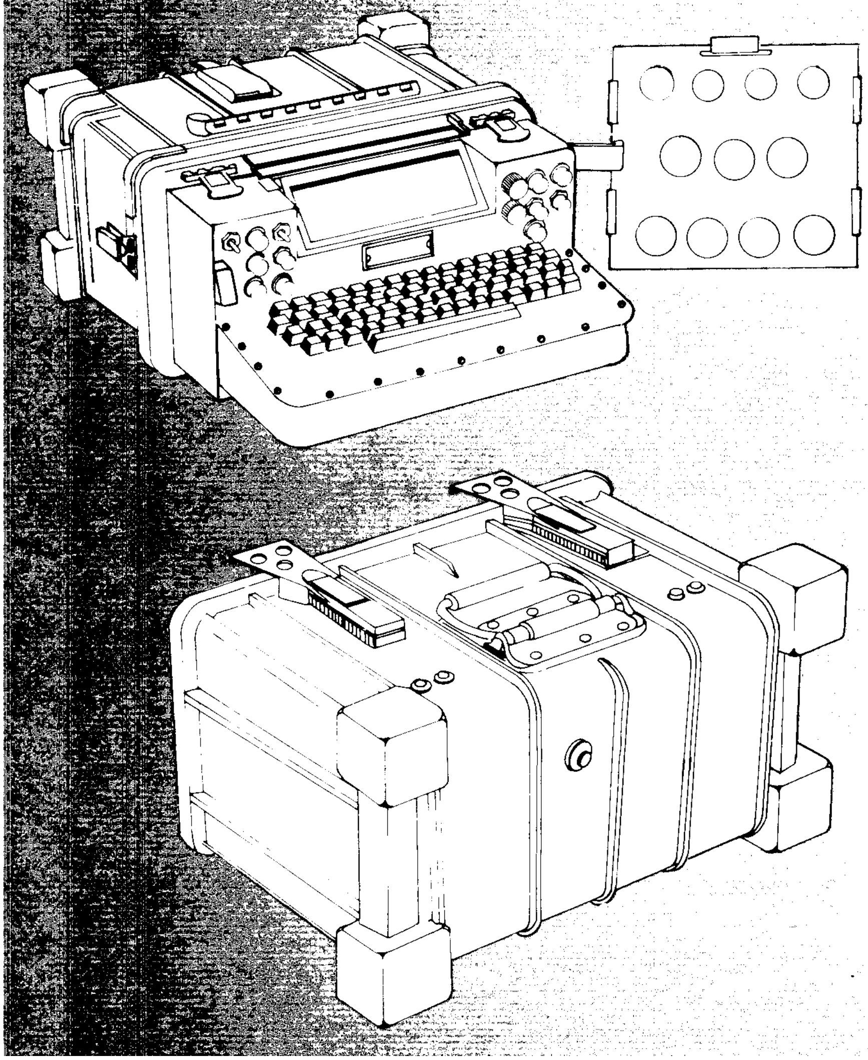
ARMY TM 11-5815-602-24
NAVY EE161-DM-MMM-010/E154UGC74
AIR FORCE TO 31W4-2UGC74-2

ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL



TERMINAL, COMMUNICATIONS AN/UGC-74A(V)3

(NSN 5815-01-062-8194)

DEPARTMENTS OF THE ARMY, THE NAVY, AND THE AIR FORCE

8 JANUARY 1984

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

4. SEND FOR HELP AS SOON AS POSSIBLE

5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

TM 11-5815-602-24
EE161-DM-MMM-01C/E154UGC74
TO 31W4-2UGC74-2
C 1

CHANGE

No. 1

DEPARTMENTS OF THE ARMY,
THE NAVY, AND THE AIR FORCE
Washington, DC, 1 January 1996

Organizational, Direct Support and General Support Maintenance Manual TERMINAL, COMMUNICATIONS AN/UGC-74A(V)3 (NSN 5815-01-062-8194) (EIC: HWS)

TM 11-5815-602-24/EE161-DM-MMM-010/E154UGC74/TO 31W4-2UGC74-2, 8 January 1984, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Added or revised illustrations are indicated by a vertical bar in front of the figure caption.

Remove Pages	Insert Pages
A and B	A and B
i through iv	i through iv
1-3 and 1-4	1-3 and 1-4
1-9 and 1-10	1-9 and 1-10
2-3 and 2-4	2-3 and 2-4
2-11 and 2-12	2-11 and 2-12
2-19 through 2-26	2-19 through 2-26
3-7 and 3-8	3-7 and 3-8
None	3-8.1 and 3-8.2
3-23 and 3-24	3-23 and 3-24
3-31 and 3-32	3-31 and 3-32
3-71 and 3-72	3-71 and 3-72
3-87 and 3-88	3-67 and 3-88
3-91 and 4-0	3-91 and 4-0
4-9 through 4-14	4-9 through 4-14
4-23 and 4-24	4-23 and 4-24
4-27 through 4-34	4-27 through 4-34
5-5 and 5-6	5-5 and 5-6
None	5-6.1 and 5-6.2
5-9 and 5-10	5-9 and 5-10
5-81 and 5-82	5-81 and 5-82
5-89 through 5-92	5-89 and 5-90
6-17 end 6-18	6-17 and 6-18
6-63 through 6-66	6-63 through 6-66
None	6-66.1 and 6-66.2
6-67 end 6-68	6-67 and 6-68
6-71 through 6-74	6-71 through 6-74
6-83 through 6-86	6-83 through 6-86
6-123 and 6-124	6-123 and 6-124
6-127 through 6-130	6-127 through 6-130
6-135 through 6-140	6-135 through 6-140
A-1 and A-2	A-1 and A-2
B-11 and B-12	6-11 and B-12
None	D-1 and D-2

2. File this change sheet in front of the publication for reference purposes.

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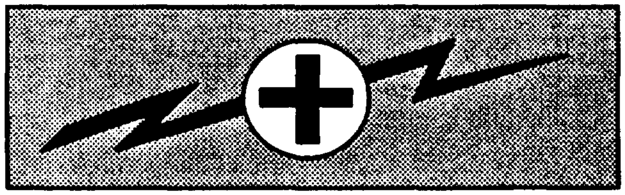
WARNING



HIGH VOLTAGE

is used in the operation of this equipment

DEATH ON CONTACT

may result if personnel fail to observe safety precautions

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technicians are aided by operators, they must be warned about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Be careful not to contact high-voltage connections or 115 volt ac input connections when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through the body.

Warning: Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.

For Artificial Respiration, refer to FM 21-11.

WARNING

Lithium organic batteries or cells are used in this equipment. They are potentially hazardous if misused or tampered with before, during, or after discharge. The following precautions must be strictly observed to prevent possible injury to personnel or equipment damage:

DO NOT heat, incinerate, crush, puncture, disassemble, or otherwise mutilate the batteries.

DO NOT shortcircuit, recharge, or bypass internal fuse.

DO NOT store in equipment during long period of nonuse in excess of 30 days.

TURN OFF the equipment immediately if you detect battery compartment becoming unduly hot, hear battery cells venting (hissing sound), or smell irritating sulphur dioxide gas. Remove and dispose of the battery only after it is cool (30-60 minutes).

Turn spent lithium batteries lacking a discharge switch into the Defense Reutilization and Marketing Office (DRMO) for disposal. If the lithium battery is equipped with a discharge switch, use the switch to discharge the battery completely and discard it as refuse.

Technical Manual
No. 11-5815-602-24
Technical Manual
No. EE161-DM-MMM-010/E154UGC74
Technical Order
No. 31W4-2UGC74-2

DEPARTMENTS OF THE ARMY,
THE NAVY, AND THE AIR FORCE

Washington, DC, 8 January 1984

Organizational, Direct Support, and General Support Maintenance Manual
TERMINAL COMMUNICATIONS AN/UGC-74A(V)3 (NSN 5815-01-062-8194) (EIC: HWS)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications-Electronics Command and Forth Monmouth, ATTN: AMSEL-LC-LM-LT, Fort Monmouth, New Jersey 07703-5007.

For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, T.O. 00-5-1. Forward direct to prime ALC/MST.

For Navy, mail comments to the Commander, Space and Naval Warfare Systems Command, ATTN: SPAWAR 8122, Washington, DC, 20363-5100.

In either case, a reply will be furnished direct to you.

TABLE OF CONTENTS

*This manual, together with, TM 11-5815-602-10, 23 September 1983, supersedes TM 11-5815-602-12, 30 November 1979 including Change 1, 16 March 1981 and TM 11-5815-602-34, 30 November 1979.

TABLE OF CONTENTS - Continued

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS – Continued

LIST OF TABLES

HOW TO USE THIS MANUAL

This manual tells you how to install, perform organizational maintenance, direct support maintenance, and general support maintenance of Communications Terminal AN/UGC-74A(V)3.

Location of Subjects in Manual

In this manual, paragraphs are numbered sequentially. If you are looking for specific information, use subject index at back of this manual to locate page where topic is described.

For rapid location of required subject, contents of chapter are listed alphabetically on the first page of each chapter.

Refer to appendix A, REFERENCES, for the complete title of all forms, technical bulletins, technical manuals and military specifications referenced in this manual.

Refer to GLOSSARY in the back of this manual for a definition of the abbreviations and unusual terms used in this manual.

Refer to TM 11-5815-602-20P for organizational maintenance repair parts and special tools lists (RPSTL); refer to TM 11-5815-602-34P for direct support and general support maintenance repair parts and special tools lists (RPSTL) used with this manual.

Use of Manual for Task Performance

You must familiarize yourself with the entire maintenance procedure before beginning the maintenance task.

You should also familiarize yourself with the operational capabilities of the terminal in order to properly perform your maintenance tasks. Refer to the operator's manual TM 11-5815-602-10 for this information.

Organizational maintenance personnel should refer to section I in chapter 3 of this manual for a good understanding of how the major components of the terminal function.

After servicing the equipment, and before returning it to the user, all levels of maintenance personnel should refer to section III in chapter 2 and perform a complete operational check of the terminal. This will insure the user receiving a 100 percent serviceable terminal.

Do not perform maintenance tasks that are assigned to a maintenance level higher than you are authorized to perform. Chapters 1 through 4 can be used by all levels of maintenance personnel (except operator). Chapter 5 is used by direct and general support personnel only. Chapter 6 is used only by general support personnel.

CHAPTER 1

INTRODUCTION

PAGE

Section I. GENERAL INFORMATION

Section II. EQUIPMENT DESCRIPTION AND DATA

Section III. PRINCIPLES OF OPERATION

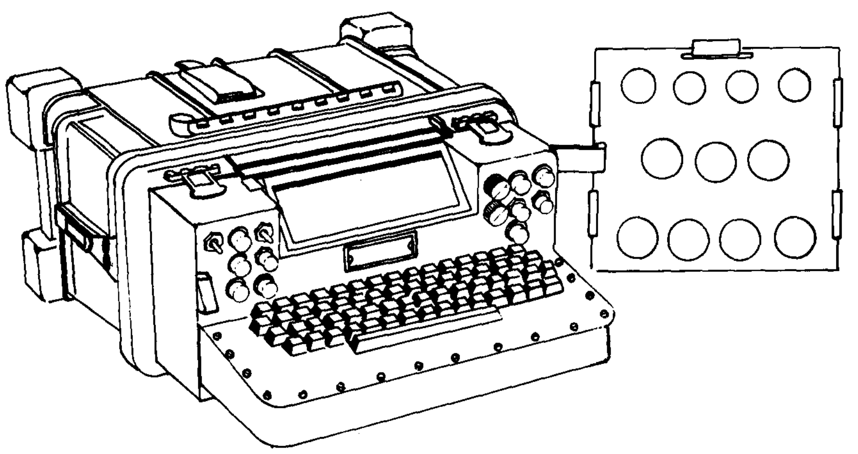


Figure 1-1. TERMINAL, COMMUNICATIONS AN/UGC-74A(V)3

Section I. GENERAL INFORMATION

1-1. SCOPE.

TYPE OF MANUAL: Organizational, Direct Support, and General Support Maintenance
MODEL NUMBER AND EQUIPMENT NAME: AN/UGC-74A(V)3 Communications Terminal

PURPOSE OF EQUIPMENT: Provides a full-duplex, asynchronous (ASCII or Baudot) communications capability with MIL-STD-188C and normal input keying (NIK) interfaces.

1-2. CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS.

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

1-3. MAINTENANCE FORMS, RECORDS, AND REPORTS

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, as contained in Maintenance Management Update (Army). Air Force personnel will use AFR 66-1 for maintenance reporting and TO-00-35D54 for unsatisfactory equipment reporting. Navy personnel will report maintenance performed utilizing the Maintenance Data Collection Subsystem (MDCS) IAW OPNAVINST 4790.2, Vol 3, and unsatisfactory material/conditions (UR submissions) IAW OPNAVINST 4790-2, Vol 2, Chapter 17.

b. Report of item and Packaging Discrepancies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

c. Transportation Discrepancy Report (TDR) (SF 361). Fill out and forward Transportation Discrepancy Report (TDR) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

a. **Army.** If your Terminal, Communications AN/UGC-74A(V)3 needs improvement, let us know. Send us an EIR. You, the user are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance, Put it on an SF 368 (Product Quality Deficiency Report). Mail it to Commander US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-ED-CFO, Fort Monmouth, New Jersey 07703-5023. We'll send you a reply.

b. **Air Force.** Air Force personnel are encouraged to submit EIR's in accordance with AFR 900-4.

c. **Navy.** Navy personnel are encouraged to submit EIR's through their local Beneficial Suggestion Program.

1-5. ADMINISTRATIVE STORAGE

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment from administrative storage, the PMCS should be performed to assure operational readiness. Disassembly and repacking of equipment for shipment or limited storage are covered in chapter 4, section V.

1-6. DESTRUCTION OF ARMY ELECTRONICS MATERIEL

Destruction of Army electronics materiel to prevent enemy use is described in TM 750-244-2.

1-7. NOMENCLATURE CROSS-REFERENCE

NOTE

Official nomenclature must be used when filling out report forms or looking up technical manuals.

COMMON NAME	OFFICIAL NOMENCLATURE
Terminal	Terminal, Communications AN/UGC-74A(V)3

INTERFACE

- Receives/transmits data in accordance with MIL-STD-188-114; 20/60 milliamp neutral; NIK for use with TSEC/KW-7.
- Communications line in MI L-STD-188-144 is + 6V polar, nonreturn to zero (NRZ) or conditioned diphase.
- These signals are converted to and from internal logic level signals.

RECEIVER/TRANSMITTER

- Receiver decodes and converts serial input signals into parallel logic output.
- Transmitter encodes and converts parallel logic input levels into serial signals.
- Most of these operations are combined into one integrated circuit called a Universal Synchonous/Asynchonous Receiver/Transmitter (USART).
- Operation is possible in ASCII or Baudot at speeds controlled by switch selection.

CENTRAL PROCESSING UNIT (CPU)

- Contains timing, microprocessor, scratch pad, random access memory, read only memory, switch and lamp interface, and baud rate generator.

CONTROLS AND INDICATORS

- Provide a man-machine interface, allowing manual inputs/operations and viewing of system status.

MEMORY

- Contains a program instruction read only memory (ROM) of 20K by eight bits each (20K x 8) and a message storage random access memory (RAM) of 16K by five bits each (16K x 5) which is a nominal ten pages of 1600 char/page.

PRINT CONTROL

- Compares central processing unit's commands to print commands with character's position on print-drum and initiates firing of print hammers.

PRINTING MECHANISM

- Provides character/drum positional data to print control and converts electrical signals to mechanical printing actions.

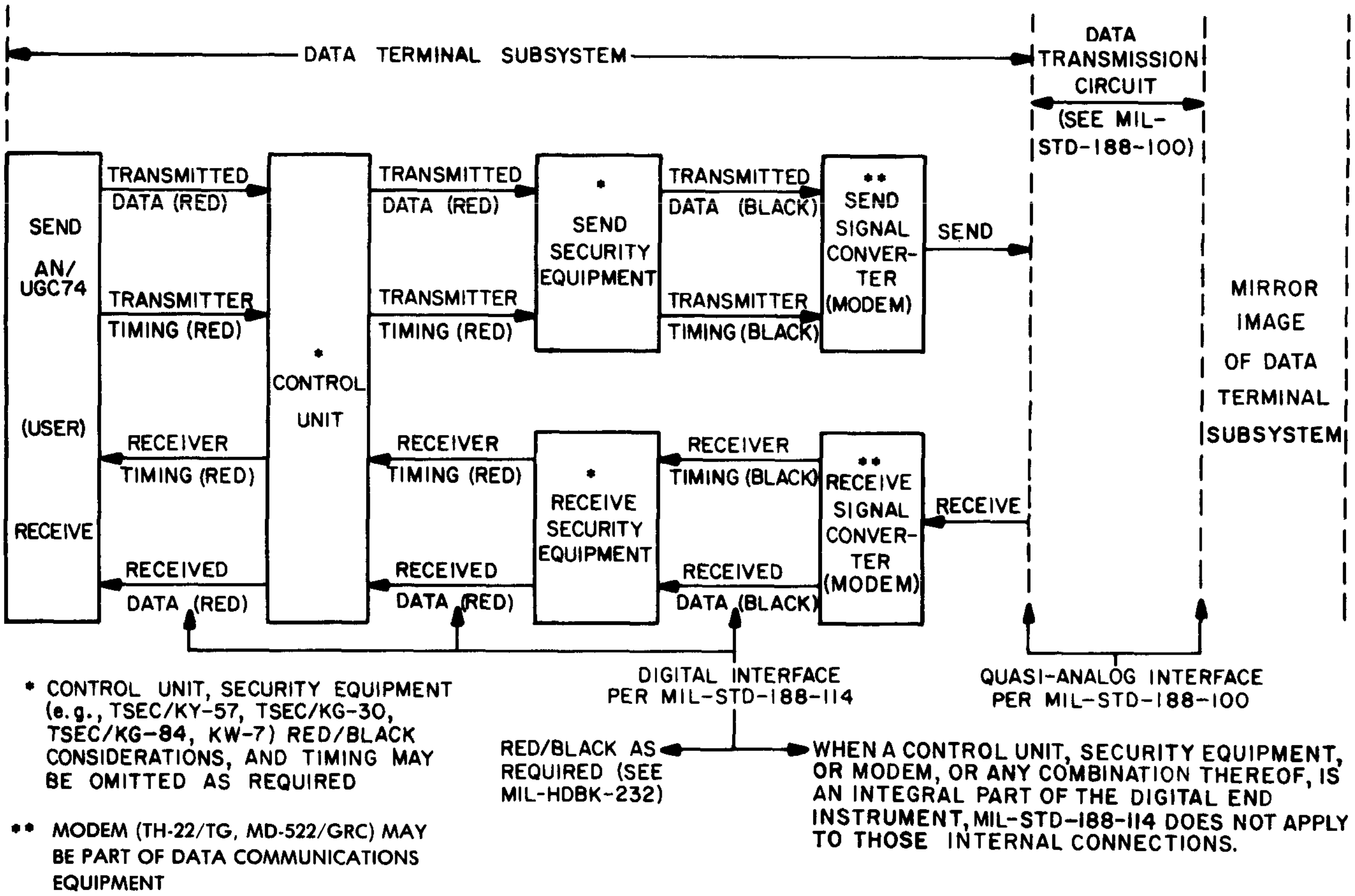
KEYBOARD

- Consists of 63 keys.
- 59 standard keys required by MIL-STD-1280 (Type 1, Class 1) and four additional editing keys.
- Keyboard is an ASCII keyboard that is also Baudot compatible.
- Keyswitches initiate character inputs to central processing unit (CPU).

1-11. SYSTEM APPLICATION

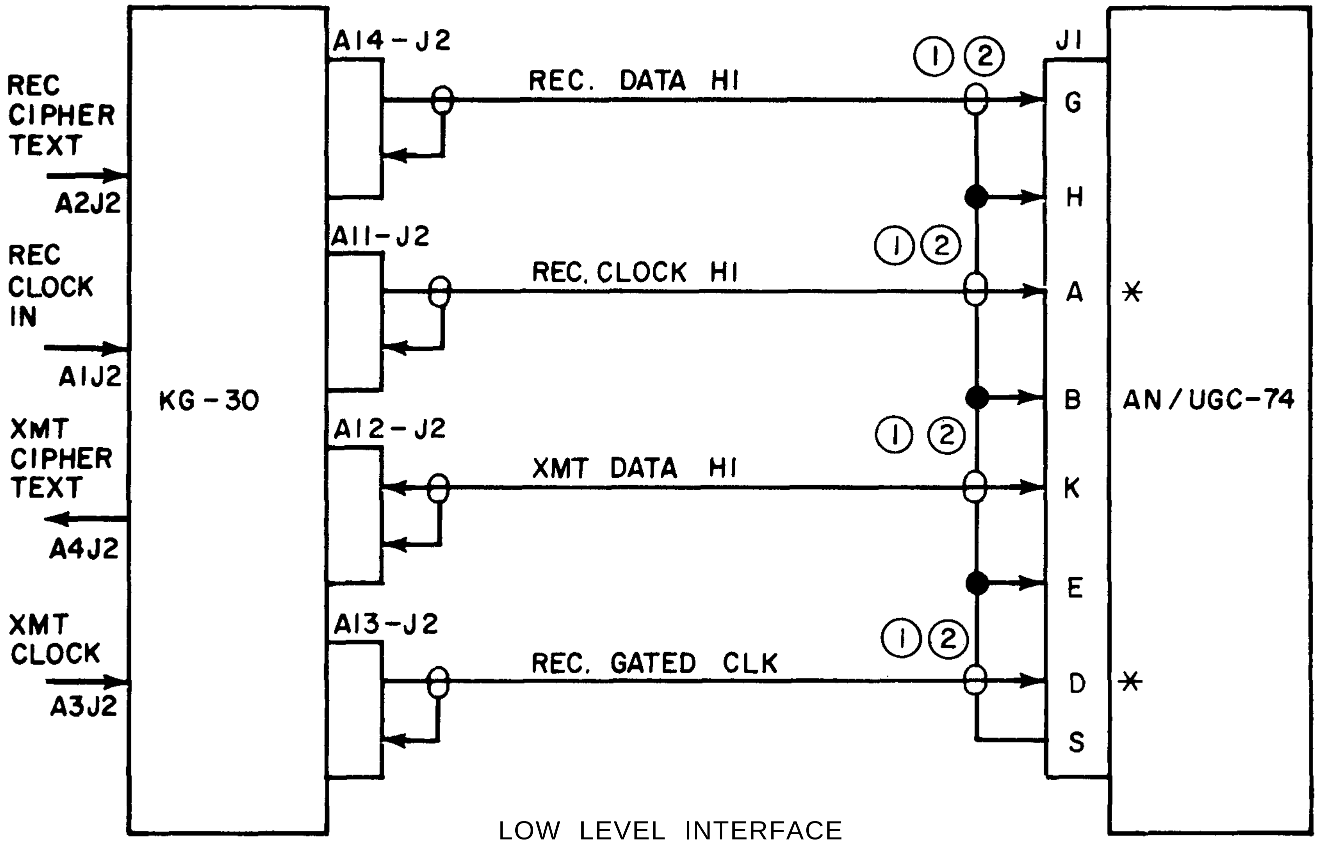
The terminal may be used in the following system configurations:

- FULL-DUPLEX - This configuration employs both the terminal transmit and receive capabilities and provides for simultaneous transmission and reception of data.
- HALF-DUPLEX - This configuration utilizes only the terminal's transmit and receive capabilities and provides for nonsimultaneous transmission and reception of data.
- SECURITY SUBSYSTEM - The block diagram below shows the terminal installed in a security subsystem interfaced with a control unit, security equipment (send and receive) and a send and receive signal converter (modem).



- SYSTEM INTERFACE - The terminal interfaces with MIL-STD-188-114 compatible devices such as:

Control Units, Security Equipment:	TSEC/KG-30	(fig. 1-2)
	TSEC/KG-84	(fig. 1-3)
	TSEC/KW-7	(fig. 1-4)
	TSEC/KY-57	(fig. 1-5)
Modems (Signal Converters):	MD-522/GRC	(fig. 1-6)
Telegraphs:	TH-22/TG	(fig. 1-7)



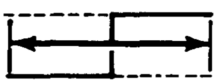
LOW LEVEL INTERFACE

INPUT AND OUTPUT DATA TRANSMISSION ±1/8 CLOCK PERIOD GATED CLOCK EDGE.

NOTE (1) INTERFACE LINES ARE EITHER HIGH SPEED (>200KBPS) OR LOW SPEED (< 200 KBPS) AND REQUIRE THE USE OF COAXIAL CABLE AS FOLLOWS: LOWSPEED-RG-62A/A, HIGH SPEED-RG-598/U. THE SIGNAL RETURN IS PROVIDED BY THE COAX WIRE SHIELDS.

(2) INTERCONNECTIONS DESIGNATED ACCORDING TO AN/UGC-74 WIRING DIAGRAMS * AN/UGC-74 OPERATE SIMULTANEOUSLY FROM BOTH GATED REC. CLOCK HI AND RECEIVE CLOCK HI FOR FULL DUPLEX MODE

RECEIVE DATA OUTPUTOR XMT DATA INPUT



GATED REC. CLOCK OR XMT CLOCK

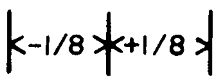
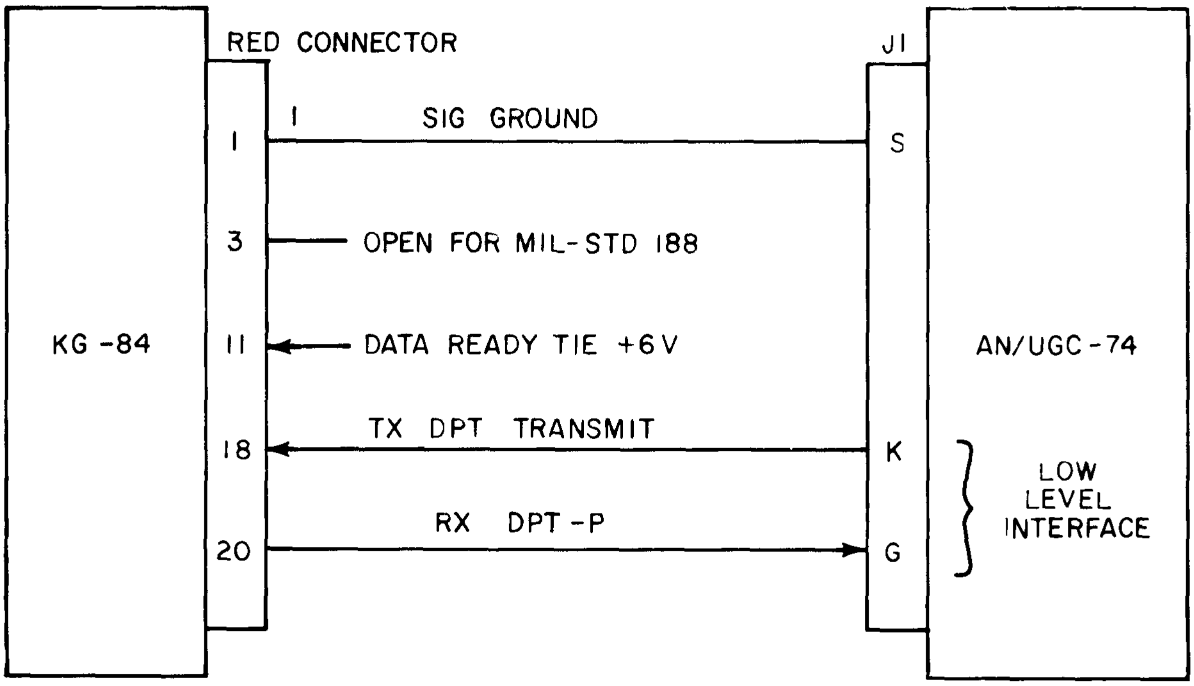


Figure 1-2. AN/UGC-74A(V)3 AN DKG-30 INTERFACE.



NOTE: 1. ALL UNUSED MIL-STD 188 INPUTS TO THE KG-84 MUST BE TIED TO THE APPROPRIATE ±6V TIE OFF POINT. (ASSUMED TO BE AVAILABLE ON KG-84).

Figure 1-3. AN/UGC-74A(V)3 AND KG-84 INTERFACE.

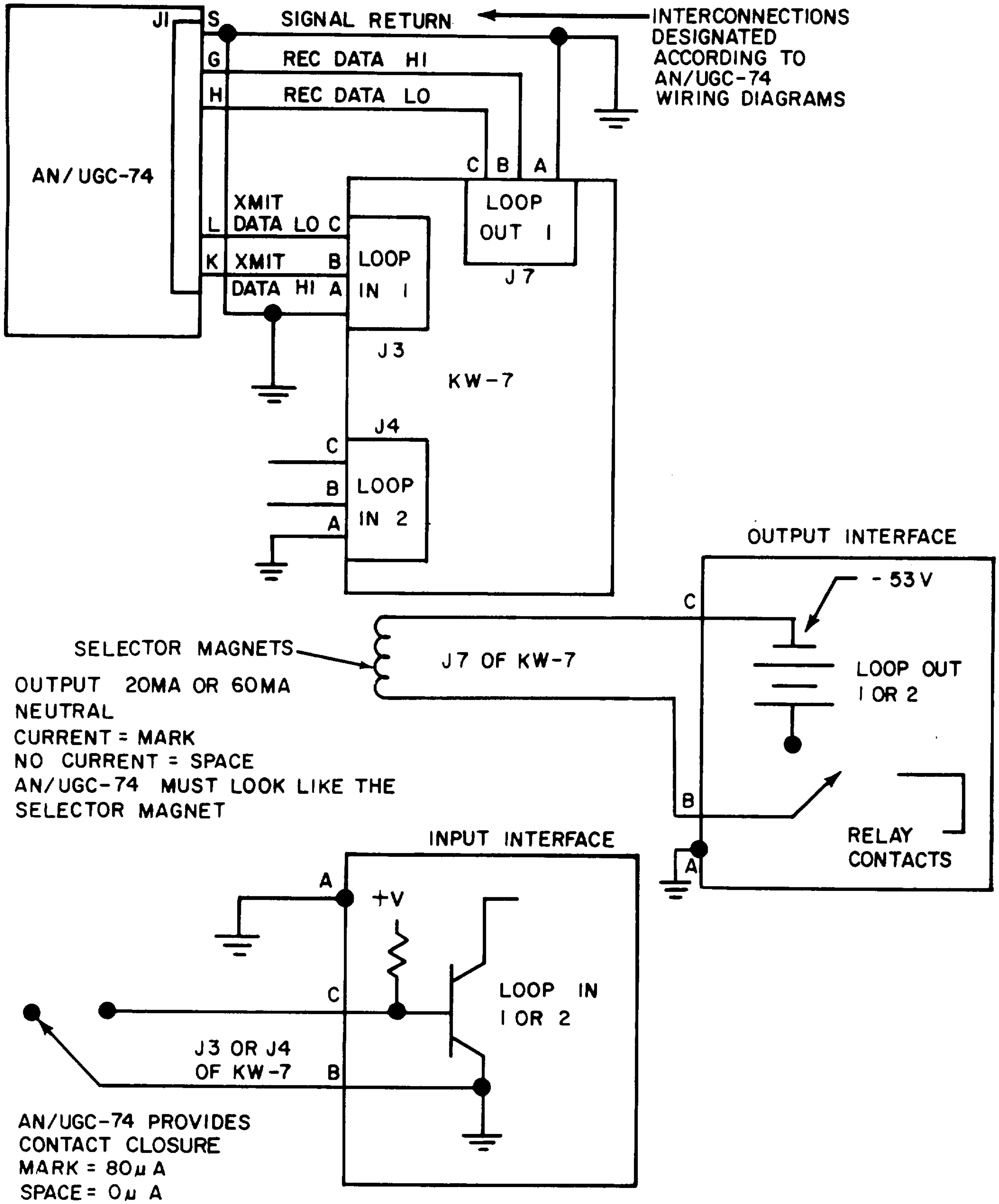


Figure 1-4. AN/UGC-74A(V)3 AND KW-7 INTERFACE.

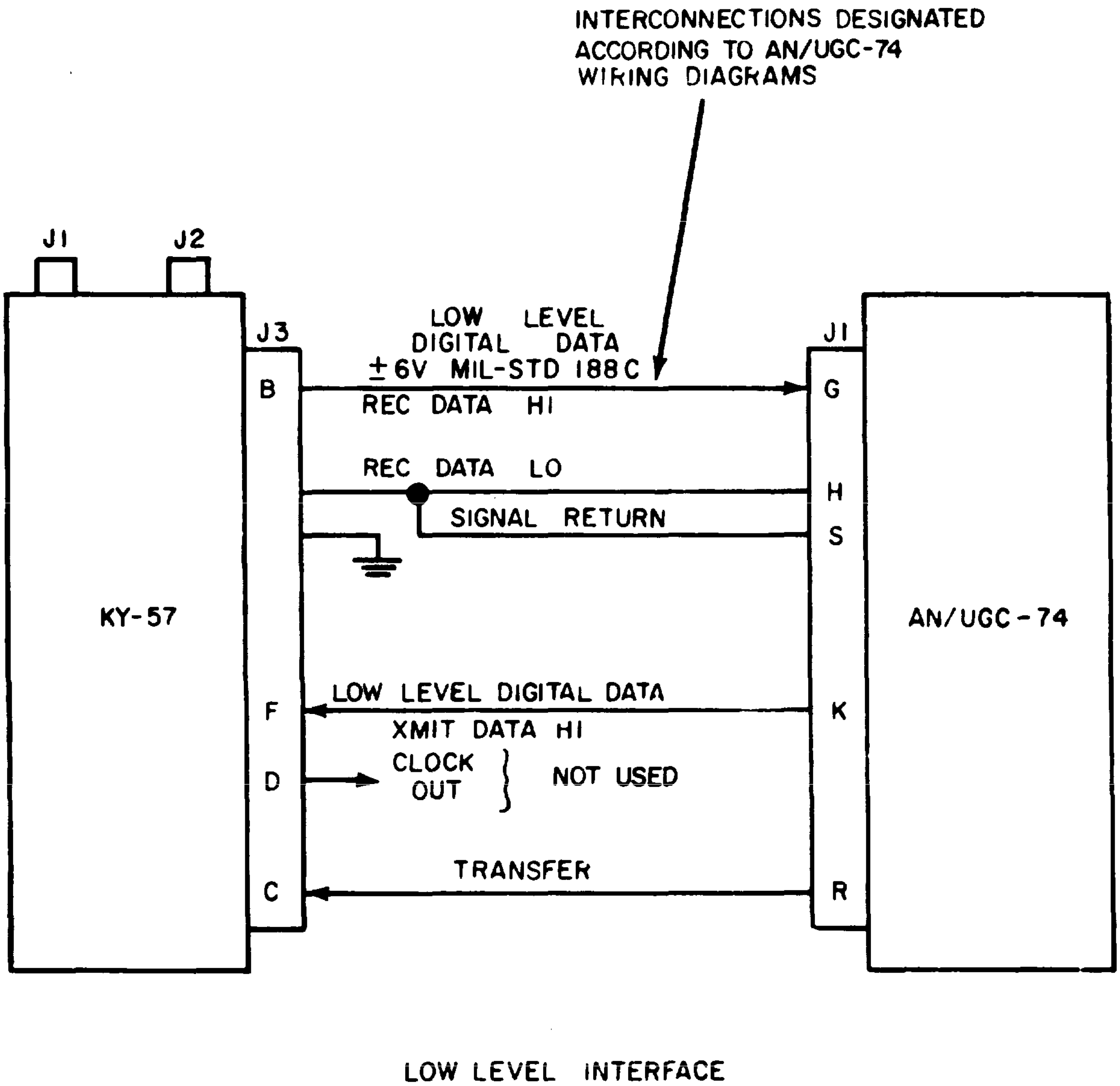


Figure 1-5. AN/UGC-74A(V)3 AND KY-57 INTERFACE.

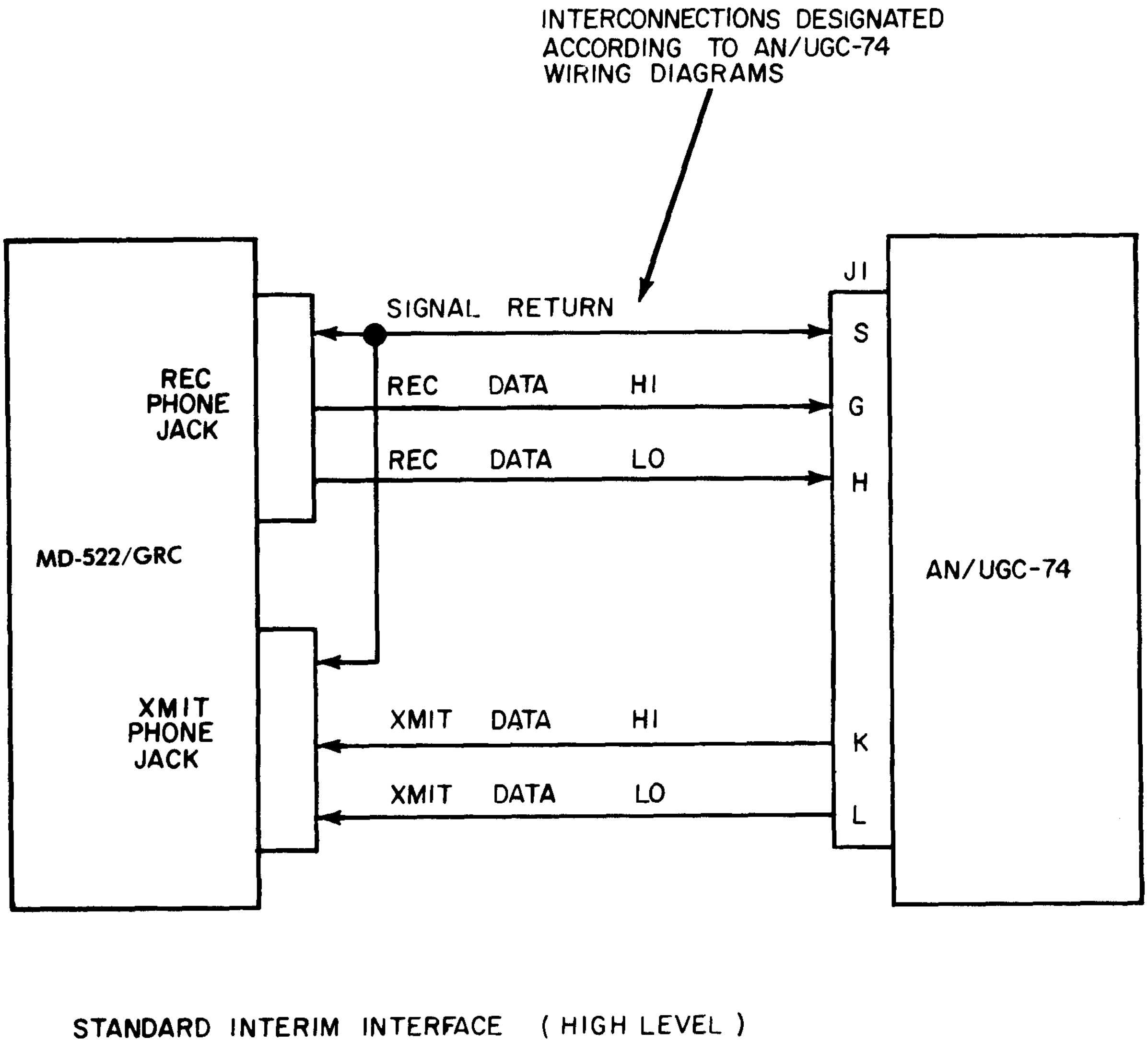


Figure 1-6. AN/UGC-74A(V)3 AND MD-522/GRC INTERFACE.

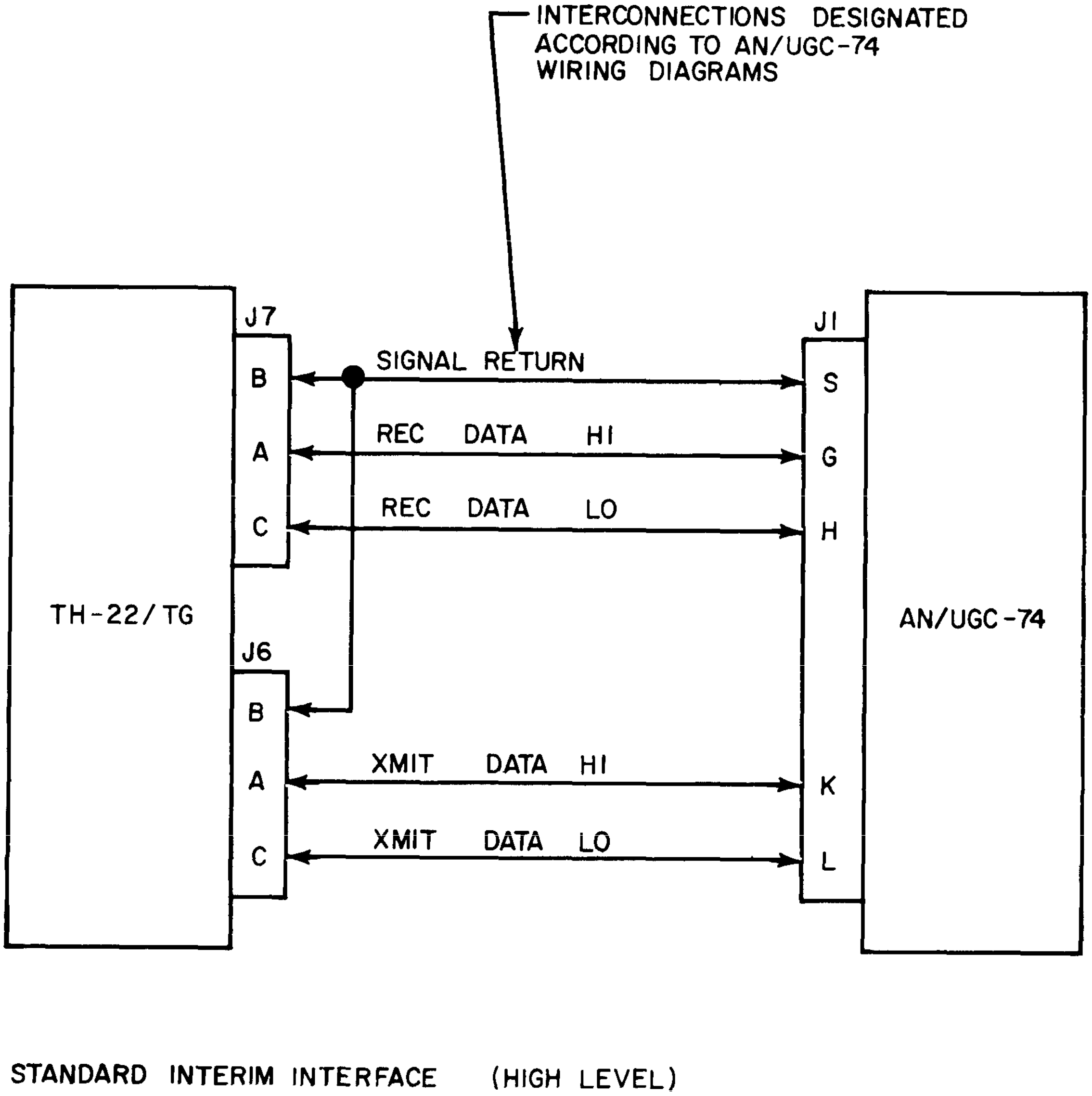


Figure 1-7. AN/UGC-74A(V)3 AND TH-22/TG INTERFACE.

Carbon paper is required — only face of form is chemical treated

SECTION III

27a. From (Action point)	28a. To (Screening point)

...ture

Phone Call Visit

Other (Specify)

necessary

STANDARD FORM 368 BACK
April 1974

DO NOT DETACH THIS STUB ON COPIES FORWARDED TO SCREENING AND ACTION POINTS
Carbon paper not required to complete this side.

QUALITY DEFICIENCY REPORT
(Category II)

SECTION I

1a. From (Originating point)	2a. To (Screening point)
126 SIGNAL COMPANY FORT MYER, VIRGINIA	24TH SIGNAL BATTALION FORT MYER, VIRGINIA
1b. Typed Name, Duty Phone and Signature ALFRED NETTA 5236	2b. Typed Name, Duty Phone and Signature HENRY MICHAELS 6187

3. Report Control No.	4. Date Deficiency Discovered	5. National Stock No. (NSN)	6. Nomenclature
M6327-32	10-OCT-78	5805-00-612-1111	GROUP MODEM MD-1026()(P)/G

7. Manufacturer/Mfg. Code/Shipper	8. Mfg. Part No.	9. Serial/Lot/Batch No.	10. Contract/PO/Document No.
RAYTHEON COMPANY	81326-7182		

11. Item	12. Date Manufactured/Repaired/Overhauled	13. Operating Time at Failure	14. Government Furnished Material
☑ New ☐ Repaired/Overhauled		1500 HOURS	☑ Yes ☐ No

15. Quantity	a. Received	b. Inspected	c. Deficient	d. In Stock

16. Deficient Item Works On/With				
a. End Item (Aircraft, tank, ship, howitzer, etc.)	(1) Type/Model/Series			(2) Serial No.
b. Next Higher Assembly	(1) National Stock No. (NSN)	(2) Nomenclature	(3) Part No.	(4) Serial No./Lot No.

17. Dollar Value	18. Est. Correction Cost	19. Item Under Warranty	20. Work Unit Code/EIC (Navy and Air Force only)
		☐ Yes ☐ No ☐ Unknown	

21. Action/Disposition

☐ Holding Exhibit for ____ days ☐ Released for Investigation ☐ Returned to Stock/Disposed of ☐ Repaired ☐ Other (Explain in Item 22)

22. Details (*Describe, to best ability, what is wrong, how and why, circumstances prior to difficulty, description of difficulty, cause, action taken including disposition, recommendations. Identify with related item number. Include and list supporting documents. Continue on separate sheet if necessary.*)

SUMMARY FAULT INDICATOR LIGHT CAME ON AND WOULD NOT GO OUT. ALL CIRCUIT CARD ASSEMBLY LAMPS O.K., SUSPECT SHORT CIRCUIT IN POWER SUPPLY.

SECTION II

23a. To (Action Point)	24a. To (Support Point) (Use Items 25 and 26 if more than one)
23b. Typed Name, Duty Phone and Signature	24b. Typed Name, Duty Phone and Signature
25a. To (Support Point)	26a. To (Support Point)
25b. Typed Name, Duty Phone and Signature	26b. Typed Name, Duty Phone and Signature

368-101

STANDARD FORM 368, April 1974
General Services Administration (FPMR 101-26-7)

STANDARD FORM 368- QUALITY DEFICIENCY REPORT

CHAPTER 2

SERVICE UPON RECEIPT AND INSTALLATION

PAGE

Section I. SERVICE UPON RECEIPT

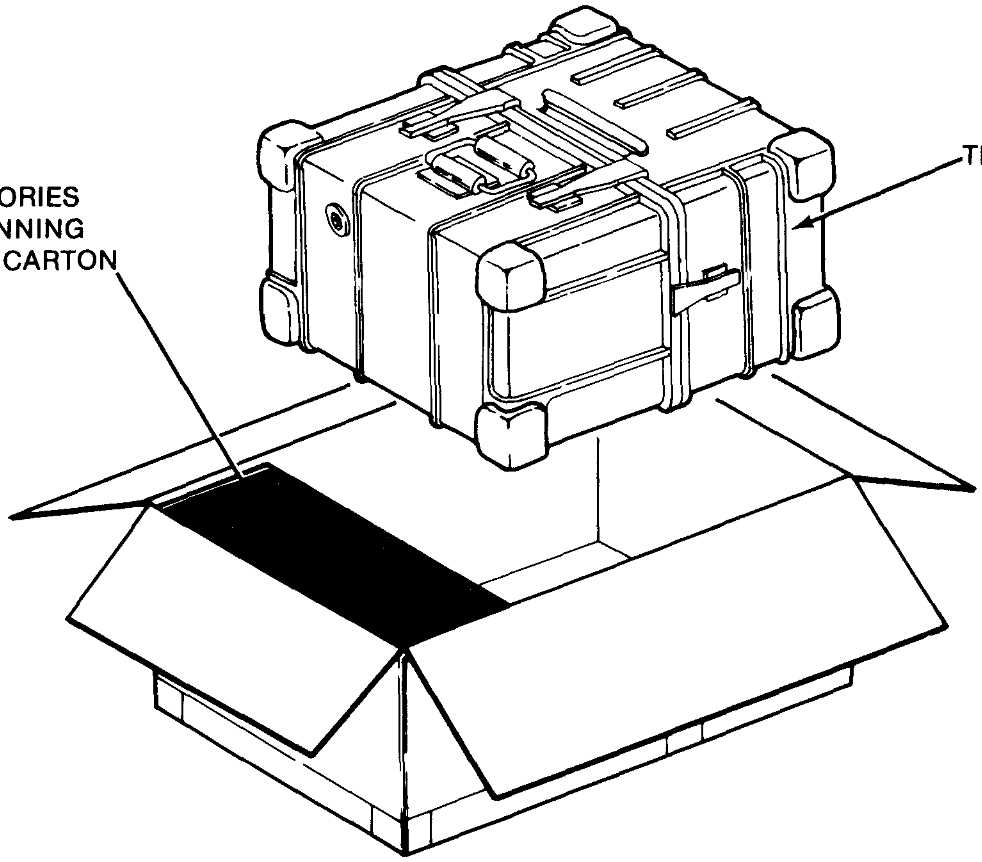
Section II. INSTALLATION INSTRUCTIONS

Section III. PRELIMINARY SERVICING AND ADJUSTMENTS

Section I. SERVICE UPON RECEIPT

2-1. PACKAGING DATA

a. TERMINAL. When packaged for shipment the terminal with the ASCII keyboard attached is secured within its combination case and placed in a fiberboard carton. The fiberboard is sealed with tape.

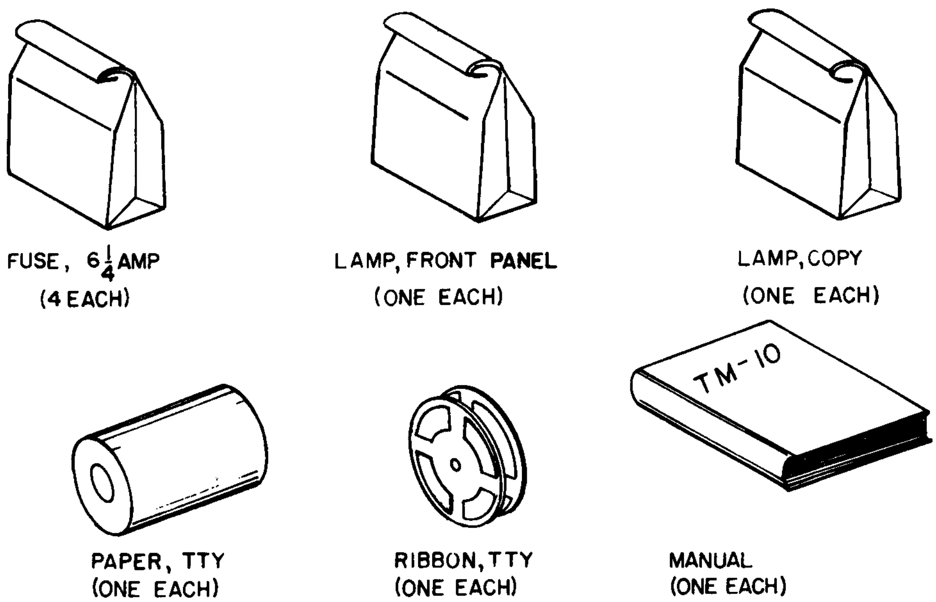


TERMINAL PACKED FOR SHIPMENT

Table 2-1. SHIPMENT DIMENSIONS

COMPONENT	LENGTH	WIDTH	HEIGHT	VOLUME	UNIT WEIGHT
Terminal/combination case in carton	27.25 in.	18.0 in.	10.375 in.	2.94 cu. ft.	120 lbs.
METRIC EQUIVALENT	69.21 cm.	45.72 cm.	26.35 cm.	.083 cu. meter	54.48 kg.
Unpacked	21.5 in.	17.5 in.	9 in.	1.96 cu. ft.	96 lbs.
METRIC EQUIVALENT	54.61 cm.	44.45 cm.	22.86 cm.	.055 cu. meter	43.58 kg.

b. ACCESSORIES AND RUNNING SPARES. The copyholer is pocked in the case cover. All running spares are packaged separately but are shipped with the terminal. The running spares are placed in a polyshroud bag and sealed, and placed within the terminal shipping container. The fiberboard tartan is sealed with tape.



NOTE

Data, power, and battery backup cables are not issued with the equipment and must be ordered separately.

Table 2-2. POWER CABLES AND FUSES

Power source	Cable number	Fuse value F1 and F2
115 Vac	SM-D-764481	1 1/2 A
230 Vac	SM-D-764482	1 1/2 A
26 Vdc	SM-D-764480	6 1/4 A
12 Vdc	SM-D-915890	2A (F3)

2-2. UNPACKING TERMINAL AN/UGC-74A(V)3

Refer to the following table.

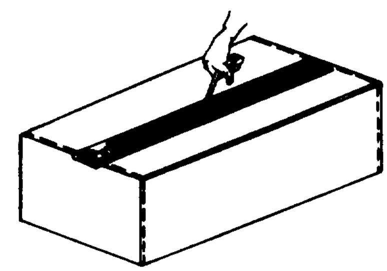
Table 2-3. UNPACKING TERMINAL AN/UGC-74A (V) 3

ITEM	ACTION	REMARKS
1. Carton	• Inspect for evidence of damage.	See packaging diagram below.
2. Terminal	• Unpack.	

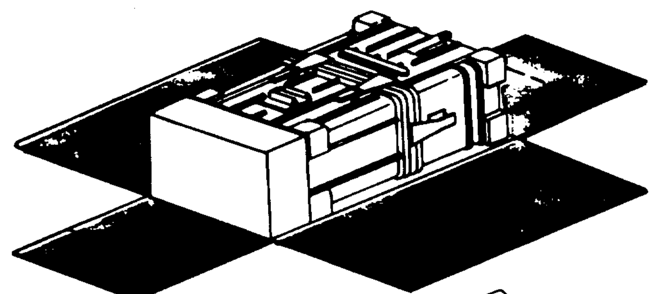
CAUTION

When unpacking equipment be careful not to damage terminal or destroy the carton.

(1) Slit tape along dotted line.



(2) Fold fiberboard carton flat.



WARNING

Terminal is compact and heavy (over 120 lbs). Use care in handling in order to protect personnel from serious injury and equipment from damage. Two (2) person lift required. Before lifting terminal, ensure that all latches are securely fastened.

(3) Grasp handle in terminal and rotate it on one end as shown.

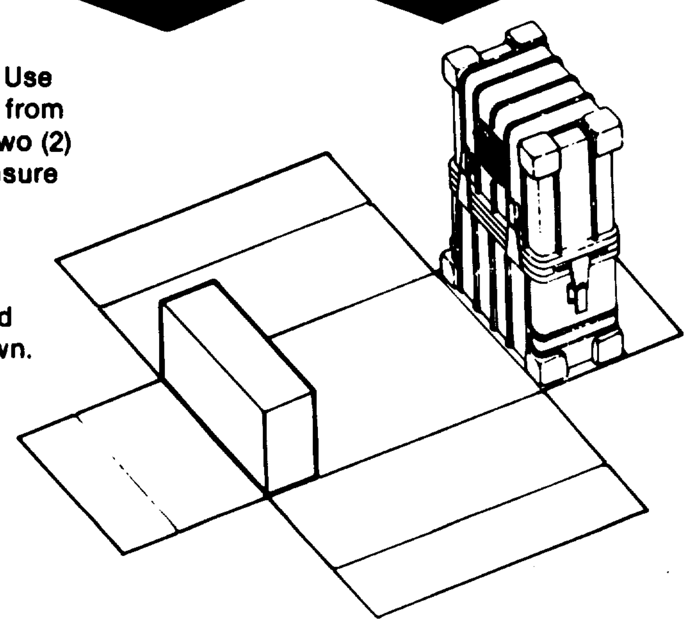


Table 2.3. UNPACKING TERMINAL AN/UGC-74A(V)3 . Continued

ITEM	ACTION	REMARKS
2. Terminal - Continued	(4) Inspect for damage that may have been caused during shipment.	Report any damage on Form SF 364, Packaging Improvement Report.
	(5) Compare with Packing List.	Be sure shipment is complete. Report any discrepancies of Form SF 361. If packing list is not available. check equipment against Components of End item List (COEIL) in Appendix B of TM 11-5815-602-10. Report any shortages in accordance with AR 735-11.2.
	(6) Check for modifications.	Check on front panel near nomenclature plate for any modification work order (MWO) numbers. They will appear ONLY if unit has been used or reconditioned. Current MWO'S which apply to Terminal AN/UGC-74A(V)3 are listed in DA Pam 25-30. Check to see if all currently applicable MWO's have been applied.
3. Carton	• **Store.**	Retain carton for storage purposes.

Section II. INSTALLATION INSTRUCTIONS

2-3. TOOLS AND TEST EQUIPMENT

The tools and test equipment required for the installation of the AN/UGC-74A(V)3 are as follows:

Item	Model No.	Quantity
Multimeter	AN/USM-223	1
Tool Kit	TE-50B	1

2-4. POWER SOURCES

The availability of at least one of the following fused power sources is required:

a. 115 volts ac ± 15% at any of the following frequencies: 50 Hz ± 5%, 60 Hz ± 5%, or 400 Hz ± 5%.

b. 230 volts ac ± 15% at any of the following frequencies: 50 Hz ± 5%, 60 Hz ± 5%, or 400 Hz ± 5%.

c. +22 to +30 volts dc.

2-5. ASSEMBLAGE MODIFICATION KITS

Modification kits have been developed for the assemblages listed below. The kits include cables and all other components necessary to install the system. Refer to DA Pam 310-1 for the pertinent MWO numbers.

a. Radio Teletypewriter Sets AN/GRC-122 and AN/GRC-142.

b. Central Office Teletypewriter AN/TGC-30.

c. Terminal Telegraph AN/TSC-58.

d. Teletypewriter Central Office AN/MGC-17.

e. Telegraph Terminal AN/MSC-29.

f. Radio Teletypewriter Set AN/VSC-2.

g. Radio Teletypewriter Set AN/VSC-3.

NOTE

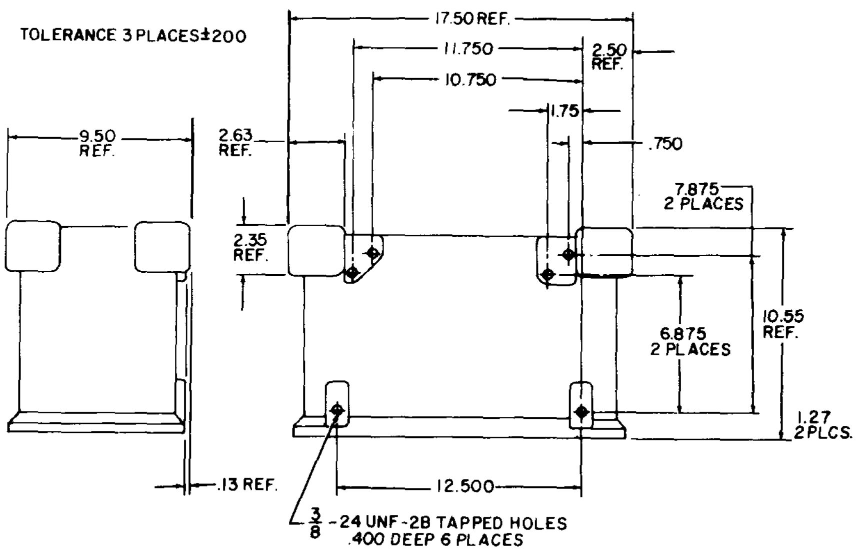
The AN/UGC-74A (V)3 does not provide loop current. The 20 mA and 60 mA current, if required, must be supplied by external equipment.

2-6. INSTALLATION.

(Initial installation to be performed by 31J or by MWO team only.) Refer to the following table.

Table 2-4. INSTALLATION INSTRUCTIONS FOR TERMINAL AN/UGC-74A(V)3

ITEM	ACTION	REMARKS
1. Terminal	• Choosing a site. • All connections are made through a combination case door at the rear of the unit. • Allow at least 18 inches of access space at rear of case for connecting and disconnecting cables.	Adequate lighting for both day and night operation should be provided for operating personnel. Access for operating and maintenance personnel should be convenient.
2. Mounting adapter	• Enables mounting of terminal on either a table or mounting shelf.	Mounting of terminal requires a mounting adapter which is to be supplied as part of an installation kit.
3. Installation diagram		



CAUTION
MOUNTING SCREWS SHALL NOT EXTEND MORE THAN 3/8 INCH ABOVE MOUNTING ADAPTER SURFACE.

Table 2-4. INSTALLATION INSTRUCTIONS FOR TERMINAL AN/UGC-74A(V)3 - Continued

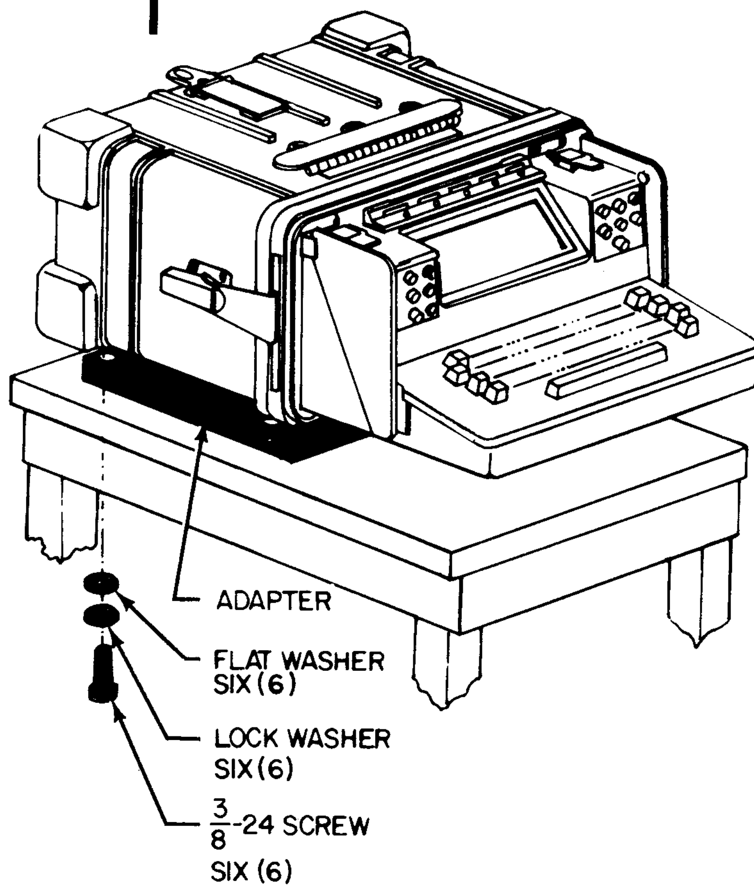
ITEM	ACTION	REMARKS
4. Terminal mounting	a. Table mounting (1) Aline terminal combination case mounting holes with holes in table top.	

CAUTION

Mounting screws must not enter mounting hole to a depth greater than 3/8th inch. Permanent damage will result if this depth is exceeded.

(2) Secure terminal with hardware specified.

(3) Open four case latches and remove front outer cover.



NOTE

The outer cover and the case have rubber seals in a groove on the mating surface. If the outer cover sticks to the case when it is removed, both rubber seals require a spray application of fluorocarbon lubricant. This lubricant (appx C, item 6) has to be applied only once for the life of the rubber seals.

(4) Latch terminal package on left and right sides to its case.

Table 2-4. INSTALLATION INSTRUCTIONS FOR TERMINAL AN/UGC-74A(V)3 - Continued

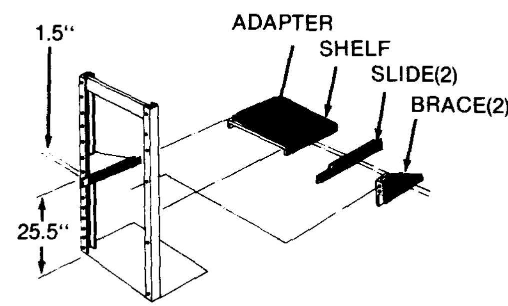
ITEM	ACTION	REMARKS
4. Terminal mounting-Continued	b. Shelf mounting (1) Mount outer channels of each slide to brace with six 10-32 flathead screws and locknuts (outer channel should extend 1½ inches beyond front edge of brace). (2) Aline each brace with holes in relay rack so that top of outer channel is 25½ inches above floor (normal operating height for seated operator). Mount brace to rack with two 10-32 roundhead screws and lockwashers. (3) Extend slides out so that inner slide mounting holes are accessible. (4) Aline mounting holes in inner slide with holes in shelf. (5) Mount shelf to inner slide with eight 10-32 flathead screws and locknuts (four screws per side). (6) Slide shelf in rack and lock it into position. **CAUTION** 120 lbs -- 2 person lift required to avoid injury. (7) Aline and secure terminal as directed for table mounting.	For shelf mounting, at least 12 inches of free space should be provided above the terminal for air circulation. 

Table 2-4. INSTALLATION INSTRUCTIONS FOR TERMINAL AN/UGC-74A(V)3 - Continued

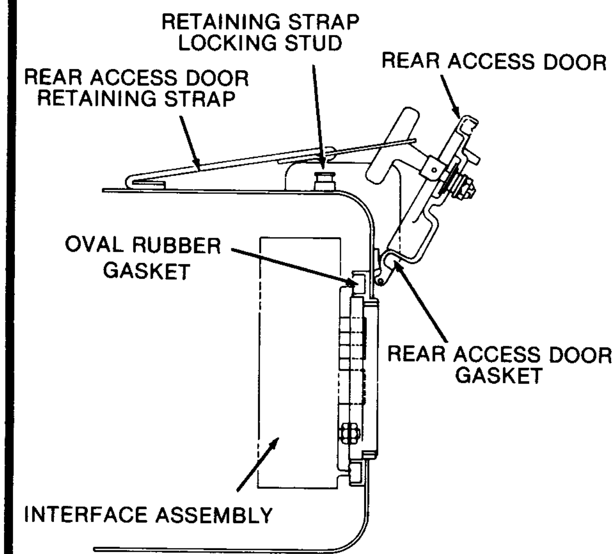
ITEM	ACTION	REMARKS
5. Cable interconnections	a. Access (1) Pull door handle down into horizontal position and rotate it ¼ turn to right. (2) Secure door in open position by unsnapping retaining strap from outer case cover and inserting rear door handle into retaining strap slot. **NOTE** Be sure that sufficient slack remains in cables after they are connected to allow for extension of machine from its case. Inspect cables after installing for crimping, severe bending, cuts and breaks. Cold weather can also effect cables. b. Interconnections (1) CHASSIS GROUND - Attach a grounding strap between chassis ground stud on connector panel (E1) to an earth ground rod, or any low resistance ground connection.	All signal and power connections to terminal are made through three plugs which mate with connector receptacles located on rear of case. 

Table 2-4. INSTALLATION INSTRUCTIONS FOR TERMINAL AN/UGC-74A(V)3 - Continued

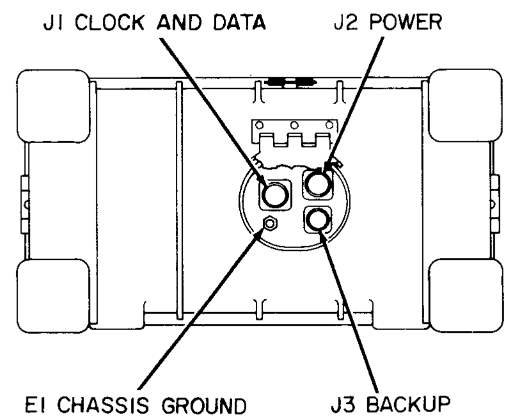
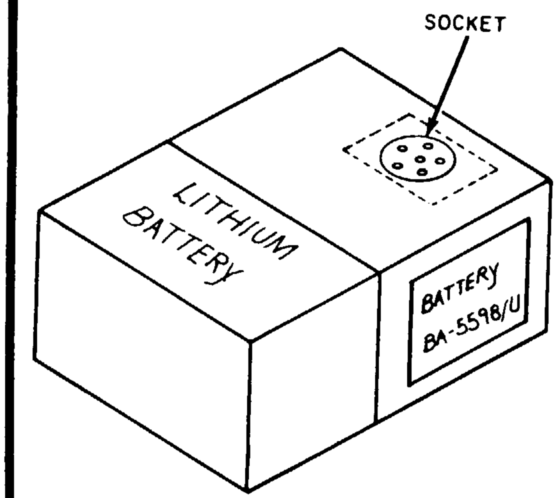
ITEM	ACTION	REMARKS
5. Cable interconnections - Continued	**NOTE** Refer to paragraph 3-22 for connector and receptacle illustrations. Be sure keys on connectors and receptacles aline. (2) CLOCK and DATA - Connect one end of CLOCK and DATA cable to designated data and/or clock source. Mate other end of cable to J1 connector by pressing cable plug firmly against mating connector and with a ½ right-hand twist of twist-lock collar, locking it securely in place. (3) POWER - Using appropriate power cable, connect it to its mating terminal (J2) by pressing them firmly together. Then, with a ½ right-hand turn on twist-lock collar of power cable connector, lock it securely in place. (4) BATTERY BACKUP - Attach terminal end of 12 volt dc battery backup cable to its mating connector (J3) by pressing them firmly together. Using a ½ right-hand turn on twist-lock collar of cable, lock it securely into place. Attach battery end of cable to Battery BA-5598/U.	

Table 2-4. INSTALLATION INSTRUCTIONS FOR TERMINAL AN/UGC-74A(V)3 - Continued

ITEM	ACTION	REMARKS
6. Initial preconditioning of newly installed battery	**WARNING** Lithium organic batteries are used in this equipment. They are potentially hazardous if misused or tampered with before, during or after discharge. Refer to the lithium battery warnings on page B before handling batteries. **NOTE** Use following procedures when battery backup supply is being used with terminal: • With prime power supplying terminal, turn POWER switch to ON position. Disconnect prime power source from terminal. • After a duration of not less than 2 minutes, reconnect prime power. **NOTE** Be sure that sufficient slack remains in cables after they are connected to allow for extension of terminal from its case. **CAUTION** Be sure that POWER ON/OFF switch is in OFF position when terminal is not being used. Leaving switch in ON position will drain backup battery if prime power is lost.	

Section III. PRELIMINARY SERVICING AND ADJUSTMENTS

2-7. PRELIMINARY CHECKS

Perform the following preliminary checks before locally testing the terminal:

- **Inspect for corrosion, rust and fungus.**
- **Inspect for an adequate supply of paper.**
- **Inspect for serviceability of ribbon.**
- **Inspect cable connections for firm seating.**
- **Ground connection - Check with multimeter to ensure that terminal is properly grounded.**

2-8. INSTALLER'S TEST OF TERMINAL

After the terminal has been installed and the preliminary checks performed, the installer makes two tests before turning the terminal over to the operator.

Table 2-5. Installer's Local Test

Table 2-6. Initial Communication Test with Distant Station In the KSR State or Initial Communication Test with Distant Station in the ICT State.

NOTE

Whether the Initial communication test will be made in the KSR or ICT State will depend on the operating state of the distant station.

If any test fails, refer to troubleshooting tables in chapter 4. Do not proceed with testing until failure is corrected.

Table 2-5. INSTALLER'S LOCAL TEST

SEQUENCE ITEM	PROCEDURE
1. LOOPBACK PLUG	Disconnect CLOCK and DATA cable J1 and replace with LOOPBACK plug (part No. SMB-916000).
2. INTERNAL CONTROLS	a. To gain access to internal controls perform following: • Release combination case latches on left and right side of terminal.

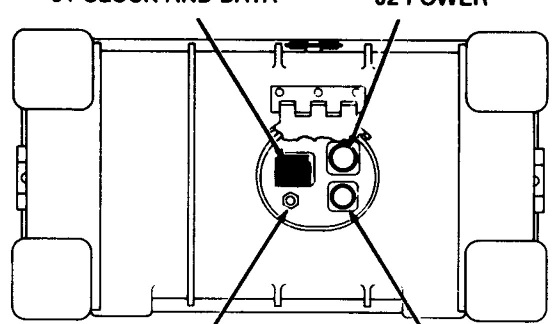


Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
2. INTERNAL CONTROLS - Continued	

CAUTION

Be careful when extending terminal from case; ensure that cables pass through terminal rear access port with a minimum of strain to avoid damaging equipment and serious injury to operating personnel.

- Extend terminal out of case by withdrawing terminal forward until slides stop in extended position.

b. Set interface assembly controls as follows:

PARITY - ODD
STATE - ICT
REC MODE and XMIT MODE - LO DATA
BAUD RATE - 75
CLOCK INT/EXT - INT
CLOCK +/− - +
FIGURES S/J - S
SIGNAL NRZ/D10 - NRZ
STOP BITS - 1
MODE - ASCII

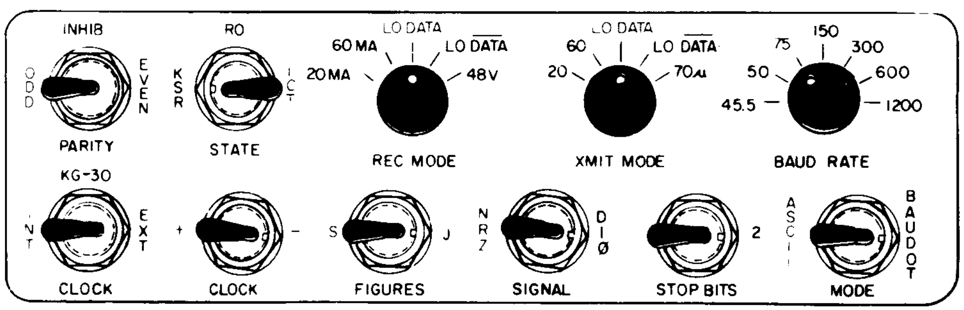
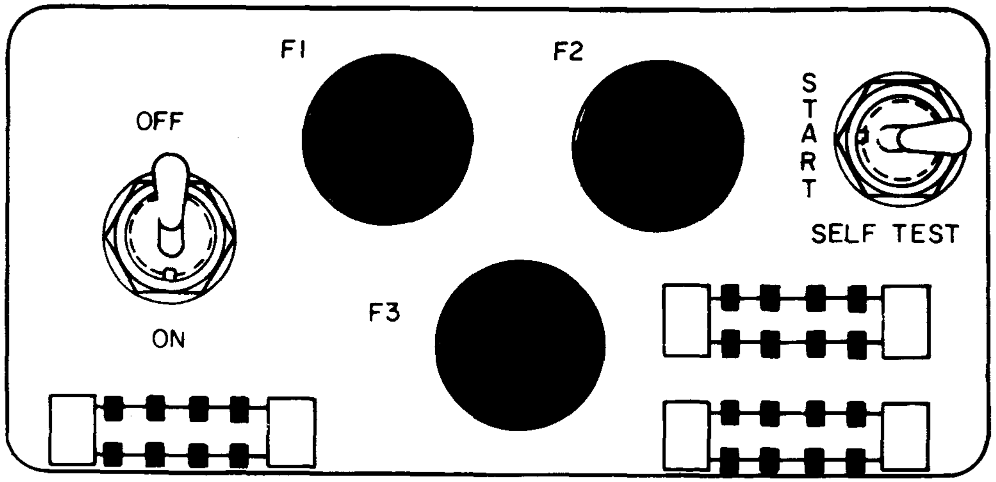


Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
2. INTERNAL CONTROLS-Continued	c. Before applying power to terminal for first time, check the value of fuses:

F1 and F2: 1½A, operate with ac power
6¼A, operate with 26V dc power
F3: 2A, battery backup circuit protection



CAUTION

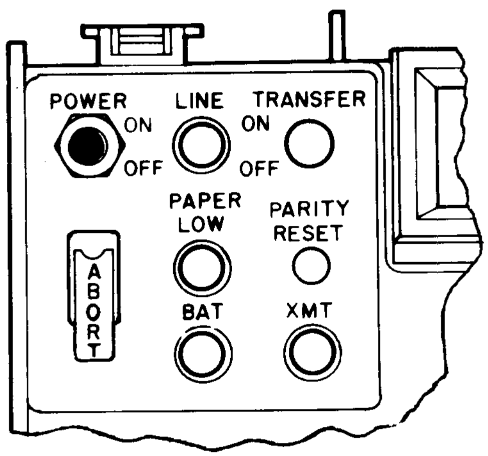
Operating the terminal with excessive fuse values may cause damage to the internal circuitry during electrical surge conditions.

Be careful when returning terminal into case; ensure that cables pass through terminal rear access port with a minimum of strain, to avoid damaging equipment and serious injury to operating personnel.

d. Return terminal into combination case and secure latches.

Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
3. DUSTCOVER CONTROLS	a. Adjust following controls: • ILLUM - BRT (bright) • AUDIO - MAX (maximum) b. Place POWER ON/OFF switch ON: • Copy lamps light. • Dustcover lamps flash on momentarily. • Print drum starts to rotate. • Audio alarm sounds momentarily.



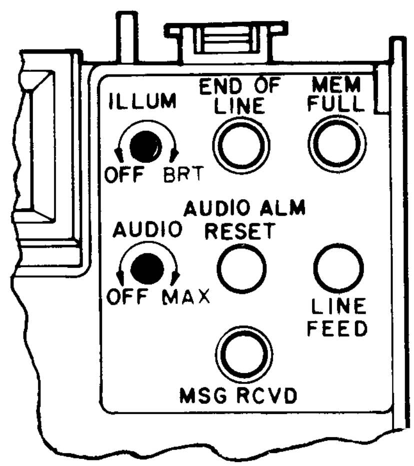
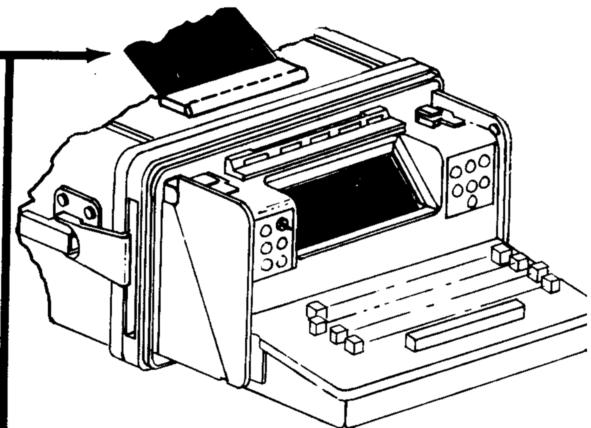


Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
4. TERMINAL	Operation Validation/State Determination message prints out; message should be identical to switch settings: SYSTEM INITIALIZED SWITCH STATE = ICT OPERATIONAL STATE = ICT OPERATIONAL CAPACITY = FULL MODE = ASCII BAUD RATE = 75 STOP BITS = 1 END OF LINE OPTION = 0D 0D 0A SPACE OPTION = OFF LINE LENGTH = 80 LINE FEEDS = 1 RECEIVE ENVELOPE OPTION = 56 5A 43 5A 43; 4E 4E 4E 4E TRANSMIT ENVELOPE OPTION = 56 5A 43 5A 43; 4E 4E 4E 4E 7F 7F 7F 7F 7F 7F 7F 7F 7F 7F 7F 7F PARITY OPTION = ODD CAPITAL LETTER OPTION = ON
5. DUSTCOVER	a. Perform lamp test by pressing and holding PARITY RESET switch. All indicators remain ON while switch is pressed. b. Place POWER ON/OFF switch OFF.



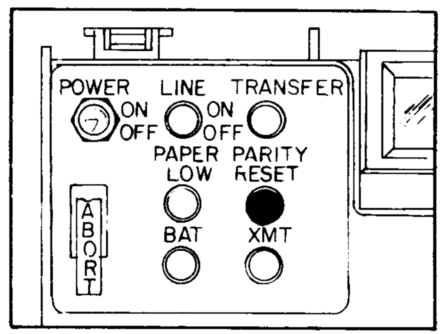


Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
6. SELF-TEST	• Release combination case latches and fully extend terminal out on its slides. • The INT/EXT/KG - 30 CLOCK switch position must be in the INT position. • Set ILLUM control to BRT and AUDIO control to MAX • Place the POWER switch in the ON position. Drum starts to rotate, dustcover lamps flash on momentarily, copy lamps light, and the alarm sounds momentarily. • The terminal prints out the terminal's Operation Validation/State Determination message. **NOTE** For failure of any test below, refer to paragraph 4-8, Organizational Troubleshooting Chart No. 2. If the trouble cannot be corrected, notify higher level maintenance. If trouble is corrected, continue self-test until successfully completed. • Momentarily operate spring-loaded SELF-TEST switch to START position.

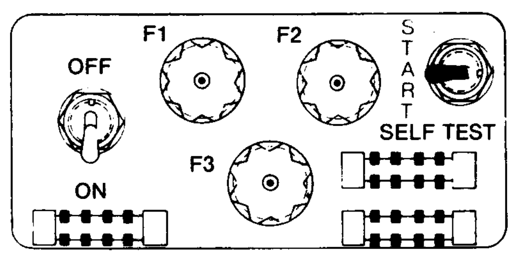
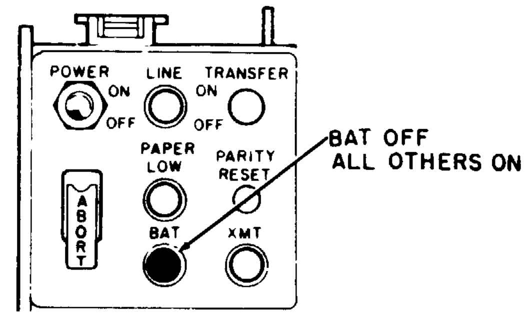


Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
6. SELF-TEST - Continued	

TEST 1. CPU Circuit Card Assembly

- All dustcover indicators, except PARITY RESET lamp, turn on immediately. BAT lamp is OFF.
- Two to four seconds later PARITY RESET lamp turns ON.

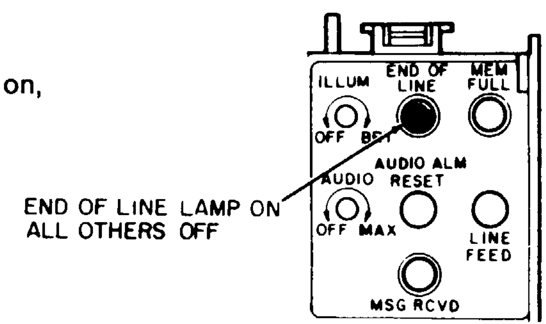


Remarks

If PARITY RESET lamp does not turn on, test has failed.

TEST 2. PRINTER Circuit Card Assembly

- When all indicator lamps except BAT are on, depress PARITY RESET switch to continue testing.
- All indicator lamps except END-OF-LINE turn OFF.
- PRINTER prints letter "E" in all 80 print character columns.
- PRINTER prints all 64 individual characters. PARITY RESET lamp turns on.



Remarks

If PARITY RESET lamp does not turn on, printed error is seen, test has failed.

Table 2-5. INSTALLERS LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
6. SELF-TEST - Continued	TEST 3. MEMORY Circuit Card Assembly • Depress PARITY RESET switch to continue testing. **NOTE** If memory board is not present, terminal will continue testing with communications board. • MEMORY FULL lamp will turn ON and END-OF-LINE and PARITY lamps will turn OFF. After test is successfully completed, PARITY lamp will turn ON. **Remarks** If PARITY RESET lamp does not turn on, or "A1 A2 FAIL" is printed, test has failed. TEST 4. COMMUNICATIONS Circuit Card Assembly • Depress PARITY RESET to continue testing. • LINE lamp is the only indicator ON. • A standard 80-character printout is transmitted and looped back through the receiver. Received message is compared to transmitted message. If two messages are identical, terminal prints out the message. • With start of printing, PARITY lamp turns ON. **Remarks** If PARITY RESET lamp does not turn on, printed error is seen, or "A1 A3FAIL" is printed, test has failed. • Terminal will transmit, receive, and print 80 character message until PARITY RESET switch is depressed. **NOTE** If keyboard is not present, testing will end at this time.

Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
6. SELF-TEST - Continued	TEST 5. KEYBOARD • Depress the PARITY RESET switch to continue testing. • PAPER LOW is only indicator ON. • Terminal prints "KEYBOARD TEST", executes one carriage-return and two line-feeds. • PARITY lamp turns ON. • Operator can freely enter keyboard characters and verify that proper characters are being printed. Keyboard is functioning properly if printout agrees with what was typed on keyboard. • Check for proper ribbon-feed and ribbon-lift operation. • SELF-TEST is ended by pressing PARITY RESET switch. • The terminal will print "READY" and then automatically prints out the operational state message. • The print drum motor shall automatically turn off if there has been no printing for 1 to 4 minutes.

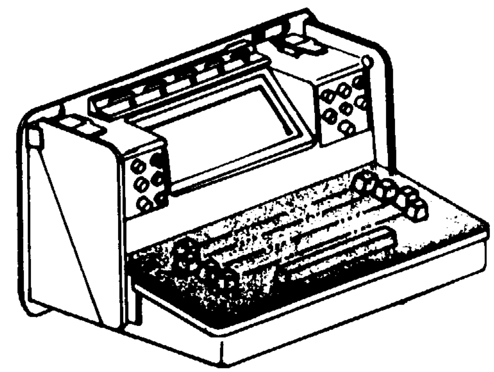


Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
7. LOOPBACK TEST	• Place POWER ON/OFF switch OFF. • Make following settings on internal controls: BAUD RATE to 45.5. MODE to BAUDOT. STATE to KSR. • Place POWER ON/OFF switch ON. • Check Operation Validation/State Determination message to ensure it agrees with switch settings. • Type a single line message, press carriage-return to cause message to be transmitted. Inspect the line printed immediately below composed line. Transmitted line and received line should be identical. • Place POWER ON/OFF switch OFF. • Make following setting on internal controls: STATE to ICT • Place POWER ON/OFF switch ON. • Check Operation Validation/State Determination message to ensure it agrees with switch settings. • Compare a transmitted and received message by performing the following procedures: Press keys E, D Press key CR (terminal prints "MESSAGE NO. 1.") Press key I Press key CR Type message Press key HLT Press keys E, X

Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
7. LOOPBACK TEST - Continued	Press key CR Press keys T, R, b_0, 1 Press key CR (terminal prints message) • Place POWER ON/OFF switch OFF. • Make following settings on internal controls: BAUD RATE to 1200 SIGNAL to DIO MODE to ASCII • Place POWER ON/OFF switch ON. • Check Operation Validation/State Determination message to ensure it agrees with switch settings. • Using preceding commands, compose and transmit message; transmit and receive message should be identical. • Release paper roll by pressing paper blocking levers together and lifting up roll. Depress LF (line-feed) key on keyboard. PAPER LOW lamp should light. • Press paper tension lever and release and press LF key on keyboard. Print drum shall stop. • Place paper roll in locked position and release paper tension lever. Enter GO and CR. Print drum shall start again. • Perform a lamp test by pressing and holding PARITY RESET switch and observing lamps on dustcover. While lamps are ON, adjust ILLUM control over its entire range and observe for a continuous change in lamp brightness.

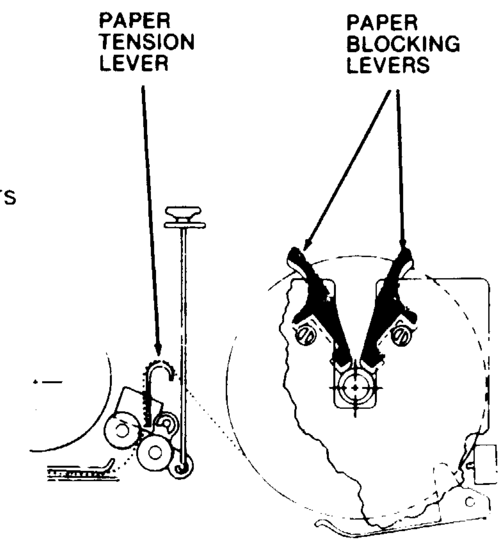


Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
7. LOOPBACK TEST - Continued	**CAUTION** Be careful when returning terminal into case; be sure that cables pass through terminal rear access port with a minimum of strain to avoid damaging equipment and serious injury to operating personnel. • Return terminal into its case and secure it with its latches. • Remove loopback plug from J1 and adjust AUDIO control from OFF to MAX. Tone shall be continuous and vary in loudness from OFF to a maximum loudness. • Reconnect loopback plug and press AUDIO ALM RESET switch. Verify that alarm turns OFF. • Place POWER ON/OFF switch OFF to clear memory. • Place POWER ON/OFF switch ON. • Transmit composed message and activate ABORT switch immediately after terminal begins line-feeding. Terminal shall halt its line-feed function and issue a prompt sequence. • Press LINE-FEED switch on dustcover and observe that line-feed function is performed. **WARNING** Set POWER ON/OFF switch to OFF. Power should not be on when performing this procedure. • Remove loopback plug (audio alarm will sound) and measure continuity across pins R and S of connector receptacle J1, (fig. 3-29). TRANSFER switch ON - Resistance shall be less than 1 ohm. TRANSFER switch OFF - Meter shall indicate an open circuit. • Reconnect loopback plug.

Table 2-5. INSTALLER'S LOCAL TEST - Continued

SEQUENCE ITEM	PROCEDURE
8. BATTERY BACKUP TEST	**NOTE** Perform following test only when a battery backup supply and cable are available. Terminal must be operating in ICT state with information stored in memory. • Remove input power by disconnecting J2 from prime power source. • Observe that BAT (battery) indicator on dustcover turns ON. • Reconnect prime power source to J2. • Terminal responds by printing prompt symbol @. • Recheck message for correctness. • If terminal performs satisfactorily in all tests and checks listed above, place POWER switch in OFF position, remove loopback plug from J1 connector, and reconnect CLOCK and DATA cable. • Return terminal into its case and secure it with its latches.

Table 2-6. INITIAL COMMUNICATION TEST WITH DISTANT STATION

TEST NUMBER	PROCEDURE
1. Test in the KSR State	After terminal has been satisfactorily local-tested by installer, and reinstalled into system, initial communications with distant station(s) will be established in KSR state as follows: • Set internal controls on interface assembly as following: STATE - KSR PARITY - ODD REC MODE and XMIT MODE - LO DATA BAUD RATE - 75 CLOCK - INT CLOCK - + FIGURES - S SIGNAL - NRZ STOP BITS - 2 MODE - BAUDOT • Refer to TM 11-5815-602-10 for detailed instructions on operating terminal in KSR state. • Place POWER ON/OFF switch ON. • After initialization message, terminal is ready for message reception or transmission. • Type message; terminal will transmit one line of text (up to 80 characters) after carriage-return (CR) key or HLT key is depressed. • Terminal transmits only upper case letters in KSR state. • Editing of one line of text is provided using DLC, DLL and REV keys. • Following station's SOP or CEOI, installer will transmit a message to distant station(s), identifying installer's station and requesting a reply that message was properly received. Example of installer's message: AN/UGC-74A(V)3 TERMINAL INSTALLED AT STATION NO. XXX (enter station's serial number). ACKNOWLEDGE RECEIPT OF THIS MESSAGE AND IF RECEIVED WITHOUT ERRORS.

Table 2-6. INITIAL COMMUNICATION TEST WITH DISTANT STATION - Continued

TEST NUMBER	PROCEDURE
1. Test in the KSR State - Continued	**NOTE** For Buffered Terminal: If message memory card is present in your terminal (buffered), all receive messages are entered into message memory before being printed. This allows terminal to receive messages at speeds in excess of printer speed of 600 baud. For Unbuffered Terminals: If your terminal is unbuffered (no memory card 3A1A2 installed), be sure that distant station(s) are aware of your lack of message memory. If distant station(s) are in KSR state, advise distant station to pause 1 or 2 seconds between lines of text (when transmitting) to allow your terminal enough time to print each line and not lose any incoming characters. If distant station(s) are in ICT state, request that baud rate be set at no more than 600 buad to prevent loss of text. • Installer will check all received messages to ensure that communication with distant station(s) has been established. **NOTE** In KSR state, terminal prints a received line of text after a carriage-return is found in the receive text, or 81st character is received, or a 0.5 to 1.5 second time lapse between received characters is detected. • When communications with distant station(s) has been satisfactorily established, installer will sign off and place terminal's POWER switch in OFF position.
2. Test in the ICT State	Initial communications with distant station(s) will be established in ICT state as follows: • Set internal controls on interface assembly as in preceding test; STATE set to ICT. • Refer to TM 11-5815-602-10 for detailed instructions in operating terminal in ICT state, TTY System Command. **NOTE** In TTY command, operator can transmit only a one line message at a time. Line length is set to 80 characters automatically for this command.

Table 2-6. INITIAL COMMUNICATION TEST WITH DISTANT STATION - Continued

TEST NUMBER	PROCEDURE
2. Test in the ICT State-Continued	• Place POWER ON/OFF switch ON. • After initialization message, installer will place terminal in TTY command using keystroke sequence b_0TTYb_0CR. • Terminal will respond with a carriage-return and line-feed; installer may now enter a line of text. • Text of line (80 characters maximum) is typed, and may be edited using DLC, DLL and REV keys. • Line of text is transmitted with an end-of-line sequence appended, and in an envelope, when a carriage-return is entered. **NOTE** Line of text is not printed on terminal when it is transmitted to distant station(s). • After line of text is transmitted, TTY command is terminated and terminal returns to Systems Command level. • Following station's SOP or CEOI, installer will transmit a one line message to distant station(s), one station at a time, requesting a reply that message was properly received. Example of a one line message: AN/UGC-74A(V)3 TERMINAL INSTALLED. ACKNOWLEDGE RECEIPT OF THIS MESSAGE. • Installer will check all received messages to insure that communications with distant station(s) has been established. • When communications with distant station(s) has been satisfactorily established, installer will sign off and place terminal's POWER switch in OFF position.

CHAPTER 3

FUNCTIONING OF EQUIPMENT

PAGE

Section I. FUNCTIONAL DESCRIPTION

Section II. ELECTRICAL, ELECTRONIC AND MECHANICAL FUNCTIONS

Section III. TEST FIXTURES, ELECTRICAL AND ELECTRONIC FUNCTIONS

Table 3-1. LIST OF ABBREVIATIONS

Abbreviation	Meaning
TTL	Transistor-Transistor Logic
PIA	Peripheral Interface Adapter
USART	Universal Synchronous Asynchronous Receiver-Transmitter
EMI	Electromagnetic Interference
RFI	Radio Frequency Interference
KSR	Keyboard Send-Receive
ROM	Read-Only Memory
ICT.	Intelligent Communication Terminal
RAM	Random Access Memory
SCR	Silicon Controlled Rectifier
SCMO	Speed Control Motor Output
EMP	Electromagnetic Pulse
DMA	Direct Memory Access
ETI	Elapsed Time Indicator

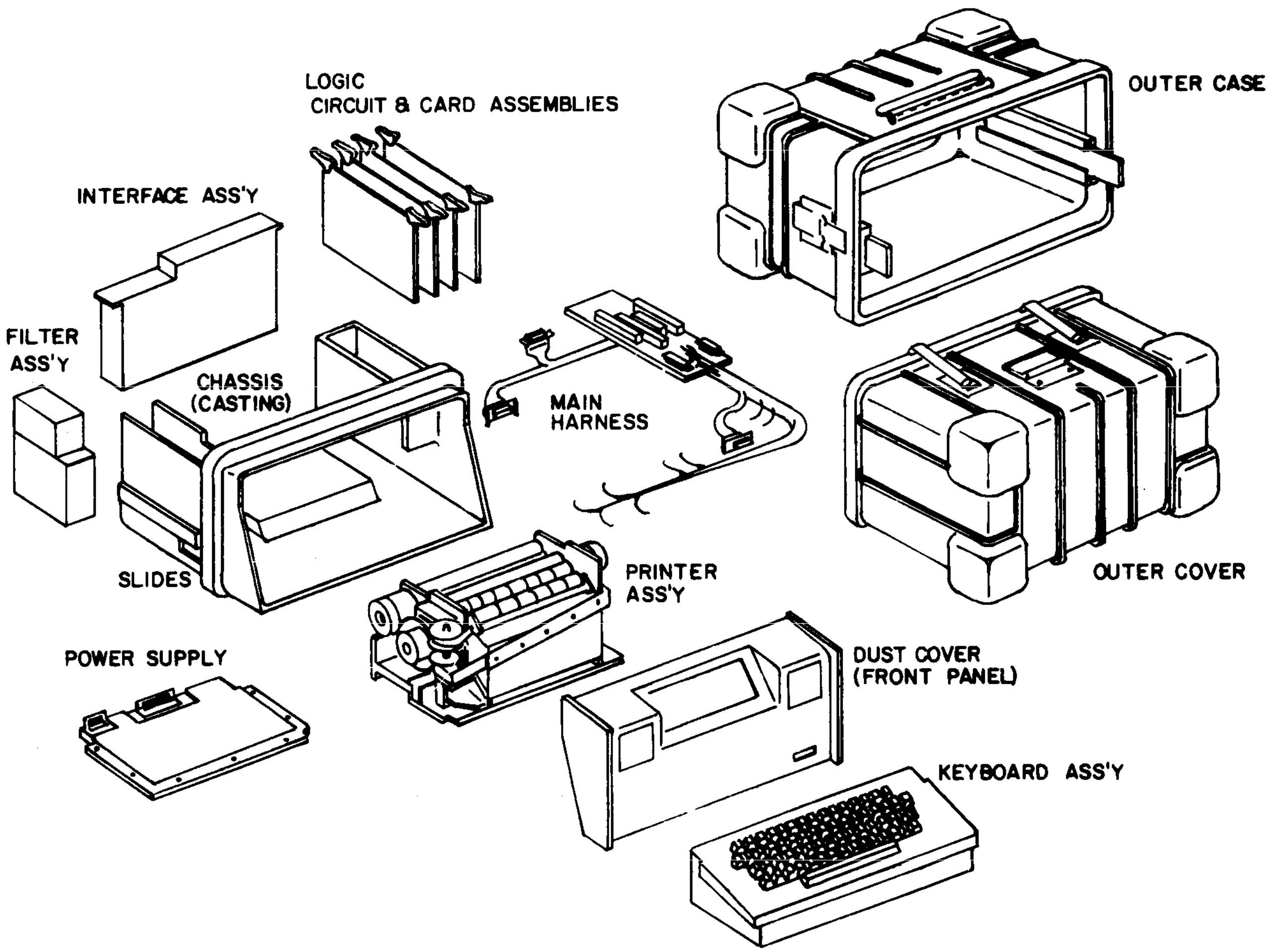


Figure 3-1. MECHANICAL COMPONENTS OF TERMINAL.

Section I. FUNCTIONAL DESCRIPTION

3-1. GENERAL

Due to the complexity of the system logic and the utilization of automatic test equipment for fault isolation and testing, only functional descriptions of the system logic, i.e., CPU (Central Processing Unit), Printer, Memory, and COMM (Communication) Control are presented. All other electronic and mechanical functions are presented in sections II and III of this chapter. Abbreviations used in this chapter are presented in table 3-1.

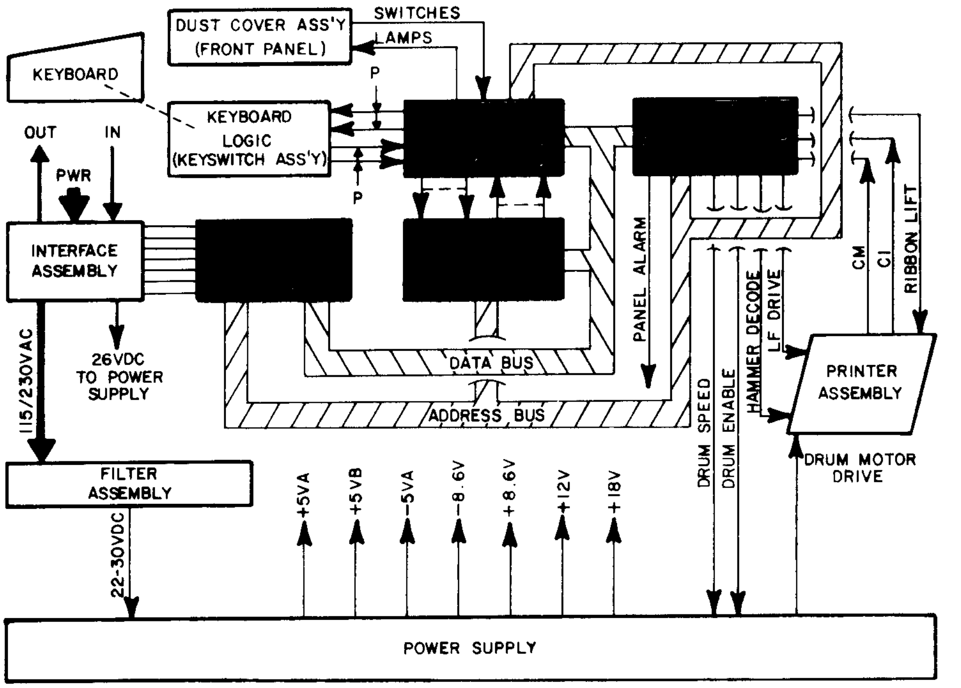


Figure 3-2. FUNCTIONAL BLOCK DIAGRAM

- The keyboard keys actuate the keyswitch assembly which contains logic circuitry to convert the keyswitch inputs into an eight bit serial data word which is input to the CPU.
- Interface between the CPU and the rest of the system are by point to point wiring and data/address buses.
- Address Bus - Set of 16 parallel lines which allow more than 64,000 addresses to be selected by the CPU.
- Data Bus - Set of eight parallel lines which may send or receive data to or from the interfacing circuit card assembly.
- The two data buses interface with the Memory Circuit Card Assembly, the Communications Circuit Card Assembly, and the Print Control Circuit Card Assembly.

3-2. SYSTEM LOGIC FUNCTIONS

System logic functions are divided into the following:

- Keyboard input
- Receive data input
- Internal timing
- Internal processing
- Printer control
- Line-feed functions
- Data transmission

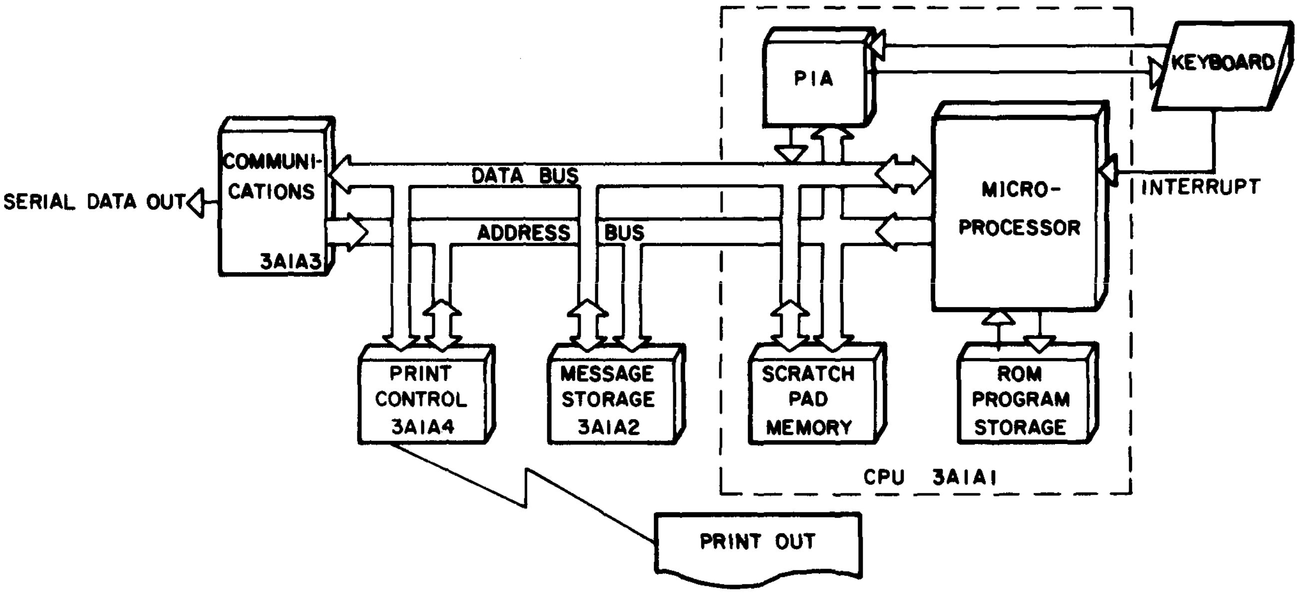


Figure 3-3. KEYBOARD DATA FLOW.

KEYBOARD INPUT - Keyboard logic generates an interrupt request whenever a character is entered from the keyboard.

- Upon receipt of interrupt, CPU circuit card reads first bit of character from the PIA which generates a keyboard clock pulse.
- Clock pulse is sent through PIA to keyboard.
- One bit of serial data is then stored in microprocessor accumulator,
- Reading second data bit causes generation of a second keyboard clock pulse.
- Third data bit is shifted to PIA.
- This process is repeated until all eight bits are loaded into microprocessor.
- Control clock (2400 Hz) is received from clock generator circuitry on CPU circuit card.

- Data is then conditioned for TTL processing by communications circuit card.
- Universal synchronous/asynchronous receiver/transmitter (USART) converts serial data to parallel data and places it on data bus.

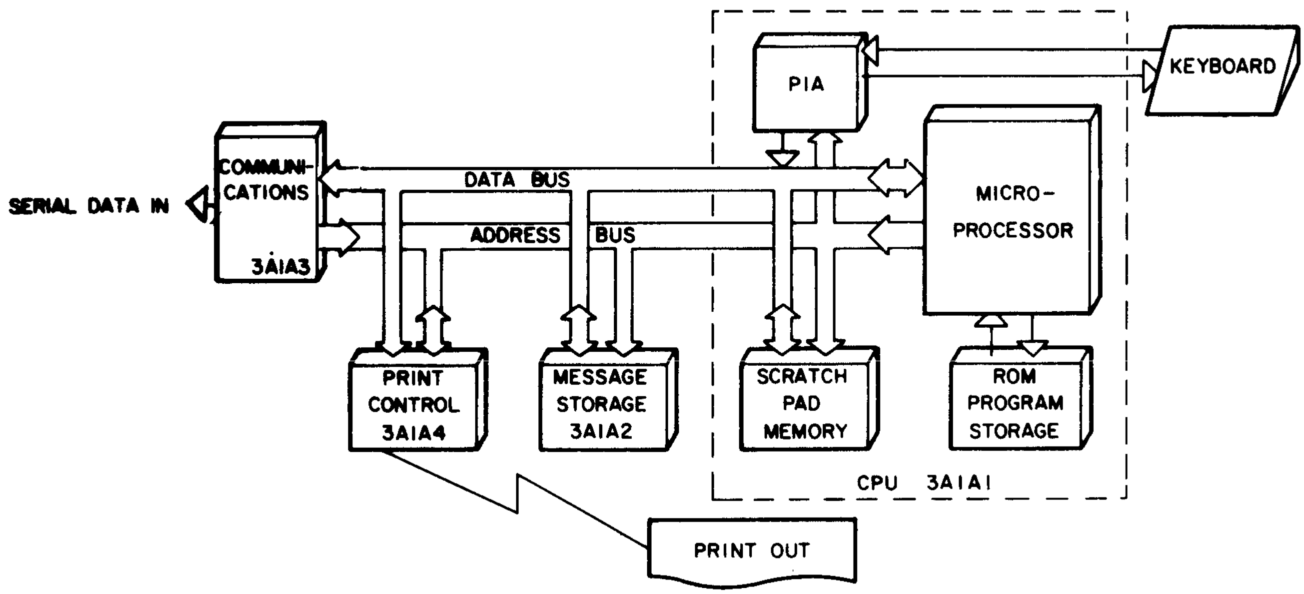


Figure 3-4. RECEIVE DATA FLOW.

RECEIVE DATA INPUT- Receive data line interfaces with interface assembly.

- Presence of input character is indicated to CPU by an interrupt request from the USART.
- ASCII/Baudot data is read by microprocessor, converted by CPU to ASCII and loaded into RAM until 80 characters are read, a carriage return is read or a 10 second time out occurs.
- Code conversions required are dependent upon availability and utilization of memory circuit card.
- If data is to be placed into message storage, it is retrieved from scratch pad memory (RAM), converted to Augmented Baudot and stored in message storage.

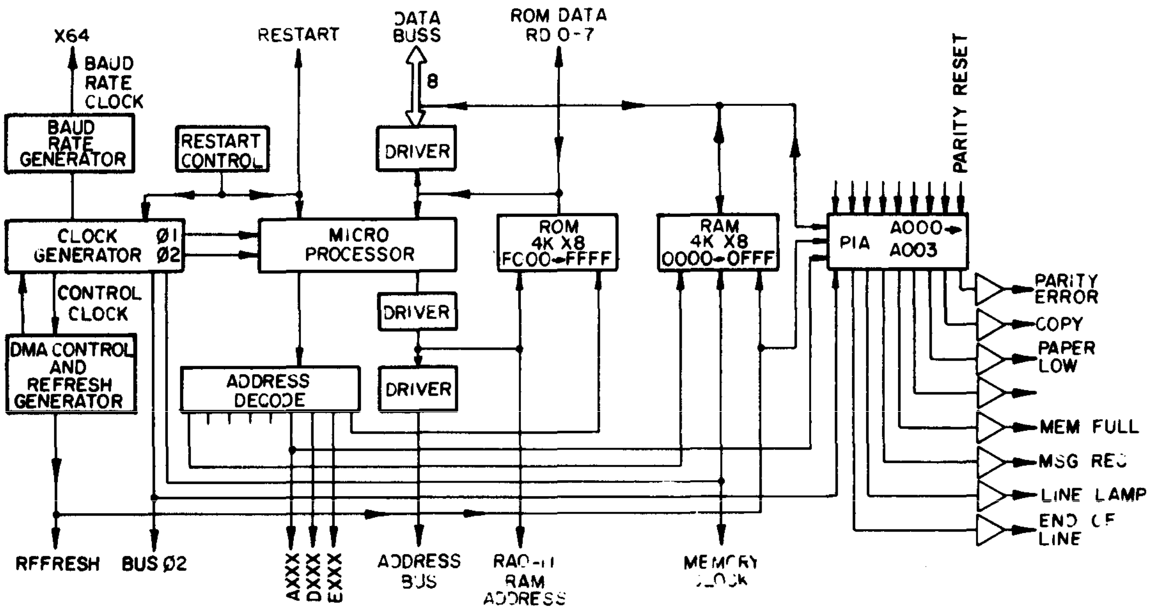


Figure 3-5. CPU BLOCK DIAGRAM

INTERNAL TIMING - CPU circuit card contains Process timing circuitry which is driven by a 4.9152 MHz oscillator.

- Clock generator produces Phase 1 and Phase 2 clocks:
  - Control clock
  - Baud-rate clock
  - Memory clock
- Baud-rate generator provides timing for communications circuit card.
- Direct memory access and refresh control provide an enable to the transmit control logic and RAM, transferring data from RAM to transmitter.

INTERNAL PROCESSING - Data received by PIA on CPU circuit card is read by CPU and stored in an accumulator.

- ROM causes coded data word to be converted into ASCII or Augmented Baudot depending upon presence or absence of memory.
  - If memory circuit card is present, Augmented Baudot is used.
  - Without memory, ASCII is used.
- When data is to be printed, it is read from memory, loaded into microprocessor accumulator and converted to printer compatible code.
- In event memory is not present, or terminal is in KSR state, input data is converted to ASCII, stored in RAM on CPU circuit card, retrieved from RAM, and converted to printer compatible format.

TIMING AND PRINTER CONTROL - Power supply regulates timing index pulse, which activates print control card. Data stored in either memory or in CPU RAM is selected to be printed by CPU. CPU card converts keyboard characters to print codes which trigger appropriate print hammers.

- When POWER switch is turned on, CPU card (A1A1) sends a signal that causes indicator lamps to be turned on. This signal is also applied to print control (A1A4).
- A1A4 sends a signal back to A1A1, which then turns off lamps.
- Initial signal from A1A1, and signal from A1A4 are also applied to DC power supply, causing power supply drum MOTOR control to turn on, thus applying voltage to motor.
- Motor causes timing mechanism's outputs to start pulsating.
- A1A4 receives pulse signals from timing mechanism and transfers them to power supply.
- Power supply compares timing signal against a reference clock and adjusts signal by increasing or decreasing voltage to motor.

NOTE

Printing process of AN/UGC-74 differs from that of other teletypewriters in that AN/UGC-74 can print multiple characters in various locations at one time using print codes which represent both the selected character and its intended location on print drum.

- Data stored in CPU accumulator is converted from ASCII or Augmented Baudot (as appropriate) to a print code, which uniquely identifies character to be printed in terms of print position on print drum.
- Print codes are loaded into 80-column memory, which holds one line of message.
- A1A4 continuously checks A1A1 to see if anything needs to be printed.
- If printing is to occur, index pulse from timing mechanism sets A1A4 counter to 0.
- A1A4 starts counting rows on print drum using pulse generated by timing mechanism. As a row is counted, A1A4 compares print codes in that row with print codes in 80-column memory.
- When a match occurs, A1A4 selects print hammer to be activated. (If print hammers one or two are to be used, A1A4 will send a signal to print hammer driver card one. For hammers three or four, print hammer driver card two receives signal.
- Print hammer driver makes a voltage available to selected hammer on all twenty cards.
- A1A4 also applies a signal to pin 3 of print hammer card which provides a ground required for magnet to energize.
- Other functions provided by printer control are:

  Ribbon lift/drop command
  Elapsed time indicator (ETI) control
  Constant current control
  Audible alarm control

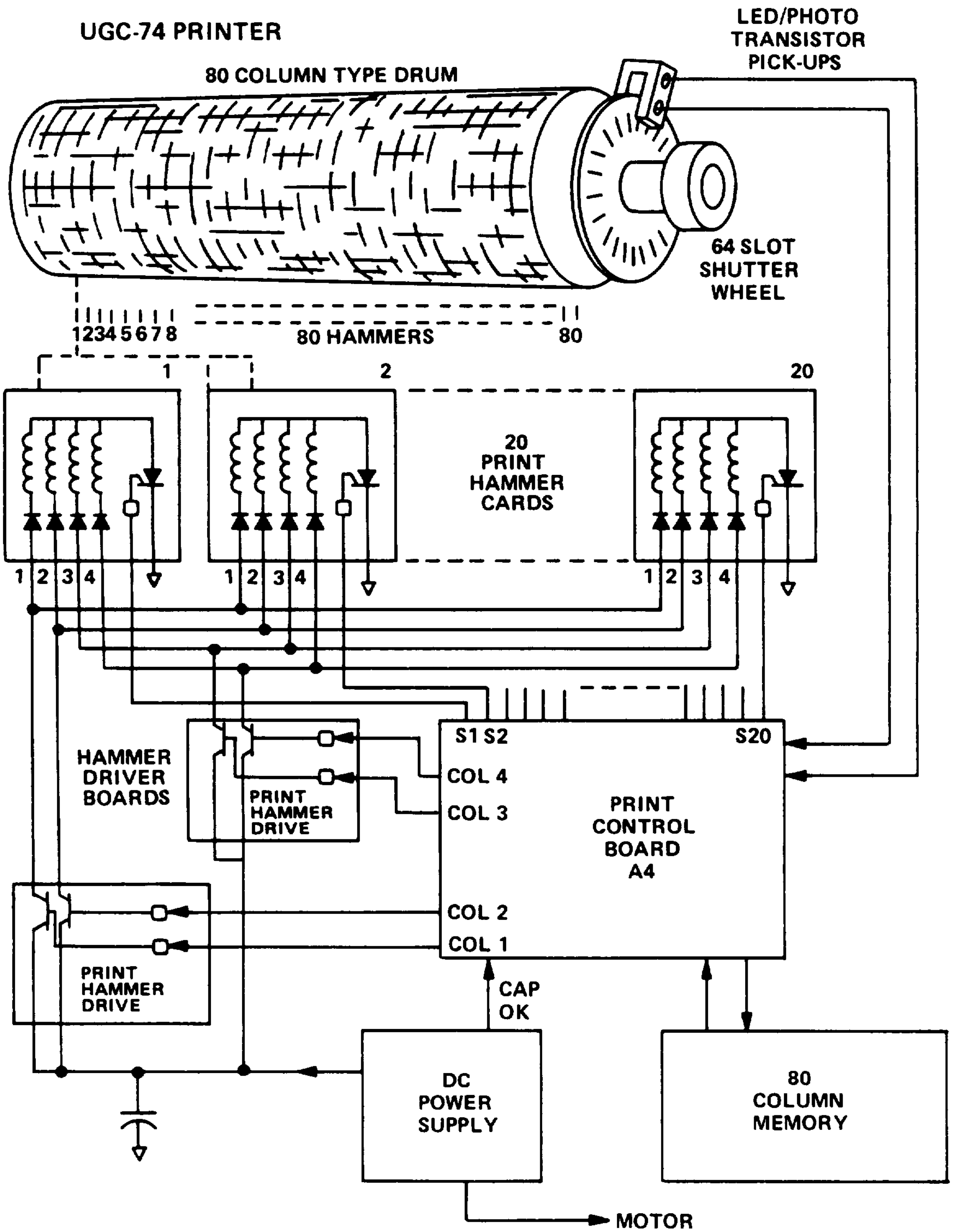


Figure 3-5.1. TIMING AND PRINT HAMMER ACTIVATION.

LINE-FEED FUNCTIONS - CPU automatically generates a line-feed command to printer after eightieth hammer has been fired or a carriage return has been received.

- Line-feed command causes a series of pulses on the four line-feed stepping motor lines to be generated.
- These pulses cause stepping motor shaft to rotate.

DATA TRANSMISSION - When transmit data command is entered, data to be transmitted is converted to appropriate ASCII or Baudot code format containing even or odd parity, and stop bits.

- This conversion is performed by communications circuit card.
- Data is input to interface assembly where it drives appropriate system interface circuitry.

COMMUNICATIONS CIRCUIT CARDS

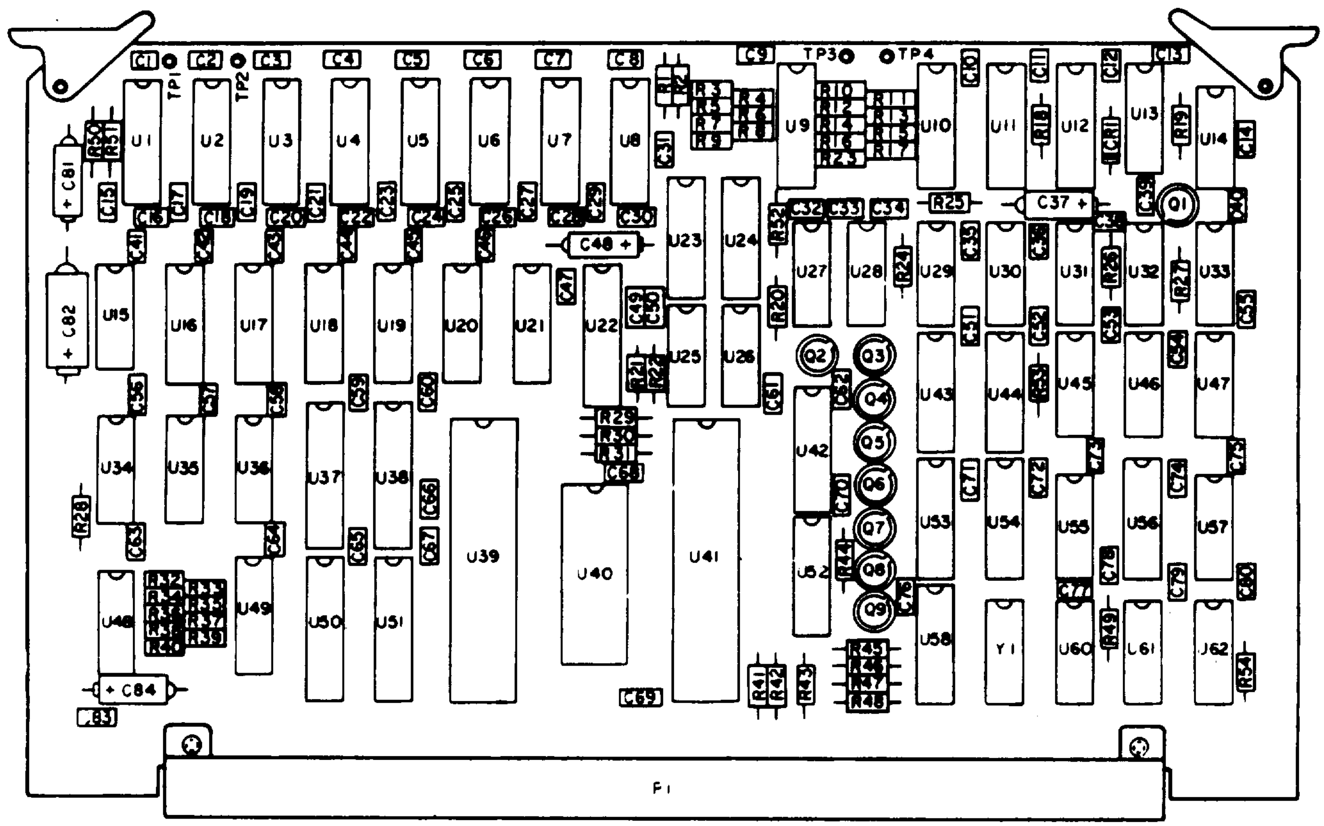


Figure 3-6. CPU CIRCUIT CARD ASSEMBLY.

CPU Circuit Card Assembly (3A1A1)

- The Central Processing Unit (CPU) is the heart of the terminal and performs the following functions:

  Clocking/timing generation
  Input data processing
  Switch and lamp interfaces
  Program memory
  Scratch pad memory

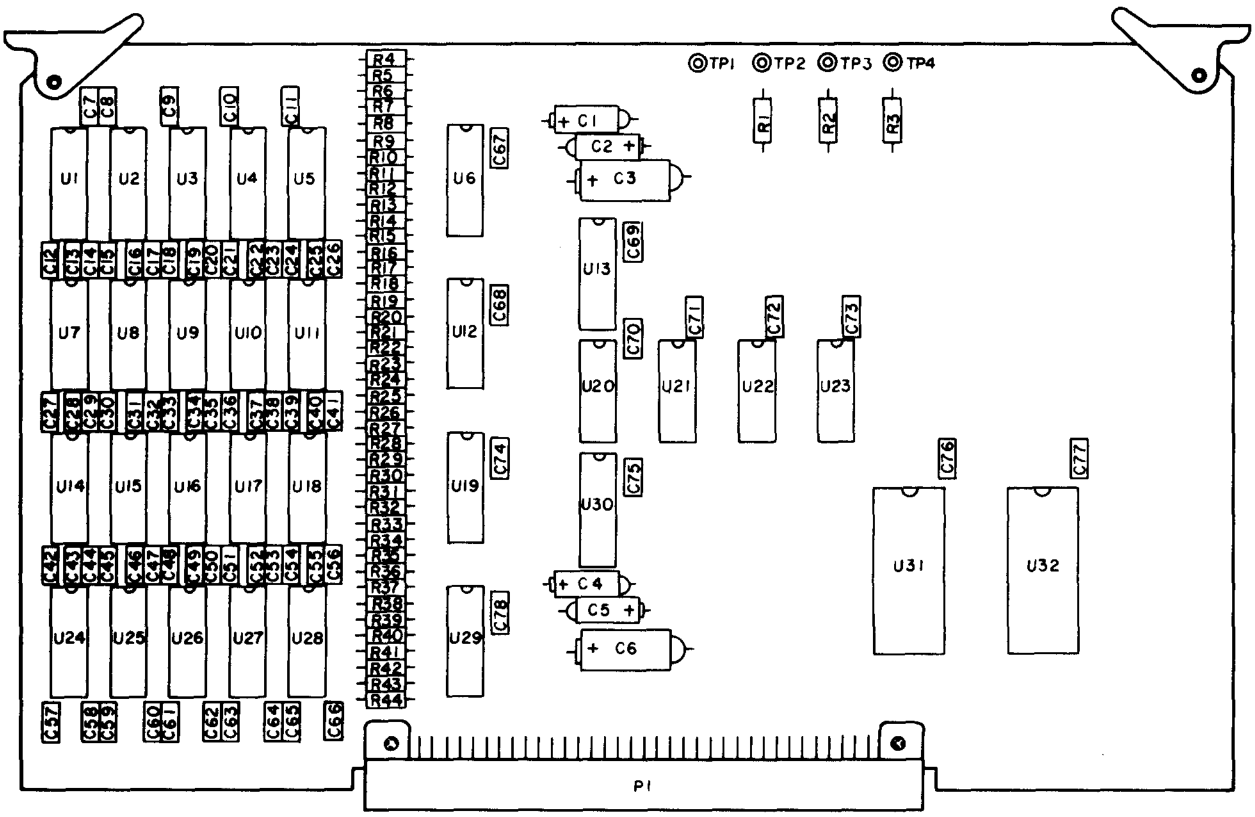


Figure 3-7. MEMORY CIRCUIT CARD ASSEMBLY.

Memory Circuit Card Assembly (3A1A2)

- Contains Read-Only Memory (ROM) and Random Access Memory (RAM) for use in text editing and storage.
- The AN/UGC-74A(V)3 can operate without this circuit card, however, message storage and full editing capabilities are not present and the terminal reverts to the Keyboard Send Receive (KSR) state.

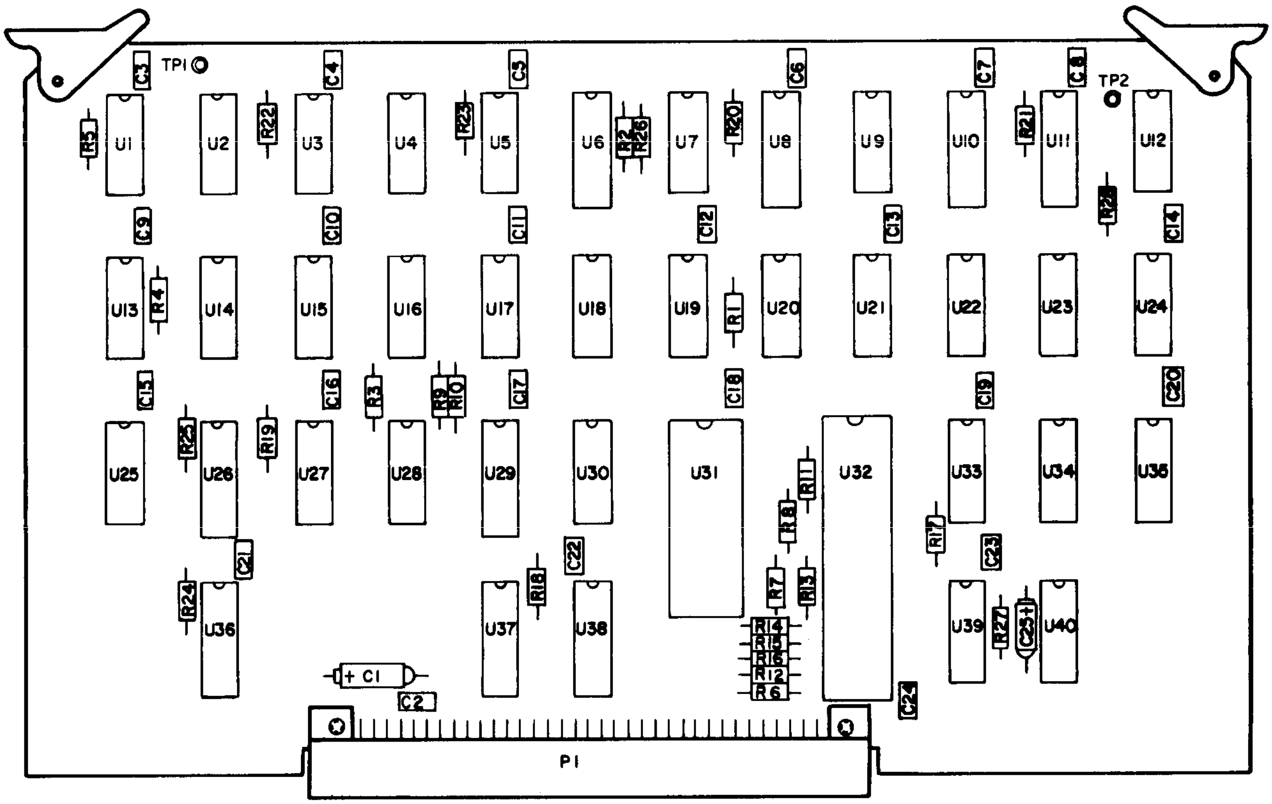


Figure 3-8. COMMUNICATIONS CIRCUIT CARD ASSEMBLY.

Communications Circuit Card Assembly (3A1A3)

- Receive and transmit data interfaces with the terminal through the interface assembly which interfaces with the communications circuit card. The overall function is to condition input and output data so that it is compatible with its respective interfaces. This conditioning includes modulation and demodulation for conditioned diphase data.
- Key interface is the Universal Synchronous/Asynchronous Receiver Transmitter (USART). All data enters and exits through the USART. The USART converts receiver serial input data to parallel and parallel transmitter output data to serial.

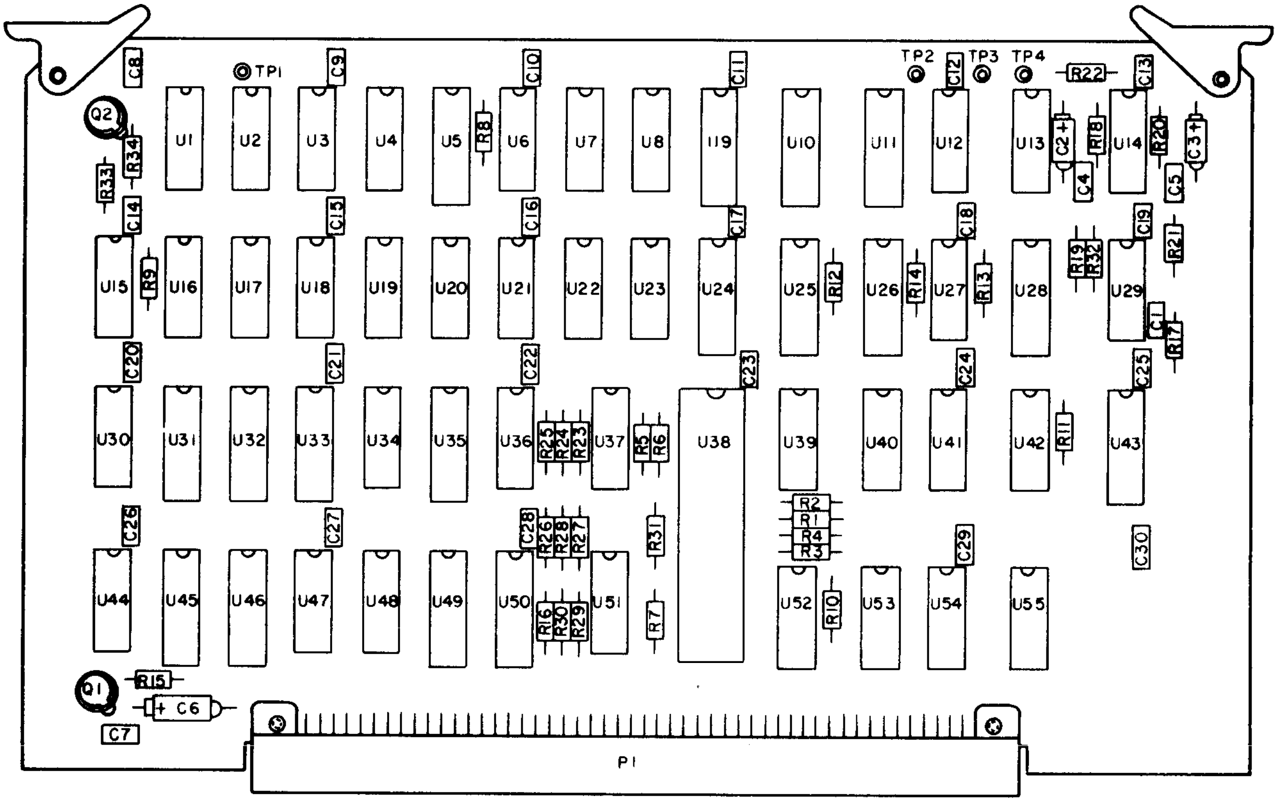


Figure 3-9. PRINTER CONTROL CIRCUIT CARD ASSEMBLY.

Printer Control Circuit Card Assembly (3A1A4)

- Responds to print commands from the microprocessor on the CPU circuit card. On command, the print control reads characters from the memory. Each character is stored in an 80 location print buffer in the CPU RAM memory.
- As each of the print drum's 64 rows pass under the hammers, the 80 locations are read and the appropriate hammer for each column is commanded to fire when the character appears approximately 1½ characters before the hammer.
- The print control, (control circuit) also issues the line feed drive command to the line feed stepping motor, as well as performing other miscellaneous functions as follows:

  Ribbon-lift control
  Audible alarm drive
  External control interface with system logic
  Precision timing signal for drum speed control

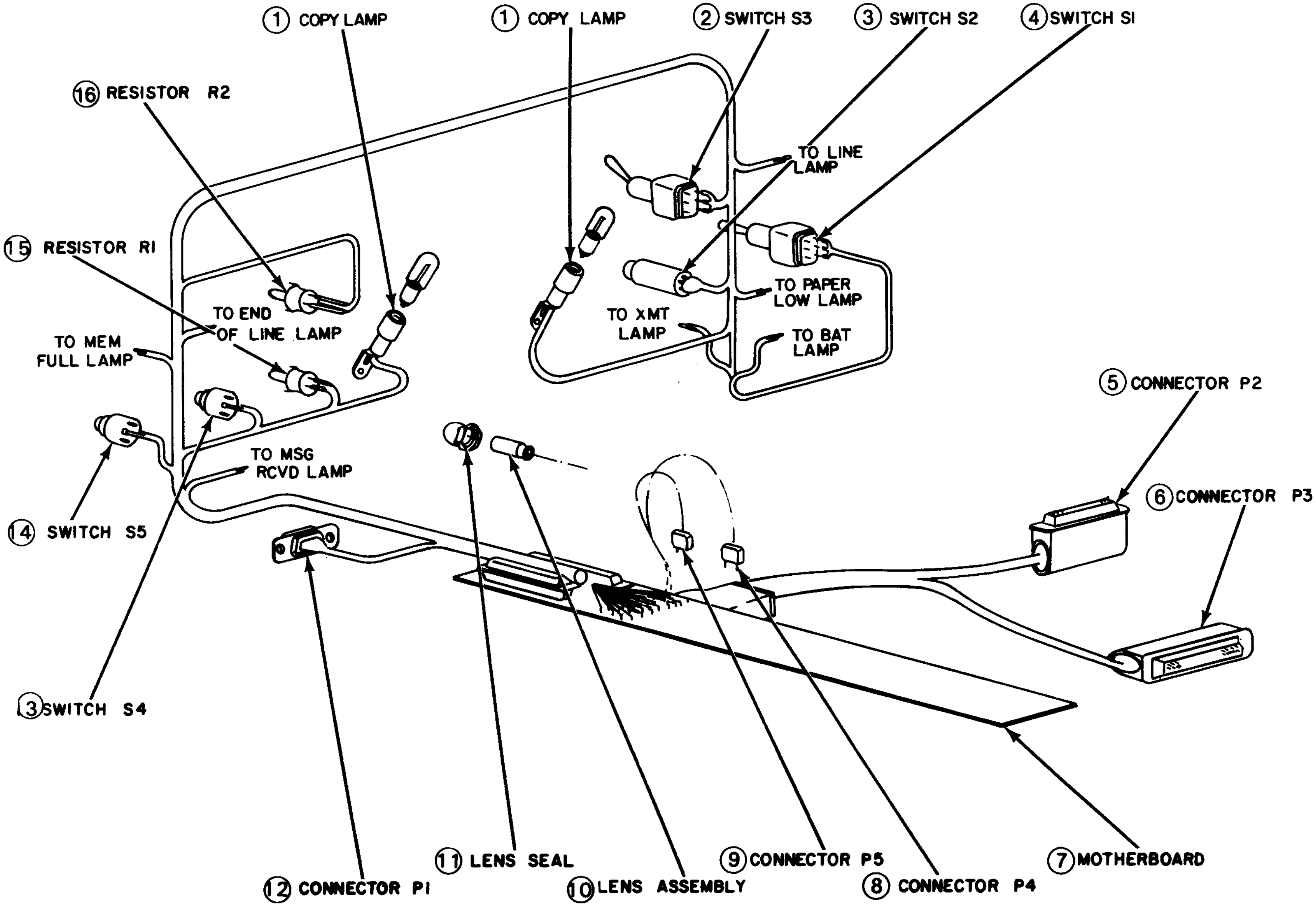


Figure 3-10. HARNESS ASSEMBLY.

- Harness Assembly - All system electrical interfaces from the logic circuit card to power supply, dustcover, and interface assembly, come through the harness assembly.
- The harness assembly is composed of the motherboard, dustcover, power supply, and interface harness.

LEGEND FOR HARNESS ASSEMBLY

KEY	INTERFACE	KEY	INTERFACE
1 Copy Lamps - DS9 and DS10	Copy illumination	9 Connector (P5) -	Inductor L2
2 Switch (S3) -	Transfer	10 Lens Assembly -	Parity Reset
3 Switch (S2) -	Parity Reset	11 Lens Seal -	Parity Reset
4 Switch (S1) -	Abort	12 Connector (P1) -	Keyboard
5 Connector (P2) -	Interface	13 Switch (S4) -	Audible Reset Alarm
6 Connector (P3) -	Power Supply	14 Switch (S5) -	Line Feed
7 Motherboard -	Electrical interface (System)	15 Resistor (R1) -	2.5k Audio Pot
8 Connector (P4) -	Inductor L1	16 Resistor (R2) -	2.5k Ilium Pot

PERIPHERAL INTERFACE ADAPTER (PIA)

- The principle interface between the logic circuits and the CPU is the PIA.
- The CPU, Printer Control and Communications circuit cards each contain an MC6820, or equivalent integrated circuit which performs the PIA function.

  The PIA may be thought of as a traffic control device, which depending upon the input control signals, allows data to flow into and out of the circuit.

  The peripheral inputs and outputs are discrete lines which interface with only a single component; i.e., switch, lampdriver, audible alarm driver, etc.

  The logic circuits interface with two sets of bidirectional data buses:

  - DATA BUS - Functions as input or output lines depending upon control signal.
  - ADDRESS BUS - Provides interfaces for process control and data routing functions.

  The bidirectional capabilities are made possible by the use of tri-state logic.

UNIVERSAL SYNCHRONOUS/ASYNCHRONOUS RECEIVER TRANSMITTER (USART)

. External data lines which interface with the terminal carry serial data. Since the terminal processes the data in parallel, a converter must be provided to change the input data from serial to parallel and the output data from parallel to serial.

  This task is performed by the USART which is a AMD9551, or equivalent integrated circuit mounted on the Communications circuit card.

TRISTATE LOGIC

- Conventional Transistor-Transistor-Logic (TTL) Devices. - Conventional TTL Logic uses two states; i.e., logic 1 (+4.75Vdc) and logic 0 (0 to 0.5Vdc).
- Both these states result in low impedance paths either to ground or to the Vdc (+5V) supply.
- The interface line between the output device and the input devices is PULLED toward ground or Vdc supply as required by the output circuit.
- The impedance of this type of operation precludes wiring together the outputs of other drivers which may drive the same logic circuitry.
- Therefore, additional interface lines and logic must be provided for these other drivers.

- Tristate TTL Devices - Tristate TTL devices utilize the same two logic states as conventional TTL devices.
- However, in addition to the low impedance logic 1 and logic 0, a third state (high impedance) is provided.
- In this state, the output device(s) offer a high impedance to the interface line which causes it to appear much like an open Circuit.

MICROPROCESSOR

- Located on the CPU circuit card.
- Controls all internal processing functions and performs the "intelligent" functions of the terminal.
- Directed in process control functions by programmed instructions contained in the ROM (Read-Only Memory).

READ-ONLY MEMORY (ROM)

- Permanently formed memory containing instruction or code conversion tables.
- In the CPU, a ROM instructs the microprocessor what to do and when to do it.
- In the KEYBOARD, ROM's translate 16 bit keyswitch code into six bit keyboard code.
- In the MEMORY CIRCUIT CARD, ROM's provide instruction to the CPU for Intelligent Communication Terminal processing (ICT).

RANDOM ACCESS MEMORY (RAM)

- Integrated circuit located on the CPU circuit card.
- Microprocessor uses the RAM as a temporary storage device in performing processing calculations.

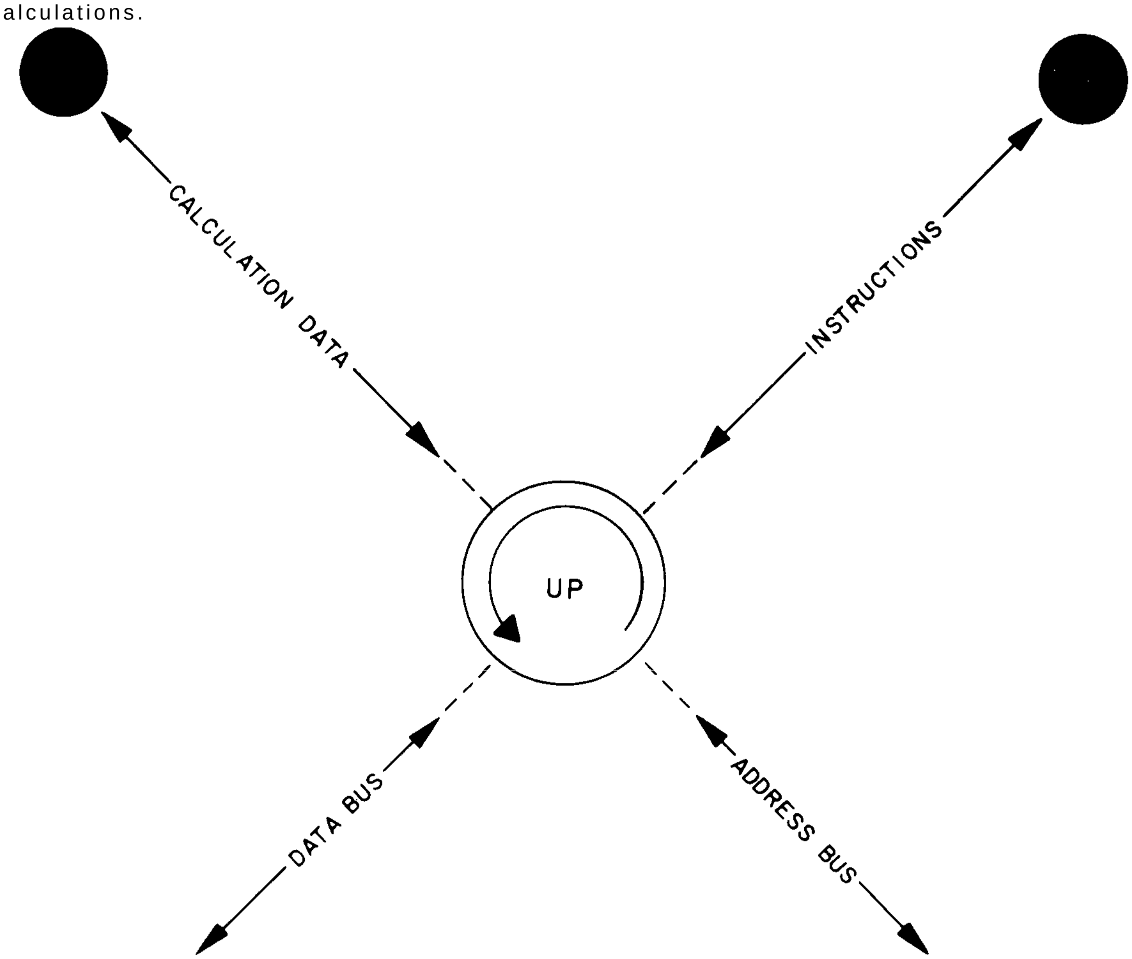


Figure 3-11. RELATIONSHIP BETWEEN RAM, ROM, AND MICROPROCESSOR.

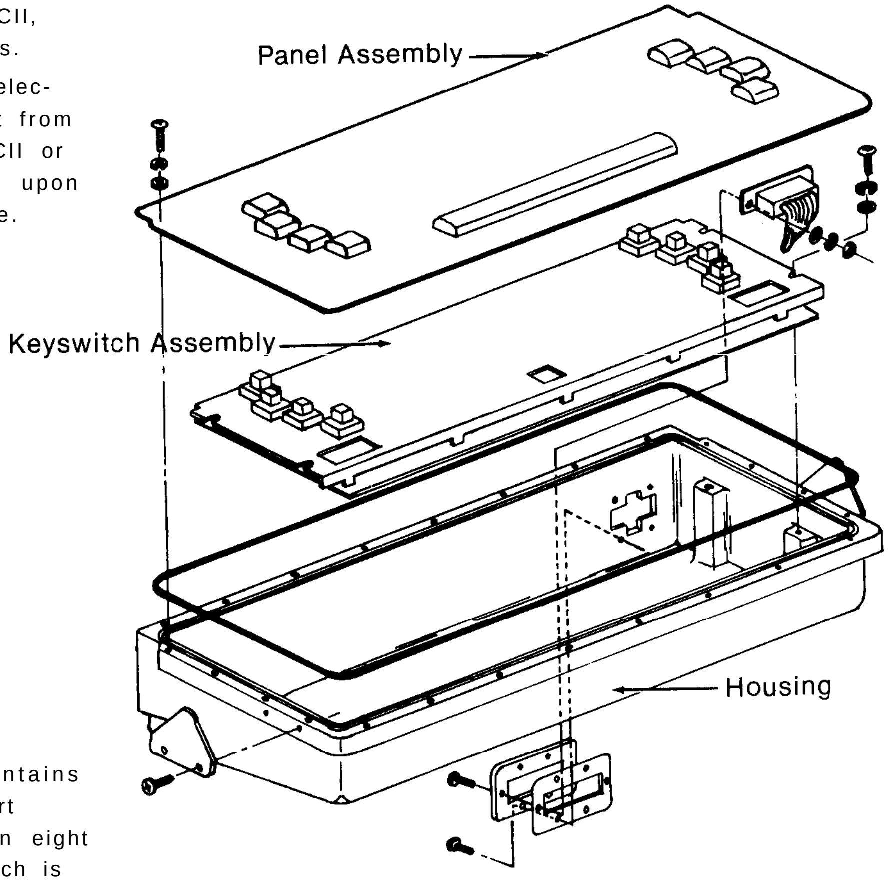
Section II. ELECTRICAL, ELECTRONIC, AND MECHANICAL FUNCTIONS

3-4. KEYBOARD ASSEMBLY (3A2)

Keyboard assembly is composed of a panel assembly and a keyswitch assembly, which are mounted together in a housing assembly.

Panel assembly:

- Contains 63 keys arranged and labelled to meet ASCII, and Baudot requirements.
- Electronics of terminal electronically translate input from keyboard into either ASCII or Baudot mode depending upon selected operating mode.



Keyswitch assembly:

- Keyswitch assembly contains logic circuitry to convert keyswitch inputs into an eight bit serial data word which is input to CPU circuit card.

- Each key actuates a Honeywell SD Type Hall Effect switch which is mounted immediately below keyboard.
- Each keyswitch has a shaft which is mounted within a rubber boot to provide environmental protection.

  The shafts come in contact with Plungers on keyswitch assembly, but are not attached to them.

  This allows panel assembly to be removed with removing keyswitch assembly.

- Keyboard is optional equipment; without it terminal has only RO capability.

3-5. KEYBOARD OPERATIONAL DESCRIPTION

When the terminal keyboard is operated, the keyswitches generate logic “0” output. All the keyswitches except SHIFT (2 keys), LOC, REPEAT, and CONTROL are wired into an 8 x 8 row/column matrix. The LOC key is an alternate action key. When pressed, it locks in the down position until a second depression releases it. This key provides the SHIFT LOC function. The REPEAT key causes the last character entered to be repeated.

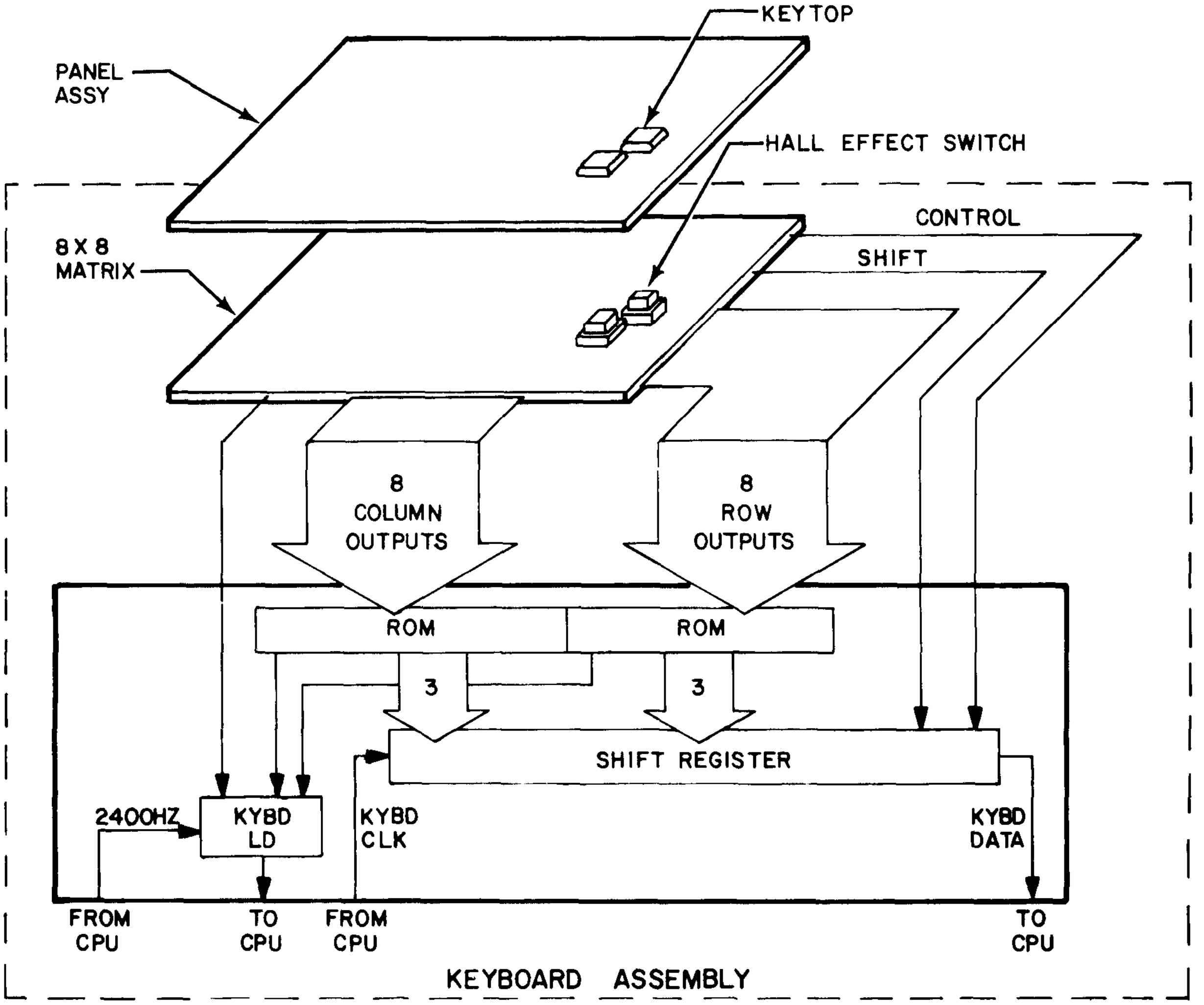


Figure 3-12. KEYBOARD BLOCK DIAGRAM.

(1) The matrix output appears as two 8-bit words. Each 8-bit word represents a row and column address for the respective ROM encoders. The 8 x 8 matrix outputs are normally all a logic 1. When a keyswitch. other than the LOC/SHIFT. CONTROL, and REPEAT is operated, the two matrix outputs change from all 1's to a single logic 0 and seven logic 1's for both the row and the column outputs. The position of the zeroes provide the row/column address of the operated switch. The presence of more than one zero in the address indicates that more than one keyswitch is operated. In such cases the ROM's (U1 and U3) ignore the address until one of the keys is released and a legal address is again recognized.

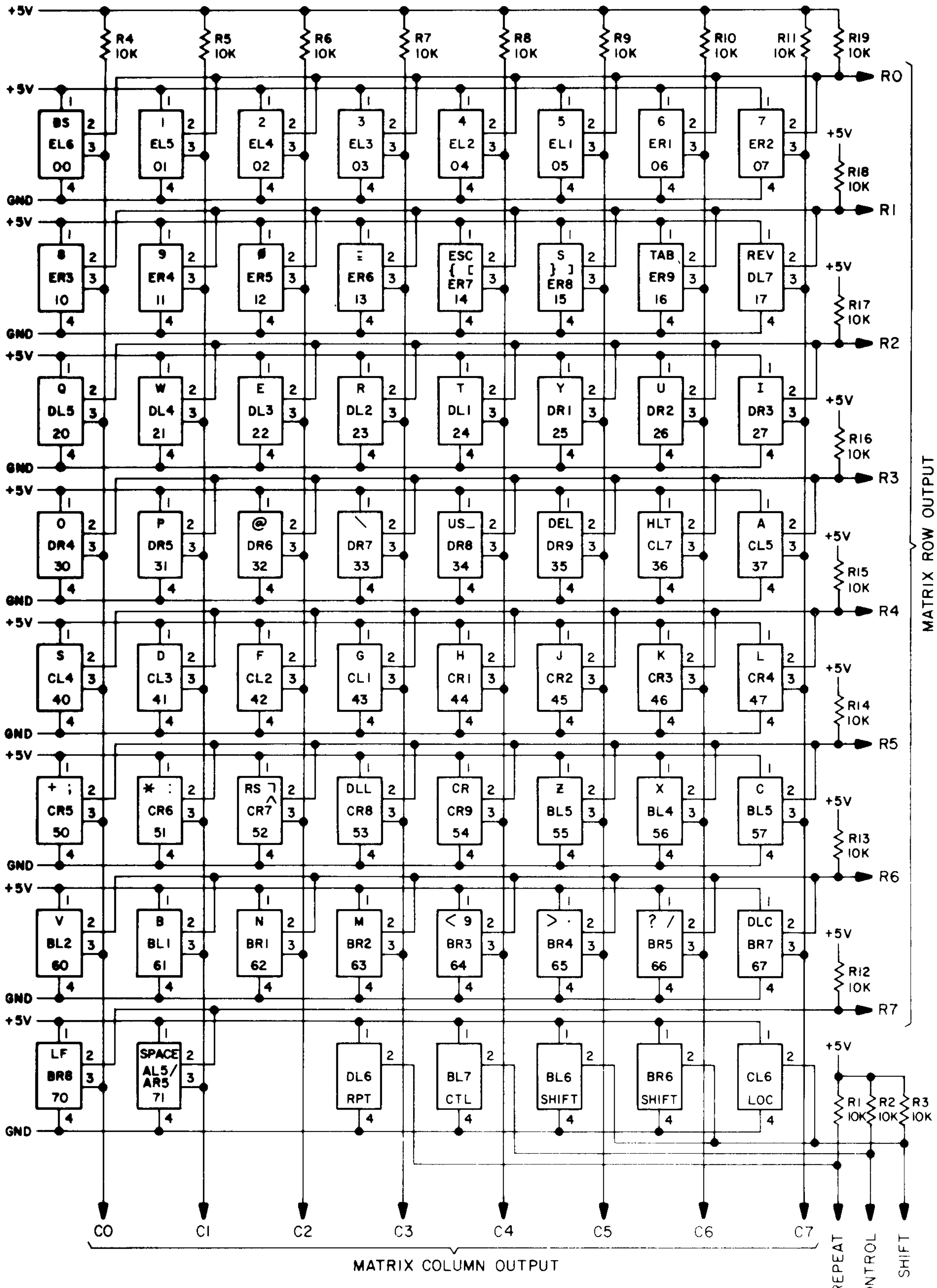


Figure 3-13 (1). KEYBOARD LOGIC DIAGRAM (Sheet 1 of 3).

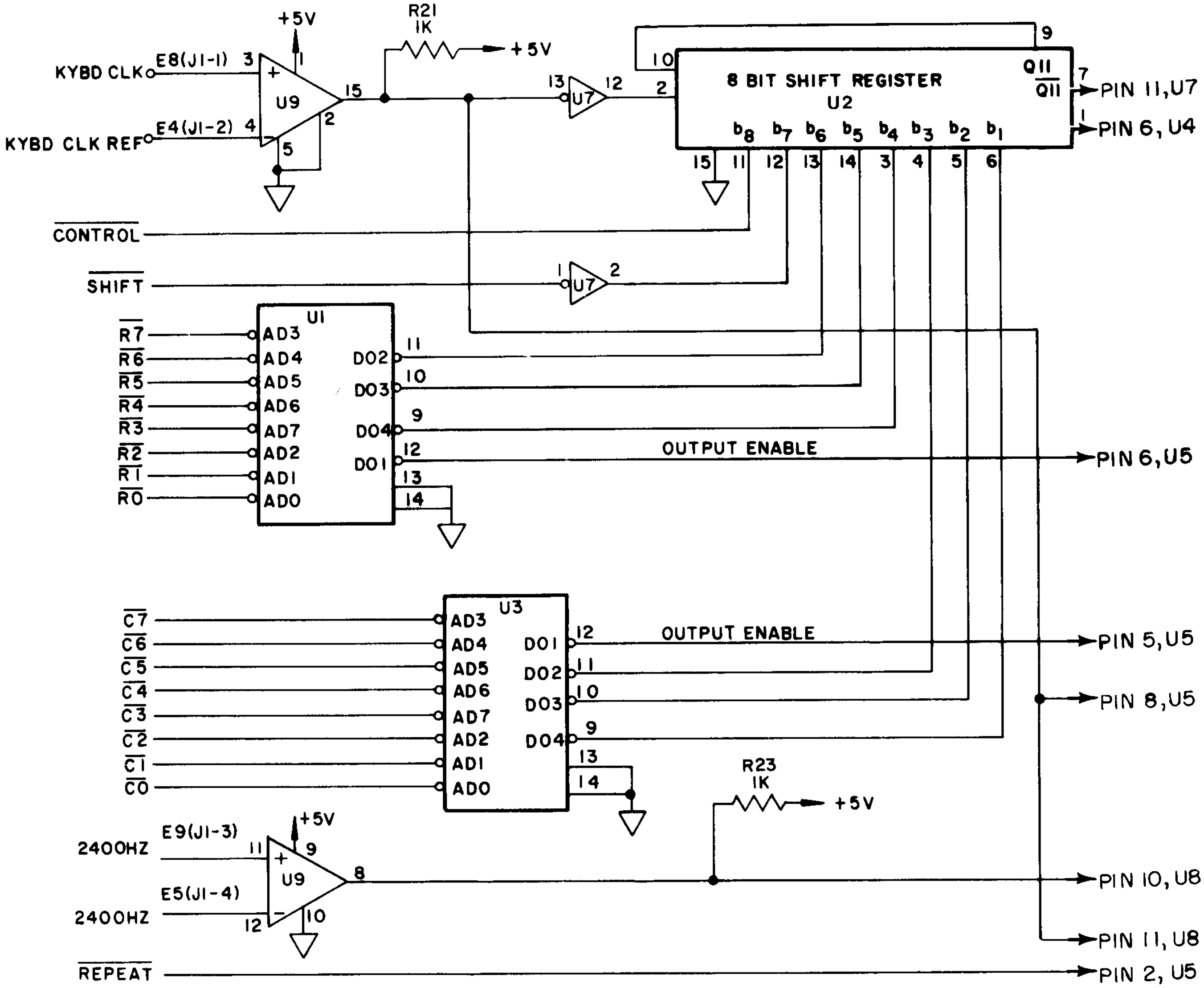


Figure 3-13 (2). KEYBOARD LOGIC DIAGRAM (Sheet 2 of 3).

(2) Having recognized the keyswitch address, the ROM generates a six-bit code representing the actuated keyswitch. The six bits generated for each key are provided in table 3-2. These six bits are input to an eight-bit shift register. Both outputs enabled from U1 and U3 become a logic 0 when a keyswitch address is recognized. The presence of a logic 0 of U5 pins 6 and 5 causes a logic 1 of U5 pin 4. Flip-flop U6 pin 2 is a logic 1 because it is wired to +5V. U6 pin 5 is a logic 0 due to an earlier clear pulse from U5 pin 10. The change of the output on U5 pin 4 from a logic 0 to a 1 causes output of U6 pin 5 to become a logic 1. The logic 1 at U6 pin 5 causes a logic 1 at U6 pin 12. The output at U6 pin 9 is a logic 0 until U9 pin 8 output changes from a logic 0 to a logic 1. When this occurs, U4 pin 2 becomes a logic 1. Output U4 pin 5 becomes a logic 1 on the next change of U9 pin 8 from a logic 0 to a logic 1. When U4 pin 5 is a logic 1, U4 pin 6 is a logic 0 which enables new data to be loaded into shift register U2. The first KYBD CLK steps the first bit (b_1) out of the shift register (U2) and also causes a logic 0 at the output of U5 pin 10. This logic 0 resets flip-flops U6 and U4 and causes KYBD LD to become a logic 0 again.

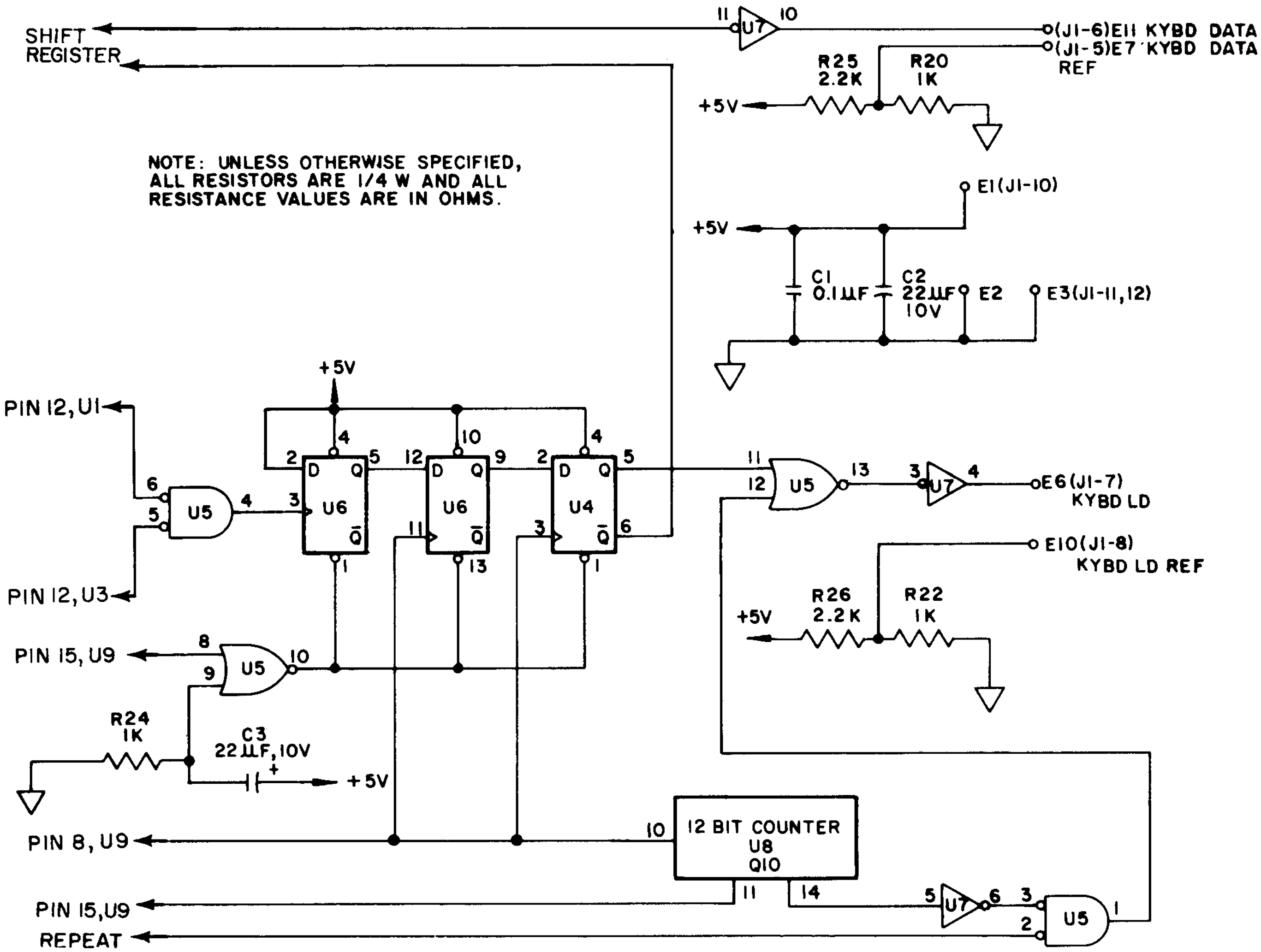


Figure 3-13 (3). KEYBOARD LOGIC DIAGRAM (Sheet 3 of 3).

(3) The character in the shift register is shifted bit by bit by the KYBD CLK from the CPU circuit card. With each clock pulse, the data is loaded back into the register so that at the end of eight clock pulses, the same data is again available. The recycling of the eight bits of data allows the character to be regenerated with the REPEAT key.

(4) When the REPEAT key is pressed, the logic 0 appears at U5 pin 2. When pin 11 of U8 is a logic 0, the 12-bit binary counter (U8) divides the 2400 Hz by 512 to produce a positive transition at pin 14 every 213 ms (4.7 times per second). The logic 1 on U8 pin 14 produces a logic 0 at U7 pin 6 and U5 pin 3. When U5 pin 3 becomes a logic 0, U5 pin 1 becomes a logic 1. The KYBD LD again becomes a logic 1, resulting in the generation of KYBD CLK. The first KYBD CLK pulse resets the counter (U8) causing U7 pin 6 to become a logic 1. U5 pin 1 becomes a logic 0 causing U7 pin 4 to become a logic 0. At the end of 213 ms (nominal), U7 pin 6 again becomes a logic 0. If the REPEAT keyswitch is still operated, the cycle is again repeated. In any case, the character remains in the register until a new character is input.

Table 3-2. CHARACTER CODE MATRIX

B8 (control)						0	0	1	1
B7 (shift)						**0**	**1**	**0**	**1**
b6	**b5**	**b4**	**b3**	**b2**	**b1**	**Unshifted controlled**	**Shifted controlled**	**Unshifted uncontrolled**	**Shifted uncontrolled**
1	1	1	1	1	1	BS	BS	BS	BS
1	1	1	1	1	0	1	!	1	!
1	1	1	1	0	1	2	“	2	“
1	1	1	1	0	0	3	#	3	#
1	1	1	0	1	1	4	$	4	$
1	1	1	0	1	0	5	%	5	%
1	1	1	0	0	1	6	&	6	&
1	1	1	0	0	0	7	I	7	/
1	1	0	1	1	1	8	(	8	(
1	1	0	1	1	0	9	)	9	)
1	1	0	1	0	1	0	0	0	0
1	1	0	1	0	0	—	=	-	=
1	1	0	0	1	1	ESC	ESC	(	(
1	1	0	0	1	0	GS	GS	)	)
1	1	0	0	0	1	TAB	TAB	TAB	TAB
1	1	0	0	0	0	REV	REV	REV	REV
1	0	1	1	1	1	DCI	DC I	q	Q
1	0	1	1	1	0	ETB	ETB	w	W
1	0	1	1	0	1	ENQ	ENQ	e	E
1	0	1	1	0	0	DC2	DC2	r	R
1	0	1	0	1	1	DC4	DC4	t	T
1	0	1	0	1	0	EM	EM	Y	Y
1	0	1	0	0	1	NAK	NAK	u	U
1	0	1	0	0	0	i	l	i	l
1	0	0	1	1	1	0	o	o	o
1	0	0	1	1	0	DLE	DLE	P	P
1	0	0	1	0	1	NUL	NUL	@	\
1	0	0	1	0	0	FS	FS	\	1
1	0	0	0	1	1	US	US	—	_
1	0	0	0	1	0	DEL	DEL	DEL	DEL
1	0	0	0	0	1	H LT	H LT	H LT	H LT
1	0	0	0	0	0	SOH	SOH	a	A
0	1	1	1	1	1	DC3	DC3	s	s
0	1	1	1	1	0	EOT	EOT	d	D
0	1	1	1	0	1	ACK	ACK	f	F
0	1	1	1	0	0	BEL	BEL	9	G
0	1	1	0	1	1	h	H	h	H
0	1	1	0	1	0	j	J	j	J
0	1	1	0	0	1	V/T	VT	k	K
0	1	1	0	0	0	FF	FF	l	L
0	1	0	1	1	1	;	+	;	+
0	1	0	1	1	0		*		*

Table 3-2. CHARACTER CODE MATRIX - Continued

B8 (control)						0	0	1	1
B7 (shift)						0	1	0	1
b6	b5	b4	b3	b2	b1	Unshifted controlled	Shifted controlled	Unshifted uncontrolled	Shifted uncontrolled
0	1	0	1	0	1	RS	RS	ˆ	¬
0	1	0	1	0	0	DLL	DLL	DLL	DLL
0	1	0	0	1	1	CR	CR	CR	CR
0	1	0	0	1	0	SUB	SUB	z	z
0	1	0	0	0	1	CAN	CAN	x	x
0	1	0	0	0	0	ETX	ETX	c	c
0	0	1	1	1	1	SYN	SYN	v	V
0	0	1	1	1	0	STX	STX	b	B
0	0	1	1	0	1	SO	SO	n	N
0	0	1	1	0	0	m	M	m	M
0	0	1	0	1	1	,	<	,	<
0	0	1	0	1	0	.	>	.	>
0	0	1	0	0	1	/	?	/	?
0	0	1	0	0	0	DLC	D LC	DLC	DLC
0	0	0	1	1	1	LF	LF	LF	LF
0	0	0	1	1	0	Space	Space	Space	Space

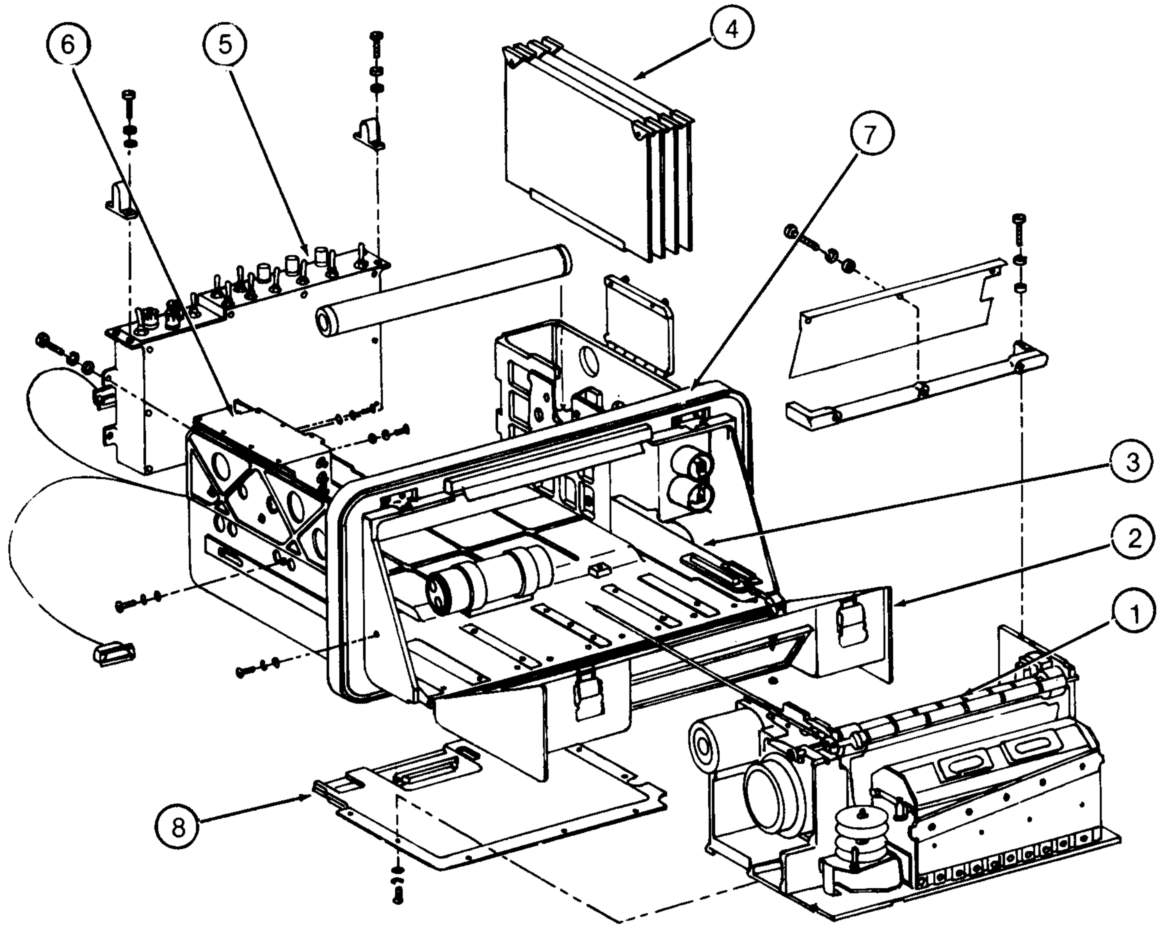


Figure 3-14. TELEPRINTER ASSEMBLY.

3-6. TELEPRINTER ASSEMBLY

(1) PRINTER ASSEMBLY - 3A1

- Converts input signals from processing logic circuit cards into printed text.

(2) DUSTCOVER ASSEMBLY - 3A1

- Contains system operating controls once mode is selected. Indicators are visually observable and allow constant monitoring of terminal operation.

(3) (MOTHERBOARD) HARNESS ASSEMBLY - 3A1

- Provides access to all inter-related Interfaces between the logic assemblies, power Supply, and interface assembly.

(4) PROCESSING LOGIC CARD ASSEMBLIES

- CPU Circuit Card Assembly - 3A1A1
- Memory Circuit Card Assembly - 3A1A2
  Expands terminal capacity for editing and storage purposes.
- Communications Circuit Card Assembly - 3A1A3
  Conditions input/out data making it compatible with respective interfaces,
- Print Control Circuit Card Assembly - 3A1A4
  Converts electrical signals into print commands.

(5) INTERFACE ASSEMBLY - 3A1A7

The interface assembly serves three functions:

- Power mode switching
- Mode selection
- Data input/output level conversion

(6) FILTER ASSEMBLY - 3A1A6FL1

- Converts and filters 115/230 Vac 50/60/400 Hz power to 22-30 Vdc . Also provides EMI filtering.

(7) CHASSIS ASSEMBLY

- Provides easy access for mounting and repair of components.

(8) POWER SUPPLY ASSEMBLY - 3A1PS1

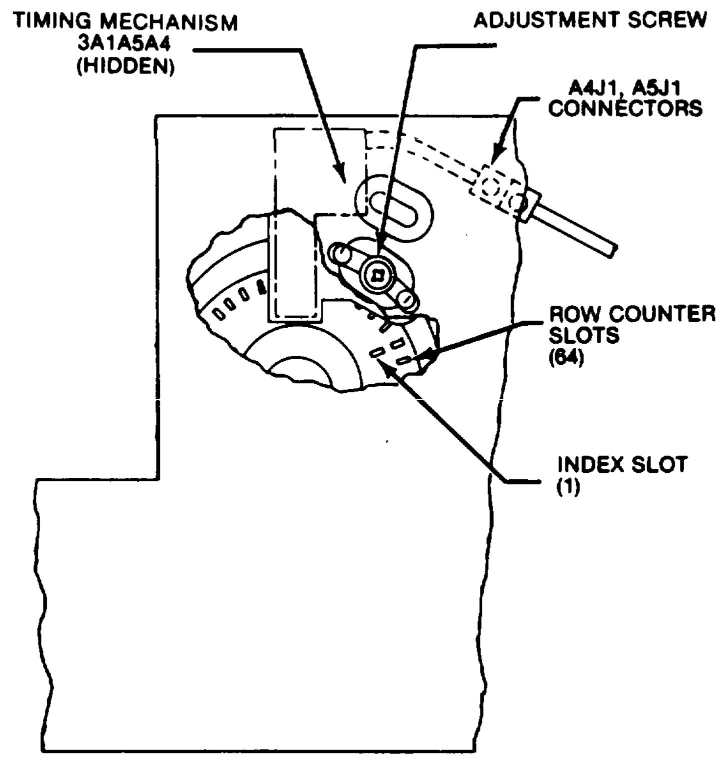
- Provides dc power for all functions as required. Also provides battery backup sensing and switching.

3-7. PRINTER ASSEMBLY MAJOR ELECTRONIC COMPONENTS

TIMING MECHANISM

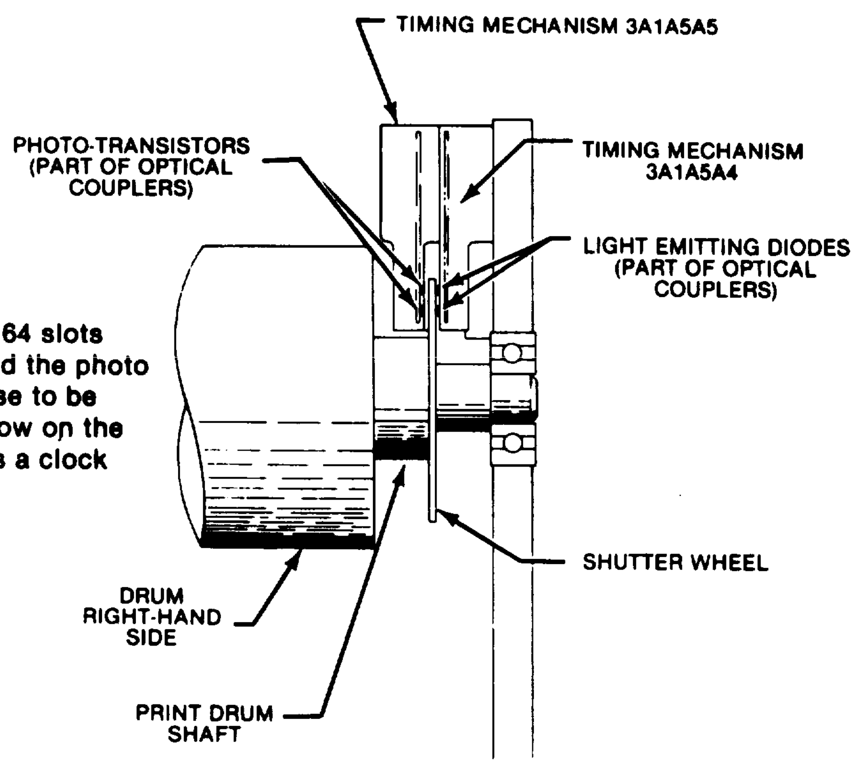
- The timing mechanism for the printer is composed of a shutter wheel and two infrared optical couplers.

- The shutter wheel is mounted on the print drum shaft and contains 64 slots evenly spaced around the circumference. A single slot is placed inward from the 64 slots.



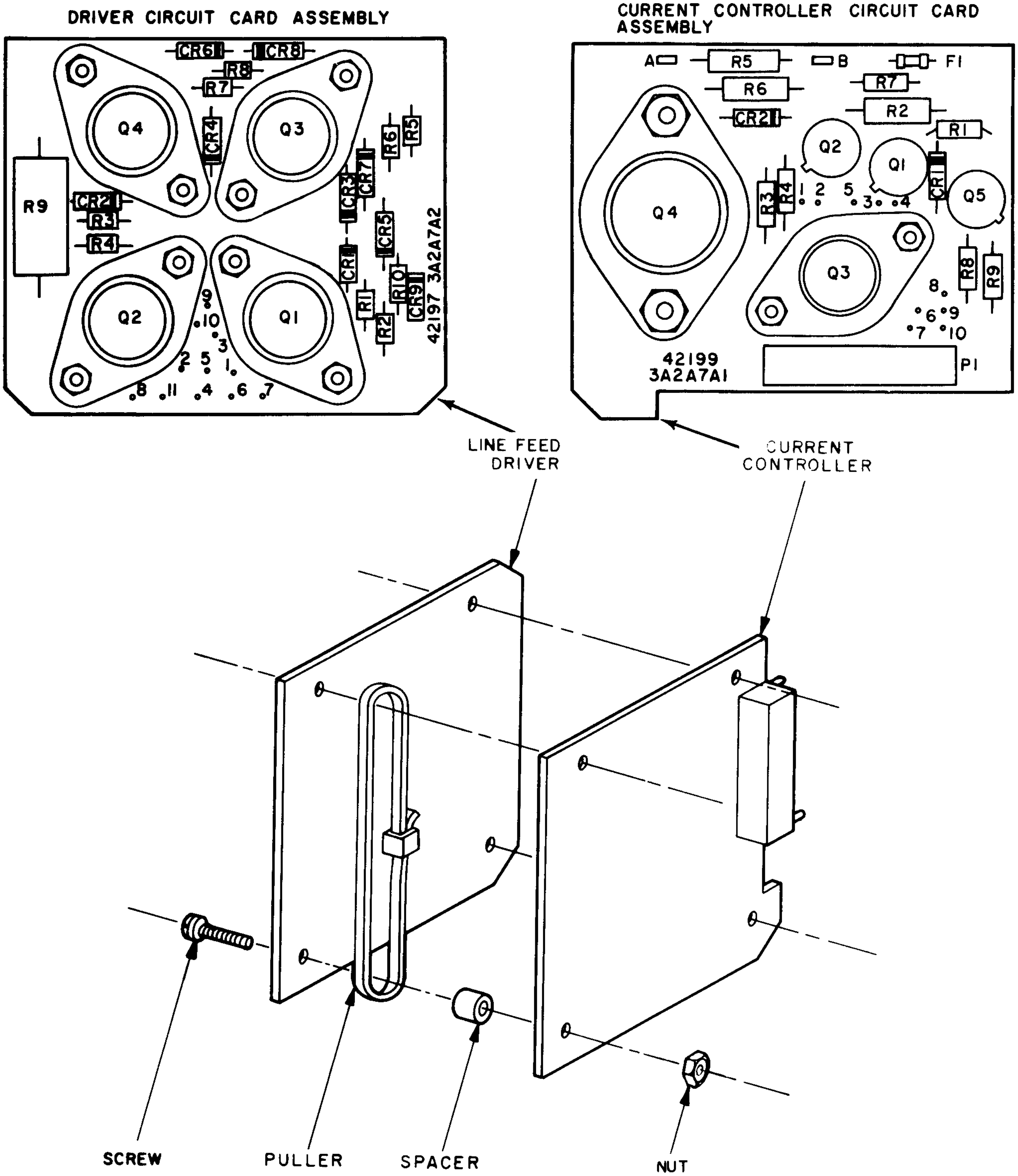
- These assemblies are sealed and considered nonrepairable.

- As the print drum turns, the 64 slots passing between the LED'S and the photo transistors causes a clock pulse to be generated for each character row on the drum. The index slot generates a clock pulse for each revolution.



MOTOR DRIVE AND CURRENT CONTROL BOARD ASSEMBLY.

- This assembly is composed of a line-feed/current controller and a line-feed driver. Assemblies mount together to make a single component mounted on left hand side of printer assembly.



(1) Line-Feed Control System

Interconnection between controller, line-feed stepping motor and driver as well as circuitry contained on each circuit card is shown below.

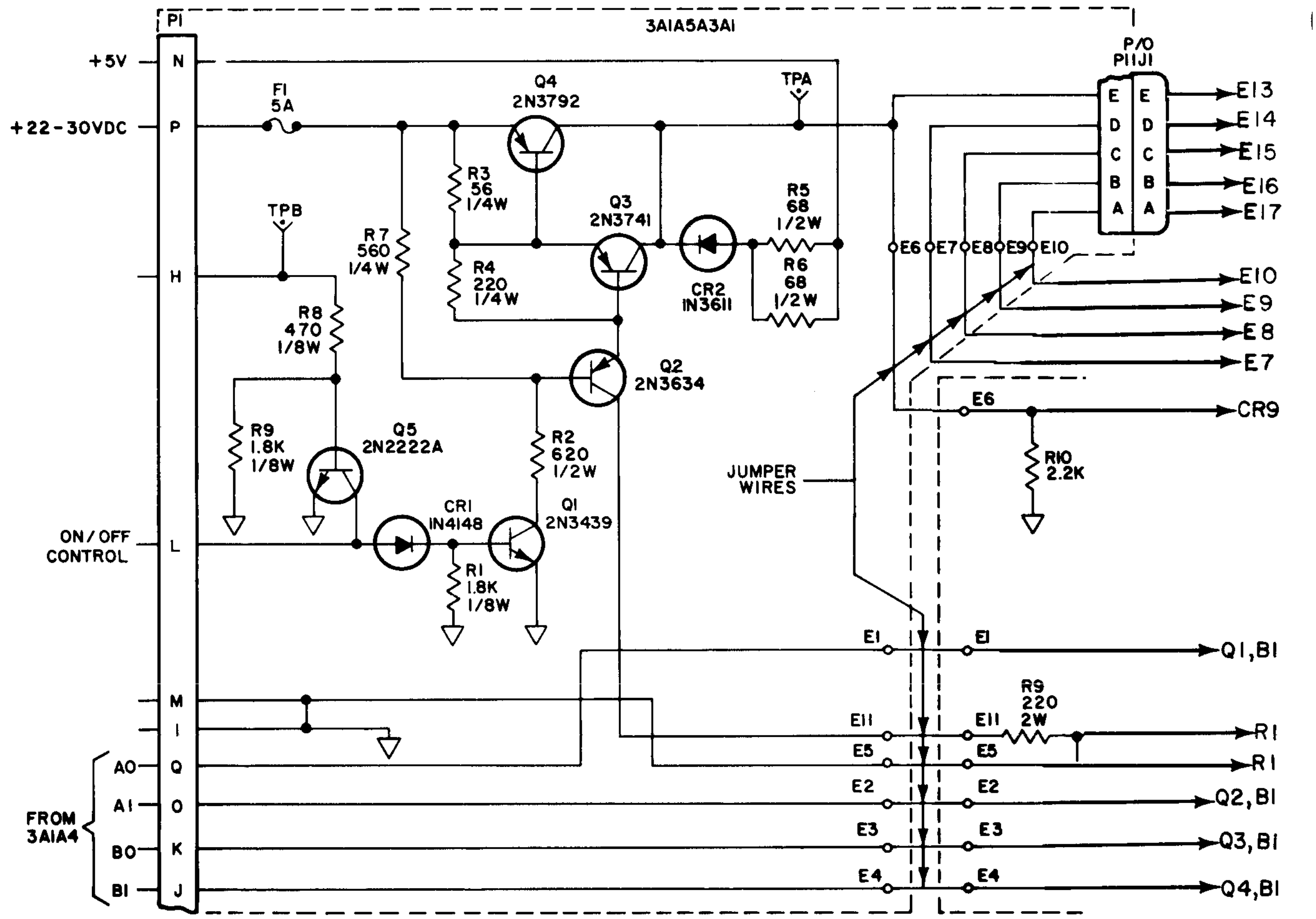


Figure 3-15(1). LINE FEED CONTROL SYSTEM (Sheet 1 of 2).

(2) Line-Feed Controller

+22 to +30 Vdc is applied to P1-P and ON/OFF control signal is applied to P1-L. During periods of time when line-feed function is not required, Pin L is at a logic 0 forcing Q1 to off condition. In turn, base of Q2 rises to between +22 and +30 Vdc causing it to turn off. With Q2 off, Q3 and Q4 also turn of opening path from +22 to +30 Vdc supply to line-feed stepping motor. However, when P1-L becomes a logic 1, Q1 turns on, causing voltage at base of Q2 to drop to between 11.4 and 15.5 Vdc. With base of Q2 at between 11.4 and 15.5 Vdc, and emitter at +22 to +30 Vdc, Q2 turns on. Q2 turning on causes base of Q3 to become between 9.7 and 13.2 Vdc. Voltage at junction of R3 and R4 drops to between 19.6 and 26.6 Vdc. Voltage at base of Q4 is now approximately 10% less positive than voltage at P1-P, causing Q4 to be biased on. Diode CR2 and resistors R5 and R6 provide transient protection during field collapse in stepping motor windings. Circuitry associated with P1-H is not used in this application.

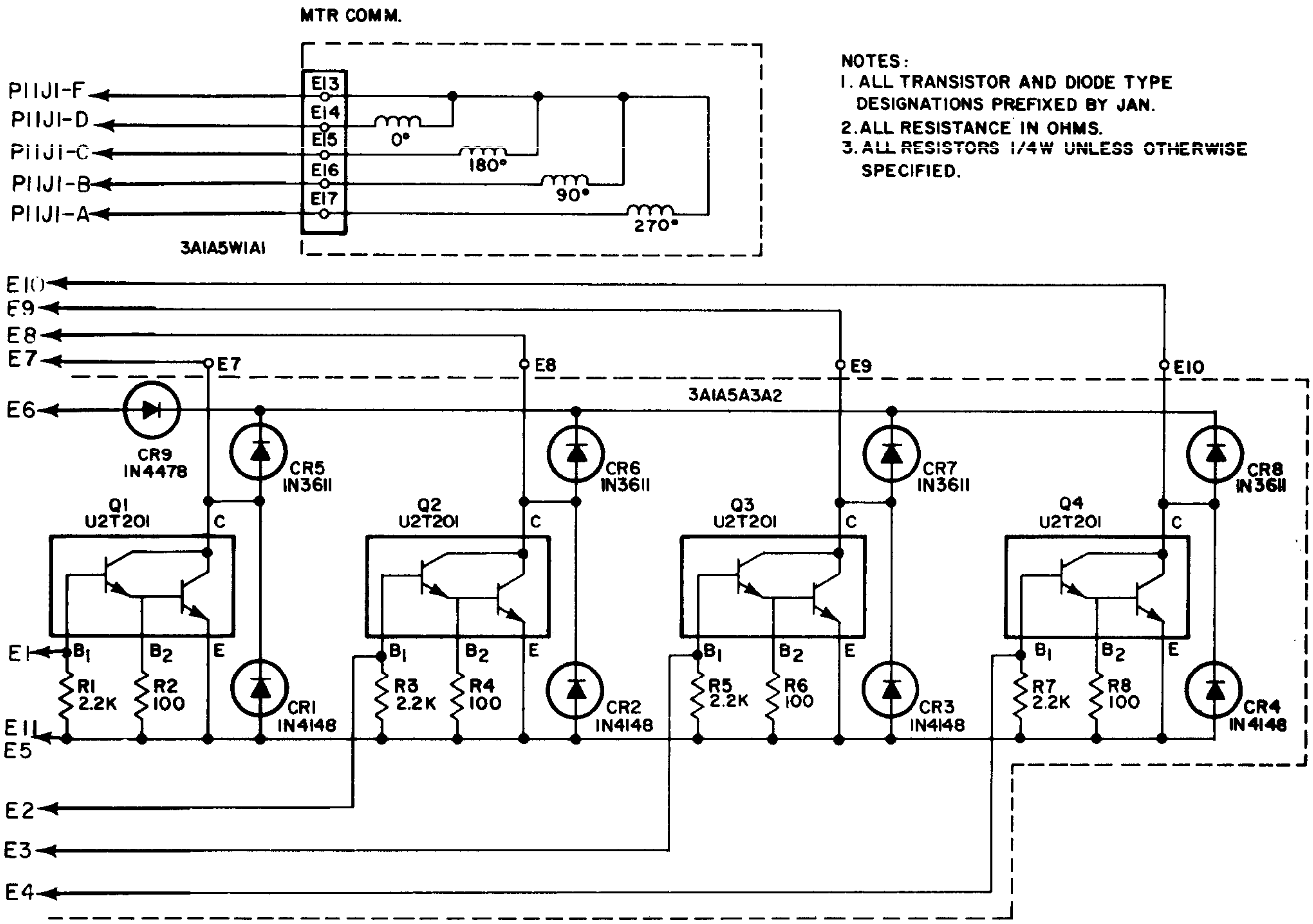
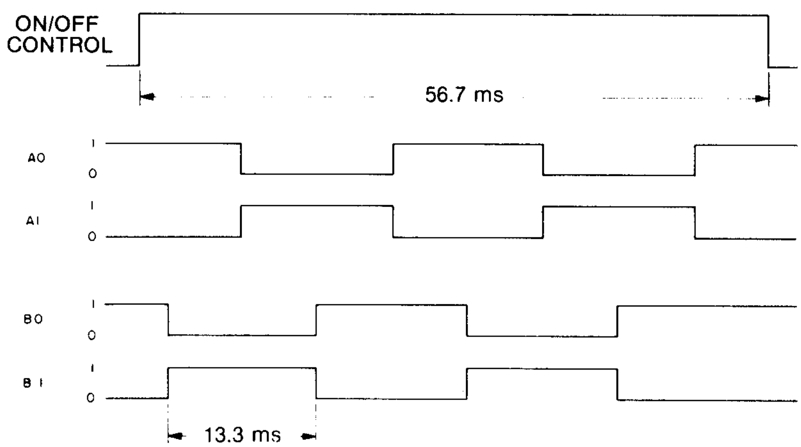


Figure 3-15(2). LINE FEED CONTROL SYSTEM (Sheet 2 of 2).

(3) Line-Feed Drivers

Line-feed drivers function as gates allowing current to flow through selected line-feed stepping motor windings. A logic 1 applied to A0, A1, B0, and B1 causes respective transistors Q1, Q2, Q3, and Q4 to turn on and provide a low impedance path for +22 to +30 Vdc to ground. Each gate allows current to flow for 13.3 ms at a time. Diodes are provided across gating transistors to pro vide suppression of transients created by collasping magnetic fields when gates are switched.

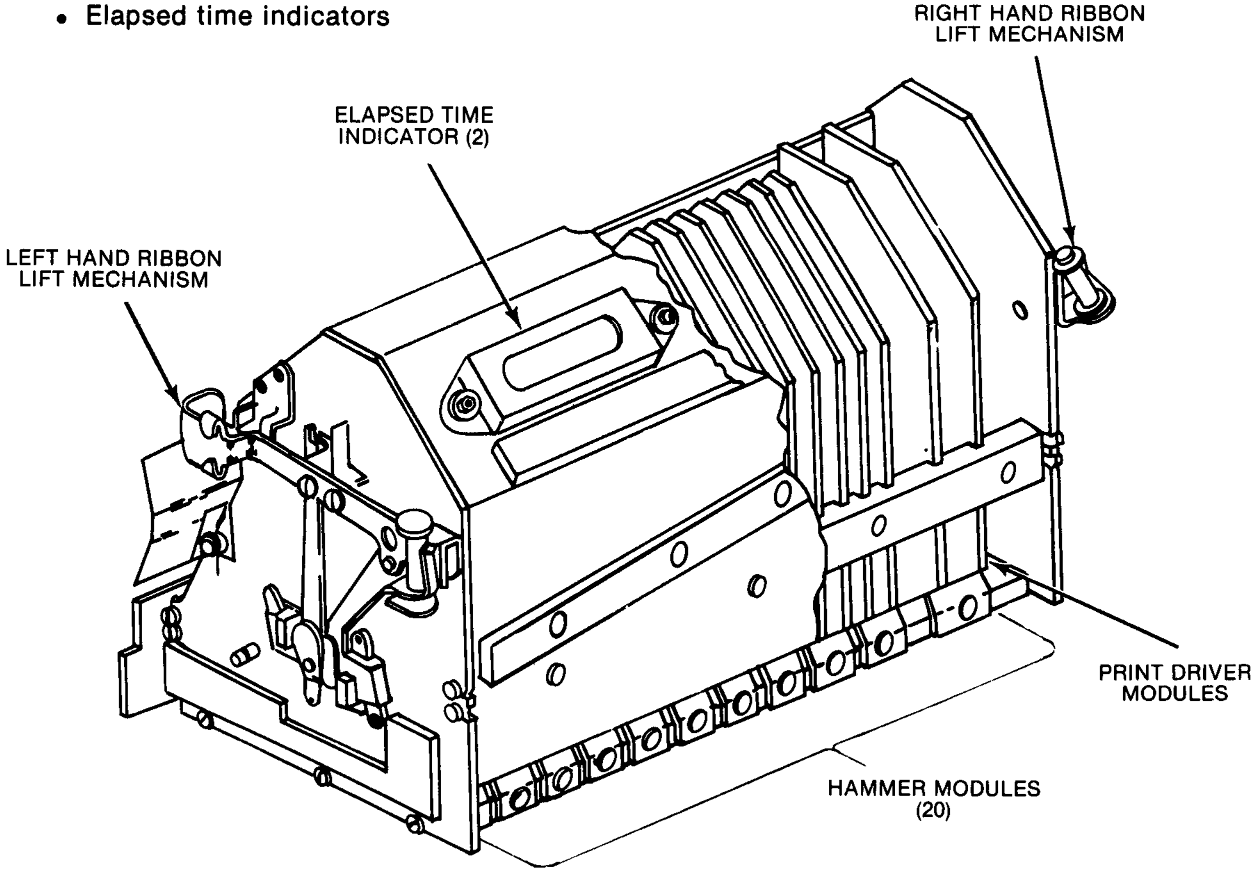
Timing diagram showing switching sequence.



3-8. PRINTER SUBASSEMBLY

Printer subassembly major electrical and electronic components:

- Ribbon-lift mechanisms
- Print driver modules
- Print hammer modules
- Elapsed time indicators



RIBBON-LIFT MECHANISM

The left and right ribbon-lift mechanisms form the left and right hand ends of the printer subassembly. The electronic components for the left and right ribbon-lift mechanisms are mounted on the right ribbon-lift mechanism.

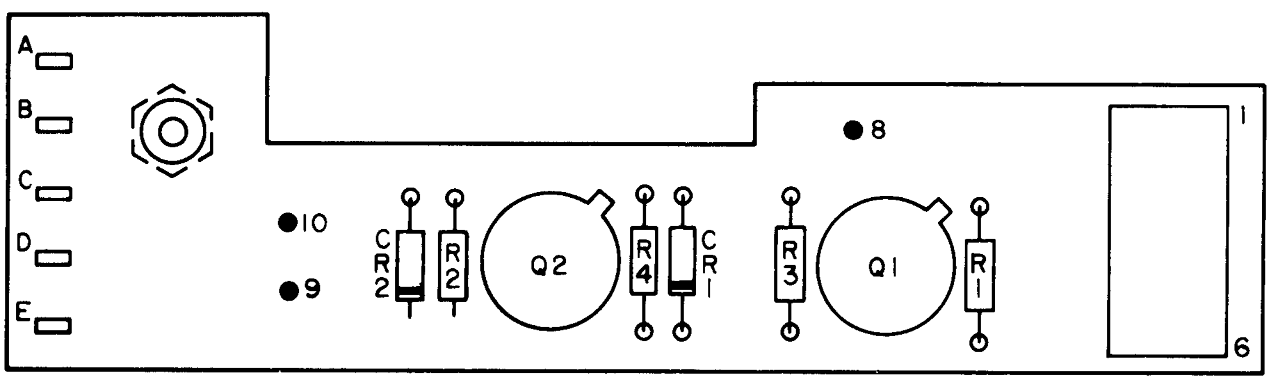


Figure 3-16 (1). RIGHT-HAND RIBBON MECHANISM CIRCUITRY (Sheet 1 of 2).

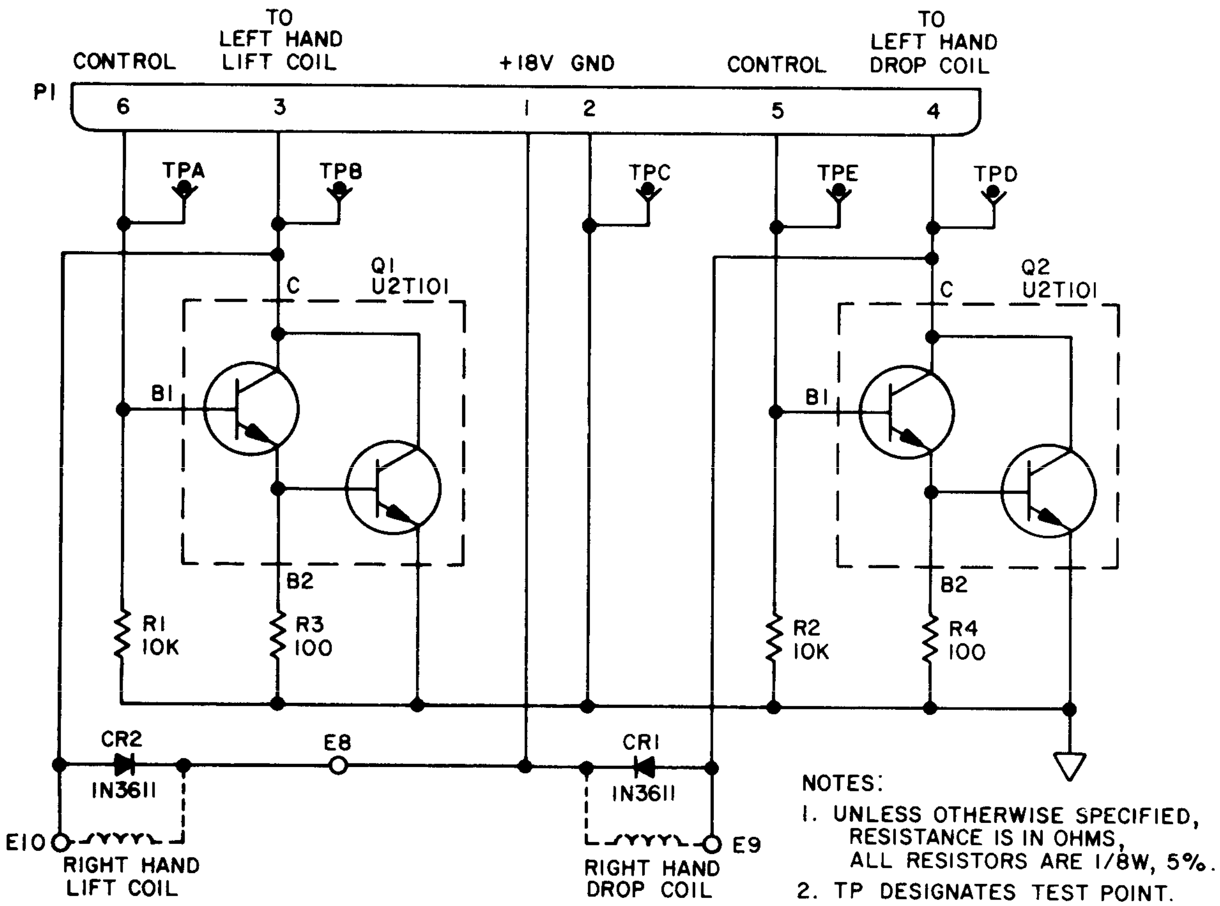


Figure 3-16(2). RIGHT-HAND RIBBON MECHANISM CIRCUITRY (Sheet 2 of 2).

P1-1 is wired to +18 Vdc. When a ribbon-lift action is required, a logic 1 is applied to P1-6 of the driver circuit card assembly which causes Q1 to turn on. This provides a path to ground for the +18 Vdc through the lift solenoid coils. The current through the coils energizes the mechanical lift mechanism. The drop mechanism is operated through Q2 when a logic 1 is applied to P1-5.

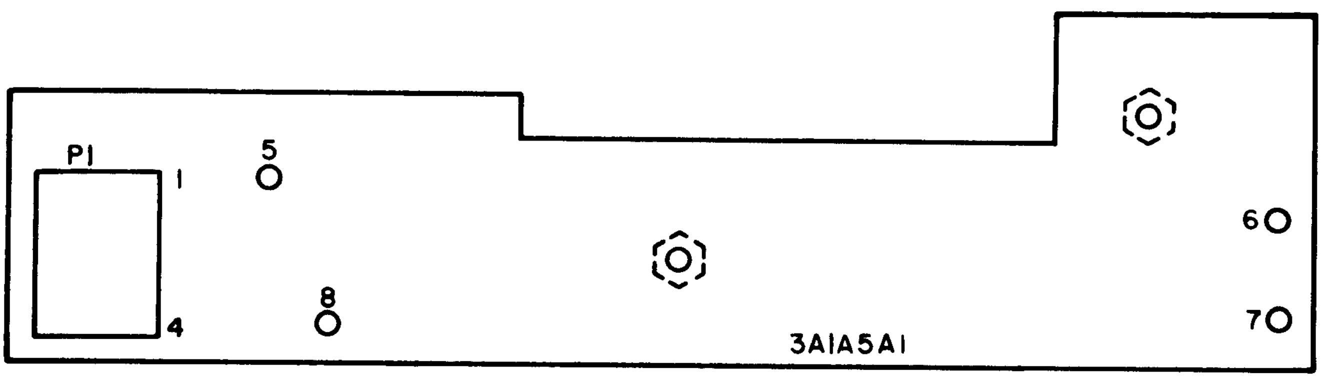


Figure 3-17(1). LEFT-HAND RIBBON MECHANISM CIRCUITRY (Sheet 1 of 2).

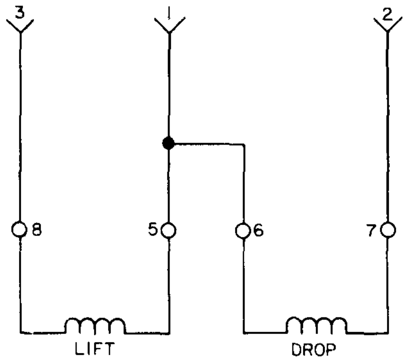


Figure 3-17(2). LEFT-HAND RIBBON MECHANISM CIRCUITRY (Sheet 2 of 2).

PRINT DRIVER MODULE(S)

Two identical print hammer driver modules are installed in the two extreme right-hand positions of the printer subassembly.

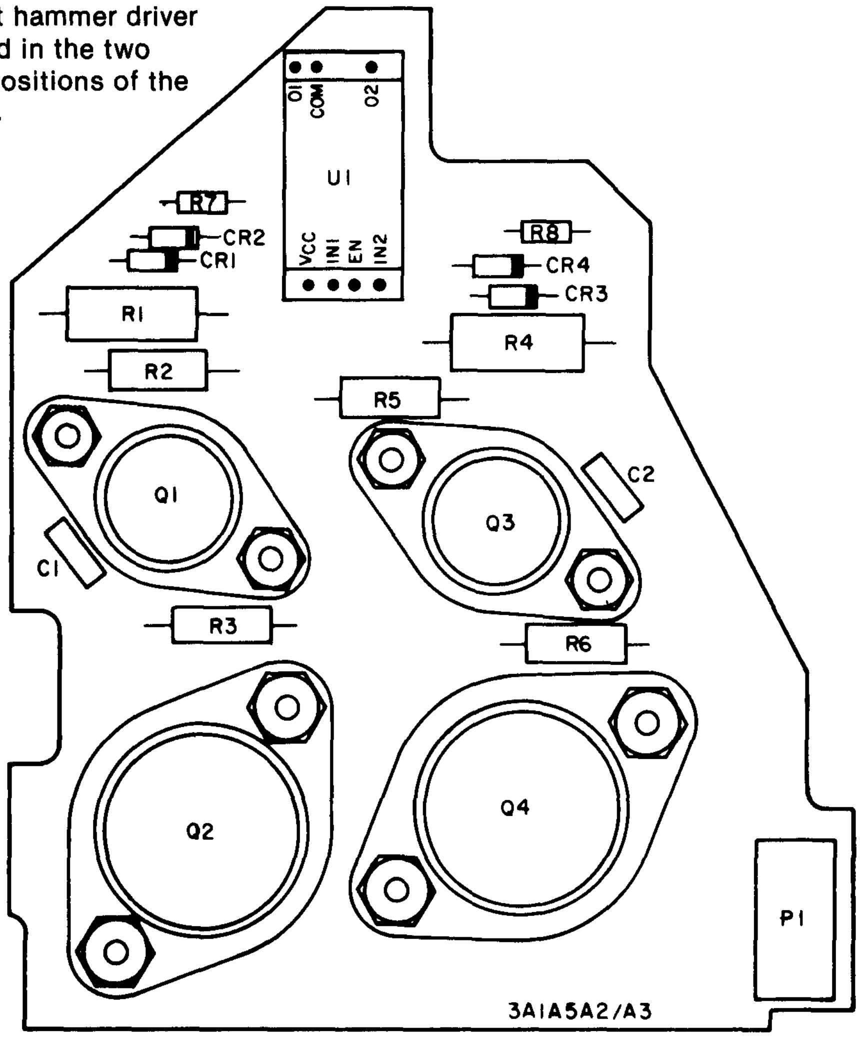


Figure 3-18(1). PRINT DRIVER (Sheet 1 of 2).

Each module contains two print driver circuits supplying +18 Vdc to the print hammer modules when a print hammer is to be operated. The 4 drivers (two per module) are assigned respective groups of 20 hammer assemblies. Each hammer assembly contains four hammers.

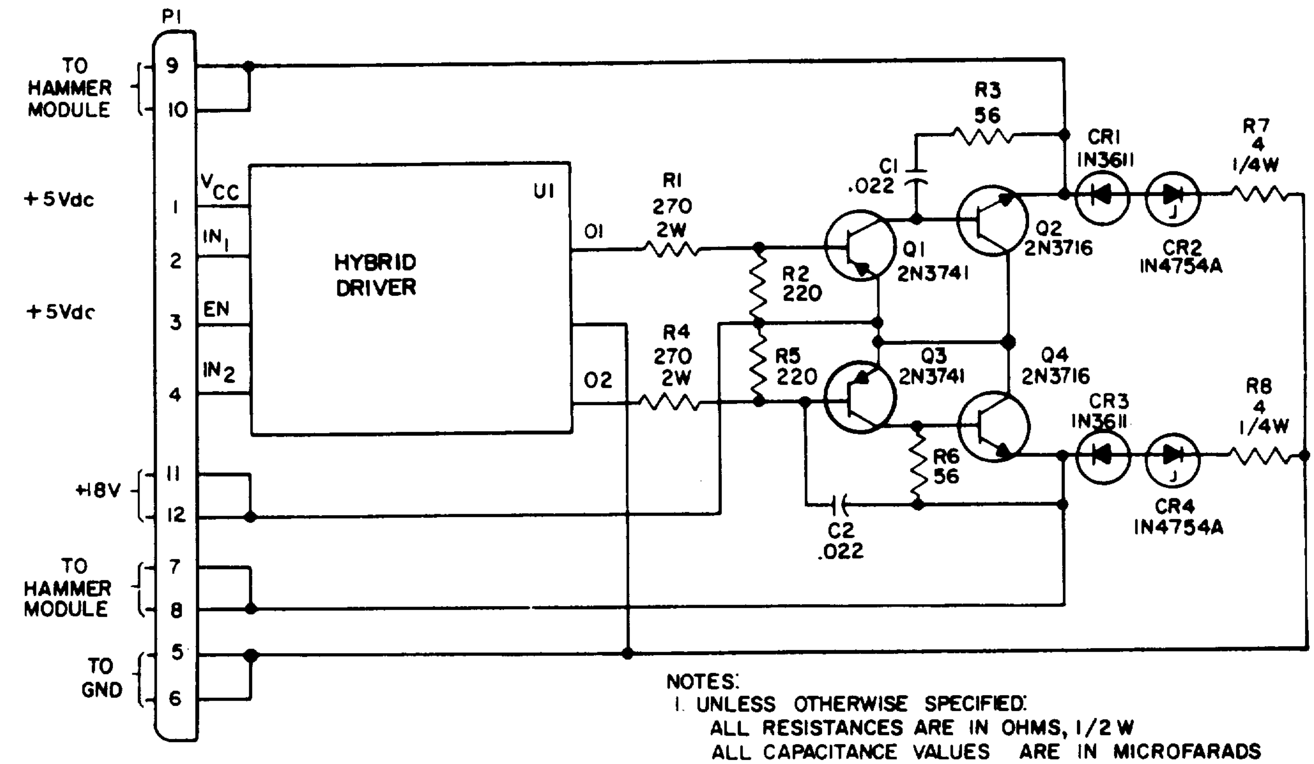


Figure 3-18(2). PRINT HAMMER DRIVER (Sheet 2 of 2).

Pins 5 and 6 of P1 are connected to ground. Pins 1 and 3 are connected to +5 Vdc externally, and pins 11 and 12 are connected to +18 Vdc. Outputs at pins 7, 8, 9, and 10 are connected to each of the respective hammer driver modules.

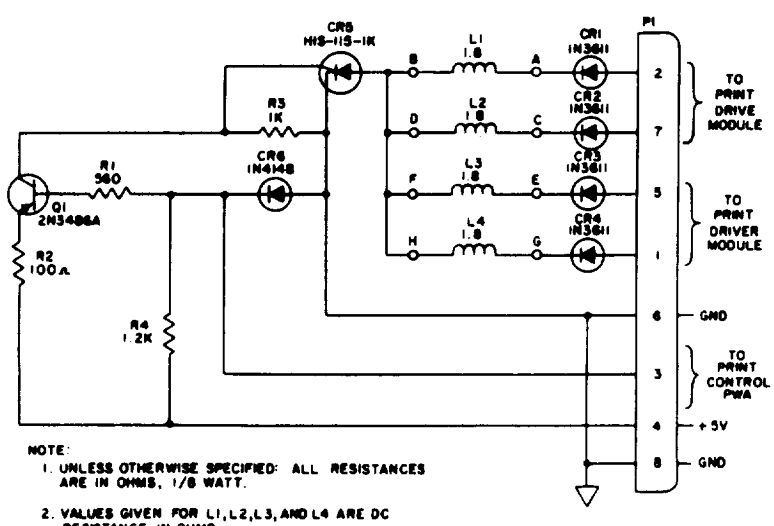
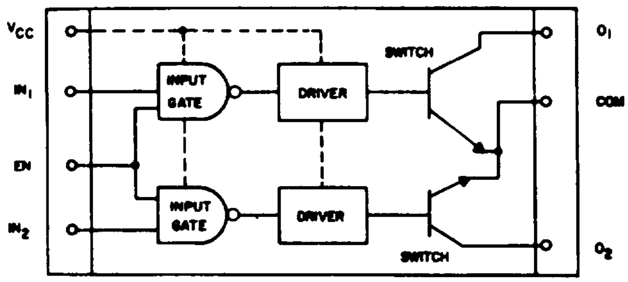


Figure 3-19. HAMMER SYSTEM.

Since pins 1 and 3 are tied to +5 Vdc when pin 2 is set to a logic 1, the 0, output of U1 Is at ground potential, creating a voltage divider as +18 Vdc flows through R1 and R2.

The current flow causes the base of Q1 to become less positive than the emitter and causes It to conduct. The conduction of Q1 properly biases Q2 to the ON condition making the 18 Vdc available for firing the hammers.



INPUTS			OUTPUTS	
IN1	IN2	EN	O1	O2
X	X	0	OFF	OFF
0	0	1	OFF	OFF
0	1	1	OFF	ON
1	0	1	ON	OFF
1	1	1	ON	ON

X = DON'T CARE
1 = V_{IHI}
0 = V_{ILO}

ON/OFF = OUTPUT TRANSISTOR STATE

Figure 3-20. UI (HYBRID DRIVER).

The remaining output circuit Is operationally identical to the one previously described and is applied to one of the remaining groups of 20 hammer modules. The 39 volt Zener diodes CR2 and CR4 are placed in the circuit to prevent inductive spikes, caused by the collasping field of the print hammer coil, from damaging circuit components.

PRINT HAMMER MODULE(S)

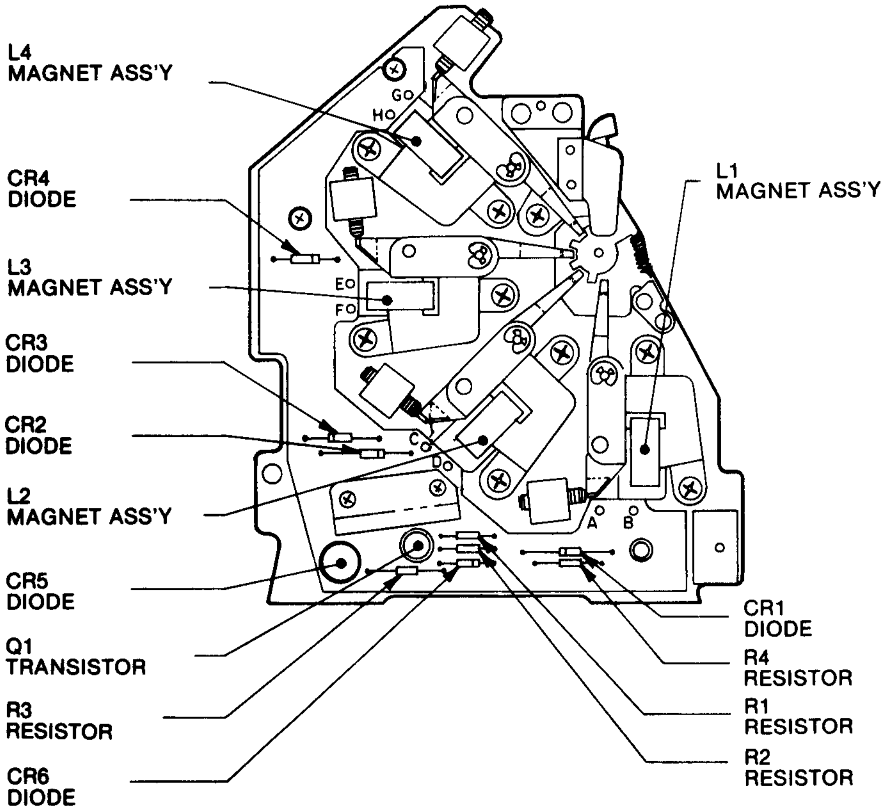


Figure 3-21. PRINT HAMMER.

Twenty identical print hammer modules are contained in the printer subassembly.

Each module contains circuitry controlling the operation of four print hammers (fig. 3-19),

P1-3 receives its input from the print control circuit card assembly. Pins 1, 2, 5 and 7 receive their inputs from the print drivers on circuit card assemblies. Pin 4 is connected to +5 volts and pins 6 and 8 are circuit ground.

Selection of a print hammer module is accomplished when the output of one of the drivers on the print hammer driver circuit card assembly is turned on, and an input is received on connector pin 3. This, in turn, turns on silicon control rectifier (SCR) CR5. Ground is now applied to the junction of the four solenoids.

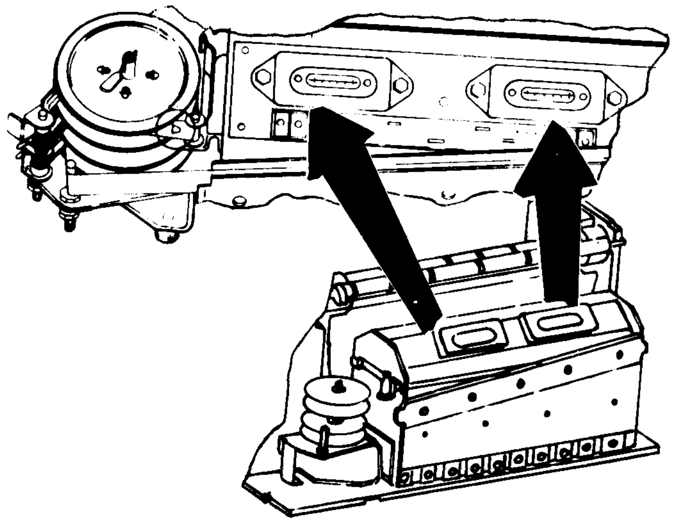
When one of the four print drivers is energized, a +18 Vdc input pulse is received at either connector pin 1, 2, 5, or 7, which energizes the associated print hammer coil. Energizing the coil pulls in the armature of a print hammer and causes the hammer to strike.

ELASPED TIME INDICATORS

Two elasped time indicators are mounted on the top cover of the printer subassembly.

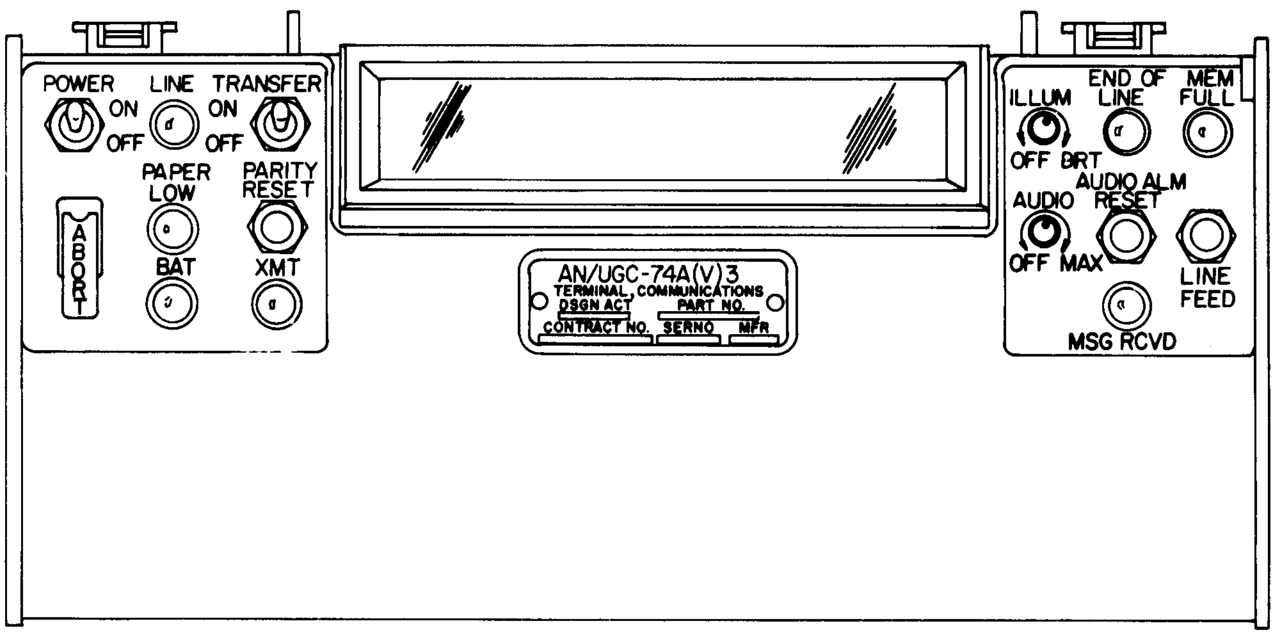
NOTE

Elapsed time meters are installed in terminals serial numbered 1 through 2000. The time meters will be deleted by the manufacturer starting with serial number 2001. Time meters will not be replaced in terminals numbered 1 through 2000.



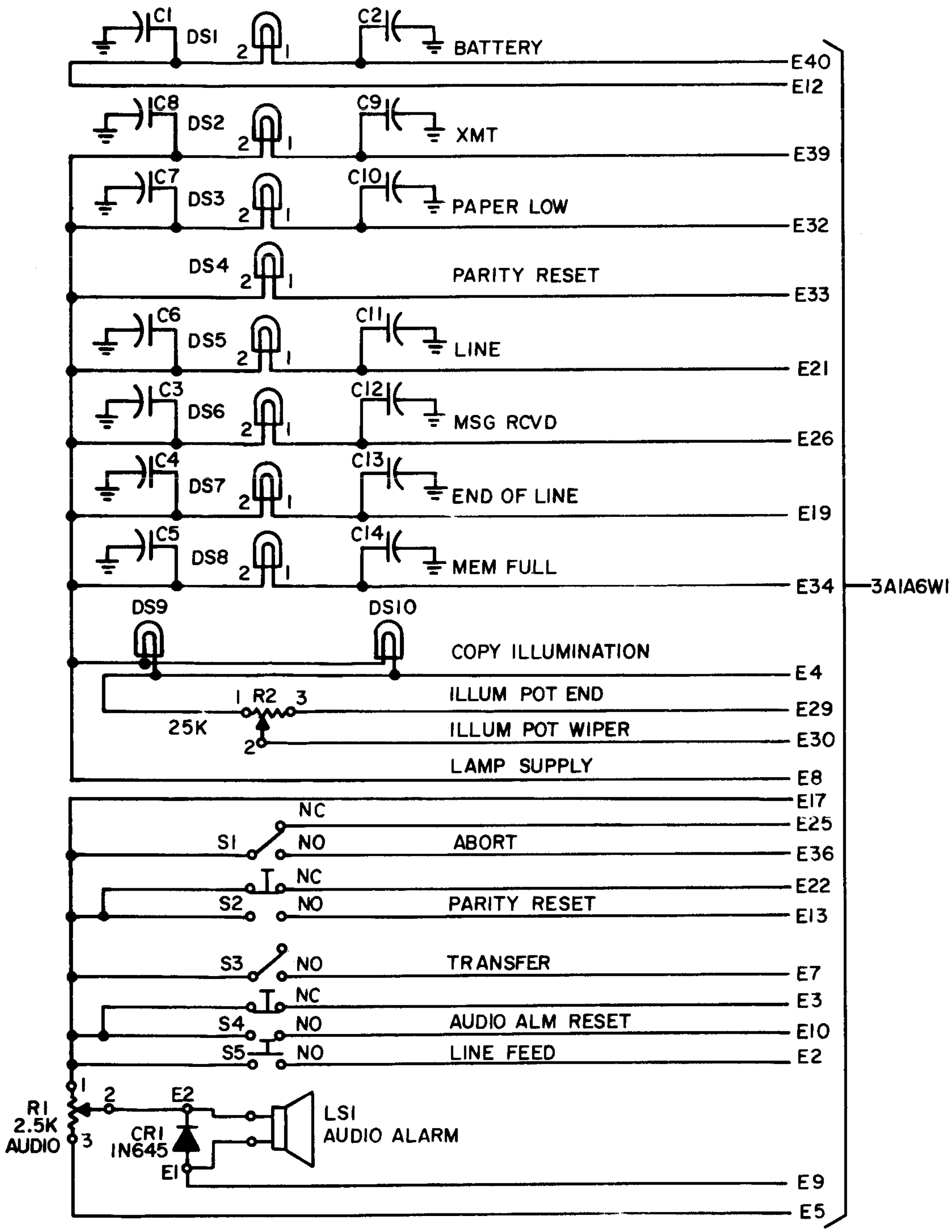
- Right-hand indicator records the total system operating time (10,000 hour range)
- Left-hand indicator records the time that the drum has been in operation (1,000 hour range)
- Both the indicators must be replaced (as part of the cover assembly) when either of their respective limits is reached.

3-9. DUSTCOVER ASSEMBLY



Contains the controls and indicators for operating the terminal. The front cover is shown schematically on the next page.

Refer to the operator's manual for description and use of operating controls.

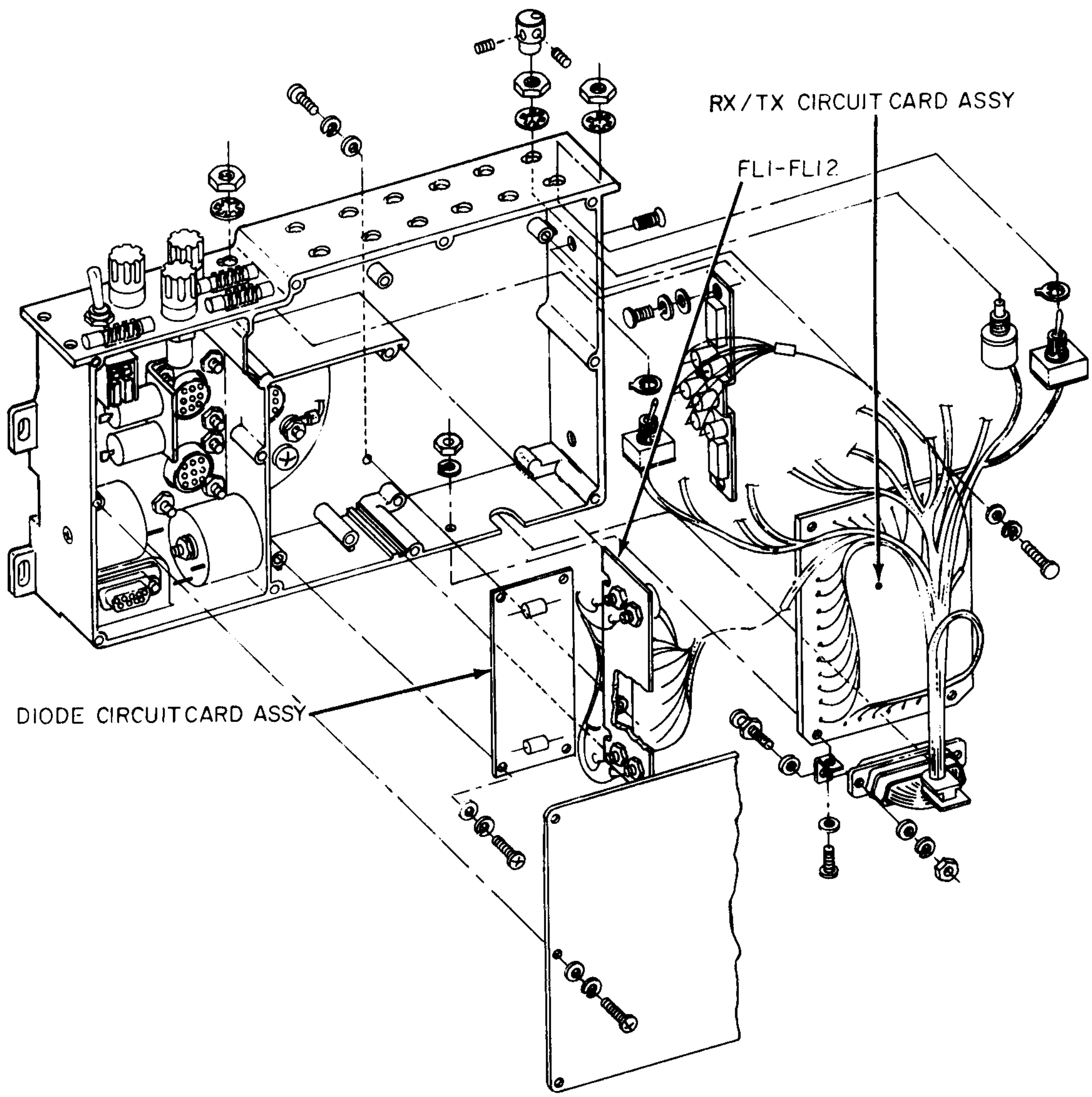


NOTE 1. ALL CAPACITORS .001µF
2. ALL RESISTOR VALUES IN OHMS

Figure 3-22. DUSTCOVER WIRING SCHEMATIC DIAGRAM.

3-10. INTERFACE ASSEMBLY

- Interface assembly contains circuitry necessary for interfacing of external data and power lines with internal system electronics.
- It also contains internal operating switches.



POWER INTERFACE

- Prime power, either ac or dc, enters unit through connector J2 located on rear of interface assembly.
- Fuses F1 and F2 on assembly provide protection against drawing excessive current and are of different values depending upon input power source.

  AC input - fuse size is 1½ amperes.

  DC input - fuse size is 6¼ amperes.
- Backup power which enters through J3 (on rear of assembly) is fused by F3 at 2 amperes.
- Switch S1 routes input voltage (except backup) back to J2 where strapping in mating connector routes voltages to appropriate pins for application to filter assembly.
- Backup power is routed directly from S1 to filter assembly.

RECEIVE DATA INTERFACE

Two types of input data to terminal may be used.

First type is a neutral current loop of 60 or 20 mA with a maximum voltage of 130 Vdc.

Second type is a standard low level, either inverted or non-inverted data.

Operator selects appropriate mode by setting REC MODE switch (S11) to desired position.

Protection of input circuitry is provided by resistors RI, R2, R3, and R4 on TB1.

Receive data is converted to TTL level on RX/TX circuit card.

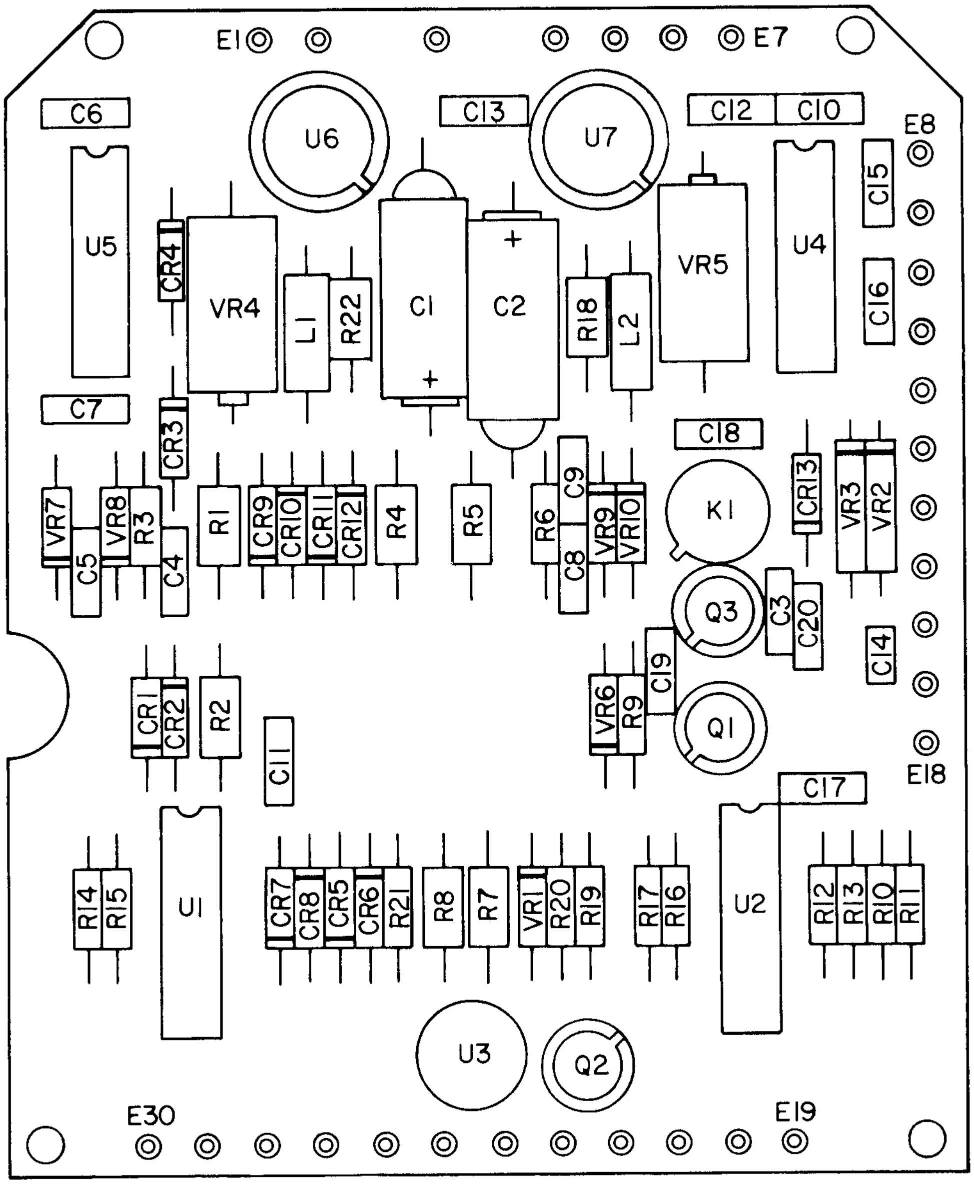
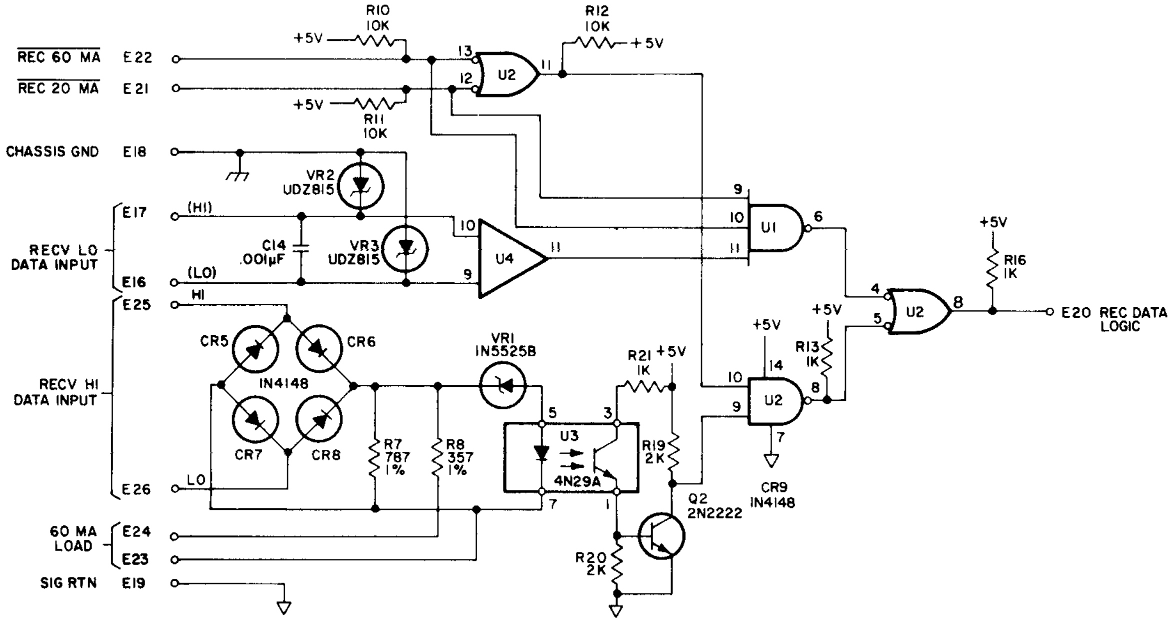


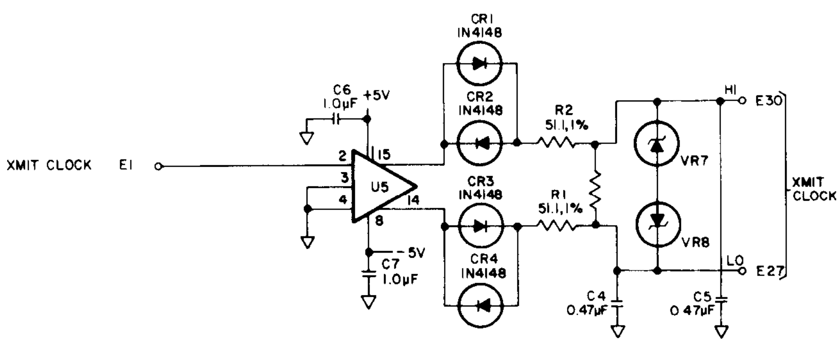
Figure 3-23. RX/TX CIRCUIT CARD ASSEMBLY.



- Gate U2 is enabled when either 60 or 20 mA inputs are low. The REC MODE switch provides this condition when 60 or 20 mA modes are selected. If the standard low level signal modes are selected, the input to U2 pins 12 and 13 are a logic 1. Input data is fed directly to U4 pins 9 and 10. The output of U4 is fed to U1 pin 11 which is enabled by a logic 1 on U1 pins 9 and 10. The output of U1 (U1 pin 8) drives U2 pin 4. Since U2 pin 5 is a constant logic 1, the gate U2 is enabled to pass the data at U2 pin 4 at TTL levels. When the REC MODE switch is in 20 mA, 60 mA or 49V position, U2 pin 11 is a logic 1. The switch also routes the data directly to a diode bridge. The bridge steers nonpolarized input current through sensing resistor R7 in the 60 mA mode. The lower combined resistance allows greater current flow through R7/R8 combination without increasing the voltage across them. When VR1 fires, current flows through the optical coupler (U3). U3 inputs the data to U2 pin 9. Since U2 pin 10 is a logic 1, data flows from U2 pin 8 to U2 pin 5 and is output from U2 pin 6.

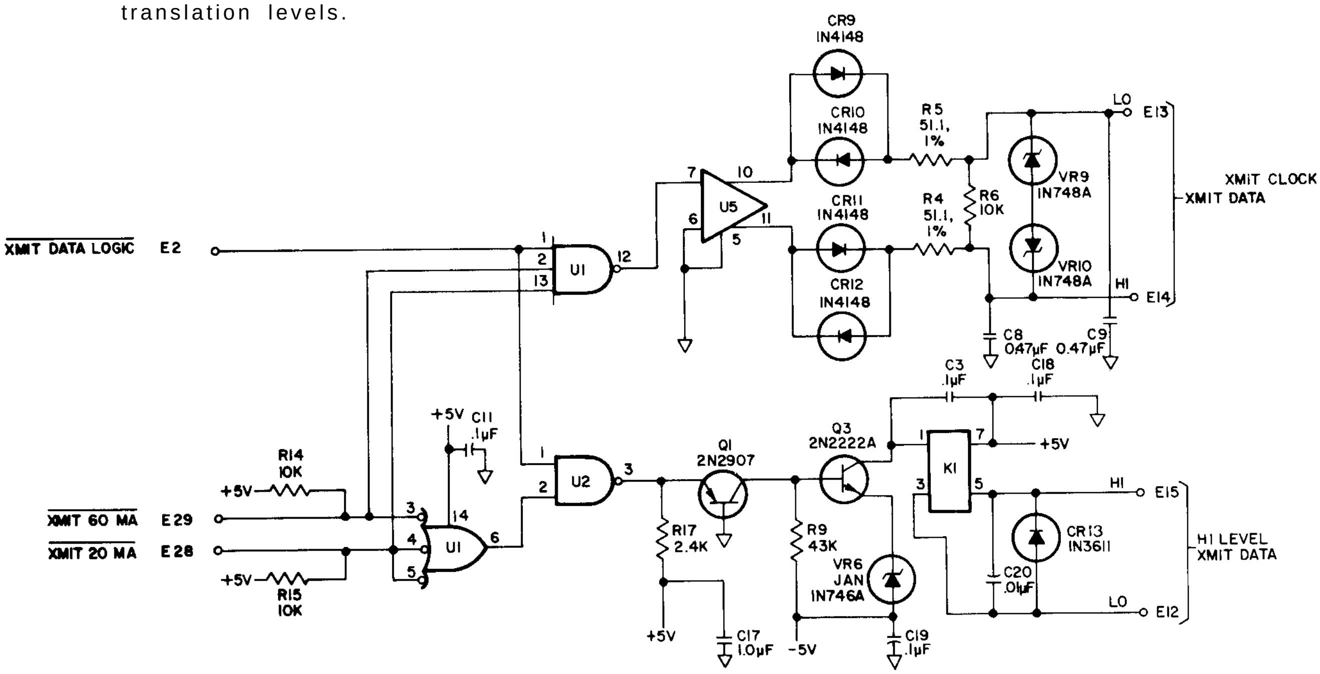
RFI AND TRANSIENT PROTECTION

- Within the interface assembly is an EMI enclosure containing a diode circuit card assembly and filters. The diodes provide transient suppression and reduce conducted interference on the data lines.



TRANSMIT DATA INTERFACE

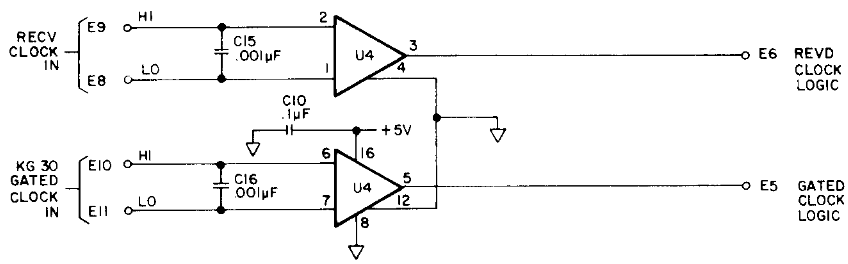
- The transmit interface circuitry functions similarly to the receive except for the translation levels.



- **TTL data is applied to U1 pin 1, which in turn inputs to U5 (dual line driver) which converts the TTL data for transmission to a balanced MIL-STD-188-144 signal line.** When the XMIT MODE switch is in the 20(mA), 60(mA) or 70(mA) position, U1 pin 6 is a logic 1. U2 pin 3 is enabled to allow transmitted data to modulate at the Hi level dc source. The modulation is accomplished by switching Q3 on and off which in turn causes contacts of K1 to open and the current path to close.

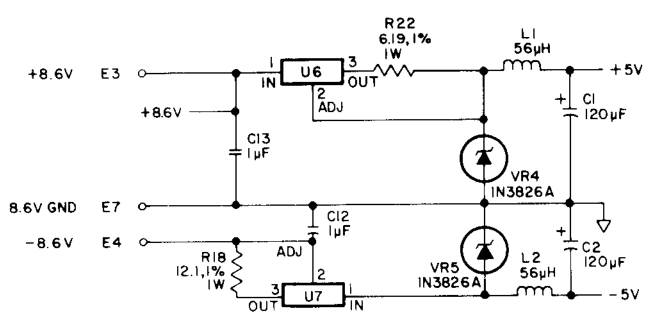
CLOCK INTERFACES

- Clock interfaces are performed by receivers and drivers as applicable.



POWER SUPPLY INTERFACE

- Input power from the power supply to the RX/TX circuit card is ±8.6 Vdc. Both voltages are regulated to provide +5 Vdc and −5 Vdc for the transmit and receive circuitry.



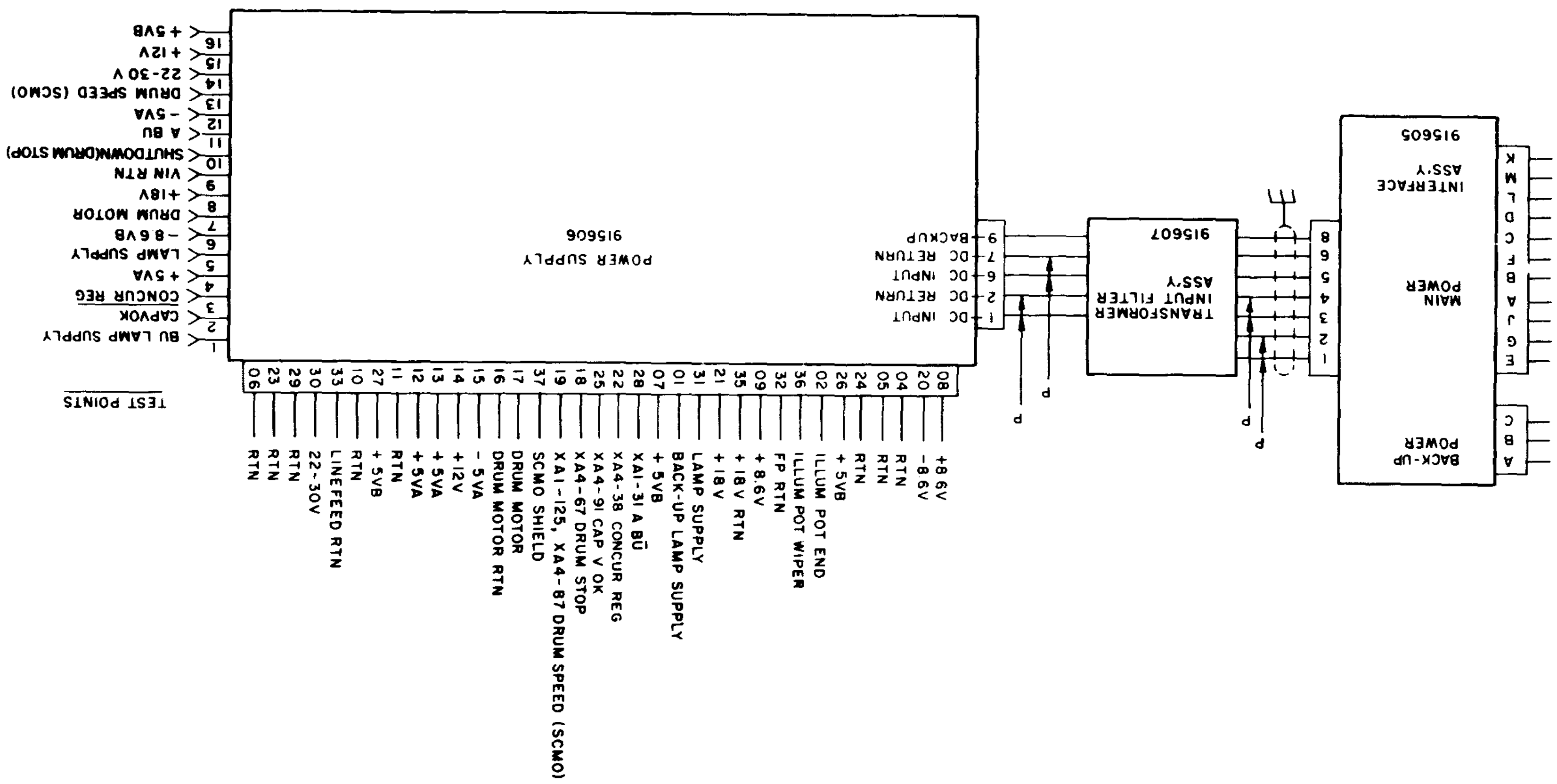


Figure 3-24. POWER SUPPLY DIAGRAM.

3-11. POWER SUPPLY ASSEMBLY (3A1PS1)

Power supply assembly for terminal is a circuit card assembly located on bottom of chassis below paper roll.

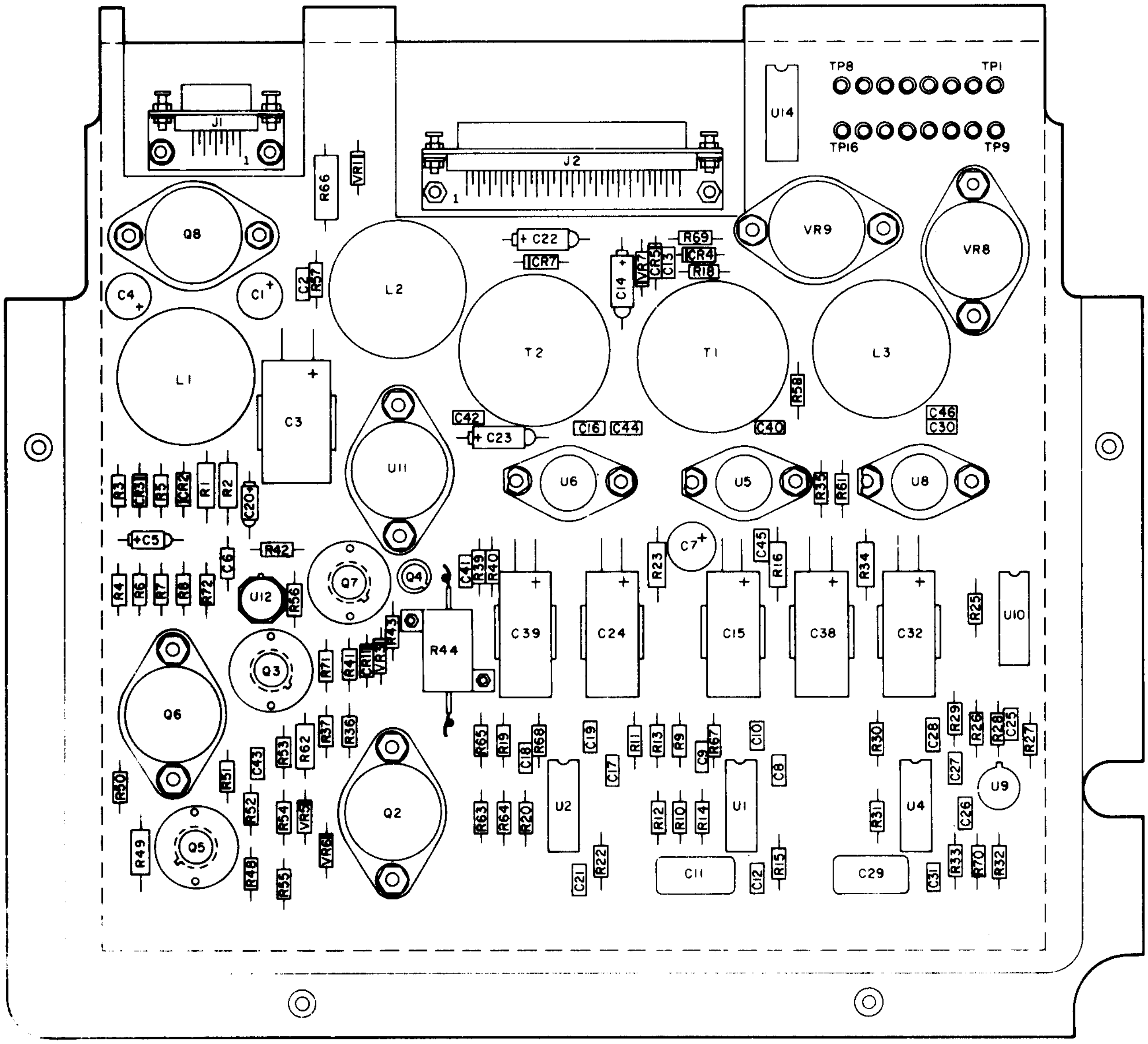


Figure 3-25. POWER SUPPLY ASSEMBLY.

Refer to figure 3-24 for the input and output pins and test points of the power supply assembly.

Power supply is described in terms of:

- Input circuitry
- Microprocessor supply
- +5, ±8.6 Vdc circuitry
- Drum motor supply
- +18 Vdc constant current supply

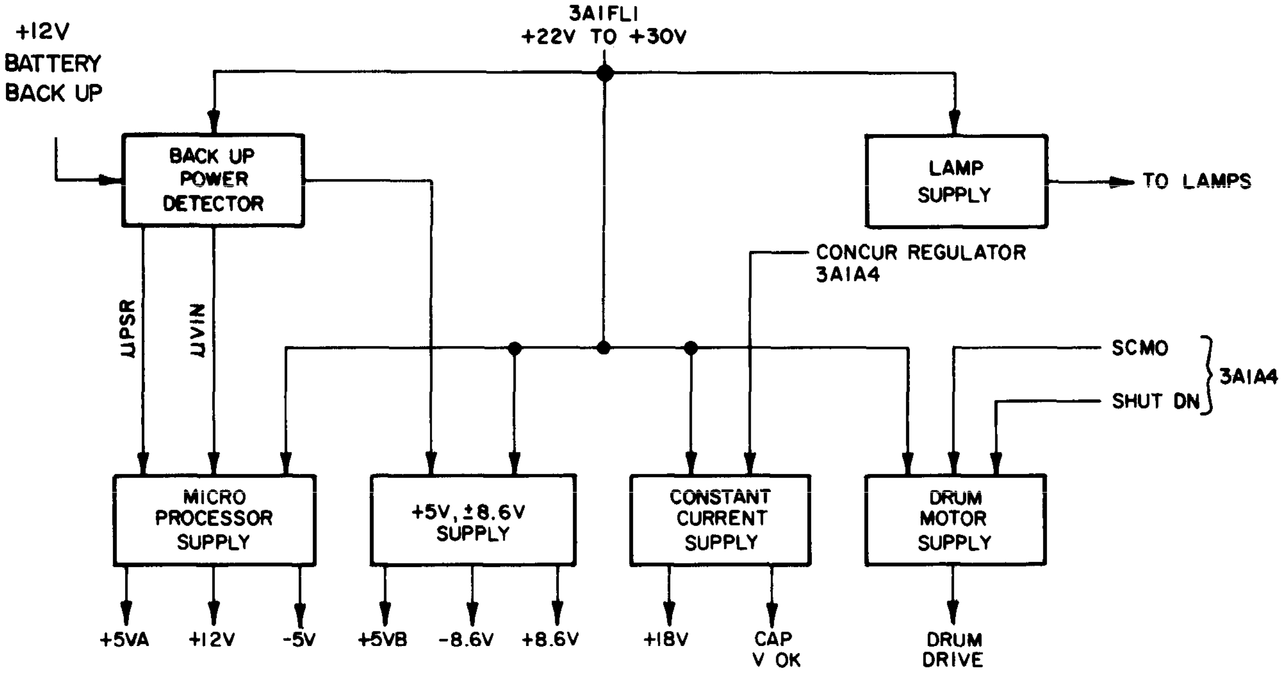


Figure 3-26. POWER SUPPLY BLOCK DIAGRAM.

POWER SUPPLY INPUT CIRCUITRY (fig. FO-3.) Ac or dc input power may be applied to the power supply input circuit. The input power connector A7J2 is wired with pins M and K used for either ac or dc input. The prime power is switched through S1 on the interface assembly (3A1A7) and routed back to the A7J2 connector. If the connector is wired for 115 Vac power, pins B, D and L are strapped together. Pins A, C, and J are also strapped together. The strapping ties the input power to the appropriate windings of the input transformer (part of 3A1A6FL1). If other than 115 Vac power is supplied, the strapping is as shown.

- The rectifier circuit (part of 3A1A6FL1) is a conventional full wave rectifier which is filtered to produce a +22 to +30 Vdc output. This voltage is used as the primary source for all power supply circuits.
- The backup power indicator drive (U12) is a comparator which drives a lamp driver on 3A1A1 to illuminate the backup lamp on the dustcover whenever the +22 to +30 Vdc output of the supply drops more than 0.4 volts below the backup power voltage.
- The backup power cable supplies +12 Vdc backup power via connector 3A1A7J3. When prime power is lost, the power supply automatically enables the +12 Vdc battery power to the microprocessor and memory. The positive side of this dc source is routed through this third section of 3A1A7S1, fuse 3A1A7F3 to connector 3A1A7J4 pin 8. The negative side in routed to connector 3A1A7J4 pin 6. The chassis return is routed through pin C of connector 3A1A7J3.
- The backup input voltage is diode ORed with the unregulated +22 to +30 volts dc to provide the power input to the microprocessor switching regulator.
- Voltage limiting is provided to the ±5V, ±8.6V and the motor control circuit controllers U2 and U4, by limiting resistor R1.

MICROPROCESSOR SUPPLY (fig. FO-4.) The microprocessor supply section of the power supply (3A1PS1) provides ±5 Vdc and +12 Vdc for the CPU (3A1A1) and memory circuit card assembly (3A1A1). The supply is regulated to ±5% by a constant frequency pulse width modulated switching regulator. The regulator (U1) samples the output voltage of the supply and compares it against a reference voltage. Depending on the results of that comparison, the pass circuit (U5) turn-on duty cycle is increased or decreased.

- The reference voltage is a function of the regulator (U1). Resistors R11, R12 and R13 form a voltage divider which produces a 2.5 Vdc reference voltage for the comparator (part of U1). The precise value of the voltage is determined by selection of R11.
- The comparison voltage is fed back to the comparator through voltage divider R9 and R10. If the output at J2 pin 13 is less than 5.0 Vdc then the compassion voltage is lowered below the reference voltage causing U5 to be commanded on. When U5 turns on, +22 to +30 Vdc is applied to capacitors C15 and C38 through transformer T1. As C15 and C38 charge, the comparison voltage rises causing U5 to go to the off state.
- The sampling of the comparison voltage is at a rate of approximately 25 KHz as determined by R14 and C11.
- Pulse width modulation applied to the primary of T1 causes a voltage to be induced in the secondary which is used to develop the +12 Vdc and the -5 Vdc supply voltages. Diode VR7, a 5.1 Vdc ±5% zener sets the -5 Vdc supply voltage. The +12 Vdc supply output voltage is determined by the turns ratio and drive through T1's primary.
- A 25 KHz synchronization output for the +5, ±8,6 Vdc switching regulator is generated by U1 pin 3 and U1 pin 7.

+5, ±8.6 Vdc VOLTAGE REGULATOR (fig. FO-5.) The +5, ±8.6 voltage regulator supplies regulated power to the keyboard, dustcover assembly, interface assembly, and Logic circuit card assembly. The interface assembly 3A1A7 utilizes the ±8.6 volts exclusively. This circuit functions in a manner similar to the microprocessor regulator with the exception of the output and the oscillator. U2 pins 3 and 7 are controlled by the microprocessor oscillator.

- The output of the switching regulator pass circuitry (U6) is +8.6 V which is applied to voltage divider R19 and R20 to produce a 2.5 Vdc nominal comparison voltage. The reference voltage is generated by R63, R64 and R65. R63 is selected to provide +8.6 Vdc ±0.01 V at J2 pin 8. U11 is a series regulator which reduces the +8.6 V to +5 Vdc ±.25 V at J2 pin 7 under normal load (1.6A). Diode VR9 protects the load circuitry in case of a Ull failure.
- Transformer T2 has a 1:1 turns ratio. Diode CR7 and capacitor C22 produce a -8.6 Vdc output.

DRUM MOTOR CONTROL (fig. FO-6.) The motor control circuit provides speed and on/off control for the dc motor used to drive the print drum and ribbon mechanism of the printer. The operation of the circuit is controlled by the main clock pulses developed by a timing mechanism which monitors print drum rotation. The motor control circuit operates as follows:

- Positive main clock pulses, supplied through pin 19 of connector 3A1PS1J2, are applied to pin 3 of U10. Resistor R25 assures a level shift from TTL logic high voltages to +5 Vdc which is supplied by the pulse width controller reference U4 pin 16. Buffer U10 switches between this reference and ground. At pin 4 of U10 the output is in phase with the precision 518.4 microsecond speed control motor output (SCMO) pulse. This input occurs 64 times for each full drum revolution.
- The dc voltage of the signal at U10 pin 4 is proportional to this drum rate which is filtered by R26 and C26 and buffered by voltage follower U9. The output of U9 pin 6 drives the regulator controlled error amplifier which compares this voltage to a reference generated by U4 pin 16 output and resistor dividers R27, R28 and R29. Select resistor R29 trims this comparison voltage to cancel initial component errors and provide a motor speed range of approximately ±7.5% with respect to a nominal pulse repetition period of 1080 microseconds.
- The motor control circuit operates at a nominal frequency of 20 KHz. Timing components C29 and R31 control this frequency. The remainder of the motor control circuit

functions similar to the +5, ±8.6 V switching regulator except the output which drives the print motor at a voltage required to maintain its speed, approximately 9 Vdc ±2 V. The current sensing resistors R35 and R61 limit the motor current to 4A ± 0.32A.

- A shut down signal under microprocessor control at pin 18 of connector 3A1PS1J2 drives pin 10 of U4 with a logic 1 to turn the motor off and minimize power dissipation during periods when printing is not active.

+ 18 Vdc CONSTANT CURRENT REGULATOR (fig. FO-7.) The constant current regulator maintains the printer under a constant load condition to mask printing intelligence during periods of message traffic and minimizes power consumption when the printer is in a standby condition. Operation of the circuit is controlled by printer logic. The voltage and current sources of this regulator maintains the stored energy of capacitor C1 located in the printer Subassembly Chassis. Capacitor C1 reduces surges caused by printer hammer operation. Circuit operation is as follows:

- When the printer is placed into operation by incoming traffic, its logic control circuit supplies a logical O-input through pin 22 of connector 3A1PS1J2 to the base of transistor Q4. Transistors Q4 and Q7 are then turned on which biases diodes VR3 and CR11 to provide a 5 Volt dc source across R71 and R41. Select resistors set current driver Q2 and Q3 to regulate the current at 1.0A ± 0.06A.
- The regulated current output restores the loss of charge caused by hammer operation. When C1 is fully charged to + 18 Vdc nominal, transistor Q5 becomes forward biased into conduction, and permits transistor Q6 to also conduct. As a result, output current is shunted to ground. For output voltages below 18.1 volts, transistors Q5 and Q6 are maintained in the off condition.
- The output voltage is monitored by comparator circuit U12. The comparator outputs a print inhibit signal through pin 25 of connector 3A1 PS1J2. This print inhibit signal is sent to the print control 3A1A4 when the print voltage drops below 16.2 volts dc nominal. If the peak print rate exceeds approximately 160 characters per second, the inhibit signal will be generated.
- When the printing function is inactive; i.e., between messages, the constant current regulator is turned off to minimize power usage by a logic 1 at pin 22 of connector 3A1PS1J2. The print voltage turn-on time delay is minimized by maintaining charge on the print capacitor while in the inactive state. The charge is maintained through resistor R62 which supplies current in excess of the leakage and bias currents that would otherwise discharge the stored 18 Vdc.

3-12 FILTER ASSEMBLY

Filter assembly for terminal includes a power transformer, RFI filter, full wave rectifier and filter capacitor.

Figure FO-3 shows the filter assembly functioning as part of the power supply input.

FILTER NETWORK. The filter network, consisting of C9 through C14 and inductors L1 and L3, filters out transient voltages that may exist either on the input or output line. Diodes VR1 and VR2 limit electromagnetic pulse (EMP) transients being transmitted to the printer through the input power cable. The filter also includes RFI filters Cl through C7. The output of the filter is applied across full wave rectifier CR1. It is then filtered by C8 to supply +22 to +30 volts dc to the power supply assembly through connector 3A1PS1J1.

ADDITIONAL FILTERS. Additional filtering for the +22 to +30 volts dc input is provided by the dc filter network in the regulator circuit of the power supply assembly 3A1 PS1. The filter circuit consists of L1 and L2, and Cl through C4 of this assembly.

DISTRIBUTION After filtering, the unregulated +22 to +30 volts dc is distributed in the power supply to the +5, ±8.6 Vdc switching regulator circuit, the microprocessor regulator circuit, the constant current regulator circuit and the motor control circuit. Additional routing is through J2-30 to the line feed stepping motor and the ribbon-lift mechanism and lamps. The backup lamp supply voltage, the +22 to +30 Vdc ORed with backup +12 Vdc, is routed to the BAT lamp through connector pin J2 pin 1.

3-13. PRINTER ASSEMBLY, MECHANICAL FUNCTIONS

Below is an exploded view of the printer assembly showing the major mechanical assemblies. The printer assembly is a removable module containing the majority of the mechanical operating functions, and consists of the following systems:

- Paper-feed system
- Line-feed system
- Printing system
- Ribbon-feed system
- Ribbon-lift system

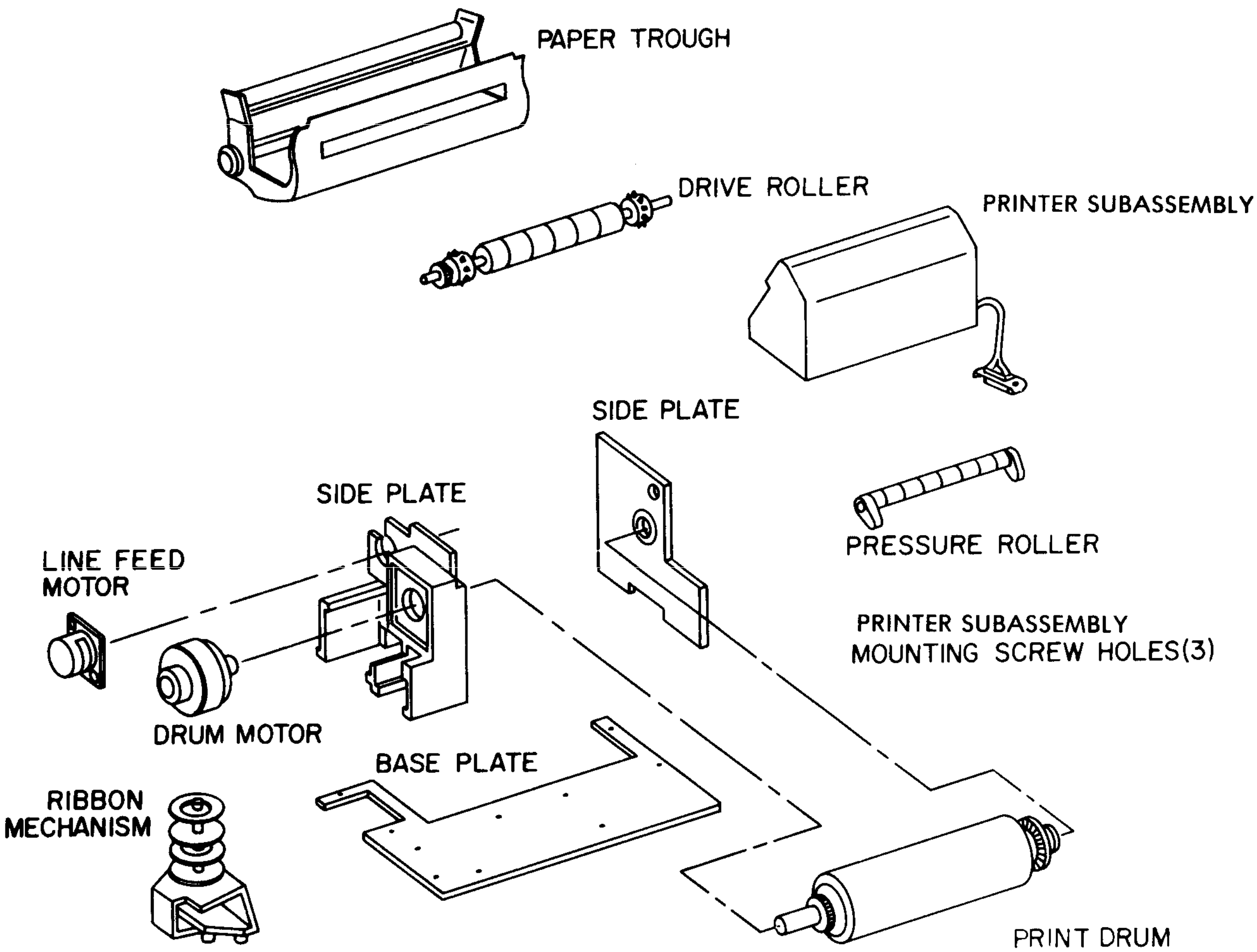
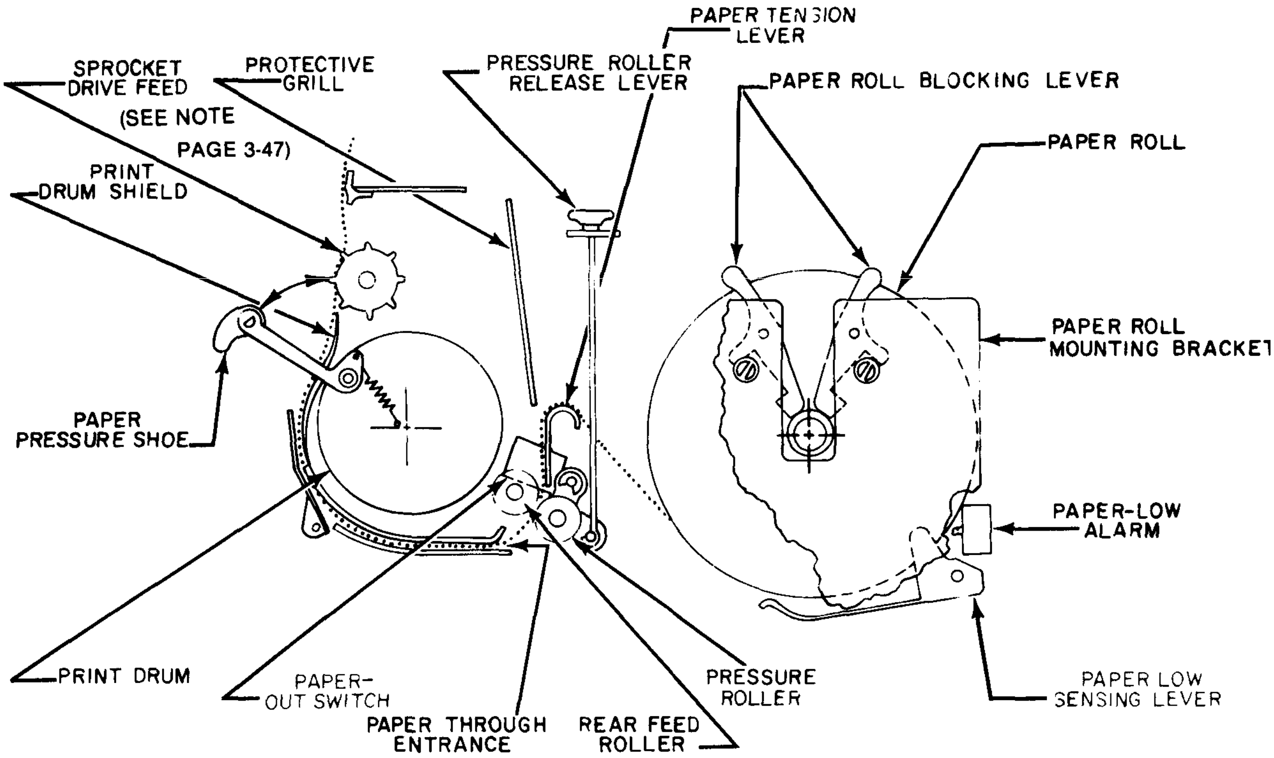


Figure 3-27. MECHANICAL ASSEMBLIES FOR REMOVABLE PRINTER ASSEMBLY.

PAPER-FEED SYSTEM

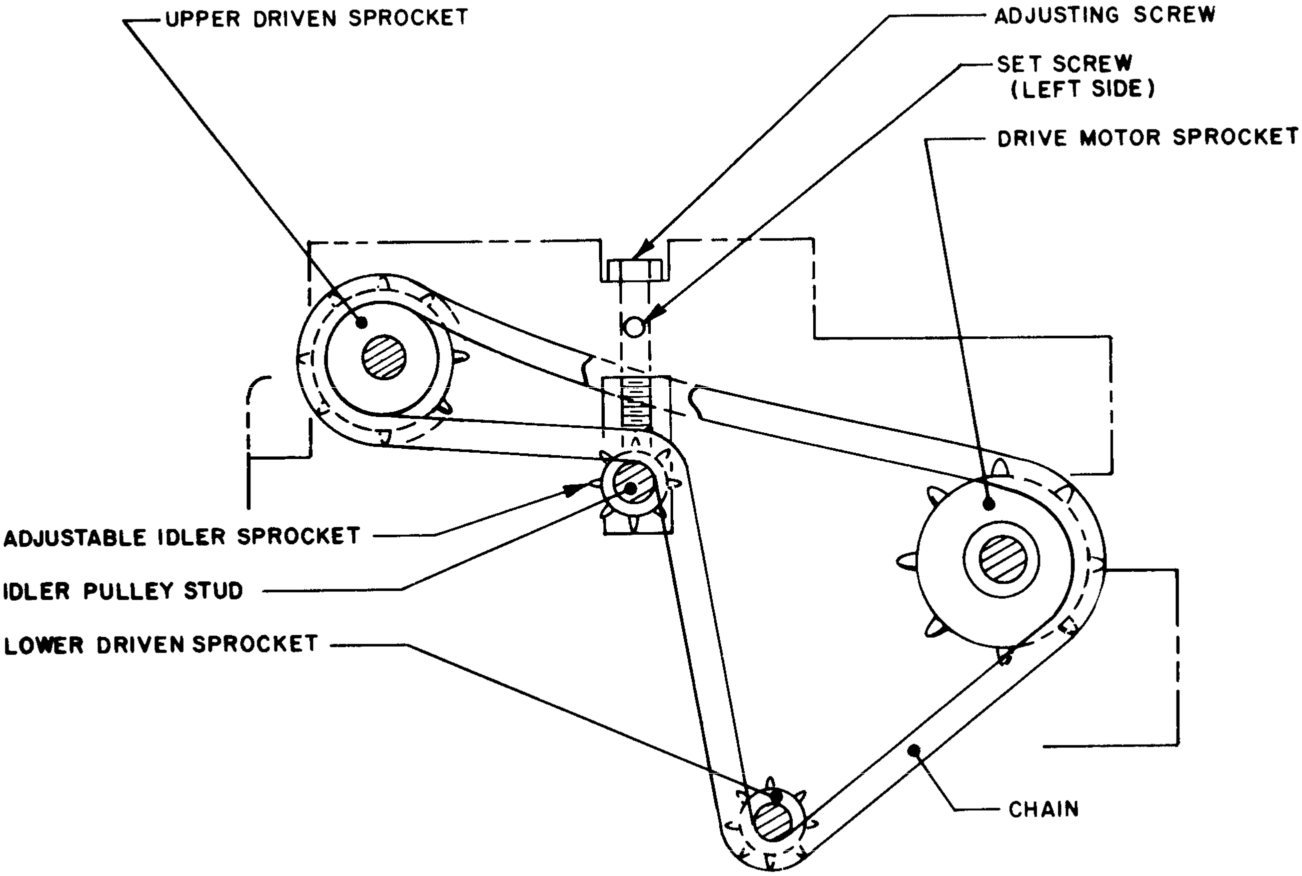
The paper-feed system of the printer handles both single and multi-part roll paper. The system guides the paper from the paper roll through the printing area and out the printer front cover. The system includes a PAPER-LOW and a PAPER-OUT sensing mechanism.



- PAPER-LOW Mechanism. Consists of a spring-loaded extension arm and a switch. The extension arm rides the outer circumference of the paper roll. When the paper roll diameter decreases to the point where the printer is almost out of paper, the lever operates the switch and the PAPER-LOW lamp lights. It does not stop the printer.
- PAPER-OUT Mechanism. Consists of a lever operated switch. Roll paper is secured to the paper-roll. When the paper supply is about depleted, the paper is drawn tight causing the lever to be pressed. The lever operates the switch generating a drum inhibit signal which stops the drum and printing.
- Refer to TM 11-5815-602-10 for operating instructions and paper supply instructions.

LINE FEED SYSTEM

The line-feed mechanism is used to advance the paper one or two line spaces as determined by the line-feed subcommand. A continuous paper feed is controlled by manually pressing the LINE-FEED pushbutton on the front panel.



- Electronic Line-Feed Control. When a line-feed code is received by the printer, or when the line-feed pushbutton on the dustcover is pressed, the line-feed stepping motor is energized. Paper is advanced by a sprocket on the motor shaft which drives a chain on the upper and lower driven sprockets and an adjustable idler sprocket. The driven sprockets in turn drive a set of pressure rollers in front of the print drum and another set below the print drum. The pressure roller assembly in front of the print drum is equipped with two paper sprockets, one on each side of the printer subassembly, as well as friction rollers. The friction rollers move the paper when roll-paper is used. The sprockets move the paper when fanfold paper is used (now discontinued).

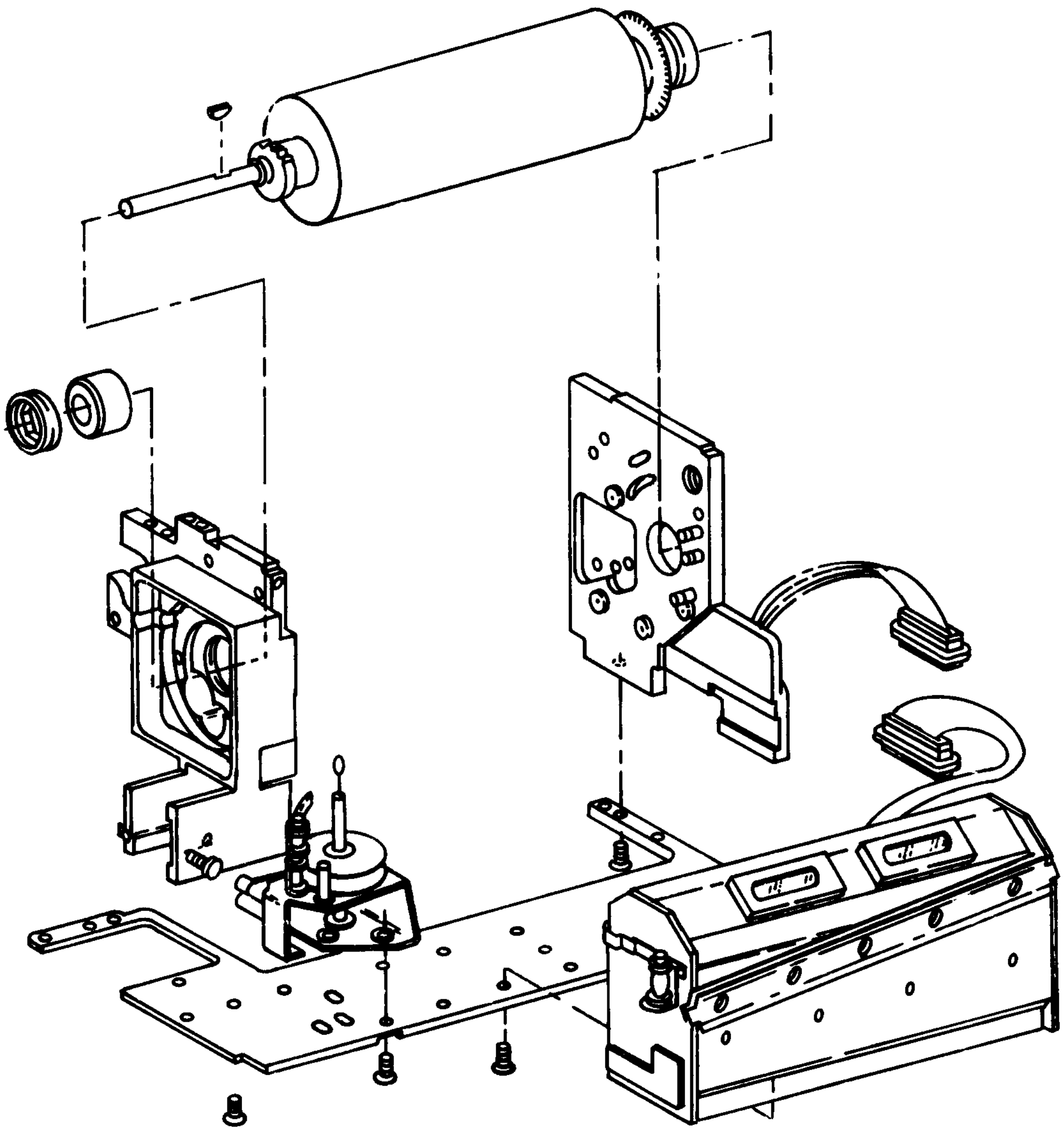
NOTE

Sprocket drive feeds (paper sprockets) are installed in terminals serial numbered 00081A through 03500A. The sprockets will be deleted by the manufacturer starting with serial number 03501A.

- The pressure roller assembly in front of the print drum is equipped with two paper sprockets, one on each side of the printer subassembly, as well as friction rollers. The friction rollers move the paper when roll-paper is used.

PRINTING SYSTEM

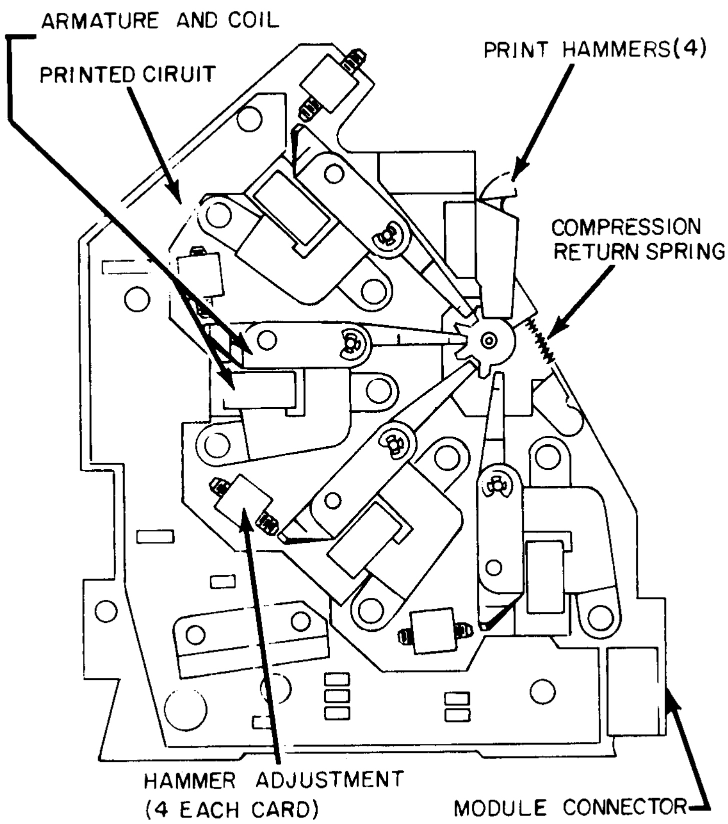
The major mechanical parts used in printing are the print drum and the solenoid-operated print hammer modules.



Print Drum. Cylinder with 80 columns of ASCII and Baudot print characters. The cylinder rotates on the print drum shaft which is supported by ball bearings and is keyed on the dc motor armature.

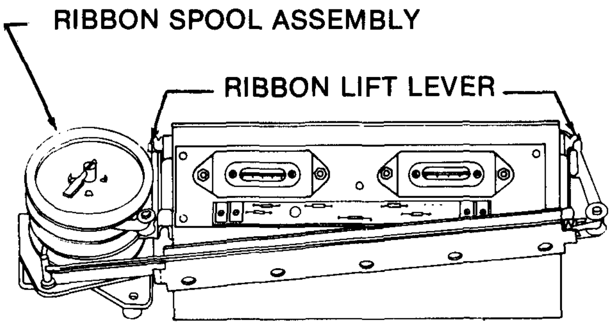
- Print Hammers. There are 20 print hammer modules contained in the printer subassembly. Each print hammer module is equipped with a four-hammer mounting block and compression return springs. Four armatures and coils are radially mounted around the hammers. The coils are wired to a connector by printed circuits. The hammer modules are alined to the print drum by slots in the base plate. Each print hammer is alined with a character column on the print drum. Four adjustment screws, one for each hammer, are provided on each print hammer assembly for the purpose of adjusting each of the hammers.

HAMMER MODULE



RIBBON-FEED SYSTEM

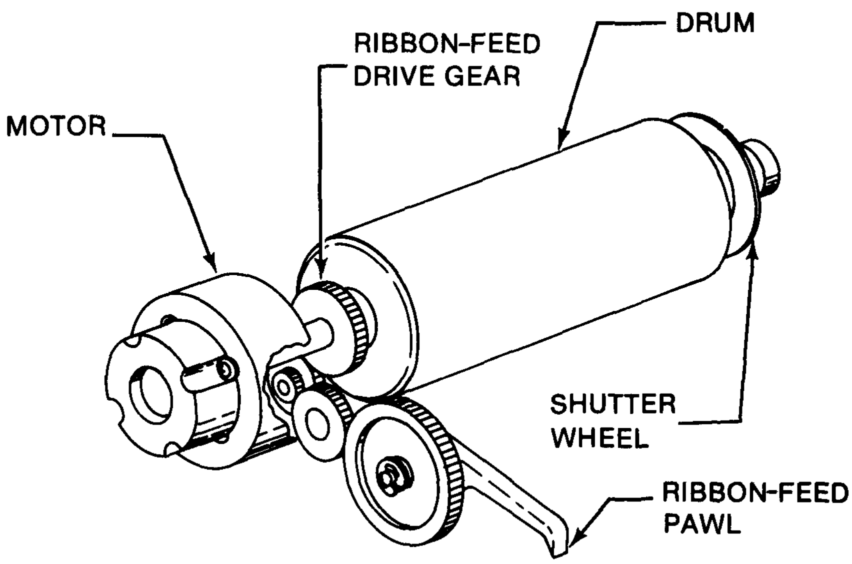
The ribbon-feed system is mounted on the left hand side of the print hammer module frame and consists of two functional mechanisms; a ribbon-feed mechanism, and a ribbon-reversing mechanism.



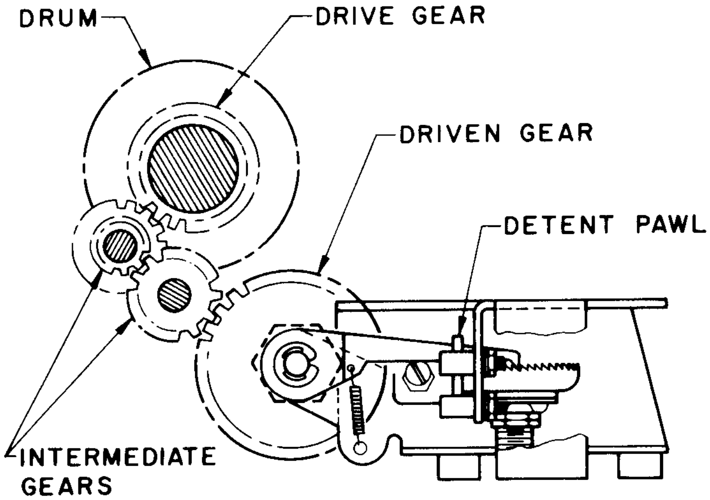
- Ribbon-Feed Mechanism. Consists of a drive gear with an eccentric hub, a feed pawl and a ratchet drive gear.

Power to drive the mechanism is obtained from a gear on the left hand side of the print drum which rotates at the same speed as the drum.

This drive gear directly engages and drives intermediate gears located under the print drum.

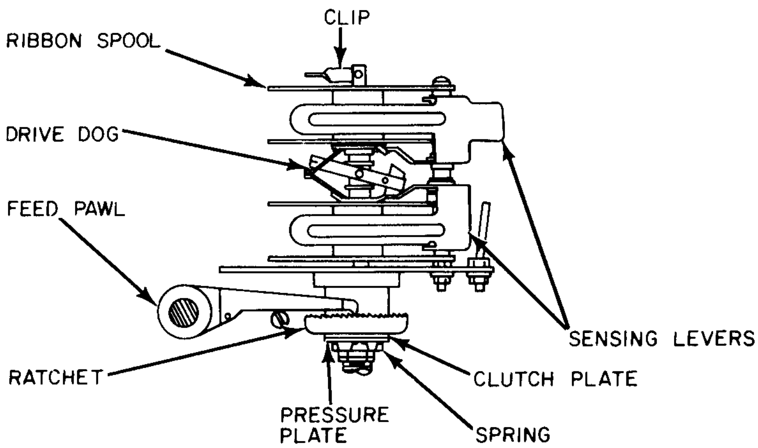


One of the intermediate gears is positioned directly behind the driven gear of the ribbon-feed mechanism. As the driven gear rotates, the eccentric hub changes the drive power to linear motion of the feed pawl. The feed pawl drives the ratchet. The ratchet rotates a shaft on which the two ribbon spools are mounted. The shaft rotates continuously as long as the drum motor is on. The ribbon spool that is engaged is determined by the position of the ribbon-reversing mechanism.



Ribbon-Reversing Mechanism. Consists of two ribbon sensing levers. one for each spool, and the ribbon reversing drive dog (detent). The detent is mounted on the ribbon spool shaft by a pin that permits it to pivot in the vertical direction.

One end of the detent is a knife edge and the other end contains a magnetic pin. The ribbon sensing lever of the empty spool forces the detent up, or down, and permits the magnetic pin on the detent to engage and drive the empty spool ratchet. Engaged by the detent, the empty spool becomes the driven spool and the full spool becomes the feed spool.



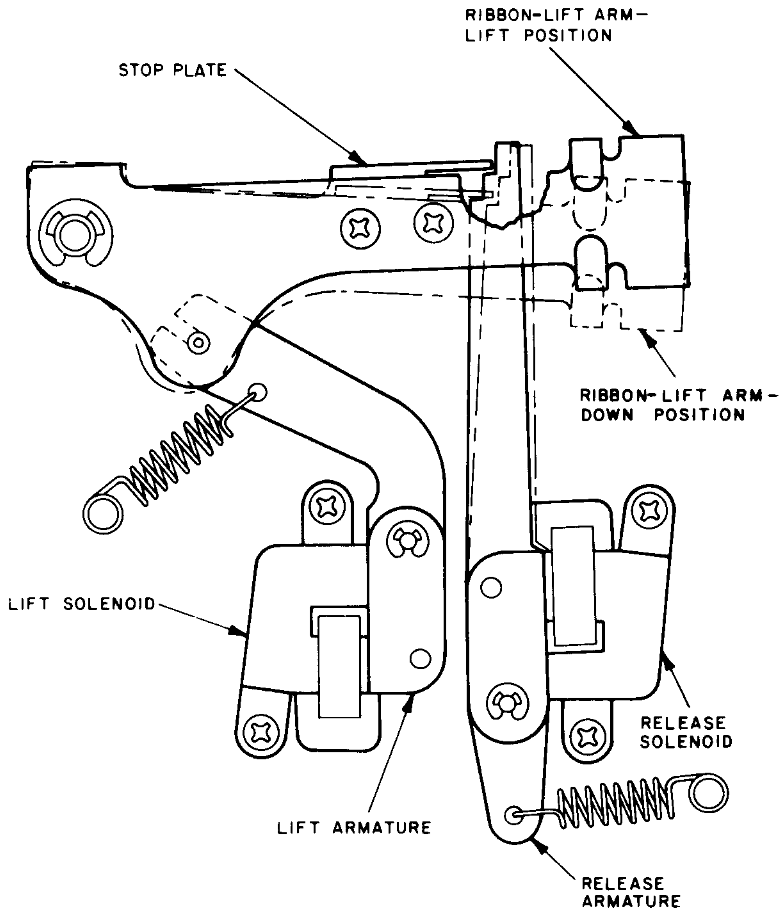
- Instructions for replacing worn or damaged spools are contained in TM 11-5815-602-10.

RIBBON-LIFT SYSTEM

The ribbon-lift system consists of two functional mechanisms, a ribbon-lift mechanism and a ribbon-drop mechanism. The normal position of the ribbon is below the printed line. The ribbon is lifted up into position by the ribbon-lift mechanism when data is to be printed. The ribbon is dropped into its normal position when printing stops.

- Ribbon-Lift Mechanism. Consists of a lift armature, lift solenoid and ribbon lift arm assembly located on each side of the printer subassembly frame. When the ribbon-lift solenoids are energized, the armatures pull in and raise the ribbon-lift arm assembly to engage the upper step of the ribbon-release armature. This moves the ribbon arms up to place the ribbon in the print position.

- Ribbon-Drop Mechanism. Consists of two release solenoids and two release armatures located on each side of the printer subassembly frame. When the release solenoids are energized, the release armatures pull in and allow the ribbon arms to drop to



Section III. TEST FIXTURES, ELECTRICAL AND ELECTRONIC FUNCTIONS

3-14. GENERAL

This section provides a detailed electrical and functional description of Terminal AN/UGC-74A(V)3 Test Fixtures.

- Test fixtures are used to test and troubleshoot modules of Terminal AN/UGC-74A(V)3.
- Procedures and information are provided below for general support maintenance personnel.

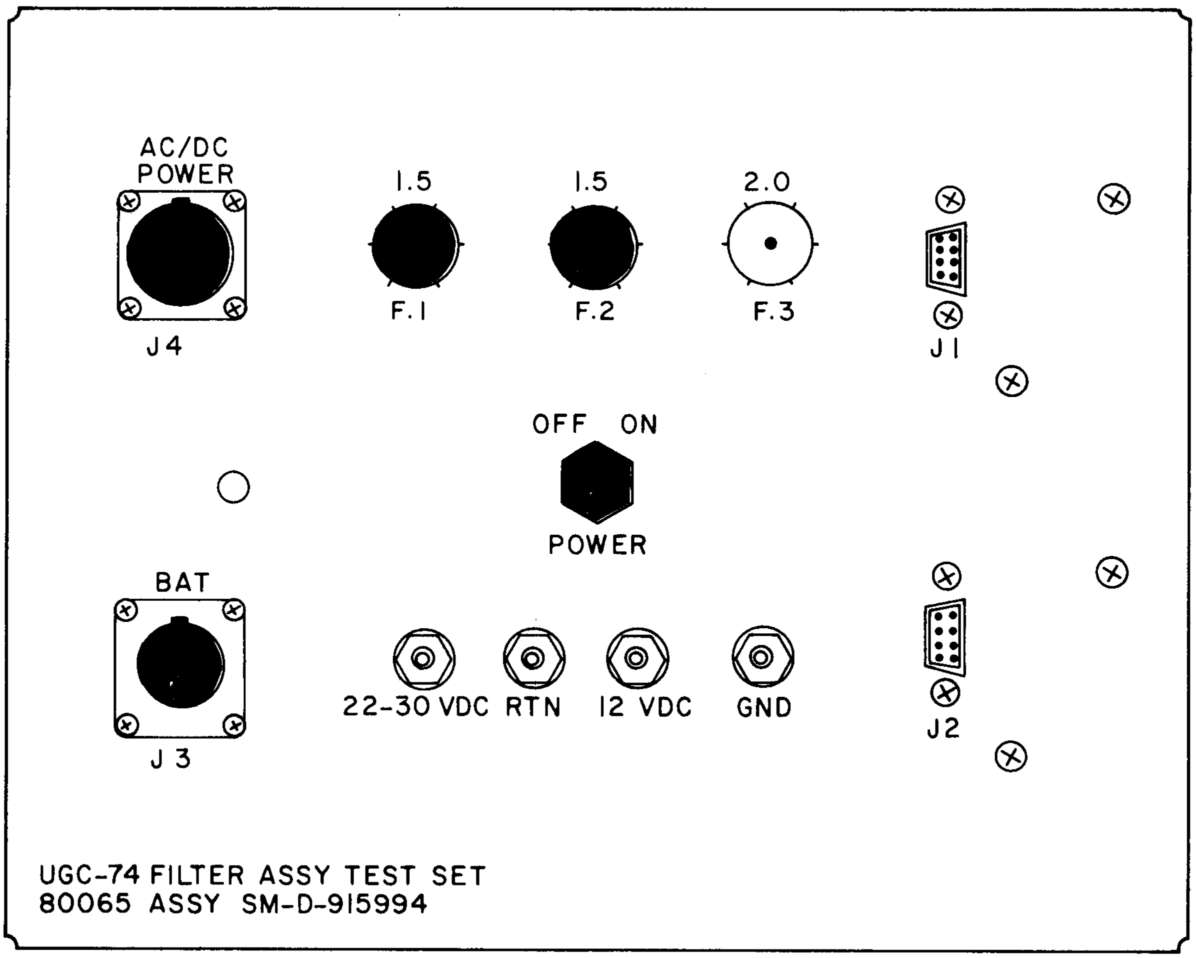
Para	
3-15	Test Fixture, Filter Assembly, Honeywell (SM-C-915994)
3-16	Test Fixture, Driver Board, Honeywell (SM-C-915982)
3-17	Test Fixture, Hammer Module, Honeywell (SM-C-915985)
3-18	Test Fixture, PWB (LF/CC) Assembly, Honeywell (SM-C-915988)
3-19	Test Fixture, Power Supply, Honeywell (SM-D-915979)
3-20	Test Fixture, Interface Assembly, Honeywell (SM-D-915991)
3-21	Test Fixture, Keyswitch Assembly, Honeywell (SM-C-915997)

- Test Fixtures Support Equipment:

Power Cable, 230 Vac, SM-D-764482
Power Cable, 120 Vac, SM-D-764481
Power Cable, 26 Vdc, SM-D-764480
Data Cable, SM-D-915889

3-15. FILTER ASSEMBLY TEST FIXTURE

- Filter assembly test fixture provides electrical interconnections between input power cables and filter assembly.
- Also provides output test points for monitoring of output voltage.
- Consists of a chassis, four connectors, three fuses, three test points, and one switch.



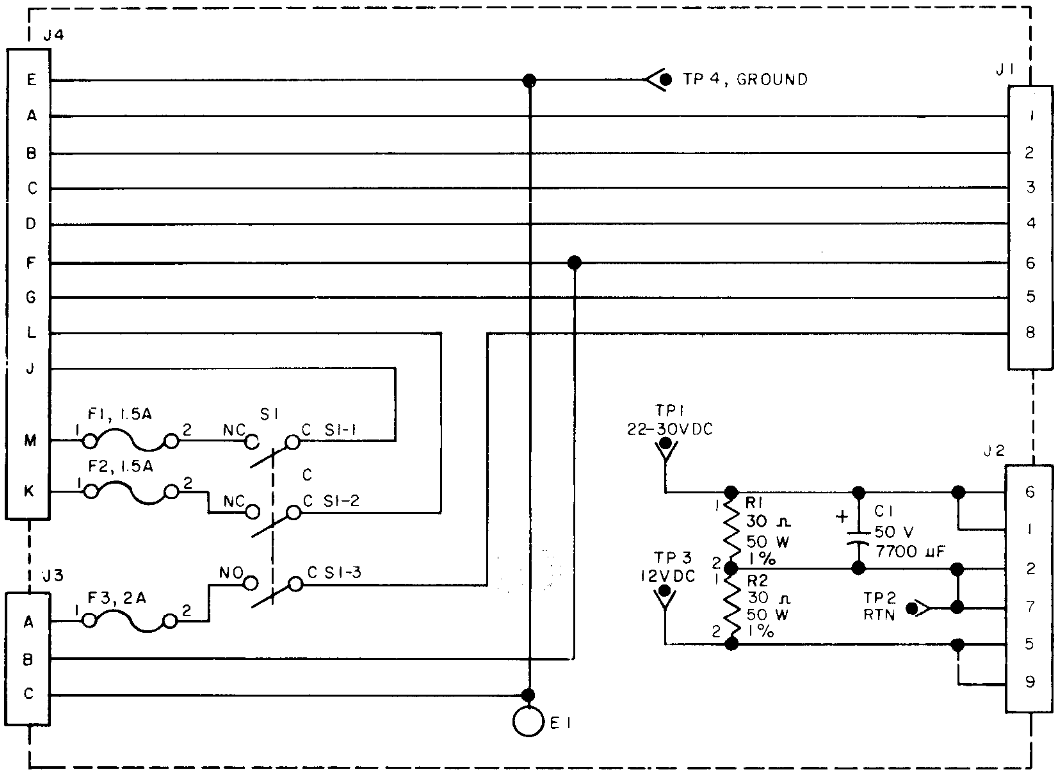
- Test fixture is a passive device which requires no power for its operation.
- Input power supplied through connectors J3 and J4 is used by module under test.
- Switch S1 (POWER) controls electrical connections between module under test and in. put power.
- Fuses F1 and F2 (1.5A) are provided to protect module from serious damage in event of a failure.

  Since loading is a constant 30 ohms and current does not exceed 1 ampere, the 1.5 ampere fuses in fixture are sufficient for both ac and dc input voltages.

- Referring to schematic below, connectors J1 and J2 interface directly with connector cables of filter module.

  J1 provides input power interfaces.

  J2 provides interfaces between filter module output and load circuitry contained in test fixture.



. Output from filter module at J2-1, 6 with respect to J2-2, 7 is nominally 30 Vdc.

  This output voltage is applied across CI and RI in fixture to produce a load of 1 ampere. This causes R1 to dissipate 30 watts.

  - R1 is physically mounted to chassis to dissipate the heat.
  - Capacitor CI provides filtering for filter assembly 22-30 Vdc output which in AN/UGC-74A(V)3 is provided by C8.
  - Voltage is monitored at TP1.

. Output from filter module at J2-5, 9 with respect to J2-2, 7 is dependent upon + 12 Vdc being supplied from J3.

  When applied, +12 Vdc current of 400 mA nominal flows through R2.

  Voltage may be measured at TP3 with respect to TP2.

Table 3-3. FILTER ASSEMBLY TEST FIXTURE WIRE LIST

Wire No.	From	To	Remarks
1	J1-1	J4-A	22 Gauge Wire
2	J1-2	J4-B	22 Gauge Wire
3	J1-3	J4-C	22 Gauge Wire
4	J2-4	J4-D	22 Gauge Wire
5	J1-5	J4-G	22 Gauge Wire
6	J1-6	J3-B	22 Gauge Wire
7	J1-7*	—	Not Used
8	J1-8	S1-3	20 Gauge Wire
9	J1-9*	—	Not Used
10	J2-1	C1(+)	22 Gauge Wire
11	J2-6	C1(+)	22 Gauge Wire
12	TP-1	C1(+)	22 Gauge Wire
13	J2-2	C1(-)	22 Gauge Wire
14	R2-1	C1(-)	22 Gauge Wire
15	TP2	C1(-)	22 Gauge Wire
16	J2-3*	—	Not Used
17	J2-4*	—	Not Used
18	J2-8*	—	Not Used
19	J2-5	TP3	22 Gauge Wire
20	J2-7	TP2	22 Gauge Wire
21	J2-9	TP3	22 Gauge Wire
22	R1-1	TP1	22 Gauge Wire

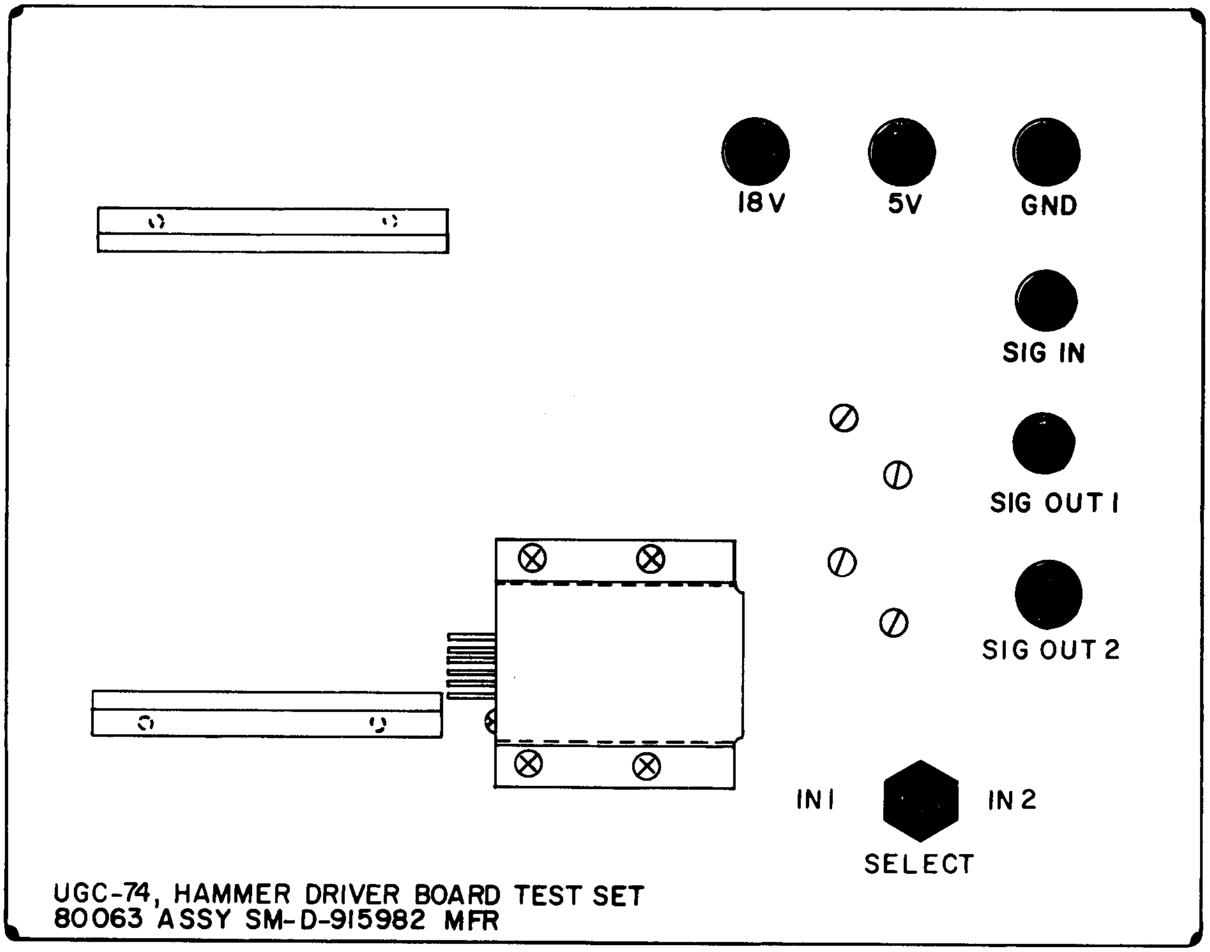
Table 3-3. FILTER ASSEMBLY TEST FIXTURE WIRE LIST . Continued

Wire No.	From	To	Remarks
23	R1-2	R2-1	22 Gauge Wire
24	R2-2	TP3	22 Gauge Wire
25	XF1-2	S1-1	20 Gauge Wire
26	XF2-2	S1-2	20 Gauge Wire
27	XF3-2	S1-3	20 Gauge Wire
28	J3-A	XF3-1	20 Gauge Wire
29	J4-L	S1-2	20 Gauge Wire
30	J4-J	S1-1	20 Gauge Wire
31	J4-M	XF1-1	20 Gauge Wire
32	J4-K	XF2-1	20 Gauge Wire
33	J3-B	J4-F	22 Gauge Wire
34	J3-C	E1	22 Gauge Wire
35	J3-D*	—	Not Used
36	J3-E*	—	Not Used
37	J4-H*	—	Not Used
38	TP-4	E-1	22 Gauge Wire
39	TP-4	J4-E	22 Gauge Wire

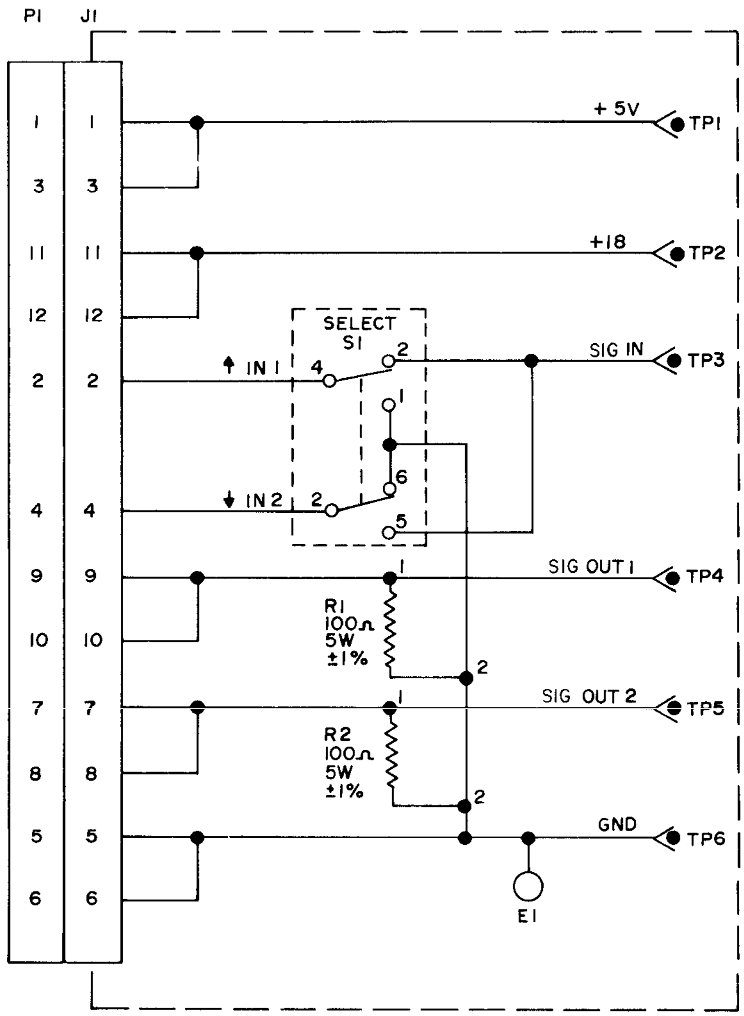
*No connection required.

3-16. HAMMER DRIVER TEST FIXTURE

- Hammer driver test fixture provides power and signal interfaces for hammer driver module.
- Inputs from external + 18V and +5Vdc power supplies and a pulse generator, when connected to test fixture, provide inputs required by hammer driver module.
- No power is required for test fixture itself.



- + 18V and +5Vdc supply voltages for hammer driver module are connected to TP2 and TP1, respectively.
- Return for both supplies is attached to GND (TP6).
- Input from pulse generator is attached to SIG IN (TP3).
- Outputs are monitored at SIG OUT 1 (TP4) and SIG OUT 2 (TP5).
- Switch S1 is used to route generator to input 1 or input 2 hf hammer driver module.



- +5Vdc input at TP1 is wired directly to connector J1-1 and 3 for input to module.
- +18Vdc input at TP2 is wired directly to connector J1-11 and 12 for input to module.
- Power supply return (GND-TP6) is wired directly to J1-5 and 6.
- Terminal E1 is physically mounted on chassis and provides a common ground for all fixture components.

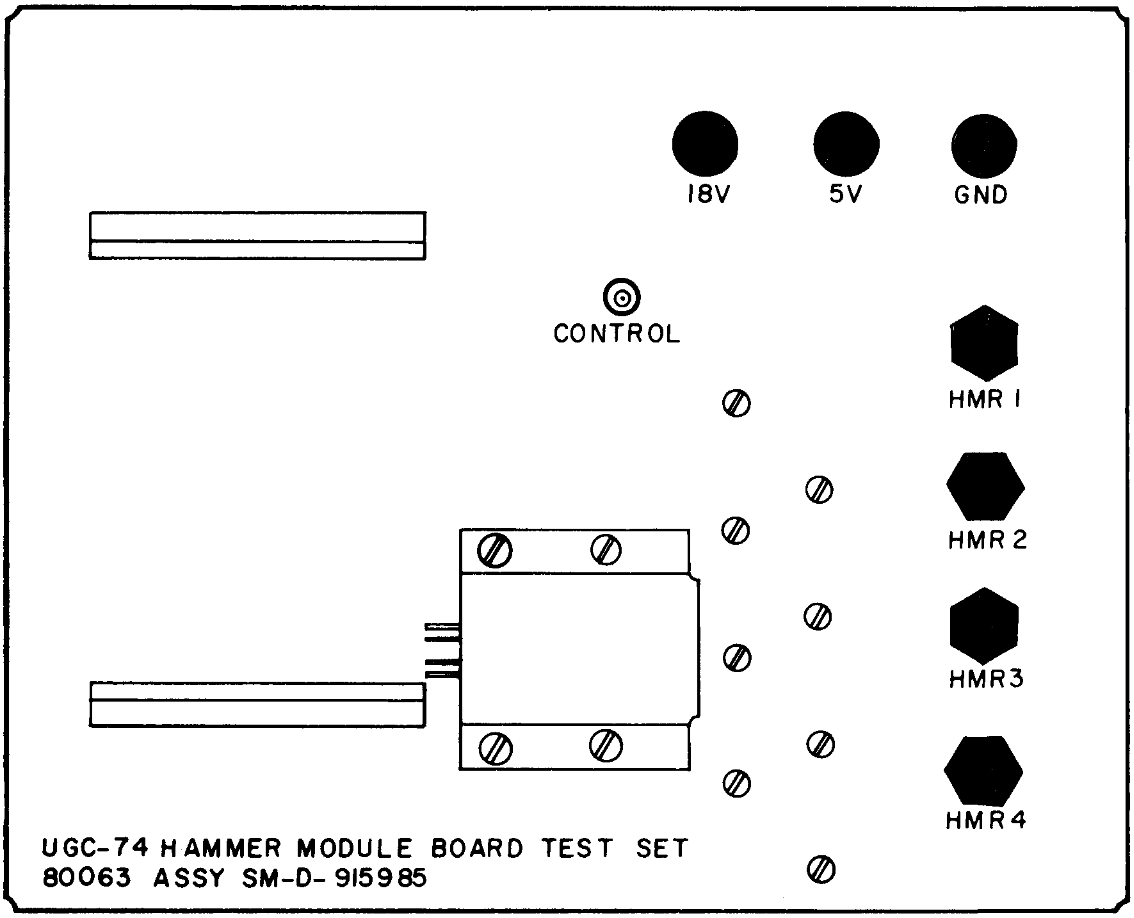
- Input signal is input to SIG IN terminal (TP3) on fixture and is wired to S1-2 and 5.
- When SELECT switch is in IN1 position, wiper ties S1-2 and S1-4 together connecting J1-2 to SIG IN (TP3).
- Switch S1 terminals 1 and 6 are internally connected to each other and wired to ground.
- Wiper of S1-3 is connected to S1-6 and causes a ground to be applied to J1-4 disabling Input 2 to module.
- When S1 is placed in IN2 position, SIG IN (TP3) is connected to J1-4 and IN1 (J1-2) is disabled.
- Outputs from module are loaded by resistors R1 and R2.
- Module output 1 (J1-9 and 10) is available for monitoring at SIG OUT 1 (TP4).
- Module output 2 (J1-7 and 8) may be monitored at SIG OUT 2 (TP5).

Table 3-4. HAMMER DRIVER MODULE TEST FIXTURE WIRE LIST

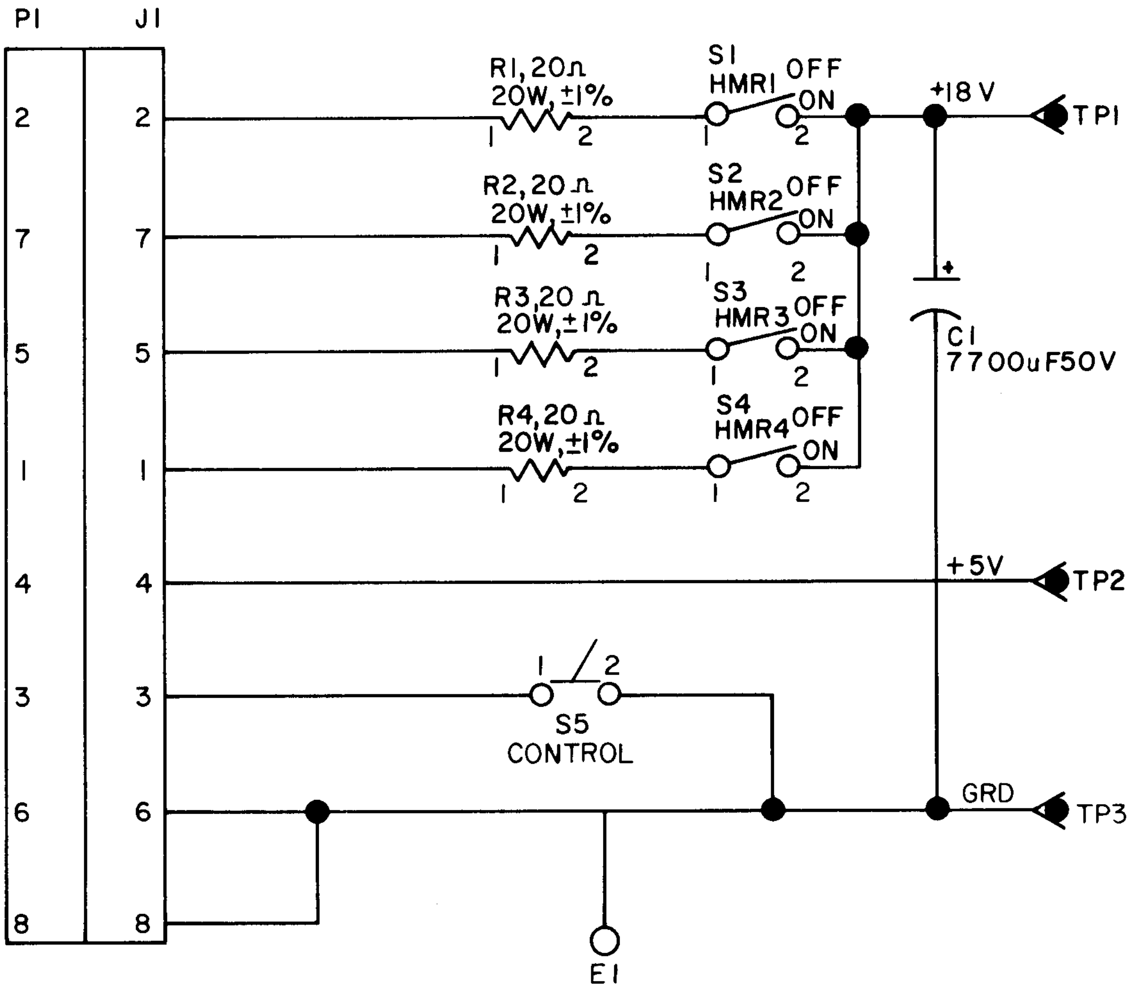
Wire No.	From	To	Remarks
1	J1-1	TP1	22 Gauge Wire
2	J1-2	S1-4	22 Gauge Wire
3	J1-3	TP1	22 Gauge Wire
4	J1-4	S1-3	22 Gauge Wire
5	J1-5	TP6	22 Gauge Wire
6	J1-6	TP6	22 Gauge Wire
7	J1-7	TP5	22 Gauge Wire
8	J1-8	TP5	22 Gauge Wire
9	J1-9	TP4	22 Gauge Wire
10	J1-10	TP4	22 Gauge Wire
11	J1-11	TP2	22 Gauge Wire
12	J1-12	TP2	22 Gauge Wire
13	S1-1	S1-6	22 Gauge Wire
14	S1-6	TP6	22 Gauge Wire
15	S1-2	S1-5	22 Gauge Wire
16	S1-2	TP3	22 Gauge Wire
17	R1-2	R2-2	22 Gauge Wire
18	TP6	E1	22 Gauge Wire
19	R1-2	E1	22 Gauge Wire
20	R1-1	TP4	22 Gauge Wire
21	TP6	E1	22 Gauge Wire
22	R2-1	TP5	22 Gauge Wire
23	R2-2	E1	22 Gauge Wire

3-17. HAMMER MODULE TEST FIXTURE

- Hammer module test fixture provides a means of selectively activating individual hammers to verify operation.
- As a passive device, it provides an interface between hammer module and supply voltages.



- +5 Vdc, + 18 Vdc and GND interface to fixture is accomplished through three terminals.
- Fixture must be connected to +5 V and +18 V power supply to become operational.
- Input power is routed directly to four switches.
- +5V input power is wired directly to pin 4 of hammer module connector which energizes +5V circuits on module when it is inserted into fixture.
- Capacitor C1 is placed across + 18V supply to provide energy storage for actuating hammers.



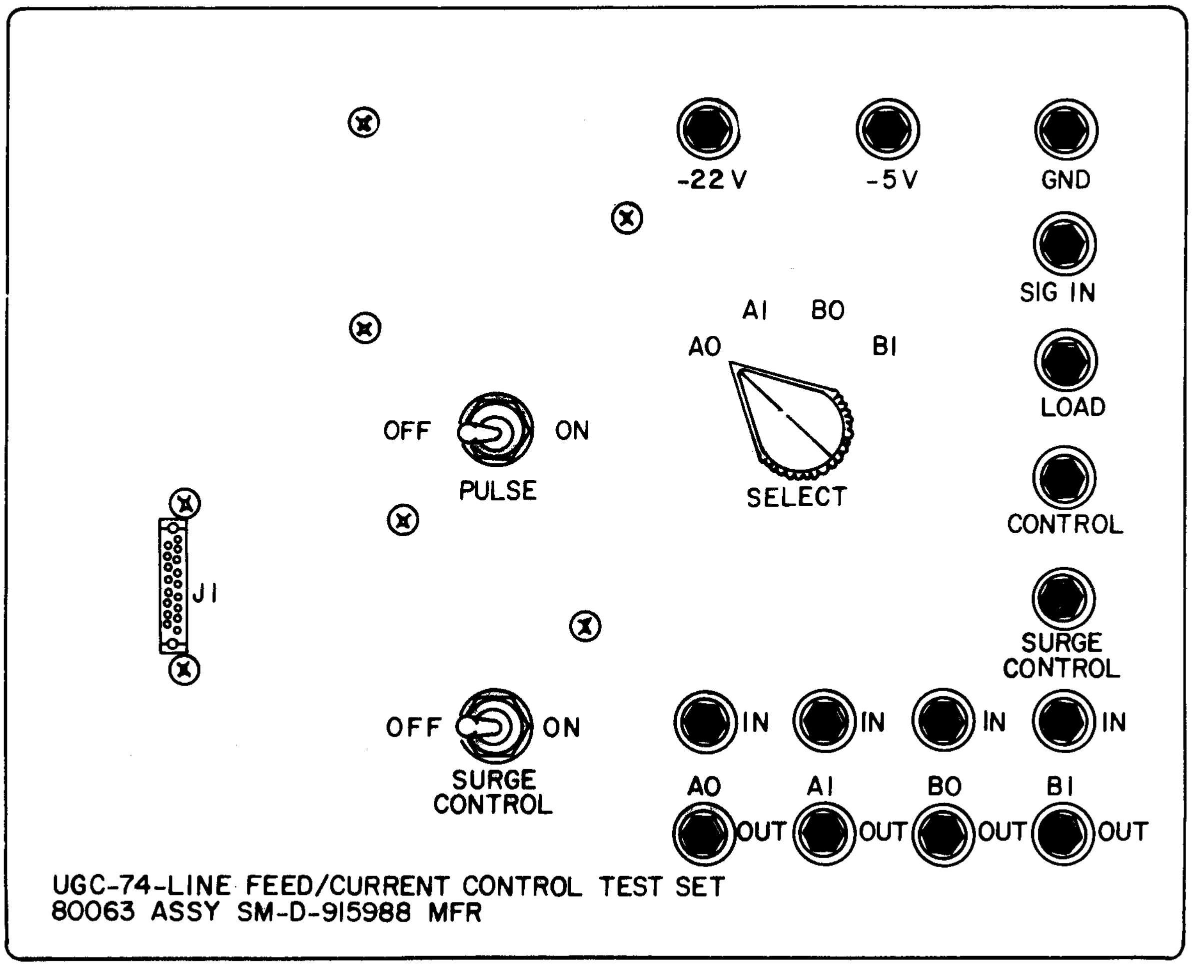
- Switches S1 through S4 control application of + 18Vdc to hammers 1, 2, 3, or 4 respectively.
- When switch S1 (HMR1) is ON (closed), + 18V is applied through current limiting resistor R1 to hammer 1. However, hammer 1 will not actuate until a return path is provided through CR5 on hammer module.
- Control of CR5 on hammer module is function of S5 (CONTROL) on fixture.
- When S5 is depressed, a logic 0 is input to pin 3 of hammer module.
- A logic 0 causes circuitry on module to drive CR5 into conduction.

Table 3-5. HAMMER MODULE TEST FIXTURE WIRE LIST

Wire No.	From	To	Remarks
1	J1-1	R4-1	22 Gauge Wire
2	J1-2	R1-1	22 Gauge Wire
3	J1-3	S5-1	22 Gauge Wire
4	J1-4	TP2	22 Gauge Wire
5	J1-5	R3-1	22 Gauge Wire
6	J1-6	E1	22 Gauge Wire
7	J1-7	R2-1	22 Gauge Wire
8	J1-8	E1	22 Gauge Wire
9	TP3	E1	22 Gauge Wire
10	S5-2	E1	22 Gauge Wire
11	C1(-)	E1	22 Gauge Wire
12	C1(+)	TP-1	22 Gauge Wire
13	S1-1	R1-2	22 Gauge Wire
14	S2-1	R2-2	22 Gauge Wire
15	S3-1	R3-2	22 Gauge Wire
16	S4-1	R4-2	22 Gauge Wire
17	S4-2	S3-2	22 Gauge Wire
18	S3-2	S2-2	22 Gauge Wire
19	S2-2	S1-2	22 Gauge Wire
20	S1-2	TP1	22 Gauge Wire

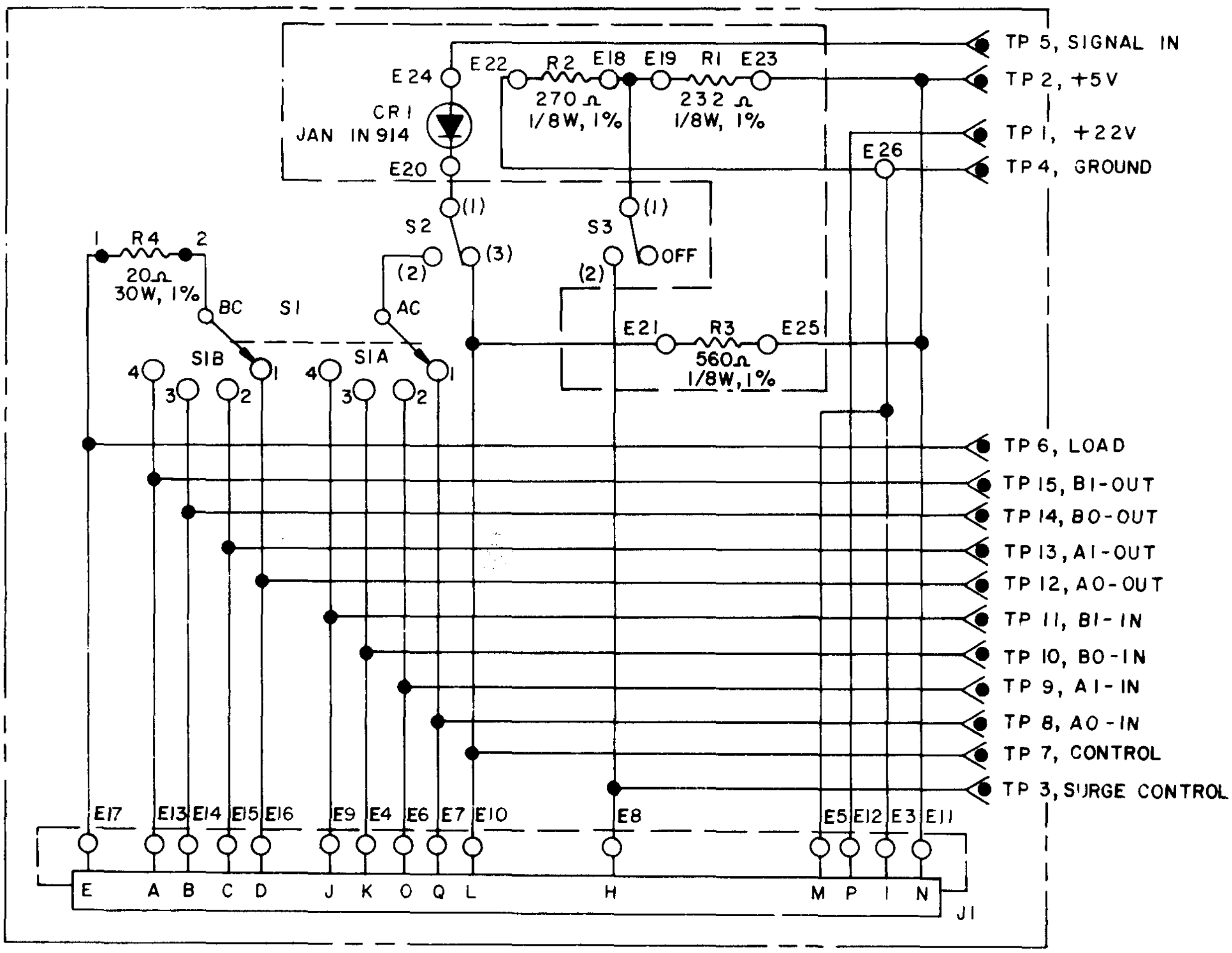
3-18. LINE. FEED/CURRENT CONTROL TEST FIXTURE

- Line-feed/current control test fixture provides power and signal interfaces for line-feed/current control assembly.
- Test points are provided for connecting + 5Vdc supply, + 22Vdc supply, pulse generator, and supply generator returns.
- Test points are also provided for monitoring input and output signals.



- Input +22Vdc at TP1 is routed directly to line-feed/current control connector J1-P.

- +5Vdc at TP2 is used to produce an input control signal and supply +5Vdc for module under test.



- +5Vdc is divided by R1 and R2 to produce an input voltage of 2.3Vdc at wiper of S3 (CONTROL).
- When this switch is closed, voltage is applied to J1-H for actuation of module's circuitry.
- Resistor R3 provides a pull-up voltage for module circuitry connected to J1-L (CONTROL) when S2-3 (PULSE) is in an CC position.
  This pull up voltage causes current control portion of module under test to be enabled continuously.
- When S2 is placed in LF position, pulse generator is connected to switching circuits of line-feed/current control module.
- Input square wave turns gating transistors on line-feed/current control module on and off.
- Flow of current through these transistors is monitored as a voltage across resistor R4 in fixture wiper.
- S1B connects R4 to proper gating transistors.
- Diode CR1 provides +5Vdc isolation for oscillator when S1 is in OFF position.

Table 3-6. LINE FEED/CURRENT CONTROL TEST FIXTURE WIRE LIST

Wire No.	From	To	Remarks
1	A1-E3	TP4	22 Gauge Wire
2	A1-E4	TP10	22 Gauge Wire
3	A1-E5	TP4	22 Gauge Wire
4	A1-E6	TP9	22 Gauge Wire
5	A1-E7	TP8	22 Gauge Wire
6	A1-E8	S3-2	22 Gauge Wire
7	A1-E9	TP11	22 Gauge Wire
8	A1-E10	S2-3	22 Gauge Wire
9	A1-E11	TP2	22 Gauge Wire
10	A1-E12	TP1	22 Gauge Wire
11	A1-E13	TP15	22 Gauge Wire
12	A1-E14	TP14	22 Gauge Wire
13	A1-E15	TP13	22 Gauge Wire
14	A1-E16	TP12	22 Gauge Wire
15	A1-E17	R4-1	22 Gauge Wire
16	TB1-E18	TB1-E19	22 Gauge Wire
17	TB1-E19	S3-1	22 Gauge Wire
18	TB1-E20	S2-1	22 Gauge Wire
19	TB1-E21	S2-3	22 Gauge Wire
20	TB1-E23	TB1-E25	22 Gauge Wire
21	TB1-E22	E26	22 Gauge Wire
22	TB1-E24	TP5	22 Gauge Wire

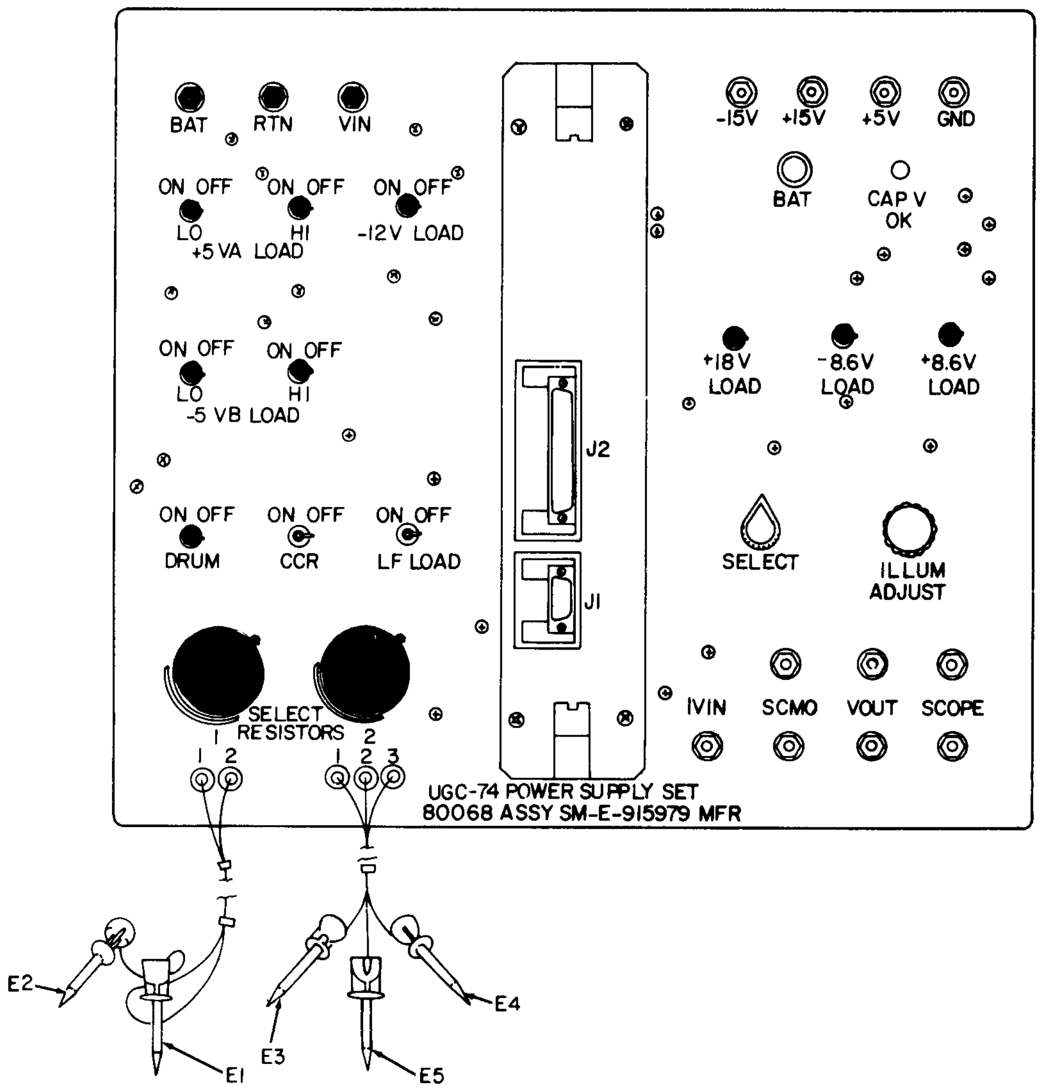
Table 3-6. LINE FEED/CURRENT CONTROL TEST FIXTURE WIRE LIST - Continued

Wire No.	From	To	Remarks
23	TB1-E23	TP4	22 Gauge Wire
24	R4-2	S1-BC	22 Gauge Wire
25	S1-B1	TP12	22 Gauge Wire
26	S1-B2	TP13	22 Gauge Wire
27	S1-B3	TP14	22 Gauge Wire
28	S1-B4	TP15	22 Gauge Wire
29	S1-AC	S2-2	22 Gauge Wire
30	S1-A1	TP8	22 Gauge Wire
31	S1-A2	TP9	22 Gauge Wire
32	S1-A3	TP10	22 Gauge Wire
33	S1-A4	TP11	22 Gauge Wire
34	TB1-E21	TP7	22 Gauge Wire
35	R4-1	TP6	22 Gauge Wire
36	S3-2	TP3	22 Gauge Wire
37	TB1-E22	TP4	22 Gauge Wire

3-19. POWER SUPPLY TEST FIXTURE

Provides following interfaces for AN/UGC-74A(V)3 power supply module:

Input power (22-30Vdc)
Battery backup power (+ 12Vdc)
Output loads and controls
Drum motor simulator



- Also provides two variable resistors for use in selecting resistor values on power supply under test.

INPUT POWER. (fig. FO-10).

- +22 to +30 Vdc input power is applied to J2-1, 6 from external power supply to VIN (TP3) and RTN(TP2).

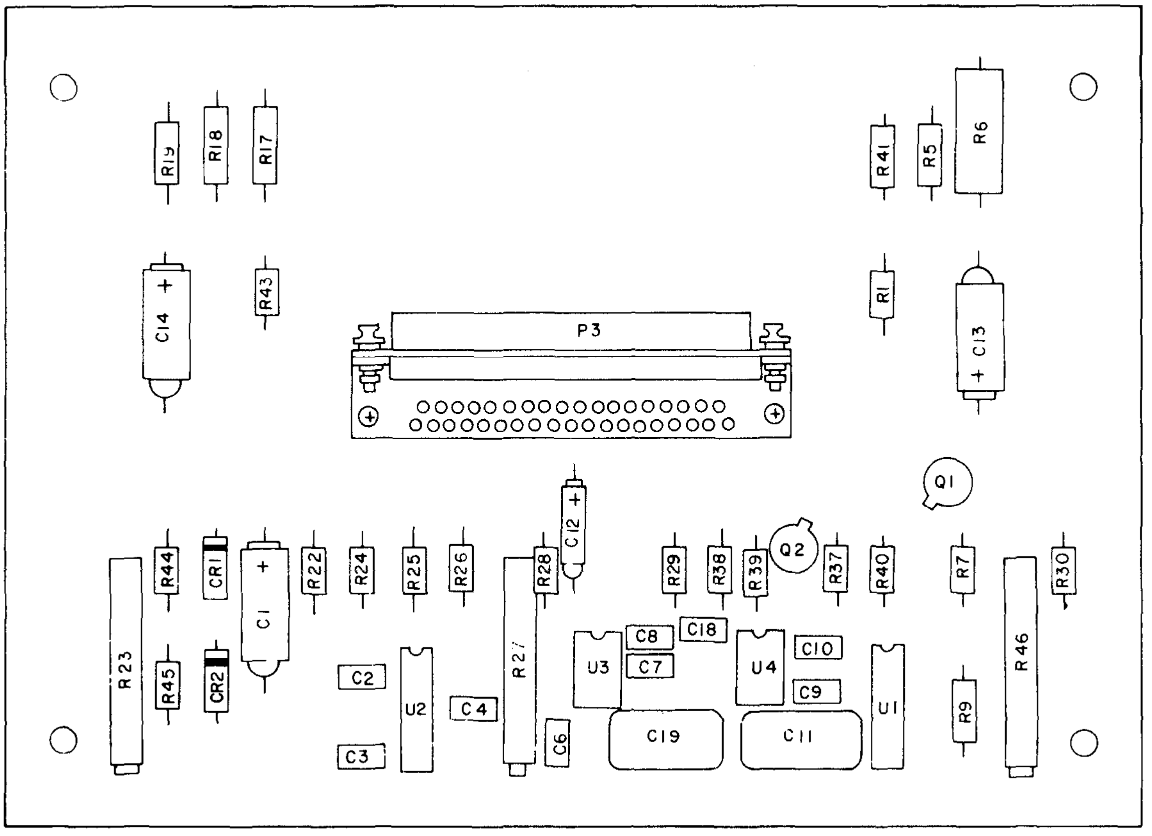
- Input current flows through R47 to module under test.
- Input current may be measured as a voltage by placing a voltmeter across TP3 (+) and TP4 (-).
- Switch S11A in position 1 enables VIN to be monitored at TP8 and TP9.

BATTERY BACKUP POWER.

- +12 Vdc battery backup power is applied to J1-5, 9 from a second external supply to BAT terminal (TP1).
- Voltage may be monitored at TP8 and TP9 by placing S11A to position 2 (BAT BU).

OUTPUT LOADS AND CONTROLS.

- +5VA output from supply under test enters test fixture at J2-12, 13.
- Output is loaded by R2, R3, and R4.
- Amount of load is determined by switchs S1 and S2.
- When S1 and S2 are both in OFF position, a minimum load condition of 8.25 ohms exests.
- When S1 (+5VA LOAD LO) is turned to ON position, a 4.99 ohm resistor is placed in parallel with the 8.25 ohms resulting in an effective load of 3.11 ohms.
- Placing S2 (+5VA LOAD HI) to ON position results in maximum load condition of 1.92 ohms by placing an additional 4.99 ohm resistor across R2, R3 combination.
- +5VA output voltage is monitored at TP8 and TP9 by placing S11A to position 3.
- + 5VA supply also provides source voltage for DS2.
- + 12VA suply (part of module under test) outputs +12 Vdc at P1-14.
- Mating connector J2-14 is wired to switch S3, switch S1 1A, and connector J3-31.
- Connector J3 mates with a test fixture circuit card assembly.



- J3-31 interconnects with P3-31.
- P3-31 is connected to R41 which in turn is connected to R5 and P3-32.
- When switch S3 is placed in NORM position, + 12VA current flows through R41 and R5, and through R6 to RTN on J3-30.
- Resistors R41 and R5 provide a load for +12 V supply whenever switch is in a NOMAX position.
- Placing switch in MAX position causes R41 to be bypassed, the connection J3-33 to be opened, and R5 to become load resistor for + 12VA supply.
- Performance of supply may be monitored at TP8 and TP9 by placing switch S11B (SELECT) to position 4.
- -5VA supply (part of module under test) outputs -5Vdc at P1-15.
- Mating connector J2-15 is wired to J3-35 and S11A-5.

- +5VB output (from module under test) enters test fixture at J2-7, 26.
- +5VB RTN (RTNB) is on J2-4, 5, 6, and 24.
- Resistor R10 (15 ohms) is connected across +5VB output.
- When +5VB LOAD LO switch (S6) is placed in ON position, R11 (30.1 ohms) is placed in parallel with R10.

  Combination of R10 and R11 produces an effective resistive load of 10.0 ohms.
- Placing +5VB LOAD HI switch (S7) to ON position, places R12 (30.1 ohms) in parallel with R10.

  If S6 is in ON position, effective resistive load is 7.5 ohms.
- SELECT switch S11, when placed in position 6, connects +5VB output to V OUT (TP9 and TP12) and SCOPE (TP3 and TP11) terminals.

- + 18V output (from module under test) enters test fixture at J2-21.
- + 18V RTN enters at J2-35.
- Capacitor C15 is connected across ±18V output and simulates capacitor C2 in AN/UGC-74A (V) 3.
- Supply output is placed under load by + 18V LOAD switch (S9) to either NORM position, or MAX position.
- When S9 is in NORM position, R15 (27.4 ohms) is placed across C15 and supply output.
- Placing S9 to MAX position, removes R15 and places R16 (12 ohms) across output.
- When S9 is in the OFF position, both resistors are removed from the output and only C15 remains in the circuit.
- + 18V output is enabled by a logic 0 at J2.22.
- Placing switch S5 (CCR) to ON position, connects a 100-ohm resistor (R43 on circuit card assembly) across J2-22 and J2-32.

  Presence of this resistor produces logic 0 at J2-22.
- When + 18V is present, module under test supplies at +5Vdc voltage at J2-25 (CAPVOK).
- Voltage is input through J3-36 to a lamp driver (U1-9) on circuit card assembly.
- Lamp driver supplies a return path for current to flow through J2-12, 13, DS2, J3-16, R9 (on circuit card assembly) and U1 output.
- SELECT switch, when placed in position 9, enables monitoring of + 18V supply voltage at SCOPE and V OUT terminals.

- Lamp Supply output of module under test provides +22 to 30Vdc which enters test fixture at J2-2.
- Potentiometer R8 (ILLUM ADJUST) is connected across the 22 to 30Vdc supply.
- Wiper of R8 is controlled by test fixture operator and presents to module under test a variable voltage at J2-36.

  This voltage is used by module to control amplitude of lamp supply voltage which is applied to test fixture at J2-31.

  Resistor R13 (40.2 ohms) is load resistor for lamp supply output.

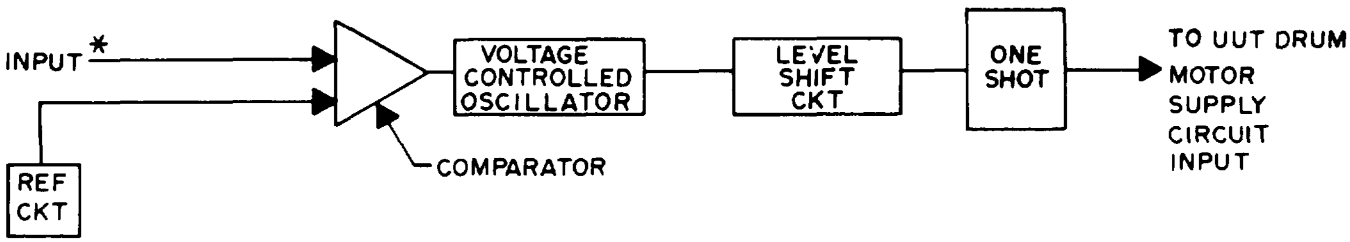
- + 8.6V module under test supplies + 8.6Vdc to J2-8.
- Switch S13 (+8.6V LOAD) is wired to J2-8 and load resistors R34, R35, and R36.
- Load resistor return (RTN) is provided by J2-5.
- When S13 is placed in NORM position, +8.6V load is provided by R35 (44.2 ohms).
- Load resistor is switched to R36 (44.2 ohms).
- Load resistor is switched to R36 (53.6 ohms) when S13 is placed in MIN position.
- When MAX position is selected, R34 provides a load of 30.1 ohms.
- Switch S11 (SELECT), when placed in position 12, enables monitoring of + 18Vdc output of SCOPE and V OUT terminals.

- -8.6V module under test supplies -8.6V to J2-20.
- Wiper of switch S10 (-8.6V LOAD) is connected to J2-20.
- Three loads are selectable:
  53.6 ohms
  82.50 ohms
  115 ohms
- When in MAX position, current flows through S10-1 to J3-27.
- On circuit card assembly, P3-27 is connected to R17 (53.6 ohms).
- Current then flows through R17 to return (RTN P3-24, J2-4).
- When S10 is in NORM position, current flow is through R18 (82.5 ohms).
- Resistor R19 is used by placing S10 in the MIN position.
- -8.6V output is monitored by placing SELECT switch (S11) to position 7.
- This connects -8.6V output to V OUT and SCOPE test points.

- Line-feed. Module under test outputs a 22-30V line-feed voltage at J2-30.
- Output is loaded by R14 (30 ohms) when switch S8 (LF LOAD) is placed to ON position.
- Select resistors. Test fixture provides two precision variable resistors which are used to select resistor values on module under test.
- Test leads E1 and E2 are connected to SELECT RESISTOR 1 (R31) which is a 10-turn, 500-ohm potentiometer.
  E1 (RED) is connected to wiper (2) and one end (3) of R31.
  E2 (BLACK) is connected to terminal 1 of R31.
  Capacitor C16 is placed across terminals 1 and 3 of R31 and provides noise filtering.
- SELECT RESISTOR 2 (R32) is same type potentiometer as R31.
  R32, however, is configured for a three-wire connection and is used to select resistors used in a voltage divider application on module under test.
  E3 (RED) is connected to wiper.
  E4 (BLACK) and E5 (YELLOW) are connected to ends 1 and 3, respectively.

DRUM MOTOR SIMULATOR (fig. FO-11).

- Drum motor output of the power supply module under test is determined by drum speed.
- In order to test this circuit, simulation of drum motor control loop must be provided in fixture.
- U1, 2, 3, and 4 provide this capability.
- Power supply under test outputs a voltage which is compared against a reference voltage by a difference amplifier.
- Output of this amplifier is a voltage proportioned to the difference between drum motor supply output and reference voltage.



* FROM UUT DRUM MOTOR OUTPUT CIRCUIT

- Voltage-controlled oscillator (VCO) responds to variable input by changing frequency of its output square wave.
- Because output level of VCO is incompatible with one-shot device, a level converter is provided.
- TTL input to one-shot causes it to produce a fixed duration pulse at frequency determined by VCO.
- This pulse is returned to power supply under test as signal SCMO.
- Output from drum motor supply of module under test is divided by resistors R20 and R21 (fig. FO-10).
- This voltage is applied to J3-6 which, in turn, is applied to U2-4 through resistor R22.
- Resistors R23 and R45 adjust reference voltage applied to U2-5.
- Resistors R21 and R24 set gain of U2 for unity.
- Capacitor C2 defines bandwidth to 1/8thpf or 55.5 Hz.
- Capacitor C4 provides noise decoupling to reduce effects of random noise on circuit.
- Reference voltage for U2 is provided by CR1, CR2, C1, R45, and R23.
  CR1 and CR2 are 6.2V Zener diodes and provide a constant 12.5Vdc across R45, R23, and C1.
  Capacitor C1 eliminates low frequency noise and helps stabilize reference voltage.
  Resistor R23 adjusts value of voltage to be used by U2 for its reference and is normally set for 4.1Vdc.
- Output of U2 at pin 10 is normally 10 to 12 Vdc with an input voltage of 5Vdc applied to J3-6.
- With +15Vdc applied at junction of C4 and R26, current flows through R26 and R25 causes 13.5Vdc to be input to U3 pin 5.
- U3 is a voltage-controlled oscillator (VCO) whose output frequency is a function of value of the input voltage.
- Resistors R27, R28, and capacitor C7 determine center frequency value.
  C7 (.022 uf) sets VCO output at approximately 1 kHz.
  Resistor R27 is adjustable and is used to set output frequency for 926 Hz.
  Capacitor C6 is provided to prevent parasitic oscillations which may occur during VCO switching.
- VCO output is a 5V square wave which switches between +6 and + 11Vdc.
- In order for this signal to be used by U4, levels must be converted to TTL.
- TTL conversion is accomplished by transistor Q2.
- Capacitor C18 and resistor R39 provide dc and load isolation for converter and VCO.
- Collecter of Q2 is driven by the VCO and switches between +5V and ground.
  Output of Q2 is applied to trigger input of one-shot U4.
- Output of U4 is a pulse whose width is determined by values of C19, C11, C46, and R30.
- R46 is adjusted to produce a pulse width of 518 usec.
- Output at SCMO (J3-12) is a 518 ± 3 usec pulse at an interval of 1080 ± 15 usec.

Table 3-7. POWER SUPPLY TEST FIXTURE WIRE LIST

Wire No.	From	To	Remarks
1	J2-1	DSI	22 Gauge Wire
2	J2-2	R8-3	22 Gauge Wire
3	J2-4	TB1-5	22 Gauge Wire
4	J2-5	TB1-5	22 Gauge Wire
5	J2-6	TB1-5	22 Gauge Wire
6	J2-24	TB1-5	22 Gauge Wire
7	J2-7	TB1-4	22 Gauge Wire
8	J2-26	TB1-4	22 Gauge Wire
9	J2-10	TB1-6	22 Gauge Wire
10	J2-11	TB1-6	22 Gauge Wire
11	J2-12	TB1-7	22 Gauge Wire
12	J2-13	TB1-7	22 Gauge Wire
13	J2-14	S11-A4	22 Gauge Wire
14	J2-15	S11-A5	22 Gauge Wire
15	J2-16	S11-B11	22 Gauge Wire
16	J2-17	S11-A11	22 Gauge Wire
17	J2-20	S11-A7	22 Gauge Wire
18	J2-21	S11-A9	22 Gauge Wire
19	J2-29	S11-B5	22 Gauge Wire
20	J2-30	S11-A10	22 Gauge Wire
21	J2-31	S11-A8	22 Gauge Wire

Table 3-7. POWER SUPPLY TEST FIXTURE WIRE LIST - Continued

Wire No.	From	To	Remarks
22	J2-8	S11-A12	22 Gauge Wire
23	J2-32	TB1-8	22 Gauge Wire
24	J2-33	TB1-8	22 Gauge Wire
25	J2-35	TB1-8	22 Gauge Wire
26	J2-18	S4-3	22 Gauge Wire
27	J2-19	TP10	Center Conductor of Shieided Cable
28	J2-22	J3-22	22 Gauge Wire
29	J2-25	J3-36	22 Gauge Wire
30	J2-28	J3-13	22 Gauge Wire
31	J2-36	R8-2	22 Gauge Wire
32	J2-37	TP13	Shield of Shielded Cable
33	J1-6	TB1-3	22 Gauge Wire
34	J1-1	TB1-3	22 Gauge Wire
35	J1-5	TB1-1	22 Gauge Wire
36	J1-9	TB1-1	22 Gauge Wire
37	J1-7	S11-B2	22 Gauge Wire
38	J1-2	TB1-2	22 Gauge Wire
39	J3-7	TB1-2	22 Gauge Wire
40	J3-34	TB1-6	22 Gauge Wire
41	J3-30	TB1-6	22 Gauge Wire
42	J3-31	S11-A4	22 Gauge Wire

Table 3-7. POWER SUPPLY TEST FIXTURE WIRE LIST . Continued

Wire No.	From	To	Remarks
43	J3-35	S11-A5	22 Gauge Wire
44	J3-32	S3-3	22 Gauge Wire
45	J3-33	S3-1	22 Gauge Wire
46	J3-23	S5-3	22 Gauge Wire
47	J3-15	DS1-1	22 Gauge Wire
48	J3-16	DS2-2	22 Gauge Wire
49	J3-5	R21-1	22 Gauge Wire
50	J3-6	R21-2	22 Gauge Wire
51	J3-27	S10-6	22 Gauge Wire
52	J3-26	S10-4	22 Gauge Wire
53	J3-25	S10-1	22 Gauge Wire
54	J3-12	TP10	Conductor of Shielded Cable
55	J3-9	TP13	Shield of Shielded Cable
56	J3-14	TB1-8	22 Gauge Wire
57	J3-24	TB1-5	22 Gauge Wire
58	J3-8	TB1-2	22 Gauge Wire
59	J3-11	TP6	22 Gauge Wire
60	J3-10	TP6	22 Gauge Wire
61	J3-28	TP6	22 Gauge Wire
62	J3-29	TP6	22 Gauge Wire
63	J3-18	TP5	22 Gauge Wire

Table 3-7. POWER SUPPLY TEST FIXTURE WIRE LIST - Continued

Wire No.	From	To	Remarks
64	J3-19	TP5	22 Gauge Wire
65	J3-37	TP5	22 Gauge Wire
66	J3-1	TP4	22 Gauge Wire
67	J3-2	TP4	22 Gauge Wire
68	J3-20	TP4	22 Gauge Wire
69	TB1-8	S9-2	22 Gauge Wire
70	TB1-8	C1-2	22 Gauge Wire
71	TB1-8	R8-1	22 Gauge Wire
72	TB1-8	S11-B8	22 Gauge Wire
73	TB1-5	R34-1	22 Gauge Wire
74	TB1-5	R1O-1	22 Gauge Wire
75	TB1-5	R35-1	22 Gauge Wire
76	TB1-6	R2-1	22 Gauge Wire
77	TB1-6	S11-63	22 Gauge Wire
78	TB1-7	R2-2	22 Gauge Wire
79	TB1-7	S1-2	22 Gauge Wire
80	TB1-7	DS2-1	22 Gauge Wire
81	TB1-7	S2-2	22 Gauge Wire
82	TB1-7	S11-A3	22 Gauge Wire
83	TB1-2	TP7	22 Gauge Wire
84	TB1-2	TP2	22 Gauge Wire

Table 3-7. POWER SUPPLY TEST FIXTURE WIRE LIST - Continued

Wire No.	From	To	Remarks
85	TB1-2	S11-B1	22 Gauge Wire
86	TB1-2	TP13	22 Gauge Wire
87	TB1-4	R11-1	22 Gauge Wire
88	TB1-4	S11-A6	22 Gauge Wire
89	TB1-3	R47-2	22 Gauge Wire
90	TB1-3	TP14	22 Gauge Wire
91	TB1-1	S11-A2	22 Gauge Wire
92	TP9	TP8	22 Gauge Wire
93	TP8	S11-AC	22 Gauge Wire
94	TP12	TP11	22 Gauge Wire
95	TP11	S11-BC	22 Gauge Wire
96	R21-1	S11-B11	22 Gauge Wire
97	S11-B8	S11-B9	22 Gauge Wire
98	S11-B9	S11-B10	22 Gauge Wire
99	S11-B9	R13-1	22 Gauge Wire
100	R13-1	S5-2	22 Gauge Wire
101	S11-B10	R14-1	22 Gauge Wire
102	R14-1	S4-2	22 Gauge Wire
103	S11-A4	S3-2	22 Gauge Wire
104	R1O-1	S11-B6	22 Gauge Wire
105	S11-B6	R36-1	22 Gauge Wire

Table 3-7. POWER SUPPLY TEST FIXTURE WIRE LIST - Continued

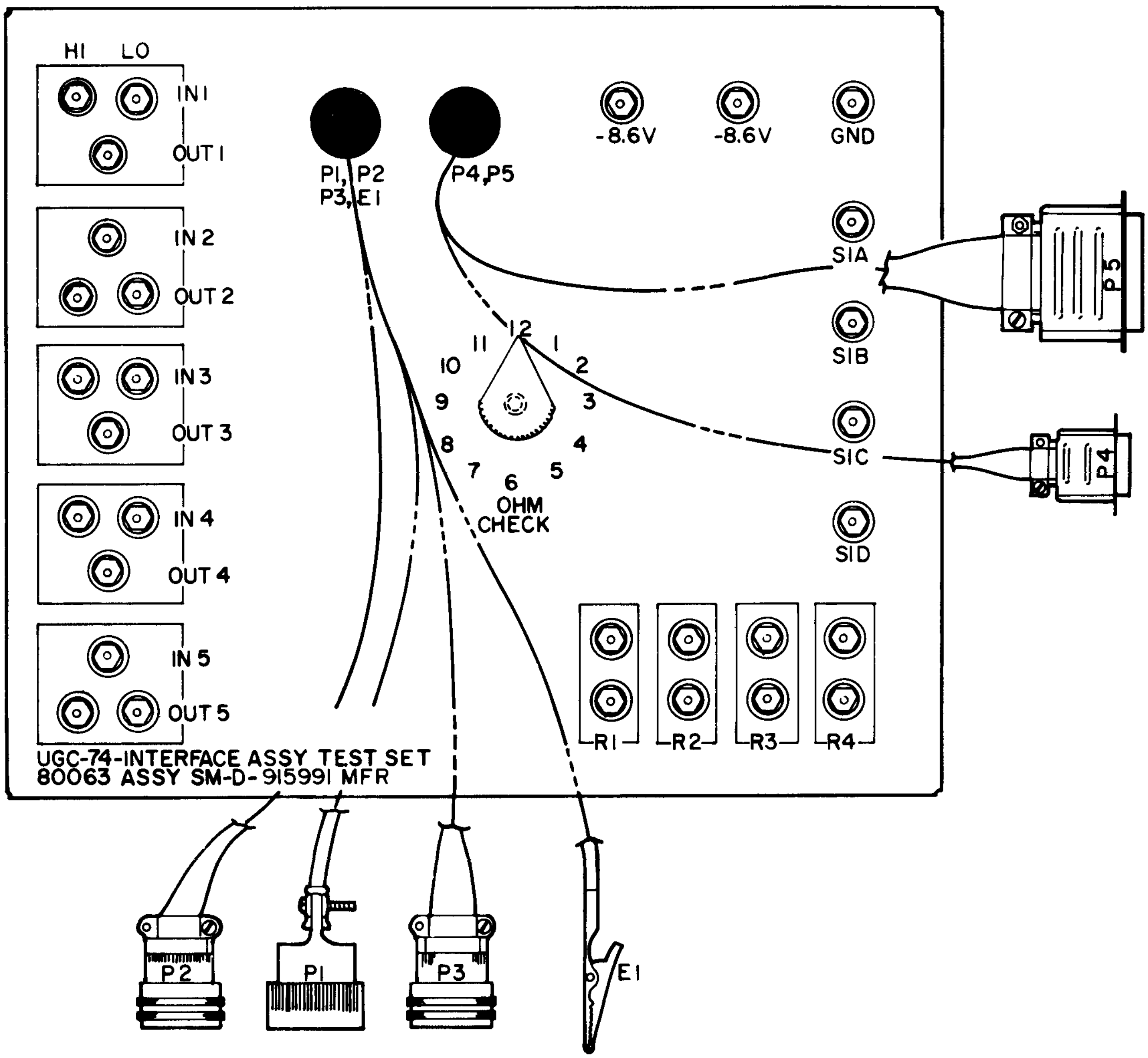
Wire No.	From	To	Remarks
106	S11-B6	S11-B7	22 Gauge Wire
107	S11-B7	S6-2	22 Gauge Wire
108	S11-B7	S11-B12	22 Gauge Wire
109	S11-B12	S7-2	22 Gauge Wire
110	R2-1	R3-1	22 Gauge Wire
111	R3-1	R4-1	22 Gauge Wire
112	S11-B3	S11-B4	22 Gauge Wire
113	S11-B4	S11-B5	22 Gauge Wire
114	S11-B1	S11-B2	22 Gauge Wire
115	R21-2	R20-1	22 Gauge Wire
116	S11-A12	S13-2	22 Gauge Wire
117	S11-A11	R20-2	22 Gauge Wire
118	S11-A10	S8-2	22 Gauge Wire
119	S11-A9	R15-1	22 Gauge Wire
120	R15-1	R16-1	22 Gauge Wire
121	R16-1	C15-1	22 Gauge Wire
122	S11-A8	R13-2	22 Gauge Wire
123	S11-A7	S10-2	22 Gauge Wire
124	S11-A6	R12-1	22 Gauge Wire
125	R12-1	R10-2	22 Gauge Wire
126	TP3	S11-A1	22 Gauge Wire

Table 3-7. POWER SUPPLY TEST FIXTURE WIRE LIST - Continued

Wire No.	From	To	Remarks
127	S11-A1	R47-1	22 Gauge Wire
128	R14-2	S8-3	22 Gauge Wire
129	R16-2	S9-1	22 Gauge Wire
130	R15-2	S9-3	22 Gauge Wire
131	R4-2	S2-1	22 Gauge Wire
132	R3-2	S1-1	22 Gauge Wire
133	R34-2	S13-6	22 Gauge Wire
134	R35-2	S13-4	22 Gauge Wire
135	R36-2	S13-1	22 Gauge Wire
136	R11-2	S6-1	22 Gauge Wire
137	R12-2	S7-1	22 Gauge Wire
138	S10-5	S10-3	22 Gauge Wire
139	S13-5	S13-3	22 Gauge Wire
140	R31-1	E2	22 Gauge Wire (Red)
141	R31-1	C16-1	22 Gauge Wire (Black)
142	R31-3	C16-2	22 Gauge Wire (Black)
143	R31-3	R31-2	22 Gauge Wire (Red)
144	R31-2	E1	22 Gauge Wire (Black)
145	R32-3	E5	22 Gauge Wire (Yellow)
146	R32-1	E4	22 Gauge Wire (Red)
147	R32-2	E3	22 Gauge Wire (Black)

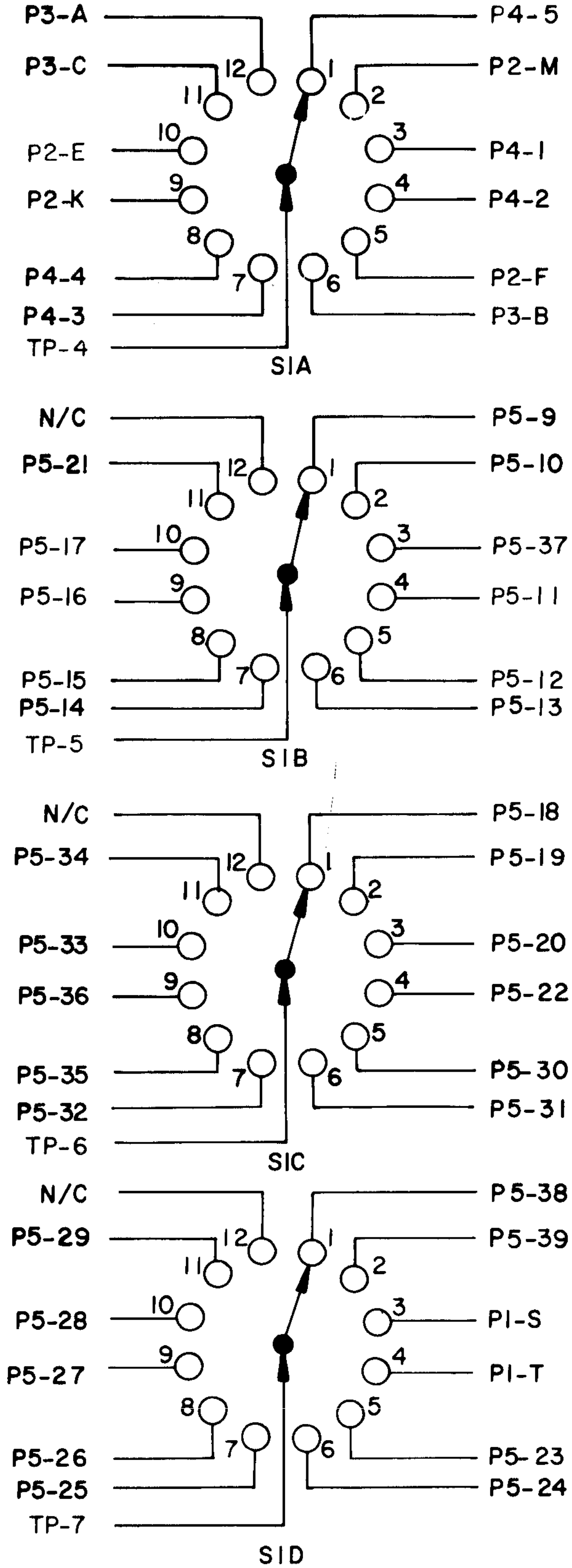
3-20. INTERFACE ASSEMBLY TEST FIXTURE

- Interface assembly test fixture provides an easy means of performing continuity and functional electrical tests on interface assembly.



CONTINUITY TESTS

- Switch S1 (OHM CHECK) is used along with terminals S1A, S1B, S1C, and S1D to perform continuity tests of internal wiring of interface assembly.



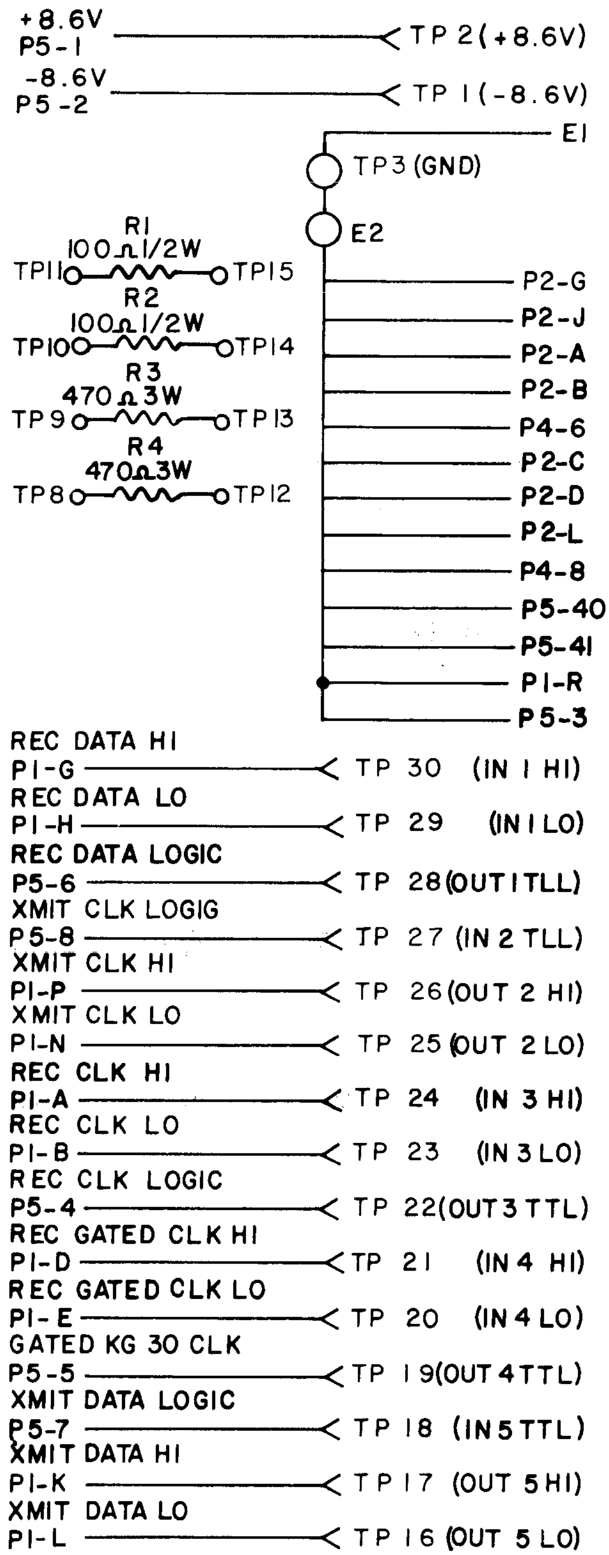
- Placing an ohmmeter between ground terminal (GND) and any of these four terminals enables a series of continuity checks to be made.

- Each of 12 terminals of wafer A of S1 are wired to pins of P2, P3, and P4.

- GND terminal is also wired to pins of P2, P4, and P5.

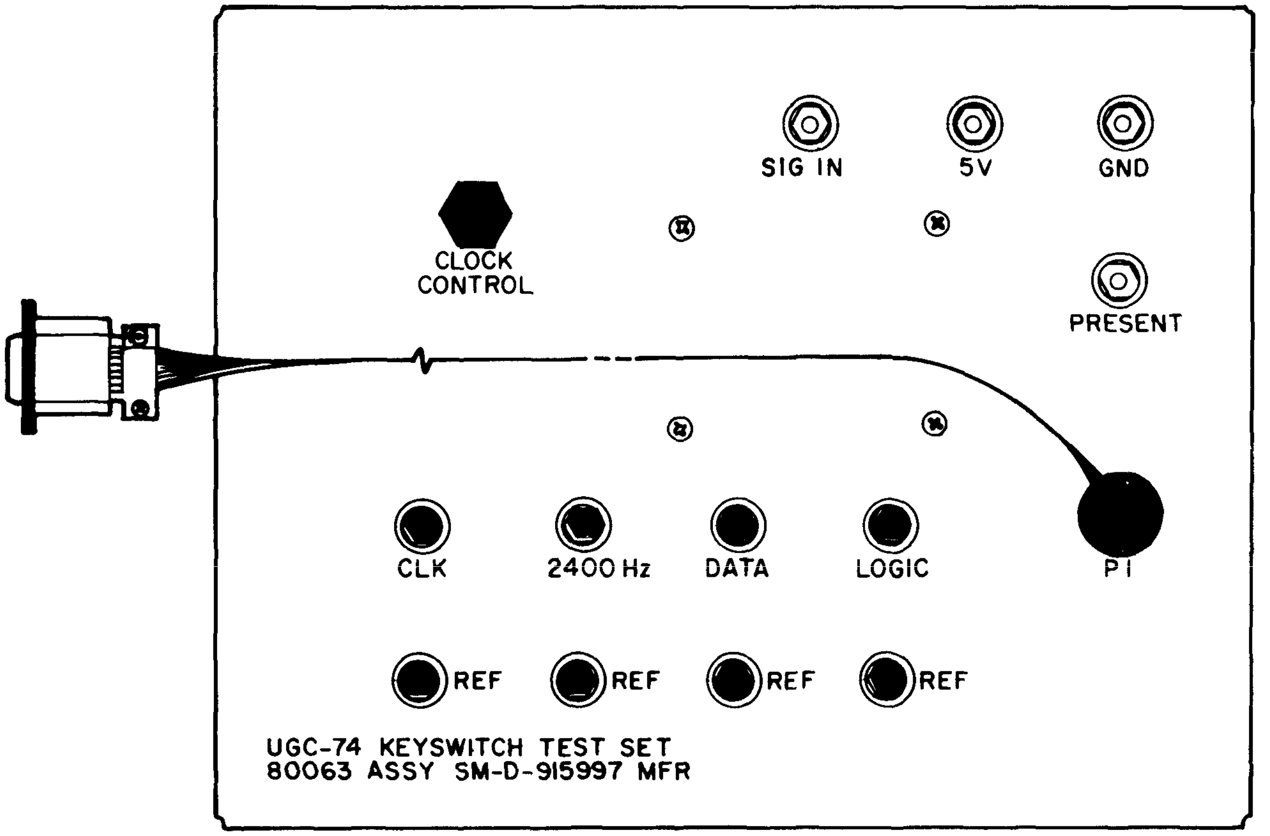
- By placing S1 in each of its 12 positions, continuity can be read through the switches, connectors, and harness of interface assembly which are wired to wafer A.

. Additional continuity tests can be performed by moving ohmmeter to terminal 5 (S1B), 6 (S1C), and 7 (S1D) and sequencing through the 12 switch positions.


+8.6V
P5-1
TP 2(+8.6V)
-8.6V
P5-2
TP 1(-8.6V)
E1
TP3 (GND)
E2
R1
100Ω 1/2W
TP11
TP15
R2
100Ω 1/2W
TP10
TP14
R3
470Ω 3W
TP9
TP13
R4
470Ω 3W
TP8
TP12
P2-G
P2-J
P2-A
P2-B
P4-6
P2-C
P2-D
P2-L
P4-8
P5-40
P5-41
P1-R
P5-3
REC DATA HI
P1-G
TP 30 (IN 1 HI)
REC DATA LO
P1-H
TP 29 (IN 1 LO)
REC DATA LOGIC
P5-6
TP 28(OUT 1 TLL)
XMIT CLK LOGIG
P5-8
TP 27 (IN 2 TLL)
XMIT CLK HI
P1-P
TP 26(OUT 2 HI)
XMIT CLK LO
P1-N
TP 25 (OUT 2 LO)
REC CLK HI
P1-A
TP 24 (IN 3 HI)
REC CLK LO
P1-B
TP 23 (IN 3 LO)
REC CLK LOGIC
P5-4
TP 22(OUT 3 TTL)
REC GATED CLK HI
P1-D
TP 21 (IN 4 HI)
REC GATED CLK LO
P1-E
TP 20 (IN 4 LO)
GATED KG 30 CLK
P5-5
TP 19(OUT 4 TTL)
XMIT DATA LOGIC
P5-7
TP 18 (IN 5 TTL)
XMIT DATA HI
P1-K
TP 17 (OUT 5 HI)
XMIT DATA LO
P1-L
TP 16 (OUT 5 LO)

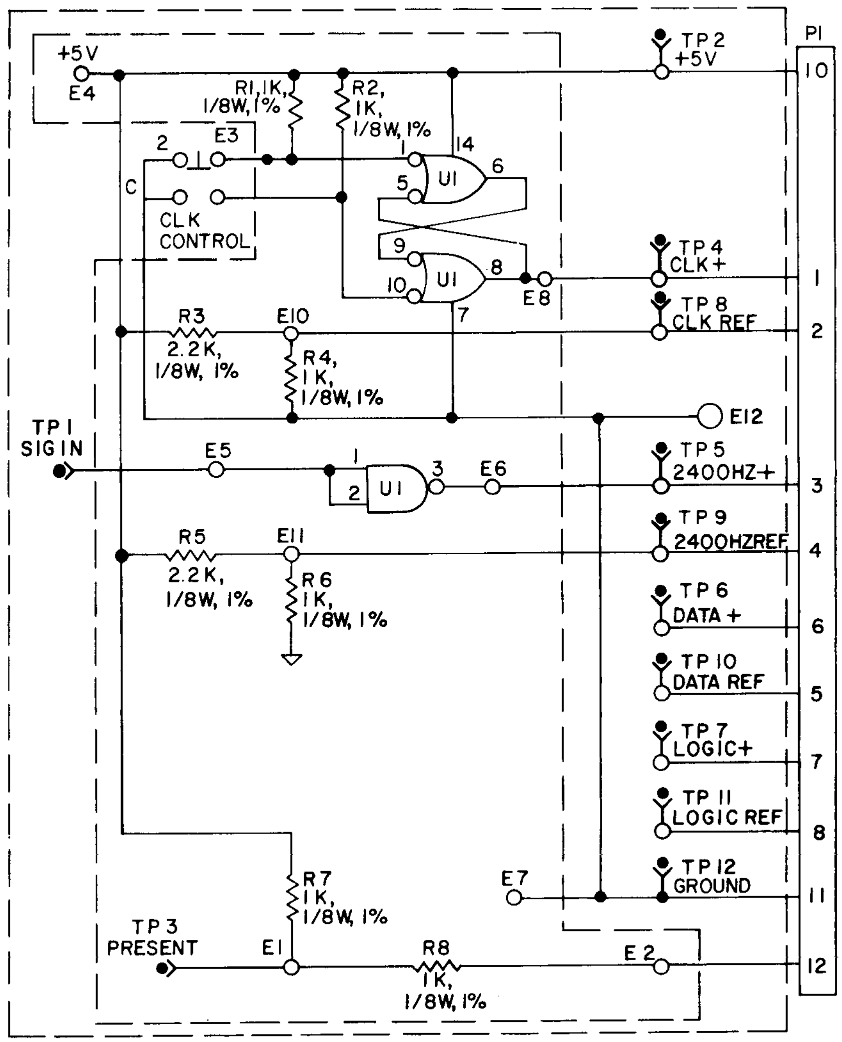
3-21. KEYSWITCH ASSEMBLY TEST FIXTURE

- Keyswitch assembly test fixture provides power and input signal interfaces for keyswitch assembly (SM-D-915636) and keyboard assembly (SM-D-915601).
- Input power of +5Vdc is supplied by an external supply and an input signal clock is supplied by an external pulse generator.



- Keyswitch assembly test fixture consists of interface terminals, connecting cable, and clock control switch.
- Input clocks and power are applied to assembly under test through TP1 (SIG IN), TP2 (+5V) and TP12 (GND), respectively.

- Circuit card assembly (AI) is mounted in test fixture and contains interface and control circuitry.
- +5Vdc, supplied to test fixture from an external supply at TP2, provides operating voltage for test fixture logic circuits as well as assembly/unit under test (UUT).
- Interface with circuit card assembly is via E4 on the assembly.
- UUT interface is through P1-10.
- Return for both power and signal sources is TP12.
- Return for circuit card assembly is connected to E7.
- UUT return is through P1-11.
- External pulse generator signal is input at TP1 and enters circuit card assembly at E5.



- U1 assures a TTL input to UUT at P1-3.
- When UUT is connected to test fixture, P-12 is tied to P-11, thus forming a voltage divider through R7 and R8.
- When +5Vdc is applied and UUT connected to fixture, +2.5Vdc may be measured at PRESENT terminal (TP3),
- Resistors R3 and R4 form a voltage divider which supplies 1.5Vdc nominal for CLK REF input to UUT through P1-2.
- TP8 is a monitor test point for this voltage.
- Resistors R5 and R6 likewise supply 2400 Hz REF input for UUT through P1-4.
- TP9 is a monitor test point for this voltage.
- TP6 (Data +) monitors KYBD DATA line from UUT at P1-6.
- TP7 (LOGIC +) monitors KYBD LD line from UUT at P1-7.
- TP10 (DATA REF) and TP1l (LOGIC REF) monitor voltage in UUT which is similar to R3/R4 and R5/R6 in fixture.
- Control of clock signal for UUT is provided by S1 and U1.

  When S1 is not depressed, U1-4 is a logic 0 and U1-10 is a logic 1.

  Since a 0 at U1-4 forces U1-6 to a 1, U1-9 is also a logic 1.

  This causes U1-8 to be held at a logic 0.

When S1 is depressed, a logic 0 is placed at U1-10 and a logic 1 is placed at U1-4.
This resets output at U1-8 to a logic 1.
Input at U1-5 becomes a 1 which causes U1-6 to become a logic 0.
This logic 0 causes U1-8 output to remain a logic 1.
When switch (S1) is released, output at U1-8 returns to a logic 0 again.
The purpose of this flip-flop action is to eliminate the effects of “contact bounce” which is inherent with almost all switches.

Table 3-8. KEYSWITCH ASSEMBLY TEST FIXTURE WIRE LIST

Wire No.	From	To	Remarks
1	P1-1	TP4	22 Gauge Wire
2	A1-E8	TP4	22 Gauge Wire
3	P1-2	TP8	22 Gauge Wire
4	A1-E10	TP8	22 Gauge Wire
5	P1 -3	TP5	22 Gauge Wire
6	A1-E6	TP5	22 Gauge Wire
7	P1 -4	TP9	22 Gauge Wire
8	A1-E11	TP9	22 Gauge Wire
9	P1-5	TP10	22 Gauge Wire
10	P1 -6	TP6	22 Gauge Wire
11	P1 -7	TP7	22 Gauge Wire
12	P1-8	TP11	22 Gauge Wire
13	P1-9		No connection
14	P1-10	TP2	22 Gauge Wire
15	A1-E4	TP2	22 Gauge Wire
16	P1-11	TP12	22 Gauge Wire
17	A1-E7	E12	22 Gauge Wire
18	P1-12	A1-E2	22 Gauge Wire
19	TP1	A1-E5	22 Gauge Wire

Table 3-8. KEYSWITCH ASSEMBLY TEST FIXTURE WIRE LIST - Continued

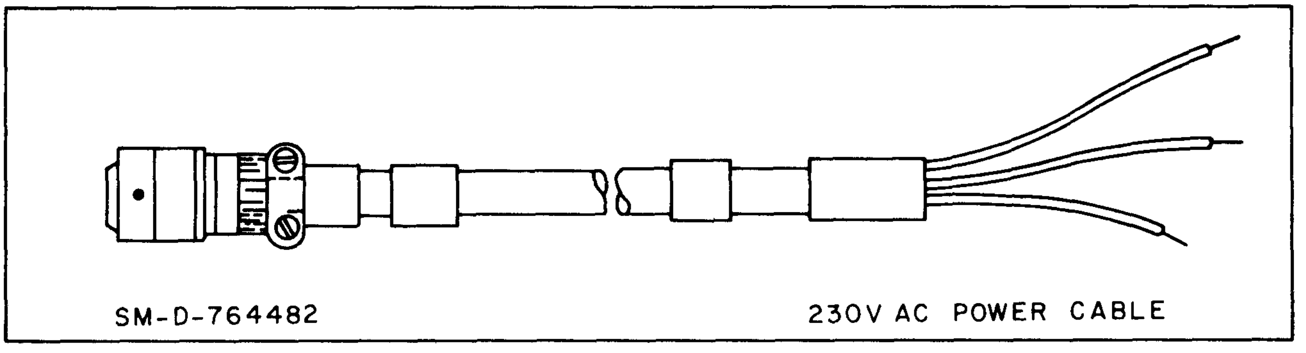
Wire No.	From	To	Remarks
20	TP3	A1-E1	22 Gauge Wire
21	S1-3	A1-E9	22 Gauge Wire
22	S1-2	E12	22 Gauge Wire
23	S1-1	A1-E3	22 Gauge Wire
24	TP12	E12	22 Gauge Wire

3-22. POWER AND DATA CABLES

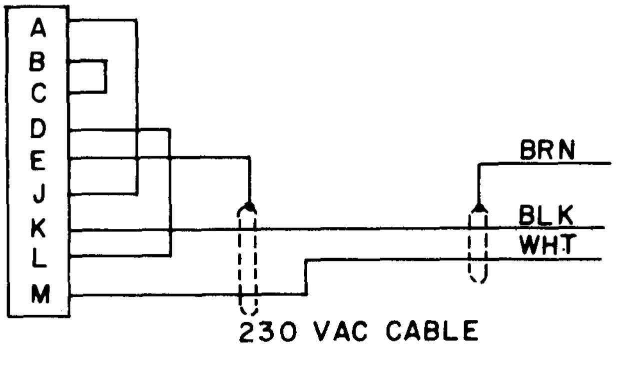
Tnere are tnree power cables and one data cable witch are used to support AN/UGC-74(V)3 testirrg:

230 Vac power cable

- The 230 Vaq power cable is configured with a prewired connector for mating with J2 on AN/UGC-74(V)3 or filter assembly test fixture.

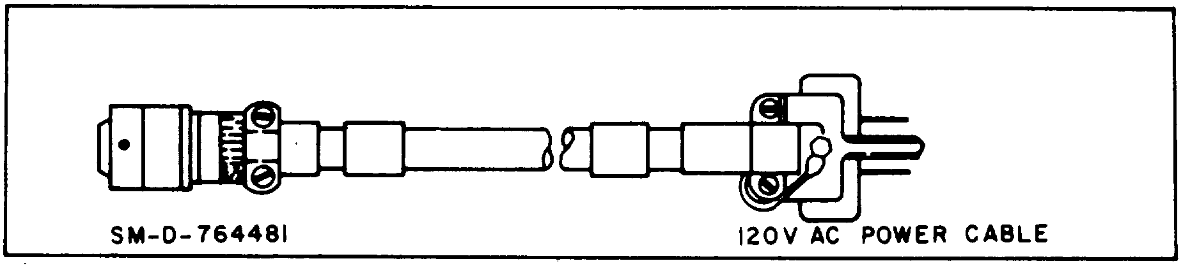


- **Connector is wired to properly interconnect 230 Vac prime power with appropriate winding of power transformer in filter module. Cable is 8 feet long and is unterminated at the other end.**

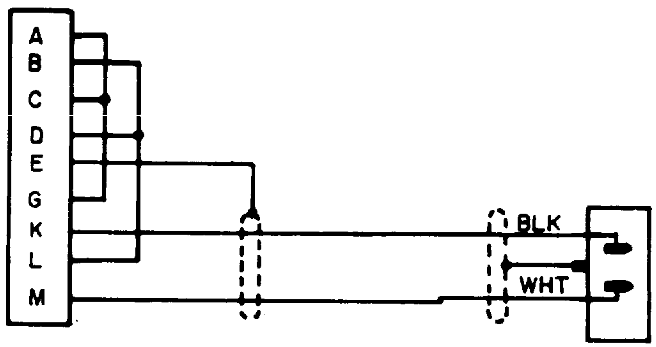


120 Vac power cable

- The 120Vac power cable is configured with a prewired connector for mating with J2 on AN/UGC-74(V)3 or filter assembly test fixture.



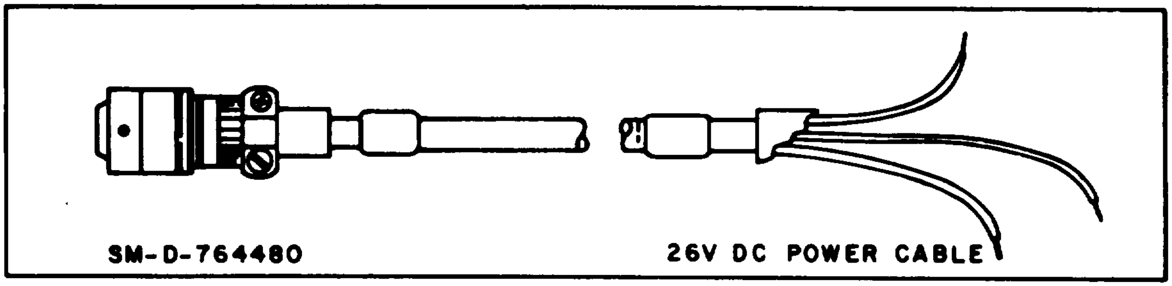
- Connector is wired to properly interconnect the 120Vac prime power with appropriate windings of filter assembly power transformer.
- Cable is 7 feet long and is terminated in a standard 3-prong 120 V plug.



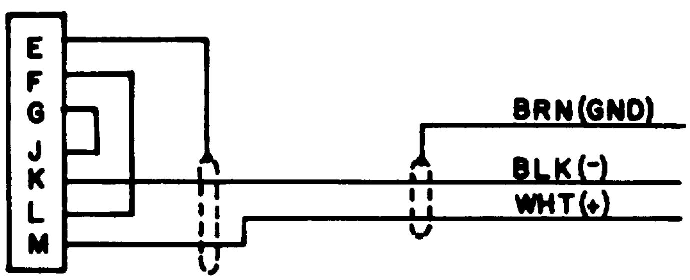
120 VAC CABLE

26Vdc power cable

- The 26Vdc power cable is configured with a prewired connector for mating with J2 on AN/UGC-74(V)3 or filter assembly test fixture.



- Connector is wired to properly interconnect the 26Vdc prime power to filter module.
- Cable is 8 feet long and is unterminated at the other end.
- When connecting to a dc source WHT wire should be connected to (+) and BLK wire to (—). BRN wire is ground.



26 VDC CABLE

• The following figure shows the key and pin identification for connector MS 3116F14-12S used on the following power cables:

SM-D-764480 (for 26Vdc power source)

SM-D-764481 (for 115Vac power source)

SM-D-764482 (for 230Vac power source)

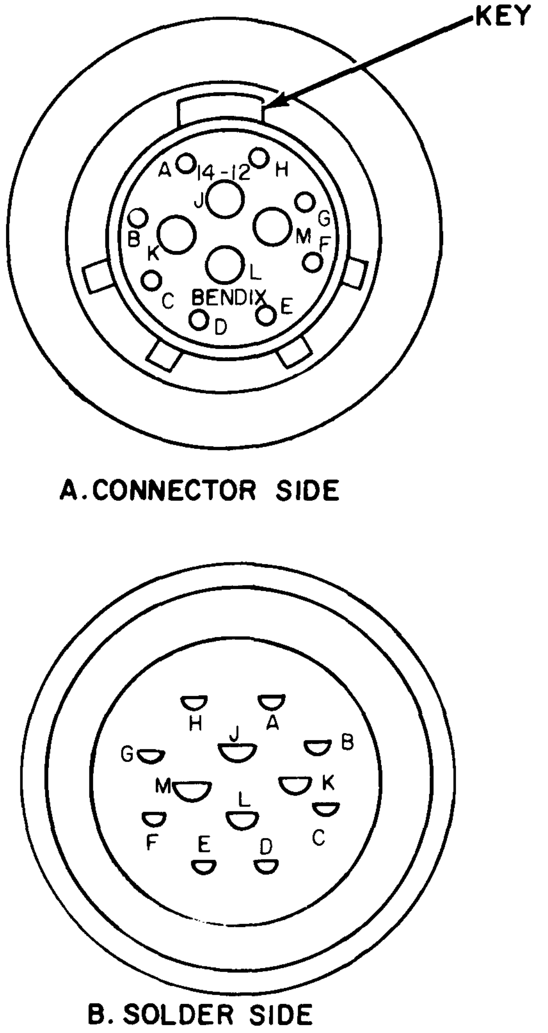
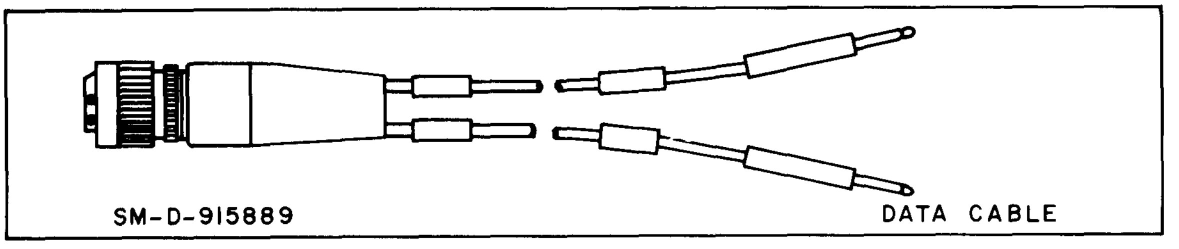


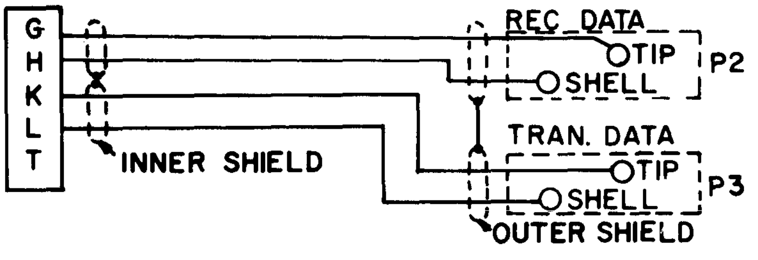
Figure 3-28. POWER CONNECTOR KEY AND PIN IDENTIFICATION.

Data cable

- Data cable provides an interface capability between equipments having phone jacks connectors and the transmit and receive lines of AN/UGC-74(V)3.



- It is used in conjunction with AN/GGM-15 during interface assembly testing.



DATA CABLE

• The following figure shows the key and pin identification for the data connector used on the SM-D-915889 data cable.

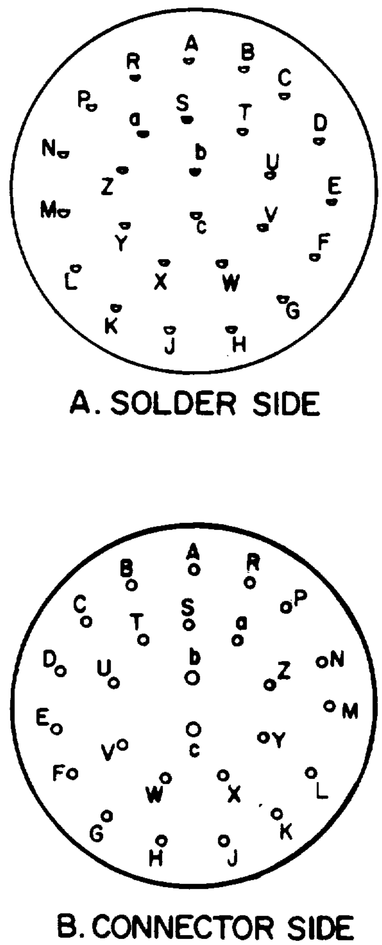


Figure 3-29. DATA CONNECTOR KEY AND PIN IDENTIFICATION.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

PAGE

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Section III. TROUBLESHOOTING

Section IV. MAINTENANCE PROCEDURES

Section V. PREPARATION FOR STORAGE AND SHIPMENT

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

4-1. COMMON TOOLS

For all authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Special tools, TM DE, and support equipment required by Organizational Maintenance personnel are listed below:

Tool Kit TE-50B
Multimeter AN/USM-223
Loopback plug
Tool, ribbon mechanism adjustment (2 required)

4-3. REPAIR PARTS

Repair parts are listed and illustrated in the repair parts and special tools list in TM 11-5815-602-24P for organizational maintenance.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-4. GENERAL

The purpose of scheduled preventive maintenance checks and services (PMCS) is to prevent trouble, reduce downtime and assure that the Communications Terminal AN/UGC-74A(V)3 remains in serviceable condition.

4-5. RECORDS AND REPORTS

Records and reports of preventive maintenance checks and services must be made in accordance with requirements set forth in TM 38-750, The Army Maintenance Management System (TAMMS). Use your PMCS Table Hem No. column to get the number for the TM ITEM NO. column of DA Form 2404, Equipment Inspection and Maintenance Worksheet. (Example is shown on page 4-7.)

4-6. PMCS TABLE

a. Organizational PMCS table 4-1 can be used to assist in:

- SYSTEMATIC CARE - Procedures given in the PMCS table explain the routine, systematic care and cleaning essential to proper upkeep and operation of the terminal,
- TROUBLESHOOTING - To help determine and correct faults.
- Reestablishing service after a shutdown.

b. Routine checks are not listed as PMCS checks. They are checks such as the following:

- Cleaning
- Dusting
- Checking for frayed cables
- Storing items not in use
- Checking for loose nuts, bolts, and screws
- Checking for loose or broken knobs

c. Routine checks are things that you should do anytime you see they must be done. If you find a routine check like one of those listed in your PMCS table, it was listed because other personnel reported problems with this item.

(1) SEQUENCE. Procedures in PMCS table are to be done in order of item number.

(2) PMCS table column headings explained:

- ITEM NUMBER(S) give the order in which the procedures are to be done. Also, these item numbers are used to identify individual procedures in the PMCS table.
- ITEM TO BE INSPECTED tells what part or function the procedure will check or service.
- PROCEDURE gives details of what is to be done, the required order for doing any steps, and results which are acceptable.

NOTES

When equipment is installed or reinstalled, all items in organizational PMCS table shall be performed. WARNINGS and CAUTIONS about electrical shock and bodily harm must be observed when performing PMCS. Refer to WARNING page in front of this manual.

If the terminal MUST be in operation all the time, check and service those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment CAN be shut down.

Table 4-1. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLE

SEMIANNUAL SCHEDULE

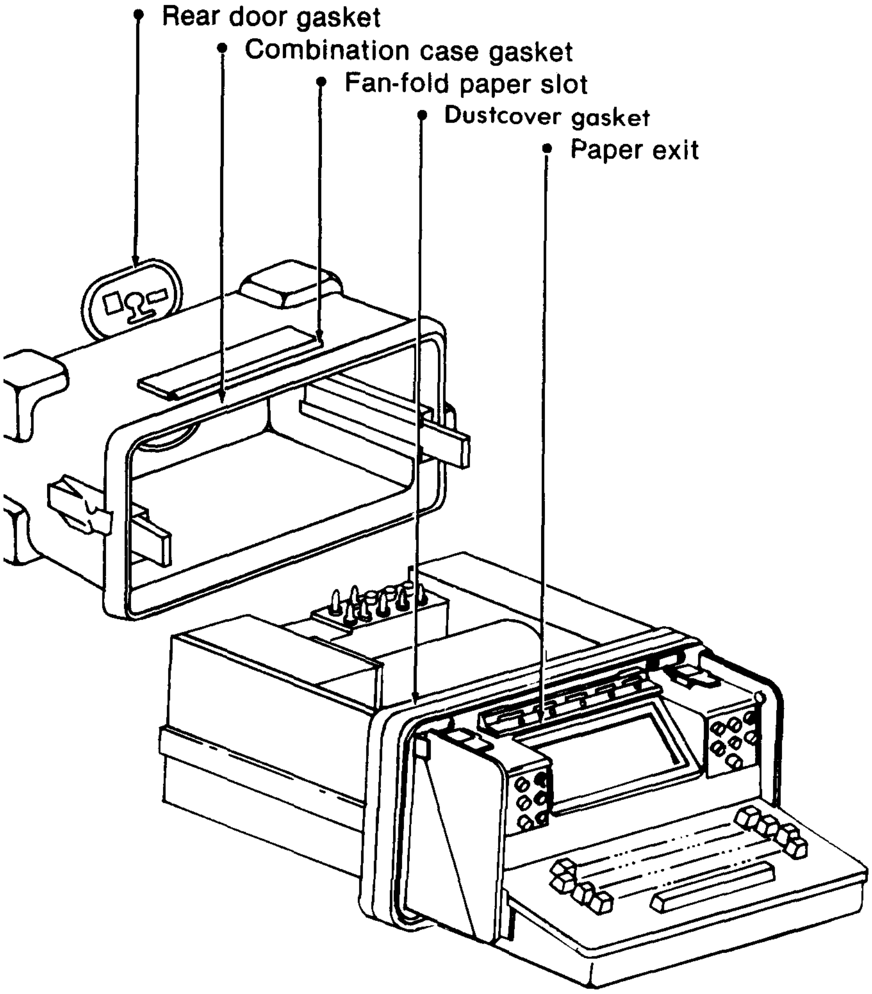
ITEM NO.	ITEM TO BE INSPECTED	PROCEDURES
1	Printing	Using message from self-test, inspect printing for clearness, even lines and that all characters are printed. Adjust print hammers as required (refer to para 4-14A). Adjustment to be performed by 31J only.
2	Gaskets	Check following gaskets for serviceability:  Inspect gaskets for dryness, rips, tears, gouges, or missing portions. Notify direct support maintenance personnel of any unserviceable gaskets.
3	Ground connector	Inspect ground connector for serviceability and cleanliness.

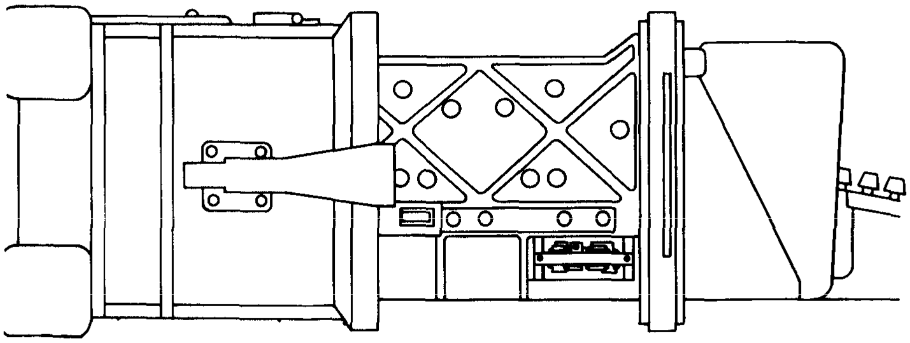
Table 4-1. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLE

SEMIANNUAL SCHEDULE - Continued

ITEM NO.	ITEM TO BE INSPECTED	PROCEDURES
4	Terminal slides	Release combination case latches and carefully extend terminal out from case until slides stop.

CAUTION

Use extreme care when extending terminal to ensure connecting cables at rear are carefully pulled through rear opening so as to prevent damaging cables or connectors.



Terminal should slide out smoothly to stop position. Inspect slides for cracks or breaks, burrs or other obstructions. File off any burrs or obstructions.

CAUTION

Be sure that all filings are kept out of terminal's interior. Any small steel particles which contact terminal's electrical components may cause serious internal shorts and grounding of circuits.

Check to ensure spring-loaded slide stop locks are working properly. Report any inoperable or unserviceable stop locks to direct support maintenance.

Table 4-1. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLE
SEMIANNUAL SCHEDULE - Continued

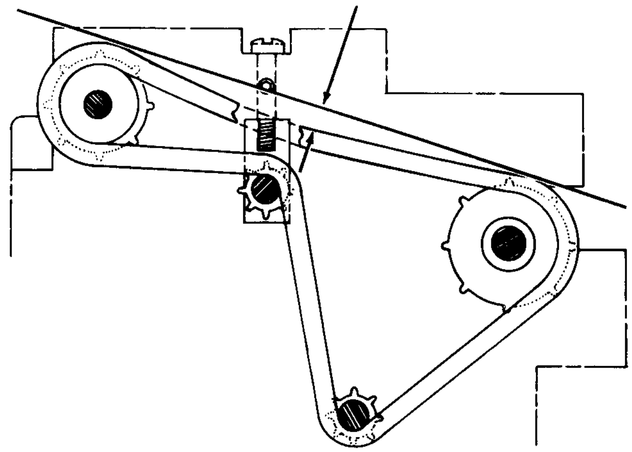
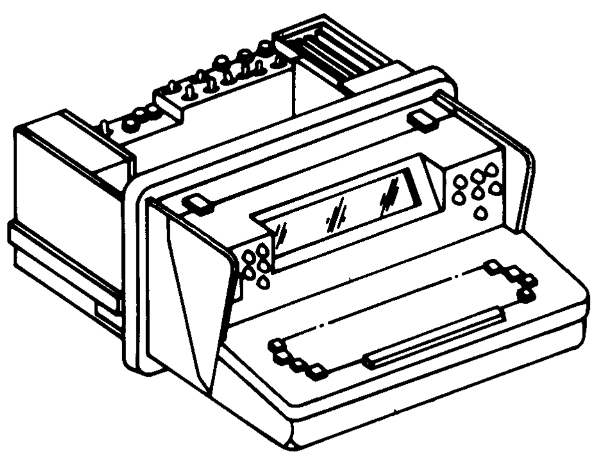
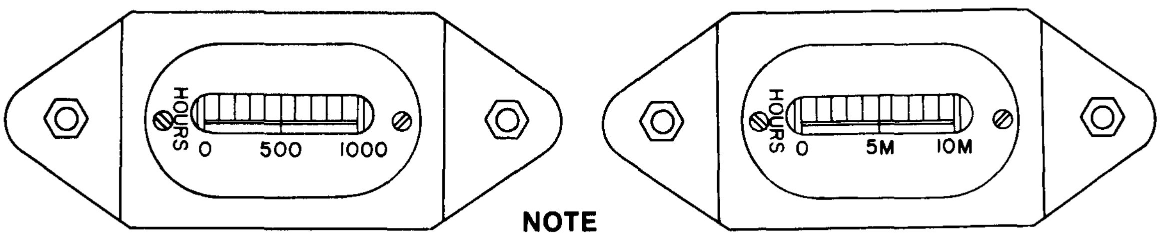
ITEM NO.	ITEM TO BE INSPECTED	PROCEDURES
5	Motor (line-feed) drive chain and sprocket	Inspect motor (line-feed) drive chain and sprockets for signs of wear or misalinement. Chain should have between 1/16 to 1/8 inch of slack.  Adjust chain tension as required (refer to para 4-14B). If motor drive (line-feed) sprockets are misalined, make necessory adjustments. Adjustment to be performed by 31J only.
6.	Internal switches and controls	Inspect for loose, bent or cracked controls and switches. Check for smooth operation.  Tighten any loose knobs. Notify direct support maintenance of bent or broken controls and switches.

Table 4-1. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLE SEMIANNUAL SCHEDULE. Continued

ITEM NO.	ITEM TO BE INSPECTED	PROCEDURES
7 *	Ribbon-feed slip clutch	Test ribbon-feed slip clutch in accordance with paragraph 4-14C.
8 *	Ribbon-reversing sensing lever	Test ribbon-reversing sensing lever in accordance with paragraph 4-14D.
9*	Ribbon-sensing lever spring	Test ribbon-sensing lever spring tension in accordance with paragraph 4-14E.
10 *	Ribbon-reversing extension	Test ribbon-reversing extension in accordance with paragraph 4-14F.
11	Low-paper alarm switch	Test low paper alarm switch in accordance with paragraph 4-14G.
12	Paper exit bracket	Test paper exit bracket in accordance with paragraph 4-14H.
13 *	Paper out switch	Test paper out switch in accordance with paragraph 4-14I.
14	Power linkage cable	Test power linkage cable in accordance with paragraph 4-14J.
15.	Elasped time indicators	Verify number of hours on clasped time meters have not exceeded maximum meter reading. If readings have been exceeded, notify direct support maintenance.

* These test to be performed by 31J only,



NOTE

Elapsed time meters are installed in terminals serial numbered 1 through 2000. The time meters will be deleted by the manufacturer starting with serial number 2001. Time meters will not be replaced in terminals numbered 1 through 2000.

DA FORM 2404, EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET.

EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET

For use of this form see TM 38-750 the proponent agency is the Office of the Deputy Chief of Staff for Logistics

1. ORGANIZATION					2. NOMENCLATURE AND MODEL TERMINAL, COMMUNICATIONS AN/UGC-74A(V)3	
3. REGISTRATION/SERIAL/FSN 5815-01-062-8194	4a. MILES	b. HOURS	c. ROUNDS FIRED	d. HOT STARTS	5. DATE	6. TYPE INSPECTION PMCS

7. APPLICABLE REFERENCE			
TM NUMBER	TM DATE	TM NUMBER	TM DATE
TM 11-5815-602-24			

INSTRUCTIONS - Perform each check listed in the TM applicable to the inspection performed. Following the sequence listed in pertinent TM, complete form as follows:

COLUMN a - Enter TM item number.

COLUMN b - Enter the applicable condition status symbol.

COLUMN c - Enter deficiencies and shortcomings.

COLUMN d - Show corrective action for deficiency or shortcoming listed in Column c.

COLUMN e - Individual ascertaining completed corrective action initial in this column.

ALL INSPECTIONS AND EQUIPMENT CONDITIONS RECORDED ON THIS FORM HAVE BEEN DETERMINED IN ACCORDANCE WITH DIAGNOSTIC PROCEDURES AND STANDARDS IN THE TM CITED HEREON.

8a. SIGNATURE (Person(s) performing inspection)	8b. TIME	9a. SIGNATURE (Maintenance Supervisor)	9b. TIME	10. MANHOURS REQUIRED

TM ITEM NO. a	STATUS b	DEFICIENCIES AND SHORTCOMINGS c	CORRECTIVE ACTION d	INITIAL WHEN CORRECTED e

NOTE

LOCAL COMMAND SOP SHOULD PROVIDE INSTRUCTIONS ON HOW TO COMPLETE DA FORM 2404 IN ACCORDANCE WITH COMMAND POLICY. IN ADDITION TM 38.750 (TAMMS) PROVIDES ALL INFORMATION NEEDED FOR COMPLETION OF THIS FORM.

Section III. TROUBLESHOOTING

4-7. GENERAL

- Troubleshooting at organizational maintenance level requires you to locate any trouble as quickly as possible.
- Once trouble is located, repair it if you are authorized to do so, or determine if a higher category of maintenance is required. Repairs by organizational maintenance personnel are limited by tools, test equipment and replacement parts allocated to that level by the Maintenance Allocation Chart (MAC) in appendix B.
- Removal and replacement of any defective units is done by a higher category of maintenance (direct support).

NOTE

Before using troubleshooting charts, check your work order and talk to the operator, if possible, for a description of trouble symptom(s).

4-8. USE OF TROUBLESHOOTING CHART

- Troubleshooting charts for the terminal are provided in this section. Only those corrective actions which are within the scope of organizational maintenance are listed In these charts. If these actions do not restore the terminal to normal operation, refer to higher category of maintenance for corrective action.
- No Power Input: If there is no indication of power input (motor does not run, lamps do not light), and there is a loss of all terminal functions, refer to Troubleshooting Chart No. 1.
- Trouble Indication with Power Input: Refer to Troubleshooting Chart No. 2 and start with step No. 1 "Self-Test."

a. When a trouble appears, refer to the proper step in the chart for correction of the trouble. If higher level maintenance is not required, perform the listed adjustment(s), or replace the defective lamp or fuse.

b. If a trouble does not appear during Self-Test, perform the Loopback Test, Troubleshooting Chart No. 2, step No. 7.

c. If there is a trouble in the battery backup operation, refer to Troubleshooting Chart No. 2, step No. 8.

d. If a trouble does not appear when operating in other than LO DATA or $\overline{\text{LO DATA}}$, refer to Troubleshooting Chart No. 2, step No. 9.

ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING CHART NO. 1

STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1	Check J1 and J2 cable connectors	Connectors are securely fastened	x		Continue trouble-shooting.
				x	Fasten connectors securely.
2	Lower dust cover and check power linkage cable	Linkage secure and working properly	x		Continue trouble-shooting.
				x	Adjust linkage as directed in paragraph 4-14J
3	Disconnect power cable J2 from terminal and place Power ON/ OFF switch to OFF. Extend terminal out on its slides, locate fuses F1 and F2, remove fuses and check continuity (less than 1 ohm) of each fuse.	Continuity	x		Continue trouble-shooting.
				x	Replace defective fuses.
4	Check cable for operat-ing voltage (115 VAC or 230 VAC) between pins M and K. Refer to Fig. 3-28.	Operating voltage present.	x		Higher maintenance required.
				x	Replace power cable J2 and set Power ON/OFF switch to ON.
5	Check external power input circuit (ac or de), especially fuses, circuit breakers, switches and plug connections.				Repair trouble if found; if not, notify higher maintenance (direct support).

ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING CHART NO. 2

STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1	Start Self-Test (refer to table 2-5, item 6).	Self-Test starts.	x		Continue trouble-shooting.
				x	Check switch settings.
		CPU test correct.	x		Continue trouble-shooting.
				x	Higher level maintenance required.
		Printer control test correct.*	x		Continue trouble-shooting.
				*	Higher level main-tenance required.
		Memory test correct.	x		Continue trouble-shooting
				x	Higher level maintenance required.
		Communications test correct.	x		Continue trouble-shooting.
				x	Higher level main-tenance required.
		Keyboard test correct.	x		Continue trouble-shooting.
				x	Higher level maintenance required.
2	Check ribbon-feed.	Ribbon feed operates properly. *	x		Continue trouble-shooting.
				*	Check ribbon mechanism adjust-ment as directed in para 4-14C, D, E, F If fault not corrected, go to step 5.
3	Check ribbon lift/ drop action.	Ribbon lift/drop operates correctly. *	x		Continue trouble-shooting
				*	Clean ribbon lift arms and pivot. If fault not corrected, higher level maintenance re-quired.

* If no go, then refer to 31J Teletypewriter Repairman.

ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING CHART NO. 2- Continued

STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
4	Using initialization message check printing for errors.	Single print position faulty. *	*		Adjust faulty hammer as directed in paragraph 4-14A. If fault not corrected, higher level maintenance required.
				x	Continue trouble - shooting.
		4 sequential positions faulty.	x		Higher level maintenance required.
				x	Continue trouble-shooting.
		Every 4th position faulty.	x		Higher level maintenance required.
				x	Continue trouble-shooting.
		All positions faulty.	x		Higher level maintenance required.
				x	Continue trouble-shooting.
5	Check line-feed tension and sprocket adjustment.	Adjustment required. *	*		Perform adjustment as directed in paragraph 4-14B.
				x	Continue trouble - shooting.
6	Check paper exit bracket adjustment.	Adjustment required.	x		Perform adjustment as directed in paragraph 4-14H.
				x	Continue trouble-shooting.
7	Start Loopback Test (refer to table 2-5 item 7).	All operating modes correct.	x		Continue trouble-shooting.
				x	Higher level maintenance required.
		Audio alarm resets.	x		Continue trouble-shooting.
				x	Higher level maintenance required.

* These adjustments to be performed by 31J only.

ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING CHART NO. 2. Continued

STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
7	Start Loopback Test - Continued	ABORT test correct.	x		Continue trouble-shooting.
				x	Higher level maintenance required.
		Manual line-feed operates correctly.	x		Continue trouble-shooting.
				x	Check for paper-feed obstruction. If fault not corrected, higher level maintenance required.
		Continuity between pins R and S of J1 (TRANSFER switch ON). Open circuit between pins R and S (TRANSFER switch OFF). Refer to figure 3-29,	x		Continue trouble-shooting.
				x	Higher level maintenance required.
		Paper-low switch operates correctly.	x		Continue trouble-shooting.
				x	Check paper-low adjustment in accordance with paragraph 4-14G.
		Drum motor stops when paper tension lever is pressed. *	x		Continue trouble-shooting.
				*	Check paper-out adjustment in accordance with paragraph 4-14 I
		Lamp test correct.	x		Continue trouble-shooting.
				x	Replace defective lamps.
		Audio alarm operates correctly.	x		Continue trouble-shooting.
				x	Higher level maintenance required.

* This adjustment to be performed by 31J only.

ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING CHART NO. 2- Continued

STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
8	(Optional test if battery backup supply available) Using a multimeter, check battery backup supply voltage.	Check at TP1 on power supply. Voltage acceptable + 12 Vdc	x		Return terminal to service.
				x	Remove and check fuse F3. If fuse good, replace battery. If battery good, higher level maintenance required.
9	If operating in other than LO DATA or $\overline{\text{LO DATA}}$, perform a Loopback Test looping signal at a local or distant patching facility Improper operation indicates receive or transmit fault.		x		Trouble may be external to terminal,
				x	Higher level maintenance required.

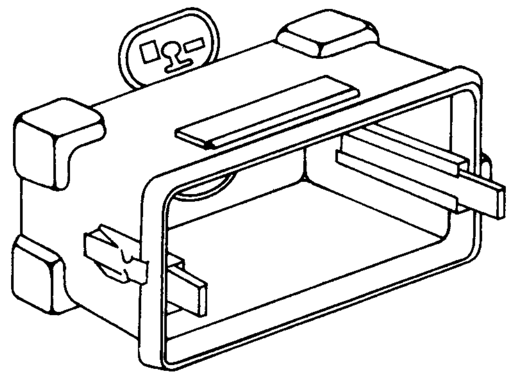
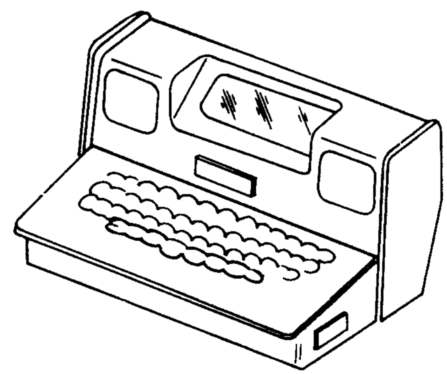
Section IV. MAINTENANCE PROCEDURES

4-9. GENERAL

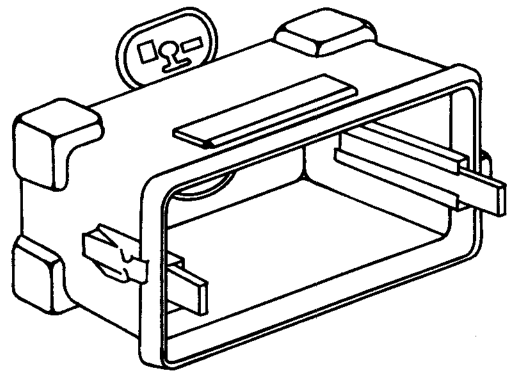
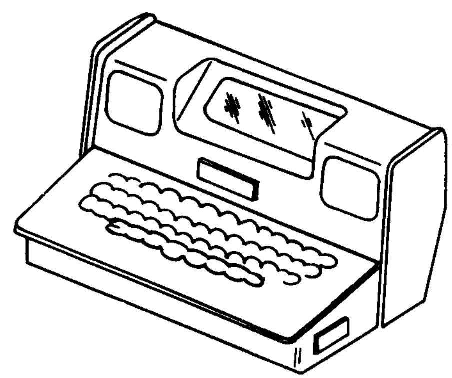
This section includes the following maintenance procedures authorized to be performed by organizational maintenance personnel:

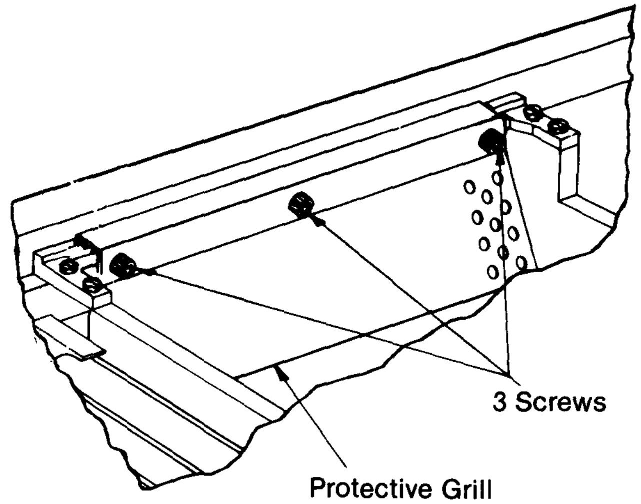
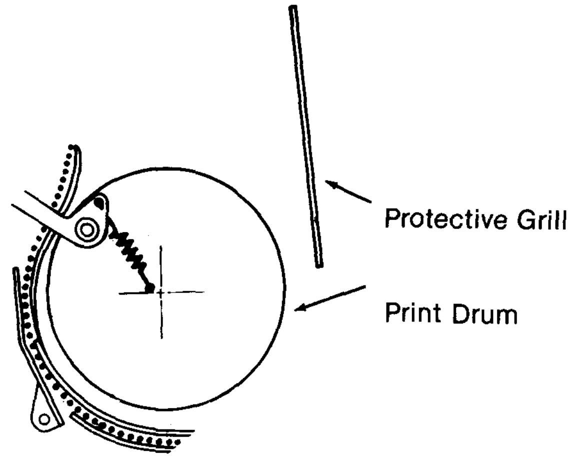
- Cleaning (para 4-10)
- Painting (para 4-11)
- Removal and replacement of fuses in the interface assembly (para 4-12)
- Removal and replacement of the PARITY RESET lamp (para 4-12)
- Lubrication (para 4-13)
- Adjustments (para 4-14)
- Final inspection (para 4-15)

4-10. ORGANIZATIONAL MAINTENANCE CLEANING INSTRUCTIONS

ITEM/LOCATION	PROCEDURES	REMARKS
1. Terminal Exterior	• With outer combination case removed, inspect exterior of combination case, keyboard, and dustcover. • Exterior surfaces should be free of dirt, dust, moisture, rust, grease, fungus and corrosion. • Remove dust, moisture and loose dirt with a clean, soft, lint-free cloth. **WARNING** Adequate ventilation should be provided while using TRICHLOROTRIFLUORO-ETHANE. Prolonged breathing of vapor should be avoided. Solvent should not be used near heat or open flames; products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which solvent cannot penetrate. If solvent is taken internally, consult a physician immediately. • Remove grease, fungus, and ground-in dirt with a cloth dampened (not wet) with TRICHLOROTRIFLUOROETHANE. • Remove dirt and dust from plugs and jacks with a stiff bristle brush.	The instructions are provided to help meet serviceability requirements during organizational maintenance and should be done whenever needed.  

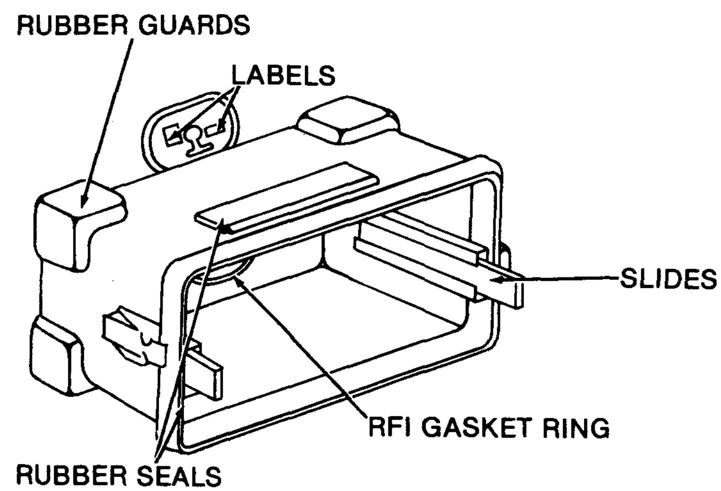
4-10. ORGANIZATIONAL MAINTENANCE CLEANING INSTRUCTIONS - Continued

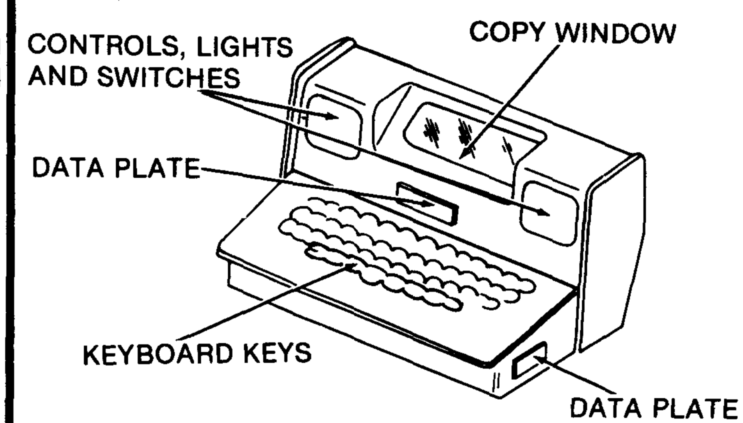
ITEM/LOCATION	PROCEDURES	REMARKS
1. Terminal Exterior Continued.	**CAUTION** Be careful when cleaning plugs and jacks; dirt forced into jacks will cause malfunctions which may be dangerous to personnel. • Clean dustcover, keys and control switches with a soft, clean cloth. • If dirt is difficult to remove, clean with a mild soap and water.	
2. Terminal Interior	• With terminal fully extended out from combination case, inspect interior for cleanliness. • Use a clean, dry, lint-free cloth or a dry, long handle sash or camel hair brush for cleaning interior portion of terminal. • Several cleaning methods may be used to remove paper, dust or dirt from interior of terminal. • Cleaning with a dry brush is preferred.	

ITEM/LOCATION	PROCEDURES	REMARKS
2. Terminal Interior Continued.	**WARNING** Compressed air shall not be used for cleaning purposes except where reduced to less than 29 pounds per square inch (psi) and then only with effective chip guarding and personnel protective equipment. Do not use compressed air to dry parts when TRICHLOROTRIFLUORO-ETHANE has been used. Compressed air is dangerous and can cause serious bodily harm if protective means or methods are not observed to prevent chip or particle (of whatever size) from being blown into the eyes or unbroken skin of the operator or other personnel. • A vacuum cleaning method may be used, or compressed air may be used provided air pressure is kept low enough to prevent damage to equipment.	
3. Print Drum	• Place the POWER switch in the OFF position. • Fully extend the terminal from the combination case. • Loosen and remove the three screws securing the protective grill covering the rear of the print drum. • Using a stiff bristle brush, clean the print drum manually rotating it as necessary. • Replace the protective grill and secure it in place with its screws. • Return the terminal inside the combination case and secure it with its latches.	

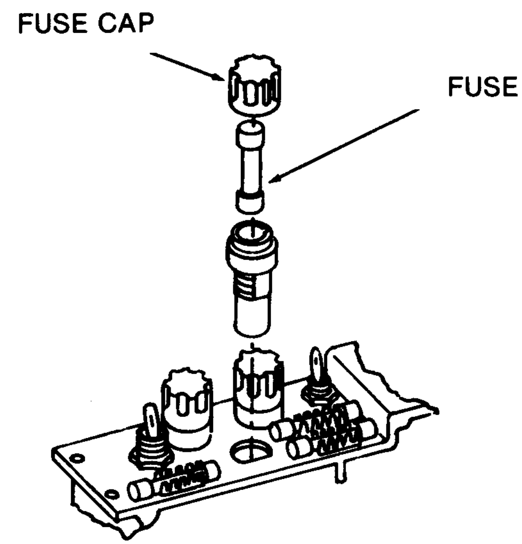
4-11. ORGANIZATIONAL MAINTENANCE PAINTING INSTRUCTIONS

ITEM/LOCATION	PROCEDURES	REMARKS
Terminal Exterior Surfaces	• Clean all damaged painted surfaces of dust, dirt and moisture with a clean, soft, lint-free cloth. • Remove rust and corrosion from metal surfaces by lightly sanding with 0000 sandpaper. • Brush two thin coats of paint on bare metal to protect it from further corrosion. • Refer to applicable cleaning and refinishing practices specified in TB 43-0118. **NOTE** The only type paints or finishes authorized for use on terminal components and assemblies are those listed in SB 11-573.	The following areas require caution and care to prevent accidental painting and should be inspected after any painting.

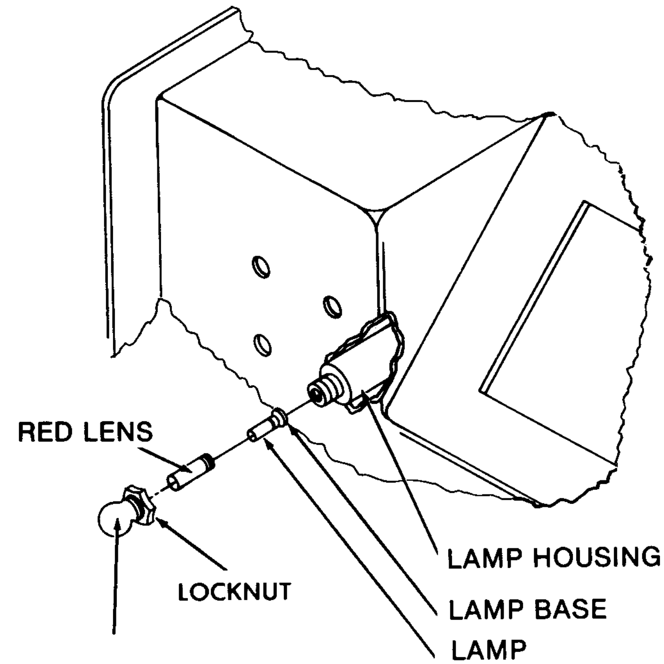




4-12. ORGANIZATIONAL MAINTENANCE REMOVAL AND REPLACEMENT

ITEM/LOCATION	PROCEDURES	REMARKS
1. Fuse Replacement on the Interface Assembly	• Place POWER ON/OFF switch to OFF. • Release the combination case latches and fully extend the terminal out on its slides. • Press downward on the fuse cap and rotate the cap counterclockwise until it is released. • Pull the cap and fuse from the fuseholder. • Remove the old fuse, check for continuity (less than 1 ohm) using Multimeter AN/USM-223 and insert the new fuse, if required, into the fuse cap. **CAUTION** Be sure to install only fuses of the correct current rating (table 2-2) in the fuseholders. • Replace the fuse cap by pressing downward on the cap and rotating the cap one-half turn clockwise. • Return the terminal into the combination case and secure it with its latches. Apply power.	

4-12. ORGANIZATIONAL MAINTENANCE REMOVAL AND REPLACEMENT - Continued

ITEM/LOCATION	PROCEDURES	REMARKS
2. Dustcover PARITY RESET Lamp Replacement	• Place POWER ON/OFF switch OFF. • Release dustcover latches and lower dustcover sufficiently to allow access to back of parity reset switch. • Using a 5/8 inch wrench, loosen nut inside rubber cap. **CAUTION** Firmly hold switch from rear to prevent switch from turning and wires from being broken off their connectors. • Remove cover (rubber cap) and nut from dustcover. • With your fingers, grasp red lens protruding from switch and turn it counterclockwise until it is removed from housing. • Once removed, grasp small rimmed flange at tip of lens assembly and pull bulb out from red lens assembly. • Insert replacement lamp into red lens, place red lens into switch and tighten it with a clockwise motion, until lens is finger tight. • Reinstall protective rubber cap and nut and tighten them down snugly with a 5/8 inch wrench. • Observe caution above to prevent damaging equipment. • Inspect switch assembly for any broken wires and resecure dustcover with its latches. • Place Power ON/OFF switch ON. • Test parity reset lamp by pressing and holding PARITY RESET switch. • Lamp should light.	

4-13. ORGANIZATIONAL MAINTENANCE LUBRICATION INSTRUCTIONS

Refer to removal and replacement procedures in chapter 5 for access to lubrication points where required.

Table 4-2. LUBRICATION SCHEDULE (SEMI-ANNUAL)
To be performed by 31J only.

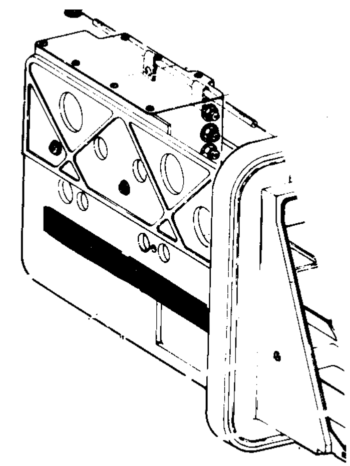
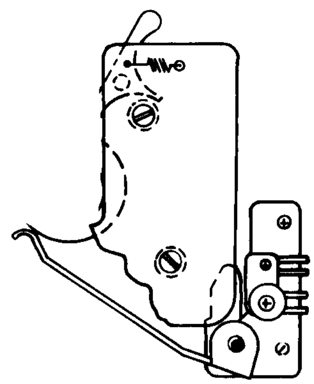
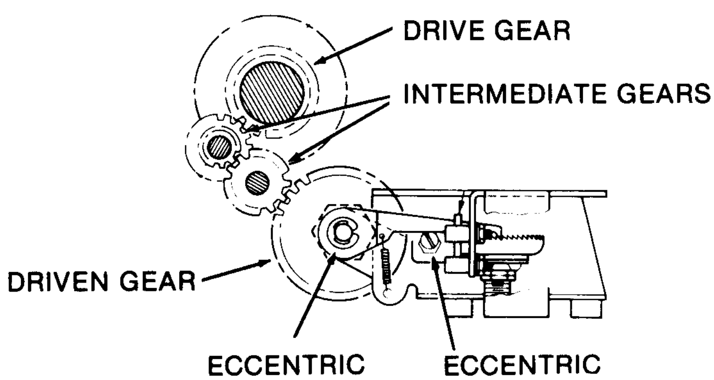
ITEM NO.	ITEM TO BE LUBRICATED	LUBRICATION PROCEDURES
1.	Slides	● With a clean, lint-free cloth, wipe a thin film of grease (a light, visible coating) over terminal slides and into top and bottom grooves of slides. 
2..	Paper low switch act ivator arm	● Lubricate paper low arm pivot with a drop of oil.  NOTE A drop of oil is the amount of oil retained on a No. 22 gauge wire which has been dipped approximately 1/2 inch into a container of oil (MIL-L-46000).
3.	Ribbon mechanism (Refer to para 5-10M for removal of printer subassembly)	● Place an even coat of grease (MIL-G-23827) on ribbon mechanism. 

Table 4.2. LUBRICATION SCHEDULE - Continued

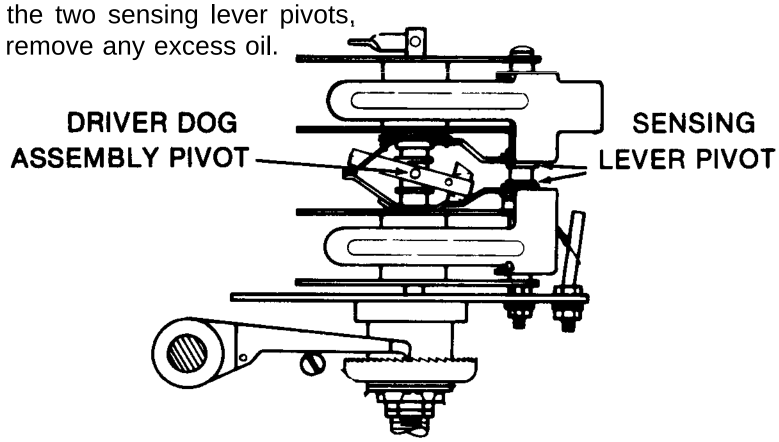
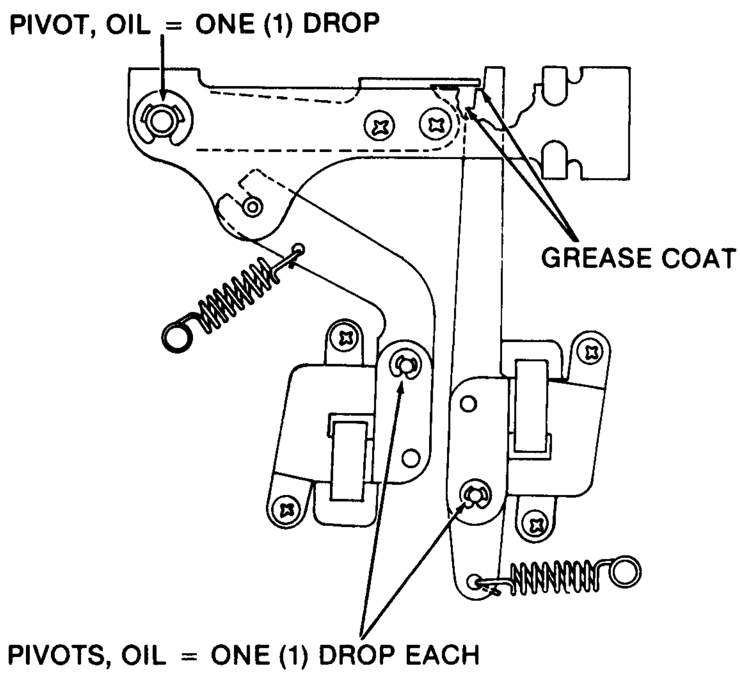
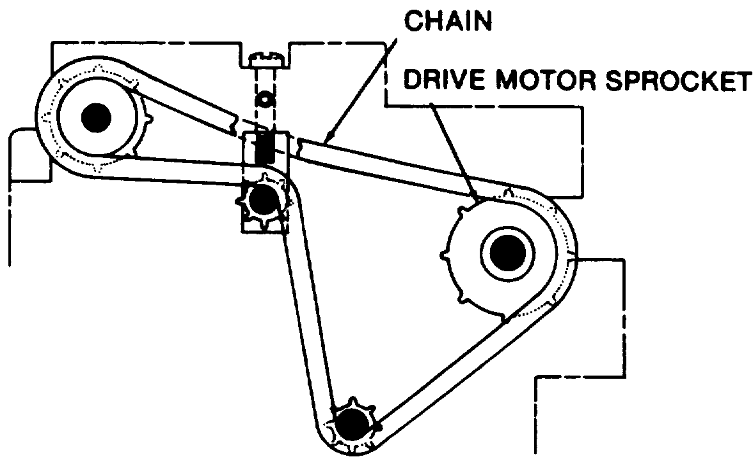
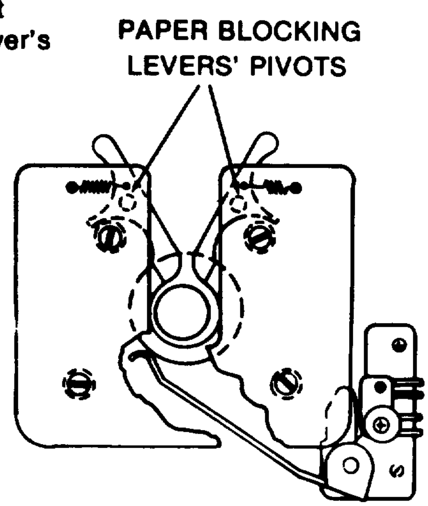
ITEM NO.	ITEM TO BE LUBRICATED	LUBRICATION PROCEDURES
3.	Ribbon mechanism-Continued	● Place a drop of oil on spool driver dog assembly pivot. ● Using a fine bristle brush, apply a light coat of oil to the two sensing lever pivots, remove any excess oil. 
4.	Ribbon lift and drop mechanisms (Refer to para 5-10M for removal of printer subassembly)	● Lubricate both left and right ribbon lift and drop mechanisms. 

Table 4.2. LUBRICATION SCHEDULE . Continued

ITEM NO.	ITEMS TO BE LUBRICATED	LUBRICATION PROCEDURES
5.	Motor (line-freed) drive chain	• Lightly oil chain using a fine bristle brush; remove excess oil.  • Apply a film of grease to drive motor sprocket using a bristle brush.
6.	Roll paper blocking levers	**• Place a drop of oil on left and right side of each lever's pivot point.** 

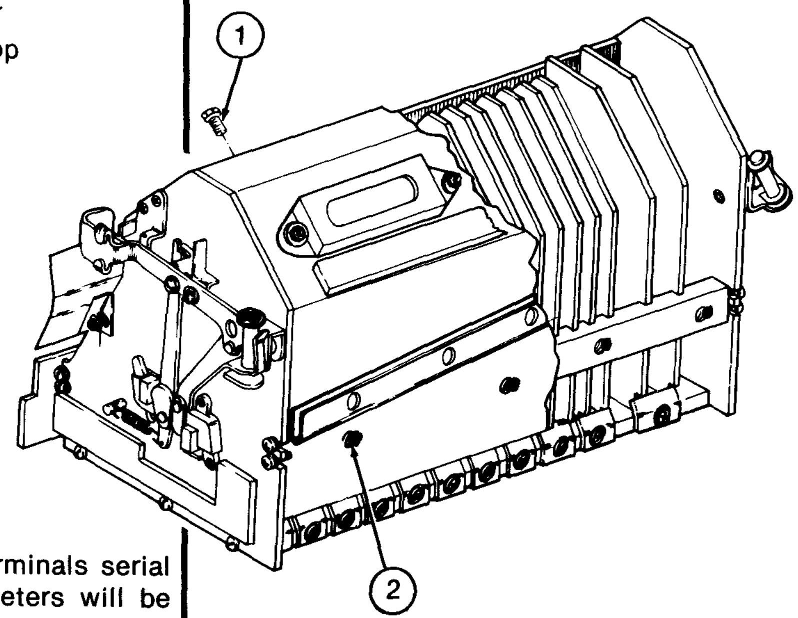
4-14. ORGANIZATIONAL MAINTENANCE ADJUSTMENTS

Organizational maintenance personnel are authorized to make following adjustments to terminal:

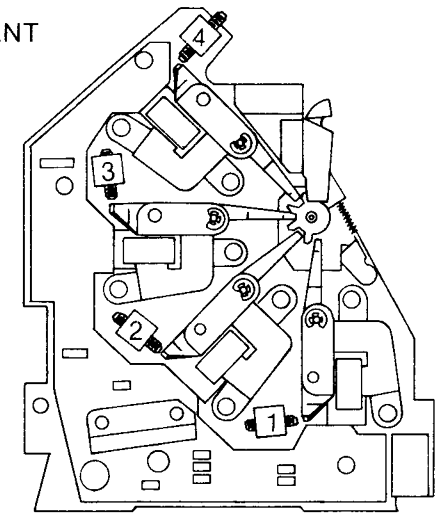
A. PRINT HAMMER*
B. MOTOR (LINE-FEED) DRIVE TENSION*
C. RIBBON SLIP CLUTCH*
D. RIBBON REVERSING EXTENSION*
E. RIBBON SENSING LEVER SPRING TENSION*
F. RIBBON REVERSING SENSING LEVER*
G. LOW PAPER ALARM SWITCH
H. PAPER EXIT BRACKET
I. PAPER OUT SWITCH*
J. POWER SWITCH LINKAGE

* These adjustments to be performed by 31J only. (A through F and I)

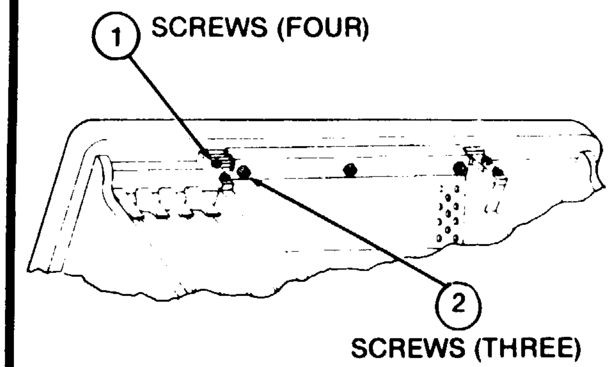
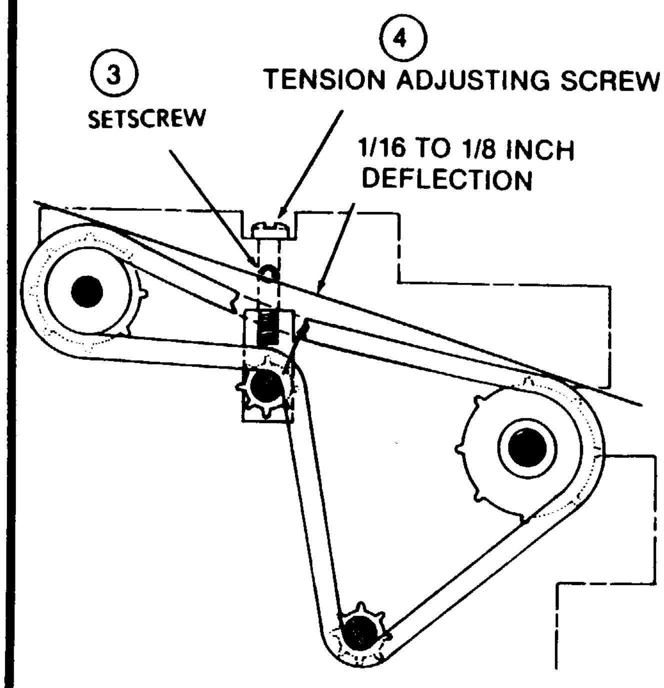
A PRINT HAMMER ADJUSTMENT

ITEM/LOCATION	PROCEDURES	REMARKS
1. Terminal	• Place POWER ON/OFF switch OFF. • Release dust cover latches and lower dustcover.	
2. Printer Subassembly	• Loosen, but do not remove four cover mounting screws (1) along back top edge of printer subassembly. • Remove four mounting screws (2) on front of printer subassembly. • Remove wire A1P2 from time meter, not shown. **NOTE** Elapsed time meters are installed in terminals serial numbered 1 through 2000. The time meters will be deleted by the manufacturer starting with serial number 2001. Time meters will not be replaced in terminals numbered 1 through 2000. • Remove ribbon from ribbon guide.	
3. Printer Subassembly cover	• Remove printer cover assembly away from printer subassembly.	

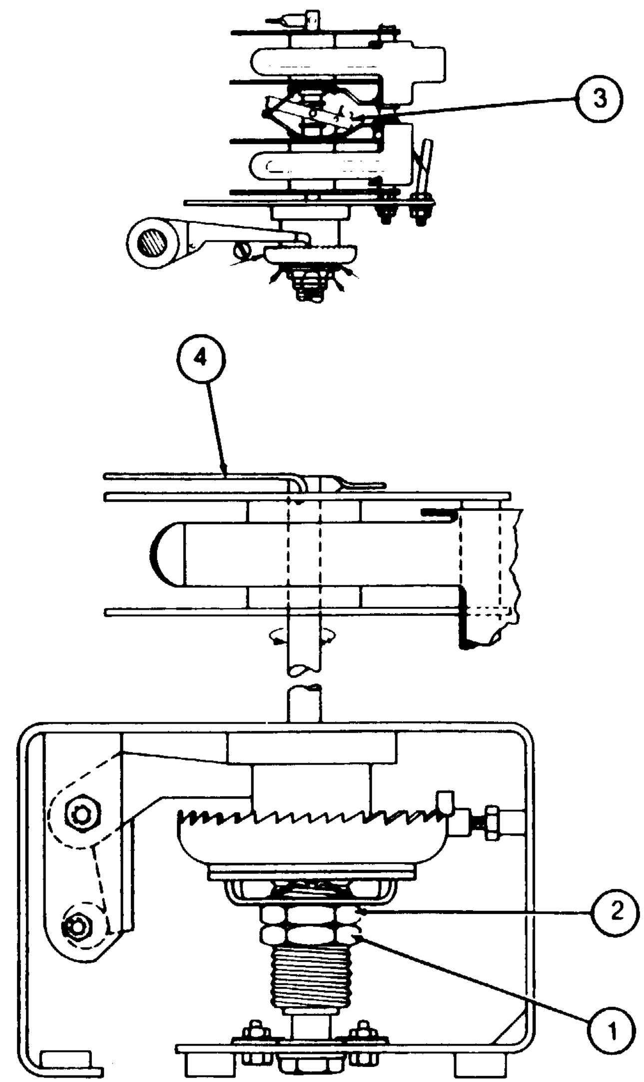
A PRINT HAMMER ADJUSTMENT - Continued

ITEM/LOCATION	PROCEDURES	REMARKS
4. Hammer Module	a. Locate the adjustment screw (1,2,3 or 4) on the proper hammer module to be alined.(Adjustment screw 1 corresponds to first hammer on left.) b. Apply power to the terminal by placing the POWER ON/OFF switch ON. c. After completion of the initialization print out, input one line (80 characters) of the letter "E". Do not enter a carriage-return. Each time a row of E's is to be printed, press the REV key. d. Adjust the hammer as follows: • Turn the adjustment screw in a clockwise direction if the hammer is printing only the bottom portion of the letter. • Turn the adjustment screw counterclockwise if the hammer is printing only the top portion of the letter. e. Repeat c and d above until the hammer is properly striking the character. f. Replace the printer cover assembly and eight mounting screws. g. Replace wire A1P2. h. Return ribbon to ribbon guide. i. Raise and secure the dustcover into position with the dustcover latches.	HAMMER MODULE SIDE VIEW ADJUSTMENT SCREWS 

B MOTOR (LINE-FEED) DRIVE TENSION ADJUSTMENT

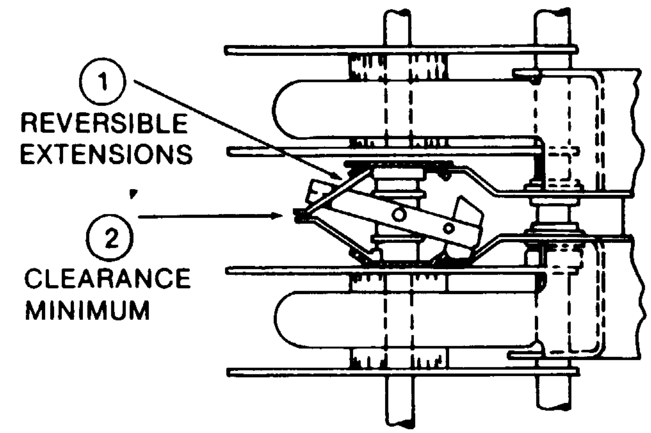
ITEM/LOCATION	PROCEDURES	REMARKS
1. Terminal	• Place POWER ON/OFF switch OFF. • Release combination case latches and fully extend terminal out on its slides.	
2. Printer Assembly	• Remove four screws (1) which secure tie bar and protective grill to printer assembly. • Remove three screws (2) which secure tie bar to main frame.	
3. Printer Assembly Left Vertical Wall	**NOTE** If required, to gain access to the tension adjusting screw remove the two screws holding the power switch linkage bracket and remove the bracket (refer to para 4-14J). • Loosen the setscrew (3) (using a counterclockwise motion).	
4. Terminal	• Adjust tension adjustment screw (4) (turn clockwise to tighten; counterclockwise to loosen) to obtain 1/8 to 3/16 inch deflection as shown. • Tighten setscrew. • Reinstall tie bar and protective grill using screws removed. • If required, reinstall power switch linkage bracket and perform power linkage cable adjustment (refer to para 4-14J). • Return terminal into combination case and secure it with its latches.	

C RIBBON SLIP CLUTCH ADJUSTMENT

ITEM/LOCATION	PROCEDURES	REMARKS
1. Terminal	• Lower dustcover.	
2. Ribbon Mechanism	• Using two ribbon adjusting tools (SM-C-916464), loosen the slip clutch locknut (1) with one tool while holding adjusting nut (2) with the other. • Engage driver dog assembly (3) with upper spool ratchet. • Attach scale hook of spring scale (tensiometer) in top spool locating hole (4). Pull scale forward without motor running. • Rotate adjustment nut to obtain required tension at 12 ounces ±1. • Tighten locknut, taking care not to move adjustment nut. • Recheck tension.	
3. Terminal	• Raise and secure dustcover.	

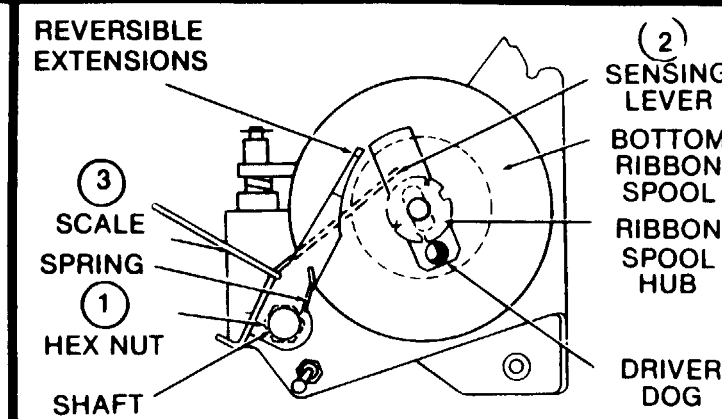
D RIBBON REVERSING EXTENSION ADJUSTMENT

ITEM/LOCATION	PROCEDURES	REMARKS
1. Terminal	• Lower dustcover.	
2. Ribbon Mechanism	• Re-form reversing extensions (1) in forming area as shown, to obtain a minimum clearance. • Position extensions so that clearance (2) is visually centered between ribbon spools.	
3. Terminal	• Raise and secure dustcover.	



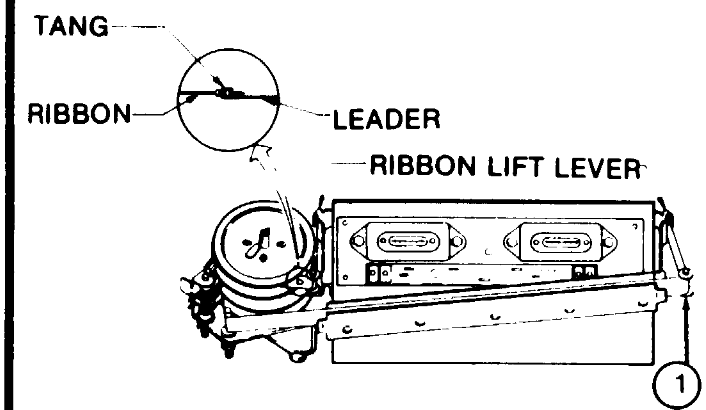
E RIBBON SENSING LEVER SPRING TENSION ADJUSTMENT

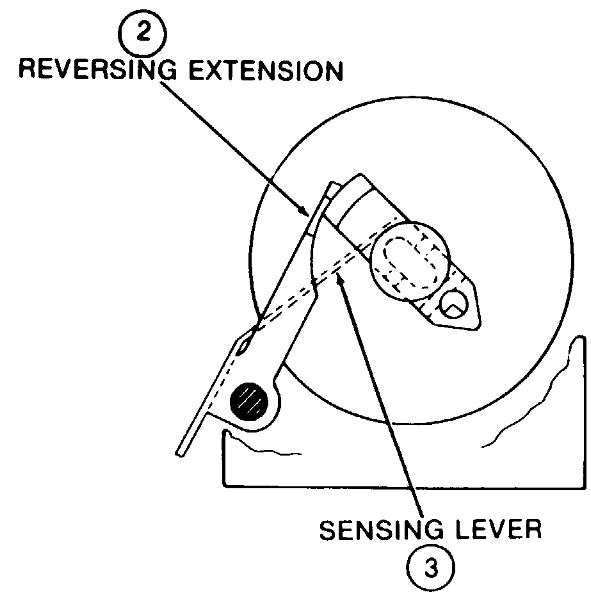
ITEM/LOCATION	PROCEDURES	REMARKS
1. Terminal	• Lower dustcover.	
2. Ribbon Mechanism	• Loosen sensing lever shaft hex nut. (1) • Tension is measured by placing scale hook tensiometer in notch on sensing lever. (2) • Sensing lever spring tension shall be between 3 to 4 ounces. (3) • Turn shaft clockwise to increase tension or counterclockwise to decrease tension. • Tighten hex nut and recheck tension.	
3. Terminal	• Raise and secure dustcover.	



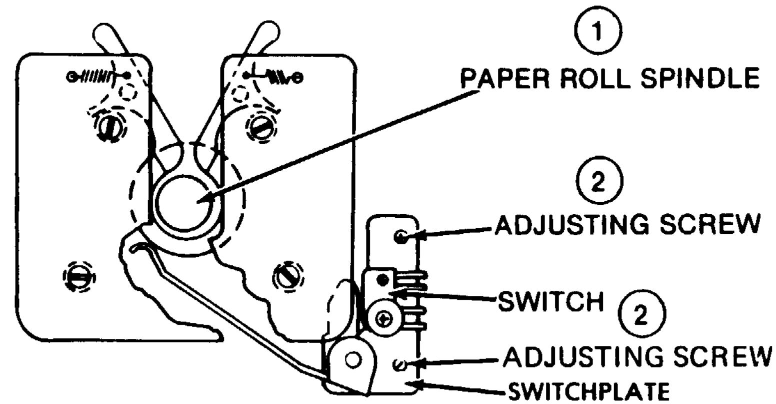
F RIBBON REVERSING SENSING LEVER ADJUSTMENT

ITEM/LOCATION	PROCEDURES	REMARKS
1. Terminal	• Lower dustcover.	
2. Ribbon Mechanism	• Wind upper ribbon spool until hook end of leader on the ribbon appears at upper right hand mechanism (1). • Hold reversing extension (2) against driver dog. • Re-form sensing lever (3) in or out as necessary, so that driver dog trips before hook end of leader reaches lift arm. • Wind ribbon on lower spool and adjust upper sensing lever to trip driver dog when six to ten turns are left on upper spool. • Check adjustment of both sensing levers to ensure that ribbon will reverse automatically.	
3. Terminal	• Raise and secure dustcover.	

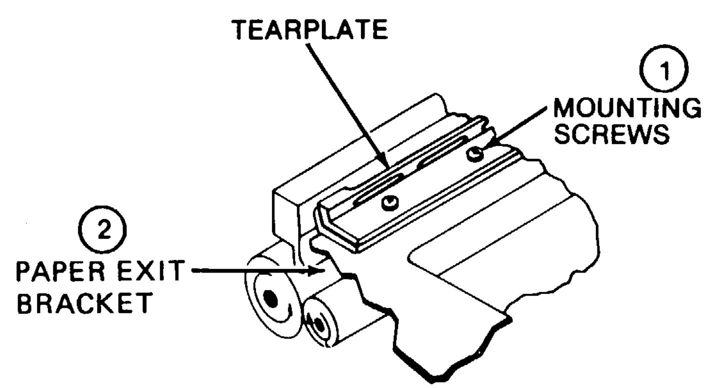




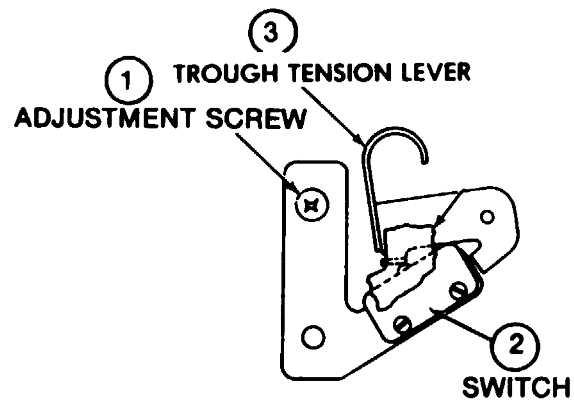
G LOW PAPER ALARM SWITCH ADJUSTMENT

ITEM/LOCATION	PROCEDURES	REMARKS
1. Terminal	• Place POWER ON/OFF switch OFF. • Release combination case latches and fully extend terminal out on its slides.	
2. Paper roll	• Remove paper from paper roll spindle (1) and reinsert spindle into paper roll holding bracket.	
3. Paper Low Switch	• Loosen adjusting screws (2) on switchplate and position it so that switch is actuated when actuator is 3/16 to 1/4 inch from paper roll spindle. • Tighten adjusting screws. • Reinstall paper. • Raise and secure dustcover.	

H PAPER EXIT BRACKET ADJUSTMENT

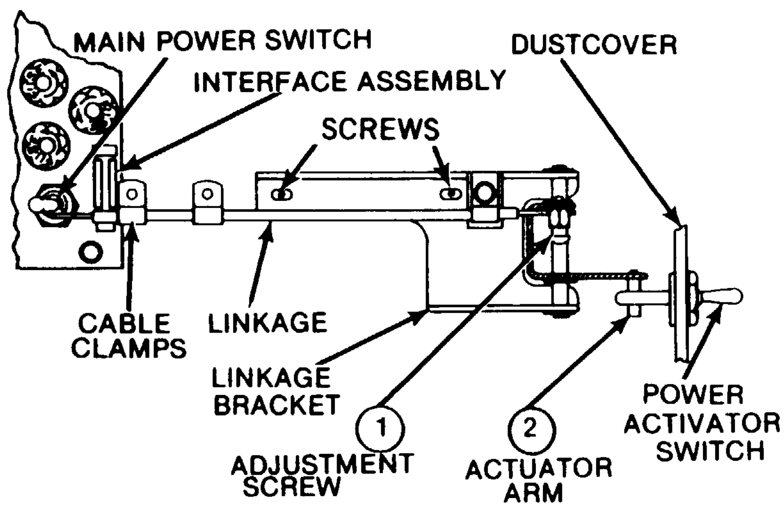
ITEM/LOCATION	PROCEDURES	REMARKS
Dustcover Assembly	a. Loosen five mounting screws (1) on top of tear plate. b. Position tear plate forward to backward to hold paper as snug as possible without causing paper to bind at paper exit bracket (2). c. Manually operate line-feed by pressing line-feed switch to ensure paper does not bind. Repeat a and b above as necessary. d. Tighten five mounting screws.	

I PAPER OUT SWITCH ADJUSTMENT

ITEM/LOCATION	PROCEDURES	REMARKS
1. Terminal	• Place POWER ON/OFF switch OFF. • Release combination case latches and fully extend terminal out on its slides. • Remove paper roll and spindle from terminal.	
2. Paper Out Switch	• Loosen adjustment screw 1. • Position switch mounting plate so that switch 2 "clicks" before paper trough tension lever 3 reaches end of its travel. • Tighten adjustment screw.	
3. Terminal	• Reinstall paper roll and spindle. • Return terminal into case and secure latches. • Place POWER ON/OFF switch ON and verify switch operation.	**NOTE** If insufficient adjustment is available by moving switch mounting plate, re-form tab on tension lever to meet requirements.

J POWER SWITCH LINKAGE ADJUSTMENT

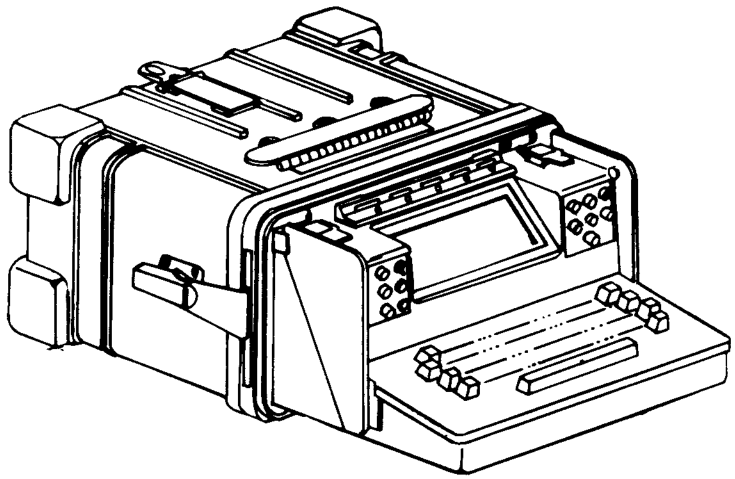
ITEM/LOCATION	PROCEDURES	REMARKS
1. Interface Assembly	• Place POWER ON/OFF switch OFF. • Disconnect power cable (J2) from terminal.	
2. Terminal	a. Release the dustcover latches and lower dustcover.	
	b. Inspect the main power switch of the interface assembly. The end loop of the power linkage cable should press against the power switch from the rear with the main power switch in the OFF position.	
	c. If the loop is not properly positioned, continue the adjustment. If the cable loop is properly positioned, go to f.	
	d. Loosen the two cables clamps nearest to the main power switch.	
	e. Pull lightly against the linkage cable assembly until the cable loop is resting against the rear of the main power switch with the switch in the OFF position.	
	f. Loosen adjustment screw (1) which secures actuator to cable.	
	g. Manually position actuator arm (2) until approximately 1/4 inch of cable extends beyond adjustment screw.	
	h. Tighten adjustment screw.	



J POWER SWITCH LINKAGE ADJUSTMENT - Continued

ITEM/LOCATION	PROCEDURES	REMARKS
3. Dustcover Assembly	• Close dustcover, being careful to hold POWER switch in OFF position. • Secure dustcover latches.	
4. Interface Assembly	• Reconnect power cable (J2) to terminal. • Place POWER ON/OFF switch ON to verify operation.	

4-15. FINAL INSPECTION PROCEDURES

ITEM/LOCATION	PROCEDURES	REMARKS
Terminal	a. Final inspection procedures ensure that all maintenance functions contained in this technical manual have been complied with before equipment is returned to service. b. Modifications - Be sure that all MWO's (if listed in DA PAM 310 - 1) have been accomplished. c. PMCS - Assure that PMCS in section III has been accomplished. d. Completeness - Inspect terminal for completeness. Refer to TM 11-5815-602-34P for a list of components and accessories. • Be sure all items listed in Basic Issue Items List are on hand. • Check to see that each item is correctly stock numbered. • Be sure that correct quantity is in each package. e. Perform complete operational check, to include the Self-Test and Loop-Back test (table 2-5) before turning equipment over to operating personnel. f. If operational check cannot be performed satisfactorily after all organizational maintenance has been performed, notify next level of maintenance (Direct Support).	

Section V. PREPARATION FOR STORAGE AND SHIPMENT

4-16. SHUTDOWN

The shutdown procedures for the terminal are as follows:

- Print out all stored messages. Any stored messages not printed out will be lost once the terminal is powered down. (Refer to TM 11-5815-602-10 for procedure in printing out stored messages.)
- Verify that all messages have been transmitted.
- Place POWER switch in OFF position.
- Perform the AFTER OPERATING checks of the Operator PMCS Table of TM 11-5815-602-10.

4-17. SECURE

Secure the terminal as follows:

- Loosen the copyholder mounting screw knob in a counterclockwise direction.
- Remove the notched end of the copyholder bar from the mounting screw.
- Release the hinged sections from the center section by opening the four rotating clips.
- Fold the two hinged sections.
- Store the copyholder in the front case cover storage compartment.
- With power source shut off, disconnect all cables and close rear panel door; secure with latch.
- Attach front case to terminal and secure latches.

4-18. ADMINISTRATIVE STORAGE

Refer to TM 740-90-1, chapter 10, for the proper siting, preparation and storage procedures.

CHAPTER 5

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

PAGE

Section I. GENERAL INFORMATION

Section II. TOOLS AND EQUIPMENT REQUIRED

Section III. TROUBLESHOOTING

Section IV. REMOVAL AND REPLACEMENT

Section V. DISASSEMBLY AND REASSEMBLY OF TERMINAL, COMMUNICATIONS AN/UGC-74A(V)3

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Section VI. DIRECT SUPPORT MAINTENANCE ADJUSTMENTS

Section VII. DIRECT SUPPORT TEST PROCEDURES

Section I. GENERAL INFORMATION

5-1. VOLTAGE AND RESISTANCE MEASUREMENTS

Voltage and resistance measurements, performed by direct support maintenance personnel, are described in the troubleshooting procedures and should be performed in conjunction with those procedures. Where applicable, the procedures reference paragraphs, tables and diagrams which contain the necessary measurement requirements. Unless specified in the procedure, all voltage measurements are made in terminal using Multimeter AN/USM-223.

5-2. CONTINUITY TESTS

Instructions and data are provided for testing the continuity of wire circuits. Data includes the location of test points, operation of switches and maximum allowable resistance.

5-3. BENCH TESTING

Direct support bench testing, troubleshooting, and repairing of terminal is as specified by the Maintenance Allocation Chart (appx B). Detailed procedures are provided in troubleshooting and maintenance sections of this chapter.

CAUTION

Before applying power to the terminal for the first time, check the value of fuses F1 and F2. If fuses are 1½A, operate only with ac power. If fuses are 6¼A, operate with 26Vdc power.

Section II. TOOLS AND EQUIPMENT REQUIRED

NOTE

Refer to the Maintenance Allocation Chart (MAC) in appendix B for the National Stock Numbers (NSN) of the following tools and test equipment.

5-4. TOOLS AND TEST EQUIPMENT

Tool Kit TE - 50B

Tool Kit, Electronic Equipment TK-105/G

Multimeter AN/USM-223

5-5. SPECIAL TOOLS

Loopback Plug (SM-B-916000)

Tool, Drum Puller (SM-C-964466)

Remover, Module (SM-B-916003)

Hammer-Drum Spacing Gauge (2)

Pin Extractors M24308/18-1 and MS27534-22VD

Module, CPU (3A1A1)

Module, Memory (3A1A2)

Module, Communications (3A1A3)

Module, Printer Control (3A1A4)

Module, Hammer Driver (3A1A5A1A2-A3)

Module, Hammer (3A1A5A1A4-A23)

Module, MD & CC (3A1A5A3)

Assembly, Interface (3A1A7)

Module, Power Supply (3A1PS1)

Section III. TROUBLESHOOTING

5-6. GENERAL

Troubleshooting at direct support level includes all the troubleshooting techniques outlined for organizational maintenance (chapter 4, section III), and any special or additional techniques required to isolate a defective assembly.

The systematic troubleshooting procedure, which begins with the operational checks performed at organizational level, must be completed by means of sectionalization and localization procedures.

- Sectionalization, the first step in troubleshooting, means tracing the trouble to the major assembly that is responsible for abnormal operation.
- Localization, the second step, means tracing the trouble to a particular component within the major assembly.

5-7. TROUBLESHOOTING CHART

Use the following chart (table 5-1) to sectionalize the trouble to the major assembly. The chart is indexed by MALFUNCTION/SYMPTOM, and TEST OR PROCEDURE to follow in order to locate the defective major assembly.

Location of the defective major assembly is done by checking for the correct terminal response listed in the INDICATION column, and performing the procedures listed in the YES or NO columns.

Table 5-1. DIRECT SUPPORT TROUBLESHOOTING

MALFUNCTION/SYMPTOM TEST OR PROCEDURE	INDICATION	YES	NO
1 NO POWER INDICATION - LOSS OF ALL TERMINAL FUNCTIONS			
Step 1. Check fuses.	Fuses good.	Go to step 2.	Replace defective fuse.
Step 2. Replace power supply assembly (para 5-11A).	Terminal has power (lights on).	. . . .	Reinstall original power supply. Go to step 3.
Step 3. Replace filter assembly (para 5-11G).	Terminal has power (lights on).	. . . .	Reinstall original filter assembly. Go to general support maintenance.
2 MOTOR DOES NOT RUN - LIGHTS ON			
Step 1. Check P2J2 for loose connection/ broken pins.	Terminal has power.	. . . .	Go to step 2.
Step 2. Test power supply TP7.	5 VDC or greater.	Go to step 5.	Go to step 3.
Step 3. Replace A1A1 and A1A4 cards.	Terminal has power.	. . . .	Reinstall cards, go to step 4.
Step 4. Replace power supply.	Terminal has power.	. . . .	Reinstall power supply. Go to general support maintenance.
Step 5. Test positive terminal of motor for voltage.	5 VDC or greater.	Go to step 7.	Go to step 6.
Step 6. Test continuity of positive terminal to power supply TP7	Low resistance.	Go to general Support maintenance.	Repair if accessible or go to genera support maintenance.

Table 5-1. DIRECT SUPPORT TROUBLESHOOTING - Continued

MALFUNCTION/SYMPTOM TEST OR PROCEDURE	INDICATION	YES	NO
Step 7. Test negative terminal of motor for voltage.	5 VDC or greater.	Go to step 8.	Go to step 9.
Step 8. Test continuity of J1 pin 12 to the negative terminal of the motor.	Low resistance.	Go to general support maintenance.	Repair if accessible or go to general Support maintenance.
Step 9. Test motor for mechanical binding.	Motor spins freely.	Go to step 11.	Go to step 10.
Step 10. Check ribbon mechanism and printer subassembly adjustments.	Adjustments proper.	Go to general support maintenance.	Adjust mechanisms.
Step 11. Test continuity between negative and positive terminal of the motor.	Low resistance.	Go to general. Support maintenance.	Go to step 12.
Step 12. Replace brushes.	Terminal has power.	. . . .	Go to step 13.
Step 13. Replace armature.	Terminal has power.	. . . .	Go to general support maintenance.

Table 5-1. DIRECT SUPPORT TROUBLESHOOTING - Continued

MALFUNCTION/SYMPTOM TEST OR PROCEDURE	INDICATION	YES	NO
3 TERMINAL FAILS SELF-TEST			
Step 1. If test No. 1 fails, replace CPU Al Al board (para 5-11B).	Test successful.	....	Reinstall original circuit board. Go to general support maintenance.
Step 2. If test No. 2 fails, replace PRINT A1A4 board.	Test successful.	....	Reinstall original circuit board. Go to general support maintenance.
Step 3. If test No. 3 fails, replace MEMORY A1A2 board.	Test successful.	....	Reinstall original circuit board. Go to general support maintenance.
Step 4. If test No. 4 fails, replace COMMUNICATIONS A1A3 board.	Test successful.	....	Reinstall original circuit board. Go to general support maintenance.
4 IMPROPER OR NO PRINTING			
Step 1. If all positions faulty, replace both hammer driver modules (para 5-11D).	Fault corrected.	....	Reinstall original hammer driver modules. Go to general support maintenance.
Step 2. If every fourth position faulty, replace appropriate hammer driver module.	Fault corrected.	....	Reinstall original hammer driver module. Go to general support maintenance.

Table 5-1. DIRECT SUPPORT TROUBLESHOOTING - Continued

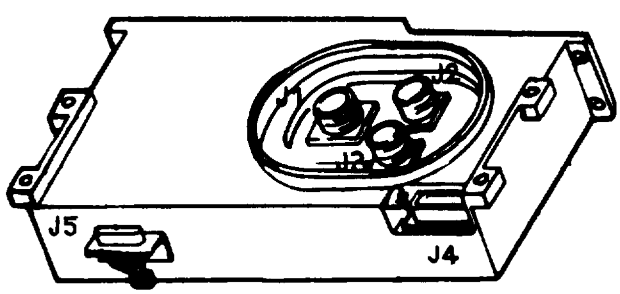
MALFUNCTION/SYMPTOM TEST OR PROCEDURE	INDICATION	YES	NO
Step 3. If four sequential positions faulty, replace appropriate hammer module (para 5-11E).	Fault corrected.	....	Reinstall original hammer module. Go to general support maintenance.
Step 4. If single print position faulty, adjust appropriate hammer on hammer module (para 4-14A).	Fault corrected.	....	Replace hammer module. If fault still not corrected, go to general support maintenance.
5 IMPROPER OR NO LINE FEED			
Replace motor feed (line-feed) and current control circuit board (para 5-11F).	Proper line feed.	....	Reinstall original motor feed and current control circuit board. Go to general support maintenance.
6 IMPROPER TRANSMISSION AND RECEPTION			
Step 1. Check for proper control and switch settings on interface assembly.	Identical transmitted and received message.	....	Go to step 2.
Step 2. Replace (para 5-11C) or repair (para 5-13F) interface assembly.	Identical transmitted and received message.	....	Go to general support maintenance.
7 IMPROPER TRANSMISSION			
Replace (para 5-11O) or repair (para 5-13G) keyboard keyswitch assembly.	Proper character or command is transmitted when appropriate key is pressed.	....	Go to general support maintenance.

5-8. INTERFACE ASSEMBLY FAULT LOCALIZATION

- Make all continuity tests with the power cable removed.
- Fault localization in the interface assembly is limited to faults which can be found by performing a continuity test as directed in table 5-2.
- Failure to detect the fault with this procedure will require forwarding the assembly to general support.
- Refer to paragraph 5-11C for interface assembly removal.

Table 5-2. INTERFACE ASSEMBLY CONTINUITY TEST

Switch	Position	From	To	Resistance (Max)
CLOCK	in	J5-40	J5-30	1 ohm
	EXT	J5-40	J5-31	1 ohm
	KG-30	J5-40	J5-30, J5-31	open
CLOCK +/-	+	J5-40	J5-32	1 ohm
	-	J5-40	J5-32	open
FIGURES S/J	s	J5-40	J5-35	1 ohm
	J	J5-40	J5-35	open
SIGNAL	DIO	J5-40	J5-36	1 ohm
	NRZ	J5-40	J5-36	open
STOP BITS	1	J5-40	J5-9	1 ohm
	2	J5-40	J5-10	1 ohm
MODE	ASCII	J5-40	J5-37	open
	BAUDOT	J5-40	J5-37	1 ohm
SELF TEST	NORMAL	J5-40	J5-33	1 ohm
	SELF TEST	J5-40	J5-34	1 ohm
POWER	ON	J2-J	J2-M	1 ohm
	OFF	J2-J	J2-M	open
	ON	J2-L	J2-K	1 ohm
	OFF	J2-L	J2-K	open
	ON	J3-A	J4-8	1 ohm
	OFF	J3-A	J4-8	open



5-9. POWER SUPPLY OUTPUT VOLTAGES

- **The values listed in table 5-3 are for troubleshooting purposes only; they represent average values. Use Multimeter AN/USM-223 for taking measurements.**

CAUTION

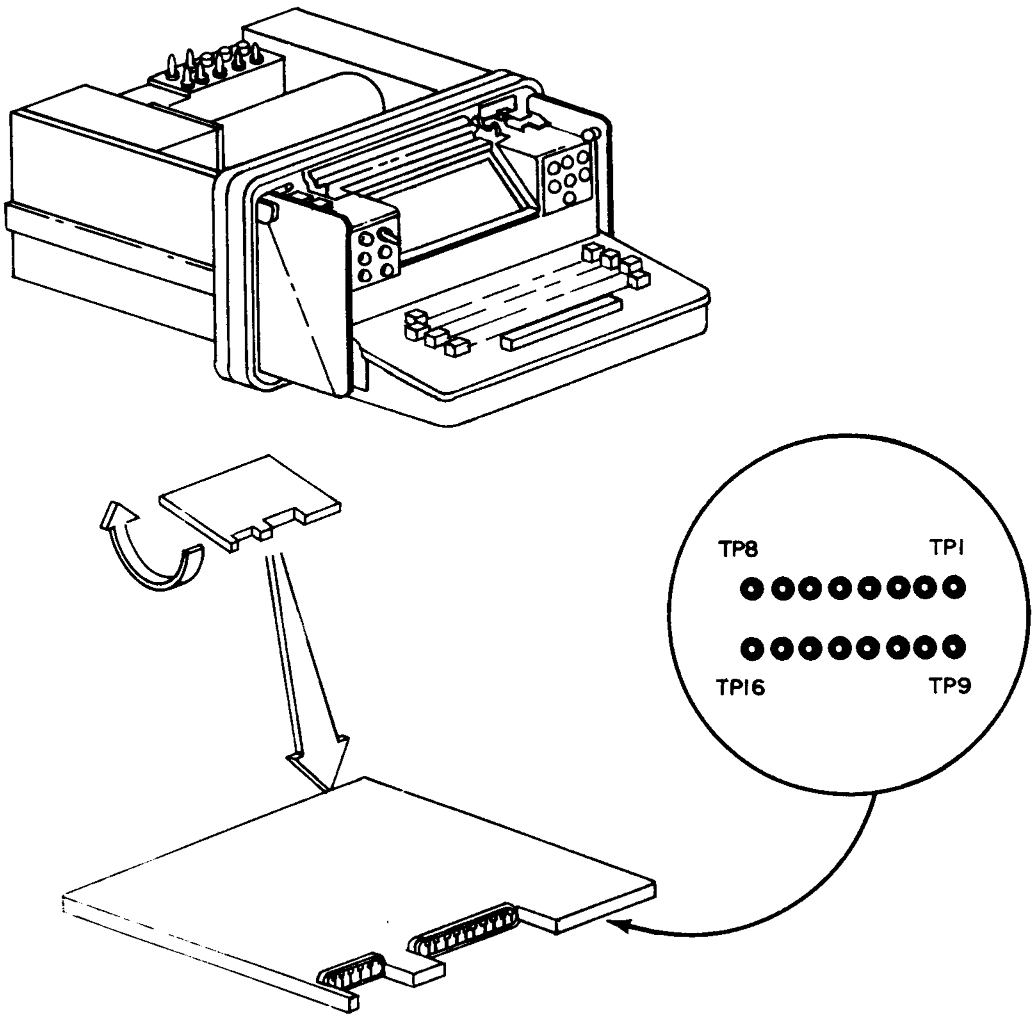
Do not short test point jacks to chassis as this could cause equipment damage.

. Refer to the following figure for location of power supply test points.

Table 5-3. POWER SUPPLY OUTPUT VOLTAGES

Test Point	Test Point Name	Normal Voltage*
1	BU lamp supply	+22 to + 32Vdc (normal input) + 12Vdc Nominal (battery backup)
2	CAP VOK	+ 4.5Vdc to + 5.5Vdc
3	CONCURR REG	+ 2.5Vdc to + 5.5Vdc (not printing) 0 to + 0.5Vdc (printing)
4	+5 V a	+ 4.75 to + 5.25Vdc
5	LAMP SUPPLY	0 to +21.5Vdc (variable by ILLUM control)
6	-8.6V b	-7.95 to -9.25
7 ......,	DRUM MOTOR	+5.6 to +11.6Vdc (drum on)
8	+18V	+17 to + 19.6Vdc
9	VIN RTN	0
10..........	SHUT DOWN	0 to + 0.5Vdc (motor running) + 2.5Vdc to + 5.5Vdc (motor not running)
11.........	ABU	0 to + 0.6Vdc (battery backup) + 3.0Vdc to + 5.0Vdc (not in battery backup)
12	-5V a	-4.8Vdc to -5.9Vdc
13	SCMO (drum speed)	1080 ±50 us period**
14	22 to 30 V	+22 to 32Vdc
15	+12 V	+ 10.8Vdc to + 13.2Vdc
16	+5V b	+ 4.8V to 5.4Vdc

*All voltages are measured with respect to test point 9.
**Cannot be checked by direct support maintenance.



POWER SUPPLY TEST POINTS

Section IV. REMOVAL AND REPLACEMENT OF MODULAR ASSEMBLIES

5-10. GENERAL

This section covers removal, replacement and repair of the following terminal components:

A. POWER SUPPLY
B. PROCESSING LOGIC CIRCUIT CARDS
C. INTERFACE ASSEMBLY
D. PRINT HAMMER DRIVER MODULE
E. PRINT HAMMER MODULE
F. LINE-FEED/CURRENT CONTROL CIRCUIT BOARD
G. FILTER ASSEMBLY
H. TIMING MECHANISM
I. DRUM MOTOR BRUSHES
J. DRUM MOTOR
K. PRINTER ASSEMBLY
L. RIBBON MECHANISM
M. PRINTER SUBASSEMBLY
N. KEYBOARD KEYSWITCH ASSEMBLY
O. DUSTCOVER

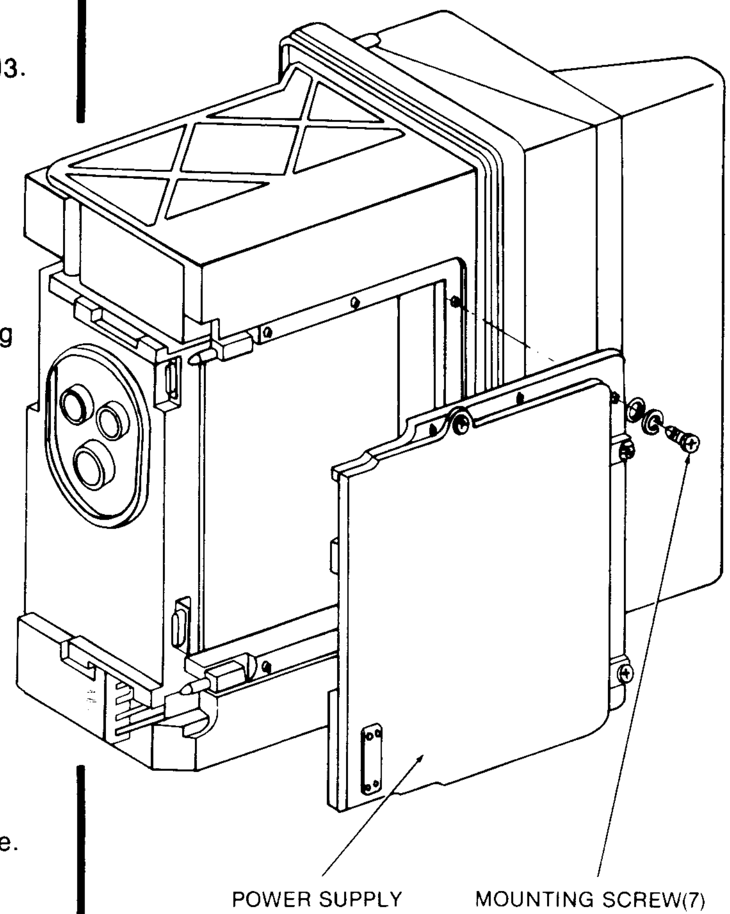
- Procedures listed are for removable modules, components, and assemblies as specified in Maintenance Allocation Chart (MAC), appendix B, for direct support maintenance.
- Most parts and assemblies of the terminal can be easily reached and replaced without use of special tools or instructions. Replacement, however, may require special techniques and tools to assure proper operation.
- Tag all wires to be unsoldered, or remove by any other means so as to reduce error in replacement.

WARNING

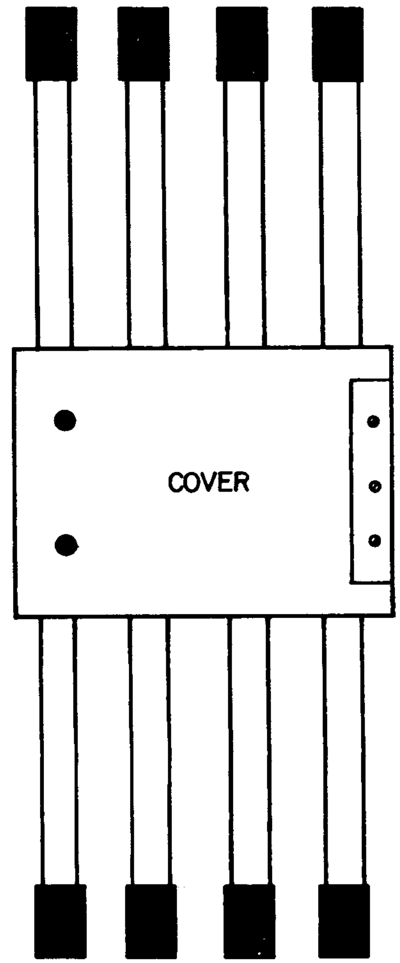
Do not attempt any unauthorized repairs on this equipment -- Avoid personal injury -- BE SAFE. Observe all cautions listed on front page of this manual.

5-11. REMOVAL AND REPLACEMENT PROCEDURES

A. POWER SUPPLY: REMOVAL AND REPLACEMENT

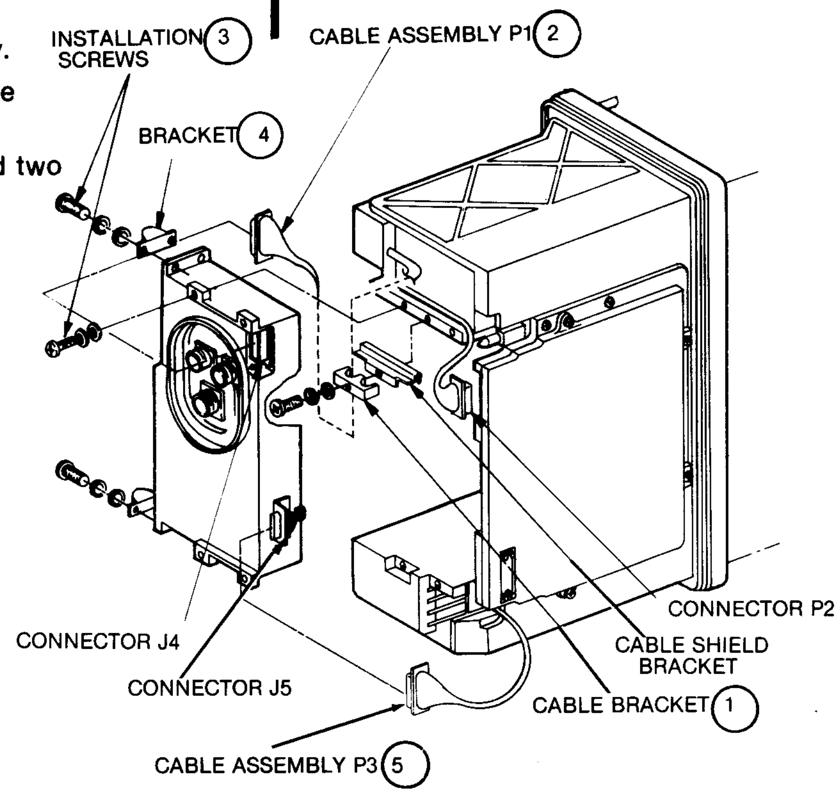
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Bottom of chassis	Power Supply	• Place POWER ON/OFF switch OFF. • Remove interface cabling from J1, J2, J3. • Release combination case latches and fully extend terminal. • While holding in spring-loaded stops remove case from terminal. • Turn terminal on its side. • Remove seven mounting screws holding power supply. • Gently pull power supply away from chassis. • Remove cable assemblies P2 and P3.	
REPLACEMENT		• Reconnect cable assemblies P2 and P3 to new power supply. • Gently place power supply in place and fasten with seven mounting screws. • Return terminal to upright position. • Reinstall terminal into combination case. • Reconnect interface cabling. • Place POWER ON/OFF switch ON. • Perform SELF-TEST. • Fully return terminal into combination case and secure latches.	

B. PROCESSING LOGIC CARD ASSEMBLIES: REMOVAL AND REPLACEMENT

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Right rear end of chassis	Processing logic card assemblies	• Place POWER ON/OFF switch OFF. • Release combination case latches and fully extend terminal. • Loosen two screws and lift cover out of way. • Simultaneously lift the inside ends of the extractors on the desired logic card assembly until the board is dislodged from its mating connector.	
REPLACEMENT		• Insert replacement logic card assembly. • Reposition cover and secure in place with two screws. • Place POWER ON/OFF switch ON. • Perform SELF-TEST. • Return terminal inside combination case and secure latches.	

C. INTERFACE ASSEMBLY: REMOVAL AND REPLACEMENT

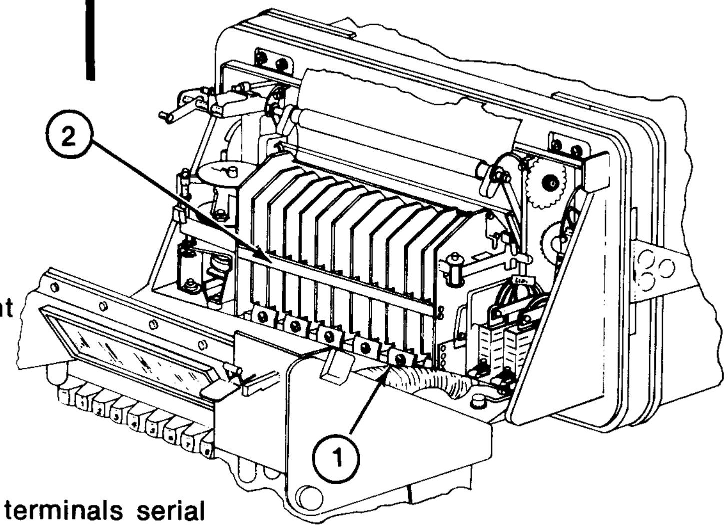
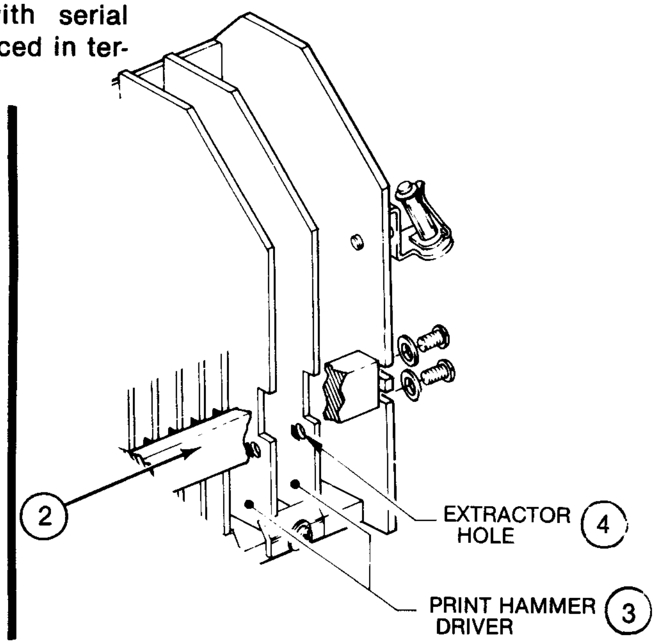
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Rear of chassis	Interface assembly	• Place POWER ON/OFF switch OFF. • Remove interface cabling from J1, J2, J3. • Release combination case latches and fully extend terminal. • While holding in spring-loaded stops remove case from terminal. • Disconnect power linkage cable from the POWER switch by loosening cable guides. • Place cable over filter assembly. • Remove bracket (1) and cable assembly P1 (2). • Remove eight screws (3) and two brackets (4).	



C. INTERFACE ASSEMBLY: REMOVAL AND REPLACEMENT - Continued

LOCATION	ITEM	ACTION	REMARKS
REMOVAL-Continued		**CAUTION** Be very careful when removing the interface assembly. The white wire can be cut or broken if care is not exercized. • Gently pull interface assembly away from chassis. • Remove cable assembly P3 (5) .	
REPLACEMENT		• Reconnect cable assembly P3. • Gently place interface assembly in place and fasten with eight screws and two brackets. • Reconnect cable assembly P1 and bracket. • Reconnect power linkage cable. • Reinstall terminal into combination case, leave in extended position. • Reconnect power cable to J2. • Place POWER ON/OFF switch ON. • Perform SELF-TEST. • Fully return terminal into combination case and secure latches.	

D. PRINT HAMMER DRIVER MODULES: REMOVAL AND REPLACEMENT

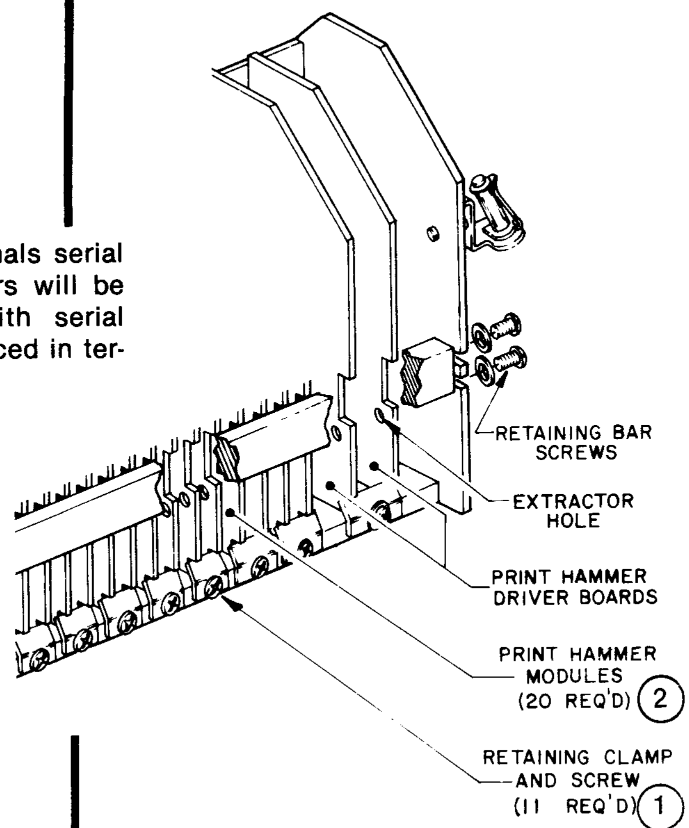
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Printer subassembly	Print hammer driver modules	• Place POWER ON/OFF switch OFF. • Release dustcover latches and lower dustcover. • Loosen, but do not remove four cover mounting screws along the back top edge of the printer subassembly. • Remove four mounting screws on front of printer subassembly. • Remove wire A1P2 from time meter. **NOTE** Elapsed time meters are installed in terminals serial numbered 1 through 2000. The time meters will be deleted by the manufacturer starting with serial number 2001. Time meters will not be replaced in terminals numbered 1 through 2000. • Remove ribbon from ribbon guide. • Remove printer cover assembly away from printer subassembly. • Remove retaining clamp (1) located at the base of the driver modules. • Remove four screws and remove retaining bar (2) . • Locate faulty driver module (3) and extract it by inserting a spring hook in extractor hole (4) and pulling until module is disengaged from its connector.	 

D.PRINT HAMMER DRIVER MODULES: REMOVAL AND REPLACEMENT - Continued

LOCATION	ITEM	ACTION	REMARKS
REPLACEMENT		• Insert replacement module and secure retaining bar and retaining clamp into position. • Replace printer cover assembly with eight mounting screws. • Reconnect wire A1P2 to time meter. • Replace ribbon in ribbon guide. • Raise dustcover .	

E. PRINT HAMMER MODULE: REMOVAL AND REPLACEMENT

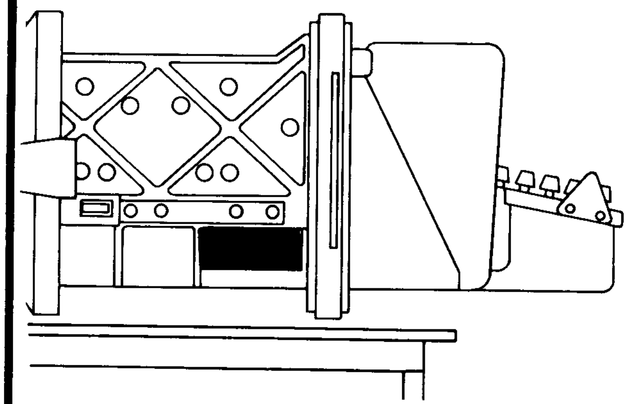
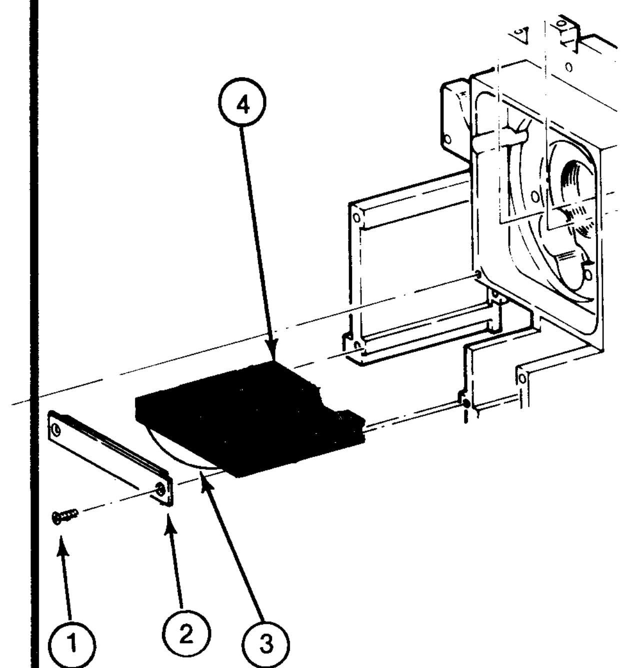
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Printer subassembly	Print Hammer modules	• Place POWER ON/OFF switch OFF. • Release dustcover latches and lower dustcover. • Loosen, but do not remove four cover mounting screws along the back top edge of the printer subassembly. • Remove four mounting screws on front of printer subassembly. • Remove wire A1P2 from time meter. **NOTE** Elapsed time meters are installed in terminals serial numbered 1 through 2000. The time meters will be deleted by the manufacturer starting with serial number 2001. Time meters will not be replaced in terminals numbered 1 through 2000. • Remove ribbon from ribbon guide. • Remove printer cover assembly away from printer subassembly. • Remove retaining clamp (1) located at base of hammer module (2) to be removed. • Remove four screws and remove retaining bar. • Locate faulty hammer module and extract it by inserting a spring hook in extractor hole and pulling until module is disengaged from its connector.	



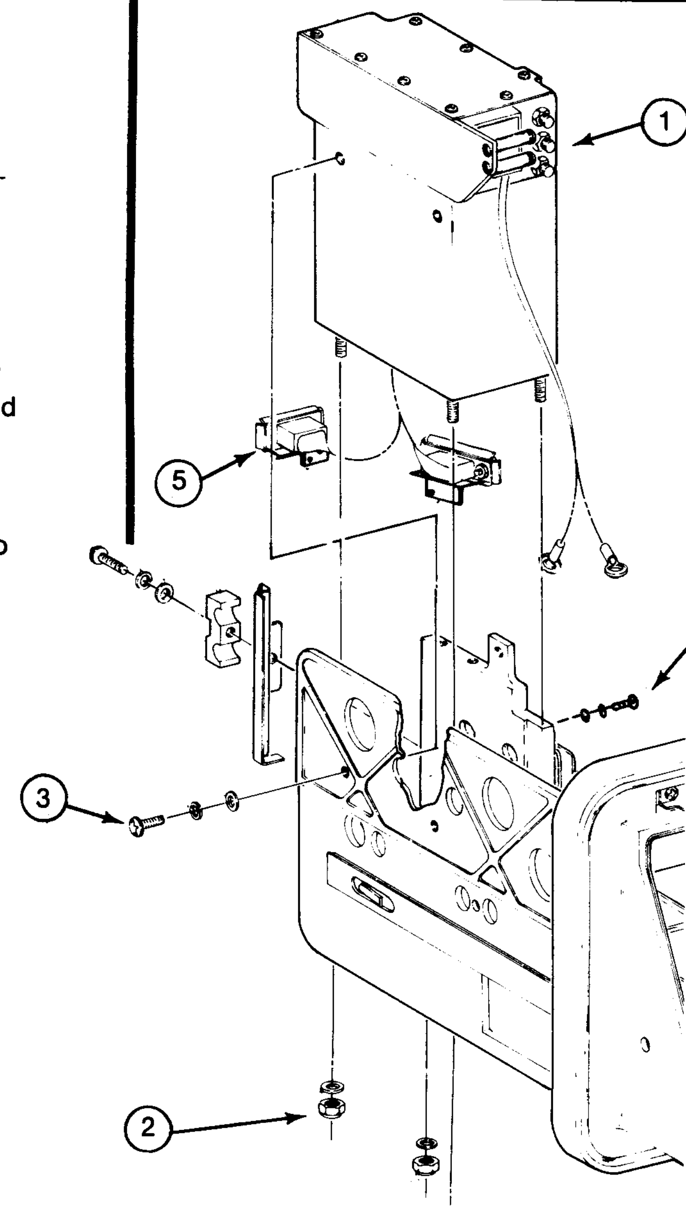
E. PRINT HAMMER MODULE: REMOVAL AND REPLACEMENT - Continued

LOCATION	ITEM	ACTION	REMARKS
REPLACEMENT		• Insert replacement module and secure retaining bar and retaining clamp into position. • Replace printer cover assembly with eight mounting screws. • Reconnect wire A1P2 to time meter. • Replace ribbon in ribbon guide. • Raise dustcover.	

F. CIRCUIT CARD: REMOVAL AND REPLACEMENT

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Left side of chassis	Motor feed (line-feed) current control board assembly	• Place POWER ON/OFF switch OFF. • Release combination case latches and fully extend terminal. • Remove two mounting screws (1) • Remove cover plate (2). • Grasp card strap (3) and gently pull until the assembly is disengaged from its connector (4) .	
REPLACEMENT		• Insert replacement assembly, ensuring that connectors are seated correctly. • Reinstall cover plate. • Replace two screws. • Place POWER ON/OFF switch ON. • Perform Self-Test. • Return terminal into combination case and secure latches.	

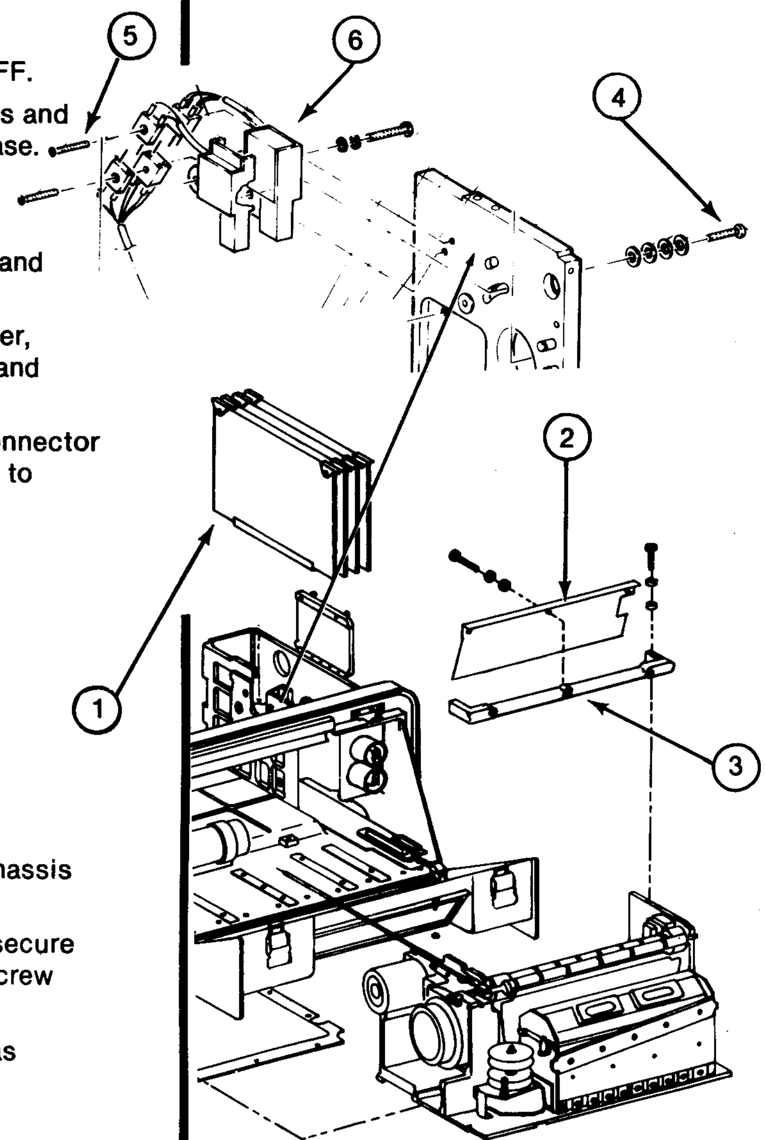
G. FILTER ASSEMBLY: REMOVAL AND REPLACEMENT

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Rear of casting	Filter	• Remove the interface assembly (refer to para 5-11C). • Tag and remove leads attached to stand-offs E1 and E2 (1) . • Turn terminal on its side. • Remove four locknuts and washers (2) . • Remove two screws and washers (3) . • Remove two inside mounting screws and washers (4) . • Remove cable assembly P2 (5) . • Grasp filter assembly and pull upward to remove from chassis.	

G.FILTER ASSEMBLY: REMOVAL AND REPLACEMENT - Continued

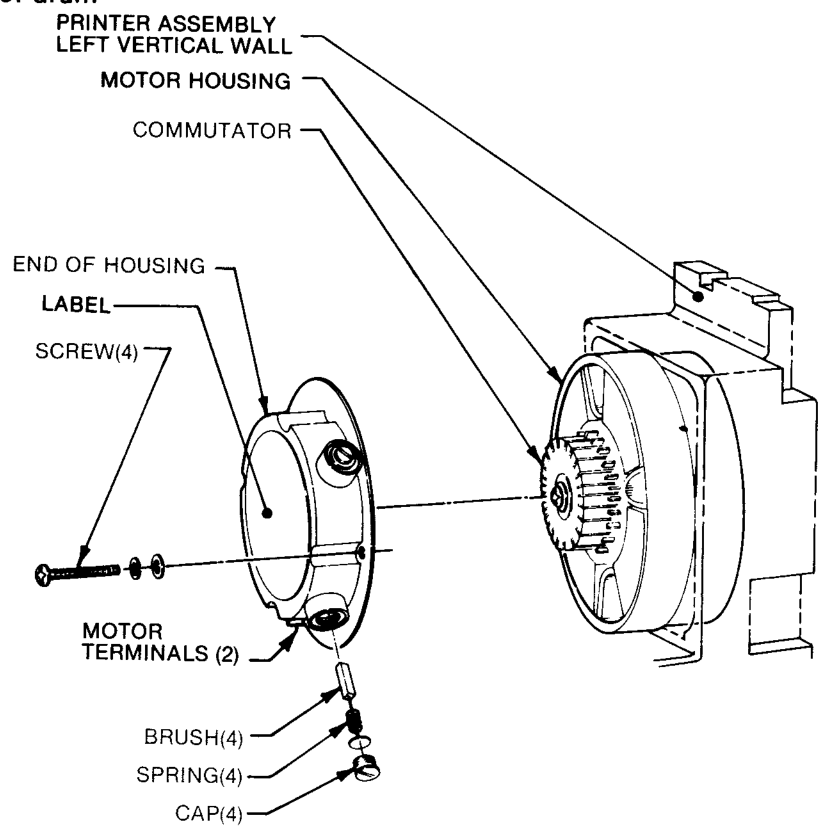
LOCATION	ITEM	ACTION	REMARKS
REPLACEMENT		• Position filter assembly in chassis. • Replace cable assembly P2. • Replace two inside mounting screws and washers. • Replace two screws and washers. • Replace four locknuts and washers. • Return terminal to upright position. • Attach leads to standoffs E1 and E2. • Replace interface assembly (refer to para 5-11C).	

H. TIMING MECHANISM: REMOVAL AND REPLACEMENT

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Right rear of chassis	Timing mechanism	• Place POWER ON/OFF switch OFF. • Release combination case latches and fully extend terminal out of its case. • Remove four logic circuit card assemblies (1). • Remove protective screen (2) and tiebar (3). • Using a No. 1 cross tip screwdriver, remove adjustment screw (4) and washers. • Remove screw (5) securing connector A4J1 of timing mechanism (6) to chassis. • Disconnect connector A4J1. • Remove timing mechanism.	
REPLACEMENT		• Reconnect A4J1 and secure to chassis with screw. • Position timing mechanism and secure to chassis with the adjustment screw and washers. • Perform adjustment procedures as specified in paragraph 5-15A.	

I. DRUM MOTOR BRUSHES: REMOVAL AND REPLACEMENT

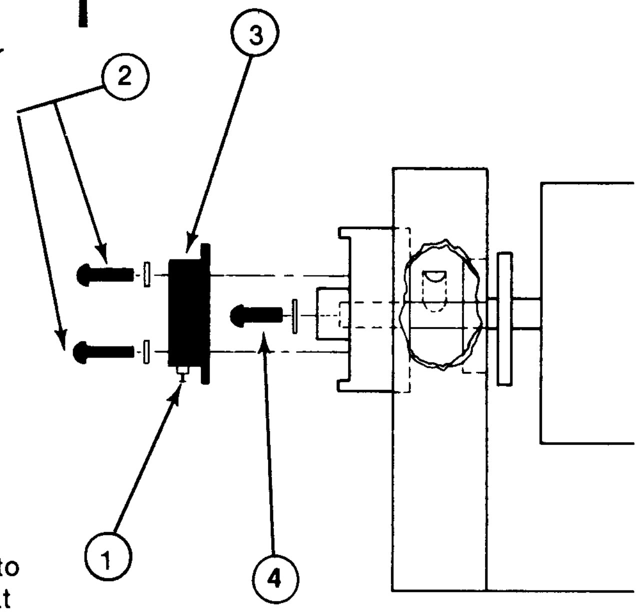
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Terminal	Printer Assembly	• Remove the printer assembly (refer to para 5-11K).	
Printer assembly	Left-hand vertical wall	• Remove all four brushes by turning brush screw caps on side of drum motor housing counterclockwise. • Remove caps and pull brushes out with their springs. • Remove four screws on end of drum motor housing.	



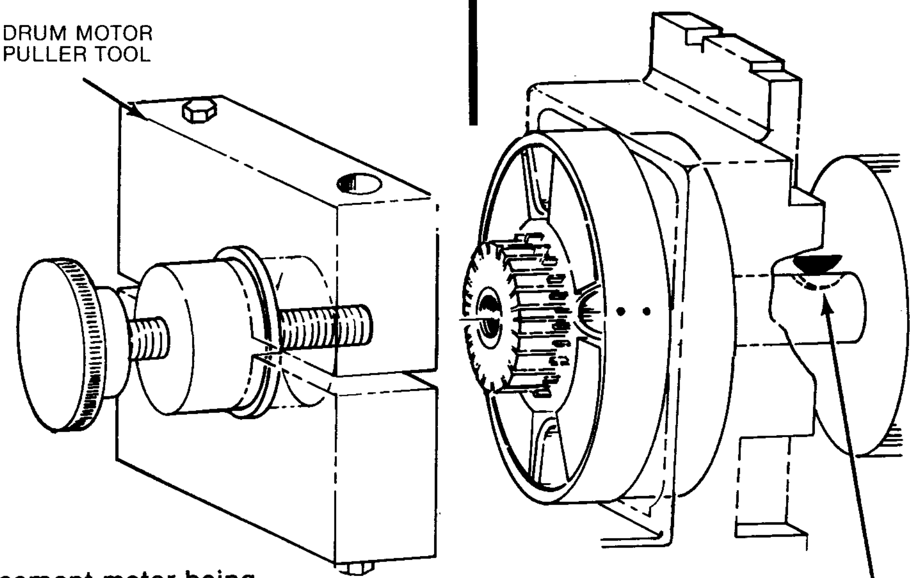
I. DRUM MOTOR BRUSHES: REMOVAL AND REPLACEMENT - *Continued*

LOCATION	ITEM	ACTION	REMARKS
REMOVAL - Continued		**CAUTION** Do not pull off wires when removing end housing. • Gently remove end housing from motor and inspect commutator for excessive wear, corrosion and carbon buildup. • Clean as required using a solvent (item 7, appx C) and sandpaper.	
REPLACEMENT		• Position end housing on motor with the motor terminals in the down position. **CAUTION** Be extremely careful to ensure wires are not broken when replacing end housing. • Secure end housing using four mounting screws. Do not overtighten brush screw caps. • Insert brushes into position and secure with brush screw caps. • Replace printer assembly (refer to para 5-11K).	

J. DRUM MOTOR: REMOVAL AND REPLACEMENT

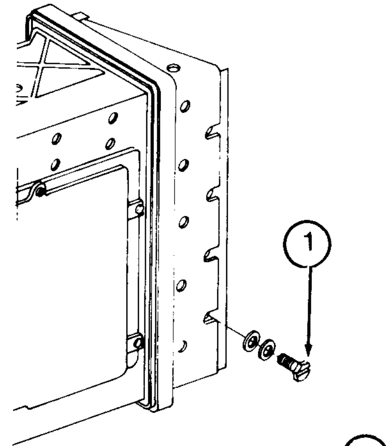
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Printer assembly left vertical wall	Drum motor	• Remove drum motor brushes (refer to para 5-11I). • Tag and unsolder four wires from motor terminal (1). • Remove four screws (2) on end of drum motor housing. **CAUTION** Do not pull off wires when removing end housing. • Gently remove end housing (3) from motor. • Remove screw (4) at end of drum shaft. • Attach tool, drum puller (SM-C-964466) to commutator being careful to assure that puller contacts only commutator and not winding terminations on commutator. • Slowly turn drum puller knob clockwise and observe movement of armature from motor housing. • Continue removing armature until approximately ½ inch of armature is exposed. • Gently pull on motor housing until it touches drum motor puller. • Repeat procedure until housing and armature clear chassis and shaft.	 **NOTE** Depending upon the position of the drum, the Woodruff key may fall out when the motor is removed. Set the key aside for use during replacement.

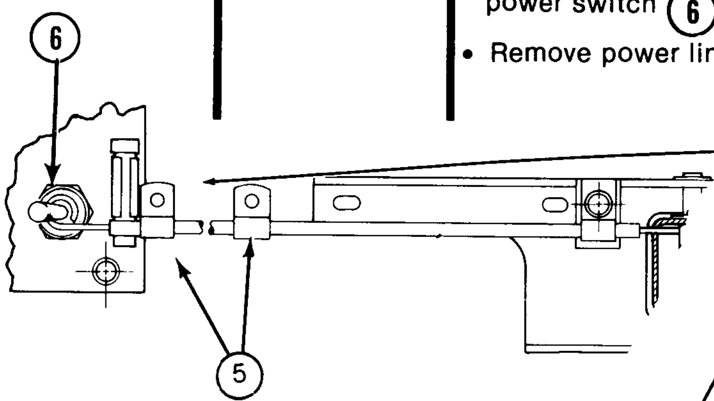
J. DRUM MOTOR: REMOVAL AND REPLACEMENT - Continued

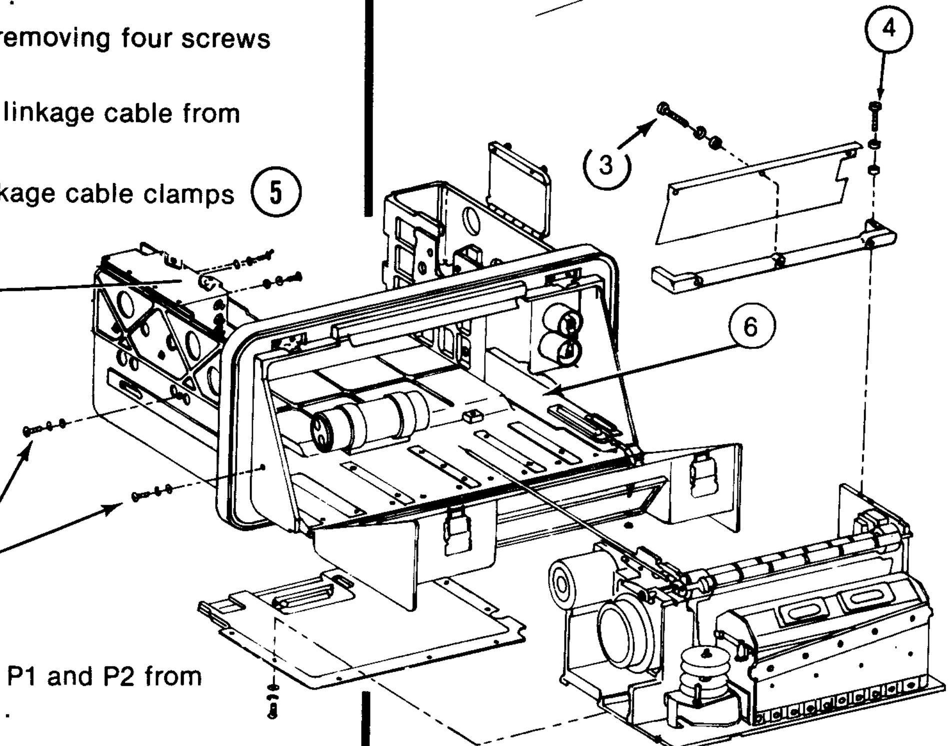


LOCATION	ITEM	ACTION	REMARKS
REPLACEMENT		• Install replacement motor being careful to aline keyway in motor with Woodruff key on shaft. **CAUTION** Do not allow the armature to be separated from the motor. • Secure motor to shaft with shaft screw, alining dots with right hand screw on end housing. • Secure drum motor housing using four screws. • Replace drum motor brushes (refer to para 5-11l). • Solder four input leads to motor terminals (+white, −black).	

K. PRINTER ASSEMBLY: REMOVAL AND REPLACEMENT

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Chassis	Casting	• Place POWER ON/OFF switch OFF. • Release combination case latches and fully extend terminal. • Remove 15 screws (1) and washers from bottom of chassis. • Lower dustcover. • Remove two side mounting screws (2) and washers. • Remove protective screen by removing three screws (3) . • Remove tiebar by removing four screws (4) . • Disconnect power linkage cable from power switch (6) • Remove power linkage cable clamps (5)	
		• Disconnect cables P1 and P2 from motherboard (6) .	

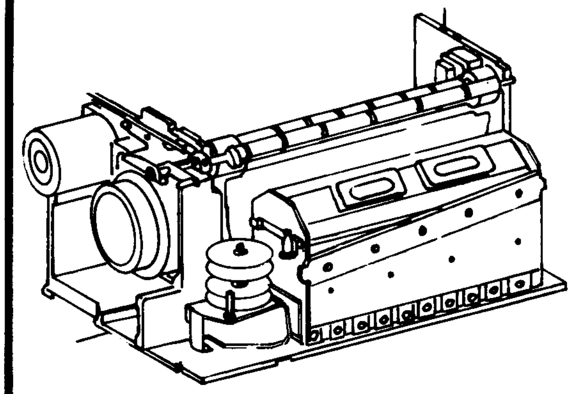
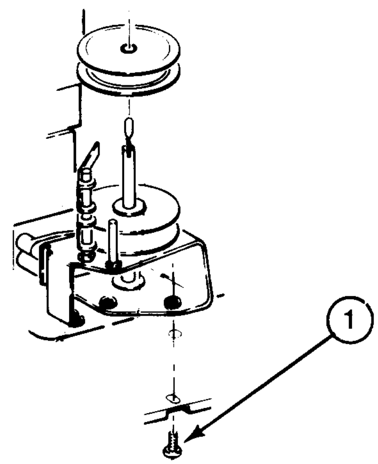




K. PRINTER ASSEMBLY: REMOVAL AND REPLACEMENT - Continued

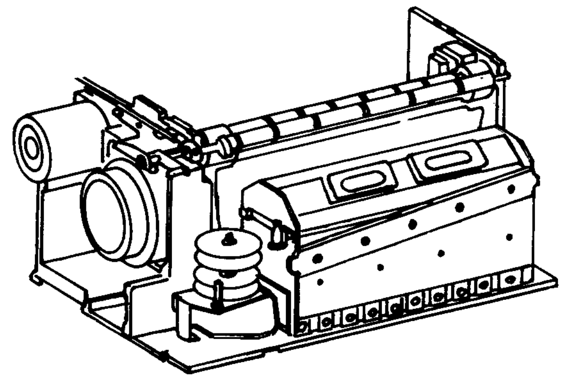
LOCATION	ITEM	ACTION	REMARKS
REMOVAL - Continued		**CAUTION** To avoid damaging the equipment, ensure that the chassis is secured to the workbench before attempting to remove printer assembly. Avoid catching wires on J1 and J2 of motherboard. • Gently slide the printer assembly over combination case flanges and lift from chassis.	
REPLACEMENT		• Position printer assembly on chassis. • Reconnect cables P1 and P2. • Reconnect power linkage cable and clamps, tie bar, and protective screen. • Replace two side mounting screws. • Raise dustcover. • Replace 15 screws. **NOTE** Perform a continuity test between filter assembly terminals E1 and E2 to chassis before applying power. The resistance shall be greater than 100K ohms after an initial capacitor charging indication. • Return terminal into combination case and secure latches.	Exercise care in replacing the printer assembly. Sharp edges on right side of chassis can cut the skin.

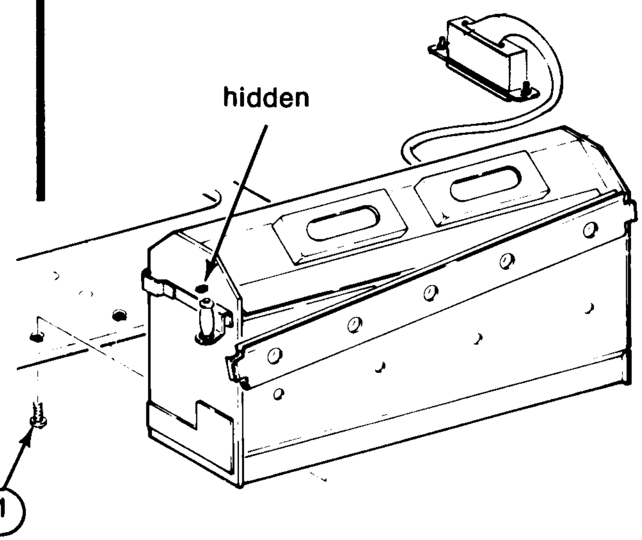
L. RIBBON MECHANISM: REMOVAL AND REPLACEMENT

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Printer assembly	Ribbon mechanism	• Remove the printer assembly (refer to para 5-11K). • Remove ribbon from printer subassembly. • Remove three screws (1). • Remove ribbon mechanism from plate.	
REPLACEMENT		• Position replacement ribbon mechanism on plate, alining the gears properly. • Secure into position using three screws. • Replace ribbon on printer subassembly. • Replace the printer assembly (refer to para 5-11K).	

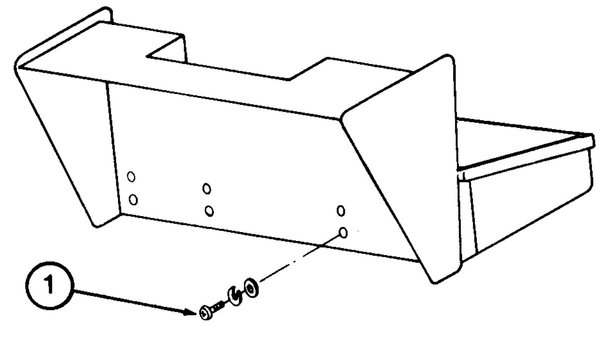
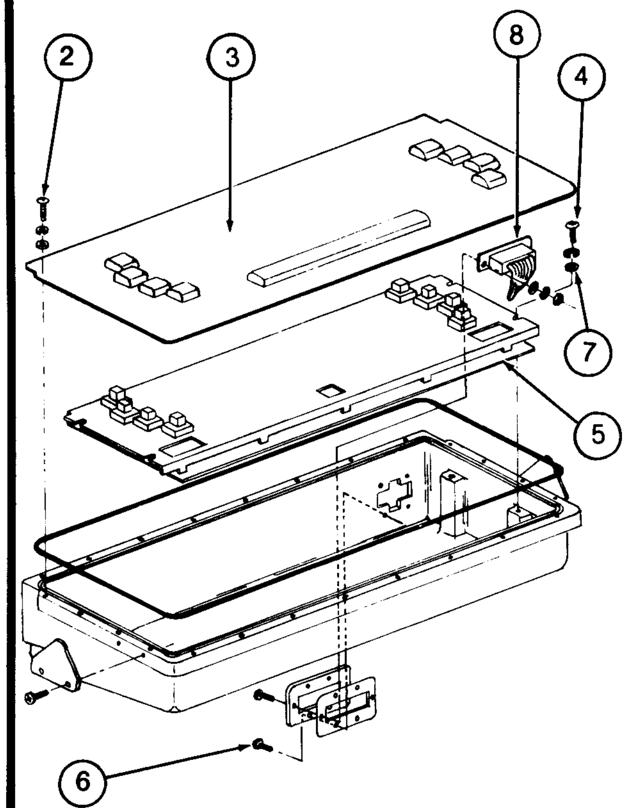
M. PRINTER SUBASSEMBLY: REMOVAL AND REPLACEMENT

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Printer assembly	Printer subassembly	• Remove the printer assembly (refer to para 5-11K). • Remove the ribbon mechanism (refer to para 5-11L). • Remove three screws (1). • Push wire assembly P2 through space in chassis. • Push wire assembly P1 through space in chassis. • Remove printer subassembly.	With grease pencil, mark outline of printer subassembly on base plate (to help with reassembly).
REPLACEMENT		• Replace the ribbon mechanism (refer to para 5-11L). • Place the printer subassembly on the base plate. • Insert the three screws (do not tighten). • Replace ribbon on printer subassembly. • Refer to para 5-15F for alinement procedures.	





N. KEYBOARD KEYSWITCH: REMOVAL AND REPLACEMENT

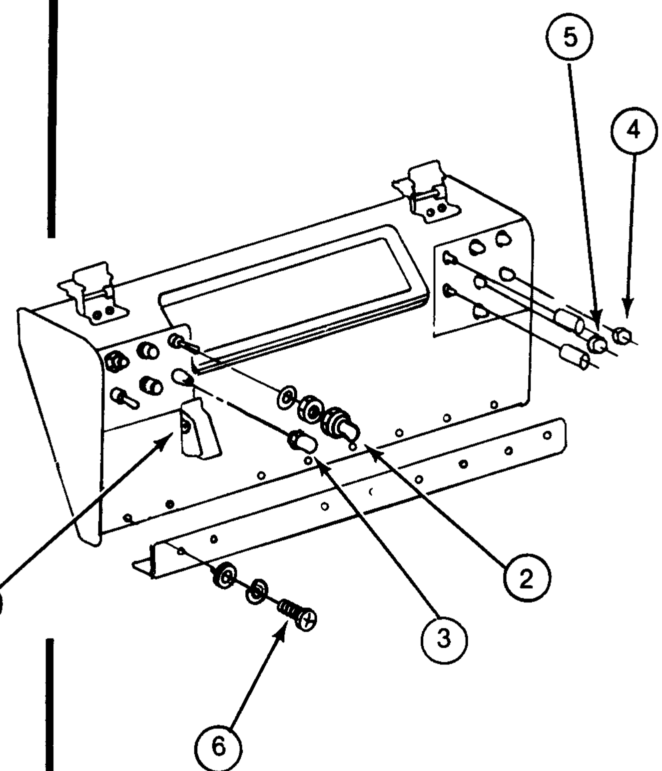
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Front of terminal	Dustcover	• Place POWER ON/OFF switch OFF. CAUTION To avoid damaging this equipment, support the keyboard as the last screw is removed. • Release latches, lower dustcover, remove eight screws and washers (1).	
Keyboard Housing Assembly	Keyboard assembly	• Remove 24 screws and washers (2). • Lift off panel assembly (3).	
	Keyswitch assembly	• Remove four screws and washers (4). • Reposition keyswitch (5) to allow access to the connector (8).	
	Connector	• Remove two screws (6) and washers and nuts (7). • Disconnect connector and remove keyswitch.	

N, KEYBOARD KEYSWITCH: REMOVAL AND REPLACEMENT - Continued

LOCATION	ITEM	ACTION	REMARKS
REPLACEMENT		**NOTE** Be sure that the wide side of the connector is installed toward the top of the keyboard assembly. **NOTE** When replacing connector, connector mounting plate may be removed and then replaced with the connector. • Position keyswitch assembly and replace connector. • Replace keyswitch assembly with four screws and washers. • Replace panel assembly with 24 screws and washers. • Replace keyboard keyswitch to dustcover with eight screws and washers. • Perform Self-Test.	

O.DUSTCOVER: REMOVAL AND REPLACEMENT

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Terminal	Dustcover	• Remove keyboard keyswitch assembly (refer to para 5-11N). • Disassemble ABORT switch (1) (refer to para 5-13E). • Disassemble TRANSFER switch (2) by removing boot, nut and lockwasher. • Disassemble PARITY RESET switch by removing boot (3) . • Disassemble LINE FEED switch by removing boot (4) . • Disassemble AUDIO RESET switch by removing boot (5) . • Disassemble potentiometers from dustcover assembly. • Disassemble copy lamps from dustcover assembly. • Remove nine screws (6) , lockwashers and washers. • Remove dustcover.	**NOTE** Do not unsolder leads to switches and potentiometers.



O. DUSTCOVER: REMOVAL AND REPLACEMENT - Continued

LOCATION	ITEM	ACTION	REMARKS
REPLACEMENT		• Replace dustcover. • Insert screws. • Replace copy lamps and potentiometers. • Replace AUDIO RESET, LINE FEED, PARITY RESET, TRANSFER and ABORT switches. • Replace keyboard keyswitch assembly (refer to para 5-11N). • Perform Self-Test.	

Section V. DISASSEMBLY AND REASSEMBLY OF TERMINAL, COMMUNICATIONS AN/UGC-74A

5-12. GENERAL

This section contains disassembly and reassembly information for the following assemblies:

A. PRINTER ASSEMBLY
B. PRINTER SUBASSEMBLY
C. RIBBON MECHANISM
D. CHASSIS ASSEMBLY
E. DUSTCOVER ASSEMBLY
F. INTERFACE ASSEMBLY
G. KEYBOARD ASSEMBLY

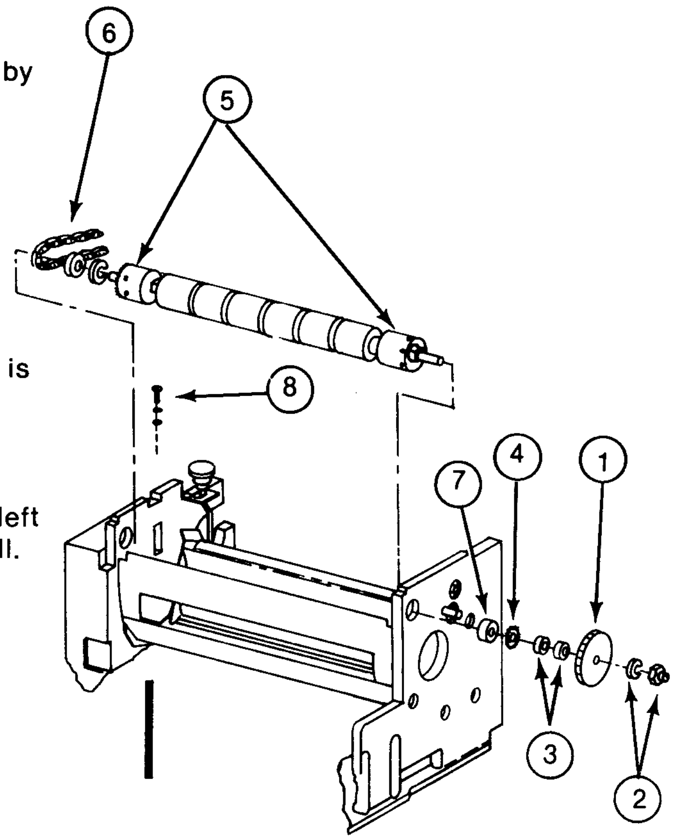
Disassembly is performed down to level for direct support maintenance as listed in the maintenance allocation chart.

5-13. DISASSEMBLY AND REASSEMBLY PROCEDURES

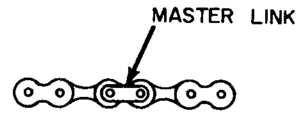
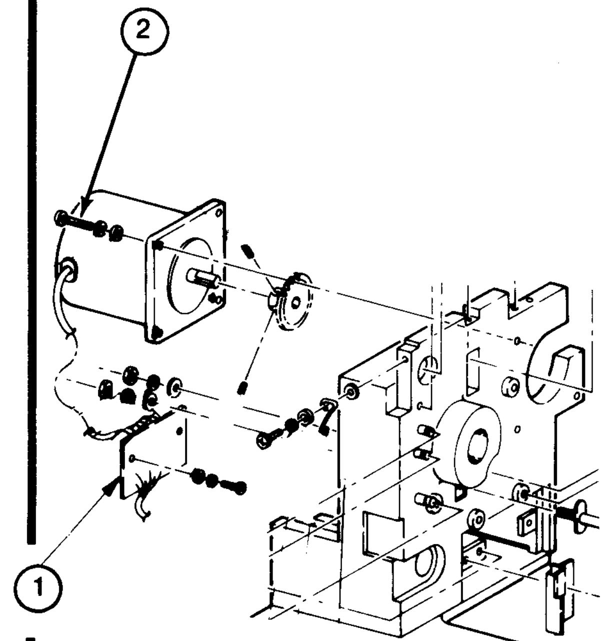
A. PRINTER ASSEMBLY: DISASSEMBLY AND REASSEMBLY

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Terminal	Printer assembly	• Remove as directed in paragraph 5-11K.	
Printer assembly	Printer subassembly	• Remove as directed in paragraph 5-11M. • Disassembly and reassembly instructions are in paragraph 5-13B.	
	Timing mechanism	• Remove as directed in paragraph 5-11H.	
	Drum motor	• Remove as directed in paragraph 5-11J.	
	Ribbon mechanism	• Remove as directed in paragraph 5-11L. • Disassembly and reassembly instructions are in paragraph 5-13C.	

A. PRINTER ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

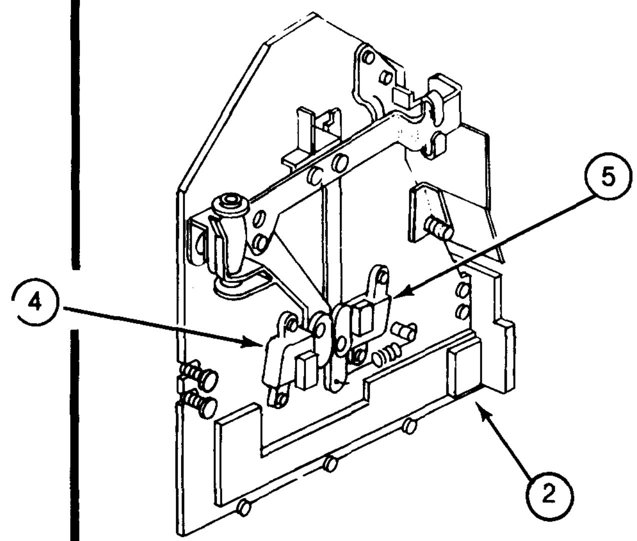
LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Printer assembly	Feed roller	• Remove knurled plastic wheel (1) by removing nut and washer (2) . • Remove two washers (3) . • Using pliers remove C-ring (4) . • Loosen setscrews using Allen wrench and slide paper feed sprockets (5) to the left as far as possible. • Grasp feed roller and move it toward right hand wall until left end of shaft is clear of wall. • Remove chain (6) from paper feed sproket. • Move feed roller upward and toward left until right end of shaft is clear of wall. • Remove bearing (7) .	
REASSEMBLY		• Replace bearing. • Position right hand end of shaft into place. **NOTE** Loosen adjustment screw (8) to put chain back on. • Lower left hand end of shaft and place chain into position. • Adjust line feed tension (refer to para 4-14B). • Tighten setscrew. • Replace C-ring and two washers. • Replace knurled plastic wheel.	

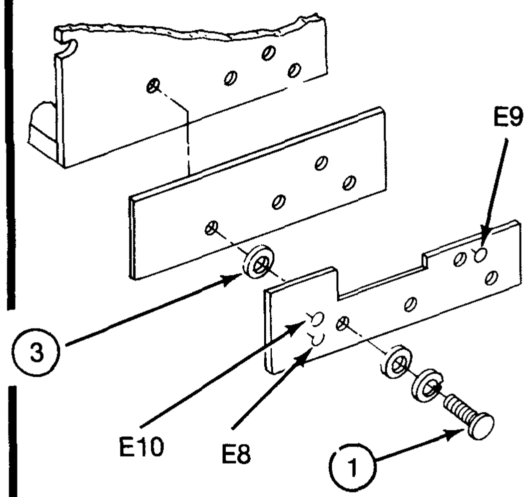
A. PRINTER ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Printer assembly Line-feed mechanism	Line-feed chain	• Turn wheel until master link on chain is accessible. • Remove master link on chain and remove chain.	
REASSEMBLY		• Place chain into position. Replace master link. • Adjust tension as required.	
DISASSEMBLY			
Printer assembly	Line-feed motor	• Tag and unsolder five wires on terminals E13 through E17 on terminal board (1) . • Remove three screws (2) securing motor to left hand side wall and remove motor.	
REASSEMBLY		• Position line feed motor into place, fasten three screws. • Solder five wires to their respective terminals.	

B. PRINTER SUBASSEMBLY: DISASSEMBLY AND REASSEMBLY

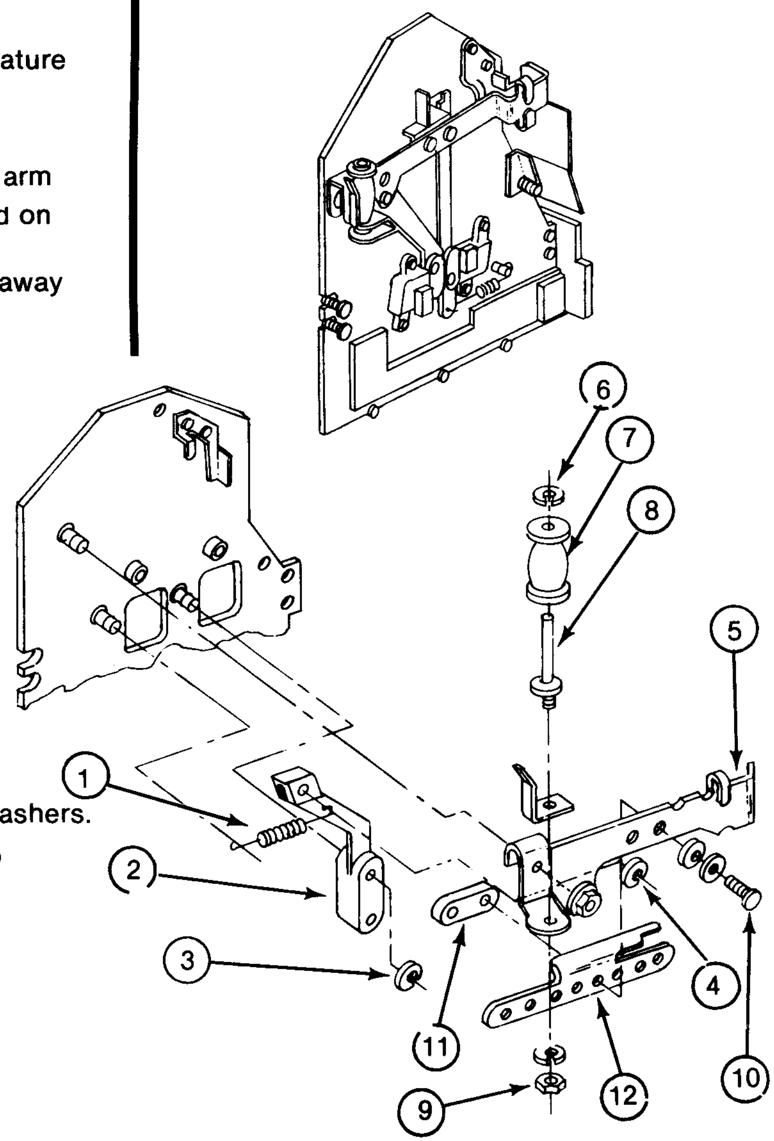
LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Right-hand ribbon-lift mechanism	Ribbon-lift drivers	• Unsolder and tag leads to terminals E8, E9 and E10 on circuit card assembly. • Remove four screws (1) and washers.	
	Circuit card assembly	• Grasp circuit card assembly and pull it until the connector (2) is free from its mating pins on motherboard.	
REASSEMBLY			
	Circuit card assembly	• Mate circuit card connector with printer subassembly mating motherboard pins.	
	Ribbon-lift drivers	• Position spacers (3) one at a time; secure with washers and screws. • Solder leads from magnet assembly (4) to E10 (red) and E8 (black). • Route red lead from magnet assembly (5) under circuit card and solder to E9. • Solder black lead from magnet assembly (5) to E8.	





B. PRINTER SUBASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

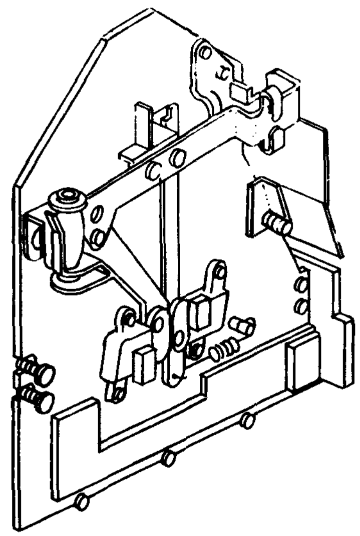
LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Right-hand Ribbon-lift mechanism	Lift armature	• Remove spring (1) from lift armature (2). • Remove E-ring (3). • Remove E-ring (4) and position arm (5) until lift armature clears stud on inside of arm. • Remove lift armature by pulling it away from mounting frame. **NOTE** Lift armature must be completely removed for arm assembly removal.	
	Arm assembly	• Remove E-ring (6). • Lift roller (7) from stud (8). • Remove nut (9) and lock-washer. • Remove stud. • Remove two screws (10) and washers. • Remove nut plate (11) and stop (12).	

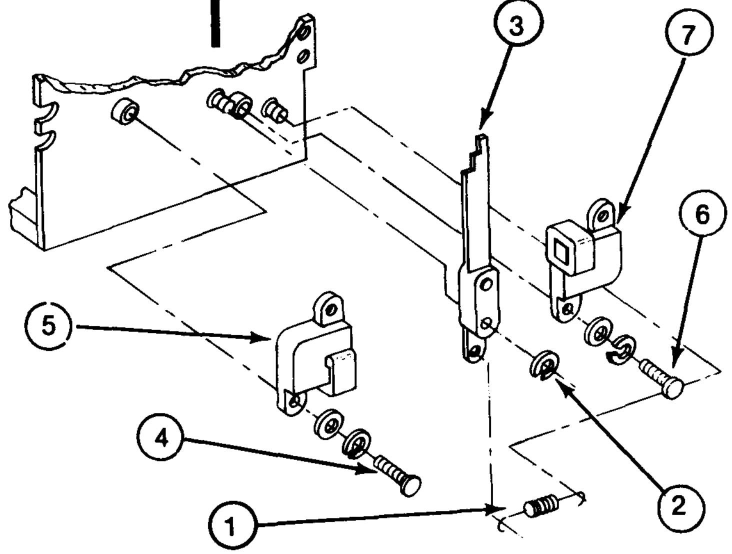


B. PRINTER SUBASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY	Arm assembly	• Fasten stop and nut plate. • Fasten stud. • Replace roller and E-ring.	
REASSEMBLY	Lift armature	• Install lift armature and E-ring. • Replace spring and E-ring.	

B. PRINTER SUBASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

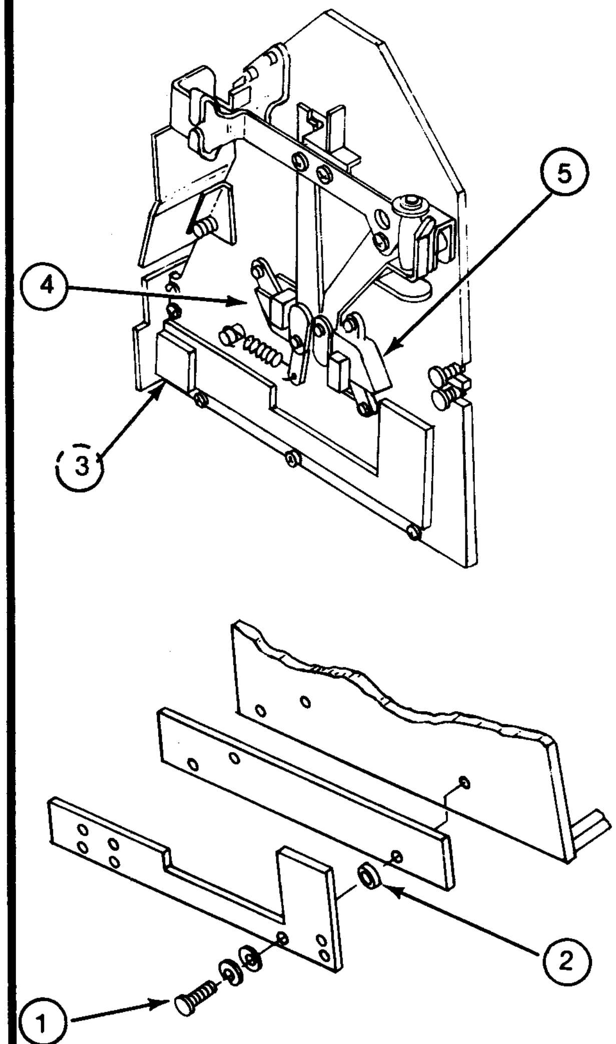
LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Right-hand ribbon-lift mechanism	Drop armature	• Remove spring (1) . • Remove E-ring (2) . • Pull drop armature (3) from mounting frame.	
	Magnet assemblies	• Unsolder and tag leads from E8 and E9 on circuit card assembly. • Remove screws and washers (4) . • Remove magnet assembly (5) . • Unsolder and tag leads from E8 and E10 on circuit card assembly. • Remove screws and washers (6) . • Remove magnet assembly (7) .	

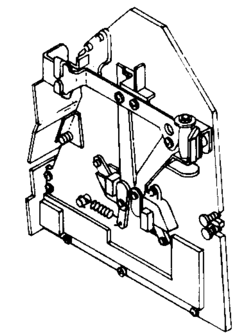
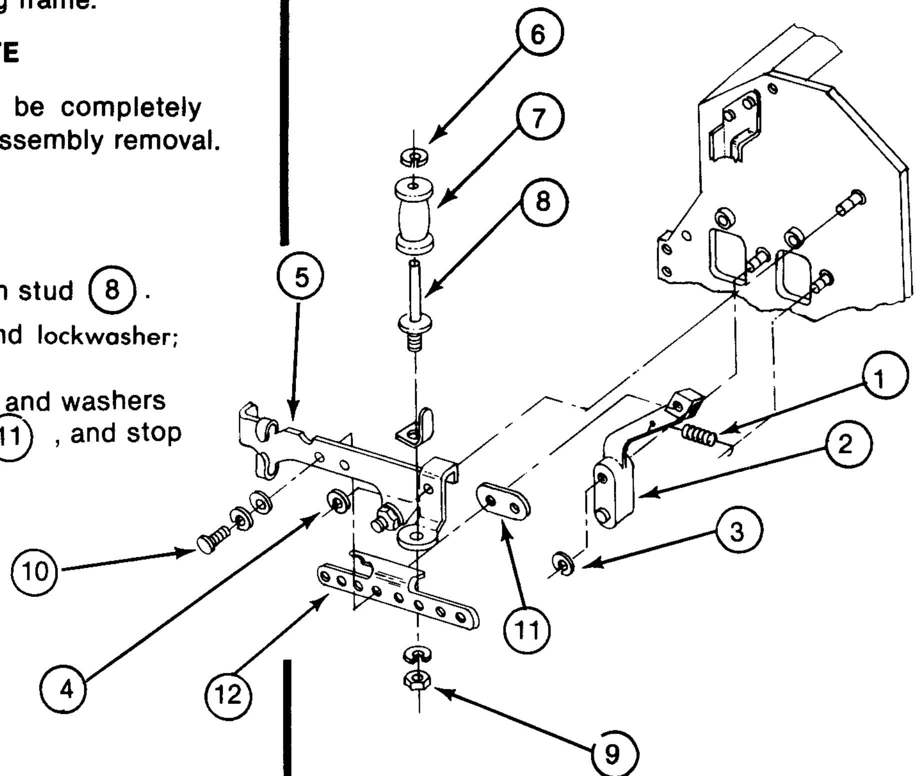


B. PRINTER SUBASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY	Magnet assemblies	• Place magnet assembly 3 into position and secure. Solder leads to E8 and E10 on circuit card assembly. • Place magnet assembly 5 into position and secure. Solder leads to E8 and E9 on circuit card assembly.	
REASSEMBLY	Drop armature	• Place drop armature on mounting frame. • Replace E-ring and spring.	

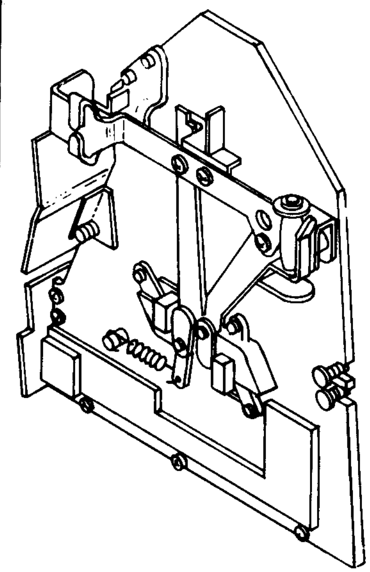
B. PRINTER SUBASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

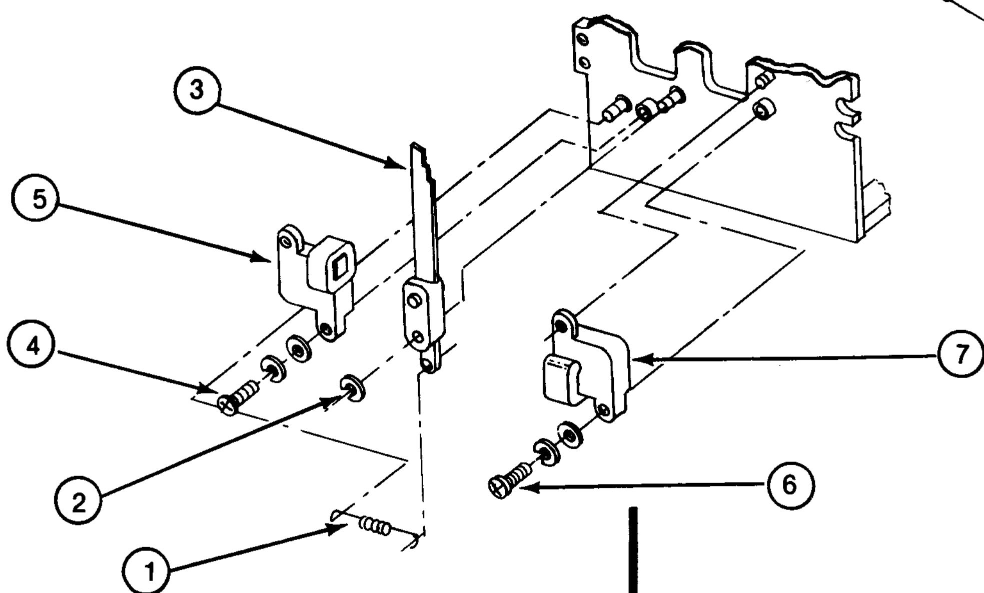
LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Left-hand ribbon-lift mechanism	Ribbon-lift drivers	• Unsolder and tag leads to terminals E5, E6, E7, and E8 on circuit card assembly. • Remove three screws and washers (1). Retain three spacers (2) for reassembly.	
	Circuit card assembly	• Grasp circuit card assembly and pull it until connector (3) is free from its mating pins .	
REASSEMBLY			
Left-hand ribbon-lift mechanism	Circuit card assembly	• Mate circuit card connector with printer subassembly mating (motherboard) pins.	
	Ribbon-lift drivers	• Position spacers one at a time; secure with screws and washers. • Solder leads from magnet assembly (4) to E5 (black) and E8 (red). • Route red and black leads from magnet assembly (5) under circuit card assembly and solder red lead to E6 and black to E7.	

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Left-hand ribbon-lift mechanism	Lift armature	• Remove spring (1) from lift armature (2). • Remove E-ring (3). • Remove E-ring (4) and position arm (5) until lift armature clears the stud on inside of the arm. • Remove lift armature by pulling it away from mounting frame. **NOTE** Lift armature must be completely removed for arm assembly removal.	
	Arm assembly	• Remove E-ring (6). • Lift roller (7) from stud (8). • Remove nut (9) and lockwasher; remove stud. • Remove two screws and washers (10), nut plate (11), and stop (12).	

B. PRINTER SUBASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY	Arm assembly	• Insert stop and stud. • Replace roller and E-ring.	
REASSEMBLY	Lift armature	• Install lift armature and secure with E-ring. • Replace spring and E-ring.	

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Left-hand ribbon-lift mechanism	Drop armature	• Remove spring (1). • Remove E-ring (2). • Pull drop armature (3) from mounting frame.	
	Magnet assemblies	• Unsolder leads from E5 and E8 on circuit card assembly. • Remove screws and washers (4). • Remove magnet assembly (5). • Unsolder leads from E6 and E7 on circuit card assembly. • Remove screws and washers (6). • Remove magnet assembly (7).	

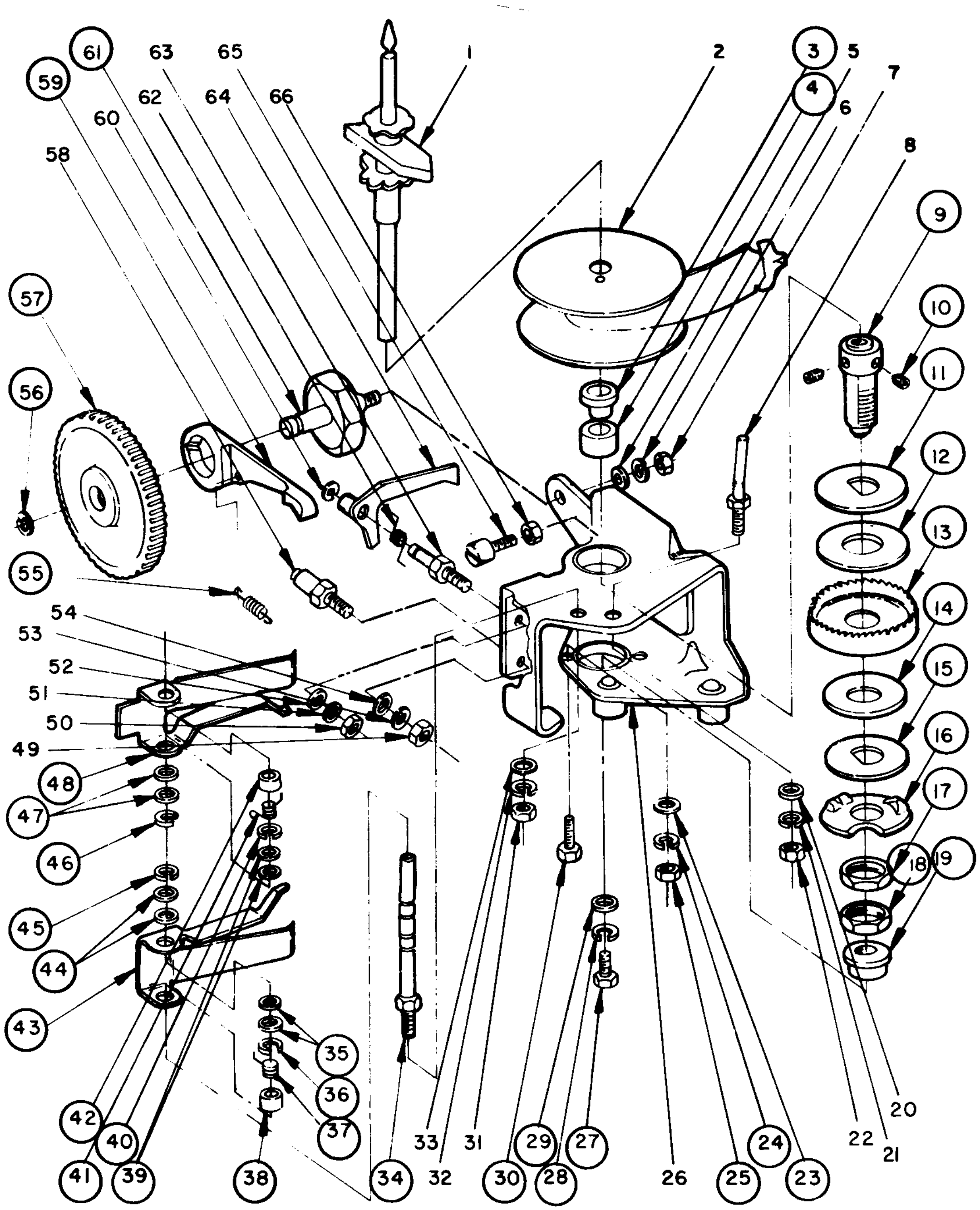


B. PRINTER SUBASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY	Magnet assemblies	• Place magnet assembly (3) into position and secure. Solder leads to E6 and E7 on circuit card assembly. • Place magnet assembly (5) into position and secure. Solder leads to E5 and E8 on circuit card assembly.	
REASSEMBLY	Drop armature	• Place drop armature on mounting frame. • Replace E-ring and spring.	

C. RIBBON MECHANISM: DISASSEMBLY AND REASSEMBLY

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Printer assembly	Ribbon mechanism	• Remove the printer assembly (refer to para 5-11K).	Refer to Ribbon Mechanism, page 5-52.
Ribbon mechanism	Spool spindle	• Remove screw (27), lockwasher (28) and flatwasher (29). • Loosen two setscrews (10). • Lift spool spindle with spacer (3) and ball bearing (4) from clutch mechanism ((9) through (18)). **NOTE** When spool spindle is lifted, clutch mechanism may be removed from bearing (19).	
	Clutch mechanism	• Remove clutch mechanism ((9) through (18)). • Remove nuts (17) and (18), spring washer (16), disk (15), friction disk (14), ratchet (13), friction disk (12) and disk (11).	



RIBBON MECHANISM

LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY			
Ribbon mechanism	Clutch mechanism	• Replace disk (11), friction disk (12), ratchet (13), friction disk (14), disk (15), spring washer (16) and nuts (17) and (18). • Position clutch mechanism in bearing.	
	Spool spindle	• Position spool spindle into clutch mechanism and tighten two set-screws. • Replace flat washer (29), lock-washer (28) and screw (27). • Adjust tension in accordance with paragraph 4-14C.	

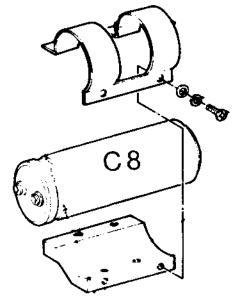
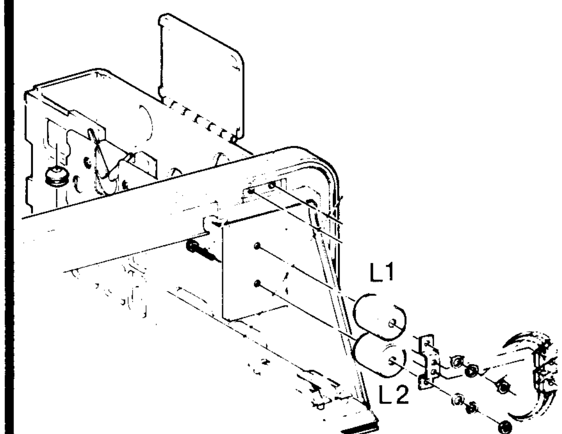
C. RIBBON MECHANISM: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Ribbon mechanism	Sensing lever	• Remove E-ring 40 . • Position lever 48 to clear upper ribbon spool and lift lever upward until spacer 42 , spring 41 and spacers 39 can be removed from shaft 34 . • Remove E-rings 45 and 46 and spacers 44 and 47 and E-ring 36 . • Repeat procedure for lever 43 , spacers 35 , spring 37 and spacer 38 .	
REASSEMBLY			
Ribbon mechanism	Sensing lever	• Replace spring and spacers on shaft lever 43 . • Replace lever 48 , spring, and spacers. • Replace shaft 34 . • Secure E-rings. • Perform adjustments in accordance with paragraph 4-14E.	

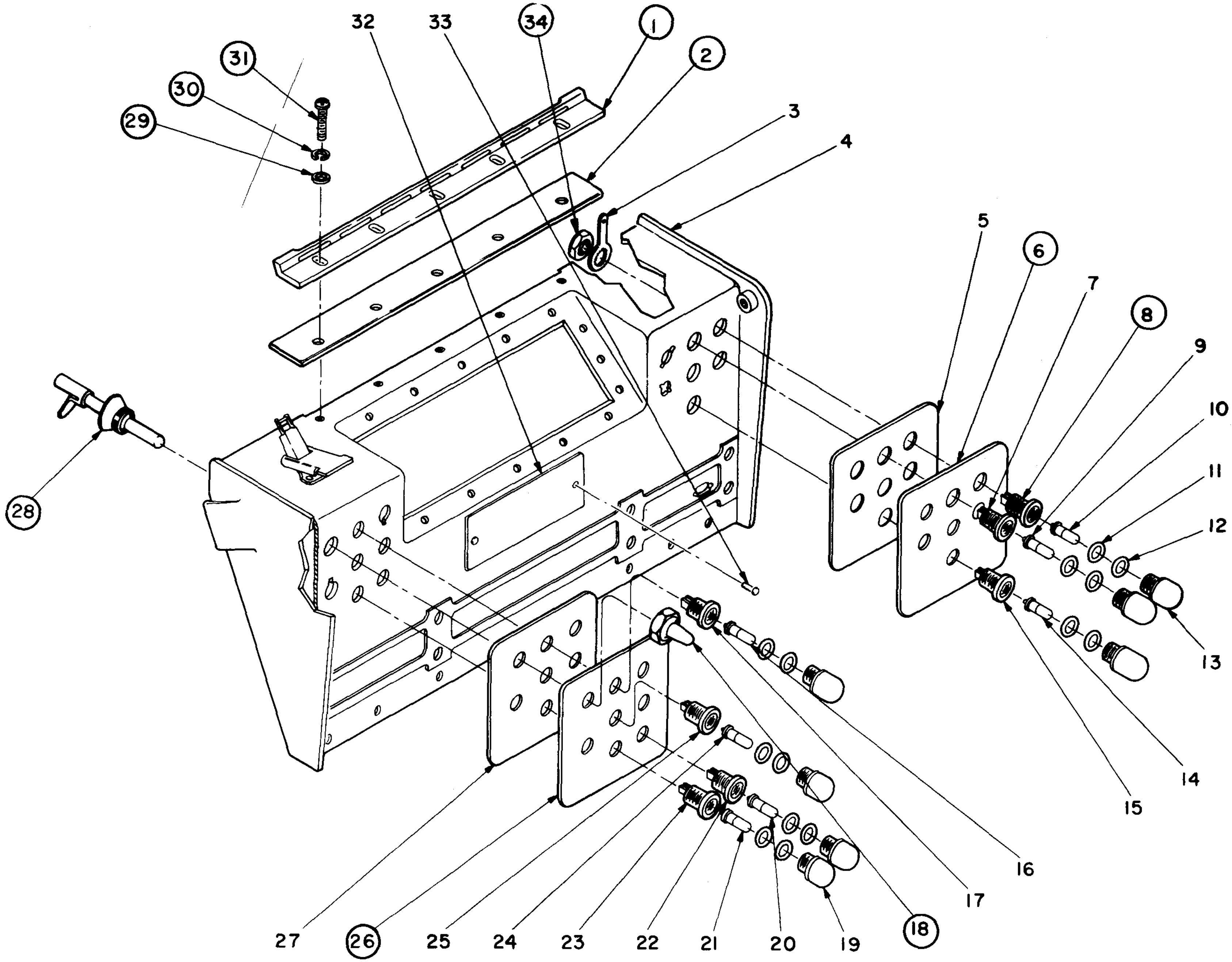
C. RIBBON MECHANISM: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Ribbon mechanism	Feed pawl	• Remove E-ring 56 and gear 57 . • Remove spring 55 and pawl 59 .	
REASSEMBLY			
Ribbon mechanism	Feed pawl	• Position pawl and gear on stud 61 . • Replace spring and secure into position with E-ring. • Perform adjustments in accordance with paragraph 5-15B.	

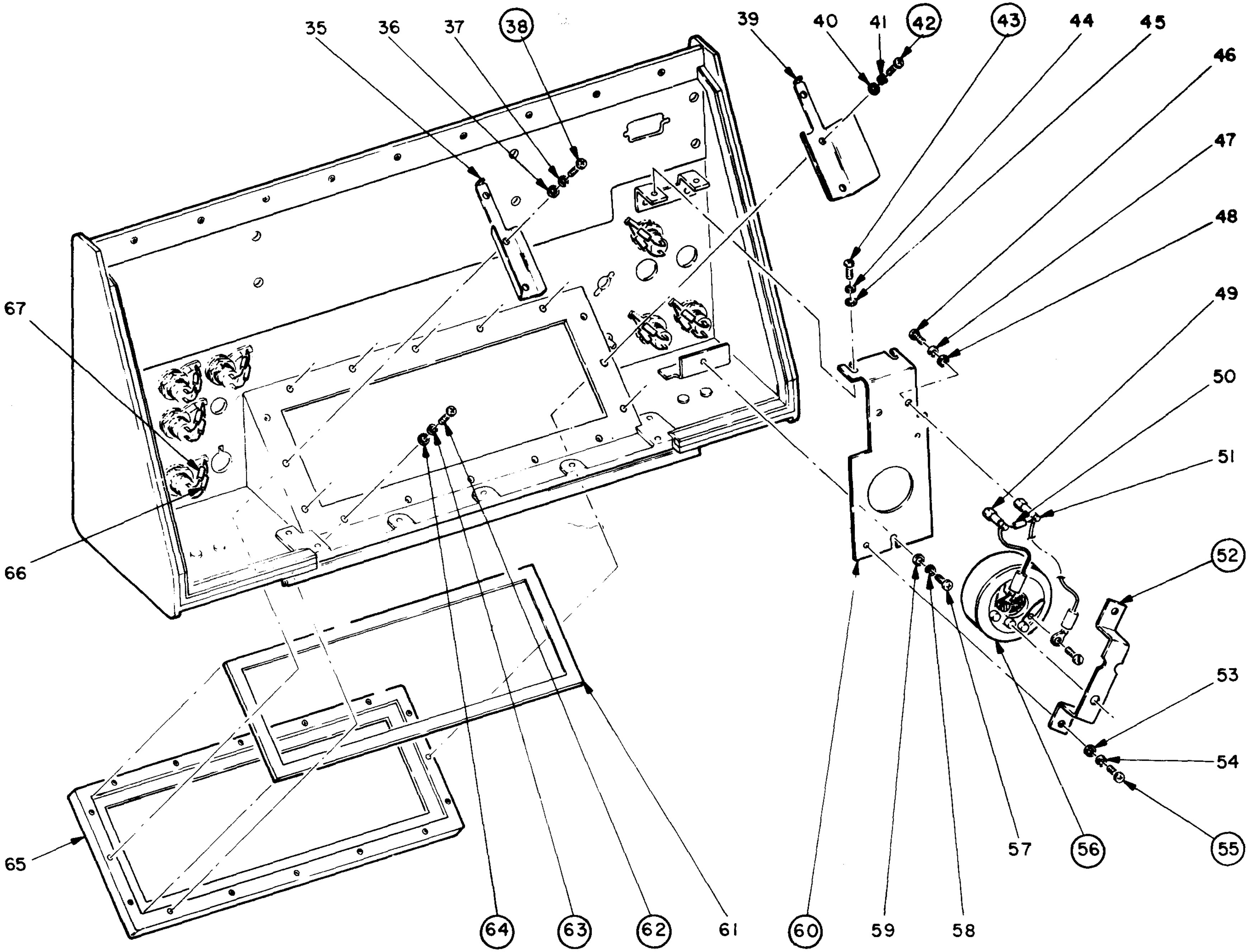
D. CHASSIS ASSEMBLY: DISASSEMBLY AND REASSEMBLY

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Chassis assembly	Filter module	• Remove as directed in paragraph 5-11G.	
	Harness assembly	• General support maintenance item. (Remove as directed in para 6-10.)	
	Capacitor C8	**NOTE** Remove printer assembly as directed in paragraph 5-11K. **WARNING** Discharge capacitor C8 before attempting removal.	
		• Remove four screws from clamp assembly. • Tag and unscrew two leads from capacitor. • Remove capacitor.	
	Inductors L1 and/or L2	**NOTE** Circuit cards must be removed to gain access to screws securing L1 and L2.	
		• Tag and disconnect leads from inductors. • Remove two screws and bracket. • Remove inductors.	

LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY			
	Inductors L1 and/or L2	• Position inductors and replace bracket. • Reconnect leads. • Replace circuit cards.	
	Capacitor C8	**WARNING** Discharge capacitor C8 before replacing. • Position capacitor and replace clamp. • Reconnect leads.	
	Filter module	• Replace as directed in paragraph 5-11G.	
	Harness assembly	• General support maintenance item. (Replace as directed in para 6-10.)	



DUSTCOVER ASSEMBLY (Sheet 1 of 2)



DUSTCOVER ASSEMBLY (Sheet 2 of 2)

E. DUSTCOVER ASSEMBLY: DISASSEMBLY AND REASSEMBLY

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
Chassis assembly	Dustcover	• Disassemble and reassemble dustcover by removal and replacement of piece parts. • Place POWER switch in OFF position. • Lower dustcover.	
REMOVAL		**NOTE** Receiver assembly must be removed prior to removal of piece parts on the right side of the dustcover.	
Dustcover	Receiver assembly	• Loosen three screws (43) which secure receiver assembly plate (60) and move assembly aside. • Unsolder leads from E1 (WHT) and E2 (ORG) and remove receiver assembly.	Refer to Dustcover Assembly, page 5-59.
REPLACEMENT			
	Receiver assembly	• Solder wires to their respective terminals. • Secure receiver assembly into place with three screws.	

E. DUSTCOVER ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
REMOVAL	Receiver	• Tag and remove terminal lugs on receiver (56) by removing two screws. • Remove two screws (55) securing receiver bracket (52) and remove receiver.	Refer to Dustcover Assembly, page 5-59.
REPLACEMENT	Receiver	• Replace receiver in bracket and secure bracket into place with two screws. • Replace two screws holding terminal lugs.	
REMOVAL Dustcover	Frame and window	• Remove 16 screws (62) lockwashers (63) and flat washers (64) which secure window frame to dustcover. **NOTE** Copy lamps must be removed to gain access to screws (38) and (42) • Remove window and frame.	
REPLACEMENT	Frame and window	• Install replacement window into position and secure with 16 screws. • Replace copy lamps.	

E. DUSTCOVER ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
	Paper exit	• Remove five screws (31), lock-washers (30), and flat washers (29). • Remove tear bar (1). • Remove gasket (2).	Refer to Dustcover Assembly, page 5-58.
REPLACEMENT			
	Paper exit	• Position gasket into place. • Position tear bar into place. • Secure with five screws, lock-washers, and flat washers.	
REMOVAL			
POWER ON/OFF switch	Lever assembly	• Remove rubber boot (18) from toggle (28) by turning nut (part of boot securing it to lever assembly) counterclockwise. • Remove lever assembly.	
REPLACEMENT			
	Lever assembly	• Position bent portion of lever toward bottom of unit. • Secure into position with nut (rubber boot) by turning clockwise.	

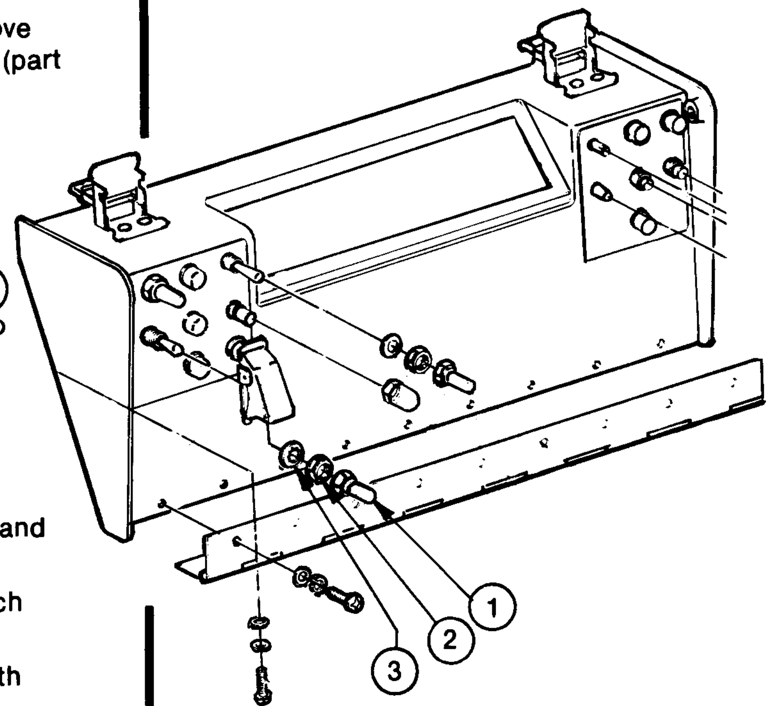
E. DUSTCOVER ASSEMBLY: DISASSEMBLY REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
LINE PAPER LOW BAT XMT END OF LINE MEM FULL MSG RCVD	Lamp socket	• Tag and unsolder leads on inside of dustcover. • Remove rear locking nut (34) and slide lamp socket (8) forward through its hole in dustcover.	Refer to Dustcover Assembly, page 5-58.
REPLACEMENT			
	Lamp socket	• Position lamp socket in its hole and secure with locking nut. • Solder wires to their respective terminals.	
REMOVAL			
TRANSFER PARITY RESET AUDIO ALM RESET LINE FEED	Switch	• Tag and unsolder leads on inside of dustcover. • Remove front mounting nut and remove switch assembly from the rear.	
REPLACEMENT			
	Switch	• Position switch in its mounting hole and secure with front mounting nut. • Solder wires to their respective terminals.	

E. DUSTCOVER ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
ILLUM AUDIO	Potentiometer	• Tag and unsolder leads on inside of dustcover. • On front of dustcover loosen setscrews securing knob to shaft and remove knob. • Remove front mounting nut from potentiometer and remove potentiometer from the rear.	
REPLACEMENT			
	Potentiometer	• Position potentiometer into mounting hole and secure with front mounting nut, making sure potentiometer shaft is turned fully clockwise. • Solder wires to their respective terminals. • Aline knob to point to OFF and tighten setscrew.	

E. DUSTCOVER ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Chassis assembly	ABORT switch	• Raise ABORT switch cover and remove protective boot (1) by turning nut (part of boot) counterclockwise. • Remove switch cover. • Lower dustcover. • Tag and unsolder three wires from ABORT switch. • On front of dustcover remove nut (2) and washer (3) securing switch to dustcover. • Remove switch from the rear.	
REPLACEMENT			
	ABORT switch	• Place positioning washer on switch and insert switch in mounting hole. • Place safety cover on threaded switch shaft with hinge up. • Aline tang on positioning washer with small hole above mounting hole. • Secure switch and safety cover to dustcover with washer and nut. • Install protective boot. • Reconnect leads.	

E. DUSTCOVER ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

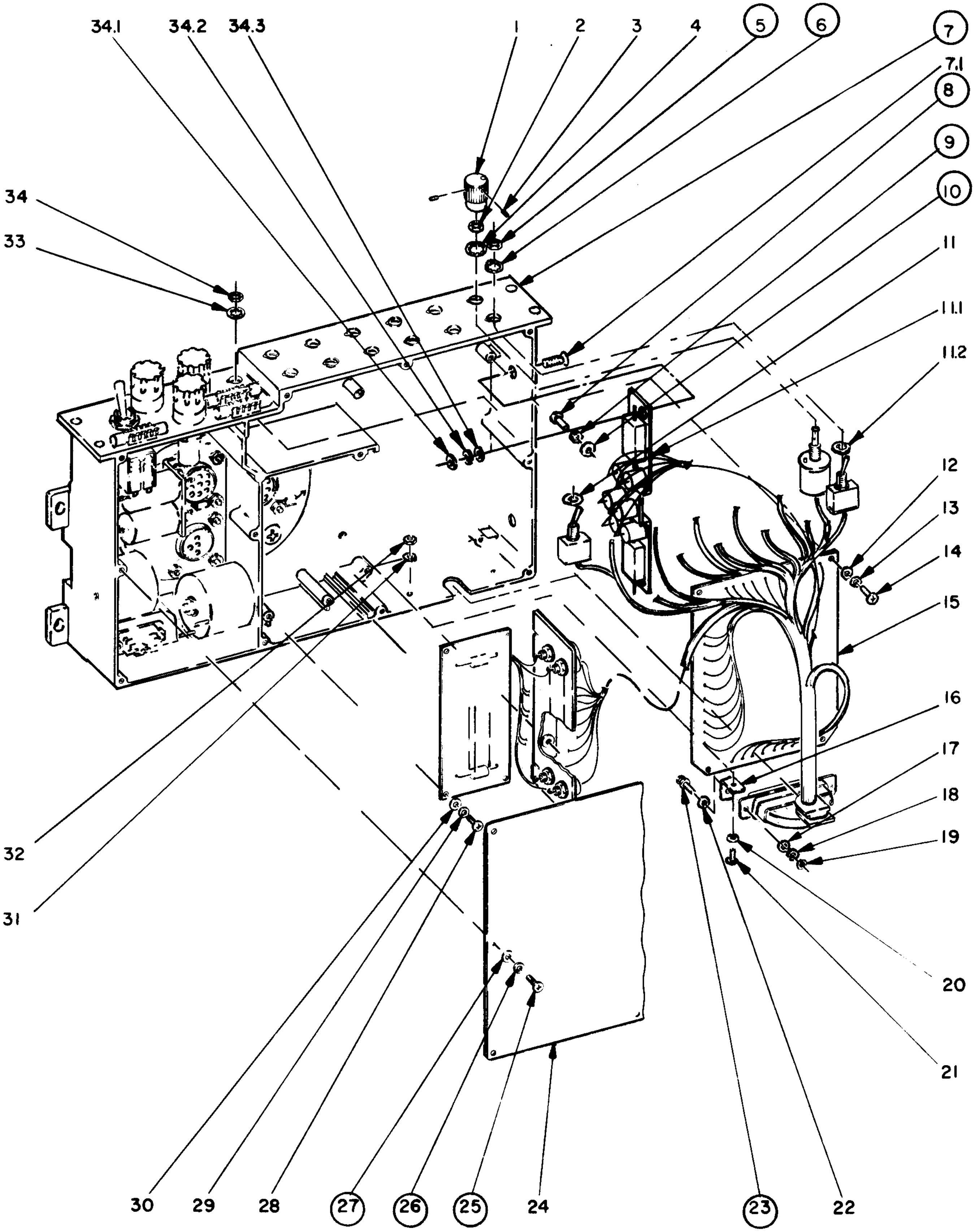
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Dustcover assembly	Designation plate	• Remove switches, potentiometers, and lamps as required to free designation plates 6 or 26 . **CAUTION** Be sure to mark all wires as to proper switch, potentiometer, and lamp connections. • Remove designation plate and gasket.	Refer to Dustcover Assembly, page 5-58.
REPLACEMENT			
	Designation plate	• Position designation plate and gasket into place. • Replace switches, potentiometers, and lamps as required.	

F. INTERFACE ASSEMBLY: DISASSEMBLY AND REASSEMBLY

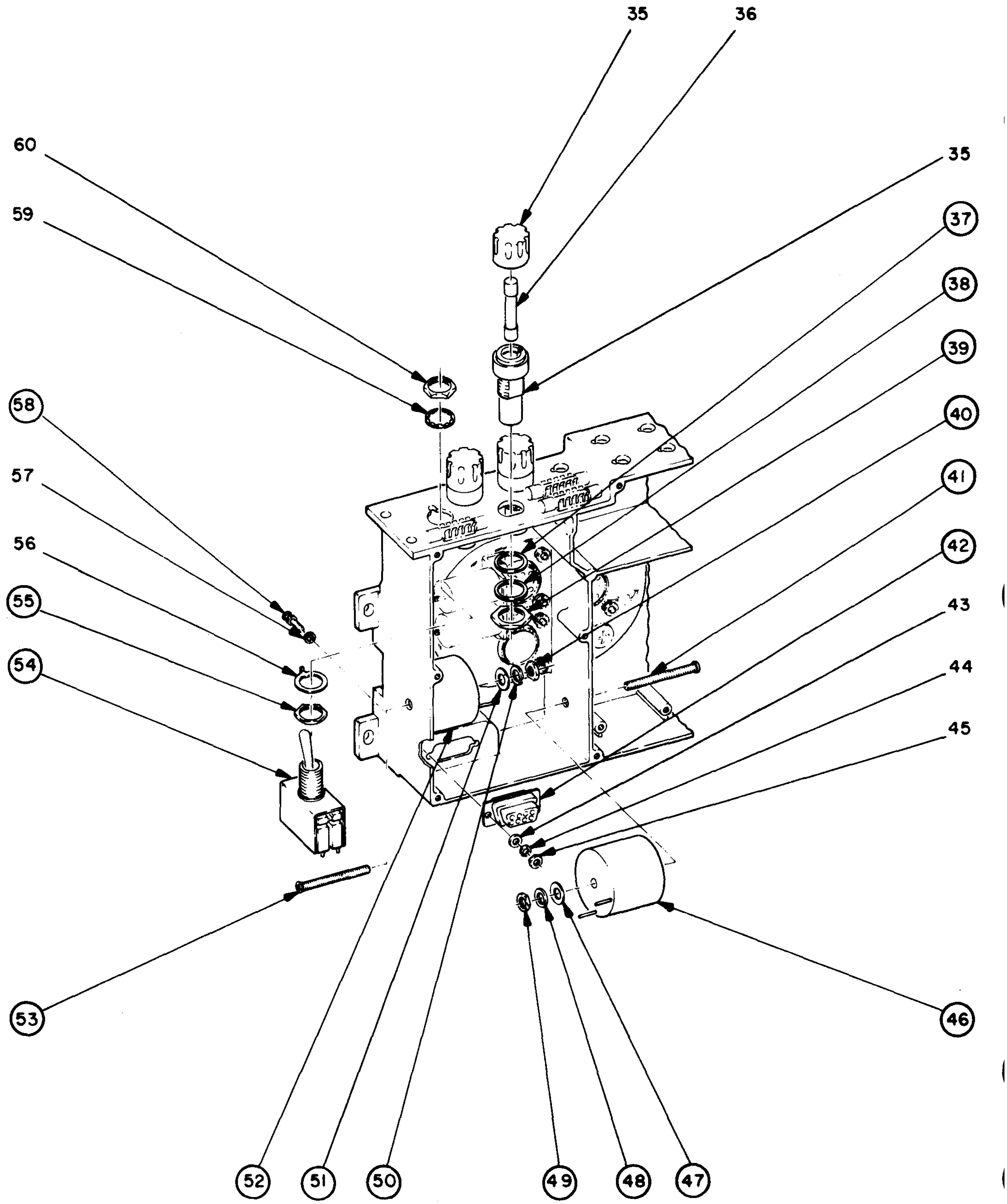
LOCATION	ITEM	ACTION	REMARKS
Rear of terminal	Interface assembly	• Remove the interface assembly (refer to para 5-11C).	
DISASSEMBLY			
Interface assembly	Rear cover	• Remove 12 screws (25), lock-washers (26), and flat washers (27). • Remove rear cover.	Refer to Interface Assembly, page 5-69.
	Fuseholder	• Remove shrink tubing and unsolder leads from fuseholder. • Mark leads for replacement. • Remove nut (39), lockwasher (38), and flat washer (37). • Lift fuseholoer from interface assembly.	Refer to Interface Assembly, page 5-70.
REASSEMBLY			
	Fuseholder	• Position replacement fuseholder in proper hole. • Secure into place with washers and nuts. • Solder wires to their respective terminals.	

F. INTERFACE ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

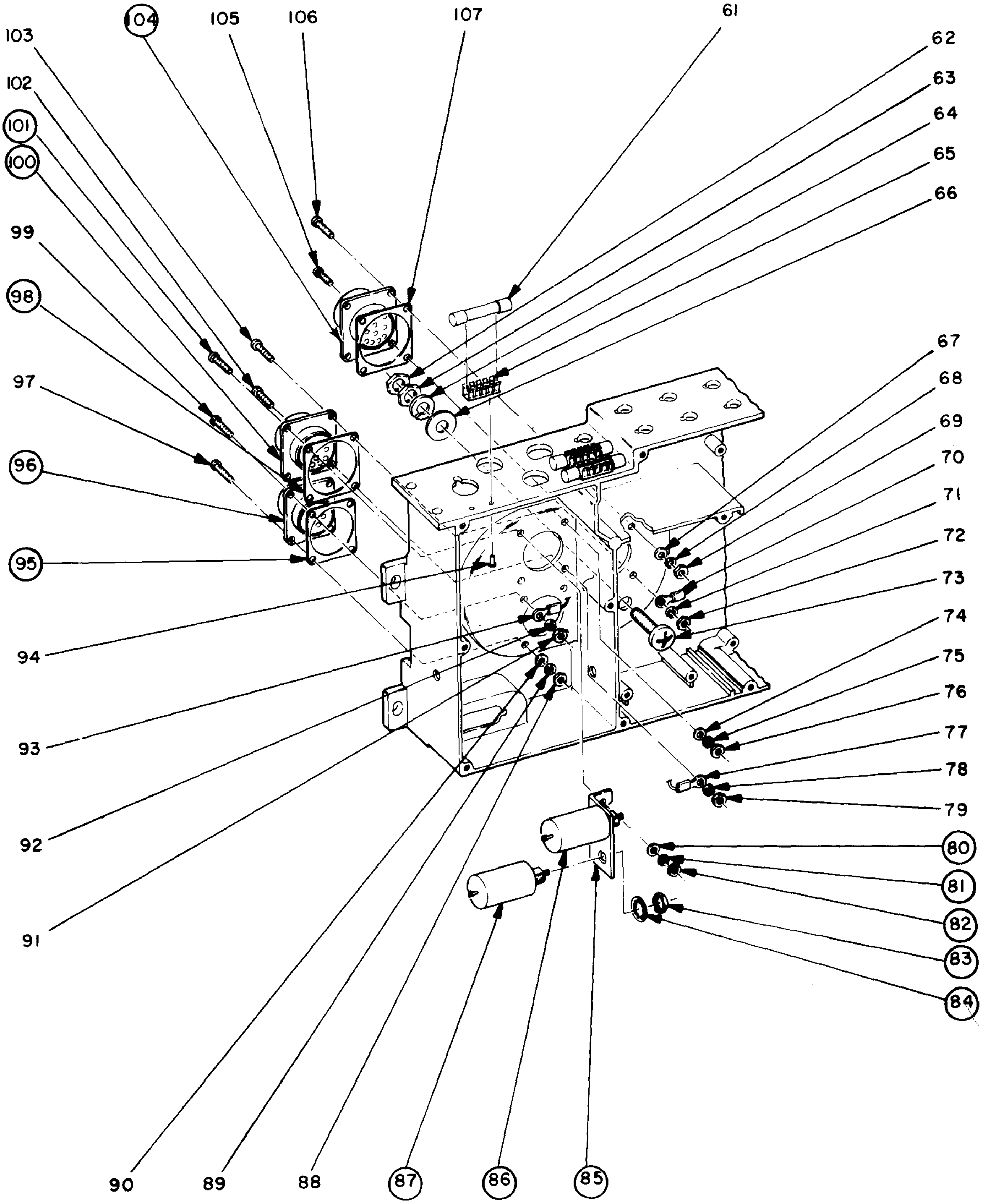
LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY	Toggle switch	**NOTE** Only toggle switches 54, 110, 112, 116, 148, 149, 150 are authorized for replacement at direct support. Rotary switches and remaining toggle switches are replaced at general support. • Tag and unsolder wires from toggle switch to be removed. • Remove nut (5) and lockwasher (6) as applicable for switch to be removed. • Remove switch.	Refer to Interface Assembly, page 5-69.
REASSEMBLY	Toggle switch	**NOTE** If switch (54) is being replaced, place inside nut (55) 3/16 inch ± 1/32 away from switch body. • Replace switch and secure into position with nut and lockwasher. • Solder wires to their respective terminals.	



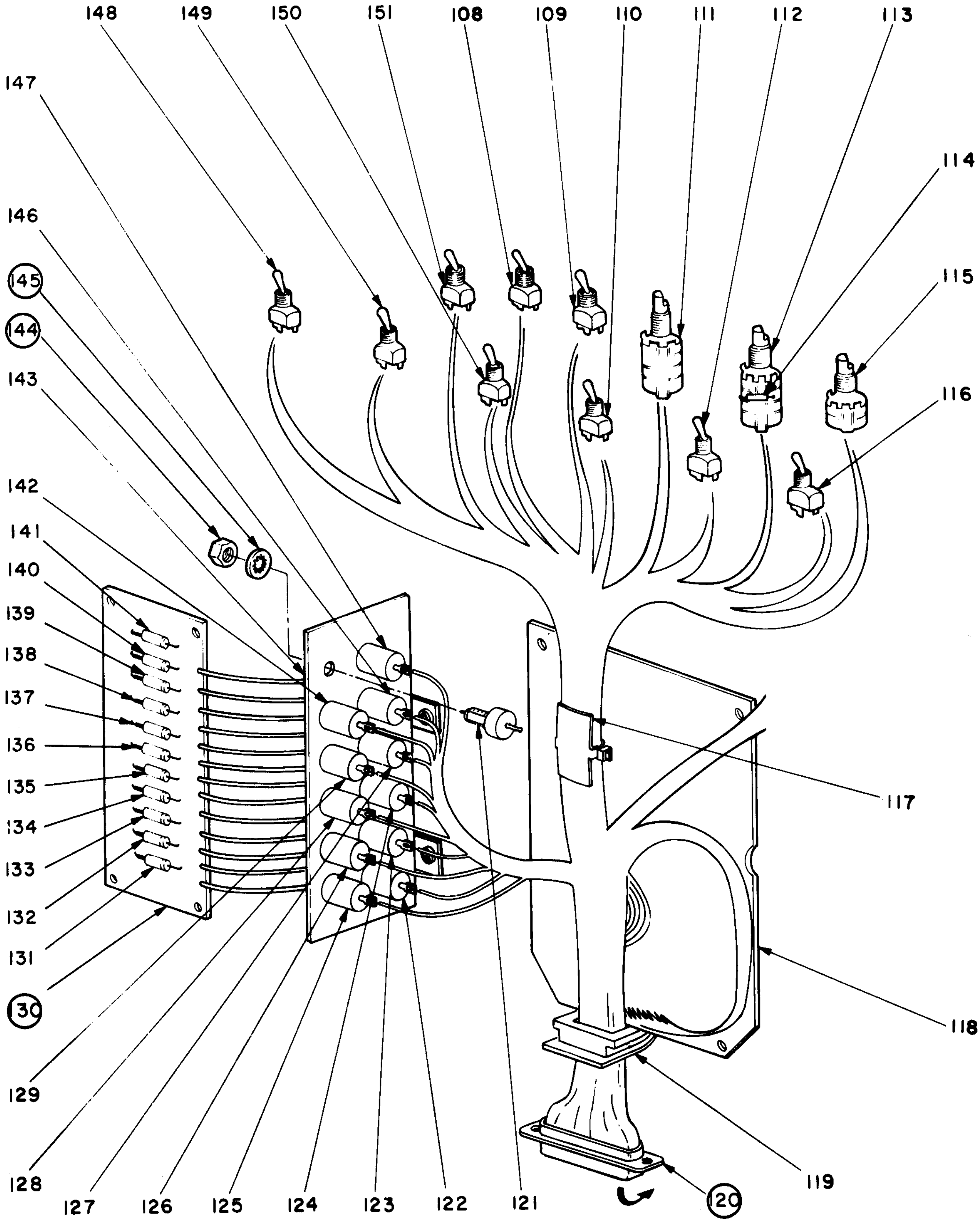
INTERFACE ASSEMBLY (Sheet 1 of 4)



INTERFACE ASSEMBLY (Sheet 2 of 4)



INTERFACE ASSEMBLY (Sheet 3 of 4)



INTERFACE ASSEMBLY (Sheet 4 of 4)

F. INTERFACE ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
	J1, J2, and J3 connectors	**NOTE** Remove four mounting screws on diode board (130) and gently lift to gain access to connector J1 wiring. • Tag and unsolder each wire to connector (96), (100), or (104) to be removed. • Remove four screws and washers securing connector to housing (7). • Remove connector (and ground wires for J2 and J3). • Removal of gasket (95), (98), or (107) may now be performed by pulling gasket from housing.	Refer to Interface Assembly, page 5-72.
REASSEMBLY			
	J1, J2, and J3 connectors	• Place gasket in position. • Secure connector in place using four screws. • Solder wires to their respective terminals.	

F. INTERFACE ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
	J4 and J5 connectors	• Tag each wire in connector (42) or (120) to be removed. • Using appropriate extraction tool (M24308/18-1 for connector J4 and MS27534-22D for connector J5) remove pins as follows: Insert extraction tool over wire connected to pin to be removed. Slide tool over pin until it bottoms in pin socket. Gently pull wire, tool and pin from connector. • Remove all pins from connector by repeating procedure. • Remove two screws (23) or (58) securing connector being removed to housing (7). • Remove connector.	Refer to Interface Assembly, pages 5-70, 5-72.
REASSEMBLY			
	J4 and J5 connectors	• Position connector in mounting hole. • Pull wires through their respective holes. • Secure connector in place with two screws.	

F. INTERFACE ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
	Filter A7A1FL1 thru FL12	**NOTE** Remove four mounting screws and gently lift diode board 130 to gain access to all filters. • Tag and remove wires from filter to be removed. • Remove nut 144 and washer 145 from filter to be removed. • Remove filter. • Filter plate is removed by performing procedure for all filters and removing two screws 8, lockwashers 9, and flat washers 10.	Refer to Interface Assembly, page 5-72.
REASSEMBLY			
	Filter A7A1FL1 thru FL12	• Position replacement filter in respective mounting hole. • Secure with nut and washer. • Solder wires to their respective terminals.	

F. INTERFACE ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

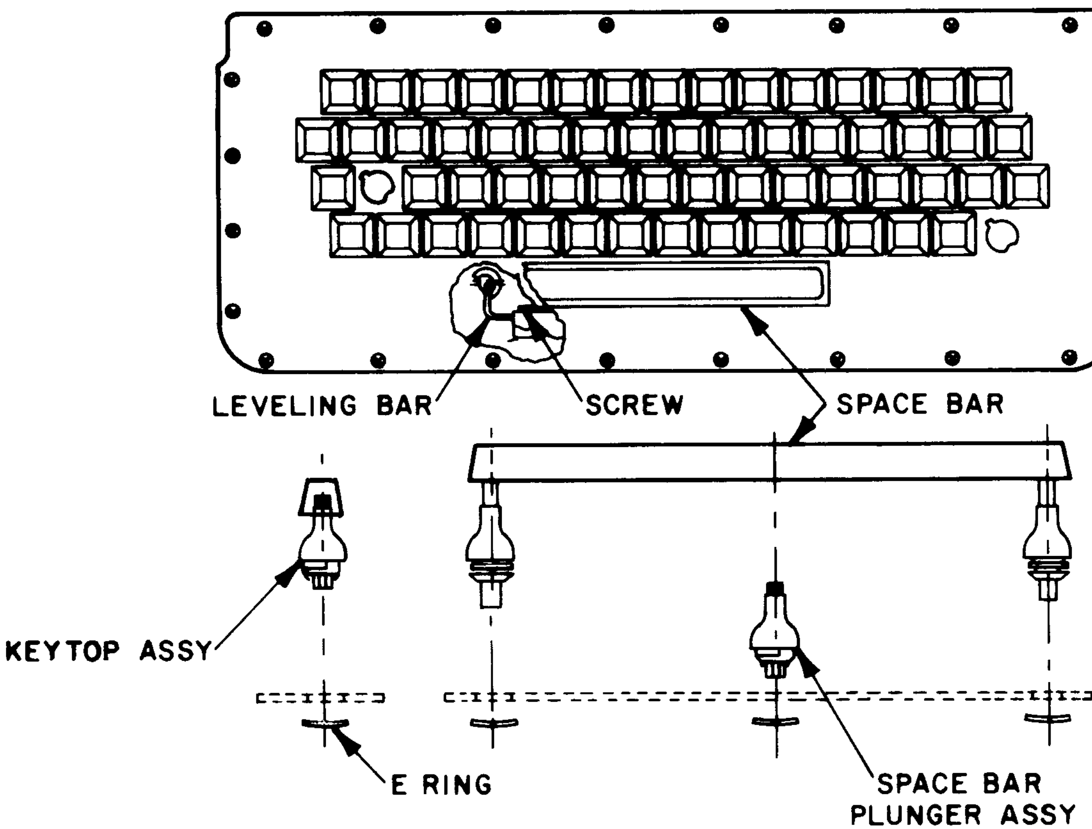
LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
	Filter A7FL1 and FL2	• Tag and remove wires from filter (86) or (87) to be removed. • Remove nut (83) and lockwasher (84) from filter to be removed. • Remove filter from its bracket (85). • Remove bracket by performing procedure for other filter and removing two screws (101), nut (82), lockwasher (81), and flat washer (80).	Refer to Interface Assembly, page 5-71.
REASSEMBLY			
	Filter A7FL1 and FL2	• Position filter in bracket and secure with lockwasher and nut. • Replace wires to their respective terminals.	

F. INTERFACE ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
	Inductors	**NOTE** Remove four mounting screws on diode board (130) and gently lift to gain access to inductor L2.	Refer to Interface Assembly, page 5-70.
	Inductor L2	• Tag and remove wires from inductor (46) or (52) to be removed. • Remove screw (41) with off-set screwdriver. Remove nut (49), lockwasher (48) and flat washer (47). • Remove inductor.	
	Inductor L1	• Remove screw (53), nut (40), lockwasher (50) and flat washer (51). • Remove inductor.	
REASSEMBLY			
	Inductor L2	• Position inductor in housing. • Secure inductor with screw, washers and nut. • Secure diode board with four screws. • Replace wires to their respective terminals.	
	Inductor L1	• Position inductor into housing. • Secure inductor with screw, washers and nut. • Replace wires to their respective terminals.	
REASSEMBLY	Rear cover	• Place cover on interface assembly and secure.	

G. KEYBOARD ASSEMBLY: DISASSEMBLY AND REASSEMBLY

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
		• For removal and replacement of keyboard components, remove keyboard assembly as directed in paragraph 5-110.	
REMOVAL			
Keyboard housing	Sealing ring	• Remove sealing ring.	Refer to illustration in paragraph 5-110.
REPLACEMENT			
	Sealing ring	• Install new sealing ring, being careful not to stretch ring as it is inserted into its groove.	
REMOVAL			
Keyboard housing	Connector mounting plate and gasket	• Remove four connector plate mounting screws. • Remove connector mounting plate. • Remove connector mounting plate gasket.	
REPLACEMENT			
	Connector mounting plate and gasket	• Install replacement gasket and position connector mounting plate into place. • Secure with four screws.	



PANEL ASSEMBLY

G. KEYBOARD ASSEMBLY: DISASSEMBLY AND REASSEMBLY - Continued

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
Panel assembly	Plunger assembly	• Remove E-ring and lift out keytop and plunger assembly.	Refer to Panel Assembly, page 5-79.
REPLACEMENT			
	Plunger assembly	• Install new plunger assembly and secure with E-ring. • Install keytop.	
REMOVAL			
Panel assembly	Space bar	• Remove two screws securing leveling bar to panel assembly. • Remove three E-rings securing space bar to panel and remove space bar. • Remove center plunger assembly by pulling it away from space bar.	
REPLACEMENT			
	Space bar	• Install new space bar and secure with three E-rings. • Replace two screws securing leveling bar to panel assembly.	
REASSEMBLY			
Keyboard housing	Keyboard assembly	• Replace keyboard assembly as directed in paragraph 5-110.	

Section VI. DIRECT SUPPORT MAINTENANCE ADJUSTMENTS

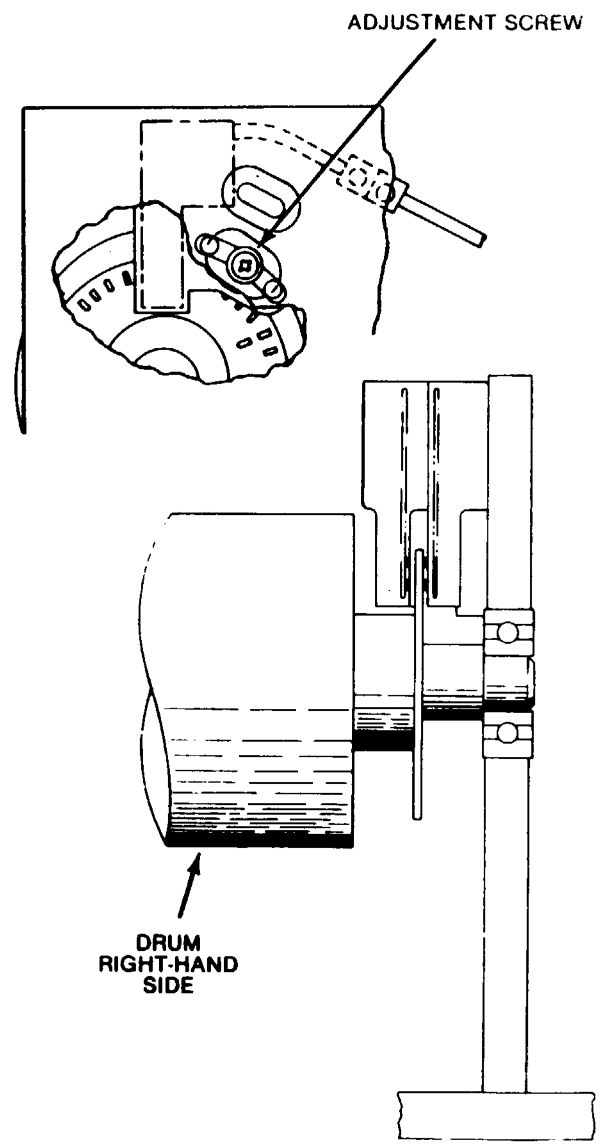
5-14. GENERAL

This section describes direct support maintenance adjustment procedures for the following:

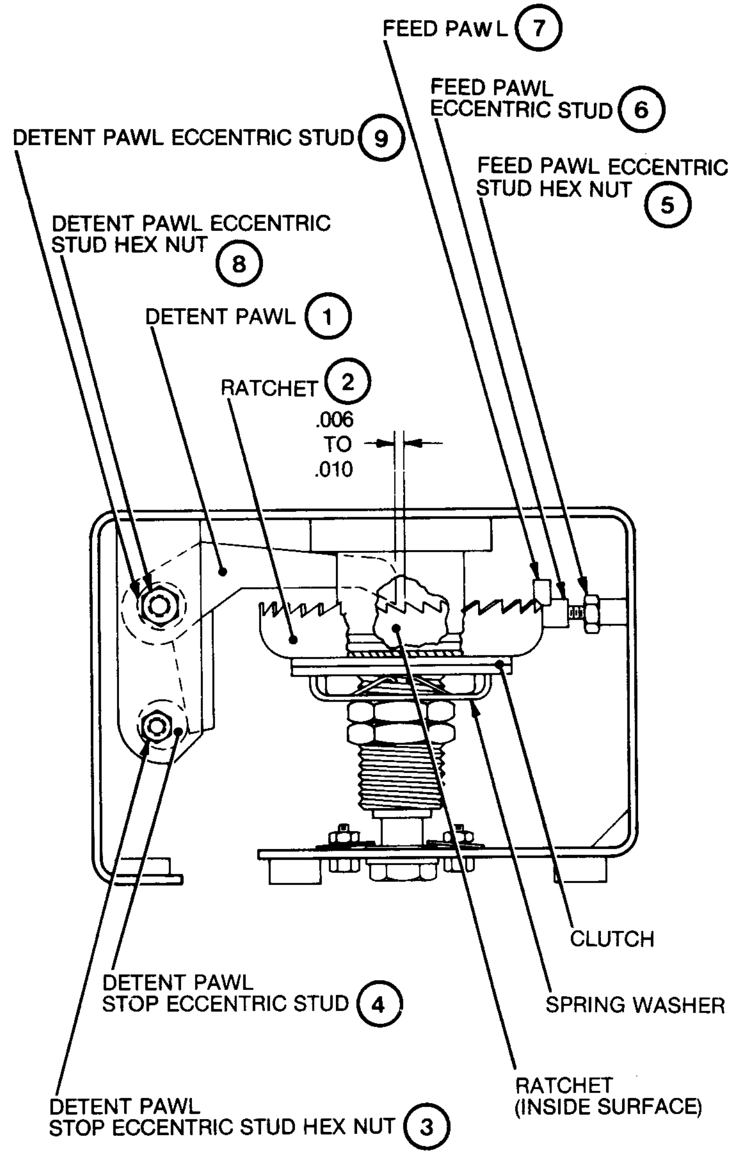
A. TIMING
B. RIBBON-FEED
C. RIBBON-LIFT MECHANISM RELEASE SOLENOID
D. RIBBON-LIFT MECHANISM LIFT SOLENOID
E. RIBBON-HEIGHT
F. PRINTER SUBASSEMBLY

5-15. ADJUSTMENT PROCEDURES

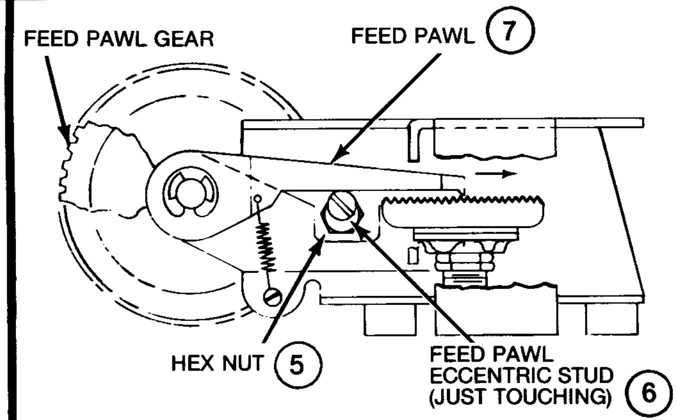
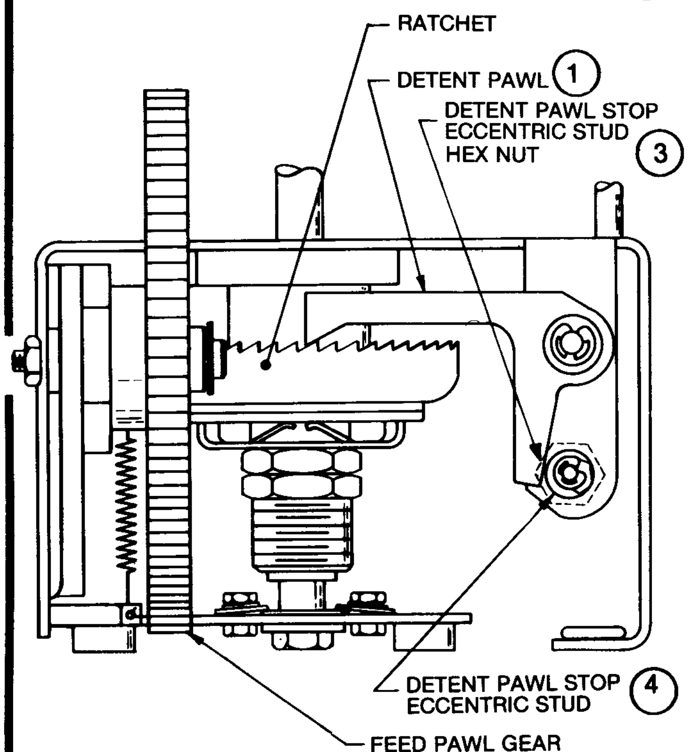
A. TIMING MECHANISM ADJUSTMENT

ITEM/LOCATION	PROCEDURE	REMARKS
Timing mechanism; right side of chassis	REQUIREMENT - Hammer timing shall be adjusted to produce complete and legible printed characters. • While in keyboard test of Self-Test (table 2-5, item 6) press REV, RPT to print a line of diamond figures ◊ . • With power off, remove four circuit cards, protective screen and tiebar to gain access to timing mechanism. • Loosen adjustment screw. • Rotate timing mechanism. • Reinstall four circuit cards, and print line of diamond figures. (All points of diamonds are printed.) • With power off, remove four circuit cards and tighten adjustment screw. • Replace four circuit cards, protective screen and tiebar. • Recheck for requirement. When adjusting the timing mechanism using Printer Assembly extension cables NSN 5995-00-404-5981 and NSN 5995-00-404-3283, use the following procedure: 1. While in keyboard test of self-test (table 2-5, item 6) press REV, RPT to print a line of diamond figures. 2. Loosen adjustment screw. 3. Rotate timing mechanism until diamond figures are printed clearly and completely. 4. Tighten adjustment screw.	

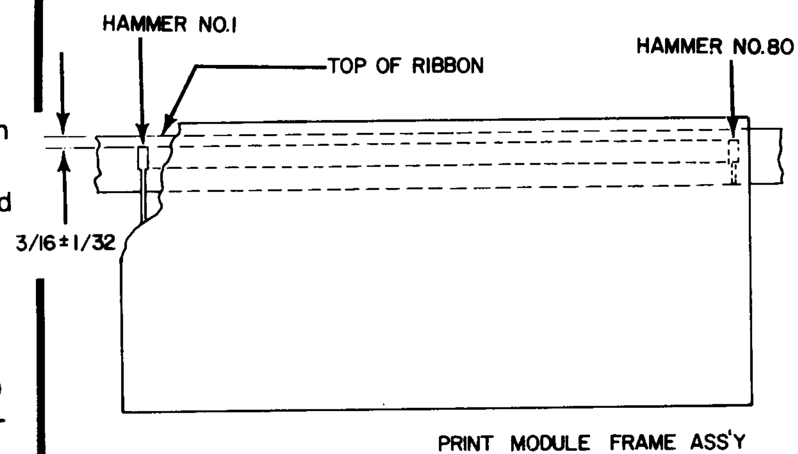
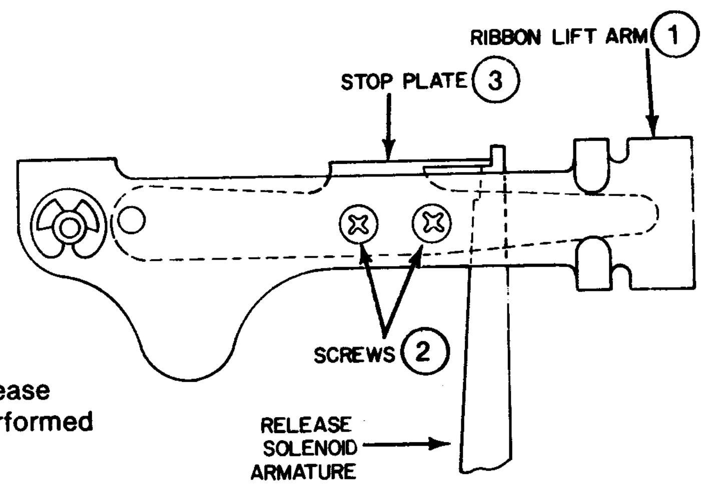
B. RIBBON-FEED MECHANISM ADJUSTMENT

ITEM/LOCATION	PROCEDURE	REMARKS
1. Ribbon-feed mechanism; detent pawl eccentric stud	*Following procedures require removal of ribbon mechanism from printer assembly. REQUIREMENT - There must be 0.006 to 0.010 inch clearance between detent pawl (1) and ratchet tooth (2) when feed pawl (7) is at a maximum forward position. **NOTE** Line up mark on feed pawl gear with feed pawl eccentric stud 6 for a feed pawl maximum forward position. • Loosen hex nut (3) that secures detent pawl stop eccentric stud (4). • Move detent pawl stop eccentric stud away from detent pawl. • Loosen hex nut (5) that secures feed pawl eccentric stud (6). • Move feed pawl eccentric stud away from feed pawl (7). • Loosen hex nut (8) that secures detent pawl eccentric stud (9). • Rotate detent pawl eccentric (located on detent pawl eccentric stud) to meet requirement and then tighten detent pawl eccentric stud hex nut. **NOTE** The feed pawl eccentric and the detent pawl eccentric will be positioned in 2 and 3 below.	

B. RIBBON-FEED MECHANISM ADJUSTMENT - Continued

ITEM/LOCATION	PROCEDURE	REMARKS
2. Ribbon-feed mechanism; feed pawl eccentric stud	REQUIREMENT - Feed pawl (7) must have maximum engagement with ratchet teeth during pawl's forward motion and must clear next tooth to be fed during pawl's rearward motion. • Position feed pawl gear so feed pawl is at its maximum forward travel. • Position feed pawl eccentric stud (6) to just touch feed pawl and tighten hex nut (5) .	
3. Ribbon-feed mechanism; detent pawl stop eccentric stud	REQUIREMENT - Detent pawl (1) must fully engage but not bottom out in ratchet teeth. • Manually spin feed pawl gear clockwise (direction of feed) observing that detent pawl bottoms in ratchet teeth, producing a clicking sound. • Adjust stop eccentric stud (4) until clicking sound stops. • Tighten stop eccentric stud hex nut (3) .	

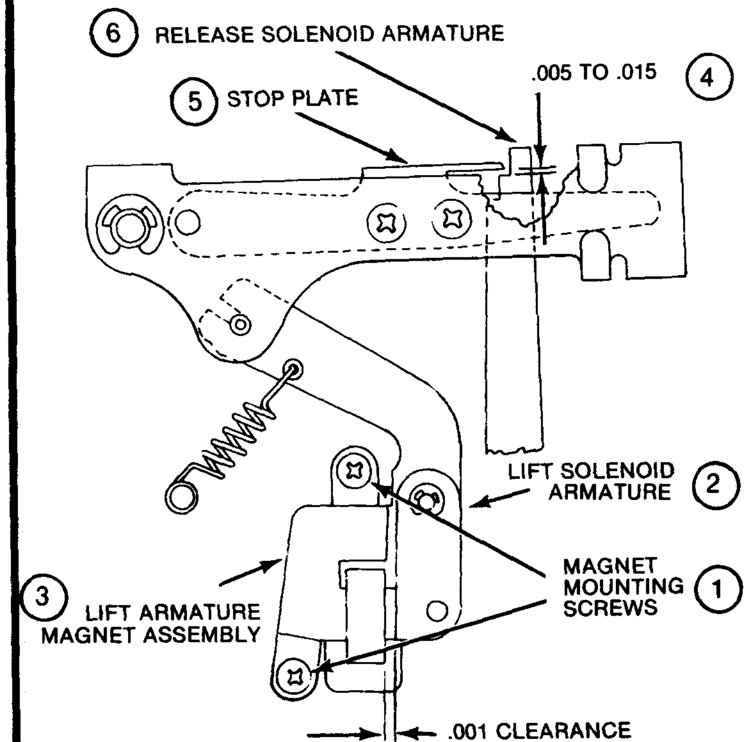
C. RIBBON HEIGHT ADJUSTMENT

ITEM/LOCATION	PROCEDURE	REMARKS
Ribbon-lift mechanism	REQUIREMENT - Top of ribbon must be positioned 3/16 inch ±1/32 above hammers 1 and 80 when right and left ribbon lift arms are latched in up position. • Remove printer subassembly as directed in paragraph 5-11M. • Latch ribbon lift arm (1) on right and left ribbon-lift mechanisms in up position. • Loosen two screws (2) (friction tight) that secure stop plate (3) to each ribbon lift arm. • Position right stop plate to meet requirement and tighten screws. • Position left stop plate to meet requirement and tighten screws. • Recheck both ribbon-lift mechanisms for requirement.	 

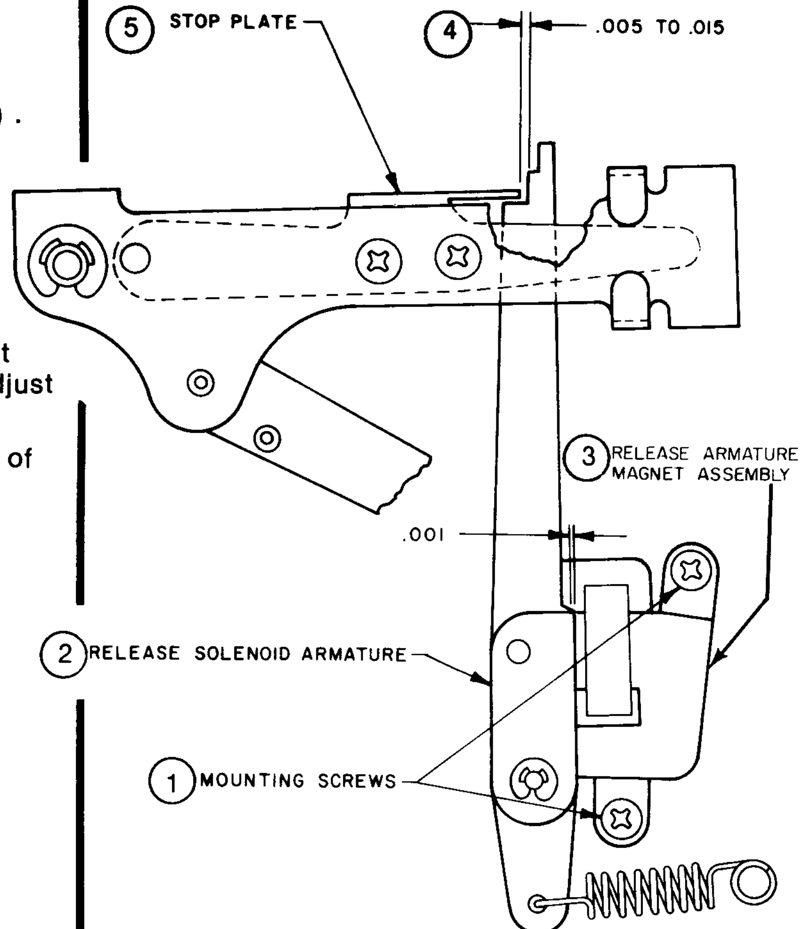
NOTE

Lift solenoid adjustment (para 5-15D) and release solenoid adjustment (para 5-15E) must be performed in sequence after ribbon height adjustment.

D. RIBBON-LIFT MECHANISM LIFT SOLENOID ADJUSTMENT

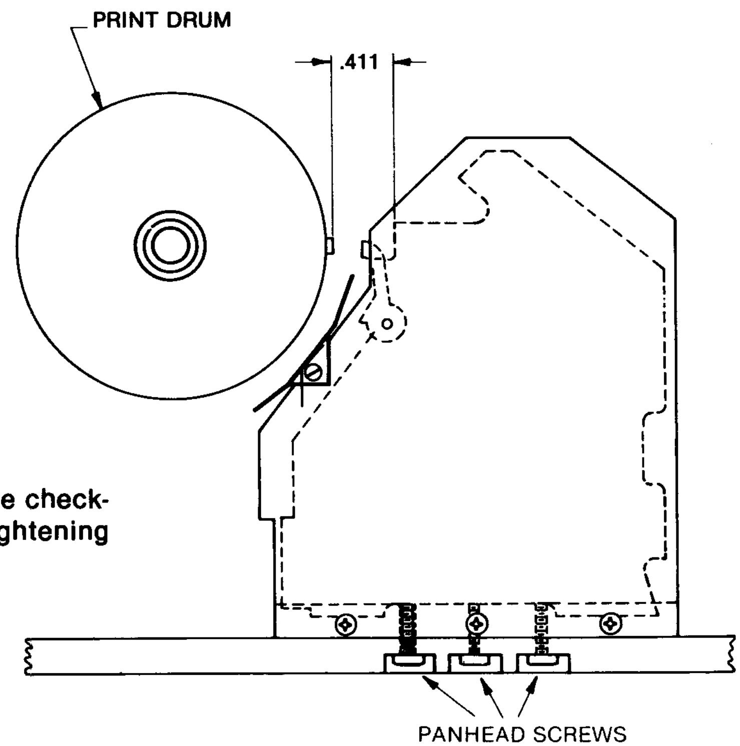
ITEM/LOCATION	PROCEDURE	REMARKS
Ribbon-lift mechanism	REQUIREMENT - There must be 0.005 to 0.015 inch clearance between stop plate and latching surface of release solenoid armature when lift solenoid armature is held against lift armature magnet assembly. • Loosen two magnet mounting screws (1) . • Place a 0.001 inch shim between lift solenoid armature (2) and lift armature magnet assembly (3) . • Position lift solenoid armature against lift armature magnet assembly and adjust for the 0.005 to 0.015 inch clearance (4) between stop plate (5) and latching surface of release solenoid armature (6). • Tighten two magnet mounting screws; remove shim. • Repeat procedures for other side ribbon-lift mechanism. • Recheck both ribbon-lift mechanisms for requirement.	

E. RIBBON-LIFT MECHANISM RELEASE SOLENOID ADJUSTMENT

ITEM/LOCATION	PROCEDURE	REMARKS
Ribbon-lift mechanism	REQUIREMENT - **There must be 0.005 to 0.015 inch clearance between stop plate and stop surface of release solenoid armature when release solenoid armature is held against release armature magnet assembly.** • Loosen two magnet mounting screws (1) . • Place a 0.001 inch shim between release solenoid armature (2) and release armature magnet assembly (3) . • Position release solenoid armature against release armature magnet assembly and adjust for the 0.005 to 0.015 inch clearance (4) between stop plate (5) and stop surface of release solenoid armature. • Tighten two magnet mounting screws; remove shim. • Repeat procedures for other side ribbon-lift mechanism. • Recheck both ribbon-lift mechanisms for requirement.	

F. PRINTER SUBASSEMBLY ALINEMENT

ITEM/LOCATION	PROCEDURE	REMARKS
Printer subassembly	REQUIREMENT - Position of printer subassembly shall be 0.411 inch away and parallel to print drum with print hammers alined with their respective print columns on print drum. • Loosen three printer subassembly mounting screws (friction tight). • Position printer subassembly so that first hammer and eightieth hammer are alined to first and eightieth print column on drum. • Place 0.411 gauges over print hammers 1 and 80. • Reposition printer subassembly as required to provide a 0.411 inch gap between printer subassembly and print drum. • Verify that hammers 1 and 80 are still properly alined with their respective columns. **NOTE** Printer subassembly alinement may have to be checked with the printing of type and subsequent tightening of the three securing screws. • Tighten three screws which secure printer subassembly to base plate.	



Section VII. DIRECT SUPPORT TEST PROCEDURES

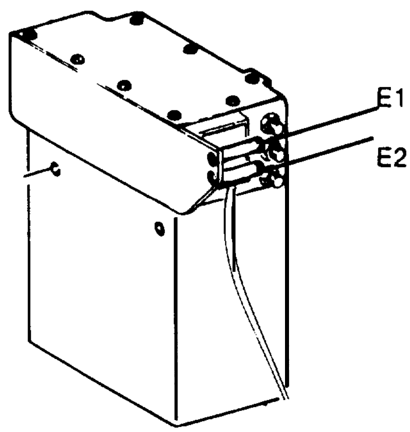
5-16. GENERAL

Perform the terminal test (an overall function test) in the following paragraph to determine if equipment has been properly repaired and can be returned to stock. This test is a compilation of tests from chapter 2 and chapter 4.

5-17. TERMINAL TEST

Preliminary Test

- With power off, extend the terminal and connect AN/USM-223 to E1; E2 on the filter module.
- Measure a resistance greater than 100K to the chassis after an initial capacitor charging indication.



Power Supply Test

- Check power supply outputs (refer to para 5-9).

Self-Test, Loop-Back Test and Battery Back-Up Test

- Refer to table 2-5.

Line Feed Test

- Transmit the composed message.
- Activate ABORT switch immediately after the terminal begins line feeding. The terminal will halt its line-feed function and issue a prompt sequence.
- Press the LINE FEED switch on the dustcover. The line-feed function will perform.

TRANSFER Switch Test

- Remove loop back plug from connector J1.
- With power removed, measure continuity across pins R and S. There will be continuity with TRANSFER switch at ON position and no continuity with TRANSFER switch at OFF position.

Memory Test

NOTE

Perform this test only when a battery backup supply and cable are available to the terminal.

- Operate terminal with STATE switch at ICT position and information stored in message memory.
- Remove input power from terminal by disconnecting prime power source from connector J2.
- Reconnect prime power source to connector J2. The terminal will print the Operation Validation/State Determination message. Check the contents of message memory.

CHAPTER 6

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

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Section I. GENERAL INFORMATION

Section II. TOOLS AND EQUIPMENT

Section III. TROUBLESHOOTING

Section IV. REMOVAL AND REPLACEMENT OF TERMINAL ASSEMBLIES

Section V. DISASSEMBLY AND REASSEMBLY OF TERMINAL COMPONENTS

Section VI. GENERAL SUPPORT TESTING PROCEDURES

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Section VII. TEST FIXTURES DISASSEMBLY AND REASSEMBLY

Section VIII. TEST FIXTURE TEST PROCEDURES

Section I. GENERAL INFORMATION

6-1. GENERAL

This chapter contains information necessary for general suppport personnel to perform maintenance tasks allocated to general support by the maintenance allocation chart (MAC) in appendix B. The chapter describes tools and equipment required, procedures for troubleshooting, removal and replacement, disassembly and reassembly, and testing.

6-2. GENERAL SUPPORT MAINTENANCE PROCEDURES

Maintenance procedures described in lower categories of maintenance (organizational and direct support), and maintenance procedures in this chapter are all included in general support maintenance. Testing procedures in this chapter determine acceptability of repaired equipment. These procedures set forth specific requirements that the repaired equipment must meet before it is returned to using organization.

6-3. MODIFICATION WORK ORDERS

Performance standards listed in Sections VI and Vlll assume that current modification work orders (MWO) have been performed. Any MWO's pertaining to this equipment that may have been published after the date of this publication will be listed in DA Pam 310-1. MWO'S other than those classified URGENT shall not be a reason for rejection.

Section II. TOOLS AND EQUIPMENT

6-4. REQUIRED TOOLS AND TEST EQUIPMENT

a. For common tools and equipment, refer to the Modified Table of Organization (MTOE) applicable to your unit.

b. Table 6-1 contains a list of all tools and test equipment required by general support maintenance personnel for performance of tasks described in this chapter.

Table 6-1. GENERAL SUPPORT TOOLS AND TEST EQUIPMENT

Tool Equipment TE-50B
Multimeter AN/USM-223
Loop Back Plug, Honeywell (SM-B-916000)
Oscilloscope AN/USM-281C
Frequency Counter AN/USM-207
Pace Kit
Power Supply PP-2309/U (six each)
Function Generator SG-1133/U (Hewlett-Packard Model 3312A)
Voltmeter, Digital AN/GSM-64B
Tool Kit, Electronic Equipment TK-105/G
Tool, Drum Puller, Honeywell (SM-C-964466)
Test Fixture, Driver Board, Honeywell (SM-C-915982)
Test Fixture, Hammer Module, Honeywell (SM-C-915985)
Test Fixture, PWB (LF/CC) Assembly, Honeywell (SM-C-915988)
Test Fixture, Filter Assembly, Honeywell (SM-C-915994)
Test Fixture, Power Supply, Honeywell (SM-D-915979)
Test Fixture, Interface Assembly, Honeywell (SM-D-915991)
Test Fixture, Keyswitch Assembly, Honeywell (SM-C-915997)
Test Set, Telegraph AN/GGM-15(V)2
Remover, Module, Honeywell (SM-B-916003) (two each)
Power Cable, UGC-74A, 120 Vac (SM-D-764481)
Power Cable, UGC-74A, 230 Vac (SM-D-764482)
Power Cable, UGC-74A, 26 Vdc (SM-D-764480)
Data Cable Assembly (SM-D-915889)
Rolling Punch, Cambion No. 6629

The following are used only at a specialized repair activity (SRA), category L in the Maintenance Allocation Chart.

Interconnection Device, CPU Circuit Card Assembly
Interconnection Device, MRY Circuit Card Assembly
Interconnection Device, Comm Circuit Card Assembly
Interconnection Device, PRT CTRL Circuit Card Assembly
Test and Repair System, Electronic Equipment AN/MSM-105(V)1

6-5. SPECIALIZED TEST EQUIPMENT

Test and Repair System, Electronic Equipment AN/MSM-105(V)1 is located at a designated Specialized Repair Activity (SRA) and is operated only by skilled personnel trained in its function.

6-6. REPAIR PARTS

Repair parts are listed and illustrated in the repair parts and special tools list TM 11-5815-602-34P covering General Support Maintenance for this equipment.

Section III. TROUBLESHOOTING

6-7. GENERAL INSTRUCTIONS

General Support troubleshooting procedures in this manual supplement those of Organizational and Direct Support Maintenance for the terminal. The systematic troubleshooting procedures include organizational and direct support sectionalization checks of the complete system; removal and replacement of components.

6-8. TROUBLESHOOTING PROCEDURES

a. Troubleshooting procedures for modules/assemblies tested at general support card become part of the test procedures for these modules/assemblies. Assemblies which are not testable by themselves (i.e., printer assembly, printer subassembly) may be fault isolated using table 6-2.

CAUTION

Before applying power to the terminal for the first time, check the value of fuses F1 and F2. If fuses are 1½A, operate only with ac power. If fuses are 6¼4A, operate only with 26Vdc power.

b. Refer to the following tables and test setups for troubleshooting a defective module/assembly.

Module/Assembly	Troubleshooting Table No.	Test Set-Up Paragraph No.
• Chassis Assembly	6-2	
• Hammer Driver (3A1A5A2-A3)	6-3	6-23
• Hammer Module (3A1A5A4-A23)	6-4	6-24
• Motor Driver and Current Control Board (3A1A5A3)	6-5	6-25
• Interface Assembly (3A1A7)	6-6,6-7,6-8,6-9	6-26
• Power Supply (3A1PS1)	6-10a,b,c,d,e	6-27
• Filter Assembly (3A1A6FL1)	6-11	6-29
• Keyboard Keyswitch Assembly (3A2A1)	6-12	6-30

c. For repair of modules/assemblies, use tools in Pace Kit and Tool Kit, Electronic Equipment TK-105/G and TE-50/B. Where required, recoat repaired area with conformal coating type UR MIL-I-46058.

d. After repair, repeat the test procedures to verify the repair action.

Table 6-2. TROUBLESHOOTING CHASSIS ASSEMBLY

MALFUNCTION/SYMPTOM TEST PROCEDURE	ASSEMBLY TO BE TESTED INDICATION	YES	NO
1 PRINT DRUM DOES NOT ROTATE	**HARNESS ASSEMBLY**		
Replace harness assembly (refer to para 6-10).	Print drum rotates.	Return to service.	Troubleshoot print drum wiring (fig. FO-6).
2 RIBBON LIFT/DROP INOPERATIVE	**PRINTER SUBASSEMBLY MOTHERBOARD, HARNESS ASSEMBLY**		
Step 1- Check continuity from printer subassembly P1 pin 20 to printer subassembly motherboard E34; from P1 pin 10 to E38 (refer to fig. 6-9).	Less than 1 ohm.	Go to step 2.	Replace (para 5-11M) or repair (para 6-17) printer subassembly.
Step 2- Check continuity from J1-20 to harness assembly XA4-40; from J1-10 to XA4-41 (refer to fig. 6-7).	Less than 1 ohm.	Return to service.	Replace harness assembly (refer to para 6-10).
3 KEYBOARD INOPERATIVE	**HARNESS ASSEMBLY**		
Replace harness assembly (refer to para 6-10).	Keyboard operates.	Return to service.	Troubleshoot keyboard keyswitch assembly (refer to table 6-12).

Table 6-3. TROUBLESHOOTING HAMMER DRIVER 3A1A5A2-A3 (fig. 6-1)

MALFUNCTION/SYMPTOM TEST PROCEDURE	INDICATION	YES	NO
NO +18VDC POWER TO HAMMER MODULES			
NOTE Use test setup as directed in paragraph 6-23.			
Step 1- With test fixture SELECT switch at IN 1, connect AN/USM-281 across SIG OUT 1 (pins 9 and 10).	Observe a 60HZ ±10%, 0 to 18V ±5% square wave on channel B of scope.	Go to step 2.	Use scope and fault isolate to failed piece part.
Step 2- Compare function generator output on channel A of scope with channel B.	Waveforms should coincide (same frequency and wave shape).	Go to step 3.	Replace defective parts.
Step 3- Place test fixture SELECT switch to IN 2. Connect AN/USM-281 across SIG OUT 2 (pins 7 and 8).	Observe a 60HZ ±10%, 0 to 18V ±5% square wave on channel B of scope.	Go to step 4.	Use scope and fault isolate to failed piece part.
Step 4- Compare function generator output on channel A of scope with channel B.	Waveforms should coincide (same frequency and wave shape).	Return to service.	Replace defective parts.

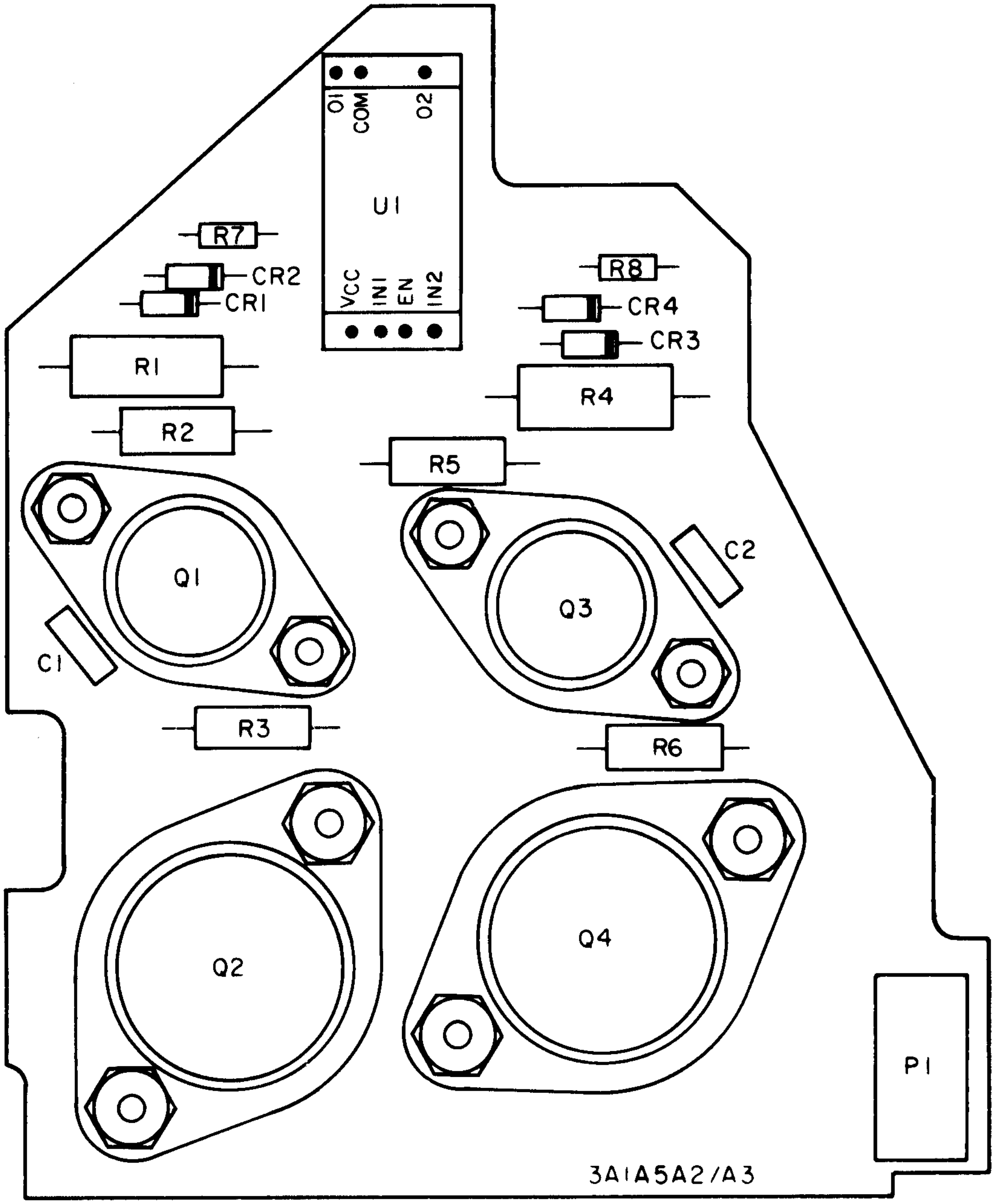


FIGURE 6-1. PRINT DRIVER MODULE.

Table 6-4. TROUBLESHOOTING HAMMER MODULE 3A1A5A4-A23 (fig. 6-2)

MALFUNCTION/SYMPTOM TEST PROCEDURE	INDICATION	YES	NO
HAMMER MODULE MALFUNCTIONS			
NOTE Use test setup as directed in paragraph 6-24.			
Step 1- Place HMR 1 to ON position and simultaneously press CONTROL pushbutton.	HMR 1 should move forward and remain forward for as long as both HMR 1 and CONTROL are energized.	This action supplies +18 Vdc to pin 2 (hammer driver circuit No. 1) and a logic control (ground) to pin 3. Go to step 2.	Use multi-meter and isolate fault to failed piece part.
CAUTION If troubleshooting requires circuit to be energized for a prolonged period (more than a few seconds), reduce +18 Vdc to +10 Vdc to prevent heating of circuitry.			
Step 2- Place HMR 2 to ON position and simultaneously press CONTROL pushbutton	HMR 2 should move forward and remain forward for as long as both HMR 2 and CONTROL are energized.	+18 Vdc to pin 7; go to step 3.	Use multi-meter and isolate fault to failed piece part.
Step 3- Place HMR 3 to ON position and simultaneously press CONTROL pushbutton.	HMR 3 should move forward and remain forward for as long as both HMR 3 and CONTROL are energized.	+18 Vdcto pin 5; go to step 4.	Use multi-meter and isolate fault to failed piece part.
Step 4- Place HMR 4 to ON position and simultaneously press CONTROL pushbutton.	HMR 4 should move forward and remain forward for as long as both HMR 4 and CONTROL are energized.	+18 Vdc to pin 1; return to service-	Use multi-meter and isolate fault to failed piece part.

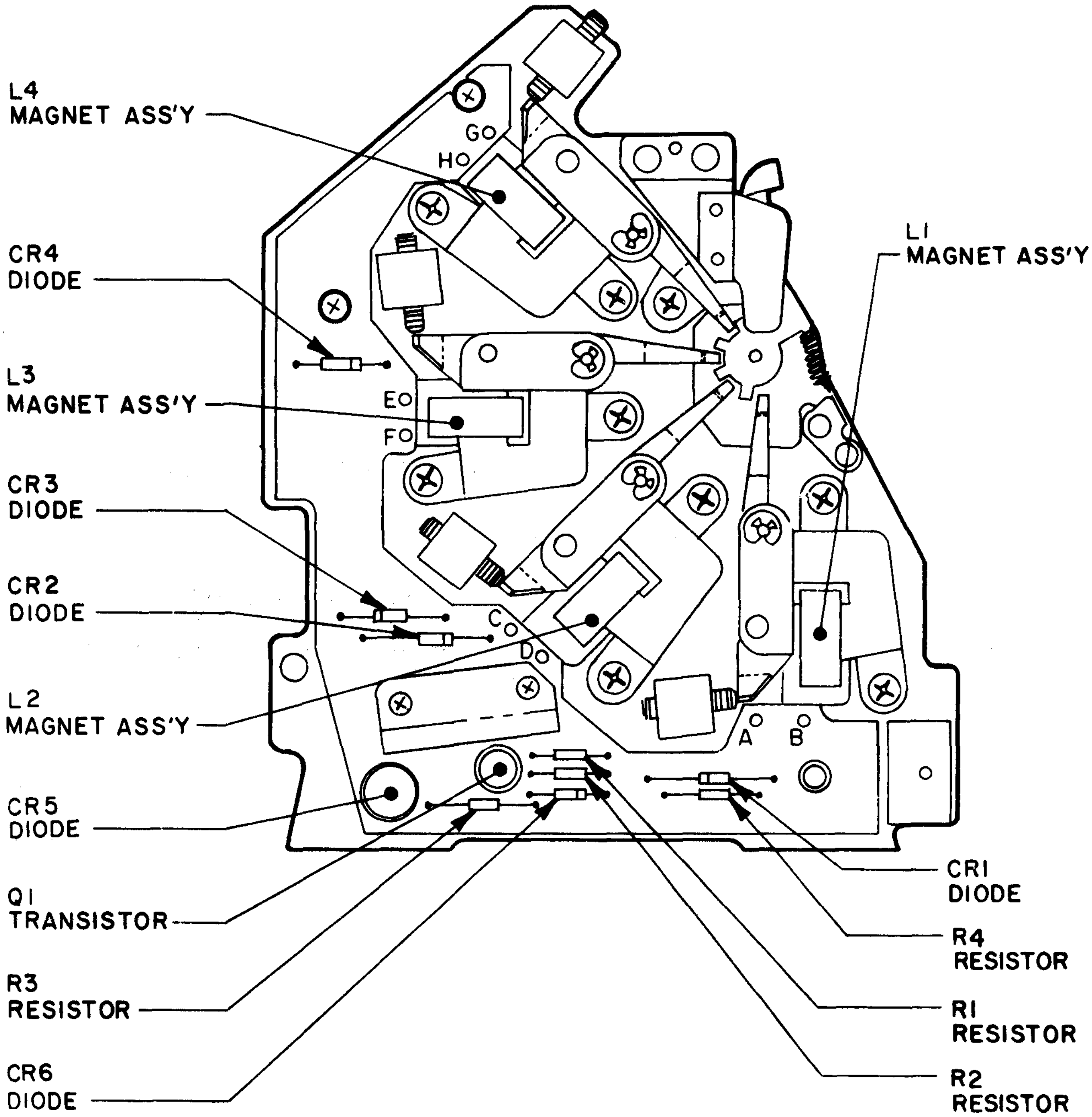


Figure 6-2. PRINT HAMMER MODULE.

Table 6-5. TROUBLESHOOTING MOTOR DRIVE AND CURRENT CONTROL BOARD ASSEMBLY 3A1A5A3 (fig. 6-3)

MALFUNCTION/SYMPTOM TEST PROCEDURE	CIRCUIT TO BE TESTED INDICATION	YES	NO
LINE-FEED FUNCTION ABNORMAL	**CONTROL CIRCUIT**		
NOTE Use test setup as directed in paragraph 6-25.			
Step 1 - Connect multimeter to CONTROL test point.	Test fixture input diode and bias circuit are working, measure 1.5 Vdc ±5%.	Go to step 2.	Test fixture defective.
Step 2 - Connect multimeter to LOAD test point.	Check current control (CC) board ability to switch 22 V to output load, measure 22 Vdc ±5%.	Go to step 3.	Current control board defective.
Step 3 - Place SURGE CONTROL switch to ON.	Surge control circuit cuts off switching action in step 2 Measure 4 to 5 Vdc at LOAD test point.	Go to step 4.	Surge control switch defective.
Step 4 - Return SURGE CONTROL switch to OFF.	Measure 22 Vdc ±5% at LOAD test point.	Go to step 5.	Surge control switch defective.
Step 5 - Place PULSE switch to LF.	Routes input signal (SIG IN) to pin Q, AO IN and applies it to line-feed board.	Output available at AO OUT, go to step 6.	Line feed board defective.
Step 6 - Observe output of channel B of oscilloscope (AO OUT).	22 V peak to peak ±5% square wave at 50 Hz.	Go to step 7.	Turn off test equipment and remove Line-Feed/ Current Control Board assembly from test fixture. Perform continuity checks through Q1 (positive lead on P1-Q and negative lead on P1-D) and read approximately 621 ±20 ohms. Reverse leads and read open. If test fails isolate fault to piece part. Refer to fig. 3-15A and B.

Table 6-5. TROUBLESHOOTING MOTOR DRIVE AND CURRENT CONTROL BOARD ASSEMBLY 3A1A5A3 (fig. 6-3) - CONTINUED

MALFUNCTION/SYMPTOM TEST PROCEDURE	CIRCUIT TO BE TESTED INDICATION	YES	NO
Step 7- Return LF/CC board assy to test fixture and compare function generator output on channel A of oscilloscope with channel B.	Waveforms should coincide (same frequency and waveshape).	Go to step 8.	Use scope and fault isolate to failed piece part. Refer to fig. 3-15A and B.
Step 8- Place SELECT switch to A1 (connects a 20-ohm load resistor to A1 OUT). Measure as in steps 8 and 7 at A1 OUT and A1 IN.	Indication same as step 7.	Go to step 9.	Again turn off test equipment and remove LF/CC board assembly from test fixture. Perform continuity checks through Q2 (positive lead on P1-0 and negative lead on P1-C) and read approximately 621 ±20 ohms. Reverse leads and read open. If test fails isolate fault to piece part. Refer to fig. 3-15A and B.
Step 9 - Place SELECT switch to BO (connects a 20-ohm load resistor to BO OUT). Measure as in steps 6 and 7 at BO OUT and BO IN.	Indication same as step 7.	Go to step 10.	Perform continuity checks through Q3 (positive lead on P1-K and negative lead on P1-B) and read approximately 621 ±20 ohms. Reverse leads and read open. If test fails isolate fault to piece part. Refer to fig. 3-15A and B.
Step 10 - Place SELECT switch to B1 (connects a 20-ohm load resistor to B1 OUT). Measure as in steps 6 and 7 at B1 OUT and B1 IN.	Indication same as step 7.	Return to service.	Perform continuity checks through Q4 (positive lead on P1-J and negative lead on P1-A) and read approximately 621 ±20 ohms. Reverse leads and read open. If test fails isolate fault to piece part. Refer to fig. 3-15A and B.

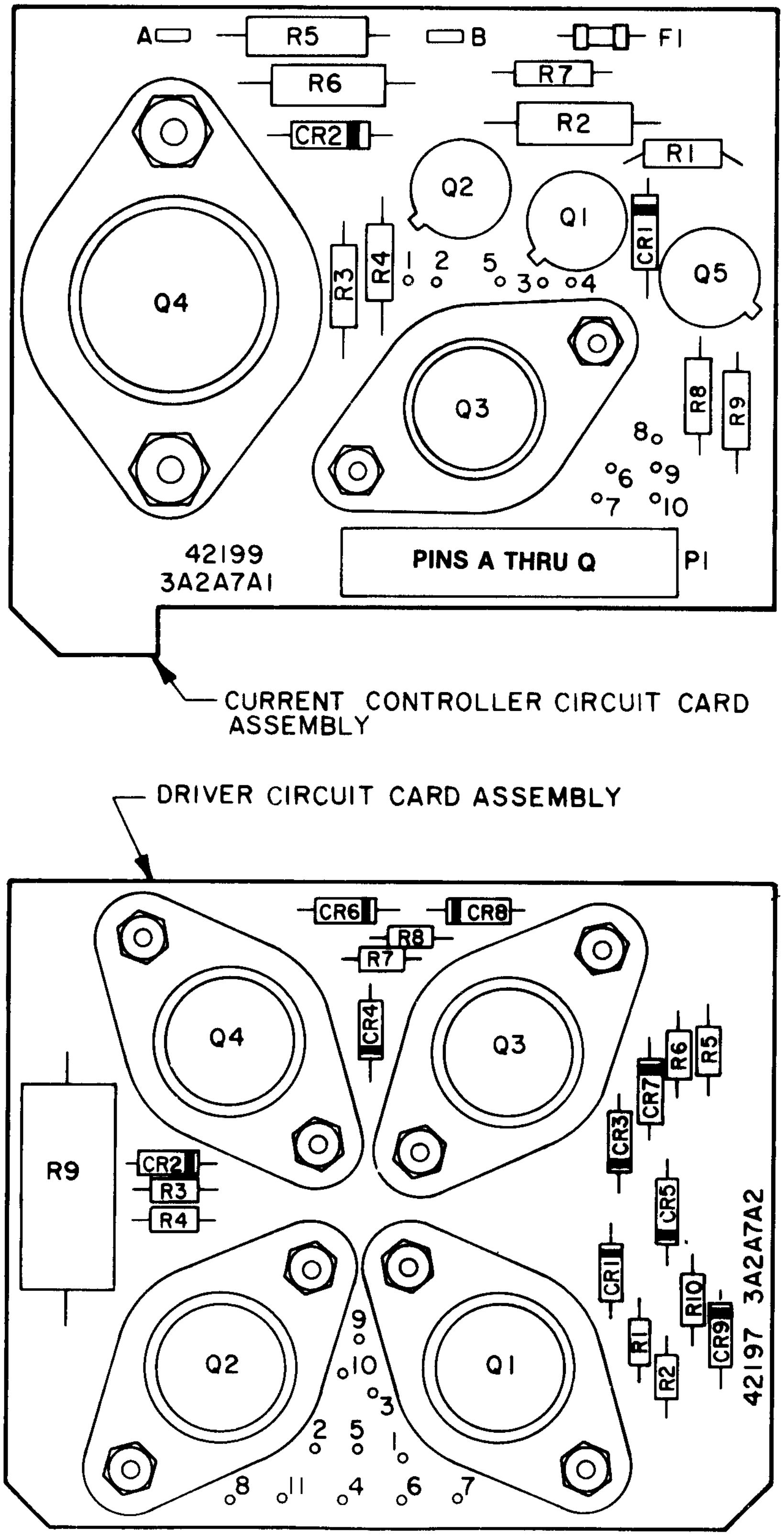


Figure 6-3. MOTOR DRIVE AND CURRENT CONTROL BOARD ASSEMBLY.

Table 6-6. TROUBLESHOOTING INTERFACE ASSEMBLY ± 6 VOLT ± 1 VOLT DATA CIRCUITS

MALFUNCTION/SYMPTOM TEST PROCEDURE	CIRCUIT TO BE TESTED INDICATION	YES	NO
LOSS OF TRANSMIT OR RECEIVE CAPABILITY	**± 6V ± 1V DATA CIRCUIT(S)**		
NOTE Use test setup as directed in paragraph 6-26c(1).			
Transmit alternate character bits from AN/GGM-15 at DATA ± 6V and at speeds between 45.5 baud and 1200 baud. Make the following checks in RECEIVER CLOCK circuit: RECEIVER GATED CLOCK circuit:	Output checks on AN/GGM-15 analyzer.	Continue trouble-shooting.	Intermediate points can be checked with oscilloscope.
J1-G to VR7 to FL7 to S11B to VR2 to E17 to U4, U1, U2 to J5-6			
J1-G to VR8 to FL8 to S11C to VR3 to E16			
J5-8 to U5 to CR1, CR4 to FL5 to VR5 to J1P			
FL6 to VR6 to J1-N			
J1-A to VR1 to FL1 to E9 to U4 to J5-4			
J1-B to VR2 to FL2 to E8			
J5-7 to E2 to U1, U5 to CR13, CR14 to E13 to S125 to FL9 to VR9 to J1-K			
U5 to CR15, CR16 to E14 to S12C to FL10 to J1-L			

Table 6-7. TROUBLESHOOTING INTERFACE ASSEMBLY 20 MA and 60 MA DATA CIRCUITS

MALFUNCTION/SYMPTOM TEST PROCEDURE	CIRCUIT TO BE TESTED INDICATION	YES	NO
LOSS OF TRANSMIT OR RECEIVE CAPABILITY	**20 MA AND 60 MA DATA CIRCUIT(S)**		
NOTE Use test setup as directed in paragraph 6-26c(3).			
Step 1- Transmit alternate character bits from AN/GGM-15 at speeds between 45.5 baud and 75 baud. Make the following checks with power supplies at 20mA:	Output checks on AN/GGM-15 analyzer.	Continue trouble-shooting.	Intermediate points can be checked with oscilloscope.
J1-G to VR7 to FL7 to S11B to E25 to CR5 to VR1 , U3, Q2, U2 to E20 to J5-6			
J1-H to VR8 to FL8 to S11C to E-26 to CR8, CR7			
J5-7 to E2 to U1, U2, U5, Q1, Q3, CR12, K1, CR13 to E15 to S12B to FL9 to VR9 to J1-K			
E12 to S12C to FL10 to VR10 to J1-L			
Step 2- Repeat procedure in step 1 for the 60 mA test.	Output checks on AN//GGM-15 analyzer.	Return to service.	Defective S11 and R8.

Table 6-8. TROUBLESHOOTING INTERFACE ASSEMBLY SWITCHES (fig. 6-4)

MALFUNCTION/SYMPTOM TEST PROCEDURE	INDICATION	YES	NO
INTERFACE ASSEMBLY SWITCH CONTINUITY			
NOTE Use test setup as directed in paragraph 6-26c(5).			
Place OHM CHECK switch to position 1. (This checks continuity of circuit path from J2-G to J4-5).	Less than 1 ohm.	Continue trouble-shooting (table 6-9).	Use multi-meter and fault isolate to failed piece part.

NOTE

Table 6-9, Interface Assembly Continuity Checks, shows all 12 positions and circuit parts that are to be checked. Move the AN/USM-223 to test points S1B, and then to S1C and finally to S1D.

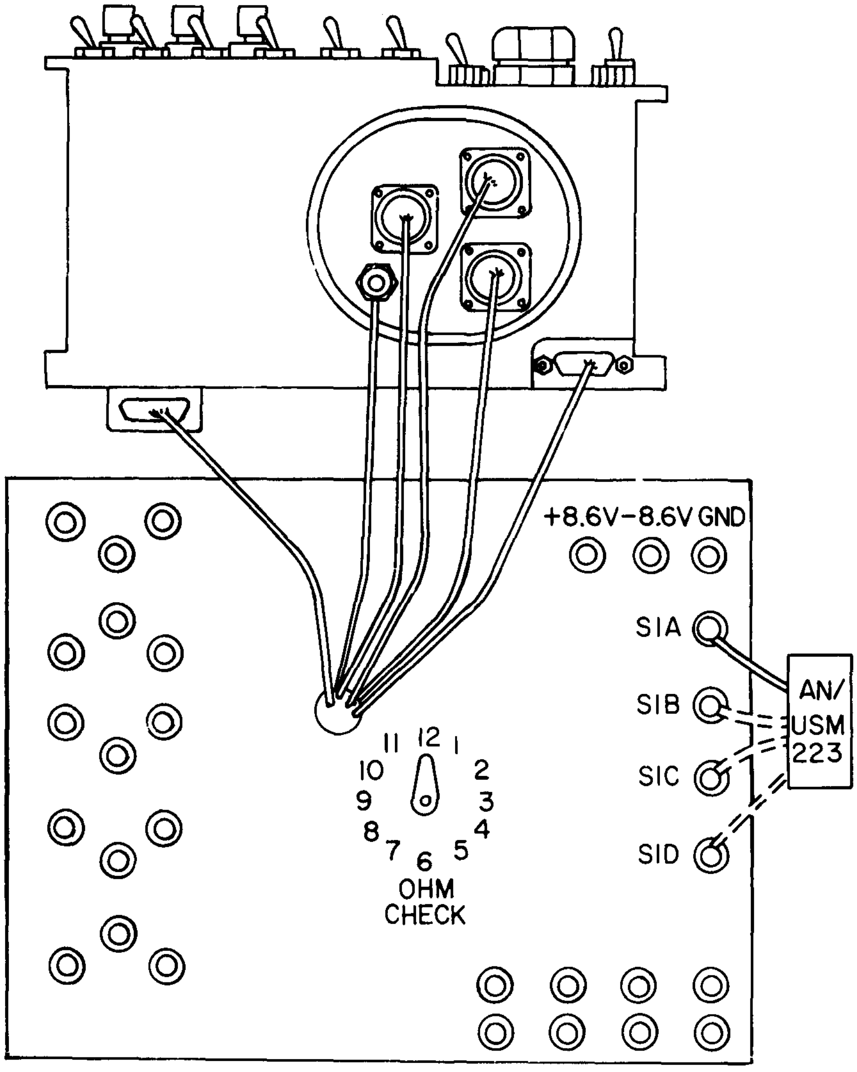


Figure 6-4. SET-UP FOR TESTING INTERFACE ASSEMBLY SWITCHES.

Table 6-9. INTERFACE ASSEMBLY CONTINUITY CHECKS

Test point	OHM check position	Interface switch position	Connection	Resistance (ohms)
S1A-GND	1		J2-G to J4-5	Less than 1
	2	Power ON	J2-M to J2-J	Less than 1
	2	Power OFF	J2-M to J2-J	Open
	3		J4-1 to J2-A	Less than 1
	4		J4-2 to J2-B	Less than 1
	5		J4-6 to J2-F	Less than 1
	6		J4-6 to J3-B	Less than 1
	7		J2-C to J4-3	Less than 1
	8		J2-D to J4-4	Less than 1
	9	Power ON	J2-L to J2-K	Less than 1
	9	Power OFF	J2-4 to J2-K	Open
	10		GND to J2-E	Less than 1
	11		J3-C to GND	Less than 1
	12	Power ON	J3-A to J4-8	Less than 1
	12	Power OFF	J3-A to J4-8	Open
S1B-GND	1	STOP BITS 1	J5-9 to J5-40	Less than 1
	2	STOP BITS 2	J5-10 to J5-40	Less than 1
	3	BAUDOT	J5-37 to J5-40	Less than 1
	3	ASCII	J5-37 to J5-40	Open
	4	PARITY-EVEN	J5-11 to J5-40	Less than 1
	5	PARITY-ODD	J5-12 to J5-40	Less than 1
	5	PARITY-INHIBIT	J5-12 to J5-40	Open
	6	STATE-KSR	J5-13 to J5-40	Less than 1
	7	STATE-ICT	J5-14 to J5-40	Less than 1
	7	STATE-RO	J5-14 to J5-40	Open
	8	REC MODE-20 MA	J5-15 to J5-40	Less than 1
	9	REC MODE-60 MA	J5-16 to J5-40	Less than 1
	10	REC MODE-48V [2]	J5-17 to J5-40	Less than 1
	11	REC MODE-LO DATA	J5-21 to J5-40	Less than 1
	12	SPARE		
S1C-GND	1	XMIT MODE-20 MA	J5-18 to J5-40	Less than 1
	2	XMIT MODE-60 MA	J5-19 to J5-40	Less than 1
	3	XMIT MODE-70 uA [2]	J5-20 to J5-40	Less than 1
	4	XMIT MODE-LO DATA	J5-22 to J5-40	Less than 1
	5	CLOCK-INT	J5-30 to J5-40	Less than 1
	6	CLOCK-EXT	J5-31 to J5-40	Less than 1
	7	CLOCK ± to +	J5-32 to J5-40	Less than 1
	8	FIG S/J-S	J5-35 to J5-40	Less than 1
	9	SIGNAL DIPHASE	J5-36 to J5-40	Less than 1
	10	SELF TEST normal	J5-33 to J5-40	Less than 1
	11	SELF TEST operated	J5-34 to J5-40	Less than 1

Table 6-9. INTERFACE ASSEMBLY CONTINUITY CHECKS . CONTINUED

Test point	OHM check position	Interface switch position	Connection	Resistance (Ohms)
S1D-GND	1		J5-38 to J1-R	Less than 1
	2		J5-39 to J5-3	Less than 1
	3		J1-S to J5-3	Less than 1
	4		J1-T to J5-3	Less than 1
	5	BAUD RATE-45.5	J5-23 to J5-41	Less than 1
	6	BAUD RATE-50	J5-24 to J5-41	Less than 1
	7	BAUD RATE-75	J5-25 to J5-41	Less than 1
	8	BAUD RATE-150	J5-26 to J5-41	Less than 1
	9	BAUD RATE-300	J5-27 to J5-41	Less than 1
	10	BAUD RATE-600	J5-28 to J5-41	Less than 1
	11	BAUD RATE-1200	J5-29 to J5-41	Less than 1

Table 6-10a. TROUBLESHOOTING POWER SUPPLY (+5VA LOAD CIRCUIT)

MALFUNCTION/SYMPTOM TEST PROCEDURE	CIRCUIT TO BE TESTED INDICATION	YES	NO
+5 VA LOAD CIRCUIT MALFUNCTIONS	**+5 VA LOAD CIRCUIT**		
NOTE Use test setup as directed in paragraph 6-27d.			
Step 1- Turn SELECT switch to position 3 (connects VOUT and SCOPE terminal to +5 V(A) output).	+5 Vdc ±5%. 50 mVrms ripple and noise maximum using AC function on DVM.	Go to step 2.	Troubleshoot +5 VA regulator circuit on micro-processor supply (fig. FO-4).
Step 2- Place +5 VA LOAD LO to ON (places a 10-ohm resistor across +5 V(A) output).	+5 Vdc ±5%. 50mVrms ripple and noise maximum using AC function on DVM.	Go to step 3.	Troubleshoot +5VA regulator circuit on micro-processor supply (fig. FO-4).
Step 3- Place +5 VA LOAD LO to OFF and place +5 VA LOAD HI to ON (places a 1.5 ohm resistor across +5 V(A) output).	+5 Vdc ±5%. 50 mVrms ripple and noise maximum using AC function on DVM.	Go to step 4.	Troubleshoot +5VA regulator circuit on micro-processor supply (fig. FO-4).
Step 4- Place +5 VA LOAD LO to ON.	+ 4.3 Vdc ±12%.	Return to service.	Troubleshoot +5VA regulator circuit on micro-processor supply (fig. FO-4).

Table 6-10b. TROUBLESHOOTING POWER SUPPLY (+12V AND -5VA LOAD CIRCUITS)

	MALFUNCTION/SYMPTOM / TEST PROCEDURE	CIRCUIT TO BE TESTED / INDICATION	YES	NO
	NOTE Use test setup as directed in paragraph 6-27d.			
1	**+12V LOAD CIRCUIT MALFUNCTIONS**	**+12V LOAD CIRCUIT**		
	Step 1- Turn SELECT switch to position 4 (connects VOUT and SCOPE terminals to + 12V output).,	+12 Vdc ±5%. 100 mVrms ripple and noise maximum.	Go to step 2.	Troubleshoot microprocessor supply (fig. FO-4).
	Step 2- Place +12 V LOAD from OFF to ON (places a 332-ohm resistor across +12 V output).	+12 Vdc ±5%. 100 mVrms ripple and noise maximum.	Return to service.	Troubleshoot microprocessor supply (fig. FO-4).
2	**-5VA LOAD CIRCUIT MALFUNCTIONS**	**-5VA LOAD CIRCUIT**		
	Turn SELECT switch to position 5 (connects VOUT and SCOPE terminals to –5V(A) output).	–5Vdc ±5%. 40 mVrms ripple and noise maximum.	Return to service.	Troubleshoot microprocessor supply (fig. FO-4).

Table 6-10c. TROUBLESHOOTING POWER SUPPLY (+5VB AND -8.6V LOAD CIRCUITS)

MALFUNCTION/SYMPTOM TEST PROCEDURE	CIRCUIT TO BE TESTED INDICATION	YES	NO
NOTE Use test setup as directed in paragraph 6-27d.			
1 **+5VB LOAD CIRCUIT MALFUNCTIONS**	**+5VB LOAD CIRCUIT**		
Step 1- Turn SELECT switch to position 6 (connects VOUT and SCOPE terminals to + 5V(B) output).	+5Vdc ±5% 15mVRms ripple and noise maximum.	Go to step 2.	Troubleshoot +5V, ±8.6V supply (fig. FO-5).
Step 2- Place +5VB LOAD LO to ON (connects a 2.37-ohm load across + 5V(B) output).	+5Vdc ±5% 15 mVrms ripple and noise maximum.	Go to step 3.	Troubleshoot + 5V, ±8.6V supply (fig. FO-5).
Step 3- Place + 5VB LOAD LO to OFF and place + 5V8 LOAD HI to ON (connects a 1.7-ohm resistor across +5V(B) output).	+5Vdc ±5% 15 mVrms ripple and noise maximum.	Go to step 4.	Troubleshoot +5V, ±8.6V supply (fig. FO-5).
Step 4- Place +5VB LOAD LO to ON.	+4.0Vdc ±15%.	Return to service.	Troubleshoot +5V, ±8.6V supply (fig. FO-5).
2 **-8.6V LOAD CIRCUIT MALFUNCTIONS**	**-8.6V LOAD CIRCUIT**		
Step 1- Turn SELECT switch to position 7 (-8.6V output) and set -8.6V LOAD switch to position 3 (115-ohm load across output).	-8.6 Vdc ±5% 85 mVrms ripple and noise maximum.	Go to step 2.	Troubleshoot +5V, ±8.6V supply (fig. FO-5).
Step 2- Set -8.6V LOAD to position 2 (82.5-ohm load).	-8.6 Vdc ±5% 85 mVrms ripple and noise maximum.	Go to step 3.	Troubleshoot +5V, ±8.6V supply (fig. FO-5).
Step 3- Set -8.6V LOAD to position 1 (53.6-ohm load).	-8.6 Vdc ±5% 85 mVrms ripple and noise maximum.	Return to service.	Troubleshoot +5V, ±8.6V supply (fig. FO-5).

Table 6-10d. TROUBLESHOOTING POWER SUPPLY (+8.6 LOAD, LAMP SUPPLY AND LINE-FEED LOAD CIRCUITS)

MALFUNCTION/SYMPTOM TEST PROCEDURE	CIRCUIT TO BE TESTED INDICATION	YES	NO
NOTE Use test setup as directed in paragraph 6-27d.			
1 +8.6V LOAD CIRCUIT MALFUNCTIONS	**+8.6V LOAD CIRCUIT**		
Step 1- Turn SELECT switch to position 12(+8.6V output) and set +8.6V LOAD switch to position 3 (53.6-ohm load).	+8.6Vdc ±5%. 85 mVrms ripple and noise maximum.	Go to step 2.	Troubleshoot + 5V, ±8.6V supply (fig. FO-5).
Step 2- Set +8.6V LOAD to position 2 (44.2-ohm load).	+8.6Vdc ±5%. 85 mVrms ripple and noise maximum.	Go to step 3.	Troubleshoot +5V, ±8.6V supply (fig. FO-5).
Step 3- Set +8.6V LOAD to position 1 (30.1-ohm load).	+ 8.6Vdc ±5%. 85 mVrms ripple and noise maximum.	Return to service.	Troubleshoot + 5V, ±8.6V supply (fig. FO-5).
2 LAMP SUPPLY CIRCUIT MALFUNCTIONS	**LAMP SUPPLY CIRCUIT**		
Turn SELECT switch to position 8 (lamp supply). Adjust ILLUM ADJUST (varies input to Q8 on power supply from 0 to 20 Vdc).	Lamp supply will vary from 0.0 Vdc ±.2 to 19 Vdc ±2.	Return to service.	Troubleshoot Q8, R66 and VR1 (fig. FO-3).
3 LINE-FEED LOAD CIRCUIT MALFUNCTIONS	**LINE-FEED LOAD CIRCUIT**		
Step 1- Turn SELECT switch to position 10 (LF output).	+22 to +30 Vdc (pin 30 of power supply) at VOUT terminals.	Go to step 2.	Troubleshoot power supply input (fig. FO-3).
Step 2- Set LF LOAD to ON.	+22 to +30 Vdc (pin 30 of power supply) at VOUT terminals.	Return to service.	Troubleshoot power supply input (fig. FO-3).

Table 6-10e. TROUBLESHOOTING POWER SUPPLY (DRUM MOTOR, BACKUP BATTERY, AND +18V, CCR, CAPVOK CIRCUITS)

MALFUNCTION/SYMPTOM TEST PROCEDURE	CIRCUIT TO BE TESTED INDICATION	YES	NO
NOTE Use test setup as directed in paragraph 6-27d.			
1 DRUM MOTOR CIRCUIT MALFUNCTIONS	**DRUM MOTOR CIRCUIT**		
Turn SELECT switch to position 11 (drum motor). Connect AN/USM-281 across SCMO HI and LO (timing simulator output) and turn DRUM switch to ON (logic O to DRUM SHUTDOWN).	Timing simulator outputs pulse whose period is proportional to drum motor output, 1080 usec ±50.	Return to service.	Troubleshoot drum motor supply circuit (fig. FO-6).
2 BACKUP BATTERY CIRCUIT MALFUNCTIONS	**BATTERY CIRCUIT**		
Step 1- Remove VIN lead.	BAT lamp comes on.	Go to step 2.	Troubleshoot comparator on input circuit (fig. FO-3).
Step 2- Perform test procedures of Tables 6-10a, b.	Indications satisfactory.	Go to step 3.	Troubleshoot comparator on input circuit (fig. FO-3).
Step 3- Replace VIN lead.	BAT lamp goes off.	Return to service.	Troubleshoot comparator on input circuit (fig. FO-3).
3 +18V, CCR, CAPVOK CIRCUIT MALFUNCTIONS	**+18V, CCR, CAPVOK CIRCUIT**		
Step 1- Connect AN/USM-223 across VOUT HI and LO. Set SELECT to position 9 (+18V print coils). With +18V LOAD to position 2 (no load), set CCR to ON (causes power supply circuit card, pin 22 to become a logic O).	CAP V OK lamp comes ON and VOUT measures +18 Vdc ±5%.	Go to step 2.	Troubleshoot constant current supply (fig. FO-7).
Step 2- Set CCR to OFF (pin 22 becomes a logic 1). Place +18V LOAD switch to position 1 (27.4 ohms).	CAP V OK lamp goes OUT and VOUT drops to less than 1 volt dc.	Go to step 3.	Troubleshoot constant current supply (fig. FO-7).

Table 6-10e. TROUBLE SHOOTING POWER SUPPLY (DRUM MOTOR, BACKUP BATTERY, AND +18V, CCR CAPVOK CIRCUITS) - CONTINUED

MALFUNCTION/SYMPTOM TEST PROCEDURE	CIRCUIT TO BE TESTED INDICATION	YES	NO
Step 3- Set CCR to ON.	CAP V OK lamp comes ON and VOUT measures +18Vdc ±5%.	Go to step 4.	Troubleshoot constant current supply (fig. FO-7).
Step 4- Place +18V LOAD to position 3 (12 ohms).	CAP V OK lamp goes OUT and VOUT measures +12 Vdc ±10%.	Return to service.	Troubleshoot constant current supply (fig. FO-7).

Table 6-11. TROUBLESHOOTING FILTER ASSEMBLY (3A1A6FL1)

MALFUNCTION/SYMPTOM TEST PROCEDURE	ASSEMBLY TO BE TESTED INDICATION	YES	NO
NOTE Use test setup as directed in paragraph 6-29d.			
1 120 VAC OPERATION MALFUNCTION	**FILTER ASSEMBLY**		
Step 1- Place test fixture POWER switch to ON. Using AN/USM-223 measure across 22-30 VDC test point and RTN.	+28 Vdc ±3.5.	Go to step 2.	Troubleshoot filter assembly (fig. FO-3).
Step 2- Use AN/USM-281 to measure ripple.	750 mVrms maximum.	Go to step 3.	Troubleshoot filter assembly (fig. FO-3).
Step 3- Measure continuity of +12 Vdc circuitry by measuring from fixture test point 12 VDC to BAT(J3) pin A. Ensure that power is disconnected but POWER switch is ON and fuse F3 is not open.	Less than 1 ohm.	Return to service.	Troubleshoot filter assembly (fig. FO-3).
2 230 VAC OPERATION MALFUNCTION	**FILTER ASSEMBLY**		
Repeat procedures in 1.			
3 26 VDC OPERATION MALFUNCTION	**FILTER ASSEMBLY**		
Repeat procedures in 1.			

Table 6-12. TROUBLESHOOTING KEYBOARD KEYSWITCH ASSEMBLY (3A2A1) (fig. 6-5)

MALFUNCTION/SYMPTOM TEST PROCEDURE	ASSEMBLY TO BE TESTED INDICATION	YES	NO
KEYBOARD KEYSWITCH ASSEMBLY MALFUNCTIONS	**KEYBOARD KEYSWITCH ASSEMBLY**		
NOTE Use test setup as directed in paragraph 6-30c.			
Step 1- Connect AN/USM-281 to LOGIC terminal and probe ground to (LOGIC) REF. Apply +5Vdc ±5% to test fixture by turning on +5V supply. Press and release CLOCK CONTROL switch.	Oscilloscope reads 0 to + 0.5Vdc .	Assures initialization of logic circuitry, go to step 2.	Refer to figure 3-13 for keyboard logic diagrams.
Step 2- Connect AN/USM-281 to 2400 Hz terminal and ground to GND terminal.	Oscilloscope shows 410 usec nominal pulse, with a low logic level of .4Vdc max and a high logic level not to exceed 5Vdc or be less than 2.5Vdc.	Go to step 3.	Refer to figure 3-13 for keyboard logic diagrams.
Step 3- Connect AN/USM-281 to DATA terminal and ground to (DATA) REF terminal. Press and hold a key on keyswitch assembly that is called out below.	Record logic level displayed on scope (bit 1).	Go to step 4.	Use scope and fault isolate to failed piece part.

Character Code Matrix

Character Code	b_1	b_2	b_3	b_4	b_5	b_6	b_7	b_8
BS (CTL, SHIFT)	1	1	1	1	1	1	1	o
9	0	1	1	0	1	1	0	1
E(SHIFT)	1	0	1	1	0	1	1	1
FS (SHIFT)	0	0	1	0	0	1	1	1
H (SHIFT)	1	1	0	1	1	0	1	1
Z (SHIFT)	0	1	0	0	1	0	1	1
?	1	0	0	1	0	0	1	1
LF	1	1	1	0	0	0	0	1
DLC	0	0	0	1	0	0	0	1
A	0	0	0	0	0	1	0	1

NOTE

This procedure causes an 8-bit character to be loaded and read out one bit at a time.

Table 6-12. TROUBLESHOOTING KEYBOARD KEYSWITCH ASSEMBLY – CONTINUED

MALFUNCTION/SYMPTOM TEST PROCEDURE	INDICATION	YES	NO
Step 4- Press and release CLOCK CONTROL switch on fixture. Key may now be released because character is stored in the logic.	Record logic level displayed on scope (bit 2).	Go to step 5.	Use scope and fault isolate to failed piece part.
Step 5- Press and release CLOCK CONTROL switch.	Record logic level displayed on scope (bit 3).	Go to step 6.	Use scope and fault isolate to failed piece part.
Step 6- Repeat procedures until bits 4 through 8 have been recorded. Compare eight readings recorded with the Character Code Matrix.	Matrix verified.	Go to step 7	Use scope and fault isolate to failed piece part.
NOTE Further use of clock control will allow 8 bit character to be reread providing that another key has not been pressed. For other codes refer to table 3-2.			
Step 7- Test 12 bit counter (U8) by pressing RPT key. Disconnect oscilloscope leads.	Observe a 210 msec square wave at logic terminals.	Go to step 8.	Use scope and fault isolate to failed piece part.
Step 8- Using multimeter check PRESENT test point with respect to GND.	+2.5Vdc ±10%.	Go to step 9.	Use scope and fault isolate to failed piece part.
Step 9- Using multimeter check each REF terminal with respect to GND.	+ 1.5Vdc ±5%.	Return to service.	Use scope and fault isolate to failed piece part.

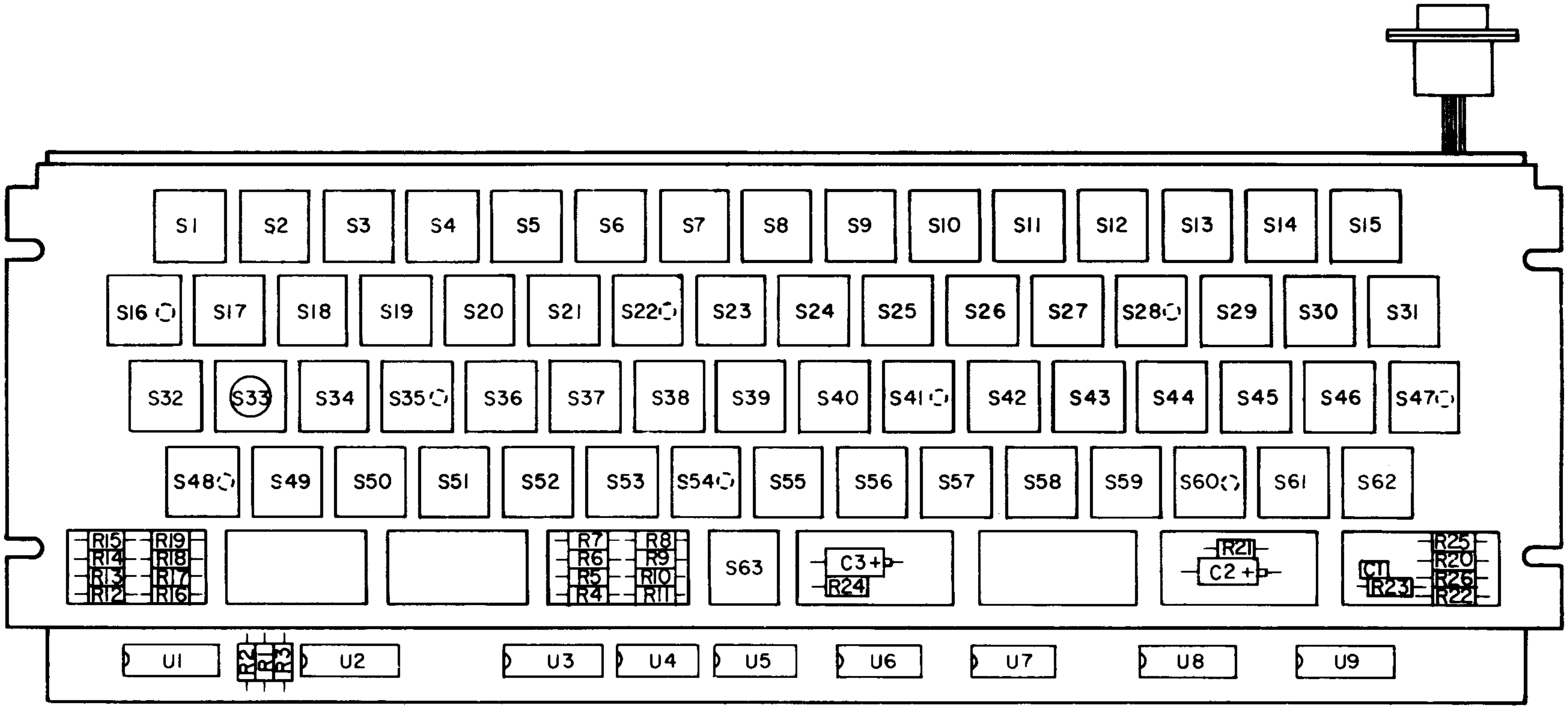


Figure 6-5. KEYSWITCH ASSEMBLY.

Section IV. REMOVAL AND REPLACEMENT OF TERMINAL ASSEMBLIES

6-9. GENERAL

This section covers removal and replacement of following components:

- HARNESS ASSEMBLY (Motherboard)
- PAPER-ROLL SUPPORT ASSEMBLY
- LOGIC BOX COVER ASSEMBLY

6-10. HARNESS ASSEMBLY - REMOVAL AND REPLACEMENT

REMOVAL (fig. 6-6)

CAUTION

Do not extend chassis over edge of workbench without securing case to bench.

- Extend chassis from its case.
- Disconnect power supply from harness assembly and filter module connectors.
- Remove power supply assembly as directed in paragraph 5-11A.
- Remove interface assembly as directed in paragraph 5-11C.
- Release dustcover latches and lower dustcover.
- Disconnect printer assembly and printer subassembly harness connectors J1 and J2 from motherboard.
- Remove keyboard as directed in paragraph 5-11N.
- With keyboard removed, remove screws (21), lockwashers (2), and nut (1), holding keyboard connector to dustcover.

NOTE

Mark all wires with appropriate labels. Remove all cable clamps (25) by removing nuts (28), lockwashers (27) and flat washers (26).

- Remove all rear mounted dustcover lamps and switches.
- Unsolder all front mounted lamps and receiver assembly. (Refer to para 5-13E for instructions on receiver assembly removal).
- Remove copy lamps by removing screw (5), lockwasher (6), and flat washer (7) for each lamp assembly.
- Remove all logic circuit card assemblies (as directed in para 5-11B).
- Remove seven screws (18) which secure the motherboard (19) to casting (9).
- Unsolder paper low switch terminals (10) and cut five cable ties holding cable to casting. (Refer to Appx C, item 8.)
- Extract motherboard by gently pulling it forward.
- Route paper low switch and power supply cables through casting opening as harness is extracted.

REPLACEMENT (fig. 6-7)

- Route paper low switch and power supply cables through casting opening as motherboard is positioned.
- Solder paper low switch terminals wires into correct position.
- Replace shrink tubing and replace five cable ties holding cable to casting.
- Replace seven screws and logic circuit card assemblies.
- Replace copy lamps, and solder all front mounted lamps into position.
- Replace rear mounted dustcover lamps and switches.
- Replace keyboard connector (12) and keyboard.
- Replace printer assembly and printer subassembly.
- Replace power supply.
- Replace interface assembly.
- Apply power and verify terminal is operational.

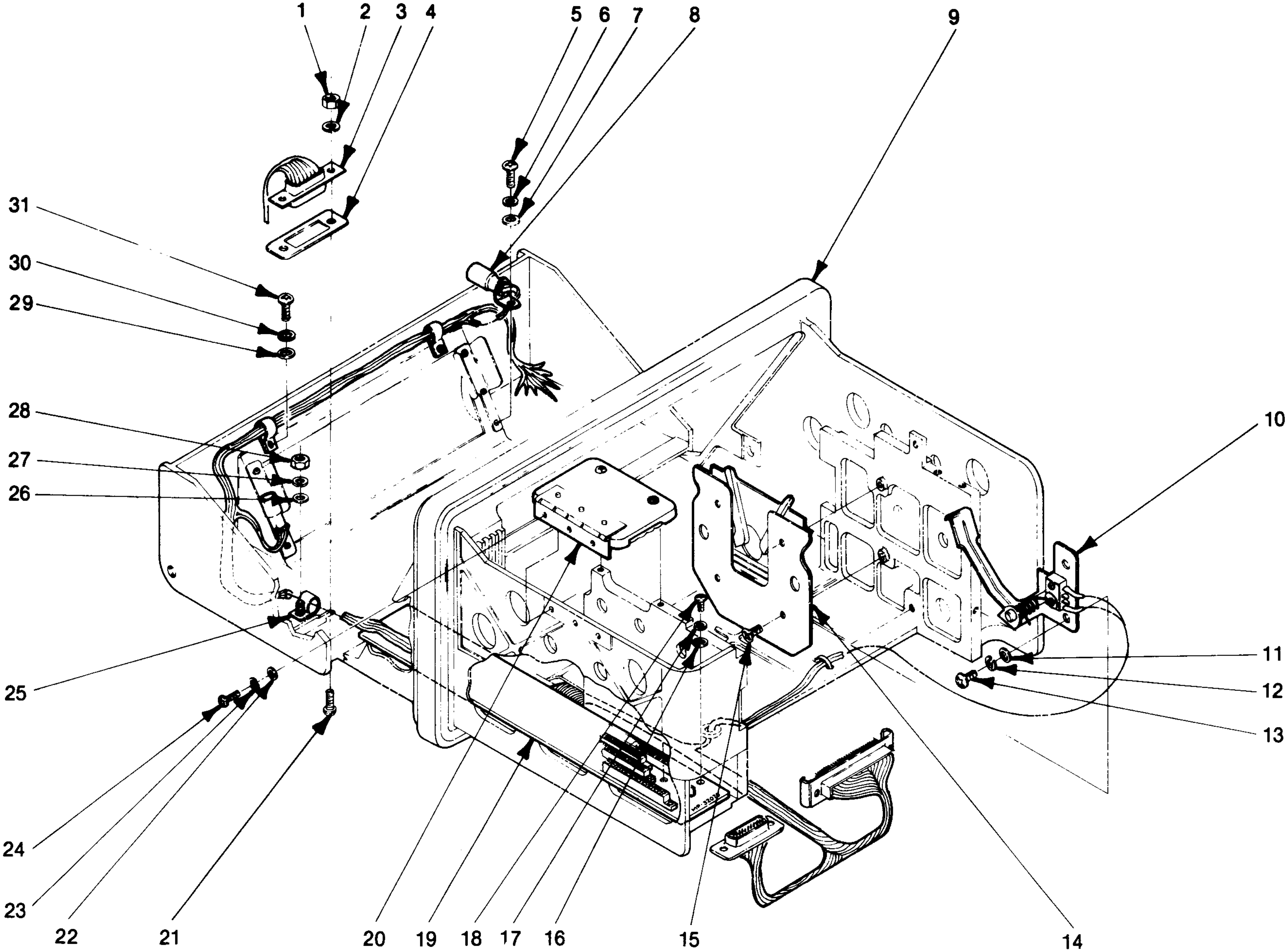


Figure 6-6. HARNESS ASSEMBLY REMOVAL AND REPLACEMENT.

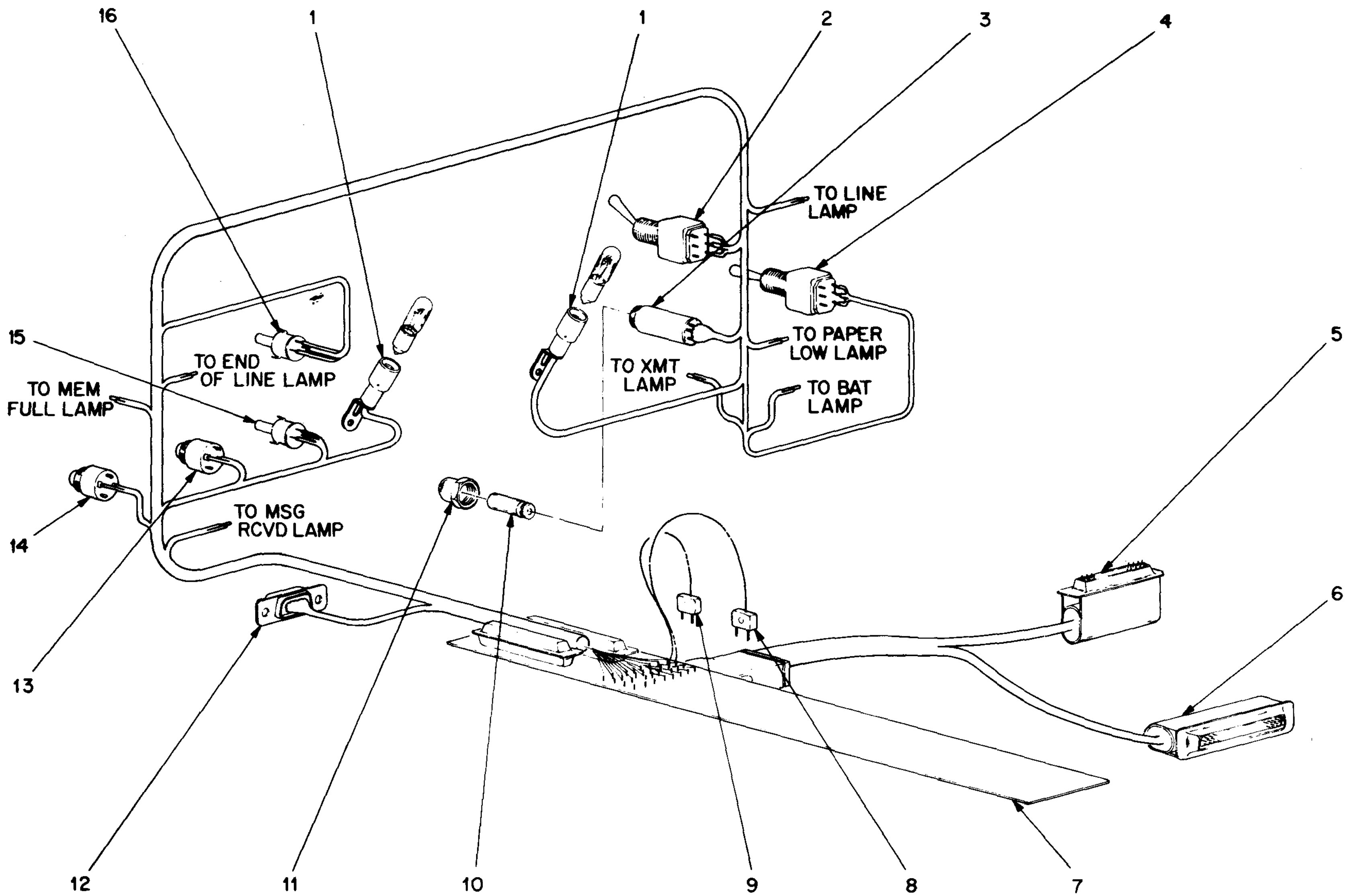


Figure 6-7. HARNESS ASSEMBLY.

Figure 6-6. LEGEND

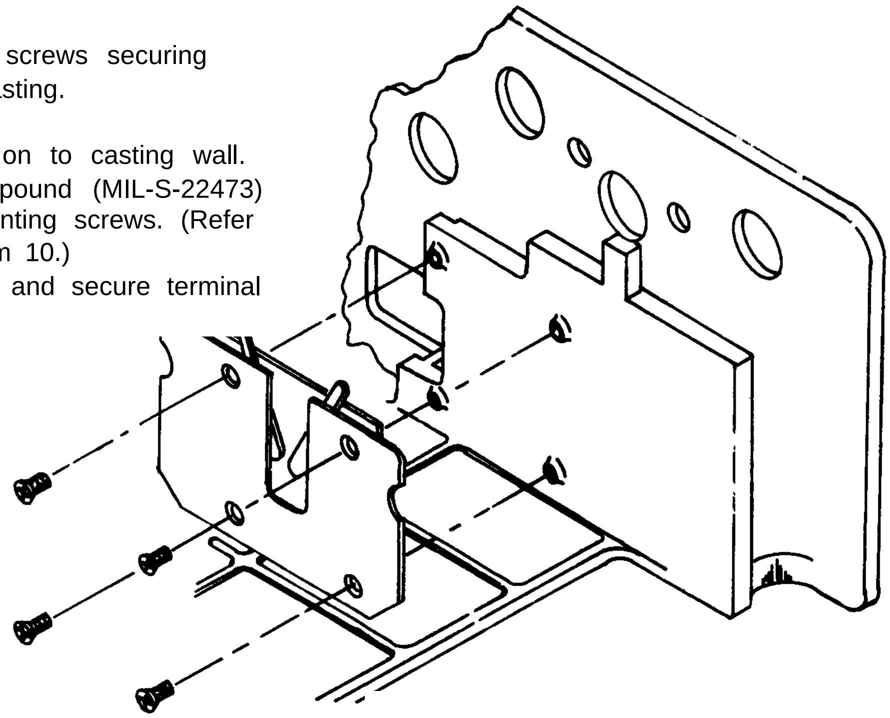
1. Nut
2. Washer, lock
3. Connector
4. Gasket
5. Screw, pnh
6. Washer, lock
7. Washer, flat
8. Lampholder
9. Casting
10. Switch assembly, paper low
11. Washer, flat
12. Washer, lock
13. Screw
14. Support, paper-roll
15. Screw, fhd
16. Washer, flat
17. Washer, lock
18. Screw
19. Harness, assembly (motherboard)
20. Cover, logic
21. Screws, fhd
22. Washer, flat
23. Washer, lock
24. Screw, pnh
25. Clamp, cable
26. Washer, flat
27. Washer, lock
28. Nut
29. Washer, flat
30. Washer, lock
31. Screw, pnh

Figure 6-7. LEGEND

1. Copy lamps
2. Switch (S3)
3. Switch (S2)
4. Switch (S1)
5. Connector (P2)
6. Connector (P3)
7. Motherboard
8. Connector (P4)
9. Connector (P5)
10. Lens assembly
11. Lens seal
12. Connector (P1)
13. Switch (S4)
14. Switch (S5)
15. Resistor (R1)
16. Resistor (R2)

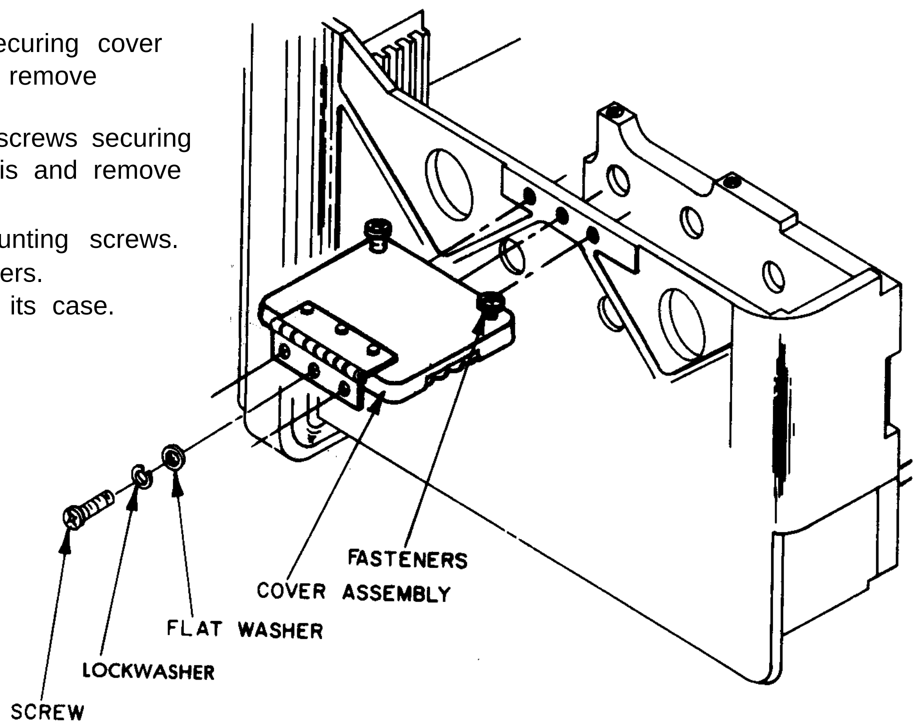
6-11. PAPER-ROLL SUPPORT ASSEMBLY-REMOVAL AND REPLACEMENT

- Release side latches and extend chassis from case.
- Remove paper roll.
- Remove four mounting screws securing support assembly to casting.
- Remove assembly.
  - Position assembly on to casting wall.
  - Apply locking compound (MIL-S-22473) to threads of mounting screws. (Refer to appendix C, item 10.)
  - Replace paper roll and secure terminal in its case.



6-12. LOGIC BOX COVER ASSEMBLY-REMOVAL AND REPLACEMENT

- Release side latches and extend chassis from case.
- Loosen two fasteners securing cover across logic box (do not remove fasteners from cover).
- Remove three mounting screws securing cover assembly to chassis and remove cover assembly.
  - Replace three mounting screws.
  - Secure two fasteners.
  - Secure terminal in its case.



Section V. DISASSEMBLY AND REASSEMBLY OF TERMINAL COMPONENTS

6-13. GENERAL

This section covers disassembly and reassembly of the following components:

KEYSWITCH MODULE
PRINTER
PRINTER SUBASSEMBLY
PAPER-LOW SENSING MECHANISM
HAMMER MODULE
INTERFACE ASSEMBLY
FILTER MODULE

6-14. KEYSWITCH MODULE - DISASSEMBLY AND REASSEMBLY

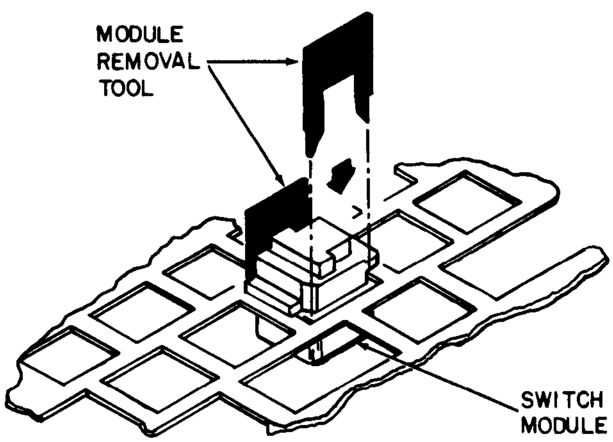
DISASSEMBLY

- Remove keyboard as directed in 5-11N.
- Remove 24 screws, washers and lockwashers.
- Remove panel assembly, careful to leave sealing ring in place.
- Remove keyswitch assembly.
- Turn keyswitch assembly over, locate keyswitch module to be replaced.
- Unsolder four terminals of switch to be replaced from keyswitch assembly using a 750°F controlled temperature, 1/8 inch chisel tip soldering iron.
- When unsoldering terminals, use a solder removal tool to remove all solder from pin holes in keyswitch assembly.

NOTE

Twenty-one switches are secured to printed circuit card by screws. If switch to be removed is one of the 21, remove screw securing it to printed circuit card assembly.

- Insert module removal tools at each side of module to restrain the tangs.
- With removal tools in position, grip switch module with a pair of pliers and pull straight out.



REASSEMBLY

- When replacing new module take care to orient switch properly. Observe that solder terminals are through keyswitch assembly prior to snapping in place.
- Solder new switch terminals using chisel tip soldering iron.

CAUTION

Solder tip should NEVER be held on terminal for over four seconds.

- Clean solder connections with cleaning solvent (refer to Appx C, item 6). Take care not to contact switch with solvent.
- Touch up conformal coating with type UR MIL-1-46058 material (refer to Appx C, item II).
- With sealing ring in place, replace panel assembly and keyswitch assembly into housing assembly and secure with 24 screws, washers and Iockwashers.
- Replace keyboard as directed in paragraph 5-11N.

6-15. PRINTER-DISASSEMBLY AND REASSEMBLY (fig. 6-8)

CAUTION

Many of the assemblies in this unit have been precisely alined. Do not loosen screws holding left vertical wall. All other assemblies are mounted with reference to this wall (left-hand plate).

NOTE

The following procedures assume complete disassembly. Procedures may be stopped and reversed at any point where desired assembly has been removed.

DISASSEMBLY

- Remove printer assembly as directed in paragraph 5-11K.
- Remove ribbon mechanism as directed in paragraph 5-11L.
- Remove printer subassembly as directed in paragraph 5-11M.
- Loosen and remove two screws (13) which secure right vertical wall (right-hand plate).
- Loosen and remove four screws (73) securing paper trough (63) to right vertical wall.
- Loosen and remove screw (56) which secures timing mechanism and remove timing mechanism (52, 53) by disconnecting A4J1 and A5J1 (50).
- Lower upper pressure roller (91) and remove spring (90) on right hand end of upper pressure roller shaft.
- Remove retaining ring (89) securing upper pressure roller to right vertical wall.
- Remove retaining ring (70) and slide shaft (64) through right vertical wall.
- Remove retaining ring (65) from lever assembly (93).
- Gently remove right vertical wall, being careful to secure spring (92).
- Remove paper-out switch bracket (5) from right vertical wall.

NOTE

Upper pressure roller assembly remains attached to right vertical wall.

- Remove drum motor (35 thru 45) as directed in paragraph 5-11J.
- Loosen and remove two screws (58) securing control lever for paper tension release.
- Remove four screws which secure paper trough to left vertical wall (26) and remove paper trough.
- Remove Woodruff key (51) (if still in place) from shaft and slide print drum toward right until it clears left hand wall.
- Remove wires from circuit board (108) as follows:
  E13 - WHT/RED
  E14 - RED
  E15 - WHT/GRN
  E16 - GRN
  E17 - WHT
- Remove three screws (117) securing line feed motor (118).
- Remove line feed motor.
- Remove two gear spurs (57 and 80) by loosening and removing nuts (113 and 114) securing studs (83 and 84).

REASSEMBLY

NOTE

Refer to DISASSEMBLY for illustration part numbers not referenced.

- Replace two spur gears and line-feed motor.
- Replace wires on circuit board (108).
- Replace print drum and Woodruff key.
- Replace paper trough.
- Replace two screws (58) securing control lever for paper tension release.
- Replace drum motor as directed in paragraph 5-11J.
- Replace paper-out switch (15).
- Replace right vertical wall.
- Replace retaining ring (95) on lever assembly.
- Replace shaft (64) through right vertical wall and replace retaining ring (70).
- Replace retaining ring (89) that secures upper pressure roller to right vertical wall.
- Replace spring (90) on right-hand end of upper pressure roller shaft.
- Reconnect A4J1 and A5J1 and replace timing mechanism with screw (56).
- Replace four screws (73) securing paper trough to right vertical wall.
- Replace two screws (13) which secure right vertical wall.
- Replace ribbon mechanism as directed by paragraph 5-11L.
- Replace printer subassembly as directed by paragraph 5-11M.
- Replace printer assembly as directed by paragraph 5-11K.

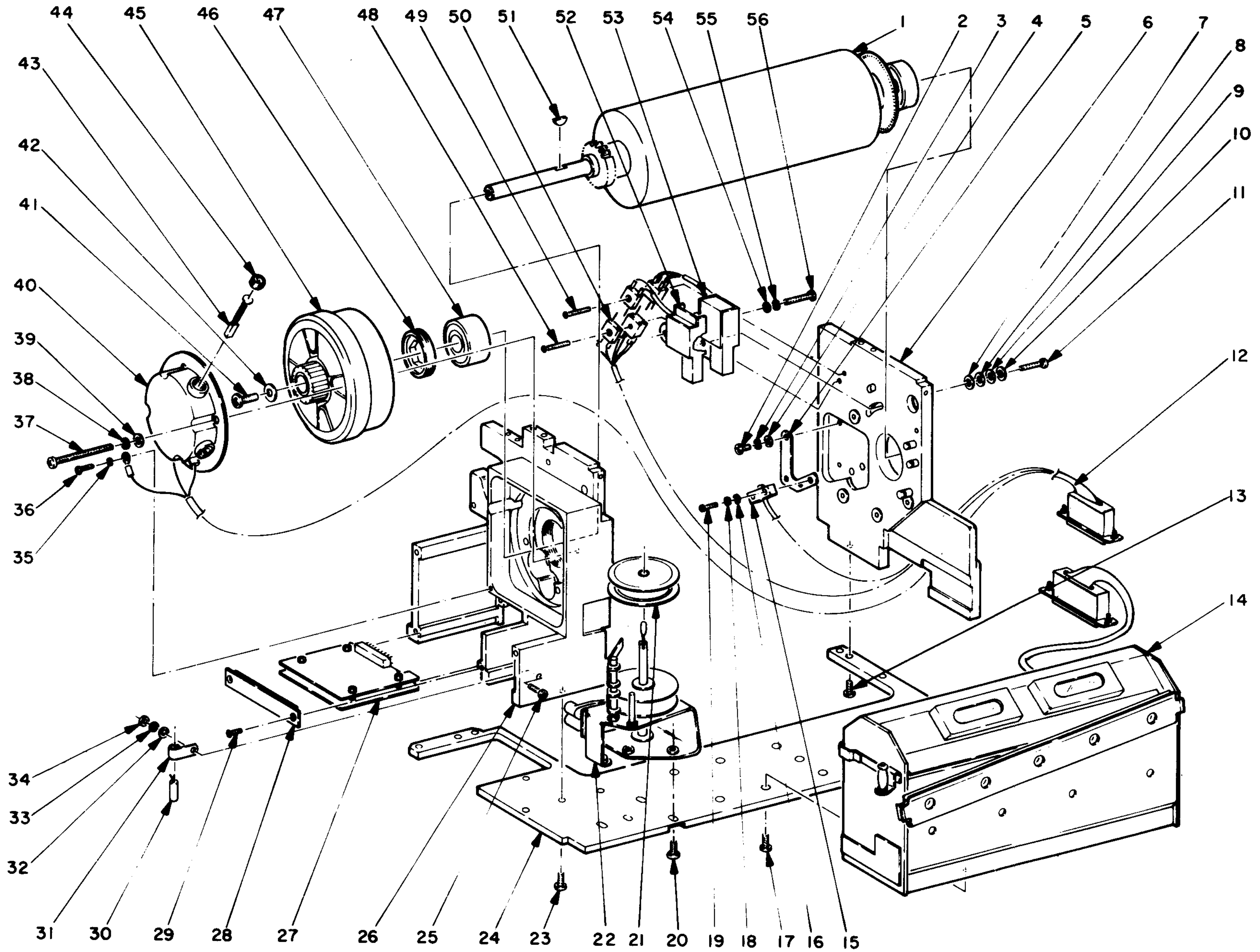


Figure 6-8(1). PRINTER ASSEMBLY.

Figure 6-8. LEGEND (SHEET 1 of 2)

1. Drum, print
2. Screw, pnh
3. Washer, lock
4. Washer, flat
5. Bracket
6. Plate, r.h.
7. Washer, flat
8. Washer, spring
9. Washer, spring
10. Washer, flat
11. Screw, pnh
12. Harness, printer
13. Screw, pnh
14. Printer, subassembly
15. Switch, paper out
16. Washer, flat
17. Screw, pnh
18. Washer, lock
19. Screw, pnh
20. Screw, pnh
21. Spool, ribbon
22. Ribbon mechanism
23. Screw, pnh
24. Plate
25. Screw, pnh
26. Plate, l.h.
27. Motor drive, current control
28. Strap, retaining
29. Screw, flh
30. Capacitor (C9)
31. Clamp
32. Washer, flat
33. Washer, lock
34. Nut
35. Washer, lock
36. Screw, pnh
37. Screw, pnh
38. Washer, lock
39. Washer, flat
40. Housing, drum motor end
41. Screw, pnh
42. Washer, flat
43. Brush
44. Retainer, brush
45. Motor, torque
46. Retainer, bearing
47. Bearing, ball
48. Screw, flh
49. Screw, flh
50. Connector
51. Key
52. Source, timing
53. Sensor, timing
54. Washer, flat
55. Washer, lock
56. Screw, pnh

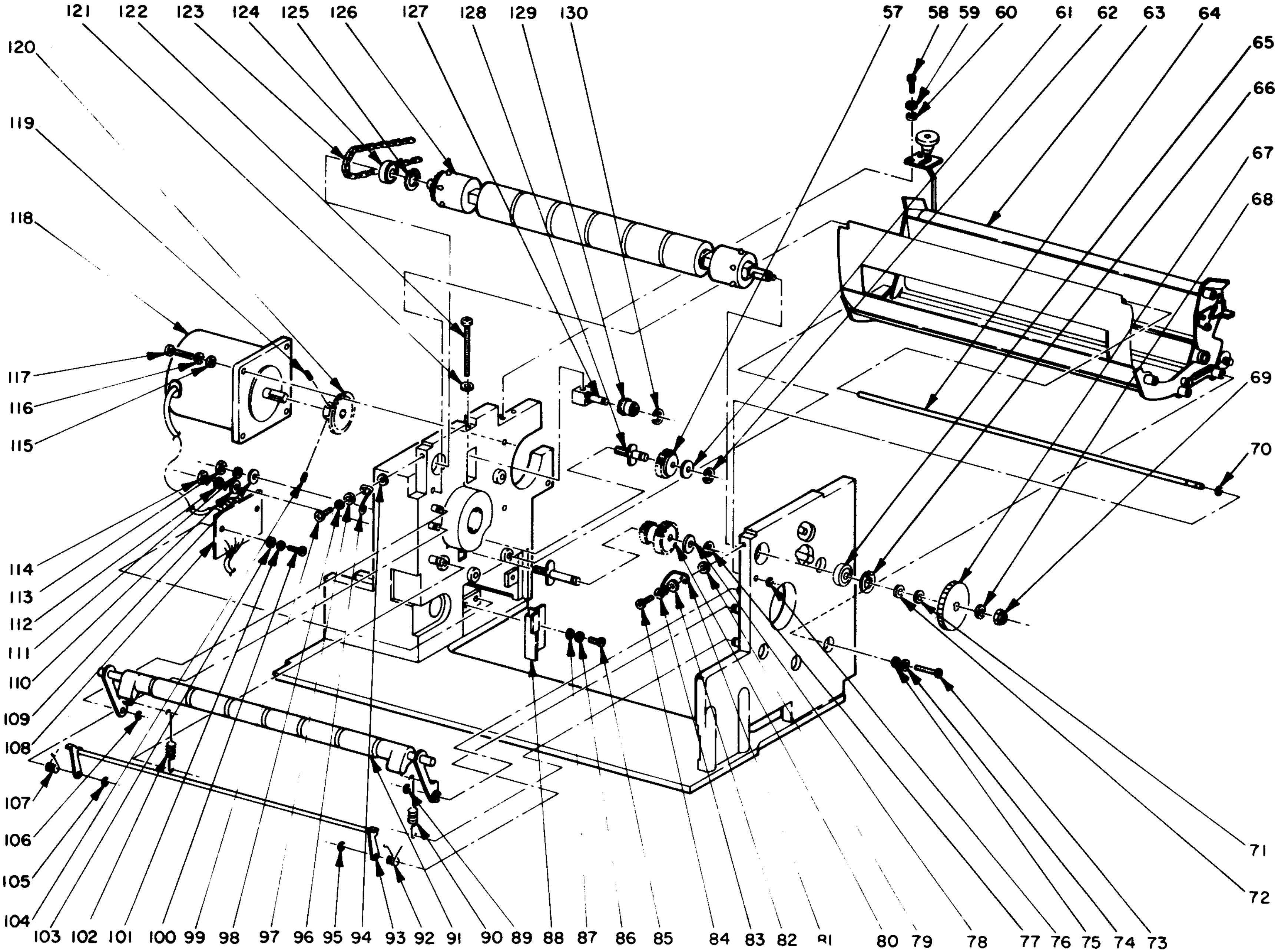


Figure 6-8 (2). PRINTER ASSEMBLY.

Figure 6-8. LEGEND (SHEET 2 of 2)

57. Gear
58. Screw, pnh
59. Washer, lock
60. Washer, flat
61. Washer, flat
62. Ring, retaining
63. Trough, paper
64. Shaft
65. Bearing
66. Ring, retaining
67. Wheel, knurled
68. Washer, flat
69. Nut, lock
70. Ring, retaining
71. Washer, flat
72. Washer, flat
73. Screw, pnh
74. Washer, lock
75. Washer, flat
76. Ring, retaining
77. Ring, retaining
78. Ring, retaining
79. Washer, flat
80. Gear
81. Spring
82. Washer, flat
83. Washer, lock
84. Screw, pnh
85. Screw, pnh
86. Washer, lock
87. Washer, flat
88. Guard, cable
89. Ring, retaining
90. Spring
91. Roller, pressure
92. Spring
93. Washer, flat
94. Ring, retaining
95. Ring, retaining
96. Spring
97. Washer, flat
98. Washer, lock
99. Screw, pnh
100. Screw, pnh
101. Washer, lock
102. Spring
103. Washer, flat
104. Screw, set
105. Ring, retaining
106. Ring, retaining
107. Spring
108. Board, terminal
109. Washer, flat
110. Washer, flat
111, Washer, lock
112. Washer, lock
113. Nut
114. Nut
115. Washer, flat
116. Washer, lock
117. Screw, pnh
118. Motor, line-feed
119. Screw, set
120. Sprocket
121. Washer, flat
122. Screw, pnh
123. Chain, line-feed
124. Bearing
125. Ring, retaining
126. Roller, feed
127. Shaft, idler sprocket
128. Shaft, gear
129. Sprocket, idler
130. Ring, retaining

6-16. PRINTER HARNESS - DISASSEMBLY AND REASSEMBLY (fig. 6-8)

DISASSEMBLY

- Remove printer as directed in paragraph 5-11K.
- Unsolder the black and white leads from the drum motor end housing (40).
- Unsolder five leads on terminals E13 through E17 on terminal board (108) (E13-WHT/RED, E14 RED, E15-WHT/GRN, E16-GRN, E17-WHT).
- Remove right vertical wall (6) as directed in paragraph 6-15.
- Remove LF/CC module (27).
- Remove printer subassembly (14) as directed in paragraph 5-11M.
- Remove two screws (85) securing the terminal board to the left side wall.
- Carefully remove harness assembly (12).

REASSEMBLY

NOTE

Refer to DISASSEMBLY for illustration part numbers not referenced.

- Replace harness assembly.
- Replace two screws securing terminal board to left side wall.
- Replace printer subassembly as directed in paragraph 5-11M.
- Replace LF/CC module.
- Replace right vertical wall as directed in paragraph 6-15.
- Resolder five leads on terminals E13 through E17 on terminal board.
- Resolder black and white leads on drum motor end housing.
- Replace printer as directed in paragraph 5-11K.

6-17. PRINTER SUBASSEMBLY-DISASSEMBLY AND REASSEMBLY (fig. 6-9)

DISASSEMBLY OF CABLE ASSEMBLY

- Remove printer as directed in paragraph 5-11K.
- Remove printer subassembly as directed in paragraph 5-11M.
- Remove all modules from printer subassembly as directed in paragraphs 5-11D and E.
- Disconnect leads to capacitor C1 (41).
- Remove two screws (32) on bottom of clamp (35) and remove C1.
- Remove two screws holding bracket (42).
- Remove remaining screws from motherboard 3A1A5A1W1A1 (22).

NOTE

Remove cable clamp (52) on terminals Serial No. 1 to 2000.

- Disconnect the motherboard two end connectors and lift motherboard from ribbon-lift mechanism.

REASSEMBLY OF CABLE ASSEMBLY

- Install new cable assembly.
- Reconnect motherboard to ribbon-lift mechanism.
- Secure with cable clamp (52) (Serial No. 1 to 2000).
- Connect leads to capacitor C1 and secure capacitor with its bracket,
- Secure motherboard into place with screws.
- Replace all circuit cards removed.
- Reinstall printer subassembly and verify operational capability.

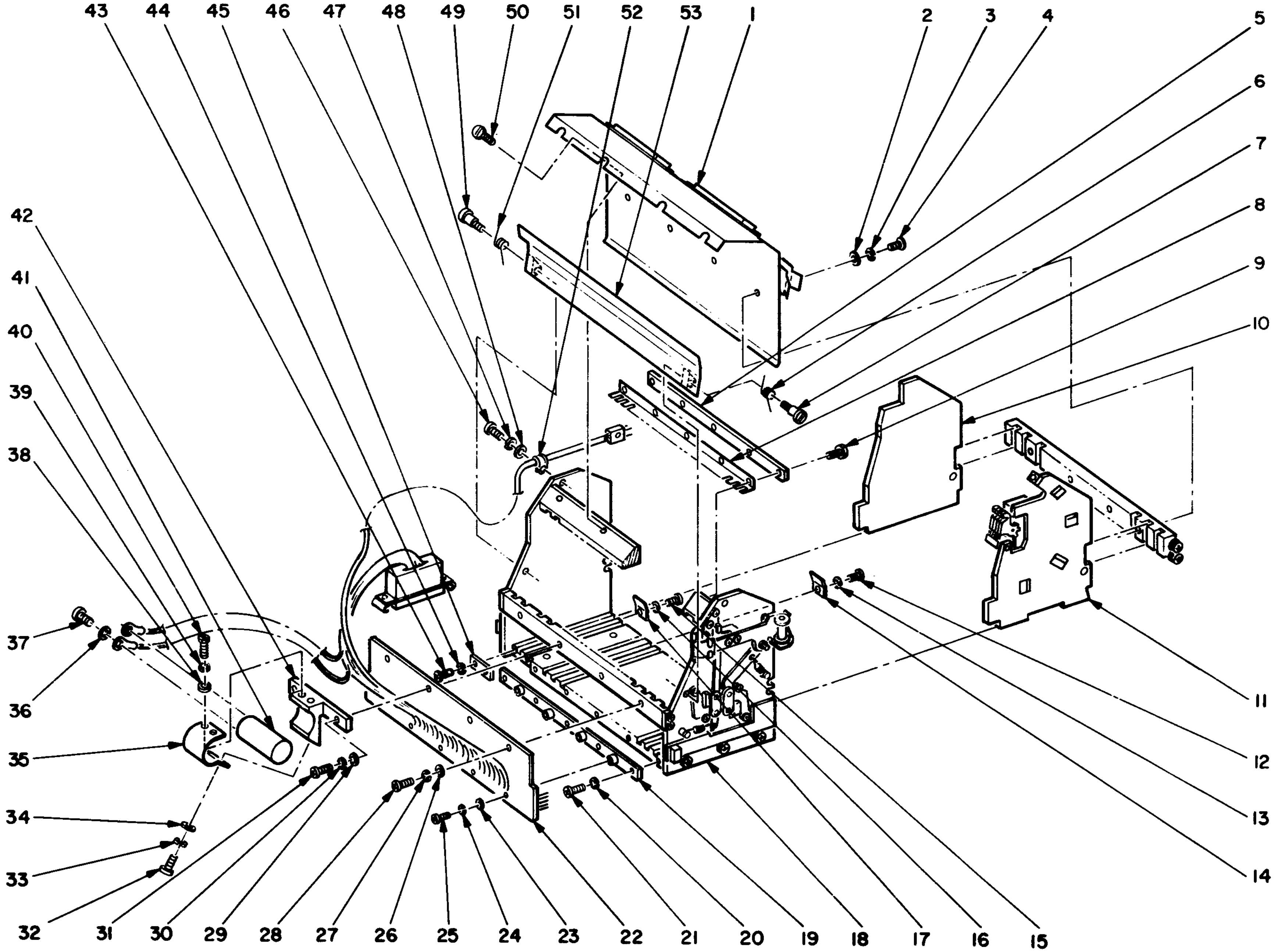


Figure 6-9. PRINTER SUBASSEMBLY.

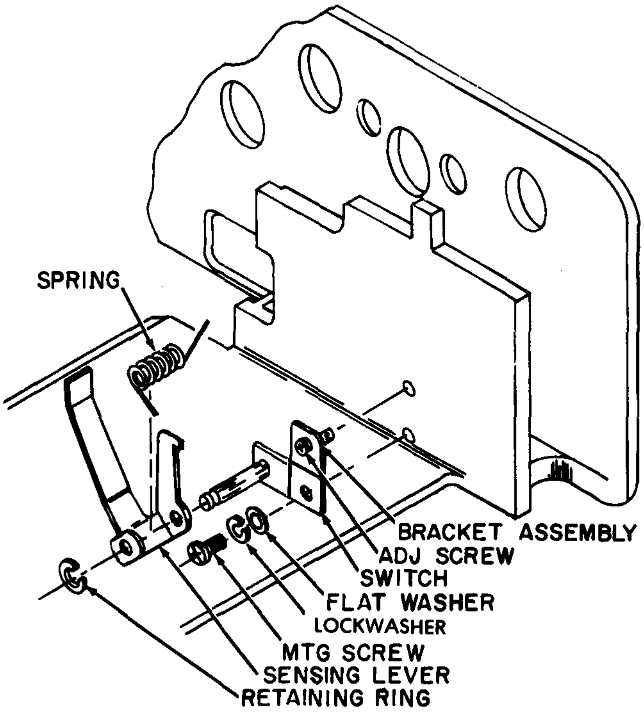
Figure 6-9. LEGEND

1. Cover assembly
2. Washer, flat
3. Washer, lock
4. Screw
5. Plate, retaining
6. Spring
7. Screw
8. Spring, flat
9. Screw
10. Module, hammer drive
11. Hammer module
12. Screw
13. Washer, lock
14. Clamp
15. Screw
16. Washer, lock
17. Clamp
18. Ribbon-lift mechanism
19. Plate, assembly
20. Washer, lock
21. Screw
22. Cable assembly (motherboard)
23. Washer, flat
24. Washer, lock
25. Screw
26. Washer, flat
27. Washer, lock
28. Screw
29. Washer, flat
30. Washer, lock
31. Screw
32. Screw
33. Washer, lock
34. Washer, flat
35. Clamp, capacitor
36. Washer, lock
37. Screw
38. Washer, lock
39. Washer, lock
40. Screw
41. Capacitor
42. Bracket, capacitor
43. Screw
44. Washer, lock
45. Plate, stop
46. Screw
47. Washer, lock
48. Washer, flat
49. Screw
50. Screw
51. Spring
52. Clamp, cable
53. Guide, paper

6-18. PAPER-LOW SENSING MECHANISM DISASSEMBLY AND REASSEMBLY

DISASSEMBLY

- Remove mounting screw and adjusting screw.
- Remove bracket assembly from frame.
- Remove retaining ring.
- Using spring hook (P/O TOOL KIT TE-50B) remove spring end that is secured behind the large washer on switch.
- Slide sensing lever until spring and lever are free.



REASSEMBLY

- Position spring and lever into place.
- Secure spring behind large washer.
- Reattach bracket assembly to frame with mounting screw and adjusting screw.
- Secure assembly into place with retaining ring.
- Replace paper roll.
- Perform adjustment procedures as necessary.

6-19. HAMMER MODULE DISASSEMBLY AND REASSEMBLY (fig. 6-10)

- Disassembly of hammer module must be performed with care to avoid damage to printed circuit wiring and solenoid leads. Use the Pace Kit as required for all unsoldering operations.

CAUTION

Do not allow terminals to heat more than 4 seconds at a time.

SOLENOID CORE DISASSEMBLY

- Remove solder from appropriate terminals on printed circuit (22).
- Gently unwrap wires from their respective terminals.
- Remove two screws (14) and remove solenoid (12) core.

SOLENOID CORE REASSEMBLY

- Place core (12) into solenoid and secure into position with screw (14).
- Wrap wires around their respective terminals and solder into place.
- Coat terminals with epoxy (refer to Appendix C, item 12) and allow to dry.
- Realine solenoid as follows:

  Select a solenoid armature (8), (10), (25) or (27) which operates a hammer next to hammer operated by solenoid core which was replaced.

  Place blade end of a common screwdriver between armature end and appropriate setscrew. (This will force hammer to its maximum point of travel.)

  Loosen screw (14) securing replaced core (12).

  Adjust setscrew (2) for solenoid being alined until hammer is even with adjacent hammer set in its maximum point of travel.

  Place a 0.001 “shim” in the gap between core and armature and manually move core tightly against the “shim”.

  Tighten two screws (14) and release core.

  Readjust setscrew (2) until it just touches the hammer in rest position.

PRINTED CIRCUIT DISASSEMBLY

- Using a .061 inch drill, drill out rivet (18) securing J1 to mounting plate (1).
- Unsolder and remove solenoid leads as described above.
- Remove three screws (17).
- Remove two screws (20) and guide (19).
- Remove printed circuit (22), remove components as required.

PRINTED CIRCUIT REASSEMBLY

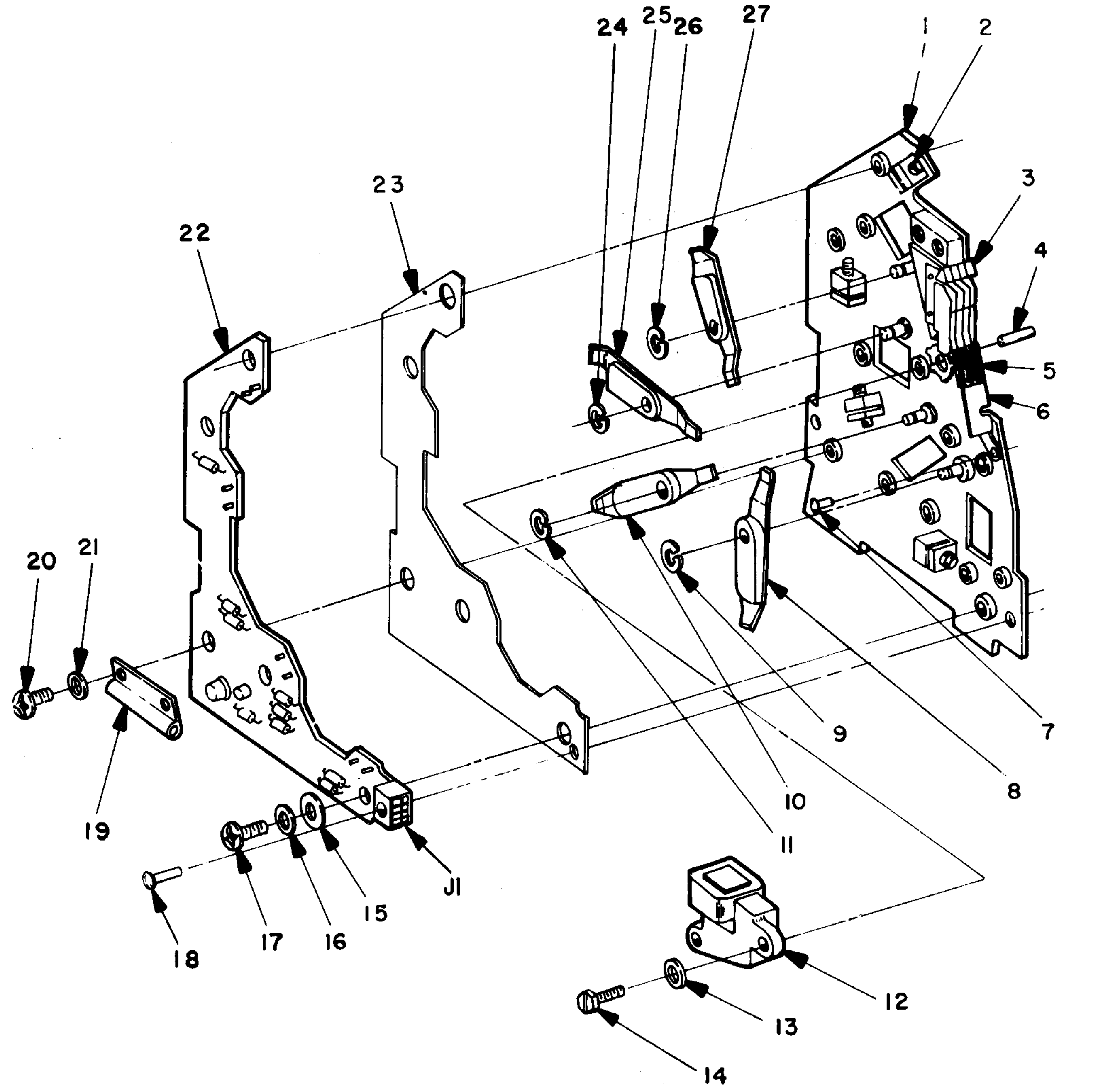
- Mount printed circuit (22) in place using three screws (17).
- Mount guide (19) and secure with screws (20).
- Solder solenoid core wires to terminals as follows:

NOTE

Refer to figure 6-2 for terminal identification.

CORE	LEAD COLOR	TERMINAL	CORE	LEAD COLOR	TERMINAL
L1	Red	G	L3	Red	C
L1	Blk	H	L3	Blk	D
L2	Red	E	L4	Red	A
L2	Blk	F	L4	Blk	B

- Using a Rolling Punch, Cambion # 6629 replace rivet (18) and swage in place.
- Coat terminals with epoxy (refer to appendix C, item 12) and allow to dry.



1	Plate, mounting	10	Armature assembly	19	Guide
2	Setscrew, oval point	11	Ring, retaining	20	Screw, machine
3	Hammer assembly	12	Magnet assembly	21	Washer, flat
4	Shaft	13	Spacer	22	Board, printed wiring
5	Spring, helical, comp	14	Screw, sltd. hex hd	23	Insulator, PW board
6	Guide, spring	15	Insulator	24	Ring, retaining
7	Rivet, tubular	16	Washer, flat	25	Armature assembly
8	Armature assembly	17	Screw, machine	26	Ring, retaining
9	Ring, retaining	18	Rivet, tubular	27	Armature assembly

Figure 6-10. HAMMER MODULE ASSEMBLY.

6-20. INTERFACE ASSEMBLY DISASSEMBLY AND REASSEMBLY (fig. 6-11)

RX/TX CIRCUIT CARD DISASSEMBLY

- Remove 12 screws (25), lockwashers (26), and flat washers (27) securing top cover (24) to assembly (7).
- Remove two screws (21), flat washers (20), lockwashers (31) and nuts (32) holding connector J2 in place.
- Remove two screws (7.1), flat washer (43.3), lockwasher (43.2) and nut (43.1).
- Remove TB1 (11.1).
- Remove four screws (28), lockwashers (29) and flat washers (30) securing diode circuit and gently lift out.
- Remove two screws on back side of interface assembly (7) holding filter board in place.
- Remove four screws (14), lockwashers (13) and flat washers (12) holding RX/TX circuit card in place.
- Gently lift up both the RX/TX circuit card and filter board at the same time.
- Tag and unsolder each wire from harness assembly connected on RX/TX circuit card with terminal number/color code.
- Remove RX/TX circuit card.

DIODE CIRCUIT CARD DISASSEMBLY

- Remove 12 screws (25), lockwashers (26) and flat washers (27) securing top cover (24) to assembly (7).
- Remove four screws (28), lock washers (29), and flat washers (30) securing diode circuit card to assembly (7).
- Gently lift diode circuit card until wires on bottom of circuit card are exposed.
- Remove diodes as required, using Pace kit.

RX/TX CIRCUIT CARD REASSEMBLY

- Resolder wires to respective terminals.
- Carefully replace RX/TX circuit card and filter board into original positions.
- Secure RX/TX card into position with four screws (14), lockwashers (13), and flat washers (12).
- Secure filter board with two screws through back side of interface assembly (7).
- Replace diode circuit card.
- Replace TB1.
- Replace connector J2.
- Replace top cover.

DIODE CIRCUIT CARD REASSEMBLY

- Position diode circuit card into assembly and secure with four screws (28), lockwashers (29), and flat washers (30).
- Secure top cover into place.

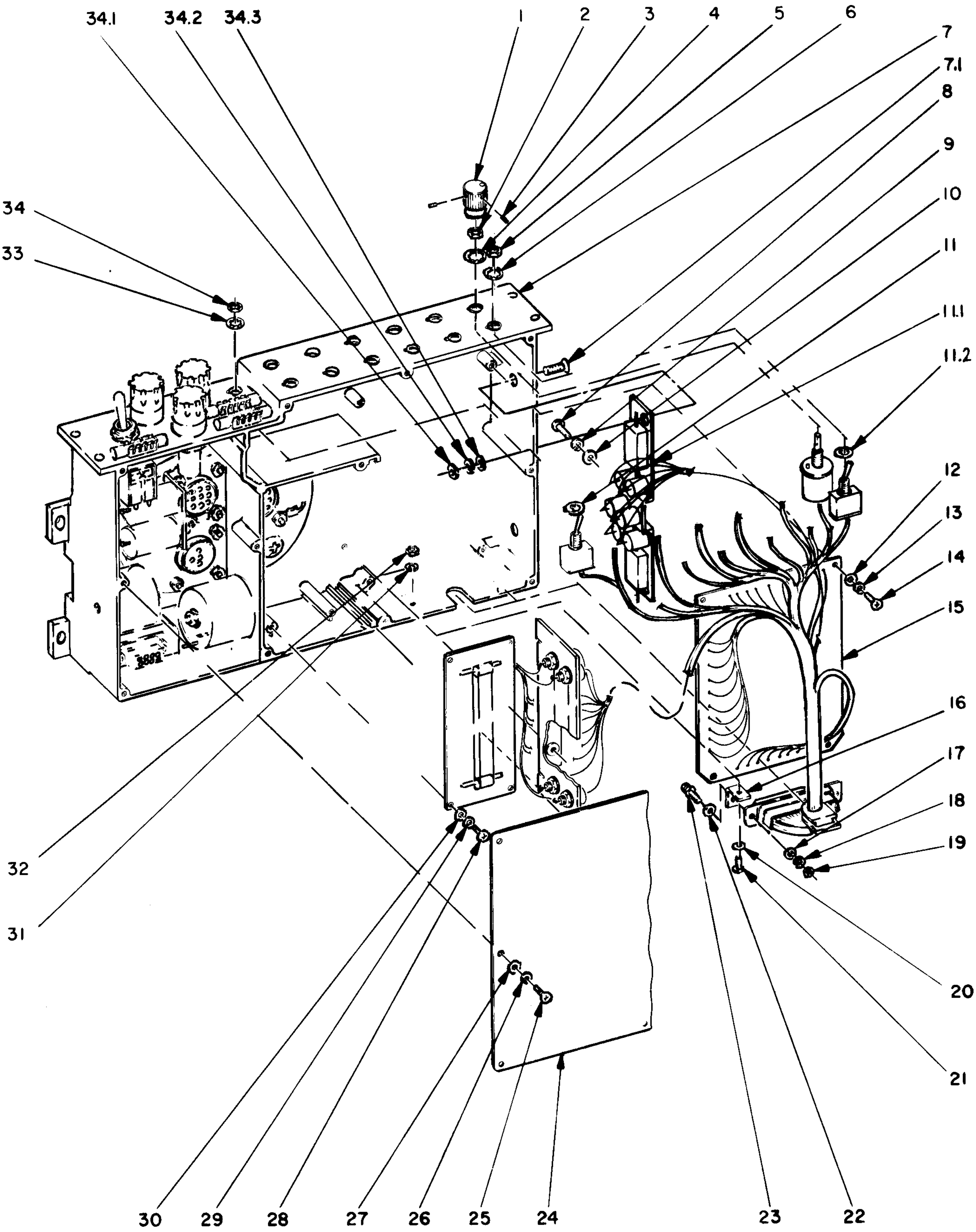


Figure 6-11. INTERFACE ASSEMBLY.

Figure 6-11. LEGEND

1. Knob
2. Nut
3. Screw, set
4. Washer, lock
5. Nut
6. Washer, lock
7. Housing, interface
7.1 .Screw, mach, flathead
8. Screw
9. Washer, lock
10. Washer, flat
11. Washer, positioning
11.1. TB1
11.2. Washer, lock
12. Washer, flat
13. Washer, lock
14. Screw
15. Subassembly, interface (A7A1)
16. Bracket
17. Washer, flat
18. Washer, lock
19. Nut
20. Washer, flat
21. Screw
22. Washer, flat
23. Screw
24. Cover, interface
25. Screw
26. Washer, lock
27. Washer, flat
28. Screw
29. Washer, lock
30. Washer, flat
31. Washer, lock
32. Nut
33. Washer, lock
34. Nut
34.1. Nut
34.2. Washer, lock
34.3. Washer, flat

6-21. FILTER MODULE DISASSEMBLY AND REASSEMBLY (fig. 6-12)

DISASSEMBLY

- Remove filter module as directed in paragraph 5-11G.
- Remove seven screws (43) and two screws (46) securing top cover plate (45) to module and remove cover plate. Note that two longer screws (46) are used with cable clamps (49).
- Remove transformer T1 (1) as follows:
  - Remove five screws (36) securing casting (70) to transformer.
  - Gently lift casting until transformer terminals are accessible.
  - Unsolder leads from terminals being careful to tag them as they are removed.
  - Lift casting free of transformer T1.
  - Remove components as required being sure to note wiring and polarities as required.

REASSEMBLY

- Solder leads to their respective terminals.
- Replace five screws (36) securing casting to transformer.
- Replace top cover and secure onto position with seven screws (43), and two screws (46).

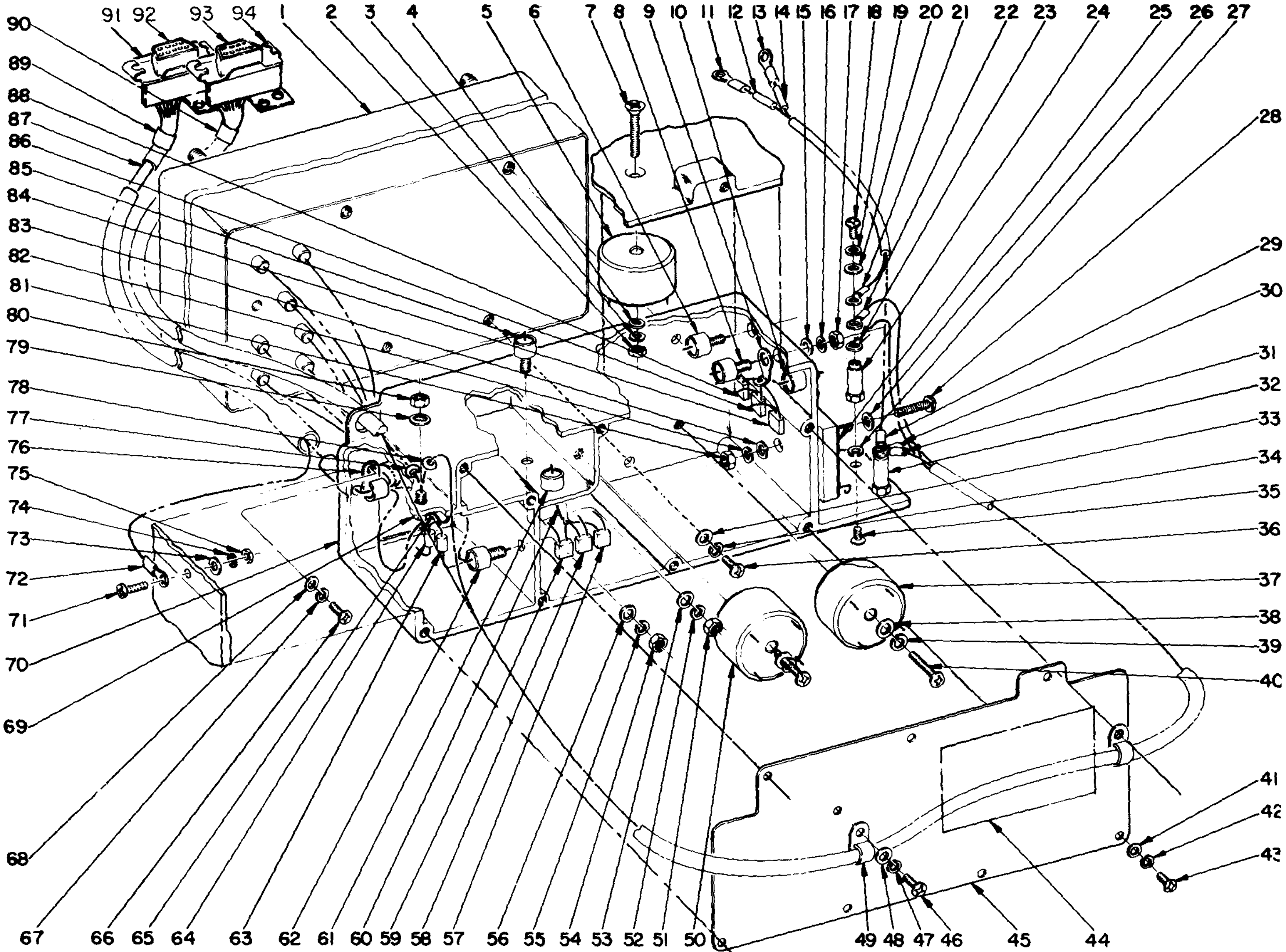


Figure 6-12. FILTER ASSEMBLY.

Figure 6-12. LEGEND

1. Transformer (T1)
2. Nut
3. Washer, lock
4. Washer, flat
5. Inductor (L2)
6. Capacitor (C7)
7. Screw, flh
8. Capacitor (C6)
9. Terminal
10. Capacitor (C5)
11. Terminal lug
12. Band, identification
13. Terminal lug
14. Band, identification
15. Washer, flat
16. Washer, lock
17. Nut
18. Screw, pnh
19, Washer, lock
20. Washer, flat
21. Terminal lug
22. Terminal lug
23. Terminal lug
24. Stand-off (E2)
25. Diode (CR1)
26. Washer, flat
27. Washer, lock
28. Screw, pnh
29. Terminal lug
30. Terminal lug
31. Terminal lug
32. Stand-off (E1)
33. Washer, flat
34. Washer, lock
35. Screw, flh
36. Screw, pnh
37. Inductor (L1)
38. Washer, flat
39. Washer, lock
40. Screw, pnh
41. Washer, flat
42. Washer, lock
43. Screw, pnh
44. Label
45. Cover
46. Screw, pnh
47. Washer, lock
48. Washer, flat
49. Clamp, cable
50. Inductor (L3)
51. Nut
52. Washer, lock
53. Washer, flat
54. Nut
55. Washer, lock
56. Washer, flat
57. Capacitor (C11)
58. Capacitor (C10)
59. Capacitor (C9)
60. Terminal (E4)
61. Capacitor (C1)
62. Capacitor (C3)
63. Capacitor
64. Diode (VR1)
65. Diode (VR2)
66. Screw, pnh
67. Washer, lock
68. Washer, flat
69. Capacitor (C4)
70. Casting
71. Screw, pnh
72. Terminal lug
73. Washer, flat
74. Washer, lock
75. Nut
76. Clamp, cable
77. Ferrite bead
78. Ferrite bead
79. Washer, lock
80. Nut
81. Nut
82. Washer, lock
83. Washer, flat
84. Capacitor (C12)
85. Capacitor (C2)
86. Capacitor (C13)
87. Ferrule, inner
88. Capacitor (C14)
89. Band, identification
90. Band, identification
91. Mounting plate
92. Connector (P1)
93. Connector (P2)
94. Mounting plate

Section VI. GENERAL SUPPORT TESTING PROCEDURES

6-22. GENERAL

- Perform tests listed below after performing maintenance on equipment. These tests determine if equipment has been properly repaired and can be returned to using organization, or stock.
- Repaired equipment must meet requirements given in paragraph 6-31, “Final Test of Communications Terminal AN/UGC-74A(V)3.”
- The following circuit card assemblies are tested and repaired only at a designated specialized repair activity (SRA) using Test & Repair System, Electronic Equipment AN/MSM-105(V)1, associated test programs, and interconnection devices.

  CPU (3A1A1)
  Memory (3A1A2)
  Communications (3A1A3)
  Printer control (3A1A4)

- Test procedures for the following modules and assemblies are explained in detail.

  Paragraph 6-23 Hammer Driver (3A1A5A2-A3)
  Paragraph 6-24 Hammer Module (3A1A5A4-A23)
  Paragraph 6-25 Motor Driver and Current Control Board Assembly (3A1A5A3)
  Paragraph 6-26 Interface Assembly (3A1A7)
  Paragraph 6-27 Power Supply (3A1PS1)
  Paragraph 6-29 Filter Assembly (3A1A6FL1)
  Paragraph 6-30 Keyboard Keyswitch Assembly (3A2A1)

- Power supply adjustments are described in paragraph 6-28.
- Final test of the Communications Terminal AN/UGC-74A(V)3 is described in paragraph 6-31.
- If a failure is observed in the testing procedure, use the same test setup and refer to the applicable troubleshooting table in section III, “Troubleshooting” to isolate fault to the failed part(s).

NOTE

Performers of test functions are directed to follow all WARNINGS, CAUTIONS, and NOTES. “BE SAFE, NOT SORRY.”

6-23. HAMMER DRIVER 3A1A5A2-A3

a. Purpose. The hammer driver provides +18Vdc to the print hammer modules on any one of four buses. These buses are selected by a logic combination of an enable signal and logic ground. The enable signal is a TTL (0-5 Volt peak), 60 Hz waveform. The logic circuits on the module require a +5Vdc source. The hammer driver test fixture is a passive device that provides the switching, loading and testing capability required to perform piece part maintenance.

b. Test Equipment.

- Hammer Driver Module Test Fixture, SM-C-915982.
- Power Supply PP-2309/U (2 each)
- Function Generator SG-1133/U
- Oscilloscope AN/USM-281C

c. Test Setup Procedure for Hammer Driver Module (fig. 6-13).

- Remove hammer driver as directed in paragraph 5-11D.
- Adjust one power supply to +5Vdc ±5%. Turn off and connect to 5V input on test fixture.
- Adjust one power supply to + 18Vdc ±5%. Turn off and connect to 18V input on test fixture.

NOTE

If power supply being used has current limiting, set limit to greater than 500 mA.

- Adjust function generator 60Hz ±10%, 0 to +5V square wave (16.6 msec period). Turn off and connect to SIG IN input on test fixture.
- Adjust channel B on oscilloscope to 1V/DIV and 2mSEC/DIV. Turn off and connect to SIG OUT 1.
- Adjust channel A to .5V/DIV and 12mSEC/DIV and connect to SIG IN.
- Connect all test equipment grounds to GND on test fixture.
- Install hammer driver into test fixture.
- Place test fixture SELECT switch to IN 1.
- Turn all test equipment on and ensure that outputs are as originally set up.

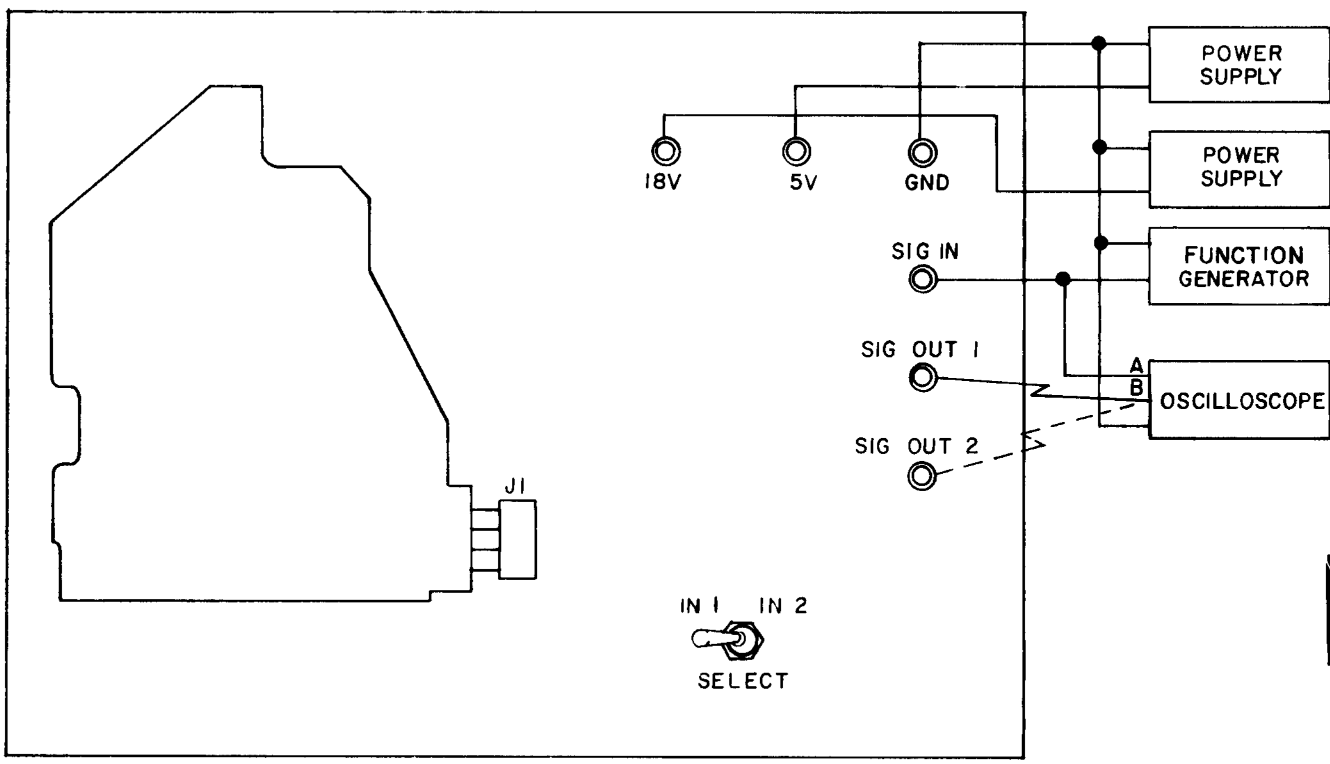


Figure 6-13. HAMMER DRIVER MODULE TEST SETUP.

d. Test Procedures (fig. 6-14 and 6-15).

1. The test setup causes a 60-Hz signal to be input to pin 2 and a logic ground to pin 4.
2. Observe a 60 Hz ± 10%, 0 to + 18V ±5%, square waveform on channel B of the oscilloscope (output from pins 9 and 10).
3. Compare the function generator output on channel A of the oscilloscope with channel B. The waveforms should coincide timewise (same frequency) and have the same wave shape.
4. Place the test fixture SELECT switch to IN 2 (signal input to pin 4 and logic ground to pin 2).
5. Move the channel B probe to SIG OUT 2 (output from pins 7 and 8) and observe waveforms as in (2) and (3) above.
6. If a failure is observed in the above steps, refer to Troubleshooting Table No. 6-3 in section III for trouble location instructions. Also refer to paragraph 3-16 for hammer driver test fixture theory of operation.

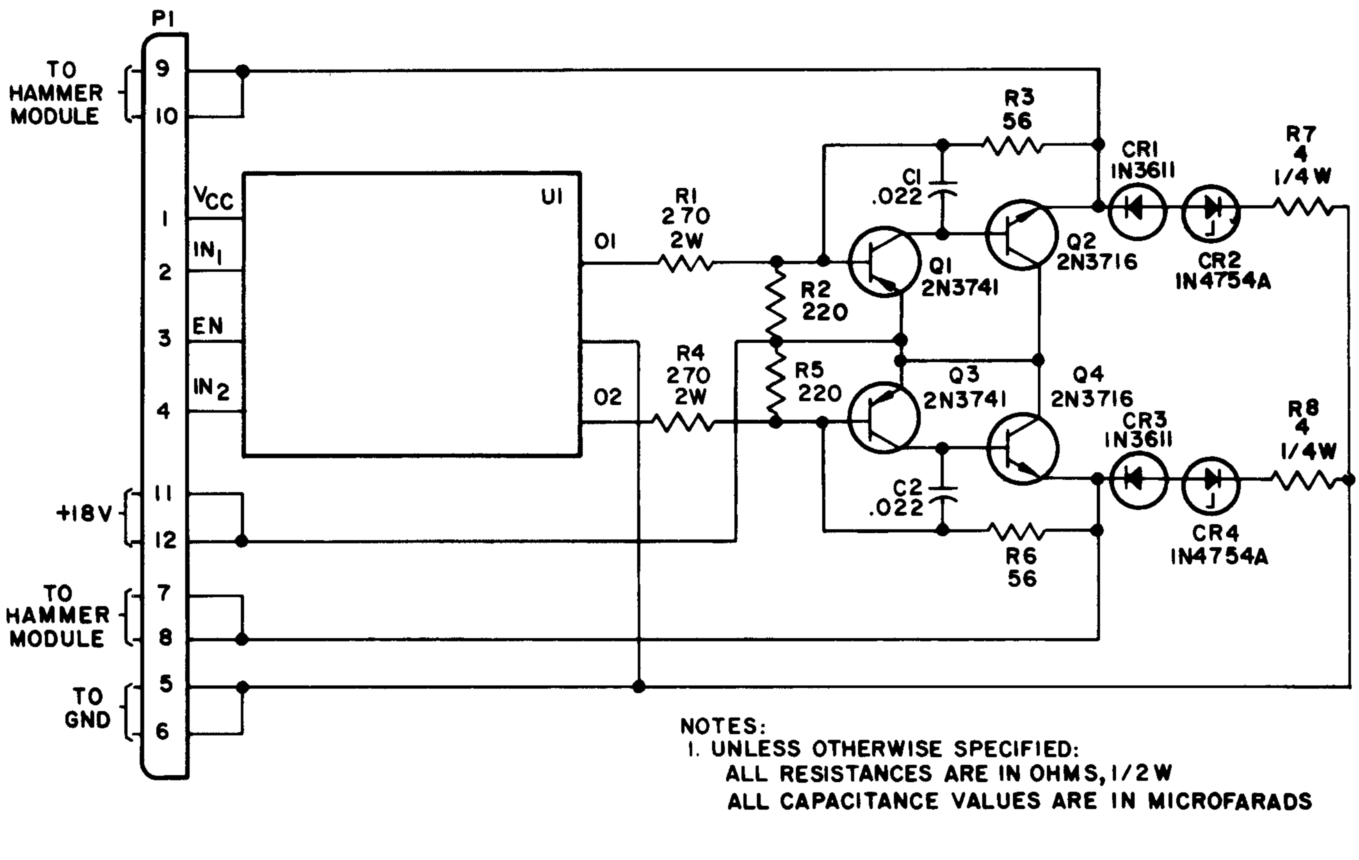
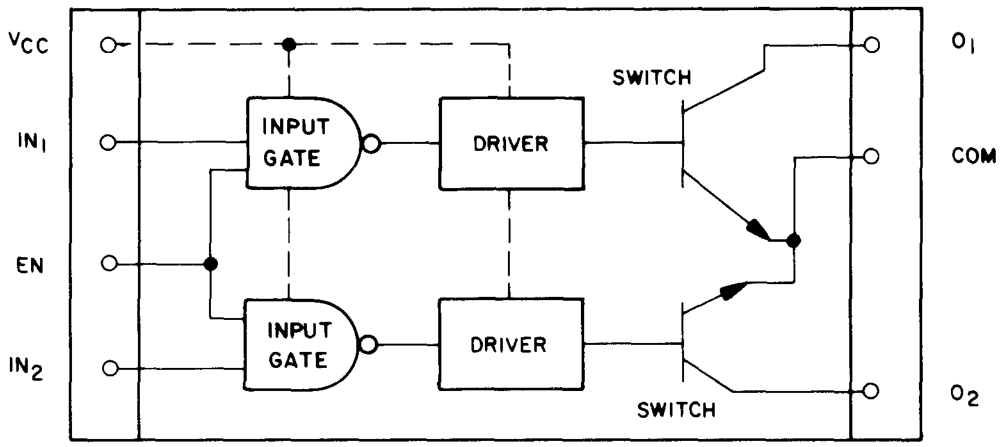


Figure 6-14. PRINT DRIVER SCHEMATIC DIAGRAM.



INPUTS			OUTPUTS	
IN_1	IN_2	E_N	O_1	O_2
X	X	0	OFF	OFF
0	0	1	OFF	OFF
0	1	1	OFF	ON
1	0	1	ON	OFF
1	1	1	ON	ON

X = DON'T CARE　　ON/OFF = OUTPUT TRANSISTOR STATE

1 = V_{IHI}

0 = V_{ILO}

Figure 6-15. HYBRID DRIVER (UI).

6-24. HAMMER MODULE 3A1A5A4-A23

a. Purpose. Each hammer module contains four print hammers. Each print hammer has an electrical drive circuit that provides the external electrical impulse which causes a hammer to move. In the terminal, the hammer driver (3A1A5A2-A3) and print control (3A1A4) provide + 18Vdc and command control signals to operate the hammer module. The hammer module test fixture simulates the hammer driver by switching + 18Vdc to a selected hammer and simulates the print control commands with a control pushbutton switch.

b. Test Equipment.

- Hammer Module Test Fixture, SM-C-915985
- Power Supply PP-2309/U (2 each)
- Multimeter AN/USM-223

c. Test Setup Procedure for Hammer Module (fig. 6-16).

- Remove hammer module as directed in paragraph 5-11E.
- Adjust one power supply to +5Vdc ±5%. Turn off and connect to 5V input on test fixture.
- Adjust one power supply to + 18Vdc ±5%. Turn off and connect to 18V input on test fixture.
- Connect all test equipment grounds to GND on test fixture.
- Install hammer module into test fixture.
- Turn all test equipment on and ensure that outputs are as originally set up.

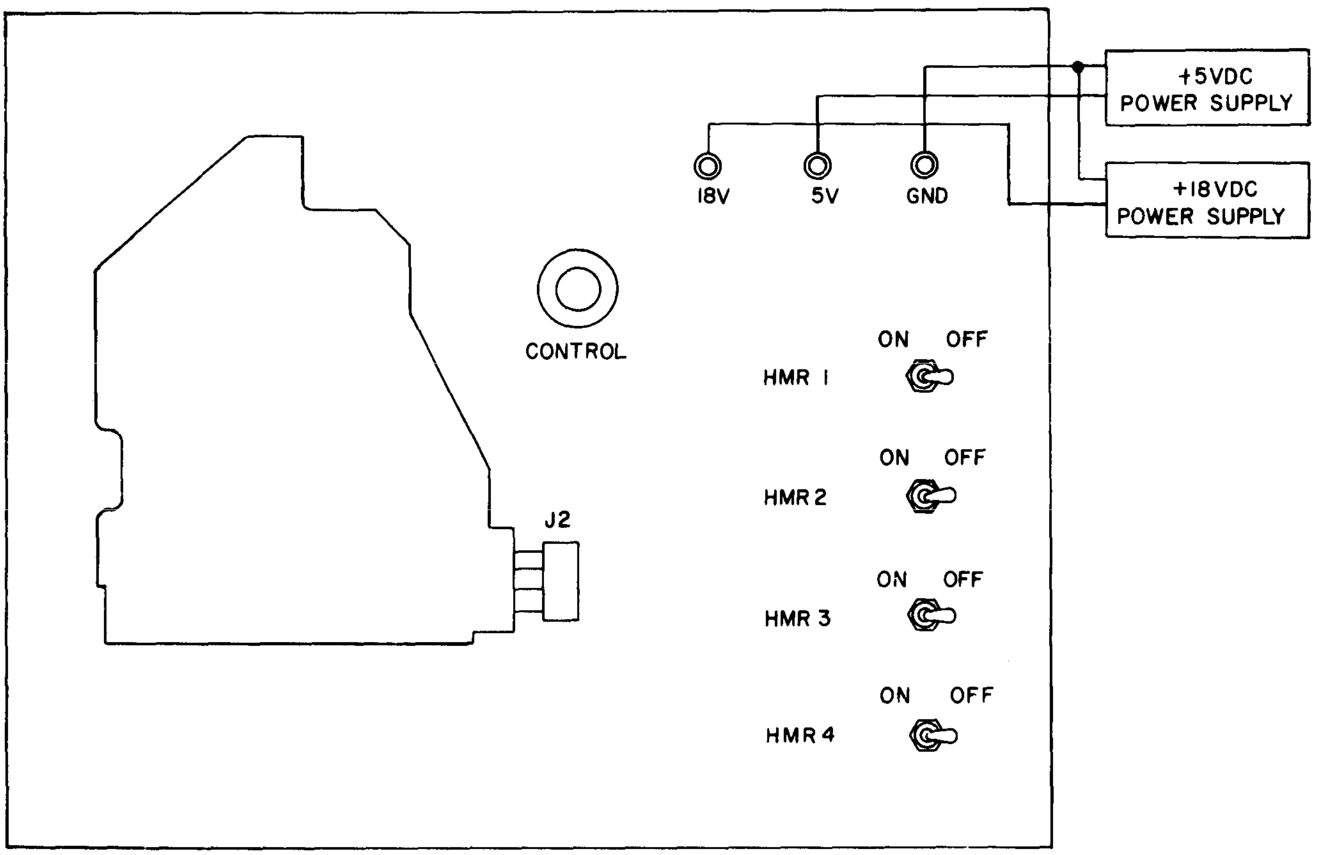


Figure 6-16. HAMMER MODULE TEST SETUP.

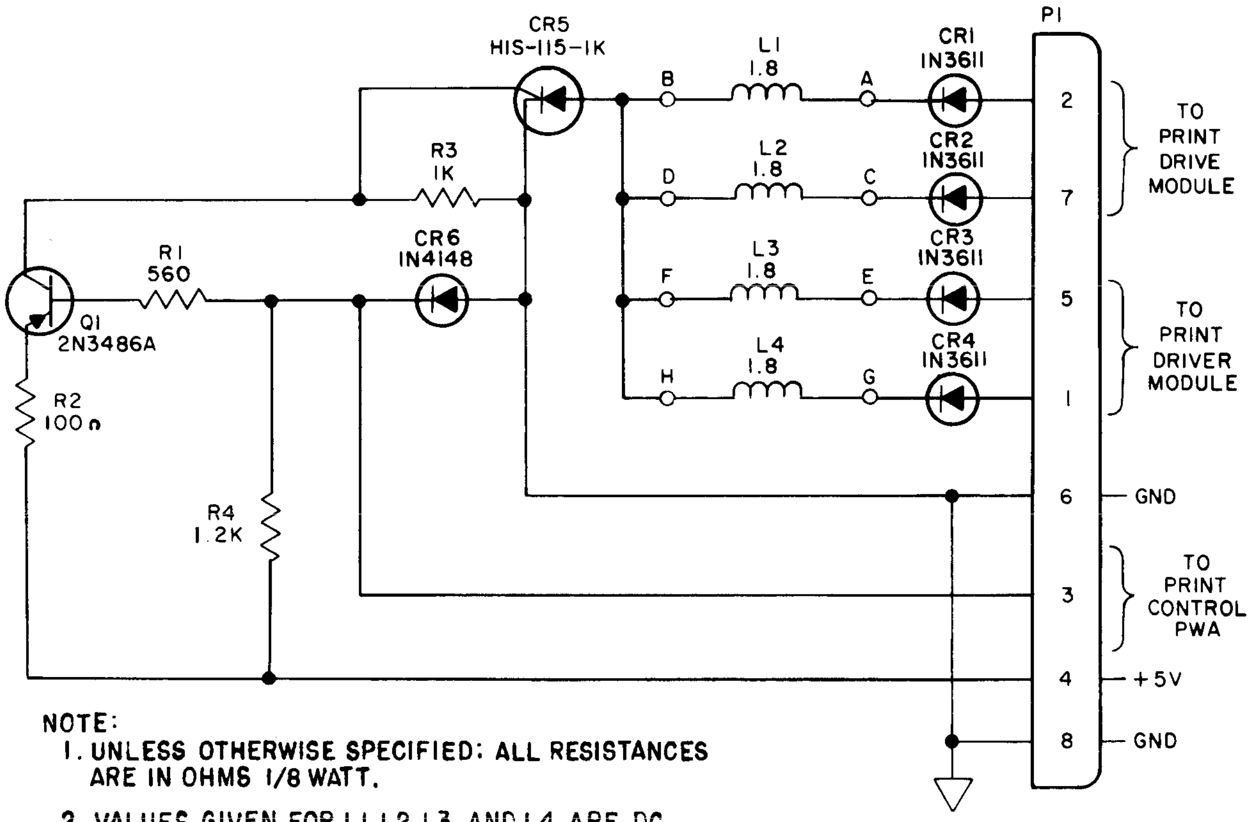
d. Test Procedures (fig. 6-17).

- Place HMR 1 to the ON position and simultaneously press the CONTROL pushbutton (See CAUTION). Hammer 1 should move forward and remain forward for as long as both HMR 1 and CONTROL are energized. This action supplies + 18Vdc to pin 2 (hammer drive circuit No. 1) and a logic control (ground) to pin 3.

CAUTION

If testing requires the circuit to be energized for a prolonged period (more than a few seconds), reduce the + 18Vdc to + 10Vdc to prevent heating of the circuitry.

- Repeat the above procedure for hammer 2 (HMR 2, + 18Vdc to pin 7), hammer 3 (HMR 3, +18Vdc to pin 5) and hammer 4 (HMR 4, +18Vdc to pin 1).
- If a failure is observed in the above steps, refer to Troubleshooting Table No. 6-4 in section III for trouble location instructions. Also refer to paragraph 3-17 for print hammer test fixture theory of operation.
- Final adjustment of hammer module print quality will be made by the organizational maintenance technician at the user level.



NOTE:
1. UNLESS OTHERWISE SPECIFIED: ALL RESISTANCES ARE IN OHMS 1/8 WATT.
2. VALUES GIVEN FOR L1, L2, L3, AND L4 ARE DC RESISTANCE IN OHMS.

Figure 6-17. PRINT HAMMER SCHEMATIC DIAGRAM.

6-25. MOTOR DRIVE (LINE FEED) AND CURRENT CONTROL BOARD ASSEMBLY 3A1A5A3

a. Purpose. This board assembly (LF/CC) supplies the operating voltages and current control to enable and stop the paper (line feed) motor. The four output circuits sequentially control the motor windings causing this motor to feed the copy paper. The control circuit, which is not used in the AN/UGC-74A(V)3, cuts off the output signals. The line feed/current control test fixture has a circuit which checks the control circuitry, a two level rotary selection switch that allows measurement of winding input and output signals, and a load resistor which simulates the motor and a control circuit.

b. Test Equipment, Tools and Materials.

- Line Feed/Current Control Text Fixture, SM-C-915988
- Power Supply PP-2309/U (2 each)
- Function Generator SG-1133/U
- Oscilloscope AN/USM-281C
- Multimeter AN/USM-223

c. Test Setup Procedure for Motor Drive (Line Feed)and Current Control Board Assembly (fig. 6-18).

- Remove board assembly as directed in paragraph 5-11 F.
- Adjust one power supply to +5Vdc ±5%. Turn off and connect to 5V input on test fixture.
- Adjust one power supply to + 22Vdc ±5%. Turn off and connect to 22V input on test fixture.
- Adjust function generator to 50 Hz, O to +5V square wave (20 msec period). Turn off and connect to SIG IN input on test fixture.
- Adjust channel B on oscilloscope to 5V/DIV and 10 mSEC/DIV. Turn off and connect to AO OUT.
- Adjust channel A to IV/DIV and 10 mSEC/DIV and connect to AO iN.
- Connect all test equipment grounds to GND on test fixture.
- Install motor drive and current control circuit card assembly into test fixture.
- Place test fixture PULSE switch to CC (connects SIG IN to pin L and CONTROL).
- Place test fixture SURGE CONTROL switch to OFF (opens circuit to pin H and SURGE CONTROL (TP)).
- Place test fixture SELECT switch to AO (connects 20-ohm load resistor to AO OUT).
- Turn all test equipment on and make sure that outputs are as originally setup.

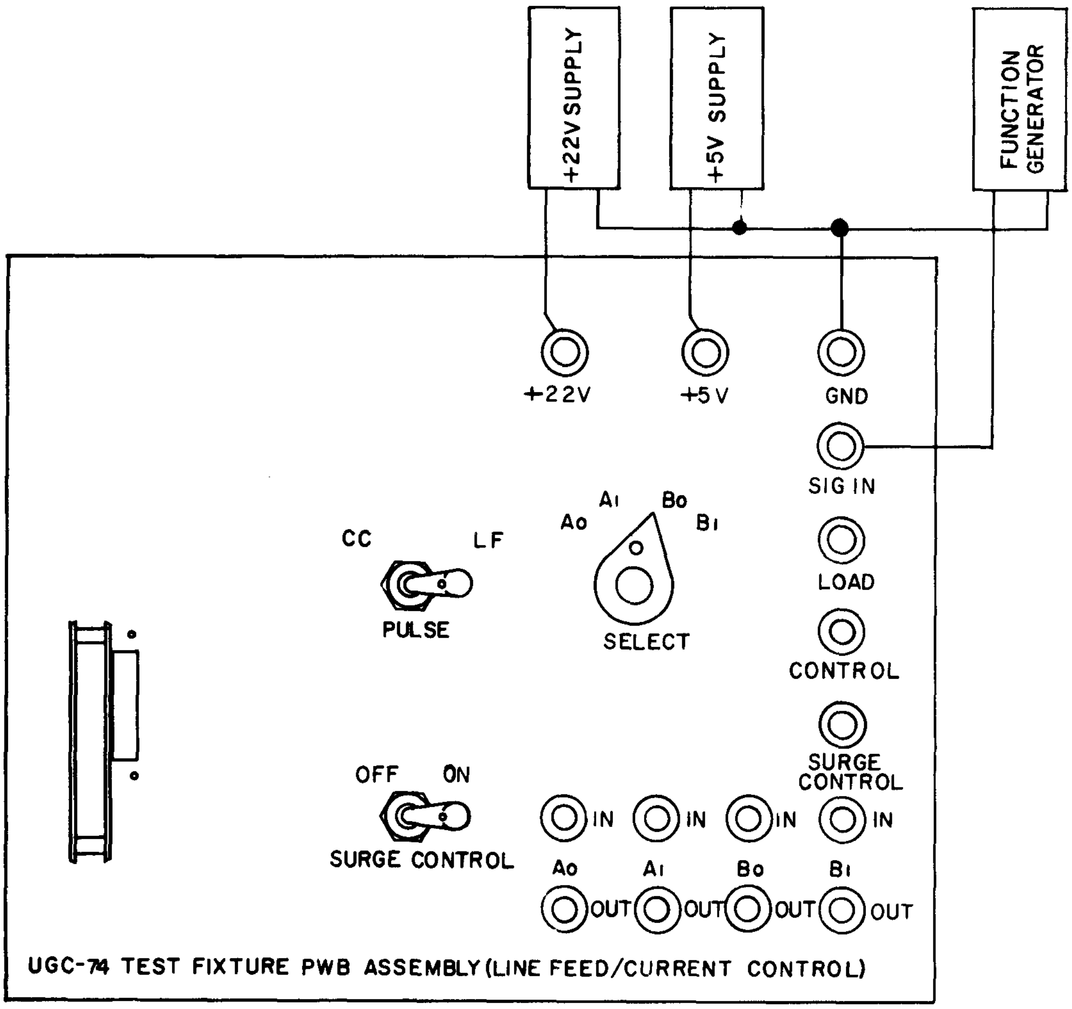


Figure 6-18. MOTOR DRIVE AND CURRENT CONTROL BOARD ASSEMBLY TEST SETUP.

d. Test Procedures (fig. 3-15).

1. Connect the multimeter to CONTROL test point and GND and measure 1.5Vdc ±5%. This proves that the test fixture input diode and bias circuit are working properly.
2. Connect the multimeter to LOAD test point and measure 22Vdc ±5%. This checks out the current control board's (SM-D-766709) ability to control and switch 22Vdc to the output load.
3. Place SURGE CONTROL switch to ON which causes the surge control circuit to cut off the switching action in (2) above. Measure 4 to 5Vdc at LOAD test point.
4. Return SURGE CONTROL switch to OFF. Measure 22Vdc ±5% at LOAD test point.
5. Place the PULSE switch to LF. This routes the input signal (SIG IN) to pin Q, AO IN applying it to the line-feed board (SM-D-766742). The output of this circuit is available at AO OUT.
6. Measure 22V peak-to-peak ±5% square wave at 50 Hz at AO OUT on channel B of the oscilloscope. This measurement checks input circuit from pin Q to E1, current control (CC) jumper to E1 line-feed (LF), through Q1 circuit to E7, E7 (LF) jumper to E7 (CC), E7 to pin D.
7. Compare the function generator output on channel A of the oscilloscope with channel B. The waveforms should coincide timewise (same frequency) and have the same wave shape.
8. Place the SELECT switch to A1 (connects 20-ohm load resistor to A1 OUT).
9. Remove scope probes from AO OUT and AO IN and connect to A1 OUT and Al IN.
10. Measure as in steps (6) and (7) above. This measurement checks input circuit from pin 0 to E2, E2 (CC) jumper to E2 (LF), through Q2 circuit to E8, E8 (LF) jumper to E8 (CC), E8 to pin C.
11. Place the SELECT switch to BO (connects 20-ohm load resistor to BO OUT).
12. Remove scope probes from A1 OUT and A1 IN and connect to BO OUT and BO IN.
13. Measure as in steps (6) and (7) above. This measurement checks input circuit from pin K to E3, E3 (CC) jumper to E3 (LF), through Q3 circuit to E9, E9 (LF) jumper to E9 (CC), E9 to pin B.
14. Place the SELECT switch to B1 (connects 20-ohm load resistor to B1 OUT).
15. Remove scope probes from BO OUT and BO IN and connect to B1 OUT and B1 IN.
16. Measure as in steps (6) and (7) above. This measurement checks input circuit from pin J to E4, E4(CC) jumper to E4(LF), through Q4 circuit to E10, E10(LF) jumper to E10(CC), E10 to pin A.
17. If a failure is observed in the above steps, refer to Troubleshooting Table No. 6-5 in Section Ill for trouble location instructions. Also refer to paragraph 3-18 for motor driver/current control test fixture theory of operation.

6-26. INTERFACE ASSEMBLY 3A1A7

a. Purpose. The interface assembly has three functions: power switching, mode selection and data input/output level conversion. The prime power is switched on and routed to the filter assembly. The mode selection is performed by setting rotary and toggle switches to the desired data mode positions. These data are routed to the CPU communications and print control circuit card assemblies. The data input and output circuits consist of five circuits which accept and convert a variety of inputs and outputs to the selected formats. The interface assembly test fixture has input and output jacks which provide direct access to the inputs and outputs of each of the five data circuits. This provides the capability to check individual circuits or series, and combinations of the five circuits. The test fixture also provides several load resistors to be used in data circuit testing. The power and mode selection wiring and switches are connected to a four-level wafer switch and their continuity is easily checked.

b. Test Equipment, Tools and Materials.

- Interface Assembly Test Fixture, SM-D-915991
- Power Supply PP-2309/U (4 each)
- Function Generator SG-1133/U
- Oscilloscope AN/USM-281C
- Multimeter AN/USM-223
- Telegraph Test Set AN/GGM-15(V)2
- Data cable assembly SM-D-915889

c. Test Setups and Procedures (fig. 6-19).

- Remove interface assembly as directed in paragraph 5-11C.

NOTE

Refer to table 6-13 on Interface Test Fixture Interconnections for test point data.

(1) Interface Assembly.
± 6V ± 1V Data Functional Test Setup

- Patch as follows:

OUT 1 to IN 2
IN 3 HI to OUT 2 HI to R1
IN 3 LO to OUT 2 LO to R1 (other side)
OUT 3 to IN 5
OUT 5 HI to R2
OUT 5 LO to R2 (other side)

- Connect AN/GGM-15(V)2:
(DATA +6/12) - IN 1 HI/LO
(BRIDGING) - OUT 5 HI/LO
- Adjust one power supply to +8.6Vdc ±5%, turn off and connect to +8.6V input on test fixture.
- Adjust one power supply to -8.6Vdc ±5%, turn off and connect to -8.6V input on test fixture.
- Connect test fixture P1 (to J1) and P5 (to J5) and ground strap (to ground lug) on interface assembly.
- Place interface assembly REC MODE and XMIT MODE switch to LO DATA.
- Turn all test equipment on and ensure that outputs are as originally setup.

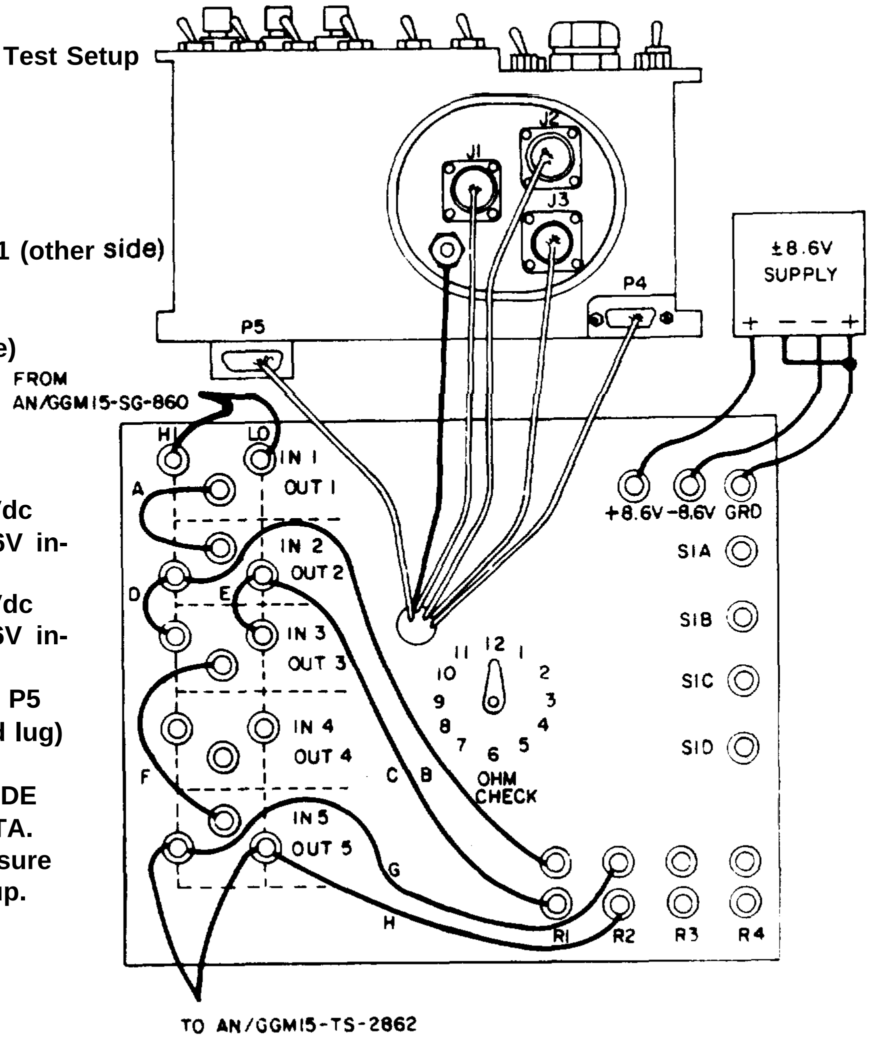


Figure 6-19. INTERFACE TEST SETUP,

Table 6-13. INTERFACE TEST FIXTURE INTERCONNECTIONS

Test point	Interface circuit	Connector
IN 1 HI	REC DATA HI	J1-G
IN 1 LO	REC DATA LO	J1-H
OUT 1 (TTL)	RCV DATA LOGIC	J5-6
IN 2 (TTL)	XMIT CLK LOGIC	J5-8
OUT 2 HI	XMIT CLK HI	J1-P
OUT 2 LO	XMIT CLK LO	J1-N
IN 3 HI	REC CLK HI	J1-A
IN 3 LO	REC CLK LO	J1-B
OUT 3 (TTL)	RCV CLK LOGIC	J5-4
IN 4 HI	REC GATED CLK HI	J1-D
IN 4 LO	REC GATED CLK LO	J1-E
OUT 4 (TTL)	GATE KG 30 CLK	J5-5
IN 5 LOGIC	XMIT DATA LOGIC	J5-7
OUT 5 (HI)	XMIT DATA HI	J1-K
OUT 5 (LO)	XMIT DATA LO	J1-L
+8.6V	+8.6V	J5-1
−8.6V	−8.6V	J5-2
GND	GND	J5-40

(2) ±6V ±1V Data Test Procedures (fig.6-20)

- Transmit alternate character bits from the AN/GGM-15 at DATA ±6V and at speeds between 45.5 baud and 1200 baud. Check the output on the AN/GGM-15 analyzer. Intermediate points can be checked with Oscilloscope AN/USM-281C using interface assembly schematic, figure FO-2, and RX/TX assembly schematic, paragraph 3-10. This test checks the following:

  1. J1-G to VR7 to FL7 to S11B to E17 to U4, U1, U2 to E-20.
  2. J1-H to VR8 to FL8 to S11C to E16 to U4, U1, U2 to E-20.
  3. J5-8 to U5 to CR1, CR4 to FL5 to VR5 to J1P.
  4. FL6 to VR6 to J1-N.
  5. J-1A to VR1 to FL1 to E9 to U4 to J5-4.
  6. J1-B to VR2 to FL2 to E8.
  7. J5-7 to E2 to U1, U5 to CR9, CR10 to E13 to S12C to FL10 to VR10 to J1-L.
  8. U5 to CR11, CR12 to E14 to S12B to FL9 to J1-K.

- Repeat the above testing substituting the RECEIVER GATED CLOCK circuit for the RECEIVER CLOCK circuit. Remove test lead F from 0UT3 and connect to OUT4. Remove test lead E from IN3 LO and connect to IN4 LO. Remove test lead D from IN3 HI and connect to IN4 H1. This layout now additionally checks J1-D/E to VR3/4 to FL3/4 to E10/11 to U4 to J5-5.
- If a failure is observed in any of the above steps, refer to Troubleshooting Table No. 6-6 in section III for trouble location instructions. Also refer to paragraph 3-20 for the interface test fixture theory of operation.

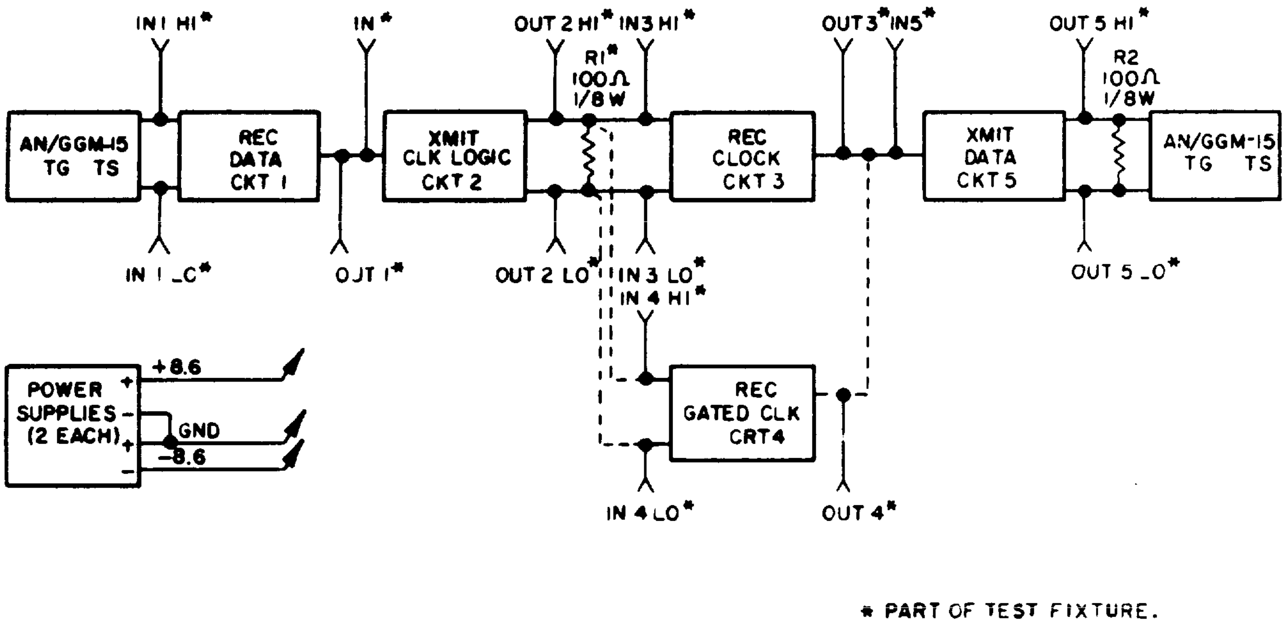


Figure 6-20. INTERFACE +6V DATA FUNCTIONAL TEST LAYOUT.

(3) Interface Assembly 20 mA and 60 mA Data Functional Test Setup (fig. 6-21).

- Remove all leads from test fixture.
- Patch as follows:

  OUT 1 to IN 5
  OUT 5 HI to R4
  IN 1 HI to - Power Supply (3)
  R3 to + Power Supply (3)
  R4 (other side) to + Power Supply (4)

- Connect AN/GGM-15(V)2:

  (DRY CONTACTS) - HIGH to R3 (other side) common to IN 1 LO

  (SERIES) - HIGH to - Power Supply (4) Common to OUT 5 LO

- Connect power supplies as shown below:

  Adjust power supplies (3) and (4) for 20 mA output; can be measured with voltmeter across R3 and R4. 20 mA = 9.4 VDC.

  Verify -8.6V ±5% at -8.6V input on test fixture.

  Verify +8.6V +5% at ±8.6V input on test fixture.

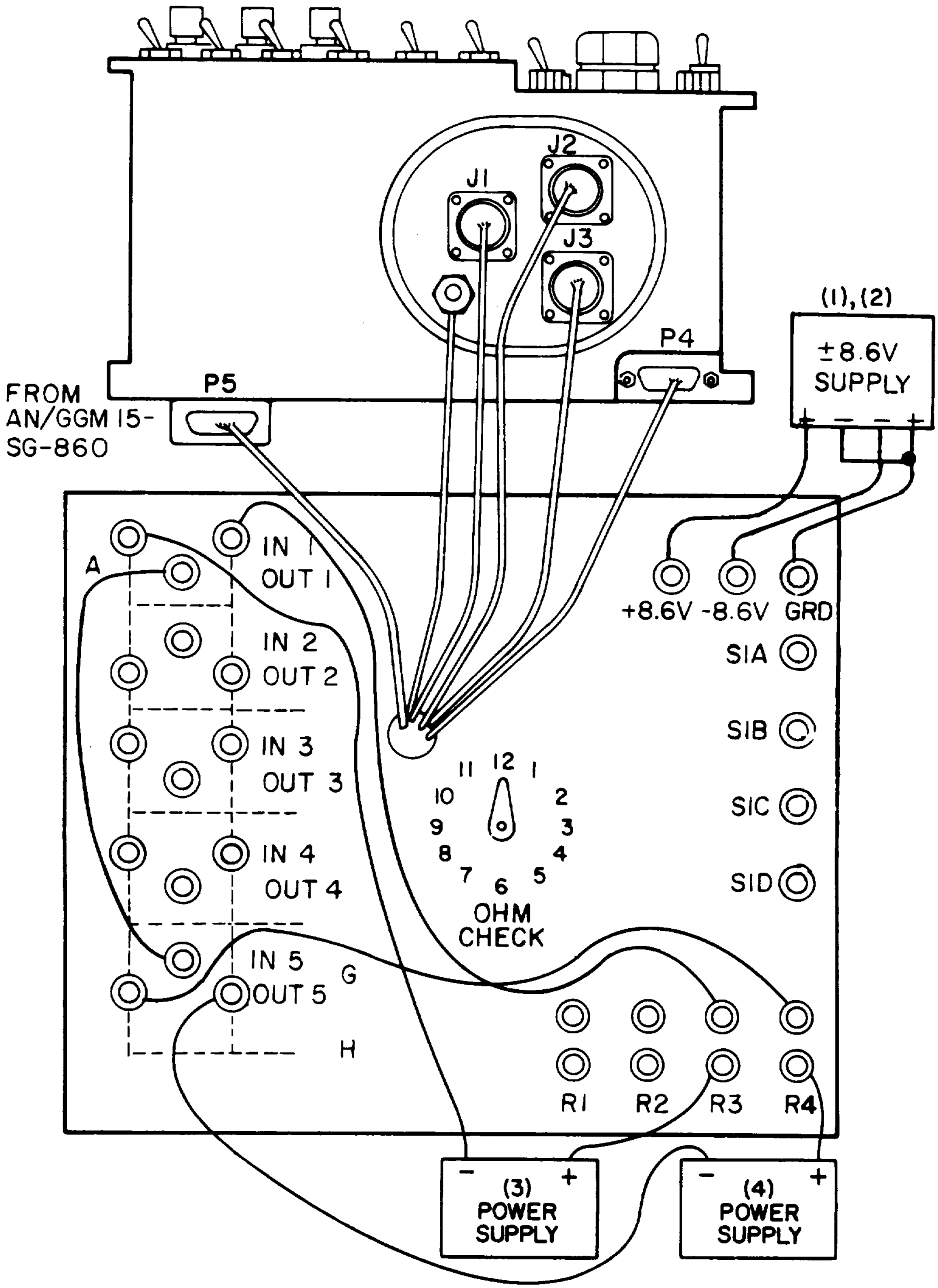


Figure 6-21. 20 mA and 60 mA Data Test Setup.

- Set AN/GGM-15(V)2 Generator SG-860 MESSAGE SELECT switch to "M" MARK HOLD.
- Verify that test fixture plug is connected to J1 and plug P5 is connected to J5.
- Ensure that ground strap is connected to interface assembly.
- Place interface assembly REC MOD switch to 20 MA and XMIT MODE switch to 20.
- Turn all test equipment on and ensure that outputs areas originally set up.

(4) 20 mA and 60 mA Data Test Procedures (fig. 6-21.1).

- Transmit alternate character bits from the AN/GGM-15 at speeds between 45.5 baud and 75 baud. Check the output on the AN/GGM-15 analyzer. Intermediate points can be checked with the AN/USM-281C oscilloscope using interface assembly schematic, figure FO-2 and RX/TX assembly schematic, paragraph 3-10. This test checks the following:

  1. J1-G to VR7 to FL7 to S11B to E25 to CR5 to VR1 , U3, Q2, U2 to E20 to J5-6.
  2. J1-H to VR8 to FL8 to S11C to E26 to CR8, CR7.
  3. J5-7 to E2 to U1, U2, Q1 to K1, CR13, E15 to S12B to FL9 to VR9 to J1-K.
  4. E12 to S12C to FL10 to VR10 to J1-L.

- Repeat the above test for 60 mA by readjusting the power supplies to 60 mA. Can be measured with voltmeter across R3 and R4. 60 mA = 28.2 VDC. Change the REC MODE switch to 60 MA and the XMIT MODE switch to 60. This check verifies the proper operation of S11 and R8.
- If failure is observed on any of the above steps, refer to Troubleshooting Table No. 6-7 in section Ill for trouble location instructions.

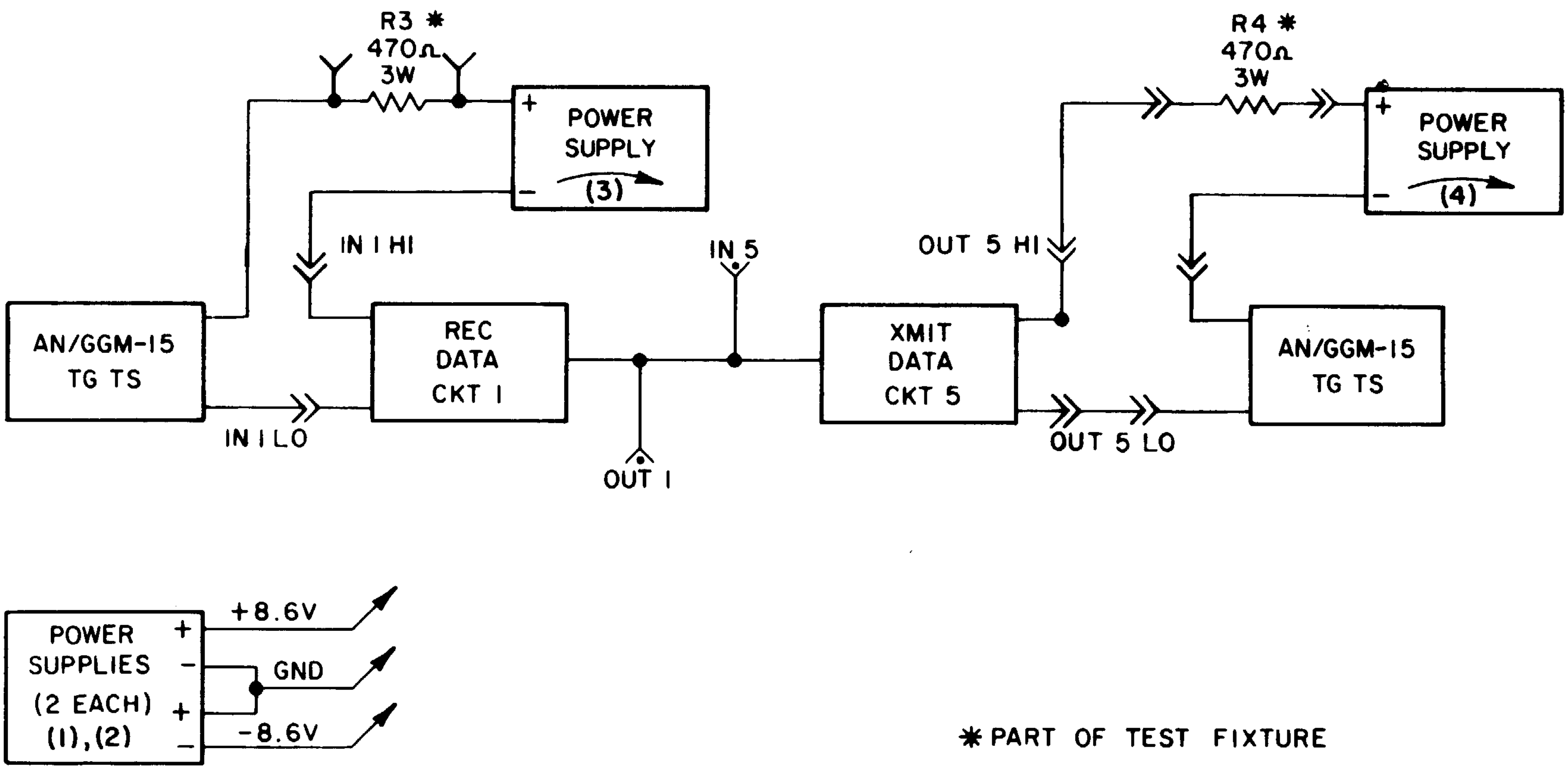
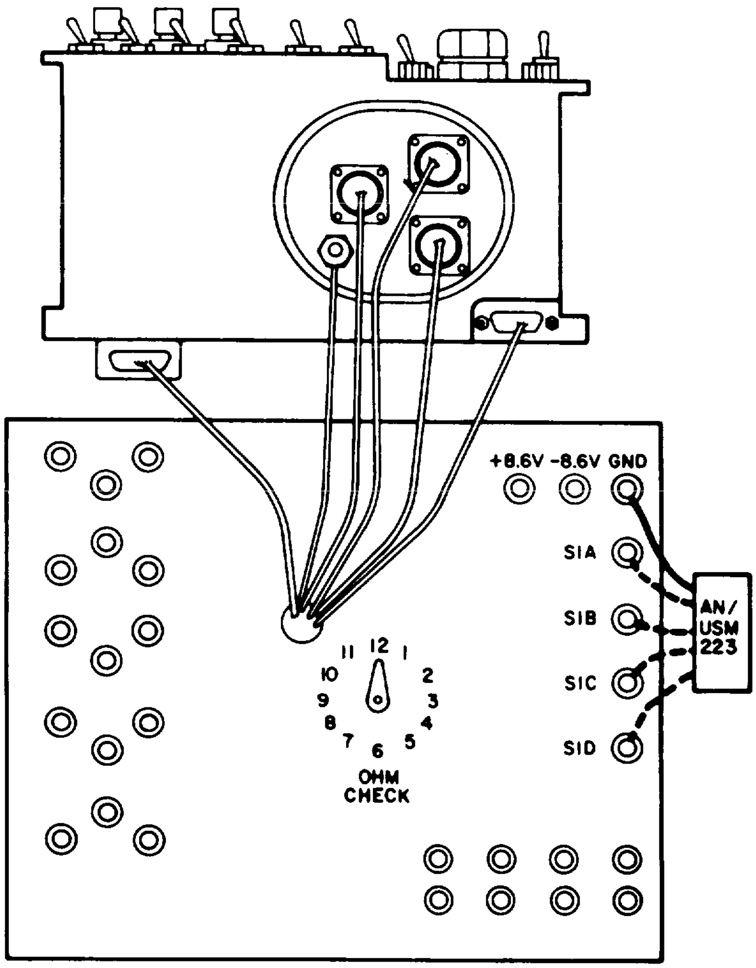


Figure 6-21.1. INTERFACE 20MA/60MA FUNCTION TEST LAYOUT.

(5) Interface Assembly Continuity Checks Test Setup.

- Connect test cables P1, 2, 3, 4, 5 and ground strap to the interface assembly.
- Connect the AN/USM-223 across the test fixture GND and test point S1A.



(6) Continuity Checks Test Procedures.

CAUTION

All test equipment power must be off. Set AN/USM -223 to measure ohms.

- Place the OHM CHECK switch to position 1. The AN/USM-223 should read less than 1 ohm resistance. This checks the continuity of the circuit path from J2-G to J4-5.
- Table 6-14 Interface Assembly Continuity Checks, shows all 12 positions and the circuit parts that are checked.
- Checking the next circuits requires moving the AN/USM-223 to test point S1B, and then to S1C, and finally S1D.
- If failure is observed in any of the above steps, refer to Troubleshooting Tables 8-8 and 6-9 in section III for trouble location instructions.

Table 6-14. INTERFACE ASSEMBLY CONTINUITY CHECKS

Test point	OHM check position	Interface switch position	Connection	Resistance (ohms)
S1A-GND	1		J2-G to J4-5	Less than 1
	2	Power ON	J2-M to J2-J	Less than 1
	2	Power OFF	J2-M to J2-J	Open
	3		J4-1 to J2-A	Less than 1
	4		J4-2 to J2-B	Less than 1
	5		J4-6 to J2-F	Less than 1
	6		J4-6 to J3-B	Less than 1
	7		J2-C to J4-3	Less than 1
	8		J2-D to J4-4	Less than 1
	9	Power ON	J2-L to J2-K	Less than 1
	9	Power OFF	J2-L to J2-K	Open
	10		GND to J2-E	Less than 1
	11		J3-C to GND	Less than 1
	12	Power ON	J3-A to J4-8	Less than 1
	12	Power OFF	J3-A to J4-8	Open
S1B-GND	1	STOP BITS 1	J5-9 to J5-40	Less than 1
	2	STOP BITS 2	J5-10 to J5-40	Less than 1
	3	BAUDOT	J5-37 to J5-40	Less than 1
	3	ASCII	J5-37 to J5-40	Open
	4	PARITY-EVEN	J5-11 to J5-40	Less than 1
	5	PARITY-ODD	J5-12 to J5-40	Less than 1
	5	PARITY-INHIBIT	J5-12 to J5-40	Open
	6	STATE-KSR	J5-13 to J5-40	Less than 1
	7	STATE-ICT	J5-14 to J5-40	Less than 1
	7	STATE-RO	J5-14 to J5-40	Open
	8	REC MODE-20 MA	J5-15 to J5-40	Less than 1
	9	REC MODE-60 MA	J5-16 to J5-40	Less than 1
	10	REC MODE-48V [2]	J5-17 to J5-40	Less than 1
	11	REC MODE-LO DATA	J5-21 to J5-40	Less than 1
	12	SPARE		
SIC-GND	1	XMIT MODE-20 MA	J5-18 to J5-40	Less than 1
	2	XMIT MODE-60 MA	J5-19 to J5-40	Less than 1
	3	XMIT MODE-70 uA [2]	J5-20 to J5-40	Less than 1
	4	XMIT MODE-LO DATA	J5-22 to J5-40	Less than 1
	5	CLOCK-INT	J5-30 to J5-40	Less than 1
	6	CLOCK-EXT	J5-31 to J5-40	Less than 1
	7	CLOCK ± to +	J5-32 to J5-40	Less than 1
	8	FIG S/J-S	J5-35 to J5-40	Less than 1
	9	SIGNAL DIPHASE	J5-36 to J5-40	Less than 1
	10	SELF TEST normal	J5-33 to J5-40	Less than 1
	11	SELF TEST operated	J5-34 to J5-40	Less than 1

Table 6-14. INTERFACE ASSEMBLY CONTINUITY CHECKS - Continued

Test point	OHM check position	Interface switch position	Connection	Resistance (ohms)
S1D-GND	1		J5-38 to J1-R	Less than 1
	2		J5-39 to J5-3	Less than 1
	3		J1-S to J5-3	Less than 1
	4		J1-T to J5-3	Less than 1
	5	BAUD RATE-45.5	J5-23 to J5-41	Less than 1
	6	BAUD RATE-50	J5-24 to J5-41	Less than 1
	7	BAUD RATE-75	J5-25 to J5-41	Less than 1
	8	BAUD RATE-150	J5-26 to J5-41	Less than 1
	9	BAUD RATE-300	J5-27 to J5-41	Less than 1
	10	BAUD RATE-600	J5-28 to J5-41	Less than 1
	11	BAUD RATE-1200	J5-29 to J5-41	Less than 1

6-27. POWER SUPPLY 3A1PS1

a. Purpose. The power supply module provides dc power for the AN/UGC-74A(V)3. It converts 28Vdc into ±5Vdc, ±8.6Vdc, + 12Vdc, + 18Vdc and variable 0-22Vdc lamp supply. It also provides battery backup sensing and switching for the terminal.

b. Five Power Supplies are Required for Test.

- +26Vdc supply is required to provide 22 to 30 Vdc power input.
- + 12Vdc is required to provide battery backup power.
- Three dc power supplies (+5Vdc, + 15Vdc, and – 15Vdc) supply power for circuitry in power supply test fixture.

c. Test Equipment.

- Power Supply Test Fixture, SM-D-915979
- Power Supply PP-2309/U (5 each)
- Oscilloscope AN/USM-281C
- Digital Voltmeter AN/GSM-64B

d. Test Setup Procedure for Power Supply (fig. 6-22).

- Remove power supply module as directed in paragraph 5-11A and remove its plate.

- Connect power supply (PS1) to VIN-RTN.
- Connect digital voltmeter (DVM) AN/GSM-64B to VOUT HI and LO with SELECT switch to position 1.
- Adjust PS1 for +26 Vdc ±5% as measured on meter.
- This supply provides input power for supply under test.

- Connect power supply (PS2) to BAT-RTN.
- Place SELECT switch to position 2.
- Adjust PS2 for +12 Vdc *5% (battery backup power).

- Connect power supply (PS3) to +5V and GND and adjust for +5Vdc ±2%. Measure at + 5V and GND (test fixture power).

- Connect power supply (PS4) to +15 and GND. Measure at + 15V and adjust for+ 15Vdc ±1.0% (test fixture power).

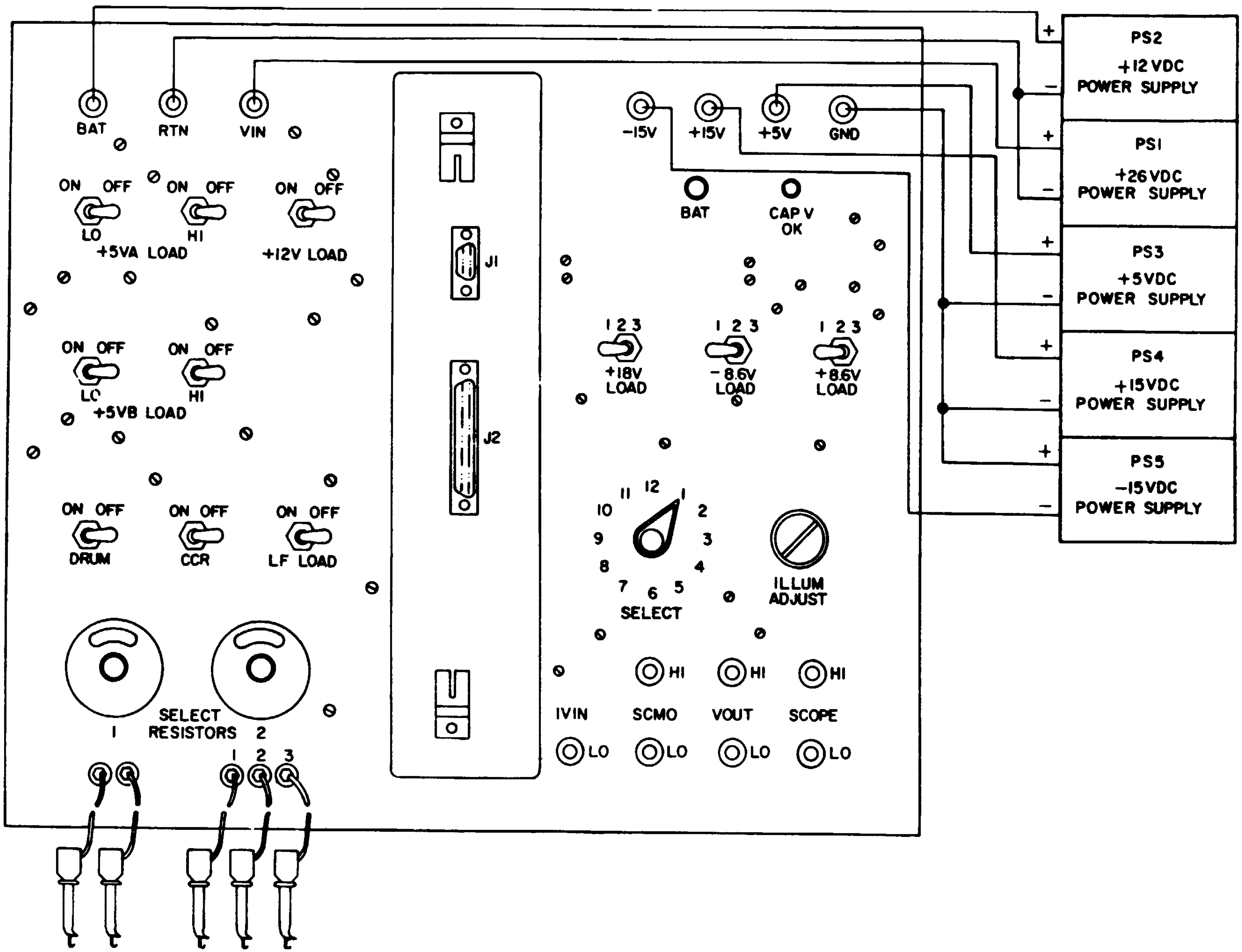


Figure 6-22. POWER SUPPLY TEST SETUP.

- Connect power supply (PS5) to - 15V and GND. Adjust for - 15V ±1.0% as measured at - 15V and GND (test fixture power).
- Place all power supplies to OFF position.
- Install power supply module under test into test fixture.
- Place all power supplies to ON position.
- Ensure that all input power supply voltages are as originally set.
- Reconnect AN/GSM-64B to VOUT HI and LO.

e. + 5V(A) Test Procedures.

- With test set up as described in d above, turn SELECT switch to position 3 (connects VOUT and SCOPE terminals to + 5V(A) output).
- Measure + 5Vdc ±5%. Using the AC function on the DVM, measure 50 mVrms ripple and noise maximum.
- Place + 5VA LOAD LO to ON; measure same as above (places a 10-ohm resistor across the + 5V(A) output).
- Place + 5VA LOAD LO to OFF and place + 5VA LOAD HI to ON (places a 1.5 ohm resistor across + 5V(A) output). Measure same as above.
- Place + 5VA LOAD LO to ON and measure +5.2V ±12%.
- Return + 5VA LOAD switches to OFF.
- If power supply fails to regulate as described above, refer to Troubleshooting Table No. 6-10a in section III for trouble location instructions. Also refer to paragraph 3-19 for the theory of operation of the power supply test fixture.

f. + 12V Test Procedures.

- With test set up as described in d above, turn SELECT switch to position 4 (connects VOUT and SCOPE terminals to +12 V output).
- Measure + 12 Vdc ±5% and 100 mVrms ripple and noise maximum using DVM.
- Place + 12V LOAD from OFF to ON and measure same as above (places a 332-ohm resistor across the + 12V output).
- Return + 12V LOAD to OFF position (places 681-ohms across output).
- If power supply fails to perform as described above, refer to Troubleshooting Table No. 6-10b in Section III for trouble location instructions.

g. **- 5V(A) Test Procedures.**

- With test set up as described in d above, turn SELECT switch to position 5 (connects VOUT and SCOPE terminals to -5V(A) output).
- Measure -5Vdc ±5% and 40 mVrms ripple and noise maximum using DVM.
- If power supply fails to perform as described above, refer to Troubleshooting Table No. 6-10b in section III for trouble location instructions.

h. + 5V(B) Test Procedures.

- With test set up as described in d above, turn SELECT switch to position 6 (connects VOUT and SCOPE terminals to + 5V(B) output).
- Measure + 5Vdc ±5% and 15 mVrms ripple and noise maximum using DVM.
- Place + 5VB LOAD LO to ON (connects a 2.37-ohm load across the + 5V(B) output). Measure same as above.

- Place +5VB LOAD LO to OFF and place +5VB LOAD HI to ON (connects a 1.7-ohm resistor across + 5V(B) output). Measure same as above.
- Place +5VB LOAD LO to ON. Measure 5.OVdc ±15%. Return +5VB LOAD switches to OFF.
- If power supply fails to perform as required, refer to Troubleshooting Table No. 6-10C in section III for trouble location instructions.

i. -8.6V Test Procedures.

- With test set up as described in d above, turn SELECT switch to position 7 (-8.6V output) and set -8.6V LOAD switch to position 3 (115-ohm load across output).
- Measure -8.6Vdc ±5% and 85 mVrms ripple and noise maximum using DVM.
- Change -8.6V LOAD from position 3 to position 2 (82.5-ohm load) and measure same as above.
- Change -8.6V LOAD from position 2 to position 1 (53.6-ohm load) and measure same as above.
- Return -8.6V LOAD switch to position 3.
- If power supply fails to perform as required, refer to Troubleshooting Table No. 6-10c in section III for trouble location instructions.

j. + 8.6V Test Procedures.

- With test set up as described in d above, turn SELECT switch to position 12 (+8.6V output) and set + 8.6V LOAD switch to position 3 (53.6-ohm load).
- Measure +8.6Vdc ±5% with 85 mVrms ripple and noise maximum using DVM.
- Change +8.6V LOAD from position 3 to position 2 (44.2-ohm load) and measure same as above.
- Change +8.6V LOAD from position 2 to position 1 (30.1-ohm load) and measure same as above.
- Return +8.6V LOAD switch to position 3.
- If power supply fails to perform as required, refer to Troubleshooting Table No. 6-10d in section III for trouble location instructions.

k. Lamp Supply Test Procedure.

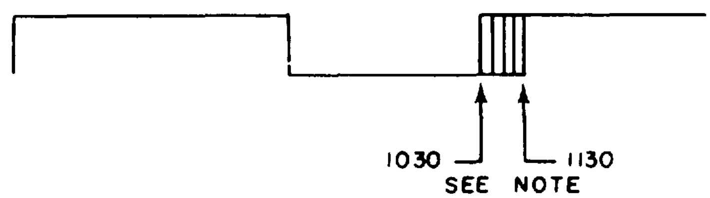
- With test set up as described in d above, turn SELECT switch to position 8 (lamp supply).
- Adjust ILLUM ADJUST (varies input to Q8 on power supply from 0 to 20 Vdc). Lamp supply will vary from 0.0Vdc ±.2 to 19VDC ±2.
- If power supply is not operating properly refer to Troubleshooting Table No. 6-10d in section III for trouble location instructions.

l. Line-Feed Test Procedure.

- With test set up as described in d above, turn SELECT switch to position 10 (LF output).
- Measure +22 to +30Vdc (pin 30 of power supply) at VOUT terminals,
- Change LF LOAD from OFF to ON, measure same as above.
- Return LF LOAD switch to OFF.
- If power supply fails to perform as required, refer to Troubleshooting Table No. 6-10d in section III for trouble location instructions.

m. Drum Motor Test Procedure.

- With test set up as described in d above, turn SELECT switch to position 11 (drum-motor).
- Connect oscilloscope across SCMO HI and LO (timing simulator output) and turn DRUM switch to ON (logic 0 to DRUM SHUTDOWN). The timing simulator outputs pulse whose period is proportional to the drum motor output.
- Observe 1080 ±15 usec pulse period on oscilloscope (fig. 6-23).
- If power supply fails to perform as required refer to Troubleshooting Table No. 6-10e in section III for trouble location instructions.



NOTE OBSERVE THAT NO TRANSITIONS OCCUR AT LESS THAN 1030 μSEC OR GREATER THAN 1130 μSEC

Figure 6-23. SCMO MEASUREMENT

n. Backup Battery Test Procedure.

- Set up as described in d above.
- Remove VIN (BAT lamp comes on).
- Repeat + 5V(A), 12V, and -5V(A) tests.
- Replace VIN (BAT lamp goes off).
- If power supply fails to perform as required, refer to Troubleshooting Table No. 6-10e in section III for trouble location instructions.

o. + 18V, CCR, CAP V OK Test Procedure.

- Set up as described in d above.
- Connect DVM across VOUT HI and LO and turn SELECT switch to position 9 (+ 18V print coils).
- With + 18V LOAD to position 2 (no load), place CCR to ON to cause power supply circuit card assembly pin 22 to become a logic 0.
- Observe that CAP V OK lamp is on and VOUT measures + 18Vdc ±5%.
- Switch CCR to OFF (pin 22 becomes a logic 1); there is no effect on output.
- Place + 18V LOAD switch to position 1 (27.4 ohms); observe that VOUT drops to less than one volt dc and CAP V OK lamp goes out.
- Place CCR switch to ON; VOUT becomes + 18V ±5% and CAP V OK comes on.
- Place + 18V LOAD switch to position 3 (12 ohms). VOUT is approximately + 12Vdc ±10% and CAP V OK lamp goes out.
- Place CCR switch to OFF.
- If power supply fails to perform as required, refer to Troubleshooting Table No. 6-10e in section III for trouble location instructions.

6-28. POWER SUPPLY ADJUSTMENTS (fig. 6-22)

a. +5V(A) Adjustment.

- Set up power supply test figure configuration as described in paragraph 6-27d and figure 6-22.
- Remove power from test fixture by placing each power supply to the OFF position.
- Using a pair of diagonal cutters, clip R11 at the resistor body being sure to leave the leads in the circuit card assembly (refer to fig. FO-8).
- Attach SELECT RESISTOR number one test leads to R11 leads.
- Set SELECT RESISTOR number one to 500 and place all power supplies to the ON position.
- Set +5VA LOAD HI switch to the OFF position and the +5VA LOAD LO switch to ON. Set + 12V LOAD switch to OFF.
- Set SELECT switch to position 3. Connect DVM to VOUT test points on the fixture.
- Measure the dc voltage on the meter and adjust SELECT RESISTOR number one as required to cause the output to be +5.02Vdc ±0.01. Note the SELECT RESISTOR setting and select the closest value of Rll from table 6-15 of Selection Values for Resistors R11, R29, R63 below.
- Set SELECT switch to position 4 and measure + 12V ±5% on the meter.
- Set SELECT switch to position 5 and measure -5V ±5% on the meter.
- Install selected value of R11.

Table 6-15. SELECTION VALUES FOR RESISTORS R11, R29, R63

Select resistor setting	Resistor value (ohms)
0020	10
0080	40.2
0143	71.5
0210	105
0274	137
0358	174
0420	210
0498	249
0574	287
0648	324
0730	365
0824	412
0906	453
0998	499

b. +5V(B) (+8.6V) Adjustment.

- Set up as described in a above.
- Remove power from test fixture by placing each power supply to the OFF position.
- Using a pair of diagonal cutters, clip R63 at the resistor body; be sure to leave the leads in the circuit card assembly (fig. FO-8).
- Attach SELECT RESISTOR number one test leads to R63 leads.
- Set SELECT RESISTOR number one to 500 and place all power supplies to the ON position
- Set +5VB LOAD HI switch to OFF and +5VB LOAD LO switch to ON.
- Set SELECT switch to position 12. Connect meter to VOUT test points on the fixture.
- Measure the dc voltage on the meter and adjust SELECTOR RESISTOR number one as required to cause the output to be +8.6V dc ±0.01. Note the SELECT RESISTOR setting and select the closest value of R63 from table of Selection Values for Resistors R11, R29, R63.
- Install selected value of R63.

c. Drum Motor Output Adjustment. The drum motor output circuitry is adjusted when the value of the pulse period is 1080 microseconds.

- Set up as described in a above.
- Remove power by placing external lower power supply, switches in the OFF position.
- Using a pair of diagonal cutters, clip R29 at the resistor's body leaving the leads attached to the circuit card assembly. (Refer to fig. FO-8.)
- Connect SELECT RESISTOR number one leads across R29.
- Apply power by placing all power switches on the external supplies to the ON position.
- Connect oscilloscope to SCMO HI and LO and place DRUM switch to ON position.
- Observe pulse period and adjust SELECT RESISTOR number one until SCMO is 1080 usec ± 12 (measured from leading edge to middle of jitter in fig. 6-23).
- Note setting of SELECT RESISTOR number one and install closest value from table of Selection Values for Resistors R11, R29, R63.

d. + 18V Constant Current Adjustment.

- Remove power from test fixture by placing individual external power supply power switches to the OFF position.
- Clip resistors R41 and R71 at the resistor bodies and attach SELECT RESISTOR number two clips 1, 2, 3 as shown in figure FO-8.
- Reapply power to test fixture. Set + 18V LOAD switch to position 1 (normal).
- Place CCR switch in the ON position. Set SELECT RESISTOR number two to 10.0. Set SELECT switch in position 9.
- Adjust SELECT RESISTOR number two until CAP V OK lamp goes out. Measure voltage at VOUT test points, It should be + 16.2V dc ±.45.
- Place + 18V LOAD switch to position 3 (max.) and increase SELECT RESISTOR number two until 12V dc ±.05 is observed on the meter.
- Observe reading on SELECT RESISTOR number two dial and select the closest values of R71 and R41 from table 6-16, “Selection Values for Resistors R41 and R71.”
- Install selected resistors R41 and R71.

Table 6-16. SELECTION VALUES FOR RESISTORS R41 AND R71

Select resistor setting	Resistor value (ohms) R41	R71
0	10	499
22	10	453
74	40	499
81	40	453
89	40	412
136	71.5	453
148	71.5	412
188	105	453
203	105	412
223	105	365
250	137	412
273	137	365
297	137	324
322	174	365
349	174	324
377	174	287
393	210	324
422	210	287
458	210	249
465	249	287
500	249	249
542	249	210
577	287	210
607	324	210
622	287	174
651	324	174
677	365	174
703	324	137
727	365	137
750	412	137
777	365	105
797	412	105
812	453	105
852	312	71.5
864	453	71.5
916	412	40
919	453	40
926	499	40
978	453	10
980	499	10

6-29. FILTER ASSEMBLY 3A1A6FL1

a. Purpose. The filter assembly converts and filters 115/230Vac, 50/60/400 Hz power to 22-30 Vdc. It also provides EM I filtering of the 26Vdc ±4 and + 12Vdc inputs.

b. Test Equipment and Materials.

- Filter Assembly Test Fixture SM-C-915994
- Oscilloscope AN/US M-281C
- Multimeter AN/USM-223
- Power Cable, UGC-74, 120 VAC, SM-D-764481
- Power Cable, UGC-74, 230 VAC, SM-D-764482
- Power Cable, UGC-74, 26 VDC, SM-D-764480

c. Filter Assembly Test Fixture. The filter assembly test fixture is a device which provides appropriate interfaces between the input power cabling and the filter assembly. The input power is provided through the three power cables listed above. Table 6-17 below provides the list of interconnections-between J4 and J1 on the fixture. The filter output normally is connected to C8 when installed in the AN/UGC-74A(V)3. An equivalent capacitor is part of the fixture and is connected to the output through P2-6 and P2-2. A resistive load is included in the fixture to simulate the load provided by the power supply 3A1PS1.

Table 6-17. PROGRAMMABLE PLUG CONNECTIONS

Plug	J4 To	J1
120 VAC	A/C/J	1/3
	B/D/L	2/4
	M/K	1/2/3/4
230 VAC	A/J	1
	B/C	2/3
	D/C	4
	M/K	1/2/3/4
26 VDC	G/J	5
	F/L	6
	M/K	6/8

CAUTION

Certain filter assembly configurations may have two loose output leads to C8. If so, tape each lead separately so that they will not short out to each other or any other object.

d. Test Setups and Procedures for Filter Assembly (fig. 6-24).

- Remove filter assembly as directed in paragraph 5-1 lG.
- Connect 120Vac cable (SM-D-766481) to J4 and to a 120Vac source. Connect P1 and P2 (filter) to J1 and J2 (fixture).
- Ground filter assembly to test fixture GND.
- Place test fixture POWER switch to ON.
- Use the AN/USM-223 to measure + 28Vdc ±3.5 across 22-30Vdc test point and RTN.
- Use the AN/USM-281C to measure 750 mVrms maximum ripple.
- Turn POWER switch to OFF. Remove 120Vac cable and replace with the 230Vac cable (SM-D-764482). Connect to a 230Vac source.
- Repeat above procedures.
- Turn POWER switch to OFF. Remove 230Vac cable and replace with the 26Vdc cable (SM-D-764480). Connect cable to a 26Vdc source.
- Repeat above procedures.

- Turn POWER switch to OFF and remove the 26Vdc cable from J4. Measure continuity of + 12Vdc circuitry by measuring from the fixture test point 12Vdc to BAT (J3) pin A.
- Be sure the POWER switch in ON and fuse F3 is not open. Read less than 1 ohm from J3-A to the 12Vdc test point using the AN/USM-223.

NOTE

An alternate method would be to connect a 12Vdc battery backup cable and source to the fixture and measure +12 volts at the 12Vdc test point.

- If a failure is observed in any of the above steps, refer to Troubleshooting Table 6-11 in section III for trouble location instructions. Also refer to paragraph 3-15 for filter assembly test fixture theory of operation.

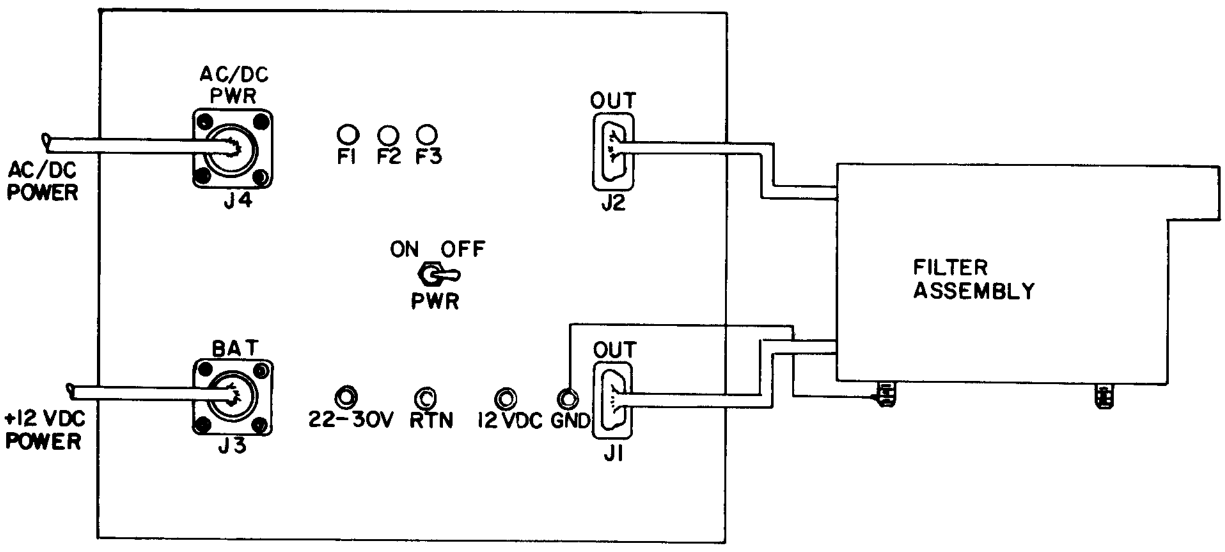


Figure 6-24. FILTER TEST SETUP.

6-30. KEYBOARD KEYSWITCH ASSEMBLY

a. Purpose. The keyswitch assembly contains all the electronics and switches used by the operator in operation of the keyboard. It is tested by verifying that the proper codes are produced in response to the keyswitch pressed. The test fixture provides clock simulation circuitry to generate the required clocks for keyswitch assembly operation.

b. Test Equipment and Materials.

- Multimeter AN/USM-223
- Oscilloscope AN/USM-281C
- Power Supply PP-2309/U
- Function Generator SG-1133/U
- Test Fixture, Keyswitch Assembly, Honeywell (SM-C-915997)
- Remover, Module, Honeywell (SM-B-916003)

c. Test Setup Procedures for Keyboard Keyswitch Assembly (fig. 6-25).

- Remove the key board keyswitch assembly os directed in paragraph 5-11N.
- Adjust power supply for +5Vdc ±0.25; turn power supply OFF.
- Connect + 5V power supply to test fixture.
- Adjust function generator for 2400 Hz nominal +5V square wave and connect it to SIG IN connector.
- Connect keyswitch assembly to test fixture.
- Connect all test equipment to ground.

NOTE

The complete keyboard assembly may also be tested on the fixture.

d. Test Procedures.

- Connect multimeter lead to LOGIC terminal and probe ground to REF (LOGIC).
- Apply +5Vdc ±5% to the test fixture by turning on the + 5 V supply. Press and release CLOCK CONTROL switch and verify that the multimeter reads from 0 to +0.5Vdc. This assures initialization of the logic circuitry.
- Set oscilloscope to .1 ms and 1V/DIV.
- Connect oscilloscope probe to 2400-Hz terminal and probe ground to GND terminal. Verify .41 ms sec nominal pulse, with a low logic level of 0.4Vdc max and a high logic level not to exceed 5Vdc, or be less than 2.5Vdc.
- Connect oscilloscope probe to DATA terminal and probe ground to REF(DATA) terminal.
- Press and hold a key on the keyswitch assembly that is called out in table 6-18.

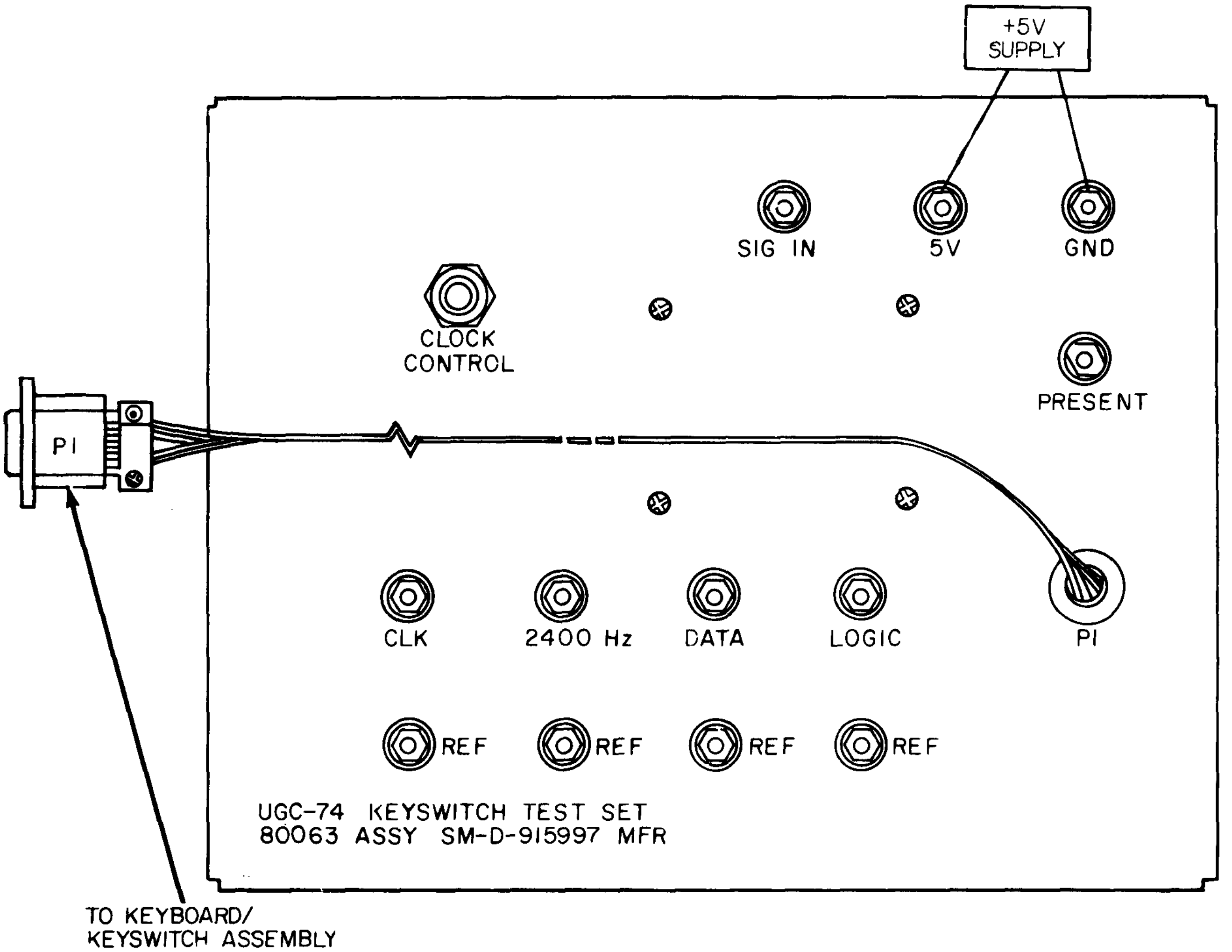


Figure 6-25. KEYBOARD KEYSWITCH ASSEMBLY TEST SETUP.

Table 6-18. Character Code Matrix Test

Character code:	b_1	b_2	b_3	b_4	b_5	b_6	b_7	b_8
BS (CTL, SHIFT)	1	1	1	1	1	1	1	0
9	0	1	1	0	1	1	0	1
E (SHIFT)	1	0	1	1	0	1	1	1
FS (SHIFT)	0	0	1	0	0	1	1	1
H (SHIFT)	1	1	0	1	1	0	1	1
Z (SHIFT)	0	1	0	0	1	0	1	1
?	1	0	0	1	0	0	1	1
LF	1	1	1	0	0	0	0	1
DLC	0	0	0	1	0	0	0	1
A	0	0	0	0	0	1	0	1

NOTE

These procedures cause an 8-bit character to be loaded and read out one bitatatime.

- Record the logic level displayedon the oscilloscope (bit 1). Press and release the CLOCK CONTROL switch on the fixture. Record the logic level displayed onthe oscilloscope (bit 2). The key may now be released because the character is stored in the logic. Press and release the CLOCK CONTROL switch and record the logic level (bit 3). Repeat until bits 4 through 8 have been recorded.

NOTE

Further use of the clock control will allow the 8 bit character tobe reread providing that another key hasnot been pressed.

- Compare the eight readings above with the codes from table 6-18. For other codes, refer to table 3-2.
- Test the 12 bit counter (U8) by pressing the RPT Key and observing a 210 msec square wave at the LOGIC terminals. Disconnect oscilloscope leads.
- Check for +2.5 Vdc ±10% at PRESENT test point with respect to ground using the multimeter.
- Check for + 1.5 Vdc ±5% with respect to GND at each of the REF terminals.
- If a failure is observed in any of the above steps, refer to Troubleshooting Table No. 6-12 in section Ill for trouble location instructions. Also refer to paragraph 3-21 for keyboard keyswitch test fixture theory of operation.

6.31. FINAL TEST OF COMMUNICATIONS TERMINAL AN/UGC-74A(V)3

a. Purpose. The final test of the terminal is performed to verify the terminal's operational condition. The terminal's message transmission and reception capabilities are tested using the equipment identified in b below.

b. Test Equipment and Materials

- Oscilloscope AN/USM-281C
- Interface Test Fixture, SM-D-915991
- Power Supply PP-2309/U
- Function Generator SG-1133/U
- Loopback Plug (SM-C-916000)
- Power Cable 26 V dc (SM-D-764480)
- Power Cable 120 V ac (SM-D-764481)
- Power Cable 230 V ac (SM-D-764482)
- Battery Backup Cable (SM-D-915890)

c. Test Connections and Conditions.

- Set interface switches as follows:

Interface Switch	Setting
BAUD RATE	300
ASCII/BAUDOT	ASCII
PARITY	ODD
K30/INT/EXT	INT
XMIT MODE	LO DATA
RCVR MODE	LO DATA
STATE	ICT

- Connect the loopback plug to J1.

d. Test Procedure.

- Apply power and perform Self-Test as directed in chapter 2 using both internal and external loopbacks.
- Repeat above for LO DATA.
- Perform Loopback Test (chapter 2). Verify the initialization sequences and the operation of the following:
  - MSG RCVD lamp
  - XMT lamp
  - Keyboard line feed
- Remove loopback plug and connect interface test fixture to data connector (J1). Connect an oscilloscope to 0UT5(HI), Refer to figure 6-26 of test setup.
- Set up function generator for 0 to +6 V square wave at 100 Hz (external/clock) and connect to IN3(HI) and IN3(LO). Connect OUT5 to IN1(HI) and (LO).
- Connect second oscilloscope channel to OUT2(HI). Using the TTY Command, transmit a line of E's observing that data at 0UT5 is being clocked on the positive edge of the clock. Synchronize the oscilloscope on DATA.
- Place CLOCK +/- switch to - and observe that data is transmitted on negative edge of the clock.

- Remove power by placing POWER switch to OFF.
- Set XMIT MODE switch 60 mA and REC MODE switch to 60 mA.
- Using the interface assembly test fixture, connect a 26V supply through R3 as shown in figure 6-27.
- Perform Loopback Test as directed in chapter 2.

- Remove power by placing POWER switch to OFF.
- Connect an external function generator adjusted for 100 Hz, ±6V peak to peak square wave to IN3 HI and IN3 LO. Set CLOCK INT/EXT/KG-30 to EXT.
- Apply power and perform Loopback Test as directed in chapter 2, except that SIGNAL switch shall be set to NRZ. Observe OUT 5 and IN 2 on an oscilloscope. Data on OUT 5 should be edge coincident with clocks on IN3.
- Set CLOCK INT/EXT/KG-30 to KG-30 and connect IN3 to IN4.
- Perform Loopback Test as directed in chapter 2, except that SIGNAL switch shall be set to NRZ.

- Remove power from terminal.
- Install 230-Vac cable and connect to 230-Vac source.
- Apply power and perform Self-Test.

- Remove power and disconnect 230-Vac cable.
- Install 6 1/4 Amp fuses in fuseholders F1 and F2.
- Connect 26Vdc cable to 26 Vdc source and terminal.
- Apply power and perform Self-Test.
- If a failure occurs in any of the preceding tests, refer to the troubleshooting tables in section III of this manual. Also, refer to figure FO-9 to check system interconnects. To assist in identifying capacitor values and ratings, refer to figure FO-1.

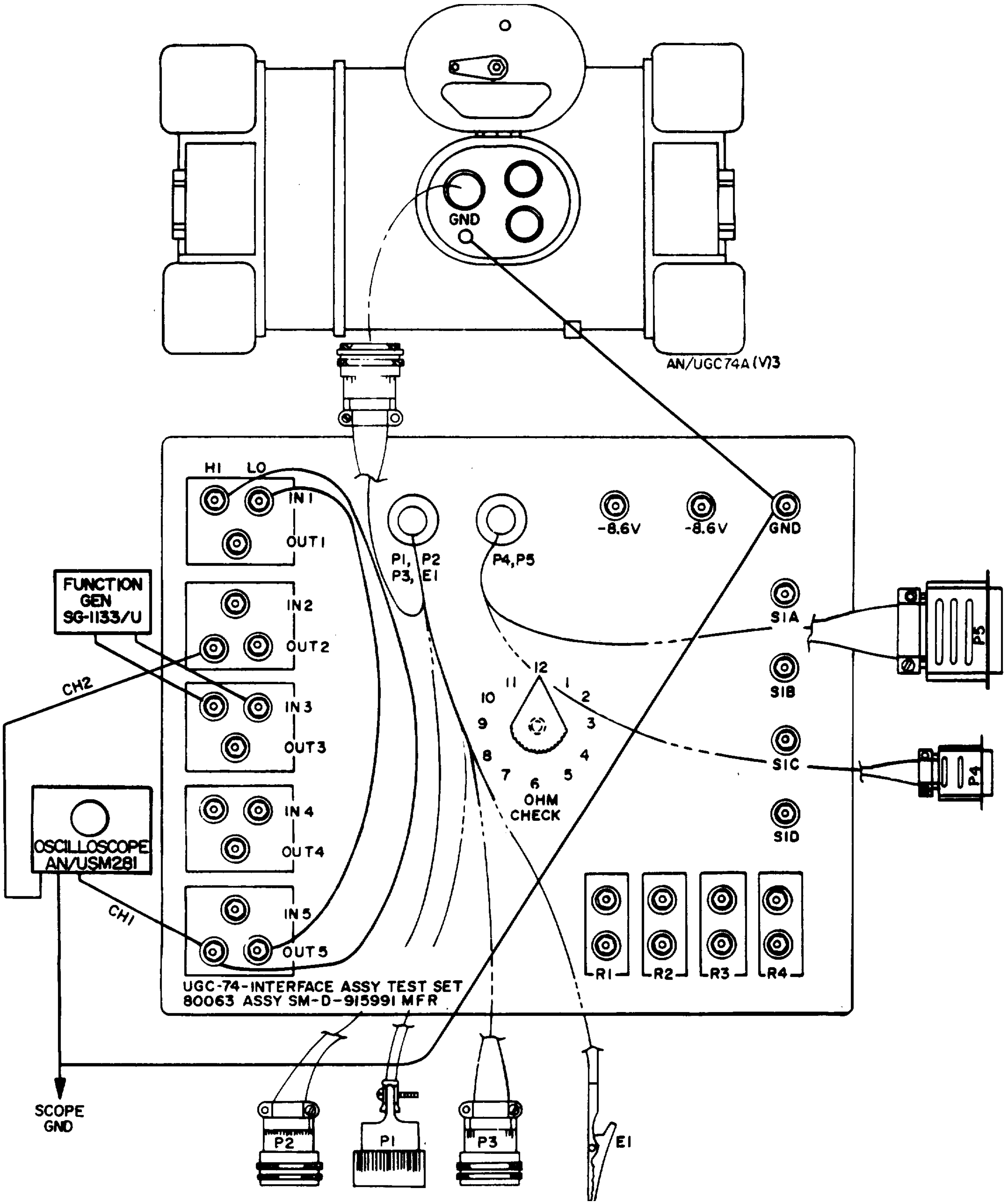


Figure 6-26. EQUIPMENT SETUP FOR DATA/CLOCK TEST.

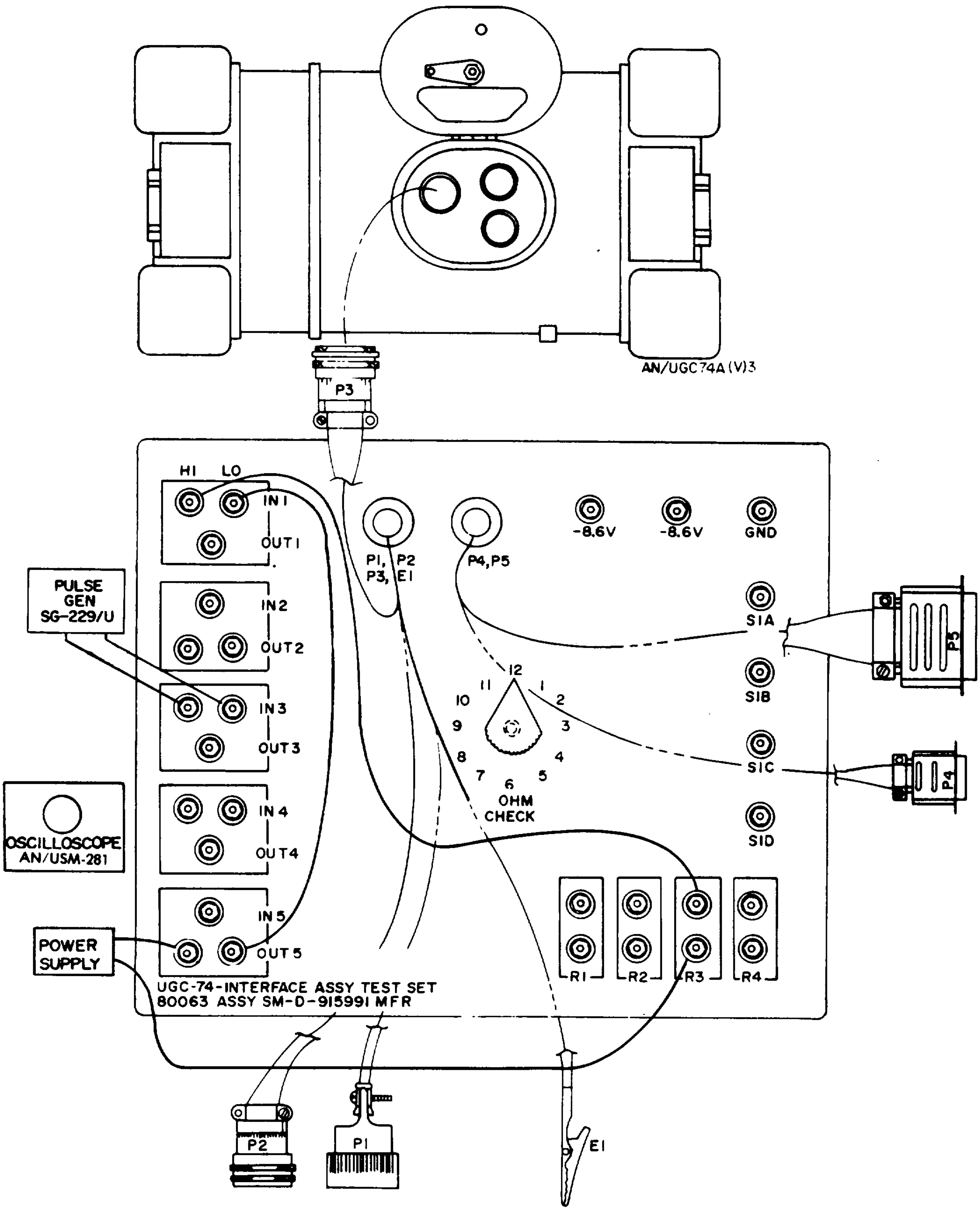


Figure 6-27. EQUIPMENT SETUP FOR 26 VOLT SUPPLY TEST.

Section VII. TEST FIXTURES DISASSEMBLY AND REASSEMBLY

6-32. GENERAL

- This section describes the disassembly and reassembly of the following test fixtures used to test the modules and assemblies of the AN/UGC-74A(V)3.

Test Fixture

A. FILTER ASSEMBLY
B. HAMMER DRIVER MODULE
C. HAMMER MODULE
D. INTERFACE ASSEMBLY
E. LINE FEED/CURRENT CONTROL
F. POWER SUPPLY
G. KEYSWITCH ASSEMBLY

- Use the same care and precautions for the disassembly and reassembly of the test fixtures as used for the terminal components in section V of this chapter.
- Refer to the applicable figure and parts description list for identification and location of test fixture parts.
- After repair and reassembly of a test fixture, refer to section VIII of this chapter and perform the test procedures required to insure complete repair of the fixture.

6-33. DISASSEMBLY AND REASSEMBLY PROCEDURES

A. FILTER ASSEMBLY TEST FIXTURE DISASSEMBLY AND REASSEMBLY (fig. 6-28).

- Remove four screws (8), washers (9) and remove bottom cover (11) from chassis (12).

Removal and Replacement of Switch S1 (72).

- Label and unsolder wires from terminals of switch S1 (72).
- Ž Remove nut (47), washer (48).
- Remove switch S1 (72).
  - Ž Replace switch S1.
  - Replace washer (48) and nut (47), tighten into position.
  - Replace and solder wires on terminals of S1.

Removal and Replacement of Connector J1 (21).

- Label and disconnect wires from connector J1 (21).
- Remove two screws (17), washers (15) and attaching hardware (18), (19), and (20).
- Remove J1.
  - Replace connector J1.
  - Replace attaching hardware (18), (19), and (20).
  - Place washer (15) and screw (17) into position and secure.
  - Replace and connect wires on terminals of J1.

Removal and Replacement of Connector J2 (31).

- Label and disconnect wires to connector J2(31).
- Remove two screws (34), washers (32) ond attaching hardware (23), (24) and (25).
- Remove connector J2.
    - Replace connector J2.
    - Replace attaching hardware (25), (24) and (23).
    - Secure into position with washer (32) and screw (34).
    - Replace and solder wires on terminals of J2.

Removal and Replacement of Connector J3 (61).

- Label and unsolder wires to connector J3 (61).
- Remove four screws (60) and attaching hardware (62), (63) and (64).
- Remove connector J3.
    - Replace connector J3.
    - Replace attaching hardware (64), (63) and (62), secure into place with screws (60).
    - Replace and solder wires on terminals of J3.

Removal and Replacement of Connector J4 (71).

- Label and unsolder wires to connector J4.
- Remove four screws (59) and attaching hardware (68), (69) and (70).
- Remove connector J4.
    - Replace connector J4.
    - Replace attaching hardware (70), (69) and (68), and secure into place with screws (59).
    - Replace and solder wires to terminals of J4.

Removal and Replacement of Fuseholders (13), (14) and (40).

- Label and unsolder fuseholder's respective wires.
- Remove nut (6) (typical) and washer (7) (typical) on each of the three fuse-holders as required.
- Remove fuseholder(s) and washer(s) (39) (typical) as required.
    - Replace fuseholder into mounting hole with washer (39) and secure into place with washer (7) and nut (6).
    - Solder respective wires to their terminals.

Removal and Replacement of Capacitor C1 (46).

- Remove capacitor Cl by removing two screws (56), bracket (52) and attaching hardware (53), (54) and (55).
- Extend capacitor C1 from chassis. Mark and disconnect leads by removing two screws (44) from C1. Remove C1.
    - Replace capacitor C1 by reconnecting leads with two screws (44).
    - Replace C1 in chassis, replace bracket (52) over C1 and replace screws (56) and attaching hardware (53), (54) and (55).

Removal and Replacement of Resistors R1 (26) and R2 (38).

- Label and unsolder the leads from the resistors.
- Remove two screws (22) and (33) which attach each resistor to the chassis (12).
- Remove resistors.
  - Replace resistors to chassis with screws (22) and (33).
  - Resolder leads to resistors.

Removal and Replacement of Test Points (43), (49), (50) and (51).

- Unsolder wires and remove nuts (1) and (2), washers (3) and (4) and spacer (5) from test points as applicable.
- Remove applicable test point(s) from chassis.
  - Replace test point(s) in chassis.
  - Replace spacer(s), washer(s) and nut(s) as applicable.
  - Resolder wire(s) to applicable test point(s).

NOTE

Refer to table 3-3 for filter assembly wire list, if required.

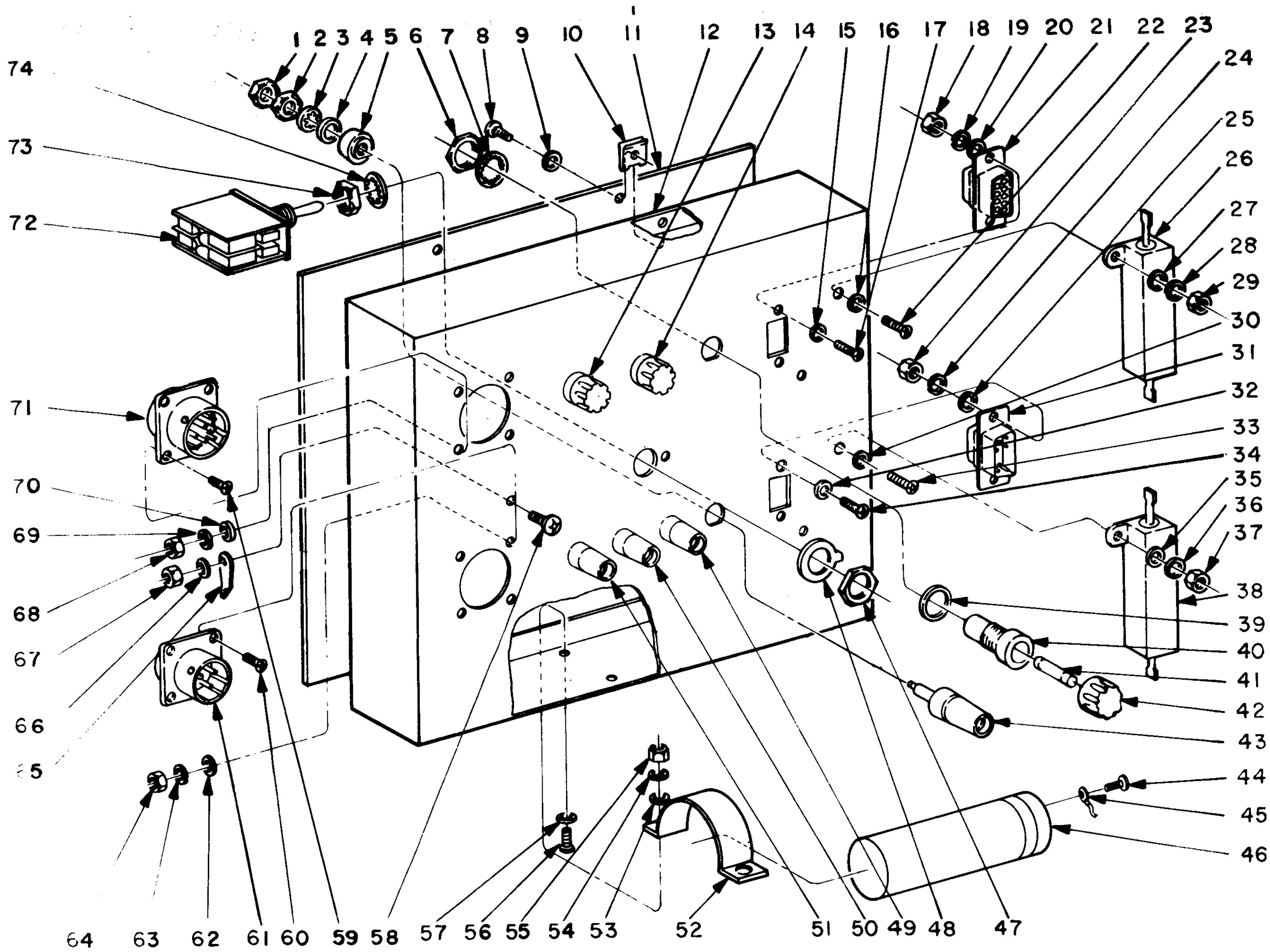


Figure 6-28. FILTER ASSEMBLY TEST FIXTURE.

Figure 6-28. LEGEND

No.	Part Description	No.	Part Description	No.	Part Description
1	Nut	26	Resistor (R1)	51	Test point (TP3)
2	Nut	27	Washer, flat	52	Bracket
3	Washer, lock	28	Washer, lock	53	Washer, flat
4	Washer, flat	29	Nut	54	Washer, lock
5	Spacer	30	Washer, flat	55	Nut
6	Nut	31	Connector (J2)	56	Screw
7	Washer, lock	32	Washer, flat	57	Washer, flat
8	Screw, pnh	33	Screw, pnh	58	Screw, pnh
9	Washer, flat	34	Screw, pnh	59	Screw, pnh
10	Nut, sheet spring U-type	35	Washer, flat	60	Screw, pnh
11	Cover, bottom	36	Washer, flat	61	Connector (J3)
12	Chassis	37	Nut	62	Washer, flat
13	Holder, fuse	38	Resistor (R2)	63	Washer, lock
14	Holder, fuse	39	Washer, flat	64	Nut
15	Washer, flat	40	Holder, fuse socket	65	Terminal
16	Washer, flat	41	Fuse	66	Washer, lock
17	Screw, pnh	42	Cap, fuse	67	Nut
18	Nut	43	Test point (TP4)	68	Nut
19	Washer, lock	44	Screw	69	Washer
20	Washer, flat	45	Terminal crimp	70	Washer, lock
21	Connector (J1)	46	Capacitor (C1)	71	Connector (J4)
22	Screw, pnh	47	Nut	72	Switch (S1)
23	Nut	48	Washer, tab	73	Nut
24	Washer, lock	49	Test point (TP2)	74	Washer, lock
25	Washer, flat	50	Test point (TP1)		

B. HAMMER DRIVER TEST FIXTURE DISASSEMBLY AND REASSEMBLY (fig. 6-29).

- Remove four screws (1) and washers (2) which secure bottom cover (3) to test fixture chassis (11).

Removal and Replacement of Test Points (15) through (20),

- Label and unsolder wire(s) from test point(s) as required.
- Remove test point(s) by removing attaching hardware (4), (5), (6), (7), and (9).
  - Position test point(s) into mounting hole and secure with attaching hardware.
  - Solder wires to their respective terminals.

Removal and Replacement of Switch S1 (23).

- Label and disconnect wires from switch S1 (23) by removing six screws (21).
- Remove attaching hardware (31), (32) and remove switch.
  - Position S1 into chassis (11) with positioning hardware (24), (25) and (26) properly oriented to engage alinement hole in chassis.
  - With switch properly alined, install attaching hardware (32), (31) so that only 1-2 threads are exposed above the shoulder of nut (31).
  - Tighten nut (31) as required to secure switch S1.
  - Connect wires to their respective terminals.

Removal and Replacement of Resistor R1 (42) and/or Resistor R2 (49).

- Label and unsolder wires from resistor (42) or (49) as required.
- Remove attaching hardware (44), (45), and (43) or (48), (47), (46) as applicable and remove resistor(s).
  - Position resistor into place and secure with attaching hardware.
  - Solder wires to their respective terminals.

Removal and Replacement of Connector Housing (33).

- Remave four screws (34), and attaching hardware (54), (55), and (56).
- Remove housing (33). Remove two screws (39) and attaching hardware (13), (14) from housing.
  - Place housing into position and secure with attaching hardware.

Removal and Replacement of Connectors (37) and (38).

- Removal of connectors (37) and (38) requires housing assembly (33) removal.
- Remove two screws (39) and attaching hordware (13), (14) from housing (33).
- Grasp connectors (37) and (38) and gently disengage mating pins.
- Pins (36) in connector (37) may be removed by depressing the tang holding the pin(s) in place and gently removing the pin(s).
- Remove guide rails (35) and (10) by removing attaching hardware (50), (41), (40) or (51), (52), (53) as applicable.
- Remove grommet (12) and pass it over connector (37).
    - Replace grommet.
    - **Replace guide rails and secure with attaching hardware.**
    - Insure that pins in connector (37) are secure by checking tangs.
    - Mate connector together.
    - Position assembly into place and secure with two screws and attaching hardware.
    - Replace housing assembly (33).

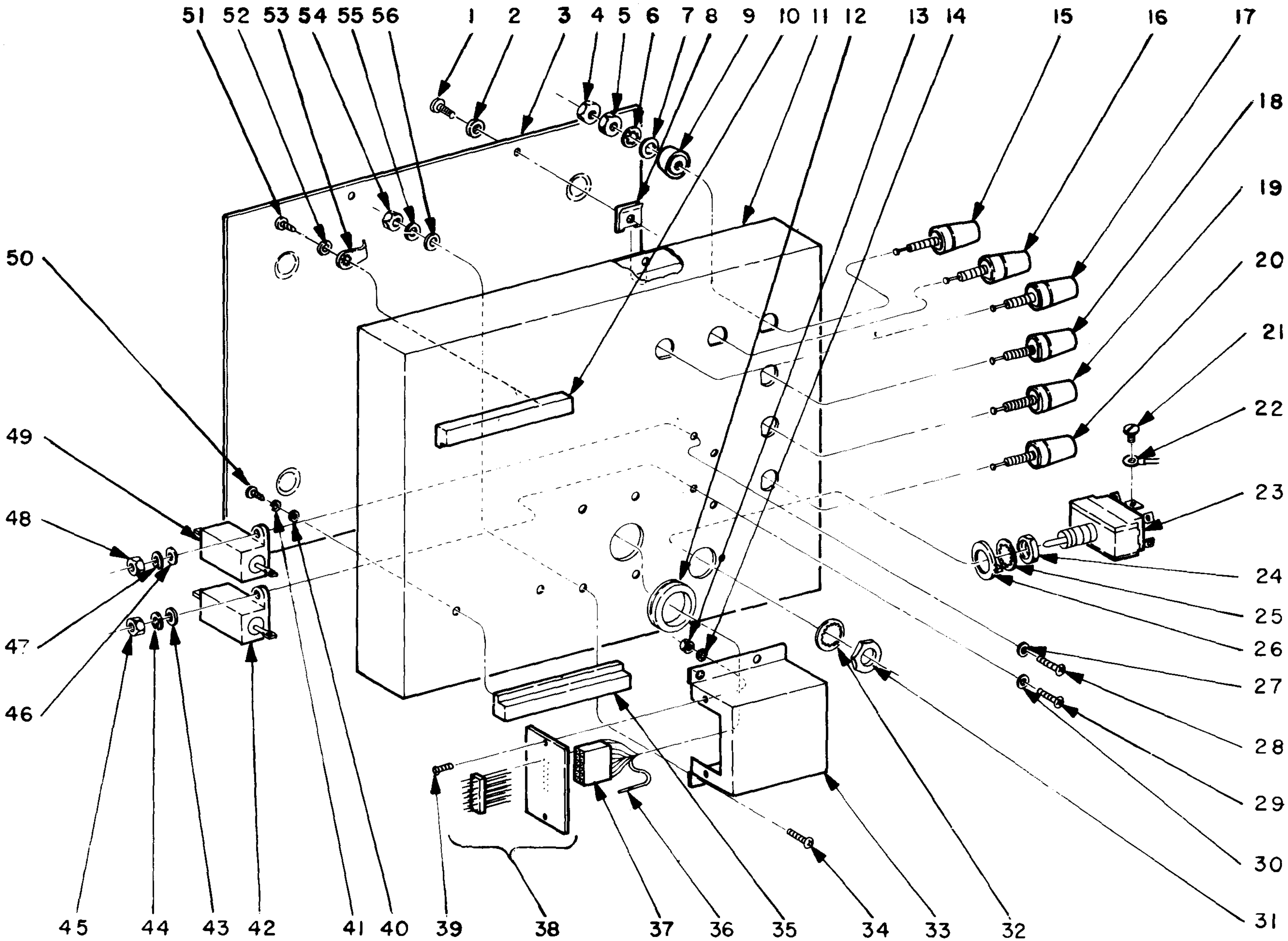


Figure 6-29. HAMMER DRIVER TEST FIXTURE.

Figure 6-29. LEGEND

No.	Part Description	No.	Part Description
1	Screw	29	Screw
2	Washer, flat	30	Washer, flat
3	Cover, bottom	31	Nut
4	Nut	32	Washer, lock
5	Nut	33	Housing
6	Washer, lock	34	Screw
7	Washer, flat	35	Guide
8	Nut, flat spring, U-type	36	Pin
9	Spacer	37	Connector
10	Guide	38	Connector assembly
11	Chassis	39	Screw
12	Grommet	40	Washer, flat
13	Nut	41	Washer, lock
14	Washer, flat	42	Resistor (RI)
15	Test point (TP2)	43	Washer, flat
16	Test point (TP1)	44	Washer, lock
17	Test point (TP6)	45	Nut
18	Test point (TP3)	46	Washer, flat
19	Test point (TP4)	47	Washer, lock
20	Test point (TP5)	48	Screw
21	Screw	49	Resistor (R2)
22	Terminal	50	Screw, self tapping
23	Switch, toggle (S1)	51	Screw, self tapping
24	Nut	52	Washer, flat
25	Washer, lock	53	Terminal lug
26	Washer, tab	54	Nut
27	Washer, flat	55	Washer, lock
28	Screw	56	Washer, flat

C. HAMMER MODULE TEST FIXTURE DISASSEMBLY AND REASSEMBLY (fig. 6-30).

• Remove screw (1), washer (2) and bottom cover (3) from chassis (13).

Removal and Replacement of Switches S1 (30), S2 (33), S3 (36), and S4 (37)

• Label terminals (28) and remove lockwashers (26) from switch(es) (30), (33), (36), and (37) as applicable.
Ž Remove nut (20), (23), (25), (48) and washers (17), (19), (21), (49) from appropriate switch to be removed. Remove switch(es) as required.
  • When installing new switch, install nut(s) (29), (32), (35), (38), and washers (26), (31), (34), (39) before positioning switch in chassis.
  • Place switch into chassis and install alinement washer(s) (17), (19), (21) and (49) to engage alinement hole in chassis.
  • Install nut(s) (20), (23), (25), (48) and tighten until 1-2 switch threads extend beyond the shoulder of nut.
  Ž Tighten nut(s) (29), (32), (35) and (38) as required to secure switch.

Removal and Replacement of Switch S5 (4).

• Unsolder and label leads from switch S5 (4).
• Remove nut (12) and remove switch and washer (7).
  • Position switch into mounting hole and secure with washer and nut.
  • Solder wires to their respective terminals.

Removal and Replacement of Test Point(s) (18), (22) and (24).

• Label and unsolder and remove wires from test point(s) (18), (22) and (24) as required.
• Remove attaching hardware (5), (6), (8), (9), (11) and remove test point(s).
  Ž Position test point(s) into mounting hole and secure with attaching hardware.
  • Solder wires to their respective terminals.

Removal and Replacement of Resistors (59), (60), (61), (68).

• Label and unsolder wires from resistor(s) (59), (60), (61), (68).
• Remove attaching hardware (72), (73), (74), (40), (41); (68), (69), (70), (42), (43); (66), (64), (63), (45), (46), (67), (65), (62), (44), and (45) respectively, and remove resistor(s).
  • Position resistor(s) into place and secure with attaching hardware.
  • Solder wires to their respective terminals.

Removal and Replacement of Capacitor (82).

• Remove capacitor (82) by removing bracket (79) and attaching hardware (75), (76), (80), (81), (85) in two places.
• Remove capacitor from chassis (13) with leads still attached.
• Remove screws (84) and disconnect leads from capacitor.
  • Connect leads to capacitor and secure with screws.
  • Position capacitor into chassis.
  • Secure into position with attaching hardware.

Removal and Replacement of Connector Assembly (55).

- Connector assembly (55) is mounted on a housing (50).
- To remove connector assembly, remove housing attaching hardware (51), (90), (91), and (92).
- Lift housing from chassis (13) and invert.
- Disconnect connector (54) from connector assembly (55) by gently pulling them apart.
- Remove two screws (56) and attaching hardware (15), (16) and remove housing (50).
- Remove guides (52), (78) by removing attaching hardware (77), (58), (57) and (87) through (89) as appropriate.
  - Replace guides and secure with attaching hardware.
  - Mate connector with connector assembly.
  - Position into chassis assembly.
  - Secure housing assembly with attaching hardware.

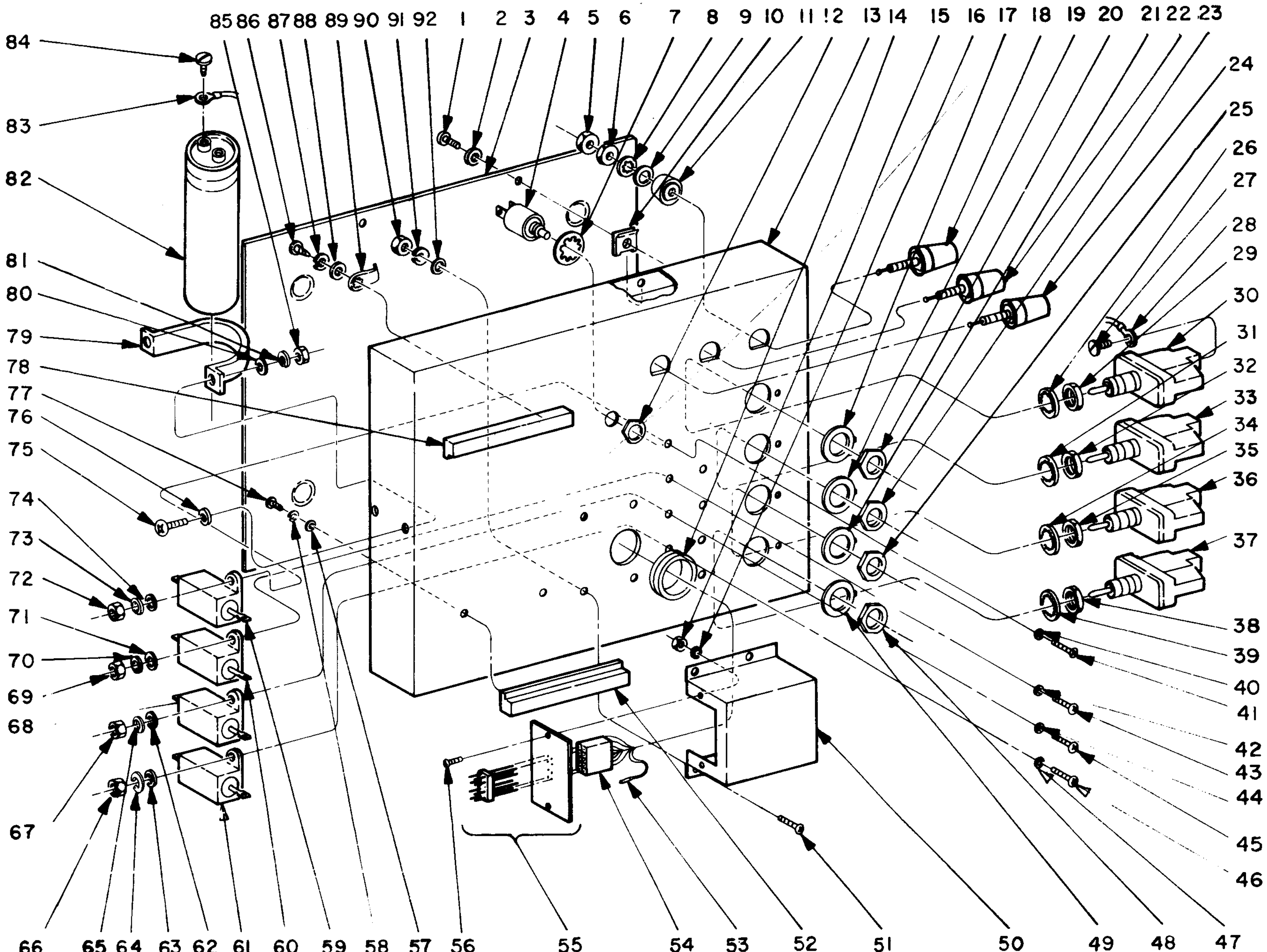


Figure 6-30. HAMMER MODULE TEST FIXTURE.

Figure 6-30. LEGEND

No.	Part Description	No.	Part Description	No.	Part Description
1	Screw	31	Washer, lock	61	Resistor (R4)
2	Washer, flat	32	Nut	62	Washer, flat
3	Cover bottom	33	Switch (S2)	63	Washer, flat
4	Switch (S5)	34	Washer, lock	64	Washer, lock
5	Nut	35	Nut	65	Washer, lock
6	Nut	36	Switch (S3)	66	Nut
7	Washer, lock	37	Switch (S4)	67	Nut
8	Washer, lock	38	Nut	68	Resistor (R3)
9	Washer, flat	39	Washer, lock	69	Nut
10	Nut, fiat spring-U-type	40	Washer, flat	70	Washer, lock
11	Spacer	41	Screw	71	Washer, flat
12	Nut	42	Washer, flat	72	Nut
13	Chassis	43	Screw	73	Washer, lock
14	Grommet	44	Washer, flat	74	Washer, flat
15	Washer, flat	45	Screw	75	Screw
16	Nut	46	Screw	76	Washer, flat
17	Washer, tab	47	Washer, flat	77	Screw, self tapping
18	Test point (TP3)	48	Nut	78	Guide
19	Test tab	49	Washer, tab	79	Bracket
20	Nut	50	Housing, connector	80	Washer, flat
21	Washer tab	51	Screw	81	Washer, lock
22	Test point (TP2)	52	Guide	82	Capacitor (C1)
23	Nut	53	Pin, connector	83	Lug, terminal crimp
24	Test point (TP1)	54	Connector	84	Screw
25	Nut	55	Connector assembly	85	Nut
26	Washer, lock	56	Screw	86	Screw
27	Screw	57	Washer, flat	87	Washer, lock
28	Lug terminal crimp	58	Washer, lock	88	Washer, flat
29	Nut	59	Resistor (R1)	89	Terminal lug
30	Switch (S1)	60	Resistor (R2)	90	Nut
				91	Washer, lock
				92	Washer, flat

D. INTERFACE ASSEMBLY TEST FIXTURE DISASSEMBLY/REASSEMBLY (figs. 6-31, 6-32, 6-33)

- **Remove four screws (2) and washers (3) which secure bottom cover (4) to chassis (15).** Remove bottom cover.

Removal and Replacement of Switch S1 (1) **(fig. 6-31)**

- To remove switch S1 (1), first mark each wire soldered to switch to identify terminal to which it is connected.
- Unsolder and remove each wire.
- Loosen setscrews in knob (28) and remove knob.
- Remove nut (43) and washer (44). Remove switch S1.
  - Posit ion'switch into mounting hole in chassis.
  - Secure into position with washer and nut.
  - Solder wires to their respective terminals.

Removal and Replacement of Test Point(s) (14), (16), (17), (18), (19), (20), (21), (45) through (50), (52), (54), (56), (58), (59), (61), (62), (63) and (69) **(fig. 6-31).**

- Prior to removing test points (14), (16), (17),(18),(19), (20), (21), (45) through (50), (52), (54), (56), (58), (59), (61), (62), (63) and (69) mark each wire to identify test point(s) from which it was removed.
- Unsolder each wire(s) from each respective test point.
- Remove attaching hardware (6), (7), .(8), (9) and (10) from each test point to be removed.
  - Position test point(s) into mounting hole in chassis and secure with attaching hardware.
  - Solder-wire(s) to respective terminals.

Removal and Replacement of Test Points (12), (13), (14), (16), (17), (18), (20) and (21) **(fig. 6-33).**

- To remove test point(s) (12), (13), (14), (16), (17), (18), (20), (21), remove resistors R1 (22), R2 (19), R3 (15) and R4 (6) as required.
- Remove attaching hardware (1) through (5) and (7) through (11) as required and remove test point(s).
  - Mount test point into mounting hole in chassis and secure with attaching hardware.
  - Replace resistor(s) removed (R1, R2, R3 or R4) as required.

Removal and Replacement of Connector Assembly (26) and (27) **(fig. 6-31).**

- To remove back shell (26) from connector (27), loosen two screws on back shell clamping the cable.
- Remove two screws (25) and washers (24) along with attaching hardware (22) and (23).
- Slide back shell toward chassis (15) along the cable.
  - With connector in place move back shell along cable to connector.
  - Secure into place with attaching hardware and two screws.

Removal and Replacement of Connector Assembly (34) and (33) **(fig. 6-31).**

- To move back shell (34) from connector (33), loosen two screws on back shell clamping cable.
- Remove the two screws (31), washer (30) and attaching hardware (32) and (29).
- Slide back shell toward chassis along the cable.
  - With connector in place move back shell along cable toward connector.
  - Secure with attaching hardware and two screws.

Removal and Replacement of Connector Assembly (51), (53), and (55) **(fig. 6-31).**

- Remove two screws and clamp on connector requiring replacement.
- Disassemble connector shell.
- Label and unsolder wires from connector.
  - Resolder wires to connector.
  - Reassemble connector.
  - Replace clamp and tighten two screws.

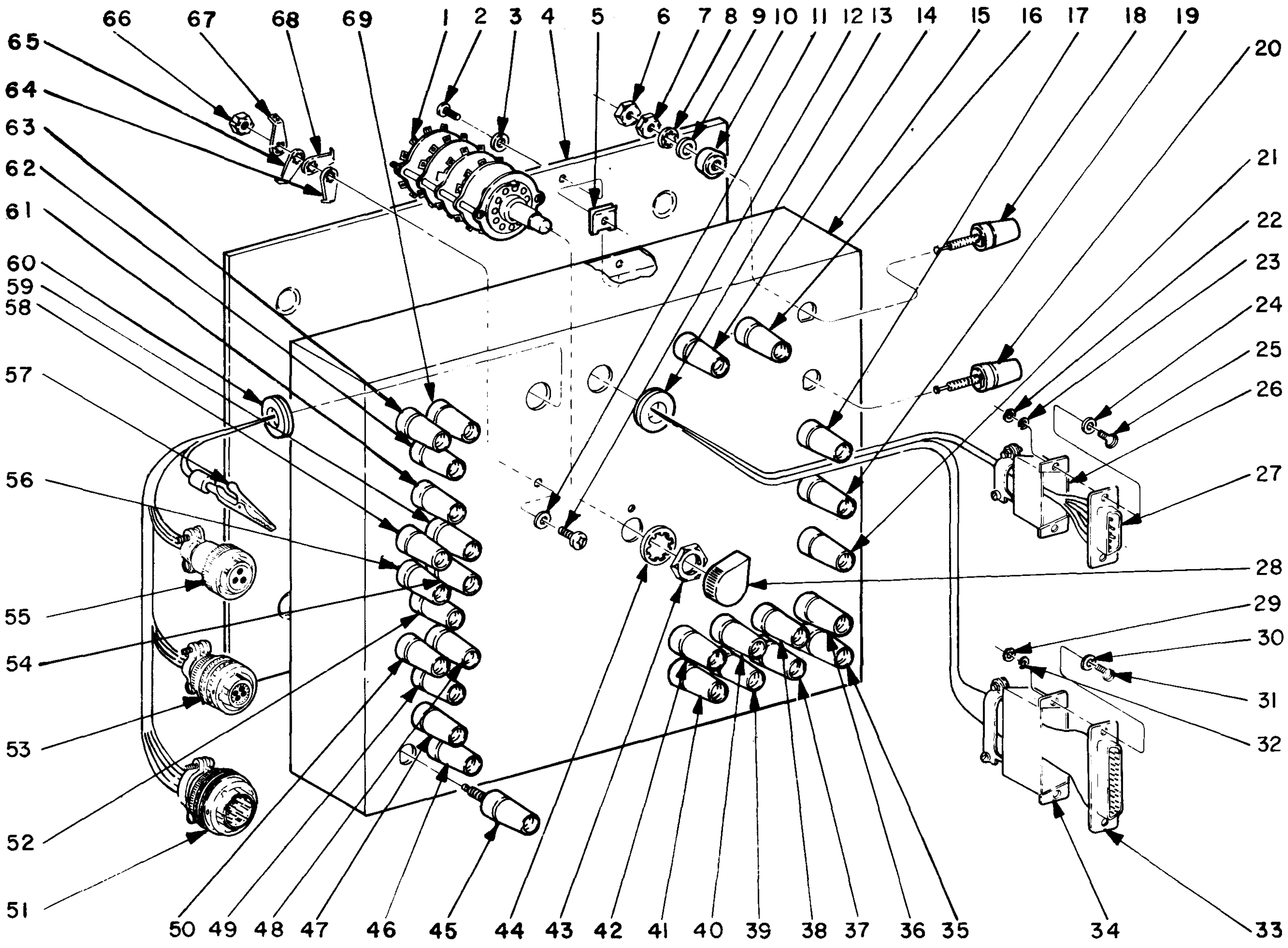


Figure 6-31. INTERFACE ASSEMBLY TEST FIXTURE.

Figure 6-31. LEGEND

No.	Part Description	No.	Part Description	No.	Part Description
1	Switch, rotary (S1)	26	Shell connector	51	Connector, elec.
2	Screw	27	Connector elec.	52	Test point (TP22)
3	Washer, flat	28	Knob, pointer	53	Connector, elec.
4	Cover, Chassis bottom	29	Nut	54	Test point (TP23)
5	Nut, sheet spring U-type	30	Washer, flat	55	Connector, elec.
6	Nut	31	Screw	56	Test point (TP24)
7	Nut	32	Washer, lock, split	57	Clip, electrical
8	Washer, lock	33	Connector, elec.	58	Test point (TP26)
9	Washer, flat	34	Shell connector	59	Test point (TP25)
10	Insulator base	35	Test point (TP12)	60	Grommet, rubber
11	Washer, flat	36	Test point (TP8)	61	Test point (TP27)
12	Screw	37	Test point (TP13)	62	Test point (TP28)
13	Grommet, rubber	38	Test point (TP9)	63	Test point (TP30)
14	Test point (TP1)	39	Test point (TP14)	64	Terminal, lug, solder
15	Chassis-interface assembly	40	Test point (TP10)	65	Terminal, lug, solder
16	Test point (TP2)	41	Test point (TP15)	66	Terminal, lug, solder
17	Test point (TP5)	42	Test point (TP11)	67	Terminal, lug, solder
18	Test point (TP3)	43	Nut	68	Terminal, lug, solder
19	Test point (TP6)	44	Washer, lock	69	Test point (TP29)
20	Test point (TP4)	45	Test point (TP17)		
21	Test point (TP7)	46	Test point (TP16)		
22	Nut	47	Test point (TP18)		
23	Washer, lock, split	48	Test point (TP20)		
24	Washer, flat	49	Test point (TP19)		
25	Screw	50	Test point (TP21)		

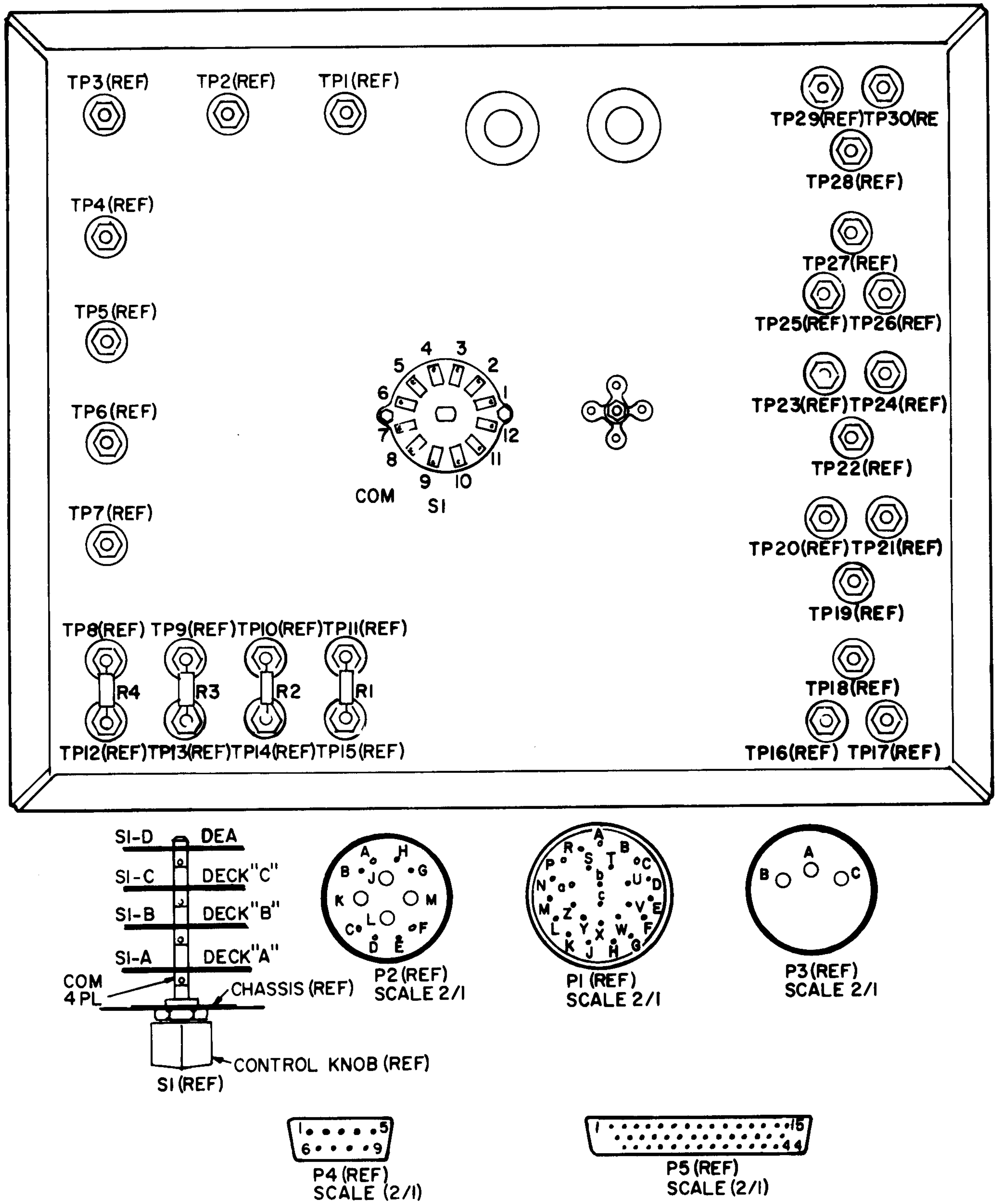
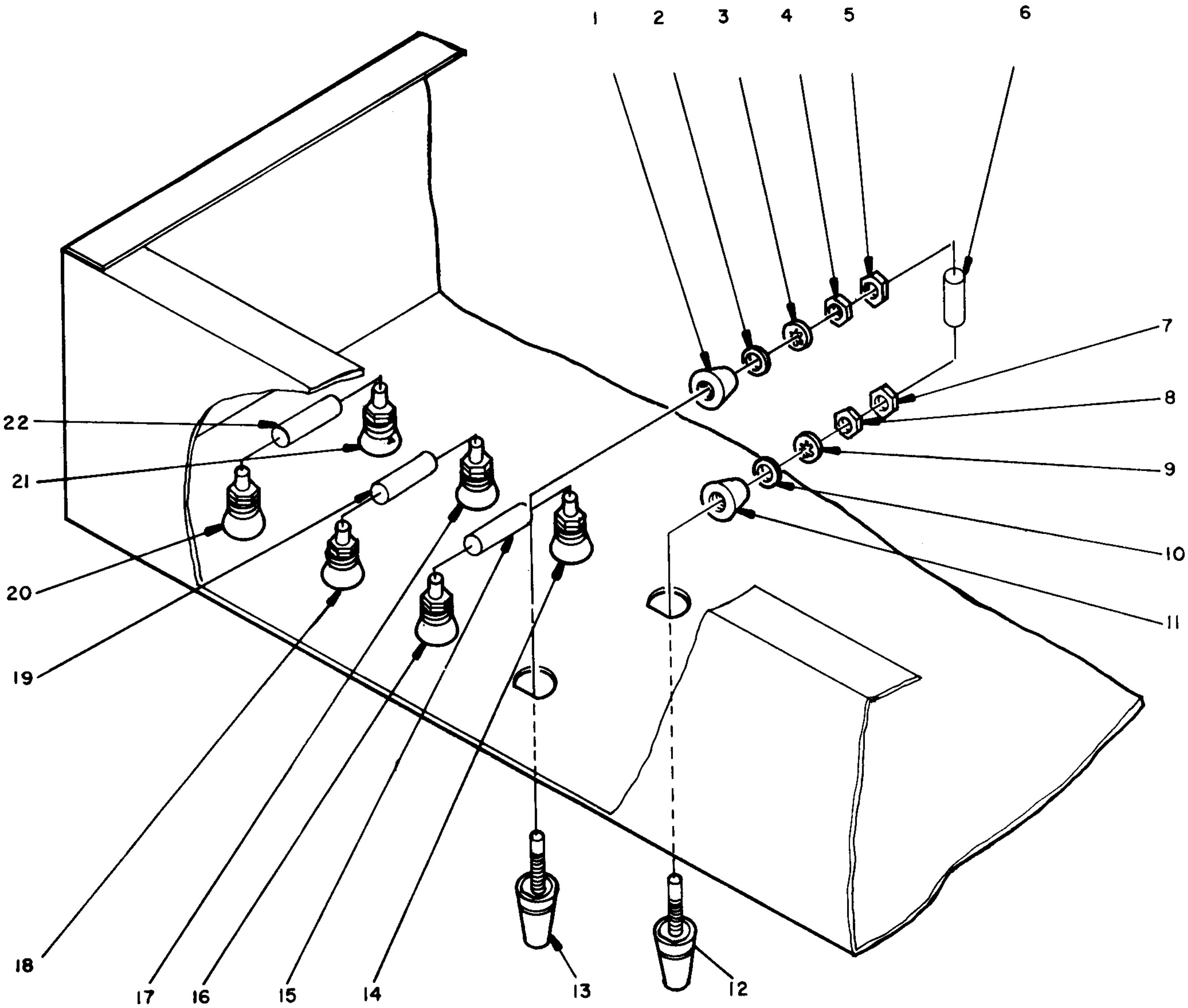


Figure 6-32. INTERFACE ASSEMBLY TEST FIXTURE (BOTTOM VIEW).



No.	Part Description	No.	Part Description
1	Spacer	12	Test point (TP11)
2	Washer, flat	13	Test point (TP15)
3	Washer, lock	14	Test point (TP10)
4	Nut	15	Resistor (R2)
5	Nut	16	Test point (TP14)
6	Resistor (R1)	17	Test point (TP9)
7	Nut	18	Test point (TP13)
8	Nut	19	Resistor (R3)
9	Washer, lock	20	Test point (TP12)
10	Washer, flat	21	Test point (TP8)
11	Spacer	22	Resistor (R4)

Figure 6-33. INTERFACE ASSEMBLY TEST FIXTURE (TEST POINT RESISTORS).

E. LINE-FEED CURRENT CONTROL TEST FIXTURE DISASSEMBLY AND REASSEMBLY (fig. 6-34)

- Remove four screws (5), washers (6) and cover (13).

Removal and Replacement of Test Point(s) (20) through (28), (30) through (35).

- Mark and unsolder wire(s) to test points (20) through (28), (30) through (35) as required.
- Remove attaching hardware (8) through (12) from each test point as required.
  - Position test point(s) into mounting hole and secure with attaching hardware.
  - Solder wires to their respective terminals.

Removal and Replacement of Switch S1 (4).

- Loosen setscrews and remove knob (29).
- Mark and unsolder wires from S1 (4).
- Remove nut (36) and washer (37). Remove S1.
  - Position S1 into mounting hole and secure with nut and washer.
  - Solder wires to their respective terminals.
  - Replace nut (36) and washer (37) on S1 threaded shaft.
  - Replace knob (29) and tighten two setscrews.

Removal and Replacement of Switch S2 (1).

- Mark wires on switch S2 (1) and remove them from switch by removing three screws (76).
- Remove nut (38) and tab washer (39) and remove switch S2.
  - Position hardware (38) and (39) over mounting hole prior to inserting switch.
  - Once inserted into chassis, switch is alined by installing washer (39) so that tang on washer mates with alinement hole in chassis.
  - Nut (38) is then tightened on switch until 1-2 threads appear above shoulder of nut.
  - Tighten nut (2) as required to secure switch.
  - Replace wires on switch with screws (76).

Removal and Replacement of Terminal Board TB1.

- Mark and unsolder leads from solder terminals E18 through E25 on TB1 (73).
- Remove resistors (67), (68), (69), (74).
  - Remove screw (65) terminal lug (64) and washer (66).
  - Remove two screws (70), washers (71) and (72) and terminal board TB1 (73).
  - Place TB1 into position and secure with attaching hardware.
  - Replace resistors.
  - Solder wires to their respective terminals.

Removal and Replacement of Printed Circuit Board (59).

- Mark and unsolder wire(s) from printed circuit card (59) as reauired.
- Remove two screws (44) and washers (45) with attaching hardware (60), (61) and (62).
- Remove connector (49) by unsoldering connector pins and separating connector from printed circuit board.
  - Connect connector to printed circuit card and solder pins.
  - Position into chassis and secure with attaching hardware.
  - Solder wires to their respective terminals.

Removal and Replacement of Resistor (R4) (55).

- Mark and unsolder wires from resistor (55).
- Remove two screws (42), washers (43), and attaching hardware (56), (57) and (58).
- Remove resistor (55).
  - Position resistor into place.
  - Secure with attaching hardware.
  - Solder leads to their respective terminals.

Removal and Replacement of Switch S3 (53).

- Mark and remove two wires by removing two screws (52) from switch (53).
- Remove attaching hardware (40), (41) and remove switch.
  - Install positioning hardware (51) and (50).
  - Insert switch through mounting hole.
  - Once inserted into chassis, switch is alined by installing washer (41) so that tang on washer mates with alinement hole in chassis.
  - Nut (40) is then tightened on switch until 1-2 threads appear above shoulder of nut.
  - Tighten nut (51) as required to secure switch.
  - Replace wires on switch.

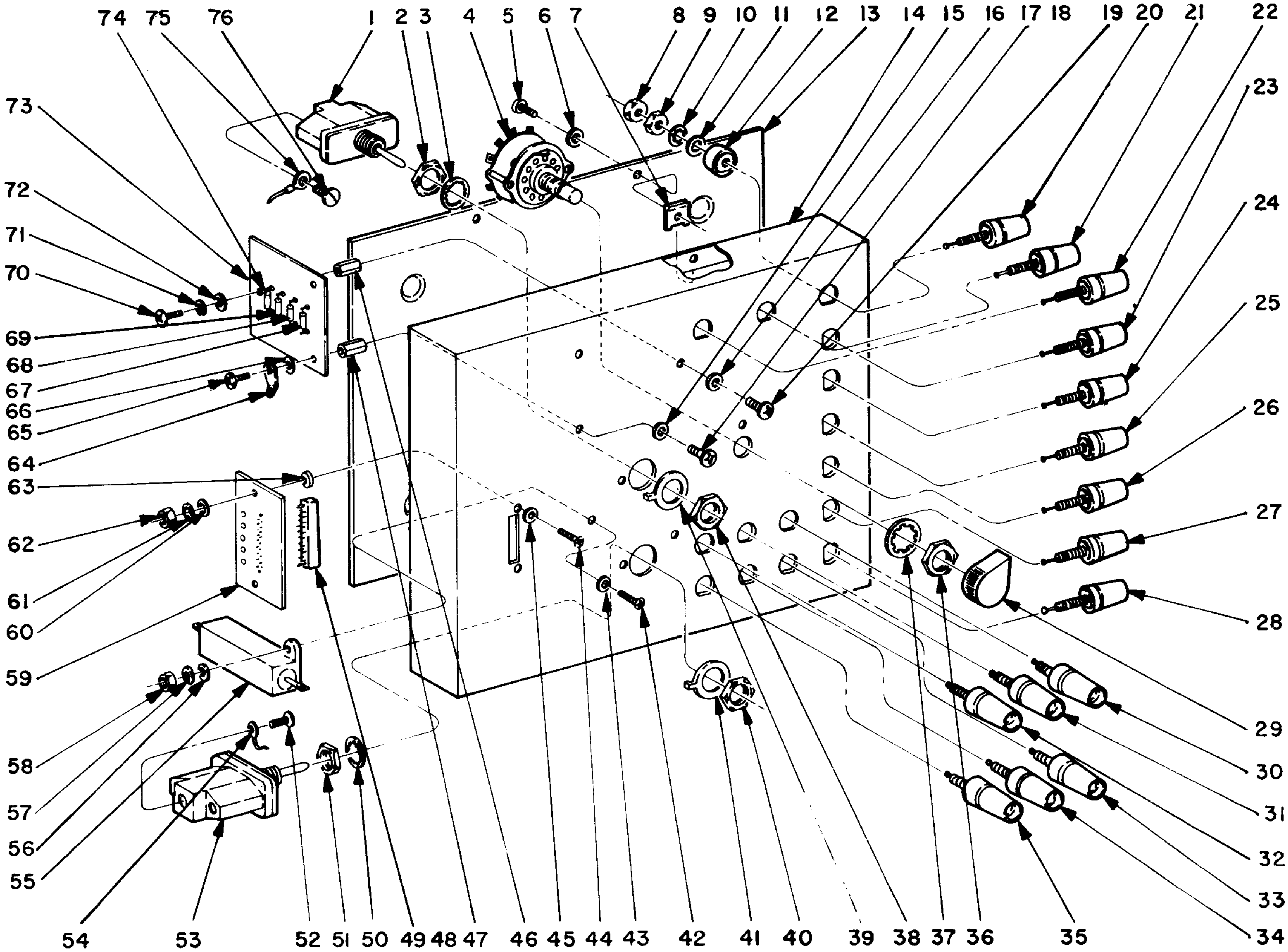


Figure 6-34. LINE FEED/CURRENT CONTROL TEST FIXTURE.

Figure 6-34. LEGEND

No.	Part Description	No.	Part Description	No.	Part Description
1	Switch, toggle (S2)	25	Test point (TP7)	51	Nut
2	Nut	26	Test point (TP3)	52	Screw
3	Washer, lock	27	Test point (TP11)	53	Switch, toggle (S3)
4	Switch, rotary (S1)	28	Test point (TP15)	54	Terminal
5	Screw	29	Knob, pointer	55	Resistor (R4)
6	Washer, flat	30	Test point (TP10)	56	Washer, flat
7	Nut, sheet spring, U-type	31	Test point (TP9)	57	Washer, lock
8	Nut	32	Test point (TP8)	58	Nut
9	Nut	33	Test point (TP14)	59	Printed circuit board
10	Washer, lock	34	Test point (TP13)	60	Washer, flat
11	Washer, flat	35	Test point (TP12)	61	Washer, lock
12	Spacer	36	Nut	62	Nut
13	Cover, chassis	37	Washer, lock	63	Washer flat insulating
14	Chassis	38	Nut	64	Terminal solder
15	Washer, flat	39	Washer, tab	65	Screw
16	Washer, flat	40	Nut	66	Washer, flat
17	Screw	41	Washer, tab	67	Resistor (R3)
18	Deleted	42	Screw	68	Diode (CR1)
19	Screw	43	Washer, flat	69	Resistor (R1)
20	Test point (TP4)	44	Screw	70	Screw
21	Test point (TP2)	45	Washer, flat	71	Washer, lock
22	Test point (TP1)	46	Standoff	72	Washer, flat
23	Test point (TP5)	47	Standoff	73	Terminal board Assy
24	Test point (TP6)	48	Deleted	74	Resistor
		49	Connector	75	Terminal, solder lug
		50	Washer, lock	76	Screw

F. POWER SUPPLY TEST FIXTURE DISASSEMBLY AND REASSEMBLY (figs. 6-35 and 6-36)

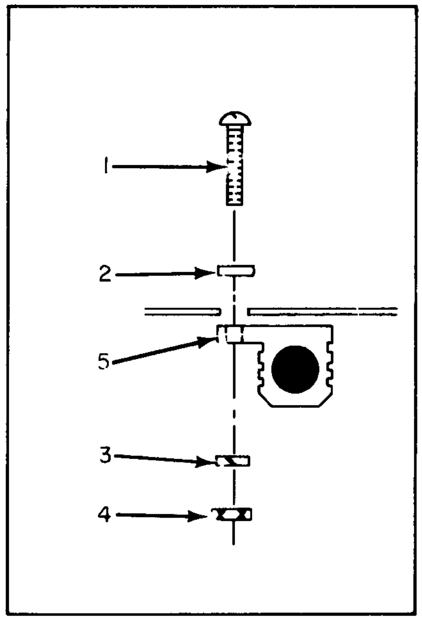
- Remove four screws which secure bottom cover to chassis.

NOTE

Use figure 6-35 for location of required component and then refer to callouts across from instruction.

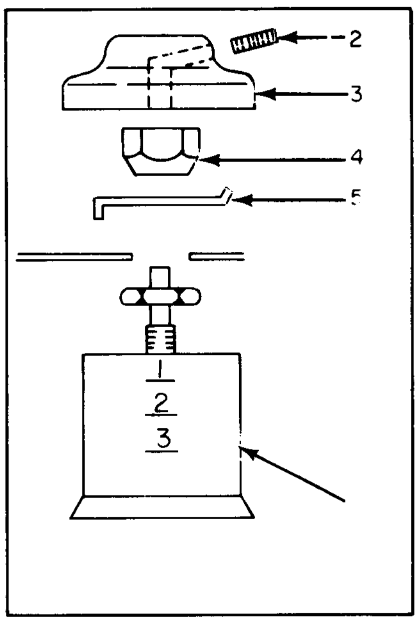
Removal and Replacement of a Power Resistor

- Label and unsolder leads from resistor terminals 1 and 2.
- Remove two screws (1), washer (2) and attaching hardware (3) and (4).
- Remove resistor (5).
  - Mount and re-attach hardware (3) and (4) and tighten screws (1) into place.
  - Identify leads and solder into place.



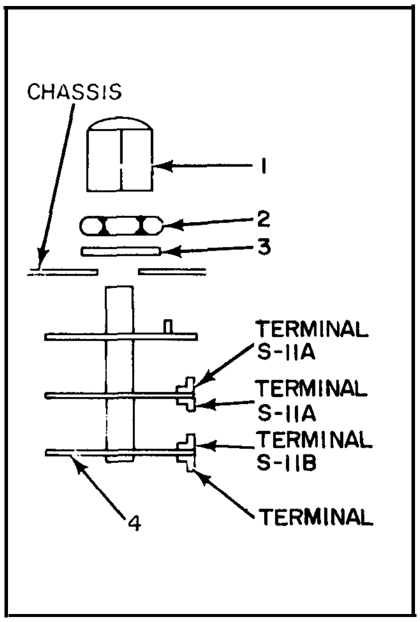
Removal and Replacement of Potentiometer (typical)

- Label and unsolder wires from potentiometer R31 (20) or R32 (21) as required.
- Loosen setscrew (2) and remove dial (3).
- Remove nut (4) and locating washer (5).
- Remove potentiometer (1).
  - Mount potentiometer and place into position using locating washer (5).
  - Replace nut (4) and tighten.
  - Replace dial (3) and tighten setscrew (2).
  - Identify wires and solder into place.



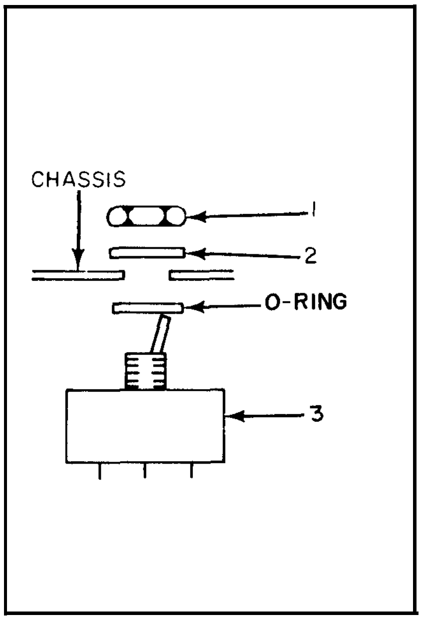
Removal and Replacement of Rotary Switch (33).

- Label and unsolder leads from rotary switch.
- Loosen setscrew in knob (1) and remove knob.
- Remove nut (2) and lockwasher (3). Remove switch (4).
  - Mount switch in position with lockwasher (3) and tighten nut (2).
  - Replace knob (1) and tighten setscrew.
  - Identify leads and solder into place.



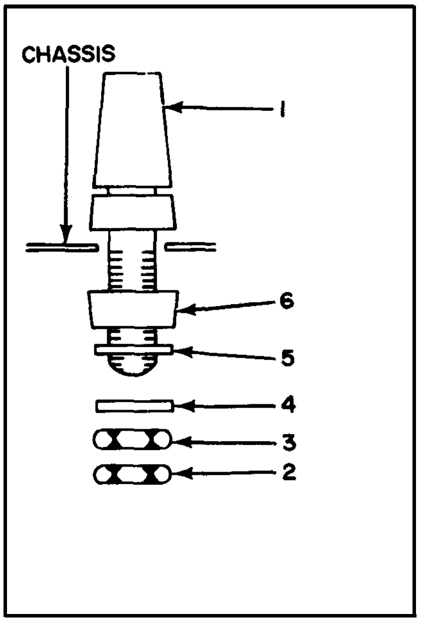
Removal and Replacement of a Toggle Switch (typical).

- Label and unsolder wires from toggle switch as applicable.
- Remove nut (1), lockwasher (2) and remove switch (3).
  - Mount switch (3) and replace hardware (2) and (1); tighten into position.
  - Identify wires and solder into place.



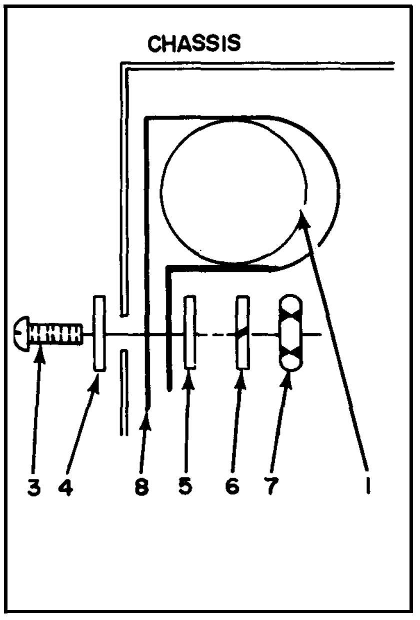
Removal and Replacement of a Test Point (typical).

- Label and unsolder wire from test point (1) as required.
- Remove nuts (2), (3), washers (4) and (5) and spacer (6).
- Remove test point.
  - Mount test point into position and replace hardware (6), (5) and (4).
  - Replace nuts (3) and (2) and tighten into place.
  - Solder wire into place.



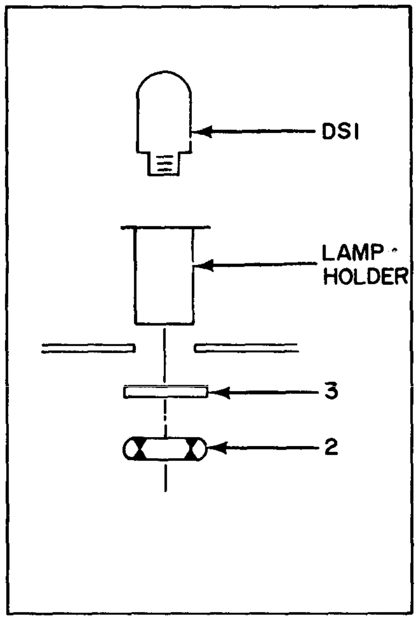
Removal and Replacement of Capacitor C1.

- Label two wires atached to capacitor C1(1).
- Remove two screws connecting wires to C1.
- Remove screws (3) and washer (4) from attaching hardware (5), (6), (7), and clamp (8).
- Remove capacitor and clamp from chassis.
- Remove capacitor from clamp.
  - Place capacitor into clamp.
  - Replace hardware (8), (7), (6), and (5).
  - Secure into place with washer (4) and screw (3).
  - Replace two screws and connecting wires.



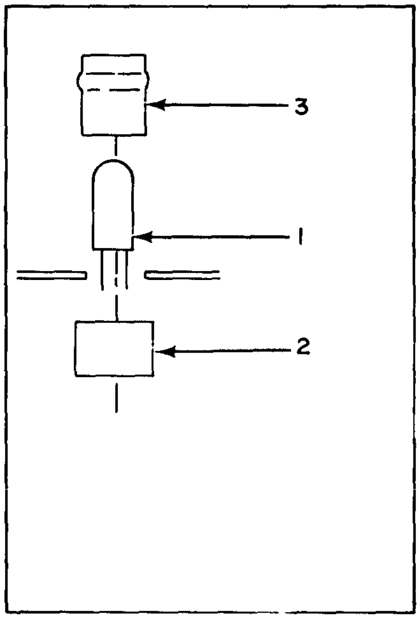
Removal and Replacement of Lamp DS1 Assembly.

- Label wires on terminals of lamp DS1 (1).
- Unsolder and remove wires.
- Remove nut (2) and washer (3).
- Remove DS1 from lens.
    - Replace lamp assembly into mounting hole.
    - Secure into position with washer (3) and nut (2).
    - Solder wires to terminals.



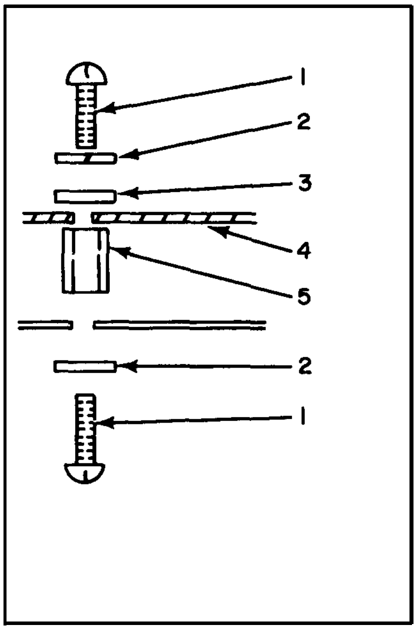
Removal and Replacement of LED DS2 Assembly.

- Label and unsolder wires on LED DS2 (1).
- Unscrew threaded bushing (2).
- Remove sleeve (3).
- Remove DS2.
    - Replace lamp assembly into mounting hole.
    - Secure into position with hardware (3) and (2).
    - Identify wires and solder into place.



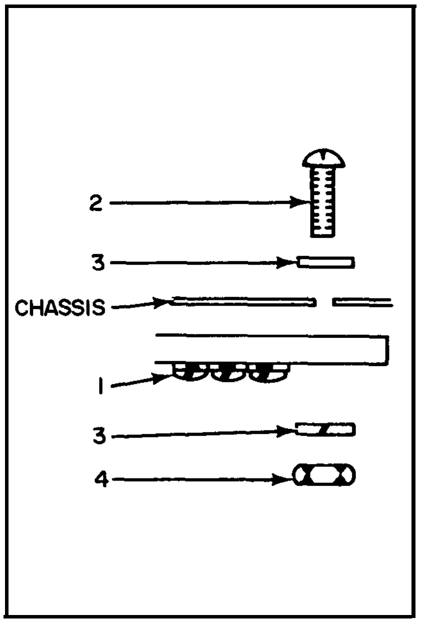
Printed Wiring Board A1 Removal and Replacement.

- Unplug cable connector from receptacle on printed wiring board A1 (refer to figure on page 3-69).
- Remove four screws (1), lockwashers (2), flat washer (3) and spacer (5).
- Remove printed wiring board (4).
  - Replace printed wiring board.
  - Secure into position with hardware (5), (3), (2), and (1).
  - Plug cable connector into connector on printed wiring board.



Removal and Replacement of Terminal Block TB1.

- Label and remove all connecting wires from terminal block TB-1 (1).
- Remove four screws (2), washers (3), and nuts (4) on each end of block.
- Remove terminal block.
  - Position terminal block into position.
  - Secure into place using hardware (4), (3) and (2).
  - Connect all wires to their appropriate terminals.



Removal and Replacement of Card Mounting Assembly.

- Use figure 6-36 and part description list for removal and disassembly of the card mounting assembly located on top of the power supply test fixture.
  - Reassemble card mounting assembly using figure 6-36 and replace on top of the power supply test fixture.

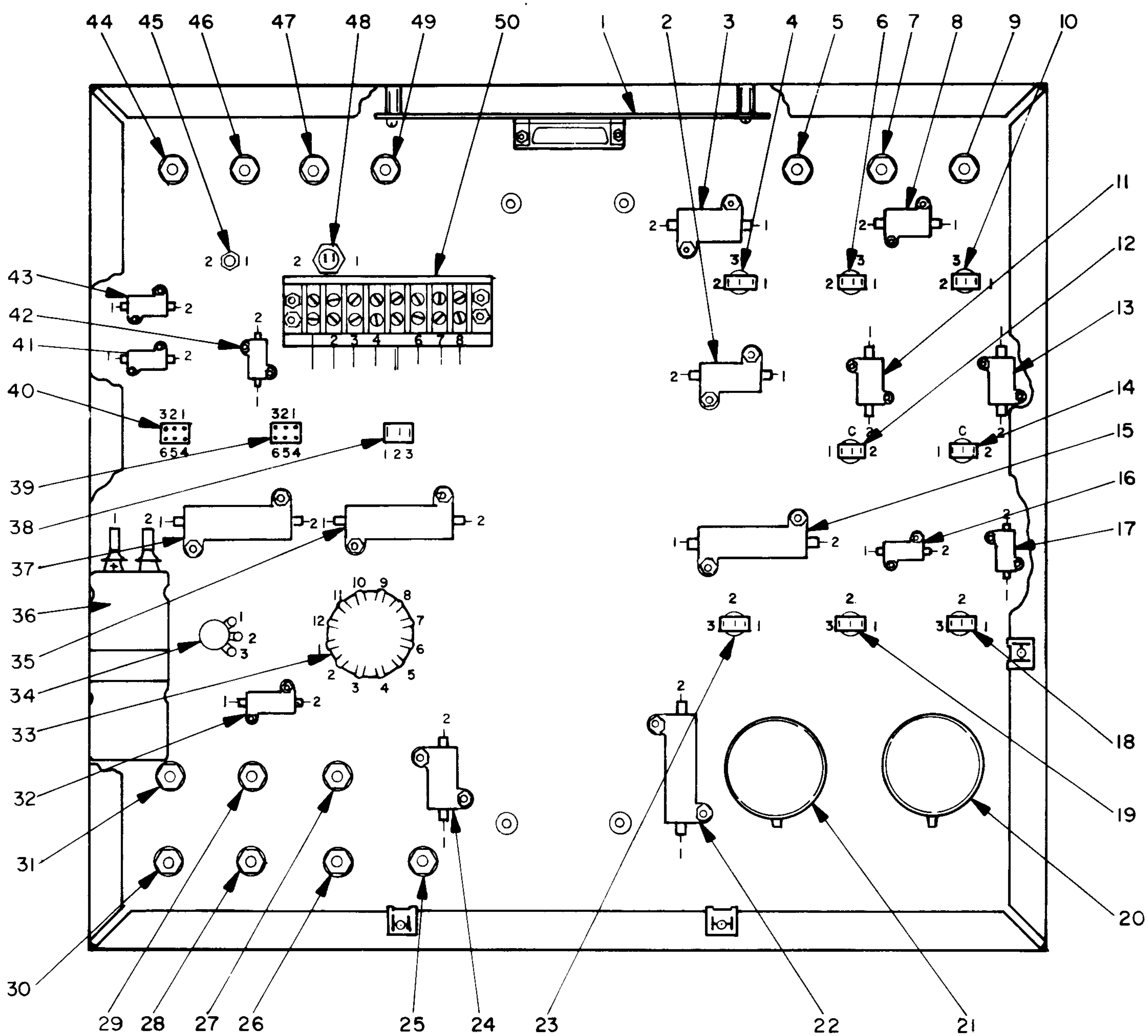


Figure 6-35. POWER SUPPLY TEST FIXTURE (BOTTOM VIEW).

Figure 6-35. LEGEND

No.	Part Description	No.	Part Description
1	Printed Wiring Board (A1)	26	Test Point (TP13)
2	Resistor (R21)	27	Test Point (TP10)
3	Resistor (R20)	28	Test Point (TP12)
4	Switch (S1)	29	Test Point (TP9)
5	Test Point (TP3)	30	Test Point (TP11)
6	Switch (S2)	31	Test Point (TP8)
7	Test Point (TP2)	32	Resistor (R47)
8	Resistor (R2)	33	Switch (S11)
9	Test Point (TP1)	34	Resistor (R8)
10	Switch (S3)	35	Resistor (R15)
11	Resistor (R3)	36	Capacitor (C1)
12	Switch (S7)	37	Resistor (R16)
13	Resistor (R4)	38	Switch (S9)
14	Switch (S6)	39	Switch (S10)
15	Resistor (R12)	40	Switch (S13)
16	Resistor (R11)	41	Resistor (R36)
17	Resistor (R20)	42	Resistor (R34)
18	Switch (S4)	43	Resistor (R35)
19	Switch (S5)	44	Test Point (TP7)
20	Potentiometer (R31)	45	LED (DS2)
21	Potentiometer (R32)	46	Test Point (TP6)
22	Resistor (R14)	47	Test Point (TP5)
23	Switch (S8)	48	Lamp (DS1)
24	Resistor (R13)	49	Test Point (TP4)
25	Test Point (TP14)	50	Terminal Block (TB1)

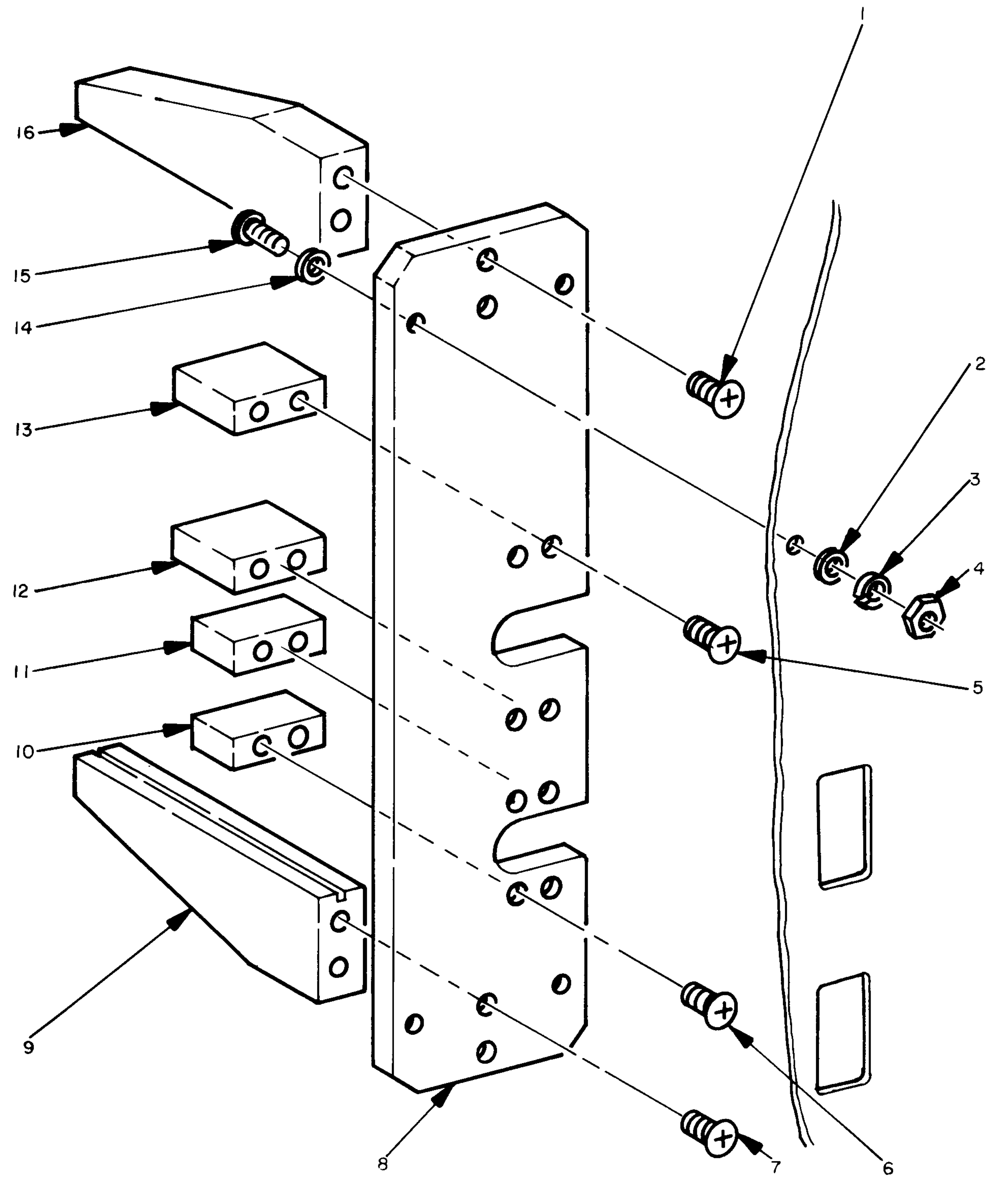


Figure 6-36. POWER SUPPLY TEST FIXTURE (CARD MOUNTING ASSEMBLY).

Figure 6-36. LEGEND

No.	Part Description
1	Screw
2	Washer, flat
3	Washer, lock
4	Nut
5	Screw
6	Screw
7	Screw
8	Base, card guide
9	Guide, card
10	Mounting block, connector
11	Mounting block, connector
12	Mounting block, connector
13	Mounting block, connector
14	Washer, flat
15	Screw
16	Guide, card

G. KEYSWITCH TEST FIXTURE DISASSEMBLY AND REASSEMBLY (figs. 6-37 and 6-38)

Ž Remove four screws (1) washers (2) and cover (3).

Removal and Replacement of Test Point(s) (14) through (17) and (24) through (31).

- Label and unsolder wire(s) from test point(s) (14) through (17) and (24) though (31) as required.
- Remove attaching hardware (4), (5), (6), (7), (9) from each test point as required.
- Remove test point.
  - Place test point into mounting hole on chassis and secure with attaching hardware.
  - Solder wire(s) to their respective test point(s).

Removal and Replacement of Switch S1 (42).

- Label and unsolder wires from each terminal of switch S1.
- Remove attaching hardware (32), (33) and remove switch.
  - When reassembling S1 (42), place S1 in chassis (10) with positioning hardware (40), (41) installed on threaded portion of switch.
  - Install attaching hardware (32), (33) so that tang in washer (33) is properly alined with alinement hole in chassis.
  - Tighten nut (32) until 1-2 threads can be seen above shoulder of nut.
  - Tighten nut until snug.
  - Identify wires and solder into place.

Removal and Replacement of Terminal Board TB1 (38).

- Remove terminal board TB1 (38) by marking and unsoldering leads from each terminal E1 through E11.
- Remove three screws (37), lockwashers (36), and flat washers (35).
- Remove TB1.
  - Place TB1 into position and secure with flat washers, lockwashers and screws.
  - Solder leads to their respective terminals.

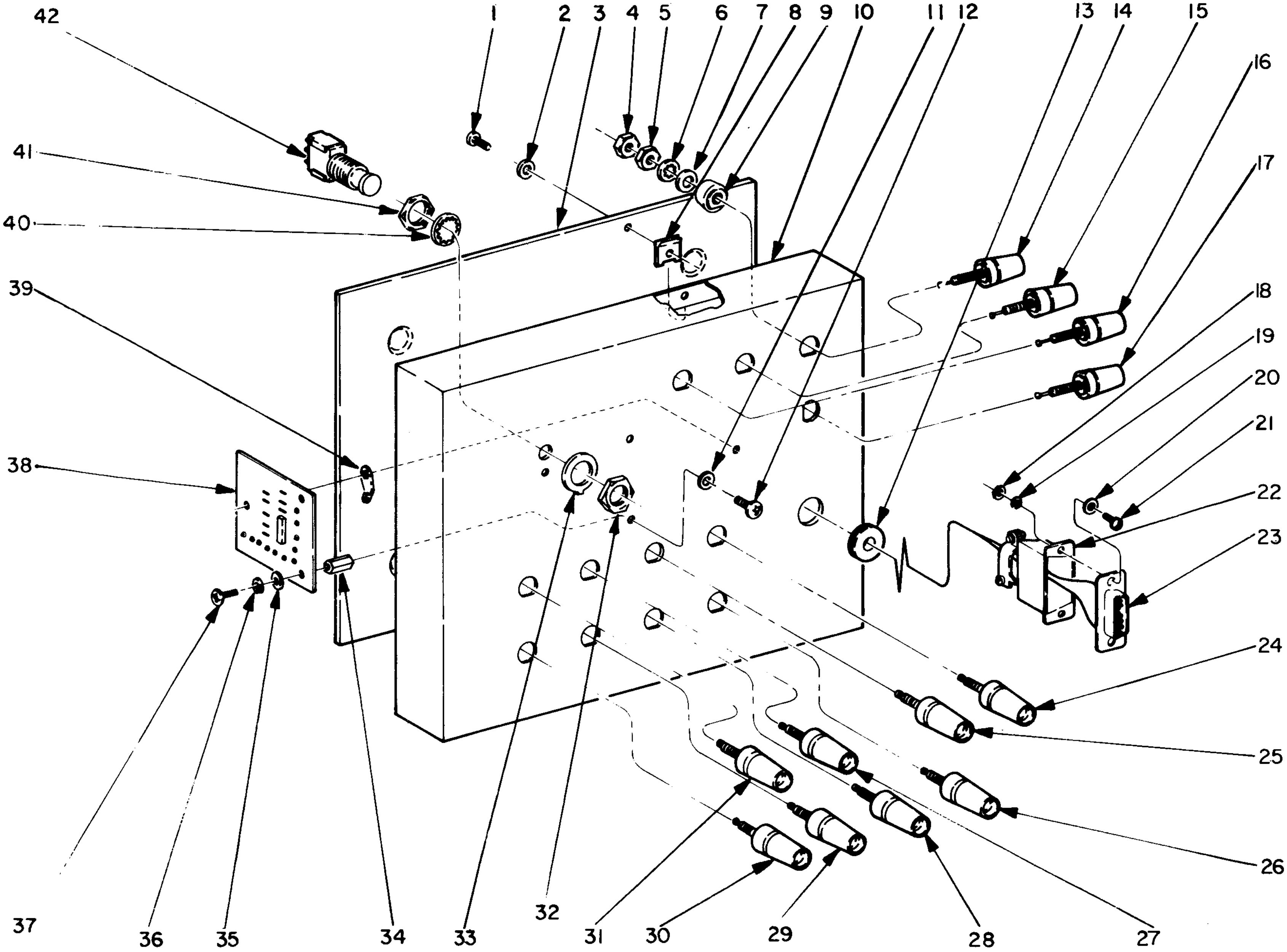


Figure 6-37. KEYBOARD TEST FIXTURE.

Figure 6-37. LEGEND

No.	Part Description	No.	Part Description
1	Screw	22	Backshell
2	Washer, flat	23	Connector (P1)
3	Cover, chassis	24	Test point (TP7)
4	Nut, hex plain	25	Test point (TP6)
5	Nut, hex plain	26	Test point (TP11)
6	Washer, lock	27	Test point (TP5)
7	Washer, flat	28	Test point (TP10)
8	Nut, sheet spring U-type	29	Test point (TP9)
9	Spacer	30	Test point (TP8)
10	Chassis	31	Test point (TP4)
11	Washer, flat	32	Nut
12	Screw, mech. pnh	33	Washer, tab
13	Grommet	34	Standoff
14	Test point (TP1)	35	Washer, flat
15	Test point (TP2)	36	Washer, lock
16	Test point (TP12)	37	Screw, math. pnh
17	Test point (TP3)	38	Circuit card (TB1)
18	Nut, hex plain	39	Terminal
19	Washer, lock	40	Washer, lock
20	Washer, flat	41	Nut
21	Screw, mech. pnh	42	Switch, pushbutton (S1)

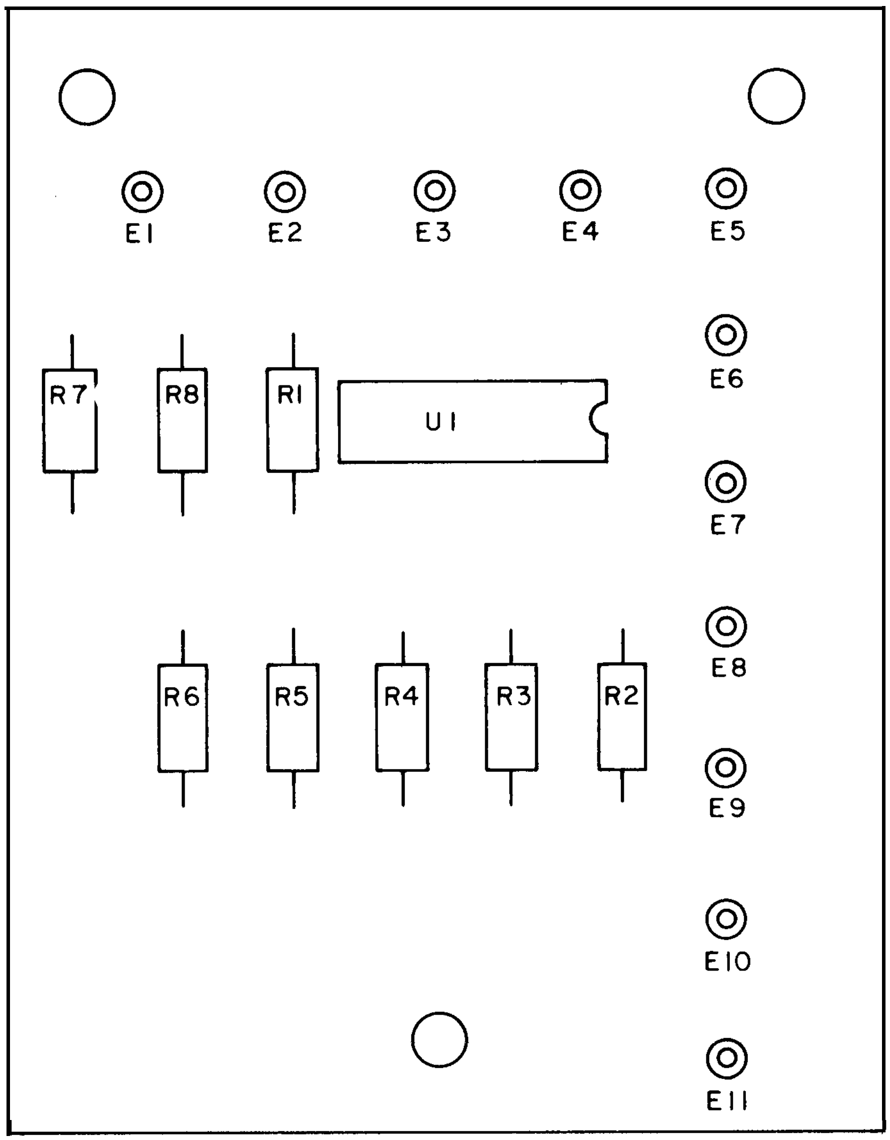


Figure 6-38. KEYBOARD TEST FIXTURE, TB1.

Section VIII. TEST FIXTURE TEST PROCEDURES

6-34. GENERAL

The following test procedures are used to verify proper operation of the respective test fixtures. Because of the simplicity of some of the test fixtures, test procedures may be limited to a continuity test. Others will require normal electronic maintenance test equipment and procedures.

TEST PROCEDURES

A. FILTER ASSEMBLY TEST FIXTURE
B. HAMMER DRIVER MODULE TEST FIXTURE
C. HAMMER MODULE TEST FIXTURE
D. INTERFACE ASSEMBLY TEST FIXTURE
E. LINE-FEED/CURRENT CONTROL TEST FIXTURE
F. POWER SUPPLY TEST FIXTURE
G. KEYSWITCH ASSEMBLY TEST FIXTURE

TOOLS REQUIRED FOR TESTS

Nomenclature

Multimeter AN/USM-223

Oscilloscope AN/USM-281C

Power Supply PP-2309/U (6 required)

Frequency Counter AN/USM-207

NOTE

Perform all continuity tests with Multimeter AN/USM-223 unless otherwise stated. Be sure all input power to test fixture is OFF.

6-35. TEST PROCEDURES

A. FILTER ASSEMBLY TEST FIXTURE TEST PROCEDURES (fig. 6-39)

- Test fixture provides an interface between the prime power inputs and the filter assembly. Fuse protection, ON/OFF power control, and test points are provided.
- Refer to table 6-19 and filter assembly test fixture schematic and perform continuity tests of each wire.
- Resistance in each case shall be less than 1 ohm.
- Connect ohmmeter across TP1 and TP2 and measure 30 ohms ± 5 %.
- Connect ohmmeter across TP2 and TP3 and measure 30 ohms± 5 %.

Table 6-19. FILTER ASSEMBLY TEST FIXTURE WIRE LIST

Wire No.	From	To	Wire No.	From	To
1	J1-1	J4-A	23	R1-2	R2-1
2	J1-2	J4-B	24	R2-2	TP3
3	J1-3	J4-C	25	XF1-2	S1-1NC
4	J1-4	J4-D	26	XF2-2	S1-2NC
5	J1-5	J4-G	27	XF3-2	S1-3ND
6	J1-6	J3-B	28	J3-A	XF3-1
7	J1-7*	—	29	J4-L	S1-2C
8	J1-8	S1-3C	30	J4-J	S1-1C
9	J1-9*	—	31	J4-M	XF1-1
10	J2-1	C1(+)	32	J4-K	XF2-1
11	J2-6	C1(+)	33	J3-B	J4-F
12	TP-1	C1(+)	34	J3-C	E1
13	J2-2	C1(−)	35	J3-D*	—
14	R2-1	C1(−)	36	J3-E*	—
15	TP2	C1(−)	37	J4-H*	—
16	J2-3*	—	38	TP4	E1
17	J2-4*	—	39	TP4	J4-E
18	J2-8*	—			
19	J2-5	TP3			
20	J2-7	TP2			
21	J2-9	TP3			
22	R1-1	TP1			

*No connection required.

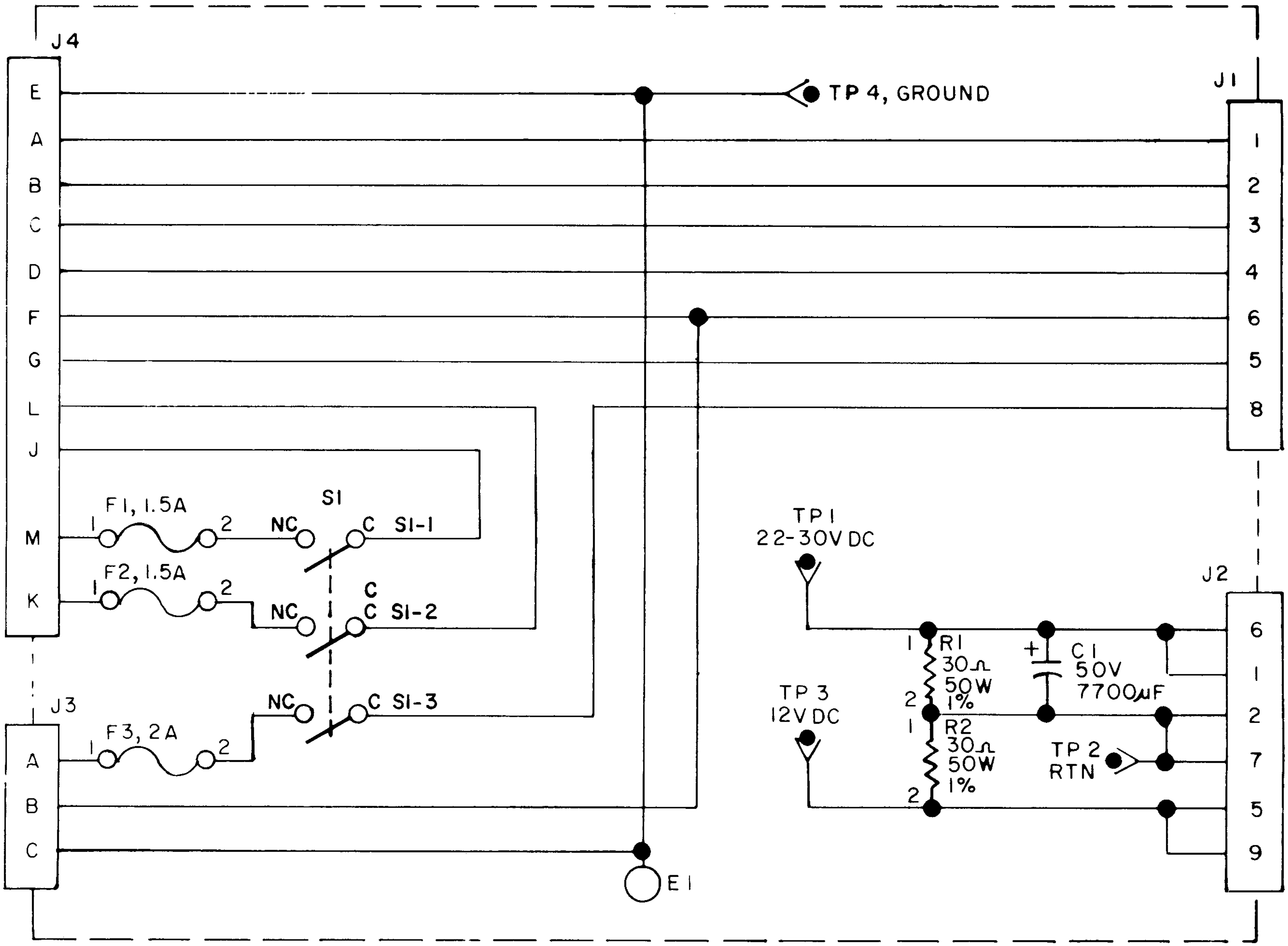


Figure 6-39. FILTER ASSEMBLY TEST FIXTURE, SCHEMATIC DIAGRAM.

B. HAMMER DRIVER MODULE TEST FIXTURE TEST PROCEDURES (fig. 6-40)

- Test fixture provides interface and control signals for the hammer driver module.
- Refer to table 6-20 and hammer driver module test fixture schematic and perform continuity tests of each wire.
- Place ohmmeter across S1 and measure continuity as follows:
  Position IN1 - S1-4 to S1-2 less than 1 ohm
  S1-3 to S1-6 less than 1 ohm
  Position IN2 - S1-4 to S1-1 less than 1 ohm
  S1-3 to S1-5 less than 1 ohm
- Place ohmmeter across TP4 to TP6, and TP5 to TP6 and measure 100 ohms ±5%.

Table 6-20. HAMMER DRIVER MODULE TEST FIXTURE WIRE LIST

Wire No.	From	To
1	J1-1	TP1
2	J1-2	S1-4
3	J1-3	TP1
4	J1-4	S1-3
5	J1-5	TP6
6	J1-6	TP6
7	J1-7	TP5
8	J1-8	TP5
9	J1-9	TP4
10	J1-10	TP4
11	J1-11	TP2
12	J1-12	TP2
13	S1-1	S1-6
14	S1-6	E1
15	S1-2	S1-5
16	S1-2	TP3
17	R1-2	R2-2
18	TP6	E1
19	R1-2	E1
20	R1-1	TP4
21	TP6	E1
22	R2-1	TP5
23	R2-2	E1

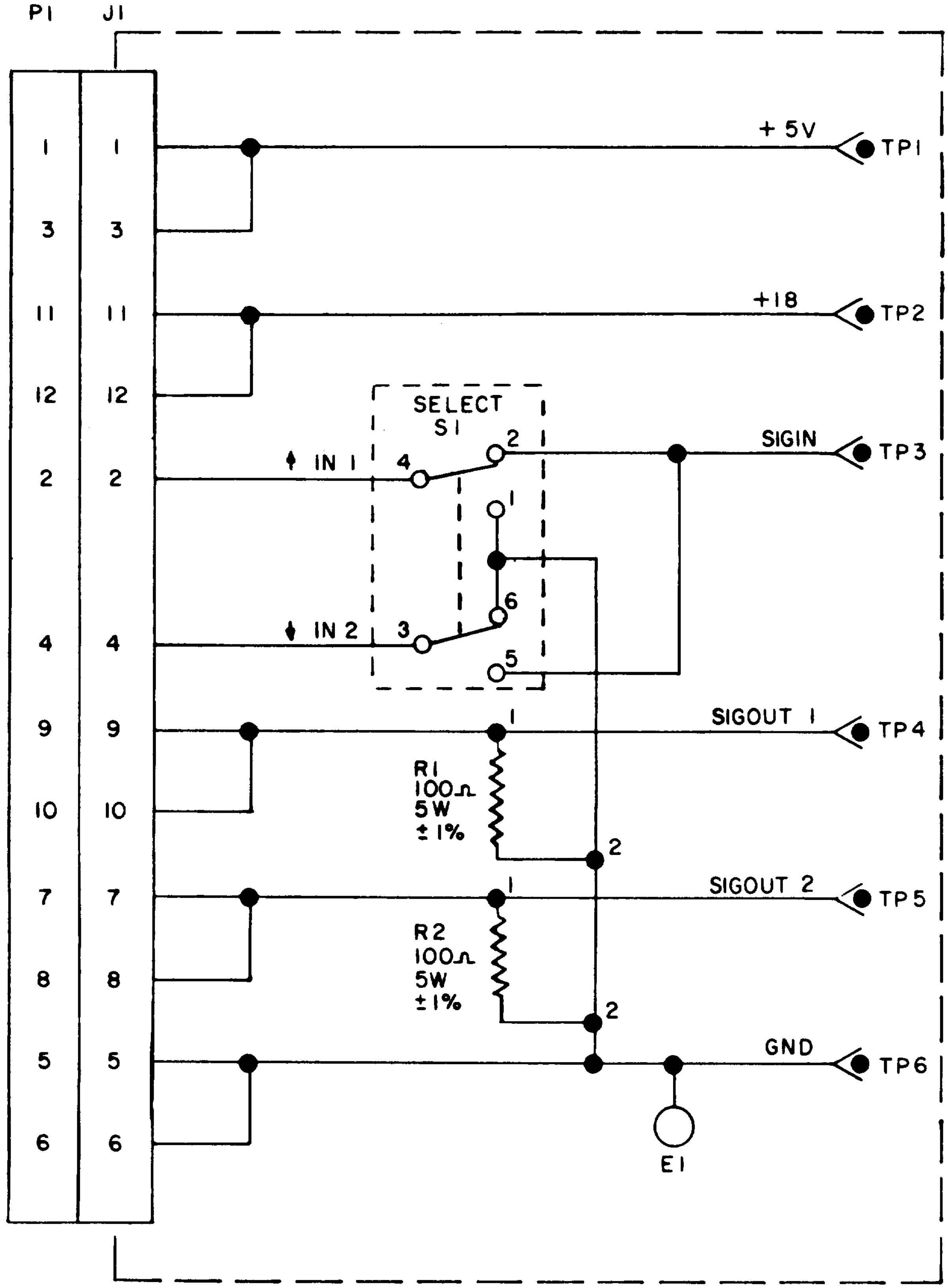


Figure 6-40. HAMMER DRIVER TEST FIXTURE, SCHEMATIC DIAGRAM.

C. HAMMER MODULE TEST FIXTURE TEST PROCEDURES (fig. 6-41)

- Test fixture provides an interface for input power and control signals required by the hammer module.
- Refer to table 6-21 and hammer module test fixture schematic and perform continuity test of each wire.
- Place ohmmeter across each switch and verify its operation.

Table 6-21. HAMMER MODULE TEST FIXTURE WIRE LIST

Wire No.	From	To
1	J1-1	R4-1
2	J1-2	R1-1
3	J1-3	S5-1
4	J1-4	TP2
5	J1-5	R3-1
6	J1-6	E1
7	J1-7	R2-1
8	J1-8	E1
9	TP3	E1
10	S5-2	E1
11	C1(−)	E1
12	C1(+)	TP-1
13	S1-1	R1-2
14	S2-1	R2-2
15	S3-1	R3-2
16	S4-1	R4-2
17	S4-2	S3-2
18	S3-2	S2-2
19	S2-2	S1-2
20	S1-2	TP1

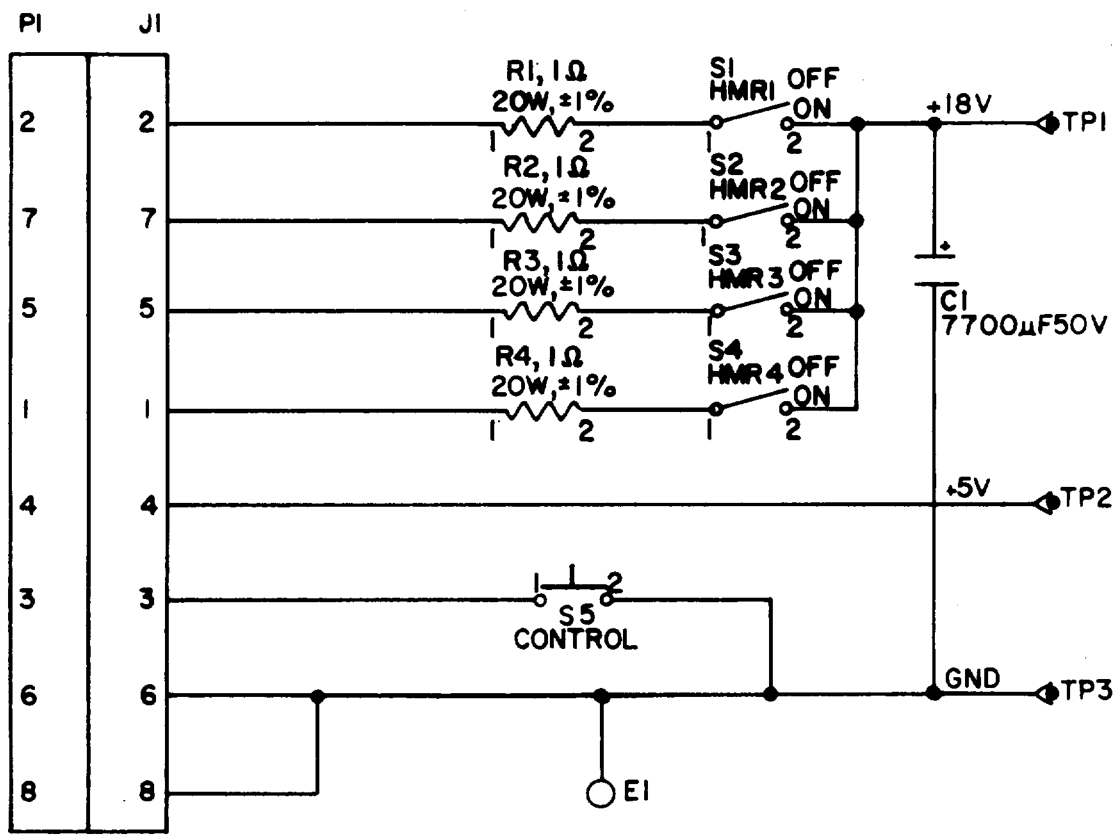


Figure 6-41. HAMMER MODULE TEST FIXTURE. SCHEMATIC DIAGRAM.

D. INTERFACE ASSEMBLY TEST FIXTURE TEST PROCEDURES (fig. 6-42)

- Test fixture provides interconnections between the unit under test and the required test equipment.
- Perform test point resistance tests of each wire in accordance with table 6-22.
- Perform switch continuity tests in accordance with table 6-23.
- Use interface assembly test fixture schematic during both tests.

Table 6-22. INTERFACE ASSEMBLY TEST FIXTURE TEST POINT RESISTANCE TESTS

From	To	Resistance
TP30 (IN 1 HI)	P1-G	Less than 1 ohm
TP30 (IN 1 LO)	P1-H	Less than 1 ohm
TP28 (OUT 1 TTL)	P5-6	Less than 1 ohm
TP27 (OUT 2 TTL)	P5-8	Less than 1 ohm
TP26 (OUT 2 HI)	P1-P	Less than 1 ohm
TP25 (OUT 2 LO)	P1-N	Less than 1 ohm
TP24 (IN 3 HI)	P1-A	Less than 1 ohm
TP23 (IN 3 LO)	P1-B	Less than 1 ohm
TP22 (OUT 3 TTL)	P5-4	Less than 1 ohm
TP21 (IN 4 HI)	P1-D	Less than 1 ohm
TP20 (IN 4 LO)	P1-E	Less than 1 ohm
TP19 (OUT 4 TTL)	P5-5	Less than 1 ohm
TP18 (IN 5 TTL)	P5-7	Less than 1 ohm
TP17 (OUT 5 HI)	P1-K	Less than 1 ohm
TP16 (OUT 5 LO)	P1-L	Less than 1 ohm
TP2 (+8.6V)	P5-1	Less than 1 ohm
TP1 (−8.6V)	P5-2	Less than 1 ohm
TP3 (GND)	E1	Less than 1 ohm
TP11 (R1)	TP15	100 ohms ±5%
TP10 (R2)	TP14	100 ohms ±5%
TP9 (R3)	TP13	470 ohms ±5%
TP8 (R4)	TP12	470 ohms ±5%
TP3 (GND)	P1-R	Less than 1 ohm
TP3 (GND)	P2-A, B, C, D, L	Less than 1 ohm
TP3 (GND)	P4-6, 8	Less than 1 ohm
TP3 (GND)	P5-3, 40, 41	Less than 1 ohm

Table 6-23. INTERFACE ASSEMBLY TEST FIXTURE SWITCH CONTINUITY TESTS

Switch S1 Position	From	To	Resistance
1	TP6 (S1-C)	P5-18	Less than 1 ohm
2	TP6 (S1-C)	P5-19	Less than 1 ohm
3	TP6 (S1-C)	P5-20	Less than 1 ohm
4	TP6 (S1-C)	P5-22	Less than 1 ohm
5	TP6 (S1-C)	P5-30	Less than 1 ohm
6	TP6 (S1-C)	P5-31	Less than 1 ohm
7	TP6 (S1-C)	P5-32	Less than 1 ohm
8	TP6 (S1-C)	P5-35	Less than 1 ohm
9	TP6 (S1-C)	P5-36	Less than 1 ohm
10	TP6 (S1-C)	P5-33	Less than 1 ohm
11	TP6 (S1-C)	P5-34	Less than 1 ohm
12	No Connection		
1	TP7 (S1-D)	P5-38	Less than 1 ohm
2	TP7 (S1-D)	P5-39	Less than 1 ohm
3	TP7 (S1-D)	P1-S	Less than 1 ohm
4	TP7 (S1-D)	P1-T	Less than 1 ohm
5	TP7 (S1-D)	P5-23	Less than 1 ohm
6	TP7 (S1-D)	P5-24	Less than 1 ohm
7	TP7 (S1-D)	P5-25	Less than 1 ohm
8	TP7 (S1-D)	P5-26	Less than 1 ohm
9	TP7 (S1-D)	P5-27	Less than 1 ohm
10	TP7 (S1-D)	P5-28	Less than 1 ohm
11	TP7 (S1-D)	P5-29	Less than 1 ohm
12	No Connection		

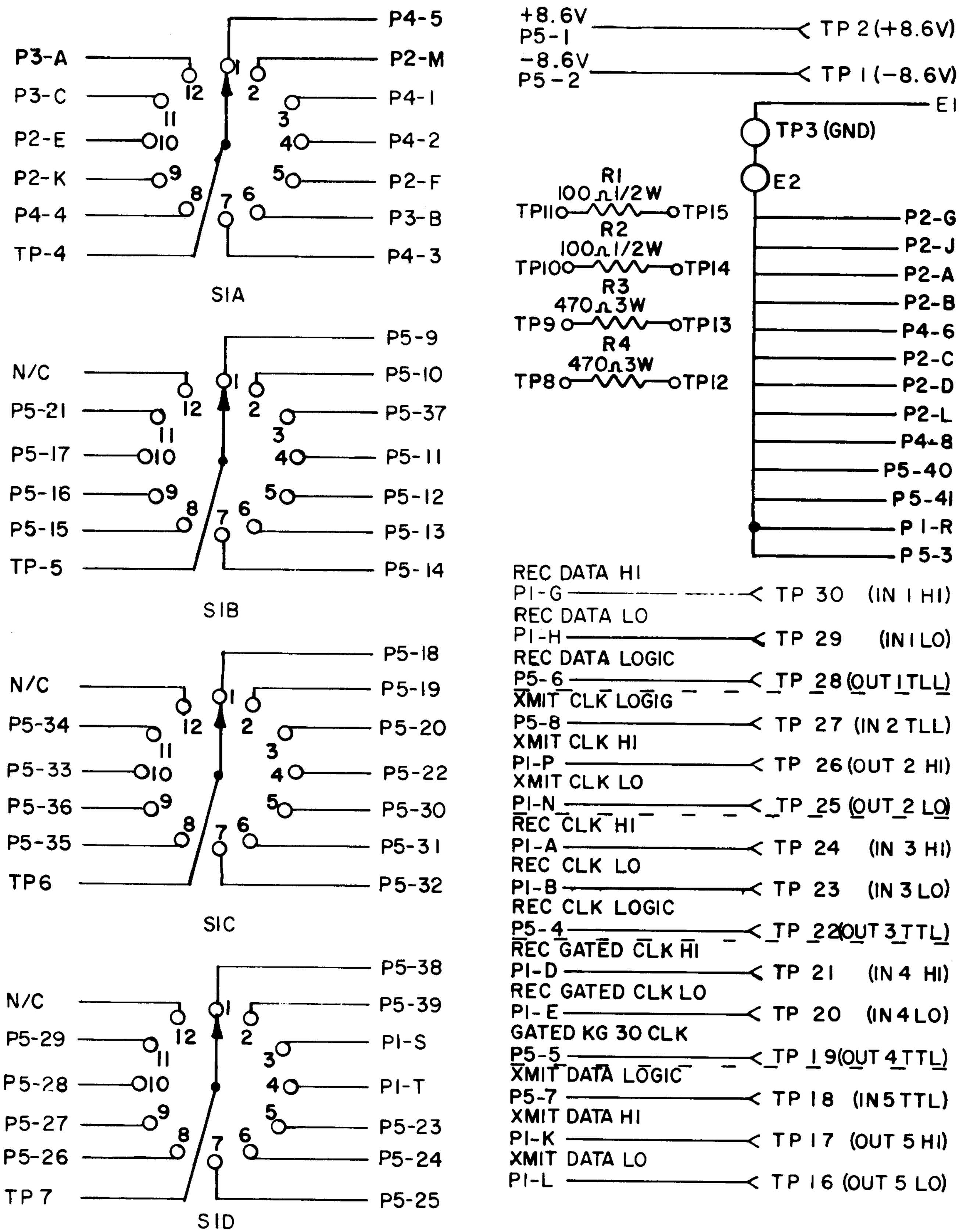


Figure 6-42. INTERFACE ASSEMBLY TEST FIXTURE SCHEMATIC.

E. LINE-FEED/CURRENT CONTROL TEST FIXTURE TEST PROCEDURES (fig. 6-43)

- Test fixture provides interconnections between the external test equipment and the Line Feed/Current Control unit under test. The test fixture also provides input signal selection capability and loads for unit under test outputs.
- Refer to table 6-24 and line-feed/current control test fixture schematic and perform continuity tests of each wire.

Table 6-24. LINE-FEED/CURRENT CONTROL TEST FIXTURE INPUT RESISTANCE MEASUREMENTS

Switch/Positior	From	To	Resistance
PULSE OFF (CC)	SIG IN(+)	CONTROL	Forward diode drop
PULSE ON (LF)	SIG IN(+)	AO IN(−)	
SELECT AO			Forward diode drop
PULSE ON (LF)	SIG IN(+)	A1 IN(—)	
SELECT A1			Forward diode drop
PULSE ON (LF)	SIG IN(+)	BO IN(—)	
SELECT BO			Forward diode drop
PULSE ON (LF)	SIG IN(+)	B1 IN(−)	
SELECT B1			Forward diode drop
SELECT AO	LOAD(+)	AO OUT(−)	
SELECT A1	LOAD(+)	A1 OUT(−)	20 ohms ±1%
SELECT BO	LOAD(+)	BO OUT(−)	20 ohms ±1%
SELECT B1	LOAD(+)	B1 OUT(−)	20 ohms ±1%
Surge Control OFF	+5V(+)	SURGE CONTROL(−)	Greater than 100K ohms
Surge Control ON	+5V(+)	SURGE CONTROL(−)	232 ohms ±1%
	+5V(+)	GND(−)	502 ohms ±2%
	+5V(+)	CONTROL(−)	560 ohms ±1%
	LOAD(+)	J1-E(−)	Less than 1 ohm
	B1 OUT(+)	J1-A(−)	Less than 1 ohm
	BO OUT(+)	J1-B(−)	Less than 1 ohm
	A1 OUT(+)	J1-C(−)	Less than 1 ohm
	AO OUT(+)	J1-D(−)	Less than 1 ohm
	B1 IN(+)	J1-J(−)	Less than 1 ohm
	A1 IN(+)	J1-0(—)	Less than 1 ohm
	BO IN(+)	J1-K(—)	Less than 1 ohm
	AO IN(+)	J1-Q(−)	Less than 1 ohm
	CONTROL(+)	J1-L(−)	Less than 1 ohm
	SURGE CONTROL(+)	J1-H(−)	Less than 1 ohm
	GND(+)	J1-M(−)	Less than 1 ohm
	+5V(+)	J1-N(−)	Less than 1 ohm
	+22V(+)	J1-P(−)	Less than 1 ohm

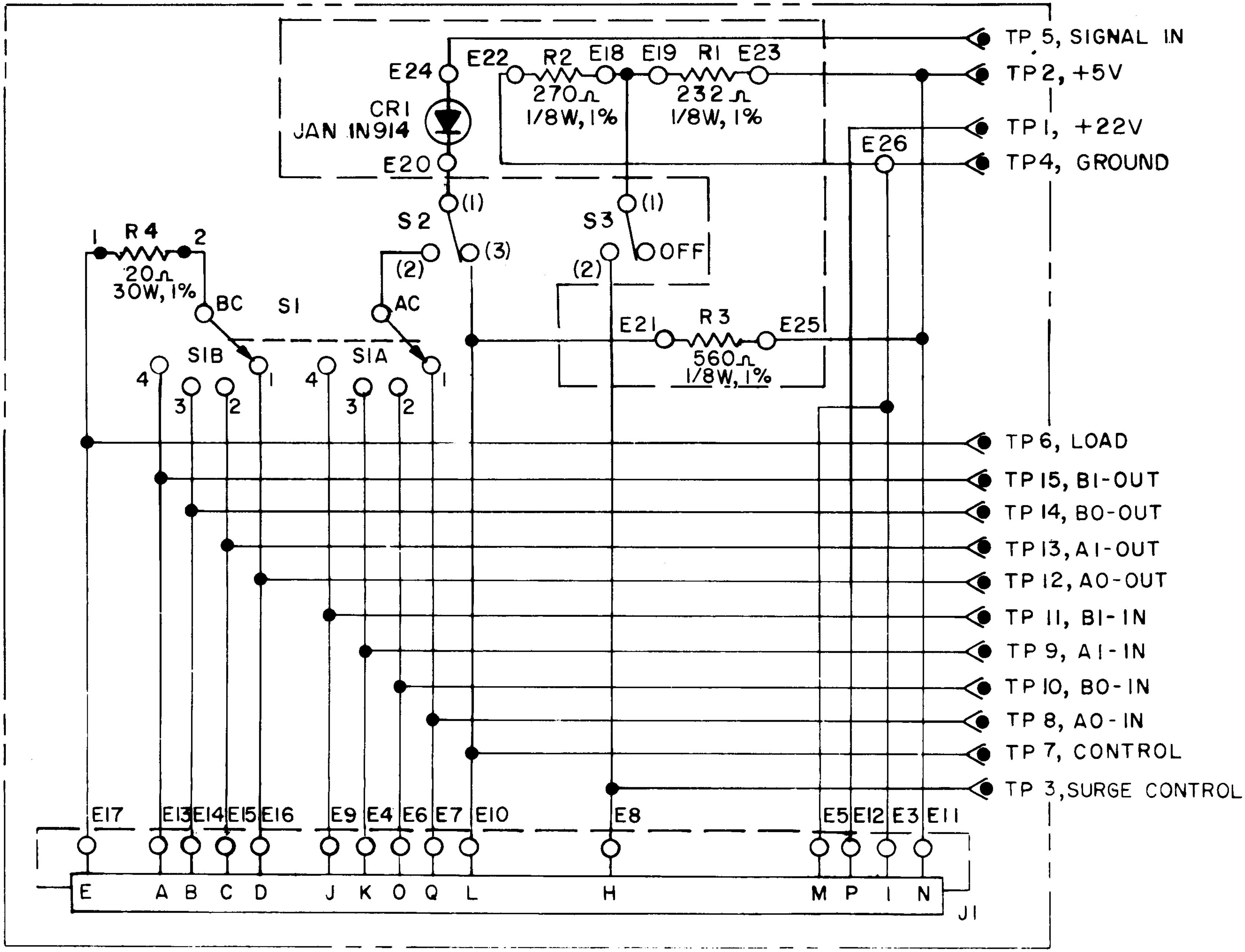


Figure 6-43. LINE FEED/CURRENT CONTROL TEST FIXTURE. SCHEMATIC DIAGRAM.

F. POWER SUPPLY TEST FIXTURE TEST PROCEDURES (fig. 6-44)

- Test fixture provides interconnections between unit under test and external test equipment. It also provides simulation and load circuitry for calibration of the unit under test.
- Refer to tables 6-25 and 6-26 and perform continuity and resistance checks as listed.
- Refer to power supply test fixture schematic, figure FO-10.

Table 6.25. POWER SUPPLY TEST FIXTURE CONTINUITY CHECKS

From	To	Resistance
TP1 (BAT)	J1-5, 9	Less than 1 ohm
TP1 (BAT)	TB1-1	
TP2 (RTN)	TB1-2	
TP2 (RTN)	J1-2, 7	
TP3 (VIN)	TP14 (IVIN)	0.1 ohms ±1%
TP4 (−15V)	J3-1, 2, 20	Less than 1 ohm
TP5 (+15V)	J318, 19, 37	
TP6 (+5V)	J3-10, 11, 28, 29	
TP7 (GND)	J3-7, 8, 9	
TP10 (SCMO HI)	J3-12	
TP13 (SCMO LO)	TP7	
TP14 (IVIN)	J1-1, 6 and TB1-3	

Table 6-26. POWER SUPPLY TEST FIXTURE RESISTANCE CHECKS

Check	Switch/Position	From	To	Resistance
1	SELECT/1	TP9 (+)	TP12 (−)	Greater than 100K
2	SELECT/2			Greater than 100K
3	SELECT/3 +5VA Load Lo OFF +5VA Load Hi OFF			8.25 ohms ±1%
4	SELECT/3 +5VA Load Lo ON +5VA Load Hi OFF			3.11 ohms ±2%
5	SELECT/3 +5VA Load Lo ON +5VA Load Hi ON			1.92 ohms ±3%
6	SELECT/4 +12VA Load OFF			200 ohms ±1%
7	SELECT/4 +12VA Load ON			320 ohms ±1%
8	SELECT/5			51K ohms ±1%
9	SELECT/6 +5VA Load Lo OFF +5VA Load Hi OFF			15 ohms ±1%

Table 6-26. POWER SUPPLY TEST FIXTURE RESISTANCE CHECKS . Continued

Check	Switch/Position	From	To	Resistance
10	SELECT/6 +5VB Load Lo ON +5VB Load Hi OFF			10 ohms ±1%
11	SELECT/6 +5VB Load Lo ON +5VB Load Hi ON			2.7 ohms ±1%
12	SELECT/7 −8.6V Load Norm (position 2)			82.5 ohms ±1%
13	SELECT/7 −8.6V Load Min. (position 3)			115 ohms ±1%
14	SELECT/7 −8.6V Load Max. (position 1)			53.6 ohms ±1%
15	SELECT/8			40.2 ohms ±1%
16	SELECT/9 +18V Load OFF (position 2)			Capacitor Charging
17	SELECT/9 +18 Load Norm. (position 1) +18 Load Max. (position 3)			27.3 ohms ±5% 12 ohms ±5%
18	SELECT/10 LF Load OFF LF Load ON			Greater than 100K ohms 30 ohms ±1%
19	SELECT/12 +8.6V Load Norm. (position 2) +8.6V Load Min. (position 3) +8.6V Load Max. (position 1)			44.2 ohms ±1% 53.6 ohms ±1% 30.1 ohms ±1%
20	Illum Adj	J2-2	J2-36	Variable 0 to 25K ohms
21	Drum ON Drum OFF	J2-18	J2-32	Less than 1 ohm Greater than 100K ohms

NOTE

Oscilloscope AN/USM-281C and six power supplies PP-2309/U are required for the following test procedures:

- Set up test fixture supplies as shown in figure 6-44.
- Do not insert power supply module SM-D-915606 (power supply for the AN/UGC-74A(V)3).
- Place SELECT switch to position 11 (drum motor) and connect a +10 Vdc power supply (place a jumper between V OUT LOW andGND) to TP9 (+) and TP12 (-).
- Turn power supplies on and check voltages.
- Touch multimeter leads to TP12 and U2-5 and monitor dc voltage as R23 is adjusted. Adjust R23 for 7 to 8 Vdc as observed on multimeter.
- Observe input pin (5) of U3. Readjust R23 for 13.5 Vdc.
- Connect frequency counter to U3-3 and GND, and adjust R27 for a frequency count of 925 + 15 HZ. Connect oscilloscope to U3-3 and observe a square wave having a period of 1.08 msec ±.015 ms.
- Connect a 1 K ohm, 1/4 W resistor from SCMO HI (TP10) to +5 Vdc (TP6).
- Connect an oscilloscope to SCMO HI and SCMO LO and observe output waveform as R46 is adjusted. Adjust R46 until positive pulse is 518 ±3 usec with a total period of 1080 ±15 usec.
- Remove the 1 K ohm, 1/4 W resistor from SCMO HI and TP6.
- Remove 10 Vdc from V OUT-LO and V OUT-HI.
- Adjust power supply for 15 Vdc.
- Place SELECT switch to position 10.
- Apply +15 Vdc to J2 pin 1 (+) lead and J2 pin 28 (-) lead on fixture and observe DS1 (BAT) lights (NOTE: Do not remove GND from V OUT LO to GND).
- Remove +15 Vdc from J2 pin 1 and J2 pin 28.
- Adjust power supply for +5 Vdc.
- Place SELECT switch in position 3.
- Apply +5 Vdc to V OUT-HI and V OUT-LO on fixture and observe DS2 (CAP V OK) lights.
- In the event of failure in any one of the above steps, refer to theory of operation in chapter 3 of this manual and troubleshoot as required.
- Remove all test equipment and power supply connections to test fixture.

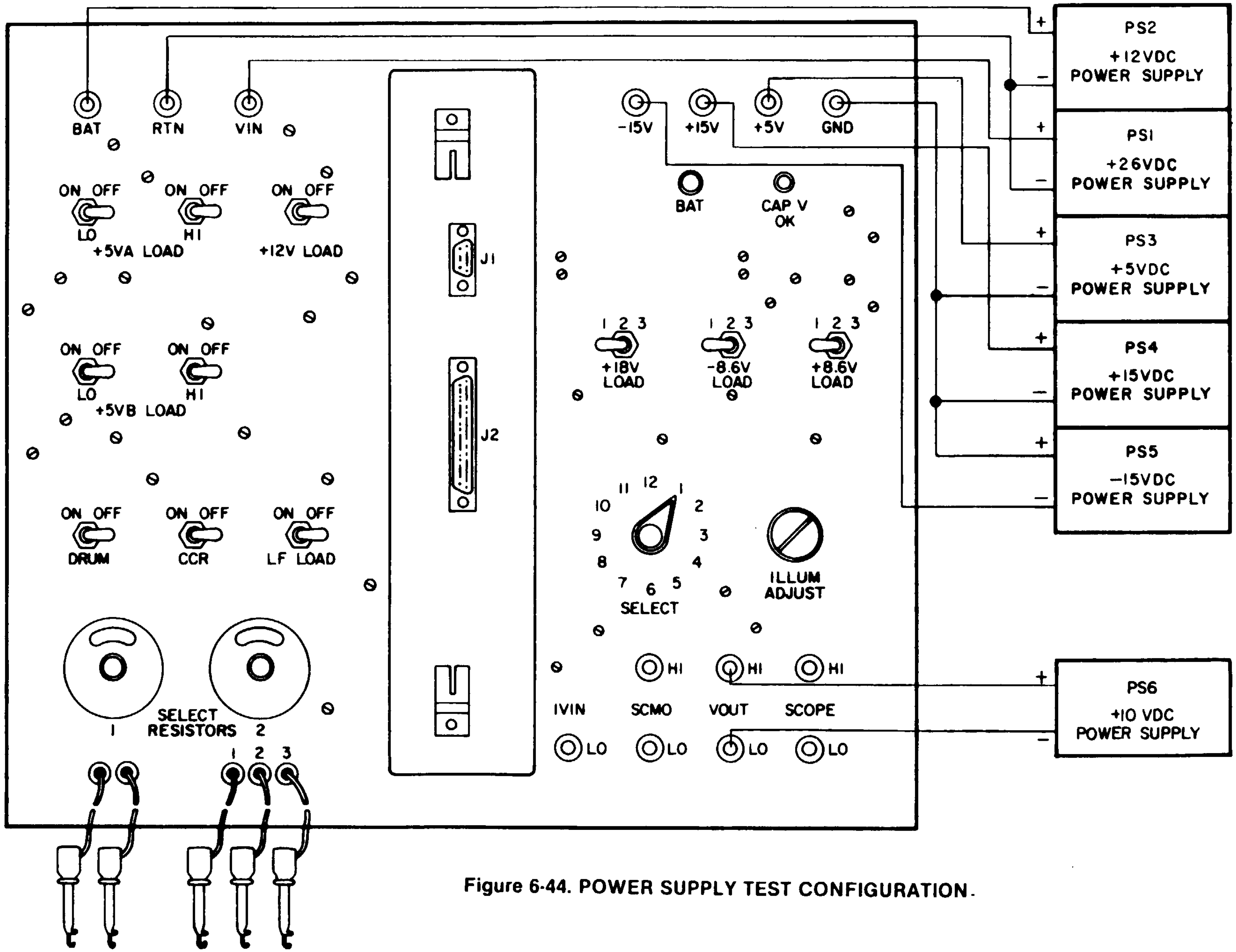


Figure 6-44. POWER SUPPLY TEST CONFIGURATION.

G. KEYSWITCH ASSEMBLY TEST FIXTURE TEST PROCEDURES (fig. 6-45 and 6-46)

Test fixture provides signal and power interfaces between the external test equipment and the keyswitch assembly under test.

NOTE

Oscilloscope AN/USM-281C and Power Supply PP-2309/U are required for the following test procedures.

- Set up the test fixture as shown in figure 6-45 with the exception of the connection to the keyswitch assembly.
- Connect + 5Vdc to + 5V and GND and monitor voltage at TP4 (CLK) with respect to TP12 (GND).
  - Observe that voltage changes from GND to 5Vdc whenever CLOCK CONTROL switch is depressed (oscilloscope connected across TP4).
- Connect TP4 (CLK) to TP1 (SIG IN) with a jumper wire and observe that TP5 (2400 Hz) changes state each time CLK CONTROL switch is depressed.
  - Also observe that TP5 is inverse of TP4.
- Measure 1.5Vdc ±10% at TP8 (CLK REF) and TP9 (2400-Hz REF).
- Measure + 5Vdc ±10% at TP3 (PRESENT).
- Connect P1-12 to TP12 (ground) and observe TP3 for 2.5Vdc +10%.
- In the event of failure in any one of the above steps, refer to keyswitch assembly test fixture schematic (fig. 6-46), and theory of operation in chapter 3 of this manual and troubleshoot as required.

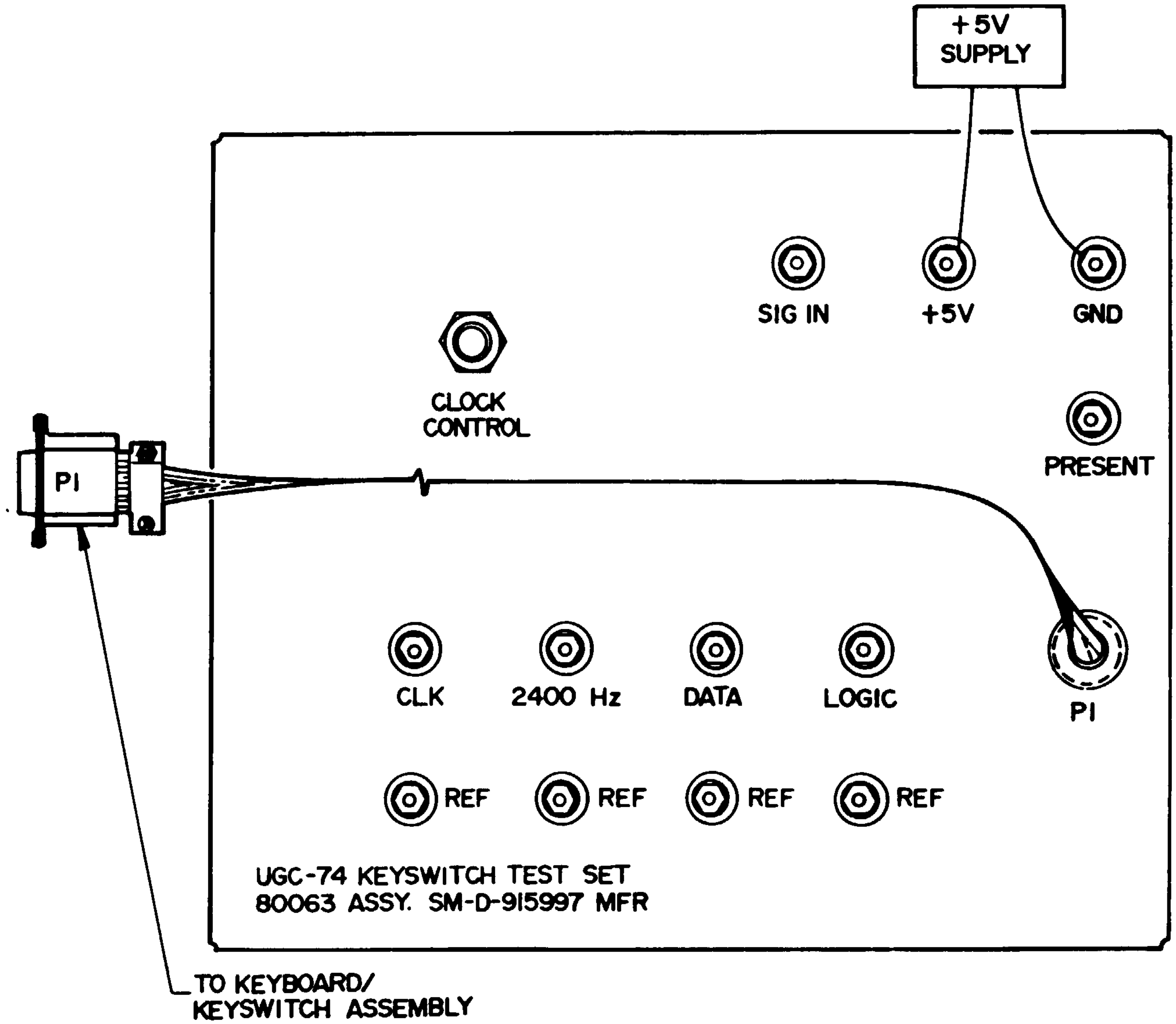


Figure 6-45. KEYBOARD ASSEMBLY TEST CONFIGURATION.

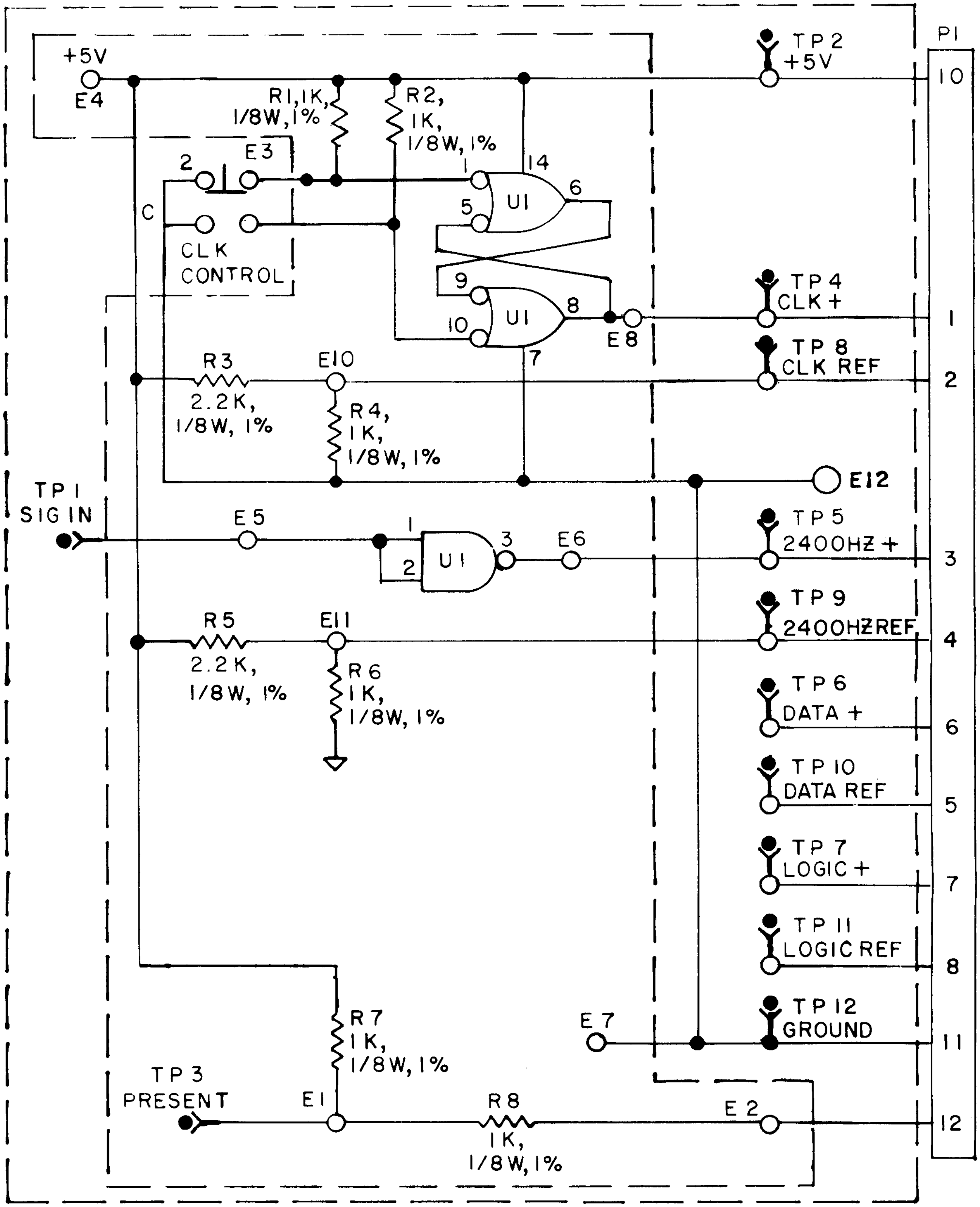


Figure 6-46. KEYSWITCH ASSEMBLY TEST FIXTURE, SCHEMATIC DIAGRAM.

APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists all forms, technical manuals, and miscellaneous publications referenced in this manual.

A-2. FORMS

Equipment Inspection and Maintenance Worksheet	DA Form 2404
Transportation Discrepancy Repin....	SF 361
Report of Discrepancy	SF 364
Product Quality Deficiency Report	SF 368

A-3. TECHNICAL MANUALS

Operators Manual: Terminal, Communications AN/UGC-74A(V)3 (NSN 5815-01-062-8194)	TM 11-5815-602-10
Organizational Maintenance Repair Parts and Special Tools Lists for Terminal, Communications, AN/UGC-74A(V)3 (NSN 5815-01-062-8194)	TM 11-5815-602-20P
Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools) for Terminal, Communications, AN/UGC-74A(V)3 (NSN 5815-01-062-8194), ...	TM 11-5815-602-34P
Operator, Organizational, Direct Support, and General Support Maintenance Manual Including Repair Parts and Special Tools Lists: Power Supply PP-2309B/U (NSN 6130-00-752-2215)	TM 11-6130-245-14-1
Operator's, Organizational, Direct Support, and General Support Maintenance Manual: Signal Generators SG-299/U (NSN 6625-00-624-3516); SG-299A/U (6625-00-897-0060); SG-299B/U (6625-00-916-8541); SG-299WU (6625-00-765-6656) and SG-299E/U.	TM 11-6625-258-14
Operator's, Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Parts and Special Tools List) for Multimeter, AN/USM-223	TM 11-6625-654-14
Operator and Organizational Maintenance Manual (Including Repair Parts and Special Tools List): Test Sets, Telegraph AN/GGM-15(V)1, (NSN 6625-00-464-1702) and AN/GGM-15(V)2 (6625-00-442-6131).	TM 11-6625-1668-12
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Oscilloscope AN/USM-281A (NSN 6825-00-228-2201)	TM 11-6625-1703-15
Procedure for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command)	TM 750-244-2

A-4. MISCELLANEOUS PUBLICATIONS

Consolidated Index of Army Publications and Blank Forms	DA PAM 25-30
The Army Maintenance Management System (TAMMS)	DA Pam 738-750
Painting and Preservation of Supplies Available for Field Use for Electronics Command Equipment	SB 11-573
Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters	TB 43-0118

APPENDIX B

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

B-1. General

This appendix provides o summary of the maintenance operations for the AN/UGC-74A(V)3. It authorizes categories of maintenance for specific maintenance functions on repairable items and components ond the tools and equipment required to perform each function. This appendix may be used as an oid in planning maintenance operations.

B-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. *Test.* To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. *Align.* To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Rep/ace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance service (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i. e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipment/components.

B-3. Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. *Column 3, Maintenance Functions.* Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a “work time” figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate “work time” figures will be shown for each category. The number of task-hours specified by the “work time” figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

C — Operator/Crew

O — Organizational

F — Direct Support

H — General Support

L — Specialized Repair Activity

D — Depot

NOTE

If the SRA in your geographical area does not have the capability for the “L” maintenance functions listed in the MAC, or if there is not SRA in your geographical area, utilize existing procedures for obtaining depot accomplishment of the “L” maintenance functions,

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remarks in section IV, Remarks, which is pertainent to the item opposite the particular code.

B-4. Tool and Test Equipment Requirements (Sect. III)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. *Maintenance Category.* The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. *Nomenclature.* This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool ar test equipment.

e. *TOOl Number.* This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

B-5. Remarks (Sect. IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

Section II. MAINTENANCE ALLOCATION CHART FOR COMMUNICATIONS TERMINAL AN/UGC-74A(V)3

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
00	Terminal, Communications AN/UGC-74A(V)3	Inspect	0.1						A
		Test	0.1	0.2					B
		Test			0.4			2, 3, 33-41	D
		Service	0.1						C
		Service		0.5				26	G
		Adjust		0.5				26, 29	E
		Aline		0.3				26	F
		Aline			0.6			1, 31	I
		Install			0.3			1	
		Replace			0.3			1	
		Repair			0.9			1, 5, 25, 31, 32	H
		Repair				2.3		1-4, 7, 9-25, 32	
		Overhaul					24.0	42-45	O
01	Teleprinter Assembly (3A1)	Repair				2.5		1, 2, 7, 22, 25, 47, 48	
0101	Circuit Card Assembly, Central Processor Unit (3A1A1)	Replace			0.1				
		Repair				4.0 (L)		6, 7, 8	P
0102	Circuit Card Assembly, Memory (3A1A2)	Replace			0.1				
		Repair				4.0 (L)		6, 7, 8	P

Section II. MAINTENANCE ALLOCATION CHART FOR COMMUNICATIONS TERMINAL AN/UGC-74A(V)3 - Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
0103	Circuit Card Assembly, Communications (3A1A3)	Replace Repair			0.1	 4.0 (L)		 6, 7, 8	 P
0104	Circuit Card Assembly, Printer Control (3A1A4)	Replace Repair			0.1	 4.0 (L)		 6, 7, 8	 P
0105	Assembly, Printer (3A1A5)	Repair				2.0		1, 2, 5, 7, 25	
010501	Printer Mechanism Assembly (3A1A5A1)	Repair				1.2		1, 2, 7, 25, 47, 48, 49	
01050101	Mechanism, Ribbon Lift (3A1A5A1A1)	Repair				1.0		1, 2, 7, 25	
01050102	Board Assembly, Printed Wiring, Print Driver (3A1A5A1A2-A3)	Replace Repair			0.2	 2.0		1 1, 4, 7, 9, 10, 11	 L
01050103	Mechanism Assembly, Printer Hammer (3A1A5A1A4-A23)	Replace Repair			0.2	 2.0		1 1, 2, 7, 9, 12, 46	 L

Section II. MAINTENANCE ALLOCATION CHART FOR COMMUNICATIONS TERMINAL AN/UGC-74A(V)3 - Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT.	(6) REMARKS
010502	Ribbon Mechanism Assembly (3A1A5A2)	Repair			1.0			1, 25	
010503	Board Assembly, Motor Drive & Current Control (3A1A5A3)	Replace Repair			0.1	 2.0		1 1, 2, 4, 7, 9, 10, 13	L L
01050301	Circuit Card Assembly (3A1A5A3A1)								J
01050302	PWB Assembly, Line Feed Drive (3A1A5A3A2)								J
010504	Assembly, Paper Trough (3A1A5A6)	Repair			1.0			1, 25	
010505	Assembly, Print Drum	Repair			0.5			1, 25	
0106	Assembly, Chassis (3A1A6)	Repair				3.0		1, 2, 4, 14, 15, 16, 25	
010601	Assembly, Dustcover (3A1A6A1)								J
010602	Assembly, Filter (3A1A6FL1)	Replace Repair			0.3	 2.0		1 1, 2, 4, 14, 15, 16, 18, 25	

Section II. MAINTENANCE ALLOCATION CHART FOR COMMUNICATIONS TERMINAL AN/UGC-74A(V)3 - Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT.	(6) REMARKS
010603	Assembly, Harness (3A1A6W1)								J
0107	Assembly, Interface (3A1A7)	Replace			0.3			1	
		Repair			2.0			1, 2, 25	K
		Repair				4.0		1, 2, 4, 7, 9, 10, 17, 19, 20, 47, 48	M
010701	Subassembly, Interface (3A1A7A1)								J
01070101	Circuit Card Assembly, Diode (3A1A7A1A1)								J
01070102	Circuit Card Assembly, Receive/Transmit Interface (3A1A7A1A2)								J
0108	Circuit Card Assembly, Power Supply (3A1PS1)	Replace			0.3			1	
		Repair				4.5		1, 4, 7, 9, 21, 24, 25	N

Section II. MAINTENANCE ALLOCATION CHART FOR COMMUNICATIONS TERMINAL AN/UGC-74A(V)3 - Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT.	(6) REMARKS
02	Assembly, Keyboard (3A2)	Repair				0.3		1, 25	
0201	Assembly, Keyswitch (3A2A1)	Replace			0.2			1	
		Repair				3.0		1, 2, 4, 7, 9, 10, 22, 23	
0202	Panel, Assembly, Actuator (3A2A2)	Repair				1.0		1, 25	
5001	Test Fixture, Power Supply Assembly	Repair				3.0		1, 2, 4, 7, 9, 24, 25	
500101	Circuit Card Assembly, Power Supply Test Fixture	Repair				1.5		1, 2, 4, 7, 9, 21, 24, 25	
5002	Test Fixture, Hammer Driver Board	Repair				1.0		1, 2, 7, 25	
5003	Test Fixture, Hammer Module Board	Repair				1.0		1, 2, 7, 25	
5004	Test Fixture, Motor Drive/Current Board	Repair				2.5		1, 2, 4, 7, 9, 10, 25	

Section II. MAINTENANCE ALLOCATION CHART
FOR
COMMUNICATIONS TERMINAL AN/UGC-74A(V)3 - Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
5005	Test Fixture, Interface Assembly	Repair				1.0		1, 2, 7, 25	
5006	Test Fixture, Filter Assembly	Repair			0.2	1.0		1, 2, 7, 25	
5007	Test Fixture, Keyswitch Assembly	Repair				2.5		1, 2, 4, 7, 9, 10, 25	
5008	Cable Assembly, Power	Repair				0.5		1, 2, 7, 25	
5009	Cable Assembly, Power	Repair				0.5		1, 2, 7, 25	
5010	Cable Assembly, Power	Repair				0.5		1, 2, 7, 25	
5011	Cable Assembly, Power	Repair				0.5		1, 2, 7, 25	
5012	Interconnection Device, Logic Cards	Replace				0.2		1	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR COMMUNICATIONS TERMINAL AN/UGC-74(V)3

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	F, H	Tool Equipment TE-50B	5180-00-356-4602	
2	O, F, H	Multimeter AN/USM-223	6625-00-999-7465	
3	O, F, H	Loopback Plug, Honeywell (SM-B-916000)	5815-01-090-5366	
4	H	Oscilloscope AN/USM-281C	6625-00-106-9622	
5	F, H	Tool, Drum Puller (SM-C-964466)	5815-01-090-1251	
6	L	Test & Repair System, Electronic Equipment AN/MSM-105 (V) 1	6625-01-098-6764	
7	H, L	Pace Kit	3439-00-196-0703	
8	L	Interconnection Device, Logic Cards		
9	H	Power Supply PP-2309/U	6130-00-752-2215	
10	H	Function Generator SG-1133/U	6625-00-028-4989	
11	H	Test Fixture, Driver Board, Honeywell (SM-D-915982)	5815-01-092-2015	
12	H	Test Fixture, Hammer Module, Honeywell (SM-D-915985)	5815-01-090-5368	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR COMMUNICATIONS TERMINAL AN/UGC-74A(V)3 - Continued

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
13	H	Test Fixture, Circuit Card Assembly (Motor Drive/Current Control) Honeywell (SM-D-915988)	5815-01-092-2014	
14	H	Power Cable, UGC-74, 120Vac (SM-D-761481)	5995-00-271-9444	
15	H	Power Cable, UGC-74, 230Vac (SM-D-764482)	5995-01-090-1423	
16	H	Power Cable, UGC-74, 26Vdc (SM-D-764480)	5995-00-271-9443	
17	H	Data Cable Assembly, Honeywell (SM-D-915889)	5995-01-090-1424	
18	H	Test Fixture, Filter Assembly, Honeywell (SM-D-915994)	5815-01-092-2013	
19	H	Test Set, Telegraph AN/GGM-15 (V) 2	6625-00-442-6131	
20	H	Test Fixture, Interface Assembly, Honeywell (SM-D-915991)	5815-01-090-5369	
21	H	Test Fixture, Power Supply, Honeywell (SM-E-915979)	5815-01-090-5367	
22	F, H	Remover, Module, Honeywell (SM-B-916003)	5815-01-090-1248	
23	H	Test Fixture, Key Switch Assembly, Honeywell (SM-D-915997)	5815-01-090-9417	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR COMMUNICATIONS TERMINAL AN/UGC-74A(V)3 Continued

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
24	H	Voltmeter, Digital AN/GSM-64B	6625-00-022-7894	
25	F, H	Tool Kit, Electronic Equipment TK-105/G	5180-00-610-8177	
26	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
27	F	Extension Cables CX 12096/GRC-103 and CX 12093/GRC-103	5995-00-404-5981 5995-00-404-3283	
28		Stand, Printer Assembly (available at Fort Gordon only)		
29	O	Tool, Ribbon Mechanism Adjustment, Honeywell (SM-C-964464)	5815-01-090-1249	
30		Not used		
31	F	Hammer-Drum Spacing Gage, Honeywell (SM-C-964465) (2 required)	5815-01-090-1250	
32	F, H	Tool, Drum Motor Puller, Honeywell	5815-01-090-1251	
33	F	Module, CPU (3A1A1)	5815-01-047-2652	
34	F	Module, Memory (3A1A2)	5815-01-047-2653	
35	F	Module, Communications (3A1A3)	5815-01-047-2654	
36	F	Module, Printer Control (3A1A4)	5815-01-083-0731	
37	F	Module, Hammer Driver (3A1A5A1A2-A3)	5815-01-047-2831	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR COMMUNICATIONS TERMINAL AN/UGC-74A(V)3 - Continued

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
38	F	Module, Hammer (3A1A5A1A4-A23)	5815-01-047-2659	
39	F	Module, MD & CC (3A1A5A3)	5815-01-047-9276	
40	F	Assembly, Interface (3A1A7)	5815-01-047-2657	
41	F	Module, Power Supply (3A1PS1)	5815-01-047-2767	
42	D	Data Cable Assembly, Low-Level Honeywell (SM-D-915896)	5995-01-101-9247	
43	D	Power Cable, UGC-74 12Vdc (SM-D-916890)	5985-01-096-8724	
44	D	Battery BA-5598/U	6135-01-034-2239	
45	D	Terminal, Communications AN/UGC-74A (V) 3	5815-01-062-8194	
46	H	Rolling Punch, Cambion # 6629		
47	H	Crimping Tool, Basic (M22520/2-01) Crimping Tool, Positioner (M22520/2-06) Crimping Tool, Positioner (M22520/2-08) Crimping Tool, Positioner (M22520/2-09)	5120-00-165-3910 5120-00-017-3809 5120-00-017-3921 5120-00-017-3927	
48	H	Pin Extractor (M81969/14-01) Pin Extractor (M81969/14-02)	5120-00-018-0575 5120-00-915-4589	
49	H	Pliers, Retaining Ring	5120-00-089-0874	

Section IV. REMARKS

REFERENCE CODE	REMARKS
A	Preventive maintenance checks.
B	Initialization and self test.
C	Service by replacement of lamps, paper, and ribbon. Clean exterior.
D	Self test, loopback test, and fault isolate by module swapping.
E	Adjust chain tension, paper low switch, paper exit, power (on/off) control cable, ribbon mechanism sensing and clutch.
F	Aline hammer throw.
G	Lubricate, clean interior, and drum.
H	Repair by replacing FGC 0101, 0102, 0103, 0104, 0107, 01050102, 01050103, 010602, 0108, 0201, fuses and parity reset lamp.
I	Alinement of printer subassembly, timing mechanism assembly, and ribbon mechanism.
J	Repaired as part of next higher assembly.
K	Repair of wiring harness, fuse sockets, and toggle switches.
L	Requires two power supplies.
M	Requires four power supplies.
N	Requires five power supplies.
O	Use depot facilities.
P	Repair at SRA.

APPENDIX C

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. Introduction

C-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the AN/UGC-74A(V)3. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

C-2. Explanation of Columns

a. Column 1 — Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e. g., "Use cleaning compound, item 5, App. D").

b. Column 2 — Level. This column identifies the lowest level of maintenance that requires the listed item.

C — Operator/Crew
O — Organizational Maintenance
F — Direct Support Maintenance
H — General Support Maintenance

c. Column 3 — National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4 — Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5 — Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e. g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C	7530-00-205-2801	Paper, Roll, Single Ply	RL
2	C	7530-00-285-5030	Paper, Roll, 3-Ply	RL
3	C	5815-01-087-8490	Ribbon, Teletypewriter SM-B-765911 (80063)	EA
4	C		Oil, MIL-L-46000 (81349)	A/R
5	C	7920-00-924-5700	Cloth, Cleaning	EA
6	C	6850-00-105-3084	Trichlorotrifluoroethane	OZ
7	O	9150-00-349-9290	Lubricant, Fluorocarbon, Telomer Dispersion, 16 oz. aerosol can	EA
8	H		Ties, cable	EA
9	H		Tubing, shrink	A/R
10	H		Locking Compound MIL-S-22473	TB
11	H		Conformal Coating MIL-1-46058	A/R
12	H		Epoxy (SM-A-964438)	A/R

APPENDIX D

ERROR MESSAGE LIST

Message Number	Message
*(1)	MESSAGE NEVER PRINTED
(2)	MESSAGE NOT FOUND
(3)	MEMORY FILLED
(4)	PHRASE NOT FOUND
(5)	DELIMITER/PHRASE IN ERROR
(6)	LINE TOO LONG
(7)	MESSAGE EMPTY
(8)	EXCESS LINES
(9)	EXCESS TABS
(10)	INVALID OR MISSING OPERAND
*(11)	XMITTER BUSY
(12)	NO SUCH COMMAND
(13)	COMMAND NOT VALID
*(14)	DEGRADED OPERATION
*(15)	IMPROPER SWITCH SETTINGS
(16)	MESSAGE NOT XMITTED
*(17)	PRINTING ABORTED
*(18)	MESSAGE XXXX REMOVED
*(19)	MESSAGE BEING TRANSMITTED
(20)	NO TABS SET
(21)	IMPROPER HEADER FORMAT
(22)	LINE TOO LONG, INPUT IGNORED

*Printed out as messages

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GLOSSARY

Section I. ABBREVIATIONS

TTL	Transistor-Transistor Logic
PIA	Peripheral Interface Adapter
USART	Universal Synchronous Asynchronous Receiver Transmitter
EMI	Electromagnetic Interface
RFI	Radio Frequency Interface
KSR	Keyboard Send-Receive
ROM	Read-OnlyMemory
ICE	Intelligent Communication Terminal
RAM	Random Access Memory
SCA R	Silicon Controlled Rectifier
SCMO	Speed Control Motor Output
EMP	Electromagnetic Pulse
DMA	Direct Memory Access
ETI	Elapsed Time Indicator

Section II. DEFINITIONS OF UNUSUAL TERMS

ADDRESS - A character or group of characters that identifies a register, aparticular partof storage, or some other data sourceor destination.

ASCII -American Standard Code for Information Interchange; acode which relates 96 displayed characters (64 without lower case) and 32 nondisplayed control characters toa sequenceof 7 on or off choices.

BUFFER -A storage device in which data preassembled temporarily during data transfers. Itis used to compensate for a difference in the rate of flow of informationor the time occurrence of events when transferring information from one device to another.

BUS. - 1. A circuit over which data or power is transmitted. Often one which acts as acommon connection among anumberof Locations (synonymous with trunk). 2. A path over which informs tion is transferred from any of several sources to any of several destinations. 3. One or more conductors used for transmitting signals or power.

CENTRAL PROCESSING UNIT - A unit of a computer that includes the circuits controlling the interpretation and execution of instructions (synonymous with main frame). Abbreviated CPU.

GLOSSARY - Continued

CLOCK -1. That specific device or unit designed to time events. 2. A data communications clock which controls the timing of the sampling of bits received in a data stream.

CLOCK PULSE - A synchronization signal provided by a clock.

DATA PROCESSING - A generic term for all the operations carried out according to precise rules or procedures.

FLIP FLOP CIRCUIT - An electronic circuit having two stable states, one input line and one output line such that as each successive pulse is received, the output line changes between two alternative conditions; e.g., high-to-low or off-to-on.

FLIP-FLOP D-D - Stands for delay. A flip flop, the output of which is a function of the input which appeared one pulse earlier; for example, if a 1 appeared at the input, the output after the next clock pulse will be a 1.

RADIO FREQUENCY INTERFERENCE (RFI). Interference; i.e., unwanted interference of electromagnetic radiation of radio frequency signals into operating circuits.

REGISTER INPUT BUFFER - A device that receives data from input devices and then transfers it to internal computer storage.

REGISTER, SHIFT - The computer register capable of shifting data as directed.

REGULATION, LOAD - A deviation from steady-state of the controlled variable when the set point is fixed. Such an offset resulting from a no-load to a full-load change (or other specified limits) is often called an offset deviation or droop.

REGULATION, VOLTAGE - A measure of the degree to which an electrical power source maintains its output voltage stability under varying load conditions, with regulation given in percents.

SCRATCH PAD - A useful and informal term referring to or designating a unique internal storage area, designed to be reserved for intermediate results, various notations, or working area. It is a quickly erasable main storage.

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CAPACITOR COLOR CODE TABLES

TABLE I. For use with Group I, Styles CM, CN, CY and CB

COLOR	MIL ID	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE				CHARACTERISTIC[2]				DC WORKING VOLTAGE	OPERATING TEMP. RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CY	CB	CM	CM	CM
BLACK	CM, CY CB	0	0	1			±20%	±20%		A				-55 to +70 C	10 - 55 cps
BROWN		1	1	10					B	E		B			
RED		2	2	100	±2%		±2%	±2%	C		C			-55 to +85 C	
ORANGE		3	3	1,000		±30%			D				300		
YELLOW		4	4	10,000					E			D		-55 to +125 C	10 - 200 cps
GREEN		5	5		±5%				F				500		
BLUE		6	6											-55 to +150 C	
PURPLE (VIOLET)		7	7												
GREY		8	8												
WHITE		9	9												
GOLD				0.1			±5%	±5%							
SILVER	CN				±10%	±10%	±10%	±10%							

TABLE II. For use with Group II, General Purposes, Style CK

COLOR	TEMP. RANGE AND VOLTAGE - TEMP LIMITS[3]	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE	MIL ID
BLACK		0	0	1	±20%	
BROWN	AW	1	1	10	±10%	
RED	AX	2	2	100		
ORANGE	BX	3	3	1,000		
YELLOW	AV	4	4	10,000		CK
GREEN	CZ	5	5			
BLUE	BV	6	6			
PURPLE (VIOLET)		7	7			
GREY		8	8			
WHITE		9	9			
GOLD						
SILVER						

TABLE III. For use with Group III, Temperature Compensating, Style CC

COLOR	TEMPERATURE COEFFICIENT[4]	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE		MIL ID
					CAPACITANCES OVER 10uuf	CAPACITANCES 10uuf OR LESS	
BLACK	0	0	0	1		±2.0uuf	CC
BROWN	30	1	1	10	±1%		
RED	80	2	2	100	±2%	±0.25uuf	
ORANGE	150	3	3	1,000			
YELLOW	220	4	4				
GREEN	330	5	5		±5%	0.5uuf	
BLUE	470	6	6				
PURPLE (VIOLET)	750	7	7	0.01			
GREY		8	8	0.1	±10%		
WHITE		9	9				
GOLD	100					1.0uuf	
SILVER							

1. The multiplier is the number by which the two significant (SIG) figures are multiplied to obtain the capacitance in uuf.

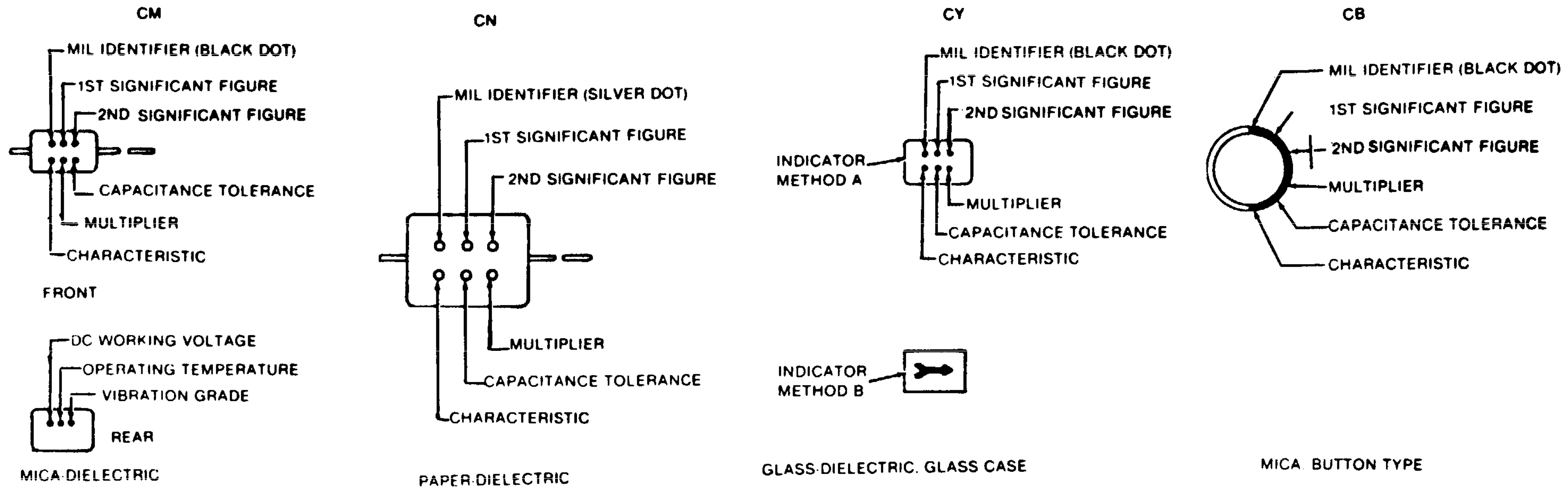
2. Letter indicate the Characteristics designated in applicable specifications: MIL-C-5, MIL-C-91, MIL-C-11272, and MIL-C-10950 respectively.

3. Letters indicate the temperature range and voltage-temperature limits designated in MIL-C-11015.

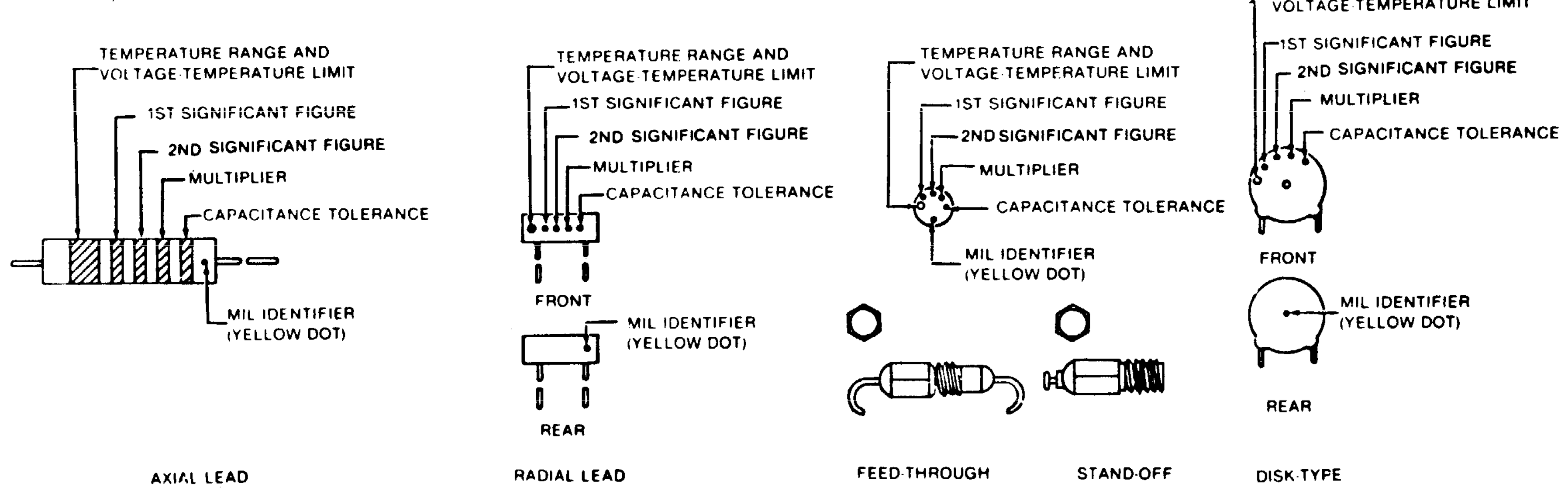
4. Temperature coefficient in parts per million per degree centigrade.

COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS

GROUP I Capacitors, Fixed, Various Dielectrics, Styles CM, CN, CY, and CB



GROUP II Capacitors, Fixed Ceramic-Dielectric (General Purpose) Style CK



GROUP III Capacitors, Fixed, Ceramic-Dielectric (Temperature Compensating) Style CC

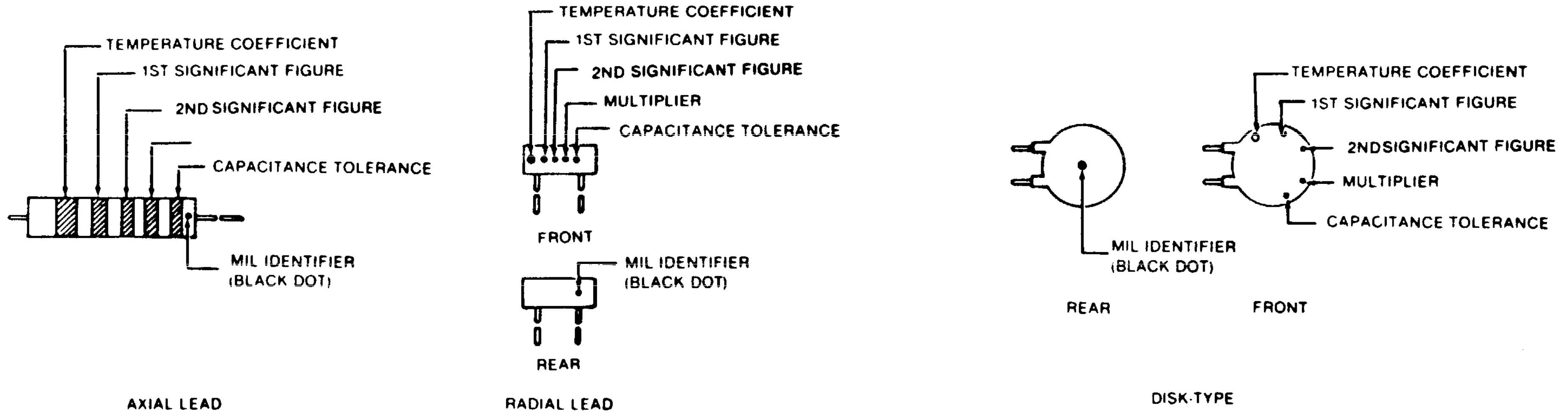
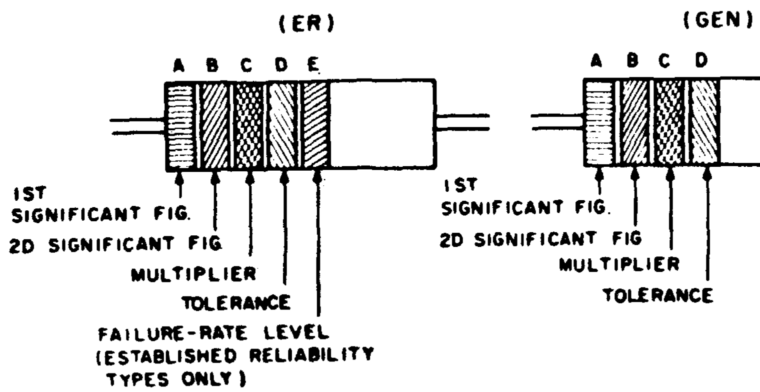
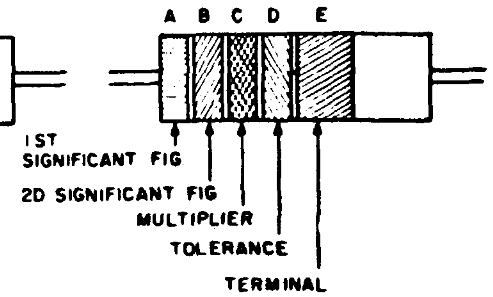


Figure FO-1 Color Code Marking for Military Standard Capacitors (Sheet 1 of 2).



COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS.



COLOR-CODE MARKING FOR FILM-TYPE RESISTORS.

TABLE I
COLOR CODE FOR COMPOSITION TYPE AND FILM TYPE RESISTORS.

BAND A		BAND B		BAND C		BAND D		BAND E		
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)	COLOR	FAILURE RATE LEVEL	TERM.
BLACK	0	BLACK	0	BLACK	1			BROWN	M=1.0	
BROWN	1	BROWN	1	BROWN	10			RED	P=0.1	
RED	2	RED	2	RED	100			ORANGE	R=0.01	
ORANGE	3	ORANGE	3	ORANGE	1,000			YELLOW	S=0.001	
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	±10 (COMP TYPE ONLY)	WHITE		SOLDERABLE
GREEN	5	GREEN	5	GREEN	100,000	GOLD	±5			
BLUE	6	BLUE	6	BLUE	1,000,000	RED	±2 (NOT APPLICABLE TO ESTABLISHED RELIABILITY)			
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7							
GRAY	8	GRAY	8	SILVER	0.01					
WHITE	9	WHITE	9	GOLD	0.1					

BAND A — THE FIRST SIGNIFICANT FIGURE OF THE RESISTANCE VALUE (BANDS A THRU D SHALL BE OF EQUAL WIDTH.)

BAND B — THE SECOND SIGNIFICANT FIGURE OF THE RESISTANCE VALUE.

BAND C — THE MULTIPLIER (THE MULTIPLIER IS THE FACTOR BY WHICH THE TWO SIGNIFICANT FIGURES ARE MULTIPLIED TO YIELD THE NOMINAL RESISTANCE VALUE.)

BAND D — THE RESISTANCE TOLERANCE.

BAND E — WHEN USED ON COMPOSITION RESISTORS, BAND E INDICATES ESTABLISHED RELIABILITY FAILURE-RATE LEVEL (PERCENT FAILURE PER 1,000 HOURS) ON FILM RESISTORS, THIS BAND SHALL BE APPROXIMATELY 1-1/2 TIMES THE WIDTH OF OTHER BANDS, AND INDICATES TYPE OF TERMINAL.

RESISTANCES IDENTIFIED BY NUMBERS AND LETTERS
(THESE ARE NOT COLOR CODED)

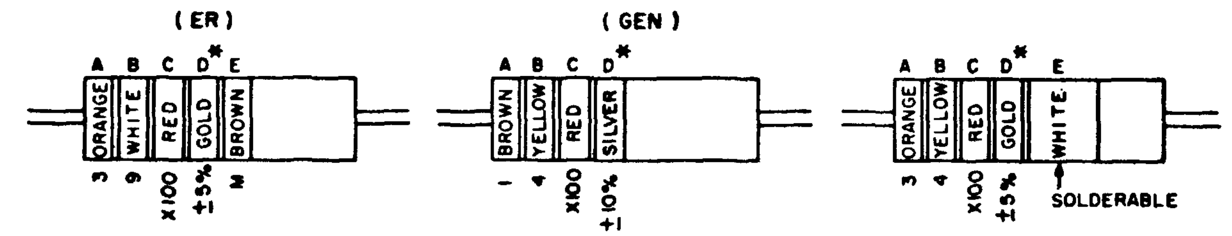
SOME RESISTORS ARE IDENTIFIED BY THREE OR FOUR DIGIT ALPHA NUMERIC DESIGNATORS. THE LETTER R IS USED IN PLACE OF A DECIMAL POINT WHEN FRACTIONAL VALUES OF AN OHM ARE EXPRESSED. FOR EXAMPLE:

2R7 = 2.7 OHMS   10R0 = 10.0 OHMS

FOR WIRE-WOUND-TYPE RESISTORS COLOR CODING IS NOT USED, IDENTIFICATION MARKING IS SPECIFIED IN EACH OF THE APPLICABLE SPECIFICATIONS.

A COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS

EXAMPLES OF COLOR CODING



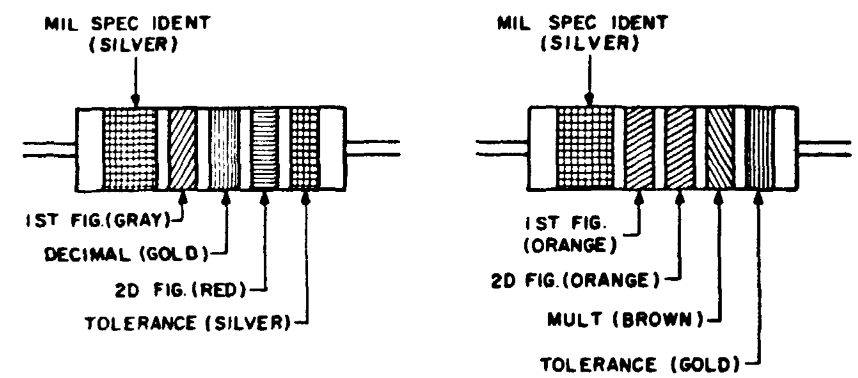
NOMINAL RESISTANCE 3,900 OHMS
RESISTANCE TOLERANCE ±5%
FAILURE RATE LEVEL M

NOMINAL RESISTANCE 1,400 OHMS
RESISTANCE TOLERANCE ±10%

NOMINAL RESISTANCE 3,400 OHMS
RESISTANCE TOLERANCE ±5%
TERMINAL SOLDERABLE

COMPOSITION-TYPE RESISTORS   FILM-TYPE RESISTORS

* IF BAND D IS OMITTED, THE RESISTOR TOLERANCE IS ±20% AND THE RESISTOR IS NOT MIL-STD.



(A) 8.2UH ±10%   (B) 330UH ±5%

COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES. AT A, AN EXAMPLE OF OF THE CODING FOR AN 8.2UH CHOKE IS GIVEN. AT B, THE COLOR BANDS FOR A 330UH INDUCTOR ARE ILLUSTRATED.

TABLE 2
COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES.

COLOR	SIGNIFICANT FIGURE	MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	1
RED	2	100	2
ORANGE	3	1,000	3
YELLOW	4		
GREEN	5		
BLUE	6		
VIOLET	7		
GRAY	8		
WHITE	9		
NONE			20
SILVER			10
GOLD	DECIMAL POINT		5

MULTIPLIER IS THE FACTOR BY WHICH THE TWO COLOR FIGURES ARE MULTIPLIED TO OBTAIN THE INDUCTANCE VALUE OF THE CHOKE COIL.

B. COLOR CODE MARKING FOR MILITARY STANDARD INDUCTORS.

Figure FO-1 Color Code Marking for Military Standards Capacitors (Sheet 2 of 2).

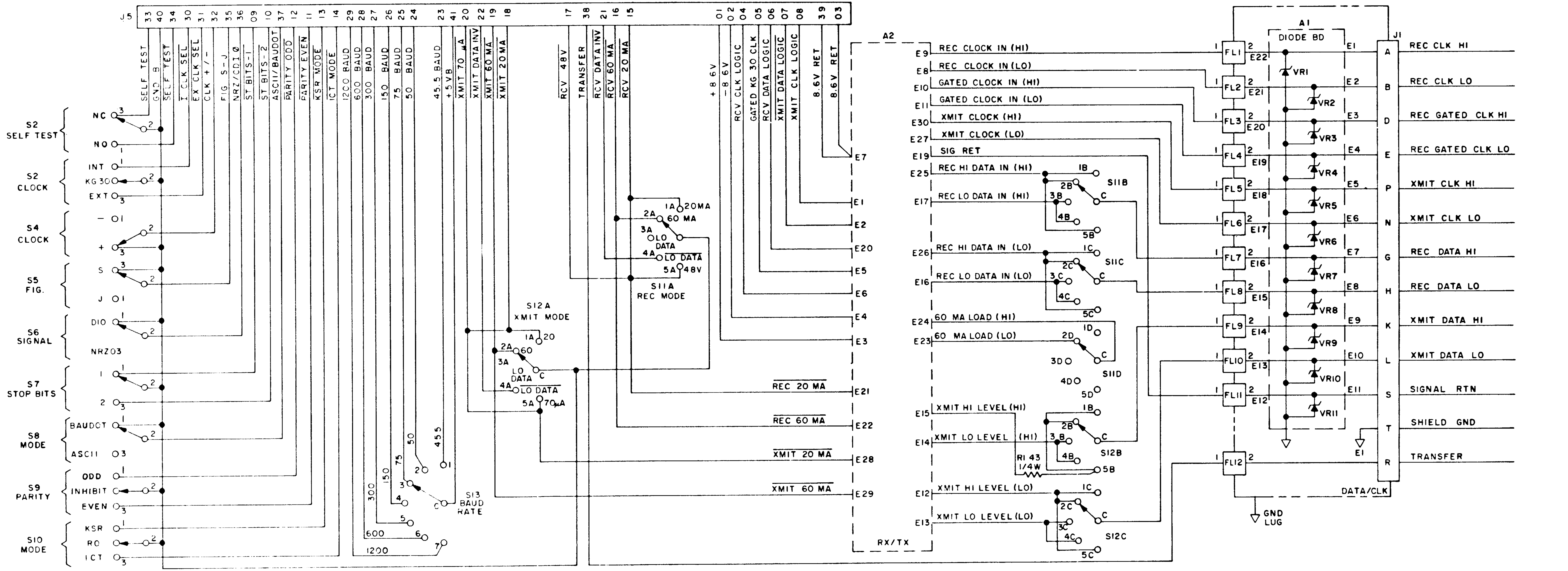


Figure FO-2 Interface Assembly, Schematic Diagram.

NOTES:

1- UNLESS OTHERWISE SPECIFIED:
RESISTORS ARE $\frac{1}{4}$W
RESISTOR VALUES ARE IN OHMS
CAPACITOR VALUES ARE IN MICROFARADS

2- LINES CONTINUED FROM FOLD-OUT TO FOLD-OUT ARE INDICATED AS FOLLOW:

XXXXXX — SIGNAL NAME
FO-9-U14-6
PIN NO.
REF DES
FOLD-OUT NO.

Figure FO-3 Power Supply Input, Schematic Diagram.

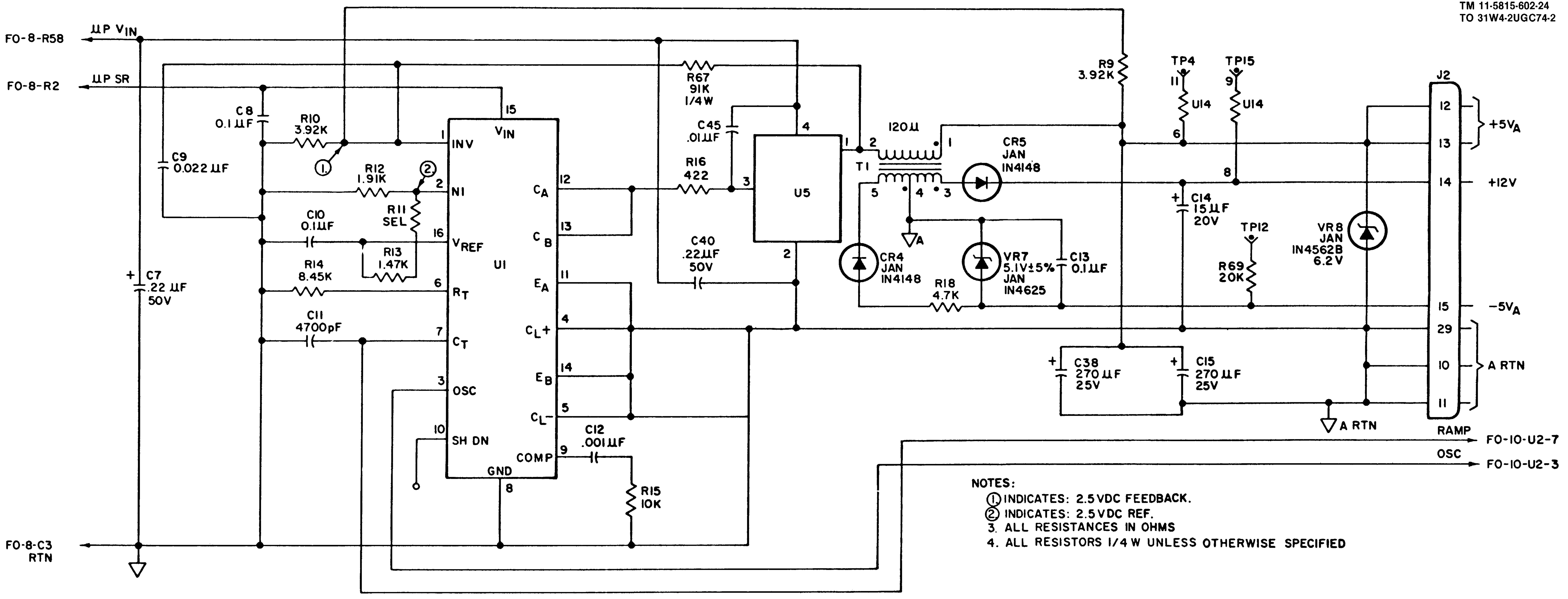


Figure FO-4 Microprocessor Supply.

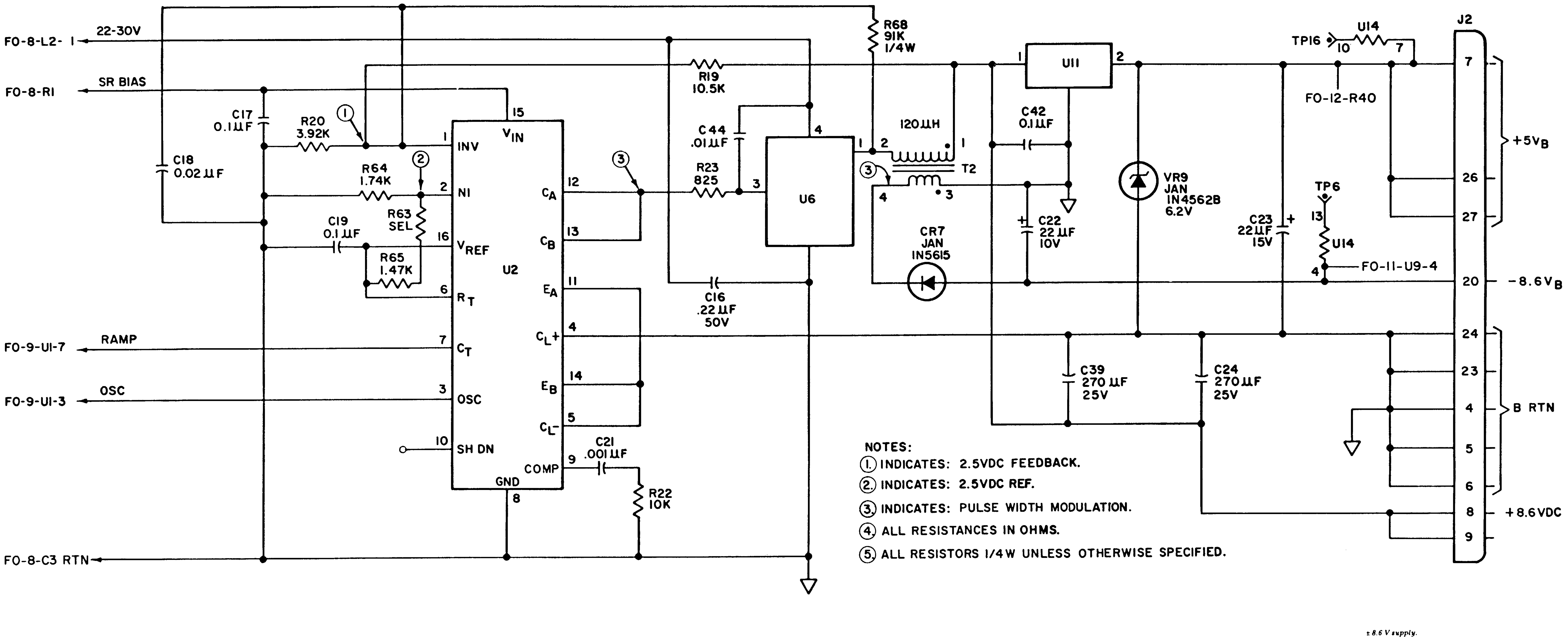


Figure FO-5 +5, ±8.6 Vdc Supply.

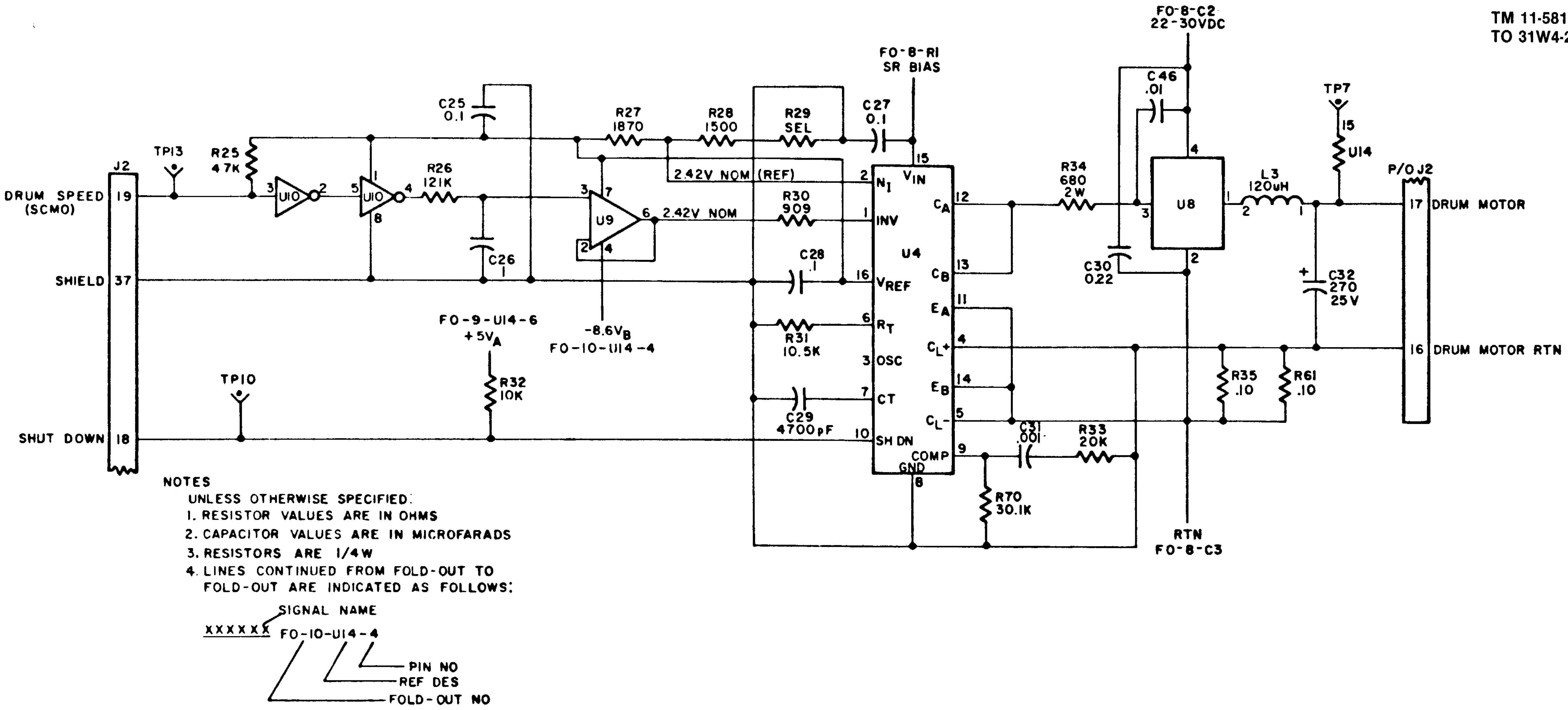


Figure FO-6 Drum Motor Supply.

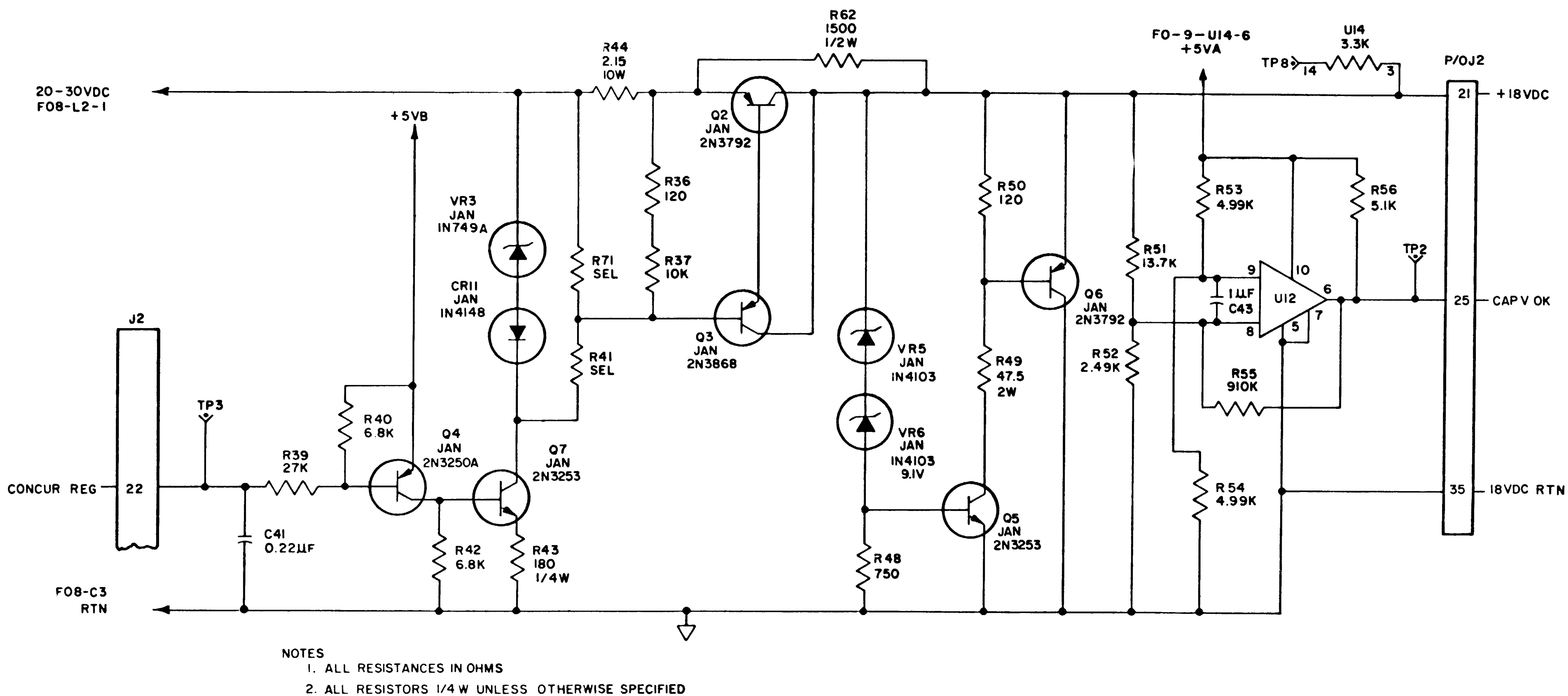


Figure FO-7 +18 Vdc Constant Current Supply.

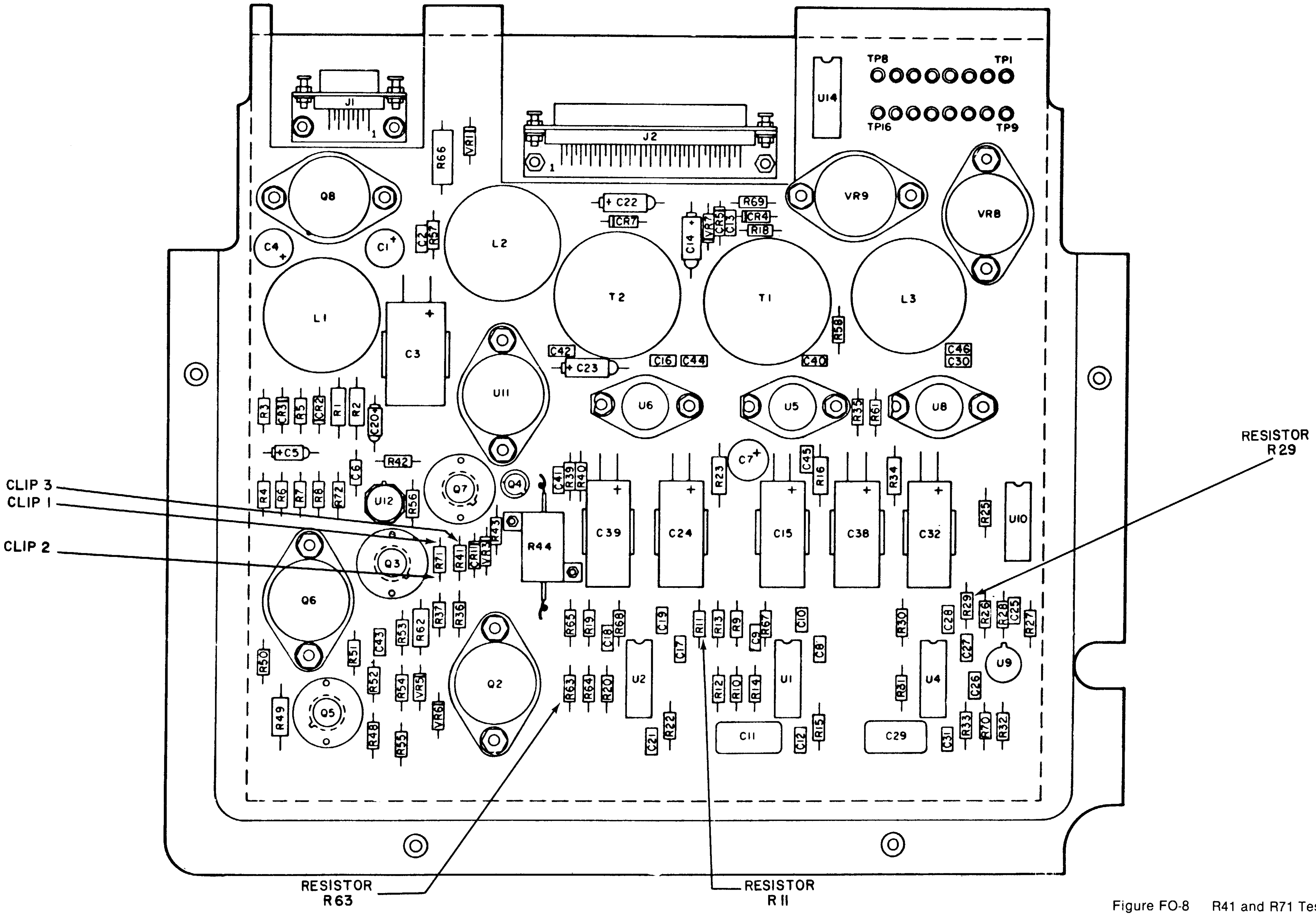


Figure FO-8 R41 and R71 Test Connections.

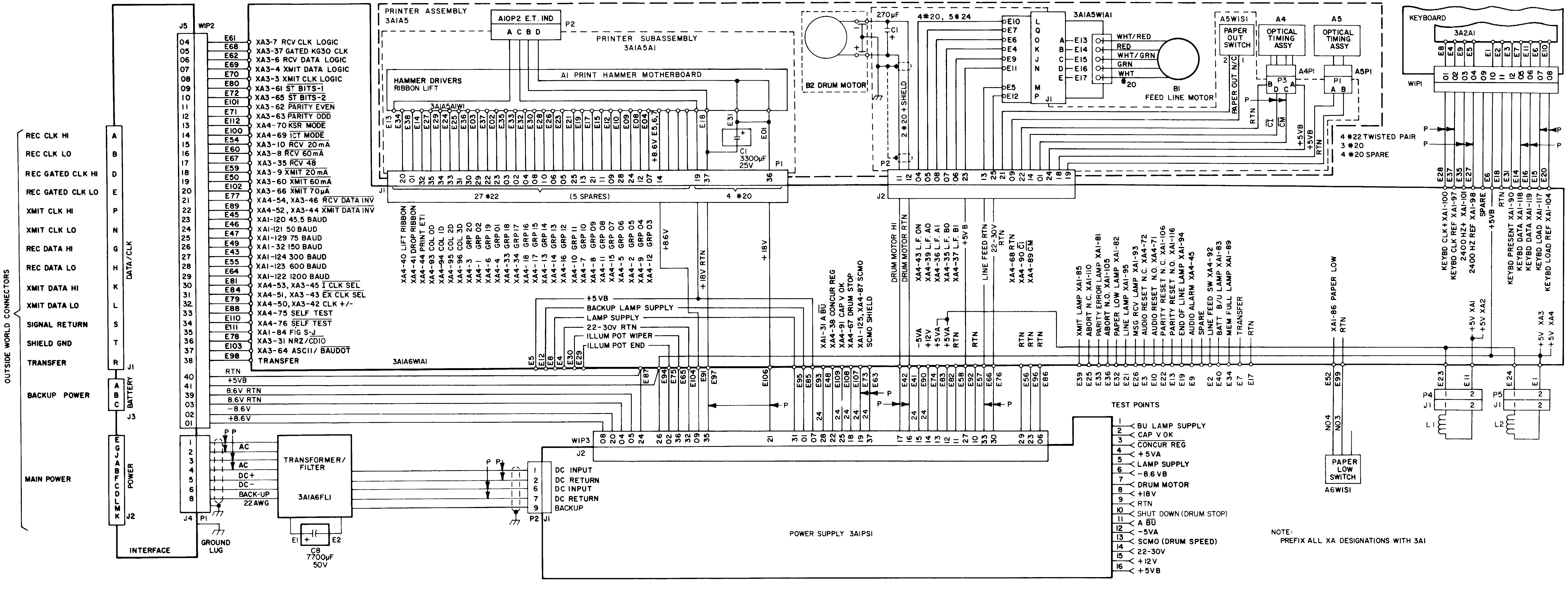


Figure FO-9 AN/UGC-74 Interconnect Diagram (Sheet 1 of 2).

Figure FO-9 AN/UGC-74 Interconnect Diagram (Sheet 2 of 2)

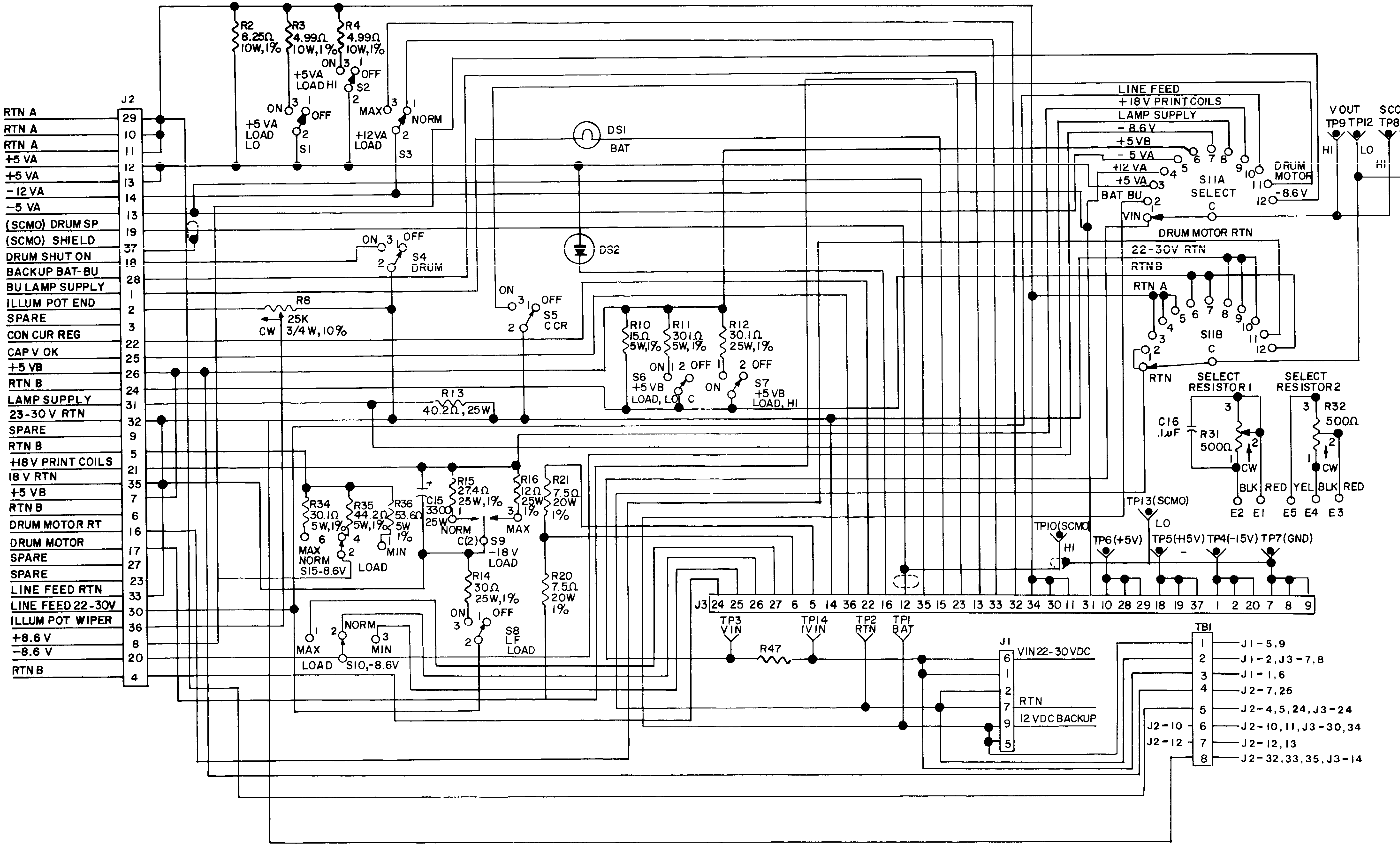


Figure FO-10 Power Supply Test Fixture, Schematic Diagram.

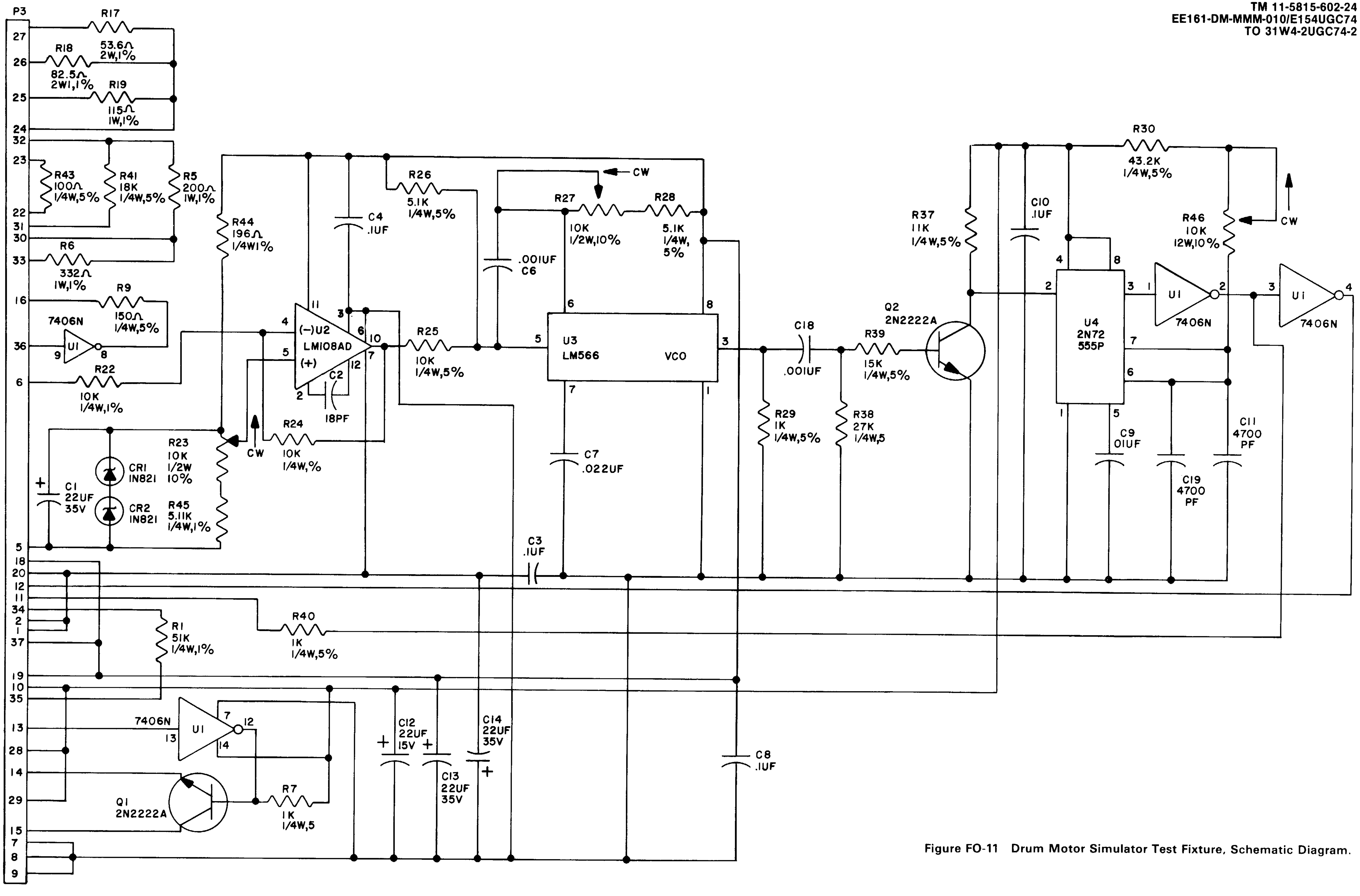


Figure FO-11 Drum Motor Simulator Test Fixture, Schematic Diagram.

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DATE SENT
10 July 1975

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5840-340-12	23 Jan 74	Radar Set AN/PRC-76

BE EXACT. . . PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

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THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

'EIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

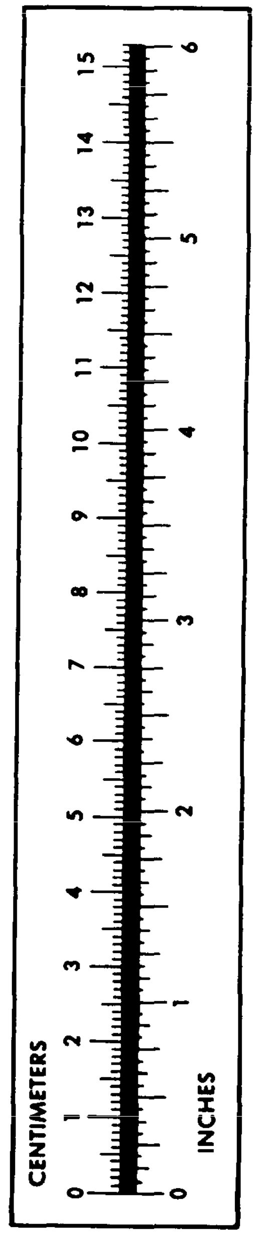
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
.allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
'ers	Gallons	0.264
.ms	Ounces	0.035
.ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
'ometers per Liter	Miles per Gallon	2.354
›meters per Hour	Miles per Hour	0.621



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