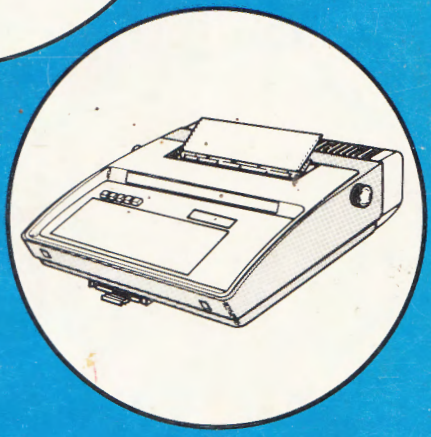
BASIC KSR



BASIC RO

the 43 teleprinter

SERVICE MANUAL

TELETYPE™

TELETYPE CORPORATION
5555 Touhy Avenue, Skokie Illinois 60077
Telephone: (312) 982-2000

SERVICE MANUAL 369
Issue 2, September 1978

THE 43 TELEPRINTER SERVICE MANUAL

TABLE OF CONTENTS

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.

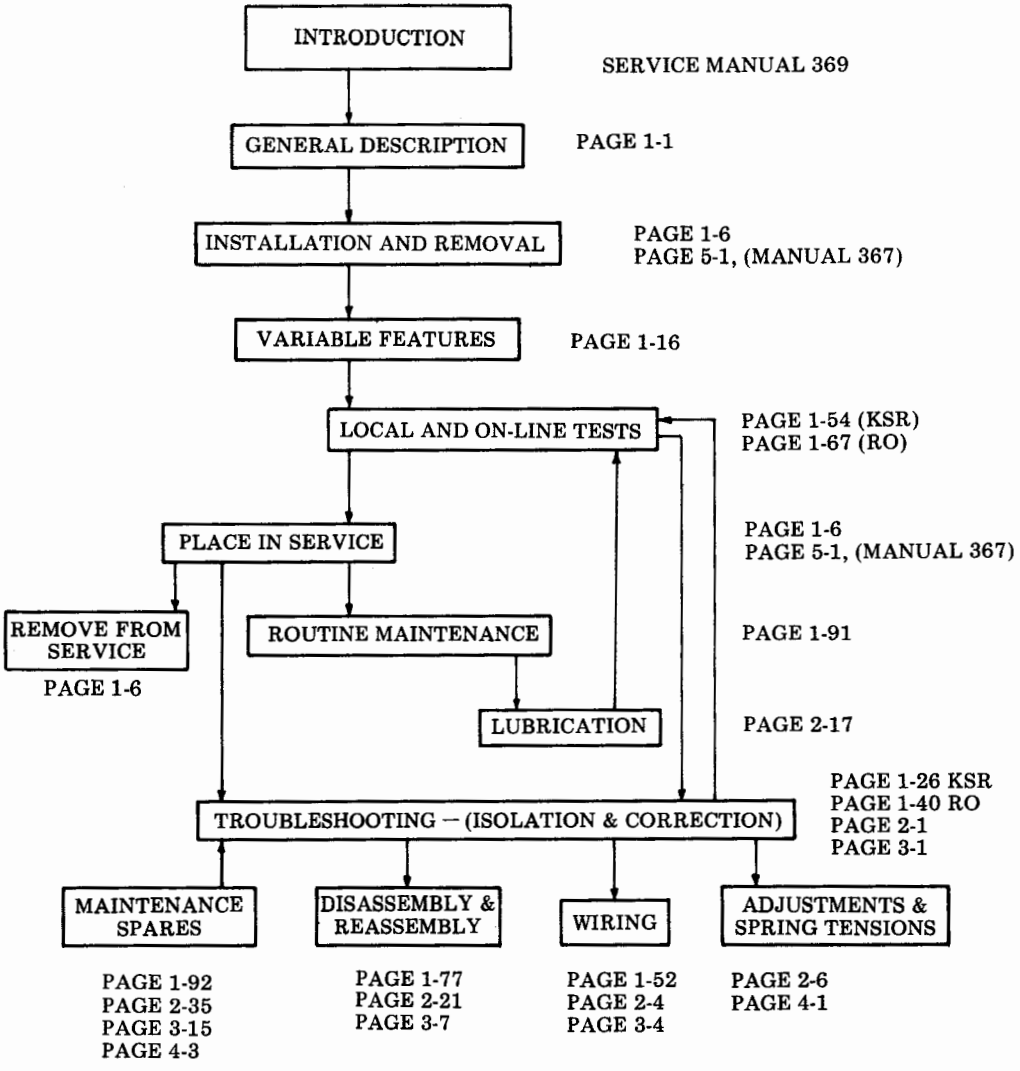
The task flow chart on the next page illustrates the intended repair and servicing activities and associated manual parts.

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), or no integrated terminal unit (no TU).

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



43 BASIC TELEPRINTER

GENERAL DESCRIPTION

CONTENTS

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 (D4BU) cord.

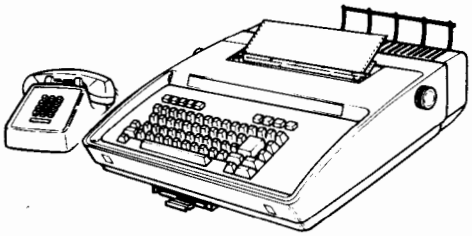


Fig. 1—43 KSR Sprocket Feed Station

2.02 The 43 KSR Station is also available with friction feed roll paper handling capabilities.

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 no integrated terminal unit that has a Transistor-Transistor Logic (TTL) voltage level interface.
- Receive Only (RO) terminals with either a TDU, a TAU or no TU.

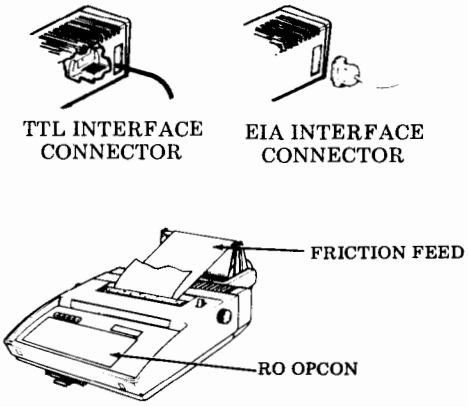


Fig. 2—RO Friction Feed and Interface Connectors

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 integrated terminal unit are usually directly connected to a nearby data device or computer.

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 engineering 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 support that is mounted to the rear of the terminal.

2.11 The terminals operate on a 115 V ac, 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 support 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.

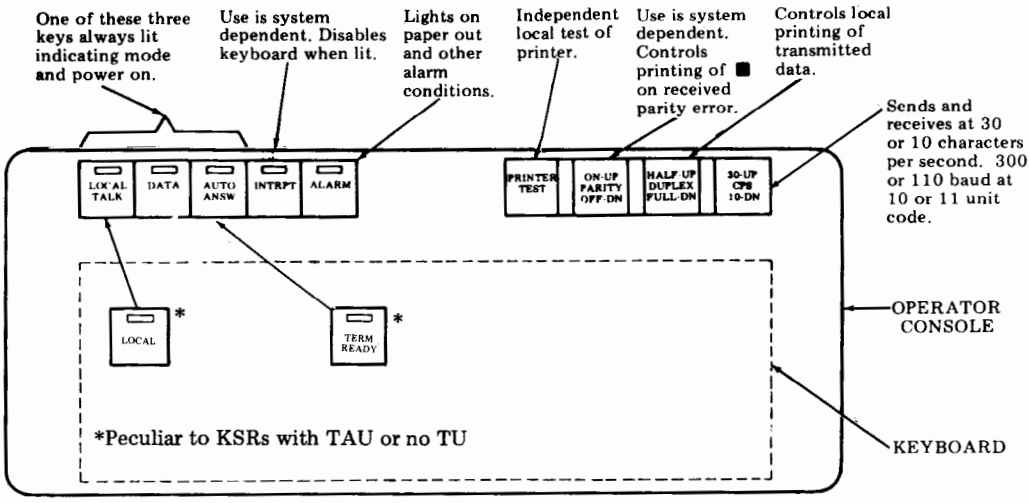


Fig. 3—KSR Operational Controls and Status Indicators

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.

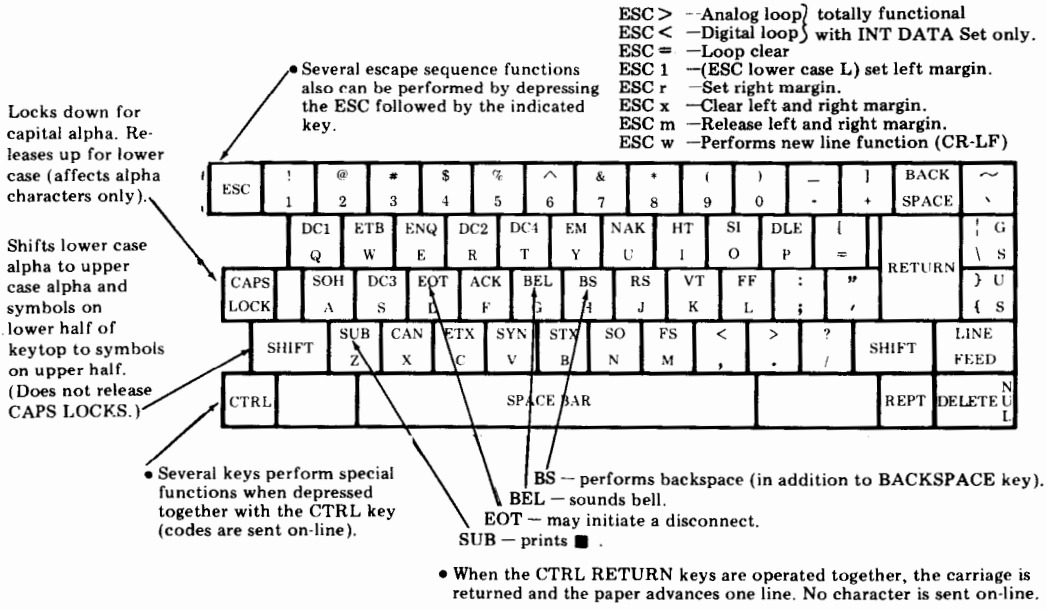


Fig. 4—KSR Keyboard Layout

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

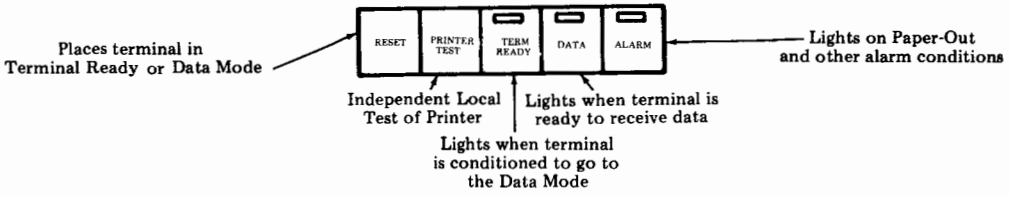


Fig. 5 — RO Operational Controls and Status Indicators

2.17 The following is a 20% reduction 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. VARIABLE FEATURES

3.01 Several variations are provided for field applications. These variations 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 ← .

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.

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 Troubleshooting, Page 1-40, and 43 RO Testing, Page 1-67, are new servicing instructions.

43 BASIC TELEPRINTER

INSTALLATION AND REMOVAL

CONTENTS PAGE

1. GENERAL

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

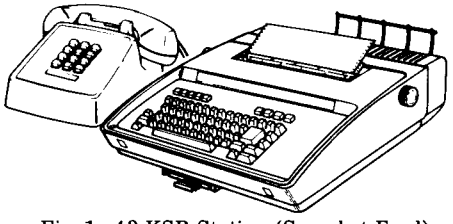


Fig. 1—43 KSR Station (Sprocket Feed)

1.02 For additional information, refer to KSR Teleprinter Testing, Page 1-54, RO Teleprinter Testing, Page 1-67, and Variable Features, Page 1-16.

1.03 The 43 Teleprinter is furnished fully assembled and tested with an integrated TAU, TDU, or no integrated terminal unit ready to connect to an external communications device or distant terminal or between a modular 500DM or 2500DM-type keyless telephone 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 w/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 cords(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.

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.

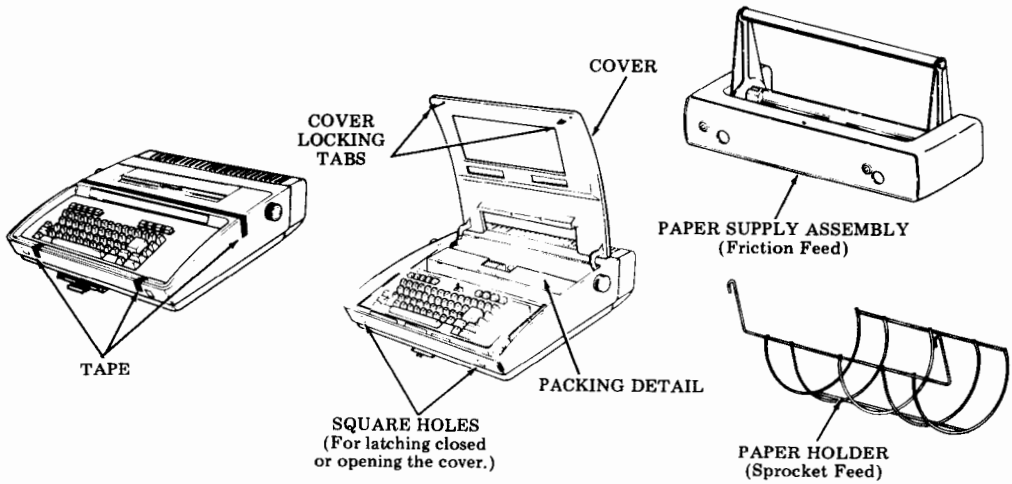


Fig. 2—Packing Detail

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, or no integrated terminal unit. For tools required to enable variable features, refer to Variable Features, Page 1-16.

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)

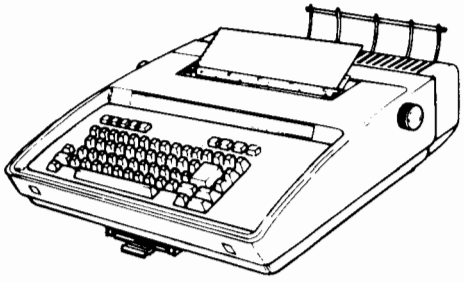
IDENTIFICATION

RO TELEPRINTERS

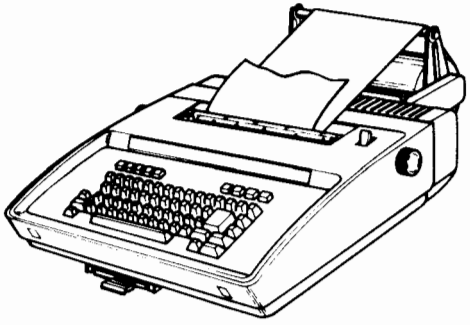
Sprocket Feed With TDU — 4310/AAB
Sprocket Feed With TAU — 4310/AAC
Sprocket Feed With TTL — 4310/AAA
Friction Feed With TDU — 4310/AAF
Friction Feed With TAU — 4310/AAD
Friction Feed With TTL — 4310/AAE

KSR TELEPRINTERS

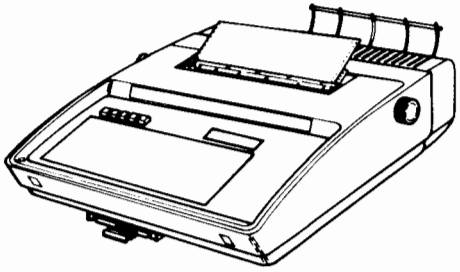
Sprocket Feed With TDU — 4320/AAB
Sprocket Feed With TAU — 4320/AAC
Sprocket Feed With TTL — 4320/AAA
Friction Feed With TDU — 4320/AAF
Friction Feed With TAU — 4320/AAD
Friction Feed With TTL — 4320/AAE



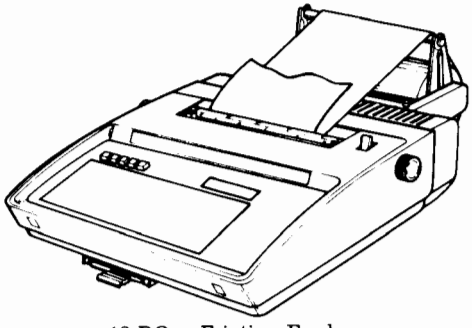
43 KSR — Sprocket Feed



43 KSR — Friction Feed



43 RO — Sprocket Feed



43 RO — Friction Feed

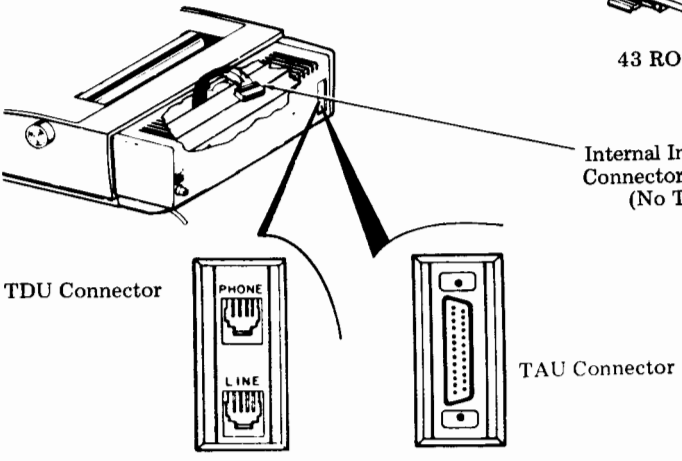


Fig. 3—Identification

CONNECTION

3.07 Place the 43 Teleprinter on the desk, table, etc, indicated by the customer. Placement should be near the external communications 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 modular 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 judgment 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.

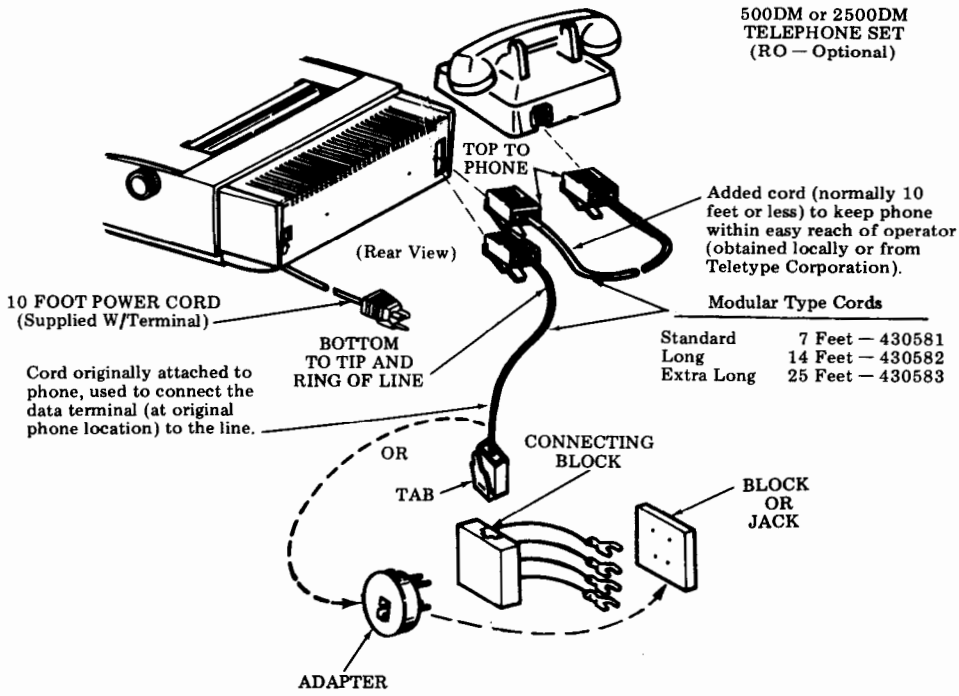


Fig. 4—Telephone Connection

4310 AAC and AAD RO Sets With TAU
4320 AAC and AAD KSR Sets With TAU

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

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

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

EIA DATA SET 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			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

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

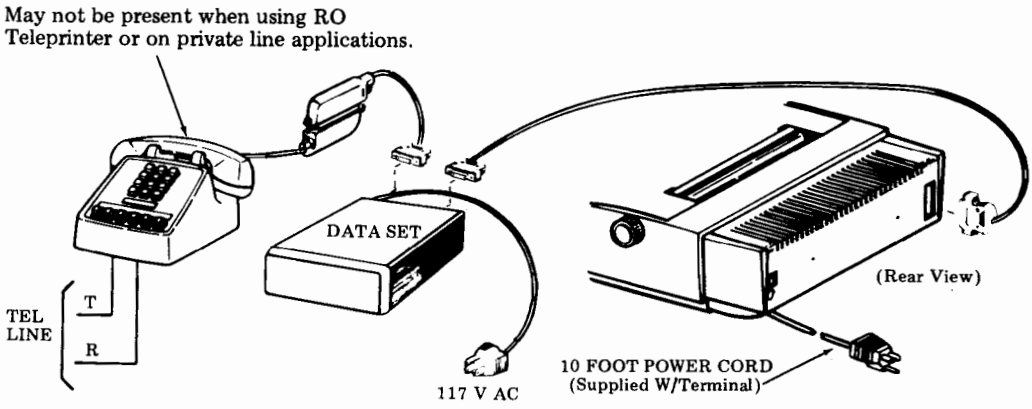


Fig. 5—Data Set Connection (Sets W/TAU)

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

3.14 Connection to the external communications device (provided by the customer) is made through a 20-pin connector, Berg 65346-003 or 3M3421-300 or equivalent at the end of a short ribbon cable. No provision is made for adding additional cable length. The pin assignments are given on the TTL Pin Assignment Chart (Page 1-12).

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

3.16 To remove the paper supply assembly, disengage latches from mounting posts by pulling straight up. Slide assembly from mounting posts (Fig. 6).

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

3.18 Electrical Characteristics of Interface Leads

Electrical signals compatible with low-power TTL logic are utilized for both control and data interchange as described below:

STATE	DRIVER	TERMINATOR
MARK (OFF) (1)	$+2.4 \leq V_{MARK} \leq +5.25$ Volts	$+2.0 \leq V_{MARK} \leq +5.25$ Volts
SPACE (ON) (0)	$0 \leq V_{SPACE} \leq +0.4$ Volts	$0 \leq V_{SPACE} \leq +0.7$ Volts

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		Reserved for future	Not Applicable, Not Wired in TTL Cable
11	-12	-12 Volts	Active
12		Reserved for future	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

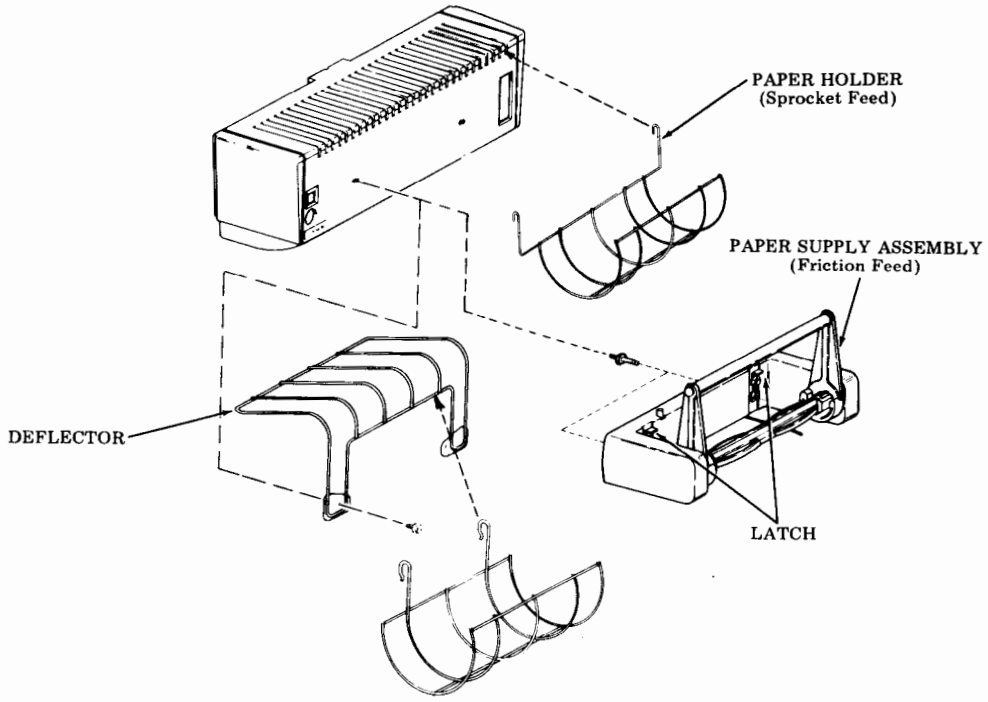


Fig. 6—Paper Holder and Paper Supply Assembly

PAPER HOLDER (Sprocket Feed)

3.19 Attach the paper holder to the deflector if present, otherwise attach it to the bustle cover as shown in Fig. 6.

PAPER SUPPLY ASSEMBLY (Friction Feed)

3.20 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

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

CHECKOUT PROCEDURE

3.22 Plug the 43 Teleprinter into a properly grounded and polarized 3-wire 115 V ac 50-60 Hz electrical power source.

3.23 Perform the appropriate Station Installation Checkout Procedures (Local and On-Line) found in 43 Basic KSR Teleprinter Testing, Page 1-54 and RO Teleprinter Testing, Page 1-67.

DIRECTORY CARD

3.24 Record the installed location of the station (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. 8).

3.25 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 performed successfully, the teleprinter has the standard variable features incorporated as shown on the card. Record any nonstandard options enabled in the space provided on the directory card. (Write in any not listed on the card.)

3.26 Clean up the unpacking area, wipe off any fingerprints on the set, and turn the 43 Station over to the subscriber.

3.27 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).

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

3.29 Place the 368 or 373 Installation and Routine Servicing Manual with the shipping containers and retain for future use.

4. STATION REMOVAL

4.01 Reverse the procedures in 3. INSTALLATION 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. 7).

4.05 If a modular telephone is present, reconnect the telephone to the phone line. Retain modular cords for future use.

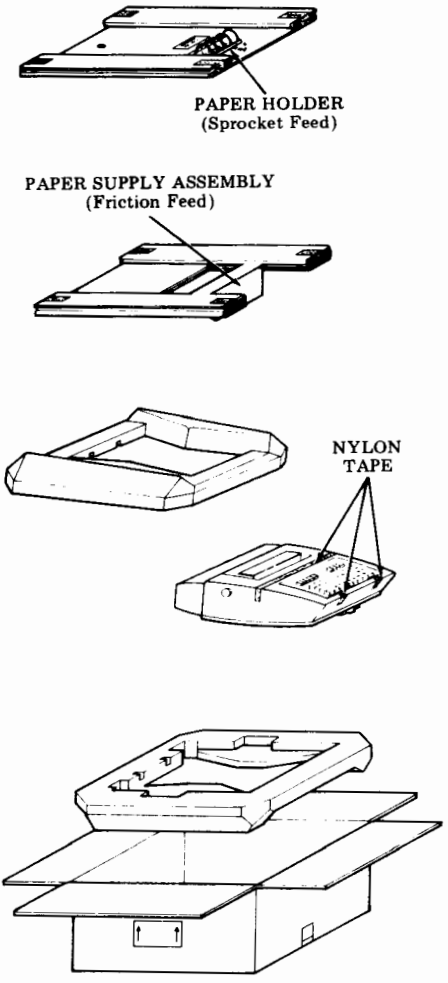


Fig. 7—Packing Details

TOP SIDE

DIRECTORY CARD

FREQUENTLY CALLED NUMBERS

NAME	AREA CODE	TEL NO
EXAMPLE		

INSTALLED LOCATION IN BUILDING

FLOOR 3 AREA Prod A16 PHONE 341-7296

LOCATION OF EXTENSION PHONE IF ANY Prod A16

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

STANDARD SWITCH POSITION

INSTALLATION DATE 11-4-76 INITIALS LM

OPTION NO — CHECK NON STANDARD OPTIONS ENABLED

- 435 ☐
- 434 ☑ b Send, Rtt & Mark
- 433 ☐
- 432 ☑ c Line Length - 80
- 431 ☐

INSTALLATION TEST PERFORMED ☑

LOCATION Floor 3.

STATION Prod A16

TEST CENTER 362-3261

MAINTENANCE SPARES — 431 W. 5th St.

LUBRICATION DATE ____

FURNISHED AT INSTALLATION

- ATTENDANT MANUAL ☑
- PAPER HOLDER ☑
- RIBBON & ORDERING CARD ☑
- PAPER ☑

DATE	TROUBLE INDICATION	CORRECTIVE ACTION	INITIALS
	EXAMPLE		

Early Design

SERVICE RECORD

INSTALLATION DATE 11-4-76 INSTALLED BY L.M.

PRINTER S N 3212

MAINT SPARES LOC 431 W. 5th St.

TEST CENTER NO 362-3261

CIRCUIT NO 431-7701

LUBRICATION DATE ____

☑ INSTALLATION TEST PERFORMED

FURNISHED AT INSTALLATION

- ☑ ATTENDANT MANUAL
- ☑ PAPER HOLDER
- ☑ RIBBON
- ☑ PAPER

NON-STANDARD OPTIONS INSTALLED (NUMBER & DESCRIPTION)

#434 b. Send, Rtt & Mark #432 c. Line Length - 80

DATE	TROUBLE INDICATION	CORRECTIVE ACTION	INITIALS
	EXAMPLE		

NOTES:

Late Design

Fig. 8—Directory Card

43 TELEPRINTER

VARIABLE FEATURES

CONTENTS

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

1.02 The variable features can be enabled to satisfy requirements using switches located on the logic circuit card mounted on the bottom of the printer frame and on the RO operator console logic card.

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

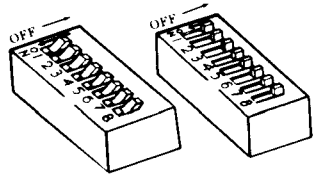
1.04 The KSR operator console circuitry can be damaged by static discharge. The 346392 static discharge ground strap is available for use by service personnel.

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

1.06 For additional servicing information refer to Basic KSR Teleprinter Troubleshooting, Page 1-26, RO Teleprinter Troubleshooting, Page 1-40, and Enclosures and Paper Handling Adjustments, Page 4-1.

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

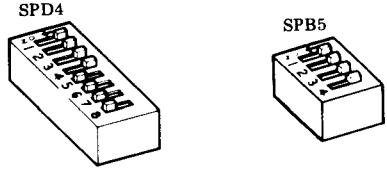


Toggle Style Slide Style

(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 requirements specify incorporating a nonstandard option (Fig. 2).



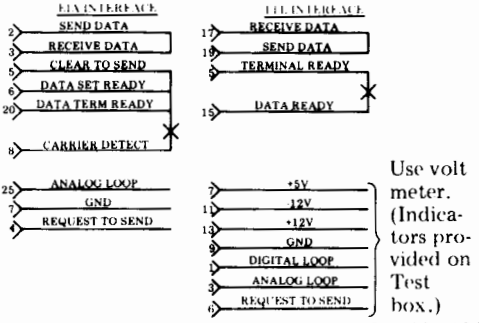
KSR and RO RO Only

Fig. 2—Standard Switch Positions

1.09 The procedures in Table C verify proper operation of nonstandard options only. The features as furnished from the factory are checked in the KSR and RO Testing Sections, Page 1-54, and Page 1-67, 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 external communication test devices are not available. Off-line checkout of Options 433 through 437 will require placing the teleprinter into the Loopback mode. (See Table A.) To perform these tests, the connector terminals, as shown below, 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 Sales Department, 312-982-2000, for availability of a 43 Teleprinter Interface Test Box, CP10.002.001-1, which provides both arrangements shown as follows:



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 performed, the external communications test device must be provided details about the teleprinter under test, such as telephone number, type of terminal (KSR or RO, friction or sprocket feed), variable features 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 variable features. 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 VARIABLE FEATURES

3.01 Turn off ac power to the teleprinter.

3.02 Depress the two locking tabs on the lower front of the cabinet and open the cover.

3.03 Locate the option switch pack SPB5 (Fig. 3) on the RO operator console (if present) and activate the option switches in 4. VARIABLE FEATURES, as required.

3.04 Loosen the two 181240 screws (one each side) on the side frames securing the operator console in place (Fig. 3).

3.05 Loosen the two 184058 bushing clamp screws (one each side) and gently lift the rear edge of the operator console assembly, pivoting it forward on the front mounting pins (Fig. 3).

3.06 Locate the option switch pack SPD4 (Fig. 3) on the logic circuit card and activate the option switches in 4. VARIABLE FEATURES, as required.

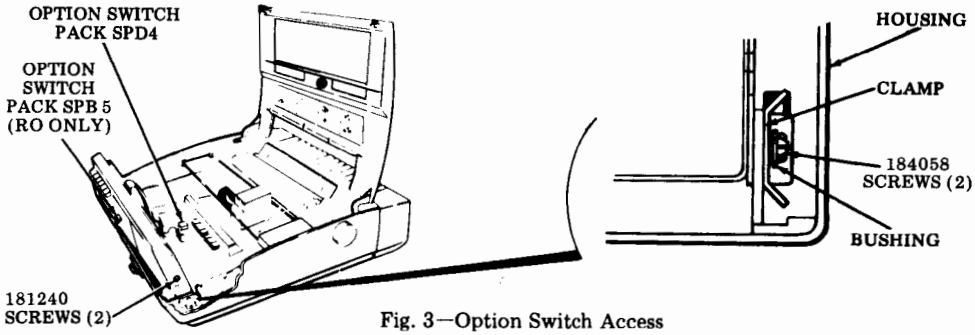


Fig. 3—Option Switch Access

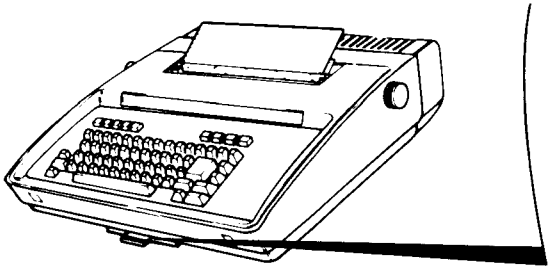
3.07 Reinstall the operator console, and tighten the screws loosened in 3.04. Perform the KEYBOARD TO COVER ALIGNMENT adjustment, Page 4-2.

3.08 Remove the pull out 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. 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. 4). Write in any not listed on card.

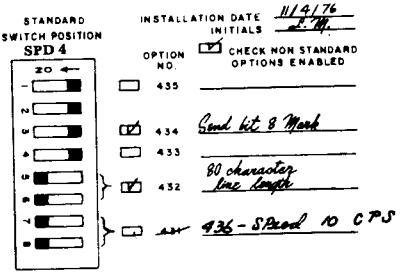
3.09 Reinstall the directory card and turn on the ac power to the station.

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

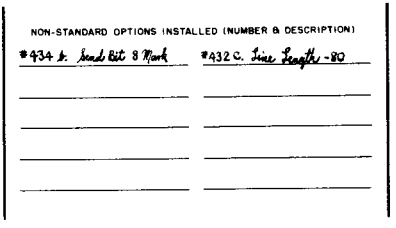
3.11 The checkout procedure in 5. provides information for checking nonstandard options only. Refer to KSR and RO Testing, Page 1-54 and 1-67 respectively for Teleprinter Testing Procedures.



EXAMPLE:



Early Design



Late Design

Fig. 4—Directory Card

4. VARIABLE FEATURES

4.01 The chart below provides information on how to set the features shown under feature numbers 431 through 437. Record any nonstandard features 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. 3)

XXX	SPD4 1	2	3	4	5	6	7	8	
a.	–	–	–	–	○	●	–	–	*
b.	–	–	–	–	○	●	–	–	

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 ←.	—	—	—	—	—	—	●	○	
c. Slash alpha Ø and wide numeric O ∧ prints as ↑ and _ prints as ←.	—	—	—	—	—	—	○	○	

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.	—	—	—	—	○	●	—	—	
c. 80 Characters §	—	—	—	—	●	○	—	—	‡
d. 72 Characters — Printed line centered. (Friction Feed Only) §	—	—	—	—	○	●	—	—	

433. EOT Response	SPD4 1	2	3	4	5	6	7	8	
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. †	SPD4 1	2	3	4	5	6	7	8	
a. Even Parity	—	—	○	—	—	—	—	—	*
b. 8th Bit Mark	—	—	●	—	—	—	—	—	

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

● 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.
† KSR only

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

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

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

● 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.

5. VARIABLE FEATURE 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.	TERM READY (AUTO ANSW) turns on, if not already on.
Depress ESC key.	TERM READY (AUTO ANSW) goes off.
Hold SHIFT key depressed and depress  key.	DATA turns on. ALARM flashes.
W/O TDU, EIA INTERFACE — Connect the test arrangement shown on Page 1-17 to the interface connector. Connect Carrier Detect to Data Term Ready.	Print head returns to left-hand margin.
Turn on Teleprinter POWER switch.	Printer performs one line feed. DATA turns on.
W/O TDU, TTL INTERFACE — Connect the test arrangement shown on Page 1-17 to the interface connector. Connect Terminal Ready to Data Ready.	
Turn on Teleprinter POWER switch.	

TABLE B

RO

ON-LINE MODE PROCEDURES

STATION UNDER TEST		TEST STATION	
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 STATION	
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 Station and request 43 KSR Teleprinter on-line variable feature test. Provide testing station with phone number of station and operating speed. Agree that testing station will call back after disconnect.		Set up operating speed as indicated by station under test.	

TABLE C

VARIABLE FEATURE CHECKOUT PROCEDURES

CHECK	PROCEDURE	RESPONSE
Option 431.b. and c.	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{|}~
```

Fig. 5—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 (13 characters per inch), Friction Feed (10 characters per inch)

Fig. 6—Printer Test Message

TABLE C (Cont)

VARIABLE FEATURE 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  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 STATION 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 STATION Set up to check even parity. STATION UNDER TEST Type the following test message on the operator console: THE QUICK BROWN FOX	TEST STATION Test Station receives message ■ Indicates even parity error. T▪E Q▪IC▪ ▪ROW▪ FOX

TABLE C (Cont)

VARIABLE FEATURE 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 STATION	STATION UNDER TEST
		Send the following message in Full Duplex mode: ESC x (lower case) 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. 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).	
	Off-Line	Depress REPT and K keys.	One printed line plus return will occur in approximately: 14 seconds (sprocket feed) 8.5 seconds (friction feed).
		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 STATION	STATION UNDER TEST
		Send the "FOX" test message at (10 CPS) to station under test.	"FOX" test message will be printed.

TABLE C (Cont)

VARIABLE FEATURE CHECKOUT PROCEDURE

CHECK	PROCEDURE		RESPONSE
Option 437.b. (RO only)		Enable Option 434b. 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:	Printer will print:
		PARITY TEST	PARITY TEST.
		Measure continuity between pins 4 and 20 on RO opcon connector.	Meter should read 0 ohms.
	On-Line (TDU only)	Place teleprinter in On-line mode. (See Table B.)	
		TEST STATION	STATION UNDER TEST
		Send the following message (8th Bit Marking) PARITY TEST	Printer will print: PARITY TEST

Note: Options 433 through 437 — 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

CONTENTS PAGE

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.

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

1.03 Component troubleshooting sections start on:

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

1.04 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.

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

1.06 To facilitate trouble correction, the recommended maintenance spares as listed on Page 1-92 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.

1.07 For component access, refer to Disassembly/Reassembly, Page 1-77 and Variable Features, Page 1-16.

1.08 For location and identification of station components, refer to Page 1-92.

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

1.12 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 for static protection.

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

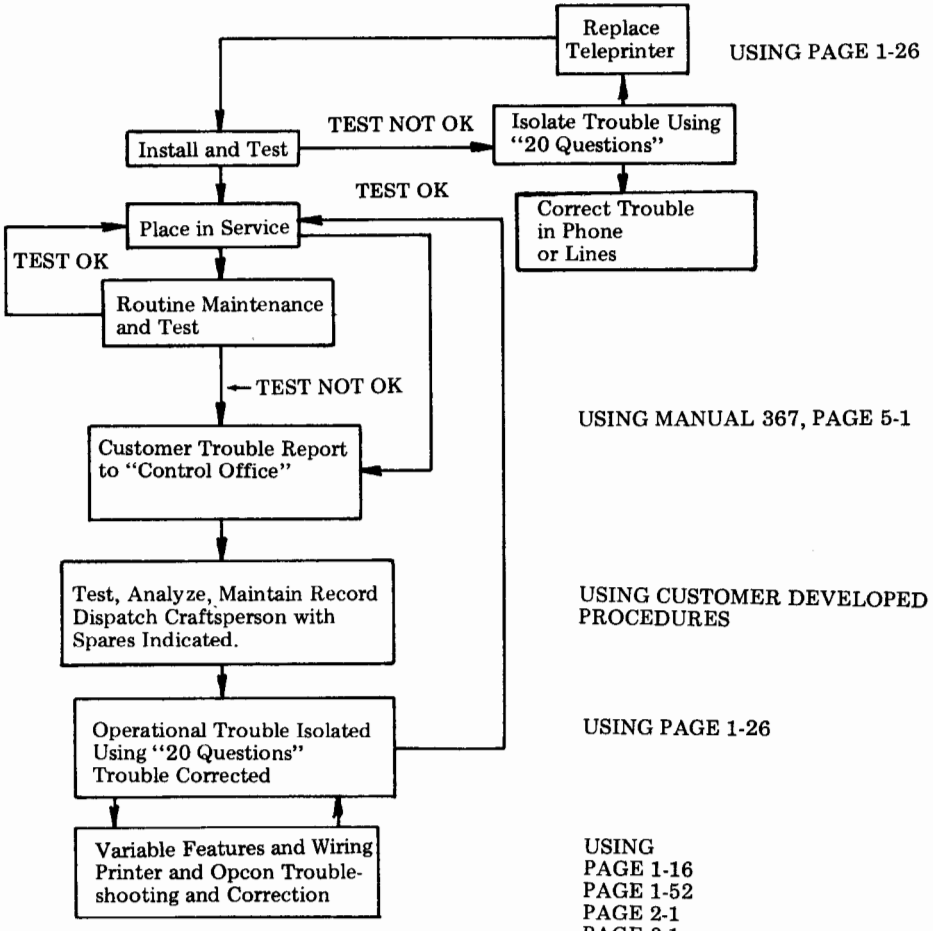
430850 Print Head
43K101/CAA and CAB Operator Console
430700 Power Supply Card
410740 Logic Card
430750 Terminal Data Unit
430751 Terminal Auxiliary Uni+

1.14 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.

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

1.16 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



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, 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 and printer cables are reconnected one at a time?	Replace the TDU, opcon 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 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 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 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.

TROUBLESHOOTING GUIDE (Teleprinter with TDU) (Cont)

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 to TDU. 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. 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	Go to 20.	Go to 28.

TROUBLESHOOTING GUIDE (Teleprinter with TDU) (Cont)

QUESTION	YES	NO
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.
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.

QUESTION	YES	NO
27. Does remote station receive interrupt?	Go to 29.	Go to 28.
28. Does station pass on-line end-to-end tests with Testing Station?	Trouble (if any) is in remote station.	Perform distortion, dBm level, or other parameter tests including digital loopback under control of Testing Station to isolate trouble to line, TDU 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 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 TAU, 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 TAU, opcon and printer cables are reconnected one at a time?	Replace the TAU, opcon 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 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.

TROUBLESHOOTING GUIDE (Teleprinter without TDU) (Cont)

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 trouble-shooting. Replace logic card.
4i. 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.
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 trouble-shooting. 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) 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?	Go to 11.	Check column indicator positioning adjustment. Replace logic card.

	QUESTION	YES	NO
11.	Does printer respond properly to keyboard operation in loop-back mode?	Go to 12.	Check P301 connector. Replace logic card. Replace Terminal Aux Unit (if present).
12.	Did ALARM indicator flash and DATA indicator light during loopback?	Go to 13.	Replace logic card. Replace opcon.
13.	Does DATA indicator flash when depressed in local talk mode?	Go to 14.	Replace opcon. Replace logic card.
14.	Does external device connected to interface connector go to data mode (DATA indicator depressed, exclusion key lifted, etc)? (TTL interface — Data Ready, pin 15 on, 0 V) (EIA interface — Carrier Detect, pin 8 on, +3 V)	Go to 15.	Go to 14a.
14a.	Is Terminal Ready pin 5, TTL interface on, 0 V? (TERM READY (AUTO ANSWER)) on?	Go to 14b.	Replace logic card.
14b.	Does external device require Request to Send (EIA interface) to be on?	Use issue 2A logic card or strap ON in cable. Sets with TAU — go to 14c.	Sets without TAU — trouble is in external device.
14c.	Is Data Term Ready pin 20 EIA interface on, +3 V?	Trouble is in external device.	Replace TAU.
15.	Does DATA indicator on opcon light when external device is in data mode?	Go to 16.	Go to 15a.
15a.	Is EIA interface Clear to Send, pin 5, Carrier Detect pin 8, and Data Set Ready, pin 6 on, +3 V? (Request to Send on if requested by external device — strapped or Issue 2A logic card present.)	Go to 15b.	Trouble is external device.
15b.	Is TTL interface Data Ready, pin 15 on?	Replace logic card.	Replace TAU.
16.	Are data messages properly sent and received in the data mode?	Go to 19.	Go to 16a.
16a.	Do PARITY, DUPLEX and CPS keys alternately lock down and release up when depressed.	Go to 17.	Replace opcon.
17.	Can any data be received?	Go to 18.	Go to 26.

TROUBLESHOOTING GUIDE (Teleprinter without TDU) (Cont)

QUESTION	YES	NO
18. Does substitute character print on some characters (PARITY key on)?	Remote station may be sending incorrect parity or be at different speed. Go to 23.	Go to 19.
19. Does printer copy and data transmit properly in half-duplex (DATA indicator lit)?	Go to 20.	Check option 434. Replace opcon. Replace logic card. Go to 26.
20. Is printer blinded to keyboard transmission in full duplex (DATA indicator lit)?	Go to 21.	Replace opcon. Replace logic card.
21. Does the carriage return automatically when characters to the right of the right hand margin are received (DATA indicator lit)?	Go to 22.	Check option 435. Replace logic card.
22. 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 23.	Check option 433. Replace logic card. Replace TAU if present.
23. Is INTRPT indicator lit?	(Interrupt received) Go to 23a.	Go to 24.
23a. Does INTRPT indicator go off when depressed?	Go to 24.	Replace opcon. Replace logic card. Go to 26.
24. Does INTRPT indicator light briefly and bell ring when INTRPT indicator is depressed?	Go to 25.	Replace opcon. Replace logic card.

QUESTION	YES	NO
25. Does remote station receive interrupt?	Go to 27.	Go to 26.
26. Does station pass on-line end-to-end tests with Testing Station?	Trouble (if any is in remote station.	Perform distortion, dBm level, or other locally developed tests including digital loopback under control of Testing Station to isolate trouble to line, TAU or logic card.
27. Is trouble present but not defined by questions 1 to 26?	Refer to printer or opcon troubleshooting for other symptoms. Replace opcon, power supply, TAU, logic card and/or print head to correct trouble.	

43 BASIC RO TELEPRINTER

TROUBLESHOOTING

CONTENTS

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.

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

1.03 Component troubleshooting sections start on:

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

1.04 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.

1.05 Trouble isolation for the attendant is provided in the How to Operate Manual 372.

1.06 To facilitate trouble correction, the recommended maintenance spares as listed on Page 1-92 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.

1.07 For component access, refer to Disassembly/Reassembly, Page 1-77 and Variable Features, Page 1-16.

1.08 For location and identification of station components, refer to Page 1-92.

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 TAU and 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.

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

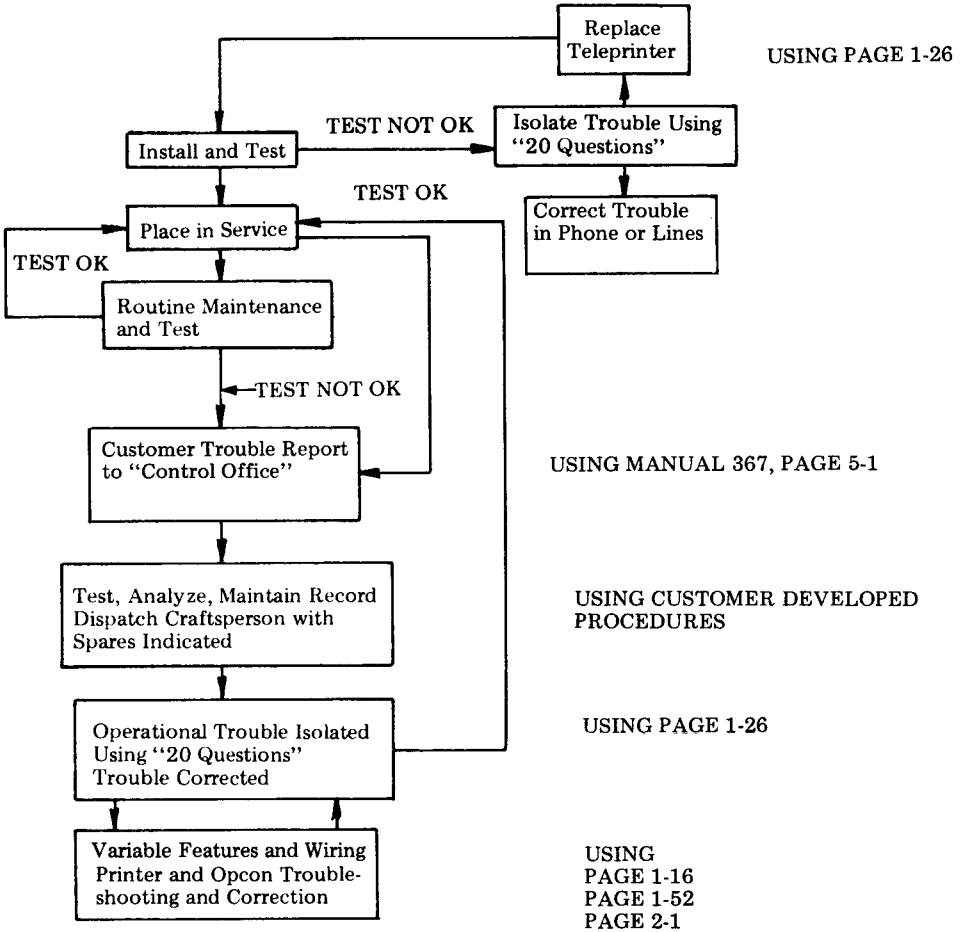
430850 Print Head
43K001/AAA Operator Console
430700 Power Supply Card
410740 Logic Card
430750 Terminal Data Unit
430751 Terminal Auxiliary Unit

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



3. TROUBLESHOOTING GUIDE (Teleprinter With TDU)

QUESTIONS	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, 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 and printer cables are reconnected one at a time?	Replace the TDU, opcon 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 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.

QUESTIONS	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 No. 2 printer test bypass switch in 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 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 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 14.	Replace logic card. Replace TDU. Go to 18.
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 Testing Station to isolate trouble to line, TDU, or logic card.
18. 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 and/or print head to correct trouble.	

4. TROUBLESHOOTING GUIDE (Teleprinter Without TDU)

QUESTIONS	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 TAU 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 TAU, opcon and printer cables are reconnected one at a time?	Replace the TAU, opcon 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.

QUESTIONS	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) (EIA interface — Carrier Detect, pin 8 on, +3 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 11b.	Replace logic card.
11b. Does external device require Request to Send (EIA interface) to be on?	Use Issue 2A logic card or strap ON in cable. Sets with TAU if present, Go to 11c.	Sets without TAU — Trouble is in external device.
11c. Is Data Term Ready pin 20, EIA interface on, +3 V?	Trouble is in external device.	Replace TAU 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, +3 V. (Request to Send on if required by external device — strapped or Issue 2A logic card present.)	Go to 12b.	Trouble is external device.
12b. Is TTL interface Data Ready, pin 15 on?	Replace logic card.	Replace TAU if present
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 15.	Replace logic card. Replace TAU if present. Go to 19.
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 automatically when characters to the right of the right-hand margin are received (DATA indicator lit)?	Go to 17.	Check option 435. Replace logic card.

QUESTION	YES	NO
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 TAU if present.
18. Does remote station receive interrupt?	Go to 29.	Go to 28.
19. 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 Testing Station or Test Center to isolate trouble to line, TAU if present or logic card.
20. Is trouble present but not defined by Questions 1 to 28?	Refer to printer or opcon troubleshooting for other symptoms. Replace opcon, power supply, TAU, if present, logic card and/or print head to correct trouble.	

43 BASIC TELEPRINTER

WIRING

CONTENTS PAGE

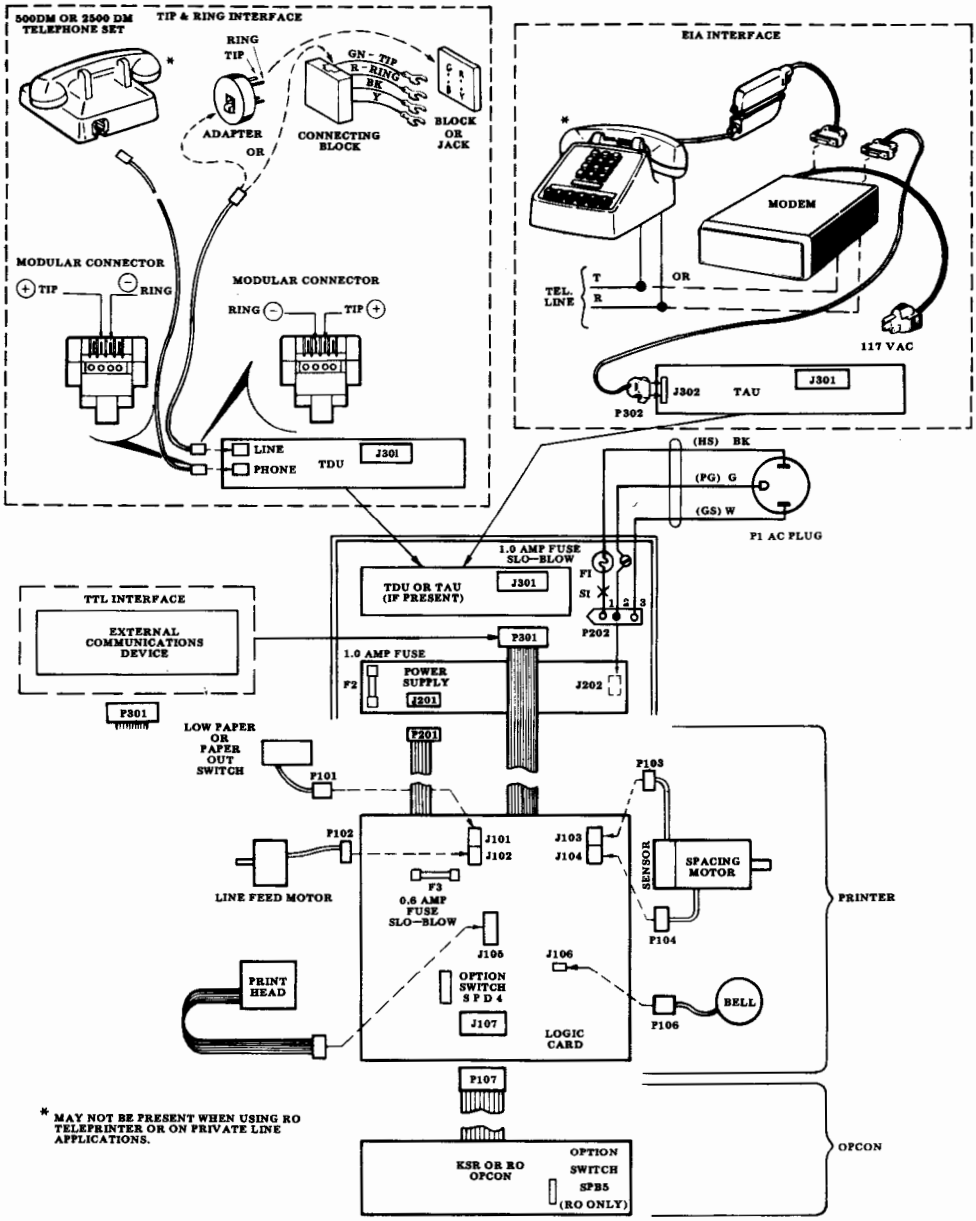
1. GENERAL

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 All numbers shown on the station wiring do not appear on plugs and jacks.

2. STATION WIRING



* MAY NOT BE PRESENT WHEN USING RO TELEPRINTER OR ON PRIVATE LINE APPLICATIONS.

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 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 KSR. Teleprinter Trouble-shooting, Page 1-26.

1.08 Teleprinters with TAUs or with no Terminal Data Unit 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 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 43 Teleprinter or equivalent.

1.10 Before an On-Line Test can be performed, the remote testing station 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 feature exceptions present? Refer to the Variable Features Section, Page 1-16 and reverse side of directory card.

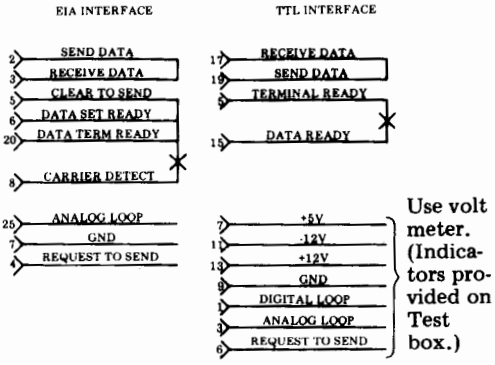
Procedures in Off-Line and On-Line Tests are based on standard factory furnished features being present. If feature exceptions are present, the test response will be as shown in Variable Features section, Page 1-16.

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 (ie, EIA or TTL interface) 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 Sales Department, 312-982-2000, for availability of a 43 Teleprinter Interface Test Box, CP10.002.001-1, which provides both arrangements shown as follows:



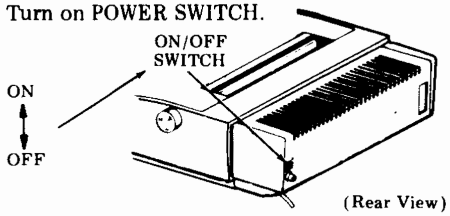
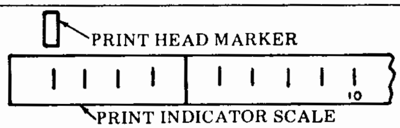
2.02 A volt-ohmmeter or equivalent means to measure +12 volts and +5 volts and perform continuity checks is required.

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. 	Print head returns to the left-hand margin. Paper feeds to next line. TERM READY (AUTO ANSW) turns on.
	2.		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 432b 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 — 13 Characters per inch

See Note 1.

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

```
luvwxyz{|}~
■ !"#$%&'()*+,-./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.

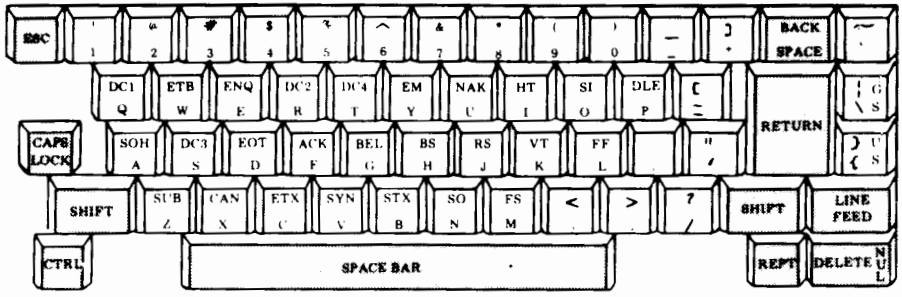


Fig. 2

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.

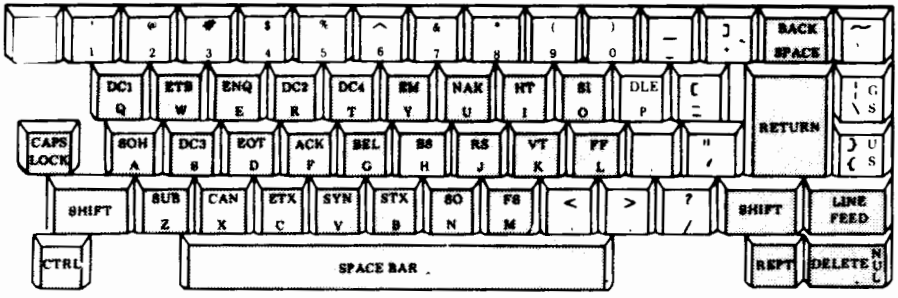


Fig. 5

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

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 VT K keys.	Paper feeds to next line. The k is printed until end of line is reached. Signal bell rings at end of line.
Cover Interlock	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 the 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 1.13.) Depress STX B 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	24.	Depress ESC and then CAN X key. (ESC_X)	Print head returns to left-hand margin and indicates beginning of line.
(Remember Lower Case)	25.	Depress SPACE BAR nine times. Depress ESC and then FF L 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 ETB W key (ESC_w).	Print head returns to left-hand margin (Column 10) and paper feeds to next line.

On teleprinters without the Terminal Data Unit (TDU), turn off POWER switch and connect the test arrangement shown on Page 1-55 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 or EIA). See instructions furnished with test box.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Loopback	32.	Place teleprinter in loopback mode:	
	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.
		Depress TERM READY (AUTO ANSW) key.	**TERM READY (AUTO ANSW)** turns on. LOCAL (LOCAL-TALK) turns off.
		Depress ESC key.	ALARM flashes.
		Hold SHIFT key depressed and depress > . key.	DATA turns on.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Loopback (Cont)	32.b.	W/O TDU, EIA INTERFACE — Connect Carrier Detect to Data Term Ready. Turn on Teleprinter POWER switch.	Print head is returned to left-hand margin. Paper feeds to next line. DATA turns on. EIA INTERFACE CONNECTOR +12 V will be present on pin 4 (Issue 2A Logic Card) GND will be present on pin 7.
	32.c.	W/O TDU, TTL INTERFACE — Connect Terminal Ready to Data Ready. Measure continuity between pins 6 and 9 on TTL Interface Connector. Turn on Teleprinter POWER switch.	Print head is returned to left-hand margin. Paper feeds to next line. Meter should read -ohms (Issue 2A Logic Card). 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.
Option 434.a.	33.	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.	AANNAALLOOGG is printed. (Refer to Option 434b for any exceptions.)
	34.	Place DUPLEX key in DOWN position (FULL DUPLEX). Type the following: TEST	TEST is printed.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Loopback (Cont) Option 433.a.	35.	Watch TERM READY (AUTO ANSW) key, then hold CTRL key depressed and depress  key.	DATA and TERM READY (AUTO ANSW) indicators flash as EOT key is depressed. (Refer to Option 433b for any exceptions.)
	36.	Depress INTRPT key.	INTRPT turns on momentarily. Signal bell rings.
	37.	Hold CTRL key depressed and depress RETURN key.	Print head does not return.
Option 435.a.	38.	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 435b for any exceptions.)
Option 435.a.	39.	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.)	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 435b for any exceptions.)
Low paper (Friction Feed) Paper-Out (Sprocket Feed)	40.	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)	41.	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.
	42.	Depress DATA key.	Sprocket Feed DATA remains off. LOCAL (LOCAL-TALK) remains on. Friction Feed DATA remains on. LOCAL (LOCAL-TALK) remains off.
	43.	Replace the paper.	ALARM flashes (sets W/TDU). ALARM turns off (sets W/O TDU).
	44.	Depress DATA key (sprocket feed only).	DATA turns on. LOCAL (LOCAL-TALK) turns off.
Loopback Clear	45.a.	W/TDU — Depress ESC and then  key.	ALARM and DATA turn off. TERM READY (AUTO ANSW) turns on.
	45.b.	W/O TDU, EIA INTERFACE — Disconnect strap between Data Term Ready and Carrier Detect.	TERM READY (AUTO ANSW) turns on. DATA turns off.
	45.c.	W/O TDU, TTL INTERFACE — Disconnect strap between Data Ready and Terminal Ready.	
Analog Loop	46.	W/O TDU — Depress ESC key. Hold SHIFT key depressed and depress  key.	ALARM flashes. EIA INTERFACE CONNECTOR DATA turns on. TERM READY (AUTO ANSW) turns off. +12 V will be present on interface connector pin 25 (Analog Loop). TTL INTERFACE CONNECTOR 0 V will be present on TTL interface connector pin 3 (Analog Loop).

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Analog Loop (Cont)	47.	W/O TDU — Depress ESC key and then  key.	ALARM turns off. EIA INTERFACE CONNECTOR DATA turns off. TERM READY (AUTO ANSW) turns on. -12 V will be present on interface connector pin 25 (Analog Loop). TTL INTERFACE CONNECTOR +5 V dc will be present on interface connector pin 3 (Analog Loop).
Digital Loop	48.	W/O TDU, TTL INTERFACE — Depress ESC key. Hold SHIFT key depressed and depress  key	0 V will be present on TTL interface pin 1 (Digital Loop).
	49.	W/O TDU, 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)	50.	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.
	51.	Depress TERM READY (AUTO ANSW) key.	TERM READY (AUTO ANSW) remains off. LOCAL (LOCAL-TALK) and ALARM remain on.
	52.	Replace the paper.	ALARM turns off.
Data key	53.	Depress DATA key.	DATA flashes. LOCAL (LOCAL-TALK) turns off.
	54.	Place CPS key in UP position (30 CPS) Place DUPLEX key in UP position (HALF-DUPLEX).	

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 Testing Station and request a 43 Teleprinter test. Provide Testing Station with phone number of station and operating speed. Agree that Testing Station will call back after disconnect.	
	3.	When instructed by Testing Station 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 Testing Station.
	5.	Testing Station 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	6.	Depress and release DUPLEX key so it returns to upper position. (HALF-DUPLEX)	Testing Station will call station under test. Phone rings once. DATA turns on. AUTO ANSW goes off.
Half-Duplex Send & Receive Data (Answering Station)	7.	Testing Station will send the following test message: NOW IS THE TIME FOR ALL GOOD MEN	Test message will be printed.
	8.	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 will be: NOW IS THE TIME FOR ALL GOOD MEN TO COME TO THE AID OF THEIR COUNTRY. Testing Station will receive the test message sent from the operator console.

TABLE B (Cont)

ON-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Digital Loop	9.	Testing Station will send the following test message: E_{SC} < DIGITAL LOOP E_{SC} =	ALARM flashes. DIGITAL LOOP will be printed. ALARM turns off.
Parity Detect	10.	Depress and release PARITY key to UP position (PARITY ON). Testing Station will send the following test message (8th Bit Marking): PARITY TEST	 Printer will print: ■■RIT■ TE ■T
	11.	Place PARITY key in DOWN position (PARITY OFF). Testing Station will send the following test message (8th Bit Marking): PARITY	 Printer will print: PARITY
	12.	Testing Station will send TEST OK message if test was satisfactory and disconnect call. Testing Station 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 with TDU.

43 RO TELEPRINTER

TESTING

CONTENTS

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 RO Teleprinter Troubleshooting, Page 1-40.

1.08 Teleprinters with TAUs or with no Terminal Data Unit 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 43 Teleprinters or equivalent.

1.10 Before an On-Line Test can be performed, the remote testing station 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 feature exceptions present? Refer to Variable Features, Page 1-16 and reverse side of directory card.

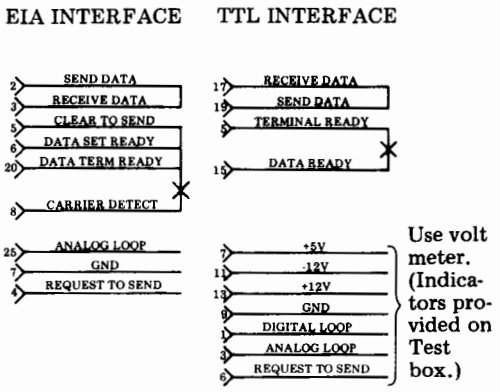
Procedures in Off-Line and On-Line Tests are based on standard factory furnished features being present. If feature exceptions are present, the test response will be as shown in Variable Features, Page 1-16.

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 (ie, EIA or TTL interface) 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 Sales Department, 312-982-2000, 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 are not available for on-line operation.

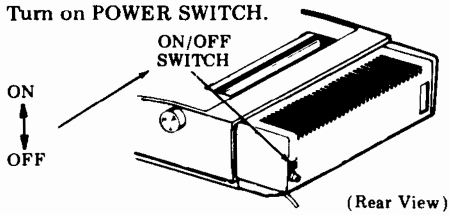
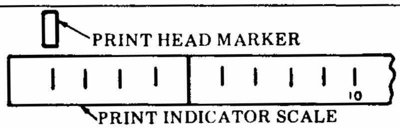
2.03 A volt-ohmmeter or equivalent means to measure ±12 volts and ±5 volts and perform continuity checks is required.

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. 	Print head returns to the left-hand margin. Paper feeds to next line. TERM READY (AUTO ANSW) turns on.
	2.		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 432b 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 — 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.
Omit Steps 8 through 24 if on-line tests are performed instead.			
Loopback	8.	Turn off POWER switch and connect the test arrangement shown on Page 1-68 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 to Data Ready. 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.	EIA INTERFACE — Connect Carrier Detect to Data Term Ready. 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 EIA Interface Connector (Issue 2A Logic Card).
	8.c.	TTL INTERFACE — Measure continuity between pins 6 and 9 on TTL Interface Connector. Connect Terminal Ready to Data Ready. 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
Loopback (Cont)	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.	
	10.	Turn on POWER switch.	TERM READY (AUTO ANSW) turns on.
	10.a.	W/TDU — Depress ESC key. Hold SHIFT key depressed and depress  key.	ALARM flashes. DATA turns on.
	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.
	11.	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.	AANNAALLOOGG is printed.
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  key.	TEST is printed. DATA and TERM READY (AUTO ANSW) flash as EOT key is depressed. (Refer to Option 433b for any exceptions.)

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Loopback (Cont)	13.	Depress INTRPT key.	INTRPT turns on momentarily. Signal bell rings.
Option 433.a. (Cont)	14.	Hold CTRL key depressed and depress RETURN key.	Print head does not return.
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 435b or 436b for any exceptions.)
Option 436.a.		Measure continuity between pins 4 and 7 on connector of RO opcon that was removed.	Meter should read an open circuit. (Refer to Option 435b or 436b for any exceptions.)
Option 437.a.	16.	Enable Option 434b. Depress the following keys: PARITY TEST	Printer will print: ■■RIT■ TE■T (Refer to Option 437b for any exceptions.)
		Measure continuity between pins 4 and 20 on connector of RO opcon that was removed.	Meter should read an open circuit. (Refer to Option 437b for any exceptions.)
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).

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Low-Paper (Friction Feed) Paper-Out (Sprocket Feed) (Cont)	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.	Depress TERM READY (AUTO ANSW) key.	Sprocket Feed DATA remains off. LOCAL (LOCAL-TALK) remains on. Friction Feed DATA remains on. LOCAL (LOCAL-TALK) remains off.
	20.	Replace the paper.	ALARM flashes (sets W/TDU). ALARM turns off (sets W/O TDU).
	21.	Depress DATA key (sprocket feed only).	DATA turns on. LOCAL (LOCAL-TALK) turns off.
Loopback Clear	21.a.	W/TDU — Depress ESC and then  key.	ALARM and DATA turn off. TERM READY (AUTO ANSW) turns on.
	21.b.	W/O TDU, EIA INTERFACE — Disconnect strap between Data Term Ready and Carrier Detect.	DATA turns off. TERM READY (AUTO ANSW) turns on.
	21.c.	W/O TDU, TTL INTERFACE — Disconnect strap between Data Ready and Terminal Ready.	
Low-Paper (Friction Feed) Paper-Out (Sprocket Feed)	22.	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.

TABLE A (Cont)

OFF-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Low-Paper (Friction Feed) Paper-Out (Sprocket Feed) (Cont)	23.	Depress TERM READY (AUTO ANSW) key.	Signal bell rings (sprocket feed only). TERM READY (AUTO ANSW) remains off. LOCAL (LOCAL-TALK) and ALARM remain on.
	24.	Replace the paper.	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
Automatic Answer	1.	With power on, verify TERM READY is on.	Testing Station will call station under test. DATA turns on. TERM READY goes off.
EOT Detect Option 433.a. 436.a.	2.	Testing Station 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 433b or 436b for any exceptions.)
Digital Loop	3.	Testing Station will call station under test.	DATA turns on. TERM READY goes off.
	4.	Testing Station will send the following message: E_{SC} < DIGITAL LOOP	 ALARM flashes. DIGITAL LOOP will be printed.
	5.	Testing Station will send: E_{SC} =	ALARM turns off.
Paper-Out	6.	Remove the paper — paper-out (sprocket feed). Lift and hold paper roll (friction feed). Testing Station will send eight LINE FEED characters. Testing Station will disconnect call.	Signal bell rings (sprocket feed only). ALARM turns on. ALARM turns on. Sprocket Feed DATA turns off as 8th line feed is received. Friction Feed DATA remains on as 8th line feed is received.
	7.	Testing Station will call station under test.	Station will not go to data mode. DATA remains off.

TABLE B (Cont)

ON-LINE TEST PROCEDURES

TEST	STEP	PROCEDURE	RESPONSE
Automatic Carriage Return Option 435.a.	8.	Replace the paper. Depress RESET key. Testing Station will call station under test 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 435b 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.	9.	Testing Station will send the following message (8th Bit Marking): PARITY TEST	Printer will print: ■■RIT■ TE■T
	10.	Testing Station will send TEST OK message if test was satisfactory and disconnect. Testing Station will send TEST NOT OK message if test was unsatisfactory and disconnect call. Call Testing Station and evaluate results.	Station will disconnect. DATA goes off. TERM READY turns on.

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

43 TELEPRINTER

DISASSEMBLY/REASSEMBLY

CONTENTS

1. GENERAL

1.01 This section provides diassembly 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:

Parts	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	3.05

1.03 The procedures provided in this section break the terminal down into subcomponents. The appropriate parts sections illustrate the arrangement of subcomponents and parts — Page 1-92, Teleprinter Parts and Page 4-31, 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 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.

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.

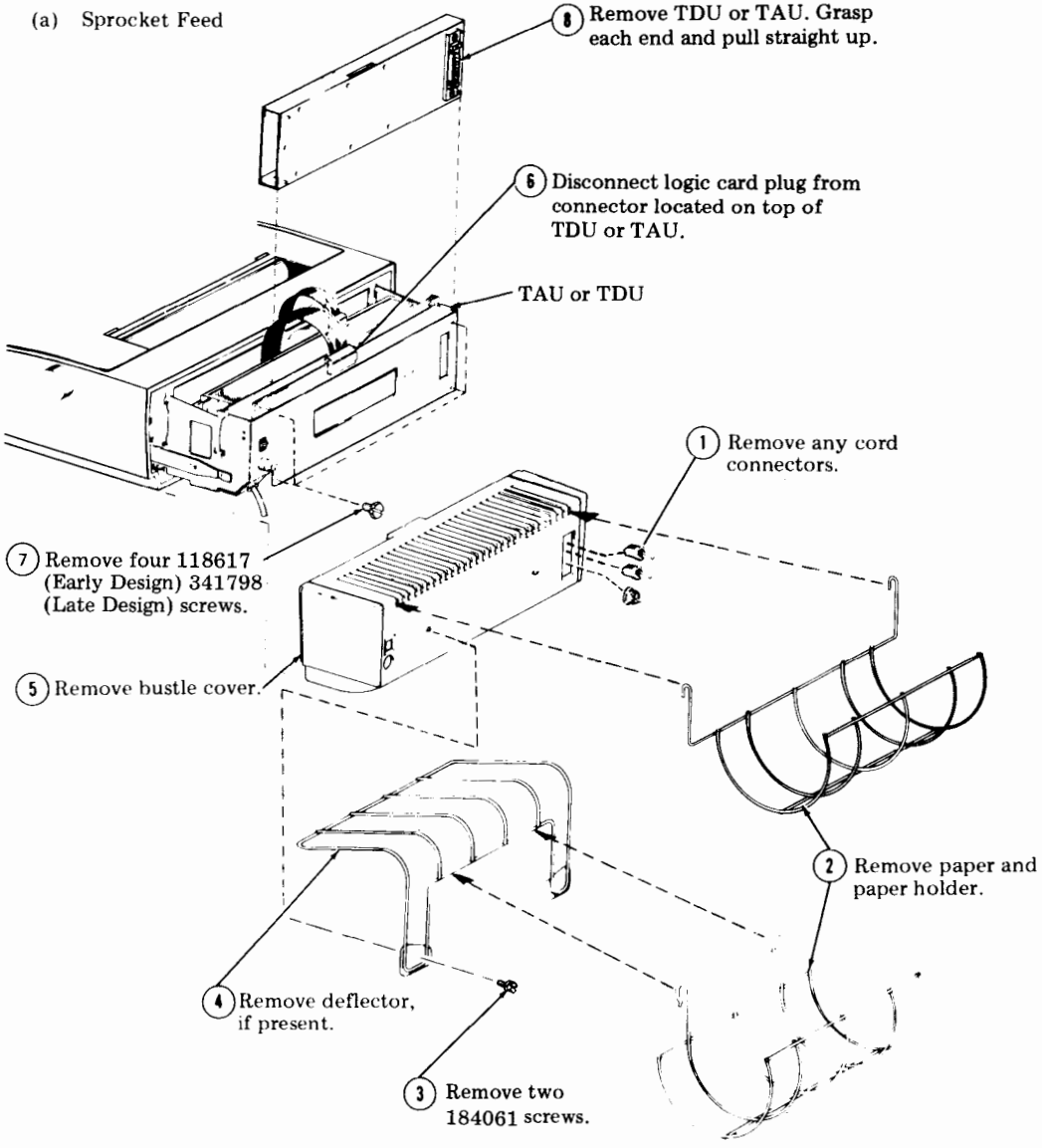
Part No.	Tools
129534	Wrench, Open End, 3/16 Inch and 1/4 Inch
135676	Handle
135677	Bit, 1/4 Inch Socket
135678	Bit, 5/16 Inch Socket
95368	Screwdriver, 1/8 Inch, 2 Inch Blade
100982	Screwdriver w/clip 1/4 Inch, 6 Inch Blade
346392	Strap, Static Discharge

3. DISASSEMBLY/REASSEMBLY

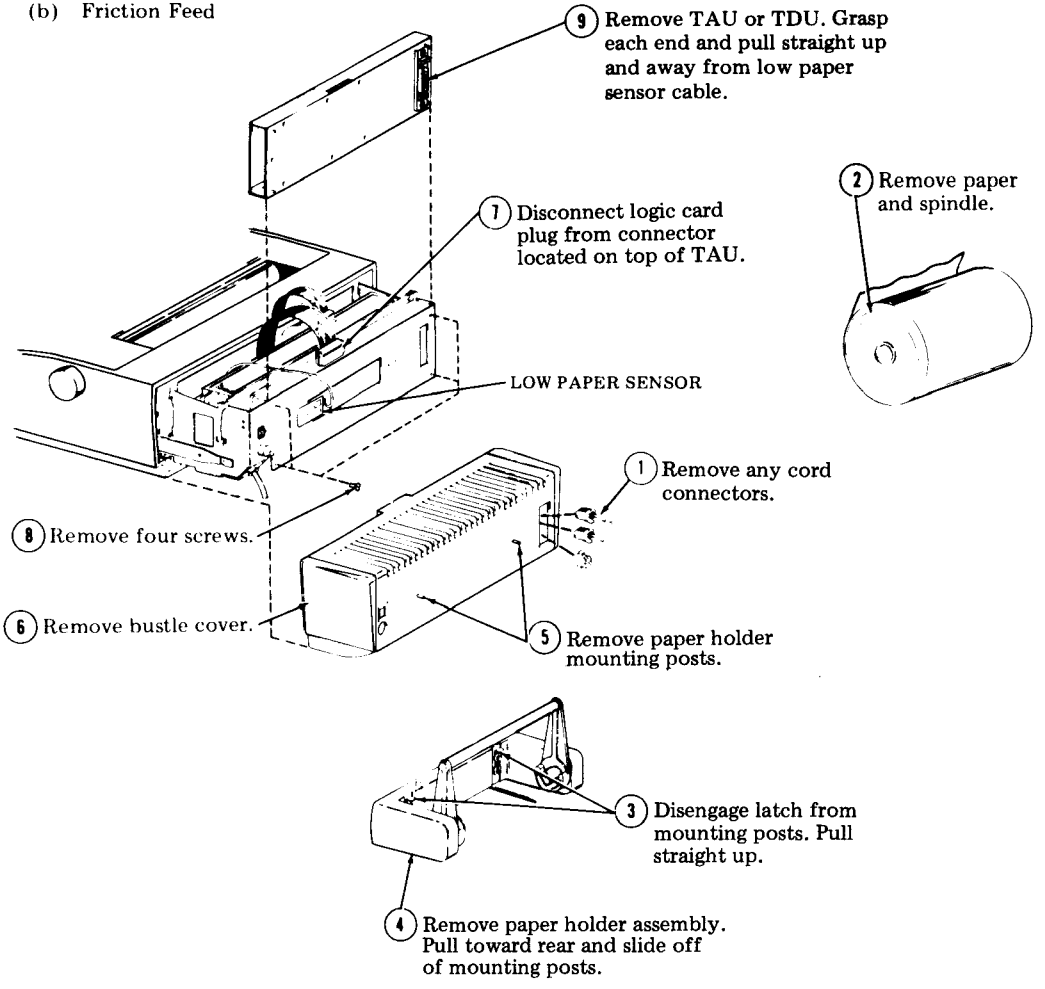
KSR AND RO TELEPRINTERS

430750 TERMINAL DATA UNIT (TDU) AND 430751 TERMINAL AUXILIARY UNIT (TAU)

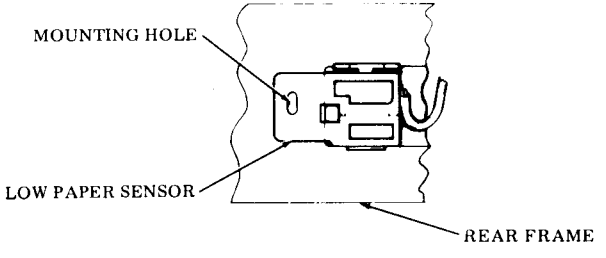
3.01 To remove the terminal data unit or terminal auxiliary unit:



(b) Friction Feed



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



430700 POWER SUPPLY

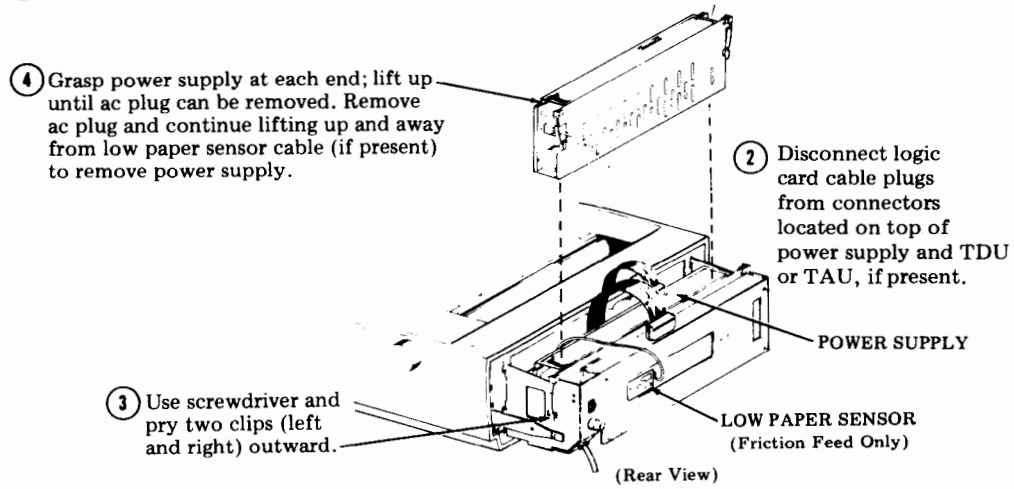
3.02 To remove power supply:

(a) Sprocket Feed

(1) Remove paper holder, deflector, if present, and bustle cover. Perform 3.01, steps 1 through 5.

(b) Friction Feed

(1) Remove paper holder and bustle cover. Perform 3.01, steps 1 through 6.



120139 POWER SUPPLY FUSE

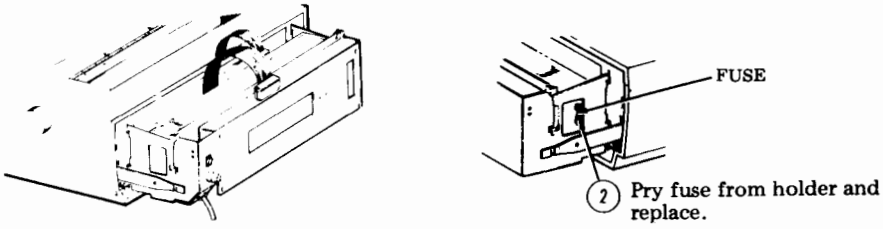
3.03 To remove the power supply fuse:

(a) Sprocket Feed

(1) Remove paper holder, deflector and bustle cover. Perform 3.01, steps 1 through 5.

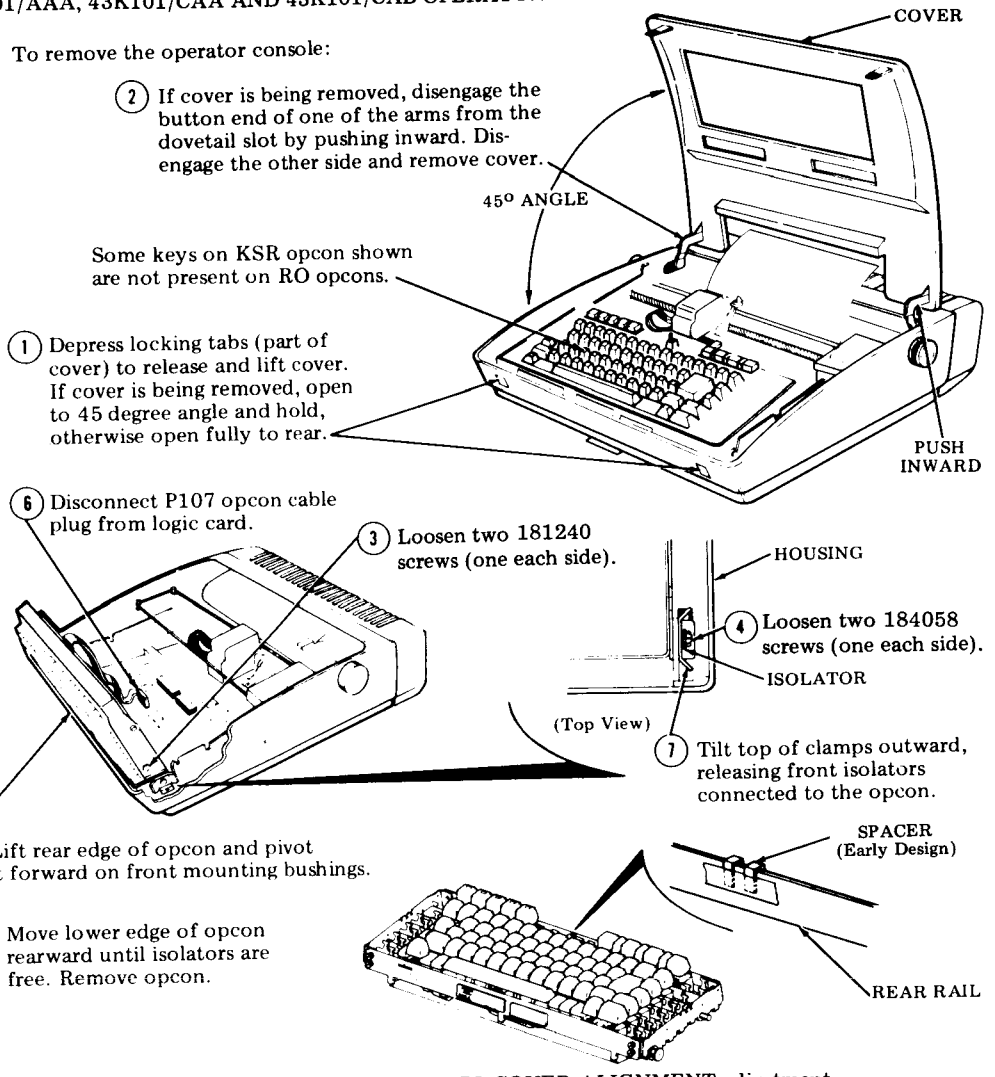
(b) Friction Feed

(1) Remove paper holder and bustle cover. Perform 3.01, steps 1 through 6.



43K001/AAA, 43K101/CAA AND 43K101/CAB OPERATOR CONSOLES

3.04 To remove the operator console:



Note 1: In reassembly, perform the KEYBOARD TO COVER ALIGNMENT adjustment.

Note 2: When replacing the cover or indicator scale, perform the COLUMN INDICATOR POSITIONING 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.

143307 LOGIC CARD FUSE

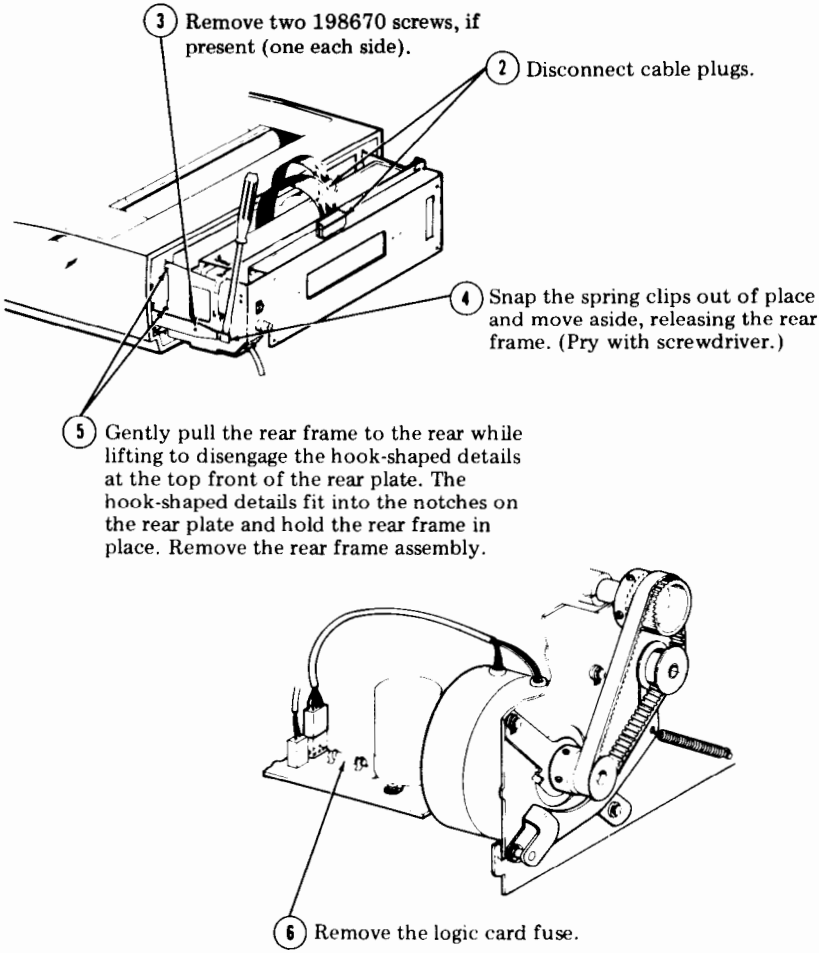
3.05 To remove the logic card fuse:

(a) Sprocket Feed

(1) Remove paper holder, deflector and bustle cover. Perform 3.01, steps 1 through 5.

(b) Friction Feed

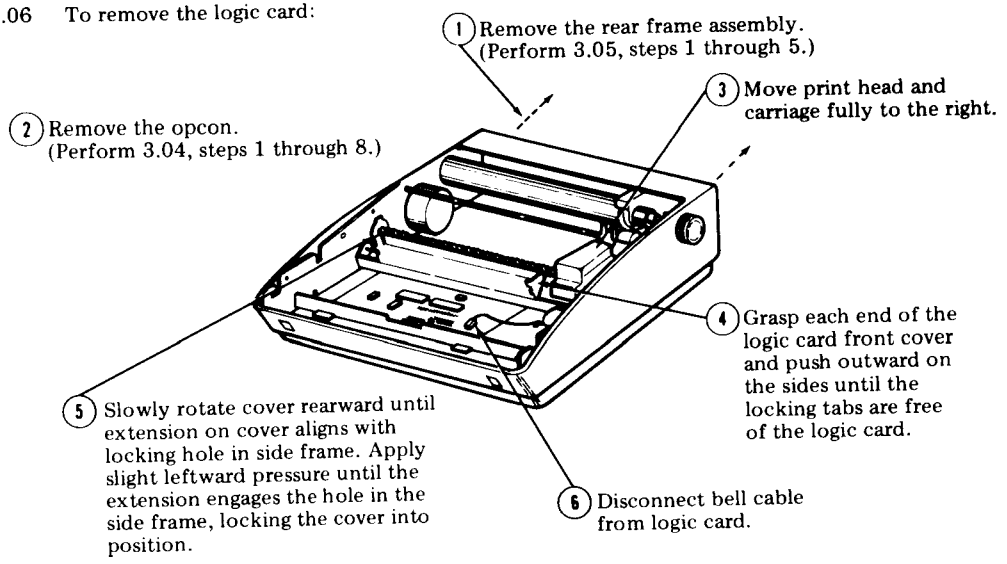
(1) Remove paper holder and bustle cover. Perform 3.01, steps 1 through 6.



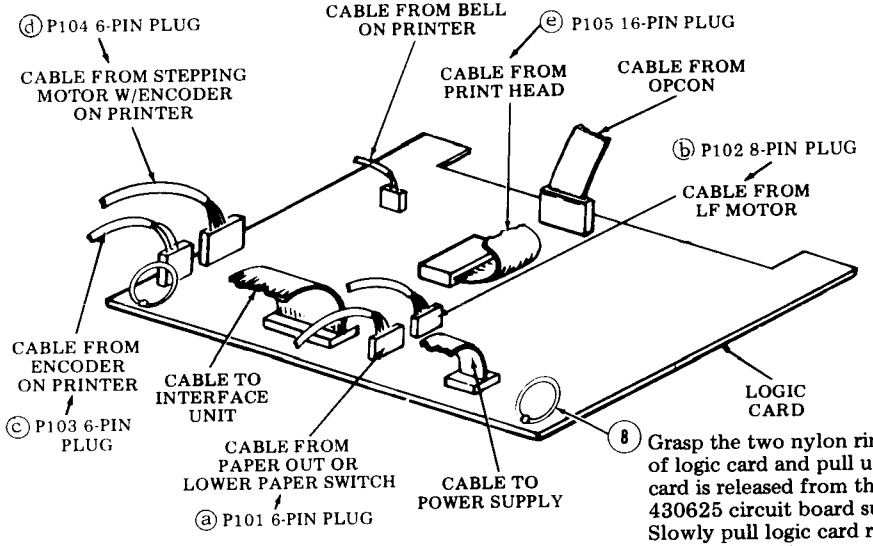
(Rear View)

410740 LOGIC CARD

3.06 To remove the logic card:



7 Disconnect the following plugs located on the logic card:



(Rear View)

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.

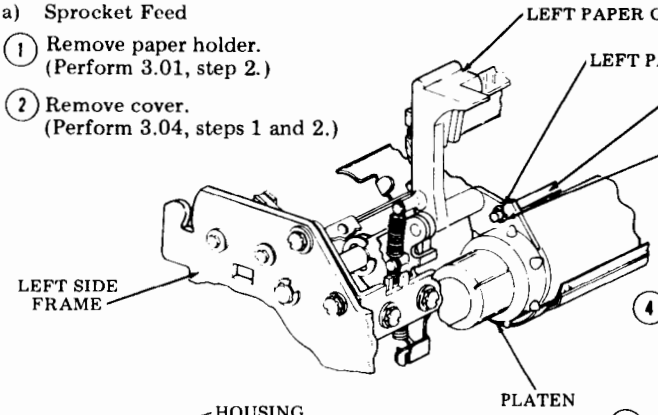
PRINTER

3.07 To remove the printer:

(a) Sprocket Feed

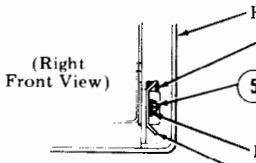
(1) Remove paper holder. (Perform 3.01, step 2.)

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



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

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



(5) Loosen two 184058 screws (one each side).

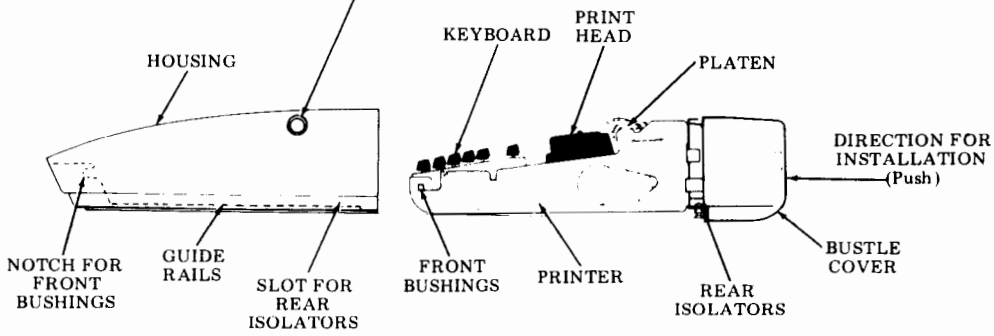
(6) Tilt top of clamps outward, releasing front isolators connected to the opcon.

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

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

(9) Remove the rear frame assembly. (Perform 3.05, steps 1 through 5.)

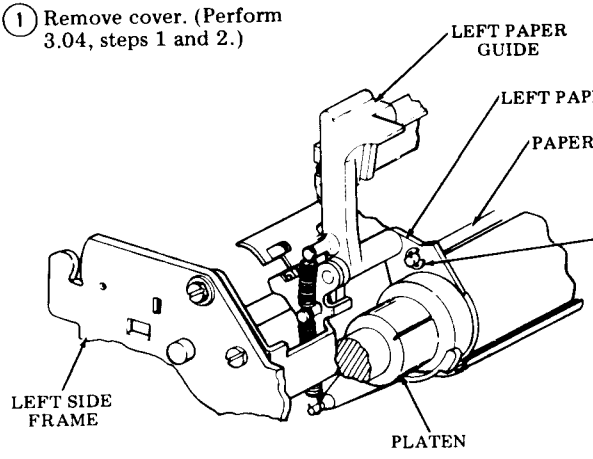
(10) Remove the operator console. (Perform 3.04, steps 3, 5, 6 and 8.)



Note: To replace the printer, perform 3.08.

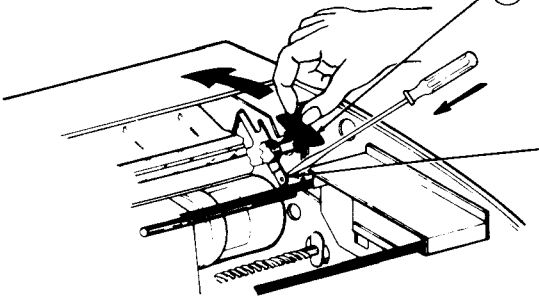
(b) Friction Feed

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



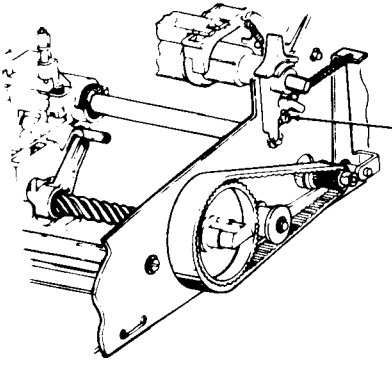
(2) Remove 119651 retaining ring from paper separator shaft.

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

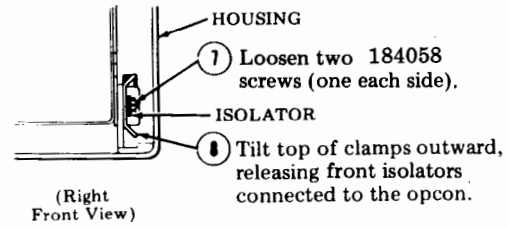


(5) Push paper release to the rear.

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

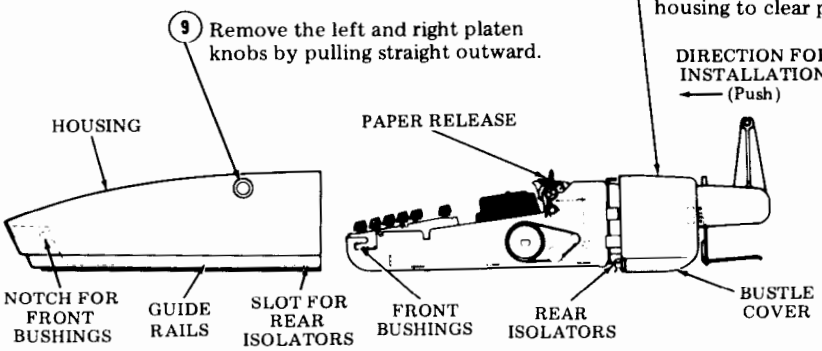


(6) Slide paper release to the right and slowly pull forward until paper release clears 119653 retaining ring on lever shaft.



11 Remove the rear frame assembly. (Perform 3.05, steps 1 through 5.)

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.



3.08 To replace the printer:

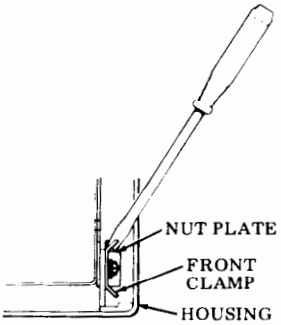
1 Install the operator console, if previously removed.

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.



(Right Front View)

5 Tighten the clamp screws.

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).

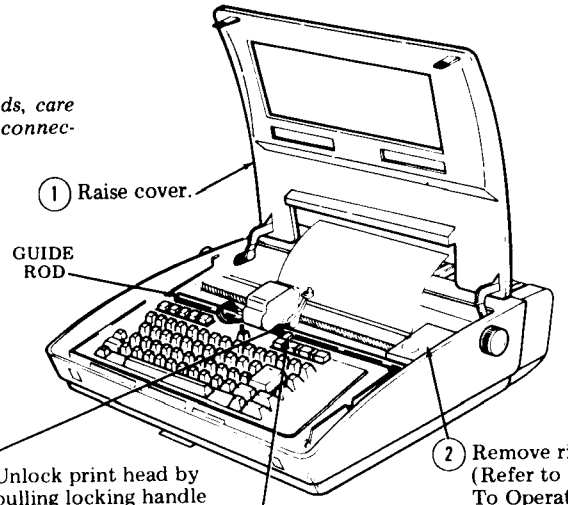
8 Replace the cover and paper holder.

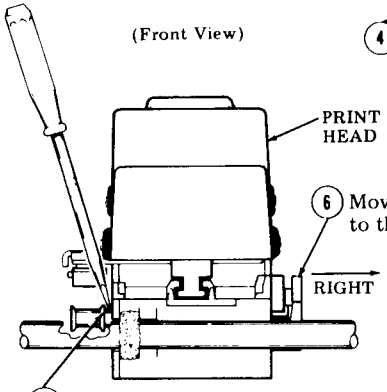
9 Perform the KEYBOARD TO COVER ALIGNMENT adjustment.

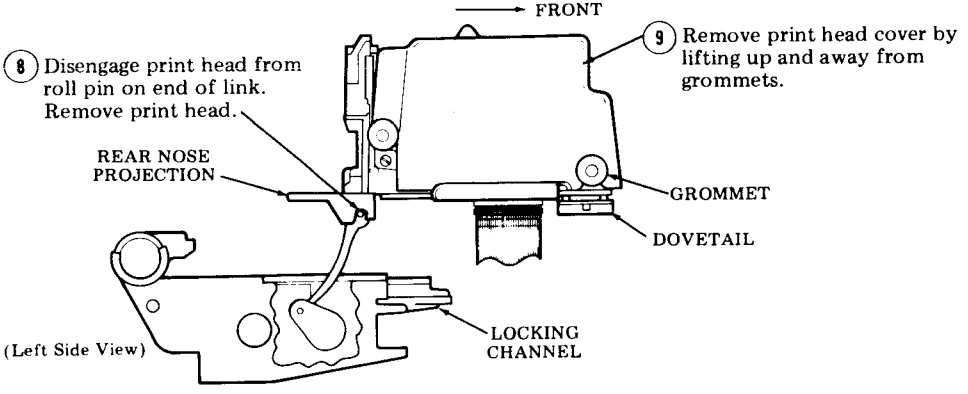
430850 PRINT HEAD

3.09 To remove the print head:

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



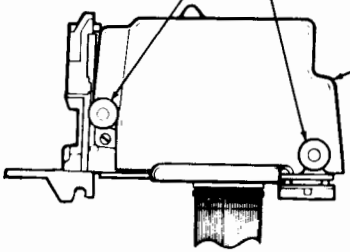




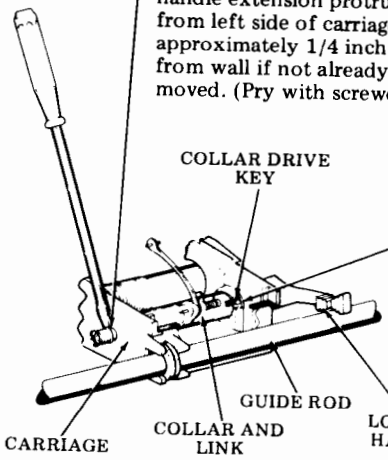
3.10 To replace the print head:

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.)



(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.)

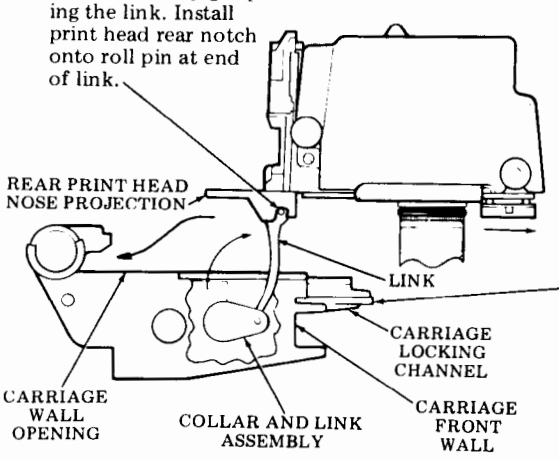


(3) Rotate locking handle frontward until it strikes the guide rod then pull locking handle to the right until collar drive key on locking handle engages slot in right carriage side wall. Observe interaction of these parts for use when performing step 7.

Note: Collar and link may snap rearward.

(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.

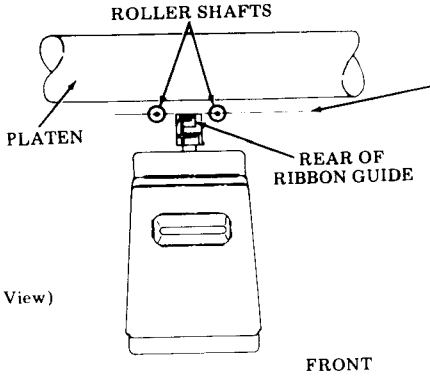
(5) Hold collar and link forward (by pressing down on the print head) while inserting nose projection in carriage wall opening.



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

(Left View)

3.10 (Cont)



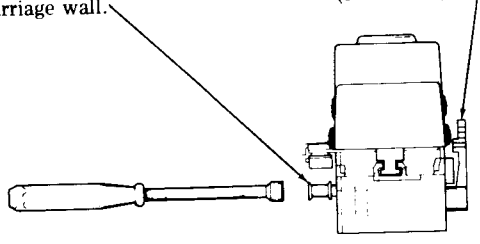
(7) Slowly push print head rearward and further into the carriage locking channel until the rear of the ribbon guide is even with center of roller shafts. Apply continuous leftward pressure to locking handle at its pivot shaft, while slowly pulling print head forward until collar drive key on handle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

Note: Parts referred to were visible in step 3.

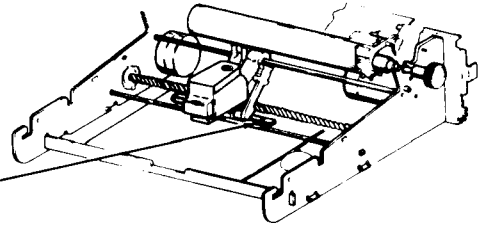
(8) Move the handle all the way to the rear, locking the print head in close proximity to the platen by the additional force necessary to detent the handle. If handle does not move to rear, the drive key did not properly engage the collar slot (step 7).

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

(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.



(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

CONTENTS PAGE

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 1-54, or 43 RO Teleprinter Testing, Page 1-67.) 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.

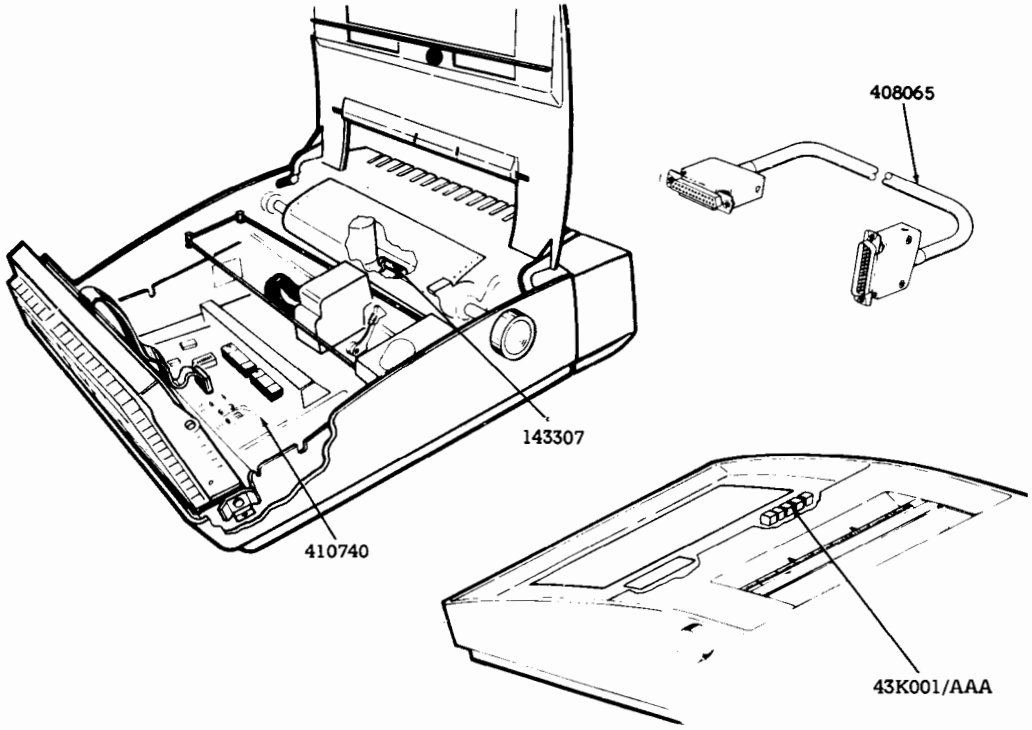
1.02 This section is provided to identify the Teletype Corporation part number and location of recommended spares that should be available and may be required to correct a trouble.

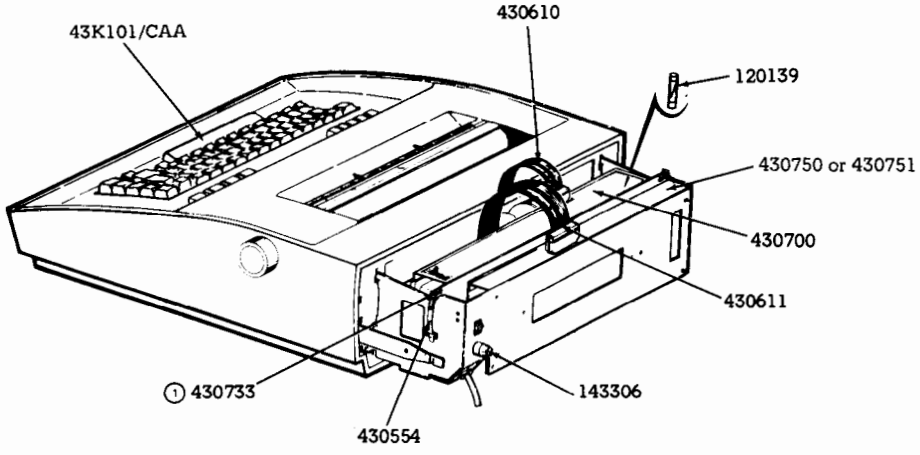
1.03 Part numbers are listed in the index in numerical order and indicate the page on which the parts appear. Asterisked numbers, stocked as "List 1", indicate a maintenance spare stocking ratio of one spare for the first twenty stations and an additional spare for each additional 30 stations in a maintenance area. Part numbers without asterisks, stocked as "List 2", indicate that one spare should be available in each maintenance area.

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

1.05 Troubleshooting, disassembly, and reassembly information for these parts is provided on Page 1-26, Page 1-40, and Page 1-77 respectively.

2. PARTS





① Part of 430554 Set of Parts (Late Design)

NUMERICAL INDEX

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

*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 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 1-26 and Page 1-40, 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 1-54 and Page 1-67. 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:

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. Sprocket Feed -- Does printed copy align properly with edge of paper (prints equally on each side of page perforation)?	Undefined problem during PRINTER TEST. Go to Teleprinter Troubleshooting.	Check PRINTED LINE POSITION 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.

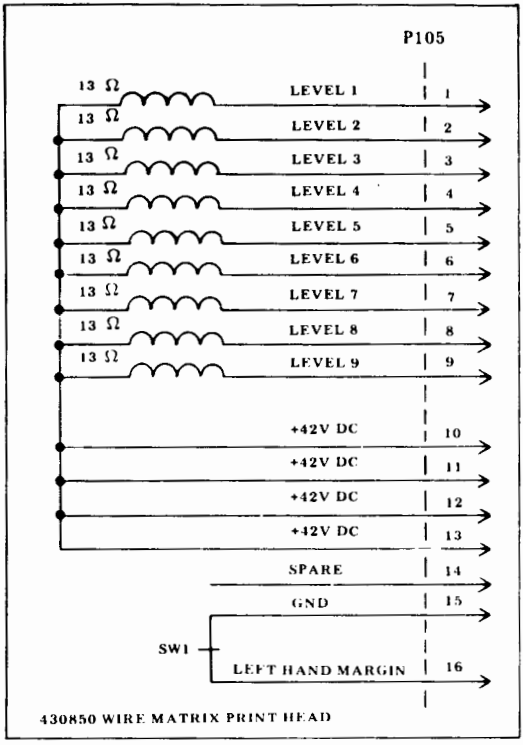
1.02 Related wiring information and cable connections to the logic card are shown in Station Wiring, Page 1-52.

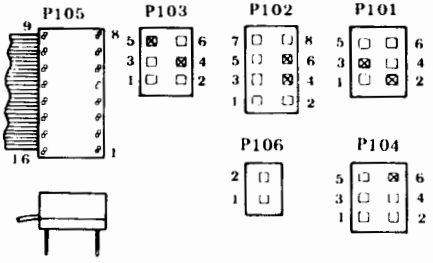
1.03 Designations on printer wiring diagram do not appear on the components.

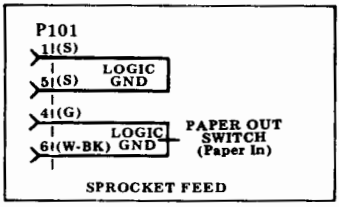
1.04 The wiring information in this section is provided to support 43 Printer Trouble-shooting, Page 2-1.

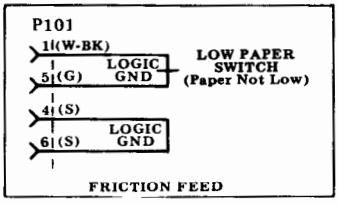
1.05 When ordering replaceable components, unless otherwise specified, prefix each part number with the letters "TP" (ie, TP430088).

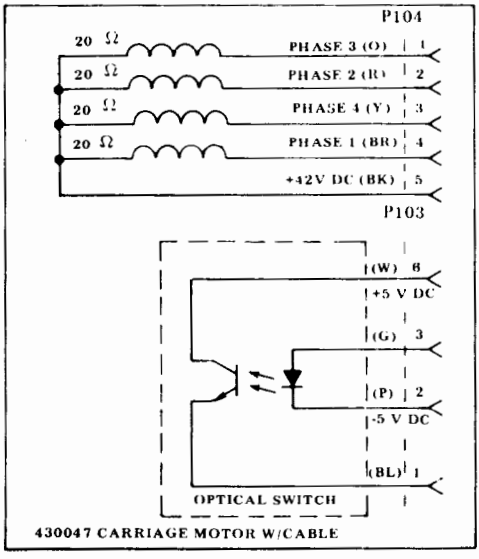
2. PRINTER WIRING

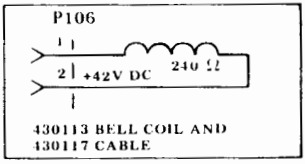


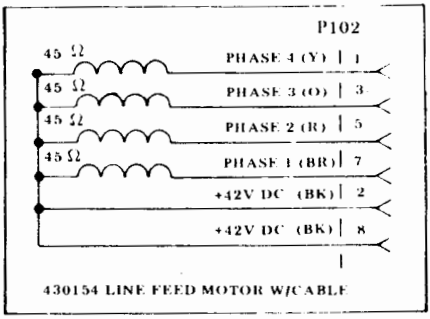












43 PRINTER

ADJUSTMENTS AND SPRING TENSIONS

CONTENTS

CONTENTS

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 tension 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.

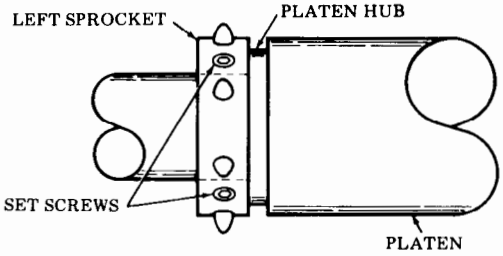
Tools	
Bit, 1/4 Inch Socket	135677
Bit, 5/16 Inch Socket	135678
Gauge Set	117781
Gauge, Tape	95960
Handle	135676
Hook, Pull Spring	75765
Hook, Pull Spring	142554
Hook, Push Spring	142555
Scale, Spring (64 Ounce)	82711
Scale, Spring (8 Ounce)	110443
Scale, Spring (32 Ounce)	110444
Scale, 15 Pound Spring	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.

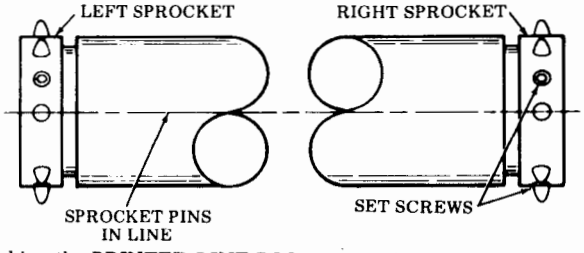
To Adjust
Loosen set screws and position left sprocket to meet requirement.



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.

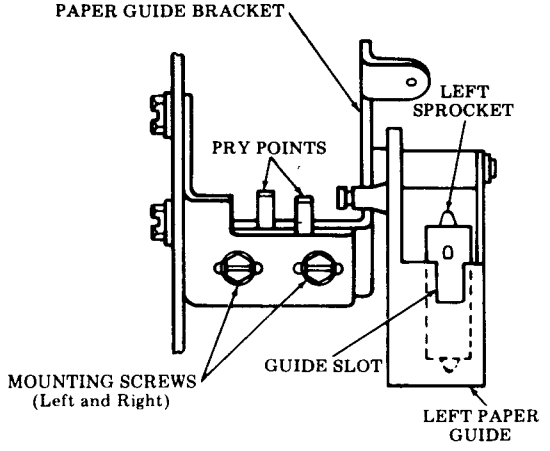


Note: This adjustment to be refined when making the PRINTED LINE POSITION adjustment.

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.

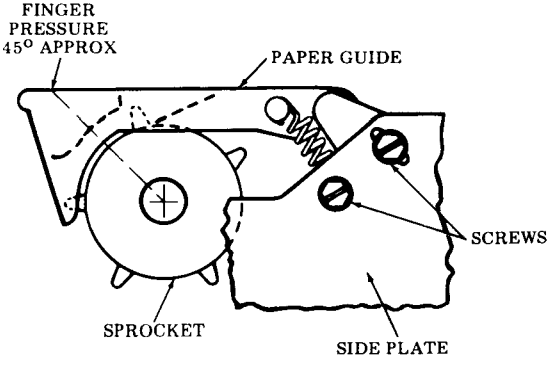
To Adjust
Loosen screws friction tight and position paper guide bracket by using a screwdriver on the pry points.



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.

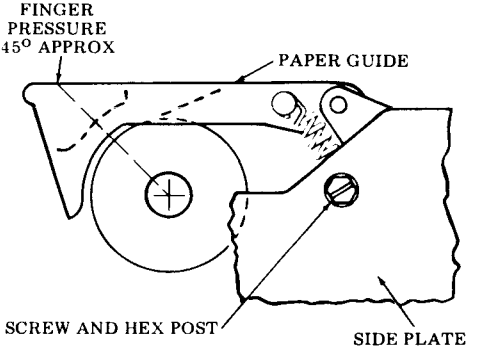


LEFT AND RIGHT PAPER GUIDES
(Angular Positioning) (Friction Feed Only)

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.



LINE FEED BELT TENSION (Sprocket Feed Only)

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

Requirement

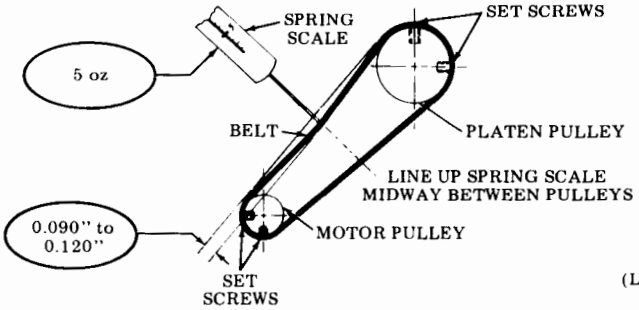
When the belt and sprocket system is at the point of least slack; a force of 5 ounces applied with a spring scale midway between the sprockets the belt should deflect between

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

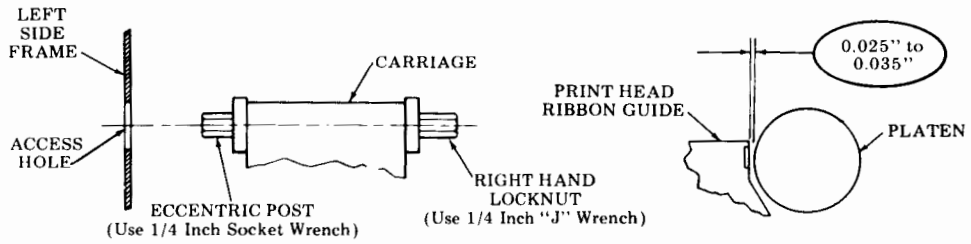
There should be

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.



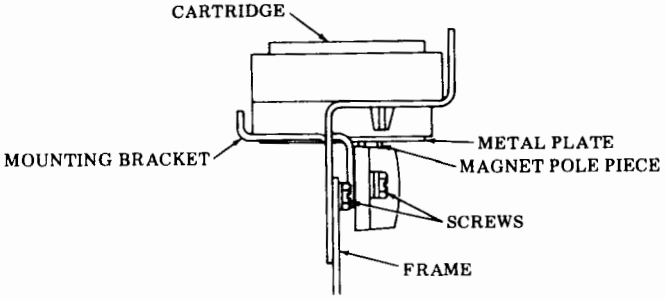
RIBBON CARTRIDGE MAGNETIC LATCH

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

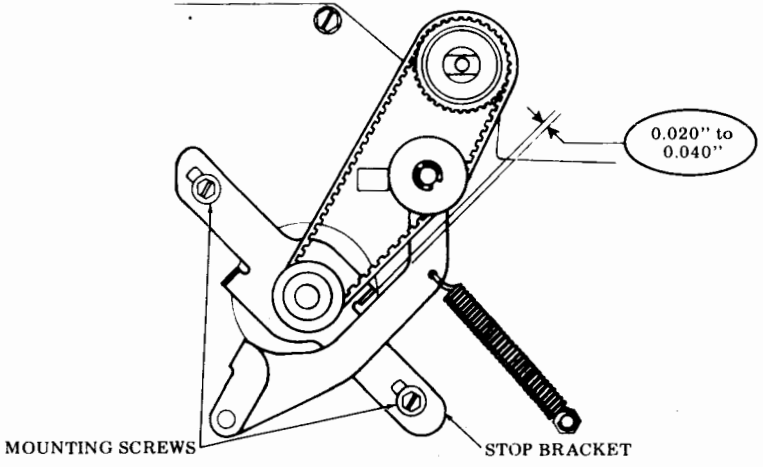
With the follower pulley resting on the belt, push the pulley against the belt to take up all friction. Slowly release pressure. Measuring between the follower lever and the adjacent tab of the stop bracket there should be

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.

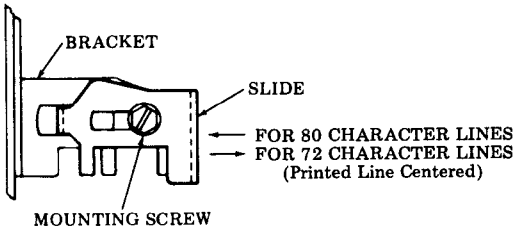


3. PRINTER ADJUSTMENTS (Cont)

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

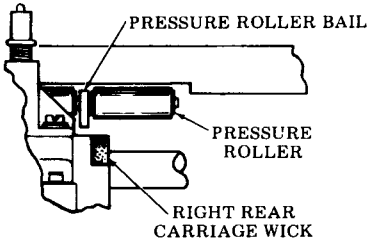
With the paper release lever in the forward position and the right end of the carriage next to the right rear carriage wick located immediately under the arm of the pressure roller bail (between the two pressure rollers) there should be from

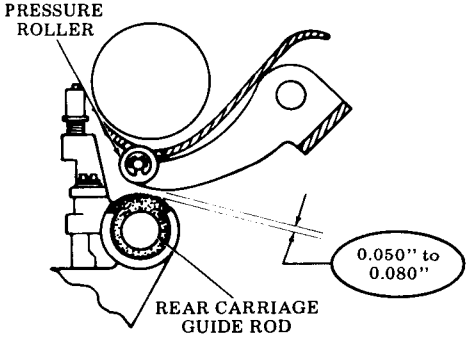
Min 0.050 inch---Max 0.080 inch

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

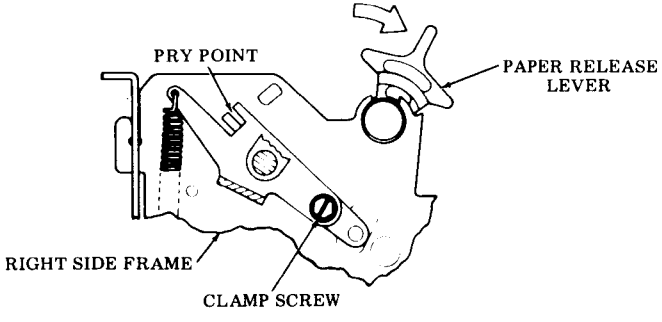
To Adjust

Loosen the clamp screw to friction tight. Move pry point down to increase gap or up to decrease gap.





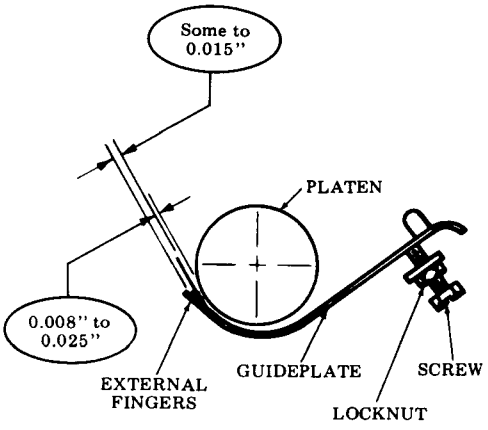
(Right Side View)



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.

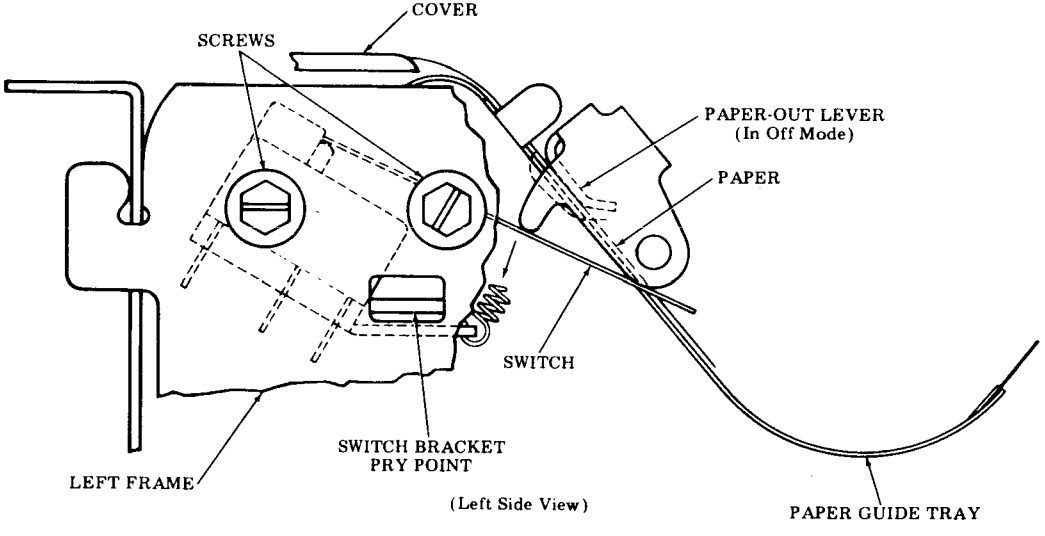
(2) Requirement
The fingers at both the left and right ends of the platen should be
Min Some---Max 0.015 inch
beyond the recorded gap between the platen and the left and right ends of the paper guideplate.

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 (contacts closed — nonalarm). With the paper out, the lever should activate the switch (contacts open — alarm mode).

To Adjust
Loosen screws and position switch bracket to meet requirement.

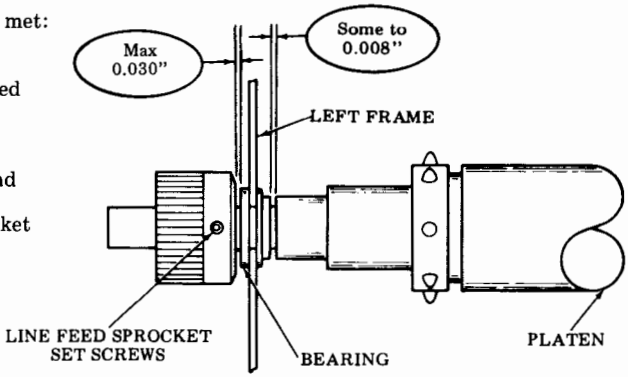


3. PRINTER ADJUSTMENTS (Cont)

PLATEN ENDPLAY AND PRINTED LINE POSITION

The following two requirements must be met:

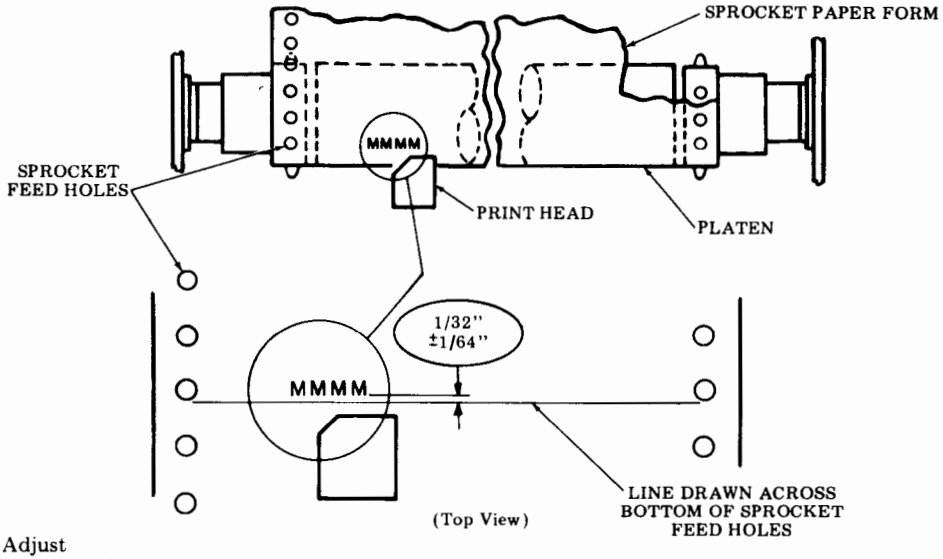
(1) Requirement
Platen Endplay — With the platen biased to the right, there should be
Min Some---Max 0.008 inch
clearance between the left bearing and the platen hub, at the closest point, and
Max 0.030 inch
between the left bearing and the sprocket at the closest point.



(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:

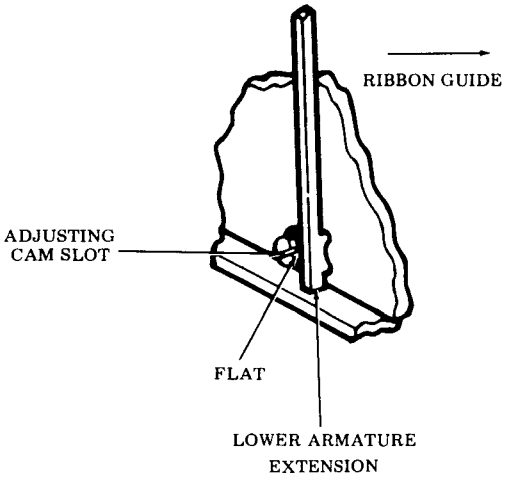
1. A line drawn between the lower edges of two opposite sprocket holes.
2. A preprinted line on the form the same as in 1. above or in 1/6 inch multiples.
3. A fold midway between two sprocket holes on fanfold paper.

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

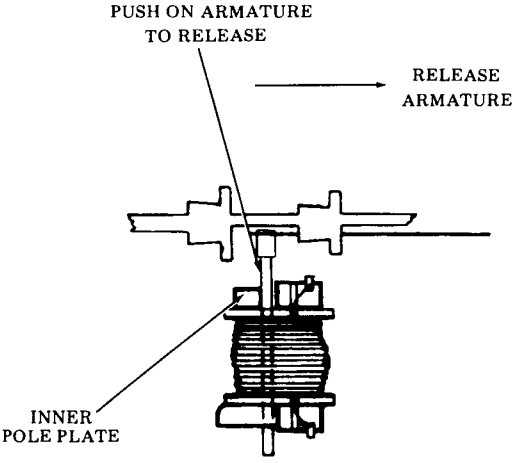


To Adjust
Loosen the line feed sprocket (at platen) set screws and position. Print the character "M" across the line and check (2) Requirement. If necessary, loosen set screw on right sprocket to meet alignment requirement.

PRINT HEAD ARMATURE



(Right Side View)



(Top View-Cover Removed)

Requirement

With the ribbon removed, the print head cover removed, the print head released and positioned away from the platen, 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.

Adjustment

Rotate the adjusting cam to meet the requirement.

Note: This adjustment must be made for all 9 levels.
(Power must be off for this adjustment)

Perform this adjustment only if dots are missing from printed characters.

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) 110437 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.

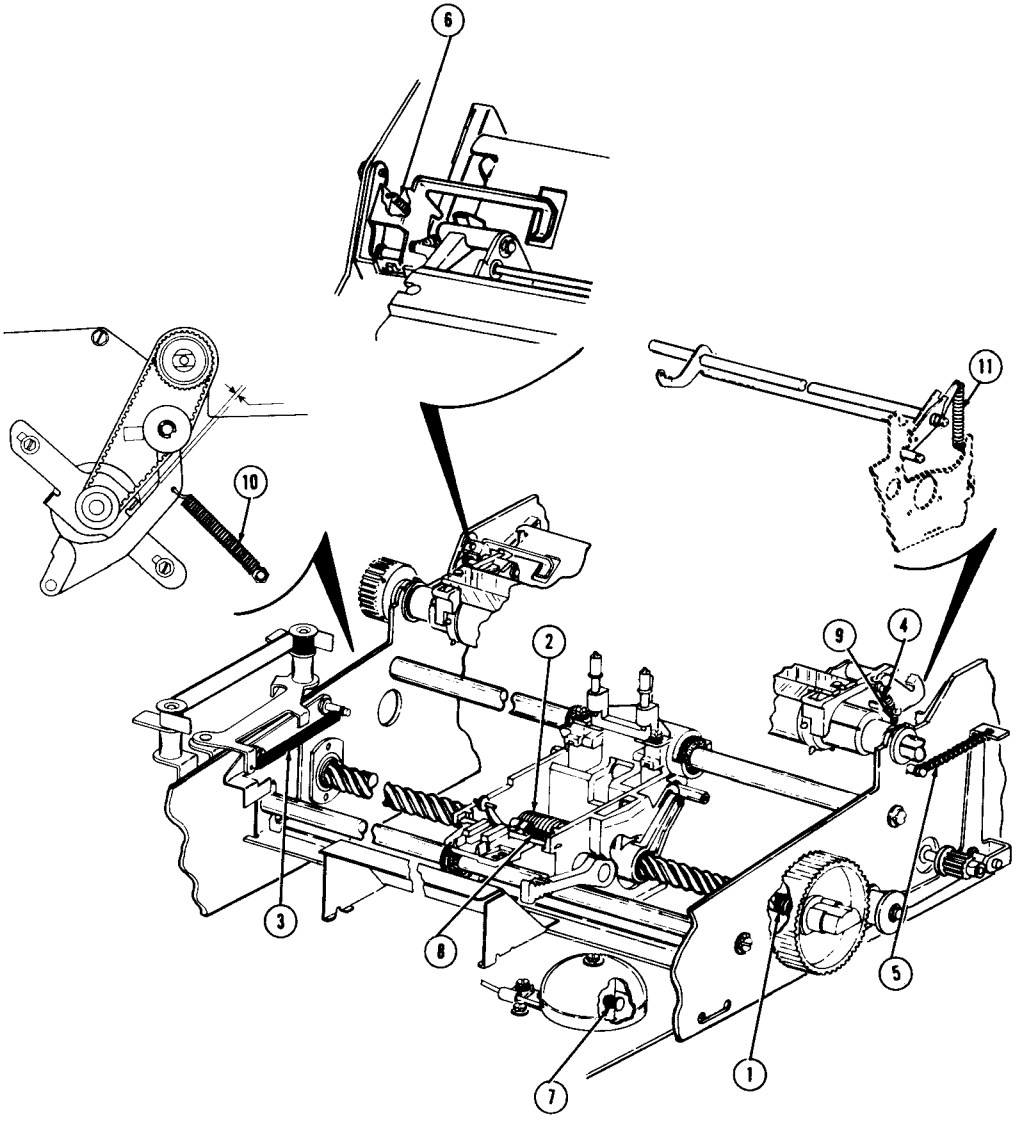
(10) 430021 Line Feed Belt Tension Arm Spring

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

CONTENTS PAGE

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 1-91.

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.

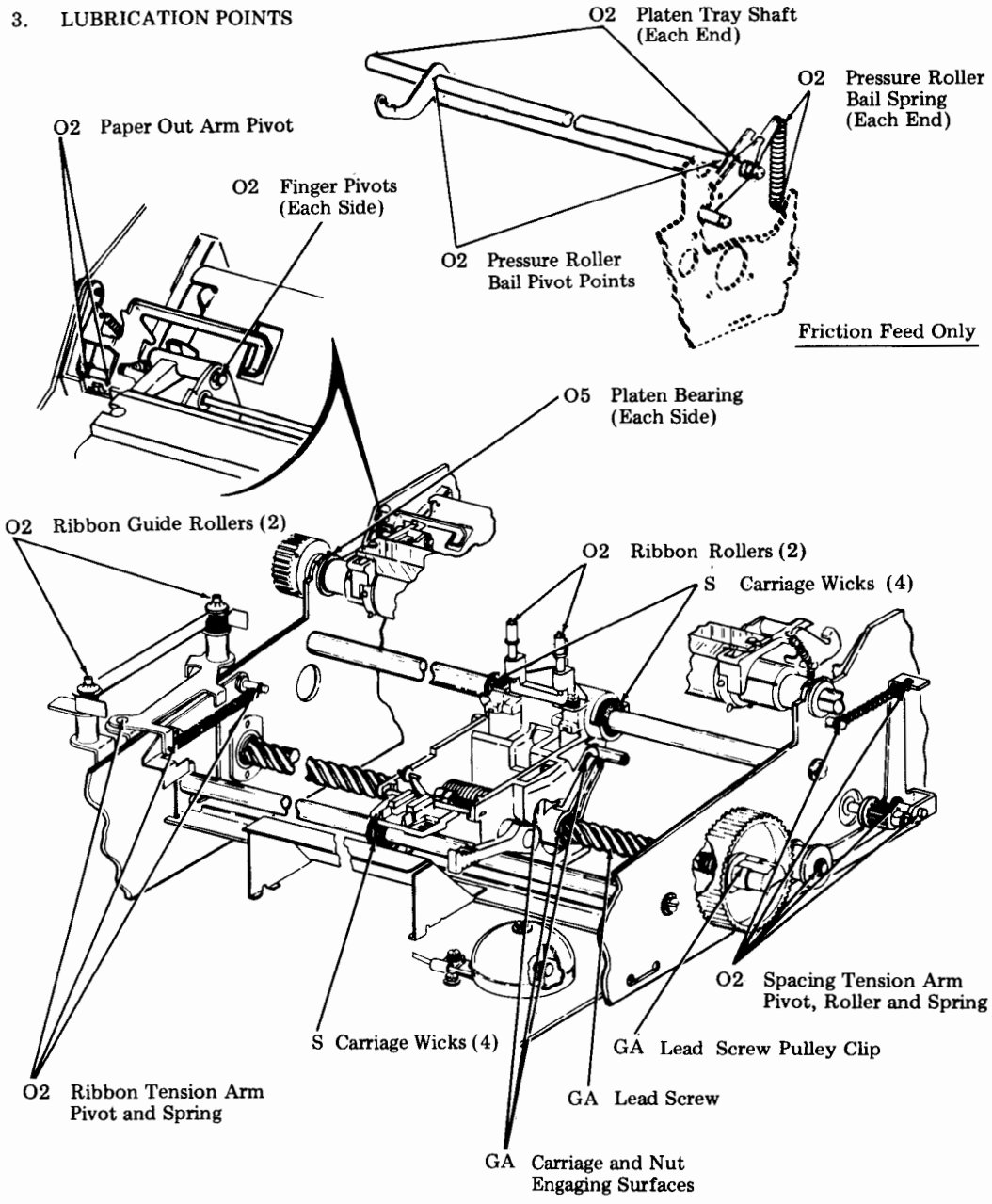
(b) Nut Keying Arm — Lubricate by packing carriage engaging slot with grease.

Print Head:

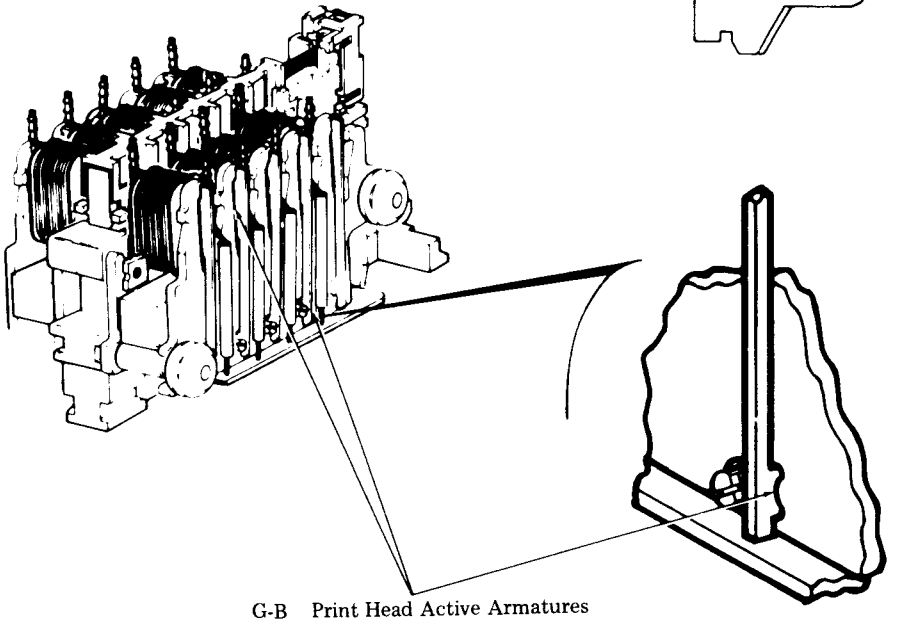
(a) Active Armatures and Outer Pole Plate — Grease at the upper pivot area as well as the lower locator area (9 places).

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

3. LUBRICATION POINTS



G-C Print Head Well Area



G-B Print Head Active Armatures and Outer Pole Plates

43 PRINTER

DISASSEMBLY/REASSEMBLY

CONTENTS

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 1-77, 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
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

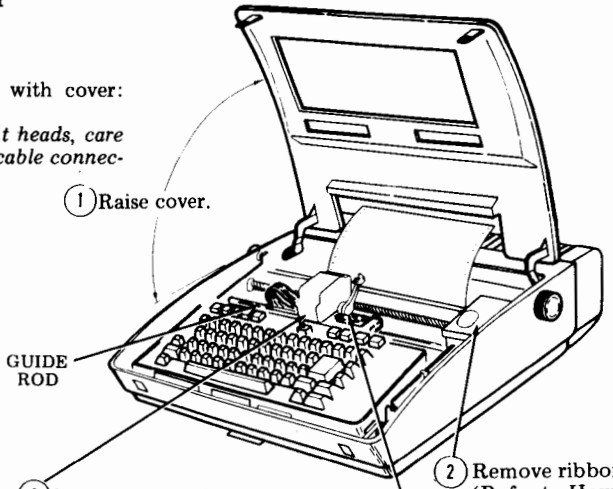
3. DISASSEMBLY/REASSEMBLY

PRINT HEAD WITH COVER

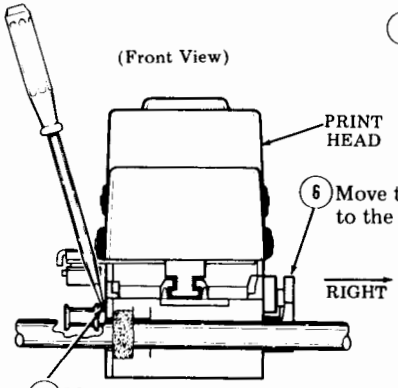
3.01 To remove the print head with cover:

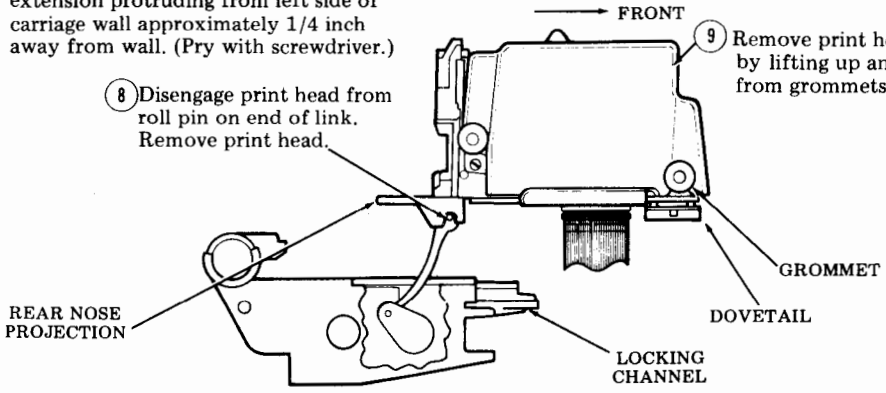
Caution: When handling loose print heads, care must be taken to prevent print head cable connector pins from being bent.

Note: Print head removal and replacement is also shown in Teleprinter Disassembly/ Reassembly, Page 1-77.



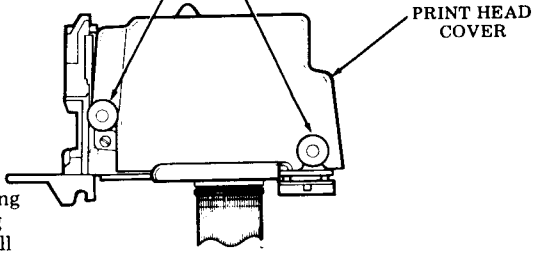
7 Grasp print head and pull forward. Lift front of print head to disengage locking channels.



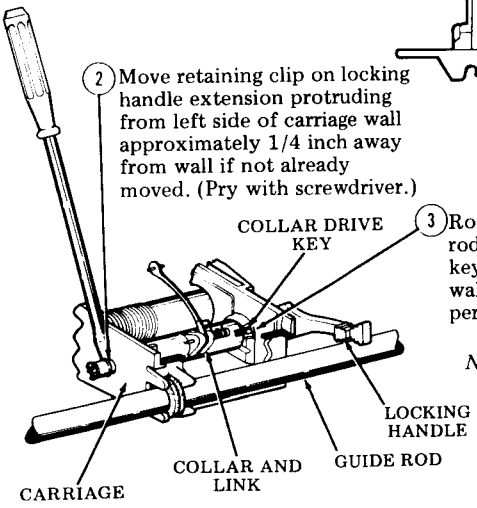


3.02 To replace the print head with cover:

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.)



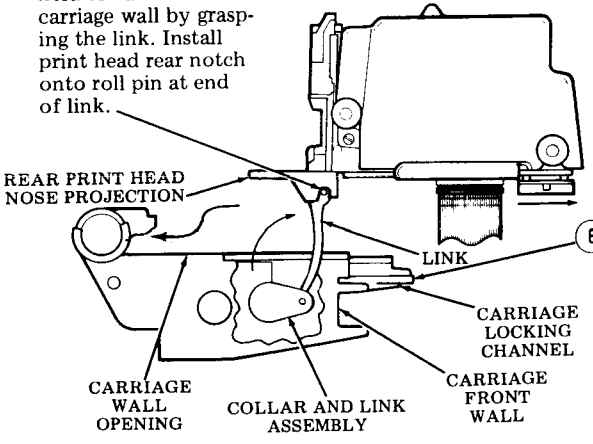
(2) Move retaining clip on locking handle extension protruding from left side of carriage wall approximately 1/4 inch away from wall if not already moved. (Pry with screwdriver.)

(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.

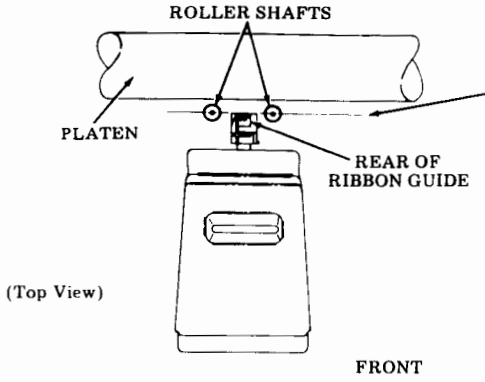
(4) Collar and link must be manually rotated and held toward front of carriage wall by grasping the link. Install print head rear notch onto roll pin at end of link.

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



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

(Left View)



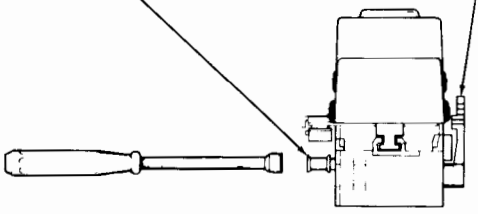
(7) Slowly push print head rearward and further into the carriage locking channel until the rear of the ribbon guide is even with center of roller shafts. Apply continuous leftward pressure to locking handle at its pivot shaft, while slowly pulling print head forward until collar drive key on handle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

Note: Parts referred to were visible in step 3.

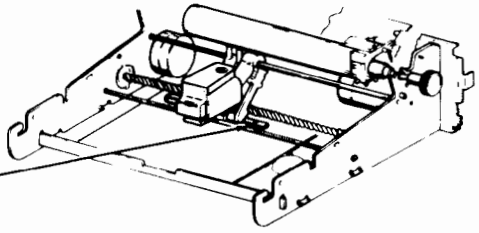
(8) Move the handle all the way to the rear, locking the print head in close proximity to the platen by the additional force necessary to detent the handle. If handle does not move to rear, the drive key did not properly engage the collar slot (step 7).

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

(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.



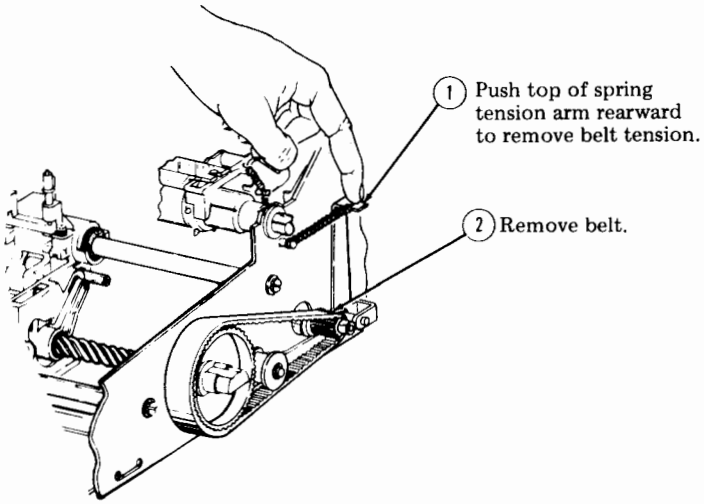
(10) Check that no connector pins are bent and carefully connect the print head cable plug to the logic card. Make sure cable does not touch left side frame when the carriage moves fully left.



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

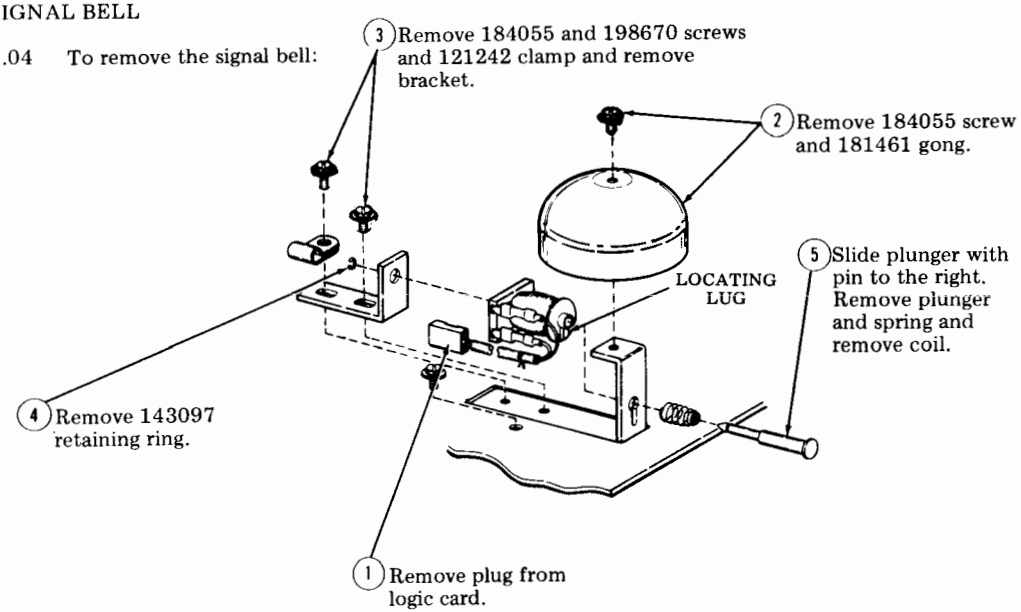
SPACING MOTOR BELT

3.03 To remove the spacing motor belt:



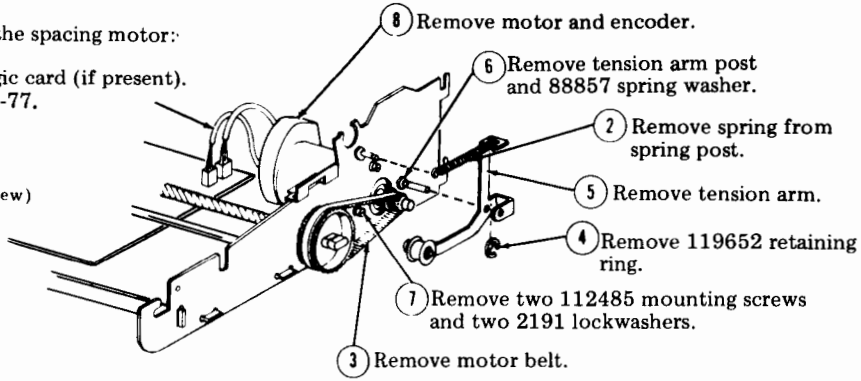
SIGNAL BELL

3.04 To remove the signal bell:



SPACING MOTOR WITH CABLE AND ENCODER

3.05 To remove the spacing motor:



(1) Remove the logic card (if present). Refer to Page 1-77.

(8) Remove motor and encoder.

(6) Remove tension arm post and 88857 spring washer.

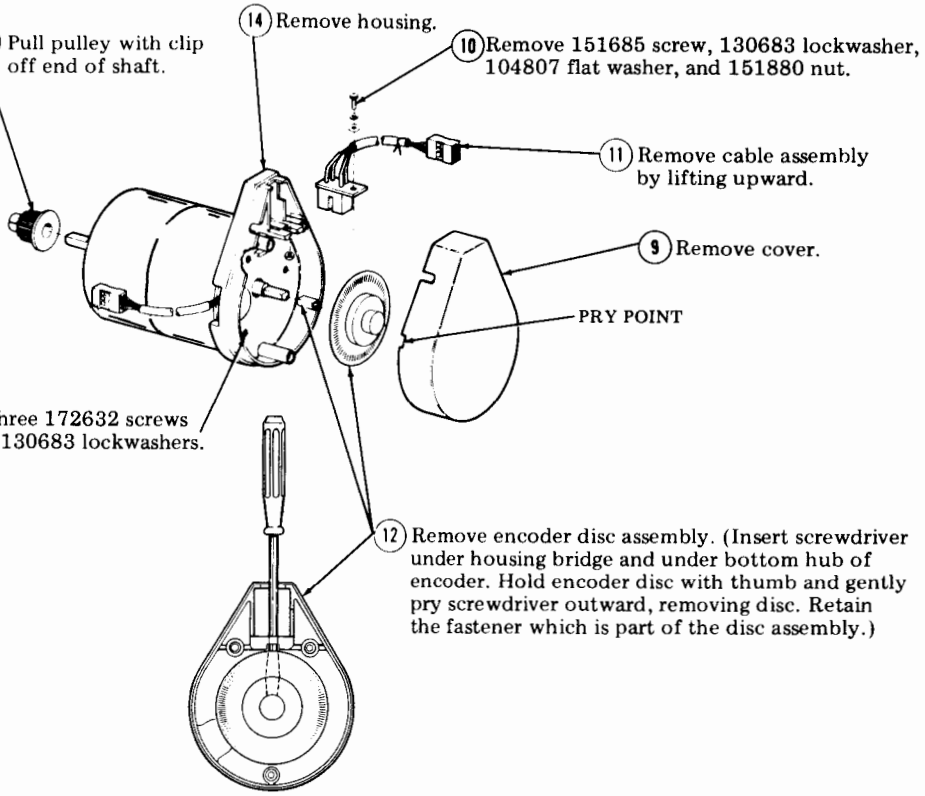
(2) Remove spring from spring post.

(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.

(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.)

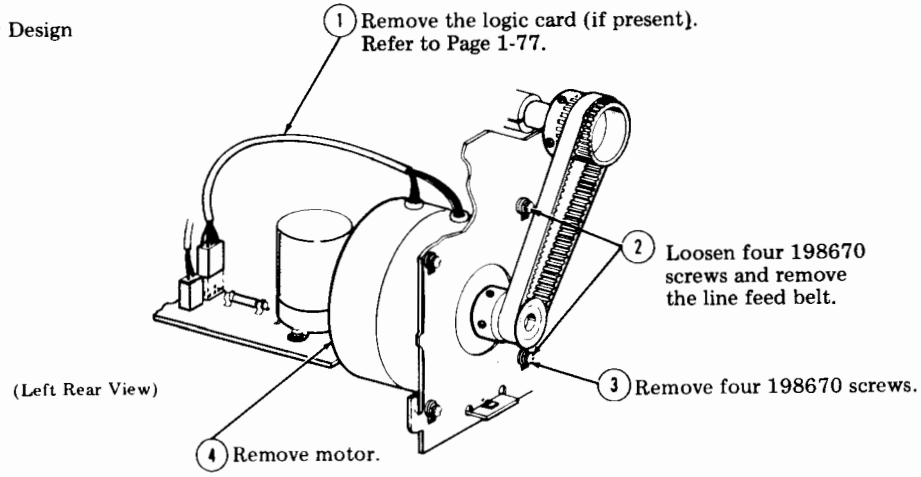
Warning: Do not pull on metal disc edges as this will deform encoder disc causing it to rub against the encoder.

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

LINE FEED MOTOR

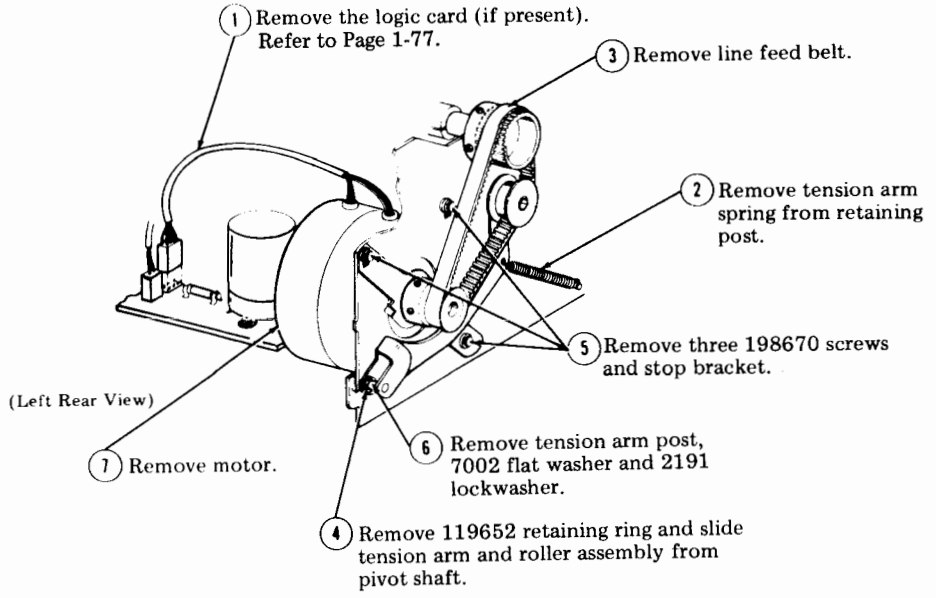
3.06 To remove the line feed motor:

(a) Early Design



Note: In reassembly, perform LINE FEED BELT TENSION adjustment

(b) Late Design

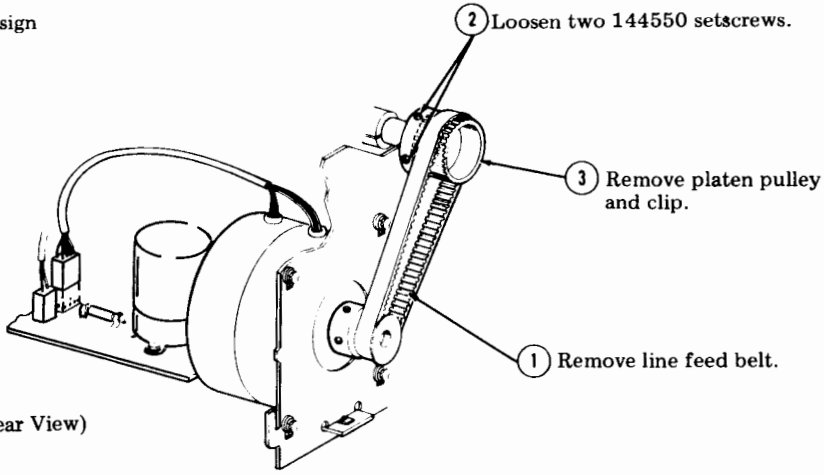


Note: In reassembly, perform STOP BRACKET adjustment.

PLATEN

3.07 To remove the platen:

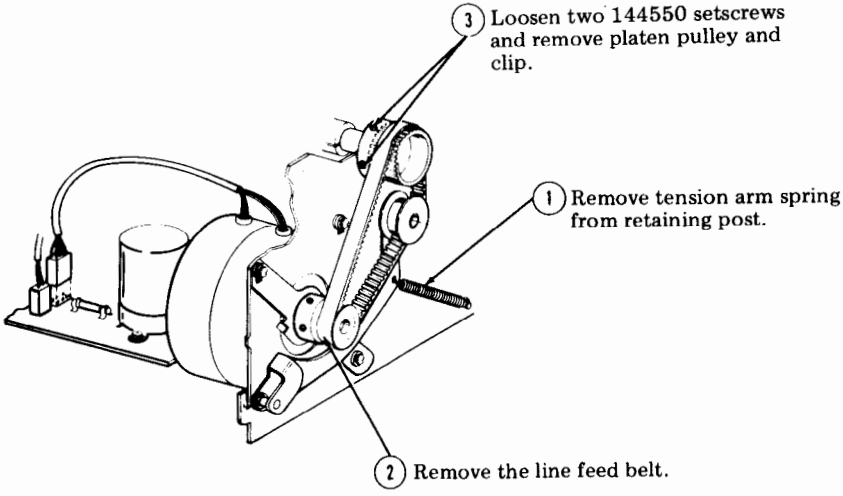
(a) Early Design



(Left Rear View)

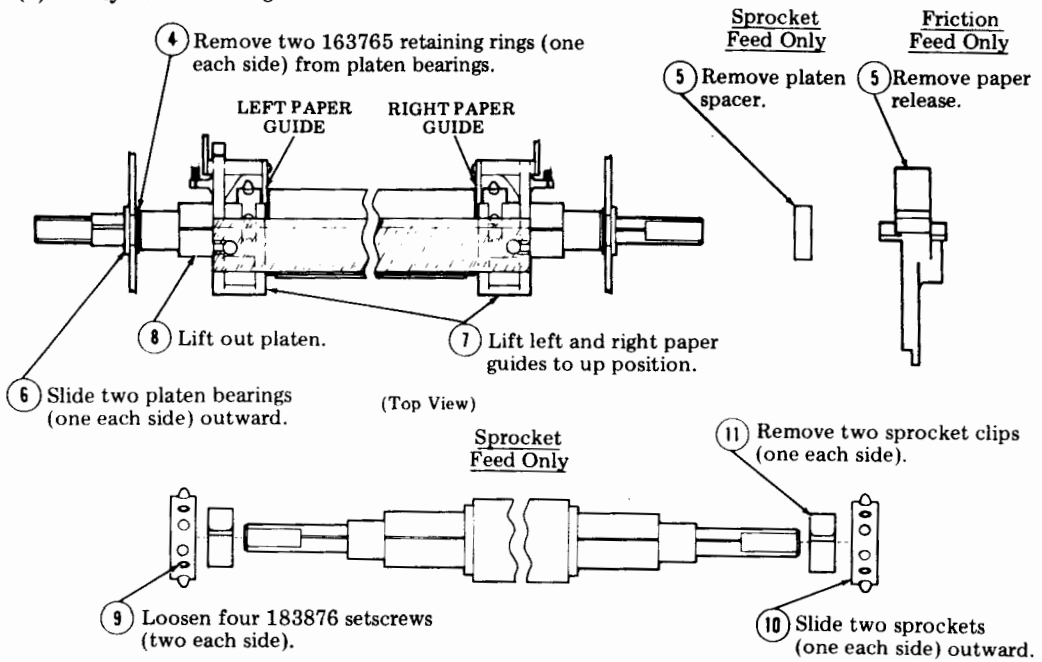
Note: In reassembly, position the setscrews away from the slot in the platen clip.

(b) Late Design



(Left Rear View)

(c) Early and Late Design



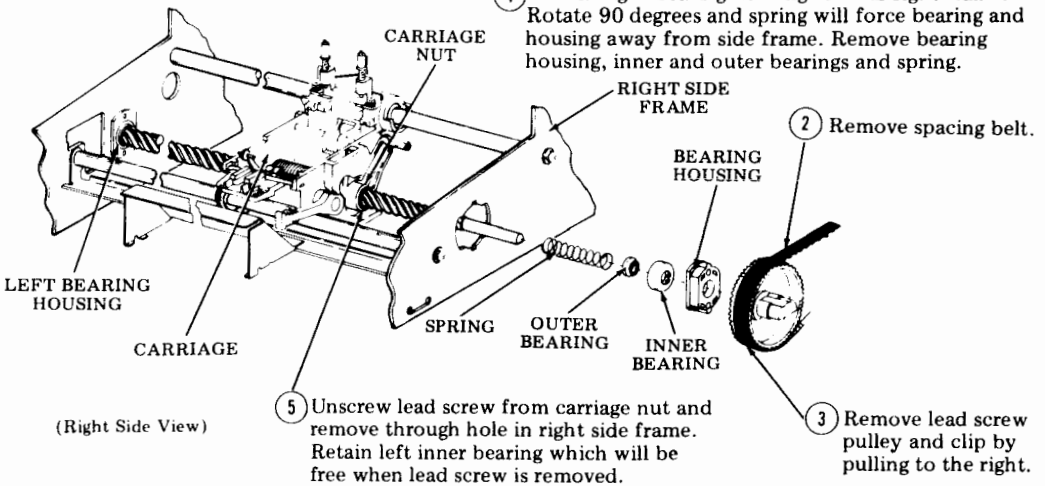
Note: In reassembly, position the setscrews away from the slot in the sprocket clip.

Perform the LEFT and RIGHT SPROCKET adjustments and PRINTED LINE POSITION and PLATEN ENDPLAY adjustments.

LEAD SCREW

1 Remove operator console if present. (Refer to Page 1-77.)

3.08 To remove the lead screw:

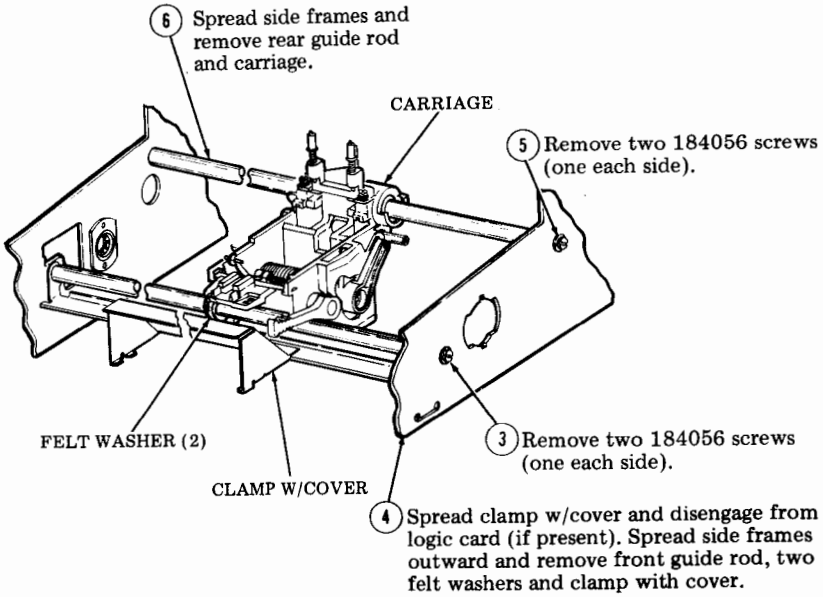


CARRIAGE WITH POST ASSEMBLY

3.09 To remove the carriage with post assembly:

(1) Remove operator console, if present. (Refer to Page 1-77.)

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



LEAD SCREW NUT

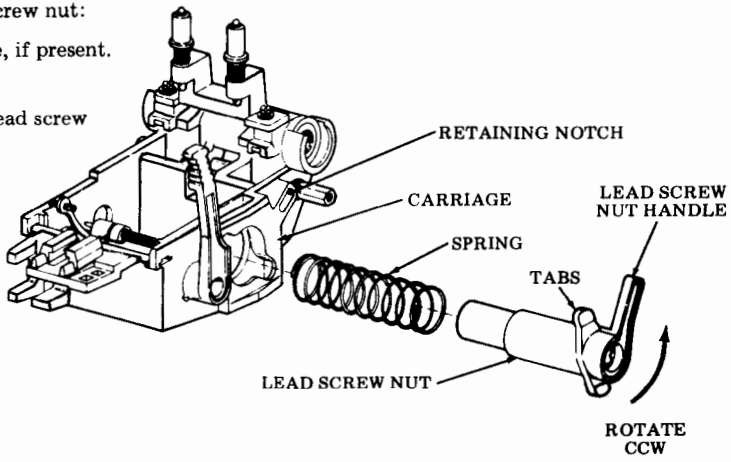
3.10 To remove the lead screw nut:

(1) Remove operator console, if present. (Refer to Page 1-77.)

(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 counterclockwise (CCW) until tabs on nut align with opening in carriage. Spring will force nut away from carriage.

(4) Remove spring and nut.



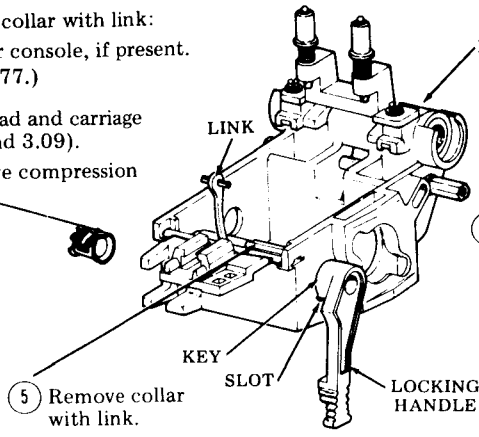
COLLAR WITH LINK

3.11 To remove the collar with link:

(1) Remove operator console, if present. (Refer to Page 1-77.)

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

(3) Remove compression ring.



(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.

(5) Remove collar with link.

PAPER TRAY

3.12 To remove the paper tray:

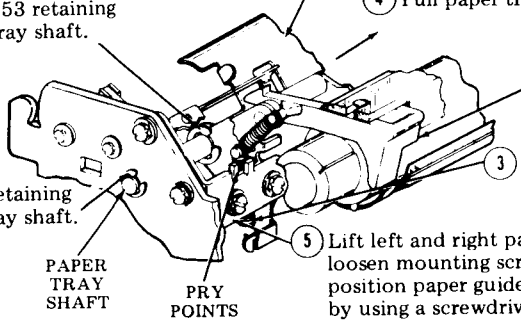
(a) Sprocket Feed

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

(6) Remove paper tray.

(4) Pull paper tray shaft out to right.

(1) Remove two 119653 retaining rings from paper tray shaft.



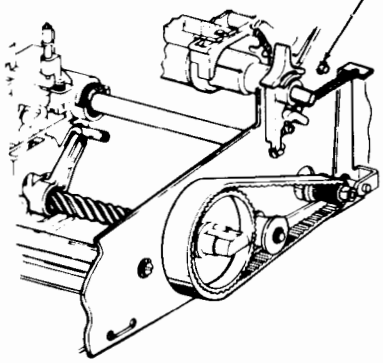
(3) Unhook and retain two 4708 paper tray springs (one each side).

(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.

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

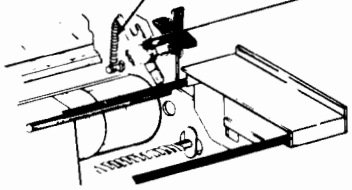
(b) Friction Feed



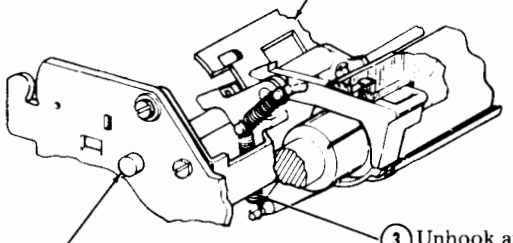
(1) Remove 119653 retaining ring from paper tray shaft and roller bail lever shaft.

(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).

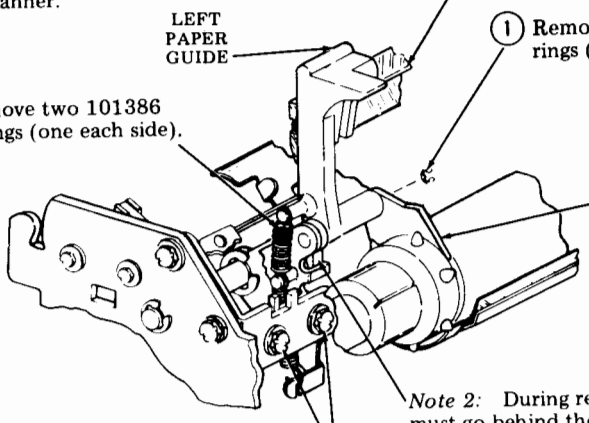
(4) Pull paper tray shaft to the left and remove.

PAPER GUIDES

3.13 To remove the paper guide:

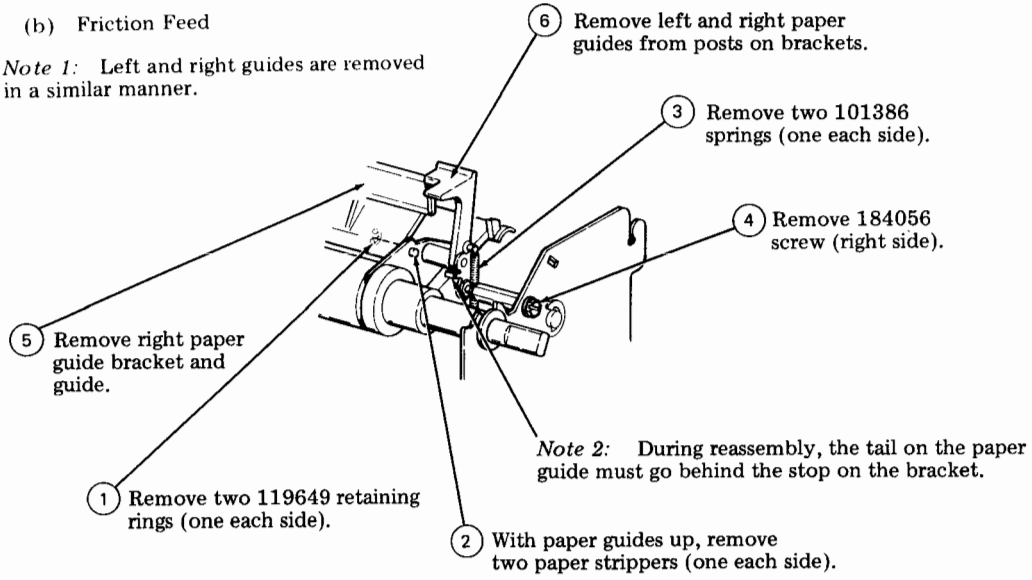
(a) Sprocket Feed

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



(b) Friction Feed

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



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

43 PRINTER

PARTS

CONTENTS

1. GENERAL

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

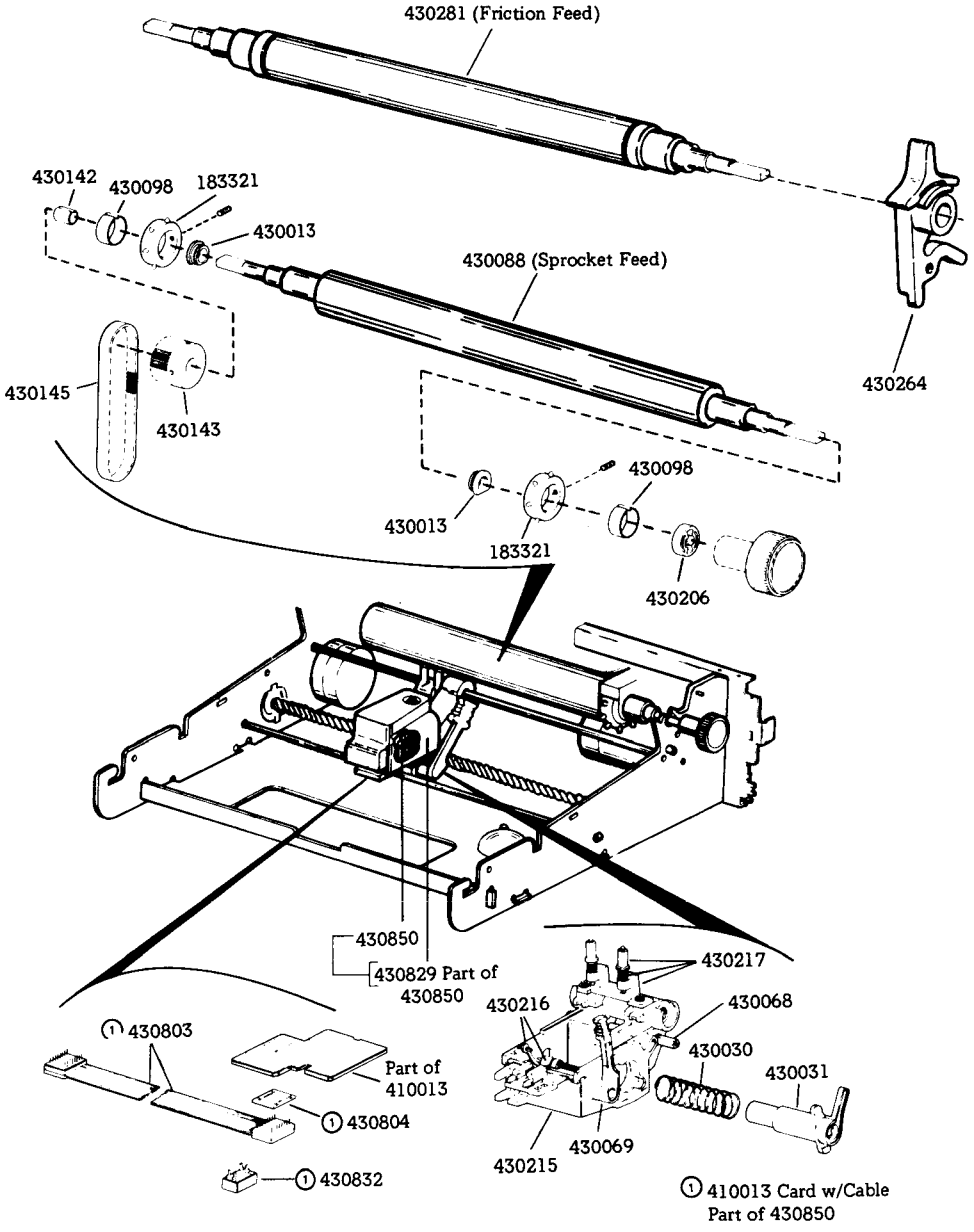
1.02 Part numbers are listed in the index in numerical order and indicate the page on which the parts appear. Asterisked numbers, stocked as "List 1", indicate a maintenance spare stocking ratio of one spare for the first twenty stations and an additional spare for each additional 30 stations in a maintenance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

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.

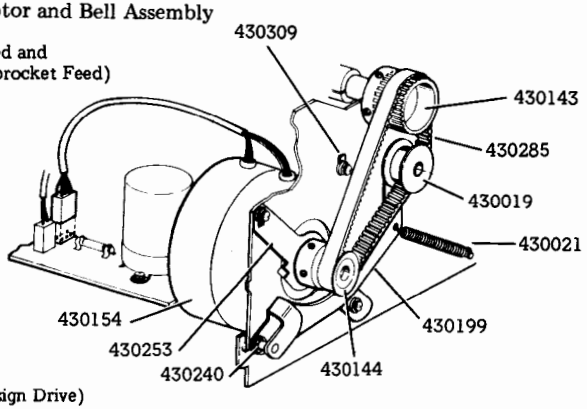
2. PARTS

Platen and Carriage Assembly

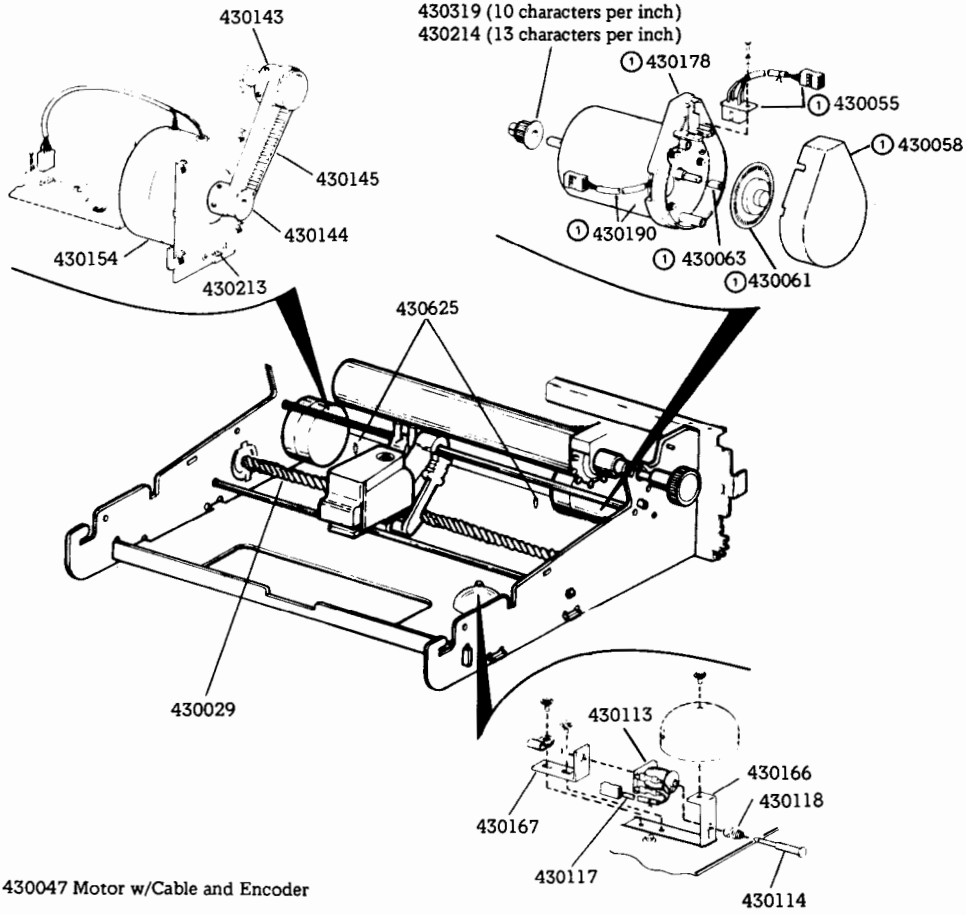


Line Feed Spacing Motor and Bell Assembly

(Friction Feed and
Late Design Drive Sprocket Feed)

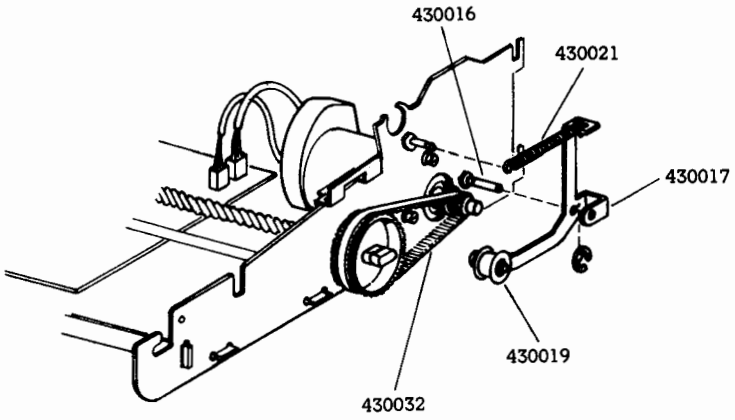


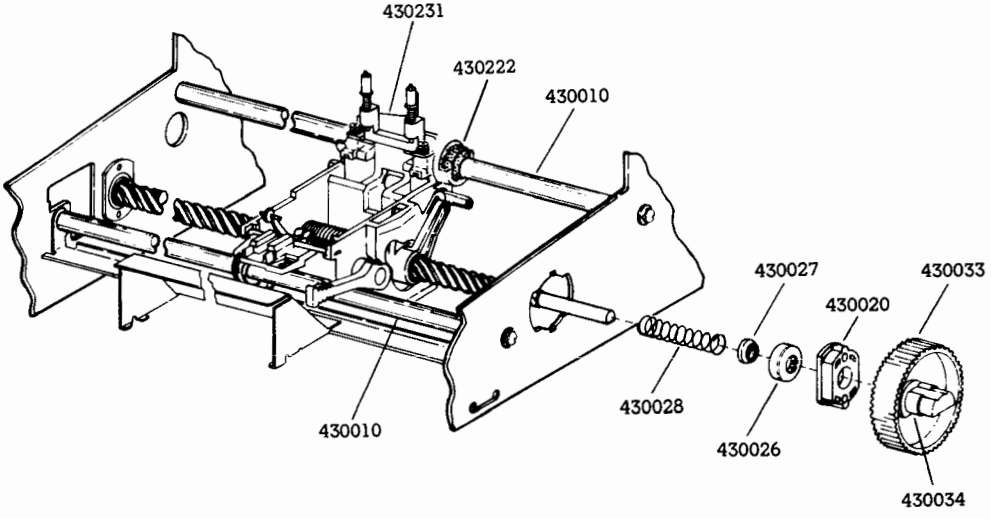
(Sprocket Feed Early Design Drive)



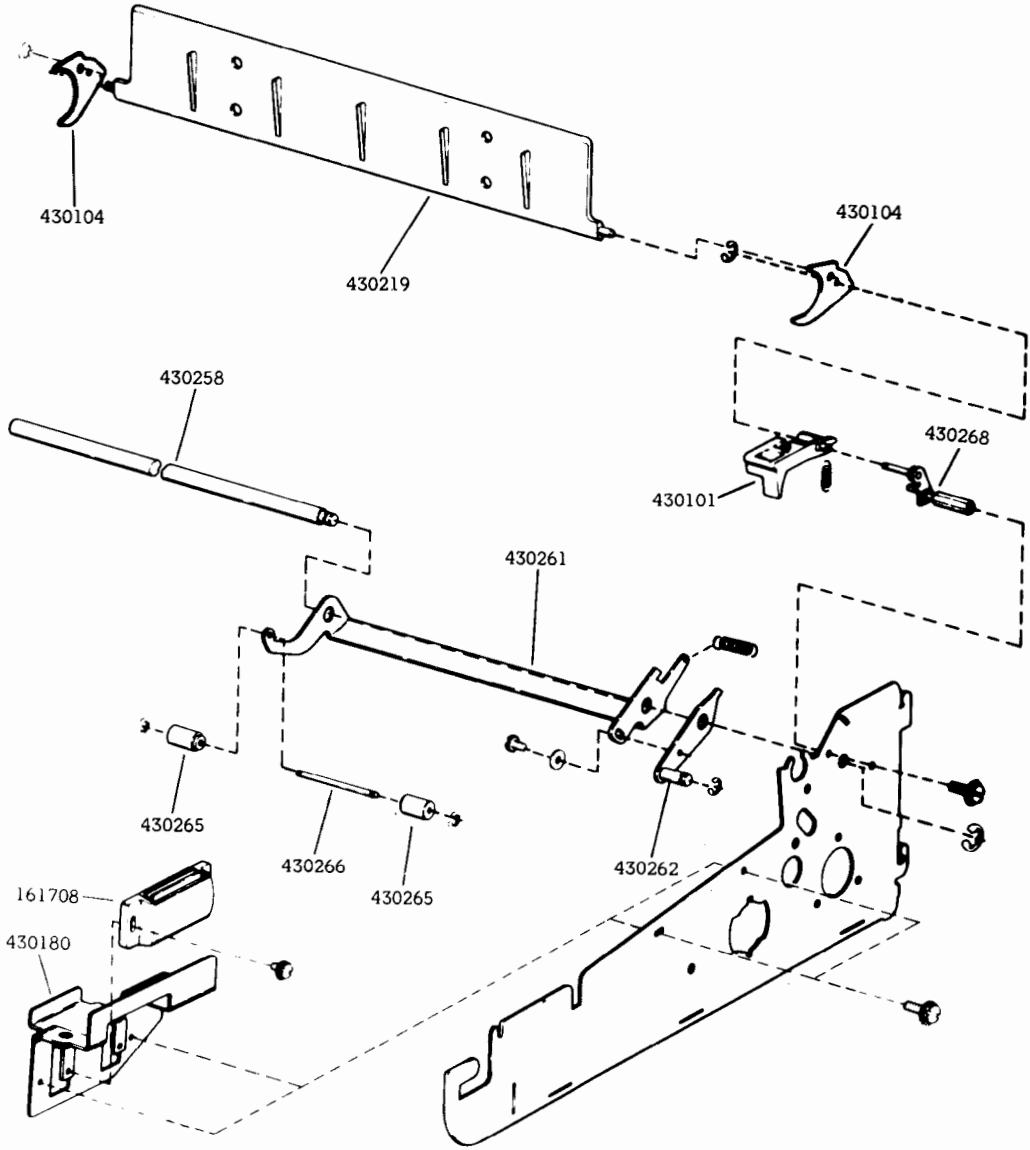
① 430047 Motor w/Cable and Encoder

Spacing Drive and Lead Screw

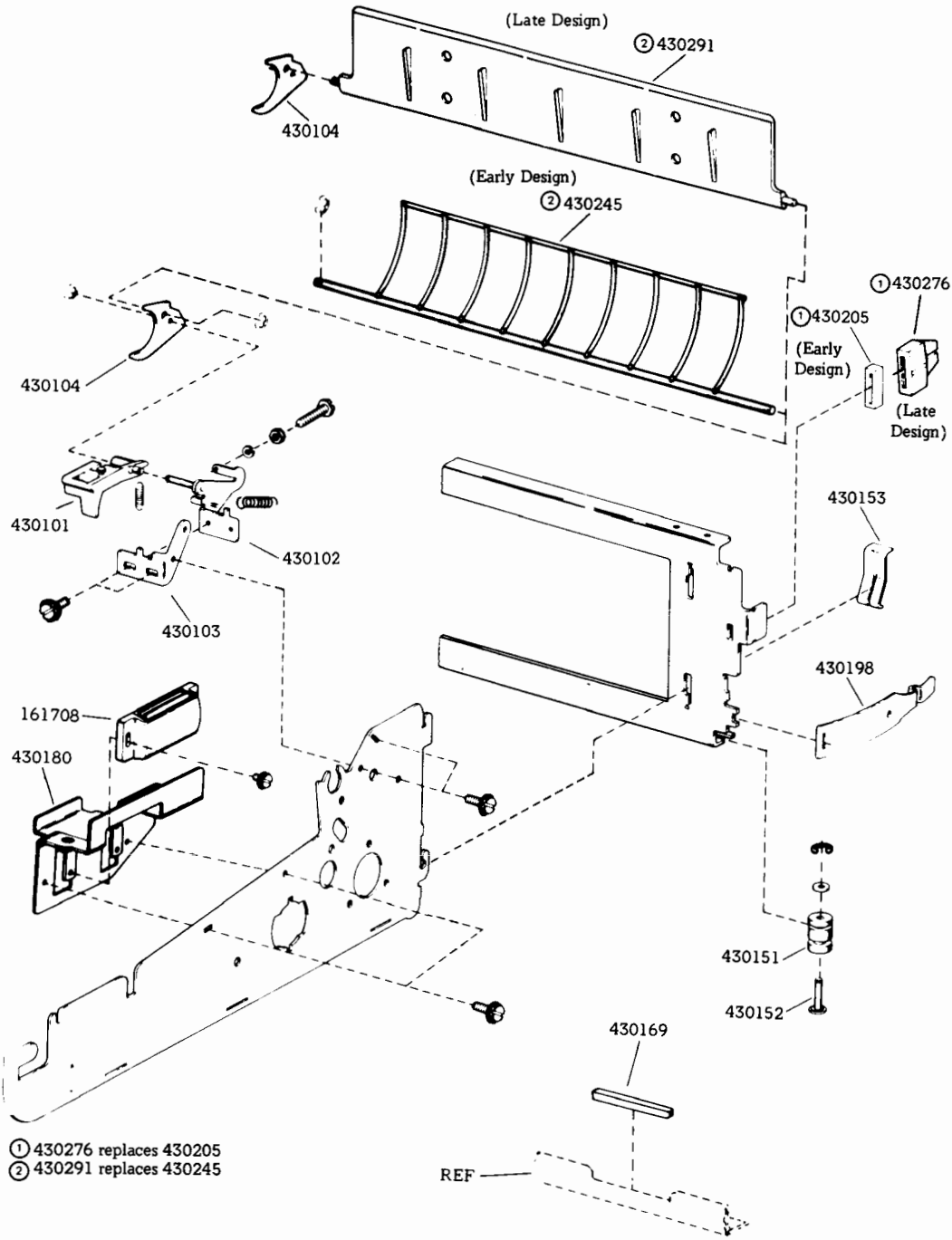




Right Side Frame (Friction Feed)

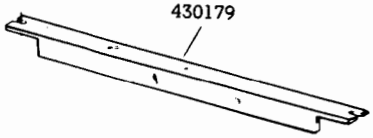


Right Side Frame (Sprocket Feed) and Rear Frame

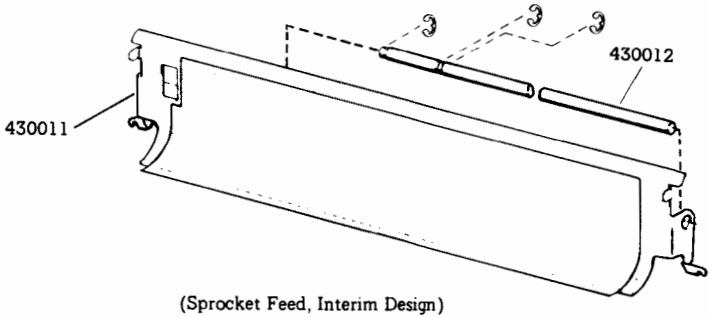


①430276 replaces 430205
②430291 replaces 430245

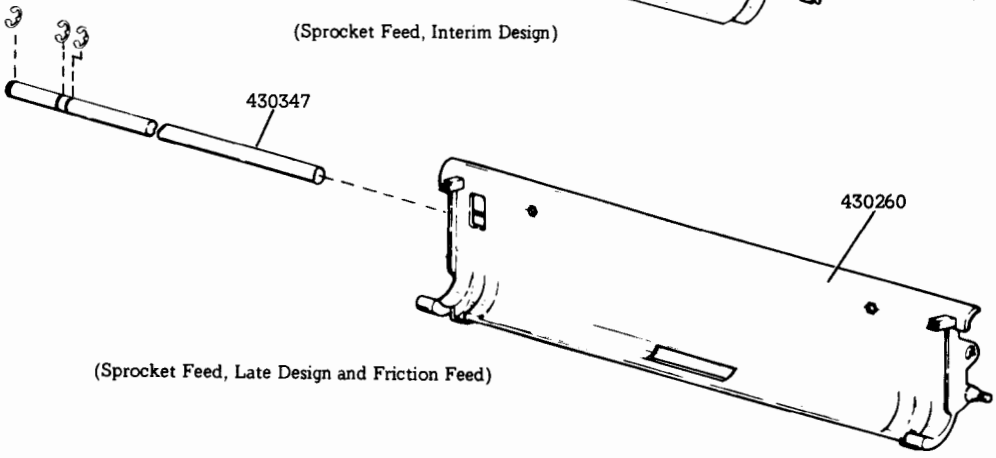
Paper Tray



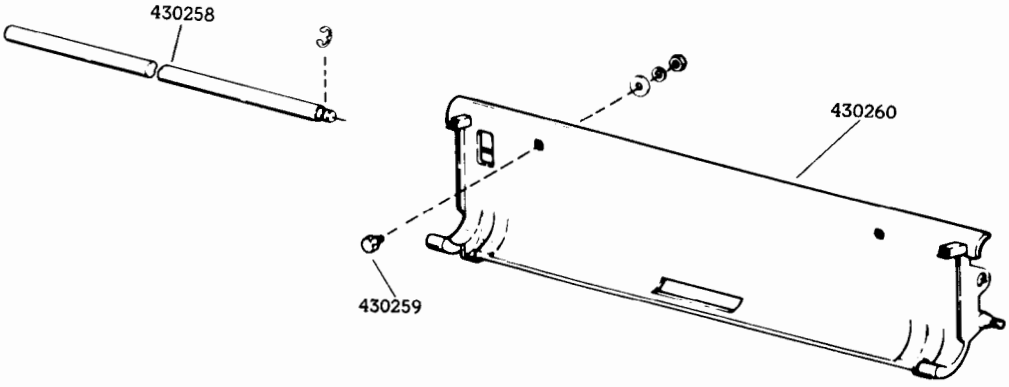
(Sprocket Feed, Early Design)



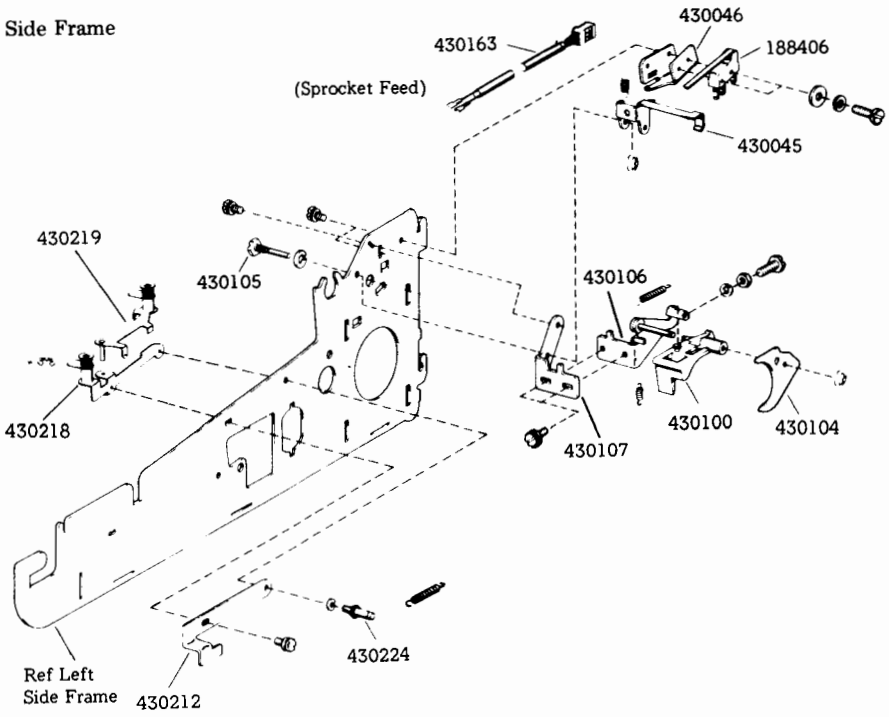
(Sprocket Feed, Interim Design)



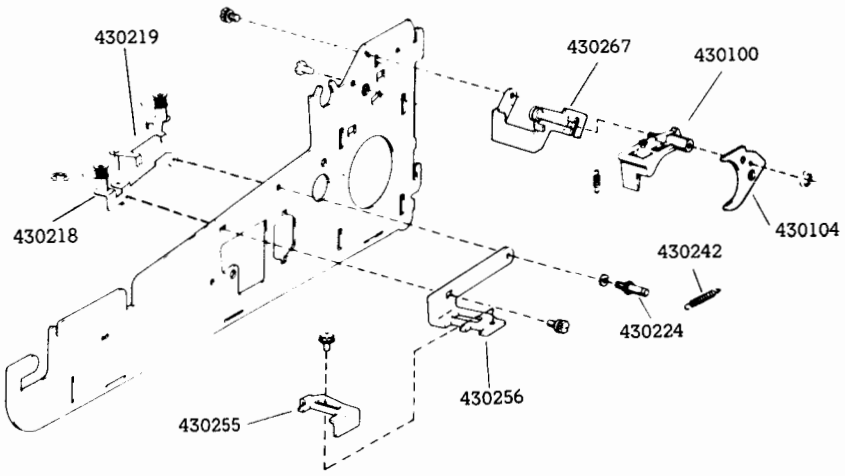
(Sprocket Feed, Late Design and Friction Feed)



Left Side Frame



(Friction Feed)



3. NUMERICAL INDEX

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

Part Number	Description and Page Number
161708	Latch, Magnetic 2-39, 2-40
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188406	Switch, Actuator 2-42
410013	Card Assembly 2-36
430010	Rod, Guide 2-38
430011	Tray, Paper 2-41
430012	Shaft, Paper Tray 2-41
430013 (2)	Bearing, Platen 2-36
430016	Post, Lever 2-38
430017	Lever w/Stud 2-38
430019*	Roller w/Bearing 2-37, 2-38
430020 (2)	Bearing, Housing 2-38
430021*	Spring 2-37, 2-38
430026*	Bearing, Outer 2-38
430027*	Bearing, Inner 2-38
430028	Spring, Compression 2-38
430029	Screw, Lead 2-37
430030	Spring, Compression 2-36, 2-38
430031*	Nut, Special 2-36, 2-38
430032*	Belt, Timing 2-38
430033*	Pulley, 81T 2-38
430034	Fastener 2-38
430045	Lever, Switch 2-42
430046	Bracket, Switch 2-42
430047*	Motor w/Cable and Encoder 2-37
430055	Cable Assembly 2-37
430058	Cover 2-37
430061	Disc, Encoder 2-37
430063	Fastener 2-37
430068	Nut 8-32 Spl 2-36
430069	Handle, Locking 2-36
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430100	Guide, Left Paper 2-42
430101	Guide, Right Paper 2-39, 2-40
430102	Bracket, w/Posts 2-40
430103	Bracket, Right 2-40
430104 (2)	Stripper,Paper 2-39,2-40,2-42
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430113*	Coil Assembly 2-37
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430152 (2)	Stud 2-40
430153 (2)	Clip 2-40
430154*	Motor w/Cable 2-37
430163	Cable Assembly 2-42
430166	Bracket, Bell 2-37
430167	Bracket, Bell 2-37
430169	Strip, Insulator 2-40
430178	Housing 2-37
430179	Guide 2-41
430180	Bracket, Right 2-39, 2-40
430190	Motor w/Cable 2-37
430198 (2)	Clamp 2-40
430199	Lever w/Stud 2-37
430205	Bumper 2-40
430206	Spacer 2-36
430212	Bracket, Margin 2-42
430213	Nut, Speed 2-37
430214*	Pulley w/Clip 2-37
430215	Carriage w/Post 2-36
430216	Collar w/Link 2-36
430217*	Bridge Assembly 2-36
430218	Bracket Assembly, Left 2-42
430219	Plate Assembly, Left 2-39, 2-42
430222	Washer, Felt 2-38
430224	Post, Spring 2-42
430231	Shield, Ribbon 2-38
430240	Stud, Idler Bracket 2-37
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430264	Lever, Friction Feed 2-36
430265	Roller, Pressure 2-39
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430267	Bracket, Left 2-42
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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

CONTENTS PAGE

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 43 Basic KSR Teleprinter or 43 RO Teleprinter Troubleshooting, Page 1-26 and Page 1-40, 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 1-54 and Page 1-67. Where analysis indicates the trouble is not in the opcon, return to Teleprinter Troubleshooting, Page 1-26 or Page 1-40 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 start on:

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?	Remove blocking spacer (if present) from under DATA key. Replace defective keyswitch.	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

CONTENTS PAGE

1. GENERAL

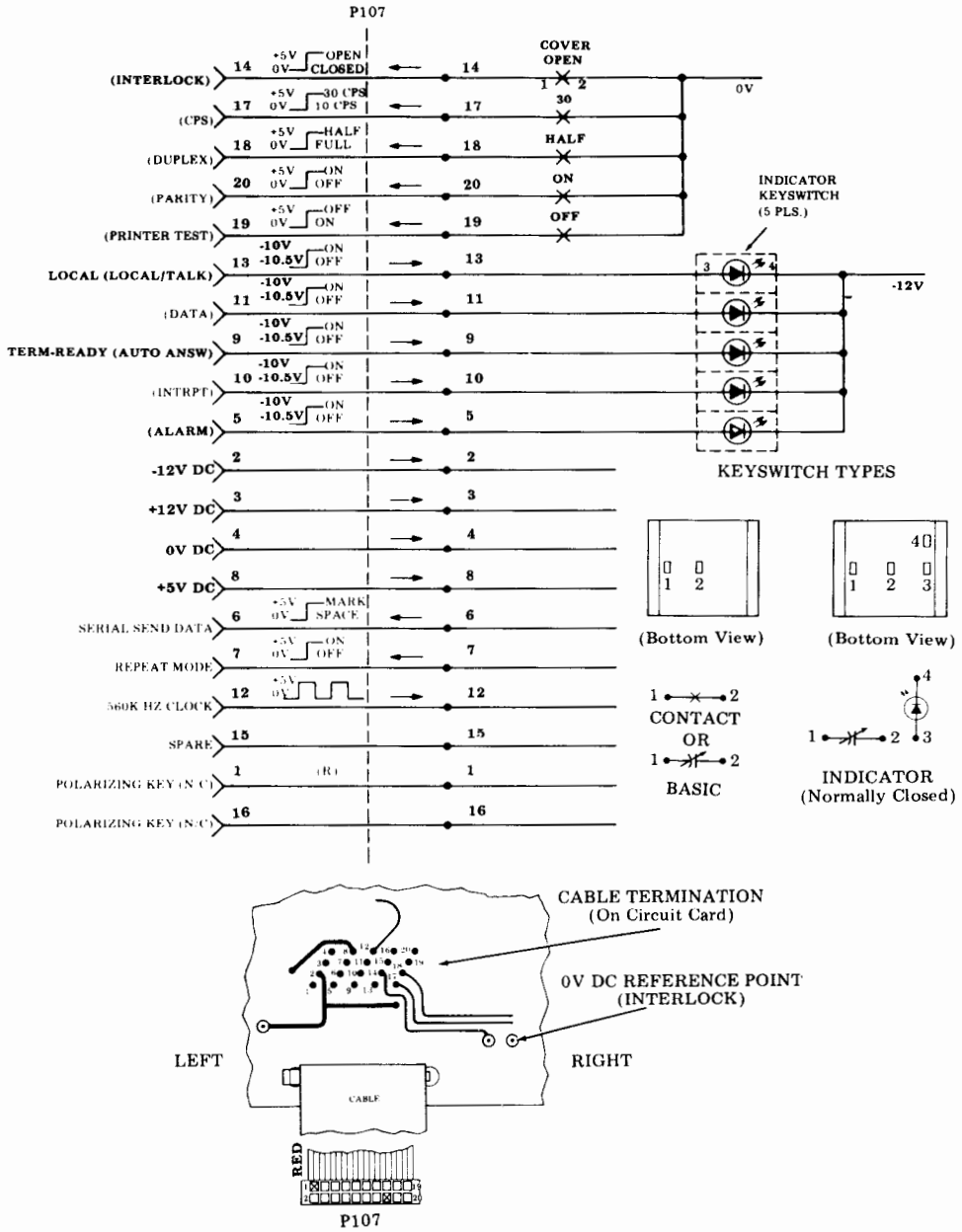
1.01 This section provides wiring information for the 43 Basic operator console.

1.02 For additional wiring information, plug or cable locations, refer to 43 Basic Teleprinter Wiring, Page 1-52.

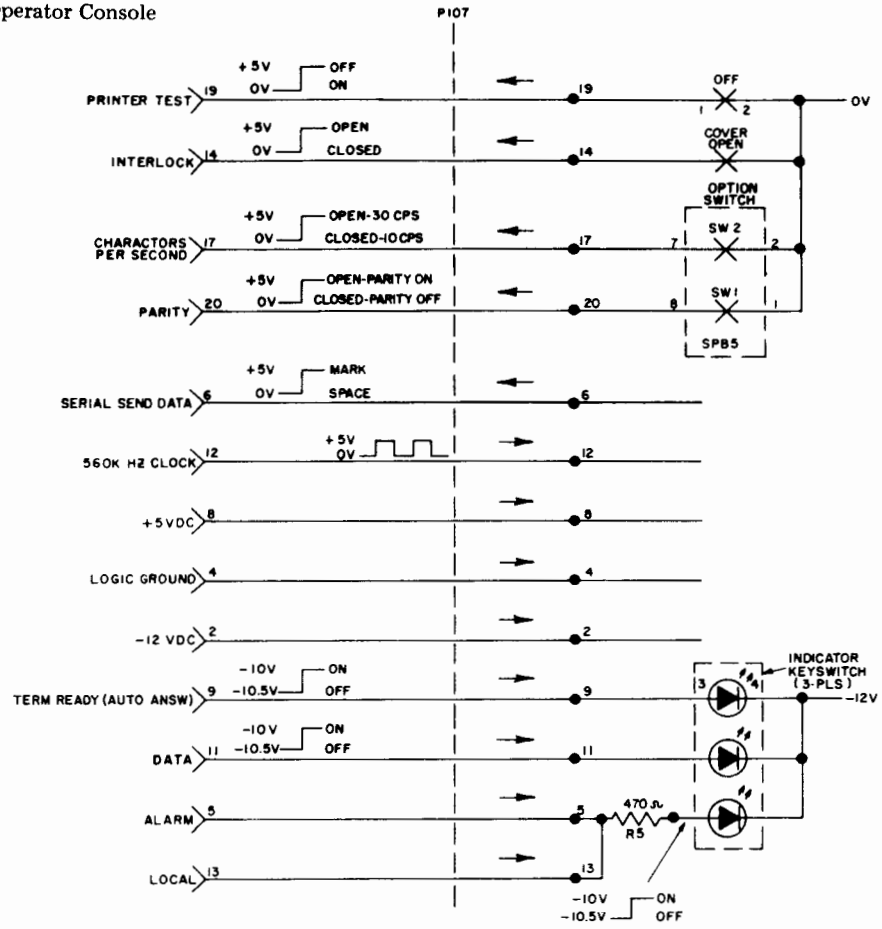
1.03 Where possible, small notes indicating voltage levels have been added to aid in troubleshooting.

2. WIRING

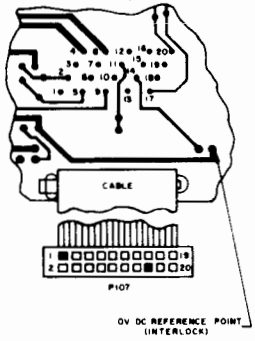
KSR Operator Console



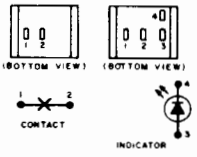
RO Operator Console



CABLE TERMINATION (ON CIRCUIT CARD):



KEYSWITCH TYPES



43 OPERATOR CONSOLE

DISASSEMBLY/REASSEMBLY

CONTENTS

1. GENERAL

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

1.02 All ordering numbers shown 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 perform the disassembly and reassembly of the 43 operator console, refer to 2. TOOLS REQUIRED.

1.06 Precautions should be taken to assure that the opcon is disassembled and reassembled under clean conditions. No oil, grease, or other liquids should be allowed on loose parts, subassemblies, 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 1-77, 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).

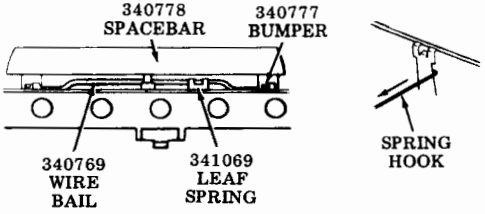


Fig. 1—Leaf Spring Disengagement

(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).

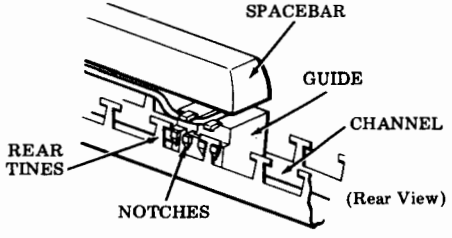


Fig. 2—Spacebar Removal

(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).

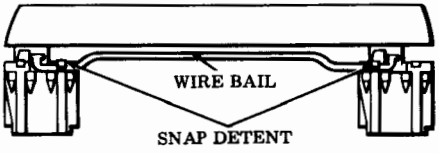


Fig. 3—Wire Bail Removal

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).

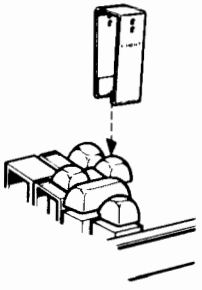


Fig. 5—Data Key Removal

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.

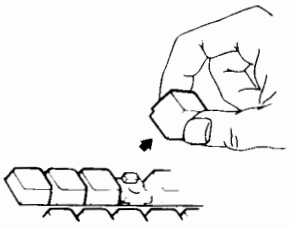


Fig. 6—Control Key Removal

(d) To remove the RETURN key with housing:

(1) Remove keys BACKSPACE, OVERLINE, 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).

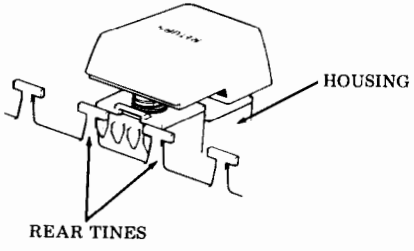


Fig. 7—Rear Tine Disengagement

(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).

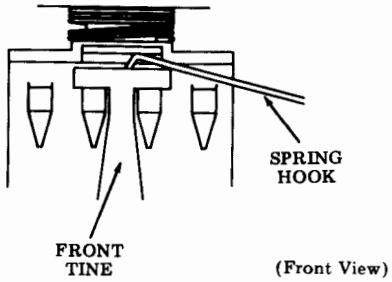


Fig. 8—Front Tine Disengagement

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).

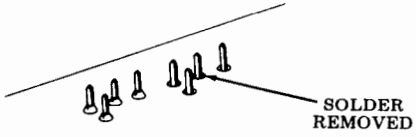


Fig. 9—Solder Removal

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).

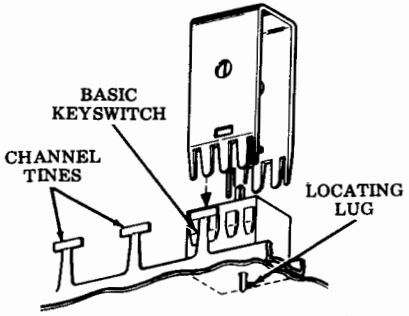


Fig. 10—Keyswitch Removal

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).

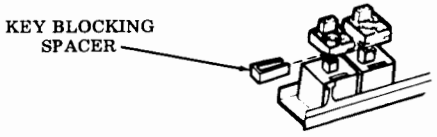


Fig. 11—Blocking Spacer Removal

(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.

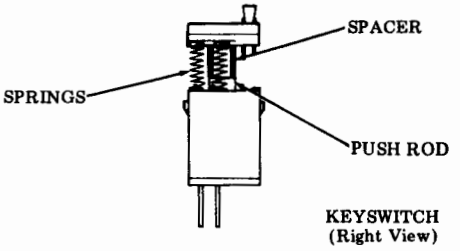


Fig. 12—Blocking Spacer Reassembly

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).

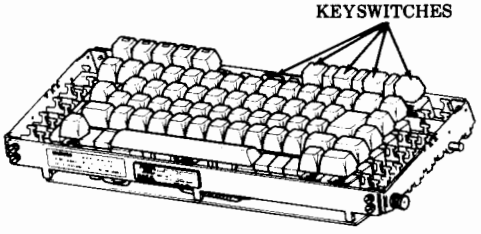


Fig. 13—Keyswitch Identification

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

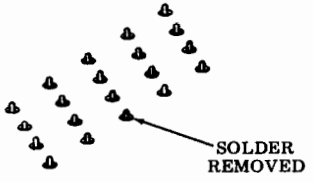


Fig. 14—Connector Pins

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).

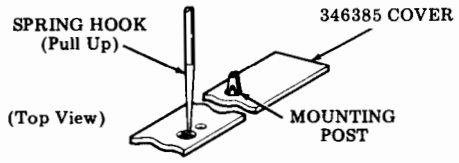


Fig. 15—Cover Removal

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

(f) Exert upward force until cable connector releases (Fig. 16).

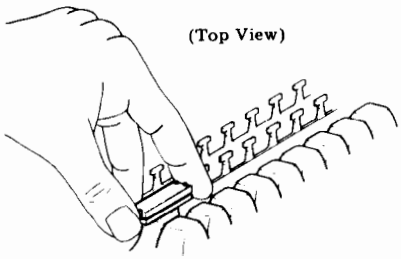


Fig. 16—Cable Connector Removal

(g) Remove rear plate (Fig. 17).

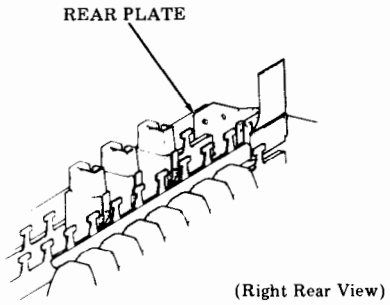


Fig. 17—Cable Removal

(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.

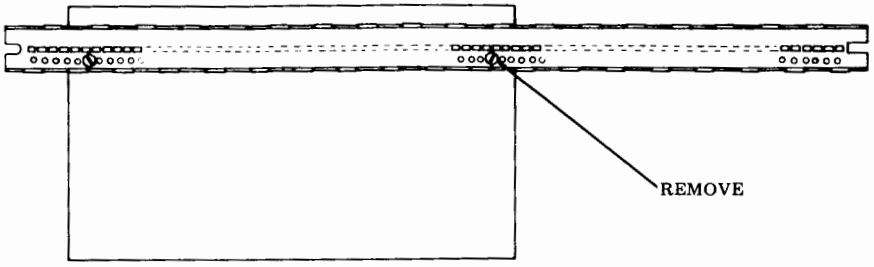


Fig. 18—Channel

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

*Present on some operator consoles.

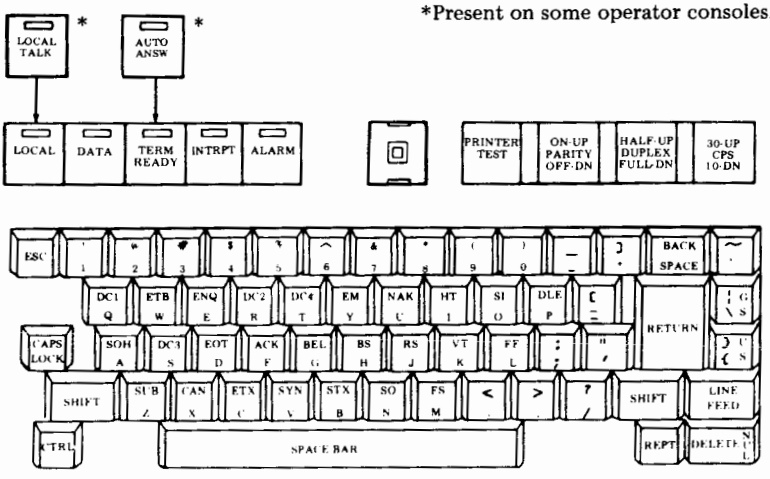


Fig. 19—KSR Keyboard Layout

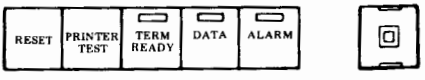


Fig. 20—RO Keyboard Layout

PART NO.	KEY DESCRIPTION	PART NO.	KEY DESCRIPTION
340701	BLOCKING – CONTROL (See Note 6)	340872	STX B
		340873	SO N
340714	BLOCKING – DATA (See Note 6)	340874	FS M
		340875	< ,
340778	SPACEBAR	340876	> .
340821	! 1	340877	? /
340822	@ 2	340889	] +
340823	# 3	340890	[=
340824	$ 4	340894	CAPS LOCK
340825	% 5	340975	ESC
340826	^ 6	340976	BACKSPACE
340827	& 7	340977	~ `
340828	* 8	340978	HT]
340829	(9	340979	DLE P
340830	) 0	340981	GS \
340831	_ -	340982	BS H
340838	DC1 Q	340983	} US {
340839	ETB W	340984	SUB Z
340840	ENQ E	340985	SYN V
340841	DC2 R	340986	LINE FEED
340842	DC4 T	340987	CTRL
340843	EM Y	340988	REPT
340844	NAK U	340989	DELETE NUL
340846	SI O	346102	LOCAL (See Note 5)
340852	SOH A	346106	INTRPT
340853	DC3 S	346116	AUTO ANSW (See Note 4)
340854	EOT D	346127	TERM READY (See Notes 2 & 5)
340855	ACK F	346161	LOCAL – TALK (See Note 4)
340856	BEL G	346162	DATA (See Notes 2 & 8)
340858	RS J	346163	ALARM (See Notes 1 and 2)
340859	VT K	346164	ON-UP PARITY OFF-DN
340860	FF L	346165	HALF-UP DUPLEX FULL-DN
340861	: ;	346166	30-UP CPS 10-DN
340862	" /	346169	PRINTER TEST
340867	SHIFT	346403	RETURN (See Note 3)
340869	CAN X	346834	RESET (See Note 7)
340870	ETX C		

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.

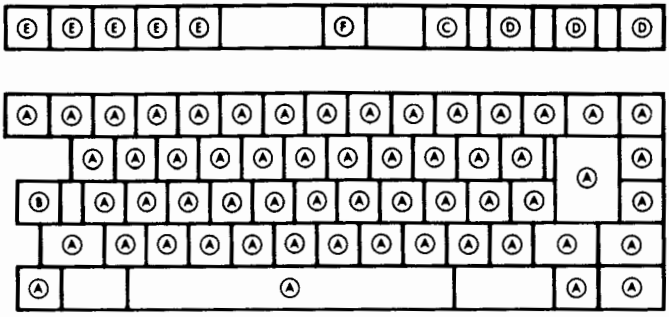
Note 5: 346102 and 346127 keys are used on 43K101/CAB opcon.

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.

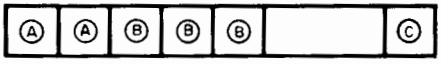
Note 8: All 43K101/CAB Operator Consoles should have the DATA key unblocked. Remove the 346409 spacer, if present under the 346162 DATA key.

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

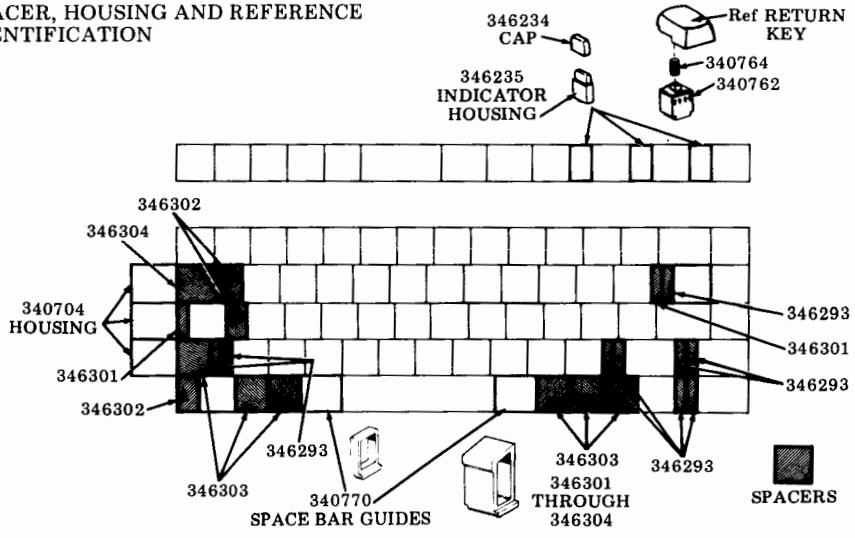


Fig. 24

43 OPERATOR CONSOLE

PARTS

CONTENTS PAGE

1. GENERAL

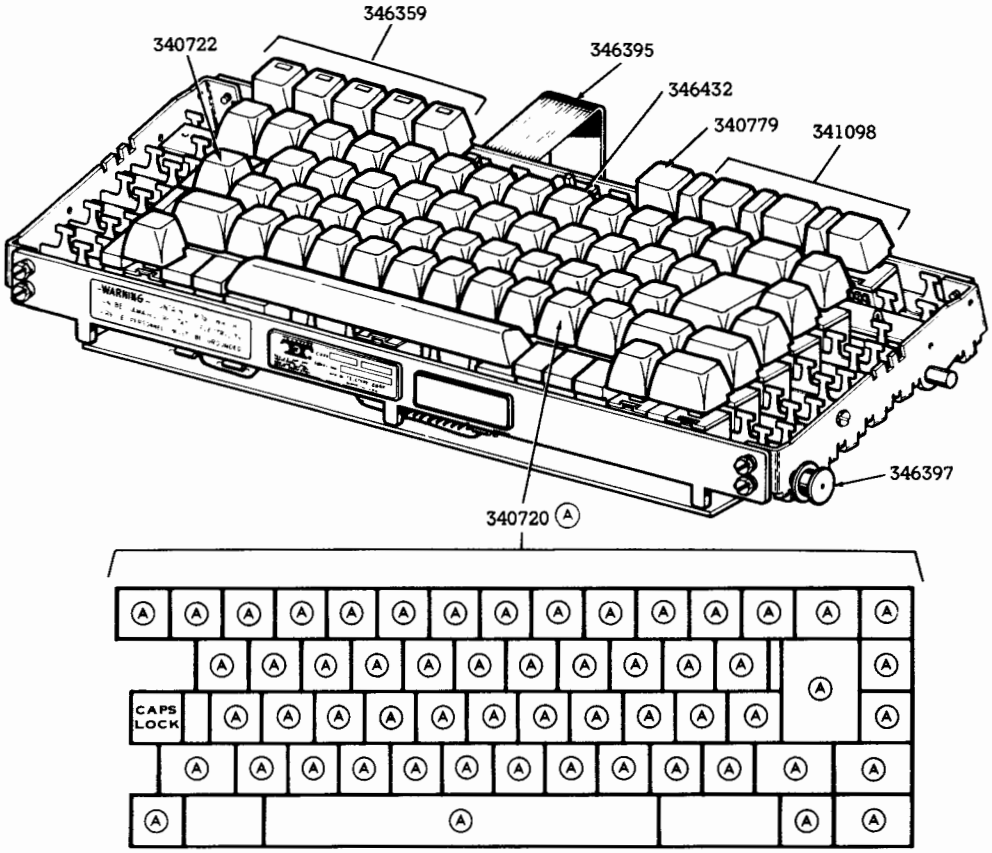
1.01 The parts in this section are maintenance spares for the 43 Operator Console. They should be available, in the quantities shown in parentheses in the numerical index, to correct troubles in the operator console.

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

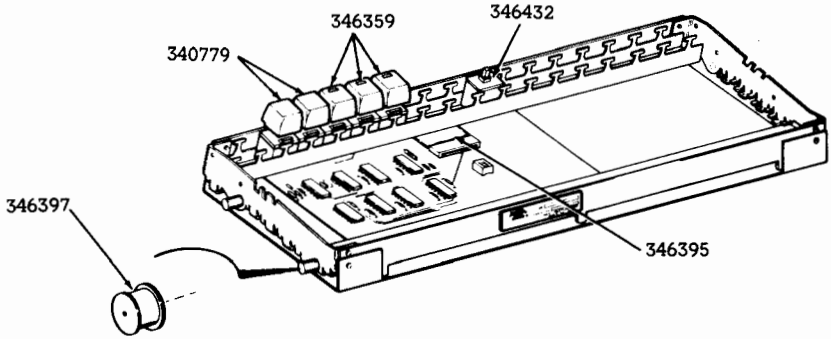
1.03 Troubleshooting and disassembly/reassembly information for these parts is provided on Page 3-1 and Page 3-7 respectively.

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.

43 ENCLOSURES AND PAPER HANDLING

ADJUSTMENTS

CONTENTS

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:

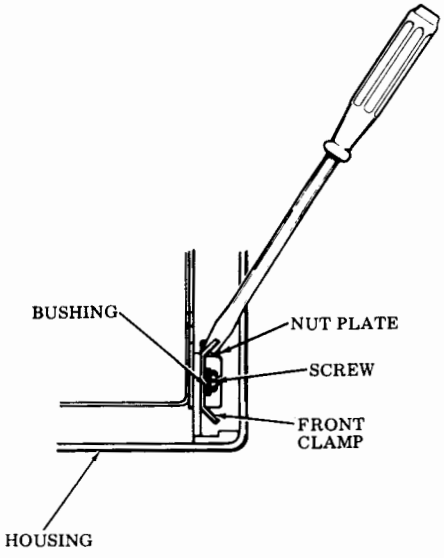
(1) Requirement
Left to Right Positioning — When the free play movement of the cover (left to right) is taken up lightly in each direction, the cover shall not touch any opcon keytops.

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 screwdriver with enough force to meet the requirement.

Warning: *Do not overtwist the screwdriver.*



(Top View — Right Corner)

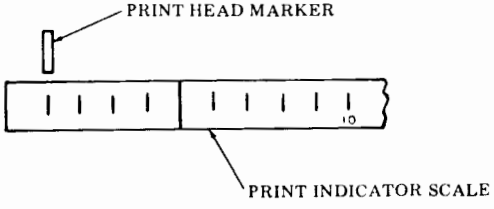
COLUMN INDICATOR POSITIONING

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.



43 ENCLOSURES AND PAPER HANDLING

PARTS

CONTENTS PAGE

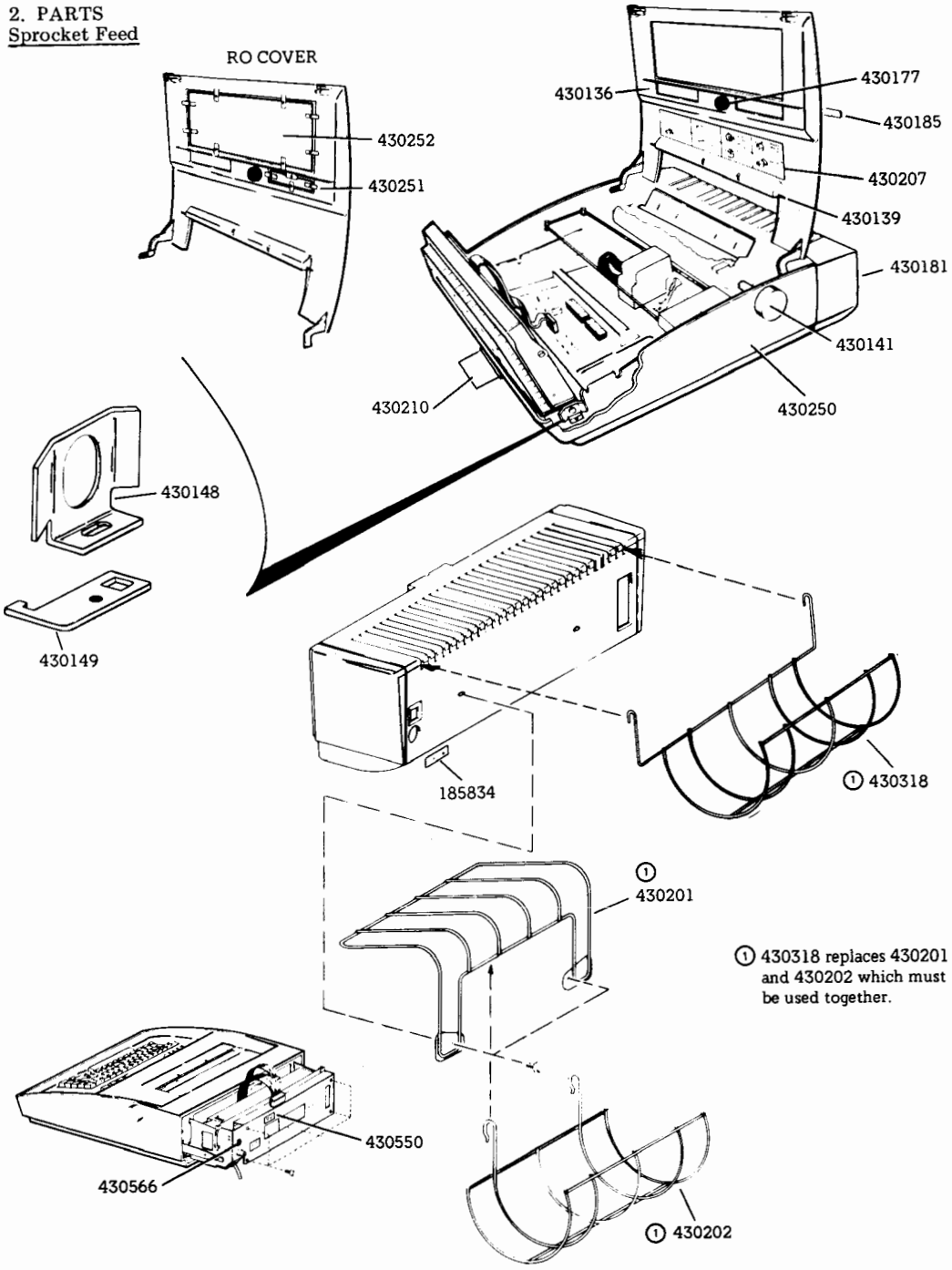
1. GENERAL

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.

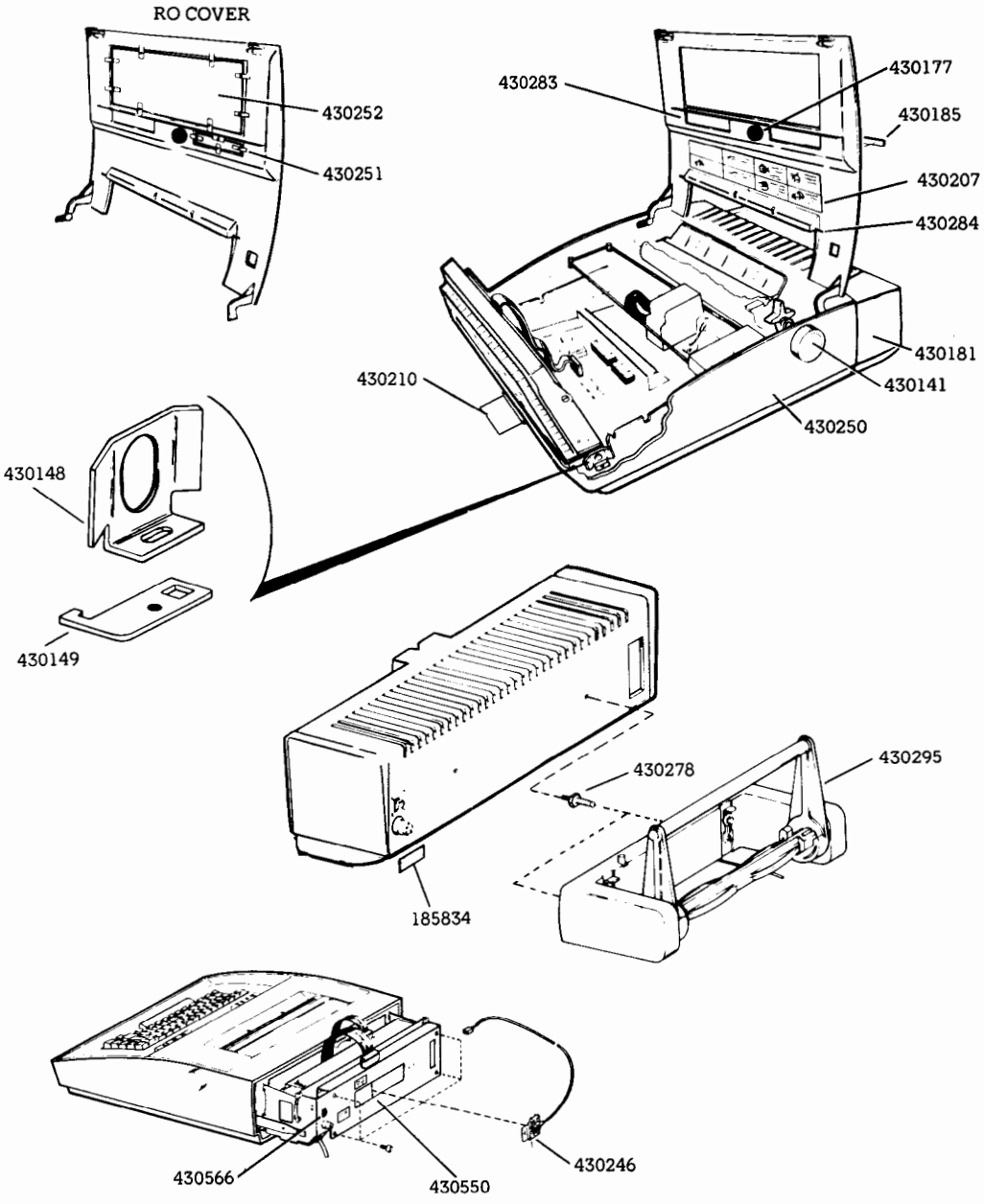
1.03 Replacement of enclosures and paper handling parts is provided in Routine Maintenance, Page 1-91. Disassembly and reassembly is provided in 43 Teleprinter, Page 1-77.

2. PARTS
Sprocket Feed

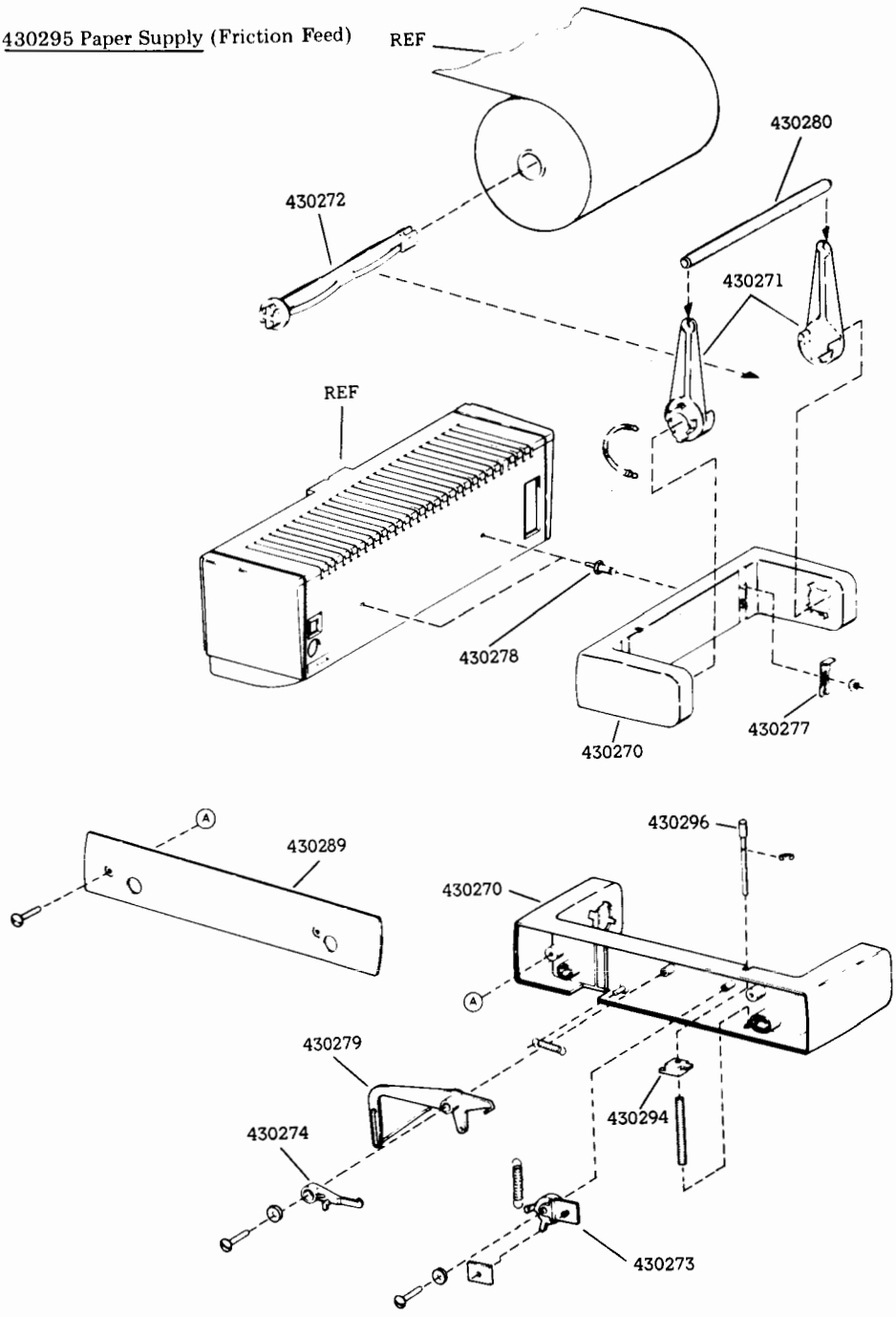


① 430318 replaces 430201 and 430202 which must be used together.

Friction Feed



430295 Paper Supply (Friction Feed)



3. NUMERICAL INDEX

QTY PER MAINTENANCE AREA	PART NUMBER	DESCRIPTION	PAGE
1	185834	Label, Fuse	4-4, 4-5
1	430136	Cover	4-4
1	430139	Scale	4-4
2	430141	Knob w/Insert	4-4, 4-5
2	430148	Clamp	4-4, 4-5
2	430149	Nut Plate	4-4, 4-5
1	430177	Button, Actuator	4-4, 4-5
1	430181	Bustle	4-4, 4-5
1	430185	Nameplate, Bell	4-4, 4-5
1	430201	Deflector, Paper	4-4
1	430202	Holder, Paper	4-4
1	430207	Label Instruction	4-4, 4-5
1	430210	Directory Card w/Labels	4-4, 4-5
1	430250	Housing w/Holder	4-4, 4-5
1	430246	Assembly, Switch Bracket	4-5
1	430251	Plate, Cover	4-4, 4-5
1	430252	Plate, Cover	4-4, 4-5
1	430270	Support, Paper Roll	4-6
1	430271	Lever, Arm	4-6
1	430272	Spindle, Paper	4-6
1	430273	Cam, Low Paper	4-6
1	430274	Cam, Follower	4-6
1	430277	Latch	4-6
5	430278	Post	4-5, 4-6
1	430279	Lever, Paper Sensor	4-6
1	430280	Roller, Paper	4-6
1	430283	Cover, Friction Feed	4-5
1	430284	Scale, 80-Column	4-5
1	430289	Plate, Rear Cover	4-6
1	430294	Lever, Reset	4-6
1	430295	Assembly, Paper Supply	4-5, 4-6
1	430296	Shaft, Lever	4-6
1	430318	Holder, Paper	4-4
1	430550	Rear Frame Assembly	4-4, 4-5
1	430566	Switch, Rocker	4-4, 4-5

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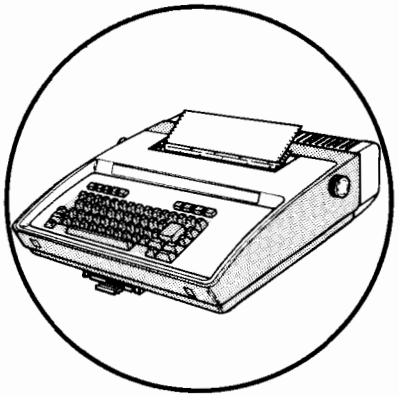
also available as..
Manual 367
Issue 2, February 1978

HOW TO OPERATE



the 43 teleprinter

BASIC KSR

TELETYPE T.M.

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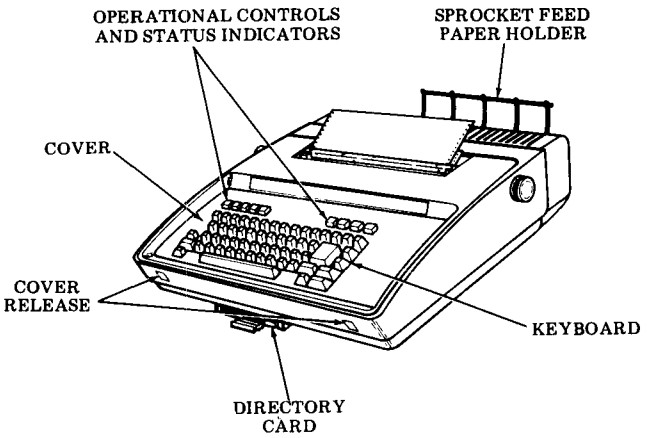
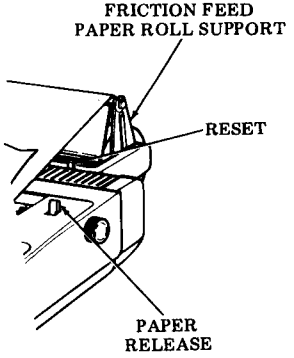
HOW TO OPERATE INSTRUCTIONS

SUPPLEMENTARY OPERATIONAL INFORMATION



43 KSR Sprocket Feed Teleprinter



43 KSR Friction Feed Teleprinter

HOW TO OPERATE INSTRUCTIONS
(Pages 1 Through 11)

INTRODUCTION

The 43 Basic KSR Teleprinter provides character-at-a-time keyboard-printer send-receive operation. Transmission speeds are 10 characters per second (cps) (100 wpm) or 30 cps (300 wpm) and can be selected by the attendant to match the remote station.

The 43 Teleprinter may be connected to an external communications device (modem) which may be associated with a telephone for connections and for transmission of data. A permanent connection via private line may also be used in these arrangements.

When connected directly to an associated modular telephone, calls are originated in a manner similar to regular telephone calls and can be answered either automatically or manually. The telephone can be used for normal voice communication or data messages can be exchanged over the telephone line using controls on the 43 Teleprinter.

In some arrangements the 43 Teleprinter may be connected directly to a computer or remote terminal.

On sprocket feed printers, messages with up to 132 characters per line are printed on 12 inch wide sprocket feed paper. The paper may be fed from a supply box or limited amounts can be placed in a paper holder that clips on the rear of the teleprinter. (See Page 8 for paper suppliers.)

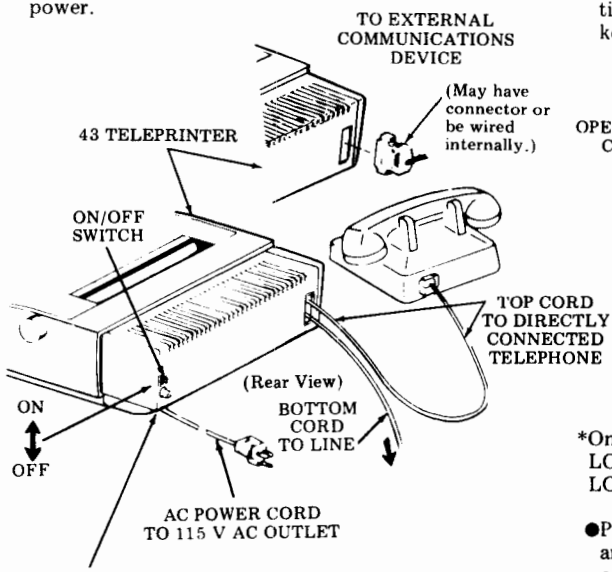
On friction feed printers, messages up to 80 characters per line are printed on 8-1/2 inch wide roll type paper. The roll is held in a support attached to the rear of the teleprinter.

The ribbon is part of a cartridge that can be readily replaced with the cover open. Replacement ribbon cartridges can be obtained from Teletype Corporation (see Page 8). An order form is included with each new ribbon.

A pullout directory card holder under the front of the keyboard may be used to write in frequently used telephone numbers and note any extensions (see Page 21). Exceptions to standard operating features should be recorded on the reverse side of the card.

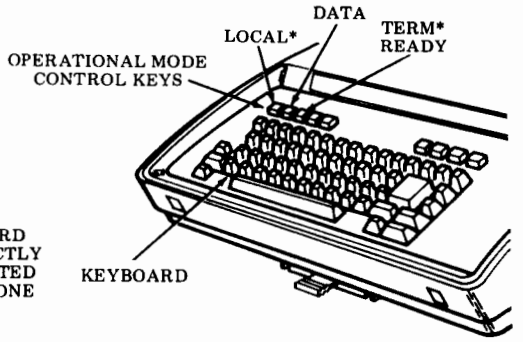
CONNECTIONS AND POWER TURN ON

- Make sure ac power cord and modular telephone cords or cord to any external communications device are connected as shown before turning on power.



- Turn on power to teleprinter by depressing upper half of ON/OFF switch.

- When power is first turned on, the print head will move fully left and the TERM READY key on the operator console will light. During normal operation one of the three operational mode control keys should always be lit indicating power is on.

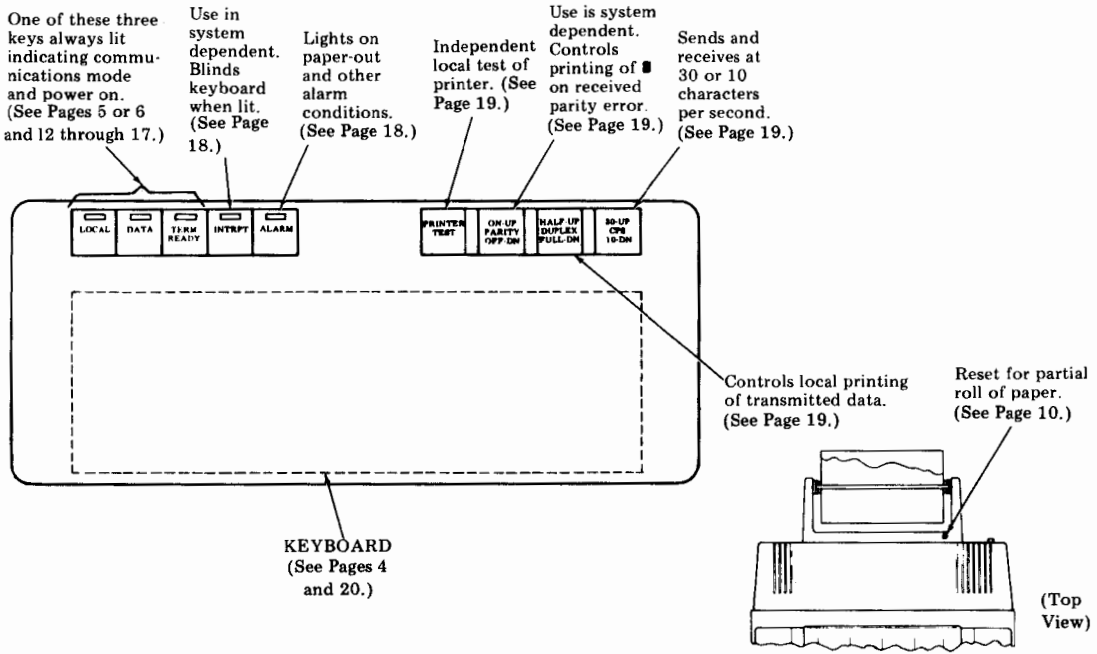


*On sets with a directly connected telephone, the LOCAL and TERM READY keys are marked LOCAL-TALK and AUTO ANSW, respectively.

- Power should normally be left on to automatically answer incoming calls on arrangements so equipped or receive data messages. However, when not in use, the power to the teleprinter may be turned off without affecting the normal use of the telephone.

OPERATIONAL CONTROLS AND STATUS INDICATORS

- Use and function of the operational control and status indicators should be reviewed before the 43 Teleprinter is operated locally or on-line.



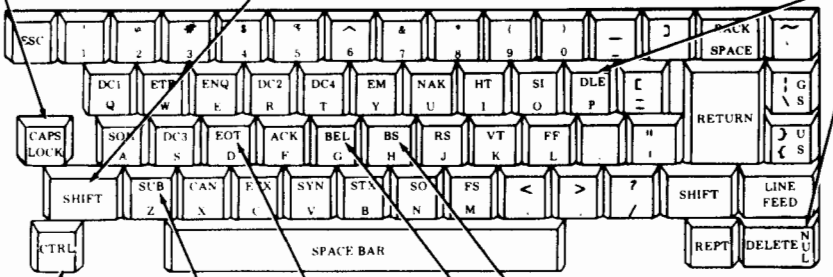
KEYBOARD LAYOUT

- The keyboard is operational locally in the Local mode and on-line in the Data mode.

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 LOCK.)

See Page 20 for the remaining CTRL key generated characters.



- Several keys perform special functions in addition to sending the code when depressed together with the CTRL key:

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

- Several escape sequence functions also can be performed by depressing the ESC followed by the indicated lower case key. (See Page 20.)

ESC l — (ESC lower case L) set left margin.
ESC r — Set right margin.
ESC x — Clear left and right margin.
ESC m — Releases left and right margin.

ESTABLISHING COMMUNICATIONS WITH DISTANT TERMINALS

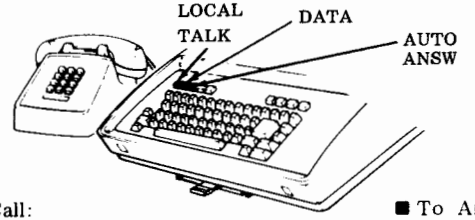
Procedures for Arrangements Without an Associated Telephone Directly Connected to the Terminal

- Establishing connection and transferring to the Data mode on these arrangements is basically under the control of the directly connected communications device (modem) and its associated telephone over the switched-network or, without a telephone over private lines. In some arrangements terminals are directly connected to the distant terminal or computer. Use of these external devices should be specified locally since many variations are possible, ie, pushbuttons on modem or on phone, exclusion keys, automatic answer, etc.

- The procedures as shown below, that normally apply to operation of the controls of the terminal, should be followed:
  - Before transferring a telephone call to the Data mode (call originated or answered) or to place terminal in a ready condition:
    1. Turn on ac power (see Page 2).
    2. Clear any alarm condition (paper-out, cover open).
    3. Depress TERM READY key (if not lit). Key should light.
  - Transfer to Data mode
    - The DATA key lights under control of the external device or distant station:
      1. Data can be sent or received on-line only when the DATA key is lit and the LOCAL key is not lit.
      2. On some arrangements the DATA key may light immediately without the TERM READY key being lit.
  - To disconnect a telephone call in DATA mode
    - Calls may be disconnected as follows:
      1. An EOT code is received. (TERM READY key may light.)
      2. The LOCAL key is depressed. (LOCAL key will light.)
      3. Paper-out and eight received line feeds (LOCAL key will light.)
      4. Other log-off procedures, loss of data signals, etc.

Procedures for Arrangements With an Associated Telephone Directly Connected to the Terminal

- Telephone calls must be originated and answered as follows in order to send and receive messages or talk. Calls can also be disconnected as described below. Power must be on to complete a data call (see Page 2).



■ To Originate a Call:

1. LOCAL TALK key lit. Depress if not lit. Dial in normal manner. (If dial tone is not heard, hang up momentarily.)
2. Listen for Data tone or talk:
   - If tone is heard, transfer to Data.
   - If no tone is heard, talk, then transfer to Data when agreed.
3. Transfer to Data mode by depressing DATA key and hang up. Key lights (may flash before lighting).
4. Data transmission may begin.

■ To Answer a Call With AUTO ANSW Key Lit: (May be depressed to light.)

1. No action required. Phone rings once. DATA key lights and AUTO ANSW key extinguishes.
2. Data transmission may begin.

■ To Answer a Call With LOCAL TALK Key Lit: (Depress if not lit.)

1. When phone rings lift handset and talk.
2. When agreed, transfer to data by depressing DATA key and hang up.
3. Key lights (may flash before lighting).
4. Data transmission may begin.

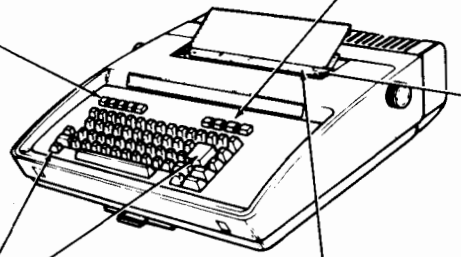
■ To Disconnect a Call:

1. In Data mode:
   - Depress the LOCAL TALK key or:
   - Send EOT or other log-off procedures or:
   - Transfer to Automatic Answer mode.

2. In Local Talk mode:
   - Hang up handset.

Note: Call may also disconnect from remote signals, such as received EOT. See the backside of the directory card for any exception to this feature, Option 433b.

KEYBOARD-PRINTER OPERATION



● The keyboard-printer can be operated locally with the LOCAL or LOCAL-TALK key lit or on-line with the DATA key lit.

● Signal Bell

The signal bell sounds when characters are entered seven characters before and at the right margin, ie, margin at 80, bell at 73 and 80. Also sounds at left margin when attempting to backspace and when an interrupt is sent.

● Local Return Line Feed

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

● Printer

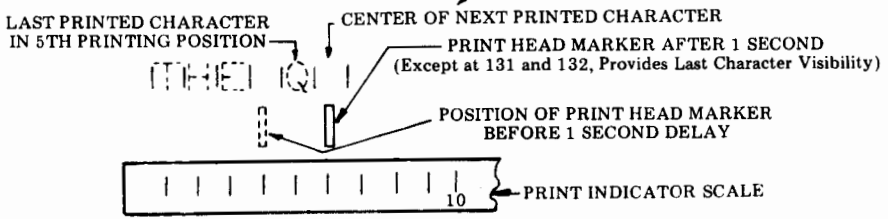
The printer copies all printable data messages except that in full duplex (Data mode only) the printer copies received data only.

● Margin Setting

When power is turned on, the left- and right-hand printing margins are reset to 1 and 132 on sprocket feed or 1 and 80 on friction feed. They may be set or cleared locally or on-line by using the escape sequences. See Page 4. To change either margin outward, both must be reset.

● Indicator Scale

The next printing location of the print head and the position for setting left- and right-hand margins is indicated by the print head marker at the print indicator scale. The print head moves back when printing resumes after 1 second delay.



TELEPRINTER SUPPLIES MAINTENANCE

It is your responsibility to keep the teleprinter equipped with sufficient paper and ribbon. In addition, an adequate supply of these items should be ordered and kept in storage.

Ribbon

Only cartridges with ribbon designated for use with 43 Teleprinter should be used. Teletype part number is 430035.

The cartridge with ribbon can be ordered from Teletype Corporation, 5555 Touhy Avenue, Skokie, IL 60076. An order form included with each new cartridge may be used for this purpose or established ordering procedures may be followed for large orders.

The ribbon should be replaced whenever it becomes frayed or print density becomes light. After the first few ribbons, replacement ribbons should produce 3 million or more legible characters of printing.

Paper

Paper for the 43 Sprocket Feed Teleprinter must be 12 inch wide sprocket feed. The original and up to two-copy multi-ply forms may be used. Paper frequently used with each teleprinter is single-ply and has 8-1/2 inch folds to provide 11 inch x 8-1/2 inch copy when the serrations are removed. This single-ply 15 pound basic paper may be obtained from the suppliers listed below or other suppliers.

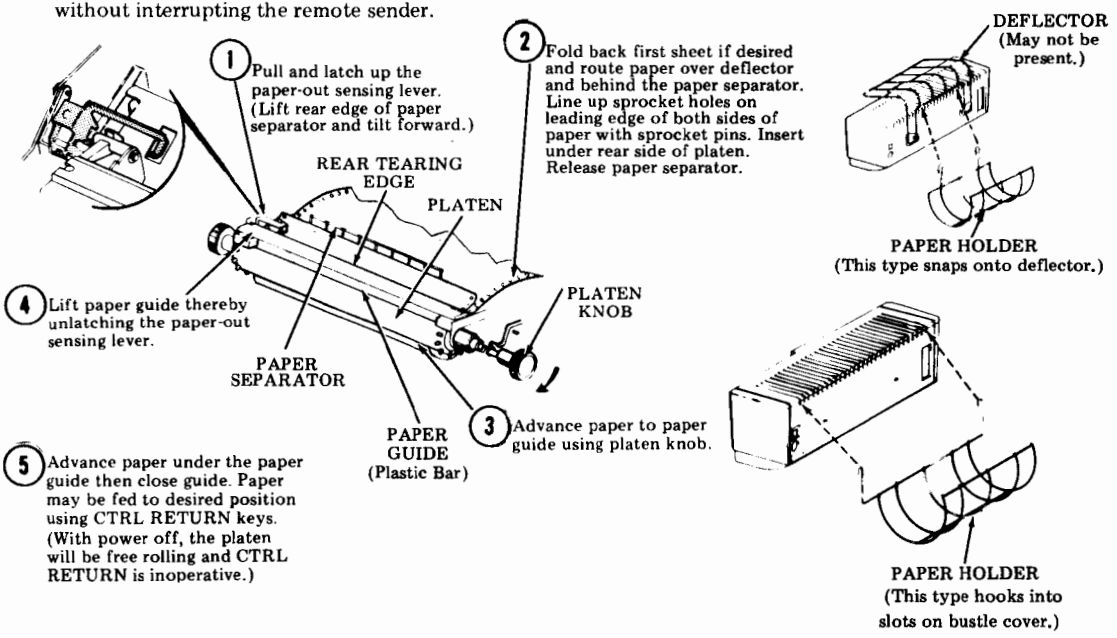
Wallace Business Forms Inc.	Duplex Products Co.
444 W. Grand Ave.	228 W. Page
Chicago, IL 60610	Sycamore, IL 60178
Cat. No. E-6879	Cat. No. 1-1280-15P

Paper for the 43 Friction Feed Teleprinter should be standard 8-1/2 inches wide, single-ply, furnished in 5 inch maximum diameter rolls with a 1 inch diameter spindle hole.

INSTALLING PAPER (Sprocket Feed)

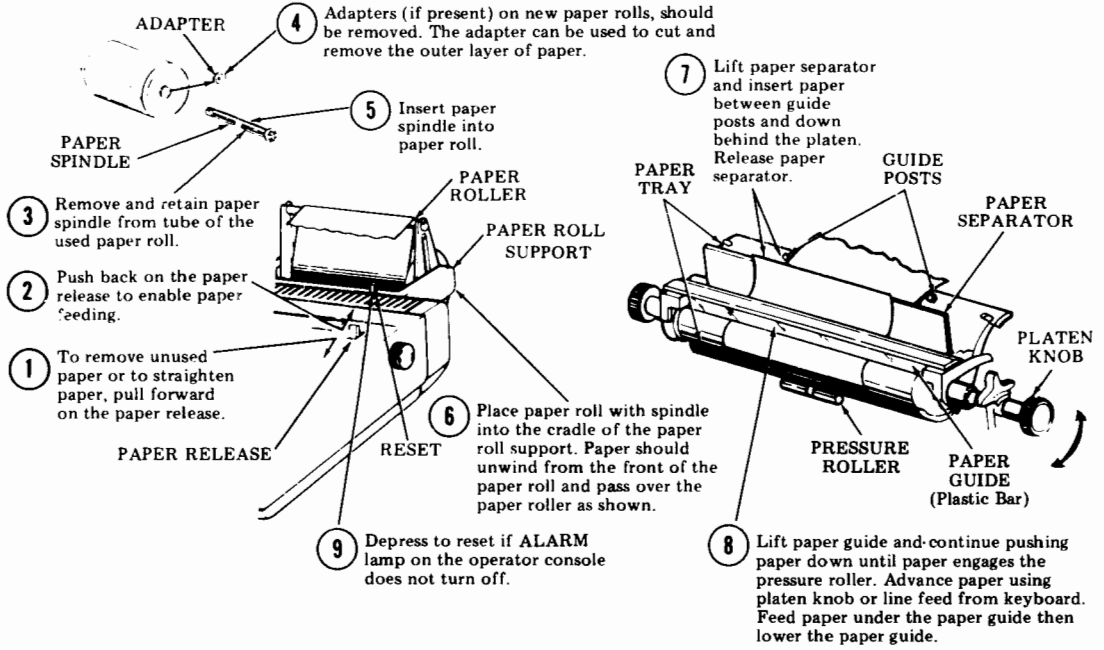
- Install paper as shown after centering the print head and removing the unused paper. It is not necessary to open the cover or turn off power. However, to avoid loss of data, paper should not be replaced without interrupting the remote sender.

Note: Paper may be fed directly from the supply box or if the paper holder is used, a limited stack of forms may be placed in the holder and fed over the deflector.



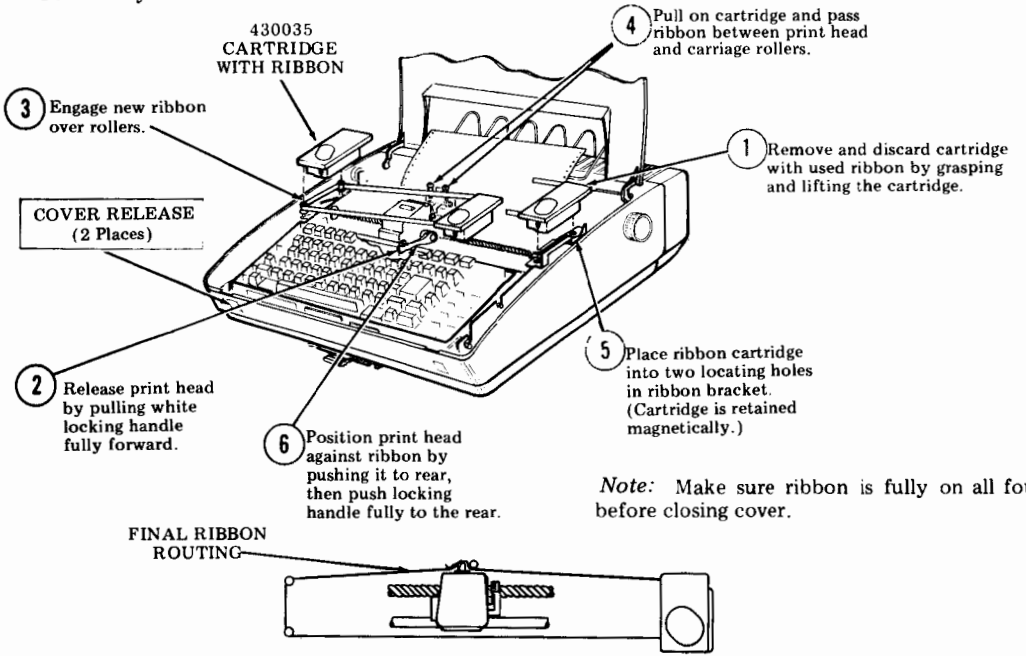
INSTALLING PAPER (Friction Feed)

- Install paper as shown after removing the unused paper from the printer. It is not necessary to turn off power or open the cover when replacing the paper but to avoid loss of data, paper should be replaced after the remote terminal stops sending.



INSTALLING RIBBON

- Install ribbon as shown after centering the print head and opening cover. (Alarm lamp lights.) Any data received with the cover open will not be printed and the keyboard and operational controls will be disabled. Power may remain on.



Note: Make sure ribbon is fully on all four rollers before closing cover.

SUPPLEMENTARY OPERATIONAL INFORMATION
(Pages 12 Through 26)

LOCAL TALK MODE KEY

(Arrangements With a Directly Connected Modular Telephone)

Key lights in Local Talk mode.

- The Local Talk mode can be entered:
  - At any time, by momentarily depressing the LOCAL TALK key. Will disconnect call in Data mode.
  - By depressing the PRINTER TEST key. (See Page 19.)
  - Opening the cover or removing paper in the Automatic Answer mode.
  - Receiving eight line feeds in the Data mode after paper-out alarm.

- The telephone is enabled for normal use and the keyboard printer can be operated locally off-line in the Local Talk mode. See Page 6 for telephone and Page 7 for keyboard-printer operation.

- The Local Talk mode can be terminated by:
  - Depressing AUTO ANSW key.
  - Transferring call to Data mode.
  - Turning off power.

- Can be used to clear Loop-Back mode or immediately stop flashing of DATA key when a call is abandoned.

(Arrangements With No Directly Connected Telephone)

Key lights in Local mode.

- The keyboard printer can be operated locally off-line in the Local mode. (Telephones associated with external communications devices may be able to operate regardless of the condition of the LOCAL lamp.)

- The Local Talk mode can be entered:
  - At any time, by momentarily depressing the LOCAL TALK key. This may cause a disconnect.
  - When PRINTER TEST key is operated.
  - Opening the cover or by removing paper in the Automatic Answer mode.
  - Receiving eight line feeds in the Data mode after paper-out alarm.

DATA MODE KEY

(Arrangements With a Directly Connected Modular Telephone)

Key lights in Data and when in Analog Loop-Back.

- Data can be sent or received on-line in the Data mode only.

- The Data mode can be entered:
  - Automatically — following a telephone call or Analog Loop-Back in the Automatic Answer mode.
  - Manually — after a telephone connection has been established in the Local Talk mode by momentarily depressing the DATA key before hanging up.

- The Data mode will be terminated disconnecting the call when:
  - Eight line feeds are received after paper-out alarm. (See Page 18.)
  - The mode is manually transferred to Automatic Answer (Page 15) or Local Talk (Page 12).
  - The character EOT (CTRL D on the Model 43 keyboard) is received.
  - Data signals from the remote station are lost.
  - The local printer test is operated (Page 19).
  - The call is disconnected for any reason (Page 17).
  - Power is turned off.

- The telephone is disabled during the Data mode (cannot ring, dial or talk).

- The DATA key may blink indicating a short interruption in data signals (short flash).

- Transfer to Data cannot be completed if the answering station turned on power after the call was received.

  Note: The DATA key flashes during transfer from the Automatic Answer or Local Talk modes. If the transfer is not properly completed within 20 seconds, (ie, local or distant station does not go to Data mode, etc.) the DATA key will stop flashing, the call will disconnect and the AUTO ANSW key will light.

(Arrangements With No Directly Connected Telephone)

Key lights in Data mode.

- With key lit (LOCAL and ALARM lamps not lit) data can be sent and received on-line.
- The Data mode is under control of the external communications device or directly connected distant terminal. (See TERM READY.)
- The DATA key is blocked from operation.

AUTOMATIC ANSWER MODE KEY

(Arrangements With a Directly Connected Modular Telephone)

Key lights in Automatic Answer mode.

- When power is turned on, the teleprinter will be in the Automatic Answer mode. In this mode the telephone will be partially disabled. (No dial tone and no dialing or talking but the ringer can sound) and no printing or data transmission can occur.

- Telephone calls received in the Automatic Answer mode will be answered automatically after one ring on the telephone and the AUTO ANSW key will turn off.

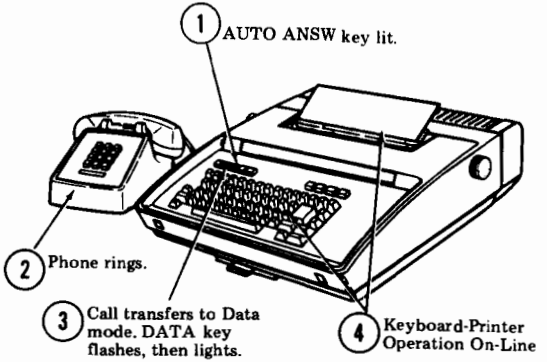
  Note: The handset must be on-hook to answer the call.

- Following the ring, the teleprinter will automatically transfer to the Data mode only after the remote originating station transfers to the Data mode.

- The Automatic Answer mode can also be entered:

  - Automatically — following calls in the Data mode. (See Pages 13 and 14 for Data mode.)

  - Automatically — following a flashing DATA key when a call is not completed.



- Depressing AUTO ANSW key momentarily after local operation or talking on the phone. (See Page 12 for Local Talk mode.) If depressed during Data mode the call will disconnect.

- The Automatic Answer mode can also be terminated by:

  - Opening the cover.
  - Operating local printer test.
  - Removing paper.
  - Manual transfer to Local Talk mode.
  - Turning off power.

(Arrangements With No Directly Connected Telephone)

Key lights indicating Terminal Ready mode.

- When power is turned on, the TERM READY lamp will light indicating a standby condition during which calls may be originated or answered.

- When calls are complete and data communication is established as indicated by the DATA lamp lighting, the TERM READY lamp turns off.

- The Terminal Ready mode can also be terminated by:

  - Opening the cover.
  - Operating local printer test.
  - Removing paper.
  - Manual transfer to Local Talk mode.
  - Turning off power.

- The Terminal Ready mode can be entered by depressing the TERM READY key momentarily. If depressed during the Data mode, a telephone call may disconnect or DATA lamp may extinguish.

- On private line arrangements, the TERM READY lamp lights only when the terminal is ready but the remote terminal or external data set is not ready.

TRANSFER TO TALK

(Arrangements With a Directly Connected Modular Telephone)

Calls can be transferrred from the Data mode to the Talk mode. (See Page 5 for transfer back to the Data mode.)

To transfer to the Talk mode, lift the handset and depress the LOCAL TALK key at each station.

Note: If the LOCAL TALK keys are not depressed within 4 seconds of each other a possible disconnect or transfer to the Automatic Answer mode may occur. This can be avoided by prearranged "go to talk" signals that should be exchanged before the transfer is initiated.

(Arrangements With No Directly Connected Telephone)

Call transfer to Talk from the Data mode is under the control of external data communications devices and any associated telephone. Transferring to the Local mode may cause a disconnect. Normally, however, the external communications device will cause the DATA lamp to extinguish and the TERM READY to light when transfer to Talk is initiated.

DISCONNECTING TELEPHONE CALLS

- Telephone calls in the Local Talk mode will be disconnected when the handset is placed on-hook.
- Transfer to Automatic Answer from the Local Talk mode or incomplete transfer to Data (after 20 seconds) will also disconnect the call.
- Telephone calls in the Data mode may be disconnected when:
  - An EOT is received.
  - The printer test is initiated.
  - Manual transfer to Automatic Answer.
  - Transfer to Local Talk mode (disconnects after 4 seconds if handset is on-hook).
  - Eight line feeds received on-line after the ALARM key lights due to a paper-out condition (sprocket feed only).

INTERRUPT AND ALARM KEYS

Key lights when transmission has been interrupted by the remote station.

Note: The use of this key is system dependent. It may not be operable with some remote stations. When operable, its use should be under direction of the system.

- The INTRPT key operates as follows:
  - It lights under control of the remote station. When lit, keyboard sending is disabled.
  - If depressed momentarily when lit, the interrupt is canceled.
  - If depressed when not lit, the remote station sending may be interrupted ie, stop sending. Locally bell rings and key lights momontarily.
- Interrupt is also canceled by a disconnect or when power is turned off.

Key lights or flashes when alarm condition exists.

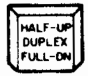
- Lights when:
  - Paper-out condition is sensed (sprocket feed). This is an advance warning that eight received line feeds later (in the Data mode), the call will disconnect. Also, after thirteen line feeds, paper will be out at the print head.
  - Low paper condition is sensed (friction feed). This is an advance warning that 25 to 50 feet of paper remain on the paper roll.
  - When the cover is opened.
  - When printer test is operated.
- Flashes when:
  - Teleprinter is in a Loopback Test mode.
- Can be cleared by:
  - Replacing paper or closing cover.
  - On friction feed printers, if a partially full paper roll is installed, it may be necessary to depress the RESET key on the paper roll support. See Page 10.
  - When flashing by:

    ESC = sequence.
    Depressing LOCAL TALK key.
    Turning off power.

Note: In some systems, the ALARM key may be flashing during normal operation accompanied by printing. Unless otherwise instructed, the Alarm should be cleared after extended periods of flashing. See Page 20.

PRINTER TEST, PARITY, DUPLEX AND CHARACTER SPEED KEYS

An independent test of the printer is provided for use by attendant or field service personnel. Test consists of continuous printing of the 94 character printed set as shown below. During test, bell rings and automatic return of carriage and line feed is performed within margin restraints.† Test should not be performed in Data mode since Data mode will be terminated and a telephone call will be disconnected. Depression of PRINTER TEST key initiates test. Test is terminated when this key is released. (See Pages 12 through 16 and 18 for keys that light or extinguish during test.)



Half-Duplex (key up) — printer copies data sent and received. The printer can be blinded to on-line transmission from the local keyboard while receiving messages simultaneously from the remote sender. This mode is known as Full Duplex (key down — DN).

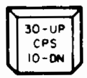
Note: The local CR-LF function will not be performed in Full Duplex.

Sample of Test Message

```
                                                                  |← Line Length 72 — Option 432b.*
                                                                        |← Line Length 80 —
                                                                           Option 432c.*
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
           Ø                         0                      ←   Option 431b.*        As Factory
           0                         Ø                      ←   Option 431c.*        Furnished
```

The proper position of this key depends on system application. The remote sender may or may not be equipped to send correct (even) parity. The 43 Teleprinter sends even parity as factory furnished, Option 434a. When PARITY key is on, characters received with incorrect (odd) parity will print as substitute character symbol ■, when parity is off, the character that is received will be printed or performed if it is a printable character or a valid function. The PARITY key alternately locks down (DN) for parity off or releases up for parity ON to set parity checking mode.

In Half-Duplex, the printer copies all data sent and received but only one sender can operate at a time without interference, ie, characters from the keyboard will be inhibited if the unit is receiving on-line. The key locks down or releases up.



In order to communicate in the Date mode, the transmission rates of the sending and receiving stations must be the same. This key alternately locks down or releases up and sets the on-line operating speed of the station to either 30 (key up) or 10 (key down — DN) characters per second (300 or 100 words per minute).

*See backside of directory card for record of any option exceptions that may have been enabled.

†If margins are set for less than 96 characters, a character will be skipped (not printed) each time a new line starts, except for the new line that starts a new cycle of printing.

SPECIAL KEYBOARD CHARACTERS

- Codes for the following characters are generated from the 43 Teleprinter keyboard by use of the CTRL key and the key with the symbol shown, operated together.

  These characters are not functional in the Model 43 Teleprinter but may be used in some systems.

DC1	EM	GS	VT	SYN
ETB	NAK	SOH	FF	STX
ENQ	HT	DC3	US	SO
DC2	SI	ACK	CAN	FS
DC4	DLE	RS	ETX	NUL

- The special escape sequences listed below (in addition to those on Page 4) are functional in the 43 Teleprinter by sending (or receiving) the character immediately following the escape character (ESC key).

  Use of other escape sequences are system dependent. (Characters following ESC will not print).

ESC > Analog Loop-Back
ESC < Digital Loop-Back‡
ESC = Clears either Loop-Back
ESC w Returns carriage and paper advances one line.

} Completely functional only on arrangements with a directly connected modular telephone. Alarm lamp may still flash.

‡Used under control of remote station.

- Repeat speed varies depending on 10, 30 cps on line and approximately 50 cps locally.

KEY TELEPHONES AND EXTENSIONS

- The modular telephone directly connected to the 43 Teleprinter is used in accordance with the originating answering and disconnecting procedures on Pages 6 and 17. In these arrangements other phones cannot be used to originate data calls. The phone may be or have an extension and therefore would be subject to the limitations of extension telephones, for example:

  - Lifting handset, dialing or talking in an extension can interfere with data transmission.

  - Calls may not be disconnected if the extension is off-hook.

- In some cases, the modular phone may be a "designated" extension of a key telephone set. These extensions may be arranged (by use of an exclusion feature) to prevent interference from other phones. The installer should indicate the presence of any extension phones on the directory card.

- Key telephones may be associated with external data sets connected to the terminal. Use of these phones to originate and answer talk and data calls are under the control of the data set and should be specified locally.

WHEN TROUBLE OCCURS

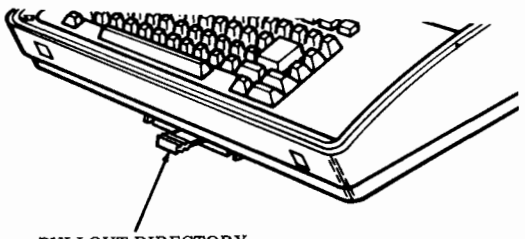
Trouble that is encountered with the terminal should be reported as locally specified. A number to be called in case of trouble may be entered on the directory card pullout by the installer.

If it can be determined that the trouble is in the remote equipment, the attendant at the location in trouble should follow local procedures for that area.

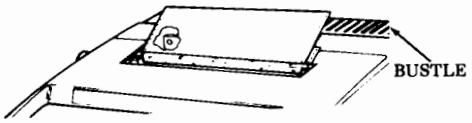
The following table of analysis questions is arranged to aid in the isolation of a trouble for:

- Local correction.
- Correction at the remote location.
- Advising service personnel in advance of trouble visit of Analysis Question results.

Before reporting a trouble, follow the Analysis Questions in the table always starting with Question no. 1 and then proceed according to the "Yes" or "No" directive on the following pages.



PULLOUT DIRECTORY
CARD FOR TROUBLE NUMBER

ANALYSIS QUESTION	YES	NO
1. Are one of the three communication mode keys lit? ●LOCAL or LOCAL-TALK ●DATA ●TERM READY or AUTO ANSW	Go to 2.	1. Check that power switch is on. 2. Check that power cord is connected. 3. Check source of power. (Wall switch, other equipment OK, circuit breaker, etc). 4. Report as local trouble in equipment.
2. Does test message print properly while the PRINTER TEST key is depressed? See Page 19.	Go to 4.	Go to 3.
3. Is red lamp on power supply lit? (Visible through slot in bustle 6th slot from the left).  	Report as local trouble in printer.	Report as local trouble in power supply.
4. Does printer respond properly to keyboard operation? (Local-Talk mode)	Go to 5 on terminals with a directly connected telephone. Go to 11 for other arrangements.	Report as local trouble in keyboard.

ANALYSIS QUESTION	YES	NO
5. Does printer respond properly to keyboard operation in Analog Loop-Back mode? (ie, print double in half-duplex.) (Entered from keyboard in Local Talk mode by ESC > sequence, ended by ESC =.) (Depress DATA key to light, ALARM key flashes.)	Go to 6.	Report as local trouble in "modem".
6. Does telephone operate normally in the Local Talk mode? (Dial tone, dialing, ringing, talk)	Go to 8.	1. Check that modular cords are connected at rear of teleprinter and phone. 2. Go to 7.
7. Does telephone operate normally when connected directly to line? (ie, modular cord from line connected to phone)	Report as local trouble in teleprinter.	Report as local trouble in telephone.
8. Does phone ring repeatedly in Automatic Answer mode? (ALARM key not lit.)	Report as on-line trouble in teleprinter.	Go to 9.
9. Does DATA key light following call in Automatic Answer or when DATA key is depressed after originating call? (Connection established.)	Go to 11.	1. Remote station must also go to Data mode. 2. Check that modular cords are not reversed, ie, top cord should go to phone. 3. If key does not flash or light, report as trouble in teleprinter. 4. Go to 10.

ANALYSIS QUESTION	YES	NO
10. Is proper tone heard in handset? (High tone if remote party answered the call automatically or transferred to data.)	Report as on-line trouble in teleprinter. (Call does not transfer to Data mode.)	Trouble may be in remote station. (Call does not transfer to Data.)
11. Are data messages properly sent and received in the Data mode?	Go to 12.	1. Check proper speed, DUPLEX and PARITY key positions. 2. Check that INTRPT key is off. 3. Report as on-line trouble in teleprinter unless trouble occurs with only one other station.
12. Is trouble present but not isolated by Questions 1 through 11?	Report other troubles as specified in local instructions.	

NOTES:

BACK COVER