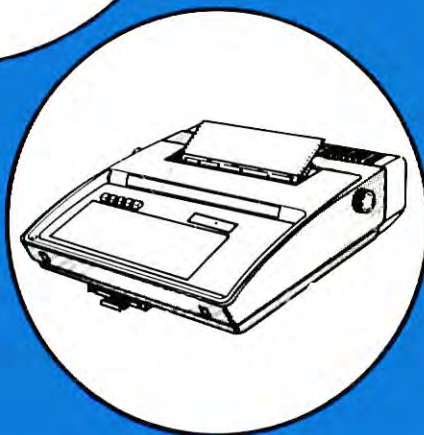**BASIC KSR**

BASIC RO

the 43 teleprinter

SERVICE MANUAL

TELETYPE

D R HOUSE TECHNICAL SERVICES

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THE 43 TELEPRINTER SERVICE MANUAL

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THE 43 TELEPRINTER

SERVICE MANUAL

INTRODUCTION

This manual provides servicing information for the 43 Basic Teleprinter
Terminals. The parts included in the service manual provide instructions for
use by crafts personnel when performing the servicing tasks required for the
installation, testing, troubleshooting and routine maintenance of the 43 KSR
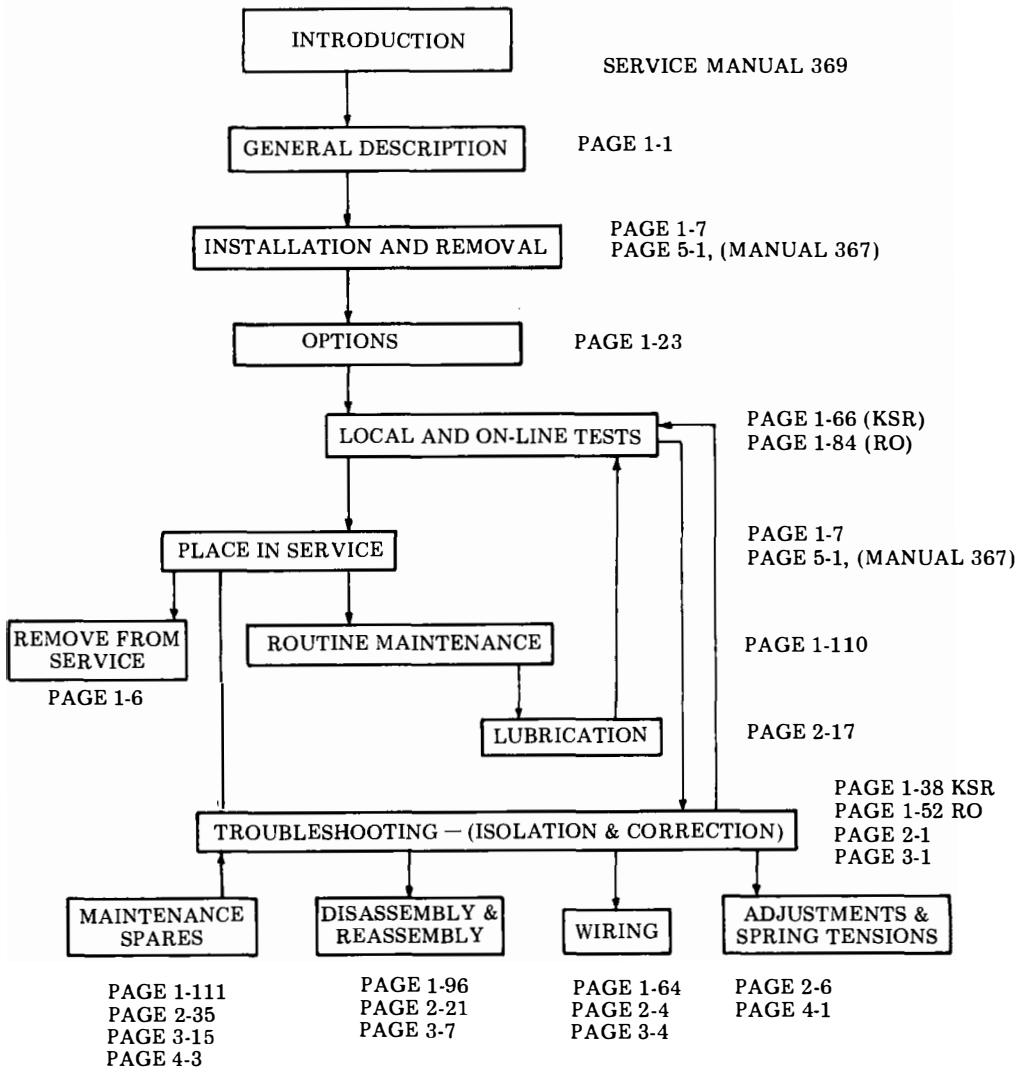and RO.

The task flow chart on the next page illustrates the intended repair and
servicing activities and associated manual parts.

A brief training course and the maintenance spares as recommended in the
parts indexes are available from Teletype Corporation. Crafts personnel should
be properly trained and have access to maintenance spares before attempting
to repair or service the 43 Teleprinter.

This manual was reissued to provide servicing information for KSR and RO
Teleprinters with either sprocket or friction feed capability and equipped with
an integrated Terminal Data Unit (TDU), an integrated Terminal Auxiliary
Unit (TAU, TAU1, TAU2), or no integrated terminal unit (no TU). Also
included in this manual is servicing information for the 430900 Answer-Back
Modification Kit.

For complete repair information on 43 Basic Teleprinter terminals without a TDU,
including repair of all major components except for the TAU, refer to Repair
Manual 391 and Circuit Diagram Manual 385. Manuals may be ordered from your
Teletype Corporation Sales Department, 5555 Touhy Ave Skokie, Il 60077.

TASK FLOW AND PAGE REFERENCES

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        ┌─────────────────────────┐
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 │ TROUBLESHOOTING — (ISOLATION & CORRECTION)    │ PAGE 3-1
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PAGE 2-35	PAGE 2-21	PAGE 2-4	PAGE 4-1
PAGE 3-15	PAGE 3-7	PAGE 3-4	
PAGE 4-3			

43 BASIC TELEPRINTER

GENERAL DESCRIPTION

1. GENERAL

1.01 This section provides a general description of the 43 Basic Teleprinter terminals and station arrangements.

1.02 All ordering numbers shown in this manual are Teletype Corporation part numbers.

2. DESCRIPTION

2.01 The 43 Keyboard Send Receive KSR sprocket feed station with integrated Terminal Data Unit (TDU) consists of a keyboard printer station arrangement and a modular 500 or 2500 telephone. The station connects directly to the switched telephone network by means of a modular cord.

2.02 The 43 KSR and RO Stations are also available with friction feed roll paper handling capabilities and an answer back circuit card.

2.03 Various 43 terminal arrangements are also available without a directly connected telephone with either friction or sprocket feed paper handling as follows (See Fig. 2).

• KSR with Terminal Auxiliary Unit (TAU) that has an EIA Interface.

• KSR with Terminal Auxiliary Unit (TAU1) that has a single combined EIA/Current interface port.

• KSR with Terminal Auxiliary Unit (TAU2) that has dual combined EIA/Current interface ports.

• KSR with no internal data unit that has a Transistor-Transistor Logic (TTL) voltage level interface.

• Receive Only (RO) terminals with either an internal data set, TAU, TAU1, or no internal data unit.

2.04 Terminals with EIA interface are normally connected to private lines or to an external data set which is connected to the public switched telephone network.

2.05 Terminals with no internal data unit or current interface are usually directly connected to a nearby data device or computer.
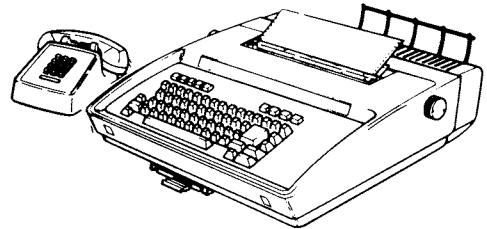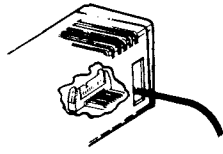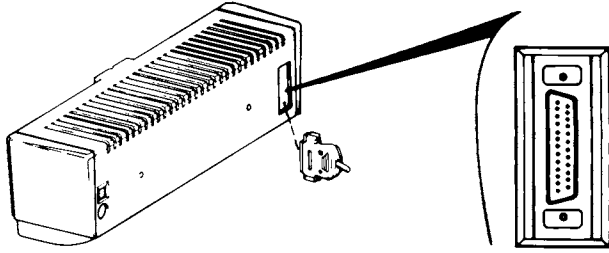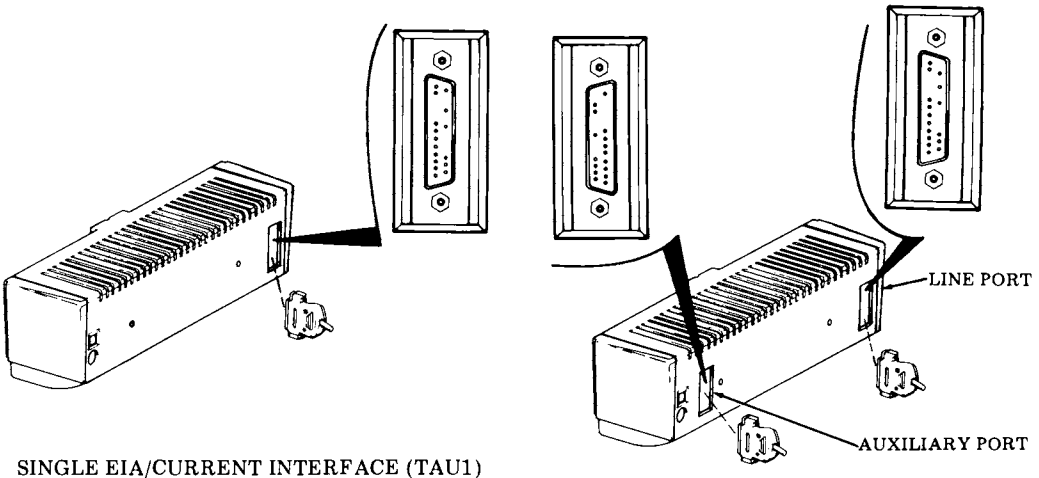

Fig. 1—43 KSR Sprocket Feed Station

TTL INTERFACE

EIA INTERFACE (TAU)

SINGLE EIA/CURRENT INTERFACE (TAU1)

LINE PORT

AUXILIARY PORT

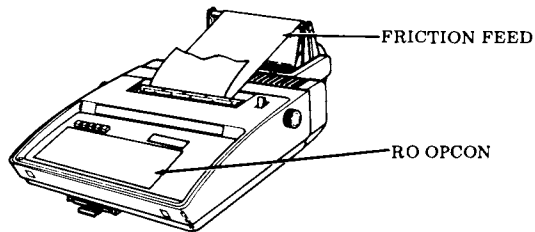DUAL EIA/CURRENT INTERFACE
(TAU2 — KSR ONLY)

FRICTION FEED

RO OPCON

Fig 2.—RO Friction Feed
and Interface Connectors

2.06   Data messages can be sent or received (or printed locally) a character-at-a-time at attendant selectable on-line speeds of 10 or 30 characters per second on KSR terminals. Receive only speeds of 10 or 30 characters per second are set by options on RO terminals. The telephone is used to originate calls for data or talk and to answer calls in the talk mode when connected to the public switched telephone network.

2.07   Characters are formed by impact on a 7 by 9 dot matrix and are printed at approximately 13 to the inch on sprocket feed and 10 to the inch on friction feed. Line lengths of up to 132 characters (SF) or 80 characters (FF) can be printed with lines spaced at 6 to the inch.

2.08   Inking is provided by a readily replaceable cartridge with ribbon (430035), available from Teletype Corporation.

2.09   Paper for the sprocket feed printer must be 12 inches wide with standard sprocket hole size and spacing. Standard weight, single-ply or multicopy paper consisting of the original and up to two additional copies can be used. Standard single ply 8-1/2 inches wide (5 inches diameter) roll paper is used on friction feed printers.

2.10   Basic 43 teleprinters are intended for table top use. The paper can be fed from the supply box or from a paper holder that clips to the rear of the sprocket feed terminals. On friction feed terminals, the paper roll is held by a paper supply assembly that is mounted to the rear of the terminal.

2.11   The terminals operate on a 115 V ac, $\pm10\%$, 50-60 Hz source of power at 100 watts. Power is controlled by an on-off rocker type switch located at the right rear of the housing. A 10-foot power cord is included with the terminal.

2.12   The teleprinters weigh approximately 30 pounds and those with modular phone connectors can readily be moved and reconnected in another location by the user.

2.13   Each coded arrangement is furnished with the teleprinter terminal (including a paper holder or paper supply assembly and new cartridge with ribbon) in addition to an attendant's manual, and installation and routine servicing instructions. The modular telephone and one additional modular cord are needed to complete a station. TTL interface or a data set and EIA cord arrangements require a locally engineered connection to the data device.

2.14   The operational controls and status indicators for the KSRs are briefly described in Fig. 3.

Description	Teletype Set Code
43 Basic KSR (S) W/TDU	4320AAB
43 Basic KSR (F) W/TDU	4320AAF
43 Basic KSR (S) W/TAU	4320AAC
43 Basic KSR (F) W/TAU	4320AAD
43 Basic KSR (S) W/TAU1	4320AAK
43 Basic KSR (F) W/TAU1	4320AAL
43 Basic KSR (S) W/TAU2	4320AAH
43 Basic KSR (F) W/TAU2	4320AAJ
43 Basic KSR (S) No TU	4320AAA
43 Basic KSR (F) No TU	4320AAE
43 Basic RO (S) W/TDU	4310AAB
43 Basic RO (F) W/TDU	4310AAF
43 Basic RO (S) W/TAU	4310AAC
43 Basic RO (F) W/TAU	4310AAD
43 Basic RO (S) W/TAU1	4310AAG
43 Basic RO (F) W/TAU1	4310AAH
43 Basic RO (S) No TU	4310AAA
43 Basic RO (F) No TU	4310AAE

One of these three keys always lit indicating mode and power on.

Use is system dependent. Disables keyboard when lit.

Lights on paper out and other alarm conditions.

Independent local test of printer.

Use is system dependent. Controls printing of ■ on received parity error.

Controls local printing of transmitted data.

Sends and receives at 30 or 10 characters per second. 300 or 110 baud at 10 or 11 unit code.

LOCAL TALK   DATA   AUTO ANSW   INTRPT   ALARM

PRINTER TEST   ON-UP PARITY OFF-DN   HALF-UP DUPLEX FULL-DN   30-UP CPS 10-DN

OPERATOR CONSOLE

LOCAL   *   TERM READY   *

*Peculiar to KSRs without TDUs.

KEYBOARD

Fig. 3—KSR Operational Controls and Status Indicators

2.15   The keyboard layout for the KSRs is shown in Fig. 4, along with brief descriptions on the keyboard-printer operation of several special keys. Character transmission is 1968 ASCII, (American National Standard Code for Information Interchange) 8-level with the 8th bit used for even parity on all characters sent.
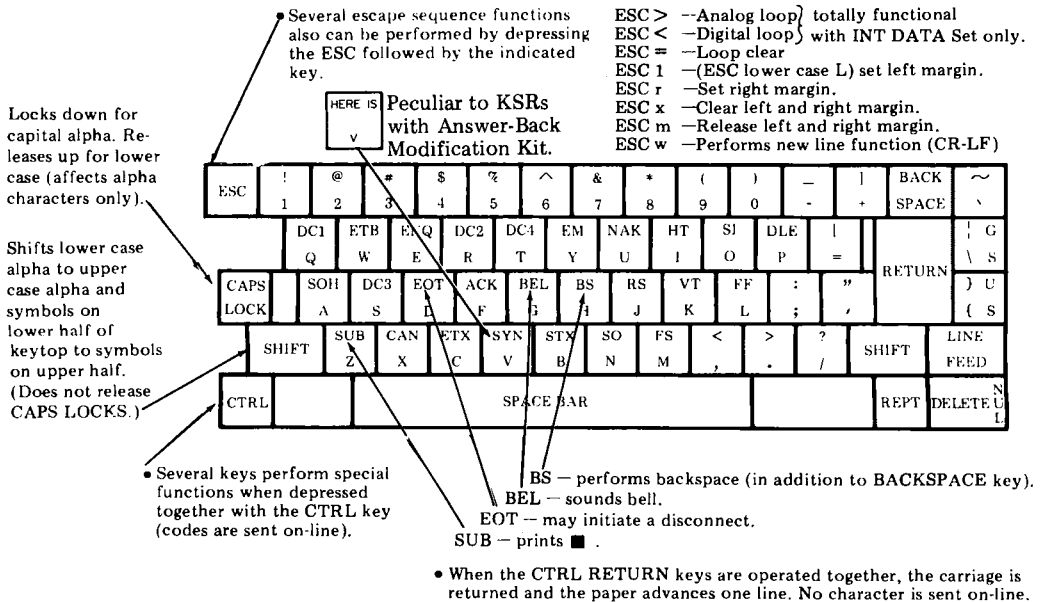
• Several escape sequence functions also can be performed by depressing the ESC followed by the indicated key.

ESC > —Analog loop ⎫ totally functional
ESC < —Digital loop ⎬ with INT DATA Set only.
ESC = —Loop clear
ESC 1 —(ESC lower case L) set left margin.
ESC r —Set right margin.
ESC x —Clear left and right margin.
ESC m —Release left and right margin.
ESC w —Performs new line function (CR-LF)

HERE IS   v   Peculiar to KSRs with Answer-Back Modification Kit.

Locks down for capital alpha. Releases up for lower case (affects alpha characters only).

Shifts lower case alpha to upper case alpha and symbols on lower half of keytop to symbols on upper half. (Does not release CAPS LOCKS.)

ESC	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	_ -	] +	BACK SPACE	~ \
	DC1 Q	ETB W	ENQ E	DC2 R	DC4 T	EM Y	NAK U	HT I	SI O	DLE P	[=		RETURN	¦ G
														\ S
CAPS LOCK	SOH A	DC3 S	EOT D	ACK F	BEL G	BS H	RS J	VT K	FF L	: ;	" '		} U
														(S
SHIFT	SUB Z	CAN X	ETX C	SYN V	STX B	SO N	FS M	< ,	> .	? /	SHIFT		LINE FEED
CTRL			SPACE BAR							REPT	DELETE	N U L

• Several keys perform special functions when depressed together with the CTRL key (codes are sent on-line).

BS — performs backspace (in addition to BACKSPACE key).
BEL — sounds bell.
EOT — may initiate a disconnect.
SUB — prints ■ .

• When the CTRL RETURN keys are operated together, the carriage is returned and the paper advances one line. No character is sent on-line.

Fig. 4—KSR Keyboard Layout

2.16   The operator console controls and status indicators for the RO are briefly described in Fig. 5.
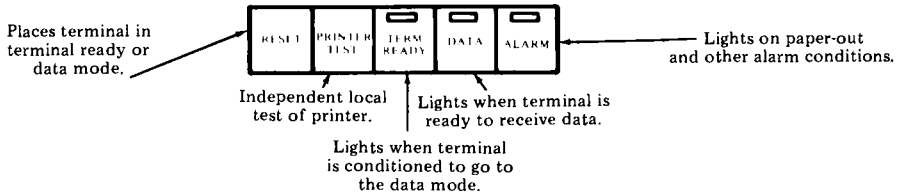

Places terminal in terminal ready or data mode.

RESET | PRINTER TEST | TERM READY | DATA | ALARM

Lights on paper-out and other alarm conditions.

Independent local test of printer.

Lights when terminal is ready to receive data.

Lights when terminal is conditioned to go to the data mode.

Fig. 5 — RO Operational Controls and Status Indicators

2.17   The following is a reduced sample of the printed character set as it appears in the printer test message on sprocket feed printers. (Lines are limited to 80 characters on friction feed.)

▪ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
▪ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

3.   OPTIONS

3.01   Several variations are provided for field applications. These variations (options) can be enabled by crafts personnel without additional material (by means of switches).

3.02   The titles and possible variations are listed as follows. Numbers with alpha suffixes are provided for ordering and record keeping purposes. In each case, the suffix a. indicates the factory furnished condition except for 432.

---

431. Type Font Arrangement

a. Narrow numeric 0 and wide alpha O
   Standard ∧ and underline __
b. Slash numeric Ø and wide alpha O
   ∧ prints as ↑ and __ prints as ←.
c. Slash alpha Ø and wide numeric O
   ∧ prints as ↑ and __ prints as ← .
d. Slash alpha Ø and wide numeric O
   Standard ∧ and underline __

---

432. Line Length With Margins Cleared

a. 132 Characters (Do not select on Friction Feed.)
b. 72 Characters (Printed line not centered.)
c. 80 Characters (Factory furnished on Friction Feed)
d. 72 Characters — Printed line centered (Friction Feed only).

---

433. EOT Response

a. Disconnect or turn off TERM READY on received EOT.
b. Does not disconnect or turn off TERM READY on received EOT.

---

434. Character Parity Bit Sent (KSR only)

a. Even Parity
b. 8th Bit Mark

---

435. End-of-Line on Receive

a. Auto CR-LF performed
b. Bell & Print Inhibit at last char. position

---

436. Speed Control (RO only)

a. 30 Characters/Sec
b. 10 Characters/Sec

---

437. Print Substitute Character ■ on odd parity received.

a. Print Sub-Char (■) on odd parity received.
b. Ignore parity.

---

438. Answer-Back on HERE IS

a. Yes
b. No

439. Answer-Back on ANSWER .

a. Yes
b. No

440. Answer-Back on ENQ

a. Yes
b. No

441. Type of Interface Unit

a. Terminal Data Unit (TDU)

b. TAU, TAU1, TAU2 or no Interface Unit

442. Local Copy of Answer-Back

a. Yes
b. No

443. Character Parity Bit Sent from
     Answer-Back

a. Even Parity
b. 8th Bit Mark

444. Blinding of ENQ Recognition.

a. Auxiliary Sender Controls (AUX. Pin 4)
   (HDX Only)
b. Auxiliary Sender cannot blind.

4.   REFERENCES

4.01   The 43 Teleprinter technical reference
        provides additional descriptions of the
station components, features, applications, and
interfacing.

4.02   The 369 Service Manual provides all
        necessary information for trained crafts
personnel to install, maintain, and, if necessary,
service the 43 Teleprinter using recommended
lists of maintenance spares. Issue 1 included KSR
sprocket feed with internal data set only. Later
issues include the friction feed, RO and additional
interfaces. 43 Basic RO Teleprinter Trouble-
shooting, Page 1-52, and 43 RO Testing, Page
1-84, are new servicing instructions.

43 BASIC TELEPRINTER

INSTALLATION AND REMOVAL

1.   GENERAL

1.01   This section provides station installation
and removal information for the 43
KSR and RO Station (Fig. 1.).

1.02   For additional information, refer to Page
1-84, RO Teleprinter Testing, Page 1-66,
Basic KSR Teleprinter Testing, and Page 1-23,
Options.

1.03   The 43 Teleprinter is furnished fully
assembled and tested with an integrated
TAU, TAU1, TAU2, TDU or no integrated termi-
nal unit ready to connect to an external communi-
cations device or distant terminal or between a
modular 500DM or 2500DM-type keyless tele-
phone and the line telephone jack. Where
telephones and jacks are not of the modular type,
they must be converted to the modular type
before station installation.

Note: When installing a terminal with an
integrated TDU (KSR or RO with telephone)
obtain locally or from Teletype Corporation at
least one modular cord of the appropriate
length to connect between the telephone and
the 43 Teleprinter (Fig. 4). Discuss with
customer where the teleprinter and phone are
to be installed before obtaining cord(s).

1.04   Before starting the installation procedure,
verify that paper in addition to the Basic
43 Teleprinter Arrangement is present at the
installation location.
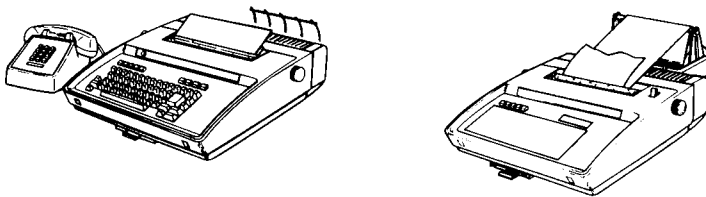
Fig. 1—43 KSR and RO Stations
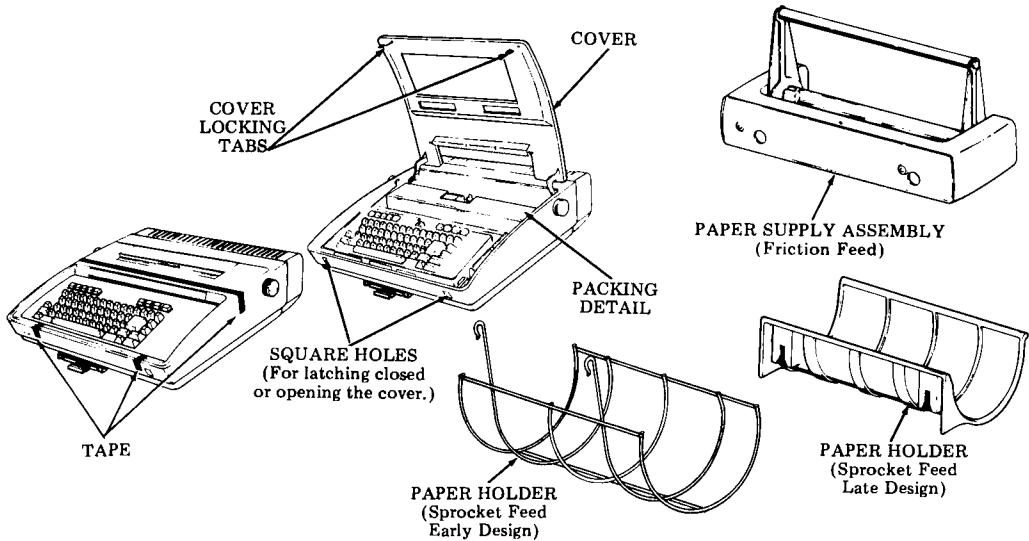
Fig. 2—Packing Detail

1.05 Reference in the procedures to left or right, up or down, and top or bottom, etc, refer to the teleprinter in its normal operating position.

1.06 All ordering numbers shown in this manual are Teletype Corporation part numbers unless specified otherwise.

2. TOOLS REQUIRED

2.01 No tools are required to install or remove the 43 Station with integrated TDU. A screwdriver (1/4 inch, 6 inch blade — 100982) will be required to install the 43 Station with Integrated TAU, TAU1, TAU2 or no integrated terminal unit. For tools required to enable options, refer to Options, Page 1-23.

3. INSTALLATION PROCEDURE

UNPACKING

3.01 Select an area to unpack the carton so that damage to the terminal will not occur.

3.02 When unpacking, be sure to wear approved safety glasses.

3.03 Unpack the large carton. Refer to instructions on the container. Remove tape securing the cover to the housing (Fig. 2).

Note: Observe all "caution" notes printed on the carton.

3.04 Depress the cover locking tabs on the lower front of the cabinet and lift the cover. Remove the packing detail securing the print head in place (Fig. 2).

3.05 The containers and other packing details are to be retained and reused by field locations to facilitate movement of stations.

3.06 Verify that the following items are included with the service order and are at the installation location after the boxes are unpacked.

1 — Set, 43 Teleprinter (Fig. 3)
1 — Paper Holder (Sprocket Feed Only)
1 — Paper Supply Assembly (Friction Feed Only)
1 — Ribbon
1 — Paper, Box of White Fan-Fold 12 x 8-1/2", (Sprocket Feed Only)
1 — Paper, Box of White Roll 8-1/2", (Friction Feed Only)
1 — Manual 367, How to Operate (KSR Only) Page 5-1
1 — Manual 372, How to Operate (RO Only)
1 — Manual 368, Installation and Routine Servicing (KSR Only)
1 — Manual 373, Installation and Routine Servicing (RO Only)

IDENTIFICATION

RO TELEPRINTERS	KSR TELEPRINTERS

Sprocket Feed With TDU — 4310/AAB
Sprocket Feed With TAU — 4310/AAC
Sprocket Feed With TAU1— 4310/AAG
Sprocket Feed With TTL — 4310/AAA
Friction Feed With TDU — 4310/AAF
Friction Feed With TAU — 4310/AAD
Friction Feed With TAU1 — 4310/AAH
Friction Feed With TTL -- 4310/AAE

Sprocket Feed With TDU — 4320/AAB
Sprocket Feed With TAU — 4320/AAC
Sprocket Feed With TAU1— 4320/AAK
Sprocket Feed With TAU2— 4320/AAH
Sprocket Feed With TTL — 4320/AAA
Sprocket Feed With TTL2 — 4320/AAU
Friction Feed With TDU — 4320/AAF
Friction Feed With TAU — 4320/AAD
Friction Feed With TAU1 — 4320/AAL
Friction Feed With TAU2 — 4320/AAJ
Friction Feed With TTL — 4320/AAE
Friction Feed With TTL2 — 4320/AAV
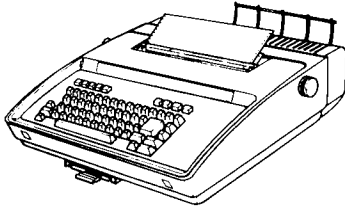
43 KSR — Sprocket Feed
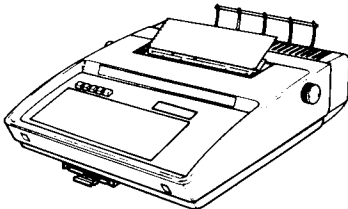
43 RO — Sprocket Feed

INTERNAL INTERFACE
CONNECTOR — TTL
AND TTL2

43 KSR — Friction Feed
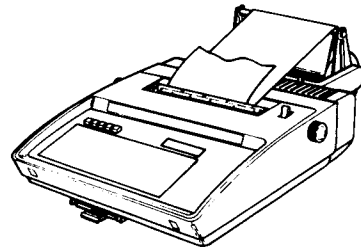
43 RO — Friction Feed
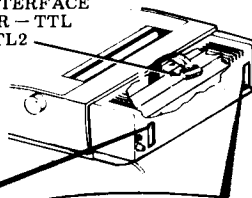
CONNECTOR TO
AUXILIARY
PORT
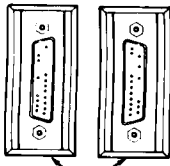
CONNECTOR TO
EXTERNAL DATA SET
OR COMMUNICATIONS
DEVICE

TDU CONNECTORS
UPPER — TO TELEPHONE
LOWER — TO LINE

TAU2
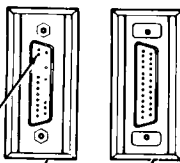
ADDED
ISSUE 3
410755   TAU1   TAU

PHONE

LINE

TDU

Fig. 3—Identification

CONNECTION

3.07   Place the 43 Teleprinter on the desk,
         table, etc, indicated by the customer.
Placement should be near the external com-
munications device or modular phone that will be
used with the teleprinter.

4310 AAB and AAF RO Sets With TDU
4320 AAB and AAF KSR Sets With TDU

Modular telephone present at installation location:

3.08   Unplug the modular plug of the cord
         from the modular jack associated with
the telephone specified on the service order
(compress tab to release) and connect it to the
lower connector marked LINE on the rear of the
TDU accessible through the opening in the left
rear of the bustle cover (Fig. 4). If telephone is
not to be placed at original phone location, a

different length cord may be needed. Connect
the additional modular cord between the upper
connector on the TDU marked PHONE and the
telephone jack.

3.09   Since the two cords are interchangeable,
         the selection of which cord to apply to
which function is a matter of installer judgement
based on length of cords available and terminal
location with respect to the wall jack.

No modular telephone present at installation
location:

3.10   Connect the modular cord plug to the
         lower connector marked LINE on the
rear of the TDU, accessible through the opening
in the left rear of the bustle cover. Connect the
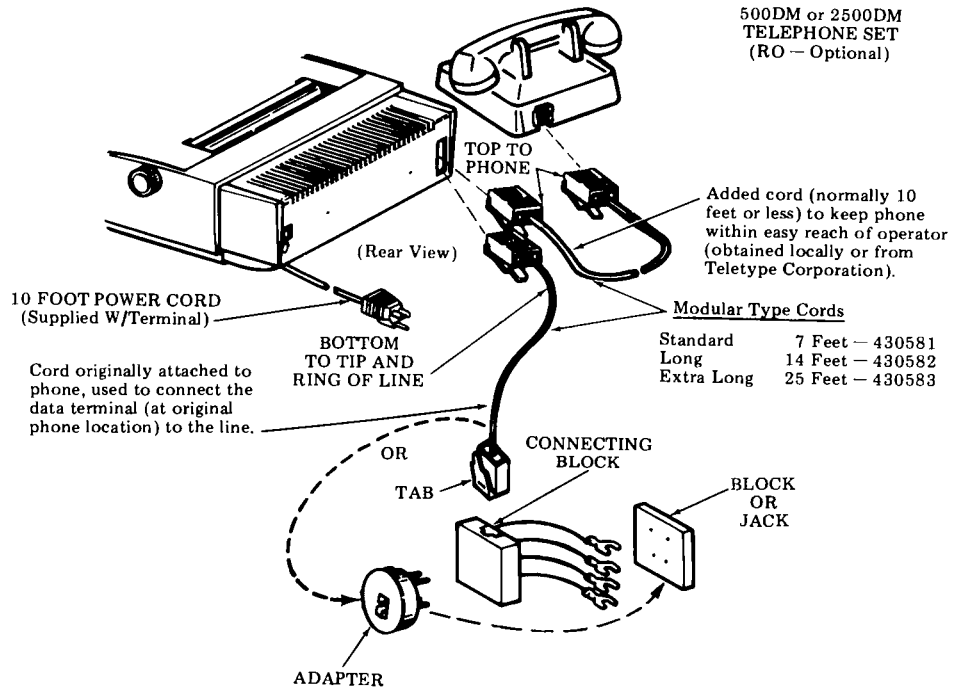remaining end of the modular cord to the line
connecting block.

Fig. 4—Telephone Connection

4310AAC and AAD RO Sets With TAU
4310AAG and AAH RO Sets With TAU1
4320AAC and AAD KSR Sets With TAU
4320AAK and AAL KSR Sets With TAU1

EIA Interface Connection

3.11   A 25-pin male receptacle with male pins
is provided for connection to an external
communications device (modem) or distant ter-
minal. The interface meets the requirements of
EIA RS-232-C. The pin assignments are given
below.

3.12   The connecting cables between the termi-
nal and the data set must be furnished by
the installer and should employ shielded cable. The
following cables are available from Teletype
Corporation.

    3 foot length — 430569
    7 foot length — 408065
    12 foot length — 408066
    25 foot length — 408067
    50 foot length — 408068

TAU INTERFACE SIGNALS

Connector Pin	Signal	EIA Circuit Designation	Status
1	Protective Ground	AA	Not Wired in TAU or Recommended Cable
* 2	Transmit Data	BA	KSR, Active — RO, Always Mark
3	Receive Data	BB	Active
4	Request to Send	RS	Always Off (Issue 1B Logic Card) — Always On (Issue 2A Logic Card)
5	Clear to Send	CB	Active
6	Data Set Ready	CC	Active
7	Signal Ground	AB	Active
8	Received Line Signal Detector	CF	Active
9			Not Wired in TAU or Recommended Cable
10			Not Wired in TAU or Recommended Cable
11	TWX Control		Not Applicable
12	Data Speed Indicator	SCF	Not Applicable
13			Not Wired in TAU or Recommended Cable
14			Not Wired in TAU or Recommended Cable
15			Not Wired in TAU
16			Not Wired in TAU or Recommended Cable
17			Not Wired in TAU
18	TWX Indicator	—	Not Applicable, Not Wired in Recommended Cable
19			Not Wired in TAU or Recommended Cable
20	Data Terminal Ready	CD	Active
21			Not Wired in TAU or Recommended Cable
* 22	Ring Indicator		Not Wired in TAU
* 23	Data Speed Select	CH	Always Off
24			Not Wired in TAU or Recommended Cable
25	Analog Loop Test		KSR, Active — RO, Always Off

* *Note:*   Refer to 50944S if 410710 answer-back circuit card is present.

TAU1 INTERFACE SIGNALS

Connector Pin	Signal	EIA Circuit Designation	Status
1	Protective Ground	AA	Active
* 2	Transmit Data	BA	KSR, Active — RO, Always Mark
3	Receive Data	BB	Active
4	Request to Send	RS	Always On
5	Clear to Send	CB	Active
6	Data Set Ready	CC	Active
7	Signal Ground	AB	Active
8	Received Line Signal Detector	CF	Active
9			Not Wired in TAU1 or Recommended Cable
10			Not Wired in TAU1 or Recommended Cable
11	TWX Control	—	Not Wired in TAU1
12	Data Speed Indicator	SCF	Active in TAU1 Only — Not Functional in Terminal
13	Transmit Current Loop	See Fig. 6	Active - Not Wired in Recommended Cable
14	Transmit Current Loop	See Fig. 6	Active - Not Wired in Recommended Cable
15	Receive Current Loop	See Fig. 6	Active
16	Receive Current Loop	See Fig. 6	Active - Not Wired in Recommended Cable
17			Not Wired in TAU1
18	TWX Indicator	—	Not Wired in TAU1 or Recommended Cable
19			Not Wired in TAU1 or Recommended Cable
20	Data Terminal Ready	CD	Active
21			Not Wired in TAU1 or Recommended Cable
22	Ring Indicator		Active
23	Data Speed Select	CH	Not Wired in TAU1
24			Not Wired in TAU1 or Recommended Cable
25	Analog Loop Test		KSR, Active — RO, Always Off

* *Note:* Refer to 50944S if 410710 answer-back circuit card is present.

3.13   The connection to the data set and telephone (if required) should be performed following the instructions for the particular data set involved (Fig. 5).

May not be present when using RO
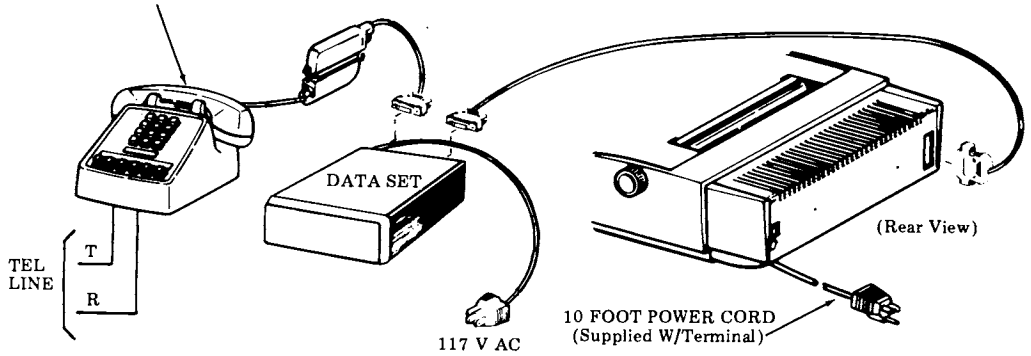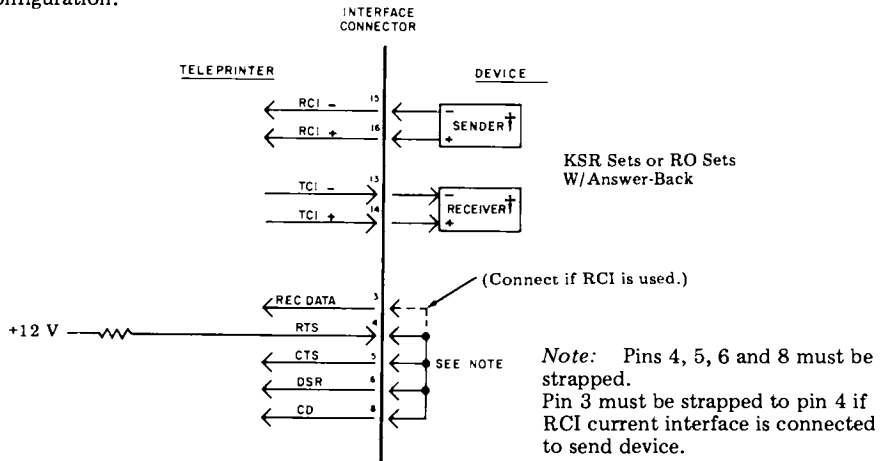Teleprinter or on private line applications.

TEL
LINE

T

R

DATA SET

(Rear View)

10 FOOT POWER CORD
(Supplied W/Terminal)

117 V AC

Fig. 5—Data Set Connection (Set W/TAU, TAU1 or TAU2)

<u>4310AAG and AAH RO Sets With TAU1</u>
<u>4320AAK and AAL KSR Sets With TAU1</u>

20/60 mA Current Loop Connection:

3.14   Determine the terminal configuration desired and connect the send and/or receive current device as shown below following any local instructions for the particular device involved. Terminal configurations are shown in Fig. 10. TAU1 interface signals are described on Page 1-12.

3.15   Refer to dc current arrangements shown in Fig. 9 to provide operation as shown in the desired terminal configuration.

INTERFACE
CONNECTOR

TELEPRINTER   DEVICE

RCI –   15   SENDER†

RCI +   16

TCI –   13   RECEIVER†

TCI +   14

KSR Sets or RO Sets
W/Answer-Back

(Connect if RCI is used.)

REC DATA   3

+12 V —/\/\/—   RTS   4

CTS   5   SEE NOTE

DSR   6

CD   8

Note: Pins 4, 5, 6 and 8 must be strapped.
Pin 3 must be strapped to pin 4 if RCI current interface is connected to send device.

†Limit current to 20mA or 60mA for MARK. Voltage must be between 12 V dc and 125 V dc and supplied by the customer.

Fig. 6—Current Loop Connection (Set W/TAU1)

4320AAH and AAJ KSR Sets With TAU2

3.16   The 4320AAH and AAJ sets equipped with a dual port terminal auxiliary unit (TAU2) provide two 25-pin interface connectors. The line interface receptacle with male pins located at the left rear of the terminal interfaces to an external communications device or distant terminal (EIA or 20/60 mA current loop) or modem. The auxiliary port plug with female pins located at the right rear of the terminal is intended to interface to a separate send-receive device such as a paper tape reader, tape punch, or a magnetic tape device (EIA or 20/60 mA current loop).

LINE
RECEPTACLE

AUXILIARY PORT PLUG
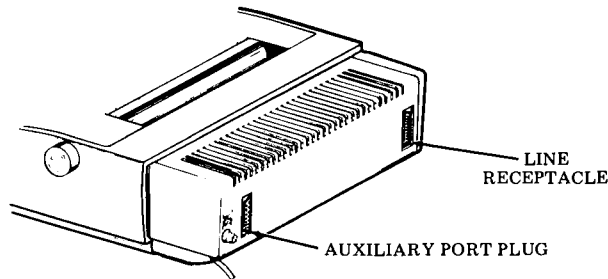
Fig. 7—TAU2 Interface Connectors

TAU2 LINE RECEPTACLE INTERFACE SIGNALS

Connector Pin	Signal	EIA Circuit Designation	Status
1	Protective Ground	AA	Not Wired in Recommended Cable
2	Transmit Data (Output)	BA	Active
3	Receive Data (Input)	BB	Active
4	Request to Send	RS	Always On
5	Clear to Send	CB	Active
6	Data Set Ready	CC	Active
7	Signal Ground	AB	Active
8	Received Line Signal Detector	CF	Active
9			Not Wired in TAU2 or Recommended Cable
10			Not Wired in TAU2 or Recommended Cable
11	TWX Control	—	Not Wired in TAU2
12	Data Speed Indicator	SCF	Active in TAU2 Only — Not Functional in Terminal
13	Transmit Current Loop	See Fig. 8	Active - Not Wired in Recommended Cable
14	Transmit Current Loop	See Fig. 8	Active - Not Wired in Recommended Cable
15	Receive Current Loop	See Fig. 8	Active
16	Receive Current Loop	See Fig. 8	Active - Not Wired in Recommended Cable
17			Not Wired in TAU2
18	TWX Indicator	—	Not Wired in TAU2 or Recommended Cable
19			Not Wired in TAU2 or Recommended Cable
20	Data Terminal Ready	CD	Active
21			Not Wired in TAU2 or Recommended Cable
22	Ring Indicator		Active
23	Data Speed Select	CH	Not Wired in TAU2
24	Device Control		Not Wired in Recommended Cable
25	Analog Loop Test		Not Wired in TAU2

TAU2 AUXILIARY PORT PLUG INTERFACE SIGNALS

Connector Pin	Signal	EIA Circuit Designation	Status
1	Protective Ground	AA	Active
2	Transmit Data (Input)	BA	Active
3	Receive Data (Output)	BB	Active
4	Request to Send	RS	Active
5	Clear to Send	CB	Always On
6	Data Set Ready	CC	Active
7	Signal Ground	AB	Active
8	Received Line Signal Detector	CF	Always On
9			Not Wired in TAU2 or Recommended Cable
10			Not Wired in TAU2 or Recommended Cable
11	TWX Control		Not Wired in TAU2
12	Data Speed Indicator	SCF	Not Wired in TAU2
13	Transmit Current Loop	See Fig. 8	Active - Not Wired in Recommended Cable
14	Transmit Current Loop	See Fig. 8	Active - Not Wired in Recommended Cable
15	Receive Current Loop	See Fig. 8	Active
16	Receive Current Loop	See Fig. 8	Active - Not Wired in Recommended Cable
17	Printer ON/OFF (TTL)		Active
18	TWX Indicator		Not Wired in TAU2 or Recommended Cable
19			Not Wired in TAU2 or Recommended Cable
20	Data Terminal Ready (Input)	CD	Active
21			Not Wired in TAU2 or Recommended Cable
22	Ring Indicator		Not Wired in TAU2
23	Data Speed Select	CH	Active
24	Device Control		Not Wired in Recommended Cable
25	Analog Loop Test		Not Wired in TAU2

EIA Interface Connection

3.17   The connecting cables between the terminal and the data set or auxiliary sender-receiver must be furnished by the installer and employ shielded cable. Refer to 3.12 for cables available from Teletype Corporation.

3.18   The connection to the auxiliary sender-receiver or data set and telephone should be performed following the instructions for the particular data set or device involved. Refer to Fig. 5 for data set and telephone connection. The diagram below describes the interface connections.

20/60 mA Current Loop Connection

3.19   Connect the send and/or receive current device using the diagram below and following any local instructions for the particular device involved. Terminal configurations are shown in Fig. 10. Line receptacle interface signals are described on Page 1-14 and auxiliary port plug interface signals are described on Page 1-15.

Except for Notes 3 and 4 (which apply regardless of the type of interface signaling) EIA interfacing is standard RS-232-C. The remaining connections are used for current interface only.

The connections shown below may be made within separately provided cables with standard 25-pin EIA connectors and terminals.
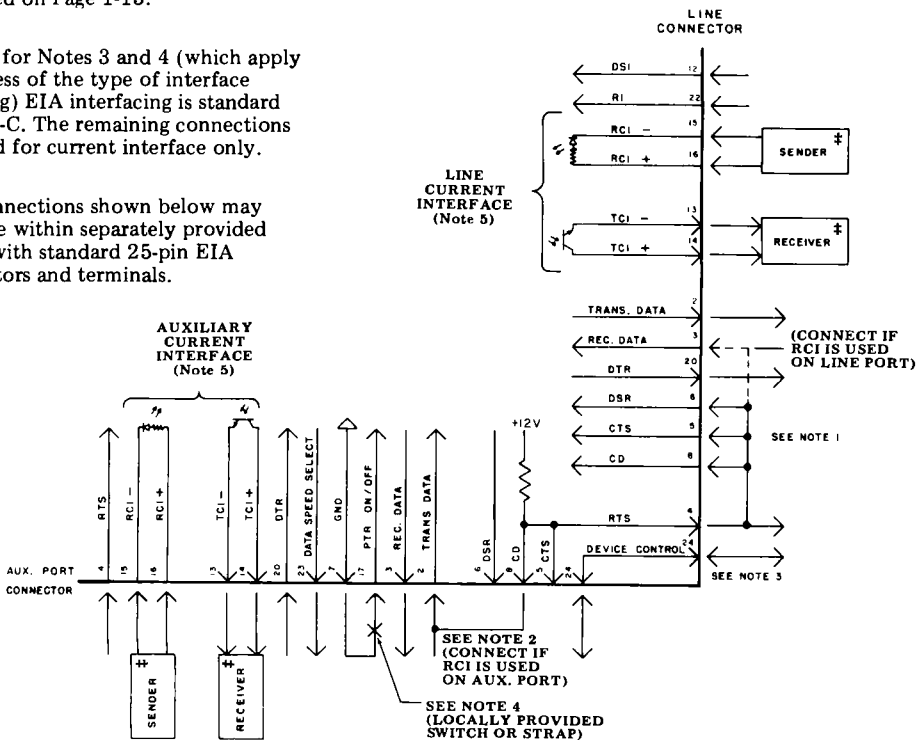
Fig. 8—Interface Connections

Note 1:   Pins 4, 5, 6 and 8 must be strapped when using 20/60 mA current loop at the line connector. Pin 3 must also be strapped to pin 4 when using RCI interface at the line connector.

Note 2:   Pins 2 and 8 must be strapped when using RCI Auxiliary current loop.

Note 3:   Provided for customer use.

Note 4:   Connect pins 7 and 17 to blind received data to the printer (current or EIA connections).

Note 5:   Current can be used on either or both ports but current and EIA cannot be used simultaneously on the same port.

‡ Limit current to 20 mA or 60 mA for mark.
  Voltage must be between 12 V dc and 125 V dc supplied by the customer.

Refer to dc current arrangements shown below to provide operation as shown in the desired terminal configuration.

Fig. 9—DC Current Arrangements
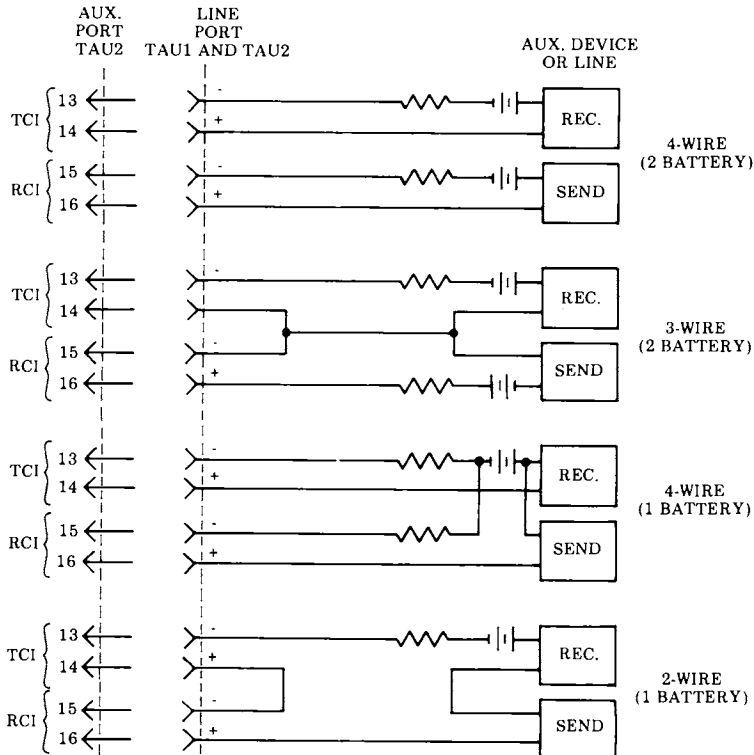
RCI = Receive Current Interface

TCI = Transmit Current Interface

TYPE OF OPERATION		KEY POSITION AND WIRING	TYPE OF TERMINAL AND COMMUNICATIONS MODE
Half-Duplex		HDX or FDX Wiring Not Applicable	KSR LOCAL
Half-Duplex		HDX Line — 3- or 4-wire or EIA Aux — 3- or 4-wire or EIA	KSR DATA
Half-Duplex (Modified)		HDX Line — 2-wire Aux — 3- or 4-wire or EIA	KSR TAU 2 only DATA
		FDX Line — 2-wire Aux — 3- or 4-wire or EIA	KSR DATA
Full Duplex		FDX Line — 3- or 4-wire or EIA Aux — 3- or 4-wire or EIA	KSR DATA
Full Duplex (Echoplex)		FDX Line — 3- or 4-wire or EIA Aux — 2-wire	KSR DATA

§ PTR ON/OFF External Switch (TAU2)
  Always On (TAU1)

Fig. 10—Terminal Configurations

4310AAA and AAE RO Sets Without Integrated Terminal Unit
4320AAA, AAE, AAU, and AAV KSR Sets Without Integrated Terminal Unit

3.20   Connection to the external communications device (provided by the customer) is made through a 20-pin connector at the end of a short ribbon cable. Mating cable connectors are Teletype Corporation 341802 (solder type), Alpha FCC-161-120 (straight solder type) or Scotchflex 3326-0001 (crimp type). No provision is made for adding additional cable length. The pin assignments are given on the TTL pin assignment chart below.

3.21   Connection to the interface cable requires the removal of the paper holder or paper supply assembly, paper deflector (if present) and bustle cover.

3.22   To remove the paper supply assembly, disengage latches from mounting posts by pulling straight up. Slide assembly from mounting posts (Fig. 11).

3.23   The connections to the telephone, data set or communications device should be performed following the instructions for the particular device involved.

Electrical Characteristics

TTL Interface	Electrical Characteristics	
	From 43 (Drivers)	To 43 (Terminators)
State 0 (Space) On	0 to 0.4 VDC	0 to 0.7 VDC
	8 ma max @ 0.4 VDC	−0.36 ma max @ 0.4 VDC
State 1 (Mark) Off	2.4 to 5.25 VDC	2 to 5.25 VDC
	−0.4 ma max @ 5.25 VDC	0.020 ma max @ 2.4 VDC

TTL PIN ASSIGNMENT CHART

Pin No.	Code	Function	Status
1	DL	Digital Loop Test	Active
2	DSI	Data Speed Indicator to Terminal	Not Applicable, Not Wired in TTL Cable
3	AL	Analog Loop Test	KSR, Active — RO, Not Applicable
¶ 4	DSS	Data Speed Select from Terminal	Not Applicable, Not Wired in TTL Cable
5	TR	Terminal Ready	Required
6	RS	Request-to-Send	Not Connected, Always Off (Issue 1B Logic Card) — Always On (Issue 2A Logic Card) Active
7	+5	+5 Volts	Not Applicable, Not Wired in TTL Cable
8		Reserved for future	
9	GND	Circuit Ground	Active
¶ 10	RTS aux.	Request to Send aux.	Not Applicable, Not Wired in TTL Cable
11	-12	-12 Volts	Active
¶ 12	RI	Ring Indicator	Not Applicable, Not Wired in TTL Cable
13	+12	+12 Volts	Active
14	DP	Duplex Indicator from Terminal	Not Applicable, Is Wired in TTL Cable
15	DR	Data Ready	Active
16	TW2	TWX Indicator	Not Applicable, Not Wired in TTL Cable
*17	RD	Receive Data	Active
18	TW1	TWX Control	Not Applicable, Not Wired in TTL Cable
*¶ 19	SD	Transmit Data	KSR, Active — RO, Always Marked
20		Reserved for future	Not Applicable, Not Wired in TTL Cable

¶ *Note:*   Refer to 50944S if 410710 Answer-Back Circuit Card is present.
*Sets with TTL2 RD and SD are also active in the local mode.

PAPER HOLDER
(Sprocket Feed
Late Design)

BUSTLE
COVER

PAPER SUPPLY ASSEMBLY
(Friction Feed)

DEFLECTOR

LATCH

PAPER HOLDER
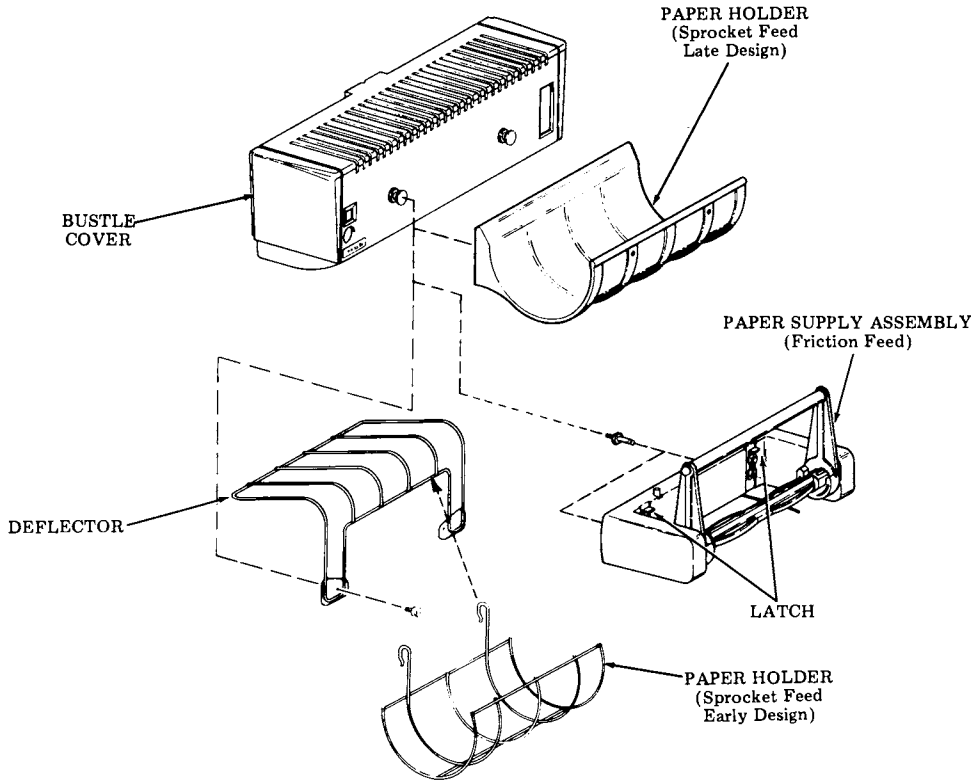(Sprocket Feed
Early Design)

Fig. 11—Paper Holder and Paper Supply Assembly

PAPER HOLDER (Sprocket Feed)

3.24   Attach the wire paper holder to the
        deflector (if present), otherwise attach
the plastic paper holder to bushings as shown in
Fig. 11.

PAPER SUPPLY ASSEMBLY (Friction Feed)

3.25   Pull the latches straight up and slide the
        paper supply assembly fully onto the
mounting posts, located at the rear of the bustle
cover. Push down on the latches until they are
secured over the mounting posts.

RIBBON AND PAPER

3.26   Install the ribbon and paper supplied. Refer
        to the How to Operate Manual, Page 5-1
for ribbon and paper installation information.

CHECKOUT PROCEDURE

3.27   Plug the 43 Teleprinter into a properly
        grounded and polarized 3-wire 115 V ac
$\pm 10\%$ 50-60 Hz electrical power source.

3.28   Perform the appropriate Station Installa-
        tion Checkout Procedures (Local and On-
Line) found in 43 Basic KSR Teleprinter Testing,
Page 1-66 and RO Teleprinter Testing, Page 1-84.

DIRECTORY CARD

3.29   Record the installed location of the sta-
        tion (floor, area, and phone number),
location of extension phone(s) if any, and the
number to be called in case of trouble in the
space provided on the slide-out directory card
(Fig. 13).

3.30   Remove the directory card by pulling it
        out as far as it will go, then, by holding card
at edges, move it slightly to one side and pivot to
clear the opposite latch. Fill in the information
requested on the underside of the card. Replace
the directory card.

> *Note:* If the checkout procedure was per-
> formed successfully, the teleprinter has the
> standard options incorporated as shown on
> the card. Record any nonstandard options
> enabled in the space provided on the card.)

3.31   Clean up the unpacking area, wipe off any
        finger prints on the set, and turn the 43
Station over to the subscriber.

3.32   Provide the customer with the attendant
        manual. Advise the customer to order
spare ribbons and paper as soon as possible
(quantities depending on expected usage).

3.33   Advise the customer of the "Trouble
        number" location on the directory card.

3.34   Place the 368 or 373 Installation and
        Routine Servicing Manual with the ship-
ping containers and retain for future use.

4.   STATION REMOVAL

4.01   Reverse the procedures in 3. INSTALLA-
        TION PROCEDURE to remove the station
from service (service disconnect).

4.02   If a paper holder was provided with the
        terminal at the time of installation (check
underside of directory card) verify its presence
before packing teleprinter.

4.03   Before repacking the teleprinter, move the
        print head to the center of the printer and
insert the packing detail removed in 3.04.

4.04   Using the containers and packing details
        retained in 3.05, pack the 43 Teleprinter
(Fig. 12).

4.05   If a modular telephone is present, recon-
        nect the telephone to the phone line.
Retain modular cords for future use.
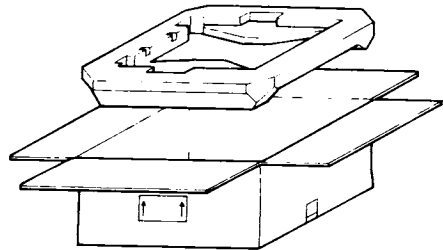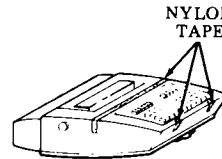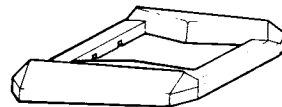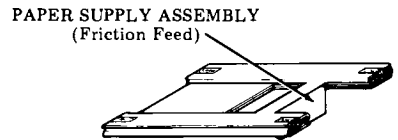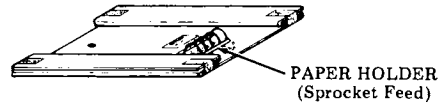
Fig. 12—Packing Details

TOP SIDE

FREQUENTLY CALLED NUMBERS

NAME	AREA CODE	TEL NO

EXAMPLE

INSTALLED LOCATION IN BUILDING

FLOOR _3_ AREA _Pool A16_ PHONE _341-7296_

LOCATION OF EXTENSION PHONE IF ANY _Pool B16_

IF THE TERMINAL DOES NOT APPEAR TO BE WORKING PROPERLY, CONSULT THE HOW TO OPERATE MANUAL THEN IN CASE OF TROUBLE CALL _362-1212_

BOTTOM SIDE

Early Design

Late Design

Fig. 13—Directory Card

DIRECTORY CARD

43 TELEPRINTER

OPTIONS

1. GENERAL

1.01 This section provides information on options for the 43 KSR and RO Teleprinter.

1.02 The options can be made to satisfy requirements using switches located on the logic circuit card mounted on the bottom of the printer frame, on the RO operator console logic card, and on the answer-back circuit card.

1.03 The options are numbered for field identification and record keeping purposes.

1.04 The KSR operator console circuitry can be damaged by static discharge. The 346392 static discharge ground strap is available for use by service personnel.

1.05 All ordering numbers shown in this manual are Teletype Corporation part numbers.

1.06 For additional servicing information refer to Page 1-38, Basic KSR Teleprinter Troubleshooting, Page 1-52, RO Teleprinter Troubleshooting, Page 4-1, Enclosures and Paper Handling Adjustments, and 50944S, 430900 Answer-Back Modification Kit.

OPTION SWITCHES

1.07 Different styles of option selecting switches may be present on the logic card. On toggle or slide type switches, options are activated by positioning the toggle or slide toward the positions indicated in Fig. 1
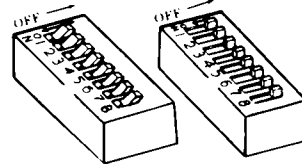
Toggle Style   Slide Style

(Toggles and slides shown in OFF position.)

Fig. 1—Option Switches

1.08 The option switches are factory optioned and should not be changed unless the local requirements specify incorporating a nonstandard option (Fig. 2).

SPD4   SPB5   SPA5

FRICTION FEED

SPROCKET FEED   RO Only

KSR and RO   Answer-Back Only
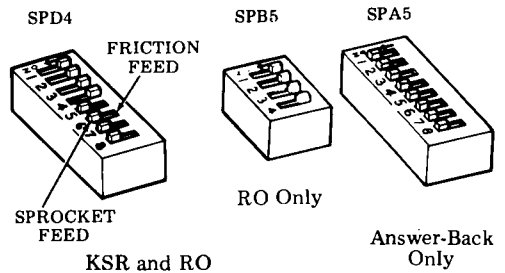
Fig. 2—Standard Switch Positions

1.09 The procedures in Table C verify proper operation of options only. The features as furnished from the factory are checked in the KSR and RO Testing Parts, Pages 1-66 and 1-84 respectively. The procedures in Table C may be checked either on-line or off-line as indicated.

1.10   For teleprinters without a TDU (ie, EIA
        or TTL interface), off-line test procedures
are provided to simulate on-line tests where ex-
ternal communication test devices or test centers
are not available. Off-line checkout of Options
433 through 444 will require placing the tele-
printer into the Loopback mode. (See Table A.)
To perform these tests, the connector terminals,
as shown below, should be strapped before pro-
ceeding with the tests. The remaining terminals
should be connected or measured as specified
during the test steps.

Note: Contact Teletype Corporation Custom
Systems Division for availability of a 43 Tele-
printer Interface Test Box, CP10.002.001-1
which provides both arrangements shown as
follows:

EIA-LINE INTERFACE CONNECTOR

2) SEND DATA
3) RECEIVE DATA
5) CLEAR TO SEND
6) DATA SET READY
20) DATA TERM READY

TTL INTERFACE CONNECTOR

17) RECEIVE DATA
18) SEND DATA
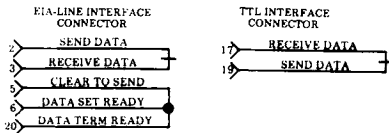
Fig. 3

1.11   A 43 KSR Operator Console, 43K101/
        CAA or CAB can be substituted in RO
Teleprinters to perform option checks off-line
when external communication test devices are
not available for on-line operation.

1.12   A volt-ohmmeter or equivalent means to
        measure ±12 volts and +5 volts is required
to perform continuity checks.

1.13   Before an on-line checkout of options
        (KSR and RO with TDU) can be per-
formed, the test center or test station must be
provided details about the teleprinter under test,
such as telephone number, type of terminal (KSR
or RO, friction or sprocket feed), options present,
speed, etc. After the test is completed, contact
the test center and verify test results.

2.   TOOLS REQUIRED

2.01   The following tools will be required to
        enable the options. These items should
normally be present in standard maintenance
tool kits.

Wrench, open end	3/16" and 1/4"	129534
Screwdriver	1/4", 6" blade	100982
Static Discharge Strap		346392

3.   ACTIVATING OPTIONS

3.01   To activate options 431 through 435:

   (a) Turn off ac power to the teleprinter.

   (b) Depress the two locking tabs on the lower
        front of the cabinet and open the cover.

3.02   Loosen the two 181240 screws (one each
        side) on the side frames securing the oper-
ator console in place (Fig. 4).

3.03   Loosen the two 184058 bushing clamp
        screws (one each side) and gently lift the
rear edge of the operator console assembly, pivot-
ing it forward on the front mounting pins (Fig. 4).

3.04   Locate the option switch pack SPD4
        (Fig. 4) on the logic circuit card and acti-
vate the option switches in 4. OPTIONS, as re-
quired.

3.05   Reinstall the operator console, and
        tighten the screws loosened in 3.02.
Perform the KEYBOARD TO COVER ALIGN-
MENT adjustment Page 4-1.

3.06   To activate options 436 and 437:

   (a) Turn off ac power to the teleprinter.

   (b) Depress the two locking tabs on the lower
        front of the cabinet and open the cover.

OPTION SWITCH PACK SPD4

OPTION SWITCH PACK SPA5 (Answer-Back Only)

HOUSING

CLAMP

184058 SCREWS (2)
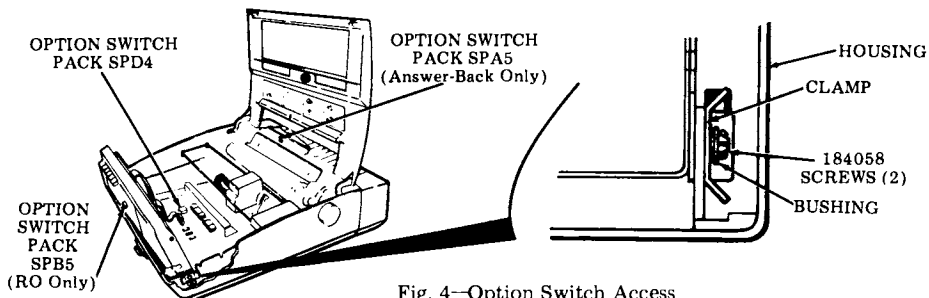
BUSHING

OPTION SWITCH PACK SPB5 (RO Only)

Fig. 4—Option Switch Access

3.07   Locate the option switch pack SPB5 (Fig. 4) on the RO operator console and activate the option switches in 4. OPTIONS, as required.

3.08   To activate Options 438 through 444:

(7) Lift up the power supply until the option switch pack SPA5 on the answer-back card clears the housing. Activate the option switches in 4. OPTIONS, as required.
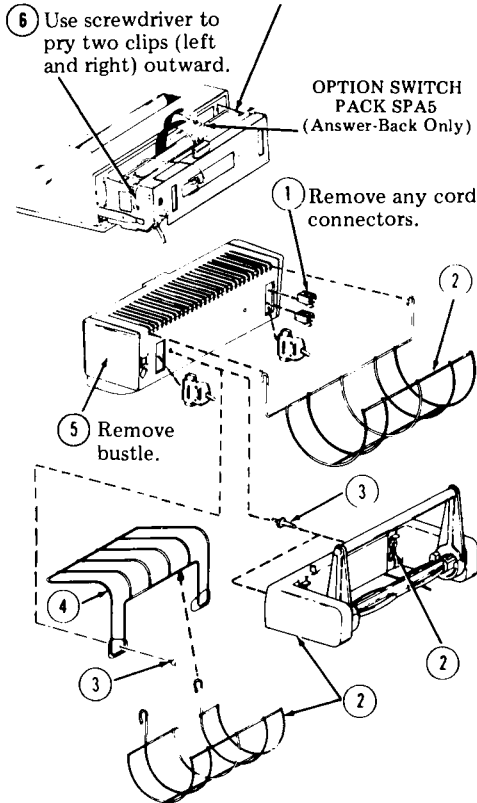
(6) Use screwdriver to pry two clips (left and right) outward.

OPTION SWITCH
PACK SPA5
(Answer-Back Only)

(1) Remove any cord connectors.

(5) Remove bustle.

Fig. 5

(2) Remove paper and paper holder or paper supply assembly, if present. To remove paper supply assembly, disengage latch from mounting posts and pull straight up. Slide off of mounting posts.

(3) Remove screws, screws with bushings, or mounting posts.

(4) Remove deflector, if present.

3.09   Reinstall the power supply, paper holder, paper, and paper supply assembly if removed in Step 3.08.

3.10   Remove the pull out directory card and record the nonstandard options incorporated in the terminal on the underside of the card. Check the appropriate square and briefly describe the enabled option(s) (Fig. 6). Write in any not listed on card.

3.11   Reinstall the directory card and turn on the ac power to the station.

3.12   Perform the options checkout procedure to verify proper operation of the nonstandard option(s) installed. Refer to 5. for checkout procedures.

3.13   The checkout procedure in 5. provides information for checking nonstandard options only. Refer to KSR and RO Testing Pages 1-66 and 1-84 respectively for teleprinter testing procedures.

EXAMPLE:
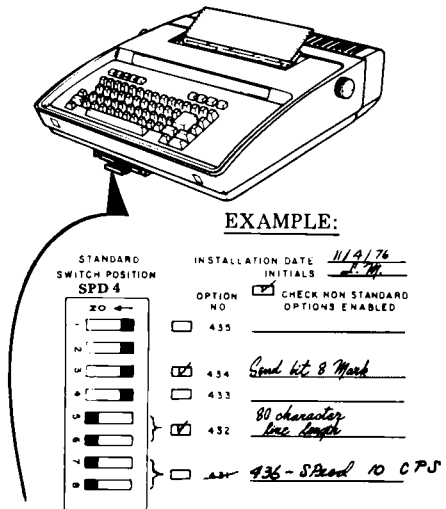
Early Design
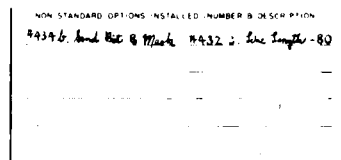
Late Design

Fig. 6—Directory Card

4. OPTIONS

4.01   The chart below provides information on how to set the options shown under option numbers 431 through 444. Record any nonstandard options enabled in the space provided on the directory card (bottom side).

Option No.   Option Suffix and Conditions   Option Definition   Switch Numbers   Location of Switch on Circuit Card (See Fig. 4)

XXX				SPD4							
				1	2	3	4	5	6	7	8	
a.				—	—	—	—	O	●	—	—	*
b.				—	—	—	—	O	●	—	—	

431. Type Font Arrangement				SPD4							
				1	2	3	4	5	6	7	8	
a. Narrow numeric 0 and wide alpha O Standard ∧ and underline __				—	—	—	—	—	—	●	●	*
b. Slash numeric Ø and wide alpha O ∧ prints as ↑ and __ prints as ←.				—	—	—	—	—	—	●	O	
c. Slash alpha Ø and wide numeric O ∧ prints as ↑ and __ prints as ←.				—	—	—	—	—	—	O	O	
d. Slash alpha Ø and wide numeric O Standard ∧ and underline __ .				—	—	—	—	—	—	O	●	

432. Line Length				SPD4							
				1	2	3	4	5	6	7	8	
a. 132 Characters (Sprocket Feed Only)				—	—	—	—	●	●	—	—	*
b. 72 Characters — Printed line not centered.				—	—	—	—	O	●	—	—	
c. 80 Characters §				—	—	—	—	●	O	—	—	‡
d. 72 Characters — Printed line centered. (Friction Feed Only) §				—	—	—	—	O	●	—	—	

433. EOT Response				SPD4							
				1	2	3	4	5	6	7	8	
a. Disconnect or turn off Term Ready on received EOT.				—	—	—	O	—	—	—	—	*
b. Does not disconnect or turn off Term Ready on received EOT.				—	—	—	●	—	—	—	—	

434. Character Parity Bit Sent. †				SPD4							
				1	2	3	4	5	6	7	8	
a. Even Parity				—	—	O	—	—	—	—	—	*
b. 8th Bit Mark				—	—	●	—	—	—	—	—	

435. End-of-Line on Receive				SPD4							
				1	2	3	4	5	6	7	8	
a. Auto CR-LF performed.				O	—	—	—	—	—	—	—	*
b. Bell & Print Inhibit at last char. position.				●	—	—	—	—	—	—	—	

● Indicates toggle or slide position to ON.
O Indicates toggle or slide position to OFF.
— Position of switch does not affect option.
* Factory furnished state of option.
† KSR only

‡ On friction feed terminals, 432c (80 Characters) is factory furnished. 432a (132 Characters) should not be selected.
§ LEFT-HAND MARGIN adjustment must be performed.

RO ONLY

436. Speed Control	SPB5			
	1	2	3	4
a. 30 Characters/Sec	—	○	—	—	*
b. 10 Characters/Sec	—	●	—	—	

437. Print substitute character ■ on odd parity received.	SPB5			
	1	2	3	4
a. Print ■ on odd parity received.	○	—	—	—	*
b. Ignore parity.	●	—	—	—	

ANSWER-BACK ONLY

438. Answer-Back on HERE IS	SPA5							
	1	2	3	4	5	6	7	8
a. Yes	—	—	—	—	—	—	●	—	*
b. No	—	—	—	—	—	—	○	—	
439. Answer-Back on ANSWER	SPA5							
	1	2	3	4	5	6	7	8
a. Yes	—	—	—	—	●	—	—	—	*
b. No	—	—	—	—	○	—	—	—	
440. Answer-Back on ENQ	SPA5							
	1	2	3	4	5	6	7	8
a. Yes	—	—	—	—	—	—	—	●	*
b. No	—	—	—	—	—	—	—	○	

● Indicates toggle or slide position to ON.
○ Indicates toggle or slide position to OFF.
— Position of switch does not affect option.
* Factory furnished state of option.

441. Type of Interface Unit	SPA5							
	1	2	3	4	5	6	7	8
a. Terminal Data Unit (TDU)	—	—	—	—	—	●	—	— *
b. TAU, TAU1, TAU2 or no Interface Unit	—	—	—	—	—	○	—	—
442. Local Copy of Answer-Back	SPA5							
	1	2	3	4	5	6	7	8
a. Yes	—	—	—	●	—	—	—	— *
b. No	—	—	—	○	—	—	—	—

443. Character Parity Bit Sent from Answer-Back	SPA5							
	1	2	3	4	5	6	7	8
a. Even Parity	●	●	—	—	—	—	—	— *
b. 8th Bit Mark	○	○	—	—	—	—	—	—

444. Blinding of ENQ Recognition	SPA5							
	1	2	3	4	5	6	7	8
a. Auxiliary Sender controls (HDX only) (Aux Pin 4)	--	—	●	—	—	—	—	— *
b. Auxiliary Sender cannot blind	—	—	○	—	—	—	—	—

● Indicates toggle or slide position to ON.
○ Indicates toggle or slide position to OFF.
— Position of switch does not affect option.
* Factory furnished state of option.

5.   OPTION CHECKOUT

TABLE A

LOOPBACK MODE PROCEDURES

PROCEDURE	RESPONSE
(RO) Remove RO Operator Console and install KSR Operator Console.	
W/TDU — Depress TERM READY (AUTO ANSW) key. Depress ESC key. Hold SHIFT key depressed and depress [> .] key.	TERM READY (AUTO ANSW) turns on, if not already on. TERM READY (AUTO ANSW) goes off. DATA turns on. ALARM flashes.
W/TAU, TAU1, or TAU2 — LINE INTERFACE: Connect the test arrangement shown on Page 1-24 to the interface connector. Connect Carrier Detect Pin 8 to Data Term Ready Pin 20. Turn on Teleprinter POWER switch. W/TTL INTERFACE — Connect the test arrangement shown on Page 1-24 to the interface connector. Connect Terminal Ready Pin 5 to Data Ready Pin 15. Turn on Teleprinter POWER switch.	Print head returns to left-hand margin. Printer performs one line feed. DATA turns on.

TABLE B

ON-LINE MODE PROCEDURES
(Teleprinters with TDUs)

RO

STATION UNDER TEST		TEST CENTER	
PROCEDURE	RESPONSE	PROCEDURE	RESPONSE
Verify TERM READY is on.		Set up operating speed.	
	DATA turns on. TERM READY goes off.	Call station under test. Go to Data mode.	Answering data tone will be heard.

KSR

STATION UNDER TEST		TEST CENTER	
PROCEDURE	RESPONSE	PROCEDURE	RESPONSE
With power on and AUTO ANSW lit, depress LOCAL-TALK key and place DUPLEX key in UP position (HALF-DUPLEX).	LOCAL-TALK turns on.		
Place CAPS LOCK key in DOWN position. Depress RETURN and LINE FEED keys.	Print head is returned to left-hand margin. Paper feeds to next line.		
Call test center and request 43 KSR Teleprinter on-line option test. Provide testing station with phone number of station, operating speed and option numbers to be tested. Agree that testing station will call back after disconnect.		Set up operating speed as indicated by station under test.	

TABLE C

OPTIONS CHECKOUT PROCEDURES

Note: All switches except those indicated for the option being checked must be in the factory furnished state while performing the options checkout procedures.

CHECK	PROCEDURE	RESPONSE
Option 431.b., c., and d.	Depress and hold PRINTER TEST key.	Characters printed as in Fig. 5. Bell sounds at end of each line.

(Option 431.b.)

● !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑← abcdefghijklmnopqrstuvwxyz{|}~

(Option 431.c.)

● !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑← `abcdefghijklmnopqrstuvwxyz{|}~

(Option 431.d.)

● !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]` `abcdefghijklmnopqrstuvwxyz{|}~

Fig. 7--Printer Test Message

CHECK	PROCEDURE	RESPONSE
Option 432.b. and c.	Depress and hold PRINTER TEST key.	Line length will be: 432.b. — 72 characters 432.c. — 80 characters Characters printed as in Fig 6. Bell sounds at end of each line.

*(Option 432.b.)

Note: The lower case "g" does not print on 72 character lines.

● !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdef
hijklmnopqrstuvwxyz{|}~
● !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdef
hijklmnopqrstuvwxyz{|}~

*(Option 432.c.)

Note: The lower case "o" does not print on 80 character lines.

● !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
pqrstuvwxyz{|}~
● !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
pqrstuvwxyz{|}~

*Sprocket Feed (approximately 13 characters per inch), Friction Feed (10 characters per inch)

Fig. 8--Printer Test Message

TABLE C (Cont)

OPTIONS CHECKOUT PROCEDURES

CHECK		PROCEDURE	RESPONSE
Option 433.b.	Off-Line	Place teleprinter in Loopback mode. (See Table A.) Depress DUPLEX key to DOWN position (FULL DUPLEX). Depress the following keys: ABC Hold CTRL key depressed and depress [EOT] key.	Printer will print ABC. DATA remains on (does not flash). TERM READY (AUTO ANSW) remains off (does not flash) as EOT key is depressed.
	On-Line (TDU only)	Place teleprinter in On-line mode. (See Table B.) TEST CENTER Send the following message ending with EOT: 43 TELEPRINTER	STATION UNDER TEST 43 TELEPRINTER will be printed. DATA remains on. AUTO ANSW remains off.
Option 434.b. (KSR only)	Off-Line	Place teleprinter in Loopback mode. (See Table A.) Depress DUPLEX key to DOWN position (FULL DUPLEX). Depress and release PARITY key to UP position (PARITY ON). Place CAPS LOCK key in DOWN position. Depress the following keys: PARITY TEST	Printer will print: ■■RIT■ TE■T
	On-Line (TDU only)	Place teleprinter in On-line mode. (See Table B.) TEST CENTER Set up to check even parity. STATION UNDER TEST Type the following test message on the operator console: THE QUICK BROWN FOX	TEST CENTER Test Center receives message ■ Indicates even parity error. T■E Q■IC■ ■ROW■ FOX

TABLE C (Cont)

OPTIONS CHECKOUT PROCEDURES

CHECK		PROCEDURE	RESPONSE
Option 435.b.		Place teleprinter in Loopback mode. (See Table A.)	Characters will be printed until end of line is reached.
	Off-Line	Depress DUPLEX key to DOWN position (FULL DUPLEX).	Automatic return and line feed will not be performed.
		Depress REPT and K keys. Hold down until end of line is reached.	Bell will sound continuously until keys are released.
	On-Line (TDU only)	Place teleprinter in On-line mode. (See Table B.)	
		TEST CENTER	STATION UNDER TEST
		Send the following message in Full Duplex mode: ESC x (lower case) LF four spaces ESC L (lower case) six spaces ESC r (lower case) CR LF ESC < two lines of repeat Ks ESC x (lower case) Send ESC = Note: CR = Carriage Return LF = Line Feed < = Hold shift key depressed when depressing < key.	ALARM flashes. Printer will print one line of Ks between columns 5 and 10. Automatic return and line feed will not be performed. Bell will sound until message is completed. Print head returns to left-hand margin and indicates beginning of line. ALARM turns off.
Option 436.b. (RO only)		Place teleprinter in Loopback mode. (See Table A.)	Continuous Ks will be printed across entire line.
		Depress DUPLEX key to DOWN position (FULL DUPLEX).	Bell rings at end of line and automatic return and line feed will be performed.
		Place CPS key in DOWN position (10 CPS).	One printed line plus return will occur in approximately: 14 seconds (sprocket feed) 8.5 seconds (friction feed).
	Off-Line	Depress REPT and K keys. Hold down until two lines of Ks are printed.	First part of second line (approximately 18 characters) will be printed at a faster rate of speed.
		Measure continuity between pins 4 and 17 on RO opcon connector.	Meter should read 0 ohms.
	On-Line (TDU only)	Place teleprinter in On-line mode (See Table B.)	
		TEST CENTER	STATION UNDER TEST
		Send the "FOX" test message at (10 CPS) to station under test.	"FOX" test message will be printed.

TABLE C (Cont)

OPTIONS CHECKOUT PROCEDURES

CHECK		PROCEDURE	RESPONSE
Option 437.b. (RO only)		Enable Option 434.b. Place teleprinter in Loopback mode. (See Table A.) Place CAPS LOCK key in DOWN position. Depress DUPLEX key to DOWN position (FULL DUPLEX).	
	Off-Line	Depress the following keys: PARITY TEST Measure continuity between pins 4 and 20 on RO opcon connector.	Printer will print: PARITY TEST. Meter should read 0 ohms.
	On-Line (TDU only)	Place teleprinter in On-line mode. (See Table B.) TEST CENTER Send the following message (8th Bit Marking) PARITY TEST	STATION UNDER TEST Printer will print: PARITY TEST
Option 438.b. (KSR with Answer-Back only)		Place teleprinter in Loopback mode. (See Table A.) Place DUPLEX key in UP position (HALF-DUPLEX).	Answer-Back message does not print.
	Off-Line	Hold CTRL key depressed and depress [ ] key.	
	On-Line (TDU only)	Place teleprinter in On-line mode. (See Table B.) STATION UNDER TEST Hold CTRL key depressed and depress [ ] key.	TEST CENTER Answer-Back message does not print.

TABLE C (Cont)

OPTIONS CHECKOUT PROCEDURES

CHECK		PROCEDURE	RESPONSE
Option 439.b. (with Answer-Back only)		Place teleprinter in Loopback mode. (See Table A.) Place DUPLEX key in UP position (HALF-DUPLEX).	
	Off-Line	W/TDU — Depress ESC and then [.] key. Place DUPLEX key in UP position (HALF-DUPLEX). Wait 6 seconds, then depress ESC key. Hold SHIFT key depressed and depress [> .] key.	ALARM turns off. ALARM flashes. DATA turns on. Answer-Back message does not print.
		W/TAU, TAU1 OR TAU2 — LINE INTERFACE: Remove strap from Send Data pin 2 to Rec Data pin 3. (Perform the following procedures within 6 seconds.) Disconnect wire from Carrier Detect pin 8 and momentarily connect to Ring Indicator pin 22, then reconnect to pin 8.	Answer-Back message does not print.
		W/TTL INTERFACE — Remove strap from Send Data pin 19 to Rec Data pin 17. (Perform the following procedures within 6 seconds.) Disconnect wire from Term Ready pin 5 and connect to +5 V pin 7. Connect strap between +12 V pin 3 and Ring Indicator pin 12. Immediately disconnect wire from pin 7 and reconnect to pin 5.	Answer-Back message does not print.
	On-Line (TDU only)	Place teleprinter in On-line mode. (See Table B.)	
		TEST CENTER Data Test Center will disconnect call and then recall station under test.	STATION UNDER TEST Phone rings once. DATA turns on. AUTO ANSW goes off. Answer-Back message does not print.

TABLE C (Cont)

OPTIONS CHECKOUT PROCEDURES

CHECK	PROCEDURE		RESPONSE
Option 440.b. (with Answer-Back only)	Off-Line	Place teleprinter in Loopback mode. (See Table A.)	
		Place DUPLEX key in UP position (HALF-DUPLEX).	
		W/TAU, TAU1, TAU2 or TTL INTERFACE — Depress ESC key.	
		Hold SHIFT key depressed and depress [> .] key.	ALARM flashes.
		Hold CTRL key depressed and depress [ ] key.	Answer-Back message does not print.
	On-Line (TDU only)	Place teleprinter in On-Line mode. (See Table B.)	
		TEST CENTER	STATION UNDER TEST
		Data Test Center sends CTRL E "ENQ".	Answer-Back message does not print.
Option 441 (with Answer-Back only)		Must match type of interface unit — Refer to Off-Line Test Procedures steps 32.a., 50, and 51.	
Option 442.b. (with Answer-Back only)	Off-Line	Place teleprinter in Loopback mode. (See Table A.)	
		Place DUPLEX key in UP position (HALF-DUPLEX).	
		W/TAU, TAU1, TAU2 OR TTL INTERFACE — Depress ESC key.	
		Hold SHIFT key depressed and depress [> .] key.	ALARM flashes
		Hold CTRL key depressed and depress [ ] key.	Answer-Back message does not print.

TABLE C (Cont)

OPTIONS CHECKOUT PROCEDURES

CHECK		PROCEDURE	RESPONSE
	On-Line (TDU only)	Place teleprinter in On-Line mode. (See Table B.)	
		<u>TEST CENTER</u>	<u>STATION UNDER TEST</u>
		Data Test Center sends CTRL E "ENQ".	Answer-Back message does not print.
		Answer-back message is received.	
Option 443.b. (with Answer-Back only)	Off-Line	Place teleprinter in Loopback mode. (See Table A.)	
		Depress and release PARITY key to UP position (PARITY ON).	
		Place DUPLEX key in UP position (HALF-DUPLEX).	Answer-Back message will be printed with substitute character (■) on parity error.
		Hold CTRL key depressed and depress ▨ key.	
	On-Line (TDU only)	Place teleprinter in On-Line mode. (See Table B.)	
		Depress and release PARITY key to UP position (PARITY ON).	
		<u>TEST CENTER</u>	<u>STATION UNDER TEST</u>
		Data Test Center sends CTRL E "ENQ".	Answer-Back message will be printed with substitute character (■) on parity error.
		Answer-Back message will be received with 8th bit marking.	
Option 444.b. (with Answer-Back only)	Off-Line	W/TAU2 AUX PORT INTERFACE: Place teleprinter in Loopback mode. (See Table A.)	
		Connect Clear to Send pin 5 to Request to Send pin 4.	
		Place DUPLEX key in UP position (HALF-DUPLEX).	Answer-Back message is printed.
		Hold CTRL key depressed and depress ▨ key.	

Note: Options 433 through 444 — Depress LOCAL (LOCAL-TALK) key to terminate checkout procedure. Disconnect Interface Test arrangement, if present. Replace RO operator console if removed.

43 BASIC KSR TELEPRINTER

TROUBLESHOOTING

1. GENERAL

1.01 This section provides troubleshooting information for the 43 Basic KSR Teleprinter.

1.02 Troubleshooting is based on isolation of troubles to major components and the correction of troubles by replacement of these components or by reference to the component troubleshooting sections.

1.03 All ordering numbers shown in this manual are Teletype Corporation part numbers.

1.04 Component troubleshooting sections are:
      Page 2-1   43 Printer
      Page 3-1   43 Basic Operator Console (Opcon)

1.05 Trouble isolation provided in this section is intended for use by the craftsperson at the same location as the station. Troubles may occur either during an installation, a routine maintenance visit or as the result of a customer trouble report.

1.06 Trouble isolation for the attendant is provided in the How to Operate Manual 367, Page 5-1.

1.07 To facilitate trouble correction, the recommended maintenance spares as listed on Page 1-111 should be available. In addition, parts for the repair of components as listed on Page 2-35, Page 3-15, and Page 4-3 for the printer, operator console and enclosures and paper handling should be available.

1.08 For component access, refer to Disassembly/Reassembly, Page 1-96 and Options, Page 1-23.

1.09 For location and identification of station components, refer to Page 1-111.

1.10 When replacement of the print head, logic card or opcon corrects the trouble, additional checks should be made to isolate and possibly correct the trouble without returning for repair.

On the print head — check cable continuity.
On the logic card — check terminal unit and power supply cables or fuse.
On the opcon — check the cable and keyswitches per opcon troubleshooting.

1.11 When replacement of a component does not correct the trouble, the original component should be reinstalled before going to the next step of the trouble analysis. If there are no more steps provided, go to the last question.

1.12 Circuitry used in the operator console can be damaged by high static voltage discharge. The 346392 wrist strap is available to ground service personnel.

1.13 When returned to the Teletype Product Service Center for repair, the set or components should be packed in the container in which the replacement is received. This includes the conductive (black) plastic bag used with the opcon and logic card for static protection.

1.14 Components returnable for repair and referred to in this section for replacement are:

430850 Print Head
43K101/CAA and CAB Operator Console
410710 Answer-Back Card
410740 Logic Card
410754 Terminal Auxiliary Unit (TAU2)
410755 Terminal Auxiliary Unit (TAU1)
430700 Power Supply
430750 Terminal Data Unit
430751 Terminal Auxiliary Unit

1.15 Before disconnecting the internal cables or replacing circuit cards, turn off ac

power. Make certain the power cord is connected to a properly polarized and grounded ac outlet.

1.16 Refer to 2. TROUBLESHOOTING FLOW DIAGRAM for the intended flow of troubleshooting procedures.

1.17 Trouble analysis is presented in the form of a "20 Questions" routine in 3. TROUBLESHOOTING GUIDE. The guide, with questions and yes or no columns, should be used always starting with the first question and proceeding according to the "yes" or "no" directive.

2. TROUBLESHOOTING FLOW DIAGRAM.

USING PAGE 1-38

USING MANUAL 367, PAGE 5-1

USING CUSTOMER DEVELOPED PROCEDURES

USING PAGE 1-38

USING
PAGE 1-23
PAGE 1-64
PAGE 2-1
PAGE 3-1

3. TROUBLESHOOTING GUIDE (Teleprinter with TDU)

QUESTION	YES	NO
1. Are any of the three communications mode indicators lit? (Power available and set power on.) (Depress other keys if proper indicator not lit.)	Go to 2.	Go to 1a.
1a. Is there any indication of power in the set? (Indicators flash when power is turned on and off, red lamp on power supply, etc.)	Go to 1b.	Check and replace set F1 fuse if blown. Replace power supply if fuse blows again. If not blown go to 1b.
1b. Is red lamp on power supply lit?	Check P107 opcon cable connector. Replace logic card. Replace opcon.	Disconnect power supply cable. Go to 1c.
1c. Does red lamp on power supply now light?	Unplug TDU, answer-back card (if present) opcon and printer cables (6). Reconnect power supply cable. Go to 1d.	Check F2 fuse on power supply. Replace if blown. Replace power supply. Replace rear frame assembly.
1d. Does red lamp on power supply still light?	Go to 1e.	Replace logic card.
1e. Does red lamp on power supply go out after the TDU, opcon, answer-back card and printer cables are reconnected one at a time?	Replace the TDU, opcon, answer-back card or the printer component (refer to printer troubleshooting) that caused lamp to extinguish.	Intermittent short. Check for foreign objects between circuit lands or terminals.
2. Does AUTO ANSW indicator light when power is turned on?	Go to 3.	Go to 2a.
2a. Does ALARM indicator: 1. Flash? 2. Light (cover closed and paper installed?)	1. Replace logic card. 2. Replace opcon or refer to printer trouble-shooting.	Go to 2b.
2b. Does AUTO ANSW indicator light when depressed?	Replace logic card.	Replace opcon.

QUESTION	YES	NO
3. Does LOCAL TALK indicator light when depressed?	Go to 4.	Go to 3a.
3a. Does AUTO ANSW indicator go out?	Replace logic card.	Replace opcon.
4. Does AUTO ANSW indicator light when depressed?	Go to 5.	Replace opcon.
5. Does test message print and perform properly while the PRINTER TEST key is depressed?	Go to 6.	Check options 431 and 432. Go to 5a.
5a. Is red lamp on power supply lit?	Go to 5c.	Disconnect power supply cable. Go to 5b.
5b. Does red lamp on power supply now light?	Reconnect power supply cable. Unplug print head and motor cables then reconnect one at a time to isolate cause of lamp not lit. Replace defective component (refer to printer troubleshooting).	Replace power supply.
5c. Does anything print or perform?	Go to 5d.	Place printer test bypass switch SPD4-2 on logic card to ON position. If ok replace opcon. Replace logic card.
5d. Does anything print?	**Go to 5e.**	Replace logic card. Refer to printer troubleshooting.
5e. Are characters properly formed?	Go to 5f.	Refer to printer troubleshooting. Replace logic card.
5f. Are the proper characters printed?	Go to 5g.	Replace logic card.
5g. Is print density acceptable (good ribbon)?	May be undefined printing problem. Refer to printer troubleshooting. Replace logic card. Go to 5h.	Refer to printer troubleshooting.

	QUESTION	YES	NO
5h.	Does paper feed properly (paper supply free)?	Go to 5i.	Check F3 fuse on logic card. Replace line feed motor if fuse blows again. Refer to printer trouble-shooting. Replace logic card.
5i.	Does print head space and return properly?	Undefined problem in printer test functions. Refer to printer trouble-shooting.	Refer to printer trouble-shooting. Replace logic card.
6.	Did ALARM indicator light during printer test?	Go to 7.	Go to 6a.
6a.	Does ALARM indicator light when cover is opened?	Replace logic card.	Replace opcon.
7.	Does ALARM indicator light when 1. paper is out and when 2. cover is opened?	Go to 8.	1. Check printer trouble-shooting. 2. Replace opcon. 3. Replace logic card.
8.	Do all characters print and functions (except bell and margin set) perform when the keys on the keyboard are operated (local talk mode)?	Go to 9.	Replace opcon. Replace logic card.
9.	Does signal bell ring on CTRL G?	Go to 10.	Go to 9a.
9a.	Did signal bell ring during printer test?	Replace logic card. Replace opcon.	Check P106 bell connector. Refer to printer (bell) trouble-shooting. Replace logic card.
10.	Does signal bell ring eight characters before right margin and at left and right margins?	Go to 11.	Replace logic card.
11.	Are margins set and cleared properly?	Go to 12.	Check column indicator positioning adjustment. Replace logic card.

QUESTION	YES	NO
12. Does printer respond properly to keyboard operated in analog loopback mode? (Entered from keyboard by ESC > sequence (data mode). Ended by ESC = sequence.)	Go to 13.	Check P301 connector. Bypass answer-back card, if present. Go to 12a.
12a. Does printer now respond properly to keyboard operated in analog loopback mode?	Replace answer-back card.	Reconnect answer-back card. Replace Terminal Data Unit. Replace logic card.
13. Did 1. ALARM indicator flash and 2. DATA indicator light during analog loopback?	Go to 14.	1. Replace logic card. 2. Replace opcon.
14. Does telephone operate normally in both local talk mode and with set power off?	Go to 15.	Check that modular cords are properly connected at rear of teleprinter and phone. Go to 14a.
14a. Does telephone operate normally (dial tone, dial, talk, ring) when connected directly to line using modular cord that was connected to the teleprinter?	Check modular cord originally between set and phone. If ok Replace Terminal Data Unit. Replace logic card.	Check tip and ring of phone line for 48 V dc. (Use 150 V or higher scale.) Check proper polarity (if no touch tone dial). Check phone resistance on-hook (capacitors only), off-hook (600 ohms). Correct wiring of phone lines or replace phone as indicated.
15. Does DATA indicator flash when depressed in local talk mode? (Handset on hook.)	Go to 16.	Replace opcon. Replace logic card.
16. Does phone ring repeatedly in automatic answer mode?	Replace Terminal Data Unit. Replace logic card.	Go to 17.
17. Does DATA indicator light following a received call in automatic answer mode?	Go to 18.	Remote station must also go to data mode. Check that modular cords are not reversed. Bypass answer-back card, if present. Go to 17a.

QUESTION	YES	NO
17a. Does DATA indicator now light following a received call in automatic answer mode?	Replace answer-back card.	Replace TDU. Replace logic card. Go to 28.
18. Are data messages properly sent and received in the data mode?	Go to 19.	Go to 18a.
18a. Do PARITY, DUPLEX and CPS keys alternately lock down then release up when depressed?	Go to 19.	Replace defective key switch.
19. Can any data be received?	With answer-back go to 19a. Without answer-back go to 20.	Go to 28.
19a. Is answer-back message properly sent and/or printed under all conditions.	Go to 20.	Check options 438 thru 444. Replace answer-back card.
20. Does substitute character print on some characters (PARITY key on)?	Remote station may be sending incorrect parity or be at different speed. Go to 25.	Go to 21.
21. Does printer copy and data transmit properly in half-duplex? (DATA indicator lit.)	Go to 22.	Check option 434. Replace opcon. Replace logic card. Go to 28.
22. Is printer blinded to keyboard transmission in full duplex? (DATA indicator lit.)	Go to 23.	Replace opcon. Replace logic card.
23. Does the carriage return automatically when characters to the right of the right hand margin are received (DATA indicator lit)?	Go to 24.	Check option 435. Replace logic card.
24. Does call disconnect on received EOT and when carrier is not received (in data mode)?	Go to 25.	Check option 433. Replace logic card. Replace TDU.

QUESTION	YES	NO
25. Is INTRPT indicator lit? (Interrupt received.)	Go to 25a.	Go to 26.
25a. Does INTRPT indicator go off when depressed?	Go to 26.	Replace opcon. Replace logic card. Go to 28.
26. Does INTRPT indicator light briefly and bell ring when INTRPT indicator is depressed?	Go to 27.	Replace opcon. Replace logic card.
27. Does remote station receive interrupt?	Go to 29.	Go to 28.
28. Does station pass on-line end-to-end tests with Test Center?	Trouble (if any) is in remote station.	Perform distortion, dBm level, or other parameter tests including digital loopback under control of Test Center to isolate trouble to line, TDU, answer-back card, or logic card.
29. Is trouble present but not defined by Questions 1 to 28?	Refer to printer or opcon troubleshooting for other symptoms. Replace opcon, power supply, TDU, logic card, answer-back card, and/or print head to correct trouble.	

4.   TROUBLESHOOTING GUIDE (Teleprinter without TDU)

QUESTION	YES	NO
1. Are any of the three communications mode indicators lit? (Power available and set power on.) (Depress other keys if proper indicator not lit.)	Go to 2.	Go to 1a.
1a. Is there any indication of power in the set? (Indicators flash when power is turned on and off, red lamp on power supply, etc.)	Go to 1b.	Check and replace set F1 fuse if blown. Replace power supply if fuse blows again. If not blown go to 1b.
1b. Is red lamp on power supply lit?	Check P107 opcon cable connector. Replace logic card. Replace opcon.	Disconnect power supply cable. Go to 1c.
1c. Does red lamp on power supply now light?	Unplug terminal unit and answer-back card, if present, opcon and printer (6) cables. Reconnect power supply cable. Go to 1d.	Check F2 fuse on power supply. Replace if blown. Check SW1 switch on rear frame assembly. Replace if blown. Replace power supply. Replace rear frame assembly.
1d. Does red lamp on power supply still light?	Go to 1e.	Replace logic card.
1e. Does red lamp on power supply go out after the terminal unit, opcon, answer-back card and printer cables are reconnected one at a time?	Replace the terminal unit, opcon, answer-back card or the printer component (refer to printer troubleshooting) that caused lamp to extinguish.	Intermittent short. Check for foreign objects between circuit lands or terminals.

2.   Does ALARM indicator:
    1. Flash?
    2. Light (cover closed and   paper installed)?
	1. Replace logic card.
	
	2. Replace opcon or refer to printer trouble- shooting.
		Go to 3.

QUESTION	YES	NO
3. Does LOCAL indicator light when depressed?	Go to 4.	Go to 3a.
3a. Does DATA indicator go out?	Replace logic card.	Replace opcon.
4. Does test message print and perform properly while the PRINTER TEST key is depressed?	Go to 5.	Check option 431 and 432. Go to 4a.
4a. Is red lamp on power supply lit?	Go to 4c.	Disconnect power supply cable. Go to 4b.
4b. Does red lamp on power supply now light?	Reconnect power supply cable. Unplug print head and motor cables then reconnect one at a time to isolate cause of lamp not lit. Replace defective component (refer to printer troubleshooting).	Replace power supply.
4c. Does anything print or perform?	Go to 4d.	Place printer test bypass switch SPD4-2 on logic card to ON position. If ok replace opcon. Replace logic card.
4d. Does anything print?	Go to 4e.	Replace logic card. Refer to printer troubleshooting.
4e. Are characters properly formed?	Go to 4f.	Refer to printer troubleshooting. Replace logic card.
4f. Are the proper characters printed?	Go to 4g.	Replace logic card.
4g. Is print density acceptable (good ribbon)?	May be undefined printing problem. Refer to printer troubleshooting. Replace logic card. Go to 4h.	Refer to printer troubleshooting.

QUESTION	YES	NO
4h. Does paper feed properly (paper supply free)?	Go to 4i.	Check F3 fuse on logic card. Replace line feed motor if fuse blows again. Refer to printer troubleshooting. Replace logic card.
4i. Does print head space and return properly?	Undefined problem in printer test functions. Refer to printer troubleshooting.	Refer to printer troubleshooting. Replace logic card.
5. Did ALARM indicator light during printer test?	Go to 6.	Go to 5a.
5a. Does ALARM indicator light when cover is opened?	Replace logic card.	Replace opcon.
6. Does ALARM indicator light when 1. paper is out and when 2. cover is opened?	Go to 7.	1. Check printer troubleshooting. 2. Replace opcon. 3. Replace logic card.
7. Do all characters print and functions (except bell and margin set) perform when the keys on the keyboard are operated (local mode)?	Go to 8.	Replace opcon. Replace logic card.
8. Does signal bell ring on CTRL G?	Go to 9.	Go to 8a.
8a. Did signal bell ring during printer test?	Replace logic card. Replace opcon.	Check P106 bell connector. Refer to printer (bell) troubleshooting. Replace logic card.
9. Does signal bell ring eight characters before right margin and at left and right margins?	Go to 10.	Replace logic card.
10. Are margins set and cleared properly?	Go to 11.	Check column indicator positioning adjustment. Replace logic card.

QUESTION	YES	NO
11. Does printer respond properly to keyboard operation in loopback mode?	Go to 12.	Check P301 connector. Bypass answer-back card, if present. Go to 11a.
11a. Does printer now respond properly to keyboard operation in loopback mode?	Replace answer-back card.	Replace Terminal Unit (if present). Replace logic card.
12. Did ALARM indicator flash and DATA indicator light during loopback?	Go to 13.	Replace logic card. Replace opcon.
13. Does external device connected to line interface connector go to data mode (DATA indicator depressed, exclusion key lifted, etc)? (TTL interface — Data Ready, pin 15 on, 0 V)	Go to 14.	Go to 13a.
13a. Is Terminal Ready pin 5, TTL interface on, 0 V, TERM READY (AUTO ANSWER) on?	Go to 13c.	Bypass answer-back card, if present. Go to 13b.
13b. Is Terminal Ready pin 5, TTL interface now on, 0 V?	Replace answer-back card.	Reconnect answer-back card. Replace logic card.
13c. Does external device require Request to Send (line interface) to be on?	Use issue 2A logic card or strap ON in cable (Sets w/TAU). Sets with Terminal Unit — go to 13d.	Sets without Terminal Unit trouble is in external device. Sets with Terminal Unit — go to 13d.
13d. Is Data Term Ready pin 20 line interface on, +12V?	Go to 14a.	Replace TAU or TAU1. Sets w/TAU2 — go to 13e.
13e. Is Data Term Ready auxiliary pin 20 on, +12V?	Replace TAU2	Trouble is in external auxiliary device.
14. Does DATA indicator on opcon light when external device is in data mode?	Go to 15.	Go to 14a.

QUESTION	YES	NO
14a. Is line interface Clear to Send, pin 5, Carrier Detect pin 8, and Data Set Ready, pin 6 on, +12V? (Request to Send on if requested by external device (strapped or Issue 2A logic card present — Sets W/TAU).)	Go to 14c. Sets W/TAU2 — go to 14b.	Trouble in external device.
14b. Is Data Set Ready auxiliary pin 6 on, +12V?	Go to 14c.	Replace Terminal Unit.
14c. Does external auxiliary device go to the data mode?	Go to 14d.	Trouble is in external auxiliary device.
14d. Is TTL interface Data Ready, pin 15 on?	Replace logic card.	Bypass answer-back card. Go to 14e.
14e. Is TTL interface Data Ready, pin 15 now on?	Replace answer-back card.	Replace Terminal Unit.
15. Are data messages properly sent and received in the data mode?	Go to 18.	Go to 15a.
15a. Do PARITY, DUPLEX and CPS keys alternately lock down and release up when depressed?	Go to 16.	Replace opcon.
16. Can any data be received?	Go to 16a.	Replace logic card. Replace Terminal Unit. Go to 25.
16a. Is answer-back message properly sent and/or printed under all conditions?	Go to 17.	Check options 438 thru 444. Replace answer-back card.
17. Does substitute character print on some characters (PARITY key on)?	Remote station may be sending incorrect parity or be at different speed. Go to 22.	Go to 18.
18. Does printer copy and data transmit properly in half-duplex (DATA indicator lit)?	Go to 19.	Check option 434. Replace opcon. Replace logic card. Replace Terminal Unit. Go to 25.
19. Is printer blinded to keyboard transmission in full duplex (DATA indicator lit)?	Go to 20.	Replace opcon. Replace logic card.
20. Does the carriage return automatically when characters to the right of the right hand margin are received (DATA indicator lit)?	Go to 21.	Check option 435. Replace logic card.

QUESTION	YES	NO
21. Does Term Ready turn off momentarily on received EOT and when carrier is not received (in data mode) (call disconnect on switched network)?	Go to 22.	Check option 433. Replace logic card. Replace Terminal Unit if present.
22. Is INTRPT indicator lit? (Interrupt received.)	Go to 22a.	Go to 23.
22a. Does INTRPT indicator go off when depressed?	Go to 23.	Replace opcon. Replace logic card. Go to 25.
23. Does INTRPT indicator light briefly and bell ring when INTRPT indicator is depressed?	Go to 24.	Replace opcon. Replace logic card.
24. Does remote station receive interrupt?	Go to 26.	Go to 25.
25. Does station pass on-line end-to-end tests with Test Center?	Trouble (if any) is in remote station.	Perform distortion, dBm level, or other locally developed tests including digital loop-back under control of Test Center to isolate trouble to line, Terminal Unit, answer-back card if present, or logic card.
26. Is trouble present but not defined by questions 1 to 25?	Refer to printer or opcon troubleshooting for other symptoms. Replace opcon, power supply, Terminal Unit, answer-back card, logic card, and/or print head to correct trouble.	

43 BASIC RO TELEPRINTER

TROUBLESHOOTING

CONTENTS   PAGE

1. GENERAL

1.01   This section provides troubleshooting information for the 43 Basic RO Teleprinter.

1.02   Troubleshooting is based on isolation of troubles to major components and the correction of troubles by replacement of these components or by reference to the component troubleshooting sections.

1.03   All ordering numbers shown in this manual are Teletype Corporation part numbers.

1.04   Component troubleshooting sections are:

     Page 2-1   43 Printer
     Page 3-1   43 Basic Operator Console
                 (Opcon)

1.05   Trouble isolation provided in this section is intended for use by the craftsperson at the same location as the station. Troubles may occur either during an installation, a routine maintenance visit, or as the result of a customer trouble report.

1.06   Trouble isolation for the attendant is provided in the How To Operate Manual 372.

1.07   To facilitate trouble correction, the recommended maintenance spares as listed on Page 1-111 should be available. In addition, parts for the repair of components as listed on Page 2-35, Page 3-15, and Page 4-3 for the printer, operator console, and enclosures and paper handling should be available.

1.08   For component access, refer to the Disassembly/Reassembly, Page 1-96, and Options, Page 1-23.

1.09   When replacement of the print head, logic card or opcon corrects the trouble, additional checks should be made to isolate and possibly correct the trouble without returning for repair.

On the print head — check cable continuity.
On the logic card — check TDU or Terminal Unit, power supply cables or fuse.
On the opcon — check the cable and keyswitches per opcon troubleshooting.

1.10   When replacement of a component does not correct the trouble, the original component should be reinstalled before going to the next step of the trouble analysis. If there are no more steps provided, go to the last question.

1.11   When returned to the Teletype Product Service Center for repair, the set or components should be packed in the container in which the replacement is received. This includes the conductive (black) plastic bag used with the logic card for static protection.

1.12   Components returnable for repair and referred to in this section for replacement are:

    430850 Print Head
    43K001/AAA Operator Console
    430700 Power Supply
    410710 Answer-Back Card

410755 Terminal Auxiliary Unit (TAU1)
410740 Logic Card
430750 Terminal Data Unit
430751 Terminal Auxiliary Unit

1.13   Before disconnecting internal cables or replacing circuit cards, turn off ac power. Make certain power cord is connected to a properly polarized and grounded ac outlet.

1.14   Refer to 2. TROUBLESHOOTING FLOW DIAGRAM for the intended flow of troubleshooting procedures.

1.15   Trouble analysis is presented in the form of a "20 Questions" routine in 3. and 4. TROUBLESHOOTING GUIDE. The guide, with questions and yes or no columns, should be used always starting with the first question and proceeding according to the "yes" or "no" directive.

2. TROUBLESHOOTING FLOW DIAGRAM

```
                                              ┌──────────────────┐
                                              │    Replace       │
                                              │  Teleprinter     │
                                              └──────────────────┘

                          TEST NOT OK    ┌─────────────────────────┐
    ┌──────────────────┐  ───────────►   │ Isolate Trouble Using   │
    │ Install and Test │                 │   "20 Questions"        │
    └──────────────────┘                 └─────────────────────────┘
                          TEST OK
    ┌──────────────────┐                 ┌─────────────────────────┐
    │ Place in Service │                 │ Correct Trouble in      │
    └──────────────────┘                 │ Phone (if present)      │
 TEST OK                                 │ or Lines                │
                                         └─────────────────────────┘
    ┌──────────────────────┐
    │ Routine Maintenance  │
    │ and Test             │
    └──────────────────────┘

                  TEST NOT OK

    ┌──────────────────────────┐
    │ Customer Trouble Report  │
    │ to Telco Special Service │         USING MANUAL 372
    │ Center (Control Office)  │
    └──────────────────────────┘

    ┌────────────────────────────────┐
    │ Test, Analyze, Maintain Record │   USING CUSTOMER DEVELOPED
    │ Dispatch Craftsperson with     │   PROCEDURES
    │ Spares Indicated               │
    └────────────────────────────────┘

    ┌────────────────────────────────┐
    │ Operational Trouble Isolated   │   USING PAGE 1-52
    │ Using "20 Questions"           │
    │ Trouble Corrected              │
    └────────────────────────────────┘

    ┌────────────────────────────────┐   USING
    │ Options and Wiring             │   PAGE 1-23
    │ Printer and Opcon Trouble-     │   PAGE 1-64
    │ shooting and Correction        │   PAGE 2-1
    └────────────────────────────────┘   PAGE 3-1
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3. TROUBLESHOOTING GUIDE (Teleprinter With TDU)

QUESTION	YES	NO
1. Are any of the 3 mode indicators lit? (Power available and set power on.) (Depress other indicators if proper indicator is not lit.)	Go to 2.	Go to 1a.
1a. Is there any indication of power in the set? (Indicators flash when power is turned on and off, red lamp on power supply, etc.)	Go to 1b.	Check and replace set F1 fuse if blown. Replace power supply if fuse blows again. If not blown go to 1b.
1b. Is red lamp on power supply lit?	Check P107 opcon cable connector. Replace logic card. Replace opcon.	Disconnect power supply cable. Go to 1c.
1c. Does red lamp on power supply now light?	Unplug TDU, answer-back card (if present), opcon and printer cables (6). Reconnect power supply cable. Go to 1d.	Check F2 fuse on power supply. Replace if blown. Check SW1 switch on rear frame assembly. Replace if bad. Replace power supply. Replace rear frame assembly.
1d. Does red lamp on power supply still light?	Go to 1e.	Replace logic card.
1e. Does red lamp on power supply go out after the TDU, opcon, answer-back card and printer cables are reconnected one at a time?	Replace the TDU, opcon, answer-back card or the printer component (refer to printer troubleshooting) that caused lamp to extinguish.	Intermittent short. Check for foreign objects between circuit lands or terminals.
2. Does TERM READY indicator light when power is turned on?	Go to 3.	Go to 2a.
2a. Does ALARM indicator: 1. Flash? 2. Light (cover closed and paper installed)?	1. Replace logic card. 2. Replace opcon or refer to printer trouble-shooting.	Go to 3.
3. Does RESET indicator cause the printer to carriage return and line feed and turn on the TERM READY indicator when depressed (ALARM indicator off)?	Go to 4.	Replace opcon. Replace logic card.

QUESTION	YES	NO
4. Does PRINTER TEST key cause the printer to carriage return and line feed and turn on the TERM READY indicator when released?	Go to 5.	Replace opcon. Replace logic card.
5. Does test message print and perform properly while the PRINTER TEST key is depressed?	Go to 6.	Check option 431 and 432. Go to 5a.
5a. Is red lamp on power supply lit?	Go to 5c.	Disconnect power supply cable. Go to 5b.
5b. Does red lamp on power supply now light?	Reconnect power supply cable. Unplug print head and motor cables then reconnect one at a time to isolate cause of lamp not lit. Replace defective component (refer to printer troubleshooting).	Replace power supply.
5c. Does anything print or perform?	Go to 5d.	Place the printer test bypass switch SPD4-2 on logic card to ON position. If ok, replace opcon. Replace logic card.
5d. Does anything print?	Go to 5e.	Replace logic card. Refer to printer troubleshooting.
5e. Are characters properly formed?	Go to 5f.	Refer to printer troubleshooting. Replace logic card.
5f. Are the proper characters printed?	Go to 5g.	Replace logic card.
5g. Is print density acceptable (good ribbon)?	May be undefined printing problem. Refer to printer troubleshooting. Replace logic card. Go to 5h.	Refer to printer troubleshooting.

QUESTION	YES	NO
5h. Does paper feed properly (paper supply free)?	Go to 5i.	Check F3 fuse on logic card. Replace line feed motor if fuse blows again. Refer to printer trouble-shooting. Replace logic card.
5i. Does print head space and return properly?	Undefined problem in printer test functions. Refer to printer trouble-shooting.	Refer to printer trouble-shooting. Replace logic card.
6. Did ALARM indicator light during printer test?	Go to 7.	Go to 6a.
6a. Does ALARM indicator light when cover is opened?	Replace logic card.	Replace opcon.
7. Does ALARM indicator light when 1. paper is out and when 2. cover is opened?	Go to 8.	1. Check printer trouble-shooting. 2. Replace opcon. 3. Replace logic card.
8. Does signal bell ring on received CTRL G?	Go to 9.	Go to 8a.
8a. Did signal bell ring during printer test?	Replace logic card.	Check P106 bell connector. Refer to printer (bell) trouble-shooting. Replace logic card.
9. Does signal bell ring eight char-acters before right margin and at left and right margins?	Go to 10.	Replace logic card.
10. Are margins set and cleared properly?	Go to 11.	Check column indicator position-ing adjustment. Replace logic card.

	QUESTION	YES	NO
11.	Does DATA indicator light following a received call in automatic answer mode?	Go to 12.	Remote station must also go to data mode. Check that modular cords are not reversed. Replace TDU. Replace logic card. Go to 18.
12.	Are data messages properly sent and received in the data mode?	Go to 13.	Check options 436b and 437b. Go to 13.
13.	Can any data be received?	Go to 13a.	Replace logic card. Replace TDU. Go to 18.
13a.	Is answer-back message properly sent and/or printed under all conditions?	Go to 14.	Check options 438 through 444. Replace answer-back card.
14.	Does substitute character print on some characters (option 437a enabled)?	Remote station may be sending incorrect parity or be at different speed. Go to 17.	Go to 15.
15.	Does the carriage return automatically when characters to the right of the right-hand margin are received (DATA indicator lit)?	Go to 16.	Check option 435. Replace logic card.
16.	Does call disconnect on received EOT and when carrier is not received (in data mode)?	Go to 17.	Check option 433. Replace logic card. Replace TDU.
17.	Does station pass on-line end-to-end tests with Testing Station or Test Center?	Trouble (if any) is in remote station.	Perform distortion, dBm level, or other parameter tests including digital loopback under control of Test Center to isolate trouble to line, TDU, answer-back card, if present or logic card.
18.	Is trouble present but not defined by Questions 1 to 17?	Refer to printer or opcon troubleshooting for other symptoms. Replace opcon, power supply, TDU, logic card, answer-back card and/or print head to correct trouble.	

4. TROUBLESHOOTING GUIDE (Teleprinter Without TDU)

QUESTION	YES	NO
1. Are any of the 3 mode indicators lit? (Power available and set power on.) (Depress other keys if proper key not lit.)	Go to 2.	Go to 1a.
1a. Is there any indication of power in the set? (Indicators flash when power is turned on and off, red lamp on power supply, etc.)	Go to 1b.	Check and replace set F1 fuse if blown. Replace power supply if fuse blows again. If not blown go to 1b.
1b. Is red lamp on power supply lit?	Check P107 opcon cable connector. Replace logic card. Replace opcon.	Disconnect power supply cable. Go to 1c.
1c. Does red lamp on power supply now light?	Unplug terminal unit and answer-back card if present, opcon and printer (6) cables. Reconnect power supply cable. Go to 1d.	Check F2 fuse on power supply. Replace if blown. Replace power supply. Replace rear frame assembly.
1d. Does red lamp on power supply still light?	Go to 1e.	Replace logic card.
1e. Does red lamp on power supply go out after the terminal unit, opcon, answer-back card and printer cables are reconnected one at a time?	Replace the terminal unit, opcon, answer-back card or the printer component (refer to printer trouble-shooting) that caused lamp to extinguish.	Intermittent short. Check for foreign objects between circuit lands or terminals.
2. Does ALARM indicator: 1. Flash? 2. Light (cover closed and paper installed)?	1. Replace logic card. 2. Replace opcon or refer to printer trouble-shooting.	Go to 3.

QUESTION	YES	NO
3. Does RESET key cause the printer to carriage return line feed and turn on the TERM READY indicator when depressed (ALARM indicator off)?	Go to 4.	Replace opcon. Replace logic card.
4. Does PRINTER TEST key cause the printer to carriage return and line feed and turn on the TERM READY indicator when released?	Go to 5.	Replace opcon. Replace logic card.
5. Does test message print and perform properly while the PRINTER TEST key is depressed?	Go to 6.	Check option 431 and 432. Go to 5a.
5a. Is red lamp on power supply lit?	Go to 5c.	Disconnect power supply cable. Go to 5b.
5b. Does red lamp on power supply now light?	Reconnect power supply cable. Unplug print head and motor cables then reconnect one at a time to isolate cause of lamp not lit. Replace defective component (refer to printer troubleshooting).	Replace power supply.
5c. Does anything print or perform?	Go to 5d.	Place the printer test bypass switch SPD4-2 on logic card to ON position. If ok, replace opcon. Replace logic card.
5d. Does anything print?	Go to 5e.	Replace logic card. Refer to printer troubleshooting.
5e. Are characters properly formed?	Go to 5f.	Refer to printer troubleshooting. Replace logic card.
5f. Are the proper characters printed?	Go to 5g.	Replace logic card.
5g. Is print density acceptable (good ribbon)?	May be undefined printing problem. Refer to printer troubleshooting. Replace logic card. Go to 5h.	Refer to printer troubleshooting.

QUESTION	YES	NO
5h. Does paper feed properly (paper supply free)?	Go to 5i.	Check F3 fuse on logic card. Replace line feed motor if fuse blows again. Refer to printer trouble-shooting. Replace logic card.
5i. Does print head space and return properly?	Undefined problem in printer test functions. Refer to printer trouble-shooting.	Refer to printer trouble-shooting. Replace logic card.
6. Did ALARM indicator light during printer test?	Go to 7.	Go to 6a.
6a. Does ALARM indicator light when cover is opened?	Replace logic card.	Replace opcon.
7. Does ALARM indicator light when 1. paper is out and when 2. cover is opened?	Go to 8.	1. Check printer trouble-shooting. 2. Replace opcon. 3. Replace logic card.
8. Does signal bell ring on received CTRL G?	Go to 9.	Go to 8a.
8a. Did signal bell ring during printer test?	Replace logic card. Replace opcon.	Check P106 bell connector. Refer to printer (bell) trouble-shooting. Replace logic card.
9. Does signal bell ring eight characters before right margin and at left and right margins?	Go to 10.	Replace logic card.
10. Are margins set and cleared properly on-line?	Go to 11.	Replace logic card.

	QUESTION	YES	NO
11.	Does external device connected to interface connector go to data mode (data key depressed, exclusion key lifted, etc)? (TTL interface — Data Ready, pin 15 on, 0 V)	Go to 12.	Go to 11a.
11a.	Is Terminal Ready pin 5, TTL interface on, 0 V, TERM READY (AUTO ANSW) indicator on?	Go to 11c.	Bypass answer-back card if present, Go to 11b.
11b.	Is Terminal Ready pin 5, TTL interface now on, 0 V?	Replace answer-back card.	Reconnect answer-back card. Replace logic card.
11c.	Does external device require Request to Send (EIA interface) to be on?	Use Issue 2A logic card or strap ON in cable. (Sets w/TAU) Sets with terminal unit, go to 11d.	Sets without Terminal Unit — Trouble is in external device. Sets with Terminal Unit — Go to 11d.
11d.	Is Data Term Ready pin 20, EIA interface on, +12 V?	Trouble is in external device.	Replace Terminal Unit if present.
12.	Does DATA indicator on opcon light when external device in data mode?	Go to 13.	Go to 12a.
12a.	Is EIA interface Clear to Send, pin 5, Carrier Detect pin 8, and Data Set Ready, pin 6 on, +12 V. Request to Send on if required by external device (strapped or Issue 2A logic card present — sets w/TAU).	Go to 12b.	Trouble in external device.
12b.	Is TTL interface Data Ready, pin 15 on?	Replace logic card.	Bypass answer-back card. Go to 12c.
12c.	Is TTL interface Data Ready pin 15 now on?	Replace answer-back card.	Replace Terminal Unit.
13.	Are data messages properly sent and received in the data mode?	Go to 16.	Go to 13a.
14.	Can any data be received?	Go to 14a, sets with answer-back. Go to 15, sets without answer-back.	Replace logic card. Replace Terminal Unit if present. Go to 19.
14a.	Is answer-back message properly sent and/or printed under all conditions?	Go to 15.	Check options 438 through 444. Replace answer-back card.

QUESTION	YES	NO
15. Does substitute character print on some characters (option 437a. enabled)?	Remote station may be sending incorrect parity or be at different speed. (Check option 436.) Go to 18.	Go to 16.
16. Does the carriage return auto-matically when characters to the right of the right-hand margin are received (DATA indicator lit)?	Go to 17.	Check option 435. Replace logic card.
17. Does call disconnect on received EOT and when carrier is not received (in data mode)?	Go to 18.	Check option 433. Replace logic card. Replace Terminal Unit if present.
18. Does remote station receive interrupt?	Go to 20.	Go to 19.
19. Does station pass on-line end-to-end tests with Test Center?	Trouble (if any) is in remote station.	Perform distortion, dBm level, or other parameter tests, includ-ing digital loopback under control of Test Center to isolate trouble to line, terminal unit, answer-back card if present, or logic card.
20. Is trouble present but not defined by Questions 1 to 19?	Refer to printer or opcon troubleshooting for other symptoms. Replace opcon, power supply, terminal unit, answer-back card if pre-sent, logic card and/or print head to correct trouble.	

43 BASIC TELEPRINTER

WIRING

CONTENTS   PAGE

1.   GENERAL

1.01   This section provides wiring information for the 43 Basic Teleprinter. The wiring information provides proper component interconnection information.

1.02   For additional wiring information refer to Printer Wiring Page 2-4 and Operator Console Wiring Page 3-4.

1.03   Not all numbers shown on the station wiring appear on plugs and jacks.

2. STATION WIRING

43 BASIC KSR TELEPRINTER

TESTING

CONTENTS   PAGE

1.   GENERAL

1.01   This section provides testing information
        for the 43 Basic KSR Teleprinter.

1.02   An installation checkout should be per-
        formed after installation to make sure the
station is operable.

1.03   On trouble calls, an installation checkout
        should be performed after trouble cor-
rection to make sure the station is operable and a
trouble verification test should be performed
under the direction of a Test Center, if available,
to isolate specific troubles not covered in the
installation test. After correction of a trouble,
the test may be confined to the specific area
that was failing.

1.04   Following routine maintenance calls at a
        location, an installation checkout should
be performed.

1.05   The checkout routines are presented in
        table form with test conditions arranged
in a specific sequence. A response is given to
verify the test condition has passed.

1.06   Always perform the tests in the order
        given. The test steps are based on satis-
factory results of all previous steps.

1.07   If the indicated response is not obtained
        in any step of a test procedure, repeat the
step to make sure that the procedure has been
performed properly. If the results are still unsatis-
factory, refer to the KSR Teleprinter Trouble-
shooting, Page 1-38.

1.08   Teleprinters without TDUs must be asso-
        ciated with locally developed external
testing arrangements and procedures to perform
actual On-Line Tests. If test station is remote,
a copy of KSR On-Line Tests should be available
at the test station.

Note: The local tests specified in this section
simulate most On-Line Tests for these teleprinters.

1.09   On-Line Tests can be performed with re-
        mote Test Centers equipped with a 43
Teleprinter or equivalent as a test station.

1.10   Before an On-Line Test can be performed,
        the remote testing station or Test Center
must be provided with advance details about the
teleprinter under test, such as telephone number,
type of terminal (friction or sprocket), option
exceptions present, speed, etc.

PRELIMINARY CHECK

1.11   Before proceeding with the checkout pro-
        cedure, check the following:

   (a) Is the station connected to a properly
        grounded and polarized ac service?

   (b) Are all cable connectors fully seated?

   (c) Are printer paper and ribbon properly
        installed?

   (d) Are any option exceptions present? Re-
        fer to the Options Section, Page 1-23 and
reverse side of directory card.

Procedures in Off-Line and On-Line Tests are based on standard factory furnished options being present. If option exceptions are present, the test response will be as shown in Options section, Page 1-23.

1.12 All references to columns are after a one-second delay, to allow the print head to index two character spaces to the right. The print head indicates the next character position to be printed.

2. TEST EQUIPMENT

2.01 For teleprinters without a TDU, Off-Line Test Procedures are provided to simulate On-Line Tests where external communication test devices are not available. To perform these tests, the connector terminals, shown as follows, should be strapped before proceeding with the tests. The remaining terminals should be connected or measured as specified during the test steps.

Note: Contact Teletype Corporation Custom Systems Division for availability of a 43 Teleprinter Interface Test Box, CP10.002.001-1, which provides both arrangements shown as follows:

LINE INTERFACE CONNECTOR

TTL INTERFACE CONNECTOR

SEND DATA
RECEIVE DATA
CLEAR TO SEND
DATA SET READY
DATA TERM READY

RECEIVE DATA
SEND DATA
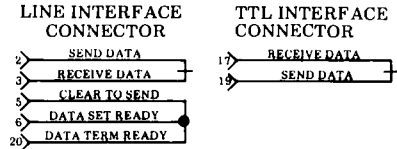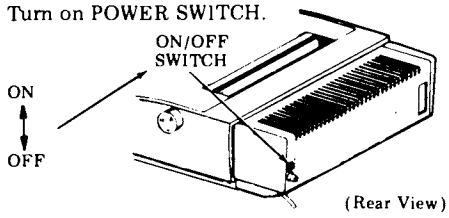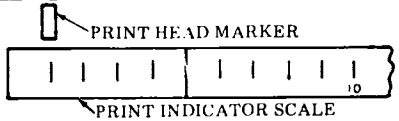
2.02 A volt-ohmmeter or equivalent means to measure +12 volts and +5 volts and perform continuity checks is required.

2.03 Steps 1 through 31 apply to all teleprinters. Steps 32 through 61 apply to all teleprinters unless otherwise indicated.

3. TESTING PROCEDURES

OFF-LINE TESTS (Installation and Trouble Call Checkout)

TABLE A
OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Power On/Off	1.	Turn on POWER SWITCH. ON/OFF SWITCH ON OFF (Rear View)	Print head returns to the left-hand margin. Paper feeds to next line. TERM READY (AUTO ANSW) turns on.
	2.	PRINT HEAD MARKER PRINT INDICATOR SCALE	Print head marker points to first mark on indicator scale.
Printer Option 431.a. 432.a.	3.	Hold PRINTER TEST key depressed until approximately eight lines are printed.	ALARM and LOCAL (LOCAL-TALK) turn on. Characters printed as in Fig. 1. (Refer to Options 431 and 432.b. and c. for any exceptions.) Bell rings at end of each line (Right-Hand Margin and Test Message).

Note 1: First line may start with any character for sprocket or friction feed printers.

```
lmnopqrstuvwxyz{|}
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_ abcdefghijklmnopqrstuvwxyz{|}'
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_ abcdefghijklmnopqrstuvwxyz{|}'
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_ abcdefghijklmnopqrstuvwxyz{|}'
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}"
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_ abcdefghijklmnopqrstuvwxyz{|}"
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_ `abcdefghijklmnopqrstuvwxyz{|}"
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_ `abcdefghijklmnopqrstuvwxyz{|}"
```

Sprocket Feed — Approximately 13 characters per inch

See Note 1.

Note 2: The lower case "o" does not print on 80 character line.

```
tuvwxyz{|}"
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
pqrstuvwxyz{|}"
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_ abcdefghijklmn
pqrstuvwxyz{|}"
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
pqrstuvwxyz{|}"
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
pqrstuvwxyz{|}"
```

Friction Feed — 10 Characters per inch

Fig. 1

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Printer (Cont)	4.	Release PRINTER TEST key.	ALARM turns off. Character printing stops.
Operator Console	5.	Hold CTRL key depressed and depress RETURN key.	Print head is returned to left-hand margin and paper feeds to next line.
	6.	Place CAPS LOCK key in DOWN position. Starting with top row and moving from left to right, depress unshaded keys in Fig. 2.	Characters printed as in Fig. 3.
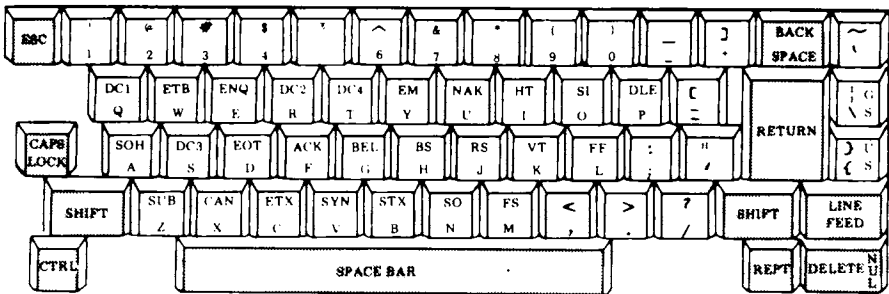
Fig. 2

1234567890-+`QWERTYUIOP=\ASDFGHJKL;'{ZXCVBNM,./

Fig. 3

1234567890-+`qwertyuiop=\asdfghjkl;'{zxcvbnm,./

Fig. 4

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Operator Console (Cont)	7.	Depress RETURN and then LINE FEED key.	Print head is returned to left-hand margin and paper feeds to next line.
	8.	Depress and release CAPS LOCK key so it returns to UP position. Starting with top row and moving left to right, depress each unshaded key in Fig. 2.	Characters printed as in Fig. 4.
	9.	Depress RETURN and then LINE FEED key.	Print head returns to left-hand margin and paper feeds to next line.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Operator Console (Cont)	10.	Hold left SHIFT key depressed and starting with top row and moving from left to right, depress each unshaded key in Fig. 5. Hold right SHIFT key depressed and depress [? /] key.	Characters printed as in Fig. 6.

Fig. 5

!@#$%^&*()_]'P[!:"}<>??
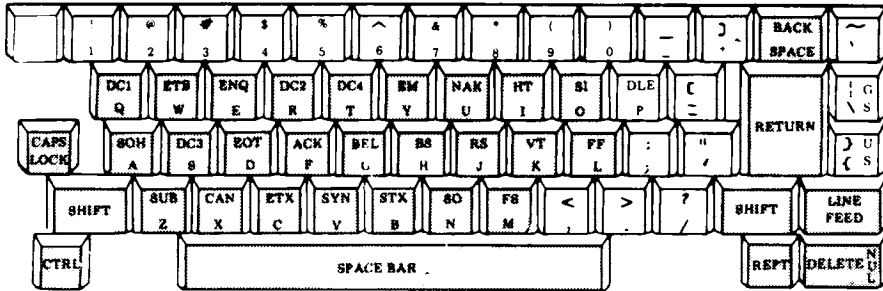
Fig. 6

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Operator Console (Cont)	11.	Depress RETURN and then LINE FEED key.	Print head returns to left-hand margin and paper feeds to next line.
	12.	Hold CTRL key depressed and depress [SUB Z] key.	SUB prints ■ .
	13.	Hold CTRL key depressed and depress [BEL G] key.	Signal bell rings.
	14.	Hold CTRL key depressed and depress [BS H] key.	Print head moves one character position to the left.
	15.	Depress SPACE BAR.	Print head moves one character position to the right.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Operator Console (Cont)	16.	Depress BACK SPACE key.	Print head moves one character position to the left.
	17.	Depress LINE FEED key. Depress and hold REPT and $\boxed{\begin{smallmatrix}VT\\K\end{smallmatrix}}$ keys.	Paper feeds to next line. The k is printed until end of line is reached. Signal bell rings at end of line.
Cover Inter-lock	18.	Depress TERM READY (AUTO ANSW) key. Raise cover.	TERM READY (AUTO ANSW) goes off. LOCAL (LOCAL-TALK) and ALARM turns on.
	19.	Close cover.	ALARM goes off.
Right Margin and Signal Bell	20.	Depress RETURN and then LINE FEED key.	Print head returns to left-hand margin and paper feeds to next line.
	21.	Space print head to column 125 (sprocket feed). Space print head to column 73 (friction feed). (See 1.12.) Depress $\boxed{\begin{smallmatrix}STX\\B\end{smallmatrix}}$ key.	Signal bell operates as character b is being printed.
	22.	Depress SPACE BAR six times.	Signal bell does not operate. Print head moves six character positions to the right.
	23.	Depress SPACE BAR two times.	Signal bell operates two times.
Margin Set and Clear (Remember Lower Case)	24.	Depress ESC and then $\boxed{\begin{smallmatrix}ETB\\W\end{smallmatrix}}$ key (ESC_W).	Print head returns to left-hand margin and paper feeds to next line.
	25.	Depress SPACE BAR nine times. Depress ESC and then $\boxed{\begin{smallmatrix}FF\\L\end{smallmatrix}}$ key. (ESC_L lower case.)	Print head moves to Column 10.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Margin Set and Clear (Cont)	26.	Space print head to Column 51. Depress ESC and then [DC2 R] key. (ESC$_r$) Depress RETURN key.	Print head returns to left margin (Column 10).
	27.	Depress BACK SPACE key.	Signal bell rings.
	28.	Space print head to Column 50. Depress SPACE BAR.	Signal bell operates. Print head indicates Column 51.
	29.	Depress SPACE BAR.	Signal bell rings. Print head remains at Column 51.
	30.	Depress ESC and then [FS M] key (ESC$_m$). Depress SPACE BAR four times.	Print head moves to Column 55.
	31.	Depress ESC and then [CAN X] key. (ESC$_x$)	Print head returns to left-hand margin and indicates beginning of line. Left and right margins are cleared.

On teleprinters without the Terminal Data Unit (TDU), turn off POWER switch and connect the test arrangement shown on Page 1-67 to the interface connector before proceeding to Step 32.

If the 43 Teleprinter Interface Test Box is available, connect the test box to the teleprinter interface connector (TTL, LINE, AUX-PORT). See instructions furnished with test box. Steps 32 through 61 may be omitted if on-line tests are performed instead.

Note: Not all tests performed in Steps 32 through 61 are checked in on-line tests.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES
SIMULATED ON-LINE TESTS (LOOPBACK)

TEST	STEP	PROCEDURE	RESPONSE
Setup	32.	Place teleprinter in Loopback mode: Perform 32.a., b., or c.	
	32.a.	W/TDU — Depress ESC and then [CAN X] key (Esc$_x$).	Print head returns to left-hand margin (Column 1) and indicates beginning of line.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Setup (Cont) Options 439.a. 441.a. 442.a. 443.a.	32.a. (Cont)	Place DUPLEX key in UP position (HALF-DUPLEX). Depress TERM READY (AUTO ANSW) key. Wait 6 seconds then depress ESC key. Hold SHIFT key depressed and depress ⬚ key.	TERM READY (AUTO ANSW) turns on. LOCAL (LOCAL-TALK) turns off. ALARM flashes. DATA turns on. Answer-Back message is printed (sets w/answer-back). (Refer to Options 439.b., 441.b., 442.b., and 443.b., for any exceptions).
	32.b.	W/TAU, TAU1 OR TAU2 — LINE INTERFACE: Connect Carrier Detect pin 8 to Data Term Ready pin 20. W/TAU2 — AUX PORT INTERFACE: Turn on Data Term Ready pin 20 (floating condition is On.) Turn on Teleprinter POWER switch.	Print head is returned to left-hand margin. Paper feeds to next line. DATA turns on. LINE INTERFACE CONNECTOR +12 V will be present on pin 4 (Issue 2A Logic Card, sets W/TAU, sets W/TAU1 or TAU2). Gnd will be present on pin 7. AUX PORT INTERFACE CONNECTOR +12 V will be present on pin 6 (sets W/TAU2). Gnd will be present on pin 7.
	32.c.	W/TTL INTERFACE — Connect Terminal Ready pin 5 to Data Ready pin 15. Measure continuity between pins 6 Request to Send and 9 Gnd on TTL Interface Connector. Turn on Teleprinter POWER switch.	Meter should read 0 ohms (Issue 2A Logic Card). Print head is returned to left-hand margin. Paper feeds to next line. DATA turns on. INTERFACE CONNECTOR +5 V dc will be present on pin 7. -12 V dc will be present on pin 11. +12 V dc will be present on pin 13. Gnd will be present on pin 9.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Data Loopback Option 434.a.	33.	Place CPS key in UP position (30 CPS). Depress and release PARITY key to UP position (PARITY ON). Place DUPLEX key in UP position (HALF-DUPLEX). Place CAPS LOCK key in DOWN position. Type the following: ANALOG Depress SPACE BAR.	LINE INTERFACE CONNECTOR -12 V will be present on pin 23 (sets W/TAU). AUX PORT INTERFACE CONNECTOR -12 V will be present on pin 23 (sets W/TAU2). AANNAALLOOGG is printed. (Refer to Option 434.b. for any exceptions.)
Printer on/off (Aux Port)	34.	W/TAU2 — AUX PORT INTERFACE: Connect Gnd pin 7 to Printer on/off pin 17. Type the following: ANALOG Depress SPACE BAR. Remove connection from pin 7 to 17	ANALOG is printed.
	35.	Place DUPLEX key in DOWN position (FULL DUPLEX). Type the following: TEST	TEST is printed.
EOT Option 433.a.	36.	Watch TERM READY (AUTO ANSW) key, then hold CTRL key depressed and depress ⬚ EOT D key.	DATA and TERM READY (AUTO ANSW) indicators flash as EOT key is depressed. (Refer to Option 433.b. for any exceptions.)
Intrpt	37.	Depress INTRPT key.	INTRPT turns on momentarily. Signal bell rings.
	38.	Hold CRTL key depressed and depress RETURN key.	Print head does not return.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
CPS Option 435.a.	39.	Depress RETURN and then LINE FEED key. Depress REPT and K keys. Hold down until two lines of Ks are printed. (Check time to print line.)	Continuous Ks will be printed across entire new line. Bell rings at end of line and automatic return and line feed will be performed. One printed line plus return will occur in approximately: 4 seconds (sprocket feed) 2.5 seconds (friction feed). (Refer to Option 435.b. for any exceptions.)
	40.	Place CPS key in DOWN position (10 CPS). Depress REPT and K keys. Hold down until two lines of Ks are printed. (Check time to print line.)	LINE INTERFACE CONNECTOR +12 V will be present on pin 23 (sets W/TAU). AUX PORT INTERFACE CONNECTOR +12 V will be present on pin 23 (sets W/TAU2). Continuous Ks will be printed across entire line. Bell rings at end of line and automatic return and line feed will be performed. One printed line plus return will occur in approximately: 14 seconds (sprocket feed) 8.5 seconds (friction feed). First part of second line (approximately 18 characters) will be printed at a faster rate of speed. (Refer to Option 435.b. for any exceptions.)
Low paper (Friction Feed) Paper-Out (Sprocket Feed)	41.	Remove the paper — paper-out (sprocket feed). Lift paper roll from paper support — (friction feed).	Signal bell rings (sprocket feed only). ALARM remains on, ie, stops flashing (sets W/TDU). ALARM turns on (sets W/O TDU).

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Low Paper (Friction Feed) Paper-Out (Sprocket Feed) (Cont)	42.	Watch DATA key and depress LINE FEED key eight times.	Sprocket Feed DATA turns off. LOCAL (LOCAL-TALK) turns on as 8th LINE FEED is received. Friction Feed DATA remains on. LOCAL (LOCAL-TALK) remains off.
	43.	Watch and depress TERM READY (AUTO ANSW) key.	Sprocket Feed DATA remains off. LOCAL (LOCAL-TALK) remains on. Friction Feed TERM READY (AUTO ANSW) flashes as key is depressed. LOCAL (LOCAL-TALK) turns on.
	44.	Replace the paper. Depress RESET button on paper roll support (friction feed only).	ALARM flashes (sets W/TDU). ALARM turns off (sets W/O TDU).
	45.	Depress DATA key.	DATA turns on. LOCAL (LOCAL-TALK) turns off.
Data Term Ready (Aux)	46.	W/TAU2 — AUX PORT INTERFACE: Connect Data Term Ready pin 20 to Receive Data Pin 3. Disconnect strap between pin 20 and pin 3.	DATA turns off. TERM READY (AUTO ANSW) turns on. DATA turns on. TERM READY (AUTO ANSW) turns off.
Answer-back on ENQ. Option 440.a. Option 443.a.	47.	W/ANSWER-BACK AND TAU, TAU1, TAU2, OR TTL INTERFACE — Depress ESC key. Hold SHIFT key depressed and depress [> .] key.	ALARM flashes.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Answer-Back on ENQ Option 440.a. Option 443.a. (Cont)	47.a.	W/ANSWER-BACK — Place DUPLEX key in DOWN position (FULL DUPLEX). Hold CTRL key depressed and depress [ENQ] key.	Answer-Back message does not print.
	47.b.	W/ANSWER-BACK — Place DUPLEX key in UP position (HALF-DUPLEX). Hold CTRL key depressed and depress [ENQ] key.	Answer-Back message is printed. (Refer to Options 440.b. and 443.b. for any exceptions.)
	47.c.	W/ANSWER-BACK AND TAU2 — AUX PORT INTERFACE: Connect Clear to Send pin 5 to Request to Send pin 4. Hold CTRL key depressed and depress [ENQ] key. Disconnect strap between pins 4 and 5.	Answer-Back message does not print.
Answer-Back on HERE-IS Option 438.a.	48.	W/ANSWER-BACK — Hold CTRL key depressed and depress [HERE IS] key.	Answer-Back message is printed. (Refer to Option 438.b. for exceptions.)
	49.	W/ANSWER-BACK AND TAU, TAU1, TAU2, or TTL — Depress ESC and then [=] key.	ALARM turns off.
Answer-Back Options 439.a. 441.a. 442.a.	50.a.	W/ANSWER-BACK AND TAU, TAU1 OR TAU2 — LINE INTERFACE: Remove strap from Send Data pin 2 to Rec Data pin 3. (Perform the following procedures within 6 seconds) Disconnect wire from Carrier Detect pin 8 and momentarily connect to Ring Indicator pin 22, then reconnect to pin 8. Reconnect strap from pin 2 to pin 3.	Answer-Back message is printed. (Refer to Options 439.b., 441.b., and 442.b. for any exceptions.)

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Answer-Back Option 439.a. 441.a. 442.a. (Cont)	50.b.	W/ANSWER BACK AND TTL INTERFACE — Remove strap from Send Data pin 19 to Rec Data pin 17. (Perform the following procedures within 6 seconds) Disconnect wire from Term Ready pin 5 and connect to +5 pin 7. Connect strap between +12 V pin 3 and Ring Indicator pin 12. Immediately disconnect wire from pin 7 and reconnect to pin 5. Disconnect strap from pin 3 to pin 12. Reconnect strap from pin 19 to pin 17.	Answer-Back message is printed. (Refer to Options 439.b., 441.b., and 442.b. for any exceptions.)
Interface Option 441.b.	51.a.	W/ANSWER BACK AND TAU OR TAU1 — Momentarily disconnect wire from Carrier Detect pin 8, then reconnect to pin 8.	Answer-Back message is not printed. (Refer to Option 441.a. for any exceptions.)
	51.b.	W/ANSWER BACK AND TTL INTERFACE — Momentarily disconnect wire from Term Ready pin 5, then reconnect to pin 5.	Answer-Back message is not printed. (Refer to Option 441.a. for any exceptions.)
Current Loop	52.a.	W/TAU1 OR TAU2 — LINE INTERFACE: Connect Data Term Ready pin 20 to Rec Data pin 3. Remove strap from Send Data pin 2 to Rec Data pin 3. Disconnect strap between pin 20 and pin 3. Reconnect strap from pin 2 to pin 3. Depress INTRPT key.	INTRPT turns on. Signal bell rings. INTRPT turns off.
	52.b.	W/TAU2 — AUX PORT INTERFACE: Connect Data Set Ready pin 6 to Trans Data pin 2. Disconnect strap between pin 6 and pin 2. Depress INTRPT key.	INTRPT turns on. INTRPT turns off.
Data Loopback Clear	53.a.	W/TDU — Depress ESC and then [⌑] key.	ALARM and DATA turn off. TERM READY (AUTO ANSW) turns on.

TABLE A (Cont)

OFF-LINE PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Loopback Clear (Cont)	53.b.	W/TAU, TAU1, TAU2 — LINE INTERFACE: Disconnect strap between Data Term Ready pin 20 and Carrier Detect pin 8.	TERM READY (AUTO ANSW) turns on. DATA turns off. -12 V will be present on AUX Interface Connector pin 6 (sets W/TAU2).
	53.c.	W/TTL INTERFACE — Disconnect strap between Data Ready pin 15 and Terminal Ready pin 5.	
Analog Loop	54.	W/O TDU — Depress ESC key. Hold SHIFT key depressed and depress [> .] key.	ALARM flashes. DATA turns on. TERM READY (AUTO ANSW) turns off (sets W/TAU or TAU1). +12 V will be present on Line Interface Connector pin 25, Analog Loop (sets W/TAU). 0 V will be present on TTL Interface Connector pin 3, Analog Loop. (sets W/TTL Interface).
	55.	W/O TDU — Depress ESC key and then [!] key.	ALARM turns off. DATA turns off. TERM READY (AUTO ANSW) turns on (sets W/ TAU or TAU1). -12 V will be present on Line Interface Connector pin 25, Analog Loop (sets W/TAU). +5 V dc will be present on TTL Interface Connector pin 3, Analog Loop (sets W/TTL Interface).
Digital Loop	56.	W/TTL INTERFACE — Depress ESC key. Hold SHIFT key depressed and depress [< ;] key.	0 V will be present on TTL Interface pin 1 (Digital Loop).
	57.	W/TTL INTERFACE — Depress ESC key and then [!] key.	+5 V dc will be present on TTL Interface pin 1 (Digital Loop).
Low Paper (Friction Feed) Paper-Out (Sprocket Feed)	58.	Sprocket Feed — Remove paper. Friction Feed — Lift paper roll from paper roll support.	Signal bell rings (sprocket feed only). TERM READY (AUTO ANSW) turns off. LOCAL (LOCAL-TALK) and ALARM turn on.

TABLE A (Cont)

OFF-LINE PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Low Paper (Friction Feed) Paper-Out (Sprocket Feed) (Cont)	59.	Depress TERM READY (AUTO ANSW) key.	TERM READY (AUTO ANSW) remains off. LOCAL (LOCAL-TALK) and ALARM remain on.
	60.	Replace the paper.	ALARM turns off. +12 V will be present on AUX Interface Connector pin 6 (sets W/TAU2).
Data key	61.	Depress DATA key. Place CPS key in UP position (30 CPS). Place DUPLEX key in UP position (HALF-DUPLEX).	LOCAL (LOCAL-TALK) turns off. DATA flashes for approximately 20 seconds then turns off. TERM READY (AUTO ANSW) turns on.

This completes the OFF-LINE test of the 43 KSR Teleprinter. Teleprinters with TDUs, proceed to the ON-LINE TESTS. Teleprinters without TDUs, use local procedures and arrangements for ON-LINE testing.

ON-LINE TESTS (Teleprinters With TDUs Only — Installation Checkout)

TABLE B

ON-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Full Duplex Send & Receive Data (Originating Station)	1.	With power on and AUTO ANSW lit, depress LOCAL-TALK key and place DUPLEX key in DOWN position (FULL DUPLEX). Place CAPS LOCK key in DOWN position. Depress RETURN and LINE FEED keys.	LOCAL-TALK lights. Print head is returned to left-hand margin. Paper feeds to next line.
	2.	Call Data Test Center and request a 43 Teleprinter test. Provide Test Center with phone number of station and operating speed. Agree that Test Center will call back after disconnect.	
	3.	When instructed by Data Test Center operator, go to Data mode by depressing DATA key.	DATA turns on. LOCAL-TALK goes off.
	4.	Type the following message request on the operator console: SEND THE QUICK BROWN FOX TEST MESSAGE.	Test message request will be received by the Data Test Center.
	5.	Data Test Center will send 'The Quick Brown Fox' test message ending with EOT.	'The Quick Brown Fox' test message will be printed. Station will disconnect. DATA goes off. AUTO ANSW goes on.
Automatic Answer Option 439.a. 441.a. 442.a. 443.a.	6.	Depress and release DUPLEX key so it returns to upper position. (HALF-DUPLEX)	Data Test Center will call station under test. Phone rings once. DATA turns on. AUTO ANSW goes off. Answer-Back message is printed at station and Test Center (sets W/answer-back). Refer to Options 439.b., 441.b., 442.b. and 443.b. for any exceptions).

TABLE B (Cont)

ON-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
ENQ Option 440.a.	7.	Data Test Center will send CTRL E (ENQ).	Answer-Back message is printed at station under test and Test Center (sets W/answer-back). Refer to Option 440.b. for any exceptions.
Aux Sender and Receiver (Full Duplex)	8.	W/AUX SENDER — Send the following message from aux sender: AUX SENDER MESSAGE FDX.	AUX SENDER MESSAGE FDX will be received by Data Test Center. Message will not be printed on printer.
	9.	W/AUX RECEIVER --- Data Test Center will send: AUX RECEIVER MESSAGE FDX.	AUX RECEIVER MESSAGE FDX will be received by aux receiver and printed on printer.
Half-Duplex Send and Receive Data (Answering Station)	10.	Test Center will send the following test message: NOW IS THE TIME FOR ALL GOOD MEN	Test message will be printed.
	11.	Depress the SPACE bar. Send the following test message from the operator console: TO COME TO THE AID OF THEIR COUNTRY.	Printed copy at the station under test will be: NOW IS THE TIME FOR ALL GOOD MEN TO COME TO THE AID OF THEIR COUNTRY. Data Test Center will receive the test message sent from the operator console.
Digital Loop	12.	Test Center will send the following test message: ESC< DIGITAL LOOP ESC =	ALARM flashes. DIGITAL LOOP will be printed. ALARM turns off.
Parity Detect	13.	Depress and release PARITY key to UP position (PARITY ON). Test Center will send the following test message (8th Bit Marking): PARITY TEST	Printer will print: ■■ RIT ■ TE ■ T

TABLE B (Cont)

ON-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Parity Detect (Cont)	14.	Place PARITY key in DOWN position (PARITY OFF). Test Center will send the following test message (8th Bit Marking): PARITY	Printer will print: PARITY
Aux Sender and Receiver (Half-Duplex)	15.	W/AUX SENDER — Send the following Message from aux sender: AUX SENDER MESSAGE HDX	AUX SENDER MESSAGE HDX will be received by aux receiver (if present) and Data Test Center and printed on printer.
	16.	W/AUX RECEIVER — Data Test Center will send: AUX RECEIVER MESSAGE HDX	AUX RECEIVER MESSAGE HDX will be received by aux receiver and printed on printer.
Intrpt	17.	Data Test Center will send INTRPT	INTRPT turns on. Signal bell rings.
	18.	Send RYRY from the keyboard.	Keyboard is blinded. RYRY will not be printed on printer or sent to Data Test Center.
	19.	Depress INTRPT key. Send RYRY from keyboard.	INTRPT turns off. RYRY will be printed and sent to Data Test Center.
	20.	Test Center will send TEST OK message if test was satisfactory and disconnect call. Test Center will send GO TO TALK message if test was unsatisfactory. Pick up handset, depress LOCAL-TALK key and evaluate results.	Station will disconnect. AUTO ANSW goes on. DATA goes off.

This completes the On-Line test of the 43 KSR Teleprinter.

43 RO TELEPRINTER

TESTING

1. GENERAL

1.01   This section provides testing information for the 43 RO Teleprinter.

1.02   An installation checkout should be performed after installation to make sure the station is operable.

1.03   On trouble calls, an installation checkout should be performed after trouble correction to make sure the station is operable and a trouble verification test should be performed under the direction of the Test Center to isolate specific troubles not covered in the installation test. After correction of a trouble, the test may be confined to the specific area that was failing.

1.04   Following routine maintenance calls at a location, an installation checkout should be performed.

1.05   The checkout routines are presented in table form with test conditions arranged in a specific sequence. A response is given to verify the test condition has passed.

1.06   Always perform the tests in the order given. The test steps are based on satisfactory results of all previous steps.

1.07   If the indicated response is not obtained in any step of a test procedure, repeat the step to make sure that the procedure has been performed properly. If the results are still unsatisfactory, refer to the RO Teleprinter Troubleshooting, Page 1-52.

1.08   Teleprinters without TDUs must be associated with locally developed external testing arrangements and procedures to perform actual On-Line Tests. If test station is remote, a copy of RO Teleprinter On-Line Tests should be available at the test station.

Note: The local tests specified in this section simulate most On-Line Tests for these teleprinters.

1.09   On-Line Tests can be performed with a 43 Teleprinter or equivalent as a testing station or with a Test Center if available.

1.10   Before an On-Line Test can be performed the remote testing station or Test Center must be provided with advance details about the teleprinter under test, such as telephone number, type of terminal (friction or sprocket) option exceptions present, speed, etc.

PRELIMINARY CHECK

1.11   Before proceeding with the checkout procedure, check the following:

(a)   Is the station connected to a properly grounded and polarized ac service?

(b)   Are all cable connectors fully seated?

(c)   Are printer paper and ribbon properly installed?

(d)   Are any option exceptions present? Refer to the Options Section, Page 1-23 and reverse side of directory card.

Procedures in Off-Line and On-Line Tests are based on standard factory furnished options being present. If option exceptions are present, the test response will be as shown in Options, Page 1-23.

2. TEST EQUIPMENT

2.01 For teleprinters without TDUs, Off-Line Test Procedures are provided to simulate On-Line Tests where external communication test devices are not available. To perform these tests, the connector terminals, shown as follows, should be strapped before proceeding with the tests. The remaining terminals should be connected or measured as specified during the test steps.

Note: Contact Teletype Corporation Custom Systems Division for availability of a 43 Teleprinter Interface Test Box, CP10.002.001-1, which provides both arrangements shown as follows:
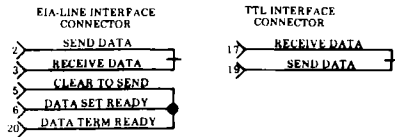
2.02 A 43 KSR Operator Console, 43K101/CAA or CAB can be substituted in RO Teleprinters to perform tests off-line when external communication test devices (Test Centers) are not available for on-line operation.
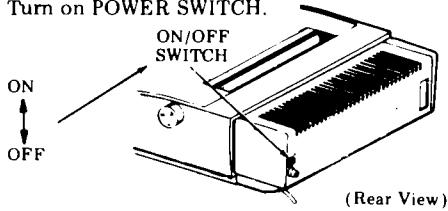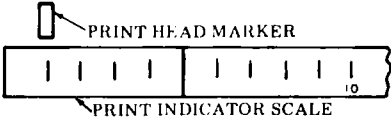
2.03 A volt-ohmmeter or equivalent means to measure ±12 volts and ±5 volts and perform continuity checks is required.

2.04 Steps 1 through 7 apply to all teleprinters. Steps 8 through 29 apply to all teleprinters unless otherwise indicated.

3. TESTING PROCEDURES

OFF-LINE TESTS (Installation and Trouble Call Checkout)

TABLE A
OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Power On/Off	1.	Turn on POWER SWITCH. (Rear View)	Print head returns to the left-hand margin. Paper feeds to next line. TERM READY (AUTO ANSW) turns on.
	2.	PRINT HEAD MARKER — PRINT INDICATOR SCALE	Print head marker points to first mark on indicator scale.
Printer Option 431.a. 432.a.	3.	Hold PRINTER TEST key depressed until approximately eight lines are printed.	ALARM turns on. Characters printed as in Fig. 1. (Refer to Option 431 or 432.b. and c. for any exceptions.) Bell rings at end of each line. (Right-Hand Margin and Test Message.)

Note 1: First line may start with any character for sprocket or friction feed printers.

```
lmnopqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{}~
```

Sprocket Feed — Approximately 13 Characters per inch

See Note 1.

Note 2: The lower case "o" does not print on 80 character line.

```
tuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
pqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
pqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
pqrstuvwxyz{}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
pqrstuvwxyz{}~
```

Friction Feed — 10 Characters per inch

Fig. 1

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Printer (Cont)	4.	Release PRINTER TEST key.	ALARM turns off. Character printing stops. Print head returns to left-hand margin. Paper feeds to next line.
Cover Interlock	5.	Raise cover	ALARM turns on. TERM READY turns off.
	6.	Close cover	ALARM remains on.
	7.	Depress RESET key.	ALARM turns off. TERM READY turns on.

Steps 8 through 29 may be omitted if On-Line Tests are performed instead.

Note: Not all tests performed in Steps 8 through 29 are checked in on-line tests.

SIMULATED ON-LINE TESTS (LOOPBACK)

Loopback	8.	Turn off POWER switch and connect the test arrangement shown on Page 1-85 to the interface connector.	
	8.a.	W/TDU — Remove the paper holder and bustle cover. Unplug the logic card cable connector on top of the TDU and plug into test arrangement. Measure continuity between pins 6 and 9 on TTL Interface Connector. TTL INTERFACE — Connect Terminal Ready pin 5 to Data Ready pin 15. Turn on teleprinter POWER switch.	Meter should read 0 ohms (Issue 2A Logic Card). Print head returns to left-hand margin. Paper feeds to next line. DATA turns on.
	8.b.	W/TAU OR TAU1 — LINE INTERFACE: Connect Carrier Detect pin 8 to Data Term Ready pin 20. Turn on teleprinter POWER switch.	Print head returns to left-hand margin. Paper feeds to next line. DATA turns on. +12 V will be present on pin 4 of Line Interface Connector (Issue 2A Logic Card, sets w/TAU or sets w/TAU1).
	8.c.	TTL INTERFACE — Measure continuity between pins 6 and 9 on TTL Interface Connector. Connect Terminal Ready pin 5 to Data Ready Pin 15. Turn on teleprinter POWER switch.	Meter should read 0 ohms (Issue 2A Logic Card). Print head returns to left-hand margin. Paper feeds to next line. DATA turns on.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Setup	9.	Turn off POWER switch. Remove RO Operator Console and install KSR Operator Console. Remove cover and manually depress Interlock switch on KSR operator console (between ALARM and PRINTER TEST keys) during test procedure.	
	9.a.	W/TDU — Remove test arrangement and reconnect TTL connector from logic card to TDU. Replace bustle cover and paper holder.	
Analog Loop	10.	Turn on POWER switch.	DATA turns on (sets w/o TDUs). TERM READY (AUTO ANSW) turns on (sets w/TDUs).
Option 439.a. 441.a. 442.a. 443.a.	10.a.	W/TDU — Place DUPLEX key in UP position (HALF-DUPLEX). Wait 6 seconds then depress ESC key. Hold SHIFT key depressed and depress [?] key.	ALARM flashes. DATA turns on. Answer-Back message is printed (sets w/answer-back). (Refer to options 439.b., 441.b., 442.b., and 443.b. for any exceptions.)
	10.b.	W/TTL INTERFACE ONLY	+5 V will be present on pin 7. -12 V will be present on pin 11. +12 V will be present on pin 13. GND will be present on pin 9.
Data Loopback	11.	Place CPS key in UP position (30 CPS). Depress and release PARITY key to UP position (PARITY ON). Place DUPLEX key in UP position (HALF-DUPLEX). Place CAPS LOCK key in DOWN position. Type the following: ANALOG Depress SPACE BAR.	-12 V will be present on pin 23 of Line Interface Connector (sets w/TAU). AANNAALLOOG is printed.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
EOT Option 433.a.	12.	Place DUPLEX key in DOWN position (FULL DUPLEX). Type the following: TEST Watch TERM READY (AUTO ANSW) key, then hold CTRL key depressed and depress ⬛EOT D⬛ key.	TEST is printed. DATA and TERM READY (AUTO ANSW) flash as EOT key is depressed. (Refer to Option 433.b. for any exceptions.)
	13.	Depress INTRPT key.	INTRPT turns on momentarily. Signal bell rings.
	14.	Hold CTRL key depressed and depress RETURN key.	Print head does not return.
CPS Option 435.a. Option 436.a.	15.	Depress RETURN and then LINE FEED key. Depress REPT and K keys. Hold down until two lines of Ks are printed (check time to print line).	Continuous Ks will be printed across entire new line. Bell rings at end of line and automatic return and line feed will be performed. One printed line plus return will occur in approximately: 4 seconds (sprocket feed) 2.5 seconds (friction feed) (Refer to Option 435.b. or 436.b. for any exceptions.)
		Measure continuity between pins 4 and 17 on connector of RO opcon that was removed.	Meter should read an open circuit. (Refer to Option 436.b. for any exceptions.)
Option 437.a.	16.	Enable Option 434.b. Depress the following keys: PARITY TEST	Printer will print: ■■RIT■ TE■T (Refer to Option 437.b. for any exceptions.)
		Measure continuity between pins 4 and 20 on connector of RO opcon that was removed. Enable Option 434.a.	Meter should read an open circuit. (Refer to Option 437.b. for any exceptions.)

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Low-Paper (Friction Feed) Paper-Out (Sprocket Feed)	17.	Remove the paper — Paper-out (sprocket feed). Lift paper roll from paper support — (friction feed).	Signal bell rings (sprocket feed only). ALARM remains on, ie, stops flashing (sets w/TDU). ALARM turns on (sets w/o TDU).
	18.	Watch DATA key and depress LINE FEED key eight times.	Sprocket Feed DATA turns off. LOCAL (LOCAL-TALK) turns on as 8th LINE FEED is received. Friction Feed DATA remains on. LOCAL (LOCAL-TALK) remains off.
	19.	Watch and depress TERM READY (AUTO ANSW) key.	Sprocket Feed DATA remains off. LOCAL (LOCAL-TALK) remains on. Friction Feed TERM READY (AUTO ANSW) flashes as key is depressed. LOCAL (LOCAL-TALK) turns on.
	20.	Replace the paper. Depress RESET button on paper roll support (friction feed only).	ALARM flashes (sets w/TDU). ALARM turns off (sets w/o TDU).
	21.	Depress DATA key.	DATA turns on. LOCAL (LOCAL-TALK) turns off.
Answer-Back on ENQ Option 440.a. Option 443.a.	22.	W/ANSWER-BACK AND TAU, TAU1 OR TTL — Hold SHIFT key depressed and depress ⎡>⎤ key.	ALARM flashes.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Answer-Back on ENQ Option 440.a. Option 443.a. (Cont)	22.a.	Place DUPLEX key in DOWN position (FULL DUPLEX). Hold CTRL key depressed and depress ⌷ENQ⌷ key.	Answer-Back message does not print.
	22.b.	Place DUPLEX key in UP position (HALF-DUPLEX). Hold CTRL key depressed and depress ⌷ENQ⌷ key.	Answer-Back message is printed. (Refer to Options 440.b. and 443.b. for any exceptions.)
	22.c.	W/ANSWER-BACK AND TAU, TAU1, OR TTL — Depress ESC and then ⌷[=⌷ key.	ALARM turns off.
Answer-Back Option 439.a. 442.a.	23.a.	W/ANSWER-BACK AND TAU OR TAU1— LINE INTERFACE: Remove strap from Send Data pin 2 to Rec Data pin 3. (Perform the following procedures within 6 seconds.) Disconnect wire from Carrier Detect pin 8 and momentarily connect to Ring Indicator pin 22; then reconnect to pin 8. Reconnect strap from pin 2 to pin 3.	Answer-Back message is printed. (Refer to Options 439.b. and 442.b. for any exceptions.)
	23.b.	W/ANSWER-BACK AND TTL INTERFACE — Remove strap from Send Data pin 19 to Rec Data pin 17. (Perform the following procedures within 6 seconds.) Disconnect wire from Term Ready pin 5 and connect to +5 V pin 7. Connect strap between +12 V pin 3 and Ring Indicator pin 12. Immediately disconnect wire from pin 7 and reconnect to pin 5. Disconnect strap from pin 3 to pin 12. Reconnect strap from pin 19 to pin 17.	Answer-Back message is printed. (Refer to Options 439.a. and 442.a. for any exceptions.)
Answer-Back Option 441.b.	24.a.	W/ANSWER-BACK AND TAU OR TAU1 — Momentarily disconnect wire from Carrier Detect pin 8, then reconnect to pin 8.	Answer-Back message is not printed. (Refer to Option 441.a. for any exceptions.)
	24.b.	W/ANSWER-BACK AND TTL INTERFACE — Momentarily disconnect wire from Term Ready pin 5, then reconnect to pin 5.	Answer-Back message is not printed. (Refer to Option 441.a. for any exceptions.)

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Current Loop	25.	W/TAU1 — LINE INTERFACE: Connect Data Term Ready pin 20 to Rec Data pin 3. Remove strap from Send Data pin 2 to Rec Data pin 3.	INTRPT turns on. Signal bell rings.
		Disconnect strap between pin 20 and pin 3. Reconnect strap from pin 2 to pin 3. Depress INTRPT key.	INTRPT turns off.
Loopback Clear	26.a.	W/TDU — Depress ESC and then [ ] key.	ALARM and DATA turn off. TERM READY (AUTO ANSW) turns on.
	26.b.	W/TAU OR TAU1 LINE INTERFACE — Disconnect strap between Data Term Ready pin 20 and Carrier Detect pin 8.	DATA turns off. TERM READY (AUTO ANSW) turns on.
	26.c.	W/TTL INTERFACE — Disconnect strap between Data Ready pin 15 and Terminal Ready pin 5.	
Low-Paper (Friction Feed) Paper-Out (Sprocket Feed)	27.	Sprocket Feed — Remove paper. Friction Feed — Lift paper roll from paper roll support.	TERM READY (AUTO ANSW) turns off. LOCAL (LOCAL-TALK) and ALARM turn on. Signal bell rings (sprocket feed only).
	28.	Depress TERM READY (AUTO ANSW) key.	TERM READY (AUTO ANSW) remains off. LOCAL (LOCAL-TALK) and ALARM remain on.
	29.	Replace the paper. Depress RESET button on paper roll support (friction feed only).	ALARM turns off.

This completes the OFF-LINE test of the 43 RO Teleprinter.

Remove the KSR Operator Console and replace the RO Operator Console.

Remove the Interface Test Arrangement (if present) and replace the bustle cover and paper holder.

Teleprinters with TDUs, proceed to the ON-LINE TESTS.

Teleprinters without TDUs, use local procedures and arrangements for ON-LINE testing.

ON-LINE TESTS (Teleprinters With TDUs only — Installation Checkout)

TABLE B

ON-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Auto-matic Answer Option 439.a. 441.a. 442.a. 443.a.	1.	With power on, verify TERM READY is on.	Data Test Center will call station under test. DATA turns on. TERM READY goes off. Answer-Back message is printed at station under test and Test Center (sets w/answer-back). (Refer to Options 439.b., 441.b., 442.b. and 443.b. for any exceptions.)
ENQ Option 440.a.	2.	Test Center will send CTRL E (ENQ)	Answer-Back message is printed at station and Test Center (sets w/ answer-back). (Refer to Option 440.b. for any exceptions.)
EOT Detect Option 433.a. 436.a.	3.	Test Center will send the following test message ending with EOT: 43 RO TELEPRINTER ON LINE TEST	Test message will be printed. Station will disconnect: DATA goes off. TERM READY turns on. (Refer to Option 433.b. or 436.b. for any exceptions.)
Digital Loop	4.	Test Center will call station under test.	DATA turns on. TERM READY goes off. Answer-Back message is printed (sets w/answer-back).
	5.	Test Center will send the following message: E_{sc} < DIGITAL LOOl	ALARM flashes. DIGITAL LOOP will be printed.
	6.	Test Center will send: E_{sc}=	ALARM turns off.

TABLE B (Cont)

ON-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Paper-Out	7.	Remove the paper — paper-out (sprocket feed).	Signal bell rings (sprocket feed only). ALARM turns on.
		Lift and hold paper roll (friction feed).	ALARM turns on.
		Test Center will send eight LINE FEED characters.	<u>Sprocket Feed</u> DATA turns off as 8th line feed is received. <u>Friction Feed</u> DATA remains on as 8th line feed is received.
		Test Center will disconnect call.	
	8.	Test Center will call station under test.	Station will not go to Data mode. DATA remains off.
Automatic Carriage Return Option 435.a.	9.	Replace the paper. Depress RESET key. Test Center will call station and send the following message: CR LF 4 Spaces E_{sc} L (lower case) 5 Spaces E_{sc} r (lower case) CR LF E_{sc} < two full lines of repeat Ks E_{sc} x (lower case) E_{sc} = *Note:* CR = Carriage Return LF = Line Feed (Refer to Option 435.b. for any exceptions.)	ALARM turns off. DATA turns on. TERM READY goes off. ALARM flashes. Printer will print Ks between columns 5 and 10 and line feed automatically at right margin. Print head will move to column 1 at end of message. ALARM turns off.
Receive Parity Detect Option 437.a.	10.	Test Center will send the following message (8th Bit Marking): PARITY TEST	Printer will print: ■ ■ RIT■ TE■ T

TABLE B (Cont)

ON-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Receive Parity Detect Option 437.a. (Cont)	11.	Test Center will send TEST OK message if test was satisfactory and disconnect. Test Center will send TEST NOT OK message if test was unsatisfactory and disconnect call. Call Test Center and evaluate results.	Station will disconnect. DATA goes off. TERM READY turns on.

This completes the On-Line Test of the 43 RO Teleprinter.

43 TELEPRINTER

DISASSEMBLY/REASSEMBLY

CONTENTS   PAGE

1. GENERAL

1.01   This section provides disassembly and reassembly procedures for the 43 KSR and RO Teleprinter and their major components.

1.02   Disassembly and reassembly information for additional enclosures and paper handling parts is provided in the following paragraphs:

Part	Paragraph
Bustle Cover (Sprocket Feed)	3.01
Bustle Cover (Friction Feed)	3.01
Deflector (Sprocket Feed)	3.01
Paper Holder (Sprocket Feed)	3.01
Paper Holder (Friction Feed)	3.01
Set Cover	3.04
Rear Frame	3.06

1.03   The procedures provided in this section break the terminal down into subcomponents. The appropriate parts section illustrates the arrangement of subcomponents and parts — Page 1-111, Teleprinter Parts and Page 4-3, Enclosures and Paper Handling Parts.

Caution: Remove all power from the set before performing any component replacement.

1.04   When removing a major component or part from the terminal, do not pry or force parts to provide the necessary clearance for removal. Follow the removal procedure and note how each part is removed and the sequence of its removal so that proper reassembly can be accomplished. For reassembly, reverse the removal procedure except where different instructions are given.

1.05   Reference in the procedures to left and right and up or down and top or bottom, etc, refer to the KSR terminal in its normal operating position.

1.06   For a listing of the tools required to perform the disassembly and reassembly procedures, refer to 2. TOOLS REQUIRED.

1.07   All ordering numbers shown in this manual are Teletype Corporation part numbers.

1.08   Some parts that are not listed in the parts sections are shown as necessary to the disassembly procedures such as screws, ring retainers, etc. Most of these parts are common to other Teletype Corporation product lines and, if needed, may already be available in field repair kits or can be ordered.   (*interesting paragraph*)

1.09   The operator console circuitry can be damaged by static discharge. The 346392 static discharge ground strap is available for use by service personnel. Maintenance spares are provided in antistatic bags which should be saved for reuse when returning components for repair.

1.10   Containers and packing materials retained from maintenance spares should be saved and reused when returning defective components for repair.

1.11   Adjustment information is provided in Printer Adjustments, Page 2-6, and Enclosures and Paper Handling Adjustments, Page 4-1.

2.   TOOLS REQUIRED

2.01   The following tools may be required when performing the station disassembly and reassembly procedures. Most of these items should normally be present in standard maintenance tool kits.

Part No.	Tools
129534	Wrench, Open End, 3/16 Inch and 1/4 Inch
135676	Handle
135677	Bit, 1/4 Inch Socket
135678	Bit, 5/16 Inch Socket
95368	Screwdriver, 1/8 Inch, 2 Inch Blade
100982	Screwdriver w/clip 1/4 Inch. 6 Inch Blade
346392	Strap, Static Discharge
407326	Extractor, I.C.

3. DISASSEMBLY/REASSEMBLY

430750 TERMINAL DATA UNIT (TDU), 430751 TERMINAL AUXILIARY UNIT (TAU), 410755 TERMINAL AUXILIARY UNIT (TAU1) AND 410754 TERMINAL AUXILIARY UNIT (TAU2)

3.01 To remove the terminal unit:

(a) Sprocket Feed

(8) Remove terminal unit. Grasp each end and pull straight up.

TAU, TDU, TAU1, TAU2

(6) Disconnect TTL cable plug from connector located on top of terminal unit.

(7) Remove four 118617 (early design) or 341798 (late design) screws.

(2) Remove paper and paper holder.

(3) Remove two 184061 screws or two 151721 screws and 430334 bushings.

(1) Remove any cord connectors.

(5) Remove bustle cover.

(4) Remove deflector, if present.

(9) Remove terminal unit. Grasp each end and pull straight up and away from low paper sensor cable.

(2) Remove paper and spindle.

(7) Disconnect TTL cable plug from connector located on top of terminal unit.

LOW PAPER SENSOR

(1) Remove any cord connectors.

(8) Remove four 118617 (early design) or 341798 (late design) screws.

(6) Remove bustle cover.

(5) Remove two 430278 paper holder mounting posts.

(3) Disengage latch from mounting posts. Pull straight up.

(4) Remove paper holder assembly. Pull toward rear and slide off of mounting posts.

Note: In reassembly, align low paper sensor mounting hole with mounting hole in rear frame.

MOUNTING HOLE

LOW PAPER SENSOR

REAR FRAME
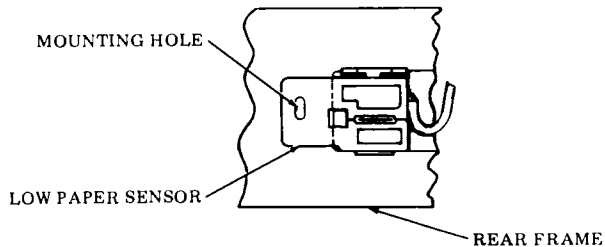
430700 POWER SUPPLY

3.02   To remove power supply:

(1) For Sprocket Feed: Remove paper holder, deflector, if present, and bustle cover. Perform 3.01 (a) steps 1 through 5.
For Friction Feed: Remove paper holder and bustle cover. Perform 3.01 (b), steps 1 through 6.

(4) Grasp power supply at each end; lift up until ac plug can be removed. Remove ac plug and continue lifting up and away from low paper sensor cable (if present) to remove power supply.

(2) Disconnect cable plugs from connectors located on top of power supply and terminal unit, if present.

POWER SUPPLY

(3) Use screwdriver and pry two clips (left and right) outward.

LOW PAPER SENSOR
(Friction Feed Only)

(Rear View)
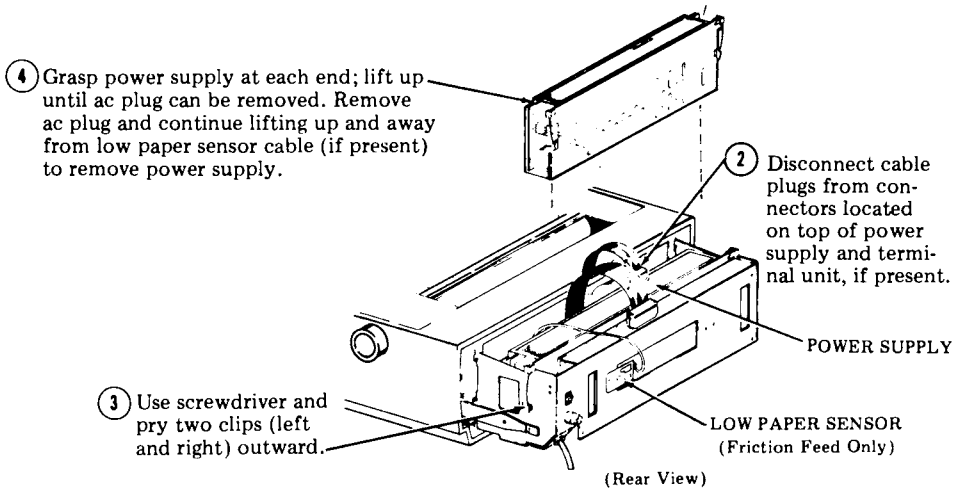
120139 POWER SUPPLY FUSE

3.03   To remove the power supply fuse:

(1) For Sprocket Feed: Remove paper holder, deflector, if present, and bustle cover. Perform 3.01 (a), steps 1 through 5.
For Friction Feed: Remove paper holder and bustle cover. Perform 3.01 (b) steps 1 through 6.

FUSE

(2) Pry fuse from holder and replace.
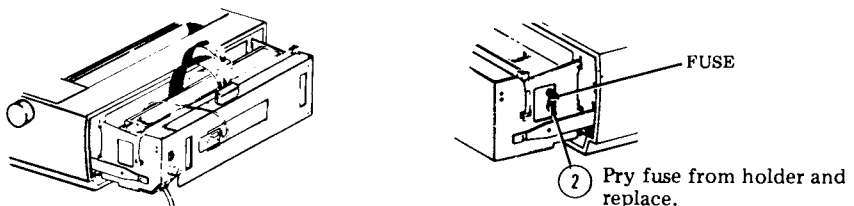
43K001/AAA, 43K101/CAA AND 43K101/CAB OPERATOR CONSOLES

3.04   To remove the operator console:

COVER

(2) If cover is being removed, disengage the button end of one of the arms from the dovetail slot by pushing inward. Disengage the other side and remove cover.

45° ANGLE

Some keys on KSR opcon shown are not present on RO opcons.
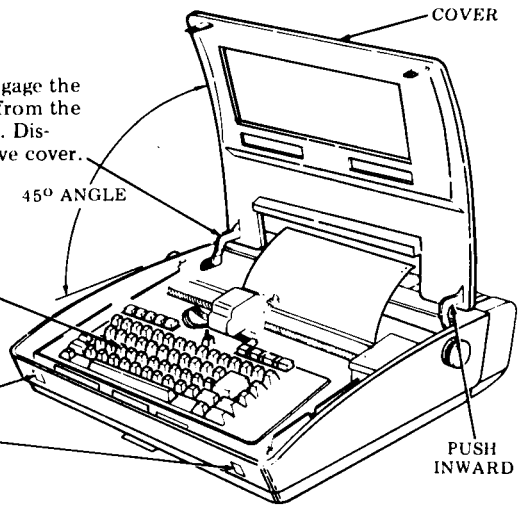
(1) Depress locking tabs (part of cover) to release and lift cover. If cover is being removed, open to 45 degree angle and hold, otherwise open fully to rear.

PUSH INWARD

(6) Disconnect P107 opcon cable plug from logic card.

(3) Loosen two 181240 screws (one each side).

HOUSING

(4) Loosen two 184058 screws (one each side).
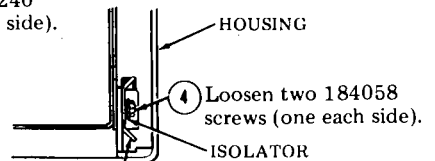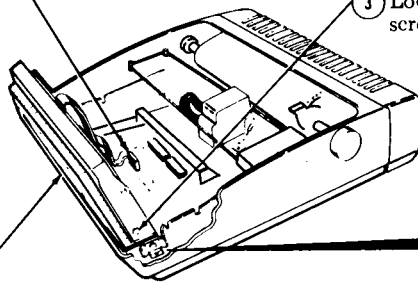
ISOLATOR

(Top View)

(7) Tilt top of clamps outward, releasing front isolators connected to the opcon.

(5) Lift rear edge of opcon and pivot it forward on front mounting bushings.

SPACER (Early Design)

(8) Move lower edge of opcon rearward until isolators are free. Remove opcon.

REAR RAIL
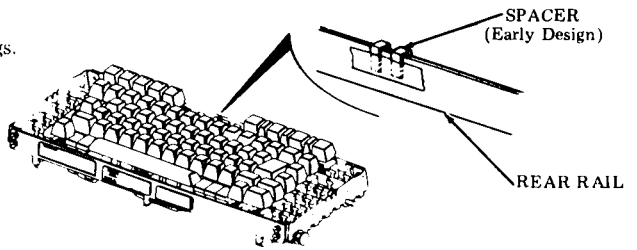
Note 1:   In reassembly, perform the <u>KEYBOARD TO COVER ALIGNMENT</u> adjustment.

Note 2:   When replacing the cover or indicator scale, perform the <u>COLUMN INDICATOR POSITIONING</u> adjustment.

Note 3:   Loose operator consoles are shipped with 181240 screws and 346397 isolators furnished in a loose envelope. These parts must be assembled to the operator console before installing into the printer side frames.

410710 ANSWER-BACK CARD

3.05   To remove the answer-back card:

(1) Remove power supply. Perform 3.02.

(2) Remove logic card TTL cable.

(4) Remove circuit card.

(3) Remove five 154202 screws from 430901 stud.
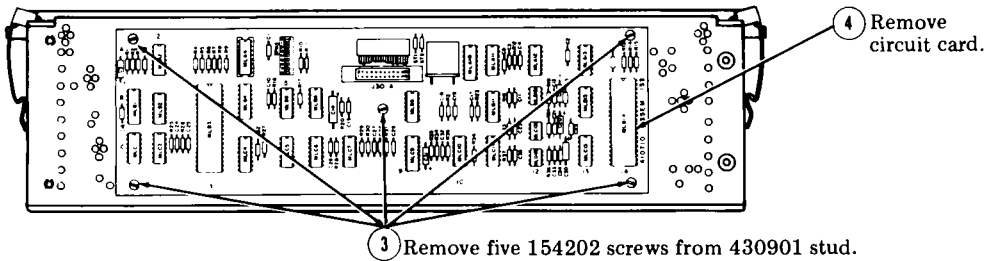
143307 LOGIC CARD FUSE

3.06   To remove the logic card fuse:

(1) For Sprocket Feed: Remove paper holder, deflector and bustle cover. Perform 3.01 (a), steps 1 through 5.
For Friction Feed: Remove paper holder and bustle cover. Perform 3.01 (b), steps 1 through 6.

(3) Remove two 198670 screws, if present (one each side).

(2) Disconnect cable plugs.

(4) Snap the spring clips out of place and move aside, releasing the rear frame. (Pry with screwdriver.)

(5) Gently pull the rear frame to the rear while lifting to disengage the hook-shaped details at the top front of the rear plate. The hook-shaped details fit into the notches on the rear plate and hold the rear frame in place. Remove the rear frame assembly.

(6) Remove the logic card fuse.
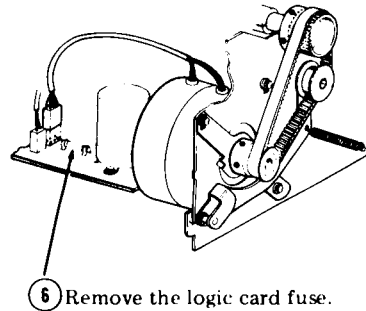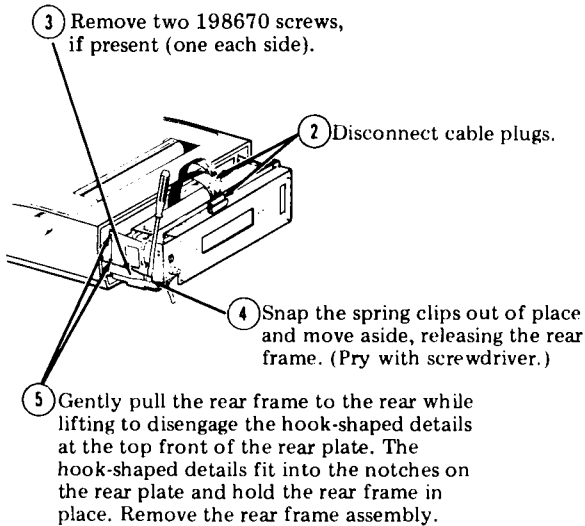
(Rear View)

410740 AND 410742 LOGIC CARDS

3.07   To remove the logic card:

(1) Remove the rear frame assembly.
(Perform 3.06, steps 1 through 5.)

(3) Move print head and
carriage fully to the right.

(2) Remove the opcon.
(Perform 3.04, steps 1 through 8.)

(4) Grasp each end of the
logic card front cover
and push outward on
the sides until the
locking tabs are free
of the logic card.

(5) Slowly rotate cover rearward until
extension on cover aligns with
locking hole in side frame. Apply
slight leftward pressure until the
extension engages the hole in the
side frame, locking the cover into
position.

(6) Disconnect bell cable
from logic card.

(7) Disconnect the following plugs
located on the logic card:

ⓓ P104 6-PIN PLUG

CABLE FROM BELL
ON PRINTER

ⓔ P105 16-PIN PLUG

CABLE FROM STEPPING
MOTOR W/ENCODER
ON PRINTER

CABLE FROM
PRINT HEAD

CABLE FROM
OPCON

ⓑ P102 8-PIN PLUG

CABLE FROM
LF MOTOR

CABLE FROM
ENCODER
ON PRINTER

CABLE TO
TERMINAL
UNIT OR
ANSWER-BACK
CARD

ⓒ P103 6-PIN
PLUG

LOGIC
CARD

(8) Grasp the two nylon rings at rear
of logic card and pull up until
card is released from the two
430625 circuit board supports.
Slowly pull logic card rearward until
it clears the printer assembly. Push
down in middle of logic card, if
components touch front cover.

CABLE FROM
PAPER OUT OR
LOWER PAPER SWITCH

CABLE TO
POWER SUPPLY

ⓐ P101 6-PIN PLUG

(Rear View)

PRINTER

A.   Removal

3.08   To remove the printer:

(a)   Sprocket Feed

(1) Remove paper holder.
(Peform 3.01 (a), step 2.)

(2) Remove cover.
(Perform 3.04, steps 1 and 2.)

LEFT PAPER GUIDE

LEFT PAPER STRIPPER
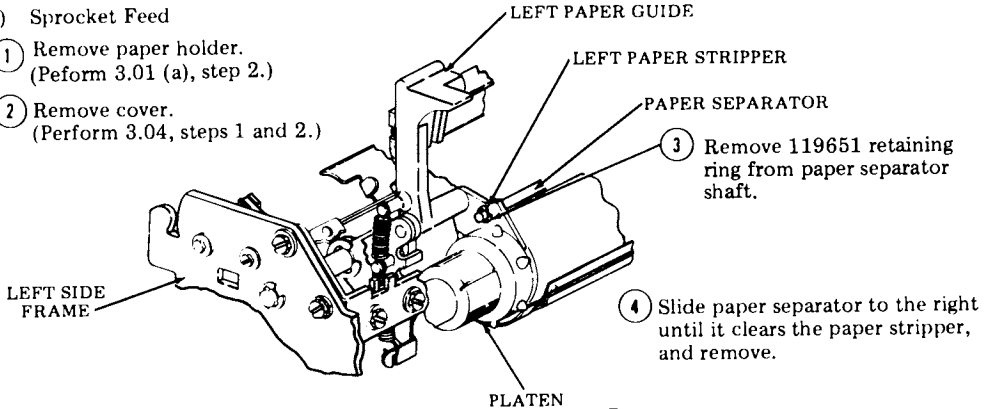
PAPER SEPARATOR

(3) Remove 119651 retaining
ring from paper separator
shaft.

LEFT SIDE
FRAME

(4) Slide paper separator to the right
until it clears the paper stripper,
and remove.

PLATEN

HOUSING

NUT PLATE

(Right
Front View)
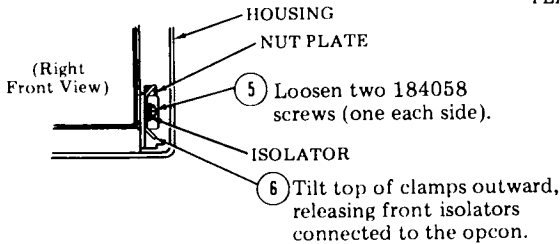
(5) Loosen two 184058
screws (one each side).

ISOLATOR

(6) Tilt top of clamps outward,
releasing front isolators
connected to the opcon.

(9) Remove the rear frame assembly.
(Perform 3.06, steps 1 through 5.)

(10) Remove the operator console.
(Perform 3.04, steps 3, 5, 6 and 8.)

(8) Grasp the bustle cover and
slide the printer and rear
frame assembly from the
housing through the rear
opening.

(7) Remove the left and right platen
knobs by pulling straight outward.

PRINT
HEAD

KEYBOARD

PLATEN

HOUSING

DIRECTION FOR
INSTALLATION
(Push)

BUSTLE
COVER

NOTCH FOR
FRONT
BUSHINGS

GUIDE
RAILS

SLOT FOR
REAR
ISOLATORS

FRONT
BUSHINGS
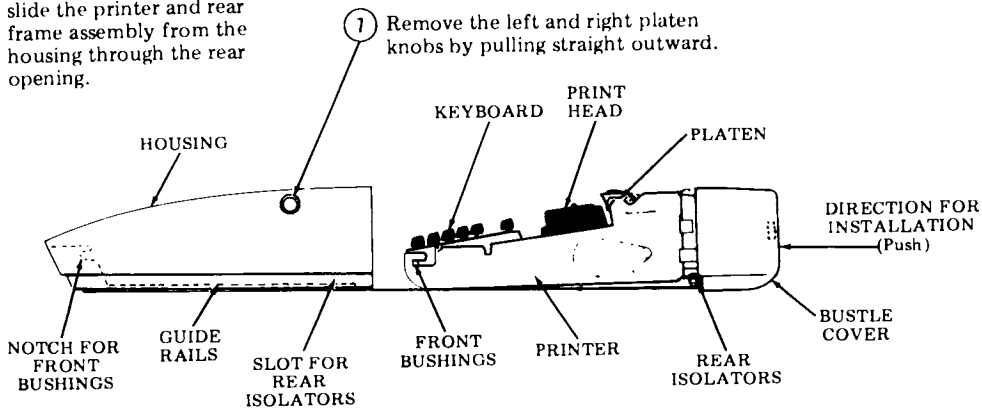
PRINTER

REAR
ISOLATORS

Note: To replace the printer, perform 3.09.

(b) Friction Feed

(1) Remove cover. (Perform 3.04, steps 1 and 2.)

LEFT PAPER GUIDE

LEFT PAPER STRIPPER

PAPER SEPARATOR

(2) Remove 119651 retaining ring from paper separator shaft.

(3) Slide paper separator to the right until it clears the left paper stripper, and remove.

LEFT SIDE FRAME

PLATEN

(5) Push paper release to the rear.

(4) Push down and to the rear on roller bail lever.

(6) Slide paper release to the right and slowly pull forward until paper release clears 119653 retaining ring on lever shaft.

HOUSING

⑦ Loosen two 184058 screws (one each side).

ISOLATOR

⑪ Remove the rear frame assembly. (Perform 3.06, steps 1 through 5.)

⑧ Tilt top of clamps outward, releasing front isolators connected to the opcon.

(Right Front View)

⑩ Grasp the bustle cover and slide the printer and rear frame assembly from housing through the rear opening. Rotate the paper release to allow the housing to clear properly.

⑨ Remove the left and right platen knobs by pulling straight outward.

DIRECTION FOR INSTALLATION ←— (Push)

HOUSING   PAPER RELEASE

NOTCH FOR FRONT BUSHINGS   GUIDE RAILS   SLOT FOR REAR ISOLATORS   FRONT BUSHINGS   REAR ISOLATORS   BUSTLE COVER
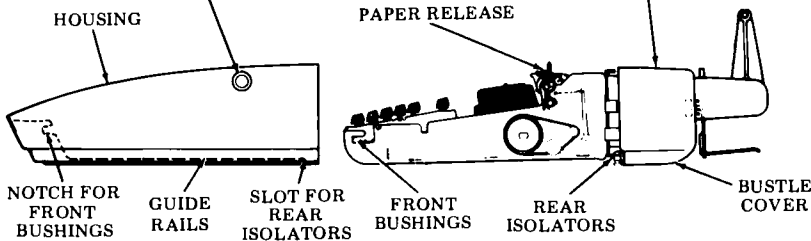
B.   Replacement

3.09   To replace the printer:

① Install the operator console, if previously removed.

② Install the rear frame assembly, bustle cover and deflector, if present.

③ Push the printer and rear frame assembly into the housing through the opening in the rear of the housing. There are two molded guide rails in the bottom of the housing to steer the assembly into position.

④ Lock the printer and rear frame assembly into position. Insert a screwdriver into the square hole in the nut plate and gently twist (or pry) the screwdriver with enough force to draw the assembly forward.

Caution: Do not overtwist the screwdriver.
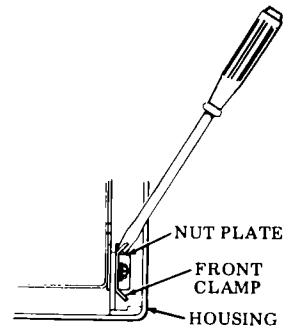
⑤ Tighten the clamp screws.

NUT PLATE

FRONT CLAMP

HOUSING

(Right Front View)

Note: The two front clamps should be loosely fastened to the nut plate before the assembly is pushed into the housing. Position each clamp so that the front bushings (operator console) protrude through the large holes in their respective clamps.

⑥ Replace the paper separator and platen knobs.

⑦ Replace the paper release (friction-feed only).

⑧ Replace the cover and paper holder.

⑨ Perform the <u>KEYBOARD TO COVER ALIGNMENT</u> adjustment.

430850 PRINT HEAD

A. Removal

3.10   To remove the print head:

Warning: When handling loose print heads, care must be taken to prevent print head cable connector pins from being bent.

(1) Raise cover.

(3) Move print head and carriage to the right of the print head cable plug.

GUIDE ROD

(8) Grasp print head and pull forward. Lift front of print head to disengage locking channels.

(Front View)

(5) Unlock print head by pulling locking handle forward until it strikes the guide rod.

(2) Remove ribbon. (Refer to How To Operate Manual.)

PRINT HEAD

(7) Move the locking handle to the right.

RIGHT

EXTRACTOR

Print head cable plug.

(4) Place projection of 407326 extractor under print head cable plug. Disconnect print head cable plug from logic card by squeezing arms of extractor together and gently pulling straight up to avoid damage to plug pins.

(6) Move retaining clip on locking handle extension protruding from left side of carriage wall approximately 1/4 inch away from wall. (Pry with screwdriver.)

FRONT

(10) Remove print head cover by lifting up and away from grommets.

(9) Disengage print head from roll pin on end of link. Remove print head.

REAR NOSE PROJECTION

GROMMET

DOVETAIL

(Left Side View)

LOCKING CHANNEL

B.   Replacement

3.11   To replace the print head:

Warning: When handling loose print heads, care must be taken to prevent print head cable connector pins from being bent.

(1) Verify that print head cover is attached securely to rubber grommets. (Push down until secure.)

PRINT HEAD
COVER

(2) Move retaining clip on locking handle extension protruding from left side of carriage wall approximately 1/4 inch away from wall if not already moved. (Pry with screwdriver.)

COLLAR DRIVE
KEY

(3) Rotate locking handle frontward until it strikes the guide rod then pull locking handle to the right until collar drive key on locking handle engages slot in right carriage side wall. Observe interaction of these parts for use when performing step 7.

Note: Collar and link may snap rearward.

GUIDE ROD

COLLAR AND
LINK

LOCKING
HANDLE

CARRIAGE

(4) Collar and link must be manually rotated and held toward front of carriage wall by grasping the link. Install print head rear notch onto roll pin at end of link.

(5) Hold collar and link forward (by pressing down on the print head) while inserting nose projection in carriage wall opening.

REAR PRINT HEAD
NOSE PROJECTION

FRONT

LINK

(6) Pivot front of print head down to carriage locking channel.

CARRIAGE
LOCKING
CHANNEL

CARRIAGE
WALL
OPENING

COLLAR AND LINK
ASSEMBLY

CARRIAGE
FRONT
WALL

(Left View)

ROLLER SHAFTS

PLATEN

REAR OF
RIBBON GUIDE

(Top View)

FRONT

(7) Slowly push print head rearward and further into the carriage locking channel until the rear of the ribbon guide is even with center of roller shafts. Apply continuous leftward pressure to locking handle at its pivot shaft, while slowly pulling print head forward until collar drive key on handle engages (snaps) into slot in collar.

Note: Parts referred to were visible in step 3.

(9) Position and hold print head and carriage assembly to right side of printer and use a 5/16 inch socket wrench to push clip against carriage wall.

(Front View)

(8) Move the handle all the way to the rear, locking the print head in close proximity to the platen by the additional force necessary to detent the handle. If handle does not move to rear, the drive key did not properly engage the collar slot (step 7).

Note: Check to make sure there is some clearance between print head and platen before detenting handle. Check PRINT HEAD TO PLATEN adjustment.

(10) Check that no connector pins are bent and carefully connect the print head cable plug to the logic card. Make sure cable does not touch left side frame when the carriage moves fully left.

(11) Install ribbon.
(Refer to How to Operate Manual.)

43 TELEPRINTER

ROUTINE MAINTENANCE

1. GENERAL

1.01 This section provides routine maintenance procedures for the 43 Teleprinter.

1.02 A routine maintenance should be performed, at the convenience of the customer, at least once a year.

1.03 Routine maintenance consists of visual checks, lubrication, and cleaning. When performed at routine intervals, the possibility of later trouble will be reduced.

1.04 Following the routine maintenance, a local and on-line installation checkout should be performed. (See 43 Basic KSR Teleprinter Testing, Page 1-66, or 43 RO Teleprinter Testing, Page 1-84.) The routine maintenance date should be filled out on the bottom side of the directory card holder.

2. VISUAL CHECKS

2.01 The following areas should be checked for mechanical condition:

(a) Frayed belts on spacing and line feed motors.

(b) Worn or frayed ribbon.

(c) All cable connectors fully seated.

3. LUBRICATION

3.01 Lubrication of the printer is required during routine maintenance. Refer to Page 2-17 for type, location, and amounts of lubrication.

4. CLEANING AND APPEARANCE

4.01 Examine exterior areas for smudges, dust, etc.

4.02 Check proper fit of cover. Replace extremely damaged or discolored cover, housing, bustle, etc.

4.03 Exterior cleaning should normally be limited to wiping with a soft cloth moistened with a mild detergent. However, in case of ink stained plastic surfaces, a waterless (non-abrasive) hand cleaner or a lather from abrasive bar soap applied with a cloth should be used.

4.04 Interior areas should be examined with the cover opened and accumulations of paper dust or ribbon fragments cleaned by carefully brushing loose material onto a cloth. Ink stains or deposits on interior surfaces, ribbon rollers, platen, etc, can be wiped with a cloth dampened in Trichloroethane.

Warning: Do not allow trichloroethane to contact exterior plastic surfaces.

43 TELEPRINTER

PARTS

CONTENTS   PAGE

1. GENERAL

1.01   Information on maintenance spare parts is
        provided in this section for the 43 Basic
KSR and RO Teleprinter.

1.02   This section is provided to identify the
        Teletype Corporation part number and
location of recommended spares that should be
available and may be required to correct a trouble.

1.03   Part numbers are listed in the index in
        numerical order and indicate the page on
which the parts appear. Asterisked numbers,
stocked as "List 1", indicate a maintenance spare
stocking ratio of one spare for the first twenty
stations and an additional spare for each addi-
tional 30 stations in a maintenance area. Part
numbers without asterisks, stocked as "List 2",
indicate that one spare should be available in each
maintenance area. Before ordering, verify that a
particular spare is applicable to the type of ter-
minal in service.

1.04   All ordering numbers shown in this
        manual are Teletype Corporation part
numbers.

1.05   Troubleshooting, disassembly, and reas-
        sembly information for these parts is
provided on Page 1-38, Page 1-52, and Page 1-96
respectively.

2.   PARTS

408065

143307

410740 or 410742

43K001/AAA

120139

430610

43K101/CAA

430611

430700

430733

430554

143306

430750

430751

410755

410754
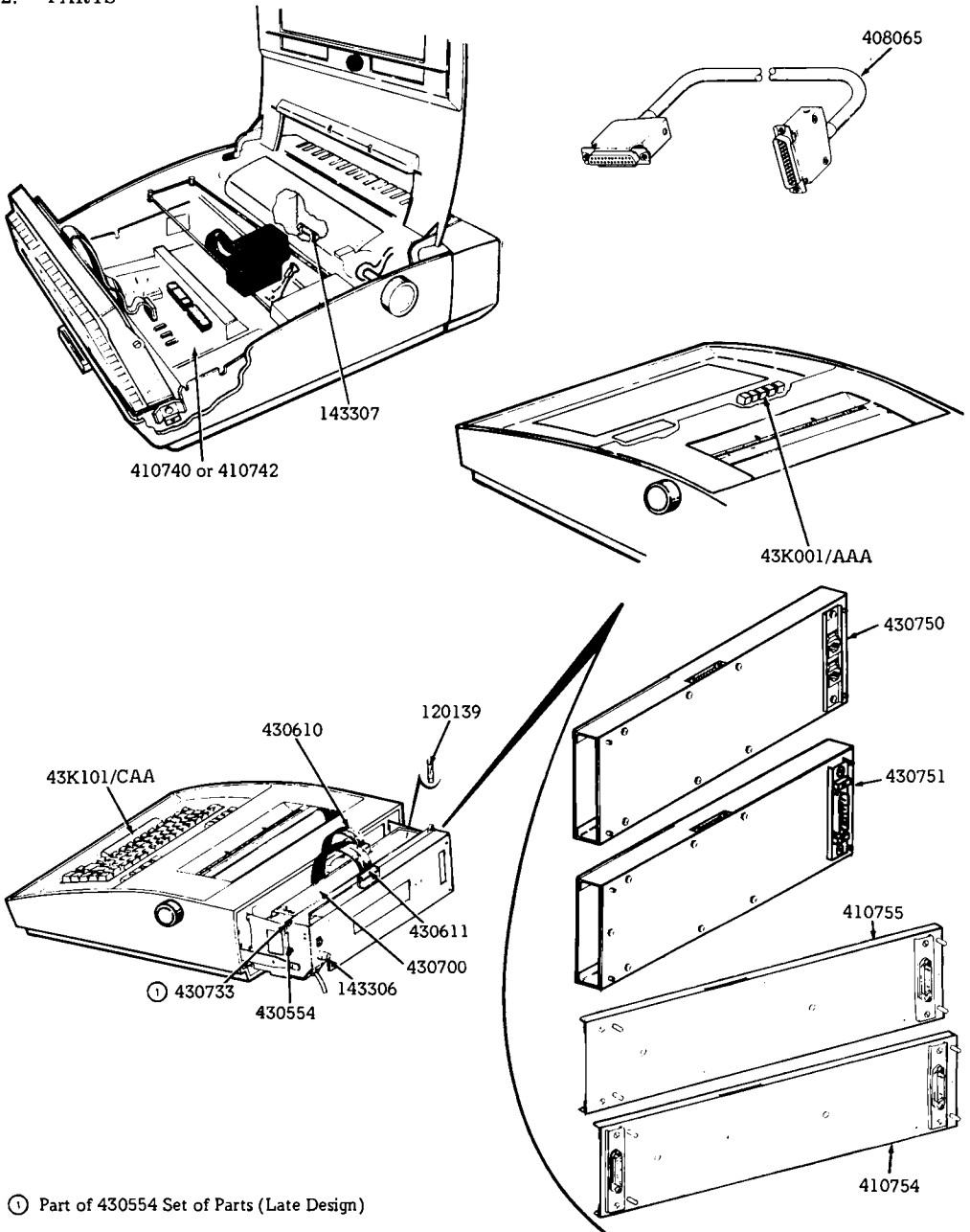
① Part of 430554 Set of Parts (Late Design)

430900 Answer-Back Modification Kit
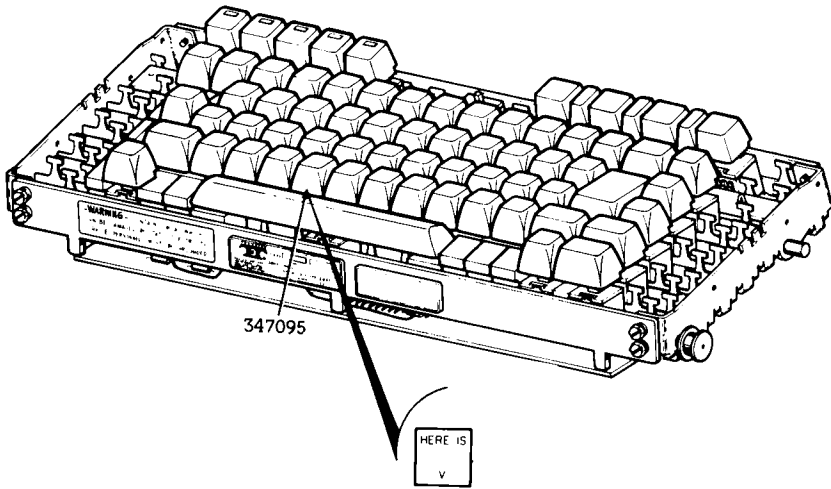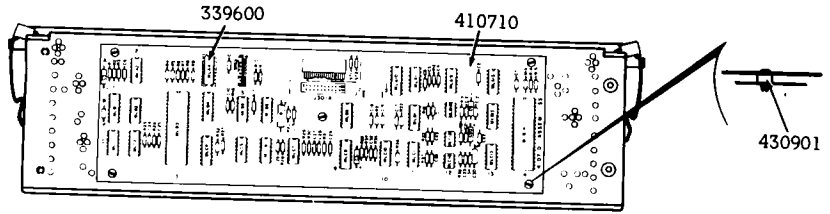
339600   410710

430901

347095

HERE IS

V

3. NUMERICAL INDEX

Note: One spare should be available in each maintenance area, unless otherwise specified in parenthesis.

Part Number	Description and Page Number	Part Number	Description and Page Number	Part Number	Description and Page Number
43K001/AAA*	Operator Console (Unit Code) 1-112	347095 (2)	Keytop, (HERE IS) 1-113	430610	Cable to Power Supply 1-112
43K101/CAA*	Operator Console (Unit Code) 1-112	408065	Cable, Data Set E.I.A. 1-112	430611	Cable to TDU 1-112
120139*(5)	Fuse 1.0A (Power Supply) F2 1-112	410710*	Circuit Card, Answer-Back 1-113	430700*	Power Supply Assembly 1-112
143306*(5)	Fuse 1.0 A SLOW-BLOW (R.Frame) F1 1-112	410740*	Logic Card 1-112	430733	Clip 1-112
		410742*	Logic Card 1-112	430750*	Terminal Data Unit (TDU) 1-112
143307*(5)	Fuse 0.6 A SLOW-BLOW (L. Card) F3 1-112	410754*	Terminal Auxiliary Unit (TAU2) 1-112	430751*	Terminal Auxiliary Unit (TAU) 1-112
		410755*	Terminal Auxiliary Unit (TAU1) 1-112	430901(15)	Fastener, Stud 1-113
339600*(2)	PROM (Uncoded) 1-113	430554(2)	Clip 1-112		

*A maintenance spare stocking ratio of one spare for the first twenty stations and one additional spare for each additional 30 stations in a maintenance area.

Modification Kits:
430900   Modification Kit, Answer-Back 1-113

43 PRINTER

TROUBLESHOOTING

CONTENTS   PAGE

1.   GENERAL

1.01   This section provides troubleshooting information for the 43 Printer.

1.02   Printer troubleshooting is initated either by 43 KSR or RO Teleprinter Troubleshooting, Page 1-38 and Page 1-52, or when trouble in the printer is suspected from symptoms observed.

1.03   Analysis in this section is limited to isolation of the trouble within the printer up to its electrical interface to the logic card. The 43 printer must be tested as part of a 43 Basic KSR or RO Teleprinter Station. Refer to Page 1-66 and Page 1-84. Where analysis indicates the trouble is not in the printer, return to the station section for further analysis.

1.04   All ordering numbers shown in this manual are Teletype Corporation part numbers.

1.05   The 430850 print head is returnable to Teletype Product Service Center for repair.

1.06   Isolation and correction of troubles is based on electrical checks, parts replacement or adjustments.

Reference Sections start on:

Page 2-4   Wiring
Page 2-6   Adjustments and Spring Tensions
Page 2-21   Disassembly/Reassembly
Page 2-35   Parts

1.07   Trouble analysis is presented in the form of a "20 Questions" routine in 2. TROUBLESHOOTING GUIDE. The guide, with questions and yes or no columns, should be used always starting with the first question and proceeding according to the "yes" or "no" directive.

2.   TROUBLESHOOTING GUIDE

QUESTION	YES	NO
1. Does test message print and paper advance properly while PRINTER TEST key is depressed (or No. 2 switch on logic card is operated on)?	Go to 2.	Go to 1a.
1a. Is red lamp on power supply lit?	Go to 1b.	Go to Teleprinter Troubleshooting. Check circuit that failed for shorts.

QUESTION	YES	NO
1b. Does anything print or perform?	Go to 1c.	Go to Teleprinter Troubleshooting.
1c. Does carriage space and return properly?	Go to 1d.	Check for mechanical bind by moving carriage manually with power off. Check for proper spacing belt spring tension. Check PLATEN END PLAY adjustment. Check continuity of spacing motor and encoder. Check switch No. 1 on print head. Replace motor and/or encoder or cable. Replace lead screw nut.
1d. Does paper advance properly (successive lines uniformly spaced)?	Go to 1e.	Check line feed belt tension. Check for mechanical bind by rotating platen manually with power off. Check PLATEN END PLAY adjustment. Check LINE FEED FOLLOWER PULLEY STOP BRACKET and PRESSURE ROLLER BAIL adjustments (friction feed). With power on (reset) check platen detenting through full rotation by turning platen knob. Check continuity of line feed motor. Replace motor or cable.
1e. Sprocket Feed — Do sprocket pins on platen line up with paper and with paper guides?	Go to 1f.	Check LEFT AND RIGHT SPROCKET adjustment. Check LEFT AND RIGHT PAPER GUIDE adjustment.
1f. Are any characters printed?	Go to 1g.	Check continuity of print head and cable. Go to Teleprinter Troubleshooting.

QUESTION	YES	NO
1g. Are any dots missing from printed characters?	Check continuity of associated print magnet. Check PRINT HEAD ARMATURE adjustment. Replace print head or cable.	Go to 1h.
1h. Are any dots noticeably out of line on characters with vertical segments?	Replace print head.	Go to 1i.
1i. Is proper print density obtained (good ribbon, proper multicopy paper)?	Go to 1j.	Check PRINT HEAD TO PLATEN adjustment. With power off and carriage moved manually, check that ribbon moves with carriage without slipping during return and does not move when carriage is moved to the right. Check carriage and left bracket ribbon rollers for "one way" rotation.
1j. Does printed copy align properly with edge of paper?	Undefined problem during PRINTER TEST. Go to Teleprinter Troubleshooting.	Sprocket Feed — Check PRINT-ED LINE POSITION adjustment. Friction Feed — Check LEFT HAND MARGIN adjustment.
2. Did bell ring during PRINTER TEST?	Go to 3.	Go to 2a.
2a. Does bell ring under any conditions (CTRL G RH margin, etc)?	Go to Teleprinter Troubleshooting.	Check bell coil and cable continuity. Check for freedom of bell plunger.
3. Sprocket Feed — Does ALARM indicator light when a paper-out condition is sensed?	Undefined trouble. Go to Teleprinter Troubleshooting.	Check continuity of paper-out cable and contacts. Check PAPER ALARM CONTACT adjustment.

43 PRINTER

WIRING

CONTENTS   PAGE

1. GENERAL

1.01   This section provides wiring information for the 43 printer.

1.02   Related wiring information and cable connections to the logic card are shown in Teleprinter Wiring, Page 1-64.

1.03   Designations on printer wiring diagram do not appear on the components.

1.04   The wiring information in this section is provided to support the 43 Printer Troubleshooting, Page 2-1.

1.05   All ordering numbers shown in this manual are Teletype Corporation part numbers.

2. PRINTER WIRING

P105   P103   P102   P101

P106   P104

FRONT VIEW

P105

13 Ω	LEVEL 1	1
13 Ω	LEVEL 2	2
.13 Ω	LEVEL 3	3
13 Ω	LEVEL 4	4
13 Ω	LEVEL 5	5
13 Ω	LEVEL 6	6
13 Ω	LEVEL 7	7
13 Ω	LEVEL 8	8
13 Ω	LEVEL 9	9
	+42V DC	10
	+42V DC	11
	+42V DC	12
	+42V DC	13
	SPARE	14
	GND	15
SW1	LEFT HAND MARGIN	16

430850 WIRE MATRIX PRINT HEAD

P101

1(S)
5(S)   LOGIC GND

4(G)
6(W-BK)   LOGIC GND

PAPER OUT SWITCH
(Paper In)

SPROCKET FEED

P101

1(W-BK)
5(G)   LOGIC GND

4(S)
6(S)   LOGIC GND

LOW PAPER SWITCH
(Paper Not Low)

FRICTION FEED

P104

20 Ω	PHASE 3 (O)	1
20 Ω	PHASE 2 (R)	2
20 Ω	PHASE 4 (Y)	3
20 Ω	PHASE 1 (BR)	4
	+42V DC (BK)	5

P103

(W) 8
+5 V DC
(G) 3
(P) 2
-5 V DC
(BL) 1

OPTICAL SWITCH

430047 CARRIAGE MOTOR W/CABLE

P106

1
2 | +42V DC   240 Ω

430113 BELL COIL AND 430117 CABLE

P102

45 Ω	PHASE 4 (Y)	1
45 Ω	PHASE 3 (O)	3
45 Ω	PHASE 2 (R)	5
45 Ω	PHASE 1 (BR)	7
	+42V DC (BK)	2 or 8
	+42V DC (BK)	8 or 2

430154 LINE FEED MOTOR W/CABLE

43 PRINTER

ADJUSTMENTS AND SPRING TENSIONS

1. GENERAL

1.01   This section provides printer adjustments and spring tensions.

1.02   Belt tensions are checked with a spring scale held at the angle shown in the adjustment illustration.

1.03   All ordering numbers shown in this manual are Teletype Corporation part numbers.

1.04   After an adjustment is complete, tighten any screws or nuts loosened to make the adjustment.

1.05   Reference in the procedure to left or right, up or down, and top or bottom, etc, refer to the printer in its normal operating position.

1.06   Adjustments should be checked and performed when a trouble indicates a specific adjustment may be out of tolerance or when an adjustment is disturbed to enable a part to be removed or replaced.

1.07   Spring tensions checks should be performed when a trouble indicates a possible defective spring or to verify proper part numbers.

1.08   Springs that do not meet the tension requirements should be replaced.

2. TOOLS REQUIRED

2.01 The following tools may be required when performing adjustments or spring tension checks. Most of these items should normally be present in standard maintenance tool kits.

Tools

Bit, 1/4 Inch Socket	135677
Bit, 5/16 Inch Socket	135678
Gauge Set	117781
Gauge, Tape	95960
Handle	135676
Hook, Pull Spring	75765
Hook, Pull Spring	142554
Hook, Push Spring	142555
Scale, Spring (64 Ounce)	82711
Scale, Spring (8 Ounce)	110443
Scale, Spring (32 Ounce)	110444
Scale, 15 Pound Spring	135059
Screwdriver, 3-1/2 Inch Blade	94647
Screwdriver	95368
Screwdriver With Clip	100982
Tweezers	151392
Wrench, Hex Key	124682
Wrench, 3/16 Inch Socket	125752
Wrench, 3/16 Inch and 1/4 Inch Open End	129534
Wrench, 5/16 Inch and 3/8 Inch Open End	152835

3. PRINTER ADJUSTMENTS

LEFT PAPER SPROCKET (Sprocket Feed Only)

Requirement
  The left sprocket should be biased against the collar of the platen hub.

To Adjust
  Loosen set screws and position left sprocket to meet requirement.
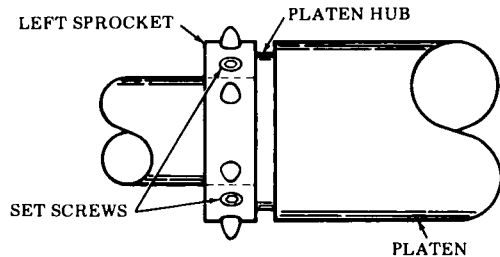
RIGHT PAPER SPROCKET (Sprocket Feed Only)

Requirement
  The right sprocket should be biased against the collar of the platen hub and the pins should be in line with the pins of the left sprocket.

To Adjust
  Loosen set screws and position right sprocket to meet requirement.
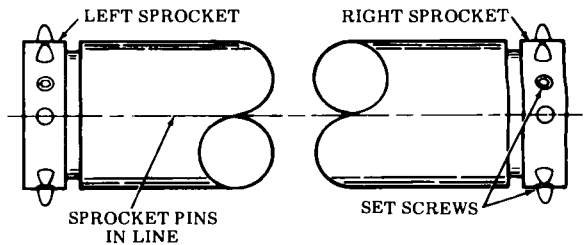
Note: This adjustment to be refined when making the PRINTED LINE POSITION adjustment.

LEFT AND RIGHT PAPER GUIDES
(Horizontal Positioning) (Sprocket Feed Only)

Requirement
There should be some clearance between the base of the sprocket pins and either side of the paper guide slot.

To Adjust
Loosen screws friction tight and position paper guide bracket by using a screwdriver on the pry points.

PAPER GUIDE BRACKET

LEFT SPROCKET

PRY POINTS

GUIDE SLOT

MOUNTING SCREWS
(Left and Right)
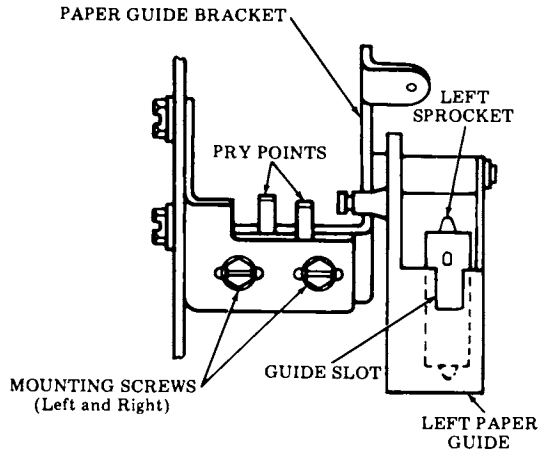
LEFT PAPER GUIDE

LEFT AND RIGHT PAPER GUIDES
(Angular Positioning) (Sprocket Feed Only)

Requirement
The paper guides should seat fully on the paper sprockets (left and right sides).

To Adjust
Loosen screws. To seat the paper guides, apply finger pressure to top of paper guides at 45 degrees and toward center of platen. With finger pressure applied at approximately 45 degrees; tighten screws.

FINGER PRESSURE 45° APPROX

PAPER GUIDE

SCREWS

SPROCKET

SIDE PLATE
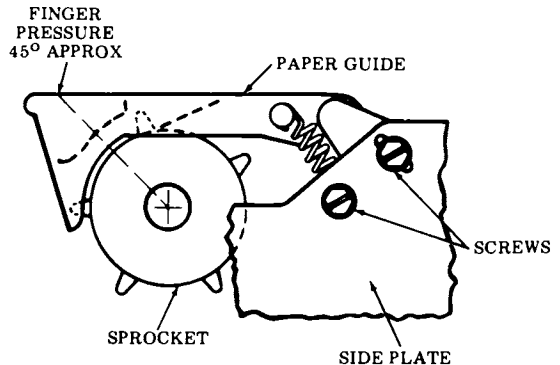
LEFT AND RIGHT PAPER GUIDES
(Angular Positioning) (Friction Feed Only)

Requirement
The left paper guide should seat fully on the hub. The right paper guide should also be fully seated on the hub and the center paper guide should just touch the platen in the middle.

To Adjust
On left side, loosen the two mounting screws friction tight and move the left paper guide mounting bracket to meet the adjustment. With finger pressure applied, tighten screws.

On right side, loosen one mounting screw and with an open end wrench applied to the hex post, rotate bracket until adjustment is met. While holding the post, retighten the screw.

FINGER PRESSURE 45° APPROX

PAPER GUIDE

SCREW AND HEX POST

SIDE PLATE
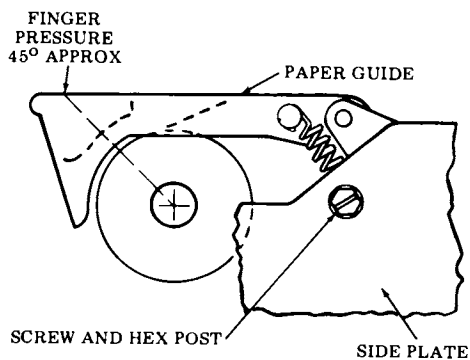
LINE FEED BELT TENSION (Sprocket Feed Only)

Note: This adjustment applies to Sprocket Feed (Early Design) only, without follower pulley.

Requirement
    When the belt and sprocket system is at the point of least slack; a force of 5 ounces applied with a spring scale midway between the sprockets the belt should deflect between
        Min 0.090 inch---Max 0.120 inch
    The point of least slack is the point where the set screws on the platen pulley and those on the motor pulley are set as shown below.

To Adjust
    Rotate the platen until the set screws on the platen pulley and the set screws on the motor pulley are aligned as shown below. Loosen motor screws, position motor to meet requirement at the point of least slack. Tighten screws.
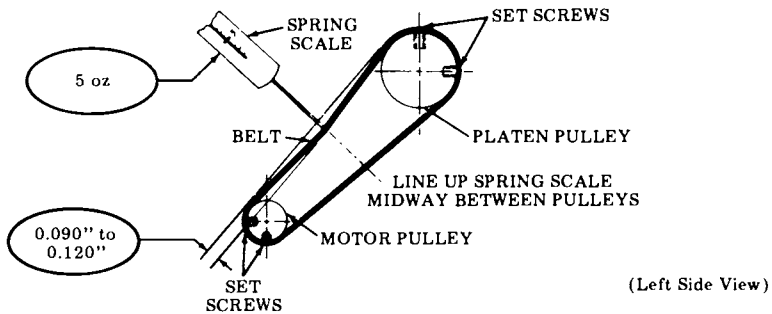
PRINT HEAD TO PLATEN

Requirement
    There should be
        Min 0.025 inch---Max 0.035 inch
    gap between the ribbon guide of the print head and the platen (without paper or ribbon) and at all positions of the carriage and platen, when platen play at the right end is biased down and to the rear and the print head is locked.

To Adjust
    Position carriage to the extreme left position. Unlock locking handle, use 1/4 inch "J" wrench to loosen right-hand locknut and with carriage biased rearward, insert 1/4 inch socket wrench through access hole in left side frame and rotate eccentric post to adjust. Tighten locknut. Check adjustment with carriage locked. Check adjustment on extreme right end of platen, while biasing platen down and to the rear. Refine adjustment, if necessary.
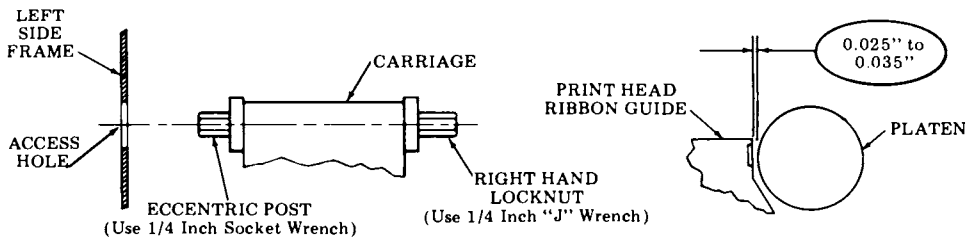
RIBBON CARTRIDGE MAGNETIC LATCH

Requirement
   The magnetic pole pieces of the magnetic latch should be firmly engaged with the cartridge lower metal
   plate when the cartridge is installed in the right-hand cartridge mounting bracket.

To Adjust
   Loosen the two magnetic latch mounting screws. Install cartridge onto the mounting bracket. While
   holding the cartridge down firmly, allow the magnetic latch to fully engage the lower metal plate of the
   cartridge. Tighten the latch mounting screws.
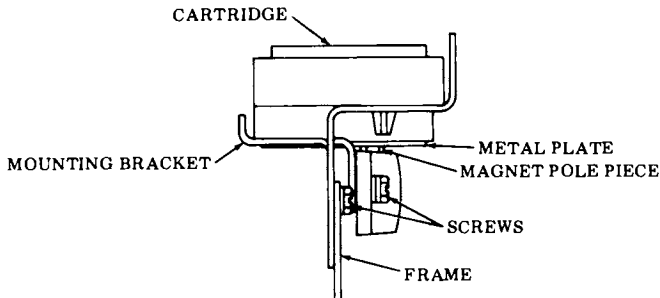
LINE FEED FOLLOWER PULLEY STOP BRACKET

Note: For units with line feed pulleys only.

Requirement
   With the follower pulley resting on the belt, push the pulley against the belt to take up all friction.
   Slowly release pressure. Measuring between the follower lever and the adjacent tab of the stop bracket
   there should be
      Min 0.020 inch---Max 0.040 inch
   gap between them.

To Adjust
   Loosen the two mounting screws on the stop bracket to friction tight and move bracket to meet the
   adjustment.
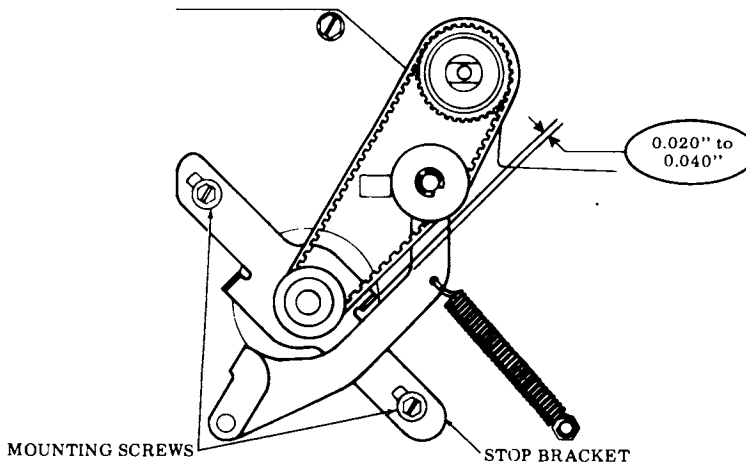
3. PRINTER ADJUSTMENTS (Cont)

LEFT HAND MARGIN (Friction Feed Only)

Requirement

When the variable feature switch arrangement on
the printer logic card has been enabled for 80
character lines (Option 432.c.), the slide should
be located all the way to the left. When the
switch arrangement has been enabled for 72
character lines and printed line centering (Option
432.d.) is required, then the slide must be
located all the way to the right.
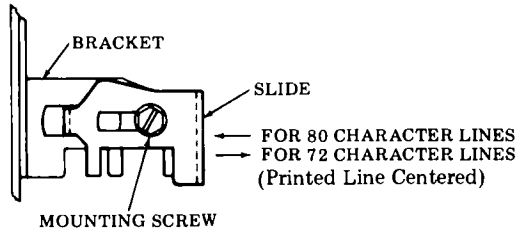
To Adjust

Loosen the single mounting screw holding the
slide to the bracket and move the slide to meet
the adjustment.

PRESSURE ROLLER BAIL (Friction Feed Only)

Requirement

With the paper release lever in the forward position and the right end of the carriage next to the right
rear carriage wick located immediately under the arm of the pressure roller bail (between the two pres-
sure rollers) there should be from

Min 0.050 inch---Max 0.080 inch

gap between the carriage and the bail arm when measured at the closest point.

To Adjust

Loosen the clamp screw to friction tight. Move pry point down to increase gap or up to decrease gap.
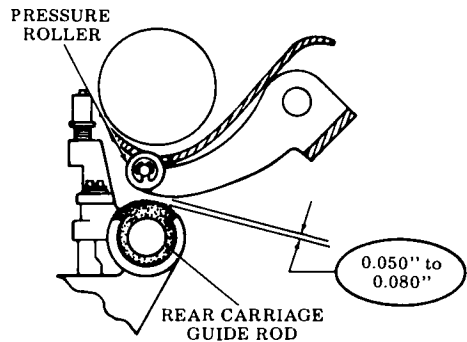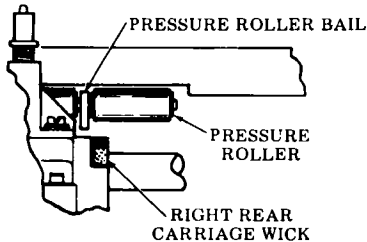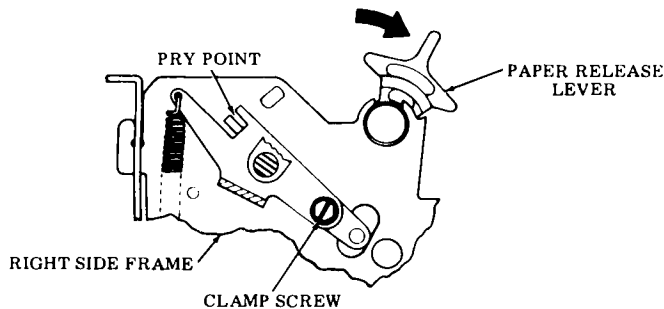
PAPER GUIDE PLATE CLEARANCE (Sprocket Feed Only)

Note: For sprocket feed (Early Design) with metal paper guide only.

(1) Requirement
With no sprocket forms in the platen mechanism and the platen oriented with the slot, or rib, on the right platen hub in the top uppermost position there should be
Min 0.008 inch---Max 0.025 inch
between the platen and the left and right ends of the paper guideplate. Record the two clearances.
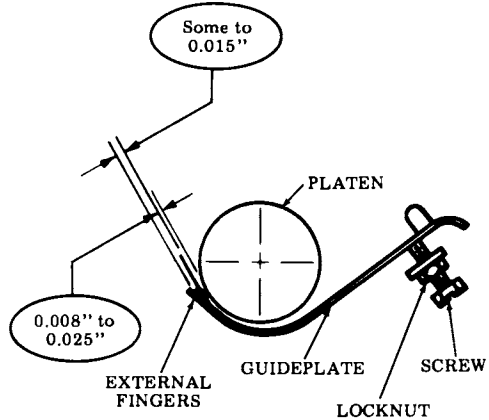
To Adjust
Loosen locknut and adjust screw. Tighten locknut.

(2) Requirement
The fingers at both the left and right ends of the platen should be
Min Some---Max 0.015 inch
beyond the recorded gap between the platen and the left and right ends of the paper guideplate.

To Adjust
Bend fingers to meet requirement.

PAPER ALARM CONTACT LEVER (Sprocket Feed Only)

Requirement
With the paper alarm contact lever resting on the paper and the paper held taut over the cutout in the paper guide tray, the switch will be in the off mode (nonalarm). With the paper-out, the lever should activate the switch (alarm mode).

To Adjust
Loosen screws and position switch bracket to meet requirement.
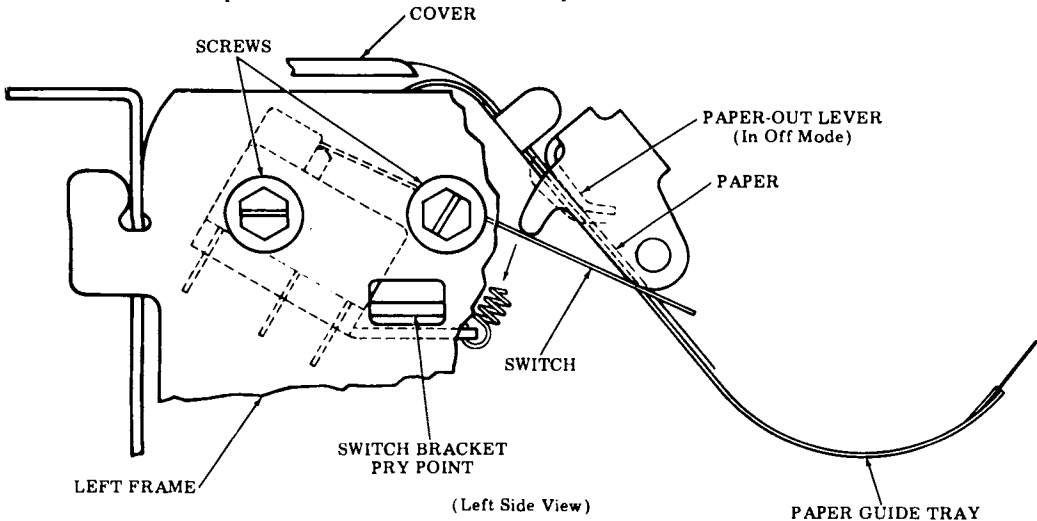
3.   PRINTER ADJUSTMENTS (Cont)

PLATEN ENDPLAY AND PRINTED LINE POSITION

The following two requirements must be met:

(1)   Requirement
Platen Endplay -- With the platen biased to
the right, there should be
Min Some — Max 0.008 inch
clearance between the left bearing and the
platen hub, at the closest point, and
Max 0.030 inch
between the left bearing and the sprocket at
the closest point.

To Adjust
Loosen line feed pulley set screws
and position.

Max
0.030"

Some to
0.008"

LEFT FRAME

LINE FEED PULLEY
SET SCREWS

BEARING

PLATEN
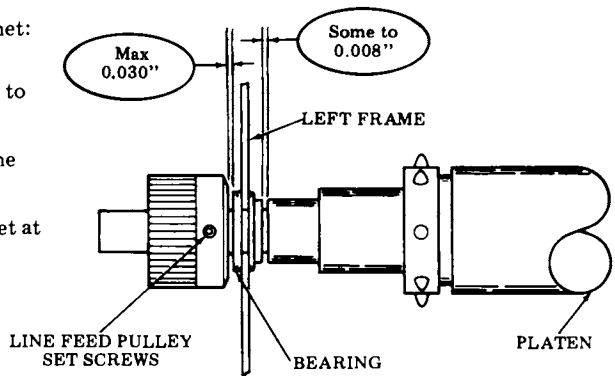
(2)   Requirement (Sprocket Feed Only)
Printed Line Position — The lower edge of a typed line of M characters should be 1/32 ±1/64 inch
above a horizontal line located by any of the following methods:

1.   A line drawn between the lower edges of two opposite sprocket holes.
2.   A preprinted line on the form the same as in 1. above or in 1/6 inch multiples.
3.   A fold midway between two sprocket holes on fanfold paper.

(Power must be on line feed motor for this adjustment.)

LEFT SPROCKET

SPROCKET PAPER FORM

SPROCKET
FEED HOLES

MMMM

PRINT HEAD

PLATEN

RIGHT SPROCKET

1/32"
±1/64"

MMMM

LINE DRAWN ACROSS
BOTTOM OF SPROCKET
FEED HOLES

(Top View)
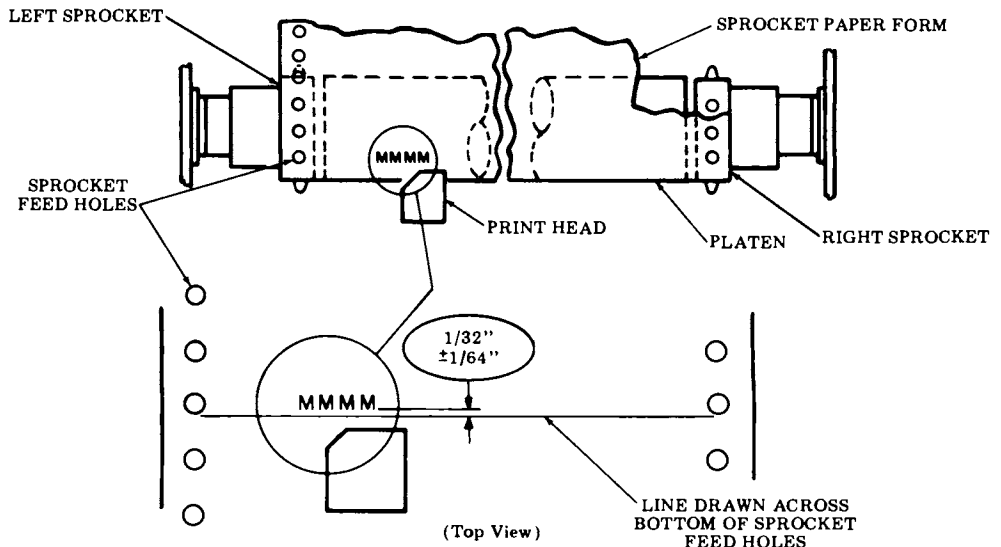
To Adjust
Loosen the left sprocket (at platen) set screws and position. Print the character "M" across the
line and check (2) Requirement. If necessary, loosen set screw on right sprocket to meet alignment
requirement.

PRINT HEAD ARMATURE

RIBBON GUIDE

ADJUSTING
CAM SLOT

FLAT

LOWER ARMATURE
EXTENSION

(Right Side View)

PUSH ON ARMATURE
TO RELEASE

RELEASE
ARMATURE

INNER
POLE PLATE

(Top View-Cover Removed)
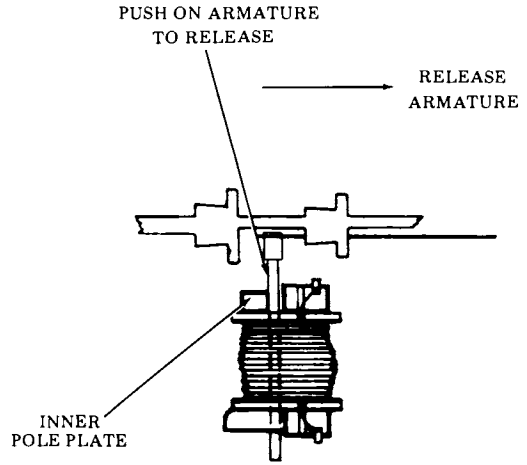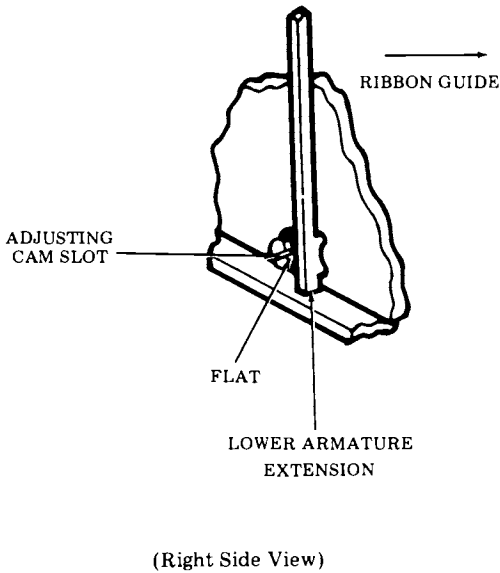
Requirement
   With a good ribbon installed and the print head positioned and locked toward the platen, no wires shall
   stick through the ribbon (will not retract) and no dots shall be missing or noticeably lighter than other
   dots on printed copy.

To Adjust
   Note: This adjustment applies to all 9 levels.
            (Power must be off for this adjustment)

   Remove the ribbon and print head cover. Release the print head and position away from the platen.
   With the lower armature extension on the high part of the cam (adjusting cam slot horizontal and the
   flat facing toward the ribbon guide) and the armature released from the inner pole plate, rotate the
   adjusting cam slowly clockwise until the armature is magnetically pulled up. Continue rotating cam
   clockwise for 3 more clicks.

4. SPRING TENSIONS

① 430028 Lead Screw Spring

On left side of lead screw, push to start to compress spring − 9 to 11 pounds.

② 430030 Carriage Nut Spring

Place carriage on left side of unit. Hold lead screw pulley. Insert spring scale through top hole of left bearing housing. Push carriage with 46 ±8 ounces to compress carriage nut spring.

③ 430242 Ribbon Tension Spring

4-1/2 to 6-1/2 ounces to pull spring to installed length with ribbon installed.

④ 101386 Paper Finger Springs (Left and Right) (2)

2 to 4 ounces to start to lift paper fingers at front edge of fingers (with center paper guide installed)

⑤ 430021 SP Belt Tension Arm Spring

18 to 22 ounces to pull spring to installed length.

⑥ 72473 Paper-Out Spring (Sprocket Feed Only)

1/2 to 1 ounce to start paper-out lever moving.

⑦ 430118 Bell Plunger Spring

1/2 to 1 ounce to seat plunger.

⑧ Link Spring (Part of 430216)

3/4 to 1-1/4 ounces at roll pin to hold spring in lowest position with locking handle in the most forward position.

⑨ 4708 Paper Tray Springs (Left and Right) (2)

On sprocket feed units, lift paper-out contact bail to latched position. Move the printhead away from the platen. With a spring scale hooked over the center of the top edge of the tray, and pulling at right angles to the main surface of the tray, it should require 5 to 9 ounces to start the tray moving forward.

⑩ 430021 Line Feed Belt Tension Arm Spring

10 to 14 ounces to pull spring to installed length.

⑪ 82727 Pressure Roller Bail Spring (Friction Feed Only)

With the paper release lever in the rear position and pulling the pressure roller bail at the spring mounting hole at a right angle to the bail arm, it should take 40 to 44 ounces to start the roller bail moving.

SPRING IDENTIFICATION

43 PRINTER

LUBRICATION

1.   GENERAL

1.01   This section provides lubrication procedures for the 43 printer.

1.02   Lubricate the printer at intervals indicated under Routine Maintenance, Page 1-110.

1.03   The printer can be lubricated by opening the cabinet cover.

2.   LUBRICATION PROCEDURES

2.01   Apply lubricant to points as indicated.

(a)   On small parts, a minimum amount of lubricant should be applied so that the lubricant remains on the parts and does not run off.

(b)   Excessive lubricant should be removed with a dry, lint-free cloth.

(c)   The following areas must be kept dry, free of all lubricant: All electrical components, including terminals. All parts normally touched by the operator, including exposed surfaces in ribbon, paper handling areas, and all large flat areas.

2.02   The following symbols indicate the quantity of lubricant to be used in a specified area: Symbols O1, O2, O3, etc, refer to 1, 2, 3, etc, drops of oil.

2.03   The following list of symbols applies to the lubrication instructions and the type of lubricant to be used:

O   Oil 88970 (1 qt), 88971 (1 gal)

G-A   Apply thin film of 97116 (4 oz) or 88973 (1 lb) grease.

G-B   Apply thin film of Syn-Tech grease (use 430836 tube with grease and 430838 brush).

G-C   Fill with Poly Oil grease (use 430837 injector with grease).

S   Saturate felt oilers, washers, and wicks with oil.

D   Keep dry, no lubricant permitted.

2.04   Lubrication checklist:

Lead Screw — Film of grease over the entire threaded portion of lead screw.

Carriage Wicks — Saturate with oil (4 places).

Ribbon Guide Rollers — Two drops of oil (2 places).

Ribbon Rollers — Two drops of oil (2 places).

Ribbon Tension Arm Pivot and Spring — Two drops of oil each (4 places).

Spacing Tension Arm Pivot, Roller and Spring — Two drops of oil each (4 places).

Platen Bearing — Five drops of oil each side (2 places).

Finger Pivots — Two drops of oil each side (2 places).

Paper-Out Arm Pivot — Two drops of oil on both pivot points (Sprocket Feed only).

Lead Screw Pulley Clip — Grease between clip and lead screw shaft.

Pressure Roller Bail Spring — Two drops of oil each end (2 places — Friction Feed only).

Platen Tray Shaft — Two drops of oil each end at the side plates (2 places — Friction Feed only).

Pressure Roller Bail — Two drops of oil each end at pivot points on each side of bail (2 places — Friction Feed only).

Carriage and Nut Engaging Surfaces:

    (a)   Two Nut Drive Arms — Grease four bearing surfaces.

    (b)   Nut Keying Arm — Lubricate by packing carriage engaging slot with grease.

Print Head:

    (a)   Active Armatures and Outer Pole Plate — Grease at the upper pivot area as well as the lower locator area (9 places).

    (b)   Print Wire Well Area — Completely fill with grease.

3.   LUBRICATION POINTS

O2   Platen Tray Shaft
(Each End)

O2   Pressure Roller
Bail Spring
(Each End)

O2   Paper-Out Arm Pivot

O2   Finger Pivots
(Each Side)

O2   Pressure Roller
Bail Pivot Points

Friction Feed Only

O5   Platen Bearing
(Each Side)

O2   Ribbon Guide Rollers (2)

O2   Ribbon Rollers (2)

S   Carriage Wicks (4)

O2   Spacing Tension Arm
Pivot, Roller and Spring

S Carriage Wicks (4)

GA Lead Screw Pulley Clip

O2   Ribbon Tension Arm
Pivot and Spring

GA   Lead Screw

GA   Carriage and Nut
Engaging Surfaces

G-C   Print Head Well Area

G-B   Print Head Active Armatures
and Outer Pole Plates

43 PRINTER

DISASSEMBLY/REASSEMBLY

1.   GENERAL

1.01   This section covers disassembly and reassembly procedures for the 43 printer.

1.02   The printer is not considered a field replaceable item. Any trouble can be corrected by adjustments or by replacement with maintenance spares.

1.03   Procedures are provided to remove individual assemblies and parts and are intended to directly access any assembly or part,

insofar as possible, without total disassembly of the unit.

1.04   When removing a subassembly or part from the printer, follow the removal procedure and note the sequence of removal to enable proper reassembly. For reassembly, reverse the procedure except where different instructions are given. Perform any adjustments indicated. Refer to Page 2-6 for adjustments.

1.05   Disassembly of printer parts except the print head will require the removal of the set housing and rear frame. Refer to Teleprinter Disassembly/Reassembly, Page 1-96 for set housing and rear frame removal and replacement procedures.

1.06   Disassembly of the printer motors will require the removal of the logic card.

1.07   Disassembly of the printer lead screw, carriage with post assembly, lead screw nut, and collar with link will require the removal of the operator console, if present.

1.08   After replacing printer parts, refer to the lubrication procedures, Page 2-17, and lubricate any parts requiring lubrication.

1.09   Some parts that are not listed in the parts sections are shown as necessary to the disassembly procedures such as screws and ring retainers, etc. These parts are common to other Teletype Corporation product lines and if needed may already be available in field repair kits or can be ordered.

1.10   All ordering numbers shown in this manual are Teletype Corporation part numbers.

1.11   Reference in the procedures to left and right, up or down, and top or bottom, etc, refer to the printer in its normal operating position.

2. TOOLS REQUIRED

2.01   The following tools may be required when performing the printer disassembly and reassembly procedures. Most of these items should normally be present in standard maintenance tool kits.

Part No.	Description
75765	Hook, Pull Spring
95368	Screwdriver, 1/8 Inch, 2 Inch Blade
100704	Screwdriver w/Clip, 10 Inch Blade
100982	Screwdriver w/Clip, 1/4 Inch 6 Inch Blade

Part No.	Description
108285	Pliers, Long-Nose
110271	Wrench, Hex Key
124682	Wrench, Hex Key
125752	Wrench, 3/16 Inch Socket
129534	Wrench, Open End, 3/16 Inch and 1/4 Inch
135676	Handle
135677	Bit, 1/4 Inch Socket
135678	Bit, 5/16 Inch Socket
142554	Hook, Pull Spring
142555	Hook, Push Spring
151392	Tweezers
152835	Wrench, Open End, 5/16 Inch and 3/8 Inch
407326	Extractor, I.C.

3. DISASSEMBLY/REASSEMBLY

PRINT HEAD WITH COVER

3.01   To remove the print head with cover:

Caution: When handling loose print heads, care must be taken to prevent print head cable connector pins from being bent.

Note: Print head removal and replacement is also shown in Teleprinter Disassembly/Reassembly, Page 1-96.

(8) Grasp print head and pull forward. Lift front of print head to disengage locking channels.

(Front View)

PRINT HEAD

(7) Move the locking handle to the right.

RIGHT

(6) Move retaining clip on locking handle extension protruding from left side of carriage wall approximately 1/4 inch away from wall. (Pry with screwdriver.)

EXTRACTOR

(4) Place projections of 407326 extractor under print head cable plug. Disconnect print head cable plug from logic card by squeezing arms of extractor together and pulling straight up to avoid damage to plug pins.

PRINT HEAD CABLE

(2) Remove ribbon. (Refer to How To Operate Manual.)

(1) Raise cover.

GUIDE ROD

(3) Move print head and carriage to the right of the print head cable plug.

(5) Unlock print head by pulling locking handle forward until it strikes the guide rod.

(9) Disengage print head from roll pin on end of link. Remove print head.

FRONT

(10) Remove print head cover by lifting up and away from grommets.

REAR NOSE PROJECTION

GROMMET

DOVETAIL

LOCKING CHANNEL

(Left Side View)

3.02   To replace the print head with cover:

Caution: When handling loose print heads, care must be taken to prevent print head cable connector pins from being bent.

(1) Verify that print head cover is attached securely to rubber grommets. (Push down until secure.)

PRINT HEAD COVER

(2) Move retaining clip on locking handle extension protruding from left side of carriage wall approximately 1/4 inch away from wall if not already moved. (Pry with screwdriver.)

COLLAR DRIVE KEY

(3) Rotate locking handle frontward until it strikes the guide rod then pull locking handle to the right until collar drive key on locking handle engages slot in right carriage side wall. Observe interaction of these parts for use when performing step 7.

Note: Collar and link may snap rearward.

LOCKING HANDLE

COLLAR AND LINK   GUIDE ROD

CARRIAGE

(4) Collar and link must be manually rotated and held toward front of carriage wall by grasping the link. Install print head rear notch onto roll pin at end of link.

(5) Hold collar and link forward (by pressing down on the print head) while inserting nose projection in carriage wall opening.

REAR PRINT HEAD NOSE PROJECTION

FRONT

LINK

(6) Pivot front of print head down to carriage locking channel.

CARRIAGE LOCKING CHANNEL

CARRIAGE WALL OPENING   COLLAR AND LINK ASSEMBLY   CARRIAGE FRONT WALL

(Left View)

ROLLER SHAFTS

PLATEN

REAR OF
RIBBON GUIDE

(Top View)

FRONT

(7) Slowly push print head rearward and further into the carriage locking channel until the rear of the ribbon guide is even with center of roller shafts. Apply continuous leftward pressure to locking handle at its pivot shaft, while slowly pulling print head forward until collar drive key on handle engages (snaps) into slot in collar.

Note: Parts referred to were visible in step 3.

(9) Position and hold print head and carriage assembly to right side of printer and use a 5/16 inch socket wrench to push clip against carriage wall.

(Front View)

(8) Move the handle all the way to the rear, locking the print head in close proximity to the platen by the additional force necessary to detent the handle. If handle does not move to rear, the drive key did not properly engage the collar slot (step 7).

Note: Check to make sure there is some clearance between print head and platen before detenting handle. Check PRINT HEAD TO PLATEN adjustment.

(10) Check that no connector pins are bent and carefully connect the print head cable plug to the logic card. Make sure cable does not touch left side frame when the carriage moves fully left.

(11) Install ribbon. (Refer to How To Operate Manual.)

SPACING MOTOR BELT

3.03   To remove the spacing motor belt:

① Push top of spring tension arm rearward to remove belt tension.

② Remove belt.
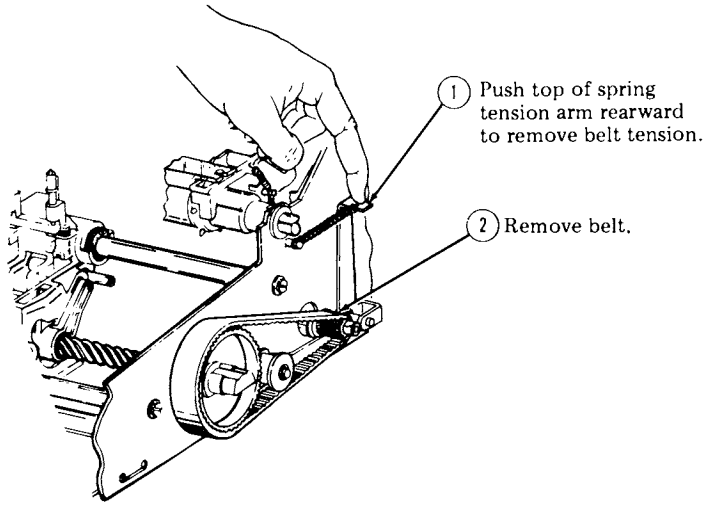
SIGNAL BELL

3.04   To remove the signal bell:

③ Remove 184055 and 198670 screws and 121242 clamp and remove bracket.

② Remove 184055 screw and 181461 gong.

⑤ Slide plunger with pin to the right. Remove plunger and spring and remove coil.

LOCATING LUG

④ Remove 143097 retaining ring.

① Remove plug from logic card.
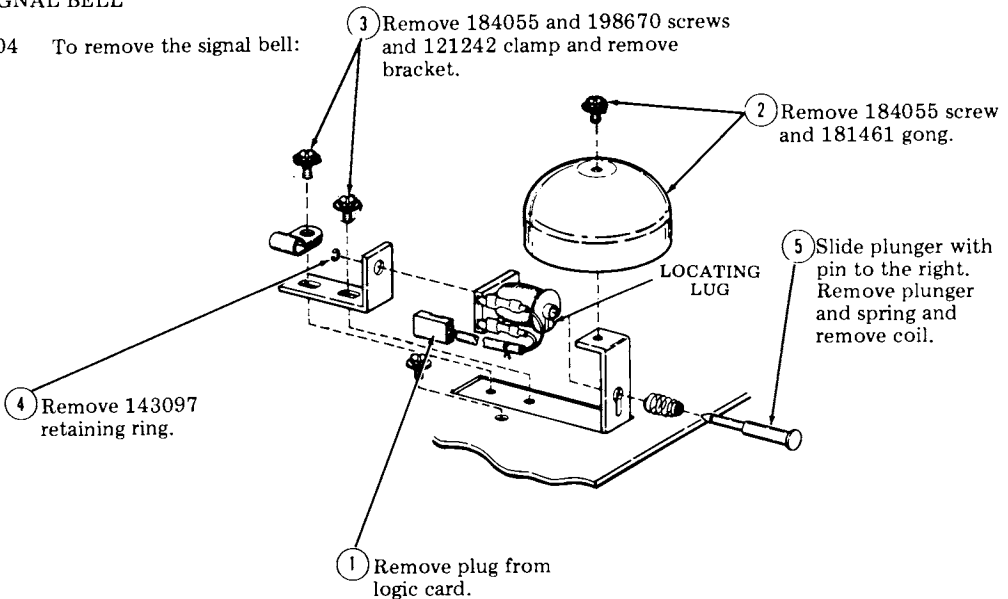
SPACING MOTOR WITH CABLE AND ENCODER

3.05   To remove the spacing motor:

⑧ Remove motor and encoder.

① Remove the logic card (if present).
Refer to Page 1-96.

⑥ Remove tension arm post
and 88857 spring washer.

② Remove spring from
spring post.

(Right Side View)

⑤ Remove tension arm.

④ Remove 119652 retaining
ring.

⑦ Remove two 112485 mounting screws
and two 2191 lockwashers.

③ Remove motor belt.

⑭ Remove housing.

⑮ Pull pulley with clip
off end of shaft.

⑩ Remove 151685 screw, 130683 lockwasher,
104807 flat washer, and 151880 nut.

⑪ Remove cable assembly
by lifting upward.

⑨ Remove cover.

PRY POINT

⑬ Remove three 172632 screws
and three 130683 lockwashers.

⑫ Remove encoder disc assembly. (Insert screwdriver
under housing bridge and under bottom hub of
encoder. Hold encoder disc with thumb and gently
pry screwdriver outward, removing disc. Retain
the fastener which is part of the disc assembly.)

*Warning: Do not pull on metal disc edges as this
will deform encoder disc causing it to rub against
the encoder.*

Note: In reassembly, make sure disc does not
rub on encoder assembly.

LINE FEED MOTOR

3.06   To remove the line feed motor:

(a)   Early Design

1 Remove the logic card (if present). Refer to Page 1-96.

2 Loosen four 198670 screws and remove the line feed belt.

3 Remove four 198670 screws.

(Left Rear View)

4 Remove motor.
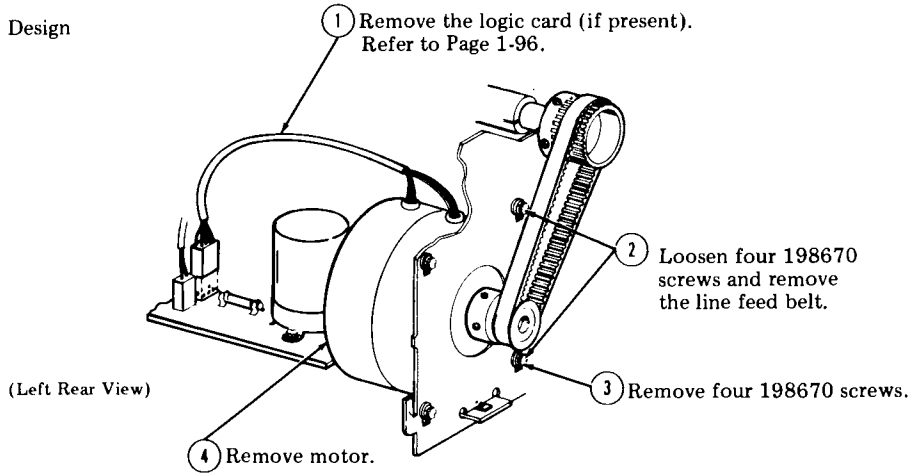
Note: In reassembly, perform **LINE FEED BELT TENSION** adjustment

(b)   Late Design

1 Remove the logic card (if present). Refer to Page 1-96.

3 Remove line feed belt.

2 Remove tension arm spring from retaining post.

5 Remove three 198670 screws and stop bracket.

(Left Rear View)

7 Remove motor.

6 Remove tension arm post, 7002 flat washer and 2191 lockwasher.

4 Remove 119652 retaining ring and slide tension arm and roller assembly from pivot shaft.
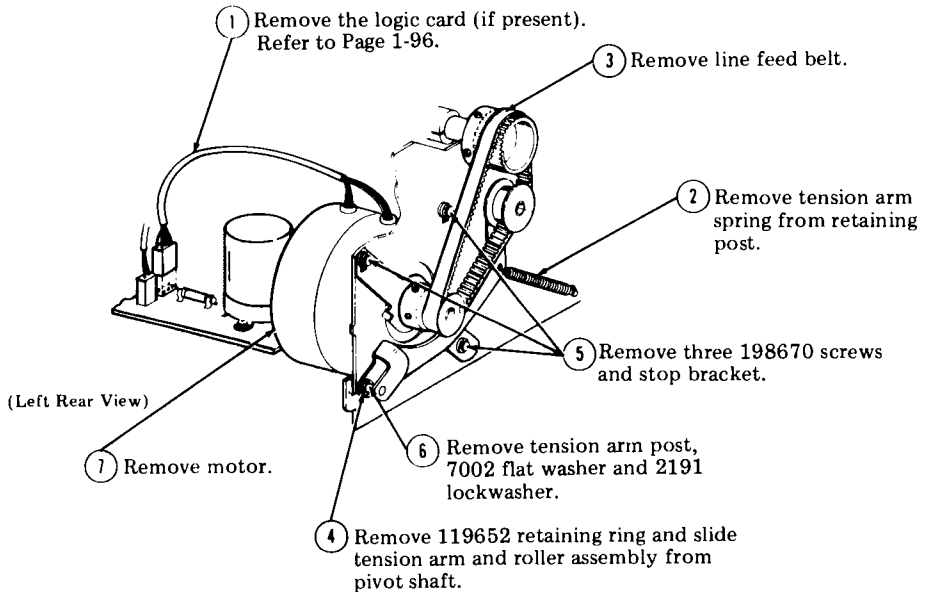
Note: In reassembly, perform **STOP BRACKET** adjustment.

PLATEN

3.07   To remove the platen:

(a)   Early Design

②Loosen two 144550 setscrews.

③ Remove platen pulley and clip.

① Remove line feed belt.

(Left Rear View)
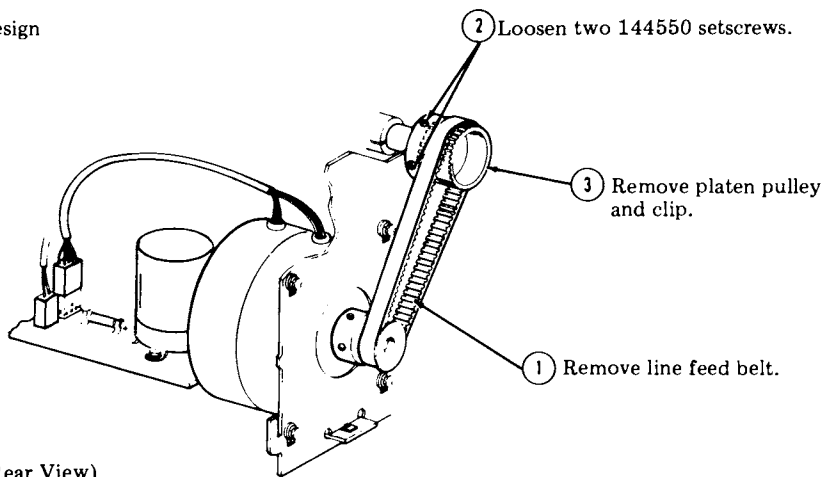
Note: In reassembly, position the setscrews away from the slot in the platen clip.

(b)   Late Design

③ Loosen two 144550 setscrews and remove platen pulley and clip.

① Remove tension arm spring from retaining post.

(Left Rear View)

② Remove the line feed belt.

(c) Early and Late Design

(4) Remove two 163765 retaining rings (one each side) from platen bearings.

<u>Sprocket Feed Only</u>

(5) Remove platen spacer.

<u>Friction Feed Only</u>

(5) Remove paper release.

LEFT PAPER GUIDE   RIGHT PAPER GUIDE

(8) Lift out platen.

(7) Lift left and right paper guides to up position.

(6) Slide two platen bearings (one each side) outward.

(Top View)

<u>Sprocket Feed Only</u>

(11) Remove two sprocket clips (one each side).

(9) Loosen four 183355 setscrews (two each side).

(10) Slide two sprockets (one each side) outward.

Note: In reassembly, position the setscrews away from the slot in the sprocket clip.

Perform the <u>LEFT</u> and <u>RIGHT SPROCKET</u> adjustments and <u>PRINTED LINE POSITION</u> and <u>PLATEN ENDPLAY</u> adjustments.

LEAD SCREW

(1) Remove operator console if present. (Refer to Page 1-96.)

3.08 To remove the lead screw:

(4) Push in right bearing housing to clear right frame. Rotate 90 degrees and spring will force bearing and housing away from side frame. Remove bearing housing, inner and outer bearings and spring.

CARRIAGE NUT

RIGHT SIDE FRAME

(2) Remove spacing belt.

BEARING HOUSING

LEFT BEARING HOUSING

CARRIAGE

SPRING   OUTER BEARING   INNER BEARING

(Right Side View)

(5) Unscrew lead screw from carriage nut and remove through hole in right side frame. Retain left inner bearing which will be free when lead screw is removed.

(3) Remove lead screw pulley and clip by pulling to the right.

CARRIAGE WITH POST ASSEMBLY

3.09   To remove the carriage with post assembly:

(1) Remove operator console, if present.
(Refer to Page 1-96.)

(2) Remove print head and lead screw
(perform 3.01 and 3.08).

(6) Spread side frames and
remove rear guide
rod and carriage.

CARRIAGE

(5) Remove two 184056 screws
(one each side).

(3) Remove two 184056 screws
(one each side).

FELT WASHER (2)

CLAMP W/COVER

(4) Spread clamp w/cover and disengage from
logic card (if present). Spread side frames
outward and remove front guide rod, two
felt washers and clamp with cover.
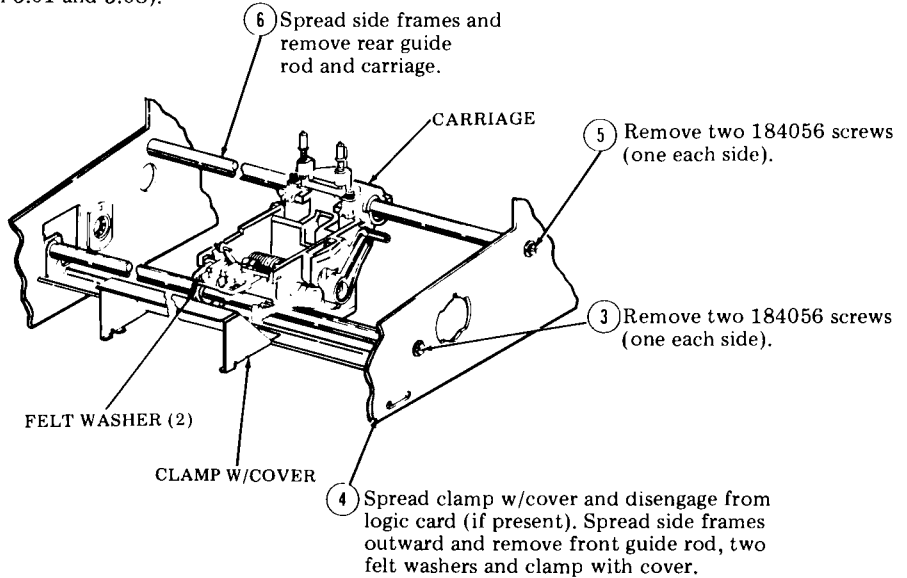
LEAD SCREW NUT

3.10   To remove the lead screw nut:

(1) Remove operator console, if present.
(Refer to Page 1-96.)

(2) Remove print head and lead screw
(perform 3.01 and 3.08).

(3) Tilt lead screw nut
handle outward to
clear retaining
notch in carriage.
Rotate counterclock-
wise (CCW) until
tabs on nut align
with opening in
carriage. Spring
will force nut
away from carriage.

(4) Remove spring and
nut.

RETAINING NOTCH

CARRIAGE

LEAD SCREW
NUT HANDLE

SPRING

TABS

LEAD SCREW NUT
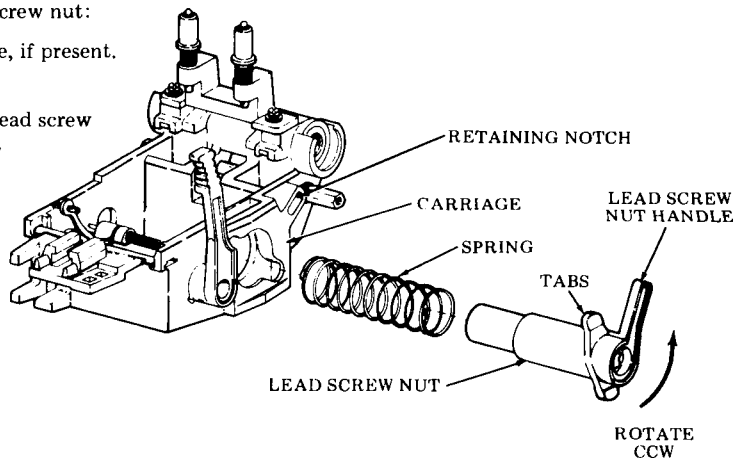
ROTATE
CCW

COLLAR WITH LINK

3.11   To remove the collar with link:

① Remove operator console, if present.
      (Refer to Page 1-96.)

② Remove print head and carriage
      (perform 3.01 and 3.09).

③ Remove compression
      ring.

REAR

LINK
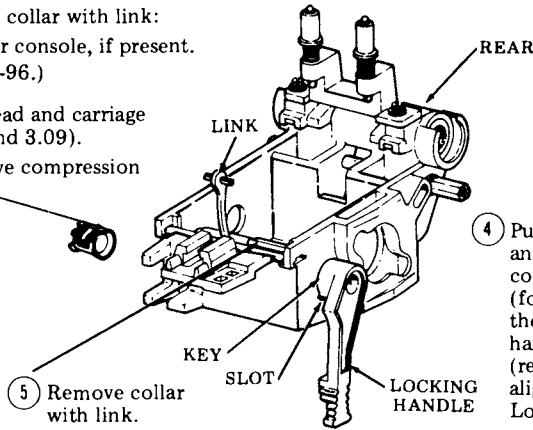
④ Push locking handle to the left
     and rotate locking handle and
     collar fully counterclockwise
     (forward). Pull the handle to
     the right while slowly rotating
     handle and collar clockwise
     (rearward) until key on handle
     aligns with slot in carriage.
     Locking handle will pop out.

KEY
SLOT
LOCKING
HANDLE

⑤ Remove collar
      with link.

PAPER TRAY

3.12   To remove the paper tray:

(a)   Sprocket Feed

⑥ Remove paper tray.

Note 1:   Parts on left and right sides are similar.

① Remove two 119653 retaining
      rings from paper tray shaft.
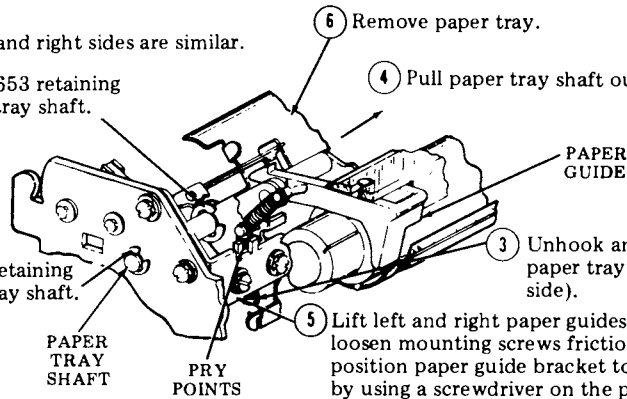
④ Pull paper tray shaft out to right.

PAPER
GUIDE

③ Unhook and retain two 4708
      paper tray springs (one each
      side).

② Remove 119652 retaining
      ring from paper tray shaft.

⑤ Lift left and right paper guides to up position,
      loosen mounting screws friction tight, and
      position paper guide bracket toward the frame
      by using a screwdriver on the pry points.

PAPER
TRAY
SHAFT

PRY
POINTS

Note 2:   In reassembly, <u>LEFT AND RIGHT PAPER GUIDE</u> adjustments must be made.

(b) Friction Feed

(1) Remove 119653 retaining ring from paper tray shaft and roller bail lever shaft.

(2) Remove 82727 roller bail spring from post.

(5) Remove roller bail assembly.

(6) Remove paper tray.

(3) Unhook and retain two 4708 paper tray springs (one each side).

(4) Pull paper tray shaft to the left and remove.
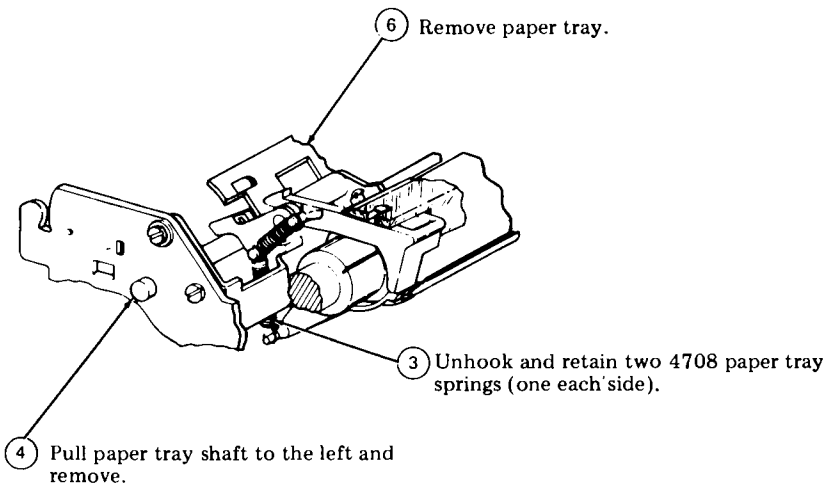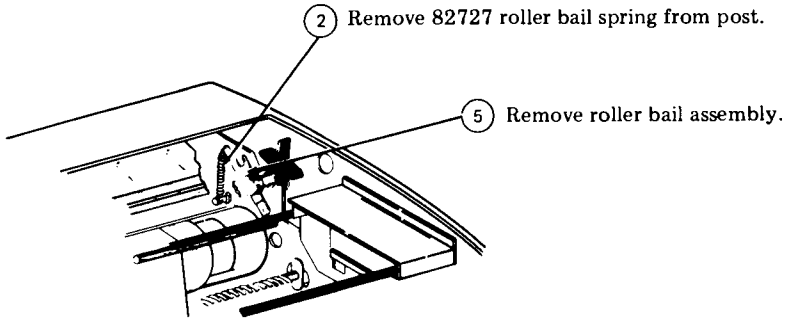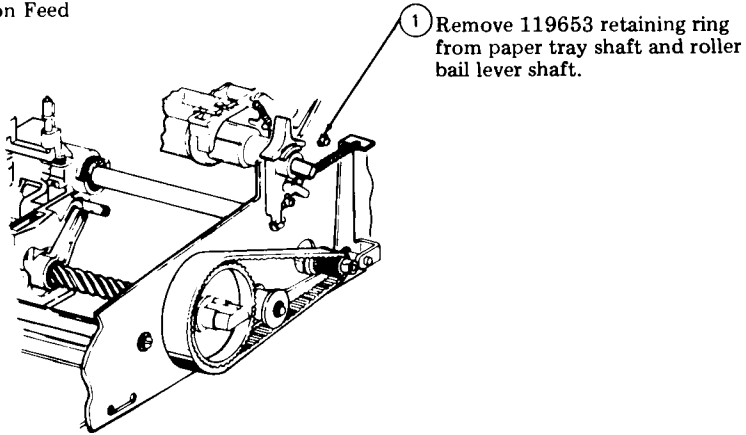
PAPER GUIDES

3.13   To remove the paper guide:

(a)   Sprocket Feed

Note 1:   Left and right guides are removed in a similar manner.

LEFT PAPER GUIDE

(4) Remove guide.

(1) Remove two 119649 retaining rings (one each side).

(5) Remove two 101386 springs (one each side).

(3) Remove two paper strippers (one each side).
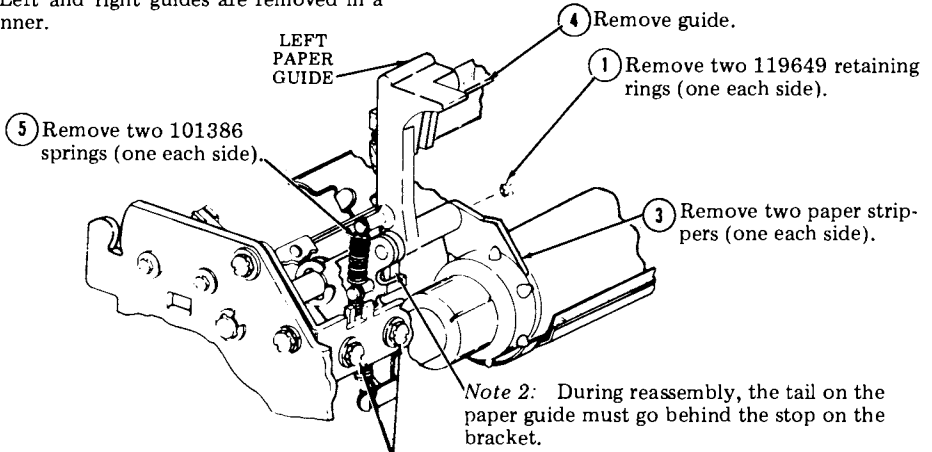
Note 2:   During reassembly, the tail on the paper guide must go behind the stop on the bracket.

(6) Remove left and right paper guides from posts on brackets.

(2) With paper guides up, loosen mounting screws friction tight; position paper guide bracket toward the frame by using a screwdriver in the pry points.

Note 3:   In reassembly, LEFT PAPER GUIDE adjustment must be made.

(b)   Friction Feed

Note 1:   Left and right guides are removed in a similar manner.

(6) Remove left and right paper guides from posts on brackets.

(3) Remove two 101386 springs (one each side).

(4) Remove 184056 screw (right side).

(5) Remove right paper guide bracket and guide.

(1) Remove two 119649 retaining rings (one each side).
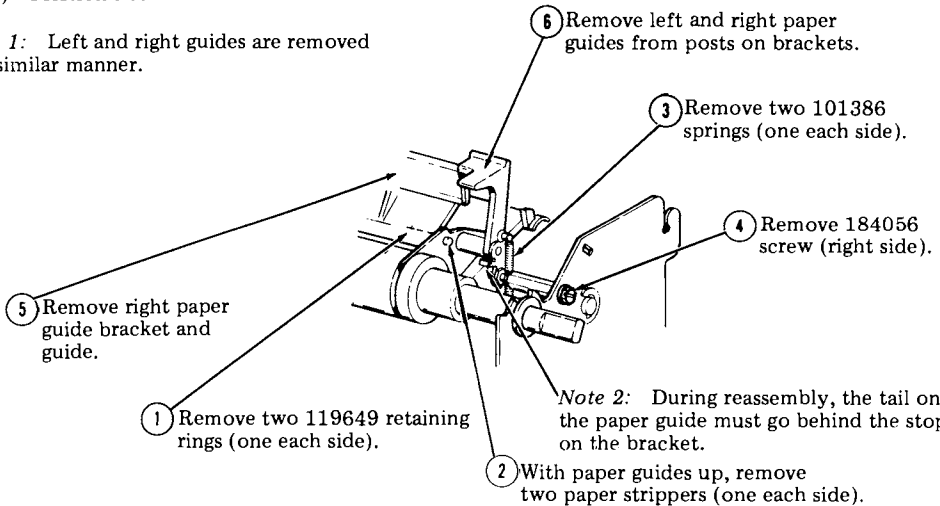
Note 2:   During reassembly, the tail on the paper guide must go behind the stop on the bracket.

(2) With paper guides up, remove two paper strippers (one each side).

Note 3:   In reassembly, RIGHT PAPER GUIDE adjustment must be made.

43 PRINTER

PARTS

CONTENTS   PAGE

1.   GENERAL

1.01   Information on maintenance spare parts is provided in this section for the 43 printer.

1.02   Part numbers are listed in the index in numerical order and indicate the page on which the parts appear. Asterisked numbers, stocked as "List 1", indicate a maintenance spare stocking ratio of one spare for the first twenty stations and an additional spare for each additional 30 stations in a maintenance area. Part numbers without asterisks, stocked as "List 2", indicate that one spare should be available in each maintenance area. Before ordering, verify that a particular spare is applicable to the type of printer in service.

1.03   All ordering numbers shown in this manual are Teletype Corporation part numbers.

1.04   Troubleshooting and disassembly/reassembly information for these parts is provided on Page 2-1 and Page 2-21 respectively.

2. PARTS

Platen and Carriage Assembly

430281 (Friction Feed)

430142 430098 183321

430013

430088 (Sprocket Feed)

430264

430145

430143

430013

430098

183321

430206

430850

430829 Part of
430850

① 430803

Part of
410013

① 430804

① 430832

430217

430216

430068

430030

430031

430069

430215

① 410013 Card w/Cable
Part of 430850
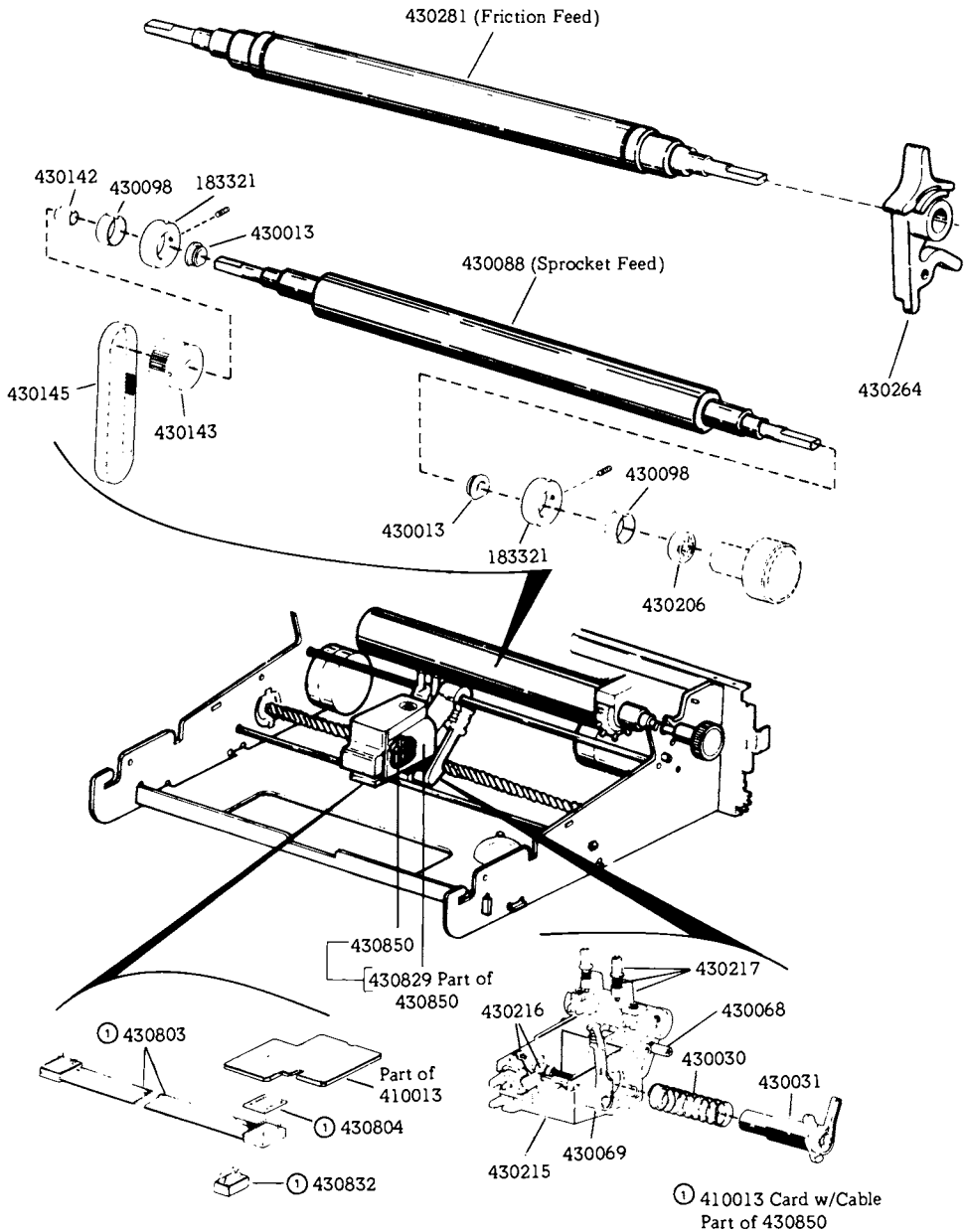
Line Feed, Spacing Motor, and Bell Assembly

(Friction Feed and
Late Design Drive Sprocket Feed)

430309

430143

430145

430019

430021

430199

430154

430253

430240

430144
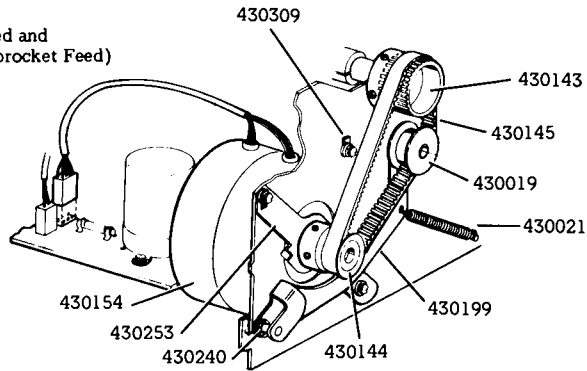
(Sprocket Feed Early Design Drive)

430143
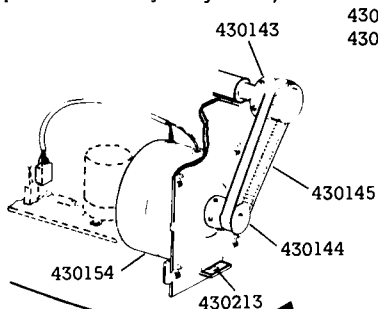
430319 (10 characters per inch)
430214 (approximately 13 characters per inch)

430145

430178

430055

430058

430144

430190

430063

430154

430061

430213

430625

430029

430113

430166

430118

430167

430117

430114
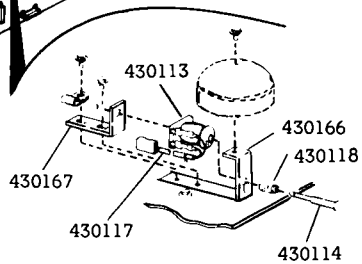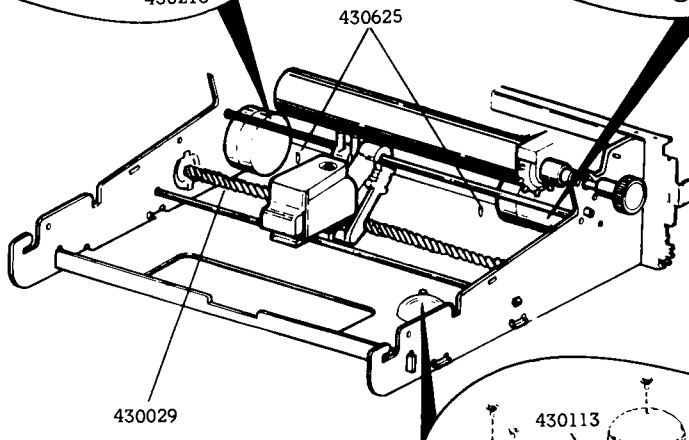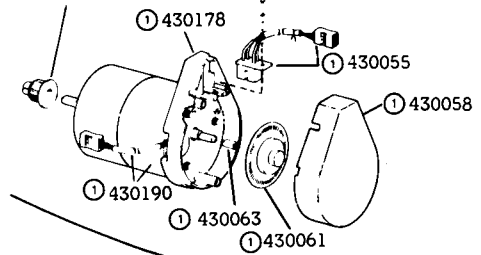
① 430047 Motor w/Cable and Encoder

Spacing Drive and Lead Screw

430016

430022

430021

430017

430019

430032 (approximately 13 characters per inch)
430285 (10 characters per inch)

430231

430222

430010

430027

430020

430033

430028

430026

430034

430010
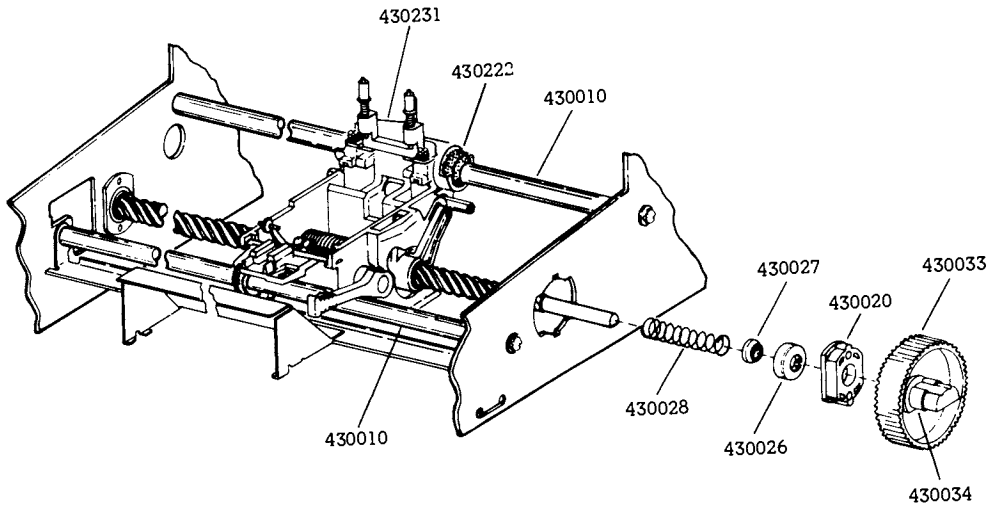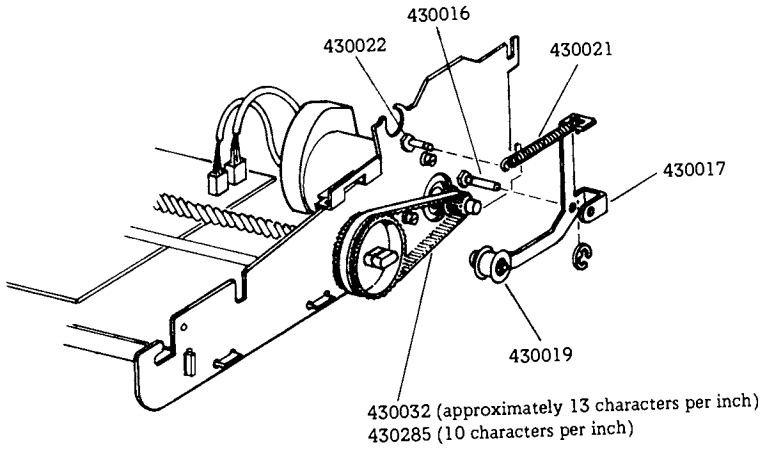
Right Side Frame (Friction Feed)

430104

430219

430104

430258

430268

430101

430261

430265

430266

430265

430262

161708

430180
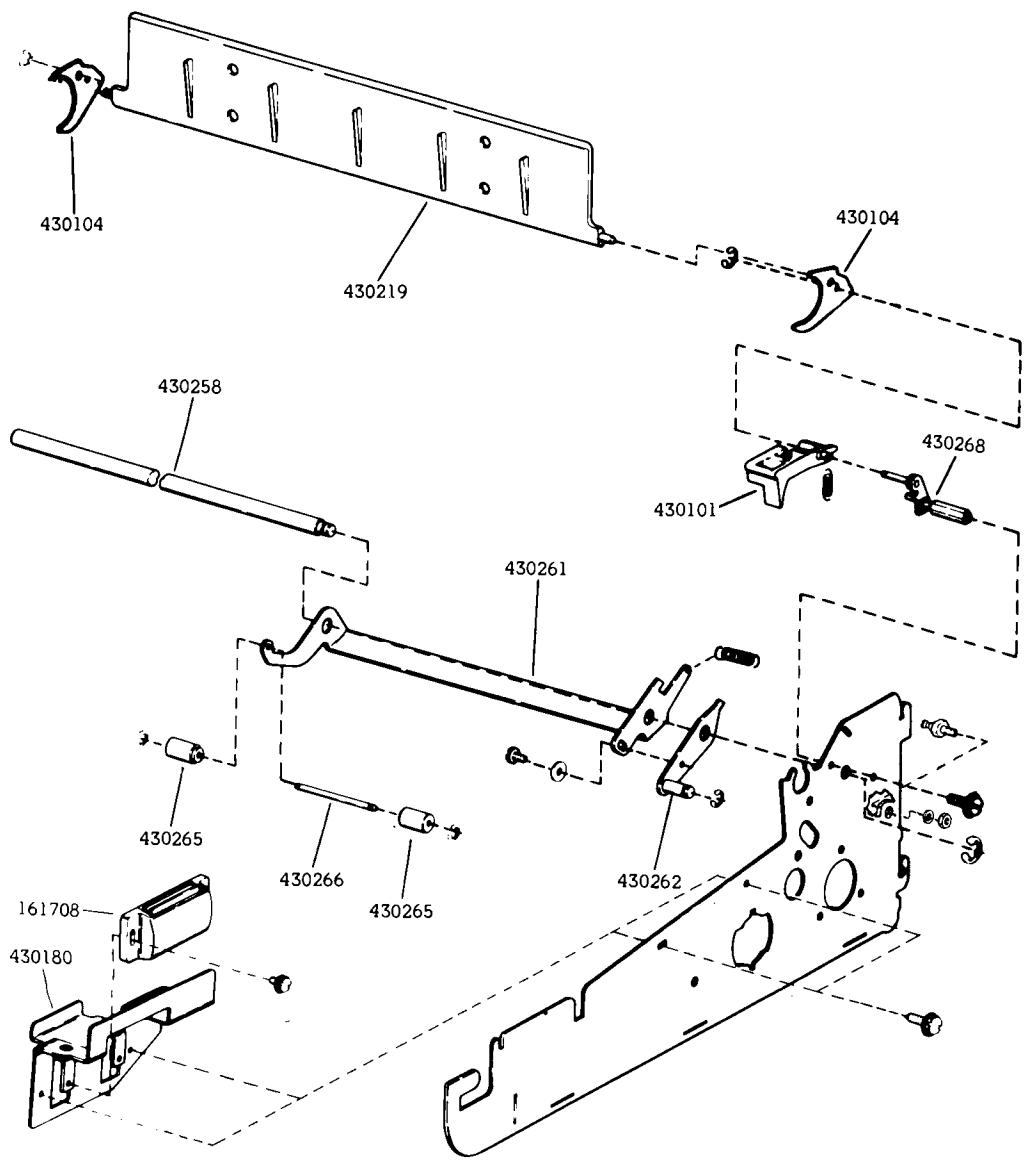
Right Side Frame (Sprocket Feed) and Rear Frame

(Late Design)
②430291

430104

(Early Design)
②430245

①430276

①430205
(Early
Design)
(Late
Design)

430104

430153

430101

430102
(Early
Design)

③430102
(Late
Design)

430103

430198

161708

430180

(Early Design)
(Early Design)

430151

430169

430152
(Early Design)

REF
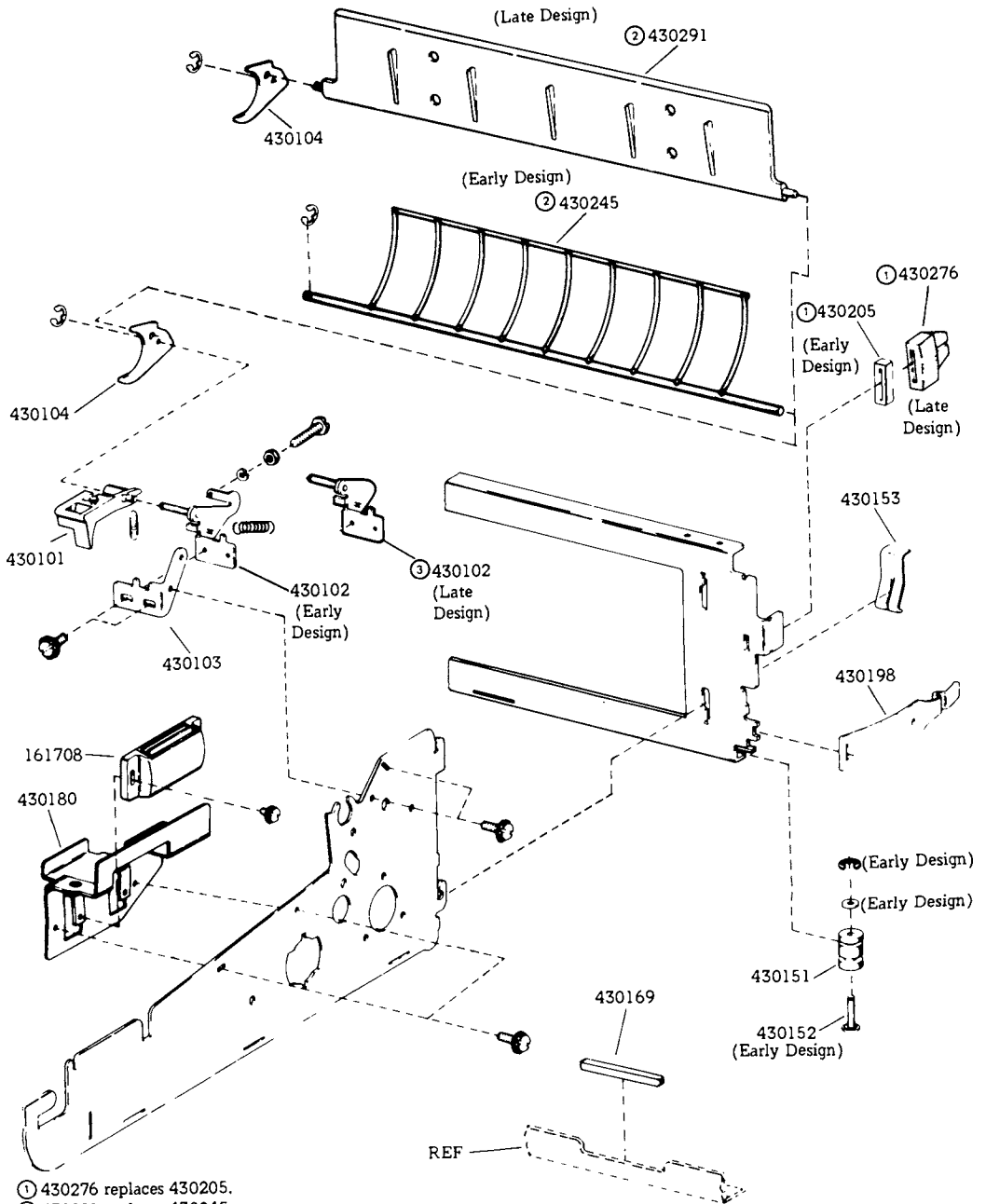
①430276 replaces 430205.
②430291 replaces 430245.
③430260 paper tray must be used with late design 430102.

Paper Tray

430179

② 430011

430012

(Sprocket Feed, Early Design)

① 430347

(Sprocket Feed, Interim Design)

①430260 (Early Design)

430258

(Friction Feed)

430260 (Early Design)

③430259

430260 (Late Design)

(Friction or Sprocket Feed)
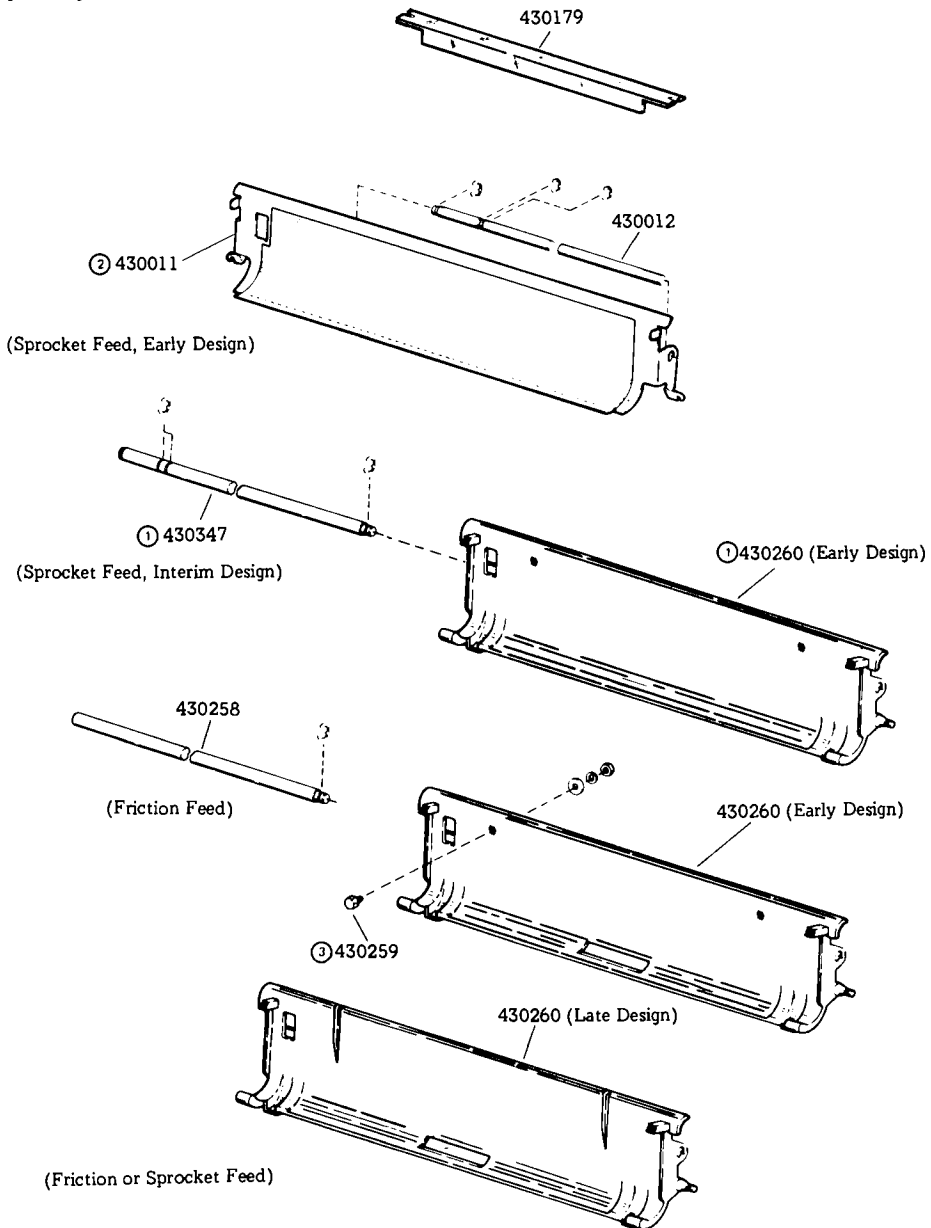
① Part of 430346 paper tray and shaft assembly.
② Orders for 430011 will be substituted by 430346 set of parts.
③ Not used with late design 430260.

Left Side Frame
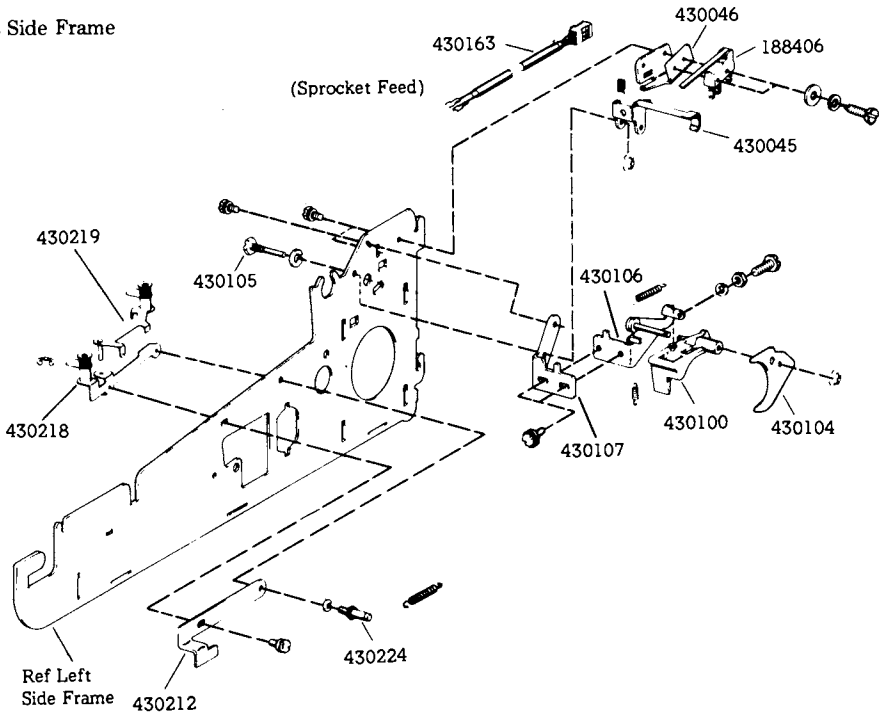
(Sprocket Feed)

430163
430046
188406
430045
430219
430105
430106
430218
430107
430100
430104
430224
Ref Left
Side Frame
430212

(Friction Feed)

430219
430267
430100
430218
430104
430242
430224
430255
430256

3. NUMERICAL INDEX

Note: One spare should be available in each maintenance area, unless otherwise specified in parentheses.

Part Number	Description and Page Number	Part Number	Description and Page Number	Part Number	Description and Page Number
161708	Latch, Magnetic 2-39, 2-40	430102	Bracket, w/Posts 2-40	430217*	Bridge Assembly 2-36
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188406	Switch, Actuator 2-42	430104(2)	Stripper, Paper 2-39,		2-42
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430011	Tray, Paper 2-41	430106	Bracket w/Post, Left	430222	Washer, Felt 2-38
430012	Shaft, Paper Tray 2-41		2-42	430224	Post, Spring 2-42
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430022	Post, Spring 2-38	430142	Clip, Platen 2-36	430256	Bracket 2-42
430026*	Bearing, Outer 2-38	430143*	Pulley, 42T Platen 2-36,	430258	Shaft, Paper Tray 2-39,
430027*	Bearing, Inner 2-38		2-37		2-41
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430030	Spring, Compression	430151 (2)	Mount, Rear 2-40	430262	Plate w/Post 2-39
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430032*	Belt, Timing 2-38	430154*	Motor w/Cable 2-37	430266	Shaft, Roller 2-39
430033*	Pulley, 81T 2-38	430163	Cable Assembly 2-42	430267	Bracket, Left 2-42
430034	Fastener 2-38	430166	Bracket, Bell 2-37	430268	Bracket w/Posts 2-39
430045	Lever, Switch 2-42	430167	Bracket, Bell 2-37	430276	Support, Bustle 2-40
430046	Bracket, Switch 2-42	430169	Strip, Insulator 2-40	430281	Platen w/Spacers 2-36
430047*	Motor w/Cable and	430178	Housing 2-37	430285	Belt Timing 2-38
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430063	Fastener 2-37	430199	Lever w/Stud 2-37		and Shaft 2-41
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*A maintenance spare stocking ratio of one spare for the first twenty stations and one additional spare for each additional 30 stations in a maintenance area.

43 OPERATOR CONSOLE

TROUBLESHOOTING

1.   GENERAL 3-1

2.   TROUBLESHOOTING 3-2

     TROUBLESHOOTING GUIDE
     (KSR Operator Console) 3-2

     TROUBLESHOOTING GUIDE
     (RO Operator Console) 3-3

1.   GENERAL

1.01   This section provides troubleshooting information for the 43 operator console (opcon)(KSR and RO).

1.02   Opcon troubleshooting is initiated by the 43 Basic KSR Teleprinter or 43 RO Teleprinter Troubleshooting, Page 1-38 and Page 1-52, or when trouble in the opcon is suspected from symptoms observed.

1.03   Analysis in this section is limited to isolating the trouble within the opcon up to its electrical interface at the logic card. The 43 opcon must be tested as part of a 43 Basic KSR or RO Teleprinter Station. Refer to Page 1-66 and Page 1-84. Where analysis indicates the trouble is not in the opcon, return to the Teleprinter Troubleshooting, Page 1-38 or Page 1-52 for further analysis.

1.04   When a trouble is verified to be in the opcon (by replacement of the opcon) this section should be used to help isolate the trouble to any replaceable components to correct the trouble.

1.05   The opcons are returnable to the Teletype Product Service Center for repair as a unit. Pack in carton (KSR opcons — using conductive plastic bag) that was used to pack replacement opcon. High voltage static discharge can damage KSR opcon circuitry. The 346392 wrist strap is available to ground service personnel.

1.06   Isolation and correction of trouble is based on electrical and mechanical checks and parts replacement.

Reference sections are:

Page 3-4   Wiring
Page 3-7   Disassembly/Reassembly
Page 3-15   Parts

1.07   Trouble analysis is presented in the form of a "20 Questions" routine in 2. TROUBLESHOOTING GUIDE. The guide, with questions and yes and no columns, should be used always starting with the first question and proceeding according to the "yes" or "no" directive.

2. TROUBLESHOOTING

TROUBLESHOOTING GUIDE (KSR Operator Console)

QUESTION		YES	NO
1.	Are any of the communication mode indicators: LOCAL (LOCAL-TALK), DATA, TERM READY (AUTO ANSW) lit? (Power on, red light in power supply lit.)	Go to 2.	Check continuity through key-lamp indicator common to -12 V.
2.	Do any indicators fail to light properly?	Go to 2a.	Go to 3.
2a.	Do any keys on the opcon generate characters?	*Note:* If indicators light when depressed but not under all its conditions, go to KSR Teleprinter Troubleshooting. Verify proper voltage at circuit card test points. Replace keyswitch or cable.	Check dc supply to opcon at circuit card test points. Check cable.
3.	Do any latching keys fail to latch down when depressed or release up when depressed again? (CAPS LOCK, PARITY, DUPLEX, or CPS) Do any other keys (except ALARM) fail to snap down when depressed or release up when released?	Replace defective key-switch.	Go to 4.
4.	Does any keyboard key fail to generate the proper character or function?	Go to 4a.	Go to 5.
4a.	Does the key fail in all modes (Shift, Unshift, Ctrl, Caps Lock)?	Replace keyswitch.	Replace opcon.
5.	Do any of the latching type keys (PARITY, DUPLEX, CPS) or PRINTER TEST key fail to operate?	Check continuity through switch. Replace keyswitch or cable.	Go to 6.
6.	Does ALARM indicator light when cover is opened?	Undefined trouble. Go to KSR Teleprinter Troubleshooting.	Check continuity through Interlock keyswitch. Check fit of cover actuating button.

TROUBLESHOOTING GUIDE (RO Operator Console)

QUESTION	YES	NO
1. Are any of the communication mode indicators (TERM READY, DATA) lit? (Power on, red light in power supply lit.)	Go to 2.	Check continuity through key-lamp indicator common to -12 V.
2. Do any indicators fail to light properly?	Verify proper voltage at circuit card test points. Replace keyswitch or cable.	Go to 3.
3. Does the PRINTER TEST or RESET key fail to snap down when depressed or release up when released?	Replace defective key-switch.	Go to 4.
4. Does the PRINTER TEST or RESET key fail to generate the proper character or function.	Check continuity through switch. Replace keyswitch or cable.	Go to 5.
5. Does ALARM indicator light when cover is opened?	Undefined trouble. Go to RO Teleprinter Troubleshooting.	Check continuity through Interlock keyswitch. Check fit of cover actuating button.

43 BASIC OPERATOR CONSOLE

WIRING

1.02   For additional wiring information, plug or cable locations, refer to 43 Basic Teleprinter Wiring, Page 1-64.

1. GENERAL

1.01   This section provides wiring information for the 43 basic operator console (KSR and RO).

1.03   Where possible, small notes indicating voltage levels have been added to aid in troubleshooting.

2. WIRING

KSR Operator Console
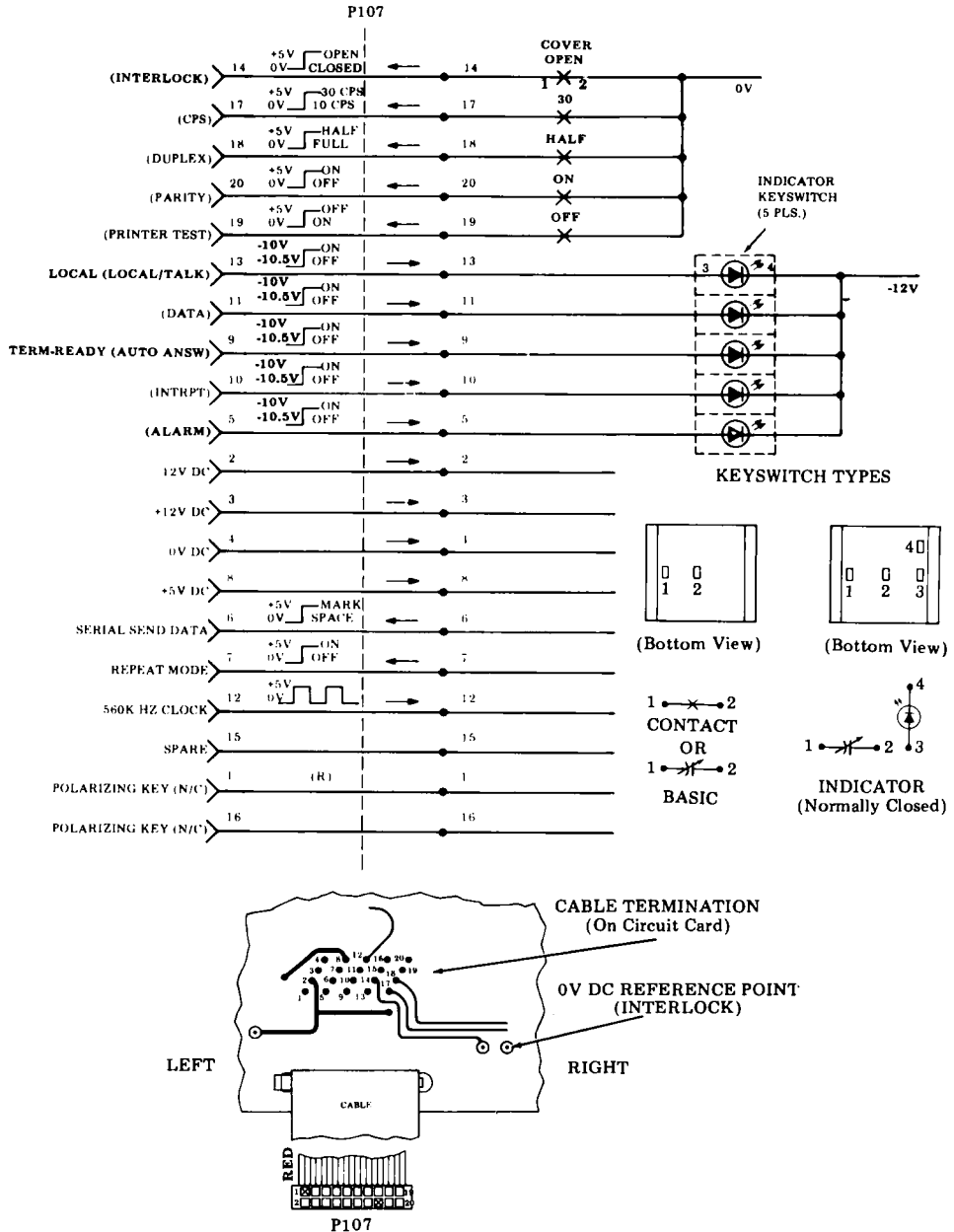
RO Operator Console
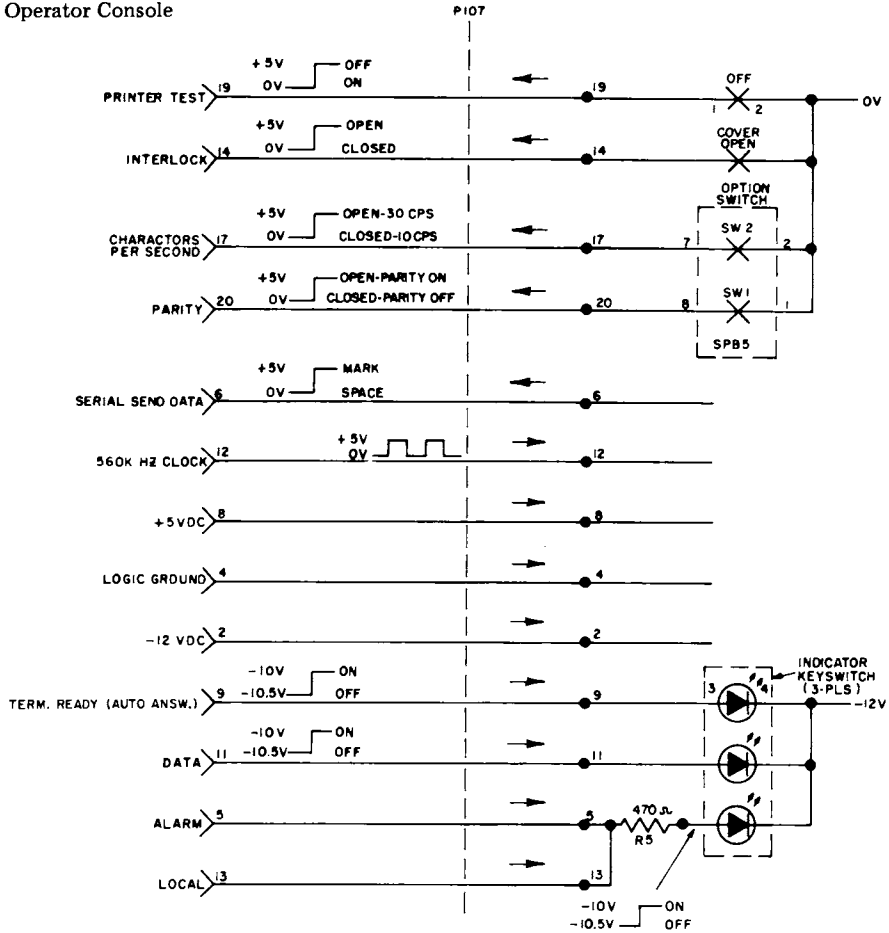
CABLE TERMINATION (ON CIRCUIT CARD):
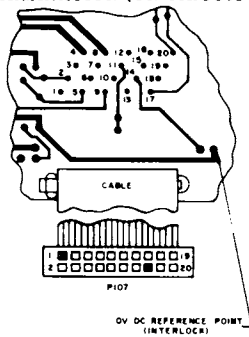
KEYSWITCH TYPES
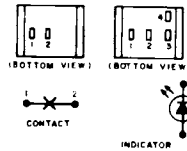
43 OPERATOR CONSOLE

DISASSEMBLY/REASSEMBLY

1. GENERAL

1.01   This section provides disassembly and
        reassembly procedures for the 43 operator
console (opcon).

1.02   All ordering numbers in this manual are
        Teletype Corporation part numbers.

1.03   The KSR operator console circuitry can
        be damaged by static discharge. The
346392 static discharge ground strap is available
for use by service personnel. Maintenance spares
are provided in antistatic bags which should be
saved for reuse when returning operator consoles
for repair.

1.04   The extent of the disassembly procedure
        is limited to that which is required for
correction of troubles or replacement of parts in
field locations. When removing a subassembly or
part from the operator console, follow the
removal procedure and note the sequence of
removal to enable proper reassembly.

1.05   For a listing of the tools required to per-
        form the disassembly and reassembly of
the 43 operator console, refer to 2. TOOLS RE-
QUIRED.

1.06   Precautions should be taken to assure that
        the opcon is disassembled and reassem-
bled under clean conditions. No oil, grease, or
other liquids should be allowed on loose parts, sub-
assemblies, keyswitches, or the complete opcon.

1.07   Reference in the procedures to left or
        right, up or down and top or bottom, etc.,
refer to the opcon in its normal operating position.

1.08   When   removing a subassembly or part
        from the opcon, do not force or pry parts
to provide the necessary clearance for removal.
No forcing is required to accomplish a removal
procedure. Follow the removal procedure and
note how each part is removed and the sequence
of its removal so that proper reassembly can be
accomplished. For reassembly, reverse the removal
procedure except where different instructions are
given.

1.09   Refer to 43 Teleprinter Disassembly/
        Reassembly, Page 1-96, for opcon removal
and replacement procedures.

1.10   Some parts that are not listed in the parts
        sections are shown as necessary to the
disassembly procedures such as screws, ring
retainers, etc. Most of these parts are common to
other Teletype product lines and if needed may
already be available in field repair kits or can be
ordered.

2. TOOLS REQUIRED

2.01 The following tools are recommended for use during the disassembly and reassembly procedures:

75765	Spring Hook — Pull
89954	1/4 Inch Nut Driver
100982	Screwdriver (6 Inch Medium)
108285	Long-Nose Pliers
346257	Keyswitch Extractor
346260	Keytop Extractor
346392	Static Discharge Strap
Customer Provided	Soldering Iron (Low Wattage)
Customer Provided	Desoldering Tool

3. DISASSEMBLY/REASSEMBLY

SPACEBAR MECHANISM

3.01 To remove the spacebar mechanism:

(a) Disengage the leaf spring (bronze colored) from the wire bail using a spring hook and pull toward the front (Fig. 1).
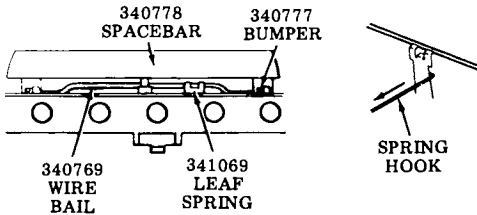
Fig. 1—Leaf Spring Disengagement

(b) Disengage the two rear tines (one at each end of spacebar) with a small screwdriver while pulling the spacebar up and toward the front (Fig. 2).
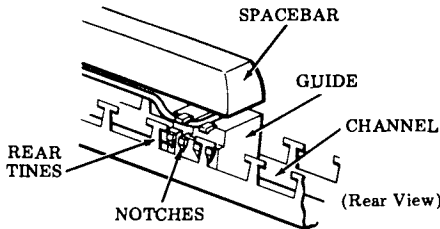
Fig. 2—Spacebar Removal

(c) Continue applying upward pressure to the spacebar and disengage the two front tines.

(d) Remove the wire bail from the left and right spacebar guides (snaps in and out) (Fig. 3).
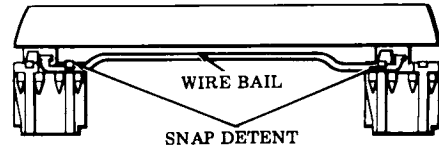
Fig. 3—Wire Bail Removal

3.02 To reassemble the spacebar mechanism:

(a) Make sure the four tines engage the notches in the space bar housing and the leaf spring is engaged to the wire bail.

(b) Check mechanical operation of the spacebar so that it returns to its unoperated position freely when depressed and released slowly.

KEYS

3.03 To remove the key (Fig. 4):

(a) There are two types of keys used on the operator console.

(1) Control Key

Indicator
Nonindicator

(2) Data Key

Fig. 4—Keys

(b) To remove data keys, place 346260 tool over the key and pull up to remove (Fig. 5).
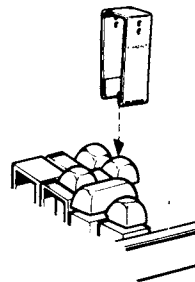
Fig. 5—Data Key Removal

Warning: CAPS LOCK, PARITY, DUPLEX, and CPS keys must be in the fully extended, unlatched position before attempting to remove the key. Failure to observe this precaution will result in a damaged keyswitch.

(c)   To remove control keys (Fig. 6):

   (1)   Grasp key using thumb and index finger.

   (2)   Exert upward force until key releases.
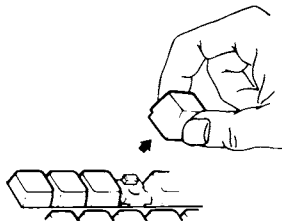
Fig. 6—Control Key Removal

(d)   To remove the RETURN key with housing:

   (1)   Remove keys BACKSPACE, OVER-LINE, GS, US, LINE FEED, SHIFT, and QUOTES that surround the RETURN key using 346260 tool.

   (2)   Disengage the rear tines from housing with a small screwdriver while pulling the RETURN key up and toward the front (Fig. 7).

REAR TINES

(Rear View)
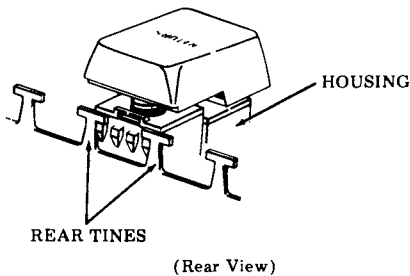
Fig. 7—Rear Tine Disengagement

(3)   Continue applying upward pressure to the RETURN key and disengage the front tine from housing using a spring hook. Remove key with housing from channel (Fig. 8).

FRONT TINE   (Front View)
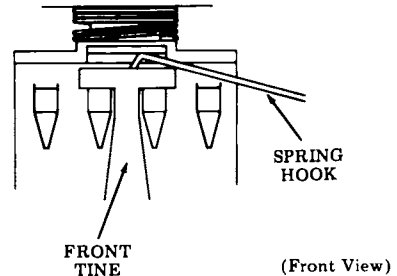
Fig. 8—Front Tine Disengagement

3.04   To reassemble the key:

Insert housing with key; observe position of locating lug on housing and press into channel. Housing must snap fully into front and rear channel tines.

KEYSWITCH

3.05   To remove the keyswitch:

(a)   Remove shield to expose circuit card by removing four screws.

(b)   Remove key.

(c)   Remove solder from around terminal pins of keyswitch to be removed (Fig. 9).
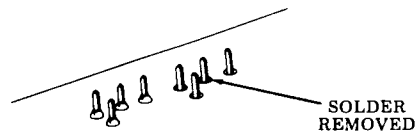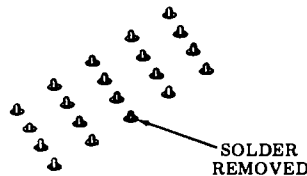

SOLDER REMOVED

Fig. 9—Solder Removal

Warning: Use a grounded low wattage soldering iron (avoid prolonged contact with pins) along with a desoldering tool to prevent damage to keyswitch card circuits and components.

(d) Place 346257 tool over the keyswitch and press downward. When the tool bottoms and embossed projections snap into notches on keyswitch, squeeze and pull back on the tool to lift keyswitch out (Fig. 10).
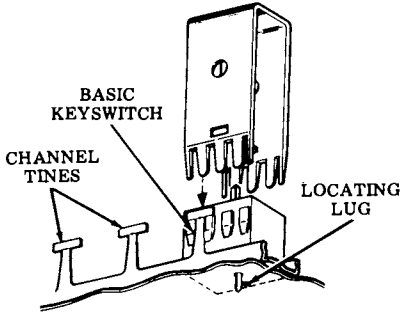
Fig. 10—Keyswitch Removal

Note: The tines of the tool must pass between the keyswitch housing and the inside of the tines of the channel.

3.06   To reassemble the keyswitch:

Insert new keyswitch, observe position of the locating lug, and press keyswitch into channel. Switch must snap fully into front and rear channel tines. Hold keyswitch in place and resolder.

BLOCKING SPACER

3.07   To remove the blocking spacer:

(a) Remove key associated with blocking spacer and first key, if present, to the left (see 3.03).

(b) Slide spacer to the left as far as it will go and then pull to the rear. (Fig. 11).
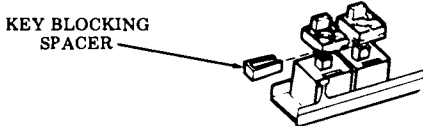
Fig. 11—Blocking Spacer Removal

(c) In reassembly, insert spacer from the left and observe that the spacer encapsulates the keyswitch push rod and that the front part of the spacer is located between the keyswitch springs. (Fig. 12.)

(d) Replace keys.
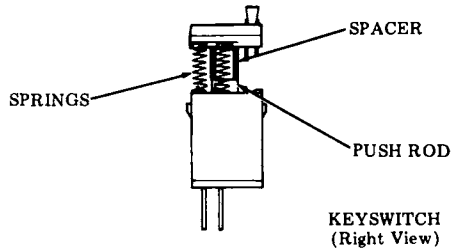
Fig. 12—Blocking Spacer Reassembly

CABLE (KSR)

3.08   To remove the cable:

(a) Remove the PRINTER TEST, PARITY, DUPLEX and CPS keys.

(b) Remove the INTERLOCK, PRINTER TEST, PARITY, DUPLEX and CPS keyswitches (Fig. 13).
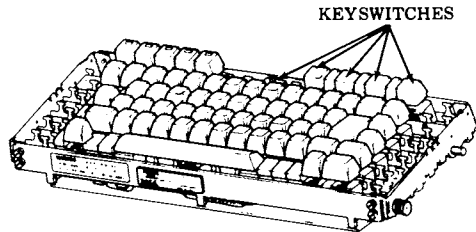
Fig. 13—Keyswitch Identification

(c) Remove solder from around connector pins of cable to be removed (Fig. 14).

Fig. 14—Connector Pins

Warning: Use a grounded, low wattage soldering iron (avoid prolonged contact with pins) along with a desoldering tool to prevent damage to card circuits and components.

(d) Remove the circuit card cover located in front of the control keys from the channel. Use a spring hook to remove the cover from the mounting posts (Fig. 15).
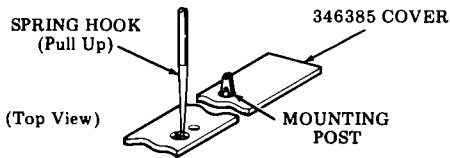
Fig. 15—Cover Removal

(e) Grasp the cable connector using thumb and index finger.

(f) Exert upward force until cable connector releases (Fig. 16).
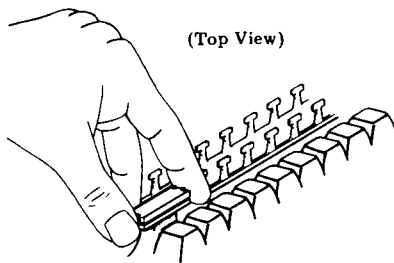
Fig. 16—Cable Connector Removal

(g) Remove rear plate (Fig. 17).
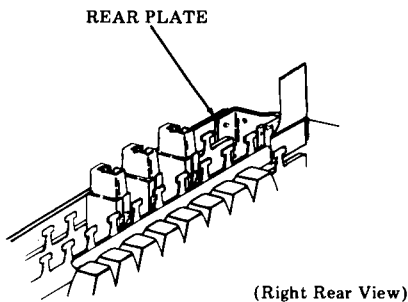
Fig. 17—Cable Removal

(h) Slide cable to the right until it clears the circuit card. Remove through opening between channels (Fig. 17).

3.09   To reassemble the cable:

(a) Insert new cable connector into circuit card holes and press into place. Hold cable connector in place and resolder.

(b) Fasten cable to card using locally furnished cable tie.

(c) Reassemble keyswitches and keys removed in 3.08 (a) and (b).

(d) Replace circuit card cover removed in 3.08 (d).

(e) Replace rear plate.

CABLE (RO)

3.10   To remove the cable:

(a) Remove the Interlock keyswitch (see 3.05).

(b) Remove solder from around connector pins of cable to be removed (Fig. 14).

Warning: Use a grounded, low wattage soldering iron (avoid prolonged contact with pins) along with a desoldering tool to prevent damage to card circuits and components.

(c) Cut the cable tie securing the cable to the circuit card.

(d) Remove the screw securing the right rear side of the circuit card to the channel (Fig. 18).

(e) Grasp the cable connector using thumb and index finger (Fig. 16).

(f) Exert upward force until cable connector releases.

(g) While biasing the right rear cover of the circuit card in the downward direction; slide the cable to the rear until it clears the circuit card. Remove cable.
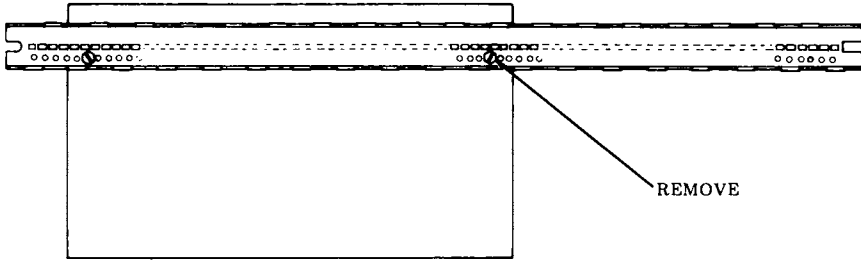
Fig. 18—Channel

3.11 To reassemble the cable:

(a) Insert new cable connector into circuit card holes and press into place. Hold cable connector in place and resolder.

(b) Fasten cable to card using cable tie.

(c) Secure the circuit card to the channel with the screw previously removed.

(d) Reassemble Interlock keyswitch previously removed.

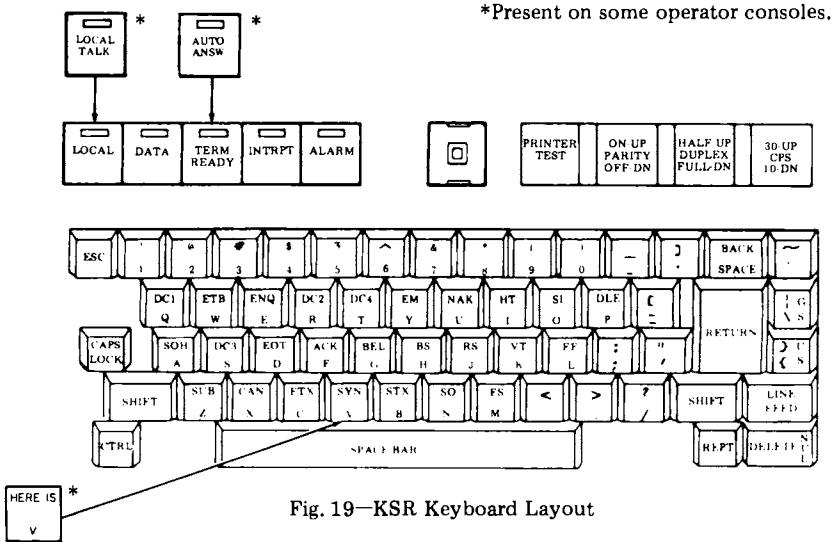(e) Replace circuit card shield.

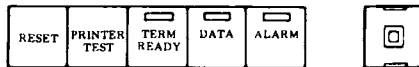## 4. KEY AND KEYSWITCH IDENTIFICATION

Fig. 19—KSR Keyboard Layout

Fig. 20—RO Keyboard Layout

PART NO.	KEY DESCRIPTION	PART NO.	KEY DESCRIPTION
340701	BLOCKING – CONTROL (See Note 6)	340872	STX B
340714	BLOCKING – DATA (See Note 6)	340873	SO N
		340874	FS M
340778	SPACEBAR	340875	< ,
340821	! 1	340876	> .
340822	@ 2	340877	? /
340823	# 3	340889	} +
340824	$ 4	340890	] =
340825	% 5	340894	CAPS LOCK
340826	∧ 6	340975	ESC
340827	& 7	340976	BACKSPACE
340828	* 8	340977	~ `
340829	(9	340978	HT	
340830	) 0	340979	DLE GS P
340831	— -	340981	: \
340838	DC1 Q	340982	BS US H
340839	ETB W	340983	} {
340840	ENQ E	340984	SUB Z
340841	DC2 R	340985	SYN V
340842	DC4 T	340986	LINE FEED
340843	EM Y	340987	CTRL
340844	NAK U	340988	REPT
340846	SI O	340989	DELETE NUL
340852	SOH A	346102	LOCAL (See Note 5)
340853	DC3 S	346106	INTRPT
340854	EOT D	346116	AUTO ANSW (See Note 4)
340855	ACK F	346127	TERM READY (See Notes 2 & 5)
340856	BEL G	346161	LOCAL – TALK (See Note 4)
340858	RS J	346162	DATA (See Notes 2 & 8)
340859	VT K	346163	ALARM (See Notes 1 and 2)
340860	FF L	346164	ON-UP PARITY OFF-DN
340861	: ;	346165	HALF-UP DUPLEX FULL-DN
340862	" '	346166	30-UP CPS 10-DN
340867	SHIFT	346169	PRINTER TEST
		346403	RETURN (See Note 3)
340869	CAN X	346834	RESET (See Note 7)
340870	ETX C	347095	HERE IS (See Note 9) V

Note 1: 346409 spacer must be installed under the 346163 key to block the action of the ALARM keyswitch on 43K101/CAA opcon.

Note 2: 346409 spacer must be installed under the 346162, 346163, and 346127 key to block the action of the ALARM keyswitch on the 43K101/CAB and 43K001/AAA and the TERM READY and DATA keyswitches on the 43K001/AAA opcon.

Note 3: The 340764 compression spring between the 346403 key and the housing must be ordered separately.

Note 4: 346116 and 346161 keys are used on 43K101/CAA opcon.

*Note 5:* 346102 and 346127 keys are used on 43K101/CAB opcon.

Note 6: 340701 and 340714 keys are not part of the opcon but may be used for local engineering requirements to block the action of keyswitches.

Note 7: 346834 key is used on 43K001/AAA opcon only.

Note 8: All 43K101/CAB operator consoles should have the DATA key unblocked. Remove the 346409 spacer, if present under the 346162 DATA key.
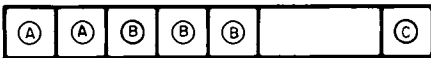
Note 9: 347095 key is used with 430900 answer-back modification kit.

Fig. 21—Key Identification
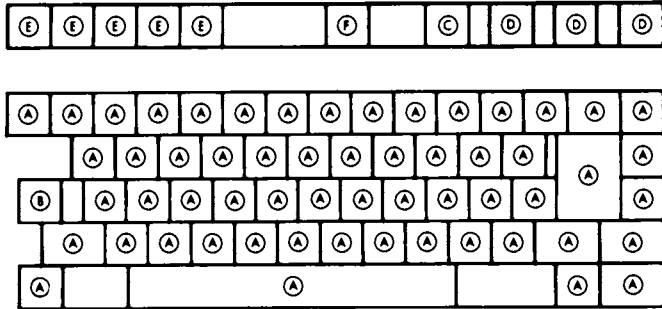
SWITCH NO.	TYPES	PUSH ROD COLOR
Ⓐ 340720	BASIC	WHITE
Ⓑ 340722	LATCHING	BLACK
Ⓒ 340779	DC CONTACT	PINK
Ⓓ 341098	LATCHING	GREY
Ⓔ 346359	INDICATOR	ORANGE
Ⓕ 346432	DC CONTACT	BLACK (Cut-Off)

Fig. 22—Keyswitch Identification (KSR)

SWITCH NO.	TYPES	PUSH ROD COLOR
Ⓐ 340779	DC CONTACT	PINK
Ⓑ 346359	INDICATOR	ORANGE
Ⓒ 346432	DC CONTACT	BLACK (CUT-OFF)

Fig. 23—Keyswitch Identification (RO)

5. SPACER, HOUSING AND REFERENCE
    IDENTIFICATION
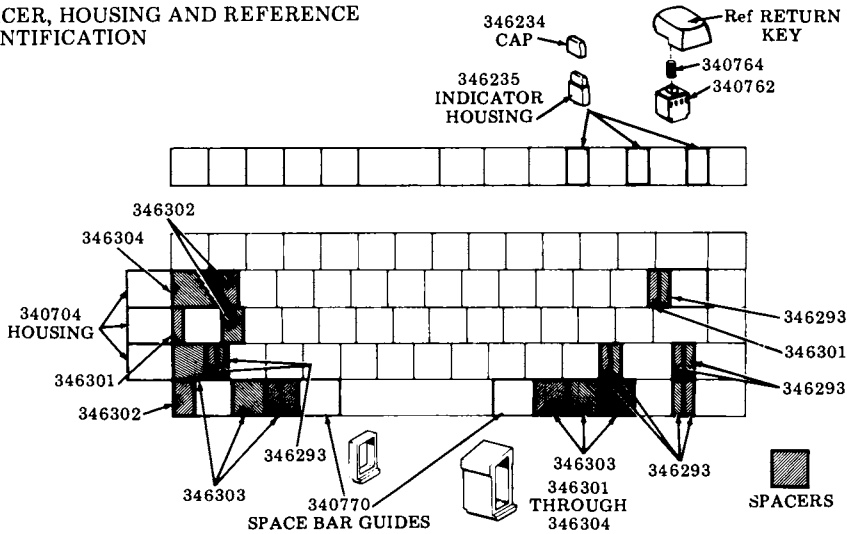
Fig. 24

43 OPERATOR CONSOLE

PARTS

1.   GENERAL

1.01   The parts in this section are maintenance spares for the 43 Operator Console. They should be available, in the quantities shown in parentheses in the numerical index, to correct troubles in the operator console.

1.02   All ordering numbers shown in this manual are Teletype Corporation part numbers.

1.03   Troubleshooting and disassembly/reassembly information for these parts is provided on Page 3-1 and Page 3-7.

2.   PARTS

KSR Operator Console — 43K101/CAA and CAB
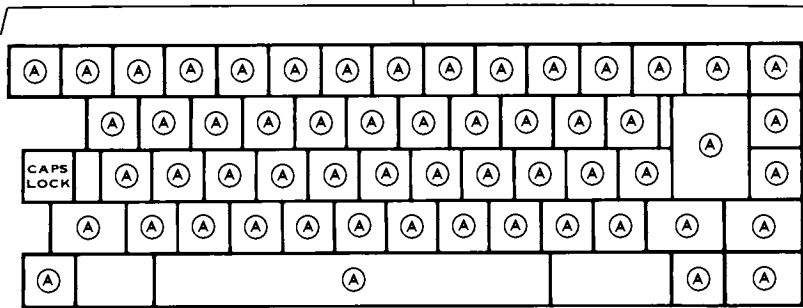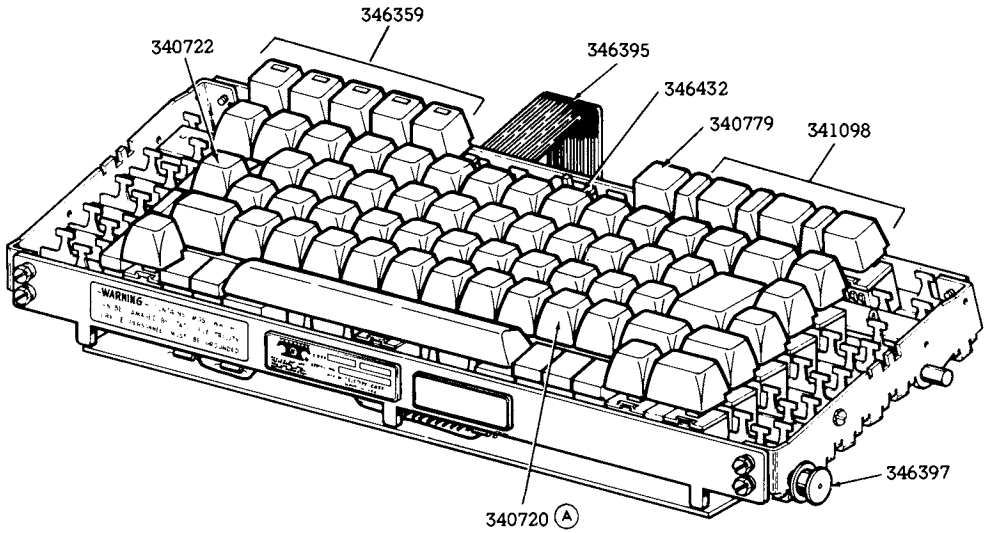
RO Operator Console — 43K001/AAA
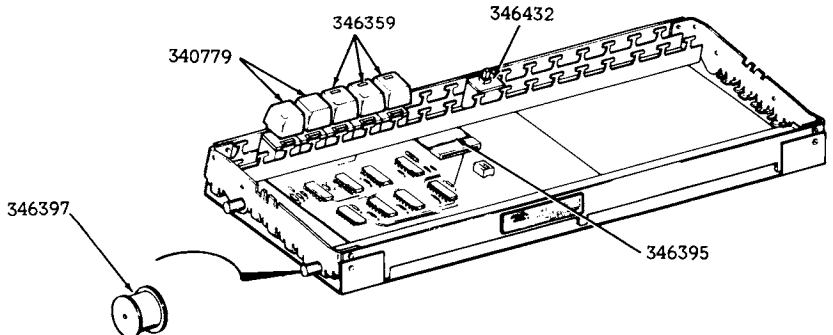
3. NUMERICAL INDEX

Note: One spare should be available in each maintenance area, unless otherwise specified in parentheses.

Part Number	Description and Page Number	Part Number	Description and Page Number	Part Number	Description and Page Number
340720(3)	Keyswitch 3-16	341098	Keyswitch 3-16	346397(2)	Bushing 3-16
340722	Keyswitch 3-16	346359	Keyswitch 3-16	346432	Keyswitch 3-16
340779	Keyswitch 3-16	346395	Cable 3-16		

43 ENCLOSURES AND PAPER HANDLING

ADJUSTMENTS

1. GENERAL

1.01   This section provides adjustment information for the 43 cabinet.

1.02   After an adjustment is completed, tighten any screws or nuts loosened to make the adjustment.

1.03   Reference in the procedure to left or right, up or down, and top or bottom, etc., refer to the teleprinter in its normal operating position.

1.04   Adjustments should be checked and performed when a trouble indicates a specific adjustment may be out of tolerance, or when an adjustment is disturbed to enable a part to be removed or replaced.

2. TOOLS REQUIRED

2.01   The only tool required to perform the cabinet adjustments is a 100982 screwdriver (1/4 inch, 6 inch blade).

3.   CABINET ADJUSTMENTS

KEYBOARD TO COVER ALIGNMENT

The following two requirements must be met:

(1)   Requirement
  Left to Right Positioning — When the free play
  movement of the cover (left to right) is taken
  up lightly in each direction, the cover shall not
  touch any opcon keytops.

To Adjust
  Loosen two screws and position the printer and
  rear frame assembly to meet the requirement.

(2)   Requirement
  Forward Positioning — The two front bushing
  clamps shall firmly engage the opcon bushings
  and hold the printer and rear frame assembly
  fully forward into the housing. There should be
  no front to rear play between the bushing and
  clamp (left and right sides).

To Adjust
  Insert a screwdriver into the square hole in the
  nut plate and gently twist (or pry) the screw-
  driver with enough force to meet the requirement.

  Warning: Do not overtwist the screwdriver.

BUSHING — NUT PLATE
— SCREW
— FRONT CLAMP

HOUSING
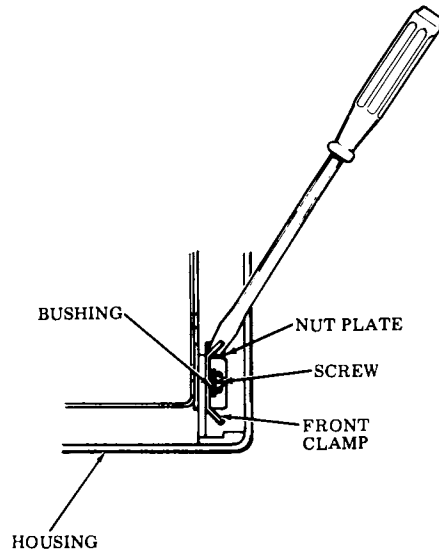
(Top View -- Right Corner)

COLUMN INDICATOR POSITIONING

Requirement
  With power applied, the cover closed, and the print head positioned to column one (1), the print head
  marker should point to the first mark on the indicator scale.

To Adjust
  Reposition scale to meet the requirement.

  Note 1:   Various means are used to hold the indicator scale in position. If glue is present, gently
  remove, perform adjustment and reglue indicator scale using household cement or equivalent.

  Note 2:   This adjustment to be refined when making the KEYBOARD TO COVER ALIGNMENT
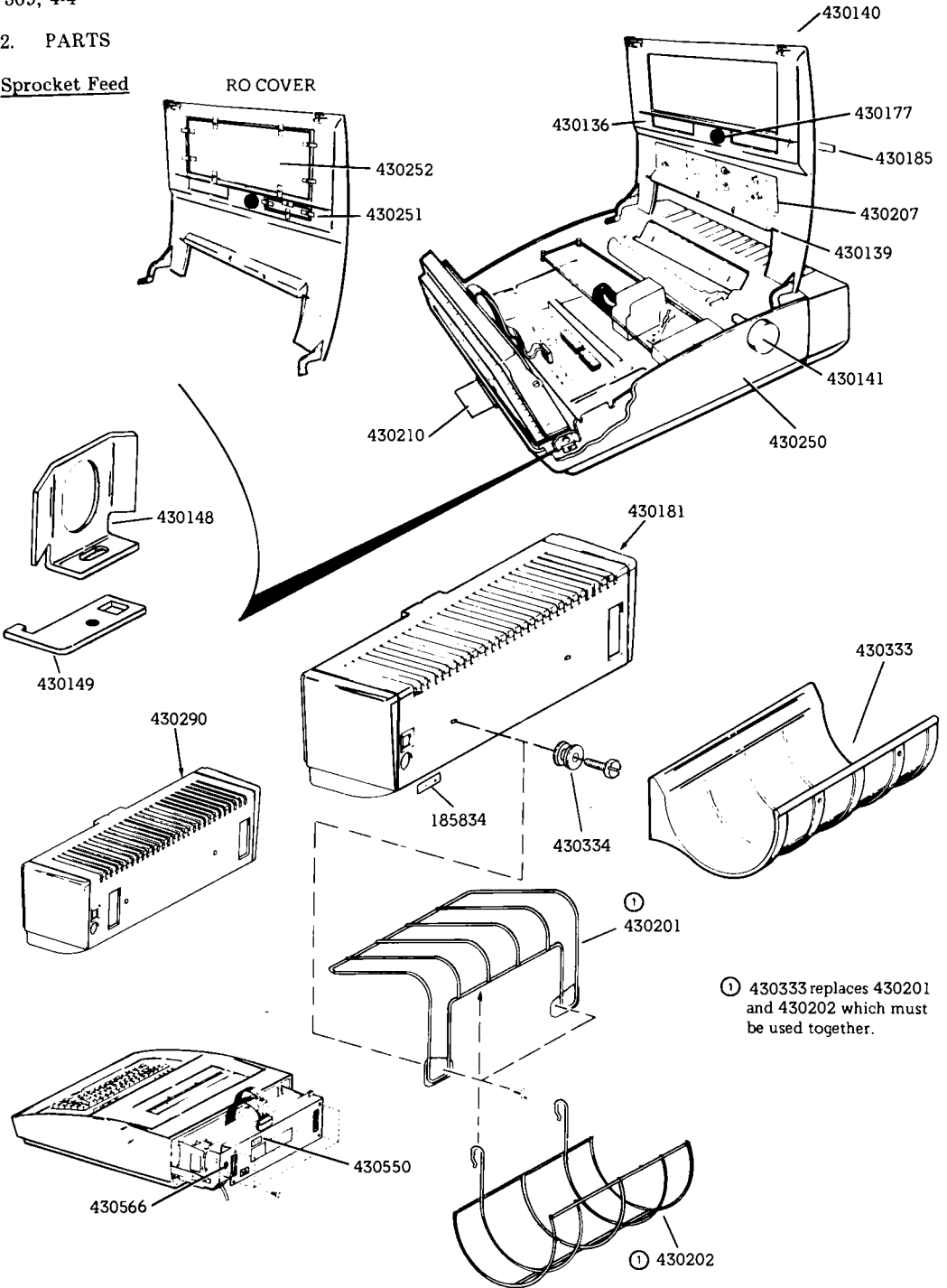 adjustment.

PRINT HEAD MARKER

PRINT INDICATOR SCALE

43 ENCLOSURES AND PAPER HANDLING

PARTS

1.   **GENERAL**

1.01   The parts in this section are maintenance spares for the 43 enclosures and paper handling assemblies. They should be available in the quantities shown in each maintenance area to correct possible troubles or to meet appearance requirements.
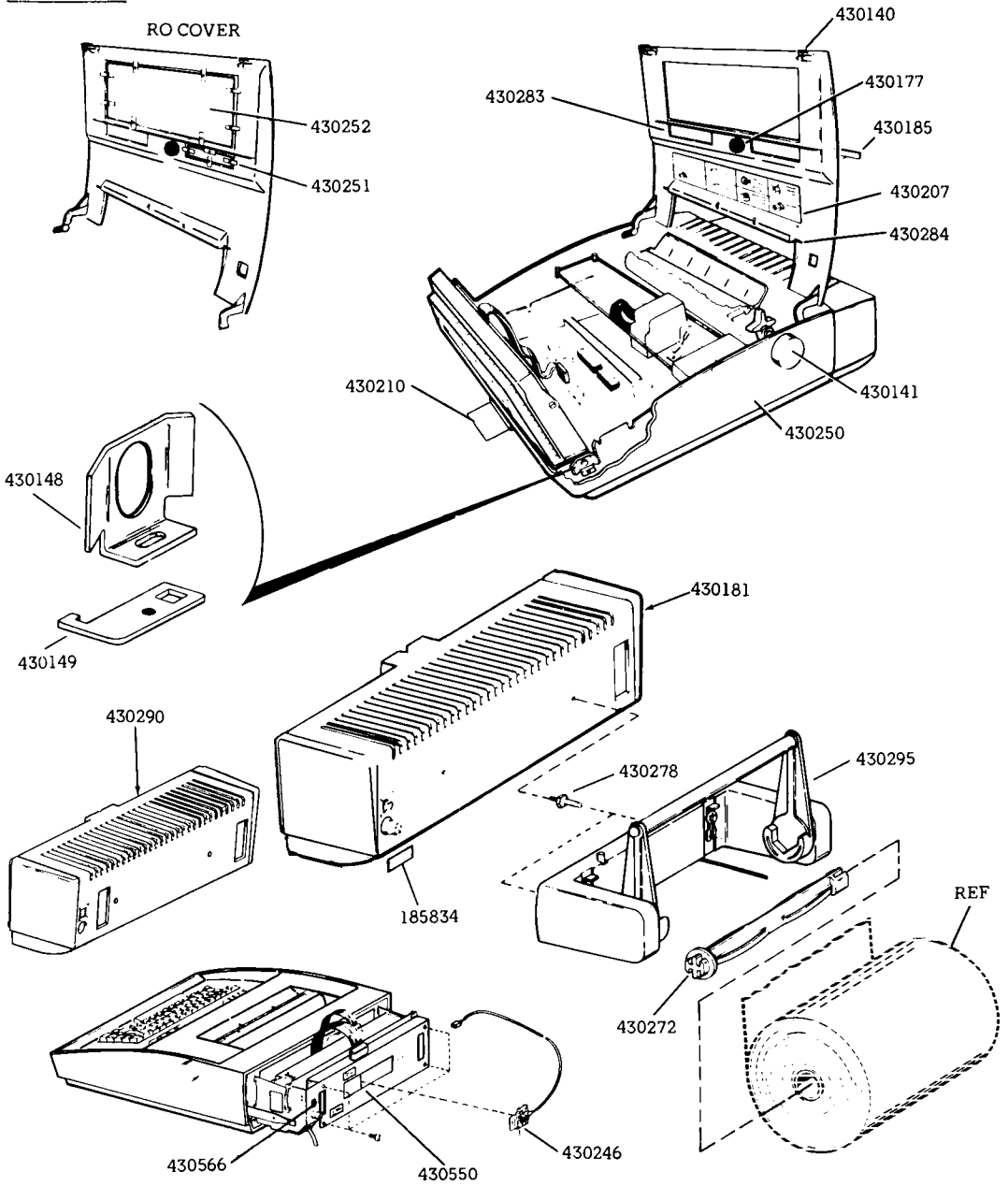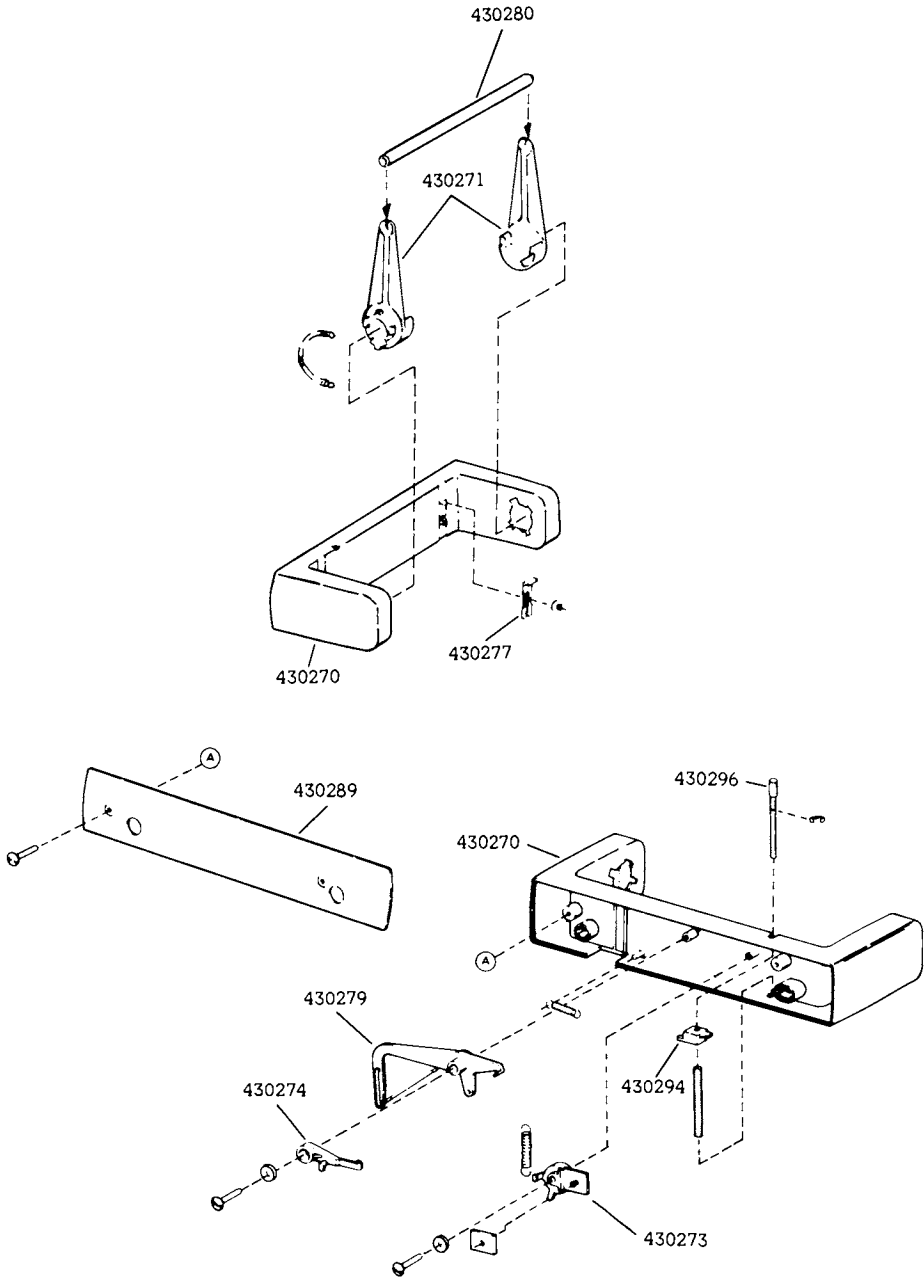
1.02   All ordering numbers shown in this manual are Teletype Corporation part numbers.

1.03   Replacement of enclosures and paper handling parts is specified in Routing Maintenance, Page 1-110. Disassembly and Reassembly is provided in 43 Teleprinter, Page 1-96.

2. PARTS

Sprocket Feed

RO COVER

430140

430252

430251

430136

430177

430185

430207

430139

430141

430250

430210

430148

430181

430333

430149

430290

185834

430334

430201

① 430333 replaces 430201
and 430202 which must
be used together.

430550

430566

① 430202

Friction Feed

RO COVER

430252

430251

430140

430283

430177

430185

430207

430284

430210

430141

430250

430148

430149

430181

430290

430278

430295

185834

REF

430272

430566

430550

430246

430295 Paper Supply (Friction Feed)

430280

430271

430270

430277

430289

430296

430270

430279

430274

430294

430273

3. NUMERICAL INDEX

Note: One spare should be available in each maintenance area, unless otherwise specified in parentheses.

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