BELL SYSTEM PRACTICES
Teletypewriter Stations

SECTION P65.906.00
Issue C, March 1958
TPT&TCo.
All Areas

TELETYPEWRITER AUTOMATIC DISPATCH SYSTEM

For Private Line Teletypewriter Service
Mark III - Mark IV
Systems

TADS MARK IV INSTALLATION

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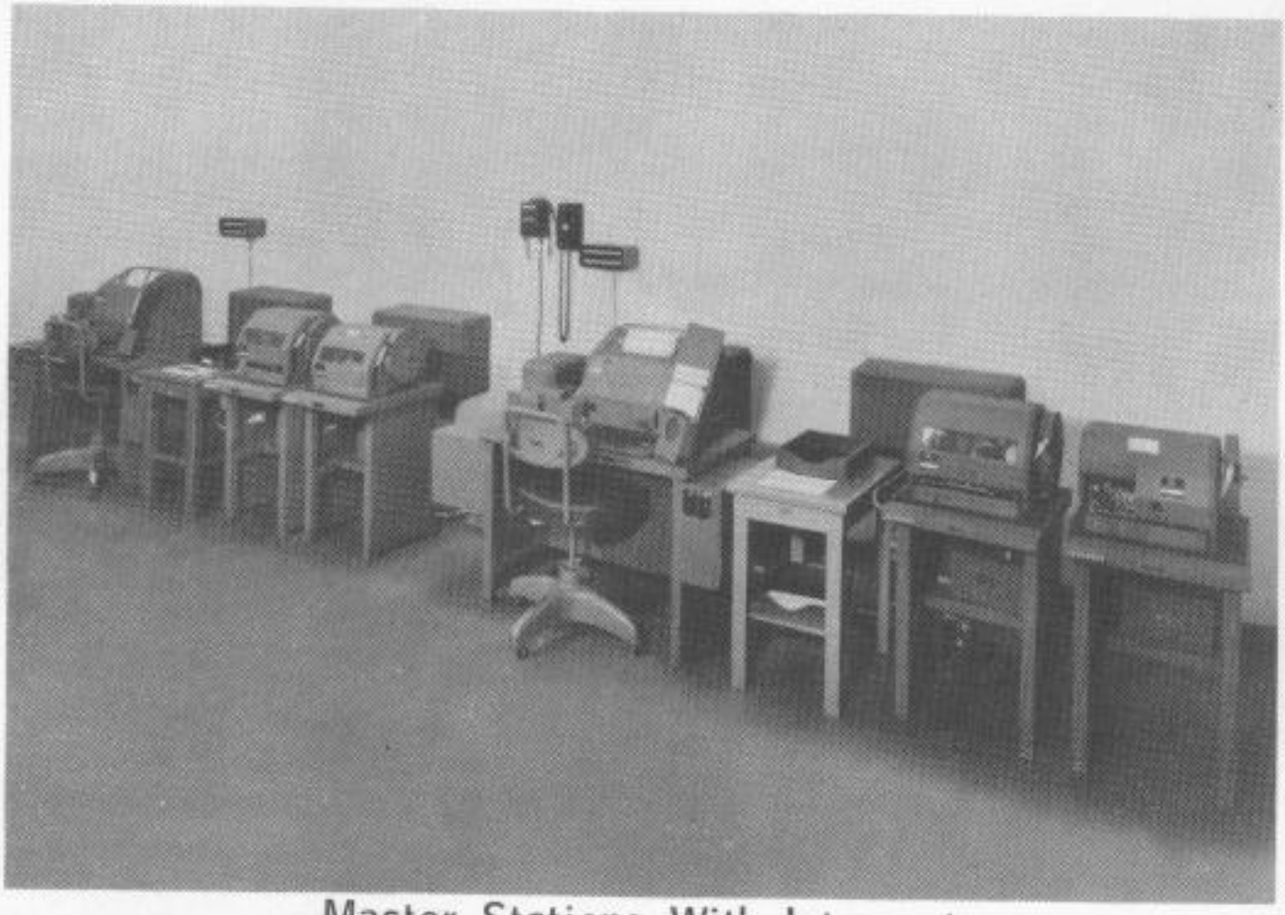
1. GENERAL

A. INTRODUCTION

1.01 This section replaces P65.906 Issue B dated October 1956. It is completely re-written to cover changes and new developments in TADS equipments, and to authorize a change in numbering. This section now bears the suffix .00 (P65.906.00) making it adaptable for sub-section numbering.

1.02 It describes the TADS (Teletypewriter Automatic Dispatch System), an automatic teletypewriter switching arrangement for private line service using teletypewriter characters for switching functions.

TADS MARK IV INSTALLATION



Master Stations With Intercept
Arranged For Manual Relay

1. GENERAL

A. INTRODUCTION (Continued)

TADS CENTRALIZED AUTOMATIC CONTROL PROVIDES FAST ACCURATE SERVICE

1.03 This system has the advantage of fully automatic centralized control. It will operate at 60, 75 or 100 words per minute on half-duplex (single) lines with as many as 36 automatic stations on one circuit. It handles traffic with speed, privacy and a minimum of attention.

1.04 Messages are prepared in tape form and placed in the transmitter. From this point on, the messages are directed automatically.

1.05 It is not necessary to watch for an opportunity to use the line. The controller scans it for traffic.

"You don't have to fight to get the circuit! Just punch a tape. Put it in the transmitter, - and TADS takes over. It's all automatic!"

1.06 The controller sends a search code out on the line. Station selectors read it. If a code for a station is received, the station selector starts the transmitter and the tape is sent to the line. Other station selectors read the directing codes in the tape, and when the code for a station is read by its selector, that station is connected to receive.

1.07 Several messages may be included in one tape, - messages to different locations. The equipment will route each to its correct destination.

CIRCUIT CONTENTION ELIMINATED BY USE OF AUTOMATIC TRANSMISSION AND STATION CODES

1.08 Since the selector contains no stepping mechanism or timing device, but is under the control of teletype codes, the problems of contention on the circuit are eliminated when all-automatic transmission is used.

1.09 Transmitter start, and station selection are accomplished by the transmission of station codes. The controller sends them in upper case to start station transmitters. Station selectors read them in lower case from the line to connect stations.

1.10 The 28 type teletypewriter may be used in this system.

CODES

CDC - Call Directing Character - Station code in lower case - Selects stations.

TSC - Transmitter Start Code - Station code in upper case - Starts transmitters.

BROADCAST CODE - Normally lower case S - Selection code for all stations.

END-OF-ADDRESS CODE - Operational code - CR (Carriage Return) - Disconnects unselected stations.

END-OF-MESSAGE CODE - Operational code - FIGS H (or character assigned) - Disconnects selected stations, stops transmitters, and causes tape to be fed out at a typing reperforator (Manual Relay point).

RELAY CODE - Selects typing reperforator for manual relay of tapes.

CROSS-OFFICE CODE - Selects automatic cross-office for automatic relay of tapes.

CROSS-OFFICE PRIORITY CODE - Operational code - ZZ. Places automatic cross-office equipment in priority condition to move its traffic.

1. GENERAL (Continued)

B. TYPES OF TAD SYSTEMS

1.11 Two types of TADS arrangements are available. They are known as the Mark III and Mark IV Systems.

1.12 The Mark III is the original TAD System. It uses single-digit station codes and is limited to 20 stations per line. This system uses the Automatic Transmitter Start Unit P92.911.03 (Controller) and Station Selector P92.901.03.

NOTE: Some Mark III Systems are equipped with Controllers P92.911.01 or .02 depending upon which model was rated Standard at the time of installation.

KEYBOARD SENDING POSSIBLE ON THE MARK III SYSTEM WHEN EQUIPPED WITH 15 TYPE MACHINES

1.13 This system may use 15 type machines. Stations equipped with these machines are signalled when they may begin hand transmission. This type of station is not recommended, but may meet some customer requirements.

1.14 Manual control of the system may be accomplished by the use of the station selectors without using the controller.

COMPLETELY AUTOMATIC TAPE TRANSMISSION USED ON THE MARK IV SYSTEM

1.15 The Mark IV is the same basic system as the Mark III with additional features. It is limited to stations using automatic tape transmission only. Keyboard (Hand sending) can not be used on the Mark IV system.

1.16 Recent design work has made applicable a combination of the 28RO teletypewriter and 14 type transmitter.

1.17 The Mark IV System operates with up to 20 stations per line when arranged for single-digit code selection, or up to 36 stations per line using two-digit code selection. It also includes priority message pickup, circuit assurance and accelerated search features.

1.18 COMPARISON OF THE TWO TAD SYSTEMS

FEATURES AND EQUIPMENT	MARK III	MARK IV
ACTIVATION		
a. Open-Close Without Automatic Disconnect	YES	NO SEE NOTE 1
b. Either Automatic or Open-Close With Automatic Disconnect if No End of Message Code in Tape.	NO	YES SEE NOTE 1
CIRCUIT ASSURANCE WITH ACCELERATED SEARCH	NO	YES
COUNTER RESTORE	YES *(Optional)*	YES *(Optional)*
EMERGENCY KEY (Priority Arrangement)	YES *(Optional)*	NO
INTERCEPT	YES *(Optional)*	YES *(Optional)*
KEYBOARD HAND SENDING	YES	NO
MANUAL OPERATION	YES *(Optional)*	YES *(Optional)*
MONITOR	YES *(Optional)*	YES *(Optional)*
MOTOR CONTROL	A or B SEE NOTE 4	A, B, C SEE NOTE 4
PRIORITY	NO	YES *(Optional)*
PUSH BUTTON SELECTION (Single Digit)	YES *(Optional)*	YES *(Optional)*
SENDING STATIONS	15 or 19	19 OR 28 WITH 14 TD
SPLIT OPERATION - 19 TTY AND 15 OR 28 RO	NO	YES
SUPPRESSION OF PRINTING - TRANSMITTER START CODES	YES *(Optional)*	YES *(Optional)*
STATION CODES AVAILABLE	20	20 or 36
STATION CODES USED	1	1 or 2
TABULATOR	YES *(Optional)*	YES *(Optional)*
TRANSMITTER STOP AND ALARM		
a. CR Ahead of CDC's	NO	YES
b. Transmitting Station CDC Omitted	NO	YES
c. Tape Snarl	NO	YES
TWO LINE AUTOMATIC CROSS-OFFICE SWITCHING	YES SEE NOTES 2-3	YES SEE NOTE 2
THREE LINE AUTOMATIC CROSS-OFFICE SWITCHING	YES SEE NOTE 6	YES SEE NOTE 6
TYPING REPERFORATOR CONTROL	YES *(Opt)* SEE NOTE 2	YES *(Opt)* SEE NOTE 2
USE OF 28 RO AND 14 TD	NO	YES
100 WPM OPERATION	NO SEE NOTE 5	YES SEE NOTE 5
CONTROLLER	P92.911.02 or .03	P92.911.02 or .03
SELECTOR	P92.901.03	P92.901.04

NOTES

Note 1 All Mark IV Systems require Automatic Disconnect.

Note 2 One of the available station codes is required when Automatic Two Line Cross Office or Typing Reperforator Control is used.

Note 3 When Automatic Two Line Cross-Office is used on a Mark III System, a Controller P92.911.03 or .02 must be used at the Master Station, and Selectors P92.901.04 must be used at the Cross-Office Point.

Note 4 A Motor Control - Motors turn off at end of transmission.

B Motor Control - Motors continue operating 15-30 seconds following end of transmission.

C Motor Control - Motors run continuously.
(Refer to section on Motor Control.)

Note 5 Refer to section on 100 wpm Operation

Note 6 Refer to section on Three Line Automatic Cross-Office.

1. GENERAL (Continued)

C. OPERATION

1.19 Both TAD Systems operate as follows: On multi-station half-duplex (Single) lines, one of the stations is designated as the master station and is equipped with a controller. This controller sends the station codes on the line in upper case in a sequence. These codes are called transmitter start codes (TSC). If a tape has been placed in a transmitter - that transmitter will start and send the tape to the station to which it is addressed.

1.20 The started transmitter will continue to send the tape until it reads an "end-of-message code" in the perforated tape. Transmission stops, the sending and selected stations disconnect and the controller sends the next TSC. If the second transmitter does not have tape in it, the controller will send another TSC. This continues until all stations have been polled for traffic. The sequence in which this search is done is determined by the customer's needs. Some stations may be searched several times during a search sequence if necessary. The TSCs are sometimes referred to as search codes.

1.21 CONTROLLER REST: Following a complete search of all stations without encountering traffic, the controller rests before the next automatic search. The rest period is determined by the TIME key at the master station. This key is located on the station selector panel and is connected to the controller.

1.22 REST TIME

Position S - Approximately three minutes

Position L - Approximately six minutes

Position R - Controller inactive until started from a station

CONTROLLER'S SEARCH CAN BE STARTED BY ANY ACTIVITY HAPPENING ON THE CIRCUIT

1.23 The controller can be caused to continue searching by the momentary operation of the **CONTROL** key at any of the stations on the line. Starting the controller's search can also be caused by any transmission taking place on the circuit such as sending a tape during the rest period.

EMERGENCY MESSAGES CAN BE SENT DURING REST

1.24 In order to send a message during the rest period, - if open-close activate operation is being used, place a tape in the transmitter, operate the **CONTROL** key to the **ON** position until the **BUSY** lamp lights and then operate the **CONTROL** key to the **ST** position until the transmitter starts. If automatic activate operation is being used, it is only necessary to operate the **CONTROL** key to **ST** position until the transmitter starts.

1.25 ADDRESSES - The call directing characters (CDCs) are the station codes in lower case, perforated in the tape preceding the message, or in the case of a 15 type machine on a Mark III System, are transmitted by keyboard. They must be preceded by **LTRS** characters. Each code must be followed by **LTRS** characters, and the sequence by **CR LF LTRS** (Carriage Return, Line Feed, Letters). Any number of codes can be sent to include as many stations as desired in the transmission.

BROADCAST AND STATION CODES ASSIGNED TO EACH STATION ON THE CIRCUIT

1.26 Provision is made for one broadcast or group code at each station, in addition to its individual code.

1.27 A new function plate and contact assembly has increased the number of codes available for use at each station.

1.28 END-OF-MESSAGE: All stations are disconnected by the end-of-message code, normally **FIGS H**.

1. GENERAL (Continued)

1.29 MULTIPLE MESSAGE TAPE: Should there be more than one message in a tape, the transmitter will stop on FIGS H following the first message and will be re-started when the controller polls the station again. This permits several messages to be sent from one piece of torn tape without a station monopolizing the line.

1.30 BUSY LAMP: A BUSY lamp flashes at each station during transmission to show that the line is busy.

1.31 INCOMING MESSAGE SIGNAL: A buzzer gives an audible signal on incoming calls. It continues operating until the CONTROL key is operated momentarily. Operation of the BZ CO key will cause the buzzer signal to be inoperative.

1.32 TYPE ARRANGEMENT D: When type arrangement D (Weathermap) is used, the end-of-message-code becomes FIGS S.

1.33 MANUAL SYSTEM OPERATION: If the customer has a requirement to operate a system at times without utilizing the automatic features of the controller to search for traffic, a Manual key may be provided at the master station to disable the controller. Manual operation is not to be confused with hand or keyboard sending.

"To use Manual operation, you just wait for the circuit to go idle. Then you put a tape in the transmitter - operate the CONTROL key and the message is sent."

"Manual operation never means you can send by hand."

TABULATOR OPERATION REQUIRES CAREFUL STUDY OF EQUIPMENT AND OPERATING LIMITATIONS

1.34 FORMS AND TABULATOR: The use of forms and tabulator is limited as follows:

(a) To circuits equipped with automatic tape transmission at all sending stations.

(b) To single-digit code selection if stations are equipped with function lever contact assembly.

(c) To one or two digit code selection if stations are equipped with function plate contact assembly.

(d) Circuits using all 28 type teletypewriters may use either one or two digit code selection. If a combination of 19 and 28 machines are used on a circuit, the limitation of (a) and (b) applies.

(e) Cannot be used with an automatic cross-office.

(f) Circuit availability time is reduced - timing circuits must be changed. Technical groups must be consulted before offering services deviating from normal operation.

TADS AUXILIARY EQUIPMENT ARRANGEMENTS PROVIDE OPERATING FLEXIBILITY

1.35 ADDITIONAL FEATURES: The following features utilizing auxiliary apparatus are available:

(a) Code selection of a typing reperforator (TRP) for manual relaying.

(b) Interception of misdirected messages on a typing reperforator at the master station. SKIP keys and lamps provided with the intercept equipment can also be furnished separately.

(c) Two Line Automatic Cross-Office switching. This arrangement automatically relays messages between two circuits using reperforator-transmitters.

1. GENERAL

ADDITIONAL FEATURES (Continued)

(d) Three Line Automatic Cross-Office switching - This arrangement automatically relays messages between three circuits using reperforator-transmitters.

(e) Pushbutton direction of messages. This is limited to 20 stations per line, single-digit code selection.

(f) A monitor (MON) key for use at any station to permit that station to copy all messages.

NOTE: Engineering advice should be obtained before ordering items (a), (c) and (d) on the same circuit. Items (c) and (d) cannot be used on a line using tabulator operation.

1.36 MOTOR CONTROL:

(a) Three motor control options are available:

Type A - The motors turn off and the machines are disconnected from the line following each transmission. The motor turns on and the machine is reconnected when the controller sends an open-close signal prior to starting the search sequence.

Type B - The machine is disconnected from the line following each transmission and is reconnected in response to the open-close signal from the controller. The motor turns off following an idle circuit condition of 15 to 30 seconds. The motors re-start in response to the open-close signal from the controller.

Type C - The motors run continuously during service hours. The machine must be turned on manually at start of service and turned off at the close of service each day.

(b) These options are furnished as follows:

Mark III	A or B
Mark IV with Open-Close Activate	A or B
Mark IV with automatic activate	C

2. OPERATING FEATURES - COMMON TO BOTH MARK III AND MARK IV SYSTEMS

A. STATION CODES

2.01 Each station is assigned a letter or combination of two letters as the station code. To direct a message to a station, the codes of the calling and the called station are sent in lower case followed by LTRS CR LF LTRS. To poll a station for transmission, the same characters are sent in upper case by the controller. The letters V, M, O, T, H and S are not suitable for selective calling purposes.

FIGS H is normally used for End-of-message code except when weathermap is used. Then FIGS S is assigned as the End-of-message code.

B. OPEN-CLOSE ACTIVATION

2.02 Following a two to three second idle line condition, the controller sends a one to two second open. Upon closure of the line, all stations are connected. After another second, the motors will have attained their operating speed if Type A Motor Control is used. Otherwise the motors run continuously.

NOTE: This open-close operation is omitted in the Mark IV System when automatic activate feature is provided.

2. OPERATING FEATURES - COMMON TO BOTH MARK III AND MARK IV SYSTEMS (Continued)

C. TRANSMITTER START CODES

2.03 Following the open-close operation, the controller sends transmitter start codes (TSC) in sequence. The Mark III System allows an interval of 15 seconds at each 15 type station for the attendant to respond.

NOTE: Use of the 15 type machine for hand sending is used only with the Mark III System

D. STATION RESPONSE:

2.04 When the TSC is received at a 19station, the transmitter will start if it is loaded. When the TSC is received at a 15 S & R station (Mark III), a buzzer will sound if the attendant has operated the SEND key indicating that a message is ready to be sent.

2.05 A Mark IV station having the circuit assurance feature will transmit a no-tape signal (upper case M, O or T) if there is no tape in the transmitter.

Automatic Cross-Office uses an upper case O (9) for the circuit assurance signal.

3. OPERATING FEATURES - MARK III SYSTEM

A. USE OF 15 TYPE MACHINES:

3.01 When a non-automatic 15 type machine is polled for traffic, a 15 second interval is allowed for the station to start sending before search is resumed. This uses circuit time but eliminates the possibility of contention. A 15 second pause during sending will cause the search to be resumed.

B. EMERGENCY TRANSMISSION

3.02 A PRIORITY key is sometimes furnished at 19 type stations for sending emergency messages. (The Mark III System does not have a regular priority arrangement and this is an interim feature not having widespread application).

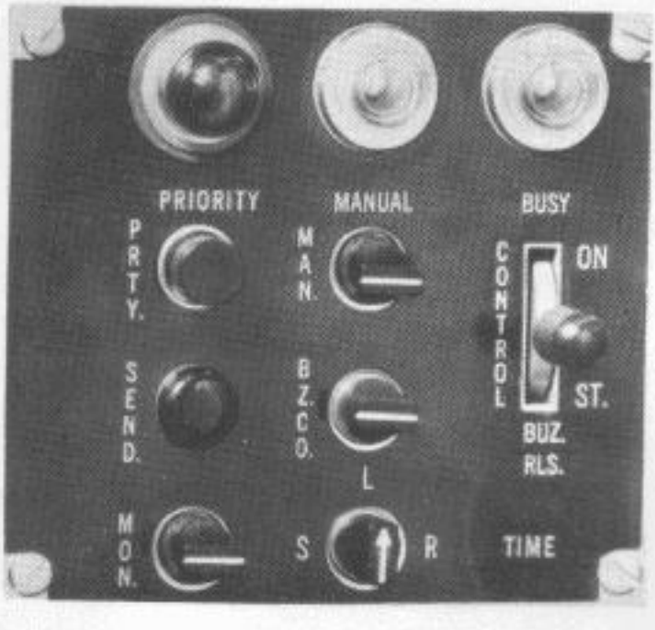
3.03 Messages may be sent from stations having this special feature as follows:

(a) When the line is busy as shown by a flashing BUSY lamp: (1) Load the transmitter. (2) Wait until the motor starts or search is resumed at the end of transmission. (3) Operate the PRIORITY key immediately for 3 seconds. (4) Send the FIGS signal about six times. (5) Send own station TSC. The transmitter will start and the message will be sent to the stations selected by the CDCs preceding the message in the tape.

(b) When the line is idle as indicated by a dark BUSY lamp: (1) Load the transmitter. (2) Operate the CONTROL key first to the ON position until the BUSY lamp lights, then to the ST position until the transmitter starts.

TADS STATION SELECTOR PANEL

Key and Lamp positions are plugged at locations not having certain features



3. OPERATING FEATURES - MARK III SYSTEM (Continued)

C. CONTACT ASSIGNMENTS:

3.04 The number of contacts available in the typing units of the 15 and 19 type teletypewriters is limited.

3.05 Those available are normally assigned as follows:

(a) FUNCTION LEVER CONTACT ASSEMBLY

Contacts	Function
Position 5	CDC and TSC
Position 6	Broadcast
Position 13	FIGS H (End-of-message code)
S	Cross-Office or TRP Control
CR	Deactivate

3.06 FIGS S, originally used for TRP control is not compatible with automatic cross-office switching.

3.07 An additional contact can be made available in position 7 by the use of a special set of parts described in P92.901.04.

(b) FUNCTION PLATE CONTACT ASSEMBLY

Position	Function
21	Spare
22	CDC (LC)
23	TSC (UC)
24	Broadcast (LC)

FUNCTION PLATE CONTACT ASSEMBLY (Continued)

Position	Function
25	TRP or XO (LC)
26	Group Code (LC)
27	CR - Deactivate (UC & LC)
28	FIGS H - End-of-message (UC)

NOTE: UC - Upper Case

LC - Lower Case

NOTE: In the event a customer requires special arrangements such as tabulator operation, the advice of plant or engineering groups should be obtained before making contact assignments to ensure proper operation of the circuit.

D. MESSAGE FORMATS

3.08 Use of correct message formats is not only important for smooth traffic operation, but also to ensure that the equipment will function correctly. The automatic features of TADS are dependent upon having tapes made up in a specified manner. The Intercept Equipment is arranged so that messages will be intercepted if there are errors in the address format.

3.09 A minimum of 10 LTRS characters should precede and follow each message. This is to ensure that a FIGS H or assigned end-of-message code will be transmitted. Failure to include LTRS characters as shown in the formats would result in messages being intercepted. If FIGS H or the assigned end-of-message code is omitted, a transmitter would fail to stop on multiple message tape transmission, resulting in a message going to the wrong address. At typing reperforator

3. OPERATING FEATURES - MARK III SYSTEM

D. MESSAGE FORMATS (Continued)

locations, tape will not be fed out if FIGS H is not received by the control equipment.

NOTE: 10 LTRS means LTRS, LTRS, LTRS repeated ten times.

TWO STATIONS ON THE SAME LINE

3.10 Station A to Station B on the same line.

10 LTRS A LTRS B LTRS CR LF TEXT FIGS H 10 LTRS

A selects own station. B selects Station B. CR disconnects unselected stations. LF advances line feed of station A and B. FIGS H disconnects stations A and B.

GROUP OF STATIONS ON THE SAME LINE

3.11 Station A to a group of stations as B, D, F - all on the same line.

10 LTRS A LTRS B LTRS D LTRS F LTRS CR LF LTRS TEXT FIGS H 10 LTRS

A selects own station. B, D, and F selects Stations B, D, and F. CR disconnects unselected stations. LF advances line feed of Stations A, B, D and F. FIGS H disconnects stations A, B, D and F.

BROADCAST TO ALL STATIONS ON THE SAME LINE

3.12 Broadcast from Station A to all stations - S assigned as broadcast code.

10 LTRS A LTRS S LTRS CR LF LTRS TEXT FIGS H 10 LTRS

A selects own station. S selects all stations on the line. CR (all stations were selected - none to disconnect). LF advances line feed of all stations. FIGS H disconnects all stations.

STATION TO STATION THROUGH AUTOMATIC CROSS-OFFICE

3.13 Station B on Circuit No. 1 to Station C on Circuit No. 2 with automatic two line cross-office switching R assigned as the cross office code.

10 LTRS B LTRS R LTRS C LTRS CR LF LTRS
TEXT FIGS H 10 LTRS

B selects own station. R selects cross-office. (R code also disconnects all unselected stations on Circuit No. 1). C selects station C on circuit No. 2. CR disconnects all unselected stations when the tape is retransmitted on Circuit No. 2. LF advances the line feed of Station B on Circuit No. 1, and when the tape is re-transmitted to Circuit No. 2, it advances the line feed of Station C. FIGS H disconnects Station B on Circuit No. 1 and cross-office, and when the tape is re-transmitted on Circuit No. 2, it stops the cross-office transmitter and disconnects Station C.

NOTE: If it is desired to send a broadcast message to all stations on Circuit No. 2, the broadcast code for Circuit No. 2 would be used instead of the code for Station C as shown above.

STATION TO STATION THROUGH MANUAL RELAY CENTER

3.14 Station C on Circuit No. 1 to a typing reperforator at Station A for manual relay to Station F on Circuit No. 2. R assigned as the selection code for the typing reperforator.

10 LTRS C LTRS A LTRS R LTRS F LTRS CR LF LTRS
TEXT FIGS H 10 LTRS

C selects own station. A selects control teletypewriter for typing reperforator. R code selects typing reperforator. (R code also disconnects all unselected stations on Circuit No. 1) F code selects Station F when the tape is re-transmitted on Circuit No. 2. CR code disconnects Station A (control Teletypewriter) on Circuit No. 1, and when the tape is sent on Circuit No. 2 it disconnects all unselected stations. LF advances the line feed of Station C on Circuit No. 1, and when the tape is sent on Circuit No. 2, it advances the line feed of Station F.

3. OPERATING FEATURES - MARK III SYSTEM

D. MESSAGE FORMATS (Continued)

FIGS H disconnects selected stations on Circuit No. 1, causes tape feedout at the typing reperforator, and when the tape is re-transmitted on Circuit No. 2, it stops transmitter of the sending station and disconnects Station F.

NOTE: The above format is for the typing reperforator control unit P92.902.01, rated Standard for the Mark III System.

PUSHBUTTON CODE GENERATOR SPEEDS RELAY JOB

3.15 If pushbutton calling is provided at the relay point, the codes for the stations on the second circuit can be omitted. These can be supplied by the TADS Pushbutton Code Generator, providing that addresses are included to permit the relay attendant to identify the stations to which the messages should go.

4. OPERATING FEATURES - MARK IV SYSTEM

A. ACTIVATION

4.01 Either of two types of operation may be used, both of which are limited to automatic tape sending.

NOTE: No keyboard hand sending may be used on a Mark IV System.

4.02 OPEN-CLOSE ACTIVATE: All stations automatically disconnect from the line at the end of transmission. Stations are reconnected in a condition to receive codes by an open-close signal from the controller.

4.03 AUTOMATIC ACTIVATE: The automatic activate feature was developed for the Mark IV TAD System to increase circuit efficiency where the average length of message is short and the circuit usage is high. Commercial experience has shown it to be very successful. It appears that this should be the normal arrangement of the Mark IV System.

AUTOMATIC ACTIVATE (Continued)

"TADS can move traffic fast with this Automatic Activate. See - the stations are all back on the line ready to grab the next message - in less than half a second."

4.04 This feature reduces the interval from the time transmission is stopped until the polling is resumed, to about 3 seconds as compared with 6-1/2 seconds for open-close activate. This is accomplished by having all stations automatically re-connect to the line ready to receive transmitter start codes within 1/2 second after transmission stops.

Automatic Activate has the following characteristics:

(a) The motors of all stations run continuously during service hours. They must be turned on manually at the start of service and turned off manually at the close of service each day.

(b) The BUSY lamp is normally lighted and flashes during transmission.

(c) When the circuit is idle, the teletypewriters are connected to the line ready to receive codes.

4. OPERATING FEATURES - MARK IV SYSTEM

AUTOMATIC ACTIVATE (Continued)

(d) The CR code following the station codes, disconnects the unselected stations as before, but does not cause their motors to turn off.

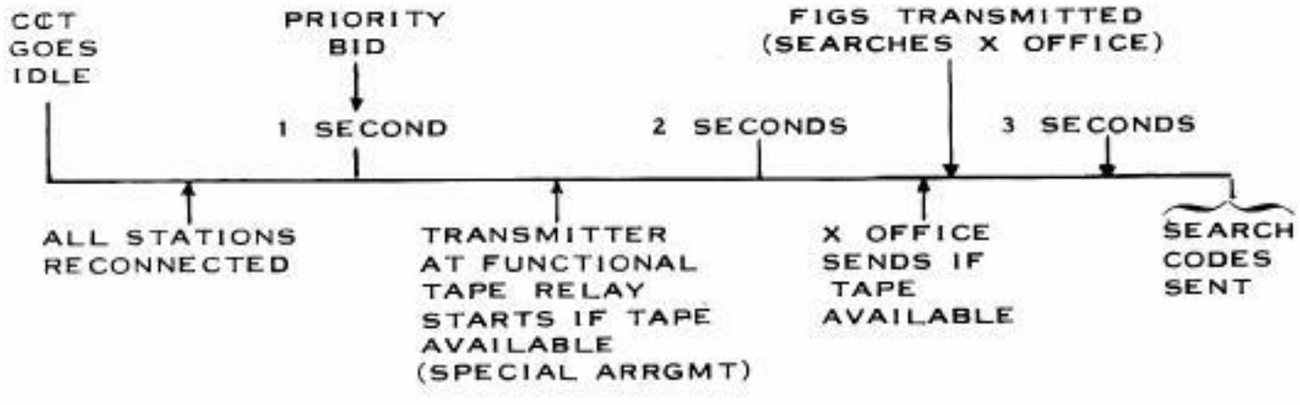
(e) Transmission stopping for 1/2 second will cause all machines to reconnect to the line in an activated condition. (In a condition to receive codes). This usually follows the end-of-message code, normally FIGS H.

(f) Automatic activate is compatible with all major features such as priority, circuit assurance, two digit calling, intercept, automatic two line and three line cross-office switching, and pushbutton calling.

(g) Manual operation is accomplished by inserting tape in the transmitters, observing the BUSY lamp to determine that the circuit is idle, and then operating the CONTROL key to ST until the transmitter starts.

4.05 AUTOMATIC ACTIVATE OPERATION: All stations automatically reconnect to the line after a transmission. The operating sequence is therefore somewhat different from open-close activate operation.

4.06 The sequence of operations when the line goes idle is illustrated below:



4.07 Note that it has not been necessary to open and close the circuit prior to starting or resuming the search as the stations are already on the line and ready to respond to station codes.

MANUAL TAPE RELAY CENTER USE ADVANTAGES OF TADS AUTOMATIC ACTIVATE OPERATION

4.08 The automatic activate feature has made possible a form of continuous-tape operation from a functional tape relay center that offers advantages in some cases. Several messages with different destinations are perforated in one tape which is inserted in the transmitter. The FIGS H following each message stops the transmitter momentarily, - long enough for all stations to be activated. Transmission is then resumed from the same tape, and the station codes preceding the next message selects a new combination of stations.

FOUR DECK CABINET FOR TYPING REPERFORATORS

This console combined with the 28 RO teletypewriter, equipped with shelf-mounted transmitter, selector, SKIP key and lamp panel, make possible a streamlined, compact manual relay center.

B. CIRCUIT ASSURANCE

4.09 The circuit assurance signal is one that is transmitted from the station in response to a search code to indicate that there is no tape in the transmitter. The signal is an upper case M, T, O or V in the case of a regular TAD station. In the case of an automatic two or three line cross-office, the circuit assurance signal is an upper case O (9). The circuit assurance signal causes the controller to send the TSC for the next station. Failure to receive the circuit assurance signal causes the TSC to be sent again in two seconds. A buzzer will sound at the master station if there is no response to the repeated TSC.

4. OPERATING FEATURES - MARK IV SYSTEM (Cont)

C. TWO DIGIT STATION CODE SELECTION

4.10 This permits up to 36 stations per line. Each station is assigned a two digit code. This code is transmitted in upper case to poll the station for traffic and in lower case to direct messages to the station. Only two different letters can be used as the first digit on any one line.

D. PRIORITY

4.11 Priority permits stations to send urgent messages ahead of normal order. This is done by inserting the tape in the transmitter and operating the PRIORITY key. Such messages will be given priority as follows:

(a) If the line is busy when the PRIORITY key is operated, the priority message will be the next one sent.

(b) If search is in progress when the PRIORITY key is operated one message may be sent ahead of the priority message.

(c) If the circuit is idle when the PRIORITY key is operated, search is started by momentary operation of the CONTROL key to ON. The priority message will be the first or second message sent.

E. TRANSMITTER STOP AND ALARM

4.12 The transmitter at a station will stop and a buzzer will sound under the following conditions:

(a) When CR LF is perforated in the tape ahead of station codes.

(b) When the code of the sending station is omitted.

NOTE: At a manual relay point, this feature is disabled by applying Option I in order that the sending station CDC can be omitted from the tape.

(c) When a tape snarl stops the transmitter.

STATION UNABLE TO SEND DURING ALARM CONDITION BUT WILL RETURN CIRCUIT ASSURANCE SIGNAL

4.13 In order to silence the buzzer, the tape must be removed from the transmitter. Should the station be polled for traffic while the transmitter is stopped in this alarm condition, the circuit assurance signal will be returned and the search will proceed.

F. CONTACT ASSIGNMENTS

4.14 FUNCTION LEVER CONTACT ASSEMBLY: The contacts available in the typing unit for selective calling purposes are normally assigned as follows:

Contacts	Function
Position 5	1st digit
Position 6	2nd digit
Position 7	End-of-message (FIGS H)
Position 13	Cross-office or TRP control
LTRS S	Broadcast
CR	Deactivate (Disconnect)

4.15 FUNCTION PLATE CONTACT ASSEMBLY: Design work has been completed on a new function plate and contact assembly for the No. 15 typing unit. This arrangement is now available and is known as the Teletypewriter Selector Function Plate and Contact Assembly per P92.905.01. It is fully described and illustrated in Bell System Practice P65.917. Assignments are shown below:

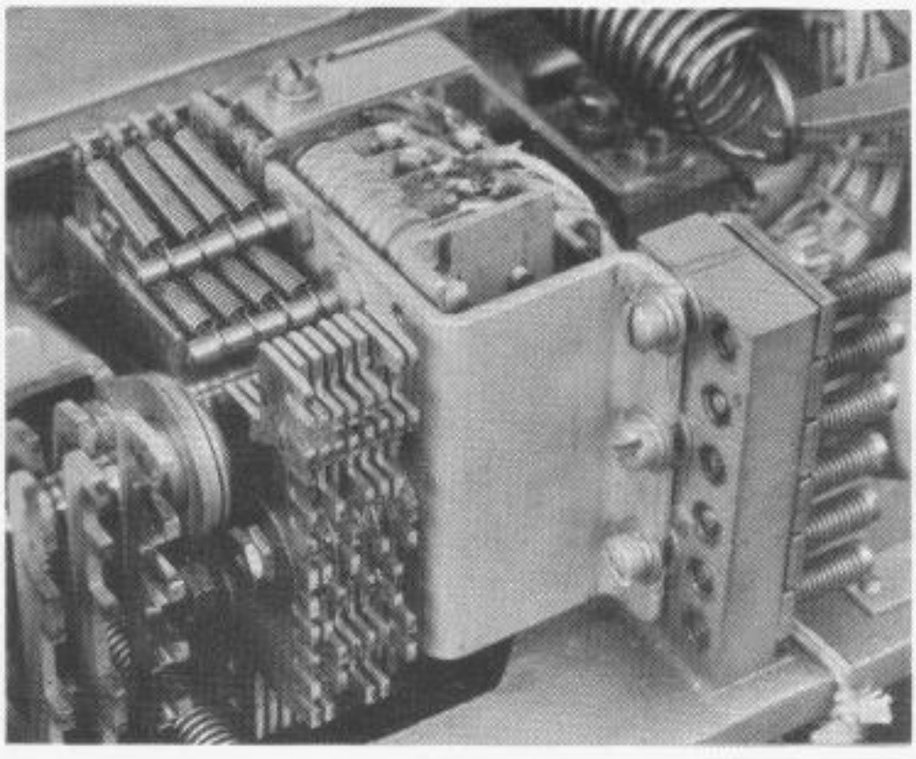
Position	Function
21	1st digit (UC & LC)
22	2nd digit (LC) Station selection
23	2nd digit (UC) - Station search

4. OPERATING FEATURES - MARK IV SYSTEM

FUNCTION PLATE CONTACT ASSEMBLY (Cont.)

	24	Broadcast (LC)
	25	TRP or Cross-office (LC)
	26	Spare (Available for Group Code)
	27	CR Deactivate (Disconnect)(UC & LC)
	28	End-of-message code (FIGS H, or upper case character desired by the customer.
(Existing)	13	Unassigned - available for automatic cross-office if position 25 is in use, or as required. required.

FUNCTION PLATE CONTACT ASSEMBLY
Shown Mounted In No. 15 Typing Unit



G. MESSAGE FORMATS

4.16 Use of correct message format is important, not only for smooth traffic handling, but because the automatic features of TADS are dependent upon these codes to function properly.

CORRECT USE OF OPERATIONAL CODES IMPORTANT IN PUNCHING TAPE FOR TRANSMISSION ON TADS

4.17 A minimum of 10 LTRS characters should precede and follow each message. This ensures that FIGS H (End-of-message code) will be transmitted. Failure to include LTRS characters as shown in the message formats would result in messages being intercepted, and placing a CR code ahead of a station code would result in a transmitter stop and alarm. If FIGS H or the assigned end-of-message code is omitted, a transmitter would fail to stop on a multiple message tape transmission, resulting in lost messages. Or tape would not be fed out at a typing reperforator location.

NOTE: 10 LTRS means LTRS, LTRS, LTRS etc. repeated 10 times. Assume Y and Z assigned as first digits.

"You'll have trouble if you don't punch your tapes correctly! Those teletype characters are commands to TADS. They must be right to get the message through!"

STATION TO STATION ON SAME LINE

4.18 Station YA to Station ZF on the same circuit.

10 LTRS YA LTRS ZF LTRS CR LF LTRS TEXT FIGS H 10 LTRS

YA selects own station. ZF selects Station ZF. CR disconnects unselected stations. LF advances line feed of Stations YA and ZF. FIGS H disconnects Stations YA and ZF.

4. OPERATING FEATURES - MARK IV SYSTEM

G. MESSAGE FORMATS (Continued)

STATION TO GROUP OF STATIONS ON SAME LINE

4.19 Station YA to Stations YC, YG, and ZF on the same circuit.

10 LTRS YA LTRS YC LTRS YG LTRS ZF LTRS CR LF LTRS TEXT FIGS H 10 LTRS

YA selects own station. YC, YG, ZF selects Stations YC, YG and ZF. CR disconnects unselected stations. LF advances line feed of Station YA, YC, YG and ZF. FIGS H disconnects Stations YA, YC, YG and ZF.

BROADCAST TO ALL STATIONS ON SAME LINE

4.20 Broadcast from Station YA to all stations on the line S assigned as the broadcast code.

10 LTRS YA LTRS S LTRS CR LF LTRS TEXT FIGS H 10 LTRS

YA selects own station. S selects all stations on the line. CR (all stations were selected - none to disconnect). LF advances line feed of all stations. FIGS H disconnects all stations.

STATION TO STATION THROUGH AUTOMATIC CROSS-OFFICE

4.21 Station YB on Circuit No. 1 to Station XC on Circuit No. 2 - YW assigned as automatic cross-office code.

10 LTRS YB LTRS YW LTRS XC LTRS CR LF LTRS TEXT FIGS H 10 LTRS

YB selects own station. YW selects cross-office. (YW code also disconnects all unselected stations on Circuit No. 1). XC selects Station XC on Circuit No. 2. CR disconnects unselected stations on Circuit No. 2. LF advances the line feed of station YB on Circuit No. 1, and when the tape is re-transmitted on Circuit No. 2, it advances the line feed of Station XC. FIGS H disconnects Station YB on Circuit No. 1 and cross-office, and when the tape is re-transmitted on Circuit No. 2, it stops the cross-office transmitter and Station XC.

STATION TO STATION THROUGH MANUAL RELAY CENTER

4.22 Station YC on Circuit No. 1 to typing reperforator at Station YA for manual relay to Station XF on Circuit No. 2 - YW assigned as TRP code.

10 LTRS YC LTRS YW LTRS XF LTRS CR LF LTRS TEXT FIGS H 10 LTRS

YC selects own station. YW selects TRP. (YW code also disconnects all unselected stations on Circuit No. 1.) XF selects Station XF on Circuit No. 2. CR disconnects all unselected stations on Circuit No. 2. LF advances line feed of Station YC on Circuit No. 1, and when the tape is re-transmitted on Circuit No. 2, it advances the line feed of Station XF. FIGS H disconnects Station YC, blinds the typing reperforator, starts tape feed-out on the TRP, and when the tape is sent on Circuit No. 2, it stops the sending station's transmitter and disconnects Station XF.

NOTE: The above format is for the typing reperforator control unit P92.902.02. It is not necessary to code the control teletypewriter at Station YA unless a page copy is desired. Also, the code of the sending station on Circuit No. 2 can be omitted. At manual relay points, Option I of the P92.901.04 drawing is applied to disable the transmitter stop and alarm.

4.23 If pushbutton calling is provided at a relay point, on a TADS circuit having single digit selection, codes for Circuit No. 2 could be omitted from the tape. These codes could be added by the pushbutton code generator providing addresses were included in the message.

5. SIGNALLING FUNCTIONS - MARK III SYSTEM EQUIPPED WITH 19 TYPE TELETYPEWRITER

5.01 Each station is assigned a code, in addition, each station may be arranged to respond to one broadcast or group code.

5.02 NORMAL CONDITION: Line closed. BUSY lamps OFF at all stations. Motors OFF at all stations. Controller at rest.

5.03 CONTROLLER OPENS LINE: BUSY lamps ON at all stations.

5.04 CONTROLLER CLOSES LINE IN TWO SECONDS: Motors ON at all stations.

5.05 CONTROLLER SENDS FIGS: Then sends station code. Searched station will start sending if there is tape in the transmitter.

5.06 LTRS FOLLOWED BY CDCs IS SENT FROM TAPE. Calling and called stations lock on the line ready to receive text. Buzzer will operate at the called stations if BZ CO key is not operated.

5.07 CR SENT: All stations not selected by the CDCs disconnect. Motors turn OFF if Type A motor control is furnished.

5.08 LF SENT: Line feed advances at all stations selected by the CDCs.

5.09 TEXT IS TRANSMITTED: Selected stations receive the text of the message. BUSY lamp flashes.

5.10 END-OF-MESSAGE CODE SENT: Selected stations disconnect. Circuit goes idle. BUSY lamps OFF.

5.11 CONTROLLER OPENS AND CLOSES THE LINE: Search for traffic resumes.

OC-1

TADS CONTROLLER STARTS SEARCH FOR TRAFFIC

INITIAL CONDITION ← Line closed
Busy lamps OFF
All stations off line
Motors OFF
TADS Controller at rest

TADS CONTROLLER
times out
sends open ← Busy lamps ON
3 Seconds (approx.)
sends close ← All stations on line. Motors ON

sends FIGS ← All TTYs upper case
(2 Sec. pause) ← Cross Office bid (See Note 2)

To OC-2, OC-6,
OC-3, OC-7,
OC-4, OC-8,
OC-5, OC-9,
or OC-10

OC-2

TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.

Cross Office Has Tape in Transmitter.

From OC-1

TADS CONTROLLER
sends FIGS ← Cross Office send
(Tape Available)

CROSS OFFICE
sends LTRS ← All TTYs lower
sends CDC ← Receiving station
sends LTRS↓CR ‹ LF ≡ ← Stations not selec
sends LTRS↓TEXT ← Busy lamps flicke
sends FIGS H ← Receiving station
Busy lamps OFF
Motors OFF at al

TADS CONTROLLER
sends open ← Busy lamps ON at
sends close ← All stations on lin
sends FIGS ← All TTYs upper
(2 Sec. Pause) ← Cross Office does

To OC-4 or OC-5

OC-6

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC

Station Has Emergency Message in the Transmitter.
Station Equipped with Key for Emergency Operation.
(This Arrangement Cannot Be Used with 2 Line Automatic Cross Office.)

From OC-1

CIRCUIT BUSY ← Line transmitting signals.
(See Note 5) ← Busy lamps flicker at all stations.

ATTENDANT
Holds "Priority" Key operated ← Busy lamps flicker until line goes idle.
Busy lamp OFF, then ON steady.

ATTENDANT
Releases "Priority" Key ← Busy lamp ON steady.
Hand sends FIGS ← Controller stopped from searching.
All TTYs upper case.

Hand sends own TSC ← Selects own station. Station Transmitter starts.

STATION
(Tape) sends LTRS ↓
sends CDC ← Receiving station selected.
sends LTRS↓CR ‹ LF ≡ ← Stations not selected disconnect.
sends LTRS↓TEXT ← Busy lamps flicker at all stations.
sends FIGS H ← Transmitting and Receiving stations disconnect.
Busy lamps OFF at all stations.
Motors OFF at all stations. (See Note 3)

Circuit Restored to Initial Condition

OC-7

INTERCEPT - MISCELLANEOUS

Tads Controller Searches for Traffic.

Station Sends Invalid or Garbled CDC.

From OC-1, OC-2, OC-3

TADS CONTROLLER
sends FIGS ↑ TSC ← Tape available.

STATION
sends LTRS ← All TTYs lower
sends invalid or garbled CDC ← Transmitting sta
stations not sele
Intercept machin
selected.
sends LTRS↓CR‹ LF ≡ ← Stations not sele
sends LTRS↓TEXT ← Busy lamps flick
sends FIGS H ← Transmitting and

Circuit Restored to Initial Condition

OPEN-CLOSE ACTIVA

OPERATION CHARTS ARE ARRANGED TO SHOW CAUSE AND EFFECT ACTION DURING A SE

No **attempt** is made to depict an entire search pattern to i
arranged so that an operation can be selected by a heading, a

*In this method of operation, as used for Mark III, Contr
station for transmission to start and approximately 15 seco
there will be a 15 second pause following the FIGS H befor*

C-2

LER SEARCHES
FOR TRAFFIC.

ce Has Tape
smitter.

OC-1

← Cross Office sends,
(Tape Available) (See Note 2)

← All TTYs lower case.

← Receiving stations selected.

← Stations not selected disconnect.

← Busy lamps flicker at all stations.

← Receiving stations disconnect.
Busy lamps OFF at all stations
Motors OFF at all stations. (See Note 3)

← Busy lamps ON at all stations.

← All stations on line. Motors ON.

← All TTYs upper case.
← Cross Office does not send.
(See Note 2)

or OC-5

OC-3

TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.

Cross Office Has No
Tape in Transmitter.

From OC-1

TADS CONTROLLER
sends FIGS ← Cross Office does not send.
(See Note 2)

continues search

To OC-4 or OC-5

Finds

TADS
sen
ser
STAT

sends
send

C-7

ISCELLANEOUS

er Searches
ffic.

s Invalid
CDC.

C-2, OC-3

← Tape available. Station sends.

← All TTYs lower case.

← Transmitting station selected. Receiving stations not selected.

Intercept machine at Master station selected.

← Stations not selected disconnect.

← Busy lamps flicker at all stations.

← Transmitting and Intercept stations disconnect.

estored
Condition

OC-8

INTERCEPT - WILFUL

Tads Controller Searches for Traffic.
Station Has Trouble Condition.
Is Placed On Intercept.

From OC-1, OC-2, OC-3

MASTER STATION ATTENDANT
operates INTERCEPT key
visual light ON ← Indicates which station on "Intercept."

TADS CONTROLLER
sends FIGS↑ TSC ← Tape available. Station sends.

STATION
sends LTRS ← All TTYs lower case.
sends CDC ← Transmitting station selected.
Receiving station is on "Intercept."
Intercept ROTR at Master Station unblinded.
sends LTRS,CR, LF ← Stations not selected disconnect.
sends LTRS,TEXT ← Busy lamps flicker at all stations.
sends FIGS H ← Transmitting station OFF. Intercept
← ROTR blinded. Feeds out tape.
Busy lamps OFF at all stations.
Motors OFF at all stations. (See Note 3)

Circuit Restored
to Initial Condition

T
S
ser

CHART
YSTEM

OPEN-CLOSE ACTIVATE OPERATION

CAUSE AND EFFECT ACTION DURING A SEARCH PATTERN WHEN VARIOUS ARRANGEMENTS OF TADS EQUIPMENT ARE INVOLV

ade to depict an entire search pattern to include all possible combinations. Operation Charts are
an operation can be selected by a heading, and then followed through to its conclusion step by step.

od of operation, as used for Mark III, Controller pauses for approximately 2 seconds at each 19 type
mission to start and approximately 15 seconds at each 15 type station. If a 15 type station sends,
15 second pause following the FIGS H before the Controller will continue the search.

OC-4

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Finds Tape Available at One 19 Type Station.

From OC-1, OC-2, or OC-3

TADS CONTROLLER sends FIGS! TSC (2 Sec. pause)	← No tape available at 1st station.
sends FIGS ! TSC	← Tape available - 2nd station sends.
STATION sends LTRS↓	← All TTYs lower case.
sends CDC	← Transmitting and Receiving stations selected.
sends LTRS↓CR< LF≡	← Stations not selected disconnect.
sends LTRS↓TEXT	← Busy lamps flicker at all stations.
sends FIGS H	← Transmitting and Receiving stations disconnect. Busy lamps OFF at all stations. Motors OFF at all stations. (See Note 3)

Circuit Restored
to Initial Condition

OC-9

BROADCAST

Tads Controller Searches
for Traffic.

Station Searched Has
Broadcast Message.

Letter S Assigned as
Broadcast Code.

From OC-1, OC-2, or OC-3

TADS CONTROLLER sends FIGS! TSC	← Broadcast tape available. Station sends.
STATION sends LTRS↓	← All TTYs lower case.
sends LTRS↓S	← All stations selected.
sends LTRS↓CR< LF≡	← Carriage positioned.
sends LTRS↓TEXT	← Busy lamps flicker at all stations.
sends FIGS H	← All stations disconnect.

Circuit Restored
to Initial Condition

RANGEMENTS OF TADS EQUIPMENT ARE INVOLVED.

eration Charts are
usion step by step.

nds at each 19 type
pe station sends,
rch.

OC-5

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Finds Traffic Available at a Station with Keyboard Sending (15 Type).

From OC-1, OC-2, or OC-3

TADS CONTROLLER sends FIGS↑ TSC ← Message waiting. Buzzer operates to signal Attendant to start keyboard sending. — NOTE 2

STATION ATTENDANT sends LTRS↓ ← All TTYs lower case. — NOTE 3

sends CDC ← Transmitting and Receiving stations selected.

sends LTRS↓CR< LF = ← Stations not selected disconnect.

sends LTRS↓TEXT ← Busy lamps flicker at all stations.

sends FIGS H ← Transmitting and Receiving stations disconnect. Busy lamps OFF at all stations. Motors OFF at all stations. (See Note 3) — NOTE 4

TADS CONTROLLER continues search (in 15 Secs.) — NOTE 5

Circuit Restored to Initial Condition

NOTE 1

e at 1st station.
2nd station sends.
case.
Receiving stations selected.
cted disconnect.
er at all stations.
Receiving stations disconnect.
at all stations.
all stations. (See Note 3)

OC-10

TADS CONTROLLER ENDS SEARCH FOR TRAFFIC, AND RESTS.

No Tape Available at Any Station (See Note 4)

From OC-1

TADS CONTROLLER sends FIGS↑ TSC (2 Sec. pause) ← No tape available. (19 type station).

sends FIGS↑ TSC (2 Sec. pause) ← No tape available. (19 type station).

sends FIGS↑ TSC (15 Sec. pause) ← No message t be sent. (15 type station).

sends FIGS H ← Line closed. Busy lamps OFF. All stations off line. Motors OFF. (See Note 3) TADS Controller at rest.

TADS CONTROLLER rests

starts search — Approx. 3 Mins.

starts search — Approx. 6 Mins.

Permanent Rest (See Note 1)

tape available. Station sends.
lower case.
s selected.
positioned.
s flicker at all stations.
s disconnect.

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NOTES

NOTE 1 TADS CONTROLLER RESTS AS FOLLOWS:

Switch Position S - Approximately 3 Minutes.
Switch Position L - Approximately 6 Minutes.
Switch Position R - Permanent Rest. In this position the CONTROLLER remains inactive until a transmission takes place or the line is opened momentarily.

NOTE 2 CROSS OFFICE may send every other time it is searched if tape is available in the transmitter, and no Cross Office Priority bid is in.

NOTE 3 Motors will turn off when station is deactivated, unless the "Delayed Motor Turn-Off" feature (Option P) is provided. With this feature, motors will remain on for approximately 30 seconds after the circuit has become idle.

NOTE 4 Following a complete search of all stations without finding traffic available, the Controller will rest. As long as there is any transmission to the line, the Controller will continue to search.

NOTE 5 If the circuit is idle, with a dark Busy lamp, hold the "Priority" key operated until the Busy lamp burns steadily. Then hand-send about 6 FIGS characters. It is important that FIGS be sent immediately after releasing the "Priority" key to keep the Controller from taking the circuit.

ABBREVIATIONS

TABLE OF ABBREVIATIONS AND DEFINITIONS
USED IN OPERATION CHARTS

CDC	-	Call Directing Character
CR<	-	Carriage Return
FIGS ↑	-	FIGS Shift
LTRS ↓	-	LTRS Shift
LF ☰	-	Line Feed

Activated Condition - Ready to receive Codes

OC	-	Operation Chart
ROTR	-	Receiving Only Typing Reperforator
TSC	-	Transmitter Start Code

Approx. 3 Mins.

Approx. 6 Mins.

Permanent Rest
(See Note 1)

Revised February, 1958.

SSG 104
Operation Chart for Mark III
Open-Close Activate Operation

OPEN-CLOSE ACTIVATE OPERATION

OPERATION CHARTS ARE ARRANGED TO SHOW CAUSE AND EFFECT ACTION DURING A SEARCH PATTERN WHEN VARIOUS ARRANGEMENTS OF TADS EQUIPMENT ARE INVOLVED.

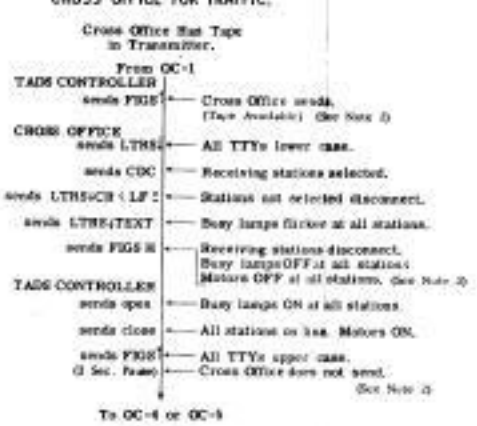
No attempt is made to depict an entire search pattern to include all possible combinations. Operation Charts are arranged so that an operation can be selected by a heading, and then followed through to its conclusion step by step.

In this method of operation, as used for Mark III, Controller pauses for approximately 2 seconds at each 19 type station for transmission to start and approximately 15 seconds at each 15 type station. If a 15 type station sends, there will be a 15 second pause following the PIGS H before the Controller will continue the search.

OC-1
TADS CONTROLLER STARTS SEARCH FOR TRAFFIC

OC-2
TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.

Cross Office Has Tape in Transmitter.



OC-3
TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.

Cross Office Has No Tape in Transmitter.

OC-4
TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Finds Tape Available at One 19 Type Station.

OC-5
TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Finds Traffic Available at a Station with Keyboard Sending (15 Type).

OC-6
TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC

Station Has Emergency Message in the Transmitter.
Station Equipped with Key for Emergency Operation.
(This Arrangement Cannot Be Used with 2 Line Automatic Cross Office.)

OC-7
INTERCEPT - MISCELLANEOUS

Tads Controller Searches for Traffic.
Station Sends Invalid or Garbled CDC.

OC-8
INTERCEPT - WILFUL

Tads Controller Searches for Traffic.
Station Has Trouble Condition.
Is Placed On Intercept.

OC-9
BROADCAST

Tads Controller Searches for Traffic.
Station Searched Has Broadcast Message.
Letter S Assigned as Broadcast Code.

OC-10
TADS CONTROLLER ENDS SEARCH FOR TRAFFIC, AND RESTS.

No Tape Available at Any Station (See Note 4)

OPEN-CLOSE ACTIVATE OPERATION

OPERATION CHARTS ARE ARRANGED TO SHOW CAUSE AND EFFECT ACTION DURING A SEARCH PATTERN WHEN VARIOUS ARRANGEMENTS OF TADS EQUIPMENT ARE INVOLVED.

No attempt is made to depict an entire search pattern to include all possible combinations. Operation Charts are arranged so that an operation can be selected by a heading, and then followed through to its conclusion step by step.

In this method of operation, as used for Mark III, Controller pauses for approximately 2 seconds at each 19 type station for transmission to start and approximately 15 seconds at each 15 type station. If a 15 type station sends, there will be a 15 second pause following the FIGS N before the Controller will continue the search.

OC-3

TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.

Cross Office Has No Tape in Transmitter.

OC-4

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Finds Tape Available at One 19 Type Station.

OC-5

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Finds Traffic Available at a Station with Keyboard Sending (15 Type).

OC-8

INTERCEPT - WILFUL

Tads Controller Searches for Traffic. Station Has Trouble Condition. Is Placed On Intercept.

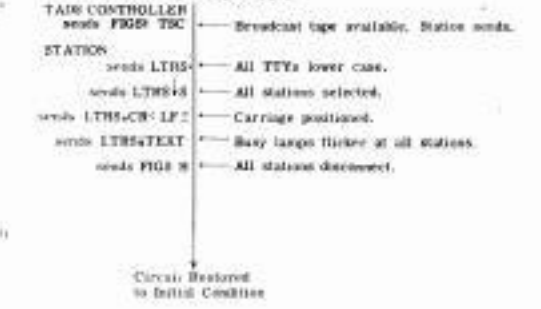
OC-9

BROADCAST

Tads Controller Searches for Traffic.

Station Searched Has Broadcast Message.

Letter S Assigned as Broadcast Code.



OC-10

TADS CONTROLLER ENDS SEARCH FOR TRAFFIC, AND RESTS.

No Tape Available at Any Station (See Note 4)

TABLE I
Mark III TADS

NOTES

NOTE 1 TADS CONTROLLER RESTS AS FOLLOWS:

Switch Position S -Approximately 2 Minutes.
Switch Position L-Approximately 5 Minutes
Switch Position R-Permanent Rest. In this position the CONTROLLER remains inactive until a transmission takes place or the line is opened momentarily.

NOTE 2 CROSS OFFICE may send every other time it is searched if tape is available in the transmitter, and no Cross Office Priority bid is in.

NOTE 3 Motors will turn off when station is deactivated, unless the "Delayed Motor Turn-Off" feature (Option F) is provided. With this feature, motors will remain on for approximately 30 seconds after the circuit has become idle.

NOTE 4 Following a complete search of all stations without finding traffic available, the Controller will rest. As long as there is any transmission to the line, the Controller will continue to search.

NOTE 5 If the circuit is idle, with a dark Busy lamp, hold the "Priority" key operated until the Busy lamp burns steadily. Then hand-send about 6 FIGS characters. It is important that FIGS be sent immediately after releasing the "Priority" key to keep the Controller from taking the circuit.

ABBREVIATIONS

TABLE OF ABBREVIATIONS AND DEFINITIONS USED IN OPERATION CHARTS

CDC	-	Call Directing Character
CR↑	-	Carriage Return
FIGS ↑	-	FIGS Shift
LTRS ↓	-	LTRS Shift
LF ↕	-	Line Feed
Activated Condition - Ready to receive Codes		
OC	-	Operation Chart
ROTR	-	Receiving Only Typing Reperforator
TSC	-	Transmitter Start Code

Revised February, 1958.

SSG 104
Operation Chart for Mark III Open-Close Activate Operation

6. SIGNALLING FUNCTIONS - MARK IV SYSTEM

6.01 Each station is assigned a call code and in addition may be coded for group or broadcast codes, depending upon the availability of contacts. The two types of activate operation are shown in the two tables below.

THE TWO TYPES OF ACTIVATION COMPARED

A. OPEN-CLOSE ACTIVATE

Normal Idle Condition ← Line closed - all stations disconnected. BUSY lamps OFF - all stations. Motors OFF - all stations. Controller at rest.

Assume outlying station operates CONTROL key to start the Controller, or Controller starts automatically at the end of a rest period.

CONTROLLER starts →

Priority Bid (If any) → ← *(See below).*

CONTROLLER sends open ← BUSY lamps ON - all stations.

sends close ← Motors start - all stations. *(Type A Motor Control)*

sends FIGS ← All TTYs shift to upper case

Controller pauses for 2 seconds at this point to allow transmission from Automatic Cross Office to start.

CONTROLLER sends FIGS TSC ← Station sends tape. *(If no tape available, - station sends Circuit Assurance)*

Tape transmission starts

STATION TRANSMITTER sends LTRS ← All TTYs lower case.

sends CDCs ← Calling and called stations selected.

Buzzer will operate at called station unless BZ CO key is operated.

sends LTRS CR LF ← Unselected stations disconnect. Motors OFF - *(Type A Motor Control)* Motors ON - *(Type B Motor Control)*

STATION TRANSMITTER *(Still sending from tape)* sends LTRS Text ← Selected stations copy message - BUSY lamp flickers.

sends FIGS H *(End of Message)* ← Stations disconnect. BUSY lamp OFF. Motors OFF - *(Type A Motor Control)* Motors ON - *(Type B Motor Control)*

B. AUTOMATIC ACTIVATE

Normal Idle Condition ← Line closed - all stations connected. BUSY lamps ON steady - all stations. Motors ON - all stations. *(Type C Motor Control)* Controller at rest.

Assume outlying station operates CONTROL key to start the Controller, or Controller starts automatically at the end of a rest period.

CONTROLLER starts →

Priority Bid (If any) → ← *(See below).*

CONTROLLER sends FIGS ← All TTYs shift to upper case.

Controller pauses for 2 seconds at this point to allow transmission from Automatic Cross Office to start.

CONTROLLER sends FIGS TSC ← Station sends tape. *If no tape available - station sends Circuit Assurance*

Tape transmission starts.

STATION TRANSMITTER sends LTRS ← All TTYs lower case.

sends CDCs ← Calling and called stations selected.

Buzzer will operate at called station unless BZ CO key is operated.

sends LTRS CR LF ← Unselected stations disconnect Motors ON.

STATION TRANSMITTER *(Still sending from tape)* sends LTRS Text ← Selected stations copy message. BUSY lamp flickers.

sends FIGS H ← Stations disconnect. BUSY lamps OFF, then ON. Motors ON - All stations. *(Type C Motor Control)*

All stations back on line ready to respond to codes within one-half second.

NOTES ON ABOVE TABLES

(a) Priority Bid - A one-half second open to the line received from a station selector whose PRIORITY button has been operated.

(b) Circuit Assurance - An upper case MT or O (Preferably O) sent from a station selector in response to a Transmitter Start Code from the Controller when there is no tape available in the station's transmitter.

(c) CDC - The station call code in lower case. It is used for station selection.

(d) TSC - The station code in upper case. It is used to start station transmitters.

(e) CR - The code used to deactivate a station. It is known as the End of Address Code.

(f) FIGS H - The code used for End-of-Message. (Other characters may be assigned for this code).

(g) Type A Motor Control - Motors turn off at end of transmission.

(h) Type B Motor Control - Motors continue operating 15-30 seconds following end of transmission.

(i) Type C Motor Control - Motors run continuously.

6.02 At the Master station, the Controller will not function while there is activity on the circuit.

6.03 Automatic Disconnect - If FIGS H (End-of-Message Code) is omitted from the tape being transmitted, the timing circuit will function to disconnect the station from the line in one second, if Open-Close Activate is used. If Automatic Activate is being used the disconnect time is within one-half second following the end of transmission.

6.04 The interval from the end of transmission until the Controller searched the next station is about 6-1/2 seconds with Open-Close Activate. This time can be reduced to about 3 seconds by applying the Automatic Activate feature.

OC-1

TADS CONTROLLER STARTS SEARCH FOR TRAFFIC

INITIAL CONDITION ← Line closed
Busy lamps OFF
All stations off line
Motors OFF
TADS Controller at rest

TADS CONTROLLER
times out
sends open ← Busy lamps ON
2 Seconds (approx.)
sends close ← All stations on line. Motors ON
1 Sec (approx.)
Priority Bid (if any) → (1/2 Sec. open-close)
sends FIGS ← All TTYs upper case
(2 Sec. Pause Max.) ← Cross Office bid (See Note 2)

To OC-2, OC-6,
OC-3, OC-7,
OC-4, OC-8,
OC-5, OC-9,
or OC-10

OC-2

TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.

Cross Office Has Tape
in Transmitter.

From OC-1

TADS CONTROLLER
sends FIGS ← Cross Office sends
(Tape Available) (S

CROSS OFFICE
sends LTRS ← All TTYs lower c
sends CDC ← Receiving stations
sends LTRS+CR ◁ LF ≡ ← Stations not select
sends LTRS+TEXT ← Busy lamps flicker
sends FIGS H ← Receiving stations
Busy lamps OFF at
Motors OFF at

TADS CONTROLLER
sends open ← Busy lamps ON at
sends close ← All stations on lin
sends FIGS ← All TTYs upper c
(2 Sec. Pause) ← Cross Office sends

To OC-4 or OC-5

OC-6

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Station C Has Priority Message.
Stations A and B Have Tape Available.

From OC-1

TADS CONTROLLER
sends FIGS↕ TSC ← Tape available. Station A sends Circuit Assurance. (Priority Bid at Station C prevents tape transmission.)
sends FIGS↕ TSC ← Tape available. Station B sends Circuit Assurance. (Priority Bid at Station C prevents tape transmission.)
sends FIGS↕ TSC ← Priority Message. Priority station (C) sends.

PRIORITY STATION
sends LTRS ← All TTYs lower case.
sends CDC ← Transmitting and Receiving stations selected.
sends LTRS+CR ◁ LF ≡ ← Stations not selected disconnect.
sends LTRS+TEXT ← Busy lamps flicker at all stations.
sends FIGS H ← Transmitting and Receiving stations disconnect.
Busy lamps OFF at all stations.
Motors OFF at all stations. (See Note 3)

Circuit Restored
to Initial Condition

OC-7

INTERCEPT - MISCELLANEOUS

Tads Controller Searches
for Traffic.

Station Sends Invalid
or Garbled CDC.

From OC-1, OC-2, OC-3

TADS CONTROLLER
sends FIGS↕ TSC ← Tape available. St

STATION
sends LTRS ← All TTYs lower c
sends invalid or garbled CDC ← Transmitting stati
stations not select
Intercept machine
selected.
sends LTRS+CR ◁ LF ≡ ← Stations not select
sends LTRS+TEXT ← Busy lamps flicke
sends FIGS H ← Transmitting and
Busy lamps OFF
Motors OFF at all

Circuit Restored
to Initial Condition

OPEN-CLOSE ACTIVAT

OPERATION CHARTS ARE ARRANGED TO SHOW CAUSE AND EFFECT ACTION DURING A SEARCH

No attempt is made to depict an entire search pattern to inclu
arranged so that an operation can be selected by a heading, and th

-2

ER SEARCHES
FOR TRAFFIC.

Has Tape
itter.

C-1

— Cross Office sends,
(Tape Available) (See Note 2)

— All TTYs lower case.

— Receiving stations selected.

— Stations not selected disconnect.

— Busy lamps flicker at all stations.

— Receiving stations disconnect. (See Note 6)
Busy lamps OFF at all stations.
— Motors OFF at all stations. (See Note 3)

— Busy lamps ON at all stations.

— All stations on line. Motors ON.

— All TTYs upper case.
— Cross Office sends Circuit Assurance.
(See Note 2)

r OC-5

7

GCELLANEOUS

r Searches
c

Invalid
CDC.
-2, OC-3

— Tape available. Station sends.

— All TTYs lower case.

— Transmitting station selected. Receiving stations not selected.

— Intercept machine at Master station selected.

— Stations not selected disconnect.

— Busy lamps flicker at all stations.

— Transmitting and Intercept stations disconnect. (See Note 6)
Busy lamps OFF at all stations.
Motors OFF at all stations. (See Note 3)

nored
ndition

OC-3

TADS CONTROLLER SEARCHES
CROSS OFFICE FOR TRAFFIC.

Cross Office Has no
Tape in Transmitter.

From OC-1

TADS CONTROLLER
sends FIGS ← Cross Office sends Circuit Assurance. (See Note 2)
continues search

To OC-4 or OC-5

OC-8

INTERCEPT - WILFUL

Tads Controller Searches for Traffic
and Does Not Receive Circuit Assurance
or Tape from Station Searched.
From OC-1, OC-2, OC-3

TADS CONTROLLER
sends FIGS↕ TSC ← No tape or Circuit Assurance sent.
repeats FIGS↕ TSC ← No tape or Circuit Assurance sent.
Audible and Visual alarm operates at the Master station.
Controller *Locked up.*

MASTER STATION ATTENDANT
operates INTERCEPT key ← Audible alarm retired. Pilot light ON.
visual light ON ← Indicates which station on "Intercept."
Controller released. Continues search.

TADS CONTROLLER
sends FIGS↕ TSC ← Tape available. Station sends.

STATION
sends LTRS↓ ← All TTYs lower case.
sends CDC ← Transmitting station selected.
Receiving station is on "Intercept."
Intercept ROTR at Master
Station unblinded.
sends LTRS↓CR↓LF ← Stations not selected disconnect.
sends LTRS↓TEXT ← Busy lamps flicker at all stations.
sends FIGS H ← Transmitting station OFF. Intercept ROTR blinded. Feeds out tape.
Busy lamps OFF at all stations.
Motors OFF at all stations.

Circuit Restored
to Initial Condition

TA
s
ST
sends
se

CHART
STEM

OPEN-CLOSE ACTIVATE OPERATION

CAUSE AND EFFECT ACTION DURING A SEARCH PATTERN WHEN VARIOUS ARRANGEMENTS OF TADS EQUIPMENT ARE INVOLVE

ade to depict an entire search pattern to include all possible combinations. Operation Charts are
an operation can be selected by a heading, and then followed through to its conclusion step by step.

EARCHES
TRAFFIC.

Cross Office sends Circuit Assurance.
(See Note 2)

-5

OC-4
SKIP OPERATION

Tads Controller Searches
for Traffic and Does Not
Receive Circuit Assurance
or Tape from Station Searched.

From OC-1, OC-2, or OC-3

TADS CONTROLLER
sends FIGS↕ TSC ← No tape or Circuit Assurance sent.

repeats FIGS↕ TSC ← No tape or Circuit Assurance sent.
Audible and Visual alarm operates
at Master Station. Controller
Locked up.

MASTER STATION
ATTENDANT
operates SKIP key ← Audible alarm retired. Pilot light ON.

visual light ON ← Indicates SKIPPED station.
Controller Released.

TADS CONTROLLER
continues search ← (See Note 5)

To OC-5

TA
F
F
TADS C
sends
sends
STATIO
sends L
sends

ILFUL
es for Traffic
ircuit Assurance
Searched.
OC-3

- No tape or Circuit Assurance sent.
- No tape or Circuit Assurance sent.
Audible and Visual alarm operates
at the Master station.
Controller *Locked up.*
- Audible alarm retired. Pilot light ON.
Indicates which station on "Intercept."
Controller released. Continues search.
- Tape available. Station sends.
- All TTYs lower case.
- Transmitting station selected.
Receiving station is on "Intercept."
Intercept ROTR at Master
Station unblinded.
- Stations not selected disconnect.
- Busy lamps flicker at all stations.
- Transmitting station OFF. Intercept
ROTR blinded. Feeds out tape.
Busy lamps OFF at all stations.
Motors OFF at all stations.

OC-9
BROADCAST

Tads Controller Searches
for Traffic.

Station Searched Has
Broadcast Message.

Letter S Assigned as
Broadcast Code.

From OC-1, OC-2, OC-3, OC-4

TADS CONTROLLER
sends FIGS↕ TSC ← Broadcast tape available. Station sends.

STATION
sends LTRS↓ ← All TTYs lower case.

sends LTRS↓S ← All stations selected.

sends LTRS↓CR < LF ≡ ← Carriage positioned.

sends LTRS↓TEXT ← Busy lamps flicker at all stations.

sends FIGS H ← All stations disconnect. (See Note 6)
Busy lamps OFF at all stations.
Motors OFF at all stations. (See Note 3)

Circuit Restored
to Initial Condition

TAD
F
No
TADS CO
sends
sends
sends
se
TADS CO
st
st

OF TADS EQUIPMENT ARE INVOLVED.

ts are
step.

OC-5

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Finds Tape Available at 1 Station.

From OC-1, OC-2, OC-3, or OC-4

TADS CONTROLLER

sends FIGS↑ TSC ← No tape available. Station sends Circuit Assurance.

sends FIGS↑ TSC ← Tape available. Station sends.

STATION

sends LTRS↓ ← All TTYs lower case.

sends CDC ← Transmitting and Receiving stations selected.

sends LTRS↓CR< LF≡ ← Stations not selected disconnect.

sends LTRS↓TEXT ← Busy lamps flicker at all stations.

sends FIGS H ← Transmitting and Receiving stations disconnect. (See Note 6)
Busy lamps **OFF** at all stations.
Motors **OFF** at all stations.

Circuit Restored to Initial Condition

rcuit Assurance sent.

rcuit Assurance sent.
nual alarm operates
ion. Controller

retired. Pilot light ON.

PED station.

leased.

NOTE 1 TADS CO
Switch P
Switch P
Switch P

NOTE 2 CROSS O
searched
no Cross
send tape
Office wi

NOTE 3 Motors w
unless th
(Option P
will rema
the circu

NOTE 4 Following
finding t
As long
the Contr

NOTE 5 The Cont
has been
Assuranc

NOTE 6 Stations
This arr

OC-10

TADS CONTROLLER ENDS SEARCH FOR TRAFFIC, AND RESTS.

No Tape Available at Any Station (See Note 4)

From OC-1

TADS CONTROLLER

sends FIGS↑ TSC ← No tape available. Station sends Circuit Assurance.

sends FIGS↑ TSC ← No tape available. Station sends Circuit Assurance.

sends FIGS↑ TSC ← No tape available. Station sends Circuit Assurance.

sends FIGS H ← Line closed.
Busy lamps **OFF**.
All stations off line.
Motors **OFF**. (See Note 3)
TADS Controller at rest.

TADS CONTROLLER

rests

starts search ---- Approx. 3 Mins.

starts search ---- Approx. 6 Mins.

Permanent Rest (See Note 1)

able. Station sends.

.

.

at all stations.

ect. (See Note 6)
all stations.
stations. (See Note 3)

TABLE OF
US

CDC -

CR< -

FIGS ↑ -

LTRS ↓ -

LF≡ -

OC -

TSC -

Circuit As

Revised February

NOTES

NOTE 1 TADS CONTROLLER RESTS AS FOLLOWS:

Switch Position S-Approximately 3 Minutes.
Switch Position L-Approximately 6 Minutes.
Switch Position R-Permanent Rest. In this position the CONTROLLER remains inactive until a transmission takes place or the line is opened momentarily.

NOTE 2 CROSS OFFICE may send every other time it is searched if tape is available in the transmitter, and no Cross Office Priority bid is in. When unable to send tape or when no tape is available, the Cross Office will send a Circuit Assurance signal.

NOTE 3 Motors will turn off when station is deactivated, unless the "Delayed Motor Turn-Off" feature (Option P) is provided. With this feature, motors will remain on for approximately 60 seconds after the circuit has become idle.

NOTE 4 Following a complete search of all stations without finding traffic available, the Controller will rest. As long as there is any transmission to the line, the Controller will continue to search.

NOTE 5 The Controller will search a station after the Skip key has been operated but will not wait for a Circuit Assurance signal from that station.

NOTE 6 Stations disconnect automatically after transmission stops. This arrangement is Standard on all Mark IV Systems.

ABBREVIATIONS

TABLE OF ABBREVIATIONS AND DEFINITIONS
USED IN OPERATION CHARTS

CDC	-	Call Directing Character
CR⟨	-	Carriage Return
FIGS ↑	-	FIGS Shift
LTRS ↓	-	LTRS Shift
LF ☰	-	Line Feed
OC	-	Operation Chart
TSC	-	Transmitter Start Code

Circuit Assurance - Upper Case O (9) sent by Station

Revised February, 1958

SSG 105
Operation Chart for Mark IV
Open-Close Activate Operation

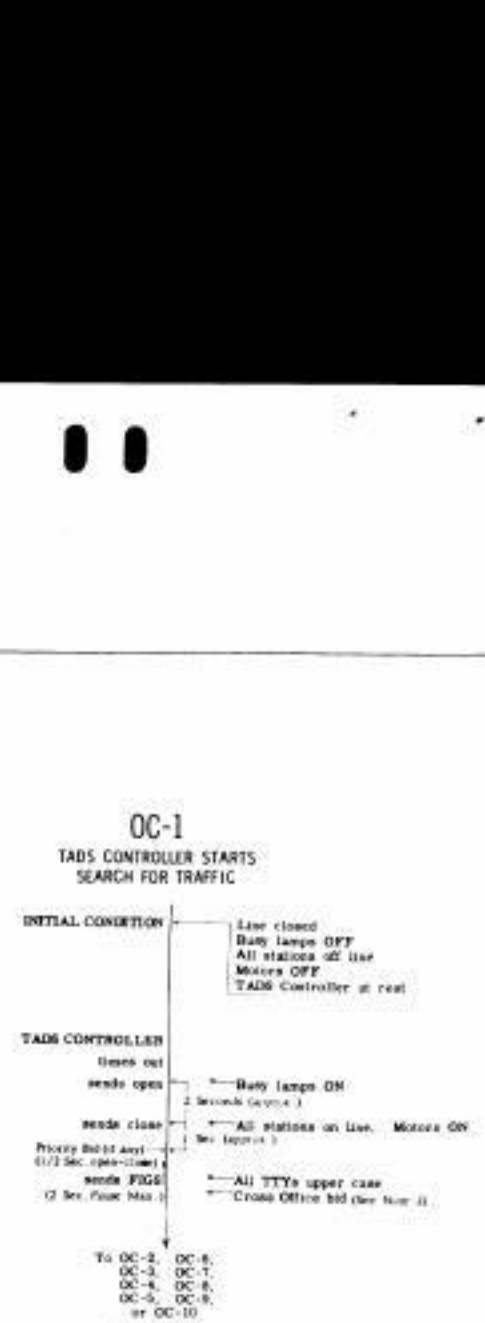
OPEN-CLOSE ACTIVATE OPERATION

OPERATION CHARTS ARE ARRANGED TO SHOW CAUSE AND EFFECT ACTION DURING A SEARCH PATTERN WHEN VARIOUS ARRANGEMENTS OF TADS EQUIPMENT ARE INVOLVED.

No attempt is made to depict an entire search pattern to include all possible combinations. Operation Charts are arranged so that an operation can be selected by a heading, and then followed through to its conclusion step by step.

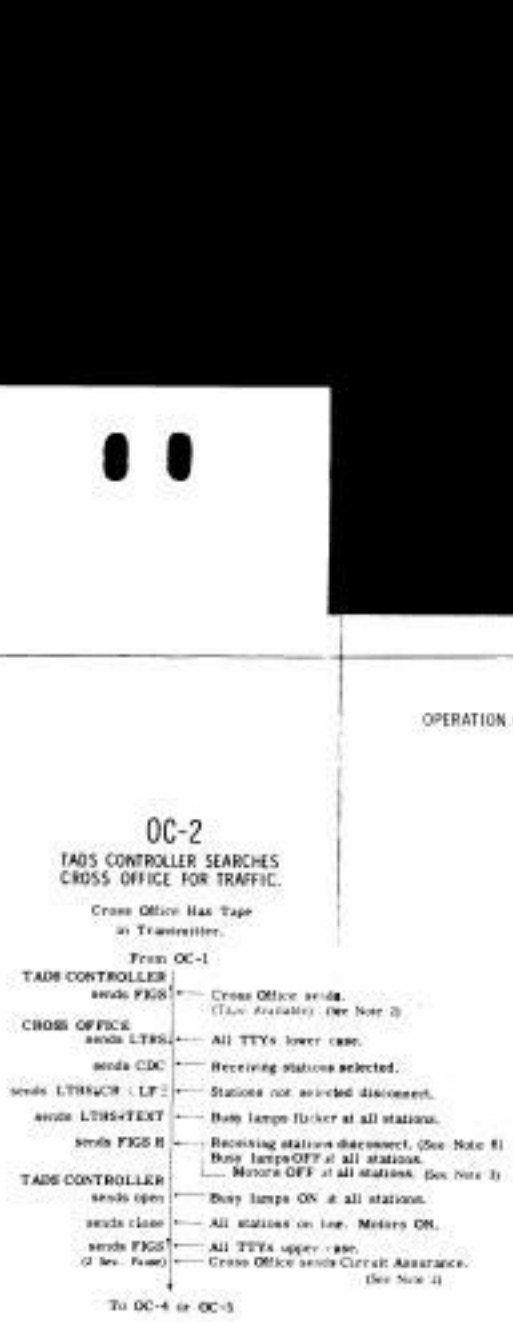
OC-1

TADS CONTROLLER STARTS SEARCH FOR TRAFFIC



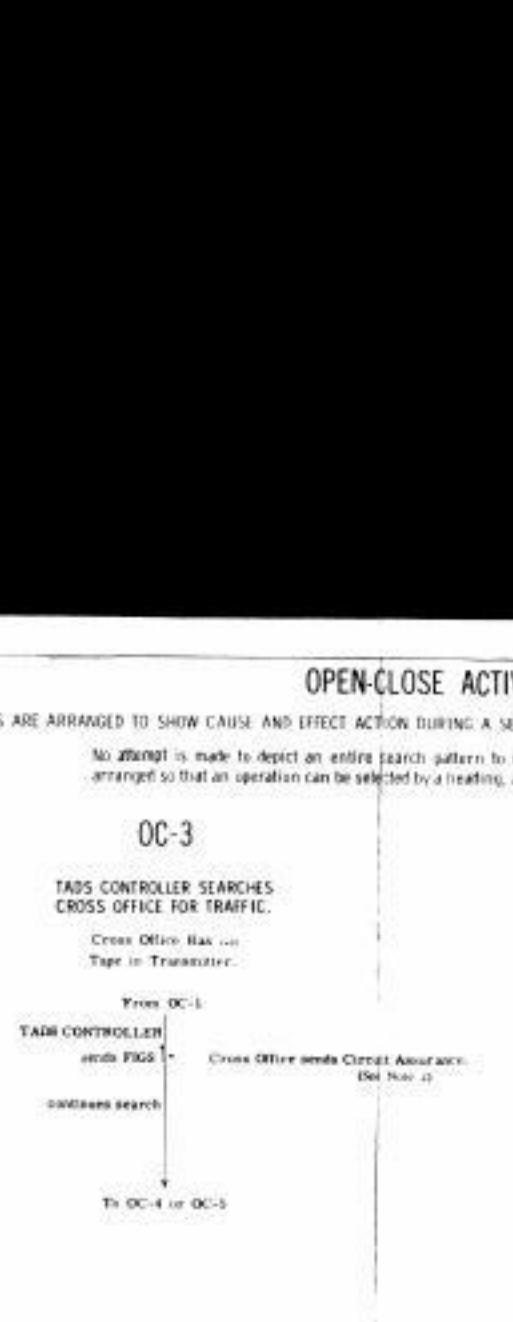
OC-2

TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.



OC-3

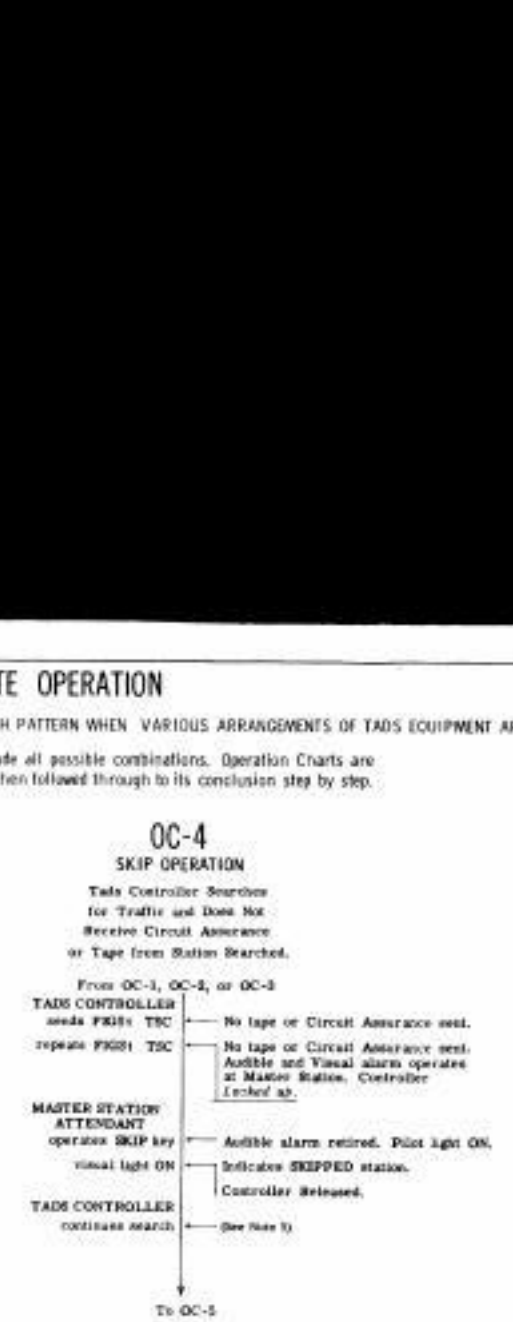
TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.



OC-4

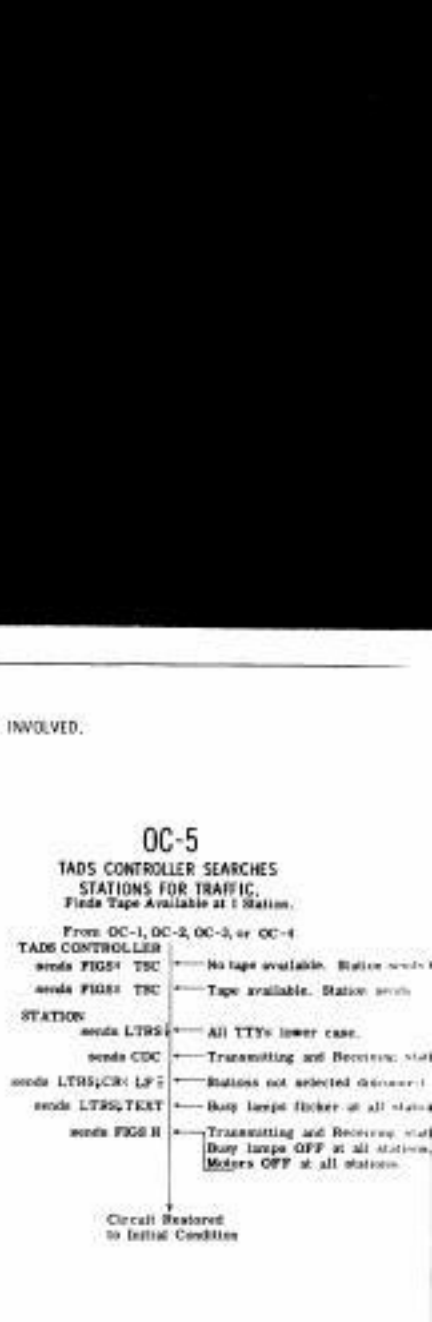
SKIP OPERATION

Tads Controller Searches for Traffic and Does Not Receive Circuit Assurance or Tape from Station Searched.



OC-5

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.
Finds Tape Available at 1 Station.



OC-6

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

OC-7

INTERCEPT - MISCELLANEOUS

Tads Controller Searches for Traffic.

OC-8

INTERCEPT - WILFUL

Tads Controller Searches for Traffic and Does Not Receive Circuit Assurance or Tape from Station Searched.

OC-9

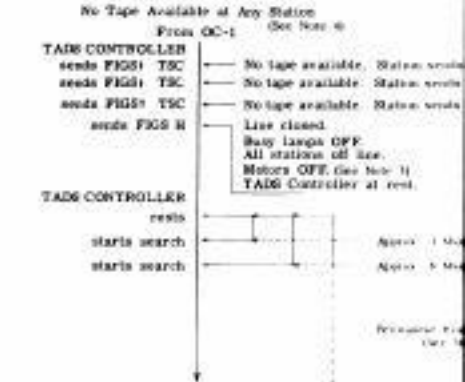
BROADCAST

Tads Controller Searches for Traffic.

OC-10

TADS CONTROLLER ENDS SEARCH FOR TRAFFIC, AND RESTS.

No Tape Available at Any Station (See Note 4)



OPEN-CLOSE ACTIVATE OPERATION

TABLE B
Mark IV TADS

OPERATION CHARTS ARE ARRANGED TO SHOW CAUSE AND EFFECT ACTION DURING A SEARCH PATTERN WHEN VARIOUS ARRANGEMENTS OF TADS EQUIPMENT ARE INVOLVED.

No attempt is made to depict an entire search pattern to include all possible combinations. Operation Charts are arranged so that an operation can be selected by a heading, and then followed through to its conclusion step by step.

OC-3

TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.

Cross Office Has ...
Tape in Transmitter.

From OC-1

TADS CONTROLLER
sends FIGS↑ TSC — Cross Office sends Circuit Assurance. (See Note 2)
continues search

To OC-4 or OC-5

OC-4

SKIP OPERATION

Tads Controller Searches for Traffic and Does Not Receive Circuit Assurance or Tape from Station Searched.

From OC-1, OC-2, or OC-3

TADS CONTROLLER
sends FIGS↑ TSC — No tape or Circuit Assurance sent.
repeats FIGS↑ TSC — No tape or Circuit Assurance sent. Audible and Visual alarm operates at Master Station. Controller Locked up.

MASTER STATION ATTENDANT
operates SKIP key — Audible alarm retired. Pilot light ON.
visual light ON — Indicates SKIPPED station. Controller Released.

TADS CONTROLLER
continues search — (See Note 5)

To OC-5

OC-5

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.
Finds Tape Available at 1 Station.

From OC-1, OC-2, OC-3, or OC-4

TADS CONTROLLER
sends FIGS↑ TSC — No tape available. Station sends Circuit Assurance.
sends FIGS↑ TSC — Tape available. Station sends.

STATION
sends LTRS↓ — All TTYs lower case.
sends CDC — Transmitting and Receiving stations selected.
sends LTRS↓CR↩ LF↕ — Stations not selected disconnect.
sends LTRS↓TEXT — Busy lamps flicker at all stations.
sends FIGS H — Transmitting and Receiving stations disconnect. (See Note 6) Busy lamps OFF at all stations. Motors OFF at all stations.

Circuit Restored to Initial Condition

OC-8

INTERCEPT - WILFUL

Tads Controller Searches for Traffic and Does Not Receive Circuit Assurance or Tape from Station Searched.

From OC-1, OC-2, OC-3

TADS CONTROLLER
sends FIGS↑ TSC — No tape or Circuit Assurance sent.
repeats FIGS↑ TSC — No tape or Circuit Assurance sent. Audible and Visual alarm operates at the Master station. Controller Locked up.

MASTER STATION ATTENDANT
operates INTERCEPT key — Audible alarm retired. Pilot light ON.
visual light ON — Indicates which station on "Intercept." Controller released. Continues search.

TADS CONTROLLER
sends FIGS↑ TSC — Tape available. Station sends.

STATION
sends LTRS↓ — All TTYs lower case.
sends CDC — Transmitting station selected. Receiving station is on "Intercept." Intercept ROTR at Master Station unblinded.
sends LTRS↓CR↩ LF↕ — Stations not selected disconnect.
sends LTRS↓TEXT — Busy lamps flicker at all stations.
sends FIGS H — Transmitting station OFF. Intercept ROTR blanked. Feeds out tape. Busy lamps OFF at all stations. Motors OFF at all stations.

Circuit Restored to Initial Condition

OC-9

BROADCAST

Tads Controller Searches for Traffic.

Station Searched Has Broadcast Message.

Letter B Assigned as Broadcast Code.

From OC-1, OC-2, OC-3, OC-4

TADS CONTROLLER
sends FIGS↑ TSC — Broadcast tape available. Station sends.

STATION
sends LTRS↓ — All TTYs lower case.
sends LTRS↓B — All stations selected.
sends LTRS↓CR↩ LF↕ — Carriage positioned.
sends LTRS↓TEXT — Busy lamps flicker at all stations.
sends FIGS H — All stations disconnect. (See Note 6) Busy lamps OFF at all stations. Motors OFF at all stations. (See Note 3)

Circuit Restored to Initial Condition

OC-10

TADS CONTROLLER ENDS SEARCH FOR TRAFFIC, AND RESTS.

No Tape Available at Any Station (See Note 4)

From OC-1

TADS CONTROLLER
sends FIGS↑ TSC — No tape available. Station sends Circuit Assurance.
sends FIGS↑ TSC — No tape available. Station sends Circuit Assurance.
sends FIGS↑ TSC — No tape available. Station sends Circuit Assurance.
sends FIGS H — Line closed. Busy lamps OFF. All stations off line. Motors OFF (See Note 3) TADS Controller at rest.
rests
starts search — Approx. 3 Mins.
starts search — Approx. 6 Mins.

Permanent Rest (See Note 1)

NOTES

NOTE 1 TADS CONTROLLER RESTS AS FOLLOWS:
Switch Position S-Approximately 3 Minutes.
Switch Position L-Approximately 6 Minutes.
Switch Position R-Permanent Rest. In this position the CONTROLLER remains inactive until a transmission takes place or the line is opened momentarily.

NOTE 2 CROSS OFFICE may send every other time it is searched if tape is available in the transmitter, and no Cross Office Priority bid is in. When unable to send tape or when no tape is available, the Cross Office will send a Circuit Assurance signal.

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NOTE 4 Following a complete search of all stations without finding traffic available, the Controller will rest. As long as there is any transmission to the line, the Controller will continue to search.

NOTE 5 The Controller will search a station after the Skip key has been operated but will not wait for a Circuit Assurance signal from that station.

NOTE 6 Stations disconnect automatically after transmission stops. This arrangement is Standard on all Mark IV Systems.

ABBREVIATIONS

TABLE OF ABBREVIATIONS AND DEFINITIONS USED IN OPERATION CHARTS

CDC	-	Call Directing Character
CR↩	-	Carriage Return
FIGS ↑	-	FIGS Shift
LTRS ↓	-	LTRS Shift
LF↕	-	Line Feed
OC	-	Operation Chart
TSC	-	Transmitter Start Code

Circuit Assurance - Upper Case O (O) sent by Station

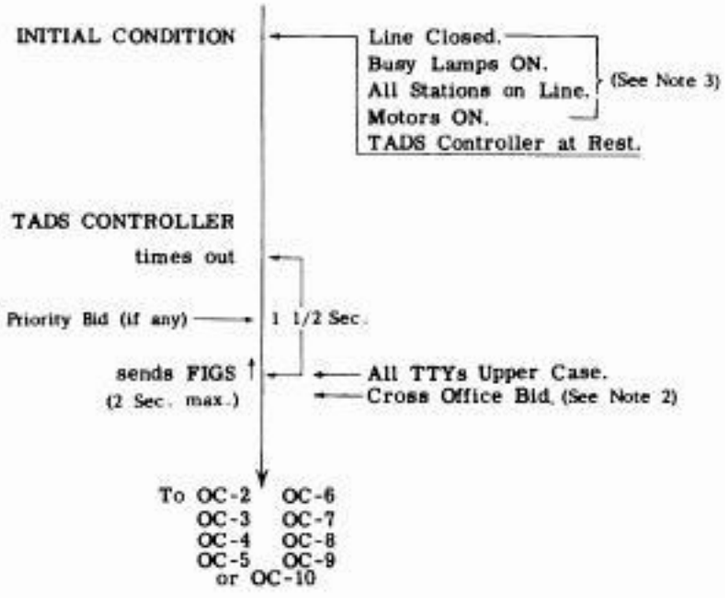
Revised February, 1958

SSG 105
Operation Chart for Mark IV Open-Close Activate Operation

C.L.R. June 1956

OC-1

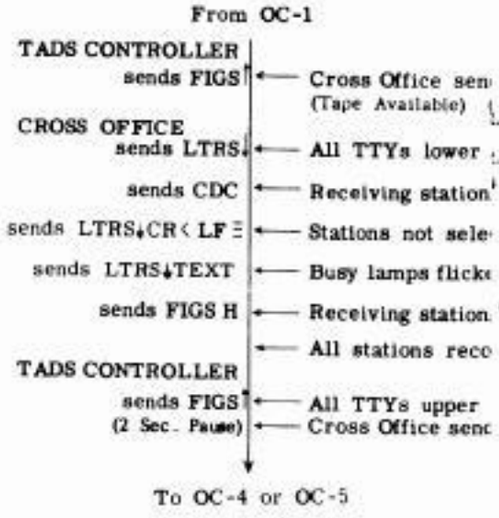
TADS CONTROLLER STARTS SEARCH FOR TRAFFIC



OC-2

TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.

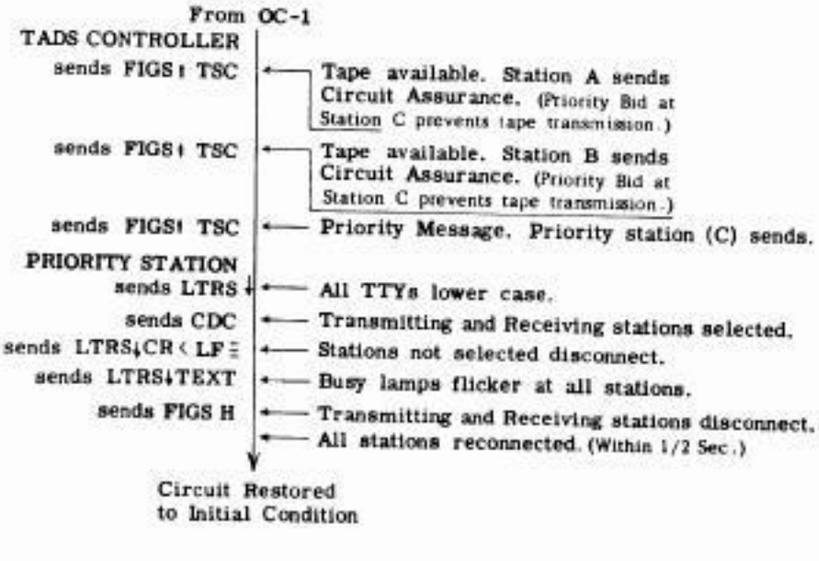
Cross Office Has Tape in Transmitter.



OC-6

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Station C Has Priority Message.
Stations A and B Have Tape Available.

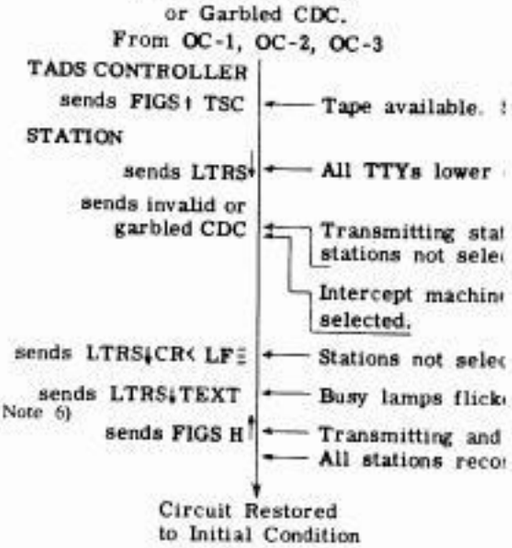


OC-7

INTERCEPT - MISCELLANEOUS

Tads Controller Searches for Traffic.

Station Sends Invalid or Garbled CDC.



AUTOMATIC ACTIVATI

OPERATION CHARTS ARE ARRANGED TO SHOW CAUSE AND EFFECT ACTION DURING A SEARCH
No attempt is made to depict an entire search pattern to include
arranged so that an operation can be selected by a heading, and the

It will be noted that, in the Automatic Activate method of oper
an activated condition, ready to receive codes within one half seco

C-2

LER SEARCHES
FOR TRAFFIC.

e Has Tape
mitter.

OC-1

← Cross Office sends. (Tape Available) (See Note 2)
← All TTYs lower case.
← Receiving stations selected.
← Stations not selected disconnect.
← Busy lamps flicker at all stations.
← Receiving stations disconnect. (See Note 6)
← All stations reconnected. (Within 1/2 Sec.)
← All TTYs upper case.
← Cross Office sends Circuit Assurance. (See Note 2)

or OC-5

OC-3

TADS CONTROLLER SEARCHES
CROSS OFFICE FOR TRAFFIC.

Cross Office Has No
Tape in Transmitter.

From OC-1

TADS CONTROLLER
sends FIGS ↑ ← Cross Office sends Circuit Assurance. (See Note 2)
continues search

To OC-4 or OC-5

C-7

MISCELLANEOUS

ller Searches
affic.
ds Invalid
ed CDC.
OC-2, OC-3

← Tape available. Station sends.
← All TTYs lower case.
← Transmitting station selected. Receiving stations not selected.
← Intercept machine at Master station selected.
← Stations not selected disconnect.
← Busy lamps flicker at all stations.
← Transmitting and Intercept stations disconnect. (See Note 6)
← All stations reconnected. (Within 1/2 Sec.)

Restored
l Condition

OC-8

INTERCEPT - WILFUL

Tads Controller Searches for Traffic
and Does Not Receive Circuit Assurance
or Tape from Station Searched.

From OC-1, OC-2, OC-3

TADS CONTROLLER
sends FIGS↑ TSC ← No tape or Circuit Assurance sent.
repeats FIGS↑ TSC ← No tape or Circuit Assurance sent. Audible and Visual alarm operates at the Master station. Controller *Locked up.*

MASTER STATION ATTENDANT
operates INTERCEPT key ← Audible alarm retired. Pilot light ON.
visual light ON ← Indicates which station on "Intercept."
Controller released. Continues search.

TADS CONTROLLER
sends FIGS↑ TSC ← Tape available. Station sends.

STATION
sends LTRS↓ ← All TTYs lower case.
sends CDC ← Transmitting station selected. Receiving station is on "Intercept." Intercept ROTR at Master Station unblinded.
sends LTRS↓CR< LF ← Stations not selected disconnect.
sends LTRS↓TEXT ← Busy lamps flicker at all stations.
sends FIGS H ← Transmitting station OFF. Intercept ROTR blinded. Feeds out tape.
← All stations reconnected. (Within 1/2 Sec.)

Circuit Restored
to Initial Condition

I CHART
SYSTEM

AUTOMATIC ACTIVATE OPERATION

EFFECT ACTION DURING A SEARCH PATTERN WHEN VARIOUS ARRANGEMENTS OF TADS EQUIPMENT ARE INVOLVED.
ar entire search pattern to include all possible combinations. Operation Charts are
can be selected by a heading, and then followed through to its conclusion step by step.

...Automatic Activate method of operation, the stations are reconnected to the line, in ... receive codes within one half second after transmission stops. (See Note 6).

OC-4

SKIP OPERATION

Tads Controller Searches
for Traffic and Does Not
Receive Circuit Assurance
or Tape from Station Searched.

From OC-1, OC-2, or OC-3

TADS CONTROLLER
sends FIGS↑ TSC ← No tape or Circuit Assurance sent.

repeats FIGS↑ TSC ← No tape or Circuit Assurance sent. Audible and Visual alarm operates at Master Station. Controller *Locked up.*

MASTER STATION ATTENDANT
operates SKIP key ← Audible alarm retired. Pilot light ON.

visual light ON ← Indicates SKIPPED station.

Controller Released.

TADS CONTROLLER
continues search ← (See Note 5)

To OC-5

...e sends Circuit Assurance.
(See Note 2)

OC-9

BROADCAST

Tads Controller Searches
for Traffic.

Station Searched Has
Broadcast Message.

Letter S Assigned as
Broadcast Code.

From OC-1, OC-2, OC-3, OC-4

TADS CONTROLLER
sends FIGS↑ TSC ← Broadcast tape available. Station sends.

STATION
sends LTRS↓ ← All TTYs lower case.

sends LTRS↓S ← All stations selected.

sends LTRS↓CR ‹ LF ≡ ← Carriage positioned.

sends LTRS↓TEXT ← Busy lamps flicker at all stations.

sends FIGS H ← All stations disconnect. (See Note 6)
← All stations reconnected. (Within 1/2 Sec.)

Circuit Restored
to Initial Condition

...or Circuit Assurance sent.
...or Circuit Assurance sent.
...and Visual alarm operates
...Master station.
...Locked up.
...alarm retired. Pilot light ON.
...which station on "Intercept."
...released. Continues search.
...Station sends.
...lower case.
...station selected.
...station is on "Intercept."
...POTR at Master Station
...selected disconnect.
...flicker at all stations.
...station OFF. Intercept
...Feeds out tape.
...reconnected. (Within 1/2 Sec.)

TADS CONTR
STATIONS
Finds Tape

From OC-1,

TADS CONTROLLE
sends FIGS↑ TS
sends FIGS↑ TS

STATION
sends LTR
sends CL
sends LTRS↓CR ‹ L
sends LTRS↓TEX
sends FIGS

Circu
to Ini

TADS CONTRO
FOR TRAFF
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TADS CONTROLLE
sends FIGS↑ TS
sends FIGS↑ TS
sends FIGS↑ TS
sends FIGS

TADS CONTROLLE
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starts searc
starts searc

OF TADS EQUIPMENT ARE INVOLVED.

OC-5

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Finds Tape Available at 1 Station.

From OC-1, OC-2, OC-3, or OC-4

TADS CONTROLLER sends FIGS↑ TSC	← No tape available. Station sends Circuit Assurance.
sends FIGS↑ TSC	← Tape available. Station sends.
STATION sends LTRS↓	← All TTYs lower case.
sends CDC	← Transmitting and Receiving stations selected.
sends LTRS↓CR〈 LF≡	← Stations not selected disconnect.
sends LTRS↓TEXT	← Busy lamps flicker at all stations.
sends FIGS H	← Transmitting and Receiving stations disconnect. (See Note 6)
	← All stations reconnected. (Within 1/2 Sec.)

Circuit Restored to Initial Condition

Circuit Assurance sent.

Circuit Assurance sent. Visual alarm operates station. Controller

retired. Pilot light ON.

PPED station.

eleased.

NOTE 1 TADS C
Switch
Switch
Switch

NOTE 2 CROSS
searche
no Cros
send tap
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NOTE 3 Motors
lamps a
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selected

NOTE 4 Followi
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the Con

NOTE 5 The Co
has bee
Assuran

NOTE 6 Stations
This ar

OC-10

TADS CONTROLLER ENDS SEARCH FOR TRAFFIC, AND RESTS.

No Tape Available at Any Station (See Note 4)

From OC-1

TADS CONTROLLER sends FIGS↑ TSC	← No tape available. Station sends Circuit Assurance.
sends FIGS↑ TSC	← No tape available. Station sends Circuit Assurance.
sends FIGS↑ TSC	← No tape available. Station sends Circuit Assurance.
sends FIGS H	← Line closed. Busy lamps ON. All stations on line. Motors ON. TADS Controller at rest. (See Note 3)
TADS CONTROLLER rests	
starts search	Approx. 3 Mins.
starts search	Approx. 6 Mins.
	Permanent Rest (See Note 1)

ailable. Station sends.

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r at all stations.

nect. (See Note 6)

nected. (Within 1/2 Sec.)

TABLE O
U

CDC -

CR〈 -

FIGS ↑ -

LTRS ↓ -

LF≡ -

OC -

TSC -

Activated

Circuit A

Revised Februar

NOTES

NOTE 1 **TADS CONTROLLER RESTS AS FOLLOWS:**

Switch Position S - Approximately 3 Minutes.
Switch Position L - Approximately 6 Minutes.
Switch Position R - Permanent Rest. In this position the CONTROLLER remains inactive until a transmission takes place or the line is opened momentarily.

NOTE 2 **CROSS OFFICE may send every other time it is searched if tape is available in the transmitter, and no Cross Office Priority bid is in. When unable to send tape or when no tape is available, the Cross Office will send a Circuit Assurance signal.**

NOTE 3 **Motors run continuously during service hours. Busy lamps are normally on, and flicker during transmission. Stations are normally connected to the line in an activated condition. They are blinded when not selected.**

NOTE 4 **Following a complete search of all stations without finding traffic available, the Controller will rest. As long as there is any transmission to the line, the Controller will continue to search.**

NOTE 5 **The Controller will search a station after the Skip key has been operated but will not wait for a Circuit Assurance signal from that station.**

NOTE 6 Stations disconnect automatically after transmission stops. This arrangement is Standard on all Mark IV Systems.

ABBREVIATIONS

TABLE OF ABBREVIATIONS AND DEFINITIONS USED IN OPERATION CHARTS

CDC	-	Call Directing Character
CR	-	Carriage Return
FIGS	-	FIGS Shift
LTRS	-	LTRS Shift
LF	-	Line Feed
OC	-	Operation Chart
TSC	-	Transmitter Start Code

Activated Condition - Ready to receive Codes

Circuit Assurance - Upper Case O (9) sent by Station

AUTOMATIC ACTIVATE OPERATION

OPERATION CHARTS ARE ARRANGED TO SHOW CAUSE AND EFFECT ACTION DURING A SEARCH PATTERN WHEN VARIOUS ARRANGEMENTS OF TADS EQUIPMENT ARE INVOLVED.

No attempt is made to depict an entire search pattern to include all possible combinations. Operation Charts are arranged so that any operation can be selected, and then followed through to its conclusion step by step.

It will be noted in the Automatic mode of operation, the stations are reconnected to the line, ... one half second after transmission stops. (See Note 6).

OC-1

TADS CONTROLLER STARTS SEARCH FOR TRAFFIC

- INITIAL CONDITION ← Line Closed. Busy Lamps ON. All Stations on Line. Motors ON. (See Note 3) TADS Controller at Rest.
- TADS CONTROLLER times out ← 1 1/2 Sec.
- Priority Bid (if any) →
- sends FIGS (2 Sec. max.) ← All TTYs Upper Case. ← Cross Office Bid. (See Note 2)

To OC-2, OC-3, OC-4, OC-5, OC-6, OC-7, OC-8, OC-9 or OC-10

OC-2

TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.

Cross Office Has Tape in Transmitter.

From OC-1

- TADS CONTROLLER sends FIGS ← Cross Office ... (Tape available ... See Note 2)
- CROSS OFFICE sends LTRS ← All TTYs lower case.
- sends CDC ← Receiving stations selected.
- sends LTRS, CR, LF ← Stations not selected disconnect.
- sends LTRS, TEXT ← Busy lamps flicker at all stations.
- sends FIGS H ← Receiving stations disconnect. (See Note 6) ← All stations reconnected. (Within 1/2 Sec.)
- TADS CONTROLLER sends FIGS (2 Sec. Pause) ← All TTYs upper case. ← Cross Office sends Circuit Assurance. (See Note 2)

To OC-4 or OC-5

OC-3

TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC

Cross Office Has No Tape in Transmitter.

From OC-1

- TADS CONTROLLER sends FIGS ← Cross Office sends Circuit Assurance (See ...)
- continues search

To OC-4 or OC-5

OC-4

SKIP OPERATION

Tads Controller Searches for Traffic and Does Not Receive Circuit Assurance or Tape from Station Searched.

From OC-1, OC-2, or OC-3

- TADS CONTROLLER sends FIGS TSC ← No tape or Circuit Assurance sent.
- repeats FIGS TSC ← No tape or Circuit Assurance sent. Audible and Visual alarm operates at Master Station. Controller Locked up.
- MASTER STATION ATTENDANT operates SKIP key ← Audible alarm retired. Pilot light ON.
- visual light ON ← Indicates SKIPPED station. Controller Released.
- TADS CONTROLLER continues search ← (See Note 5)

To OC-5

OC-5

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC. Finds Tape Available at 1 Station.

From OC-1, OC-2, OC-3, or OC-4

- TADS CONTROLLER sends FIGS TSC ← No tape available. Station sends Circuit Assurance.
- sends FIGS TSC ← Tape available. Station sends.
- STATION sends LTRS ← All TTYs lower case.
- sends CDC ← Transmitting and Receiving stations selected.
- sends LTRS, CR, LF ← Stations not selected disconnect.
- sends LTRS, TEXT ← Busy lamps flicker at all stations.
- sends FIGS H ← Transmitting and Receiving stations disconnect. ← All stations reconnected. (Within 1/2 Sec.)

Circuit Restored to Initial Condition

OC-6

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.

Station C Has Priority Message. Stations A and B Have Tape Available.

From OC-1

- TADS CONTROLLER sends FIGS TSC ← Tape available. Station A sends Circuit Assurance. (Priority Bid at Station C prevents tape transmission.)
- sends FIGS TSC ← Tape available. Station B sends Circuit Assurance. (Priority Bid at Station C prevents tape transmission.)
- sends FIGS TSC ← Priority Message. Priority station (C) sends.
- PRIORITY STATION sends LTRS ← All TTYs lower case.
- sends CDC ← Transmitting and Receiving stations selected.
- sends LTRS, CR, LF ← Stations not selected disconnect.
- sends LTRS, TEXT ← Busy lamps flicker at all stations.
- sends FIGS H ← Transmitting and Receiving stations disconnect. (See Note 6) ← All stations reconnected. (Within 1/2 Sec.)

Circuit Restored to Initial Condition

OC-7

INTERCEPT - MISCELLANEOUS

Tads Controller Searches for Traffic.

Station Sends Invalid or Garbled CDC.

From OC-1, OC-2, OC-3

- TADS CONTROLLER sends FIGS TSC ← Tape available. Station sends.
- STATION sends LTRS ← All TTYs lower case.
- sends invalid or garbled CDC ← Transmitting station selected. Receiving stations not selected. ← Intercept station at Master station selected.
- sends LTRS, CR, LF ← Stations not selected disconnect.
- sends LTRS, TEXT ← Busy lamps flicker at all stations.
- sends FIGS H ← Transmitting and Intercept stations disconnect. (See Note 6) ← All stations reconnected. (Within 1/2 Sec.)

Circuit Restored to Initial Condition

OC-8

INTERCEPT - MILFIO

Tads Controller Searches for Traffic and Does Not Receive Circuit Assurance or Tape from Station Searched.

From OC-1, OC-2, OC-3

- TADS CONTROLLER sends FIGS TSC ← No tape or Circuit Assurance sent.
- repeats FIGS TSC ← No tape or Circuit Assurance sent. Audible and Visual alarm operates at the Master station. Controller Locked up.
- MASTER STATION ATTENDANT operates INTERCEPT key ← Audible alarm retired. Pilot light ON.
- visual light ON ← Indicates which station ... "Intercept." Controller released. Continues search.
- TADS CONTROLLER sends FIGS TSC ← Tape available. Station sends.
- STATION sends LTRS ← All TTYs lower case.
- sends CDC ← Transmitting station selected. Receiving station is on "Intercept." Intercept BOTH at Master Station selected.
- sends LTRS, CR, LF ← Stations not selected disconnect.
- sends LTRS, TEXT ← Busy lamps flicker at all stations.
- sends FIGS H ← Transmitting station OFF "Intercept." BOTH blocked. Feeds ... tape. ← All stations reconnected. (Within 1/2 Sec.)

Circuit Restored to Initial Condition

OC-9

BROADCAST

Tads Controller Searches for Traffic.

Station Searched Has Broadcast Message.

Letter S Assigned as Broadcast Code.

From OC-1, OC-2, OC-3, OC-4

- TADS CONTROLLER sends FIGS TSC ← Broadcast tape available. Station sends.
- STATION sends LTRS ← All TTYs lower case.
- sends LTRS S ← All stations selected.
- sends LTRS, CR, LF ← Carriage positioned.
- sends LTRS, TEXT ← Busy lamps flicker at all stations.
- sends FIGS H ← All stations disconnect. (See Note 6) ← All stations reconnected. (Within 1/2 Sec.)

Circuit Restored to Initial Condition

OC-10

TADS CONTROLLER ENDS SEARCH FOR TRAFFIC, AND RESTS.

No Tape Available at Any Station (See Note 4)

From OC-1

- TADS CONTROLLER sends FIGS TSC ← No tape available. Station sends Circuit Assurance.
- sends FIGS TSC ← No tape available. Station sends Circuit Assurance.
- sends FIGS TSC ← No tape available. Station sends Circuit Assurance.
- sends FIGS H ← Line closed. Busy lamps ON. All stations on line. Motors ON. (See Note 3) TADS Controller at rest.
- TADS CONTROLLER rests
- starts search — Approx. 3 Mins.
- starts search — Approx. 6 Mins.

Permanent Rest (See Note 1)

AUTOMATIC ACTIVATE OPERATION

TABLE 8a
Mark IV TADS

OPERATION CHARTS ARE ARRANGED TO SHOW CAUSE AND EFFECT ACTION DURING A SEARCH PATTERN WHEN VARIOUS ARRANGEMENTS OF TADS EQUIPMENT ARE INVOLVED.

No **attempt** is made to depict an entire search pattern to include all possible combinations. Operation Charts are arranged so that an operation can be selected by a heading, and then followed through to its conclusion step by step.

It will be noted that, in the Automatic Activate method of operation, the stations are reconnected to the line, in an activated condition, ready to receive codes within one half second after transmission stops. See Note 6)

OC-3

TADS CONTROLLER SEARCHES CROSS OFFICE FOR TRAFFIC.

Cross Office Has No Tape to Transmitter.

From OC-1

TADS CONTROLLER
- sends FIGS ↑ — Cross Office sends Circuit Assurance. (See Note 2)
- continues search

To OC-4 or OC-5

OC-4

SKIP OPERATION

Tads Controller Searches for Traffic and Does Not Receive Circuit Assurance or Tape from Station Searched.

From OC-1, OC-2, or OC-3

TADS CONTROLLER
- sends FIGS↑ TSC — No tape or Circuit Assurance sent.
- repeats FIGS↑ TSC — No tape or Circuit Assurance sent. Audible and Visual alarm operates at Master Station. Controller *Locked up.*

MASTER STATION ATTENDANT
- operates SKIP key — Audible alarm retired. Pilot light ON.
- visual light ON — Indicates SKIPPED station. Controller Released.

TADS CONTROLLER
- continues search — (See Note 5)

To OC-5

OC-5

TADS CONTROLLER SEARCHES STATIONS FOR TRAFFIC.
Finds Tape Available at 1 Station.

From OC-1, OC-2, OC-3, or OC-4

TADS CONTROLLER
- sends FIGS↑ TSC — No tape available. Station sends Circuit Assurance.
- sends FIGS↑ TSC — Tape available. Station sends.

STATION
- sends LTRS↓ — All TTYs lower case.
- sends CDC — Transmitting and Receiving stations selected.
- sends LTRS↓CR↑LF↕ — Stations not selected disconnect.
- sends LTRS↓TEXT — Busy lamps flicker at all stations.
- sends FIGS ↑ — Transmitting and Receiving stations disconnect. (See Note 6)
- All stations reconnected. (Within 1/2 Sec.)

Circuit Restored to Initial Condition

NOTES

NOTE 1 **TADS CONTROLLER RESTS AS FOLLOWS:**
Switch Position S - Approximately 3 Minutes.
Switch Position L - Approximately 6 Minutes.
Switch Position R - Permanent Rest. In this position the CONTROLLER remains inactive until a transmission takes place or the line is opened momentarily.

NOTE 2 CROSS OFFICE may send every other time it is searched if tape is available in the transmitter, and no Cross Office Priority bid is in. When unable to send tape or when no tape is available, the Cross Office will send a Circuit Assurance signal.

NOTE 3 Motors run continuously during service hours. Busy lamps are normally on, and flicker during transmission. Stations are normally connected to the line in an activated condition. They are bridged when not selected.

NOTE 4 Following a complete search of all stations without finding traffic available, the Controller will rest. As long as there is any transmission to the line, the Controller will continue to search.

NOTE 5 The Controller will search a station after the Skip key has been operated but will not wait for a Circuit Assurance signal from that station.

NOTE 6 Stations disconnect automatically after transmission stops. This arrangement is Standard on all Mark IV Systems.

OC-8

INTERCEPT - WILFUL

Tads Controller Searches for Traffic and Does Not Receive Circuit Assurance or Tape from Station Searched.

From OC-1, OC-2, OC-3

TADS CONTROLLER
- sends FIGS↑ TSC — No tape or Circuit Assurance sent.
- repeats FIGS↑ TSC — No tape or Circuit Assurance sent. Audible and Visual alarm operates at the Master station. Controller *Locked up.*

MASTER STATION ATTENDANT
- operates INTERCEPT key — Audible alarm retired. Pilot light ON.
- visual light ON — Indicates which station on "Intercept." Controller released. Continues search.

TADS CONTROLLER
- sends FIGS↑ TSC — Tape available. Station sends.

STATION
- sends LTRS↓ — All TTYs lower case.
- sends CDC — Transmitting station selected. Receiving station is on "Intercept." Intercept BOTH at Master Station unbleeded.
- sends LTRS↓CR↑LF↕ — Stations not selected disconnect.
- sends LTRS↓TEXT — Busy lamps flicker at all stations.
- sends FIGS ↑ — Transmitting station OFF. Intercept BOTH bleeded. Feeds for tape.
- All stations reconnected. (Within 1/2 Sec.)

Circuit Restored to Initial Condition

OC-9

BROADCAST

Tads Controller Searches for Traffic.

Station Searched Has Broadcast Message.

Letter S Assigned as Broadcast Code.

From OC-1, OC-2, OC-3, OC-4

TADS CONTROLLER
- sends FIGS↑ TSC — Broadcast tape available. Station sends.

STATION
- sends LTRS↓ — All TTYs lower case.
- sends LTRS↓S — All stations selected.
- sends LTRS↓CR↑LF↕ — Carriage positioned.
- sends LTRS↓TEXT — Busy lamps flicker at all stations.
- sends FIGS ↑ — All stations disconnect. (See Note 6)
- All stations reconnected. (Within 1/2 Sec.)

Circuit Restored to Initial Condition

OC-10

TADS CONTROLLER ENDS SEARCH FOR TRAFFIC, AND RESTS.

No Tape Available at Any Station (See Note 4)

From OC-1

TADS CONTROLLER
- sends FIGS↑ TSC — No tape available. Station sends Circuit Assurance.
- sends FIGS↑ TSC — No tape available. Station sends Circuit Assurance.
- sends FIGS↑ TSC — No tape available. Station sends Circuit Assurance.
- sends FIGS ↑ — Line closed. Busy lamps ON. All stations on line. Motors ON. TADS Controller at rest. (See Note 3)

TADS CONTROLLER
- rests
- starts search — Approx. 3 Min.
- starts search — Approx. 6 Min.

Permanent Rest (See Note 1)

ABBREVIATIONS

TABLE OF ABBREVIATIONS AND DEFINITIONS USED IN OPERATION CHARTS

CDC	-	Call Directing Character
CR↓	-	Carriage Return
FIGS ↑	-	FIGS Shift
LTRS ↓	-	LTRS Shift
LF↕	-	Line Feed
OC	-	Operation Chart
TSC	-	Transmitter Start Code

Activated Condition - Ready to receive Codes

Circuit Assurance - Upper Case O (5) sent by Station

Revised February, 1958

SSG 106
Operation Chart for Mark IV Automatic Activate Operation

C.L.R. June 1956

7. CONTROLLER - P92.911.03

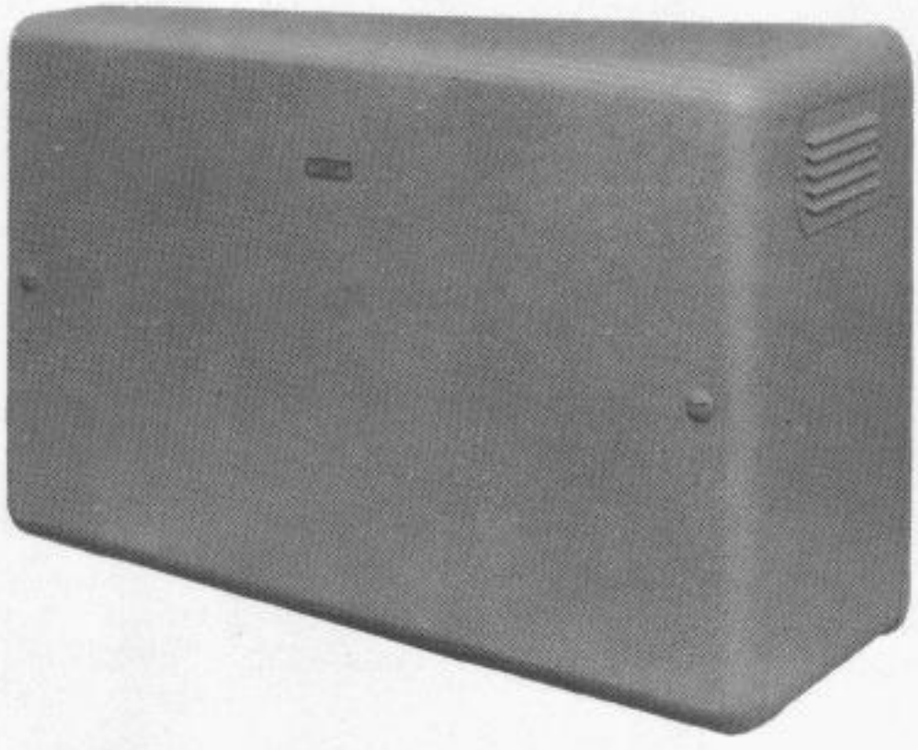
A. DESCRIPTION

7.01 Controller P92.911.03 is now replacing earlier models of P92.911.01 and P92.911.02. It has the same basic circuitry as the previous model P92.911.02, offers the same features, but in addition will operate up to 100 words per minute.

7.02 All previous features have been retained. Certain components have been moved to better adapt the unit for cabinet, rack or console mounting, and the power supply has been improved and made less hazardous.

7.03 The AC rectifier has been re-designed, a block provided to concentrate strapping operations, and a cover provided to prevent accidental contact with "hot" parts of the unit.

TADS CONTROLLER



Housed in gray-green Fiberglas cabinet.
9" x 16" x 25"

7. CONTROLLER - P92.911.03

A. DESCRIPTION (Continued)

WIRING OPTIONS PROVIDE TADS CONTROLLER WITH VARIED OPERATING FEATURES

7.04 When all stations on a circuit are equipped for automatic tape transmission, this controller provides the following features:

(a) Two-digit codes permitting up to 36 stations per line.

(b) Circuit assurance, with accelerated search.

(c) Priority.

(d) Automatic activate.

7.05 Any of these features can be obtained by wiring options. The controller is installed at the master station. It can be mounted in the gray-green fiber glass apparatus cabinet 9" x 16" x 25" used for the previous TADS controllers, or may be rack or console mounted.

B. LIMITATIONS - CONTROLLER P92.911.03

7.06 Engineering or technical people familiar with the limitations of this equipment should be consulted before service is offered involving special features.

CARE IN ASSIGNING STATION CALLS ESSENTIAL

7.07 In assigning two-digit station calls, two letters only can be used for the first digit of each group on a single circuit, and they can not be repeated as second-digit station calls in any combination. For example: If X is assigned as the first digit of a group, and Y as the first digit of the other group - then XY or YX can not be assigned as a station call. Also, double combinations such as XX or YY can not be used.

CERTAIN LETTERS TO BE AVOIDED IN ASSIGNMENT OF STATION CALLS

7.08 The letters H and S are not available for use as station codes. FIGS H is normally used as the end-of-message code - disconnecting the station and turning off the motor if Type A Motor Control is used.

7.09 The letters T, O, M and V are not suitable as the first or second digits of station codes.

7.10 All sending stations must employ automatic tape transmission if any stations on the circuit are equipped with TADS P92.901.04 selectors.

7.11 If hand sending is desired on a circuit using this controller, station selectors must be of the P92.901.03 type. Strapping options are provided in the controller to retime circuits for slower operation needed for hand sending.

7.12 This controller is suitable for 60, 75 and 100 words per minute service.

OPERATING REQUIREMENTS OF THE CIRCUIT ALSO DEPENDENT UPON STATION SELECTORS

7.13 All stations on a circuit must be equipped with P92.901.04 selectors when priority or circuit assurance features are required. This selector is also required for two-digit calling, but in those cases where the circuit is already equipped with the P92.901.02 or .03 selector, the P92.901.04 selector need be furnished only at the stations which have the same second digit - YA and ZA.

INTERCEPT REQUIRED WITH CIRCUIT ASSURANCE

7.14 When circuit assurance is provided, it is advisable to provide the intercept feature. Otherwise, a special arrangement of SKIP keys and lamps will be required to indicate the station failing to respond to the search, this enables the attendant to place the station on skip, after notifying all points on the circuit that the station is out of service.

7. CONTROLLER - P92.911.03 (Continued)

C. FUNCTIONS - CONTROLLER P92.911.03

7.15 Transmits a two second open signal, followed by a one second closed, idle circuit period. The closing of the line for one second allows the motors to attain full operating speed.

The transmission of the open-close signal is omitted when automatic activate operation is used.

7.16 Transmits a FIGS signal following the break. This shifts all teletypewriters to upper case, and polls the cross-office switching equipment for traffic.

7.17 Polls each station in sequence, preceding each TSC with FIGS, automatically starting transmitters if they are loaded.

NOTE: Although each TSC is preceded by FIGS, cross-office will only respond to the first one at the start of the search sequence.

7.18 Sends the next TSC immediately in response to a no-tape signal (circuit assurance).

7.19 Sends the TSC a second time if there is no response to the first transmission, stops the search and gives an alarm if there is no response to the second TSC.

7.20 Permits any station to transmit a priority signal (a one-half second open), immediately following the one referred to previously, this signal prevents the other stations from sending, allowing the station with the priority message to send next.

7.21 Goes into a rest condition if a complete search cycle is made without response.

7.22 Resumes search in response to operation of the CONTROL key at any station, or a transmission on the line.

8. SELECTOR P92.901.04

A. DESCRIPTION

8.01 This is the station part of the Mark IV TADS equipment. It operates with a teletypewriter to provide selective calling on multi-station teletypewriter private line circuits. Teletype codes are used to select stations and start transmitters.

8.02 It is used in place of the P92.901.02 or P92.901.03 selector when priority, circuit assurance or two-digit calling is required. These features are obtained by wiring options.

NOTE: All sending stations on the line must have automatic tape transmission. Hand sending can not be used with this selector.

8.03 The P92.901.04 selector is housed in the same apparatus cabinet as the P92.901.03 selector. This is a gray-green cabinet measuring 16 inches long, 12-1/2 inches high, and 5 inches deep, mounted on the side of the teletypewriter table.

THE TADS STATION SELECTOR

Selector Shown On Outlying Station

8. SELECTOR - P92.901.04

A. DESCRIPTION (Continued)

8.04 The basic circuitry is the same as that of the P92.901.03 selector.

8.05 It can be used to extend line equipped with the P92.901.02 or .03 selector to more than 20 stations. In this case, two-digit calling must be used and those stations whose codes have the same second digit must be equipped with the .04 selector. All sending stations on the circuit must have automatic tape transmission. A controller P92.911.02 or .03 and P92.901.04 selector must be used at the master station. Sufficient other stations must be equipped with the .04 selector to gain two letters, to be used as the first letters of two-digit station codes. The remainder of the stations may use .02, .03 or .04 selectors.

B. LIMITATIONS - SELECTOR P92.901.04

SPECIAL FEATURES NOT TO BE OFFERED WITHOUT CLEARANCE FROM ENGINEERING OR PLANT GROUPS

8.06 Engineering or technical people familiar with the limitations of this equipment should be consulted before service is offered involving special features.

8.07 This selector is not adaptable to 15 type teletypewriters for hand sending. The 15 type machine must be used on a receiving only basis.

KIND OF CONTACT ASSEMBLY DETERMINES NUMBER OF CODES THAT MAY BE USED

8.08 Station selection is limited to the station call code and a broadcast (group) code if the typing unit is equipped with a function lever contact assembly. If the typing unit is equipped with the new function plate contact assembly, an additional code is available for station selection.

TADS Teletypewriter Selector Function Plate and Contact Assembly is described in Bell System Practice P65.917.

CAREFUL ASSIGNMENT OF STATION CODES IMPORTANT FOR CORRECT OPERATION

8.09 No more than two different characters can be used for the first digit of each station code (each group on a single circuit, and they can not be repeated as second digit codes in any combination. For example: If X is assigned as the first digit of a group, and Y as the first digit of the other group, - then YX or XY can not be assigned as a station code. Also double combinations such as XX and YY can not be used.

8.10 The stations must be divided between the two code groups. If there should be an uneven number, the odd station should be assigned to the group having the lowest letter alphabetically for the first digit.

8.11 The letters H, S, T, O, M, and V are not suitable as station call codes. FIGS H is normally used for end-of-message code and S is used for broadcast.

8.12 Tabulator operation is limited:

(a) To circuits equipped with automatic tape transmission at all sending stations.

(b) To single digit code selection if stations are equipped with function lever contact assembly.

(c) To one or two digit code selection if stations are equipped with function plate contact assembly.

(d) Circuits using all 28 type teletypewriters may use either one or two digit code selection. If a combination of 19 and 28 type machines are used on a circuit, the limitations of (a), (b) applies.

(e) Can not be used with automatic cross-office.

(f) Circuit availability time is reduced - timing circuits must be changed. Technical groups should be consulted before offering services deviating from normal operation.

8. SELECTOR - P92.901.04

B. LIMITATIONS (Continued)

AUTOMATIC TAPE TRANSMISSION A REQUIREMENT WHEN USING THIS STATION SELECTOR

8.13 All transmission on the circuit must be automatic. Keyboard sending could result in a station being disconnected during transmission due to the fast action of the timing circuit.

8.14 This equipment will operate at 60, 75, or 100 words per minute.

8.15 Failure to adhere to specified formats will cause lost or misdirected messages.

8.16 A momentary open on the circuit will cause unwanted stations to be selected.

PILE-UP OF STATION CODES DURING SEARCH A SOURCE OF CUSTOMER COMPLAINT

8.17 Station codes will normally be printed during search and selection and will sometimes overline. During periods of light traffic, typing will pile up at the end of a line. When forms are not used, the controller can be coded to shut down on CR LF instead of FIGS H to minimize overlining and pile-up. This method can be used if automatic activate operation is used; it will not work with open-close activate.

NEW TADS EQUIPMENT EFFECTIVELY SUPPRESSES SEARCH AND SELECTION CODES

8.18 However an optional feature is now available which can be added to suppress printing of all codes prior to the selection of the station. This is the TADS Teletypewriter Selection Code Printing Suppressor P92.904.01. It is fully illustrated and described in Bell System Practice Section P65.918.

C. FUNCTIONS - SELECTOR P92.901.04

8.19 This selector incorporates the following features in addition to those provided in the P92.901.02 and .03 selectors.

(a) Two-digit station codes *(Optional)*. It permits up to 36 station per line.

(b) Circuit assurance *(Optional)*. Each station responds to its polling code by transmitting tape or a single character answer-back, upper case M, O, or T.

NOTE: The Circuit assurance signal from an automatic cross-office is an upper case O (9).

(c) Priority *(Optional)*. A priority message may be given preference over all other traffic. Operation of the PRIORITY key locks out all other stations, allowing the one with the emergency message to have a clear circuit.

(d) Provides for type A, B, or C motor control.

(e) Stops the transmitter and sounds an alarm if CR is transmitted ahead of the station codes (CDCs) or if a tape snarl occurs.

NOTE: This feature may be disabled if required at a manual relay point to permit omitting the sending station's code.

(f) Automatic disconnect - Automatically disconnects stations and turns off BUSY lamps. (BUSY lamps are turned OFF with Open-Close Activate - with automatic activate, they remain ON steady.

(g) Automatic Activate *(Optional)* - Automatically reconnects all stations to the circuit in a condition to respond to the codes within 1/2 second after transmission stops.

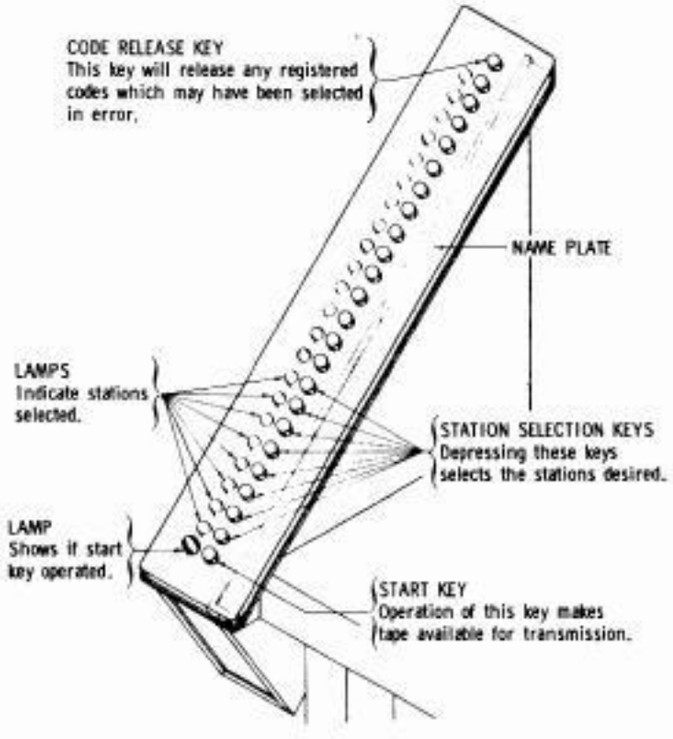
9. PUSHBUTTON CODE GENERATOR - P92.903.31

A. DESCRIPTION

9.01 This equipment provides for adding station and operational codes to uncoded tapes by the operation of push-buttons. Messages may be directed to any one or more of 20 stations, to a typing reperforator for manual relay to another circuit, or to a reperforator-transmitter at an automatic cross-office for automatic relay.

9.02 A panel containing keys and lamps is mounted on the left side of the teletypewriter. It has a key and lamp for each station, a START key, and a CODE RELEASE key. This adds about 2-1/2 inches to the over-all length of the machine. Relay equipment is housed in a six plate apparatus cabinet with a cover identical in appearance to that used for the TADS controller.

PUSHBUTTON CODE GENERATOR PANEL



9.03 The Pushbutton Code Generator can be added to existing master stations. However, if it is desired to add it to an existing outlying station, a master station equipment minus the controller must be provided.

TAD STATION EQUIPPED WITH
PUSHBUTTON CODE GENERATOR
(Control Equipment Not Shown)

9.04 The transmitter can be loaded and station selections set up while the line is busy.

9.05 The equipment is compatible with priority, circuit assurance, manual cross-office, and intercept provided single digit station codes are assigned to the circuit.

9.06 It will transmit up to 22 codes, available in the following units:

(a) Basic unit of 8 codes.

(b) Two additional units of 7 codes each.

9.07 Tapes with incorrect station codes can be properly directed and the incorrect codes made part of the text.

9.08 Transmits tapes with correct codes by operation of the START key only.

9. PUSHBUTTON CODE GENERATOR P92.903.31 (Continued)

B. LIMITATIONS - PUSHBUTTON CODE GENERATOR P92.903.31

9.09 Limited to single-digit services with a maximum of 20 stations per line. When provided on a line arranged for manual or automatic relaying to another line, the tape must be sent twice if it is to go to stations using the same codes on both lines; once for stations on the first line and again for stations on the second line.

C. FUNCTIONS - PUSHBUTTON CODE GENERATOR

9.10 Transmits the LTRS character preceding each code.

9.11 Transmits CR and LF after the station codes.

9.12 Transmits end-of-message code (FIGS H) if not included in the tape.

10. TWO LINE AUTOMATIC CROSS-OFFICE - P92.940.01

A. DESCRIPTION - 2X0 - P92.940.01

10.01 This two line cross-office arrangement uses two reperforator-transmitters (RTs). It is located at a point common to two TADS lines. This location may be at the master stations, at two outlying stations or at a point with a combination of a master station and an outlying station.

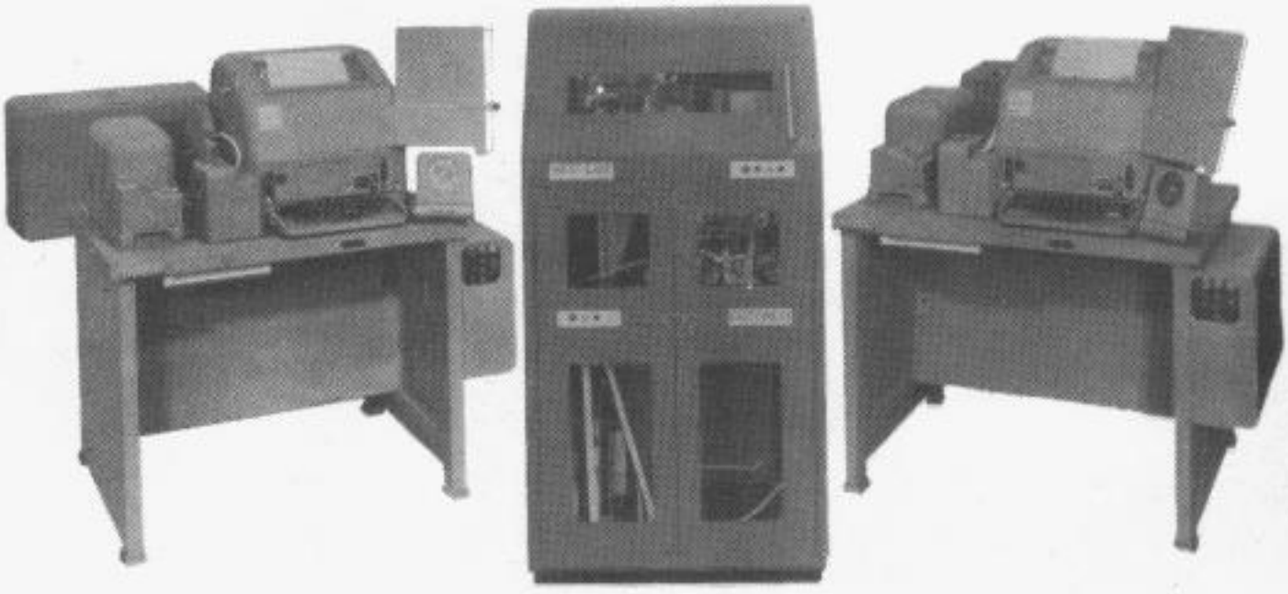
10.02 Each line must have a 19 type teletypewriter at this location.

10.03 One RT will relay traffic from Circuit A to Circuit B, and the other RT will relay traffic from Circuit B to Circuit A. The receiving side of RT No. 1 will be associated with Circuit A and the sending side with Circuit B. The receiving side of RT No. 2 will be associated with Circuit B and the sending side with Circuit A.

REPERFORATOR-TRANSMITTERS AND CONTROL EQUIPMENT USE CABINET MOUNTING

10.04 The reperforator-transmitters are mounted in a 100E apparatus cabinet, and the control equipment is mounted in an apparatus cabinet similar to that used for the TADS controller.

TADS TWO LINE AUTOMATIC CROSS-OFFICE



B. LIMITATIONS - 2X0 - P92.940.01

10.05 Both lines must be TADS equipped and operate at the same speed.

10.06 All transmission must be automatic tape, operating at 60 or 75 words per minute, on half-duplex (single) lines.

Not available for 100 word per minute operation at this time.

10.07 All operating practices, formats, etc. must be compatible with standard TADS operation.

10.08 Can not be used with tabulator operation.

10.09 At the switching point, stations on both lines must be provided with TADS station selectors P92.901.04.

10. TWO LINE AUTOMATIC CROSS-OFFICE - P92.940.01

B. LIMITATIONS - 2XO (Continued)

10.10 The TADS P92.911.03 controller must be provided on both lines.

Some circuits may be equipped with the P92.911.02 controller, - having been installed at the time this model was rated Standard.

10.11 Uses one of the available station codes on each line for cross-office selection.

C. FUNCTIONS - 2X0 - P92.940.01

10.12 Permits the automatic exchange of traffic between two teletypewriter lines upon receipt of the correct teletypewriter selection codes.

10.13 Provides for storing overflow cross-office traffic. All stored cross-office traffic can be sent on a priority basis by the operation of the MAN. PRIORITY key.

10.14 Stored cross-office traffic can be given a priority rating by introducing a cross-office priority code (ZZ) in the tape following the code for cross-office.

10.15 Provides for activating the TADS controller on either line if tape should become available during the controller's rest interval by sending a LTRS signal to the line.

10.16 With the exception of the two associated 19 type control teletypewriters, the same station codes may be assigned on both lines without interference.

10.17 Provides necessary alarms. If trouble develops in the cross-office equipment, intra-line stations on either circuit will not be affected.

11. THREE LINE AUTOMATIC CROSS-OFFICE

A. DESCRIPTION - 3X0 - P92.941.01

11.01 The TADS Three Line Automatic Cross-Office Arrangement directs the exchange of traffic between three TADS equipped multi-station lines using teletypewriter characters for switching function.

11.02 This cross-office switching arrangement consists of the following equipments:

(1) Six reperforator-transmitters mounted in three 100E apparatus cabinets.

(2) Three 28 RQ teletypewriters equipped with stunt box, 14 transmitter, selector P92.901.04, SKIP keys and lamps.

(3) Three TADS controllers P92.911.03

(4) Three RO typing reperforators mounted in a console cabinet.

(5) Three 2X0 units P92.940.01 and rectifiers.

(6) Three Intercept Equipments P92.923.02.

(7) Control circuitry - makes use of equipment already designed, but connected differently to achieve a new concept in this application. Mounting of the control equipment may be rack or cabinet according to the requirements of the customer.

(8) One 19 ASR teletypewriter to be used for tape preparation at the switching center.

11. THREE LINE AUTOMATIC CROSS-OFFICE (Cont'd)

B. LIMITATIONS - 3X0 - P92.941.01

11.03 Speed of operation is limited to 60 or 75 words per minute. Design work on the 14 reperforator-transmitter may permit 100 word per minute operation later.

11.04 Up to seventeen stations can be operated on one line using one first CDC. Two additional codes are used for cross-office switching.

11.05 Code assignments for each line then, are as follows: One code for each outlying station (16 codes). One code for the master station (1 code). Two codes for cross-office switching (2 codes).

11.06 By using an additional first CDC, the number of stations per line can be increased to 26.

11.07 Master stations and intercept must be at the switching center.

11.08 Two-digit selection codes must be used in all cases. This does not preclude the use of Mark III (a single-digit system) at the outlying stations. The Mark III stations continue to use single-digit codes, but with the exception that an additional digit precedes each regular station code. This additional first digit has no effect on the station selectors at the outlying stations. Its use is for uniform operation of the cross-office switching equipment and to satisfy requirements of the intercept feature.

11.09 All transmission must be automatic. No hand sending can be used.

11.10 Operation of two systems in tandem is not being provided in the initial design. Requirements for special arrangements such as this should be referred to the design engineering group through normal plant or engineering channels.

C. FUNCTIONS - 3X0 P92.941.01

11.11 Provides a method of relaying traffic from an incoming line to the switching center and directing it to either one or two lines, or both.

11.12 Provides for storing cross-office traffic.

11.13 Provides for activating the TADS controller if tape should become available in a cross-office transmitter during a rest period.

11.14 Provides necessary alarm equipment.

D. OPERATION - 3X0 - P92.941.01

11.15 Each circuit can code direct traffic into either or both of two reperforator-transmitters for re-transmission to other lines. Each line has the transmitter portion of the reperforator-transmitters receiving from the other two lines connected in such a manner that they are searched by the controller.

11.16 These transmitters are searched periodically by the FIGS (pause) sent by the controller following each message.

11.17 If an incorrect or mutilated CDC is contained in a message format, it will cause that message to be intercepted and copied on the RO typing reperforator on the line to which the message is being directed.

11.18 MESSAGE FORMAT - Lines C, D, and F. Message from Line C to stations on three lines:

10 LTRS CA LTRS CB LTRS CD LTRS DG LTRS DK LTRS CF LTRS FX LTRS CR LF LTRS TEXT FIGS H 10 LTRS

CA LTRS CB LTRS - selects stations on Line C. CD LTRS - selects RT for retransmission to Line D. DG LTRS DK LTRS - selects stations on Line D. CF LTRS - selects RT for retransmission to Line F. FX LTRS - selects station on Line F. Text - sent to all selected stations. FIGS H - End-of-message code.

12. INTERCEPT - P92.923.02

A. DESCRIPTION

12.01 A typical TADS Intercept installation consists of the following:

(a) A No. 14 Typing reperforator equipped with a full complement of pull-bar contact assemblies and a non-interfering tape feed-out assembly.

(b) An XRT-200-AD Teletype Table equipped with a 26 pair terminal, keys and buzzer.

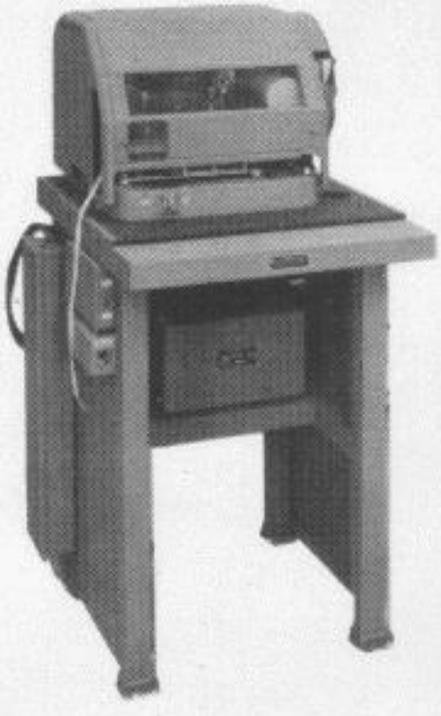
(c) A relay control circuit assembled on three 189A 23 inch mounting plates suitable for cabinet or relay rack mounting.

(d) A SKIP key and lamp cabinet P92.925.01 to control the wilful intercept feature and other functions of the Intercept equipment.

(e) A Non-Interfering Manual Tape Feed-out key to allow the attendant to feed out tape under certain operating conditions. The key is automatically disabled while Transmitter Start Codes or station selection codes are being sent on the line.

INTERCEPT TYPING REPERFORATOR

MTFO key (Manual Tape Feedout), BUZZER key and Cable Terminal shown mounted on side of the XRT-200-AD Teletype Table.



B. LIMITATIONS - P92.923.02

12.02 The Intercept equipment must be located at a master station equipped with a TADS controller P92.911.02 or .03.

12.03 Other limitations pertaining to TAD Systems such as message format, speed of operation and transmission are applicable.

12.04 It is adaptable to either single-digit or two-digit selection.

C. FUNCTIONS - P92.923.02

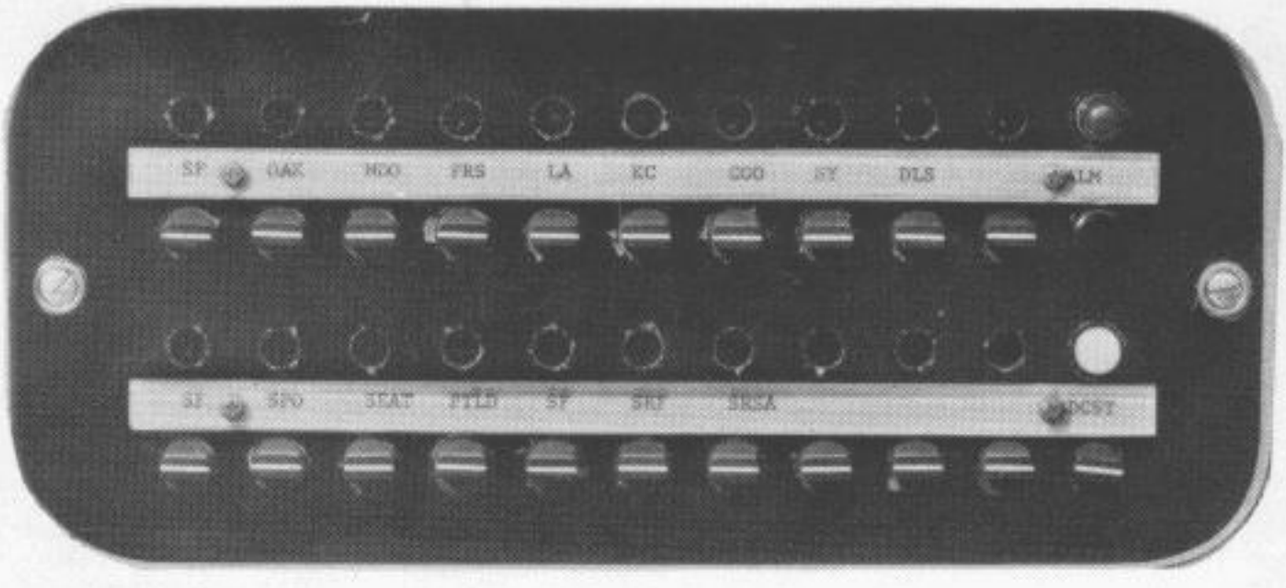
12.05 Automatically intercepts incorrectly addressed messages sent on a TADS equipped multi-station line.

12.06 Provides a means of wilfully intercepting messages to any station on a TADS equipped circuit.

12.07 Gives a visual indication of which station is being searched by means of the SKIP key and lamp cabinet.

12.08 Provides an audible alarm and a lamp to indicate which station has failed to respond to the search code when the circuit assurance feature is furnished.

SKIP KEY AND LAMP CABINET



12. INTERCEPT - P92.923.02

C. FUNCTIONS (Continued)

12.09 Feeds out tape automatically at the end of each group of correct addresses, and after each intercepted message.

12.10 Blinds the typing reperforator while search codes are being sent on the line.

13. SKIP KEYS AND LAMPS - P92.924.01

A. DESCRIPTION

13.01 The key and lamp panel normally associated with the intercept circuit can be provided separately - without the typing reperforator and control equipment.

B. LIMITATIONS - P92.924.01

13.02 The customer's master station must follow either of two procedures when a station is out of order.

(a) Notify all stations to withhold traffic to that station.

(b) Monitor the line and re-send all messages received for that station.

C. FUNCTIONS - P92.924.01

13.03 Gives visual indication of the station being searched.

13.04 Gives a visual and an audible alarm if there is no response from a station.

13.05 Provides a SKIP key and lamp per station. Operation of a SKIP key will not prevent the controller from searching the station in sequence. However, it will not stop nor sound an alarm if there is no response to the transmitter start code, while the SKIP key is operated.

14. TYPING REPERFORATOR CONTROL UNIT P92.902.01 - P92.902.02

A. DESCRIPTION - P92.902.01

14.01 The P92.902.01 Typing Reperforator Control Unit provides a method of relaying teletypewriter tapes manually on a Mark III TAD System.

14.02 This unit receives its operating information from the P92.901.03 station selector and the control teletypewriter's typing unit at the relay point.

14.03 When using this unit, the associated control teletypewriter must be selected before the typing reperforator.

14.04 A wiring option gives the customer the choice of receiving a page copy or not on the control teletypewriter at the time the typing reperforator is taking copy. This option is applied as a wiring change - coding of tapes to effect this choice can not be done with this circuit.

14.05 This control unit can be used at a master or an outlying station.

TYPING REPERFORATOR

For Use With Typing Reperforator Control Units P92.902.01 or P92.902.02.

14. TYPING REPERFORATOR CONTROL UNIT
A. DESCRIPTION - P92.902.01 (Continued)

RELAY CODE OPERATES CONTROL CONTACTS TO DISCONNECT UNSELECTED STATIONS

14.06 Typing reperforator control contacts operate at unselected stations, not having a typing reperforator, to disconnect them when the code for the typing reperforator is sent. This prevents stations on the originating circuit from being selected by duplicate codes of another circuit.

Relay Code - The code assigned to call in the Typing Reperforator at a Manual Relay Center.

ACTION OF CONTROL CONTACTS ILLUSTRATED BY PRACTICAL EXAMPLE

14.07 To illustrate the action of these control contacts, the following example is shown: Assume two circuits are equipped with typing reperforators at a common location A. Each circuit has stations A, B, C, D, E and F. Assume also, that a message is transmitted from Station C on Circuit No. 1 to Stations D and F on Circuit No. 2. The typing reperforator selection code sent prior to the codes for the stations on Circuit No. 2 disconnects all unselected stations on Circuit No. 1. This arrangement prevents Stations D and F on Circuit No. 1 from receiving the message.

THE CONTROL UNIT P92.902.01 IS STANDARD FOR MARK III, P92.902.02 FOR MARK IV

14.08 The P92.902.01 typing reperforator control unit is Standard for all TADS lines equipped with P92.901.03 station selectors (Mark III). It is used for Additions and Maintenance on TADS lines equipped with P92.901.04 station selectors. The P92.902.02 typing reperforator control unit is Standard for lines equipped with the P92.901.04 station selectors.

B. LIMITATIONS (P92.902.01 CONTROL UNIT)

14.09 This equipment is limited to 60 and 75 WPM operation and single-digit selection codes.

CONTACT ASSEMBLY SUPPLIED IN TYPING UNITS POSES OPERATING PROBLEM FOR RELAY POINTS

14.10 On lines having typing units equipped with function lever contact assemblies, and more than one typing reperforator location is desired, the same selection code will normally have to be assigned to each typing reperforator. With this arrangement, each typing reperforator will copy, if its associated control station is selected.

14.11 Where typing units are equipped with the new function plate contact assemblies, more contacts are available for selection codes, and the limitation of the preceding paragraph does not apply.

14.12 If one of the station codes is assigned for selecting the typing reperforator, the number of codes available for station selection will be reduced.

C. FUNCTIONS - P92.902.01 CONTROL UNIT

14.13 To start the motor of the typing reperforator whenever the associated control 19 teletypewriter is selected to receive a message.

14.14 To unblind the typing reperforator upon receipt of its selection code.

14.15 To blind the associated control teletypewriter upon receipt of the CR code.

14.16 To cause the typing reperforator to be blinded and feed out tape upon receipt of FIGS H (or end-of-message code assigned).

14.17 To stop tape feed-out if the associated control teletypewriter is again selected while tape feed-out is in progress.

14. TYPING REPERFORATOR CONTROL UNIT

C. FUNCTIONS - P92.902.01 (Continued)

14.18 To re-start tape feed-out upon receipt of FIGS H (end-of-message code) if the typing reperforator is not selected.

D. DESCRIPTION - P92.902.02 CONTROL UNIT

14.19 The P92.902.02 typing reperforator control unit provides a method of relaying teletypewriter tapes manually on a Mark IV TAD System.

14.20 This unit receives its operating information from the P92.901.04 station selector and the control teletypewriter's typing unit at the relay point.

14.21 It is designed for operation at 60, 75 or 100 words per minute using either one or two digit selection codes.

RELAY TYPING REPERFORATOR MAY BE CODED DIRECTLY WITHOUT CALLING IN CONTROL TELETYPEWRITER

14.22 The 14 typing reperforator may be coded directly. It is not necessary to select the associated control teletypewriter prior to selecting the typing reperforator as was required with the P92.902.01 control unit.

14.23 Page copy may be received at the relay point, if desired, by inserting the station code of the associated control teletypewriter ahead of the code of the typing reperforator in the tape.

14.24 All stations on the circuit must be equipped with typing reperforator control contacts. These contacts function at all unselected stations not equipped with typing reperforators, to disconnect them, preventing their selection by

duplicate codes being transmitted to another circuit. With this arrangement, the code for the typing reperforator will disconnect all stations on the first circuit that were not coded in the tape. For an example of this action, refer to sub-section A.

SENDING STATION'S CODE MAY BE OMITTED FROM MESSAGE FORMAT AT RELAY POINT

14.25 At a relay point, it is frequently desirable to omit the sending station code in the message format. Normal operation of the TADS station selector P92.901.04 prevents this. Omission of the sending station's code will cause a transmitter stop and alarm. Therefore, when this typing reperforator control unit is used, the normal procedure is to use Option I on the station selector, disabling the transmitter stop and alarm feature.

14.26 A measured length of tape is fed out by the typing reperforator at the end of each message. Extended tape feed-out, and a manual tape feed-out key may be obtained as options.

14.27 The typing reperforator is normally mounted on a shelf over the associated teletypewriter, or on a separate table. Cabinet mounting may be used, but requires some local engineering.

TYPING REPERFORATOR

For Intercept Or Manual Relay Application

Shown mounted on shelf over TADS station teletypewriter

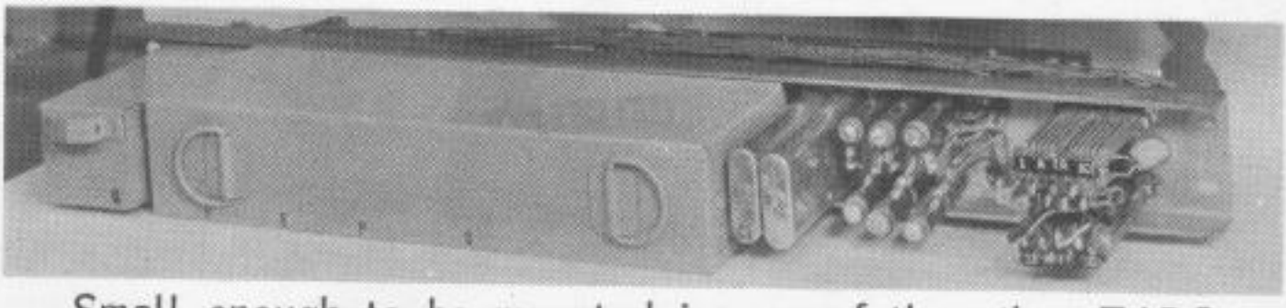
14. TYPING REPERFORATOR CONTROL UNIT

D. DESCRIPTION - P92.902.02 (Continued)

CABLING WITH PLUG-IN CONNECTORS FURNISHED

14.28 Relays and other components are mounted on a single 19 inch mounting plate. Cables equipped with plug-in connectors are supplied to interconnect the various units associated with the control circuit.

TYPING REPERFORATOR CONTROL UNIT P92.902.02



Small enough to be mounted in one of the other TADS cabinets, - seldom needs one of its own.

MOTOR OPERATION IS CONTINUOUS IN THE P92.902.02 TRP CONTROL UNIT

14.29 The 14 typing reperforator is arranged for continuous motor operation.

14.30 The P92.902.02 typing reperforator control circuit is Standard for all TADS lines equipped with P92.901.04 station selectors.

E. LIMITATIONS - P92.902.02 CONTROL UNIT

14.31 This equipment must be used with a teletypewriter equipped with a TADS station selector P92.901.04.

14.32 All sending must be automatic tape transmission. No hand sending may be used.

14.33 The typing reperforator will not feed out tape if FIGS H (end-of-message code) is not received.

CHOICE OF RELAY POINTS IMPORTANT WHEN ASSIGNING STATION CODES

14.34 On circuits having teletypewriters with function lever contact assemblies, and more than one typing reperforator location is desired, the same selection code will normally have to be assigned to each typing reperforator. With this arrangement, each TRP will copy if the selection code is received.

14.35 Where typing units are equipped with the new function plate contact assemblies, more contacts are available, and the limitations of the preceding paragraph does not apply.

NOTE: In cases where typing reperforator locations are required, it is suggested that the advice of plant or engineering groups be obtained to ensure correct operation of the circuit.

F. FUNCTIONS - P92.902.02 CONTROL UNIT

14.36 To unblind the typing reperforator upon receipt of its selection code.

14.37 To blind the typing reperforator and feed out tape upon receipt of FIGS H (or assigned end-of-message code).

14.38 To stop tape feed-out if the typing reperforator is selected while it is feeding out tape.

15. USE OF THE 28 TYPE TELETYPEWRITER

15.01 Two arrangements are now available for using the 28 type teletypewriter on a Mark IV TAD System. Both of these arrangements are covered by drawings which are a part of the P92.901.04 section.

(A) A 28 RO teletypewriter with a 14 type transmitter and a P92.901.04 station selector. A special cabinet mounts on the right hand side of the 28 teletypewriter

15. USE OF THE 28 TYPE TELETYPEWRITER (Cont'd)

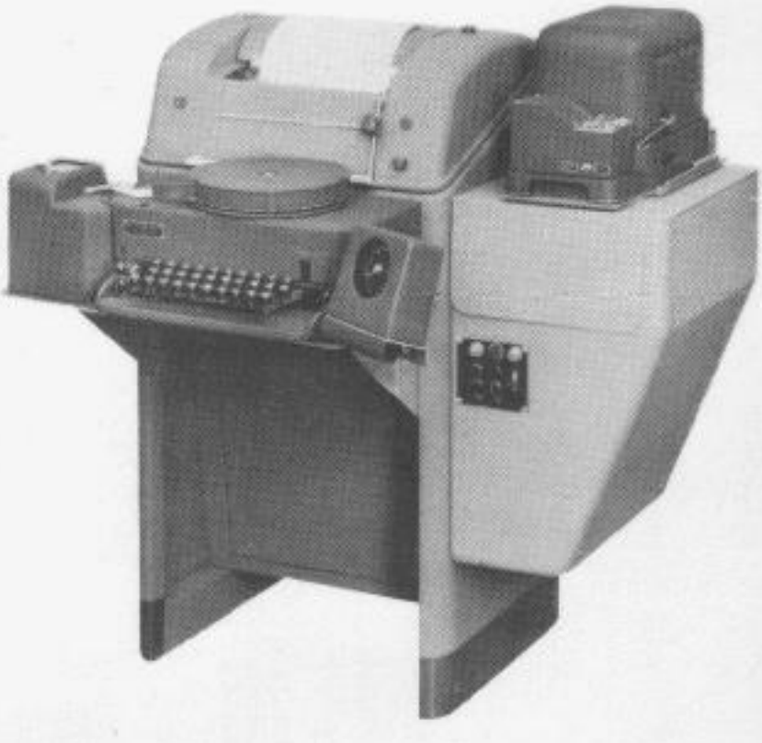
providing a housing for the P92.901.04 station selector, space for a 20 key and lamp panel (Normally SKIP keys and lamps). If the SKIP keys and lamps are not needed, a cover plate is available. The top of the cabinet provides the shelf for mounting the 14 type transmitter.

28 WITH SELECTOR AND TD

At the left, the 28 RO teletypewriter is shown complete with cabinet and a No. 14 transmitter-distributor. At TADS receiving-only locations, this equipment arrangement can be supplied without the transmitter mounting.

TADS 28 WITH PERFORATOR

For tape preparation, a 15M perforator is mounted on a shelf in front of the 28 RO. Drawings for this shelf can be supplied.



15. USE OF THE 28 TYPE TELETYPEWRITER (Cont'd)

(B) This arrangement is known as split operation. It consists of a 28 RO teletypewriter in its own cabinet, a 14 type transmitter and a 15 type perforator, mounted on an XRT-205 table. A 15 type typing unit can be used with this combination if it is desired to make a page copy while perforating tape.

TADS SPLIT OPERATION ARRANGEMENT

Above arrangement used for 60, 75 or 100 WPM operation. Useful where operator requires a page copy while preparing tape. Drawings are a part of the P92.901.04 section.

FUTURE DESIGN WORK

Future design work will include adapting the 28 AS&R for general use in TADS equipment assemblies as soon as these machines become generally available.

16. 100 WORD PER MINUTE OPERATION

16.01 Preliminary tests on all TADS equipment for operation at 100 words per minute have been made. TADS operation at 100 speed is based upon the use of the 28 RO teletypewriter for page copy as covered in the section on use of the 28 teletypewriter.

NEW CONTROLLER DESIGNED WITH 100 WPM OPERATION IN MIND

16.02 The station selector P92.901.04 and Typing Reperforator Control Unit P92.902.02 operate satisfactorily without any modification. The TADS Controller P92.911.02 requires some modifications; so it is being replaced with the P92.911.03 model which is designed for 100 speed operation.

16.03 The TADS Intercept Equipment P92.923.02 will not perform satisfactorily at 100 words per minute at this time due to the difficulty being experienced with the pull-bar contact assembly on the typing reperforator. Development work is now in progress to adapt this equipment for high speed operation.

16.04 The Automatic Two and Three Line Cross-Offices cannot be offered for 100 word per minute operation at this time due to limitations of the No. 14 Reperforator-Transmitter. The Teletype Corporation has scheduled development work to adapt this unit for 100 word per minute operation.

16.05 Operation at this speed imposes certain limitations on TADS equipment. Operation must be automatic activate, two digit station selection with circuit assurance and accelerated search. The priority feature is optional.

HIGH OPERATING SPEEDS TEND TO RAISE EQUIPMENT MAINTENANCE REQUIREMENTS

16.06 Since high operating speed may cause more frequent routining of teletypewriters and typing reperforators, adequate maintenance routines should be set up at points where the 100 word per minute operation is offered. This preparation should be set up sufficiently in advance of in-service dates to ensure that adequate customer protection is assured.

GOOD LINE FACILITIES A MUST FOR HIGH SPEED TELETYPEWRITER TRANSMISSION

"You must have the best facilities for hundred speed!"

16.07 Successful operation of any TAD System is dependent upon good line facilities. Past experience has shown that using marginal facilities may result in a great deal of time and effort being expended before service is satisfactory. The detrimental effect of marginal line facilities is greater at high speeds. Transmission errors which were tolerable to the customer using manual operation will not be tolerated on a high speed automatic system.

16.08 Every effort should be made through plant and engineering channels to ensure that high grade facilities, - both toll and exchange are available and suitable for 100 word per minute operation.

17. EQUIPMENT ARRANGEMENTS - CHARTS

17.01 Equipment Compatibility Chart	P92.911.03 TADS Controller	P92.901.03 Station Sel.	P92.901.04 Station Sel.	P92.923.02 Intercept	P92.940.01 2X0 Cross-Office	P92.902.01 14 TRP Control	P92.902.02 14 TRP Control	P92.903.31 Code Gen.	P92.924.01 Circuit Assurance Skip Keys	Rating
P92.911.03 TADS Controller	Note 4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	STD
P92.901.03 Station Selector	Yes		Note 1 Yes	Note 1 Yes	Note 1&2 Yes	Yes	A&M No	Yes	No	A&M or when manual Xmission required
P92.901.04 Station Selector	Yes	Note 1 Yes		Yes	Yes	A&M No	Yes	Yes	Yes	STD
P92.923.02 Intercept	Yes	Note 1 Yes	Yes		Yes	Yes	Yes	Yes	No	STD
P92.940.01 "2X0" Cross-Office	Yes	Note 1&2 Yes	Yes	Yes		Yes	Yes	Yes	Yes	STD
P92.902.01 14 TRP Control	Yes	Yes	A&M No	Note 1 Yes	Yes			Yes	No	A&M for use with .04 Sel
P92.902.02 14 TRP Control	Yes	A&M No	Yes	Yes	Yes			Yes	Yes	A&M for use with .03 Sta Sel
P92.903.31 Code Generator	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	STD Note 3
P92.924.01 Circuit Assurance Skip Keys	Yes	No	Yes	No	Yes	No	Yes	Yes		STD

NOTES:

1. All transmission must be automatic.
2. 19 TTY at cross-office point must be E/W .04 Station Selector
3. Limited to single digit operation.
4. The P92.911.03 TADS Controller is now rated Standard, replacing the P92.911.02 Controller, rated Mfr. Discontinued.

17. EQUIPMENT ARRANGEMENTS - CHARTS (Cont'd)

17.02 Equipment and Feature Chart	Single-Digit Selection	Two-Digit Selection	Circuit Assurance	Priority	Hand Sending	Automatic Shutoff	Automatic Activate	Open-Close Activate	Manual Control	Delayed Motor Turn-Off	Tabulator Note 3	Suppression Transmitter Start Codes
P92.911.03 TADS Controller Note 4	Yes	Yes	Yes	Yes	Note 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P92.901.03 TTY Selector Unit	Yes	No.	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes
P92.901.04 TTY Selector Unit	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P92.923.02 Intercept	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P92.940.01 "2XO" Cross-Office	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes
P92.902.01 14 TRP Control	Yes	No	No	No	Note 2 Yes	No	No	Yes	Yes	Yes	Note 3 Yes	Yes
P92.902.02 14 TRP Control	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Note 3 Yes	Yes
P92.903.31 Code Generator	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P92.924.01 Circuit Assurance Skip Keys	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NOTES:

1. Hand sending when all stations E/W P92.901.03 Station Selectors.
2. P92.902.01 14 TRP Control now A&M for use with P92.901.04 Station Selector. Must be used with P92.901.03 Station Selector when hand sending is used.
3. Tabulator operation cannot be used with P92.902.01 and P92.902.02 Typing Reperforator Control circuits when 19 type teletypewriters are equipped with function lever contact assemblies.
4. The P92.911.03 TADS Controller is now rated Standard, replacing the P92.911.02 Controller, rated Mfr. Discontinued.