

INSTRUCTIONS FOR INSTALLING THE 179472 MODIFICATION
KIT TO PROVIDE A TRANSMITTER CONTROL DEVICE FOR USE
ON FAA EQUIPMENT

1. GENERAL

a. The 179472 Modification Kit is basically a control relay group which through the related circuitry utilizes the operation of the line relay associated with a printer set to provide open and busy line alarm signals which are represented by corresponding lights mounted on the printer set. The alarm signals are used to prevent automatically the transmission of a message into the line when the line is busy or open, and to indicate when the line is open. Two function box contacts located in the printer set are actuated by sequential line signals to administer start-request intelligence to the relay group. Upon receipt of these signals the relay group permits automatic sending to the line from a transmitter distributor if tape is available at the time, and the signal line is neither in a busy or open condition. As part of the console equipment, control panel mounted non-locking push buttons are provided to afford manual originations of start-request indications when required. The circuit configuration contains a memory provision so that if a request to start is received during a busy line condition, the request will be held in abeyance and acted upon when the line returns to an idle condition.

b. Features required on units to be modified with the (179472) Modification Kit are as follows:

- (1) Open line lamp.
- (2) Busy line lamp.
- (3) Non-locking push buttons for manual control.

c. Relay group to be capable of operation at a nominal of 48 volts D.C. in the following manner:

- (1) Prevent automatic sending into:
 - (a) Open line.
 - (b) Busy line.
- (2) Retain a start-request received during a busy-line condition, and grant the request upon an idle line condition, providing an end of message sequence is not received first.

(3) The relay group should be capable of providing a "start ground" for associated automatic sending equipment when:

- (a) Tape is waiting to be sent.
- (b) Line is neither busy nor open.
- (c) A start-request is received from either a function box contact or a manual push button.

(4) The busy-line and open-line relays must be capable of remaining energized while the unit is receiving continuous letters or blanks at 25% distortion. They must release after a soaked condition within 500MS.

d. The 179472 Modification Kit consists of:

4	150323	Washer, Flat	4	160389	Screw
4	151819	Strap, Wire	1	179955	Control Assembly
1	160365	Strap, Wire	1	3463WD	Diagram, Wiring
			1	3464WD	Diagram, Wiring

e. One of the following relay group cables (ordered separately) is used with the 179472 Modification Kit. The required cable is included with cabinet LBAC235.

179435 Cable for Model 28 Set VSL248, VSL249
179448 Cable for Model 28 Set VSL245
160336 Cable for Cabinet LAAC or LAC

f. For part numbers referred to and for parts ordering information see Teletype Model 28 Parts Bulletin 1149B or 1169B.

2. THEORY OF OPERATION (Refer to Wiring Diagram 3463WD)

a. Standby Condition of Circuit

(1) In the standby or normal resting conditions of the circuit when no signals are being received the line relay is operated to MARK causing the selector magnets to be held closed and the open-line relay (OL) to be operated.

(2) With no tape awaiting transmission in the transmitter distributor the tight tape contacts will be closed while the tape out contacts are open. (The Transmitter Distributor Unit may be either a Model 28 or a Model 14 Transmitter Distributor).

b. Busy-Line Condition of Circuit

(1) The busy-line relay (BL) has a slow release characteristic provided by the diode which shunts the coil. It has a release delay of approximately 120MS which keeps the relay energized as long as there is a spacing pulse received at least every 100MS.

Under normal tape transmissions this relay is continuously energized. During keyboard transmission it will release on any pause over 120MS.

(2) BL contacts (4-5) provide 5.5 V.A.C. for the busy line lamp whenever the relay is energized. The 22 OHM, 1 WATT Resistor in series with the busy-line lamp is to reduce the brilliance of the lamp (ASR set) if required by customer. (Resistor must be strapped in KSR or RO set).

(3) BL contacts (1-2) break the current path for the start relay so that it could never energize until the signal line is in an idle condition.

c. Open-Line Conditions of Circuit

(1) The open-line relay (OL) has the same characteristics as the BL relay except that it operates when the line relay is in the mark condition. An open line in excess of 120MS will release this relay.

(2) When the OL Relay releases:

(a) The OL contacts (1-2-3) remove 5.5 V.A.C. from the BL lamp circuit and transfer it to the OL circuit which flashes the OL lamp. It flashes due to a thermal flasher in series with the OL lamp.

(b) OL contacts (4-5) break the current path for the RS and the ST Relays. Whenever an open line condition exists, RS and ST will not operate or if operated, they will release.

d. Transmitter Distributor Sending

(1) The origination of an automatic Transmitter Distributor sending cycle is considered to be at the time the attendant places tape in the tape gate of the desired Transmitter Distributor. At this time the tape-out contacts close and provide battery for relays RS and ST.

(2) At this time a request to start signal is required and may be furnished from:

(a) Manual start push button (if during an uncontrolled portion of the circuit operation).

(b) Function box contact (10) (if during a scan controlled portion of the circuits operation).

(3) The request to start signal operates relay RS with current flowing from negative 48 volts through the tape-out switch, tight-tape switch, stop switch OL contacts (4-5), RS Relay, and then through manual start switch or function box contacts (10) and (8) to positive 48V.

(4) Relay RS Operated:

(a) Holds itself operated through RS (1-2) and function box contact (8).

(b) RS (3-4) provides a current path for start relay when BL contacts (1-2) are closed. (Line is idle).

(5) Relay ST operates with current flowing from negative battery through tape-out switch, tight-tape switch, stop switch, OL contacts (4-5), start relay, BL contacts (1-2), RS contacts (3-4) to positive battery.

(6) Relay ST operated:

(a) Holds itself operated through contacts (4R-6R).

(b) ST contacts (2L-3L) provide a current path for the DC control relay so that the printer will shift into the print case, thereby, providing a copy of its own transmission.

(c) ST contacts (4L-5L) provide current path for the sensing clutch magnet to start transmission from the Transmitter Distributor.

(7) Upon completion of tape transmission, the trailing end of the tape opens the tape-out contacts which removes battery from the RS and ST Relays. The circuit returns to the standby condition.

(8) The operator's selection of the manual stop-push button will also remove battery from RS and ST with the same result as described in the above paragraph (7).

3. INSTALLATION (Figure 1)

a. Mount the transmitter control on the mounting rack using the four 160389 Screws, and 150323 Flat Washers.

b. Connect the terminal ends of the cable to the cabinet terminal strips in accordance with wiring diagrams 3463WD and 3464WD.

CAUTION: Due to the presence of two diodes shunting the OL and BL Relay, caution must be observed to prevent damage to these diodes. Insure the M-1 Lead goes to positive 120 VDC and M-3 and M-4 Leads (through the line relay contacts) go to negative 120 VDC.

c. Fasten the 160365 Wire Strap to the metal cover ground screw and cabinet ground screw.

d. Use the four 151819 Wire Straps on the terminal block where necessary.

4. ADJUSTMENTS (Figure 2)

a. Use a contact burnishing tool on the relay contacts. Make certain that the adjustments are not disturbed.

b. Adjust the 160358 Relay Cover for a snug fit by bending the spring like projection on each of the four 160411 Cover Brackets.

c. Bend the 160361 Mounting Clip to insure a firm fit when the 160363 Capacitor is slipped into place.

d. To insure a good mechanical and electrical connection of the 160332 Thermal Flasher, adjust the 160357 Spring Clip by bending.

e. Adjust the selector armature spring for optimum performance.

f. For adjustment of the relays, see Figure Numbers 1A, 1B, and 1C. However, these relays are factory adjusted; and it is rather difficult to obtain optimum performance without the use of special gauges and test equipment employed by specially trained and highly skilled personnel. Rather than attempt any relay adjustments, it would prove more feasible to replace the faulty relay in order to guarantee future trouble-free performance.

g. The OL and BL Relays with their shunting diodes must meet the following requirements: (105 V.D.C.)

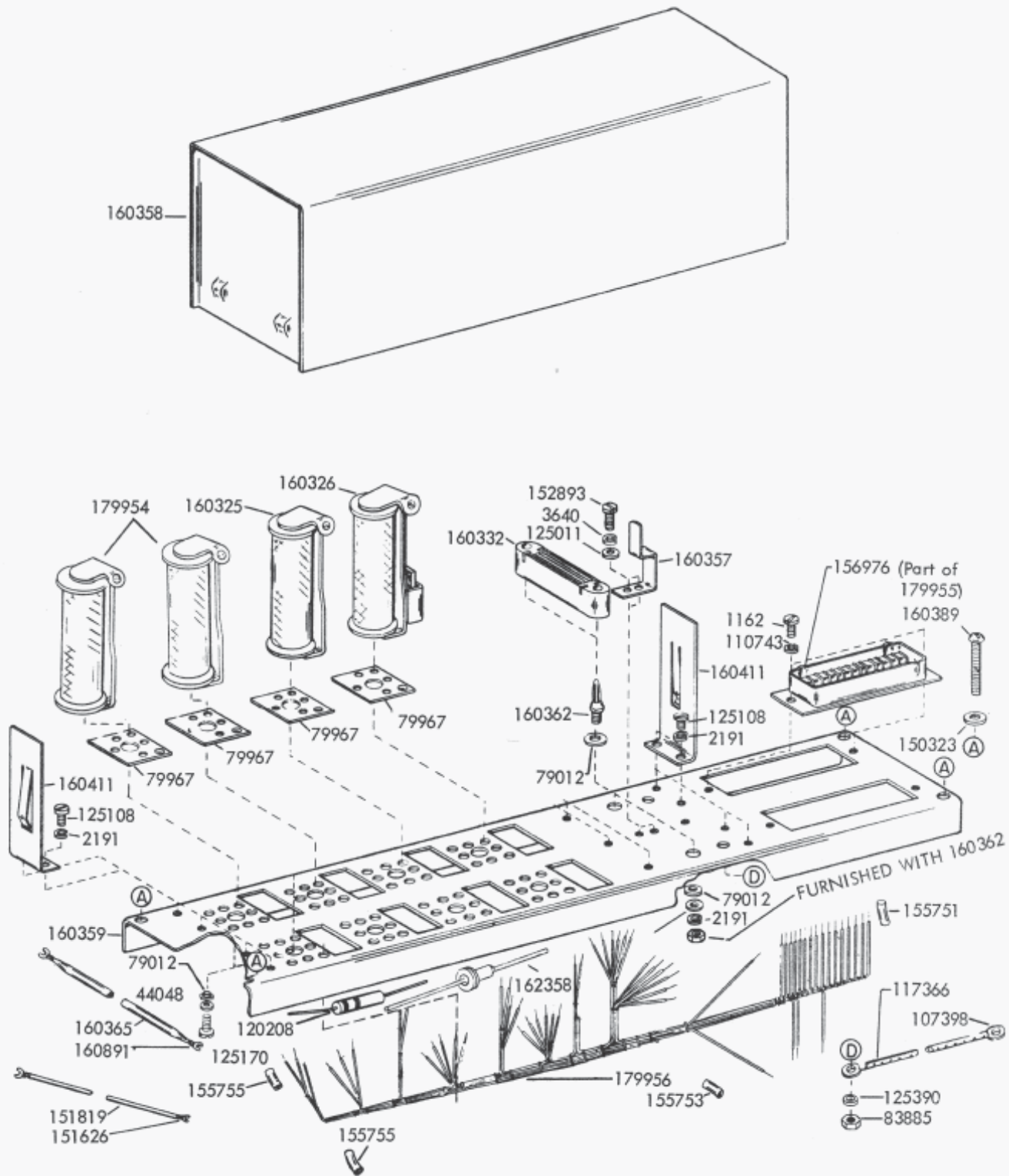
(1) Relay must hold solidly while receiving an 8 MS pulse every 100 MS.

(2) After a 2 min. soak, the relay must de-energize within 350 MS.

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Part Number	Relay	Figure No.	Contacts-18 Gauge, 135 Watts, 3 amps. (Non-Inductive)	VDC Nominal Voltage 60 MA	Residual Disc	Turns	E. C. Wire Size	Stroke	Coil (s) Ohms D. C. Resistance	Test for (Current Values in Amps)				Class "B" Relay Type
										Operate		Not to Operate		
										Readjust	Test	Readjust	Test	
160325	RS	2A	X	48	.003"	34600	38	.014"	4000	.00301	.00324	.00254	.00231	57AL
160326	ST	2B	X	48	.003"	28600	38	.026"	3000	.00682	.00735	.00577	.00525	57AL
179954	BL OL	2C	X	120		23800	37	.036"		.0052	.0053	.0049	.0048	57AS

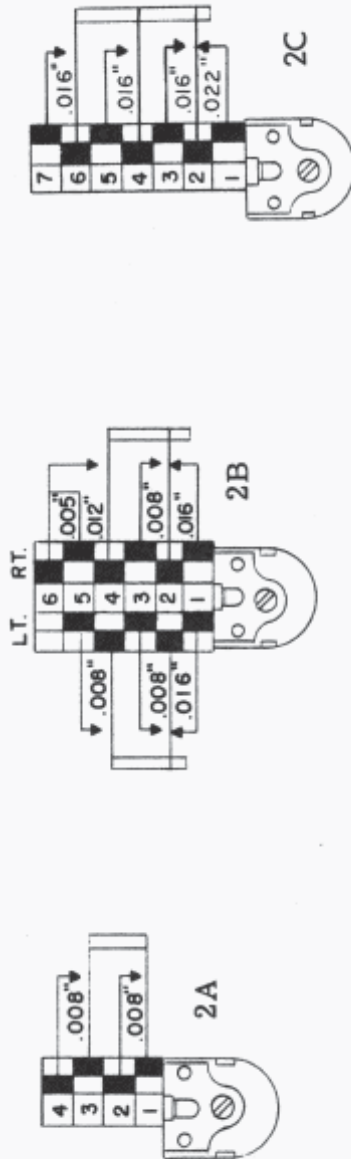


FIGURE 2. (Bottom View)