33 AND 35 TELETYPEWRITER SETS

FOR

EIA AND DIRECT NEUTRAL INTERFACE

DESCRIPTION

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1. GENERAL

1.01 This section describes 33 and 35 teletypewriter sets used in DATREX*, DATA-PHONE®, and PRIVATE LINE services. This section also describes the interface hardware which allows a number of data facilities to interconnect with the teletypewriter sets for the various services. It is reissued to include information for the private line modification kit, and recent engineering changes. Because the changes are extensive, arrows in the margins (to indicate changes) have been omitted.

1.02 The following references provide additional descriptive information on the sets:

33 sets — Section 574-100-101
35 ASR sets — Section 574-202-100
35 KSR, RO sets — Section 574-201-100

2. TECHNICAL DATA

33 TELETYPEWRITER SETS

2.01 Speed: 100 words per minute (110 bauds), 600 operations per minute.

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Prepared for American Telephone and Telegraph Company by Teletype Corporation

2.02 Transmission Code: 8-level start-stop signals with 11-unit transmission pattern.

2.03 Dimensions and Weight (approximate)

(a) ASR

Width	22 inches
Depth	18-1/2 inches
Height	8-3/8 inches
Weight	44 pounds

(b) KSR

Width	18-5/8 inches
Depth	18-1/2 inches
Height	8-3/8 inches
Weight	40 pounds

(c) RO

Width	18-5/8 inches
Depth	18-1/2 inches
Height	8-3/8 inches
Weight	39 pounds

(d) Stand

Width	17-3/4 inches
Height	24-1/2 inches
Depth at top of enclosure	8 inches
Depth at bottom of enclosure	6-1/2 inches
Length of feet	17-3/4 inches
Weight	12 pounds

2.04 Electrical

Power requirements	115 volts ac + 10% 60 Hz ± 0.45, single phase
Signal line current	0.020 ampere
Nominal input to selector	0.500 ampere at 20 volts dc

2.05 Printing and Paper or Form Handling

(a) Feed

Friction or sprocket	Six lines per inch, adjustable for single or double line feed

(b) Paper or Form

Friction feed	8-1/2 inches wide, maximum 5-inch diameter roll
Sprocket feed	8-1/2 inches wide, 7-, 8-1/2, 9-, 10-, 11-, and 12-inch form lengths or multiples of 1/3 or 1/2 thereof

(c) Characters and Line

Friction feed	10 characters per inch, maximum 74 character line
Sprocket feed	10 characters per inch, maximum 72 character line

(d) Legible Copies

Friction feed	Original and one copy
Sprocket feed	Original and two copies

2.06 Motor

Type	Synchronous
Input	115 volts ac ± 10%, 60 Hz ± 0.45 Hz, single phase
Input current	2 amperes
Output	33 millihorsepower
Speed	3600 rpm
Temperature rating	130° C max
Power factor	0.40

2.07 Tape Reader (ASR set)

(a) Dimensions and Weight (approximate)

Feeding and Sensing Portion

Width	3-1/2 inches
Depth	4 inches
Height	3-1/2 inches
Weight	2 pounds

Power Pack

Width	6-1/4 inches
Depth	2-1/2 inches
Height	2-3/4 inches
Weight	1 pound

(b) Power Pack — Electrical

High Voltage

Input . . . . . 48 volts ac
Output . . . . . 32 ±8 v dc

Low Voltage (for automatic reader control)

Input . . 115 volts ac ± 10%, 60 Hz ± 0.45 Hz, single phase
Output . . . . . 24 volts dc at 1.8 amps
Heat dissipation . . . . . 17 watts with tape reader operating

CAUTION: HIGH VOLTAGE PERSISTS IN POWER PACK FOR 10 SECONDS AFTER POWER IS REMOVED.

(c) Feed Magnet

Power dissipation . . . . . 2-1/4 watts
Nominal attract time. . . . . 8-11 milliseconds at 0.220 ampere
Nominal release time . . . . . 7-10 milliseconds

2.08 Tape Punch (ASR set)

(a) Dimensions and Weight (approximate)

Width. . . . . 3-1/2 inches
Height . . . . . 7-1/2 inches
Depth. . . . . 13-1/4 inches
Weight . . . . . 1-1/2 pounds

(b) Tape Specifications

Level 8-level
Width. . . . . 1 inch
Code combinations per inch 10
Feed hole diameter. . . . . 0.0465 inch

2.09 Environment

Operating range. . . . . 40^{o} F to 110^{o} F
Heat dissipation:
ASR . . . . . 375 btu/hr
KSR and RO . . . . . 324 btu/hr

35 TELETYPEWRITER SETS

2.10 Speed: 100 words per minute (110 bauds), 600 operations per minute.

2.11 Transmission Code: 8-level start-stop signals with 11-unit transmission pattern.

2.12 Dimensions (approximate)

(a) ASR

Floor to top of lid . . . . . 38-1/2 inches
Floor to underside . . . . . 25-1/2 inches of keyboard
Width . . . . . 40 inches
Depth . . . . . 21 inches

(b) KSR and RO sets

Floor to top of lid . . . . . 38-1/2 inches
Floor to underside . . . . . 25-1/2 inches of keyboard
Width. . . . . 24 inches
Depth. . . . . 21 inches

2.13 Electrical

Power requirements . . . . . 115 v ac ± 10%, 60 Hz
Signal line. . . . . 0.020 ampere
Nominal input to selector. . . . . 0.500 ampere at 20 v dc

2.14 Printing and Paper or Form Handling

(a) Feed

Friction or sprocket. . . 6 lines per inch, adjustable for single or double line feed

(b) Paper or Form

Friction feed. . . . . 8-1/2 inches wide, maximum 5-inch diameter roll
Sprocket feed . . . . . 8-1/2 inches wide, 5-1/2 inch and 11-1/2 inch form lengths

(c) Number of Characters per Inch

Friction feed. . . .10 characters per inch
Sprocket feed. . . .10 characters per inch

(d) Legible Copies

Friction feed. . . . . Original and two copies
Sprocket feed . . . . . Original and seven copies

2.15 Motors

(a) ASR, KSR, and RO sets

Type	Synchronous
Input	115 v ac ±10%, 60 Hz
Input current	Start 9 amperes; run 2 amperes
Output	50 millihorsepower
Rotation	3600 rpm
Temperature rating	130° C max

(b) Answer-Back and Transmitter Distributor

Type	Synchronous
Input	115 v ac ±10%, 60 Hz
Input current	1 ampere
Output	10 millihorsepower
Rotation	1800 rpm
Temperature rating	130° C max

2.16 Tape Punch

(a) Dimensions and Weight (approximate)

Height	8 inches
Width	7 inches
Length	8 inches
Weight	8 pounds

(b) Tape Specifications

Level	8-level
Width	1 inch
Code combinations per inch	10
Feed hole diameter	0.0465 inch

2.17 Tape Reader

Clutch magnet operating current	48 v dc ± 10% or 115 v ac — 100 milliamperes
Signal contacts	Operate at 60 milliampere ± 10% or 20 milliamperes ± 10% dc

Contact points are gold plated.
Signal generator contacts operate at a line current of 40 milliamperes at -20 v dc to +20 v dc.

2.18 Environment

Operating range	40° F to 110° F
Heat dissipation:	
ASR	1228 btu/hr
KSR	853 btu/hr
RO	853 btu/hr

3. DESCRIPTION

33 TELETYPEWRITER SETS

3.01 The model 33 teletypewriter sets used in applications such as DATREX, DATAPHONE, and PRIVATE LINE have no operator controls in themselves. The sets interface either with certain data sets directly through the call control unit, with a logic assembly, or a private line modification kit, which in turn connects with the data set. If the set interfaces directly with the data set, operator controls will be present on the data set; if the set connects with a logic assembly, or a private line modification kit, the operator controls are present on it.

3.02 The ASR sets are equipped with an automatic reader which operates at 24 v dc. The reader control lever has four operating positions, two locking and two nonlocking. The locking positions are FREE and AUTO; the nonlocking positions are MANUAL START and MANUAL STOP. When the control lever is in the FREE position, the tape can be moved freely through the tape reader. The tape reader will not respond to signals from the function box contacts as it does when the control lever is in the AUTO position. When the control lever is in the AUTO position, the tape reader will respond to start or stop signals from the function box contacts or from the logic assembly. When the control lever is moved to the MANUAL START position the reader is turned on. When released the control lever will return to the AUTO position. In order to stop the reader the control lever must be moved to the MANUAL STOP position and held there until the reader stops. Upon being released the control lever will return to the AUTO position, but the reader remains off. A noncontention feature allows only the distant tape reader and not the local reader to operate when the DC1 keytop is depressed on the keyboard.

3.03 The ASR sets are also equipped with an automatic tape punch which can be turned on or off manually or automatically. When the tape punch receives the DC2 code (tape punch on) it turns on and stays on until turned off either automatically upon receiving the DC4 code (tape punch off) or manually by depression of the OFF button. Manually the tape punch can be turned on by depression of the ON button on the tape lid; it can be turned off by depressing the OFF button.

The four buttons on the tape punch lid are: ON; OFF; B. SP. (Backspace); REL. (Release). The B. SP. button backspaces the tape one character each time it is depressed. The REL. pushbutton allows the tape to be pulled through the tape punch freely.

3.04 The sets are equipped with an answer-back which can be operated locally by depressing the HERE IS key on the keyboard, or electrically by an externally generated signal. A 24 v dc trip coil actuates the answer-back when the signal is externally generated. The ASR and KSR sets are equipped with a noncontention feature which allows only the distant and not the local answer-back to be operated when the ENQ keytop is depressed on the keyboard.

3.05 A number of contacts are mounted on the function box that control various set operations. The function box contacts are: tape reader on, ACK, ENQ/EOT, tape reader on/ tape reader off, and EOT.

3.06 ASR and KSR sets have the new line feature. This feature mechanically operates carriage return whenever line feed or form feed (sprocket feed units) is received by the typing unit. This feature is disabled when the set is shipped from the factory and can be enabled by removing the disabling bracket on the function box. Sprocket feed sets have a function lever in slot 2 of the function box which operates carriage return when either carriage return or form feed is initiated. This feature is not disabled.

3.07 Friction feed sets are equipped with a paper alarm. Sprocket feed sets have a form out alarm.

3.08 ASR and KSR sets are equipped with even parity keyboards.

35 TELETYPEWRITER SETS

3.09 The 35 teletypewriters are existing switched network sets adapted for the various services by the use of modification kits. The particular kit used depends on the service. Also, the kits apply to both the friction and sprocket feed sets.

3.10 All components except the call control unit are standard 35 components. The 35 call control unit is replaced by call control unit UCC29 which functions as a primitive interface. This call control unit has no operator controls. Operator controls are present either on the EIA interface assembly or the data set.

A. ASR Sets

3.11 The ASR sets have three modes of operation controlled by three mode keys with designations K, KT, and T. In the K mode, the keyboard and typing unit are connected to the signal line. Transmission is possible from the keyboard and tape reader and is monitored by the typing unit. The tape punch is disabled. The tape reader can be disabled by removal of an option strap in the ESU. Local operation is the same except there is no connection to the signal line. In the KT mode, the keyboard, tape reader, and tape punch are connected to the signal line. When the tape reader is transmitting, the message will be typed by the typing unit and punched in the tape. If transmission is from the keyboard the message will be typed locally by the typing unit and punched in the tape. Local operation is the same except there is no connection to the signal line. In the T mode, the tape reader and typing unit are connected to the signal line, the typing unit monitoring what is being transmitted or received. The keyboard and tape punch are on an auxiliary circuit which is not connected to the signal line. Tape can be punched by means of the keyboard without interfering with the line transmission. Local operation is the same except there is no connection to the signal line.

3.12 Tape reader operation can be either manual or automatic. By rotating the TD CALL IN key and depressing the TD ON or TD OFF pushbuttons on the control panel, the tape reader can be turned on or off. Automatic operation depends on the particular service. Some methods of automatic operation include turning the reader on or off from the keyboard, coding the tape to turn the reader on or off, and coding the end of an answer-back message with a character that will turn the reader on.

3.13 The tape reader will stop or fail to start if any of the following conditions are present:

(a) There is no tape in the tape reader.

(b) A tight-tape condition is present.

(c) Set is in TTR mode. The tape reader must be started after switching to K, KT, T, or TTS modes.

3.14 A BREAK pushbutton on the control panel is used to immediately stop transmission without losing the connection. An operating tape reader will be turned off by a break. Restoration of transmission is service dependent.

3.15 The sets have a MOTOR ON switch which turns on the motors in the set only. If placed in the T mode tape can be prepared using the keyboard and tape punch.

3.16 Local Operation — The set can be used to practice typing and other off-line functions by depressing the LOCAL button. The motor will turn on and the automatic answer-back will be disabled.

3.17 There is a low paper alarm switch in the typing unit which will prevent the set from receiving a call if paper is low.

3.18 Noncontention — This feature guarantees that when a set generates the WRU or X-ON code, only the answer-back or tape reader of the distant set will operate, and not at the originating set.

B. KSR Sets

3.19 The KSR set has automatic answer capabilities. If the service requires station identification, operation of the answer-back mechanism causes the set to transmit a multiple character identification message. This message is locally typed by the typing unit.

3.20 The KSR set can send by operating the keyboard, the answer-back mechanism, or the BREAK button. The keyboard signal generator is connected to a signal regenerator which is connected to the data set. The answer-back signal generator is in series with the output of the signal regenerator. The break key is connected to the data set on separate leads.

3.21 The answer-back mechanism can be tripped manually or remotely. Manually the answer-back can be tripped by depressing the HERE IS button on the keyboard. Remotely the answer-back can be tripped by the stunt box recognition of the WRU code.

3.22 Besides the usual printing functions the KSR set has other functions, such as:

(a) A REPT keytop and any other keytop associated with a character depressed simultaneously results in repeated transmission of the character.

(b) Operation of the SHIFT keytop simultaneously with any other keytop having a graphic symbol on the upper half results in the transmission of that code.

(c) The ESC keytop provides other functions (customer options). Depressing ESC before depressing the desired function keytop will provide the nonprinting function.

3.23 Functions are controlled by the function box of the transmitting set. They are selected by depressing the CTRL key and the desired function keytop on the keyboard simultaneously.

(a) TAB (Horizontal Tabulation), VT (Vertical Tabulation), and FORM (Form Out) are functions used only in sets containing sprocket feed typing units.

(b) The signal bell operates through function box make contacts.

C. RO Sets

3.24 The RO set has neither a keyboard, nor tape reader, nor tape punch. The RO set is equipped with an answer-back.

3.25 The set motor is turned on when the ON or LCL keys are depressed or when a station answers automatically. The motor is turned off when the OFF key is depressed or when the set disconnects. The motor is prevented from turning off during form feed, vertical or horizontal tabulation, and during answer-back.

4. SET LOGIC ASSEMBLY (TP186627)

TECHNICAL DATA

4.01 Dimensions and Weight

Width	7-1/8 inches
Depth	4-3/4 inches
Height	3-1/2 inches
Weight	3 pounds

4.02 Signal Requirements

Send and receive signals between logic assembly and data set ..... ±3 v dc to ±25 v dc
Data and control signals between logic assembly and teletypewriter ..... Neutral dc (current-no-current)
Polar data signal:
Mark ..... Negative
Space ..... Positive
Polar control signals:
Negative ..... Off
Positive ..... On

4.03 Electrical

Power requirements ... +24 v dc and -20 v dc
Impedance (terminating)
Minimum ..... 3000 ohms
Maximum ..... 7000 ohms
Shunt capacitance ..... 2500 picofarads

Note: Voltages between ±3 are undefined.

4.04 Environment

Operating temperature ... 40^{o} F to 110^{o} F
Relative humidity ..... Up to 95%
Power consumed ..... 7.5 watts (average)

DESCRIPTION

4.05 The TP186627 set logic assembly (1051SD) is a basic module designed to provide facilities for the interconnection of teletypewriter terminal equipment and data sets which conform to the standards of the EIA. In accordance with these standards, all data and control leads of the data set carry polar voltage signals.

4.06 The set logic assembly accepts current-no-current data and control signals from the teletypewriter and converts them into suitable polar signals for use by the data set. In addition, it accepts polar data and control signals from the data set and converts them into current-no-current signals for use by the teletypewriter.

4.07 The set logic assembly contains two time delay circuits and a timed break generator circuit. Two second time delay — indicates data terminal ready. Two minute time delay — will terminate call if data set is not ready. Timed break generator — will provide a timed break of approximately 500 millisecond duration.

4.08 Transistorized switching devices provide the required signal conversion between the data set and teletypewriter. No interchange circuits are used to operate inductive devices directly, such as relay coils.

4.09 An eight foot cable is provided to interconnect the set logic assembly and data set. The cable terminates in a 25-pin connector in accordance with EIA standards.

4.10 A second cable interconnects the set logic assembly and the teletypewriter. This cable terminates in two connectors and plugs into the rear of the call control unit at positions 1 and 2.

4.11 All power for the set logic assembly is provided for by the call control unit.

4.12 The set logic assembly provides coupling for the following EIA interchange circuits:

Circuit Designation	Description
AA	Protective Ground
AB	Signal Ground
BA	Transmitted Data
BB	Received Data
CB	Clear to Send
CC	Data Set Ready
CD	Data Terminal Ready
CE	Ring Indicator

4.13 The set logic assembly may be used with other data sets provided that the circuits conform to EIA standards and that additional circuits to those shown above are not required.

4.14 The set logic assembly provides the option of receiving local copy when the teletypewriter is transmitting (similar to half-duplex) or allowing remote traffic to be received when transmitting locally (similar to full-duplex).

4.15 If the set logic assembly is connected for half-duplex operation, a noninterfering line break feature is provided whereby,

if traffic is being received by the teletypewriter, line break may be transmitted without interfering with the traffic being received.

4.16 If the data set is disconnected or has power off, the set logic assembly holds circuit BB (received data) marking and circuit CD (data terminal ready) in the off condition.

4.17 The following provides information concerning pin numbers assigned to the interface assembly circuits. See 4.18 through 4.25 for a functional description of each circuit.

Pin Number	Circuit Designation	Description
1	AA	Protective Ground
2	BA	Transmitted Data
3	BB	Received Data
5	CB	Clear to Send
6	CC	Data Set Ready
7	AB	Signal Ground
20	CD	Data Terminal Ready
22	CE	Ring Indicator

4.18 AA — Protective Ground — This conductor is electrically connected to the frame of the terminal apparatus. It may be further connected to external grounds as required by applicable regulations.

4.19 AB — Signal Ground — This conductor establishes the common-ground reference potential for all interchange circuits except circuit AA (protective ground). It may be connected to circuit AA or the frame, as required by applicable regulations.

4.20 BA — Transmitted Data — Signals on this circuit are generated by the terminal apparatus for transmission to remote data sets.

4.21 BB — Received Data — Signals on this circuit are generated by the data set in response to data signal received from remote data sets.

4.22 CB — Clear to Send — Signals on this circuit are generated by the data set to indicate that the data set is ready to transmit data when in the on condition. This circuit is brought into the set logic assembly from the data set and is reserved for future applications.

4.23 CC — Data Set Ready — Signals on this circuit are generated by the data set to indicate that it is ready to operate (on condition). The off condition indicates either:

(a) Any abnormal or test condition which disables or impairs normal operation.

(b) That the communication channel is switched to an alternate means of communication.

(c) That the data set is not connected to the communication channel.

4.24 CD — Data Terminal Ready — Signals on this circuit are generated by the terminal apparatus to control switching of the data set to a communications channel. The on condition causes the data set to be connected to the communications channel. The off condition removes the data set from the communications channel to terminate a call, free the line for alternate use, or permit the use of the terminal apparatus for an alternate function. Two strapping options have been provided for this circuit. Option designated D causes the data terminal relay to be held energized, thus indicating an "on" condition. (This option is required in some DATA-PHONE operations.) Option designated E disables the terminal ready timing circuit.

4.25 CE — Ring Indicator — Signals on this circuit are generated by the data set to indicate that ringing current is being received from a remote station. The on condition indicates that a ringing signal is being received with the off condition maintained at all other times.

ORIGINATING A CALL

4.26 The following information, 4.27 through 4.29, relates the set logic assembly to such service offerings as DATREX and DATA-PHONE.

4.27 The attendant must depress the ON key on the set logic assembly. Dialing procedures then take place according to the type of data set. With the ON key depressed the CD lead (data terminal ready) and the disconnect timers are activated. If the terminal is equipped with the break detector option, its circuit will likewise be enabled at this time.

4.28 Approximately two seconds after the data terminal timer is activated the set logic assembly transmits the CD (data terminal ready) signal to the data set.

4.29 A connection must be made and the data set must have sent a CC (data set ready) signal to the terminal within two minutes, otherwise the terminal disconnect circuitry will terminate the call and turn the set motor off.

RECEIVING A CALL

4.30 The teletypewriter terminal can answer a call unattended. The CC lead (data set ready) comes up and the break detection circuit is enabled. The motor turns on and the CD circuit (data terminal ready) is started. The CD lead going on indicates to the data set that the terminal is ready and the call should be maintained. If CD does not come up, CC will go down turning the motor off.

OPTIONS

4.31 The following options are available on the TP186627 set logic assembly:

A — Half-Duplex: This strapping option causes the send circuit signals to be fed into the receive circuit and the set is in half-duplex.

B — Full-Duplex: With this option the send circuit signals are isolated from the receive circuit in an on-line mode, and the set is in full-duplex (factory wired).

C — Low Paper Originating: This option allows the set to originate a call in a low paper condition (factory wired).

D — DATA-PHONE: With this strapping the data terminal ready relay will be held energized, thus indicating to the data set that the terminal is ready. This is required in automatic-answer DATA-PHONE applications.

E — Data Terminal Ready Timer Bypass: With this strapping the data terminal ready timing circuit is bypassed.

F — Distributor Control: With this strapping the set's distributor would be enabled (factory wired).

5. PRIVATE LINE MODIFICATION KIT (TP186670)

TECHNICAL DATA

5.01 Dimensions and Weight (approximate)

Width	4-3/4 inches
Length	7-1/4 inches
Height	3-1/4 to 4 inches
Weight	2-1/2 pounds

5.02 Signal Requirements

Send and receive signals between modification kit and data set	±3 v dc to ±25 v dc
Data and control signals between modification kit and teletypewriter	Neutral dc (current-no-current)
Polar data signal:	
Mark	Negative
Space	Positive
Polar control signals:	
Negative	Off
Positive	On

5.03 Electrical

Power requirements	+24 v dc and -20 v dc
Impedance (terminating)	
Minimum	3000 ohms
Maximum	7000 ohms
Shunt capacitance	2500 picofarads

5.04 Environment

Operating temperature	40° F to 110° F
Relative humidity	Up to 95%

DESCRIPTION

5.05 The private line modification kit (TP186670) interconnects the teletypewriter and data sets for private line terminal-to-terminal, or terminal-to-computer operation. The operation is in accordance with ANSI (American National Standard Institute X3.3.4/212) data communication control procedures, and EIA standard RS-232-C.

5.06 The private line modification kit accepts current-no-current data and control signals from the teletypewriter and converts them into suitable polar signals for use by the data set. In addition, it accepts polar data and control sig-

nals from the data set and converts them into current-no-current signals for use by the teletypewriter.

5.07 An eight foot cable is provided to interconnect the modification kit and data set. The cable terminates in a 25-pin connector in accordance with EIA standards.

5.08 A second cable interconnects the modification kit and the teletypewriter. This cable terminates in two connectors and plugs into the rear of the call control unit at positions 1 and 2.

5.09 All power for the modification kit is provided for by the call control unit.

5.10 The modification kit mounts on the call control unit baseplate at the right of the teletypewriter. A 30-wire cable interconnects the modification kit and the call control unit and contains leads for the send and break contacts, selector magnet driver input, function box contacts, motor control relay, and power supplies.

5.11 A six pushbutton key assembly contains control functions labeled OFF, ON, BREAK RELEASE, LOCAL, OUT OF SERVICE and SPARE. All keys, except OFF, have indicating lamps. Two indicator lamps labeled PAPER ALARM, and PROCEED mount on a lamp bracket at the rear of the modification kit.

5.12 The modification kit provides coupling for the following EIA interchange circuits:

Circuit	Function
AA	Protective Ground
AB	Signal Ground
BA	Transmitted Data
BB	Received Data
CC	Data Set Ready
CF	Data Carrier Detector

5.13 The modification kit can be used with different data sets provided the interface circuits and control methods are the same. The following information, 5.14 through 5.19 is a functional description of each interface circuit.

5.14 AA — Protective Ground — This circuit is connected to the frame of the terminal equipment and to the ac power cord ground.

5.15 AB — Signal Ground — This circuit is the common reference for signal and power supply grounds. It is not connected to circuit AA (protective ground).

5.16 BA — Transmitted Data — Signals on this circuit are generated by the keyboard, reader, answer-back, or break key and sent to a remote terminal.

5.17 BB — Received Data — Signals on this circuit are received from a remote terminal.

5.18 CC — Data Set Ready — When the signal on this circuit is positive, the data set is ready to transmit or receive data. When it is negative, the data set will not be ready. If the data set loses power, the voltage will be zero. Whenever the voltage is negative or zero, the terminal will be placed in the out of service mode and light the OUT OF SERVICE lamp.

5.19 CF — Data Carrier Detector — This circuit gives the status of the data sets and connects them together. Normally the circuit is positive. It will be negative if the carrier is not detected or if the data link is lost. When this happens, the terminal will be placed in the out of service mode and light the OUT OF SERVICE lamp.

INDICATORS AND CONTROLS

A. Indicators

5.20 PROCEED — The PROCEED lamp is attached to a separate bracket at the rear of the modification kit. Lamp power and control are derived from circuit card TP303831. The lamp has a green lens and indicates, when on, that data can be transmitted. When the lamp is off, the reader is disabled and transmission therefore prevented.

5.21 PAPER ALARM — This lamp is attached to the same bracket as the PROCEED lamp and is powered and controlled by circuit card TP303831. The PAPER ALARM has a red lens and indicates, when on, that a low paper condition on a friction-feed terminal and a paper out condition on a sprocket-feed terminal exists. Operation of the terminal is unaffected. After the terminal is turned off, activity on the BB circuit (received data) will be ignored because a low paper or paper out alarm disables the

automatic answering capability of the terminal. To turn on the terminal when a paper alarm exists, depress the ON key.

B. Controls

5.22 OFF — This is a nonlocking, releasing key. Depressing it will cause any other locking key to release. A mechanical interlock prevents the OFF key from being depressed simultaneously with any other key except the BREAK RELEASE key. Depressing the OFF key turns off the terminal if it is on-line, or in the local, out of service, or spare/test mode. (Sets are shipped with a SPARE key which is field converted to a TEST key.)

5.23 ON — This is a nonlocking, releasing key. Depressing it will cause any other locking key to release. A mechanical interlock prevents the ON key from being depressed simultaneously with any other key except the BREAK RELEASE key. Depressing the ON key places the terminal on-line. Also, the terminal can be turned on remotely or from any of the other modes of operation without going to the OFF state.

5.24 BREAK RELEASE — This is a nonlocking, nonreleasing key. Depressing it will not cause any other key to release. Since this key does not have a mechanical interlock, it can be depressed simultaneously while other keys are depressed without affecting the manual controls of the terminal. The BREAK RELEASE lamp will come on whenever a break signal is detected by the terminal. Depressing the BREAK RELEASE key will reset the break detector circuit only after the transmission of a break signal has stopped. When this happens the reader and proceed circuits are enabled, and the keyboard, and BA circuit (send data) is activated.

5.25 LOCAL — This is a locking, releasing key. When depressed and locked, it will only be released by any of the other releasing keys. A mechanical interlock prevents the LOCAL key from being depressed simultaneously with any other keys. Depressing the LOCAL key will activate the terminal while preventing signals from being transmitted on the BA circuit (send data). While in this mode the terminal will ignore any activity on the BB circuit (received data) thus allowing page copy and tape to be prepared. The LOCAL key can be placed in any other mode of operation from the local mode or from any other mode of operation to the local mode.

5.26 OUT OF SERVICE — This is a locking, releasing key. When depressed and locked, it will only be released by any of the other releasing keys. A mechanical interlock prevents this key from being depressed simultaneously with any other key except the BREAK RELEASE key. The OUT OF SERVICE key must be depressed before changing the ribbon, paper, or tape. This will prevent the terminal from responding to a remote start command by inhibiting the motor, maintaining a steady mark signal, and preventing the terminal from responding to signals on the BB circuit (received data). The terminal can be placed in the out of service mode from any other mode, or be placed in any other mode from the out of service mode except whenever the CC circuit (data set ready), or the CF circuit (data carrier detector) indicate not ready or carrier fail conditions respectively. These last two conditions will light the OUT OF SERVICE lamp even though the key has not been depressed. The lamp will remain lighted until the terminal is restored to on-line operation.

Note: The OUT OF SERVICE key must be depressed to change the ribbon, paper, or tape.

Depressing the OFF key will clear the out of service condition. If the terminal is on-line when a CC or CF signal causes the OUT OF SERVICE lamp to light, the terminal will turn off and return to the out of service mode. If at any time the OUT OF SERVICE lamp is lighted when the ON key is depressed, the ON lamp will light but the terminal will be unaffected. Releasing the ON key will turn off the ON lamp.

5.27 SPARE — This is a locking, releasing key. When depressed and locked, it will only be released by any of the other releasing keys. A mechanical interlock prevents this key from being depressed simultaneously with any other key except the BREAK RELEASE key. Depressing the SPARE key turns off the motor and prevents it from being energized. In this condition, the BA circuit (data transmitted), and the BB circuit (data received) is not inhibited. Transmission and reception of the break signal on these leads can take place. The selector will chatter in response to the BB signals and the break detector circuit will detect any break signal. The terminal can be placed in the spare mode from any other mode of operation, or be placed in any other mode of operation from the spare mode.

OPTIONS

5.28 The set logic assembly contains four strapped options which are factory installed. These straps are located on circuit cards TP303831 and TP303832. See Table A for retaining or removing any option.

5.29 The idle line disconnect is an independent option and may be used with or without the EOT disconnect option. The various option combinations are shown in Table B.

6. TELETYPEWRITER SET OPTIONS

BREAK DETECTOR AND INDICATOR

6.01 The break detector and indicator is an option with set logic assembly TP186627. (With the TP186670 modification kit, the break detector and indicator is not optional but an integral part of the modification kit.) It consists of a break detector circuit card assembly, an indicator lamp with reset button, an interconnecting cable, and a mounting bracket.

TABLE A

OPTION TO BE RETAINED OR REMOVED

OPTION	STRAP	FUNCTION
EOT Disconnect	Retained	Upon reception of an EOT character, the terminal will turn off.
	Removed	Terminal will not turn off on EOT; significant only to ANSI data communication control procedures.
Idle Line Disconnect	Retained	A timer monitors the BA (send data) and BB (receive data) circuits. After 2 to 8 minutes of inactivity, the terminal will turn off.
	Removed	No idle line disconnect.
Local Break Override	Retained	Any locally generated BREAK will cause the receive circuits to MARK, inhibiting the selector magnet driver for 590 ±160 milliseconds.
	Removed	BREAK will not affect the receive circuits.
Full-Duplex/Half-Duplex	Retained	For half-duplex operation, local copy is produced when transmitting on-line.
	Removed	For full-duplex operation, no local copy is produced when transmitting on-line.

TABLE B

OPTION COMBINATIONS

OPTIONS		FUNCTION
Idle Line Disconnect	EOT Disconnect	
Present	Present	Terminal will automatically disconnect on EOT, or after any period of inactivity exceeding 2 minutes.
Present	Removed	Terminal will go into contention on EOT and disconnect automatically after any period of inactivity exceeding 2 minutes.
Removed	Present	Terminal will automatically disconnect on EOT, but will not time out and disconnect.
Removed	Removed	Requires manual disconnect.

6.02 The break detector circuit card is mounted on the call control unit. The indicator lamp with reset button mounts on a bracket which mounts on the call control unit base plate. Refer to Sections 591-810-210 (DATREX) and 591-815-200 (DATA-PHONE) for assembly instructions.

6.03 With this set option, receipt of a break will cause the automatic tape reader to stop, if operating, and will prevent keyboard sending. Upon receipt of a disconnect code the break indicator will be reset. When the break is received the break lamp will light requiring a pushbutton reset. The break detector receives all power and input from the call control unit. The output of the break detector card terminates at the call control unit.

AUTOMATIC ANSWER-BACK

6.04 The automatic answer-back is compatible only with the set logic assembly and 103G or similar type answering data sets. This option provides answer-back under the control of the ring indicator and clear-to-send data set leads (CB and CE).

6.05 The modification kit consists of a circuit card and mounting hardware. The input to the circuit card corresponds to EIA interface voltages of ±3 to ±25 volts dc. The answer-back is activated when both inputs are positive. The output of the circuit card is capable of switching 60 volts dc (maximum) at 120 ma (maximum), or 30 volts dc (maximum) at 350 ma (maximum). The answer-back trip magnets in 33 and 35 sets equipped with the set logic assembly require the following voltages and current levels which are within the above requirements:

(a) for 33 sets — 24 v dc at 220 ma (nominal)

(b) for 35 sets — 48 v dc at 80 ma (nominal).

6.06 The answer-back is activated when both the clear-to-send and ring indicator data set leads are positive 3 to 25 volts (on condition). The data set must be in the auto answer mode and the CE ON option in the data set is required to allow the CE ring indicator lead to switch on when ringing first occurs and to remain on until disconnect. In addition, each time the data set is switched between the talk and data modes during a call connection, the answer-back will be tripped.

6.07 The circuit card is operable in a maximum free-air ambient of 70° C (158° F). Storage temperature should not exceed 85° C (186° F).

6.08 Power consumption of the answer-back is less than 700 milliwatts.