

**DEPARTMENT OF THE ARMY TECHNICAL MANUAL**

**TM 11-7440-238-15**

**DEPARTMENT OF THE NAVY TECHNICAL MANUAL**

**NAVSHIPS 0967-324-0100**

**DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER**

**TO 31W4-1-101**

**OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT,  
AND DEPOT MAINTENANCE MANUAL**

**DIGITAL SUBSCRIBER TERMINALS  
AN/FYA-71(V)1. through AN/FYA-71(V)6  
AND  
DEVICE SWITCH MODULE SA-1616/G**

This copy is a reprint which includes current  
pages from Changes I through 4.

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

**MARCH 1969**

**WARNING**

**DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT**

Be careful when working anywhere within the enclosure of this equipment. Serious injury or death may result from contact with high-voltage terminals.

**DONT TAKE CHANCES!**

CHANGE

No. 3

DEPARTMENTS OF THE ARMY,  
THE NAVY, AND THE AIR FORCE  
WASHINGTON, DC, 30 June 1975

**Operator's, Organizational, Direct Support,  
General Support, and Depot Maintenance Manual  
DIGITAL SUBSCRIBER TERMINALS AN/FYA-71 (V) 1 THROUGH AN/FYA-71 (V)6  
AND DEVICE SWITCH MODULE SA-1616/G**

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1. A vertical bar appears opposite changed material.
2. This change contains information resulting from MWO 11-7440-215-30-2, MWO 11-7440-217-30-4 and MWO 11-7440-218-30-3 *which are not effective until 27 November 1975.*
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For explanation of abbreviations used, see AR 310-50.

CHANGE

No. 4.

DEPARTMENTS OF THE ARMY,  
THE NAVY, AND THE AIR FORCE  
WASHINGTON, DC, 30 June 1975

**Operator's, Organizational, Direct Support, General**  
**Support, and Depot Maintenance Manual**  
**DIGITAL SUBSCRIBER TERMINALS AN/ FYA-71(V)1 THROUGH**  
**AN/ FYA-71(V) 6 AND DEVICE SWITCH MODULE SA-1616/ G**

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MICOM (2)	USAERDAA (1)
USACC (10)	USAERDAW 11)
USACC-PAC (2)	Units org under fol TOE
USACC-EUR (251)	(1 cy each unit):
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USAICS (3)	11-500 (AA-AC)
7th & 8th Arnies (4)	29-134
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NG: None.

USAR: None.

For explanation of abbreviations used, see AR 310-50.

TECHNICAL MANUAL  
 No. 11-7440-238-15'  
 NAVELEX 0967-324-0100  
 Technical Order  
 No. 31W4-4-1-101

DEPARTMENTS OF THE ARMY  
  
 THE NAVY, AND THE AIR FORCE  
  
 WASHINGTON, D.C., 31 March 1969

**Organizational, Direct Support, General Support, and Depot Maintenance Manual**

**DIGITAL SUBSCRIBER TERMINALS  
 AN/FYA-71 (V) 1 THROUGH AN /FYA-71 (V)6  
 AND DEVICE SWITCH MODULE SA-161 6/G**

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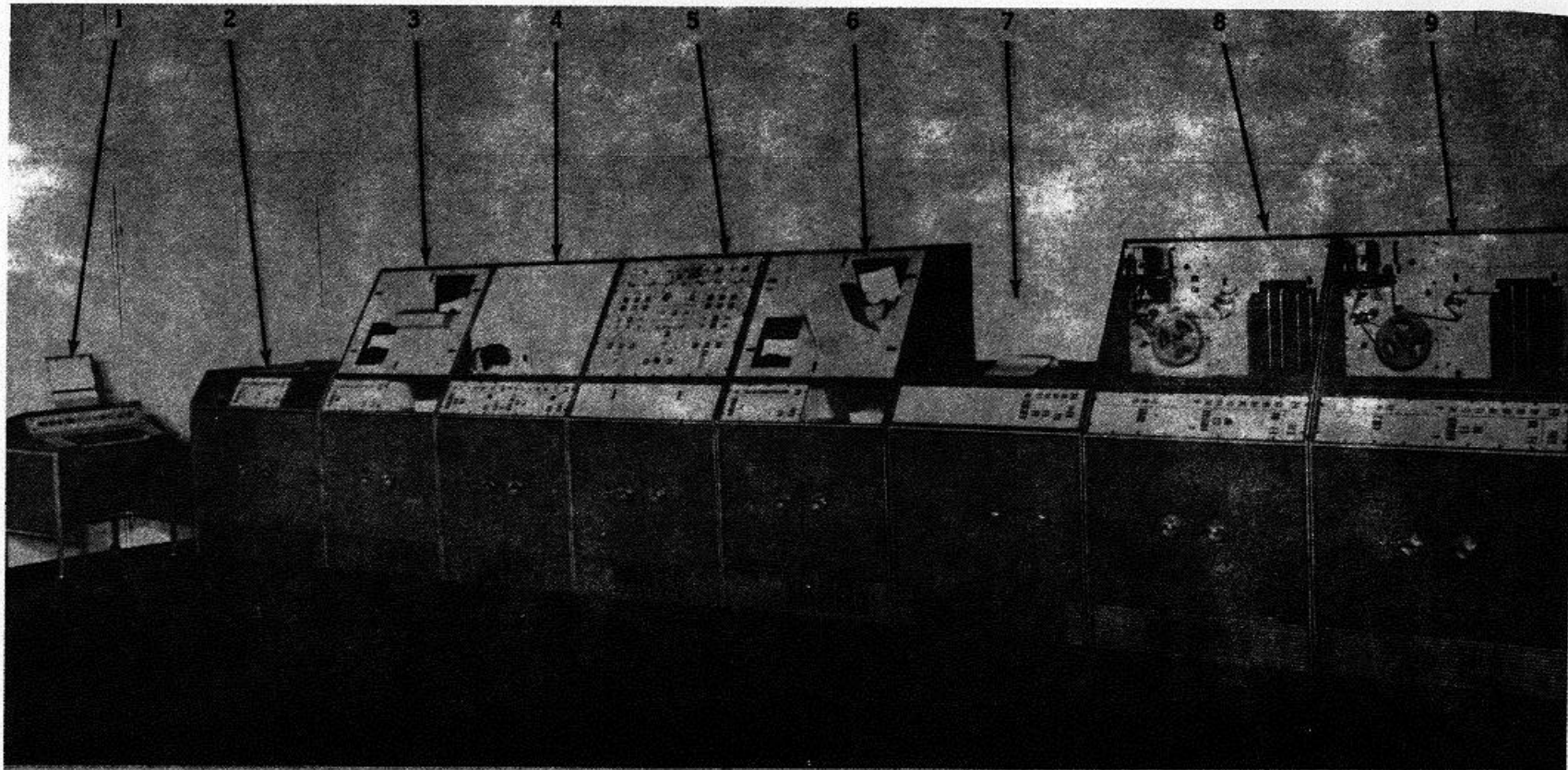
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|--|---|
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| 2 - CARD PUNCH, LOW-SPEED R0-313/G     | 7 - PRINTER, PAGE RP-157/G                |
| 3 - READER, PUNCHED CARD RP-152/G      | 8 - PAPER TAPE PUNCH, HIGH-SPEED R0-314/G |
| 4 - READER, PUNCHED TAPE RP-154 (P) /G | 9 - PAPER TAPE PUNCH, LOW-SPEED R0-315/G  |
| 5 - COMMON CONTROL UNIT C-8120 (P) /G  |   |

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Figure 1-1. Major components of digit subscriber terminal sets.

## CHAPTER 1

## INTRODUCTION

## Section I. GENERAL

**1-1. Scope**

This manual describes Digital Subscriber Terminals AN/FYA-71(V) through AN/FYA-71(V)6 (DST sets) and contains operating instructions, and preventive and corrective maintenance of the DST sets. It also includes a list of basic issue items (app B). Refer to TM 11-7440-239-15/NAVALEX 0967324-0114/TO 31W4-4-1-111 (chap. 2) for installation and checkout procedures. Refer to the individual equipment manuals (app A) for detailed information on each of the components of the DST sets (fig. 1-1).

**1-2. Indexes of Publications**

a. *DA Pam 310-4.* Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. *DA Pam 310-7.* Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

**1-3. Forms and Records**

a. *Reports of Maintenance and Unsatisfactory Equipment.* Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750 (Army). Air Force personnel will use AFM 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) in accordance with OPNAVINST 4790.2, Vol 3 and unsatisfactory material/conditions (UR submissions) in accordance with OPNAVINST 4790.2, Vol 2, chapter 17.

b. *Report of Packaging and Handling Deficiencies.* Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 7113/MCO P4030.29A, and DSAR 4145.8.

c. *Discrepancy in Shipment Report (DISREP) (SF361).* Fill out the forward discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR -55-38/NAVSUPINST 4610.33A/AFR 7518/MCO P4610.19B, and DSAR 4500.15.

**1-3.1. Reporting of Errors**

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703 (Army); USAFLC Form 252 (Request for TO Revision or Change) and forward direct to prime ALC/MST (Air Force); or forward to Commander, Naval Electronic Systems Command, Code 4903, Washington, DC 20360 (Navy). A reply will be furnished direct to you.

**1-3.2. Reporting Equipment Improvement Recommendations (EIR)**

EIR will be prepared using DA Form 2407 (Maintenance Request). Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Management System. EIR's should be mailed direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

**1-3.3. Administrative Storage**

For procedures, forms, and records, and inspections required during administrative storage of this equipment, refer to TM 740-90-1.

**1-3.4. Destruction of Electronic Materiel**

Demolition and destruction of electronic equipment will be under the direction of the commander and in accordance with TM 750-244-2.

## Section II. DESCRIPTION AND DATA

**NOTE**

**AUTODIN subscriber terminal card equipment has been modified to use the Federal Standard FIPS-14 card codes.**

Whenever the term "Hollerith" appears in the text relating to the card code, understand reference is being made to the FIPS-14 standard code.

**1-4. Purpose and Use**

a. The digital subscriber terminal sets (DST sets) are used to process messages in the automatic digital network (AUTODIN) portion of the Defense Communication System (DCS). The messages are processed over trunk lines between a DST set, and its associated automatic switching center (ASC). If the DST set is equipped with a circuit switching module (CSM), the DST set may also process messages over tributary channels through a circuit switching unit (CSU) at the ASC, directly to other digital subscriber terminals. All DST sets provide two-way simultaneous (duplex) communications with automatic channel and error control.

b. Messages to be processed are automatically segmented into blocks of 80 characters each, exclusive of control characters. Messages may range in length from 1 to 550 blocks. Each character consists of seven information bits and an eighth parity bit and utilizes the American Standard Code for Information Interchange (ASCII). Message characters have odd parity and control characters have even parity, with the exception of the last character of each block called the block parity (BP) character which may have either odd or even parity. The characters are transmitted and received by the DST set serially by bits, with the low order bit first and the parity bit last. A typical message will consist of three parts; the header, a variable number of text blocks, and an end of message block. Each block of 80 text characters will be preceded and followed by two framing control characters for a total of 84 characters.

c. A typical digital subscriber terminal (fig. 1-2) consists of a common control unit; input devices such as card readers or paper tape readers; and output and monitor devices such as card punches, paper tape punches, and page printers. In addition, an off-line universal keyboard and output device, such as a low speed card punch or a paper tape punch, provide a means for preparing messages. Provision is made for encrypting and decrypting messages to and from the ASC by connecting crypto and modem equipment to the common control unit through a crypto ancillary unit (CAU). Section II discusses the various configurations of equipment possible in DST sets in more detail.

d. Control and buffering for processing messages between input and output devices and the ASC trunk lines is provided by Common Control Unit C8120(P)/G (CCU). Buffering is provided by an 8X512 bit random access ferrite core memory in the CCU, which allows buffering of two blocks of data in both the transmit and receive section at one time. A message to be transmitted is *read* from an input device and stored in the core memory one block at a time (each block

consisting of 80 characters). The CCU *reads* a block of 80 characters from the core memory, generates the required framing characters, and transmits the block and framing characters to the ASC trunk line. During transmission of the group of characters to the ASC trunk line, a second block of data is *read* from the input device and stored in the core memory. When the ASC trunk line, a second block of data is *read* from the input device and stored in the core memory. When the ASC acknowledges good receipt of the first block of characters, the CCU automatically begins transmission of the second block of characters. Incoming messages from the ASC are received at the CCU, where the framing and control characters are decoded for control purposes, and a block of 80 characters are stored in the core memory. If no errors are detected during receipt of the block of characters, and the received block is not the last block of the message, the CCU acknowledges good receipt. The CCU then *reads* the block of characters from the core memory and transfers them to an output device of the DST set while simultaneously receiving another block of 80 characters from the ASC. The CCU will not acknowledge good receipt of the last block of the message (or a single card message) until the output device acknowledges good receipt of the block of characters. The CCU employs duplex operation, thereby enabling messages to be transmitted and received simultaneously.

**1-5. Technical Characteristics**

*a. Set Characteristics.*

Operating temp.	Between 68° and 86° (20° and 30°C)
Nonoperating temperature.	-54 degrees C (min) to 85 degrees C (max).
Operating humidity .	Between 20% and 50%.
Nonoperating humidity	100 percent (max).
Operating altitude	To 10,000 ft. (max).
Nonoperating altitude	To 50,000 ft. (max).
Signal Parameters:	
Interunit control signals.	+0.5±0.5 V and +6 V (±1 V).
Interunit information signals.	+6 V (±1 V) and -6 V(±1 V).
Operating Speeds:	
High speed input/output devices.	2400 baud (page printer); all others 1200 baud. Tape reader switch permits limiting of tape reading at 150 baud when reading chadless paper tape.
Low speed input/output devices.	300 baud maximum (150 baud for low speed paper tape punch). Low speed paper tape punch can operate at 600 baud when operated without use of printer interpreter.

*b. Set Equipment Component Characteristics.*

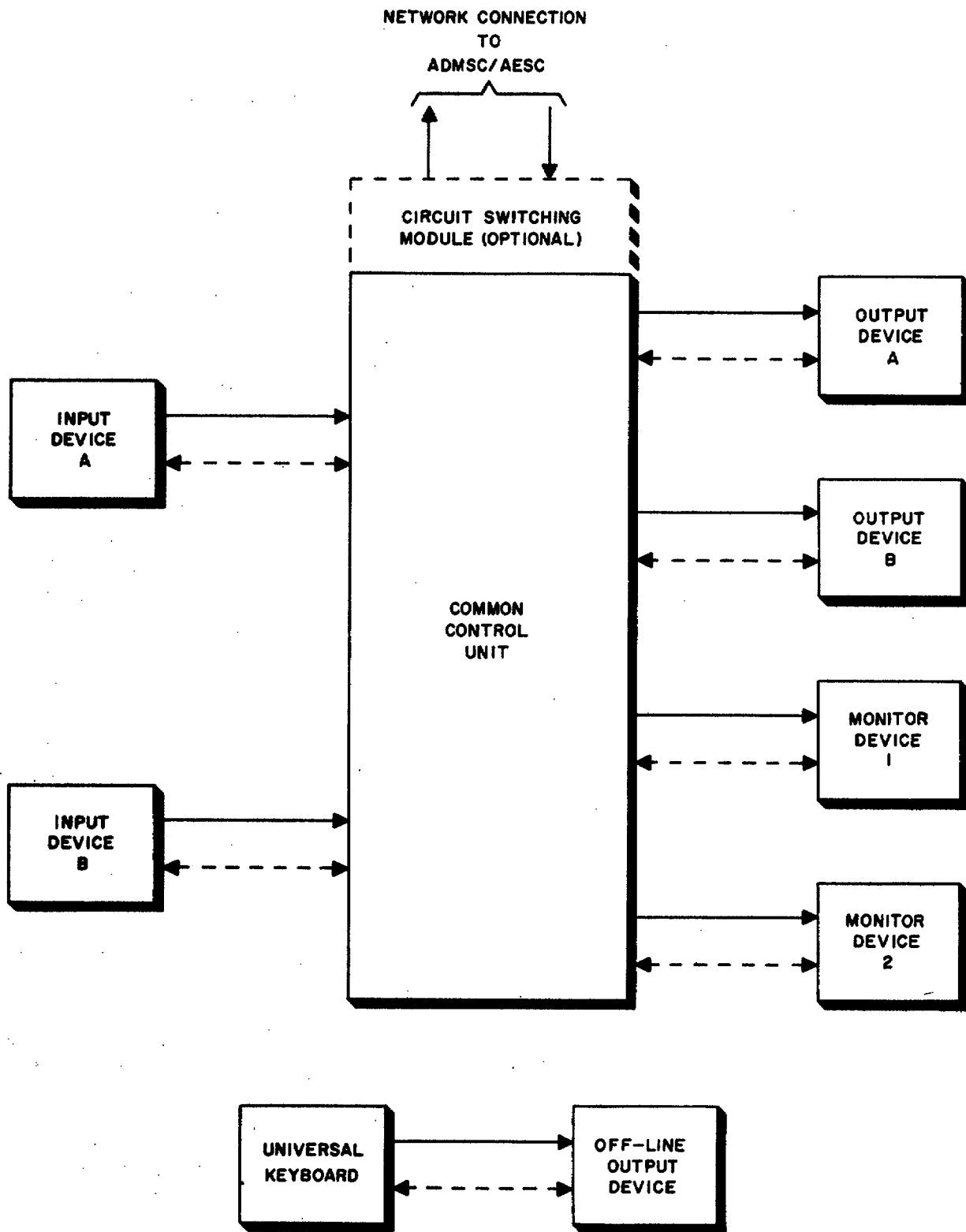
(1) *Common Control Unit C-8120(P)/G.*

Operating speed to ASC 75 to 4800, baud, 160 to 4800  
 baud.  
 Operating speed to input/output devices. Up to 300 characters per second.  
 Operating speed during self test. 1.2 kHz.  
 Information code..... ASCII.  
 Information transfer to input and output devices. Bit-parallel, character serial  
 Parity ..... Eight character bit maintains odd parity.  
 Internal signal levels ..... 0 V and +4.5 V DC.  
 Power requirements ..... 96-132 VAC, 47.5-52.5 or 57-63 Hz, single phase: starting current: 12 amperes; running current: 5 amperes.

*(2) Card Punch, High Speed RO-312/G.*

Operating speeds..... 112.5 cards per minute.  
 Card capacity ..... 1000 (min) 80-column cards.  
 Punch type ..... Rectangular holes conforming to EIA Standard RS-292.  
 Output code ..... 12-level Hollerith.  
 Information code ..... ASCII.  
 Information transfer..... Bit-parallel, character-serial.  
 Parity..... Eight character bit maintains odd parity.  
 Power requirements 96-132 VAC, 47.5-52.5 or 57-63 Hz, single phase; starting current: 57 amperes; running current: 14 amperes.

**Change 4 1-2.1**



**NOTE:**

- INFORMATION SIGNALS
- - - CONTROL SIGNALS

TM 7440-238-15-1

Figure 1-2. Typical digital subscriber terminal, block diagram.  
Change 2 1-3

**(3) Cara Punch, Low Speed RO-313/G**

Operating speed..... 28.125 cards per minute.  
 Card capacity ..... 1000 (min) 80-column cards.  
 Punch type ..... Rectangular holes conforming to EIA Standard RS292.  
 Output code..... 12-level Hollerith.  
 Information code..... ASCII.  
 Information transfer ..... Bit-parallel, character-serial.  
 Parity ..... Eighth character bit maintains odd parity.  
 Power requirements ..... 96-132, 47.5-52.5 or 57-63 Hz, single phase; starting current: 25 amperes; running current: 9.5 amperes.

**(4) Reader, Punched Card RP-152/G.**

Operating speeds ..... 112.5 cards per minute.  
 Card capacity ..... 1000 (min) 80-column punched cards.  
 Input code ..... 12-level Hollerith.  
 Information code ..... ASCII.  
 Information transfer ..... Bit-parallel, character-serial.  
 Parity ..... Eighth character bit maintains odd parity.  
 Power requirements ..... 90-132 VAC, 47.5-52.5 or 57-63 Hz., single phase; starting current: 35 amperes; running current: 8.2 amperes.

**(5) Reader, Punched Tape RP-154(P)/I.**

Operating speed ..... 150 characters per second (perforated tape); 18.75 characters per second (chadless tape).  
 Tape type..... 8-track, 1 inch wide; 5-track, 1 inch wide; 5-track, 1 1/2 inch wide; 5-track, % inch wide.  
 Input code..... ITA #2 chad (fully perforated) or chadless; ASCII chad (fully perforated) or chadless.  
 Information transfer ..... Bit-parallel, character-serial.  
 Tape capacity ..... Torn-tape operation; includes tape input and output bins; output bin holds approx 10-ft of tape.  
 Parity ..... Eighth character bit maintains odd parity (ASCII line). ASCII tape input is even parity.  
 Information code..... ASCII.  
 Power requirements ..... 96-132 VAC, 47.5-52.5 or 57-63 Hz, single phase; starting current: 17 amperes; running current: 4.3 amperes.

**(6) Paper Tape Punch, High Speed RO-314/G**

Operating speed..... 150 characters per second.  
 Tape types..... 8-track, 1 inch wide; 5-track, 1 inch wide; 5-track, 1 1/8 inch wide; 5-track, 7/8 inch wide.  
 Tape capacity ..... 1200 foot reel.  
 Output codes..... ITA 2 and ASCII fully perforated.  
 Information transfer ..... Bit-parallel, character-aerial.

Parity ..... Eighth character bit maintains odd parity (ASCII line). ASCII tape output is even parity.  
 Information code ..... ASCII.  
 Power requirements ..... 90-132 VAC, 47.5-2.5 or 57-63 Hz, single phase; starting current: 21 amperes; running current: 15 amperes.

**(7) Paper Tape Punch, Low Speed RO-315/G**

Operating speed..... 18.75 characters per second (with printing); 75 characters per second (without printing).  
 Tape types ..... 8-track, 1 inc wide; 5-track, 1 inch wide; 5-track, 1%6 inch wide; 5-track, % inch wide.  
 Tape capacity..... 1000 foot reel.  
 Output codes ..... ITA #2 and ASCII fully perforated.  
 Information code ..... ASCII.  
 Information transfer ..... Bit-parallel, character-serial.  
 Parity ..... Eighth character bit maintains odd parity (ASCII line). ASCII tape output even parity.  
 Power requirements ..... 90-132 VAC, 47.5-52.5 or 57-63 Hz, single phase; starting running current: 8.5 amperes

**(8) Page Printer RP-157/G.**

Operating speed..... 300 characters per second.  
 Paper type..... 9 1/2 inch wide, sprocket fed, single ply or 2, 3, 4, or 5 multiply.  
 Printout capability ..... 10 characters per inch, 1 to 80 characters per line, 6 lines per inc)  
 Information code ..... ASCII.  
 Information transfer ..... Bit-parallel, character-serial.  
 Parity ..... Eighth character bit maintains odd parity.  
 Power requirements ..... 96-132 VAC, 47.5-52.5 or 57-63 Hz, single phase; starting current: 64 amperes; running current: 11 amperes.

**(9) Control Keyboard C7185/G.**

Equipment compatibility. Used with Card Punch, Low Speed RO313/G, Paper Tape Punch, High Speed RO-314/G and Paper Tape Punch, Low Speed RO-315/G.  
 Information code ..... ASCII;  
 Information transfer ..... Bit-parallel, character-serial.  
 Parity ..... Eighth character bit maintains odd parity.  
 Keyboard blocking..... Keys not used for a particular mode are blocked by lever control.  
 Power requirements ..... All power supplied by associated punch device (approx 0.8 ampere).



1-6. Items Comprising an Operable Equipment

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
		<b>NOTE</b>				
		<b>The part number is followed by the applicable 5-digit Federal supply code for manufacturers (FSCM) identified in SB 708-42 and used to identify manufacturer, distributor, or Government agency, etc.</b>				
		AA Configuration Digital Subscriber Terminal AN/FYA-71(V)1				
		Consisting of:				
		Common Control Unit C-8120(P)/G; 80063	64	30	35	464
		Circuit Switch Module SA-1493/G; SM-D-546270; 80063				
		Reader, Punched Tape RP-154(P/G); A64750-001; 58189	64	30	35	428
		Paper Tape Punch, Low Speed RO-315/G; A64503-001; 58189	64	30	35	630
		Page Printer RP-157/G; 810001-869; 58189	43	30	35	750
		Control-Keyboards C-7185/G; A64825-001; 58189	45	24	24	50
		Installation Kit AA (Configuration, Straight Line) A61710-001; 58189				
		Consisting of:				
	2	Cable Assembly. Special Purpose Electrical: A61666-001; 58189				
	68	Wire Electrical; MIL16878-1; 81349				
	81	Cable Assembly, Special Purpose Electrical; V00015-001; 58189				
5940-00-993-5216	176	Ferrule; 2-323930-2: 00779				
5940-00-503-9995	4	Terminal Lug; MS25036-1; 96906				
5940-00-143-5284	4	Terminal Lug; MS25036-15; 96906				
5940-00-686-6030	176	Terminal Lug; RA1213: 59730				
5940-00-114-1305	4	Terminal Lug; MS25036-16; 96906				
	2	Cable Assembly, Special Purpose Electrical; A61666-008; 58189				
I		Cable Assembly. Special Purpose Electrical; A61666-009; 58189				
	15	Adapter, Cable; S680-16R: 07418				
	8	Fanning Strip: 650L22XXXP: 75382				
	1	Wireway, Electrical; 540970-106: 58189				
	3	Wireway, Electrical; 540970-105: 58189				
	1	Wireway. Electrical; 540970-103; 58189				
	2	Wireway, Electrical; 540970-102: 58189				
	3	Wireway, Electrical; 540970-101; 58189				
	2	Tee; 540970-107: 58189				
		OR				
		Installation Kit AA (Configuration, Parallel A61711-001; 58189				
		Consisting of:				
	1	Cable Assembly. Special Purpose Electrical; A61666-001; 58189				
	68	Wire. Electrical; MILW16878-1: 81349				
	153	Cable Assembly, Special Purpose Electrical; V00015-001; 58189				
5940-00-993-5216	176	Ferrule; 2-323930-2: 00779				
5940-00-813-0698	4	* Terminal lug; MS25036-1: 96906				
5940-00-143-5284	7	Terminal Lug; MS25036-15: 96906				
5940-00-686-6030	176	Terminal Lug. RA1213: 59730				
5940-00-114-1305	4	Terminal Lug; MS25036-16: 96906				
	1	Cable Assembly. Special Purpose Electrical: A61666-00:3; 58189				
	1	Cable Assembly, Special Purpose Electrical: A61666-004: 58189				

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
5310-00-205-8924 5310-00-933-8121	15	Adapter, Cable; S680-16R; 07418				
	8	Fanning Strip; 6501,22XXXP; 75382				
	1	Wireway. Electrical; 540970-106; 58189				
	1	Wireway. Electrical; 540970-104; 58189				
	1	Connector, Raceway; 540970-114; 58189				
	2	Plate, Enclosure; 540970-115; 58189				
	7	Screw, Machine; 639123-549; 58189				
	7	Washer, Flat; AN960C4161.; 88044				
	7	Washer, Lock; MS35338-139; 96906				
	4	Plate, Enclosure; 540970-115; 58189				
	13	Connector, Raceway; 540970-114; 58189				
	2	Elbow. Sweep; 540976-109; 58189				
	1	Hanger; 540970-117; 58189				
	11	Screw. Machine; 639123-549; 58189				
	5310-00-205-8924 5310-00-933-8121	11	Washer, Flat; AN960C416L; 88044			
11		Washer, Lock; MS35338-139; 96906				
		OR				
		Installation Kit AA (Configuration. Parallel W/50 Ft. Separation) A61712-001; 58189				
		Consisting of:				
	1	Cable Assembly, Special Purpose Electrical: A61666-001; 58189				
	68	Wire, Electrical: MILW16878-1; 81349				
	282	Cable Assembly, Special Purpose, Electrical: V00015-001; 58189				
5940-00-993-5216	176	Ferrule; 2-323930-2; 00779				
5940-00-813-0698	4	Terminal Lug; MS25036-1; 96906				
5940-00-143-5284	4	Terminal Lug; MS25036-15; 96906				
5940-00-686-6030	176	Terminal Lug; RA1213; 59730				
5940-00-114-1305	4	Terminal Lug; MS25036-16; 96906				
	3	Cable Assembly, Special Purpose, Electrical: A61666-015; 58189				
5310-00-2054924 5310-00-933-81-1	15	Adapter, Cable; S680-16R; 07418				
	8	Fanning Strip; 650L22XXXP; 75382				
	5	Wireway, Electrical, 540970-106; 58189				
	3	Wireway. Electrical; 540970-105; 58189				
	1	Wireway, Electrical; 540970-104; 58189				
	1	Wireway, Electrical; 540970-103; 58189				
	2	Wireway, Electrical; 540970-102; 58189				
	2	Wireway, Electrical; 540970-101; 58189				
	2	Tee; 540970-107; 58189				
	4	Plate, Enclosure; 540970-115; 58189				
	2	Elbow, Sweep; 540970-109; 58189				
	17	Connector, Raceway, 540970-114; 58189				
	9	Hanger; 540970-117; 58189				
	11	Screw, Machine; 639123-549; 58189				
	5310-00-2054924 5310-00-933-81-1	11	Washer, Flat; AN960C416L; 88044			
11		Washer, Lock; MS35338-139; 96906				
		AB Configuration Digital Subscriber Terminal AN/FYA-711V)2				
		Consisting of:				
		Common Control Unit C.8120(P)/G: SM-D-546247; 80063	64	30	35	464
		Device Switch Module SA-1616/G; SM-D-634798; 80063				
		Circuit Switch Module SA-1493/G: SM-D-546270; 80063				
		Reader, Punched Card RP-152/G; A64400-001: 58189	64	30	35	464
		Reader, Punched Tape RP-154(P/G): A64750-001; 58189	64	30	35	428
		Paper Tape Punch, Low Speed RO-315/G A64503-001; 58189				

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
		Page Printer RP-157/G; 81001-869; 58189	43	30	35	750
		Card Punch, Low Speed RO-313/G; A64000-001; 58189	43	30	43	536
		Control Keyboard C-7185/G; A64825-001; 58189	45	24	24	50
		Installation Kit For AB (Configuration, Straight Line): A61713-001: 58189				
		Consisting of:				
	2	Cable Assembly Special Purpose Electrical; A61666-001: 58189				
	119	Wire, Electrical: MILW16878-1; 58189				
	167	Cable, Special Purpose Electrical: V00015-001; 58189				
	572	Ferrule; 2-323930-2: 00779,				
	13	Terminal Lug, MS25036-1: 96906				
	9	Terminal Lug; MS25036-15; 96906				
	308	Terminal Lug: RA1213; 59730				
	7	Terminal Lug: MS25036-16; 96906				
	2	Cable Assembly, Special Purpose, Electrical; A61666-003: 58189				
	1	Cable Assembly, Special Purpose, Electrical; A61666405: 58189				
	2	Cable Assembly, Special Purpose, Electrical; A61666-007: 58189				
	18	Adapter, Cable; S680-16R: 07418				
	14	Fanning Strip: 65OL22XXXP; 75382				
	2	Wireway, Electrical; 640970-106; 58189				
	2	Device Switch Module; SMD834798: 80063				
	2	Device Switch Module Unit; SMD546259: 80063				
	2	Panel Assembly; SMD634781: 80063				
	2	Switch Assembly. 1197-45; 96182				
	2	Filter. Colored; IOELGGAA: 96182				
	2	Display Screen: IOEN2: 96182				
	2	Lens. Front: IOERIT5VI6PRIMEALT: 96182				
	4	Clamp. Cable: HP2N: 12357				
	2	Nut: MS35649-284: 92906				
	2	Washer. Lock: MS35338-137; 96906				
	2	Washer, Flat: MS15795-807: 96906				
	2	Wiring Harness: SMA546713: 80063				
	4	Terminal Lug: MS25036-46: 96906				
	2	Relay Assembly: SMD634794: 80063				
	2	Plate Assembly: SMD634795: 80063				
	2	Relay 801-43C115G212: 14193				
	4	Screw Machine: MS51957-27: 96906				
	4	Washer. Lock: MS35338-136: 96906				
	7	Terminal Block: MS60OGMFIUH: 75382				
	32	Screw Machine: MS51957-31: 96906				
	32	Nut: MS35649-264: 96906				
	32	Washer, Lock: MS35338-136: 96906				
	8	Marker Strip: MS600-20OXXPIA: 75382				
	2	Wiring Harness: SMA546790: 80063				
	16	Connector. Plug. Electrical: 88601G76: 14195				
	16	Strap. Cable: MS17821-1-9: 96906				
	4	Screw Machine: MS51957-30: 96906				
	4	Washer. Flat: AN960C6: 88044				
	2	Terminal Lug: MS77068-2: 96906				
	2	Wiring Harness: SMA546804: 80063				
	1	Wireway. Electrical- 540970-104: 58189				
	2	Connector. Raceway: 540970-114: 58189				
	2	Plate. Enclosure: 540970-115: 58189				
	17	Screw. Machine: 639123-549: 58189				
5310-00-2054924	17	Washer, Flat: AN960C416L: 88044				
	17	Washer. Lock: MS35338-139: 96906				

OR

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
		Installation Kit For AB (Configuration, L-Shape) A61714-001; 58189 Consisting of:				
	1	Cable Assembly, Special Purpose Electrical; A61666-001; 58189				
	68	Wire, Electrical; MILW16898-1; 81349				
	145	Cable, Special Purpose Electrical; V00015-001; 58189				
	440	Ferrule; 2-323930-2; 07779				
	10	Terminal Lug; MS25036-1; 96906				
	4	Terminal Lug; MS25036-15; 96906				
	132	Terminal Lug; RA1213; 59730				
	3	Terminal Lug; MS25036-16; 96906				
	1	Cable Assembly, Special Purpose, Electrical; A61666-003; 58189				
	1	Cable Assembly, Special Purpose, Electrical; A61666-010; 58189				
	1	Cable Assembly, Special Purpose, Electrical; A61666-012; 58189				
	2	Device Switch Module; SMD634798; 80063				
	2	Device Switch Module Unit; SMD546259; 80063				
	2	Panel Assembly; SMD634781; 80063				
	2	Switch Assembly; 1197-45; 96182				
	2	Filter, Colored; 1OELGGAA; 96182				
	2	Display Screen; 1OEN2; 96182				
	2	Lens, Front; IOERIT5V16PRIMEALT; 96182				
	4	Clamp, Cable; HP2N; 12357				
	2	Nut; MS35649-284; 96906				
	2	Washer, Lock; MS35338-137; 96906				
	2	Washer, Flat; MS15795-807; 96906				
	2	Wiring Harness; SMA546713; 80063				
	4	Terminal Lug; MS25036-46; 96906				
	2	Relay Assembly; SMD634794; 80063				
	2	Plate Assembly; SMD634795; 80063				
	2	Relay; 801-43C115G212; 14193				
	4	Screw, Machine; MS51957-27; 58189				
	40	Washer, Lock; MS35338-136; 96906				
	8	Terminal Block; MS60OGMF1UH; 75382				
	32	Screw, Machine; MS51937-31; 96906				
	36	Nut; MS35649-264; 96906				
	8	Marker Strip; MS600-20OXXXPIA; 75382				
	2	Wire Harness; SMA546790; 80063				
	16	Connector. Plug, Electrical; 88601G76; 14195				
	16	Strap. Cable; MS17821-1-9; 96906				
	4	Screw. Machine; MS51957-30; 96906				
	4	Washer, Flat; AN960C6; 88044				
	2	Terminal Lug; MS77068-2; 96906				
	2	Wire Harness; SMA546804; 80063				
		OR				
		Installation Kit For AB (Configuration Parallel) A61715-001; 58189 Consisting of:				
	2	Cable Assembly. Special Purpose, Electrical; A61366-001; 58189				
	119	Wire. Electrical; MILW'16878-1; 81349				
	289	Cable. Special Purpose. Electrical; V00015-001; 58189				
	529	Ferrule; 2-323930-2; 00779				
	13	Terminal Lug; MS25036-1; 96906				
	9	Terminal Lug; MS25036-15; 96906				
	309	Terminal Lug; RA1213; 59730				
	8	Terminal Lug; MS25()36-16; 96906				
	1	Cable Assembly. Special Purpose. Electrical; AS1666-010; 58189				

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
	2	Cable Assembly, Special Purpose. Electrical; A61666-009; 68189				
	1	Cable Assembly, Special Purpose. Electrical; A61666-011; 58189				
	1	Cable Assembly Special Purpose, Electrical; A61666-012; 58189				
	36	Adapter, Cable: S680-16R; 07418				
	2	Fanning Strip: 65OL2XXXP; 75382				
	3	Wireway, Electrical; 540970-106; 58189				
	9	Wireway, Electrical; 540970-105; 58189				
	3	Wireway, Electrical; 540970-103; 68189				
	5	Wireway, Electrical; 540970-101; 58189				
	5	Elbow, Sweep; 540970-109; 58189				
	4	Tee; 540970-10; 58189				
	29	Connector, Raceway; 540970-114; 58189				
	7	Plate, Enclosure; 540970-115; 58189				
	2	Hanger; 540970-117; 58189				
	34	Screw, Machine; 639123-549; 58189				
	34	Washer, Flat; AN96OC416L; 88044				
	34	Washer, Lock; MS35338-139; 96906				
	2	Device, Switch Module; SMD634798; 80063				
	2	Device, Switch Module Unit; SMD546259; 80063				
	2	Panel Assembly; SMD63478; 80063				
	2	Switch Assembly; 1197-45; 96182				
	2	Filter, Colored; IOELGGAA; 96182				
	2	Display Screen; 1OEN2; 96182				
	2	Lens, Front; 1OER1T5VI6PRIMEALT; 96182				
	4	Clamp, Cable; HP2N; 12357				
	2	Nut, Plain Hexagon; MS35649-284; 96906				
	2	Washer, Lock; MS35338-137; 96906				
	2	Washer, Flat; MS15795-807; 96906				
	2	Wiring Harness; SMA546713; 80063				
	4	Terminal Lug; MS25036-46; 96906				
	2	Relay Assembly; SMD634794; 80063				
	2	Plate Assembly; SMD634795; 80063				
	2	Relay; 801-43C115G212; 14193				
	4	Screw, Machine; MS51957-27; 96906				
	40	Washer, Lock; MS35338-136; 96906				
	8	Terminal Block; MS60OGMFIUH; *75382				
	32	Screw, Machine; MS51957-31; 96906				
	36	Nut, Plain Hexagon; MS35649-264; 96906				
	8	Marker, Strip; MS600-20OXXPIA; 75382				
	2	Wiring Harness; SMA546790; 80063				
	16	Connector Plug, Electrical; 88601G76; 14195				
	16	Strap, Cable; MS17821-1-9; 96906				
	4	Screw, Machine; MS51957-30; 96906				
	4	Washer, Flat; AN96OC6; 88044				
	2	Terminal Lug; MS77068-2; 96906				
	2	Wiring Harness; SMA546804; 80063				
	2	Wiring, Electrical; 540970-102; 58189				
		OR				
		Installation Kit For AB (Configuration, Parallel W/50 Ft Separation) A6176-001; 58189				
		Consisting of:				
	2	Cable Assembly, Special Purpose, Electrical: A61666-001; 58189				
	119	Wire, Electrical; MILW16878-1; 81349				
	511	Cable, Special Purpose, Electrical; V00015-001: 58189				
	474	Ferrule; 2-323930-2; 00779				
	13	Terminal Lug; MS25036-1; 96906				
	7	Terminal Lug; MS25036-15; 96906				
	7	Terminal Lug; MS25036-16; 96906				

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
5310-00-205-8924	308	Terminal Lug; RA121:3: 59730				
	1	Cable Assembly. Special Purpose Electrical: A61(i6-0)17: 5\$1\$Y				
	2	Cable Assembly. Special Purpose Electrical: A61666-()16: 58189				
	1	Cable Assembly. Special Purpose Electrical A61666-018: 58189				
	1	Cable Assembly. Special Purpose Electrical: A61666-019: 58189				
	2	Device. Switch Module: SMD634798: 80063				
	2	Device. Switch Module Unit: SMD546259: 80663				
	2	Panel Assembly: SMI)634781: 80063				
	2	Switch Assembly: 1197-45: 96182				
	2	Filter. Colored: IOELGGA: 96182				
	2	Display Screen: 1OEN2: 96182'				
	2	Lens Front: IOERIT5V16PRIMEALT: 96182				
	4	Clamp. Cable: HP2N: 12357				
	2	Nut. Plain Hexagon: MS35649-284: 96906,				
	2	Washer, Lock: MS3733-137: 96906				
	2	Washer, Flat: MS15795-807: 96906				
	2	Wiring Harness; SMA546713: 80063				
	3	Terminal Lug: MS25036-46; 96906				
	2	Relay Assembly; SMD634794: 80063				
	2	Plate Assembly: SMD634795: 80063				
	2	Relay: 801-43C115G212; 14193'				
	4	Screw. Machine; MS51957-27:; 96906				
	40	Washer, Lock; MS35338-136; 96906				
	8	Terminal Block. MS60OGMFIUH; 75382				
	32	Screw, Machine: MS5195t41; 96906				
	36	Nut, Plain Hexagon; MS35649-264; 96906				
	8	Marker Strip; MS600-20OXXXPIA; 75382				
	2	Wiring Harness SMA546790; 80063				
	16	Connector Plug, Electrical; 88601G6; 14195				
	16	Strap, Cable. MS17821-1-9: 96906				
	4	Screw, Machine; MS61957-30: 96906				
	4	Washer, Flat; AN960C6; 88044				
	2	Terminal Lug; MS77068-2; 96906				
	2	Wiring Harness; SMA546804; 80063				
	18	Adapter, Cable, S680-16R; 07418				
	14	Fanning Strip; 65OL22XXXP; 75382				
	6	Wireway Electrical; 540970-106; 58189				
	4	Wireway, Electrical; 540970-105; 58189				
	1	Wireway, Electrical; 540970-103; 58189				
	2	Wireway, Electrical; 540970-101; 58189				
	2	Elbow, Sweep: 540970-109; 58189				
	2	Tee; 540970-108; 58189				
	3	Plate, Enclosure; 540970-115; 58189				
	17	Connector, Raceway; 540970-114; 58189				
	9	Hanger; 540970-117; 58189 -				
	17	Screw, Machine; 639123-549; 58189				
	17	Washer, Flat, AN960C41SL; 88044'				
17	Washer, Lock; MS35338-139; 96906					
	A E Configuration Digital Subscriber Terminal AN/FYA-71(V)3 Consisting of:					
	Common Control Unit C-8120(P)/G; SM- D-546247: 80063	64	30	36	464	
	Control, Keyboard C-7185/G: A64825-001; 58189	45	24	24	50	
	Circuit Switch Module SA-1493/G; SM- D-546270; 80063					
	Page Printer, RP-157/G; 810001469; 58189.	43	30	35	750'	
	Reader, Punched Tape RP-1541P/G); A64750-002: 58189	64	30	35	428'	

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
		Paper Tape Punch, Low Speed RO-315/G: A64503-001: 58189	64	30	35	536
		Paper Tape Punch. High Speed RO-314/G; A64500-001: 58189	64	30	35	630
	1	Installation Kit AF' (Configuration, Straight Line): A61717-001: 58189				
	3	Consisting of: Cable Assembly, Special Purpose. Electrical: A61666-001: 58189				
	35	Wire, Electrical: MILW6878-1: 81349				
	103	Cable. Special Purpose. Electrical: V00015-001: 58189				
5940-00-993-5216	220	Ferrule: 2-323930-2: 00779				
5940-00-813-0698	5	Terminal Lug; MS25036-1: 96906				
5940-00-143-5284	4	Terminal Lug; MS25036-15: 96906				
	220	Terminal Lug; RA1213: S9730				
5940-00-114-1305	6	Terminal Lug; MS25036-16: 96906				
	1	Cable Assembly. Special Purpose. Electrical: A61666-003: 58189				
	1	Cable Assembly. Special Purpose. Electrical: A61666-006: 58189				
	15	Adapter. Cable: S680-16R: 07418				
	10	Fanning Strip: 65OL22XXXP: 75382				
	1	Wireway. Electrical: 540970-106: 58189				
	1	Wireway, Electrical: 540970-104: 58189				
	1	Connector, Raceway. 540970-114: 58189				
	2	Plate, Enclosure: 540970-115: 58189				
	11	Screw. Machine: 639123-549: 58189				
	11	Washer. Flat: AN960C416L: 88044				
	11	Washer. Lock: MS35338-139: 96906				
	1	OR				
		Installation Kit AE (Configuration. Parallel): A61718-001: 58189				
		Consisting of:				
	2	Cable Assembly. Special Purpose. Electrical: A61666-001: 58189				
	85	Wire, Electrical: MILWI6878-1: 81349				
	171	Cable, Special Purpose. Electrical: V00015-001: 58189				
	220	Ferrule: 2-323930-2: 00779				
	5	Terminal Lug: MS25036-1: 96906				
	8	Terminal Lug: MS25036-15: 96906				
	5	Terminal Lug: MS25036-16: 96906				
	220	Terminal Lug; RA1213: 59730				
	1	Cable Assembly. Special Purpose. Electrical: A61666-008: 58189				
	1	Cable Assembly. Special Purpose. Electrical: A61666-009: 58189				
	15	Adapter. Cable: S680-16R: 07418				
	10	Fanning Strip: 650L22XXXP: 75382				
	1	Wireway. Electrical: 540970-106: 58189				
	3	Wireway. Electrical: 540970-105: 58189				
	1	Wireway. Electrical: 540970-103: 58189				
	1	Wireway. Electrical: 540970-102: 58189				
	4	Wireway. Electrical: 540970-101: 58189				
	2	Tee: 540970-107: 58189				
	2	Elbow. Sweep: 540970-109: 58189				
	13	Connector, Raceway: 540970-114: 58189				
	4	Plate. Enclosure: 540970-115: 58189				
	1	Hanger: 540970-117: 58189				
	11	Screw. Machine- 639123-549: 58189				
5310-00-205-8924	11	Washer. Flat: AN960C416L: 88044				
5310-00-933-4121	11	Washer. Lock: MS35338-139: 96906				

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
		OR				
	1	Installation Kit AE (Configuration Parallel WS50 Ft. Separation); A61719-001; 58189				
		Consisting of:				
	2	Cable Assembly, Special Purpose, Electrical; A61666-001; 58189				
	303	Cable, Special Purpose, Electrical; V00015-001; 58189				
	85	Wire, Electrical; MILW16878-1; 81349				
5940-00-993-5216	220	Ferrule; 2-323930-2; 00779				
5940-00-813-0698	5	Terminal Lug; MS25036-1; 96906				
5940-00-143-5284	5	Terminal Lug; MS25036-15; 96906				
	220	Terminal Lug; RA1213; 59730				
5940-00-114-1305	5	Terminal Lug. MS25036-16; 96906				
	1	Cable Assembly, Special Purpose, Electrical; A61666-015; 58189				
	1	Cable Assembly, Special Purpose, Electrical; A61666-016; 58189				
	15	Adapter. Cable; S680-16R; 07418				
	10	Fanning Strip; 650L22XXXP; 75382				
	5	Wireway. Electrical; 540970-106; 58189				
	3	Wireway, Electrical; 540970-105; 58189				
	1	Wireway, Electrical; 540970-104; 58189				
	1	Wireway, Electrical; 540970-103; 58189				
	1	Wireway. Electrical; 540970-102; 58189				
	3	Wireway, Electrical; 540970-101; 58189				
	2	Elbow. Sweep; 540970-109; 58189				
	2	Tee; 540970-107; 58189				
	2	Plate, Enclosure; 540970-115; 58189				
	17	Connector, Raceway; 540970-114; 58189				
	9	Hanger; 540970-117; 58189				
	11	Screw, Machine; 639123-549; 58189				
	11	Washer. Flat; AN960C416L; 88044				
	11	Washer. Lock; MS35338-139; 96906				
		BB Configuration; Digital Subscriber Terminal AN/FYA-711VI4				
		Consisting of:				
		Common Control Unit C-81201P)/G; SM-D-546247; 80063	64	30	35	464
		Control-Keyboard C-7185/G; A64825-001; 58189	45	24	24	50
		Circuit Switch Module SA-1493/G; SM-D-546270; 80063				
		Reader Punched Card RP-152/G; A64400-001; 58189	64	30	35	464
		Page Reader RP-157/G; 810001-869; 58189	43	30	35	750
		Card Punch High Speed RO-312/G; A64002-001; 58189	64	30	35	583
		Card Punch Low Speed RO-313/G; A64000-001; 58189	43	30	43	536
		Installation Kit BB (Configuration. Straight Line) A61720-001; 58189				
		Consisting of:				
	2	Cable Assembly. Special Purpose. Electrical; A61666-001; 58189				
		Wire. Electrical; MILW1678-1; 81349				
	92	Cable Special Purpose. Electrical; V00015-001; 58189				
	176	Ferrule; 2-323930-2; 00779				
5940-00-813-0698	4	Terminal Lug; MS25036-1; 96906				
5940-00-143-5284	4	Terminal Lug; MS25036-15; 96906				
5940-00-686-6030	176	Terminal Lug; RA1213; 59730				
5940-00-114-1305	1	Terminal Lug; MS 2.5036-16; 96906				
	2	Cable Assembly, Power Electrical. A61666-006; 58189				



NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
5310-00-205-8924 5310-00-933-8121	14	Adapter, Cable; S680-16R; 07418				
	8	Fanning Strip; 650L22XXXP; 75382				
	1	Wireway, Electrical; 540970-106; 58189				
	1	Wireway, Electrical; 540970-103; 68189				
	2	Connector, Raceway; 540970-114; 58189				
	2	Plate, Enclosure; 540970-115; 58189				
	1	Wireway, Electrical; 540970-102; 58189				
	11	Screw, Machine; 639123-549; 58189				
	11	Washer, Flat; AN960C416L; 88044.				
	11	Washer, Lock; MS35338-139; 96906				
			OR			
		Installation Kit BB (Configuration, L Shape) A61721-001; 58189 Consisting of:				
	1	Cable Assembly, Special Purpose, Electrical; A61666-001; 58189				
	68	Wire, Electrical; MILW16878-1; 81349				
	127	Cable, Special Purpose, Electrical; V00015-001; 58189				
5940-00-993-5216	176	Ferrule; 2-323930-2; 00779				
5940-00-813-0698	4	Terminal Lug; MS25036-1; 96906				
5940-00-143-5284	6	Terminal Lug; MS25036-15; 96906				
5940-00-114-1305	4	Terminal Lug; MS25036-16; 96906				
5940-00-686-6030	176	Terminal Lug; RA1213; 59730				
	2	Cable Assembly, Special Purpose, Electrical; A61666-008; 58189				
	1	Cable Assembly, Special Purpose, Electrical; A61666-003; 58189				
	14	Adapter, Cable; S680-16R; 07418				
	6	Fanning Strip; 650L22XXXP; 75381				
	3	Wireway, Electrical; 540970-105; 58189				
	2	Wireway, Electrical; 540970-104; 58189				
	1	Wireway, Electrical; 540970-103; 58189				
	3	Wireway, Electrical; 540970-101; 58189				
	2	Tee; 540970-107; 58189				
	3	Elbow, Sweep; 540970-109; 58189				
	2	Plate, Enclosure; 540970-115; 58189				
	13	Connector, Raceway; 540970-114; 58189				
	1	Hanger; 540970-117; 58189				
	11	Screw, Machine; 639123-549; 58189				
5310-00-2054924	11	Washer, Flat; AN960C416L; 88044				
5310-00-9334121	11	Washer, Lock; MS35338-139; 96906				
		OR				
		Installation Kit BB (Configuration, Parallel) A61722-001; 58189 Consisting of:				
	1	Cable Assembly, Special Purpose, Electrical; A61666-001; 58189				
	68	Wire, Electrical; MILW.16878-1; 81349				
	171	Cable, Special Purpose, Electrical; V00015-001; 58189				
5940-00-993-5216	176	Ferrule; 2-323930-2; 00779				
5940-00-813-0698	4	Terminal Lug; MS25036-1; 96906				
5940-00-143-5284	5	Terminal Lug; MS25036-15; 96906				
	176	Terminal Lug; RA1213; 59730				
5940-00-114-1305	4	Terminal Lug; MS25036-16; 96906				
	1	Cable Assembly, Special Purpose, Electrical; A61666-009; 58189				
	1	Cable Assembly, Power Electrical; A61666-010; 58189				
	1	Cable Assembly, Power Electrical; A61666-012; 58189				
	14	Adapter, Cable; S680-16R; 07418				

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)	
			Height	Depth	Width		
5310-00-205-8924 5310-00-933-8121	8	Fanning Strip: 6501,22XXXII: 75382					
	2	Wireway. Electrical: 540970-106: 58189					
	2	Wireway. Electrical: 540970-105: 58189					
	3	Wireway. Electrical: 540970-101; 58189					
	2	Tee: 540970-107: 58189					
	2	Elbow, Sweep: 540970-109: 58189					
	2	Plate, Enclosure; 540970-115; 58189					
	12	Connector. Raceway: 540970-114: 58189					
	1	Hanger: 540970-117: 58189					
	11	Screw. Machine: 639123-549: 58189					
	11	Washer. Flat: AN96OC416L: 88044					
	11	Washer, Lock: MS35338-139: 96906					
	2	Wireway. Electrical; 540970-103: 58189					
		OR					
		Installation Kit BB (configuration, Parallel W/50 Ft. Separation) 61723-001: 58189					
		Consisting of:					
	1	Cable Assembly, Special Purpose, Electrical: A61666-001: 58189					
	68	Wire, Electrical: MILW16878-1: 81349					
	298	Cable, Special Purpose. Electrical. V00015-001; 58189					
	5940-00-993-5216	176	Ferrule. 2-323930-2; 00779				
	5940-00-813-0698	4	Terminal Lug: MS25036-1: 96906				
	5940-00-143-5284	4	Terminal Lug: MS25036-15; 96906				
5940-00-114-1305	4	Terminal Lug: MS 25036-16; 96906					
5940-00-686-6030	176	Terminal Lug; RA1213; 59730					
	1	Cable Assembly, Special Purpose, Electrical; A61666-015; 58189					
	1	Cable Assembly, Special Purpose, Electrical; A61666-018; 58189					
	1	Cable Assembly, Power, Electrical: A61666-017; 58189					
	14	Adapter, Cable: S680-16R; 07418					
	8	Fanning Strip: 650L22XXXP; 75382					
	6	Wireway, Electrical: 540970-106; 58189					
	2	Wireway, Electrical; 540970-105; 58189					
	4	Wireway, Electrical; 540970-101; 58189					
	2	Tee; 540970-107; 58189					
	2	Elbow, Sweep; 540970-109; 58189					
	2	Plate, Enclosure; 540970-115; 58189					
	16	Connector, Raceway; 540970-114; 58189					
	9	Hanger; 540970-117; 58189					
	1	Wireway, Electrical: 540970-104; 58189					
	1	Wireway, Electrical, 540970-103; 58189					
	1	Wireway, Electrical; 540970-102; 58189					
5310-00-205-8924	11	Screw, Machine; 639123-549; 58189					
5310-00-933-8121	11	Washer, Flat; AN96OC416L; 88044					
	11	Washer, Lock; MS35338-139; 96906					
		BC Configuration Digital Subscribe Terminal AN/FYA-71(V)5					
		Consisting of:					
		Common Control Unit C-8120(P)/G; SM-D-546247; 80063	64	30	35	464	
		Control-Keyboard C-7185/G; A64825-001; 58189	45	24	24	50	
		Circuit Switch Module SA-1493/G; SM-D-546270; 80063					
		Reader, Punched Card RP-152/G; A64400-001; 58189	64	30	35	464	
		Card Punch, Low Speed RO-313/G; A64000-001; 58189	43	30	43	536	
		Installation Kit BC (Configuration, Straight Line) A61724-001; 58189					

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
	1	Consisting of: Cable Assembly, Special Purpose. Electrical; A61666-001; 58189				
	51	Wire. Electrical; MILW16878-1, 81349				
	64	Cable. Special Purpose, Electrical: V00015-001: 58189				
5940-00-993-5216	132	Ferrule: 2-323930-2: 00779				
5940-00-81340698	3	Terminal Lug: MS25036-1: 96906				
5940-00-143-5284	3	Terminal Lug; MS25036-15: 96906				
5940-00-114-1305	3	Terminal Lug: MS25036-16: 96906				
5940-686-6030	132	Terminal Lug: RA1213: 59730				
	1	Cable Assembly. Special Purpose. Electrical: A61666-003: 58189				
	1	Cable Assembly. Special Purpose. Electrical: A61666-005: 58189				
	13	Adapter, Cable: S680-16R: 07418				
	9	Washer, Flat: AN960C416L: 88044				
5310-00-9334121	9	Washer. Lock: MS35338-139: 96906				
		OR				
		Installation Kit. BC (Configuration. Parallel) A16725-001; 58189				
		Consisting of:				
	1	Cable Assembly, Special Purpose. Electrical; A61666-001: 58189				
	51	Wire, Electrical; MILW16878-1: 81349				
	121	Cable. Special Purpose. Electrical; V00015-001: 58189				
5940-00-993-5216	132	Ferrule: 2-323930-2: 00779				
5940-00-813-0698	3	Terminal Lug: MS25036-1: 96906				
5940-00-143-5284	3	Terminal Lug: MS25036-15: 96906				
5940-00-686-4030	132	Terminal Lug: RA1213: 59730				
5940-00-114-1305	3	Terminal Lug: MS25036-16: 96906				
	1	Cable Assembly. Special Purpose. Electrical; A61666-010: 58189				
	1	Cable Assembly. Special Purpose. Electrical: A61666-011: 58189				
	13	Adapter. Cable: S680-16R: 07418				
	6	Fanning Strip: 650L22XXXP: 75382				
	1	Wireway. Electrical: 540970-106: 58189				
	2	Wireway. Electrical: 540970-105: 58189				
	3	Wireway. Electrical: 540970-101: 58189				
	3	Wireway. Electrical: 540970-103: 58189				
	1	Wireway. Electrical: 540970-104: 58189				
	2	Tee: 540970-107: 58189				
	2	Elbow. Sweep: 540970-109: 58189				
	13	Connector. Raceway: 540970-114: 58189				
	2	Plate, Enclosure: 540970-115: 58189				
	1	Hanger: 540970-117: 58189				
	9	Screw. Machine: 639123-549: 58189				
5310-00-205-8924	9	Washer. Flat: AN960C416L: 88044				
5310-00-933-8121	9	Washer, Lock: MS35338-139: 96906				
		OR				
		Installation Kit. BC (Configuration. Parallel W/50 Ft. Separation) A61726-001-58189				
		Consisting of:				
	1	Cable Assembly. Special Purpose. Electrical: A61666-001: 58189				
	68	Wire. Electrical: MILW16878-1: 81349				
	203	Cable. Special Purpose. Electrical: V00015-001: 58189				
5940-00-993-5216	132	Ferrule: 2-323930-2: 00779				
5940-00-813-4698	3	Terminal Lug: MS25036-1: 96906				
5940-00-143-5284	3	Terminal Lug: MS25036-15: 96906				

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
5940-00-686-6030	132	Terminal Lug; RA1213; 59730				
5940-00-114-1305	3	Terminal Lug; MS25036-16; 96906				
	1	Cable Assembly, Special Purpose, Electrical; A61666-016; 58189				
	1	Cable Assembly, Special Purpose, Electrical; A61666-017; 58189				
	13	Adapter, Cable; S680-16R; 07418				
	6	Fanning Strip; 650L22XXXP; 75382				
	5	Wireway, Electrical; 540970-106; 58189				
	2	Wireway, Electrical; 540970-105; 58189				
	2	Wireway, Electrical; 540970-101; 58189				
	3	Wireway, Electrical; 540970-103; 58189				
	2	Wireway, Electrical; 540970-1.04; 58189				
	2	Tee; 540970-107; 58189				
	2	Elbow, Sweep; 540970-109; 58189				
	17	Connector, Raceway; 540970-114; 58189				
	2	Plate, Enclosure; 540970-115; 58189				
	9	Hanger; 540970-117; 58189 .				
	9	Screw, Machine; 639123-549; 58189				
5310-00-205-8924	9	Washer, Flat; AN960C416L; 88044				
5310-00-933-8121	9	Washer, Lock; MS35338-139; 96906				
		BE Configuration Digital Subscriber Terminal AN/FYA-711V)6; Consisting of:				
		Common Control Unit, C-8120(P)/G; SM-D-546247; 80063	64	30	34	464
		Device Switch Module SA-1616/G; SM-D-634798; 80063				
		Circuit Switch Module SA-1493/G; SM-D-546270; 80063				
		Reader, Punched Card RP-152/G A64400-001; 58189	64	30	35	464
		Reader, Punched Tape RP-154fP/GI; A64750-001; 58189	64	30	35	428
		Card Punch, High Speed RO-312/G; A64002-001; 58189	64	30	35	583
		Paper Tape Punch, High Speed RO-314/G; A64500-001; 58189	64	30	35	630
		Card Punch. Low Speed RO-313/G; A64000-001; 58189	43	30	43	536
		Paper Tape Punch, Low Speed RO-315/G; A64503-001; 58189	64	30	35	536
		Page Printer RP-157/G; 81001-869; 58189	43	30	35	750
		Control-Keyboard C-7185/G; A64835-001; 58189	45	24	24	50
	1	Installation Kit, BE (Configuration, Straight Line) A61727-001; 58189 Consisting of:				
	2	Cable Assembly. Special Purpose. Electrical; A61666-003; 58189				
	119	Wire. Electrical; MILW16878-1; 81349				
	15	Cable. Special. Purpose. Electrical; V00015-001; 58189				
5940-00-993-5216	572	Ferrule, 2-323930-2; 00779				
5940-00-813-0698	13	Terminal Lug; MS25036-1; 96906				
5940-00-143-5284	7	Terminal Lug; MS25036-15; 96906				
5940-00-114-1305	7	Terminal Lug; MS25036-16; 96906				
6940-00-686-6030	264	Terminal Lug; RA1213; .59730				
	2	Cable Assembly. Special Purpose. Electrical; A61666-001; 58189				
	1	Cable Assembly. Special Purpose. Electrical; A61666-005; 58189				
	1	Cable Assembly. Special Purpose, Electrical; A61666-004; 58189				

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
	1	Cable Assembly, Special Purpose, Electrical; A61666-006; 58189				
	18	Adapter, Cable; S680-16R; 07418				
	14	Fanning Strip; 650L22XXXP; 75382				
	2	Wireway, Electrical; 540970-106; 58189				
	1	Connector, Raceway; 540970-114; 58189				
	2	Plate, Enclosure-, 540970-115; 58189				
5310-00-205-8924	17	Screw, Machine; 639123-549; 58189				
	17	Washer, Flat; AN960C416; 96906				
	17	Washer, Lock; MS35338-139; 96906				
7440-00-097-8377	2	Device, Switching Module; SMD634798; 80063				
	2	Device, Switching Module; SMD546259; 80063				
	2	Panel Assembly; SMD634781; 80063				
	2	Switch Assembly; 1197-45; 96182				
	2	Filter, Colored; 10ELGGAA; 96182				
	2	Display Screen; 10EN2; 96182				
	1	Lens, Front; 10ERIT5V16PRIMEALT; 96182				
5310-00:934-9759	3	Clamp, Cable; HP2N; 12357				
5310-00-933-8119	3	Nut; M535649-284; 96906				
5310-00-722-5998	2	Washer, Lock; MS35338-137; 96906				
	2	Washer, Flat; M515795-807; 96906				
	2	Wiring Harness; SMA546713; 80063				
	4	Terminal Lug; MS25036-46; 96906				
	2	Relay Assembly; SMD634794; 80063				
	2	Plate Assembly; SMD634795; 80063				
	2	Relay; 801-43C115G212; 14193				
5305-00-054-6651	4	Screw, Machine; MS51957-27; 96906				
	36	Washer, Lock; MS35338-136; 96906				
	8	Terminal Block; MS60OGMF1UH; 75382				
5305-00-054-6655	36	Screw, Machine; M551957-31; 96906				
5310-00-934-9761	36	Nut; MS35649-264; 96906				
	8	Marker, Strip; MS600-20OXXXPA; 75382				
	2	Wiring Harness; SMA546790; 80063				
	16	Connector, Plug, Electrical; 88601G76; 14195				
	16	Strap, Cable; MS17821-1-9; 96906				
5305-00-054-6654	4	Screw, Machine; MS51957-30; 96906				
5301-00-531-9514	4	Washer, Flat; AN960C6; 88044				
5940-00427-2653	2	Terminal Lug; MS77068-2; 96906				
	2	Wiring Harness; SMA546804; 80063				
		OR				
		Installation Kit BE (Configuration L-Shape)				
		A61728-001; 58189				
		Consisting of:				
	1	Cable Assembly, Special Purpose. Electrical; A61666-001; 58189				
	119	Wire, Electrical; MII,W16878-1; 81349				
	258	Cable, Special Purpose, Electrical; V00015-001; 58189				
5940-00-993-5216	572	Ferrule; 2-323930-2; 00779				
5940-00-813-0698	13	Terminal Lug; MS25036-1; 96906				
5940-00-143-5284	8	Terminal Lug; MS25036-15; 96906				
5940-00-686-6030	308	Terminal Lug; RA1213; 96906				
5940-00-114-1305	7	Terminal Lug, MS25036-16; 96906				
	1	Cable Assembly, Special Purpose. Electrical; A61666-003; 58189				
	1	Cable Assembly, Special Purpose. Electrical; A61666-005; 58189				
	1	Cable Assembly. Special Purpose. Electrical: A61666-008; 58189				
	1	Cable Assembly, Special Purpose. Electrical: A61666-009; 58189				
	1	Cable Assembly, Special Purpose, Electrical: A61666-010; 58189				

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
	1	Cable Assembly. Special Purpose. Electrical: A61666-011; 58189				
	18	Adapter. Cable: S680; 07418				
	14	Fanning Strip: 650L22XXXP; 75382				
	1	Wireway. Electrical: 540970-106; 58189				
	4	Wireway. Electrical: 540970-105; 58189				
	1	Wireway. Electrical: 540970-104; 58189				
	1	Wireway. Electrical: 540970-103; 58189				
	1	Wireway. Electrical; 540970-102; 58189				
	2	Wireway. Electrical: 540970-101; 58189				
	3	Elbow. Sweep; 540970-109; 58189				
	14	Connector, Raceway: 540970-114; 58189				
	2	Tee; 540970-107; 58189				
	3	Plate. Enclosure: 540970-115; 58189				
	1	Hanger: 540970-117; 58189				
	17	Screw. Machine: 639123-549; 58189				
5310-00-205-8924	17	Washer. Flat: AN960C416L; 88044				
5310-00-933-8121	17	Washer. Lock: MS35338-139; 96906				
	2	Device. Switching Module: SMD634798; 80063				
7440-00-0974377	2	Device. Switching Module Unit: SMD546259: 80063				
	2	Panel Assembly: SMD634781; 80063				
	2	Switch Assembly: 1197-45; 96182				
	2	Filter. Colored: 10ELGGAA; 96182				
	2	Display Screen; 10EN2; 96182				
	2	Lens, Front: 10ERIT5VI6PRIMEALT; 96182				
	4	Clamp Loop: HP2N; 12357				
5310-00-934-9759	2	Nut: MS35649-284; 96906				
5310-00-933-8119	2	Washer, Lock: MS35338-137; 96906				
5310-00-722-5998	2	Washer, Flat: MS15795-807; 96906				
	2	Wiring Harness: SMA546713; 80063				
	4	Terminal Lug: MS25036-46; 96906				
	2	Relay Assembly: SMD634794; 80063				
	2	Plate Assembly: SMD634795; 80063				
	2	Relay; 801-43C115G212; 14193				
5305-00-054-6651	4	Screw, Machine, MS51967-27; 96906				
	40	Washer, Lock; MS35338-136; 96906				
	8	Terminal Block; MS600GMF1UH; 65382				
5305-00-054-6655	32	Screw, Machine; MS51957-31; 96906				
5310-00-934-9761	36	Nut; MS35649-264; 96906				
	8	Marker, Strip; MS600-200XXXPIA; 75382				
	2	Wiring Harness; SMD546790; 80063				
	16	Connector, Plug, Electrical; 88601G76; 14195				
	16	Strap, Cable; MS17821-1-9; 96906				
5303-00-054-6654	4	Screw, Machine: MS51957-30; 96906				
5310-00-513-9514	4	Washer, Flat: AN960C6; 88044				
5940-00-827-2653	2	Terminal Lug; MS77068-2; 96906				
	2	Wiring Harness; SMA546804; 80063				
		OR				
		Installation Kit, BE (Configuration, Parallel); A16729-001; 58189				
		Consisting of:				
	2	Cable Assembly. Special Purpose, Electrical; A61666-001; 58189				
	102	Wire, Electrical; MILW16878-1; 81349				
	268	Cable, Special Purpose, Electrical; V0001S901; 58189				
5940-00-993-5216	572	Ferrule; 2-323930-2; 00779				
5940-00-813-0698	13	Terminal Lug; MS25036-1; 96906				
5940-00-143-5284	9	Terminal Lug; MS25036-15; 96906				
5940-00-114-1305	6	Terminal Lug; MS25036-16; 96906				
5940-00-686-6030	308	Terminal Lug; RA1213; 59730				

Table Heading

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
	2	Cable Assembly. Special Purpose. Electrical; A61666-010: 58189				
	1	Cable Assembly. Power, Electrical; A61666-012; 58189				
	2	Cable Assembly. Special Purpose. Electrical, A61666-009: 58189				
	18	Adapter. Cable; S680-16R: 07418				
	14	Fanning Strip: 65OL22XXXP; 76382				
	1	Wireway, Electrical: 540970-106: 58189				
	5	Wireway, Electrical: 540970-105; 58189'				
	1	Wireway, Electrical: 540970-104; 58189				
	1	Wireway, Electrical: 540970-103: 58189				
	3	Wireway, Electrical: 540970-101; 58189'				
	14	Connector, Raceway: 540970-114; 58189				
	3	Plate, Enclosure; 540970-115; 58189				
	2	Elbow. Sweep, 540970-109: 58189				
	2	Tee: 540970-107: 58189'				
	1	Hanger: 540970-117; 58189				
	17	Screw, Machine: 639123-549; 58189				
5310-00-205-8924	17	Washer. Flat: AN960C416L: 88044'				
5310-()0-933-8121	17	Washer. Lock: MSS5338-139; 96906				
	2	Device, Switching Module; SMD634798: 80063				
7440-00-097-8377	2	Device, Switching Module Unit; SMD546259: 80063				
	2	Panel Assembly. SMD634781: 80063				
	2	Switch Assembly, 1197-45; 96182				
	2	Filter, Colored: IOELGGAA: 96182				
	2	Display Screen; IOEN2; 96182 , '				
	2	Lens, Front: IOERIT5V16PRIMEALT; 96182				
	4	Clamp, Cable; HP2N; 12857				
5310-00-934-9759	2	Nut: MS35649-284: 96906				
5310-00-933-8119	2	Washer, Lock: MS35a38-'137: 96906				
5310-00-722-5998	2	Washer, Flat: MS15795-807; 96906				
	2	Wiring Harness; SMA546713; 80063				
	4	Terminal Lug, MS25036-46a; 96906				
	2	Relay Assembly; SMD634794; 80063				
	2	Plate Assembly: SMD634795: 80063				
	2	Relay: 801-43C115G212: 14193				
5305-00-054-6651	4	Screw. Machine; MS51957-27: 96906				
	40	Washer, Lock; MS35338-136: 96906				
	8	Terminal Block: MS60OGMFIUH; 75382				
5305-00-054-6655	32	Screw. Machine: MS51957-31: 96906				
5310-00-934-9761	36	Nut: MS35649-264: 96906'				
	8	Marker. Strip; -MS600-200XXX; 75382				
	2	Wiring Harness. SMA546790: 80063				
	16	Connector, Plug. Electrical; 88601G76: 14195				
	16	Strap, Cable; MS17821-1-9: 96906				
5305-00-054-6654	4	Screw, Machine: MS351957-30: 96906				
5310-00-531-9514	4	Washer, Flat; AN960C6: 88044				
5940-00-827-2653	2	Terminal Lug: MS77068-2; 96906				
	2	Wiring Harness: SMA546804: 80063				
		OR				
		Installation Kit For BE (Configuration. Parallel w/50 ft. separation) A61730-001: 58189				
		Consisting of:				
	2	Cable Assembly. Special Purpose. Electrical: A61666-001: 58189				
	119	Wire. Electrical: MILW16878-1: 81349				
	504	Cable. Special Purpose. Electrical: V00015-001;, 58189				
5940-00-993-5216	572	Ferrule: 2-323930-2: 007794				
5940-00-813-0698	13	Terminal Lug: MS25036-1: 96906				
5940-00-143-5284	7	Terminal Lug: MS25036-15: 96906				

Table Heading

NSN	Qty	Nomenclature, part No., and mfr code	Dimensions (in.)			Weight (lb)	
			Height	Depth	Width		
5940-00-114-1305	308	Terminal Lug; RA1213; 59730					
	7	Terminal Lug; MS25036-16; 96906					
	2	Cable Assembly, Special Purpose, Electrical; A61666-017; 58189					
	1	Cable Assembly, Special Purpose, Electrical; A61666-018; 58189					
	2	Cable Assembly, Special Purpose, Electrical; A61666-016; 58189					
	18	Adapter, Cable; S680-16R; 07418					
	14	Fanning Strip; 65OL22XXXP; 75382					
	5	Wireway, Electrical; 540970-106; 58189					
	5	Wireway, Electrical; 540970-105; 58189					
	2	Wireway, Electrical; 540970-104; 58189					
	1	Wireway, Electrical; 540970-103; 58189					
	2	Wireway, Electrical; 540970-101; 58189					
	2	Elbow, Sweep; 540970-109; 58189					
	18	Connector, Raceway, 540970-114; 58189					
	3	Plate, Enclosure; 540970-115; 58189					
	9	Hanger; 540970-117; 58189					
	2	Tee; 540970-107; 58189					
	5310-00-933-8121	17	Screw, Machine; 639123-549; 58189				
17		Washer, Flat; AN960C416L; 88044					
7440-00-097-8377	17	Washer, Lock; MS35338-139; 96906					
	2	Device, Switch Module; SMD634798; 80063					
	2	Device, Switch Module Unit; SMD546259; 80063					
	2	Panel Assembly; SMD634781; 80063					
	2	Switch Assembly; 1197-45; 96182					
	2	Filter. Colored; IOELGGAA; 96182					
	2	Display Screen; IOEN2; 96182					
	2	Lens, Front; 1OERIT5V16PRIMEALT; 96182					
	4	Clamp. Cable; HP2N; 12357					
	2	Nut, Plain Hexagon; MS35649-284; 96906					
5310-00-934-9759	2	Washer. Lock; MS35338-137; 96906					
5310-00-933-8119	2	Washer. Flat; MS15795-807; 96906					
5310-00-722-5998	2	Wiring Harness; SMA546713; 80063					
	4	Terminal Lug; MS25036-46; 96906					
	2	Relay Assembly; SMD634794; 80063					
	2	Plate Assembly; SMD634795; 80063					
	2	Relay; 801-43C115G212; 14193					
	5305-00-054-6651	4	Screw, Machine; MS51957-27; 96906				
		40	Washer, Lock; MS35338-136; 96906				
	5305-00-054-6655	8	Terminal Block; MS60OGMFIUH; 75382				
		32	Screw Machine; MS51957-31; 96906				
	5310-00-934-9761	36	Nut, Plain Hexagon; MS35649-264; 96906				
8		Marker Strip; MS600-20OXXXPIA; 75382					
2		Wiring Harness; SMA546790; 80063					
16		Connector Plug. Electrical; 88601G76; 14195					
16		Strap. Cable; MS17821-1-9; 96906					
5305-00-054-6654		4	Screw. .Machine; MS51957-30; 96906				
		4	Washer. Flat; AN960C6; 88044				
5310-00-531-9514		4	Washer. Flat; AN960C6; 88044				
5940-00-827-2653		2	Terminal Lug; MS77068-2; 96906				
		2	Wiring Harness; SMA546804; 80063				



**1-7. Common Names**

<i>Item</i>	<i>Common name</i>
Common Control Unit C-8120(P)/G.	Common control unit (CCU).
Card Punch, High Speed RO-312/G.	High speed card punch (HSCP).
Card Punch, Low Speed RO-313/G.	Low speed card punch (LSCP).
Reader, Punched Card RP-152/G.	Card reader (CR).
Reader, Punched Tape RP-154(PW)/G.	Paper tape reader (PTR).
Paper Tape Punch, High Speed RO-314/G.	High speed paper tape punch (HSPTP).
Paper Tape Punch, Low Speed RO-315/G.	Low speed paper tape punch (LSPTP).
Page Printer RP-157/G.	Page printer (PP).
Control-Keyboard C-7185/G.	Control keyboard (CK).
Device Switch Module SA-1616/G.	Device switching module (DSM).
Circuit Switch Module SA-1493/G.	Circuit switching module (CSM).
Transmission Identification Generator Kit MK-1583/G.	Transmission identification generator (TIG).

**1-8. Description of Digital Subscriber Terminal Equipment**

The digital subscriber terminal equipment consists of a common control unit, various input/output devices, and a universal keyboard (fig. 1-1). The input devices consist of a card reader and a paper tape reader. Output devices consist of both high and low speed versions of paper tape punches and card punches, and a page printer. The number and type of input/output devices used at a particular digital subscriber terminal site depends on the operational requirements. Every digital subscriber terminal has a common control unit, one or two input devices, and one or two output devices. In addition, every terminal has a universal keyboard which functions off-line with an output device. A terminal may also have one or more output devices for use as monitors. All equipment except the universal keyboard is mounted in sloped-front enclosures similar in appearance. The universal keyboard is mounted on a roll-around cart.-The terminal equipment is interconnected by data and control signal cables (figs. 3-6 through 3-11).

**1-9. Description of Major Components of DST Sets**

*a. Common Control Unit C8120 (P )/G.*

(1) The common control unit (CCU) is the central control point for equipment of the DST set, and allows automatic duplex synchronous data communications between the DST set and the AUTODIN network.

Messages received via communications lines from the AUTODIN network are automatically switched to the appropriate output device by the CCU. Messages for transmission to the AUTODIN network are read from an input device under control of the CCU, which also adds certain message heading information and checks message components for character parity. Data is transferred at a rate consistent with the capabilities of the line, up to 4800 baud.

(2) The CCU consists of four main subassemblies; a control panel, a logic control unit, a core memory buffer storage unit, and a power supply. These subassemblies are housed in a free standing console cabinet, the upper front portion of which contains the operator's control panel. This control panel allows the operator to select input or output devices for message processing, assign monitoring devices, and coordinate control of all on-line equipment of the DST set. The panel, also contains indicators which show certain equipment and system transmission faults.

(3) A hinged panel at the bottom of the operator's control panel covers a maintenance panel which contains controls, switches and indicators to allow troubleshooting and confidence testing the common control unit.

*b. Card Punch, High Speed RO-12/G.*

(1) The high speed card punch is an output device which converts ASCII-coded data received from the CCU into 12-bit punched card code data and punches the information into standard 80 column EAM cards in two-column increments. Cards are punched at a rate of 150 characters per second (112.5 cards per minute).

(2) A power supply, logic control unit, and mechanical punch mechanism are the major subassemblies of the high speed card punch. These subassemblies are mounted in a free-standing console cabinet which also contains a hopper, a stacker, and a card handling workshelf. Both the hopper and the stacker have a capacity of 1000 cards; a squaring corner on the workshelf allows tamping and squaring of up to 800 cards.

(3) An operator's panel is also mounted on the front of the high speed card punch cabinet. This panel provides the operator with standardized controls and indicators for either on-line operation, or local operation of the high speed card punch.

*c. Card Punch, Low Speed RO-313/G.*

(1) The low speed card punch functions either as a low speed on-line output device, or as an off-line keypunch card preparation device. When used on-line, the low speed card punch converts ASCII-coded data received from the CCU into 12-bit punched card code

data and punches the information into standard 80-column EAM cards. The data characters are also printed between the twelfth row and the edge of the card. Cards are punched and printed at a rate of 28 cards per minute.

(2) When used with the universal keyboard as an off-line keypunch device. the data transfer rate is controlled by the universal keyboard. When the universal keyboard is connected to the low speed card punch. interlock circuits prevent power being applied to the universal keyboard while the low speed card punch is assigned at the common control unit.

(3) Major subassemblies of the low speed card punch are a power supply. logic control unit, and card transport subassembly. The card transport subassembly includes the main frame, punch mechanism, printer mechanism, feeder, intermediate station, routing station, stacker, motor drive, and motion control subassemblies. All subassemblies are mounted in a freestanding console cabinet which also contains a hopper and a card handling workshelf. Both the hopper and the stacker have a capacity of 1000 cards; a squaring corner on the workshelf allows tamping and squaring of up to 800 cards.

(4) An operator's panel is also mounted on the front of the low speed card punch cabinet. This panel provides the operator with standardized controls and indicators for either on-line operation, or local off-line operation of the low speed card punch.

*d. Reader, Punched Card RP-152/G.*

(1) The card reader is an input device which reads 12-bit punched card code data from standard 80-column punched cards and converts it to 8bit ASCII data, then transmits the data to the common control unit for subsequent transmission into the AUTODIN system. Cards are read at a rate of up to 112.5 cards per minute.

(2) The card reader consists of a power supply, logic control unit, and an electromechanical reader mechanism mounted. in a free-standing console cabinet. The cabinet also houses a 1000 card capacity hopper and stacker, and a card handling workshelf. Up to 800 cards may be squared and tamped in a squaring corner of the workshelf.

(3) The front of the card reader cabinet also contains an operator's panel which contains standardized controls and indicators to allow selection of on-line operation, or local off-line operation under operator control.

*c. Reader, Punched Tape RP-154(P)/G.*

(1) The paper tape reader is input device that reads ASCII or ITA#2 data from punched chad or chadless paper tape, and transmit the information to the common control unit in the form of ASCII coded data. Either 8or 5-track paper tapes in 1-, 7/8-, or 11/16-inch widths may be used. Fully perforated tape is read at rates of up to 150 characters per second; chadless tape is read at a maximum rate of 18.75 characters per second.

(2) A power supply, a logic control unit, and an electromechanical tape reader mechanism are the major subassemblies of the paper tape reader. The subassemblies are mounted in a free-standing console cabinet which also houses tape holders for up to 12 tapes awaiting transmission, and tape bins for storage of tapes after transmission.

(3) An operator's panel is mounted at the front of the paper tape reader cabinet. This panel contains standardized controls and indicators to allow either on-line operation, or local manual operation of the paper tape reader.

(4) At terminals where traffic volume requires the use of two paper tape readers, an additional tape reader mechanism, associated power supply and logic control unit, are mounted in the console cabinet.

*f. Paper Tape Punch, High Speed RO-14/G.*

(1) The high speed paper tape punch is an output device which accepts ASCII data from the common control unit, converts it to ITA#2 data if desired, and punches the ASCII or ITA#2 information into paper tape at speeds up to 150 characters per second. In addition, the printer interpreter mechanism prints the punched character between the sprocket holes on the tape. The printer-interpreter may be operated independently of the punch mechanism. Either 8track 1-inch paper tape, or 5-track 1-, 7/8-, or 11/16-inch paper tape may be used.

(2) The high speed paper tape punch consists of a punch mechanism, logic control assembly, and power supply for the punch portion, and an independent power supply and printer-interpreter mechanism for the printer portion. All subassemblies are mounted in a free-standing console cabinet. The cabinet also contains a supply reel and a take-up reel, both of which have a capacity of 1000 feet of paper tape, and a tape bin for

storing processed tape at the operator's option.

(3) An operator's control panel is mounted at the front of the console cabinet. This panel allows the device to be operated on-line, or manually off-line, and the punch and printer-interpreter mechanisms to be operated independently.

*a. Paper Tape Punch, Low Speed R0415/G.*

(1) The low speed paper tape punch functions as a low speed on-line output device, or as an off-line paper tape message preparation unit. When used on-line, the low speed paper tape punch accepts ASCII data from the common control unit, converts it to ITA#2 data if desired, and punches the ASCII or ITA#2 information into paper tape at speeds up to 75 characters per second. In addition, a printer-interpreter mechanism prints the punched character between the sprocket holes on the tape. When the printer-interpreter is used, information is punched and printed at a maximum of 18.75 characters per second. The printer-interpreter mechanism may also be operated independently of the punch mechanism. Either 8-track, 1-inch paper tape, or 5-track, 1-, 7/8-, or 11/16-inch paper tape may be used.

(2) When used with the universal keyboard as an off-line paper tape message preparation device, data transfer rate is controlled by the universal keyboard. When the universal keyboard is connected to the low speed paper tape punch, interlock circuits prevent power being applied to the universal keyboard while the low speed paper tape punch is assigned at the common control unit.

(3) Major subassemblies of the low speed paper tape punch include a punch mechanism, logic control unit, and power supply for the punch portion, and an independent power supply and printer-interpreter mechanism for the printer-interpreter portion. These subassemblies are mounted in a free-standing console cabinet which also houses a supply reel and a take-up reel, both of which have a capacity of 1000 feet of paper tape, and a tape bin for storing processed tape at the operator's option.

(4) Mounted at the front of the console cabinet is an operator's control panel which contains standardized controls and indicators to allow the device to be operated on-line, or manually off-line, or the punch and printer-interpreter mechanisms to be operated independently.

*h. Page Printer RP-157/G.*

(1) The page printer is an output or monitor device which accepts ASCII information from the CCU and prints the corresponding message characters onto 9 1/2 inch wide paper at speeds of up to 300 characters per second. Printing paper used may be 1, 2, 3, 4, or 5-ply

with carbons, or multi-lith or spirit duplicating masters, 8 1/2, 11 or 14 inches long. All paper must have sprocket holes.

(2) The page printer consists of a rotary-drum impact type printer mechanism, an associated logic control unit, and a power supply, all mounted in a free-standing console cabinet. The cabinet also contains a paper supply compartment which will hold a 12-inch high stack of paper, and a paper stacker, capable of accommodating at least a 3-inch stack of printed material.

(3) An operator's control panel mounted at the front of the console contains the necessary controls and indicators to allow the page printer to be operated in either the on-line or manual off-line mode of operation. In addition to the control panel mounted controls and indicators, operator controls are provided to allow adjustment of the impact of the print hammers to compensate for varying thicknesses of printing mediums, selection of single, double or triple line spacing, and selection of a 1-inch margin immediately above and below perforations at paper folds.

*i. Control Keyboard C-7185/G.*

(1) The universal keyboard functions as an off-line message preparation device when used with the low speed card punch or high or low speed paper tape punch.

(2) The universal keyboard consists of a photo-electric keyboard and a logic assembly mounted on a roll-around cart. Power is derived from the low speed card punch or paper tape punch being used. Power and interface signals are transmitted through an interconnecting cable attached to the rear of the cart.

(3) The operator's manual inputs to the photo-electric keyboard are converted to ASCII data by the logic assembly and transferred to the device being used on a bit-parallel, character-serial basis. When used with a low speed card punch, a selector switch on the universal keyboard may be used to select punched card code key blocking. Data is still transferred in ASCII code (conversion to punched card code is done in the low speed card punch) but those keys which do not convert to punched card code are physically blocked. Similarly, when used with an ITA#2 low speed paper tape punch, the selector switch can be set to ITA#2 and those keys which do not convert to ITA#2 code are blocked.

(4) A control panel mounted on the front of the cart allows the operator to control card or tape motion from the universal keyboard, including backspacing of paper tape, and also provides indications of errors or alarm conditions.

**1-10. Description of Minor Components of Digital Subscriber Terminal Equipment Set**

*a. Circuit Switch Module SA-1493/G.*

(1) The circuit switching module is a modular addition to some common control units which enables the DST set to interface and operate in conjunction with the circuit switching unit of the automatic switching center (ASC). The circuit switching unit of the ASC allows direct connection between subscriber terminals having high traffic density for real-time message transfer between subscriber terminals connected to circuit switching units, and between subscriber terminals and the message switching unit. The circuit switching module is used to establish the circuit connection, monitor the circuit, and disconnect on completion of transmission.

(2) When installed in the common control unit, the circuit switching module consists of three printed circuit logic boards, an operator's panel and an interconnecting cable. The logic boards are installed in the common control unit logic assembly and the operator's panel is installed in the upper portion of the common control unit front panel.

(3) The circuit switching module is described in detail in the technical manual for the common control unit (app. A).

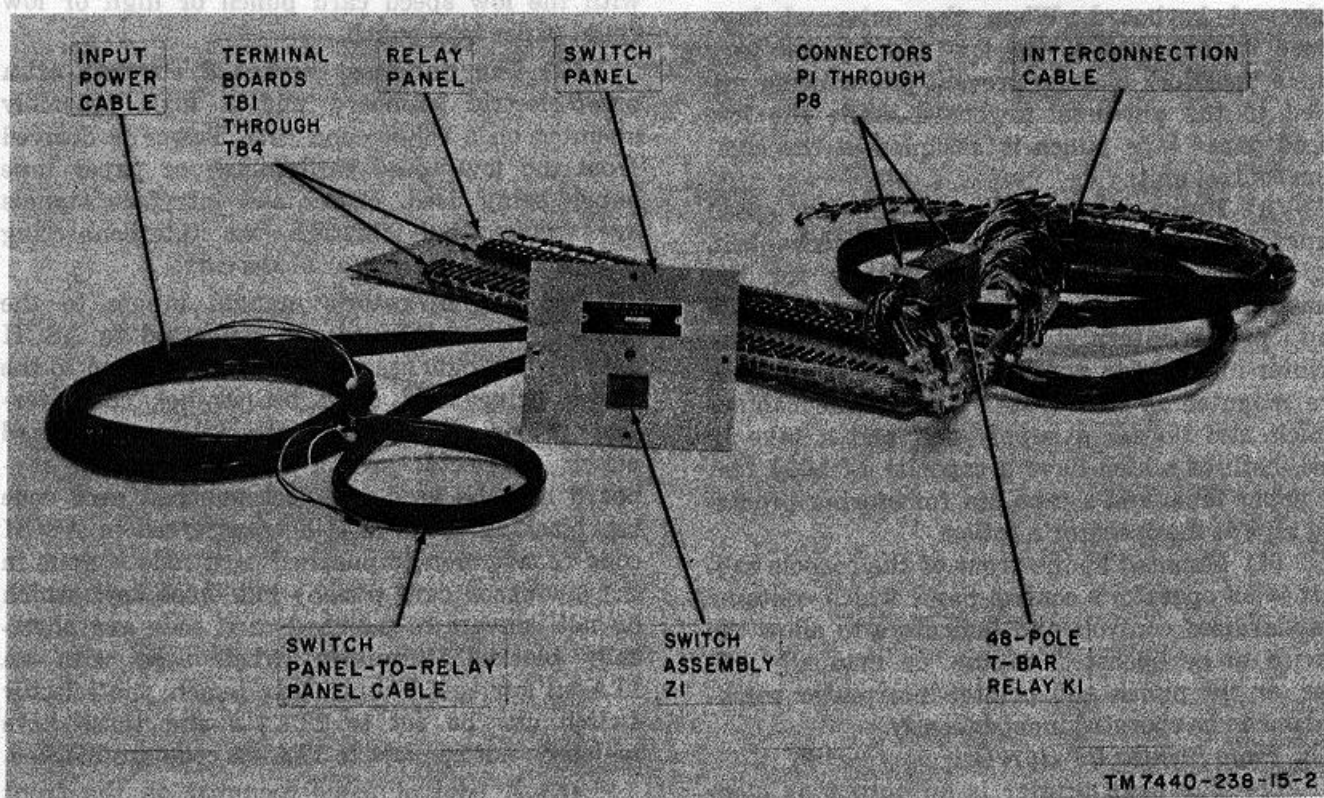
*b. Device Switching Module SA-1616/G.*

(1) The device switching module (fig. 1-3) is a modular addition to some common control units which enables the common control unit operator to select either one of two input devices for each common control unit send channel, or to select either of two output devices for each common control unit receive channel or monitor channel.

(2) When installed in a common control unit, the device switching module consists of a 48-pole relay, an alternate action pushbutton switch mounted in a control panel, and an interconnecting cable (fig. SM). The control panel is mounted in the upper portion of the common control unit front panel.

**NOTE**

**A conversion kit is available for revision of the cable harness of a device switch module to permit any one input, output, or monitor device**



**Figure 1-3. Device Switch Module SA-1616/G**

to be switched between any two CCU send, receive, or monitor channels (para 3-3d)

### CAUTION

If a T-Bar relay has been replaced, use only alcohol to clean solder flux from the terminals. Freon Type TF may be used for general cleaning of relay, but it is not an effective solvent for solder flux. Use of any other type of cleaning compound may result in damage to plastic relay parts and impairment of proper operation.

c. *Transmission Identification Generator Kit MK-1583/G.*

(1) The transmission identification generator kit is a modular addition to some punched tape reader units to enable automatic generation of channel designation, channel sequence numbers, and ACP-127 start of message code characters in message transmission where punched tape traffic is introduced into the AUTODIN via DSTE, AN/FYA-71V.

(2) When installed in the punched tape reader RP-154(P)/G, the transmission identification generator consists of a printed circuit card and a chassis. The printed circuit card is installed in the logic assembly of the punched tape reader. The chassis consists of a control panel containing controls and indicators and a printed circuit card. Interconnecting cables and mounting hardware are also provided with the kit.

(3) The transmission identification generator is described in detail in the technical manual for the punched tape reader.

### 1-11. Additional Equipment Required

The following additional equipment is not supplied as part of the DST set but is required for normal operation.

- a. Synchronizer, Electrical SN394(V)/G (crypto ancillary unit).
- b. Cryptographic unit.
- c. Modem, Low Speed Wire Line MD-474 (P)/G (modem).

Section III. SYSTEM APPLICATION

1-12. System Application of Equipment

a. The DST sets include all equipment necessary for transforming messages contained on punched paper tape or punched EAM cards into the electrical signals necessary for transmission over the AUTODIN network, and at the receiving end, of converting the received electrical signals into hard copy, punched tape or punched cards. The DST sets also contain the equipment necessary for preparing messages on punched paper tape or punched cards.

b. Messages for transmission are converted into electrical signals by the paper tape reader or card reader, and hard copy output is provided by the page printer, high or low speed card punch, or high or low speed paper tape punch. Off-line message preparation capability is provided by the universal keyboard operating with a low speed card punch or high or low speed paper tape punch.

c. The DST sets are supplied in six basic configurations (AN/FYA-71(V)1 through AN/FYA71(V)6) to meet the various communications requirements of AUTODIN subscriber terminals (fig. 1-4). All terminals are equipped with a common control unit and universal keyboard, and some terminals are supplied with duplicate

devices for critical applications. Depending on the floor space available, the equipment components of each set may be physically arranged into one of several different floor plans; in-line, parallel, parallel separated by 50 feet distance, and I-shaped. The only differences between the various floor plans is the length and routing of interconnecting cables and ductwork; equipment interrelationships remain the same.

1-13. DST Set Configurations

a. DST Set Configuration AA (AN/FYA-71(V)1).

(1) The AA configuration (fig. 1-5) is used for 150 baud paper tape (teletypewriter) operation, and consists of the following six devices:

- (a) Common Control Unit C-8120(P)/G.
- (b) Control-Keyboard C-7185/G.
- (c) Reader, Punched Tape RP-154(P)/G.
- (d) Page Printer RP-157/G.

SET NOMENCLATURE	ORIGINAL CONFIGURATION CODE	CAPABILITY						INPUT/OUTPUT DEVICES SUPPLIED								
		150 BAUD PAPER TAPE	1200 BAUD PAPER TAPE	300 BAUD PUNCHED CARD	1200 BAUD PUNCHED CARD	COMMON CONTROL UNIT C-8120(P)/G	CONTROL-KEYBOARD C-7185/G	READER, PUNCHED TAPE RP-154(P)/G	READER, PUNCHED CARD RP-154(P)/G	PAGE PRINTER RP-157/G	CARD PUNCH, LOW SPEED RO-313/G (ON LINE)	CARD PUNCH, LOW SPEED RO-313/G (OFF LINE)	CARD PUNCH, HIGH SPEED RO-312/G	PAPER TAPE PUNCH, LOW SPEED RO-315/G (ON LINE)	PAPER TAPE PUNCH, LOW SPEED RO-315/G (OFF LINE)	PAPER TAPE PUNCH, HIGH SPEED RO-314/G
AN/FYA-71(V)1	AA	●			●	●		●	●					●	●	
AN/FYA-71(V)2	AB	●	●		●	●	●	●	●	●	●			●	●	
AN/FYA-71(V)3	AE		●		●	●		●	●						●	●
AN/FYA-71(V)4	BB				●	●	●		●		●	●				
AN/FYA-71(V)5	BC		●		●	●	●			●	●					
AN/FYA-71(V)6	BE	●		●	●	●	●	●	●		●	●		●	●	

Figure 1-4. DST set capabilities and equipment components

TM7440-238-15-3

(e) Paper Tape Punch, Low Speed RO315/G (on-line).

(f) Paper Tape Punch, Low Speed RO315/G (off-line).

(2) Figure 1-5 shows a block diagram of the AA configuration. Punched paper tape is prepared off-line on either a teletypewriter or the off-line low Speed paper tape punch used with the universal keyboard. This punched paper tape is then loaded on the paper tape reader where it is read under control of the common control unit and the information sent to the ASC. Received messages are printed out on the page printer used as a monitor, and a punched paper tape is prepared by the on-line low speed paper tape punch. The normally off-line low speed paper tape punch may also be used to receive messages.

*b. DST Set Configuration AB (AN/TYA-71 (V)2).*

(1) For 150 baud paper tape and 300 baud punched card operations, the AB configuration (fig. 1-6) is used. This configuration consists of the following nine devices:

- (a) Common Control Unit C-8R120(P)/G.
- (b) Control-KeyBoard C7185/G.
- (c) Reader, Punched Tape RP-154(P)/G.

(d) Reader, Punched Card RP-152/G.

(e) Paper Tape Punch, Low Speed RO-315/G (on-line).

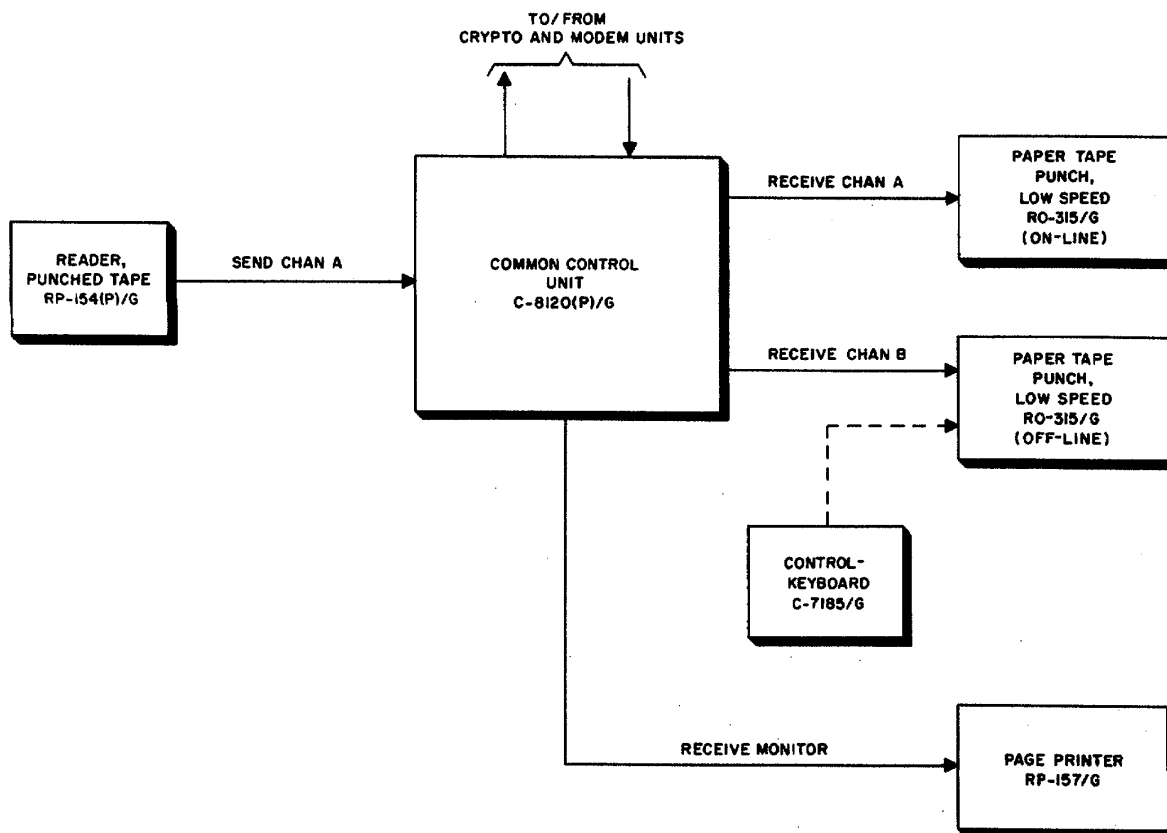
(f) Paper Tape Punch, Low Speed RO315/G (off-line).

(g) Card Punch, Low Speed RO313/G (on-line).

(h) Card Punch, Low Speed RO-313/G (off-line).

(i) Page Printer RP-157/G.

(2) As shown in figure 1, configuration AB provides both punched paper tape and punched card capability. Punched paper tape operation is identical to that described for configuration AA (para 1-13a.). Punched cards are prepared off-line on a low-speed card punch used with the universal keyboard, or other off-line card punch. The punched cards are loaded onto the card reader and read under control of the common control unit, and the information is sent to the ASO. Received card messages are printed out on the page printer (if desired) and on an on-line



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Figure 1-5. Digital Subscriber Terminal AN/FYA-71(V)1 (AA configuration), block diagram.

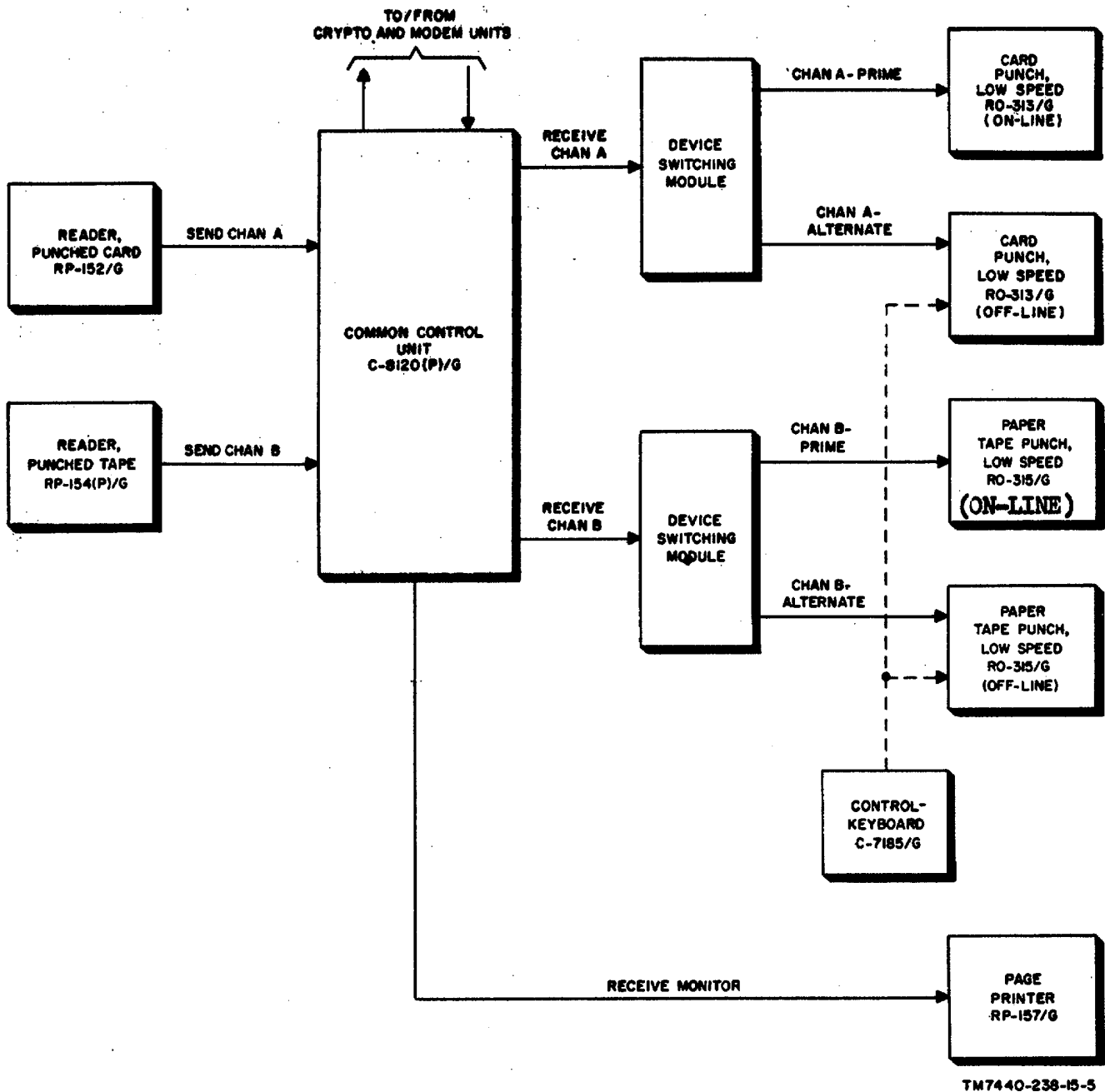


Figure 1-6. Digital Subscriber Terminal AN/FYA-71 (V2) (AB configuration), block diagram.

low speed card punch. Device switching modules installed in the common control unit allow the received messages to be switched to either on-line or normally off-line devices.

c. DST Set Configuration AE (AN/FYA-71V)S).

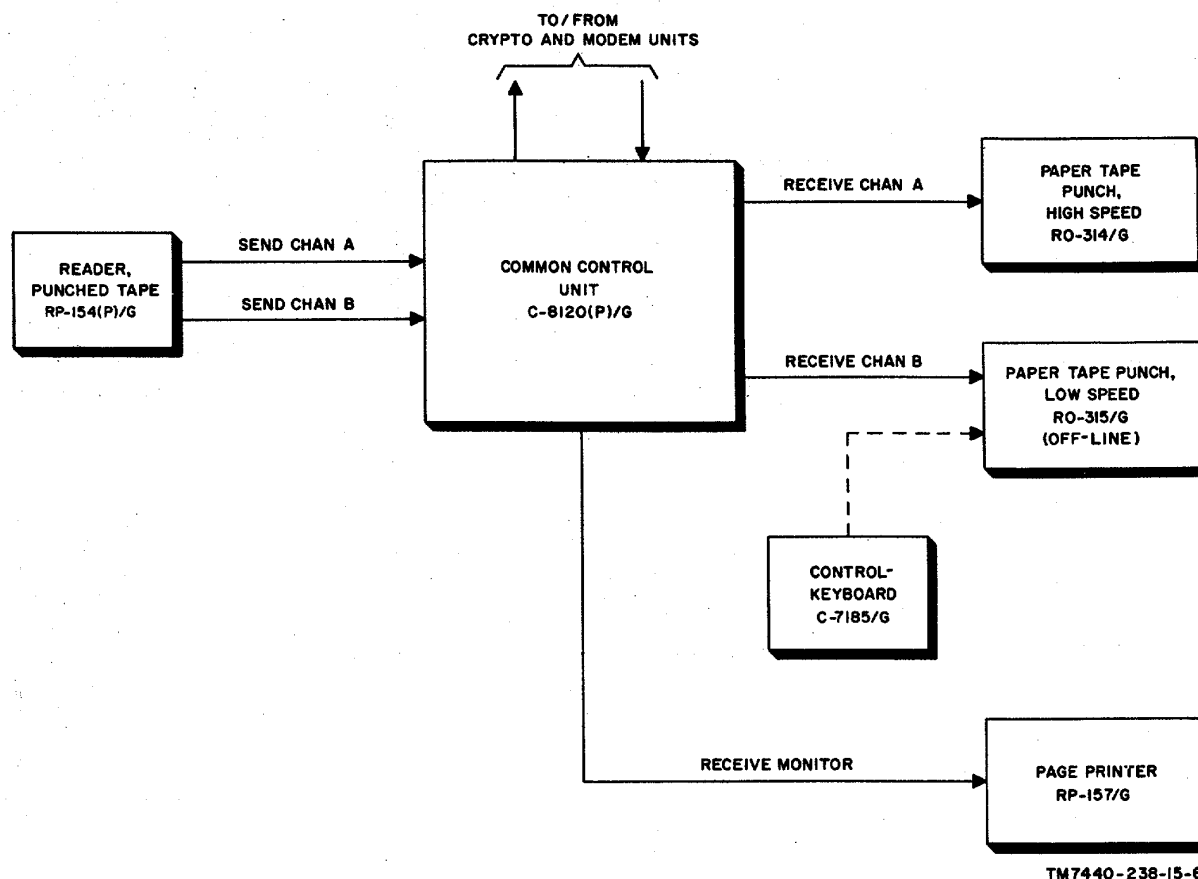
(1) The AE configuration is used at terminals which require 1200 baud paper tape operation, and consists of the following six devices:

- (a) Common Control Unit C-8120(P)/G.
- (b) Control-KeyBoard C-7185/G.

- (c) Reader, Punched Tape RP-154(P)/G (with two reader mechanisms).
- (d) Paper Tape Punch, High Speed RO814/G.
- (e) Paper Tape Punch, Low Speed RO-315/G (off-line).
- (f) Page Printer RP-157/G.

(2) Figure 1-7 shows a block diagram of the AB configuration. Operation is the same as for configuration AA (para. 1-13a) except that messages





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Figure 1-7. Digital Subscriber Terminal AN/FYA-71 (V)3 (AE configuration), block diagram.

are processed at 1200 baud by the on-line high speed paper tape punch.

d. DST Set Configuration BB (AN/FYA-71(V)4).

(1) At terminals where 1200 baud punched card operation is required, the BB configuration is used. This configuration consists of the following six devices:

- (a) Common Control Unit C-8120(P)/G.
- (b) Control-Keyboard C-7185/G.
- (c) Reader, Punched Card RP-152/G.
- (d) Card Punch, High Speed RO312/G.
- (e) Card Punch, Low Speed RO313/G

(off-line).

- (f) Page Printer RP-157/G.

(2) A block diagram of the BB configuration is shown in figure 1-8. Punched cards are prepared off-line by the low speed card punch used with the universal keyboard, or other off-line card punch. The cards are then loaded onto the card reader, where they are read under control of the common control unit and the information transmitted to the ASC. Received messages are printed out by the page printer while the high speed card punch prepares punched cards containing the message at 112.5 cards per minute.

e. DST Set Configuration BC (ANIPYA-71(V)).

(1) Card operation at 300 baud is provided by the BC configuration. This configuration consists of the following five devices:

- (a) Common Control Unit C-8120(P)/G.
- (b) Control-Keyboard C-7185/G.
- (c) Reader, Punched Card RP-152/G.
- (d) Card Punch, Low Speed RO313/G
- (e) Card Punch, Low Speed RO313/G

(on-line).

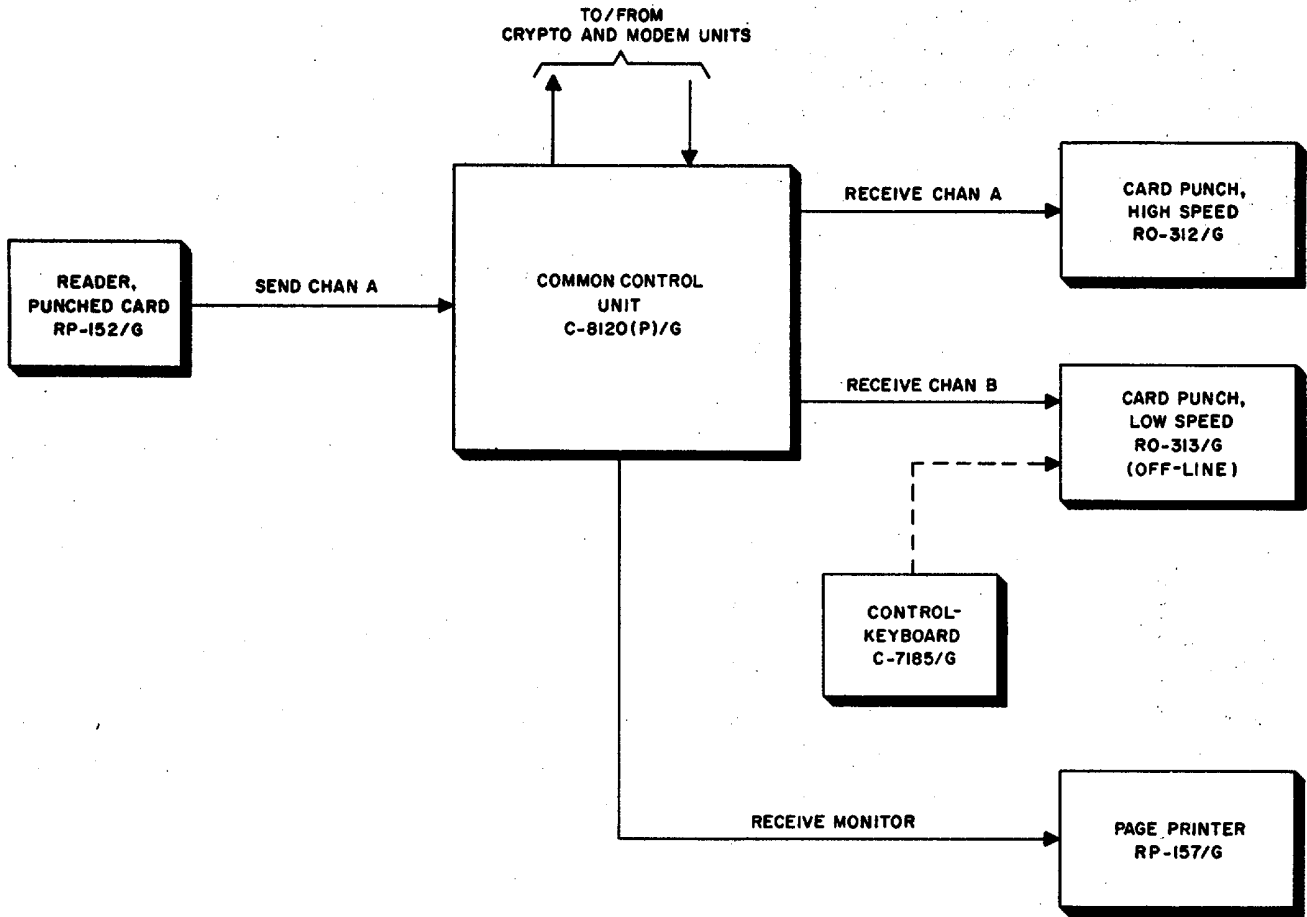
(off-line).

(2) As shown in the block diagram of figure 1-9 operation of configuration BC is similar to that of configuration BB (para 1-13M except that a low speed card punch is used as the on-line device and no page printer is provided.

f. DST Set Configuration BE (AN/FYA-71(V)6).

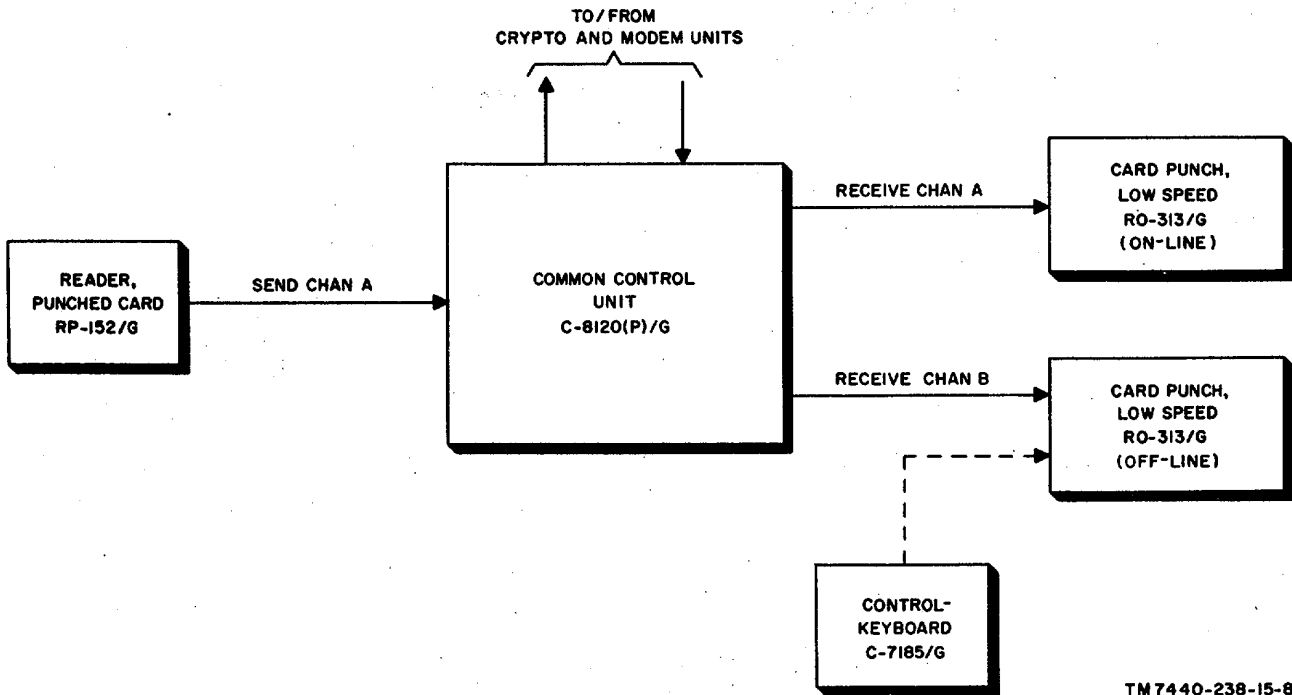
(1) The BE configuration is used for 1200 baud paper tape and 1200 baud punched card operations, and consists of the following nine devices:

- (a) Common Control Unit C-8120(P)/G.



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Figure 1-8. Digital Subscriber Terminal AN/FYA-71 (V)4 (BB configuration), block diagram.



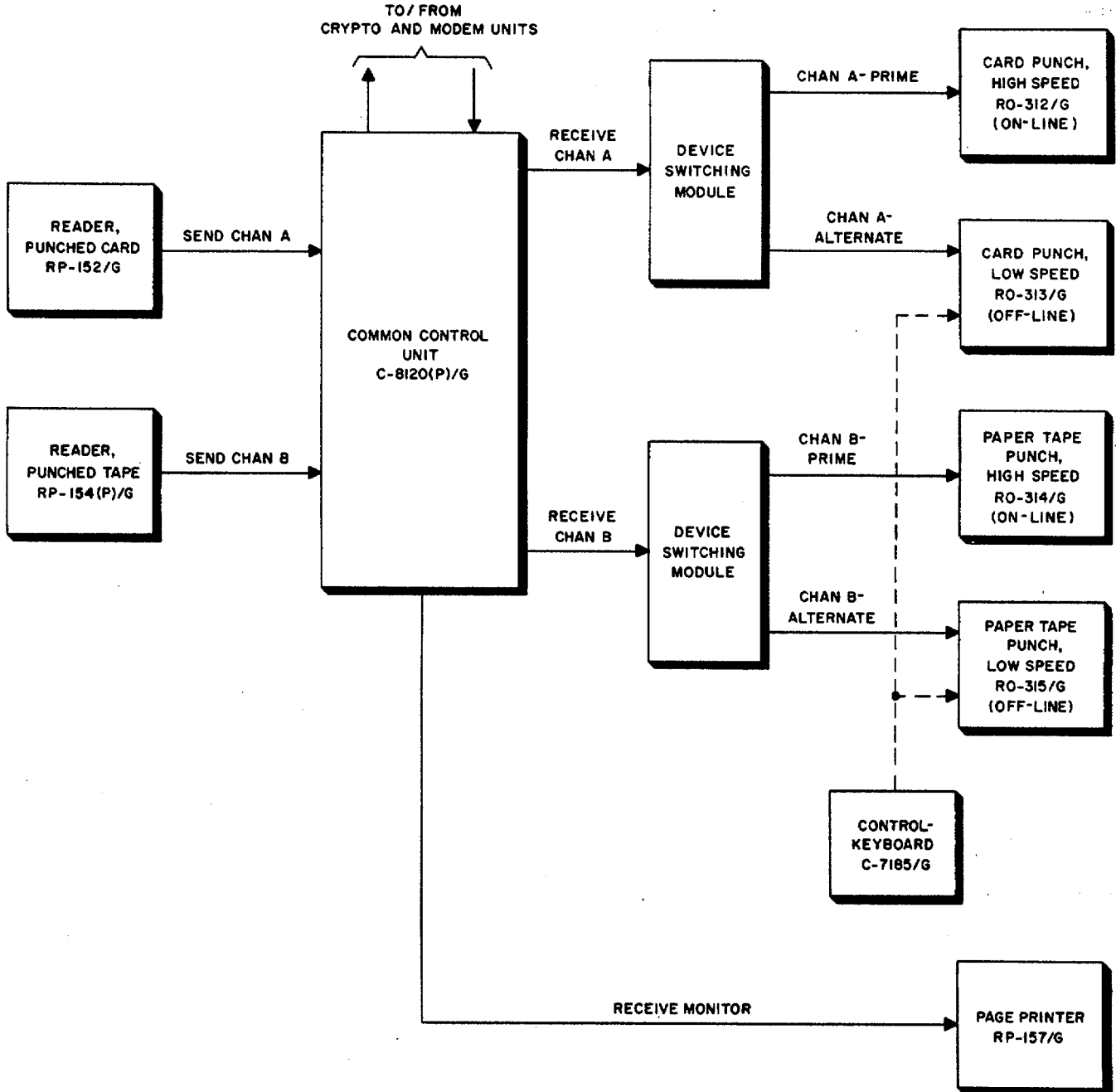
TM 7440-238-15-8

Figure 1-9. Digital Subscriber Terminal AN/FYA-71 (V)5 (BC configuration), block diagram.

- (b) Control-Keyboard C-7185/G.
- (c) Reader, Punched Card RP-152/G.
- (d) Reader, Punched Tape RP-154(P)/G.
- (e) Card Punch, High Speed RO-312/G (on-line).
- (f) Card Punch, Low Speed RO313/G (off-line).
- (g) Paper Tape Punch, High Speed RO314/G (on-line).

- (h) Paper Tape Punch. Low Speed RO 315/G (off-line).
- (i) Page Printer RP-157/G.

(2) Figure 1-10 shows a block diagram of configuration BE. Operation is similar to configuration AB (para 1-13b.) except that high speed output devices are used on-line.



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Figure 1-10. Digital Subscriber Terminal AN/FYA-71 (V6) (BE configuration), block diagram.  
1-14 Change 2

**2-1. Controls, Indicators, and Connectors**

Table 2-1 presents the controls and indicators associated with the device switching module when it is installed in a common control unit. All controls, indicators, and connectors for devices comprising the DST sets are explained in the individual technical manuals for each equipment (app. A).

*Table 2-1. Device Switching Module Front Panel Controls and Indicators*

<i>Control and indicator</i>	<i>Function</i>
PRIME/ALTER-NATE (alternate action pushbutton switch).	Selects and indicates input or output device connected to associated send, rec. or mon channel of CCU.
<i>Sw indication</i>	<i>Device connected</i>
PRIME	Device designated as normally on-line connected to input or output channel.
ALTER-NATE	Normally off-line .device connected to input or output channel.

**Note: When Device Switching Module Conversion Kit SM-A-634825) is installed, switch indications reflect following:**

<u>Sw Indication</u>	<u>Device connected</u>
PRIME	Device connected to normally designated send, receive, or mon channel.
ALTERNATE	Device connected to alternate send, receive, or monitor channel.

**Note. Paragraphs 2-2 through 2-8 provide instructions on use of the DST set equipment components to prepare, transmit, and receive messages only. AUTODIN message formats, routing doctrines, and overall operational procedures are contained in other appropriate publications.**

**2-2. Types of Operation**

a. Each DST set is capable of simultaneously transmitting a message from an input device to the Automatic Digital Message Switching Center or Automatic Electronic Switching Center (ASC) and receiving a message from the ASC for an output device. The DST set is also, capable of monitoring the messages being transmitted or received. The DST set may be connected through crypto and modem equipment and the crypto ancillary unit to the ASC.

b. In those DST sets in which the common control unit contains a circuit switching module, the store and forward portions of the ASC may be bypassed. Circuit

switch operation allows DST sets, which are similarly equipped with circuit switching modules, to interchange messages on a real-time basis. DST sets which do not have circuit switching modules stalled use the store and forward portions of the ASC for message switching operation.

c. At those DST sets in which duplicate input or output devices are provided, and a device switching module is installed in the common control unit, alternate input or output devices may be used for each input or output channel. Device switching modules are supplied with the AB and BE configurations (para 1-13) and allow either one of two paper tape punches to be used on one receive channel and either one of two card punches to be used on the other receive channel.

d. To operate the equipment for any particular type of operation, perform the following procedures:

- (1) Preliminary starting procedure (para 2-3).
- (2) Starting procedure (para 2-4).
- (3) Procedure for the desired type of operation (para 2-5).
- (4) Stopping procedure (para 2-6).

**2-3. Preliminary Starting Procedure**

Prior to placing the DST set equipment into operation, perform the following steps:

- a. Check that all wall mounted circuit breakers supplying power to the equipment are on.
- b. Install blank paper, tape, cards and ribbon on output and monitor devices as described in the applicable technical manuals (appx A).
- c. Check that modem, crypto, and crypto ancillary units are turned on.

24. Starting Procedure Note. If abnormal indication is obtained during the starting procedure, refer to the equipment performance check list (para 4-3b.) for suggested corrective measures. Start the DST set equipment by, performing the following steps:

- a. *At the common control unit:*
  - (1) Press the AC POWER switch and check that it lights white. The DC POWER indicator should also light white.
  - (2) Press LAMP/AUDIO TEST. pushbutton momentarily and check that all indicators light.
  - (3) Check that STATUS SW SYNC indicator is out.
  - (4) Press CRYPTO INIT SYN pushbutton switch to initiate cryptographic unit synchronization if CRYPTO CAU ALARM indicator is on.
  - (5) If any STATUS indicators are lit, press STATUS CLEAR pushbutton switch to extinguish the lamps.

(6) For AB and BE configurations only, check that PRIME portion of PRIME/ALTERNATE pushbutton switch on each device switching module is lit. If any are not, press appropriate pushbutton switch once.

(7) Press SEND DEVICE CANCEL switch to establish ACK synchronization.

*b. At each output or monitor device:*

(1) Press AC POWER switch and check that it lights. Check that DC POWER indicator also lights white, NOT ASSIGNED indicator lights amber, and the STOP switch-indicator lights (red).

**Note. A delay of up to 45 seconds for the page printer DC POWER indicator to light is normal.**

(2) Press LAMP TEST pushbutton switch momentarily and check that all indicators light.

(3) Press START pushbutton switch. Pushbutton should light green and NOT ASSIGNED indicator should remain on.

*c. At each input device:*

(1) Press AC POWER pushbutton switch and check that it lights white. DC POWER indicator should also light white, NOT ASSIGNED indicator should light amber, and the STOP switch-indicator lights (red).

(2) Press LAMP TEST pushbutton momentarily and check "flat all indicators light.

## 2-5. Operating Procedures

This paragraph describes the steps necessary to accomplish either on-line (para b) or off-line (para c) operations. Refer to the appropriate paragraph for the operation to be performed.

*a. Audible Alarm.* Certain indicators which show faults or other information requiring immediate operator attention sound an audible alarm at the common control unit. Volume of the alarm may be adjusted by the VOLUME control on the common control unit operator's panel. The audible alarm may be silenced by either pressing the AUDIBLE RESET pushbutton switch on the common control unit, or by pressing the AUDIBLE RESET pushbutton switch on the device causing the alarm. Silencing the audible alarm does not turn off the indicator which initiated the alarm, so it is suggested that the appropriate AUDIBLE RESET pushbutton switch be pressed to silence the alarm, then the common control unit operator's panel be scanned to determine which input or output device initiated the alarm. If a FAULT light for an input or output device is lit, the control panel for that device should then be scanned to determine the exact cause of the malfunction. Take corrective action as instructed in individual technical manuals. The audible alarm will also stop sounding automatically when the condition causing the alarm is corrected.

*b. On-Line Operating Procedure.*

(1) *System Status Indicators.* During message transmission or reception, system STATUS indicators on the common control unit may light. These indicators show the status of the interface between the DSTE Set common control unit and the ASC. The meaning of each indicator, and the proper action to take when each lights, is as follows:

(a) *RM indicator.* When the RM (reject message) indicator lights red, it means that the message contains a defect which cannot be corrected by retransmission of the line block. Carefully examine the message, correct it if necessary, and attempt to retransmit the message. Extinguish the indicator by pressing the STATUS CLEAR pushbutton switch.

(b) *3 RPT indicator.* The 3 RPT indicator will light when the common control unit has retransmitted the reply (REP) or cancel (CAN) character to the ASC three times without receiving the proper reply, and indicates that an answer is outstanding. (Refer to paragraph 3-3a(2) (e) and (3) (c) for detail discussion of conditions which will cause the 3 RPT indicator to light.) The indicator will extinguish automatically when the proper reply is received from the ASC.

(c) *5 MIN WBT indicator.* After a WBT (wait-before-transmit) signal has been received from the ASC for five consecutive minutes, the 5 MIN WBT indicator will light red and the audible alarm will sound. Depending on the priority of the message, either contact the ASC or attempt to transmit the message at a later time. Pressing the STATUS CLEAR pushbutton switch will extinguish the indicator.

(d) *INV indicator.* If the INV (invalid) indicator lights during message reception, it indicates that the common control unit has sent an unsolicited control character to the ASC. If the INV indicator lights during message transmission, it indicates that the ASC has sent the common control unit an unsolicited control character. In either case, the message in process should be suspected of being incorrect or invalid. Operate the STATUS CLEAR pushbutton switch to extinguish the indicator.

(e) *SW WBT indicator.* When a WBT (wait-before-transmit) signal is sent from the ASC to the common control unit, the SW WBT indicator will light red. The indicator automatically goes out when a control character other than wait-before-transmit is received. Therefore, no operator action is required unless the 5 MIN WBT indicator also lights ((c) above), but the indicator shows why the message is not being transmitted.

(f) *SW SYN indicator.* If synchronization with the ASC is lost, the SW SYN (switch synchronization) indicator will light red. While the light

is on, messages cannot be transmitted and none can be received. The common control unit will attempt to automatically resynchronize; in which case, the indicator will go out. If the SW SYN indicator remains on, be sure modem and cryptographic equipment is operating properly, then contact the ASC.

(2) *Crypto interface controls and indicators.*

Controls and indicators are provided on the common control unit operator's panel to control and indicate the interface between the DST set common control-unit and the cryptographic and cryptographic auxiliary units. These controls and indicators, and the procedure to follow, are as follows:

(a) *RESYN indicator.* This indicator shows that the cryptographic unit is undergoing a resynchronization process. While the RESYN indicator is lit red, no data will be sent or received. The indicator will go out automatically when resynchronization is complete.

(b) *INIT SYN control.* When pressed, the INIT SYN control initiates the cryptographic resynchronization process.

(c) *CAU ALARM indicator.* When this indicator lights red, it indicates that an alarm signal has been received from the cryptographic auxiliary unit. This indicator will remain on until the alarm signal is removed. Correct the condition at the cryptographic auxiliary unit which is causing the alarm by following the procedures of the appropriate technical manual.

(3) *Device switching module operation.* A device switching module is supplied with each AB and BE configuration, and provisions are made to install the modules in other configurations as needed. In the AB and BE configurations, the device switching module allows two paper tape punches to be alternately connected to one receive channel and two card punches to be alternately connected to the other receive channel. When a device is installed, an alternate action pushbutton switch for each device switching module used is mounted in the upper portion of the common control unit operator's control panel. This switch is labeled PRIME/ALTERNATE and the appropriate portion of the pushbutton lights to show the output device in use on each receive channel. To change device assignments, press the switch once. The illuminated portion should go out and the opposite half of the pushbutton should light. Refer to paragraph 28 for use of the device switching module under emergency conditions.

(4) *Circuit switching module operation.*

Circuit switching modules are installed in some common

control units to allow the DST sets to operate in the circuit switch mode (para 2-2b.) The circuit switching module selects the method of message handling to be used.

**NOTE**

**For circuit switching operation, check to be sure that a printed circuit card is not present in the A17 PC card position of the CCU logic assembly and that the PC card A16 is patched correctly. Refer to TM 11-7440-239-15 for instructions on the correct patching of PC card A16.**

(a) *Circuit switching operation.* To operate in circuit switching, proceed as follows:

1. Press SELECT MSU/CSU pushbutton switch on circuit switching module control panel so that CSU portion lights. The OPER MODE CS indicator should also light white and the DISC MODE DISCONNECT pushbutton should light amber.

2. Select automatic or manual disconnect at end of message by pressing the DISC MODE AUTO/MANUAL pushbutton switch to light the appropriate portion. With AUTO portion on, an automatic disconnect will occur after each message transmission. With MANUAL portion on, the called terminal remains connected so that several messages may be sent to the terminal in sequence. When manual disconnect is used, the DISC MODE DISCONNECT pushbutton switch must be pressed to terminate the connection.

3. Transmit and receive messages using the procedures of paragraphs 2-5b(5) and (6). If, during transmission, the MESSAGE STATUS RETRANSMIT pushbutton switch lights red, it indicates that the message has not been transmitted. Reload the message on the input device and press the illuminated switch to reset. Attempt to transmit the message a second time. If both the MESSAGE STATUS RETRANSMIT pushbutton and MESSAGE STATUS BUSY indicator light, it indicates that the common control unit has attempted to transmit the message three times and the called terminal is busy. Depending on the priority of the message, either attempt to transmit the message at a later time or use message switching operation (pan b.) so that the store and forward portion of the ASC is used.

(b) Message switching operation. For message switching, perform the procedures in 1 and 2 below.

**NOTE**

**Before operating in the message switching mode, check to be sure that PC card SM-E-546651 is in position A17 of the logic assembly.**

1. Press the SELECTMSU/CSU switch on the CSM control panel to cause the MSU portion to light. The OPER MODE MS indicator should light also.

2. Transmit and receive messages by following the procedures described in (5) and (6) below.

(5) *Transmitting messages.* Message transmission consists of loading a card deck or punched paper tape containing the message(s) onto a card reader or paper tape reader, and selecting the device from the common control unit. Messages are read from the device under control of the common control unit, and when all message transmission is complete the device stops. The following subparagraphs describe the procedure to follow using either a card reader ((a) below) or a paper tape reader ((b) below) as an input device. Follow the procedure of the appropriate subparagraph for the input device(s) available at your terminal.

(a) *Transmission using card reader as input device.*

1. At the common control unit, check that no CRYPTO or STATUS indicators are on.

2. Select the input device to be used by pressing the SEND DEVICE A ASSIGNED or SEND DEVICE B ASSIGNED pushbutton switch. Check that switch pushbutton lights white and associated FAULT indicator does not light.

**NOTE**

**If two input devices are available and both are assigned and ready for operation, the common control unit will automatically switch between the devices on an alternative message basis.**

3. If monitoring of the message being transmitted is desired, ready the monitor device, then press SEND MONITOR A ASSIGNED or SEND MONITOR B ASSIGNED pushbutton switch on the Common Control Unit. The CAUTION or FAULT lights associated with the monitor device should not light, and the appropriate pushbutton should light white.

**NOTE**

**As supplied, monitor devices are only**

**used on receive channels. However, by rewiring (see TM 11-74401239-15), 24 Change 2 the monitor device may be used on a send channel.**

4. At the card reader, check that the NOT ASSIGNED indicator is out. Load message contained on punched cards onto card reader by following the instructions of the card reader technical manual.

5. Press START switch on card reader. The switch should light white and the card reader should start operating, the SELECT indicator on the common control unit should also light white.

6. Messages being transmitted may be canceled by pressing the CANCEL control on the common control unit operator's control panel. The CANCEL pushbutton will light amber, and the CANCEL indicator on the card reader and the SEND DEVICE A (or B) CANCEL indicator on the common control unit will light red. When the ASC acknowledges that the message has been canceled, the CANCEL pushbutton will go out, but the SEND DEVICE A (or B) CANCEL indicator and the CANCEL indicator on the card reader will remain on. The SELECT indicator for the device will also go out.

**NOTE**

**The CANCEL indicators may light because of an automatically initiated cancel. In this case, other fault indicators will also light.**

7. If it is desired to interrupt a message to add more cards to the hopper, or to empty the stacker, press the EOB STOP pushbutton switch on the common control unit operator's control panel. The card reader will stop at the end of a block (one card) and will resume operation when the EOB STOP pushbutton is pressed a second time. The pushbutton will light red while the card reader is in an end-of-block stop condition.

8. To halt operations before all messages loaded are processed (to insert a higher priority message, for example) press the EOM STOP pushbutton switch on the common control unit operator's control panel. The card reader will stop at the end of the message being read, but will remain selected by the common control unit (SELECT indicator remains on). Normal operations will resume when the EOM STOP pushbutton is pressed the second time. The EOM STOP pushbutton will light white to indicate an end-of-message stop is pending, and will light red while the card reader is in an end-of-message condition.

*(b)Transmission using paper tape reader as input device.*

1. Perform the procedures described in (5) (a) 1, 2, and 3 above.

2. At the paper tape reader, check that ,NOT ASSIGNED indicator is out.

3. Select the proper operating speed For the paper tape reader by pressing the HIGH SPEED/LOW SPEED pushbutton switch. Pushbutton will light to show speed being used. Use HIGH SPEED for fully perforated punched paper tape, and use LOW SPEED for chadless tape.

4. Check that ASCII/ITA #2 switch located on the paper tape reader logic panel is in the proper position for the message tape to be used.

5. If the punched tape reader has a transmission generator installed, check that the ON LINE/OFF LINE switch located on the transmission identification generator control panel is in the position required for proper operation of your terminal. If the switch is in the ON LINE position, check to determine the TIG ON indicator is illuminated white. In addition, check the count in the NEXT MESSAGE display and, if necessary, load the message sequence Counter to the proper number to be used on the next message to be transmitted. If the switch is in the OFF LINE position, check to determine the TIG ON indicator is not illuminated.

6. If message text and heading information is contained on one continuous tape, perform 7 below. If message text and heading information are contained on separate tapes, perform 8 below.

7. Load punched paper tape containing the message into the paper tape reader by following the procedure of the applicable technical manual. Press the tape reader START switch, which should light white. The paper tape reader should start operating and the SELECT indicator on the common control unit should light white. In addition, on punched tape readers having a transmission identification generator operating in the on-line mode, the NEXT NUMBER display on the transmission identification generator control panel should increment by one.

8. Load the tape containing the message heading information onto the paper tape reader by following the procedure of the applicable technical manual. Press PILOT HEADER pushbutton switch. The pushbutton should light amber and the SELECT indicator at the common control unit should light white. The paper tape reader should start and read the entire pilot header tape. When the pilot header tape is completely read, the paper

tape reader will stop and the OUT OF TAPE indicator will light. However, the paper tape reader will remain selected by the common control unit. Load the tape containing the text of the message and press the START pushbutton. Normal message processing should proceed. On punched tape readers having a transmission identification generator operating in the on-line mode, the NEXT NUMBER display on the transmission identification generator control panel should increment by one.

9. Messages being transmitted may be canceled by pressing the CANCEL pushbutton on the common control unit operator's control panel. The CANCEL pushbutton will light amber and the CANCEL indicator on the paper tape reader and the SEND DEVICE A (or B) CANCEL and FAULT indicators on the common control unit will light red. When the ASC acknowledges that the message has been canceled, the CANCEL pushbutton will go out, but the SEND DEVICE A (or B) CANCEL indicator on the CCU, and the CANCEL indicator on the paper tape reader, will remain on. The SELECT indicator for the device will also go out.

**NOTE**

**The CANCEL indicator may light because of an automatically initiated cancel. In this case, other fault indicators will also light.**

10. If it is desired to interrupt a message for a short period of time, press the EOB STOP pushbutton switch on the common control unit operator's control panel. The paper tape reader will stop at the end of a block and will resume operation when the EOB STOP pushbutton is pressed a second time. The pushbutton will light red while the paper tape reader is in an end-of-block stop condition.

11. To halt operations before all messages loaded are processed (to insert a higher priority message, for example), press the EOM STOP pushbutton switch on the common control unit operator's control panel. The paper tape reader will stop at the end of the message being read, but will remain selected by the common control unit (SELECT indicator remains on). Normal operations will resume when the EOM STOP pushbutton is pressed the second time. The EOM STOP pushbutton will light white to indicate an end-of-message stop is pending, and will light



red while the paper tape reader is in an end-of-message condition.

(6) *Receiving messages.* Message reception consists of preparing output devices to receive messages, assigning the devices at the common control unit, and monitoring the proper operation of the devices. When a message is received from the ASC, the proper receive channel handles the message. This is determined by the select code in the heading of the received message. When the entire message has been copied, the output device stops. To receive messages, proceed as follows:

(a) At the common control unit check that no CRYPTO or STATUS indicators are on.

(b) Check that output devices to be used for message reception are loaded with blank paper, tape, cards or ribbon as instructed in applicable technical manuals (app A) and are ready for operation.

(c) If a device switching module is installed in the common control unit, press PRIME/ ALTERNATE pushbutton as necessary to select the desired output device to receive the message for each channel.

(d) At the common control unit, press the RECEIVE DEVICE A ASSIGNED and RECEIVE DEVICE B ASSIGNED pushbutton switches. The pushbuttons should light white and the associated CAUTION and FAULT indicators should not light.

(e) At each output device, check that NOT ASSIGNED indicator is out.

(f) If a low speed card punch is being used as an output device, check that PRINT pushbutton is lit white. If not, press the switch once.

(g) If a high or low speed paper tape punch is being used as an output device, check that the WIDE/NARROW switch is indicating properly for the width of tape loaded (WIDE for 1 and 7/8-inch wide tape; NARROW for 11/16-inch tape). Press the switch once to change indications. Also check that ASCII/ITA#2 switch, located on paper tape punch logic panel, is in proper position.

(h) Press START pushbutton switch on output device. Pushbutton should light green.

(i) At common control unit, check that READY indicators for the assigned output devices are lit green. Until a message is received, the output device START switch, and the READY indicator at the common control unit should both remain green. When a message is 26 Change 2 received, the START pushbutton on the device should light white and at the common control unit, the READY indicator should go out and the SELECT indicator should light.

#### NOTE

**If a message containing a select character for an output channel which is not assigned is received, the appropriate common control unit RECEIVE DEVICE A ASSIGNED or RECEIVE DEVICE B ASSIGNED pushbutton switch will light red and the audible alarm will sound. If the device is prepared for operation, press the ASSIGNED pushbutton switch. The device will copy the message and the audible alarm will stop.**

(j) During message reception, check for proper operation of the output device. Certain device conditions which should be corrected will cause the CAUTION indicator to light at the common control unit. When this occurs, look at the control panel of the device. One or more indicators should be on to indicate the exact cause of the CAUTION indication. When the condition is corrected, the CAUTION indicator should go out.

(7) *Monitoring messages.* Either messages being sent or messages being received may be monitored. The monitor device (card punch, paper tape punch, or page printer) is assigned to the desired send or receive channel at the common control unit and all messages being sent or received on that channel will be printed out. To accomplish monitoring, proceed as follows:

(a) Prepare DSTE Set equipment to transmit or receive messages as instructed in paragraphs (5) or (6).

(b) Check that monitor device has been loaded with blank paper, tape, cards or ribbon as instructed in applicable technical manuals (Appendix I). Press the START pushbutton switch on the monitor device and check that the pushbutton lights green.

(c) To monitor an input channel, press the appropriate SEND MONITOR A ASSIGNED or SEND MONITOR B ASSIGNED pushbutton switch at the common control unit. To monitor an output channel, press the appropriate RECEIVE MONITOR A ASSIGNED or RECEIVE MONITOR B ASSIGNED pushbutton switch.

(d) When the monitor device is assigned, check that CAUTION and FAULT indicators are out, and READY indicator lights green at common

control unit.. Also check that NOT ASSIGNED indicator on monitor device goes out.

(e) When a message is transmitted or received, the READY light should go out at the CCU and the SELECT indicator should light. The START pushbutton switch at the monitor device should light white.

(f) For operation of FLASH pushbutton switch during monitoring of received messages, see paragraph 2-7.

*c. Off-Line Operating Procedures.* Off-line operation consists of preparing messages or message heading data with the universal keyboard connected to a low-speed card punch or to a low-speed or high-speed paper tape punch. The operating procedures of the following subparagraphs are divided into procedures for card equipment and procedures for paper tape equipment. Refer to the appropriate subparagraph for equipment at your terminal.

(1) Universal keyboard used with low speed card punch.

(a) Connect universal keyboard to low speed card punch by inserting quick-disconnect connector PS on the universal keyboard cable into receptacle J1 on the front of the low-speed card punch.

(b) Prepare low-speed card punch for operation as instructed in applicable technical manual (app A). Be sure that PRINT pushbutton on low-speed card punch control panel is illuminated white. If it is not, press switch once.

(c) On universal keyboard, place code select switch at left side of keyboard in HOL LERITH position.

(d) Press POWER pushbutton switch on universal keyboard. The pushbutton should light white and the STOP switch red. Press the LAMP TEST switch momentarily and be sure that all other indicator lamps light also.

**NOTE**

**All power to the universal keyboard is obtained from the output device to which it is connected. If the device is in the local test mode or is on-line and selected by the common control unit,**

**the POWER switch on the universal keyboard has no effect.**

(e) Press the REJECT/BACKSPACE switch. The STOP indicator on the keyboard should go out and the START switch of the low-speed card punch should light (white). The card under the punch head should be rejected and offset stacked.

(f) Press RESET pushbutton switch.

(g) Adjust SET EOB WARNING thumbwheels to indicate the desired number of characters to trigger an end-of-block warning.

**NOTE**

**The EOB WARNING indicator will light amber and the audible alarm will sound when the number of characters typed equals the number of characters selected by the SET EOB WARNING thumbwheels. The amber light will stay on until the end of the 80-character block.**

(h) Press COUNTER RESET pushbutton switch. The LINE/BLOCK and CHARACTER counters should indicate all zeros.

(i) Press CR key on keyboard.

(j) Type desired message, using unblocked keys on keyboard. As each key is depressed, the CHARACTER counter should increase by one.

(k) As the end of each 80-character block is reached, the LINE/BLOCK counter should increase by one.

(l) If a typing error occurs, press the REJECT/BACKSPACE pushbutton switch. This will cause the card containing the error to be rejected and offset stacked at the low-speed card punch. It is then necessary to retype all information contained in the 80-character block on the card that was rejected.

(m) During the typing operation, the CAUTION or STOP indicators on the universal keyboard may light. A CAUTION light indicates that the low-speed card punch has entered a condition which should be corrected before the next card (80 character block) is

punched. Conditions such as hopper low or chad box full will cause a CAUTION indication. A STOP light indicates that the low-speed Ad punch has stopped and no more information may be punched. In either case, correct the condition.

(2) Universal Keyboard Used With low-Speed Paper Tape Punch or High-Speed Paper Tape ½ Note: The following procedures are applicable to either the low-speed paper tape punch or the high-speed paper tape punch unless otherwise noted.

(a) Connect universal keyboard to paper tape punch by inserting quick disconnect connector P3 on end of universal keyboard cable into receptacle J1 on the front of the paper tape punch.

(b) Prepare paper tape punch for operation as instructed in applicable technical manual (app. A). Be sure that WIDE/NARROW switch is indicating properly for the width of tape loaded (WIDE for 1-and 34-inch wide tape; NARROW for X-inch tape). Press the switch once to change indications. Also, be sure the ASCII/ITA#2 switch, located on paper tape punch maintenance control panel, is in proper position for output code to be used.

(c) On universal keyboard, place code select switch at left side of keyboard in position for code being used on paper tape punch (either ITA#2 or ASCII).

(d) Perform (1) (d), (e), and (f) above.

(e) Adjust SET EOB WARNING thumbwheels to indicate the desired number of characters to trigger the end of line warning.

**Note: The EOB WARNING indicator will light amber and the audible alarm will sound when the number of characters typed equals the number of characters selected by the SET EOB WARNING thumbwheels. The amber light will stay on until the carriage return (CR) key is pressed.**

(f) Press COUNTER RESET pushbutton switch. The LINE/BLOCK and CHARACTER counters should indicate all zeros.

(g) Press CR key on keyboard.

(h) Type desired message; using unblocked keys on keyboard. As each key is pressed, the CHARACTER counter should increase by one. The CHARACTER counter does not count machine function characters such as bell or line feed, and should reset to zero when the carriage return (CR) key is pressed.

(i) When LF key is pressed, the LINE/BLOCK counter should increase by one. At the end of a message, when the EOM key is pressed, the counter

should reset to all zeros. The counter may also be reset to all zeros by pressing the COUNTER RESET pushbutton switch.

(j) If a typing error occurs, press the REJECT/BACKSPACE pushbutton switch. This causes the paper tape to be back-spaced at the paper tape punch. Press the DEL (delete) key on the keyboard to delete the character(s) in error, then resume typing the correct information.

(k) During the typing operation, the CAUTION or STOP indicators on the universal keyboard may light. A CAUTION light indicates that the paper tape punch has entered a condition (such as low tape or slack tape) which should be corrected before the next message is prepared. A STOP light indicates that the paper tape punch has stopped, and no more information may be punched. In either case, correct the condition.

## 2-5 Stopping Procedure.

The DST set equipment should be stopped only after all messages have been transmitted or received.

a. Following transmission of messages, wait until all cards or tape have been read from the input device, then press SEND DEVICE A ASSIGNED or SEND DEVICE B ASSIGNED pushbutton switch at common control unit to deassign the input device. Press STOP pushbutton switch at input device and turn power off by pressing AC POWER switch once. If a monitor device is being used on a send channel, press the appropriate SEND MONITOR A ASSIGNED or SEND MONITOR B ASSIGNED pushbutton switch on common control unit. Then press STOP and AC POWER switches on device.

b. Receiving devices should be stopped only after message processing is complete. Press the EOM STOP pushbutton switch on the common control unit so that any messages in process will be completed. (The common control unit will not accept any more messages from the ASC after the EOM STOP switch is pressed.) Press the RECEIVE DEVICE A ASSIGNED or RECEIVE DEVICE B ASSIGNED pushbutton switch on common control unit to deassign the output device. Press STOP pushbutton switch at output device and turn power off by pressing AC POWER switch once. If a monitor device is being used on a receive channel, press the appropriate RECEIVE MONITOR ASSIGNED or RECEIVE MONITOR B ASSIGNED pushbutton switch on common control unit. Then press STOP and AC POWER switches on monitor device.

c. The common control unit should be stopped only after all input, output, and monitor devices have been deassigned. With no devices assigned at the common control unit, press the AC POWER switch once to turn off power.

**2-7. Special Operating Procedures**

*a. Flash Message Procedures.* Messages containing a flash select character result in special operation of the output and output monitor devices. If both devices are assigned and ready, they will automatically copy the message. However, if either device is not assigned, the common control unit will attempt to assign the device. The ASSIGNED pushbutton for that device will light red and the audible alarm will sound intermittently. Also, both FLASH indicators will blink. Pressing the ASSIGNED pushbutton will cause the device to be selected, if it is ready, and both devices will copy the message. Pressing either the RECEIVE DEVICE FLASH or RECEIVE MONITOR FLASH pushbutton switch deassigns the associated device and causes the opposite device to accept the message. When in a flash message condition, the only way to deassign the device is by pressing the associated FLASH pushbutton switch. After the message is complete, normal operation resumes except for the audible alarm, which resumes sounding intermittently. Clear the audible alarm by pressing the AUDIBLE RESET pushbutton switch.

**NOTE**

**Digital Subscriber Terminal Set AN/FYA-71(V)5 (BC configuration) (.fig. 1-9) does not include a monitor page printer; flash messages are recorded on the Low Speed Card Punch RO-313/G.**

*b. FIPS-14 Card Code Conversion.* Subscriber terminal card equipment has been modified to reflect the Federal Standard FIPS14 card codes.

This modification changed nineteen of the sixty-four card codes. Modified card equipment will properly punch and read the FIPS14 card codes, however changes to subscriber terminal printing equipment has not been incorporated. As a result, interpretation of printed data is required in some instances. However, this interpretation is limited to normally little used characters. Modification work orders associated with this card code conversion are listed below:

MWO 11-7440-215-30-2, Reader, Punched Card RP-152/G.

MWO 11-7440-217-30-4, Card Punch, High Speed RO-312/G.

MWO 11-7440-218-30-3, Card Punch, Low Speed RO-313/G.

(1) Code differences! Table 2-1 identifies the nineteen characters changed by the above modification work orders. The table shows the differences in the codes prior to the modification and after completion of the conversion.

(2) Impact on printing devices. Printing equipment in the subscriber was not modified. As a result there are instances where printed data will not reflect the actual character being received. These characters are identified in table 2-1 and notes are provided to enable proper interpretation of the printed data.

Table 2-1. FIPS-14 Card Code Modification.

<u>ASCTI line code</u>	<u>Old graphic symbol</u>	<u>New graphic symbol</u>	<u>Symbol printed</u>	<u>Old AUTODIN punched card code</u>	<u>New FIPS-14 punched card code</u>	<u>Notes</u>
0100001				11-8-7	12-8-7	
0100100	\$	\$	\$	0-8-6	11-8-3	
0100110	&	&	&	0-1	12	
0100111	'	'	'	8-2	8-5	
0101000	(	(	(	12-8-6	12-8-5	
0101001	)	)	)	8-6	11-8-5	
0101011	+	+	+	12-8-5	12-8-6	
0101101	-	-	-	12	11	1
0101111	/	/	/	11	0-1	
0111010	:	:	:	8-5	8-2	
0111101	=	=	=	12-8-7	8-6	
0111110	>	>	>	8-4	0-8-6	
0111111	?	?	?	0-8-5	0-8-7	
1000000	'	@	'	0-8-7	8-4	3
1100000	@	'	'	0-8-7*	8-4*	2, 3
1011100	~	\	~	12-0	0-8-2	4
1111100	~		~	12-0*	0-8-2*	2, 4
1011110	^	^	^	11-0	11-8-7	
1111110		~	^	11-0*	11-8-7*	2, 5
1011111	-	-	-	0-8-2	0-8-5	
1111111	DEL	DEL	None or _	0-8-2*	0-8-5*	2, 6
1011011	[	[	[	11-8-3	12-0*	2, 7
1111011	{	{ or ð	[	11-8-3*	12-0	2, 7
1011101	]	]	]	11-8-5	11-0*	2, 7
1111101	}	} or ò	]	11-8-5*	11-0	2, 7

Table 2-1. FIPS-14 Card Code Modification (cont).

## NOTES:

1. The hyphen is used as a part of the AUTODIN header. After the code change modification is incorporated in the Punched Card Reader, RP-152/G assure that the header cards are punched with the 11 code for this character.
2. The punched card codes identified with an asterisk (\*) reflect the code punched by the Low Speed Card Punch, RO-313/G and the High Speed Card Punch, RO-312/G when the associated ASCII line code is received by the subscriber terminal. The ASCII line codes associated with the punched card codes marked with the asterisk (\*) cannot be generated by the Punched Card Reader, RP-152/G.
3. In converting to the FIPS-14 standard code, the ASCII line code for the grave accent (`) and the commercial at (@) characters have been interchanged. The subscriber terminals now print the grave accent character and will continue to print the grave accent after modification. Therefore after modification, interpretation will be required of subscriber terminal printing to recognize that (`) indicates the commercial at (@) character.
4. In converting to the FIPS-14 standard code, the ASCII line code for the tilde (~) is replaced by the reverse slant (\) and the code for the overline (<sup>a</sup>) was replaced by the vertical bar (|). After conversion when either the ASCII line code for the reverse slant or the vertical bar is received, the subscriber terminal printing equipment will print the tilde (~) character. Thus interpretation is required to recognize a printed tilde indicates the reverse slant or the vertical bar.
5. In converting to the FIPS-14 standard code, the ASCII line code for the vertical bar (|) was replaced by the tilde (~). Printing devices will print the character as a circumflex (^). Therefore the tilde is no longer a part of the AUTODIN characters (see note 4 above).
6. The delete character does not print on the subscriber terminal page printer or paper tape punches. If received by the subscriber terminal card punches, the ASCII line code of 1111111 will be printed as an underscore (\_) by the low speed card punch. The delete character cannot be transmitted by a card subscriber terminal.
7. The Military Departments have a requirement for "plus zero" (<sup>+</sup>0) and "minus zero" (<sup>-</sup>0) characters. These have been traditionally expressed by the 12-0 and 11-0 punched card codes. This MWO includes capability for adding these characters in place of the little used opening brace ( { ) and closing brace ( } ) characters. Printing equipment will still print the opening bracket ( [ ) and closing bracket ( ] ) however for the plus-zero and minus zero characters, thus interpretation will be required for the printed bracket characters.

**2-8. Operation under Emergency Conditions**

a. *AB and BE Terminals.* At those terminals having a device switching module, emergency operation can be accomplished by switching from a malfunctioning output device to a standby device. With the alternate device ready for operation, perform the following steps:

(1) Press the RECEIVE DEVICE EOB STOP pushbutton switch on common control unit. The indicator should light red.

(2) When the output device stops operating, press the PRIME/ALTERNATE pushbutton switch on the device switching module.

(3) If the alternate output device is ready for operation, press the RECEIVE DEVICE EOB STOP pushbutton switch a second time. The switched-in device should start copying the message.

b. *AA, AE, BB, and BC Terminals.* Should a receive channel output device develop a malfunction while copying a message, emergency operation can be accomplished by making the alternate channel output device ready for operation and performing the following steps:

(1) If traffic is being transmitted on the send channel, press the SEND DEVICE EOM STOP pushbutton switch. The indicator should light white.

(2) When the SEND DEVICE EOM STOP indicator lights red, indicating the end of message transmission, or if send channel traffic is not being transmitted, press the MASTER RESET switch on the common control unit maintenance panel.

(3) Perform starting and operating procedures outlined in paragraphs 2-4 and 2-5, however do not press the RECEIVE DEVICE ASSIGNED pushbutton switch (para 25b (6)(d)) for the malfunctioning output device.

(4) Coordinate action taken with the ASC to permit retransmission of the message for reception by the alternate output channel.

c. At terminals having a device switching module with a conversion kit (SM--A-634835) installed permitting alternate designation of an output device as the Receive Channel B Device, the following emergency procedures should be accomplished if the Receive Channel A Device becomes inoperative:

(1) Make the device connected to the device switching module ready for operation and press the PRIME/ALTERNATE pushbutton switch on the device switching module, causing the ALTERNATE indicator to illuminate.

(2) If the RECEIVE DEVICE A SELECT indicator is not illuminated, press the RECEIVE DEVICE A ASSIGNED pushbutton switch causing its indicator to extinguish and press the RECEIVE DEVICE B ASSIGNED pushbutton switch, causing its indicator to light white. The alternate output device, if ready, should start copying the next message when it is received.

(3) If the RECEIVE DEVICE A SELECT indicator is illuminated white, perform the procedures outlined in b above.

d. At terminals which have the Common Control Unit C-8120(P)/G modified by MWO 11-7440-214-30-1 /NAVELEX 0967-324-0190/ TCTO 31W4-2G-504 to allow the Printer, Page RP157/G to become a primary output device when one of the output devices become disabled, proceed as follows:

(1) When an output device becomes disabled deassign the output device by pressing the appropriate Receive Device ASSIGNED switch. The NOT ASSIGNED indicator on the output device will light if power is still applied. The Receive Device ASSIGNED switch will light red and the CCU audible alarm will sound if the switch is pressed while a message is being received. If the Receive Device ASSIGNED switch is pressed when a message is not being processed, the switch will not be lit.

(2) Press the appropriate A or B ASSIGNED switch on the modification panel to use the page printer as the prime receive device. The modification panel A or B ASSIGNED switch will light; the associated Receive Monitor A or B ASSIGNED switch will light; the page printer NOT ASSIGNED indicator will not be lit; and the page printer will process received messages independent of the disabled output device. Verify the page printer power is on and the START switch has been pressed.

**NOTE**

**Do not press both ASSIGNED switches on the modification panel at the same time. When both ASSIGNED switches on the modification panel are lit, operation of the modification is inhibited.**

## CHAPTER 3

## FUNCTIONING

**3-1. DSTE Set Block Diagram**

(fig.-1)

*a. General.* The DST sets provide for the transmission and reception of digital messages in the AUTODIN system. Control of the transmitting and receiving operations is accomplished through use of the common control unit. Transmitted and received messages are punched on either paper tape or data processing cards. A paper tape message may be punched in either American Standard Code for Information Interchange (ASCII) or in International Telegraph Alphabet No. 2 (ITA #2). All card messages are in punched card code.

*b. Transmitting Messages.*

(1) A message to be transmitted is placed on an appropriate input device (either a card reader or a paper tape reader). The operator assigns the device from the common control unit operator's panel to initiate automatic processing of the message. The input device reads each character of the message, converts the punched card or punched tape character to ASCII code, and transfers the character, along with a character strobe pulse, to the common control unit input circuits. The input circuits store the character momentarily in a flip-flop register and check character parity. If the character parity is correct (odd), the input circuits transfer the character into core memory. The input circuits then send a step/data acknowledge pulse to the input device to request the next character. This process continues until a block of 80 data characters is stored in the core memory. Control of this block of characters in core memory is then transferred to the transmit circuits of the common control unit.

(2) The transmit circuits generate framing characters that precede and follow a block of data characters. After the two framing characters that precede the block are generated, each data character is read from core memory in sequence and transferred to the transmit circuits. After the last data character of the block, the two framing characters that follow a block of data characters are generated. As each data and framing character becomes available, the character is converted from 8-bit parallel to bit-serial, and the serial bits are transmitted onto the line in synchronism with the transmit line clock. While this block is being transmitted, the next block of the message is being read from the input device, processed through the input circuits, and stored in core memory. Before the second block can be transmitted however, the

common control unit must receive an acknowledgment that the previous block has been received by the ASC. When the receive circuits detect the control characters indicating an acknowledgment of the previous block, the next block is then transmitted onto the line in the same manner as the first. This process then continues until all blocks of the message are transmitted.

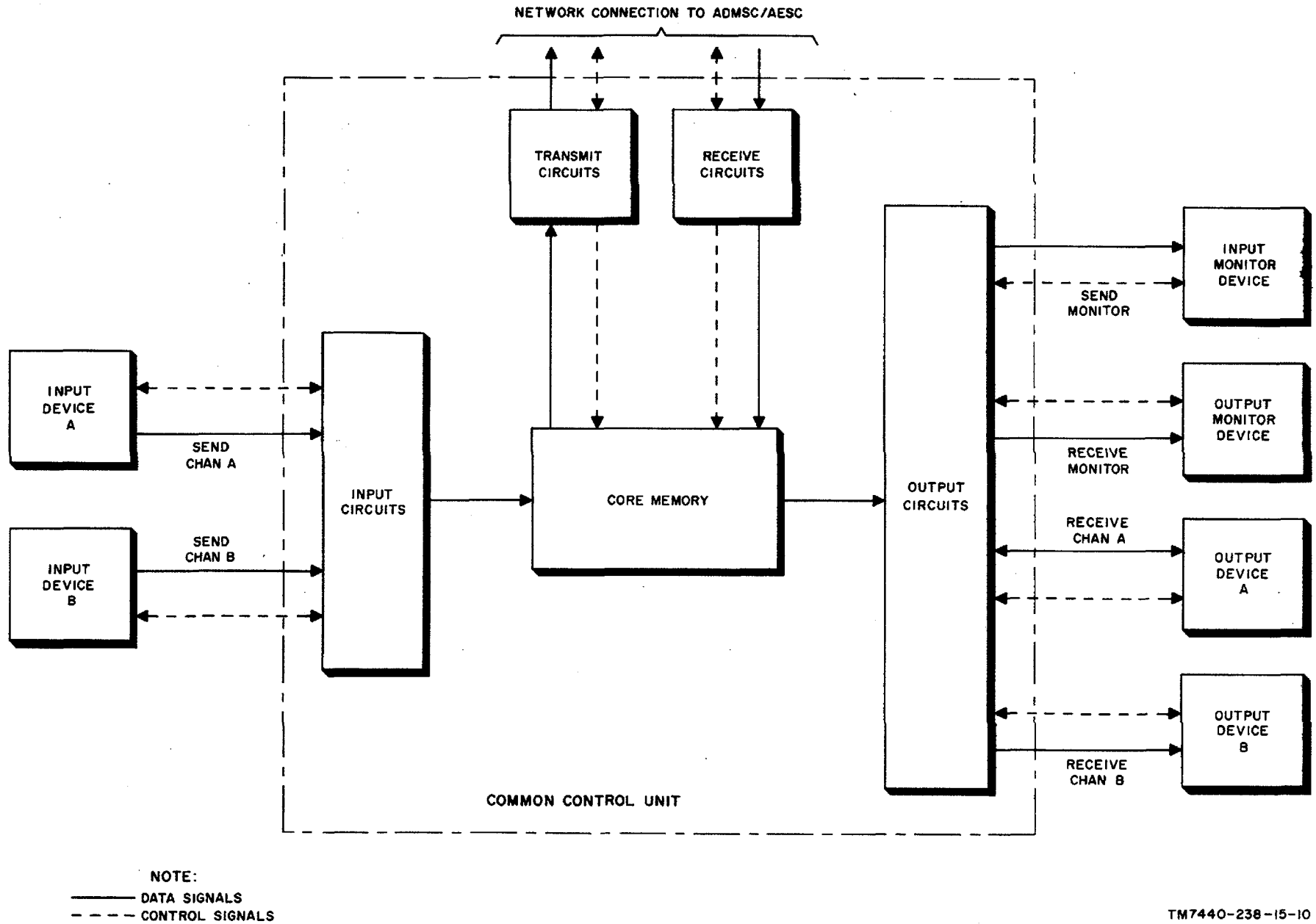
*c. Receiving Messages.*

(1) Received message characters enter the common control unit receive circuits in bit serial form. The receive circuits check the character parity and convert the bit serial information into bit parallel form. Even parity framing and control characters are decoded to determine whether they are proper or to determine the required control function. Odd parity data characters are transferred into core memory. If the received block of characters has correct framing, character parity, and block parity, the transmit circuits of the common control unit will respond with control characters indicating acknowledgment for the block. The common control unit then becomes ready to receive the next block of characters from the ASC.

(2) The previous block of data characters is sequentially read from core memory and transferred to the output circuits. The output circuits send each data character, along with a data strobe, to the selected output device (page printer, high- or low-speed card punch, or high- or low-speed paper tape punch). After each character is transferred, the output device responds with a data request for the next character. The output device performs any necessary code conversion and punches and/or prints the data characters on the output medium (cards, tape, or paper). This process continues until all characters of the block are transferred to the output device. When the output device acknowledges receipt of the total block of data, the second block of data characters in core memory are read out to the device and the common control unit accepts another block of characters from the ASC. This sequence continues until all blocks of the message have been processed.

*d. Monitoring Messages.* Any output device, such as a card punch, paper tape punch, or page printer, may also be used as a monitor device. A monitor device may be installed so as to monitor either the send channels or the receive channels of the common control unit. When wired to the send channels, the





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Figure 3-1. Digital subscribe terminal equipment set data flow, block diagram.

monitor device is assigned to send channel A or B by the operator at the common control unit operator's control panel. Each character in core memory for the block of the message being transmitted to the ASC is also accessed by the monitor device and copied on the output medium. During transmit operations, both the ASC and the monitor device (if assigned) must acknowledge receipt of the block data before subsequent blocks can be processed. When a monitor device is installed to monitor a receive channel, the device is assigned to either receive channel A or B by the operator at the common control unit operator's control panel. Each character of the block of data being transferred to an output device is also read out and transferred to the monitor device where it is copied on the output medium. During message reception, both the output device and the monitor device (if assigned) must acknowledge receipt of the block of data before subsequent blocks can be processed.

### 3-2. Signaling Codes

a. All information transferred between the ASC and the DST set, and between the common control unit and the input/output devices within the DST set are in the ASCII code. All message characters are transferred on the line with odd parity and all control characters are transferred with even parity, with the exception of the block parity (BP) character which may have either odd or even parity. Control characters are used for block formatting, channel coordination, and error control between the common control unit and the ASO. Only

message characters are transferred between the common control unit and the input/output devices.

b. Table 3-1 is a cross-reference chart of the ASCII, ITA#2 and punched card codes. The table shows all ASCII characters and also shows the code punched and the symbol printed on the output medium in the DST set paper tape punches and card punches. Certain ASCII characters may be received and punched and printed in all three codes, others may be received in only one or two of the three possible codes. Still others may be received and converted to another form for processing (lowercase letters for example, which are converted to uppercase letters). However, the card reader and paper tape reader are wired to inhibit the transmission of characters not allowed in a given code. For example, the paper tape reader will not transmit certain characters while operating with ITA#2 code but will transmit the characters while operating with ASCII code. Table 3-1 identifies these characters by a 'No' in the 'Chara. Read' column. If these prohibited characters are contained in a message being read by the card reader or paper tape reader, the device will stop in an invalid character fault condition. Table 3-2 lists the ASCII codes used as control characters in the AUTODIN system and cross references the AUTODIN name for the character. Refer to the applicable input and output device manuals listed in Appendix A for the appropriate codes used by each equipment.

Table 3-1. ASCII, ITA#2 and Punched Card Codes used in DSTE Sets

CHARACTER		ASCII CODE	PAPER TAPE DEVICES <sup>b</sup>						CARD DEVICES <sup>c</sup>		
Symbol	Name	8(P) 765 4321 (Bits)	ASCII				ITA#2		Punched Code (Columns)	Symbol Printed	Chara. Read <sup>d</sup>
			Punched Code 8(P)765 4321 (Columns)	Symbol Printed	Chara. Read <sup>d</sup>	Punched Code 543 21 (Columns)	Symbol Printed	Chara. Read <sup>d</sup>			
NUL	Null	1 000 0000	0 000 0000	None	Yes	000 00	None	Yes	11-4-8	*	No
SOH <sup>a</sup>	Start of heading	0 000 0001	1 000 0001	None	No	001 00	None	No	11-4-8	*	No
STX <sup>a</sup>	Start of text	0 000 0010	1 000 0010	None	No	001 00	None	No	11-4-8	*	No
ETX <sup>a</sup>	End of text	1 000 0011	0 000 0011	None	No	001 00	None	No	11-4-8	*	No
EOT	End of transmission	0 000 0100	1 000 0100	None	No	001 00	None	No	11-4-8	*	No
ENQ	Enquiry	1 000 0101	0 000 0101	None	No	001 00	None	No	11-4-8	*	No
ACK <sup>a</sup>	Acknowledge	1 000 0110	0 000 0110	None	No	001 00	None	No	11-4-8	*	No
BEL <sup>a</sup>	Alarm (bell)	0 000 0111	1 000 0111	None	Yes	001 01	None	Yes	11-4-8	*	No
BS	Backspace	0 000 1000	1 000 1000	None	No	001 00	None	Yes	11-4-8	*	No
HT	Horizontal tab	1 000 1001	0 000 1001	None	No	001 00	None	N	11-4-8	*	No
LF	Line Feed	1 000 1010	0 000 1010	None	Yes	000 10	None	Yes	11-4-8	*	No
VT	Vertical tab	0 000 1011	1 000 1011	None	No	001 00	None	No	11-4-8	*	No
FF	Form Feed	1 000 1100	0 000 1100	None	No	001 00	None	No	11-4-8	*	No
CR	Carriage return	0 000 1101	1 000 1101	None	Yes	010 00	None	Yes	11-4-8	*	No
SO	Shift out (figures)	0 000 1110	1 000 1110	None	Yes	110 11	None	Yes	11-4-8	*	No
SI	Shift in (letters)	1 000 1111	0 000 1111	None	Yes	111 11	None	Yes	11-4-8	*	No
DLE	Data link escape	0 001 0000	1 001 0000	None	No	001 00	None	No	11-4-8	*	No
DC1 <sup>a</sup>	Device control 1	1 001 0001	0 001 0001	None	No	001 00	None	No	11-4-8	*	No
DC2 <sup>a</sup>	Device control 2	1 001 0010	0 001 0010	None	No	001 00	None	No	11-4-8	*	No
DC3	Device control 3	0 001 0011	1 001 0011	None	No	001 00	None	No	11-4-8	*	No
DC4 <sup>a</sup>	Device control 4	1 001 0100	0 001 0100	None	Yes	001 00	None	No	11-4-8	*	No
NAK <sup>a</sup>	Negative acknowledge	0 001 0101	1 001 0101	None	No	001 00	None	No	11-4-8	*	No
SYN <sup>a</sup>	Synchronous idle	0 001 0110	1 001 0110	None	No	001 00	None	No	11-4-8	*	No
ETB <sup>a</sup>	End of xmxn block	1 001 0111	0 001 0111	None	No	001 00	None	No	11-4-8	*	No
CAN <sup>a</sup>	Cancel	1 001 1000	0 001 1000	None	No	001 00	None	No	11-4-8	*	No
EM <sup>a</sup>	End of medium	0 001 1001	1 001 1001	None	Yes	001 00	None	No	11-4-8	*	No
SUB <sup>a</sup>	Start special seq.	0 001 1010	1 001 1010	None	No	001 00	None	No	11-4-8	*	No
ESC	Escape	1 001 1011	0 001 1011	None	No	001 00	None	No	11-4-8	*	No
FS <sup>a</sup>	File separator	0 001 1100	1 001 1100	None	No	001 00	None	No	11-4-8	*	No
GS <sup>a</sup>	Group separator	1 001 1101	0 001 1101	None	No	001 00	None	No	11-4-8	*	No
RS <sup>a</sup>	Record separator	1 001 1110	0 001 1110	None	No	001 00	None	No	11-4-8	*	No
US	Unit separator	0 001 1111	1 001 1111	None	No	001 00	None	No	11-4-8	*	No
SP	Space (blank)	0 010 0000	1 010 0000	None	Yes	001 00	None	Yes	No punches	None	Yes
!	Exclamation point	1 010 0001	0 010 0001	!	Yes	011 01	!	Yes	12-7-8	!	Yes
"	Quotation mark	1 010 0010	0 010 0010	"	Yes	100 01	"	Yes	7-8	"	Yes
#	Number sign	0 010 0011	1 010 0011	#	Yes	101 00	#	Yes	3-8	#	Yes
\$	Dollar sign	1 010 0100	0 010 0100	\$	Yes	010 01	\$	Yes	11-3-8	\$	Yes
%	Percent sign	0 010 0101	1 010 0101	%	Yes	001 00	Space	No	β-4-8	%	Yes

- a. See notes at end of table
- b. See notes at end of table
- c. See notes at end of table
- d. See notes at end of table

Table 3-1. ASCII, ITA#2 and Punched Card Codes used in DSTE Sets (cont)

CHARACTER		ASCII CODE	PAPER TAPE DEVICES <sup>b</sup>						CARD DEVICES <sup>c</sup>		
			ASCII			ITA#2			Punched Code (Columns)	Symbol Printed	Chars. Read <sup>d</sup>
Symbol	Name	8(P)765 4321 (Bits)	Punched Code 8(P)765 4321 (Columns)	Symbol Printed	Chars. Read <sup>d</sup>	Punched Code 543 21 (Columns)	Symbol Printed	Chars. Read <sup>d</sup>			
&	Ampersand	0 010 0110	1 010 0110	&	Yes	110 10	&	Yes	12	&	Yes
'	Apostrophe	1 010 0111	0 010 0111	'	Yes	010 11	'	Yes	5-8	'	Yes
(	Opening parenthesis	1 010 1000	0 010 1000	(	Yes	011 11	(	Yes	12-5-8	(	Yes
)	Closing parenthesis	0 010 1001	1 010 1001	)	Yes	100 10	)	Yes	11-5-8	)	Yes
*	Asterisk	0 010 1010	1 010 1010	*	Yes	001 00	*	None	11-4-8	*	Yes
+	Plus	1 010 1011	0 010 1011	+	Yes	001 00	+	None	11-6-8	+	Yes
,	Comma	0 010 1100	1 010 1100	,	Yes	011 00	,	Yes	5-3-8	,	Yes
-	Hyphen	1 010 1101	0 010 1101	-	Yes	000 11	-	Yes	11	-	Yes
.	Period	1 010 1110	0 010 1110	.	Yes	111 00	.	Yes	12-3-8	.	Yes
/	Slant	0 010 1111	1 010 1111	/	Yes	111 01	/	Yes	5-1	/	Yes
0	Zero	1 011 0000	0 011 0000	0	Yes	101 10	0	Yes	101 10	0	Yes
1	One	0 011 0001	1 011 0001	1	Yes	101 11	1	Yes	1	1	Yes
2	Two	0 011 0010	1 011 0010	2	Yes	100 11	2	Yes	2	2	Yes
3	Three	1 011 0011	0 011 0011	3	Yes	000 01	3	Yes	3	3	Yes
4	Four	0 011 0100	1 011 0100	4	Yes	010 10	4	Yes	4	4	Yes
5	Five	1 011 0101	0 011 0101	5	Yes	100 00	5	Yes	5	5	Yes
6	Six	1 011 0110	0 011 0110	6	Yes	101 01	6	Yes	6	6	Yes
7	Seven	0 011 0111	1 011 0111	7	Yes	001 11	7	Yes	7	7	Yes
8	Eight	0 011 1000	1 011 1000	8	Yes	001 10	8	Yes	8	8	Yes
9	Nine	1 011 1001	0 011 1001	9	Yes	110 00	9	Yes	9	9	Yes
:	Colon	1 011 1010	0 011 1010	:	Yes	011 10	:	Yes	2-8	:	Yes
;	Semicolon	0 011 1011	1 011 1011	;	Yes	111 10	;	Yes	11-5-8	;	Yes
<	Less than	1 011 1100	0 011 1100	<	Yes	001 00	<	None	12-4-8	<	Yes
=	Equals	0 011 1101	1 011 1101	=	Yes	001 00	=	None	6-8	=	Yes
>	Greater than	0 011 1110	1 011 1110	>	Yes	001 00	>	None	5-6-8	>	Yes
?	Question mark	1 011 1111	0 011 1111	?	Yes	110 01	?	Yes	5-7-8	?	Yes
@	Commercial at	0 100 0000	1 100 0000	@	Yes	001 00	@	None	4-8	@	Yes
A <sup>a</sup>	A	1 100 0001	0 100 0001	A	Yes	000 11	A	Yes	12-1	A	Yes
B <sup>a</sup>	B	1 100 0010	0 100 0010	B	Yes	110 01	B	Yes	12-2	B	Yes
C <sup>a</sup>	C	0 100 0011	1 100 0011	C	Yes	011 10	C	Yes	12-3	C	Yes
D <sup>a</sup>	D	1 100 0100	0 100 0100	D	Yes	010 01	D	Yes	12-4	D	Yes
E <sup>a</sup>	E	0 100 0101	1 100 0101	E	Yes	000 01	E	Yes	12-5	E	Yes
F <sup>a</sup>	F	0 100 0110	1 100 0110	F	Yes	011 01	F	Yes	12-6	F	Yes
G <sup>a</sup>	G	1 100 0111	0 100 0111	G	Yes	110 10	G	Yes	12-7	G	Yes
H <sup>a</sup>	H	1 100 1000	0 100 1000	H	Yes	101 00	H	Yes	12-8	H	Yes
I <sup>a</sup>	I	0 100 1001	1 100 1001	I	Yes	001 10	I	Yes	12-9	I	Yes
J <sup>a</sup>	J	0 100 1010	1 100 1010	J	Yes	010 11	J	Yes	11-1	J	Yes
K <sup>a</sup>	K	1 100 1011	0 100 1011	K	Yes	011 11	K	Yes	11-2	K	Yes

a. See notes at end of table  
 b. See notes at end of table  
 c. See notes at end of table  
 d. See notes at end of table

Table 3-1. ASCII, ITA#2 and Punched Card Codes used in DSTE Sets (cont)

CHARACTER		ASCII CODE 8(P)765 4321 (Bits)	PAPER TAPE DEVICES <sup>b</sup>						CARD DEVICES <sup>c</sup>		
Symbol	Name		ASCII			ITA#2			Punched Code (Columns)	Symbol Printed	Chara. Read <sup>d</sup>
			Punched Code 8(P)765 4321 (Columns)	Symbol Printed	Chara. Read <sup>d</sup>	Punched Code 543 21 (Columns)	Symbol Printed	Chara. Read <sup>d</sup>			
L	L	0 100 1100	1 100 1100	L	Yes	100 10	L	Yes	11-3	L	Yes
M <sup>a</sup>	M	1 100 1101	0 100 1101	M	Yes	111 00	M	Yes	11-4	M	Yes
N	N	1 100 1110	0 100 1110	N	Yes	011 00	N	Yes	11-5	N	Yes
O	O	0 100 1111	1 100 1111	O	Yes	110 00	O	Yes	11-6	O	Yes
P <sup>a</sup>	P	1 101 0000	0 101 0000	P	Yes	101 10	P	Yes	11-7	P	Yes
Q <sup>a</sup>	Q	0 101 0001	1 101 0001	Q	Yes	101 11	Q	Yes	11-8	Q	Yes
R <sup>a</sup>	R	0 101 0010	1 101 0010	R	Yes	010 10	R	Yes	11-9	R	Yes
S <sup>a</sup>	S	1 101 0011	0 101 0011	S	Yes	001 01	S	Yes	β-2	S	Yes
T <sup>a</sup>	T	0 101 0100	1 101 0100	T	Yes	100 00	T	Yes	β-3	T	Yes
U <sup>a</sup>	U	1 101 0101	0 101 0101	U	Yes	001 11	U	Yes	β-4	U	Yes
V	V	1 101 0110	0 101 0110	V	Yes	111 10	V	Yes	β-5	V	Yes
W	W	0 101 0111	1 101 0111	W	Yes	100 11	W	Yes	β-6	W	Yes
X	X	0 101 1000	1 101 1000	X	Yes	111 01	X	Yes	β-7	X	Yes
Y	Y	1 101 1001	0 101 1001	Y	Yes	101 01	Y	Yes	β-8	Y	Yes
Z	Z	1 101 1010	0 101 1010	Z	Yes	100 01	Z	Yes	β-9	Z	Yes
[	Opening bracket	0 101 1011	1 101 1011	[	Yes	001 00	None	No	12-β	[	No
\	Reverse slant	1 101 1100	0 101 1100	\	Yes	001 00	None	No	β-8-2	\	Yes
]	Closing bracket	0 101 1101	1 101 1101	]	Yes	001 00	None	No	11-β	]	No
^	Circumflex	0 101 1110	1 101 1110	^	Yes	001 00	None	No	11-7-8	^	Yes
_	Underline	1 101 1111	0 101 1111	_	Yes	001 00	None	No	β-5-8	_	Yes
`	Grave accent	1 110 0000	0 110 0000	`	Yes	001 00	None	No	4-8	`	No
a	a	0 110 0001	1 110 0001	A	No	000 11	A	No	12-1	A	No
b	b	0 110 0010	1 110 0010	B	No	110 01	B	No	12-2	B	No
c	c	1 110 0011	0 110 0011	C	No	011 10	C	No	12-3	C	No
d	d	0 110 0100	1 110 0100	D	No	010 01	D	No	12-4	D	No
e	e	1 110 0101	0 110 0101	E	No	000 01	E	No	12-5	E	No
f	f	1 110 0110	0 110 0110	F	No	011 01	F	No	12-6	F	No
g	g	0 110 0111	1 110 0111	G	No	110 10	G	No	12-7	G	No
h	h	0 110 1000	1 110 1000	H	No	101 00	H	No	12-8	H	No
i	i	1 110 1001	0 110 1001	I	No	001 10	I	No	12-9	I	No
j	j	1 110 1010	0 110 1010	J	No	010 11	J	No	11-1	J	No
k	k	0 110 1011	1 110 1011	K	No	011 11	K	No	11-2	K	No
l	l	1 110 1100	0 110 1100	L	No	100 10	L	No	11-3	L	No
m	m	0 110 1101	1 110 1101	M	No	111 00	M	No	11-4	M	No
n	n	0 110 1110	1 110 1110	N	No	011 00	N	No	11-5	N	No
o	o	1 110 1111	0 110 1111	O	No	110 00	O	No	11-6	O	No
p	p	0 111 0000	1 111 0000	P	No	101 10	P	No	11-7	P	No

a. See notes at end of table  
 b. See notes at end of table  
 c. See notes at end of table  
 d. See notes at end of table

Table 3-1. ASCII, ITA#2 and Punched Card Codes used in DSTE Sets (cont)

CHARACTER		ASCII CODE		PAPER TAPE DEVICES <sup>b</sup>					CARD DEVICES <sup>c</sup>		
Symbol	Name	8(P)765 4321 (Bits)	ASCII		ITA#2				Punched Code (Columns)	Symbol Printed	Chara. Read <sup>d</sup>
			8(P)765 4321 (Columns)	Symbol Printed	Chara. Read <sup>d</sup>	Punched 543 21 (Columns)	Symbol Printed	Chara. Read <sup>d</sup>			
q	q	1 111 0001	0 111 0001	Q	No	101 11	Q	No	11-8	Q	No
r	r	1 111 0010	0 111 0010	R	No	010 10	R	No	11-9	R	No
s	s	0 111 0011	1 111 0011	S	No	001 01	S	No	β-2	S	No
t	t	1 111 0100	0 111 0100	T	No	100 00	T	No	β-3	T	No
u	u	0 111 0101	1 111 0101	U	No	001 11	U	No	β-4	U	No
v	v	0 111 0110	1 111 0110	V	No	111 10	V	No	β-5	V	No
w	w	1 111 0111	0 111 0111	W	No	100 11	W	No	β-6	W	No
x	x	1 111 1000	0 111 1000	X	No	111 01	X	No	β-7	X	No
y	y	0 111 1001	1 111 1001	Y	No	101 01	Y	No	β-8	Y	No
z	z	0 111 1010	1 111 1010	Z	No	100 01	Z	No	β-9	Z	No
{ or Ø	Opening brace	1 111 1011	0 111 1011	[	No	001 00	None	No	12-β	[	Yes
	Vertical line	0 111 1100	1 111 1100	~	No	001 00	None	No	β-8-2	~	No
} or Ø	Closing brace	1 111 1101	0 111 1101	]	No	001 00	None	No	11-β	]	Yes
~	Tilde	1 111 1110	0 111 1110	^	No	001 00	None	No	11-7-8	^	No
DEL <sup>a</sup>	Delete (space)	0 111 1111	1 111 1111	none	Yes	001 00	None	No	β-5-8	-	No

NOTE a.

Code for this character is used with even parity as control character in AUTODIN, see table 3-2. Letters are even parity only when they appear in select or security position of message header.

NOTE b.

Paper tape devices include Paper Tape Punch, High Speed R0-314/G, Paper Tape Punch, Low Speed R0-315/G, and Reader, Punched Tape RP-154/G operating in ASCII or ITA#2 as shown.

NOTE c.

Card devices include Card Punch, High Speed R0-312/G, Card Punch Low Speed R0-313/G, and Reader, Punched Card RP-152/G. Card Punch, High Speed R0-312/G does not print symbols on card, but will punch holes in columns indicated.

NOTE d.

A No in this column signifies that the basic ASCII character (extreme left hand column) is inhibited in the respective paper tape reader or card reader and will cause an invalid character fault if detected in the input medium.

Table 3-2. Even Parity ASCII Control Character Codes

ASCII Symbol	AUTODIN Symbol	AUTODIN Character Name	Code 8(P) 765 4321	Remarks
SOH	SOH	Start of heading	1 000 0001	Block framing character
STX	STX	Start of text	1 000 0010	Block framing character
ETX	ETX	End of text	0 000 0011	Block framing character
ENQ	ENQ	Enquiry	0 000 0101	Transmit control character
ACK	ACK-1	Acknowledge 1	0 000 0110	Receive control character
BEL	INV	Invalid	1 000 0111	Transmit control character
DC1	REP	Reply	0 001 0001	Transmit control character
DC2	RM	Reject message	0 001 0010	Receive control character
NAK	NAK	Negative acknowledge	1 001 0101	Receive control character
SYN	SYN	Synchronous idle	1 001 0110	Synchronous idle character
ETB	ETB	End of xmsn block	0 001 0111	Block framing character
CAN	CAN	Cancel	0 001 1000	Transmit control character
EM	EM	End of medium	1 001 1001	Special control character
SUB	MC	Mode change	1 001 1010	Special control character
FS	ACK-2	Acknowledge 2	1 001 1100	Receive control character
GS	START	Start	0 001 1101	
RS	WBT	Wait before transmit	0 001 1110	Receive control character
A	A	A	0 100 0001	Select character - ITA#2 paper tape format and control
B	B	B	0 100 0010	Select character - Binary nonstandard parity magnetic tape
C	C	C	1 100 0011	Select or security character: Select - Binary standard parity magnetic tape Security - Confidential
D	D	D	0 100 0100	Select character - Punched card format
E	E	E	1 100 0101	Select or security character: Select - Data format magnetic tape Security - EFTO
F	F	F	1 100 0110	Select character - Flash message

Table 3-2. Even Parity ASCII Control Character Codes (con't)

ASCII Symbol	AUTODIN Symbol	AUTODIN Character Name	8(P)765 4321	Remarks
G	G	G	0 100 0111	Select character - ENQ response
H	H	H	0 100 1000	Select character - ASCII paper tape format and code
J	J	J	1 100 1010	Select character - Select message switching unit (MSU)
K	K	K	0 100 1011	Select character - Select circuit switching unit (CSU)
M	M	M	0 100 1101	Select character - Magnetic tape
P	P	P	0 101 0000	Select character - On-line computer or processor
R	R	R	1 101 0010	Security character - Restricted
S	S	S	0 101 0011	Select or security character: Select - Flash message Security - Secret
T	T	T	1 101 0100	Security character - Top secret
U	U	U	0 101 0101	Security character - Unclassified
X	X	X	1 101 1000	Security character - Unclassified special handling
DEL	DEL	Delete	1 111 1111	Framing character
None	BP	Block parity	Varies	Framing character formed by binary addition of all bits in each row of the block



### 3-3. Detailed Functioning of DSTE Set

#### a. DST Set Interface with ASC.

##### (1) Digital synchronization.

(a) Two levels of synchronization must be established before transmission and reception of messages can occur. First, cryptographic bit synchronization must be established (when operating with crypto and modem equipment) through the Crypto Ancillary Unit. Secondly, character frame synchronization must be established with the ASC. Both levels of synchronization are established automatically. Cryptographic bit synchronization is established by the crypto equipment. If cryptographic bit synchronization cannot be established, the CRYPTO CAU ALARM indicator on the common control unit will light to warn the operator that messages cannot be transmitted or received.

(b) Character frame synchronization is established by the common control unit. The synchronous idle (SYN) character is a special control character used to establish and maintain character frame synchronization when no other characters are being exchanged. In a nonframed, nondata state, the common control unit and the ASC shift the received serial bits until a SYN character is detected. After the first SYN character is detected, the next three consecutive characters are decoded. If these three characters are also SYN characters, the system is considered to be in character frame synchronization and messages may then be exchanged. If the next three characters are not SYN characters, the above process is repeated. All discussion hereafter will assume that synchronization has been established and maintained unless stated otherwise.

##### (2) Block Formatting and Normal Control.

###### (a) Framing.

1. Two framing control characters precede, and two framing control characters follow, each block of 80 data characters, making a total of 84 characters in each line block. The start of heading (SOH) character is the first framing character of the first block of a message. The SOH character is always followed by a select character. The select character is an alphabetic character with even parity. In messages transmitted from a DST set, the select character denotes the input channel on which the message was read. In messages received by the DST set, the select character is used by the common control unit to select the output channel compatible with the message format (cards or tape), or to process a flash precedence message. The specific meaning of the select characters are listed in

2. The first framing character of all blocks except the first block of a message is the start of text (STX) character. In messages from the DST 310 set, the STX character will be followed by the delete (DEL) character. In messages received by the DST set, the STX character will be followed by an even parity alphabetic character denoting the security classification of the message. Specific meaning of the security classification characters are listed in Table 3-2.

3. The end of transmission block (ETB) character is the, third framing character of all blocks except the last block of a message. The end of text (ETX) character is the third framing character of the last block of a message. The ETB and ETX characters appear in the 83rd character position. The last framing character of all blocks of a message is the block parity (BP) character. The BP character is formed by the binary addition, without carry, of all bits in each row of a block. This addition starts with the second framing character (select, SEL, DEL, or security), includes all text and special control (EM and MC) characters, and ends with the third framing character (ETB or ETX). Receive control characters, transmit control characters, and SYN characters are not included in the BP summation. The BP character may have odd or even character parity because its eighth bit is formed by the summation of the row of character parity bits.

###### (b) Block-by-Block Receive.

1. During the time when no blocks of information are being processed, the common control unit is normally transmitting and receiving SYN characters from the ASC. Between messages, the common control unit looks for the SOH character, signifying start of message heading. The SOH character must be followed by a select character which is decoded to validate acceptability and select the output channel for the message. After the first block of a message, the STX character will be accepted by the common control unit to signify start of a data block. The STX character will be followed by a security character, which is checked for even parity by the common control unit.

2. After the SOH (or STX) character and the select (or security) characters are received, the next 80 odd parity data characters will be stored in core memory. After the 80th data character, the common control unit will look for the ETB or ETX character followed by a BP character. If all characters of the block were received with correct parity and the block parity is correct, the common control unit transmit circuits will send an acknowledge sequence to the ASC. The first block of the message will be answered with two consecutive ACK-1 or two consecutive ACK-2 characters. Subsequent blocks will be answered alternately with ACK-1 and ACK2 character sequence

(c) *Block-by-block transmit.* When the common control unit has a block of data ready to transmit, it will send out the SOH or STX character followed by a select character. The block of 80 data characters is then read from memory and transmitted in bit-serial form to the ASC. After the 80th data character is transmitted, the common control unit sends the ETB or ETX character followed by the BP character. A timer is then started that determines the time during which an answer must be received for the block just transmitted. This answer timer is variable from 0.25 to 3.00 seconds and will be set for the maximum normal response time (plus a safety factor) for the particular installation. The ASC should respond with the normal ACK-1 or ACK-2 character sequence acknowledgment during this time. When acknowledgment for the block is received, the second block of data in core memory is transmitted and another block is read from the input device. This action continues until all blocks of the message have been transmitted.

(d) *Duplex operation.* During duplex operation, the common control unit transmits and receives data simultaneously. After each block of data is transmitted from the common control unit, the ASC momentarily interrupts any data being transmitted to the DST set to respond with the ACK character sequence. Likewise, after each block of data is received by the common control unit, the common control unit momentarily interrupts any of its data being transmitted to respond with the ACK character sequence. The ACK sequence may interrupt the data characters or SYN characters being transmitted; however, it may not be sent between the first framing character (SOH or, STX) and the second framing character (select DEL, or security); nor may it be sent between the third framing character (ETB or ETX) and the fourth framing character (BP).

(e) *Delays.*

1. Message transmission will be delayed when the receiving station cannot store or output the data as fast as it is received. When this delay occurs, the receiving station sends the wait-before transmit (WBT) character sequence in response to the last block of data or to a CAN character to notify the transmitting station to delay sending more blocks. The WBT character sequence is a proper response to a block. The transmitting station will send back the reply (REP) character sequence requesting a reply. If the delay still exists at the receiving station, the WBT response will again be returned to the transmitting station. The transmitting and receiving stations will continue to exchange WBT and REP characters until the receiving station responds with ACK-1, ACK-2, NAK, or reject message (RM) characters indicating that the delay no longer exists.

2. The common control unit will light the STATUS SW WBT indicator when the ASC requests a delay in transmission. After the REP character sequence is transmitted three times, the STATUS 3 RPT indicator will light and, if the delay continues for 5 consecutive minutes, the STATUS s MIN WBT indicator will light to notify the operator. All indicators will be extinguished when the proper acknowledgment is received from the ASC.

(3) *Error Control.*

(a) *Framing Errors.* The common control unit and the ASC check all received blocks for proper framing characters. An incorrect SOH or STX character will be ignored. If any other improper framing character is received, or if a framing or SYN character is received during the data portion of a block, the receiving station will ignore the block and wait for a reply (REP) or cancel (CAN) character sequence response. When the transmitting station sends the REP character sequence, the receiving station will respond with the last control character sequence previously sent.

(b) *Message Errors.*

1. If the common control unit should send (to the ASC) a properly framed block which contains an error in the message format, the ASC will send a double character reject message (RM) character sequence at the end of the defective block. This indicates that the message cannot be corrected by retransmission and therefore must be canceled. The common control unit responds to the RM character sequence by returning the cancel (CAN) character sequence. The ASC will then return the ACK-2 character sequence indicating receipt of the cancel character.

2. Only the ASC can reject a message automatically; however, a message being transmitted by the DST set may be cancelled manually. This is accomplished at the DST set by pressing the SEND DEVICE CANCEL pushbutton on the front panel of the common control unit.

3. When a message is cancelled, the transmitting station sends the CAN character sequence and the receiving station responds with the ACK-2 character sequence. When the common control unit receives the CAN character sequence, a cancel signal is sent to the output device to mark the cancelled message for the operator. Paper tape punches notch the tape three times. Card punches punch a cancel code and offset the card in the deck to mark the cancelled message.

*(c) Block Errors.*

1. The receive control characters (ACK-1, ACK-2, NAK, RM, and WBT) are normally sent to a transmitting station by a receiving station in response to a block or to a REP or CAN character sequence. If any of these receive control characters are sent at any other time, the transmitting station will return the invalid (INV) character sequence to notify the receiving station that the message is suspected to be invalid. The common control unit will light the STATUS INV indicator to notify the operator of the suspected invalid message when the INV character sequence is transmitted or received.

2. When a receiving station detects an error in a block that may be corrected by retransmission of the block, the negative acknowledgment (NAK) character sequence is returned to the transmitting station. When the transmitting station receives the NAK character sequence, the block in error is retransmitted.

3. If the receiving station should fail to send a receive control character in response to a block before the answer timer at the transmitting station expires, the transmitting station will send the reply (REP) character sequence to request the answer. The answer timer is then restarted. If the REP character sequence is sent three times without receiving a response, the STATUS 3 RPT indicator on the common control unit front panel lights to notify the operator. Whenever the ACK-1, ACK-2, NAK, or RM character sequence is received, the answer timer is stopped and operation is resumed.

*(d) Out of Sync.* When the common control unit is in character frame synchronization, it will remain in this state until the out of frame criteria is recognized. The common control unit will consider itself out of frame synchronization and start the reframing procedure when it fails to detect four consecutive SYN characters or a REP or CAN character sequence within a time delay equal to the answer timer setting. The time delay will start at the end of a block after the BP character is received or when the common control unit is ignoring characters waiting for the REP or CAN character sequence. Every time four consecutive SYN characters or the REP or CAN character sequence is received, the answer timer is restarted, thus preventing the timer from expiring. If the common control unit fails to detect four SYN characters or the REP or CAN character sequence, the answer timer will expire and all message processing will be inhibited until character frame synchronization is again established. While the common control unit is out of sync, the STATUS SW SYNC light on the panel lights to notify the operator of the situation. If the out of sync criteria is not detected, the answer timer 3-12 is reset when the SOH or STX character for the next block is received.

*b. DST Set Interface Signals.*

(1) *General.* Information transfer between devices of the DST set is controlled by the common control unit, in conjunction with the device originating or receiving the message. The following paragraphs describe the interface signals, their sequence, and their use in the DST set. No attempt has been made to explain the detailed generation or use of the signals internal to each device; this information may be found in individual technical manuals for the devices (app. A).

(2) *Common control unit-output (or monitor) device interface.* (fig. 3-2).

*(a)* When the RECEIVE DEVICE A (or B) ASSIGNED switch on the common control unit is activated, the common control unit supplies a low level to the not assigned line. When an output (or monitor) device START switch is activated, and no faults are present, the device supplies a low level on the ready line. The output device uses the low level on the not assigned line to turn out the NOT ASSIGNED indicator. Once both the ready and not assigned lines are low, the common control unit can select the device by applying a low level to the select line. This acknowledges that the device is ready and indicates that the common control unit has a block of data to transfer to the device. The device acknowledges receipt of the select signal by sending a first data request pulse to the common control unit. This is a high level on the first data request line.

*(b)* Following receipt of a first data request, the common control unit loads its output circuits with a data character from memory. This applies a high or low level to each of the 8 data lines, depending on the bit structure of the character. Shortly after the output circuits are loaded, the common control unit sends a data strobe pulse to the selected output (or monitor) device. The device uses the data strobe pulse to gate the levels on the 8 data lines into the device logic circuits for processing.

*(c)* If the character being transferred is the first character of a message, a start of message (SOM) pulse is generated on the data control line simultaneous with the first data strobe pulse. This signals the device that a new message is starting.

*(d)* After the device has completed processing the first character, it requests another character by raising the data request line to +6v. The common control unit responds by reading another character out of memory into the output circuits and sending a second data strobe pulse to the output (or monitor) device. To acknowledge receipt of each data strobe pulse from the common control unit, the data request

line drops to -6v for a minimum of 5 microseconds after each data strobe pulse is received. AR characters in the common control unit output memory block are read out, one at a time, in this manner. Simultaneously with the 80th data strobe, the common control unit generates an end-of-block (EOB) pulse on the data control line. This signals the device to step to the next data block and advance cards, paper, etc. The device sends an 81st data request, signifying receipt of the total block of data, which is answered by an 81st data strobe from the common control unit.

(e) If the device had detected an error anywhere within the data block, instead of signifying receipt of good data with an 81st data request, the device would have sent a first data request to the common control unit. This would cause the entire block of data to be repeated.

(f) Following advancement of paper, or picking of a new card, the output (or monitor) device sends another first data request to the common control unit, which answers with the first character of the next block of data. The 80 characters now in memory are sent to the output (or monitor) device as previously explained.

(g) Common control unit response to the 81st data request following the last character in a message is the normal 81st data strobe, along with an end of message (EOM) pulse on the data control line. This signal tells the device the message has ended, and not to send another first data request until selected again. The common control unit also raises the select line to +6v between the 80th and 81st data strobes of every block.

(h) Between blocks of a message, the select line stays high to prevent the device from requesting data until the common control unit is ready to transfer data. If a monitor device is also being used, both the output and monitor devices must acknowledge receipt of a data block before the common control unit will output the next block. It should be noted that both the output device and the monitor device send data requests to the common control unit. Each data request causes a character to be transferred from memory to the output circuits, but only -the device sending a data request receives the data strobe pulse for that character from the common control unit.

(i) Certain alarm and cancel signals may also be exchanged, depending on fault or alarm conditions in the common control unit or output devices. (Refer to applicable technical manuals for the conditions which will cause these signals to be generated.) A message cancel signal will be transmitted to the output device from the common control unit simultaneously with the first data strobe in response to a first data request. In paper tape devices, this causes the tape to be edge notched 3 times and advanced. In card punches, the cancel signal causes the card in the punch

head to be punched in row 8, column 81 and offset stacked. The page printer will immediately advance to the next line, print out one complete line of circumflexes (Λ) and will advance to the next form.

(j) The output (or monitor) device may signal the common control unit of fault conditions in any one of several ways. The ready line may rise following the 81st data strobe and inhibit the start of the next block of data. A condition which will result in a caution indication at the common control unit causes the caution alarm line to raise, which turns on the CAUTION indicator on the common control unit. A fault signal may be sent to the common control unit at any time by raising of the fault line. This will prohibit transfer of data to the output (or monitor) device.

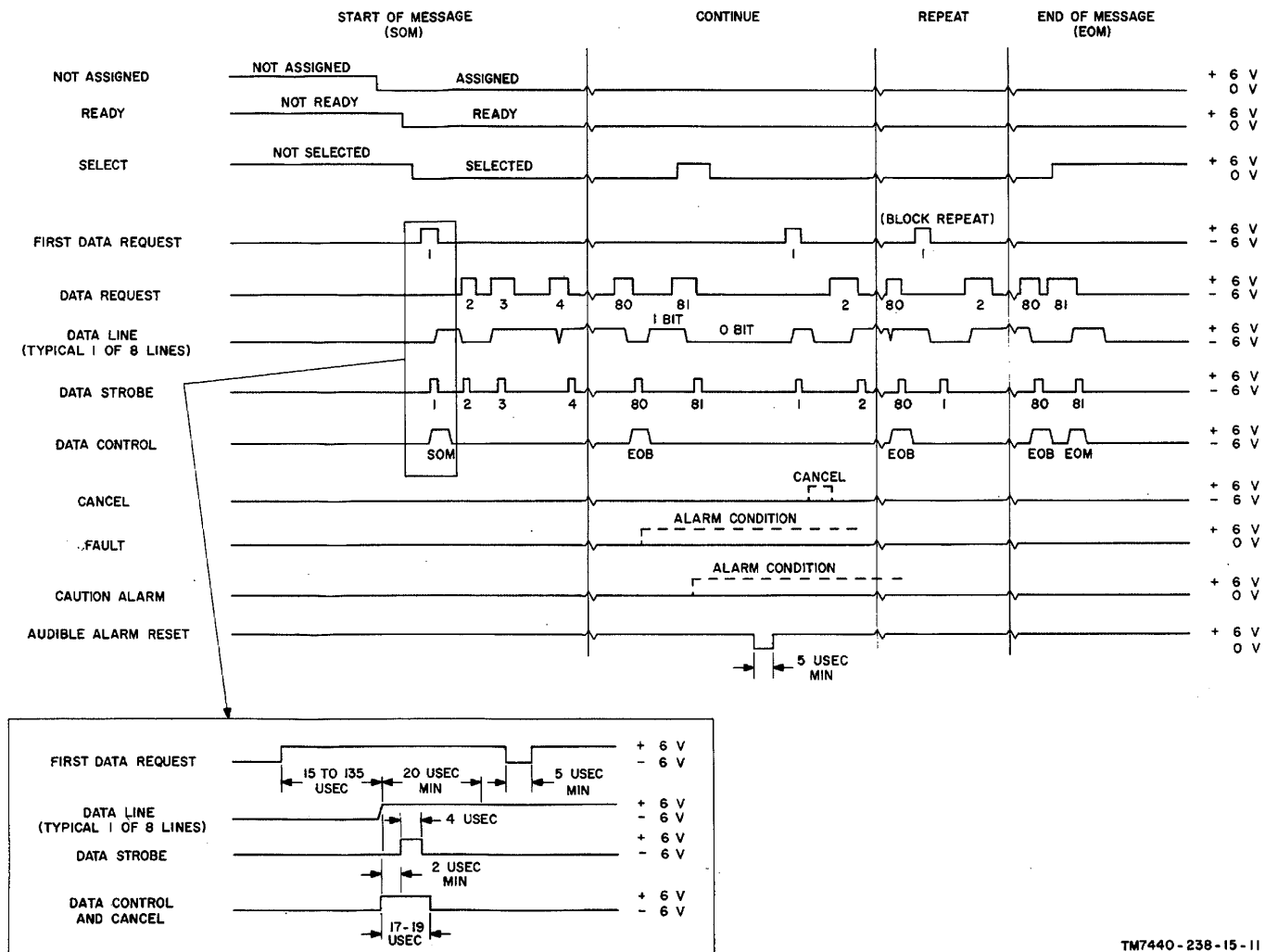
(k) An audible alarm reset pulse is generated by the device when the AUDIBLE RESET switch on the device is pressed. This pulse is used by the common control unit to shut off the audible alarm.

(3) *Common control unit-input device interface* (fig. 3-3).

(a) Once the input device is ready, assigned, and selected, the common control unit raises the step/data acknowledge line, which signals the device to send a data character and a data strobe pulse. The data character is then gated into the common control unit input circuits. Parity of the character is checked and the character is transferred to core memory. Within blocks (data strobes 1 through 79), the step/data acknowledge signal is sent to the input device again between 20 and 100 microseconds after the trailing edge of the data strobe pulse. Following the 80th data strobe pulse however, the step/data acknowledge signal is delayed until the common control unit has received acknowledgment of the previous data block from the ASC and the monitor device (if assigned). When the ASC (and monitor) acknowledges receipt of the block previously transmitted, the 80-character block just read into core memory is transferred to the transmit circuits and transmitted to the ASC one character at a time.

(b) Each block of the message being read is processed in a similar manner until the last block is read into core memory. The common control unit input circuits decode the end-of-message sequence and generate an end-of-message (EOM) pulse. The card reader uses this EOM pulse as a signal that the message is finished. The paper tape reader uses the EOM signal to step through idle characters between messages.

(c) If two input devices are assigned and ready, the common control unit will start processing



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Figure 3-2. Signal sequence, common control unit to output device interface.

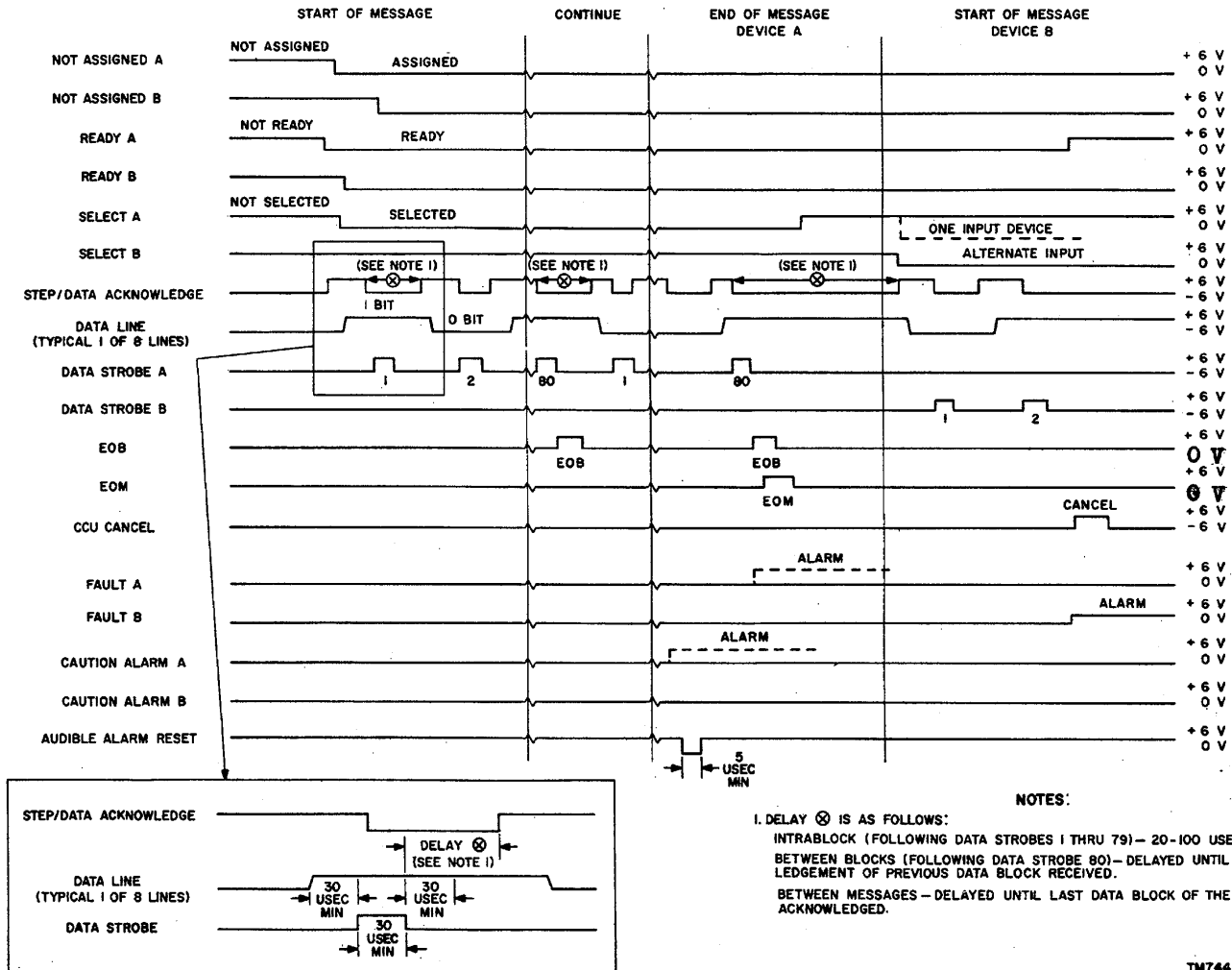


Figure 3-3. Signal sequence, common control unit to input device interface.

Change 1 3-15

a message on the second device only after acknowledgment for the last block of the previous message has been received from the ASC and monitor device (if assigned). When proper acknowledgment is received, the common control unit will then lower the select line of the second input device and send a step/data request pulse. The message on the second input device will be read as described above.

c. *Device Select Codes.* During initial installation, several solder-type hard-wire patches are made in each common control unit to make the common control unit select circuits compatible with the different types of input and output devices at the particular subscriber terminal. These hard-wire patches determine the output channel that will be selected by the common control unit in response to the select character in the select character framing position in the first block of a message. The patching also determines the select character that will be generated when a message is transmitted from the DSTE set, allows the common control unit to determine the end-of-message sequence from an input device, and accommodates Flash message processing. Refer to TM 11-7440-239-15 (app. A) for details of the patch connections for each type of input and output device used at a terminal.

d. *Device Switching Module.*

(1) Each device switching module consists of an alternate action pushbutton switch, a 48-pole relay, and 4 terminal boards. The alternate action switch is mounted in a modular plate which is installed in the upper portion of the common control unit operator's panel. The relay and terminal boards are mounted to a chassis plate which is installed on the side of the common control unit cabinet. Up to four device switching modules may be installed in each common control unit.

(2) Figure 3-4 is a schematic diagram of the device switching module. During initial installation, the normally on-line input or output device is designated as the "prime" device and is wired to terminal boards TB1 and TB2 of the device switching module. These terminal boards are cabled to normally closed contacts of relay K1. The normally off-line input or output device is designated the "alternate" device and is wired to terminal boards TB3 and TB4 of the device switching module. Terminal boards TB3 and TB4 are cabled to the normally open contacts of relay K1. When PRIME/ALTERNATE alternate action pushbutton switch S1 is activated to the back-lighted ALTERNATE

1 Reference designator prefixes vary depending on installation of device switching module. Thus, a device switching module installed for send channel A is A6 a detaching module installed for send channel B is A7; one installed for receive channel A is A8; and one installed for receive channel B is A9. Then, for example, device switching module terminal board TB1 will be A6TB1, A7TB1, A8TB1, or A9TB1, depending on use of device switching module.

(3) The common (switched) contacts of relay K1 are wired to the normal input terminal boards of the common control unit for the send or receive channel on which the device switching module is being used. Therefore, by energizing or deenergizing relay K1, either the prime or alternate device may be connected to the common control unit send or receive channel.

e. *Power and Signal Distribution Circuits.*

(1) *Power circuit* (fig. 3-5). Each device in the DST set, with the exception of the universal keyboard, contains an integral power supply which converts primary ac power into required dc voltages. Power is supplied to the universal keyboard by the output device to which it is connected, through the universal keyboard interconnecting cable. Refer to the technical manual for the universal keyboard (app. A) for details of the interconnection. All other input, output, and monitor devices, and the common control unit, are wired basically the same. AC power enters each device through an RFI-tight filter assembly (assembly FL1). The filter assembly contains powerline filters and terminal strips for distribution of ac power to the device power supply. A hazard ground terminal is also provided within the filter assembly to connect the third wire of the ac power input cable to the cabinet of the device. All cabinets are then connected to an earth reference plane (station ground). For power distribution within individual devices, refer to applicable technical manuals.

(2) *Signal Wiring.*

(a) Each on-line input device and each output or monitor device is wired directly to the common control unit through a signal cable enclosed in a metal ductwork. Wires are routed directly from terminal boards in the input, output, or monitor devices to terminal boards mounted within the common control unit cabinet. Each device contains two signal terminal boards which are wired to corresponding signal terminal boards in the common control unit, and a third terminal board for signal ground connections. Shields of all signal wires are grounded at the voltage source. Common control unit signal interface terminal boards and the functions associated with each are as follows:

<i>Terminal board</i>	<i>Function</i>
TB1 .....	Signal reference plane.
TB2 & TB3 .....	Send channel A.
TB4 & TB5 .....	Send channel B.
TB6 & TB7 .....	Receive channel A.
TB8 & TB9 .....	Receive channel B.
TB10 & TB11 .....	Send monitor channel.
TB12 & TB13 .....	Receive monitor channel.
TB16 .....	Crypto Ancillary Unit.
TB14 & TB15 .....	Ckt switching mod,

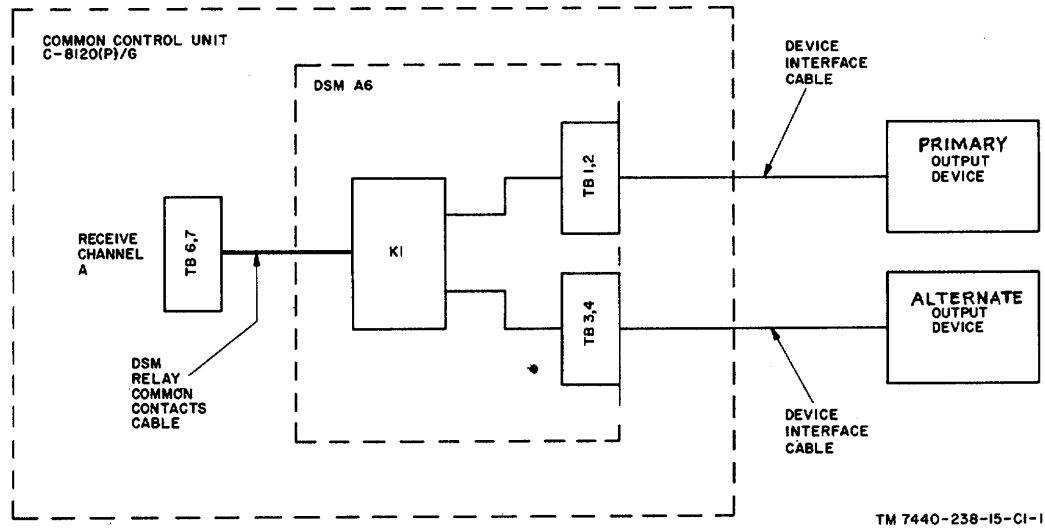


Figure 3-4.1. Typical installed device switching module.

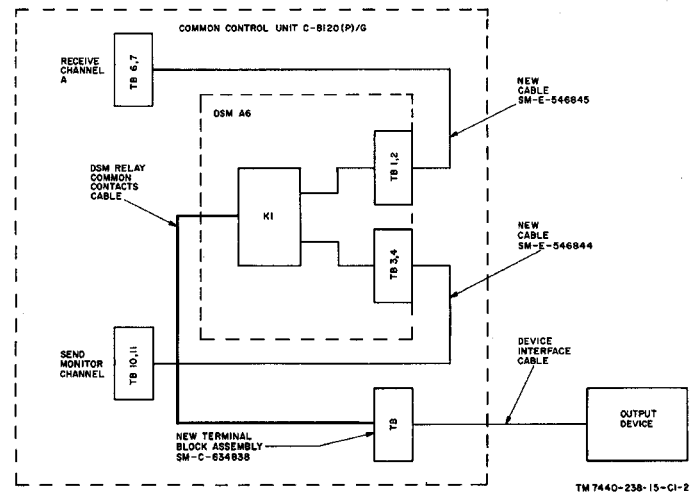
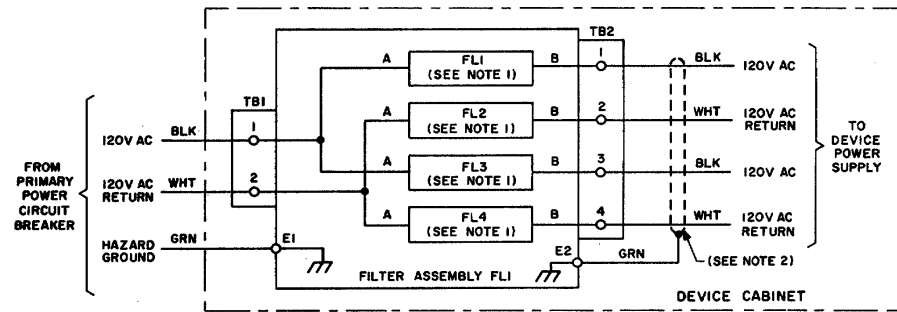
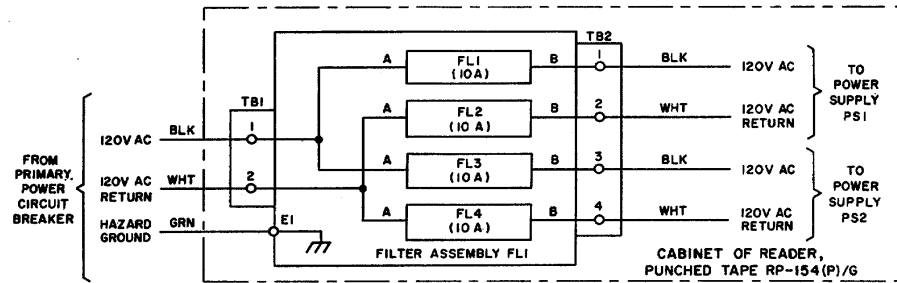


Figure 3-4.2. Typical device switching module after installation of conversion kit.

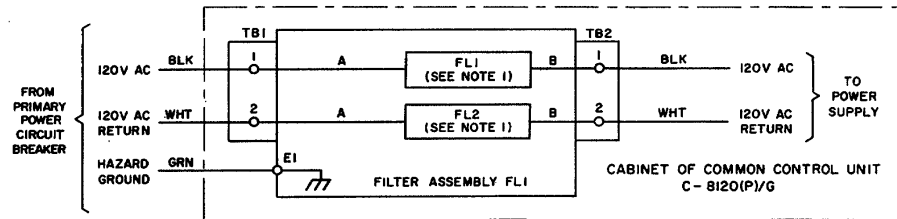




A. ALL DEVICES EXCEPT READER, PUNCHED TAPE RP-154(P)/G, PAGE PRINTER RP-157/G, AND COMMON CONTROL UNIT C-8120(P)/G.



B. READER, PUNCHED TAPE RP-154(P)/G.



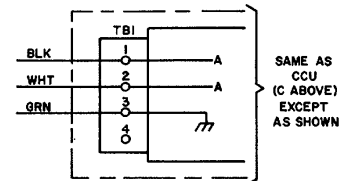
C. COMMON CONTROL UNIT C-8120(P)/G.

NOTES:

1. FILTERS USED IN EACH DEVICE ARE AS FOLLOWS:

DEVICE	FL1	FL2	FL3	FL4
CARD PUNCH, HIGH SPEED RO-312/G	10A	10A	20A	20A
CARD PUNCH, LOW SPEED RO-313/G	10A	10A	20A	20A
READER, PUNCHED CARD RP-152/G	10A	10A	10A	10A
PAPER TAPE PUNCH, HIGH SPEED RO-314/G	20A	20A	20A	20A
PAPER TAPE PUNCH, LOW SPEED RO-315/G	10A	10A	20A	20A
PAGE PRINTER RP-157/G	20A	20A		
COMMON CONTROL UNIT C-8120(P)/G	10A	10A		

2. SHIELDED WIRE USED ON CARD PUNCH, HIGH SPEED RO-312/G ONLY, ALL OTHERS USE TWISTED PAIR.



D. PAGE PRINTER RP-157/G.

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Figure 3-5. DST set AC power input wiring.

(b) When a device switching module is installed in the common control unit, the input or output devices for a desired input, output, or monitor channel are wired to terminal boards on the device switching module, then the common (switched) cable of the device switching module is wired to the desired common control unit input, output, or monitor terminal board. Figures 3-6 through 3-11 are cabling diagrams of the various DUT set configurations, and figures 3-7 and 3-11 show cabling when device switching modules are installed in the common control unit. Figures 3-12 and 3-13 show details of interconnecting wiring with terminal board numbers and signal ground wiring. Figure 3-14 shows the common control unit to crypto ancillary unit interconnections.

*f. Device Switching Module Conversion Kit.*

(1) Conversion kit, device switching module (SM-A-634835) is available to convert the cable harness of an installed device switching module so that one input or output device may be switched between any two send, receive, or monitor channels of the common control unit.

(2) Conversion kit SM-A-634835 contains the additional cabling, terminal block assembly, and mounting hardware necessary to allow the device switching module relay to be used in reverse, so that a single device (input or output) may be connected to either of two channels (input, output, or monitor) through alternate positions of the relay. Figure 3-4.1 shows a simplified cabling diagram of a typical installed device switching module before conversion and figure 3-4.2 shows the same device switching module cabling after the conversion kit has been installed. DSM A6 (see note below) is arbitrarily shown, switching common control unit channel A between two output devices before conversion. The same DSM is shown switching a single output device between receive channel A and the send monitor channel after conversion.

(3) Figure 3-4.3 is a schematic diagram of the device switching module with conversion kit SM-A-634835 installed. The interface cable from the input or output device is connected to TB1 and TB2 of the

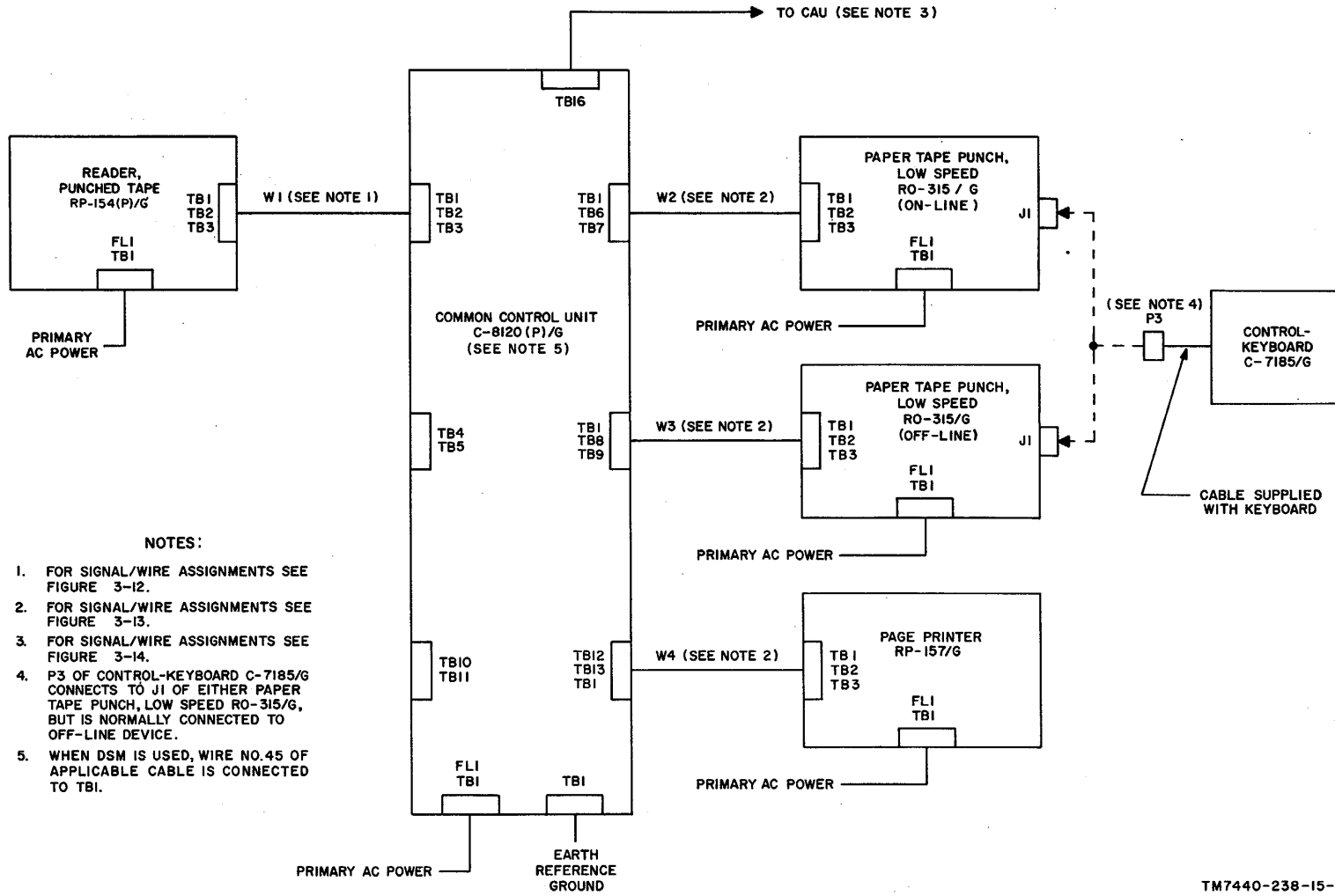
terminal block assembly supplied with the conversion kit. The common (switched) contacts of relay K1 of the device switching module are also connected to TB1 and TB2 of the terminal block assembly of the conversion kit.

(4) During initial installation, the normal function of the device is designated as the "prime" indication on the device switching module control panel, and TB1 and TB2 of the device switching module (see note below) is cabled to the appropriate input, output, or monitor interface terminal board (para. 3-3e(2) (a)). TB1 and TB2 of the device switching module is cabled to the normally-closed contacts of relay K1.

(5) Terminal boards TB3 and TB4 are cabled to the normally-open contacts of relay K1 and to the interface terminal boards in the common control unit used for the designated "alternate" function of the device. Therefore, energizing and deenergizing relay K1 through operation of the alternate action PRIME/ALTERNATE switch-indicator (Z1) on the device switching module control panel selects the channel function of the input or output device. The two cables connecting the device switching module to the interface terminal boards in the common control unit are supplied as part of the conversion kit.

**NOTE**

**Reference designator prefixes vary depending on installation of the device switching module. Converted device switching modules will be installed in unused locations; however, normally locations A6 or A7 will be used for send monitor and locations A8 or A9 will be used for receive monitor. Then, for example, device switching module terminal board TB1 will be A6TB1, A7TB1, A8TB1 or A9TB1 depending on location of device switching module.**



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Figure 3-6. AN/FYA-71 (V)1 (AA configuration), cabling diagram.

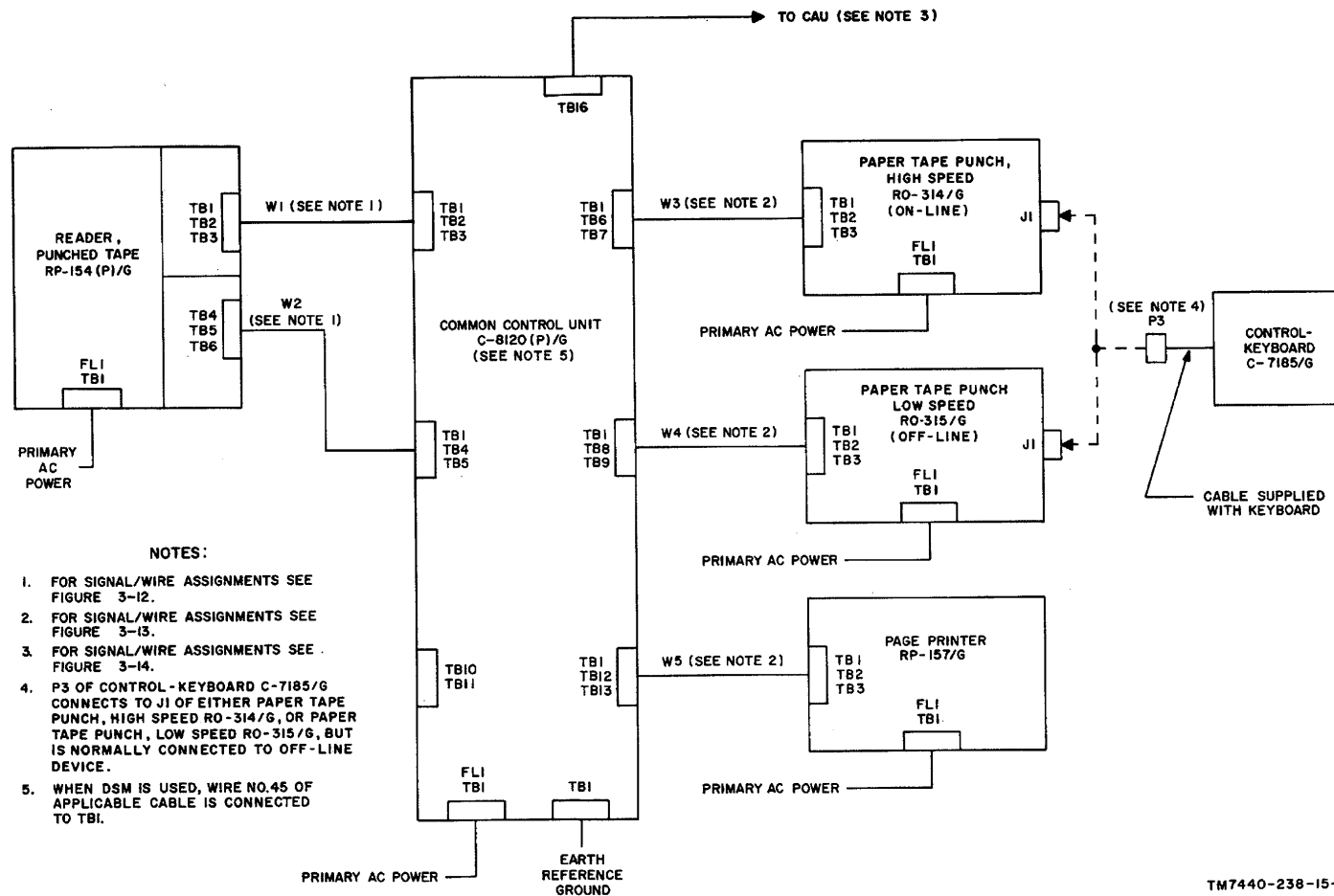


Figure 3-8. AN/FYA-71(V)S (AE configuration), cabling diagram.

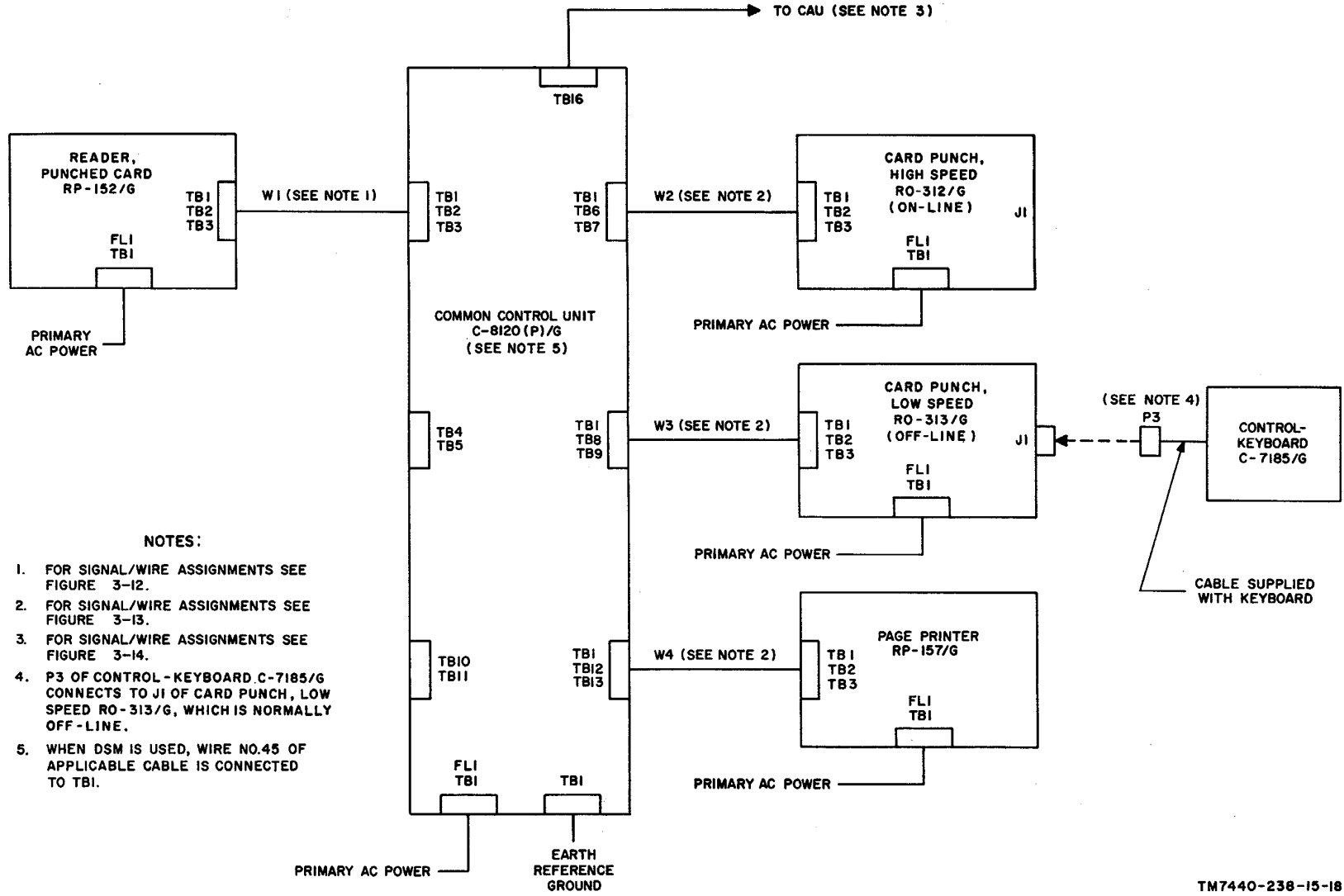
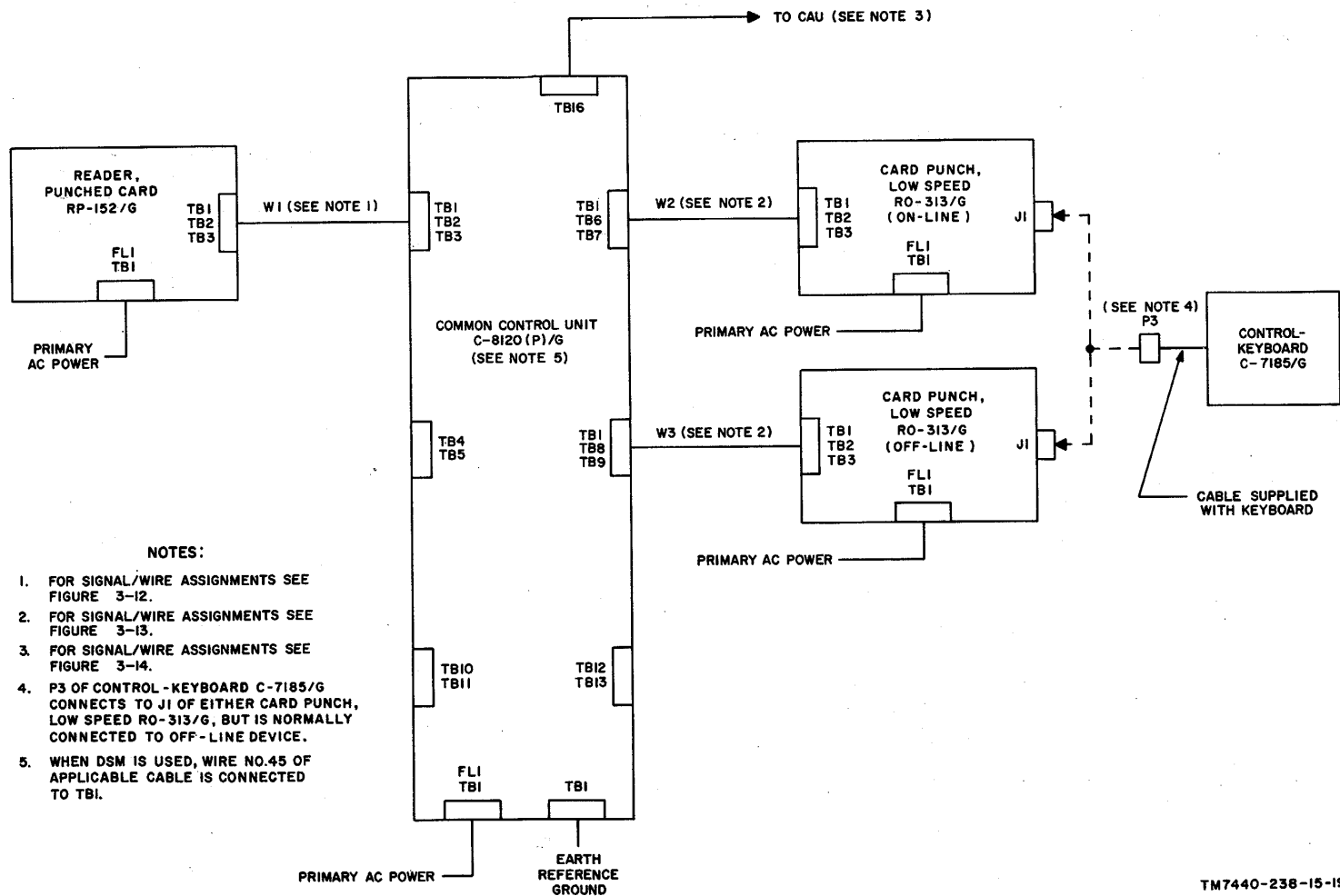
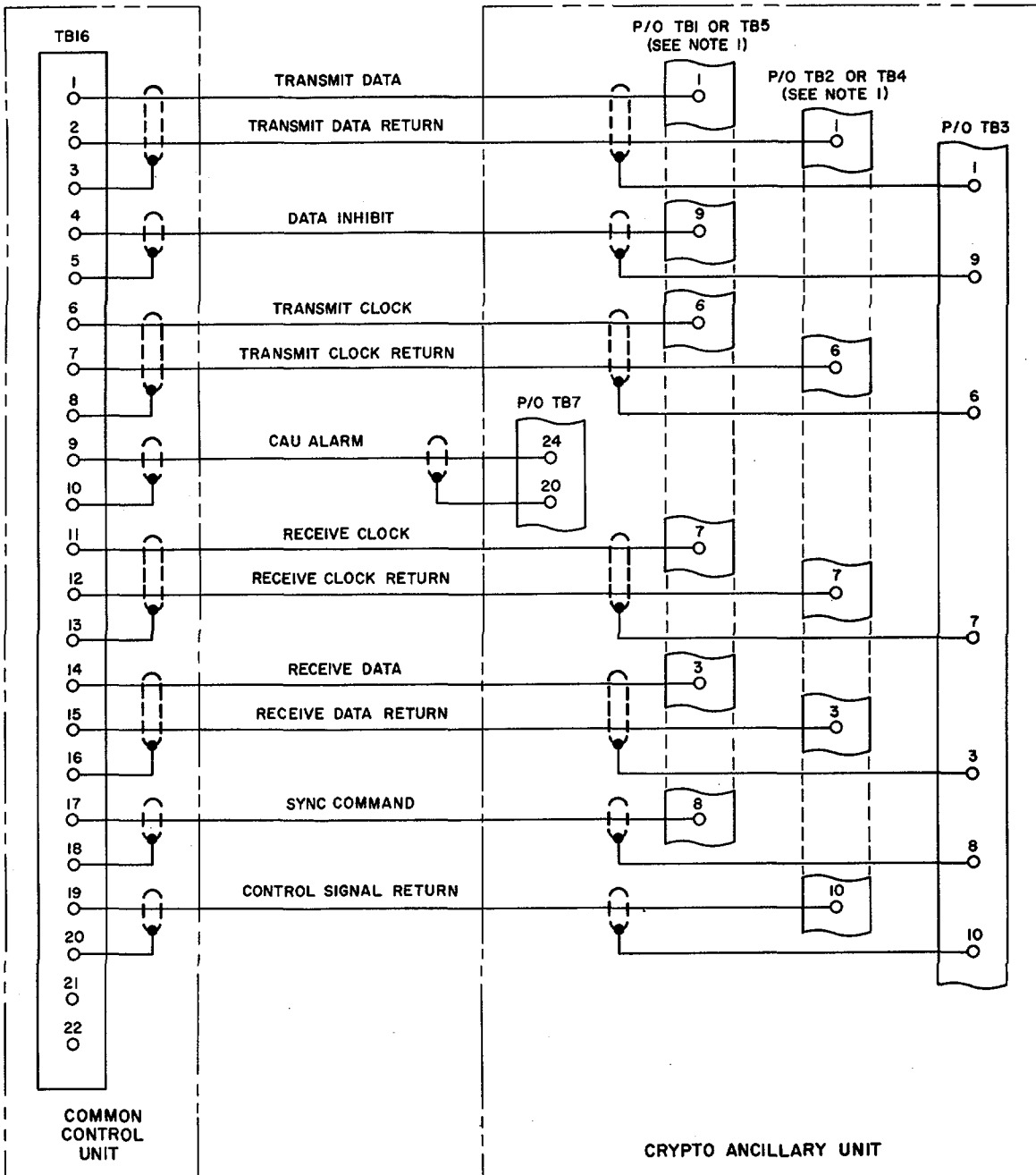


Figure 3-9. AN/FYA-71(V)4 (BB configuration), cabling diagram.



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Figure 3-10. AN/FYA-71(V)5 (BC configuration), cabling diagram.



NOTE  
 TERMINAL BOARD DESIGNATIONS VARY DEPENDING  
 ON WIRING OPTIONS USED.

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Figure 3-14. Signal/wire assignments, common control unit-crypto ancillary unit cable.

## CHAPTER 4 MAINTENANCE INSTRUCTIONS

### Section I. GENERAL

#### 4-1. Scope of Maintenance

This chapter contains instructions covering operator, organizational, direct support, and general support maintenance of the DST sets. It includes instructions for performing periodic preventive maintenance checks and services and troubleshooting at the DST set level. Detailed maintenance instructions for input and output devices and the common control unit are contained in the applicable technical manuals listed in Appendix A.

#### 4-2. Tools, Materials, and Test Equipment Required

The tools, materials, and test equipment required for maintenance of the major components of the DST sets are listed below. Lubricants and other materials peculiar to each device are listed, in the related technical manuals (app. A).

##### a. Tools.

- (1) Tool Kit, Electronic Equipment, TK-105/G, Federal stock number 5180-610-8177.
- (2) Tool Kit, Tape Equipment, FSN 1580-168-9999.
- (3) Tool Kit, Card Equipment, FSN 5180-168-9998.
- (4) Tool Kit, Page Printer, FSN 5180-167-9997.
- (5) Tool Kit, Power Supply and Miscellaneous Tools, FSN 5180-168-9996
- (6) Vacuum Cleaner.

##### b. Materials.

- (1) Clean, lint-free cleaning cloth.
- (2) Brush, typewriter, toothbrush style, Federal stock No. 7510-178-8320.
- (3) Cleaning Compound, Federal stock No. 7930-395-9542.

**Warning: Prolonged breathing of cleaning compound is dangerous; make certain that adequate ventilation is provided. Cleaning compound is flammable; do not use near flame.**

- (4) Fine sandpaper.
- (5) Coater, Filter, FSN 4130-860-0012 (1-pt spray can)
- (6) Enamel, semi-gloss, gray, FSN 8010-087-0109 (1-qt can)
- (7) Enamel, semi-gloss, blue, FSN 8010-721-9753 (15-oz spray can)
- (8) Enamel, semi-gloss, black, FSN 8010-844-4792 (1-qt can)

##### c. Test Equipment.

- (1) Multimeter. AN/USM-210 (Simpson Model No. 250-5, FSN 6625-149-6301).
- (2) Oscilloscope AN/USM-309(V)1, FSN 6625-121-6328 consists of Hewlett-Packard Mod 140A oscilloscope, Mod 1421A generator, Mod H06-1405A Amplifier and 2 ea 6-ft test prods HP No. C16-10003B.
- (3) Probe tip, coil-spring, 2 ea, Tektronix No. 206 0061-00 FSN 6625-054-0231.
- (4) Oscilloscope cart, Hewlett-Packard No. 1119B.
- (5) Stroboscope, Electronic Brazing Co. 510AL, Federal stock No. 6625-223-5150.

*d. Test Tapes and Test Card Decks.* Test tapes and/or test card decks containing test messages are required to perform operational checks described in the preventive maintenance checks and services of paragraphs 4-4 and 4-5. Punch the test tapes and/or test card decks described below on the off-line punch device in conjunction with the off-line universal keyboard. The test messages must be prepared in accordance with the standard formats used in the AUTODIN system. Insert self-addressed routing indicators in the header of each message. This will allow the use of the test tape or test card deck for transmitting test messages to the ASC for processing and rerouting back to the terminal when checking the operation of the DST set in the normal on-line mode. Be sure to punch the proper end of message sequence at the end of each message on the test tape or test card deck.

- (1) One test tape or test card deck containing at least two error-free messages of any length. Use self-addressed routing indicators in the header of the messages and use the proper select characters (card or tape) so that the messages correspond to the type of output device to be used.

**NOTE: (2) below is not used as a preventive maintenance check. Use only as required for corrective maintenance.**

- (2) One test tape or test card deck containing an error-free message of any permissible length with the FLASH precedence prosign (Z) inserted in the header of the message. This test tape or test card deck is used in the on-line test mode to check the flash message recognition capability of the common control unit.

- (3) One test tape or test card deck containing a message of any length with errors intentionally



inserted in the header of the message. The errors must be of such nature as to cause the ASC to reject the message when this test tape or test card deck is used in the on-line test mode, such as garbled redundant security characters. A second error-free test message should also be included in the test tape or test card deck. The second message should have an error-free, self-addressed header block.

(4) One test tape or test card deck containing three error-free messages. The first message should be of maximum length (500 blocks), the second should be relatively short (25 blocks) and the third should also be short (25 blocks). All messages should have correct self-addressed routing indicators in the header of the message and should have select codes (card or tape) for the type of equipment at your terminal. The first two messages should have a correct end of message sequence following the text of the message. The third

message should have no end of message sequence, but should end after the last full block of the message. The first block of text of the first message, and subsequent blocks, should consist of only one character repeated in all 80 positions within the block. Each character should be repeated for 6 blocks in a row, so that the text of the message consists of 6 blocks of all A's, 6 blocks of all B's, etc. through Z, all 0's, all 1's, etc. through 9, and all, punctuation marks permitted in AUTODIN. Refer to the appropriate AUTODIN Operating Procedures publications and to the code chart of table 3-1 to determine which characters are permitted.

(5) One test tape or test card deck which consists of several blocks of the alternate characters U and \*. The ASCII codes for these characters cause alternate 1 and 0 bits in each data line, and are helpful for troubleshooting parity or character errors.

## Section II. PREVENTIVE MAINTENANCE

### 4-3. Use of Preventive Maintenance Information

*a. General.* Preventive maintenance is the systematic care, inspection, and servicing of the DST set to maintain it in serviceable condition, prevent breakdowns, and to assure maximum operational capability. The procedures described in paragraphs 4-4 through 4-9 cover routine inspection, testing, cleaning, retouching of painted surfaces, and lubrication of moving parts essential to proper upkeep and operation of the terminal equipment.

*b. Preventive Maintenance Checks and Services.* The preventive maintenance checks and services charts (para 4-4, 4-5, and 4-6) outline functions to be performed at specific intervals. These checks and services are designed to help maintain the DST set in serviceable condition. They indicate what items should be checked, how they should be checked, and the normal conditions. Also included are references to text, illustrations, and other manuals that contain supplementary information. For those terminals having device switching modules installed (configurations AB and BE), perform the appropriate tests once with the device switching modules set to the PRIME position, then repeat the tests with the device switching modules set to the ALTERNATE position. It is only necessary to repeat those portions of the tests affected by selecting alternate equipment (output device tests).

**Note.** The preventive maintenance checks and services charts are based on a standard AB or BE configuration (both cards and tape), and on similar devices interchanging messages (i.e. tape readers sending to tape punches; card readers sending to card punches). At terminals having either card or tape devices, ignore the inappropriate steps of the preventive maintenance checks and services charts.

*c. Preventive Maintenance Intervals.* Preventive maintenance checks and services are required on a daily (para 4-4), a weekly (para 4-5), and a monthly (para 4-6) basis. A week and month are defined as approximately 7 and 30 calendar days of 24 hours a day operation, respectively. The preventive maintenance functions are normally performed during periods of low traffic density. Equipment maintained in a standby condition (ready for immediate operation) must have weekly preventive maintenance.

*d. Records and Reports.* Records and reports of preventive maintenance must be made in accordance with procedures given the appropriate publication (para 1-2 d).

**4-4. Daily Preventive Maintenance Checks and Services Chart**

<i>Sequence No.</i>	<i>Item</i>	<i>Procedure</i>	<i>References</i>
1	Exterior surfaces.....	Check that all equipment and cabinets are free of dust, dirt, or grease. Clean as required.	Para 4-7.
2	Interconnecting cables and connectors.	Check that all exposed interconnecting cables, mating plugs and jacks are clean, intact, and corrosion free. Clean if required.	Para 4-7.
3	Indicator lamps.....	Check indicator lamp and pushbutton switch lenses for looseness or damage.	
4	Control knobs, levers, and switches.	Check switches, levers and control knobs for looseness and binding	
5	Input, output and monitor devices.	Perform daily preventive checks and services, including operational checks.	Applicable TM's (app. A).
<p><i>Note.</i> The following operational check (sequence 6 and 7) is performed on-line by transmitting self-addressed test messages to the ABC. Inform the ABC that you are going to perform the on-line check.</p>			
6	DST set operation (on-line).	<p>a. Perform preliminary starting procedure for DST set</p> <p>b. Perform starting procedure for DST set</p> <p>c. At each input device:</p> <p>(1) Load a test tape or card deck containing at least two error-free test messages.</p> <p>(2) Press device START pushbutton switch and check that it lights green.</p> <p>d. At the common control unit:</p> <p>(1) Assign the monitor device to receive channel A by pressing the RECEIVE MONITOR A ASSIGNED pushbutton switch. Switch should light white<sup>a</sup> and RECEIVE MONITOR READY indicator should light green.</p> <p>(2) Press RECEIVE DEVICE A ASSIGNED pushbutton switch. Switch should light white and RECEIVE DEVICE READY should light green.</p> <p>(3) Press SEND DEVICE A ASSIGNED and SEND DEVICE B ASSIGNED<sup>b</sup> pushbutton switches. Switches should light white.<sup>a</sup></p> <p>(4) Check that SEND DEVICE A READY indicator goes out and SELECT indicator lights white indicating that the common control unit is transmitting the message to the ASC. Also, check that input device A starts operating (reading cards or tape).</p> <p>e. When the first test message on input device A is complete, the device should stop operating and input device B should start operating.<sup>b</sup> Check that following indications occur at common control unit:</p> <p>(1) SEND DEVICE A SELECT indicator goes out and READY indicator lights green.</p> <p>(2) SEND DEVICE B READY indicator goes out and SELECT indicator lights white.</p> <p>f. When the message for output device A is returned from the ASC, check for the following indications at the common control unit:</p> <p>(1) RECEIVE DEVICE A READY indicator goes out and SELECT indicator lights white. RECEIVER MONITOR READY indicator goes out and SELECT indicator lights white.</p> <p>(2) Output device A starts and copies message with no errors.</p> <p>(3) Monitor device starts and copies message with no errors.</p> <p>g. When message for output device B is returned from ASC,<sup>c</sup> check for following indications:</p> <p>(1) At the common control unit, RECEIVE DEVICE B READY indicator goes out and SELECT indicator lights white.</p> <p>(2) Output device B starts and copies message with no errors.</p> <p>(3) Monitor device does not operate.</p>	<p>Para 2-3.</p> <p>Para 2-4.</p> <p>Para 4-2d(1).</p>

<sup>a</sup> When device is assigned at the common control unit, the amber NOT ASSIGNED indicator on the device should go out.  
<sup>b</sup> At those terminals having only one input device, ignore references to input device B. Indications listed for input device A should be received, however.  
<sup>c</sup> At those terminals having only one output device on-line; ignore references to output device B.

**NOTE:** The following sequence is given for reference only, to be performed only when maintenance conditions warrant it. **DO NOT PERFORM ON A DAILY BASIS.**

<i>Sequence No.</i>	<i>Item</i>	<i>Procedure</i>	<i>References</i>
7	DST set operation (on-line).	<ol style="list-style-type: none"> <li>a. Deassign output device A and the monitor device by pressing the RECEIVE DEVICE A ASSIGNED and RECEIVE MONITOR A pushbutton switches on the common control unit.</li> <li>b. Load input device A with a test tape or card deck containing two self-addressed error-free messages containing the Flash prosign (Z).</li> <li>c. Press START pushbutton switch on input device A. The device should start operating.</li> <li>d. At the common control unit, press the SEND DEVICE EOM STOP pushbutton switch. The switch should light white during the message, then should light red when the input device stops.</li> <li>e. When the flash message is returned from the ASC, check for the following indications:                             <ol style="list-style-type: none"> <li>(1) RECEIVE DEVICE A ASSIGNED and RECEIVE MONITOR A ASSIGNED pushbuttons light white.</li> <li>(2) RECEIVE DEVICE FLASH and RECEIVE MONITOR FLASH pushbuttons blink red.</li> <li>(3) Audible alarm sounds intermittently.</li> <li>(4) Both output device A and the monitor device copy the message with no errors.</li> </ol> </li> <li>f. Reset audible alarm by pressing AUDIBLE RESET pushbutton switch.</li> <li>g. At the end of the message, both the RECEIVE DEVICE A ASSIGNED and RECEIVE MONITOR A ASSIGNED switches should become nonilluminated again. Both devices should stop with their START switches lighted green.</li> <li>h. Press STOP pushbutton switch on output device A. The switch should light red.</li> <li>i. At the common control unit, press the RECEIVE MONITOR A ASSIGNED switch. Switch should light white and RECEIVE MONITOR READY indicator should light green.</li> <li>j. Transmit the second Flash message on the input device by pressing the SEND DEVICE EOM STOP switch on the common control unit.</li> <li>k. When the Flash message is returned from the ASC, check for the following indications:                             <ol style="list-style-type: none"> <li>(1) RECEIVE DEVICE A ASSIGNED pushbutton lights red.</li> <li>(2) RECEIVE DEVICE FLASH and RECEIVE MONITOR FLASH pushbuttons blink red.</li> <li>(3) Audible alarm sounds intermittently.</li> <li>(4) Neither the output device nor the monitor device copies the message.</li> </ol> </li> <li>l. Press the RECEIVE DEVICE FLASH pushbutton switch, and check that the monitor device copies the message with no errors.</li> <li>m. Silence audible alarm by pressing AUDIBLE RESET pushbutton switch.</li> <li>n. Restore terminal equipment to normal operations.</li> </ol>	Para 4-2d(2).

**4-5. Weekly Preventive Maintenance Checks and Services Chart**

<i>Sequence No.</i>	<i>Item</i>	<i>Procedure</i>	<i>References</i>
1	Exterior surfaces	Inspect all exterior painted surfaces for rust and corrosion. Clean and touchup paint as required. (See TB 746-10.)	Para 4-7 and 4-8.
2	Interconnecting cables and connectors.	Inspect all exposed interconnecting cables for chafed, cracked, or frayed insulation or broken connectors. Repair minor damage with electrical insulation tape. Replace cables that have cracks or broken connectors.	
3	Air filters	<ol style="list-style-type: none"> <li>a. Remove the air filters in the blowers behind the front grills on all devices and replace with proper spare air filters.</li> <li>b. Clean removed air filters</li> </ol>	b. Para 4-7b.

<i>Sequence No.</i>	<i>Item</i>	<i>Procedure</i>	<i>References</i>
4	Interior surfaces	Check that interior surfaces and mechanical assemblies of each device are free of dust, dirt, oil, grease, moisture, corrosion, rust, and paper lint. Clean if required.	Applicable TM's (app. A).
5	Internal wiring, plugs, and receptacles.	<ol style="list-style-type: none"> <li>a. Inspect the internal wiring, cables and cords of each device for broken, cracked, or defective insulation, deposits of oil, grease, dust, or paper lint. Clean as required.</li> <li>b. Inspect the internal plugs and receptacles for breakage, firm seating, loose screws or nuts, corrosion, and grease or oil deposits. Clean if required.</li> </ol>	<ol style="list-style-type: none"> <li>a. Applicable TM's (app. A).</li> <li>b. Applicable TM's (app. A).</li> </ol>
6	Input, output and monitor devices	Perform weekly preventive maintenance checks and services-----	Applicable TM's (app. A).
<p><i>Note.</i> The following operational check is performed on-line by transmitting self-addressed test messages to the switching center that you are going to perform the on-line check.</p>			
7	DST set operation (on-line).	<ol style="list-style-type: none"> <li>a. Perform sequences No. 6 of Daily Preventive Maintenance Checks and Services Chart.</li> <li>b. Load input device A with a test tape or test card deck containing two test messages. The first message should contain an error in the header block that will cause the ASC to reject the message. This should be followed by an error-free test message having a self-addressed header.</li> <li>c. At the common control unit:               <ol style="list-style-type: none"> <li>(1) Press RECEIVE DEVICE A ASSIGNED pushbutton switch. Switch should light white and RECEIVE DEVICE READY indicator should light green.</li> <li>(2) Press SEND DEVICE A ASSIGNED pushbutton switch. Switch should light white and SEND DEVICE A. SELECT indicator should light white.</li> </ol> </li> <li>d. The input device should start operating and read the first few blocks of the test message. Then the input device should stop and the following indications should be obtained:               <ol style="list-style-type: none"> <li>(1) At the input device:                   <ol style="list-style-type: none"> <li>(a) STOP switch lights red.</li> <li>(b) CANCEL indicator lights red.</li> </ol> </li> <li>(2) At the common control unit:                   <ol style="list-style-type: none"> <li>(a) STATUS RM indicator lights red.</li> <li>(b) SEND DEVICE A CANCEL indicator lights red.</li> <li>(c) SEND DEVICE CANCEL switch pushbutton may light amber momentarily but should not remain on.</li> <li>(d) SEND DEVICE A SELECT and READY indicators go out.</li> <li>(e) Audible alarm sounds.</li> </ol> </li> </ol> </li> <li>e. At the common control unit, reset the audible alarm by pressing the AUDIBLE RESET pushbutton switch, and reset STATUS RM indicator by pressing STATUS CLEAR pushbutton switch.</li> <li>f. At the input device, advance the test tape or feed cards until the header of the next message is reached.</li> <li>g. Press input device START switch. The switch should light white, the CANCEL indicator should go out, and the device should start processing cards or tape.</li> <li>h. When the ASC returns the message, output device A should copy the message with no errors.</li> <li>i. Contact switching center and request that they send a proper format message (card or tape) for the equipment at your terminal and cancel the message during transmission.</li> <li>j. When the message cancel occurs, check for the following indications:               <ol style="list-style-type: none"> <li>(1) If a paper tape punch is being used as the output device, check that it notches the tape 3 times and advances it a minimum of 6 inches.</li> <li>(2) If a card punch is being used as an output device, check that card is offset stacked and is punched in row 8 of column 81.</li> <li>(3) The common control unit RECEIVE DEVICE CANCEL indicator may flicker, but should not remain on.</li> </ol> </li> <li>k. Proceed to sequence 8.</li> </ol>	<p>Para 4-4.</p> <p>Para 4-2d(3).</p>

*Note.* The following check is performed off-line utilizing the input/output mode of operation of the common control unit. Inform the switching center that your terminal will be off-line for the duration of the following check.

<i>Sequence</i>	<i>No.</i>	<i>Item</i>	<i>Procedure</i>	<i>References</i>
8	DST set operation (off-line).	<ol style="list-style-type: none"> <li>a. Open the maintenance panel cover on the common control unit and place the CCU TEST MODE SELECT switch in the I/O position.</li> <li>b. Load input device A with a test tape or card deck containing at least three error free test messages. Use test messages described in para 42d(4).               <ol style="list-style-type: none"> <li>a</li> </ol> </li> <li>c. Check that RECEIVE DEVICE A ASSIGNED and RECEIVE MONITOR A ASSIGNED pushbutton switches on the common control unit are lit white. If they are not, press applicable switch once.</li> <li>d. Test the input and output stop circuits by performing the following steps:               <ol style="list-style-type: none"> <li>(1) Press input device A START switch. Switch should light white and input device should start processing cards or tape. Output device A and the monitor device should start copying the message.</li> <li>(2) At the common control unit, press the SEND DEVICE EOB STOP switch. The switch pushbutton should light red and input device should stop at end of block in process. Output and monitor devices should also stop. The SEND DEVICE A, RECEIVE DEVICE A, and RECEIVE MONITOR A ASSIGNED switches should all be white and the associated SELECT indicators should be white.</li> <li>(3) Press the SEND DEVICE EOB STOP switch a second time. Switch should go out and input device should start processing cards or tape again. Output and monitor device should also start.</li> <li>(4) Press RECEIVE -DEVICE EOB STOP switch. Switch should light red and input, output and monitor devices should all stop at end of block in process. Indications should be as described in step (2).</li> <li>(5) Press RECEIVE DEVICE EOB STOP switch again. Normal message processing should resume.</li> <li>(6) Press SEND DEVICE EOM STOP switch. Switch should light white and when all devices stop at the end of the first message switch should light red. Indications should be as described in step (2).</li> <li>(7) Press SEND DEVICE EOM STOP switch again. Input device should step to the next message and normal message processing should resume.</li> <li>(8) Press RECEIVE DEVICE EOM STOP switch. Switch should light white and when all devices stop at end of message in process switch should light red. Indications should be as described in step (2).</li> <li>(9) Press RECEIVE DEVICE EOM STOP switch again. Normal message processing should resume. While the third test message is being processed, perform step e.</li> </ol> </li> <li>e. Test the input and output alarm circuits by performing the following steps:               <ol style="list-style-type: none"> <li>(1) As the test message is being processed, press the SEND DEVICE A ASSIGNED switch to de-assign the input device. Check for the following indications:                   <ol style="list-style-type: none"> <li>(a) SEND DEVICE A CANCEL indicator lights red.</li> <li>(b) Audible alarm sounds.</li> <li>(c) SEND DEVICE A ASSIGNED switch goes out.</li> <li>(d) Input device A stops operating and STOP switch and CANCEL indicator light red.</li> <li>(e) Output device stops operating. If a paper tape punch is being used, check that tape is edge notched 3 times and advanced at least 6 inches. If a card punch is being used, check that card is punched in row 8, column 81, and is offset stacked.</li> <li>(f) Page printer immediately advances to next line, prints out one line (80 columns) of circumflex (A), and advances to next form.</li> </ol> </li> </ol> </li> </ol>	Para 4-2d(4).	

See footnote at end of table.

Sequence No.	Item	Procedure	References
		(2) Press SEND DEVICE A ASSIGNED switch again.	
		(3) Press AUDIBLE RESET to silence audible alarm.	
		(4) Reload input device test tape or card deck to start of first test message and press START switch. Switch should light white, STOP and CANCEL indicators should go out and device should start processing cards or tape. CANCEL indicator on common control unit should also go out.	
		(5) Check that output device starts and copies message with no errors. While message is being processed, press SENT DEVICE CANCEL switch on common control unit. Check that indications of steps (1) (a) through (f) are obtained.	
		(6) Repeat steps (3) and (4).	
		(7) If a paper tape reader is being used as an input device, create a tight tape condition by holding the tape from stepping through the reader mechanism. If a card reader is being used as the input device, simulate a stacker full condition by pressing the plate on top of the pile of cards in the stacker upward.	
		(8) When the fault condition of step (7) is created check that the indications of steps (1) (a) through (f) are obtained.	
		(9) Repeat steps (3) and (4) except reload to start of third test message (having no end of message sequence).	Para 4-2d(4).
		(10) Message should be processed normally until end of tape or last card is read. Then indications of steps (1) (a) through (f) should be obtained.	
		(11) Repeat steps (3) and (4).	
		(12) While message is being processed, press RECEIVE DEVICE A ASSIGNED switch. Switch should light red and audible alarm should sound. Both input device A and the monitor device should stop operating but remain selected (SELECT indicator white) by the common control unit.	
		(13) Press RECEIVE DEVICE A ASSIGNED switch again. Output device should become assigned and selected and normal message processing resume.	
		(14) Press SEND DEVICE A EOM STOP switch to halt operations at the end of the message.	
		(15) Press RECEIVE MONITOR A ASSIGNED switch to deassign monitor and perform step <i>f</i> for paper tape equipment and/or step <i>g</i> for card equipment.	
	<i>f.</i>	Test caution and alarm stop circuits of paper tape punches by performing the following steps:	
		(1) Load the paper tape punch with a nearly empty reel of blank tape. Use 40 feet of tape on the low speed paper tape punch; 200 feet of tape on the high speed paper tape punch.	
		(2) Press START switch on paper tape punch and START switch on paper tape reader. Switches should light white, and the message being read by the paper tape reader should be punched on the paper tape punch.	
		(3) When the low speed paper tape punch supply reel contains only a 2 to 4 minute supply of tape (52 to 92 seconds for high speed paper tape punch) the LOW TAPE indicator should light red, and the appropriate RECEIVE DEVICE A (or B) CAUTION indicator on the common control unit should light. The audible alarm will also sound.	
		(4) Press SEND DEVICE EOB STOP switch. When message processing stops, advance the tape through the paper tape reader to a point near the end of the message, then press SEND DEVICE EOB STOP switch again to resume message processing.	
		(5) When the end of message sequence has been processed, the following indications should occur:	
		(a) Paper tape punch STOP indicator lights red.	
		(b) Paper tape punch TAPE OUT indicator lights red.	
		(c) Common control unit RECEIVE DEVICE A (or B) FAULT indicator lights red, and audible alarm sounds.	

Sequence No.	Item	Procedure	References
		(6) Reset audible alarm by pressing AUDIBLE RESET switch. Press RECEIVE DEVICE A (or B) ASSIGNED switch to deassign output device. If your terminal also contains card equipment, perform step <i>g</i> ; if not, proceed to step <i>h</i> .	
	<i>g</i> .	<p>Test card equipment caution and alarm stop circuits by performing the following steps:</p> <ol style="list-style-type: none"> <li>(1) Load card punch with a low number of blank cards. Use approximately 100 cards on low speed card punch; 300 cards on high speed card punch.</li> <li>(2) Press START switch on card punch and START switch on card reader. Switches should light white and the message being read on the card reader should be punched on the card punch.</li> <li>(3) When the supply of blank cards is reduced to a small number (25-55 on low speed card punch; 140-240 on high speed card punch) the HOPPER LOW indicator on the card punch should light. At the same time, the appropriate RECEIVE DEVICE A (or B) CAUTION indicator on the common control unit will light and the audible alarm will sound.</li> <li>(4) Silence audible alarm by pressing AUDIBLE RESET switch, then press SEND DEVICE EOB STOP switch. When message processing stops, advance cards through the card reader until near the end of the message, then press SEND DEVICE EOB STOP switch again to resume message processing.</li> <li>(5) When the end of message sequence has been processed the following indications should occur:               <ol style="list-style-type: none"> <li>(a) Card punch STOP indicator lights red.</li> <li>(b) Card punch CARD ALARM indicator lights red.</li> <li>(c) Common control unit RECEIVE DEVICE A (or B) FAULT indicator lights red and audible alarm sounds.</li> </ol> </li> <li>(6) Press AUDIBLE RESET switch to silence alarm.</li> <li>(7) Press RECEIVE DEVICE A (or B) ASSIGNED switch to deassign output device.</li> </ol>	
	<i>h</i> .	<p>Test monitor device caution and alarm stop circuits by performing the following steps:</p> <ol style="list-style-type: none"> <li>(1) Load page printer with a small supply of paper, a minimum of 2 sheets above the setting of the paper low switch.</li> <li>(2) Press START switch on page printer, which should light green.</li> <li>(3) At the common control unit, press RECEIVE MONITOR A ASSIGNED switch and check that RECEIVE MONITOR READY indicator lights green.</li> <li>(4) Load output device A with a full quantity of blank cards or tape and press START switch, which should light green.</li> <li>(5) Press RECEIVE DEVICE A ASSIGNED switch at common control unit and check that switch lights white and READY indicator lights green.</li> <li>(6) Reload the test tape or card deck on input device to start of first message. Press START switch. Input device should start and process the message.</li> <li>(7) Check that output device A and page printer also start and copy the message.</li> <li>(8) When paper supply falls below the paper low level, the PAPER LOW indicator on the page printer should light and the RECEIVE MONITOR CAUTION indicator on the common control unit should light amber. The audible alarm will also sound.</li> <li>(9) Silence audible alarm by pressing AUDIBLE RESET switch.</li> <li>(10) When paper supply is exhausted (less than 8 inches of paper remaining to be printed on the following indications should occur:               <ol style="list-style-type: none"> <li>(a) Page printer STOP indicator lights red.</li> <li>(b) Page printer PAPER LOW indicator goes out and PAPER FAIL indicator lights red.</li> </ol> </li> </ol>	

Sequence No.	Item	Procedure	References
		<ul style="list-style-type: none"> <li>(c) Common control unit RECEIVE MONITOR FAULT indicator lights red and audible alarm sounds.</li> <li>(d) Output device stops operating, but START switch remains green.</li> <li>(e) At common control unit, SEND DEVICE A and RECEIVE DEVICE A SELECT indicators remain white.</li> <li>(f) Input device stops.</li> </ul>	
		(11) Silence audible alarm by pressing AUDIBLE RESET switch.	
		(12) Load paper in page printer and press START switch. STOP and PAPER FAIL indicators should go out and page printer should resume operating.	
		(13) Input and output devices should also start operating again and FAULT light at common control unit should go out.	
		(14) Press SEND DEVICE EOM STOP switch on common control unit. When end of message is reached, input, output and monitor devices should stop operating.	
	i.	Deassign devices by pressing SEND DEVICE A ASSIGNED, RECEIVE DEVICE A ASSIGNED, and RECEIVE MONITOR A ASSIGNED switches.	
	j.	Press the SEND DEVICE EOM STOP switch on the CCU and observe the indicator is not lighted.	
	k.	<p>Test transmission identification generator circuitry. If the punched tape reader has not been modified by the addition of a transmission identification generator kit MK-1583/G, proceed with l below.</p> <ul style="list-style-type: none"> <li>(1) Place the ON-LINE/OFF-LINE switch on the transmission identification generator to be checked in the ON-LINE position. Check that the TIG ON indicator is illuminated white.</li> <li>(2) Set the transmission identification generator MANUAL UPDATE thumbwheel switches to "999" and then press the LOAD switch. Check that the NEXT NUMBER indicators display "999."</li> <li>(3) Repeat preceding step by setting the MANUAL UPDATE thumbwheel to each of the following settings. Check to insure the NEXT NUMBER indicator displays the correct count after the LOAD switch has been pressed.                             <ul style="list-style-type: none"> <li>(a) 000</li> <li>(b) 111</li> <li>(c) 222</li> <li>(d) 333</li> <li>(e) 444</li> <li>(f) 555</li> <li>(g) 666</li> <li>(h) 777</li> <li>(i) 888</li> </ul> </li> <li>(4) Place the punched tape reader in low speed operation by pressing the HIGH SPEED/LOW SPEED switch until the LOW SPEED indicator is illuminated white.</li> <li>(5) At the common control unit, press the RECEIVE DEVICE A (or B) ASSIGNED switch and check that the RECEIVE DEVICE A (or B) READY indicator lights green.</li> <li>(6) Load punched tape reader input device A (or B) with a test tape containing at least three error free test messages. Use test message described in paragraph 4-2d(4).</li> <li>(7) At the punched tape reader, press the START switch and observe that the START indicator lights green and tape advances to the first character of the first message</li> </ul>	<p>Punched tape reader TM (app A).</p> <p>(Para 4-2d(4)).</p>



Sequence No.	Item	Procedure	References
		and then stops.	
(8)		At the common control unit, press the SEND DEVICE A (or B) ASSIGNED switch. Check the following indications: <ul style="list-style-type: none"> <li>(a) The punched tape reader starts processing paper tape.</li> <li>(b) The START indicator on the punched tape reader is lighted white until the end of each message is reached.</li> <li>(c) At the start of each message, the transmission identification generator NEXT NUMBER indicators increments the count by one at the same time the punched tape reader START indicator lighted white.</li> </ul>	
(9)		After the punched tape reader starts to process the third message, press the SEND DEVICE EOM STOP switch on the common control unit. When the end of the message is reached, the input and output devices should stop operating.	
(10)		Deassign devices by pressing SEND DEVICE A (or B) ASSIGNED and RECEIVE DEVICE A (or B) ASSIGNED switches.	
(11)		Check the message prepared by the receive device for accuracy of data transmission. The received messages should be identical to the transmitted messages except each message should be immediately preceded by a 13 to 16 character transmission identification sequence as described in the TM for the punched tape reader.	
(12)		Clear the stop condition of the CCU by pressing the SEND DEVICE EOM STOP switch. Observe the SEND DEVICE EOM STOP indicator is not lighted.	
I.		Return terminal to the on-line condition by placing common control unit CCU TEST MODE SELECT switch to the OFF position. Close maintenance panel cover.	

<sup>a</sup> At those terminals having the punched tape reader modified by the addition of a transmission identification generator kit MK-1583/G, set the ON-LINE/OFF-LINE switch on the transmission identification generator to the OFF-LINE position and observe the TIG ON indicator is not lighted.

**4-6. Monthly Preventive Maintenance Checks and Services Chart**

Sequence No.	Item	Procedure	References
1	Completeness-----	Check that all equipment items are complete-----	Figure 1-5 and Appendix B.
2	Spare parts -----	Check all spare parts for general condition and methods of storage. Requisition all shortages and replacements for defective parts.	Appendix B.
3	Publications -----	Check that all technical manuals covering the DST set are complete, serviceable, and current. Requisition manuals that are not on hand or in usable condition.	Appendix A.
4	Modifications -----	Check DA Pam 310-7 to determine if any MWO's are required for the equipment of the DST set. Check equipment to see if applicable MWO's have been accomplished and MWO number is stamped as required. Request modifications as applicable.	DA Pam 310-7 and TM 38-750.
5	Fuses -----	Check that all operating fuses are of correct value. Check spare fuses for proper value and quantity.	Applicable TM's (app A).
6	Connections -----	Check to be sure that connections of all interconnecting cables and wires are tight and corrosion free.	
7	Equipment mountings	<ul style="list-style-type: none"> <li>a. Tighten loose bolts, nuts, and screws that hold equipment, frames, brackets, and mounting hardware. Replace missing bolts, nuts, and screws.</li> <li>b. Check that equipment mountings, such as frames and brackets are not so bent, broken or out of shape as to endanger equipment or personnel.</li> </ul>	
8	Input, output and monitor devices.	Perform monthly preventive maintenance checks and services --	Applicable TM's (app A).

Note. The following operational sequences test the off-line devices. To test the universal keyboard-low speed paper tape punch or universal keyboard-high speed paper tape punch combination, perform sequence 9. To test the universal keyboard-low speed card punch combination. perform sequence 10.

Sequence No.	Item	Procedure	References (Para 2-5c. (2) (a) through (c)).
9	Off-line equipment check (paper tape equipment).	<ul style="list-style-type: none"> <li>a. Connect universal keyboard to paper tape punch and prepare the combination for operation.</li> <li>b. At common control unit, press RECEIVE DEVICE A (or B) ASSIGNED switch for paper tape punch being used. Switch should light white.</li> <li>c. Press universal keyboard POWER switch. Switch should not light.</li> <li>d. Press common control unit RECEIVE DEVICE A (or B) ASSIGNED switch again. Switch should go out.</li> <li>e. Press universal keyboard POWER switch. Switch should light white.</li> <li>f. Type a test message at the universal keyboard and check that tape is being advanced through the paper tape punch. Press EOM key, then RPT and N keys, so that letter N is repeated at least 3 times.</li> <li>g. At the paper tape punch, press the FEED OUT switch to feed tape thru the printer-interpreter. Check that at least 6 inches of tape separate the end of message (EOM) and N letter sequence.</li> <li>h. Press the REJECT/BACKSPACE switch on the universal keyboard control panel and check that the paper tape punch backspaces.</li> <li>i. Press the DEL key several times in succession. Check that the tape is edge notched by the paper tape punch.</li> <li>j. Remove the reel of blank tape from the paper tape punch and thread a 2-foot strip of blank tape through the guide and punch head.</li> <li>k. Press RPT key and any other key on the universal keyboard so tape advances thru the paper tape punch. When the end of the tape is reached, the following indications should be obtained:               <ul style="list-style-type: none"> <li>(1) Paper tape punch TAPE OUT indicator lights red.</li> <li>(2) Paper tape punch STOP switch lights red.</li> <li>(3) Universal keyboard STOP indicator lights red.</li> <li>(4) Universal keyboard becomes locked and no keys can be depressed.</li> </ul> </li> <li>l. Reload blank tape on paper tape punch and press START switch.</li> <li>m. Press RESET switch on universal keyboard and type several blocks of a test message to verify correct operation.</li> </ul>	
10	Off-line equipment check (card equipment).	<ul style="list-style-type: none"> <li>n. Press universal keyboard POWER switch to turn off power.</li> <li>a. Connect universal keyboard to low speed card punch and prepare the combination for operation.</li> <li>b. At common control unit press RECEIVE DEVICE A (or B) ASSIGNED switch for low speed card punch being used.</li> <li>c. Press universal keyboard POWER switch. Switch should not light.</li> <li>d. Press common control unit RECEIVE DEVICE A (or B) ASSIGNED switch again. Switch should go out.</li> <li>e. Press universal keyboard POWER switch. Switch should light white.</li> <li>f. Type a test message on the universal keyboard and check that the card is being advanced thru the low speed card punch.</li> <li>g. Type the first 10 characters on a card, then press the REJECT/BACKSPACE switch. Check that card is rejected and offset stacked. Verify that card is punched in first 10 columns, and in row 4 of column 81 only.</li> <li>h. Remove all blank cards from hopper of low speed card punch.</li> <li>i. Press RPT key and any other key so that card in punch head is fully punched and advanced.</li> <li>j. When low speed card punch is empty, the following indications should be obtained:               <ul style="list-style-type: none"> <li>(1) Low speed card punch STOP switch lights red.</li> </ul> </li> </ul>	

**Change 2 4-10.1**

<i>Sequence No.</i>	<i>Item</i>	<i>Procedure</i>	<i>References</i>
		(2) Low speed card punch CARD ALARM indicator lights red.	
		(3) Universal keyboard STOP indicator lights red.	
		(4) Universal keyboard becomes locked and no keys can be depressed.	
	k.	Reload blank cards in hopper of low speed card punch and press START switch.	
	l.	Press RESET switch on universal keyboard, and type a test message on another card to verify correct operation.	
	m.	Press universal keyboard POWER switch to turn off power.	

**Change 2 4-10.2**

**4-7. Cleaning**

General instructions for cleaning the components of the DST sets are listed below. For detailed cleaning instructions peculiar to the input and output devices, refer to the related technical manuals listed in Appendix I.

a. *Exterior Surfaces.* The exterior surfaces of all components of the DST set should be free of dust, grease, and fungus.

(1) Use a dry, clean, lint-free cloth or brush to remove dust and dirt from the equipment.

**Warning: Cleaning compound is flammable and its fumes are toxic. Do not use near a flame and provide adequate ventilation.**

(2) Use a cloth dampened (not wet) with cleaning compound to remove grease, fungus, and hard to-remove dirt from all surfaces. After cleaning, wipe dry with a clean cloth.

(3) Clean the front panels, control knobs, and indicator lamps with a soft, clean cloth. If dirt proves difficult to remove, dampen the cloth with water. Use a mild soap if necessary.

(4) Remove dust or dirt from plugs and jacks with a brush.

**Warning: Compressed air is dangerous and can cause serious bodily harm. It can also cause mechanical damage to the equipment. Do not use**

**compressed air to dry parts where cleaning compound has been used.**

(5) Dry compressed air, not to exceed 60 pounds per square inch, may be used to remove dirt from inaccessible places.

b. *Air Filters.* Wash air filter in **warm water and detergent, rinse** and allow to dry. When dry, coat the filter with RP Super Filter Coat (Research Products Corp.) as follows:

(1) Hold the spray can about 12 inches from air filter with opening in spray head toward filter.

(2) Press button while moving can. Coat evenly with several thin coats. Avoid excess.

(3) For best results, coat both sides of filter.

**4-8. Touchup Painting**

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the base metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in **TB 764-10.**

**4-9. Lubrication**

Lubrication procedures for components of the Digital Subscriber Terminal Equipment are contained in the applicable technical manuals listed in appendix A.

**Section III. TROUBLESHOOTING**

**4-10. Use of Troubleshooting Information**

a. *General.*

(1) The symptoms in the troubleshooting chart (b below) are based on the operational checks in the daily, wetly, and monthly preventive maintenance checks and services charts (paras 4-4, 4-5, and 4-6). To troubleshoot the DST set, perform the sequences of the daily, weekly, or monthly preventive maintenance checks and services chart that will reveal the abnormal condition reported. Portions of charts to perform are as follows:

<i>To check</i>	<i>Perform sequence No.</i>	<i>Para No</i>
Normal on-line message processing.....	6	4-4
Flash message processing.....	7	4-4
ASC message rejection and cancel .....	7	4-5
Input/output device cautions and alarm stops .....	8	4-5
Universal keyboard--paper tape punch operation .....	9	4-6
Universal keyboard--card punch operation	10	4-6

(2) Proceed through the sequence until an abnormal condition or result is observed, then note the

item number and turn to the corresponding item number in the troubleshooting chart (para 4-10b). Perform the checks and corrective measures indicated in the troubleshooting chart. The chart does not isolate troubles to an individual circuit within a device, but should be used as a guide to determine which device to troubleshoot per applicable technical manuals (app. A).

**Note. The troubleshooting chart of para G10b is divided into three sections corresponding to the daily, weekly, and monthly preventive maintenance checks and services charts., Be sure you are referring to the correct portion of the troubleshooting chart.**

(3) Paragraph 411 contains additional information and instructions for performing tests to be used during the troubleshooting procedure.

b. Troubleshooting Chart.

Item	Daily Preventive Maintenance Trouble symptom	Checks and Services Chart Probable trouble	Troubleshooting Checks and corrective measures
6c (2).....	Device START switch does not light green when pressed.  b. Defective device	a. Device not ready.....  b. Refer to applicable TM for	a. Check that tape, cards, paper, etc. has been properly loaded per procedure of applicable technical manual.  troubleshooting information.
6d (1), (2), or (3).	ASSIGNED switch on common control unit does not light white when pressed. b. Defective switch	a. Burned out indicator lamp..  b. Check switch and replace if  c. Defective logic circuit in common control unit.	a. Check indicator lamp by pressing LAMP/AUDIO TEST switch and replace lamp if defective.  defective. c. Refer to applicable TM for troubleshooting information.
6d (1) and (2)	READY indicator for assigned  b. Device not ready  c. No ready signal from device	a. Burned out indicator lamp.. device does not light green.  b. Check that device START switch  c. Check for presence of ready	a. Check indicator lamp by pressing LAMP/AUDIO TEST switch and replace lamp if defective.  is green. If it is not, refer to checks for 6c (2) above.  signal from device (para 4-11c). If signal is present, troubleshoot common control unit per applicable TM; if signal is not present, troubleshoot device per applicable TM.
6d (4).....	READY light does not go out and SELECT indicator does not light white when send device is assigned.	Defective common control unit logic circuitry.	Troubleshoot common control unit per applicable TM.
6e.....	Device A SELECT indicator does not go out and device B SELECT indicator does not light when message on input device A is complete.	Defective common control unit logic circuitry.	Troubleshoot common control unit per applicable TM.
6e.....	Input device B does not start operating when input device A stops.	a. Common control unit not selecting second device because of defective logic circuitry.	a. Check that device READY light is on. If it is, troubleshoot common control unit logic circuitry. If device READY light is not on, refer to checks for 6d (1) and (2) above.
6f (1).....	Either RECEIVE DEVICE A or RECEIVE MONITOR READY indicator does not go out, and associated SELECT light does not light white when message is returned from ADMS/AESC.	Defective common control unit logic circuitry.	Troubleshoot common control unit logic circuitry per applicable TM.
6f (2).....	Output or monitor device does not start, but is selected by common control unit.	Defective output or monitor device.	Troubleshoot device per applicable TM.
6f (2), (3) or 6g (2).	Message received contains errors	Error being introduced during transmission or reception.	Perform character check of paragraph 4-11h.
7e (2).....	FLASH pushbuttons do not blink red when flash message is received.	Defective common control unit logic circuitry.	Troubleshoot common control unit per applicable TM.
7e (3).....	Audible alarm does not sound when flash message received.	Defective common control unit logic circuitry.	Troubleshoot common control unit per applicable TM.
7e (4).....	Either output or monitor device does not copy flash message.	Defective device.....	Troubleshoot device per applicable TM.
7e (4).....	Message received contains errors	Errors being introduced during transmission or reception.	Perform character check of paragraph 4-11h.
7k (4).....	The output device or the monitor device starts and copies the flash message before being assigned.	Defective flash logic circuits in common control unit.	Troubleshoot common control unit per applicable TM.

<i>Item</i>	<i>Trouble symptom</i>	<i>Probable trouble</i>	<i>Checks and corrective measures</i>
7l.....	Pressing RECEIVE DEVICE FLASH switch does not cause monitor device to copy flash message.	Defective flash logic circuits in common control unit.	Troubleshoot common control unit per applicable TM.
<i>Weekly Preventive Maintenance Checks and Services Chart Troubleshooting</i>			
7d (1).....	Input device STOP switch and CANCEL indicators do not light red when ASC rejects message.	No cancel signal transmitted to device from common control unit.	Check that other indications of para 7d (2) are obtained. If they are, repeat test and check for presence of cancel signal to device (para 4-11b). If cancel signal is being generated by common control unit, troubleshoot device per applicable TM. If no cancel signal is being generated, troubleshoot the common control unit per applicable TM.
7d (2).....	Common control unit CANCEL indicators do not light, but STATUS RM indicator lights.	Defective common control unit logic circuitry.	Troubleshoot common control unit per applicable TM.
7d(2).....	SEND DEVICE CANCEL switch remains amber when cancel sent to ASC.	a. Defective common control unit logic circuitry. b. ASC has not answered cancel signal with ACK-2 sequence.	a. Troubleshoot common control unit per applicable TM. b. Contact switching center for further information.
7g.....	CANCEL indicator on device does not go out when START switch pressed.	Defective device logic circuits.....	Troubleshoot device per applicable TM.
7h.....	Received message contains error	Errors being introduced during transmission or reception.	Perform character check of paragraph 4-11h.
7j (1).....	Tape punch does not notch tape 3 times or advance it 6 inches when message is canceled.	Cancel signal not sent to output device by common control unit.	Check for generation of cancel signal by common control unit (para 4-11b). If signal is present, troubleshoot output device per applicable TM. If cancel signal not present, troubleshoot common control unit per applicable TM.
7j (2).....	Card punch does not offset a stack and punch card in row 8, column 81 when message canceled.	Same as 7j (1) above .....	Same as 7j (1) above.
7j (3).....	RECEIVE DEVICE CANCEL indicator remains on after message is cancelled.	Common control unit has not returned ACK-2 sequence in response to cancel from ASC.	Troubleshoot common control unit per applicable TM.
8d (2).....	Input device does not stop at end of block in process when SEND DEVICE EOB STOP switch is pressed.	Defective common control unit ...	Troubleshoot common control unit per applicable TM. To check EOB signal, refer to paragraph 4-11f.
8d (4).....	Input, output and monitor devices do not stop when RECEIVE DEVICE EOB STOP switch is pressed.	Defective common control unit ...	Troubleshoot common control unit per applicable TM. To check EOB signal, refer to paragraph 4-11f.
8d (6).....	Input device does not stop at end of message in process when SEND DEVICE EOM STOP switch is pressed.	Defective common control unit ...	Troubleshoot common control unit per applicable TM. To check EOM signal, refer to paragraph 4-11f.
8d (8).....	Input, output and monitor devices do not stop at end of message in process when RECEIVE DEVICE EOM STOP switch is pressed.	Defective common control unit ...	Troubleshoot common control unit per applicable TM. To check EOM signal, refer to paragraph 4-11f.
8e (1).....	Indications of automatic cancel not received when device deassigned in middle of message.	Defective common control unit ...	Troubleshoot common control unit per applicable TM.

<i>Item</i>	<i>Trouble symptom</i>	<i>Probable trouble</i>	<i>Checks and corrective measures</i>
8e (1).....	Neither output device notches tape (or punches card) correctly to indicate cancelled message.	Common control unit did not send cancel signal to device.	Troubleshoot common control unit per applicable TM.
8e (1).....	One output device notches tape (or punches card) to indicate a cancelled message, but the other does not.	Device has failed to respond to the cancel signal.	Troubleshoot device per applicable TM.
8e (5).....	Refer to 8e (1) above	Same as 8e (1) above.....	Same as 8e (1) above.
8e (8).....	Indications of alarm stop not obtained when fault condition simulated.	Fault signal not being generated by device.	Repeat test, checking for fault signal (para 4-11e). If signal is not being generated, troubleshoot device per applicable TM. If signal is being generated, troubleshoot common control unit per applicable TM.
8e (10).....	Refer to 8e (8) above	Same as 8e (8) above.....	Same as 8e (8) above.
8e (12).....	Refer to 8e (1) above	Same as 8e (1) above.....	Same as 8e (1) above.
8f (2).....	Message being received contains errors.	Errors being introduced during transmission or reception.	Perform character check of paragraph 4-11h.
8f (3).....	LOW TAPE indicator at paper tape punch does not light, but CAUTION indicator at common control unit lights.	Burned out LOW TAPE indicator lamp.	Replace defective lamp.
8f (3).....	Neither LOW TAPE indicator at paper punch or CAUTION indicator at common control unit light.	Defective low tape circuit in paper tape punch.	Troubleshoot paper tape punch per applicable TM.
8f (3).....	LOW TAPE indicator at paper tape punch lights but CAUTION indicator at common control unit does not.	No caution alarm signal generated by device.	Check for presence of caution alarm signal (para 4-11 d). If signal is not being generated, troubleshoot device per applicable TM. If signal is being generated, troubleshoot common control unit per applicable TM.
8f (5).....	At paper tape punch, STOP switch does not light red and TAPE OUT indicator does not light; FAULT indicator at common control unit does not light.	Defective paper tape punch.....	Troubleshoot paper tape punch per applicable TM.
8f (5).....	At paper tape punch, STOP switch lights red and TAPE OUT indicator lights; FAULT indicator at common control unit does not light.	Fault signal is not being sent to common control unit.	Check for fault signal (para 4-11 e). If signal is present, troubleshoot common control unit per applicable TM. If signal is not being generated, troubleshoot paper tape punch per applicable TM.
8g (2).....	Message being punched contains errors.	Errors being introduced during transmission or reception.	Perform character check of paragraph 4-11h.
8g (3).....	HOPPER LOW indicator at card punch lights but CAUTION indicator at common control unit does not.	a. Burned out indicator lamp.....  b. No caution alarm signal being generated by card punch.	a. Check indicator lamp by pressing LAMP/AUDIO TEST switch. Replace if defective.  Check for presence of caution alarm signal (para 4-11 d). If signal is not being generated, troubleshoot card punch per applicable TM. If signal is being generated, troubleshoot common control unit per applicable TM.
8g (5).....	At card punch, STOP switch does not light red and CARD ALARM indicator does not light; FAULT indicator at common control unit does not light.	Defective card punch.....	Troubleshoot card punch per applicable TM.

<i>Item</i>	<i>Trouble symptom</i>	<i>Probable trouble</i>	<i>Checks and corrective measures</i>
8f(5).....	At card punch, STOP switch lights red and CARD ALARM indicator lights; FAULT indicator at common control unit does not light.	Fault signal is not being sent to common control unit.	Check for fault signal (para 4-11e). If signal is pressed, troubleshoot common control unit per applicable TM. If signal is not being generated, troubleshoot card punch per applicable TM.
8h(7).....	Message being copied contains errors.	Errors being introduced during transmission or reception.	Perform character check of paragraph 4-11h.
8h(s).....	PAPER LOW indicator at page printer does not light; and RECEIVE MONITOR CAUTION indicator at common control unit does not light.	Defective page printer	Troubleshoot page printer per applicable TM.
8h(8).....	PAPER LOW indicator at page printer lights but CAUTION indicator at common control unit does not light.	No caution alarm signal generated by page printer.	Check for presence of caution alarm signal (para 4-11d). If signal is not being generated, troubleshoot device per applicable TM. If signal is being generated, troubleshoot common control unit per applicable TM.
8h(10).....	At page printer, STOP switch does not light red.	Defective page printer alarm circuits.	Troubleshoot page printer per applicable TM.
8h(8).....	PAPER LOW indicator at page printer does not light; and RECEIVE MONITOR CAUTION indicator at common control unit does not light.	Defective page printer .....	Troubleshoot page printer per applicable TM.
8h(8).....	PAPER LOW indicator at page printer lights but CAUTION indicator at common control unit does not light. applicable TM. If signal is being generated, troubleshoot common control unit per applicable TM.	No caution alarm signal generated by page printer.	Check for presence of caution alarm signal (para 4-11d). If signal is not being generated, troubleshoot device per
8h(10).....	At page printer, STOP switch does not light red, and PAPER FAIL indicator does not light; FAULT indicator at common control unit does not light.	Defective page printer alarm circuits.	Troubleshoot page printer per applicable TM.
8h(10).....	At page printer, STOP switch lights red and PAPER FAIL indicator lights, but FAULT indicator at common control unit does not light.	Fault signal is not being sent to common control unit.	Check for fault signal (para 4-11e). If signal is being generated, troubleshoot common control unit per applicable TM. If signal is not being generated, troubleshoot page printer per applicable TM.
8k(1).....	TIG ON indicator does not illuminate white.	Defective transmission identification generator.	Troubleshoot transmission identification generator per applicable TM.
8k(2).....	NEXT NUMBER indicators do not display correct count.	Defective transmission identification generator sequence counter circuits.	Troubleshoot transmission identification generator per applicable TM.
8k(3).....	Refer to 8k(2) above .....	Same as 8k(2) above .....	Same as 8k(2) above.
8k(8).....	Punched tape reader START indicator fails to light white.	Defective transmission identification generator sequence counter circuits.	Troubleshoot transmission identification generator per applicable TM.
8k(8).....	Receive device stops after processing a partial block of data.	Defective common control unit end of medium circuits.	Check that PC card A30 in the common control unit has been modified with changes to enable transmission identifica-



Item	Trouble symptom	Probable trouble	Checks and corrective measures
8k(8).....	NEXT NUMBER indicators do not increment by one on each message.	Defective transmission identification generator sequence counter circuits.	tion generator operation. If modified, troubleshoot common control unit per applicable TM. Troubleshoot transmission identification generator per applicable TM.
<i>Monthly Preventive Maintenance Checks and Services Chart Troubleshooting</i>			
<i>Note.</i> At those terminate having more than one output device which works with the universal keyboard, faults can be isolated rapidly to either the universal keyboard or to the output device by connecting the universal keyboard to the second output device and repeating the test. If the fault repeats the trouble is in the universal keyboard, if the fault does not repeat, the trouble is in the first output device.			
9c.....	Universal keyboard POWER switch lights when pressed and associated paper tape punch is assigned at common control unit.	Defective paper tape punch.....	Troubleshoot paper tape punch per applicable TM.
9e.....	Universal keyboard POWER switch does not light when pressed.	<ul style="list-style-type: none"> <li>a. Burned out indicator lamp (universal keyboard).</li> <li>b. Defective power switch (universal keyboard).</li> <li>c. No power being supplied to universal keyboard from paper tape punch.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check indicator lamp by pressing LAMP TEST switch. Replace if defective.</li> <li>b. Check power switch and replace if defective.</li> <li>a. Troubleshoot paper tape punch per applicable TM.</li> </ul>
9g.....	Less than 6 inches of tape separate EOM and N letter sequence.	Defective paper tape punch.....	Troubleshoot paper tape punch per applicable TM.
9h.....	Paper tape does not backspace when REJECT/BACKSPACE switch is pressed.	Universal keyboard not generating reject/backspace pulse.	Check for generation of reject/backspace signal by universal keyboard (para 4-11g). If signal is being generated, troubleshoot paper tape punch per applicable TM. If signal is not being generated, troubleshoot universal keyboard per applicable TM.
9k (1), (2), and (3).	At paper tape punch, TAPE OUT indicator and STOP switch do not light red; STOP indicator at universal keyboard does not light when tape supply depleted.	Defective alarm circuit in paper tape punch.	Troubleshoot paper tape punch per applicable TM.
9k (1), (2), and (3).	At paper tape punch, TAPE OUT indicator and STOP switch light red; STOP switch at universal keyboard does not light when tape supply depleted.	<ul style="list-style-type: none"> <li>a. Burned out indicator lamp (universal keyboard).</li> <li>b. Defective logic circuitry in universal keyboard.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check indicator lamp by pressing LAMP TEST switch. Replace if defective.</li> <li>b. Troubleshoot universal keyboard per applicable TM.</li> </ul>
9k (4).....	Universal keyboard keys do not lock when in fault condition,	Defective keyboard.....	Troubleshoot universal keyboard per applicable TM.
10c.....	Universal keyboard POWER switch lights when pressed and associated low speed card punch is assigned at common control unit.	Defective card punch logic .....	Troubleshoot low speed card punch per applicable TM.
10e.....	Universal keyboard POWER switch does not light when pressed.	<ul style="list-style-type: none"> <li>a. Burned out indicator lamp (universal keyboard).</li> <li>b. Defective power switch (universal keyboard).</li> </ul>	<ul style="list-style-type: none"> <li>a. Check indicator lamp by pressing LAMP TEST switch. Replace if defective.</li> <li>b. Check power switch and replace if defective.</li> </ul>

<i>Item</i>	<i>Trouble symptom</i>	<i>Probable trouble</i>	<i>Checks and corrective measures</i>
10g.....	Card does not reject and offset stack when REJECT/BACK-SPACE switch is pressed.	c. No power being supplied universal keyboard from low speed card punch. Universal keyboard is not generating reject/backspace pulse.	c. Troubleshoot low speed card punch per applicable TM.  Check for generation of reject/backspace signal by universal keyboard (para 4-11g). If signal is being generated, troubleshoot low speed card punch per applicable TM. If signal is not being generated, troubleshoot universal keyboard per applicable TM.
10j (1), (2), and (8).	At low speed card punch, CARD ALARM indicator and STOP indicator at universal keyboard does not light when card supply depleted.	Defective alarm circuit in low speed card punch.	Troubleshoot low speed card punch per applicable TM.
10j (1), (2), and (3).	At low speed card punch, CARD ALARM indicator and STOP switch light red; STOP switch at universal keyboard does not light when card supply depleted.	a. Burned out indicator lamp (universal keyboard) switch. Replace if defective. b. Defective logic circuitry in universal keyboard.	a Check indicator lamp by pressing LAMP TEST  b. Troubleshoot universal keyboard per applicable TM.
10j (4).....	Universal keyboard keys do not lock when in fault condition.	Defective keyboard.....	Troubleshoot keyboard per applicable TM.

Change 2 4-16.1

**4-11. Supplementary Troubleshooting Information**

*a. General.*

(1) The following paragraphs describe how to check for the presence of various interface signals between devices of the DST set. Because most of the signals occur only once during an operation, and are of short duration, extreme care must be used to identify the desired signals. Where possible, substitute alternate equipment for the suspected malfunctioning device to determine if the trouble is caused by the common control unit or the suspected device. If equipment substitution is not possible, or is inconclusive, perform the required checks of the following paragraphs.

(2) Wherever possible, interface signals should be checked at the interface terminal boards of the input, output or monitor device. After connecting the test equipment as instructed in the appropriate subparagraphs (*b* through *h*), repeat the portion of the test where an error occurred, while observing the test equipment closely.

*b. Cancel Signal.*

(1) A cancel signal is sent to an output device from the common control unit coincident with the first data strobe, which occurs in response to a first data request from the device. To check that the cancel signal is being generated by the common control unit, proceed as follows:

(a) Connect oscilloscope to terminals of output or monitor device where it is desired to measure the cancel signal as follows:

<i>Connect oscilloscope</i>	<i>To device terminal</i>
MAIN SWEEP TRIGGER INPUT.	TB2-9 (first data request).
CHANNEL A-INPUT	TB1-19 (cancel).
CHANNEL B-INPUT	TB1-17 (data strobe).

(b) Adjust oscilloscope to trigger on positive going +6 v pulse of first data request line.

(c) Adjust oscilloscope controls to display the cancel signal (approximate 10 microsecond wide pulse of +6 v amplitude) on channel A, and to display data strobe (approximate 4 microsecond wide, +6 v amplitude) pulse on channel B.

(d) Repeat the test where the malfunction occurred. When message cancel occurs, cancel signal should be displayed on trace A, and should be intersected by the data strobe signal on trace B. Signal widths and timing relationships should be as shown in figure 3-2.

(2) Cancel can be sent to an input device at any time during a block. To check for the generation and transmission of a cancel signal to an input device, the oscilloscope is triggered from the cancel line and the data strobe signal displayed. If the data strobe pulse is displayed, the cancel signal has been generated; if the data strobe pulse cannot be displayed, no cancel pulse is present. To make this check, proceed as follows:

(a) Connect oscilloscope to terminals of input device where it is desired to measure the cancel signal as follows:

<i>Connect oscilloscope</i>	<i>To device terminal</i>
MAIN SWEEP TRIGGER-- INPUT.	TB2-13 (cancel).
CHANNEL A-INPUT.....	TB1-17 (data strobe).

(b) Adjust oscilloscope to trigger on positive going +6 v cancel pulse.

(c) Adjust oscilloscope controls to display the data strobe pulse (approximately 4 microseconds wide, +6 v amplitude) on trace A.

(d) Repeat the test where the malfunction occurred. When message cancel occurs, data strobe pulse should be displayed on trace A.

*c. Ready Signal Level.* Check the presence or absence of a ready signal by performing the following steps:

(1) Connect oscilloscope to terminals of input or output device where it is desired to measure the ready signal as follows:

<i>Connect oscilloscope</i>	<i>To input device terminal</i>	<i>To output device terminal</i>
CHANNEL A-- INPUT.	TB2-15 (not assigned).	TB2-5 (not assigned).
CHANNEL B-- INPUT.	TB2-7 (ready) ..	TB2-19 (ready).

(2) Adjust oscilloscope for continuous sweep (line trigger).

(3) Adjust oscilloscope controls for channels A and B de coupled, 6 volt per centimeter amplitude sensitivity.

(4) Repeat the test. When the appropriate ASSIGNED switch at the common control unit is pressed, the +6 volt level on trace A should drop to 0 volts, followed shortly by the +6 volt level on trace B dropping to 0 volts. Time delay between the not assigned (trace A) and ready (trace B) lines dropping to 0 volts is not critical.

*d. Caution Alarm Signal.* A caution alarm may be sent to the common control unit at any time within a block. To check for the presence of a caution alarm, proceed as follows:

(1) Connect oscilloscope to terminals of input or output device where it is desired to measure the caution alarm signal as follows:

<i>Connect oscilloscope</i>	<i>To input device terminal</i>	<i>To output device terminal</i>
CHANNEL A- INPUT.	TB2-3 (caution alarm).	TB2-15 (caution alarm).

(2) Adjust oscilloscope for continuous sweep (line trigger).

(3) Adjust oscilloscope controls for channel A only, dc coupled, and 6 volts per centimeter amplitude sensitivity.

(4) Repeat the test where the malfunction occurred. When a caution alarm is generated by the device, trace A should rise to a +6 volt level.

e. *Fault Signal.* A fault signal may be sent to the common control unit at any time during a block, for conditions which require immediate stop of message processing. However, if the condition only affects subsequent blocks of data, the fault signal is not sent until the 81st data strobe occurs. To check for the presence of a fault signal, perform the following steps:

(1) Connect oscilloscope to terminals of input or output device where it is desired to measure the fault signal as follows:

	<i>To input device terminal</i>	<i>To output device terminal</i>
<i>Connect oscilloscope</i> CHANNEL A-- INPUT.	TB2-1 (fault).....	TB2-17 (fault).

(2) Adjust oscilloscope for continuous sweep (line trigger).

(3) Adjust oscilloscope sweep controls for channel A only, do coupled, and 6 volt per centimeter amplitude sensitivity.

(4) Repeat the test where the malfunction occurred. When a fault signal is generated by the device, trace A should rise to a +6 volt level.

f. *EOB and EOM Signals.* An EOB signal should be generated by the common control unit coincident with the 80th data strobe of every block. An EOM signal should be generated by the common control unit coincident with the 81st data strobe of the last block in a message. These signals are transmitted to input devices on separate lines, but occur sequentially on the data control line to output or monitor devices. To observe the EOB and EOM signals, perform the following steps:

(1) Trigger oscilloscope from count of 80 from the common control unit output register by connecting the oscilloscope MAIN SWEEP TRIGGER--INPUT to pin U of XA66 in the common control unit. (Refer to TM 11-7440-214-15 for location of card connectors in the common control unit.) Adjust oscilloscope to trigger on negative going -4.5 volt signal.

(2) Connect oscilloscope to appropriate terminals of common control unit as follows:

<i>To measure</i>	<i>Connect oscilloscope</i>	<i>To common control unit terminal</i>
Input device A EOB.....	CHANNEL A-- INPUT.	TB3-17
Input device A EOM.....	CHANNEL B-- INPUT.	TB3-19
Input device B EOB.....	CHANNEL A-- INPUT.	TB5-17
Input device B EOM.....	CHANNEL B-- INPUT.	TB5-19
Output device A EOB and EOM.	CHANNEL A-- INPUT.	TB6-21 <sup>1</sup>
Output device B EOB and EOM.	CHANNEL A-- INPUT.	TB8-2 <sup>1</sup>
Receive Monitor EOB and EOM.	CHANNEL A-- INPUT.	TB12-21 <sup>1</sup>

<sup>1</sup> Data control is a common buss signal shared by all output and monitor devices, and may be checked at any terminal listed. Both EOB and EOM signals appear on this line for output and monitor devices.

(3) Repeat the test where the malfunction occurred. At the end of the block, the EOB signal should be observed. If the block is the last one in a message, the EOM signal should also be generated. Signal widths and timing relationships should be as shown in figures 3-2 and 3-3.

g. *Reject/Backspace Pulse.* The reject/backspace pulse can be measured at the output of the line transmitter within the universal keyboard, with the universal keyboard connected to a punch device. To verify that a reject/backspace pulse is being generated, adjust the oscilloscope to display a +6 volt pulse on trace A and to trigger on an internal positive, going pulse. Connect the oscilloscope CHANNEL A-INPUT to pin 16 of XA10 in the universal keyboard. (Refer to TM 11-7440-228-15 for location of card connectors within universal keyboard.) Turn on power to the universal keyboard, then press REJECT/BACKSPACE switch while observing oscilloscope. The reject/backspace pulse will cause + 6 volt amplitude pulse to be displayed on trace A.

h. *Data Characters.*

(1) To determine if errors are being introduced during transmission or reception of messages, the test message should consist of blocks of data having only one character within each block, as described in paragraph 4-2d(4). While performing the weekly preventive maintenance checks and services with the

common control unit CCU TEST MODE SELECT switch in the I/O position, observe the SEND DATA DISPLAY and RECEIVE DATA DISPLAY indicator lamps on the common control unit maintenance control panel. These lamps should light in the same pattern as the characters being processed through the common control unit. The SEND DATA DISPLAY lamps show the character bits from the selected input device; and by placing the send DISPLAY SELECT switch in the INPUT REG (input register), CORE OUTPUT REG (core output register) or P/S CONV (parallel to serial converter) positions, the character bit structure internal to the common control unit may be observed. Similarly, the receive DISPLAY SELECT switch allows the characters being processed through the output circuits to be observed on the RECEIVE DATA DISPLAY. As each block of data is transferred from the send circuits to the receive circuits of the common control unit, the RECEIVE DATA DISPLAY lamps should light in the same pattern as the SEND DATA DISPLAY lamps did.

(2) If a character bit is being lost between devices, parity checks may cause an immediate fault and prevent enough data from being processed to allow convenient observation of the common control unit data display lamps. It may be possible to determine which data line is in error by closely examining the bit sequence which causes a parity error. (i.e. The differences between a block that can be processed and one that cannot will, in most cases, be a change in only one or two bits, and these data lines should be checked first.)

(3) Each data line must be checked individually for input devices; output and receive monitor data lines are a common buss signal in the common control unit and may be checked at any of the output or monitor device terminal boards. To check data lines, perform the following steps:

(a) Load the input device with a test tape or test card deck consisting of several blocks of data of the alternate characters U and paragraph 42d (5).

(b) Adjust the oscilloscope to trigger on an external +6 volt signal (step/data request or data request), and to display a +6 volt level (a '1' bit) on trace A and a + 6 volt, 4 microsecond wide pulse (data strobe) on trace B.

(c) Connect the oscilloscope to the appropriate terminals of the input or output device for the data lines to be checked as listed below. Then start message processing, moving the probe connected to oscilloscope channel A to each suspected data line. Pulse widths and amplitudes should be as shown in figures 3-2 and 3-3 for input and output devices.

**Note.**

**If a fault occurs at the start (first character) of a block of data to an output or monitor device, connect the oscilloscope MAIN SWEEP TRIGGER-INPUT to the first data request line; if a second or subsequent character in error, connect the trigger input to the data request line.**

To check input device data lines:

<i>Connect oscilloscope</i>	<i>To input device terminal</i>
MAIN SWEEP TRIGGER-INPUT.	TB2-11 (step/data request).
CHANNEL B-INPUT -----	TB1-17 (data strobe).
CHANNEL A-INPUT -----	TB1-1 (data line 1).
	TB-13 (data line 2).
	TB1-5 (data line 3).
	TB1-7 (data line 4).
	TB1-9 (data line 5).
	TB1-1 (data line 6).
	TB1-13 (data line 7).
	TB1-15 (data line 8).

To check output or monitor device data lines:

<i>Connect oscilloscope</i>	<i>To output or monitor device terminal</i>
MAIN SWEEP TRIGGER-INPUT.	TB2-9 (first data request).
	TB2-11 (data request).
CHANNEL B-INPUT -----	TB1-17 (data strobe).
CHANNEL A-INPUT -----	TB1-1 (data line 1).
	TB1-3 (data line 2).
	TB1-5 (data line 3).
	TB1-7 (data line 4).
	TB1-9 (data line 5).
	TB1-11 (data line 6).
	TB1-13 (data line 7).
	TB1-15 (data line 8).

**4-12. Corrective Maintenance**

Corrective maintenance for individual devices of the DST set is contained in the technical manuals for each device (app. A). At the DST set level, corrective maintenance consists of substituting operating devices for malfunctioning devices. At terminals equipped with device switching modules, this is easily accomplished by operating the device switching module to connect the off-line device to an on-line receiving channel. If the device switching module itself becomes inoperative, so that the alternate device cannot be selected, emergency repairs can be accomplished by rewiring the desired output device directly to the output terminal boards in the common control unit, bypassing the device switching module. (Refer to TM 11-7440-239-15 (app. A) for installation wiring instructions.)

**4-13. Repairs and Adjustments**

a. No special repair and adjustment procedures are necessary at the DST set level. All repairs and adjustments for individual devices are contained in the technical manual for that device (app. A).

b. Repair of the device switching module consists of replacing switch Z1, relay K1, and/or a damaged terminal strip. No special repair techniques are required. Refer to the device switching module schematic diagrams (figs. 3-4 and 3-4.3).

**4-14. General**

This section describes the disassembly and reassembly of the major assemblies, subassemblies, and components of the DSTE installation kits, the Device Switching Module (DSM) SA- 1616/G, and the DSM Conversion Kit part number SM-A-634835. These paragraphs mainly contain illustrations with references to the AUTODIN Digital Subscriber Terminals Station Manual, TM 11-7440-239-15/NAVSHIPS 0967-324-0112/TO 31W4-4-1-111. Use these procedures in conjunction with troubleshooting, repair, and adjustment outlined in paragraphs 4-3 through 4-13.

**CAUTION**

**Before attempting any disassembly or reassembly, insure that all power has been removed from the terminal equipment.**

**4-15. Disassembly and Reassembly of Installation Kits**

(figs. 4-1 through 4-22)

This paragraph contains the instructions and supporting component location diagrams required for disassembly and reassembly of all installation kits (General Dynamics part numbers A61710 through A61730). The following cross reference chart is provided for a quick

*Nomenclature*

Cable assembly, special purpose (used in all installation kits)  
 Installation kit, straight-line AA configuration  
 Installation kit, parallel AA configuration  
 Installation kit, parallel AA configuration with 50-foot separation  
 Installation kit, straight-line AB configuration  
 Installation kit, L-shape AB configuration  
 Installation kit, parallel AB configuration  
 Installation kit, parallel AB configuration with 50-foot separation  
 Installation kit, straight-line AE configuration  
 Installation kit, parallel AE configuration  
 Installation kit, parallel AE configuration with 50-foot separation  
 Installation kit, straight-line BB configuration  
 Installation kit, L-shape BB configuration  
 Installation kit, parallel BB configuration  
 Installation kit, parallel BB configuration with 50-foot separation  
 Installation kit, straight-line BC configuration  
 Installation kit, parallel BC configuration  
 Installation kit, parallel BC configuration with 50-foot separation  
 Installation kit, straight-line BE configuration  
 Installation kit, L-shape BE configuration  
 Installation kit, parallel BE configuration  
 Installation kit, parallel BE configuration with 50-foot separation

reference between installation kit nomenclature, part numbers, and component location diagrams.

*a. Disassembly.* Disassemble the installation kits by reversing the procedures outlined in paragraphs 2-14 through 2-18 of TM 11-7440-239-15/NAVSHIPS 0967-324-0112/TO 31W4-4-1-111. In addition, the installation kits may be disassembled by reversing the procedures outlined in General Dynamics drawing number A61731, Installation Procedures for AUTODIN Digital Subscriber Terminal Equipment, which is provided as a part of each installation kit. For component location, refer to the appropriate figure outlined in the above chart.

*b. Reassembly.* Perform the procedures outlined in paragraphs 2-14 through 2-18, TM 11-7440-239-15/NAVSHIPS 0967-324-0112/TO 31W4-4-1-111 or General Dynamics drawing number A61731.

**4-16. Disassembly and Reassembly of Device Switching Module SA-1616/G**

(fig. 4-24)

**CAUTION**

**Before attempting disassembly or reassembly, insure AC power is removed from the common control unit cabinet.**

<i>NSN</i>	<i>General dynamics part number</i>	<i>Figure number</i>
	A61666-XXX	4-1
7440-00-027-9833	A61710-001	4-2
7440-00-027-9841	A61711-001	4-3
7440-00-029-9884	A61712-001	4-4
7440-00-027-9886	A61713-001	4-5
7440-00-027-9888	A61714-001	4-6
7440-00-027-9939	A61715-001	4-7
7440-00-027-9980	A61716-001	4-8
7440-00-027-9991	A61717-001	4-9
7440-00-027-9994	A61718-001	4-10
7440-00-027-9999	A61719-001	4-11
7440-00-028-1562	A61720-001	4-12
7440-00-030-2756	A61721-001	4-13
7440-00-030-2761	A61722-001	4-14
7440-00-030-2843	A61723-001	4-15
7440-00-030-2892	A61724-001	4-16
7440-00-033-7620	A61725-001	4-17
7440-00-030-3539	A61726-001	4-18
7440-00-030-9962	A61727-001	4-19
7440-00-032-1444	A61728-001	4-20
7440-00-032-2627	A61729-001	4-21
7440-00-336-6515	A61730-001	4-22

a. *Removal.* The DSM consists of a switch panel, a relay panel, and their interconnecting cables. Remove the DSM from the common control unit inclosure by reversing the installation procedures outlined in paragraph 2-8 of TM 11-7440-239-15/NAVALEX 0967-324-0114/TO 31W4-4-1-111.

b. *Replacement.* Replace the DSM by following the, installation procedures identified in a above.

c. *Disassembly.* Disassemble the DSM by following the sequence of index numbers listed in figure 4-24.

d. *Reassembly.* To reassemble the DSM, reverse the procedures in c above.

**4-17. Disassembly and Reassembly of DSM Conversion Kit SM-A-634835**

(fig. 4-23)

**CAUTION**

**Before attempting disassembly or**

**reassembly, insure AC power is removed from the common control unit cabinet.**

a. *Removal.* The DSM conversion kit consists of cabling, terminal block assembly, and mounting hardware. To remove the DSM conversion kit from the common control unit inclosure, reverse the installation procedures outlined in paragraph 2-8.1 of TM 11-7440-239-15/NAVALEX 0967-324-0114/TO 31W4-4-1-111.

b. *Replacement.* Replace the DSM conversion kit by following the installation procedures identified in a above.

c. *Disassembly.* Disassemble the DSM conversion kit by following the sequence of index numbers listed in figure 4-23.

d. *Reassembly.* To reassemble the DSM conversion kit, reverse the procedures in c above.

**Section V. DECLASSIFICATION OF CORE MEMORIES IN DIGITAL SUBSCRIBER**

**TERMINAL EQUIPMENTS**

**4-18. General**

The section explains the reason for and method of declassifying core memories in AUTODIN Digital Subscriber Terminal (DST) equipments. DST equipments that contain core memories are also listed.

**4-19. Reason for Declassification**

Declassification will permit operational activities to erase classified message information from DST equipment and allow release of equipment as unclassified material. Governmental activities responsible for operation and maintenance of AUTODIN DST will declassify core memory equipments as directed in the applicable publications (app A).

**4-20. Method of Declassification**

a. The following units of DST equipment use magnetic core memories and must be declassified when removed from an installation for transfer or storage:

(1) High Speed Paper Tape Punch, RO-314/G (HSPTP).

(2) Common Control Unit, C-8120(P)/G (CCU).

(3) Low Speed Card Punch, RO-313/G (LSCP).

b. Detailed declassification procedures, contained in the applicable publications, may be performed by use of the operating controls provided on DST equipment.

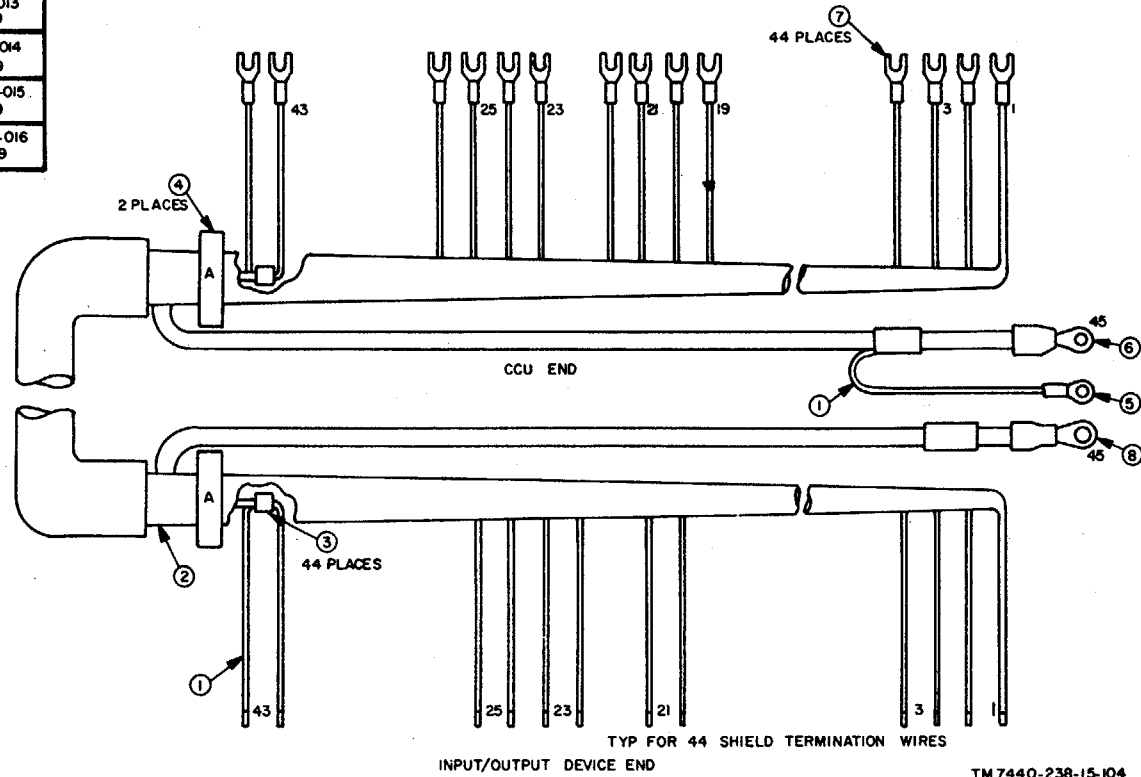
c. Declassification is performed by causing the change of all DST memory cores zero-to-one state at least 1000 times. DST core memories will change state when continuous ones are read into the out of memory. The CCU and LSCP cores will change state twice when a one is read into and out of memory. The HSPTP cores will change state once when a one is fed into and read out of memory.

d. The CCU and HSPTP can each be operated with continuous read-in and read-out of "ones" without the use of other DST equipment. The LSCP must be operated with the CCU and a DST Punched Card Reader RP-152/G (CR) to cause continuous read-in and read-out of ones in memory.

DASH NO.	LENGTH	MARKING
001	216.00±6.00	A61666-001 58189
002		
003	232.00±10.00	A61666-003 58189
004	288.00±10.00	A61666-004 58189
005	300.00±10.00	A61666-005 58189
006	336.00±10.00	A61666-006 58189
007	384.00±10.00	A61666-007 58189
008	528.00±10.00	A61666-008 58189

DASH NO.	LENGTH	MARKING
009	564.00±10.00	A61666-009 58189
010	600.00±10.00	A61666-010 58189
011	636.00±12.00	A61666-011 58189
012	672.00±12.00	A61666-012 58189
013	720.00±12.00	A61666-013 58189
014	780.00±12.00	A61666-014 58189
015	1056.00±12.00	A61666-015 58189
016	1092.00±12.00	A61666-016 58189

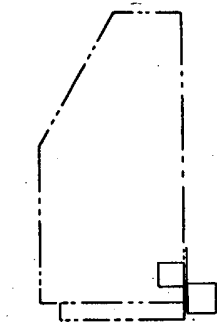
DASH NO.	LENGTH	MARKING
017	1128.00±12.00	A61666-017 58189
018	1176.00±12.00	A61666-018 58189
019	1212.00±12.00	A61666-019 58189



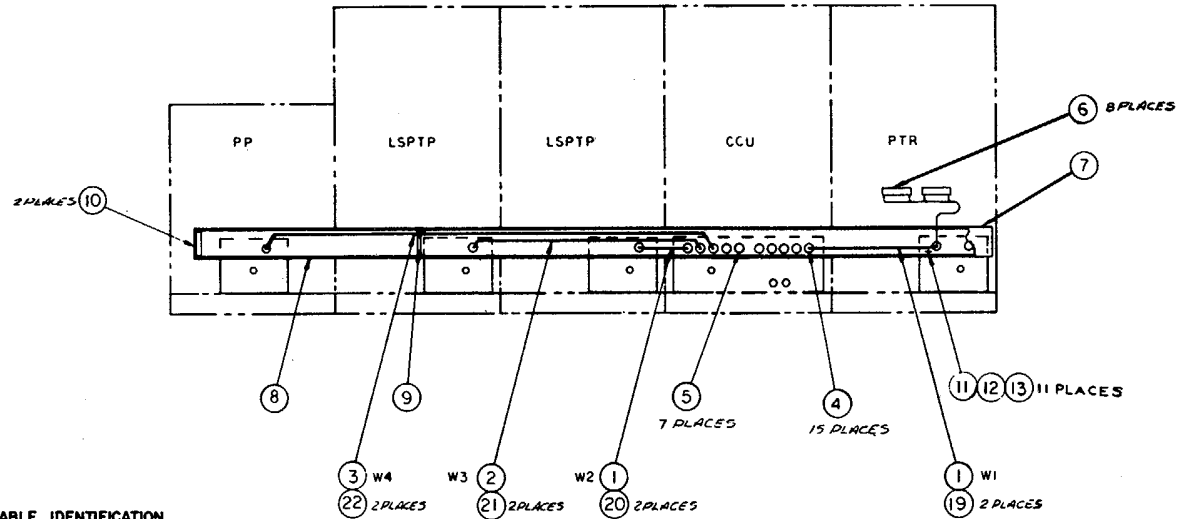
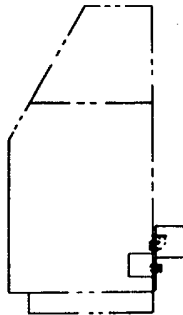
- 1 Electrical wire
- 2 Electrical cable
- 3 Ferrule termination
- 4 Cable identification strap
- 5 Terminal lug
- 6 Terminal lug
- 7 Terminal lug
- 8 Terminal lug

Figure 4 1. Cable assembly, special purpose electrical, component location diagram.





ALTERNATE METHOD OF  
INSTALLATION  
FILTER PLATES ROTATED 180°



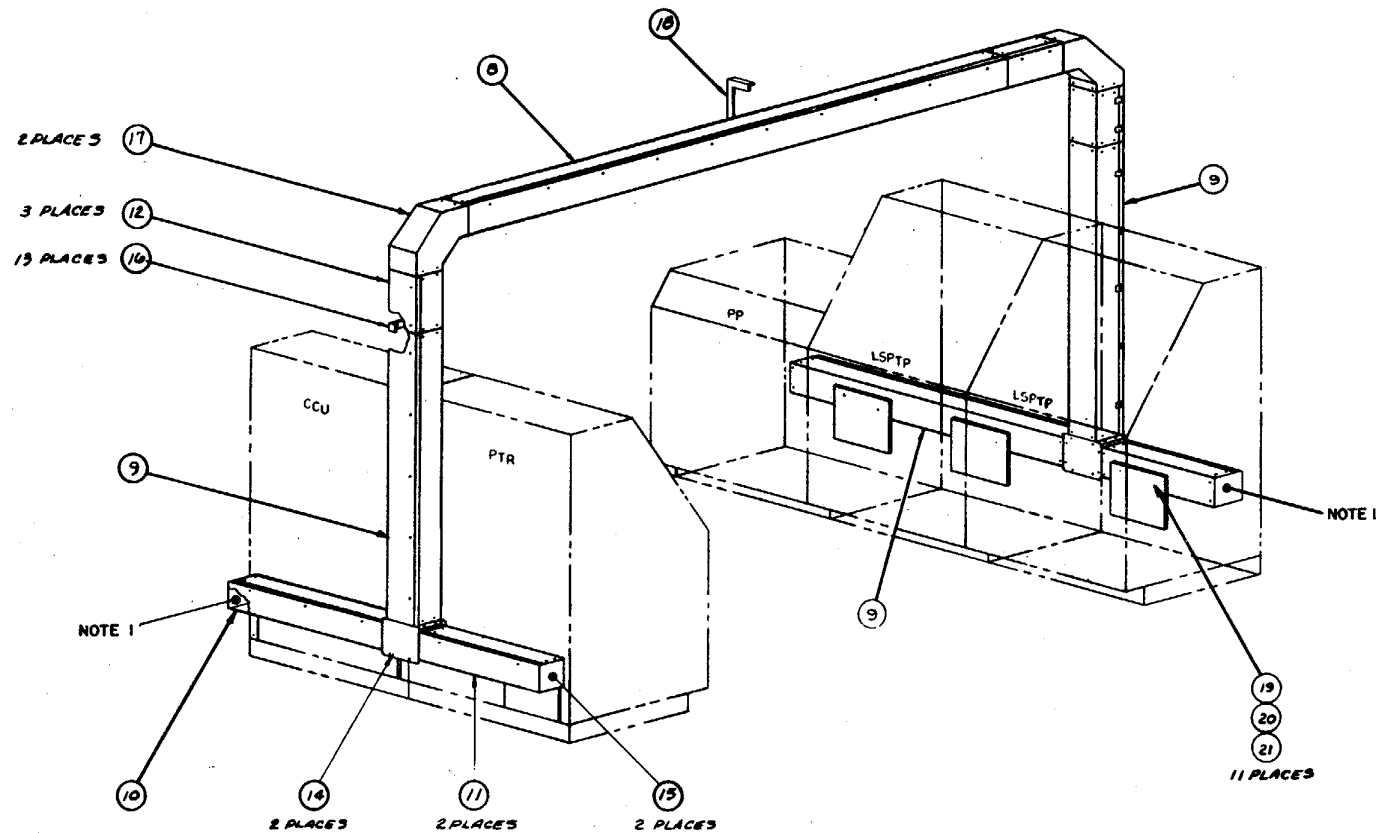
NOTE: ITEM NO. 16 (CABLE IDENTIFICATION STRAP) TO BE USED AS REQUIRED.

REAR VIEW

TM7440-238-15-105

- |   |   |                                |                    |
|---|---|--------------------------------|--------------------|
| 1 Special purpose cable assembly W1, W2 | 7 Electrical wireway                          | 13 Washer, split lock, No. 1/4 | 19 Cable marker W1 |
| 2 Special purpose cable assembly W3     | 8 Electrical wireway                          | 14 Not used                    | 20 Cable marker W2 |
| 3 Special purpose cable assembly W4     | 9 Electrical wireway connector                | 15 Not used                    | 21 Cable marker W3 |
| 4 Cable adapter                         | 10 Closure plate                              | 16 Cable identification strap  | 22 Cable marker W4 |
| 5 Protective cover                      | 11 Screw, hex head, No. 1/4-20, 1/2-inch long | 17 Not used                    |                    |
| 6 Fanning strip                         | 12 Washer, flat, No. 1/4                      | 18 Not used                    |                    |

Figure 4 2. Installation kit, AA straight configuration, component location diagram.  
Change 3 4-23



NOTES:  
 1. USE EXTRA CLOSURE PLATE PROVIDED WITH ITEM (14) (2 PLACES).  
 2. ITEM NO. (CABLE IDENTIFICATION STRAP) TO BE USED AS REQUIRED.

TM 7440-238-15-106 (1)

- 1 Special cable assembly W1
- 2 Special purpose cable assembly W2, W3
- 3 Not used
- 4 Special purpose cable assembly W4
- 5 Cable adapter
- 6 Protective cover
- 7 Fanning strip
- 8 Electrical wireway

- 9 Electrical wireway
- 10 Electrical wireway
- 11 Electrical wireway
- 12 Electrical wireway
- 13 Not used
- 14 Tee
- 15 Closure plate

- 16 Electrical wireway connector
- 17 Elbow
- 18 Hanger
- 19 Screw, hex head, No. 1/4-20, 1/2-inch long
- 20 Washer, flat, No. 1/4
- 21 Washer, split lock, No. 1/4
- 22 Not used

- 23 Not used
- 24 Cable identification strap
- 25 Not used
- 26 Cable marker W1
- 27 Cable marker W2
- 28 Cable marker W3
- 29 Cable marker W4

Figure 4 3 (1). Installation kit. AA parallel configuration, component location diagram (sheet 1 of 2).

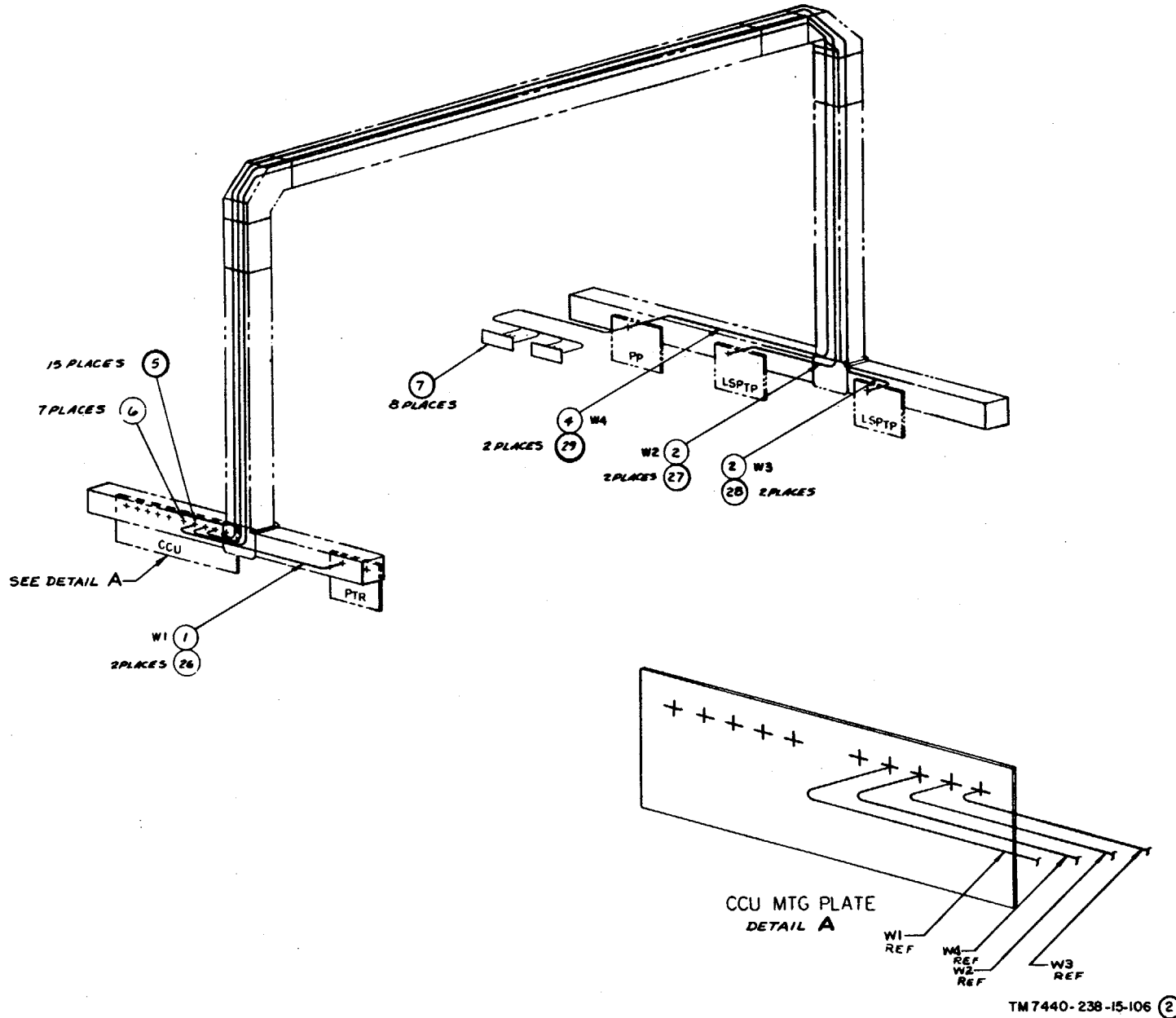
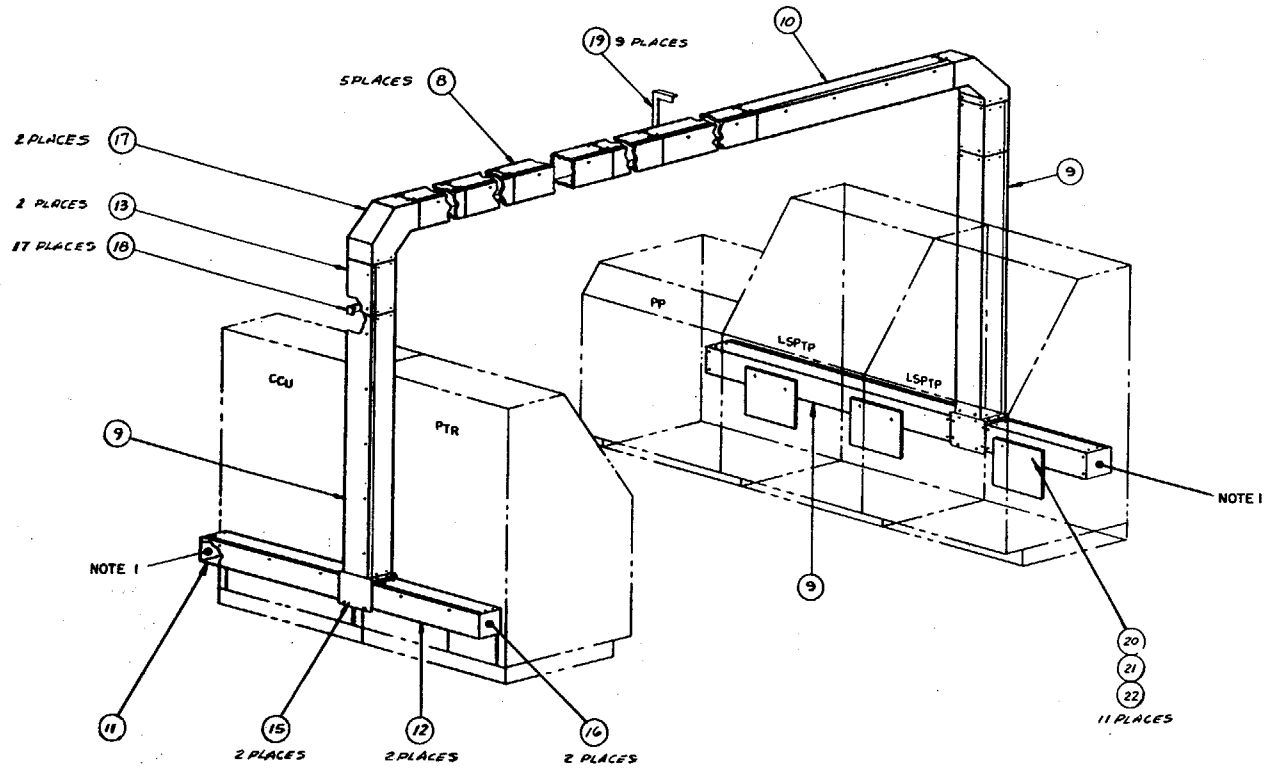


Figure 4 3 (2) . Installation kit, AA parallel configuration, component location diagram (sheet 2 of 2).  
Change 3 4-25



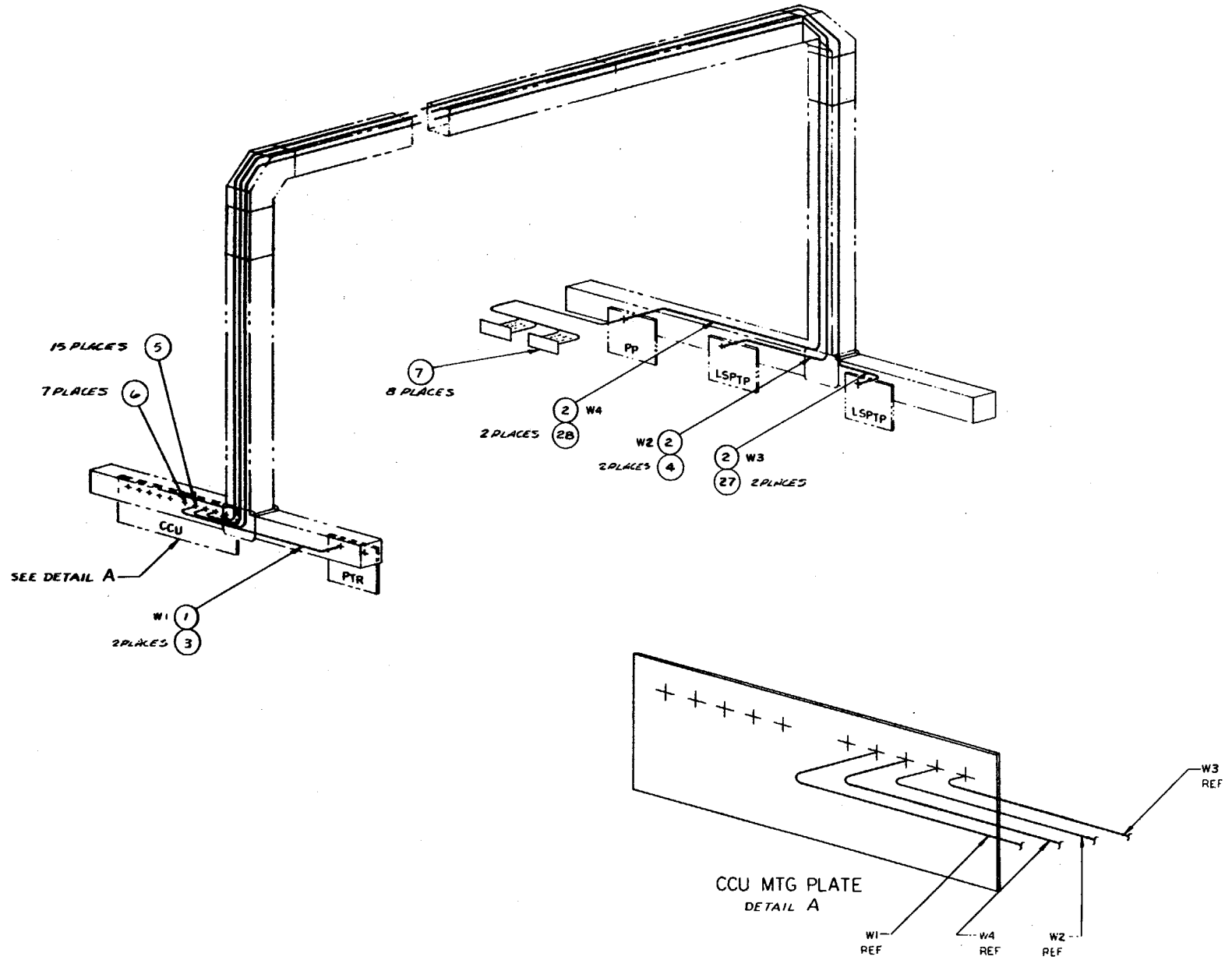
NOTES:  
 1. USE EXTRA CLOSURE PLATE PROVIDED WITH ITEM (16) (2 PLACES).  
 2. ITEM NO. (25) (CABLE IDENTIFICATION STRAP) TO BE USED AS REQUIRED.

TM 7440-238-15-107 (1)

- |   |                       |   |                                |
|---|-----------------------|---|--------------------------------|
| 1 Special purpose cable assembly W1         | 8 Electrical wireway  | 15 Tee  | 22 Washer, split lock, No. 1/4 |
| 2 Special purpose cable assembly W2, W3, W4 | 9 Electrical wireway  | 16 Closure plate                              | 23 Not used                    |
| 3 Cable marker W1                           | 10 Electrical wireway | 17 Elbow                                      | 24 Not used                    |
| 4 Cable marker W2                           | 11 Electrical wireway | 18 Electrical wireway connector               | 25 Cable identification strap  |
| 5 Cable adapter                             | 12 Electrical wireway | 19 Hanger                                     | 26 Not used                    |
| 6 Protective cover                          | 13 Electrical wireway | 20 Screw, hex head, No. 1/4-20, 1/2-inch long | 27 Cable marker W3             |
| 7 Fanning strip                             | 14 Not used           | 21 Washer, flat, No. 1/4                      | 28 Cable marker W4             |

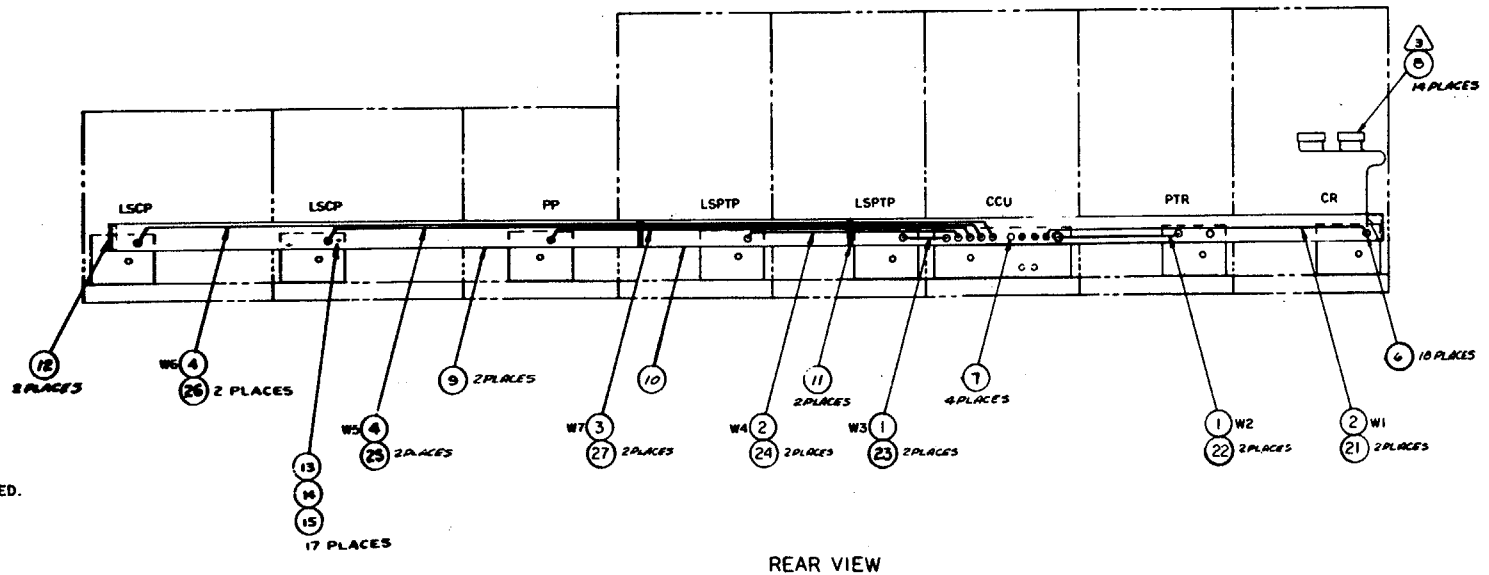
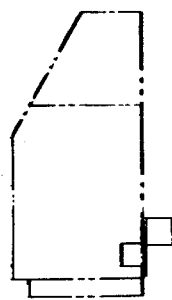
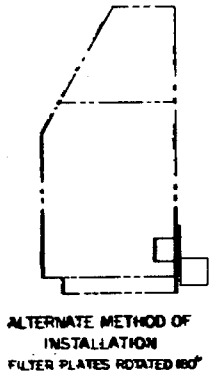
Figure 4-4 (1). Installation kit, AA parallel configuration (50 feet), component location diagram (sheet 1 of 2)

Change 3 4-26



TM7440-238-15-107 (2)

Figure 4-4 (2). Installation kit, AA parallel configuration (50 feet), component location diagram (sheet 2 of 2).  
Change 3 4-27



NOTE: ITEM 20 (CABLE IDENTIFICATION STRAP) TO BE USED AS REQUIRED.

TM7440-238-15-108

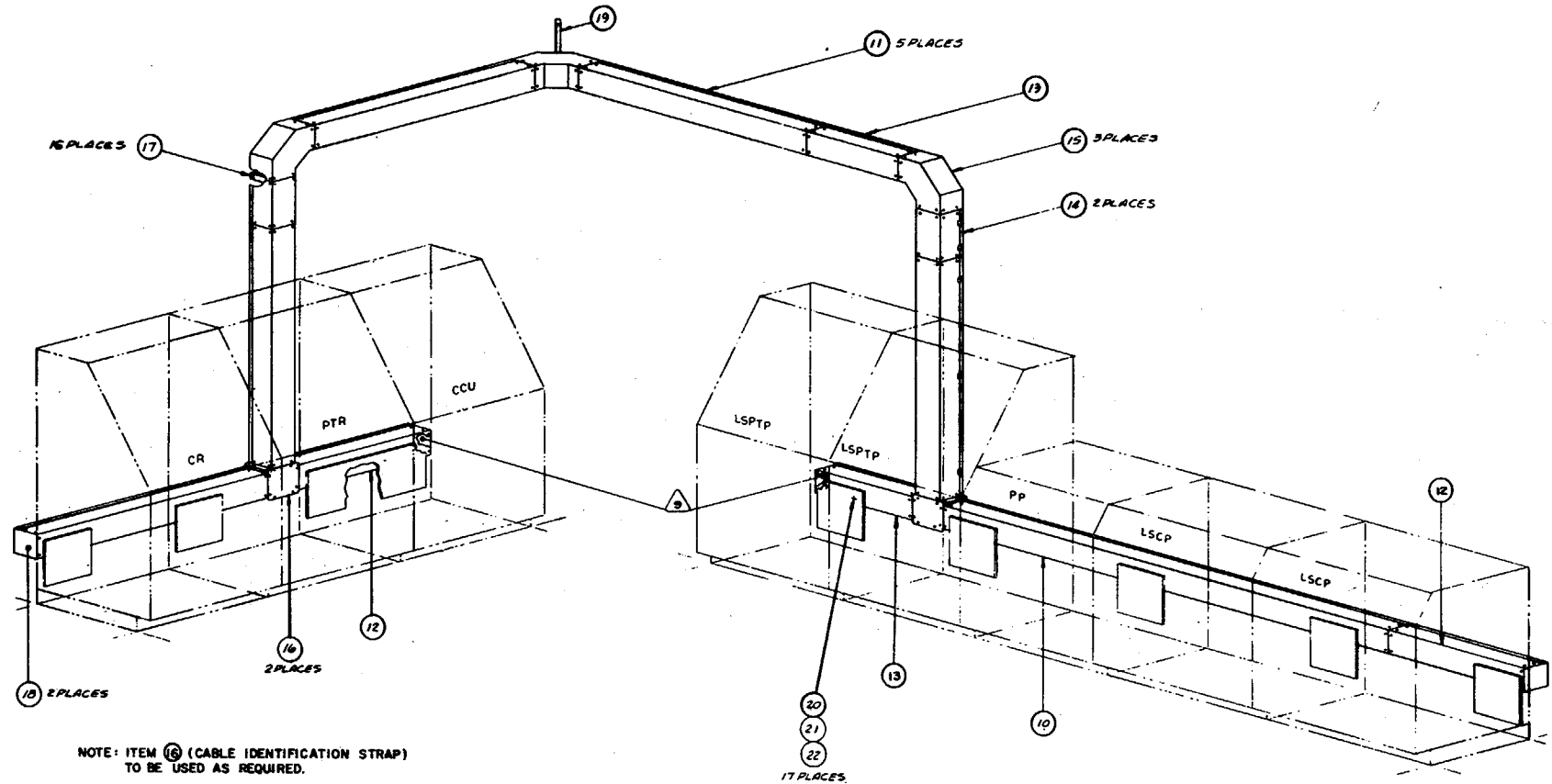
- 1 Special purpose cable assembly W2, W3
- 2 Special purpose cable assembly W1, W4
- 3 Special purpose cable assembly W7
- 4 Special purpose cable assembly W5, W6
- 5 Not used
- 6 Cable adapter

- 7 Protective cover
- 8 Fanning strip
- 9 Electrical wireway
- 10 Electrical wireway
- 11 Electrical wireway connector
- 12 Closure plate

- 13 Screw, hex head, No. 1/4-20, 1/2-inch long
- 14 Washer, flat, No. 1/4
- 15 Washer, split lock, No. 1/4
- 16 through 19 Not used
- 20 Cable identification strap
- 21 Cable marker W1

- 22 Cable marker W2
- 23 Cable marker W3
- 24 Cable marker W4
- 25 Cable marker W5
- 26 Cable marker W6
- 27 Cable marker W7

Figure 4-5. Installation kit, AB straight line configuration, component location diagram.  
Change 3 4-28



TM 7440-238-15-109①

- |   |                       |   |                    |
|---|-----------------------|---|--------------------|
| 1 Special purpose cable assembly W2     | 9 Fanning strip       | 17 Electrical wireway connector               | 27 Cable marker W1 |
| 2 Special purpose cable assembly W1     | 10 Electrical wireway | 18 Closure plate                              | 28 Cable marker W2 |
| 3 Special purpose cable assembly W3, W7 | 11 Electrical wireway | 19 Hanger                                     | 29 Cable marker W3 |
| 4 Special purpose cable assembly W4     | 12 Electrical wireway | 20 Screw, hex head, No. 1/4-20, 1/2-inch long | 30 Cable marker W4 |
| 5 Special purpose cable assembly W5, W6 | 13 Electrical wireway | 21 Washer, flat, No. 1/4                      | 31 Cable marker W5 |
| 6 Not used                              | 14 Electrical wireway | 22 Washer, split lock, No. 1/4                | 32 Cable marker W6 |
| 7 Cable adapter                         | 15 Elbow              | 23 through 25 Not used                        | 33 Cable marker W7 |
| 8 Protective cover                      | 16 Tee                |   |                    |

Figure 4 6 (1). Installation kit, AB L-configuration, component location diagram (sheet 1 of 2).  
Change 3 4-29

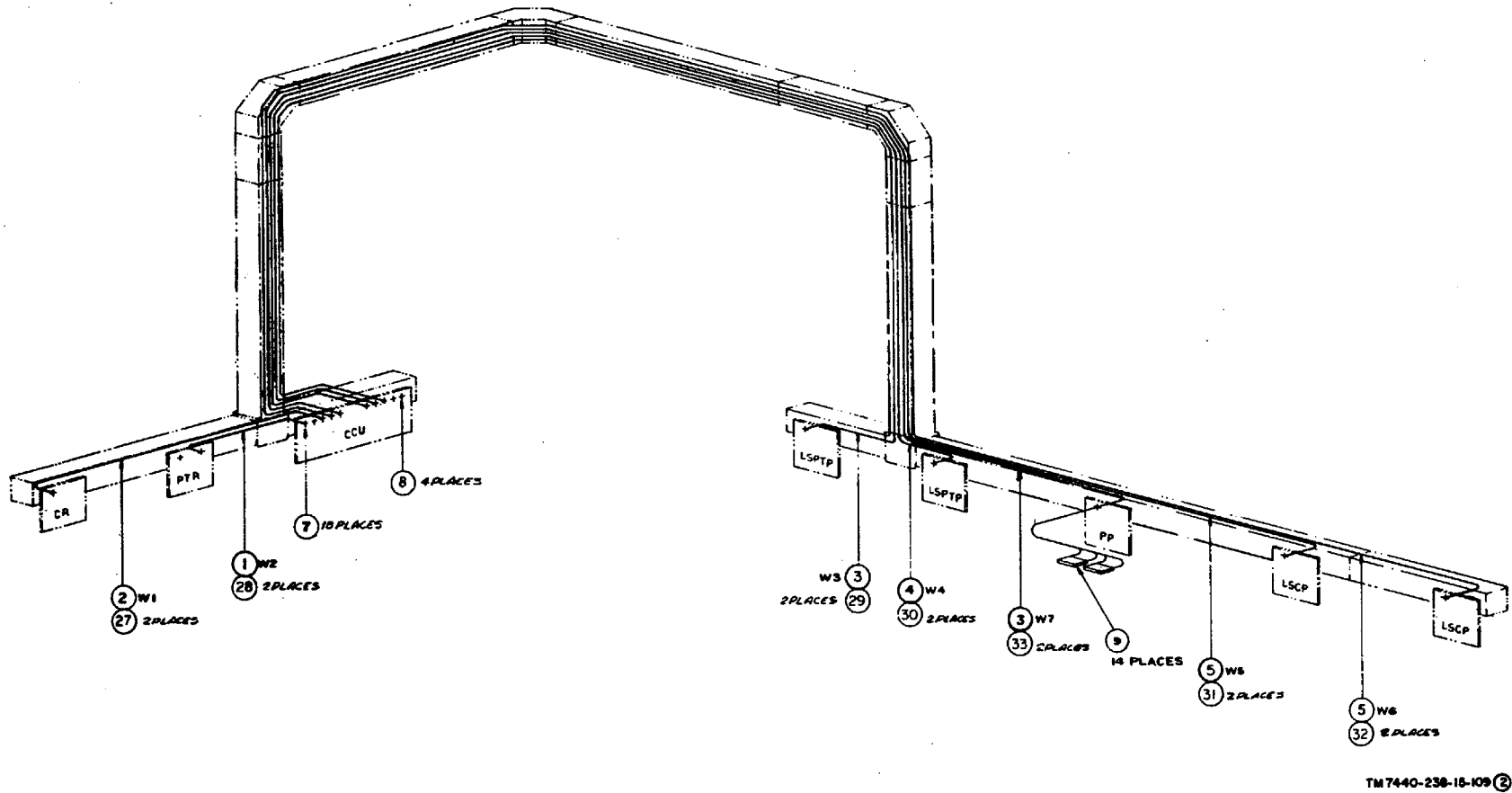
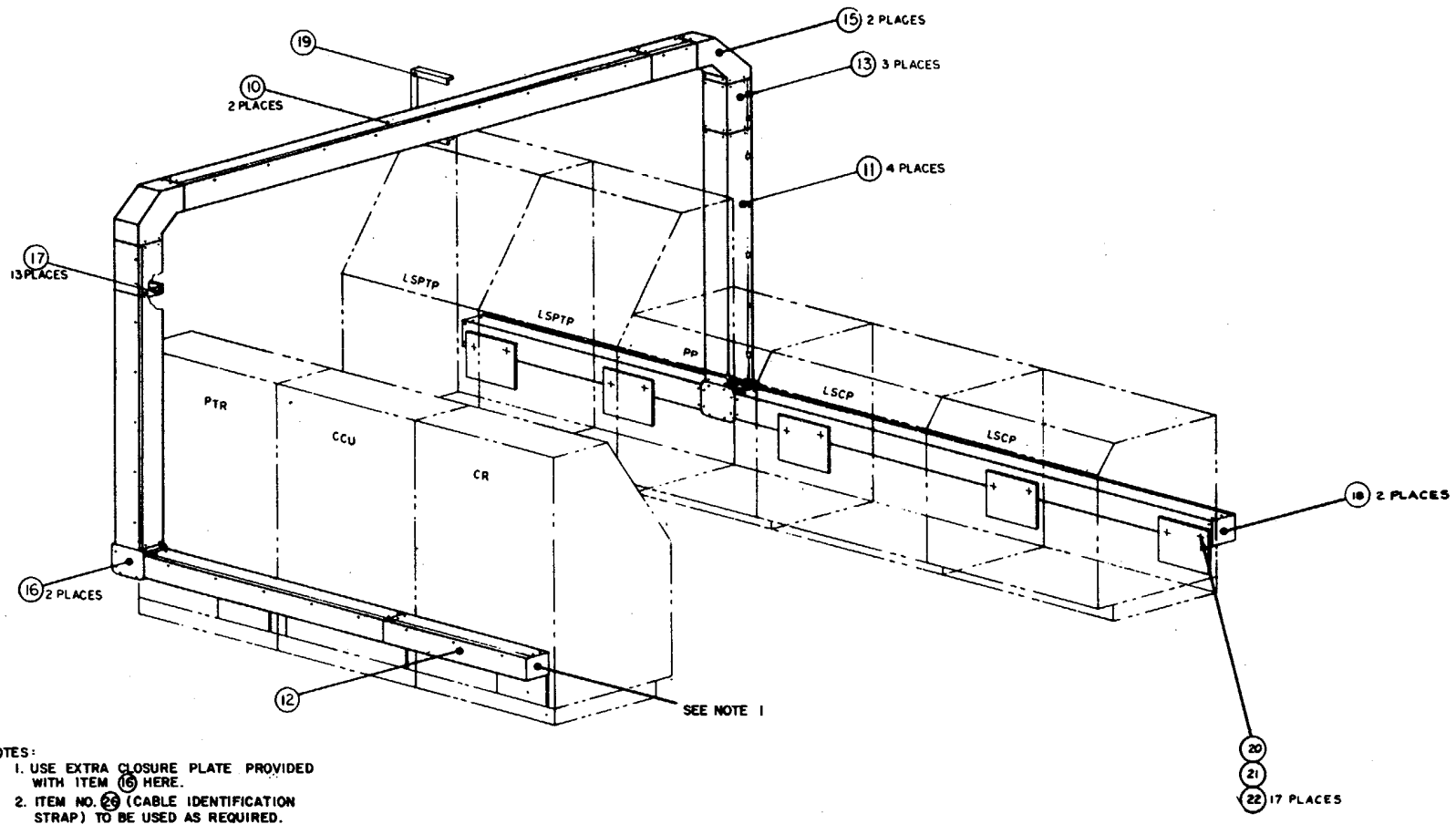


Figure 4 6 (2). Installation kit, AB L-configuration, component location diagram (sheet 2 of 2).  
Change 3 4-30





TM7440-238-15-110①

- |   |                                 |   |                    |
|---|---------------------------------|---|--------------------|
| 1 Special purpose cable assembly W1, W2 | 10 Electrical wireway           | 18 Closure plate                          | 28 Cable marker W2 |
| 2 Special purpose cable assembly W4     | 11 Electrical wireway           | 19 Hanger                                 | 29 Cable marker W3 |
| 3 Special purpose cable assembly W3, W7 | 12 Electrical wireway           | 20 Screw, hex head, 1/4-20, 1/2-inch long | 30 Cable marker W4 |
| 4 Not used                              | 13 Electrical wireway           | 21 Washer, flat, No. 1/4                  | 31 Cable marker W5 |
| 5 Special purpose cable assembly W5     | 14 Not used                     | 22 Washer, split lock, No. 1/4            | 32 Cable marker W6 |
| 6 Special purpose cable assembly W6     | 15 Elbow                        | 23 through 25 Not used                    | 33 Cable marker W7 |
| 7 Cable adapter                         | 16 Tee                          | 26 Cable identification strap             |                    |
| 8 Protective cover                      | 17 Electrical wireway connector | 27 Cable marker W1                        |                    |
| 9 Fanning strip                         |                                 |   |                    |

Figure 4-7 (1). Installation kit, AB parallel configuration, component location diagram (sheet 1 of 2).  
Change 3 4-31

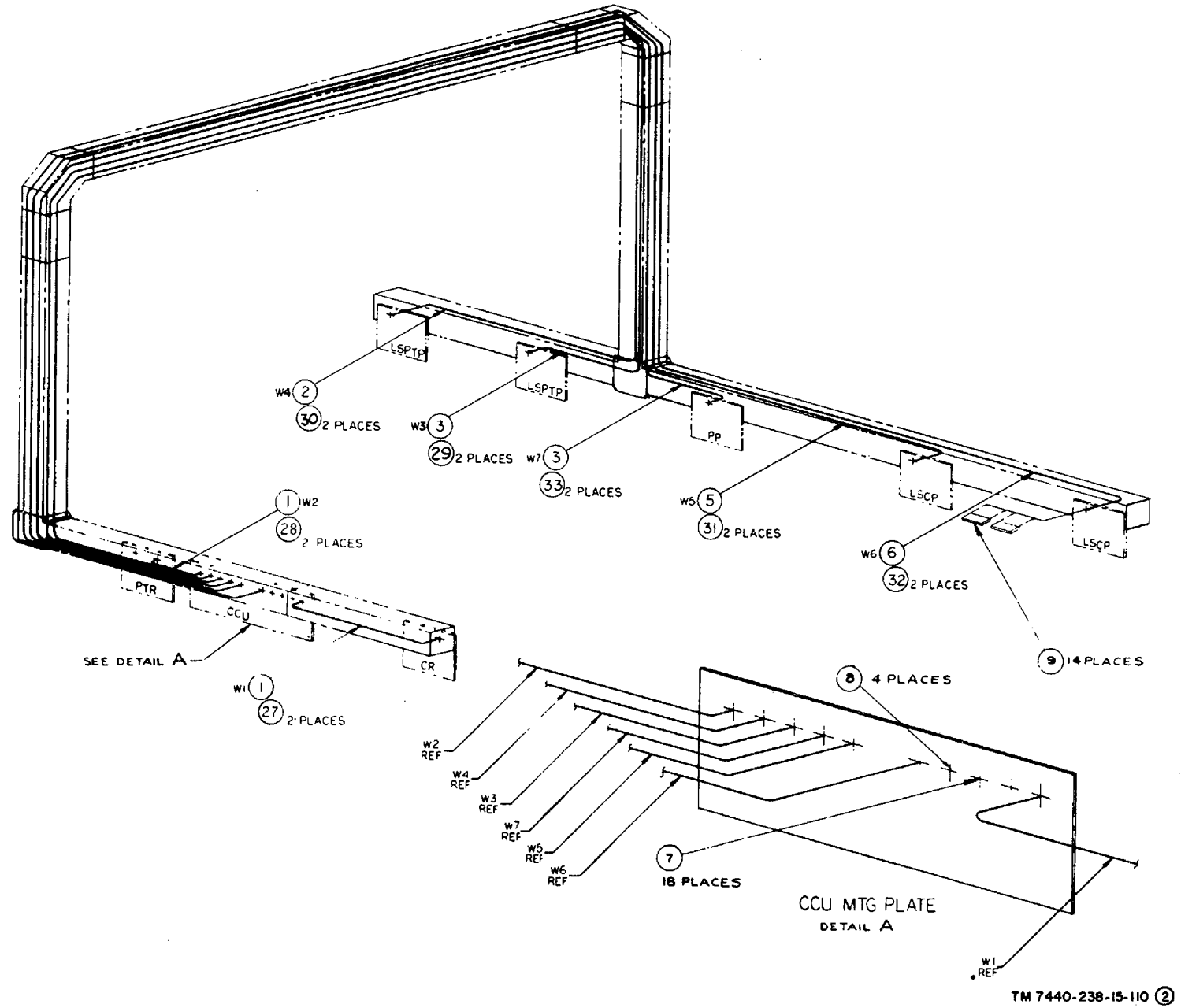
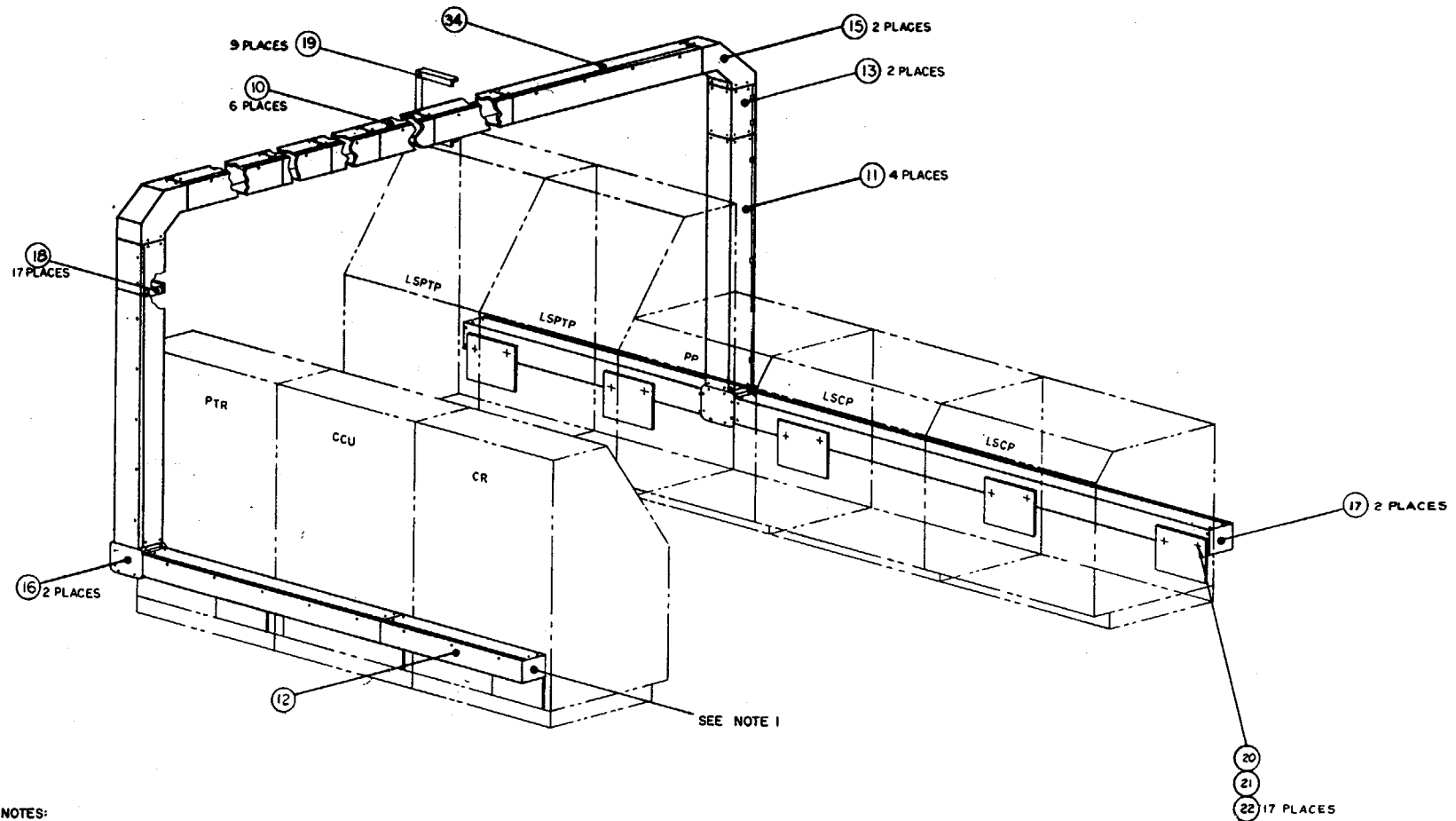


Figure 4-7 (2) . Installation kit. AB parallel configuration. component location diagram (sheet 2 of 2).  
Change 3 4-32



NOTES:  
 1. USES EXTRA CLOSURE PLATE PROVIDED WITH ITEM.

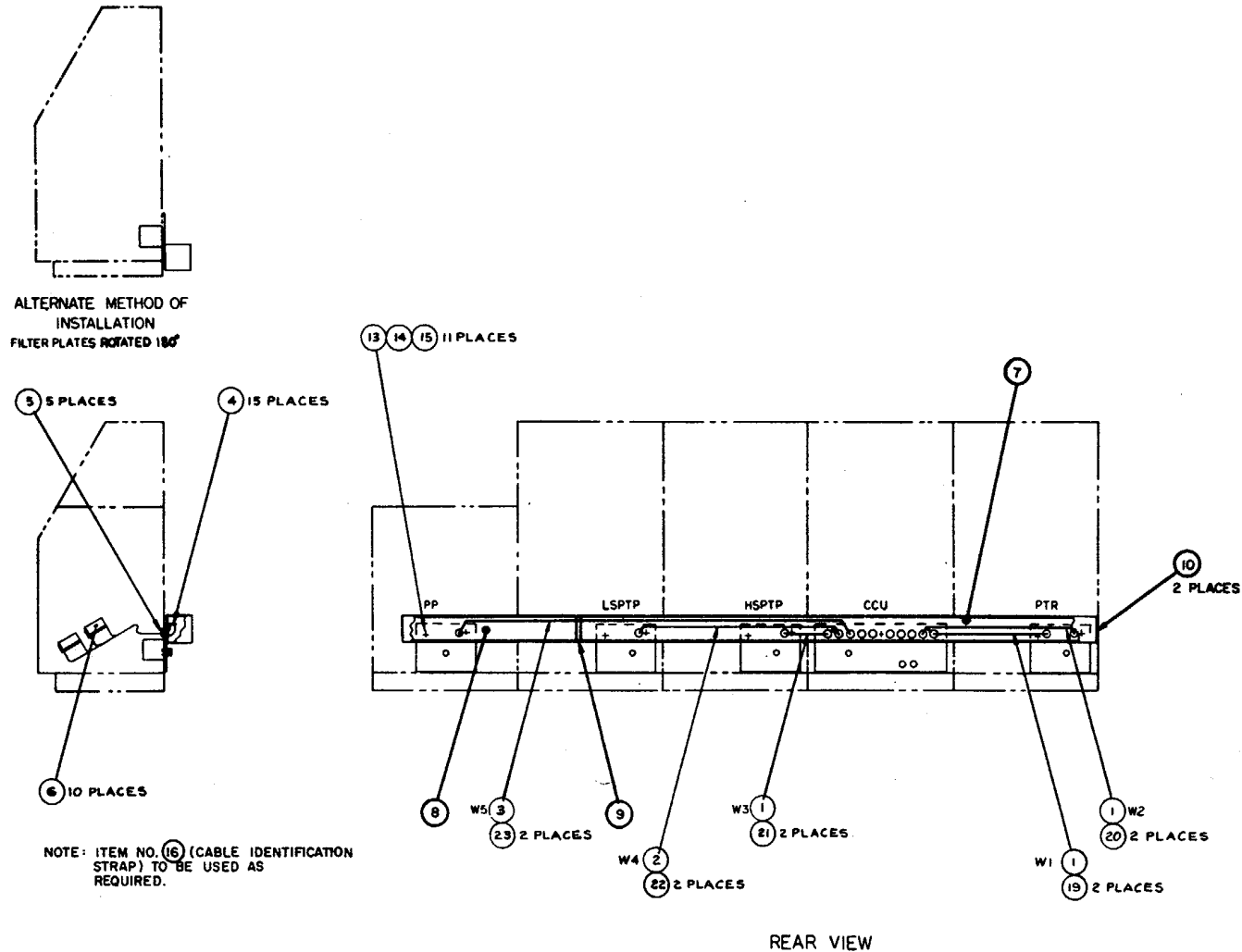
TM7440-238-15-III (1)

- |   |                       |   |                       |
|---|-----------------------|---|-----------------------|
| 1 Special purpose cable assembly W1, W2 | 9 Fanning strip       | 17 Closure plate                              | 27 Cable marker W1    |
| 2 Special purpose cable assembly W4     | 10 Electrical wireway | 18 Electrical wireway connector               | 28 Cable marker W2    |
| 3 Special purpose cable assembly W3, W7 | 11 Electrical wireway | 19 Hanger                                     | 29 Cable marker W3    |
| 4 Special purpose cable assembly W5     | 12 Electrical wireway | 20 Screw, hex head, No. 1/4-20, 1/2-inch long | 30 Cable marker W4    |
| 5 Special purpose cable assembly W6     | 13 Electrical wireway | 21 Washer, flat, No. 1/4                      | 31 Cable marker W5    |
| 6 Not used                              | 14 Not used           | 22 Washer, split lock, No. 1/4                | 32 Cable marker W6    |
| 7 Cable adapter                         | 15 Elbow              | 23 through 25 Not used                        | 33 Cable marker W7    |
| 8 Protective cover                      | 16 Tee                | 26 Cable identification strap                 | 34 Electrical wireway |

Figure 4-8 (1). Installation kit, AB parallel configuration (50 feet), component location diagram (sheet 1 of 2).

Change 3 4-33

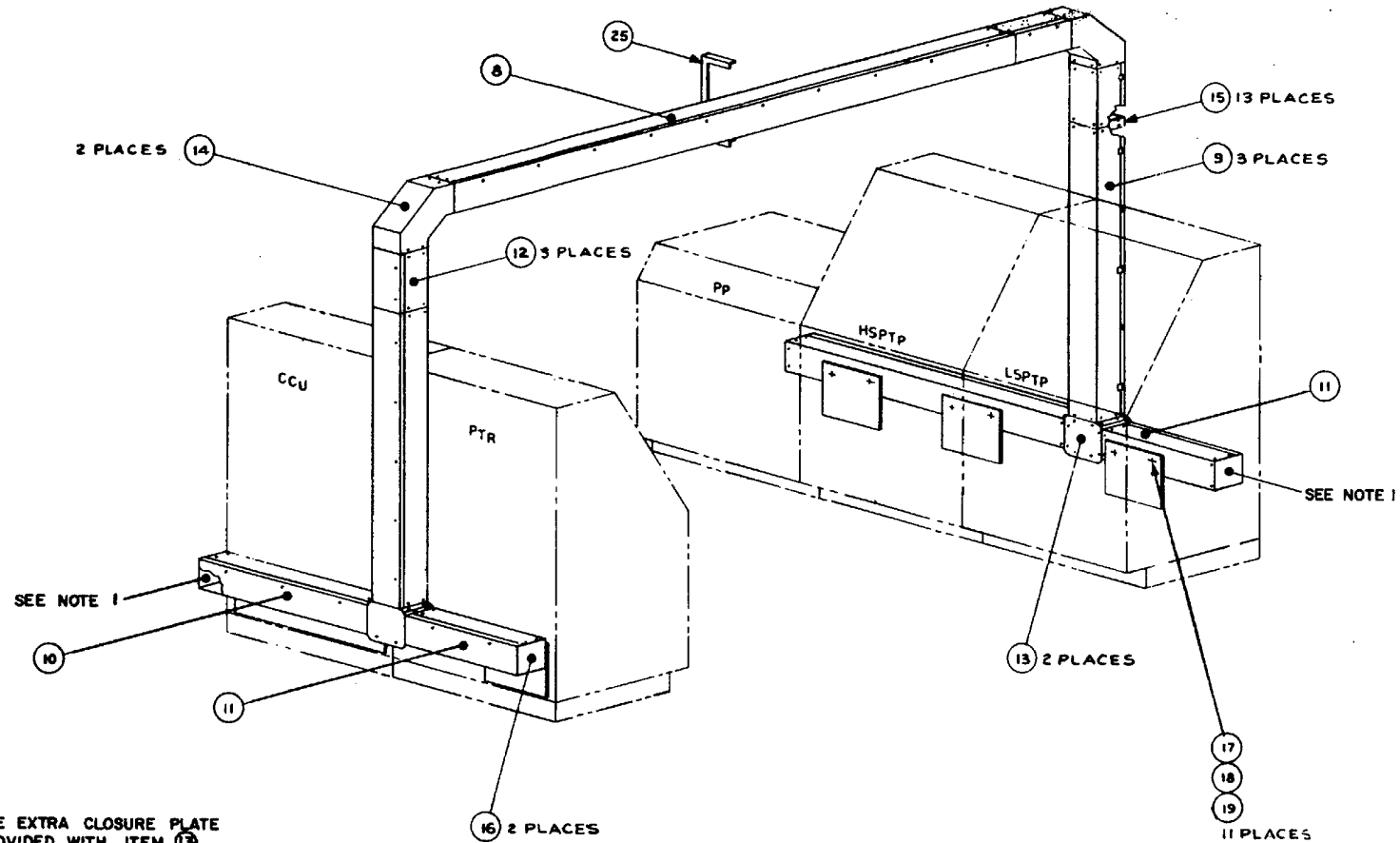




TM 7440-238-15-112

- |   |                                |   |                    |
|---|--------------------------------|---|--------------------|
| 1 Special purpose cable assembly W1, W2, W3 | 7 Electrical wireway           | 13 Screw, hex head, No. 1/4-20, 1/2-inch long | 19 Cable marker W1 |
| 2 Special purpose cable assembly W4         | 8 Electrical wireway           | 14 Washer, flat, No. 1/4                      | 20 Cable marker W2 |
| 3 Special purpose cable assembly W5         | 9 Electrical wireway connector | 15 Washer, split lock, No. 1/4                | 21 Cable marker W3 |
| 4 Cable adapter                             | 10 Closure plate               | 16 Cable identification strap                 | 22 Cable marker W4 |
| 5 Protective cover                          | 11 Not used                    | 17 Not used                                   | 23 Cable marker W5 |
| 6 Fanning strip                             | 12 Not used                    | 18 Not used                                   |                    |

Figure 4-9. Installation kit, AE straight line configuration, component location diagram.  
Change 3 4-35



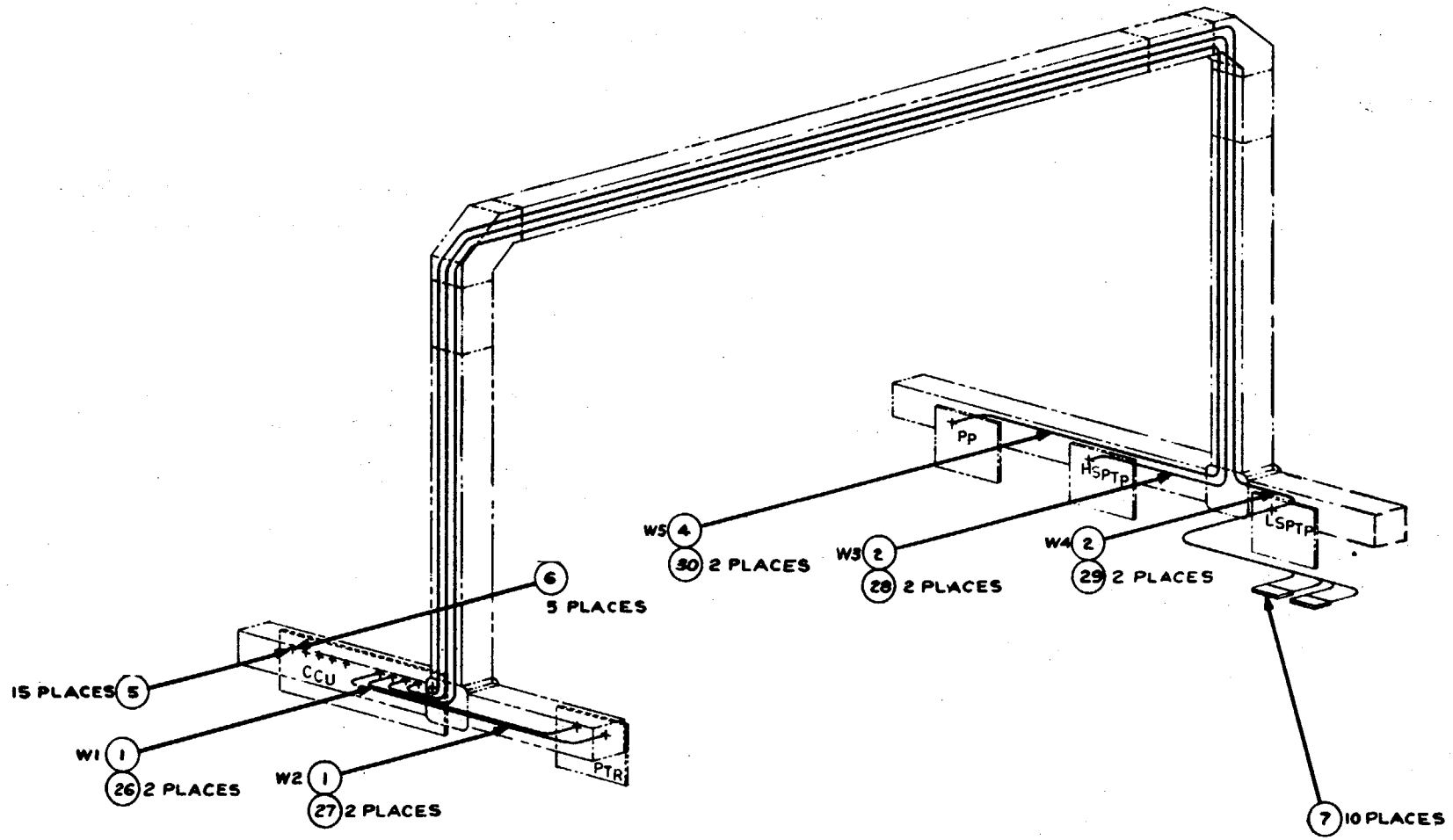
- NOTES:
1. USE EXTRA CLOSURE PLATE PROVIDED WITH ITEM 16 (2 PLACES)
  2. ITEM NO. 22 (CABLE IDENTIFICATION STRAP) TO BE USED AS REQUIRED.

TM 7440-238-15-113 ①

- |   |                       |   |                    |
|---|-----------------------|---|--------------------|
| 1 Special purpose cable assembly W1, W2 | 8 Electrical wireway  | 15 Electrical wireway connector               | 23 and 24 Not used |
| 2 Special purpose cable assembly W3, W4 | 9 Electrical wireway  | 16 Closure plate                              | 25 Hanger          |
| 3 Not used                              | 10 Electrical wireway | 17 Screw, hex head, No. 1/4-20, 1/2-inch long | 26 Cable marker W1 |
| 4 Special purpose cable assembly W5     | 11 Electrical wireway | 18 Washer, flat, No. 1/4                      | 27 Cable marker W2 |
| 5 Cable adapter                         | 12 Electrical wireway | 19 Washer, split lock, No. 1/4                | 28 Cable marker W3 |
| 6 Protective cover                      | 13 Tee                | 20 and 21 Not used                            | 29 Cable marker W4 |
| 7 Fanning strip                         | 14 Elbow              | 22 Cable identification strap                 | 30 Cable marker W5 |

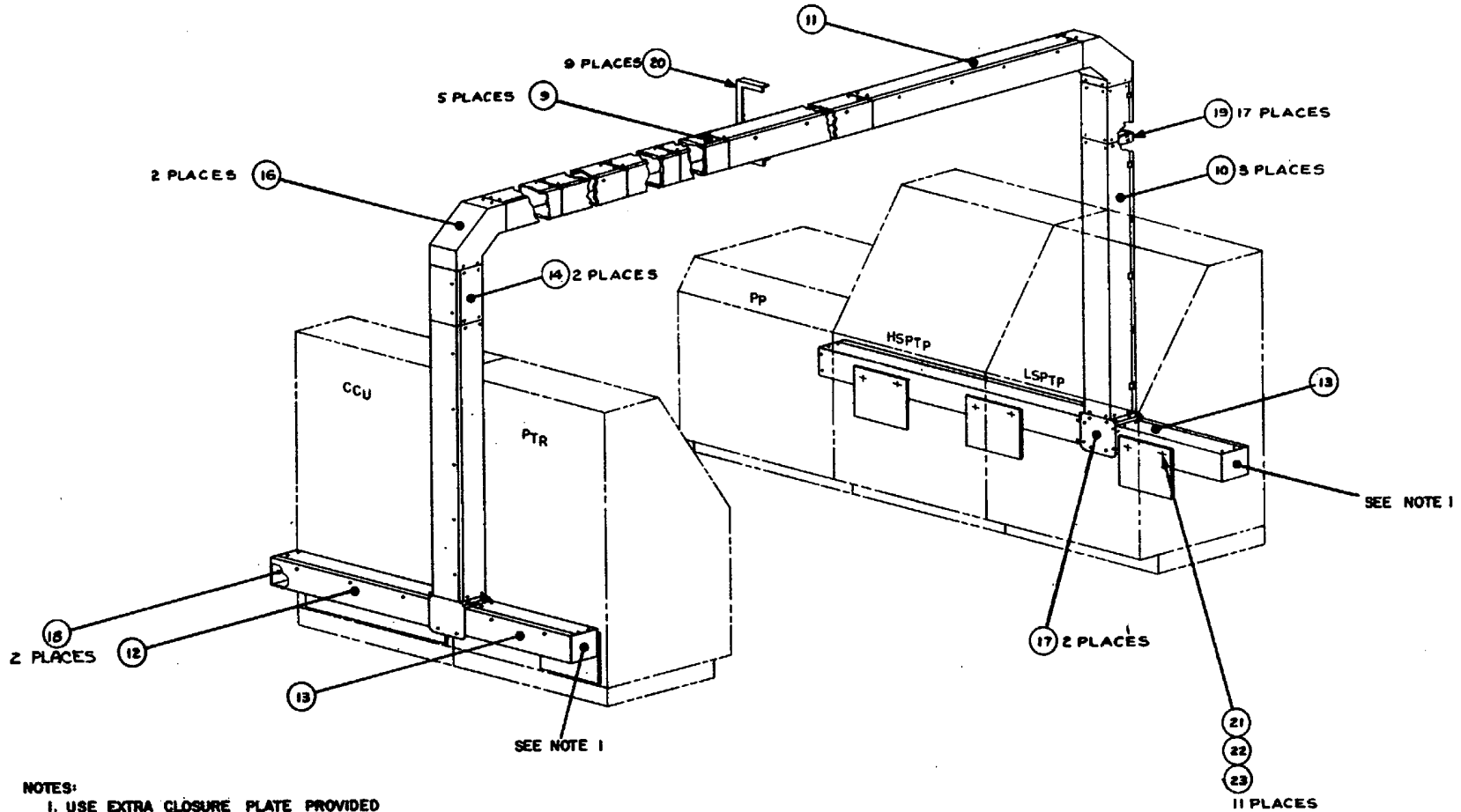
Figure 4-10 (1). Installation kit, AE parallel configuration, component location diagram (sheet 1 of 2).

Change 3 4-36



TM 7440-238-15-113 ②

Figure 4-10 (2) . Installation kit, AE parallel configuration, component location diagram (sheet 2 of 2 ).  
Change 3 4-37



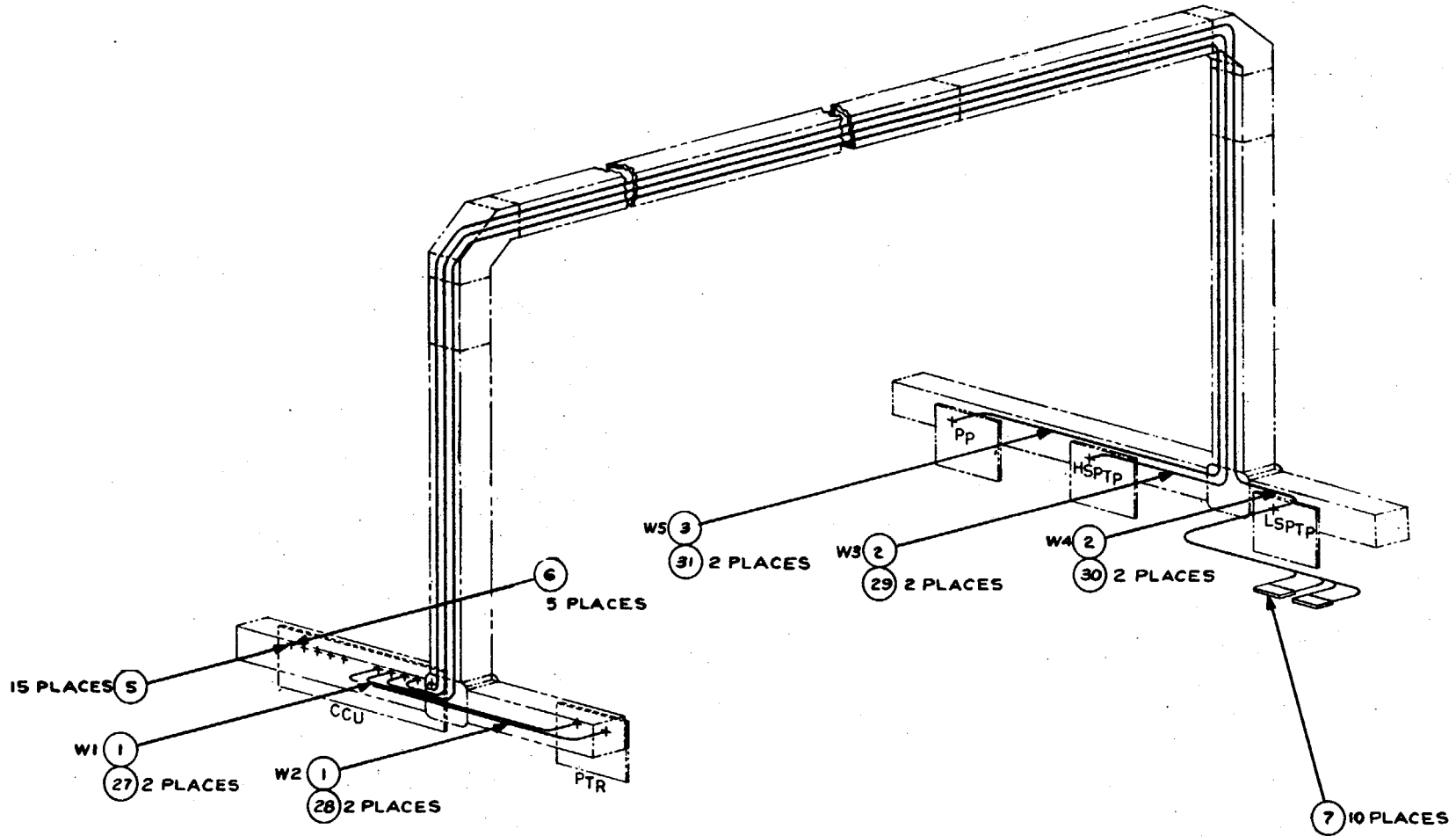
- NOTES:
1. USE EXTRA CLOSURE PLATE PROVIDED WITH ITEM (18) (2 PLACES).
  2. ITEM NO. (8) (CABLE IDENTIFICATION STRAP) TO BE USED AS REQUIRED.

TM 7440-238-15-114 (1)

- |   |                       |   |                        |
|---|-----------------------|---|------------------------|
| 1 Special purpose cable assembly W1, W2 | 9 Electrical wireway  | 17 Tee  | 24 through 26 Not used |
| 2 Special purpose cable assembly W3, W4 | 10 Electrical wireway | 18 Closure plate                              | 27 Cable marker W1     |
| 3 Special purpose cable assembly W5     | 11 Electrical wireway | 19 Electrical wireway connector               | 28 Cable marker W2     |
| 4 Not used                              | 12 Electrical wireway | 20 Hanger                                     | 29 Cable marker W3     |
| 5 Cable adapter                         | 13 Electrical wireway | 21 Screw, hex head, No. 1/4-20, 1/2-inch long | 30 Cable marker W4     |
| 6 Protective cover                      | 14 Electrical wireway | 22 Washer, flat, No. 1/4                      | 31 Cable marker W5     |
| 7 Fanning strip                         | 15 Not used           | 23 Washer, split lock, No. 1/4                |                        |
| 8 Cable identification strap            | 16 Elbow              |   |                        |

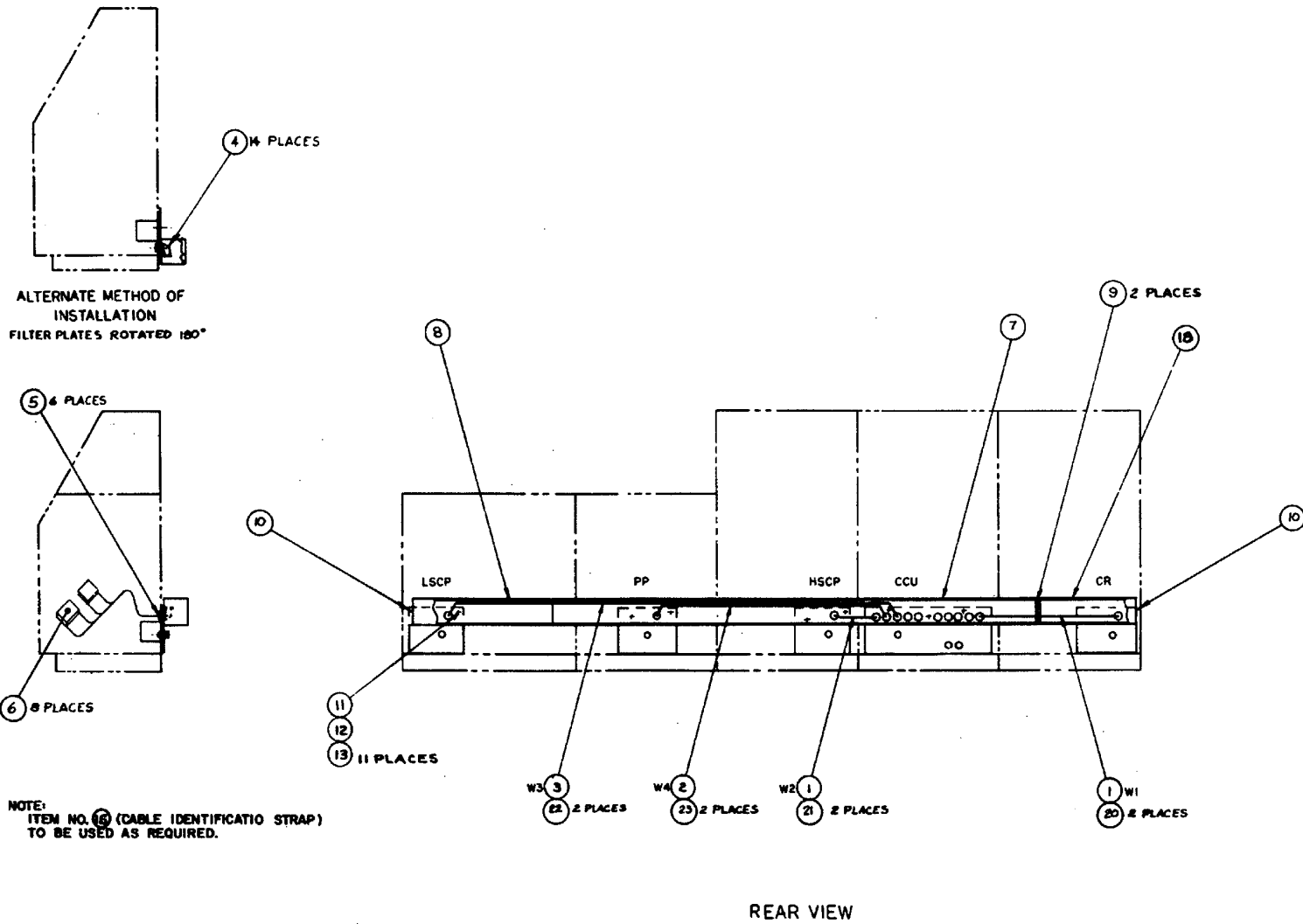
Figure 4-11 (1). Installation kit, AE parallel configuration (50 feet), component location diagram (sheet 1 of 2).  
Change 3 4-38





TM 7440-238-15-114 (2)

Figure 4 11 (2) . Installation kit, AE parallel configuration (50 feet), component location diagram (sheet 2 of 2).  
Change 3 4-39



TM7440-238-15-115

- 1 Special purpose cable assembly W1, W2
- 2 Special purpose cable assembly W4
- 3 Special purpose cable assembly W3
- 4 Cable adapter
- 5 Protective cover
- 6 Fanning strip

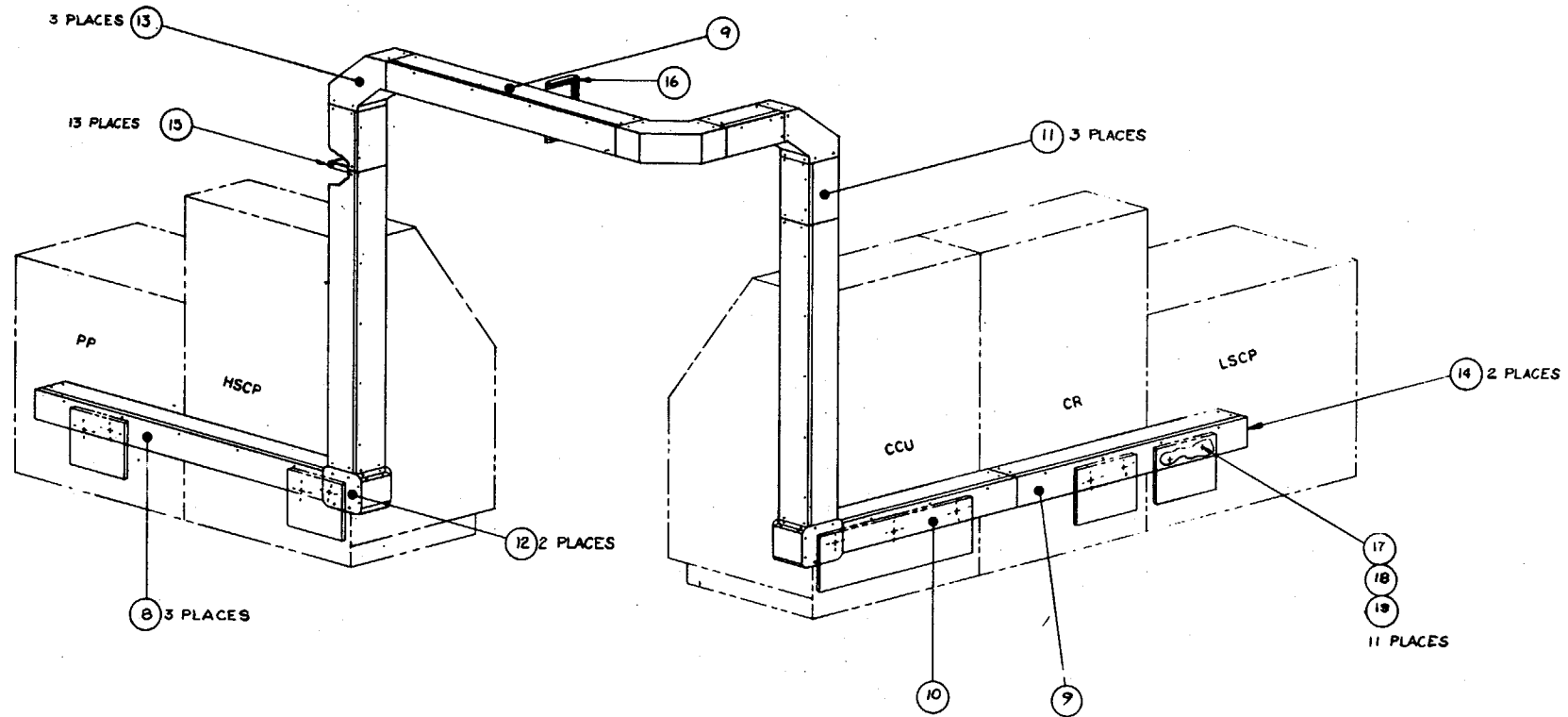
- 7 Electrical wireway
- 8 Electrical wireway
- 9 Electrical wireway connector
- 10 Closure plate
- 11 Screw, hex head, No. 1/4-20, 1/2-inch long
- 12 Washer, flat, No. 1/4

- 13 Washer, split lock, No. 1/4
- 14 and 15 Not used
- 16 Cable identification strap
- 17 Not used
- 18 Electrical wireway

- 19 Not used
- 20 Cable marker W1
- 21 Cable marker W2
- 22 Cable marker W3
- 23 Cable marker W4

Figure 4-12. Installation kit, BB straight line configuration, component location diagram.

Change 3 4-40



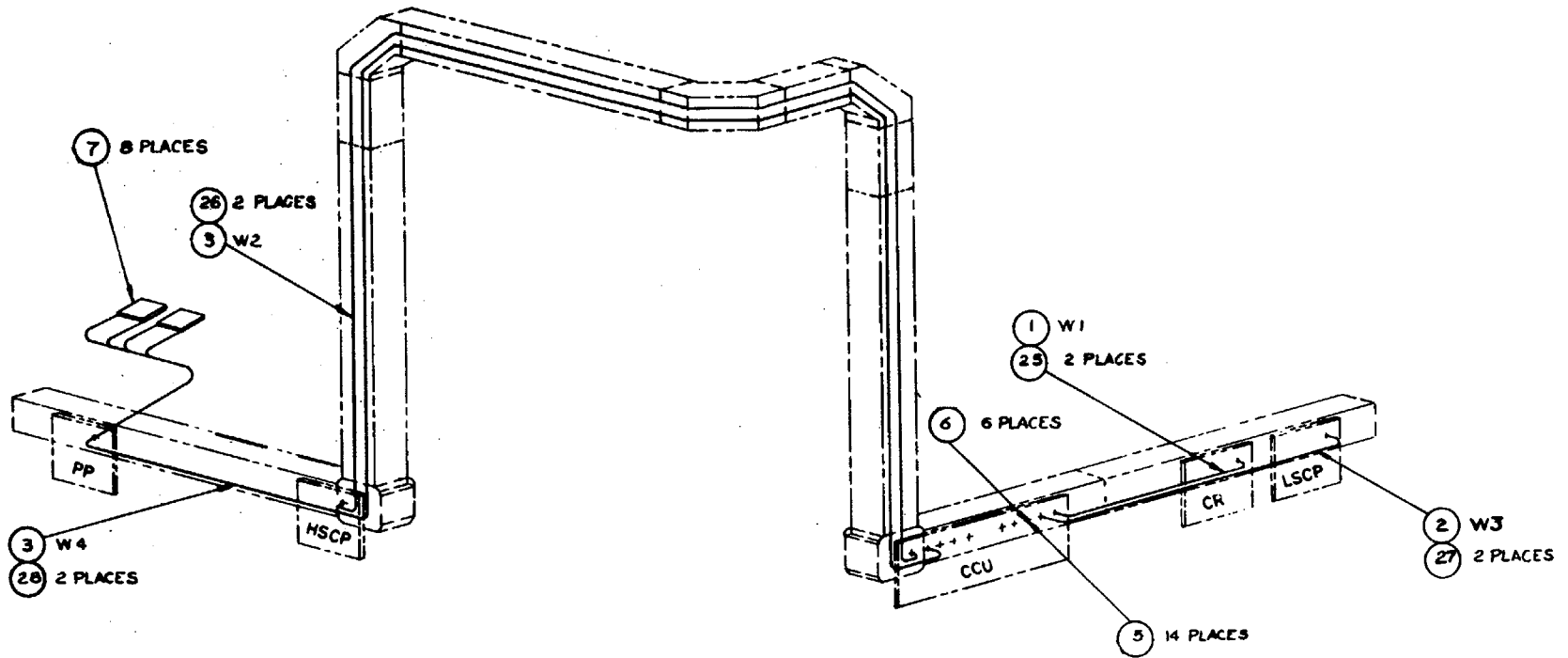
NOTE:  
ITEM NO. 22 (CABLE IDENTIFICATION STRAP)  
TO BE USED AS REQUIRED.

TM 11-7440-238-15-116 ①

- |   |                       |   |                               |
|---|-----------------------|---|-------------------------------|
| 1 Special purpose cable assembly W1     | 8 Electrical wireway  | 15 Electrical wireway connector               | 22 Cable identification strap |
| 2 Special purpose cable assembly W3     | 9 Electrical wireway  | 16 Hanger                                     | 23 and 24 Not used            |
| 3 Special purpose cable assembly W2, W4 | 10 Electrical wireway | 17 Screw, hex head, No. 1/4-20, 1/2-inch long | 25 Cable marker W1            |
| 4 Not used                              | 11 Electrical wireway | 18 Washer, flat, No. 1/4                      | 26 Cable marker W2            |
| 5 Cable adapter                         | 12 Tee                | 19 Washer, split lock, No. 1/4                | 27 Cable marker W3            |
| 6 Protective cover                      | 13 Elbow              | 20 and 21 Not used                            | 28 Cable marker W4            |
| 7 Fanning strip                         | 14 Closure plate      |   |                               |

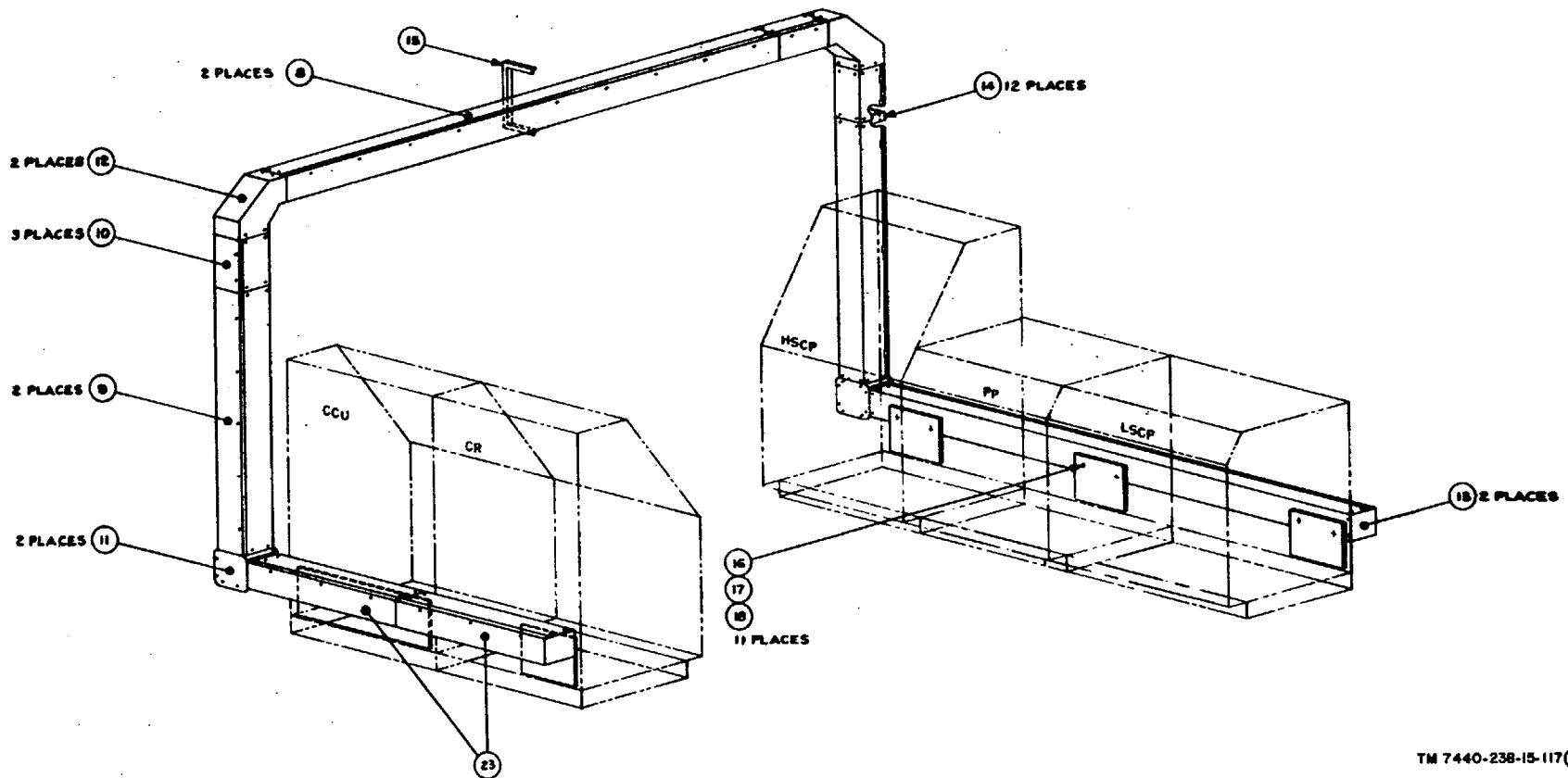
Figure 4-13 (1). Installation kit, BB L-shape configuration, component location diagram (sheet 1 of 2).

Change 3 4-41



TM 7440-238-15-116(2)

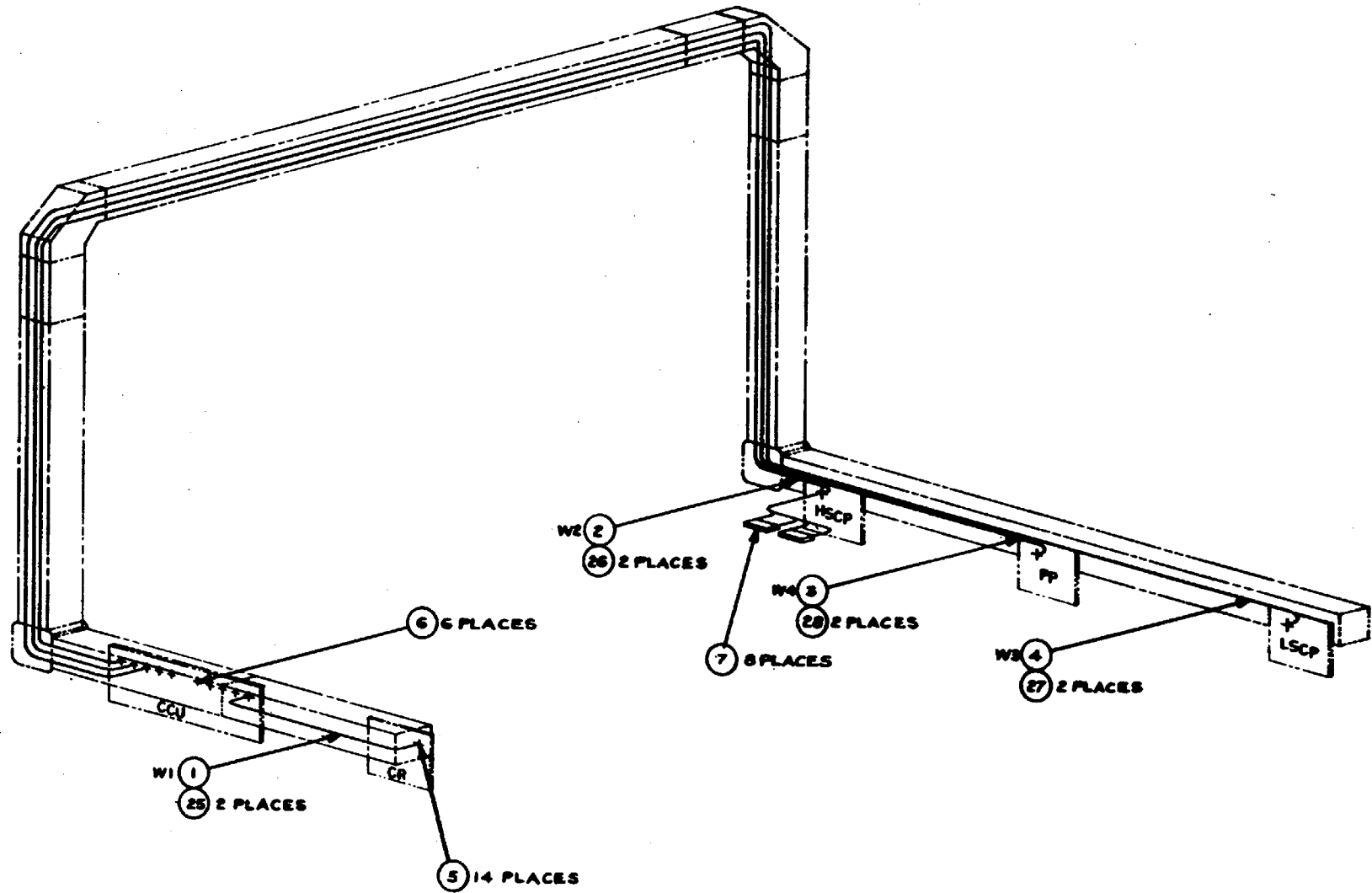
Figure 4-13 (2). Installation kit, BB L-shape configuration, component location diagram (sheet 2 of 2).  
Change 3 4-42



TM 7440-238-15-117 (1)

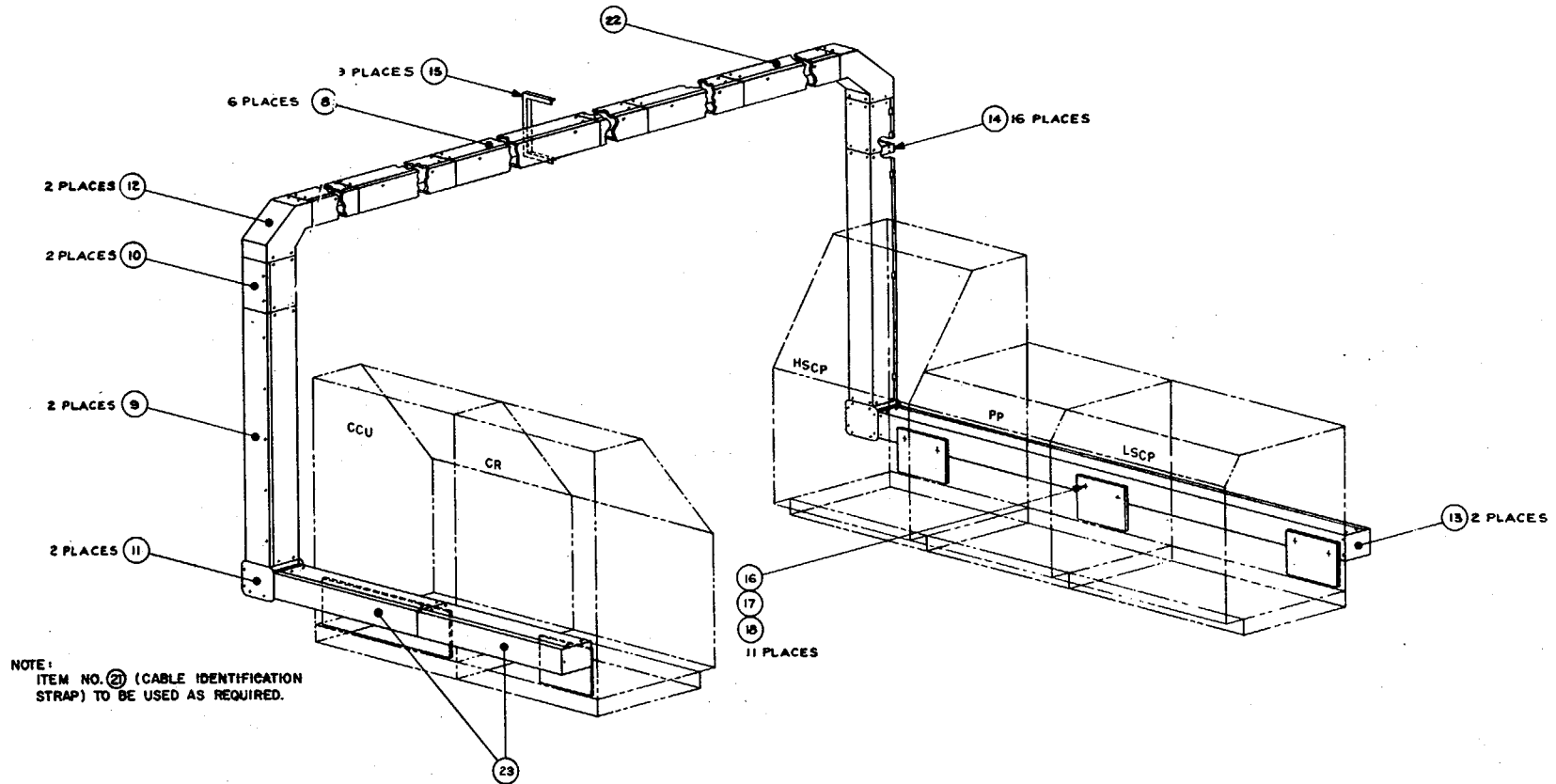
- |                                     |                                 |   |                       |
|-------------------------------------|---------------------------------|---|-----------------------|
| 1 Special purpose cable assembly W1 | 8 Electrical wireway            | 15 Hanger                                     | 23 Electrical wireway |
| 2 Special purpose cable assembly W2 | 9 Electrical wireway            | 16 Screw, hex head, No. 1/4-20, 1/2-inch long | 24 Not used           |
| 3 Special purpose cable assembly W4 | 10 Electrical wireway           | 17 Washer, flat, No. 1/4                      | 25 Cable marker W1    |
| 4 Special purpose cable assembly W3 | 11 Tee                          | 18 Washer, split lock, No. 1/4                | 26 Cable marker W2    |
| 5 Cable adapter                     | 12 Elbow                        | 19 and 20 Not used                            | 27 Cable marker W3    |
| 6 Protective cover                  | 13 Closure plate                | 21 Cable identification strap                 | 28 Cable marker W4    |
| 7 Fanning strip                     | 14 Electrical wireway connector | 22 Not used                                   |                       |

Figure 4-14 (1) . Installation kit, BB parallel configuration, component location diagram (sheet 1 of 2).  
Change 3 4-43



TM7440-238-15-117 (2)

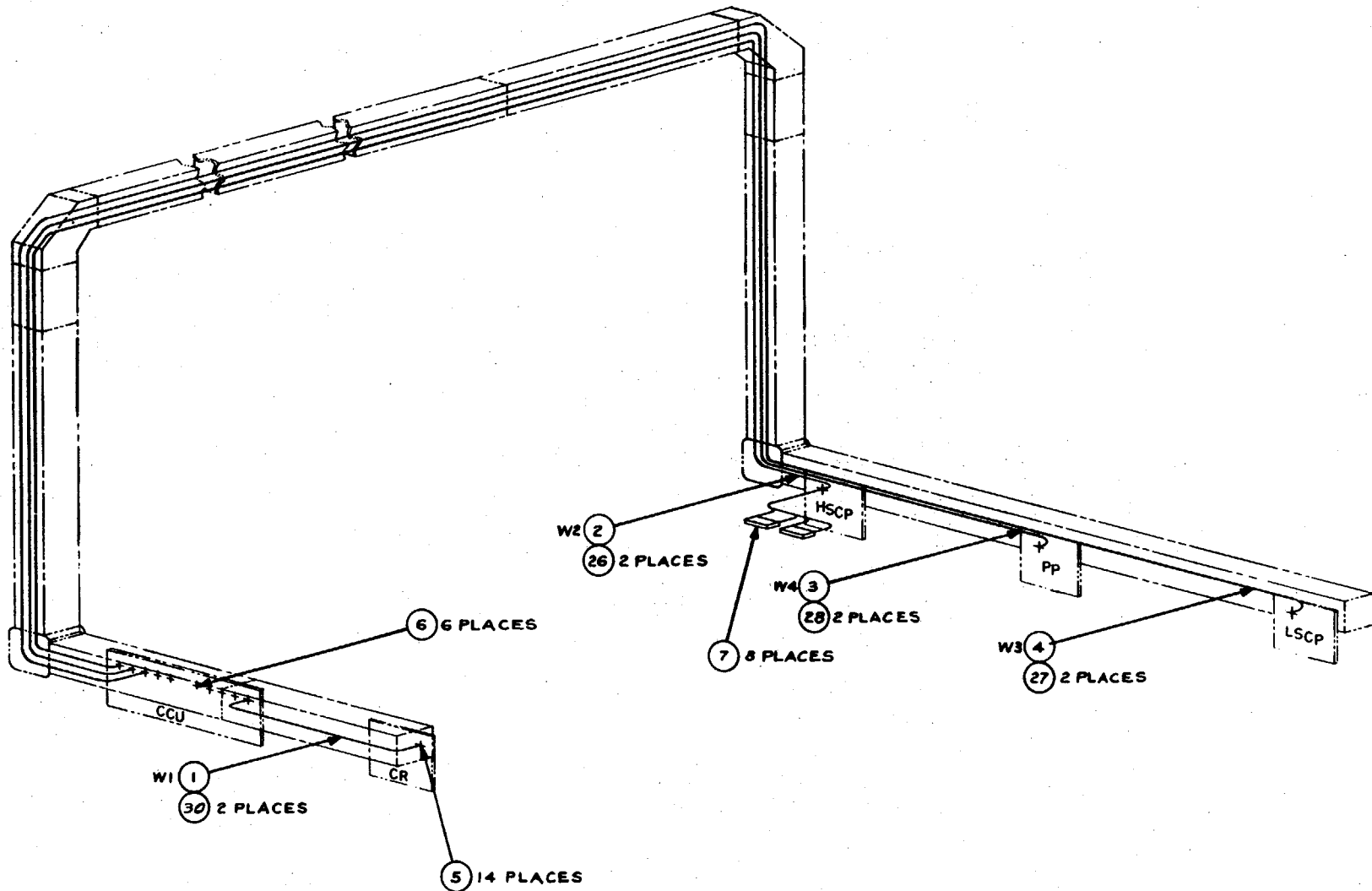
Figure 4-14 (2). Installation kit, BB parallel configuration, component location diagram (sheet 1 of 2).  
Change 3 4-44



TM 7440-238-15-118 ①

- |                                     |                                 |   |                       |
|-------------------------------------|---------------------------------|---|-----------------------|
| 1 Special purpose cable assembly W1 | 8 Electrical wireway            | 15 Hanger                                     | 23 Electrical wireway |
| 2 Special purpose cable assembly W2 | 9 Electrical wireway            | 16 Screw, hex head, No. 1/4-20, 1/2-inch long | 24 and 25 Not used    |
| 3 Special purpose cable assembly W3 | 10 Electrical wireway           | 17 Washer, flat, No. 1/4                      | 26 Cable marker W2    |
| 4 Special purpose cable assembly W4 | 11 Tee                          | 18 Washer, split lock, No. 1/4                | 27 Cable marker W3    |
| 5 Cable adapter                     | 12 Elbow                        | 19 and 20 Not used                            | 28 Cable marker W4    |
| 6 Protective cover                  | 13 Closure plate                | 21 Cable identification strap                 | 29 Not used           |
| 7 Fanning strip                     | 14 Electrical wireway connector | 22 Electrical wireway                         | 30 Cable marker W1    |

Figure 4-15 (1). Installation kit, BB parallel configuration (50 feet), component location diagram (sheet 1 of 2).

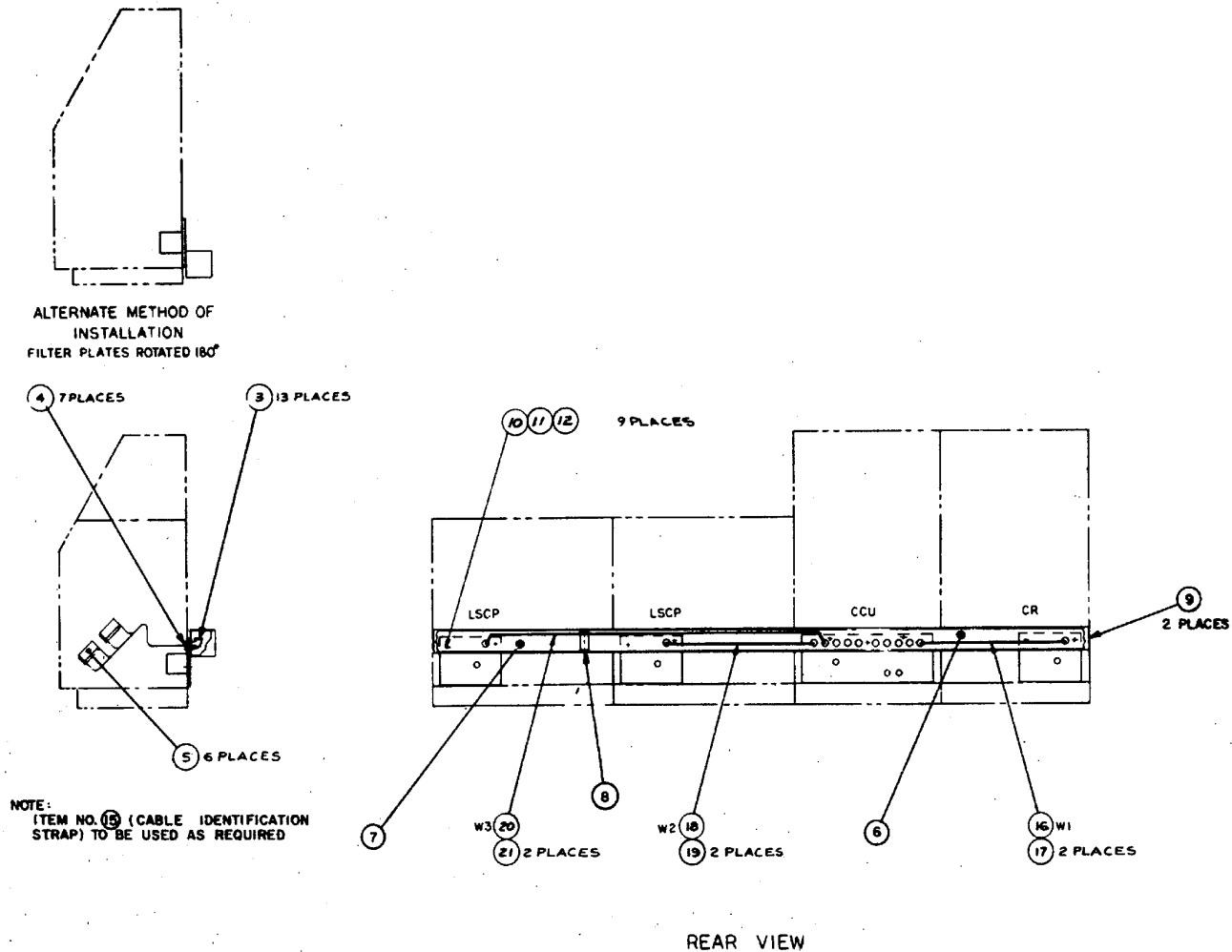


TM 7440-238-15-118 (2)

Figure 4-15 (2) . Installation kit, BB parallel configuration (50 feet), component location diagram (sheet 2 of 2).

Change 3 4-46

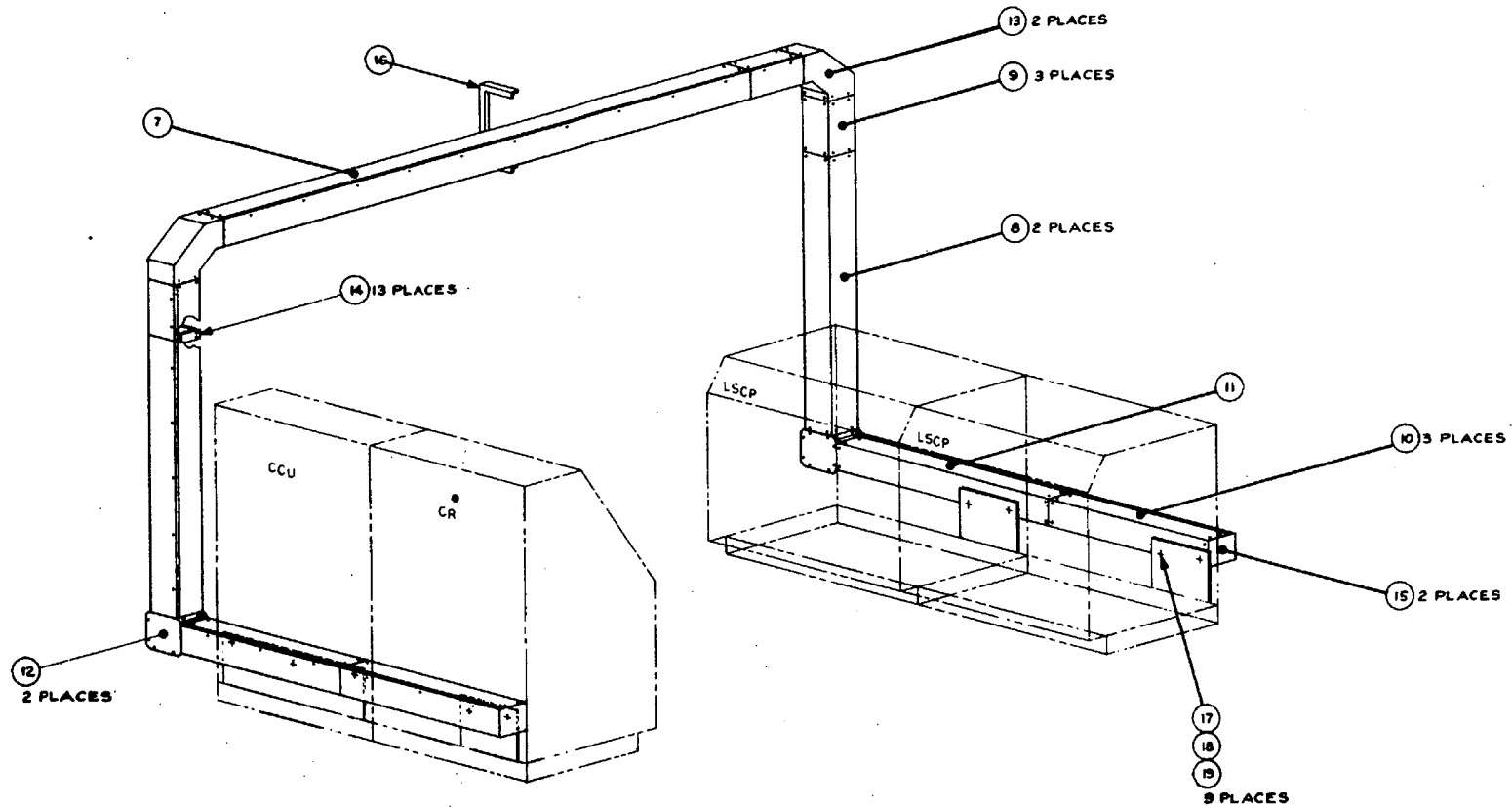




TM 7440-238-15-119

- |                    |   |                                      |                                      |
|--------------------|---|--------------------------------------|--------------------------------------|
| 1 Not used         | 6 Electrical wireway                          | 11 Washer, flat, No. 1/4             | 17 Cable marker W1                   |
| 2 Not used         | 7 Electrical wireway                          | 12 Washer, split lock, No. 1/4       | 18 Special purpose cable assembly W2 |
| 3 Cable adapter    | 8 Electrical wireway connector                | 13 and 14 Not used                   | 19 Cable marker W2                   |
| 4 Protective cover | 9 Closure plate                               | 15 Cable identification strap        | 20 Special purpose cable assembly W3 |
| 5 Fanning strip    | 10 Screw, hex head, No. 1/4-20, 1/2-inch long | 16 Special purpose cable assembly W1 | 21 Cable marker W3                   |

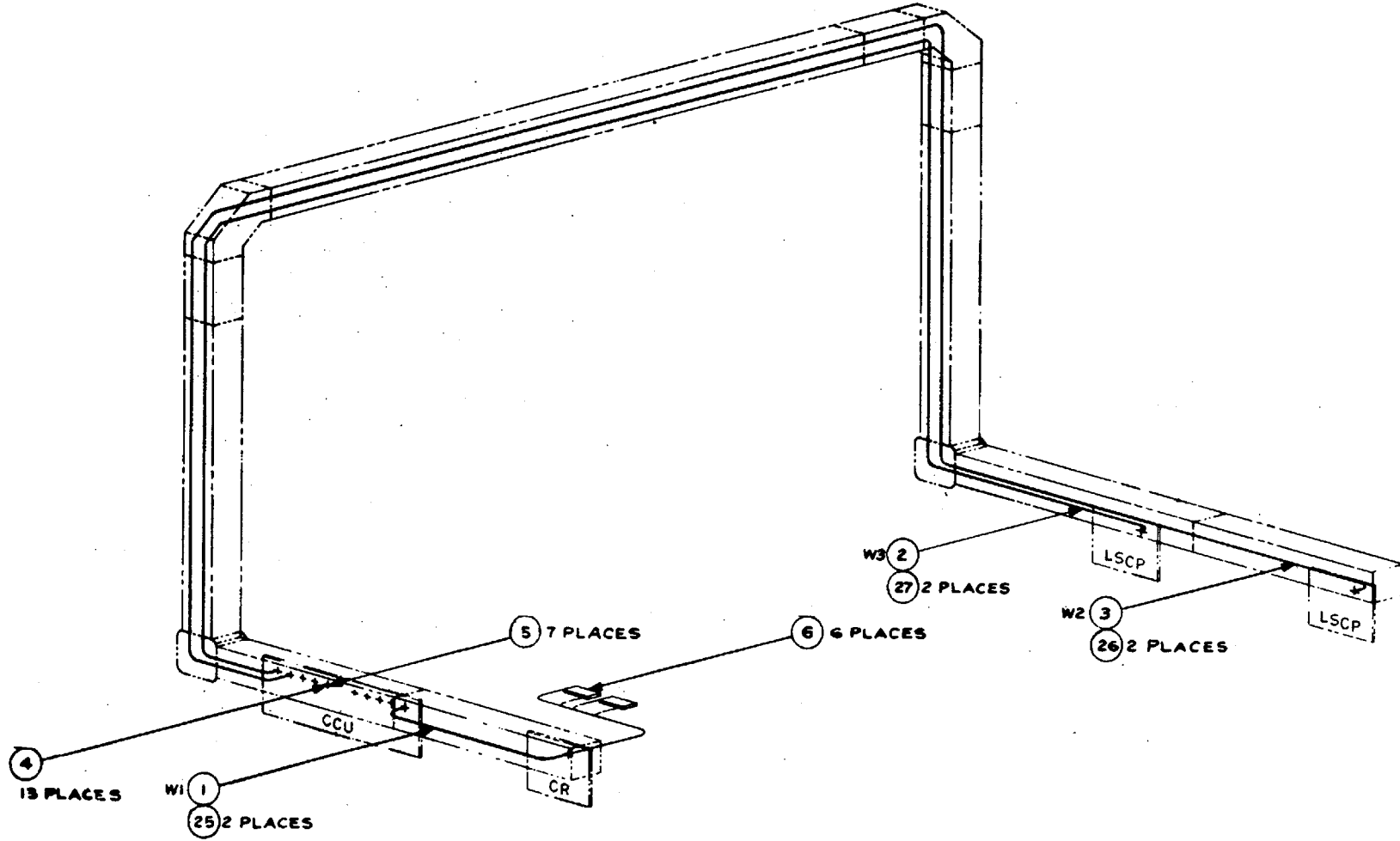
Figure 4-16. Installation kit, BC straight line configuration, component location diagram.



TM 7440-238-15-120 ①

- |                                     |                                 |   |                               |
|-------------------------------------|---------------------------------|---|-------------------------------|
| 1 Special purpose cable assembly W1 | 8 Electrical wireway            | 15 Closure plate                              | 22 Cable identification strap |
| 2 Special purpose cable assembly W3 | 9 Electrical wireway            | 16 Hanger                                     | 23 Not used                   |
| 3 Special purpose cable assembly W2 | 10 Electrical wireway           | 17 Screw, hex head, No. 1/4-20, 1/2-inch long | 24 Not used                   |
| 4 Cable adapter                     | 11 Electrical wireway           | 18 Washer, flat, No. 1/4                      | 25 Cable marker W1            |
| 5 Protective cover                  | 12 Tee                          | 19 Washer, split lock, No. 1/4                | 26 Cable marker W2            |
| 6 Fanning strip                     | 13 Elbow                        | 20 and 21 Not used                            | 27 Cable marker W3            |
| 7 Electrical wireway                | 14 Electrical wireway connector |   |                               |

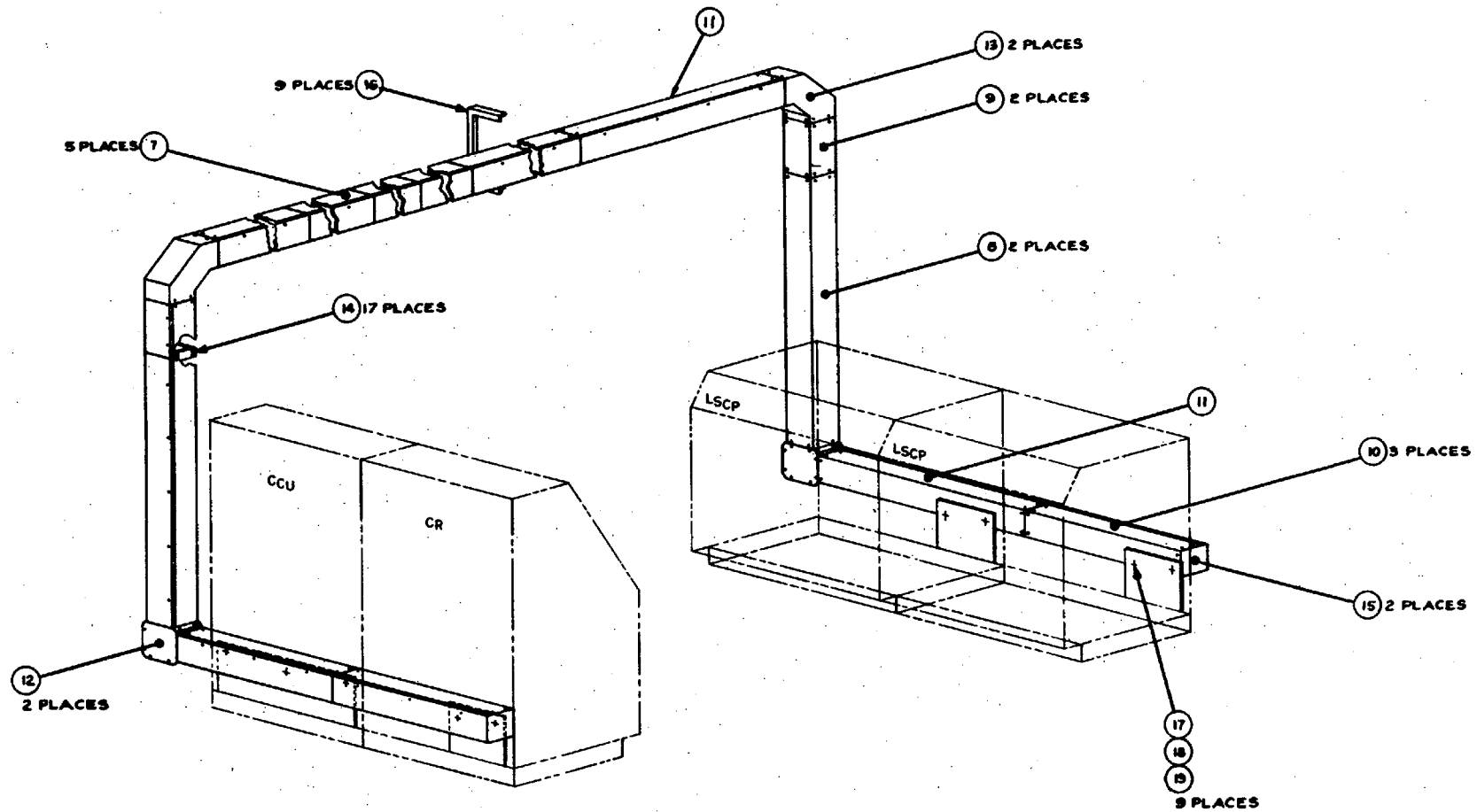
Figure 4-17 (1). Installation kit, BC parallel configuration, component location diagram (sheet 1 of 2).



TM 7440-238-15-120 ②

Figure 4 17 (2) . Installation kit, BC parallel configuration, component location diagram (sheet 2 of 2).

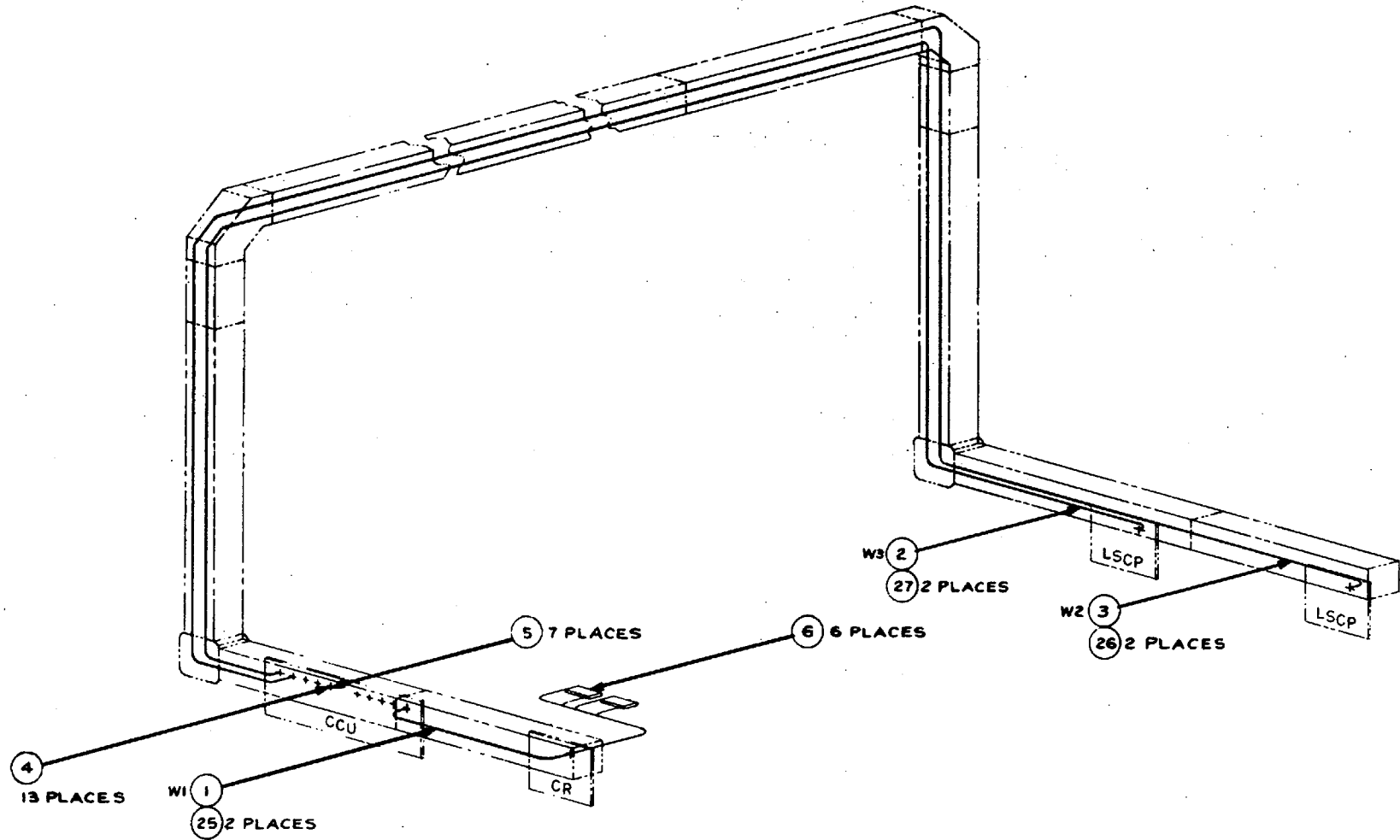
Change 3 4-49



TM7440-238-15-121(1)

- |                                     |                       |   |                               |
|-------------------------------------|-----------------------|---|-------------------------------|
| 1 Special purpose cable assembly W1 | 8 Electrical wireway  | 14 Electrical wireway connector               | 20 and 21 Not used            |
| 2 Special purpose cable assembly W3 | 9 Electrical wireway  | 15 Closure plate                              | 22 Cable identification strap |
| 3 Special purpose cable assembly W2 | 10 Electrical wireway | 16 Hanger                                     | 23 and 24 Not used            |
| 4 Cable adapter                     | 11 Electrical wireway | 17 Screw, hex head, No. 1/4-20, 1/2-inch long | 25 Cable marker W1            |
| 5 Protective cover                  | 12 Tee                | 18 Washer, flat, No. 1/4                      | 26 Cable marker W2            |
| 6 Fanning strip                     | 13 Elbow              | 19 Washer, split lock, No. 1/4                | 27 Cable marker W3            |
| 7 Electrical wireway                |                       |   |                               |

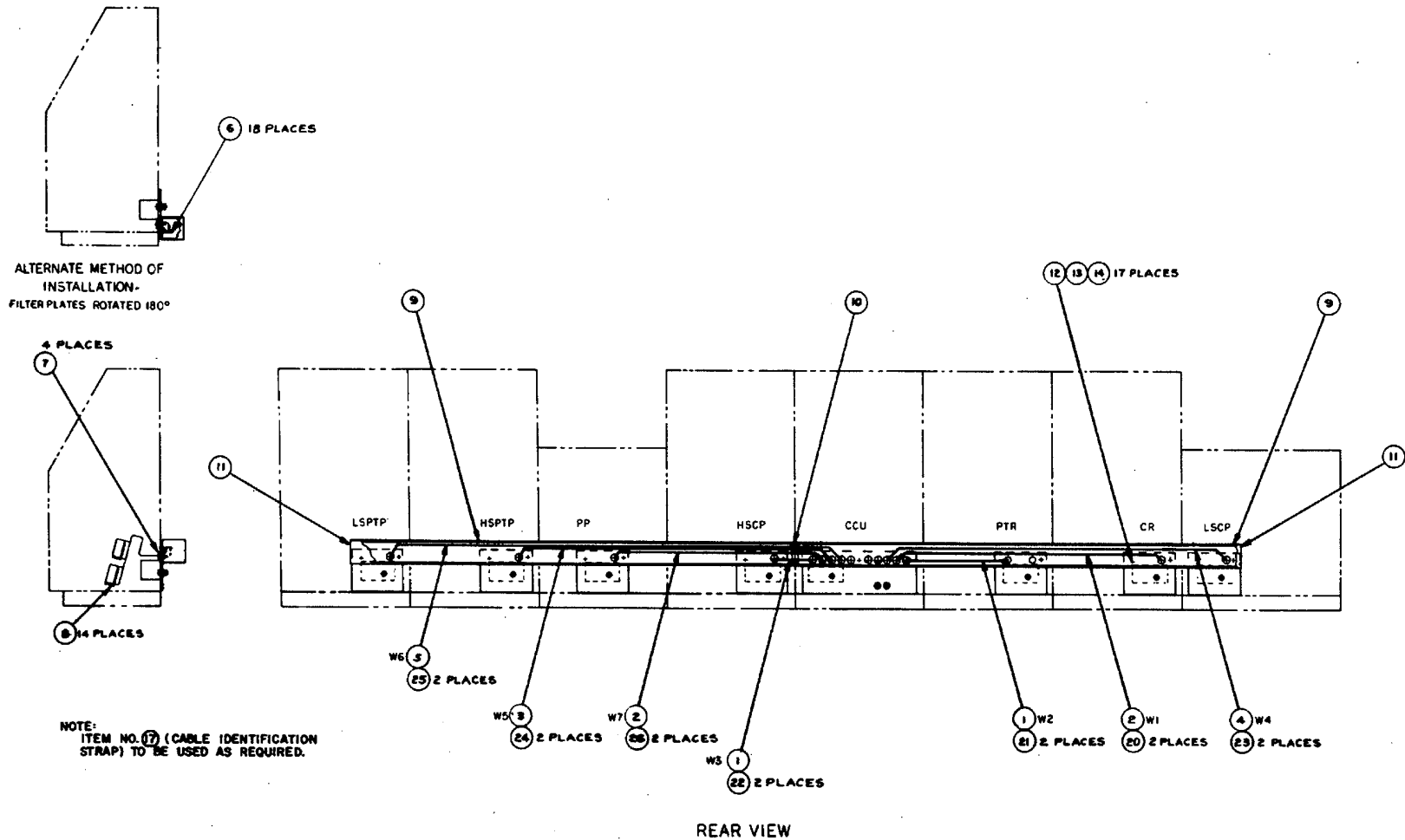
Figure 4-18 (1). Installation kit, BC parallel configuration (50 feet), component location diagram (.sheet 1 of 2).



TM 7440-238-15-121 ②

Figure 4 18 (2). Installation kit, BC parallel configuration (50 feet ), component location diagram (sheet 2 of 2).

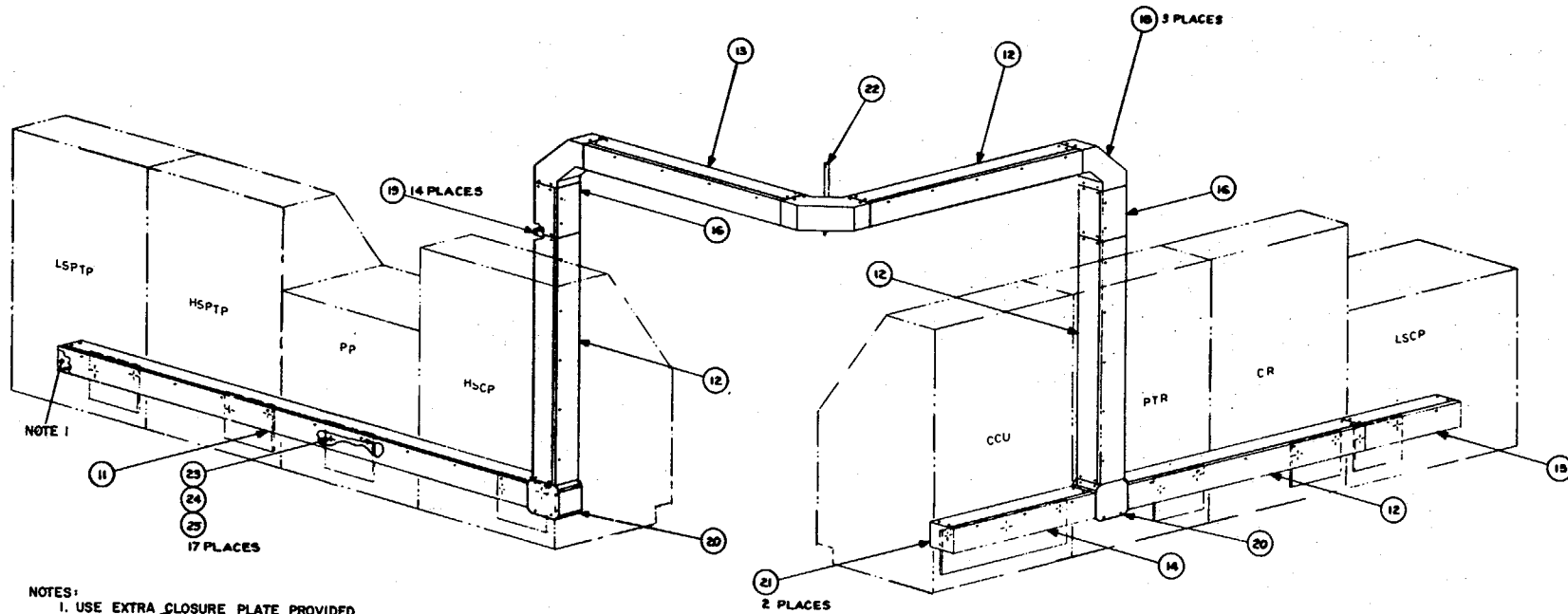
Change 3 4-51



TM 7440-238-15-122

- |   |   |                                |                    |
|---|---|--------------------------------|--------------------|
| 1 Special purpose cable assembly W2, W3 | 7 Protective cover                            | 13 Washer, flat, No. 1/4       | 21 Cable marker W2 |
| 2 Special purpose cable assembly W1, W7 | 8 Fanning strip                               | 14 Washer, split lock, No. 1/4 | 22 Cable marker W3 |
| 3 Special purpose cable assembly W5     | 9 Electrical wireway                          | 15 and 16 Not used             | 23 Cable marker W4 |
| 4 Special purpose cable assembly W4     | 10 Electrical wireway connector               | 17 Cable identification strap  | 24 Cable marker W5 |
| 5 Special purpose cable assembly W6     | 11 Closure plate                              | 18 and 19 Not used             | 25 Cable marker W6 |
| 6 Cable adapter                         | 12 Screw, hex head, No. 1/4-20, 1/2-inch long | 20 Cable marker W1             | 26 Cable marker W7 |

Figure 4-19. Installation kit, BE straight configuration, component location diagram.

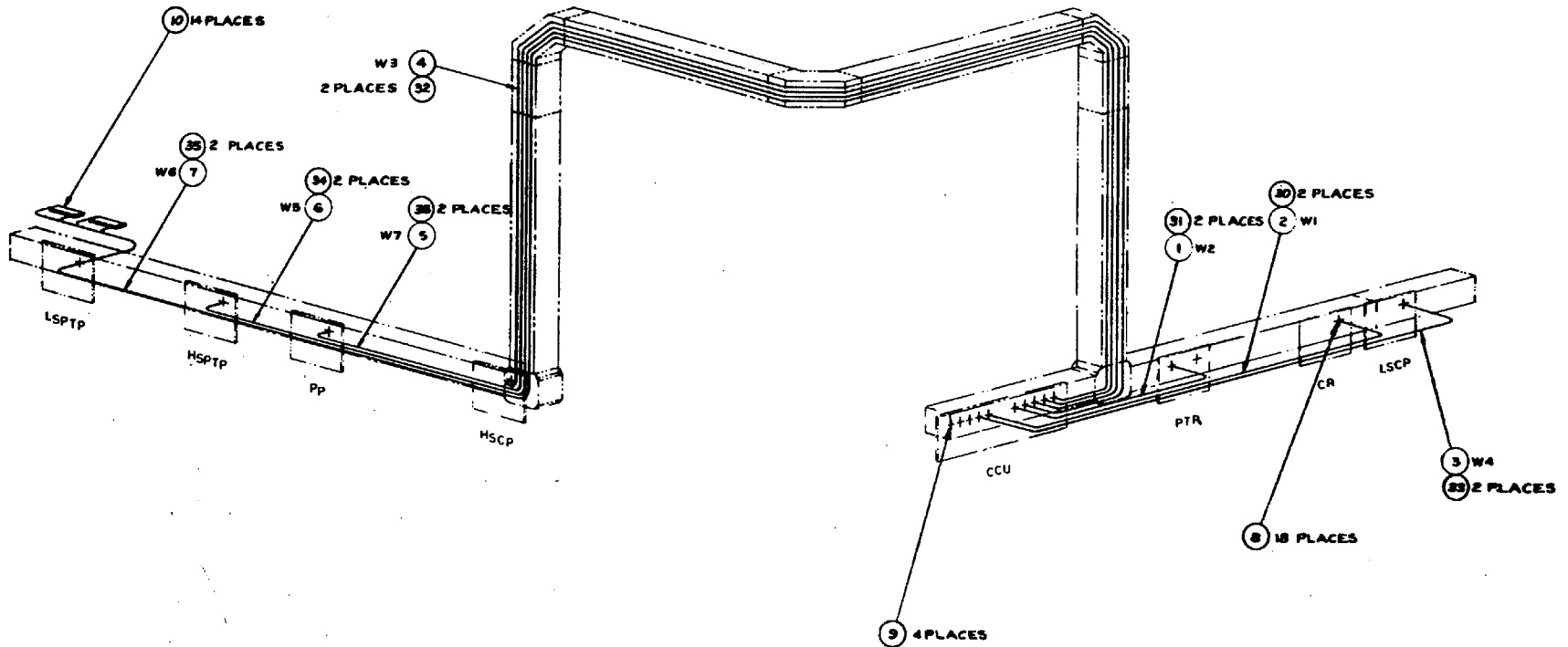


NOTES:  
 1. USE EXTRA CLOSURE PLATE PROVIDED WITH ITEM 21.  
 2. ITEM NO. 26 (CABLE IDENTIFICATION STRAP) TO BE USED AS REQUIRED.

TM7440-238-15-123 (1)

- |                                     |                       |   |                        |
|-------------------------------------|-----------------------|---|------------------------|
| 1 Special purpose cable assembly W2 | 10 Fanning strip      | 19 Electrical wireway connector               | 27 through 29 Not used |
| 2 Special purpose cable assembly W1 | 11 Electrical wireway | 20 Tee  | 30 Cable marker W1     |
| 3 Special purpose cable assembly W4 | 12 Electrical wireway | 21 Closure plate                              | 31 Cable marker W2     |
| 4 Special purpose cable assembly W3 | 13 Electrical wireway | 22 Hanger                                     | 32 Cable marker W3     |
| 5 Special purpose cable assembly W7 | 14 Electrical wireway | 23 Screw, hex head, No. 1/4-20, 1/2-inch long | 33 Cable marker W4     |
| 6 Special purpose cable assembly W5 | 15 Electrical wireway | 24 Washer, flat, No. 1/4                      | 34 Cable marker W5     |
| 7 Special purpose cable assembly W6 | 16 Electrical wireway | 25 Washer, split lock, No. 1/4                | 35 Cable marker W6     |
| 8 Cable adapter                     | 17 Not used           | 26 Cable identification strap                 | 36 Cable marker W7     |
| 9 Protective cover                  | 18 Elbow              |   |                        |

Figure 4- 20 (1) . Installation kit, BE L-shape configuration, component location diagram (sheet 1 of 2).

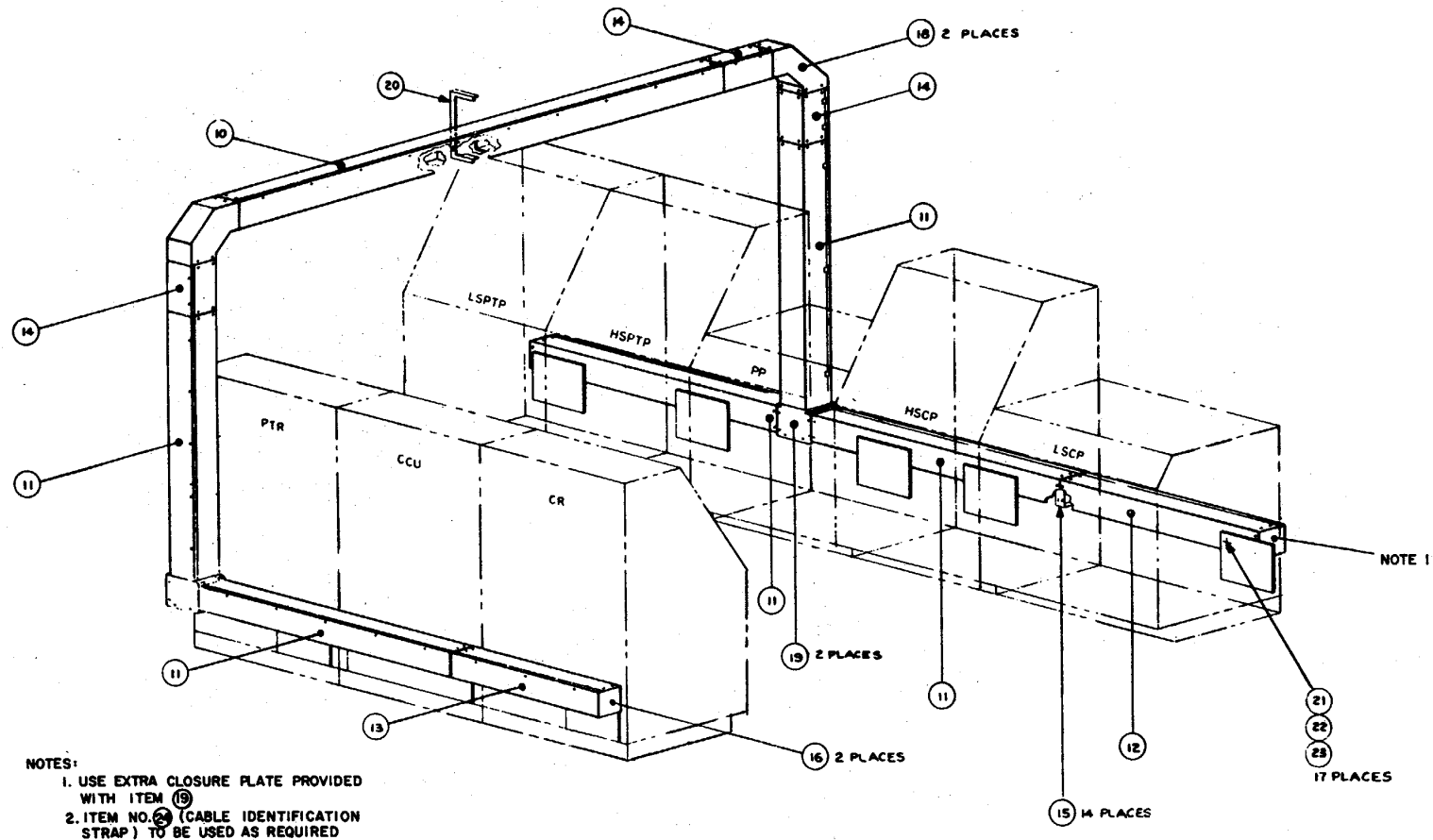


TM7440-238-15-123 (2)

Figure 4—20 (2) . Installation kit, BE L-shape configuration, component location diagram (sheet 2 of 2).

Change 3 4-54





NOTES:  
 1. USE EXTRA CLOSURE PLATE PROVIDED WITH ITEM (16)  
 2. ITEM NO. (24) (CABLE IDENTIFICATION STRAP) TO BE USED AS REQUIRED

TM 7440-238-15-124 (1)

- 1 Special purpose cable assembly W1, W2
- 2 Special purpose cable assembly W3, W6
- 3 Special purpose cable assembly W5, W7
- 4 and 5 Not used
- 6 Special purpose cable assembly W4
- 7 Cable adapter
- 8 Protective cover

- 9 Fanning strip
- 10 Electrical wireway
- 11 Electrical wireway
- 12 Electrical wireway
- 13 Electrical wireway
- 14 Electrical wireway
- 15 Electrical wireway connector
- 16 Closure plate

- 17 Not used
- 18 Elbow
- 19 Tee
- 20 Hanger
- 21 Screw, hex head, No. 1/4-20, 1/2-inch long
- 22 Washer, flat, No. 1/4
- 23 Washer, split lock, No. 1/4
- 24 Cable identification strap

- 25 through 27 Not used
- 28 Cable marker W1
- 29 Cable marker W2
- 30 Cable marker W3
- 31 Cable marker W4
- 32 Cable marker W5
- 33 Cable marker W6
- 34 Cable marker W7

Figure 4- 21 (1) . Installation kit, BE parallel configuration, component location diagram (sheet 1 of 2) .

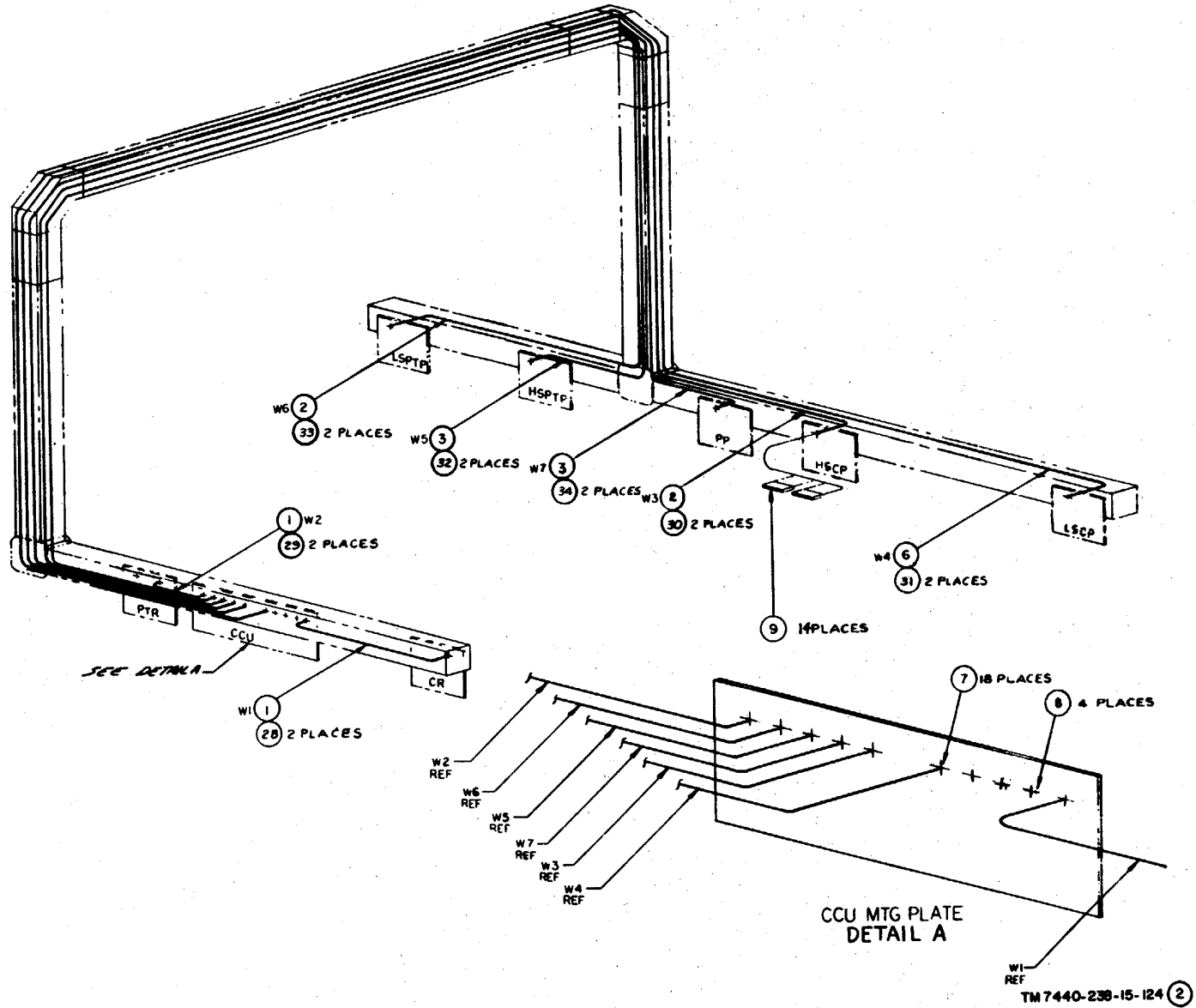
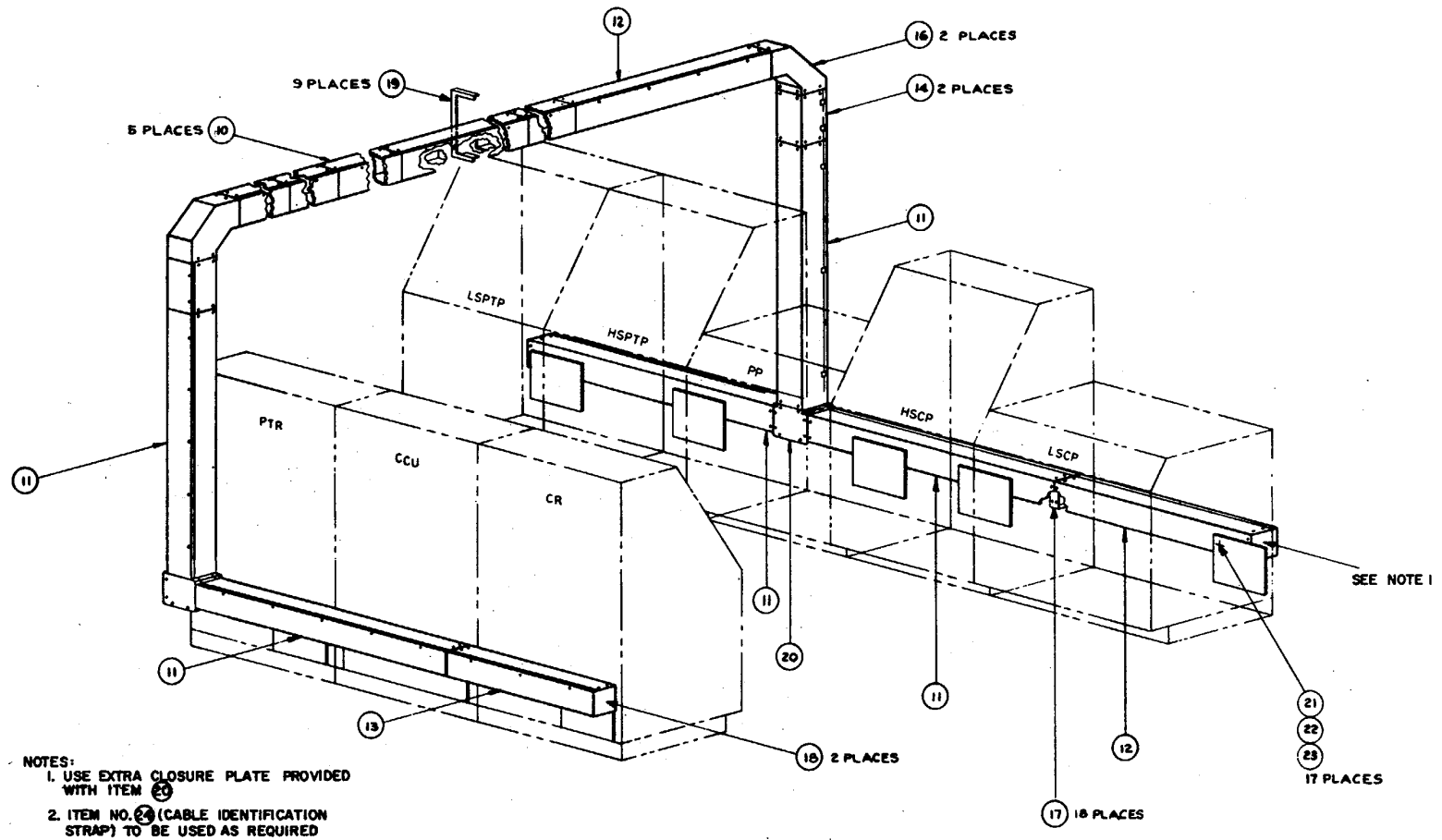


Figure 4-21 (2) . Installation kit, BE parallel configuration, component location diagram (sheet 2 of 2).



TM7440-238-15-125 ①

- 1 Special purpose cable assembly W1, W2
- 2 Special purpose cable assembly W3, W6
- 3 Special purpose cable assembly W4
- 4 Special purpose cable assembly W5, W7
- 5 and 6 Not used
- 7 Cable adapter
- 8 Protective cover
- 9 Fanning strip

- 10 Electrical wireway
- 11 Electrical wireway
- 12 Electrical wireway
- 13 Electrical wireway
- 14 Electrical wireway
- 15 Not used
- 16 Elbow
- 17 Electrical wireway connector

- 18 Closure plate
- 19 Hanger
- 20 Tee
- 21 Screw, hex head, No. 1/4-20, 1/2-inch long
- 22 Washer, flat, No. 1/4
- 23 Washer, split lock, No. 1/4
- 24 Cable identification strap
- 25 through 27 Not used

- 28 Cable marker W1
- 29 Cable marker W2
- 30 Cable marker W3
- 31 Cable marker W4
- 32 Cable marker W5
- 33 Cable marker W6
- 34 Cable marker W7

Figure 4-22 (1). Installation kit, BE parallel configuration (50 feet), component location diagram (sheet 1 of 2).

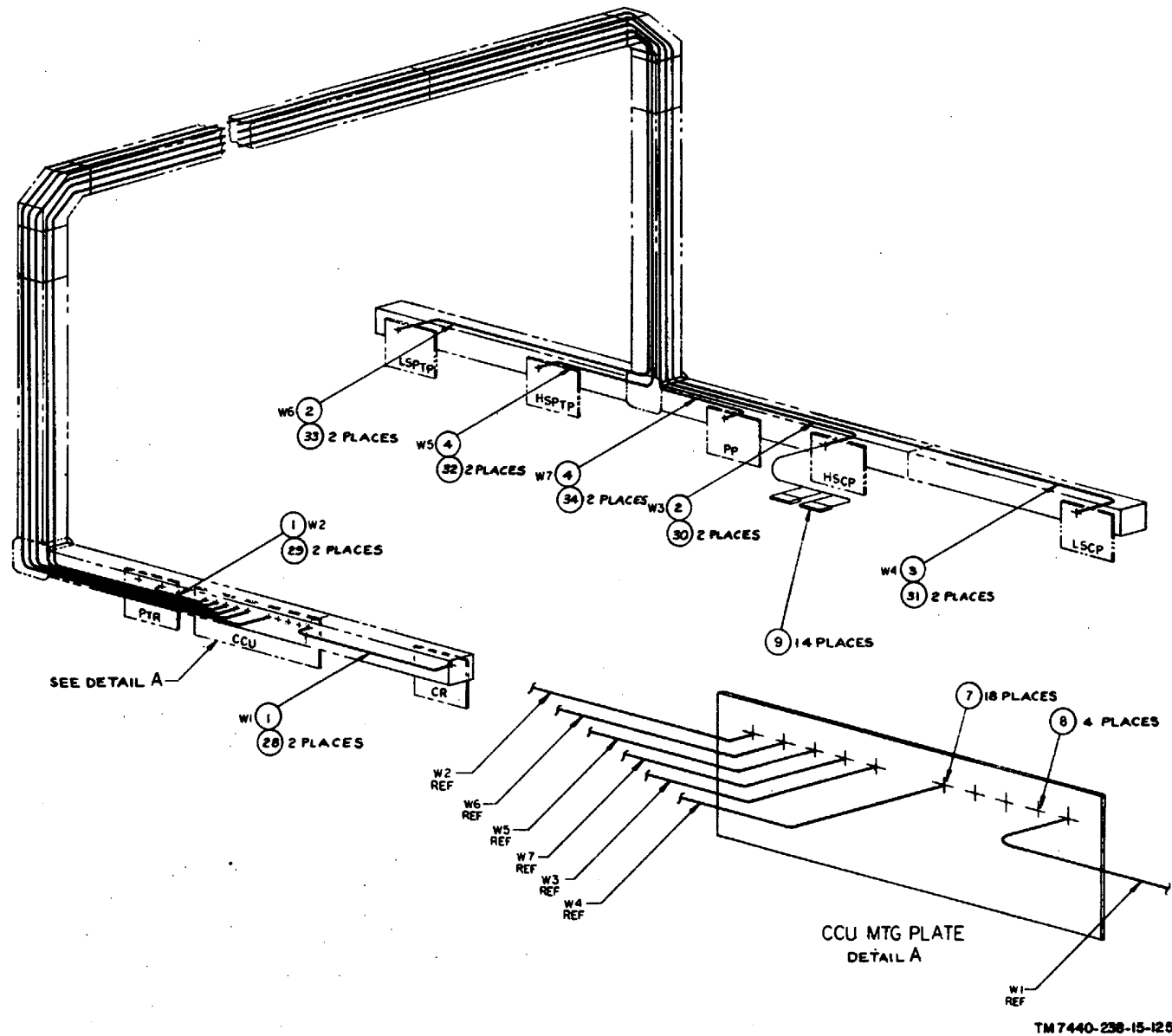
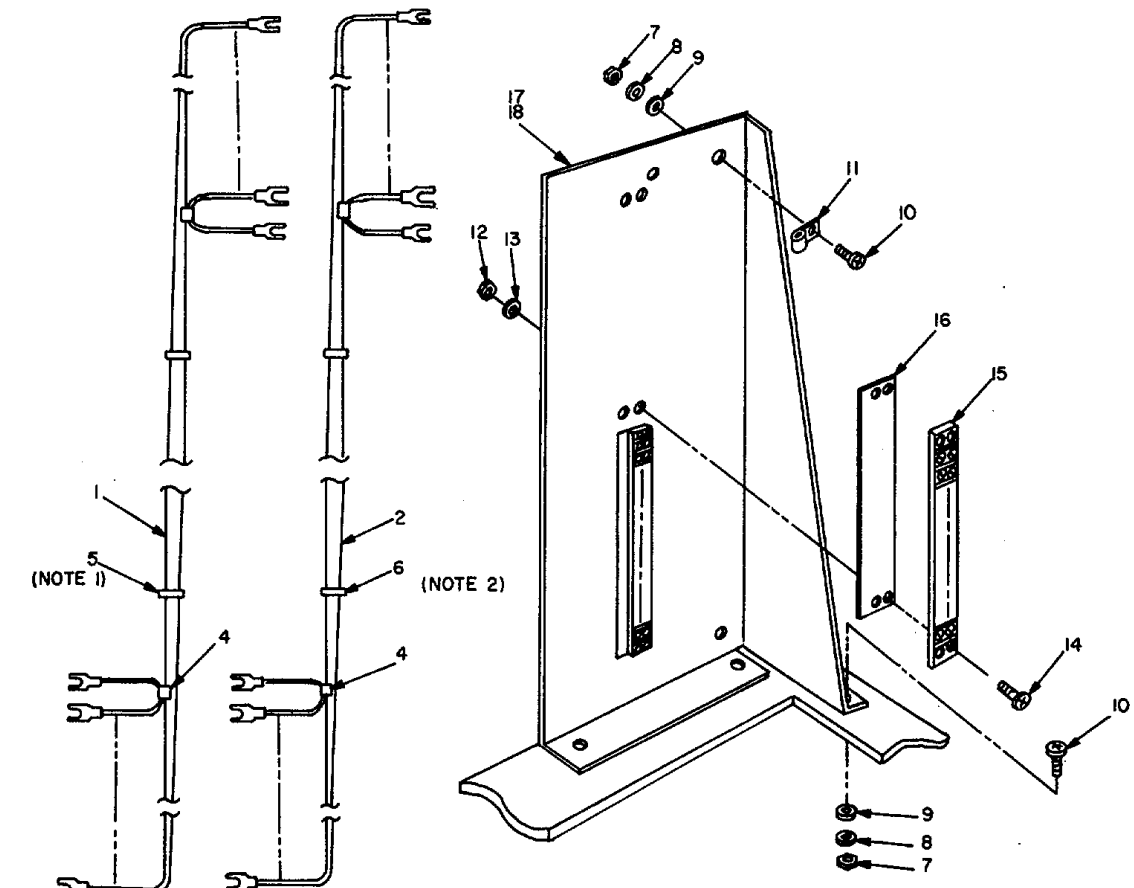


Figure 4-22 (2). Installation kit, BE parallel configuration (50 feet), component location diagram (sheet 2 of 2).

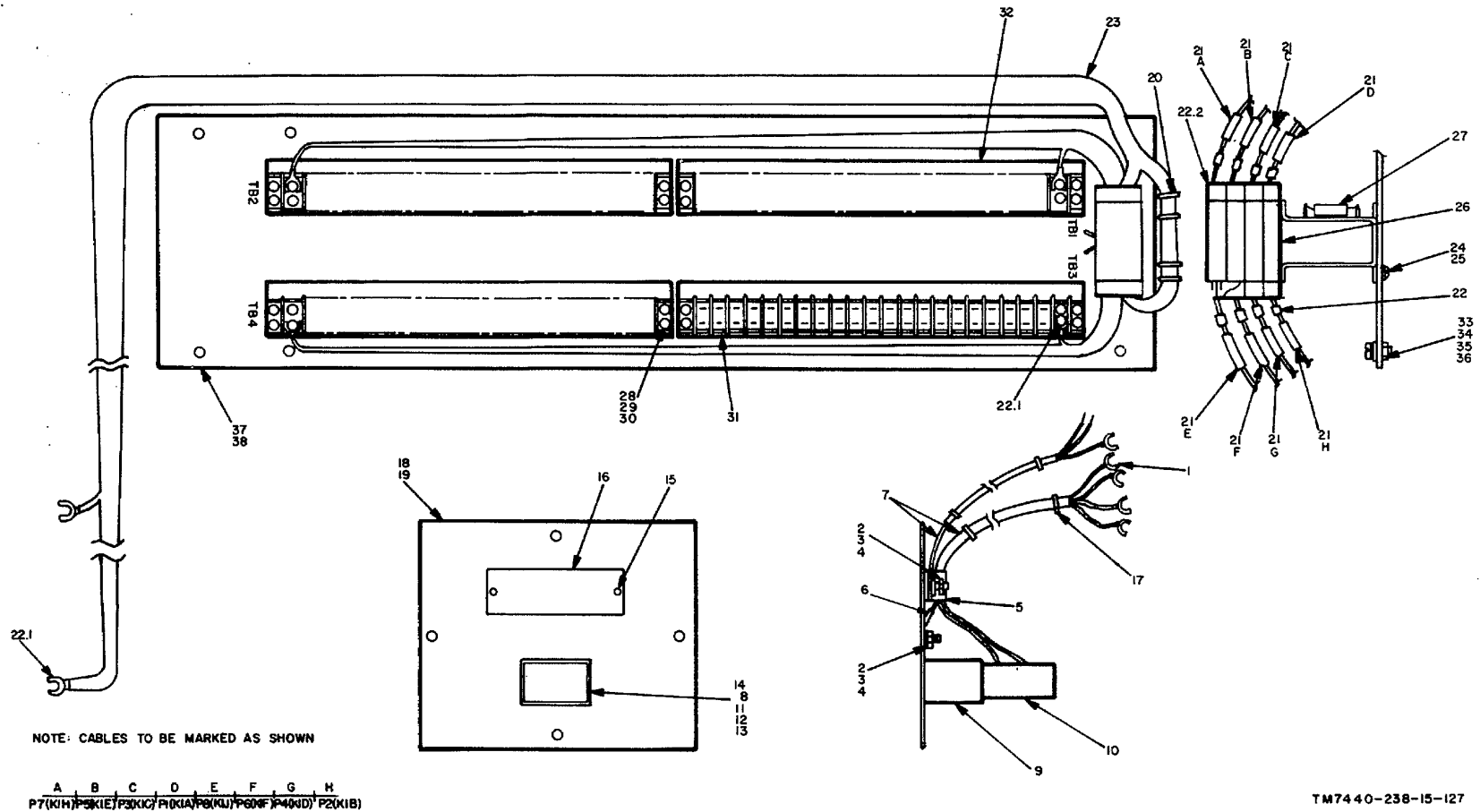


NOTES:  
 1. ITEM 16 TO BE STAMPED SM-E-546844 80063. TM7440-238-15-126  
 2. ITEM 17 TO BE STAMPED SM-E-546845 80063.

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1 Cable assembly</li> <li>2 Cable assembly</li> <li>3 Terminal lug</li> <li>4 Ferrule</li> <li>5 Cable identification strap</li> <li>6 Cable identification strap</li> <li>7 Nut, hex, No. 10-32</li> <li>8 Washer, lock, No. 10</li> <li>9 Washer, flat, No. 10</li> </ul> | <ul style="list-style-type: none"> <li>10 Screw, pan head, No. 10-32, 5/8 inch long</li> <li>11 Cable clamp</li> <li>12 Nut, hex, No. 6-32</li> <li>13 Washer, lock, No. 6</li> <li>14 Screw, pan head, No. 6-32, 5/8 inch long</li> <li>15 Terminal block</li> <li>16 Marker strip</li> <li>17 Mounting bracket</li> <li>18 Terminal block assembly</li> </ul> |
|--|---|

Figure 4 23. DSM Conversion Kit SM-A 634835, component location diagram.

Change 3 4-59



- |                        |                             |  |   |
|------------------------|-----------------------------|--|---|
| 1 Terminal lug         | 11 Colored bulb filter      | 21 Cable identification plate              | 29 Nut, hex., No. 6-32                      |
| 2 Nut, hex., No. 8-32  | 12 Display screen           | 22 Ferrule                                 | 30 Washer, lock, No. 6                      |
| 3 Washer, lock, No. 8  | 13 Front lens               | 22.1 Terminal lug                          | 31 Terminal block TB1 - TB4                 |
| 4 Washer, flat, No. 8  | 14 Lamp, No. 382            | 22.2 Connector plug, electrical P1-P8      | 32 Marker strip                             |
| 5 Cable clamp          | 15 Drive screw              | 23 Wiring harness                          | 33 Screw, panhead, No. 10-32, 7/16 in. long |
| 6 Terminal lug         | 16 Identification plate     | 24 Screw, panhead, No. 6-32, 5/16 in. long | 34 Nut, hex., No. 10-32                     |
| 7 Wiring harness       | 17 Cable strap              | 25 Washer, lock, No. 6                     | 35 Washer, lock, No. 10                     |
| 8 Pushbutton switch S1 | 18 Panel                    | 26 Relay K1                                | 36 Washer, flat, No. 10                     |
| 9 Switch-light unit    | 19 DSM front panel assembly | 27 Rectifier                               | 37 Relay plate                              |
| 10 Switch assembly     | 20 Cable strap              | 28 Screw, panhead, No. 6-32, 5/8 in. long  | 38 Relay assembly                           |

Figure 4-24. Device Switching Module SA-1616/G, component location diagram.

CHAPTER 5

FINAL TEST PROCEDURES

5-1. Applicability of Final Test Procedures

a. *General.* The tests outlined in this chapter are designed to measure the performance capability of a repaired DST set. A set that meets the minimum standards stated in the tests will have performance capabilities equivalent to that of new equipment.

b. *Test Implementation.* Equipment tests are divided into two main categories below. Each individual set must have passed its own performance standard before these tests are run.

(1) *Paragraph 5-5.* Low speed terminal equipment consisting of CCU, CR, PTR, LSCLP, LSPTP, PP, and CK.

(2) *Paragraph 5-6.* High speed terminal equipment configuration consisting of CCU, CR, PTR, HSCLP, HSPTP, and PP.

5-2. Applicable References

a. *Repair Standards.* Applicable procedures of the depots performing this test and its general standards for repaired electronic equipment form a part of the requirements for testing this equipment.

b. *Technical Publications.* Refer to appendix A for technical publications applicable to this equipment.

c. *Modification Work Orders.* Perform the work specified by modification work orders pertaining to this equipment before making the test specified. DA Pam 310-7 lists all available MWO's.

5-3. Test Facilities Required

The equipments listed below, or suitable equivalents, is required for performance of the test procedures given in this chapter.

a. Test Equipment

Equipment	NSN	Qty
Multimeter AN/USM-210	6625-004019-0816	1
Oscilloscope, Hewlett-Packard 140A	6625-00-957-0509	1
Dual Channel Amplifier Plug-In, Hewlett-Packard 1405B	6625-00-930-8118	1
Time Base Plug-In, Hewlett-Packard 1421A	6625-00-930-8119	1
Oscilloscope Cart, Hewlett-Packard 1115A	6625-00-078-5217	1

Equipment	NSN	Qty
Voltage Divider Probe, Hewlett-Packard CO-2-10003A	6625-00-078-5219	1
Voltage Divider Probe, Hewlett-Packard CO-2-10003B	6625-00-917-6279	1
Stroboscope, Electronic Brazing Co. 510 AL	6625-00-223-5150	1
Vacuum Gage, Gast Manufacturing Co. AE205	6625-00-832-8766	1

b. Additional Equipment.

Equipment	Quantity
P.C. Boards Extender (General Dynamics)	1
Card Extender (Ferroxcube)	1
Magnetic Base Indicator Probe	1
Spring Tester	1
Modem, Low Speed Wire Line MD-674(P)/G	1
Synchronizer, Electrical (CAU)SN-394(V)/G	1
Cryptographic Equipment	1

5-4. General Test Conditions and Requirements.

Before the tests (para 5-5 and 5-6) are made, the equipment listed in a below shall meet the mechanical requirements specified in b below. The general test conditions of c below shall be established and the terminal patching arrangements of d below shall be accomplished. The modem shall be patched in a back/back configuration and operated at 1200 baud. The CCU-TEST MODE SELECT switch shall be placed in ON LINE or OFF position.

a. *Equipment to be Tested.* Equipment items to be tested by this test procedure are as follows:

- (1) Common Control Unit (CCU), C-8120(P) /G.
- (2) High Speed Card Punch (HSCP), RO-312/G.
- (3) Low Speed Card Punch (LSCLP), RO-313/G.
- (4) Card Reader (CR), RP-152/G.
- (5) High Speed Paper Tape Punch (HSPTP), RO-314/G.
- (6) Low Speed Paper Tape Punch (LSPTP), RO-315/G.
- (7) Paper Tape Reader (PTR), RP-154(P)/G.
- (8) Page Printer (PP), RP-157/G.

- (9) Control Keyboard (CK), C-7185/G.
- (10) Device Switching Module (DSM), SA-1616/G.

b. *Mechanical Requirements.* The AUTODIN DSTE should be adjusted to meet the requirements of each individual equipment item as specified in chapter 2 of the corresponding technical manual.

c. *Test Conditions.*

(1) Unless otherwise specified, all tests will be performed under the following conditions:

- Temperature . . . . . Ambient (20° C to 30° C)  
(68° F to 86° F)
- Altitude..... Normal ground
- Humidity ..... Room ambient between  
20% and 50%
- Power ..... 120 +12.0, - 24.0 Vac, at 60  
±3.0 Hertz, single phase.

(2) Set up the AUTODIN DSTE as shown in figure 5-1 and connect the equipment as shown in figure 5-2. Refer to chapter 2 of TM 11-7440-239-15/NAVSHIPS 0967-324-0110/TO 31W4-4-1-111 for general guidance. Assure that each device is set up for the proper line frequency (50 or 60 Hertz). If not, refer

to paragraph 2-7 of TM 11-7440-239-15/NAVSHIPS 0967-324-0112/TO 31W4-4-1-111 for changeover instructions. Instructions for installation of the DSM sets and the DSM conversion kit SM-A-634835 are provided in paragraphs 2-8.1 and 2-9 of TM 11-7440-239-15/NAVSHIPS 0967-324-0112/TO 31W4-4-1-111. Instructions for installation of modem and CAU equipment are provided in paragraphs 2-19 through 2-24 of TM 11-7440-239-15/NAVSHIPS 0967-324-0112/TO 31W4-4-1-111.

d. *Terminal Patching Arrangements.* Patching arrangements for the configurations required during the conduction of this test are presented in (1) through (4) below. The instructions in (3) apply to the low speed terminal configuration only. Similarly, the instructions in (4) apply to the high speed terminal configuration only. However, (1) and (2) apply to both configurations. Additional information, if needed, is provided in paragraph 2-10 of TM 11-7440-239-15/NAVSHIPS 0967-324-0112/TO 31W4-4-1-111.

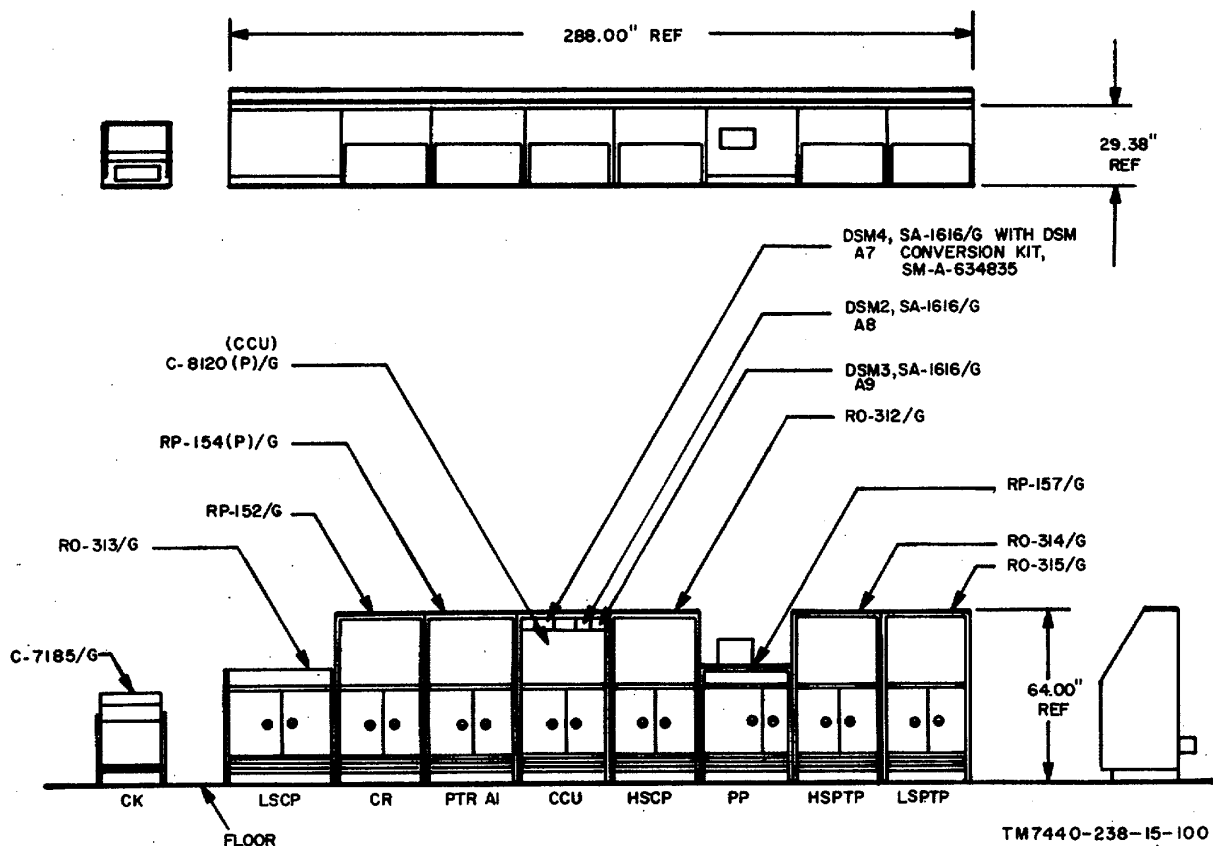


Figure 5-1. System test setup for DSTE.



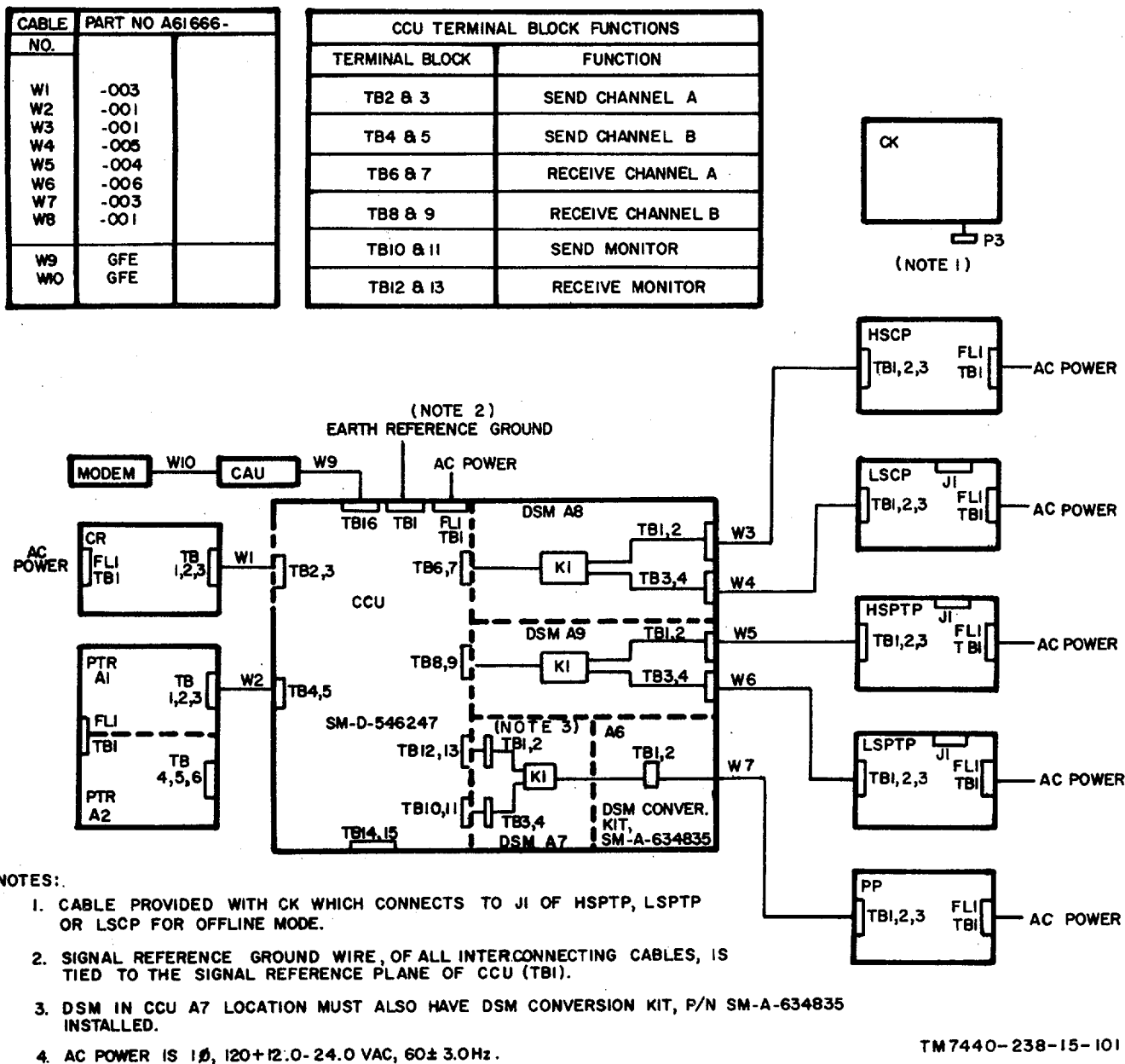


Figure 5-2. System test setup cabling for DSTE.

(1) Verify that LSPTP motor stop assembly printed circuit card A5A1, P/N 12-890096-2 is strapped from terminal B to C. If it is strapped from A to C, correct strapping since paper tape will only advance one character on automatic local test cycle each time the drive motor starts. The B to C patch provides for a 5-character advance.

(2) Verify that HSPTP motor stop assembly printed circuit card A6A1, P/N 12-890096-1 is strapped from terminal B to C. If it is strapped from A to C, correct strapping since paper tape will only advance one character on automatic local test cycle each time the

drive motor starts. The B to C patch provides for a 5-character advance.

(3) For the low speed terminal configuration tests performed in paragraph 5-5, strap the terminals on printed circuit card A1A61 of CCU as explained below and as shown in figure 5-3.

Leave all other terminals blank.

(a) INPUT SELECT PATCH BOARD connections.

Connect terminal	To terminal
A1	A2
B1	B2

Connect terminal To terminal

A SEL B1 or B2  
B SEL A1 or A2

(c) RECEIVE SELECT PATCH BOARD  
to RECEIVE DEVICE PATCH BOARD CONNECTIONS.

Connect RECEIVE SELECT PATCH BOARD terminal To RECEIVE DEVICE PATCH BOARD terminal

(b) I/P DEV to TRANSMIT SELECT PATCH BOARD connections.

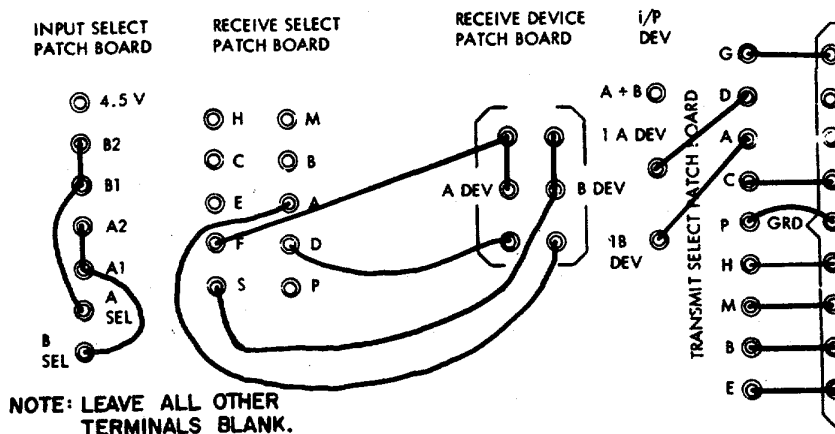
Connect TRANSMIT SELECT PATCH BOARD terminals To adjacent GRD terminals

G, C, P, H, M, B, E  
1A DEV  
1B DEV  
(leave A + B terminal blank.)

GRD  
D  
A

----- A DEV top to A DEV middle  
----- B DEV top to B DEV middle  
F A DEV top or middle  
S B DEV top or middle  
D A DEV bottom (toward  
connector) B DEV bottom  
A

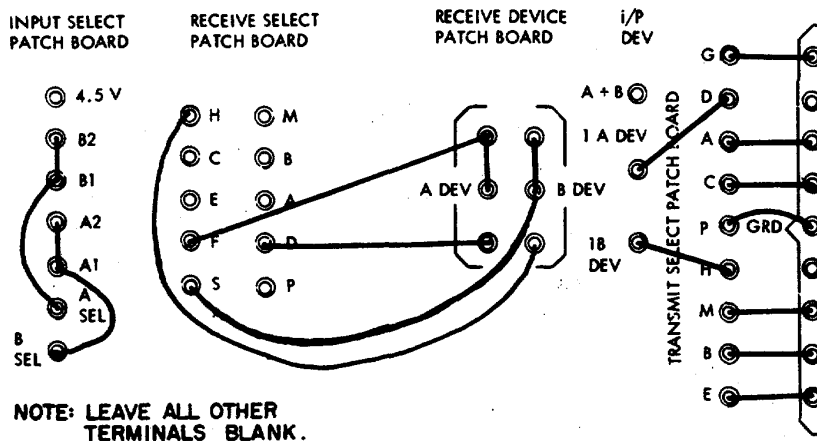
(Leave C, E, M, B, H and P terminals blank.)



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Figure 5-3. Patchboard portion of printed circuit card A61 of CCU (wired for low speed terminal configuration).

(4) For the high speed terminal configuration tests performed in paragraph 5-6, strap the terminals as explained below and as shown in figure 5-4. Leave all other terminals blank.



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Figure 5-4. Patchboard portion of printed circuit card A61 of CCU (wired for high speed terminal configuration).

(a) INPUT SELECT PATCH BOARD connections.

Connect terminal	To terminal
A	A2
B	B2
A SEL	B1 or B2
B SEL	A1 or A2
(Leave 4.5V terminal blank.)	

(b) I/P DEV to TRANSMIT SELECT PATCH BOARD connections.

Connect TRANSMITSELECT PATCH BOARD terminals	To adjacent GRD terminals
G,A,C,P,M,B,E	GRD
1A DEV	D
1B DEV	H

(Leave A +B terminal blank.)

(c) RECEIVE SELECT PATCH BOARD to RECEIVE DEVICE PATCH BOARD connections.

Connect RECEIVE SELECT PATCH BOARD terminal	To RECEIVE DEVICE PATCH BOARD terminal
----	A DEV top to A DEV middle
----	B DEV top to B DEV middle
F	A DEV top or middle
S	B DEV top or middle
D	A DEV bottom (toward connector)
H	B DEV bottom

Leave C, E, M, B, A and P blank.)

e. *Test Messages.* All test messages shall be prepared in accordance with JANAP-128 (cards and tape) to the extent necessary to perform the required tests. All test messages shall conform correct day-time groups and correct station serial numbering for the test. The textual content of the messages and the length of the text to be used in each test is defined in appendix D.

f. *Maintenance Requirements.*

(1) *Preventive maintenance.* Preventive maintenance shall be performed in accordance with the recommended preventive maintenance schedules outlined in technical manuals for the DSTE equipment. As a minimum preventive maintenance, 100-hour preventive maintenance checks and services shall be performed on all DSTE devices prior to start of system testing.

(2) *Corrective maintenance during test.* When a failure occurs, the equipment shall be repaired as set forth in the appropriate technical manual before proceeding with testing.

g. *Additional Equipment Required.* The additional equipment required for conduction of the DSTE tests includes Modems, MD-674(P)/G; Cryptographic Equipment; and Crypto Ancillary Units (CAU) SN-394(V)/G. In the event that the cryptos at each end of the line are unable to operate, the cryptos and CAU are to be strapped out and the tests started/continued. In the event of a loss of crypto sync or failure during a test, the testing shall be continued with crypto bypass if necessary.

5-5. Low Speed Terminal Configuration Test

a. *Verification of CCU Patching.* Verify the CCU patching as described in paragraph 5-4d(3).

b. *Devices to be Operated.* The following devices shall be turned on by depressing their AC POWER switch: CCU, LSPTP, LSCP, PTR-A1, CR and PP. Verify that AC POWER and DC POWER indicators for all of these devices are illuminated white. The HSPTP, HSCP and PTR-A2 are not used in this configuration testing and may be left in the power off condition.

(1) At the CCU operators panel, verify that all switches and indicators are extinguished with the exception of the RM/CANCEL switch. STATUS indicators also may or may not be illuminated.

(2) Verify that the STOP switch is illuminated red and the NOT ASSIGNED indicator is illuminated amber at the following devices: LSPTP, LSCP, PTR-A1, CR and PP. Ignore media alarms (i.e., HOPPER LOW) which may or may not be present.

c. *Positioning of DSM Controls.* The DSM controls shall be positioned as follows to obtain the low speed configuration:

(1) DSM2 ALTERNATE position shall be illuminated amber.

(2) DSM3 ALTERNATE position shall be illuminated amber.

(3) DSM4 ALTERNATE position shall be illuminated amber.

d. *Loading the LSCP.* Load the LSCP with approximately 800 unpunched cards. Load the LSPTP with a 1000 foot roll of 1-inch oil tape. Place 200 prepunched cards in the CR hopper. Place a 1-inch prepunched ITA #2 tape on the PTR-A1. The message content on the cards and tape is unimportant during the ASSIGN interlock test. Place (or verify placement) of the following controls:

(1) At the PTR-A1, the ASCII/ITA #2 switch shall be placed in the ITA #2 position.

(2) At the LSPTP, the PRINT INDEPENDENT switch shall be nonilluminated.

(3) At the LSCP, the PRINT switch shall be illuminated white.

(4) On LSPTP with motor stop modification, the Motor Stop Control CONTINUOUS/AUTOMATIC switch shall be set to the CONTINUOUS position.

(5) On LSCP with motor stop modification, the Motor Stop Control CONTINUOUS/AUTOMATIC switch shall be set to the CONTINUOUS position.

*e. Assigned Interlocks Tests.*

(1) *Assigned vs reset.*

(a) At the LSPTP, LSCP, and PTR-A1, perform the following tests one device at a time.

1 Depress the START switch. The START switch shall illuminate green.

2 On the maintenance panel, depress the MASTER RESET switch. The START switch shall extinguish and the STOP switch shall illuminate red. Observe P1 START and STOP switch respond the same as LSPTP.

(b) At the CCU, depress the following ASSIGNED switches: Send Device B, Receive Device A, Receive Device B. All these ASSIGNED switches shall illuminate white. Depress Send EOM STOP switch. Send EOM STOP switch will illuminate red. Receive Device A and B FAULT indicators illuminate red and CCU audible alarm activates.

(c) At the LSPTP, LSCP, and PTR-A1, the following test shall be done one device at a time.

1 Depress the START switch. The START switch shall illuminate green.

2 On the maintenance panel, depress the RESET switch. Observe the following: RESET switch has no effect; START switch remains illuminated green; CCU FAULT indicators extinguish when output device START switch is depressed; a blank card is processed by the LSCP.

(2) *Assigned vs local test.*

(a) On the LSPTP, LSCP, and PTR-A1, depress the STOP switches. The STOP switches shall illuminate red. The CCU Receive Device A and B FAULT indicators will illuminate red and audible alarm is activated.

(b) At the LSPTP, LSCP, and PTR-A1, depress the LOCAL TEST switch of each device in turn. The LOCAL TEST switches shall have no effect.

(c) At the CCU, depress the Send EOM STOP switch and the following ASSIGNED switches: Send Device B, Receive Device A, and Receive Device B. Observe the following:

1 ASSIGNED switches will extinguish.

2 Send EOM STOP switch will extinguish.

3 Receive Device A and B FAULT indicators will extinguish.

4 Audible alarm will deactivate.

(d) At the LSPTP, LSCP, and PTR-A1, perform the following tests one at a time.

1 Depress the LOCAL TEST switch. The LOCAL TEST switch illuminates amber. The device performs the LOCAL TEST function(s).

2 Depress the STOP switches. The STOP switch(es) illuminates red. The LOCAL TEST function(s) will terminate.

(3) *End of test tasks.* Remove all cards from the hopper and stacker of the CR and from the stacker of the LSCP. Remove all tape from the PTR-A1. Depress the FORM FEED switch on the PP and the FEED OUT switch on the LSPTP.

*f. Initial Test Conditions.* The following conditions are defined as initial test conditions for this configuration.

(1) At the CCU, all ASSIGNED switches shall be nonilluminated (i.e., all devices are NOT ASSIGNED).

(2) Depress the STOP switches at the LSCP, the LSPTP, the PP, the CR, and the PTR-A1. The STOP switches shall be illuminated red.

(3) Verify that character synchronization has been established. The SW SYN indicator on the CCU shall not be illuminated.

(4) Establish ACK synchronization by depressing the Send CANCEL switch on the CCU. The RM/CANCEL switch will extinguish, indicating that ACK synchronization has been established.

(5) Load the LSCP with approximately 800 unpunched cards.

(6) The paper supply on the LSPTP shall not be replenished until it has diminished to approximately 200 feet. If required, load the LSPTP with a 1000 foot roll of 1-inch oil tape.

(7) Load the PP with a box of 11-inch single ply paper. The PP should not be reloaded till the amount of paper has diminished to approximately 50 pages.

(8) Verify the placement of the following controls:

(a) The CCU TEST MODE SELECT switch on the maintenance panel shall be in either the ON LINE position or the OFF position. The ON LINE position is used to enable the indicators on the CCU maintenance panel.

(b) At the LSPTP, verify the following control settings:

1 On the maintenance panel, place (or verify placement) of the ASCII/ITA #2 control in the ITA #2 position. Place the TAPE FEED control in the 18-inch position.

2 On the operator panel, place (or verify placement) of the PRINT INDEPENDENT switch to the non-illuminated position. At the NARROW-WIDE switch, WIDE shall be illuminated white.

(c) On the PTR-A1, set the ASCII/ITA #2 switch to the ITA #2 position and the HIGH SPEED/LOW SPEED switch to illuminate the LOW SPEED section.

(d) At the PP maintenance panel, place (or verify placement) of:

1 The MARGIN SELECTION to the OUT position.

2 The LINE FEED SELECTION control to position 1.

*g. Error Free Message Test with Receive Channel B Not Assigned.*

(1) Verify the terminal is in the initial test condition for the low speed terminal configuration as detailed in f above.

(2) On the LSPTP, depress the START switch. The START switch shall illuminate green.

(3) On the PP, depress the START switch. The START switch shall illuminate green.

(4) On the CCU, depress the Send Monitor B ASSIGNED switch. The Send Monitor B ASSIGNED switch shall illuminate white. The Send Monitor READY indicator shall also illuminate green.

(5) On the CCU, depress the Send Device B ASSIGNED switch. The Send Device B ASSIGNED switch will illuminate white. The Send Device B SELECT and READY indicators will not illuminate.

(6) On the PTR-A1, load message 0101 (refer to appendix D for test message) and depress the START switch on the PTR-A1. Observe the following:

(a) PTR-A1 START switch illuminates green, then white.

(b) CCU Send Device B SELECT and Send Monitor SELECT indicators illuminate white during message transmission.

(c) CCU Send Monitor READY indicator extinguishes.

(7) The message will thus be transmitted through the modems and returned to the DSTE. The Receive Device B ASSIGNED switch and SW WBT indicator shall illuminate red and the CCU audible alarm shall activate.

**NOTE**

**During processing of the blocks/message in the following steps, the status indicator SW WBT will illuminate red and extinguish. This is a normal condition especially prevalent with a low speed terminal operating at 1200 baud.**

(8) Depress the Receive Device B ASSIGNED switch. Observe the following:

(a) CCU Receive Device B ASSIGNED illuminates white.

(b) CCU audible alarm will deactivate.

(c) CCU Receive Device B SELECT indicator illuminates white.

(d) The message is processed by the LSPTP.

(e) LSPTP START switch illuminates white during message processing.

(9) At the end of the message observe the following:

(a) CCU Receive Device A and Send Monitor SELECT indicators extinguish and the associated READY indicators illuminate green.

(b) The START switches on the LSPTP and PP shall return to a green illumination.

(c) After the PTR-A1 has processed the message, it will go into a STOP indication and the START switch illumination will extinguish.

(d) The CCU Send Device B SELECT and READY indicators are extinguished.

(10) Check the messages on the receive and monitor devices for accuracy.

**NOTE**

**The above indications of the device START and STOP switches and the CCU channel SELECT and READY indicators are the normal operational sequence of events expected. The SELECT and READY indicators are mutually exclusive; if the SELECT becomes illuminated, then the READY indicator, if illuminated, shall extinguish and vice versa. The illumination of the device START switches shall be white during message processing and green when the device is ready but not in message. At the end of all messages on an input device, the START switch illumination shall extinguish and the STOP switch shall be illuminated.**

*h. Error Free Message Transmission Test with Receive Device A Not Assigned.*

(1) Restore the terminal to the initial test condition for the low speed terminal configuration as detailed in f above.

(2) On the LSPTP, depress the START switch. The START switch shall illuminate green.

(3) On the PP, depress the START switch. The START switch shall illuminate green.

(4) On the CCU, depress Send Monitor A ASSIGNED switch. The Send Monitor A ASSIGNED switch will illuminate white. The Send Monitor READY indicator will illuminate green.

(5) On the CCU, depress Send Device A ASSIGNED. The Send Device A ASSIGNED switch will illuminate white. The Send Device A SELECT and READY indicators will not illuminate.

(6) On the CR, load message Ø1Ø2 (app D) and depress the START switch. Verify the following:

(a) The CR START switch illuminates white.

(b) The CCU Send Device A SELECT and Send Monitor SELECT indicators illuminate white during message transmission.

(c) The message shall be transmitted through the modems and returned to the DSTE. The CCU Receive Device A ASSIGNED switch and SW WBT indicator illuminate red and the CCU audible alarm activates.

(7) Depress Receive Device A ASSIGNED switch. Verify the following:

(a) The CCU Receive Device A ASSIGNED switch illuminates white and the audible alarm terminates. The CCU Receive Device A SELECT indicator illuminates white.

(b) The message is processed by the LSCP. The START switch at the LSCP illuminates white during message reception and returns to green illumination at the end of message.

(c) After the CR has processed the message, it will go into a STOP indication. At the CCU, the Send Device A SELECT and READY indicators will be nonilluminated.

(8) Check the receive messages for accuracy.

*i. Error Free Message Transmission Test with Deassigning Send Channel and Manual Cancel.*

(1) Restore the terminal to the initial test condition for low speed terminal configuration as detailed in f above.

(2) On the LSCP, depress the START switch. The START switch will illuminate green.

(3) On the PP, depress the START switch. The START switch will illuminate green.

(4) On the CCU, depress the Send Monitor A ASSIGNED switch. The Send Monitor A ASSIGNED switch will illuminate white and the Send Monitor READY indicator will illuminate green.

(5) On the CCU, depress the Receive Device 5-8 Change 3 A ASSIGNED switch. The Receive Device A ASSIGNED switch will illuminate white and the

Receive Device A READY indicator will illuminate green.

(6) On the CCU, depress the Send Device A ASSIGNED switch. The Send Device A ASSIGNED control will illuminate white. The Send Device A SELECT and READY indicators Will not illuminate.

(7) On the CR, load message Ø1Ø3 (app D). Depress the START switch on the CR. Observe the following:

(a) CR START switch illuminates white.

(b) CCU Send Device A SELECT indicator illuminates white.

(c) CCU Receive Device A and Send Monitor SELECT indicators illuminate white.

(d) LSCP and PP START indicators change illumination from green to white.

(e) The LSCP and PP start processing the message.

(8) During message transmission, depress the CCU Send Device A ASSIGNED switch.

(a) Observe the CCU Send Device A ASSIGNED indicator extinguishes.

(b) An automatic CANCEL sequence will be transmitted. Observe the CCU Send Device CANCEL switch momentarily illuminates amber and the audible alarm is activated.

(c) Upon reception of the ACK 2 sequence, observe the following:

1 CCU Send Device CANCEL indicator is extinguished.

2 CCU audible alarm is silenced.

3 CCU Send Device A CANCEL indicator illuminates red.

4 CCU Receive Device A and Send Monitor SELECT indicators are extinguished.

5 CCU Receive Device A and Send Monitor READY indicators illuminate green.

(d) At the CR, observe the following:

1 CANCEL indicator illuminates red.

2 STOP switch illuminates red.

3 NOT ASSIGNED indicator illuminates amber.

(e) On the LSCP and PP, observe the following:

1 START switch indicator changes from white to green illumination.

2 LSCP processes and offset stacks a cancel card with row 8 column 81 punched.

3 PP prints a line of circumflexes after the last line printed and form feeds the paper.

(9) Reload test message 0103 into the CR. Depress the CR START switch. Observe the following:

(a) CR START switch illuminates green.

(b) CR CANCEL indicator extinguishes.

(c) CCU Send Device A CANCEL indicator extinguishes.

(10) At the CCU, depress the Send Device A ASSIGNED switch. Observe the following:

(a) CCU Send Device A ASSIGNED and Send Monitor A ASSIGNED switches illuminate white.

(b) CCU Send Device A SELECT and Send Monitor A SELECT indicators illuminate white.

(c) CCU Receive Device A SELECT indicator illuminates white.

(d) LSCP and PP start processing the message.

(11) While the message on the CR is being transmitted, depress the CCU Send Device CANCEL switch.

(a) A CANCEL sequence will be transmitted. Observe the CCU Send Device CANCEL switch momentarily illuminates amber and the audible alarm is activated.

(b) Upon reception of the ACK 2 sequence, observe and perform the following:

1. CCU Send Device CANCEL indicator is extinguished.

2. CCU audible alarm is still activated. Silence the alarm by depressing the AUDIBLE RESET switch at the CCU.

3. CCU Send Device A CANCEL and A FAULT indicators illuminate red.

4. CCU Receive Device A SELECT indicator extinguishes.

5. CR CANCEL indicator illuminates red.

6. LSCP punches a cancel card with row 8 column 81 punched.

7. PP prints a line of circumflexes and form feeds paper.

(12) At the CR, reload the test message Ø1Ø3. Depress the START switch. The CR START switch shall illuminate white. The CCU Send Device A CANCEL and FAULT indicators shall extinguish.

(13) The CR message will be transmitted and returned. The LSCP and the PP shall process the message.

(14) Verify accuracy of the received and monitored message.

*j. Device Alternation Test and Device Stop Test.*

(1) Restore the terminal to initial test condition for the low speed terminal configuration as described in f above.

(2) On the LSPTP, depress the START switch. The START switch will illuminate green.

(3) On the PP, depress the START switch. The START switch will illuminate green.

(4) On the LSCP, depress the START switch. The START switch will illuminate green.

(5) On the CCU, depress the Receive Device A ASSIGNED and B ASSIGNED switches. Both ASSIGNED switches will illuminate white. The Receive Device A and B READY indicators will illuminate green.

(6) On the CCU, depress the Send Device A ASSIGNED and Send Monitor B ASSIGNED switches. The Send Monitor A and B ASSIGNED switches will illuminate white. The Send Monitor READY indicator will illuminate green.

(7) On the PTR-A1, load a test tape with messages Ø1Ø4, Ø1Ø6, Ø1Ø8 and depress the START switch (refer to appendix D for test messages). The START switch will illuminate green.

(8) On the CR, load the test message Ø1Ø5, Ø1Ø7, and Ø1Ø9, and depress the START switch. The START switch will illuminate green.

(9) On the CCU, depress the Send Device B ASSIGNED and then the Send Device A ASSIGNED switches. The Send Device A and B ASSIGNED switches will illuminate white.

(10) The first message on the PTR-A1 (Channel B) is transmitted, Send Device B SELECT and Send Monitor B SELECT will illuminate white and Send Device A READY will illuminate green. Receive Device B SELECT will illuminate white and the LSPTP START switch will illuminate white.

(11) After the first message on the PTR has been transmitted, the CR will be selected by the CCU. The CCU Send Device B READY indicator will illuminate green and the Send Device A and Send Monitor A SELECT indicators will illuminate white. CCU Receive Device B READY indicator shall illuminate green and the Receive Device A SELECT indicator shall illuminate white. The LSCP START switch shall illuminate white. After the message on the CR has been transmitted, the PTR will be selected. During transmission of the second message from the PTR, depress the PTR STOP switch. The PTR STOP switch shall illuminate red. Depress the START switch at the PTR. The PTR START switch shall illuminate white and the PTR will continue transmission of the second message. At the end of the second message from the PTR, the CCU will deselect the PTR and select the CR. The CCU Send Device A SELECT indicator shall illuminate white. During transmission of the second message from the CR, depress the CR

STOP switch. The CR STOP switch shall illuminate red. At the CR, depress the START switch. The CR START switch shall illuminate white and the CR shall continue transmission of the second message. At the end of the second message from the CR, the CCU will select the PTR. When the third message is being received at the LSPTP and the PP, depress the STOP switch at the LSPTP. The LSPTP STOP switch will illuminate red. At the CCU, the Receive Device B FAULT indicator shall illuminate red, and the audible alarm shall be activated. At the LSPTP, depress the START switch. The LSPTP START switch shall illuminate white and the LSPTP shall continue to process the message. The CCU Receive Device B FAULT indicator shall extinguish and the audible alarm shall deactivate. At the end of the message, the CCU will deselect the LSPTP. The CCU Receive Device B SELECT indicator shall extinguish.

(12) This part of the test has demonstrated the capability of the DSTE to alternate between two input devices when both are ready and assigned.

(13) By inspecting the second of each type message when it is received, the ability of the input devices to stop and subsequently start the message transmission without loss or duplication of data is demonstrated.

(14) At the end of the third message from the PTR, the CCU will select the CR for the third and last message. When the third card message is received, the CCU will select the LSCP. The CCU Receive Device A SELECT indicator shall illuminate white. Depress the STOP switches on the LSCP. The LSCP STOP switch shall illuminate red and the LSCP START switch shall be extinguished. At the CCU, the Receive Device A FAULT indicator shall illuminate red and the audible alarm shall be activated. Depress the START switch on the LSCP. The LSCP STOP switch shall be extinguished and the LSCP START switch shall illuminate white. The CCU Receive Device A FAULT indicator shall extinguish and the audible alarm is deactivated. At the end of the message, the CCU Receive Device A SELECT indicator shall extinguish. The CCU Receive Device A READY indicator shall illuminate green. The LSCP and PP START switches illumination shall change from white to green. By inspecting the third message received, the ability of the output and monitor devices to stop and subsequently start the message reception without loss or duplication of data is demonstrated.

(15) Check all messages received for accuracy of content.

*k. Input/Output STOP EOB/EOM Test-CCU Channel B.*

(1) Restore the terminal to initial test condition for the low speed terminal configuration as required.

(2) At the LSPTP, depress the START switch. The START switch will illuminate green.

(3) Load the PTR-A1 with two messages Ø11Ø and Ø111 (app D). Depress the START switch. The START switch will illuminate green.

(4) At the CCU, depress the Receive Device B ASSIGNED switch. The Receive Device B ASSIGNED switch will illuminate white. The Receive Device B READY indicator will illuminate green.

(5) At the CCU, depress the Send Device B ASSIGNED switch. The Send Device B ASSIGNED switch will illuminate white. The Send Device B SELECT indicator will illuminate white. The Receive Device B SELECT will illuminate white and the LSPTP START switch will illuminate white.

(6) During transmission of the first message, depress the CCU Send Device EOB STOP switch. The Send Device EOB STOP switch will illuminate red.

(7) The PTR will stop processing tape at the end of block. The PTR START switch will remain illuminated white. The Send Device B SELECT indicator at the CCU will remain illuminated white.

(8) At the CCU, depress the Send Device EOB STOP switch. The Send Device EOB STOP switch light will extinguish and the PTR will continue processing tape.

(9) At the CCU, depress the Send Device EOM STOP switch during the transmission of first message. The Send Device EOM STOP switch will illuminate white.

(10) The PTR will stop at the end of the message. The CCU Send Device B SELECT indicator will remain illuminated white. The CCU Send Device EOM STOP switch will illuminate red.

(11) At the CCU, depress the Send Device EOM STOP switch. The Send Device EOM STOP switch will extinguish and the second message will be transmitted.

(12) During the second message reception, depress the CCU Receive Device EOB STOP switch. The CCU Receive Device EOB STOP switch will illuminate red.

(13) The LSPTP will stop at the end of the block in process. The LSPTP START switch will remain illuminated white. The CCU Receive



Device B SELECT indicator remains illuminated white.

(14) Depress the CCU Receive Device EOB STOP switch. The CCU Receive Device EOB STOP switch will extinguish and the LSPTP will resume punching the received message.

(15) During the second message reception, depress the CCU Receive Device EOM STOP switch. The CCU Receive Device EOM STOP switch will illuminate white.

(16) The LSPTP will stop at the end of the message. The CCU Receive Device EOM STOP switch will illuminate red. The CCU Receive Device B SELECT indicator will remain illuminated white.

(17) At the CCU, depress the Receive Device EOM STOP switch. The CCU Receive Device EOM STOP switch will extinguish. The second message will be acknowledged, and the CCU Send Device B and Receive Device B SELECT indicators shall extinguish. Verify the accuracy of the messages.

*l. Input Alarm Stop Test-Channel B.*

(1) Restore the terminal to the initial test conditions for the low speed terminal configuration as described in f above.

(2) Load the PTR-A1 with test message 0112 (app D.) Note that the EOM sequence (2CR8LF4N) shall be missing from the tape.

(3) On the PTR, depress the START switch. The PTR START switch shall illuminate green.

(4) On the LSPTP, depress the START switch. The LSPTP START switch will illuminate green.

(5) On the CCU, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch will illuminate white. The CCU Receive Device B READY indicator will illuminate green.

(6) On the CCU, depress the Send Device B ASSIGNED switch. The CCU Send Device B ASSIGNED switch shall illuminate white. The CCU Send Device B SELECT indicator shall illuminate white.

(7) At the PTR, the START switch will illuminate white. The message will be transmitted through the modems to the CCU Receive Device B. The CCU Receive Device B SELECT indicator will illuminate white and the LSPTP will process the message. When the PTR gets to the end of the tape, the PTR STOP switch and the PTR OUT OF TAPE indicators will illuminate red.

(8) The CCU will transmit the CANCEL sequence. The CCU Send Device CANCEL switch shall illuminate amber. The CCU Send Device B CANCEL and FAULT indicators shall illuminate red. The audible

alarm shall be activated. The CANCEL indicator at the PTR shall illuminate red.

(9) Upon reception of ACK 2 in response to the CANCEL sequence, the CCU Send Device CANCEL switch and the CCU Send Device B SELECT indicator will extinguish. The LSPTP will punch the cancel indication (3 notches) and feed out 18-inches of tape.

(10) Reset the audible alarm by depressing AUDIBLE RESET at the CCU.

(11) Load a test message Ø113 on the PTR (app D). Depress the START switch. The PTR START switch shall illuminate white. The CANCEL and OUT OF TAPE indicators on the PTR and the Send Device B CANCEL and FAULT indicators at the CCU shall extinguish.

(12) The message will be transmitted and processed by the LSPTP.

(13) Check for accuracy of the received message.

*m. Input Alarm Stop Test-Channel A and Card Reader.*

(1) Restore the terminal to the initial test conditions for the low speed terminal configuration as described in f above.

(2) Load the CR with test message 0114 (app D). Note that the third card shall have a punch in rows 3 and 4 of the 30th column. The 3rd and 4th punch is an invalid hollerith combination.

(3) On the CR, depress the START switch. The CR START switch shall illuminate green.

(4) On the LSCP depress the START switch. The LSCP START switch will illuminate green.

(5) On the CCU, depress the Receive Device A ASSIGNED switch. The CCU Receive Device A ASSIGNED switch shall illuminate white. The CCU Receive Device A READY indicator shall illuminate green.

(6) On the CCU, depress the Send Device A ASSIGNED switch. The CCU Send Device A ASSIGNED switch shall illuminate white. The CCU Send Device A SELECT indicator shall illuminate white.

(7) At the CR, the START switch will illuminate white. The message will be transmitted through the modems to the LSCP. When the CR gets to the invalid character card, the CR STOP switch and the CR INVALID CHARACTER indicator will illuminate red.

(8) The CCU will transmit the CANCEL sequence. The CCU Send Device CANCEL switch shall momentarily illuminate amber. The CCU Send Device A CANCEL and FAULT indicator shall illuminate red. The audible alarm shall be activated. The CANCEL indicator at the CR shall

illuminate red.

(9) Upon reception of ACK 2 in response to the cancel sequence, the CCU Send Device CANCEL switch and the CCU Send Device A SELECT indicator shall be extinguished.

(10) Reset the audible alarm by depressing AUDIBLE RESET switch at the CCU. Remove the EOM card from the CR. Verify the cancel card is produced on the LSCP. The CCU Receive Device A READY and LSCP START indications shall be illuminated green.

(11) Load a test message Ø115 (app D), on the CR. Depress the CR START switch. The CR START switch shall illuminate white. The CR CANCEL and CR INVALID CHARACTER indicators will extinguish.

(12) The message will be transmitted and be processed by the LSCP.

(13) Check for accuracy of the received message.

*n. Output Alarm/Alarm Stop Test-Channel B and LSPTP.*

(1) Restore the terminal to the initial test conditions for the low speed terminal configuration as described in *f* above, except that the LSPTP shall be loaded with approximately 50 feet of tape.

(2) On the LSPTP, depress the START switch. The LSPTP START switch will illuminate green.

(3) On the CCU, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch will illuminate white. The CCU Receive Device B READY indicator will illuminate green.

(4) Load the PTR-A1 with test message 0116 which has been spliced to form a loop. Refer to Appendix D for sample of message.

(5) On the PTR, depress the START switch. The PTR START switch will illuminate green.

(6) On the CCU, depress the Send Device B ASSIGNED switch. The CCU Send Device B ASSIGNED switch will illuminate white. The CCU Send Device B SELECT indicator will illuminate white.

(7) The message at the PTR will be transmitted and punched at the LSPTP. Upon reception of the message, the CCU Receive Device B SELECT will illuminate white while at the LSPTP, the START switch will illuminate white.

(8) When the tape on the LSPTP has diminished to approximately a 30-foot supply, a sensor will activate the LOW TAPE indicator. The LSPTP LOW TAPE indicator will illuminate amber. At the CCU, the Receive Device B CAUTION indicator will illuminate

amber and the audible alarm will be activated. Message processing will continue.

(9) Reset the audible alarm by depressing AUDIBLE RESET switch at the LSPTP.

(10) When the next EOM is received at the LSPTP, the LSPTP will go into a STOP condition. The LSPTP TAPE OUT indicator will illuminate red. The LSPTP STOP switch will illuminate red and the CCU audible alarm will be activated. The CCU Receive Device B FAULT indicator will illuminate red.

(11) Restore the terminal to initial test conditions (*f* above) for the low speed terminal configuration. In addition, depress the RESET switch on the CCU and PTR, and then depress the CCU Send Device A and B ASSIGNED switches.

(12) Load the LSPTP with a new roll of tape. Depress the LSPTP START switch. The LSPTP START switch shall illuminate white. The CCU Receive Device B FAULT and CAUTION indicators shall extinguish.

(13) Load the PTR-A1 with test message 0117 (refer to appendix D for sample message). Depress the PTR START switch. The PTR START switch will illuminate white.

(14) The message on the PTR will be transmitted to the LSPTP. During message reception on the LSPTP, depress the LAMP TEST control on the LSPTP, the LAMP TEST control shall illuminate the LSPTP lamps and shall not affect the data being punched, or the operation of the DSTE.

(15) Verify the accuracy of the messages received.

*o. Output Alarm/Alarm Stop Test-Channel A and LSCP.*

(1) Restore the terminal to the initial test conditions for the low speed terminal configuration as described in *f* above, except that the LSCP shall be loaded with approximately 15 cards.

(2) On the LSCP, depress the START switch. The LSCP START switch will illuminate green. The LSCP HOPPER LOW indicator shall illuminate amber.

(3) On the CCU, depress the Receive Device A ASSIGNED switch. The CCU Receive Device A ASSIGNED switch will illuminate white. The CCU Receive Device A CAUTION indicator shall illuminate amber and the audible alarm shall activate. Reset the audible alarm.

(4) Load the CR with test message 0118 (refer to appendix D for sample message).

(5) On the CR, depress the START switch. The CR START switch will illuminate green.

(6) On the CCU, depress the Send Device A

ASSIGNED switch. The CCU Send Device A ASSIGNED switch will illuminate white. The CCU Send Device A SELECT indicator will illuminate white.

(7) The message at the CR will be transmitted through the modems and returned to be punched at the LSCP. Upon reception of message, the CCU Receive Device A SELECT will illuminate white and the LSCP START switch will illuminate white.

(8) When the LSCP runs out of cards, the LSCP will go into a STOP condition. The LSCP CARD ALARM indicator will illuminate red. The LSCP STOP switch will illuminate red. The audible alarm will be activated.

(9) The CCU Receive Device A FAULT indicator will illuminate red. Reset the audible alarm at the CCU.

(10) Load cards into the LSCP hopper. Depress the LSCP START switch. The LSCP START switch shall illuminate white. The LSCP will continue to process the message. During card processing, depress the LAMP TEST switch on the LSCP. The LAMP TEST switch shall illuminate the lamps on the LSCP and shall not affect the operation of the DSTE.

(11) Check for accuracy of the message received.

*p. Monitor Alarm/Alarm Stop Test.*

(1) Restore the terminal to initial test condition for the low speed test configuration as described in *f* above, except that the PP shall be loaded with 3 pages of paper. The low paper sensor shall be located at its lowest point (2 pages) by positioning the low paper sensor between the second and third page of the paper supply. On the maintenance panel, the MARGIN SELECTION switch shall be set to the IN position and the LINE FEED SELECTION control shall be set to 3.

(2) On the LSCP, depress the START switch. The LSCP START switch will illuminate green.

(3) On the PP, depress the START switch. The PP START switch will illuminate green.

(4) Load the CR with test message 0119 (refer to appendix D for sample message).

(5) On the CR, depress the START switch. The CR START switch will illuminate green.

(6) On the CCU, depress the Send Monitor A ASSIGNED and Receive Device A ASSIGNED switches. Both ASSIGNED switches will illuminate white. Depress the Send Device A ASSIGNED switch.

(7) The message on the CR will be transmitted and punched on the LSCP. The CCU Receive Device A SELECT will illuminate white during

message reception. The Send Monitor SELECT indicator shall illuminate white and the message will be printed on the PP.

(8) When the end of the paper on the PP has passed the "paper low" switch, a sensor will activate. The PP PAPER LOW indicator will illuminate amber. At the CCU, the audible alarm will activate and the Send Monitor CAUTION indicator will illuminate amber.

(9) Reset the audible alarm at the PP by depressing AUDIBLE RESET switch.

(10) Upon exhaustion of paper, the PP will stop. The CCU audible alarm will be activated and the CCU Send Monitor FAULT indicator will illuminate red. The STOP switch at the PP will illuminate red. The PP PAPER FAIL indicator will illuminate red and the PP PAPER LOW indicator shall extinguish.

(11) Reset the audible alarm at the CCU by depressing AUDIBLE RESET switch at the PP.

(12) Depress the CCU Send Monitor A ASSIGNED switch. The CCU Send Monitor ASSIGNED and FAULT indications shall extinguish. Message transmission will be continued.

(13) Check for accuracy of the message received.

(14) Load the PP with paper. Depress the PP START switch. The PP START switch will illuminate green. The PP PAPER FAIL indicator will extinguish.

(15) Position the PP MARGIN SELECTION switch to the OUT position and the PP LINE FEED SELECTION control to position 1.

*q. Print Independent (600 Baud) Test.*

(1) Restore the terminal to the initial test conditions for the low speed terminal as described in *f* above. In addition, position the PRINT INDEPENDENT switch on the LSPTP to illuminate the indicator. The STOP switch on the LOW SPEED PRINTER INTERPRETER (LSPI) shall illuminate red. Depress the LSPTP START switch. The LSPTP START switch will illuminate green.

(2) Load the PTR-A1 with message 0120 (refer to appendix D for test message). Depress the PTR START switch. The PTR START switch will illuminate green.

(3) At the CCU, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch will illuminate white. The CCU Receive Device B READY indicator will illuminate green.

(4) At the CCU, depress the Send Device B ASSIGNED switch. The CCU Send Device B

ASSIGNED switch will illuminate white. The CCU Send Device B SELECT switch will illuminate white. The CCU Receive Device B SELECT switch will illuminate white and the LSPTP START switch will illuminate white.

(5) During transmission from the PTR, depress the LAMP TEST switch on the PTR. The LAMP TEST switch shall not affect the operation of the DSTE.

(6) Upon completion of the message, the LSPTP START switch will illuminate green. Depress the LSPTP STOP switch and then hold the LSPTP FEED OUT switch depressed long enough to allow the punched characters to be fed through the LSPI.

(7) Depress the START switch on the LSPI. Depress STOP on the LSPI after the punched characters have fed through the printer.

(8) Verify the accuracy of the received message.

*r. Control Keyboard and Low Speed Paper Tape Punch Test.*

(1) Restore the terminal to initial test conditions for the low speed terminal configuration as described in f above.

(2) Connect the CK to the LSPTP.

(3) On the CCU, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch shall illuminate white, the CCU Receive Device B FAULT indicator shall illuminate red, and the CCU audible alarm shall be activated. On the LSPTP, the NOT ASSIGNED indicator shall be extinguished.

(4) On the CK, depress the POWER switch. The POWER switch shall have no effect.

(5) On the CCU, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch and CCU Receive Device B FAULT indicator shall extinguish. On the LSPTP, the NOT ASSIGNED indicator shall illuminate amber.

(6) On the CK, depress the POWER switch. The POWER switch shall illuminate white. The STOP indicator on the CK shall illuminate red. This demonstrates the LSPTP ASSIGNED vs CK interlock function.

(7) On the LSPTP, depress the START switch. The START switch shall illuminate white. The CK STOP indicator shall extinguish.

(8) Position the CK CODE LEVER switch to ASCII and the EOB WARNING control to 59.

(9) On the CK, type a test message such as: THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1,234,567,890 TIMES. The audible alarm

at the CK shall be activated and the EOB WARNING indicator shall illuminate amber when the 59th character key is depressed. Depress the EOM key. Verify the accuracy of the typed message and the EOM identification. The EOM identification is 2CR8LF4N and a minimum of 6-inches of tape feed.

(10) For checking keyboard locking due to tight tape test on the CK, depress any 5 unblocked keys. Verify that the LSPTP PRINT INDEPENDENT indicator is non-illuminated and manually move the tight tape sensor arm down to simulate a tight tape condition. The LSPTP TIGHT TAPE indicator and STOP switch will illuminate red. On the CK, the STOP indicator shall be illuminated red and the keyboard shall be locked. On the LSPTP, verify that the tight tape sensor is back in its position for normal punch operation and depress the START switch. The START switch shall illuminate white on the LSPTP and the keyboard will be unlocked. Depress any 5 unblocked keys and feed the tape by depressing the FEED control on the LSPTP. Verify punching on the tape.

(11) For check operator error and backspace on the LSPTP, depress the START switch. On the CK, type a message such as: THE QUICK BROWN FOZ; stop after typing Z, depress the REJECT/BACKSPACE switch on the CK. The LSPTP shall backspace one position. On the CK, depress the DEL key. Now continue to type the message starting with X JUMPED OVER THE LAZY DOGS BACK 1,234,567,890 TIMES. On the CK, depress the EOM key. Verify Z has been deleted and is followed by X code (4, 5, 7, 8 bits punched).

(12) For checking LSPTP not ready results in locked keyboard on the LSPTP, depress the STOP switch. The STOP switch shall illuminate red. On the CK, the STOP indicator shall illuminate red. Verify that the keyboard is locked.

(13) Assignment at CCU of device operating with CK results in FAULT alarm. On the CCU, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch shall illuminate white. The CCU Receive Device B FAULT indicator shall illuminate red, and the CCU Receive Device B CAUTION indicator shall illuminate amber. The audible alarm shall be activated. Depress the CCU Receive Device B ASSIGNED switch to extinguish the Receive Device B ASSIGNED and FAULT indicators and the audible alarm.

(14) On the CK, depress the POWER switch. The POWER switch and STOP indicator shall extinguish. Depress the AC POWER switch on the LSPTP. Disconnect the CK from the LSPTP.

s. *Control Keyboard and Low Speed Card Punch Test.*

(1) Restore the terminal to initial test ½ conditions for the low speed terminal configuration as described in f above.

(2) Connect the CK to the LSCP.

(3) On the CCU, depress the Receive Device A ASSIGNED switch. The CCU Receive Device A ASSIGNED switch shall illuminate white. CCU Receive Device A FAULT indicator shall illuminate and the audible alarm shall activate. On the LSCP, the NOT ASSIGNED indicator shall be non-illuminated.

(4) On the CK, depress the POWER switch. The POWER switch shall have but effect.

(5) On the CCU, depress the Receive Device A ASSIGNED switch. The CCU Receive Device A ASSIGNED switch shall extinguish. On the LSCP, the NOT ASSIGNED indicator shall illuminate amber.

(6) On the CK, depress the POWER switch. The POWER switch shall illuminate white. The STOP indicator on the CK shall illuminate red.

(7) On the LSCP, depress the START switch. The LSCP START switch shall illuminate white. The CK STOP indicator shall extinguish.

(8) Position the CK CODE LEVER switch to HOLLERITH and the EOB WARNING control to 69.

(9) On the CK, type a test message such as: THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1,234,567,890 TIMES. The audible alarm at the CK shall be activated and the EOB WARNING indicator shall illuminate amber when the 69th character key is depressed. Space out through the 80th character.

(10) For keyboard locking due to punch error test proceed as follows:

(a) Depress the POWER switch on the CK and the AC POWER switch on the LSCP. Remove printed circuit card A9 from the LSCP card basket. Depress the AC POWER switch on the LSCP and the POWER switch on the CK. Depress the START switch on the LSCP which shall illuminate white. On the CK, type the following sequential characters A,B,C,D,E, and F.

(b) Upon depression of the "F" key, the CK shall block the keyboard and illuminate the REJECT half of REJECT/BACKSPACE switch.

(c) On the LSCP, the PUNCH ERROR indicator shall illuminate red. The card shall be punched with a 12-1 in column 1, 12-2 in column 2, 12-3 in column 3, 12-4 in column 4, 12-5 in column 5, 12 punch in column 6, 4 punch in column 81 and the card shall be offset stacked.

(d) Depress the REJECT control on the CK to release the keyboard lock and reset the CHARACTER COUNT display. Type a complete card with the characters ABCD.

(e) Depress the POWER switch on the CK and the AC POWER switch on the LSCP. Replace printed circuit board A9 into XA9 connector in the LSCP. Depress the AC POWER switch on the LSCP and the POWER switch on the CK. These power controls shall illuminate white. Depress the START control on the LSCP which shall illuminate white.

(11) For checking operator error and REJECT test on the CK, type a card such as "THE QUICK BROWN FOX, etc." Before finishing the sentence, stop typing and depress the CK REJECT/BACKSPACE control. The LSCP shall eject, error punch, and offset stack the card. The keyboard shall unblock after the card is processed. Type a second test card to verify CK/LSCP operation.

(12) For checking LSCP not ready results in locked keyboard on the LSCP, depress the STOP switch. The LSCP STOP switch shall illuminate red. On the CK, the STOP indicator shall illuminate red. Verify that the keyboard is locked.

(13) For checking assignment at CCU of device operating with CK results in Fault Alarm on the CCU, depress the Receive Device A ASSIGNED switch. The CCU Receive Device A ASSIGNED switch shall illuminate white, and CCU Receive Device A CAUTION indicator shall illuminate. The CCU Receive Device A FAULT indicator shall illuminate red. The CCU audible alarm shall be activated. Depress the CCU Receive Device A ASSIGNED switch to extinguish the CCU Receive Device A ASSIGNED and FAULT indicators and silence the audible alarm.

(14) On the CK, depress the POWER switch. The POWER switch shall extinguish. Disconnect the CK from the LSCP.

t. *Motor Stop Test for Low Speed Paper Tape Punch and Low Speed Card Punch.* Perform procedure outlined in paragraph 4-16.2 of TM 11-7440-214-15/NAVSHIPS 0967-324-0015 TO 31W4-2G-21 to check out motor stop circuitry for LSPTP and LSCP equipment modified by MWO 117440-222-30/1/NAVELEX 0967-324-0220/TCTO 31W4-2G-508 and MWO 11-7440-218'-30/1/NAVELEX 0967-324-0200/TCTO 31W4-2G-506, respectively.

u. *Control Keyboard and High Speed Paper Tape Punch Test.*

(1) Restore the terminal to initial test

conditions for the low speed terminal configuration as described in *f* above.

(2) Connect the CK to the HSPTP. Depress AC POWER switch on HSPTP and place DSM2 switch on the CCU to the PRIME position.

(3) On the CCU, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch shall illuminate white. On the HSPTP, the NOT ASSIGNED indicator shall be extinguished.

(4) On the CK, depress the POWER switch. The POWER switch shall have no effect.

(5) On the CCU, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch shall extinguish. On the HSPTP, the NOT ASSIGNED indicator shall illuminate amber.

(6) On the CK, depress the POWER switch. The POWER switch shall illuminate white. The STOP indicator on the CK shall illuminate red. This demonstrated the HSPTP ASSIGNED vs UK interlock function.

(7) On the HSPTP, depress the START switch. The HSPTP START switch shall illuminate white. The CK STOP indicator shall' extinguish.

(8) Position the CK CODE LEVER switch to ASCII and the EOB WARNING control to 59.

(9) On the CK, type a test message such as: THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1,234,567,890 TIMES. The audible alarm at the CK shall be activated and the EOB WARNING indicator shall illuminate amber when the 59th character key is depressed. Depress the CK EOM key. Verify the accuracy of the typed message and the EOM identification. The EOM identification is 2CR, 8LF, 4N, and a minimum of 6-inches of tape feed.

(10) For checking keyboard locking due to tight tape test proceed as follows:

(a) On the CK, depress any 5 unblocked keys. Verify that the HSPTP PRINT INDEPENDENT indicator is non-illuminated and manually move the tight tape sensor arm down to simulate a tight tape condition. The HSPTP TIGHT TAPE indicator and HSPTP STOP switch will illuminate red. On the CK, the STOP indicator shall be illuminated red and the keyboard shall be locked.

(b) On the HSPTP, verify that the tight tape sensor is back in its position for normal punch operation and depress the START switch. The HSPTP START switch shall illuminate white and the keyboard will be unlocked.

(c) Depress any 5 unblocked keys and feed the tape by depressing the FEED control on the HSPTP. Verify punching on the tape.

(11) For checking operator error and backspace depress START on HSPTP. On the CK, type a message such as: THE QUICK BROWN FOZ. Stop after typing Z and depress the REJECT/BACKSPACE switch on the CK. The HSPTP shall backspace one position. On the CK, depress the DEL key. Now, continue to type the message starting with X JUMPED OVER THE LAZY DOGS BACK 1,234,567,890 TIMES. On the CK, depress the EOM key. Verify Z has been deleted and is followed by X code (4,5,7,8 bits punched).

(12) When HSPTP not ready results in locked keyboard depress the HSPTP STOP switch. The HSPTP STOP switch shall illuminate red. On the CK, the STOP indicator shall illuminate red. Verify that the keyboard is locked.

(13) When assignment to CCU of device operating with CK results in FAULT alarm, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch shall illuminate white. The CCU Receive Device B FAULT indicator shall illuminate red. The CCU audible alarm shall be activated. Depress the CCU Receive Device B ASSIGNED switch to extinguish the CCU Receive Device B ASSIGNED and FAULT indicators and the audible alarm.

(14) On the CK, depress the POWER switch. The POWER switch shall extinguish. Disconnect the CK from the HSPTP.

*v. Plus-zero and Minus-zero Characters Card Reader Test.*

(1) Restore the terminal to initial test conditions as described in paragraph *g* above.

(2) Depress the START switch on the LSCP. The LSCP START switch shall illuminate green.

(3) On the CCU maintenance panel, rotate the Send DISPLAY SELECT switch to the INPUT REG position.

(4) Rotate the CCU TEST MODE SELECT switch on the CCU maintenance panel to the I/O position to enable observation of the maintenance panel indicators.

(5) Depress the CCU Send Device A and Receive Device A ASSIGNED switches. These ASSIGNED switches shall illuminate white. The CCU Receive Device A READY indicator shall illuminate green.

(6) Ready the CR with test message 0216 (refer to appendix D for message content) and depress the START switch. The CR START switch shall illuminate white. This message is, composed of test cards punched with the card

code for the plus-zero to) character.

(7) The message will be read and then processed by the LSCP. While the test cards are being processed by the CR, the CCU maintenance panel SEND DATA DISPLAY indicators will show the ASCII code being generated by the CR.

(8) While the cards are being read (after the header card has been processed), observe the SEND DATA DISPLAY indicators on the CCU and verify the following ASCII code character is displayed:

<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>
1	1	1	1	1	1	1	1

(9) After transmission of the message the CR STOP switch will illuminate red.

(10) Remove the punched cards from the LSCP stacker. Verify all cards are punched with the 12-10 code in each column.

(11) Ready the CR with test message 0217 (refer to appendix D for message content) and depress the START switch. The CR START switch shall illuminate white. This message is composed of test cards punched with the card code for the minus-zero (5) character.

(12) The message will be read and then processed by the LSCP. While the test cards are being processed by the CR, the CCU maintenance panel SEND DATA DISPLAY indicators will show the ASCII code being generated by the CR.

(13) While the cards are being read (after the header card has been processed), observe the SEND DATA DISPLAY indicators on the CCU and. verify the following ASCII code character is displayed:

<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>
1	1	1	1	1	1	1	1

(14) After transmission of the message the CR START switch shall illuminate red.

(15) Remove the punched cards from the LSCP stacker. Verify all cards are punched with a 11-10 code in each column.

### 5-6. High Speed Terminal Configuration Test

*a. Verification of CCU Patching.* Verify CCU patching as described in paragraph 5-4d(3).

*b. Devices to Operated.* The following devices shall be turned on by depressing their AC POWER switch: CCU, HSPTP, HSCP, PTR-A1, CR and PP. Verify that the AC POWER and DC, POWER indicators for all of these devices are illuminated white. LSPTP and LSCP shall not be used in this configuration testing and may be left in the "power off" condition.

(1) At the CCU operators panel, verify that all switches and indicators are nonilluminated with the exception of the audible alarm, the RM/CANCEL switch,

and the STATUS indicators which may or may not be activated.

(2) Verify that the STOP switch is illuminated red and the NOT ASSIGNED indicator is illuminated amber at each of the following devices: HSPTP, HSCP, PTR-A1, CR, and PP. Ignore media alarms (i.e., HOPPER LOW), which may or may not be present.

*c. Positioning of DSM Controls.* The DSM controls shall be positioned as follows to obtain the high speed configuration.

(1) DSM2 PRIME position shall be illuminated green.

(2) DSM3 PRIME position shall be illuminated green.

(3) DSM4 PRIME position shall be illuminated green.

*d. Loading the HSCP.* Load the HSCP with approximately 800 unpunched cards. Load the HSPTP with a 1000 foot roll of 1-inch oil tape. Place 200 prepunched cards on the CR hopper. The message content on the cards is unimportant during the assigned interlock test ( f below).

*e. Control Placement.* Place (or verify placement) of the following controls:

(1) At the PTR-A1, place the ASCII/ITA #2 switch to the ASCII position.

(2) At the HSPTP, set the PRINT INDEPENDENT switch to its nonilluminated position and position the ASCII/ITA #2 switch to the ASCII position.

(3) On HSPTP with motor stop modification, the Motor Stop Control CONTINUOUS/AUTOMATIC switch shall be set to the CONTINUOUS position.

(4) On HSCP with motor stop modification, set the Motor Control switch to the CONTINUOUS RUN position.

*f. Assigned Interlocks Test.*

(1) ASSIGNED vs. RESET.

(a) At the HSPTP, CR and PP, perform the following test on one device at a time.

1 Depress the START switch. The START switch shall illuminate green.

2 On the maintenance panel, depress the MASTER RESET switch. The START switch shall extinguish and the STOP switch shall illuminate red.

(b) At the HSCP depress the LOCAL TEST switch. The local test function commences and the HSCP LOCAL TEST switch illuminates amber.

(c) Cause a HSCP MOTION FAIL by holding card to keep it from being picked. The HSCP MOTION FAIL indicator shall illuminate red. The HSCP STOP switch shall illuminate red

and the HSCP LOCAL TEST switch shall extinguish.

(d) Repeat (b) and (c) above and verify MOTION FAIL indicator illuminates on the HSCP.

(e) At the CCU, depress the following ASSIGNED switches: Send Device A, Receive Monitor A, Receive Device A, Receive Device B. All these ASSIGNED switches shall illuminate white. Depress Send Device EOM STOP switch. Send Device EOM STOP indicator will illuminate red.

(f) At the HSPTP, CR and PP, perform the following test on one device at a time.

1 Depress the START switch. The START switch shall illuminate green.

2 On the device maintenance panel depress the RESET switch. The RESET switch(es) shall have no action. The START switch(es) shall remain illuminated green.

3 On the maintenance panel of the HSCP depress the RESET switch. The RESET switch shall have no effect and the MOTION FAIL indicator shall remain illuminated. Depress the START switch on the HSCP to extinguish the MOTION FAIL indicator.

(2) ASSIGNED vs. LOCAL TEST.

(a) On the HSPTP, HSCP, CR, and PP, depress the STOP switches. The STOP switches shall illuminate red.

(b) At the HSPTP, HSCP, CR, and PP, depress the LOCAL TEST switch. The LOCAL TEST switches shall have no effect.

(c) At the CCU, depress the following ASSIGNED switches: Receive Device A, Receive Device B, Send Device A, and Receive Monitor A. The ASSIGNED switches will extinguish. Depress the Send Device EOM STOP switch which shall extinguish.

(d) At the HSPTP, HSCP, CR, and PP, perform the following tests one at a time.

1 Depress the LOCAL TEST switch. The LOCAL TEST switch shall illuminate amber. The device shall perform the local test functions.

2 Depress the STOP switches. The STOP switch(es) will illuminate red. The local test functions will be terminated.

(3) *Removal of cards.* Remove all cards from the hopper and stacker of the CR and from the stacker of the HSCP. Depress the FORM FEED switch on the PP and the FEED OUT switch on the HSPTP.

*g. Initial Test Conditions.* The following conditions are defined as initial test conditions for the high speed terminal configuration.

(1) At the CCU, all ASSIGNED switches shall be nonilluminated (i.e., all devices are NOT ASSIGNED).

(2) Depress the STOP switches at the HSCP, the HSPTP, the PP, the CR, the PTR-A1. The STOP switches shall be illuminated red.

(3) Verify that character synchronization has been established. The SW SYN indicator on the CCU shall be extinguished.

(4) Establish ACK synchronization by depressing the Send Device CANCEL switch on the CCU. The CCU RM/CANCEL switch will extinguish, indicating that ACK synchronization has been established.

(5) Load the HSCP with approximately 800 unpunched cards.

(6) Load the HSPTP with a 1000 foot roll of 1-inch oil tape. The paper supply on the HSPTP shall not be replenished till it has diminished to approximately 200 feet.

(7) Load the PP with a box of 11-inch single ply paper. The PP should not be reloaded until the amount of paper has diminished to approximately 50 pages.

(8) Verify the placement of the following controls:

(a) The CCU TEST MODE SELECT switch on the maintenance panel shall be in either the ON LINE position or the OFF position. The ON LINE position is used to enable the indicators on the CCU maintenance panel.

(b) At the HSPTP, verify the following control settings:

1 On the maintenance panel, place (or verify placement) of the-ASCII/ITA #2 control in the ASCII position. The TAPE FEED control shall be in the 18-inch position.

(2) On the HSPTP operator panel, place (or verify placement) of the PRINT INDEPENDENT switch to the nonilluminated position and the NARROW/WIDE switch set so the WIDE part shall be illuminated white.

(c) At the PTR-A1, set (or verify position of) the ASCII/ITA #2 switch to the ASCII position. Set the HIGH/LOW SPEED switch so the HIGH SPEED part is illuminated white.

(d) At the PP maintenance panel, place (or verify placement of):

1 The MARGIN SELECTION switch to the OUT Position.

2 The LINE FEED SELECTION control to position 1.

*h. Error Free Message Transmission Test with Deassigning Send Channel and Manual Cancel.*

(1) Verify the terminal is in the initial test condition for the high speed terminal



configuration as described in *g* above.

(2) On the HSPTP, depress the START switch. The HSPTP START switch will illuminate green.

(3) On the PP, depress the START switch. The PP START switch shall illuminate green.

(4) On the CCU, depress the Receive Monitor B ASSIGNED switch. The CCU Receive Monitor B ASSIGNED switch will illuminate white. The CCU Receive Monitor READY indicator will illuminate green.

(5) On the CCU, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch shall illuminate white. The CCU Receive Device B READY indicator shall illuminate green.

(6) On the CCU, depress the Send Device B ASSIGNED switch. The CCU Send Device B ASSIGNED control will illuminate white. The CCU Send Device B SELECT and READY indicators will not illuminate.

(7) On the PTR-A1, load message Ø2Ø1 (refer to appendix D for test message). Depress the START switch on the PTR. The PTR START switch shall illuminate white.

(8) The CCU Send Device B SELECT indicator, Receive Device B SELECT and Receive Monitor SELECT indicators shall illuminate white and the START switches on the HSPTP and PP shall illuminate white.

(9) During message transmission, depress the CCU Send Device B ASSIGNED switch.

(a) Observe the CCU Send Device B ASSIGNED indicator extinguishes.

(b) An automatic CANCEL sequence will be transmitted. Observe the CCU Send Device CANCEL switch momentarily illuminates amber and the audible alarm is activated.

(c) Upon reception of the ACK 2 sequence, observe the following:

1 CCU Send Device CANCEL indicator is extinguished.

2 CCU audible alarm is activated. Reset alarm by pressing CCU AUDIBLE RESET switch.

3 CCU Send Device B CANCEL indicator illuminates red.

4 CCU Receive Device B and Send Device B SELECT indicators are extinguished.

5 CCU Receive Device A and Send Monitor READY indicators illuminate green.

(d) At the PTR, observe the following:

1 CANCEL indicator illuminates red.

2 STOP switch illuminates red.

3 NOT ASSIGNED indicator illuminates amber.

(e) On the HSPTP and PP, observe the following:

1 START switch indicator changes from white to green illumination.

2 HSPTP punches cancel flag consisting of three half punches on outside edge of tape and 18-inches of tape will be fed out.

3 PP prints a line of circumflexes after the last line printed and form feeds the paper.

(10) Reload test message Ø2Ø1 into the PTR. Depress the PTR START switch. Observe the following:

(a) PTR START switch illuminates green.

(b) PTR CANCEL indicator extinguishes.

(c) CCU Send Device B CANCEL indicator extinguishes.

(11) At the CCU, depress the Send Device B ASSIGNED switch. Observe the following:

(a) CCU Send Device B ASSIGNED switch illuminates white.

(b) CCU Send Device B SELECT and Receive Monitor B SELECT indicators illuminate white.

(c) CCU Receive Device B SELECT indicator illuminates white.

(d) HSPTP and PP start processing the message.

(12) While the message on the PTR is being transmitted, depress the CCU Send Device CANCEL switch.

(a) A CANCEL sequence will be transmitted. Observe the CCU Send Device CANCEL switch momentarily illuminates amber and the audible alarm is activated.

(b) Upon reception of the ACK 2 sequence, observe and perform the following:

1 CCU Send Device CANCEL indicator is extinguished.

2 CCU audible alarm is still activated. Silence the alarm by depressing the AUDIBLE RESET switch at the CCU.

3 CCU Send Device B CANCEL and B FAULT indicators illuminate red.

4 CCU Receive Device B SELECT indicator and Receive Monitor B SELECT indicator extinguish.

5 CR CANCEL indicator illuminates red.

6 HSPTP punches cancel notches and feeds 18-inch of tape.

7 PP prints a line of circumflexes and form feeds paper.

(13) At the PTR, reload test message Ø2Ø1. Depress the START switch. The PTR START

switch shall illuminate white and the PTR CANCEL indicator extinguishes. The CCU Send Device B CANCEL and FAULT indicators shall be extinguished.

(14) The PTR message will be transmitted through the modems. The HSPTP and the PP shall process the message.

(15) Verify message received for accuracy.

*i. Device Alternation Test and Device Stop Test.*

(1) Restore the terminal to initial test condition for the high speed terminal configuration as described in g above.

(2) On the HSPTP, depress the START switch. The HSPTP START switch will illuminate green.

(3) On the PP, depress the START switch. The PP START switch will illuminate green.

(4) On the HSCP, depress the START switch. The HSCP START switch will illuminate green.

(5) On the CCU, depress the Receive Device A and Receive Device B ASSIGNED switches. The CCU Receive Device A and B ASSIGNED switches will illuminate white. The CCU Receive Device A and B READY indicators will illuminate green.

(6) On the CCU, depress the Receive Device A and Receive Monitor B ASSIGNED switches. The CCU Receive Device A and Receive Monitor B ASSIGNED switches will illuminate white. The CCU Receive Monitor READY indicator will illuminate green.

(7) On the PTR-A1, load a test tape with messages 0202, 0204, and 0206 and depress the START switch (refer to appendix D for test messages). The PTR START switch will illuminate green.

(8) On the CR, load the test messages 0203, 0205, and 0207 and depress the START switch (refer to appendix D for test messages). The CR START switch will illuminate green.

(9) On the CCU, depress the Send Device B ASSIGNED switch and then Send Device A ASSIGNED switch. The CCU Send Device A and Send Device B ASSIGNED switches will illuminate white.

(10) When the first message on the PTR-AI (Channel B) is being transmitted, the CCU Send Device B SELECT indicator will illuminate white, and Send Device A READY indicator will illuminate green.

(11) After the first message on the PTR has been transmitted, the CR will be selected by the CCU. The CCU Send Device B READY indicator will illuminate green, and the CCU Send Device A SELECT indicator will illuminate white. After the message on the

CR has been transmitted, the PTR will be selected. The above sequence will be repeated through the remainder of this test. The HSPTP and the PP will receive the message from the PTR. The CCU Receive Device B SELECT and Receive Monitor SELECT indicators will illuminate white. The CCU Receive Device A READY indicator will be illuminated green. The message from the CR will be received at the HSCP and PP. The CCU Receive Device A SELECT and Receive Monitor SELECT indicators shall illuminate white. The CCU Receive Device B READY indicator shall illuminate green. Similar indications will occur when the second tape and second card messages are returned. During the transmission of each second message, depress the LAMP TEST switch on the CCU. The LAMP TEST switch shall not affect the operation of the DSTE. This part of the test has demonstrated the capability of the DSTE to alternate between two input devices when both are ready and assigned, and the CCU lamp test function.

(12) When the third message is being received at the HSPTP and the PP, depress the STOP switch at the HSPTP. The HSPTP STOP switch will illuminate red. At the CCU, the Receive Device B FAULT indicator shall illuminate red, and the audible alarm shall be activated. At the HSPTP, depress the START switch. The HSPTP START switch shall illuminate white and the HSPTP shall continue to process the message. The CCU Receive Device B FAULT indicator shall extinguish and the audible alarm shall deactivate. At the end of the message, the CCU will deselect the HSPTP and the PP. The CCU Receive Device B and Receive Monitor SELECT indicators shall extinguish.

(13) When the third message from the CR is received at the terminal, the CCU will select the HSCP and the PP. The CCU Receive Device A and Receive Monitor SELECT indicators shall illuminate white. Depress the STOP switch at the HSCP. The HSCP STOP switch shall illuminate red. At the CCU, the Receive Device A FAULT indicator shall illuminate. Now depress the START switch at the HSCP. The HSCP START switch shall illuminate white and the HSCP and PP shall continue to process the message. At the end of the message, the CCU Receive Device A and Receive Monitor SELECT indicators shall extinguish. By inspecting each third message received, the ability of the output device to stop and subsequently start the message reception without loss or duplication of data is dem-

onstrated.

(14) Check all messages received for accuracy of content.

*j. Output Alarm/Alarm Stop Test-Channel B and HSPTP.*

(1) Restore the terminal to the initial test conditions for the high speed terminal configuration as described in *g* above, except that the HSPTP shall be loaded with approximately 200 feet of tape. Set tape length just above low tape sensing position.

(2) On the HSPTP, depress the START switch. The HSPTP START switch will illuminate green.

(3) On the CCU, depress the Receive Device B ASSIGNED switch. The CCU Receive Device B ASSIGNED switch will illuminate white. The CCU Receive Device B READY indicator will illuminate green.

(4) Load the PTR-A1 with test message Ø2Ø8 (spliced to form a loop) (refer to appendix D for test message content).

(5) On the PTR, depress the START switch. The PTR START switch will illuminate green.

(6) On the CCU, depress the Send Device B ASSIGNED switch. The CCU Send Device B ASSIGNED switch will illuminate white. The CCU Send Device B SELECT indicator will illuminate white.

(7) The message at the PTR will be transmitted and punched at the HSPTP. The CCU Receive Device B SELECT indicator will illuminate white. At the HSPTP, the START switch will illuminate white.

(8) When the tape on the HSPTP has diminished to approximately a 150-foot supply, a sensor will activate the LOW TAPE indicator. The HSPTP LOW TAPE indicator will illuminate amber. At the CCU, the Receive Device B CAUTION indicator will illuminate amber and the audible alarm will be activated. Message processing continues. Depress the Send Device EOM STOP switch at the CCU.

(9) Reset the audible alarm by depressing AUDIBLE RESET at the HSPTP.

(10) When the next EOM is received at the HSPTP, the HSPTP will go into a STOP condition. The HSPTP TAPE OUT indicator will illuminate red. The HSPTP STOP switch will illuminate red and the audible alarm will be activated. The CCU Send Device EOM STOP switch shall illuminate red.

(11) On the CCU, the Receive Device B FAULT indicator will illuminate red. Reset the audible alarm by depressing AUDIBLE RESET at the HSPTP.

(12) Load the HSPTP with a new roll of tape. Depress the HSPTP START switch. The HSPTP START switch shall illuminate green.

(13) Depress the AC POWER switch on the HSCP. The AC POWER, DC POWER and STOP switches on the HSPTP shall extinguish. On the CCU, depress the Receive Device A ASSIGNED switch. The CCU Receive Device A ASSIGNED switch and the Receive Device A FAULT indicator shall illuminate.

(14) Load the PTR with test message 0209 (refer to appendix D for message content). Depress the PTR START switch. The PTR START switch will illuminate white. Depress the CCU Send Device EOM STOP switch.

(15) The message on the PTR will be transmitted and processed on the HSPTP.

(16) Verify the accuracy of the messages received.

*k. Output Alarm/Alarm Stop Test-Channel A and HSCP.*

(1) Restore the terminal to the initial test conditions for the high speed terminal configuration as described in *g* above, except that the HSCP shall be loaded with approximately 130 cards.

(2) On the HSCP, depress the START switch. The HSCP START switch will illuminate green and HSCP HOPPER LOW indicator shall illuminate amber.

(3) On the CCU, depress the Receive Device A ASSIGNED switch. The CCU Receive Device A ASSIGNED switch will illuminate white. The CCU Receive Device A READY and CAUTION indicators will illuminate. Reset the audible alarm.

(4) Load the CR with test message 0210 (refer to appendix D for message content).

(5) On the CR, depress the START switch. The CR START switch will illuminate green.

(6) On the CCU, depress the Send Device A ASSIGNED switch. The CCU Send Device A ASSIGNED switch will illuminate white. The CCU Send Device A SELECT indicator will illuminate white.

(7) The message at the CR will be transmitted and punched at the HSCP. Upon reception of message, the CCU Receive Device A SELECT indicator will illuminate white and the HSCP START switch will illuminate white.

(8) When the HSCP runs out of cards, the HSCP will go into a STOP condition. The HSCP CARD ALARM indicator will illuminate red. The HSCP STOP switch will illuminate red. The CCU audible alarm will be activated.

(9) Load 800 unpunched cards into HSCP

hopper and depress the HSCP START switch. The HSCP START switch shall illuminate white and the CCU audible alarm shall extinguish.

(10) The CCU Receive Device A FAULT indicator will extinguish. The HSCP will continue to process the message.

(11) Check accuracy of the message received.

*l. Receive Message Cancel Test.*

(1) Restore the terminal to initial test conditions for the high speed terminal configuration as described in g above.

(2) Load the CR with test message 0211 (20 blocks) (refer to appendix D for message content). On the HSCP depress the START switch. The \*HSCP START switch will illuminate green.

(3) On the PP, depress the START switch. The PP START switch will illuminate green. On the CR, depress the START switch. The CR START switch will illuminate green.

(4) On the CCU, depress the Receive Device A and the Receive Monitor A ASSIGNED switches. Both ASSIGNED switches will illuminate white. The CCU Receive Device A and Receive Monitor READY indicators will illuminate green. Depress the CCU Send Device A ASSIGNED switch. The CCU Send Device A ASSIGNED switch will illuminate white.

(5) The CCU Receive Device A and Receive Monitor SELECT indicators will illuminate white during message reception. During message transmission, depress the Send Device CANCEL switch on the CCU. The CANCEL sequence shall be transmitted. The CCU Send Device CANCEL switch shall momentarily illuminate amber and the CCU audible alarm shall be activated. Upon reception of the ACK 2 sequence, the CCU Send Device CANCEL switch shall be extinguished. The CCU Send Device A CANCEL and FAULT indicators shall be illuminated red.

(6) Verify the cancel message indication at the HSCP and the PP. The cancel indication for the HSCP is a card with only one (1) punch at the 81st column, 8th row, and offset stacked. The cancel indication for the PP is a line of circumflexes and a form feed.

(7) Retransmit the message without canceling the message.

(8) Verify reception of the second message.

*m. Input Non-Cancel Fault Test.*

(1) Restore the terminal to initial test conditions for the high speed test configuration as described in g above.

(2) On the HSCP depress the START switch. The HSCP START switch will illuminate green.

(3) On the CCU, depress the Receive Device A ASSIGNED switch. The CCU Receive Device A ASSIGNED switch will illuminate white. The CCU Receive Device A READY indicator will illuminate green.

(4) On the CCU, depress the Send Device A ASSIGNED switch. The CCU Send Device A ASSIGNED switch will illuminate white.

(5) On the CR, load a message 0212 (refer to appendix D for message content). This message has no EOM card. Depress the CR START switch. The CR START switch will illuminate white.

(6) On the CCU, the Send Device A SELECT indicator will illuminate white and the message will be transmitted and processed by the HSCP. The CCU Receive Device A SELECT indicator will illuminate white.

(7) When the CR finishes reading the message, the STOP and CARD ALARM indicators at the CR will illuminate red. On the CCU, the Send Device A FAULT indicator will illuminate red and the audible alarm shall be activated. Reset the audible alarm by depressing AUDIBLE RESET at the CR.

(8) Place a card with the proper EOM sequence into the CR hopper and depress the CR START switch. The CR CARD ALARM indicator shall extinguish and the START switch will illuminate white while the card is being processed and then extinguish. On the CCU, the Send Device A FAULT indicator shall extinguish and the Send and Receive Device A SELECT indicators will extinguish after the card has been processed.

(9) Check for accuracy of the received message.

*n. Single Card Feed Test.*

(1) Restore the terminal to initial test conditions for the high speed terminal configuration as described in g above.

(2) On the HSCP, depress the START switch. The HSCP START switch shall illuminate green.

(3) On the CCU, depress the Send Device A and Receive Device A ASSIGNED switches.

Both switches shall illuminate white.

(4) On the CR, load message 0213 (refer to appendix D for message content). Depress the CR SINGLE FEED switch. The CR SINGLE FEED switch shall illuminate white. At the conclusion of the card reading process, the CR SINGLE FEED illumination shall extinguish and the CR STOP indication shall illuminate red. Quickly depress the CR SINGLE FEED control and continue this STOP-SINGLE FEED-STOP sequence through message.

(5) The message will be transmitted through the modems and returned to the DSTE. The message shall be processed by the HSCP. During message processing, the HSCP START switch illumination shall change from green to white.

(6) After message acknowledgment, the CCU Send Device A SELECT indicator illumination shall extinguish and the STOP switch on the CR shall illuminate red. The CCU Receive Device A SELECT illumination shall extinguish and the Receive Device A READY indicator shall illuminate green. The HSCP START switch will return to green at the end of the message.

(7) Verify the accuracy of the received message.

*o. Pilot Header Test.*

(1) Restore the terminal to the initial test conditions for the test configuration as described in g above.

(2) On one HSPTP, depress the START switch. The HSPTP START switch shall illuminate green.

(3) On the PP, depress the START switch. The PP START switch shall illuminate green.

(4) On the CCU, depress Receive Device B, Send Device B, and Receive Monitor B ASSIGNED switch. These ASSIGNED switches shall illuminate white.

(5) Prepare a pilot header tape which contains the header information in message Ø214 Header (refer to appendix D for message content). This pilot header shall be followed by 20 blanks minimum. Load the PTR with the pilot header tape and depress PTR PILOT HEADER switch. The PTR PILOT HEADER switch shall illuminate amber. The CCU Send Device B SELECT shall illuminate white. The pilot header shall be read until the PTR TAPE OUT and STOP indicators illuminate red. The PTR PILOT HEADER switch remains illuminated amber.

(6) On the PTR, manually load the test message Ø214. Depress the PTR START switch. The PTR START indicator will illuminate white and the PTR PILOT HEADER switch will extinguish. The message shall be transmitted and the HSPTP shall process the message received.

(7) After transmission of the message, the PTR STOP switch will illuminate red.

(8) Check for accuracy of the received and monitored message.

*p. 64 Valid Hollerith Characters Card Reader Test.*

(1) Restore the terminal to initial test conditions as described in g above.

(2) Depress the START switch on the HSCP. The HSCP START switch shall illuminate green.

(3) Depress the CCU Send Device A and Receive Device A ASSIGNED switches. These ASSIGNED switches shall illuminate white. The CCU Receive Device A READY indicator shall illuminate green.

(4) Ready the CR with test message 0215 (refer to appendix D for message content). Depress the START switch. The CR START switch shall illuminate white. This message is composed of test cards from the LSCLP.

(5) The message will be transmitted, returned, and then processed by the HSCP.

(6) Verify the accuracy of the received message and the presence of the 64 different Hollerith characters.

*g. Motor Stop Tests for High Speed Paper Tape Punch.* For HSPTP equipment modified by MWO 11-7440-221-30/1/NAVELEX 0967-324-0210/TCTO 31W4-2G-507 to add the motor stop function, perform the test procedures outlined in paragraph 4-16.2 of TM 11-7440-214-15/NAVSH IPS 0967-324-0010/TO 31W4-2G-21.

*r. Motor Stop Tests for High Speed Card Punch.* Performance tests for the HSCP modified by the addition of the motor stop function (MWO 11-7440-214-30/1/NAVELEX 0967-324-0181/TCTO 31W4-2G-501D) are contained in the performance tests outlined in chapter 6 of TM 11-7440-217-15/NAVSH IPS 0967-324-0030/TO 31W4-2G-41. Since individual equipment performance tests are performed prior to performing the system test (para 5-1b), additional testing is not required.

**5-7. Shutdown**

*a. Power Off.* Press the AC POWER switch on each device to extinguish the indicator. Verify all indicators on the unit are extinguished.

*b. Power Circuit Breakers.* Open the wall circuit breakers supplying power to each of the units.

*c. Test Equipment.* Disconnect all test leads and power down the test equipment.

*d. Disconnect Test Setup.* Remove the interconnection signal and power cables between the terminal equipment.

*e. Terminal Patching.* Remove PC card AIA61 in the CCU, and strap terminals as outlined in paragraph 5-4d(3) above.

CHAPTER 6

POWER SUPPLY MANUAL CONTROL CARD ASSEMBLIES

6-1. General

The manual control card assemblies referenced below are used to provide manual control of the power supply sequencing during troubleshooting of the DST component power supplies. Each of the power supplies includes a sequencing module (A12) which automatically controls the activation and deactivation of the various circuits of the power supply to prevent damage to the power supply.

a. Manual control card assembly No. D39245 is required for maintenance of the power supply in the card reader, tape reader, and low and high speed tape punches.

b. Manual control card assembly No. D39348 is required for maintenance of the power supply of the low speed card punch.

c. Manual control card assembly No. D39246 is required for maintenance of the power supply in the common control unit.

d. Manual control card assembly No. D39244 is required for maintenance of the power supply of the high speed card punch.

6-2. Manual Control Card Assembly Diagrams

Figures 6-1 through 6-8 provide schematic and part location information for reference when troubleshooting the manual control card assemblies. Figure 6-9 shows card extender assembly D39724, which is required for troubleshooting PC cards.

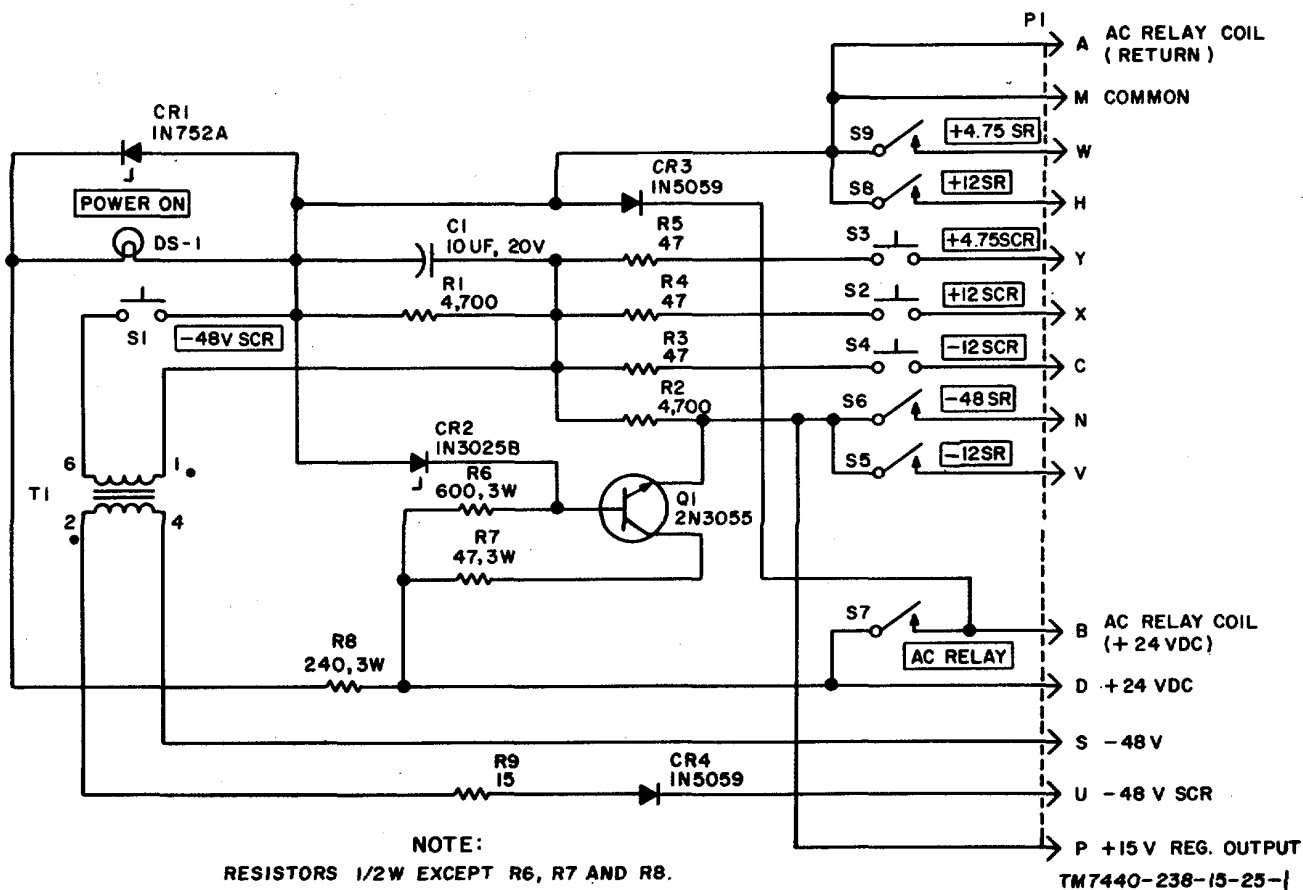


Figure 6-1. Power supply manual control card assembly DS39245, schematic diagram.

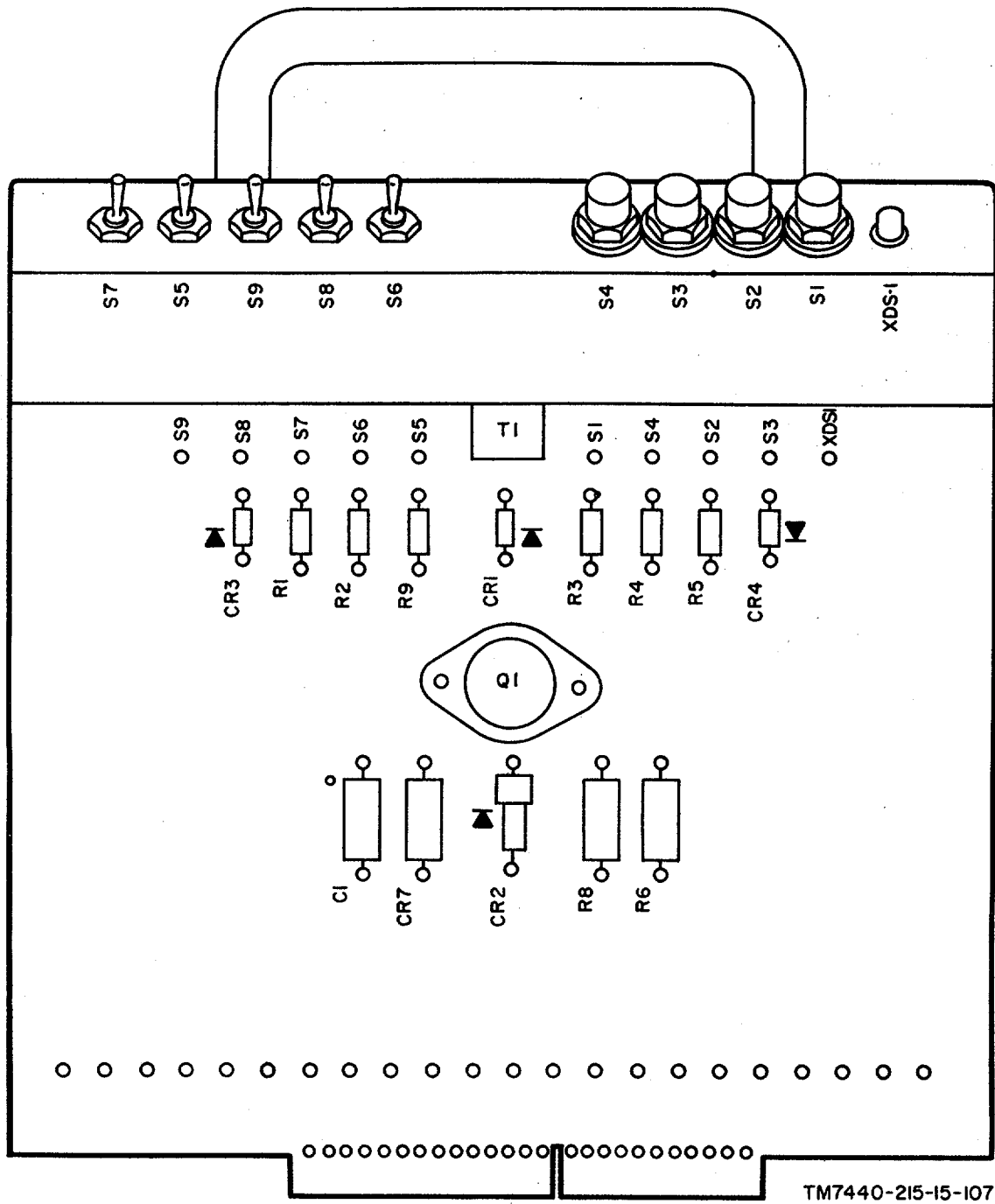


Figure 6-2. Power 8 supply manual control card assembly D39245, component location diagram.

Change 2 6-2

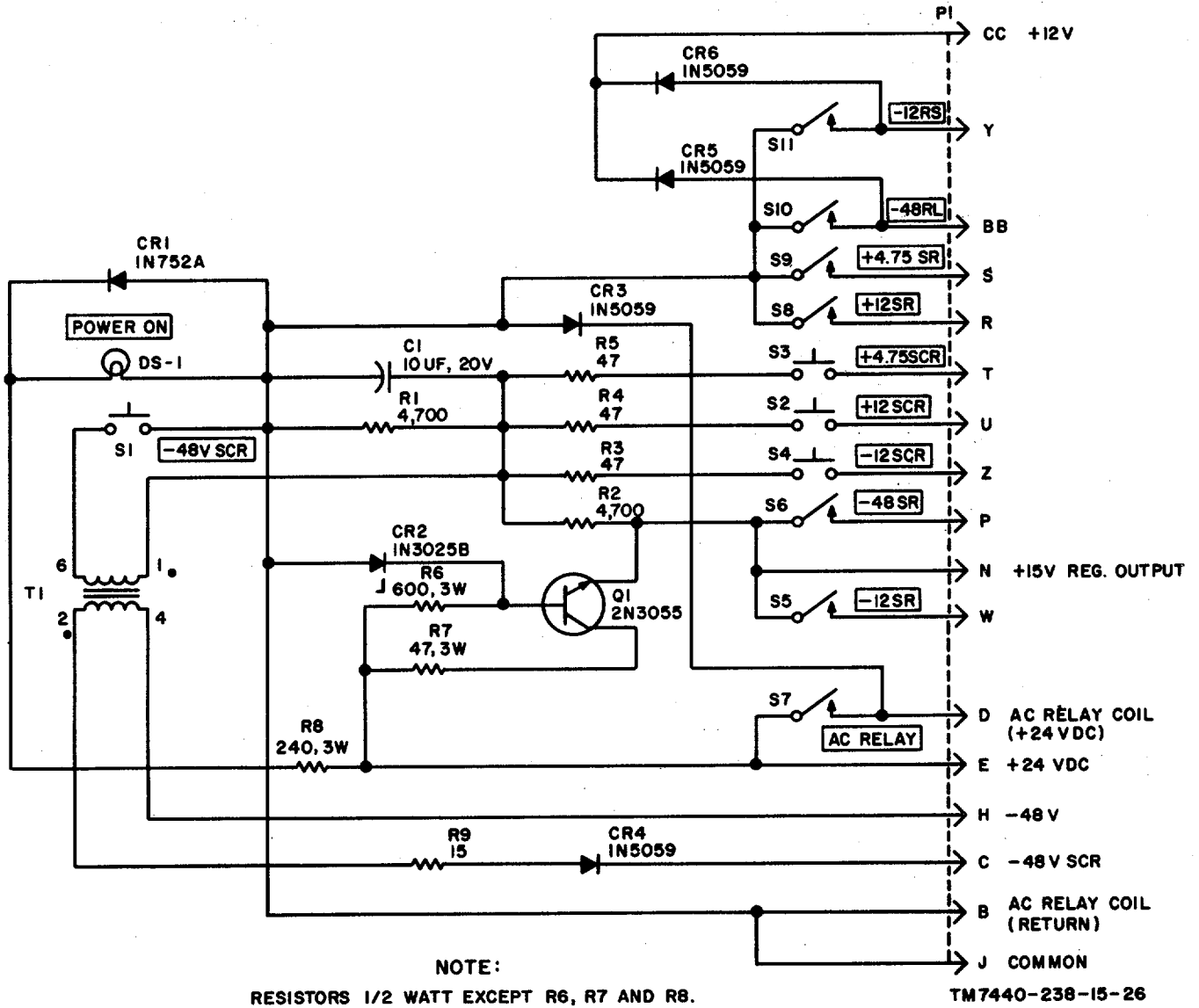


Figure 6-3. Power supply manual control card assembly D39348, schematic diagram.



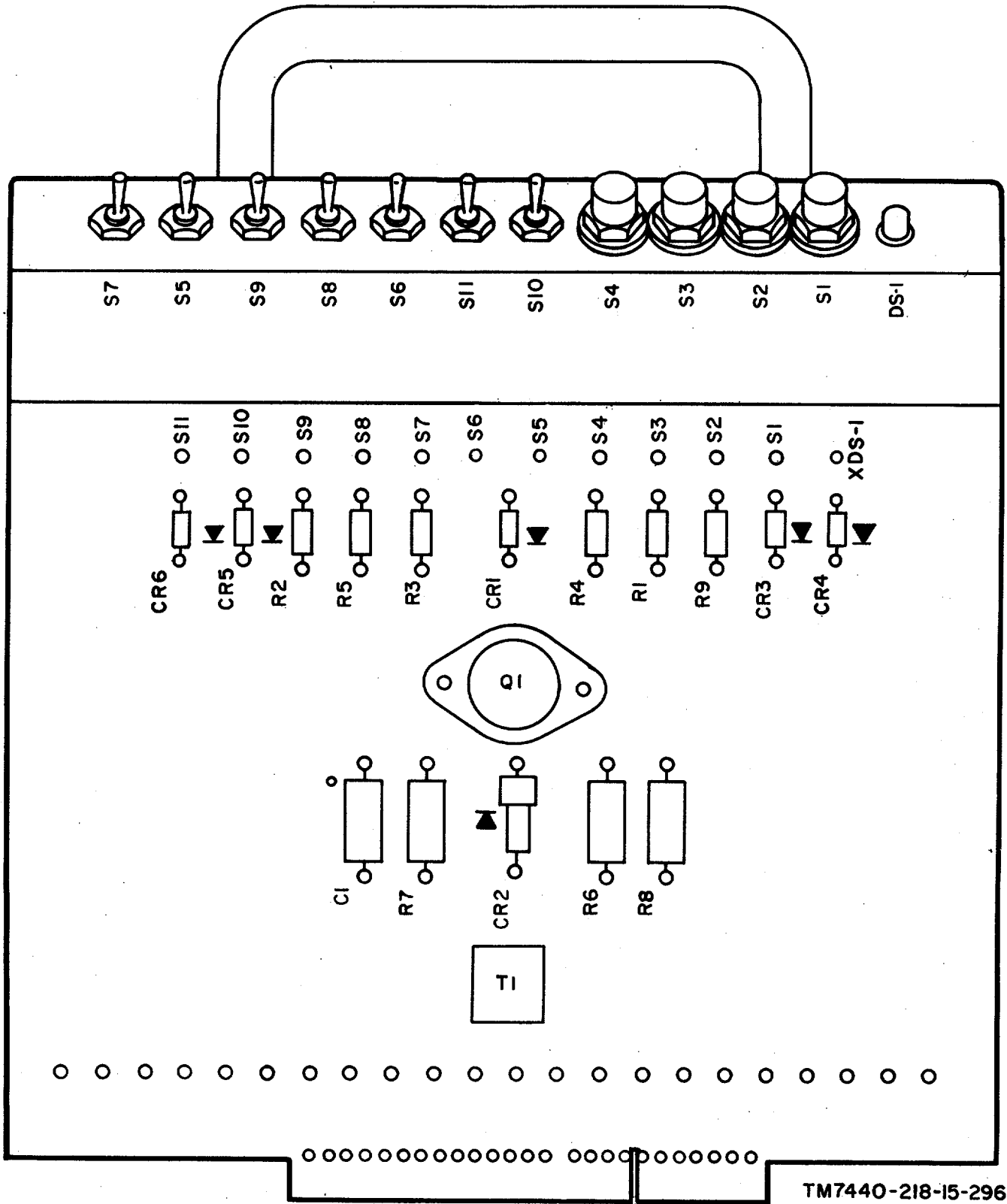
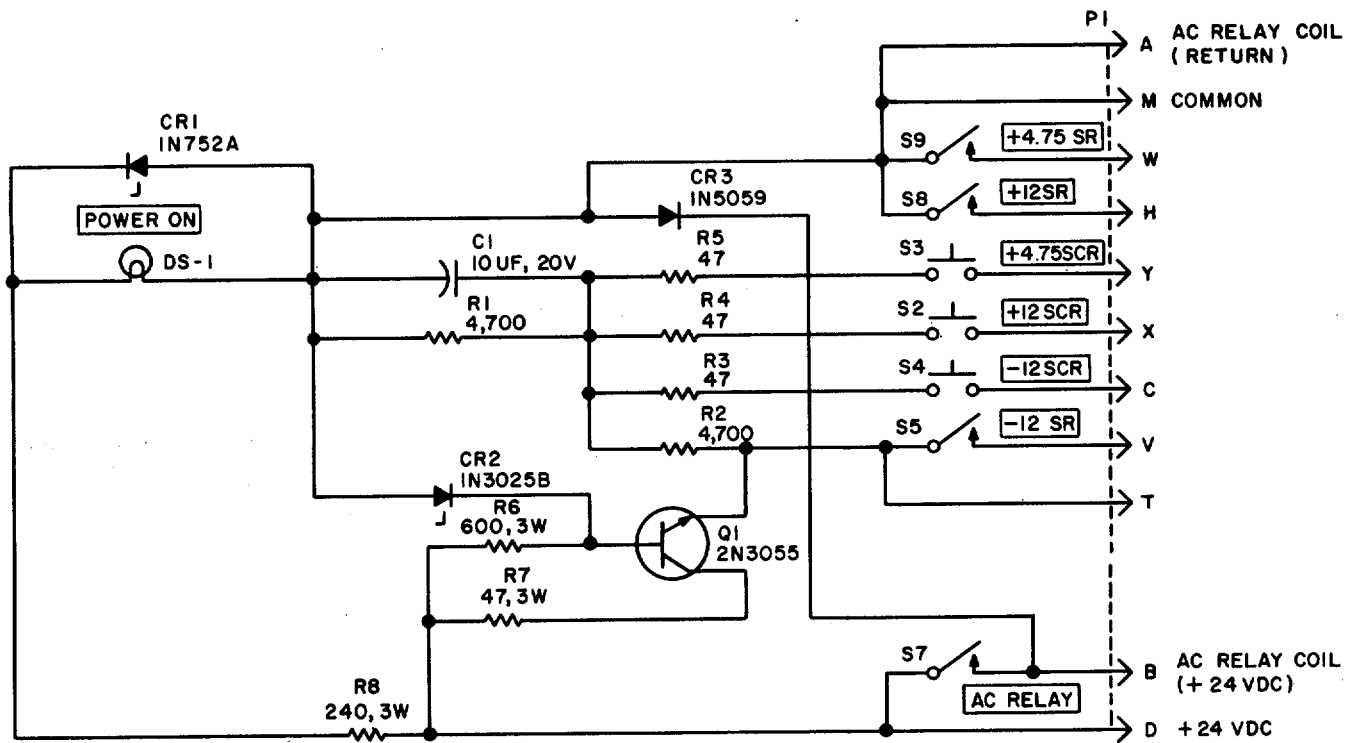


Figure 6-4. Power supply manual control card, assembly D39348, component location diagram.



NOTE :

RESISTORS 1/2 W EXCEPT R6, R7 AND R8.

TM7440-238-15-27

Figure 6-5. Power supply manual control card assembly D39246, schematic diagram.

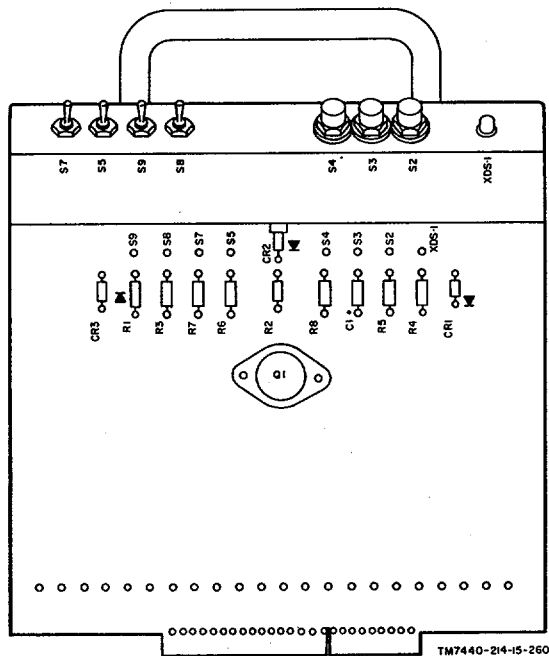
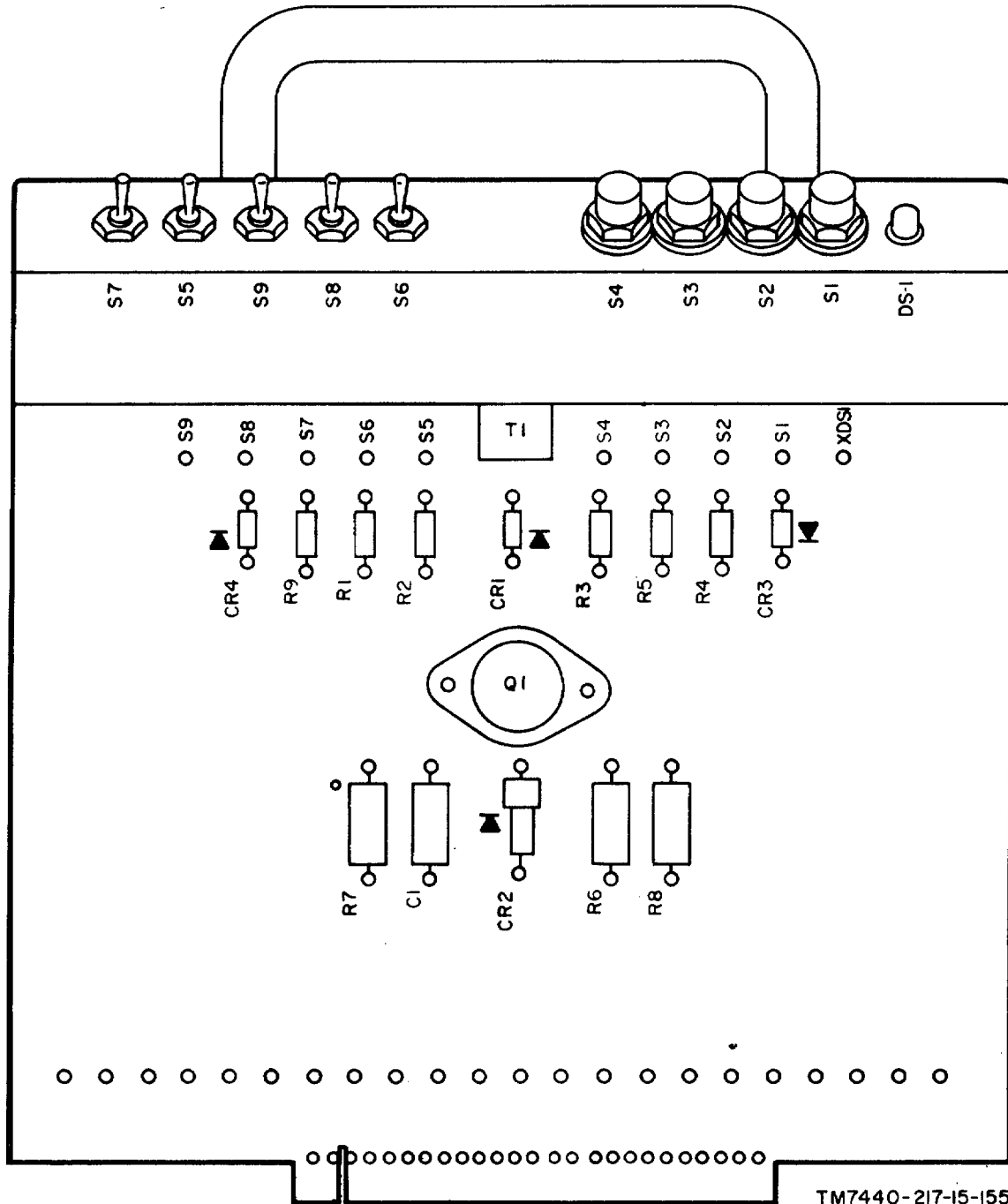


Figure 6-6. Power supply manual control card assembly D89246, component location diagram.





TM7440-217-15-155

Figure 6-8. Power supply manual control card -assembly D89244, component location diagram.

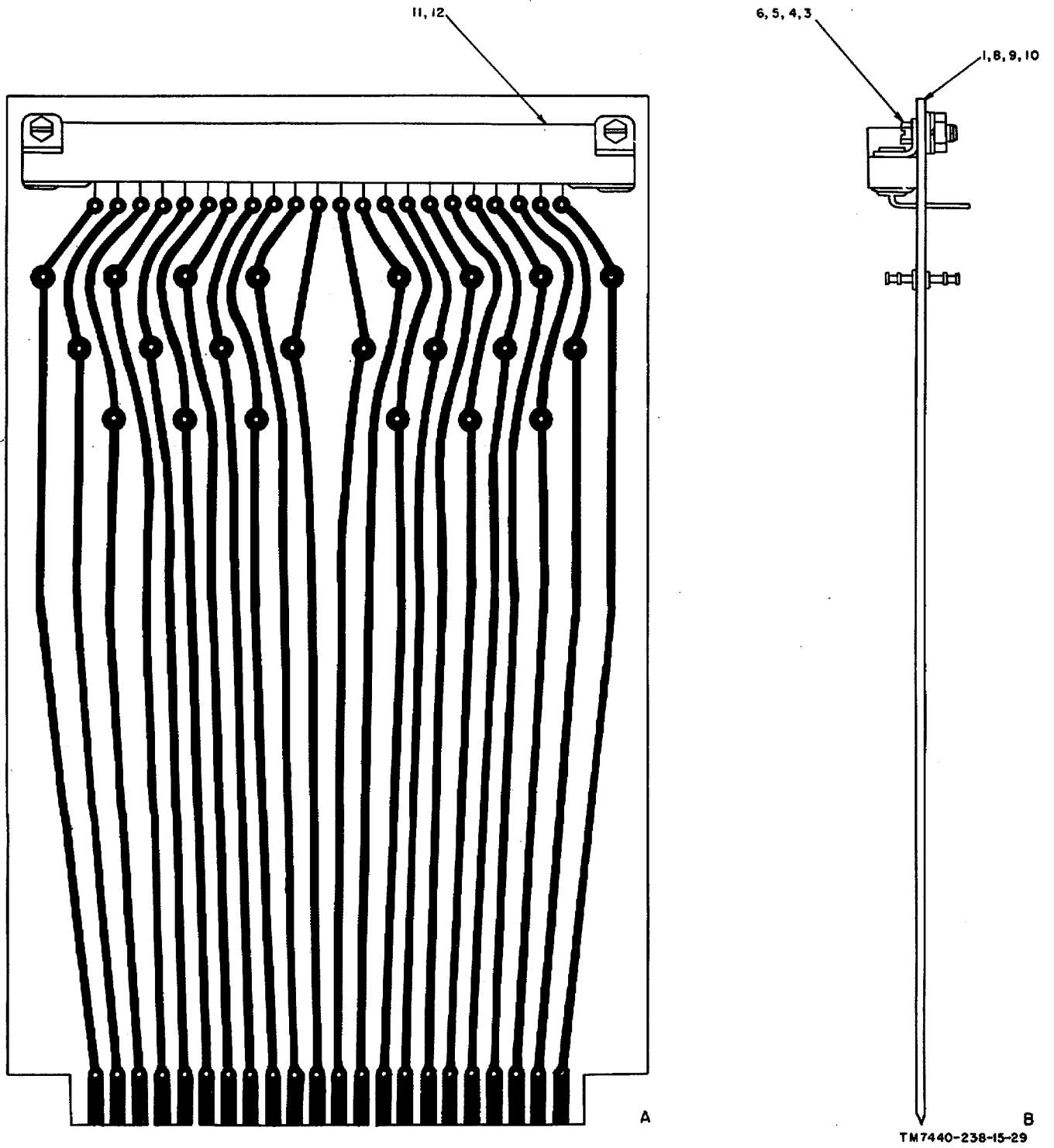


Figure 6-9. Power supply card extender assembly D39724, component location diagram.

**CHAPTER 7  
SHIPMENT, LIMITED STORAGE, AND DEMOLITION  
TO PREVENT ENEMY USE**

**Section I. SHIPMENT AND LIMITED STORAGE**

**7-1. Disassembly of DST Set**

To prepare the DST set devices and ductwork for shipment, perform the following steps for each device:

**Warning:**

**At terminals using parallel layouts, disassembly should start with devices at the ends of each row. Remove devices mounting the vertical ductwork last. Hangers for overhead ductwork are not strong enough to support the weight of all ductwork fully loaded with cables.**

- a. Turn off power to device by shutting off primary power circuit breaker.
- b. Remove interface signal wiring from TB1 and TB2 in each input or output device, and from appropriate terminal board in common control unit. Also remove the number 8 ground wire from TB3 in the device and from the signal reference plane in the common control unit.

**Note.**

**At terminals having a paper tape reader containing two reader units, also remove wires from terminal boards TB4, TB5 and TB6.**

- c. Remove any cable clamps or lacing holding interface signal cable to interior of device cabinet.
- d. Remove bolts holding adapter plate to rear of cabinet.
- e. Remove ac power wiring as follows:
  - (1) In all devices except page printer:
    - (a) Remove cover of filter assembly FL1 in device and pull filter towards front of cabinet slightly to gain access to ac power terminal board.
    - (b) Remove ac power wiring from TB1 of filter assembly and remove ground wire from grounding stud.
    - (c) Remove cable clamp holding ac wiring to interior of filter assembly.
  - (2) In page printer:
    - (a) Remove cover from box on adapter plate.
    - (b) Remove cover of filter assembly FL1 and pull filter towards front of cabinet slightly to gain access to ac power terminal board.

- (c) Remove ac power wiring from TB1 of filter assembly and remove ground wire from ground stud.

- (e) Remove cable clamp holding ac wiring to interior of filter assembly.

- (e) Carefully pull wires from conduit between box mounted on adapter plate and filter assembly.

- f. Slide device forward, taking care that interface signal cable comes free from cabinet interior and remains with ductwork.

- g. Open hinged cover of section of ductwork behind device just removed and from ductwork behind common control unit. Open cover of any other ductwork that is accessible.

- h. Remove nut holding bulkhead feedthrough adapter to adapter plate and lift signal interface cable from ductwork. Carefully feed fanning strip on end of cable through hole in adapter plate.

- i. Remove adapter plate assembly from ductwork. Access to mounting bolts is from inside ductwork.

- j. Reassemble adapter plate to rear of cabinet and reassemble cover to filter assembly.

- k. At the common control unit, also remove the number 00 wire from the signal reference plane terminal board TB1. Remove wiring from CAU interface terminal board TB16.

- l. Disassemble ductwork sections as cables are removed from each section.

- m. Pack equipment per paragraph 7-2.

**7-2. Repackaging for Shipment or Limited Storage**

Repackaging of equipment for shipment or limited storage normally will be performed at a packaging facility or by a packaging team. Should emergency packaging be required, package the equipment in accordance with the original packaging insofar as possible with available materials (see TM 11-7440-239-15, app. A).

## Section II. DEMOLITION OF MATERIAL TO PREVENT ENEMY USE

### 7-3. Authority for Demolition

Demolition of the equipment will be accomplished only upon the order of the commander. The destruction procedures outlined in paragraph 74 will be used to prevent further use of the equipment.

### 7-4. Methods of Destruction

Use any or all of the following methods to destroy the equipment:

*a. Smash.* Smash the controls, magnets, switches, capacitors, transformers, castings, shafts, gears, and bearings; use sledges, axes, handaxes, pickaxes, hammers, or crowbars.

*b. Cut.* Cut the input power cord, the output cords, patch cords, interunit cables, and all base wiring; use axes, cutting pliers, bayonets, or machetes.

*c. Burn.* Burn all cords, wiring diagrams, technical manuals, coils, and relays; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

*d. Bend.* Bend covers, consoles, cabinets, and bases.

*e. Explode.* If explosives are necessary, use firearms, grenades, or TNT.

*f. Dispose.* Bury or scatter the destroyed parts in slit trenches, foxholes, or throw them into streams.

**CHAPTER 8  
SPECIAL TOOL KITS FOR  
AUTODIN DST MAINTENANCE**

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**8-1. General**

The following tool kits are required for maintenance of the components of the AUTODIN DST sets:

- a. Toolkit, general (AUTODIN DST) (para 8-2, NSN 5180-00-168-9996.
- b. Toolkit, paper tape equipment (AUTODIN DST) (para 83), NSN 5180-00-168-9999.
- c. Toolkit, punched card equipment (AUTODIN DST) (para 8-4), NSN 5180-00-168-9998.

- d. Toolkit, page printer (AUTODIN DST) (para 8-6), NSN 5180-00-168-9997.

**8-2. Toolkit, General (AUTODIN DST)**  
(fig. 81)

Refer to table 8-1 for a listing of the miscellaneous tools required and the application of each tool in the maintenance of the AUTODIN DST equipment. Refer to figure 8-1 for the tools in the general toolkit.



Table 8-1. TOOL KIT, GENERAL (AUTODIN DST)

Item	Item Description	Manufacturer	Part Number	FSN	Application
1	Pliers, Hose Clamp	Corbin Rose Clamp Div, Irt Corp	P-8	5120-537-3375	HSCP, CR, HSPTP
2	Pliers, Retaining Ring, Tat	Waldes-Rohinoor	0100	5120-293-0048	LSCP, PP
3	Pliers, Retaining Ring, Ext	Waldes-Kohinoor	0200	5120-288-9717	LSCP, PP, PTR, H&LSPTP
4	Pliers, Retaining Ring, Ext	Waldes-Kohinoor	L-1520	5120-2934046	HSCP, CR, PTR, H&LSPTP
5	Pliers: Slip Joint; multiple tongue and groove; angle nose; w/o cutter; 10 in.	-	-	5120-278-0352	PP, LSCP, Gen. Purp.
6	Rule, Steel, Machinist's; RH readings; 1/100, 1/64, 1/32 and 1/16 grad; 6-in lg.	-	-	5210-273-1965	LSCP, H&LSPTP
7	Key, socket head screw; 7/64 in. hex; T-handle w/6 in 1g blade	Allen Mfg Co	609 T-handle w/6 in, 7164 in hex blade	5120-889-2162	PP, H&LSPTP, PTR
8	Key, socket head screw, hex, .028 in. non. key size	-	-	5120-555-2639	H&LSPTP, PTR (provide 2 ea), PP
9	Key, socket head screw, hex, 5/16 in. non key size	-	-	5120-240-5274	LSCP, & General
10	Hammer, Hand: Plastic face, 8 oz, 1 in dia face	-	-	5120-900-7877	H6SPTP, PM, PP, HSCP, PCR
11	Hammer, Hand: Machinists'; ball- peen; 4-oz head; 10-1/2 in lg handle	-	-	5120-243-2985	General
12	Punch: Drive Pin, 1/16 in dia point	-	-	5120-240-6082	LSCP, H&LSPTP, PTR
13	Punch: Drive Pin, 3/32 in dia point	-	-	5120-242-3435	LSCP, Gen use
14	Punch: Drive Pin, 1/8 in dia point	-	-	5120-242-5966	LSCP, Gen use
15	Punch: Drive Pin, 3/16 in dia point	-	-	5120-293-0791	LSCP, Gen use
16	Punch: Center, 5/16 in dia body, size 2, 3-3/4 in lg	-	-	5120-293-3512	PP, Gen use
17	Wrench, Adjustable: Open end; single head; 4 in nom. size, 0 - 1/2 in opening	-	-	5120-240-5330	PP, PTR, H&LSPTP
18	Finger, Mechanical: rigid type; 8 in. reach; site 3	-	-	5120-288-8716	General

Table 8-1. TOOL KIT, GENERAL (AUTODIN DST) (cont)

Item	Item Description	Manufacturer	Part Number	FSN	Application
19	Scriber, Machinists': Single point; pocket style	-	-	5120-224-9728	General
20	Screwdriver, Jewelers', .055 wide blade	-	-	5120-180-0727	LSCP, PM, H&LSPTP
21	Screwdriver, Ratchet: right angle offset; 1/4 in wide tip one side, 3/8 in wide tip other side	-	-	5120-595-9574	General
22	Screwdriver, Ratchet: right angle offset; rt. and lft hand turning; 2 blades No. 1 and No. 2 points size Phillips Drive	-	-	5120-892-5931	General
23	Screwdriver: Cross tip; Phillips; straight, plastic handle; No. 3 point size; 6 in. nom. blade length	-	-	5120-234-8912	General
24	Screwdriver, Flat Tip: plastic handle; 1/4 in wd tip; 10 in blade lg	-	-	5120-293-0314	General
25	Screwdriver, Flat Tip: plastic handle; 3/8 in wd tip; 8 in blade lg	-	-	5120-237-6985	General
26	Screwdriver, Flat Tip: plastic handle; 5/16 in wd tip; 6 in blade lg	-	-	5120-278-1283	General
27	Screwdriver, Flat Tip: plastic handle; 7/32 in wd tip; 1 in blade lg	-	-	5120-222-8866	General
28	Screwdriver, Flat Tip: plastic handle; 5/32 in. wd. tip; 10 in blade lg	-	-	5120-293-3178	General
29	Screwdriver, Flat Tip: plastic handle; 5/16 in. wd. tip; 8 in blade lg	-	-	5120-234-8910	General
30	Tweezers, Craftsman's: Clock; 6 in	-	-	5120-233-6985	General
31	Brush, Paint: Sash-Tool, Oval, 1 in.	-	-	8020-297-6657	General
32	Contact Removal Tool	National Connector	T-5116	1220-922-8346	General

**Table 8-1. TOOL KIT, GENERAL (AUTODIN DST) (cont)**

<b>Item</b>	<b>Item Description</b>	<b>Manufacturer</b>	<b>Part Number</b>	<b>FSN</b>	<b>Application</b>
33	Tool, Hand Wire Unwrapping	Gardner-Denver	500130	5120-104-9022	General
34	Tool, Hand Wire Wrapping No. 22 ga. wire	Gardner-Denver	A-20557-28	5120-134-1149	PP, H&LSPTP
35	Tool, Hand Wire Wrapping No. 24 ga. wire	Gardner-Denver	A-20557-23	5120-134-1150	General
36	Tool, Taper Pin Insertion	Amp Corp	380431-2	5120-784-2884	TR, CR, HSCP
37	Tool, Taper Pin Removal	Amp Corp	380305-1	5120-772-2467	TR, CR, HSCP
38	Brush, Type Cleaning Tooth Brush Shape			7510-550-8446	General

**Note:**

**Contents of this tool kit supplements Tool Kit TK-105/G to provide all DSTE requirements for common hand tools.**

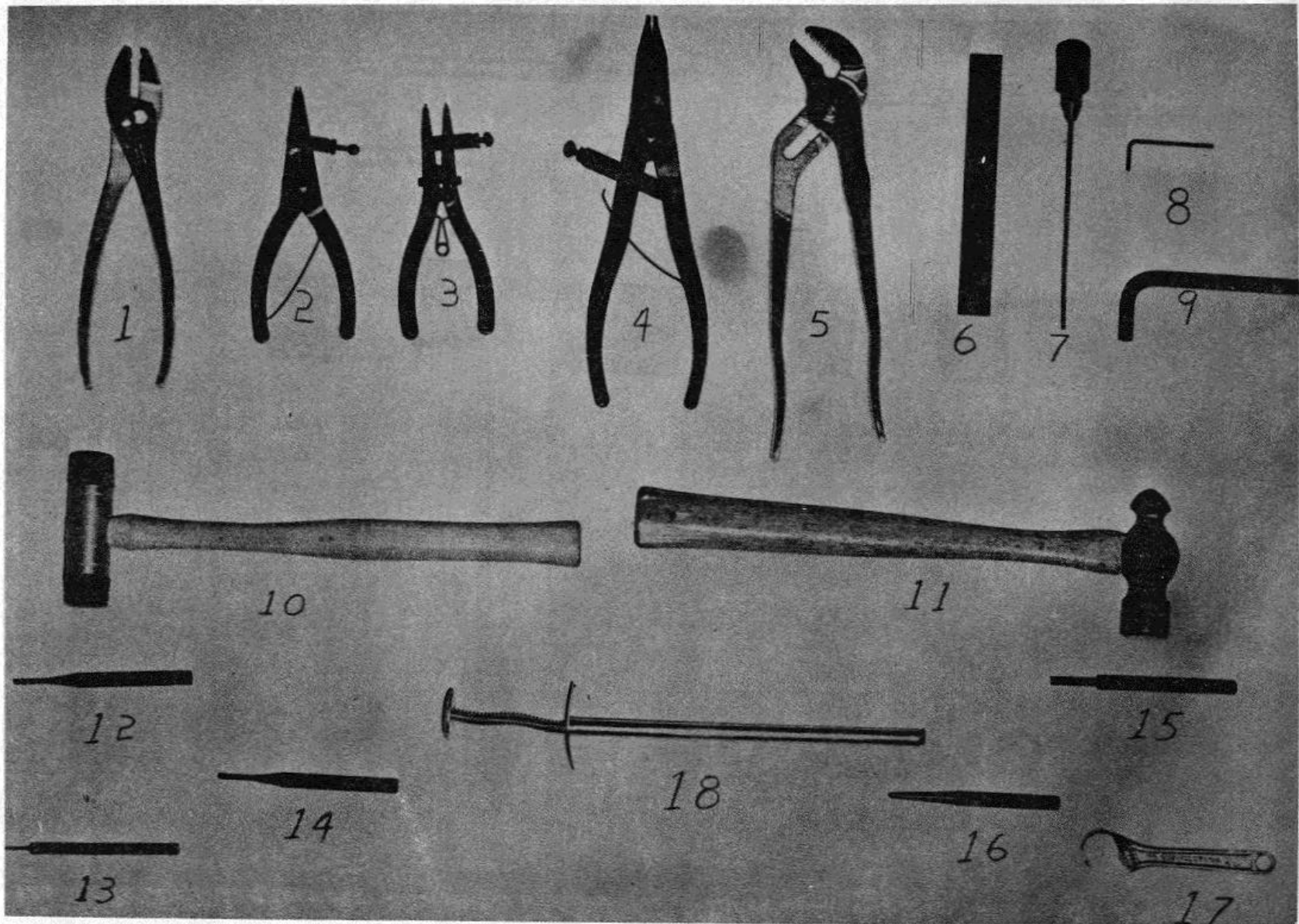


Figure 8-1(1). Toolkit, general (AUTODIN DST) (part 1 of 2).

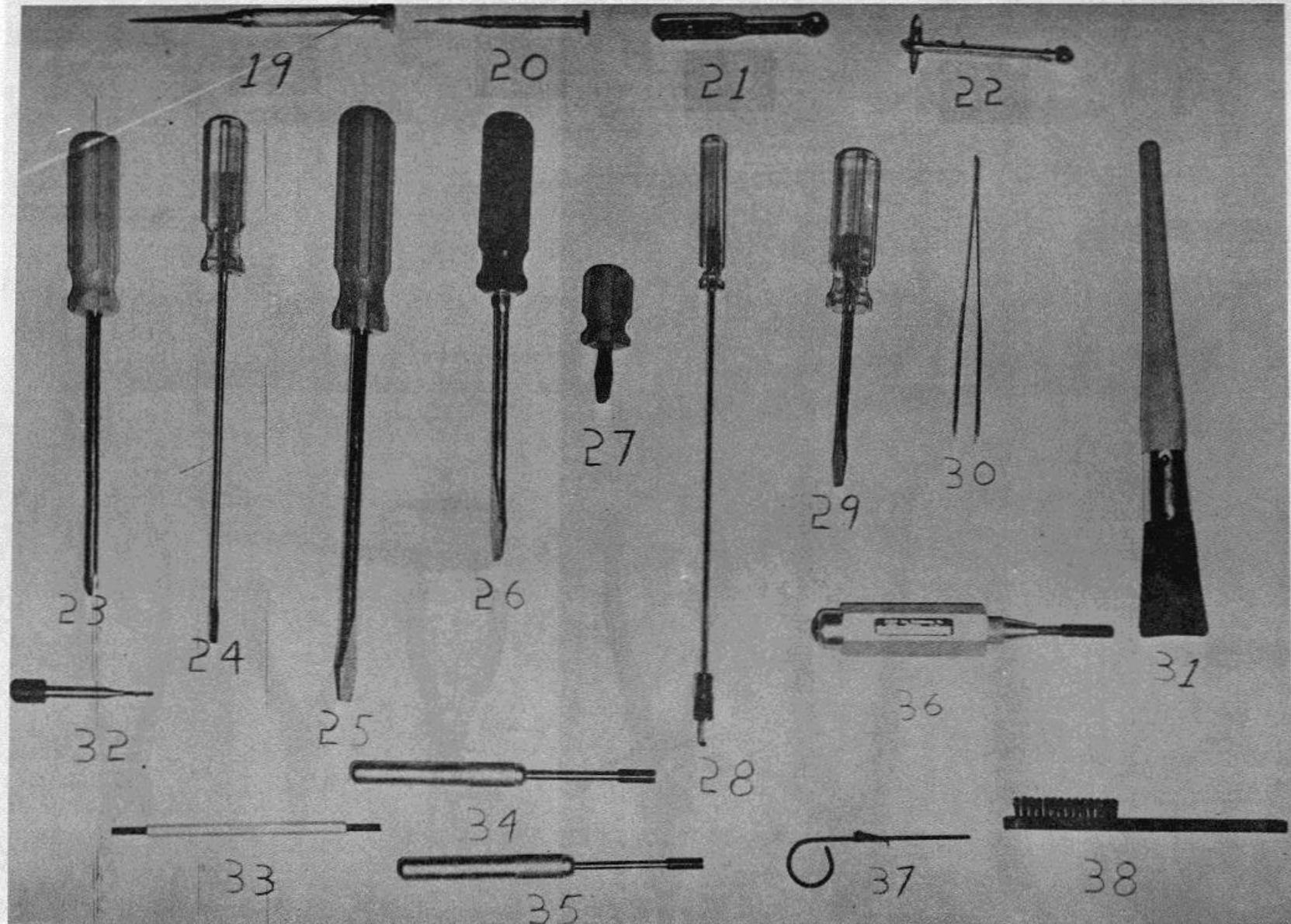
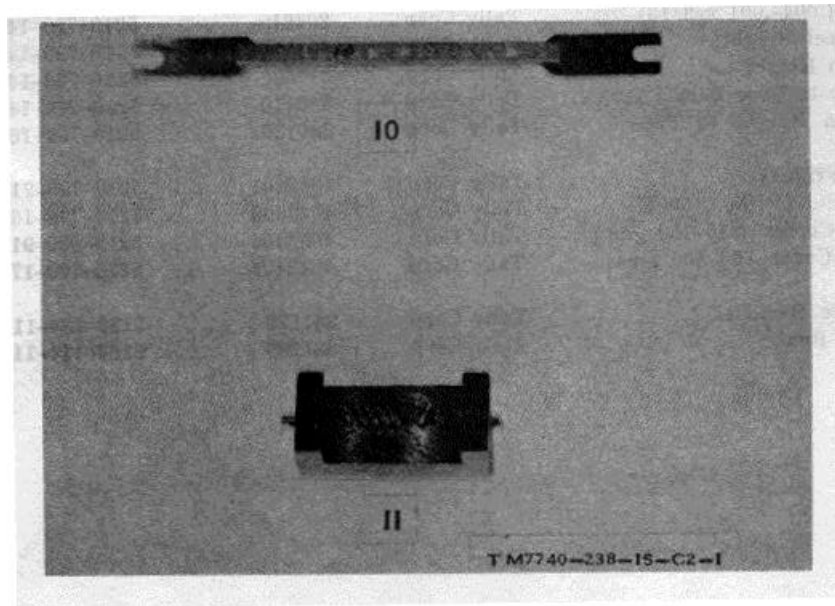


Figure 8-1 (2). Toolkit, general (AUTODIN DST) (part 2 of 2).

**8-3. Toolkit, Paper Tape Equipment (AUTODIN DST)**

(fig. 8-1.1 and 8-2)

Refer to table 8-2 for a listing of the special tools and the application of each tool required for maintenance of the AUTODIN DST paper tape equipment. Refer to figures 8-1.1 and 8-2 for illustrations of the special tools.



**Figure 8-1.1. Toolkit, paper tape equipment (AUTODIN DST), items 10 and 11.**

**Table 8-2. Tool Kit, Paper Tape Equipment (AUTODIN DST)**

<i>Item</i>	<i>Item Description</i>	<i>Manufacturer</i>	<i>Part Number</i>	<i>FSN</i>	<i>Application</i>
1	Arm, Torque .....	Tally Corp .....	226620.....	5120-134-1138 .....	PTR
2	Arm, Torque .....	Tally Corp .....	319170.....	5120-930-9190 .....	H&LSPTP
3	Driver, Collet Pin .....	Tally Corp .....	319030.....	5120-930-9006 .....	H&LSPTP
4	Gage, Heel Gap (.016-.018).....	Tally Corp .....	359560.....	5210-799-1973 .....	H&LSPTP, PTR
5	Gage, Tip Clearance (.008-.010).....	Tally Corp .....	327940.....	5210-799-1953 .....	H&LSPTP, PTR
6	Gage, Tip Clearance (.007-.013).....	Tally Corp .....	228860.....	5210-930-9013 .....	H&LSPTP
7	Gage, Feeler (.005-.010 x 1/4).....	Tally Corp .....	304612.....	5210-930-9011 .....	H&LSPTP
8	Gage, Feeler (.005-.015 x 1/4).....	Tally Corp .....	304618.....	5210-799-1397 .....	H&LSPTP, PTR
9	Gage, Feeler (.001-.003 x 3/16).....	Tally Corp .....	335510.....	5210-799-1399 .....	H&LSPTP
10	Gage, Feeler (.004-.00(1 x 3 1i).....	Tally Corp .....	304619.....	5210-799-1402 .....	H&LSPTP, PTR
11	Gage, Starwheel Height.....	Tally Corp .....	361500.....	5210-799-1404 .....	PTR
12	Gage, Capstan Height .....	Tally Corp .....	375560.....	5210-799-1434 .....	PTR
13	Gage, Stripper-to-Tape Deck (.110).....	Tally Corp .....	380110.....	5210-799-1407 .....	H&LSPTP
14	Gage, Capstan Height to Tape..... Deck (.105)	Tally Corp .....	380120.....	5210-799-1633 .....	H&LSPTP
15	Gage, Tape (Friden) .....	Tally Corp .....	4043401.....	5210-799-2177 .....	H&LSPTP
16	Gage, Feeler Set (Proto #000E) .....	Tally Corp .....	4043600.....	5210-799-1671 .....	H&LSPTP, PTR
17	Gage, Gram (Correx #15-150 gms) .....	Tally Corp .....	4043404.....	5210-930-9199 .....	PTR
18	Gage, Gram (Carpo 100-500 gms) .....	Tally Corp .....	4043402.....	5210-799-1771 .....	H&LSPTP, PTR
19	Deleted				
20	Tool, Die Plate Removal.....	Tally Corp .....	381170.....	5120-134-1136 .....	H&LSPTP
21	Clamp, Clutch Bank.....	Tally Corp .....	381280.....	5120-134-1137 .....	H&LSPTP

**Table 8-2. TOOL KIT, PAPER TAPE EQUIPMENT  
(AUTODIN DST) (cont)**

Item	Item Description	Manufacturer	Part Number	FSN	Application
22	Deleted.				
23	Deleted.				
24	Gage, Gram (Correx 3-30 gm)	Tally Corp	4043403	5210-799-2106	PTR
25	Hook, Pull - 12 in.	Tally Corp	4043405	5120-134-1142	H&LSPTP
26	Remover, Taper Pin (deleted) <sup>a</sup>				
27	Deleted				
28	Tachometer Adapter	Anelex Corp	56640	6680-168-0957	LSPI
29	Gage, Sprocket Height	Anelex Corp	56263-2	5210-799-2130	H&LSPI
30	Deleted.				
31	Wrench, Tape Sprocket (deleted) <sup>b</sup>				
32	Pliers, Retaining Ring (Truarc) 90°	Waldes-Kohinoor	No. 0200-90	5120-134-1145	H&LSPTP, PTR
33	Applicator E Ring (Truarc)	Waldes-Kohinoor	E12-015	5120-134-1146	H&LSPTP, PTR
34	Tool Case	C. H. Ellis	760	5120-134-1156	

**Note: Above tools required only for maintenance:**

HSPTP - High Speed Paper Tape Punch RO-314/G  
 LSPTP - Low Speed Paper Tape Punch RO-315/G  
 PTR - Punched Tape Reader RP-154/G

HSPI - High Speed Printer Interpreter - part of HSPTP  
 LSPI - Low Speed Printer Interpreter - part of LSPTP

<sup>a</sup> Use item 3 to remove taper pins.

<sup>b</sup> Issued as separate item for high speed tape equipment only.



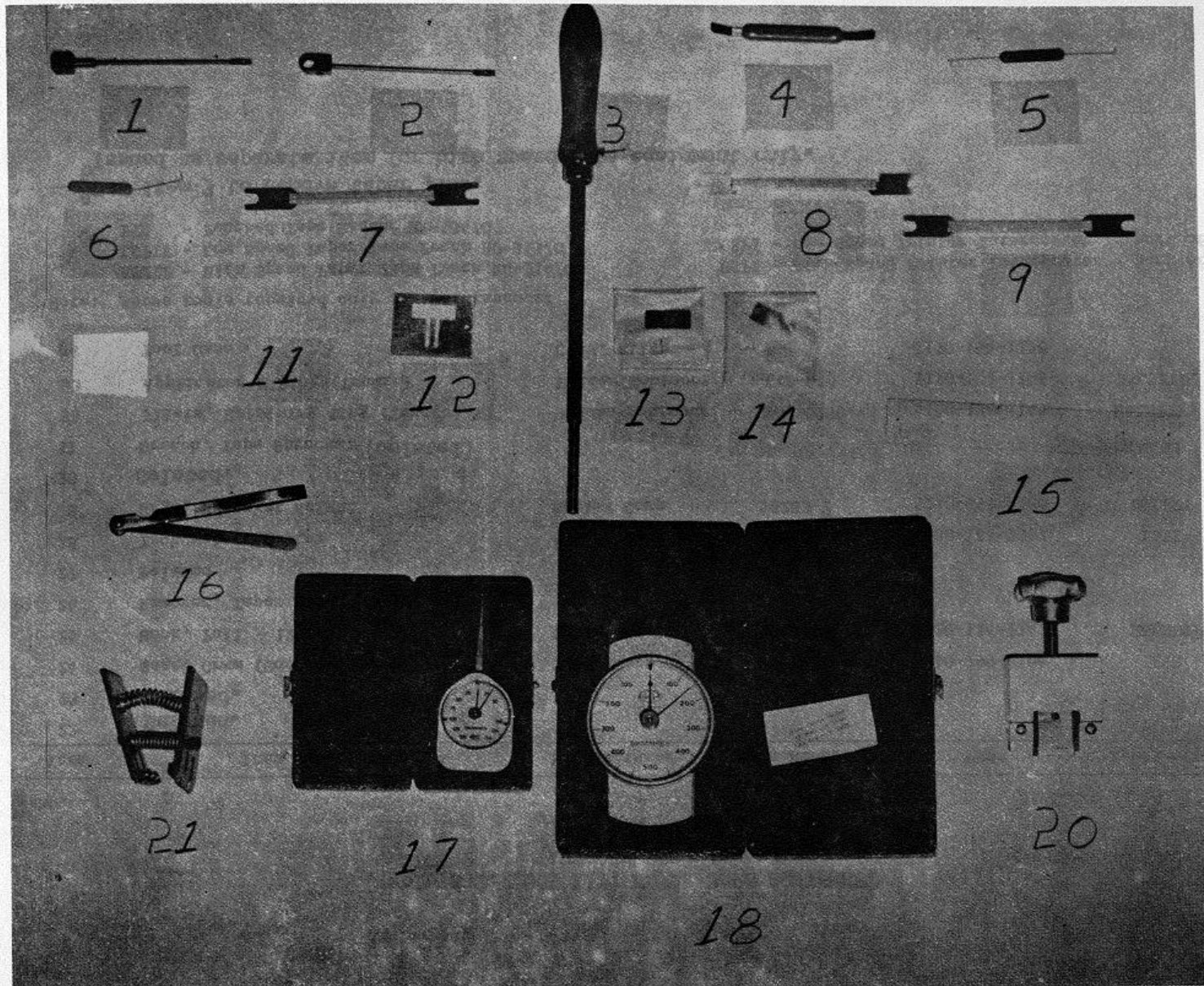


Figure 8-2 (1). Toolkit, paper tape equipment (AUTODIN DST) (par 1 of 2).

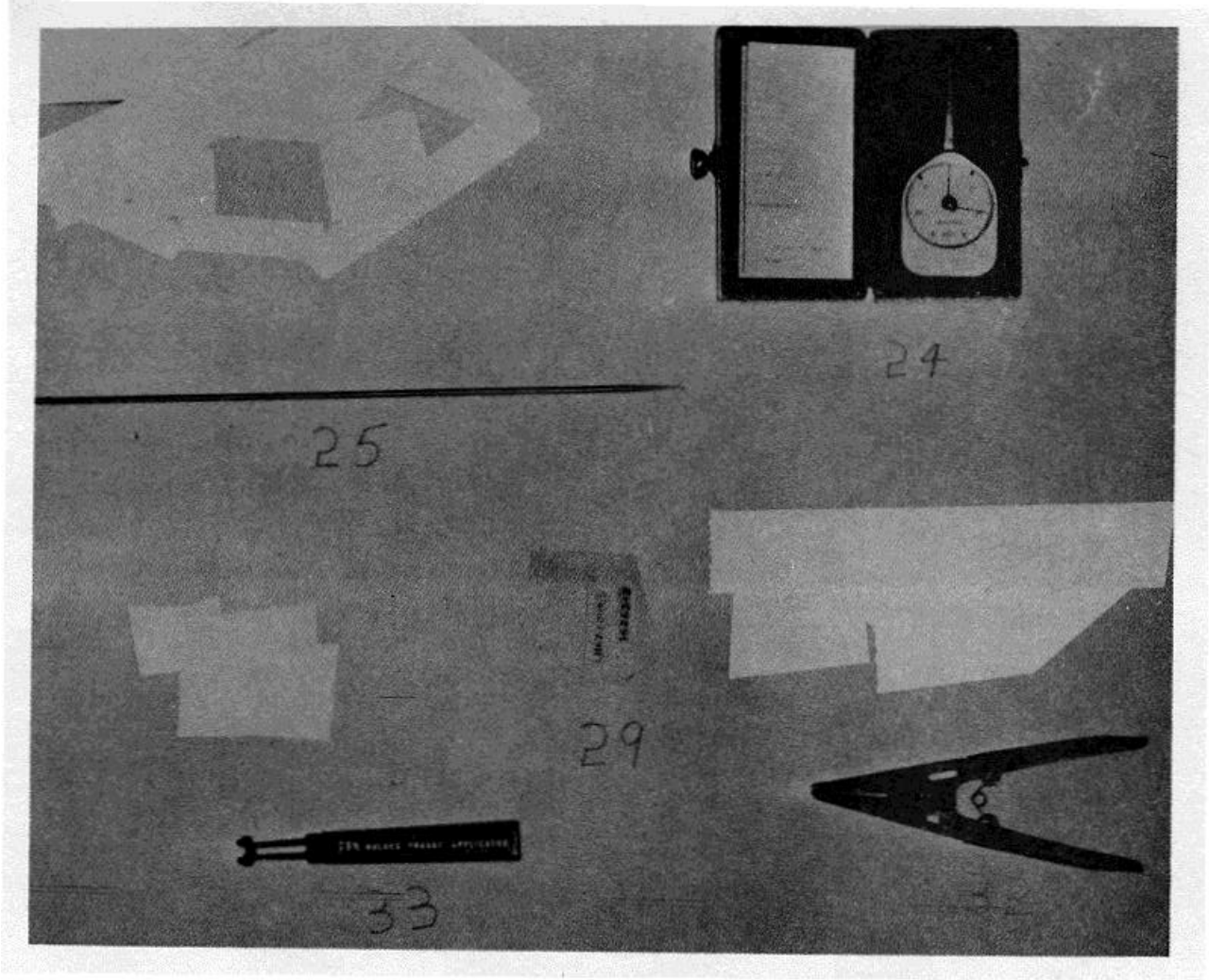


Figure 8-2 (2). Toolkit, paper tape equipment (AUTODIN DST) (part 2 of 2).

**8-4. Toolkit, Punched Card Equipment  
(AUTODIN DST)**

Refer to table 8-3 for a listing of the special tools

and the application of each tool required for maintenance of the AUTODIN DST punched card equipment. Refer to figure 8-3 for illustrations of the special tools.

Table 8-3. TOOL KIT, PUNCHED CARD EQUIPEMENT (AUTODIN DST)

Item	Item Description	Manufacturer	Part Number	FSN
1 8692	Gage, 80 Column Card LSCP	IBM	450550	5895-980-
2 1899	Gage, Throat Roller LSCP	Control Data Corp	49072300	5210-799-
3 2032	Gage, Ribbon Guide & Armature LSCP	Control Data Corp	82513400	5210-799-
4 2033	Gage, Latch Arm & Pinch Roller - Go LSCP	Control Data Corp	82513500	5210-799-
5 2095	Gage, Latch Arm & Pinch Roller - No Go LSCP	Control Data Corp	82513501	5210-799-
6 2064	Gage, Magnet Bank LSCP	Control Data Corp	82513800	5210-799-
7 1890	Gage, Picker Knife & Guard LSCP	Control Data Corp	82514000	5210-799-
8 1896	Gage, Step Error Photocell LSCP	Control Data Corp	82539900	5210-799-
9 10 7868	Deleted Gage, Push-Pull, dial indicating w/max LSCP, HSCP, PCR pointer; 10 lb cap.	John Chatillon & Son	DPP-10	5210-880-
11 9932	Pin, Feeder Cam Timing LSCP	Control Data Corp	82513600	5315-796-
12 8447	Wrench, Ignition LSCP	See <sup>2</sup> below.		5120-184-
13 6071	Wrench, Cam Follower Eccentric LSCP	ACCO/Bristol <sup>b</sup>	9306-0000	5120-489-
14 0333	Connector, Energizing LSCP	Control Data Corp	82513900	5935-134-
15 1152	Puller, Ratchet Wheel LSCP	Control Data Corp	82514100	5120-134-
16 17 2125	Deleted Indicator Cam Timing LSCP	Control Data Corp	82657800	5210-799-
18 1144	Fixture, Hammer Set-Up LSCP	Control Data Corp	47965700	5120-134-
19 1148	Applicator, "E" Ring LSC?	Waldes-Kohinoor	E15-025	5120-134-
20 4746	Applicator, "E" Ring LSCP	Waldes-Kohinoor	E18-025	5120-568-
21 1155	Applicator, "E" Ring LSCP	Waldea-Kohinoor	E37-035	5120-134-
22 9711	Pliers, Retaining Ring, External HSCP, PCR	Waldes-Kohinoor	0018	5120-288-
23 3924	Hook, Spring Push LSCP	-		5120-448-
24 3927	Book, Spring Pull LSCP	-		5120-448-
25 26 8038	Deleted Gun, Hand Grease, 3 oz LSCP	Alemite Div	6570	4930-250-
27 8780	Stewart Warner Pin, Standard Dowel, Dia: Max - LSCP (2 ea req' d) .1253 in, Min - .1251 in - 1-112 in lg.	Allen Mfg. Co	No Part No.	5315-988-

<sup>a</sup> GSA item. Supersedes formerly used Control Data Corp No. 49374200.

<sup>b</sup> Supersedes fatherly used Control Data Corp, No. 82657600.

**Table 8-3. TOOL KIT, PUNCHED CARD EQUIPEMENT (AUTODIN DST)**

Item	Item Description	Manufacturer	Part Number	FSN
28 6744	Wrench, Open End, 1/2 in and 9/16", LSCP 4-1/4 in lg, 5/32 thick	Snap-On Tool Co	J-3236	5120-891-
29 9505	Wrench, 7/16 in box - open end HSCP, PCR	-	-	5120-228-
30 9506	Wrench, 1/2 in box - open end HSCP, PCR	-	-	5120-228-
31 9507	Wrench, 9/16 in, box - open end HSCP, PCR	-	-	5120-228-
32 5396	Handle, Socket Wrench LSCP, HSCP, PCR Hinged Type, 3/8 in sq. dr.	-	-	5120-240-
33 1689	Extension, Socket Wrench, 3/8 in sq. LSCP dr, 3 in long	-	-	5120-243-
34 0404	Wrench, Torque: Deflecting Beam; PCR indicator plate; direct reading w/audible signal; 3/8 in. sq. dr; 0-50 ft lb	-	-	5120-684-
35 6703	Socket, Socket Wrench; double hex LSCP (12-point); 3/8 in. sq. dr.; regular length; 7/16 in nom.	-	-	5120-227-
36 0977	Socket, Socket Wrench; double hex HSCP, PCR (12-point); 3/8 in sq. dr.; regular length; 1/2 in nom.	-	-	5120-237-
37 1151	Key, socket head screw; 3/16 in. HSCP, PCR hex, T-handle w/12 in lg. blade hex blade	Allen Mfg Co	609 T-handle  w/12 in, 7/32 in	5120-134-
38 1141	Key, socket bead screw; 7/32 in. HSCP, PCR hex; T-handle w/12 in lg. blade hex blade	Allen Mfg Co	609 T-handle  w/12 in, 3/16 in	5120-134-
39 1140	Key, socket head screw; 1/4 in. HSCP, PCR hex, T-handle w/12 in lg blade hex blade	Allen Mfg Co	609 T-handle  w/12 in, 1/4 in	5120-134-
40 1143	Key, socket head screw; 5/16 in. HSCP, PCR hex, T-handle w/12 in IS blade hex blade	Allen Mfg Co	609 T-handle  w,/12 in, 5/16 in	5120-134-
41 1964	Rule Steel, Machinists', 12 in lg. LSCP	-	-	5210-273-

**Change 3 8-14**

**TABLE 8-3. TOOL KIT, PUNCH CARD EQUIPMENT  
(AUTODIN DST) (cont)**

Item	Item Description	Manufacturer	Part Number	FSN
42 3453	Gage, Thickness feeler, 27 leaves: LSCP, HSCP, CR 12 in long, 1/2 wide:  .001, .0015, .002, .0025, .003, .004, .005, .006, .007, .008, .009, .010, .011, .012, .013, .014, .015, .016, .017, .018, .019, .020, .021, .023, .022, .024, .025 in thick			5210-753-
43 1156	Tool Case	C. H. Ellis	760	5120-134-
44 6948	Cleaner, chute, blade LWCP	IBM	-	5120898-
Note:	Above tools required only for maintenance: HSCP - High Speed Card Punch LSCP - Low Speed Card Punch PCR - Punched Card Reader	RO-312/G RO-313/G RP-152/G		

**Change 1 8-15**

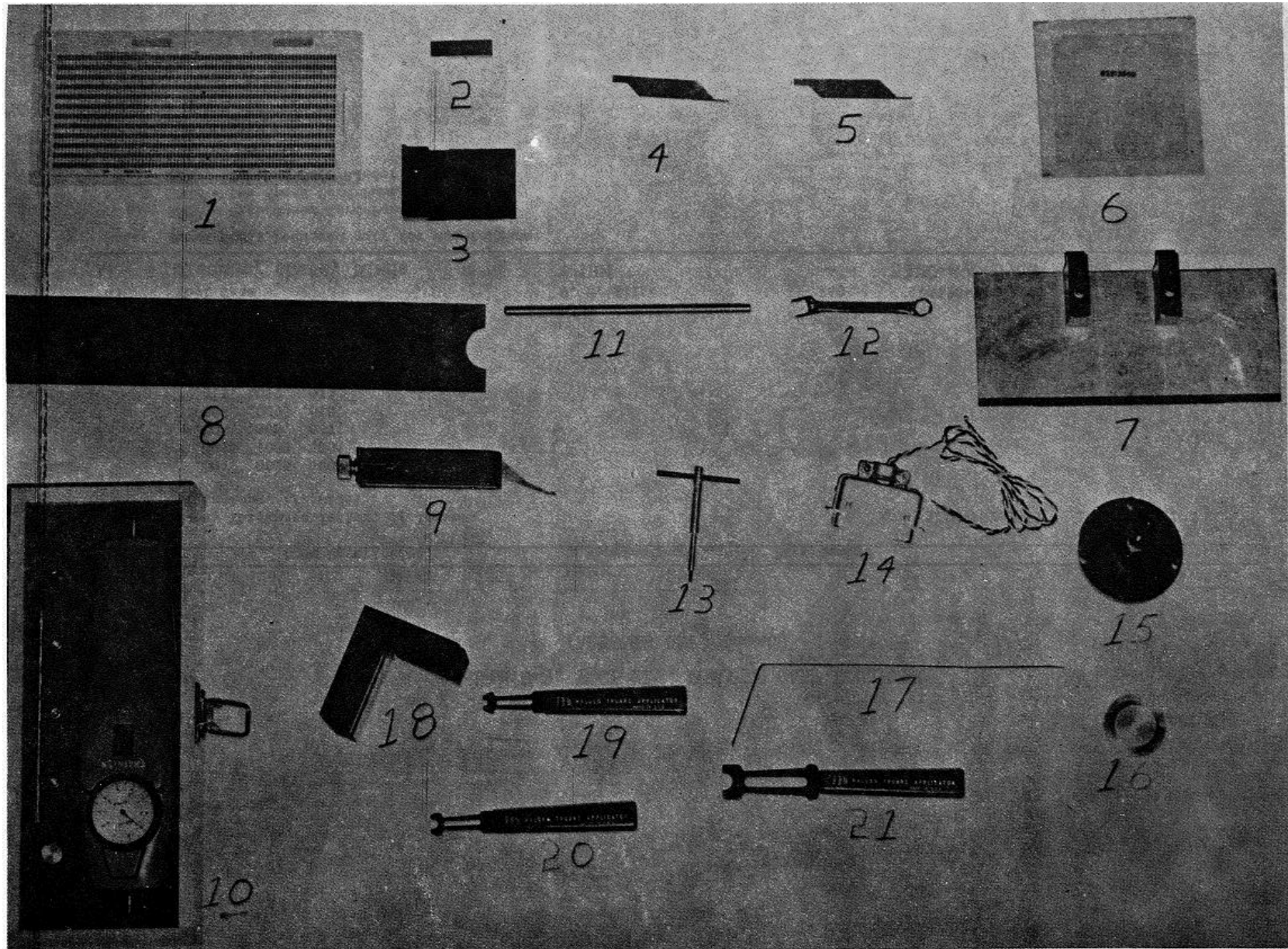


Figure 8-3 (1). Toolkit, punched card equipment (AUTODIN DST) (part 1 of 2).  
Change 1 8-16



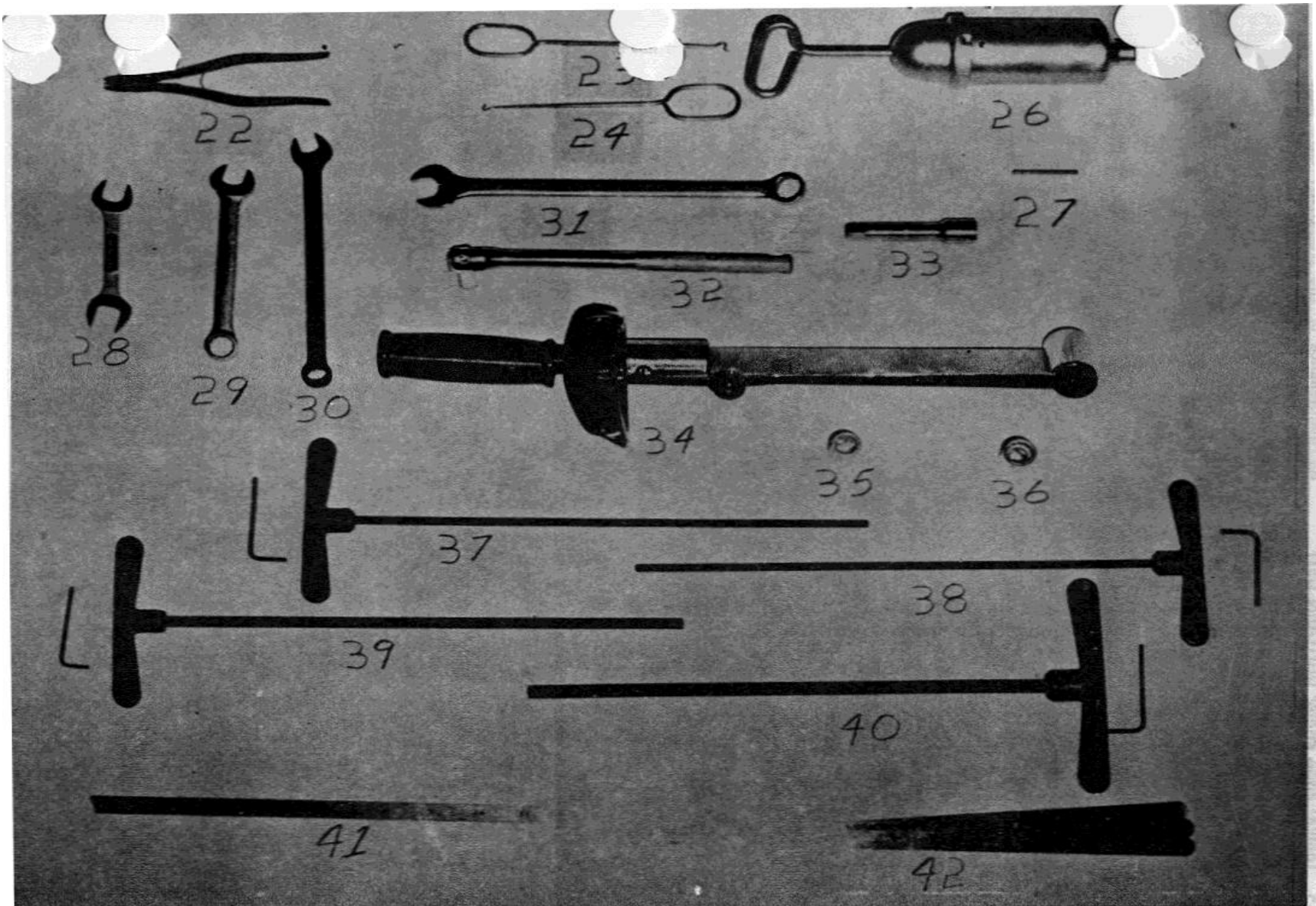


Figure 8-3 (2). Toolkit, punched card equipment (A UTODIN DST) (part 2 of 2).  
Change 1 8-17



**8-5. Toolkit, Page Printer (AUTODIN DST) (fig. 94)**

Refer to table 84 for a listing of the special tools and the application of each tool required

for maintenance of the AUTODIN DST page printer.

Refer to figure 84 for illustrations of the tools.

**Change 1 8-18**

**Table 8-4. TOOL KIT, PAGE PRINTER  
(AUTODIN DST)**

Item	Item Description	Manufacturer	Part Number	FSN	Application
1	Adaptor, Tachometer	Mohawk Data Sciences	34361	6680-00-168-090	
2	Deleted				
3	Gage, Tractor	Anelex Corp	56635	5210-799-1897	
4	Tachometer1	Servo-Tele Prods. Co	SA-757A-2	6680-891-2796	
5	Tool, Hammer Alignment2	Allen Corp	607	5120-489-6070	
6	Tool, Pin Extraction	Winchester Elec	107-1015	5120-790-0131	
7	Tool, Pin Insertion	Winchester Elec	107IOR01	5120-829-6176	
8	Gage, Feeler, 9 leaves,	Starrett	#172A	5210-74-2857	
		1/2 x 3 in.			
9	Screwdriver, Torque, 1/4 in. hex. dr.3	Cleco Pneumatic	Cal-35	5120-021-2041	
10	Adapter, Screwdriver, Torque, Cleco Pneumatic 1/4 in. sq. dr.3	849960 (0-024)	5120-021-2042		

Notes:

1. Also utilized for maintenance of High and Low Speed Printer Interpreter.\*
2. Also utilized for maintenance of High Speed Printer Interpreter.\* (Spsds Anelex Corp No. 51787)
3. Also utilized for maintenance of High and Low Speed Paper Tape Punches.\*

\*Part of High Speed Paper Tape Punch RO-314/G and Low Speed Paper Tape Punch R0-315/G.

**Change 4 8-19**

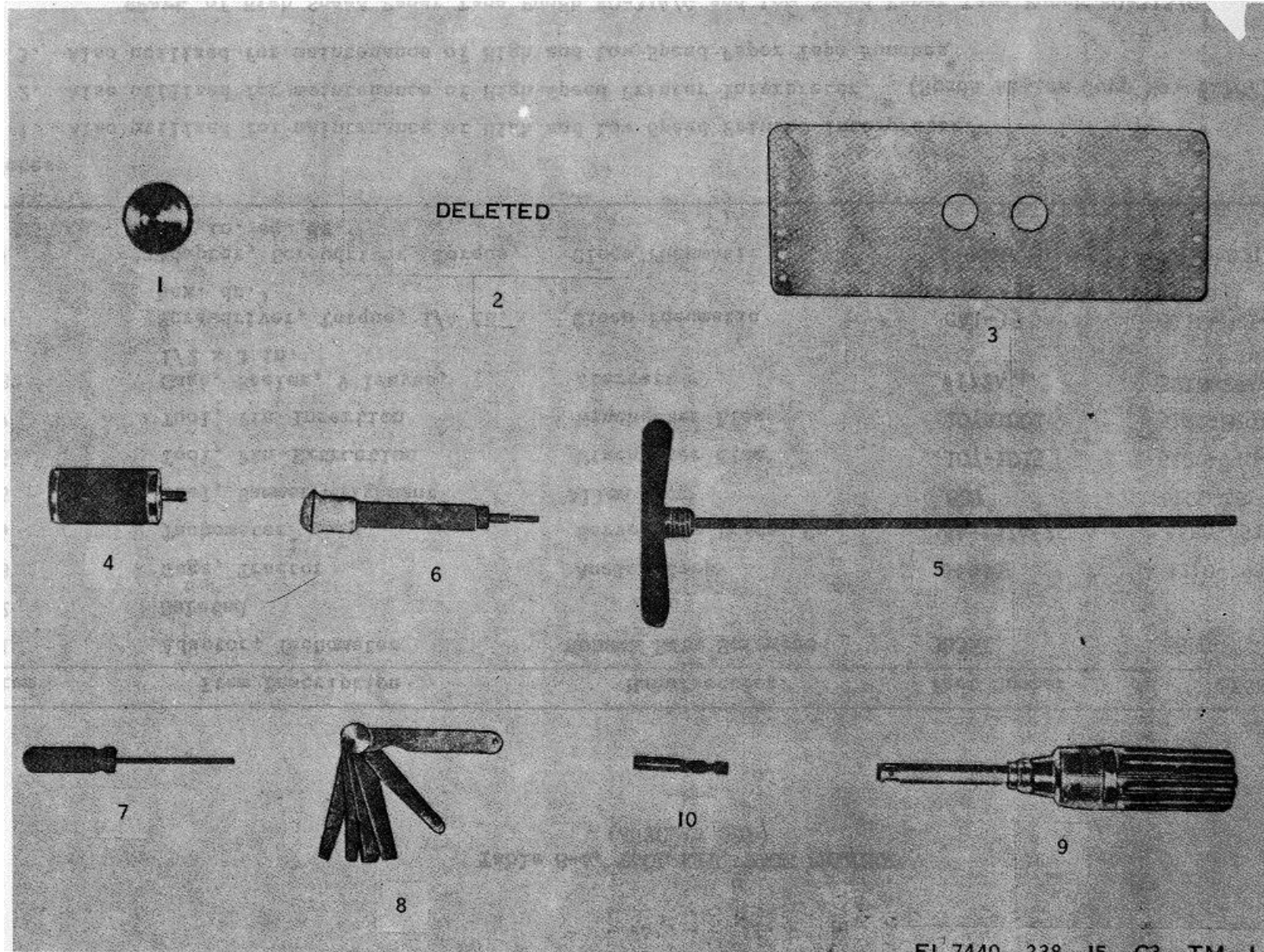


Figure 8-4. Toolkit, page printer (AUTODIN DS7).

Change 4 8-20

APPENDIX A

REFERENCES

Following is a list of applicable references which are available to operating and maintenance personnel:

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	U.S. Army Equipment Index of Modification Work Orders.
MWO 11-7440-214-30-1 NAVELEX 0967-324-0190 TCTO 31W4-2G-504	Modification of Common Control Unit C-8120(P)/G to allow Printer, Page RP-157/G to Become a Primary Output Device When One of the Output Devices Becomes Disabled.
MWO 11-7440-217-30-1 NAVELEX 0967-324-0181 TCTO 31W4-2G-501D	Modification of Card Punch, High Speed RO-312/G to Add Automatic Motor Stop Feature.
MWO 11-7440-218-30-1 NAVELEX 0967-324-0200 TCTO 31W4-2G-506	Modification of Card Punch, Low Speed RO-313/G to Add Automatic Motor Stop Feature.
MWO 11-7440-221-30-1 NAVELEX 0967-324-0210 TCTO 31W4-2G-507	Modification of Paper Tape Punch, High Speed RO-314/G to Add Automatic Motor Stop Feature.
NWO 11-7440-222-30-1 NAVELEX 0967-324-0220 TCTO 31W4-2G-508	Modification of Paper Tape Punch, Low Speed RO-315/G to Add Automatic Motor Stop Feature.
MWO 11-7440-223-30-1 NAVELEX 0967-324-0230 TCTO 31W4-2G-509	Installation of Light-Emitting Diodes in Printer, Page RP-157/G.
NW 00-15PA-1	Technical Inspection Manual, Soldering for Electric and Electronic Application (Navy).
SB 38-100	Preservation, Packaging and Packing Materials, Supplies, and Equipment Used by the Army.
SB 708-42	Federal Supply Code for Manufacturers-United States and Canada - Code to Name (Cataloging Handbook H4-2).
TB SIG 222	Solder and Soldering.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-7440-214-15/ NAVSHIPS 0967-324-0015/ TO 31W4-2G-21	Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists: Common Control Unit C-8120(P)/G and circuit Switch Model SA 1493/G.
TM 11-7440-215-15/ NAVSHIPS 0967-324-0026/ TO 31W4-2G-31	Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools List: Reader, Punched Card RP R152/G.
TM 11-7440-217-15/ NAVELEX 0967-324-0035/ TO 31W4-2G-41	Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools Lists: Card Punch, High Speed RO-312/G.
TM 11-7440-218-15/ NAVELEX 0967-LP-324-0046/ TO03IW4-2G-51	Operator's Organizational, Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools List: Card Punch, Low Speed RO-313/G.

**TM 11-7440-238-15/NAVSHIPS 0967-324-0100/TO 31W4-4-1-101**

- TM 11-7440-219-15/  
NAVSHIPS0967-324-0056/  
TO31W4-2G-61  
Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools Lists: Reader, Punched Tape RP-154(P)/G and Transmission Identification Generator Kit MK-1683/0.
- TM 11-7440-221-15/  
NAVSHIPS0967-324-0062/  
TO31W4-2G-71  
Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools Lists): Paper Tape Punch, High Speed RO-314/0.
- TM 11-7440-222-15/  
NAVSHIPS0967-824-0075/  
TO31W4-2G-81  
Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools Lists: Paper Tape Punch, Low Speed RO-416SG.
- TM 11-7440-223-16/  
NAVELEX 0967-LP-324-0086/  
TO31W4-2G-91  
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools Lists: Printer, Page RP-157/G (NSN 7440-00-997-6210).
- TM 11-7440-228-15/  
NAVSHIPS 0967-324-0094/  
TO31W4-2G-101  
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools Lists: Control-Keyboard C-7186/G.
- TM 11-7440-238-15/  
NAVELEX0967-LP-324-0104/  
TO31W4-4-1-101  
Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Digital Subscriber Terminals AN/FYA-71(V)1 through AN/PYA-71(V)S and Device Switch Module SA-1616/G.
- TM 11-7440-239-15/  
NAVALEX0967-324-0114/  
TO31W4-4-1-111  
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: AUTODIN Digital Subscriber Terminals (Station Manual).
- TM 38-750  
TO00-25-234  
The Army Maintenance Management System (TAMMS)  
General Shop Practice Requirements for the Repair, Maintenance, and Test of Electronic Equipment.
- TM 740-90-1  
TM 750-244-2  
Administrative Storage of Equipment  
Procedure for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command)

**Change 4 A-2**

**BASIC ISSUE ITEMS LIST (BIIL) AND ITEMS TROOP**

**INSTALLED OR AUTHORIZED LIST (ITIAL)**

**Section I. INTRODUCTION**

**B-1. Scope**

This appendix lists only basic issue items required by the crew/operator for installation, operation, and maintenance of Digital Subscriber Terminals AN/FYA-71(V)1 through AN/FYA-71(V)6 and Device Switch Module SA-1616/G.

**B-2. General**

This basic issue items and items troop installed or authorized list is divided into the following sections:

*a. Basic Issue Items List Section II.* A list, in alphabetical sequence, of items which are furnished with, and which must be turned in with the end item.

*b. Items Troop Installed or Authorized List - Section III.* Not applicable.

**B-3. Explanation of Columns**

The following provides an explanation of columns found in the tabular listings:

*a. Illustration.* Not applicable.

*b. National Stock Number.* Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

*c. Description.* Indicates the Federal item name and a minimum description required to identify the item. The last line for each item in the BIIL indicates the part number with the FSCM in parenthesis.

(1) *Part number.* Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

(2) *Federal supply code for manufacturer (FSCM).* The FSCM is a 5-digit numeric code listed in SB 70842 which is used to identify the manufacturer, distributor, or Government agency, etc.

*d. Quantity Furnished with Equipment (Basic Issue Items Only).* Indicates the quantity of the basic issue item furnished with the equipment.

**SECTION II. BASIC ISSUE ITEMS LIST**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION		(4) QTY FURN WITH EQUIP
(a) FIG NO.	(b) ITEM NO.		PART NUMBER & FSCM	USABLE ON CODE	
			CAP, PROTECTIVE J608-16 (07418)		7

APPENDIX D

TEST MESSAGES

**D-1. General**

Following is a listing of test messages which are provided in this appendix. They are to be used as examples for preparing the test messages in card or paper tape format required to carry out the DSTE test procedures described in chapter 5 of this technical manual.

Message	Ø1Ø1	Ø113	Ø2Ø5
	Ø1Ø2	Ø114	Ø2Ø6
	Ø1Ø3	Ø115	Ø2Ø7
	Ø1Ø4	Ø116	Ø2Ø8
	Ø1Ø5	Ø117	Ø2Ø9
	Ø1Ø6	Ø118	Ø21Ø
	Ø1Ø7	Ø119	Ø211
	Ø1Ø8	Ø12Ø	Ø212
	Ø1Ø9	Ø2Ø1	Ø213
	Ø11Ø	Ø2Ø2	Ø214
	Ø111	Ø2Ø3	Ø215
	Ø112	Ø2Ø4	

b. The following form for representation of certain characters for ASCII and ITA #2 tape messages is used in this procedure:

C  
R = Carriage return

B  
K = Blank

S  
I = Shift in

B  
E = Bell  
L

D  
C = DC4  
4

L  
S = Letters (or letters shift)

L  
F = Line feed

S  
O = Shift out

E  
M = End of medium

N  
U = Null  
L

D  
E = Delete  
L

F  
S = figure (or figures shift)

**D-2. Format Instructions**

AR messages to be used in DSTE set testing shall conform to the card and paper tape format as specified in JANAP-.128. The Routing Indicator for all messages shall be RUXXGDE. The precedence for all messages (except flash) shall be routine (R) and the Security Classification shall be unclassified (U).

a. To assist in any record keeping function, Station Serial Numbering of messages shall be sequential as described by characters 17 through 20 of each header. In addition, the date-time group in the header (characters 22 through 28), shall conform to the following standard. The date-time group shown in each message as daymoyr is understood to mean:

day = three digit date of year (Jan. 1 = ØØ1, Dec. 31=365)

mo = two digit month of year (Jan. =Ø, Nov. = 11)

yr = last two digits of year (68=1968, 69=1969)

*Example:* 246Ø868 = 2 Sep 68

**NOTE**

The term ( EOMS ) is used to define the end-of-message sequence for paper tape which consists of 2 carriage returns, 8 line feeds, 4 N's and 6 blanks.

CCLLLLLLLL BBBB

(EOMS) = RRRRRRRRNNNNKKKKKK



1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message Ø1Ø1

LLLLL F L FL FLCLL  
SSSSRTTUTEST RUXXGDESØ1Ø1 daymoyr-SUUUUS-SRUXXGDES.SRFF

THIS MESSAGE TESTS THE D.S.T.E. FOR ERRORRED PAPER TAPE SEQUENCES RFF

CLL  
XNNNRFF

THIS MESSAGE TESTS THE D.S.T.E. FOR ERRORRED PAPER TAPE EOM SEQUENCES RFF

CLL  
NXNNRFF

THIS MESSAGE TESTS THE D.S.T.E. FOR ERRORRED PAPER TAPE EOM SEQUENCES RFF

CLL  
NNNXRFF

THIS MESSAGE TESTS THE D.S.T.E. FOR ERRORRED PAPER TAPE EOM SEQUENCES RFR

CLL  
NNNNRFF(EOEMS)

1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message 0102

RCCUTEST RUXXGDE0102 daymojr 0007-UUUU-RUXXGDE.

THIS MESSAGE TESTS THE D.S.T.E. TERMINAL EQUIPMENTS FOR ERRORRED CARD EOMS NNNNX

THIS MESSAGE TESTS THE D.S.T.E. TERMINAL EQUIPMENTS FOR ERRORRED CARD EOMS 2XNNN

THIS MESSAGE TESTS THE D.S.T.E. TERMINAL EQUIPMENTS FOR ERRORRED CARD EOMS 3NXNN

THIS MESSAGE TESTS THE D.S.T.E. TERMINAL EQUIPMENTS FOR ERRORRED CARD EOMS 4NNXN

THIS MESSAGE TESTS THE D.S.T.E. TERMINAL EQUIPMENTS FOR ERRORRED CARD EOMS 5NNNX

RCCUTEST RUXXGDE0102 daymojr 0007-UUUU NNNN

1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message 0103

RCCUTEST RUXXGDE0103 daymojr 0006-UUUU-RUXXGDE.

(4 cards as shown below) (see note)

TESTABCDEFGHIJKLMN0PQRSTUVWXYZ0123456789!"#\$ %&'()\*+,-./:;<=>

? [~]^\_ABCDEFGHIJKL

RCCUTEST RUXXGDE001003 daymojr 0006-UUUU NNNN

NOTE

Characters shown above reflect the characters printed by the subscriber terminal printing equipment. Refer to table 2-1 for actual character being punched for opening bracket ([) closing bracket (]), tilde (~), and grave accent characters (`).



1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message 0107

RCCUTEST RUXXGDE0107 daymoyr 0011-UUUU-RUXXGDE.

9 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES.

RCCUTE ST RUXXGDE0107 7 daymoyr 0011-UUUU NNNN

Message 0108

LLLL F L F L F CLL  
SSSSRTTUTEST RUXXGDES0108 daymoyr-SUUUUS-SRUXXGDES.RFF

9 lines as shown below

L F L  
STEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK S1234567890 STIMES  
CLL  
RFF

(EOMS)

(Messages 0104, 0106 & 0108 are on one tape.)

Message 0109

RCCUTEST RUXXGDE0109 daymoyr 0012-UUUU-RUXXGDE.

10 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890. TIMES.

RCCUTEST RUXXGDE0109 daymoyr-0012-UUUU NNNN

Message 0110

LLLL F L F L F CLL  
SSSSRTTUTEST RUXXGDES0110 daymoyr-SUUUUS-SRUXXGDES.RFF

12 lines as shown below

L F L  
STEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK S1234567890 STIMES  
CLL  
RFF

(EOMS)

(Messages 0110 & 0111 are on one tape.)

1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message Ø111

LLLL F L F L F CLL  
SSSSRTTUTEST RUXXGDESØ111 daymoyr-SUUUUS-SRUXXGDES.RFF

11 lines as shown below

L F L  
STEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK S123456789Ø STIMES

CLL  
RFF

(EOMS)

(Messages Ø11Ø & Ø111 are on one tape.)

Message Ø112

LLLL F L F L F CLL  
SSSSRTTUTEST RUXXGDESØ112 daymoyr-SUUUUS-SRUXXGDES.RFF

3 lines as shown below

L F L  
STEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK S123456789Ø STIMES

CLL  
RFF

Message Ø113

LLLL F L F L F CLL  
SSSSRTTUTEST RUXXGDESØ113 daymoyr-SUUUUS-SRUXXGDES.RFF

2 lines as shown below

L F L  
STEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK S123456789Ø STIMES

CLL  
RFF

(EOMS)

Message Ø114

RCCUTEST RUXXGDEØ114 daymoyr ØØØ4-UUUU-RUXXGDE.

2 cards of solid 3's except thirtieth column  
of second card possesses a 3 and a 4 over punch.

RCCUTEST RUXXGDEØ114 daymoyr ØØØ4-UUUU

NNNN

1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message 0115

RCCUTEST RUXXGDE0115 daymojr 0004-UUUU-RUXXGDE.

2 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES.

RCCUTEST RUXXGDE0114 daymojr 0004-UUUU NNNN

Message 0116

LLLLLLLLLLLLL F L F L F CLL  
SSSSSSSSSSSRRTTUTEST RUXXGDES0116 daymojr-SUUUUS-SRUXXGDES.RFF

2 lines as shown below

L F L  
STEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK S1234567890 STIMES

CLL  
RFF  
LLLLLLLLLLLL  
(EOMS)SSSSSSSSSS

Message 0117

LLLL F L F L F CLL  
SSSSRRTTUTEST RUXXGDES0117 daymojr-SUUUUS-SRUXXGDES.RFF

2 lines as shown below

L F L  
STEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK S1234567890 STIMES

CLL  
RFF  
(EOMS)

Message 0118

RCCUTEST RUXXGDE0118 daymojr 0050-UUUU-RUXXGDE.

48 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAXY DOGS BACK 1234567890 TIMES.

RCCUTEST RUXXGDE0118 daymojr 0050-UUUU NNNN

Change 3 D-7

1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message 0119

RCCUTEST RUXXGDE0119 daymojr 0150-UUUU-RUXXGDE.

148 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES.

RCCUTEST RUXXGDE0119 daymojr 0150-UUUU

Message 0120

LLLL F L FL F CLL  
SSSSRTTUTEST RUXXGDES0120 daymojr-SUUUUS-SRUXXGDES.RFF

5 lines as shown below

L F L  
STEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK S1234567890 STIMES

CLL  
RFF

(EOMS)

Message 0201

CLL  
RAAUTEST RUXXGDE0201 daymojr-UUUU-RUXXGDE.RFF

CLL  
THIS MESSAGE TESTS THE D.S.T.E. FOR ERRORRED PAPER TAPE SEQUENCES.RFF

CLL  
XNNNRFF

CLL  
THIS MESSAGE TESTS THE D.S.T.E. FOR ERRORRED PAPER TAPE EOM SEQUENCES.RFF

CLL  
NXNNRFF

CLL  
THJS MESSAGE TESTS THE D.S.T.E. FOR ERRORRED PAPER TAPE EOM SEQUENCES.RFF

CLL  
NNNXRFF

CLC  
THIS MESSAGE TESTS THE D.S.T.E. FOR ERRORRED PAPER TAPE EOM SEQUENCES.RFR

CLL  
NNNNRFF (EOMS)

1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message 0202

CLL

RAAUTEST RUXXGDE0202 daymoyr-UUUU-RUXXGDE.RFF

4 lines as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES

CLL  
RFF

(EOMS)

(Messages 0202, 0204 & 0206 are on one tape.)

Message 0203

RCCUTEST RUXXGDE0203 daymoyr0006 UUUU-RUXXGDE.

4 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES.

RCCUTEST RUXXGDE0203 daymoyr0006-UUUU NNNN

Message 0204

CLL

RAAUTEST RUXXGDE0204 daymoyr-UUUU-RUXXGDE.RFF

6 lines as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES

CLL  
RFF

(EOMS)

(Messages 0202, 0204 & 0206 are on one tape.)

Message 0205

RCCUTEST RUXXGDE0205 daymoyr0008-UUUU-RUXXGDE.

6 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES.

RCCUTEST RUXXGDE0203 daymoyr0008UUUU NNNN



1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message 0206

CLL  
RAAUTEST RUXXGDE0206 daymoyr-UUUU-RUXXGDE.RFF

12 lines as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES

CLL  
RFF

(EOMS)

(Messages 0202, 0204 & 0206 are on one tape.)

Message 0207

RCCUTEST RUXXGDE0207 daymoyr 0016-UUUU-RUXXGDE.

14 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES.

RCCUTEST RUXXGDE0207 daymoyr0016-UUUU NNNN

Message 0208 (Loop)

BBBBBB CLL  
KKKKKKRAAUTEST RUXXGDE0208 daymoyr-UUUU-RUXXGDE.RFF

2 lines as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES

CLL  
RFF

BBBBBBBBB  
(EOMS)KKKKKKKKK

Message 0209

CLL  
RAAUTEST RUXXGDE0209 daymoyr-UUUU-RUXXGDE.RFF

4 lines as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES

CLL  
RFF

(EOMS)

1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message 0210

RCCUTEST RUXXGDE0210 daymoyr 0156UUUU-RUXXGDE.

15 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES.

RCCUTEST RUXXGDE0120 daymoyr 0156-UUUU NNNN

Message 0211

RCCUTEST RUXXGDE0211 daymoyr 0020-UUUU-RUXXGDE.

18 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES.

RCCUTEST RUXXGDE0211 daymoyr0020-UUUU NNNN

Message 0212 No EOM Card

RCCUTEST RUXXGDE0212 daymoyr 0006-UUUU-RUXXGDE.

4 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES.

End of Message Card for Message 0212

RCCUTEST RUXXGDE0121 daymoyr0006-UUUU NNNN

Message 0213

RCCUTEST RUXXGDE0213 daymoyr0009-UUUU-RUXXGDE.

7 cards as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890 TIMES.

RCCUTEST RUXXGDE0213 daymoyr 0009-UUUU NNNN

Pilot Header For Message 0214

CLLBBBBBBBBBBBB

RAAUTEST RUXXGDE0214 daymoyr-UUU-RUXXGDE.RFFKKKKKKKKKKKK

1234567890123456789012345678901234567890123456789012345678901234567890  
10 20 30 40 50 60 70 80

Message Ø214

CLL

RAAUTEST RUXXGDEØ214 daymoyr-UUUU-RUXXEDG.RFF

4 lines as shown below

TEST THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 123456789Ø TIMES

CLL  
RFF

(EOMS)

Message Ø215

RCCUTEST RUXXGDEØ215 daymoyr ØØØ8-UUUU-RUXXGDE.

6 self-test cards from LSCP

RCCUTEST RUXXGDEØ215 daymoyrØØØ8-UUUU NNNN

Message Ø216

RCCUTEST RUXXGDEØ216 daymoyr ØØ12-UUUU-RUXXGDE.

+  
10 cards of solid 12-10 punches to represent the plus-zero (0) character. This character is indicated by the opening bracket ([]) on AUTODIN printing equipment.

**NOTE**

**The cards may be prepared by using the control keyboard connected to the low speed card punch and pressing the opening bracket ([ ) key on the control keyboard.**

RCCUTEST RUXXGDEØ216 daymoyr ØØ12-UUUU NNNN

Message Ø217

RCUTEST RUXXGDEØ217 daymoyr ØØ12-UUUU-RUXXGDE.

-  
10 cards of solid 11-10 punches to represent the minus-zero (0) character. This character is indicated by the closing bracket (]) on AUTODIN printing equipment.

**NOTE**

**The cards may be prepared by using the control keyboard connected to the low speed card punch and pressing the closing bracket (]) key on the control keyboard.**

RCUTEST RUXXGDEØ217 daymoyrØØ12-UUUU NNNN

**GLOSSARY**

**ADDRESS** - The destination of the message in a communication system, or storage location of information in a data processing system.

**ADMSC** - Automatic Digital Message Switching Center. Name of automated switching center used in AUTODIN and installed overseas.

**AESC** - Automatic Electronic Switching Center. Name of automated switching center used in AUTODIN and installed in continental United States.

**ASCII** - American Standard Code for Information Interchange. A seven - bit plus parity code, promulgated by the American Standard Association. Used for information exchange between all devices of AUTODIN system.

**ASYNCHRONOUS TRANSMISSION** - A transmission process such that between any two significant instants in the same group, there is always an integral number of unit intervals. Between the significant instants located in different groups, there is not always an integral number of unit intervals.

**AUTODIN** - Automatic Digital Network.

**AUTOVON** - Automatic Voice Network.

**BAUD** - The unit of modulation rate. One baud corresponds to a rate of one unit interval per second. The modulation rate is expressed as the reciprocal of the duration in seconds of the unit interval. Example: if the duration of the unit interval is 20 milliseconds, the modulation rate is 50 bands.

**BINARY CODE** - A code composed of a combination of entities, each of which can assume one of two possible states.

**BINARY DIGIT** - An information state in binary notation (e.g., 0 or 1).

**BINARY STREAM** - Serial flow of binary digits.

**BIT** - A contraction of the term binary digit.

**BLOCK - BY - BLOCK TRANSMISSION MODE** - A transmission mode in which a line block is not transmitted until proper acknowledgment is received for the preceding line block.

**BUFFER** - A storage device used to compensate for a difference in the rate of flow of information, or the time of occurrence of events.

**CAU** - Crypto Ancillary Unit.

**CHANNEL** - A means of one - way transmission. Several channels may share a common path as in carrier systems; in this case each channel is allocated a particular frequency band which is reserved for it.

**CHANNEL COORDINATION** - Interaction between terminals of a transmission line to effect SYNC, exchange of message responsibility, etc.

**CHARACTER** - The actual or coded representation of a digit, letter, or special symbol.

**CHARACTER INTERVAL** - The total number of unit intervals (including synchronizing, intelligence, error checking, or control bits) required to transmit any given communication system. Extra bits which are not associated with individual characters are not included.

**CLOCK** - A reference source of timing information for a machine or system.

**CODE (telegraph or data)** - A system of rules and conventions according to which the telegraph signals forming a message or the data signal forming a block should be formed, transmitted, received and processed.

**CODE CHARACTER** - The representation of a discrete value or symbol in accordance with a code.

**CODE CONVERSION** - The process by which a code of some predetermined bit structure (for example, 5, 7, 14 bits per character interval) is converted to a second code with more or less bits per character interval. No alphabetical significance is assumed in this process. In certain cases, such as the conversion from start/stop telegraph equipment to synchronous equipment, a code conversion process may only consist of discarding the stop and start elements and adding a sixth element to indicate the stop and start condition. In other cases, it may consist of addition or deletion or control and/or parity bits.

**CONTINUOUS TRANSMISSION CODR** - A transmission mode in which line blocks are sent without any pause between them, as long as no more than one completely transmitted block is unacknowledged.  
Receipt of acknowledgment for a line block is expected during the transmission of the succeeding line block.

**CSU** - Circuit Switching Unit.

**DATA (analog or digital)** - Material transmitted or processed to provide information, or to control a process.

**DATA BLOCK** - The accumulation of a specific number of characters to be transmitted as a block or unit.

**DATA SOURCE** - The equipment which supplies data signals to be transmitted.

DATA TERMINAL - Equipment employed at the end of a transmission circuit for the transmission and reception of data. It may include end instruments or signal converters or both.

DCA - Defense Communications Agency.

DEMODULATION - A process such that the signal derived as a result of the process has essentially the same characteristics as the original signal before modulation.

DST - Digital Subscriber Terminal. Equipment installed at subscriber terminals of AUTODIN system exclusive of cryptographic and modem devices.

DUPLEX - A type of operation in which simultaneous two - way conversations, messages, or information may be passed between any two or more given points. (Also known as full - duplex).

ERROR, Single, Double, Triple, etc. - A group of 1, 2, 3, etc. consecutive erroneous bits, preceded and followed immediately by at least one correct bit.

FORMAT - Arrangement of bits or characters within a group, such as a word, message or language, shape, size and general makeup of a document.

HEADER - The first part of a message, which contains all necessary information for directing the message to desired destinations.

INPUT/OUTPUT DEVICE - Any equipment which introduces data into or extracts data from a data communication system.

INTERFACE - A concept involving the specification of interconnection between two equipments or systems. The specification includes the type, quantity, and function of the interconnection circuits and the type and form of signals to be interchanged via those circuits.

INTRA - SYSTEM TRUNK - A channel connecting two ADMSC's.

ITA#2 - International Telegraph Alphabet Code No. 2. A five - bit non - parity code used for teletypewriters. At digital subscriber terminals may be used in paper tape reader and high and low speed paper tape punches.

LANGUAGE MEDIA FORMAT (LMF) - A two - character sequence in a data formatted message header; first character indicating the method used by the originator in preparing the message and the second indicating the preferred form of delivery.

LINE - A trunk or circuit between an ADMSC and a tributary.

LINE BITS - The bits used in transmitting messages including bits used in control characters for coordination purposes.

LINE BLOCK - Eighty - character block of data framed by four framing characters, which is transmitted on Mode I/III channels.

MEMORY - A device that stores bits, words, or characters in a computer system.

MODE I CHANNEL COORDINATION - A duplex operation with automatic error and channel controls allowing independent and simultaneous two - way transmission.

MODE II CHANNEL COORDINATION - A duplex operation without automatic error and channel controls allowing independent and simultaneous two - way transmission.

MODE III CHANNEL COORDINATION - A duplex operation with automatic error and channel controls, but utilizing only one - way data transmission. The return direction is used exclusively for error control and channel coordination responses. The Mode III channel is reversible on a message basis.

MODE IV CHANNEL COORDINATION - Unidirectional operation - send only or receive only - without error control and channel coordination. The Mode IV is nonreversible.

MODE V CHANNEL COORDINATION - Teletypewriter controlled mode. A duplex operation with character framing detection and channel controls allowing independent and simultaneous two - way transmission.

MODEM - Acronym for modulator - demodulator.

MODULATION - The process of varying some characteristics of the carrier wave in accordance with the instantaneous value, or samples of the intelligence to be transmitted.

MODULATION RATE - Reciprocal of the unit interval measured in seconds. (This rate is expressed in bauds.) MSU - Message Switching Unit.

OFF - LINE - Units removed from the transmitting or receiving mode.

ON - LINE - Units transmitting, receiving, or ready to perform same.

ROUTING INDICATORS - An address or group of characters in the header of a message defining the final circuit or terminal to which the message has to be delivered.

SERVICE MESSAGE - A brief, concise message between the ADMSC/AESC and communication centers or tributary stations pertaining to any phase of traffic handling.

**SYNCHRONOUS TRANSMISSION** - A transmission process such that between any two significant instants in the overall stream, there is always an integral number of unit intervals.

**TRIBUTARY** - The transmission path and terminal equipment associated with a particular subscriber to the AUTODIN system.

**TRUNK** - A single circuit between two points, both of which are switching centers and/or individual distribution points.

**TRUNK GROUP** - Two or more trunks between the same two points.

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**Change 4. 1-2**



By Order of the Secretaries of the Army, the Navy, and the Air Force:

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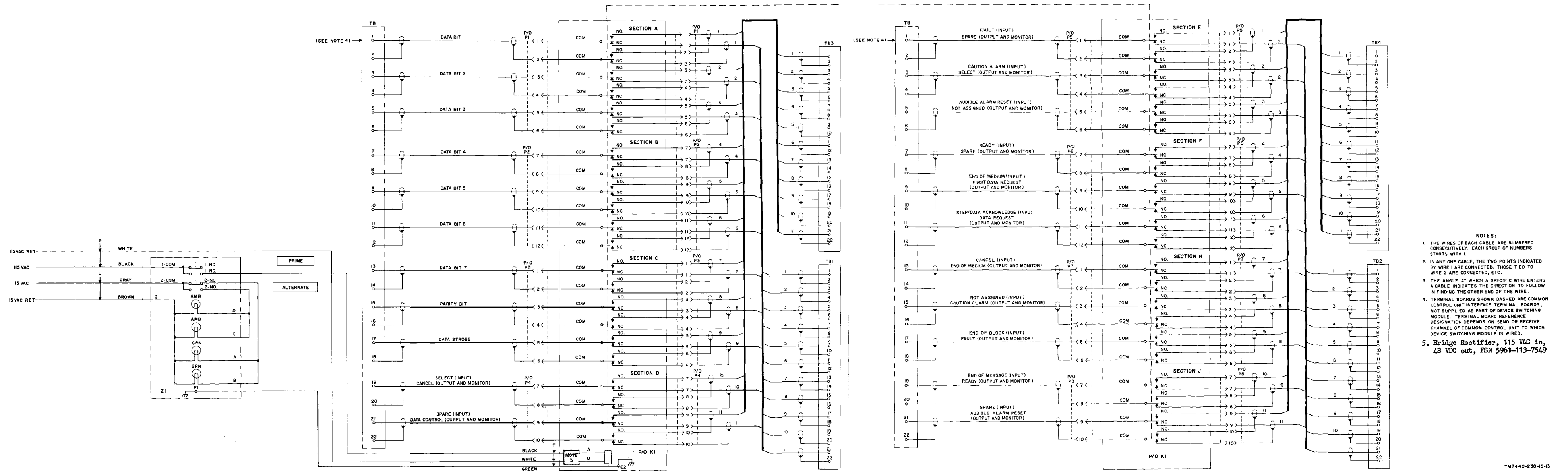
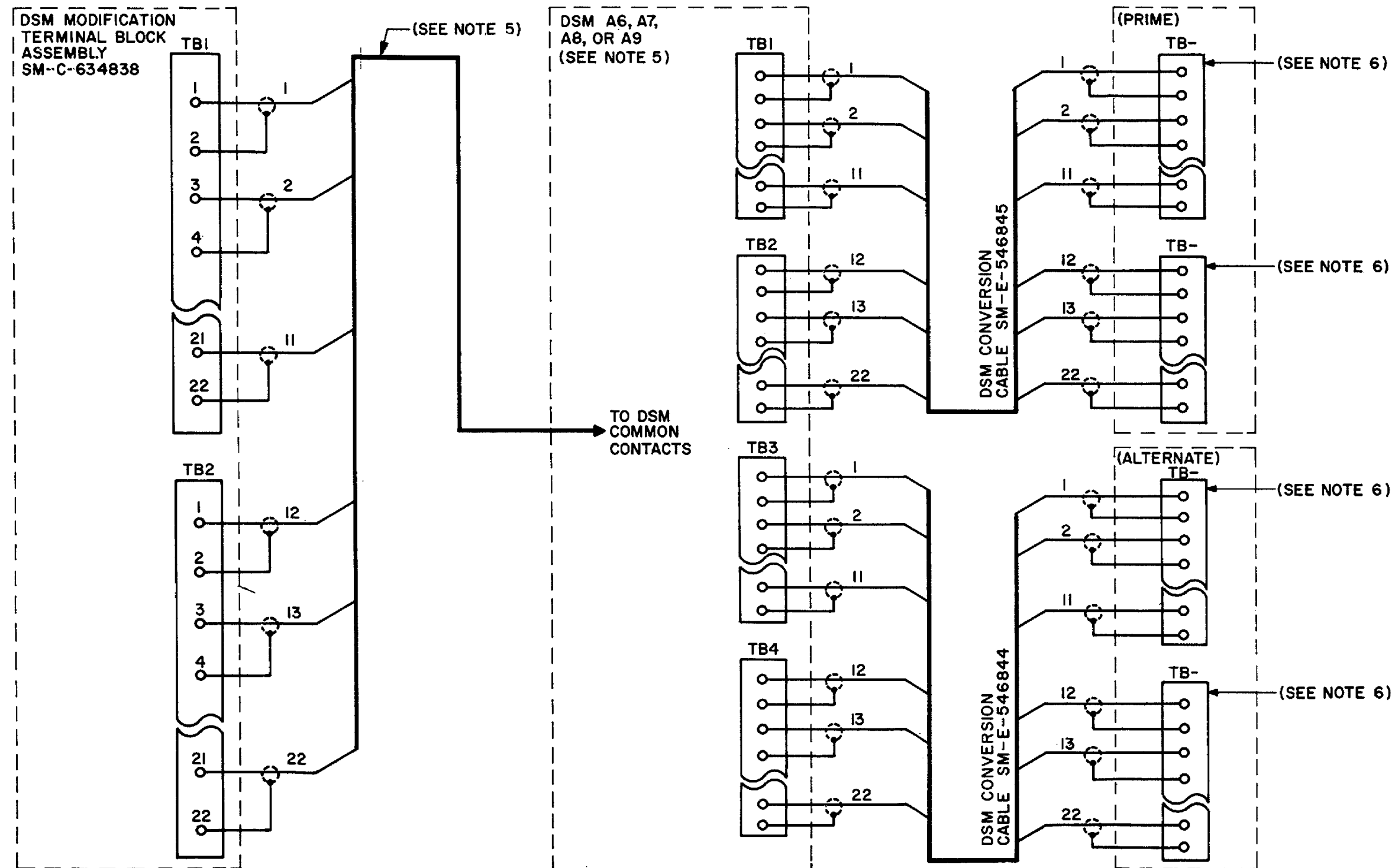


Figure 3-4. Device switching module schematic diagram.

Change 2 3-16.1



NOTES

1. TERMINAL BOARDS ARE DRAWN SHOWING TYPICAL CONNECTIONS EACH TERMINAL BOARD CONTAINS 22 TERMINALS AND HAS 11 SHIELDED WIRES CONNECTED
2. THE WIRES OF EACH CABLE ARE NUMBERED CONSECUTIVELY EACH GROUP OF NUMBERS STARTS WITH 1
3. THE ANGLE AT WHICH A SPECIFIC WIRE ENTERS A CABLE INDICATES THE DIRECTION TO FOLLOW IN FINDING THE OTHER END OF THE WIRE
4. TO DETERMINE FUNCTION OF A SPECIFIC WIRE, REFER TO
  - A FIG 3-12 IF INPUT DEVICE.
  - B FIG 3-13 IF OUTPUT AND/OR MONITOR DEVICE
5. CABLE SHOWN IS PART OF DEVICE SWITCHING MODULE REFER TO FIG 3-4 FOR DETAILED SCHEMATIC DRAWING OF DEVICE SWITCHING MODULE
6. TERMINAL BOARDS SHOWN DASHED ARE COMMON CONTROL UNIT INTERFACE TERMINAL BOARDS, NOT SUPPLIED AS PART OF DEVICE SWITCHING MODULE TERMINAL BOARD REFERENCE DESIGNATION DEPENDS ON SEND OR RECEIVE CHANNEL OF COMMON CONTROL UNIT TO WHICH THE DEVICE SWITCHING MODULE IS WIRED

Figure 3-4.3 Converted device switching module schematic diagram

Change 1 3-16.5



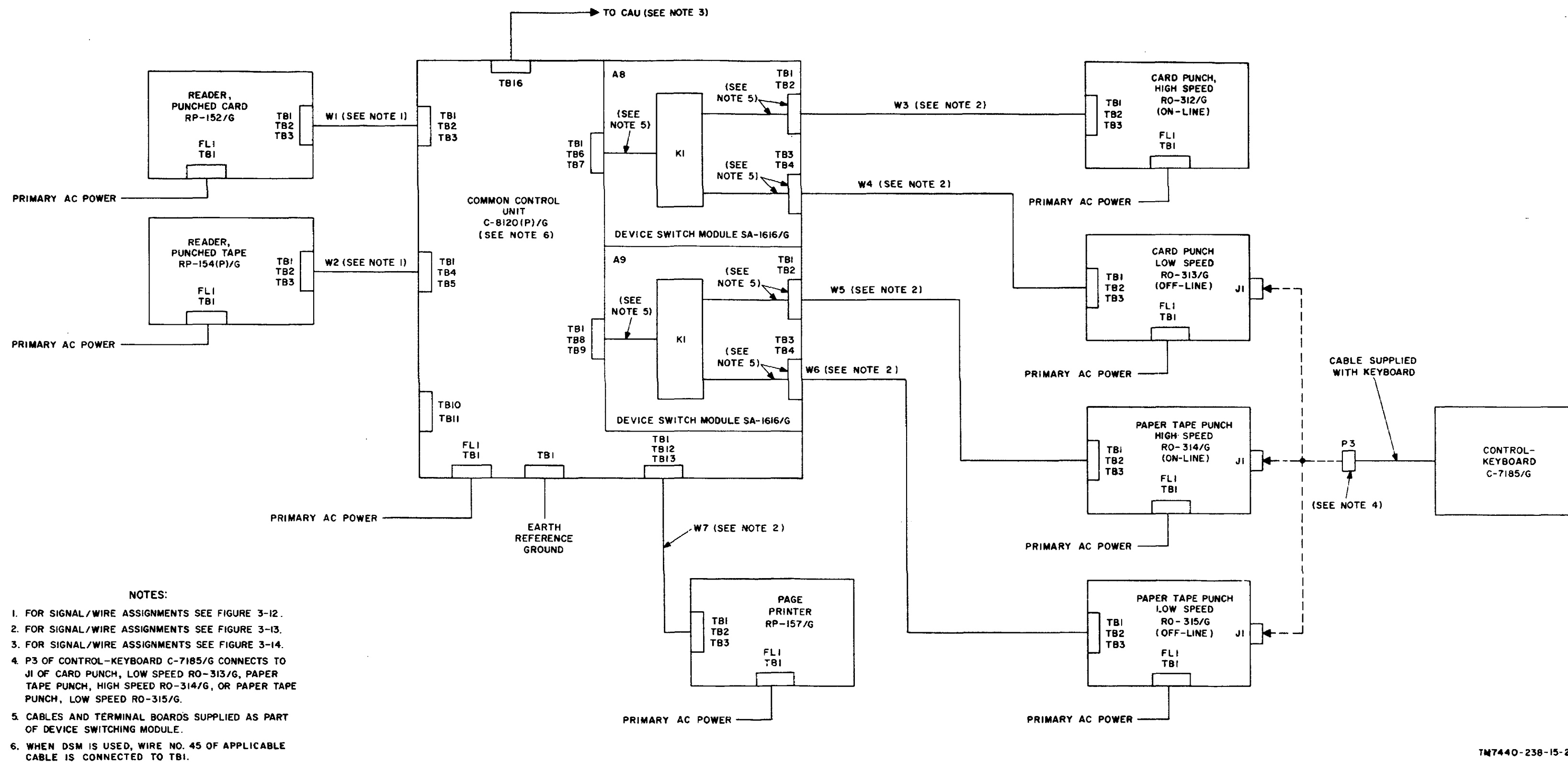
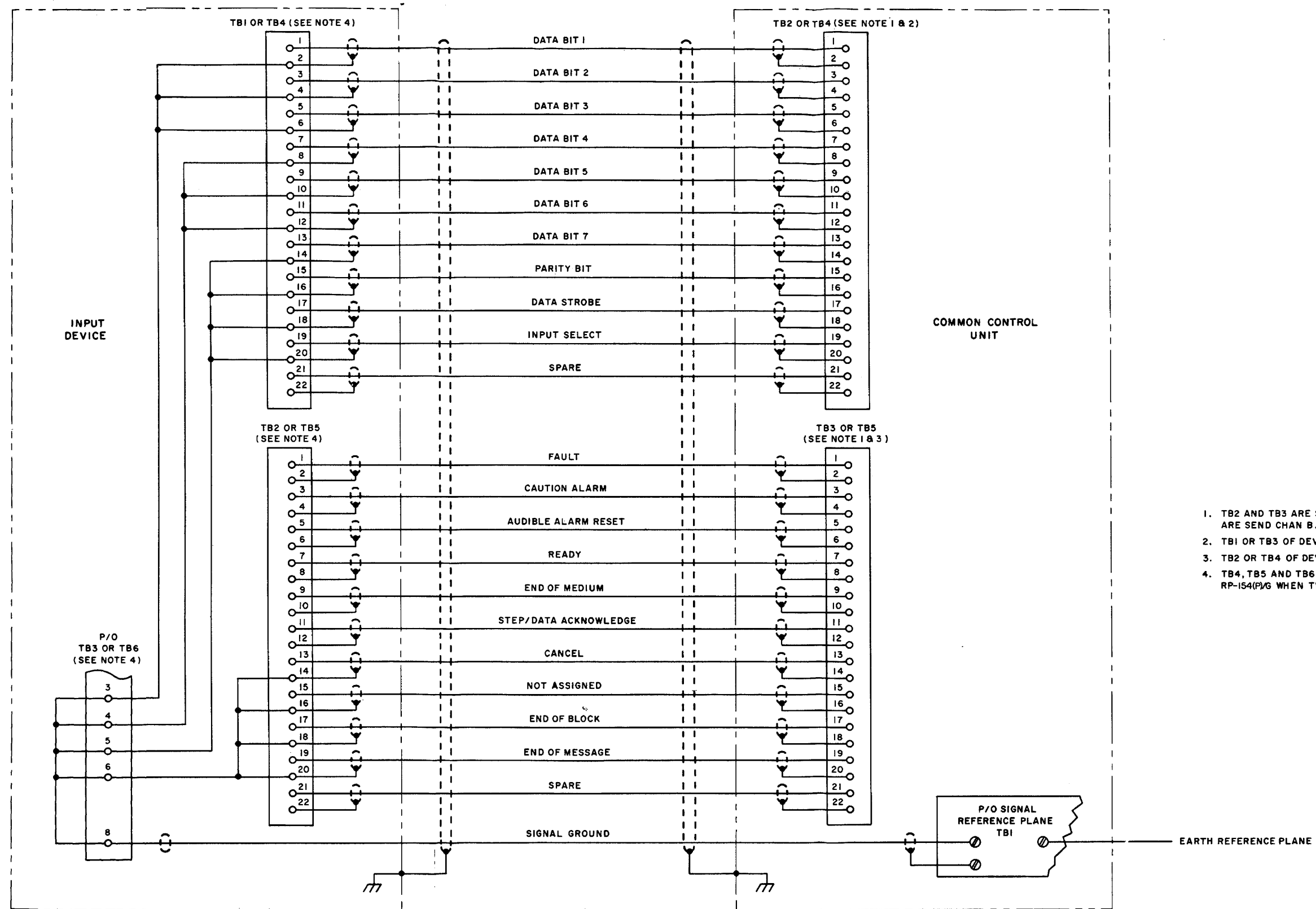


Figure 3-11. AN/FYA-71(V)6 (BE configuration), cabling diagram.

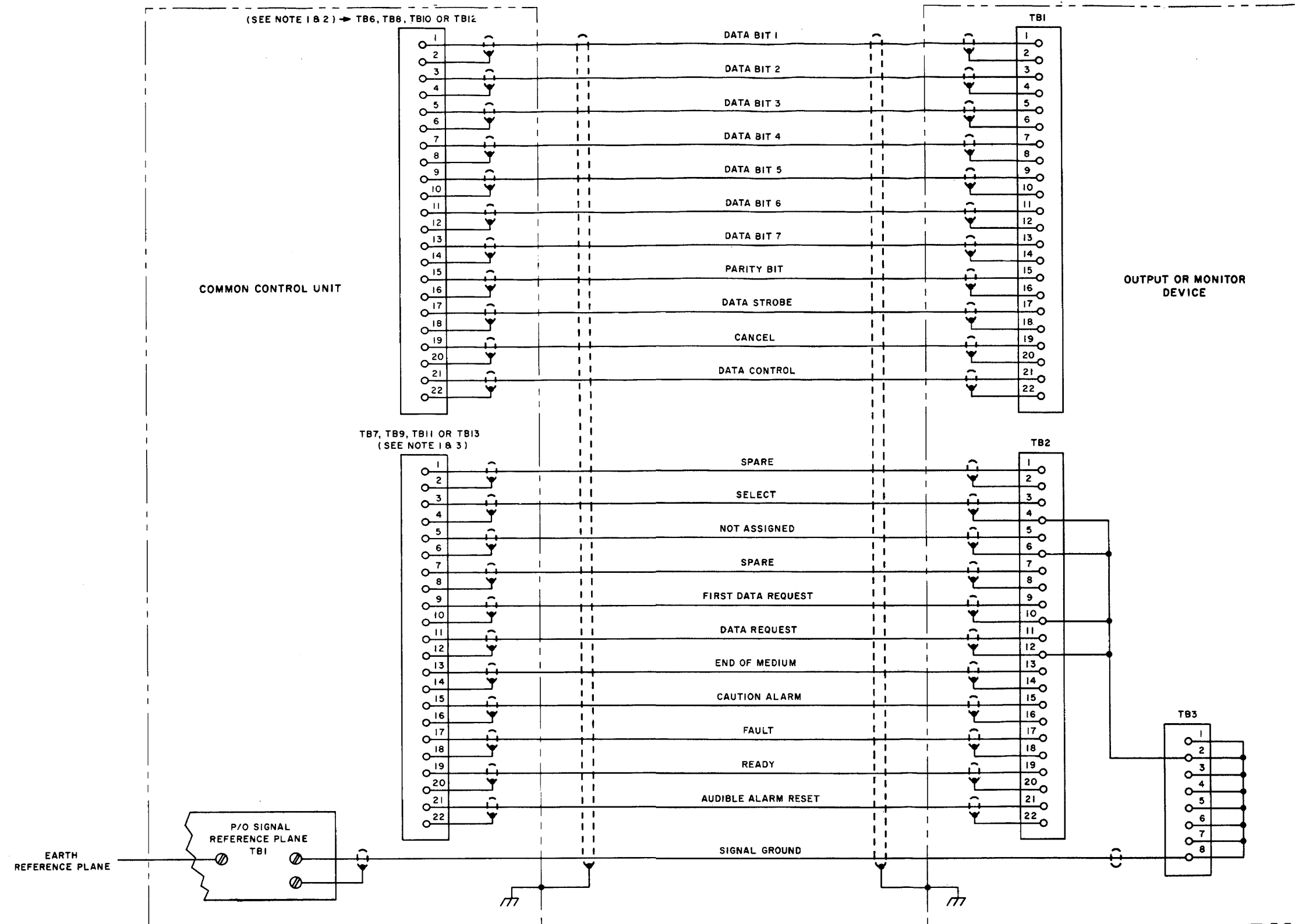
Change 1 3-22.1



- NOTES:
1. TB2 AND TB3 ARE SEND CHAN A; TB4 AND TB5 ARE SEND CHAN B.
  2. TB1 OR TB3 OF DEVICE SWITCHING MODULE IF INSTALLED.
  3. TB2 OR TB4 OF DEVICE SWITCHING MODULE IF INSTALLED.
  4. TB4, TB5 AND TB6 ARE USED IN READER, PUNCHED TAPE RP-154(P)G WHEN TWO READING MECHANISMS ARE INSTALLED.

Figure 3-12. Signal/wire assignments, input device - common control unit cables.


Change 1 3-22.3



- NOTES:
1. a. TB6 & TB7 ARE RECEIVE CHAN A.  
b. TB8 & TB9 ARE RECEIVE CHAN B.  
c. TB10 & TB11 ARE SEND MONITOR.  
d. TB12 & TB13 ARE RECEIVE MONITOR.
  2. TB1 OR TB3 OF DEVICE SWITCHING MODULE IF INSTALLED.
  3. TB2 OR TB4 OF DEVICE SWITCHING MODULE IF INSTALLED.

Figure 3-13. Signal/wire assignments, common control unit-output or monitor device cables.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

 <p>THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.</p>				FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)		
				DATE SENT		
PUBLICATION NUMBER		PUBLICATION DATE	PUBLICATION TITLE			
BE EXACT PIN-POINT WHERE IT IS				IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.		
PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.			
PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER				SIGN HERE		



## The Metric System and Equivalents

### Linear Measure

1 centimeter = 10 millimeters = .39 inch  
 1 decimeter = 10 centimeters = 3.94 inches  
 1 meter = 10 decimeters = 39.37 inches  
 1 dekameter = 10 meters = 32.8 feet  
 1 hectometer = 10 dekameters = 328.08 feet  
 1 kilometer = 10 hectometers = 3,280.8 feet

### Weights

1 centigram = 10 milligrams = .15 grain  
 1 decigram = 10 centigrams = 1.54 grains  
 1 gram = 10 decigrams = .035 ounce  
 1 decagram = 10 grams = .35 ounce  
 1 hectogram = 10 decagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

### Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.81 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

### Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

### Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

## Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

### Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
----	------------------------	----------------------------	---------------------	----

