

EIA DATA TERMINAL SWITCH ASSEMBLY  
DESCRIPTION AND PRINCIPLES OF OPERATION

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1.03 Original design application for the switch assembly interconnects a DATASPEED 40 Receive-Only Printer (ROP), a DATASPEED 40 Keyboard Display (KD), a DATASPEED 4210 Magnetic Tape (MT) Terminal with an auxiliary terminal, and a 202 series Data Set (DS).

1.04 Other data equipment may be interconnected with the switch assembly, but interface arrangements must be resolved before the switch assembly is connected to any terminal. This is particularly important due to design features built into the circuitry. (See Table B.) Fig. 2 illustrates one practical switch application.

1.05 Operating instructions for compatible equipment (connected to switch assembly) are not covered in this section. Information for this equipment should be contained in literature covering the compatible equipment; or, information may be furnished by the user to cover his particular equipment arrangement.

1.06 Operating mode one allows one local terminal-to-terminal connection. All other mode connections are terminal to data set (line connector to local connector). This arrangement allows data to be loaded into or unloaded out of a 4210 MT Terminal through an auxiliary terminal, while the DATASPEED 40 KD is in a conversational mode with the 202S Data Set.

1. GENERAL

1.01 The DATASPEED EIA (Electronic Industries Association) switch assembly (TP345630) provides a method of interconnecting five data terminals (EIA type) into three operating modes. Marginal arrows are used to indicate changes and additions.

1.02 Each mode is established by operating one of the three pushbuttons (Fig. 1). Signal and control interface leads are connected to the required receptacles (P1 through J7) through banks of slide transfer switches which are activated by the pushbuttons. No signal limiting or modification takes place in the switch assembly.

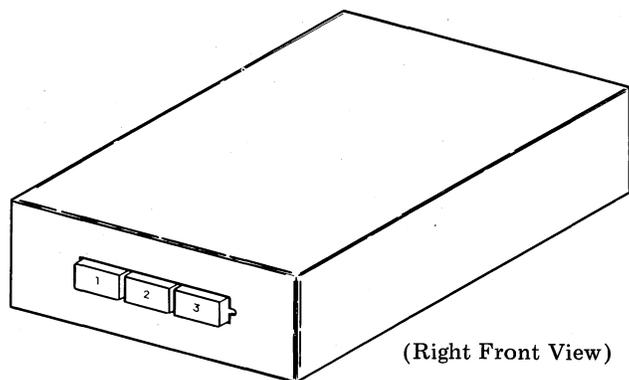


Fig. 1—EIA Switch Assembly

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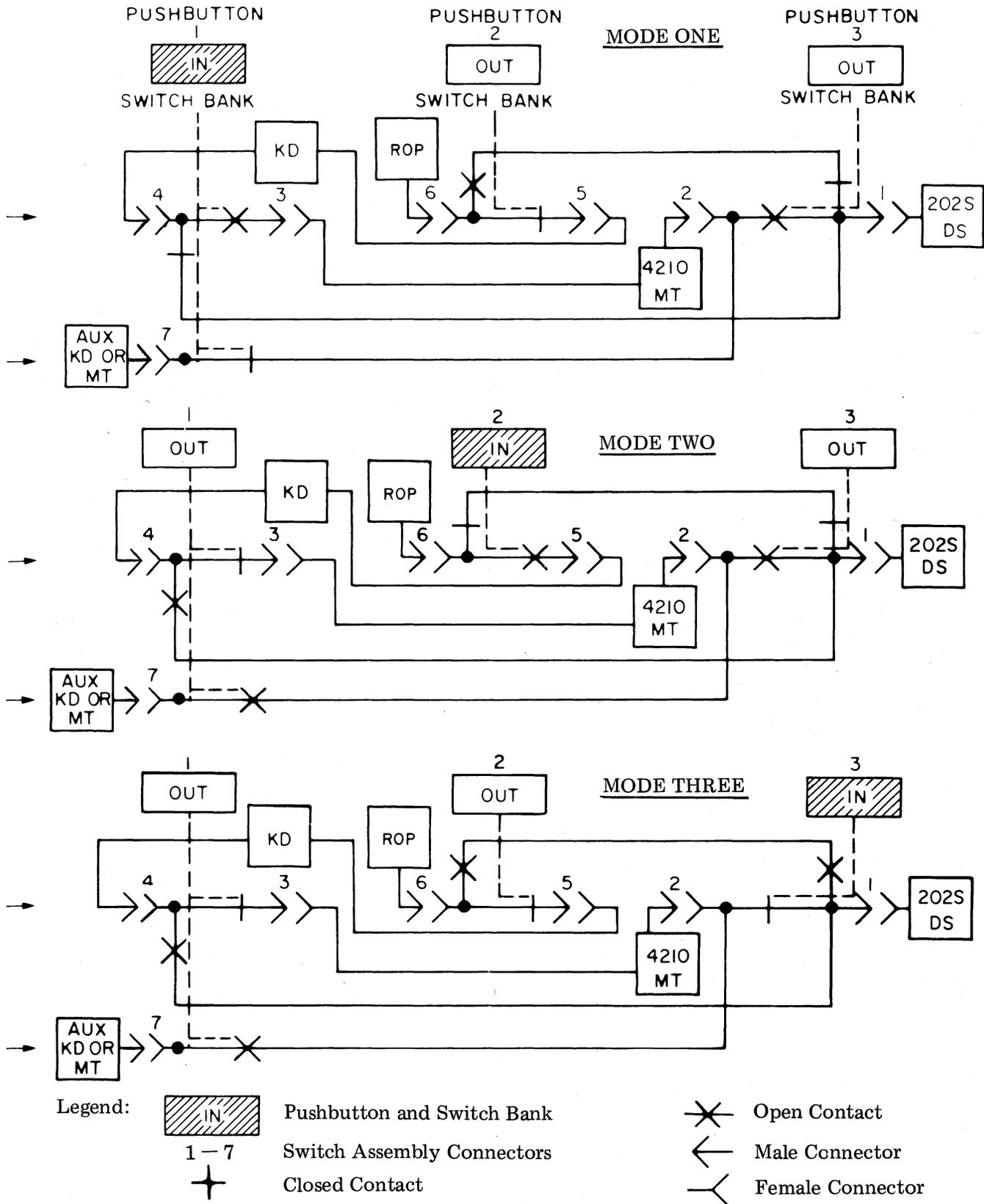


Fig. 2—Basic Switch Configuration With Three Interconnecting Modes

1.07 Mode switching during on-line operation is possible, but not recommended. Full operating details may be found in Part 3 of this section, Principles of Operation. The switch assembly was designed for table-top mounting and will fit under a desk phone or 202S Data Set, but may be mounted in any desired position. If the switch assembly is mounted on a table top or cabinet (not attached physically), it may be necessary to hold the switch assembly with one hand while depressing a pushbutton with the other hand, to prevent the assembly from being moved rearward from its location.

2. DESCRIPTION

2.01 The DATASPEED EIA switch assembly consists of interlocking slide switches mounted between two circuit cards. All interconnections between switches are made through the circuit cards. The circuit card terminals connect to connectors that are wired to the EIA receptacles on the back of the switch assembly. (Refer to Fig. 3.)

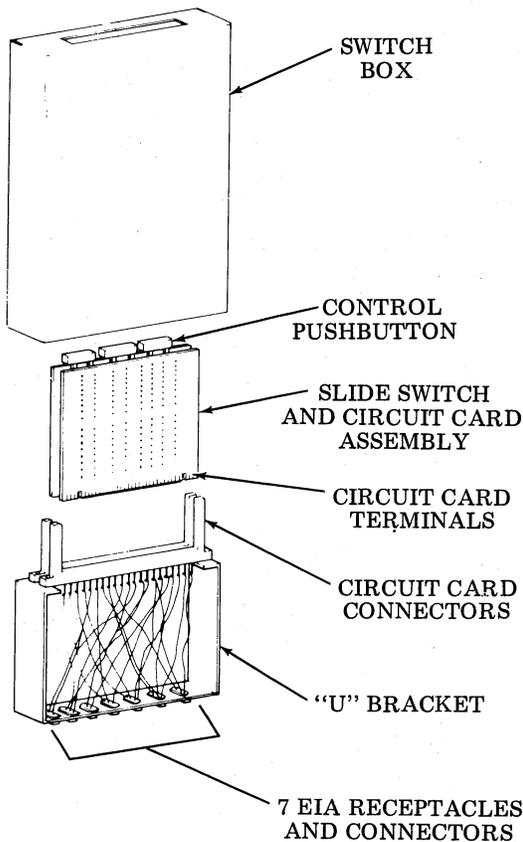


Fig. 3—Component Configuration

2.02 The switch assembly consists of four switch sections, each section comprised of 12 transfer-type switches. Three pushbuttons activate the switch sections (Fig. 4). Pushbuttons 2 and 3 operate one switch section each (with two spare sets of contacts for each section). Pushbutton 1 operates two switch sections (with two spare sets of contact — one set for each section). These spare contacts may be used for locally engineered applications (refer to Fig. 4 for illustrated details).

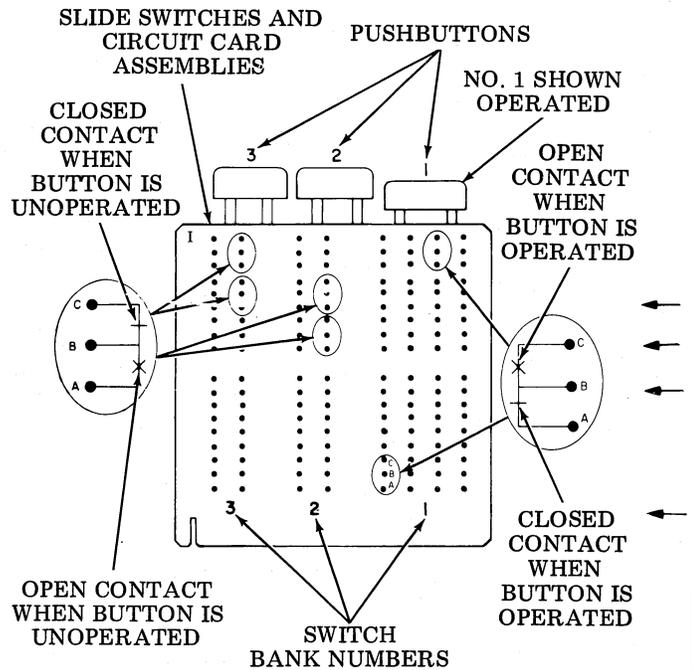


Fig. 4—Spare Switch Contacts

2.03 A pushbutton interlocking feature provides that when operating one pushbutton another will be released. Either of the two buttons that had previously been operated will be released by the depressed button. There is no lockout feature preventing two buttons from being operated at the same time; this would cause an invalid condition.

2.04 The switch assembly is contained in a rectangular metal box (see Fig. 7 for dimensions). The rear plate of the box (which includes the EIA receptacles and connectors — Fig. 5) is formed by the bottom of the "U" bracket, two 36-pin circuit card connectors are mounted to the top of the bracket (Fig. 3). Wiring from the card connectors goes to the seven EIA receptacles and connectors mounted in the bottom of the "U" bracket.

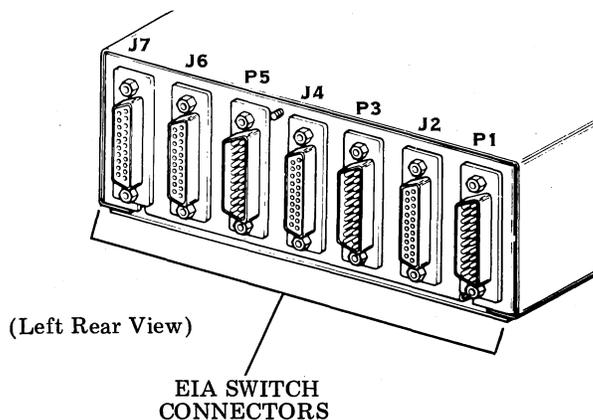


Fig. 5—Switch Assembly Connectors

- 2.05 The switch and circuit card assembly plugs into the circuit card connectors and the complete assembly slides into the box (Fig. 3). The bottom plate (with four rubber feet) is then placed on the box and attached with six sheet metal screws and two tapped-in screws to secure the "U" bracket in place, as shown in Fig. 6.

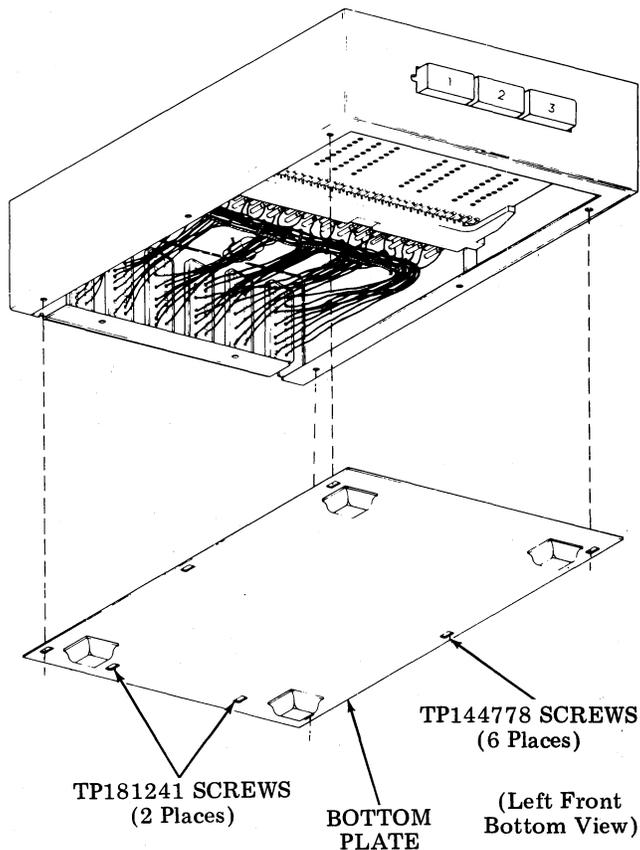


Fig. 6—Switch Assembly With Bottom Plate

- 2.06 The pushbuttons are identified 1, 2, and 3 from left to right (Fig. 1). A label may be attached to the switch assembly to indicate the significance of the three switches in relation to the station equipment.

2.07 Interface cables (EIA) from station equipment are plugged into the switch connectors mounted on the rear of the switch assembly (Fig. 5). One 7-foot interconnecting cable (TP341896) is shipped with the switch assembly for connecting to a data set. Refer to Section 582-001-200 for complete installation information.

### 3. PRINCIPLES OF OPERATION

- 3.01 The DATASPEED EIA switch assembly changes station operating modes without interchanging station equipment cables. The following information shows how the switches connect DATASPEED station equipment in the three operating modes (shown in Fig. 2 and 9).

#### Mode One

- 3.02 With pushbutton one depressed, the following EIA connectors are interconnected through closed contacts in switch banks 1, 3, and 2 (see Fig. 4).

*Note:* Refer to Table B for connections between 2 and 7.

- 3.03 The DATASPEED 40 ROP is connected to the printer connector of the KD through switch connectors 6 and 5 (connectors on switch assembly) and the normally closed contacts in switch bank associated with pushbutton number 2.

3.04 The DATASPEED 40 KD line connector connects to a 202 Data Set through connectors 4 and 1 and switch bank 1. The KD is in conversational mode with the data set, and copy may be monitored on the ROP.

3.05 While operations in the preceding paragraph are taking place, the 4210 Magnetic Tape line connector is connected to an auxiliary terminal (another KD or MT) through connectors 2 and 7 (Table B) and switch bank 1. Data may be loaded in and unloaded out of the MT at this time.

Mode Two

3.06 When pushbutton 2 is depressed (pushbutton 1 or 3 is released depending on the mode used previously), the following EIA connectors are interconnected through closed contacts in the switch banks.

3.07 In this mode, the KD is connected to MT for local operation through connectors 3 and 4 (switch bank 1) to permit preparation of messages on the KD that may be accumulated in the MT terminal.

3.08 During this time, the ROP may receive on-line from the data set through connectors 1 and 6 and switch banks 3 and 2.

Mode Three

3.09 When pushbutton 3 is depressed the following EIA connectors are interconnected through closed contacts in the switch banks.

3.10 In this mode, the DATASPEED 40 ROP connects to the KD printer connector, the KD line connector connects to MT interface connector, and the MT line connector connects to the 202 Data Set. These connections are accomplished through switch banks 1, 2, and 3 and connectors 1 through 6.

3.11 This mode (three) features 4210 MT automatic answering, which allows multiple messages to be sent or received on-line. If the

MT terminal is equipped with auto-rewind feature, on-line messages may be automatically transferred to the display or printer.

EIA Lead Connections

3.12 The EIA lead connections shown in Table A are between the connectors previously mentioned in modes one, two, and three, except for connectors 7 and 2 which are listed in Table B.

TABLE A  
EIA CONNECTIONS

PIN NO. TO PIN NO.	CIRCUIT DESCRIPTION
2	Transmitted Data
3	Receive Data
4	Request to Send (RTS)
5	Clear to Send (CTS)
6	Data Set Ready (DSR)
8	Data Carrier Detect (DCD)
11 & 19	Reverse Channel Send (RCS)
12	Reverse Channel Receive (RCR)
20	Data Terminal Ready (DTR)
22	Ring Indicator
*23	Character Control

\*Note: Special non-EIA on pin 23 between switch connectors 3 and 4 allows a TELETYPE® Standard Serial Interface (SSI) to be used and supplies character control between a KDP and MT operation.

TABLE B  
TERMINAL TO TERMINAL CONNECTIONS

CONNECTOR 2 PIN NO.	CONNECTOR 7 PIN NO.	CIRCUIT DESCRIPTION
8 6 20	8 6 20	Data Carrier Detect Data Set Ready Data Terminal Ready
4 5	4 5	Request to Send Clear to Send
19 11 12 2 3 22	19 11 12 2 3 22	Reverse Channel Send Reverse Channel Receive Transmitted Data Received Data Ring Indicator

Note: Station equipment signal grounds (pin 7) which are tied together, and frame grounds (pin 1) which are tied together in all 7 receptacles are at different levels and kept separate.

Terminal To Terminal

3.13 The connections shown in Table B for mode one switch arrangement provides terminal-to-terminal back-to-back operation through switch connector receptacles 2 and 7. When a DATASPEED 40 ROP is connected to switch assembly connector 7, the operator must depress pushbutton 1 (mode one) to turn on the printer motor. Pushbuttons 2 or 3 (modes two or three) when operated, turn off the printer motor.

→ 3.14 The DTR signal lead in receptacle 1 (pin 20) has an integrating 10 mfd capacitor to provide mode switching to receptacle 2, 4, or 6, during on-line operation, although, this mode of operation is not recommended. Even with the DTR signal integrated, mode switching completion depends on speed and skill of the operator when operating the pushbuttons. The data set must be plugged into receptacle 1. Fig. 9 through → 12 show practical station arrangements using the switch assembly.

4. TECHNICAL DATA

Physical Characteristics

4.01 The switch assembly which includes two circuit cards, three pushbutton switch assemblies, factory wiring from circuit card connectors to receptacles, and a metal box enclosure weighs approximately 3 pounds. Switch assembly dimensions are shown in Fig. 7.

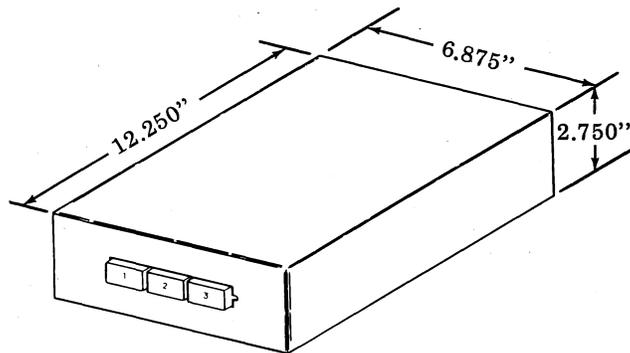


Fig. 7—DATASPEED EIA Switch Assembly Dimensions

Operating Environment

4.02 Temperature requirements are as follows:

Storage Temperature . . . -40°F to +150°F.

*Caution: This equipment is intended to be operated in a room environment within the temperature range of 40°F to 110°F. Serious damage to it could result if this range is*

*exceeded. In this connection, particular caution should be exercised in using acoustical or other enclosures.*

Humidity Range . . . . . 2% to 95%  
(noncondensing).

Reference Drawings

4.03 Refer to the following drawings for additional information:

- Wiring Information — 9553WD
- Assembly Information — TP345636
- Schematic Drawing — 1287SD

5. DISASSEMBLY AND REASSEMBLY

5.01 The disassembly or reassembly procedure is straight forward and involves only the use of a screwdriver. Major components are shown in Fig. 8. The slide switch and circuit card assembly is removed and replaced as a unit. If possible, replacement of the assembly is advised if any part need repair.

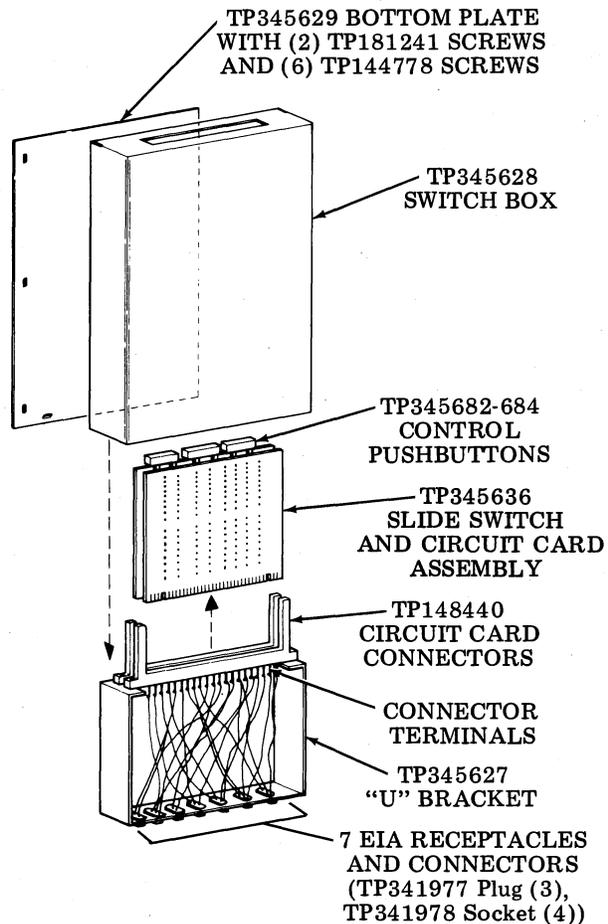


Fig. 8—Switch Assembly Components

5.02 Disassembly procedures cover only sub-assemblies that may be removed and replaced for correcting troubles in field locations. The switch assembly should be disassembled and reassembled under clean conditions; oil, grease, and dust should not come in contact with circuit cards, cables, and connectors.

5.03 Do not force or pry parts to provide the necessary clearance for removal. Forcing is not required to remove any subassembly or part. Follow the removal procedure to be sure that reassembly will be accomplished properly. Reverse disassembly procedure for reassembly, except, where different instructions are given.

5.04 Due to the various mounting applications of the switch assembly, dismantling the switch assembly from the equipment is left up to the ingenuity of the person working on the equipment.

#### Disassembly Procedure

5.05 Remove the eight mounting screws securing the bottom plate (Fig. 6) to the switch box. The switch assembly may then be removed from the receptacle end by sliding the assembly away from the box (Fig. 8).

5.06 The circuit card and pushbutton switch assembly may be separated from the unit by grasping the circuit card assembly at the pushbutton end with one hand and grasping the "U" bracket at the EIA receptacle end with the other hand and pulling the circuit card assembly out of the circuit card connectors.

5.07 Switches and circuit cards may be ordered from the factory as a preassembled unit. Do not attempt to disassemble and repair circuit cards and switches in field locations.

5.08 Circuit card connectors should not be removed in the field. If card connectors or EIA receptacles or connectors are damaged, the switch assembly should be sent to a WE Repair Center and replaced with a new switch assembly.

## 6. STATION ARRANGEMENTS

6.01 The system may be designed to use substitute terminal equipment or modify the station arrangements within the limits of the switch assembly. Some typical station arrangements using the EIA switch with a DATASPEED 40 KD, KDP, ROP, and/or DATASPEED Magnetic Tape Terminal with an auxiliary terminal are shown in Fig. 9, 10, 11, and 12 and provide

three interconnecting modes by the switch assembly. Table C provides the interconnections of EIA connectors in each mode. (Card 13 of MT must be issue 8A or higher and KD must be optioned EIA to printer.)

TABLE C

EIA INTERCONNECTIONS IN EACH MODE

SWITCH MODE (OPERATED)	EIA CONNECTORS (INTERCONNECTED)
1	6 to 5 4 to 1 7 to 2
2	6 to 1 4 to 3
3	6 to 5 4 to 3 2 to 1

6.02 Mode one provides DATASPEED 40 KD and ROP arrangement coupled to the DS (Fig. 9). This mode also provides interconnections between MT and an auxiliary terminal through connectors 2 and 7 (Table B) and modifies the auxiliary terminal interface to look like a data set. This condition enables bi-directional (terminal-to-terminal) signaling.

6.03 Mode two connects the ROP to the DS, and the KD to the MT to permit preparation of messages on the KD that may be accumulated on the MT.

6.04 Mode three connects the ROP and KD to MT which is connected directly to the DS. This configuration allows the station to batch data on-line through the MT. If the MT is equipped with an auto-rewind feature, messages from the line can be automatically transferred to the display or printer. (See Fig. 2 and 9.)

### 4210 MAGNETIC TAPE TERMINAL WITH "DATASPEED" 40 KDP

6.05 The DATASPEED 40 Keyboard Display Printer (KDP) used with 4210 MT Terminal is shown in diagram form in Fig. 10. Mode one provides a KDP connection to the data set and the data set connector of the MT connected to an optional auxiliary terminal with interface connections arranged for bi-directional data transfer.

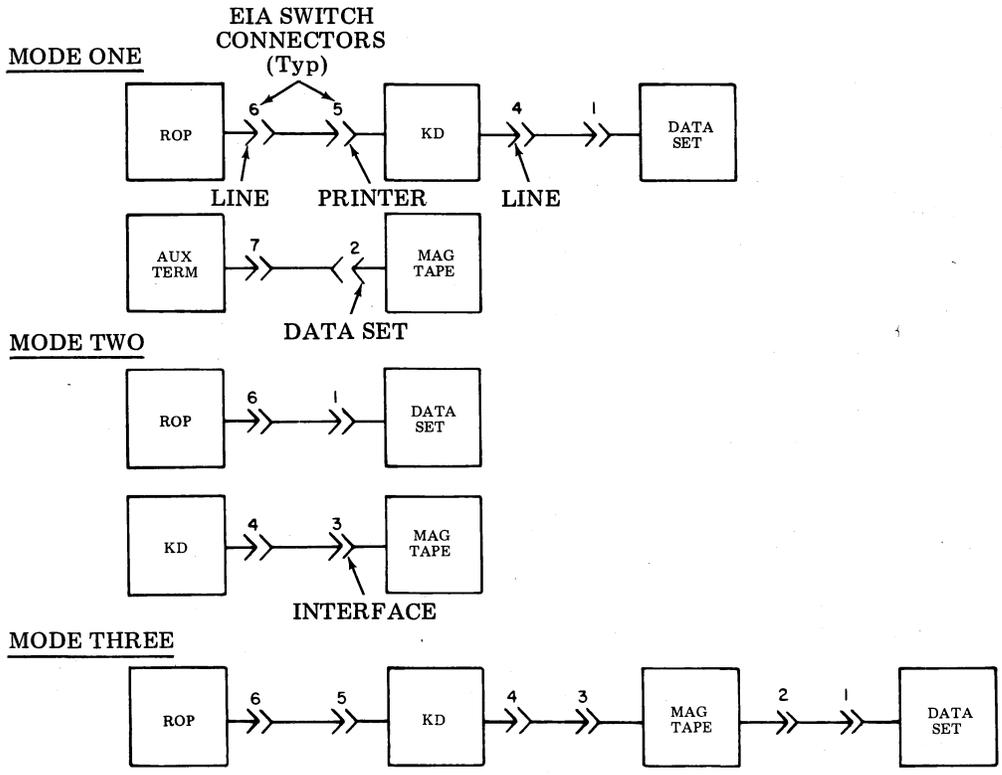


Fig. 9—Magnetic Tape Terminal With DATASPEED 40 KD and ROP With Optional Auxiliary Terminal

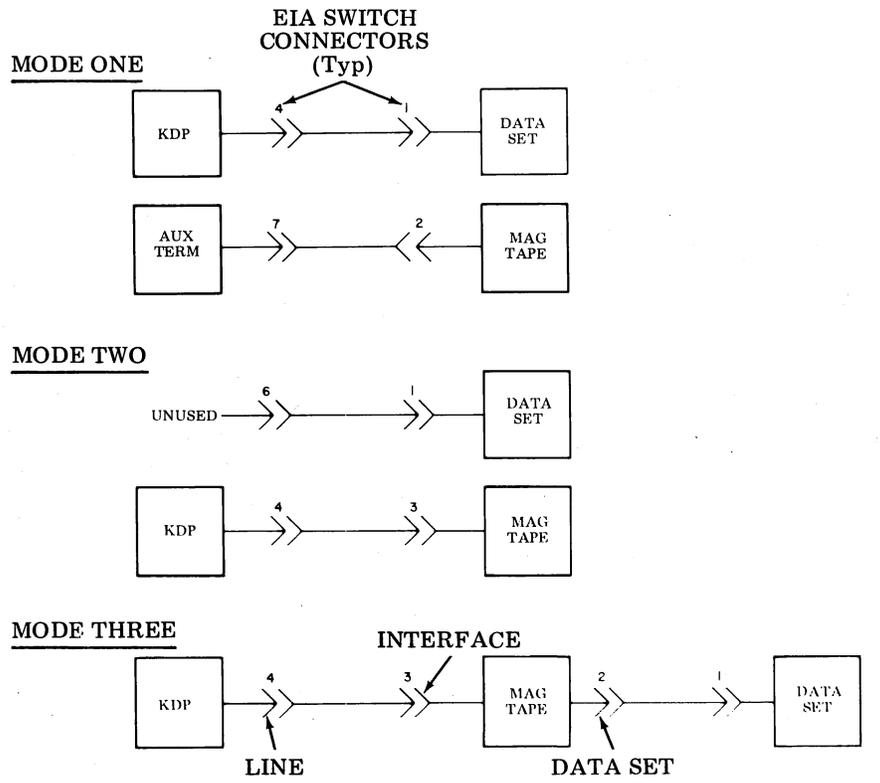


Fig. 10—Magnetic Tape Terminal With DATASPEED 40 KDP

6.06 In mode two, the KDP accumulates messages in the MT terminal or retrieves previously stored messages. The data set is not used in this mode. Any DATASPEED terminal, or equivalent, could be added to the station configuration to be used in this mode.

6.07 Mode three uses the 4210 MT between the KDP and DS. The messages may be prepared on the KDP and stored on the MT and released for batch transmission. If the MT is equipped with an auto-rewind feature, on-line messages received may be automatically transferred to the display or printer.

6.08 If printed copy is not required, a KD may be substituted for the KDP. The KDP should be assigned to switch assembly connector 4, and the interface connector on the MT to switch connector 3 (Fig. 10).

6.09 Switch connectors 3 and 4 provide the additional interface connection on pin 23 (Table A) required for KDP control of the MT. This control feature allows the MT to act as a line buffer for the printer, and eliminates the need for

line length formatting and preventing data stacking.

4210 MAGNETIC TAPE TERMINAL WITH "DATASPEED" 40 AND MODEL 33 OR 35 RO PRINTER

6.10 Mode one permits an optional auxiliary terminal to transfer data to and from the KD which can deliver data to the MT. The DS is not used in this mode (Fig. 11). Any DATA-SPEED terminal could be connected to switch assembly connector 4 for on-line operations in this mode.

6.11 Mode two connects the MT to the DS for either sending or receiving data. The KD is not used in this mode.

6.12 In mode three, the KD is connected between MT and the DS. The KD can send or receive on-line and transfer data to the MT through the PRINT LOCAL or PRINT ON-LINE function keys. In all three modes, the MT can be put into operation permitting transfer of data to the Model 33 or 35 RO Printer.

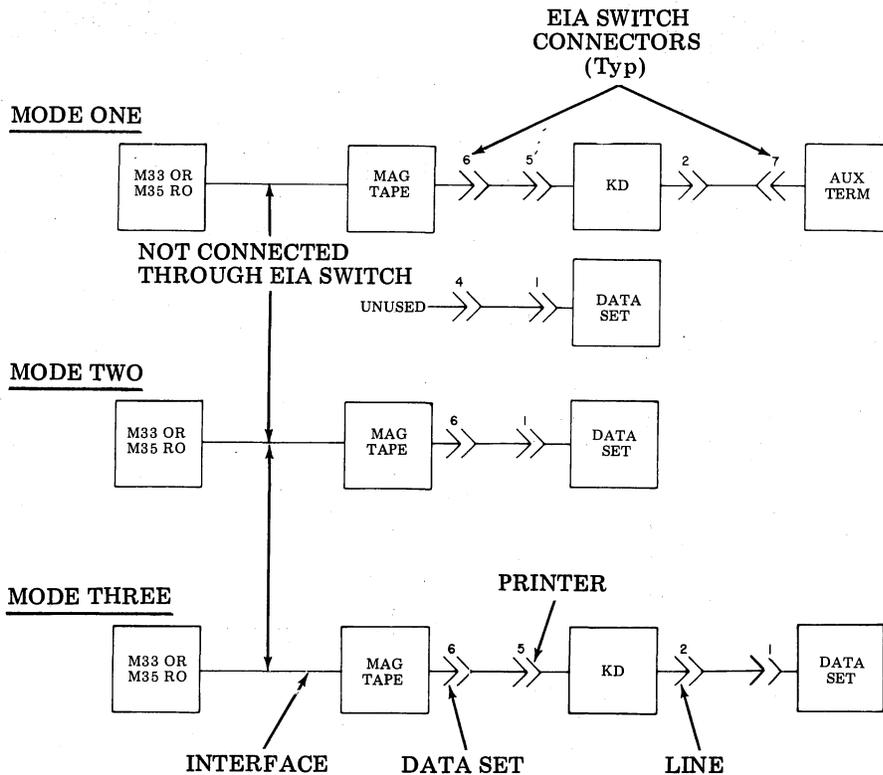


Fig. 11—Magnetic Tape Terminal With DATASPEED 40 KD and Model 33 or 35 RO Printer

4210 MAGNETIC TAPE TERMINAL WITH MODEL 33 OR 35 RO PRINTER

6.13 With an optionally purchased TP343762 jumper cable connected to switch assembly connectors 5 and 7, the two MT terminals are connected back-to-back sharing one DS as shown in Fig. 12. A Model 33 or 35 RO is connected directly to the interface connector of each MT.

6.14 Mode one permits the transfer of data between two MT terminals. The DS is not used in this mode. Any DATASPEED terminal, or equivalent, may be connected to switch assembly connector 4 for on-line operation.

6.15 Mode two interconnects MT terminal no. 1 to the DS for on-line data sending and receiving. MT terminal no. 2 is not connected to either device through the switch assembly.

6.16 Mode three interconnects MT terminal no. 2 to the DS. Magnetic tape terminal no. 1 is not connected to any other device. MT terminal no. 1 can be put into a mode permitting transfer of data to a Model 33 or 35 RO Printer.

*Note:* Optional biasing of the ring indicator lead is necessary for use with two MT terminals in a back-to-back mode of operation. A 2.7K ohm resistor has been factory wired between connector 5, pin 22, and connector 6, pin 25, but -12 volts must be provided at connector 6, pin 25 for the ring indicator lead to be properly biased. This is done by connecting a TP344373 strap between connector J112, pin A12, and XZ13, pin B33 on MT terminal no. 1.

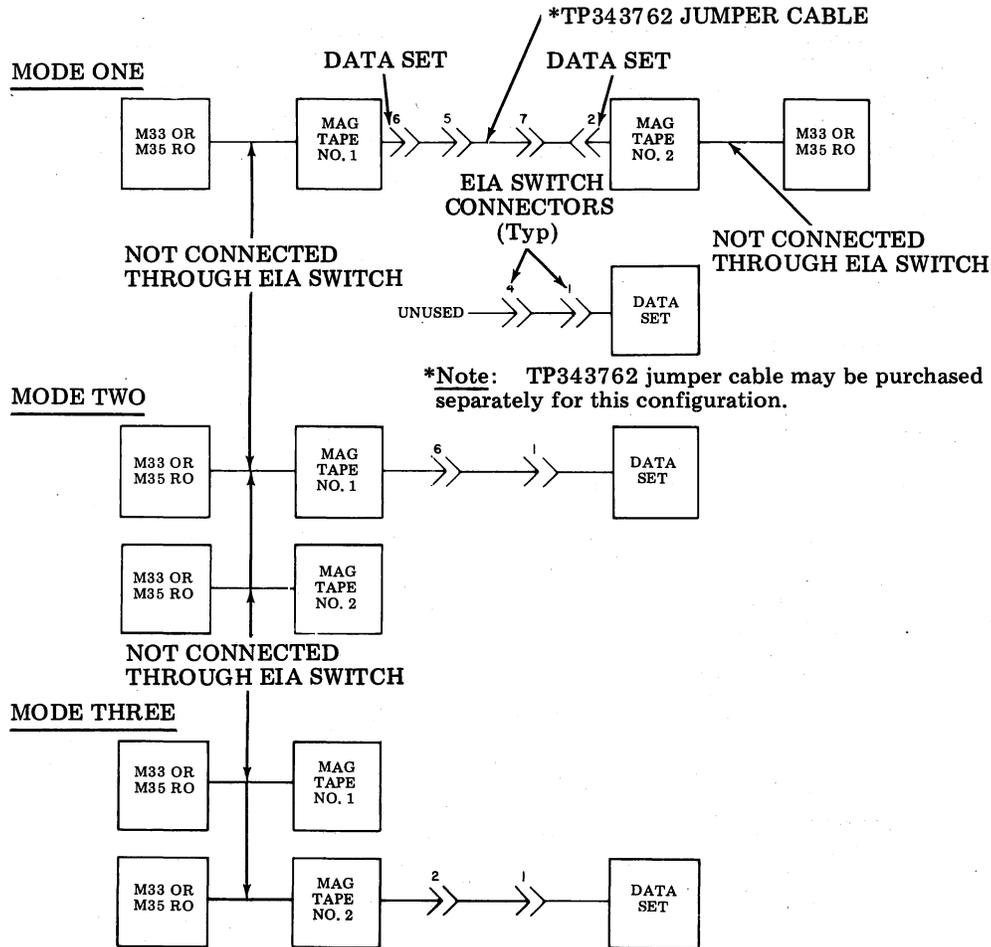


Fig. 12—Magnetic Tape Terminal and Model 33 or 35 RO Printers