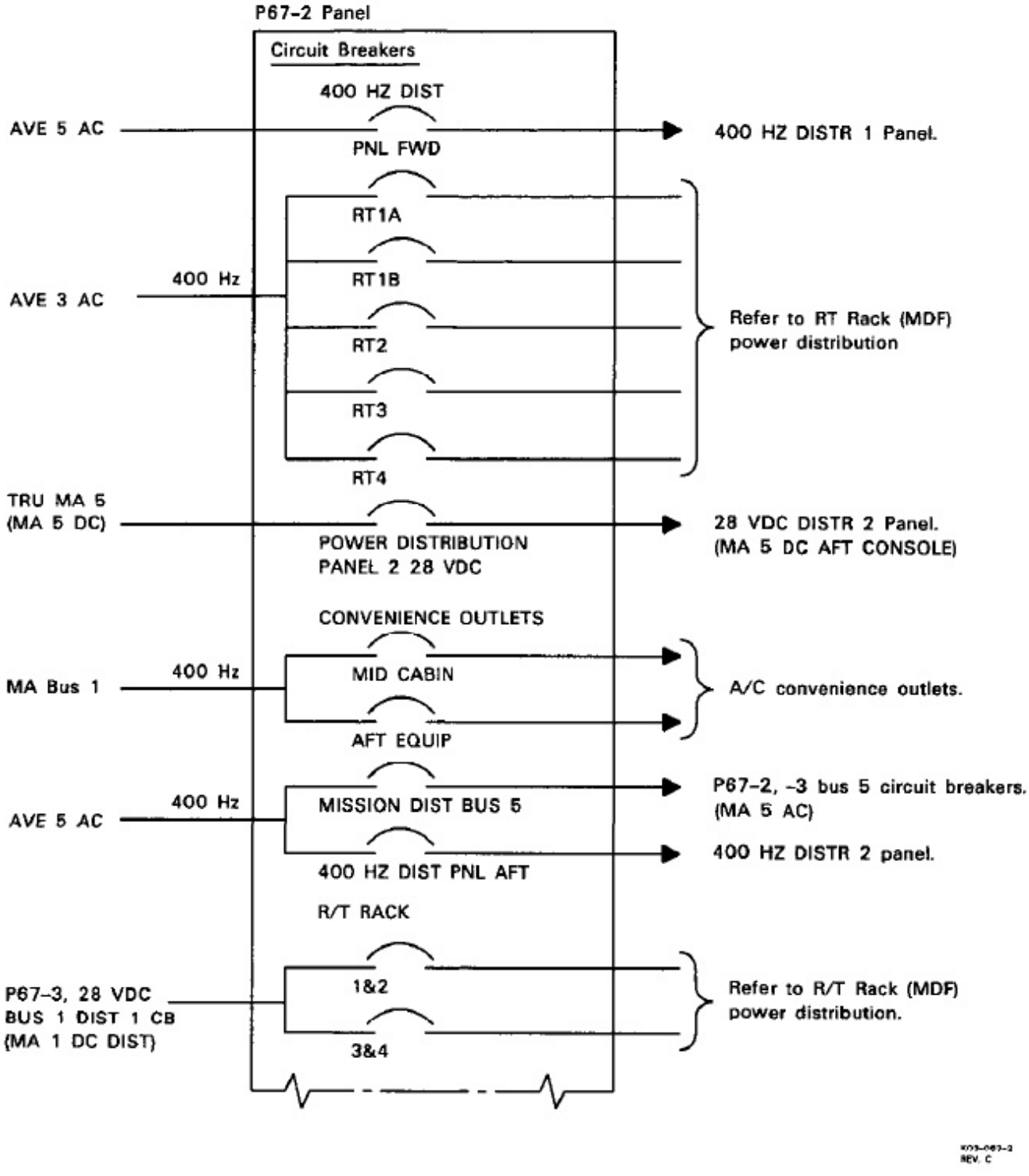


Figure 18-5. P67 Panel Power Distribution (Sheet 2 of 5)

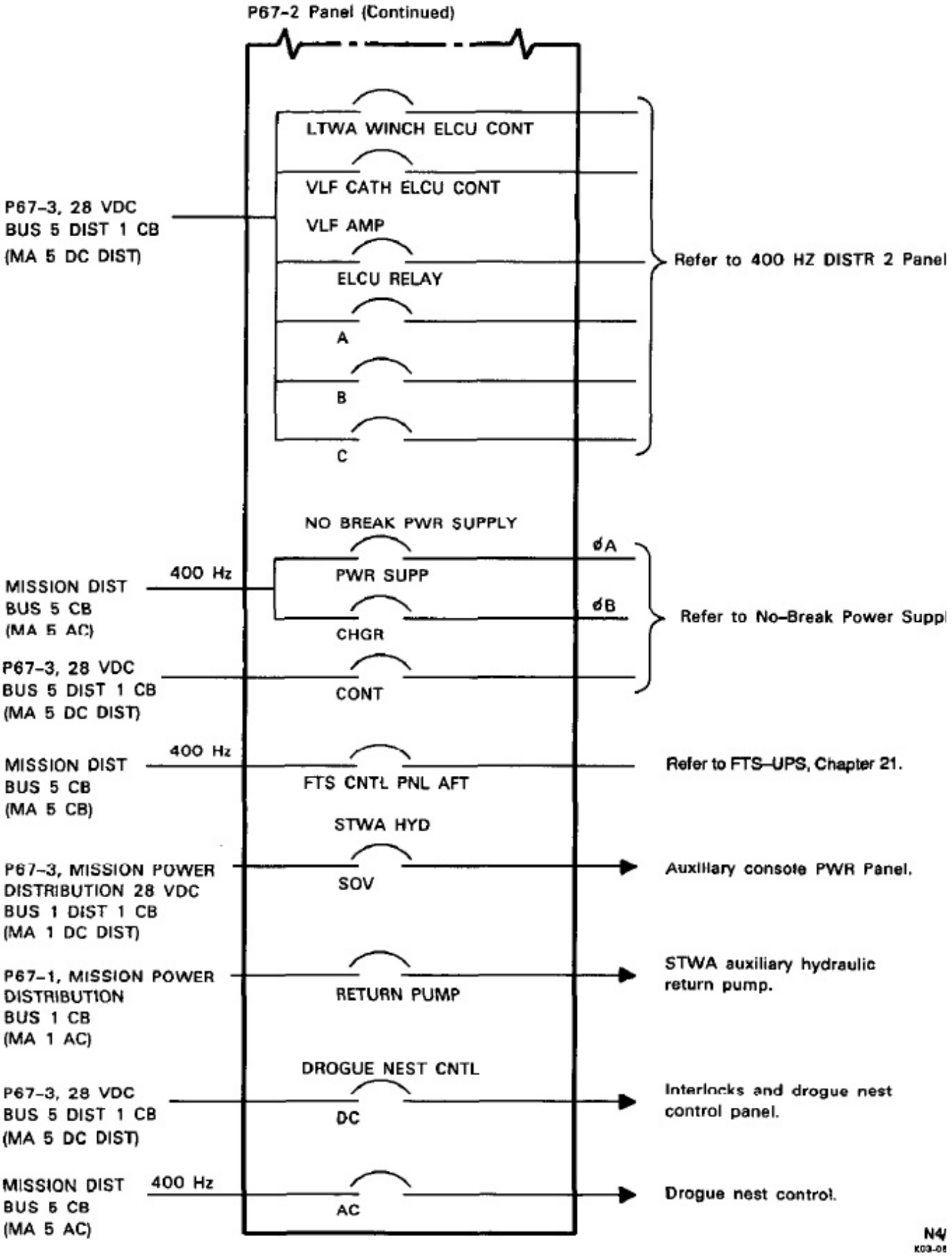


Figure 18-5. P67 Panel Power Distribution (Sheet 3 of 5)

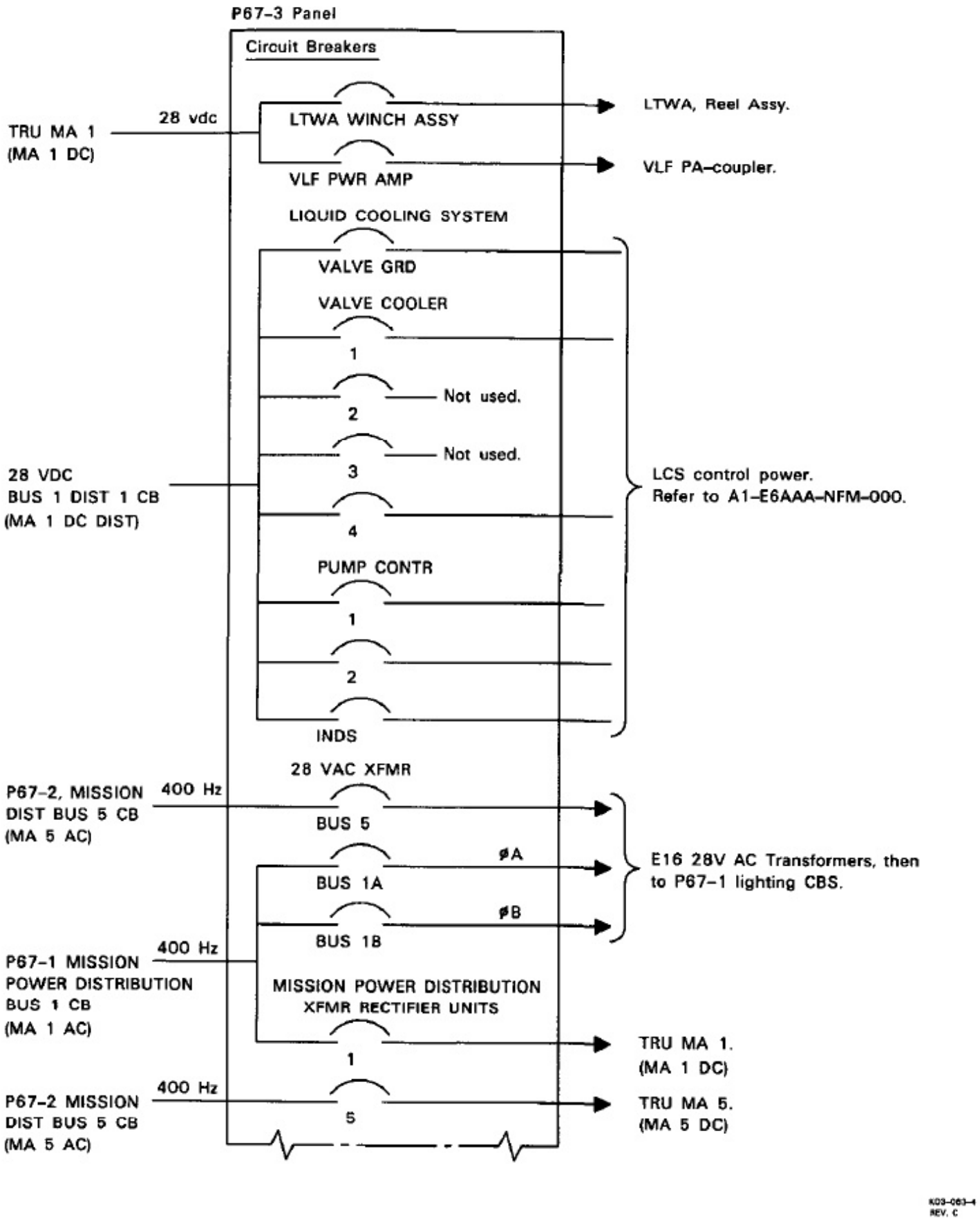


Figure 18-5. P67 Panel Power Distribution (Sheet 4 of 5)

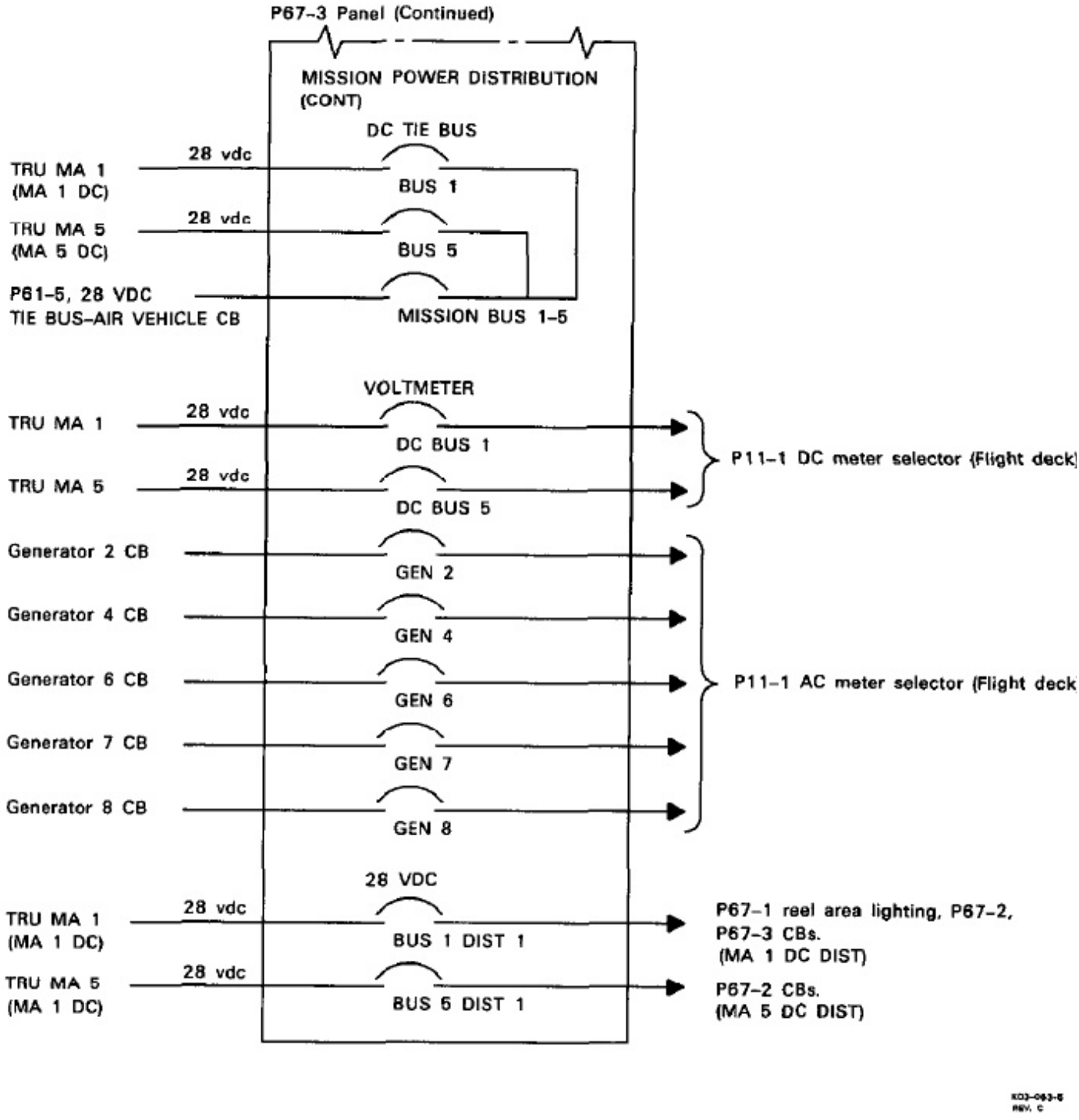
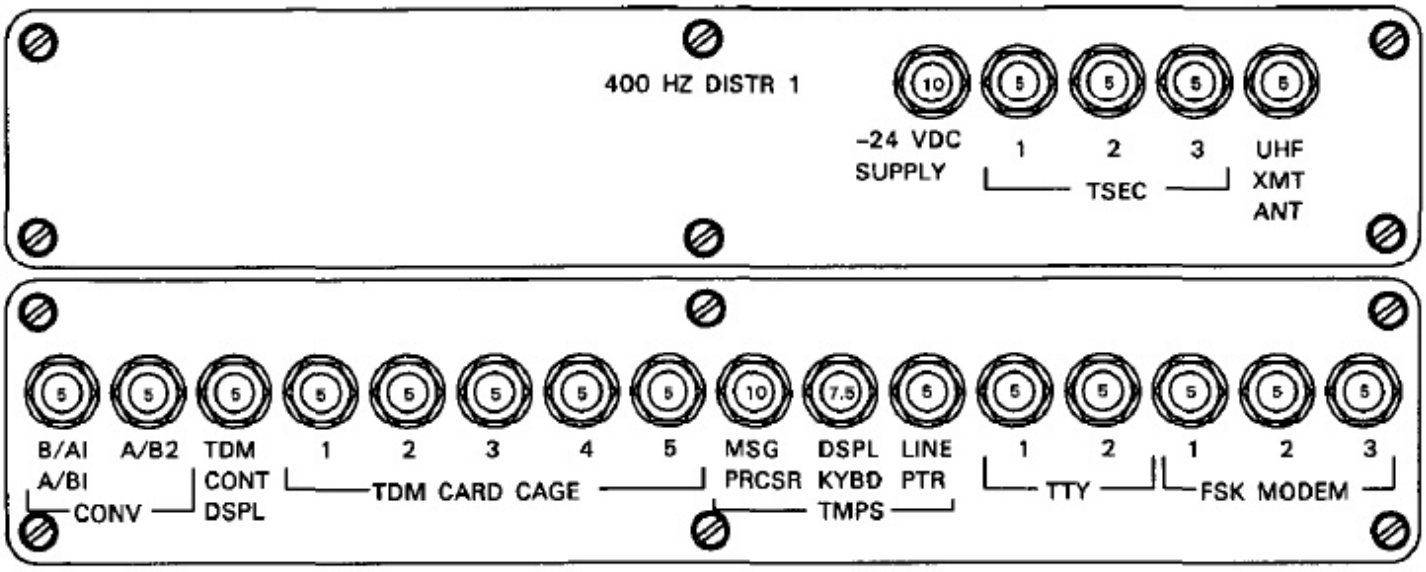
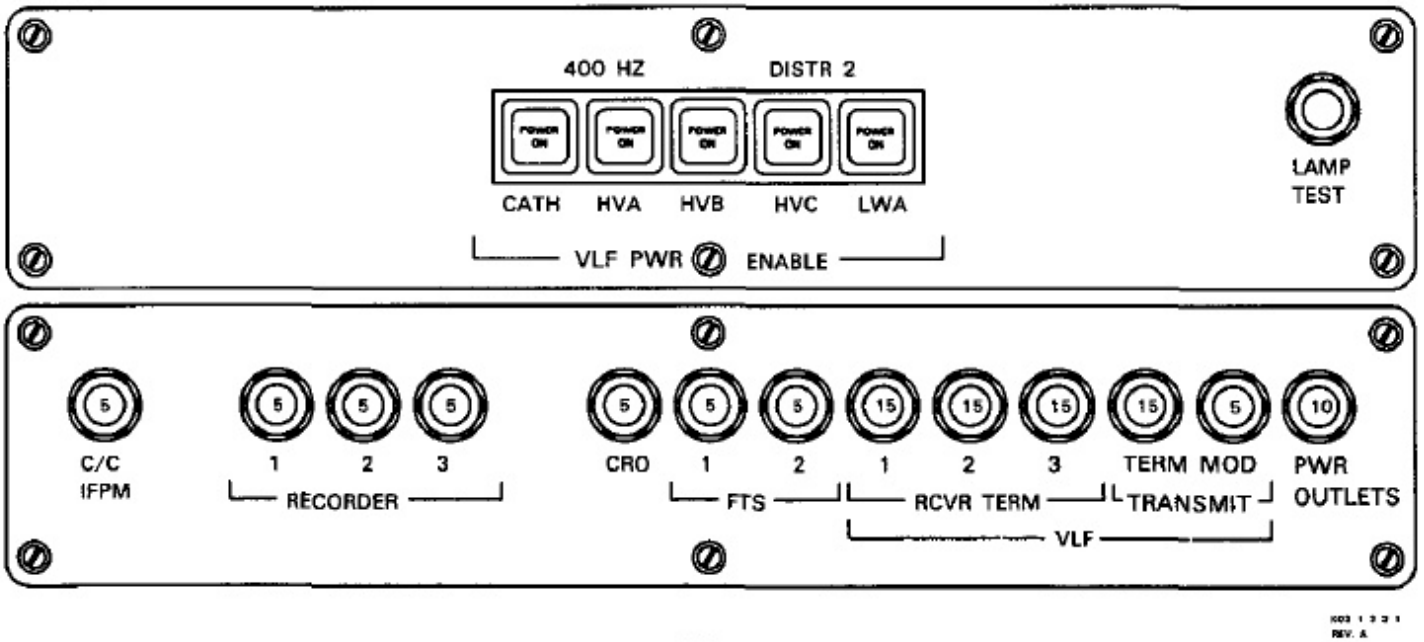


Figure 18-5. P67 Panel Power Distribution (Sheet 5 of 5)



FORWARD CONSOLE
(P20–1 PANEL)



AFT CONSOLE
(P30–2 PANEL)

Figure 18-6. 400 Hz Distribution Panels

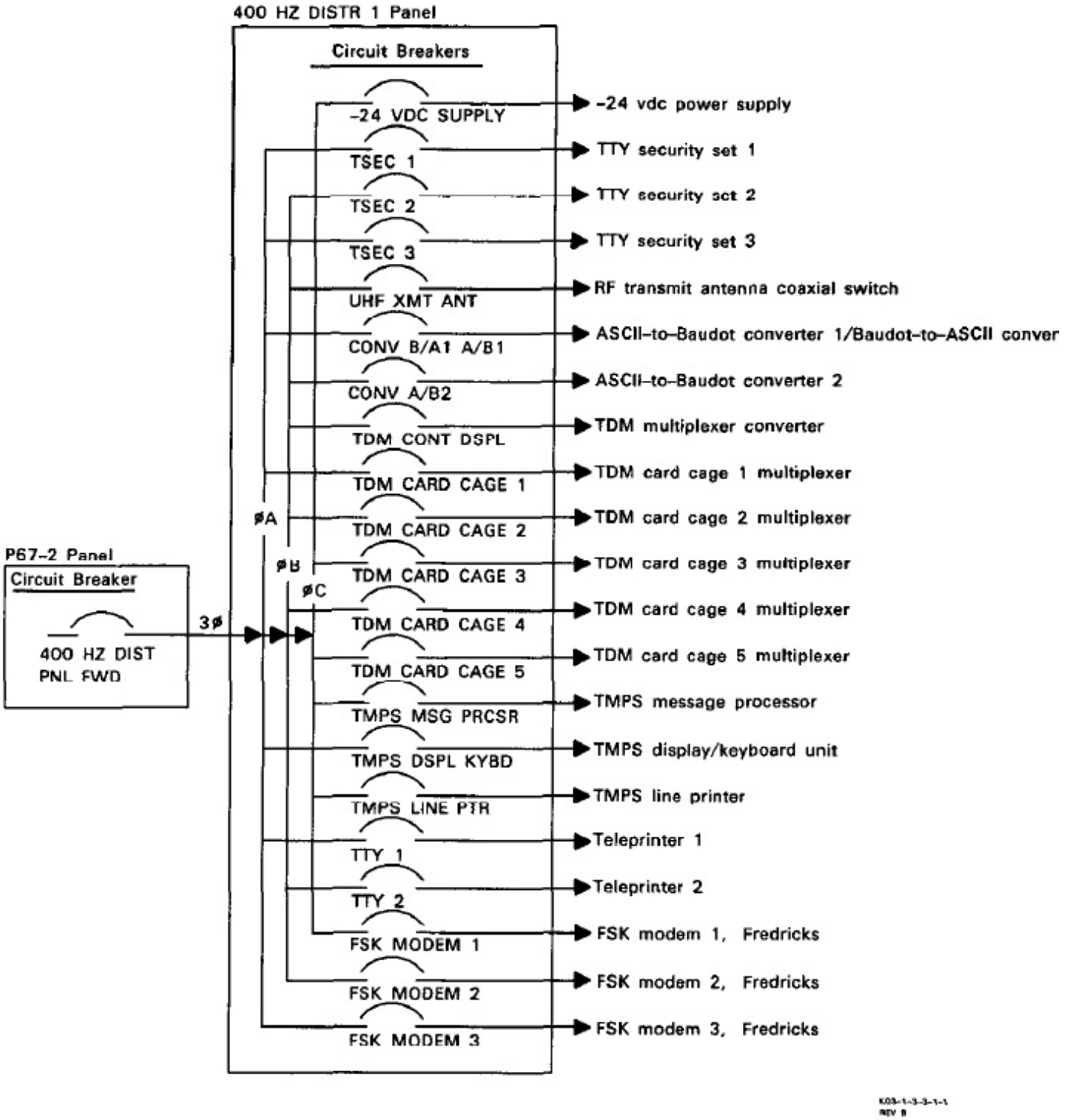


Figure 18-7. 400 Hz Distribution Panel Power (Sheet 1 of 2)

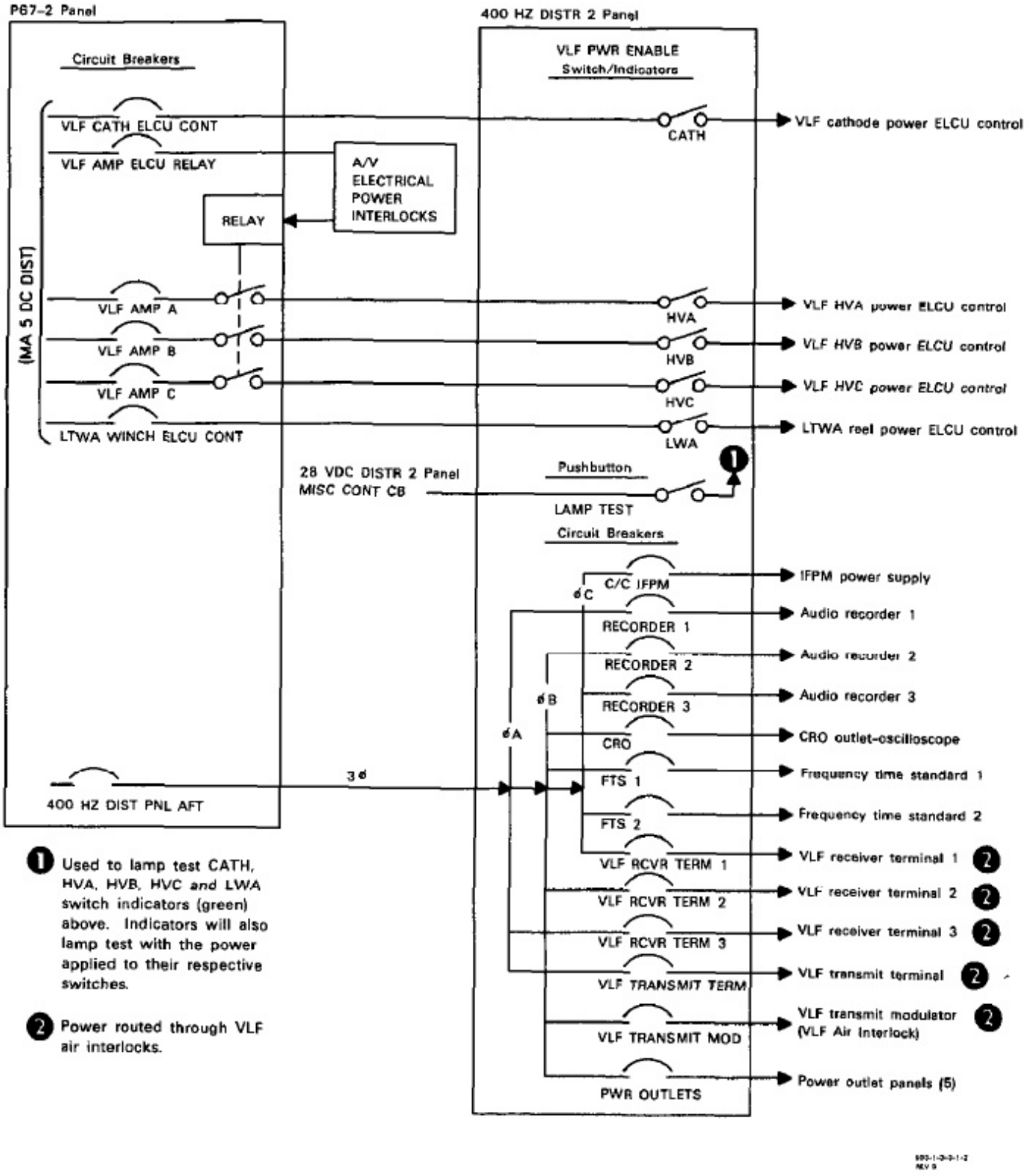
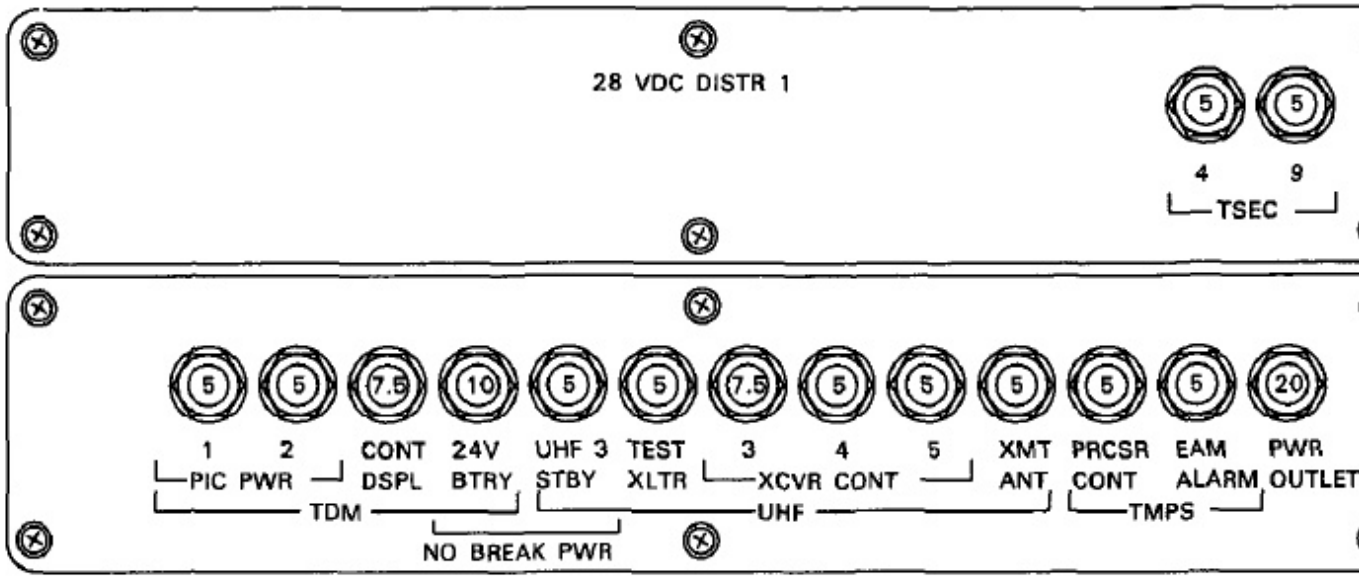
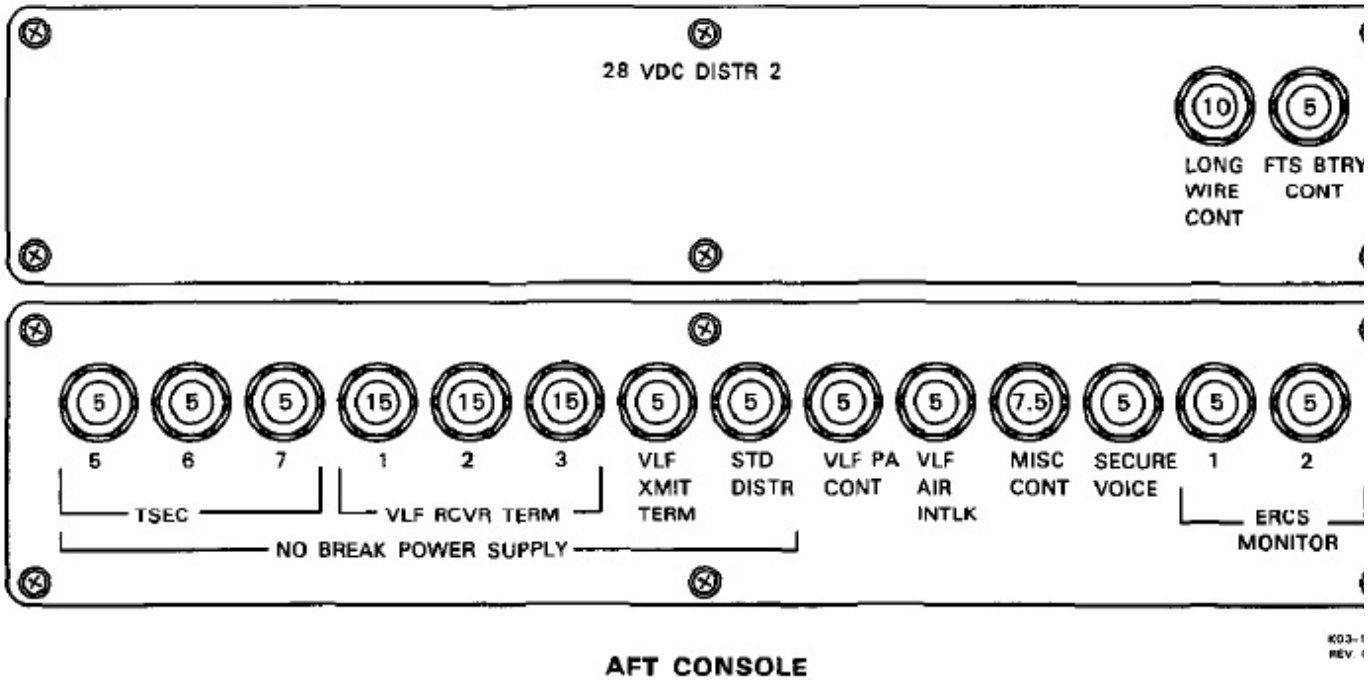


Figure 18-7. 400 Hz Distribution Panel Power (Sheet 2 of 2)



FORWARD CONSOLE
(P20–2 PANEL)



AFT CONSOLE
(P30–3 PANEL)

Figure 18-8. 28 Vdc Distribution Panels

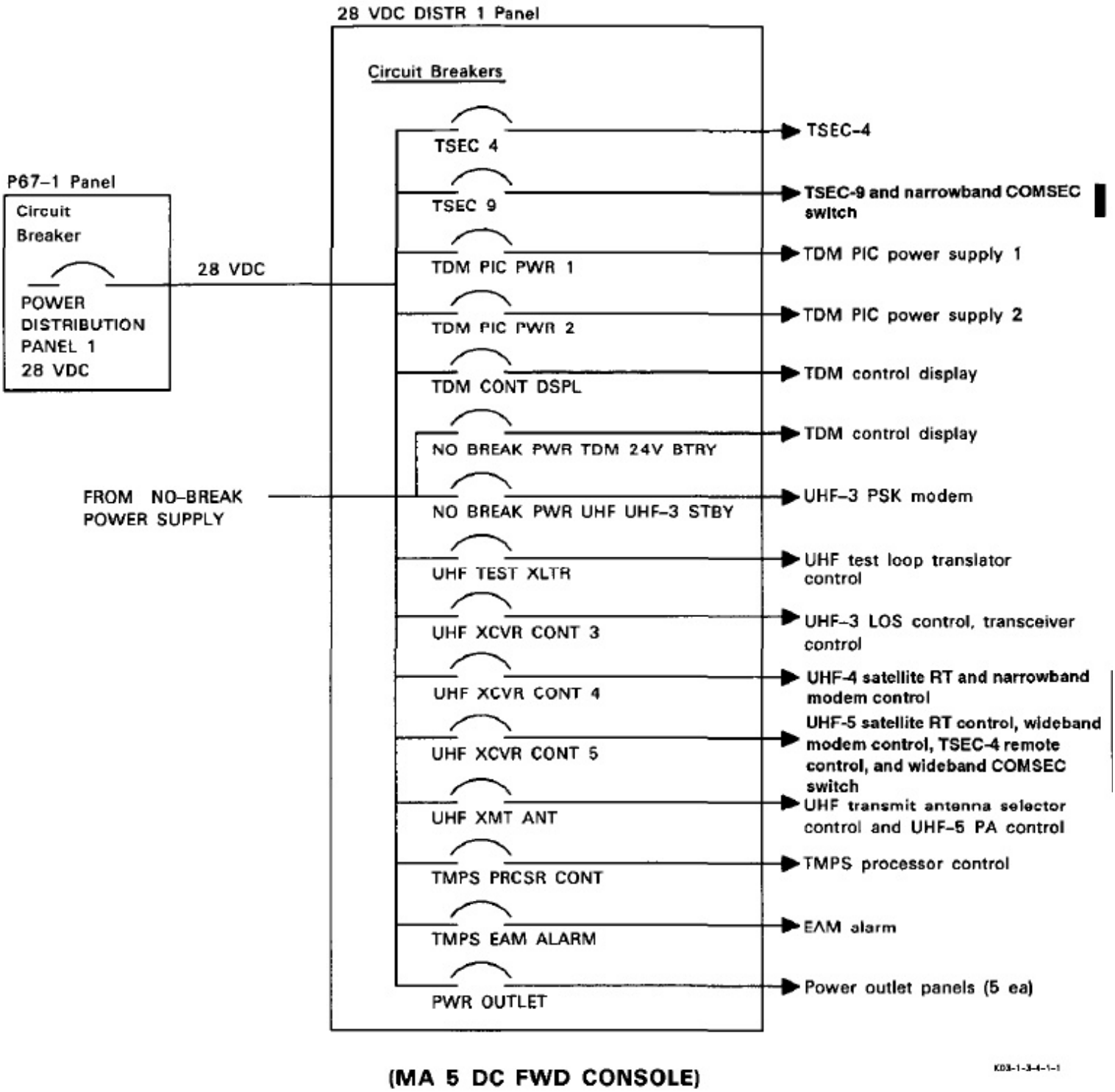


Figure 18 9. 28 Vdc Distribution Panel Power (Sheet 1 of 2)

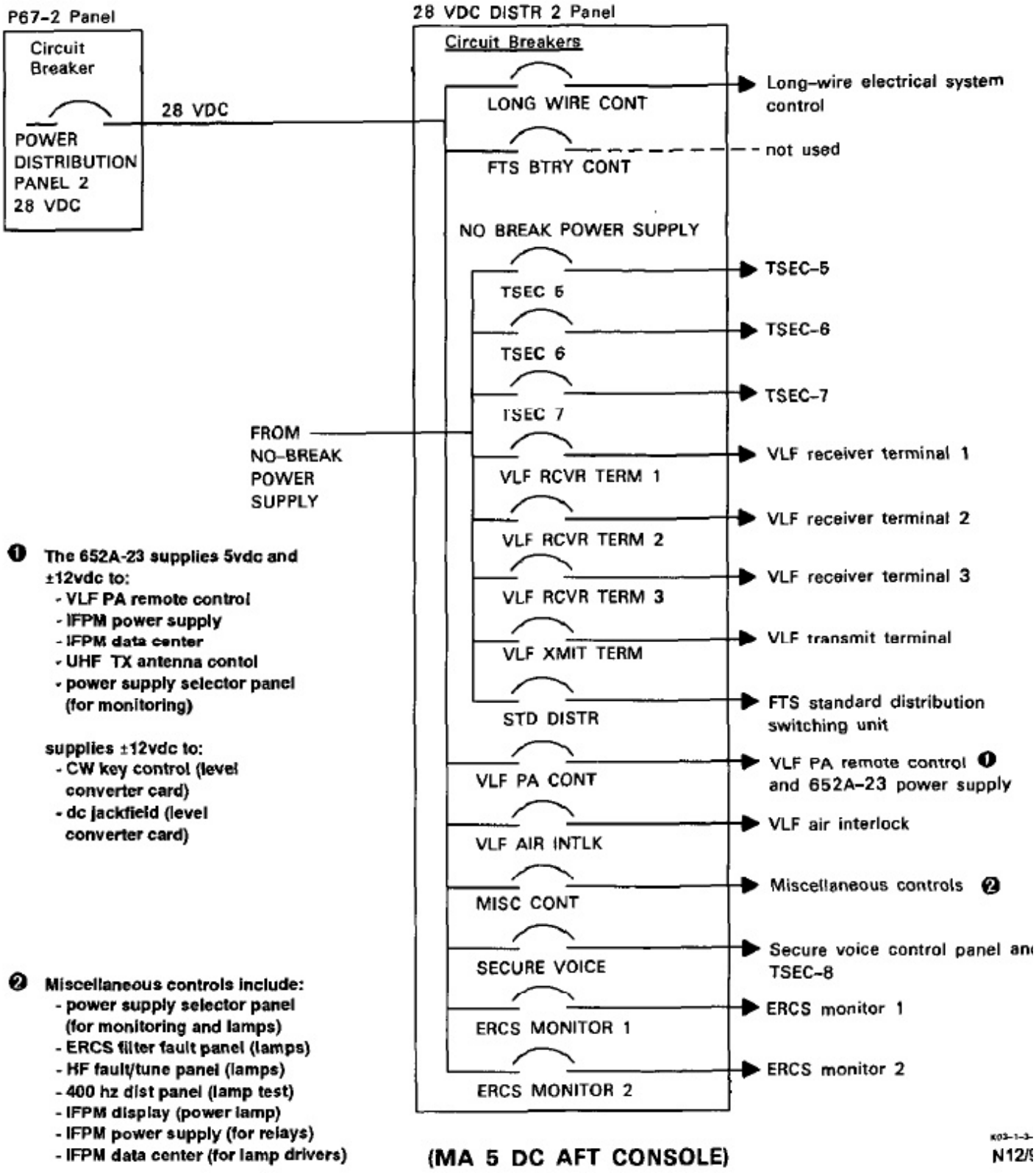


Figure 18-9. 28 Vdc Distribution Panel Power (Sheet 2 of 2)

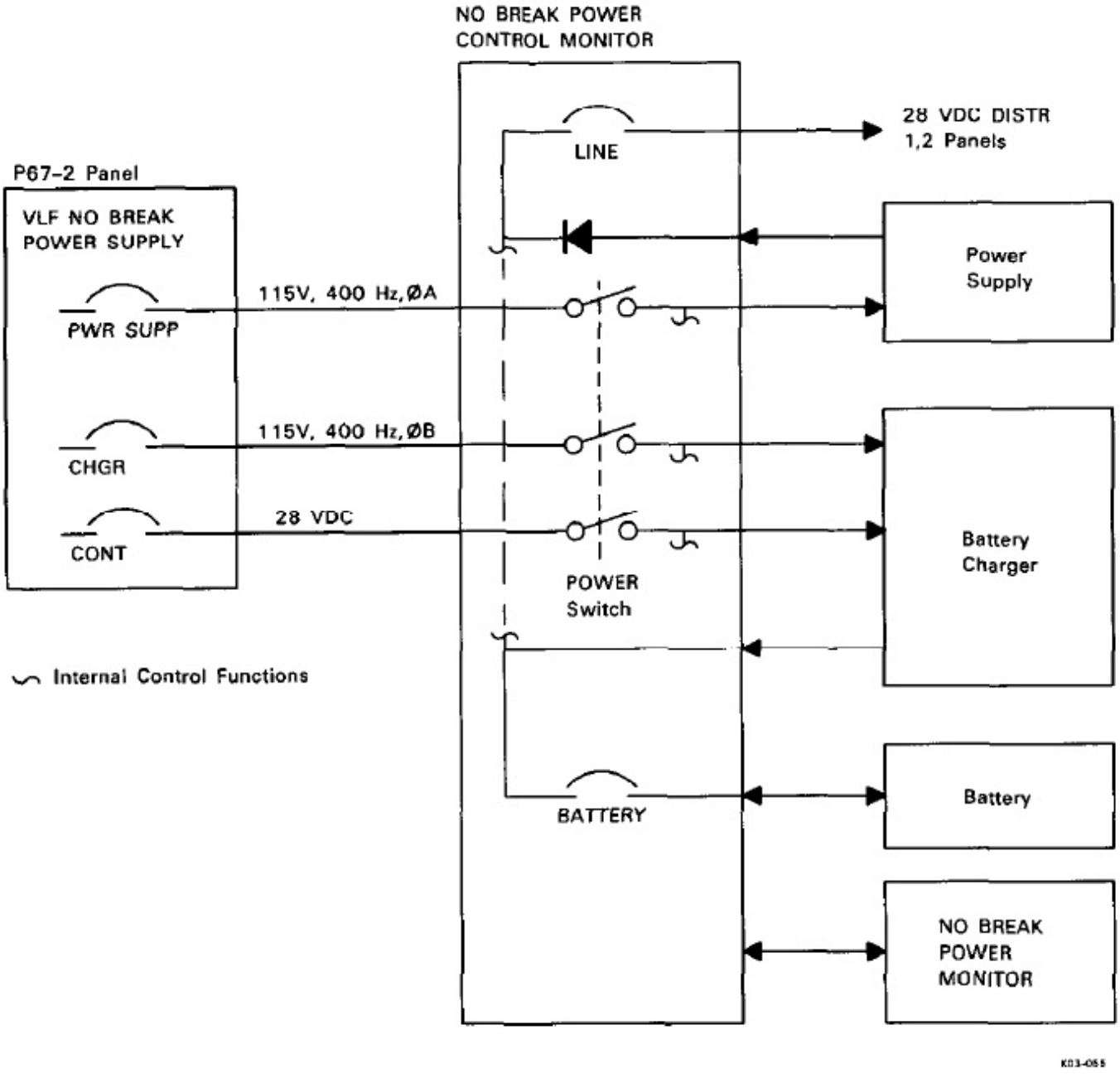


Figure 18-10. No-Break Power Distribution

The NBPS consists of equipment on a pallet in the forward lower compartment E-15 rack and a no-break power monitor panel (Figure 18-11) at comm central seat four. The pallet equipment includes: a 28-vdc power supply, a 24v battery, a battery charger, and a monitor console. The monitor console has a no-break power control/monitor panel (Figure 18-12) that is used for power application and status monitoring.

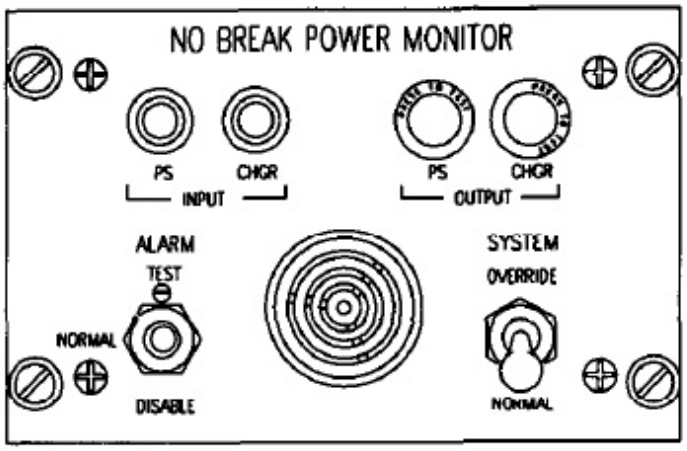


Figure 18-11. No-Break Power Monitor Panel

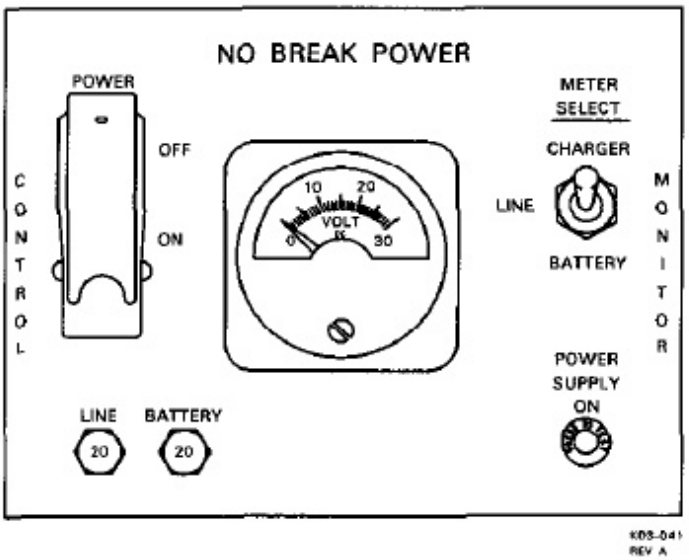


Figure 18-12. No-Break Power Control Monitor Panel

18.3.4.1 Comm Central Controls and Indicators. The no-break power monitor panel consists of four indicator lights, two switches, and an audible alarm. The two INPUT and two OUTPUT indicators, PS and CHGR, are normally on showing the presence of correct current inputs and outputs.

Note

The charger output indicator may be extinguished during some of the battery charging cycles.

The ALARM switch will signal the loss of airc input power when left in the NORMAL position. momentary TEST position will verify the audi alarm function. The DISABLE position is used tc lence the alarm after it has signaled a power st alert. The NBPS system can be enabled to conti operation in the power supply mode (using 115v, Hz power) when normal 28-vdc control power is by positioning the SYSTEM switch to the OVI RIDE position. In the NORMAL position, aircraf vdc power is used for control.

18.3.4.2 Monitor Console Controls and Indi tors. Power is applied to the NBPS assembly with POWER supply switch on the no-break power c trol/monitor panel. The POWER SUPPLY ON ind tor illuminates when the power is on. The MET SELECT switch is used to select the voltage that ca monitored on the panel meter. The voltages availa are from the power supply line, the battery cha output, or the battery. The LINE circuit breaker prot the output circuit of the power supply and the B TERY circuit breaker protects the output circuit of battery.

18.3.5 60 Hz Power Distribution. Secondary power (115 vac, 60 Hz, 1-phase) is produced by static converters in R/T bay 4. The static conver change 115 vac, 400 Hz, three-phase input to 115 60 Hz, one-phase that is routed by the 60 Hz Distribu Panel (SB-3883) (Figure 18-13). The supply powe the converters is filtered to prevent noise from converters from getting back on the supply bus. power distribution to and from the panel is describe Figure 18-14. The two indicators on the panel iden when each of the converters is powered. The RCVRS switch is used to select which converter wil used to power the VLF receive equipment. The T EQPT switch is used to select which converter power the TTY equipment loads.

18.3.6 652A-23 Power Supply. Various dc v ages are provided by a 652A-23 power supply loc in R/T bay 4. These outputs are supplied to the: IFI VLF PA remote control, CW key control, dc jackfi and UHF transmit antenna control, and also to the po supply selector panel for monitoring. The input su voltage is regulated to 24 vdc by the voltage regula also located in R/T bay 4.

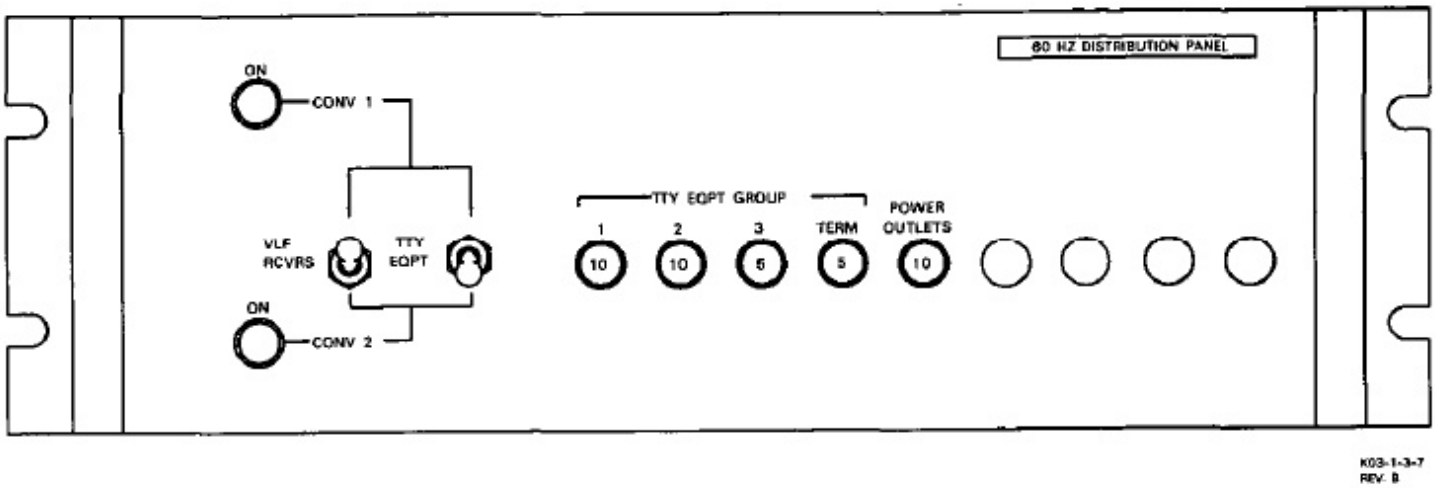


Figure 18-13. 60 Hz Distribution Panel (SB-3883)

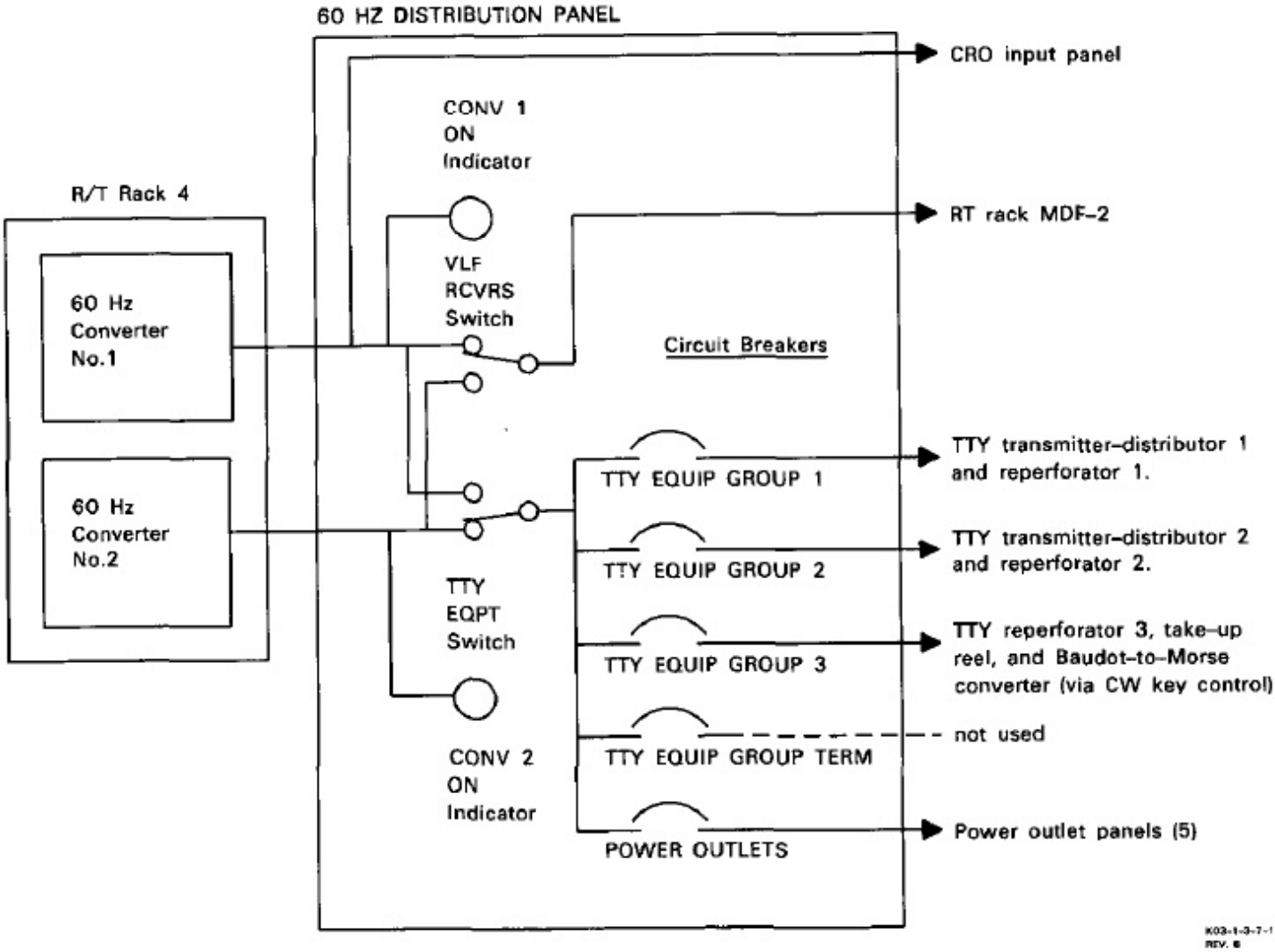


Figure 18-14. 60 Hz Power Distribution

18.3.7 Power Supply Selector Panel (C-10103). The power supply selector (Figure 18-15) allows comm central operators to monitor power source voltages and to select the -24v power supplies. Except for primary ac power, all major power source voltages are applied to the power supply selector, where controls permit the operator to monitor the selected system. Refer to Figure 18-16 for a description of the controls and indicators. The switch/indicators show which -24v power supply is in operation and which 60 Hz converter is being monitored.

18.3.8 Receiver/Transmitter Rack Power Controls. At the top of each of the four R/T bays (FO-4) is a MDF Figure 18-17 that is used for power distribution. The power distributed to equipment and blowers in the racks (Figure 18-18) comes from the P67-2 panel and the 60 Hz distribution panel. Both toggle switch and push/pull type circuit breakers are located in these panels to protect circuits in the racks.

18.3.9 Power Outlet Panels. The five power outlet panels (Figure 18-19) each contain a 28 vdc, a 115 vac, 60 Hz, and a 115 vac, 400 Hz power outlet. There are two power outlet panels at the comm central consoles, two at the R/T group, and one at the antenna reel console. The three console panels also have ICS and CW keying connections. The ICS connections on the power outlet panels at the comm central consoles are not functional and the CW KEY jack and right-hand ICS connection at the reel operators console are not functional.

18.4 INTERCOMMUNICATIONS/KEYLINE SYSTEMS

The ICS provides communications between crewmembers and routes audio signals between operators and radios. It also keys transmitters during voice transmission. The keyline systems are used to select and provide the keying signals to the radios for data transmission.

18.4.1 Intercommunications Subsystem (AN/AIC-32). The intercommunication system provides for ten mission crew stations, nonsecure or secure, low-crosstalk communications from station-to-station and from station-to-radio on the E-6 aircraft. The ICS is also used to select transmitters during voice and data transmission. The ICS provides the flight deck with: a public address system capability, receive only audio from several navigation aids and other receivers, and communications for flight safety. Additionally, maintenance units are provided at the reel operators station and various locations throughout the aircraft for internal coordination and ground maintenance. Each operator is linked to the ICS with a microphone-headset and a l microphone switch. The antenna operator's con and each comm central seat position, except the A has a parallel functioning foot operated PTT swi Each crew station unit provides the individual oper with access to the ICS. Nonsecure or secure inter and radio access, and volume controls are accesse the CSUs.

All intercommunications to and from each sta are through the CCU, located in the forward lo compartment. Refer to Figure 18-20 for interrelat ship of ICS components. Communications capab at each mission station varies, depending on the panels located at the station and the responsibilities signed to the station. Refer to Figure 18-21 for capabilities at each station and the networks availa Four types of panels are used in the mission area: (CSU, (2) an ACU, (3) a MCU, and (4) a MSU. five comm central positions have a CSU. Seats and four, and the ACO also have an ACU loc above the CSU. The reel operator's auxiliary con has a MCU that can serve two persons when used a parallel headset jack. There are also eight MSUs cated throughout the aircraft, primarily maintenance and utility purposes.

18.4.1.1 Crew Station Units. The mission CSU panels (Figure 18-22) provide primary ICS in face for the five comm central stations. The C provide access to four transceiver and three inter networks, three recorders, and eight radio monitors addition, the ACO and seat one also have access fourth intercom network shared with flight deck pers nel. Transmit access on the basic CSU is permitte any of the three HF transceivers and on the UH transmit channel within the applicable intercom works. Refer to Figure 18-21 for station compatibi any receive station may be monitored simultaneo with others. However, only one of the ICS netw may be monitored at one time. Transmit access is one-at-a-time basis, giving the station with the transi ter keyed priority. Refer to Figure 18-23 for CSU trol and indicator descriptions.

18.4.1.1.1 CSU Radio Reception/Transm sion. The CSU panel can be used to access four tr ceivers (HF-3, HF-4, HF-5, and UHF-3) by pressing control switch of the desired network and using associated volume control. In addition, the transm must be loaded and keyed prior to transmission. E special receive-only radio networks are selected by t ing the appropriate volume control from off to an a ble level.

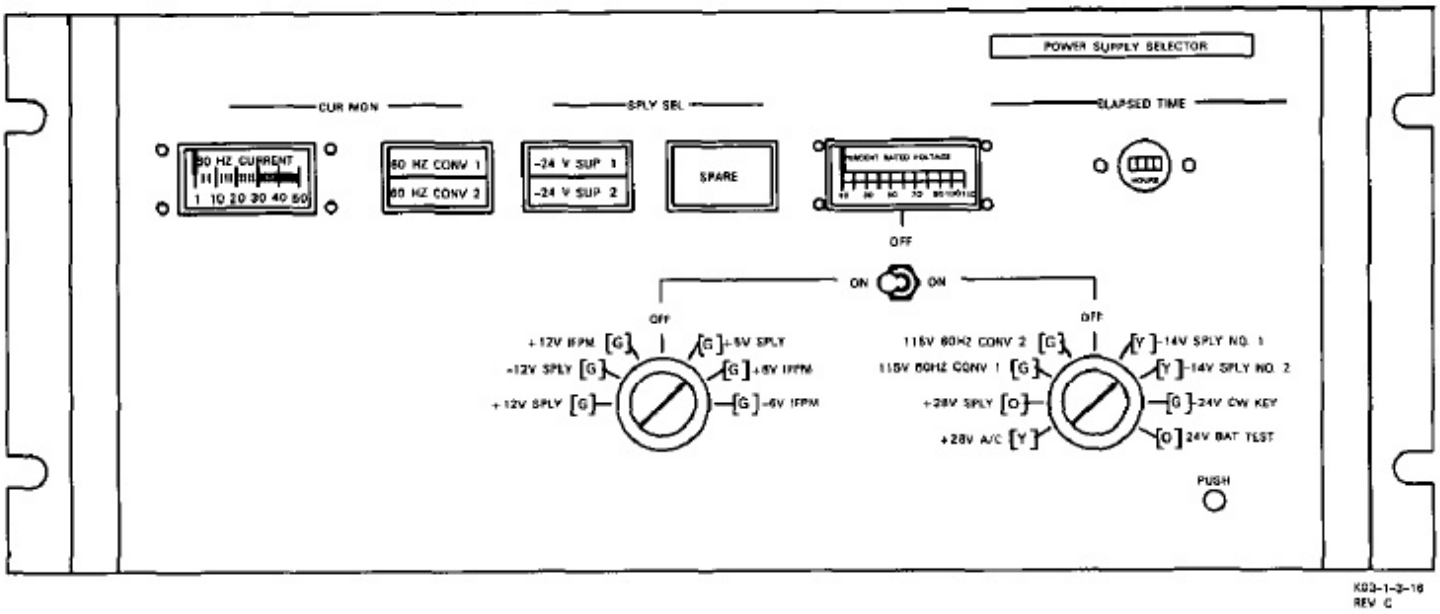


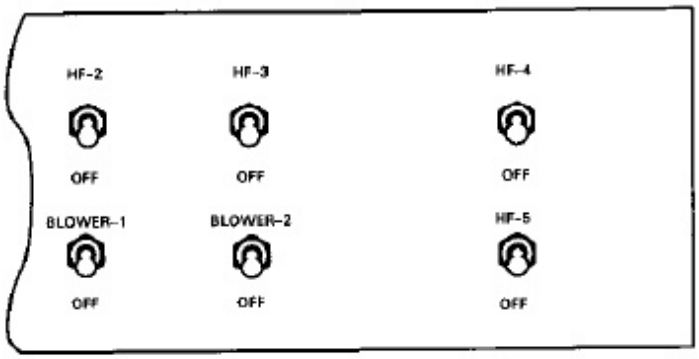
Figure 18-15. Power Supply Selector Panel (C-10103)

CONTROL/INDICATOR	FUNCTION
CUR MON Meter	Indicates 60 Hz line current of selected converter.
CUR MON Pushbutton/60 HZ CONV 1 and 2 Indicators	Used for alternate action selection of converter 1 or 2 for monitoring on current monitoring meter. Indicator identifies selection.
SPLY SEL Pushbutton/–24V SUP 1 and 2 Indicators	Used for alternate action selection of –24v power supply 1 or 2 for use and for monitoring on PERCENT RATED VOLTAGE meter. Indicator identifies selection.
SPARE Switch/Indicator	Not used.
ELAPSED TIME Meter	Registers the total time 28 vdc power is applied to comm central.

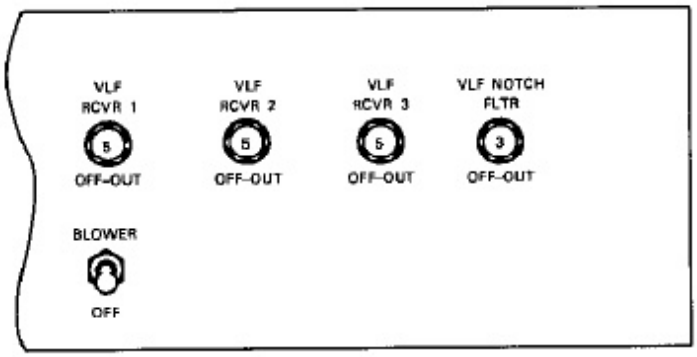
Figure 18-16. Power Supply Selector Panel Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
PERCENT RATED VOLTAGE Meter	Indicates the voltage of the source routed by switches below. Norma reading bands of green[G], orange[O], and yellow[Y] on the mete are identified at the selector positions.
ON/OFF/ON Switch	Selects one of the two rotary selectors as the source for the PERCEN RATED VOLTAGE meter.
Left Selector Knob	Selects signal for display on PERCENT RATED VOLTAGE mete
+12V SPLY[G]	Selects +12 VDC output from 652A-23 power supply.
-12V SPLY[G]	Selects -12 VDC output from 652A-23 power supply.
+12V IFPM[G]	Selects +12 VDC from IFPM power supply.
OFF	No signal selected.
[G]+5V SPLY	Selects +5 VDC output from 652A-23 power supply.
[G]+6V IFPM	Selects +6 VDC from IFPM power supply.
[G]-6V IFPM	Selects -6 VDC from IFPM power supply.
Right Selector Knob	Selects signal for display on PERCENT RATED VOLTAGE meter
+28V A/C[Y]	Selects aircraft 28 VDC from 28 VDC DISTR 1 panel.
+28V SPLY[O]	Selects aircraft 28 VDC from MISC CONT circuit breaker on 2 VDC DISTR 2 panel.
115V 60HZ CONV 1[G]	Selects ouput from 60 Hz converter 1.
115V 60HZ CONV 2[G]	Selects ouput from 60 Hz converter 2.
OFF	No signal selected.
[Y]-14V SPLY NO.1	Not used.
[Y]-14V SPLY NO.2	Not used.
[G]-24V CW KEY	Selects the output of the SPLY SEL pushbutton.
[O]24V BAT TEST	Used with BAT TEST pushbutton to monitor output of NBPS.
BAT TEST Pushbutton	Enables monitoring output of NBPS.

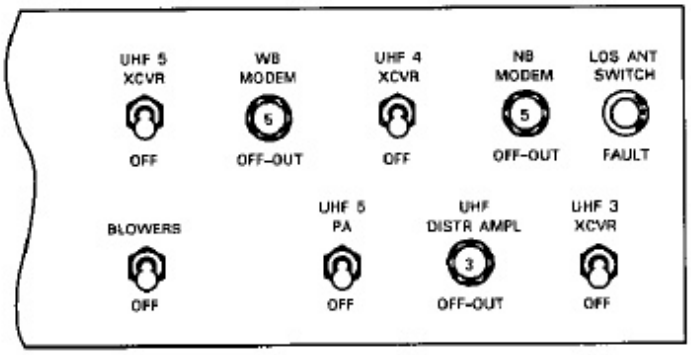
Figure 18-16. Power Supply Selector Panel Controls and Indicators (Sheet 2 of 2)



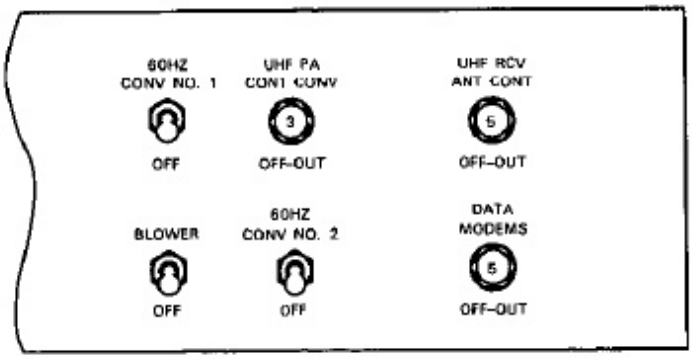
MDF-1



MDF-2



MDF-3



MDF-4

K03-076
REV. A

Figure 18-17. Main Distribution Frames

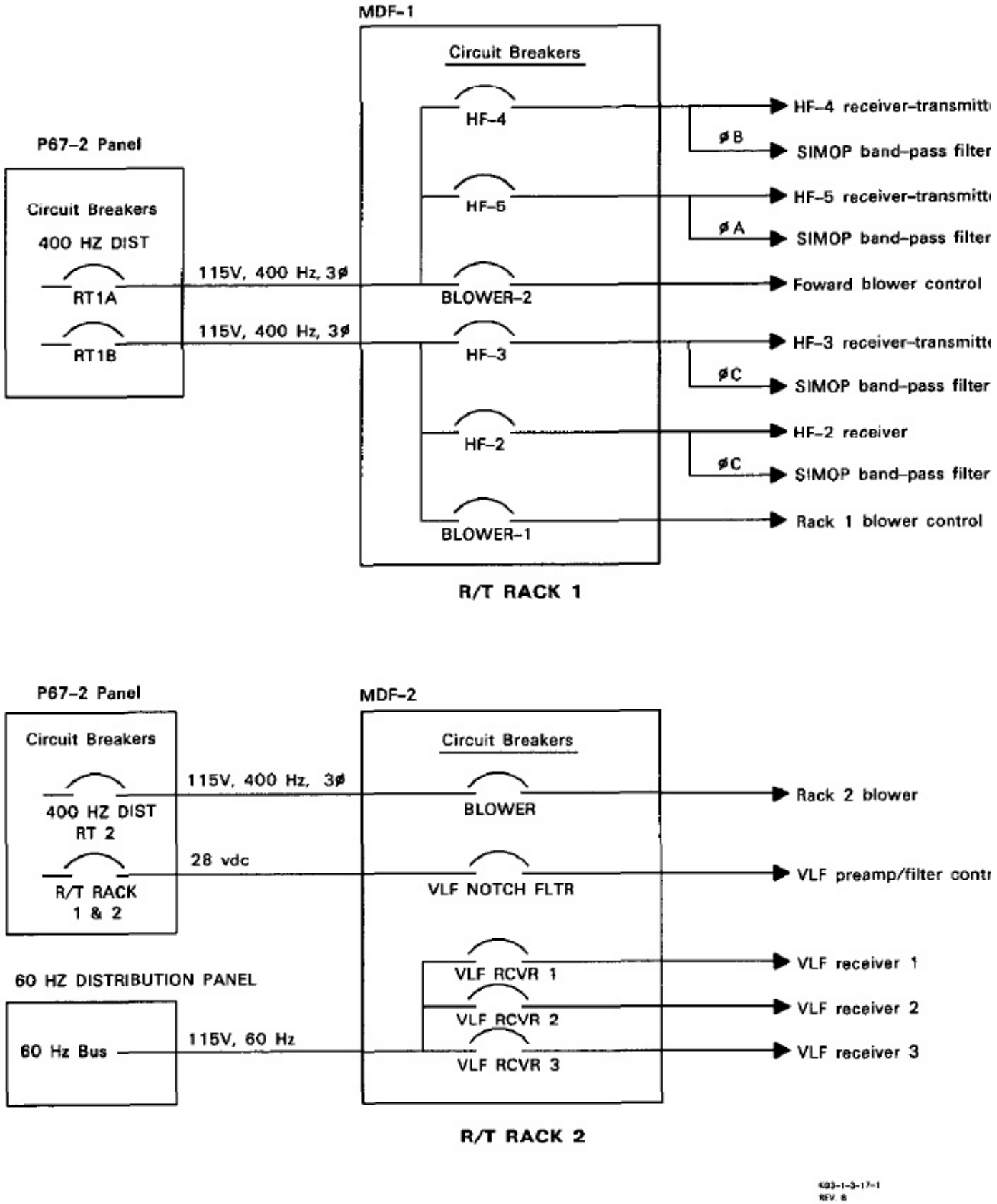


Figure 18-18. R/T Rack MDF Power Distribution (Sheet 1 of 2)

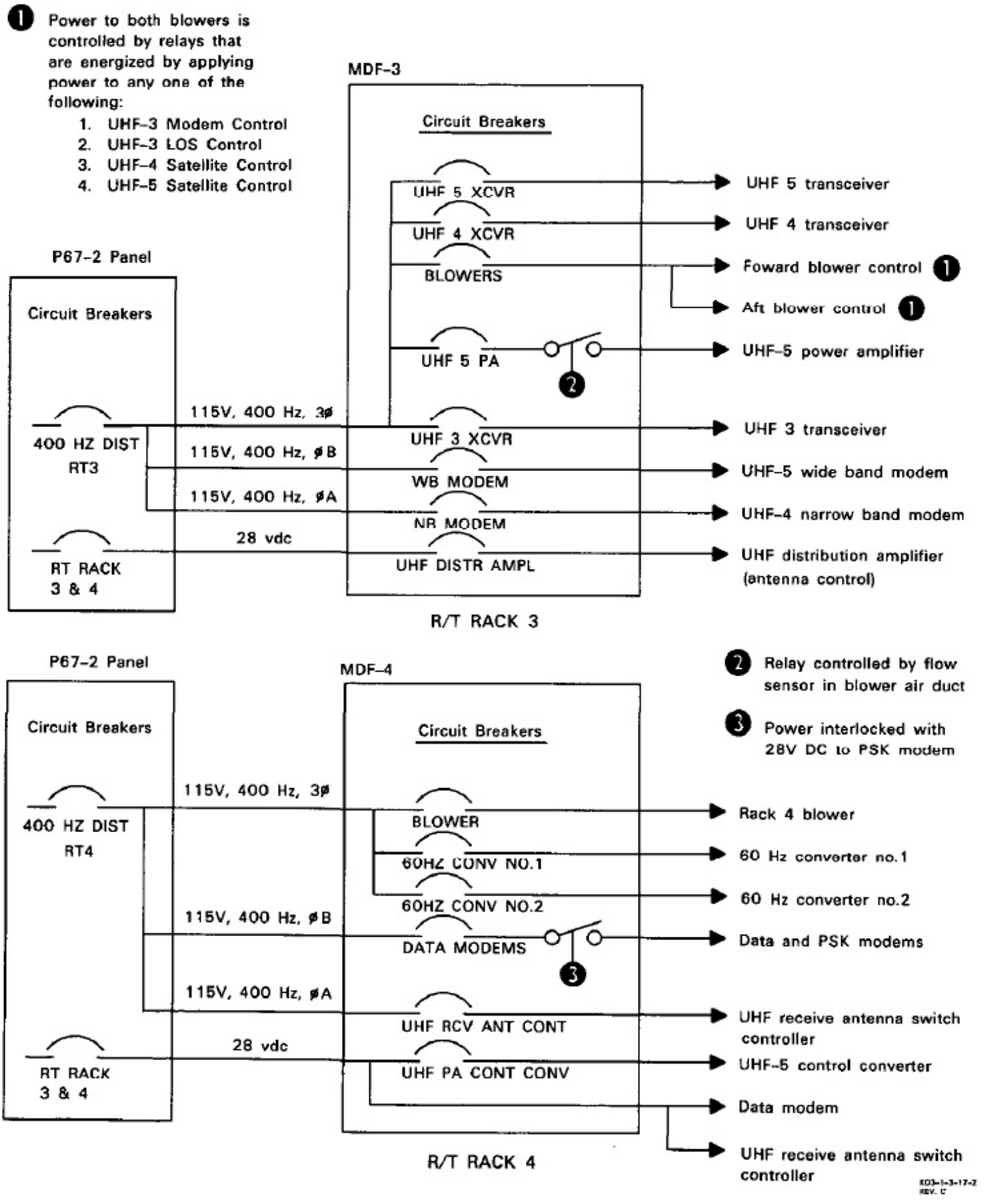
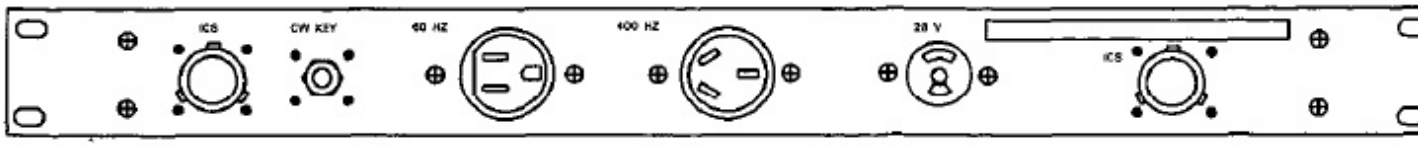
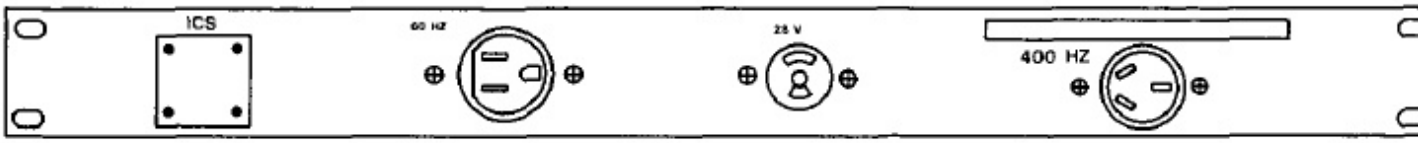


Figure 18-18. R/T Rack MDF Power Distribution (Sheet 2 of 2)



FWD CONSOLE, AFT CONSOLE, REEL CONSOLE



RT RACK 2 & 3

Figure 18-19. Power Outlet Panels

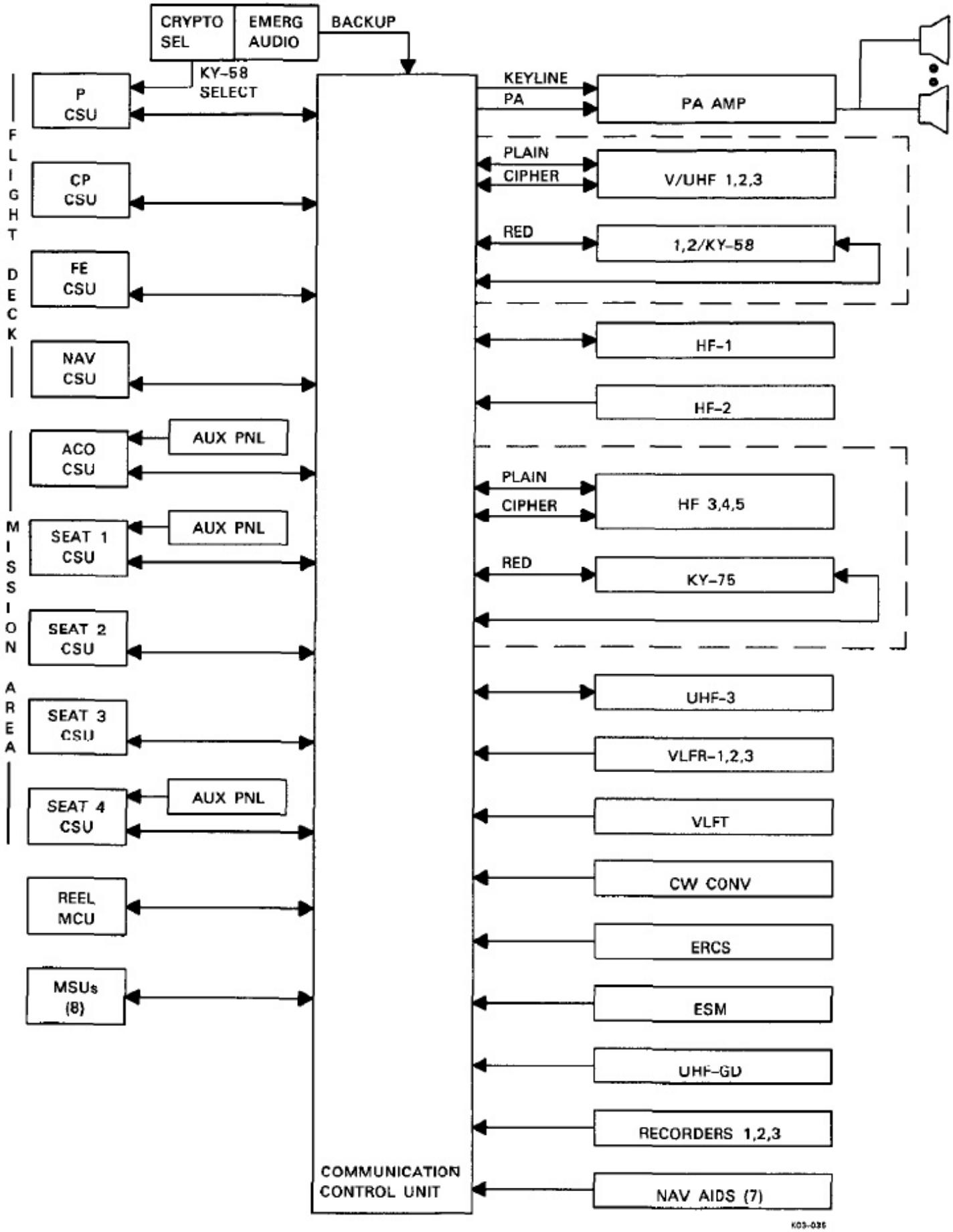


Figure 18-20. Intercommunications System Block Diagram

Function	Station	Pilot	Copilot	FE	NAV	ACO	Seat 1	Seat 2	Seat 3	Seat 4	RO ❶	MSU
VHF/UHF	No. 1	R/T	R/T	R/T	R/T	R/T	R/T			R/T		
	No. 2	R/T	R/T	R/T	R/T	R/T	R/T			R/T		
	No. 3	R/T	R/T	R/T	R/T	R/T	R/T			R/T		
HF	No. 1	R/T	R/T	R/T	R/T	R/T	R/T			R/T		
	No. 2					R	R	R	R	R		
	No. 3	R/T	R/T	R/T	R/T	R/T	R/T	R/T	R/T	R/T		
	No. 4					R/T	R/T	R/T	R/T	R/T		
	No. 5					R/T	R/T	R/T	R/T	R/T		
UHF GD		R	R	R	R	R	R	R	R	R		
UHF	No. 3					R/T	R/T	R/T	R/T	R/T		
ERCS						R	R	R	R	R		
VLF RX	No. 1					R	R	R	R	R		
	No. 2					R	R	R	R	R		
	No. 3					R	R	R	R	R		
VLF TX CW						R	R	R	R	R		
CW CONV						R	R	R	R	R		
RCDR ❸	No. 1					R	R	R	R	R		
	No. 2					R	R	R	R	R		
	No. 3					R	R	R	R	R		
ICS	ALL	R/T	R/T	R/T	R/T	R/T	R/T	R/T	R/T	R/T	R/T	R/T
	CONF1	R/T	R/T	R/T	R/T	R/T	R/T				R/T	
	CONF2					R/T	R/T	R/T	R/T	R/T	R/T	
❹	CALL	R/T	R/T	R/T	R/T	R/T	R/T	R/T	R/T	R/T	R/T	R/T
Public Address		T	T									
Back-Up		VHF/ UHF-1 (R/T)	HF-1 (R/T)			HF-5 (R/T)	HF-4 (R/T)	HF-2 (R)	ERCS (R)	HF-3 (R/T)		

R = receive T = transmit

❶ Two RO positions can exist with the single Maintenance Control Unit (MCU) using 2 parallel headset jacks.
❷ There are eight maintenance station units.
❸ Two playback channels per recorder selectable on a one-at-a-time basis.
❹ ICS CALL is only ICS function available in back-up mode.

Figure 18-21. ICS Station Capability

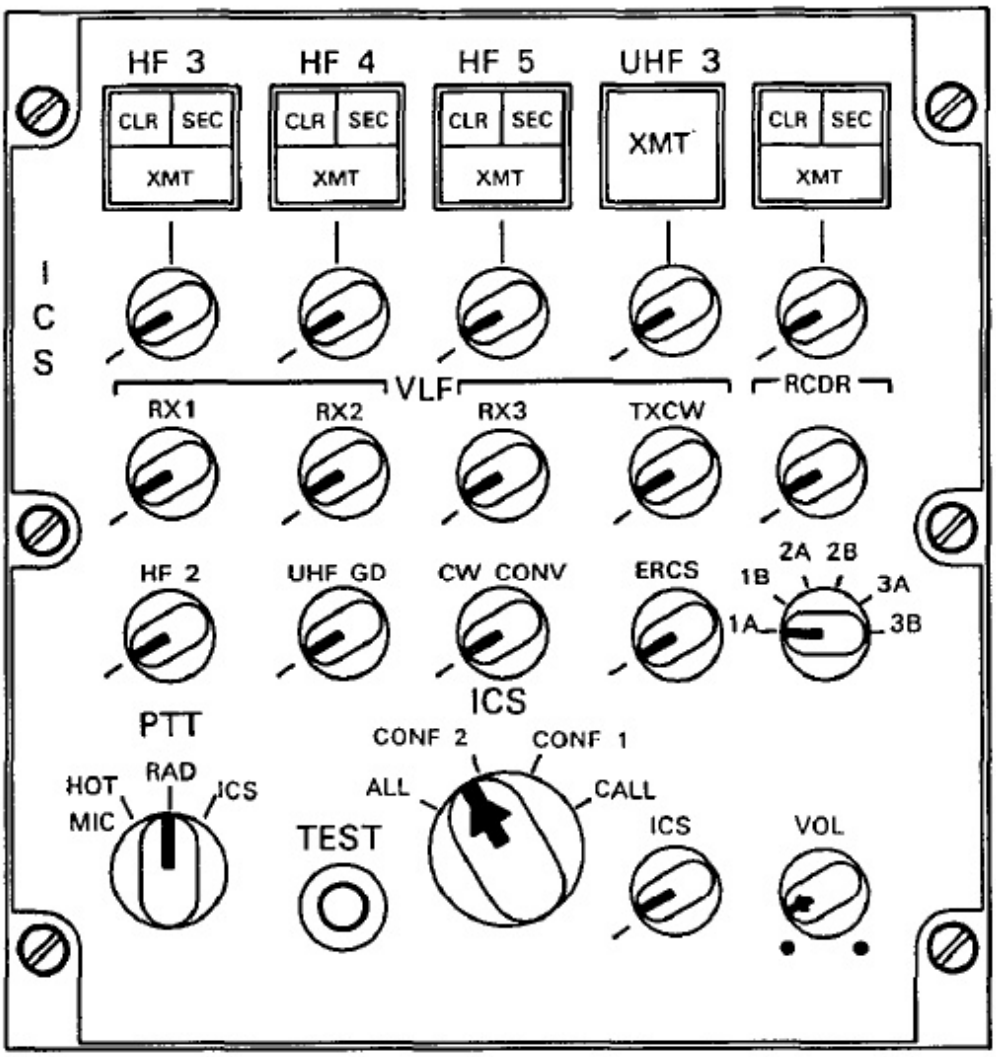


Figure 18-22. Crew Station Unit

CONTROL/INDICATOR	FUNCTION
Note	
Except for the master VOL control, all volume control switches attenuate at 7 levels and have a counterclockwise off position.	
HF 3, HF 4 and HF 5	
Momentary Pushbutton Switch	Used to request HF-3, HF-4, and HF-5 transmit access. Will deselec if pressed a second time or if another network is selected on the CSU Also, provides associated HF reception at minimum volume i associated volume control is set to off.
XMT Indicator (Green)	Illuminates when HF-3, HF-4, and HF-5 transmit is selected.
CLR Indicator (Amber)	Illuminates when the radio is selected for transmit and receive operation and a crypto unit assigned via the ACU panel is operating in the non-secure (clear) mode. Also illuminates if the crypto unit is in the secure mode and non-secure reception is detected.
SEC Indicator (Green)	Illuminates when the radio is selected for transmit or receive (the volume switch is moved from the off position) and a crypto unit assigned via the ACU panel is set for operation in the secure mode.
Note	
The SEC indicator will illuminate even if power is not applied to crypto unit. If power is applied to the crypto unit, the network is monitored, and both the CLR and SEC indicators are off, then no crypto device is connected on the auxiliary control unit and the network is in the non-secure mode.	
Volume Control	Attenuates received audio of selected radio.
UHF 3	
Momentary Pushbutton Switch	Used to request UHF-3 transmit access. Will deselect if pressed a second time or another network is selected on the CSU. Also, provides associated UHF reception at minimum volume if associated volume control is set to off.
XMT Indicator (Green)	Lights when UHF-3 transmit is selected.
Volume Control	Attenuates UHF-3 reception.
Unlabeled Switch and Knob	Not used.

Figure 18-23. Crew Station Unit Controls and Indicators (Sheet 1 of 3)

CONTROL/INDICATOR	FUNCTION
VLF	
RX 1 Volume Control	Attenuates VLF-1 receiver reception.
RX 2 Volume Control	Attenuates VLF-2 receiver reception.
RX 3 Volume Control	Attenuates VLF-3 receiver reception.
TX CW Volume Control	Attenuates VLF transmit CW sidetone.
RCDR	
Volume Control	Attenuates audio recorder playback.
Channel Selector	Selects access to either channel 1 or 2 of the three audio recorders with positions 1A, 1B, 2A, 2B, 3A and 3B.
Note Selector switch positions 1A, 2A, and 3A are equivalent to channel 1 of recorder 1, 2, and 3 respectively. Selector switch positions 1B, 2B, and 3B are equivalent to channel 2 of recorder 1, 2, and 3 respectively.	
HF 2 Volume Control	Attenuates HF-2 receiver reception.
UHF GD Volume Control	Attenuates UHF guard receiver reception.
CW CONV Volume Control	Attenuates sidetone CW converter reception.
ERCS Volume Control	Attenuates ERCS reception.
PTT Selector Switch	
HOT MIC Position	Provides hands off, continuous key ICS operation and push-to-talk access to a selected transmitter.
RAD Position	Allows push-to-talk access to a selected transmitter from CSU panel.
ICS Position	Enables push-to-talk access on selected ICS intercom network.

Figure 18-23. Crew Station Unit Controls and Indicators (Sheet 2 of 3)

CONTROL/INDICATOR	FUNCTION
ICS Selector Switch	
ALL Position	Connects the CSU to the ALL ICS network which is accessible by all stations.
CONF 1 Position	Connects the CSU to conference 1 network which allows the ACO and seat 1 position to talk to the flight deck conference 1 network.
CONF 2 Position	Connects the CSU to conference 2 network which is accessible by all mission crew stations.
CALL Position	Used for emergency communications only. When in the call position, the microphone output will override any audio that may be present. This function is the only intercom network available when ICS is in the emergency mode and enables any operator to talk to all stations that are not keying a radio transmitter, regardless of the setting of their ICS switches.
ICS Volume Control	Attenuates ICS network reception.
Master VOL Control	Adjusts volume level of composite audio signal received by CSU. There is no off position. In the backup mode, the control is the only volume control that functions.
TEST Pushbutton	When pressed, enables test and connects headset microphone audio to headset earphones and lights all indicators.

Figure 18-23. Crew Station Unit Controls and Indicators (Sheet 3 of 3)

18.4.1.1.2 Secure Transmission. The mission CSU provides access to secure transmission on HF-3, HF-4, and HF-5. Transceiver network security status is derived from the crypto equipment and displayed by the CLR (nonsecure) and SEC indicators on the HF select switch. The CLR and SEC indicators are off until the crypto is allocated to the HF radio on the auxiliary control panel at seat four. When a transceiver is selected for transmit or receive, the SEC indicator illuminates if the associated crypto unit (KY-75) is in cipher text mode.

Note

The SEC indicator will illuminate if power is not applied to crypto unit.

If a plain text reception is in use, the SEC indicator will not illuminate. The CLR indicator illuminates if the crypto unit is in Nonsecure mode, or a nonsecure reception is present while the crypto unit is in a secur mode. Secure access is available to those station having HF-3, HF-4, and HF-5 reception as shown i Figure 18-21.

Red (secure)/black (nonsecure) network designa tions are used by the CCU to determin communication networks. Red networks are:

1. Audio and PTT control between the crypto uni and the CCU
2. MIC and headset audio between the CSUs an CCU
3. MIC and headset audio between the MCU, MS and CCU
4. CONF-1, CONF-2, ALL, and CALL ICS ne works.

Red/black network interlocks operate so that:

1. Transmission from a CSU on any intercom network will not interrupt any red programmed network reception at the CSU.

2. Radio transmission from a CSU on any black programmed network will momentarily interrupt all red programmed network radio reception at the CSU.

3. Radio reception from a red programmed network will not interrupt any other radio receive network at the CSU, with the exception of CALL. When a radio is keyed, the CALL function is inhibited to that station.

4. If a crypto-to-radio interface selection is made, and the actual crypto is not installed, or is in plain text mode, the audio will continue to follow the appropriate black audio path directly to the transceiver, bypassing the crypto unit.

18.4.1.1.3 Hot Microphone. Selection of the HOT MIC mode on the PTT selector switch allows for hands free, continuous key transmit access to a selected intercom network. While in the HOT MIC mode, a selected transmitter can be keyed using a foot switch or cordset PTT switch. If a radio transmit network is activated, the intercom receive network function is muted.

18.4.1.2 Auxiliary Control Unit. The ACO and seats one and four have an ACU panel as part of the CSU. The ACUs provide enhanced transmit and receive capabilities to these stations. Refer to Figure 18-24 for the panel, and Figure 18-25 for a description of the controls and indicators. Switches on the panel provide access to the V/UHF and HF-1 transmitters.

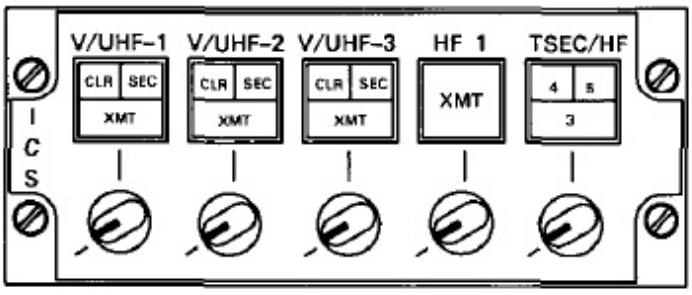


Figure 18-24. Auxiliary Control Unit

The ACU at seat four position has an additional capability that allows the KY-75 crypto device to be switched online with one of the three HF transceivers by use of the TSEC/HF switch. Operation of the HF/KY-75 interface is as follows:

1. Upon ICS initialization, no HF to crypto interfaces exist. The HF indicators will be extinguished.

2. The first time the switch is pressed, the HF-3 transceiver is enabled to interface with the KY-75. The HF-3 indicator illuminates when the interface is complete.

3. Pressing the switch the second time, HF-3 will be deselected and the interface between HF-4 and the KY-75 will be activated, provided the HF-3 transmit key has been released. If the HF-3 transmit key has not been released, the deselection will queue until the transmit key is released.

4. In the same manner, the HF-5 interface to the KY-75 can be activated.

5. Pressing the button again will deselect HF-5. The KY-75 will return to the initial state.

6. If the KY-75 is in Nonsecure mode (or not installed), the voice audio path for the designated transceiver will follow the black audio route directly to the HF transceiver and bypass the KY-75.

18.4.1.3 Maintenance Control Unit. An MCU panel, located on the auxiliary control console, is used for ICS operation at the reel operators station. Refer to Chapter 24 for a description of the panel.

18.4.1.4 Maintenance Station Unit. ICS function is provided to eight MSUs (Figure 18-26) at various aircraft locations. The panels are used primarily by maintenance personnel using the ALL network. The MSU locations are: one next to the galley, two in the aft mission compartment, one in the forward lower compartment, one in the aft lower compartment, and three externally. The MSU panel switch provides the following functions in each of the following positions:

1. HOT MIC — continuous key ICS operation on the ALL network

2. ALL — push-to-talk ICS operation on the ALL network

3. CALL — spring loaded position used for aircraft emergency communications.

CONTROL/INDICATOR	FUNCTION
Note	
All volume control switches attenuate at 7 levels and have a counterclockwise off position.	
V/UHF 1, 2, and 3	
Momentary Pushbutton Switch	Used to request flight deck V/UHF-1, -2 or -3 transmit access. Will deselect if pressed a second time or if another network is selected on the CSU.
XMT Indicator (Green)	Illuminates when V/UHF transmit is selected.
CLR Indicator (Amber)	Illuminates when the radio is selected for transmit or the volume switch is moved from the off position and the associated crypto device selected on the pilots crypto select/emergency audio panel is in the non-secure mode.
SEC Indicator (Green)	Illuminates when the radio is selected for transmit or receive (the volume switch is moved from the off position), and the crypto unit selected at the pilots' crypto select/emergency audio panel is actively encrypting or decrypting.
Note	
The SEC indicator will illuminate if a crypto device is selected at the crypto select/emergency audio unit, even if power is not applied to the crypto unit. If a crypto device is not selected on the crypto select/ emergency audio panel for this transceiver, the CLR and SEC indicators will be extinguished and the network will be in the non-secure mode.	
Volume Control	Attenuates selected V/UHF reception.
HF 1	
Momentary Pushbutton Switch	Used to gain HF-1 flight deck transmit access. Will deselect if pressed a second time or if another network is selected on the CSU.
Volume Control	Used to attenuate HF-1 reception.
TSEC/HF (Functions at seat 4 only)	
Momentary Pushbutton Switch	Used to select KY-75 access. Refer to switch operation description in text for details.
HF 3, 4, and 5 Indicators	Illuminate when the radio-to-crypto device interface has been selected.
Volume Control	Not functional.

Figure 18-25. Auxiliary Control Unit Controls and Indicators

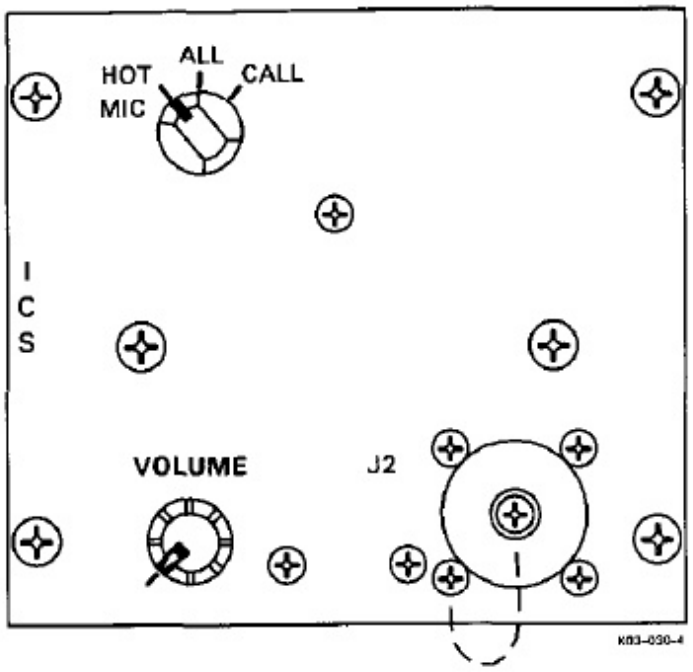


Figure 18-26. Maintenance Station Unit

18.4.1.5 Intercom Network Operations. The ICS has four intercom networks available to various aircraft stations:

ALL — This network is available at all ICS stations/panels for use by the flight deck, comm central, reel operators station, and all maintenance stations.

CONF 2 — This network is limited for use by the mission personnel, namely: the ACO, the four comm central seats, and the reel operator.

CONF 1 — This network is primarily for use by the flight deck, though the ACO, seat one and the reel operator also have access to the network.

CALL — All operators (mission and flight deck) can use the call capability of the ICS. This function enables any operator to talk to all stations, regardless of the setting of their ICS switches. When in the call position, the microphone output will override any audio that may be present.

Note

- The call function shall only be used for emergency communications.
- CALL is the only intercom network available when the ICS is in the emergency mode.
- Keying a transmitter at the CSU will inhibit the CALL reception and ICS transmission at that station.

18.4.1.6 Emergency Backup Mode If a failure in the CCU is detected, switches on a flight deck ICS crypto select/emergency audio panel are used to initiate the hardwired backup radio networks and the PA network. This mode is initiated by the pilot or copilot. When in the Backup mode:

1. The audio circuits of the pilot's, copilot's, and five comm central CSUs are directly connected through relays in the CCU to the radios defined in Figure 18-21.
2. All units including the CSUs, MCU and MSUs can maintain intercom communications with the CALL function control.
3. The transmit switch/indicators on the CSUs and ACUs are not operative.
4. Only the master volume control on the CSU is operative.

18.4.2 Keyline Control (C-11658). The keyline control selects HF and UHF key sources and selects forward and reflected UHF transmit outputs for monitor. The keyline control (Figure 18-27) is located at the forward console bay 2. The panel controls and indicators description and functions are explained in Figure 18-28.

18.4.3 CW Key Control (C-11657). The CW key control panel (Figure 18-29) consists of a rotary switch that selects the source of the VLF transmitter keying when in the CW/FSK mode. The switch position functions are:

1. OFF — CW key control disabled
2. AFT — selects the aft (console) power outlet panel for CW keying operation
3. FWD — selects the forward (console) power outlet panel for CW keying operation
4. TTY — applies 60 Hz power to and connects the Baudot-to-Morse converter to the VLF modulator
5. LOCK — sets the constant keying to the modulator.

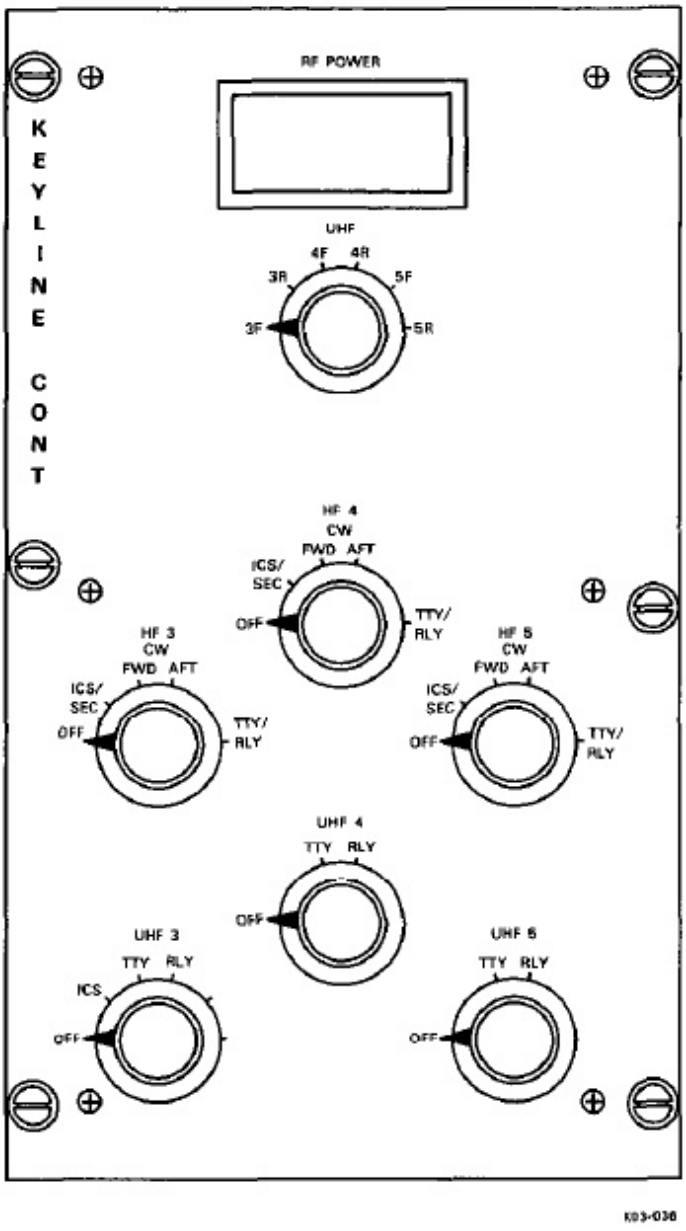


Figure 18-27. Keyline Control (C-11658)

CONTROL/INDICATOR	FUNCTION
RF POWER Meter	Displays RF power measurements from the UHF transmitters as determined by the UHF selector switch.
UHF Selector Switch (Positions 3F, 3R, 4F, 4R, 5F, and 5R)	Selects UHF transmitter power measurement to be displayed on the RF POWER meter. The number at each selected position designates the UHF transmitter and the letter (F or R) designates forward or reflected power displayed.
HF 3, HF 4, and HF 5 Selector Switches	Selects source of each HF transmitter keying for a specific mode of operation.
OFF	Transmitter keyline disabled.
ICS/SEC	Transmitter is keyed by the PTT switch of selected operator during non-secure or secure voice communications.
CW FWD	Selects the forward (console) power outlet panel CW KEY jack for CW keying operation of the transmitter.
CW AFT	Selects the aft (console) power outlet panel CW KEY jack for CW keying operation of the transmitter.
TTY/RLY	Transmitter is constantly keyed for TTY and relay operations. Position is used for operation with the TE-204A-4 data modem signals or when FSK or audio signals are connected to HF transmitters via the audio jackfield.
UHF 3, UHF 4, and UHF 5 Selector Switches	Selects source of each UHF transmitter keying for a specific mode of operation.
OFF	Transmitter keyline disabled.
ICS (UHF-3 only)	Transmitter is keyed by the PTT switch of the selected operator during voice communications.
TTY	Transmitter key is controlled by the associated modem during TTY transmission for UHF-4 (NB modem) and UHF-5 (WB modem). Constant keying is provided for UHF-3 in LOS.
RLY	Transmitter is constantly keyed during relay operation.

Figure 18-28. Keyline Control Panel Controls and Indicators

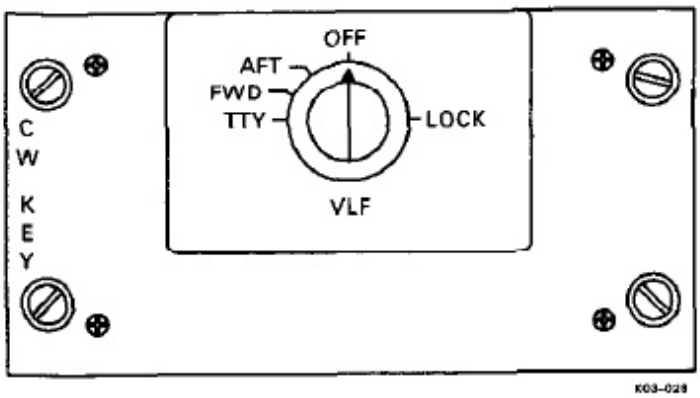


Figure 18-29. CW Key Control (C-11657)

18.5 INTERCONNECTION SUBSYSTEM

The interconnection subsystem provides an interface between subsystems and various equipment. It consists of the dc jackfield, audio jackfield, TDM, and the PIC.

18.5.1 Audio Jackfield (C-11656). Several of the components of the AN/USC-13(V) receive inputs from and provide outputs to the audio jackfield (Figure 18-30). The 56 source jacks on the audio jackfield connect directly to the outputs of various equipment. Each is labeled to indicate the equipment to which it is connected. Any source jack can be connected (patched), by way of an interconnecting cable, to any load jack. The output of one unit (source) can be connected to the input of another unit (load). Parallel jacks are provided so more than one load can be connected to a single source. The audio jackfield is located at comm central aft console bay 3. Radio voice signals are routed within the audio jackfield to the ICS system. Radio voice source jacks are permanently wired to the ICS system. Radio voice load jacks are routed from the ICS system.

Note

If a plug is inserted into a load jack, the normal through connection from the ICS is broken.

The CRO CH A and CRO CH B switches on the audio jackfield route audio signals to the CRO input panel. The CRO CH A switch selects signals on source jacks J1 through J28; the CRO CH B switch selects signals on source jacks J29 through J56.

18.5.2 Dc Jackfield (SB-3384). The dc jackfield (Figure 18-31) is an interconnecting device for 6 vdc TTY data signals. The 28 source jacks on the dc field are the outputs of various equipment. The t six load jacks are connected to the inputs of va equipment. Each jack is labeled to indicate the e ment to which it is connected. Any source jack c connected (patched) to any load jack. The signal s monitor switch on the dc jackfield allows a signa source jack to be routed to the dc voltmeter o jackfield. Some of the loads have two parallel jac one or two loads can be patched to one source. Inp the CRO input panel are obtained by the two load marked CRO CH A and CRO CH B. The dc jackfi located at comm central forward console bay 4.

Note

The dc jackfield source jacks for the TDM are labeled TDM LOAD and the load jacks are labeled TDM SOURCE to correspond with the TDM loop.

18.5.3 Parallel Interface Circuits. The PIC sists of two redundant power supplies located in the of the forward console, bay 5, and a card cage lo in the back of the forward console, bay 4. The p supplies furnish required operating voltages to the cage. Each power supply has an ON/OFF switch. card cage contains six PIC cards that interface, tran and receive equipment with the TMPS and TDM route monitoring data to the IFPM.

18.5.4 Time Division Multiplexer (C-101 The TDM is a distribution switch used to connect ous TTY resources by pushbutton operation at a co panel. Except for VERDIN and UHF NB, TTY operations require patching at the audio and/or dc fields. Refer to Figure 18-32 for a simplified signal diagram. The TDM consists of five card cages, a power supply, and a TDM control and display. TDM control and display (Figure 18-33) permits o tor control for routing signals to and from TTY e ment, TMPS, security sets, VERDIN, UHF equipment, and jacks on the dc jackfield. The control and display not only permits the operat make and release the desired source and load co tions, it also indicates equipment connections, avai ity, and TDM faults. A control switch on the control and display allows manual or automatic s tion of the A or B TDM loop.

The switch can also be used to override the formance monitor and select either loop. The control and display is located at comm central fo console bay 3. The TDM card cages are located C1 rack, bay 2.

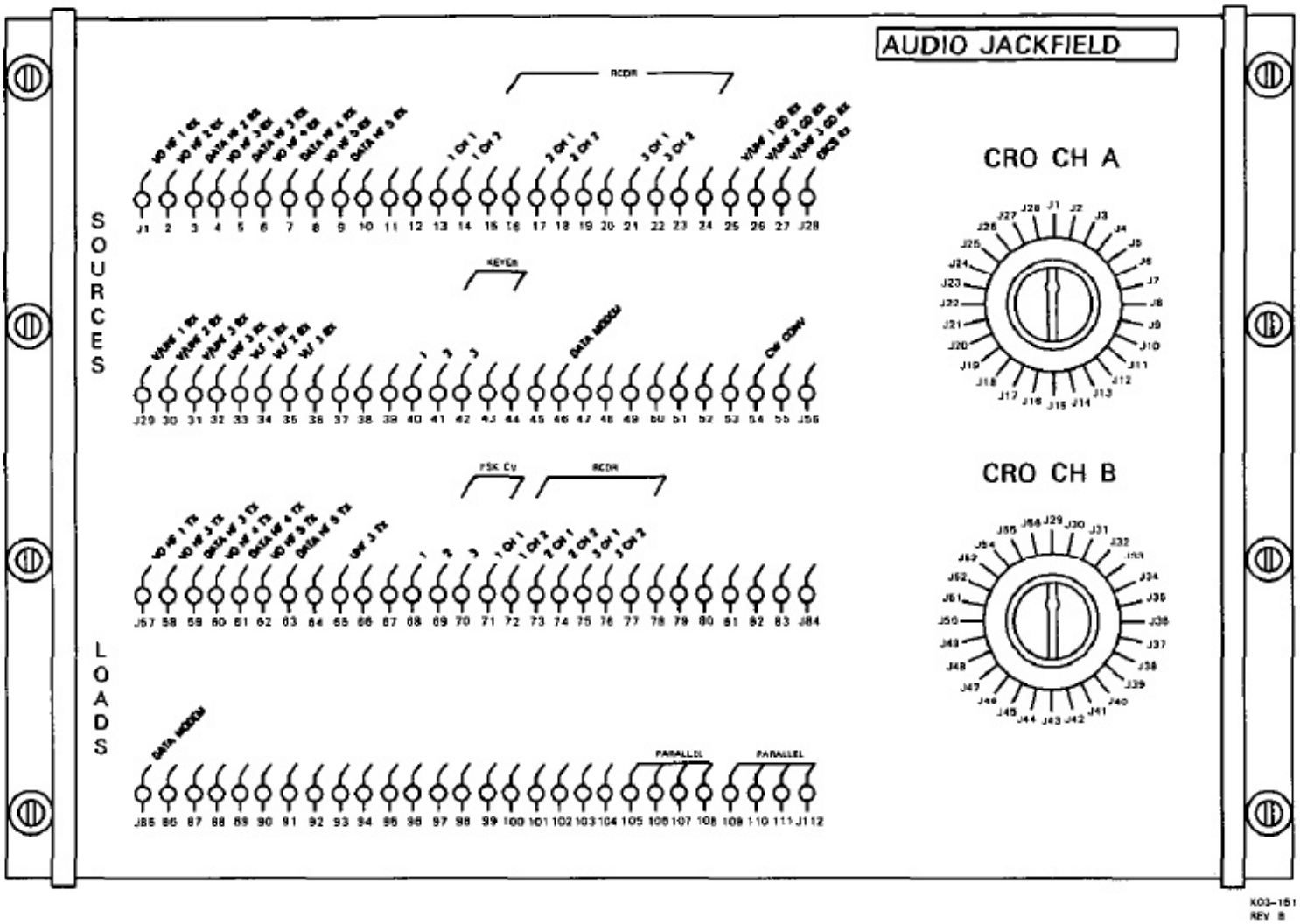


Figure 18-30. Audio Jackfield (C-11656)

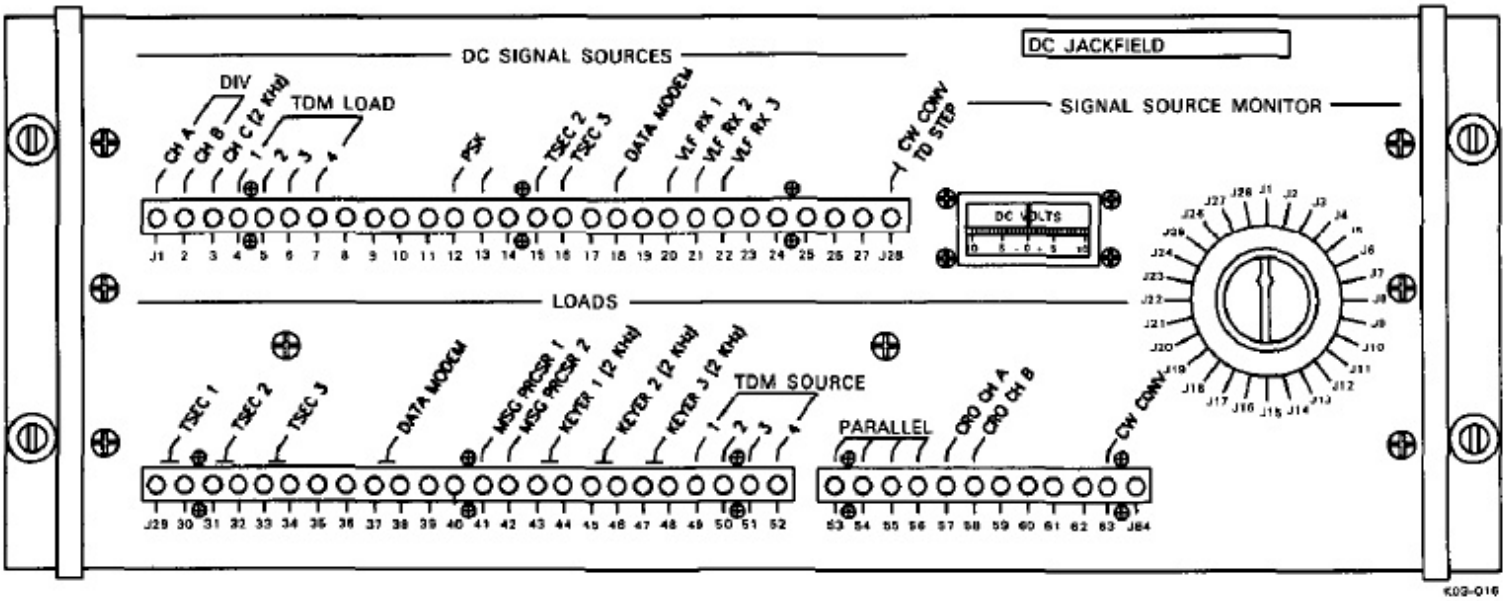


Figure 18-31. Dc Jackfield (SB-3384)

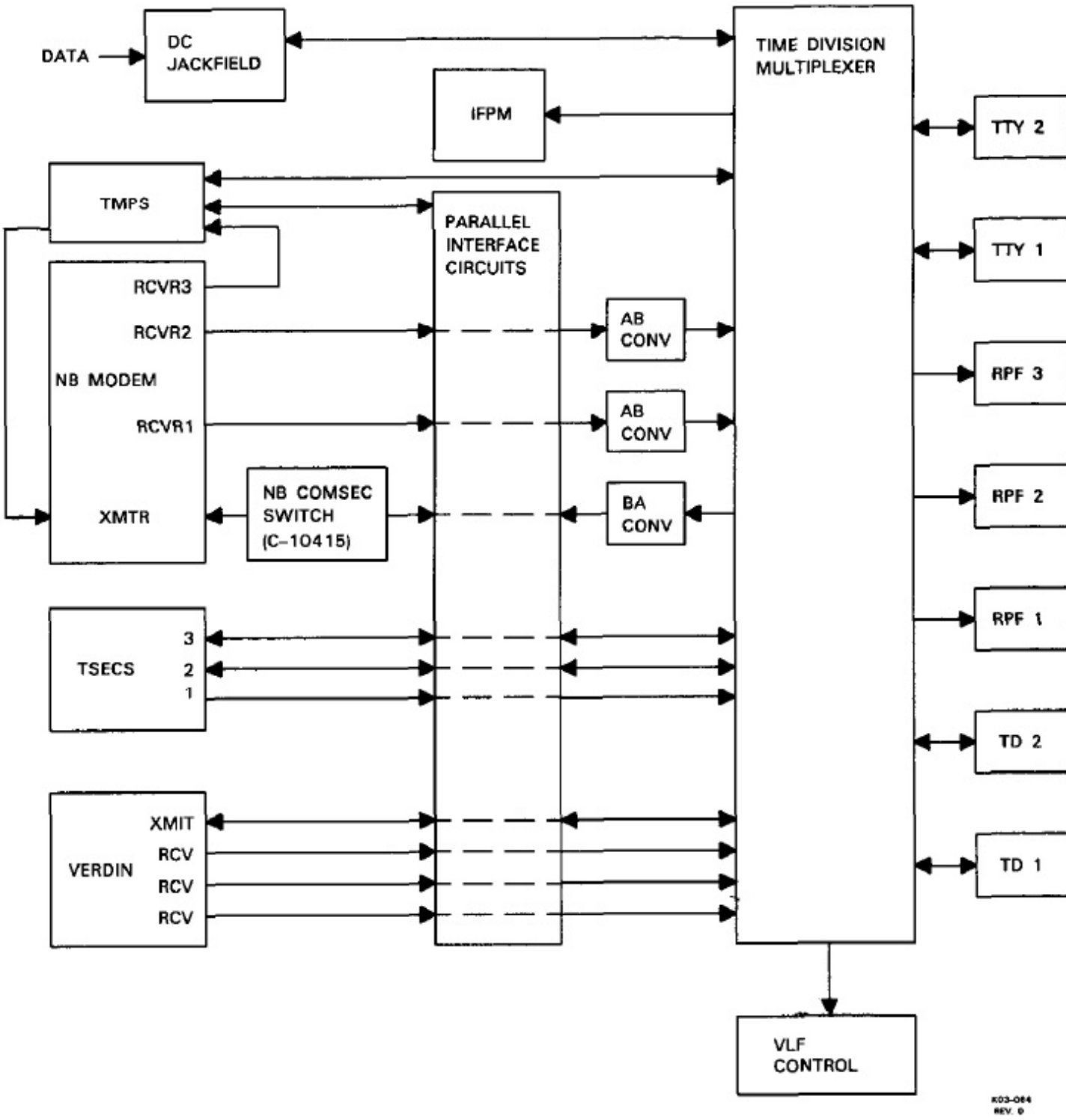


Figure 18-32. TDM Interfaces

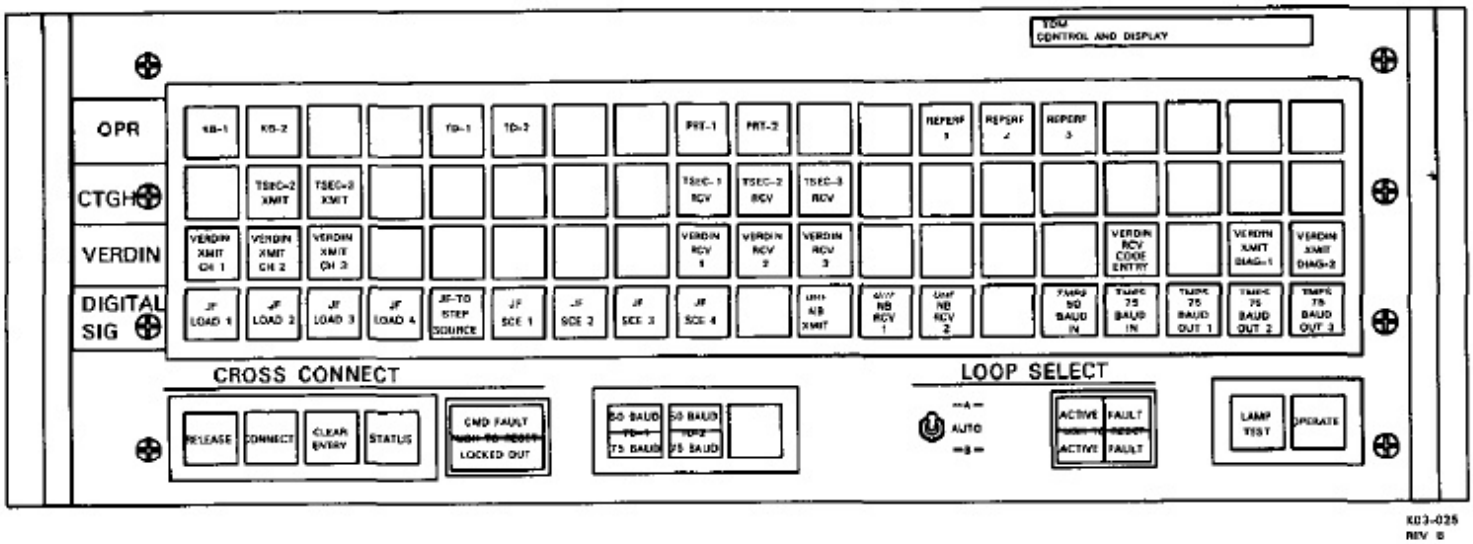


Figure 18-33. TDM Control and Display Panel (C-10113)

18.5.4.1 TDM Restrictions. When making TDM connections, the following restrictions apply:

1. A TD or keyboard cannot be simultaneously connected to a TSEC and a nonsecure load.

2. Two sources cannot be connected together, and two loads cannot be connected without a common source.

3. No connection can be made to a load already connected.

4. A keyboard cannot be connected to more than one VERDIN transmit channel.

5. More than fifteen loads cannot be connected to a single source.

6. A TD cannot be connected to more than one VERDIN transmit channel or to more than one step device.

Attempting to violate the above restrictions will result in a locked-out fault and the LOCKED OUT indicator will illuminate. The fault can be cleared by pressing the PUSH TO RESET switch. Commands can then be entered. To turn the TDM on, lift the guard tab on top of the OPERATE switch on the TDM control and display, press the switch, allow TDM to stabilize, and reset faults. The switch should illuminate green.

18.5.4.2 TDM Source and Load Connection. To connect a source and a load, press the appropriate SOURCE and LOAD switches, then press the CONNECT switch. The upper left quadrant of the SOURCE and LOAD switches will illuminate green if the connection is normal. The lower half of the switches will illuminate red if the source is red/black and the load is black (dc jackfield, UHF NB XMIT). The upper right quadrant will illuminate yellow to indicate a fault. Figure 18-34 lists TDM sources, loads, and data-transfer rates.

Note

A security violation is possible if 28 vdc NBPS is lost for more than 2 minutes. When power is reapplied, visual indication on the TDM control/display is blank; however, previous connections are maintained by the TDM loop. Cross connect table does not apply to previous connections.

18.5.4.3 Additional Loads To An Existing Connection. To add a load to an existing connection, press the source switch and the load switch associated with the additional load, then press the CONNECT switch.

18.5.4.4 Disconnecting Sources And Loads. To disconnect a load, press the associated load switch, then press the RELEASE switch. If all loads are to be disconnected from a source, this must be repeated for each load. With the release of the last load, the green source indicator will extinguish.

18.5.4.5 Clear Entry. If the wrong switch or switches are pressed before the CONNECT or RELEASE switches are pressed, the error can be corrected by pressing the CLEAR ENTRY switch. The correct switches can then be pressed to enter the correct command.

TDM SOURCES	DEVICE SPEED	REMARKS
Keyboard (2) KB-1, -2	50/75 baud.	
Transmitter-distributor (2) TD-1, -2	50/75 baud.	Controlled by TD-1/50 BAUD/75 BAUD and TD-2/50 BAUD/75 BAUD switches.
Message processor (3) TMPS 75 BAUD OUT 1, 2, 3	75 baud.	
UHF narrowband receive (2) UHF NB RCV 1, 2	75 baud.	
TTY security receive (3) TSEC 1, 2, 3, RCV	60, 67, 100 WPM.	
VERDIN transmit diagnostics (2) VERDIN XMIT DIAG 1, 2	50 baud.	DIAG 1 used with VERDIN XMIT CH 2. DIAG 2 used with VERDIN XMIT CH 3.
VERDIN receive terminals (3) VERDIN RCV 1, 2, 3	50 baud.	
DC jackfield terminals (4) JF SCE 1, 2, 3, 4	Determined by signal source.	Circuit originates at DC jackfield load jack labeled TDM SOURCE 1, 2, 3, 4.
DC jackfield step source (1) JF-TD STEP SOURCE		Used to connect Baudot-to-Morse converter step to TD.

TDM LOADS	DEVICE SPEED	REMARKS
Printers (2) PRT-1, -2	50/75 baud.	
Reperforator (3) REPERF 1, 2, 3	65, 71, 107 WPM.	
Message processor 50 baud (1) TMPS 50 BAUD IN	50 baud.	
Message processor 75 baud (1) TMPS 75 BAUD IN	75 baud.	
UHF narrowband transmit (1) UHF NB XMIT	75 baud.	

Figure 18-34. TDM Sources and Loads (Sheet 1 of 2)

TDM LOADS	DEVICE SPEED	REMARKS
TTY security transmit (2) TSEC-2, -3, XMIT	60, 67, 100 WPM.	Connects TD step for TD operation.
VERDIN transmit channel (1) VERDIN XMIT CH 1	75 baud.	TD input, connects TD step
VERDIN transmit channel (2) VERDIN XMIT CH 2, 3	50 baud.	Keyboard input only.
VERDIN receive code entry (1) VERDIN RCV CODE ENTRY	50/75 baud.	TD input, connects TD step. TD should be set to 75 baud. KBD input for programming VERDIN receive terminal using keyboard entry. KBD shall be set to 50 baud.
DC jackfield terminals (4) JF LOAD 1, 2, 3, 4	Determined by connected load	Circuit terminates at DC jackfield source jack labeled TDM LOAD 1, 2, 3, 4.

Figure 18-34. TDM Sources and Loads (Sheet 2 of 2)

18.5.4.6 Status. When several load/source combinations are connected, the TDM control and display will display all connections. To determine which loads are connected to a given source, press the source switch, then press the STATUS switch. Only the load(s) connected to that source will illuminate as long as the STATUS switch is pressed. When the STATUS switch is released, all connections will once again be displayed.

18.5.4.7 VERDIN Connections. To connect a keyboard to a VERDIN transmit channel, press the desired keyboard (KB-1, KB-2) switch, the desired VERDIN XMIT switch, and then the CONNECT switch. To connect the VERDIN transmit diagnostics, press one of the VERDIN XMIT DIAG switches associated with the channel (DIAG-1 for channel 2 or DIAG-2 for channel 3), the PRT switch associated with the selected keyboard (PRT-1 with KB-1, etc.), and the CONNECT switch. The printer will print the diagnostic and what is typed on the keyboard. To connect a printer to a VERDIN receive terminal, press the desired VERDIN RCV switch, the desired PRT switch, and then the CONNECT switch.

Note

- The associated keyboard and printer shall be set for 50-Baud operation.
- Only VERDIN XMIT CH1 and VERDIN RCV CODE ENTRY provide a step signal for TD inputs.

Connect the TD by pressing the desired TD switch, the VERDIN XMIT CH1 or VERDIN RCV CODE ENTRY switch, and the CONNECT switch. The 50 BAUD/75 BAUD switch associated with the selected TD should be set for 75 Baud. The step signal is connected automatically to the TD.

18.5.4.8 Jackfield Connections. The jackfield connections can be used to connect the TTY equipment for nonsecure traffic. The necessary connection must be made at the audio and/or dc jackfields as in preceding systems. As noted previously, the jackfield switch markings on the TDM control and display are relative to the TDM loop. Thus, a JF LOAD switch relates to a TDM LOAD jack on the dc jackfield. A signal from the TDM SOURCE jack is considered a signal source for the TDM loop.

Note

A red indicator on the TDM control and display indicates a nonsecure connection has been made.

18.5.4.9 Crypto Connections. To make connections for transmission of secure TTY signals, press one of the KB or TD switches (as applicable), one of the TSEC XMIT switches, and the CONNECT switch. This connects the keyboard or TD to the transmit input of the TTY security set; the output of the security set is applied to an appropriate source jack on the dc jackfield. Patching at the dc and audio jackfield can then be performed as in preceding systems to apply the signals to the appropriate transmitter.

To make connections for receiving secure TTY signals, press one of the PRT or REPERF switches, one of the TSEC RCV switches, and the CONNECT switch. This connects the printer or reperforator through the TTY security set to the appropriate TSEC LOAD jack on the dc jackfield. Proper patching at the audio and dc jackfields must be made as in preceding systems to connect the desired receiver output. If both a hard copy and a tape are desired, add the required equipment.

18.5.4.10 UHF Narrowband Connections. To make connections for transmission of UHF NB signals, press desired TD or keyboard switch, UHF NB XMIT switch, and CONNECT switch. This connects the TD or keyboard to the input of the Baudot-to-ASCII converter. No further patching is required; the converter output is hardwired to the transmit channel of the UHF NB modem.

To make connection for receiving UHF NB signals, press the desired UHF NB RCV switch, one of the PRT or REPERF switches, and the CONNECT switch. This connects the printer or reperforater to the output of the appropriate ASCII-to-Baudot converter. No further patching is required as the converter outputs are hardwired through the PIC card cage to the UHF NB modem receive channels. If both a hard copy and tape are desired, add the required equipment.

18.5.4.11 TACAMO Message Processor Subsystem Connections. All transmit and receive circuits on the TDM loop (except JF LOAD 1-4 and RCV CODE ENTRY) are available to the TMPS via the parallel interface card cage. A 2400 Baud line from the TDM connects equipment status information to the TMPS, inhibiting the TMPS from using load devices currently connected by the TDM.

Five TDM switches permit the TMPS to access TTY equipment. To make connections for output of TMPS messages or information to a reperforator or printer, press one of the three TMPS 75 BAUD OUT switches, the desired PRT or REPERF switches, and the CONNECT switch. Messages or information may then be output to the device by executing the pro TMPS command. To make connections for inpu messages or commands to TMPS from a keyboar TD, press the desired KB or TD switch, the TMPS BAUD IN or 75 BAUD IN switch, and the CO NECT switch.

Note

The associated TTY equipment must be set to the appropriate Baud rate.

The TDM may also be used to backup non TMPS input/output circuits. For example, if it is termined that the TMPS VERDIN RECEIVE 2 in port has failed, the operator can use TDM assets pressing the VERDIN RCV 2 switch, the TMPS BAUD IN switch, and the CONNECT switch. cause the TMPS is aware of all TDM connections, received messages will be processed as if the sig had been input via the TMPS VERDIN RECEIV input port.

18.5.4.12 Preparing a Tape. To prepare a tape use by a TD, press one of the KB switches, one of REPERF switches, and the CONNECT switch. selected reperforator will punch messages typed on keyboard. If a hard copy is also desired, add a prin

18.5.4.13 Use of the Baudot-to-Morse Co verter. The Baudot-to-Morse converter can patched to the TDM system by using the dc jackfi Any dc jackfield TDM LOAD jack can be used, but converter step control must be patched to the co sponding TDM SOURCE jack on the dc jackfield. example, at the dc jackfield, patch TDM LOAD 4 to Baudot-to-Morse input load jack and patch CW CO TD STEP to TDM SOURCE 4 jack. Connect TD- dc jackfield TDM LOAD 4 jack by pressing TD-1 LOAD 4, JF-TD STEP SOURCE, and CONNECT. TDM control and display will connect the step signa the JF SCE 4 modulator to the TD 1 step demodula This connection will result in proper illumination of TD-1, JF LOAD 4 and JF SCE 4 switches.

Note

The JF-TD STEP SOURCE switch will not illuminate.

18.5.4.14 TDM Loop Selection. TDM loop se tion is made by using the LOOP SELECT toggle sw on the TDM control and display. When the toggle sw is in the AUTO position, the performance monitor in TDM control and display selects either the A or B lo depending on loop quality. A degraded condition on

loop will cause automatic switch over to the other loop. The pushbutton switch will illuminate to indicate which loop is active and will also illuminate if one of the loops is faulty. Manual selection of the loop can be made by setting the toggle switch to the A or B position.

18.5.4.15 TD Baud Rate Control. The two BAUD switches at the bottom of the TDM control and display are alternate-action pushbutton switches that control the indicated TD Baud rate.

18.6 COMMUNICATION CENTRAL COMMON EQUIPMENT POWER SOURCES

Figure 18-35 lists the power sources for the equipment common to comm central operator stations, including the type of power, and the circuit breaker location/label.

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
Intercommunications Subsystem	28 VDC	AVE 1 DC FA 1	P5 Panel, NORM CCU
	28 VDC	AVE 1 DC FA 1	P5 Panel, MSN-1 CCU
	28 VDC	AVE 1 DC FA 1	P5 Panel, MSN-2 CCU
	28 VDC	AVE 1 DC FA 1	P5 Panel, MSU
No Break Power Supply	115V, 400 Hz	MA 5 AC	P67-2 Panel, NO BREAK PWR SUPPLY PWR SUPP
	115V, 400 Hz	MA 5 AC	P67-2 Panel, NO BREAK PWR SUPPLY CHGR
	28 VDC	MA 5 DC DIST	P67-2 Panel, NO BREAK PWR SUPPLY CONT

Figure 18-35. Comm Central Common Equipment Power Sources (Sheet 1 of 2)

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
Parallel Interface Circuits	28 VDC	MA 5 DC FWD console	28 VDC DISTR 1 Panel, TDM PIC PWR 1
	28 VDC	MA 5 DC FWD console	28 VDC DISTR 1 Panel, TDM PIC PWR 2
Power Outlet Panels	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, POWER OUTLETS
	115V, 60 Hz	60 Hz Distribution	60 HZ DISTRIBUTION PANEL, POWER OUTLETS
	28 VDC	MA 5 DC FWD console	28 VDC DISTR 1 Panel, PWR OUTLET
Time Division Multiplexer	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TDM CONT DSPL
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TDM CARD CAGE 1
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TDM CARD CAGE 2
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TDM CARD CAGE 3
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TDM CARD CAGE 4
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TDM CARD CAGE 5
	28 VDC	MA 5 NO BREAK	28V DC DISTR 1 Panel, 24V BTRY
	28 VDC	MA 5 DC FWD console	28V DC DISTR 1 Panel, TDM CONT DSPL
652A-23 Power Supply	28 VDC	MA 5 DC AFT console	28 VDC DISTR 2 Panel, VLF PA CONT

Figure 18-35. Comm Central Common Equipment Power Sources (Sheet 2 of 2)

CHAPTER 19

Seat One Position — Preflight, Operation and Postflight

19.1 SEAT ONE POSITION RESPONSIBILITIES

Seat one is responsible for the preflight, operation, and postflight of the TMPS. This position is the primary TMPS operator and is usually the ACS for comm central.

19.2 TACAMO MESSAGE PROCESSOR SUBSYSTEM

The TMPS consists of a message processor control, message processor, message processor I/O, DKU, line printer, EAM alarm, and the display/keyboard switch. The storage capacity of the TMPS consists of a 32K core memory.

The TMPS is used for receive circuit monitoring, automated message handling, configuring and managing of various mission receive and transmit communications links. Refer to Figure 19-1 for a simplified block diagram of the TMPS. The TMPS receives, identifies, classifies, stores, edits, and transmits messages. The TMPS can receive, store, and transmit messages to and from external devices either automatically or on operator command. Message traffic enters the TMPS automatically from VLF, UHF and local TTY sources. Operator transmit or process commands can be entered from the system DKU or TTY keyboards and TD via the TDM. Command acknowledgment, error, status, intercept and logging messages are provided for operator action/information. In addition to message traffic, diagnostic and performance data is received by the TMPS from the VERDIN terminals.

Received messages are assigned a message sequence number that is logged on both the DKU and line printer. If the message is an emergency command precedence message, visual and audio outputs are initiated. If the text is error free and the phonetic letter spellouts are recognized as members of the thirty-six character set of letters and numbers, the message is assumed to be an EAM. An alphanumeric ver (ART-50 compatible) will be stored, and paper t will be punched if a reperforator is connected vi TDM.

19.2.1 Message Processor Control (C-999

The message processor control (Figure 19-2) ap primary power through a power relay to the mes processor and processor I/O. Memory clear and gram load instructions are provided by the proc control, with TMPS program loading accompli through an EPROM card. Faults within the unit are indicated on the panel.

19.2.1.1 Controls and Indicators. The I/O MPU FAULT indicators normally identify faults i message processor I/O and message processor, res tively. The MPU FAULT indicator also illuminate a moment during program load. The PROGL FAULT indicator is not used. The POWER indi illuminates when power is applied to the process the POWER switch. The INIT PROG LOAD indi illuminates when initial program load segments a progress. The PROC MEM CLEAR indi illuminates when memory clear is in progress and ing segments of program load. When pressed, LAMP TEST switch illuminates all front-panel in tors. The IPL switch is used to load a program, an MEM DMP switch is not used.

19.2.2 Message Processor (C-1394A).

message processor is the central element in the TM it executes operator commands and processes com nications through multiple I/O lines. The message cessor has no controls or indicators. The mes processor is located in the C1 rack, bay 2.

19.2.3 Message Processor I/O (CV-3618A).

message processor I/O expands the input/output c bility of the message processor. All communica between the message processor and external vices/subsystems pass through the message proce I/O. Required power and control are provided by

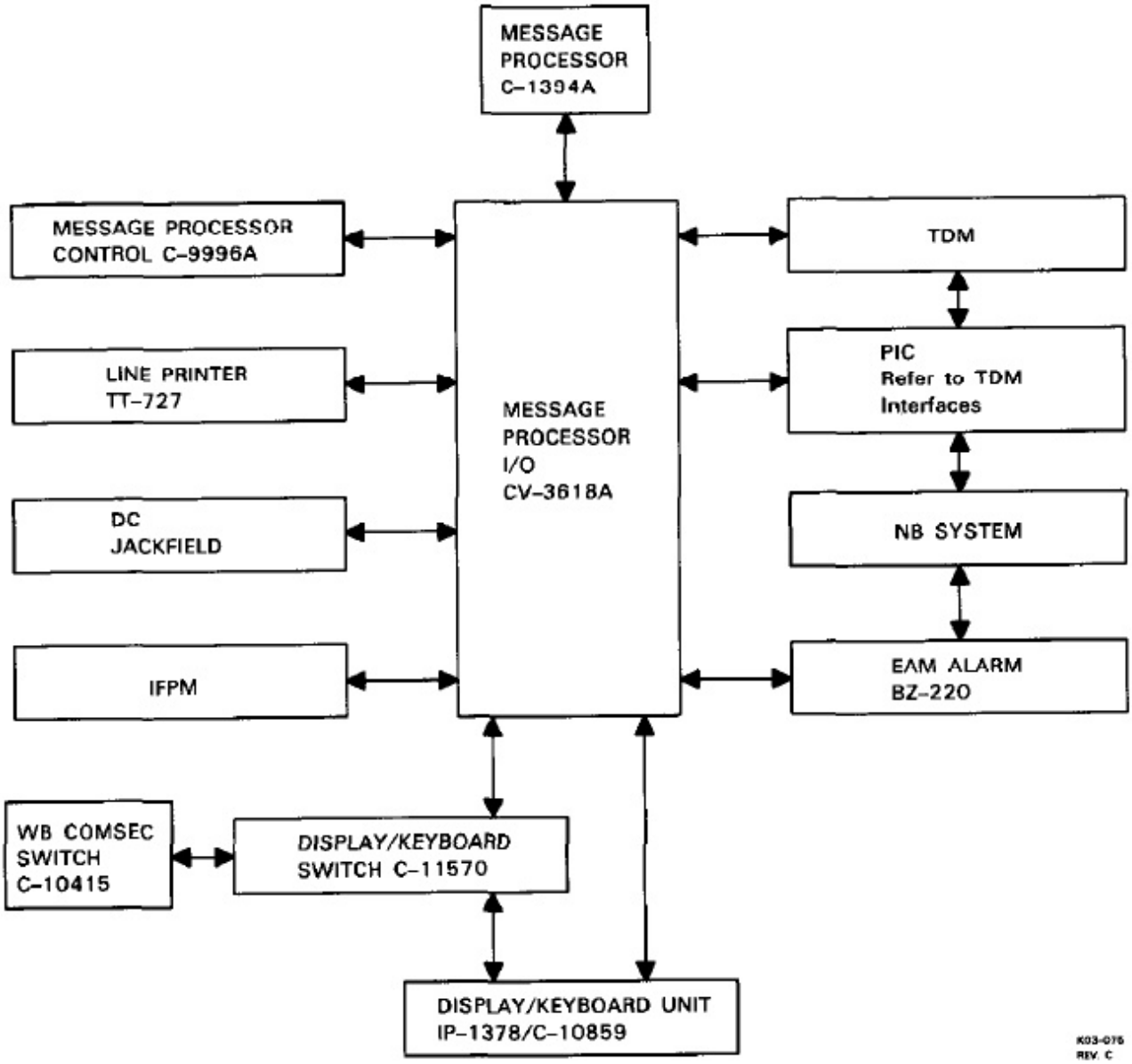


Figure 19-1. TMPS Block Diagram

message processor. The message processor I/O is located in the C1 rack, bay 1.

19.2.4 Display/Keyboard Unit (IP-1378/C-10859). The DKU is the primary interface between operator and TMPS equipment. Using the DISPLAY KEYBOARD switch, DKU PROC and WB keys, the operator can select two modes of operation for the DKU. In the Processor mode, two full-duplex I/O paths are provided between the message processor and the DKU. The WB mode of operation provides one full-duplex path between the WB modem circuit and the DKU. The UHF-5 section in chapter 20 describes WB operation.

The DKU provides split-screen operation by dividing the display into two fields (41 lines total). The upper field, normally used for logging and message display, contains thirty lines (1 through 30). The lower field, normally reserved for command and control, contains eleven lines (31 through 41). Each line of display is sixty-four characters long. A status line displays the current number of messages of each precedence (E = EAMS in fixed storage, Y = ECP message not in fixed storage, Z = Flash, 0 = Immediate, P = Priority, R = Routine, U = Undefined), it also shows the number of message bins remaining in memory and date time group. It is updated every second to the top line (line 31) of the lower field. The bottom line (line 41) is the operator scratch pad. The last three character positions of line 41 display the number of lines of data waiting in buffer for upper field display.

Figure 19-3 shows the DKU keyboard and Figure 19-4 explains the keyboard functions. Refer to Figure 19-5 for mnemonic description transfer rates and circuit types.

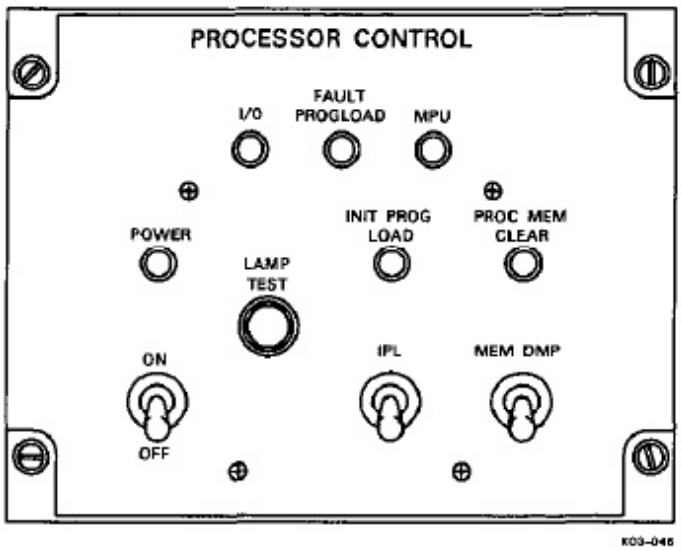


Figure 19-2. Message Processor Control

19.2.5 Line Printer (TT-727). The line printer is a three hundred character-per-second (2400 Baud) electrographic printer that can print sixty-three discrete characters plus a space in lines up to eighty characters long. Figure 19-6 shows the line printer front panel.

19.2.5.1 Controls and Indicators. The POWER switch applies power to internal circuits. The POWER indicator (green) illuminates to show presence of circuit power. The FORM FEED switch advances the paper one sheet. The ON LINE indicator (green) illuminates v internal circuits are ready to accept external data. W held up, the TEST switch runs the printer self test causes a formatted self-test printout. Two prote circuit breakers (CB1 and CB2) and an elapsed meter are located behind the front cover.

19.2.6 EAM Alarm (BZ-220). The EAM a sounds when an ECP message is received. Figure shows the EAM alarm. A three-position switch prov the following functions: the NORMAL position al the alarm to be triggered, the RESET position turn the audible alarm, and the TEST position activate audible alarm. Both the TEST and RESET position spring loaded. Once the alarm is reset, it will not s again until another ECP message is received.

19.2.7 Display Keyboard Switch (C-11570). display keyboard switch, Figure 19-8, permits the ator to bypass the TMPS in the WB mode and us DKU as a full-duplex terminal for UHF-5 WB o tions. WB transmit messages can be typed and sent the DKU lower screen. All WB receive messages be printed on the upper screen and not routed t processor. The display keyboard switch in the WB m has no effect on other processor inputs. The Proc mode allows operator interface with the TMPS pr sor in a normal configuration.

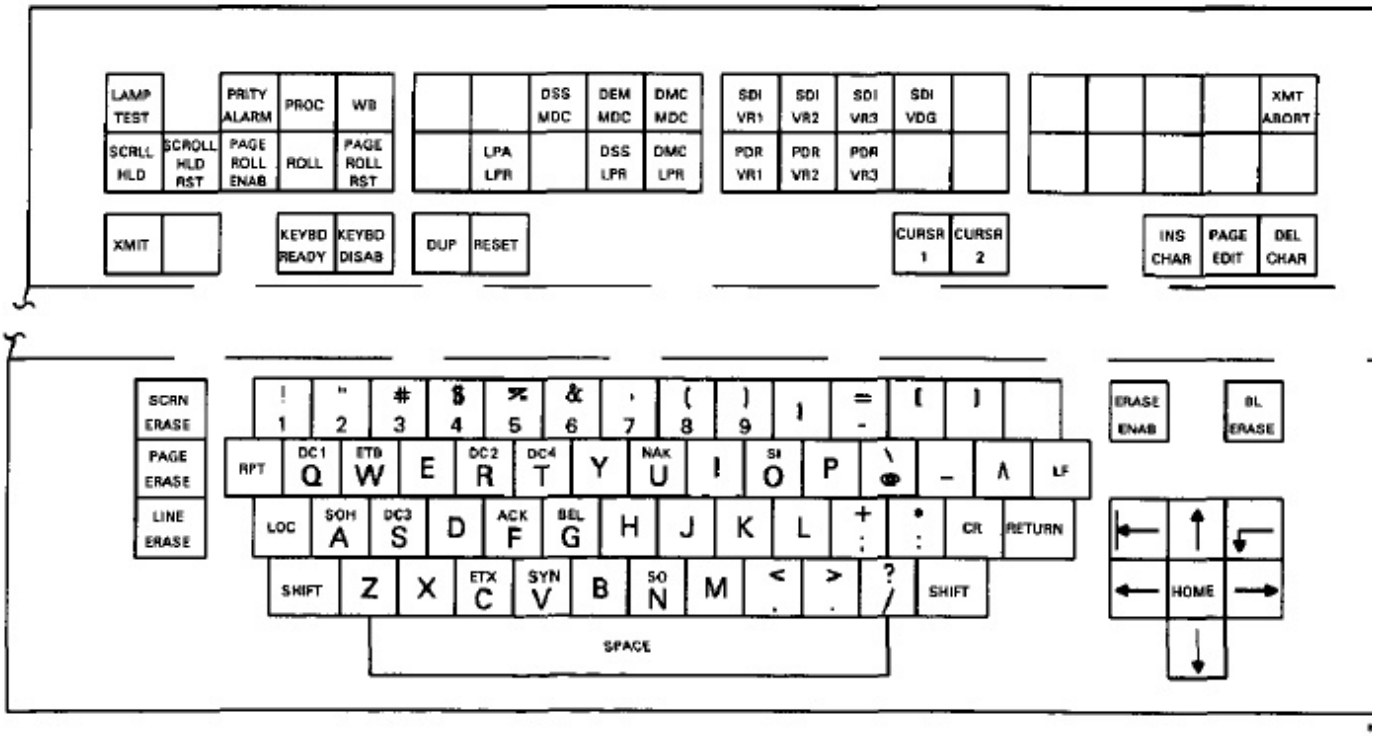


Figure 19-3. Display/Keyboard Unit Keyboard (C-10859)

KEY	FUNCTION
KEYBD READY	Illuminates KEYBD READY key, places display in operator control mode, and enables the keyboard.
KEYBD DISAB	Disables keyboard except for cursor controls.
CURSOR 1	Activates cursor 1 for data entry, function, and edit operations.
CURSOR 2	Activates cursor 2 for data entry, function, and edit operations. **Note** The active cursor will flash at its current position on the display.
↵ (new line)	Moves the active cursor to the first unprotected character position in the next line.
⇤ (cursor return)	Moves the active cursor from its current position in a line to the first unprotected character in the same line.
→ (cursor advance)	Moves the active cursor to the next unprotected character position to the right. If held down, moves active cursor to the right until released.
← (cursor backspace)	Moves active cursor to next unprotected character position to the left. If held down, moves active cursor to the left until released.
↓ (cursor down)	Moves active cursor down to next unprotected character position. If held down, moves active cursor down until released.
↑ (cursor up)	Moves active cursor up to next unprotected character position. If held down, moves cursor up until released.
HOME	Returns both cursors to column 1 of line 41.
INS CHAR	Press to illuminate/extinguish. When illuminated, permits additional characters to be inserted into existing display messages. Existing data shifts to the right as new characters are entered at active cursor.
PAGE EDIT	Press to illuminate/extinguish. Works with the INS CHAR and DEL CHAR keys. When illuminated, all characters from the active cursor to the last unprotected character position of the field shift. When extinguished, all characters from the active cursor to the last unprotected character of the active line shift.

Figure 19-4. Display/Keyboard Unit Keys (Sheet 1 of 3)

KEY	FUNCTION
DEL CHAR	Deletes character at active cursor; existing data shifts to the left.
CR	Causes carriage return character to be displayed.
LF	Causes line feed character to be displayed.
RETURN	Causes carriage return and line feed characters to be displayed a returns active cursor to first unprotected character position on ne line.
SPACE Bar	Moves active cursor to first unprotected character position on sar line.
DUP	In the wideband mode, duplicates the character that is at the inacti cursor in the upper field to the active cursor position in the low field.
PROC	Causes DKU to operate with TMPS (depending on position display/keyboard switch).
WB	Causes DKU to operate with UHF wideband modem (depending position of display/keyboard switch).
XMIT	In PROC mode, transmits data to the processor. In WB moc transits data to the wideband modem.
RESET	Resets DKU system logic circuits to a quiescent state and stops a data transmissions in progress from the DKU.
ERASE ENAB	Enables erase functions when used with appropriate erase key.
BL ERASE	Erases all unprotected characters on the bottom line of the lower fie and returns both cursors to first unprotected character of Line 4
LINE ERASE	With ERASE ENABLE key, erases the character at the active curs and all unprotected characters following in that line.
SCRN ERASE	With ERASE ENABLE key, erases all data on the display.
PAGE ERASE	With ERASE ENABLE key, erases character at active cursor a all unprotected characters following in the field.
PARITY ALARM	Illuminates if invalid parity is received on any character. Press to re alarm.
SCROLL HLD	Press to illuminate. When illuminated, holds data displayed on upp field. Automatically disabled after 10 seconds or when data buf is 90% full.

Figure 19-4. Display/Keyboard Unit Keys (Sheet 2 of 3)

KEY	FUNCTION
SCROLL HLD RST	Resets scroll hold function.
PAGE ROLL ENAB	Press to illuminate. When illuminated, enables rewrite of upper field with contents of data buffer or first 30 lines of data buffer.
ROLL	When PAGE ROLL ENAB is set, causes one line at a time to be rolled from the data buffer to the upper field.
PAGE ROLL RST	Resets PAGE ROLL ENAB key.
LAMP TEST	Activates all indicators on the keyboard.
DSS LPR	Displays system status on line printer.
DMC MDC	Displays message catalog on upper field.
LPA LPR	Advances line printer two lines.
DMC LPR	Displays message catalog on line printer.
DEM MDC	Displays stored EAMS on upper field.
SDI VR1	Sets and removes diagnostic inhibit for VERDIN receive terminal 1.
SDI VR2	Sets and removes diagnostic inhibit for VERDIN receive terminal 2.
SDI VR3	Sets and removes diagnostic inhibit for VERDIN receive terminal 3.
SDI VDG	Sets and removes diagnostic inhibit for VERDIN transmit terminal. **Note** Inhibit function is set at IPL, allowing only MSK and EAM FSK message traffic from the VERDIN to be processed by the TMPS (No diagnostic outputs).
XMT ABORT	Clears messages in queue for transmission prior to execution of the VER command.
DSS MDC	Display system status on upper field.
PDR VR1	Display paged message from VERDIN receive terminal 1.
PDR VR2	Display paged message from VERDIN receive terminal 2.
PDR VR3	Display paged message from VERDIN receive terminal 3.
DATA KEYS	The data keys are an alphanumeric keyboard set. The SHIFT key selects the upper character set, and the LOC key locks the keyboard in shift. When the RPT key is held down and any subsequent alphanumeric key or the space key is pressed, the character repeats until RPT is released.

Figure 19-4. Display/Keyboard Unit Keys (Sheet 3 of 3)

MNEMONIC	DESCRIPTION	TRANSFER RATE
VFT1	VERDIN transmit channel 1	75 baud
VFT2	VERDIN transmit channel 2	50 baud
VFT3	VERDIN transmit channel 3	50 baud
TST2	TSEC 2 transmit	75 baud
TST3	TSEC 3 transmit	75 baud
WBT1	Wideband transmit	75 baud
NBT1	Narrowband transmit	75 baud
VRX1	VERDIN receive terminal 1	50 baud
VRX2	VERDIN receive terminal 2	50 baud
VRX3	VERDIN receive terminal 3	50 baud
TSR1	TSEC 1 receive	75 baud
TSR2	TSEC 2 receive	75 baud
TSR3	TSEC 3 receive	75 baud
NBR1	Narrowband receive channel 1	75 baud
NBR2	Narrowband receive channel 2	75 baud
NBR3	Narrowband receive channel 3	75 baud
WBR1	Wideband receive	75 baud
JFR1	DC jackfield receive 1	50 baud
JFR2	DC jackfield receive 2	50 baud
JSW1	TDM jackfield source switch 1	50 or 75 baud
JSW2	TDM jackfield source switch 2	50 or 75 baud
JSW3	TDM jackfield source switch 3	50 or 75 baud
JSW4	TDM jackfield source switch 4	50 or 75 baud
MDCT	Message display transmit (processor output to DKU upper field)	2400 baud
CCT1	Command control transmit (processor output to DKU lower field)	2400 baud
LPTR	Line printer	2400 baud
PGP1	Page printer 1	75 baud
PGP2	Page printer 2	75 baud
RPF1	Reperforator 1	75 baud
RPF2	Reperforator 2	75 baud
RPF3	Reperforator 3	75 baud
MDCR	Message display receive (DKU upper field input to processor)	2400 baud
CCR1	Command control receive (DKU lower field input to processor)	2400 baud
KBD1	Keyboard 1	50 or 75 baud
KBD2	Keyboard 2	50 or 75 baud
TDR1	Transmitter distributor 1	50 or 75 baud
TDR2	Transmitter distributor 2	50 or 75 baud
VFDG	VERDIN transmit diagnostic	50 baud

Figure 19-5. Mnemonic Descriptions and Transfer Rates

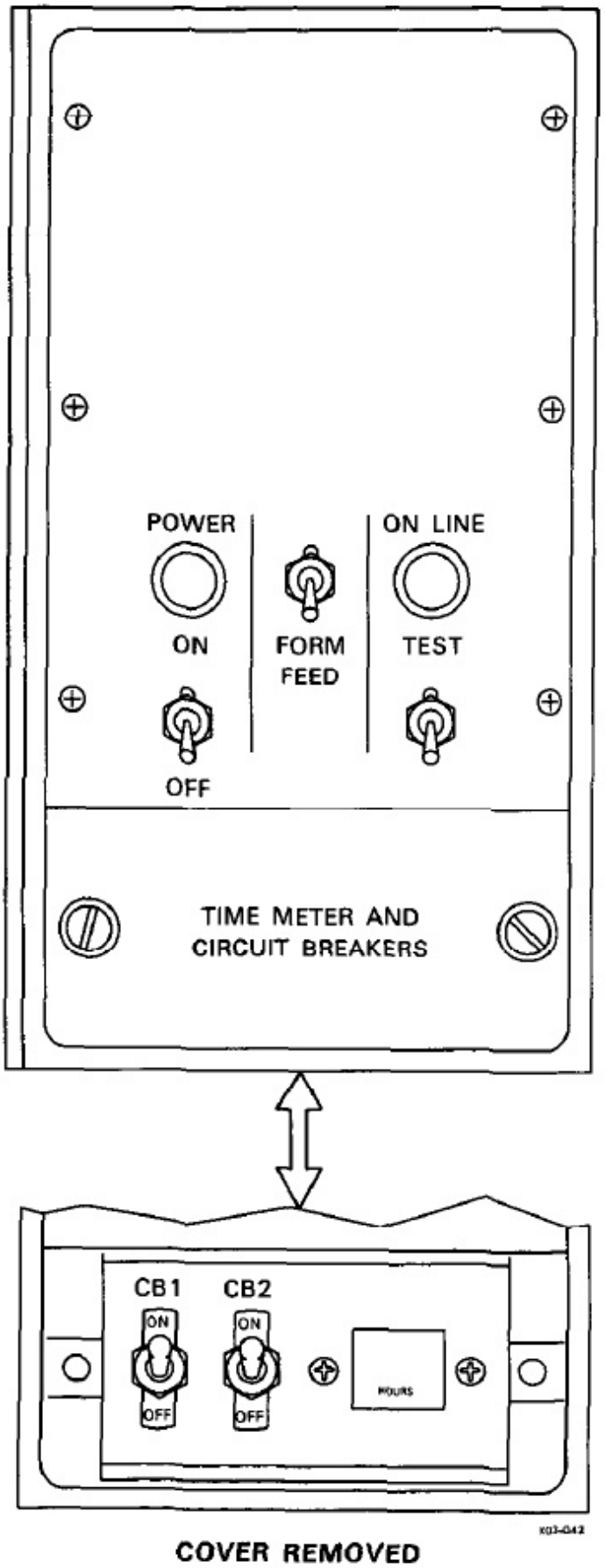


Figure 19-6. Line Printer Control Panel

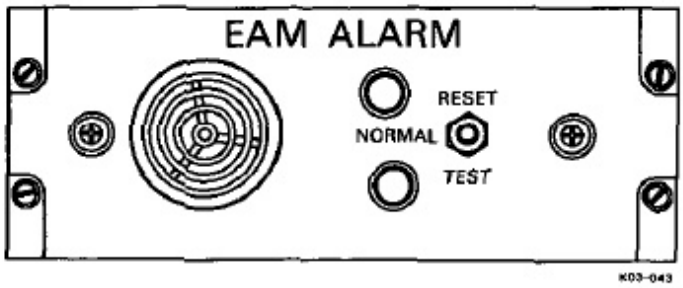


Figure 19-7. EAM Alarm (BZ-220)

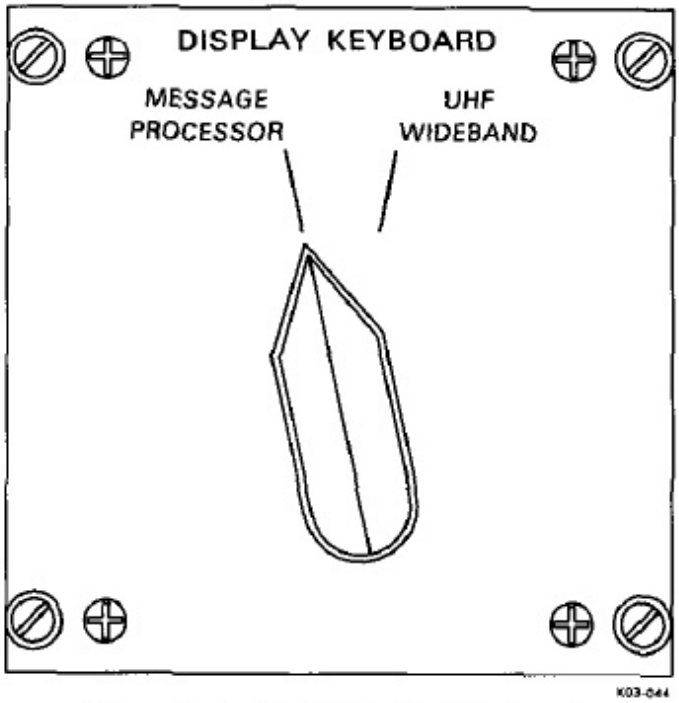


Figure 19-8. TMPS Display Keyboard Switch (C-11570)

19.3 SEAT ONE EQUIPMENT POWER SOURCES

Figure 19-9 lists the power sources for equipment associated with the TMPS operator position, including the type of electrical power, and the circuit breaker location/label.

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
CW Key Control	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, -24 VDC SUPPLY
	115V, 60 Hz	60 Hz Distribution	60 HZ DISTRIBUTION PANEL, TTY EQPT GROUP 3
	28 VDC	MA 5 DC AFT Console	28 VDC DISTR 2 Panel, VLF PA CONT
TMPS Display/Keyboard Unit	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TMPS DSPL KYBD
EAM Alarm	28 VDC	MA 5 DC FWD Console	28 VDC DISTR 1 Panel, TMPS EAM ALARM
Line Printer	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TMPS LINE PTR
Message Processor	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TMPS MSG PRCSR
Message Processor Control	28 VDC	MA 5 DC FWD Console	28 VDC DISTR 1 Panel, TMPS PRCSR CONT

Figure 19-9. Seat One Equipment Power Sources

19.4 SEAT ONE PREFLIGHT

19.4.1 Station Oxygen/ICS Preflight

1. ICS CSU — Checked.

   a. All volume controls — CCW.

   b. PTT switch — ICS.

   c. ICS selector switch — ALL.

   d. ICS volume switch — Midrange.

   e. TEST switch — Pressed.

      Set VOL control for comfortable level and speak into microphone. Ensure voice sidetone is present in headset and all lamps illuminate on the CSU and ACU. Release TEST switch, all lamps extinguish.

2. Oxygen, ICS — Checked.

   a. Mask visual check — Complete.

      Check hose, mask, and regulator for cleanliness and damage. Verify oxygen mask is connected.

   b. SUPPLY lever — ON.

   c. Emergency lever — TEST MASK.

      Hold mask facing away from yourself. Hold emergency lever to the TEST MASK position, then release.

   d. Microphone check — Complete.

      Verify mask MIC works with ICS.

   e. Diluter lever — 100 percent OXYGEN.

   f. Emergency lever — EMERGENCY.

      Positive pressure should be indicated.

   g. Emergency lever — NORMAL.

      Breathe for a minimum of three cycles. The blinker should show alternately black and white. Hold breath momentarily (Blinker should remain black). Pressure should be 290 to 430 psi.

   h. SUPPLY lever — OFF.

19.4.2 TMPS Preflight. Perform the following to prepare the TMPS for operation:

1. Circuit breakers — Checked.

   All breakers closed (in) or banded/tagged (open).

2. DISPLAY KEYBOARD switch — MESSAGE PROCESSOR.

3. Line printer — Checked.

   a. Internal circuit breakers — Closed.

   b. POWER switch — On.

      POWER and ON LINE indicators illuminate.

   c. TEST switch — Up.

      Hold for ten seconds; each character should print in all locations forming a spiral pattern. ON LINE indicator will extinguish during test and illuminate when switch is released.

4. EAM ALARM — Checked.

   Move panel switch to TEST and verify audible alarm. Set switch to RESET and release to NORMAL position.

5. DKU — Set.

   a. POWER switch — ON.

      The screen separation line and the cursor should appear. The PARITY ALARM, PROC, and CURSOR 1 indicators illuminate.

   b. KEYBD READY key — Activated.

   c. LAMP TEST key — Depressed.

      Hold momentarily and verify all indicators illuminate.

6. Message processor control — Set.

   a. Power switch — ON.

      Verify POWER indicator illuminates.

   b. LAMP TEST — Depressed.

Hold momentarily and verify all indicators illuminate.

7. TMPS program — Loaded.

a. IPL Switch — Initiated.

INIT PROG LOAD (IPL) and PROC MEM CLEAR (PMC) lights flash during program loading. Verify following messages are printed on line printer and displayed on line printer:

```
THE EPROM SATISFIED ITS REGISTERS → & ← TESTS
THE EPROM SATISFIED ITS I/O RESET TESTS
THE EPROM SATISFIED ITS ADDRESS INCREMENT TESTS
```

Initial program load complete is denoted by receipt of "ENTER BASE NUMBERS AS, 123456,123456" message.

b. BASE NUMBER — Entered.

Verify "CK SUM NUMBERS ARE..." message appears. Depress XMIT key.

c. PARITY ALARM — Reset.

d. BL ERASE key — Pressed.

e. Diagnostic tests — As Required.

Verify EXECUTE DIAGNOSTICS? Y OR P message is displayed. Enter Y or P and press XMIT key. If Y, tests begin. If P is entered then tests are passed. If no entry is made for approximately 1 minute, TMPS will perform the diagnostic test. If diagnostic tests are selected, verify the results printed on line printer and displayed on screen as follows:

```
INSTRUCTION TESTS N PROCESS
ALL INSTRUCTION TESTS OK
MEM HI TST N PROCESS
MEM SLOTS A2A1-A2A12 OK
MEM LO TST N PROCESS
MEM SLOTS A1A11-A1A14 OK
RT CLK OK
I/O OK
```

f. TMPS display — Verified.

```
ARE YOU ORDERWIRE MODIFIED?
ENTER "Y" FOR YES OR ANY
CHARACTER FOR NO
```

g. "Y"— Entered

Press BL ERASE key, Y key, then XM key. Verify the following message:

```
ENTER REPERF OUTPUT SEQ/NO OF COPIES
A-MEECN MODE 8,9     /NO COPIES 1-9.
B-MEECN MODE 15      /NO COPIES 1-9.
C-28                 /NO COPIES 1.
D-MMPM               /NO COPIES 1.
ENTRY FORMAT A9B9C1D1
```

h. PROC MEM CLEAR indicator — Check

Verify indicator on processor control is ext guished.

i. Reperf tape format — Entered.

Enter desired format number on the k board, and verify the following message pears: "TMPS VER X MOD .X ON-LINE

Note

The version and modification numbers in the message will change with programs currently in use.

The TMPS program contains a set of system m agement commands to control the TMPS. Comma may be entered to the TMPS from the lower field the DKU by bracketing the command with the curs and pressing the XMIT key. Commands may be in from any local input circuit by preceding the co mand with a three-character sequence C:[space], following the command with NNNN (upper-fi command entry requires only C:[space], cursor bra eting, and pressing XMIT key.) Entered comma cause a response message to be output to the D lower field; the message is an acknowledgment if e cuted (commanded EXC followed by the comm MNEMONIC), or an error message if not execu Refer to the current issue of the TMPS user's gu for the TMPS command functions, mnemonic form and input/output circuits that are available for transfer.

Note

Teletype equipment (KBD-1, 2; PRT-1, 2; reperforators 1, 2, 3; TD-1, 2) must be connected to the TMPS on the TDM control/display for processor access.

19.5 SEAT ONE POSTFLIGHT

Postflight procedures should be performed any time seat one equipment has been energized prior to leaving the aircraft, or expected loss of aircraft power.

All seat one equipment shall be secured and zeroized in such a manner as to prevent any compromise of classified information. Station shall be sanitized to ensure all classified information has been properly removed and stowed prior to exiting the aircraft.

The aircraft shall be clean and all stations properly secured (i.e., seats facing station with seatbelts fastened neatly, armrests down).

19.5.1 Station Oxygen/ICS Postflight

1. Oxygen — NORMAL, 100 percent OXYGEN, SUPPLY OFF.

2. CSU PTT selector — ICS.

19.5.2 Keyline Control Selector Switches — OFF

19.5.3 TMPS Shutdown. Anytime the TMPS is to be secured, prior to the removal of power from the system, all classified messages shall be removed from memory.

1. Processor memory — Zeroized.

   Execute ZRO command in accordance with current version of the TMPS users guide.

2. PROC MEM CLEAR indicator — Extinguished.

   May remain illuminated for several minutes while processor memory is zeroized.

3. Display/keyboard power switch — OFF.

4. Line printer power switch— OFF.

5. Message processor control power switch — OFF.

CHAPTER 20

Seat Two Position — Preflight, Operation and Postflight

20.1 SEAT TWO POSITION RESPONSIBILITIES

Seat two is responsible for the preflight, operation and postflight of the TACAMO teletype subsystem and the UHF radio equipment. This position is primary operator of the teletype equipment and controls the operation and modes of the UHF-3, UHF-4, and UHF-5 subsystems.

20.2 TELETYPE SUBSYSTEM

The teletype subsystem affords secure or nonsecure FSK-TTY communications and provides a manual backup to the TMPS. It consists of the TTY data modem, keyboards, printers, transmitter distributors, reperforators, takeup reel, and TSEC-1, -2 and -3.

20.2.1 TTY Equipment. The TTY equipment consists of two TTY keyboard/printers, three reperforators, and two TDs.

20.2.1.1 Keyboard/Printer (AN/UGC-129(V)-1). The SSTTY set is a self-contained microprocessor controlled duplex set (refer to Figure 20-1).

20.2.1.1.1 Keyboard Controls and Indicators. The keyboard assembly controls allow the operator to draft, transmit, store, edit, and print pages. Refer to Figure 20-2 for the keyboard and Figure 20-3 for the Keyboard Assembly mode controls and indicators.

a. Baudot Mode. When the SSTTY is in the Baudot mode, the keyboard generates Baudot code signals. The Baudot signals for BLANK, SPACE, FIGURES, and LETTERS are generated with the CTL and NULL, SPACE, CTL and SO, and CTL and SI keys respectively. Upper case H generates the # signal.

20.2.1.1.2 Page Printer Assembly. The page printer assembly is comprised of the following elements: power supply, printer, microprocessor, minimum of 8K memory, signal conditioning, gating, driver circuits, and character display. The text mem provides for on-line and off-line storage of message te The page printer assembly prints the ASCII 64 charac subset plus selected acronyms. The page printer asse bly can be operated separately from the keyboard sembly as a receive only device.

a. Page Printer Assembly Controls and In cators. The page printer controls and indicators us frequently are mounted on the page printer front pa (Figure 20-4). Refer to Figure 20-5 for page prin controls and indicators. Those controls and indicat used less frequently are mounted on the page prin internal panel (Figure 20-6). Refer to Figure 20-7 fo description of TTY interface controls.

20.2.1.2 Reperforator (TT-192). The reperfora (Figure 20-8) requires 50 vdc, 20 mA input pov supplied by the TDM to operate the selector magnet c The reperforator operates at 65, 71, and 107 words minute. A speed selector is located under the top cov The reperforators are located in the forward cons (P20), bay 6.

20.2.1.2.1 Takeup Reel. A takeup reel is loca next to reperforator 3 and is used to wind tape as i perforated. When a tape is properly wound through capstan and onto the reel, the action of the reperfora generating tape will release tension on the capstan a allow the reel to turn.

20.2.1.3 Transmitter-Distributor (TT-187). T TDs (Figure 20-8) connect to the TDM through Ba rate converter cards. The TD contact requires 20 mA operation, and the clutch coil requires a 50 vdc, 100 m TD step. Both are supplied by the TDM. The TD op ates at the Baud rate of 75. Two Baud-rate cont circuits allow transmission from the TD to the TD loop at either 50 or 75 Baud. The TDs are located in forward console (P20), bay 6.

20.2.2 Data Modem (TE-204A-4). The data mod (Figure 20-9), in R/T rack bay 4, is a full-dupl

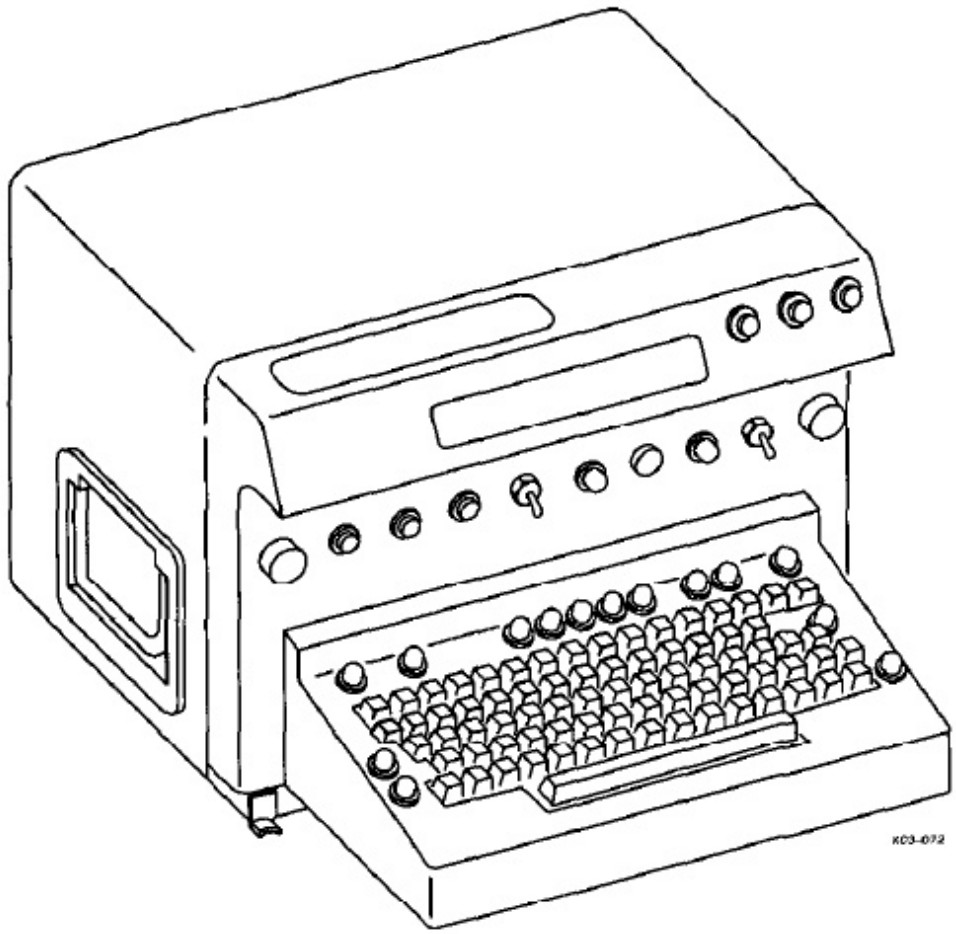


Figure 20-1. SSTTY Keyboard/Printer (AN/UGC-129)

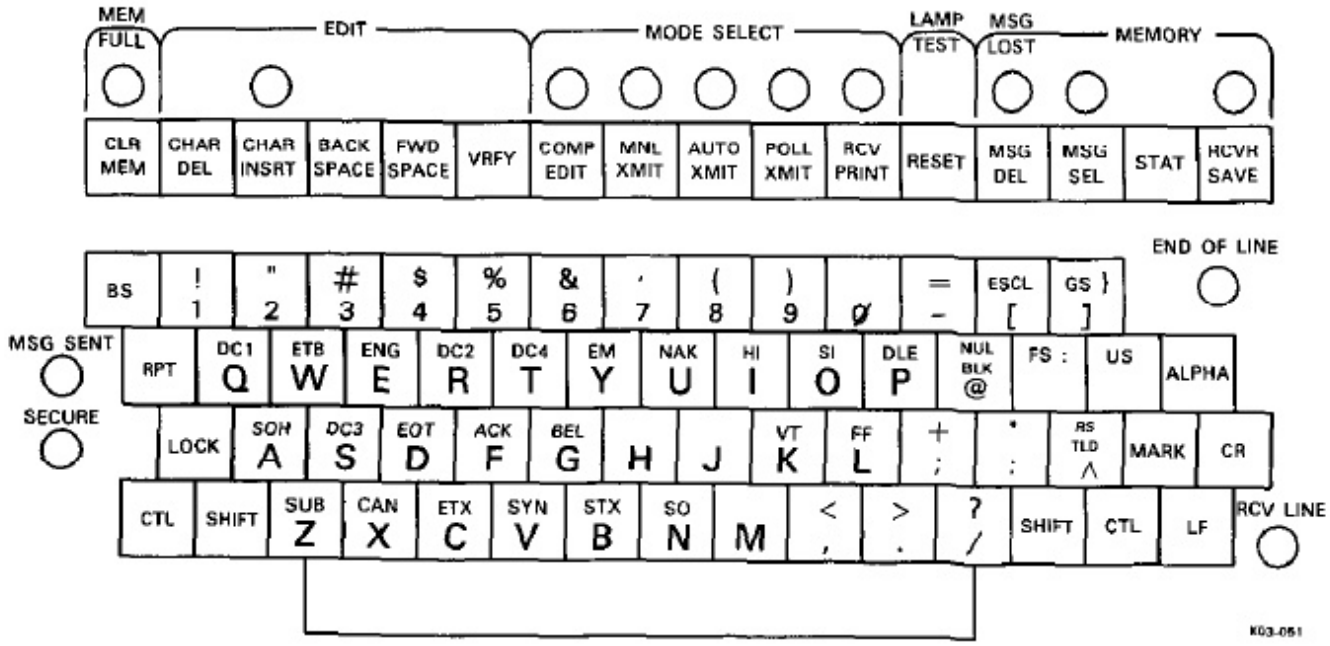


Figure 20-2. SSTTY Keyboard

CONTROL/INDICATOR	FUNCTION
FULL Indicator (Yellow)	Indicates text memory is full.
CLR MEM Key	Used to erase entire contents of text memory when depressed i conjunction with CTL key.
CHAR DEL Key	Used in edit mode to delete characters from stored text.
CHAR INSRT Key and Indicator (Green)	Used in edit mode to insert additional characters in stored text.
BACK SPACE Key	Used in edit mode to move the display cursor backward onc characte at a time during editing.
FWD SPACE Key	Used in edit mode to move display cursor forward one character a a time during editing. Forward space function is auto-repeating if hel depressed.
VRFY Key	Used in edit mode to obtain printed hard copy of the contents of th selected message for verification. Printing can be interrupted an restarted by depressing the VRFY key as desired.
COMP EDIT Key and Indicator (Green)	Selects mode used to compose and store messages into text memor from the keyboard assembly or to verify and edit messages stored i memory. CHAR DEL, CHAR INSRT, BACKSPACE, FWI SPACE and VRFY controls can only be active when compose/edi mode is selected.
MNL XMIT Key and Indicator (Green)	Selects mode used to transmit data directly from the keyboar assembly.
AUTO XMIT Key and Indicator (Green)	Selects mode used to automatically transmit a message stored in tex memory. This control can be used to generate an RY series tes message pattern. COMP EDIT key is depressed first, then CTL i depressed and held while AUTO XMIT is depressed. RY pattern i transmitted if teletypewriter set is connected into communicatio system.
POLL XMIT Key and Indicator	Not used.
RCV PRINT Key and Indicator (Green)	Selects mode used to disable printing for all modes of operation excep printing receive messages or for verification of stored messages.
LAMP TEST/RESET Key	Used to disable any previously selected modes except for RCV SAVE mode. Illuminates all indicators and display pixels while hel depressed for lamp test.

Figure 20-3. SSTTY Keyboard Mode Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
MSG LOST Indicator (Yellow)	Indicates received message has exceeded length of available memory and has overwritten previously stored message or, if no room is available for storage, the received message has been lost.
MSG DEL Key	Used to erase the selected message from memory, MSG DEL must be depressed after CTL is depressed and held.
MSG SEL Key and Indicator	Used to assign message numbers to the contents of memory or to select messages for transmission, verification, or editing.
STAT Key	Used to review memory status. When depressed, the printer responds with a list of message origin and remaining number of segments available.
RCVR SAVE Key and Indicator (Green)	Used to route incoming messages to memory. Message numbers are automatically assigned in this mode.
MSG SENT Indicator (White)	Indicates completion of message transmission from memory.
SECURE Indicator (Yellow)	Not used.
END OF LINE Indicator (Yellow)	Illuminates five characters prior to selected end of line.
RCV LINE Indicator (White)	Illuminates when receive data is on line. Blinks to indicate receive line open in current loop interface mode only.

Figure 20-3. SSTTY Keyboard Mode Controls and Indicators (Sheet 2 of 2)

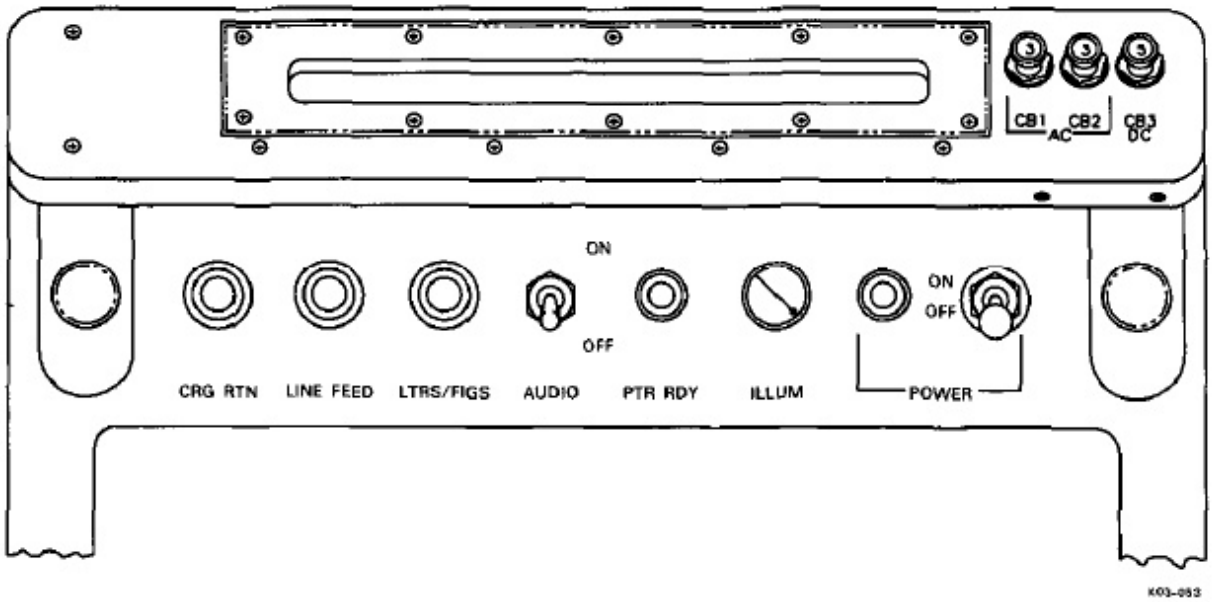


Figure 20-4. SSTTY Page Printer Front Panel

CONTROL/INDICATOR	FUNCTION
CRG RTN Pushbutton	Used to return printhead to the left margin position.
LINE FEED Pushbutton	Used for paper advancement.
LTRS/FIGS Pushbutton	Used to shift from letters to figures or figures to letters durin reception of Baudot.
ILLUM Control	Controls intensity of the lamp used to illuminate the printing are
PTR RDY Indicator (Green)	Indicates that printer is ready to print. Remains on until power removed or equipment malfunctions.
POWER Indicator (Green)	Indicates that power is on.
POWER Switch	Controls input power to power supply.
AUDIO Switch	Enables/disables audio alarm.
ADDRESS Selectors (AFSATCOM) (Not on some units)	Not used.
CB1, CB2, CB3 Circuit Breakers	CB1 and CB2 protect ac power input lines. CB3 (dc power) is not use

Figure 20-5. SSTTY Page Printer Controls and Indicators

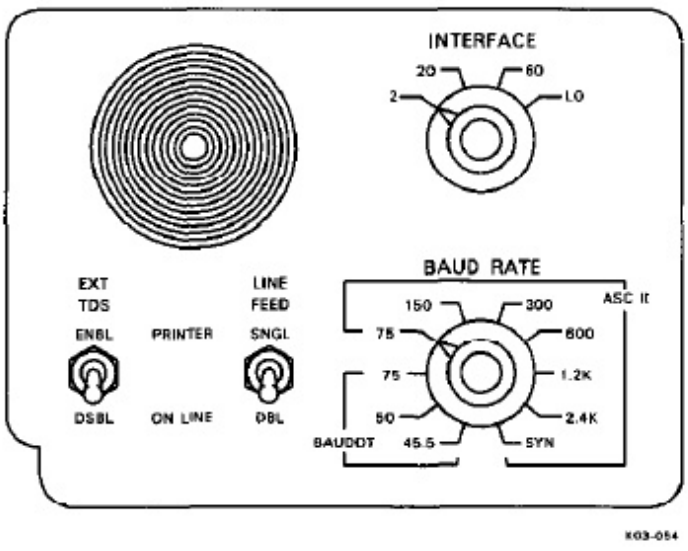


Figure 20-6. SSTTY Page Printer Internal Panel

CONTROL	FUNCTION
BAUD RATE Selector	Allows the operator to select data rates and data format in either ASCII or Baudot code. ASCII data code is available in asynchronous, synchronous (AFSAT), or isosynchronous (KG-30) data format. Baudot format is asynchronous. In receive operation, the BAUD RATE position selected must match the data rate, code, and format of the incoming message.
EXT TDS Toggle Switch	Used for enabling (ENBL) address switches. When disabled (DSBL), locks out address code and prints all incoming messages. Used with AFSATCOM. Currently not used.
LINE FEED Toggle Switch	Used to select local single (SNGL) or double (DBL) line feed.
INTERFACE Selector	Controls signal level interfacing between the external source and the SSTTY. In receive operation, the INTERFACE position selected must match the signal level of the incoming message.

Figure 20-7. SSTTY Page Printer Internal Panel Controls

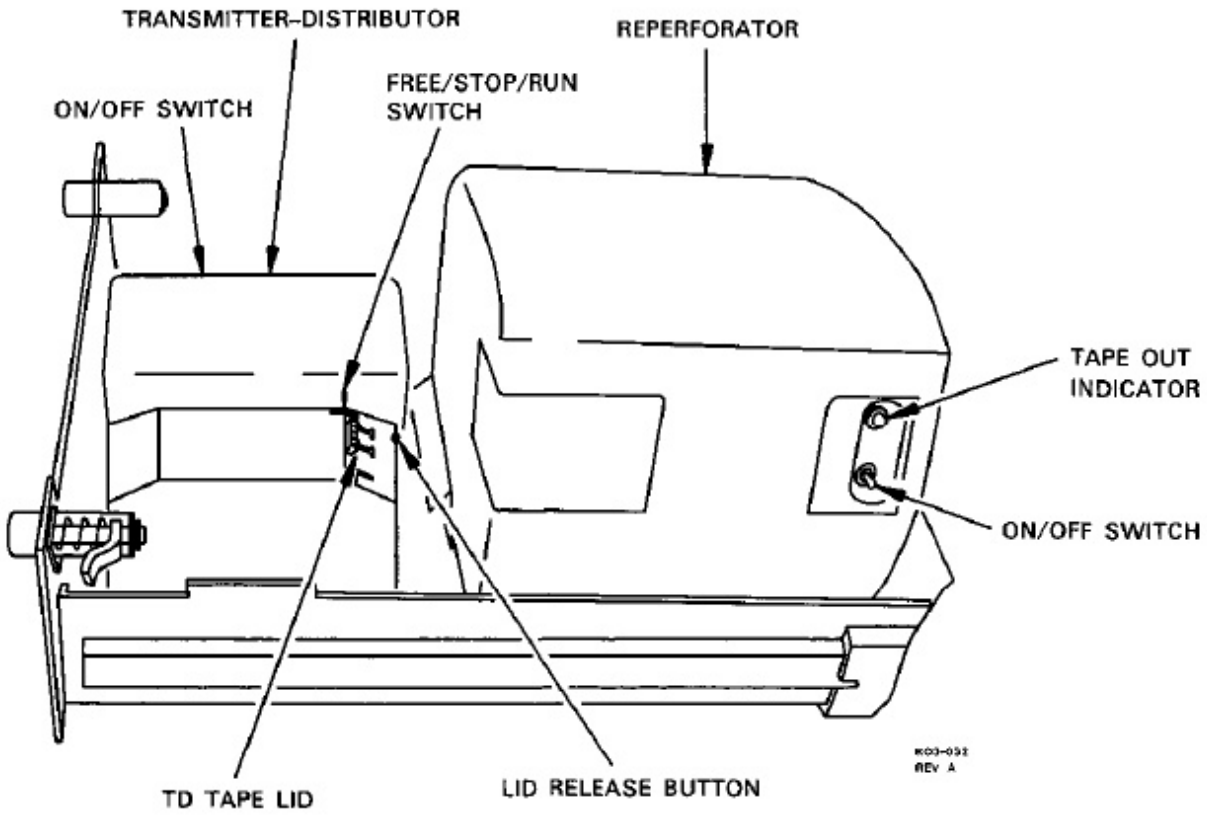


Figure 20-8. TTY Reperforator/TTY TD (TT-192/TT-187)

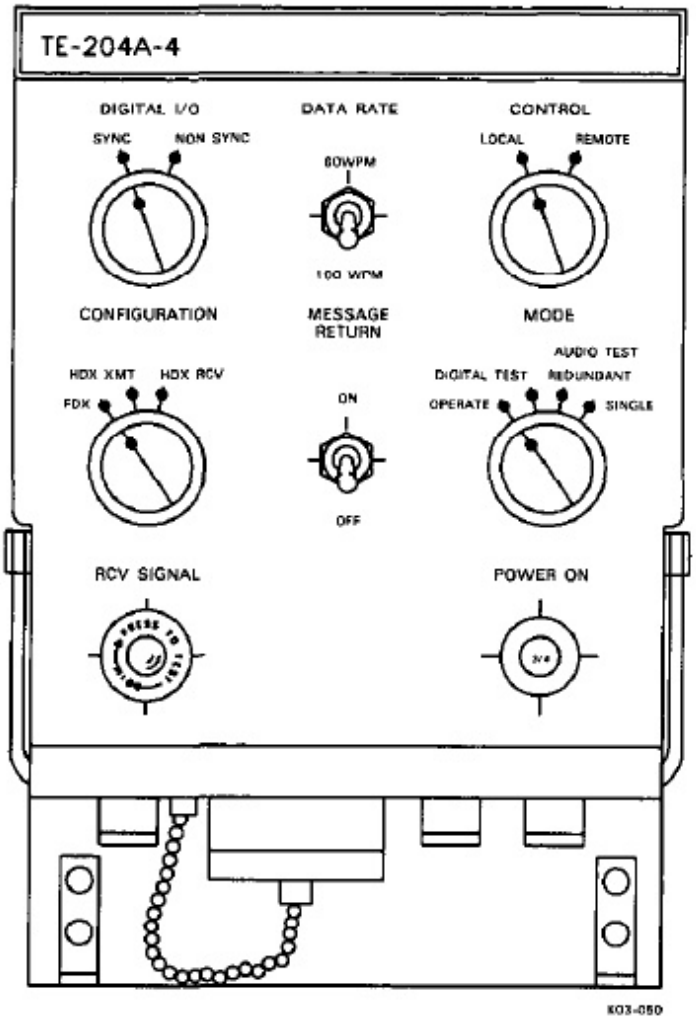


Figure 20-9. Data Modem (TE-204A-4)

automatic, synchronous/nonsynchronous FSK data modulator-demodulator. It converts TTY signals from the dc jackfield and load jacks into four FSK tones that modulate a HF or UHF transmitter. The audio tones produced are divided into two mark tones (935 Hz, 1815 Hz) and two space tones (1375 Hz, 2255 Hz). The data modem converts UHF or HF receive FSK signals to polar (6 vdc) outputs that connect to dc jackfield source jacks. The data modem can also be used as a real time relay and as a regenerative repeater that regenerates a received dc signal to eliminate distortion (DIGITAL TEST position). Refer to Figure 20-10 for a description of the data modem controls and indicators.

20.2.2.1 Data Modem Modes of Operation. Before activating the SSTTY system equipment, the operator must ensure that the controls on the data modem are properly set for the desired operation mode. Figure 20-11 lists the controls and their proper settings.

20.2.3 Baudot-to-Morse Converter (CV-2939). The Baudot-to-Morse converter (Figure 20-12) accepts Baudot (TTY) characters and transforms them to the CW equivalent Morse-code characters. The opera lects the converter for keying input to the VLF trans at the CW key control. The CW key control routes 1 60 Hz and connects the key closure output fro Baudot-to-Morse converter to the keyline input transmitter when in the TTY position. The Baudo to the converter can come from any TD or ke (connected through the TDM). The operator patch selected TTY source to the converter at the dc jac For TD operation, once the punched-paper tape is s the speed of the TD is controlled automatically Baudot-to-Morse converter. For keyboard operatic operator must monitor the audio output of the cor while typing and adjust the typing speed to the sp the converter. Morse code (key closure) output converter goes to the CW key control, where it can b to key the VERDIN modulator for VLF transm Converter audio sidetone output can be monitored ICS by use of the CW CONV control. Morse code output from the converter is also applied to the jackfield where it can be patched to other equipme monitored. The Baudot-to- Morse converter has tw erating controls. The DOT LENGTH control var speed in WPM of the converter; the SIDETONE L control varies the loudness of the converter's audio

20.2.4 TTY Security Sets (KG-84C). Three security sets (TSEC-1, -2, -3) contain equipment sary to process TTY signals for secure transmiss reception. The TTY security sets (Figure 20-1 used when transmitting and/or receiving encrypt TTY and UHF PSK. The TSEC units (KG-84 installed in the comm central equipment cor TSEC-1 is located in bay 3, while TSEC-2 and located in bay 5. Refer to Figure 20-14 for a desc of TTY security set controls and indicators.

Note

- TSEC-1 is hardwired for receive only.
- For security reasons, details of the TTY security sets are not covered in this manual. Refer to KAO-210 (current) fo TSEC principles of operation.

20.2.5 FSK Keyer/Demodulator CV-3888) 3 FSK keyer/demodulators have dual functions; vide demodulation of frequency shift keying si and the conversion of high level neutral/polar te input data to FSK output signals. Each unit cons a keyer that converts ±6 Vdc teletype signals to ±425 Hz audio signal and a converter for conv 2000 ±425 Hz audio signals to ±6 Vdc. Filter c determine the frequency shift and Baud rate for th demodulator. The FSK keyer/demodulator is set

CONTROL/INDICATOR	FUNCTION
DIGITAL I/O Switch	
SYNC Position	Selects synchronous data processing.
NON SYNC Position	Inhibits synchronous data processing.
DATA RATE Switch	Selects the data modem to accept nonsynchronous input data rate at 60 or at 100 words per minute.
CONTROL Switch	
LOCAL Position	Used for normal operating position.
REMOTE Position	Not used. The data modem has no remote control.
CONFIGURATION Switch	
FDX Position	Selects data modem to simultaneous transmit and receive operation.
HDX XMT Position	Selects data modem transmit operation only.
HDX RCV Position	Selects data modem receive operation only.
MESSAGE RETURN Switch	Permits data retransmission when set to ON.
MODE Switch	
OPERATE Position	Enables normal data paths through the modem.
DIGITAL TEST Position	Connects digital transmit and receive circuits back-to-back and the audio circuits are bypassed. This position causes distorted incoming signals to be regenerated before decription.
AUDIO TEST REDUNDANT Position	Not used.
AUDIO TEST SINGLE Position	Routes received serial data through the digital and audio modem transmit circuits then back through the audio and digital receive circuits.
RCV SIGNAL Indicator (Amber)	Illuminates to indicate reception of useful data.
POWER ON Switch	Applies power to the data modem when pressed on.

Figure 20-10. Data Modem Controls and Indicators

CONTROL	POSITION
DATA MODEM OPERATION	
Switches	
DIGITAL I/O	As required (TSEC – SYNC, TTY – NON SYNC)
DATA RATE	RATE REQUIRED
CONTROL	LOCAL
CONFIGURATION	FDX
MESSAGE RETURN	OFF
MODE	OPERATE
Circuit breaker	
POWER ON	Pushed in
TTY REGENERATIVE REPEATER	
Switches	
DIGITAL I/O	SYNC
DATA RATE	RATE REQUIRED
CONTROL	LOCAL
CONFIGURATION	FDX
MESSAGE RETURN	OFF
MODE	DIGITAL TEST
Circuit breaker	
POWER ON	Pushed in
DATA MODEM RELAY	
Switches	
DIGITAL I/O	NON-SYNC
DATA RATE	RATE REQUIRED
CONTROL	LOCAL
CONFIGURATION	FDX
MESSAGE RETURN	ON
MODE	OPERATE
Circuit breaker	
POWER ON	Pushed in

Figure 20-11. Data Modem Operation Control Settings

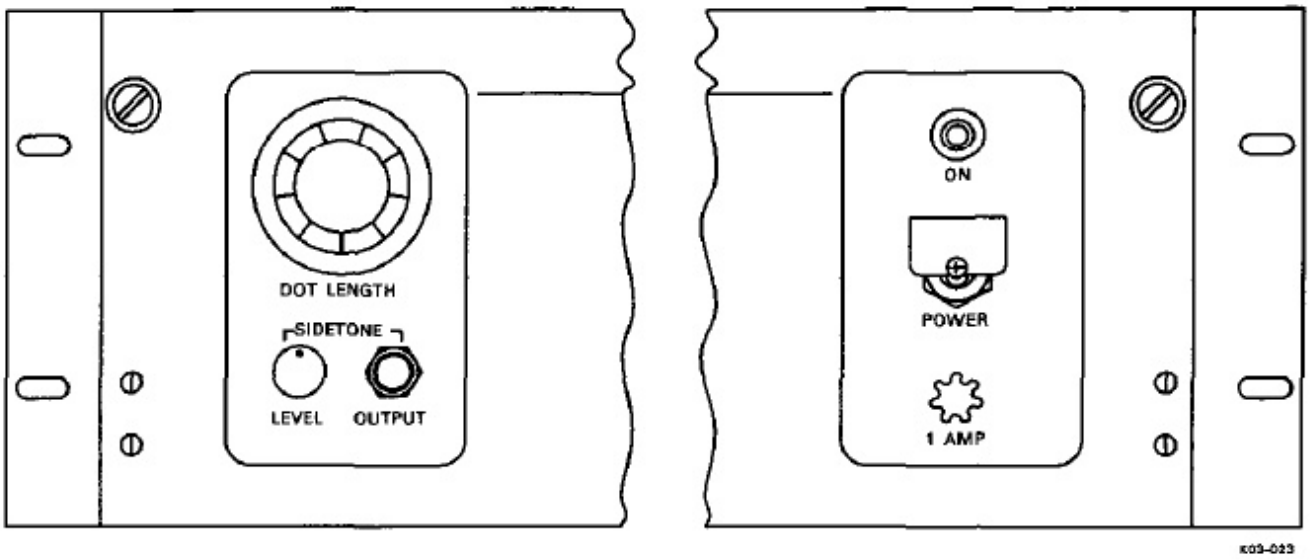


Figure 20-12. Baudot-to-Morse Converter (CV-2939)

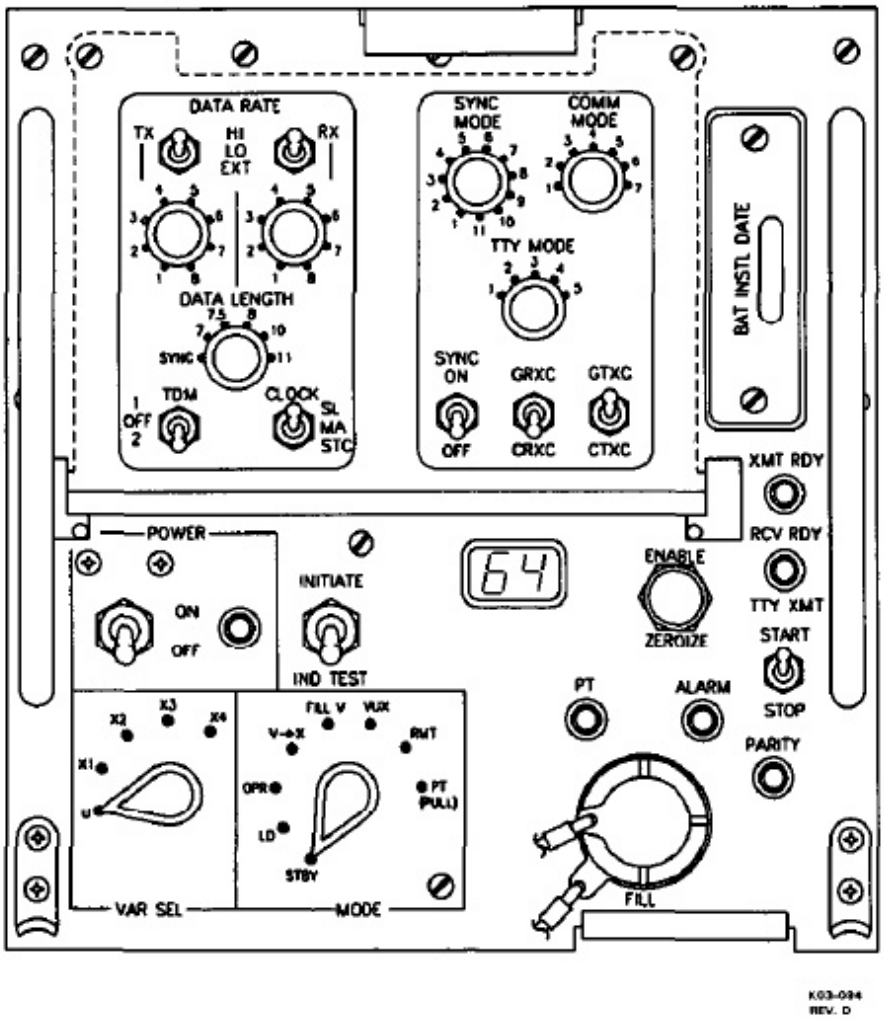


Figure 20-13. TTY Security Sets (KG-84C)

CONTROL/INDICATOR	FUNCTION
VISIBLE CONTROLS	
POWER Switch	Applies power to the KG-84C when set to ON.
POWER Indicator (Green)	Illuminates when power is applied and ENABLE/ZEROIZE switc is set to ENABLE.
INITIATE/IND TEST Switch	
INITIATE Position	Performs the function set by the MODE switch.
Center Position	Off
IND TEST Position	Illuminates all indicators and increments update counter.
Update Counter LED Indicator	With a good fill, indicates 00 and increments by 1 with each updat of the traffic encryption key (TEK) or key encryption key (KEK)
ENABLE/ZEROIZE Switch	
ENABLE Position	Guarded (mechanical lock) for normal operations.
ZEROIZE Position	Zeroize all key storage locations and removes power from KG-84(when switch handle is pulled out and down.
XMT RDY Indicator (Amber)	Illuminates when KG-84C is transmitting. Also is constantl illuminated when SYNC MODE position 5 is selected. Blinks whe sync transmission is in process.
RCV RDY Indicator (Amber)	Illuminates when KG-84C is receiving. Also remains illuminate when SYNC MODE position 5 is selected. Blinks when a sync ha been detected.
TTY XMT START/STOP Switch	Enabled only in internal simplex mode (COMM MODE at positio 5 and TTY MODE at position 4).
START Position	Places unit in transmit mode and initiates synchronization whicl allows the unit to process incoming plain text for transmission.
STOP Position	The unit will indicate the end of a locally transmitted message to remote KG-84C, switches from transmitter to receiver, and await resynchronization.
Center Position	Off
PARITY Indicator (Red)	Blinks to indicate that fill parity is good when transferring a key fron a fill device to the KG-84C and when transferring keys within th KG-84C. When this light stays on, a parity error (bad fill) ha occurred.

Figure 20-14. TTY Security Sets Controls and Indicators (Sheet 1 of 3)

CONTROL/INDICATOR	FUNCTION
ALARM Indicator (Red)	A crypto-alarm is present when illuminated and traffic should not be sent.
PT (Plain Text) Indicator (Red)	Illuminates when either in the plain text maintenance mode or in the plain text header mode used with TDM 1 or 2.

Note

Input data is being passed to transmitter unencrypted when PT indicator is illuminated.

FILL Connector	Provides fill interface for the KYK-13, KYX-15, and K0I-18.
MODE Selector	
STBY Position	COMSEC logic is disabled. A master reset is sent to all logic although the keys are retained.
LD Position	Enables a key to be loaded from a fill device to the TEK's location or in the location selected by the X-VAR switch position when the INITIATE switch is activated.
OPR Position	Allows the KG-84C to operate.
V → X Position	Causes the key stored in the V location to be transferred to the working storage and loaded into the TEK location selected by the X-VAR selector when the INITIATE switch is activated. An automatic resynchronization occurs when the MODE switch is activated or returned to the OPR position remote rekeying operation.
FILL V Position	Used only with rekeying operations and cannot be used to store future TEKs.
VUX Position	Causes update of the TEK selected by the X-VAR switch when the INITIATE switch is applied. To update more than once, the MODE switch must be moved from VUX to OPR and back to VUX with the INITIATE switch activated each time the MODE switch is in the VUX position for each update required.
RMT Position	Enables remote control of the front panel MODE switch, INITIATE/IND TEST switch, and the X-VAR switch.
PT Position	Enables plain text maintenance by passing of key generators. Plain text presented on the red side will be passed as plain text on the cipher text side of the equipment for troubleshooting the circuit only.

Note

Security violations will result if unit is operated in the PT position.

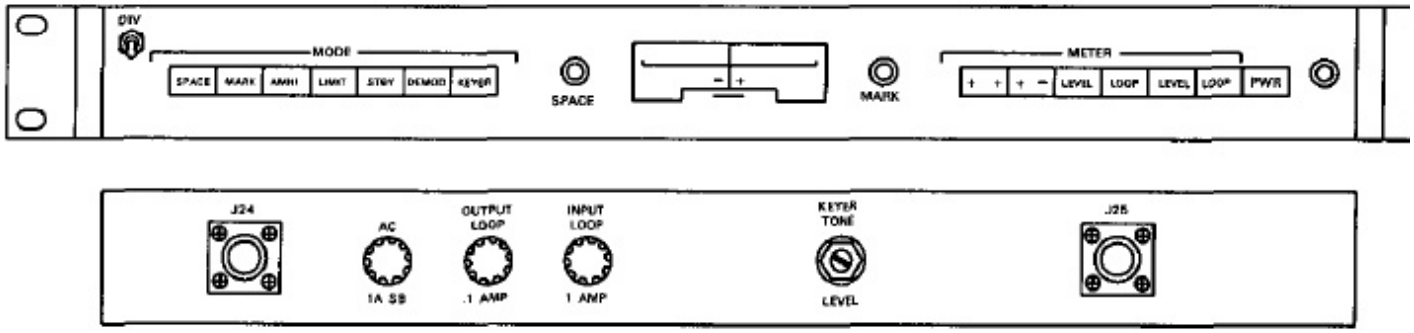
Figure 20-14. TTY Security Sets Controls and Indicators (Sheet 2 of 3)

CONTROL/INDICATOR	FUNCTION
VAR SEL Selector	Selects one of four TEK "X" locations or the KEK "U" for use witl the MODE switch LD position.
BAT INSTL DATE Plate	Covers 6.5V battery which allows key storage when unit is no powered up. Battery should be replaced six month from date show on cover plate.

Note

The concealed controls located behind the protective cover on the top half of the panel are used in tailoring the KG-84C for a specific communication system. Consult the KAO-210 for control functions when initially setting or changing control positions.

Figure 20-14. TTY Security Sets Controls and Indicators (Sheet 3 of 3)



REAR VIEW

Figure 20-15. FSK Keyer/Demodulator (CV-3888)

Baud operation with a center frequency of 2000 Hz, and a mark-space frequency shift of 425 Hz. The front panel (Figure 20-15) controls and indicators are explained in Figure 20-16.

20.3 UHF RADIOS

Comm central UHF satellite communications are provided by three UHF transceivers; UHF-3, UHF-4 and UHF-5. Associated equipment for the UHF transceivers include UHF transmit antenna control (UHF-4 and -5), UHF receive antenna switch controller, UHF receive antenna control, and UHF loop test translator. Figure 20-17 presents a simplified block diagram of the UHF antenna subsystem.

20.3.1 UHF Transmit Antenna Control (SA-1676). UHF-4 and -5 satellite RT transmit antenna selection is provided by the UHF transmit antenna control (Figure 20-18). When the satellite is near the horizon, one of the monopole antennas (UHF-5, -6, or -7 selected either manually or automatically. In autom operation, the aircraft provides roll reference from inertial reference system via the digital-to-analog c verter (DAC) 2 primary. Setting the ANTENNA LECTOR switch to AUTO automatically selects monopole antenna that is most vertical. Setting the A TENNA SELECTOR switch to LEFT, CTR, or RIG manually selects the left, center, or right monopole an nas. The DIPOLE antenna is also manually selected. respective antenna indicator lights when selected.

20.3.2 UHF Receive Antenna Switch Contro (CP-1694). UHF-3, -4, and -5 satellite receive ante selection is made by the UHF receive antenna sw controller located in R/T bay 4. The optimum ante selection is based on digital and analog data from aircraft inertial reference system via the digital analog converters, timing pulses from the FTS, information from the satellite data board. The U

CONTROL/INDICATOR	FUNCTION
DIV Toggle Switch	Provides HF diversity selection between the top two demodulator units when both units are selected. Used when reception is weak or poor quality. On the lowest unit, this switch does not function.
MODE Switches	
SPACE	Disables mark channel when depressed.
MARK	Disables space channel when depressed.
AMHI	Commands mark-hold circuit to place data output in mark state when either mark or space channel(or both) has a signal loss.
LIMIT	Activates the limiter circuit and provides 30 dB minimum additional gain.
STBY	Places demodulator loop in steady mark state.
DEMOD	Selects correct mark-space polarity at demodulator output.
KEYER	Selects correct mark-space polarity at keyer output.
Note	
With a DEMOD or KEYER switch depressed, a mark-low polarity is selected.	
METER Switches	
+ +	Used to tune receiver to a FSK signal. Receiver is properly tuned when meter shows maximum deflection and minimum oscillation.
+ -	Used to indicate input signals by deflecting meter to the right for mark and left for space.

Figure 20-16. FSK Keyer/Demodulator Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
LEVEL	Used to monitor input level of demodulator signal. Normal leve 0 dBM.
LOOP	Used to monitor current in demodulator high level output loop.
LEVEL	Used to monitor output signal level from tone keyer. Meter calibrated to 0 dBM.
LOOP	Used to monitor current in tone keyer high level input loop.
PWR Switch	Used to control power to FSK keyer/demodulator.
Power Indicator (Red)	Indicates when unit is on.
MARK Indicator (Red)	Indicates when demodulator detects a mark signal higher th mark-hold level.
SPACE Indicator (Red)	Indicates when demodulator detects a space signal higher th mark-hold level.
KEYER TONE LEVEL Adjustment (Rear apron)	Permits adjustment of tone keyer output level.

Figure 20-16. FSK Keyer/Demodulator Controls and Indicators (Sheet 2 of 2)

receive antenna switch controller operates in one of four modes:

1. Automatic primary; using digital and analog data from inertial reference system via DAC 1 primary.
2. Automatic secondary; using analog data from inertial reference system DAC 2 alternate and with manual position entered every 10 minutes.
3. Manual antenna selection mode.
4. Clock failure mode; with manual time entry each minute.

20.3.3 UHF Receive Antenna Control (C-10066/A). The UHF receive antenna control (Figure 20-19) displays or enters data from/to the UHF receive antenna switch controller. Refer to Figure 20-20 for a description of the controls and indicators.

20.3.4 UHF Loop Test Translator (CV-3221). The UHF loop test translator (Figure 20-21) and associated equipment permits operators to test the UHF satellite equipment transmit and receive signal paths.

20.3.4.1 Controls and Indicators. The SIC CALIBRATE meter shows signal level of th output. The two-position MODE SELECT swit lects UHF-5 WB or UHF-4 NB mode for ANT ANT 2 LOOP tests.

Note

For loop test antenna 1 and 2, preset fre quencies A, B, or C only must be used with UHF-4 and UHF-5.

The LOOP TEST push-button selects:

1. ANT 1 — On air test loop.
2. ANT 2 — Nonradiating test loop using d load.
3. ANT 3 — Energizes test signal for recei tenna test (not used).

The LVL SELECT (DBW) switch adjusts RF in 3 dB steps from 90 to 120 DBW (settings 150 are on the unit). LEVEL ADJUST control a meter indication to midscale (clockwise rotati creases RF gain).

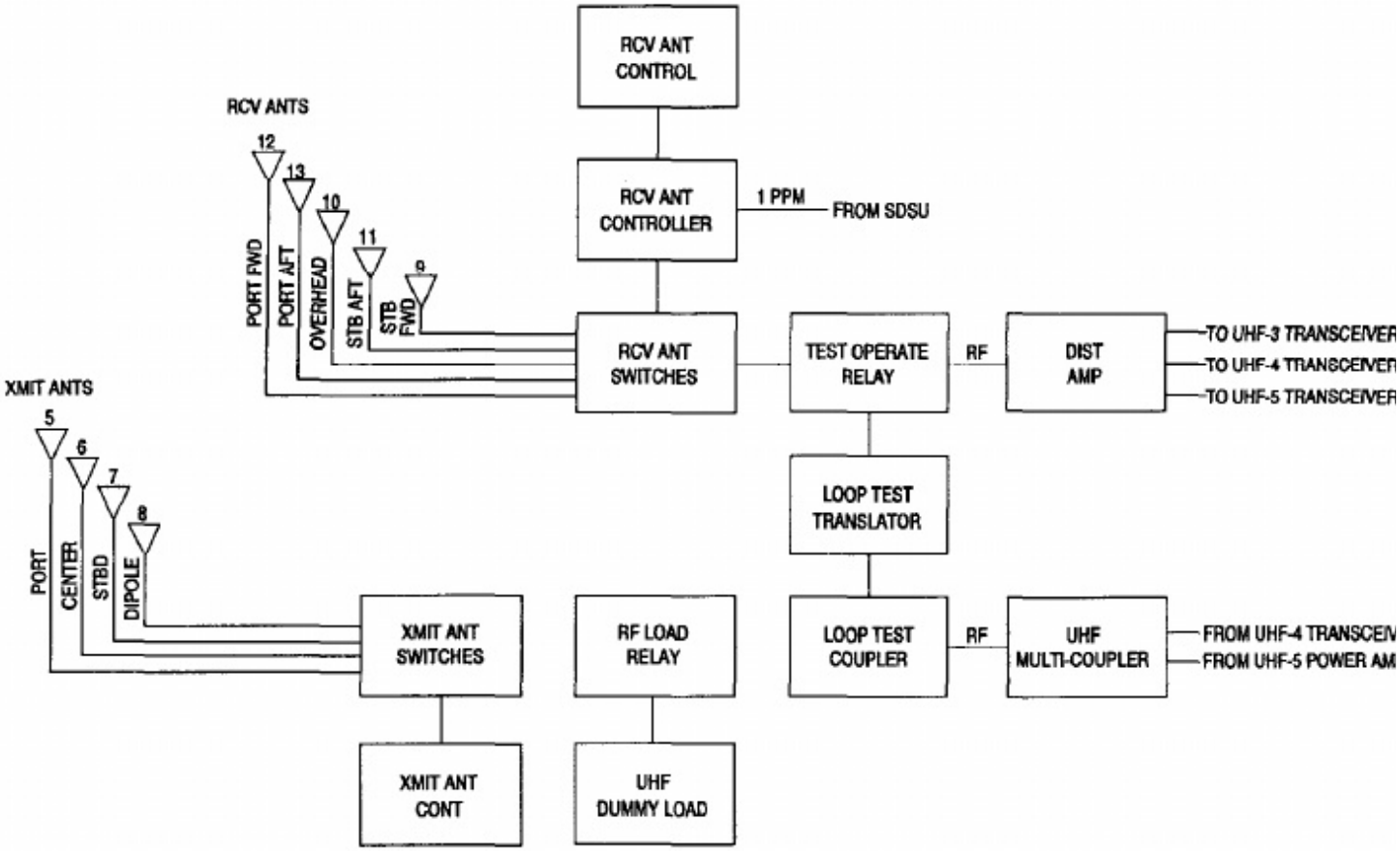


Figure 20-17. UHF-Antenna Subsystem Block Diagram

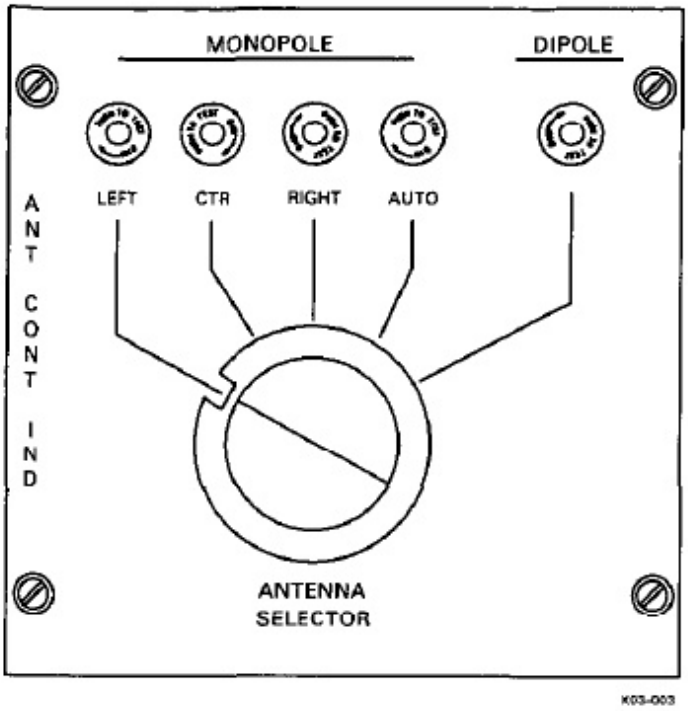


Figure 20-18. UHF Transmit Antenna Control (SA-1676)

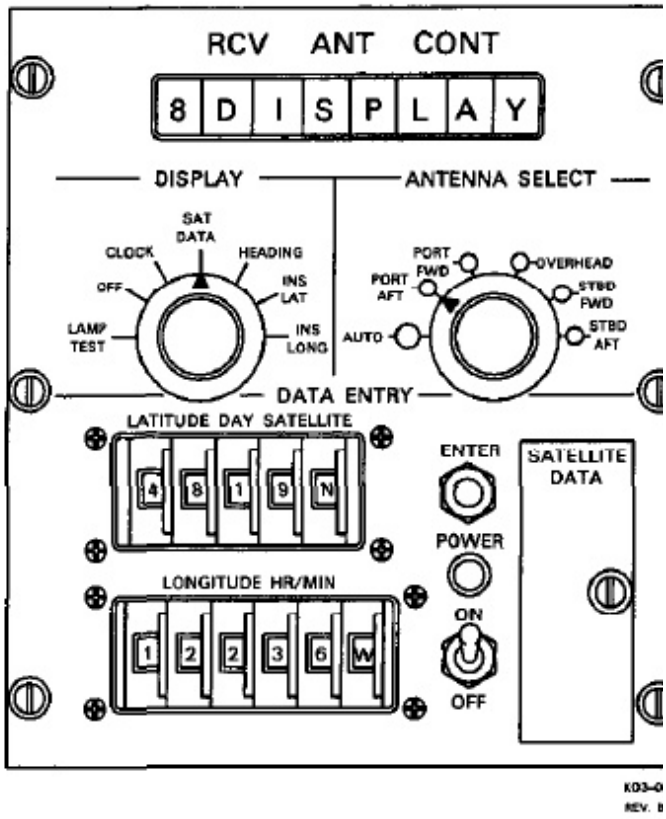


Figure 20-19. UHF Receive Antenna Control (C-10066/A)

CONTROL/INDICATOR	FUNCTION
8 Digit Display	Displays data selected by the DISPLAY switch.
DISPLAY Selector	
LAMP TEST Position	Illuminates the five antenna select indicators and 8-digit display.
CLOCK Position	Displays Julian day (0-366) and time in hours and minutes.
SAT DATA Position	Displays name of satellite.
HEADING Position	Displays aircraft true heading in degrees and minutes.
INS LAT Position	Displays aircraft latitude in degrees, minutes, and north or south.
INS LONG Position	Displays aircraft longitude, in degrees, minutes, and east or west.

Figure 20-20. UHF Receive Antenna Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
ANTENNA SELECT Switch	
AUTO Position and Indicator (Green/Red)	Used to select the primary (normal) mode of operation. The system will automatically select the most effective of the 5 UHF receive antennas. The indicator at the respective antenna select switch position will illuminate. The AUTO indicator illuminates green when switch system is operating normally. When red, indicates a switch system fault or incomplete startup procedure.
PORT AFT Position and Indicator	Used to manually select UHF 13 antenna in the port aft wing pod. Indicator identifies antenna is selected.
PORT FWD Position and Indicator	Used to manually select UHF 12 antenna in the port forward wing pod. Indicator identifies antenna is selected.
OVERHEAD Position and Indicator	Used to manually select UHF 10 antenna on top of the fuselage. Indicator identifies antenna is selected.
STBD FWD Position and Indicator	Used to manually select UHF 9 antenna in the starboard forward wing pod. Indicator identifies antenna is selected.
STBD AFT Position and Indicator	Used to manually select UHF 11 antenna in the starboard aft wing pod. Indicator identifies antenna is selected.
LATITUDE-DAY-SATELLITE Thumbwheel Switches	Enters latitude (five positions), Julian day (three left-hand positions), and satellite number (single left-hand position).
LONGITUDE-HR/MIN Thumbwheel Switches	Enters longitude (six positions) or Greenwich mean time in hours and minutes (four left-hand positions).
ENTER Switch (Spring Loaded)	Used to enter data set on thumbwheel switches into the computer.
SATELLITE DATA Board	Used to enter satellite data.
POWER Indicator (Green)	Illuminates when power is applied to the control.
POWER Switch	Applies power to antenna control when set to ON.

Figure 20-20. UHF Receive Antenna Controls and Indicators (Sheet 2 of 2)

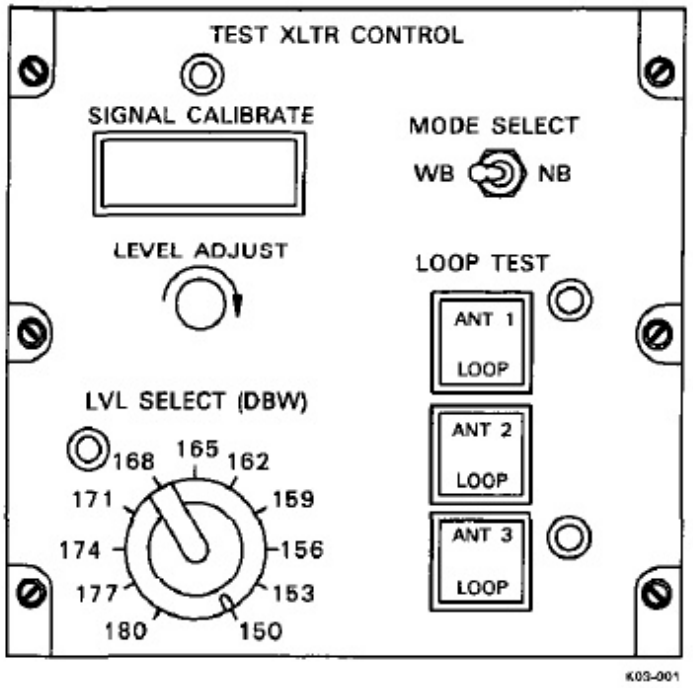


Figure 20-21. UHF Loop Test Translator (CV-3221)

Note

UHF-4 or UHF-5 must be keyed to adjust signal level.

20.4 UHF-3 SUBSYSTEM

The UHF-3 transceiver and associated equipment provide LOS AM voice or satellite (secure or nonsecure TTY) PSK receive capabilities. Refer to Figure 20-22 for a simplified block diagram of the UHF-3 subsystem.

20.4.1 LOS Mode. The UHF-3 LOS mode control panel is located at seat 4. Refer to Chapter 22.

20.4.2 PSK Mode. In the PSK mode (receive only), UHF-3 input comes from the selected receive satellite antenna. Frequency selection is controlled by the PSK modem control. The UHF-3 receiver output is applied to the PSK modem. The PSK modem output goes to the dc jackfield.

20.4.2.1 PSK Modem (MD-1135). The PSK modem performs two major functions: it demodulates a 1200 BPS encoded PSK channel and it selects one bit for output from each frame of 16 bits. Included in these functions are the detection and correction of frequency, phase, and symbol timing offsets and the obtaining frame alignment by detecting and repeating sync channel.

20.4.2.2 PSK Modem Control (C-10357). The PSK modem control (Figure 20-23) contains the controls and indicators (Figure 20-24) for the operation of the PSK modem. The control searches for and acquir the input signal, selects the receiver channel, and se the data rate.

20.5 UHF-4 SUBSYSTEM

The UHF-4 transceiver, NB modem, and associat equipment allow full duplex NB satellite encrypted/ u encrypted TTY communications. Transceiver power ar frequency are controlled with a UHF-4 satellite RT co trol. Transmit power output is 100 watts. A NB mode control selects a transmit and three receive channels. Tl EAM alarm is activated if the message preamble is re ognized by the modem. Two of the receiver outpu (ASCII data) are split by a PIC card that outputs to t TMPS and ASCII-to-Baudot (A/B) converters 1 and Receive channel 3 is routed directly to the TMPS. Tl output of the A/B converters is applied to the TD (UHF NB RCV 1,2). The transmit channel input sign originates at the TD or at the TMPS. The TDM signal routed through the Baudot-to-ASCII (B/A) convert and is applied to the NB modem transmit channel inpu Refer to Figure 20-25 for a simplified block diagram the UHF-4 subsystem.

20.5.1 Narrowband Modem Control (C-9693
The NB modem control (Figure 20-26) contains or transmit (XMTR) and three receive CHANNEL SELEC thumbwheel switches 1, 2, and 3. Each switch selects 1 12 positions. The RCVR BUSY indicator illuminat when the respective receive modem channel is busy. Tl FAULT indicator illuminates when a fault occurs with the UHF-4 transceiver, NB modem, satellite RT contro or modem control. The eight-position rotary TEST swit controls the following functions:

1. SYNC RCVR 1, 2, or 3 permits normal mode receive operations and monitors the fault lines.
2. LAMP tests indicators on the UHF-4 satellite R and modem controls.
3. CONT tests UHF-4 satellite RT and mode controls.
4. RT tests UHF-4 transceiver.
5. MODEM tests NB modem; the 3 RCVR BUS indicators illuminate.
6. KEY keys UHF-4 transmitter.

20.5.2 UHF-4 Satellite RT Control (C-9694A
The UHF satellite RT control (Figure 20-27) contro the Satellite mode and frequency of the UHF-4 tran ceiver. The six thumbwheels select usable alterna

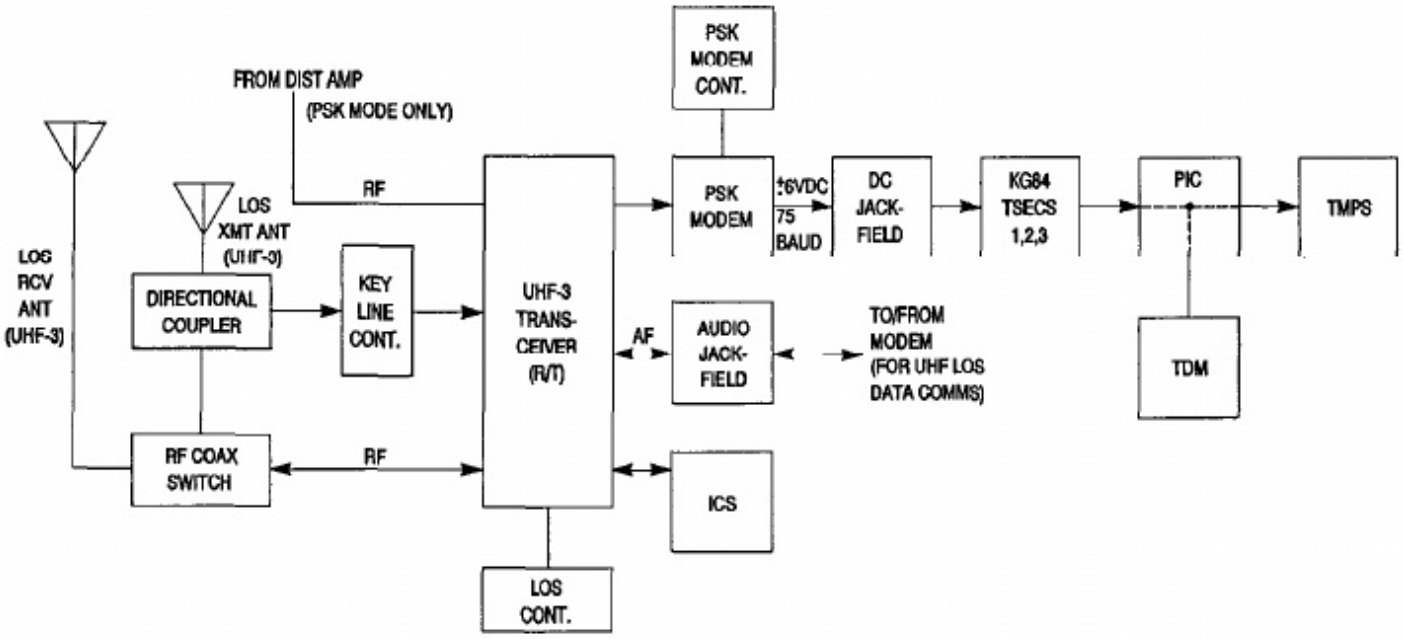


Figure 20-22. UHF-3 (PSK/LOS) System

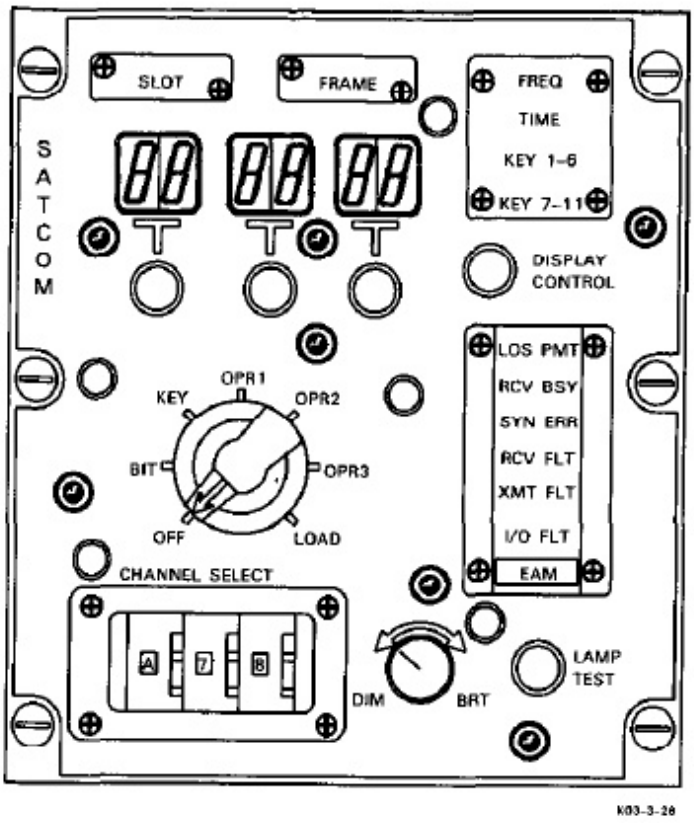


Figure 20-23. PSK Modem Control (C-10357)

frequencies from 225 to 399.995 Mhz, in 5 kHz incr ments. The green ON indicator illuminates when t mode selector is at SATL or ALTN XMT FREQ and t associated equipment is operating. The red FAULT i dicator illuminates when associated equipment contai a fault. The three-position rotary OFF/SATL/ALT XM FREQ selector controls power for the associated equi ment: the ALT XMT FREQ position is not used. T five-position SATL selector selects one of five satelli frequency plans: A, B, C, D, or E.

20.5.3 A/B, B/A Converters (CV-3389). The tw A/B and one B/A converters are located in the left si of the C1 rack. Figure 20-28 shows the controls a indicators on the A/B and B/A converters. The PW switch applies power to the respective converter a illuminates the ON indicator. Pressing the ADV swit generates an EOM signal that enables a readout of a data in the unit. The DATA IN indicator illuminat when input data is being processed. The DATA indicat illuminates when data storage has received about t percent of its capacity. The DATA OUT indicat illuminates when output data is being processed. T ALM indicator illuminates when input data contai two seconds or more of space, when the convert receives invalid data, or when data storage is full.

CONTROL/INDICATOR	FUNCTION
Mode Selector	
OFF Position	Removes normal power to the PSK modem and PSK modem control. Also removes UHF-3 transceiver power when operating in the satellite mode.
BIT Position	Initiates a built-in-test function for localizing faults.
KEY Position	Not used.
OPR 1 Position	Not used.
OPR 2 Position	Enables normal operation for PSK reception. Allows selection of PSK receive channel, frequency plan, and desired slot. When OPR 2 is entered, the SLOT indicator illuminates and the SLOT numeric indicators display 16. LOS operation will preempt PSK operation.
OPR 3 Position	Not used.
LOAD Position	Enables the six-digit display to serve as a real-time clock for update or display.

Figure 20-24. PSK Modem Controls and Indicators (Sheet 1 of 3)

CONTROL/INDICATOR	FUNCTION
LOS PMT Indicator (Amber)	Illuminates when control of the radio is preempted by the LOS control, which takes precedence over all other functions including the PSK function. When illuminated, a new request to transmit is ignored except when the mode selector is in the LOAD position.
RCV BSY Indicator (Amber)	When in the OPR 2 mode, illuminates on recognition of an acceptable preamble and remains on until the message is terminated. Does not illuminate when LOS PMT indicator is illuminated.
SYN ERR Indicator (Amber)	Illuminates when a PSK carrier is being detected in a selected channel and frequency plan and the TDM sychronization signal is not present. May illuminate momentarily if a channel is extremely noisy. Does not illuminate when LOS PMT indicator is illuminated.
RCV FLT Indicator (Amber)	Illuminates for the following receive mode faults: 1. PSK carrier not detected on selected plan and channel. 2. R/T fault signal present. 3. No phase lock on internal frequency synthesizer. XMT FLT will also illuminate in this case. Does not illuminate when LOS PMT indicator is illuminated.
XMT FLT Indicator (Amber)	Not used.
I/O FLT Indicator (Amber)	Illuminates for a fault affecting the I/O device, the memory unit, or the low power RAM detected during any operating mode. Clearing may be attempted by changing modes or pressing the DISPLAY CONTROL pushbutton.
EAM Indicator (Amber)	Not used.
LAMP TEST Pushbutton	When pressed, causes all indicators on the control panel to illuminate.
DIM/BRT Knob	Varies the brightness of indicators from full-on to full-off.
SLOT Indicator (Green)	Illuminates when the mode selector is in OPR 2 mode during PSK operation. Slot numeric indicators will display number (1 through 16) selected with pushbutton directly below.
FRAME Indicator (Green)	Illuminates when the mode selector is set to OPR 2 and the modem is in the timed state. The three numeric indicators under the FRAME indicator are always held to 000.

Figure 20-24. PSK Modem Controls and Indicators (Sheet 2 of 3)

CONTROL/INDICATOR	FUNCTION
CHANNEL SELECT	
Left Thumbwheel	Selects satellite plans A through M (I is not used) in OPR 2 mode Only positions A, B and C are used. When displayed on numeric indicators, letters will read as numbers (A=1, B=2, etc.).
Note Selecting any plan D through M will cause the modem to periodically blink the indicators on the panel.	
Center Thumbwheel	Selects the transmit channel. Not used for TACAMO.
Right Thumbwheel	Selects the receive channel (1 through 12) for use in OPR 2 mode. Receive channels 11 and 12 on plans A, B and C are equivalent to channel 10 of each plan.
DISPLAY CONTROL Pushbutton	Used to change numeric indicators depending on mode selector position: BIT – When a fault is detected and displayed, it can be used to make system resume testing. With some serious faults, testing will not continue and the number will remain displayed. OPR 2 – Used to alternately blank and display SLOT and FRAME numbers. The EAM alarm and indicator can be reset with the pushbutton. LOAD – Used to start and stop real time clock. Time is entered by stopping the clock then entering an advance time by using the three numeric display pushbuttons, and finally as reference time reaches display time, pressing the DISLAY CONTROL pushbutton. If the I/O indicator is illuminated, it will go out when the pushbutton is used in stopping the clock.
SLOT Pushbutton	Used to select the slot displayed in the numeric indicator above. Value increments with each push of the pushbutton unless it is held for more than one second which will cause it to auto-increment.
FREQ Indicator (Green)	Not used.
TIME Indicator (Green)	Illuminates when the mode selector is set to LOAD and the numeric indicators are displaying time of day.
KEY 1-6 Indicator	Not used.
KEY 7-11 Indicator	Not used.

Figure 20-24. PSK Modem Controls and Indicators (Sheet 3 of 3)

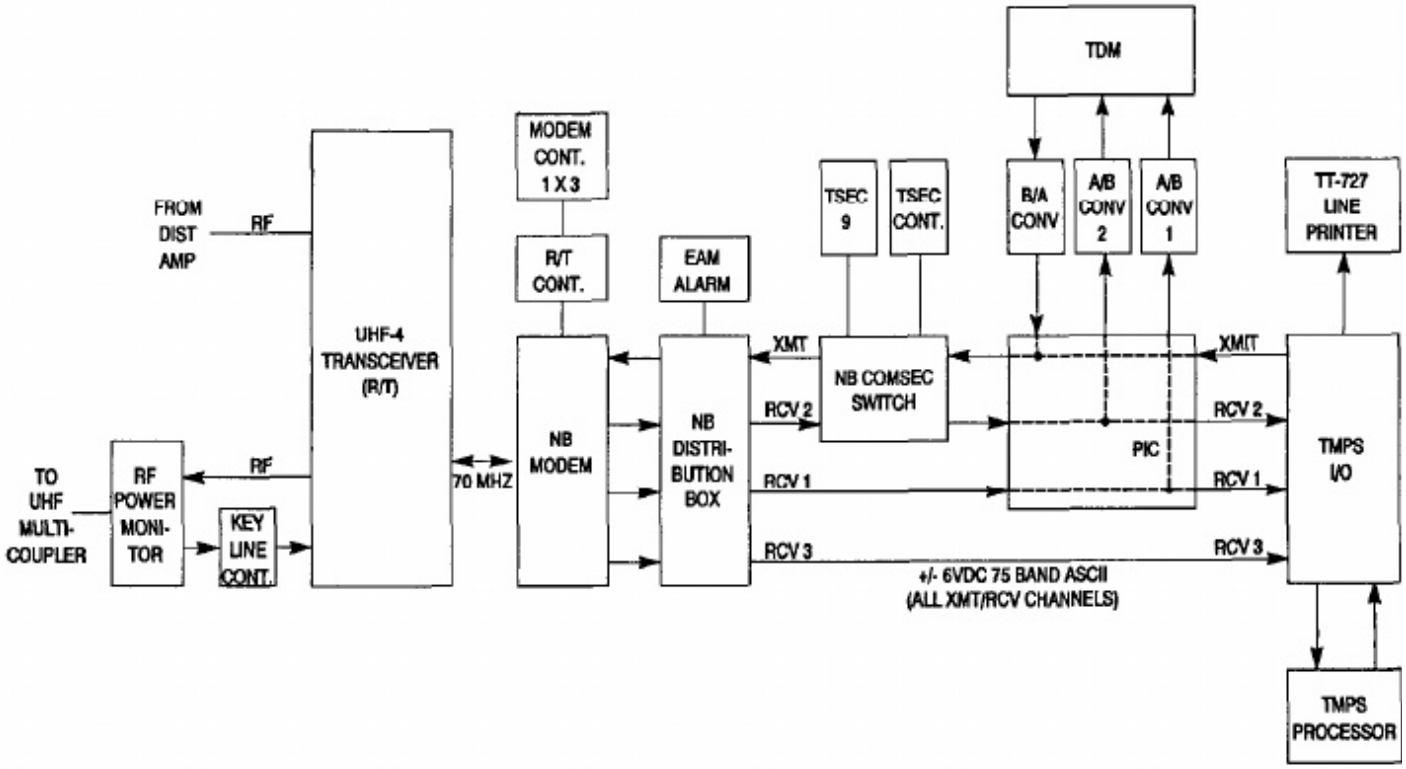


Figure 20-25. UHF-4 System

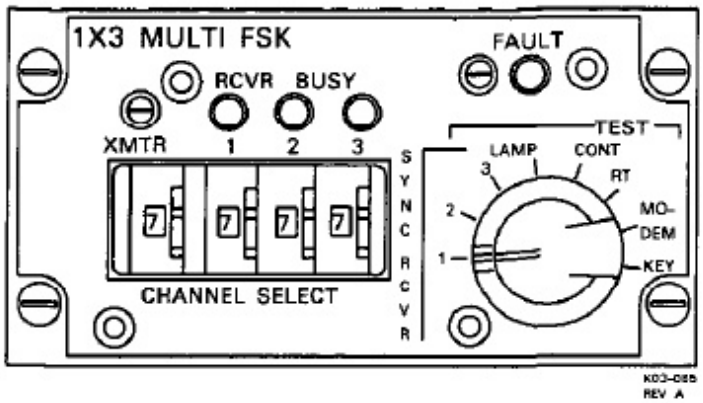


Figure 20-26. UHF-4 Narrowband Modem Control (C-9693)

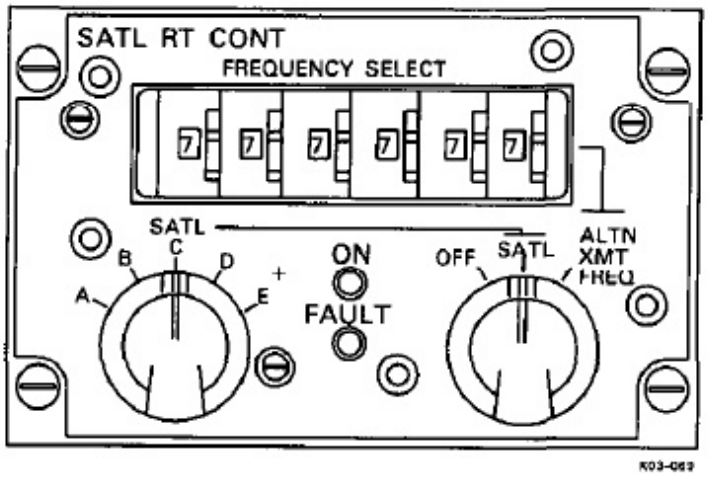


Figure 20-27. UHF-4 Satellite R/T Control (C-9694A)

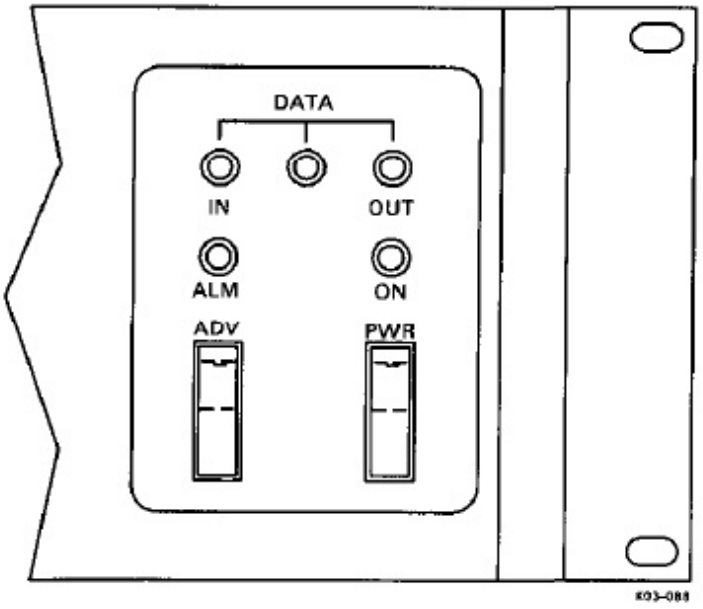


Figure 20-28. A/B, B/A Converter Controls and Indicators (CV-3389)

20.5.4 TSEC-9 (KG-33MI). TSEC-9 (Figure 20-29) encrypts and decrypts messages with a secure message preamble that have been routed through the NB COMSEC switch. Encrypted/decrypted messages are routed

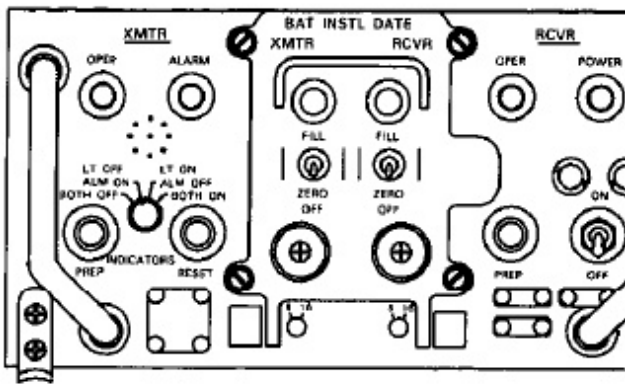


Figure 20-29. TSEC-9 (KG-33MI)

back to the NB COMSEC switch for processin required. Figure 20-30 describes the TSEC-9 con and indicators. Refer to KAO-137D for TSEC pr ples of operation. TSEC-9 and the NB COMSEC sv are located in the forward console (P20), bay 5.

20.5.4.1 Narrowband COMSEC Switch. The COMSEC switch interfaces the NB modem tran input and receive output with TSEC-9, based on a sage classification preamble. Encrypted message routed through TSEC-9 for encryption/decryption v nonsecure data bypasses the TSEC.

20.5.4.2 TSEC-9 Remote Control (C-9995). TSEC-9 remote control (Figure 20-31) applies pow the NB data buffer, zeroizes TSEC-9 receive and tran circuits, initiates TSEC-9 start sequence, and indi security faults. Refer to Figure 20-32 for a descriptic TSEC-9 remote control controls and indicators.

20.6 UHF-5 SUBSYSTEM

The UHF-5 transceiver and associated equipment mit satellite (nonsecure or encrypted TTY) full-du wideband communications. Refer to Figure 20-33 f simplified block diagram of the UHF-5 subsystem. transceiver contains a 100-watt transmitter power an fier. Transceiver power and frequency are controlle the UHF-5 satellite RT control. In the Receive mode transceiver converts FSK signals received from band-pass filter to 70 MHz IF data and routes it to WB modem. In the Transmit mode, the transceiver verts 70 MHz IF received from the WB modem to FSK signals. The FSK signals are routed to the PA transmission. If on, the UHF-5 PA increases UH transmit power output to 800 watts (power output the PA off is 100 watts). PA status is monitored at UHF-5 PA control.

20.6.1 UHF-5 PA Control (C-10115). The UH PA control (Figure 20-34) contains a READY ind tor that illuminates green when the PA is ready

CONTROL/INDICATOR	FUNCTION
XMTR OPER Indicator (White)	Illuminates when start sequence is complete and transmitter is ready to process data.
XMTR ALARM Indicator (Red)	Illuminates momentarily during alarm check cycle. Also illuminates continuously when a malfunction occurs.
FILL Indicators (Red)	Indicators go out upon successful completion of the fill tape loading sequence. Indicators remain on if a fill sequence is not successful, or if an alarm condition exists. Lamp will be illuminated when zeroized. There is a separate lamp for the receiver and transmitter.
ZERO Switches	Zeroizes the TSEC.
RCVR OPER Indicator (White)	Illuminates when start sequence is complete and receiver is ready to process data.
POWER Indicator (Green)	Illuminates when power switch is set to ON.
Left Circuit Breaker	10 AMP circuit breaker for ac and dc primary power protection.
Right Circuit Breaker	2 AMP circuit breaker for AC primary power protection.
ON/OFF Switch	Applies primary power to unit. Activates power indicator circuits, starts automatic alarm check sequence in transmitter, and prepares receiver.
RCVR PREP Switch	Initializes receiver circuits.

Figure 20-30. TSEC-9 Controls and Indicators (Sheet 1 of 2)

operation, a FAULT indicator that illuminates red when the PA has an internal fault, and a RESET pushbutton switch that resets the fault indicator.

20.6.1.1 PA Control Converter (SA-2106A). The PA control converter provides all the necessary interface circuitry required for the UHF-5 transceiver to drive the PA control. The serial-to-parallel converter converts the selected serial control line to parallel information for the PA control.

20.6.2 Wideband Modem Control (C-9689). In WB operation, UHF-5 receiver outputs and transmitter inputs connect to the WB modem. WB modem functions are controlled and monitored by the WB modem control (Figure 20-35). Refer to Figure 20-36 for a description of WB modem controls and indicators.

20.6.3 UHF-5 Satellite RT Control (C-9694A). The satellite control used with UHF-5 is identical to the unit used with UHF-4.

20.6.4 WIDEBAND COMSEC Switch. The WB COMSEC switch interfaces the WB modem transmit input and receive output with TSEC-4, based on a message classification preamble. Encrypted messages are routed through TSEC-4 for encryption/decryption while nonsecure data bypasses the TSEC.

20.6.5 TSEC-4 (KG-33MI). TSEC-4 equipment used for UHF-5 is identical to TSEC-9 used with UHF-4, and functions for UHF-5 WB in the same manner as it does for UHF-4 NB. The DISPLAY/KEYBOARD switch selectively connects the DKU or TMPS to the data buffer. The DISPLAY/KEYBOARD switch is covered in the TMPS section of this manual.

20.7 SEAT TWO EQUIPMENT POWER SOURCES

Figure 20-37 lists the power sources for equipment associated with the teletype equipment/UHF operator position, including the type of electrical power, and the circuit breaker location/label.

CONTROL/INDICATOR	FUNCTION
RCVR 8/16 Switch	Selects mode pattern frame length (8 or 16 bits) for receiver.
XMTR 8/16 Switch	Selects mode pattern frame length (8 or 16 bits) for transmitter.
XMTR RESET Switch	Initializes transmitter circuits.
Mode Selector Switch	Enables/disables audible alarm and front panel indicators.
BOTH ON	Enables audible alarm and front panel indicators.
BOTH OFF	Disables audible alarm and front panel indicators.
LT ON/ALM OFF	Indicators enabled, alarm disabled.
LT OFF/ALM ON	Indicators disabled, alarm enabled. Switch does not affect norma operation of remote indicators.
XMTR PREP Switch	Initiates new start sequence in transmitter.

Figure 20-30. TSEC-9 Controls and Indicators (Sheet 2 of 2)

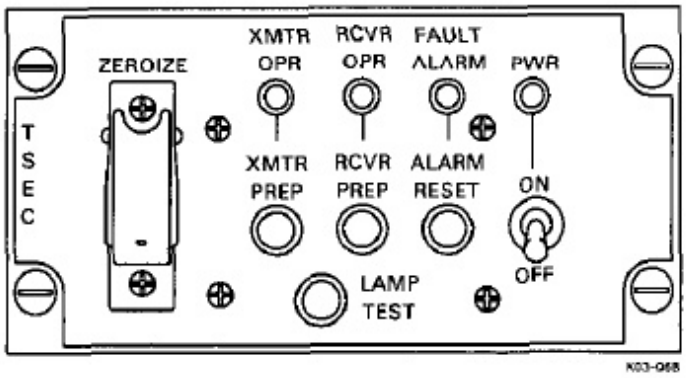


Figure 20-31. TSEC-9 Remote Control (C-9995)

CONTROL/INDICATOR	FUNCTION
ZEROIZE Switch	Momentarily applies 28 vdc to simultaneously zeroize the key settings of both transmit and receive codes.
	CAUTION When using the ZEROIZE switch, momentarily select then release.
XMTR PREP Pushbutton	Initiates a start sequence in the TSEC transmit circuits.
XMTR OPR Indicator (Green)	Illuminates when the transmit circuits are processing data.
RCVR PREP Pushbutton	Initiates the TSEC receive circuits.
RCVR OPR Indicator (Green)	Illuminates when the receive circuits are processing data.
FAULT ALARM Indicator (Red)	Illuminates when the system, except the TSEC, has a security fault.
ALARM RESET Pushbutton	Resets the system when pressed after an alarm has occurred.
PWR Switch	Applies power to the data buffer.
PWR Indicator (White)	Illuminates when power is applied to the data buffer.
LAMP TEST Pushbutton	Illuminates all TSEC-9 remote control indicators while depressed.

Figure 20-32. TSEC-9 Remote Control Panel Controls and Indicators

Figure 20-33. UHF-5 System

Figure 20-34. UHF-5 PA Control (C-10115)

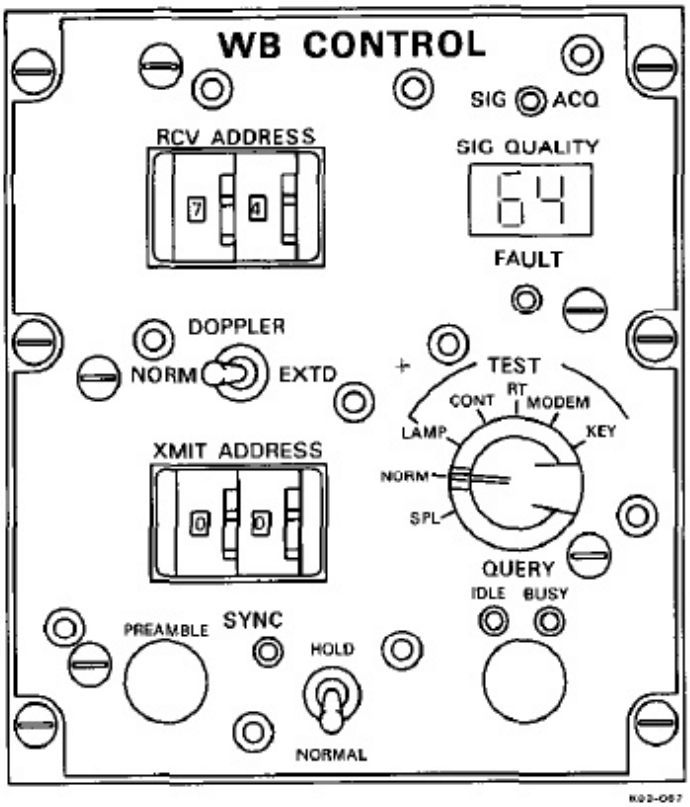


Figure 20-35. UHF-5 Wideband Modem Control (C-9689)

CONTROL/INDICATOR	FUNCTION
RCV ADDRESS Thumbwheel Switches	Used to select receiver channel (frequency-hopping code). Accepts values from 00 to 77, (64 channel combinations).
SIG ACQ Indicator (Green)	Illuminates when a receive signal is acquired.
SIG QUALITY Digital Display	Displays quality of receive signal in values ranging from 00 to 64.
FAULT Indicator (Red)	Illuminates when a system fault occurs.
Seven-Position Selector	Selects operate and test.
SPL Position	Tunes the transceiver to the specially assigned 500 kHz channel.
NORM Position	Tunes the transceiver to the normally assigned 500 kHz channel.
LAMP TEST Position	Tests all wideband modem control indicators.
CONT TEST Position	Tests wideband modem serial bit stream. System faults will illuminate the FAULT indicator. A good test illuminates the SIG ACQ and IDLE indicators and display a SIG QUALITY of 55.

Figure 20-36. Wideband Modem Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
RT TEST Position	Tests UHF-5 satellite RT control serial stream. Improper response illuminates FAULT indicator.
MODEM TEST Position	Loop-tests the modem.
KEY TEST Position	Continuously keys modem and enables transmitter keyline.
QUERY Pushbutton Switch	Allows the operator to determine whether the modem transmit address is busy.
IDLE Indicator (Green)	Modem transmit address is idle.
BUSY Indicator (Amber)	Modem transmit address is busy.
SYNC Toggle Switch	The HOLD position selects sync hold mode for both transmit and receive functions of the modem. It also allows the preamble to be transmitted fully when the PREAMBLE switch is pressed.
SYNC indicator (Amber)	Flashes when the modem is in sync hold.
XMIT ADDRESS Thumbwheel Switches	Used to select transmitter channel (frequency-hopping code). Accept values from 00 to 77 (64 channel combinations).
DOPPLER Toggle Switch	Controls the modem's Doppler search over normal (NORM) range of 400 Hz or extended (EXTD) range of 800 Hz.

Figure 20-36. Wideband Modem Controls and Indicators (Sheet 2 of 2)

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
Baudot-to-Morse Converter	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, -24 VDC SUPPLY
	115V, 60 Hz	60 Hz Distribution	60 HZ DISTRIBUTION PANEL, TTY EQPT GROUP 3
	28 VDC	MA 5 DC AFT Console	28 VDC DISTR 2 Panel, VLF PA CONT
Data Modem	115V, 400 Hz	AVE 3 AC	MDF-4, DATA MODEMS
	28 VDC	MA 1 DC DIST	P67-2 Panel, RT RACK 3&4
FSK Keyer/Demodulator	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, FSK MODEM 1
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, FSK MODEM 2
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, FSK MODEM 3
Keyboard/Printer	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TTY 1
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TTY 2
Reperforator	115V, 60 Hz	60 Hz Distribution	60 HZ DISTRIBUTION Panel, TTY EQPT GROUP 1
	115V, 60 Hz	60 Hz Distribution	60 HZ DISTRIBUTION Panel, TTY EQPT GROUP 2
	115V, 60 Hz	60 Hz Distribution	60 HZ DISTRIBUTION Panel, TTY EQPT GROUP 3
Take-up Reel	115V, 60 Hz	60 Hz Distribution	60 HZ DISTRIBUTION Panel, TTY EQPT GROUP 3

Figure 20-37. Seat Two Equipment Power Sources (Sheet 1 of 3)

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
Transmitter-Distributor	115V, 60 Hz	60 Hz Distribution	60 HZ DISTRIBUTION Panel, TTY EQPT GROUP 1
	115V, 60 Hz	60 Hz Distribution	60 HZ DISTRIBUTION Panel, TTY EQPT GROUP 2
TTY Security Sets (KG-84C)	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TSEC 1
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TSEC 2
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, TSEC 3
UHF-3 Subsystem	115V, 400 Hz	AVE 3 AC	MDF-3, UHF3 XCVR
	115V, 400 Hz	AVE 3 AC	MDF-4, DATA MODEMS
	28 VDC	MA 5 DC FWD Console	28 VDC DISTR 1 Panel, UHF XCVR CONT 3
UHF-4 Subsystem	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, CONV B/A1 A/B1
	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, CONV A/B2
	115V, 400 Hz	AVE 3 AC	MDF-3, UHF 4 XCVR
	115V, 400 Hz	AVE 3 AC	MDF-3, NB MODEM
	28 VDC	MA 5 DC FWD Console	28 VDC DISTR 1 Panel, UHF XCVR CONT 4
	28 VDC	MA 5 DC FWD Console	28 VDC DISTR 1 Panel, TSEC 9

Figure 20-37. Seat Two Equipment Power Sources (Sheet 2 of 3)

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
UHF-5 Subsystem	115V, 400 Hz	AVE 3 AC	MDF-3, UHF 5 XCVR
	115V, 400 Hz	AVE 3 AC	MDF-3, UHF 5 PA
	115V, 400 Hz	AVE 3 AC	MDF-3, WB MODEM
	28 VDC	MA 5 DC FWD Console	28 VDC DISTR 1 Panel, UHF XCVR CONT 5
	28 VDC	MA 5 DC FWD Console	28 VDC DISTR 1 Panel, TSEC 4
	28 VDC	MA 1 DC DIST	MDF-4, UHF PA CONT CONV
UHF Loop Test Translator	28 VDC	MA 5 DC FWD Console	28 VDC DISTR 1 Panel, UHF TEST XLTR
UHF Receive Antenna Switch Controller	115V, 400 Hz	AVE 3 AC	MDF-4, UHF RCV ANT CONT
	28 VDC	MA 1 DC DIST	P67-2 Panel, RT RACK 3 & 4
	28 VDC	MA 1 DC DIST	MDF-3, UHF DISTR AMPL
UHF Transmit Antenna Control	115V, 400 Hz	MA 5 AC 400 HZ DISTR 1	400 HZ DISTR 1 Panel, UHF XMT ANT
	28 VDC	MA 5 DC FWD Console	28 VDC DISTR 1 Panel, UHF XMT ANT
	28 VDC	MA 5 DC AFT Console	28 VDC DISTR 2 Panel, VLF PA CONT

Figure 20-37. Seat Two Equipment Power Sources (Sheet 3 of 3)

20.8 SEAT TWO PREFLIGHT

20.8.1 Station Oxygen/ICS Preflight

1. ICS CSU — Checked.

   a. All volume controls — CCW.

   b. PTT switch — ICS.

   c. ICS selector switch — ALL.

   d. ICS volume switch — Midrange.

   e. TEST switch — Pressed.

      Set VOL control for comfortable level and speak into microphone. Ensure voice sidetone is present in headset and all lamps illuminate on the CSU. Release TEST switch, all lamps extinguish.

2. Oxygen, ICS — Checked.

   a. Mask visual check — Complete.

      Check hose, mask, and regulator for cleanliness and damage. Verify oxygen mask is connected.

   b. SUPPLY lever — ON.

   c. Emergency lever — TEST MASK.

      Hold mask facing away from yourself. Hold emergency lever to the TEST MASK position, then release.

   d. Microphone check — Complete.

      Verify mask microphone works with ICS.

   e. Diluter lever — 100 percent OXYGEN.

   f. Emergency lever — EMERGENCY.

      Positive pressure should be indicated.

   g. Emergency lever — NORMAL.

      Breathe for a minimum of three cycles. The blinker should show alternately black and white. Hold breath momentarily (blinker should remain black). Pressure should be 290 to 430 psi.

   h. SUPPLY lever — OFF.

20.8.2 TDM/TTY Preflight. To preflight TDM/TTY subsystem, use the following procedu

1. Paper and ribbon — Checked.

   Verify that adequate quantities of paper an bon are present for proper operation o SSTTY keyboard/printers and reperforators

2. TDM, TTY equipment, power — On.

   Apply power to the TDM, TTY equipı TSECs, data modem, and FSK keyers/demc tors. Verify that all applicable power on/off cators illuminate.

3. TDM — Checked.

   a. Circuit breakers — Checked.

      All breakers closed (in) or banded/ta (open).

Note

If the TDM control/display locks up during power application, turn off power, reset the following circuit breakers and reapply power:

* TDM CONT DSPL (28 VDC DISTR 1 panel)
* TDM 24V BTRY (28 VDC DISTR 1 panel)
* TDM CONT DSPL (400 HZ DISTR 1 panel)

   b. LAMP TEST switch — Pressed.

      Verify all indicators illuminate.

   c. LOOP SELECT switch — AUTO.

   d. Faults — Reset.

   e. TD-1 and TD-2 BAUD SELECT swi — 75 BAUD.

4. Keyboard/printers — Checked.

   a. CB1, CB2, and CB3 — Closed.

   b. Illumination level — Adjusted.

c. AUDIO switch — As Required.

d. PTR RDY indicator — On.

e. LAMP TEST pushbutton — Pressed.

All indicators On.

f. INTERFACE selector — LO.

g. EXT TDS — DSBL.

h. LINE FEED — As Required.

i. BAUD RATE selector — 75 BAUDOT.

5. TTY TSEC — Checked.

a. ENABLE/ZEROIZE switch — ENABLE.

b. POWER switch — ON.

Verify POWER and ALARM indicators illuminate.

c. INITIATE/IND TEST switch — IND TEST.

Verify all indicators illuminate.

d. MODE switch — LD.

e. VAR SEL switch — U.

Verify that the PARITY indicator momentarily illuminates.

f. KEK loading — Complete.

Note

- Code tape need not be loaded into KEK. If loaded, it shall not be same tape as loaded into X1, X2, X3, or X4.
- If KEK is not required, set INITIATE/IND TEST switch to INITIATE, release, then proceed to step g.

(1) K0I-18 — Prepared.

Connect to FILL connector. Insert tape into K0I-18.

(2) INITIATE/IND TEST switch — INITIATE.

(3) Key tape — Loaded.

Pull key tape through K0I-18 to load KEK, verify PARITY indicator flashes once and extinguishes, which shows the load as been accepted.

Note

Tape must be entered within 3 seconds of setting the INITIATE/IND TEST switch to INITIATE or PARITY indicator will extinguish and code will not be accepted.

g. TEK loading — Complete.

(1) VAR SEL switch — As Required.

Select X1, X2, X3, or X4 to load TEK into one of the X storage locations.

(2) K0I-18 — Prepared.

Insert tape into K0I-18.

(3) INITIATE/IND TEST switch — INITIATE.

(4) Key tape — Loaded.

Pull key tape through K0I-18 to load TEK, verify PARITY indicator flashes once and extinguishes, which shows the load has been accepted, UPDATE COUNTER display reads 00 and ALARM indicator extinguishes.

Note

Tape must be entered within 3 seconds of setting the INITIATE/IND TEST switch to INITIATE or PARITY indicator will extinguish and code will not be accepted.

h. K0I-18 — Removed.

i. VAR SEL switch — As Required.

Select X1, X2, X3, or X4 for TEK required.

j. MODE switch — OPR.

k. INITIATE/IND TEST switch — INITIATE.

Verify that the ALARM indicator blinks once, and the PARITY indicator blinks twice. Verify that the XMT RDY and RCV RDY INDICATORS flash and then remain illuminated.

6. FSK keyer/demodulator — Set.

a. PWR switch — Depressed.

Verify power indicator is illuminated.

b. AMHI switch — Depressed.

c. DIV switch — Down.

d. DEMOD and KEYER switches — Depressed.

Selects low-frequency mark polarity.

7. Reperforators and TDs — Checked.

a. TDM connections — Connected.

(1) KB-1 to PRT-1.

(2) KB-1 to REPERF 1.

(3) KB-2 to PRT-2.

(4) KB-2 to REPERF 2.

(5) KB-2 REPERF 3.

b. Automatic RY test — Initiated.

At TTY keyboard/displays, first press RCV PRINT and COMP EDIT; then press CTL and AUTO XMIT simultaneously at each keyboard. Verify RY test message is cut on each reperforator and printed on each printer and that RCV LINE indicator illuminates. Press RESET at each keyboard to stop printing.

c. TDM connections — Released.

d. TDM connections — Connected.

Place test tapes from reperforators 1 and 2 on TD-1 and TD-2, respectively.

(1) TD-1 to PRT-1.

(2) TD-2 to PRT-2.

e. RY tester — Sent.

Select RUN at each TD. Verify test mess is printed on each printer. Select STOF each TD.

f. TDM connections — Released.

8. TDM digital status and TSEC circuits Checked.

a. Dc jackfield patches — Complete.

Patch TSEC 2 sources to TSEC 3 load TSEC 3 source to TSEC 2 load.

b. TDM connections — Connected.

Connect TD-1 to TSEC-2 XMIT and TSE RCV to PRT-1.

c. RY test — Initiated.

Install test tape at TD 1 and select RUN. V ify TSEC-2 XMT RDY and TSEC-3 R RDY indicators illuminate. Verify test m sage is printed at keyboard printer one.

d. TD-1 — STOP

Release previous connections at TDM.

e. TDM connections — Connected

Connect TD-1 to TSEC-3 XMIT and TSE RCV to PRT-1.

f. RY test — Initiated.

Install test tape at TD 1 and select RUN. V ify TSEC-3 XMT RDY and TSEC-2 R RDY indicators illuminate. Verify test m sage is printed at keyboard printer one.

g. TD-1 — STOP.

h. Dc jackfield patches — Complete.

Remove previous patches at the dc jackfiel

TSEC-3 source to TSEC 1 load.

i. TDM connections — Complete.

Release printer connections at TDM. Connect TSEC-1 RCV to PRT-1.

j. RY test — Complete.

Install test tape at TD 1 and select RUN. Verify TSEC-3 XMT RDY and TSEC-1 RCV RDY indicators illuminate. Verify test message is printed at keyboard printer one.

k. TD-1 — STOP.

Release all connections at TDM control display. Remove all patches at dc jackfield. At each TTY security set, select ZEROIZE if code is no longer desired and set POWER switch to OFF.

9. FSK keyer/demodulators — Checked.

a. Dc jackfield patches — Complete.

(1) TDM LOAD 1 (J4) — KEYER 1 (J43/J44).

(2) TDM LOAD 2 (J5) — KEYER 2 (J45/J46).

(3) TDM LOAD 3 (J6) — KEYER 3 (J47/J48).

(4) DIV CH A (J1) — TDM SOURCE 1 (J49).

(5) DIV CH B (J2) — TDM SOURCE 2 (J50).

(6) CH C (J3) — TDM SOURCE 3 (J51).

b. Audio jackfield patches — Complete.

(1) KEYER 1 (J40) — FSK CV 2 (J69).

(2) KEYER 2 (J41) — FSK CV 3 (J70).

(3) KEYER 3 (J42) — FSK CV 1 (J68).

c. TDM connections — Complete.

(1) KB-1 — JF LOAD 1.

(2) JF SCE 2 — JF LOAD 2.

(3) JF SCE 3 — JF LOAD 3.

(4) JF SCE 1 — PRT-1.

d. RY test — Complete.

At TTY keyboard/display, first press RCV PRINT and COMP EDIT; then press CTL and AUTO XMIT simultaneously. Verify RY test message is printed, and that RCV LINE indicator illuminates. Press RESET at keyboard to stop printing. Release all connections at TDM control display. Remove all patches at audio and dc jackfields.

10. FSK keyer/demodulator diversity — Checked.

a. Diversity switches — Up.

b. Dc jackfield patches — Complete.

(1) TDM LOAD 1 to KEYER 3.

(2) TDM SOURCE 1 to DIV CH A.

(3) TDM SOURCE 2 to DIV CH B.

c. Audio jackfield patches — Complete.

(1) KEYER 3 to PARALLEL.

(2) FSK CV 1 to PARALLEL.

(3) FSK CV 2 to PARALLEL.

d. TDM connections — Complete.

Connect KB-2 to JF LOAD 1 and PRT-2 to JF SCE 1.

e. RY test — Complete.

At TTY keyboard/display, first press RCV PRINT and COMP EDIT; then press CTL and AUTO XMIT simultaneously. Verify RY test message is printed, and that RCV LINE indicator illuminates.

(1) Remove audio jackfield patch FSK CV 1 and verify printer two continues to print test pattern.

(2) Reinstall audio jackfield patch FSK CV 1, remove audio jackfield patch FSK CV 2 and verify printer two continues to print test pattern.

f. TTY keyboard no. 2 — RESET.

g. TDM connections — Released.

Remove all patches at dc and audio jackfields.

h. FSK keyer/demodulators — Secured.

(1) DIV switch — Down.

(2) PWR pushbutton — off.

11. Data modem — Checked.

a. Data modem switches — Set.

Set for normal operation. Refer to Figure 20-11.

b. Dc jackfield patches — Complete.

(1) TDM LOAD 4 to DATA MODEM (J37).

(2) DATA MODEM (J18) to TDM SOURCE 4.

c. Audio jackfield patches — Complete.

Patch DATA MODEM (J46) to DATA MODEM (J85).

d. TDM connections — Complete.

Connect TD-1 to JF LOAD 4 and connect JF SCE 4 to PRT-1.

e. RY tester — Complete.

Install test tape at TD-1 and select RUN. Verify that test message is printed on keyboard printer 1. Select STOP at TD-1. Release the TDM connections and remove all patches at dc and audio jackfield.

20.8.3 UHF Transmit Antenna Control Preflight. Rotate the antenna selector switch through each antenna and verify that switching occurs at each position and indicators illuminate at each position selected, except in AUTO position, when both AUTO and CTR indicators will illuminate.

20.8.4 UHF Receive Antenna Control Preflight. Check the UHF receive antenna control as follows:

1. Attitude reference equipment — Checked.

Verify that the inertial reference units, digital-to-analog converters, and flight management computer systems are operating properly.

2. FTS — On.

3. SATELLITE DATA board — Installed.

4. ANTENNA SELECT — AUTO.

5. Display selector — CLOCK.

6. POWER switch — ON.

Observe that POWER and AUTO indicator minate and display indicates CHECK OK.

Note

If satellite data board is not installed, the display will flash SAT BRD. Manual antenna selection is possible without satellite data board installed.

7. ENTER switch — Pressed.

The display indicates SET CLK.

8. Date and time — Entered.

Set Julian date (DDDxxx) and time (HHM on the thumbwheel switches. Press EN switch; LED indicates the date and time en on thumbwheels. Press ENTER switch agai display indicates SET SAT.

9. Test satellite — Selected.

Select satellite 6 on LATITUDE DAY SA LITE thumbwheel switches (6XXXX). Pres TER switch; display indicates 6. Press EN switch; AUTO indicator illuminates green, i tor corresponding to the selected antenna il nates and LED displays N STAR. Syste operating in automatic primary mode.

10. DISPLAY switch — INS LAT.

Verify that indicated latitude is the same flight management computer system latitud minutes.

11. DISPLAY switch — INS LONG.

Verify that indicated longitude is the same flight management computer system lon ±50 minutes.

12. DISPLAY switch — HEADING.

    Verify that indicated heading is the same as the flight management computer system heading (true heading).

13. Left-hand LATITUDE DAY SATELLITE Thumbwheel — 2.

    Verify that indicated roll is the same as the attitude direction indicator (ADI) roll (±2°).

14. Left-hand LATITUDE DAY SATELLITE Thumbwheel — 3.

    Verify that indicated pitch is the same as inertial reference system pitch (±2°).

CAUTION

If it is necessary to cycle power, wait 5 seconds between OFF and ON settings of power switch

20.8.5 UHF-3 PSK Preflight. Preflight of the UHF-3 PSK control should be done in coordination with the seat four preflight of the UHF-3 LOS control. Check PSK operation as follows:

1. TDM/TTY and TMPS — ON.
2. UHF-3 LOS control mode switch — OFF or SATL.
3. UHF loop test translator — Off.

   Ensure that all LOOP TEST antenna switches are OFF.

4. PSK modem control — Checked.

   a. Mode selector switch — BIT.

      All lamps and numeric indicators illuminate for 5 seconds, then blank for 15 seconds. After 15 seconds 33344 is on digital display.

   b. DISPLAY CONTROL switch — Pressed.

      Digital display is blank for 10 seconds. After 10 seconds, 11042 is on digital display.

   c. DISPLAY CONTROL switch — Pressed.

      Digital display blank for 5 seconds. After 5 seconds, positions of CHANNEL SELECT switches are shown on digital display.

   d. CHANNEL SELECT thumbwheels — CHECKED.

      Rotate thumbwheels through all positions. Verify all positions are shown on digital display.

   e. Mode selector switch — OPR 2.

      SLOT lamp 1 and 16 shown in left digital display segments.

   f. LAMP TEST pushbutton — Pressed.

      Verify all lamps and numeric indicators (all segments) illuminate.

   g. CHANNEL SELECT thumbwheels — Test Channel.

5. Dc jackfield patches — Complete.

   Connect PSK (J12) to TDM SOURCE 1 (J49).

6. TDM connections — Complete.

   Connect JF SCE 1 to PTR 1.

7. Test pattern — Printed.

   Verify PRT 1 is printing repeating characters.

8. TDM connections — Released.
9. Dc jackfield patches — Removed.
10. PSK modem control mode selector — OFF.
11. UHF-3 LOS control mode switch — OFF.

20.8.6 UHF-4 Preflight. Check UHF-4 operation as follows:

Note

Ensure frequency plan and channel selection are authorized.

1. TTY, TMPS, and UHF receive antenna subsystems — On.
2. TSEC-9 PWR switch — On.

3. TSEC-9 remote control PWR switch — On.

Verify no alarms occur that cannot be reset.

4. UHF-4 nonsecure — Checked.

a. UHF transmit antenna control ANTENNA SELECTOR Switch — AUTO.

b. UHF loop test translator — SET.

ANT 1 —	OFF
ANT 2 —	ON
ANT 3 —	OFF
MODE SELECT —	NB
LVL SELECT —	150

c. UHF-4 satellite RT control — SET.

(1) MODE switch — SATL.

(2) SATL switch — A, B, or C.

Reset the EAM alarm if it activates.

d. Keyline control — Set.

(1) UHF 4 switch — TTY.

(2) UHF selector switch — 4F.

e. NB modem control — Set.

(1) Mode switch — Tested.

Step mode switch through the five TEST positions. Check that the FAULT indicator remains extinguished in all positions except LAMP, which illuminates all indicators.

(2) Mode selector — SYNC RCVR 1, 2, or 3.

(3) CHANNEL SELECT switches — Set.

XMTR —	1
RCVR1 —	1
RCVR2 —	1
RCVR3 —	1

Note

The CHANNEL SELECT switches may be set to any number between 1 and 12, but all must be set to the same number.

f. B/A and A/B converters — ON.

g. TDM connections — Connected.

TD-1 or TD-2 to UHF NB XMT. UHF RCV 1 to a printer or reperforator and U NB RCV 2 to a second printer or reperf tor.

h. NB control TEST switch — KEY.

On keyline control, monitor UHF-4F po for an indication in the UHF-FM band monitor UHF-4R power for an indicatio the REFL band. When transmitter is ke calibrate UHF loop test translator for r scale deflection.

i. NB TEST switch — SYNC RCVR 1, 2 3.

j. NB loop test — Initiated.

Place a test message tape on TD selecte step g. Select RUN on the TD. All t RCVR BUSY indicators on NB mo should illuminate.

k. NB loop test — Completed.

Select STOP on TD when message test is completed. Verify that message rece on selected printers or reperforators and dium-speed printer is the same as transmit Release TDM connection TD to UHF XMT.

5. UHF-4 secure — Checked.

a. TSEC-9 remote control LAMP TEST Pressed.

b. TSEC-9 — Set.

(1) Code — Loaded.

Assign receive and transmit circuits the same code.

(2) XMIT PREP and RCV PREP — Pressed.

c. Test message — Transmitted.

Enter a secure test message (with classification preamble) from TMPS. On TSEC-9 remote control, XMTR OPR and RCVR OPR indicators illuminate. Verify that message on upper display field and selected reperforators or printer connected to UHF NB RCV 2 is the same as transmitted.

d. TDM connections — Released.

e. Keyline control UHF-4 switch — OFF.

f. TTY TDs and reperforator power switches — OFF.

g. UHF-4 satellite R/T control — OFF.

h. TSEC-9 remote control — Set.

Toggle ZEROIZE switch if code is no longer needed and set PWR switch to OFF.

CAUTION

When using the ZEROIZE switch, momentarily select then release.

i. UHF loop test translator ANT 2 LOOP switch — OFF.

j. TSEC-9 power switch — OFF.

20.8.7 UHF-5 Preflight. Check UHF-5 operation as follows:

1. TTY, TMPS, and UHF receive antenna subsystems — On.

2. UHF-5 WB — Checked.

a. UHF transmit antenna control ANTENNA SELECT switch — AUTO.

AUTO indicator is illuminated.

b. UHF loop test translator — Set.

ANT 1 — OFF.
ANT 2 — ON.
ANT 3 — OFF.
MODE SELECT — WB.
LVL SELECT — 150.

c. Keyline control — Set.

(1) UHF-5 switch — TTY.

(2) UHF selector switch — 5F.

d. UHF-5 satellite RT control — SET.

(1) SATL switch — A, B, or C.

(2) MODE switch — SATL.

Green ON indicator illuminates and red FAULT indicator remains extinguished. Reset EAM alarm if it activates.

e. WB modem control — Set.

(1) Mode switch — Tested.

Step mode switch through the five TEST positions. Check that the FAULT indicator remains extinguished in all positions except LAMP, which illuminates all indicators.

(2) MODE switch — NORM.

(3) SYNC TOGGLE switch — NORMAL.

(4) DOPPLER switch — NORM.

(5) Transmit and receive addresses — Set.

Both set to identical address.

f. TSEC-4 PWR switch — ON.

g. TSEC-4 remote control PWR switch — ON.

Verify no alarms occur that cannot be reset.

h. TMPS DISPLAY KEYBOARD switch — MESSAGE PROCESSOR.

i. MDF-3 UHF-5 PA circuit breaker — Closed.

Note

- Allow 5 minutes for the PA to warm up.
- UHF-5 PA has limited duty cycle when keyed in loop test 2. PA will cycle and be on for about 15 seconds and off for about 2.5 minutes.

j. UHF PA control RESET button — Pressed.

FAULT indicator extinguishes.

k. WB control mode switch — KEY.

Monitor UHF-5F power until an indication in the UHF-FM band is indicated, then monitor UHF-5R power for indication in the REFL band.

l. WB control mode switch — NORM.

m. MDF-3 UHF-5 PA circuit breaker — OPEN.

n. Nonsecure test message — Transmitted.

Enter message from TMPS. On WB control, SIG QUALITY reads 64 and SIG ACQ indicator illuminates. Verify that message on the line printer is the same as transmitted.

o. TMPS DISPLAY KEYBOARD switch — UHF WIDEBAND.

p. Nonsecure test message — Transmitted.

Enter test message from DKU. On WB control, SIG QUALITY reads 64 and SIG ACQ indicator illuminates. Verify that message on upper display field is the same as transmitted.

3. UHF-5 WB secure operations — Checked.

a. TSEC-4 — Set.

(1) Code — Loaded.

Assign receive and transmit circuits with the same code.

(2) XMIT PREP and RCV PREP — Pressed.

b. Test message — Transmitted.

Enter a secure test message (with classi tion preamble) from DKU. On WB contr

SIG QUALITY reads 64 and SIG ACQ cator illuminates. On TSEC-4 remote cor XMTR OPR and RCVR OPR indic illuminate. Verify that message on upper play field is the same as transmitted.

c. Keyline control UHF-5 switch — OFF.

d. UHF loop test translator ANT 2 L switch — OFF.

e. TSEC-4 remote control — SET.

Toggle ZEROIZE switch if code is no lo required and set PWR switch to OFF.

CAUTION

When using the ZEROIZE switch, momentarily select then release.

f. UHF-5 RT control power switch — OFI

g. TSEC-4 power switch — OFF.

20.8.8 Baudot-to-Morse Converter/Handk Preflight

1. CW KEY control VLF switch — TTY.

Verify power indicator illuminates on Baudot-to-Morse converter.

2. Dc jackfield patches — Complete.

a. TDM LOAD 1 (J4) to CW CONV (J63).

b. CW CONV TD STEP (J28) to T SOURCE 1 (J49).

Note

Any TDM LOAD and corresponding TDM SOURCE may be used.

3. VERDIN modulator POWER switch — On

Set the modulation switch to CW FSK.

4. TDM connection — Complete.

   Press TD-1, JF LOAD 1, and JF-TD STEP SOURCE: then press CONNECT.

Note

Verify that TD-1 BAUD select switch setting is 75 BAUD.

5. Test tape — Transmitted.

   a. Place a test tape on TD-1, set power switch to ON, and set to RUN.

6. ICS CSU CW CONV volume — Set.

   Adjust control to a comfortable level. Observe flickering input data light on VLF modulator.

7. Baudot-to-Morse converter DOT LENGTH — Adjusted.

   Set control for desired transmission rate.

8. TD-1 — STOP.

   Set power switch to OFF.

9. Dc jackfield patches — Removed.

10. TDM connections — Released.

11. CW KEY control VLF switch — FWD.

12. FWD console outlet panel — Set.

    Connect CW handkey.

13. ICS CSU VLF TXCW volume control — Set.

    Adjust to a comfortable level.

14. CW handkey — Tested.

    Operate handkey. Verify flickering INPUT DATA indicator on VLF MODULATOR and CW tone in headset.

15. CW key control VLF switch — AFT.

16. CW handkey — Tested.

    Operate handkey. Verify flickering INPUT DATA indicator on VLF MODULATOR and CW tone in headset.

17. CW key control — OFF.

18. VERDIN modulator POWER switch — OFF.

19. CW handkey — Disconnected and Stowed.

20.9 SEAT TWO OPERATION

20.9.1 UHF Receive Antenna Control Operation. Special operations of the UHF receive antenna control are as follows:

1. To select another satellite:

   a. DISPLAY selector — SAT DATA.

   b. Steps 10 through 13 of preflight — Completed.

2. To change time:

   a. DISPLAY switch — CLOCK.

   b. Steps 7, 8, and 9 of preflight — Completed.

   c. Enter switch — Toggled.

      Display indicates date and time.

3. To display pitch and roll, accomplish the following:

Note

Pitch and roll data will only display when satellite 6 is selected.

   a. DISPLAY switch — HEADING.

   b. Left-most LATITUDE-DAY-SATELLITE switch — SET.

      Select 2 for roll or 3 for pitch.

4. In response to flashing SET LAT on display:

   a. LATITUDE DAY SATELLITE thumbwheel switches — Aircraft Latitude.

   b. ENTER switch — PRESSED.

      Display indicates SET LAT (not flashing).

   c. ENTER switch — Pressed.

      Display indicates entered latitude.

d. ENTER switch — Pressed.

Display indicates SET LONG.

e. LONGITUDE HR/MIN thumbwheel switches — Aircraft Longitude.

f. ENTER switch — Pressed.

Display indicates entered longitude.

g. ENTER switch — Pressed.

AUTO indicator illuminates green; indicator corresponding to the selected antenna illuminates.

h. DISPLAY switch — Heading.

Verify that indicated heading is the same as aircraft heading.

Note

System is operating in the secondary mode. Steps a through h will have to be repeated when the display again flashes SET LAT (approximately 10 minutes).

5. In response to flashing CLK FLT on display:

a. DISPLAY switch — CLOCK.

b. ENTER switch — Pressed.

Display indicates the date and time of clock fault plus one minute. If display is correct, steps c through f may be omitted.

c. ENTER switch — PRESSED.

Display indicates SET CLK (not flashing).

d. Julian date and time — Entered.

Set (DDDxx) and time (HHMMxx) on the thumbwheel switches.

e. ENTER switch — Pressed.

Display indicates date and time entered.

f. ENTER switch — PRESSED.

Receive antenna group operates normally.

Note

System is operating in the clock fault mode. Step five will have to be repeated every minute.

6. To manually select antenna:

Set the ANTENNA SELECT switch to the sired antenna; the selected antenna indic illuminates.

20.9.2 UHF-3 PSK Operation. Operate UH PSK as follows:

1. UHF-3 LOS control function switch — OF SATL.

2. PSK modem control mode switch — OPR 2

3. PSK modem control receive channel and quency plan — As Required.

4. Dc jackfield — Patched.

Connect PSK (J12) to desired TSEC (J29, or J33).

5. TSEC — Set.

a. ENABLE/ZEROIZE switch — ENABLI

b. POWER switch — ON.

c. MODE switch — OPR.

Verify POWER indicator is on and PAR indicator flashes two times and the ALA indicator flashes once.

Note

If TSEC has been zeroized, perform step five of TDM/TTY Preflight, paragraph 20.8.2.

6. TDM connections — As Required.

TSEC to a SSTTY printer, if printout is desire

Note

Output of TSEC may be monitored by TMPS if the circuit is not set to skip.

20.9.3 UHF-4 Operation. Operate UHF-4 as follows:

1. TTY, TMPS, and UHF receive antenna subsystems — On.
2. UHF-4 — On.
3. TSEC-9 and TSEC-9 remote control — On.

   Verify no alarms occur that cannot be reset.
4. Appropriate CRYPTO key — Loaded.

   If using a secure circuit.
5. UHF-4 satellite RT control — Set.
   a. MODE switch — SATL.
   b. SATL switch — As Required.
6. NB mode selector — SYNC RCVR 1, 2, or 3.

   CHANNEL SELECT switches to appropriate positions.

Note

- If NB circuit is monitored with TMPS only, no TDM connections are necessary.
- If NB circuit is monitored on TTY printers, turn on A/B converters and make appropriate TDM connections between NB RCV 1 or 2 and desired TTY equipment.

20.9.4 UHF-5 Operation. Operate UHF-5 as follows:

1. TMPS and UHF receive antenna subsystems — On.
2. Keyline control — Set.
   a. UHF-5 switch — TTY.
   b. UHF selector switch — 5F.
3. UHF-5 satellite RT control — Set.
   a. SATL switch — As Required.
   b. MODE switch — SATL.

   Reset EAM alarm if it activates.
4. WB modem control — Set.
   a. MODE switch — NORM.
   b. SYNC TOGGLE switch — NORMAL.
   c. DOPPLER switch — NORM.
   d. Transmit and receive addresses — Set.

      Correct address for circuit used.
5. TSEC 4 remote control PWR switch — ON.

   Verify PWR indicator illuminates and no alarms occur that cannot be reset.
6. TSEC 4 crypto keylist — LOADED.

Note

UHF-5 WB is now ready for use either by TMPS or directly from the TMPS DKU, depending on the position of the DKU switch.

20.10 SEAT TWO POSTFLIGHT

Postflight procedures should be performed any time seat two equipment has been energized prior to leaving the aircraft, or for expected loss of aircraft power.

All seat two equipment shall be secured and zeroized in such a manner as to prevent any compromise of classified information. Station shall be sanitized to ensure all classified information has been properly removed and stowed prior to exiting the aircraft.

The aircraft shall be clean and all stations properly secured (i.e. seats facing station with seatbelts fastened neatly, armrests down).

20.10.1 Station Oxygen/ICS Postflight

1. Oxygen — NORMAL, 100 percent OXYGEN, SUPPLY OFF.
2. CSU PTT selector — ICS.

20.10.2 TDM/TTY Postflight

1. TDM control/display — Off.
2. TTY keyboard/printers, reperforators, and TDs — OFF.

   Remove printed paper and tapes from equipment.
3. Dc jackfield patches — Removed.
4. TSECs — SET.
   a. ENABLE/ZEROIZE switch — ZEROIZE.
   b. POWER switch — OFF.

20.10.3 UHF Receive Antenna Control Postflight

1. Thumbwheel switches — Zeroized.

   All set to (1's)
2. POWER switch — OFF.
3. Satellite data board — Removed and Stowed.

20.10.4 UHF-3 PSK Postflight. Secure the UHF-3 PSK as follows:

1. PSK modem control mode selector — OFF.
2. PSK modem control thumbwheel switches — All.

20.10.5 UHF-4 Postflight. Secure UHF-4 as follows:

1. Keyline control UHF-4 switch — OFF.
2. UHF-4 R/T control power switch — OFF.
3. UHF-4 R/T control SATL switch — A.
4. Narrowband modem control — Zeroize.
5. TSEC-9 remote control ZEROIZE switch — Toggled.

CAUTION

When using the ZEROIZE switch, momentarily select then release.

6. TSEC-9 remote control PWR switch — OFF
7. TSEC-9 — Set.
   a. XMTR/RCVR ZERO OFF switches ZERO OFF (down).
   b. POWER ON/OFF switch — OFF.

20.10.6 UHF-5 Postflight. Secure UHF-5 as follows:

1. Keyline control UHF-5 switch — OFF.
2. TSEC-4 remote control — Secured.
   a. ZEROIZE switch — Toggled.

CAUTION

When using the ZEROIZE switch, momentarily select then release.

   b. PWR switch — OFF.
3. WB modem control — Zeroized.
4. UHF-5 satellite R/T control — Set.
   a. Power switch — OFF.
   b. SATL switch — A.
5. TSEC-4 — SET.
   a. XMTR/RCVR ZERO OFF switches - ZERO OFF (down).
   b. POWER ON/OFF switch — OFF.

CHAPTER 21

Seat Three Position — Preflight, Operation, and Postflight

21.1 SEAT THREE POSITION RESPONSIBILITIES

Seat three is responsible for the preflight, operation, and postflight of the VLF subsystem, including the VLF transmit and receive subsystems, the frequency time standard (including power supply), and the oscilloscope. The VLF operator is also responsible for monitoring the in-flight performance monitor subsystem. The position is the primary VLF operator.

21.2 VLF SUBSYSTEM

21.2.1 VLF Receive Subsystem. The VLF receive subsystem receives and processes clear or encrypted TTY signals and CW. It consists of the VLF receive antenna, preamplifier/filter, VLF receivers, VERDIN receive terminals, and TSECs 5, 6, and 7.

21.2.2 VLF Transmit Subsystem. The VLF transmit subsystem transmits high powered MSK, FSK, or CW FSK signals at frequencies between 17 and 30 kHz. It consists of a VERDIN transmit terminal, TSECs 5 and 6, modulator, power amplifier-coupler, and antenna group (long and short trailing-wire antenna).

Figure 21-1 presents a simplified block diagram of the VLF transmit and VLF receive subsystems.

21.2.3 Frequency Time Standard (O-1622). Two FTS provide 5-MHz reference and 1-PPM timing signals to the VERDIN transmit and VERDIN receive terminals, and the VERDIN modulator, as well as provide a 5-MHz reference signal to the VLF receivers and the preamplifier/filter. Both FTS 5-MHz reference and 1-PPM timing signals are routed to a SDSU where the outputs of a selected FTS are distributed to the VLF transmit and receive equipment. A 1-PPM timing signal from the SDSU also goes to the UHF receive antenna switch controller. The FREQ STD switch on the VLF control selects FTS 1 or 2. The FTS is synchronized to an external time standard before each mission. If primary and secondary power are removed, each FTS has an internal battery that, if fully charged, supplies proximately 30 minutes of power.

CAUTION

After interruption of ac power with no dc power backup, do not attempt a restart for at least 5 minutes.

Note

- When synchronization is lost, the VLF receive terminals and VLF transmit terminal cannot operate in the MSK mode.
- Ac power must be available for initial turn on of FTS.
- Allow each FTS 30 minutes warmup.

21.2.3.1 FTS Controls and Indicators. The control (Figure 21-2) contains a 24-hour clock that be controlled and synchronized with an external t standard using the controls and displays describe Figure 21-3. To set the display on the digital clock, p the HR and STOP button simultaneously to rap change the hour on the clock. Use the MIN and S buttons simultaneously to change the minutes on clock. Seconds are set using the FAST button alone

21.2.3.2 FTS Batteries/Chargers. The FTS ceives power from a UPS, consisting of two batte and two chargers located in the forward lower lobe, a control panel located in the aft console (P30), ba In normal operation, the FTS power is supplied by power supply through the batteries and the batteries maintained in a charged state. Figure 21-4 show simplified power distribution to the FTS. In the ever a loss of 115v, 400 Hz power, the batteries will su power to one FTS for approximately 50 hours. Po for the FTS is managed from the FTS UPS CONTR PANEL (CP-0234) (Figure 21-5). Refer to Figure 2

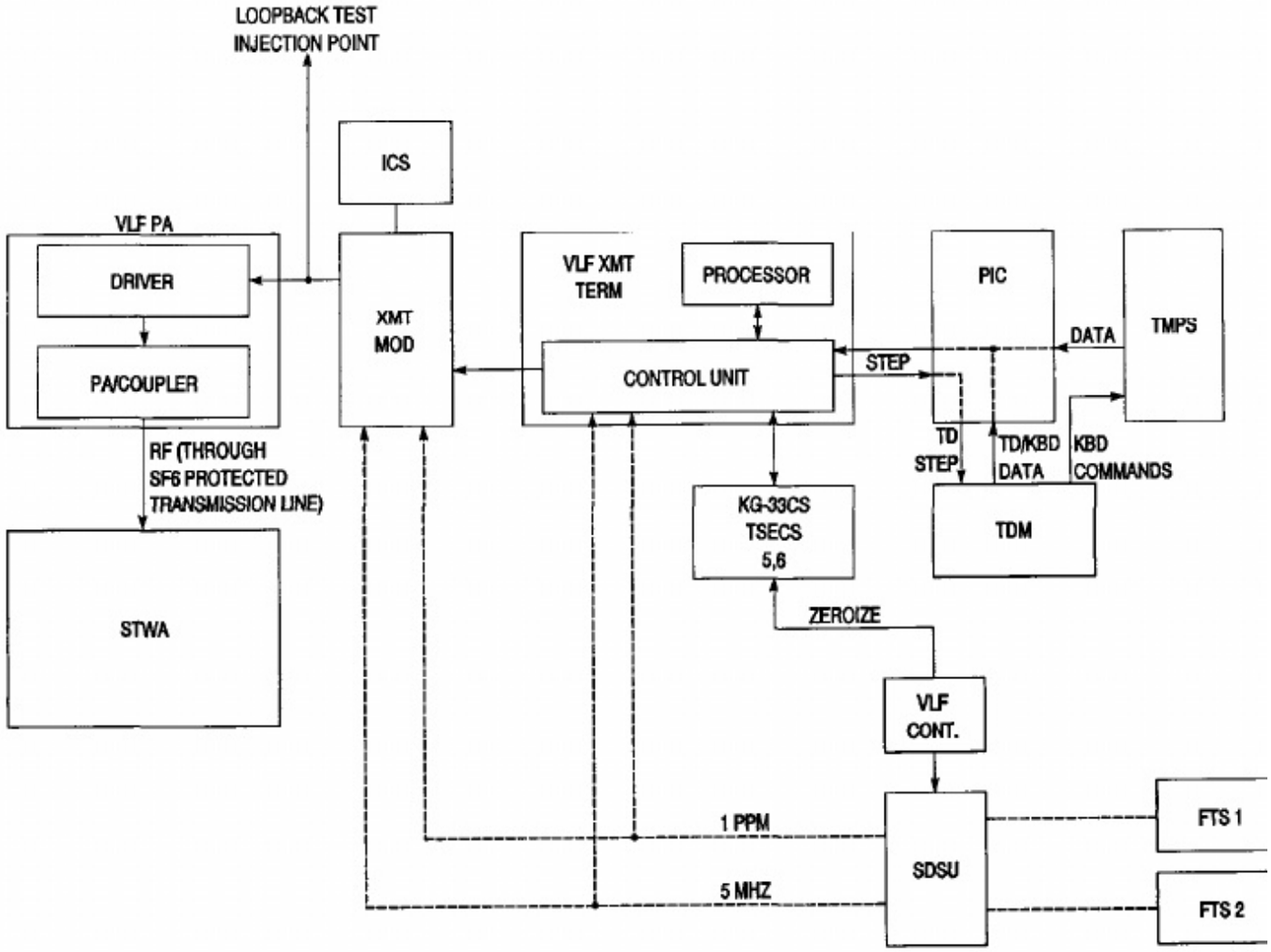


Figure 21-1. VLF Transmit Subsystem (Sheet 1 of 2)

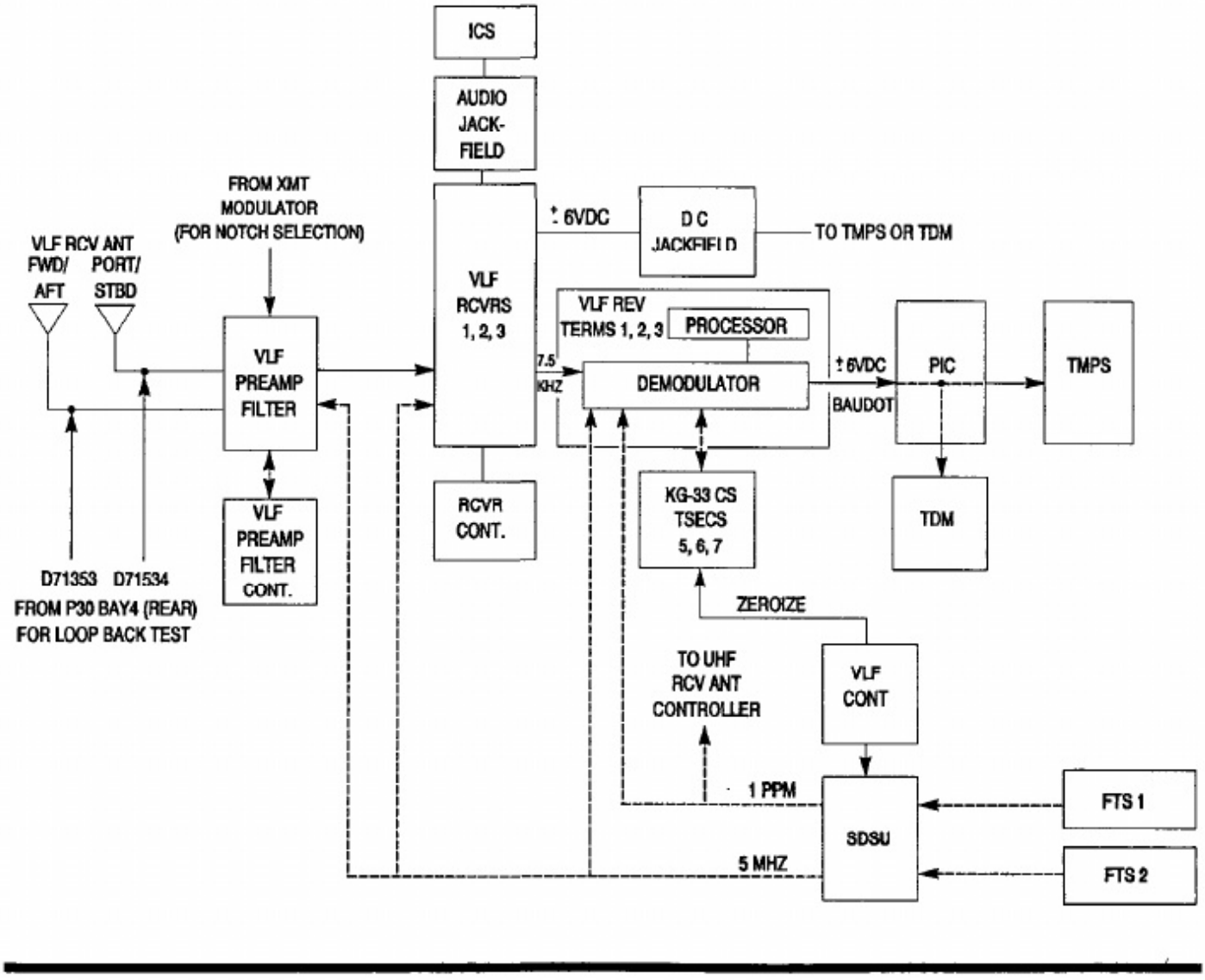


Figure 21-1. VLF Receive Subsystem (Sheet 2 of 2)

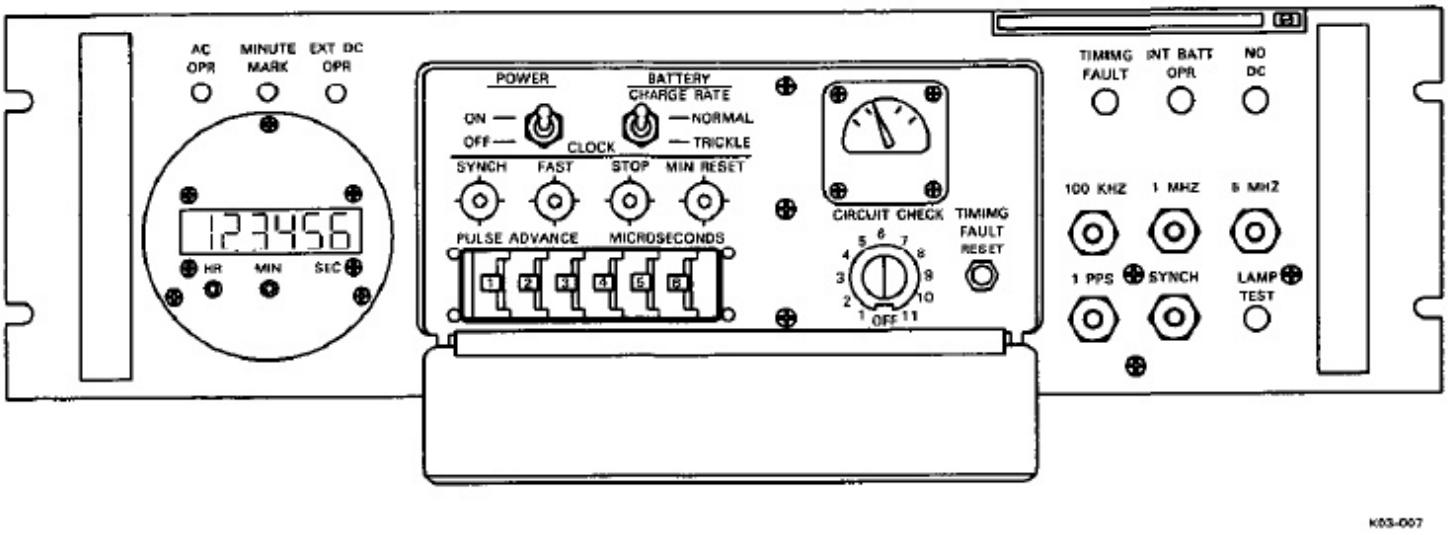


Figure 21-2. Frequency Time Standard (0-1622)

CONTROL/INDICATOR	FUNCTION
Digital Clock	Provides visual display of 24 hour time.
AC OPR Indicator (Green)	Indicates FTS is operating on ac power.
MINUTE MARK Indicator (White)	Illuminates when each clock 1-PPM occurs.
EXT DC OPR Indicator (Amber)	Indicates FTS is operating on external dc power.
HR Pushbutton	Used to advance hour setting.
MIN Pushbutton	Used to advance minute setting.
SYNCH Pushbutton	Enables synchronization of internal clock with external time standard pulse applied to SYNCH input.
FAST Pushbutton	Used to speed up the clock second movement, 1-PPS, and 1-PPM outputs by five times.
POWER Toggle Switch (Lever lock)	Applies power to the FTS.
STOP Pushbutton	Stops the clock advance and 1-PPS/1-PPM outputs.

Figure 21-3. FTS Panel Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
BATTERY CHARGE RATE Switch	Selects NORMAL or TRICKLE charge rate for internal battery
Note Anytime the internal battery is used on the FTS the BATTERY CHARGE RATE switch should be set to NORMAL for 14-16 hours for battery recharging. After charging is complete return the BATTERY CHARGE RATE switch to TRICKLE.	
MIN RESET Pushbutton	Used to cause 1-PPM output to occur on next second and eve minute thereafter.
PULSE ADVANCE Switches	Advances the 1-PPM and 1-PPS outputs in 1 microsecond steps to 999,999 microseconds.
CIRCUIT CHECK Selector	Switches internal metered circuit outputs for monitoring CIRCUIT CHECK meter.
CIRCUIT CHECK Meter	Displays readings for metered circuits being monitored.
TIMING FAULT RESET Pushbutton	Resets timing fault logic circuit and TIMING FAULT indicator
TIMING FAULT Indicator (Red)	Indicates fault that may have affected timing has occurred.
INT BATT OPR Indicator (Red)	Indicates FTS operation on internal battery.
NO DC Indicator (Red)	Indicates neither external dc nor internal battery power is availab and ac power is present.
LAMP TEST Pushbutton	Used to test all indicators on the panel.

Figure 21-3. FTS Panel Controls and Indicators (Sheet 2 of 2)

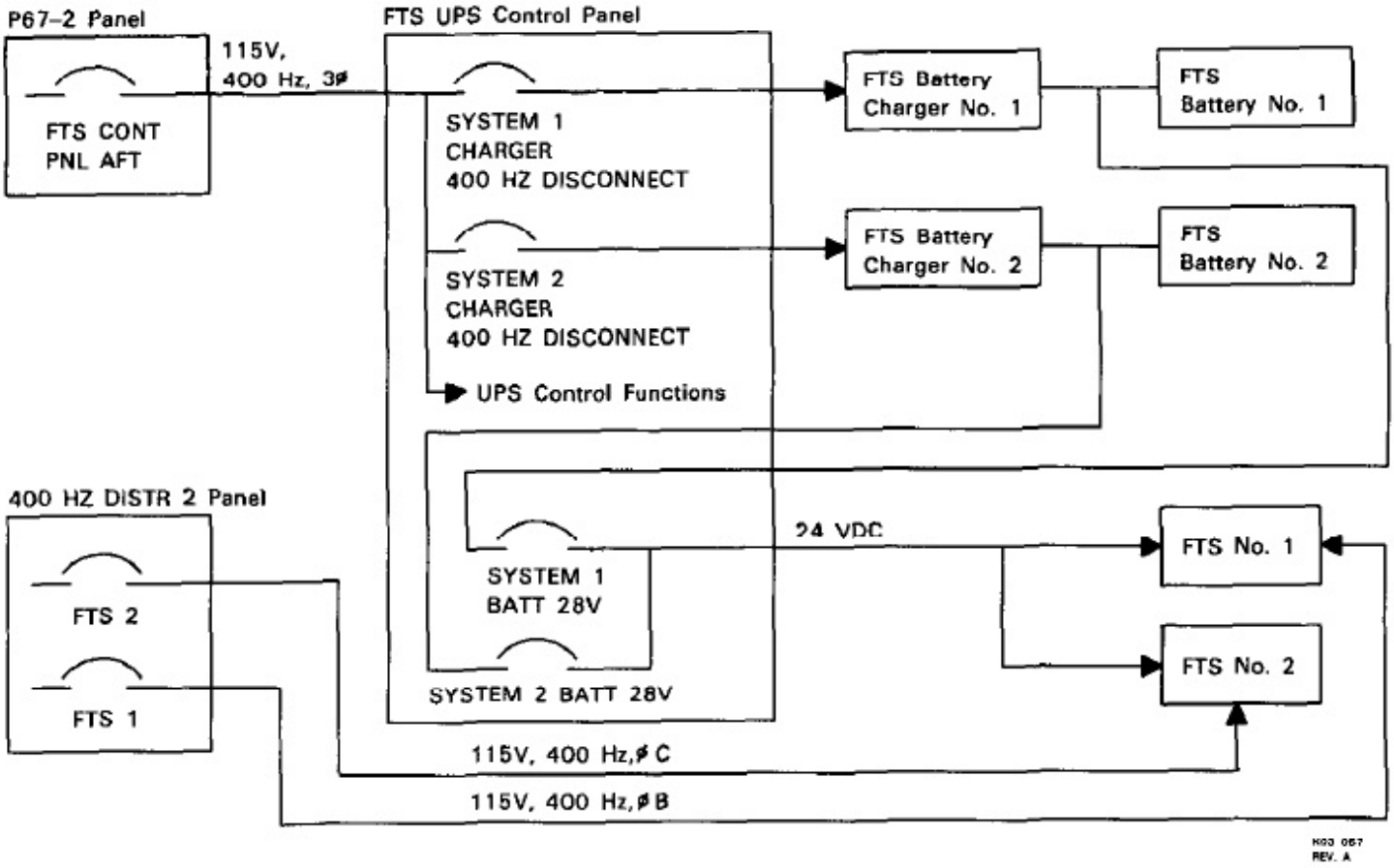


Figure 21-4. FTS Power Distribution

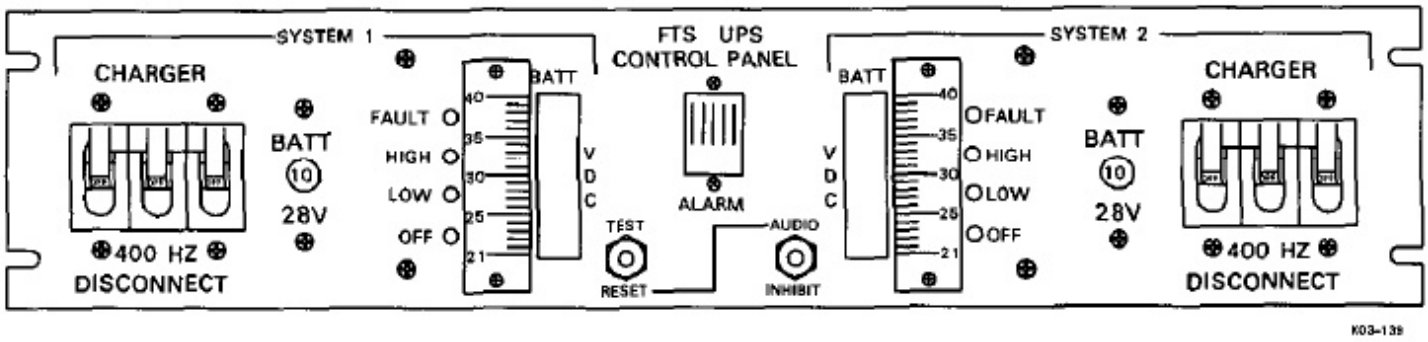


Figure 21-5. FTS UPS Control Panel (CP-0234)

for an explanation of the controls and indicators on the panel.

21.2.4 Oscilloscope. The oscilloscope (Figure 21-7) can be used to check signals patched from the audio or dc jackfield. The oscilloscope is a dual-channel oscilloscope and can thus be used for simultaneous signal comparison. Inputs to the two channels are routed through the CRO input panel from the audio jackfield and the dc jackfield. Switches on the audio jackfield and jacks on the dc jackfield select the specific signals applied to the oscilloscope. Figure 21-8 explains the oscilloscope controls and indicators.

Note

The oscilloscope described herein is a unit commonly in use. Other oscilloscopes with the same capabilities/functions may be encountered.

21.2.4.1 CRO Input Panel. The CRO input panel (Figure 21-9) is used to select the input signals to the oscilloscope. The CRO input panel has three rotary switches and three connectors that mate with coaxial cables connected to the oscilloscope input jacks.

CONTROL/INDICATOR	FUNCTION
ALARM Speaker	Sounds alarm when fault is detected in either charger 1 or 2 circuit or battery voltage is out of limits.
TEST/RESET Pushbutton	Used to test audio alarm and reset alarm function after it has bee silenced.
AUDIO INHIBIT Pushbutton	Used to silence alarm audio speaker.
UPS SYSTEM 1 or 2	
CHARGER 400 HZ DISCONNECT Circuit Breaker	Controls 115v, 400 Hz power to battery charger.
BATT 28V Circuit Breaker	Controls 24 vdc power from battery to FTS bus.
FAULT Indicator (Red)	Illuminates when charger detects battery is drawing too muc current, a battery high or low temperature exists, or the voltag difference between two halves of the battery is more than 1 volt.
HIGH Indicator (Red)	Indicates battery is being charged at the maximum rate.
LOW Indicator (Red)	Indicates battery is being charged at the 10 amp rate.
OFF Indicator (Red)	Indicates battery is being trickle charged.
BATT VDC Meter	Indicates battery charger voltage. The bar scale flashes and the audibl alarm sounds when voltage exceeds 35 volts.

Figure 21-6. FTS UPS Control Panel Controls and Indicators

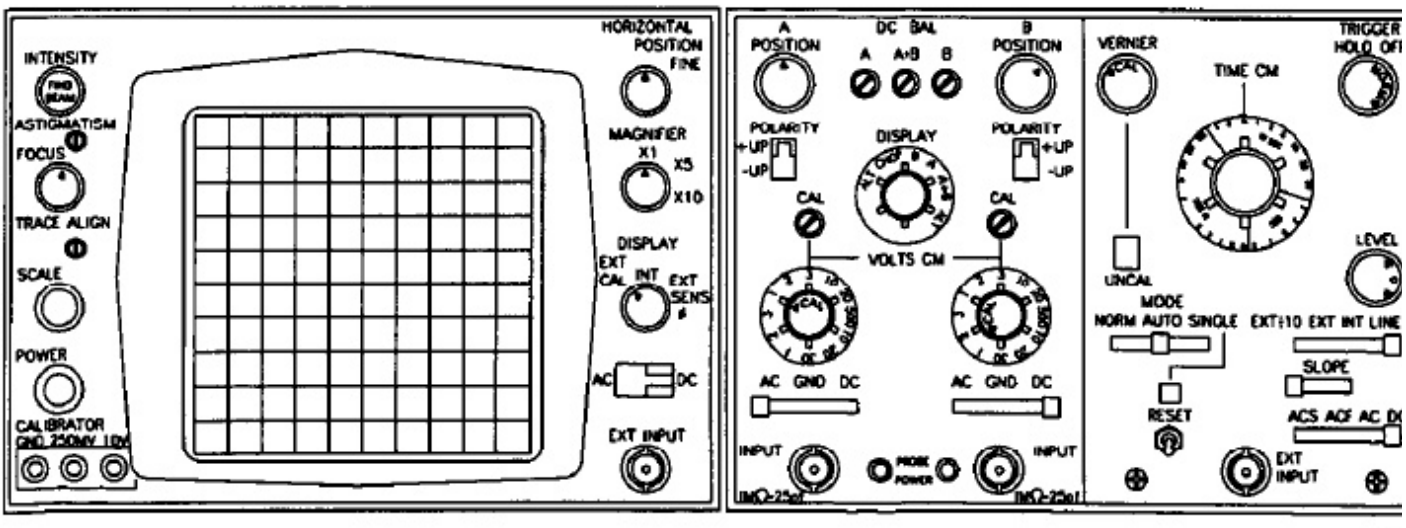


Figure 21-7. Oscilloscope

CONTROL/INDICATOR	FUNCTION
DC BAL A, A+B, B Screwdriver Adjustments	Normally a maintenance adjustment to minimize vertical shift whe POLARITY is switched. A controls channel A. B controls chann B. A + B controls both channels when in A + B operation.
B POSITION Knob	Varies the vertical position of the channel B display.
Left POLARITY Switch (+UP, –UP)	Selects between a normal (+UP) or inverted (–UP) display fo channel A.
Right POLARITY Switch (+UP, –UP)	Selects between a normal (+UP) or inverted (–UP) display fo channel B.
DISPLAY Switch	Selects the type of display. Input signals can be displayed either alon or together.
ALT (B TRIGGER)	Allows input to each channel to be displayed separately on alternat sweeps. B channel input is used as trigger signal.
CHOP (B TRIGGER)	Allows input to each channel to be displayed during same sweep b switching each channel on and off at a 400 kHz rate. B channel inpu is used as trigger signal.
B	Presents a display of the input to channel B only.
A	Presents a display of the input to channel A only.
A + B	Displays algebraic sum of inputs to both channels. The POLARIT setting of each channel determines whether the display is the sum o the difference of the input amplitudes.
ALT	Each channel input is displayed on alternate sweeps.
Left VOLTS/CM CAL Screwdriver Adjustment	Maintenance adjustment that calibrates the channel A deflectio circuits.
Right VOLTS/CM CAL Screwdriver Adjustment	Maintenance adjustment that calibrates the channel B deflectio circuits.
Left VOLTS/CM Switch	Selects the channel A input amplitude necessary to give 1 CM o deflection.
Left VOLTS/CM CAL Knob	Provides continuous adjustment of volts/CM between calibrate positions of left VOLTS/CM switch.
Right VOLTS/CM Switch	Selects the channel B input amplitude necessary to give 1 CM o deflection.
Right VOLTS/CM CAL Knob	Provides continuous adjustment of volts/CM between calibrate positions or right VOLTS/CM switch.

Figure 21-8. Oscilloscope Controls and Indicators (Sheet 2 of 4)

CONTROL/INDICATOR	FUNCTION
Left AC/GND/DC Switch	Selects coupling for channel A input signal.
AC	Selects capacitive coupling.
GND	Grounds channel A input stage while disconnecting the input signal.
DC	Selects direct coupling.
Right AC/GND/DC Switch	Selects coupling for channel B input signal.
AC	Selects capacitive coupling.
GND	Grounds channel B input stage while disconnecting the input signal.
DC	Selects direct coupling.
Left INPUT Jack	BNC connector for coupling channel A input signals.
PROBE POWER Jacks	Supply, + 15.0 and – 12.6 vdc to active probes (if used).
Right INPUT Jack	BNC connector for coupling channel B input signals.
VERNIER Knob	Continuously varies the sweep time between calibrated positions of the TIME/CM switch.
TIME CM Switch	Selects the time represented by each CM or horizontal deflection.
TRIGGER HOLD OFF Knob	Controls the hold-off time between the end of one sweep and the beginning of the next.
UNCAL Indicator (Amber)	Illuminates when the VERNIER knob is not fully CW and sweep time is not calibrated.
LEVEL knob	Selects the point on the trigger wave-form that starts the sweep.
MODE Switch	Selects sweep triggering mode.
NORM	Sweep is triggered by incoming signal.
AUTO	Sweep is triggered by incoming signal or is free running in absence of an input signal.
SINGLE	Sweep is triggered only once and must be rearmed by pressing RESET switch.
RESET Switch/Indicator	Switch arms the sweep circuit in the SINGLE mode; indicator illuminates when circuit is armed.

Figure 21-8. Oscilloscope Controls and Indicators (Sheet 3 of 4)

CONTROL/INDICATOR	FUNCTION
EXT ÷ 10 EXT INT LINE Switch	Selects the signal source that starts the sweep.
EXT ÷ 10	The signal applied to the EXT INPUT jack triggers the sweep; t signal is attenuated (÷10); this position should be used when sig amplitude is more than 10v P-P.
EXT	The signal applied to the EXT INPUT jack triggers the sweep.
INT	A portion of the vertical deflection signal is used to trigger the swe
LINE	The power line (400 Hz) signal is used to trigger the sweep.
SLOPE switch	Determines the polarity of the trigger signal slope that starts t sweep.
ACS/ACF/AC/DC switch	Selects type of coupling for trigger input signal.
ACS	Attenuates signals above 20 kHz and prevents high-frequency no from triggering the sweep.
ACF	Attenuates signals below 15 kHz and prevents power line frequen ripple from triggering the sweep.
AC	Blocks dc component of trigger signals.
DC	Used for trigger signals from dc to 90 MHz.
EXT INPUT jack	BNC connector for connecting external trigger signal.

Figure 21-8. Oscilloscope Controls and Indicators (Sheet 4 of 4)

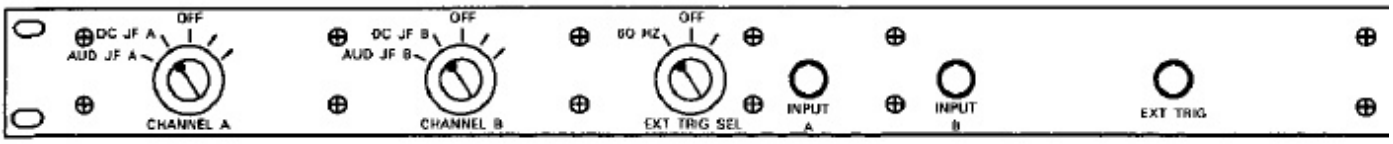


Figure 21-9. CRO Input Panel

21.2.4.1.1 CHANNEL A Switch. The CHANNEL A switch selects the various inputs to oscilloscope channel A. The AUD JF A position connects the CRO CH A switch of the audio jackfield to the oscilloscope. The DC JF A position connects CRO CH A jack J57 of the dc jackfield to the oscilloscope. The OFF position removes all inputs to oscilloscope channel A.

21.2.4.1.2 CHANNEL B Switch. The CHANNEL B switch selects the various inputs to oscilloscope channel B. The AUD JF B position connects the CRO CH B switch of the audio jackfield to the oscilloscope. The DC JF B position connects CRO CH B jack J58 of the dc jackfield to the oscilloscope. The OFF position removes all inputs to oscilloscope channel B.

21.2.4.1.3 EXT TRIG SEL Switch. With the EXT TRIG SEL switch in the 60 Hz position, a 60 Hz signal is routed from the 60 Hz converter 1 to the EXT TRIG jack of the CRO input panel.

21.2.5 VLF Receive Subsystem

21.2.5.1 VLF Receive Antenna Group. The VLF receive antenna group consists of an antenna, a preamplifier (including notch filters), and a preamplifier/filter control. The group provides maximum reception sensitivity to signals in the 17 to 30 kHz band while protecting the receivers from signals in the HF and UHF bands. Without notch filtering, the group will receive the full band when in the Bypass mode. The VLF signals are received, amplified, and distributed to the three VLF receivers. The amplifier has notch filters that provide rejection of the VLF transmit signal and a feature that allows the transmitted signal to be monitored by one of the receivers, if desired. Both the selection of the notch filter and the routing of the transmit monitor signal are controlled by the VLF preamplifier/filter control unit.

21.2.5.1.1 VLF Receive Antenna (AS-4069). The VLF receive antenna consists of two identical orthogonal loops on a ferrite frame. Communication signal is received through the antenna loops and routed to the preamplifier/filter.

21.2.5.1.2 VLF Preamplifier/Filter (AM-7287). The VLF preamplifier/filter receives incoming VLF signals from the VLF receive antenna. The signal is amplified, combined, and distributed to the VLF receivers. Notch filtering in the 17 to 30 kHz band is provided to reject the VLF transmit signal. The VLF loop back test capability can be provided by enabling the injection of the transmit signal directly from the VERDIN modulator into the preamplifier/filter. Connectors D71353 (forward/aft) and D71354 (port/starboard) provide VLF loop-back test capabilities by injecting the transmit signal directly into the preamplifier/filter. Operator interface for the preamplifier/filter is through the preamplifier/filter control while loop-back test connections must be made by the operator in the aft console (P30), bay 4.

21.2.5.1.3 VLF Preamplifier/Filter Control Unit (C-11564). The VLF preamplifier/filter control unit (Figure 21-10) provides dc power to the preamplifier and control for the selection of the notch filter and the routing of the transmit monitor signal to the 3 VLF receivers. Refer to Figure 20-11 for a description of the preamplifier/filter control unit controls and indicators.

21.2.5.2 VLF Receivers (R-2141). Three remotely controlled VLF receivers (Figure 21-12) accept MSK, FSK, and CW FSK signals in the 14 to 59.99 kHz range from the preamplifier/filter. Receive signals can be demodulated and applied as: low-level outputs to the dc jackfield, audio to the audio jackfield, comm central ICS, and 7.5 kHz to respective receive terminals. CW FSK signals are heterodyned in the VLF receiver and are routed to the audio jackfield and comm central ICS. MSK and FSK signals are translated to an intermediate frequency and routed to a specific VERDIN receive terminal (VLF receiver 1 to VERDIN receive terminal 1, receiver 2 to terminal 2, and receiver 3 to terminal 3.) The VLF receivers are located in the RT Rack, bay 2.

Each VLF receiver has a TEST CIRCUITS selector that is used with the signal-level meter on the corresponding VLF receiver control head for operational

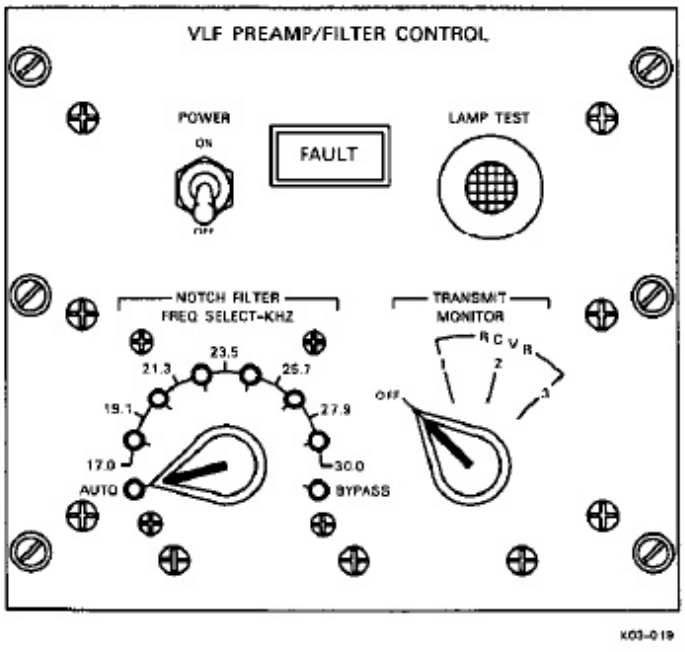


Figure 21-10. VLF Preamplifier/Filter Control Unit (C-11564)

CONTROL/INDICATOR	FUNCTION
POWER Switch	Used to apply power to the preamplifier and the control unit.
FAULT Indicator (Red)	Illuminates when a fault is determined by built-in-test (BIT) circui
LAMP TEST Pushbutton	Tests all indicators on the panel.
NOTCH FILTER FREQ SELECT-KHZ Selector/Indicators (Green)	In the AUTO position, the control unit automatically tracks the V transmitter operating frequency and inserts the appropriate one of notch filters at the front end of the amplifier. Also can be used manually select one of six band-reject filters that attenuate frequenc between 17 and 30 kHz by at least 57 dB. In the BYPASS positi no notch filtering is used, with a resulting gain of 23 to 11 dB (to 60 kHz).
TRANSMIT MONITOR Selector	Passes an attenuated (approximately 60 dB) sample of the V transmission signal when set to receiver 1, 2, or 3.

Figure 21-11. VLF Preamp/Filter Control Unit Controls and Indicators

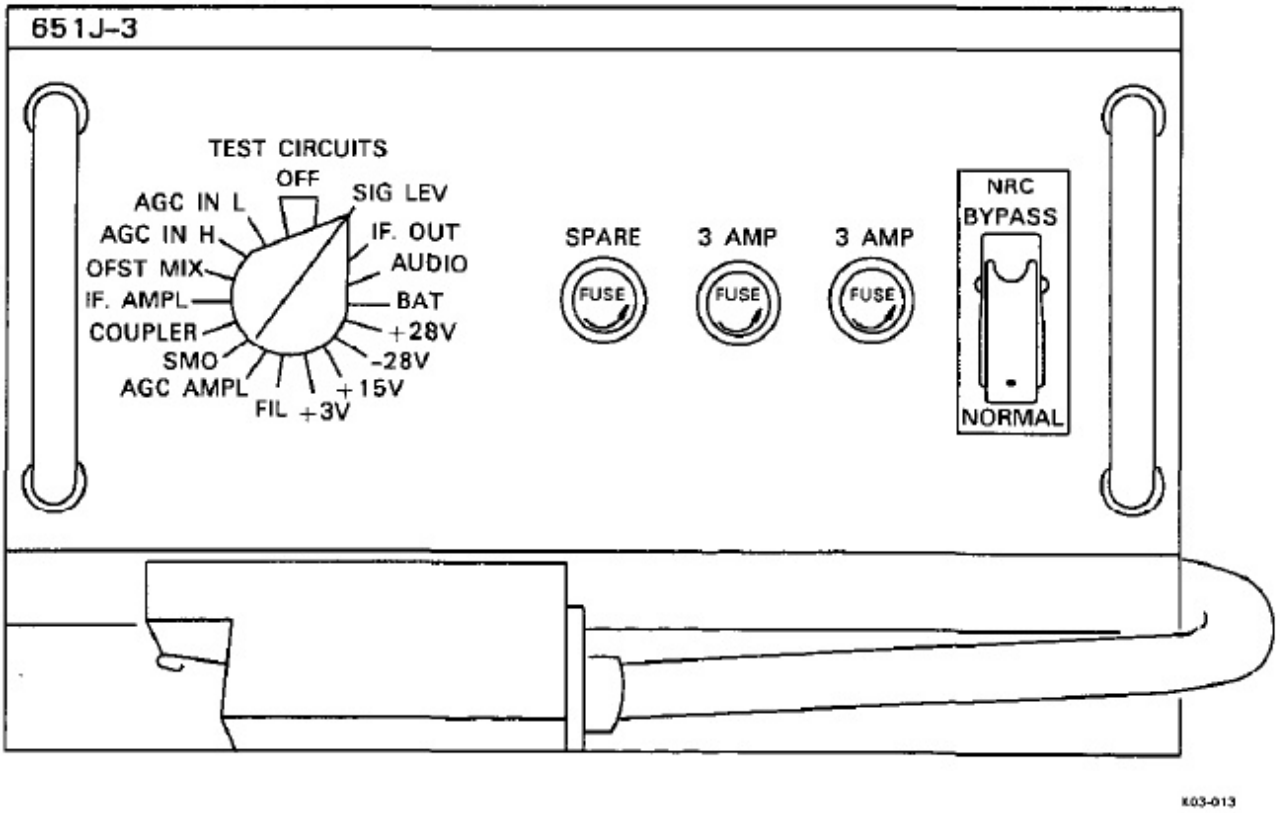


Figure 21-12. VLF Receiver (R2141)

self checking. As the switch is set to each position, test conditions are set up within the receiver to check a particular function. During normal operation (no check being accomplished), the test circuit switch is set to SIG LEV. The front panel of the VLF receiver also contains a NRC (noise reduction control) switch that, when set to NORMAL, reduces background noise of the corresponding VLF receiver output.

21.2.5.3 VLF Receiver Controls (C-10608). The three VLF receiver controls (Figure 21-13), control and monitor the VLF receivers. Each control has switches and knobs that control the receiver tuning, gain, mode, on/off status, selection of FSK or MSK, and meters that are used with test switches on the receivers to monitor receiver performance. Refer to Figure 21-14 for a description of the VLF receiver control panel indicators and controls.

21.2.5.4 VERDIN Receive Terminal. Each VERDIN receive terminal consists of a processor and a receive demodulator. The digital data receiving set (VERDIN receive terminal) accepts MSK data from a

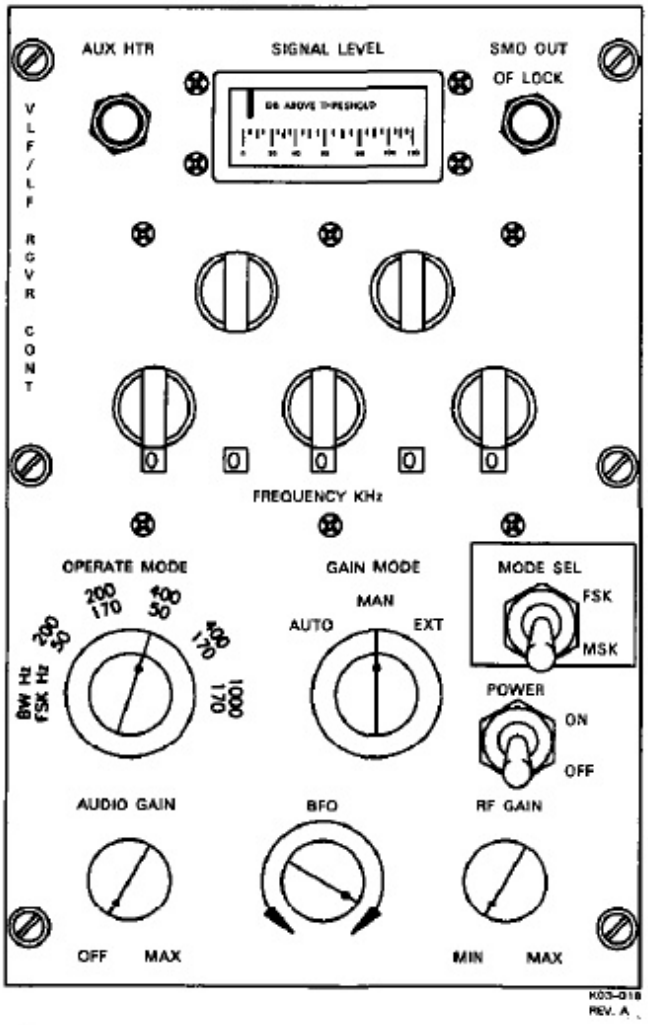


Figure 21-13. VLF Receiver Control (C-10608)

VLF receiver and provides overall control of detection, decoding, and processing of the incoming data. The processor contains instructions to generate required Communication modes and system diagnostics. The demodulator provides input/output processing between the processor and other elements of the VERDIN system. The receive terminal interfaces with corresponding equipment that contain voltage/impedance conversion circuits and EMI/TEMPEST filtering. The output is routed through the parallel interface circuits to TMPS and TDM.

21.2.5.4.1 VERDIN Processor (CP-1072B/AR). The VERDIN processor (Figure 21-15) is a special purpose processor that demultiplexes, decodes, and processes data from the VERDIN demodulator in accordance with a program stored on three EPROM cards. The VERDIN processor reformats the demodulated digital data into Baudot code, acts as a data buffer, and controls the input/output devices through the demodulator. The processors enable the VERDIN system to operate in 18 different modes. A built-in-test automatically checks the equipment during idle time. The processors used with the VERDIN receive terminals are identical to the processor used with the VERDIN transmit terminal and each can be interchanged. Refer to Figure 21-16 for a description of the processor controls and indicator functions. Details of the AN/ARR-82 operating modes and their procedures are contained in the AN/ARR-82 SOI.

21.2.5.4.2 VERDIN Demodulator (MD-1193/ARR-82). The VERDIN demodulators (Figure 21-17) accept MSK signals at 7.5 kHz intermediate frequency from the VLF receivers and convert them into digital information for the processors. The demodulators serve as input/output adapters between the processors and other elements of the VERDIN system. The demodulators also provide timing signals and power control for the processors. The VERDIN demodulators have internal power supplies to maintain critical timing in case of primary power shutdown or failure. Refer to Figure 21-19 for a description of the VERDIN demodulator controls and indicators.

21.2.5.5 VLF Secure Receive (TSEC-5, 6, 7) (KG-33CS). The VLF receiver translates the received MSK signals to a 7.5 kHz intermediate frequency signal and sends them to the VERDIN receive terminal for decoding. If the received data is encrypted, the receive terminal uses a TSEC that is hardwired to the terminal for decryption. TSEC 5 is hardwired to terminal 1, TSEC 6 is hardwired to terminal 2, and TSEC 7 is hardwired to terminal 3.

CONTROL/INDICATOR	FUNCTION
AUX HTR Indicator (Amber)	Illuminates if the heater in the 5 MHz reference oscillator is operating
SIGNAL LEVEL Meter	Indicates level of signals selected by TEST CIRCUITS switch on VL receiver.
SMO OUT OF LOCK Indicator (Red)	Illuminates when receiver is out of phase lock with the externa frequency standard.
FREQUENCY KHz Selectors (5)	Selects the receiver frequency in 10 Hz steps. Setting for each switc is read in small window below.
OPERATE MODE Selector	Selects receiver band-width/frequency-shift mode of operation.
200/50 Position	Selects receiver reception at bandwidth of 200 Hz, frequency shift o 50 (±25) Hz. Normal for reception at baud rate less than 75 and fo CW reception.
200/170 Position	Selects receiver reception at bandwidth of 200 Hz, frequency shift o 170 (±85) Hz. Normal for reception at baud rate less than 75.
400/50 Position	Selects receiver reception at bandwidth of 400 Hz, frequency shift at 50 (±2 Hz. Normal for reception at baud rate greater than or equal to 75.
400/170 Position	Selects receiver reception at bandwidth of 400 Hz, frequency shift at 170 (±8 Hz. Normal for reception at baud rate greater than or equal to 75.
1000/170 Position	Selects receiver reception at bandwidth of 1000 Hz, frequency shif of 170 (±85) Hz. Normal for reception at baud rate greater than 75
GAIN MODE Rotary Switch	
AUTO Position	Enables automatic control of receiver gain by internal circuits.
MAN Position	Activates the RF GAIN potentiometer to control gain.
EXT Position	Not used.
MODE SEL Switch	Routes receiver output to the DC jackfield when at FSK, and to th VERDIN receive terminals when at MSK.
POWER Switch	Applies power to the receiver.
RF GAIN Control	Used with the GAIN MODE switch MAN position to manuall control receiver gain.
BFO Potentiometer	Controls the beat frequency oscillator to produce an audio sideton during CW reception.
AUDIO GAIN Switch	Controls the CW amplifier (potentiometer is not used).

Figure 21-14. VLF Receiver Controls and Indicators

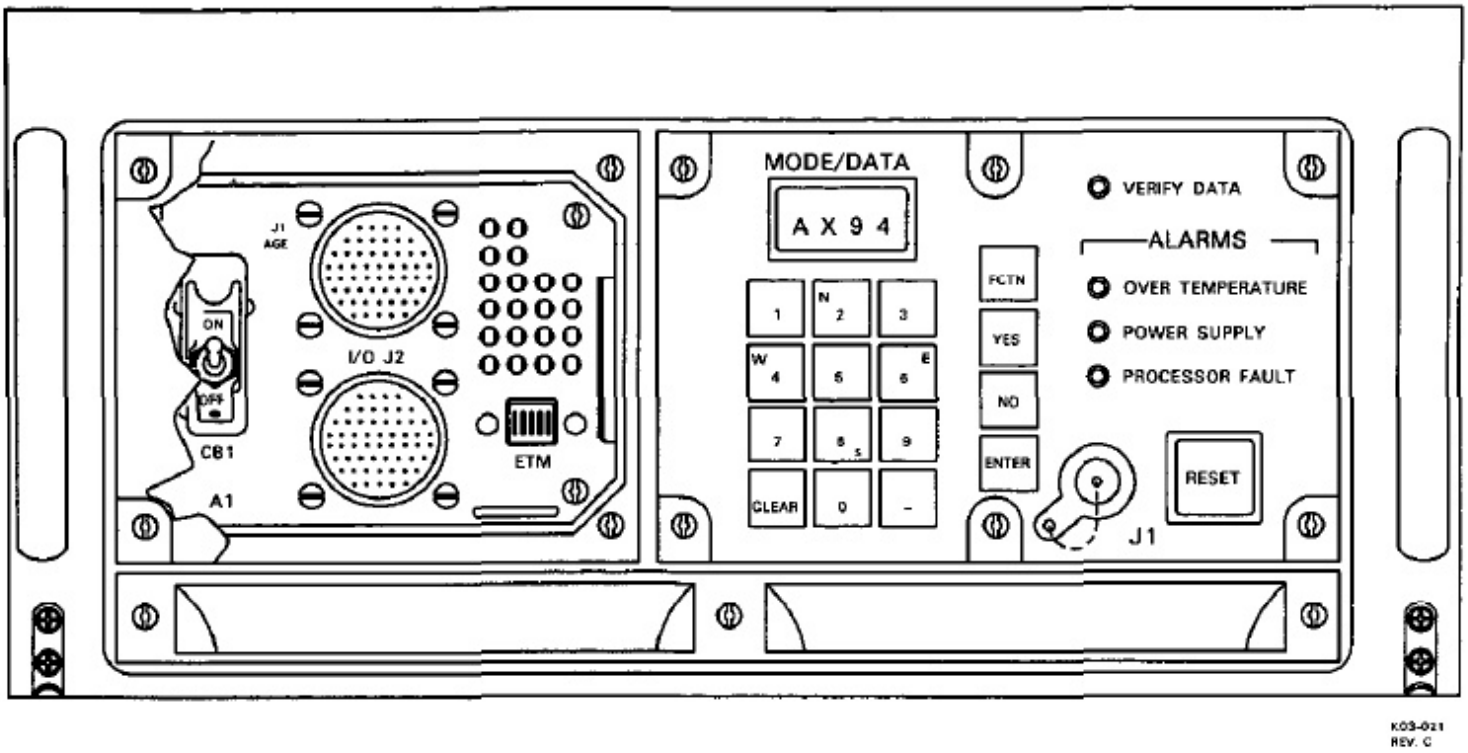


Figure 21-15. VERDIN Processor (CP-1072B/AR)

CONTROL/INDICATOR	FUNCTION
MODE/DATA Display	Displays transmit or receive mode number, except when fault occurs or when numeric keyboard data are being entered.
FCTN Pushbutton	When pressed with proper numeric keys, display shows one of the following: a. Current mode. b. Real time. c. Current delay time variable. Pressing pushbutton, followed by a two-digit code and ENTER, defines the message I/O device or displays various parameters.
VERIFY DATA Indicator (Amber)	Indicates operator YES/NO or RESET input required.
OVER TEMPERATURE ALARM Indicator (Red)	Indicates unit has exceeded high temperature limit (75 °C, 167 °F).
POWER SUPPLY ALARM Indicator (Red)	Indicates overvoltage or undervoltage within power supply.

Figure 21-16. VERDIN Processor Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
PROCESSOR FAULT ALARM Indicator (Red)	Indicates software fault or that a remote program load has bee attempted. It cannot be reset by software if set by hardwa built-in-test.
RESET Pushbutton	Resets processor and initiates an initial program load and self-te fault location.
J1 Interface Jack	Not used.
YES Pushbutton	Affirmative response to query on display or TTY printer.
NO Pushbutton	Negative response to query on display or TTY printer.
ENTER Pushbutton	Enters operator input, as shown on MODE/DATA display, into th processor.
0 thru 9 Keys	Enters number in rightmost position of DATA DISPLAY and shi of existing number to left. The N (north) character on key 2 an S (south) character on key 8 is used for entry of latitude data. Th W (west) character on key 4 and the E (east) character on key 6 used for entry of longitude data.
– (minus) Key	Used for negative numbers.
CLEAR Key	Clears display.
Note	
The following items are located beneath the protective cover on the left side of the panel.	
CB 1 Circuit Breaker	Protects processor from high or low power levels. Not to be used a an on-off switch.
J1 AGE Connector	Not used.
TEST POINT Connectors	Provides maintenance measurement points.
ETM (Elapsed Time Meter) Indicator	Records and displays time power has been on the processor.
J2 I/O Connector	Not used.

Figure 21-16. VERDIN Processor Controls and Indicators (Sheet 2 of 2)

CONTROL/INDICATOR	FUNCTION
CLOCK ERROR Indicator (Red)	Illuminates to show discrepancy between demodulator time bas (TB) 1 PPM and external frequency time standard.
PRGM FAULT (Red)	Illuminates to show demodulator has not received program aları reset signal from EVP within 200 ms.
KEY GEN-1	
RDY Indicator (Green)	Illuminates to show KG1 is ready for on-line operation.
ON-LINE Indicator Green)	Illuminates to show EVP selected KG1 for on-line operation.
KEY GEN-2	
RDY Indicator (Green)	Not used.
ON-LINE Indicator (Green)	Not used.
POWER Switch	At ON, connects both ac and dc power to demodulator and ac powe to EVP.
DC IN USE Indicator (Yellow)	Illuminates to show demodulator is operating from dc powe (standby). Maintains critical timing circuits only.
AC Indicator (Green)	Illuminates to show primary power is activated for use by bot demodulator and EVP.
Note	
The following items are located on top of the demodulator unit.	
DC Circuit Breaker (Left)	Provides demodulator circuit protection.
Time Totalizing Meter	Displays demodulator total operating time.
AC Circuit Breaker (Right)	Provides demodulator circuit protection.

Figure 21-19. VERDIN Receive Demodulator Controls and Indicators

CONTROL/INDICATOR	FUNCTION
OUTPUT ALARM Indicator (Red)	Illuminates when output alarm is set. This disables the control uni output data port.
KEY GEN Indicators and Select Switch	Identifies status of selected key generator 1 (left indicators) or ke generator 2 (right indicators).
ALARM Indicators (Red)	Illuminate to show selected KG alarm signal.
READY Indicators (Green)	Illuminate to show selected KG has been run up and is ready for use
RUN UP Indicators (Yellow)	Illuminate to show that the selected KG is being run up with th high-speed KG clock.
ON LINE SELECT Switch	When set to 1, KG1, is on-line and operational and KG2 is availabl for run up.
	When set to 2, KG2 is on-line and operational and KG1 is availabl for run up.
MODE Select Switch	
PLAIN Position	System set for non-secure data functions.
CIPHER Position	System set for secure data functions.

Note

Switching from PLAIN to CIPHER or CIPHER to PLAIN causes the control unit output data port to the modulator to be disabled until the EVP system mode conforms to the mode switch setting.

TIME ENTRY Pushbutton	When pressed, arms the control unit time-base circuit to be run u from the processor.
CIPHER SELECT Switches	Select operation mode for respective KG.
1 Position	Set for KG block 1 operation.
2A Position	Set for KG block 2A operation. Internal control unit switches selec the 2A substream.
2B Position	Set for KG block 2B operation. Internal control unit switches selec the 2B substream.
POWER Switch	
ON Position	Applies both ac and dc power to control unit and ac power t processor.

Figure 21-21. VERDIN Control Unit Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
OFF Position	Removes all power from both control unit and processor.
DC POWER IN USE Indicator (Yellow)	Illuminates when control unit is operating from dc power (standby). Only critical timing circuits are maintained.
AC POWER Indicator (Green)	Illuminates when the control unit is operating from ac power.
Note	
The following items are located on the top of the control unit.	
DC Circuit Breaker (Left)	Provides control unit protection.
Time-totalizing HOURS Meter	Displays control unit cumulative operating time.
AC Circuit Breaker (Right)	Provides control unit protection.

Figure 21-21. VERDIN Control Unit Controls and Indicators (Sheet 2 of 2)

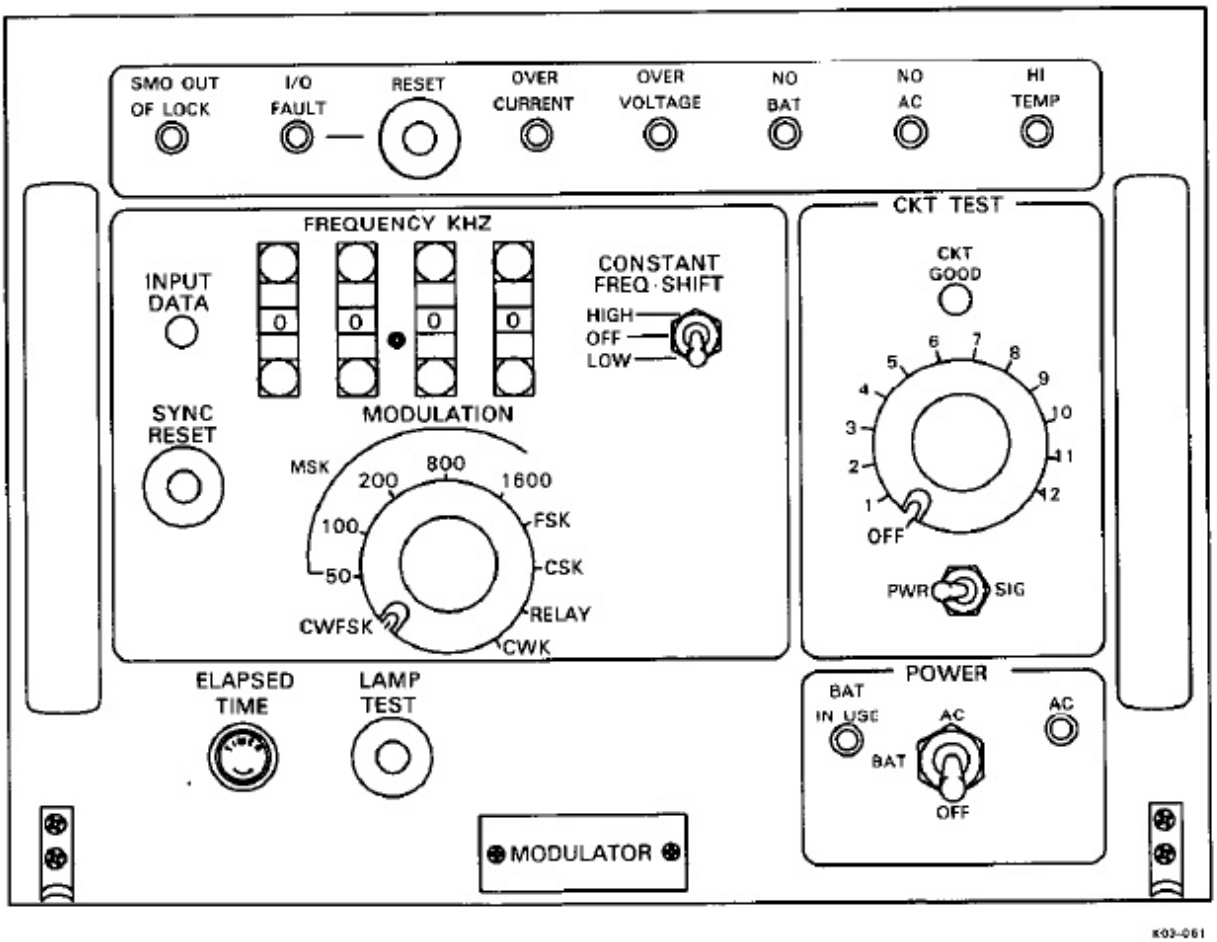


Figure 21-22. VERDIN Modulator (MD-1194/ART-53)

CONTROL/INDICATOR	FUNCTION
AC Indicator (Green)	Illuminates when primary ac power is on.
BAT IN USE Indicator (Amber)	Illuminates when NBPS power is used in the event of an ac powe failure.
POWER Switch	At AC position connects ac power to modulator. At BAT position connects dc power from NBPS to modulator.
LAMP TEST Pushbutton	When pressed, tests all front panel indicators except AC power o indicator.
ELAPSED TIME Meter	Indicates total operating time.
CKT TEST Selector	Selects which one of 10 modulator signals or 6 power supply voltage will be tested, depending on the position of the CKT TEST toggl switch.

Figure 21-23. VERDIN Modulator Controls and Indicators (Sheet 1 of 2)

control unit via the KEY GEN SELECT switch. Key generator 1 is TSEC-6. Key generator 2 is TSEC-5.

Note

The MODE switch on the control unit must be in CIPHER position to access TSEC-5 or -6.

21.2.7 VLF Air Interlock Panel. The VLF air interlock panel (Figure 21-24) contains interlock circuits that remove primary power from the VERDIN transmit and receive terminals if the comm central draw-through cooling fails. The VLF air interlock panel VLF XMT switch (red guarded), when at BATTLE SHORT, restores primary power to the VERDIN transmit terminal and modulator only, regardless of the draw-through cooling status.

21.2.8 VLF Power Amplifier-Coupler Remote Control-Indicator Panel. Comm central seat three has a remote control indicator to control the VLF power amplifier coupler. The panel is identical to the unit that is installed in the local maintenance panel on the VLF PA coupler. Refer to Chapter 23 for the panel and operation of the controls and indicators.

21.2.9 STWA and LTWA Length Indicators. A short wire length indicator panel and a long wire length indicator panel (Figure 21-25), located at the aft console bay 2/3, display the respective lengths (four and five digit) of antenna wire extended by the reel operator. The panel receives length information from the reel ope tors console.

21.3 IN-FLIGHT PERFORMANCE MONITOR

The IFPM data center continuously monitors equ ment status within comm central and receiv transmitter groups. Operating personnel are provi indications on the IFPM display panel whenever malfunction occurs. The IFPM monitor sensor gr consists of the IFPM data center, IFPM power sup and the IFPM display panel. The IFPM data cente located in the back of the aft console (P30), bay 2 the IFPM power supply is located in the back of aft console (P30), bay 3.

21.3.1 IFPM Display Panel. The IFPM disp panel (Figure 21-26) has high-intensity red LED f indicators. These indicators are mounted in functio groups to simplify fault recognition. The IFPM po switch connects 28-volt power to the IFPM power s ply control relays that, in turn, apply power to the IF data center. A momentary-action switch on the disp panel is used in the lamp test circuit. The IFPM POW fault indicator is driven directly from the IFPM d center via the lamp driver cards. VERDIN termin TMPS, VLF preamplifier/filter, PIC, and TDM po fault signals are applied directly to the lamp driver ca The DC POWER-14V, FSK KEYER 3, FSK KEY 4, CONV 4, DIV CONV 1A, and DIV CONV 1B lam are not used.

CONTROL/INDICATOR	FUNCTION
CKT TEST Toggle Switch	At the PWR position, allows the CKT TEST switch to test one of 6 power supply voltages. At the SIG position, allows the CKT TEST switch to test one of 10 modulator signals.
CKT GOOD Indicator (White)	Illuminates when circuit being tested is good.
CONSTANT FREQ SHIFT Switch	Forces the modulator to generate a constant upper frequency shift (at the HIGH position) or lower frequency shift (at the LOW position) for maintenance.
MODULATION Selector	Selects the mode of operation and associated data rate. The CWK mode is disabled for AN/USC-13(V).
FREQUENCY KHZ Selector Switches	The four switches operate together to select the modulator output operating frequency in the range of 10 kHz to 59.99 kHz in 10-Hz steps.
INPUT DATA Indicator (White)	Illuminates for every binary 1 (mark) data bit received.
SYNC RESET Switch	Synchronizes the modulator timing with the 1 PPM system clock.
SMO OUT OF LOCK Indicator (Red)	Illuminates when the stabilized master oscillator circuits are out of phase lock.
I/O FAULT Indicator (Red)	Illuminates when a timing fault or an I/O data-mark malfunction exists. The indicator remains on until reset by the RESET switch.
RESET Pushbutton	Resets I/O FAULT indicator circuit after fault is removed.
OVER CURRENT Indicator (Red)	Illuminates when the load on any dc voltage output exceeds a preset maximum current limit.
OVER VOLTAGE Indicator (Red)	Illuminates when any dc voltage output exceeds a preset maximum voltage limit.
NO BAT Indicator (Red)	Illuminates when no NBPS power is available.
NO AC Indicator (Red)	Illuminates when no ac power is available.
HI TEMP Indicator (Red)	Illuminates when power supply temperature exceeds 83 °C (179 °F).

Figure 21-23. VERDIN Modulator Controls and Indicators (Sheet 2 of 2)

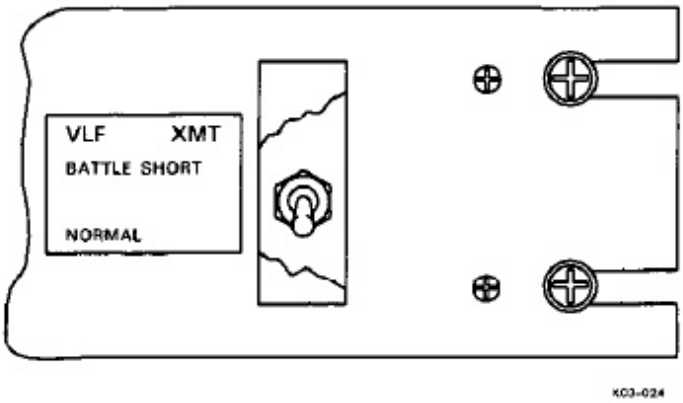


Figure 21-24. VLF Air Interlock Panel

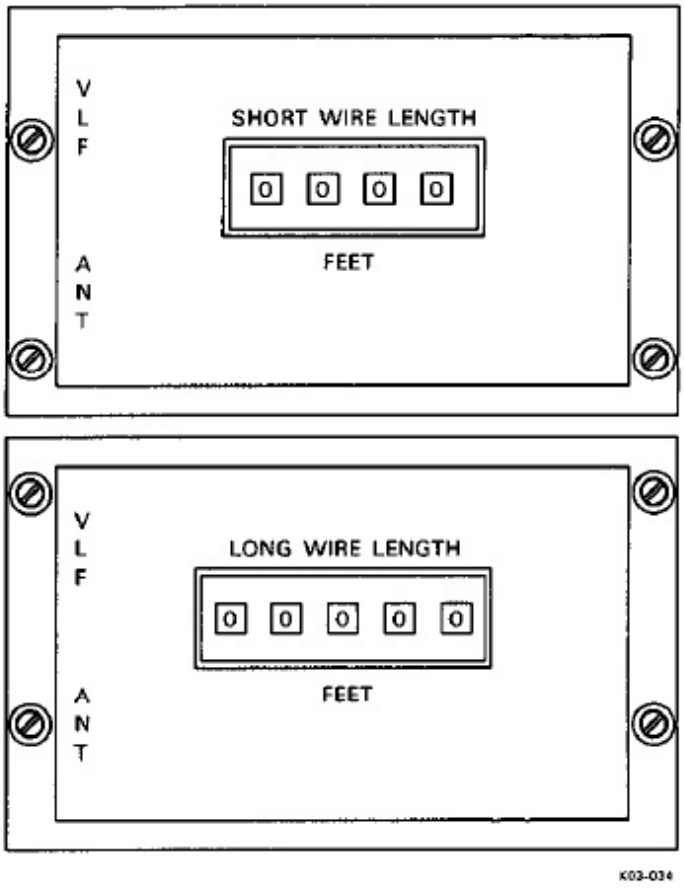


Figure 21-25. STWA/LTWA Length Indicators

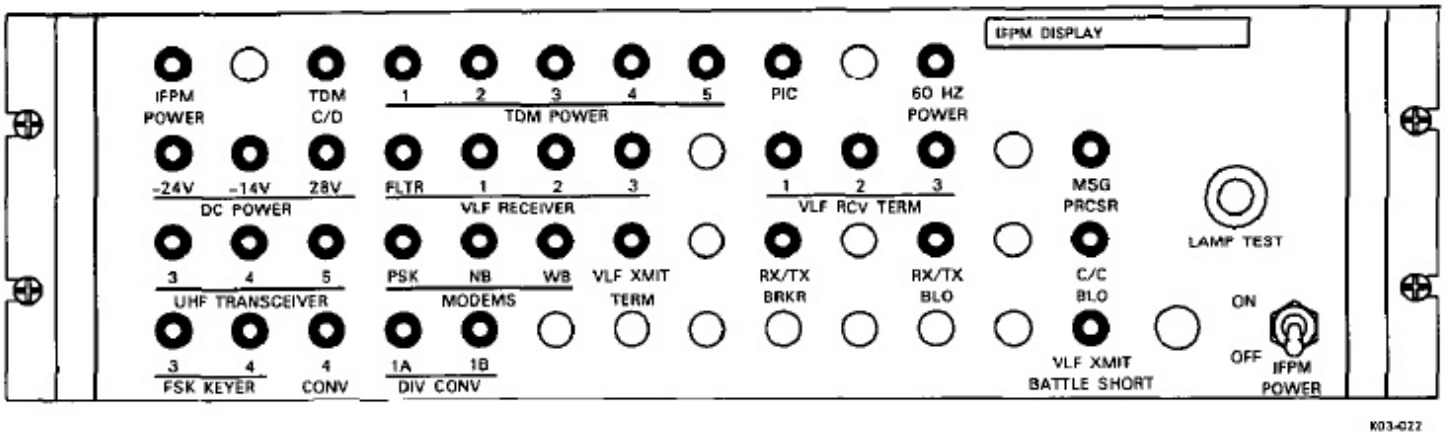


Figure 21-26. IFPM Display Panel

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
Frequency Time Standard, Uninterrupted Power Supply (UPS)	115V, 400 Hz	MA 5 AC	P67-2 Panel, FTS CONT PNL AFT
Standard Distribution and Switching Unit	28 VDC	MA 5 No Break	28 VDC DISTR 2 Panel, STD DISTR
Frequency Time Std 1	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, FTS 1
	28 VDC	FTS UPS	FTS UPS CONTROL PANEL SYSTEM 1 BATT 28V
Frequency Time Std 2	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, FTS 2
	28 VDC	FTS UPS	FTS UPS CONTROL PANEL SYSTEM 2 BATT 28V

Figure 21-27. Seat Three Equipment Power Sources (Sheet 1 of 3)

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
Inflight Performance Monitor (IFPM)	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, C/C IFPM
	28 VDC	MA 5 DC AFT Console	28 VDC DISTR 2 Panel, VLF PA CONT
	28 VDC	MA 5 DC AFT Console	28 VDC DISTR 2 Panel, MISC CONT
Oscilloscope	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, CRO
VERDIN Receive Terminal 1	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, VLF RCV TERM 1
	28 VDC	MA 5 No Break	28 VDC DISTR 2 Panel, NBPS VLF RCV TERM 1
VERDIN Receive Terminal 2	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, VLF RCV TERM 2
	28 VDC	MA 5 No Break	28 VDC DISTR 2 Panel, NBPS VLF RCV TERM 2
VERDIN Receive Terminal 3	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, VLF RCV TERM 3
	28 VDC	MA 5 No Break	28 VDC DISTR 2 Panel, NBPS VLF RCV TERM 3
VERDIN Transmit Terminal	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, VLF TRANSMIT TERM
	28 VDC	MA 5 No Break	28 VDC DISTR 2 Panel, VLF XMIT TERM
VLF Air Interlock Panel	28 VDC	MA 5 DC AFT Console	28 VDC DISTR 2 Panel, VLF AIR INTLK

Figure 21-27. Seat Three Equipment Power Sources (Sheet 2 of 3)

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
VLF Power Amplifier-Coupler Remote Control-Indicator	28 VDC	MA 5 DC AFT Console	28 VDC DISTR 2 Panel, VLF PA CONT
VLF Preamplifier/Filter Control Unit	28 VDC	MA 1 DC DIST	MDF-2, VLF NOTCH FLTR
VLF Receiver 1	115V, 60 Hz	60 HZ Distribution	MDF-2, VLF RCVR 1
VLF Receiver 2	115V, 60 Hz	60 HZ Distribution	MDF-2, VLF RCVR 2
VLF Receiver 3	115V,60 Hz	60 HZ Distribution	MDF-2, VLF RCVR 3
VLF Receiver Control 1	115V, 60 Hz	60 HZ Distribution	MDF-2, VLF RCVR 1
VLF Receiver Control 2	115V, 60 Hz	60 HZ Distribution	MDF-2, VLF RCVR 2
VLF Receiver Control 3	115V, 60 Hz	60 HZ Distribution	MDF-2, VLF RCVR 3
VLF Secure Receive/ Transmit (TSEC-5)	28 VDC	MA 5 No Break	28 VDC DISTR 2 Panel, NBPS TSEC 5
VLF Secure Receive/ Transmit (TSEC-6)	28 VDC	MA 5 No Break	28 VDC DISTR 2 Panel, NBPS TSEC 6
VLF Secure Receive (TSEC-7)	28 VDC	MA 5 No Break	28 VDC DISTR 2 Panel, NBPS TSEC 7
VERDIN Modulator	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 PANEL, VLF TRANSMIT MOD
	28 VDC	MA 5 No Break	28 VDC DISTR 2 Panel, NBPS VLF XMIT TERM

Figure 21-27. Seat Three Equipment Power Sources (Sheet 3 of 3)

21.4 SEAT THREE EQUIPMENT POWER SOURCES

Figure 21-27 lists the power sources for equipment associated with the VLF operator position, including the type of electrical power, and the circuit breaker location/label.

21.5 SEAT THREE PREFLIGHT

21.5.1 Station Oxygen/ICS Preflight

1. ICS CSU — Checked.

   a. All volume controls — CCW.

   b. PTT switch — ICS.

   c. ICS selector switch — ALL.

   d. ICS volume switch — Midrange.

   e. TEST switch — Pressed.

      Set VOL control for comfortable level and speak into microphone. Ensure voice sidetone is present in headset and all lamps illuminate on the CSU. Release TEST switch, all lamps extinguish.

2. Oxygen, ICS — Checked.

   a. Mask visual check — Complete.

      Check hose, mask, and regulator for cleanliness and damage. Verify oxygen mask is connected.

   b. SUPPLY lever — ON.

   c. Emergency lever — TEST MASK.

      Hold mask facing away from yourself. Hold emergency lever to the TEST MASK position, then release.

   d. Microphone check — Complete.

      Verify mask MIC works with ICS.

   e. Diluter lever — 100 percent OXYGEN.

   f. Emergency lever — EMERGENCY.

      Positive pressure should be indicated.

   g. Emergency lever — NORMAL.

      Breathe for a minimum of three cycles. Tl blinker should show alternately black ar white. Hold breath momentarily (blink should remain black). Pressure should be 2! to 430 psi.

   h. SUPPLY lever — OFF.

21.5.2 Equipment Power Up

1. FTS UPS power — On.

2. FTS 1 and 2 power — On.

3. VLF receiver control heads power — On.

4. VLF preamplifier/filter control power — On.

5. VERDIN modulator power — On.

6. VERDIN terminals power — On.

7. IFPM power — On.

8. TSEC's 5, 6, and 7 power — On.

9. TMPS, TDM, and HF receiver — Available.

   Verify the TMPS and TDM are operational ar 1 HF receiver is available.

21.5.3 FTS UPS Preflight

1. 400 HZ DISTR 2 panel FTS 1 and FTS 2 circu breakers — Open.

   Observe frequency time standards. Verify tl AC OPR indicators extinguish and the EXT D OPR indicators illuminate.

2. FTS UPS control panel — Checked.

   a. SYSTEM 1 CHARGER 400 HZ DISCO! NECT circuit breakers — Open.

   b. SYSTEM 2 BATT 28V circuit breaker — Ope

      Verify SYSTEM 1 FAULT indicat illuminates, audio alarm sounds and FTS and 2 DC OPR indicators remain illuminate

   c. FTS UPS circuit breakers — Closed.

      Reset alarm. Verify fault indication extinguish

d. SYSTEM 2 CHARGER 400 HZ DISCONNECT circuit breakers — Open.

e. SYSTEM 1 BATT 28V circuit breaker — Open.

Verify SYSTEM 2 FAULT indicator illuminates, audio alarm sounds and FTS 1 and 2 DC OPR indicators remain illuminated.

f. FTS UPS circuit breakers — Closed.

Reset alarm. Verify fault indication extinguishes.

3. 400 HZ DISTR 2 Panel FTS 1 and FTS 2 circuit breakers — Closed.

Verify no alarms occur that cannot be reset. Observe frequency time standards, verify AC OPR indicators illuminate and EXT DC OPR indicators extinguish.

21.5.4 Oscilloscope Preflight. The oscilloscope (o'scope) preflight described herein is for a unit commonly in use. Other o'scopes with similar preflight requirements may be encountered.

1. Coax cables — Connected.

Connect between the CRO input A/B jacks and the o'scope channel A/B jacks, respectively.

2. CRO input panel channel A — AUD JF A.

3. CRO input panel channel B — AUD JF B.

4. O'scope — Set.

a. SCALE knob — Midposition.

b. FOCUS knob — Midposition.

c. INTENSITY knob — Midposition.

d. HORIZONTAL POSITION outer knob — Midposition.

e. MAGNIFIER switch — X1.

f. DISPLAY knob — INT.

g. AC/DC sliding switch — AC.

h. A POSITION knob — Midposition.

i. B POSITION knob — Midposition.

j. DISPLAY switch — Chop (B TRIGGER).

k. POLARITY switches — +UP.

l. VOLTS/CM switches — 1.

Inner CAL knob fully CW to CAL position.

m. AC/GND/DC sliding switches — DC.

n. VERNIER knob — Max Clockwise.

To CAL position.

o. TIME/CM switches — 0.5 m SEC.

p. MODE sliding switch — AUTO.

q. LEVEL Knob — Minimum (CCW).

r. EXT ÷ 10/EXT/INT/LINE sliding, switch — INT.

s. SLOPE switch — (+).

t. ACS/ACF/AC/DC switch — AC.

u. O'scope — ON.

5. Audio jackfield CRO Channel A and B switches — Active Circuit.

Select positions appropriate to apply a test signal to the o'scope. Observe o'scope. Adjust FOCUS, INTENSITY, B position, right VOLTS/CM switch, HORIZONTAL POSITION, and LEVEL knobs to obtain display.

6. O'scope INTENSITY control — Counterclockwise.

Until display just disappears.

21.5.5 FTS Preflight. Ensure 30-minute warmup prior to performing the following procedure.

1. Minimum performance checks — Complete.

Rotate the CIRCUIT CHECK switch through each position and verify the readings are normal as indicated on the front cover. Lamp test and verify all indicators illuminate.

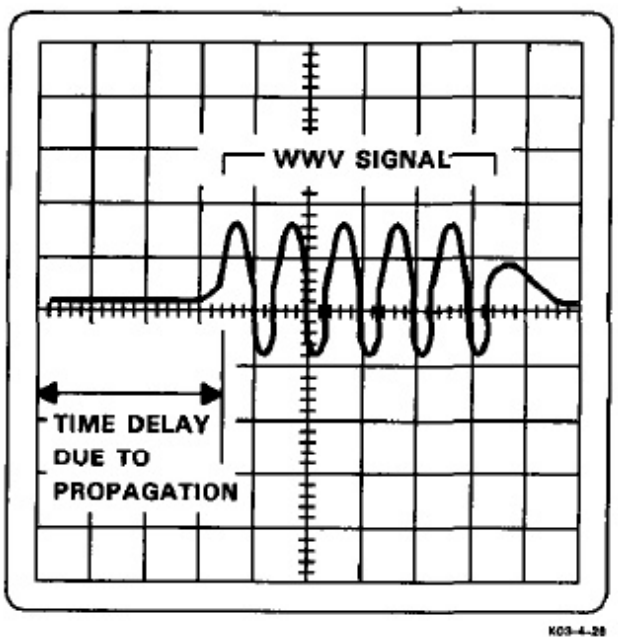


Figure 21-28. WWV Oscilloscope Signal

2. TIMING FAULT reset pushbutton — Pressed.

   Verify the TIMING FAULT indicator is extinguished.

3. Coax — Connected.

   FTS 1 PPS jack to EXT INPUT jack on o'scope.

4. Audio jackfield CRO CH A selector switch — HF Receive Voice Jack.

5. Time hack — Selected.

   On selected HF receiver, obtain the best time standard signal in the AM MODE. Audio gain MAX.

6. CRO input panel CHANNEL A switch — AUD JF A.

7. Clock — Synchronized.

   a. O'scope DISPLAY — A.

   b. MODE — NORM.

   c. EXT ÷ 10/EXT/INT/LINE — EXT.

   d. TIME CM — 50 m SEC.

   e. HORIZONTAL POSITION — Adjusted.

      Set sweep start to align with left side o per centimeter scale.

   f. FTS thumb wheels — Adjusted.

      Align UTC signal with left side of tir scale.

   g. TIME CM — Set.

      Decrease to next lower time division. F steps f and g until TIME CM switch is 1 m SEC.

Note

If delay is more than 10 m SEC, set TIME CM switch to 2 m SEC.

   h. Delay setting — SET.

      Calculate distance from present positi UTC, and add appropriate delay using thumb wheels (Figure 21-28).

   i. FTS clock face — Set.

      Synchronize with UTC from CSU HF a

   j. 1-PPM — Set.

      Press and release MIN RESET on the 5 ond mark.

8. FTS 1 and 2 — Synchronized.

   a. FTS 2 minimum performance chec Complete.

      Perform steps 1 and 2.

   b. Coax — Routed.

      Remove FTS 1 coax connector from o' EXT input and attach to FTS 2 SYNC in

   c. FTS 2 thumb wheels — 000001.

   d. FTS 2 SYNC button — Pressed.

      Hold for a minimum of 3 seconds.

e. FTS 2 clock face — Set.

Synchronize with FTS 1 clock face.

Note

Inadvertent connection of both FTS 1 PPS output jacks may result in FTS clock face stopping.

f. FTS 2 — Verified.

Remove coax from FTS 1, 1 PPS output and attach to o'scope EXT input. Remove coax from FTS 2 SYNC input and connect to FTS 2, 1 PPS output. Verify display for correct delay.

9. O'scope INTENSITY control — Set.

Rotate counter/clockwise until display disappears, then set POWER switch to OFF.

10. VLF control FREQ STD switch — 1 or 2 as applicable.

21.5.6 VLF Preflight (Loop Back). The VLF receive/transmit preflight procedure utilizes the loopback test cable installed in the aircraft to inject a signal directly from the VERDIN modulator into the VLF receive system as follows.

CAUTION

Coordinate with the IFT prior to removal of D70936 from the modulator shelf back cap to prevent damage to the VLF PA coupler.

1. Connector J03 — Disconnected.

a. At the rear of P30 bay 4, disconnect connector D70936 from J03 of the modulator shelf back cap assembly.

b. VLF Modulator signal output — Verified.
Connect test output adjust cable between J03 and channel 1 or 2 of the oscilloscope. Verify output is 3.4 ±0.2v P-P. Remove test output adjust cable when complete.

c. Modulator output cable — Set.
Connect either D71353 (forward/aft) or D71534 (port/starboard) to J03. This routes the output of the modulator through a fixed attenuator into the input circuits of the VLF preamplifier/filter.

2. VERDIN modulator circuit tests — Performed.

a. CKT TEST toggle switch — PWR.

b. CKT TEST select switch — 1 through 6.

Allowing 3 seconds at each position for internal test to complete. Verify the CKT TEST indicator illuminates at each position. Return switch to OFF.

c. CKT TEST toggle switch — SIG.

d. CKT TEST select switch — 1 through 10.

Allowing 3 seconds at each position for internal test to complete. Verify the CKT TEST indicator illuminates at each position. Return switch to OFF.

3. VERDIN terminal circuit tests — Performed.

a. VLF RCVR TERM 1, 2, and 3 circuit breakers — Open.

On receive terminal demodulators 1, 2, and 3, verify the DC IN USE indicator illuminates and the AC indicator extinguishes.

b. VLF RCVR TERM 1, 2, and 3 circuit breakers — Closed.

Verify the DC IN USE indicator extinguishes and the AC indicator illuminates.

c. VLF TRANSMIT TERM and VLF TRANSMIT MOD circuit breakers — Open.

On VERDIN control unit and VERDIN modulator verify the DC IN USE indicator illuminates and the AC indicator extinguishes.

d. VLF TRANSMIT TERM and VLF TRANSMIT MOD circuit breakers — Closed.

Verify the DC IN USE indicator extinguishes and the AC indicator illuminates.

4. VLF preamplifier/filter control panel — Set.

a. NOTCH FILTER FREQ SELECT switch — AUTO.

b. TRANSMIT MONITOR switch — OFF.

DISPLAY	MEANING
ACQ	Indicates that program is attempting to synchronize.
CORR	System initialization complete, correlation in progress.
CSAR	KG clock set and reset.
DLAY	System is ready for delay entry.
FCXX	Indicates function code being entered into processor.
FSK	System is processing FSK signal.
HS	System in high speed run-up.
KG1X/KG2X	Enter (0) for block I, (1 thru 16) for block II.
MMPM	MEECN message processing mode.
MODE	System is ready for operating mode number entry.
MSK	System processing MSK system.
NACQ	Indicates no sync is present (no acquisition).
OPKG	Enter operational KG number, 1 for KG1, 2 for KG2.

DISPLAY	MEANING
PANL	System is ready for input device selection (TTY or front panel).
PRT?	System is ready for print output selection (TTY or front panel).
REL	Release MMPM message.
REL?	Request for number of MMPM copies to send.
STUP	Notifies operator to verify setting of system controls for selected operating mode.
STRT	(1) for late start, (2) for guard band start.
SWH1	KG on-line select switch to (1).
SWH2	KG on-line select switch to (2).
TIME	System requires time entry.
TSWH	Press and release time entry switch.
WAIT	Processing data, panel entry switches disabled.

Figure 21-29. VERDIN Processor Front Panel Displays and Meaning

5. NOTCH FILTER auto tuning — CHECKED.

   Enter the following frequencies on the VERDIN modulator and verify the corresponding NOTCH FILTER FREQ SELECT indicators illuminate on the VLF preamplifer/filter control:

Modulator	Preamplifier/Filter
18.00 kHz	17.0 to 19.1
20.00 kHz	19.1 to 21.3
22.00 kHz	21.3 to 23.5
24.00 kHz	23.5 to 25.7
27.00 kHz	25.7 to 27.9
29.00 kHz	27.9 to 30.0

Note

Switching may take up to 24 seconds on the VLF preamplifer/filter control for each frequency band.

6. Receive terminal processors — Programmed.

   Set for automatic mode recognition.

Note

VERDIN processor display may be used in lieu of keyboard/printer for operator interface.

a. Printer Baud — 50 Baud.

b. TDM connection — Connected.

Connect VERDIN RCV 1 to the selected printer as required for operator instructions.

Note

- SECURITY PRECAUTION — If power is lost or any malfunction prevents RESET to clear the RAM cards of classified data, the processor shall be safe guarded as SECRET material until the RAM cards are cleared or removed.
- For additional operating instructions refer to NAVAIR 16-30ARR82-2 (SOI manual digital data receiving set AN/ARR-82).
- The fill light on the KG-30 equipment may remain lit following the proper fill operation. However, the light will extinguish during normal system initialization. The operator may wish to perform the fill operation immediately prior to powering up the demodulator.

c. VERDIN receive processors — Programmed.

Enter appropriate four-digit mode number for "Automatic mode recognition" from program configuration card. Configure and operate the equipment in response to prompts from the processor. Refer to Figure 21-29 for processor front panel displays and meanings.

d. VLF receiver control panels — Set.

(1) OPERATE MODE — 1000/170.

(2) MODE SELECT — MSK.

(3) FREQUENCY KHZ — 02975.

(4) GAIN MODE — AUTO.

e. VLF receiver TEST CIRCUITS switch — SIG LEV.

7. Transmit terminal — Programmed.

Set for MEECN mode 9.

Note

VERDIN processor display may be used in lieu of keyboard/printer for operator interface.

a. TDM connections — Connected.

Connect VERDIN XMIT DIAG-1 to selected printer.

b. VERDIN control unit — Set.

(1) MODE — CIPHER.

Note

SECURITY PRECAUTION — The airborne transmitting set shall not be operated on the air using Block II setup until authorized by the National Security Agency at some undetermined future date.

(2) KG1/KG2 CIPHER SELECT switches — 1.

Note

- SECURITY PRECAUTION — If power is lost or any malfunction prevents RESET to clear the RAM cards of classified data, the processor shall be safe guarded as SECRET material until the RAM cards are cleared or removed.
- For additional operating instructions refer to NAVAIR 16-30ART53-2 (SOI manual digital data transmitting set AN/ART-53).

c. Processor programming — Initiated.

Enter appropriate four-digit mode number for "MEECN mode 9" from program configuration card. Configure and operate the equipment in response to prompts from the processor. Refer to Figure 21-29 for processor front panel displays and meanings.

d. TDM connections — Released.

e. VERDIN modulator — Set.

(1) MODULATION — MSK 800.

(2) CONSTANT FREQUENCY SHIFT — OFF.

(3) FREQUENCY KHz — 29.75.

(4) I/O FAULT — Reset As Required.

8. TDM connections — Connected.

Connect selected printer to VERDIN RCV 1. Verify "CHANNEL ONE" message is printed.

9. Test message — Transmitted.

Insert and release a test message from the TMPS. Verify test message is received by the VERDIN receive terminal and printed.

10. VERDIN receive terminals 2 and 3 — Checked.

Repeat steps 8 and 9 for VERDIN receive terminals 2 and 3.

Note

VERDIN processor display may be used in lieu of keyboard/printer for operator interface.

11. TDM connections — Connected

Release available printer and connect to VERDIN XMIT DIAG 1.

12. VERDIN transmit terminal — MM15.

Reinitiate processor programming without KG run up by entering appropriate function code (FCTN, 9, 9, and ENTER) and four-digit mode number for "MEECN mode 15" from program configuration card. Configure and operate the equipment in response to prompts from the processor.

13. VERDIN modulator — Set.

a. MODULATION switch — FSK.

b. I/O FAULT — Reset As Required.

14. TDM connections — Connected.

a. TD — VERDIN XMIT CH 1.

b. TD — 75 BAUD.

c. Printer — Released.

Connect to VERDIN RCV 1. Verif "CHANNEL ONE" message is received o VERDIN receive terminal and printed.

Note

"CHANNEL ONE" message will only be printed after transmit terminal processor programming is complete.

15. Test message — Transmitted.

Place MEECN mode 15 test message on TD an set FREE/STOP/RUN switch to RUN. Pres FCTN, 0, 1, and ENTER on transmit processo Verify test message is received by selected VL receive terminal and printed.

16. VERDIN receive terminals 2 and 3 — Checked.

Reinitiate transmission of test message whil monitoring receive terminals 2 and 3 to ensur they receive message.

17. Modulator POWER switch — OFF.

18. TDM connections — Released.

19. TTY equipment — As Required.

20. Modulator output cable — Normal.

At the rear of P30 bay 4, disconnect the te cable from J03 of the modulator shelf backca assembly and reconnect D70936, modulator ou put. Secure the test cable within bay 4.

21. Equipment power — Secured.

Secure all equipment not powered by the NBP prior to comm central power shift.

21.6 SEAT THREE OPERATION

21.6.1 Oscilloscope Operation. The o'scope i used to monitor selected audio or dc signals. The signal are routed from the audio or dc jackfield through th CRO input panel to the o'scope.

21.6.1.1 Dc Signals. To monitor dc jackfield signals:

1. O'scope POWER switch — On.
2. Dc jackfield patches — Patched.

   Patch desired signal into CRO CH A jack J57 or CRO CH B jack J58 of the dc jackfield.

3. O'scope input channel — Selected.

   If signal is patched into J57, set CHANNEL A switch of CRO input panel to DC JF A. If signal is patched into J58, set CHANNEL B switch of CRO input panel to DC JF B. Jack J57 and J58, the two switches of the CRO input panel, and the two channels of the o'scope can be used to display two separate signals simultaneously.

4. O'scope controls — Set.

   INTENSITY, FOCUS, HORIZONTAL POSITION, SCALE ILLUMINATION, VERTICAL POSITION, etc. to obtain best display.

21.6.1.2 Audio Signals. To monitor audio jackfield signals:

1. O'scope POWER switch — On.
2. Audio jackfield signal source — Selected.

   If the signal to be monitored is in the top row of SOURCES section of the audio jackfield, set CRO CH A switch of audio jackfield to position corresponding to the jack number of the desired signal, and set CHANNEL A switch of CRO input panel to AUD JF A. If the signal is in the second row of SOURCES section of the audio jackfield, set CRO CH B of audio jackfield to position corresponding to jack number of desired signal, and set CHANNEL B switch of CRO input panel to AUD JF B.

3. O'scope controls — Set.

   INTENSITY, FOCUS, HORIZONTAL POSITION, SCALE ILLUMINATION, VERTICAL POSITION, etc. to obtain best display.

21.6.2 VLF Receive Operation

21.6.2.1 VLF FSK Operation. For FSK operation, the OPERATE MODE switch setting on the VLF receiver control is important. The proper position depends upon the frequency shift and the Baud rate of the FSK signal being received. Four switch positions are used for normal FSK reception. (The 1000/170 Hz position may be used to search the bands for an incoming signal, but once a signal has been found, the switch should be set to one of the other positions.) If the input signal frequency shift is 50 Hz and the Baud rate is 75 or more, the OPERATE MODE switch should be set to 400/50. If the input signal frequency shift is 50 Hz and the Baud rate is less than 75, the OPERATE MODE switch should be set to 200/50. If the input signal frequency shift is 170 Hz and the Baud rate is 75 or more, the OPERATE MODE switch should be set to 400/170. If the input signal frequency shift is 170 Hz and the baud-rate is less than 75, the OPERATE MODE switch should be set to 200/170.

Note

- For 25 Hz shift, set OPERATE MODE switch to 200/50 or 400/50.
- For 85 Hz shift, set OPERATE MODE switch to 200/170 or 400/170.
- For 60 WPM operation, set OPERATE MODE switch to 200/50 or 200/170.
- For 100 WPM operation, set OPERATE MODE switch to 400/50 or 400/170.

The FSK output can be routed to either the dc jackfield or to a VERDIN receive terminal. To set up a VLF receiver for FSK reception:

1. VLF receiver NRC switch — NORMAL.
2. VLF receiver control — Set.
   a. POWER — On.
   b. MODE SELECT — As Required.

      Set to FSK to route signal to dc jackfield or MSK to route signal to VERDIN terminal.

   c. FREQUENCY KHz switches — Set.

      Set to desired reception frequency.

   d. GAIN MODE — Auto.

e. OPERATE MODE — Set.

Set for appropriate position for frequency shift and Baud rate of input signal (normally 200/50.)

f. AUDIO GAIN — On.

g. BFO — As Required

Adjust BFO control for desired tone pitch while listening to FSK tones from associated VLF RX volume control on ICS CSU panel.

3. VERDIN receive terminal — As Required.

Program load VERDIN terminal for appropriate mode for FSK operation, if the terminal is being used. Output of VERDIN terminal can be monitored either on a teletype printer through the TDM or on the TMPS.

4. Dc jackfield patches — As Required.

If output of VLF receiver is selected to the dc jackfield, make appropriate patches on dc jackfield to route signal to a printer through the TDM or route directly to TMPS via the MSG PRCSR 1 or 2 jacks.

5. VLF preamplifier/filter control — On.

21.6.2.2 VLF MSK Operation. VLF MSK reception can only be accomplished using the VERDIN terminal that processes the signal from the VLF receiver. To set up to receive VLF MSK signals:

1. VLF receiver control — Set.

a. POWER switch — On.

b. MODE SEL — MSK.

c. FREQUENCY KHz switches — Set.

Set to desired reception frequency.

d. GAIN MODE switch — AUTO.

e. OPERATE MODE — As Required.

Set to appropriate position for frequency shift and Baud rate of input signal (normally 1000/170.)

2. VERDIN receive terminal — Loaded.

Program load VERDIN terminal for appropria operating mode. Output of the VERDIN termin can be monitored on teletype equipment, throu the TDM, or on the TMPS.

3. VLF preamplifier/filter control — On.

21.6.2.3 VLF CW Reception. To set up for VI CW reception:

1. VLF preamplifier/filter control — On.

2. VLF receiver control — Set.

a. VLF control power switch — On.

b. FREQUENCY KHz switches — Set.

Set to desired reception frequency.

c. GAIN MODE switch — MANUAL.

d. RF GAIN control — MIDSCALE.

e. OPERATE MODE switch — 200/50.

f. AUDIO GAIN switch — On.

g. BFO — As Required.

Adjust BFO control for desired tone pit while listening to CW tones from associat VLF RX volume control on ICS CSU panel

3. VLF preamplifier/filter control — On.

21.6.3 VLF Transmit Operation. Ensure conne tor D70936 is connected to J03 of the modulator she To set up VLF transmit terminal:

1. VLF preamplifier/filter control — Set.

a. POWER switch — On.

b. NOTCH FILTER FREQ SELECT-KH switch — AUTO.

CAUTION

The VLF preamplifier/filter control NOTCH FREQ SELECT — KHZ switch shall be set to AUTO during VLF PA coupler transmissions. At all other times BYPASS may be selected.

2. VLF modulator — Set.

   a. POWER switch — AC.

   b. FREQUENCY KHz switches — Set.

      Set switches to desired transmission frequency.

CAUTION

Do not change frequency while VLF PA coupler is operating.

   c. CONSTANT FREQ SHIFT switch — OFF.

   d. MODULATION switch — As Required.

      Set to correct modulation for desired transmission mode.

CAUTION

Do not change position of MODULATION switch while VLF PA coupler is operating.

   e. I/O FAULT RESET button — Pressed.

      If I/O FAULT light illuminates, pressing this switch will reset fault light.

3. VERDIN transmit terminal — Loaded.

   Program load VERDIN terminal for appropriate operating mode.

4. Message transmission — Initiated.

   Transmission may be initiated by use of function codes on the VERDIN terminal while message is sent via teletype equipment through the TDM, or by sending a message from the TMPS to the VERDIN terminal.

Note

Coordinate with ACO, ACS, and VLF PA operator to ensure VLF PA is operating prior to transmitting message.

21.7 SEAT THREE POSTFLIGHT

Postflight procedures should be performed any time seat three equipment has been energized prior to leaving the aircraft, or for expected loss of aircraft power.

All seat three equipment shall be secured and zeroized in such a manner as to prevent any compromise of classified information. Station shall be sanitized to ensure all classified information has been properly removed and stowed prior to exiting the aircraft.

The aircraft shall be clean and all stations properly secured (i.e. seats facing station with seat belts fastened neatly, armrests down.)

21.7.1 Station Oxygen/ICS Postflight

1. Oxygen — NORMAL, 100 percent OXYGEN, SUPPLY OFF.

2. CSU PTT selector — ICS.

21.7.2 VERDIN Transmit/Receive Terminals. Shutdown procedures for both transmit and receive terminals are as follows:

1. Modulator POWER switch — OFF.

2. Processor front panel RESET — PRESSED.

Note

- SECURITY PRECAUTION — If power is lost or any malfunction prevents RESET to clear the RAM cards of classified data, the processor shall be safe guarded as SECRET material until the RAM cards are cleared or removed.

- Ensure 8 is displayed momentarily followed by MODE.

3. Demodulators/control unit POWER switches — OFF.

4. TSEC -5, -6, and -7 — Secured.

   a. XMTR/RCVR ZERO OFF switches — ZERO OFF (down).

      Ensure XMTR/RCVR FILL indicator is illuminated.

   b. POWER ON/OFF switch — OFF.

21.7.3 VLF Receive Subsystem

1. VLF receiver controls — Secured.
   a. FREQUENCY KHZ switches — Zeroized.

      Set to all 1's.

   b. POWER switch — OFF.
2. VLF preamplifier/filter control — OFF.

21.7.4 Frequency Time Standards

21.7.4.1 Frequency Time Standards (One Secured, One Powered by FTS UPS System). Whenever an FTS is to be left on without the use of ac power:

1. FTS UPS circuit breakers — Closed.
2. Nonessential FTS — Secured.
   a. POWER switch — OFF.
   b. BATTERY CHARGE RATE switch — TRICKLE.
   c. Front panel — Closed.
3. Essential FTS — Set.
   a. BATTERY CHARGE RATE switch - TRICKLE.
   b. Front panel — Closed.

      After removal of ac power ensure EXT dc indicator is illuminated.

21.7.4.2 Frequency Time Standards (Both Secured)

1. POWER switch — OFF.
2. BATTERY CHARGE RATE switch - TRICKLE.
3. Front panel — Closed.

21.7.5 Oscilloscope Postflight

1. INTENSITY control — Fully CCW.
2. POWER switch — OFF.

CHAPTER 22

Seat Four Position — Preflight, Operation, and Postflight

22.1 SEAT FOUR POSITION RESPONSIBILITIES

Seat four is responsible for the preflight, operation and postflight of the HF radio subsystem, HF secure voice (TSEC-8) equipment, the three audio cassette tape recorders, two UHF-6 ERCS receivers, and the UHF-3 LOS radio control. In addition, seat four is responsible for the preflight of the NO-BREAK POWER MONITOR panel and the 24-volt power supply selector panel. The position is the primary radio operator.

22.2 HF SUBSYSTEM

The HF radio subsystem is comprised of four AN/ARC-190(V) radio sets (identified as HF-2, HF-3, HF-4, and HF-5), a fault/tune panel, and a power monitor panel. All four radio sets use identical equipment. HF-2 is used only for reception as the transmit keying line is disabled. HF-3, HF-4, and HF-5 can be used for reception and transmission. Each radio set consists of a radio set control, a R/T, a preselector band-pass filter, a filter-coupler group, and an antenna. The HF fault/tune panel and HF power monitor panel are used to augment the HF radios. The radio sets are totally solid state, including the 400-watt power amplifier, and have no motor driven components. Tuning is automatic and BIT is provided for fault detection and isolation of faulted components. Reception and transmission are available on 280,000 manually selected channels or on any of 30 preset channels. The operating frequency separation between radios in percentage of selected frequency is:

Frequency Band	Separation
2 to 6 MHz	28 percent
6 to 13 MHz	15 percent
13 to 30 MHz	10 percent

Modes of operation available include: AME, USE and LSB voice, USB and LSB data, and CW. Voic access to each HF radio is through the ICS and audi jackfield. Data access to each HF radio is through th audio jackfield. Figure 22-1 presents a simplifie block diagram of the HF subsystem.

22.2.1 HF Receiver/Transmitter (RT-1341). On HF receive and three HF R/Ts are located in R/T bay (FO-6).

22.2.2 HF Radio Set Control (C-10828). A radi set control (Figure 22-2) for each HF radio provides a the operating controls required. Refer to Figure 22-3 fo a description of the controls and indicators.

22.2.3 HF Preselector Band-Pass Filter (F-1535 An F-1535 preselector band-pass filter (Figure 22-4) fo each HF set is located in R/T bay 1 next to each HF R/ The filters provide additional selectivity ahead of th first tuned circuits in the receiver during reception an added selectivity of the excitation signal to the powe amplifier during transmission. The front panel contain three indicators: the PWR, OVLD, and the FAUL indicators. The PWR indicator illuminates when th radio system power is applied. The OVLD indicato illuminates when the receive RF signal level exceeds preset limit in the filter. Recovery from overload automatic. The FAULT indicator illuminates when fault exists in the filter and will also display as a PRI SEL FAULT on the HF fault/tune panel.

22.2.4 HF Filter-Coupler Group. The filter-cou pler group comprises a SIMOP band-pass filter and a antenna coupler. An F-1602 SIMOP band-pass filte (Figure 22-5) for each of the HF transceivers is locate in R/T bays 1, 2, or 4. The filter provides highly selectiv filtering for transmitted and received signals to reduc broad band noise and allows SIMOP operation of th

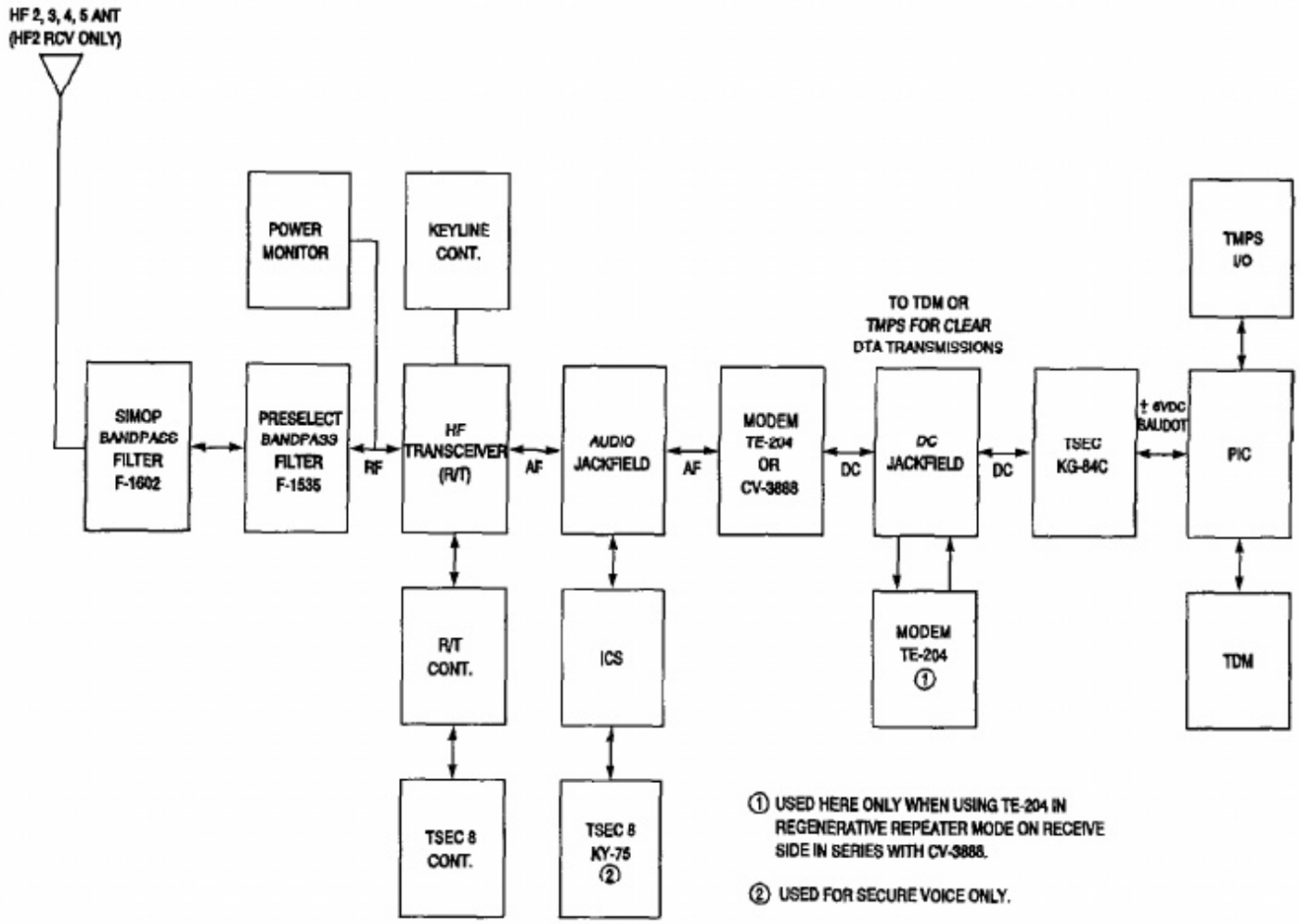


Figure 22-1. HF Subsystem

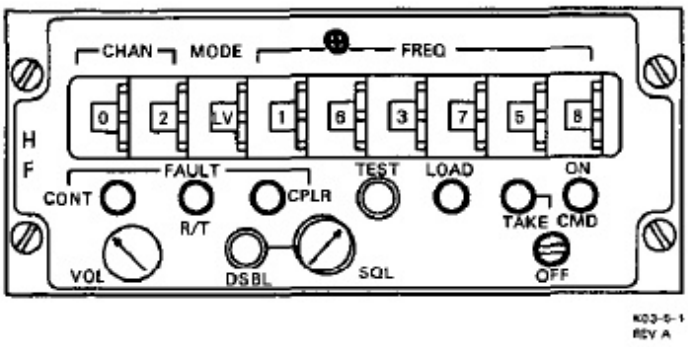


Figure 22-2. HF Radio Set Control (C-10828)

HF radios. The units also contain absorptive filters t attenuate harmonics and spurious emissions in th VHF/UHF spectrum. Each filter operates in conjunctio with an antenna coupler that provides an impedanc match between the antenna and the R/T. The antenn couplers are located at each antenna. The front panel c each of the SIMOP filters contains two fault indicator A FLTR FAULT indicator (in combination with CPL indicator) illuminates when a fault is present in th SIMOP band-pass filter. The CPLR FAULT indicat illuminates when a fault is present in the associate coupler. These faults are also displayed on the H fault/tune panel.

CONTROL/INDICATOR	FUNCTION
CHAN Thumbwheel Selectors (2)	Used to select 1 of 30 channels (00 through 29) for preset mode and frequency data.
MODE Thumbwheel Selector	Used to select one of the following modes: LV – Lower sideband voice. UV – Upper sideband voice. LD – Lower sideband data. UD – Upper sideband data. CW – Continuous wave. AM – Amplitude modulation equivalent. P – Preset (R/T FAULT indicator will illuminate if set in this mode with CHAN selectors set to an unloaded preset channel). A – Undefined (CONT FAULT indicator will illuminate if selected).
FREQ Thumbwheel Selectors (6)	Used to select up to 280,000 frequency channels spaced at 100 Hz increments from 2.0000 to 29.9999 MHz.
Note Frequency selection below 2.0000 MHz will cause a CONT FAULT indication.	
ON Indicator (Green)	Illuminates when radio set power is applied.
TAKE CMD Momentary Toggle Switch	Used to turn radio set on or off (take command function not used).
TAKE CMD Indicator (Green)	Illuminates when radio set control has applied power to the radio set.
LOAD Momentary Pushbutton Switch	Used to store mode and frequency data in the receiver-transmitter preset channel memory. Data stored in memory location indicated by the preset CHAN selector.

Figure 22-3. HF Radio Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
TEST Momentary Pushbutton Switch	Used to initiate a self-test cycle. When pressed, all FAULT indicators illuminate and the radio goes through a receive self-test. When released, all FAULT indicators extinguish unless a fault is registered at one of the indicators. The next time the microphone PTT switch is keyed after using the TEST switch, a transmit self-test cycle is initiated. If the transmit test fails, one of the FAULT indicators will illuminate.
	WARNING Verify that all personnel are clear of radiation areas prior to initiating a transmit test.
	Note Verify radio is set to non-critical frequency prior to initiating a transmit test.
SQL Selector Switch (4 position)	Used to select a squelch threshold level. Disabled when in fully counterclockwise position or when disabled with the DSBL switch.
DSBL Momentary Pushbutton Switch	Used alternately to enable or disable the SQL switch.
CPLR FAULT Indicator (Amber)	Illuminates when a malfunction occurs in the antenna coupler or SIMOP band-pass filter (F-1602). Fault indicators on the SIMOP band-pass filter and the IIF fault/tune panel will identify which of the two has failed. This fault condition will also cause the COUPLER FAULT indicator on the HF fault/tune panel to illuminate.
R/T FAULT Indicator (Amber)	Illuminates when a malfunction occurs in the receiver/transmitter or preselector bandpass filter (F-1535), or when a filter overload condition occurs. Fault and overload indicators on the preselector bandpass filter and HF fault/tune panel will identify which fault or condition has occured. The R/T FAULT indicator will also illuminate when the CHAN thumbwheels are set to an unloaded preset channel with the MODE thumbwheel set to P.
CONT FAULT Indicator (Amber)	Illuminates when a malfunction occurs in the radio set control, FREQ thumbwheels are set to below 02.0000 MHz, or when MODE thumbwheel is set to A.
VOL Control (8 position)	Sets receiver/transmitter audio output level.

Figure 22-3. HF Radio Controls and Indicators (Sheet 2 of 2)

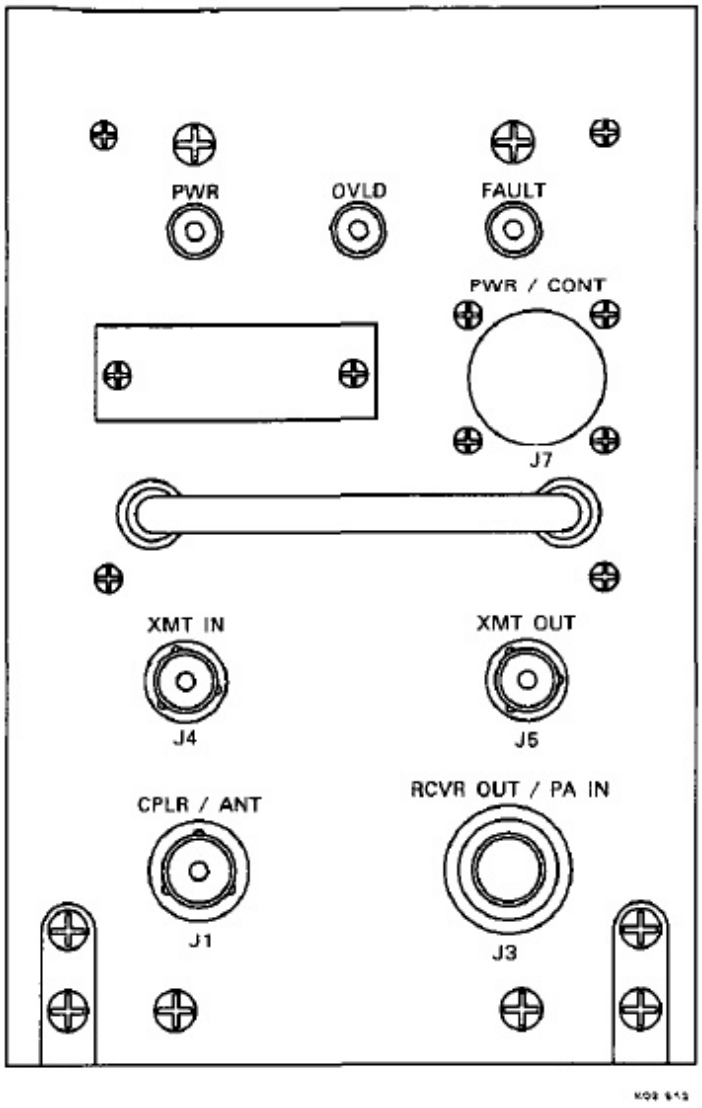


Figure 22-4. Bandpass Filter (F-1535)

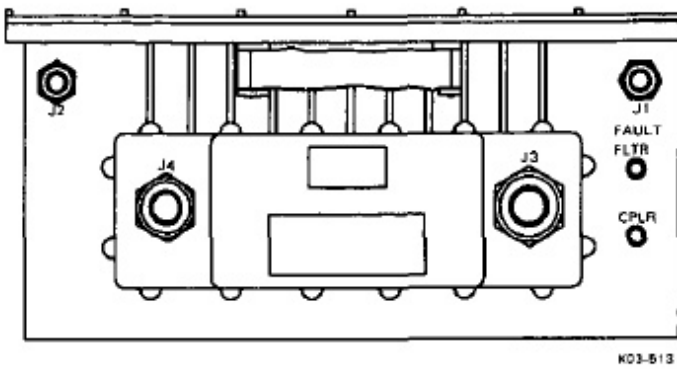


Figure 22-5. HF SIMOP Bandpass Filter (F-1602)

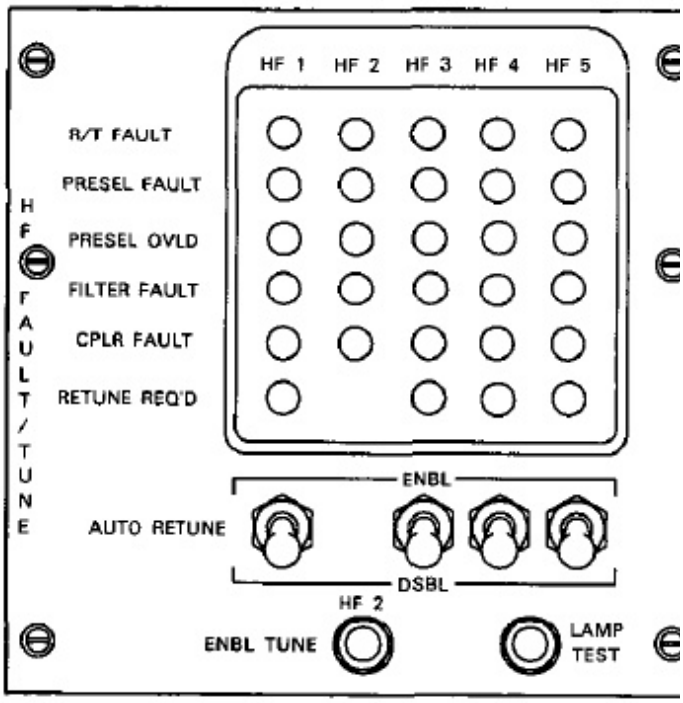


Figure 22-6. HF Fault/Tune Panel (C-11655)

22.2.5 HF Fault/Tune Panel (C-11655). The HF fault/tune panel (Figure 22-6) provides for summary monitoring of faults in all 5 HF radios, including HF-1. It also provides the enabling function of automatic tuning for the HF radios. The controls and indicators are described in Figure 22-7.

22.2.6 HF Power Monitor Panel (ID-2399). The HF power monitor panel (Figure 22-8) is used to display HF-3, HF-4, and HF-5 forward and reflected power. The HF transceiver forward (F) or reflected (R) power is selected with the switch and the level of signal is displayed by the power meter.

22.2.7 HF-1 Radio. HF-1 radio is primarily f flight deck use and the radio set control is located at t pilots forward electronic panel. The radio set is identic to the mission sets except for the antenna coupler, whi tunes the HF long wire antenna. The RF power fro HF-1 cannot be measured on the HF power monit panel. The radio can be accessed by the mission cre for reception and transmission through the ICS auxilia control panel. All controls for HF-1, except the AUT RETUNE switch, are on the flight deck radio set contr

CONTROL/INDICATOR	FUNCTION
R/T FAULT Indicators (Yellow)	Illuminate when a fault condition exists in the respective receiver/transmitter.
PRESEL FAULT Indicators (Yellow)	Illuminate when a fault exists in the respective preselector bandpass filter.
PRESEL OVLD Indicators (Yellow)	Illuminate when an overload condition exists in the respective preselector bandpass filter.
FILTER FAULT Indicators (Yellow)	Illuminate when a fault exists in the respective SIMOP band-pass filter.
CPLR FAULT Indicators (Yellow)	Illuminate when a fault condition exists in the respective antenna coupler.
RETUNE REQ'D Indicators (Yellow)	Illuminate when a retune request has been received from the respective filter-coupler group.
AUTO RETUNE Toggle Switches	
ENBL Position	Enables automatic retuning of HF-1, HF-3, HF-4 and HF-5 antenna coupler and SIMOP band-pass filter in response to a retune request from the respective filter-coupler group.
DSBL Position	Disables AUTO RETUNE function.
HF 2 ENBL TUNE Momentary Pushbutton	Used to enable tuning of the HF-2 filter-coupler group. Not required if HF-2 is being used to receive on a preset channel.
LAMP TEST Momentary Pushbutton	Used to lamp test all indicators on panel.

Figure 22-7. HF Fault/Tune Panel Controls and Indicators

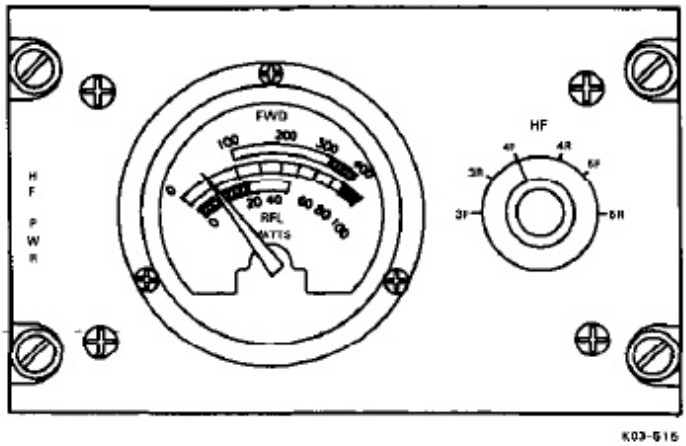


Figure 22-8. HF Power Monitor Panel (ID-2399)

22.3 ADVANCED NARROWBAND DIGITAL VOICE TERMINAL

The ANDVT enables HF-3, HF-4, and HF-5 transceivers to transmit and receive secure voice communications. The ANDVT system consists of a COMSEC module (Figure 22-9), split remote control unit (Figure 22-11), and basic terminal unit. Key lists are loaded into the CM using a portable remote fill device. The operator/equipment interface is made through the ICS. Clear transmit audio from the ICS is encrypted by the CM and routed to the selected transceiver. Received audio is decrypted by the CM and routed through the ICS. The BTU and CM are located in the back of the aft console (P30), bay 2. The BTU provides the voice processing, coding, and modem functions. The CM provides the encryption, decryption, and bypass (transmit plain-text) functions.

The SRCU is located at the seat four operator con The SRCU allows remote operation and provid indication of the operating status. The controls an dicators on the CM and SRCU are describe Figures 22-10 and 22-12, respectively.

22.4 CASSETTE TAPE RECORDERS (AN/UNH-16A)

Each of three audio cassette recorders (Figure 2 enables operators to record and store audio frequ signals for future transmission or reference. The sette recorder is a miniature, two-channel, four- unit that operates at 15/16 IPS to record or repro audio signals from 200 Hz to 4 kHz. The unit u cassette cartridge loaded with 300 feet of 0.15 wide magnetic tape to record a signal input fron audio jackfield. The unit records on one half o

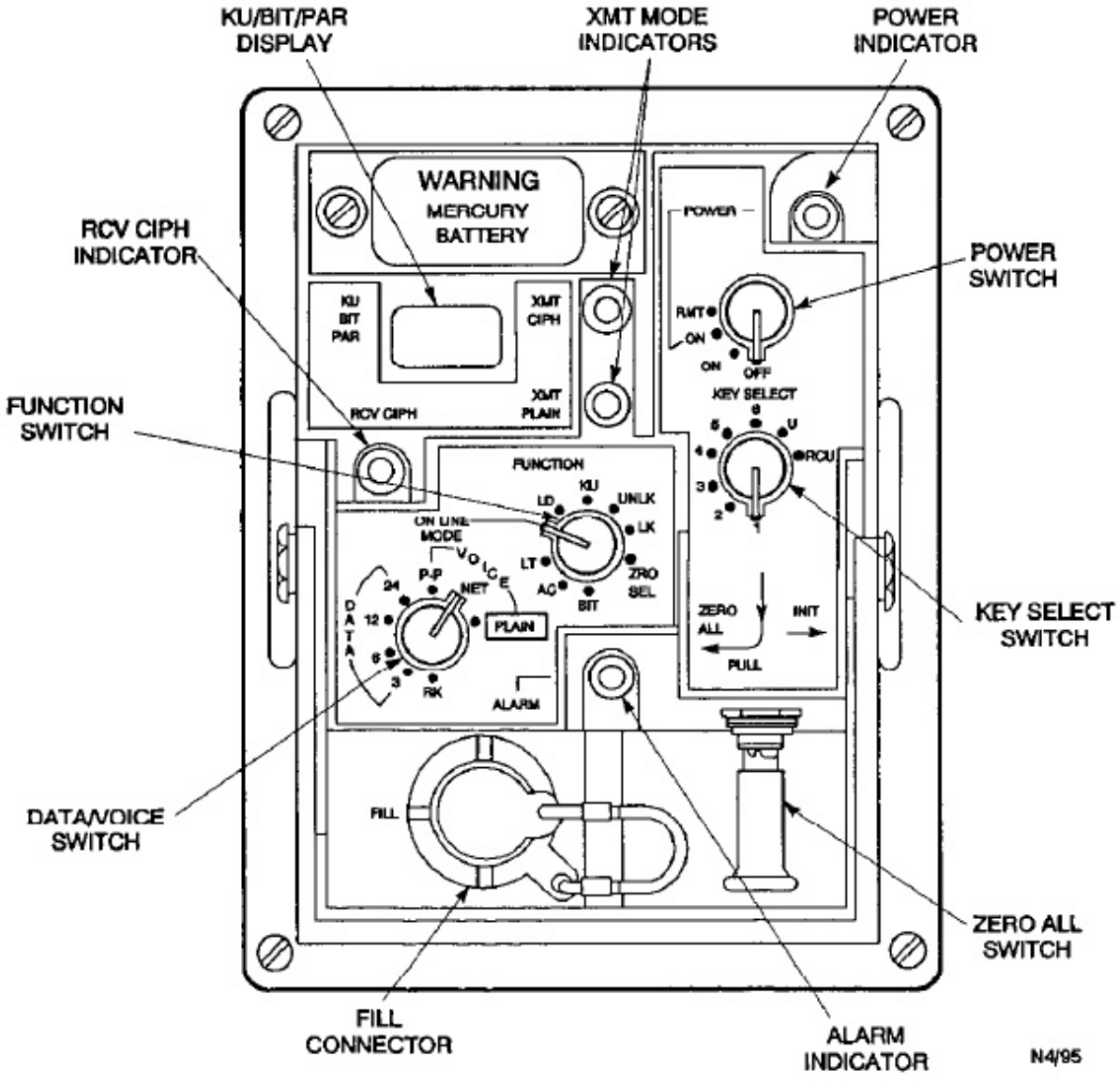


Figure 22-9. ANDVT KYV-5 COMSEC Module Front Panel

CONTROL/INDICATORS	FUNCTION
KEY SELECT Switch	The KEY SELECT switch is an eight-position rotary switch that selects the key to be used for encryption/decryption of digital information when in the on-line mode. It also selects the key to be updated in the off-line mode by the KU function.
1-6	Registers for storage of traffic encryption keys.
U	Unique register used for over-the-air rekeying.
RCU	Not usable.
Function Switch	The function switch is a nine-position rotary switch that selects the operating mode of the CM and/or off-line function to be performed upon actuation of the initiate (INIT) switch.
BIT (Built-in Test)	Enables manual initiation of the built-in-test capability of the CM and BTU. The results of the BIT are displayed on the two-digit hexadecimal display.
AC (Alarm Check)	Enables manual initiation of a confidence check on the CM that includes an alarm check sequence. Successful completion of an alarm check resets any preexisting alarm condition/indicator. An AC sequence is also performed during initialization and BIT.
LT (Lamp Test)	Enables the activation of all CM front panel indicators; the LED display will sequence through all hexadecimal characters.
ON LINE MODE	Places the CM in the selected on-line operating mode.
LD (Load Key)	Allows a variable to be transferred from the fill interface to the storage location selected by the KEY SELECT switch. Success or failure of the transfer is indicated on the front panel display. The LD position is also used during initialization, but the CM does not load the variables until the initialization sequence is completed.
KU (Key Update)	Allows the key in a selected location to be updated. Procedures are not in place for utilization of this function and should not be attempted as the key cannot be reset to the original value, requiring a reload of the key.
UNLK (Unlock)	Allows unlocking of previously locked CM.
LK (Lock)	Allows locking of CM.
ZRO SEL	Enables zeroization of keys stored in the CM upon activation of the INIT switch. The key to be zeroized is controlled by the KEY SEL switch.

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Figure 22-10. ANDVT KYV-5 COMSEC Module Controls and Indicators (Sheet 1 of 3)

CONTROL/INDICATORS	FUNCTION
POWER Switch	The POWER switch is a four-position rotary switch that determines power and functional control of the COMSEC module.
OFF	The OFF switch position disables the main power supply in the BTU. The BTU supplies standby voltage when primary power input is available. Keys are retained in the CM memory by the BTU-supplied standby power or local batteries installed in the CM (if standby power is unavailable).
ON	All CM lamps and indicators are disabled, enables BTU power supply voltages. The system is fully operational in this position.
POWER ON	Power ON indicator is activated and all other lamps and indicators are enabled. The system is fully operational in this position.
RMT	Enables power and functional control by the SRCU only; all CM indicators are disabled.
Indicator Lights	Five indicator lights are provided on the front panel of the CM to indicate, when enabled, terminal and CM status. Activation is controlled by the CM logic and the position of the power switch.
ALARM	This yellow LED indicates a crypto alarm in the CM. The ALARM LED is inhibited when the terminal is in the plain-text transmit mode or in the STBY state. This indicator will flash momentarily during an alarm check.
RCV CIPH	This green LED indicates the CM audio output is the product of decrypting encrypted voice.
XMT MODE PLAIN	This yellow LED indicates the BTU is ready to transmit in the plain-text mode.
XMT MODE CIPH	This green LED indicates the BTU is ready to transmit in the cipher test mode.
POWER	This green LED indicates that power is on and functional control is by the CM.
KU/BIT/PAR Display	This two-digit hexadecimal display indicates the results of various functions depending on the CM operating mode.

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Figure 22-10. ANDVT KYV-5 COMSEC Module Controls and Indicators (Sheet 3 of 3)

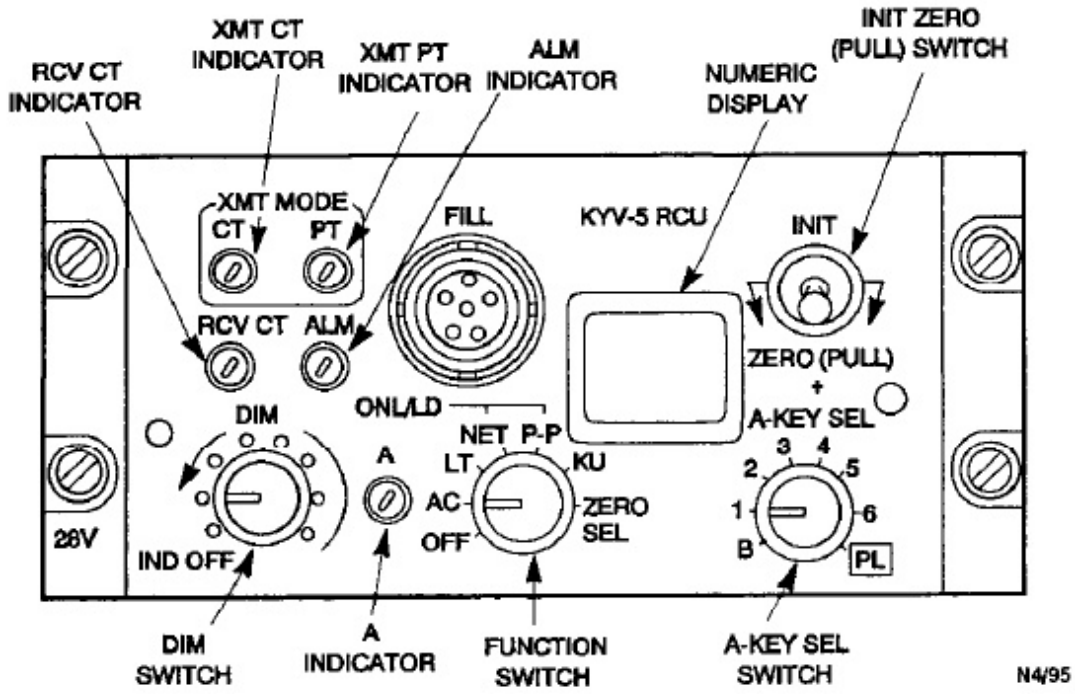

Figure 22-11. ANDVT Split Remote Control Unit

tape width for a complete passage of tape, then the cassette is turned over and the process repeated for a total recording time of more than 2 hours. The audio output of the recorder connects to the audio jackfield and to the ICS monitor panels in comm central. Refer to Figure 22-14 for a description of the cassette tape recorder controls and indicators.

22.5 ERCS

22.5.1 UHF-6 ERCS Radio Sets (AN/ARC-159). The 2 UHF-6 ERCS receivers (AN/ARC-159(V)1) (Figure 22-15), receive UHF signals in the 225.000 to 399.975 MHz band. They are used to monitor (ERCS) transmissions. The receive output audio goes to ERCS jack J-28 on the audio jackfield and to comm central ICS. Each receiver utilizes a separate dedicated ERCS antenna: a crossed dipole antenna located on top of the aircraft (ERCS 2) and a blade antenna located on the bottom of the aircraft (ERCS 1). Two active band-pass ERCS receive filters are located at the back of the console. The receiver controls and indicators are identified in Figure 22-16.

Note

The ERCS receiver described herein is a unit commonly in use. Another receiver with the same capability/function may be encountered.

22.5.2 ERCS Filter Fault Panel. Malfunctions either of the ERCS receiver filters are annunciated the ERCS filter fault panel (Figure 22-17). A FILTE or 2 indicator (amber) will illuminate to identify a fi fault when the ERCS radio is powered. The indicat will also illuminate when the filter has power appl and the receiver does not, or if the frequency selecte outside the filter frequency band of 225.000 to 399.9 MHz. A LAMP TEST pushbutton is used to test indicators.

22.6 UHF-3 LOS

The UHF-3 LOS provides simplex capabilities AM line of sight transmissions via two dedicated L antennas, a LOS transmit only antenna (UHF-4) an LOS receive only antenna. In the LOS mode, UH RF output connects to the UHF-4 transmit ante through a coaxial relay. A relay stuck in the trans position will illuminate the UHF TRANSCEIVEI indicator on the IFPM and the LOS ANT SWIT FAULT indicator on MDF-3. The UHF-3 transcei is tuneable in 25-kHz increments from 225.000 399.975 MHz. A guard receiver allows simultane reception of the guard frequency. Transmit power put is 30 watts. Audio connection is via the ICS. UHF-3 LOS control (Figure 22-18), located at aft c sole bay 2, controls the transceiver during L operation. Refer to Figure 22-19 for a descriptior the LOS control panel controls and indicators.

CONTROL/INDICATOR	FUNCTION
A-KEY SEL Switch	The A-KEY SEL switch is an eight-position rotary switch which selects the key to be used for encryption/decryption of digital information when in the on-line mode or the key location to be modified in the off-line mode. The six numbered positions are used to select the location of a traffic key; the B position is not used in the E-6; the PL position is used to select plain text.
Function Switch	The function switch is a seven-position switch that selects an off-line function or puts the terminal in the on-line mode. The selected off-line function will be performed upon operation of the mode initiate switch.
OFF	Selection of the OFF position on the SRCU function switch when the CM has selected the remote mode results in the BTU power being turned off. The CM and SRCU are unpowered when the BTU is off.
AC (Alarm Check)	Enables the manual initiation of a COMSEC confidence check, which includes a cryptographic alarm check. An alarm check initiated on the SRCU will check the CM COMSEC logic. Note the MI switch is ignored if B or PLAIN is selected on the A-KEY SEL switch.
LT (Lamp Test)	Enables the testing of the discrete front panel indicators. Upon activation of the MI switch, the discrete indicators are sequenced; after release of the MI switch, the hexadecimal display characters are sequenced through all 16 digits. The CM controller sequences the display.
ONL/LD NET	Places the ANDVT in the on-line net operating mode. (The KYV-5 can be loaded by activating the MI switch while the function switch is in either on-line/LD position (NET or PP) and not processing traffic.) The fill device must be connected to the KYV-5 fill port of the CM.
ONL/LD P-P	Places the ANDVT in the on-line point-to-point operating mode. (The E-6 is not wired for this mode. If selected, NET mode is entered).
KU (Key Update)	Allows the key in a selected location to be updated. Procedures are not in place for utilization of this function and should not be attempted as the key cannot be reset to the original value, requiring a reload of the key.
ZERO SEL	Enables the manually initiated (by operation of the MI switch) erasure of the key location selected by A-KEY SEL switch. Note that the MI switch is ignored if the A-KEY SEL switch is in the B or PLAIN position.
DIM Switch	The DIM switch is an eight-position rotary switch that determines the display intensity. The most counterclockwise position completely deactivates all indicators including the hexadecimal display. The other positions determine the display intensity by controlling the duty cycle of the indicator drive signal.

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Figure 22-12. ANDVT Split Remote Control Unit Controls and Indicators (Sheet 1 of 3)

CONTROL/INDICATOR	FUNCTION
INIT/ZERO (PULL) Switch	The MI switch is a three-position, spring-loaded toggle switch that used to initiate off-line function or to zeroize all stored keys. The swi resets in the center (off) position for normal operation.
MI (INIT)	The switch is pushed up to the MI (momentary INIT) position and th released to initiate the selected off-line function selected by the SR function switch. When the function switch is in the LT position, discrete indicators will be sequenced as long as the INIT/ZERO (PUL switch is held in the MI position. The hexadecimal display will sequenced upon release of the switch.
ZERO (PULL)	The switch handle must be pulled out and then down to the ZE (PULL) position. Operation of the ZERO switch on the SRCU w erase all keys stored in the CM. The SRCU ZERO function is operal whether or not the CM power switch is in the RMT position.
Indicators	The following indicators (LEDs) are located on the SRCU front pane The indicators can be dimmed by the use of the appropriate position the dimmer switch.
ALM	This amber LED indicates a crypto alarm in the ANDVT system. T indicator will flash momentarily during an alarm check.
RCV CT	This green LED indicates that the current ANDVT audio output resu from the processing of encrypted data received from the communicatic channel. This indicator is controlled by the BTU.
XMT CT	This green indicator indicates that the ANDVT is on line and controlled to transmit in the secure mode
XMT PT	This amber LED indicates that the ANDVT is on line and is condition to transmit in the nonsecure mode.
A	This green LED power indicator indicates that CM power switch is the RMT position and key selection is possible from the SRCU.
Numeric Display	A two-digit hexadecimal display indicates the results or status various functions dependent upon the operating mode. Numeric displ indications follow:

N

Figure 22-12. ANDVT Split Remote Control Unit Controls and Indicators (Sheet 2 of 3)

CM STATUS	FUNCTION SWITCH	ON-LINE MODE	DISPLAY DATA SOURCE	DISPLAY LH : RH	MEANING
Cold Start	N/A	N/A	CM	C : 4 C : 3 C : 2 C : 1 — : —	Initialization Required Initialization In Progress Initialization In Progress Initialization In Progress CM Initialized
Power Up	N/A	N/A	CM	B : F D : 1-8 B : 5-8 — : —	Low Battery Voltage CM Test Failure Low Battery Voltage and CM Test Error** CM Operational
Operational	On-Line Mode	ANY	BTU	— : — E : 0 - 7	BTU Operational BTU Test Failure/Status
Operational	BIT (at CM only)	N/A	CM BTU	B : F D : 1-8 B : 5-8 0-7 : 0-7	Low Battery Voltage CM Test Errors Low Battery Voltage and CM Test Error ** BTU BIT Status
Operational	Alarm Check	N/A	CM	B : F D : 1-8 B : 5-8 — : —	Low Battery Voltage CM Test Errors Low Battery Voltage and CM Test Error ** CM Operational
Operational	Lamp Test	N/A	CM	O-F: O-F	Lamp Test
Operational	Load	N/A	CM	O : 1 F : F	Successful Key Transfer Parity Failure
Operational	Key Update	N/A	CM	0 : 0 0 : 1 0 : 2 0 : 3 9 : 9 A : 0	Zeroized Initial Load One Update Subsequent Updates Last Update
Operational	UNLK/LK (at CM)	N/A	CM	C : D — : —	CM Locked CM Unlocked
Operational	Zeroize	N/A	CM	0 : 0	Selected Key Zeroized

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** Multiple Errors

Figure 22-12. ANDVT Split Remote Control Unit Controls and Indicators (Sheet 3 of 3)

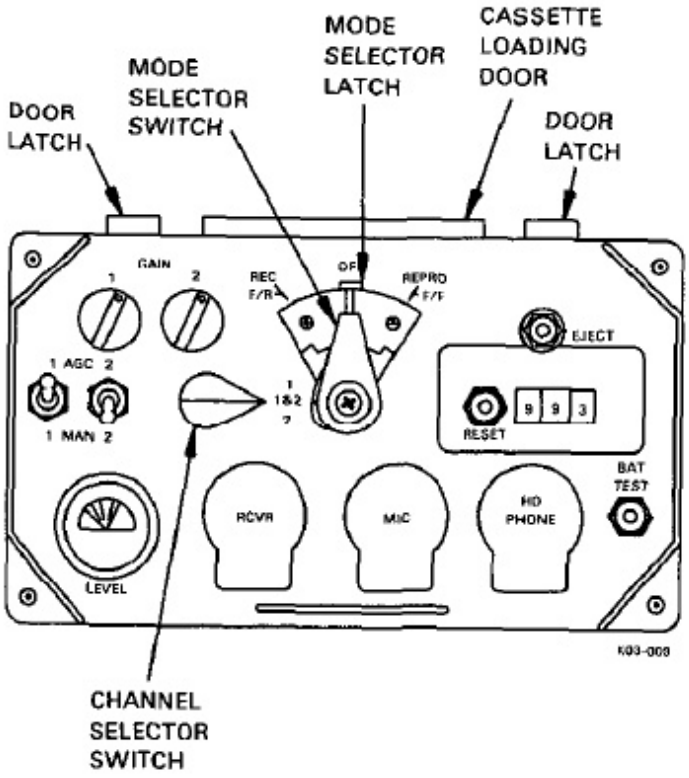


Figure 22-13. Cassette Tape Recorder (AN/UNH-16A)

22.7 SEAT FOUR EQUIPMENT POWER SOURCES

Figure 22-20 lists the power sources for equipment associated with the radio operator position, including the types of power, and the circuit breaker labels/location.

CONTROL/INDICATOR	FUNCTION
Mode Selector Switch	Permits manual selection of any one of four operating modes:
REC (Record)	To record, push mode selector in, press latch, and set to REC. Must be manually returned to OFF.
F/R (Fast Rewind)	To rewind, set mode selector to F/R and hold until tape counter stops. Mode selector will return to OFF when released.
REPRO (Reproduce)	To playback recorded signal, push mode selector in, press latch, and set to REPRO. Must be manually returned to OFF.
F/F (Fast Forward)	To fast-forward tape, set mode selector to F/F and hold until tape counter indicates desired location on tape. Mode selector switch returns to OFF when released.
OFF	Recorder off.

Note

In the record or reproduce modes, an end-of-tape sensor interrupts power to the tape drive and energizes a tone to warn the operator that end of tape has been reached. The mode selector switch must then be set to OFF. The unit will not operate without a cassette. Trying to operate the unit without a cassette will result in the unit stopping and generating a tone in the headset.

BAT TEST Pushbutton	Shows line voltage on the LEVEL meter when pressed. Not used for battery test.
AGC/MAN 1 and 2 Toggle Switches	Used to select amplifier automatic gain control (AGC) or manual gain control (MAN) for channel 1 and for channel 2.
GAIN Potentiometers	Used with manual gain control to adjust signal levels on channel 1 and on channel 2.
Channel Selector Switch	3-position switch selects which of the two (or combination) channels will be recorded or monitored. Also routes monitor signals of the desired channel to the LEVEL meter.
EJECT Pushbutton	Disengages the cassette from the drive for removal. Mode selector switch must be OFF and access door at top of recorder must be open before the EJECT pushbutton is pressed.
3-Digit Counter	Counter is driven by the take-up reel and permits the operator to index a specific point on the tape.
RESET Pushbutton	Used to reset the tape index counter to 000.
RCVR, MIC, and HD PHONE Jacks	Not used.

Figure 22-14. Cassette Tape Recorder Controls and Indicators

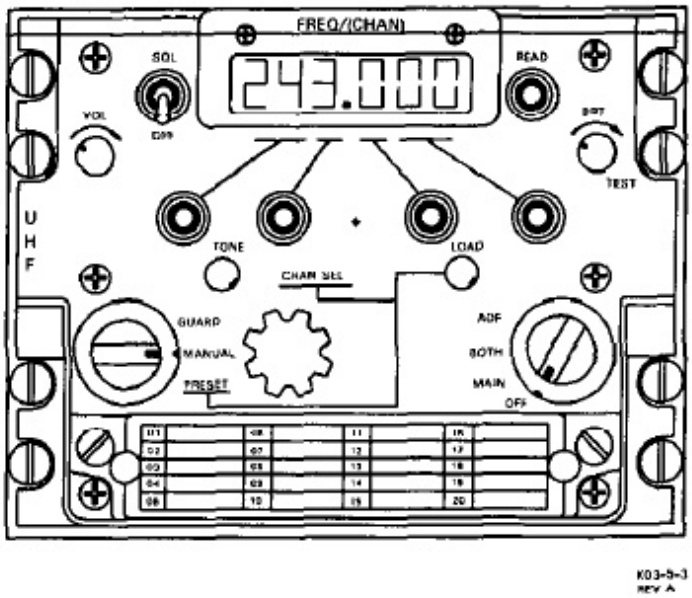


Figure 22-15. UHF-6 ERCS Receiver (AN/ARC-159)

CONTROL/INDICATOR	FUNCTION
Function Select Switch	Selects receiver operating mode.
OFF	Removes power from receiver.
MAIN	Enables main receiver.
BOTH	Enables both main and guard receivers.
ADF	Not used.
Mode Select Switch	Selects frequency operating mode.
GUARD	Not used.
MANUAL	Permits manual selection of frequency and displays selected frequenc on readout.
PRESET	Selects one of 20 preset channels and displays channel on readou
CHAN SEL Selector	Selects 1 of 20 preset frequencies.

Figure 22-16. UHF-6 ERCS Receiver Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
LOAD Pushbutton	Loads preset frequencies into memory.
TONE Pushbutton	Not used.
Manual Frequency Selectors (4 each)	Used to select one of 7000 frequencies in 25 kHz increments.
FREQ/(CHAN) Readout	Displays receiver frequencies or channels as controlled by the mode selector switch.
BRT/TEST Knob	Adjusts intensity of FREQ/(CHAN) readout and tests FREQ (CHAN) readout in TEST position (fully clockwise).
READ Momentary Toggle Switch	Displays frequency of selected preset channel on readout.
SQL/OFF Switch	Enables or disables main receiver squelch.
VOL Control	Adjust level of audio output signal.
SQUELCH Level Adjustment (Located behind frequency placard)	Adjusts receiver squelch sensitivity.

Figure 22-16. UHF-6 ERCS Receiver Controls and Indicators (Sheet 2 of 2)

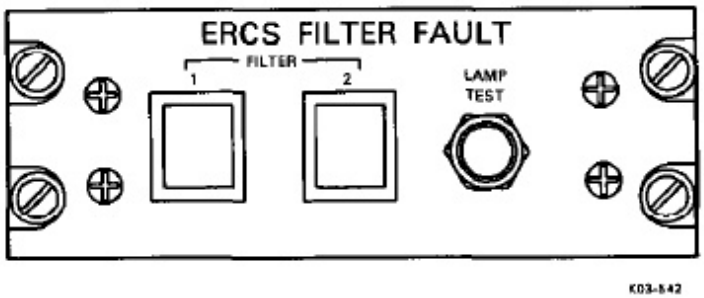


Figure 22-17. ERCS Filter Fault Panel

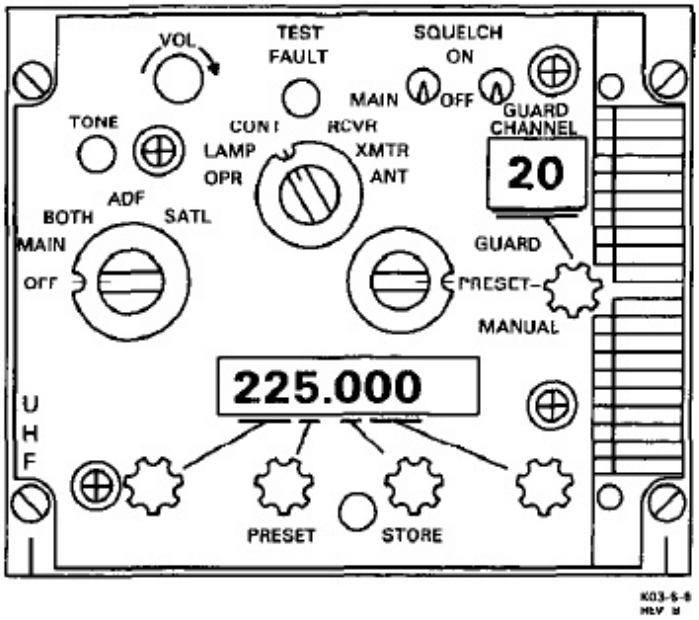


Figure 22-18. UHF-3 LOS Control (C-9665)

CONTROL/INDICATOR	FUNCTION
VOL Control	Adjusts audio output.
TEST FAULT Indicator (Yellow)	Illuminates when a fault exists in equipment, depending on TE selector position.
SQUELCH Switches (2)	Enable (ON positon) or disable (OFF position) either the MAIN GUARD receiver squelch circuits.
CHANNEL Control and Display	Selects and displays one of 20 preset channels.
TEST Selector	
OPR Position	Tests normal system operation.
LAMP Position	Tests panel indicators.
CONT Position	Tests LOS control.
RCVR Position	Tests receiver.
XMTR Position	Tests transmitter.
ANT Position	Tests power amplifier.

Figure 22-19. UHF-3 LOS Controls and Indicators (Sheet 1 of 2)

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
Cassette Tape Recorder 1	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, RECORDER 1
Cassette Tape Recorder 2	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, RECORDER 2
Cassette Tape Recorder 3	115V, 400 Hz	MA 5 AC 400 HZ DISTR 2	400 HZ DISTR 2 Panel, RECORDER 3
ERCS Filter Fault Panel	28 VDC	MA 5 DC AFT CONSOLE	28 VDC DISTR 2 Panel, MISC CONT
HF Fault/Tune Panel	28 VDC	MA 5 DC AFT CONSOLE	28 VDC DISTR 2 Panel, MISC CONT
HF-2 Radio	115V, 400 Hz	AVE 3 AC	MDF-1, HF-2
HF-3 Transceiver	115V, 400 Hz	AVE 3 AC	MDF-1, HF-3
HF-4 Transceiver	115V, 400 Hz	AVE 3 AC	MDF-1, HF-4
HF-5 Transceiver	115V, 400 Hz	AVE 3 AC	MDF-1, HF-5
ANDVT	28 VDC	MA 5 DC AFT CONSOLE	28 VDC DISTR 2 Panel, SECURE VOICE
UHF-3 LOS	115V, 400 Hz	AVE 3 AC	MDF-3, UHF 3 XCVR
	28 VDC	MA 5 DC FWD CONSOLE	28 VDC DISTR 1 Panel, UHF XCVR CONT 3
UHF-6 ERCS Radio No. 1	28 VDC	MA 5 DC AFT CONSOLE	28 VDC DISTR 2 Panel, ERCS MONITOR 1
UHF-6 ERCS Radio No. 2	28 VDC	MA 5 DC AFT CONSOLE	28 VDC DISTR 2 Panel, ERCS MONITOR 2

Figure 22-20. Seat Four Equipment Power Sources

22.8 SEAT FOUR PREFLIGHT

22.8.1 Station Oxygen/ICS Preflight

1. ICS CSU — Checked.

   a. All volume controls — CCW.

   b. PTT switch — ICS.

   c. ICS selector switch — ALL.

   d. ICS volume switch — Midrange.

   e. TEST switch — Pressed.

      Set VOL control for comfortable level and speak into microphone. Ensure voice sidetone is present in headset and all lamps illuminate on the CSU and ACU. Release TEST switch, all lamps extinguish.

2. Oxygen, ICS — Checked.

   a. Mask visual check — Complete.

      Check hose, mask, and regulator for cleanliness and damage. Verify oxygen mask is connected.

   b. SUPPLY lever — ON.

   c. Emergency lever — TEST MASK.

      Hold mask facing away from yourself. Hold emergency lever to TEST MASK release.

   d. Microphone check — Complete.

      Verify mask MIC works with ICS.

   e. Diluter lever — 100 percent OXYGEN.

   f. Emergency lever — EMERGENCY.

      Positive pressure should be indicated.

   g. Emergency lever — NORMAL.

      Breathe for a minimum of three cycles. The blinker should show alternately black and white. Hold breath momentarily (blinker should remain black). Pressure should be 290 to 430 psi.

   h. SUPPLY lever — OFF.

22.8.2 No-Break Power Monitor Preflight. Verify with in-flight technician that the NO-BREAK POWER CONTROL MONITOR preflight (in forward lower compartment) has been accomplished.

1. SYSTEM switch — NORMAL.

2. Both INPUT indicators — On.

3. Both OUTPUT indicators — On.

Note

OUTPUT CHGR indicator may not be illuminated, depending on charger status.

4. ALARM switch — TEST, NORMAL.

   Verify aural alarm operation then release. Switch will return to NORMAL.

22.8.3 HF Preflight

WARNING

- Do not use HF transmission during refueling operations.
- Verify that all personnel are clear of radiation areas.

22.8.3.1 HF Power Up. Apply power to the HF subsystem as follows:

1. Circuit breakers — Checked.

Ensure circuit breakers are closed (in) or open (out) and tagged.

   a. 28 VDC DISTR 2 panel MISC CONT — Checked.

CAUTION

To prevent damage to equipment, 28 vdc power must be supplied before applying 400 Hz power.

   b. MDF-1 panel — Checked.

      (1) BLOWER-1.

      (2) BLOWER-2.

(3) HF-2.

(4) HF-3.

(5) HF-4.

(6) HF-5.

CAUTION

To prevent overheating, RT rack 1 blowers must be operating before powering up equipment.

2. HF FAULT/TUNE panel — Set.

   a. LAMP TEST — Checked.

      Press, verify all fault indicators illuminate.

   b. AUTO RETUNE switches — ENBL.

3. TAKE CMD switch — TAKE CMD.

   Select TAKE CMD on HF-2, HF-3, HF-4, and HF-5, TAKE CMD and ON indicators illuminate.

Note

- Fault indicators on the radio set control, HF FAULT/TUNE panel, preselector bandpass filter, and SIMOP band-pass filter may illuminate momentarily on power application.
- If fault indicator on radio set control remains on, attempt reset by cycling the frequency.

22.8.3.2 HF BIT Tests

1. HF-2, HF-3, HF-4, and HF-5 — Checked.

   Perform the low-, mid-, and high-band tests on each radio.

   a. Low-band BIT test — Complete.

      (1) MODE thumbwheel — UV.

      (2) FREQ thumbwheels — 031111.

      (3) HF VOL control — Midscale.

      (4) TEST pushbutton — Press.

      Verify no-fault lights remain illuminate

      For HF-2, press and hold HF-2 EN TUNE on HF FAULT/TUNE panel pr to pressing TEST pushbutton.

      (5) Keyline control HF selectors — ICS/SE

      Steps (5) through (9) do not apply HF-2.

      (6) ICS CSU HF pushbutton — XMT.

      Press and release as required to sel XMT.

      (7) ICS CSU PTT selector switch — RAD

      (8) HF power monitor selector — Set.

      Select 3F, 4F, or 5F as required for HF HF-4, and HF-5 respectively.

      (9) ICS hand key — Press, Release.

      Momentarily key the microphone. Tuni tone can be heard in headset within 4 s onds. During the tuning cycle, verify HF power monitor tuning meter is green or yellow FWD band.

WARNING

Verify that all personnel are clear of radiation areas.

   b. Midband bit test — Complete.

      Repeat step 1a with FREQ thumbwheels to 091111.

   c. High-band bit test — Complete.

      Repeat step 1a with FREQ Thumbwheels to 291111.

22.8.3.3 HF Voice Check. Verify voice operation HF-3, HF-4, and HF-5 with a known ground station follows:

e. HF power monitor selector — 3F.

Verify needle deflects to FWD green band.

f. Keyline control HF-3 selector — OFF.

4. Keyer 2/HF-4 — Complete.

Repeat steps 3a through 3f using HF-4 radio control, keyline HF-4 selector and HF power monitor 4F.

5. Keyer 3/HF-5 — Complete.

Repeat steps 3a through 3f using HF-5 radio control, keyline HF-5 selector and HF power monitor 5F.

22.8.4 Secure Voice (ANDVT) Preflight

22.8.4.1 Cold Start/Initialization. This procedure is required upon initial installation (cold start) or upon simultaneous loss of BTU power and standby power while the battery is removed or inoperable. Zeroization of stored keys does not force a cold start. A readout display of C-4 indicates initialization is required. If C-4 is not displayed, go to paragraph 22.8.4.2.

1. Set the POWER switch to POWER ON position. Observe POWER ON indicator is lit and, after momentarily flashing, the codes D1 through D5 will display C4, indicating the need for initialization.

2. Set the FUNCTION SELECT switch to LD.

3. Push the ZERO ALL/INIT switch to INIT and release. The display will change to C3.

4. Set the FUNCTION SELECT switch to AC.

5. Push the ZERO ALL/INIT switch to INIT and release. The display will change to C2.

6. Set the FUNCTION SELECT switch to LD.

7. Push the ZERO ALL/INIT switch to INIT and release. The display will change to C1.

8. Set the FUNCTION SELECT switch to AC.

9. Push ZERO ALL/INIT switch to INIT and release. The display will continue the off-line test D6 through D8, then go blank. Initialization is now completed.

22.8.4.2 Power Up. COMSEC module valida tests are automatically performed upon applicatior restoration) of power. A successful completion re in a blank display. The display will cycle while the are being performed and will stop on one of the inc tions provided below if a COMSEC fault is detec The COMSEC faults will be displayed for appr mately 4 seconds.

DISPLAY	FAILURE INDICATION
D1	CPU Failure
D2	ROM Integrity Failure
D3	RAM Integrity Failure
D4	Plain-Test Relay Failure
D5	KG and/or Alarm Failure (See also B5)
D6	Variable Processor Failure
D7	Cold Start Test Failure
D8	New CKV Failure
B5	Battery Low and a KG/Alarm Failure (see also BF and D5)
B6	Battery Low and a Var Processor Failure
B7	Battery Low and a Cold Start Test Failure (see also BF and D7)
B8	Battery Low and a New CKV Failure (se also BF and D8)
BF	Battery Low, No Other Failures
FF	No Key (panel initiated alarm check only)

22.8.4.3 Keyloading and BIT Procedures. fill procedures below are typical procedures usi KYK-13 electronic transfer device or KOI-18 reader. The BIT function tests the operational inte of the CM and BTU. Key loading and BIT can onl accomplished from the KYV-5 (CM) located at th P30 console, bay 2.

Note

- AC (alarm check) and BIT test require a valid key loaded into the CM. The KU/BIT/PAR display displays the letters FF to indicate a key parity error that would occur without a valid key.

- If a BIT test is performed, conducting a separate AC alarm check is unnecessary since an alarm check is automatically run as part of the BIT test.

1. Connect the loader to the FILL connecto KYV-5.

2. Turn on the fill device and select the location of the key to be loaded into the CM or insert the tape leader into the tape reader, as appropriate.

3. Set the KEY SELECT switch in the position to which the key is to be loaded.

4. Set the FUNCTION SELECT switch to LD.

5. Press ZERO ALL/INIT switch to the right and release. If using a tape reader, immediately pull tape through the reader. The display will flash 01 after the key is received.

6. Set the FUNCTION SELECT switch to KU. Verify key load with display 01 in KU/BIT/PAR display.

7. If FF is displayed, key load failed. Check KYV-5 and FILL device and repeat procedure.

8. Set FUNCTION SELECT switch to BIT position.

9. Press ZERO ALL/INIT switch to the right and release.

10. The KU/BIT/PAR briefly displays D1 through D8 during CM validation tests. If a COMSEC fault is detected, the display will freeze for approximately 4 seconds. The associated failure is indicated in table above.

Note

If any individual failure code D1 through D8 is displayed, KYV-5 shall not be utilized for secure communications. Replace COMSEC module.

11. The KU/BIT/PAR display indicates 00 through 70, then 01 through 71 during BTU tests. Failures are indicated by a constant display of a two-digit number. These numbers correlate with the BIT test table chart on the right side cover of BTU.

12. Upon successful key load of all desired crypto, set the POWER switch to the RMT position. All functions are now transferred to the SRCU located at seat four.

22.8.5 Cassette Tape Recorder Preflight

1. Cassette recorders 1, 2, and 3 — Set.

   Prepare all three cassette recorders as follows:

   a. Cassette — Loaded.

   b. Mode selector switch — F/R.

      Hold until tape is rewound.

   c. Tape counter — RESET.

   d. AGC/MAN 1 and 2 toggle switches — AGC.

   e. Channel selector switch — 1 and 2.

   f. Mode selector switch — REC.

      Record one minute to ensure tape is blank.

   g. Mode selector switch — F/R.

      Hold until tape is rewound.

2. Audio jackfield — Patches Complete.

   Make the following patches:

   a. KEYER 3 (J42) — PARALLEL (J105).

   b. KEYER 2 (J41) — PARALLEL (J109).

   c. PARALLEL (J106) — RCDR 1 CH 1 (J71).

   d. PARALLEL (J107) — RCDR 1 CH 2 (J72).

   e. PARALLEL (J108) — RCDR 2 CH 1 (J73).

   f. PARALLEL (J110) — RCDR 2 CH 2 (J74).

   g. PARALLEL (J111) — RCDR 3 CH 1 (J75).

   h. PARALLEL (J112) — RCDR 3 CH 2 (J76).

3. Record test — Complete.

   Perform record test on all recorders.

   a. Mode selector switch — REC.

      Counter movement indicates that the cassette recorder is recording.

   b. Mode selector switch — Off.

      Stop recording after 30 seconds of keyer tone.

4. Playback test — Complete.

Perform playback test on all recorders.

a. Audio jackfield — Set.

Remove all recorder patches.

b. Mode selector switch — F/R.

Rewind the tape to 000 on the counter.

c. Mode selector switch — REPRO.

Counter movement indicates that tape is being played back. At the ICS CSU, set the RCDR selector to each recorder channel individually; listen for the previously recorded keyer tones being played back. Ensure that a comfortable listening level can be easily achieved and that no noticeable noise or distortion exists.

d. Mode selector switch — F/R, OFF.

Rewind tape and return mode selector switch to OFF.

22.8.6 ERCS Preflight

1. ICS CSU ERCS volume control — Midrange.

2. ERCS filter fault panel lamp test — As Required.

Not required if lamps already illuminated.

3. ERCS 1 — Checked.

ERCS 2 remains off until completion of ERCS 1 preflight.

a. Function select switch — BOTH.

Respective ERCS FILTER FAULT indicator extinguishes when a valid frequency is selected.

b. BRT/TEST knob — Checked, Set.

Set knob to TEST and verify all readout segments illuminate at full brightness (888.888). Return to midrange and observe that readout intensity varies.

c. VOL control — Midrange.

d. Manual frequency check — Complete.

Tune to a known operating frequency. S
from station should be loud and clear.

e. Preset/frequency/check — As Required.

This check need only be performed if p
frequencies have been loaded into memo

(1) Mode select switch — PRESET.

(2) CHAN SEL — As Required.

Set to a known operating channel. S
from station should be loud and clear.

(3) READ switch — READ.

Verify display changes from preset c
nel to preset frequency.

f. VOL control — Low.

Rotate fully CCW.

4. ERCS 2 — Checked.

Repeat steps 3a through 3e for ERCS 2.

5. ERCS 1 and 2 — Set.

Select operational frequency on both ERC
ceivers and return ERCS 1 VOL control to
range.

22.8.7 UHF-3 LOS Preflight

Note

Accomplish UHF-3 LOS control preflight in coordination with seat two UHF-3 PSK preflight.

1. UHF-3 LOS control — Set.

Set up the UHF-3 LOS control as follows:

a. Function select switch — MAIN.

b. TEST selector — Checked.

Rotate selector through the five test posi
and return to OPR. Fault indicator shou
extinguished at all positions except LAM

c. Mode select switch — MANUAL

d. MAIN SQUELCH switch — ON

e. GUARD SQUELCH switch — ON

f. VOL control — As Required.

g. FREQUENCY selectors — As Required.

Select a frequency for a voice check.

2. ICS CSU panel — Set.

a. UHF-3 volume switch — Midrange.

b. UHF-3 pushbutton — XMT.

c. VOL control — As Required.

d. PTT selector switch — RAD

3. Keyline control — Set.

a. UHF selector switch — 3F.

b. UHF-3 selector switch — ICS.

c. Forward power — Checked.

Key UHF-3 transmitter. Keyline control RF POWER meter should read in the UHF-AM (middle green) band.

WARNING

Verify that all personnel are clear of radiation areas.

d. Reflected power — Checked.

Select 3R on keyline control UHF selector switch. Key UHF-3 transmitter again. Keyline control RF POWER meter should read in the REFL (first green) band.

4. Radio check — Complete.

Perform voice radio check with known ground station IAW applicable instructions.

5. UHF-3 LOS function select switch — OFF.

6. ICS CSU PTT selector switch — ICS.

7. Keyline control UHF-3 selector switch — OFF.

22.8.8 Power Supply Selector Panel Preflight

1. ON/OFF/ON switch — Left, ON.

Rotate the left selector switch to each position. Verify each position selected reads in the green band on PERCENT RATED VOLTAGE meter. Return selector to OFF.

2. ON/OFF/ON switch — Right, ON.

Rotate the right selector switch to each position. Verify each position selected reads in the appropriate band indicated on PERCENT RATED VOLTAGE meter, (Y-yellow, O-orange, G-green) with the exception of the -14V power supplies. When in the -24V CW KEY position, press SPLY SEL to obtain a reading of both -24V power supplies. Return selector to OFF.

Note

In the 24V BAT TEST position, you must press the BAT TEST pushbutton switch to obtain a reading of the NBPS.

3. *ON/OFF/ON switch — OFF.*

22.9 SEAT FOUR OPERATION

22.9.1 HF System Operation. Operate the HF system as follows:

22.9.1.1 Preset HF Frequencies. Insert or change any of the thirty preset HF channels as follows:

1. ICS CSU — Set.

a. HF pushbutton — XMT.

Press to select for desired HF.

b. PTT selector switch — RAD.

2. HF control — Set.

a. CHAN thumbwheel selectors — Set.

Select channel desired.

b. MODE thumbwheel selector — Set.

Select mode desired (except P or A).

c. FREQ thumbwheel selectors — Set.

Select desired frequency (between 02.0000 and 29.9999 MHz).

3. LOAD momentary pushbutton — Pressed.

Verify load tone is heard in headset.

4. HF power monitor selector — As Required.

Select 3F, 4F, or 5F.

5. Mode thumbwheel selector — P.

Momentarily key microphone. Tuning tone can be heard in headset within 5 seconds. During the tuning cycle, verify the HF power monitor panel tuning meter deflects.

WARNING

Verify that all personnel are clear of radiation areas.

Note

Frequencies remain stored in memory even after power is removed.

6. Repeat procedure to load additional preset channels.

22.9.1.2 Preset Operation. Tune an HF radio using the preset channels at the radio set control, as follows:

WARNING

Verify that all personnel are clear of radiation areas if HF radio is to be keyed.

Note

Tuning cycle tone is not required for a previously loaded preset channel.

1. CHAN thumbwheel selectors — Set.

Select previously loaded channel.

2. MODE thumbwheel selector — P.

3. SQL selector switch — As Required.

4. VOL control — As Required.

22.9.1.3 Manual Operation. Tune an discrete quency and select a mode of operation at the radi control, as follows:

1. MODE thumbwheel selector — As Require

Select desired mode (except P or A).

2. FREQ thumbwheel selectors — As Require

Select desired frequency (between 02.0000 29.9999 MHz).

3. SQL selector switch — As Required.

4. VOL control — As Required.

Momentarily key microphone and listen for ing tone in headset within 5 seconds.

WARNING

Verify that all personnel are clear of radiation areas.

22.9.2 Secure Voice (ANDVT) Operation Seat Four From the SRCU)

1. Set A-KEY SEL to keylist position desired.

2. ICS ACU TSEC HF pushbutton — Press U Desired HF-3, HF-4, or HF-5 Indicato Illuminated.

3. Set the FUNCTION switch to NET.

4. Transmit to desired station, ensuring the X CT indicator is lit.

Note

In addition to indicating a COMSEC alarm condition, the ALARM lamp momentarily illuminates at the start of all transmissions.

5. Listen to appropriate received preamble, obs RCV CT indicator is lit.

22.9.3 Cassette Recorder Operation. Perform record, playback, fast forward, and fast rewind functions as follows:

1. Record

   a. Audio jackfield — Patched.

      Patch source jack of desired signal to load jack of desired recorder/channel.

   b. Cassette recorder — Set.

      (1) AGC/MAN switches — AGC.

      (2) Channel selector switch — As Required.

         Select 1, 1 and 2, or 2 based on audio jackfield patches.

      (3) Mode selector switch — REC.

2. Playback

   a. ICS CSU — SET.

      (1) RCDR select switch — As Required.

         Select desired recorder and recorder channel.

      (2) RCDR volume control — As Required.

   b. Cassette recorder — Set.

      (1) CHAN selector switch — As Required.

         Select desired channel for playback.

      (2) Mode selector switch — REPRO.

         Adjust ICS CSU RCDR volume and VOL controls to desired listening level.

3. Fast forward/fast rewind

   a. Mode selector switch — F/F.

      Set and hold until desired position of tape is reached, then release.

   b. Mode selector switch — F/R.

      Set and hold until desired position of tape is reached, then release.

22.9.4 ERCS Operation

1. Manual mode operation

   a. Function select switch — Set.

      Select MAIN or BOTH as required.

   b. Mode select switch — MANUAL.

   c. Manual frequency selectors — Set.

      Select operational frequency desired.

   d. SQL/OFF switch — SQL.

   e. VOL switch — As Required.

2. Loading of preset channel frequencies

   a. Function select switch — Set.

      Select MAIN or BOTH as required.

   b. Mode select switch — PRESET.

   c. CHAN SEL Switch — As Required.

      Select channel desired to load a preset frequency.

   d. READ switch — Up.

      Toggle READ switch up, then release. FREQ/(CHAN) readout displays frequency previously loaded.

   e. Manual frequency selectors — Set.

      Select frequency desired.

   f. LOAD pushbutton — Pressed.

      To verify successful load, cycle CHAN select switch to another channel then back and toggle READ switch up. FREQ/(CHAN) readout displays frequency loaded.

3. Preset mode operation

   a. Function select switch — Set.

      Select MAIN or BOTH as required.

   b. Mode select switch — PRESET.

c. CHAN SEL selector — Set.

Select preset channel desired.

d. SQL/OFF switch — SQL.

e. VOL switch — As Required.

22.9.5 UHF-3 LOS Operation. Coordinate closely with the seat two UHF operator to operate the UHF-3 LOS.

1. Manual operation

a. Function select switch — Set.

Set MAIN or BOTH as required.

b. Mode select switch — MANUAL.

c. Test selector — OPR.

d. MAIN and GUARD SQUELCH switches — As Required.

e. VOL control — As Required.

f. FREQUENCY selectors — As Required.

2. Loading of preset channel frequencies

Repeat the following steps for each preset channel required.

a. Function select switch — Set.

Select MAIN or BOTH as required.

b. Mode select switch — PRESET.

c. CHAN selector — As Required.

Select channel desired to load a preset frequency.

d. Manual frequency selectors — Set.

Select frequency desired.

e. PRESET STORE switch — PRESSED.

3. Preset mode

a. Function select switch — Set.

Set MAIN or BOTH as required.

b. Mode select switch — PRESET.

c. Test selector — OPR.

d. MAIN and GUARD SQUELCH switches As Required.

e. VOL control — As Required.

f. CHANNEL selector — As Required.

22.10 SEAT FOUR POSTFLIGHT

Postflight procedures should be performed any t seat four equipment has been energized prior to l ing the aircraft, or for expected loss of aircraft pow

All seat four equipment shall be secured zeroized in such a manner as to prevent any com mise of classified information. Station shall sanitized to ensure all classified information has b properly removed and stowed prior to exiting aircraft.

The aircraft shall be clean and all stations prop secured (i.e., seats facing station with seatbelts tened neatly, armrests down.)

22.10.1 Station Oxygen/ICS Postflight

1. Oxygen — NORMAL, 100 percent OXYG SUPPLY OFF.

2. ICS CSU PTT selector — ICS.

22.10.2 No-Break Power Monitor Postfligh

1. ALARM switch — DISABLE.

2. SYSTEM switch — NORMAL.

22.10.3 HF Postflight

1. HF controls — SET.

At HF-2, HF-3, HF-4 and HF-5 radio set trols perform the following.

a. CHAN thumbwheel selectors — 11.

b. MODE thumbwheel selector — AM.

c. FREQ thumbwheel selectors — 111111

d. TAKE CMD momentary switch — OFF.

TAKE CMD and ON indicators extinguish.

2. HF FAULT/TUNE panel AUTO RETUNE switches — DSBL.

22.10.4 Secure Voice (ANDVT) Postflight

1. Place ZERO ALL/INIT switch into the ZERO ALL position.

Note

Activating the (CM) ZERO ALL/INIT switch to the ZERO ALL position or the SRCU INIT/ZERO (PULL) switch to the ZERO (PULL) position will zeroize all encryption keys stored in the CM. These switches are active whether or not equipment is powered.

2. Place ZERO ALL/INIT switch into the center position.

Note

Leaving the CM ZERO ALL/INIT switch in the ZERO ALL position or the SRCU INIT/ZERO (PULL) switch in the ZERO (PULL) position will shorten CM battery life.

3. Place FUNCTION SELECT switch to OFF position.

Note

Selection of the OFF position on the SRCU FUNCTION SELECT switch (when CM has selected the remote mode) results in the BTU power being turned off. The CM and SRCU are unpowered when the BTU is off.

22.10.5 Cassette Recorders Postflight At each recorder perform the following:

1. Mode selector switch — OFF.
2. Cassette tape — Removed.
3. Cassette loading door — Closed, Latched.

22.10.6 ERCS Postflight

1. Mode select switch — MANUAL.
2. Manual frequency select switches — 222.225.
3. BRT/TEST knob — SET.

   Rotate fully CCW to dim setting.
4. Function select switch — OFF.

22.10.7 UHF-3 LOS Postflight

1. Mode select switch — MANUAL.
2. CHANNEL control — 11.
3. FREQUENCY selectors — 222.225.
4. Function select switch — OFF.

CHAPTER 23

In-Flight Technician Position — Preflight Operation, and Postflight

23.1 IN-FLIGHT TECHNICIAN RESPONSIBILITIES

The IFT is responsible for the preflight, operation, and postflight of the VLF power amplifier. The IFT also performs limited in-flight maintenance on comm central equipment as required.

23.2 POWER AMPLIFIER-COUPLER DESCRIPTION

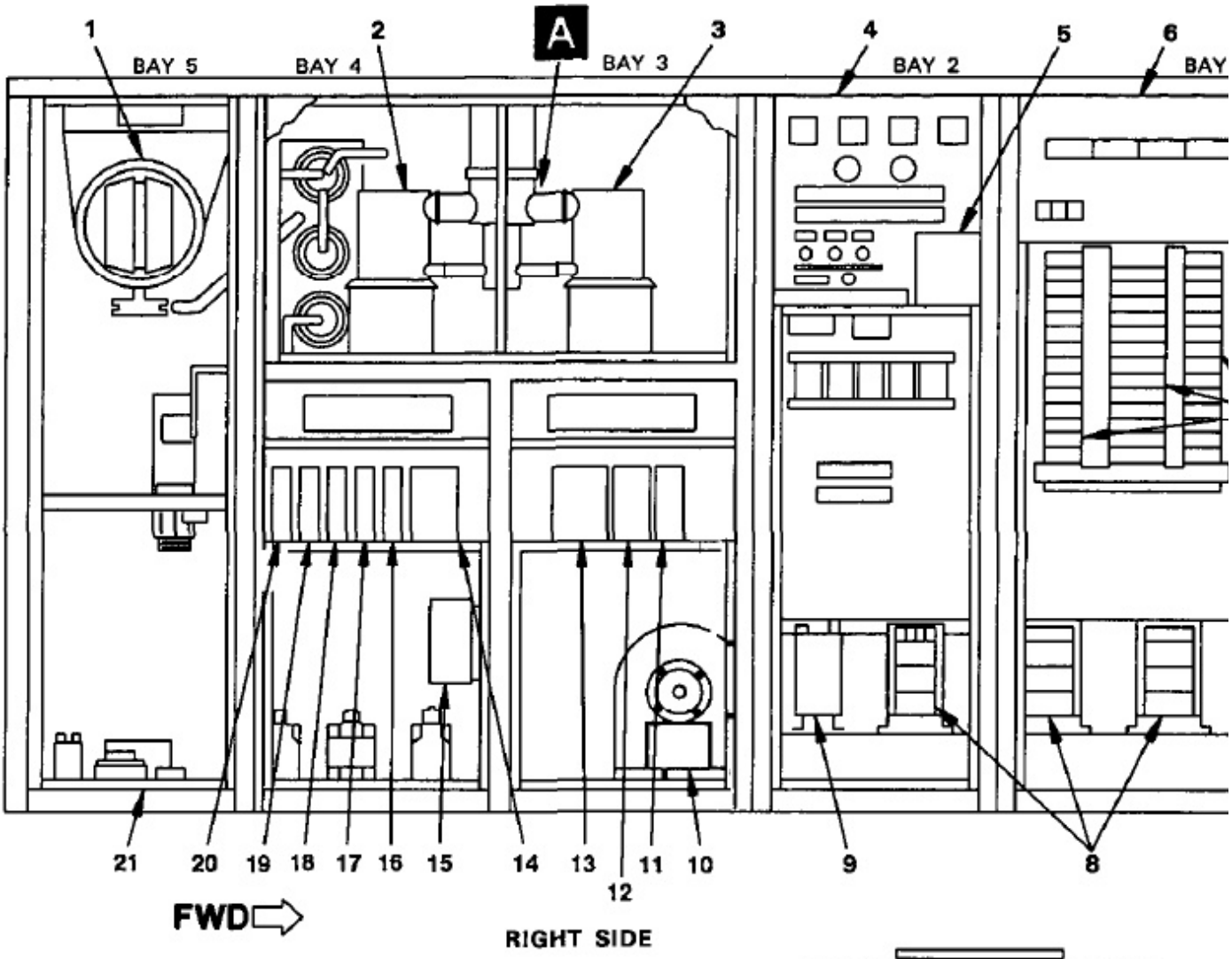
23.2.1 Power Amplifier-Coupler Group. The PA coupler (Figure 23-1) performs high power amplification and antenna coupling functions for the VLF transmit subsystem. The PA coupler contains: a control computer, an IFPM computer, high- and low-voltage power supplies, a local maintenance panel, monitor meters, a monitor panel, power amplifier tubes, a heat exchanger, variometers, and an SF_6 system. Low level, modulated RF signals are amplified in the frequency range of 17 to 30 kHz. The PA coupler also matches the impedance of the amplifier circuits to the impedance of the short wire antenna and attenuates harmonic frequencies. Normal tuning of the amplifier coupler is rapid and automatic. Operation of the PA coupler can be accomplished from the local maintenance panel or a remote control-indicator panel located at comm central seat three. Automatic or manual control can be selected. The automatic operation of the PA coupler is performed by the control computer. Control signals from the remote or local control-indicator panels command power levels and operating frequencies in the control computer. The computer directs the VLF tuning, output power, and antenna coupler matching with a minimum number of inputs by the VLF operator.

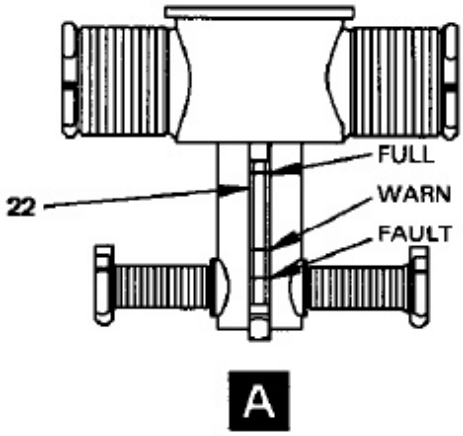
23.2.2 Power Amplifier Tubes. The main components of the PA are the two vapor-cooled, parallel-connected, tetrode vacuum tubes. The tubes and their associated equipment are located in PA bays 3 and 4 (Figure 23-2). The tubes are driven by an 800 watt RF signal from a driver and generate output power up to 200 kw. Cooling is provided by boiler assemblies surro ing the tubes. An ethylene glycol and water mi absorb the heat energy and the resultant steam p into a liquid cooled heat exchanger located on top PA. The condensation from the heat exchanger is tinuously returned to the boiler assembly. The ai liquid cooling system is used to transfer the heat from the heat exchanger.

23.2.3 Variometers. Six variometers (in bay nodes 1, 2 and 3) are used in the amplifier co (Figure 23-2). Each variometer is a motor-drive ductor used in an impedance matching or freque selective network. Each variometer consists of a coil (stator) and a moveable coil (rotor) mounted base that contains a gear train. The angle between and stator coils affects mutual inductance of the so overall variometer inductance varies as the position changes.

23.2.4 Test Load. The test load, located in n compartment, is a water and steam-cooled resisto sembly used to absorb radio frequency power fro PA coupler during tuning and testing. A load resis located in one side of a U-shaped assembly and ope submerged in a solution of water and ethylene g coolant. In operation, the coolant is heated to co the water into steam, thereby cooling the resistor. steam passes into a liquid cooled heat exchanger, w it condenses. It then flows into the steam separator upon demand through a valve back to the test load. drink valve is controlled by fiber optic sense prob maintain a minimum coolant level within the test Sight glasses are provided to monitor coolant leve

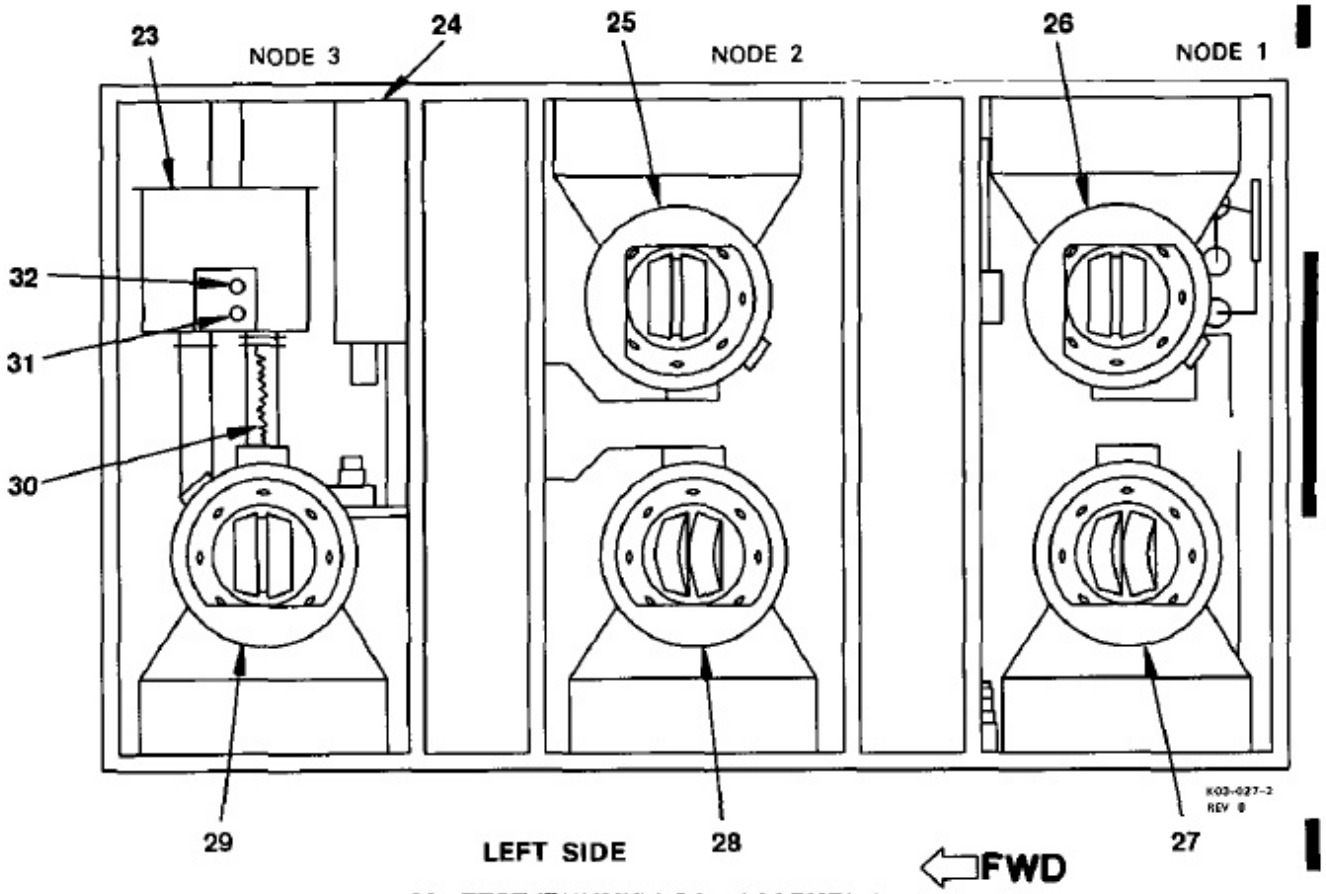
23.2.5 RF Transmission Line. RF energy is veyed from the PA coupler to the short wire ant assembly by a RF transmission line. The voltage r of the line is high because the line is pressurized sulfur hexafloride (SF_6), which has a high diele value. The line is routed from the forward top of th coupler to the short wire antenna reel assembly.





1. VARIOMETER LR (LR)
2. LEFT PA TUBE
3. RIGHT PA TUBE
4. LOCAL MAINTENANCE PANEL
5. LOCAL CONTROL-INDICATOR PANEL
6. CIRCUIT BREAKER PANEL
7. HV POWER SUPPLY RECTIFIERS
8. HV POWER SUPPLY TRANSFORMERS
9. CATHODE POWER SUPPLY TRANSFORMERS
10. PA BLOWER ASSEMBLY
11. IFPM COMPUTER SLOT (SPARE PACS COMPUTER – CP-1999/USC-13 (V))
12. PA CONTROL (PACS) COMPUTER (CP-1999/USC-13 (V))
13. PA DIGITAL INTERFACE (C-9306)
14. DRIVER (PA-C) (AM-6928/A)
15. ATR BLOWER
16. LOGIC POWER SUPPLY (PP-6358/A)
17. LOGIC POWER SUPPLY (PP-6358/A)
18. MULTIPLEXER (TD-948A)
19. ANALOG-TO-DIGITAL CONVERTER (CV-25
20. SERVO AMPLIFIER (AM-6229/TSC-60(V)
21. LOW VOLTAGE POWER SUPPLY
22. STEAM SEPARATOR SIGHT GAUGE

Figure 23-2. Power Amplifier Coupler — Panels Removed (Sheet 1 of 2)



23. TEST (DUMMY) LOAD ASSEMBLY
24. LORAN FILTER COMPARTMENT (COMPONENTS REMOVED)
25. VARIOMETER L2-3
26. VARIOMETER L1-2
27. VARIOMETER L1
28. VARIOMETER L2
29. VARIOMETER L3
30. TEST (DUMMY) LOAD RESISTOR
31. DUMMY LOAD RESERVOIR SIGHT GAUGE – FAULT
32. DUMMY LOAD RESERVOIR SIGHT GAUGE – DRINK

Figure 23-2. Power Amplifier Coupler — Panels Removed (Sheet 2 of 2)

flow sensors, a control panel located at the flight engineers station, and associated air ducts. Refer to A1-E6AAA-NFM-000 for additional detail on the forced air cooling system. In operation, air is drawn from the aft cabin through the PA coupler and is either dumped overboard or conditioned and returned to the aft cabin, depending on the mode of operation.

23.3 POWER DISTRIBUTION

23.3.1 VLF Power Amplifier-Coupler Power. Primary power to the PA coupler is controlled by four ELCUs that engage the aircraft mission bus to the four power disconnect switches on the circuit breaker panel. The four ELCUs are controlled by four pushbutton switches on the 400 HZ DISTR 2 panel in comm central. The pushbuttons are CATH, HVA, HVB, and HVC. Control power for the switches is supplied from the P67-2 panel. Power for 28 VDC to the VLF PA is provided from a circuit breaker on the P67-3 circuit breaker panel.

23.3.2 Circuit Breaker Panel. Application of primary power to the PA coupler is controlled from the circuit breaker panel (Figure 23-3) in bay 1. The panel controls are described in Figure 23-4.

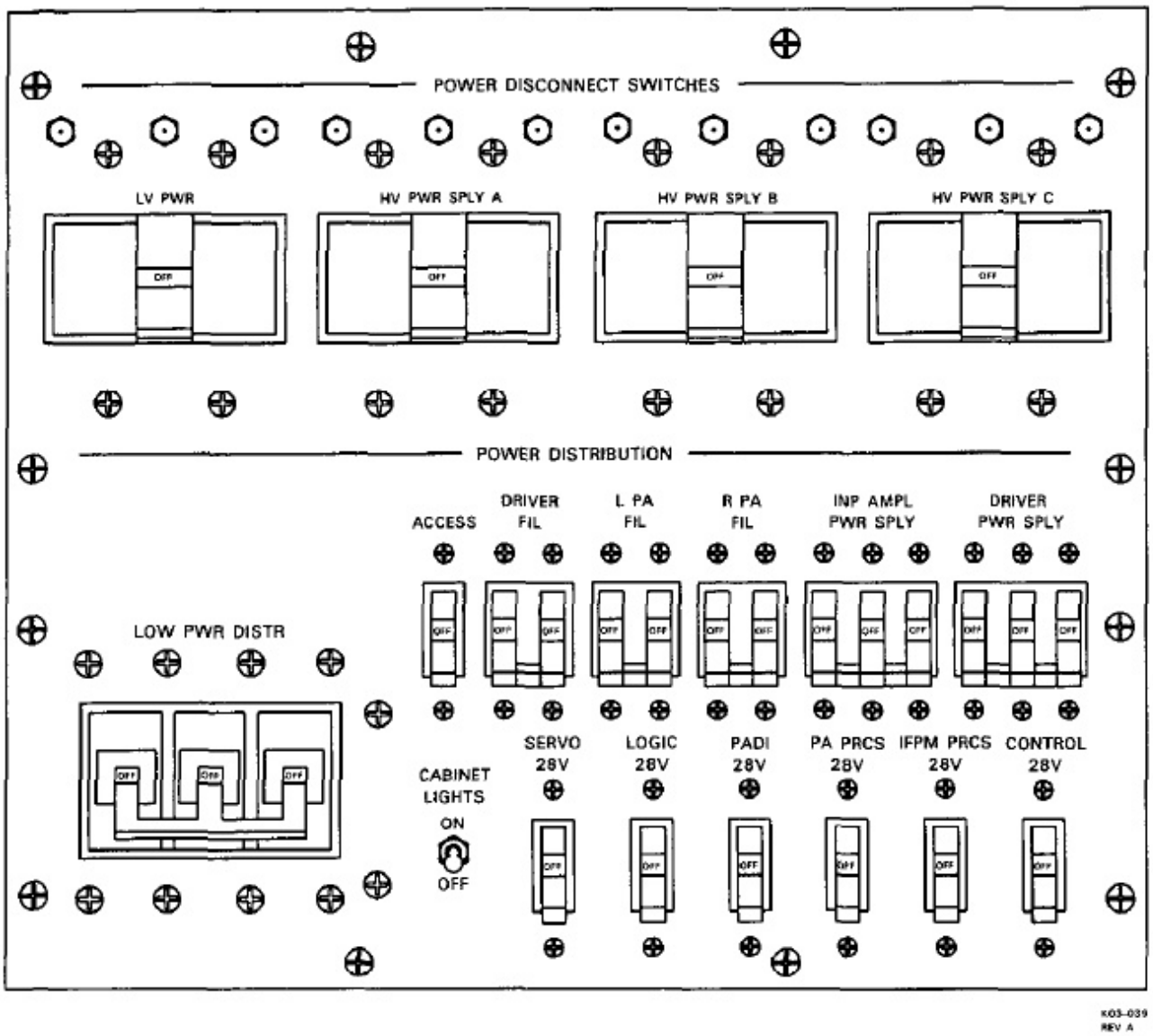


Figure 23-3. Circuit Breaker Panel

23.4 CONTROLS/INDICATORS

23.4.1 Local Maintenance Panel. All manual and automatic operation of the VLF amplifier coupler, except primary power application, can be performed from the LMP (Figure 23-5). The LMP provides monitoring controls, meters, and indicators to enable complete observation of VLF amplifier-coupler operation. Automatic control of the VLF amplifier-coupler is accomplished by use of a local control indicator tha identical to the remote control indicator located in co central. A switch/indicator on the LMP enables tran of active control between the two control-indicator p els. Although the local control indicator is mounted the LMP, it is a separate component of the VLF ampli coupler. The LMP controls and indicators are explai in Figure 23-6.

CONTROL	FUNCTION
	POWER DISCONNECT SWITCHES
LV PWR	Controls ac power to LOW PWR DISTR circuit breaker and cathode power supply.
HV PWR SPLY A	Controls ac power to high voltage power supply A.
HV PWR SPLY B	Controls ac power to high voltage power supply B.
HV PWR SPLY C	Controls ac power to high voltage power supply C.
	POWER DISTRIBUTION Circuit Breakers
LOW PWR DISTR	Controls ac power to low voltage distribution points except cathode power supply.
ACCESS	Controls ac power to CABINET LIGHTS switch.
DRIVER FIL	Controls ac power to driver ATR filament circuit.
L PA FIL	Controls ac power to left power amplifier filament circuit.
R PA FIL	Controls ac power to right power amplifier filament circuit.
INP AMPL PWR SPLY	Controls ac power to input amplifier plate power supply.
DRIVER PWR SPLY	Controls ac power to driver cathode power supply.
SERVO 28V	Controls dc power to servo amplifier.
LOGIC 28V	Controls dc power to logic power supply.
PADI 28V	Controls dc power to logic power supply powering PA digital interface circuits.
PA PRCS 28V	Controls dc power to PA-coupler group control computer.
IFPM PRCS 28V	Controls dc power to IFPM computer.
CONTROL 28V	Controls dc power to PA-coupler group 28 volt control system.
CABINET LIGHTS Toggle Switch	Controls ac power to cabinet lights.

Figure 23-4. Circuit Breaker Panel Controls

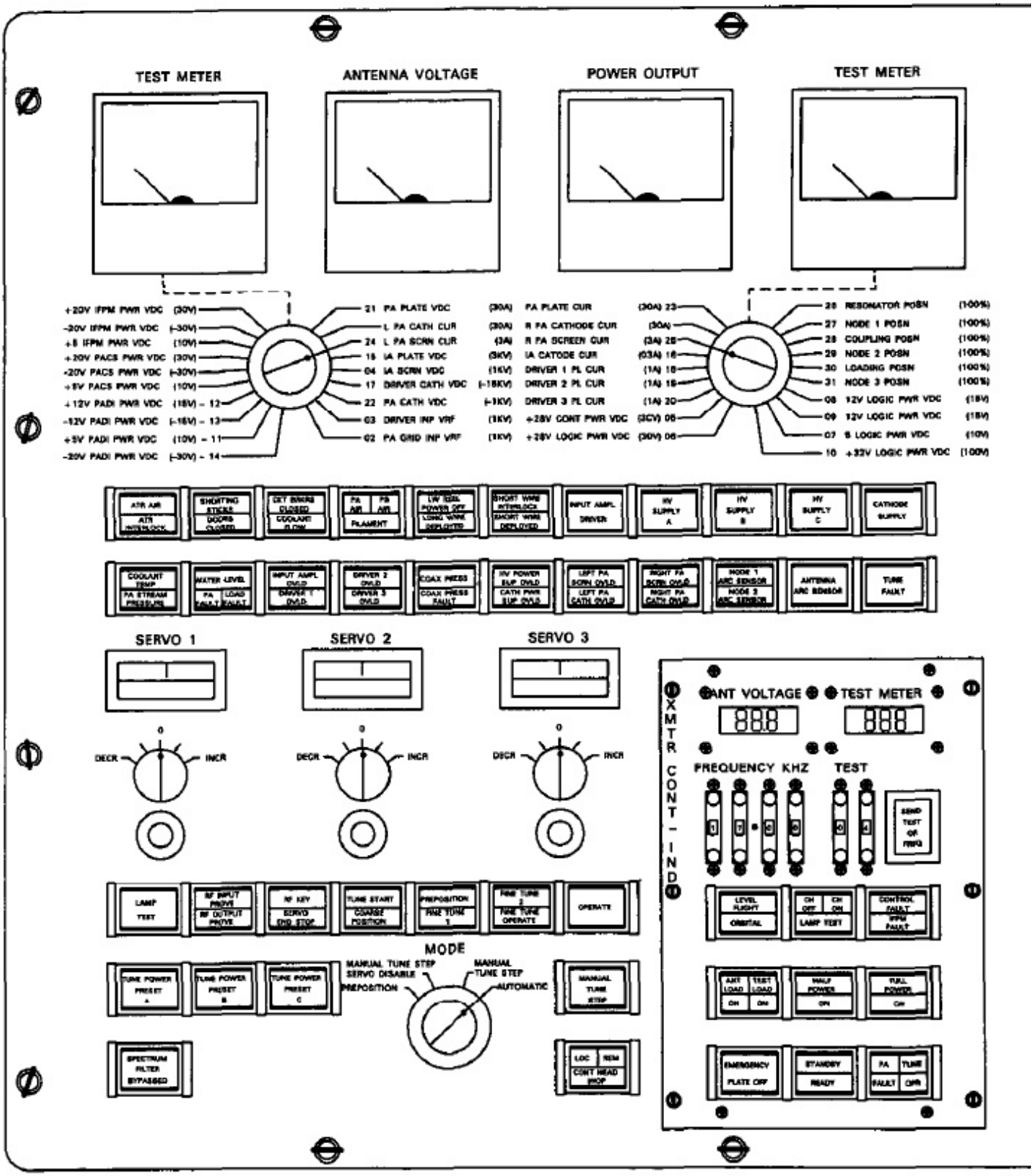


Figure 23-5. Local Maintenance Panel

CONTROL/INDICATOR	FUNCTION
Left TEST METER	Displays voltage or current selected by left TEST METER select switch.
ANTENNA VOLTAGE Meter	Displays antenna voltage in KV.
POWER OUTPUT Meter	Displays power output in KW.
Right TEST METER	Displays voltage or current selected by right TEST METER select switch.
Left TEST METER Selector	Selects voltage or current to be displayed on left test meter.
Right TEST METER Selector	Selects voltage or current to be displayed on right test meter.
ATR AIR Indicator (Green)	Indicates ATR cooling air satisfactory.
ATR INTERLOCK Indicator (Green)	Indicates all interlocked ATR units are plugged in.
SHORTING STICKS Indicator (Green)	Indicates all shorting sticks are properly stowed.
DOORS CLOSED Indicator (Green)	Indicates all doors are closed and panels in place.
CKT BRKRS CLOSED Indicator (Green)	Indicates all circuit breakers (except ACCESS) are closed.
COOLANT FLOW Indicator (Green)	Indicates adequate coolant (liquid cooling system ethylene glycol and water) flow to VLF power amplifier-coupler heat exchanger.
PA AIR Indicator (Green)	Indicates VLF power amplifier-coupler grid compartment cooling air satisfactory.
PS AIR Indicator (Green)	Indicates power supply cooling air satisfactory.
FILAMENT Indicator (Green)	Indicates filament circuits are energized.
LW REEL POWER OFF Indicator (Green)	Indicates long wire reel drive motor power is off.
LONG WIRE DEPLOYED Indicator (Green)	Indicates long wire is not nested.
SHORT WIRE INTERLOCK Indicator (Green)	Indicates short wire interlock is closed and ready to accept RF power. Antenna is not grounded by antenna group.

Figure 23-6. Local Maintenance Panel Controls and Indicators (Sheet 1 of 6)

CONTROL/INDICATOR	FUNCTION
SHORT WIRE DEPLOYED Indicator (Green)	Indicates short wire is not nested.
INPUT AMPL DRIVER Indicator (Green)	Indicates +1750 volt and -950 volt power supplies are energized.
HV SUPPLY A Indicator (Green)	Indicates high voltage power supply A is energized.
HV SUPPLY B Indicator (Green)	Indicates high voltage power supply B is energized.
HV SUPPLY C Indicator (Green)	Indicates high voltage power supply C is energized.
CATHODE SUPPLY Indicator (Green)	Indicates cathode supply (-650v) is energized.
COOLANT TEMP Indicator (Red)	Indicates coolant (LCS EGW) temperature to heat exchanger is above 165 °F.
PA STEAM PRESSURE Indicator (Red)	Indicates steam pressure in steam condenser is above 5 psi.
WATER LEVEL Indicator (Yellow)	Indicates water level in tube assemblies is below normal, but not ye at a critically low level.
PA FAULT Indicator (Red)	Indicates water level in tube assemblies is too low for operation.
LOAD FAULT Indicator (Red)	Indicates water level in test load is too low for operation.
INPUT AMPL OVLD Indicator (Red)	Indicates excessive cathode current in input amplifier stage of driver
DRIVER 1 OVLD Indicator (Red)	Indicates excessive plate current in driver tube 1 of driver.
DRIVER 2 OVLD Indicator (Red)	Indicates excessive plate current in driver tube 2 of driver.
DRIVER 3 OVLD Indicator (Red)	Indicates excessive plate current in driver tube 3 of driver.
COAX PRESS Indicator (Yellow)	Indicates the SF_6 pressure in transmission coax is below 3.8 psi.
COAX PRESS FAULT Indicator (Red)	Indicates the SF_6 pressure in transmission coax is below 1.3 psi.

Figure 23-6. Local Maintenance Panel Controls and Indicators (Sheet 2 of 6)

CONTROL/INDICATOR	FUNCTION
HV POWER SUP OVLD Indicator (Red)	Indicates excessive current output of plate power supply.
CATH PWR SUP OVLD Indicator (Red)	Indicates excessive current output of cathode power supply.
LEFT PA SCRN OVLD Indicator (Red)	Indicates excessive current in left tube screen circuit.
LEFT PA CATH OVLD Indicator (Red)	Indicates excessive current in left tube cathode circuit.
RIGHT PA SCRN OVLD Indicator (Red)	Indicates excessive current in right tube screen circuit.
RIGHT PA CATH OVLD Indicator (Red)	Indicates excessive current in right tube cathode circuit.
NODE 1 ARC SENSOR Indicator (Red)	Indicates node 1 arc sensor has triggered.
NODE 2 ARC SENSOR Indicator (Red)	Indicates node 2 arc sensor has triggered.
ANTENNA ARC SENSOR Indicator (Red)	Indicates antenna arc sensor has triggered in node 3.
Note *The overload and arc sensor indicators illuminate continuously only* after the VLF power amplifier-coupler fails to overcome the overload by automatically retuning.	
TUNE FAULT Indicator (Red)	Indicates the PA has not reached FINE TUNE OPERATE within the 10 seconds allowed by the fault limiter circuitry.
LAMP TEST Momentary Switch/Indicator (White)	Energizes all indicators on LMP.
RF INPUT PROVE Indicator (Green)	Indicates adequate level of RF voltage at transmitter.
RF OUTPUT PROVE Indicator (Green)	Indicates adequate level of RF at node 3 for tuning cycle to advance.
RF KEY Indicator (Green)	Indicates RF is keyed.
SERVO END STOP Indicator (Yellow)	Indicates one or more variometers are positioned at either high or low end stop.

Figure 23-6. Local Maintenance Panel Controls and Indicators (Sheet 3 of 6)

CONTROL/INDICATOR	FUNCTION
TUNE START Indicator (White)	Indicates transmitter is in tune start step of the tune cycle (10-second fault limiter enabled).
COARSE POSITION Indicator (White)	Indicates transmitter is in coarse step of tune cycle (L_2, L_{2-3}, an L_3 are being coarse-positioned).
PREPOSITION Indicator (White)	Indicates transmitter is in preposition step of tune cycle (LR, L_1, an L_{1-2} are being prepositioned).
FINE TUNE 1 Indicator (White)	Indicates transmitter is in fine-tune step of tune cycle (L_3 is being tune by discriminator at tune power level, RF key illuminated and R output prove illuminated).
FINE TUNE 2 Indicator (White	Indicates transmitter is in second fine tune-step of tune cycle (L_3 an L_2 are being tuned by discriminator and L_{2-3} is being tuned b loading comparator at tune power level).
FINE TUNE OPERATE Indicator (White)	Indicates transmitter is in the third fine tune step of tune cycle (san as FINE TUNE 2, except power level is controlled by operator selection on control-indicator, fault limiter disabled).
OPERATE Indicator (White)	Indicates transmitter has completed tune cycle and is in an operat condition at power level selected by the operator on the control indicator.
SERVO 1 Meter	Displays error signal voltage on servo 1 (LR or L_2).
SERVO 2 Meter	Displays error signal voltage on servo 2 (L_1 or L_{2-3}).
SERVO 3 Meter	Displays error signal voltage on servo 3 (L_{1-2} or L_3).
SERVO 1 Rotary Slewing Switch-Spring (Returns to center off)	When activated, applies dc voltage directly to servo motor c variometer connected to servo 1 circuit (LR or L_2). Operable i manual mode only.
SERVO 2 Rotary Slewing Switch-Spring (Returns to center off)	When activated, applies dc voltage directly to servo motor c variometer connected to servo 2 circuit (L_1 or L_{2-3}). Operable i manual mode only.
SERVO 3 Rotary Slewing Switch-Spring (Returns to center off)	When activated, applies dc voltage directly to servo motor c variometer connected to servo 3 circuit (L_{1-2} or L_3). Operable i manual mode only.
SERVO 1 Momentary Switch	Enables servo drive controls for manual positioning of variometer L in manual tune step mode only.
SERVO 2 Momentary Switch	Enables servo drive controls for manual positioning of variomete L_{2-3} in manual step tune mode only.

Figure 23-6. Local Maintenance Panel Controls and Indicators (Sheet 4 of 6)

CONTROL/INDICATOR	FUNCTION
SERVO 3 Momentary Switch	Enables servo drive controls for manual positioning of variometer L_3 in manual step tune mode only.
MODE Selector Switch	Selects mode of operation when in local control only. In remote, operation is always automatic.
PREPOSITION	1. Servos 1, 2, and 3 are connected to LR, L_1 and L_{1-2}, respectively. 2. All servo amplifiers are disabled. 3. Slewing controls are connected to respective elements (LR, L_1 and L_{1-2}). 4. Servo meters display prepositioning error voltage of respective elements. (Above functions are independent of the tune sequence step). 5. Manual tune step control is activated.
MANUAL TUNE STEP SERVO DISABLE	1. Servos 1, 2, and 3 are connected to L_2, L_{2-3}, and L_3. 2. All servo amplifiers are disabled. 3. Slewing controls are connected to respective elements (L_2, L_{2-3} and L_3). 4. Servo meters display respective elements RF discriminator error voltage. (Above functions are independent of the tune sequence step. However, in TUNE START, and PREPOSITION, the RF is not keyed so RF discriminator error voltage will be zero). 5. Manual tune step control is activated.
MANUAL TUNE STEP	1. Manual tune step control is activated. 2. All other functions in the tune sequence except tune step advance are controlled by processor; that is, servo activation and servo meter displays depend on the tune sequence step.
AUTOMATIC	Selects complete control of tune sequence by processor.
TUNE POWER PRESET A Momentary Switch/Indicator (White)	Selects high-voltage power supply A for tune power level operation when in local control. High-voltage power supply A is requested for tune power.

Figure 23-6. Local Maintenance Panel Controls and Indicators (Sheet 5 of 6)

CONTROL/INDICATOR	FUNCTION
TUNE POWER PRESET B Momentary Switch/Indicator (White)	Selects high-voltage power supply B for tune power level operatio when in local control. High-voltage power supply B is requested fo tune power.
TUNE POWER PRESET C Momentary Switch/Indicator (White)	Selects high-voltage power supply C for tune power level operatio when in local control. High-voltage power supply C is requested fo tune power.
MANUAL TUNE STEP Momentary Switch/Indicator (White)	Advances tune sequence one step each time it is pressed when in eithe of two manual tune-step modes. Indicates MODE switch is i MANUAL TUNE STEP SERVO DISABLE or MANUAL TUNI STEP position.
SPECTRUM FILTER BYPASSED Switch/Indicator (Yellow)	Switch allows operator to bypass spectrum filter. Indicator indicate that filter is bypassed.
LOC/REM/CONT HEAD INOP Alternate Action Switch/Indicator	Selects either local (LMP) or remote (comm central) control-indicato panel.
LOC Indicator (Green)	Indicates local control-indicator has been selected for operation.
REM Indicator (Yellow)	Indicates remote control-indicator has been selected for operation.
CONT HEAD INOP Indicator (Red)	Indicates that the control-indicator selected (either local or remote is inoperative.

Figure 23-6. Local Maintenance Panel Controls and Indicators (Sheet 6 of 6)

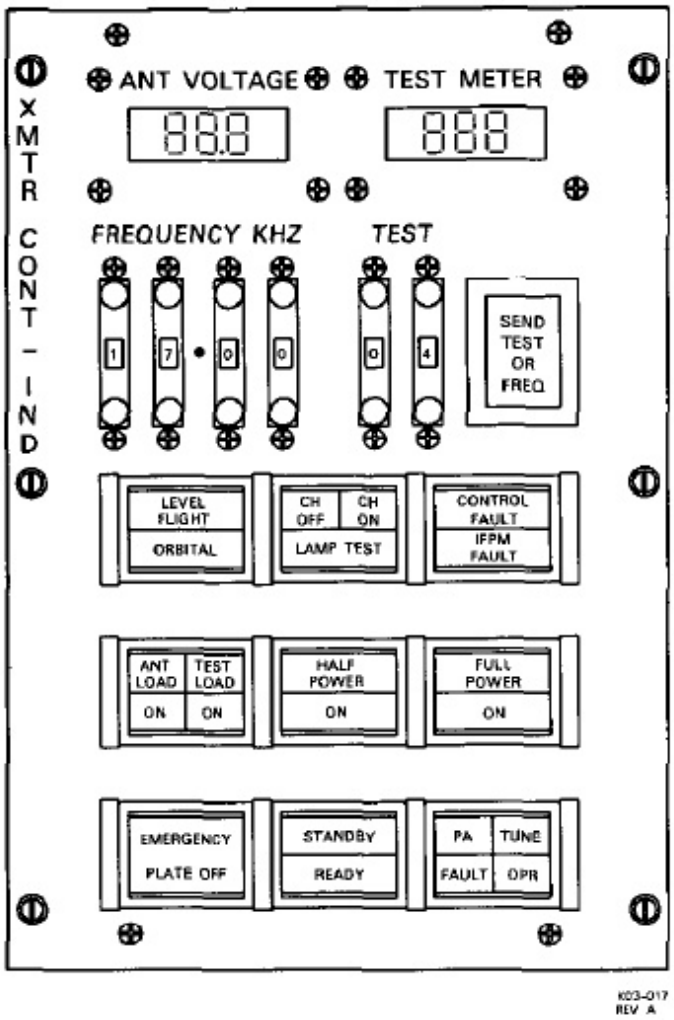


Figure 23-7. Local/Remote Control-Indicator Panel (C-9316)

23.4.2 VLF PA-Coupler Local/Remote Control-Indicator Panel (C-9316). Automatic operation of the VLF PA coupler can be controlled from comm central by the VLF operator using the remote control indicator at comm central seat three. The remote control indicator panel is the same as the local control indicator panel, and is shown in Figure 23-7. The panel is the input device through which the operator commands output frequencies and power levels from the PA coupler and selects coupling to the antenna or the internal test load. The panel also contains discrete status indicators and a test and display capability that allows test points within the PA coupler to be monitored. Each of the test points that are selectable via the switches and meters on the LMP, may also be monitored on the control indicator by entering the desired TEST number on the pushbutton switches and reading the TEST METER indication. The local/remote control-indicators panel controls and indicators are explained in Figure 23-8. The ANT VOLTAGE display on both control indicators also display numbers that represent various faults in the VLF amplifier coupler. See Figure 23-9 for list of the displayed numbers and faults.

23.4.3 Power-Amplifier Control System Computer. The PACS computer located in the right ATR shelf directs the VLF power amplifier-coupler tuning, output power, and antenna coupler matching with a minimum number of inputs from the VLF operator. Memory circuits within the control computer retain the PACS computer program. The program is automatically initiated from EPROM when power is applied.

To initiate computer BIT, Figures 23-10 and 23-11:

1. Momentarily press PUSH TO TEST switch to initiate lamp test. Switch and indicators are located on the front of the computer. Verify CPU, PROM, CCS, and HIGH SPEED indicators illuminate.

2. Press and hold PUSH TO TEST switch for 5 seconds to initiate BIT of computer internal circuit cards. Illumination of indicator verifies that respective card has passed self-test. Verify CPU, PROM, CCS, and HIGH SPEED indicators illuminate.

23.4.4 SF_6 Pressure Regulator Set. Pressure in the RF transmission line is maintained at 10.3 ±1 psig by a regulator set that also monitors the pressure of the SF_6 gas being supplied by two cylinders. The equipment rack is located on the aft side of the STWA support console. A valve on each cylinder is used to turn on or shut off the supply of SF_6 from the cylinders. A manifold pressure gauge indicates supply pressure of the source. The system pressure gauge indicates the regulated pressure of SF_6 supplied to the PA coupler through to the exit tube. Pressure is preset to 10.3 ±1 psi.

WARNING

- SF_6 is a colorless, odorless, tasteless gas that can be detected only with proper sensing equipment. Although SF_6 is non-toxic at normal temperatures, it can settle and displace breathable air.

- If arcing has occurred within the coaxial line, toxic by-products of SF_6 (hydrogen fluoride, sulfur oxy-fluorides, metal fluorides, etc.) may be present.

CONTROL/INDICATOR	FUNCTION
ANT VOLTAGE Segmented 7-bar Display LED (Red)	Displays antenna voltage. Also displays control system sequen number or performance monitor numbers when VLF pow amplifier-coupler has faulted.
TEST METER Segmented 7-bar Display LED (Red)	Display reading of selected test.
FREQUENCY KHZ Pushbutton Selector Switch Block (Four digits)	Selects frequency for tuning the transmitter.
TEST Pushbutton Selector Switch Block (Two digits)	Selects test for readout on TEST METER display. Also used to inp selected operations to the VLF amplifier-coupler control syste processor.

MUX Channel	Information Displayed
00	antenna voltage (KV)
01	power output (kw)
02	PA grid input VRF (volts RF)
03	driver input VRF (volts RF)
04	input amplifier screen Vdc
05	+28V cont pwr Vdc
06	+28V logic pwr Vdc
07	+5V logic pwr Vdc
08	+12V logic pwr Vdc
09	-12V logic pwr Vdc
10	+32 logic pwr Vdc
11	+5V padi pwr vdc
12	+12V padi pwr Vdc
13	-12V padi pwr Vdc
14	-20V padi pwr Vdc
15	input amplifier plate Vdc
16	input amplifier cathode current
17	driver cathode Vdc
18	driver 1 plate current
19	driver 2 plate current
20	driver 3 plate current
21	PA plate Vdc
22	PA cathode Vdc
23	PA plate current
24	left PA screen current
25	right PA screen current
26	variometer L_R position
27	variometer L_1 position
28	variometer L_{1-2} position
29	variometer L_2 position
30	variometer L_{2-3} position
31	variometer L_3 position

Figure 23-8. Control-Indicator Panel Controls and Indicators (Sheet 1 of 3)

CONTROL/INDICATOR	FUNCTION
LEVEL FLIGHT Indicator (White)	Indicates reel operator has selected level flight mode.
ORBITAL Indicator (White)	Indicates reel operator has selected orbital flight mode.
CH OFF Indicator (Yellow)	Indicates control-indicator not selected at this location.
CH ON Indicator (Green)	Indicates control-indicator selected at this location.
LAMP TEST Momentary Switch/Indicator (White)	Illuminates all indicators on XMTR CONT/IND panel and causes an 88.8 readout on the ANT VOLTAGE indicator and an 88.8 readout on the TEST METER.
CONTROL FAULT Indicator (Red)	Indicates fault in VLF power amplifier-coupler control computer system.
IFPM FAULT Indicator (Yellow)	Indicates fault in IFPM computer.
SEND TEST OR FREQ Momentary Switch/Indicator (White)	Enters test and/or frequency request into processor. Illuminates when new input is selected at TEST switches or FREQUENCY KHZ switches. Indicator extinguishes when processor accepts new frequency or test.
ANT LOAD/ON/TEST LOAD/ON Alternate Action Switch/4-position Indicator	Selects antenna load or test load.
ANT LOAD Indicator (White)	Indicates antenna load requested.
ON Indicator (Green)	Indicates antenna load connected.
TEST LOAD Indicator (White)	Indicates test load requested.
ON Indicator (Green)	Indicates test load connected.
HALF POWER/ON Alternate Action Switch/2-position Indicator.	Requests two high-voltage power supplies for operate mode.
HALF POWER Indicator (White)	Indicates two high-voltage power supplies requested.
ON Indicator (Green)	Indicates two high-voltage power supplies are on.

Figure 23-8. Control-Indicator Panel Controls and Indicators (Sheet 2 of 3)

CONTROL/INDICATOR	FUNCTION
FULL POWER/ON Alternate Action Switch/2-position Indicator	Requests all three high-voltage power supplies.
FULL POWER Indicator (White)	Indicates all three high-voltage power supplies requested.
ON Indicator (Green)	Indicates all three high-voltage power supplies are on.
EMERGENCY PLATE OFF Alternate Action Switch/Indicator (Red)	Switch interrupts transmitter plate interlock circuit, turning off a driver and VLF power amplifier-coupler power supplies. Indicat switch is in emergency off condition. For emergency use only.
STANDBY/READY Alternate Action Switch/2-position Indicator	Turns filaments and blower power on.
STANDBY Indicator (White)	Indicates filament-on and blower-on commands.
READY Indicator (Green)	Indicates filament time delay complete.
PA/TUNE/FAULT/OPR Momentary Switch/4-position Indicator	Commands high voltage on and initiates a tune cycle.
PA Indicator (White)	Indicates high voltage on command received by VLF power amplifie coupler control computer.
TUNE Indicator (Yellow)	Indicates transmitter is in a tune cycle.
FAULT Indicator (Red)	Indicates that a fault has occurred.
OPR Indicator (Green)	Indicates transmitter is in operate condition.

Figure 23-8. Control-Indicator Panel Controls and Indicators (Sheet 3 of 3)

DISPLAY	PA FAULT
	Note
	The following will be displayed with the fault number when applicable.
	XX ⊐ = Fault occurred during tuning and before operation.
	XX ⊏ = Fault occurred after tuning and during operation.
1	ATR air fault.
2	ATR interlock fault.
3	Shorting stick fault.
4	Doors open.
5	Filament level circuit breaker off.
6	Coolant flow off.
7	PA air fault.
8	Power supply air fault.
9	Filament power fault.
10	Long-wire reel power on.
11	Long-wire not deployed.
12	Short-wire interlock fault.
13	Long or short wire nested.
14	Plate level circuit breaker off.
15	Input amplifier power supply fault.
16	High-voltage power supply A fault.
17	High-voltage power supply B fault.
18	High-voltage power supply C fault.
19	PA cathode power supply fault.
20	Radio frequency key fault.
21	Antenna contactor fault.

Figure 23-9. Control-Indicators Display Fault Listing (Sheet 1 of 3)

DISPLAY	PA FAULT
22	Test load contactor fault.
23	Radio frequency input prove fault.
24	Radio frequency output prove fault.
25	Test load water level fault.
26	High-voltage power supply A fault (TUNE POWER PRESET).
27	High-voltage power supply B fault (TUNE POWER PRESET).
28	High-voltage power supply C fault (TUNE POWER PRESET).
29	Two or three high-voltage power supply faults.
50	Tune-start step.
51	Coarse-position step.
52	Preposition step.
53	Fine-tune 1 step.
54	Fine-tune 2 step.
55	Fine-tune operate step.
60	Coolant temperature fault.
61	PA steam pressure fault.
62	PA water level fault.
63	Input amplifier overload.
64	Driver 1 overload.
65	Driver 2 overload.
66	Driver 3 overload.
67	Coaxial pressure fault.
68	High-voltage power supply fault.
69	Cathode power supply overload.
70	Left PA screen overload.

Figure 23-9. Control-Indicators Display Fault Listing (Sheet 2 of 3)

DISPLAY	PA FAULT
71	Left PA cathode overload.
72	Right PA screen overload.
73	Right PA cathode overload.
74	Node 1 arc sensed.
75	Node 2 arc sensed.
76	Node 3 arc sensed.

Figure 23-9. Control-Indicators Display Fault Listing (Sheet 3 of 3)

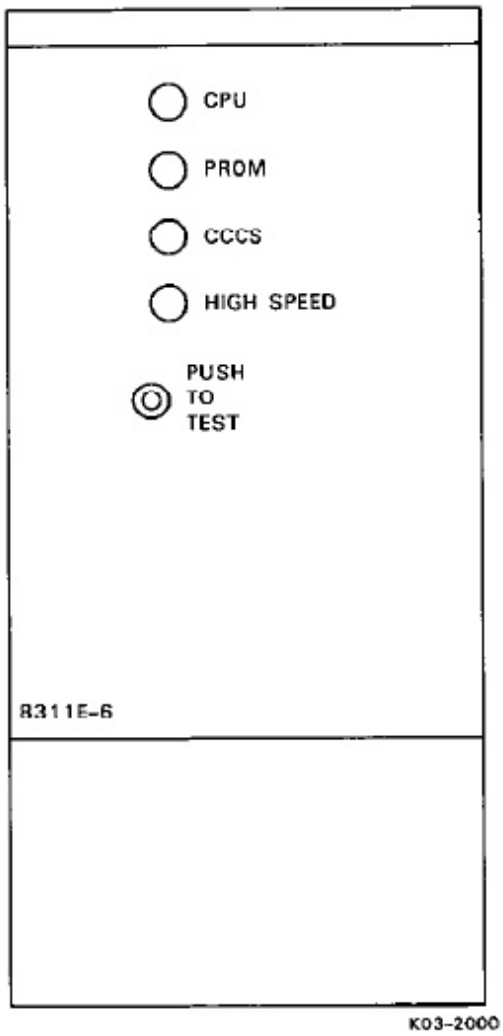


Figure 23-10. PA Control Computer or IFPM Computer (CP-1999/USC-13(V))

CONTROL/INDICATOR	FUNCTION
CPU Indicator	Illuminates during built-in-test (BIT) to indicate the CPU circuit car passed self-test.
PROM Indicator	Illuminates during BIT to indicate the PROM circuit card passe self-test.
CCCS Indicator	Illuminates during BIT to indicate the CCCS circuit card passe self-test.
HIGH SPEED Indicator	Illuminates during BIT to indicate the high speed circuit card passe self-test.
PUSH TO TEST Switch	When pressed momentarily, initiates lamp test of front pane indicators. When pressed and held (5 seconds), initiates BIT o internal circuit cards.

Figure 23-11. Power Amplifier Control Computer or IFPM Computer Controls and Indicators

EQUIPMENT/ SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
VLF PA-Coupler	115V, 400 Hz	VLF CATH ELCU	400 HZ DISTR 2 Panel, VLF PW ENABLE CATH Switch
	115V, 400 Hz	VLF HVA ELCU	400 HZ DISTR 2 Panel, VLF PW ENABLE HVA Switch
	115V, 400 Hz	VLF HVB ELCU	400 HZ DISTR 2 Panel, VLF PW ENABLE HVB Switch
	115V, 400 Hz	VLF HVC ELCU	400 HZ DISTR 2 Panel, VLF PW ENABLE HVC Switch
	28 VDC	MA 1 DC	P67-3 Panel, VLF PWR AMP
	28 VDC	MA 5 DC DIST	P67-2 Panel, VLF AMP-A
	28 VDC	MA 5 DC DIST	P67-2 Panel, VLF AMP-B
	28 VDC	MA 5 DC DIST	P67-2 Panel, VLF AMP-C
	28 VDC	MA 5 DC DIST	P67-2 Panel, VLF AMP-ELC RELAY
	28 VDC	MA 5 DC DIST	P67-2 Panel, VLF CATH ELC CONT

Figure 23-12. VLF Power Amplifier-Coupler Power Sources

23.5 IN-FLIGHT TECHNICIAN EQUIPMENT POWER SOURCES

Figure 23-12 lists the power sources for equipment associated with the in-flight technician position, including the type of electrical power, and the circuit breaker location/label.

23.6 IN-FLIGHT TECHNICIAN PREFLIGHT

23.6.1 Aircraft Interior Inspection. Special attention shall be given to the physical security of classified equipment and associated locking devices.

23.6.1.1 Forward Lower Compartment. Inspect all equipment for security or damage.

1. Radar transponder — Checked.
2. E45 rack — Checked.
3. E1 rack (port side) — Checked.
4. Radar RT — Checked.

   Ensure RT is mounted in port rack and XMTR switch is pinned in ON position.

5. E5 rack MSU — Checked.
   a. Selector switch — ALL.
   b. VOLUME control — Set.

      Midrange or higher.

6. E1 rack (starboard side) — Checked.
7. E14 rack — Checked.
8. E15 rack MSU — Checked.
   a. Selector switch — ALL.
   b. VOLUME control — Set.

      Midrange or higher.

9. NBPS pallet — Checked, Set.
   a. BATTERY and LINE circuit breakers — CLOSED.
   b. Power supply switch — ON.

      POWER SUPPLY ON indicator illuminates.
   c. Voltage checks — Complete.

      (1) LINE — Approximately 28 VDC.

      (2) CHARGER — 27.5 ±1.5 VDC.

      Note

      Voltage will be indicated only if CHGR OUTPUT indicator is illuminated on NO BREAK POWER MONITOR panel.

      (3) BATTERY — 24.0 to 29.0 VDC.

10. FTS UPS batteries and chargers — Checked.
11. MSPE rack MSU — Checked.
    a. Selector switch — ALL.
    b. VOLUME control — Set.

       Midrange or higher.

23.6.1.2 Interior Walkaround. Inspect all equipment for damage and security.

1. Flight station avionics equipment — Checked.
2. Galley MSU — Checked.
   a. Selector switch — ALL.
   b. VOLUME control — Set.

      Midrange or higher.

3. C-1 rack equipment — Checked.
4. P67 circuit breaker panels — Checked.

   All mission related circuit breakers closed.

5. P20 equipment — Checked.
6. Comm central circuit breaker panels — Set.

   Verify the following comm central circuit breaker panels are set:

   Note

   Reset FTS UPS control panel alarm as required.

a. 28 VDC DISTR 1 and 2 — Set.

b. 400 HZ DISTR 1 and 2 — Set.

c. 60 HZ DISTRIBUTION PANEL — Set.

7. P30 equipment — Checked.

8. RT racks — Checked.

Ensure all MDF circuit breakers are closed except UHF 5 PA on MDF-3.

CAUTION

To prevent damage to HF subsystem equipment, 28 vdc power must be supplied before applying 400 Hz power.

9. Reel area port MSU — Checked.

a. Selector switch — ALL.

b. VOLUME control — Set.

Midrange or higher.

10. SF_6 system check — Complete.

a. Line pressure gauge — 8 psig minimum.

If necessary, open an SF_6 bottle to charge system. When system pressure has stabilized (minimum 30 minutes), close the bottle. Ensure pressure is maintained for 30 minutes.

b. SF_6 assembly — Checked.

11. Reel area starboard MSU — Checked.

a. Selector switch — ALL.

b. VOLUME control — Set.

Midrange or higher.

12. Onboard spares — Checked.

Check all spares for sufficient quantities and proper stowage.

a. TTY paper and ribbons — Checked.

b. TMPS paper — Checked.

c. PA water — Checked.

d. SF_6 bottle — Checked.

e. Consumables kit — Checked.

f. CW handkey and FTS cables — Checke

g. Audio and dc patch cords — Checked.

Ensure minimum of 15 each.

13. Crew tools and test equipment — Inventor Checked, Stowed.

Coordinate tool, test equipment checkout, stowage with reel operators.

14. Publications — Checked, Stowed.

23.6.1.3 Station Oxygen/ICS Preflight.

1. Station 10 oxygen — Checked.

a. Mask visual check — Complete.

Check hose, mask, and regulator for clea ness and damage. Verify oxygen mask is nected.

b. SUPPLY lever — ON.

c. Emergency lever — TEST MASK.

Hold mask facing away from yourself. H emergency lever to the TEST MASK p tion, then release.

d. Diluter lever — 100 percent OXYGEN.

e. Emergency lever — EMERGENCY.

Positive pressure should be indicated.

f. Emergency lever — NORMAL.

Breathe for a minimum of three cycles. blinker should show alternately black white. Hold breath momentarily (blir should remain black). Pressure should be to 430 psi.

g. SUPPLY lever — OFF.

h. Oxygen mask — Stowed.

2. Station 9 Oxygen, ICS — Checked.

   a. Mask visual check — Complete.

      Check hose, mask, and regulator for cleanliness and damage. Verify Oxygen mask is connected.

   b. SUPPLY lever — ON.

   c. Emergency lever — TEST MASK.

      Hold mask facing away from yourself. Hold emergency lever to the TEST MASK position, then release.

   d. Microphone check — Complete.

      Connect mask to available ICS station and press PTT switch. Verify sidetone is present in mask headphones.

   e. Diluter lever — 100 percent OXYGEN.

   f. Emergency lever — EMERGENCY.

      Positive pressure should be indicated.

   g. Emergency lever — NORMAL.

      Breathe for a minimum of three cycles. The blinker should show alternately black and white. Hold breath momentarily (blinker should remain black). Pressure should be 290 to 430 psi.

   h. SUPPLY lever — OFF.

   i. Oxygen mask — Stowed.

23.6.1.4 Aft Lower Compartment

1. Lower Comp Access MSU — Checked.

   a. Selector switch — ALL.

   b. VOLUME control — Set.

      Midrange or higher.

2. Low-range radio altimeter RT — Checked.

   Inspect equipment for damage and security.

3. Aft cargo door MSU — Checked.

   a. Selector switch — ALL.

   b. VOLUME control — Set.

      Midrange or higher.

23.6.2 VLF PA-Coupler Inspection. Normal VLF PA coupler preflight shall be attempted using two external power carts. If two power carts are unavailable, follow the procedures in Paragraph 23.8.2.

In each bay and node give special attention to compartment cleanliness, indications of burned, discolored, worn or loose components. After doors and panels are opened, check shorting stick assembly for integrity and ensure proper mechanical operation of shorting stick and door interlock switches. After compartment inspection, ensure doors and panels are properly closed prior to operation.

WARNING

Use extreme caution when performing preflight procedures. These procedures contain checks of high-voltage and power connections. Use shorting sticks at all power points. Do not enter any PA compartment without first using shorting sticks.

Note

- Reel area side panel inspection/maintenance dome lights are recommended for the following procedures.
- Component location diagrams are on placards located on the inner side of each bay and node door.

1. Bay 1 check — Complete.

WARNING

All power disconnect switches shall be off.

   a. HVB and HVC TR units — Checked.

   b. HV power contactors K35 and K36 — Checked.

   c. Shorting switch S58 — Checked.

      Inspect for proper mechanical operation.

d. Upper bay 28 VDC filter network — Checked.

WARNING

Capacitors C-104 through C-111 in upper bay 1 have 28 VDC applied. Extreme caution should be used in this area.

2. Bay 2 check — COMPLETE.

All power disconnect switches shall be off.

a. Cathode and HVA TR units — Checked.

b. Cathode and HV power contactors K37 and K34 — Checked.

c. Shorting switch S59 — Checked.

Inspect for proper mechanical operation.

d. Fiberoptic assembly — Checked.

e. LMP — CHECKED.

Inspect the following LMP components:

Note

The shorting stick required for the LMP inspection may be obtained from lower bay 2 or upper bay 3.

(1) All left and rear wall control relays and terminal boards (E4 and E5).

(2) I/O connectors P1 and P16 for security and associated cabling for damage.

(3) All components on the LMP door for security.

3. Bay 3 and bay 4 checks — Complete.

a. Lower bays — Checked.

(1) Arc gaps — Checked.

Inspect for arcing or corrosion.

(2) Shorting switches S60 and S61 — Checked.

Inspect for proper mechanical operatio

(3) Blowers B1 and B2 — Checked.

(4) Air vane switches S5, S6, and S7 Checked.

(5) Doors — Closed.

b. Left and right ATR shelves — Checked.

(1) All electronic slices — Checked.

(2) I/O connectors and cabling — Check

(3) Doors — CLOSED.

c. Left and right grid enclosures CHECKED.

Note

The shorting stick required for the left and right grid enclosure inspection may be obtained from upper or lower bays 3 and 4.

(1) Shorting switches S55 and S56 Checked.

Inspect for proper mechanical operatio

(2) Tube sockets — Checked.

(3) Doors — Closed.

d. Upper Bays 3 and 4 — Checked.

(1) Arc gap — Checked.

(2) C0A, C0B, and C1A — Checked.

(3) Water level — FULL.

(4) Fiber optic connections — Checked.

(5) RF connections — Checked.

Inspect connections between PA tu and capacitor C0B.

(6) PA tubes — Checked.

Inspect tube seating to ensure that qu release clamps are tight with no evide of leaks.

4. PA water level checks — Complete.

   a. ELCU switch/indicators — Set.

      On 400 HZ DISTR 2 panel, ensure CATH, HVA, HVB, and HVC switch indicators are illuminated.

WARNING

Power is on throughout this procedure. Do not enter any PA compartment without first using shorting sticks.

Note

If split system breaker is not opened and proper power applied to the ME sync bus, the HVA, HVB, and HVC switch indicators will not illuminate.

   b. PA-coupler circuit breaker panel — Set.

      On the PA-coupler circuit breaker panel, set the following power disconnect switch and circuit breakers to ON:

      (1) LV PWR

      (2) LOW PWR DISTR

      (3) ACCESS

      (4) CABINET LIGHTS

      (5) LOGIC 28V

      (6) PADI 28V

      (7) PA PRCS 28V

      (8) CONTROL 28V

Note

If CONTROL FAULT indicator is illuminated on local control-indicator, program load the PACS computer.

   c. Coolant system — Drained.

      Use the water fill bottle, drain and save liquid coolant from the PA tubes until the coolant level is below the warning line.

      (1) WATER LEVEL warning — On.

         Continue to drain coolant until water level is below the fault line.

      (2) PA FAULT indicator — ON.

         Illuminates after approximately 20 seconds.

   d. Coolant system — Filled.

      Fill the coolant system with an additional one liter of coolant, once the coolant level has reached the top of the steam seperator sight gauge. Check for water leakage around drain fitting.

      (1) WATER LEVEL warning — Off.

      (2) PA FAULT — Off.

   e. Upper bays 3 and 4 doors — CLOSED

   f. PACS computer lamp test — Complete.

      Momentarily press the PUSH TO TEST switch on the PACS computer. Verify all PACS computer lamps illuminate momentarily.

   g. PACS computer BIT test — Complete.

      Press and hold (5 seconds) PUSH TO TEST switch on the PACS computer. Verify all PACS computer lamps illuminated at end of test.

   h. IFPM computer lamp test — Complete.

      Momentarily press PUSH TO TEST switch on PACS computer. Verify all IFPM Computer lamps illuminate momentarily.

   i. IFPM computer BIT test — Complete.

      Press and hold (5 seconds) PUSH TO TEST switch on IFPM computer. Verify all IFPM computer lamps illuminated at end of test.

5. Variometer position and alignment checks — Complete.

   a. LMP MODE switch — PREPOSITION.

   b. L_R low end stop — Checked.

      (1) Right-hand TEST METER — 26.

      Adjust the LMP SERVO 1 drive control for a minimum indication on the righthand TEST meter. Observe TEST meter for smooth meter movement at both speeds.

      (2) Local control-indicator TEST switches — 26.

      Press SEND TEST OR FREQ switch indicator. MUX channel 26 should be less than 40 and greater than 0. The SERVO END STOP indicator should illuminate. Record indications in PA log.

Note

With the analog test meter and the control indicator set to the same MUX channel, loading of the meter circuitry may occur.

   c. L_R high end stop — Checked.

   Adjust the LMP SERVO 1 drive control for a maximum indication on the right hand TEST meter. Observe TEST meter for smooth meter movement at both speeds. MUX channel 26 should be less than 500 and greater than 460. The SERVO END STOP indicator should illuminate. Record indications in PA log.

   d. L_R — Centered.

   Adjust the LMP SERVO 1 drive control for an indication of 250 on the local control indicator. Verify the SERVO END STOP indicator is extinguished.

   e. L_1 low end stop — Checked.

   Repeat step b using MUX 27 and SERVO 2 drive control.

   f. L_1 high end stop — Checked.

   Repeat step c using SERVO 2 drive control.

   g. L_1 — Centered

   Repeat step d using SERVO 2 drive contro

   h. L_{1-2} low end stop — Checked.

   Repeat step b using MUX 28 and SERV drive control.

   i. L_{1-2} High End Stop — Checked.

   Repeat step c using SERVO 3 drive contro

   j. L_{1-2} — Centered.

   Repeat step d using SERVO 3 drive contro

   k. LMP MODE switch — MANUAL TU STEP SERVO DISABLE.

   l. L_2 low end stop — Checked.

   Repeat step b using MUX 29 and SERV drive control.

   m. L_2 high end stop — Checked.

   Repeat step c using SERVO 1 drive contro

   n. L_2 — Centered.

   Repeat step d using SERVO 1 drive contro

   o. L_{2-3} low end stop — Checked.

   Repeat step b using MUX 30 and SERV drive control.

   p. L_{2-3} high end stop — Checked.

   Repeat step c using SERVO 2 drive contro

   q. L_{2-3} — Centered.

   Repeat step d using SERVO 2 drive contro

   r. L_3 low end stop — Checked.

   Repeat step b using MUX 31 and SERV drive control.

   s. L_3 high end stop — Checked.

   Repeat step c using SERVO 3 drive contro

t. L_3 — Centered

Repeat step d using SERVO 3 drive control.

u. LMP MODE switch — AUTOMATIC.

6. Bay 5 check — Complete.

a. Variometer — Checked.

(1) RF connections — Checked.

(2) Ground strap — Checked.

Ensure ground strap is present on variometer shaft.

(3) Rotor — Checked.

Check rotor for excessive movement or looseness and verify the rotor is roughly perpendicular to the stator.

b. Feed through capacitor C35 — Checked.

c. Shorting switches S57 and S62 — Checked.

Check for proper mechanical operation.

d. Driver power supply — Checked.

e. Arc gaps — Checked.

7. Node 1 check — Complete.

a. Shorting switch S8 — Checked.

Check for proper mechanical operation.

b. RF connections — Checked.

c. Coaxial connections — Checked.

d. Arc sensor — Checked.

e. Variometers L_1 and L_{1-2} — Checked.

(1) Control connectors — Checked.

(2) Ground strap — Checked.

Presence of ground strap on variometer shafts.

(3) Rotors — Checked.

Check rotors for excessive movement or looseness and verify the rotors are roughly perpendicular to the stators.

f. Band switching relays K63 and K64 — CHECKED.

g. Aft wall capacitor bank — Checked.

Check for evidence of arcing and condition of coating on insulated panel and barrel nuts on which capacitors are mounted.

8. Node 2 check — Complete.

a. RF connections — Checked.

b. Coaxial connections — Checked.

c. Arc sensor — Checked.

d. Variometers L_2 and L_{2-3} — Checked.

(1) Control connectors — Checked.

(2) Ground strap — Checked.

Presence of ground strap on variometer shafts.

(3) Rotors — Checked.

Check rotors for excessive movement or looseness and verify the rotors are roughly perpendicular to the stators.

e. Band switching relay K65 — Checked.

f. Blower B4 — Checked.

9. Node 3 check — Complete.

a. RF connections — Checked.

b. Coaxial connections — Checked.

c. Arc sensor — Checked.

d. Variometer L_3 — Checked.

(1) Control connector — Checked.

(2) Ground strap — Checked.

Presence of ground strap on variometer shaft.

(3) Rotor — Checked.

Check rotor for excessive movement or looseness and verify the rotor is roughly perpendicular to the stator.

e. Band switching relay K66 — Checked.

f. Dummy load — Checked.

(1) Fluid level — Full.

Floats at the top of both sight glasses.

(2) Fiber optic connections — Checked.

(3) Water leaks — None.

g. Blower B3 — Checked.

h. Fish bowl — Checked.

Check for evidence of dirt, cracks, or arcing.

i. Antenna load/test load relays K61 and K62 — Checked.

10. Exterior check — Complete.

a. Doors and panels — Secure.

b. Top of bays 1 and 2 — Checked.

Connectors on top of bays 1 and 2 properly connected.

c. Inboard steam vent valve — Checked.

Verify inboard steam vent valve closed.

23.6.3 VLF PA-Coupler Operational Checks. Coordinate all power and fuel requirements through the flight engineer and all liquid cooling requirements through the reel operator.

WARNING

All personnel in aft compartment during STWA or LTWA retraction, or during VLF PA operation exceeding PEL (see Figure 3-7, A1-E6AAA-NFM-000) shall wear hearing protection.

1. Split system breaker — Set.

Verify the split system breaker is open and CATH, HVA, HVB, and HVC ELCU switch dicators on the 400 HZ DISTR 2 panel are lected and illuminated.

Note

When operating the VLF PA COUPLER on ground power, both ground power receptacles must be powered and the split system breaker must be open prior to selecting external power.

2. Liquid cooling system — ON.

Verify the liquid cooling system is activated accordance with Chapter 24.

CAUTION

If LCS system is not monitored an overheat condition may occur.

Note

When either main fuel tank one or four contains less than 5,000 pounds of fuel with the LCS heat exchanger operating, monitor fuel and LCS coolant temperature.

3. PA-coupler circuit breaker panel — Set.

Ensure the following power disconnect swit and circuit breakers are ON:

a. LV PWR

b. LOW PWR DISTR

c. DRIVER FIL

d. L PA FIL

e. R PA FIL

f. INP AMPL PWR SPLY

g. DRIVER PWR SPLY

h. LOGIC 28V

i. PADI 28V

j. PA PRCS 28V

e. EMERGENCY PLATE OFF switch indicator — Off.

f. LOCAL/REM/CONT HEAD INOP switch indicator — REM.

Press and verify LOC indicator extinguishes and REM indicator illuminates.

g. Remote control indicator emergency plate off check — Complete.

(1) Lamp test — Complete.

Press CH ON/CH OFF/LAMP TEST Switch-Indicator and verify all remote control-indicator lamps illuminate.

(2) STANDBY/READY switch indicator — STANDBY/READY.

Press and verify only the following indicators are illuminated.

(a) STANDBY/READY READY 30 to 45 seconds after STANDBY is pressed

(b) LEVEL FLIGHT or ORBITAL

(c) CH ON

(d) TEST LOAD/ON.

(3) EMERGENCY PLATE OFF switch indicator — On.

(4) PA/TUNE/FAULT/OPR switch indicator — Press.

Verify PA illuminates and a 14 is displayed in the ANT VOLTAGE display.

(5) PA/TUNE/FAULT/OPR switch indicator — Press.

Verify PA indicator and 14 extinguish.

(6) EMERGENCY PLATE OFF switch indicator — Off.

h. LMP LOC/REM/CONT HEAD INOP switch indicator — LOC.

Press and verify REM indicator extinguishes and LOC indicator illuminates.

6. Short wire interlock check — Complete.

WARNING

Verify all STWA panels are secured and no one is near the STWA drogue.

a. Reel station — Set.

Complete the following at the reel op station:

(1) 400 HZ POWER DISTRIBUTION (A2A4) CB2 — On.

(2) +28 VDC POWER control (A1A VDC switch — ON.

(3) SHORT WIRE VELOCITY C (A1A2) ANTENNA ACCESS swit OFF.

b. Local control indicator FREQUENCY switches — 18.00.

Press SEND TEST OR FREQ switch i tor, verify it extinguishes.

c. ANT LOAD/ON/TEST LOAD/ON s indicator — ANT LOAD/ON.

Press and verify TEST LOAD/ON indi extinguish and ANT LOAD/ON indi illuminate.

WARNING

Verify all three HV PWR SPLY disconnec switches are off.

d. PA/TUNE/FAULT/OPR switch indicat Press.

Verify PA and TUNE indicators illum On the STWA verify the STWA int solenoid energizes. On the LMP verify () is displayed in the ANT VOLTAG play and the following additional indi illuminate:

(1) SHORT WIRE INTERLOCK

(2) INPUT AMPL DRIVER.

e. PA/TUNE/FAULT/OPR switch indicator — Press.

Verify indicators in the last step extinguish and the STWA interlock solenoid deenergizes.

f. Reel station — Set.

Complete the following at the reel operator station:

(1) SHORT WIRE VELOCITY control (A1A2) ANTENNA ACCESS switch — ON.

(2) +28 VDC POWER control (A1A4) 28 VDC switch — OFF.

(3) 400 HZ POWER DISTRIBUTION panel (A2A4) CB2 — OFF.

7. ANT LOAD/ON/TEST LOAD/ON switch indicator — TEST LOAD/ON.

On the local control indicator press ANT LOAD/ON/TEST LOAD/ON switch indicator, verify ANT LOAD/ON indicators extinguish and TEST LOAD/ON indicators illuminate.

8. LMP MODE switch — AUTOMATIC.

9. Circuit breaker panel — Set.

a. HV PWR SPLY A disconnect switch — ON.

b. HV PWR SPLY B disconnect switch — ON.

c. HV PWR SPLY C disconnect switch — ON.

10. Power supply A check — Complete.

a. LMP TUNE POWER PRESET A switch indicator — On.

Press to select, verify it illuminates.

b. VERDIN modulator — Set.

(1) FREQUENCY KHZ — 29.00

(2) MODULATION switch — CWFSK.

(3) CONSTANT FREQ SHIFT switch — LOW.

c. Local control indicator FREQUENCY KHZ switches — 29.00

Then press SEND TEST OR FREQ switch indicator, verify it extinguishes.

d. PA/TUNE/FAULT/OPR switch indicator — Press.

Verify the following additional indicators illuminate:

(1) Local control indicator — Checked.

(a) PA

(b) TUNE (for up to 10 seconds)

(c) OPR (same time FINE TUNE OPERATE illuminates on the LMP).

(2) LMP — Checked.

(a) INPUT AMPL DRIVER

(b) HV SUPPLY A, B, OR C (matches the selected TUNE POWER PRESET switch indicator)

(c) CATHODE SUPPLY

(d) TUNE START

(e) COARSE POSITION

(f) PREPOSITION

(g) FINE TUNE 1

(h) FINE TUNE 2

(i) FINE TUNE OPERATE

(j) OPERATE

(k) RF KEY

(l) RF OUTPUT PROVE.

The PA automatically advances through the tune cycle in 10 seconds. The TUNE START through OPERATE indicators (D through J above) show the tune cycle and will illuminate in the order shown. The RF KEY and RF OUTPUT PROVE indicators illuminate during the FINE TUNE 1 step.

e. MUX channels — Checked, Recorded.

5. Forced air cooling — Set.

   Verify the forced air cooling is activated.

6. LCS — Set.

   Verify the LCS is activated.

7. VLF PA coupler circuit breaker panel — Set.

   Set the following POWER DISCONNECT SWITCHES and circuit breakers to ON:

   a. LV PWR

   b. LOW PWR DIST

   c. DRIVER FIL

   d. L PA FIL

   e. R PA FIL

   f. INP AMPL PWR SPLY

   g. DRIVER PWR SPLY

   h. LOGIC 28V

   i. PADI 28V

   j. PA PRCS 28V

   k. IFPM PRCS 28V

   l. CONTROL 28V

   m. SERVO 28V.

8. LMP — Checked, Set.

   On the LMP check the following:

   a. Test Meters — Checked.

      Test meters for correct operating voltages.

   b. Lamp tests — Complete.

      Lamp test both LMP and selected control indicator.

   c. LMP indicators — Checked, Set.

      Verify the following LMP indicators are illuminated.

      (1) ATR AIR/ATR INTERLOCK

      (2) SHORTING STICKS/DOORS CLOSED

      (3) CKT BREAKERS/COOLANT FLOW

      (4) LW REEL POWER OFF

      (5) LOC.

      All other indicators should be extinguished with the possible exception of RF INPUT PROVE, SPECTRUM FILTER BYPASS, or any one of the TUNE POWER PRESET indicators. If the LOC indicator is not illuminated, press the LOC/REM/CONT HEAD INOP switch indicator to select LOC.

9. Local control indicator — Set.

   a. Indicators — On.

      Verify the following local control-indicator indicators are illuminated:

      (1) LEVEL FLIGHT or ORBITAL

      (2) CH ON

      (3) TEST LOAD/ON

      All other indicators should be extinguished, if not, press to deselect.

   b. STANDBY/READY switch indicator — STANDBY.

      Press and verify the following additional indicators are illuminated:

      (1) STANDBY

      (2) PA AIR/PS AIR/FILAMENT

      (3) READY (30 to 45 seconds after STANDBY is pressed).

10. HV A, HV B, and HV C disconnect switches — As Required.

    Set HV PWR SPLY A, HV PWR SPLY B, and HV PWR SPLY C disconnect switches as required.

23.7.2 Transmission. To initiate VLF PA-coupler transmission, use the following procedures.

1. VERDIN modulator — Set.

   Verify the VERDIN modulator is setup for required mode.

2. Standby/ready procedures — Complete.

3. FREQUENCY KHZ switches — Set.

   Enter the operating frequency at the selected control indicator.

4. ANT LOAD/ON/TEST LOAD/ON switch indicator — ANT LOAD/ON.

   Press and verify TEST LOAD/ON indicators extinguish and ANT LOAD/ON indicators illuminate.

   Note

   - TUNE POWER PRESET A, B, or C may be selected at this time.
   - HALF POWER/ON and FULL POWER/ON may be selected at this time.

5. PA/TUNE/FAULT/OPR switch indicator — Press.

   When directed to begin VLF PA-coupler operation, press PA/TUNE/FAULT/OPR switch on the selected control-indicator to initiate VLF PA-coupler transmission. The PA indicator will illuminate. When the tune cycle starts, the TUNE indicator illuminates. When the tune cycle is complete, the TUNE indicator extinguishes and the OPR indicator illuminates.

   WARNING

   At no time shall any interlocks be defeated to operate the VLF PA coupler.

6. Power level — Set.

   If not previously selected, select the desired power level.

   CAUTION

   To prevent VLF PA-coupler arcing during transition between level and orbit flight or while changing wire length when the VLF PA-coupler is keyed, ensure that the reel operator, VLF PA-coupler operator, and flight deck personnel are in close communication to coordinate aircraft attitude and antenna wire lengths.

7. Transmission termination — Complete.

   To terminate transmission and secure the V PA coupler:

   a. PA/TUNE/FAULT/OPR switch indicator Press.

      When directed, press the PA/TUI FAULT/OPR switch indicator. Indicators tinguish.

   b. STANDBY/READY switch indicator OFF.

      Press STANDBY/READY switch. Indica extinguish. Note that in 30 to 45 seconds PA AIR and PS AIR indicators on the L extinguish.

   c. Circuit breaker panel — Secured.

      Secure all power switches and circuit breake

   d. FREQUENCY KHZ Switches — 1111.

      On both control-indicators, zeroize opera frequency.

   e. Water level — Checked.

      Approximately 10 minutes after turn-off, ify that water levels are correct. Servic necessary.

      Note

      If water levels are low due to steam venting overboard, service with water only.

f. Forced air cooling — As required.

Notify flight engineer that forced air cooling system is no longer required, if applicable.

g. LCS — As required.

Notify reel operator that LCS is no longer required for VLF PA-coupler operation.

23.7.3 Output Power Control. During operation to change the VLF PA-coupler power output level, use the following procedure:

1. Tune power level — Set.

   a. FULL POWER/ON switch indicator — Off.

   b. HALF POWER/ON switch indicator — Off.

2. Half power level — Set.

   a. HALF POWER/ON switch indicator — On.

   b. FULL POWER/ON switch indicator — Off.

3. Full power level — Set.

   a. HALF POWER/ON switch indicator — As required.

   HALF POWER/ON switch indicator may be ON or OFF.

   b. FULL POWER/ON switch indicator — ON.

23.7.4 Frequency Change. To change the VLF PA-coupler operating frequency, use the following procedure:

CAUTION

The VLF PA coupler shall not be transmitting when changing the operating frequency.

1. Standby/ready condition — Set.

   Verify the VLF PA coupler is at the standby/ready condition.

2. FREQUENCY KHZ switches — Set.

   Set the FREQUENCY KHZ switches on the selected control indicator to the desired operating frequency. Press the SEND TEST OR FREQ switch indicator and verify it extinguishes.

3. VERDIN modulator — Set.

   Verify the new frequency has been entered into the VERDIN modulator.

4. Wire lengths — Adjusted.

   Verify antenna wire lengths are adjusted to new frequency requirements.

23.8 DEGRADED MODES

23.8.1 Loss of SF_6 Pressure. VLF PA-coupler operation with a loss of SF_6 pressure may be permitted provided the following conditions are met:

1. Aircraft has not descended below 5,000 feet MSL with the SF_6 system pressure indicating zero psig.

2. System pressure can be maintained above 1.3 psig.

3. System integrity has not been broken.

CAUTION

At no time will the SF_6 safety interlock be defeated in order to operate the VLF PA coupler when line pressure is 1.3 psig or below. Line pressure falling to zero psig below 5,000 feet MSL will render system inoperative until purge has been accomplished in accordance with maintenance procedures.

23.8.2 VLF PA-Coupler Degraded Preflight. VLF PA-Coupler preflight with only one external power cart available or when using the APU generator may be accomplished using the following guidelines.

1. VLF PA-coupler inspection — Complete.

   Perform paragraph 23.6.2 VLF PA-Coupler Inspection.

2. Preliminary operation checks — Complete.

   Perform paragraph 23.6.3 VLF PA-Coupler Operational Checks steps 1 through 8 (disregard the note pertaining to step 1) and 17 through 22.

   While performing this procedure, coordinate with the flight engineer to ensure continuous monitoring of the AVE SYNC bus to prevent an overload condition.

   Note

   Completion of the following steps shall be coordinated with the flight station, comm central, and reel operator.

3. ICS — As Required.

   Establish ICS communications via the forward reel area starboard MSU prior to commencement of engine start checklist.

4. Operational checks — Complete.

   Perform paragraph 23.6.3 VLF PA-Coupler Operational Checks, steps 1 through 4, 5a, and 9 through 22.

23.9 IN-FLIGHT TECHNICIAN POSTFLIGHT

Prior to securing from air crew duties, the IFT will ensure maintenance/training forms and mission/maintenance debrief have been completed, as required.

23.9.1 Station Oxygen/ICS Postflight

1. Oxygen — NORMAL, 100 percent OXYGEN, SUPPLY OFF.

2. CSU PTT selector — ICS.

23.9.2 VLF-PA Coupler Postflight

WARNING

Use extreme caution when performing post flight procedures. All power disconnect switches shall be off. Do not enter any PA compartment without first using the shorting sticks.

1. Water levels — Checked.

   Service as required.

2. Frequency KHZ and test switches — Zeroize

   Digits all the same (i.e. all 1's).

23.9.3 Comm Central Postflight

1. Circuit breaker panels — Set.

   a. P67-1 panel — Set.

      Open the following circuit breaker:

      (1) POWER DISTRIBUTION PANEL 1 VDC.

   b. P67-2 panel — Set.

Open the following circuit breakers:

   a. 400 HZ DIST PNL FWD

   b. RT 1A

   c. RT 1B

   d. RT2

   e. RT4

   f. POWER DISTRIBUTION PANEL 2 VDC

   g. RT RACK 3 and 4

   h. FTS CNTL PNL AFT

   i. 400 HZ DIST PNL AFT.

Note

If one FTS will be left on after postflight the FTS CNTL PANL AFT and 400 HZ DIST PNL AFT circuit breakers shall remain closed to allow the batteries to charge any time ac power is applied to the aircraft.

2. Onboard spares — CHECKED.

Note

All shortages and/or discrepancies shall be noted for pass down to maintenance.

3. Test equipment and tools — checked/inventoried.

23.9.4 Forward Lower Compartment Postflight

1. No-break power control monitor panel — Set.
   a. Power switch — OFF.
   b. BATTERY circuit breaker — Open.

CHAPTER 24

Reel Systems — Preflight, Operation, and Postflight

24.1 REEL OPERATOR RESPONSIBILITIES

The reel operator is responsible for the preflight, operation, and postflight of the VLF dual trailing wire antenna system.

24.2 GENERAL DESCRIPTION

24.2.1 Long Trailing Wire Antenna. The LTWA is in the aft mission equipment area. The LTWA includes the braking, control, monitoring, and electrohydraulic equipment necessary to extend and retract antenna wire stored on an internally contained spool. Major LTWA antenna components are: (1) an enclosure containing the electrohydraulic motors and pumps, the antenna normal and emergency brakes, hydraulic control lines, and antenna wire spool; (2) an operator control console (FO-8) that contains all the controls and indicators necessary to control and monitor both the long trailing wire and short trailing wire antenna operational status; (3) a circuit breaker panel (A2A4) providing main power and overload protection; (4) an antenna exit tunnel containing pulley, tension, velocity, length, and overspeed sensors and emergency antenna wire cable cutters; and (5) a drogue attached to the antenna wire for wire stabilization. Refer to Figure 24-1.

Five modes can be used for extending the LTWA. These modes are: Automatic Brake, Automatic Hydraulic, Manual Brake, Manual Hydraulic, and the LTWA Emergency Extend modes. In the two brake modes, the electric motor, hydraulic pump, hydraulic motor, and gear train are decoupled from the reel. The velocity of extension is controlled by aerodynamic drag and vapor cooled disk brakes. In the two hydraulic modes, the electro hydraulic components are not decoupled from the reel and the velocity of extension is controlled by aerodynamic drag on the drogue and by varying the displacement of the hydraulic pump and motor. The difference between automatic and manual operations is that in the automatic modes, length control is maintained by the antenna group electronics; in manual modes, length control is maintained by the operator. The LTWA Emergency Ext mode uses the controls of the long wire emergency tend panel to control antenna extension speed length.

The LTWA is retracted by electro hydraulic co ponents. The 60 hp electric motor drives a hydrau pump to provide pressure required for extension retraction of the LTWA in the hydraulic mode. flow generated drives the hydraulic motor that in t drives the antenna reel. Velocity is controlled varying the rate of flow in hydraulic components.

24.2.2 Long Wire Drogue Nest Assembly. T LTWA drogue is deployed away from the aircraft into the airstream by an arm at the aft bottom part of aircraft. The arm, nest, and drogue are housed in unpressurized shroud (Figure 24-2). The arm is ployed by an electrical motor and is controlled at the operator's console. A backup mechanical drive is av able in case of a failure. The arm is attached by strut the drogue nest bay doors, that automatically open close with the drogue nest arm motion. View pc located atop and on the forward end of the shroud, all a downward and aft view of the drogue nest area.

24.2.3 Short Trailing Wire Antenna. The ST (Figure 24-3) is mounted in the aft mission equipm area on a support console. The STWA includes a hydr lic motor that is driven from the aircraft auxiliary draulic power, and the braking and sensor equipm necessary to extend and retract the antenna wire stc on an internally contained spool. Control and moni ing is provided by instruments at the reel operator c trol console. Major STWA components are (1) enclosure containing the hydraulic drive/control u normal brakes, hydraulic control lines, emerge brakes, and antenna wire spool; (2) a status transmi connected to pulleys that sense antenna tension, sp and length; (3) a drogue attached to the antenna wire wire stabilization. The STWA is the driven ante element and is connected to the VLF power amplif coupler output by a coaxial transmission line p

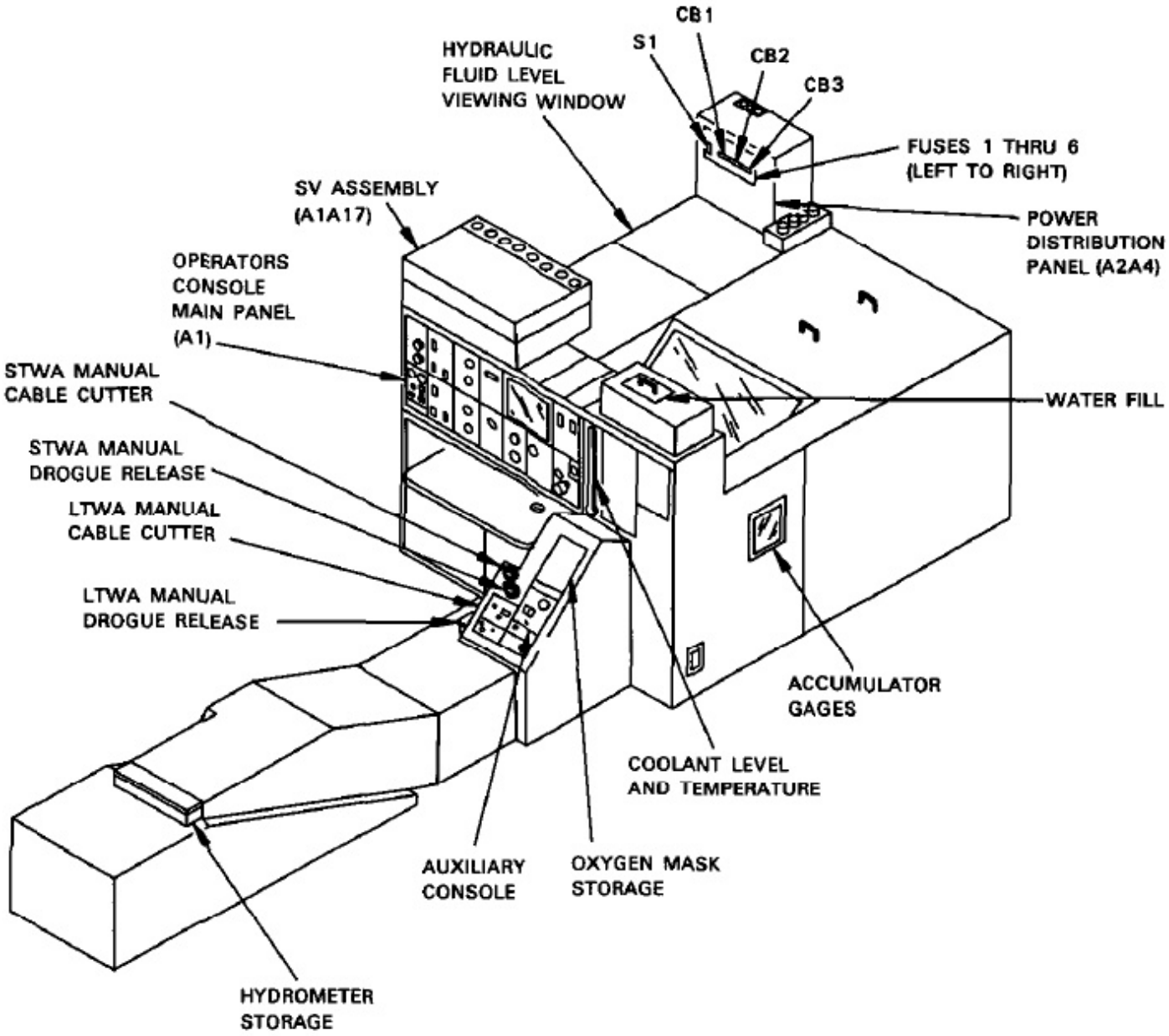


Figure 24-1. Reel Operators Station

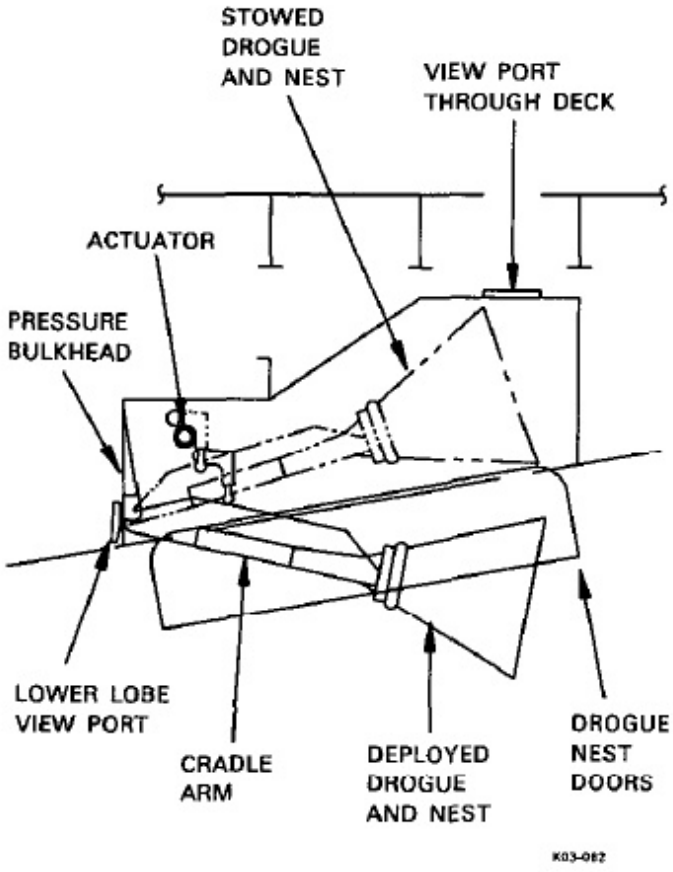


Figure 24-2. Long Trailing Wire Antenna Drogue Nest Installation

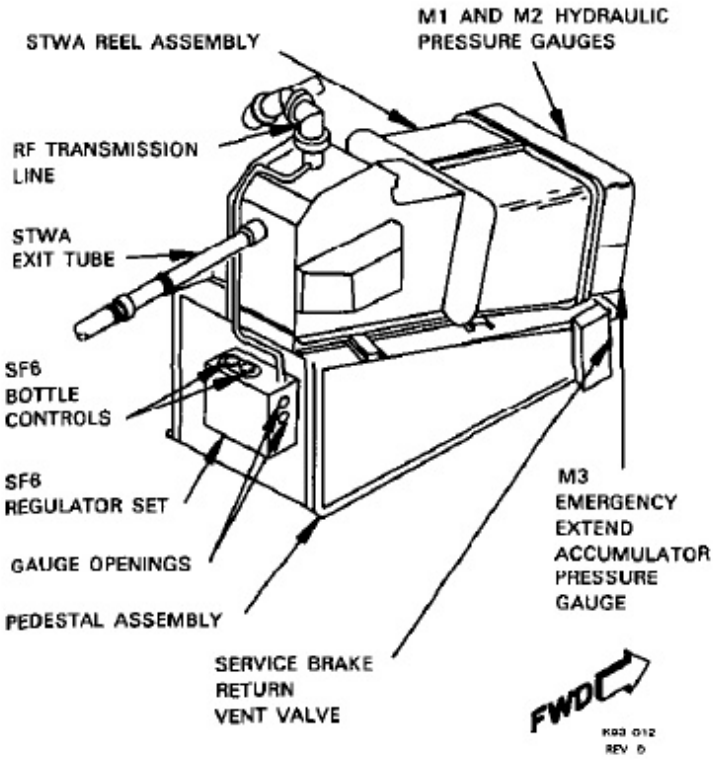


Figure 24-3. Short Trailing Wire Antenna Drogue Next Installation

surized with sulfur hexafluoride (SF_6). A short switch shorts the RF line when the VLF amplifier c pler is not transmitting.

The STWA is extended by aerodynamic drag on antenna drogue and the extending wire. Velocity c trol is maintained by varying the pressure on normal brake. The STWA may be extended in Au matic, Manual, or Emergency modes.

The STWA is retracted by varying hydraulic mo displacement. The aircraft auxiliary hydraulic syst provides 3,000 psi pressure to a drive motor wh then drives the reel that retracts and stows the sh wire antenna. A scavenge pump, located in the ri wheelwell, is provided to reduce auxiliary hydrau return line back pressure.

24.2.4 Control/Indicator Console. Primary c trol of the LTWA and STWA is from a console (A located aft of the long trailing wire reel assembly. T seats are provided, one for the primary reel operator one for an assistant operator. Refer to FO-8 for controls that are located at the console.

24.2.5 Liquid Cooling System. The LCS is u to cool the hydraulic fluid in the LTWA reel drive the power amplifier steam condenser. LTWA hydrau fluid is routed to a heat exchanger located in the aft lo compartment where heat is transferred to cooled eth ene glycol/water in the LCS system. Heat from the L system is then transferred to the fuel in the number 1 number 4 main wing tanks. Refer to A1-E6AAA-NF 000 for additional information on the LCS.

24.3 POWER DISTRIBUTION

Electrical power for the operation of the two re comes from both the mission and air vehicle bus Refer to Chapter 18 for a discussion of power dis bution. The mission bus loads are provided directly the LTWA. The remaining air vehicle bus loads distributed through the P67 panels, the 28 V DISTR 2 panel, and the flight deck P61-4 panel. Re to Figure 24-4 for both the LTWA and STWA pow distribution.

24.3.1 Reel Assembly 400 HZ POWER DIST BUTION Panel (A2A4). A 400 HZ POWER D TRIBUTION panel on top of the LTWA enclosure tributes 400 Hz power and provides circuit and f protection for the long wire antenna reel. Refer to Fig 24-4 for switch and circuit breaker functions. Suppr sion filters within the panel protect the power circui

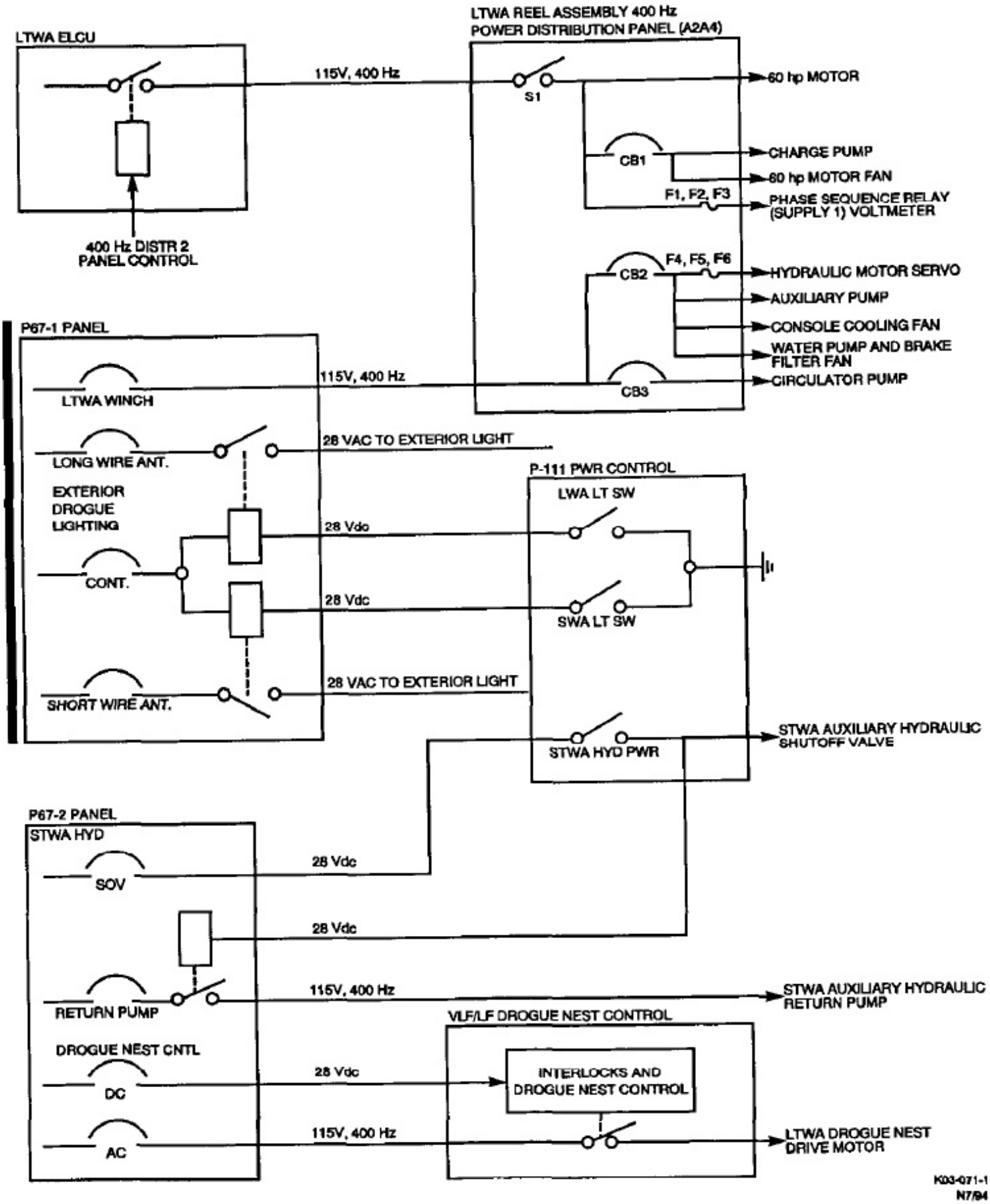


Figure 24-4. LTWA/STWA Power Distribution (Sheet 1 of 2)

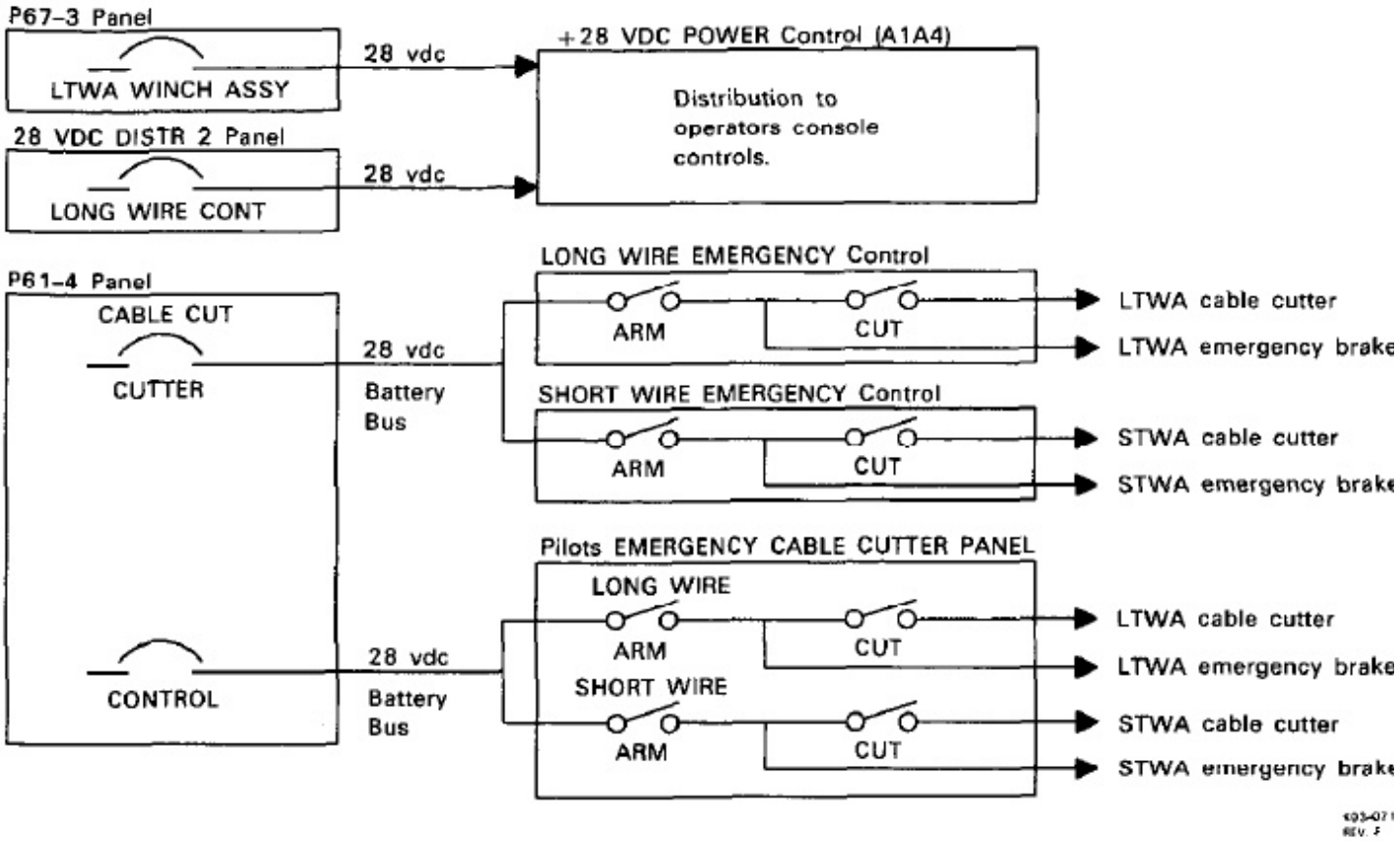


Figure 24-4. LTWA/STWA Power Distribution (Sheet 2 of 2)

24.3.2 Antenna Group Electromagnetic Pulse Protection. The antenna group is hardened against EMP by three methods:

1. Suppression filters on control, monitoring, and secondary power lines

2. Suppression filters on the 115v, 400 Hz primary power inputs at the LTWA power distribution panel (A2A4)

3. EMP gaskets and seals on the antenna access panels and on the exit tubes to protect points of entry.

24.3.3 Power Outlet Panel (A1A12). A power outlet panel at the control console provides 28 vdc, 115v, 60 Hz, and 115v, 400 Hz power connectors and ICS connectors. The CW KEY jack and right-hand ICS connection are not functional.

24.4 CONTROL EQUIPMENT

Five control panels control the LTWA. These panels are the drogue nest control (P108), the long wire emergency control (A1A6), the long wire velocity control (A1A7), the long wire length control (A1A8), and the long wire emergency extend control (A1A11).

Four control panels control the STWA. These els are the short wire emergency control (A1A1) short wire velocity control (A1A2), the short length control (A1A3), and the short wire emerg extend control (A4A6).

The remaining control panels on the reel oper control consoles are used for both LTWA and ST operation. These control panels include the LCS trol (LTWA and PA) (P104), the length limit co (A1A15), the fluid system control (A1A9), the ele cal systems control (A1A10), the 28 vdc p control (A1A4), the power control (P111), and the station. The ICS MCU panel is described in this c ter and the ICS system is described in Chapter 18.

24.4.1 Operators Console — Main Panel

24.4.1.1 LENGTH LIMIT Control (A1A15). length limit control (Figure 24-5) contains two ele mechanical counters (SHORT WIRE RESERVE F and LONG WIRE RESERVE FEET) that display le (in feet) of antenna wire remaining on the reels. The RESET pushbuttons reset the corresponding counte zero. The long trailing wire counter cannot be rese shows more than 2,000 and less than 90,000 feet of remaining on the reel. The short trailing wire co cannot be reset if it shows more than 200 and less 9,000 feet of wire remaining on the reel.

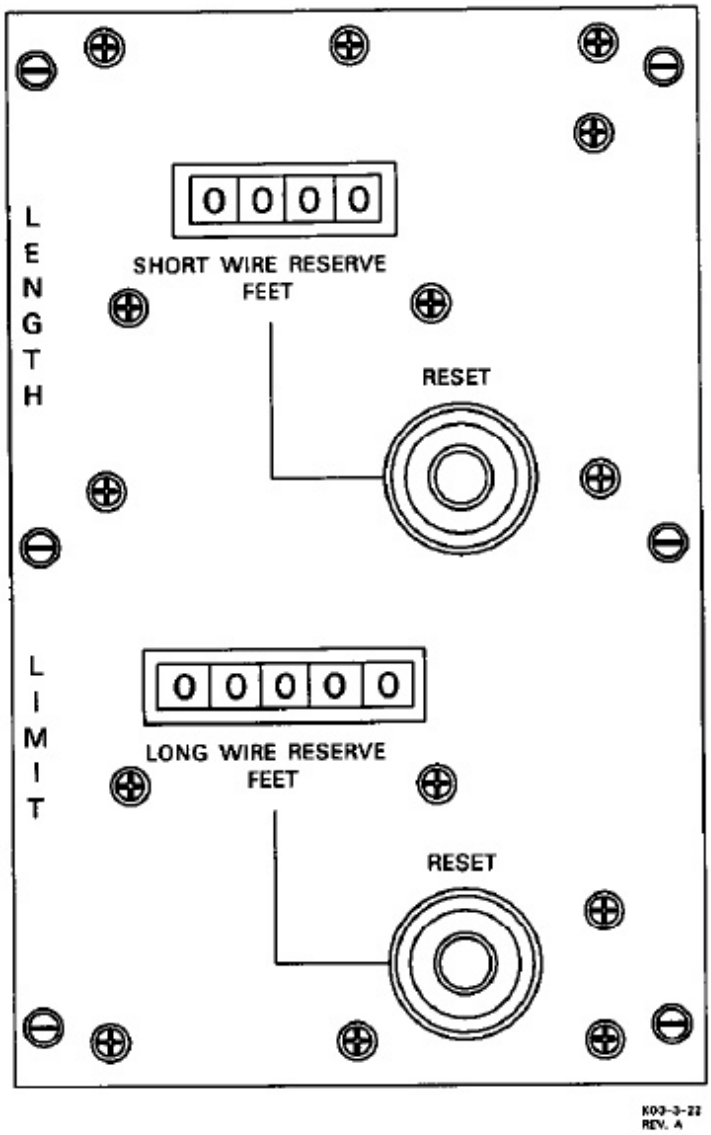


Figure 24-5. Length Limit Control (A1A15)

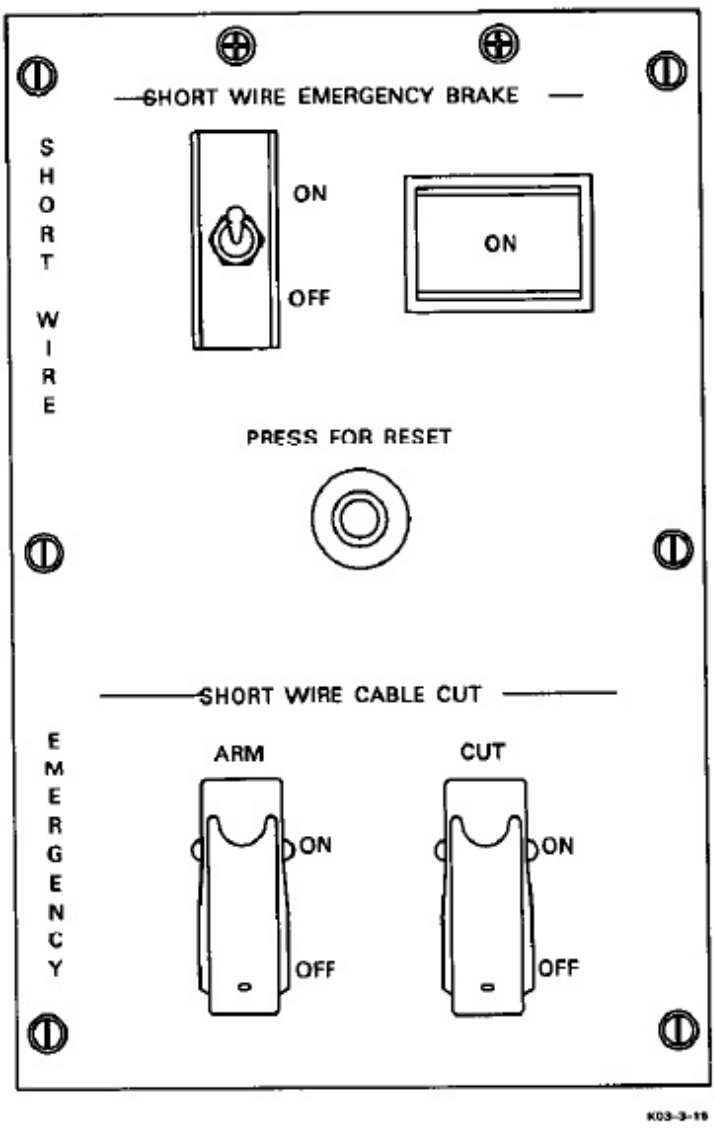


Figure 24-6. Short Wire Emergency Control (A1A1)

24.4.1.2 SHORT WIRE EMERGENCY Control (A1A1). The short wire emergency control (Figure 24-6) contains a SHORT WIRE EMERGENCY BRAKE ON/OFF switch that activates STWA emergency brakes. When in the ON position, the SHORT WIRE EMERGENCY BRAKE ON indicator illuminates red to show that the emergency brakes are applied. The SHORT WIRE CABLE CUT ARM switch activates STWA emergency brakes and applies power to the CUT switch when in the ON position. Setting the CUT switch to ON then activates the short trailing wire cable cutter and short wire overspeed indicator. When a condition causing emergency braking is corrected, pressing the PRESS FOR RESET push-button resets the short trailing wire emergency brake control circuits.

24.4.1.3 SHORT WIRE VELOCITY Control (A1A2). The short wire velocity control (Figure 24-7) contains a TENSION meter that shows tension in pounds for the STWA. The VELOCITY meter shows direction and velocity (feet/minute) of the STWA. The four-segment indicator shows the condition of the VLF PA coupler as follows:

PA — Will illuminate any time dc power is applied to A1A2 SHORT WIRE VELOCITY control panel.

OFF — When illuminated, shows PA coupler plate voltage is off.

ON ANT — When illuminated, shows PA coupler is transmitting on the antenna.

ON TEST — When illuminated, shows PA coupler is transmitting on the test load.

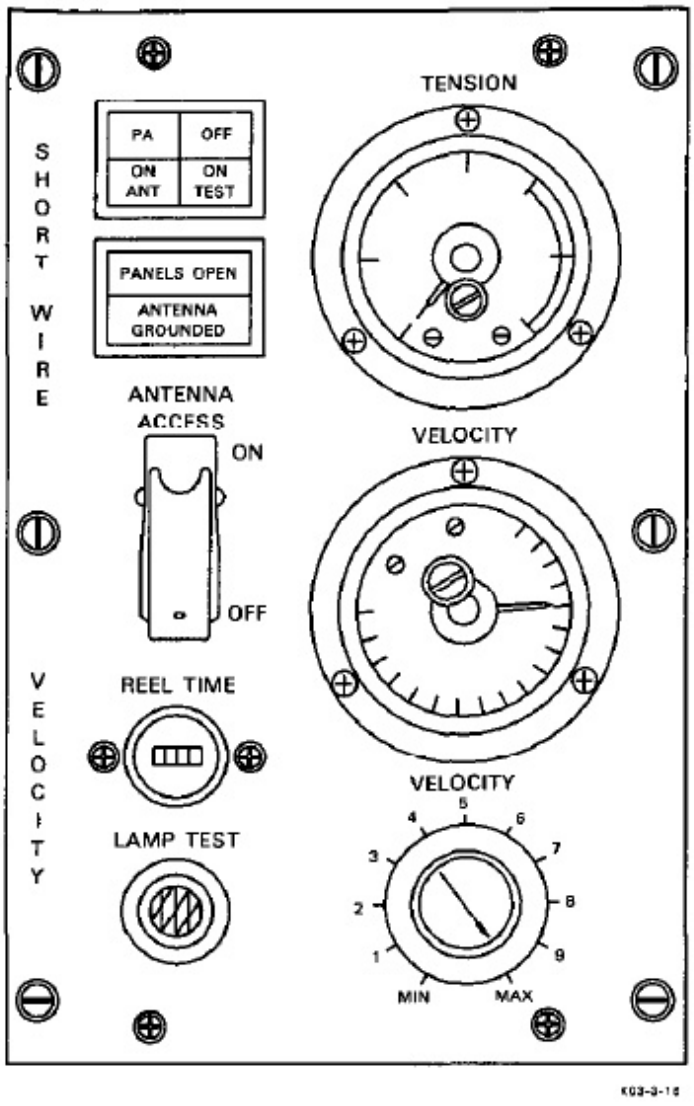


Figure 24-7. Short Wire Velocity Control (A1A2)

The PANELS OPEN indicator illuminates red to indicate that STWA access panels are open. The ANTENNA GROUNDED indicator illuminates when the STWA is grounded by the shorting switch. The REEL TIME elapsed time counter registers total reeling time on the STWA. The VELOCITY MIN/MAX selector switch sets the velocity limit for manual operation and percentage of velocity profile for automatic operation. When positioned to ON, the ANTENNA ACCESS switch prevents the VLF amplifier coupler from transmitting. Pressing the LAMP TEST switch illuminates all indicators on the short wire emergency, velocity, and length controls.

WARNING

At no time shall the panels-open interlocks be overridden during antenna operations. If conditions necessitate removal of the STWA enclosure panels, then the STWA shorting stick shall be used and ANTENNA ACCESS switch shall be ON.

24.4.1.4 SHORT WIRE LENGTH Cont (A1A3). The short wire length control (Figure 24 contains a seven-segment four-digit LENGTH FE display that shows the length, in feet, of extended w The DROGUE IN indicator illuminates when the STV drogue is latched in the nest. The DROGUE O indicator illuminates when the drogue is unlatched out of the nest. The SHORT WIRE OVERSPEED in cator (red) illuminates when a 120 percent or 130 p cent STWA overspeed or 110 percent hydraulic mo overspeed condition exists. When a short trailing w mechanical (less than 200 feet on A1A15) or electro (more than 4,544 feet on A1A3) counter over len occurs, the SHORT WIRE OVER LENGTH indica (red) illuminates. When the aircraft is on the ground, GRD PWR indicator illuminates. The DIRECTI ERROR indicator illuminates to show that the direct selected (RETRACT or EXTEND) is incorrect for g ting from current length to desired length. The em gency load switch (S1) is a recessed toggle swi located on the left side of the short wire length contr The emergency load switch can be used to reenter len feet indications into the card cage in the event of a pow disruption.

When STWA tension becomes less than 35 poun the DROGUE LOST indicator (red) illuminat Pressing the PRESS FOR OVERRIDE switch ov rides the drogue lost condition and enables STV extend operation. The LENGTH COMMAN switches select the desired STWA length. T DROGUE RELEASE switch/indicator illumina when pressed and unlatches the drogue from its n Automatic or manual control of the velocity a length for antenna retraction or extension is selec and indicated by the AUTOMATIC/MANU switch/indicator. Pressing the RETRACT switch tracts the STWA. Pressing the STOP switch st antenna retraction or extension. Pressing the E TEND switch extends the STWA.

24.4.1.5 +28 VDC POWER Control (A1A The +28 VDC POWER control (Figure 24-9) conta a 28 VDC ON/OFF switch that applies 28 vdc powe the antenna group when positioned to ON. The LIGH switch controls power to the LTWA reel light. Circ breaker CB 1, CB 2, CB 3, and CB 4 protect cont circuits for the LTWA reel, STWA reel, switching u A14, and card cage A13, respectively.

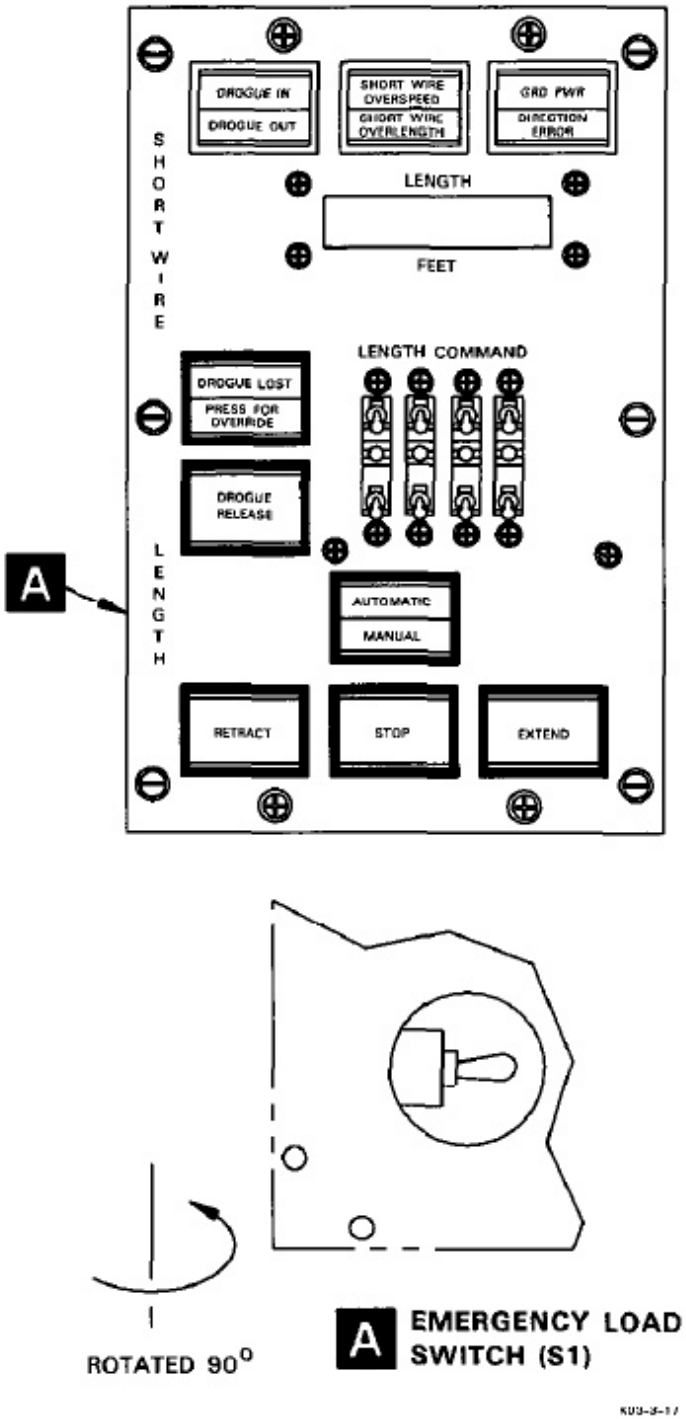


Figure 24-8. Short Wire Length Control (A1A3)

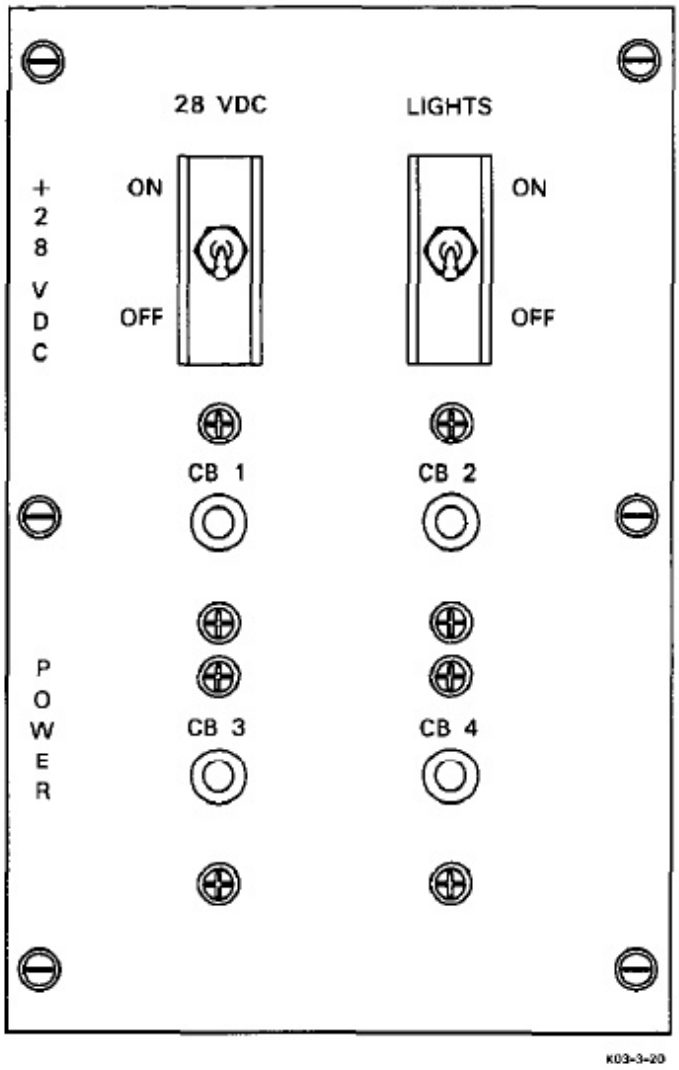


Figure 24-9. +28Vdc Power Control (A1A4)

24.4.1.6 LIQUID COOLING SYSTEM Control (P104). The liquid cooling system is controlled by use of the LIQUID COOLING SYSTEM control (Figure 24-10). The panel controls and indicators are described in Figure 24-11. Refer to A1-E6AAA-490-100, for details on the liquid cooling system.

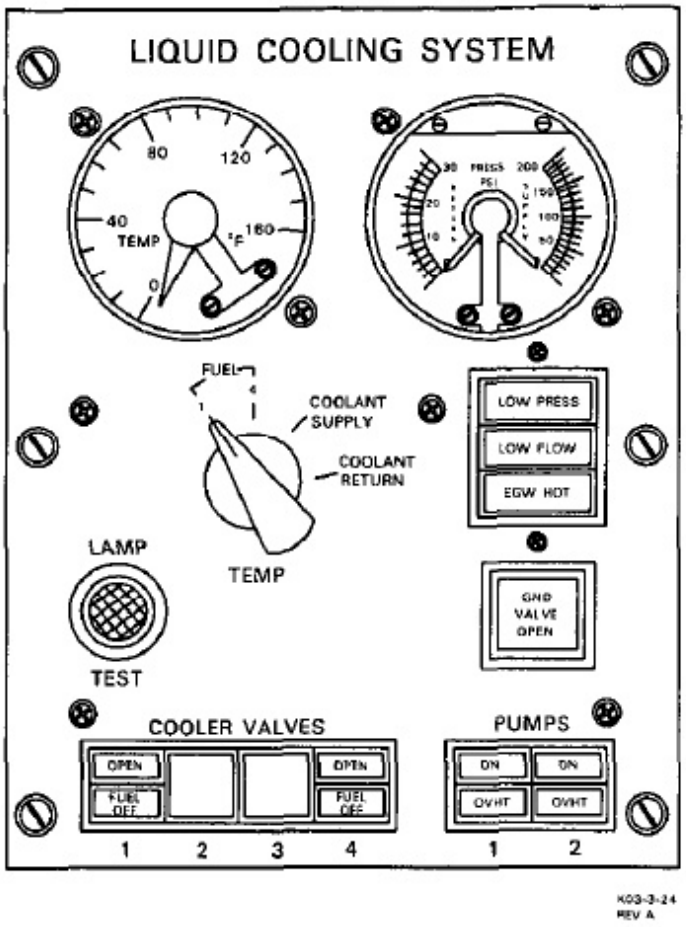


Figure 24-10. Liquid Cooling System Control (P104)

24.4.1.7 LONG WIRE EMERGENCY Control (A1A6). The long wire emergency control (Figure 24-12) contains a LONG WIRE EMERGENCY BRAKE-ON/OFF switch that activates LTWA emergency brakes when positioned to ON. The LONG WIRE EMERGENCY BRAKE ON indicator (red) illuminates to indicate the emergency brakes are applied. The LONG WIRE CABLE CUT ARM switch activates LTWA emergency brakes and applies power to the CUT switch when positioned to ON. Positioning the CUT switch to ON activates the LTWA cable cutter and normal brake and causes the OVERSPEED indicator to illuminate. When a condition causing emergency braking is corrected, pressing the PRESS FOR RESET push button resets the LTWA emergency brake control circuits.

24.4.1.8 LONG WIRE VELOCITY Cont (A1A7). The long wire velocity control (Figure 24- contains a TENSION meter that indicates tension, pounds, on the LTWA. The VELOCITY meter indica direction and velocity (feet/minute) of the LTWA. T PANELS OPEN indicator (red) illuminates when LTWA access panels are open. Two elapsed time cou ers register total time of LTWA operation; HYDR RE TIME registers total hydraulic reeling time and BRA REEL TIME registers total brake reeling time. T VELOCITY MIN/MAX rotary switch selects the vel ity limit for manual operation and percentage of veloc profile for automatic operation. The VEL X 0.1 pu button reduces the scale on the velocity meter by a fac of 10 (a reading of 1,000 on the meter would be equ alent to 100 feet/minute). Pressing the LAMP TE push button illuminates all indicators on the long w emergency, velocity, and length controls.

24.4.1.9 LONG WIRE LENGTH Control (A1A The long wire length control (Figure 24-14) contain seven-segment five-digit LENGTH FEET display t shows the length, in feet, of extended wire. T DROGUE IN indicator illuminates when the LTV drogue is latched in the nest. The DROGUE O indicator illuminates when the drogue is unlatched out of the nest. The LONG WIRE OVERSPEED in cators (red) illuminate when a 60 hp motor or long-w overspeed (110 percent or 120 percent) condition exis When a long trailing wire mechanical (less than 2,0 feet on A1A15) or electronic (greater than 26,880 f on A1A8) counter overlength occurs, the LONG WI OVER LENGTH indicator (red) illuminates. When aircraft is on the ground, the GRD PWR indica illuminates. The DIRECTION ERROR indica illuminates when the direction selected (RETRACT EXTEND) is incorrect for getting from current leng to length commanded. The emergency load switch (is a recessed toggle switch located on the left side of long wire length control. The emergency load swi can be used to reenter length feet indications into card cage in the event of a power disruption.

When LTWA tension becomes less than 75 poun the DROGUE LOST indicator (red) illuminat Pressing the PRESS FOR OVERRIDE push but overrides the drogue-lost condition and enables lc trailing wire Extend Brake mode operations. T LENGTH COMMAND switches select the desi LTWA length. The DROGUE RELEASE push b ton/indicator illuminates when pressed and unlatcl the drogue from its nest. The HYDRAULIC MO push button/indicator selects and indicates Hydrau mode for retraction or extension of LTWA. Automa or manual control of the velocity and length for tenna retraction or extension is selected and indica

CONTROL/INDICATOR	FUNCTION
Temperature Gauge	Indicates temperature in degrees Fahrenheit at sensor selected by TEMP switch.
TEMP Switch	
FUEL 1	Selects No. 1 main wing fuel tank to be monitored on the temperature gauge.
FUEL 4	Selects No. 4 main wing fuel tank to be monitored on the temperature gauge.
Note The fuel temperature gauge at the flight engineers station indicates in degrees Celsius.	
COOLANT SUPPLY	Selects the EGW supply line to be monitored on the temperature gauge. Normal operating range is from 59 to 90° F.
CAUTION Coolant supply temperature must remain below 130° F.	
COOLANT RETURN	Selects the EGW return line to be monitored on the temperature gauge.
Pressure Gauge	
RETURN (port side)	Indicates the pressure in the coolant return line. Normally between 10 and 30 psig.
SUPPLY (starboard side)	Indicates the pressure in the coolant supply line. Normally between 120 and 200 psig.
LOW PRESS Indicator (Amber)	Illuminates when the expansion tank inlet pressure falls to 8 (±1) psig and extinguishes when pressure rises to 12 psig.
LOW FLOW Indicator (Amber)	Illuminates when coolant supply flow falls below 49 (±2) gpm and extinguishes when flow rate resumes 55 gpm.
EGW HOT Indicator (Amber)	Illuminates when coolant supply temperature exceeds 125° F, extinguishes when temperature drops below 118° F.
GND VALVE OPEN Switch/Indicator (White)	Alternate action switch commands ground cooler shutoff valve to the open or closed position. Indicator illuminates when valve is open and extinguishes when valve starts to shut.

Figure 24-11. Liquid Cooling System Control and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
LAMP TEST Pushbutton	Tests all lamps on panel when pressed and held.
COOLER VALVES 1 and 4 Switches (2 and 3 are non-functioning)	Alternate action switches command applicable coolant shutoff valve to ope or close.
OPEN Indicators (White)	Illuminate when cooler valve is open and extinguishes when valve starts to shut.
FUEL OFF Indicators (Amber)	Illuminate when fuel is not being circulated through the flight cooler.
PUMPS 1 & 2 Switches	Alternate action switches command the EGW pump motors to operate or to stop.
ON Indicators (White)	Illuminate when pump control unit is energized.
OVHT Indicators (Amber)	Illuminate when pump motor is excessively hot.

Figure 24-11. Liquid Cooling System Control and Indicators (Sheet 2 of 2)

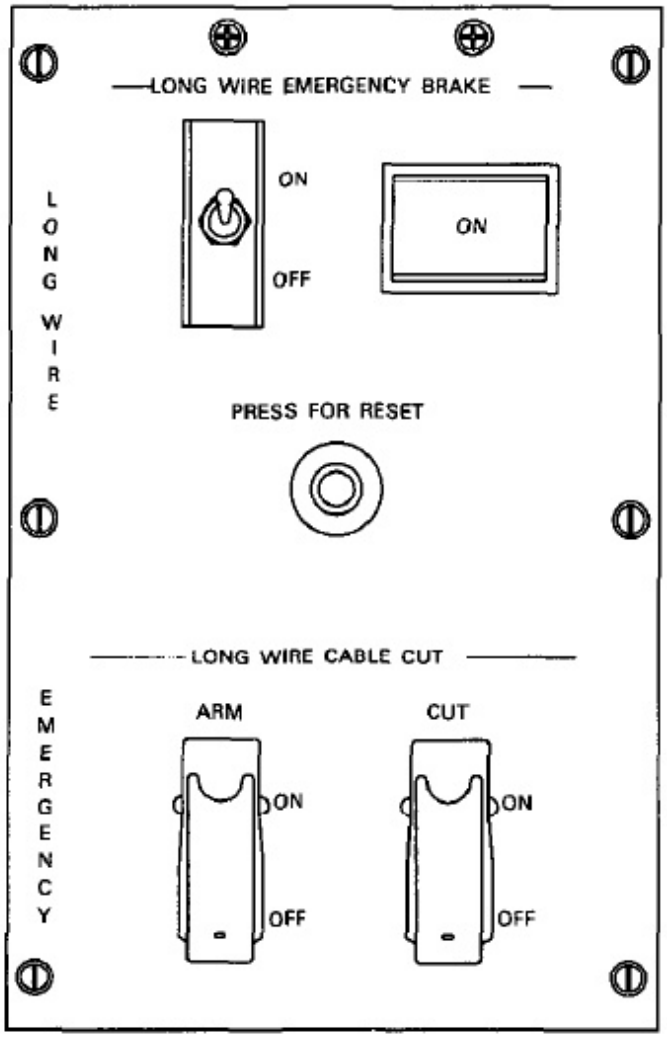


Figure 24-12. Long Wire Emergency Control (A1A6)

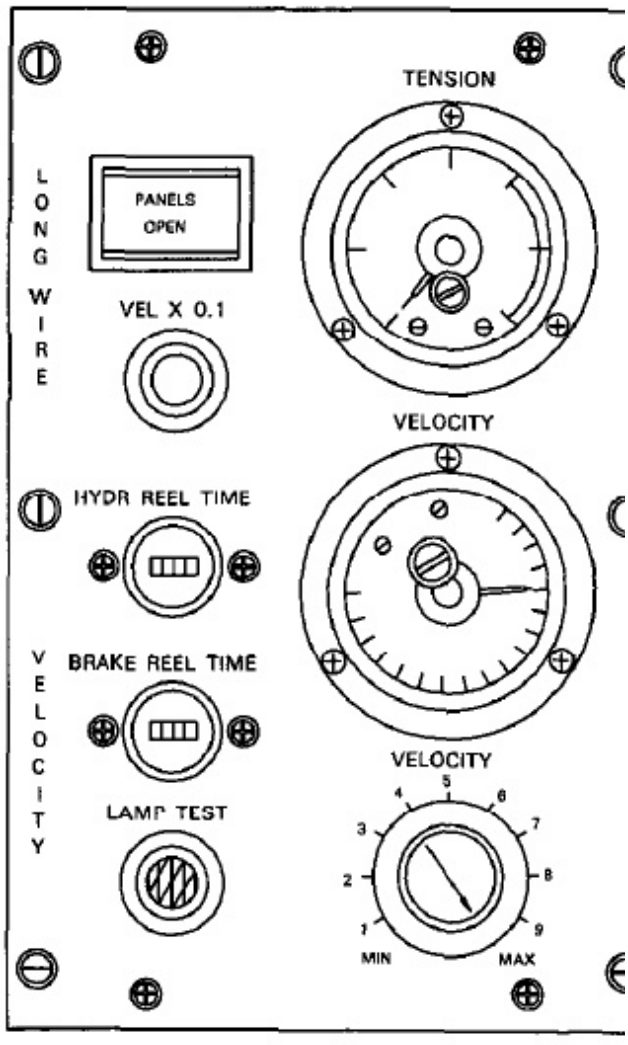


Figure 24-13. Long Wire Velocity Control (A1A

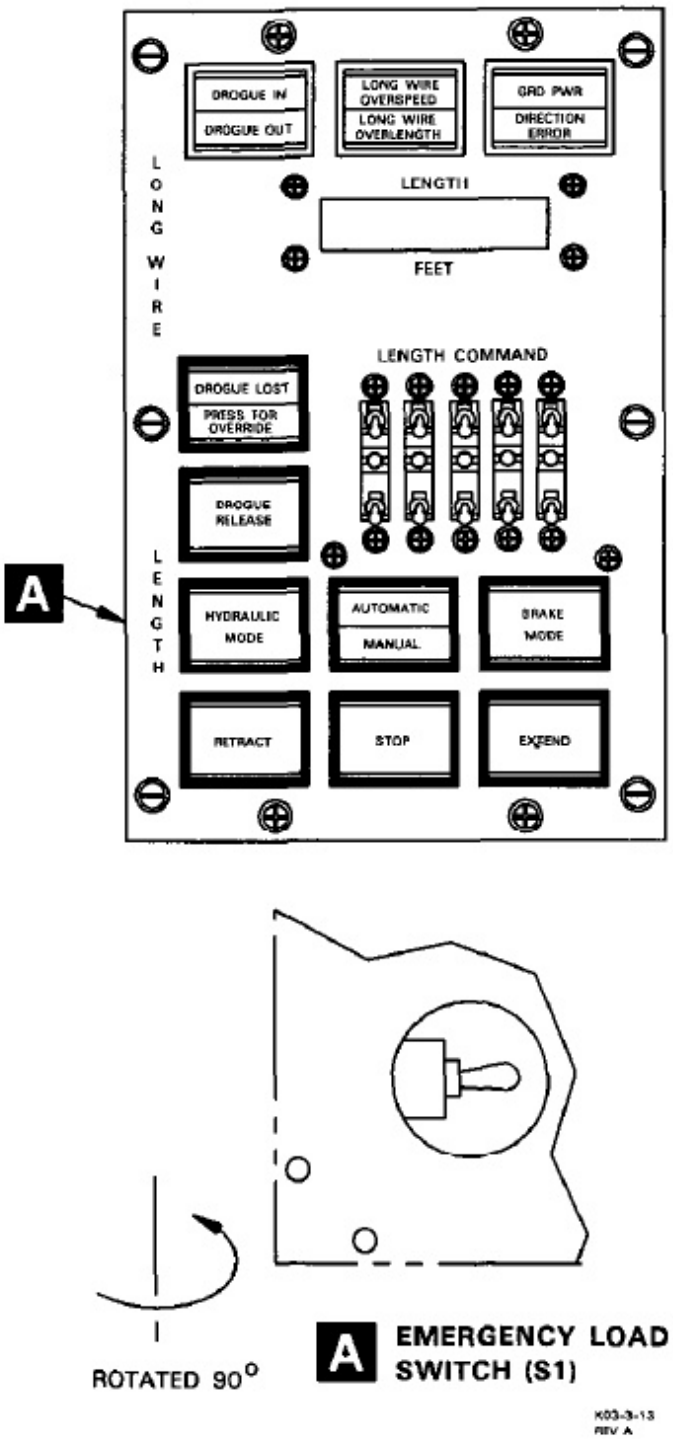


Figure 24-14. Long Wire Length Control (A1A8)

by the AUTOMATIC/MANUAL push button/indicator. BRAKE MODE push button/indicator selects and indicates extension of the LTWA in the Brake mode. Pressing the RETRACT push-button/indicator retracts the LTWA. Pressing the STOP push button/indicator stops LTWA extension or retraction. Pressing the EXTEND push button/indicator extends the LTWA.

24.4.1.10 FLUID SYSTEMS Control (A1A9). The fluid systems control (Figure 24-15) controls and monitors the antennas hydraulic and water fluid systems. The CRCLT PUMP indicator illuminates when the circulating pump pressure is above 45 ±5 psi. The CHG PUMP indicator illuminates when the charge pump pressure is above 120 psi. The BLOWER indicator illuminates when the 60 HPM blower output is greater than 0.3 to 1.0 inches of water. The HYDR HOT indicator illuminates when the hydraulic fluid temperature becomes greater than 170 ±5 °F.

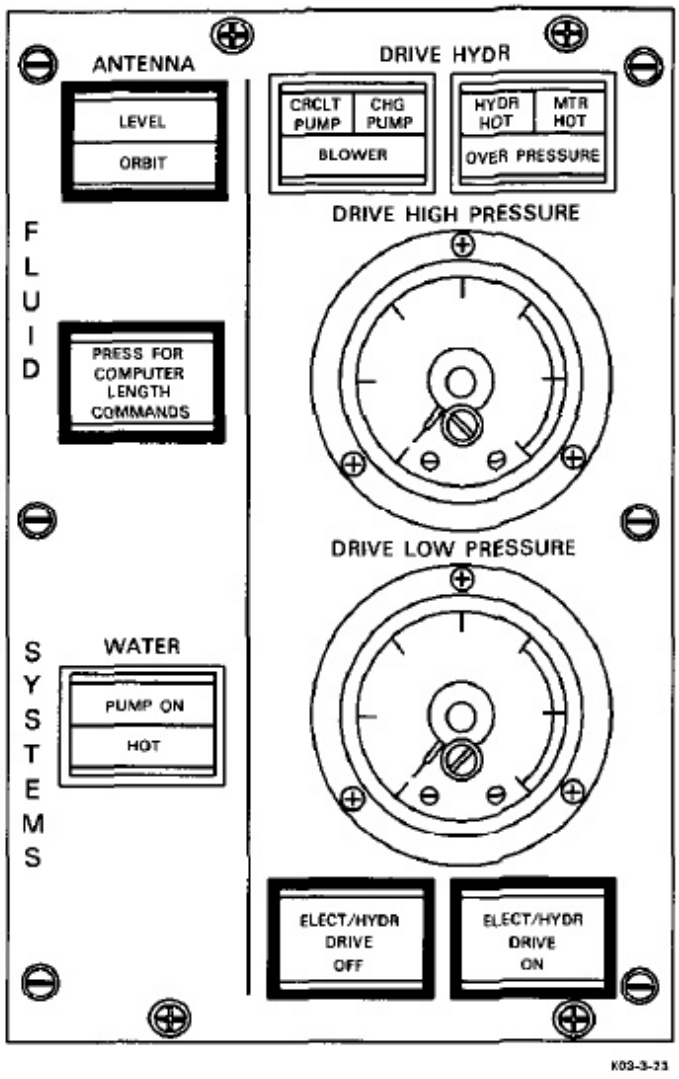


Figure 24-15. Fluid Systems Control (A1A9)

The MTR HOT indicator illuminates when the 60 hp electric motor is overheated (340 ±5 °F). The OVER PRESSURE indicator illuminates when hydraulic pressure exceeds 3,750 psi for 5 seconds. The WATER PUMP ON indicator illuminates when water pump pressure is 55 psid. The WATER HOT indicator illuminates when water temperature is above 230 ±5 °F.

The DRIVE HIGH PRESSURE meter displays hydraulic pressure of the high-pressure side of the system. The DRIVE LOW PRESSURE meter displays hydraulic pressure on the low pressure side of the

electrohydraulic drive system. Pressing the ELEC/HYDR DRIVE ON push button/indicator turns the electro hydraulic drive system on; it illuminates yellow showing that the start sequence has been initiated, then illuminates green when the 60 hp motor exceeds 5,000 RPM. Pressing the ELEC/HYDR DRIVE OFF switch/indicator turns the electro hydraulic drive system off, and then illuminates blue to show that the drive system is off. The alternate action LEVEL/ORBIT push button/indicator programs the VLF PA-coupler computer for level or orbit antenna wire length readout. Pressing the PRESS FOR COMPUTER LENGTH COMMANDS switch/indicator illuminates the indicator and causes the wire length, as calculated by the VLF amplifier-coupler computer, to be displayed on the long- and short-wire length controls. When the switch is not pressed, the extended antennas wire lengths are displayed on the long- and short-wire length controls.

24.4.1.11 ELECTRICAL SYSTEMS Control (A1A10). The electrical systems control (Figure 24-16) controls and monitors the reel prime electrical systems and indicates reel 28 vdc source availability. The panel also applies power to the LTWA auxiliary hydraulic system and monitors both long wire auxiliary and short wire hydraulic pressure and temperature. The AC VOLTS/AMPS meter displays selected three-phase, 400 Hz SUPPLY 1 power voltage and current levels. The PHASE SEQUENCE indicators illuminate when the phase sequence from power supplies SUPPLY 1 and SUPPLY 2 is correct. The PRIME POWER selector selects which SUPPLY 1 phase, voltage, or current is to be displayed on the meter. The LONG WIRE AUX HYDR HOT indicator illuminates (red) when the temperature of the LTWA auxiliary hydraulic system fluid exceeds 170 ±5 °F. The long trailing wire NORMAL PRESSURE indicator illuminates (green) when the LTWA auxiliary hydraulic system pressure exceeds 950 ±50 psi. The long trailing wire LOW PRESSURE indicator illuminates (red) when LTWA auxiliary hydraulic system pressure goes below 700 ±50 psi.

The SHORT WIRE HYDR HOT indicator illuminates (red) when the temperature of the STWA hydraulic system fluid exceeds 170 ±5° F. The short trailing wire NORMAL PRESSURE indicator illuminates (green) when the aircraft auxiliary hydraulic system pressure exceeds 2,875 psi. The short trailing wire LOW PRESSURE indicator illuminates (red) when the aircraft auxiliary hydraulic system pressure is below 2,600 ±100 psi. The +28V dc indicators illuminate (green) when MA 1 DC bus (AIRCRAFT), aircraft BAT bus (BATTERY), and MA 5 AFT CONSOLE bus (INTERNAL) 28v dc power sources are available. Pressing the long wire

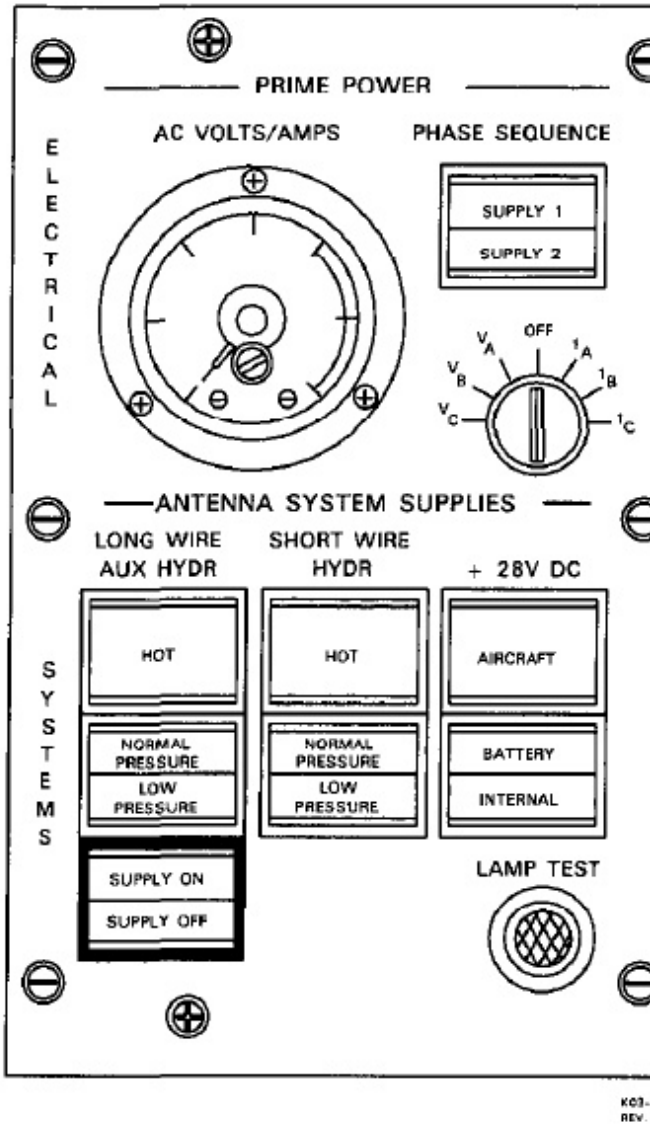


Figure 24-16. Electrical Systems Control (A1A1

SUPPLY ON/OFF push button applies power to LTWA auxiliary hydraulic system and illuminates SUPPLY ON indicator (green); pressing it again sh off the hydraulic system and illuminates the SUPP OFF indicator (blue). Pressing the LAMP TEST pu button momentarily illuminates all the indicators the fluid systems and electrical systems controls.

24.4.1.12 LONG WIRE EMERGENCY EXTE Control (A1A11). The long wire emergency ext control (Figure 24-17) contains a NORMAL BRA PRESSURE meter that displays actual pressure on normal brakes. The EMERGENCY BRAKE RELEASE lever manually positions the emergency br valve. The NORMAL BRAKE knob controls the draulic pressure on the normal brakes during emerge extend operation.

24.4.1.13 Coolant Ratio Graphs. Four gra are displayed on panels mounted on the right side of

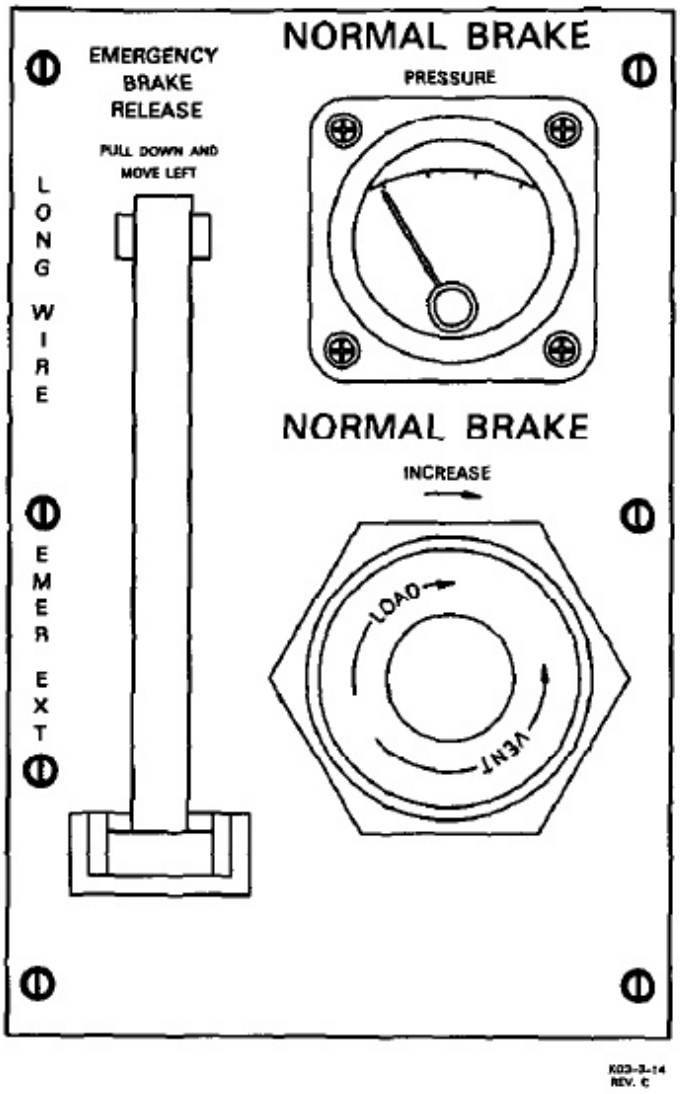


Figure 24-17. Long Wire Emergency Extend Control (A1A11)

reel operator position. Refer to Figure 24-18. One graph is used to determine the content of the water/glycol coolant and the freezing temperature limitations. Three graphs are used during the automatic brake mode extension of the LTWA.

24.4.1.13.1 Water/Glycol Ratio of Coolant. A graph is used by the reel operator to determine the content and the freezing point of the water/glycol coolant. Knowledge of water/glycol coolant content is necessary to extend the LTWA in the brake modes. Knowledge of the coolant's freezing point is necessary to prevent freezing.

To determine the percentage of water in the water/glycol coolant using the water/glycol ratio graph:

1. Determine the specific gravity of the coolant by taking a hydrometer reading at the LTWA fill cap.

Note

Sampling must be done prior to flight or when aircraft is unpressurized.

2. Determine the coolant temperature by observing the coolant temperature gauge at the bottom of the coolant level viewing tube.

3. Locate the specific gravity on the vertical scale of the water/glycol ratio graph; locate the coolant temperature on the horizontal scale of the water/glycol ratio graph.

4. Determine the cross point of two imaginary lines (one extending horizontally from the specific gravity, one extending vertically from the coolant temperature).

5. The percentage of water in the water/glycol coolant is determined by the position of the cross-point in relation to the percentage WATER curves. For example: a specific gravity of 1.04 at a coolant temperature of 80 °F. determines a cross point between the 60 percent and 70 percent WATER curves. The percentage of water may be determined as approximately 65 percent.

To determine the water/glycol coolant freezing point:

1. Determine the percentage of water in the water/glycol coolant using the preceding procedure.

2. Determine the intersection of an imaginary percent WATER curve (drawn through the percentage of water cross point) with the FREEZE CURVE.

3. Read the freeze point temperature from the water/glycol ratio graph horizontal scale. For example: A water/glycol mixture consisting of approximately 65 percent water has an imaginary percent WATER curve that intersects the FREEZE CURVE at a temperature of approximately -10 °F.

24.4.1.13.2 Coolant Capacity Required For 26,000-Foot Extend. The three coolant capacity graphs are used by the reel operator to determine whether the content and supply of the water/glycol coolant in the LTWA reservoir are adequate to allow extension of the antenna in the Automatic or Manual Brake modes. The graphs indicate the allowable number of extend cycles (Automatic or Manual Brake mode) at certain aircraft airspeeds with the water/glycol coolant

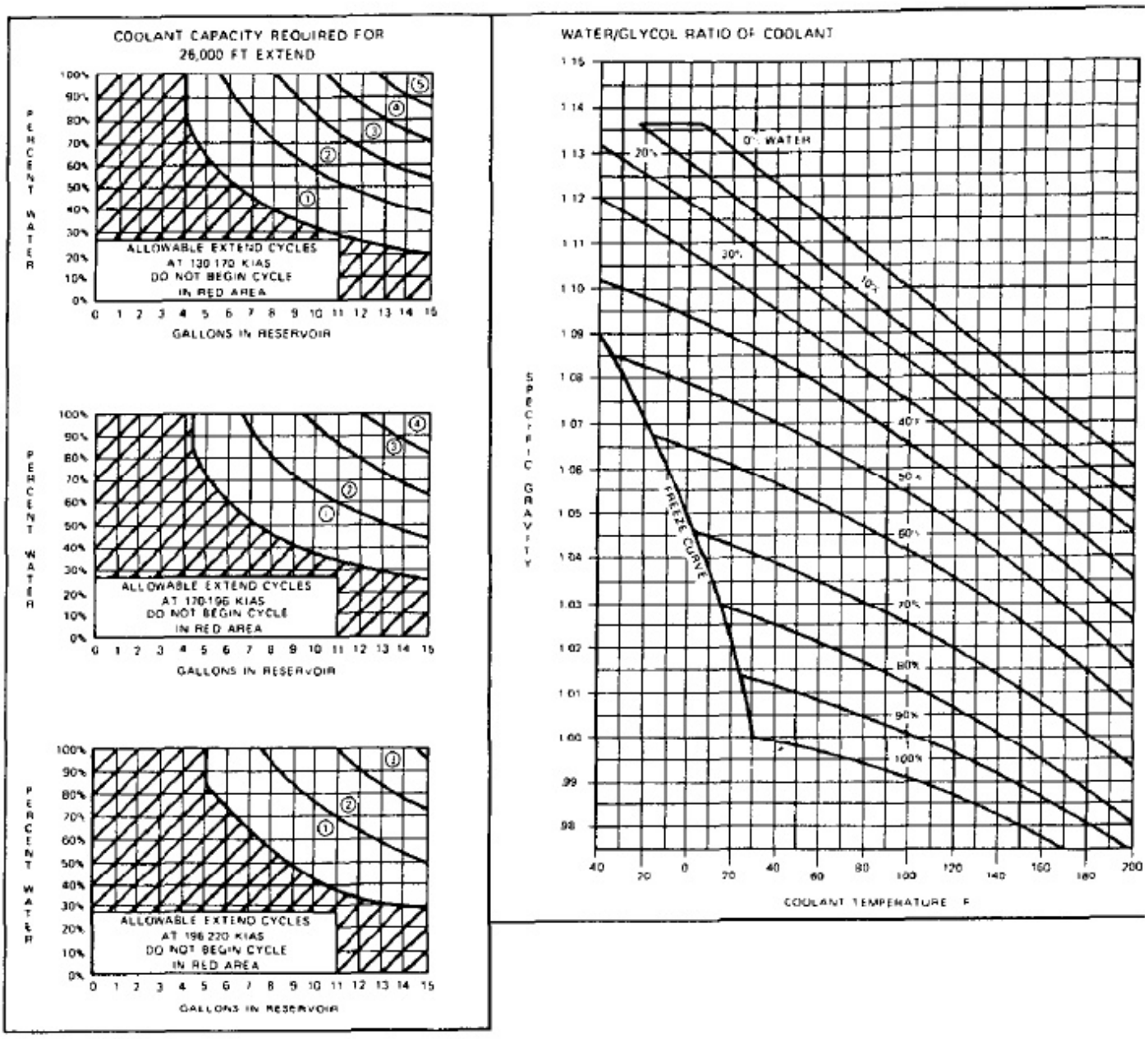


Figure 24-18. Reel Operators Console Graphs

at a specific content and level. All three graphs are used in the same manner. The particular graphs used by the reel operator depend upon the airspeed of the aircraft.

To determine the allowable number of extend cycles using the coolant capacity graphs:

1. Request airspeed from the aircraft pilot.

2. Select a coolant capacity graph having an airspeed range that includes current aircraft airspeed.

3. Determine the percentage of water in the water/glycol coolant using the water/glycol ratio graph.

4. Determine the number of gallons of coolan the LTWA reservoir by reading the COOLA LEVEL gauge.

5. Locate the percentage of water on the vert scale of the coolant capacity graph; locate number of gallons capacity graph; locate number of gallons on the horizontal scale of coolant capacity graph.

6. Determine the crosspoint of two imaginary li (one extending horizontally from the percent of water; one extending vertically from the nu ber of gallons).

7. *The number of allowable extend cycles is indicated by the circled number corresponding to the region of the graph in which the crosspoint lies. For example: assume conditions of 180 KIAS airspeed, 13 gallons of coolant and coolant of 70 percent water. The second coolant capacity graph indicates that two 26,000 foot extension cycles are allowable.*

24.4.2 Auxiliary Control Console. In addition to the following control panels described here, the auxiliary control console contains two oxygen stations that are described in A1-E6AAA-NFM-000.

24.4.2.1 SHORT WIRE EMERGENCY EXTEND Control (A4A6). *The short trailing wire emergency extend system provides for extension of the STWA in the event of primary system failure. Since the system operates on the energy stored in a hydraulic accumulator, it is limited to use for a last extension of the STWA. The short wire emergency extend control (Figure 24-19) contains a manually controlled EMERGENCY BRAKE RELEASE valve that is used to release the emergency brake from the wire, leaving the wire to the restraint of the normal brake. The valve handle must be rotated clockwise to release the emergency brake. The pressure on the normal brake is shown on the NORMAL BRAKE PRESSURE gauge. The gauge will read 47 ±5 psi when the auxiliary hydraulic return pump is not operating. The NORMAL BRAKE PRESSURE control knob applies hydraulic pressure on the normal brake during emergency extend operation. A spring loaded BLEED VALVE push button will relieve the hydraulic pressure on the emergency extend system when turned clockwise.*

24.4.2.2 VLF/LF DROGUE NEST CONTROL (P108). The VLF/LF drogue nest control (Figure 24-20) is used to open the long trailing wire bay doors and deploy the drogue nest. The alternate action ARM push-button enables power to the RETRACT/ OFF/EXTEND switch provided continuity exists through the safety interlock switch in the drogue bay. The white ARM indicator in the switch illuminates when the system is armed. Holding the spring loaded RETRACT/OFF/ EXTEND switch to EXTEND will open the bay doors and deploy the drogue nest. Holding the switch in RETRACT will raise the drogue nest and close the bay doors. The NEST IN indicator illuminates when the drogue nest is fully retracted and the ARM switch is activated. The NEST OUT indicator illuminates when the drogue nest is fully deployed. The IN TRANSIT indicator illuminates (amber) when the drogue nest is in any intermediate position between fully retracted and fully deployed. The LAMP TEST push button is used to test all the indicators on the panel.

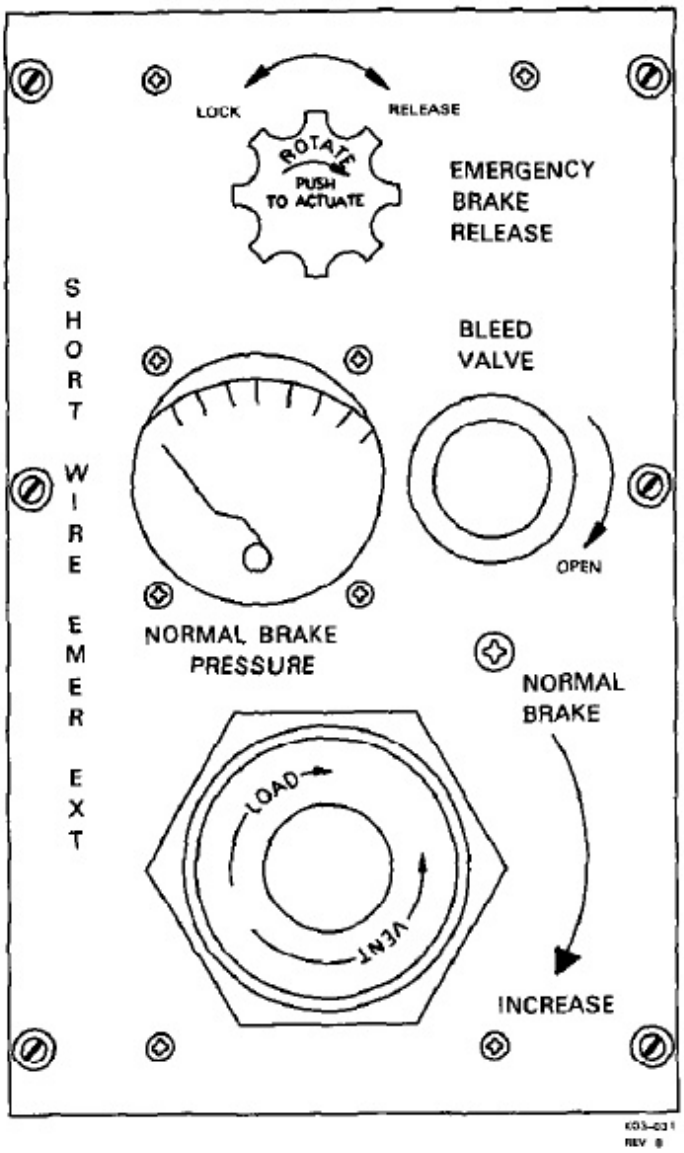


Figure 24-19. Short Wire Emergency Extend Control (A4A6)

24.4.2.3 Power Control Panel (P111). The STWA hydraulic power/drogue light power control panel (Figure 24-21) has two separate functions. The STWA HYDR PWR toggle switch opens and closes a valve that applies aircraft auxiliary hydraulic power to the STWA reel and closes a relay applying power to the auxiliary hydraulic return pump. The two DROGUE LT toggle switches (STWA and LTWA) control the illumination of the drogue nests and antenna wires. Illumination is provided out to a distance of 100 feet. The DROGUE LT indicator illuminates on when either of the exterior lights is illuminated.

24.4.2.4 ICS Maintenance Control Unit. The ICS is provided to the reel operators station through a MCU panel (Figure 24-22) and two microphone-headset interfaces, one on the power outlet panel (A1A12) and one on the auxiliary control console. On the MCU panel, the PTT switch provides continuous key oper-

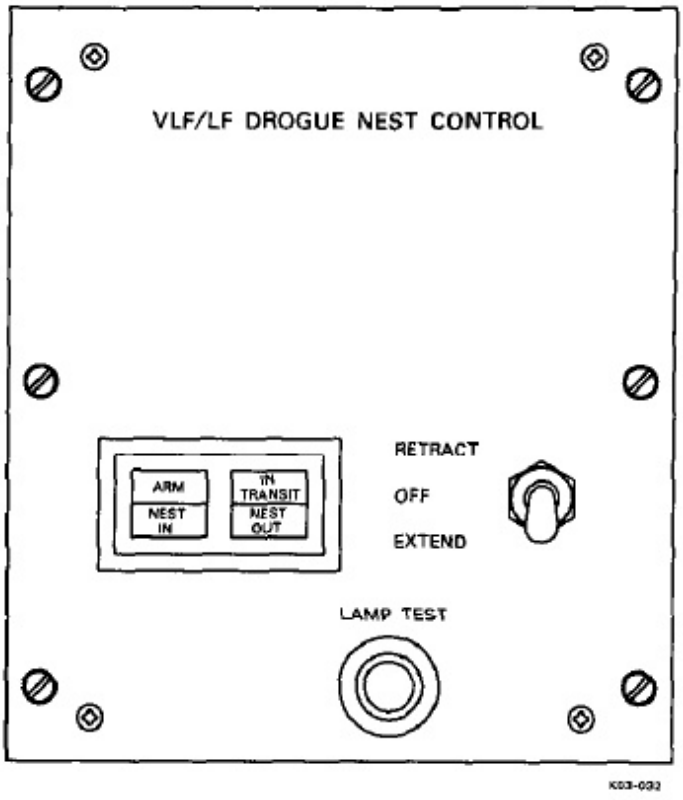


Figure 24-20. LTWA Drogue Nest Control (P108)

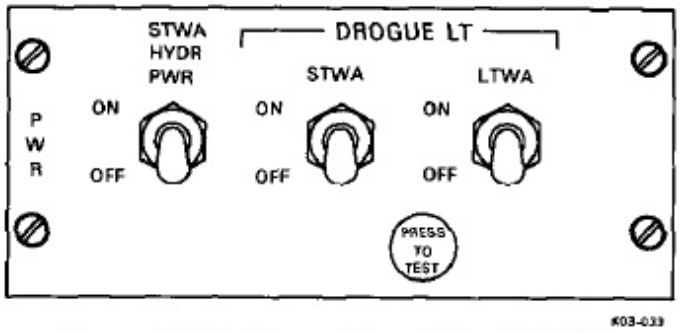


Figure 24-21. Power Control Panel (P111)

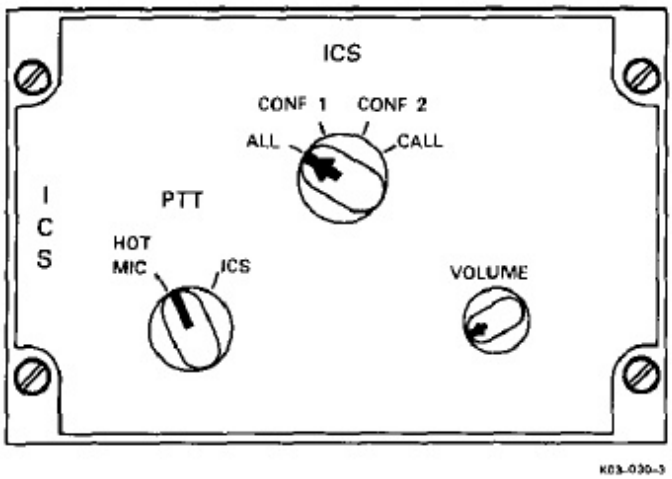


Figure 24-22. Maintenance Control Unit

ation in the HOT MIC position, while the ICS pos requires microphone push-to-talk operation on the system. The ICS select switch provides access t three ICS networks (ALL, CONF 1 and CONF 2) CALL position for aircraft wide emergency opera Each network access is described in Chapter 18. VOLUME control adjusts the volume level of the posite received audio signal and has no off posi When the ICS is in the Emergency mode, only the C selection is operational.

Note

The CALL function shall only be used during an emergency.

24.4.2.5 Manual DROGUE RELEASE (Ye T-Handle.) The LTWA DROGUE RELEASE handle permits the reel operator to manually rel the long trailing wire drogue in an emergency.

24.4.2.6 Manual CABLE CUTTERS (Red handle). The LTWA CABLE CUTTER T-handl cated on forward section of the A3 assembly ne auxiliary control console, permits the reel operat manually cut the LTWA in an emergency.

24.4.3 LTWA/STWA Enclosure Controls an dicators. Several controls and indicators are loc on the LTWA enclosure and at the short trailing installation. See Figures 24-1 and 24-2. Many of t controls and indicators are not normally used for ext ing or retracting the antenna wire, but are usec maintenance or for emergency operation. The con and indicators are described in Figure 24-23.

24.4.4 Miscellaneous Controls and Indicat Three remote length indicators also display the le of both antennas. One LTWA and one STWA le indicator are in comm central and a dual reading u on the flight deck. A dual tension indicator mounte the pilots instrument panel displays tension for antennas. Emergency controls for arming and cuttir both antenna wires are located on the pilot's instru panels. The flight deck DTWA controls and indic are described in the A1-E6AAA-NFM-000.

24.4.4.1 LTWA Drogue Nest Arm Manual D Assembly. A manual drive assembly (Fi 24-24), located below the deck near the STWA er sure, permits emergency deployment of the LT drogue nest arm. In the event the normal extend sy fails, a hand crank can be used to deploy and retrac nest.

CONTROL/INDICATOR	FUNCTION
LONG TRAILING WIRE ANTENNA	
WATER LEVEL Glass Indicating Tube	Shows coolant level in the brake coolant reservoir.
HYD FLUID LEVEL Glass Indicating Tube	Shows hydraulic fluid level in the hydraulic reservoir.
M2 and M4 Hydraulic Accumulator Gauges	Shows brake hydraulic system pressure. Normal precharge for long trailing wire antenna is 650 ± 50 psi.
COOLANT TEMP Thermometer	Indicates temperature of brake coolant.
Hydrometer	Indicates specific gravity of brake coolant.
Manual Cable Cutter	Mechanical T-handle used to cut antenna wire. Operated by rotating handle 90° and pulling sharply.
Manual Drogue Release	Mechanical pull used to manually release long trailing wire antenna drogue.

Figure 24-23. Reel Enclosure Controls and Indicators (Sheet 1 of 2)

CONTROL/INDICATOR	FUNCTION
SHORT TRAILING WIRE ANTENNA	
M1 Inlet Supply Pressure Gauge	Indicates aircraft auxiliary hydraulic system pressure at the STWA input.
M2 Brake Servo Valve Inlet Pressure Gauge	Indicates brake valve inlet hydraulic pressure/discharge. Normal accumulator precharge is 150 ± 15 psi with system hydraulic pressure off.
M3 Emergency Release Accumulator Pressure Gauge	Indicates pressure in hydraulic accumulator used to control emergency STWA release. When system is bled, shows 750 ± 50 psi precharge. When charged, indicates peak aircraft auxiliary hydraulic pressure of 3000 ± 200 psi.
MV1 Manual Valve	Hydraulic motor bypass valve must be in the open position for emergency extend of the short trailing wire, and closed at all other times.
MV2 Manual Valve	Manual shutoff valve for hydraulic motor.
SERVICE BRAKE RELEASE VENT Valve	Relieves auxiliary hydraulic system back pressure by venting hydraulic fluid overboard. This permits STWA normal brake release in the event of an auxiliary hydraulic return pump failure.

Figure 24-23. Reel Enclosure Controls and Indicators (Sheet 2 of 2)

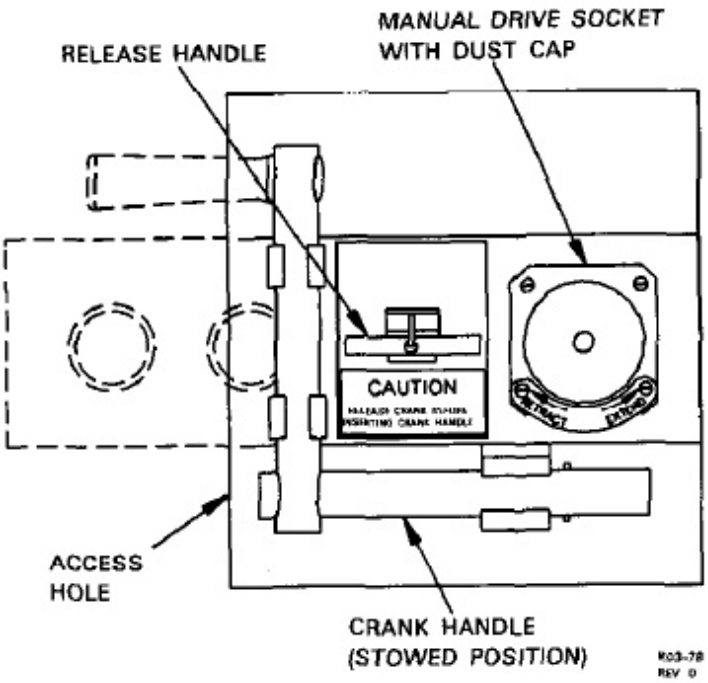


Figure 24-24. LTWA Drogue Nest Arm Manual Drive

24.5 REEL SYSTEM EQUIPMENT POWER SOURCES

Figure 24-25 lists the power sources to equipment associated with the long and short trailing wire systems, including the type of power, and the circuit breaker location/label.

24.6 REEL OPERATOR PREFLIGHT

Procedures are listed in the sequence in which they are normally performed. Reel operator preflight procedures must be completed prior to mission flight.

24.6.1 External Visual Preflight

1. Starboard wheelwell — Check STWA hydraulic return pump for leaks.

WARNING

Verify wheelwell door safety locks are installed.

2. Aft lower compartment:

   a. LTWA drogue window — Check for cleanliness.

   b. TWA/STWA spare drogues — Check for curity.

   c. Check area for visible signs of hydrau leaks.

3. LTWA drogue nest — Retracted.

WARNING

If the drogue nest is extended, verify bay interlock switch is deactivated and pinned.

4. STWA drogue — Nested.

5. Port wheelwell area:

WARNING

Verify wheel well door safety locks are installed.

   a. LCS expansion tank sight gauge — Float ball is within one inch of ramp temperature

   b. Check area for visible signs of EGW leaks.

CAUTION

If EGW leak or spill is found on preflight, do not accept aircraft for flight until maintenance has determined whether the problem is a leak or a spill and has removed as much of the liquid as possible. If EGW solution comes in contact with silver, silver coated, or tin solder connections, corrosion can occur. If these connections are carrying a dc voltage of more than 1.5 volts, the EGW can ignite. The danger is greater when a thin film is present. If leak is in pressurized portion of LCS, it should be repaired before flight.

   c. LCS nitrogen pressure gauge — Over psi.

   d. Nitrogen shut off valve — Open.

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
Hydraulic Return Pump	115V, 400 Hz	MA 1 AC	P67-2 Panel, STWA HYD RETURN PUMP
	28 VDC	MA 1 DC DIST	P67-2 Panel, STWA HYD SOV
Liquid Cooling System	115V, 400 Hz	GEN 1 thru GCB 1 & AVE SYNC Bus thru BTB1	LIQUID COOLING SYSTEM, PUMPS 1, ON Pushbutton
	115V, 400 Hz	GEN 5 thru GCB5 & AVE SYNC Bus thru BTB5	LIQUID COOLING SYSTEM, PUMPS 2, ON Pushbutton
	28 VDC	MA 1 DC DIST	P67-3 Panel, VALVE GRD
	28 VDC	MA 1 DC DIST	P67-3 Panel, VALVE COOLER 1
	28 VDC	MA 1 DC DIST	P67-3 Panel, VALVE COOLER 4
	28 VDC	MA 1 DC DIST	P67-3 Panel, PUMP CONTR 1
	28 VDC	MA 1 DC DIST	P67-3 Panel, PUMP CONTR 2
	28 VDC	MA 1 DC DIST	P67-3 Panel, INDS
Long Wire Cable Cutter Control	28 VDC	BAT	P61-4 Panel, CABLE CUT CUTTER
	28 VDC	BAT	P61-4 Panel, CABLE CUT CONTROL

Figure 24-25. Reel System Equipment Power Sources (Sheet 1 of 2)

24.6.2 Internal Visual Preflight

1. Flight deck reel systems indicators and controls:

   a. EMERGENCY CABLE CUTTER Panel — Check ARM and CUT switches (4) are red guarded and shear wired.

   b. STWA/LTWA TENSION indicators — Check for zero readings.

   c. VLF ANT panel — Check for blank readings.

   d. Verify the following P61-4 panel circuit breakers are closed:

      (1) CABLE CUT — CUTTER and CONTROL.

      (2) HEATER — VLF STEAM VENT MAST.

2. Lavatory area:

   a. Toilet paper — As Required.

   b. Hand soap — As Required.

   c. Paper towels — As Required.

3. Galley area:

   a. Plates, cups, cutlery — As Required.

EQUIPMENT/SYSTEM	TYPE OF POWER	POWER SOURCE	CIRCUIT BREAKER LOCATION/LABEL
LTWA Reel Assembly	115V, 400 Hz	ME SYNC	400 Hz DISTR 2 Panel, VLF PWR ENABLE LWA Pushbuttor (Supply 1)
	115V, 400 Hz	AVE 1 AC	P67-1 Panel, LTWA WINCH (Supply 2)
	28 VDC	MA 5 DC DIST	P67-2 Panel, LTWA WINCH ELCU CONT
Drogue Lighting Power Control	28 VDC	MA 1 DC DIST	P67-1 Panel, EXTERIOR LIGHTING DROGUE CONT
	28 VAC	MA 1 AC 28V	P67-1 Panel, EXTERIOR LIGHTING DROGUE LONG WIRE ANT
	28 VAC	MA 1 AC 28V	P67-1 Panel, EXTERIOR LIGHTING DROGUE SHORT WIRE ANT
Short Wire Hydraulic Shut Off Valve	28 VDC	MA 1 DC DIST	P67-2 Panel, STWA HYD SOV
Short Wire Cable Cutter Control	28 VDC	BAT	P61-4 Panel, CABLE CUT CUTTER
	28 VDC	BAT	P61-4 Panel, CABLE CUT CONTROL
VLF/LF Drogue Nest Control	115V, 400 Hz	MA 5 AC	P67-2 Panel, DROGUE NEST CNTL AC
	28 VDC	MA 5 DC DIST	P67-2 Panel, DROGUE NEST CNTL DC
+28 VDC Power Control (A1A4)	28 VDC	MA 5 AFT CONSOLE	28 VDC DISTR 2 Panel, LONG WIRE CONT (INTERNAL)
	28 VDC	MA 1 DC	P67-3 Panel, LTWA WINCH ASSY (AIRCRAFT)

Figure 24-25. Reel System Equipment Power Sources (Sheet 2 of 2)

b. Trash bags — As Required.

c. Coffee, Sugar, creamer — As Required.

d. Galley electrical control panel circuit breakers and switches — As Desired.

e. Refrigerator power switches — As Desired.

4. Verify the following P67 panels circuit breal are closed:

a. P67-1

(1) MISSION POWER DISTRIBUTION BUS 1.

(2) LTWA WINCH.

(3) EXTERIOR LIGHTING DROGUE

(a) CONT

(b) LONG WIRE ANT

(c) SHORT WIRE ANT.

b. P67-2

(1) MISSION DIST BUS 5.

(2) DROGUE NEST CNTL — AC and DC.

(3) STWA HYD — RETURN PUMP and SOV.

(4) LTWA WINCH ELCU CONT.

(5) POWER DISTRIBUTION PANEL 2 — 28 VDC.

c. P67-3

(1) LTWA WINCH ASSY.

(2) LIQUID COOLING SYSTEM:

(a) VALVE GRD

(b) VALVE COOLER — 1 and 4

(c) PUMP CONTR — 1 and 2

(d) INDS.

(3) MISSION POWER DISTRIBUTION

(a) XFMR RECTIFIER UNITS — 1 and 5

(b) 28 VDC — BUS 1 DIST 1 and BUS 5 DIST 1.

5. Comm central controls and indicators:

a. 400 Hz DISTR 2 panel — Press VLF PWR ENABLE LWA pushbutton and verify POWER ON indicator is on.

CAUTION

If LTWA ELCU trips, only one attempt to reset the ELCU is permitted unless the cause of the tripping has been determined and corrected.

b. 28 VDC DISTR 2 panel — Verify LONG WIRE CONT circuit breaker is closed.

c. Seat four VLF ANT Panels (2) — Check for zero readings.

6. LTWA A2 area:

a. A2A4 400 HZ POWER DISTRIBUTION panel:

(1) Fuses (6) and reel motor switch (S1) — Check for security and general condition.

(2) Circuit breakers (3) — OFF.

b. A2 hydraulic reservoir fluid sight gauge — Check for proper level (normal range).

c. Deck areas — Check for obvious signs of hydraulic leaks.

d. A2A1 hydraulic panel — Check for precharge pressure of 650 ±50 psi on M2 and M4 gauges.

e. Brake coolant reservoir area — Check area for visible signs of EGW leakage.

CAUTION

If EGW leak or spill is found on preflight, do not accept aircraft for flight until maintenance has determined whether the problem is a leak or a spill and has removed as much liquid as possible. If EGW solution comes in contact with silver, silver coated, or tin solder connections, corrosion can occur. If these connections are carrying a dc voltage of more than 1.5v, the EGW can ignite. The danger is greatest when a thin film is present.

Note

The M4 gauge may require bleeding to check precharge.

f. Fleet angle compensator — Check for proper lubrication.

g. Antenna wire — Check for correct antenna wire routing.

h. Access panels — Check for proper security.

7. LTWA A3 Area:

a. LTWA cable cutter manual T-handle — Check for proper position and shear wired.

b. LTWA manual drogue release T-handle — Check for proper position.

c. Pulley and cable cutter assemblies — Check for proper antenna wire routing and component security.

CAUTION

Electrical cable cutter shall be operational for mission flights.

d. Cable cutter safety pins — Remove and Stow.

CAUTION

When removing cable cutter safety pin, ensure trip lever is not pulled out. If a pin does not remove easily, push trip lever in slightly to remove pin. If pin still does not remove easily, maintenance may be required.

e. Access panels — Check for proper security.

8. STWA A4 area:

a. Drip pan — Check for obvious signs of hydraulic leaks.

b. SERVICE BRAKE RETURN VENT Valve — NORMAL and safety wired.

CAUTION

- Operation of the STWA with the service brake return vent valve in the SERVICE BRAKE RETURN VENT position will cause loss of auxiliary hydraulic fluid and degrade system capabilities.
- Coordinate with the flight deck prior to opening the valve.

c. Remote emergency brake handle — Up properly latched in retainer.

d. Manual valve MV1 — Closed and sa wired.

e. Manual valve MV2 — Open and sa wired.

f. M1 gauge — Zero psi.

g. M2 gauge — Precharge pressure of 150 psi.

h. M3 gauge — Precharge pressure of 750 psi

Note

M3 gauge may require bleeding to check precharge.

i. Pulley and cable cutter assemblies — Ch for proper antenna wire routing and com nent security.

WARNING

When entering reel housing area or projection box area on STWA, ensure shorting stick is used to ground inner enclosure.

CAUTION

Electrical cable cutter shall be operational for mission flights.

j. Dielectric platform — Check for cracks.

k. Load cell — Check for leaks and security.

l. Cable cutter safety pins — Removed and Stowed.

CAUTION

When removing cable cutter safety pin, ensure trip lever is not pulled out. If a pin does not remove easily, push trip lever in slightly to remove pin. If pin still does not remove easily, maintenance may be required.

m. Access panels — Check for proper security.

Note

If the STWA ground denesting/nesting procedures are to be performed, leave shorting stick in at this time.

9. A1 main/auxiliary control console areas:

a. Lower kick panel — Check for proper security.

b. Control panels — Inspect for proper positioning and security.

c. Meters and gauges — Check for cracks and cleanliness.

d. A1A1 and A1A6 EMERGENCY control panels — Check ARM and CUT switches are red guarded and shear wired.

e. A1A11 LONG WIRE EMER EXT control panel:

(1) EMERGENCY BRAKE RELEASE handle — Up and stowed.

(2) NORMAL BRAKE knob — Rotate CCW until fully vented.

(3) NORMAL BRAKE pressure gauge — Zero psi.

f. Water coolant sight gauge — Check for proper level (14 gallon minimum) and visible signs of EGW leakage.

CAUTION

If EGW leak or spill is found on preflight, do not accept aircraft for flight until maintenance has determined whether the problem is a leak or a spill and has removed as much liquid as possible. If EGW solution comes in contact with silver, silver coated, or tin solder connections, corrosion can occur. If these connections are carrying a dc voltage of more than 1.5v, the EGW can ignite. The danger is greatest when a thin film is present.

g. A4A6 SHORT WIRE EMER EXT Control panel:

(1) EMERGENCY BRAKE RELEASE knob — LOCK (fully CCW).

(2) NORMAL BRAKE Knob Rotate CCW until fully vented.

(3) NORMAL BRAKE PRESSURE Gauge — 47 ±5 psi

h. STWA emergency cable cutter T-handle — Check for proper position and shearwired.

i. STWA manual drogue release T-handle — Check for proper position.

j. P111 PWR control panel:

(1) STWA HYDR PWR switch — OFF.

(2) DROGUE LT switches:

(a) STWA switch — OFF.

(b) LTWA switch — OFF.

k. P108 VLF/LF DROGUE NEST CONTROL panel:

(1) RETRACT/OFF/EXTEND switch — OFF.

(2) All indicators — Off.

24.6.3 Liquid Cooling System Preflight

1. COOLER VALVES 1 and 4 FUEL OFF indicators — Off.

CAUTION

LCS will be activated whenever LTWA hydraulic system is to be operated over 5 minutes or VLF PA coupler is to be operated.

Note

If illuminated, coordinate LCS activation with flight engineer.

2. P104 LIQUID COOLING SYSTEM control panel:

   a. FUEL 1 and 4 TEMP switch — Verify temperature on TEMP gauge.

CAUTION

Maximum allowable fuel temperature for heat exchanger operation during preflight is 120 °F 49 °C).

   b. RETURN pressure gauge — 20 ±10 psi.

   c. LOW PRESS indicator — Off.

   d. LOW FLOW indicator — On.

   e. EGW HOT indicator — Off.

   f. LAMP TEST — Press and observe all indicators illuminate.

   g. COOLER VALVES 1 and 4 switches — Press and observe OPEN indicators illuminate within 12 seconds.

   h. PUMPS 1 Switch — Press and observe the following:

CAUTION

- Use of both pumps simultaneously may cause pump cavitation and overheat.
- If pump ELCU trips, only one attempt to reset the ELCU is permitted unless the cause of the tripping has been determined and corrected.

(1) PUMPS 1 ON indicator — On.

(2) SUPPLY pressure gauge — 160 °40 j

(3) LOW FLOW indicator — Off.

Note

On increasing flow, the LOW FLOW lamp should go off before flow rate reaches 55 gallons per minute. At low EGW temperatures, the flow rate may not reach 55 gallons per minute. Therefore, at temperatures below 10 °F, the LOW FLOW lamp may remain illuminated. The light should normally go out when EGW temperature reaches or is above 35 °F.

(4) COOLANT SUPPLY TEMP Switc verify temperature on TEMP gauge

CAUTION

- Coolant supply temperature must remain below 130° F to prevent LCS equipment overheat.
- If EGW HOT indicator comes on during operation, shut off pump.

Note

Normal operating temperature will be between 59 and 90 °F, after LCS has warmed up.

   i. PUMPS 1 switch — Press and observ following:

(1) PUMPS 1 ON indicator — Off.

(2) SUPPLY pressure gauge — 20 ±1 (return pressure).

(3) LOW FLOW indicator — On.

j. PUMPS 2 switch — Press and observe the following:

CAUTION

- Use of both pumps simultaneously may cause pump cavitation and overheat.
- If pump ELCU trips, only one attempt to reset the ELCU is permitted unless the cause of the tripping has been determined and corrected.

(1) PUMPS 2 ON indicator — On.

(2) SUPPLY pressure gauge — 160 ±40 psi.

(3) LOW FLOW indicator — Off.

Note

On increasing flow, the LOW FLOW lamp should go off before flow rate reaches 55 gallons per minute. At low EGW temperatures, the flow rate may not reach 55 gallons per minute. Therefore, at temperatures below 10 °F the LOW FLOW lamp may remain illuminated. The light should normally go out when EGW temperature reaches or is above 35 °F.

(4) COOLANT SUPPLY TEMP Switch — Verify temperature on TEMP Gauge.

CAUTION

- Coolant supply temperature must remain below 130 °F to prevent LCS equipment overheat.
- If EGW HOT indicator comes on during operation, shut off pump.

Note

- Normal operating temperature will be between 59 to 90 °F, after LCS has warmed up.
- The LCS will be left on at this time to allow completion of the preflight procedures.

24.6.4 Antenna Group Power On

WARNING

All personnel in aft compartment during STWA or LTWA retraction, or during VLF PA operation exceeding PEL, (see Figure 3-7, A1-E6AAA-NFM-000) shall wear hearing protection.

1. A1A4 +28 VDC POWER control panel:

a. CB1, CB2, CB3, and CB4 — Closed.

CAUTION

Removal of A1 console lower kick panel will cause insufficient air cooling from A1 console cooling fan to cool A1PS1 and A1PS2 power supplies.

b. 28 VDC switch — ON.

c. LIGHTS switch — ON.

2. A2A4 400 HZ POWER DISTRIBUTION panel:

a. S1 — Press and observe ON light illuminates and OFF light extinguishes.

b. CB1 — ON.

c. CB2 — ON.

Note

CB2 will energize the A1 console cooling fan.

d. CB3 — ON.

e. Verify all fuse lights (six) are off.

3. A1A2 SHORT WIRE VELOCITY Control panel — Press LAMP TEST and observe the following:

   a. All indicators on A1A1, A1A2, and A1A3 control panels illuminate.

   b. A1A3 LENGTH FEET display reads 8888.

4. A1A7 LONG WIRE VELOCITY control panel — Press LAMP TEST and observe the following:

   a. All indicators on A1A6, A1A7, and A1A8 control panels illuminate.

   b. A1A8 LENGTH FEET display reads 88888.

5. A1A10 ELECTRICAL SYSTEMS control panel — Press LAMP TEST and observe all indicators on A1A9 and A1A10 control panels illuminate.

6. P108 VLF/LF DROGUE NEST CONTROL panel — Press LAMP TEST and observe all indicators illuminate.

7. P111 PWR control panel — Push PRESS TO TEST Lamp and observe light illuminates.

8. LTWA/STWA switches, switch/indicators, and controls — Check for the following:

   a. A1A15 LENGTH LIMIT control panel:

      (1) SHORT WIRE RESERVE FEET indicator — Logged.

      (2) LONG WIRE RESERVE FEET indicator — Logged.

Note

If reserve lengths are below 26,940 LTWA or 4,230 STWA, notify the ACO.

   b. A1A1 SHORT WIRE and A1A6 LONG WIRE EMERGENCY control panels:

      (1) EMERGENCY BRAKE switches — ON.

      (2) EMERGENCY BRAKE ON indicators — On.

   c. A1A2 SHORT WIRE VELOCITY control panels:

      (1) PA/OFF/ON ANT/ON TEST Indicato

         (a) PA indicator — On.

         (b) OFF indicator — On.

         (c) ON ANT indicator — Off.

         (d) ON TEST indicator — Off.

      (2) PANELS OPEN indicator — Off.

      (3) ANTENNA GROUNDED indicator On.

      (4) ANTENNA ACCESS switch — ON guarded.

      (5) TENSION meter — 35 pounds minim

      (6) VELOCITY meter — Zero fpm.

      (7) VELOCITY knob — Check for movement.

      (8) REEL TIME meter — Logged.

   d. A1A7 LONG WIRE VELOCITY con panel:

      (1) PANELS OPEN indicator — Off.

      (2) TENSION meter — 75 pounds minim

      (3) VELOCITY meter — Zero fpm.

      (4) VELOCITY knob — Check for movement.

      (5) HYDR REEL TIME meter — Logged.

      (6) BRAKE REEL TIME meter — Logge

   e. A1A3 SHORT WIRE and A1A8 LO WIRE LENGTH control panels:

      (1) DROGUE In indicators — On.

      (2) DROGUE OUT indicators — Off.

      (3) OVERSPEED indicators — Off.

Note

If OVERSPEED indicator is on, push PRESS FOR RESET switch on A1A1 or A1A6 EMERGENCY Control Panel.

(4) OVERLENGTH indicators — Off.

(5) GRD PWR indicators — On.

Note

GRD PWR indicator will not go out until the aircraft is airborne.

(6) DIRECTION ERROR indicators — Off.

(7) LENGTH FEET display — Zero.

(8) DROGUE LOST indicators — Off.

Note

If DROGUE LOST indicator is on, check that the TENSION meters are more than 35 pounds (SHORT WIRE) or 75 pounds (LONG WIRE). If tensions are correct, push PRESS FOR OVERRIDE switch and DROGUE LOST indicator should extinguish.

(9) PRESS FOR OVERRIDE indicator — Off.

(10) DROGUE RELEASE indicators — OFF.

(11) LENGTH COMMAND switches:

(a) A1A3 — 0000.

(b) A1A8 — 00000.

(12) AUTOMATIC/MANUAL switch — Select both AUTOMATIC and MANUAL, verify both indicators illuminate.

(13) EXTEND indicators — Off.

(14) STOP indicators — On.

Note

If off, press STOP switch.

(15) RETRACT indicators — Off.

(16) HYDRAULIC MODE indicator (A1A8 only) — Off.

(17) BRAKE MODE indicator (A1A8 only) — Off.

f. A1A9 FLUID SYSTEMS control panel:

(1) DRIVE HYDR indicators:

(a) CRCLT PUMP indicator — Off.

(b) CHG PUMP indicator — Off.

(c) BLOWER indicator — Off.

(d) HYDR HOT indicator — Off.

(e) MTR HOT indicator — Off.

(f) OVER PRESSURE indicator — Off.

(2) DRIVE HIGH PRESSURE meter — Zero psi.

(3) DRIVE LOW PRESSURE meter — Zero psi.

(4) ELECT/HYDR DRIVE OFF indicator — On.

Note

If off, press ELECT/HYDR DRIVE OFF switch.

(5) ELECT/HYDR DRIVE ON indicator — Off.

(6) WATER indicator:

(a) PUMP ON indicator — Off.

(b) HOT indicator — Off.

(7) ANTENNA indicators:

(a) LEVEL/ORBIT switch — Select both LEVEL and ORBIT, verify both indicators illuminate.

(b) PRESS FOR COMPUTER LENGTH COMMANDS switch — Push and hold while observing the following:

1) PRESS FOR COMPUTER LENGTH COMMAND indicator — On.

2) A1A3 and A1A8 LENGTH FEET display — Computed STWA/LTWA lengths.

Note

If a frequency has not been inserted into the PA, LENGTH FEET display will indicate zero.

g. A1A10 ELECTRICAL SYSTEMS control panel:

(1) PRIME POWER indicator:

(a) PHASE SEQUENCE

1) SUPPLY 1 indicator — On.

2) SUPPLY 2 indicator — On.

(b) AC VOLTS/AMPS selector — Position and observe AC VOLTS/ AMPS meter for the following:

1) OFF — Zero.

2) VA, VB, VC positions indicate 115 ±5 VAC for each respective phase.

3) IA — Zero amps, leave selector in IA.

(2) ANTENNA SYSTEM SUPPLIES indicators:

(a) +28 VDC indicators

1) AIRCRAFT indicator — On.

2) BATTERY indicator — On.

3) INTERNAL indicator — On.

(b) SHORT WIRE HYDR indicators:

1) LOW PRESSURE indicator — On.

2) NORMAL PRESSURE indicator — Off.

3) HOT indicator — Off.

(c) LONG WIRE AUX HYDR indicators:

1) SUPPLY ON/SUPPLY switch:

a) SUPPLY OFF indicator —

b) SUPPLY ON indicator —

2) LOW PRESSURE indicato Off.

3) NORMAL PRESSURE indi — Off.

4) HOT indicator — Off.

Note

Only the following red indicators should be illuminated at this time:

- A1A1 SHORT WIRE EMERGENCY BRAKE ON indicator.
- A1A6 LONG WIRE EMERGENCY BRAKE ON indicator.
- A1A10 SHORT WIRE HYDR LOW PRESSURE indicator.

24.6.5 Long Trailing Wire Antenna Pref Checks

24.6.5.1 LTWA Drogue Nest Extend

1. P108 VLF/LF DROGUE NEST CONT panel:

a. ARM/NEST IN switch — Press and ob the following:

WARNING

Clear drogue area before extending drogue nest.

(1) ARM indicator — On.

(2) NEST IN indicator — On.

b. RETRACT/OFF/EXTEND switch — Select and hold in EXTEND while observing the following:

CAUTION

Do not extend/retract LTWA drogue nest unless drogue is latched and fully nested. (On A1A8 LONG WIRE LENGTH control panel, DROGUE IN indicator is on and DROGUE LOST indicator is off.)

(1) NEST IN indicator — Off.

(2) IN TRANSIT indicator — On until nest is fully extended, then will extinguish.

(3) NEST OUT indicator — On after IN TRANSIT indicator extinguishes.

Note

Flight deck DROGUE BAY indicator will also illuminate.

c. ARM/NEST IN switch — Press and observe the following:

(1) ARM indicator — Off.

(2) NEST OUT indicator — On.

2. Drogue nest interlock switch — Deactivated and pinned.

24.6.5.2 LTWA Power On

1. A1A10 SUPPLY ON/SUPPLY OFF switch — Press and observe the following:

a. SUPPLY ON indicator — On.

b. SUPPLY OFF indicator — Off.

c. LOW PRESSURE indicator — Off.

Note

LOW PRESSURE indicator will initially illuminate then extinguish after auxiliary hydraulic pressure exceeds 950 psi.

d. NORMAL PRESSURE indicator — On.

e. HOT indicator — Off.

f. A1A9 FLUID SYSTEMS control panel:

(1) CRCLT PUMP indicator — On.

(2) DRIVE LOW PRESSURE meter — 70 ±10 psi (circulating pump pressure)

g. A2A1 hydraulic panel:

(1) M2 gauge — 1,200 ±50 psi

(2) M4 gauge — 1,200 ±50 psi

24.6.5.3 LTWA Brake Mode Checks

1. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select OFF and Observe the following:

a. A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — Off.

Note

If not off, push PRESS FOR RESET switch.

b. A1A11 NORMAL BRAKE pressure gauge — Increases to 450 ±50 psi.

2. A1A8 LONG WIRE LENGTH control panel:

a. AUTOMATIC/MANUAL switch — Select MANUAL.

b. BRAKE MODE switch — Press and observe the following:

Note

When changing drive modes, it is recommended that this be done by cycling the emergency brake ON then OFF again. This action ensures clutch engagement and disengagement.

(1) A1A9 WATER PUMP ON indicator — On.

Note

If normal brake water cooling system is inoperative, BRAKE MODE indicator will not enable.

(2) A1A8 BRAKE MODE Indicator — On.

c. EXTEND switch — Press and observe the following:

CAUTION

Do not press DROGUE RELEASE switch.

(1) EXTEND indicator — On.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

d. RETRACT switch — Press and observe the following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

e. AUTOMATIC/MANUAL switch — Select AUTOMATIC.

f. EXTEND switch — Press and observe the following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

Note

Extend mode will not be accepted by A1 card cage because LENGTH COMMAND switches and LENGTH FEET display are equal.

g. LENGTH COMMAND switches — Set to 10000.

h. EXTEND switch — Press and observe the following:

CAUTION

Do not press DROGUE RELEASE switch.

(1) EXTEND indicator — On.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

i. RETRACT switch — Press and observ following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

j. LENGTH COMMAND switches — S 00000.

3. A1A6 LONG WIRE EMERGENCY BR switch — Select ON and observe the follow

a. A1A6 LONG WIRE EMERGE BRAKE ON indicator — On.

b. A1A8 BRAKE MODE indicator — Off.

c. A1A11 NORMAL BRAKE pressure — Decreases to zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing hydraulic or brake modes of operation.

24.6.5.4 LTWA Hydraulic Mode Checks

1. A1A9 FLUID SYSTEMS control panel:

a. ELECT/HYDR DRIVE ON switch — and observe the following:

CAUTION

- Do not start the LTWA 60 hp motor unless ground power cart or carts capable of supplying 90 KVA are connected to the external power receptacles. The preload for a 90 KVA ground source must not exceed 75 amps.

- Do not start the LTWA 60 hp motor when the aircraft is powered by the APU.

CAUTION

- Do not start the LTWA 60 hp motor unless at least two aircraft generators are supplying power to the ME sync bus. The combined preload for the two generators shall not exceed 100 amps.
- Check with comm central and the flight engineer prior to starting the 60 hp motor.
- Verify LTWA 60 hp motor blower intake is clear of obstructions.

(1) ELECT/HYDR DRIVE OFF indicator — Off.

(2) CHG PUMP indicator — On.

(3) BLOWER indicator — On.

(4) ELECT/HYDR DRIVE ON indicator — On (yellow).

(5) A1A10 AC VOLTS/AMPS selector — Position to IA, IB, and IC while monitoring AC VOLTS/AMPS meter for approximately 300 amps.

Note

- The ELECT/HYDR DRIVE ON indicator should illuminate yellow after the charge pump and blower have started. The indicator will turn green approximately 4 seconds after it illuminates yellow. Current shall be monitored during the 60 hp motor start. The AC VOLTS/AMPS meter will indicate approximately 300 amps for 3 to 4 seconds, then drop back to a normal range of 70 ±12 amps.
- During start condition (ELECT/HYD DRIVE ON indicator yellow), the 60 hp motor will automatically shut off if elapsed time exceeds 4.5 seconds.

(6) After 60 hp motor is up to speed, observe the following:

(a) ELECT/HYD DRIVE ON indicator — On (green).

(b) DRIVE LOW PRESSURE gauge — 185 ±35 psi (charge pump pressure).

(c) DRIVE HIGH PRESSURE gauge — 185 ±35 psi (main drive loop pressure).

(d) A1A10 AC VOLTS/AMPS selector — Position to IC, IB, and IA while monitoring AC VOLTS/AMPS meter for 70 ±12 amps.

2. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select OFF and observe the following:

a. A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — Off.

Note

If not off, push PRESS FOR RESET switch.

b. A1A11 NORMAL BRAKE pressure gauge — Increases to 450 ±50 psi.

3. A1A8 LONG WIRE LENGTH control panel:

a. AUTOMATIC/MANUAL switch — Select MANUAL.

b. HYDRAULIC MODE switch — Press and observe the following:

Note

When changing drive modes, it is recommended that this be done by cycling the emergency brake ON then OFF again. This action ensures clutch engagement and disengagement.

(1) HYDRAULIC MODE indicator — On.

Note

If hydraulic drive clutch does not engage, HYDRAULIC MODE indicator will not enable.

(2) A1A9 WATER PUMP ON indicator — On.

Note

If normal brake water cooling system is inoperative, hydraulic mode of operation will not be affected.

c. EXTEND switch — Press and observe the following:

CAUTION

Do not press DROGUE RELEASE switch.

(1) EXTEND indicator — On.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

d. RETRACT switch — Press and observe the following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

e. AUTOMATIC/MANUAL switch — Select AUTOMATIC.

f. EXTEND switch — Press and observe the following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

Note

Extend mode will not be accepted by A1 card cage because LENGTH COMMAND switches and LENGTH FEET display are equal.

g. LENGTH COMMAND switches — Set to 10000.

h. EXTEND switch — Press and observe the following:

CAUTION

Do not press DROGUE RELEASE switch.

(1) EXTEND indicator — On.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

i. RETRACT switch — Press and observe following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

j. STOP switch — Press and observe the lowing:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

k. LENGTH COMMAND switches — Se 00000.

4. A1A6 LONG WIRE EMERGENCY BRA switch — Select ON and observe the followin

a. A1A6 LONG WIRE EMERGEN BRAKE ON indicator — On.

b. A1A8 HYDRAULIC MODE indicator Off.

c. A1A11 NORMAL BRAKE pressure ga — Decreases to zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing hydraulic or brake modes of operation.

24.6.5.5 LTWA Emergency Extend Mode Checks

1. A1A11 LONG WIRE EMER EXT control panel:

   a. NORMAL BRAKE knob — Rotate CW (LOAD) until NORMAL BRAKE pressure gauge indicates 450 ±50 psi.

   b. EMERGENCY BRAKE RELEASE handle — Pull down, move left and hold. Observe A1A6 LONG WIRE EMERGENCY BRAKE ON indicator is off.

   c. EMERGENCY BRAKE RELEASE handle — Release and stow while observing A1A6 LONG WIRE EMERGENCY BRAKE ON indicator is on.

   d. NORMAL BRAKE knob — Rotate CCW (VENT) and observe NORMAL BRAKE pressure gauge decreases to zero psi.

24.6.5.6 LTWA Ground Denesting/Nesting

CAUTION

- On initial missions from the main operating base, standby alert launches, COMNAV trainers, and postflight after in-flight antenna operation, the ground denesting/nesting procedures shall be accomplished.
- Do not perform ground denesting during inclement weather (rain, fog, etc.).
- Do not *dry fire* the drogue release.

Note

- A minimum of four personnel, as listed below, should be utilized to perform the LTWA denesting/nesting procedures.
- Reel operator stationed at operator panel on the ICS.
- Observer on the ICS stationed outside with a view of the denesting operation.
- Two people to provide 125 ± 25 pounds of tension on drogue with cargo strap.

1. LTWA ground denesting:

   a. Drogue — Attach a cargo strap to the drogue lift ring.

WARNING

- Ground personnel shall not wrap cargo strap around any part of their person.
- Observer shall notify reel operator of any possible mishap while denesting.
- Reel operator shall immediately apply emergency brake if any malfunction occurs.
- Ground personnel shall stand to one side as drogue is released, while maintaining drogue tension.

   b. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select OFF and observe the following:

      (1) A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — Off.

Note

If not off, push PRESS FOR RESET switch.

      (2) A1A11 NORMAL BRAKE pressure gauge — Increases to 450 ±50 psi.

   c. A1A7 VELOCITY knob — Set to 5.

   d. A1A8 LONG WIRE LENGTH control panel:

      (1) BRAKE MODE switch — Press and observe BRAKE MODE indicator is on.

      (2) AUTOMATIC/MANUAL switch — Select MANUAL.

      (3) LENGTH COMMAND switches — Set as desired.

      (4) EXTEND switch — Press and observe EXTEND indicator is on.

      (5) Notify observer and ground personnel to standby for drogue release.

(6) DROGUE RELEASE switch — Press and hold while observing the following:

(a) DROGUE IN indicator — Off.

(b) DROGUE OUT indicator — On.

(c) A1A7 VELOCITY meter — Moves off zero in EXT direction.

(7) DROGUE RELEASE switch — Release.

(8) LENGTH FEET display — Indicates selected length, press STOP switch and observe the following:

CAUTION

After antenna wire stops, ground personnel shall maintain positive tension on the antenna wire while setting the drogue on the deck with nose up. This will prevent twisting and kinking of antenna wire.

(a) EXTEND indicator — Off.

(b) STOP Indicator — On.

(c) A1A11 NORMAL BRAKE pressure gauge — Increases to 450 ±50 psi.

e. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select ON and observe the following:

(1) A1A6 EMERGENCY BRAKE ON indicator — On.

(2) A1A8 BRAKE mode indicator — Off.

(3) A1A11 NORMAL BRAKE pressure gauge — Decreases to zero psi.

f. When ground personnel releases tension on drogue, observe the following:

(1) A1A8 DROGUE LOST indicator — On.

(2) A1A7 TENSION meter — zero pounds.

g. A1A15 LONG WIRE RESERVE FEET indicator — Should indicate less than the logged length.

h. Drogue — Check for proper operation condition of all components.

i. Antenna wire — Inspect for damage, fray and kinks.

j. Inner and outer nest — Check for dama cracks, and overall security.

k. Manual drogue nest release linkages Check for proper movement.

l. Check remaining nest components for se rity, damage, and overall general conditior

WARNING

If the drogue nest is extended, verify bay interlock switch is deactivated and pinned.

2. LTWA ground nesting:

a. Notify ground personnel to standby for tract operation and place 125 ±25 pound tension on antenna wire.

WARNING

- Ground personnel shall not wrap cargo strap around any part of their person.
- Observer shall notify reel operator of any possible mishap while nesting.
- Reel operator shall immediately apply emergency brake if any malfunction occurs.
- Do not stand directly behind drogue when drogue enters the nest.

CAUTION

Before moving antenna wire, check that antenna wire is not kinked, twisted, or caught on any object.

b. A1A7 TENSION meter — Observe 125 pounds tension.

c. A1A7 VELOCITY knob — Set to MIN.

d. A1A8 LONG WIRE LENGTH control panel:

(1) *LENGTH COMMAND* switches — Set to 00000.

(2) DROGUE LOST/PRESS FOR OVERRIDE switch — Push and observe DROGUE LOST indicator is off.

e. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select OFF and observe the following:

(1) A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — Off.

Note

If not off, push PRESS FOR RESET switch.

(2) A1A11 NORMAL BRAKE pressure gauge — Increases to 450 ±50 psi.

f. A1A7 VEL X 0.1 switch — Press and hold.

g. A1A8 LONG WIRE LENGTH control panel:

(1) HYDRAULIC MODE switch — Press and observe HYDRAULIC MODE indicator is on.

(2) RETRACT switch — Press and observe the following:

CAUTION

Reel operator shall guard the LONG WIRE EMERGENCY BRAKE switch and immediately apply emergency brake if any malfunction occurs during nesting.

(a) A1A7 VELOCITY meter — Moves off zero in RETR direction.

(b) A1A9 DRIVE HIGH PRESSURE gauge — Increases.

(c) LENGTH FEET display — Decreases toward zero.

(3) After drogue engages the nest, observe the following:

CAUTION

If tension increases rapidly past 600 pounds, immediately apply emergency brake.

(a) DROGUE IN indicator — On.

(b) DROGUE OUT indicator — Off.

(c) LENGTH FEET display — Zero.

(d) STOP indicator — On.

(e) RETRACT indicator — Off.

(f) A1A7 TENSION meter — 75 pounds minimum.

(g) A1A11 NORMAL BRAKE pressure gauge — 450 ±50 psi.

(h) A1A9 DRIVE HIGH PRESSURE gauge — Drops to 185 ±35 psi.

h. A1A7 VEL X 0.1 switch — Release.

i. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select ON and observe the following:

(1) A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — On.

(2) A1A8 HYDRAULIC MODE indicator — Off.

(3) A1A11 NORMAL BRAKE pressure gauge — Decreases to zero psi.

j. A1A15 LONG WIRE RESERVE FEET indicator — Observe recorded length.

k. Drogue — Detach cargo strap from drogue lift ring.

24.6.5.7 LTWA Power Off

1. A1A9 FLUID SYSTEMS control panel:

   a. ELECT/HYDR DRIVE OFF switch — Press and observe the following:

      (1) ELECT/HYDR DRIVE ON indicator — Off.

      (2) ELECT/HYDR DRIVE OFF indicator — On.

      (3) DRIVE LOW PRESSURE gauge — 70 ±10 psi.

      (4) CHG PUMP indicator — Off.

      (5) BLOWER indicator — Off.

2. A1A10 SUPPLY ON/SUPPLY OFF switch — Press and observe the following:

CAUTION

After the ELECT/HYDR DRIVE system has been secured, wait 15 seconds before securing the circulating pump to prevent the main drive pump from cavitating.

   a. SUPPLY ON indicator — Off.

   b. SUPPLY OFF indicator — On.

   c. LOW PRESSURE indicator — Off.

   d. NORMAL PRESSURE indicator — Off.

   e. HOT indicator — Off.

   f. A1A9 FLUID SYSTEMS control panel:

      (1) CRCLT PUMP indicator — Off.

      (2) DRIVE HIGH PRESSURE gauge — zero psi.

      (3) DRIVE LOW PRESSURE gauge — zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing hydraulic or brake modes of operation.

   g. A2A1 Hydraulic panel:

      (1) M2 gauge — 650 ±50 psi.

      (2) M4 gauge — 1,200 ±50 psi.

Note

Accumulator 4 (indicated on M4) should hold 1,200 ⁄50 psi system pressure for the entire mission flight. If pressure is less than 950 psi, emergency extend mode may be unavailable for operation.

24.6.5.8 LTWA Drogue Nest Retract

1. Drogue nest interlock switch — Activated pinned.

2. P108 VLF/LF DROGUE NEST CONTR panel:

   a. ARM/NEST IN switch — Press and obs the following:

WARNING

Clear area before retracting drogue nest.

      (1) ARM indicator — On.

      (2) NEST IN indicator — Off.

   b. RETRACT/OFF/EXTEND switch — Se and hold in RETRACT while observing following:

CAUTION

Do not extend/retract LTWA drogue nest unless drogue is latched and fully nested (On A1A8 LONG WIRE LENGTH control panel DROGUE IN indicator is on and DROGUE LOST indicator is off).

      (1) NEST OUT indicator — Off.

(2) IN TRANSIT indicator — On until nest is fully retracted, then will extinguish.

(3) NEST IN indicator — On after IN TRANSIT indicator extinguishes.

Note

Flight deck DROGUE BAY indicator will also extinguish.

c. ARM/NEST IN switch — Press and observe the following:

(1) ARM indicator — Off.

(2) NEST IN indicator — Off.

24.6.6 Short Trailing Wire Antenna Preflight Checks

24.6.6.1 STWA Power On

1. Aircraft auxiliary hydraulic system — Verify on.

2. P111 PWR control panel STWA HYDR PWR switch — Select ON and observe the following:

a. A1A10 SHORT WIRE HYDR indicators:

(1) LOW PRESSURE indicator — Off.

(2) NORMAL PRESSURE indicator — On.

(3) HOT indicator — Off.

b. A4 Hydraulic panel:

(1) M1 and M3 gauges — 3,000 ±200 psi.

(2) M2 gauge — 250 ±15 psi.

c. A4A6 SHORT WIRE EMER EXT control panel NORMAL BRAKE PRESSURE gauge — 15 psi or less.

24.6.6.2 STWA Mode Checks

1. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select OFF and observe SHORT WIRE EMERGENCY BRAKE ON indicator is off.

Note

If not off, push PRESS FOR RESET switch.

2. A1A3 SHORT WIRE LENGTH control panel:

a. AUTOMATIC/MANUAL switch — Select MANUAL.

b. EXTEND switch — Press and observe the following:

CAUTION

Do not press DROGUE RELEASE switch.

(1) EXTEND indicator — On.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

c. RETRACT Switch — Press and observe the following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — On.

d. STOP switch — Press and observe the following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

e. AUTOMATIC/MANUAL switch — Select AUTOMATIC.

f. EXTEND switch — Press and observe the following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

Note

Extend mode will not be accepted by A1 card cage because LENGTH COMMAND switches and LENGTH FEET display are equal.

g. LENGTH COMMAND switches — Set to 1000.

h. EXTEND switch — Press and observe the following:

CAUTION

Do not press DROGUE RELEASE switch.

(1) EXTEND indicator — On.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

i. RETRACT switch — Press and observe the following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — On.

(4) DIRECTION ERROR indicator — On.

j. STOP switch — Press and observe the following:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

(4) DIRECTION ERROR indicator — Off.

k. LENGTH COMMAND switches — Set to 0000.

3. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select ON and observe SHORT WIRE EMERGENCY BRAKE ON indicator is on.

24.6.6.3 STWA Emergency Extend Mode Checks

1. A4A6 SHORT WIRE EMER EXT Control Panel:

a. NORMAL BRAKE knob — Rotate (Load) until NORMAL BRAKE PRESSU gauge indicates 213 psi (maximum 275 ps

b. EMERGENCY BRAKE RELEASE knob Rotate CW (RELEASE) and hold.

2. Auxiliary control console:

a. STWA manual drogue release T-handle Pull and hold while observing the followir

(1) A1A3 DROGUE IN indicator — Off.

(2) A1A3 DROGUE OUT indicator — O

(3) A1A1 SHORT WIRE EMERGEN BRAKE ON indicator — Off.

b. STWA Manual Drogue Release T-handle Stow and observe the following:

(1) A1A3 DROGUE IN indicator — On.

(2) A1A3 DROGUE OUT indicator — O

Note

When the drogue engages the nest, a 3 to 5 second delay occurs prior to DROGUE IN indicator illuminating.

(3) A1A1 SHORT WIRE EMERGEN BRAKE ON indicator — On.

3. A4A6 SHORT WIRE EMER EXT con panel:

a. EMERGENCY BRAKE RELEASE knob Rotate CCW to LOCK (DETENT).

b. NORMAL BRAKE knob — Rotate f CCW (VENT) and observe NORM BRAKE PRESSURE gauge decreases to psi or less.

24.6.6.4 STWA Ground Denesting/Nesting

WARNING

Prior to STWA ground denesting, ensure shorting stick is used to ground antenna.

CAUTION

- On initial missions from the main operating base, standby alert launches, COMNAV trainers, and postflight after in-flight antenna operation, the ground denesting/ nesting procedures shall be accomplished.
- Do not perform ground denesting during inclement weather (rain, fog, etc.).
- Do not *dry fire* the drogue release.

Note

- A minimum of three personnel as listed below, should be utilized to perform the STWA denesting/nesting procedures.
- Reel operator stationed at operator panel on the ICS.
- Observer stationed outside with a view of the denesting operation on the ICS.
- One person to provide 75 ±25 pounds of tension on drogue with a cargo strap.

1. STWA ground denesting:

   a. Drogue — Attach a cargo strap to drogue lift ring.

WARNING

- A B-1 stand or equivalent shall be utilized while attaching the cargo strap to the drogue lift ring.
- Ground personnel shall not wrap cargo strap around any part of their person.
- Observer shall notify reel operator of any possible mishaps while denesting.
- Reel operator shall immediately apply emergency brake if any malfunction occurs.

   b. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select OFF and observe SHORT WIRE EMERGENCY BRAKE ON indicator is off.

Note

If not off, push PRESS FOR RESET switch.

   c. A1A2 VELOCITY knob — Set to MAX.

   d. A1A3 SHORT WIRE LENGTH control panel:

      (1) AUTOMATIC/MANUAL switch — Select MANUAL.

      (2) LENGTH COMMAND switches — Set as desired.

      (3) EXTEND switch — Press and observe EXTEND indicator is on.

      (4) Notify observer and ground personnel to standby for drogue release.

      (5) DROGUE RELEASE switch — Press and hold while observing the following:

         (a) DROGUE IN indicator — Off.

         (b) DROGUE OUT indicator — On.

         (c) A1A2 VELOCITY meter — Moves off zero in EXT direction.

      (6) DROGUE RELEASE switch — Release.

      (7) LENGTH FEET display — Indicates selected length, press STOP switch and observe the following:

CAUTION

After antenna wire stops, ground personnel shall maintain positive tension on the antenna wire while setting the drogue on the deck with nose up. This will prevent twisting and kinking of antenna wire.

         (a) EXTEND indicator — Off.

         (b) STOP indicator — On.

         (c) RETRACT indicator — Off.

   e. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select ON and observe

SHORT WIRE EMERGENCY BRAKE ON indicator is on.

f. When ground personnel releases tension on drogue, observe the following:

(1) A1A3 DROGUE LOST indicator — On.

(2) A1A2 TENSION meter — Zero pounds.

g. A1A15 SHORT WIRE RESERVE FEET indicator — Should indicate less than the logged length.

h. Drogue — Check for proper operation and condition of all components.

i. Antenna wire — Inspect for damage, fraying, and kinks.

j. Inner and outer nest — Check for damage, cracks, and overall security.

2. STWA ground nesting:

a. Notify ground personnel to standby for retract operation and place 75 ±25 pounds of tension on antenna wire.

WARNING

- Ground personnel shall not wrap cargo strap around any part of their person.
- Observer shall notify reel operator of any possible mishap while denesting.
- Reel operator shall immediately apply emergency brake if any malfunction occurs.

CAUTION

Before moving antenna wire, check that antenna wire is not kinked, twisted, or caught on any object.

b. A1A2 TENSION meter — Observe 75 ±25 pounds tension.

c. A1A2 VELOCITY knob — Set to position four or below.

d. A1A3 SHORT WIRE LENGTH co panel:

(1) LENGTH COMMAND switches — to 0000.

(2) DROGUE LOST/PRESS FOR OV RIDE switch — Push and obs DROGUE LOST indicator is off.

e. A1A1 SHORT WIRE EMERGEI BRAKE switch — Select OFF and obs SHORT WIRE EMERGENCY BRAKE indicator is off.

Note

If not off, push PRESS FOR RESET switch.

f. A1A3 SHORT WIRE LENGTH co panel:

(1) RETRACT switch — Press and obs the following:

CAUTION

Reel operator shall guard SHORT WIRE EMERGENCY BRAKE switch and immediately apply emergency brake if any malfunction occurs during nesting.

(a) A1A2 VELOCITY meter — M off zero in RETR direction.

(b) LENGTH FEET display — Dec es towards zero.

(2) After drogue engages the nest, obs the following:

CAUTION

If tension increases rapidly past 350 pounds, immediately apply emergency brake.

(a) DROGUE IN indicator — On.

(b) DROGUE OUT indicator — Off.

Note

When the drogue engages the nest, a 3- to 5-second delay occurs prior to DROGUE IN indicator illuminating.

(c) LENGTH FEET display — Zero.

(d) EXTEND indicator — Off.

(e) STOP indicator — On.

(f) RETRACT indicator — Off.

(g) A1A2 TENSION meter — 35 pounds minimum.

g. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select ON and observe SHORT WIRE EMERGENCY BRAKE ON indicator is on.

h. A1A15 SHORT WIRE RESERVE FEET indicator — Observe recorded length.

i. Drogue — Detach cargo strap from drogue lift ring.

j. Shorting stick — Removed.

k. Access panels — Check for proper security.

24.6.6.5 STWA Power Off

1. P111 PWR control panel STWA HYDR PWR switch — Select OFF and observe the following:

   a. A1A10 SHORT WIRE HYDR indicators:

      (1) LOW PRESSURE indicator — On.

      (2) NORMAL PRESSURE indicator — Off.

      (3) HOT indicator — Off.

   b. A4 hydraulic panel:

      (1) M1 gauge — Zero psi.

      (2) M2 gauge — 150 ±15 psi.

      (3) M3 gauge — 3,000 ±200 psi.

Note

Accumulator 2 (indicated on M3) should hold 3,000 ±200 psi system pressure for the entire mission flight.

   c. A4A6 SHORT WIRE EMER EXT control panel NORMAL BRAKE PRESSURE gauge — 47 ±5 psi.

2. Notify the flight deck that aircraft auxiliary hydraulic system is no longer needed for STWA operation.

24.6.7 Antenna Group Power Off

1. A2A4 400 HZ POWER DISTRIBUTION panel:

   a. S1 — Press and observe OFF light illuminates and ON light extinguishes.

   b. CB1 — OFF.

   c. CB2 — OFF.

   d. CB3 — OFF.

2. A1A4 +28 VDC POWER control panel:

   a. 28 VDC switch — Off.

   b. LIGHTS switch — Off.

24.6.8 Liquid Cooling System Secure

1. P104 LIQUID COOLING SYSTEM control panel:

   a. PUMPS 2 switch — Press and observe the following:

CAUTION

Do not shut down LCS until 5 minutes after PA-coupler operation and LTWA hydraulic system has been shut down to allow for system cool down.

      (1) PUMPS 2 ON indicator — Off.

      (2) SUPPLY pressure gauge — 20 ±10 psi (return pressure).

      (3) LOW FLOW indicator — On.

b. COOLER VALVES 1 and 4 OPEN Indicators — On.

Note

Valves will be left open to allow entire system to equalize at coolant return pressure.

2. Notify flight deck that fuel boost pump operation is not required to support LCS operation.

24.6.9 Oxygen/ICS Preflight. Perform oxygen, ICS preflight listed in A1-E6AAA-NFM-000, Chapter 7, paragraph 7.5.3.1. This step may be completed before this checklist, if desired.

24.7 REEL SYSTEMS OPERATION

Procedures are listed in the sequence in which they are normally performed. Reel systems operation procedures shall be performed during the extension and retraction of antenna wires during flight operations.

WARNING

All personnel in aft compartment during STWA or LTWA retraction or during VLF PA operation exceeding PEL (see Figure 3-7, A1-E6AAA-NFM-000) shall wear hearing protection.

CAUTION

The manual mode of operation shall be used to operate any antenna with known or suspected malfunctions.

24.7.1 Liquid Cooling System Activation

CAUTION

LCS will be activated whenever LTWA hydraulic system is to be operated over 5 minutes or VLF PA coupler is to be operated.

1. COOLER VALVES 1 and 4 FUEL OFF indicators — Off.

Note

If illuminated, coordinate LCS activation with flight engineer.

2. P104 LIQUID COOLING SYSTEM co panel:

a. FUEL 1 AND 4 TEMP switch — V temperature on TEMP gauge.

CAUTION

Maximum allowable fuel temperature for heat exchanger operation is 120 °F (49 °C) decreasing with altitude (see A1-E6AAA-NFM-000).

b. RETURN pressure gauge — 20 ±10 psi.

c. LOW PRESS indicator — Off.

d. LOW FLOW indicator — On.

e. EGW HOT indicator — Off.

f. COOLER VALVES 1 and 4 OPEN in tors — On.

g. PUMPS 1 or 2 switch — Press and obs the following:

CAUTION

- Use of both pumps simultaneously may cause pump cavitation and overheat.
- If pump ELCU trips, only one attempt to reset the ELCU is permitted unless the cause of the tripping has been determined and corrected.

(1) Selected PUMPS ON indicator — On

(2) SUPPLY pressure gauge — 160 ±40

(3) LOW FLOW indicator — Off.

(4) COOLANT SUPPLY TEMP switcl Verify temperature on TEMP gauge.

CAUTION

- Coolant supply temperature must remain below 130 °F to prevent LCS equipment overheat.
- If EGW HOT indicator comes on during operation, shut off pump.

Note

Normal operating temperature will be between 59 and 90 °F, after LCS has warmed up.

24.7.2 Antenna Group Initialization

24.7.2.1 Antenna Group Power On

1. A1A4 +28 VDC POWER control panel:
   a. CB1, CB2, CB3, and CB4 — Closed.

CAUTION

Removal of A1 console lower kick panel will cause insufficient air cooling from A1 console cooling fan to cool A1PS1 and A1PS2 power supplies.

   b. 28 VDC switch — On.
   c. LIGHTS switch — On.
2. A2A4 400 HZ POWER DISTRIBUTION panel:
   a. S1 — Press and observe ON light illuminates and OFF light extinguishes.
   b. CB1 — On.
   c. CB2 — On.

Note

CB2 will energize the A1 console cooling fan.

   d. CB3 — On.
   e. Verify all six fuse lights are off.
3. LTWA/STWA switches, switch/indicators, and controls — Check for the following:
   a. A1A1 SHORT WIRE and A1A6 LONG WIRE EMERGENCY control panels:
      (1) EMERGENCY BRAKE switches — On.
      (2) EMERGENCY BRAKE ON indicators — On.
   b. A1A2 SHORT WIRE VELOCITY control panels:
      (1) PA/OFF/ON ANT/ON TEST indicators:
         (a) PA indicator — On.
         (b) OFF indicator — On.
         (c) ON ANT indicator — Off.
         (d) ON TEST indicator — Off.
      (2) PANELS OPEN indicator — Off.
      (3) ANTENNA GROUNDED indicator — On.
      (4) ANTENNA ACCESS switch — ON and guarded.
      (5) TENSION Meter — 35 pounds minimum.
      (6) VELOCITY meter — Zero fpm.
   c. A1A7 LONG WIRE VELOCITY control panel:
      (1) PANELS OPEN indicator — Off.
      (2) TENSION meter — 75 pounds minimum.
      (3) VELOCITY meter — Zero fpm.
   d. A1A3 SHORT WIRE and A1A8 LONG WIRE LENGTH control panels:
      (1) DROGUE IN indicators — On.
      (2) DROGUE OUT indicators — Off.
      (3) OVERSPEED indicators — Off.

Note

If OVERSPEED indicator is on, push PRESS FOR RESET switch on A1A1 or A1A6 EMERGENCY control panel.

(4) OVERLENGTH indicators — Off.

(5) GRD PWR indicators — Off.

(6) DIRECTION ERROR indicators — Off.

(7) LENGTH FEET displays — Zero.

(8) DROGUE LOST indicators — Off.

Note

If DROGUE LOST indicator is on, check that the TENSION meters are more than 35 pounds (SHORT WIRE) or 75 pounds (LONG WIRE). If tensions are correct, push PRESS FOR OVERRIDE switch and DROGUE LOST indicator should extinguish.

(9) PRESS FOR OVERRIDE indicator — Off.

(10) DROGUE RELEASE indicators — Off.

(11) EXTEND indicators — Off.

(12) STOP indicators — On.

Note

If off, press STOP switch.

(13) RETRACT indicators — Off.

(14) HYDRAULIC MODE indicator (A1A8 only) — Off.

(15) BRAKE MODE indicator (A1A8 only) — Off.

e. A1A9 FLUID SYSTEMS control panel:

(1) DRIVE HYDR indicators:

(a) CRCLT PUMP indicator — Off.

(b) CHG PUMP indicator — Off.

(c) BLOWER indicator — Off.

(d) HYDR HOT indicator — Off.

(e) MTR HOT indicator — Off.

(f) OVERPRESSURE indicator — C

(2) DRIVE HIGH PRESSURE meter Zero psi.

(3) DRIVE LOW PRESSURE meter — psi.

(4) ELECT/HYDR DRIVE OFF indicato On.

Note

If off, press ELECT/HYDR DRIVE OFF switch.

(5) ELECT/HYDR DRIVE ON indicato Off.

(6) WATER indicator:

(a) PUMP ON indicator — Off.

(b) HOT indicator — Off.

(7) ANTENNA indicators:

(a) LEVEL/ORBIT switch — S intended flight mode to be used mission.

(b) PRESS FOR COMPUTER LEN COMMANDS switch — Push hold while performing the followi

1) A1A8 LENGTH FEET displa Indicates computed LTWA le Set LENGTH COMMA switches equal to LENGTH F display.

2) A1A3 LENGTH FEET displa Indicates computed STWA le Set LENGTH COMMA switches equal to LENGTH F display.

Note

If a frequency has not been inserted into the PA, LENGTH FEET display will indicate zero.

(c) PRESS FOR COMPUTER LENGTH COMMAND switch — Release and A1A3 and A1A8 LENGTH FEET indicators should return to zero.

f. A1A10 ELECTRICAL SYSTEMS control panel:

(1) PRIME POWER indicator:

(a) PHASE SEQUENCE

1) SUPPLY 1 indicator — On.

2) SUPPLY 2 indicator — On.

(b) AC VOLTS/AMPS selector — Position and observe AC VOLTS/AMPS meter for the following:

1) OFF — Zero.

2) VA, VB, VC positions indicate 115 ±5 VAC for each respective phase.

3) IA — Zero amps, leave selector in IA.

(2) ANTENNA SYSTEM SUPPLIES indicators:

(a) +28 VDC Indicators

1) AIRCRAFT indicator — On.

2) BATTERY indicator — On.

3) INTERNAL indicator — On.

(b) SHORT WIRE HYDR indicators:

1) LOW PRESSURE indicator — On.

2) NORMAL PRESSURE indicator — Off.

3) HOT indicator — Off.

(c) LONG WIRE AUX HYDR indicators:

1) SUPPLY ON/SUPPLY OFF switch:

a) SUPPLY OFF indicator — On.

b) SUPPLY ON indicator — Off.

2) LOW PRESSURE indicator — Off.

3) NORMAL PRESSURE indicator — Off.

4) HOT indicator — Off.

g. A1A11 LONG WIRE EMER EXT control panel:

(1) EMERGENCY BRAKE RELEASE handle — Up and stowed.

(2) NORMAL BRAKE knob — Rotate CCW until fully vented.

(3) NORMAL BRAKE Pressure gauge — Zero psi.

h. A4A6 SHORT WIRE EMER EXT control panel:

(1) EMERGENCY BRAKE RELEASE knob — LOCK (fully CCW).

(2) NORMAL BRAKE knob — Rotate CCW until fully vented.

(3) NORMAL BRAKE PRESSURE gauge — 47 ±5 psi.

Note

- Only the following red indicators should be illuminated at this time:
- A1A1 SHORT WIRE EMERGENCY BRAKE ON indicator.
- A1A6 LONG WIRE EMERGENCY BRAKE ON indicator.
- A1A10 SHORT WIRE HYDR LOW PRESSURE indicator.

24.7.2.2 LTWA Drogue Nest Extend

1. P108 VLF/LF DROGUE NEST CONTROL panel:

a. ARM/NEST IN switch — Press and observe the following:

(1) ARM indicator — On.

(2) NEST IN indicator — On.

b. RETRACT/OFF/EXTEND switch — Select and hold in EXTEND while observing the following:

CAUTION

Do not extend/retract LTWA drogue nest unless drogue is latched and fully nested (On A1A8 LONG WIRE LENGTH control panel DROGUE IN indicator is on and DROGUE LOST indicator is off).

(1) NEST IN indicator — Off.

(2) IN TRANSIT indicator — On until nest is fully extended, then will extinguish.

(3) NEST OUT indicator — On after IN TRANSIT indicator extinguishes.

Note

Flight deck DROGUE BAY indicator will also illuminate.

c. ARM/NEST IN switch — Press and observe the following:

(1) ARM indicator — Off.

(2) NEST OUT indicator — On.

Note

Normal aircraft speed limits apply with drogue nested and drogue doors open.

24.7.2.3 STWA Power On

1. P111 PWR control panel STWA HYDR PWR switch — Select ON and observe the following:

a. A1A10 SHORT WIRE HYDR

(1) LOW PRESSURE indicator — Off.

(2) NORMAL PRESSURE indicator —

(3) HOT indicator — Off:

b. A4 hydraulic panel:

(1) M1 and M3 gauges — 3,000 ±200 p

(2) M2 gauge — 250 ±15 psi.

c. A4A6 SHORT WIRE EMER EXT c panel NORMAL BRAKE PRESSURE — 15 psi or less.

24.7.2.4 LTWA Power On

1. A1A10 SUPPLY ON/SUPPLY OFF swit Press and observe the following:

a. SUPPLY ON indicator — On.

b. SUPPLY OFF indicator — Off.

c. LOW PRESSURE indicator — Off.

Note

LOW PRESSURE indicator will initially illuminate then extinguish after auxiliary hydraulic pressure exceeds 950 psi.

d. NORMAL PRESSURE indicator — On.

e. HOT indicator — Off.

f. A1A9 FLUID SYSTEMS control panel:

(1) CRCLT PUMP indicator — On.

(2) DRIVE LOW PRESSURE meter — ±10 psi (circulating pump pressure).

g. A2A1 hydraulic panel:

(1) M2 gauge — 1,200 ±50 psi.

(2) M4 gauge — 1,200 ±50 psi.

24.7.3 Dual Trailing Wire Antenna Normal Extend Operation

24.7.3.1 LTWA Brake Extend Mode Set Up

1. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select OFF and observe the following:

Note

When changing drive modes, it is recommended that this be done by cycling the emergency brakes ON then OFF again. This action ensures clutch engagement and disengagement.

a. A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — Off.

Note

If not off, push PRESS FOR RESET switch.

b. A1A11 NORMAL BRAKE pressure gauge — Increases to 450 ±50 psi.

2. A1A7 VELOCITY knob — As desired.

Note

To ensure controllable velocity, reel operator may desire to place VELOCITY knob to position five vice MAX prior to deploying antenna wire. Once predicted velocity is established, rotate VELOCITY knob to MAX while monitoring VELOCITY meter to ensure selected mode velocity is not exceeded.

3. A1A8 LONG WIRE LENGTH control panel:

a. AUTOMATIC/MANUAL switch — Select AUTOMATIC or MANUAL.

(1) Brake automatic extend mode selected — Antenna will automatically stop when actual length reaches commanded length. A1A7 VELOCITY knob set to MAX, velocity will reach 4,600 fpm within the first 1,100 feet of antenna wire deployment, then gradually increase towards a maximum velocity of 6,000 fpm.

(2) Brake manual extend mode selected — Antenna will not automatically stop when actual length reaches desired length. This mode requires reel operator intervention prior to reaching desired length. A1A7 VELOCITY knob set to MAX, velocity will reach and maintain a maximum of 4,600 fpm within first 1,100 feet of antenna wire deployment.

b. BRAKE MODE switch — Press and observe the following:

(1) A1A9 WATER PUMP ON indicator — On.

(2) A1A9 WATER HOT indicator — Off.

(3) A1A8 BRAKE MODE indicator — On.

Note

If normal brake water cooling system is inoperative, BRAKE MODE indicator will not enable.

c. EXTEND switch — Press and observe the following:

(1) EXTEND indicator — On.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

24.7.3.2 STWA Extend Mode Set Up

1. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select OFF and observe SHORT WIRE EMERGENCY BRAKE ON indicator is off.

Note

If not off, push PRESS FOR RESET switch.

2. A1A2 VELOCITY knob — As desired.

CAUTION

If STWA is to be operated with less than a full spool of wire (4,550 reserve feet), set VELOCITY knob at a setting less than MAX. This will prevent a STWA overspeed.

Note

To ensure controllable velocity, reel operator may desire to place VELOCITY knob to position five vice MAX prior to deploying antenna wire. Once predicted velocity is established, rotate VELOCITY knob to MAX while monitoring VELOCITY meter to ensure selected mode velocity is not exceeded.

3. A1A3 SHORT WIRE LENGTH control panel:

   a. AUTOMATIC/MANUAL switch — Select AUTOMATIC or MANUAL.

      (1) Automatic Extend mode selected — Antenna will automatically stop when actual length reaches commanded length. A1A2 VELOCITY knob set to MAX, velocity will reach a maximum of 1,200 fpm within the first 100 feet of antenna wire deployment, then gradually decrease towards 600 fpm.

Note

A decrease of velocity will prevent a STWA motor overspeed from occurring.

      (2) Manual Extend Mode selected — Antenna will not automatically stop when actual length reaches desired length. This mode requires reel operator intervention prior to reaching desired length. A1A2 VELOCITY knob set to MAX, velocity will reach and maintain a maximum of 600 fpm within first 100 feet of antenna wire deployment.

   b. EXTEND switch — Press and observe the following:

      (1) EXTEND indicator — On.

      (2) STOP indicator — On.

      (3) RETRACT indicator — Off.

24.7.3.3 STWA Drogue Release

1. A1A2 VELOCITY knob — As desired.

2. A1A3 SHORT WIRE LENGTH control panel:

   a. DROGUE RELEASE switch — Press a hold while observing the following:

CAUTION

- Do not release LTWA/STWA drogues simultaneously.
- Holding DROGUE RELEASE switch for more than five seconds will cause the drogue release solenoid to overload through A1A14 switching unit, causing both LTWA/STWA emergency brakes to apply.

      (1) DROGUE IN indicator — Off.

      (2) DROGUE OUT indicator — On.

      (3) LENGTH FEET display — Increases.

      (4) A1A2 VELOCITY meter — Moves zero in EXT direction.

Note

Do not release DROGUE RELEASE switch until an indication of length and velocity is observed.

   b. DROGUE RELEASE switch — Release.

3. STWA deployment — Observe the following:

CAUTION

Reel operator shall monitor reel spool if antenna wire is being stretched or the amount of antenna wire is in doubt.

   a. A1A2 SHORT WIRE VELOCITY con panel:

      (1) TENSION meter — Tension will decr from nested tension then increase gra ally.

      (2) VELOCITY meter — 1200 fpm (A matic Extend mode) or 600 fpm (Ma Extend mode).

   b. A1A3 LENGTH FEET display — Increa

c. A1A15 SHORT WIRE RESERVE FEET indicator — Decreases.

24.7.3.4 LTWA Drogue Release

1. A1A7 VELOCITY knob — As desired.
2. A1A8 LONG WIRE LENGTH control panel:
   a. DROGUE RELEASE switch — Press and hold while observing the following:

CAUTION

Do not release LTWA/STWA drogues simultaneously.

(1) DROGUE IN indicator — Off.

(2) DROGUE OUT indicator — On.

(3) LENGTH FEET display — Increases.

(4) A1A7 VELOCITY meter — Moves off zero in EXT direction

Note

Do not release DROGUE RELEASE switch until an indication of length and velocity is observed.

   b. DROGUE RELEASE switch — Release.
3. *LTWA deployment — Observe the following:*

CAUTION

Reel operator shall monitor reel spool if antenna wire is being stretched or the amount of antenna wire is in doubt.

   a. A1A7 LONG WIRE VELOCITY control panel:

(1) TENSION meter — Tension will decrease from nested tension then increase gradually.

(2) VELOCITY meter — 6,000 fpm (Brake Automatic Extend mode) or 4,600 fpm (Brake Manual Extend mode).

   b. A1A11 NORMAL BRAKE PRESSURE gauge — Decreases to zero within first 1,100 feet of antenna wire deployment, then gradually increases.

   c. A1A8 LENGTH FEET display — Increases.

   d. A1A15 LONG WIRE RESERVE FEET indicator — Decreases.

   e. LTWA reel spool/fleet angle compensator — Observe for smooth operation.

24.7.3.5 STWA Deployment Termination

1. Automatic Extend Mode selected:
   a. Antenna wire slewdown — Observe the following:

(1) A1A2 VELOCITY meter — Decreases rapidly.

(2) A1A3 LENGTH FEET display — Approaches commanded length.

Note

At approximately 128 feet from commanded length, depending on velocity, antenna will commence slewdown. Antenna will automatically stop at commanded length. If wire does not slewdown when LENGTH FEET is 20 feet from commanded length, reel operator should select STOP.

   b. Antenna wire stops — Observe the following:

(1) A1A3 SHORT WIRE LENGTH control panel:

(a) LENGTH FEET display and LENGTH COMMAND indicators — Equal ±15 feet.

(b) EXTEND indicator — Off.

(c) STOP indicator — On.

(d) RETRACT indicator — Off.

(2) A1A2 SHORT WIRE VELOCITY control panel:

(a) VELOCITY meter — zero fpm.

(b) TENSION meter — Stabilized.

c. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select ON and observe SHORT WIRE EMERGENCY BRAKE ON indicator is on.

2. Manual Extend mode selected:

a. Antenna wire — At 500 feet from desired length, slow velocity to 500 fpm. Continue to match velocity with remaining length (400 fpm at 400 feet, 300 fpm at 300 feet, etc.). At 100 feet from desired length, ensure velocity is 100 fpm or less.

b. A1A3 LENGTH FEET display — Indicates selected length, press STOP switch and observe the following:

(1) A1A3 SHORT WIRE LENGTH control panel:

(a) LENGTH FEET display and LENGTH COMMAND indicators — Equal ±15 feet.

(b) EXTEND indicator — Off.

(c) STOP indicator — On.

(d) RETRACT indicator — Off.

(2) A1A2 SHORT WIRE VELOCITY control panel:

(a) VELOCITY meter — zero fpm.

(b) TENSION meter — Stabilized.

c. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select ON and observe SHORT WIRE EMERGENCY BRAKE ON indicator is on.

24.7.3.6 LTWA Deployment Termination

1. Brake Automatic Extend mode selected:

a. Antenna wire slewdown — Observe the following:

(1) A1A7 VELOCITY Meter — Decre rapidly.

(2) A1A8 LENGTH FEET display — proaches commanded length.

(3) A1A11 NORMAL BRAKE PRESSU gauge — Increases.

Note

At approximately 1,280 feet from commanded length, depending on velocity, antenna will commence slewdown. Antenna will automatically stop at commanded length. If wire does not slewdown when LENGTH FEET is 70 feet from commanded length, reel operator should select STOP.

b. Antenna wire stops — Observe the foll ing:

(1) A1A8 LONG WIRE LENGTH cor panel:

(a) LENGTH FEET display LENGTH COMMAND indicators Equal ±20 feet.

(b) EXTEND indicator — Off.

(c) STOP indicator — On.

(d) RETRACT indicator — Off.

(2) A1A7 LONG WIRE VELOCITY cor panel:

(a) VELOCITY meter — zero fpm.

(b) TENSION meter — Stabilized.

(3) A1A11 NORMAL BRAKE pres gauge — 450 ±50 psi.

c. A1A6 LONG WIRE EMERGEN BRAKE switch — Select ON and obs the following:

(1) A1A6 LONG WIRE EMERGEN BRAKE ON indicator — On.

(2) A1A8 BRAKE MODE indicator — O

(3) A1A11 NORMAL BRAKE pressure gauge — Decreases to zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing Hydraulic or Brake modes of operation.

2. Brake Manual Extend mode selected:

   a. Antenna wire — At 4,000 feet from desired length, slow velocity to 4000 fpm. Continue to match velocity with remaining length (3000 fpm at 3,000 feet, 2000 fpm at 2000 feet, etc.). At 100 feet from desired length, ensure velocity is 100 fpm or less.

   b. A1A8 LENGTH FEET display — Indicates selected length, press STOP switch and observe the following:

      (1) A1A8 LONG WIRE LENGTH control panel:

         (a) LENGTH FEET display and LENGTH COMMAND indicators — Equal ±20 feet.

         (b) EXTEND indicator — Off.

         (c) STOP indicator — On.

         (d) RETRACT indicator — Off.

      (2) A1A7 VELOCITY control panel:

         (a) VELOCITY meter — Zero fpm.

         (b) TENSION meter — Stabilized.

      (3) A1A11 NORMAL BRAKE pressure gauge — 450 ±50 psi.

   c. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select ON and observe the following:

      (1) A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — On.

      (2) A1A8 BRAKE Mode indicator — Off.

(3) A1A11 NORMAL BRAKE pressure gauge — Decreases to zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing Hydraulic or Brake modes of operation.

24.7.4 Dual Trailing Wire Antenna Alternate Extend Operation

24.7.4.1 LTWA Hydraulic Extend Mode Set Up

Note

Hydraulic Extend mode should be utilized as a backup when brake extend mode is inoperative.

1. A1A9 FLUID SYSTEMS control panel:

   a. ELECT/HYDR DRIVE ON switch — Press and observe the following:

CAUTION

- Do not start the LTWA 60 hp motor unless at least two aircraft generators are supplying power to the ME sync bus. The combined preload for the two generators shall not exceed 100 amps.
- Verify LTWA 60 hp motor blower intakes are clear of obstructions.

      (1) ELECT/HYDR DRIVE OFF indicator — Off.

      (2) CHG PUMP indicator — On.

      (3) BLOWER indicator — On.

      (4) ELECT/HYDR DRIVE ON indicator — On (yellow).

      (5) A1A10 AC VOLTS/AMPS selector — Position to IA, IB, and IC while monitoring AC VOLTS/AMPS meter for approximately 300 amps.

Note

- The ELECT/HYDR DRIVE ON indicator should illuminate yellow after the charge pump and blower have started. The indicator will turn green approximately 4 seconds after it illuminates yellow. Current shall be monitored during the 60 hp motor start. The AC VOLTS/AMPS meter will indicate approximately 300 amps for 3 to 4 seconds, then drop back to a normal range of 70 ±12 amps.

- During start condition (ELECT/HYDR DRIVE ON indicator yellow), the 60 hp motor will automatically shut down if elapsed time exceeds 4.5 seconds.

(6) After 60 hp motor is up to speed, Observe the following:

(a) ELECT/HYDR DRIVE ON indicator — On (green).

(b) DRIVE LOW PRESSURE gauge — 185 ±35 psi (charge pump pressure).

(c) DRIVE HIGH PRESSURE gauge — 185 ±35 psi (main drive loop pressure).

(d) A1A10 AC VOLTS/AMPS selector — Position to IA, IB, and IC while monitoring AC VOLTS/AMPS meter for 70 ±12 amps.

2. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select OFF and observe the following:

Note

When changing drive modes, it is recommended that this be done by cycling the emergency brakes on then off again. This action ensures clutch engagement and disengagement.

a. A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — Off.

Note

If not off, push PRESS FOR RESET switch.

b. A1A11 NORMAL BRAKE pressure g — Increase to 450 ±50 psi.

3. A1A7 VELOCITY knob — Position 3.

CAUTION

Velocity knob shall be set to position 3 to ensure antenna velocity does not exceed drogue speed and create a bird's nest in the A2 area.

4. A1A8 LONG WIRE LENGTH control panel

a. AUTOMATIC/MANUAL switch — S AUTOMATIC or MANUAL

(1) Hydraulic Automatic Extend mode lected — Antenna will automatically when actual length reaches comma length. A1A7 VELOCITY knob s MAX, velocity will reach and maint maximum of 2100 fpm within the 1,100 feet of antenna wire deploymen

(2) Hydraulic Manual Extend mode sel — Antenna will not automatically when actual length reaches desired le This mode requires reel operator inte tion prior to reaching desired le A1A7 VELOCITY knob set to MAX locity will reach and maintain a maxi velocity of 2100 fpm within the 1,100 feet of antenna wire deploymen

b. HYDRAULIC MODE switch — Press observe the following:

(1) A1A9 WATER PUMP ON indicat On.

(2) A1A9 WATER HOT indicator — O

(3) A1A8 HYDRAULIC MODE indicat On.

Note

- If normal brake water cooling system is inoperative, hydraulic mode of operation will not be affected.

- If hydraulic drive clutch does not engage, HYDRAULIC MODE indicator will not enable.

c. EXTEND switch — Press and observe the following:

(1) EXTEND indicator — On.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

24.7.4.2 STWA Extend Mode Set Up

1. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select OFF and observe SHORT WIRE EMERGENCY BRAKE ON indicator is off.

Note

If not off, push PRESS FOR RESET Switch.

2. A1A2 VELOCITY knob — As desired.

CAUTION

If STWA is to be operated with less than a full spool of wire (4,550 reserve feet) set VELOCITY knob at a setting less than MAX. This will prevent an STWA overspeed.

Note

To ensure controllable velocity, reel operator may desire to place VELOCITY knob to position five vice MAX prior to deploying antenna wire. Once predicted velocity is established, rotate VELOCITY knob to MAX while monitoring VELOCITY meter to ensure selected mode velocity is not exceeded.

3. A1A3 SHORT WIRE LENGTH control panel:

a. AUTOMATIC/MANUAL switch — Select AUTOMATIC or MANUAL.

(1) Automatic Extend mode selected — Antenna will automatically stop when actual length reaches commanded length. A1A2 VELOCITY knob set to MAX, velocity will reach a maximum of 1,200 fpm within the first 100 feet of antenna wire deployment, then gradually decrease towards 600 fpm.

Note

A decrease of velocity will prevent an STWA motor overspeed from occurring.

(2) Manual Extend mode selected — Antenna will not automatically stop when actual length reaches desired length. This mode requires reel operator intervention prior to reaching desired length. A1A2 VELOCITY knob set to MAX, velocity will reach and maintain a maximum of 600 fpm within first 100 feet of antenna wire deployment.

b. EXTEND switch — Press and observe the following:

(1) EXTEND indicator — On.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

24.7.4.3 STWA Drogue Release

CAUTION

If hydraulic extend mode is used, deploy STWA first.

1. A1A2 VELOCITY knob — As desired.

2. A1A3 SHORT WIRE LENGTH control panel:

a. DROGUE RELEASE switch — Press and hold while observing the following:

CAUTION

- Do not release LTWA/STWA drogues simultaneously.
- Holding DROGUE RELEASE switch for more than 5 seconds will cause the drogue release solenoid to overload through A1A14 switching unit, causing both LTWA/STWA emergency brakes to apply.

(1) DROGUE IN indicator — Off.

(2) DROGUE OUT indicator — On.

(3) LENGTH FEET display — Increases.

(4) A1A2 VELOCITY meter — Moves off zero in EXT direction.

Note

Do not release DROGUE RELEASE switch until an indication of length and velocity is observed.

b. DROGUE RELEASE switch — Release.

3. STWA deployment — Observe the following:

CAUTION

Reel operator shall monitor reel spool if antenna wire is being stretched or the amount of antenna wire is in doubt.

a. A1A2 SHORT WIRE VELOCITY control panel:

(1) TENSION meter — Tension will decrease from nested tension then increase gradually.

(2) VELOCITY meter — 1,200 fpm (Automatic Extend mode) or 600 fpm (Manual Extend mode).

b. A1A3 LENGTH FEET display — Increases.

c. A1A15 SHORT WIRE RESERVE FEET indicator — Decreases.

24.7.4.4 LTWA Drogue Release

1. A1A7 VELOCITY knob — As desired.

2. A1A8 LONG WIRE LENGTH control panel:

a. DROGUE RELEASE Switch — Press and hold while observing the following:

CAUTION

Do not release LTWA/STWA drogues simultaneously.

(1) DROGUE IN indicator — Off.

(2) DROGUE OUT indicator — On.

(3) LENGTH FEET display — Increase

(4) A1A7 VELOCITY meter — Move zero in EXT direction.

Note

Do not release DROGUE RELEASE switch until an indication of length and velocity is observed.

b. DROGUE RELEASE switch — Release

3. LTWA deployment — Observe the followi

CAUTION

Reel operator shall monitor reel spool if antenna wire is being stretched or the amount of antenna wire is in doubt.

a. A1A7 LONG WIRE VELOCITY c panel:

(1) TENSION meter — Tension wil crease from nested tension then in gradually.

(2) VELOCITY meter — 2,100 fpm.

b. A1A9 DRIVE HIGH PRESSURE gau Increases from 185 ±35 psi to approxin 1500 psi.

c. A1A8 LENGTH FEET display — Incr

d. A1A15 LONG WIRE RESERVE FEET cator — Decreases.

e. LTWA reel spool/fleet angle compensa Observe for smooth operation.

24.7.4.5 STWA Deployment Termination

1. Automatic Extend mode selected:

a. Antenna wire slewdown — Observ following:

(1) A1A2 VELOCITY meter — Dec rapidly.

(2) A1A3 LENGTH FEET display — Approaches commanded length.

Note

At approximately 128 feet from commanded length, depending on velocity, antenna will commence slewdown. Antenna will automatically stop at commanded length. If wire does not slewdown when LENGTH FEET is 20 feet from commanded length, reel operator should select STOP.

b. Antenna wire stops — Observe the following:

(1) A1A3 SHORT WIRE LENGTH Control panel:

(a) LENGTH FEET display and LENGTH COMMAND indicators — Equal ±15 feet

(b) EXTEND indicator — Off.

(c) STOP indicator — On.

(d) RETRACT indicator — Off.

(2) A1A2 SHORT WIRE VELOCITY control panel:

(a) VELOCITY meter — Zero fpm.

(b) TENSION meter — Stabilized.

c. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select ON and observe SHORT WIRE EMERGENCY BRAKE ON indicator is on.

2. Manual Extend Mode Selected:

a. Antenna wire — At 500 feet from desired length, slow velocity to 500 fpm. Continue to match velocity with remaining length (400 fpm at 400 feet, 300 fpm at 300 feet, etc.). At 100 feet from desired length, ensure velocity is 100 fpm or less.

b. A1A3 LENGTH FEET display — Indicates selected length, press STOP switch and observe the following:

(1) A1A3 SHORT WIRE LENGTH control panel:

(a) LENGTH FEET display and LENGTH COMMAND indicators — Equal ±15 feet.

(b) EXTEND indicator — Off.

(c) STOP indicator — On.

(d) RETRACT indicator — Off.

(2) A1A2 SHORT WIRE VELOCITY control panel:

(a) VELOCITY meter — Zero fpm.

(b) TENSION meter — Stabilized.

c. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select ON and observe SHORT WIRE EMERGENCY BRAKE ON indicator is on.

24.7.4.6 LTWA Deployment Termination

1. Hydraulic Automatic Extend mode selected:

a. Antenna wire slewdown — Observe the following:

(1) A1A7 VELOCITY meter — Decreases rapidly.

(2) A1A8 LENGTH FEET display — Approaches commanded length.

(3) A1A9 DRIVE HIGH PRESSURE gauge — Increases.

Note

At approximately 200 feet from commanded length, depending on velocity, antenna will commence slewdown. Antenna will automatically stop at commanded length. If wire does not slewdown when LENGTH FEET is 70 feet from commanded length, reel operator should select STOP.

b. Antenna wire stops — Observe the following:

(1) A1A8 LONG WIRE LENGTH control panel:

(a) LENGTH FEET display and LENGTH COMMAND indicators — Equal ±20 feet.

(b) EXTEND indicator — Off.

(c) STOP indicator — On.

(d) RETRACT indicator — Off.

(2) A1A7 LONG WIRE VELOCITY control panel:

(a) VELOCITY meter — Zero fpm.

(b) TENSION meter — Stabilized.

(3) A1A11 NORMAL BRAKE pressure gauge — 450 ±50 psi.

(4) A1A9 DRIVE HIGH PRESSURE Gauge — 185 ±35 psi.

c. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select ON and observe the following:

(1) A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — ON.

(2) A1A8 HYDRAULIC mode indicator — Off.

(3) A1A11 NORMAL BRAKE pressure gauge — Decreases to zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing Hydraulic or Brake modes of operation.

2. Hydraulic Manual Extend mode selected:

a. Antenna wire — At 2,000 feet from desired length, slow velocity to 2,000 fpm. Continue to match velocity with remaining length (1,000 fpm at 1,000 feet, 500 fpm at 500 feet, etc.). At 100 feet from desired length, ensure velocity is 100 fpm or less.

b. A1A8 LENGTH FEET display — Indi selected length, press STOP switch an serve the following:

(1) A1A8 LONG WIRE LENGTH co panel:

(a) LENGTH FEET display LENGTH COMMAND indicato Equal ±20 feet.

(b) EXTEND indicator — Off.

(c) STOP indicator — On.

(d) RETRACT indicator — Off.

(2) A1A7 LONG WIRE VELOCITY co panel:

(a) VELOCITY meter — Zero fpm.

(b) TENSION meter — Stabilized.

(3) A1A11 NORMAL BRAKE pre gauge — 450 ±50 psi.

(4) A1A9 DRIVE HIGH PRESSURE g — 185 ±35 psi.

c. A1A6 LONG WIRE EMERGE BRAKE switch — Select ON and ob the following:

(1) A1A6 LONG WIRE EMERGE BRAKE ON indicator — On.

(2) A1A8 HYDRAULIC mode indicat Off.

(3) A1A11 NORMAL BRAKE pre gauge — Decreases to zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing Hydraulic or Brake modes of operation.

24.7.5 Dual Trailing Wire Antenna Park Monitor Operation

24.7.5.1 STWA Park Mode

1. P111 PWR control panel STWA HYDR switch — Select OFF and observe the follo

a. A1A10 SHORT WIRE HYDR indicators:

(1) LOW PRESSURE indicator — On.

(2) NORMAL PRESSURE indicator — Off.

(3) HOT indicators — Off.

b. A4 hydraulic panel:

(1) M1 gauge — Zero psi.

(2) M2 gauge — 150 ±15 psi.

(3) M3 gauge — 3,000 ±200 psi.

c. A4A6 SHORT WIRE EMER EXT control panel NORMAL BRAKE PRESSURE gauge — 47 ±5 psi.

2. A1A2 ANTENNA ACCESS switch — Guarded OFF.

Note

ANTENNA ACCESS switch to OFF enables comm/central to unground the shorting switch for transmission. While the VLF-PA is in a transmitting cycle, A1A2 ANTENNA GROUNDED indicator will be off.

3. A1A3 LENGTH COMMAND switches — Set to LENGTH FEET display.

24.7.5.2 LTWA Park Mode

1. A1A11 NORMAL BRAKE knob — Rotate CW (LOAD) until NORMAL BRAKE pressure gauge indicates 450 ±50 psi.

2. A1A9 FLUID SYSTEMS control panel:

a. ELECT/HYDR DRIVE OFF switch — Press and observe the following:.

(1) ELECT/HYDR DRIVE ON indicator — Off.

(2) ELECT/HYDR DRIVE OFF indicator — On.

(3) DRIVE LOW PRESSURE gauge — 70 ±10.

(4) CHG PUMP indicator — Off.

(5) BLOWER indicator — Off.

3. A1A10 SUPPLY ON/SUPPLY OFF switch — Press and observe the following:

CAUTION

After the ELECT/HYDR DRIVE system has been secured, wait 15 seconds before securing the circulating pump to prevent the main drive pump from cavitating.

a. SUPPLY ON indicator — Off.

b. SUPPLY OFF indicator — On.

c. LOW PRESSURE indicator — Off.

d. NORMAL PRESSURE indicator — Off.

e. HOT indicator — Off.

f. A1A9 FLUID SYSTEMS control panel:

(1) CRCLT PUMP indicator — Off.

(2) DRIVE HIGH PRESSURE gauge — Zero psi.

(3) DRIVE LOW PRESSURE gauge — Zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing hydraulic or brake modes of operation.

g. A2A1 hydraulic panel:

(1) M2 gauge — 650 ±50 psi.

(2) M4 gauge — 1,200 ±50 psi.

Note

If parked mode will be for an extended period, the LCS may be shut down, except when needed for PA-coupler operation.

4. A1A8 LENGTH COMMAND switches — Set to LENGTH FEET display.

5. Notify comm/central and pilot that both antennas are parked and give actual antenna wire length.

24.7.5.3 LTWA/STWA Equipment Monitoring

1. LTWA — Observe the following:

   a. A1A7 TENSION meter:

CAUTION

While antennas are extended and stopped, reel operator will leave all electrical power on and closely monitor A1A2 and A1A7 TENSION meters for abnormal indications.

   (1) LEVEL flight — Stable.

   (2) ORBIT flight — Tension may *yo-yo* several hundred pounds.

Note

Tension will be between 450 to 1,250 pounds during level flight, 450 to 1,600 pounds during orbit flight, depending on length of antenna wire extended and aircraft speed.

   b. A1A8 LENGTH FEET display — Equal to LENGTH COMMAND indicators.

   c. A1A11 NORMAL BRAKE pressure gauge — 450 ±50 psi

   d. A2A1 hydraulic panel:

   (1) M2 gauge — 650 ±50 psi.

   (2) M4 gauge — 1,200 ±50 psi.

   e. A1A15 LONG WIRE RESERVE FEET indicator — Concurs with A1A8 LENGTH FEET display and log.

   f. P104 LIQUID COOLING SYSTEM control panel COOLANT SUPPLY TEMP switch — Verify temperature on TEMP gauge is less than 130° F.

Note

Normal operating temperatures will be between 59 to 90 °F, after LCS has warmed up.

2. STWA — Observe the following:

   a. A1A2 TENSION meter — Stable.

Note

Tension will be between 150 to 400 pounds depending on length of antenna wire extended and aircraft speed.

   b. A1A3 LENGTH FEET display — Equ LENGTH COMMAND indicators.

   c. A4 hydraulic panel:

   (1) M1 gauge — Zero psi.

   (2) M2 gauge — 150 ±15 psi.

   (3) M3 gauge — 3,000 ±200 psi.

   d. A1A15 SHORT WIRE RESERVE FEE dicator — Concurs with A1A3 LEN FEET display and log.

24.7.6 Antenna Group Reinitialization

24.7.6.1 STWA Power On

1. P111 PWR control panel STWA HYDR switch — Select ON and observe the follow

   a. A1A10 SHORT WIRE HYDR indicator

   (1) LOW PRESSURE indicator — Off.

   (2) NORMAL PRESSURE indicator —

   (3) HOT indicator — Off.

   b. A4 hydraulic panel:

   (1) M1 and M3 gauges — 3,000 ±200 ps

   (2) M2 gauge — 250 ±15 psi.

   c. A4A6 SHORT WIRE EMER EXT c panel NORMAL BRAKE PRESSURE — 15 psi or less.

2. A1A2 ANTENNA ACCESS switch — Gu ON.

24.7.6.2 LTWA Power On

1. A1A10 SUPPLY ON/SUPPLY OFF switch — Press and observe the following:

   a. SUPPLY ON indicator — On.

   b. SUPPLY OFF indicator — Off.

   c. LOW PRESSURE indicator — Off.

Note

LOW PRESSURE indicator will initially illuminate then extinguish after auxiliary hydraulic pressure exceeds 950 psi.

   d. NORMAL PRESSURE indicator — On.

   e. HOT indicator — Off.

   f. A1A9 FLUID SYSTEMS control panel:

      (1) CRCLT PUMP indicator — On.

      (2) DRIVE LOW PRESSURE meter — 70 ±10 psi (circulating pump pressure).

   g. A2A1 hydraulic panel:

      (1) M2 gauge — 1,200 ±50 psi.

      (2) M4 gauge — 1,200 ±50 psi.

24.7.7 Dual Trailing Wire Antenna Retract Operation

24.7.7.1 LTWA Hydraulic Retract Mode Set Up

1. A1A9 FLUID SYSTEMS control panel:

   a. ELECT/HYDR DRIVE ON switch — Press and observe the following:

CAUTION

- Do not start the LTWA 60 hp motor unless at least two aircraft generators are supplying power to the ME sync bus. The combined preload for the two generators shall not exceed 100 amps.

- Verify LTWA 60 hp motor blower intakes are clear of obstructions.

      (1) ELECT/HYDR DRIVE OFF indicator — Off.

      (2) CHG PUMP indicator — On.

      (3) BLOWER indicator — On.

      (4) ELECT/HYDR DRIVE ON indicator — On (yellow).

      (5) A1A10 AC VOLTS/AMPS selector — Position to IA, IB, and IC while monitoring AC VOLTS/AMPS meter for approximately 300 amps.

Note

- The ELECT/HYDR DRIVE ON indicator should illuminate yellow after the charge pump and blower have started. The indicator will turn green approximately 4 seconds after it illuminates yellow. Current shall be monitored during the 60 hp motor start. The AC VOLTS/AMPS meter will indicate approximately 300 amps for 3 to 4 seconds, then drop back to a normal range of 70 ±12 amps.

- During start condition (ELECT/HYDR DRIVE ON indicator yellow), the 60 hp motor will automatically shut down if elapsed time exceeds 4.5 seconds.

      (6) After 60 hp motor is up to speed, observe the following:

         (a) ELECT/HYDR DRIVE ON indicator — On (green).

         (b) DRIVE LOW PRESSURE gauge — 185 ±35 psi (charge pump pressure).

         (c) DRIVE HIGH PRESSURE gauge — 185 ±35 psi (main drive loop pressure).

         (d) A1A10 AC VOLTS/AMPS selector — Position to IA, IB, and IC while monitoring AC VOLTS/AMPS meter for 70 ±12 amps.

2. A1A11 NORMAL BRAKE Knob-Rotate CCW (VENT) until NORMAL BRAKE pressure gauge indicates zero psi.

3. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select OFF and observe the following:

   a. A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — Off.

Note

If not off, push PRESS FOR RESET switch.

   b. A1A11 NORMAL BRAKE pressure gauge — Increase to 450 ±50 psi.

4. A1A7 VELOCITY knob — Set to MAX.

5. A1A8 LONG WIRE LENGTH control panel:

   a. LENGTH COMMAND switches — Set to 00000.

   b. AUTOMATIC/MANUAL switch — Select AUTOMATIC or MANUAL.

      (1) Hydraulic Automatic Retract mode selected — Antenna will automatically stop when actual length reaches commanded length. A1A7 VELOCITY knob set to MAX, velocity will reach 1,400 fpm within the first 1,000 feet of antenna wire retraction. Velocity will increase to 2,100 fpm (horsepower limiting range). Velocity will be maintained at a maximum of 2,100 fpm (constant velocity range).

      (2) Hydraulic Manual Retract mode selected — Antenna will not automatically stop when actual length reaches desired length. This mode requires reel operator intervention prior to reaching desired length if a length other than zero is selected. A1A7 VELOCITY knob set to MAX, velocity will reach 1,400 fpm within the first 1,000 feet of antenna wire retraction. Velocity will increase to 2,100 fpm (horsepower limiting range). Velocity will be maintained at a maximum of 2,100 fpm (constant velocity range).

   c. HYDRAULIC MODE switch — Press and observe the following:

      (1) A1A9 WATER PUMP ON indicator — On.

      (2) A1A9 WATER HOT indicator — Off.

      (3) HYDRAULIC MODE indicator — O

Note

- If normal brake water cooling system is inoperative, hydraulic mode of operation will not be affected.
- If hydraulic drive clutch does not engage, HYDRAULIC MODE indicator will not enable.

24.7.7.2 STWA Retract Mode Set Up

1. A1A1 SHORT WIRE EMERGENCY BR/ switch — Select OFF and observe SHORT W EMERGENCY BRAKE ON indicator is off.

Note

If not off, push PRESS FOR RESET switch.

2. A1A2 VELOCITY knob — Set to MAX.

3. A1A3 SHORT WIRE LENGTH control pan

   a. LENGTH COMMAND switches — Se 0000.

   b. AUTOMATIC/MANUAL switch — Se AUTOMATIC or MANUAL

      (1) Automatic Retract Mode selected — tenna will automatically stop when a length reaches commanded length. A VELOCITY knob set to MAX, vel will reach 240 fpm within the first 100 of antenna wire retraction, then increase maintain a maximum of 370 fpm.

      (2) Manual Retract Mode selected — tenna will not automatically stop whe tual length reaches desired length. mode requires reel operator interver prior to reaching desired length if a le other than 0 is selected. A1A2 VEL ITY knob set to MAX, velocity will r and maintain a maximum of 150 within first 100 feet of antenna wire traction.

24.7.7.3 STWA Retraction

1. A1A3 SHORT WIRE LENGTH control panel:

   a. A1A3 RETRACT switch — Press and observe the following:

CAUTION

A drogue watch shall be posted at the drogue observation window when a wire problem exists, when a lost drogue is suspected, and during the last 500 feet of wire retraction.

   (1) EXTEND indicator — Off.

   (2) STOP indicator — Off.

   (3) RETRACT indicator — On.

   (4) LENGTH FEET display — Decreases.

   (5) A1A2 VELOCITY meter — Moves off zero in RET direction.

2. A1A2 VELOCITY knob — As desired.

3. STWA retraction — Observe the following:

   a. A1A2 SHORT WIRE VELOCITY control panel:

   (1) TENSION meter — Tension will decrease.

   (2) VELOCITY meter — 370 fpm (Automatic Retract mode) or 150 fpm (Manual Retract mode).

   b. A1A3 LENGTH FEET display — Decreases.

   c. A1A15 SHORT WIRE RESERVE FEET indicator — Increases.

24.7.7.4 LTWA Retraction

1. A1A8 LONG WIRE LENGTH control panel:

   a. RETRACT switch — Press and observe the following:

CAUTION

- When initiating retract mode, reel operator shall guard the LONG WIRE EMERGENCY BRAKE switch. If main drive high pressure exceeds 4,000 psi or negative antenna wire movement occurs, immediately apply emergency brake.

- A drogue watch shall be posted at the drogue observation window when a wire problem exists, when a lost drogue is suspected, and during the last 500 feet of wire retraction.

   (1) EXTEND indicator — Off.

   (2) STOP indicator — Off.

   (3) RETRACT indicator — On.

   (4) LENGTH FEET display — Decreases.

   (5) A1A7 VELOCITY meter — Moves off zero in RET direction.

   (6) A1A11 NORMAL BRAKE pressure gauge — Decrease to zero psi.

2. A1A7 VELOCITY knob — As desired.

3. LTWA retraction — Observe the following:

   a. A1A7 LONG WIRE VELOCITY control panel:

   (1) TENSION meter — Tension will decrease.

   (2) VELOCITY meter — 2,100 fpm.

   b. A1A9 DRIVE HIGH PRESSURE gauge — 3,075 ±125 psi until velocity indicates 2,100 fpm then decrease slowly towards 500 psi.

   c. A1A8 LENGTH FEET display — Decreases.

   d. A1A15 LONG WIRE RESERVE FEET indicator — Increases.

   e. LTWA reel spool/fleet angle compensator — Observe for smooth operation.

24.7.7.5 STWA Nesting

CAUTION

- During the last 100 feet of antenna wire retraction, reel operator shall guard the SHORT WIRE EMERGENCY BRAKE switch and immediately apply emergency brake if slewdown does not occur by 50 feet from the nest.
- Do not nest LTWA/STWA drogues or be in nesting cycle simultaneously.

1. Slewdown — Observe while performing the following:
   a. A1A2 VELOCITY meter — Decreases rapidly from 370 fpm (Automatic Retract mode) or 150 fpm (Manual Retract mode) to 100 fpm (nesting velocity).
   b. A1A2 VELOCITY knob — Position 4 or less after slewdown has occurred.
2. Nesting — Observe while performing the following:

CAUTION

If tension increases rapidly past 350 poounds, immediately apply emergency brake.

   a. A1A3 SHORT WIRE LENGTH control panel:
      (1) DROGUE IN indicator — On.
      (2) DROGUE OUT indicator — Off.

Note

When the drogue engages the nest, a 3- to 5-second delay occurs prior to DROGUE IN indicator illuminating.

      (3) LENGTH FEET display — Zero.
      (4) EXTEND indicator — Off.
      (5) STOP indicator — On.
      (6) RETRACT indicator — Off.
   b. A1A2 TENSION meter — 35 pounds r mum.
   c. A1A1 SHORT WIRE EMERGEI BRAKE switch — Select ON and obs SHORT WIRE EMERGENCY BRAKE indicator is on.
   d. A1A15 SHORT WIRE RESERVE FEE dicator — Logged length.

Note

A1A15 RESERVE FEET indicators may have more feet than logged length.

24.7.7.6 LTWA Nesting

CAUTION

- During the last 200 feet of antenna wire retraction, reel operator shall guard the LONG WIRE EMERGENCY BRAKE switch and immediately apply emergency brake if slewdown does not occur by 150 feet from the nest.
- Do not nest LTWA/STWA drogues or be in nesting cycle simultaneously.

1. Slewdown — Observe while performing the lowing:
   a. A1A7 VELOCITY meter — Decreases ra from 2,100 fpm to 100 fpm (nesting velocit

Note

After velocity has dropped below 400 fpm, VEL X 0.1 switch should be used for a more accurate reading.

   b. A1A7 VELOCITY knob — Position MIN after slewdown has occurred.
2. Nesting — Observe while performing the lowing:

CAUTION

If tension increases rapidly past 600 pounds, immediately apply emergency brake.

a. A1A8 LONG WIRE LENGTH control panel:

(1) DROGUE IN indicator — On.

(2) DROGUE OUT indicator — Off.

(3) LENGTH FEET display — Zero.

(4) EXTEND indicator — Off.

(5) STOP indicator — On.

(6) RETRACT indicator — Off.

b. A1A7 TENSION meter — 75 pounds minimum.

c. A1A11 NORMAL BRAKE pressure gauge — 450 ±50 psi.

d. A1A9 DRIVE HIGH PRESSURE gauge — 185 ±35 psi.

e. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select ON and observe the following:

(1) A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — On.

(2) A1A8 BRAKE MODE indicator — Off.

(3) A1A11 NORMAL BRAKE pressure gauge — Decreases to zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing Hydraulic or Brake modes of operation.

f. A1A15 LONG WIRE RESERVE FEET Indicator — Logged length.

Note

A1A15 RESERVE FEET indicators may have more feet than logged length.

24.7.8 Antenna Group Secure

24.7.8.1 LTWA Power Off

1. A1A9 FLUID SYSTEMS control panel:

a. ELECT/HYDR DRIVE OFF switch — Press and observe the following:

(1) ELECT/HYDR DRIVE ON indicator — Off.

(2) ELECT/HYDR DRIVE OFF indicator — On.

(3) DRIVE LOW PRESSURE gauge — 70 ±10.

(4) CHG PUMP indicator — Off.

(5) BLOWER Indicator — Off.

2. A1A10 SUPPLY ON/SUPPLY OFF switch — Press and observe the following:

CAUTION

After the ELECT/HYDR DRIVE system has been secured, wait 15 seconds before securing the circulating pump to prevent the main drive pump from cavitating.

a. SUPPLY ON indicator — Off.

b. SUPPLY OFF indicator — On.

c. LOW PRESSURE indicator — Off.

d. NORMAL PRESSURE indicator — Off.

e. HOT indicator — Off.

f. A1A9 FLUID SYSTEMS control panel:

(1) CRCLT PUMP indicator — Off.

(2) DRIVE HIGH PRESSURE gauge — Zero psi.

(3) DRIVE LOW PRESSURE gauge — Zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing Hydraulic or Brake modes of operation.

g. A2A1 hydraulic panel:

(1) M2 gauge — 650 ±50 psi.

(2) M4 gauge — 1,200 ±50 psi.

Note

Accumulator four (indicated on M-4) should hold 1,200 ±50 psi system pressure for the entire mission flight. If pressure is less than 950 psi, Emergency Extend mode may be unavailable for operation.

24.7.8.2 STWA Power Off

1. P111 PWR control panel STWA HYDR PWR switch — Select OFF and observe the following:

a. A1A10 SHORT WIRE HYDR indicators:

(1) LOW PRESSURE indicator — On.

(2) NORMAL PRESSURE indicator — Off.

(3) HOT indicator — Off.

b. A4 hydraulic panel:

(1) M1 gauge — Zero psi.

(2) M2 gauge — 150 ±15 psi.

(3) M3 gauge — 3,000 ±200 psi.

Note

Accumulator two (indicated on M3) should hold 3,000 ±200 psi system pressure for the entire mission flight.

c. A4A6 SHORT WIRE EMER EXT control panel NORMAL BRAKE PRESSURE gauge — 47 ±5 psi

24.7.8.3 LTWA Drogue Nest Retract

1. P108 VLF/LF DROGUE NEST CONTROL panel:

a. ARM/NEST IN switch — Press and obs the following:

(1) ARM indicator — On.

(2) NEST IN indicator — Off.

b. RETRACT/OFF/EXTEND switch — S and hold in RETRACT while observing following:

CAUTION

Do not extend/retract LTWA drogue nest unless drogue is latched and fully nested (On A1A8 LONG WIRE LENGTH control panel DROGUE IN indicator is on and DROGUE LOST indicator is off).

(1) NEST OUT indicator — Off.

(2) IN TRANSIT indicator — On until n fully retracted, then will extinguish.

(3) NEST IN indicator — On after TRANSIT indicator extinguishes.

Note

Flight deck DROGUE BAY indicator will also extinguish.

c. ARM/NEST IN switch — Press and obs the following:

(1) ARM indicator — Off.

(2) NEST IN indicator — Off.

24.7.8.4 Antenna Group Power Off

1. A2A4 400 HZ POWER DISTRIBUTION pa

a. S1 — Press and observe OFF illuminates and ON light extinguishes.

b. CB1 — OFF.

c. CB2 — OFF.

d. CB3 — OFF.

2. A1A4 +28 VDC POWER control panel:

a. 28 VDC switch — Off.

b. LIGHTS switch — Off.

24.7.9 Liquid Cooling System Secure

1. P104 LIQUID COOLING SYSTEM control panel:

   a. PUMPS 1 or 2 switch — Press and observe the following:

CAUTION

Do not shut down LCS until 5 minutes after PA-coupler operation and LTWA hydraulic system has been shut down to allow for system cool down.

(1) Selected PUMPS ON indicator — Off.

(2) SUPPLY pressure gauge — 20 ±10 psi (return pressure).

(3) LOW FLOW indicator — On.

   b. COOLER VALVES 1 and 4 OPEN indicators — On.

Note

Valves will be left open to allow entire system to equalize at coolant return pressure.

2. Notify flight deck that fuel boost pump operation is not required to support LCS operation.

24.8 DEGRADED MODES OF OPERATION

24.8.1 Loss of Computer Readout. Antenna lengths may be determined by using Figure 24-26 Antenna Lengths Versus Frequency.

24.8.2 Incorrect Length Feet Display

CAUTION

If the antenna loses length memory, the length shall be loaded back into the A1 card cage and LENGTH FEET display.

1. A1A3 or A1A8 length control panel:

   a. LENGTH COMMAND switches — Set to desired length.

   b. Remove panel.

   c. Emergency load switch — Toggle and observe LENGTH FEET display and LENGTH COMMAND switches are equal.

   d. Install panel.

24.8.3 Manual LTWA Drogue Nest Arm Extend/Retract

1. Drogue nest manual drive access panel — Remove.

2. Hand crank — Remove.

3. Manual drive socket dust cap — Remove.

4. Brake release handle:

   a. Pull up until ball swage is clear of housing.

WARNING

Release brake before hand crank is installed.

   b. Ball swage — Set into adjoining notch.

5. Hand crank:

   a. Insert into manual drive socket.

   b. Push down and rotate CCW to extend or CW to retract.

WARNING

Do not release hand crank when drogue nest is in transit.

CAUTION

Do not extend/retract LTWA drogue nest unless drogue is latched and fully nested. (On A1A8 LONG WIRE LENGTH control panel DROGUE IN indicator is on and DROGUE LOST indicator is off).

FREQ. (KHz)	DTWA LENGTHS			FREQ. (KHz)	DTWA LENGTHS		
	LTWA (FEET)	STWA			LTWA (FEET)	STWA	
		ORBIT (FEET)	LEVEL (FEET)			ORBIT (FEET)	LEVEL (FEET)
17.0	24940	3315	4030	20.3	21000	2753	3243
17.1	24820	3295	4004	20.4	20900	2745	3232
17.2	24700	3278	3978	20.5	20790	2737	3222
17.3	24570	3259	3951	20.6	20690	2729	3211
17.4	24450	3240	3925	20.7	20590	2721	3201
17.5	24330	3222	3899	20.8	20490	2713	3190
17.6	24210	3203	3873	20.9	20380	2705	3180
17.7	24080	3185	3846	21.0	20280	2697	3169
17.8	23960	3166	3820	21.1	20180	2689	3159
17.9	23840	3147	3794	21.2	20080	2681	3148
18.0	23720	3129	3768	21.3	19970	2672	3138
18.1	23590	3110	3741	21.4	19870	2664	3127
18.2	23470	3091	3715	21.5	19770	2656	3117
18.3	23350	3073	3689	21.6	19670	2648	3106
18.4	23230	3054	3663	21.7	19560	2640	3096
18.5	23100	3035	3636	21.8	19460	2632	3085
18.6	22980	3017	3610	21.9	19360	2624	3075
18.7	22860	2998	3584	22.0	19260	2616	3064
18.8	22740	2979	3558	22.1	19150	2608	3054
18.9	22610	2961	3531	22.2	19050	2600	3043
19.0	22490	2942	3505	22.3	18950	2592	3033
19.1	22370	2924	3479	22.4	18850	2584	3022
19.2	22250	2905	3453	22.5	18740	2576	3012
19.3	22120	2886	3426	22.6	18640	2568	3001
19.4	22000	2868	3400	22.7	18570	2555	2989
19.5	21880	2849	3374	22.8	18500	2542	2977
19.6	21760	2830	3348	22.9	18430	2529	2965
19.7	21630	2812	3321	23.0	18360	2517	2952
19.8	21510	2793	3295	23.1	18290	2504	2940
19.9	21410	2785	3285	23.2	18220	2491	2928
20.0	21310	2777	3274	23.3	18150	2478	2918
20.1	21200	2769	3264	23.4	18080	2465	2904
20.2	21100	2761	3253	23.5	18010	2452	2892

K03-1
REV. A

Figure 24-26. Antenna Lengths Versus Frequency (Sheet 1 of 2)

FREQ. (KHz)	DTWA LENGTHS		
	LTWA (FEET)	STWA	
		ORBIT (FEET)	LEVEL (FEET)
23.6	17940	2440	2880
23.7	17880	2427	2868
23.8	17810	2414	2855
23.9	17740	2401	2843
24.0	17640	2388	2831
24.1	17600	2375	2819
24.2	17530	2363	2807
24.3	17460	2350	2795
24.4	17390	2337	2783
24.5	17320	2324	2771
24.6	17250	2311	2758
24.7	17160	2298	2746
24.8	17110	2285	2734
24.9	17040	2273	2722
25.0	16920	2260	2710
25.1	16900	2247	2698
25.2	16830	2234	2688
25.3	16760	2221	2673
25.4	16640	2208	2661
25.5	16560	2196	2649
25.6	16490	2183	2637
25.7	16420	2170	2625
25.8	16350	2157	2613
25.9	16280	2144	2601
26.0	16210	2131	2589
26.1	16130	2119	2576
26.2	16060	2106	2564
26.3	15990	2093	2552
26.4	15920	2080	2540
26.5	15860	2075	2531
26.6	15810	2070	2522
26.7	15750	2064	2513
26.8	15690	2059	2505

FREQ. (KHz)	DTWA LENGTHS		
	LTWA (FEET)	STWA	
		ORBIT (FEET)	LEVEL (FEET)
26.9	15640	2054	2496
27.0	15580	2049	2487
27.1	15520	2044	2478
27.2	15470	2038	2469
27.3	15410	2033	2460
27.4	15360	2028	2452
27.5	15300	2023	2443
27.6	15240	2018	2434
27.7	15190	2012	2425
27.8	15130	2007	2416
27.9	15070	2002	2407
28.0	15020	1997	2398
28.1	14960	1992	2390
28.2	14900	1986	2381
28.3	14850	1981	2372
28.4	14790	1976	2363
28.5	14740	1965	2349
28.6	14690	1953	2335
28.7	14640	1942	2321
28.8	14590	1930	2308
28.9	14540	1919	2294
29.0	14490	1907	2280
29.1	14440	1896	2266
29.2	14400	1885	2252
29.3	14350	1873	2238
29.4	14300	1862	2224
29.5	14250	1850	2210
29.6	14200	1839	2197
29.7	14150	1827	2183
29.8	14100	1816	2169
29.9	14050	1804	2155
30.0	14000	1793	2141

K03-1001
REV. A

Figure 24-26. Antenna Lengths Versus Frequency (Sheet 2 of 2)

c. Stop rotation after P108 VLF/LF DROGUE NEST CONTROL panel NEST OUT indicator is on for extend, NEST IN indicator is on for retract, or mechanical stops are contacted.

CAUTION

Do not force hand crank after structural stop has been contacted. Doing so will cause shear rivets to fail.

Note

NEST IN indicator will not come on unless ARM indicator is on.

6. Brake release handle — Pull up until ball swage is clear of notch and release.

7. Hand crank — Remove from manual drive socket and stow.

8. Manual drive socket dust cover — Install.

9. Drogue nest manual drive access panel — Install.

24.8.4 LTWA/STWA Manual Drogue Release (In Flight). If the DROGUE RELEASE switch fails, drogue can be released by pulling the LTWA or STWA Manual Drogue Release T-Handle sharply.

24.8.5 LTWA/STWA Hung Drogue. Is shown by the lack of tension, DROGUE OUT indicator is on, and drogue still in nest.

24.8.5.1 LTWA Hung Drogue

1. A1A6 LONG WIRE EMERGENCY BRAKE switch — Verify OFF.

2. A1A8 LONG WIRE LENGTH control panel:

   a. AUTOMATIC/MANUAL switch — Select MANUAL.

   b. PRESS FOR OVERRIDE switch — Push and hold.

Note

PRESS FOR OVERRIDE switch must be held until tension exceeds 75 pounds.

c. BRAKE MODE switch — Press and obs the following:

   (1) A1A9 WATER PUMP ON indicato On.

   (2) A1A9 WATER HOT indicator — Of

   (3) A1A8 BRAKE MODE indicator — C

Note

If normal brake water cooling system is inoperative, BRAKE MODE indicator will not enable.

d. EXTEND switch — Press and observe following:

   (1) EXTEND indicator — On.

   (2) STOP indicator — Off.

   (3) RETRACT indicator — Off.

Note

Antenna should extend, if not, have the pilot deploy spoilers/speed brakes until antenna wire extends. If problem still exists after several attempts, ground maintenance will be required.

3. Normal operations may be continued.

24.8.5.2 STWA Hung Drogue

1. A1A1 SHORT WIRE EMERGENCY BR switch — Verify OFF.

2. A1A3 SHORT WIRE LENGTH control pan

   a. AUTOMATIC/MANUAL switch — S MANUAL.

   b. PRESS FOR OVERRIDE switch — and hold.

Note

PRESS FOR OVERRIDE switch must be held until the tension exceeds 35 pounds.

24.8.6.2 STWA Loss of Tension With Drogue Nested

1. STWA cable cutters — Verify not fired.

Note

If one of the cable cutters has fired, drogue will be lost when drogue release is attempted.

2. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Verify OFF.
3. A1A3 SHORT WIRE LENGTH control panel:
   a. AUTOMATIC/MANUAL switch — Select MANUAL.
   b. PRESS FOR OVERRIDE switch — Push and hold.

Note

PRESS FOR OVERRIDE switch must be held until the tension exceeds 35 pounds.

   c. EXTEND switch — Press and observe the following:
      (1) EXTEND indicator — On.
      (2) STOP indicator — On.
      (3) RETRACT indicator — Off.
   d. DROGUE RELEASE switch — Press and hold while observing the following:

CAUTION

- Do not release LTWA/STWA drogues simultaneously.
- Holding DROGUE RELEASE switch for more than 5 seconds will cause the drogue release solenoid to overload through A1A14 switching unit, causing both LTWA/STWA emergency brakes to apply.

      (1) DROGUE IN indicator — Off.
      (2) DROGUE OUT indicator — On.
      (3) LENGTH FEET display — Increases.
      (4) A1A7 VELOCITY meter — Moves zero in EXT direction.

Note

Do not release DROGUE RELEASE switch until an indication of length and velocity is observed.

   e. DROGUE RELEASE switch — Release.

Note

Antenna should extend, if not, have the pilot deploy spoilers/speed brakes until antenna wire extends. If problem still exists after several attempts, ground maintenance will be required.

4. Normal operations may be continued.

24.8.7 LTWA Emergency Extend Operation

Note

Coordinate with mission commander prior to performing LTWA emergency extend procedures.

24.8.7.1 LTWA Emergency Extend

1. A1A11 LONG WIRE EMER EXT con panel:
   a. NORMAL BRAKE knob — Rotate ((LOAD) until NORMAL BRAKE press gauge indicates 450 ±50 psi.
   b. EMERGENCY BRAKE RELEASE har — Pull down, move left, and hold. Obse A1A6 LONG WIRE EMERGEN BRAKE ON indicator is off.
2. Manual drogue release T-handle — Pull drogue has not been released.
3. A1A11 NORMAL BRAKE knob — Ro CCW (VENT) until LTWA reel spool begin move, rotate as required to regulate antenna locity.

CAUTION

Antenna velocity shall not exceed 2,500 fpm.

4. LTWA deployment — Observe the following:

CAUTION

Reel operator shall monitor reel spool if antenna wire is being stretched or the amount of antenna wire is in doubt.

a. A1A7 LONG WIRE VELOCITY control panel:

(1) TENSION meter — Tension will decrease from nested tension then increase gradually.

(2) VELOCITY meter — Not to exceed 2,500 fpm.

Note

At 2350 fpm, A1A8 LONG WIRE OVERSPEED indicator comes on. This is normal and should be disregarded.

b. A1A8 LENGTH FEET display — Increases.

c. A1A15 LONG WIRE RESERVE FEET Indicator — Decreases.

d. Manual drogue release T-handle — Stowed.

e. LTWA reel spool/fleet angle compensator — Observe for smooth operation.

24.8.7.2 LTWA Deployment Termination

1. Emergency Extend mode selected:

Note

Antenna will not automatically stop when actual length reaches desired length. This mode requires reel operator intervention prior to reaching desired length.

a. Antenna wire — At 2,000 feet from desired length, slow velocity to 2,000 fpm. Continue to match velocity with remaining length (1,000 fpm at 1,000 feet, 500 fpm at 500 feet, etc.). At 100 feet from desired length, ensure velocity is 100 fpm or less.

b. A1A8 LENGTH FEET display — Indicates selected length, perform and observe the following:

(1) A1A11 EMERGENCY BRAKE RELEASE handle — Release and stow while observing A1A6 LONG WIRE BRAKE ON indicator is on.

(2) A1A8 LONG WIRE LENGTH control panel:

(a) LENGTH FEET display and LENGTH COMMAND indicators — Equal ±20 feet.

(b) EXTEND indicator — Off.

(c) STOP indicator — On.

(d) RETRACT indicator — Off.

(3) A1A7 VELOCITY control panel:

(a) VELOCITY meter — Zero fpm.

(b) TENSION meter — Stabilized.

24.8.7.3 LTWA Park Mode Procedures

1. A1A11 NORMAL BRAKE knob — Rotate CW (LOAD) until NORMAL BRAKE pressure gauge indicates 450 ±50 psi.

2. A1A9 FLUID SYSTEMS control panel:

a. ELECT/HYDR DRIVE OFF switch — Press and observe the following:

(1) ELECT/HYDR DRIVE ON indicator — Off.

(2) ELECT/HYDR DRIVE OFF indicator — On.

(3) DRIVE LOW PRESSURE gauge — 70 ±10 psi.

(4) CHG PUMP indicator — Off.

(5) BLOWER indicator — Off.

3. A1A10 SUPPLY ON/SUPPLY OFF switch — Press and observe the following:

CAUTION

After the ELECT/HYDR DRIVE system has been secured, wait 15 seconds before securing the circulating pump to prevent the main drive pump from cavitating.

a. SUPPLY ON indicator — Off.

b. SUPPLY OFF indicator — On.

c. LOW PRESSURE indicator — Off.

d. NORMAL PRESSURE indicator — Off.

e. HOT indicator — Off.

f. A1A9 FLUID SYSTEMS control panel:

(1) CRCLT PUMP indicator — Off.

(2) DRIVE HIGH PRESSURE gauge — Zero psi.

(3) DRIVE LOW PRESSURE gauge — Zero psi.

Note

WATER PUMP ON indicator will remain on for 3 minutes after securing Hydraulic or Brake modes of operation.

g. A2A1 hydraulic panel:

(1) M2 gauge — 650 ±50 psi.

(2) M4 gauge — 1,200 ±50 psi.

Note

If parked mode will be for an extended period, the LCS may be shut down, except when needed for PA-coupler operation.

4. A1A8 LENGTH COMMAND switches — Set to LENGTH FEET display.

5. Notify comm/central and pilot that both antennas are parked and give actual antenna wire lengths.

24.8.8 STWA Emergency Extend Operati (With Hydraulic Pressure)

Note

Coordinate with mission commander prior to performing STWA emergency extend procedures.

24.8.8.1 STWA Emergency Extend

1. A4 hydraulic panel:

a. M3 gauge — Verify 3,000 ± 200 psi.

b. Manual valve MV1 — Open (horizontal p tion).

2. A4A6 SHORT WIRE EMER EXT con panel:

a. NORMAL BRAKE knob — Rotate ((LOAD) until NORMAL BRAKE PR SURE gauge indicates 213 psi (maxim 275 psi).

b. EMERGENCY BRAKE RELEASE knob Rotate CW (RELEASE) and hold.

3. Manual drogue release T-handle — Pull drogue has not been released and hold while serving the following:

a. A1A3 DROGUE IN indicator — Off.

b. A1A3 DROGUE OUT indicator — On.

c. A1A1 SHORT WIRE EMERGEN BRAKE ON indicator — Off.

4. A4A6 SHORT WIRE EMER EXT control p NORMAL BRAKE knob — Rotate C (VENT) until STWA reel spool begins to m rotate as required to regulate antenna velocity

CAUTION

Antenna velocity shall not exceed 600 fpm.

5. STWA deployment — Observe the following

CAUTION

Reel operator shall monitor reel spool if antenna wire is being stretched or the amount of antenna wire is in doubt.

a. A1A2 SHORT WIRE VELOCITY control panel:

(1) TENSION meter — Tension will decrease from nested tension then increase gradually.

(2) VELOCITY meter — Not to exceed 600 fpm.

b. A1A3 LENGTH FEET display — Increases.

c. A1A15 SHORT WIRE RESERVE FEET indicator — Decreases.

d. Manual drogue release T-handle — Stowed.

24.8.8.2 STWA Deployment Termination

1. Emergency Extend mode selected:

Note

Antenna will not automatically stop when actual length reaches desired length. This mode requires reel operator intervention prior to reaching desired length.

a. Antenna wire — At 500 feet from desired length, slow velocity to 500 fpm. Continue to match velocity with remaining length (400 fpm at 400 feet, 300 fpm at 300 feet, etc.). At 100 feet from desired length, ensure velocity is 100 fpm or less.

b. A1A3 LENGTH FEET display — Indicates selected length, perform and observe the following:

(1) A4A6 STWA EMER EXT control panel EMERGENCY BRAKE RELEASE knob — Rotate CCW to LOCK (DETENT) while observing A1A1 SHORT WIRE BRAKE ON indicator is on.

(2) A1A3 SHORT WIRE LENGTH control panel:

(a) LENGTH FEET display and LENGTH COMMAND indicators — Equal ±15 feet.

(b) EXTEND indicator — Off.

(c) STOP indicator — On.

(d) RETRACT indicator — Off.

(3) A1A2 SHORT WIRE VELOCITY control panel:

(a) VELOCITY meter — Zero fpm.

(b) TENSION meter — Stabilized.

c. A4A6 SHORT WIRE EXT control panel NORMAL BRAKE knob — Rotate fully CCW (VENT).

d. Manual value MV1 — Closed.

24.8.8.3 STWA Park Mode Procedures

1. P111 PWR control panel STWA HYDR PWR switch — Select OFF and observe the following:

a. A1A10 SHORT WIRE HYDR indicators:

(1) LOW PRESSURE indicator — On.

(2) NORMAL PRESSURE indicator — Off.

(3) HOT indicators — Off.

b. A4 hydraulic panel:

(1) M1 gauge — Zero psi.

(2) M2 gauge — 150 ±15 psi.

c. A4A6 SHORT WIRE EMER EXT control panel NORMAL BRAKE PRESSURE gauge — 47 ±5 psi.

2. A1A2 ANTENNA ACCESS switch — Guarded OFF.

Note

ANTENNA ACCESS switch to OFF enables comm/central to unground shorting switch for transmission. While VLF-PA is in a transmitting cycle, A1A2 ANTENNA GROUNDED indicator will be off.

3. A1A2 LENGTH COMMAND switches — Set to LENGTH FEET display.

4. Notify comm/central and pilot that both antennas are parked and give actual antenna wire lengths.

24.8.9 STWA Emergency Extend Operation (Without Hydraulic Pressure). This procedure shall only be performed in the event of loss of hydraulic pressure to the STWA as seen as A4A5M3. Coordinate with mission commander prior to performing this procedure.

CAUTION

RO at A4A1 hydraulic control panel shall be in ICS communication with the second RO or an observer at the main control console.

24.8.9.1 STWA Emergency Extend

1. A1A2 VELOCITY meter — Draw a heavy line on the 600 fpm mark with a grease pencil.

2. Remove the STWA hydraulic cover panel.

3. A4A1 manual valve MV1 — Open (horizontal position).

4. Service brake return vent valve — Open.

CAUTION

- Operation of STWA with service brake return vent valve in the open position will cause loss of auxiliary hydraulic fluid (approximately 0.2 GPM) and degrade aircraft system capabilities.

- Coordinate with aircraft commander prior to opening the service brake return vent valve.

5. Manual drogue release T-handle — Have RO/observer pull if drogue has not been released and hold while observing the following:

   a. A1A3 DROGUE IN indicator — Off.

   b. A1A3 DROGUE OUT indicator — On.

6. A4A1 Emergency brake handle — Pull/push until A1A2 VELOCITY meter indicates wire movement. Vary pressure on handle as requi to regulate antenna velocity.

CAUTION

Antenna velocity shall not exceed 600 fpm.

7. STWA deployment — Observe the following:

CAUTION

Reel operator shall monitor reel spool if antenna wire is being stretched or the amount of antenna wire is in doubt.

   a. A1A2 SHORT WIRE VELOCITY con panel:

      (1) TENSION meter — Tension will crease from nested tension then incre gradually.

      (2) VELOCITY meter — Not to exceed fpm.

   b. A1A3 LENGTH FEET display — Increas

   c. A1A15 SHORT WIRE RESERVED FE display — Decreases.

   d. Manual drogue release T-handle — H RO/observer stow handle.

24.8.9.2 STWA Deployment Termination

1. Emergency Extend mode selected:

Note

Antenna will not automatically stop when actual length reaches desired length. This mode requires reel operator intervention prior to reaching desired length.

   a. Antenna wire — At 500 feet from desi length, slow velocity to 500 fpm. Continu match velocity with remaining length (fpm at 400 feet, 300 fpm at 300 feet, etc.). 100 feet from desired length, ensure velo is 100 fpm or less.

b. A1A3 LENGTH FEET display — Indicates selected length, perform and observe the following:

(1) A4A1 emergency brake handle — Release.

(2) A1A1 SHORT WIRE EMERGENCY BRAKE ON indicator — On.

c. A1A3 SHORT WIRE LENGTH control panel:

(1) LENGTH FEET display and LENGTH COMMAND indicators — Equal ±15 feet.

(2) EXTEND indicator — Off.

(3) STOP indicator — On.

(4) RETRACT indicator — Off.

d. A1A2 SHORT WIRE VELOCITY control panel:

(1) VELOCITY meter — Zero fpm.

(2) TENSION meter — Stabilized.

e. Manual valve MV1 — Closed.

f. Service brake return vent valve — Closed.

24.8.9.3 STWA Park Mode Procedures

1. A1A2 ANTENNA ACCESS switch — Guarded OFF.

Note

ANTENNA ACCESS switch to OFF enables comm/central to unground shorting switch for transmission. While VLF-PA is in a transmitting cycle, A1A2 ANTENNA GROUNDED indicator will be off.

2. A1A2 LENGTH COMMAND switches — Set to LENGTH FEET display.

3. Notify comm/central and pilot that both antennas are parked, and give actual antenna wire lengths.

24.8.10 LTWA/STWA Uncontrollable Velocity

24.8.10.1 LTWA Uncontrollable Velocity

1. Immediately apply emergency brake..

2. Perform LTWA Manual Brake Extend mode setup procedures listed in paragraph 24.7.3.1.

3. If problem recurs, immediately apply emergency brake and perform LTWA Manual Hydraulic Extend mode setup procedures listed in paragraph 24.7.4.1.

4. If problem recurs, immediately apply emergency brake and perform LTWA Emergency Extend procedures listed in paragraph 24.8.7.1.

Note

- Coordinate with mission commander prior to performing LTWA emergency extend procedures.
- This condition will require maintenance to remedy.

24.8.10.2 STWA Uncontrollable Velocity

1. Immediately apply emergency brake.

2. Perform STWA Manual Extend Mode procedures listed in paragraph 24.7.3.2.

3. If problem recurs immediately apply emergency brake and perform STWA emergency extend procedures listed in paragraph 24.8.8.1.

Note

- Coordinate with Mission Commander prior to performing STWA Emergency Extend procedures.
- This condition will require maintenance to remedy.

24.8.11 LTWA/STWA Excessive Tension

CAUTION

- If tension is above 1,600 pounds on LTWA or 400 pounds on STWA, do not retract antenna. Keep LTWA normal and emergency brakes on and STWA emergency brake on.
- If all attempts to correct the condition fail, coordinate with aircraft commander prior to cutting antenna wire.

Note

Excessive tension is above 1,600 pounds on LTWA and 400 lbs on STWA.

1. Check for excessive airspeed.
2. Check for icy conditions.
   a. If icy conditions exist, pilot should climb or descend as necessary.
   b. If attempting to climb does not remedy the situation, pilot should nose the aircraft over while reel operator attempts to retract antenna during descent.

24.8.12 LTWA/STWA Cable Cutting

Note

Coordinate with aircraft commander prior to cutting antenna wire.

1. Electrical method
   a. A1A6 or A1A1 ARM switch — Unguarded and ON.
   b. A1A6 or A1A1 CUT switch — Unguarded and ON.

Note

Electrical arming and cutting of antenna wire must be done from the same panel (flight deck or A1 main console).

2. Manual method
   a. LTWA cable cutter manual T-handle — tate CW 90° and pull sharply.
   b. STWA cable cutter manual T-handle — sharply.

24.8.13 LTWA Misspool

1. A1A8 STOP switch — Press and observe following:
   a. EXTEND indicator — Off.
   b. STOP indicator — On.
   c. RETRACT indicator — Off.
2. A1A7 VELOCITY control panel:
   a. VELOCITY meter — Zero fpm.
   b. TENSION meter — Stabilized.
   c. VELOCITY knob — Position two.
3. A1A11 NORMAL BRAKE pressure gaug 450 ±50 psi.
4. A1A8 LENGTH control panel:
   a. AUTOMATIC/MANUAL switch — S MANUAL.
   b. EXTEND switch — Press and observe following:
      (1) EXTEND indicator — On.
      (2) STOP indicator — Off.
      (3) RETRACT indicator — Off.
5. Slowly extend antenna wire past misspool.
6. A1A8 LENGTH control panel:
   a. STOP switch — Press and observe the lowing:
      (1) EXTEND indicator — Off.
      (2) STOP indicator — On.
      (3) RETRACT indicator — Off.

b. RETRACT switch — Press and observe the following:

CAUTION

When initiating Retract mode, reel operator shall guard the LONG WIRE EMERGENCY BRAKE switch. If main drive high pressure exceeds 4,000 psi or negative antenna wire movement occurs, immediately apply emergency brake.

(1) EXTEND indicator — Off.

(2) STOP indicator — Off.

(3) RETRACT indicator — On.

(4) LENGTH FEET display — Decreases.

(5) A1A7 VELOCITY meter — Moves off zero in retract direction.

7. Slowly retract antenna wire until misspool is corrected.

8. A1A7 velocity knob — As desired, when misspool is corrected.

Note

If antenna wire continues to misspool at about the same area, decrease and increase velocity as necessary to retract antenna wire.

9. Continue retract in manual mode.

10. LTWA reel spool/fleet angle compensator — Observe for smooth operation.

24.8.14 LTWA Excessive Nesting Speed. If nesting cycle does not occur by 150 feet from nest, perform the following:

1. A1A6 LONG WIRE EMERGENCY BRAKE switch — ON.

2. After antenna has stopped, perform the following:

a. A1A6 LONG WIRE EMERGENCY BRAKE switch — Select OFF and observe the following:

(1) A1A6 LONG WIRE EMERGENCY BRAKE ON indicator — Off.

Note

If not off, push PRESS FOR RESET switch.

(2) A1A11 NORMAL BRAKE pressure gauge — Increases to 450 ±50 psi.

b. A1A7 VELOCITY knob — Position 1 or less.

c. A1A8 LONG WIRE LENGTH control panel:

(1) AUTOMATIC/MANUAL switch — Select MANUAL.

(2) HYDRAULIC mode switch — Press and observe the following:

(a) A1A9 WATER PUMP ON indicator — On.

(b) HYDRAULIC MODE indicator — On.

Note

- If normal brake water cooling system is inoperative, Hydraulic mode of operation will not be affected.
- If hydraulic drive clutch does not engage, HYDRAULIC MODE indicator will not enable.

(3) Extend switch — Press and observe the following:

CAUTION

Antenna velocity shall not exceed 100 fpm.

(a) EXTEND indicator — On.

(b) STOP indicator — Off.

(c) RETRACT indicator — Off.

3. A1A8 LENGTH FEET display — Indicates 500 feet, press STOP switch and observe the following:

a. A1A8 LONG WIRE LENGTH control panel:

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

b. A1A7 LONG WIRE VELOCITY control panel:

(1) VELOCITY meter — Zero fpm.

(2) TENSION meter — Stabilized.

c. A1A11 NORMAL BRAKE pressure gauge — 450 ±50 psi.

d. A1A9 DRIVE HIGH PRESSURE gauge — 185 ±35 psi.

4. Perform LTWA Retract procedures listed in Paragraph 24.7.7.4.

CAUTION

Antenna velocity shall not exceed 100 fpm.

24.8.15 STWA Excessive Nesting Speed. If the nesting cycle does not occur by 50 feet from nest, perform the following:

1. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select ON and observe SHORT WIRE EMERGENCY BRAKE ON indicator is on.

2. After antenna has stopped, perform the following:

a. A1A1 SHORT WIRE EMERGENCY BRAKE switch — Select off and observe SHORT WIRE EMERGENCY BRAKE ON indicator is off.

Note

If not off, push PRESS FOR RESET switch.

b. A1A2 VELOCITY knob — Position four or less.

c. A1A3 SHORT WIRE LENGTH control panel:

(1) AUTOMATIC/MANUAL switch — lect MANUAL.

(2) EXTEND switch — Press.

CAUTION

Antenna velocity shall not exceed 100 fpm.

3. A1A3 LENGTH FEET display — Indicates feet, press STOP switch and observe the foll ing:

a. A1A3 LONG WIRE LENGTH control pa

(1) EXTEND indicator — Off.

(2) STOP indicator — On.

(3) RETRACT indicator — Off.

b. A1A2 LONG WIRE VELOCITY cor panel:

(1) VELOCITY meter — Zero fpm.

(2) TENSION meter — Stabilized.

4. Perform STWA Retract procedures listed paragraph 24.7.7.3.

CAUTION

Antenna velocity shall not exceed 100 fpm.

24.8.16 Liquid Cooling System Leak (In Flig

1. If a leak in the LCS is discovered — Shut d LCS.

CAUTION

If EGW solution comes in contact with silver, silver coated, or tin solder connections carrying a dc voltage of more than 1.5 volts dc, the EGW can ignite.

2. Inspect all accessible equipment connected to LCS.

3. Clean EGW spills, especially near electrical equipment.

4. If LCS is holding pressure and no electrical equipment appears contaminated, continue operations.

5. Monitor LCS pressure carefully for remainder of flight.

24.8.17 Loss of STWA Hydraulic Return Pump. Failure of STWA hydraulic return pump is indicated by A4A6 NORMAL BRAKE PRESSURE gauge indicating 47 ±5 psi when power has been applied to the pump. If this occurs perform the following:

1. P624-2 STWA HYD circuit breakers:

   a. RETURN PUMP — In.

   b. SOV — In.

2. P111 PWR STWA HYDR PWR switch — Select OFF and then ON.

3. If STWA hydraulic return pump still will not start, and retract operation is desired, attempt to retract antenna without the use of the STWA hydraulic return pump.

4. If antenna will not retract or extend, perform the following:

   a. Service brake return vent valve — Open.

CAUTION

- Operation of STWA with service brake return vent valve in the open position will cause loss of auxiliary hydraulic fluid (approximately 0.2 GPM) and degrade aircraft system capabilities.

- Coordinate with aircraft commander prior to opening the service brake return vent valve.

- Antenna will be operated in an automatic mode to prevent excessive loss of hydraulic fluid.

   b. Perform STWA Automatic Extend/Retract mode procedures as required.

   c. Service brake return vent valve — Close.

24.8.18 Loss of Drogue. Three possible combinations of drogue losses can occur:

1. Loss of the LTWA drogue, but not the STWA Drogue.

2. Loss of the STWA drogue, but not the LTWA Drogue.

3. Loss of both LTWA and STWA drogues.

In each of these three categories, the drogue may have been lost near the aircraft or at some distance from it.

CAUTION

- These procedures shall be used in an emergency only.

- Coordinate with mission commander prior to performing these procedures.

24.8.18.1 LTWA Drogue Loss at Some Distance From Nest. Assume that antenna wire broke at or near drogue and LENGTH FEET DISPLAY is near correct. Operate under this assumption unless proven otherwise.

1. If tension is above 75 pounds, continue to operate antenna to desired length in manual mode.

2. If tension is less than 75 poundss, perform the following:

WARNING

Extreme care shall be exercised during this type of operation.

Note

If the tension is below 75 pounds, the antenna length is probably less than 1,500 feet.

   a. Aircraft speed — Slow to minimum practical airspeed.

   b. Antenna — Operate in either manual or emergency mode.

c. Exit/nest assemblies — Hand feed antenna wire until sufficient tension (75 pounds) is gained to allow normal operation of antenna.

Note

Because of exit assembly construction, hand feeding may require entering aft lower lobe and removing the exit tube access panel (port side).

d. Extend LTWA to desired length and allow antenna wire to stabilize before extending STWA.

WARNING

If the whipping action of antenna wire becomes excessive, stop operation and cut antenna wire.

e. During retract cycle, retract STWA first.

CAUTION

Antenna wire shall not be retracted to the nest without a drogue attached.

24.8.18.2 STWA Drogue Loss at Nest

WARNING

Extreme care shall be exercised during this type of operation.

1. Aircraft speed — Slow to minimum practical airspeed.
2. Antenna — Operate in either manual or emergency mode.
3. Exit/nest assemblies — Hand feed antenna wire until sufficient tension (35 pounds) is gained to allow normal operation of antenna.

WARNING

When entering reel housing area or projection box area on STWA, ensure shorting stick is used to ground inner enclosure.

4. Extend STWA to desired length and allow tenna wire to stabilize before extending LTW

WARNING

If the whipping action of antenna wire becomes excessive, stop operation and cut antenna wire.

5. During retract cycle, retract LTWA first

WARNING

Antenna wire shall not be retracted to the nest without a drogue attached.

24.8.18.3 STWA Drogue Loss Some Distar From Nest.

Assume that antenna wire broke a near drogue and *LENGTH FEET DISPLAY* is r correct. Operate under this assumption unless pro otherwise.

1. If tension is above 35 pounds, continue to o ate antenna to desired length in manual mode

WARNING

Extreme care shall be exercised during this type of operation.

2. If tension is less than 35 pounds, perform the lowing:

Note

If the tension is below 35 pounds, the antenna length is probably less than 1,500 feet.

a. Aircraft speed — Slow to minimum pract airspeed.

b. Antenna — Operate in either manual emergency mode.

c. Exit/nest assemblies — Hand feed antenna wire until sufficient tension (35 pounds) is gained to allow normal operation of antenna

WARNING

When entering reel housing area or projection box area on STWA, ensure shorting stick is used to ground inner enclosure.

d. Extend STWA to desired length and allow antenna wire to stabilize before extending LTWA.

WARNING

If the whipping action of antenna wire becomes excessive, stop operation and cut antenna wire.

Note

Antenna voltage on the PA may be used to indicate correct antenna length. Antenna length may be varied until correct readings are obtained.

e. During retract cycle, retract LTWA first

WARNING

Antenna wire shall not be retracted to the nest without a drogue attached.

24.8.18.4 Loss of Both Drogues at Some Distance From the Nest. If this condition occurs, perform the following:

1. If in extend, immediately stop both antennas

2. extend the stwa first as described in stwa drogue loss some distance from nest procedures listed in paragraph 24.8.18.3

CAUTION

The STWA is likely to have the most violent whipping action and shall be extend first and allowed to stabilize at a length assumed to be correct before LTWA is extended.

3. Extend the LTWA as described in LTWA drogue loss at some distance from nest procedures listed in paragraph 24.8.18.1.

4. During retract cycle, retract LTWA first as described in LTWA drogue loss at some distance from nest procedures listed in paragraph 24.8.18.1.

CAUTION

Care must be exercised to avoid tangling the antenna wires.

5. Retract STWA as described in STWA drogue loss some distance from nest procedures listed in paragraph 24.8.18.3.

24.9 REEL OPERATOR POST FLIGHT

If LTWA/STWA have been deployed in flight, perform LTWA/STWA DENEST/NEST PROCEDURES prior to performing the following procedures.

24.9.1 Internal Visual Post flight

1. A1 main/auxiliary control console areas:

   a. Lower kick panel — Check for proper security.

   b. Control panels — Inspect for proper positioning and security.

   c. Meters and gauges — Check for cracks and cleanliness.

   d. A1A1 and A1A6 EMERGENCY control panels — Check ARM and CUT switches are red guarded and shear wired.

   e. A1A11 LONG WIRE EMER EXT control panel:

      (1) EMERGENCY BRAKE RELEASE handle — Up and stowed.

      (2) NORMAL BRAKE knob — Rotate CCW until fully vented.

      (3) NORMAL BRAKE pressure gauge — Zero psi.

f. Water coolant sight gauge — Check for proper level (14 gallon minimum) and visible signs of EGW leakage.

CAUTION

If EGW leak is found on postflight, inform maintenance that there is a discrepancy. If EGW comes in contact with silver, silver coated, or tin solder connections, corrosion can occur. If these connections are carrying a dc voltage of more than 1.5 volts, the EGW can ignite. The danger is greatest when a thin film is present. If the leak is in a pressurized portion of the LCS, the leak should be repaired before the next flight.

g. A4A6 SHORT WIRE EMER EXT control panel:

(1) EMERGENCY BRAKE RELEASE knob — LOCK (fully CCW).

(2) NORMAL BRAKE knob — Rotate CCW until fully vented.

(3) NORMAL BRAKE PRESSURE gauge — 47 ±5 psi.

h. STWA emergency cable cutter T-handle — Check for proper position and shear wired.

i. STWA manual drogue release T-handle — Check for proper position.

j. P111 PWR control panel:

(1) STWA HYDR PWR switch — OFF.

(2) DROGUE LT switches:

(a) STWA switch — OFF.

(b) LTWA switch — OFF.

k. P108 VLF/LF DROGUE NEST CONTROL panel:

(1) RETRACT/OFF/EXTEND switch — OFF.

(2) All indicators — Off.

2. STWA A4 area:

a. Drip pan — Check for obvious signs of draulic leaks.

b. SERVICE BRAKE RETURN VENT v — NORMAL and safety wired.

CAUTION

Operation of the STWA with the service brake return vent valve in the SERVICE BRAKE RETURN VENT position will cause loss of auxiliary hydraulic fluid and degrade system capabilities.

c. Remote emergency brake handle — UP properly latched in retainer.

d. Manual valve MV1 — Closed and s wired.

e. Manual valve MV2 — Open and s wired.

f. M1 gauge — Zero psi.

g. M2 gauge — Precharge pressure of 150 psi.

h. M3 gauge — Precharge pressure of 750 psi.

Note

M3 gauge may require bleeding to check precharge.

i. Pulley and cable cutter assemblies — C for proper wire routing and component s rity

WARNING

When entering reel housing area or projection box area on STWA, ensure shorting stick is used to ground inner enclosure.

j. Dielectric platform — Check for cracks.

k. Load cell — Check for leaks and security

l. Cable cutter safety pins — Installed.

CAUTION

When installing cable cutter safety pin, ensure trip lever is not pulled out. If a pin does not install easily, push trip lever in slightly to install pin. If pin still does not install easily, maintenance may be required.

m. Access panels — Check for proper security.

3. LTWA A3 area:

a. LTWA cable cutter manual T-handle — Check for proper position and shear wired.

b. LTWA manual drogue release T-handle — Check for proper position.

c. Pulley and cable cutter assemblies — Check for proper wire routing and component security.

d. Cable cutter safety pins — Installed.

CAUTION

When installing cable cutter safety pin, ensure trip lever is not pulled out. If a pin does not install easily, push trip lever in slightly to install pin. If pin still does not install easily, maintenance may be required.

e. Access panels — Check for proper security

4. LTWA A2 area:

a. A2A4 400 HZ POWER DISTRIBUTION panel:

(1) Fuses (6) and Reel Motor switch (S1) — Check for security and general condition.

(2) Circuit breakers (3) — OFF.

b. A2 hydraulic reservoir fluid sight gauge — Check for proper level (normal range).

c. Deck areas — Check for obvious signs of hydraulic leaks.

d. A2A1 hydraulic panel — Check for precharge pressure of 650 ±50 psi on M2 and M4 gauges.

e. Reservoir area — Check for visible signs of EGW leakage.

CAUTION

If EGW leak is found on postflight, inform maintenance that there is a discrepancy. If EGW comes in contact with silver, silver coated, or tin solder connections, corrosion can occur. If these connections are carrying more than 1.5 vdc, the EGW can ignite. The danger is greatest when there is a thin film. If the leak is in a pressurezed portion of the LCS, the leak should be repaired before next flight.

Note

The M4 gauge may require bleeding to check precharge.

f. Fleet angle compensator — Check for proper lubrication.

g. Antenna wire — Check for correct wire routing.

h. Access panels — Check for proper security.

5. Comm/central controls and indicators:

a. 400 Hz DISTR 2 panel — Press VLF PWR ENABLE LWA Pushbutton and verify POWER ON Indicator is off.

b. 28 VDC DISTR 2 panel — Verify LONG WIRE CONT circuit breaker is closed.

c. Seat 4 VLF ANT panels (2) — Check for zero readings.

6. Verify the following P67 panels circuit breakers are closed:

a. P67-1

(1) MISSION POWER DISTRIBUTION — BUS 1.

(2) LTWA WINCH.

(3) EXTERIOR LIGHTING DROGUE

(a) CONT.

(b) LONG WIRE ANT.

(c) SHORT WIRE ANT.

b. P67-2

(1) MISSION DIST BUS 5.

(2) DROGUE NEST CNTL — AC and DC.

(3) STWA HYD — RETURN PUMP and SOV.

(4) LTWA WINCH ELCU CONT.

(5) POWER DISTRIBUTION PANEL 2 — 28 VDC.

c. P67-3

(1) LTWA WINCH ASSY.

(2) LIQUID COOLING SYSTEM:

(a) VALVE GRD.

(b) VALVE COOLER — 1 and 4.

(c) PUMP CONT — 1 and 2.

(d) INDS.

(3) MISSION POWER DISTRIBUTION.

(a) FMR RECTIFIER UNITS — 1 and 5.

(b) 28 VDC — BUS 1 DIST 1 and BUS 5 DIST 1.

7. Galley area:

a. Trash bags — Remove and dispose.

b. Refrigerator power switches — OFF.

c. Galley electrical control panel MAIN POWER switch — off.

d. Galley — Check for cleanliness.

8. Lavatory area — Check for cleanliness.

9. Flight deck reel systems indicators and controls:

a. EMERGENCY CABLE CUTTER pane Check ARM and CUT switches (4) are guarded and shear wired.

b. STWA/LTWA TENSION indicators Check for zero readings.

c. VLF ANT panel — Check for blank r ings.

d. P61-4 panel circuit breakers:

(1) CABLE CUT — CUTTER and C TROL — Closed.

(2) HEATER — VLF STEAM VENT M — Closed.

24.9.2 External Visual Post flight

1. Starboard wheel well — Check STWA hydra return pump for leaks.

WARNING

Verify wheel well door safety locks are installed.

2. Aft lower compartment:

a. LTWA/STWA spare drogues — Check security.

b. Check area for visible signs of hydra leaks.

3. LTWA drogue nest — Retracted.

WARNING

If the drogue nest is extended, verify bay interlock switch is deactivated and pinned.

4. STWA drogue — Nested.

5. Port wheel well area:

WARNING

Verify wheel well door safety locks are installed.

a. Check area for visible signs of EGW leaks.

CAUTION

If EGW leak or spill is found on postflight, have maintenance determine whether the problem is a leak or a spill and clean up as much of the liquid as possible. If EGW solution comes in contact with silver, silver coated, or tin solder connections, corrosion can occur. If these connections are carrying a dc voltage of more than 1.5 volts, the EGW can ignite. The danger is greatest when a thin film is present. If leak is in pressurized portion of LCS, it should be repaired before flight.

b. LCS nitrogen pressure gauge — Over 500 psi.

CHAPTER 25

Mission System Checklists

25.1 SEAT ONE

This checklist does not replace the amplified version of the procedures in Chapter 19 of this manual. To operate the equipment safely and efficiently, you must read and thoroughly understand why each step is performed and why it occurs in a certain sequence.

25.1.1 Seat One Preflight

25.1.1.1 Station Oxygen/ICS Preflight

1. ICS CSU — Checked.
   a. All volume controls — CCW.
   b. PTT switch — ICS.
   c. ICS selector switch — ALL.
   d. ICS volume switch — Midrange.
   e. TEST switch — Pressed.
2. Oxygen, ICS — Checked.
   a. Mask visual check — Complete.
   b. SUPPLY lever — ON.
   c. Emergency lever — TEST MASK.
   d. Microphone check — Complete.
   e. Diluter lever — 100% OXYGEN.
   f. Emergency lever — EMERGENCY.
   g. Emergency lever — NORMAL.
   h. SUPPLY lever — OFF.

25.1.1.2 TMPS Preflight

1. Circuit breakers — Checked.
2. DISPLAY KEYBOARD switch — MESSAG PROCESSOR.
3. Line printer — Checked.
   a. Internal circuit breakers — Closed.
   b. POWER switch — ON.
   c. TEST switch — Up.
4. EAM ALARM — Checked.
5. DKU — Set.
   a. POWER switch — ON.
   b. KEYBD READY key — Activated.
   c. LAMP TEST key — Depressed.
6. Message processor control — Set.
   a. Power switch — ON.
   b. LAMP TEST — Depressed.
7. TMPS program — Loaded.
   a. IPL switch — Initiated.
   b. BASE NUMBER — Entered.
   c. PARITY ALARM — Reset.
   d. BL ERASE key — Pressed.
   e. Diagnostic tests — As Required.

f. TMPS display — Verified.

g. "Y" — Entered.

h. PROC MEM CLEAR indicator — Checked.

i. Reperf Tape Format — Entered.

25.1.2 Seat One Postflight

25.1.2.1 Station Oxygen/ICS Postflight

1. Oxygen — NORMAL, 100% OXYGEN, SUPPLY OFF.
2. CSU PTT selector — ICS.

25.1.2.2 Keyline Control Selector Switches — OFF

25.1.2.3 TMPS Shutdown

1. Processor memory — Zeroized.
2. PROC MEM CLEAR indicator — Extinguished.
3. Display/keyboard power switch — OFF.
4. Line printer power switch — OFF.
5. Message processor control power switch — OFF.

25.2 SEAT TWO

This checklist does not replace the amplified version of the procedures in Chapter 20 of this manual. To operate the equipment safely and efficiently, you must read and thoroughly understand why each step is performed and why it occurs in a certain sequence.

25.2.1 Seat Two Preflight

25.2.1.1 Station Oxygen/ICS Preflight

1. ICS CSU — Checked.
   a. All volume controls — CCW.
   b. PTT switch — ICS.
   c. ICS selector switch — ALL.
   d. ICS volume switch — Midrange.
   e. TEST switch — Pressed.
2. Oxygen, ICS — Checked.
   a. Mask visual check — Complete.
   b. SUPPLY lever — ON.
   c. Emergency lever — TEST MASK.
   d. Microphone check — Complete.
   e. Diluter lever — 100% OXYGEN.
   f. Emergency lever — EMERGENCY.
   g. Emergency lever — NORMAL.
   h. SUPPLY lever — OFF.

25.2.1.2 TDM/TTY Preflight

1. Paper and ribbon — Checked.
2. TDM, TTY equipment, power — On.
3. TDM — Checked.
   a. Circuit breakers — Checked.
   b. LAMP TEST switch — Pressed.
   c. LOOP SELECT switch — AUTO.
   d. Faults — Reset.
   e. TD-1 and -2 BAUD SELECT switches — BAUD.
4. Keyboard/printers — Checked.
   a. CB1, CB2, and CB3 — Closed.
   b. Illumination level — Adjusted.
   c. AUDIO switch — As Required.
   d. PTR RDY indicator — On.
   e. LAMP TEST pushbutton — Pressed.
   f. INTERFACE selector — LO.
   g. EXT TDS — DSBL.
   h. LINE FEED — As Required.
   i. BAUD RATE selector — 75 BAUDOT.
5. TTY TSEC — Checked.
   a. ENABLE/ZEROIZE switch — ENABLE
   b. POWER switch — ON.
   c. INITIATE/IND TEST switch — IND TE
   d. MODE switch — LD.
   e. VAR SEL switch — U.
   f. KEK loading — Complete.
   g. TEK loading — Complete.
   h. K0I-18 — Removed.
   i. VAR SEL switch — As Required.
   j. MODE selector switch — OPR.
   k. INITIATE/IND TEST switch — INITIA
6. FSK keyer/demodulator — Set.
   a. PWR switch — Depressed.
   b. AMHI switch — Depressed.
   c. DIV switch — Down.

d. DEMOD and KEYER switches — Depressed.

7. Reperforators and TDs — Checked.

a. TDM connections — Connected.

(1) KB-1 to PRT-1.

(2) KB-1 to REPERF 1.

(3) KB-2 to PRT-2.

(4) KB-2 to REPERF 2.

(5) KB-2 to REPERF 3.

b. Automatic RY test — Initiated.

c. TDM connections — Released.

d. TDM connections — Connected.

(1) TD-1 to PRT-1.

(2) TD-2 to PRT-2.

e. RY tester — Sent.

f. TDM connections — Released.

8. TDM digital status and TSEC circuits — Checked.

a. Dc jackfield patches — Complete.

b. TDM connections — Connected.

c. RY test — Initiated.

d. TD-1 — STOP.

e. TDM connections — Connected.

f. RY test — Initiated.

g. TD-1 — STOP.

h. Dc jackfield patches — Complete.

i. TDM connections — Complete.

j. RY test — Complete.

k. TD-1 — STOP.

9. FSK keyer/demodulators — Checked.

a. Dc jackfield patches — Complete.

b. Audio jackfield patches — Complete.

c. TDM connections — Complete.

d. RY test — Complete.

10. FSK keyer/demodulator diversity — Checked.

a. Diversity switches — Up.

b. Dc jackfield patches — Complete.

c. Audio jackfield patches — Complete.

d. TDM connections — Complete.

e. RY test — Complete.

f. TTY keyboard No. 2 — RESET.

g. TDM connections — Released.

h. FSK keyer/demodulators — Secured.

11. Data modem — Checked.

a. Data modem switches — Set.

b. Dc jackfield patches — Complete.

c. Audio jackfield patches — Complete.

d. TDM connections — Complete.

e. RY tester — Complete.

25.2.1.3 UHF Transmit Antenna Control — Checked

25.2.1.4 UHF Receive Antenna Control Preflight

1. Attitude reference equipment — Checked.

2. FTS — On.

3. SATELLITE DATA board — Installed.

4. ANTENNA SELECT switch — AUTO.

5. DISPLAY selector — CLOCK.

6. POWER switch — ON.
7. ENTER switch — Pressed.
8. Date and time — Entered.
9. Test satellite — Selected.
10. DISPLAY switch — INS LAT.
11. DISPLAY switch — INS LONG.
12. DISPLAY switch — HEADING.
13. Left-hand LATITUDE DAY SATELLITE thumbwheel — 2.
14. Left-hand LATITUDE DAY SATELLITE thumbwheel — 3.

25.2.1.5 UHF-3 PSK Preflight

1. TDM/TTY and TMPS — On.
2. UHF-3 LOS control mode switch — OFF or SATL.
3. UHF loop test translator — Off.
4. PSK modem control — Checked.
   a. Mode selector switch — BIT.
   b. DISPLAY CONTROL switch — Pressed.
   c. DISPLAY CONTROL switch — Pressed.
   d. CHANNEL SELECT thumbwheels — Checked.
   e. Mode selector switch — OPR 2.
   f. LAMP TEST pushbutton — Pressed.
   g. CHANNEL SELECT thumbwheels — Test Channel.
5. Dc jackfield patches — Complete.
6. TDM connections — Complete.
7. Test pattern — Printed.
8. TDM connections — Released.
9. Dc jackfield patches — Removed.
10. PSK modem control mode selector — OFF.
11. UHF-3 LOS control mode switch — OFF.

25.2.1.6 UHF-4 Preflight

1. TTY, TMPS, and UHF receive antenna subs tems — On.
2. TSEC-9 PWR switch — On.
3. TSEC-9 remote control PWR switch — ON.
4. UHF-4 nonsecure — Checked.
   a. UHF transmit antenna control ANTEN SELECTOR switch — AUTO.
   b. UHF loop test translator — Set.
   c. UHF-4 satellite RT control — Set.
      (1) MODE switch — SATL.
      (2) SATL switch — A, B, or C.
   d. Keyline control — Set.
      (1) UHF-4 switch — TTY.
      (2) UHF selector switch — 4F.
   e. NB modem control — Set.
      (1) Mode switch — Tested.
      (2) Mode selector — SYNC RCVR 1, 2, o
      (3) CHANNEL SELECT switches — Set.
   f. B/A and A/B converters — ON.
   g. TDM connections — Connected.
   h. NB control TEST switch — KEY.
   i. NB TEST switch — SYNC RCVR 1, 2, or
   j. NB loop test — Initiated.
   k. NB loop test — Completed.
5. UHF-4 secure — Checked.
   a. TSEC-9 remote control LAMP TEST Pressed.

b. TSEC-9 — Set.

(1) Code — Loaded.

(2) XMIT PREP and RCV PREP — Pressed.

c. Test message — Transmitted.

d. TDM connections — Released.

e. Keyline control UHF-4 switch — OFF.

f. TTY TDs reperforator power switches — OFF.

g. UHF-4 satellite R/T control — OFF.

h. TSEC-9 remote control — Set.

i. UHF loop test translator ANT 2 LOOP switch — OFF.

j. TSEC-9 power switch — OFF.

25.2.1.7 UHF-5 Preflight

1. TTY, TMPS, and UHF receive antenna subsystems — On.

2. UHF-5 WB — Checked.

a. UHF transmit antenna control ANTENNA SELECT switch — AUTO.

b. UHF loop test translator — Set.

c. Keyline control — Set.

(1) UHF-5 switch — TTY.

(2) UHF selector switch — 5F.

d. UHF-5 satellite RT control — Set.

(1) SATL switch — A, B, or C.

(2) MODE switch — SATL.

e. WB modem control — Set.

(1) MODE switch — Tested.

(2) MODE switch — NORM.

(3) SYNC TOGGLE switch — NORMAL.

(4) DOPPLER switch — NORM.

(5) Transmit and receive addresses — Set.

f. TSEC-4 PWR switch — ON.

g. TSEC-4 remote control PWR switch — ON.

h. TMPS DISPLAY KEYBOARD switch — MESSAGE PROCESSOR.

i. MDF-3 UHF-5 PA circuit breaker — Closed.

j. UHF PA control RESET button — Pressed.

k. WB control mode switch — KEY.

l. WB control mode switch — NORM.

m. MDF-3 UHF-5 PA circuit breaker — Open.

n. Nonsecure test message — Transmitted.

o. TMPS DISPLAY KEYBOARD switch — UHF WIDEBAND.

p. Nonsecure test message — Transmitted.

3. UHF-5 WB secure operations — Checked.

a. TSEC-4 — Set.

(1) Code — Loaded.

(2) XMIT PREP and RCV PREP — Pressed.

b. Test message — Transmitted.

c. Keyline control UHF-5 switch — OFF.

d. UHF loop test translator ANT 2 LOOP switch — OFF.

e. TSEC-4 remote control — Set.

f. UHF-5 RT control power switch — OFF.

g. TSEC-4 power switch — OFF.

25.2.1.8 Baudot-to-Morse Converter/Handkey Preflight

1. CW KEY control VLF switch — TTY.

2. Dc jackfield patches — Complete.

3. VERDIN modulator POWER switch — On.
4. TDM connection — Complete.
5. Test tape — Transmitted.
6. ICS CSU CW CONV volume — Set.
7. Baudot-to-Morse converter DOT LENGTH — Adjusted.
8. TD-1 — STOP.
9. Dc jackfield patches — Removed.
10. TDM Connections — Released.
11. CW KEY control VLF switch — FWD.
12. FWD console outlet panel — Set.
13. ICS CSU VLF TXCW volume control — Set.
14. CW handkey — Tested.
15. CW KEY control VLF switch — AFT.
16. CW handkey — Tested.
17. CW KEY control — OFF.
18. VERDIN modulator POWER switch — OFF.
19. CW handkey — Disconnected and Stowed.

25.2.2 Seat Two Operation

25.2.2.1 UHF Receive Antenna Control Operation

1. To select another satellite:.
   a. DISPLAY selector — SAT DATA.
   b. Steps 10 through 13 of preflight — Completed.
2. To change time:.
   a. DISPLAY switch — CLOCK.
   b. Steps 7, 8, and 9 of preflight — Completed.
   c. Enter switch — Toggled.
3. To display pitch and roll:
   a. DISPLAY switch — HEADING.
   b. Left-most LATITUDE-DAY-SATELL switch — SET.
4. In response to flashing SET LAT on display:.
   a. LATITUDE DAY SATELLITE thumbwl switches — Aircraft Latitude.
   b. ENTER switch — Pressed.
   c. ENTER switch — Pressed.
   d. ENTER switch — Pressed.
   e. LONGITUDE HR/MIN thumbwl switches — Aircraft Longitude.
   f. ENTER switch — Pressed.
   g. ENTER switch — Pressed.
   h. DISPLAY switch — Heading.
5. In response to flashing CLK FLT on display:.
   a. DISPLAY switch — Clock.
   b. ENTER switch — Pressed.

   If display is correct, steps c through f ma omitted.
   c. ENTER switch — Pressed.
   d. Julian date and time — Entered.
   e. ENTER switch — Pressed.
   f. ENTER switch — Pressed.

25.2.2.2 UHF-3 PSK Operation

1. UHF-3 LOS control function switch — OF SATL.
2. PSK modem control mode switch — OPR 2.
3. PSK modem control receive channel and quency plan — As Required.
4. Dc jackfield — Patched.

5. TSEC — Set.
   a. ENABLE/ZEROIZE switch — ENABLE.
   b. POWER switch — ON.
   c. MODE switch — OPR.
6. TDM connections — As Required.

25.2.2.3 UHF-4 Operation

1. TTY, TMPS, and UHF receive antenna subsystems — On.
2. UHF-4 — On.
3. TSEC-9 and TSEC-9 remote control — On.
4. Appropriate crypto key — Loaded.
5. UHF-4 satellite RT control — Set.
   a. MODE switch — SATL.
   b. SATL switch — As Required.
6. NB mode selector — SYNC RCVR 1, 2, or 3.

25.2.2.4 UHF-5 Operation

1. TMPS and UHF receive antenna subsystems — ON.
2. Keyline control — Set.
   a. UHF-5 switch — TTY.
   b. UHF selector switch — 5F.
3. UHF-5 satellite RT control — Set.
   a. SATL switch — As Required.
   b. MODE switch — SATL.
4. WB modem control — Set.
   a. MODE switch — NORM.
   b. SYNC TOGGLE — NORMAL.
   c. DOPPLER switch — NORM.
   d. Transmit and receive addresses — Set.
5. TSEC 4 remote control PWR switch — ON.
6. TSEC 4 crypto keylist — Loaded.

25.2.3 Seat Two Postflight

25.2.3.1 Station Oxygen/ICS Postflight

1. Oxygen — NORMAL, 100% OXYGEN, SUPPLY OFF.
2. CSU PTT selector — ICS.

25.2.3.2 TDM/TTY Postflight

1. TDM control/display — Off.
2. TTY keyboard/printers, reperforators, and TDs — Off.
3. Dc jackfield patches — Removed.
4. TSECs — Set.
   a. ENABLE/ZEROIZE switch — ZEROIZE.
   b. POWER switch — OFF.

25.2.3.3 UHF Receive Antenna Control Postflight

1. Thumbwheel switches — Zeroized.
2. POWER switch — OFF.
3. Satellite data board — Removed and Stowed.

25.2.3.4 UHF-3 PSK Postflight

1. PSK modem control mode selector — OFF.
2. PSK modem control thumbwheel switches — A11.

25.2.3.5 UHF-4 Postflight

1. Keyline control UHF-4 switch — OFF.
2. UHF-4 R/T control power switch — OFF.
3. UHF-4 R/T control SATL switch — A.
4. NB modem control — Zeroized.
5. TSEC-9 remote control ZEROIZE switch — Toggled.

6. TSEC-9 remote control PWR switch — OFF.
7. TSEC-9 — Set.
    a. XMTR/RCVR ZERO OFF switches — ZERO OFF (down).
    b. POWER ON/OFF switch — OFF.

25.2.3.6 UHF-5 Postflight

1. Keyline control UHF-5 switch — OFF.
2. TSEC-4 remote control — Secured.
    a. ZEROIZE switch — Toggled.
    b. PWR switch — OFF.
3. WB modem control — Zeroized.
4. UHF-5 satellite R/T control — Set.
    a. Power switch — OFF.
    b. SATL switch — A.
5. TSEC-4 — Set.
    a. XMTR/RCVR ZERO OFF switches ZERO OFF (down).
    b. POWER ON/OFF switch — OFF.

25.3 SEAT THREE

This checklist does not replace the amplified version of the procedures in Chapter 4 of this manual. To operate the equipment safely and efficiently, you must read and thoroughly understand why each step is performed and why it occurs in a certain sequence.

25.3.1 Seat Three Preflight

25.3.1.1 Station Oxygen/ICS Preflight

1. ICS CSU — Checked.
   a. All volume controls — CCW.
   b. PTT switch — ICS.
   c. ICS selector switch — ALL.
   d. ICS volume switch — Midrange.
   e. TEST switch — Pressed.
2. Oxygen, ICS — Checked.
   a. Mask visual check — Complete.
   b. SUPPLY lever — ON.
   c. Emergency lever — TEST MASK.
   d. Microphone check — Complete.
   e. Diluter lever — 100% OXYGEN.
   f. Emergency lever — EMERGENCY.
   g. Emergency lever — NORMAL.
   h. SUPPLY lever — OFF.

25.3.1.2 Equipment Power Up

1. FTS UPS power — On.
2. FTS 1 and 2 power — On.
3. VLF receiver control heads power — On.
4. VLF preamp/filter control power — On.
5. VERDIN modulator power — On.
6. VERDIN terminals power — On.
7. IFPM power — On.
8. TSEC's 5, 6, and 7 power — On.
9. TMPS, TDM, and 1 HF receiver — Available.

25.3.1.3 FTS UPS Preflight

1. 400 HZ DISTR 2 panel FTS 1 and FTS 2 circu breakers — Open.
2. FTS UPS control panel — Checked.
   a. SYSTEM 1 CHARGER 400 HZ DISCOI NECT circuit breakers — Open.
   b. SYSTEM 2 BATT 28V circuit breaker - Open.
   c. FTS UPS circuit breakers — Closed.
   d. SYSTEM 2 CHARGER 400 HZ DISCOI NECT circuit breakers — Open.
   e. SYSTEM 1 BATT 28V circuit breaker - Open.
   f. FTS UPS circuit breakers — Closed.
3. 400 HZ DISTR 2 panel FTS 1 and FTS 2 circu breakers — Closed.

25.3.1.4 Oscilloscope Preflight

1. Coax cables — Connected.
2. CRO input panel channel A — AUD JF A.
3. CRO input panel channel B — AUD JF B.
4. O'scope — Set.
   a. SCALE knob — Midposition.
   b. FOCUS knob — Midposition.
   c. INTENSITY knob — Midposition.
   d. HORIZONTAL POSITION outer knob - Midposition.
   e. MAGNIFIER switch — X1.
   f. DISPLAY knob — INT.
   g. Ac/dc sliding switch — AC.

h. A POSITION knob — Midposition.

i. B POSITION knob — Midposition.

j. DISPLAY switch — Chop (B TRIGGER).

k. POLARITY switches — +UP.

l. VOLTS/CM switches — 1.

m. AC/GND/DC sliding switches — DC.

n. VERNIER knob — Max Clockwise.

o. TIME/CM switches — 0.5 m SEC.

p. MODE sliding switch — AUTO.

q. LEVEL knob — Minimum (CCW).

r. EXT ÷ 10/EXT/INT/LINE sliding switch — INT.

s. SLOPE switch — (+).

t. ACS/ACF/AC/DC switch — AC.

u. O'scope — On.

5. Audio jackfield CRO Channel A and B switches — Active Circuit.

6. O'scope INTENSITY control — Counter-Clockwise.

25.3.1.5 FTS Preflight

1. Minimum performance checks — Complete.

2. TIMING FAULT reset pushbutton — Pressed.

3. Coax — Connected.

4. Audio jackfield CRO CH A selector switch — HF Receive Voice Jack.

5. Time hack — Selected.

6. CRO input panel CHANNEL A switch — AUD JF A.

7. Clock — Synchronized.

   a. O'scope DISPLAY — A.

   b. MODE — NORM.

   c. EXT ÷ 10/EXT/INT/LINE — EXT.

   d. TIME CM — 50 m SEC.

   e. HORIZONTAL POSITION — Adjusted.

   f. FTS thumbwheels — Adjusted.

   g. TIME CM — Set.

   h. Delay setting — Set.

   i. FTS clock face — Set.

   j. 1-PPM — Set.

8. FTS 1 and 2 — Synchronized.

   a. FTS 2 minimum performance checks — Complete.

   b. Coax — Routed.

   c. FTS 2 thumbwheels — 000001.

   d. FTS 2 SYNC button — Pressed.

   e. FTS 2 clock face — Set.

   f. FTS 2 — Verified.

9. O'scope INTENSITY control — Set.

10. VLF control FREQ STD switch — 1 or 2 As Applicable.

25.3.1.6 VLF Preflight (Loop Back)

1. Connector J03 — Disconnected.

   a. VLF Modulator signal output — Verified.

   b. Modulator output cable — Set.

2. VERDIN modulator circuit tests — Performed.

   a. CKT TEST toggle switch — PWR.

   b. CKT TEST select switch — 1 Through 6.

   c. CKT TEST toggle switch — SIG.

   d. CKT TEST select switch — 1 Through 10.

3. VERDIN terminal circuit tests — Performed.

   a. VLF RCVR TERM 1, 2, and 3 circuit breakers — Open.

b. VLF RCVR TERM 1, 2, and 3 circuit breakers — Closed.

c. VLF TRANSMIT TERM and VLF TRANSMIT MOD circuit breakers — Open.

d. VLF TRANSMIT TERM and VLF TRANSMIT MOD circuit breakers — Closed.

4. VLF preamp/filter control panel — Set.

a. NOTCH FILTER FREQ SELECT switch — AUTO.

b. TRANSMIT MONITOR switch — OFF.

5. NOTCH FILTER auto tuning — Checked.

6. Receive terminal processors — Programmed.

a. Printer Baud — 50 Baud.

b. TDM connection — Connected.

c. VERDIN receive processors — Programmed.

d. VLF receiver control panels — Set.

(1) OPERATE MODE — 1000/170.

(2) MODE SELECT — MSK.

(3) FREQUENCY KHZ — 02975.

(4) GAIN MODE — AUTO.

e. VLF receiver TEST CIRCUITS switch — SIG LEV.

7. Transmit terminal — Programmed.

a. TDM connections — Connected.

b. VERDIN control unit — Set.

(1) MODE — CIPHER.

(2) KG1/KG2 CIPHER SELECT switches — 1.

c. Processor programming — Initiated.

d. TDM connections — Released.

e. VERDIN modulator — Set.

(1) MODULATION — MSK 800.

(2) CONSTANT FREQUENCY SHIFT OFF.

(3) FREQUENCY KHz — 29.75.

(4) I/O FAULT — Reset As Required.

8. TDM connections — Connected.

9. Test message — Transmitted.

10. VERDIN receive terminals 2 and 3 — Check

11. TDM connections — Connected.

12. VERDIN transmit terminal — MM15.

13. VERDIN modulator — Set.

a. MODULATION switch — FSK.

b. I/O FAULT — Reset As required.

14. TDM connections — Connected.

a. TD — VERDIN XMIT CH 1.

b. TD — 75 BAUD.

c. Printer — Released.

15. Test message — Transmitted.

16. VERDIN receive terminals 2 and 3 — Check

17. Modulator POWER switch — OFF.

18. TDM connections — Released.

19. TTY equipment — As Required.

20. Modulator output cable — Normal.

21. Equipment power — Secured.

25.3.2 Seat Three Operation

25.3.2.1 Oscilloscope Operation

25.3.2.1.1 Dc Signals

1. O'scope POWER switch — On.

2. Dc jackfield patches — Patched.

3. O'scope input channel — Selected.

4. O'scope controls — Set.

25.3.2.1.2 Audio Signals

1. O'scope POWER switch — On.
2. Audio jackfield signal source — Selected.
3. O'scope controls — Set.

25.3.2.2 VLF Receive Operation

25.3.2.2.1 VLF FSK Operation

1. VLF receiver NRC switch — NORMAL.
2. VLF receiver control — Set.
   a. POWER — On.
   b. MODE SELECT — As Required.
   c. FREQUENCY KHz switches — Set.
   d. GAIN MODE — Auto.
   e. OPERATE MODE — Set.
   f. AUDIO GAIN — On.
   g. BFO — As Required.
3. VERDIN receive terminal — As Required.
4. Dc jackfield patches — As Required.
5. VLF preamp/filter control — On.

25.3.2.2.2 VLF MSK Operation

1. VLF receiver control — Set.
   a. POWER switch — On.
   b. MODE SEL — MSK.
   c. FREQUENCY KHz switches — Set.
   d. GAIN MODE switch — AUTO.
   e. OPERATE MODE — As Required.
2. VERDIN receive terminal — Loaded.
3. VLF preamp/filter control — On.

25.3.2.2.3 VLF CW Reception

1. VLF preamp/filter control — On.
2. VLF receiver control — Set.
   a. VLF control power switch — On.
   b. FREQUENCY KHz switches — Set.
   c. GAIN MODE switch — MANUAL.
   d. RF GAIN control — MIDSCALE.
   e. OPERATE MODE switch — 200/50.
   f. AUDIO GAIN switch — On.
   g. BFO — As Required.
3. VLF preamp/filter control — On.

25.3.2.3 VLF Transmit Operation

1. VLF preamp/filter control — Set.
   a. POWER switch — On.
   b. NOTCH FILTER FREQ SELECT-KHz switch — AUTO.
2. VLF modulator — Set.
   a. POWER switch — Ac.
   b. FREQUENCY KHz switches — Set.
   c. CONSTANT FREQ SHIFT switch — OFF.
   d. MODULATION switch — As Required.
   e. I/O FAULT RESET button — Pressed.
3. VERDIN transmit terminal — Loaded.
4. Message transmission — Initiated.

25.3.3 Seat Three Postflight

25.3.3.1 Station Oxygen/ICS Postflight

1. Oxygen — NORMAL, 100% OXYGEN, SUPPLY OFF.
2. CSU PTT selector — ICS.

25.3.3.2 VERDIN Transmit/Receive Terminals

1. Modulator POWER switch — OFF.
2. Processor front panel RESET — Pressed.
3. Demodulators/control unit POWER switches — OFF.
4. TSEC 5, 6, and 7 — Secured.
   a. XMTR/RCVR ZERO OFF switches — ZERO OFF (down).
   b. POWER ON/OFF switch — OFF.

25.3.3.3 VLF Receive Subsystem

1. VLF receiver controls — Secured.
   a. FREQUENCY KHZ switches — Zeroized.
   b. POWER switch — OFF.
2. VLF preamplifier/filter control — OFF.

25.3.3.4 Frequency Time Standards (One cured, One Powered by FTS UPS System)

1. FTS UPS circuit breakers — Closed.
2. Nonessential FTS — Secured.
   a. POWER switch — OFF.
   b. BATTERY CHARGE RATE switch TRICKLE.
   c. Front panel — Closed.
3. Essential FTS — Set.
   a. BATTERY CHARGE RATE switch TRICKLE.
   b. Front panel — Closed.

25.3.3.5 Frequency Time Standards (Both Secured)

1. POWER switch — OFF.
2. BATTERY CHARGE RATE switch TRICKLE.
3. Front panel — Closed.

25.3.3.6 Oscilloscope Postflight

1. INTENSITY control — Fully CCW.
2. POWER switch — OFF.

25.4 SEAT FOUR

This checklist does not replace the amplified version of the procedures in Chapter 22 of this manual. To operate the equipment safely and efficiently, you must read and thoroughly understand why each step is performed and why it occurs in a certain sequence.

25.4.1 Seat Four Preflight

25.4.1.1 Station Oxygen/ICS Preflight

1. ICS CSU — Checked.
   a. All volume controls — CCW.
   b. PTT switch — ICS.
   c. ICS selector switch — ALL.
   d. ICS volume switch — Midrange.
   e. TEST switch — Pressed.
2. Oxygen, ICS — Checked.
   a. Mask visual check — Complete.
   b. SUPPLY lever — On.
   c. Emergency lever — TEST MASK.
   d. Microphone check — Complete.
   e. Diluter lever — 100% OXYGEN.
   f. Emergency lever — EMERGENCY.
   g. Emergency lever — NORMAL.
   h. SUPPLY lever — OFF.

25.4.1.2 No Break Power Monitor Preflight

1. SYSTEM switch — NORMAL.
2. Both INPUT indicators — On.
3. Both OUTPUT indicators — On.
4. ALARM switch — TEST, NORMAL.

25.4.1.3 HF Preflight

25.4.1.3.1 HF Power Up

1. Circuit breakers — Checked.
   a. 28 VDC DISTR 2 Panel MISC CONT Checked.
   b. MDF-1 panel — Checked.
2. HF FAULT/TUNE panel — Set.
   a. LAMP TEST — Checked.
   b. AUTO RETUNE switches — ENBL.
3. TAKE CMD switch — TAKE CMD.

25.4.1.3.2 HF BIT Tests

1. HF-2, HF-3, HF-4, and HF-5 — Checked.
   a. Low-band bit test — Complete.
      (1) MODE thumbwheel — UV.
      (2) FREQ thumbwheels — 031111.
      (3) HF VOL control — Midscale.
      (4) TEST pushbutton — Press.
      (5) Keyline control HF selectors — ICS/SI
      (6) ICS CSU HF pushbutton — XMT.
      (7) ICS CSU PTT selector switch — RAD
      (8) HF power monitor selector — Set.
      (9) ICS hand key — Press, Release.
   b. Midband bit test — Complete.
   c. High-band bit test — Complete.

25.4.1.3.3 HF Voice Check

1. HF-3 — Checked.
   a. Keyline control HF-3 selector — ICS/SEC

b. MODE thumbwheel — As Required.

c. FREQ thumbwheels — As Required.

d. ICS CSU HF-3 pushbutton — XMT.

e. Radio check — Complete.

2. HF-4 — Checked.

3. HF-5 — Checked.

4. ICS CSU PTT selector — ICS.

5. ICS CSU HF pushbutton — Off.

25.4.1.3.4 Data Transmit Check

1. FSK keyer/demodulators 1, 2, and 3 — Set.

a. POWER switch — On.

b. DIV switch — Down.

2. Audio jackfield — Set.

a. KEYER 1 (J40) — VOICE HF-3 TX (J58).

b. KEYER 2 (J41) — VOICE HF4 TX (J60).

c. KEYER 3 (J42) — VOICE HF5 TX (J62).

3. Keyer 1/HF-3 — Checked.

a. O'scope — Set.

b. Keyer output — Checked.

c. HF-3 radio control — Set.

(1) MODE thumbwheel — UD.

(2) FREQ thumbwheels — As Required.

d. Keyline control HF-3 selector — TTY/RLY.

e. HF power monitor selector — 3F.

f. Keyline control HF-3 selector — OFF.

4. Keyer 2/HF-4 — Complete.

5. Keyer 3/HF-5 — Complete.

25.4.1.4 Secure Voice (TSEC-8) Preflight

1. ICS ACU TSEC/HF pushbutton — Set.

2. ICS CSU HF pushbutton — XMT.

3. Processor control — Set.

a. PWR/FILL switch — 1.

b. Mode select switch — CIPHER.

c. RMT/LOCAL/SIG CLR switch — LOCAL.

4. Key list(s) — Loaded.

a. RMT/LOCAL/SIG CLR switch — SIG CLR.

b. ALARM indicator — Extinguished.

5. Processor control mode select switch — PLAIN.

6. ICS ACU TSEC/HF pushbutton — Set.

7. ICS CSU HF pushbutton — Off.

25.4.1.5 Cassette Tape Recorder Preflight

1. Cassette recorders 1, 2, and 3 — Set.

a. Cassette — Loaded.

b. Mode selector switch — F/R.

c. Tape counter — Reset.

d. AGC/MAN 1 and 2 toggle switches — AGC.

e. Channel selector switch — 1 and 2.

f. Mode selector switch — REC.

g. Mode selector switch — F/R.

2. Audio jackfield — Patches Complete.

a. KEYER 3 (J42) — PARALLEL (J105).

b. KEYER 2 (J41) — PARALLEL (J109).

c. PARALLEL (J106) — RCDR 1 CH 1 (J71).

d. PARALLEL (J107) — RCDR 1 CH 2 (J72).

e. PARALLEL (J108) — RCDR 2 CH 1 (J73).

f. PARALLEL (J110) — RCDR 2 CH 2 (J74).

g. PARALLEL (J111) — RCDR 3 CH 1 (J75).

h. PARALLEL (J112) — RCDR 3 CH 2 (J76).

3. Record test — Complete.

a. Mode selector switch — REC.

b. Mode selector switch — Off.

4. Playback test — Complete.

a. Audio jackfield — Set.

b. Mode selector switch — F/R.

c. Mode selector switch — REPRO.

d. Mode selector switch — F/R, OFF.

25.4.1.6 ERCS Preflight

1. ICS CSU ERCS volume control — Midrange.

2. ERCS filter fault panel lamp test — As Required.

3. ERCS 1 — Checked.

a. Function select switch — BOTH.

b. BRT/TEST knob — Checked, Set.

c. VOL control — Midrange.

d. Manual frequency check — Complete.

e. Preset frequency check — As Required.

(1) Mode select switch — PRESET.

(2) CHAN SEL — As Required.

(3) READ switch — READ.

f. VOL control — Low.

4. ERCS 2 — Checked.

5. ERCS 1 and 2 — Set.

25.4.1.7 UHF-3 LOS Preflight

1. UHF-3 LOS control — Set.

a. Function select switch — MAIN.

b. TEST selector — Checked.

c. Mode select switch — MANUAL.

d. MAIN SQUELCH switch — ON.

e. GUARD SQUELCH switch — ON.

f. VOL control — As Required.

g. FREQUENCY selectors — As Required.

2. ICS CSU panel — Set.

a. UHF-3 volume switch — Midrange.

b. UHF-3 pushbutton — XMT.

c. VOL control — As Required.

d. PTT selector switch — RAD.

3. Keyline control — Set.

a. UHF selector switch — 3F.

b. UHF-3 selector switch — ICS.

c. Forward power — Checked.

d. Reflected power — Checked.

4. Radio check — Complete.

5. UHF-3 LOS function select switch — OFF.

6. ICS CSU PTT selector switch — ICS.

7. Keyline control UHF-3 selector switch — OF

25.4.1.8 Power Supply Selector Panel Prefli

1. ON/OFF/ON switch — Left, ON.

2. ON/OFF/ON switch — Right, ON.

3. ON/OFF/ON switch — OFF.

25.4.2 Seat Four Operation

25.4.2.1 HF System Operation

25.4.2.1.1 Preset HF Frequencies

1. ICS CSU — Set.
   a. HF pushbutton — XMT.
   b. PTT selector switch — RAD.
2. HF control — Set.
   a. CHAN thumbwheel selectors — Set.
   b. MODE thumbwheel selector — Set.
   c. FREQ thumbwheel selectors — Set.
3. LOAD momentary pushbutton — Pressed.
4. HF power monitor selector — As Required.
5. Mode thumbwheel selector — P.

25.4.2.1.2 Preset Operation

1. CHAN thumbwheel selectors — Set.
2. MODE thumbwheel selector — P.
3. SQL selector switch — As Required.
4. VOL control — As Required.

25.4.2.1.3 Manual Operation

1. MODE thumbwheel selector — As Required.
2. FREQ thumbwheel selectors — As Required.
3. SQL selector switch — As Required.
4. VOL control — As Required.

25.4.2.2 Secure Voice (TSEC-8) Operation

1. OFF/ZEROIZE switch — As Required.
2. Mode switch — As Required.
3. ICS ACU TSEC HF pushbutton — As Required.

25.4.2.3 Cassette Recorder Operation

1. Record
   a. Audio jackfield — Patched.
   b. Cassette recorder — Set.
      (1) AGC/MAN switches — AGC.
      (2) Channel selector switch — As Required.
      (3) Mode selector switch — REC.
2. Playback
   a. ICS CSU — SET.
      (1) RCDR select switch — As Required.
      (2) RCDR volume control — As Required.
   b. Cassette recorder — Set.
      (1) CHAN selector switch — As Required.
      (2) Mode selector switch — REPRO.
3. Fast forward/fast rewind.
   a. Mode selector switch — F/F.
   b. Mode selector switch — F/R.

25.4.2.4 ERCS Operation

1. Manual mode operation
   a. Function select switch — Set.
   b. Mode select switch — MANUAL.
   c. Manual frequency selectors — Set.
   d. SQL/OFF switch — SQL.
   e. VOL switch — As Required.
2. Loading of preset channel frequencies
   a. Function select switch — Set.
   b. Mode select switch — PRESET.
   c. CHAN SEL switch — As Required.

d. READ switch — Up.

e. Manual frequency selectors — Set.

f. LOAD pushbutton — Pressed.

3. Preset mode operation

a. Function select switch — Set.

b. Mode select switch — PRESET.

c. CHAN SEL selector — Set.

d. SQL/OFF switch — SQL.

e. VOL switch — As Required.

25.4.2.5 UHF-3 LOS Operation

1. Manual operation

a. Function select switch — Set.

b. Mode select switch — MANUAL.

c. Test selector — OPR.

d. MAIN and GUARD SQUELCH switches — As Required.

e. VOL control — As Required.

f. FREQUENCY selectors — As Required.

2. Loading of preset channel frequencies

a. Function select switch — Set.

b. Mode select switch — PRESET.

c. CHAN selector — As Required.

d. Manual frequency selectors — Set.

e. PRESET STORE switch — Pressed.

3. Preset mode

a. Function select switch — Set.

b. Mode select switch — PRESET.

c. Test selector — OPR.

d. MAIN and GUARD SQUELCH switches As Required.

e. VOL control — As Required.

f. CHANNEL selector — As Required.

25.4.3 Seat Four Postflight

25.4.3.1 Station Oxygen/ICS Postflight

1. Oxygen — NORMAL, 100% OXYGEN, S PLY OFF.

2. ICS CSU PTT selector — ICS.

25.4.3.2 No Break Power Monitor Postfligh

1. ALARM switch — DISABLE.

2. SYSTEM switch — NORMAL.

25.4.3.3 HF Postflight

1. HF control — Set.

a. CHAN thumbwheel selectors — 11.

b. MODE thumbwheel selector — AM.

c. FREQ thumbwheel selectors — 111111.

d. TAKE CMD momentary switch — OFF.

2. HF FAULT/TUNE panel AUTO RETU switches — DSBL.

25.4.3.4 Secure Voice Postflight

1. PWR/FILL selector switch — OFF/ZEROIZ

25.4.3.5 Cassette Recorders Postflight

1. Mode selector switch — OFF.

2. Cassette tape — Removed.

3. Cassette loading door — Closed, Latched.

25.4.3.6 ERCS Postflight

1. Mode select switch — MANUAL.

2. Manual frequency select switches — 222.22

3. BRT/TEST knob — Set.

4. Function select switch — OFF.

25.4.3.7 UHF-3 LOS Postflight

1. Mode select switch — MANUAL.
2. CHANNEL control — 11.
3. FREQUENCY selectors — 222.225.
4. Function select switch — OFF.

25.5 IN-FLIGHT TECHNICIAN

This checklist does not replace the amplified version of the procedures in Chapter 23 of this manual. To operate the equipment safely and efficiently, you must read and thoroughly understand why each step is performed and why it occurs in a certain sequence.

25.5.1 In-Flight Technician Preflight

25.5.1.1 Aircraft Interior Inspection

25.5.1.1.1 Forward Lower Compartment

1. Radar transponder — Checked.
2. E45 rack — Checked.
3. E1 rack (port side) — Checked.
4. Radar RT — Checked.
5. E5 rack MSU — Checked.
   a. Selector switch — ALL.
   b. VOLUME control — Set.
6. E1 rack (starboard side) — Checked.
7. E14 rack — Checked.
8. E15 rack MSU — Checked.
   a. Selector switch — ALL.
   b. VOLUME control — Set.
9. NBPS pallet — Checked, Set.
   a. BATTERY and LINE circuit breakers — Closed.
   b. Power supply switch — ON.
   c. Voltage checks — Complete.
      (1) LINE — Approximately 28 VDC.
      (2) CHARGER — 27.5 ±1.5 VDC.
      (3) BATTERY — 24.0 to 29.0 VDC.
10. FTS UPS batteries and chargers — Checked.
11. MSPE rack MSU — Checked.
    a. Selector switch — ALL.
    b. VOLUME control — Set.

25.5.1.1.2 Interior Walkaround

1. Flight station avionics equipment — Checked.
2. Galley MSU — Checked.
   a. Selector switch — ALL.
   b. VOLUME control — Set.
3. C-1 rack equipment — Checked.
4. P67 circuit breaker panels — Checked.
5. P20 equipment — Checked.
6. Comm central circuit breaker panels — Set.
   a. 28 VDC DISTR 1 and 2 — Set.
   b. 400 HZ DISTR 1 and 2 — Set.
   c. 60 HZ DISTRIBUTION PANEL — Set.
7. P30 equipment — Checked.
8. RT racks — Checked.
9. Reel area port MSU — Checked.
   a. Selector switch — ALL.
   b. VOLUME control — Set.
10. SF_6 system check — Complete.
    a. Line pressure gauge — 8 Psig Minimum.
    b. SF_6 assembly — Checked.
11. Reel area starboard MSU — Checked.
    a. Selector switch — ALL.
    b. VOLUME control — Set.
12. Onboard spares — Checked.
    a. TTY paper and ribbons — Checked.
    b. TMPS paper — Checked.

c. PA water — Checked.

d. SF_6 bottle — Checked.

e. Consumables kit — Checked.

f. CW handkey and FTS cables — Checked.

g. Audio and dc patch cords — Checked.

13. Crew tools and test equipment — Inventoried, Checked, Stowed.

14. Publications — Checked, Stowed.

25.5.1.1.3 Station Oxygen/ICS Preflight

1. Station 10 oxygen — Checked.

   a. Mask visual check — Complete.

   b. SUPPLY lever — ON.

   c. Emergency lever — TEST MASK.

   d. Diluter lever — 100% OXYGEN.

   e. Emergency lever — EMERGENCY.

   f. Emergency lever — NORMAL.

   g. SUPPLY lever — OFF.

   h. Oxygen mask — Stowed.

2. Station 9 oxygen, ICS — Checked.

   a. Mask visual check — Complete.

   b. SUPPLY lever — ON.

   c. Emergency lever — TEST MASK.

   d. Microphone check — Complete.

   e. Diluter lever — 100% OXYGEN.

   f. Emergency lever — EMERGENCY.

   g. Emergency lever — NORMAL.

   h. SUPPLY lever — OFF.

   i. Oxygen mask — Stowed.

25.5.1.1.4 Aft Lower Compartment

1. Lower comp access MSU — Checked.

   a. Selector switch — ALL.

   b. VOLUME control — Set.

2. Low-range radio altimeter RT — Checked.

3. Aft cargo door MSU — Checked.

   a. Selector switch — ALL.

   b. VOLUME control — Set.

25.5.1.2 VLF PA-Coupler Inspection

1. Bay 1 check — Complete.

   a. HVB and HVC TR units — Checked.

   b. HV power contactors K35 and K36 — Checked.

   c. Shorting switch S58 — Checked.

   d. Upper bay 28 vdc filter network — Checked.

2. Bay 2 check — Complete.

   a. Cathode and HVA TR units — Checked.

   b. Cathode and HV power contactors K37 and K34 — Checked.

   c. Shorting switch S59 — Checked.

   d. Fiber optic assembly — Checked.

   e. LMP — Checked.

3. Bay 3 and bay 4 checks — Complete.

   a. Lower bays — Checked.

      (1) Arc gaps — Checked.

      (2) Shorting switches S60 and S61 — Checked.

      (3) Blowers B1 and B2 — Checked.

      (4) Air vane switches S5, S6, and S7 — Checked.

      (5) Doors — Closed.

b. Left and right ATR shelves — Checked.

(1) All electronic slices — Checked.

(2) I/O connectors and cabling — Checked.

(3) Doors — Closed.

c. Left and right grid enclosures — Checked.

(1) Shorting switches S55 and S56 — Checked.

(2) Tube sockets — Checked.

(3) Doors — Closed.

d. Upper bays 3 and 4 — Checked.

(1) Arc gap — Checked.

(2) C0A, C0B, and C1A — Checked.

(3) Water level — FULL.

(4) Fiber optic connections — Checked.

(5) RF connections — Checked.

(6) PA tubes — Checked.

4. PA water level checks — Complete.

a. ELCU switch/indicators — Set.

b. PA-coupler circuit breaker panel — Set.

c. Coolant system — Drained.

(1) WATER LEVEL warning — On.

(2) PA FAULT indicator — On.

d. Coolant system — Filled.

(1) WATER LEVEL warning — Off.

(2) PA FAULT — Off.

Note

With AVC 4172 installed, complete steps f through i.

f. PACS computer lamp test — Complete.

g. PACS computer bit test — Complete.

h. IFPM computer lamp test — Complete.

i. IFPM computer BIT test — Complete.

5. Variometer position and alignment checks Complete.

a. LMP MODE switch — PREPOSITION.

b. L_R low end stop — Checked.

(1) Right-hand TEST METER — 26.

(2) Local control-indicator TEST switches 26.

c. L_R high end stop — Checked.

d. L_R — Centered.

e. L_1 low end stop — Checked.

f. L_1 high end stop — Checked.

g. L_1 — Centered.

h. L_{1-2} low end stop — Checked.

i. L_{1-2} high end stop — Checked.

j. L_{1-2} — Centered.

k. LMP MODE switch — MANUAL TU STEP SERVO DISABLE.

l. L_2 low end stop — Checked.

m. L_2 high end stop — Checked.

n. L_2 — Centered.

o. L_{2-3} low end stop — Checked.

p. L_{2-3} high end stop — Checked.

q. L_{2-3} — Centered.

r. L_3 low end stop — Checked.

s. L_3 high end stop — Checked.

t. L_3 — Centered.

u. LMP MODE switch — AUTOMATIC.

6. Bay 5 check — Complete.
   a. Variometer — Checked.
      (1) RF connections — Checked.
      (2) Ground strap — Checked.
      (3) Rotor — Checked.
   b. Feed through capacitor C35 — Checked.
   c. Shorting switches S57 and S62 — Checked.
   d. Driver power supply — Checked.
   e. Arc gaps — Checked.
7. Node 1 check — Complete.
   a. Shorting switch S8 — Checked.
   b. RF connections — Checked.
   c. Coaxial connections — Checked.
   d. Arc sensor — Checked.
   e. Variometers L_1 and L_{1-2} — Checked.
      (1) Control connectors — Checked.
      (2) Ground strap — Checked.
      (3) Rotors — Checked.
   f. Band switching relays K63 and K64 — Checked.
   g. Aft wall capacitor bank — Checked.
8. Node 2 check — Complete.
   a. RF connections — Checked.
   b. Coaxial connections — Checked.
   c. Arc sensor — Checked.
   d. Variometers L_2 and L_{2-3} — Checked.
      (1) Control connectors — Checked.
      (2) Ground strap — Checked.
      (3) Rotors — Checked.
   e. Band switching relay K65 — Checked.
   f. Blower B4 — Checked.
9. Node 3 check — Complete.
   a. RF connections — Checked.
   b. Coaxial connections — Checked.
   c. Arc sensor — Checked.
   d. Variometer L_3 — Checked.
      (1) Control connector — Checked.
      (2) Ground strap — Checked.
      (3) Rotor — Checked.
   e. Band switching relay K66 — Checked.
   f. Dummy load — Checked.
      (1) Fluid level — Full.
      (2) Fiber optic connections — Checked.
      (3) Water leaks — None.
   g. Blower B3 — Checked.
   h. Fish bowl — Checked.
   i. Antenna load/test load relays K61 and K62 — Checked.
10. Exterior check — Complete.
    a. Doors and panels — Secure.
    b. Top of bays 1 and 2 — Checked.
    c. Inboard steam vent valve — Checked.

25.5.1.3 VLF PA-Coupler Operational Checks

1. Split system breaker — Set.
2. Liquid cooling system — On.
3. PA-coupler circuit breaker panel — Set.
4. LMP — Set.
   a. Test meters — Checked.

b. Lamp test — Complete.

c. LMP indicators — Checked.

d. Local control-indicator indicators — Checked.

5. Emergency plate off check — Complete.

a. STANDBY/READY switch indicator — STANDBY/READY.

b. EMERGENCY PLATE OFF switch indicator — On.

c. PA/TUNE/FAULT/OPR switch indicator — Press.

d. PA/TUNE/FAULT/OPR switch indicator — Press.

e. EMERGENCY PLATE OFF switch indicator — Off.

f. LOCAL/REM/CONT HEAD INOP switch-indicator — REM.

g. Remote control indicator emergency plate off check — Complete.

(1) Lamp test — Complete.

(2) STANDBY/READY switch indicator — STANDBY/READY.

(3) EMERGENCY PLATE OFF switch indicator — ON.

(4) PA/TUNE/FAULT/OPR switch indicator — Press.

(5) PA/TUNE/FAULT/OPR switch indicator — Press.

(6) EMERGENCY PLATE OFF switch indicator — Off.

h. LMP LOC/REM/CONT HEAD INOP switch indicator — LOC.

6. Short wire interlock check — Complete.

a. Reel station — Set.

(1) 400 HZ POWER DISTRIBUTION panel (A2A4) CB2 — ON.

(2) +28 VDC POWER control (A1A VDC switch — ON.

(3) SHORT WIRE VELOCITY c (A1A2) ANTENNA ACCESS swit OFF.

b. Local control indicator FREQUENCY switches — 18.00.

c. ANT LOAD/ON/TEST LOAD/ON s indicator — ANT LOAD/ON.

d. PA/TUNE/FAULT/OPR switch indicat Press.

e. PA/TUNE/FAULT/OPR switch indicat Press.

f. Reel station — Set.

(1) SHORT WIRE VELOCITY c (A1A2) ANTENNA ACCESS swit ON.

(2) +28 VDC POWER control (A1A VDC switch — OFF.

(3) 400 HZ POWER DISTRIBUTION (A2A4) CB2 — OFF.

7. ANT LOAD/ON/TEST LOAD/ON switch cator — TEST LOAD/ON.

8. LMP MODE switch — AUTOMATIC.

9. Circuit breaker panel — Set.

a. HV PWR SPLY A disconnect switch —

b. HV PWR SPLY B disconnect switch —

c. HV PWR SPLY C disconnect switch —

10. Power supply A check — Complete.

a. LMP TUNE POWER PRESET A swit dicator — On.

b. VERDIN modulator — Set.

(1) FREQUENCY KHZ — 29.00.

(2) MODULATION switch — CWFSK

(3) CONSTANT FREQ SHIFT switch — LOW.

c. Local control indicator FREQUENCY KHZ switches — 29.00.

d. PA/TUNE/FAULT/OPR switch indicator — Press.

(1) Local control indicator — Checked.

(2) LMP — Checked.

e. MUX channels — Checked, Recorded.

f. PA/TUNE/FAULT/OPR switch indicator — Press.

11. Power supply B check — Complete.

12. Circuit breaker panel — Set.

a. HV PWR SPLY A disconnect switch — Off.

b. HV PWR SPLY B disconnect switch — Off.

13. LMP LOC/REM/CONT HEAD INOP switch indicator — REM.

14. Power supply C check — Complete.

15. LMP LOC/REM/CONT HEAD INOP switch indicator — LOC.

16. HV PWR SPLY C disconnect switch — Off.

17. STANDBY/READY switch indicator — Off.

18. Circuit breaker panel — Set.

19. VERDIN modulator — As Required.

20. Split system breaker — As Required.

21. VLF PA-coupler water levels — Checked.

22. LCS — As Required.

25.5.2 VLF PA-Coupler Operation

25.5.2.1 Standby/Ready

1. 400 HZ DISTR 2 panel — Set.

2. sF-6 — Checked.

3. ICS — As Required.

4. Split system breaker — OPEN.

5. Forced air cooling — Set.

6. LCS — Set.

7. VLF PA-coupler circuit breaker panel — Set.

8. LMP — Checked, Set.

a. TEST meters — Checked.

b. Lamp tests — Complete.

c. LMP indicators — Checked, Set.

9. Local control indicator — Set.

a. Indicators — On.

b. STANDBY/READY switch indicator — STANDBY.

10. HV A, HV B, and HV C disconnect switches — As Required.

25.5.2.2 Transmission

1. VERDIN modulator — Set.

2. Standby/ready procedures — Complete.

3. FREQUENCY KHZ switches — Set.

4. ANT LOAD/ON/TEST LOAD/ON switch indicator — ANT LOAD/ON.

5. PA/TUNE/FAULT/OPR switch indicator — Press.

6. Power level — Set.

7. Transmission termination — Complete.

a. PA/TUNE/FAULT/OPR switch indicator — Press.

b. STANDBY/READY switch indicator — Off.

c. Circuit breaker panel — Secured.

d. FREQUENCY KHZ switches — 1111.

e. Water level — Checked.

f. Forced air cooling — As Required.

g. LCS — As Required.

25.5.2.3 Output Power Control

1. Tune power level — Set.

   a. FULL POWER/ON switch indicator — Off.

   b. HALF POWER/ON switch indicator — Off.

2. Half power level — Set.

   a. HALF POWER/ON switch indicator — On.

   b. FULL POWER/ON switch indicator — Off.

3. Full power level — Set.

   a. HALF POWER/ON switch indicator — As Required.

   b. FULL POWER/ON switch indicator — On.

25.5.2.4 Frequency Change

1. Standby/ready condition — Set.

2. FREQUENCY KHZ switches — Set.

3. VERDIN modulator — Set.

4. Wire lengths — Adjusted.

25.5.3 In-Flight Technician Postflight

25.5.3.1 Station Oxygen/ICS Postflight

1. Oxygen — NORMAL, 100% OXYGEN, S PLY OFF.

2. CSU PIT selector — ICS.

25.5.3.2 VLF-PA Coupler Postflight

1. Water levels — Checked.

2. FREQUENCY KHZ and TEST switches Zeroized.

25.5.3.3 Comm Central Postflight

1. Circuit breaker panels — Set.

   a. P67-1 panel — Set.

   b. P67-2 panel — Set.

2. Onboard spares — Checked.

3. Test equipment and tools — Checked/Inve ried.

25.5.3.4 Forward Lower Compartment Postflight

1. No break power control monitor panel — Set

   a. Power switch — Off.

   b. BATTERY circuit breaker — Open.

25.6 REEL OPERATOR

This checklist does not replace the amplified version of the procedures in Chapter 24 of this manual. To operate the equipment safely and efficiently, you must read and thoroughly understand why each step is performed and why it occurs in a certain sequence.

25.6.1 Reel Operator Preflight

25.6.1.1 External Visual Preflight

1. Starboard wheel well — Checked.
2. Aft lower compartment — Checked.
3. LTWA drogue nest — Retracted.
4. STWA drogue — Nested.
5. Port wheel well — Checked.

25.6.1.2 Internal Visual Preflight

1. Flight deck reel systems indicators and controls:
   a. EMERGENCY CABLE CUTTER panel — Checked.
   b. STWA/LTWA TENSION indicators — 0 Reading.
   c. VLF ANT panel — Checked.
   d. P61-4 panel circuit breakers — Closed.
2. Lavatory area — Checked.
3. Galley area — Checked.
4. P67 panel circuit breakers — Closed.
5. Comm central controls and indicators:
   a. VLF PWR ENABLE LWA pushbutton — Press ON.
   b. LONG WIRE CONT circuit breaker — Closed.
   c. VLF ANT panels — Checked.
6. LTWA A2 area:
   a. A2A4 400 HZ POWER distribution panel — Checked.
   b. A2 hydraulic reservoir fluid sight gau Checked.
   c. Deck areas — Checked.
   d. A2A1 hydraulic panel — Checked.
   e. Fleet angle compensator — Checked.
   f. Antenna wire — Checked.
   g. Access panels — Checked.
7. LTWA A3 area:
   a. LTWA cable cutter manual T-handl Checked.
   b. LTWA manual drogue release T-hand Checked.
   c. Pulley and cable cutter assemblie Checked.
   d. Cable cutter safety pins — Remove Stow.
   e. Access panels — Checked.
8. STWA A4 area:
   a. Drip pan — Checked.
   b. SERVICE BRAKE RETURN VENT — NORMAL and Safety Wired.
   c. Remote emergency brake handle — U Latched.
   d. Manual valve MV-1 — Closed and S Wired.
   e. Manual valve MV-2 — Open and S Wired.
   f. M1 gauge — Zero psi.
   g. M2 gauge — 150 ±15 psi.
   h. M3 gauge — 750 ±50 psi.
   i. Pulley and cable cutter assemblie Checked.
   j. Dielectric platform — Checked.

k. Load cell — Checked.

l. Cable cutter safety pins — Removed and Stowed.

m. Access panels — Checked.

9. A1 main/auxiliary control console areas:

a. Lower kick panel — Checked.

b. Control panels — Checked.

c. Meters and gauges — Checked.

d. A1A1 and A1A6 EMERGENCY control panels — Checked.

e. A1A11 LONG WIRE EMER EXT control panel — Checked.

f. Water coolant sight gauge — Checked.

g. A4A6 SHORT WIRE EMER EXT control panel — Checked.

h. STWA emergency cable cutter T-handle — Checked.

i. STWA manual drogue release T-handle — Checked.

j. P111 PWR control panel — Checked.

k. P108 VLF/LF DROGUE NEST control panel — Checked.

25.6.1.3 Liquid Cooling System Preflight

1. COOLER VALVES 1 and 4 FUEL OFF indicators — Off.

2. P104 LIQUID COOLING SYSTEM control panel:

a. FUEL 1 and 4 TEMP switch — Verify Temperature.

b. RETURN pressure gauge — 20 ±10 psi.

c. LOW PRESS indicator — Off.

d. LOW FLOW indicator — On.

e. EGW HOT indicator — Off.

f. LAMP TEST — Checked.

g. COOLER VALVES 1 and 4 switches — Checked.

h. Pumps 1 switch — Press On.

i. Pumps 1 switch — Press Off.

j. Pumps 2 switch — Press On.

25.6.1.4 Antenna Group Power On

1. A1A4 +28 VDC POWER control panel:

a. CB1, CB2, CB3, and CB4 — Closed.

b. 28 VDC switch — ON.

c. LIGHTS switch — ON.

2. A2A4 400 HZ POWER DISTRIBUTION panel:

a. S1 — Press ON.

b. CB1 — ON.

c. CB2 — ON.

d. CB3 — ON.

e. Fuse lights — OFF.

3. A1A2 SHORT WIRE VELOCITY control panel LAMP TEST — Checked.

4. A1A7 LONG WIRE VELOCITY control panel LAMP TEST — Checked.

5. A1A10 ELECTRICAL SYSTEMS control panel LAMP TEST — Checked.

6. P108 VLF/LF DROGUE NEST CONTROL panel LAMP EST — Checked.

7. P111 PWR control panel PRESS TO TEST — Checked.

8. LTWA/STWA switches, switch/indicators, and controls:

a. A1A15 LENGTH LIMIT control panel — Checked.

b. A1A1 SHORT WIRE and A1A6 LONG WIRE EMERGENCY control panels — Checked.

c. A1A2 SHORT WIRE VELOCITY control panel — Checked.

d. A1A7 LONG WIRE VELOCITY control panel — Checked.

e. A1A3 SHORT WIRE and A1A8 LONG WIRE LENGTH control panels — Checked.

f. A1A9 FLUID SYSTEMS control panel — Checked.

g. A1A10 ELECTRICAL SYSTEMS control panel — Checked.

25.6.1.5 Long Trailing Wire Antenna Preflight Checks

25.6.1.5.1 LTWA Drogue Nest Extend

1. P108 VLF/LF DROGUE NEST CONTROL panel:

   a. ARM/NEST IN switch — Press On.

   b. RETRACT/OFF/EXTEND switch — EXTEND.

   c. ARM/NEST IN switch — Press Off.

2. Drogue nest interlock switch — Deactivated/Pinned.

25.6.1.5.2 LTWA Power On

1. A1A10 SUPPLY ON/SUPPLY OFF switch — Press On.

25.6.1.5.3 LTWA Brake Mode Checks

1. A1A6 LONG WIRE EMERGENCY BRAKE switch — Off.

2. A1A8 LONG WIRE LENGTH control panel — Set.

   a. AUTOMATIC/MANUAL switch — MANUAL.

   b. BRAKE MODE switch — Press On.

   c. EXTEND switch — Press On.

   d. RETRACT switch — Press.

   e. AUTOMATIC/MANUAL switch — A MATIC.

   f. EXTEND switch — Press On.

   g. LENGTH COMMAND switches — 10

   h. EXTEND switch — Press On.

   i. RETRACT switch — Press.

   j. LENGTH COMMAND switches — 00

3. A1A6 LONG WIRE EMERGENCY BI switch — On.

25.6.1.5.4 LTWA Hydraulic Mode Checks

1. A1A9 FLUID SYSTEMS control panel:

   a. ELECT/HYDR DRIVE ON switch — On.

2. A1A6 LONG WIRE EMERGENCY BI switch — OFF.

3. A1A8 LONG WIRE LENGTH control pan

   a. AUTOMATIC/MANUAL switch — UAL.

   b. HYDRAULIC MODE switch — Press

   c. EXTEND switch — Press On.

   d. RETRACT switch — Press.

   e. AUTOMATIC/MANUAL switch — A MATIC.

   f. EXTEND switch — Press.

   g. LENGTH COMMAND switches — 10

   h. EXTEND switch — Press On.

   i. RETRACT switch — Press.

   j. STOP switch — Press.

   k. LENGTH COMMAND switches — 00

4. A1A6 LONG WIRE EMERGENCY BI switch — ON.

25.6.1.5.5 LTWA Emergency Extend Mode Checks

1. A1A11 LONG WIRE EMER EXT control panel:
   a. NORMAL BRAKE knob — Rotate CW.
   b. EMERGENCY BRAKE RELEASE handle — Pull Down, Move Left and Hold.
   c. EMERGENCY BRAKE RELEASE handle — Release and Stow.
   d. NORMAL BRAKE knob — Rotate CCW.

25.6.1.5.6 LTWA Ground Denesting/Nesting

1. LTWA ground denesting:
   a. Drogue — Attach Cargo Strap.
   b. A1A6 LONG WIRE EMERGENCY BRAKE switch — OFF.
   c. A1A7 VELOCITY knob — 5.
   d. A1A8 LONG WIRE LENGTH control panel — Set.
      (1) BRAKE MODE switch — Press On.
      (2) AUTOMATIC/MANUAL switch — MANUAL.
      (3) LENGTH COMMAND switches — As Desired.
      (4) EXTEND switch — Press On.
      (5) Ground personnel — Notified.
      (6) DROGUE RELEASE switch — Press and Hold.
      (7) DROGUE RELEASE switch — Release.
      (8) LENGTH FEET DISPLAY — Press STOP at Desired Length.
   e. A1A6 LONG WIRE EMERGENCY BRAKE switch — ON.
   f. Ground personnel — Release Tension.
   g. A1A15 LONG WIRE RESERVE FEET indicator — Checked.
   h. Drogue — Checked.
   i. Antenna wire — Checked.
   j. Inner and outer nest — Checked.
   k. Manual drogue nest release linkage — Checked.
   l. Remaining nest components — Checked.
2. LTWA ground nesting:
   a. Ground personnel — Notified.
   b. A1A7 TENSION meter — 125 ±25 Lb.
   c. A1A7 VELOCITY knob — MIN.
   d. A1A8 LONG WIRE LENGTH control panel — Set.
      (1) LENGTH COMMAND switches — 00000.
      (2) *DROGUE LOST/PRESS FOR OVER-*RIDE switch — Press.
   e. A1A6 LONG WIRE EMERGENCY BRAKE switch — OFF.
   f. A1A7 VEL X 0.1 switch — Press and Hold.
   g. A1A8 LONG WIRE LENGTH control panel:
      (1) HYDRAULIC MODE switch — Press On.
      (2) RETRACT switch — Press On.
      (3) Drogue nested — Checked.
   h. A1A7 VEL X 0.1 switch — Release.
   i. A1A6 LONG WIRE EMERGENCY BRAKE switch — ON.
   j. A1A15 LONG WIRE RESERVE FEET indicator — Checked.
   k. Drogue — Detach Cargo Strap.

25.6.1.5.7 LTWA Power Off

1. A1A9 FLUID SYSTEMS control panel:
   a. ELEC/HYDR DRIVE OFF switch — Press On.
2. A1A10 SUPPLY ON/SUPPLY OFF switch — Press On.

25.6.1.5.8 LTWA Drogue Nest Retract

1. Drogue nest interlock switch — Activated/ Pinned.
2. P108 VLF/LF DROGUE NEST CONTROL panel:
   a. ARM/NEST IN switch — Press.
   b. RETRACT/OFF/EXTEND switch — RETRACT.
   c. ARM/NEST IN switch — Press Off.

25.6.1.6 Short Trailing Wire Antenna (STWA) Preflight Checks

25.6.1.6.1 STWA Power On

1. Aircraft auxiliary hydraulic system — On.
2. P111 PWR control Panel STWA HYDR PWR switch — ON.

25.6.1.6.2 STWA Mode Checks

1. A1A1 SHORT WIRE EMERGENCY BRAKE switch — OFF.
2. A1A3 SHORT WIRE LENGTH control panel:
   a. AUTOMATIC/MANUAL switch — MANUAL.
   b. EXTEND switch — Press On.
   c. RETRACT switch — Press On.
   d. STOP switch — Press On.
   e. AUTOMATIC/MANUAL switch — AUTOMATIC.
   f. EXTEND switch — Press.
   g. LENGTH COMMAND switches — 1000.
   h. EXTEND switch — Press On.
   i. RETRACT switch — Press On.
   j. STOP switch — Press On.
   k. LENGTH COMMAND switches — 0000.
3. A1A1 SHORT WIRE EMERGENCY BRA switch — ON.

25.6.1.6.3 STWA Emergency Extend Mode Checks

1. A4A6 SHORT WIRE EMER EXT con panel:
   a. NORMAL BRAKE knob — Rotate CW.
   b. EMERGENCY BRAKE RELEASE knob Rotate CW/Hold.
2. Auxiliary control panel:
   a. STWA manual drogue release T-handle Pull/Hold.
   b. STWA manual drogue release T-handle Stow.
3. A4A6 SHORT WIRE EMER EXT con panel:
   a. EMERGENCY BRAKE RELEASE knob Rotate CCW to LOCK.
   b. NORMAL BRAKE knob — Rotate CCW

25.6.1.6.4 STWA Ground Denesting/Nestin

1. STWA ground denesting:
   a. Drogue — Attach Cargo Strap.
   b. A1A1 SHORT WIRE EMERGEN BRAKE switch — OFF.
   c. A1A2 VELOCITY knob — MAX.
   d. A1A3 SHORT WIRE LENGTH con panel:
      (1) AUTOMATIC/MANUAL switch MANUAL.

(2) LENGTH COMMAND switches — As Desired.

(3) EXTEND switch — Press On.

(4) Ground personnel — Notified.

(5) DROGUE RELEASE switch — Press and Hold.

(6) DROGUE RELEASE switch — Release.

(7) LENGTH FEET display — Press STOP at Desired Length.

e. A1A1 SHORT WIRE EMERGENCY BRAKE switch — ON.

f. Ground personnel — Release Tension.

g. A1A15 SHORT WIRE RESERVE FEET indicator — Checked.

h. Drogue — Checked.

i. Antenna wire — Checked.

j. Inner and outer nest — Checked.

2. STWA ground nesting:

a. Ground personnel — Notified.

b. A1A2 TENSION meter — 75 ±25 Lb.

c. A1A2 VELOCITY knob — 4 or Less.

d. A1A3 SHORT WIRE LENGTH control panel:

(1) LENGTH COMMAND switches — 0000.

(2) DROGUE LOST/PRESS FOR OVERRIDE switch — Press.

e. A1A1 SHORT WIRE EMERGENCY BRAKE switch — OFF.

f. A1A3 SHORT WIRE LENGTH control panel:

(1) RETRACT switch — Press On.

(2) Drogue nested — Checked.

g. A1A1 SHORT WIRE EMERGENCY BRAKE switch — ON.

h. A1A15 SHORT WIRE RESERVE FEET indicator — Checked.

i. Drogue — Detach Cargo Strap.

j. Shorting stick — Removed.

k. Access panels — Checked.

25.6.1.6.5 STWA Power Off

1. P111 PWR control panel STWA HYDR PWR switch — OFF.

2. Flight deck — Notified.

25.6.1.7 Antenna Group Power Off

1. A2A4 400 HZ POWER DISTRIBUTION panel:

a. S1 — Press Off.

b. CB1 — OFF.

c. CB2 — OFF.

d. CB3 — OFF.

2. A1A4 +28 VDC POWER control panel:

a. 28 VDC switch — OFF.

b. LIGHTS switch — OFF.

25.6.1.8 Liquid Cooling System Secure

1. P104 LIQUID COOLING SYSTEM control panel:

a. PUMPS 2 switch — Press Off.

b. COOLER VALVES 1 and 4 OPEN indicators — On.

2. Flight deck — Notified.

25.6.1.9 Oxygen/ICS Preflight — Completed

25.6.2 Reel Systems Operation

25.6.2.1 Liquid Cooling System Activation

1. COOLER VALVES 1 and 4 FUEL OFF indicators — Off.
2. P104 LIQUID COOLING SYSTEM control panel:
   a. FUEL 1 and 4 TEMP switch — Verify Temperature.
   b. RETURN pressure gauge — 20 ±10 psi.
   c. LOW PRESS indicator — Off.
   d. LOW FLOW indicator — On.
   e. EGW HOT indicator — Off.
   f. COOLER VALVES 1 and 4 OPEN indicators — On.
   g. Pumps 1 or 2 switch — Press On.

25.6.2.2 Antenna Group Initialization

25.6.2.2.1 Antenna Group Power On

1. A1A4 +28 VDC POWER control panel:
   a. CB1, CB2, CB3, and CB4 — Closed.
   b. 28 VDC switch — ON.
   c. LIGHTS switch — ON.
2. A2A4 400 HZ POWER DISTRIBUTION panel:
   a. S1 — Press On.
   b. CB1 — ON.
   c. CB2 — ON.
   d. CB3 — ON.
   e. Fuse lights — Off.
3. LTWA/STWA switches, switch/indicators, a controls:
   a. A1A1 SHORT WIRE and A1A6 LON WIRE EMERGENCY control panels:
      (1) EMERGENCY BRAKE switches — O
      (2) EMERGENCY BRAKE ON indicator On.
   b. A1A2 SHORT WIRE VELOCITY cont panel — Checked.
   c. A1A7 LONG WIRE VELOCITY cont panel — Checked.
   d. A1A3 SHORT WIRE and A1A8 LON WIRE LENGTH control panels — Checke
   e. A1A9 FLUID SYSTEMS control panel Checked.
   f. A1A10 ELECTRICAL SYSTEMS cont panel — Checked.
   g. A1A11 LONG WIRE EMER EXT cont panel — Checked.
   h. A4A6 SHORT WIRE EMER EXT cont panel — Checked.

25.6.2.2.2 LTWA Drogue Nest Extend

1. P108 VLF/LF DROGUE NEST CONTR panel:
   a. ARM/NEST IN switch — Press On.
   b. RETRACT/OFF/EXTEND switch — E TEND.
   c. ARM/NEST IN switch — Press Off.

25.6.2.2.3 STWA Power On

1. P111 PWR control panel STWA HYDR PV switch — ON.

25.6.2.2.4 LTWA Power On

1. A1A10 SUPPLY ON/SUPPLY OFF switch Press On.

25.6.2.3 Dual Trailing Wire Antenna Normal Extend Operation

25.6.2.3.1 LTWA Brake Extend Mode Set Up

1. A1A6 LONG WIRE EMERGENCY BRAKE switch — OFF.
2. A1A7 VELOCITY knob — As Desired.
3. A1A8 LONG WIRE LENGTH control panel:
   a. AUTOMATIC/MANUAL switch — As Desired.
   b. BRAKE MODE switch — Press On.
   c. EXTEND switch — Press On.

25.6.2.3.2 STWA Extend Mode Set Up

1. A1A1 SHORT WIRE EMERGENCY BRAKE switch — OFF.
2. A1A2 VELOCITY knob — As Desired.
3. A1A3 SHORT WIRE LENGTH control panel:
   a. AUTOMATIC/MANUAL switch — As Desired.
   b. EXTEND switch — Press On.

25.6.2.3.3 STWA Drogue Release

1. A1A3 SHORT WIRE LENGTH control panel:
   a. DROGUE RELEASE switch — Press and Hold.
   b. DROGUE RELEASE switch — Release.
2. A1A2 VELOCITY knob — As Desired.
3. STWA deployment — Observe.
   a. A1A2 SHORT WIRE VELOCITY control panel — Monitor.
   b. A1A3 LENGTH FEET display — Increases.
   c. A1A15 SHORT WIRE RESERVE FEET indicator — Decreases.

25.6.2.3.4 LTWA Drogue Release

1. A1A8 LONG WIRE LENGTH control panel:
   a. DROGUE RELEASE switch — Press and Hold.
   b. DROGUE RELEASE switch — Release.
2. A1A7 VELOCITY knob — As Desired.
3. LTWA deployment — Observe.
   a. A1A7 LONG WIRE VELOCITY control panel — Monitor.
   b. A1A11 NORMAL BRAKE PRESSURE gauge — Decreases.
   c. A1A8 LENGTH FEET display — Increases.
   d. A1A15 LONG WIRE RESERVE FEET indicator — Decreases.
   e. LTWA reel spool/fleet angle compensator — Monitor.

25.6.2.3.5 STWA Deployment Termination

1. Automatic extend mode selected:
   a. Antenna wire slewdown — Observe.
   b. Antenna wire stops — Observe.
   c. A1A1 SHORT WIRE EMERGENCY BRAKE switch — ON.
2. Manual extend mode selected:.
   a. Antenna wire — Manually Slow Down.
   b. A1A3 LENGTH FEET display — Press STOP.
   c. A1A1 SHORT WIRE EMERGENCY BRAKE switch — ON.

25.6.2.3.6 LTWA Deployment Termination

1. Brake automatic extend mode selected:
   a. Antenna wire slewdown — Observe.
   b. Antenna wire stops — Observe.

c. A1A6 LONG WIRE EMERGENCY BRAKE switch — ON.

2. Brake manual extend mode selected:

a. Antenna wire — Manually Slow Down.

b. A1A8 LENGTH FEET display — Press STOP.

c. A1A6 LONG WIRE EMERGENCY BRAKE switch — ON.

25.6.2.4 Dual Trailing Wire Antenna Alternate Extend Operation

25.6.2.4.1 LTWA Hydraulic Extend Mode Set Up

1. A1A9 FLUID SYSTEMS control panel:

a. ELEC/HYDR DRIVE ON switch — Press ON.

2. A1A6 LONG WIRE EMERGENCY BRAKE switch — OFF.

3. A1A7 VELOCITY knob — 3.

4. A1A8 LONG WIRE LENGTH control panel:

a. AUTOMATIC/MANUAL switch — As Desired.

b. HYDRAULIC MODE switch — Press On.

c. EXTEND switch — Press On.

25.6.2.4.2 STWA Extend Mode Set Up

1. A1A1 SHORT WIRE EMERGENCY BRAKE switch — OFF.

2. A1A2 VELOCITY knob — As Desired.

3. A1A3 SHORT WIRE LENGTH control panel:

a. AUTOMATIC/MANUAL switch — As Desired.

b. EXTEND switch — Press On.

25.6.2.4.3 STWA Drogue Release

1. A1A3 SHORT WIRE LENGTH control panel:

a. DROGUE RELEASE switch — Press a Hold.

b. DROGUE RELEASE switch — Release.

2. A1A2 VELOCITY knob — As Desired.

3. STWA deployment — Observe.

a. A1A2 SHORT WIRE VELOCITY contr panel — Monitor.

b. A1A3 LENGTH FEET display — Increase

c. A1A15 SHORT WIRE RESERVE FEET i dicator — Decreases.

25.6.2.4.4 LTWA Drogue Release

1. A1A8 LONG WIRE LENGTH control panel:

a. DROGUE RELEASE switch — Press a Hold.

b. DROGUE RELEASE switch — Release.

2. A1A7 VELOCITY knob — As Desired.

3. LTWA deployment — Observe.

a. A1A7 LONG WIRE VELOCITY contr panel — Monitor.

b. A1A9 DRIVE HIGH PRESSURE gauge Increase.

c. A1A8 LENGTH FEET display — Increase

d. A1A15 LONG WIRE RESERVE FEET in cator — Decreases.

e. LTWA reel spool/fleet angle compensator Observe.

25.6.2.4.5 STWA Deployment Termination

1. Automatic extend mode selected:.

a. Antenna wire slewdown — Observe.

b. Antenna wire stops — Observe.

c. A1A1 SHORT WIRE EMERGENC BRAKE switch — ON.

2. Manual extend mode selected:

   a. Antenna wire — Manually Slow Down.

   b. A1A3 LENGTH FEET display — Press STOP.

   c. A1A1 SHORT WIRE EMERGENCY BRAKE switch — ON.

25.6.2.4.6 LTWA Deployment Termination

1. Hydraulic automatic extend mode selected:

   a. Antenna wire slewdown — Observe.

   b. Antenna wire stops — Observe.

   c. A1A6 LONG WIRE EMERGENCY BRAKE switch — ON.

2. Hydraulic manual extend mode selected:.

   a. Antenna wire — Manually Slow Down.

   b. A1A8 LENGTH FEET display — Press STOP.

   c. A1A6 LONG WIRE EMERGENCY BRAKE switch — ON.

25.6.2.5 Dual Trailing Wire Antenna Park and Monitor Operation

25.6.2.5.1 STWA Park Mode

1. P111 PWR control panel STWA HYDR PWR switch — OFF.

2. A1A2 ANTENNA ACCESS switch — Guarded OFF.

3. A1A3 LENGTH COMMAND switches — Set.

25.6.2.5.2 LTWA Park Mode

1. A1A11 NORMAL BRAKE knob — Rotate CW.

2. A1A9 FLUID SYSTEMS control panel:

   a. ELEC/HYDR DRIVE OFF switch — Press On.

3. A1A10 SUPPLY ON/SUPPLY OFF switch — Press Off.

4. A1A8 LENGTH COMMAND switches — Set.

5. Comm/central and flight deck — Notified.

25.6.2.5.3 LTWA/STWA Equipment Monitoring

1. LTWA — Observe.

   a. A1A7 TENSION meter — Monitor.

   b. A1A8 LENGTH FEET display — Monitor.

   c. A1A11 NORMAL BRAKE pressure gauge — 450 ±50 psi.

   d. A2A1 hydraulic panel — Checked.

   e. A1A15 LONG WIRE RESERVE FEET indicator — Checked.

   f. P104 LIQUID COOLING SYSTEM control panel COOLANT SUPPLY TEMP — Monitor.

2. STWA — Observe.

   a. A1A2 TENSION meter — Stable.

   b. A1A3 LENGTH FEET display — Monitor.

   c. A4 hydraulic panel — Checked.

   d. A1A15 SHORT WIRE RESERVE FEET indicator — Monitor.

25.6.2.6 Antenna Group Reinitialization

25.6.2.6.1 STWA Power On

1. P111 PWR control panel STWA HYDR PWR switch — ON.

2. A1A2 ANTENNA ACCESS switch — Guarded ON.

25.6.2.6.2 LTWA Power On

1. A1A10 SUPPLY ON/SUPPLY OFF switch — Press.

25.6.2.7 Dual Trailing Wire Antenna Retract Operation

25.6.2.7.1 LTWA Hydraulic Retract Mode Set Up

1. A1A9 FLUID SYSTEMS control panel:
   a. ELEC/HYDR DRIVE ON switch — Press ON.
2. A1A11 NORMAL BRAKE knob — Rotate CCW.
3. A1A6 LONG WIRE EMERGENCY BRAKE switch — OFF.
4. A1A7 VELOCITY knob — MAX.
5. A1A8 LONG WIRE LENGTH control panel:
   a. LENGTH COMMAND switches — 00000.
   b. AUTOMATIC/MANUAL switch — As Desired.
   c. HYDRAULIC MODE switch — Press On.

25.6.2.7.2 STWA Retract Mode Set Up

1. A1A1 SHORT WIRE EMERGENCY BRAKE switch — OFF.
2. A1A2 VELOCITY knob — MAX.
3. A1A3 SHORT WIRE LENGTH control panel:
   a. LENGTH COMMAND switches — 0000.
   b. AUTOMATIC/MANUAL switch — As Desired.

25.6.2.7.3 STWA Retraction

1. A1A3 SHORT WIRE LENGTH control panel:
   a. A1A3 RETRACT switch — Press.
2. A1A2 VELOCITY knob — As Desired.
3. STWA retraction — Observe.
   a. A1A2 SHORT WIRE VELOCITY control panel — Monitor.
   b. A1A3 LENGTH FEET Display — Decrease.
   c. A1A15 SHORT WIRE RESERVE FEE dicator — Increase.

25.6.2.7.4 LTWA Retraction

1. A1A8 LONG WIRE LENGTH control panel
   a. RETRACT switch — Press ON.
2. A1A7 VELOCITY knob — As Desired.
3. LTWA retraction — Observe.
   a. A1A7 LONG WIRE VELOCITY co panel — Monitor.
   b. A1A9 DRIVE HIGH PRESSURE gaug Increase.
   c. A1A8 LENGTH FEET display — Decre
   d. A1A15 LONG WIRE RESERVE FEET cator — Increase.
   e. LTWA reel spool/fleet angle compensat Observe.

25.6.2.7.5 STWA Nesting

1. Slewdown — Observe/Perform.
   a. A1A2 VELOCITY meter — Decrease.
   b. A1A2 VELOCITY knob — 4 or less.
2. Nesting — Observe/Perform.
   a. A1A3 SHORT WIRE LENGTH co panel — Observe.
   b. A1A2 TENSION meter — 35 Lb Minim
   c. A1A1 SHORT WIRE EMERGE BRAKE switch — ON.
   d. A1A15 SHORT WIRE RESERVE FEE dicator — Logged.

25.6.2.7.6 LTWA Nesting

1. Slewdown — Observe/Perform.
   a. A1A7 VELOCITY meter — Decrease.
   b. A1A7 VELOCITY knob — 1 or Min.

2. Nesting — Observe/Perform.

   a. A1A8 LONG WIRE LENGTH control panel — Observe.

   b. A1A7 TENSION meter — 75 Lb Minimum.

   c. A1A11 NORMAL BRAKE pressure gauge — 450 ±50 psi.

   d. A1A9 DRIVE HIGH PRESSURE gauge — 185 ±35 psi.

   e. A1A6 LONG WIRE EMERGENCY BRAKE switch — ON.

   f. A1A15 LONG WIRE RESERVE FEET indicator — Logged.

25.6.2.8 Antenna Group Secure

25.6.2.8.1 LTWA Power Off

1. A1A9 FLUID SYSTEMS CONTROL panel:

   a. ELEC/HYDR DRIVE OFF switch — Press On.

2. A1A10 SUPPLY ON/SUPPLY OFF switch — Press Off.

25.6.2.8.2 STWA Power Off

1. P111 PWR control panel STWA HYDR PWR switch — OFF.

25.6.2.8.3 LTWA Drogue Nest Retract

1. P108 VLF/LF DROGUE NEST CONTROL panel:

   a. ARM/NEST IN switch — Press On.

   b. RETRACT/OFF/EXTEND switch — RETRACT.

   c. ARM/NEST IN switch — Press Off.

25.6.2.8.4 Antenna Group Power Off

1. A2A4 400 HZ POWER DISTRIBUTION panel:

   a. S1 — Press Off.

   b. CB1 — OFF.

   c. CB2 — OFF.

   d. CB3 — OFF.

2. A1A4 +28 VDC POWER control panel:

   a. 28 VDC switch — OFF.

   b. LIGHTS switch — OFF.

25.6.2.9 Liquid Cooling System Secure

1. P104 LIQUID COOLING SYSTEM control panel:

   a. PUMPS 1 or 2 switch — Press Off.

   b. COOLER VALVES 1 and 4 OPEN indicators — On.

2. Flight deck — Notified.

25.6.3 Reel Operator Postflight

25.6.3.1 Internal Visual Postflight

1. A1 main/auxiliary control console areas:

   a. Lower kick panel — Checked.

   b. Control panels — Checked.

   c. Meters and gauges — Checked.

   d. A1A1 and A1A6 EMERGENCY control panels — Checked.

   e. A1A11 LONG WIRE EMER EXT control panel — Checked.

   f. Water coolant sight gauge — Checked.

   g. A4A6 SHORT WIRE EMER EXT control panel — Checked.

   h. STWA emergency cable cutter T-handle — Checked.

   i. STWA manual drogue release T-handle — Checked.

   j. P111 PWR panel — Checked.

   k. P108 VLF/LF DROGUE NEST CONTROL panel — Checked.

2. STWA A4 area — Checked.
   a. Drip pan — Checked.
   b. SERVICE BRAKE RETURN VENT valve — NORMAL and Safety Wired.
   c. Remote emergency brake handle — Up and Latched.
   d. Manual valve MV-1 — Closed and Safety Wired.
   e. Manual valve MV-2 — Open and Safety Wired.
   f. M1 gauge — Zero psi.
   g. M2 gauge — 150 ±15 psi.
   h. M3 gauge — 750 ±50 psi.
   i. Pulley and cable cutter assemblies — Checked.
   j. Dielectric platform — Checked.
   k. Load cell — Checked.
   l. Cable cutter safety pins — Installed.
   m. Access panels — Checked.
3. LTWA A3 area — Checked.
   a. LTWA cable cutter manual T-handle — Checked.
   b. LTWA manual drogue release T-handle — Checked.
   c. Pulley and cable cutter assemblies — Checked.
   d. Cable cutter safety pins — Installed.
   e. Access panels — Checked.
4. LTWA A2 area — Checked.
   a. A2A4 400 HZ POWER DISTRIBUTION panel — Checked.
   b. A2 hydraulic reservoir fluid sight gau Checked.
   c. Deck areas — Checked.
   d. A2A1 hydraulic panel — Checked.
   e. Fleet angle compensator — Checked.
   f. Antenna wire — Checked.
   g. Access panels — Checked.
5. Comm central controls and indicators:
   a. VLF PWR ENABLE LWA pushbutto Press Off.
   b. LONG WIRE CONT circuit breake CLOSED.
   c. VLF ANT panels — Checked.
6. P67 panels circuit breakers — Closed.
7. Galley area — Checked.
8. Lavatory area — Checked.
9. Flight deck reel systems indicators and cont
   a. EMERGENCY CABLE CUTTER pan Checked.
   b. STWA/LTWA TENSION indicators —
   c. VLF ANT panel — Checked.
   d. P61-4 panel antenna related circuit bre — Closed.

25.6.3.2 External Visual Postflight

1. Starboard wheel well — Checked.
2. Aft lower compartment — Checked.
3. LTWA drogue nest — Retracted.
4. STWA drogue — Nested.
5. Port wheel well — Checked.

25.7 COMM CENTRAL ALERT CHECKLIST

The following checklists shall be used for crews assuming or being relieved from Ready Alert status.

25.7.1 Cocking Checklist

1. Preflights — Complete (ACS, FT).
2. Data boxes — Set, Secure (ACO, ACS).
3. Circuit breakers — Set, Power Applied (FT).
4. NBPS — Set (FT).
5. TMPS — Set (ACS).
6. WB/NB/PSK — Freq Plan, Set (ACS).
7. Audio jackfield — Patches Made (ACS).
8. Dc jackfield — Patches Made (ACS).
9. HF radios — Set (ACS).
10. FTS — Delay Set, Verified (ACO).
11. Comm crew brief — Completed (ACO).

25.7.2 Uncocking Checklist

1. Postflights — Complete (ACS, FT).
2. Data boxes — Removed, Secure (ACO, ACS
3. TSECS — Zeroized (ACO, ACS).
4. TMPS — Cleared (ACO, ACS).
5. SATCOM radios — Zeroized (ACO, ACS).
6. HF radios — Zeroized (ACO, ACS).
7. UHF radios — Zeroized (ACO, ACS).
8. Comm central area — Sanitized (ACO, ACS
9. Circuit breakers — As Required (FT).
10. VLF/PA — Zeroized (FT).

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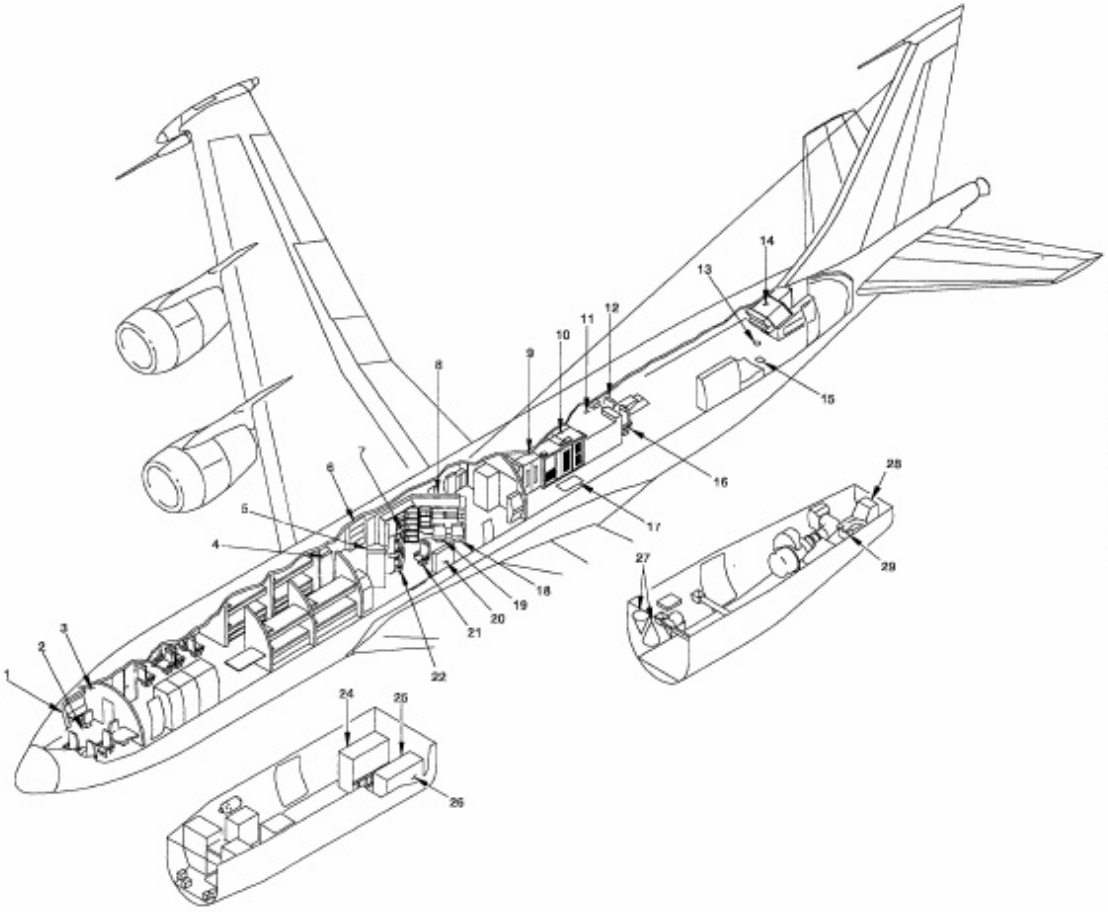
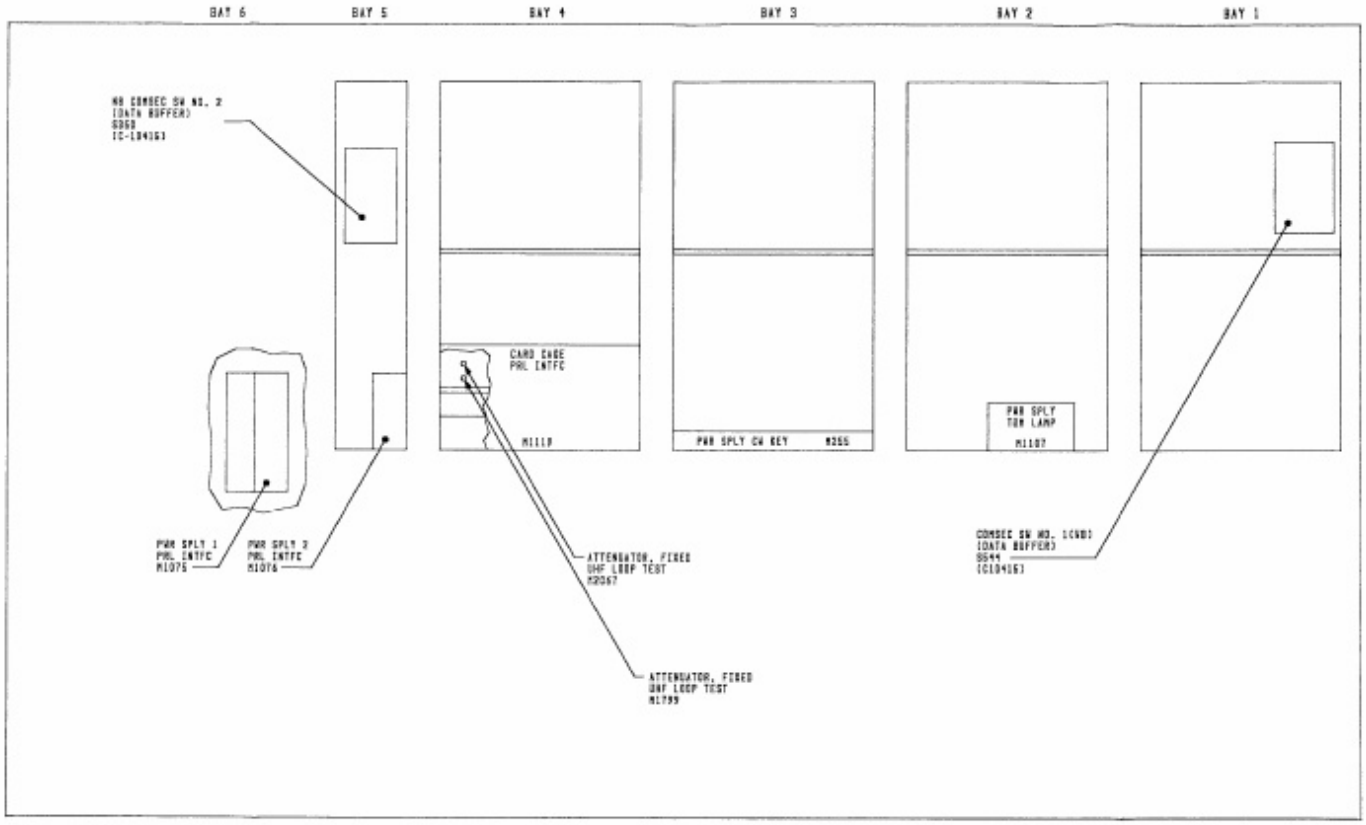


1. FLIGHT ENGINEER CONSOLE
2. P5 CIRCUIT BREAKER PANEL (OVERH
3. P61 CIRCUIT BREAKER PANEL
4. C1 RACK
5. FORWARD MISSION CONSOLE (P20)
6. P67 CIRCUIT BREAKER PANEL
7. COMM CENTRAL SEAT 2
8. AFT MISSION CONSOLE (P30)
9. RECEIVER/TRANSMITTER GROUP (E43
10. POWER AMPLIFIER GROUP (E44)
11. LTWA REEL ASSY (P52) AND OPERAT
12. SECOND REEL OPERATOR SEAT
13. DROGUE NEST VIEWING PORT (FLOO
14. STWA REEL ASSY
15. EMERGENCY DROGUE NEST CRANK
16. FIRST REEL OPERATOR SEAT
17. AFT LOWER COMPARTMENT ACCESS
18. COMM CENTRAL SEAT 4
19. COMM CENTRAL SEAT 3
20. ACO SECURITY CABINET
21. AIRBORNE COMMUNICATIONS OFFIC
22. COMM CENTRAL SEAT 1
23. FORWARD LOWER COMPARTMENT A
24. POWER DISTRIBUTION RACK (D16)
25. P23 CIRCUIT BREAKER PANEL
26. POWER DISTRIBUTION RACK (D15)
27. SPARE DROGUE STORAGE
28. DROGUE NEST SHROUD
29. DROGUE NEST VIEWING PORT (LOWE

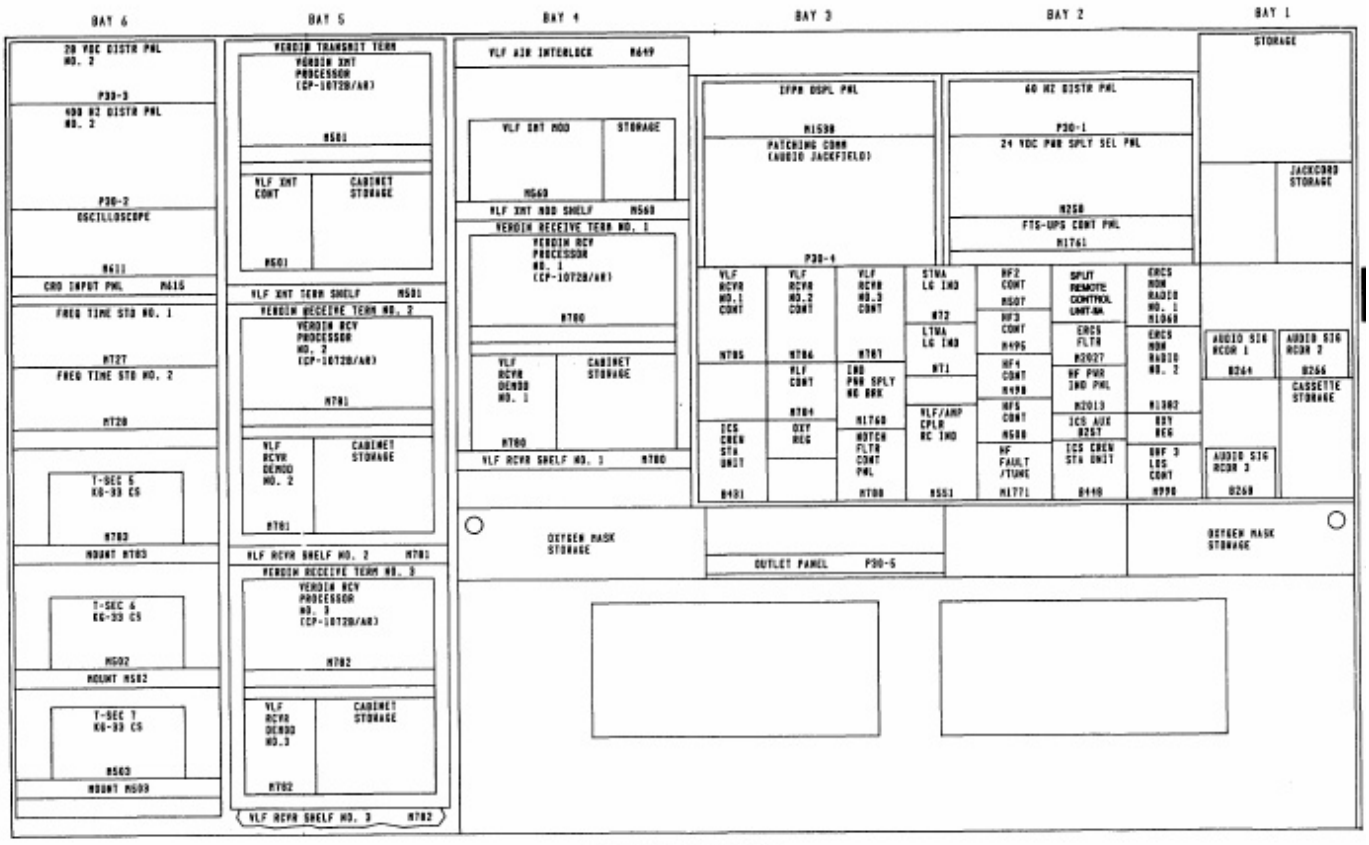
Interior Arrangement — Missio



FWD

FWD CONSOLE (P20)
(REAR VIEW)

Comm Central Forward Console Ec
(Sheet 2 of 2)



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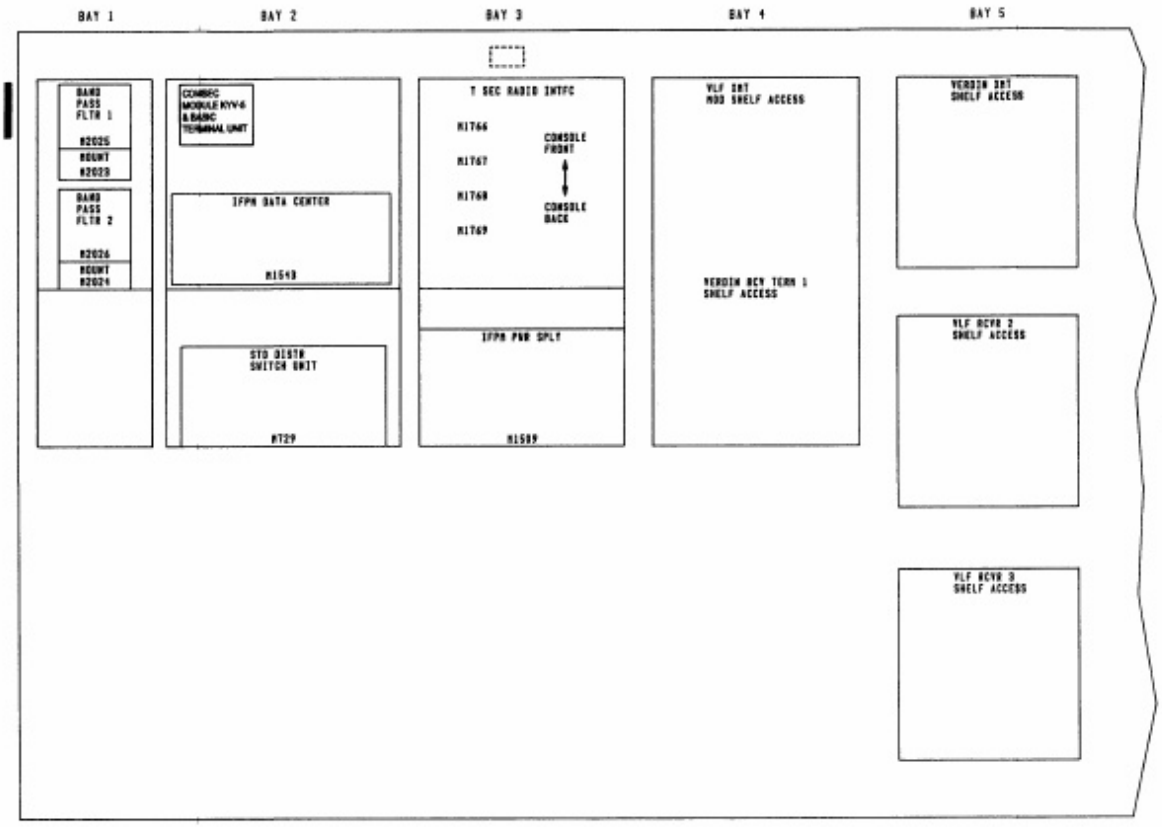
AFT CONSOLE (P30)
(FRONT VIEW)

Comm Central Aft Console Equi
(Sheet 1 of 2)



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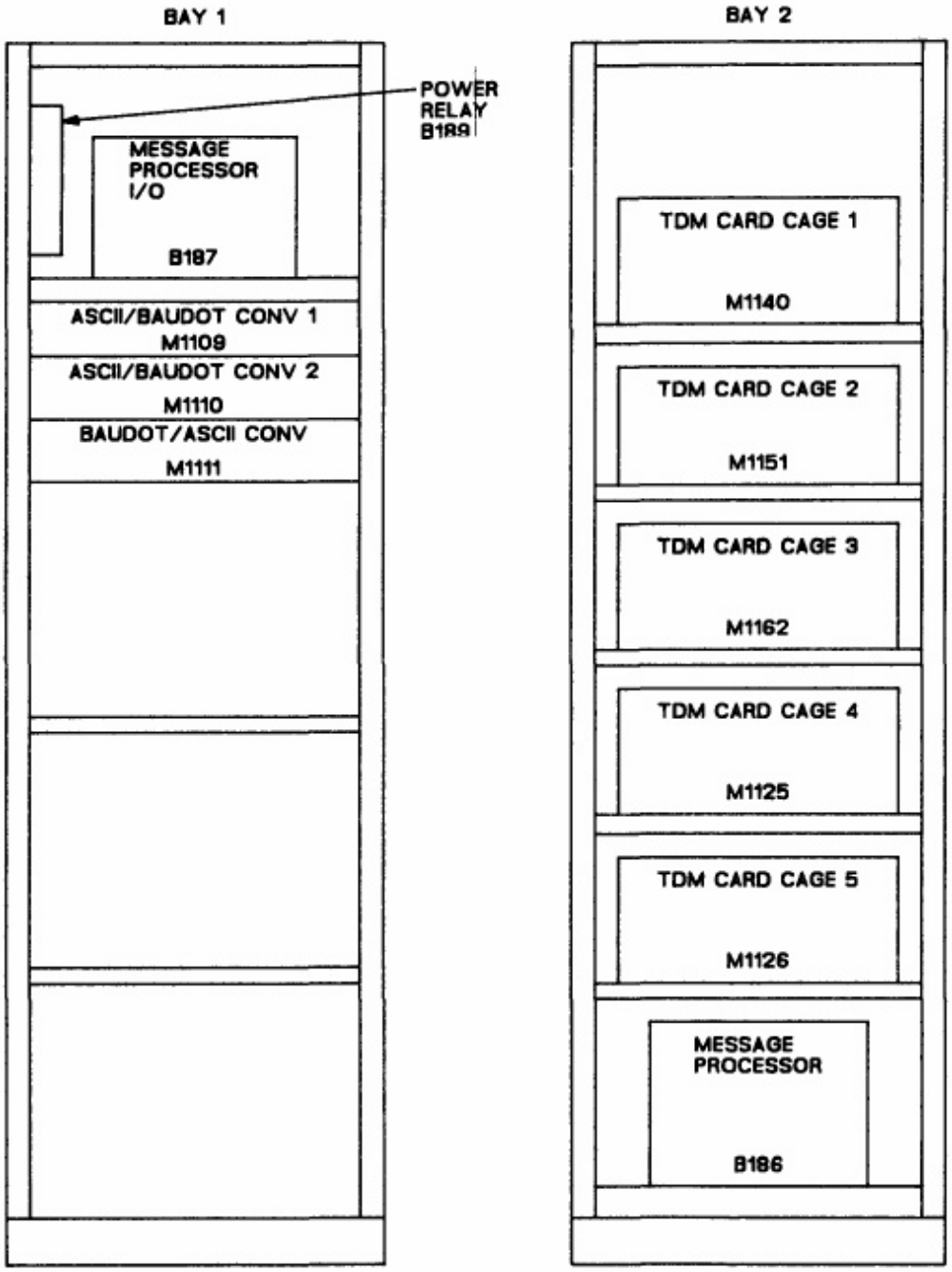
AFT CONSOLE (P30)
(REAR VIEW)

Comm Central Aft Console Equi
(Sheet 2 of 2)



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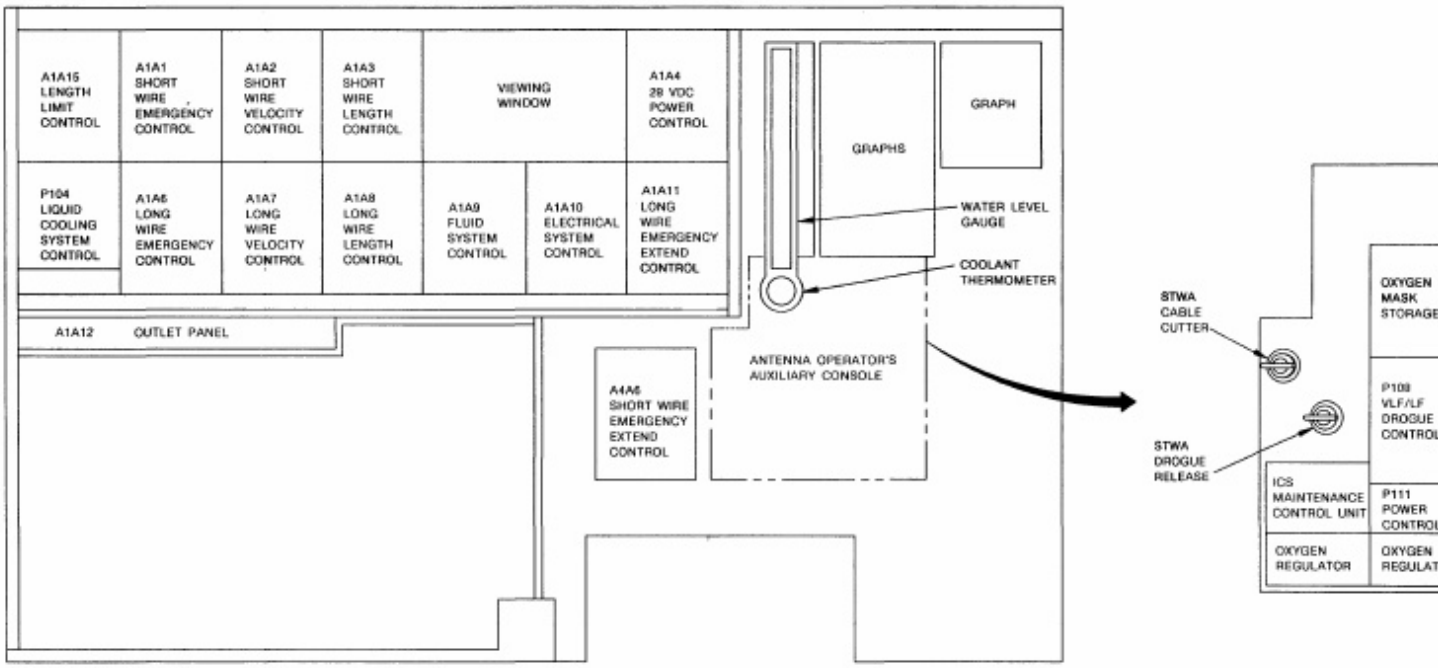
C1 Rack Equipment Location



Reel Operator Panel Loca

FO-8 (Reverse Blank)