

SECTION 1

INTRODUCTION

1-1. GENERAL

This book contains information for installing the SPERRY UNIVAC Universal Terminal System 400 (UTS 400). The system consists of three major components: a Master Terminal Type 3544, Slave Terminal Type 3548, and a Controller Type 8594. Installation information for each of the system components is contained in the following sections.

- Section 2 - Installation
- Section 3 - Strapping
- Section 4 - De-Installation
- Appendix A - Feature Installation
- Appendix B - Cable Data
- Appendix C - ASCII Conversion Chart
- Appendix D - Memory Location
- Appendix E - Foldout Illustrations

RG-59BU

1-2. REFERENCE MATERIAL

The following books should be available as aids for installing the terminal system:

<u>Book</u>	<u>Title</u>
MR6085	SPERRY UNIVAC Universal Terminal System 400 Preinstallation Planning Specifications
MR6087	SPERRY UNIVAC Universal Terminal System Functional Analysis and Servicing
MR6088	SPERRY UNIVAC Universal Terminal System 400 Master Terminal Type 3544 Illustrated Parts Breakdown
MR6089	SPERRY UNIVAC Universal Terminal System 400 Slave Terminal Type 3548 Illustrated Parts Breakdown
MR6090	SPERRY UNIVAC Universal Terminal System 400 Controller Terminal Type 8594 Illustrated Parts Breakdown

1-3. EQUIPMENT DESCRIPTION

The SPERRY UNIVAC Universal Terminal System 400 (UTS 400) is a microprocessor-based, intelligent, general purpose display terminal for use in interactive data communications with a central processor. The basic areas of application are:

- Data entry and accessing
- Control and monitoring operations
- Offline operations

The UTS 400 consists of a master terminal, slave terminal, and a controller (figure 1-1). The system may be configured as a single master terminal, a master with slaves (up to 3), or as a controller with up to 6 slaves. The system is designed to support existing 7-bit interface devices such as the SPERRY UNIVAC Tape Cassette System (TCS), and 8-bit peripheral devices such as a freestanding diskette subsystem. The system is also compatible with existing UNISCOPE display terminal software.

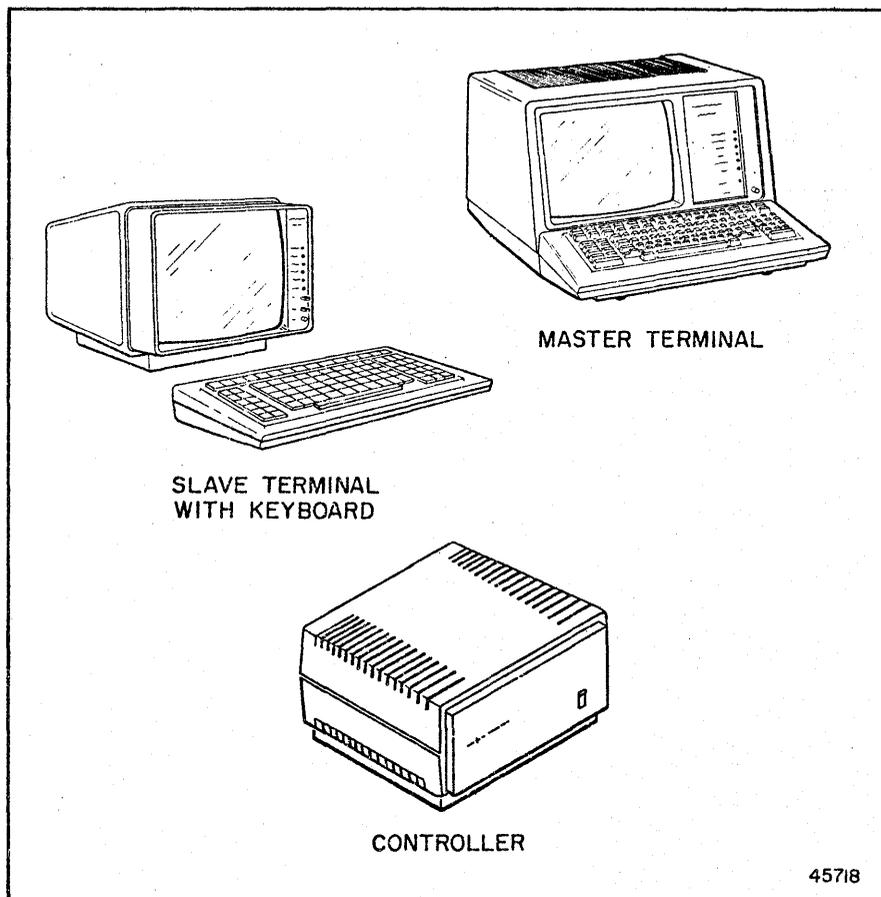


Figure 1-1. Universal Terminal System 400 - System Components

1-4. SPECIAL TOOLS AND SUPPLIES

Common hand tools and the following items are required to install and service the terminal system.

<u>Equipment</u>	<u>Part Number</u>
Volt-ohmmeter, triplett No. 310 or equivalent*	3001444-00
Test leads for triplett No. 310*	920508
Printed circuit board (module) extractor*	2820407-00
Module extender	2818455-00
Extension cable (50 conductor)	2820659-01
LED test module	2812637-01
Mask, CPU	2812738-021
Mask, ROM	2812738-022
Mask, I/O	2812738-023
Mask, auxiliary	2812738-024
Alignment tool (Hex.)	2050181-00
Alignment tool (double ended hex.)	2050182-00
Crimping tool	2050282-00
Auxiliary interface turnaround	2820654-00
I/O test connector	2818449-00
Internal auxiliary interface cable	2816523-00
Internal communications I/O cable	2816522-00

1-5. PLACEMENT CONSIDERATIONS

The master and slave terminals are designed to be placed on any flat surface (such as a desk or table top) which affords the operator comfortable access to the console and keyboard and provides good visibility of the display screen. Cable length between the master and slave terminals must also be considered. A minimum of 4 inches (10.2 cm) must be allowed to the right, left, and rear of the unit for operation.

At least 2 feet (61 cm) of clearance on all sides of the master and slave terminals must be provided for maintenance; however, if the minimum clearance cannot be provided, leave sufficient cable loop to allow the terminal to be moved to an area with adequate work space.

Since an operator is not required for the controller, the controller may be located in an out-of-the-way place and moved (with cables attached) for maintenance access if sufficient cable loop is provided.

At least 15 inches clearance above the controller must be provided for removal of the top cover. A minimum of 5½ inches clearance must be provided on all sides of the controller.

\*These tools are required for installation.

1-6. SIGNAL CABLING

The master and controller are connected to slave terminals, peripheral devices, and communications devices by means of the cables listed in table 1-1, and illustrated in part in figure 1-2. (Figure 1-2 is a sample system configuration; additional configuration samples are provided in MR6085 SPERRY UNIVAC Universal Terminal System 400 Preinstallation Planning Specifications.) The circled reference numbers in figure 1-2 correspond to the item number listed in table 1-1. Table 1-1 lists all of the standard cables used for interconnecting a master or controller terminal to the system components and communications devices. Table 1-2 provides general information about cable length data, and appendix B provides detailed part number suffixes (dash numbers) relating to the cables and available lengths.

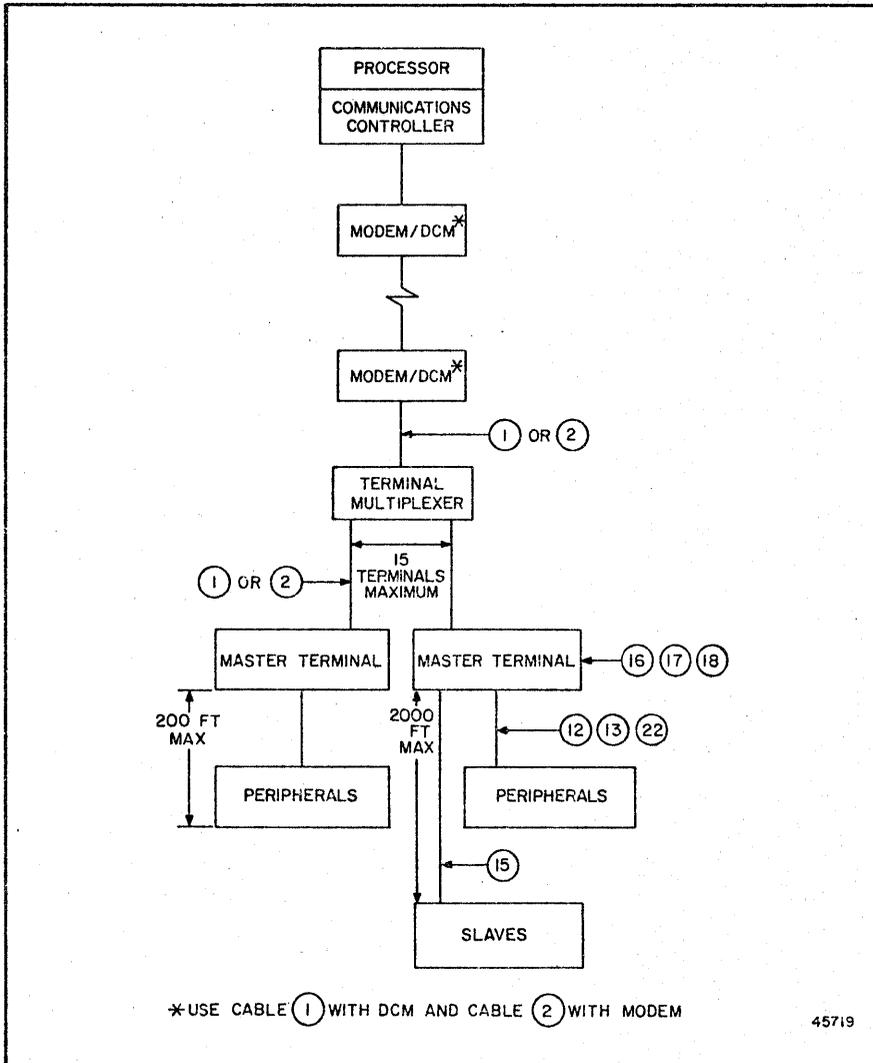


Figure 1-2. Sample System Configuration

Table 1-1. System Signal Cables

Item	Part Number	Description	Length (Table 1-2)
1	2805096-XX*	Unshielded, connects master or controller terminal to multiplexer or Direct Connection Module (DCM). Male or female ends. Maximum length is 300 feet (91.4 meters)	D
2	2808043-XX	Unshielded, connects master or controller terminal to multiplexer or modem. Maximum length is 50 feet (15.2 meters).	B
3	2807723-XX	Unshielded, connects master or controller or multiplexer ** to junction box (item 4). One end open and one female end.	D
4	2807819-00	Junction box assembly, used for onsite connections.	-
5	2807724-XX	Unshielded, connects junction box to modem, multiplexer or DCM. One end open and one male end.	D
6	2807725-XX	Shielded, for long distance runs between junction boxes. For serial or duct installation. Both ends open.	A
7	2807765-XX	Shielded, for direct burial long distance runs between junction boxes. (Junction boxes are not buried.) Both ends open.	A
8	2807748-XX	Unshielded, connects multiplexer** directly to a Communication Terminal Module (CTMC). Male and female ends.	D
9	2807754-XX	Unshielded, connects junction box to CTMC. One open end and one male end.	D
10	2807867-XX	Unshielded, connects multiplexer** directly to Line Terminal Controller (LTC). Male and female ends.	B
11	2807868-XX	Unshielded, connects junction box to LTC. One open end and one male end.	B
12	2814419-XX	Shielded, connects master or controller to Communications Output Printer, or connects Communications Output Printer to a Tape Cassette System (TCS). Male and female ends.	C
13	2814880-XX	Shielded, connects master or controller to TCS, or model 800 terminal printer, or type 0786 printer. Male and female ends.	C
14	2816519-XX	Unshielded, connects keyboard to master terminal.	E

\*Refer to Appendix B table B-4 for instructions for converting cable 2805096-XX for use with modems.

\*\*This cable is also used to provide direct connection to UNISCOPE Display Terminals. Cannot be used for direct connection to the UTS 400.

UTS 400

Table 1-1. System Signal Cables (Cont)

Item	Part Number	Description	Length (Table 1-2)
15	2820374-XX	Shielded, with female BNC connectors for connecting slave terminals to master or controller. Maximum length is 2000 feet.	F
16	2816515-00	Shielded, connects display driver to additional slave terminals.	(Internal-expansion)
17	2820659-00	Unshielded, connects display driver to display control; required for additional slave terminals.	(Internal-expansion)
18	2816509-00	Unshielded, connects display driver to DC power supply.	(Existing cable)
19	6432694	Unshielded, connects General Communications System (GGS) to multiplexer.	G
20	6432697	Unshielded, connects GCS to item 4.	G
21	2871358	Shielded, with male and female connectors. Interconnects DGMs.	H
22	2814880-XX	Shielded, with male lock screw (3011816-01) on connector P2. Female lock screw on connector P1 is used for 8-bit peripheral connections to master or controller.	C

Table 1-2. System Signal Cables - Available Lengths\*

Designation (Table 1-1)	Available Lengths - Feet		Available Lengths - Meters	
	Length	Increments**	Length	Increments
A	300 to 500 <sup>o</sup>	50	91.4 to 152.4	15.2
B	5 to 50	5	1.5 to 15.2	1.5
C	5 and 10 to 200	10	1.5 and 3 to 61	3
D	3 and 5 to 100	5	9.9 and 1.5 to 30.5	1.5
	100 to 200 and	10	30.5 to 61	3
	200 to 300	20	61 to 91.4	6.1
E	4 to 10	4, 6, 10	1.2 to 3	1.2, 1.8, 3
F	10, 25, 50, 75, 100, 250, 500, 750, 1,000 and 2000	as indicated (00 thru 09), respectively	3, 7.6, 15.2, 22.8, 30.5, 76.2, 152.4, 228.6, 304.8, 610	as indicated (00 thru 09), respectively
G	16.4 to 98.4	16.4	5 to 30	5
H	5 to 100 and	5	1.5 to 30.5	1.5
	100 to 200 and	10	30.5 to 61	3
	200 to 300	20	61 to 91.4	6.1

\*Except for item G, all cable lengths specified are provided in foot lengths (conversion to metric is shown). Item G is provided in metric lengths (conversion to feet is shown).

\*\*See appendix B for cable part number suffixes (dash numbers) corresponding to all increments.

## SECTION 2

### INSTALLATION

#### 2-1. INTRODUCTION

This section contains procedures for unpacking, installing and checking the SPERRY UNIVAC Universal Terminal System 400 (UTS 400). The procedures are designed to allow a Customer Engineer to install and set-up the terminal system in a minimum amount of time.

#### 2-2. EQUIPMENT PLACEMENT

The carrier is responsible for moving the equipment to its approximate location in the prescribed area. The customer should be present while the carrier is unloading the equipment to ensure that it is not handled roughly and that improper lifting devices are not used.

#### CAUTION

Do not use a forklift to move equipment containers. The terminal is packed in a polystyrene container which should be handled with care. The container can be easily penetrated by forklift prongs, and the terminal severely damaged.

The customer should instruct the carrier as to initial unit placement at the operating location. Correct placement at this time will avoid problems in unpacking later. After the system is loaded and placed in the approximate operating location, inspect the container or containers for signs of damage that may have occurred during shipment.

If damage is found, or a portion of the shipment is missing, this must be noted on the bill of lading. Also any equipment which was handled roughly or dropped during unloading or placement should be so noted on the bill of lading, even though no damage may be apparent. This aids in filing a claim if damage is discovered during unpacking.

2-3. UNPACKING

It is recommended that two customer engineers be available for lifting the terminal system during unpacking to avoid possible damage to the units. The procedures for unpacking the master, slave, and the controller are contained in tables 2-1, 2-2, and 2-3, respectively.

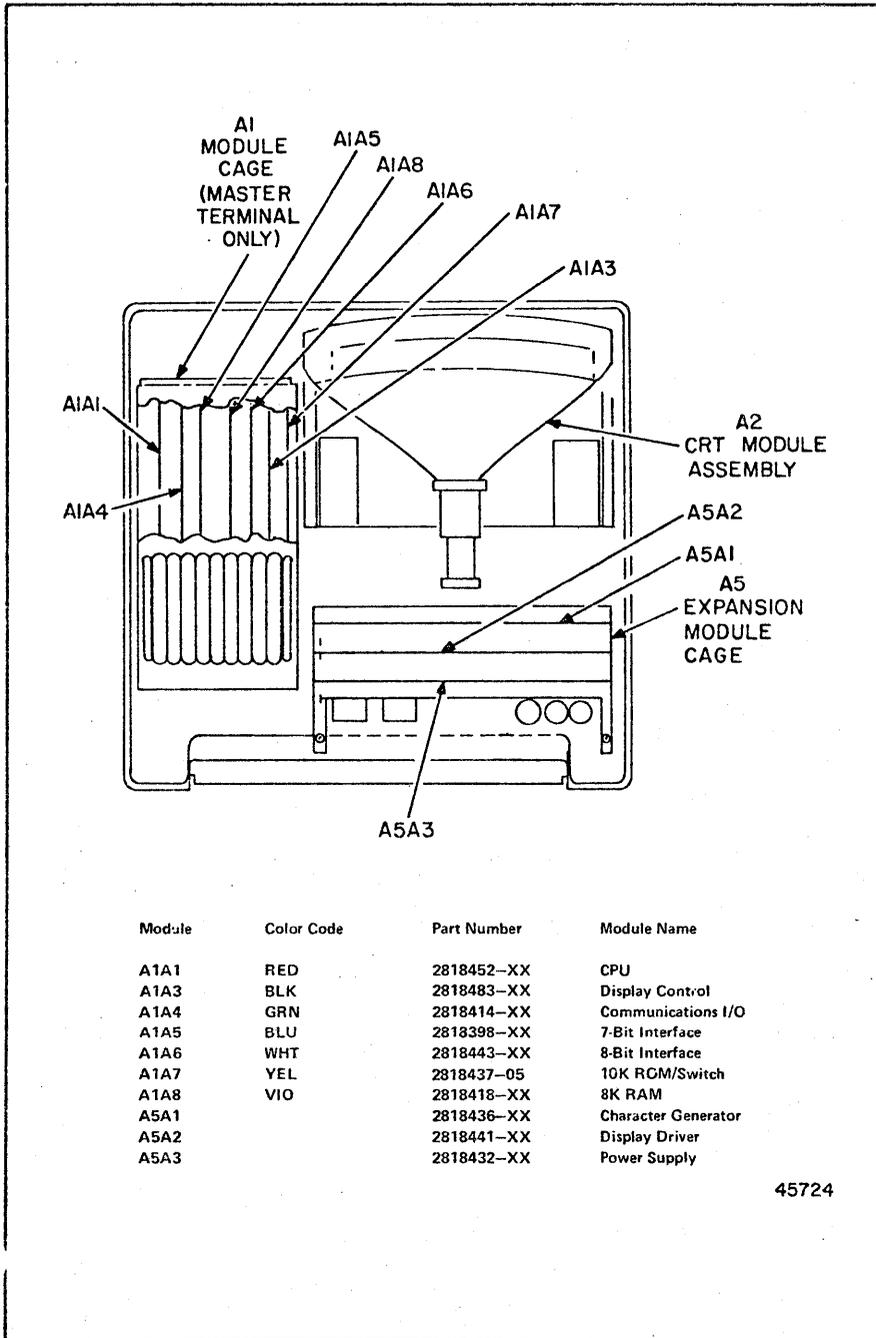
Information about the major electronic components of the terminal system can be found in MR6087, SPERRY UNIVAC Universal Terminal System 400 Functional Analysis and Servicing.

NOTE

Be sure to save packing material, shipping bags, and the two packing container halves in the event that the system should require shipment to a new location. The number of sets of shipping material is to be determined by consultation with the customer. The procedure for repacking the components is provided in Section 4.

Table 2-1. Master Terminal Unpacking Procedure

Step	Procedure	Reference
1	Remove master terminal container from carton and place on floor.	
2	Cut bands holding container sections together and remove container top.	
3	Remove bagged communication cable (if present) from top of master terminal.	
4	Remove and unpack master terminal and keyboard. Check units for visible damage.	
5	Remove tape securing power cord and front panel to master terminal.	
6	Remove exterior casework by rotating two turnlock fastener studs at rear of unit, then sliding casework forward to clear the faceplate, and lifting off.	
7	Ensure that all L.E.D. indicators are securely in place in their sockets.	
8	Remove any internal packing material from module cages A1 and A5.	Figure 2-1
NOTE		
Detailed inspection of printed circuit modules, to include broken or missing ROMs, is accomplished later in the installation procedure.		
9	Inventory the units and fill in the appropriate sections of the inventory and inspection report shipped with each unit. (Use the referenced figures to assist in inventory and inspection of the unit.) Notify branch office of any damage or shortage.	Figure 2-1 and Appendix A



Module	Color Code	Part Number	Module Name
A1A1	RED	2818452-XX	CPU
A1A3	BLK	2818483-XX	Display Control
A1A4	GRN	2818414-XX	Communications I/O
A1A5	BLU	2818398-XX	7-Bit Interface
A1A6	WHT	2818443-XX	8-Bit Interface
A1A7	YEL	2818437-05	10K RCM/Switch
A1A8	VIO	2818418-XX	8K RAM
A5A1		2818436-XX	Character Generator
A5A2		2818441-XX	Display Driver
A5A3		2818432-XX	Power Supply

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Figure 2-1. Master Terminal Module Locations

Table 2-1. Master Terminal Unpacking Procedure (Cont)

Step	Procedure	Reference
10	If installation is to be completed at this time proceed to table 2-4, if not continue with step 11.	
11	Replace exterior casework and place unit in a suitable place.	

Table 2-2. Slave Terminal Unpacking Procedure

Step	Procedure	Reference
1	Remove slave terminal container from carton and place on floor.	
2	Cut bands holding container sections together and remove container top.	
3	Remove bagged communication cable (if present) from top of slave terminal.	
4	Remove and unpack slave terminal and keyboard. Check units for visible damage.	
5	Remove tape securing power cord and front panel to slave terminal.	
6	Remove exterior casework by rotating the two turnlock fastener studs at the rear of the unit. Tilt faceplate forward by loosening screws at top of unit.	
7	Ensure that all sockets are securely in place on the L.E.D. indicator.	
8	Remove any internal packing material from module cage A5.	
9	Inventory the units and fill in the appropriate sections of the inventory and inspection report shipped with each unit. Notify branch office of any damage or shortage.	Figure 2-2
10	If installation is to be completed at this time proceed to table 2-5, if not continue with step 11.	
11	Replace exterior casework and place unit in a suitable place.	

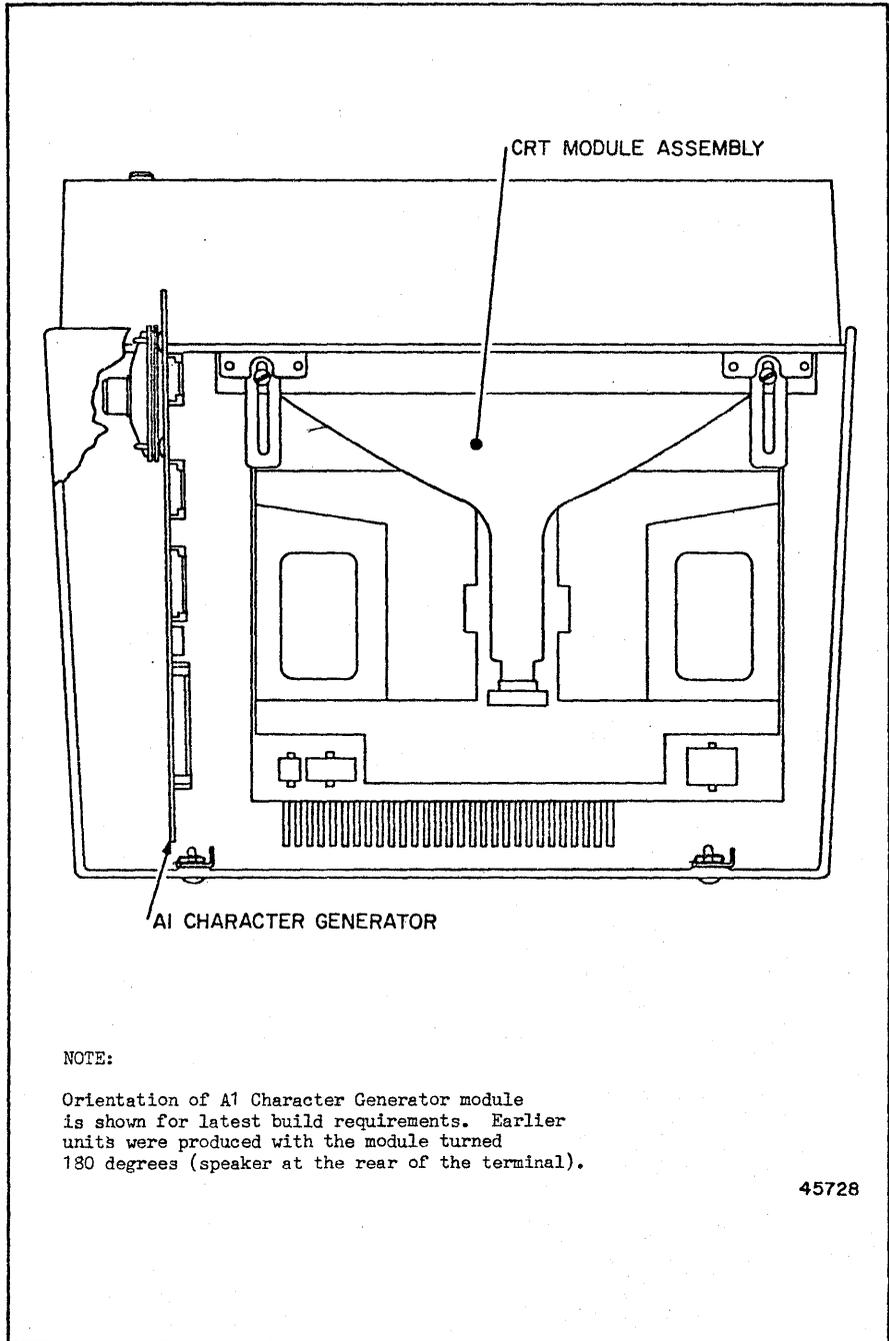


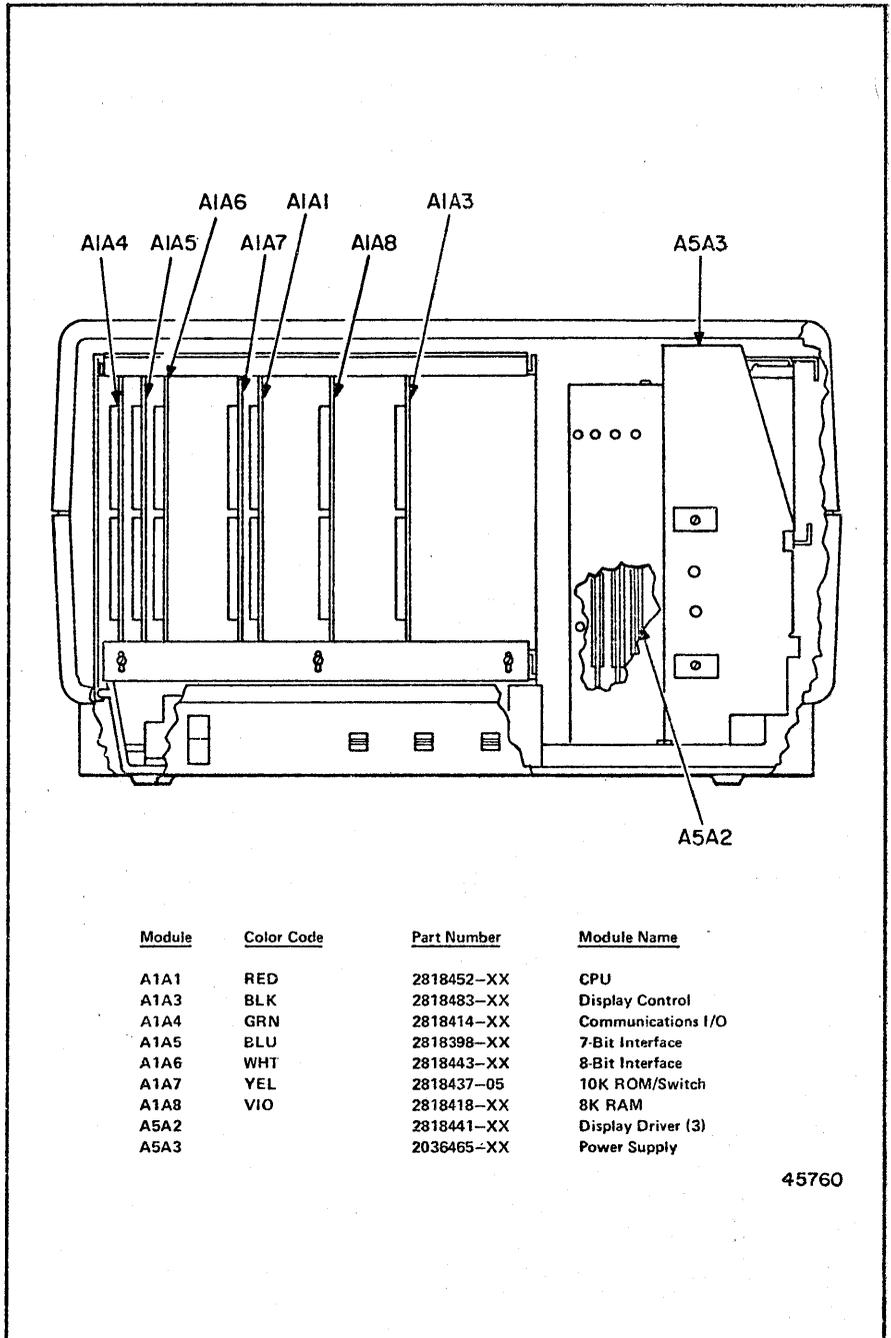
Figure 2-2. Slave Terminal - Module Location

Table 2-3. Controller Unpacking Procedure

Step	Procedure	Reference
1	Remove controller from carton and place on floor.	
2	Cut bands holding container sections together and remove container top.	
3	Remove bagged communication cable (if present) from the package.	
4	Remove controller top cover as follows: (a) Loosen two retaining screws on the rear of the cabinet and back the screws out 8 to 10 turns (about 1/4 inch). (b) Tip the cover and front panel toward the front and lift off.	
5	With the cover removed, ensure that all L.E.D. indicators are securely in place in their sockets.	
6	Remove any internal packing material from module cages A1 and A5.	Figure 2-3
	NOTE  Detailed inspection of printed circuit modules, to include broken or missing ROMs, is accomplished later in the installation procedure.	
7	Inventory the units and fill in the appropriate sections of the inventory and inspection report shipped with each unit. (Use the referenced figures to assist in inventory and inspection of the unit.) Notify branch office of any damage or shortage.	Figure 2-3 and Appendix A
8	If installation is to be completed at this time proceed to table 2-6, if not continue with step 9.	
9	Replace exterior casework and place unit in a suitable place.	

2-4. INSTALLATION PROCEDURES

The procedures for installing the master terminal are described in table 2-4, the slave terminal in table 2-5, and the controller in table 2-6. Table 2-7 provides the final procedures for checking the system and connecting the system to a modem or multiplexer.



<u>Module</u>	<u>Color Code</u>	<u>Part Number</u>	<u>Module Name</u>
A1A1	RED	2818452-XX	CPU
A1A3	BLK	2818483-XX	Display Control
A1A4	GRN	2818414-XX	Communications I/O
A1A5	BLU	2818398-XX	7-Bit Interface
A1A6	WHT	2818443-XX	8-Bit Interface
A1A7	YEL	2818437-05	10K ROM/Switch
A1A8	VIO	2818418-XX	8K RAM
A5A2		2818441-XX	Display Driver (3)
A5A3		2036465-XX	Power Supply

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Figure 2-3. Controller Terminal Module Locations

Table 2-4. Master Terminal Installation

Step	Procedure	Reference
1	Remove exterior casework by rotating two turnlock fastener studs at rear of unit, then sliding casework forward to clear the faceplate, and lifting off.	
2	Roll master terminal on side with power supply chassis supporting the unit.	
3	Loosen cable clamp on bottom of unit and route keyboard cable (2816519-XX) thru opening in bottom of master terminal. Leave sufficient cable in unit for a cable loop. Secure cable with cable clamp.	Figure 2-4
4	Roll master terminal upright and connect cable connector A5A3F5 to A5A1J5 on character generator module in location A5A1.	Figure 2-5
5	If keyboard cable 2816519-XX is not connected to keyboard, connect remaining end of cable to A2J1 on keyboard.	Figure 2-6, Figure 2-7

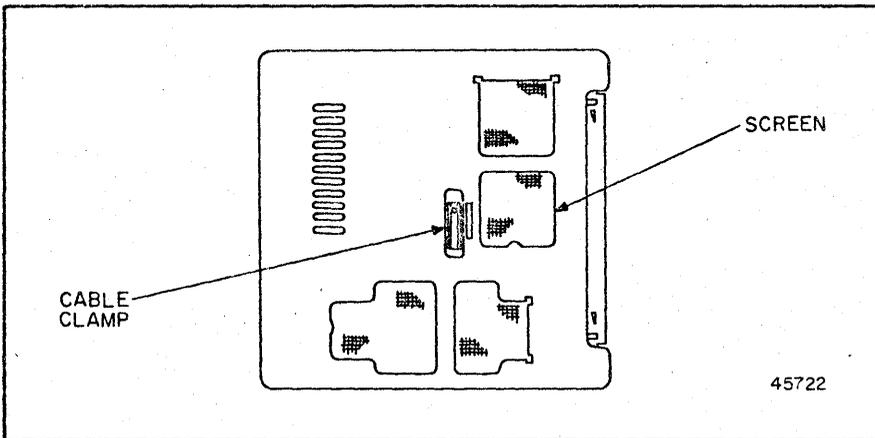


Figure 2-4. Master Terminal - Bottom View

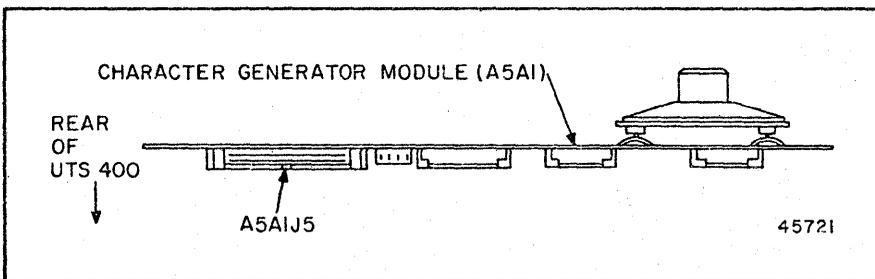


Figure 2-5. Keyboard Cable Connection - Character Generator Module

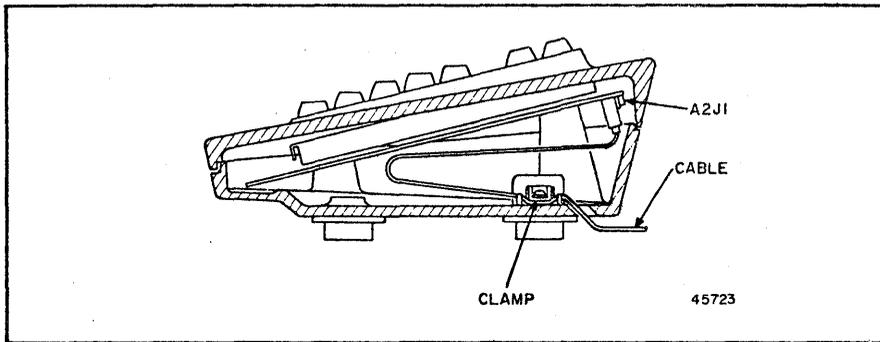


Figure 2-6. Keyboard Cabling

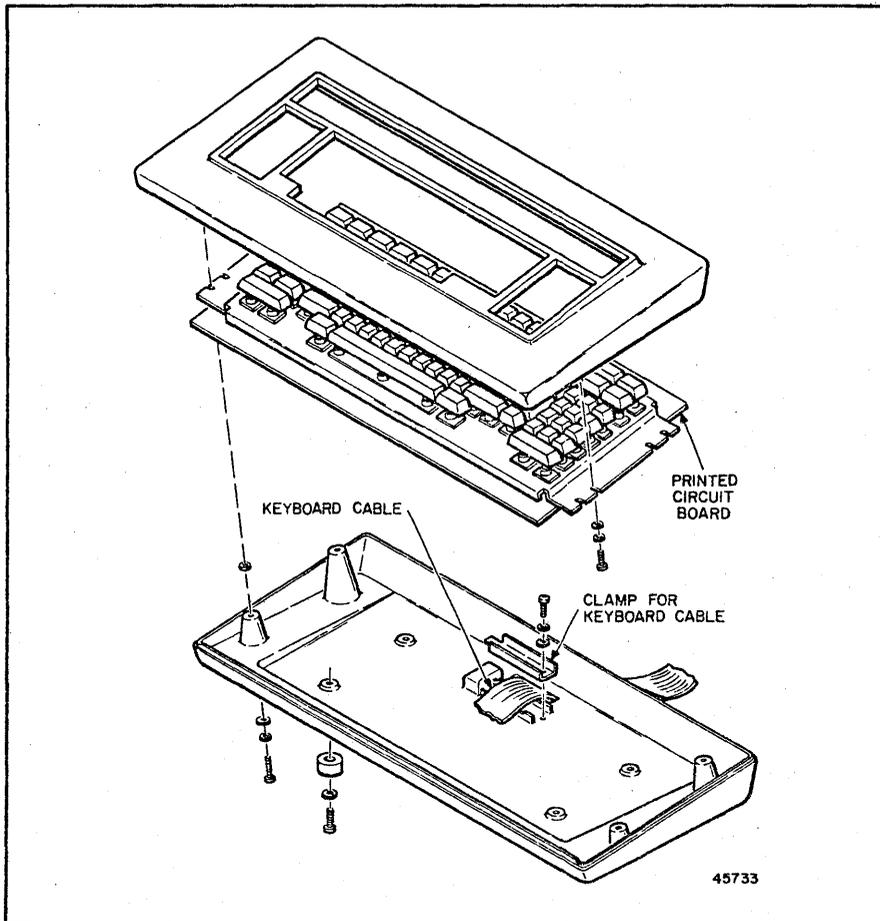


Figure 2-7. Keyboard Disassembly

Table 2-4. Master Terminal Installation (Cont)

Step	Procedure	Reference
6	Check for broken or cracked connectors on terminal boards, and bent or shorted connector pins. Inspect for foreign material.	
7	Ensure that all push-on terminals are securely attached to their respective switches, indicators and potentiometers, etc.	Figure 2-8 (Foldout)
8	Ensure that all internal cables are properly routed and securely plugged into the appropriate connectors.	Figure 2-8, Figure 2-9 (Foldouts)
<p><b>CAUTION</b></p> <p>Two cables in the UTS 400 system require keying. They are:</p> <p>(1) Keyboard cable (W6) P/N 2816519-XX (master and slave) Pin A is keyed on both ends.</p> <p>(2) Monitor signal cable (W10) P/N 2816517-XX Pin A is keyed on both ends.</p> <p>Improper orientation of the noted cables can cause equipment damage.</p>		
9	Remove power supply module A5A3 cover.	
10	Determine the AC voltage of the operating location and strap the power supply module as described in Section 3.	Section 3
11	Replace power supply module A5A3 cover.	
12	Strap the unit as described in Section 3. While the modules are removed from the unit, check for broken, loose, or missing ROM elements, according to the information in appendix D.	Section 3 and Appendix D
13	Fill out Configuration Descriptions Record shipped with each unit. Follow instructions on form. Keep a record on reverse side of form for all future FCOs installed.	
14	Set POWER ON/OFF switch (front panel behind keyboard) to OFF position.	Figure 2-10
<p><b>NOTE</b></p> <p>Units are shipped from the factory strapped for 115 VAC 60 Hz with a Hubbell 5251, 5252, or equivalent power plug. On units to be used with other power sources, an appropriate primary power plug must first be installed.</p>		
15	Use ohmmeter to ensure that AC power input leads are not shorted.	
16	Connect power cord to primary AC power source.	

Table 2-4. Master Terminal Installation (Cont)

Step	Procedure	Reference
	<p style="text-align: center;">NOTE</p> <p>The power-on confidence test is initiated by turning power on to the unit. The READY indicator lights when the test is successfully completed; if not successfully completed, the error condition is displayed on the screen. Refer to <u>SPERRY UNIVAC Universal Terminal System 400 Functional Analysis and Servicing, MR6087</u> for troubleshooting if an error condition is displayed.</p>	
17	<p>Set POWER ON/OFF switch to ON position. POWER ON indicator should light and READY indicator should light at successful completion of power-on confidence test.</p>	Figure 2-10

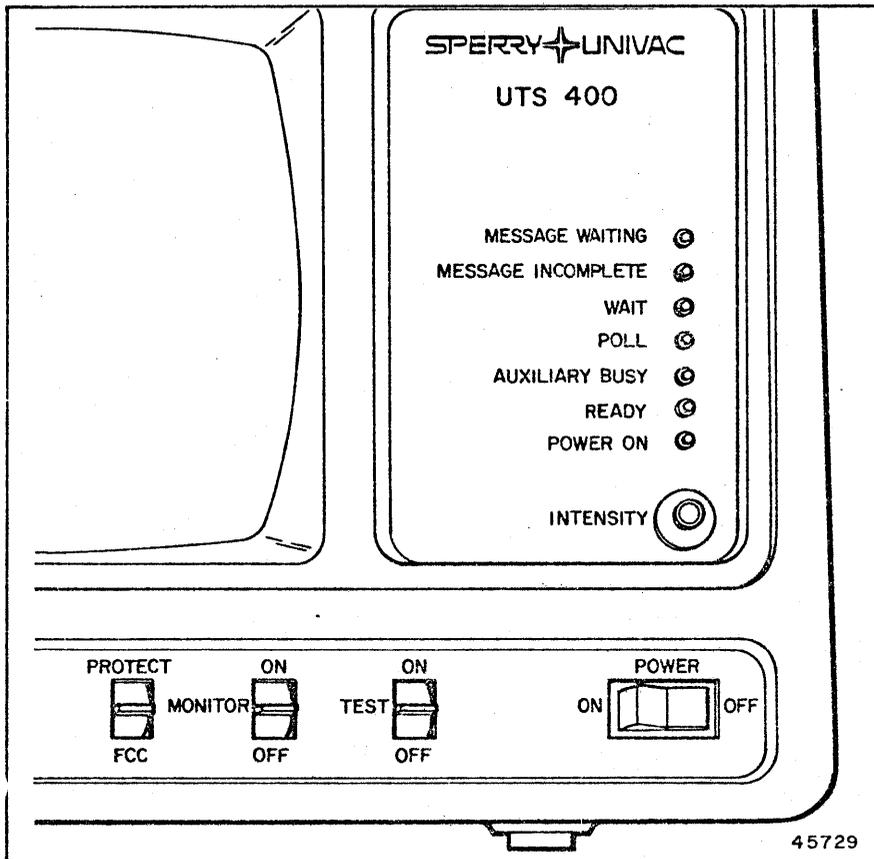
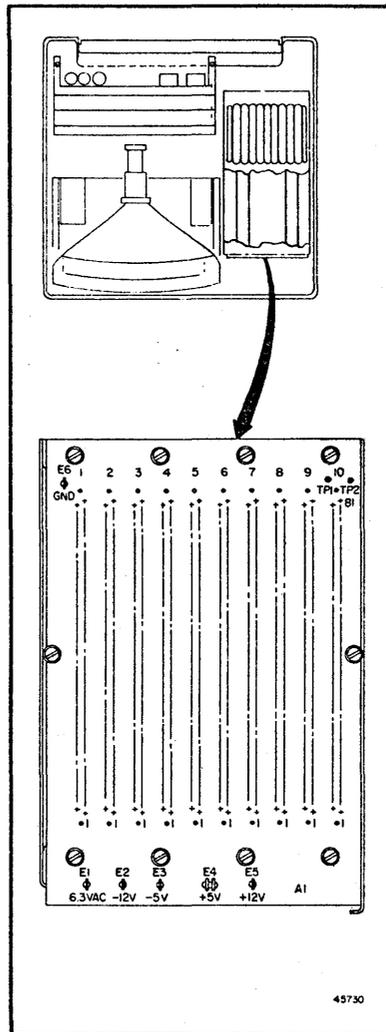


Figure 2-10. Master Terminal Controls and Indicators

Table 2-4. Master Terminal Installation (Cont)

Step	Procedure	Reference																		
18	<p>Using volt-ohmmeter, check power supply voltage at following locations on A1 backplane. Set POWER ON/OFF switch to ON after meter is connected and to OFF after each voltage check.</p> <p style="text-align: center;">NOTE</p> <p>Terminal E1 is not connected to the 6.3 VAC source.</p> <table border="1" data-bbox="436 487 850 733"> <thead> <tr> <th colspan="2" data-bbox="436 487 669 529">Terminals</th> <th data-bbox="669 487 850 529">Voltages</th> </tr> <tr> <th data-bbox="436 529 585 571">Return</th> <th data-bbox="585 529 669 571">Output</th> <td></td> </tr> </thead> <tbody> <tr> <td data-bbox="436 571 585 613">E6 (GND)</td> <td data-bbox="585 571 669 613">E2</td> <td data-bbox="669 571 850 613">-10.8 to -13.2</td> </tr> <tr> <td data-bbox="436 613 585 655">E6</td> <td data-bbox="585 613 669 655">E3</td> <td data-bbox="669 613 850 655">-4.2 to -5.5</td> </tr> <tr> <td data-bbox="436 655 585 697">E6</td> <td data-bbox="585 655 669 697">E4</td> <td data-bbox="669 655 850 697">+5.0 to +5.4</td> </tr> <tr> <td data-bbox="436 697 585 733">E6</td> <td data-bbox="585 697 669 733">E5</td> <td data-bbox="669 697 850 733">+10.8 to +13.2</td> </tr> </tbody> </table>	Terminals		Voltages	Return	Output		E6 (GND)	E2	-10.8 to -13.2	E6	E3	-4.2 to -5.5	E6	E4	+5.0 to +5.4	E6	E5	+10.8 to +13.2	Figure 2-11
Terminals		Voltages																		
Return	Output																			
E6 (GND)	E2	-10.8 to -13.2																		
E6	E3	-4.2 to -5.5																		
E6	E4	+5.0 to +5.4																		
E6	E5	+10.8 to +13.2																		
19	<p>If voltages are not within tolerance or one or more of the voltages are missing refer to <u>SPERRY UNIVAC Universal Terminal System 400 Functional Analysis and Servicing</u>, MR6087 for functional data on the power supply.</p>	MR6087																		
20	<p>Perform CRT module adjustments as required. Refer to <u>SPERRY UNIVAC Universal Terminal System 400 Functional Analysis and Servicing</u>, MR6087 for the adjustment procedures.</p> <p style="text-align: center;">NOTE</p> <p>A maximum of three slave terminals may be connected to the master terminal. The connection of the three slave terminals requires modification of the master terminal by installing features 2278-00 (display driver module) and feature 2280-00 (display control module and associated cables).</p> <p>The first slave terminal requires the installation of feature 2280-00. Connecting the second slave terminal requires the installation of feature 2278-00. The installation of a third feature 2280-00 provides for the third slave terminal connection. See following steps.</p>	MR6087																		



NOTE

At least one module must be plugged into the backplane to check the -5V, -12V, and +12V power supply voltages on A1 backplane.

Figure 2-11. Power Supply Voltage Checkpoints

Table 2-4. Master Terminal Installation (Cont)

Step	Procedure	Reference
21	If slave terminals are to be installed at this time, proceed to the next step; if not, proceed to step 25.	
22	Install feature 2280-00 according to procedures in field instructions for feature installation (FIFI) 2812095. (Feature components are illustrated in appendix A, ROM locations in appendix D, and a wiring diagram in appendix E.)	Appendix A Appendix D Appendix E
23	If a second slave terminal is to be installed, install features 2278-00 and 2280-00 according to field instructions for feature installation (FIFI) 2812094 and 2812095, respectively.	Appendix A Appendix D Appendix E
24	If a third slave is to be installed, install feature 2280-00 according to field instructions for feature installation 2812095. Continue with steps 25 and 26 before installing slave terminals (table 2-5).	Appendix A Appendix D Appendix E
25	If applicable, install 8K RAM or screen bypass features by inserting universal 8K RAM module or modules, as required. Refer to section 3 for all strapping information, and to FIFI 2812142 (8K RAM) or FIFI 2812143 (screen bypass). The module is the feature component; ROM locations are shown in appendix D, and a wiring diagram in appendix E.	Figure 2-1 Appendix D Appendix E
26	If applicable, install communications I/O module (feature 2286-00) according to FIFI 2812096. Install 7-bit auxiliary interface module (F2285-00) according to FIFI 2812093, and 8-bit peripheral interface module (F2285-00) according to FIFI 2812144. Refer to section 3 for all applicable strapping information, including additional features obtained by strapping. Feature components are shown in appendix A, ROM locations in appendix D, and a wiring diagram in appendix E.	Figure 2-1 Appendix A Appendix D Appendix E
<p>NOTE</p> <p>Connectors J12, J14, J15, or J16 on the rear of the terminal may be wired for 7- or 8-bit peripheral connections. It is recommended that J12 be wired for 7-bit peripheral connections, and J14 for 8-bit peripheral connections.</p>		
27	If slave terminals are to be connected to the master, refer to table 2-5 for instructions; if no slave terminals are to be installed, refer to table 2-7 for final installation procedures, including connection of 7- or 8-bit peripheral devices.	Table 2-5 Table 2-7
28	Replace top cover on the master terminal when installation of modules is complete.	

Table 2-5. Slave Terminal Installation

Step	Procedure	Reference
1	Remove exterior casework of a slave terminal by rotating two turnlock fastener studs at rear of unit, then sliding casework to the rear of the unit and lifting off.	
2	Position unit on its side and remove screen on bottom of unit.	Figure 2-12
3	Route keyboard cable (2816519-XX, W5) through opening in bottom of unit and connect cable end marked A5A3P5 to A5A1J5 on character generator module A5A1.	Figure 2-12
4	Leave sufficient cable loop and install screen on bottom of unit. Insure that cable is positioned in slot under cable clamping device.	Figure 2-12

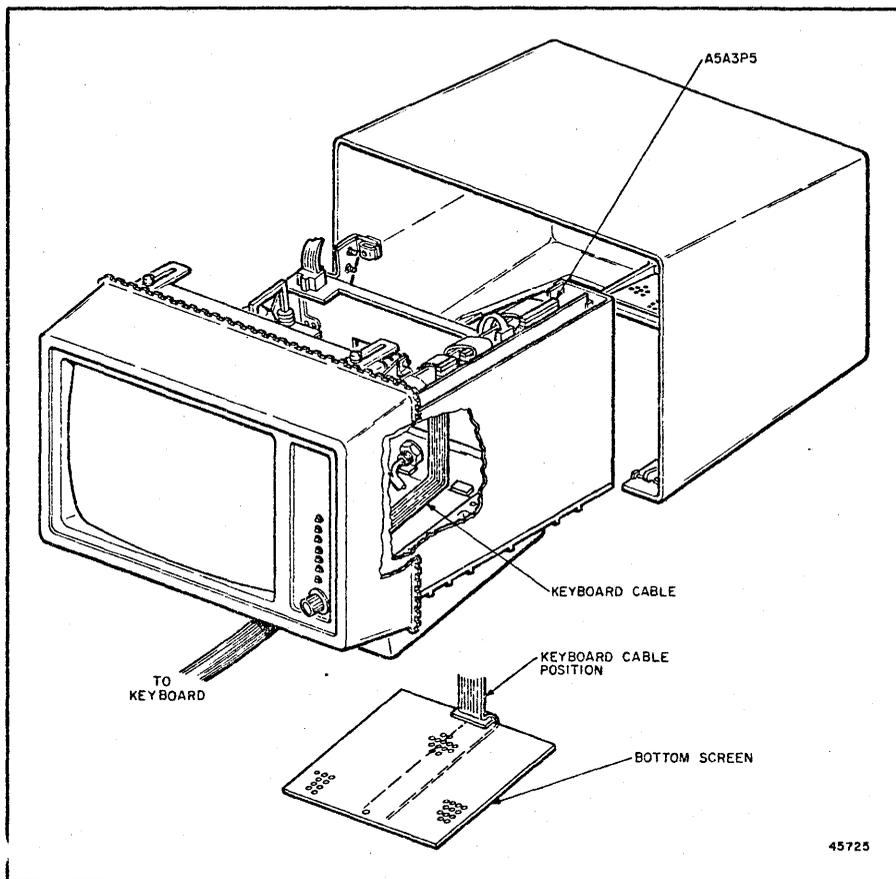


Figure 2-12. Slave Terminal - Keyboard Cable Routing

Table 2-5. Slave Terminal Installation (Cont)

Step	Procedure	Reference
5	<p>If keyboard cable 2816519-XX is not connected to keyboard, connect remaining end of cable to A2J1 on keyboard.</p> <p style="text-align: center;">CAUTION</p> <p>Ensure that slave terminal power cord is <u>not</u> plugged in before setting voltage selection switch on back of monitor power supply.</p>	Figure 2-13
6	<p>Locate the voltage selection switch on the back of the monitor power supply (see referenced figure). Ensure that voltage selection is correct. If necessary, use a standard blade screw driver, set the voltage selection switch for the required voltage (115 or 230 volts AC).</p>	Figure 2-14
7	<p>Check circuit breaker 1 (CB-1) power cord wiring according to the detail shown in the referenced figure. Rewire circuit breaker as required for voltage selection.</p>	Figure 2-14
8	<p>Fill out Configuration Descriptions Record shipped with each unit. Follow instructions on form. Keep a record on reverse side of form for all future FCOs installed.</p>	

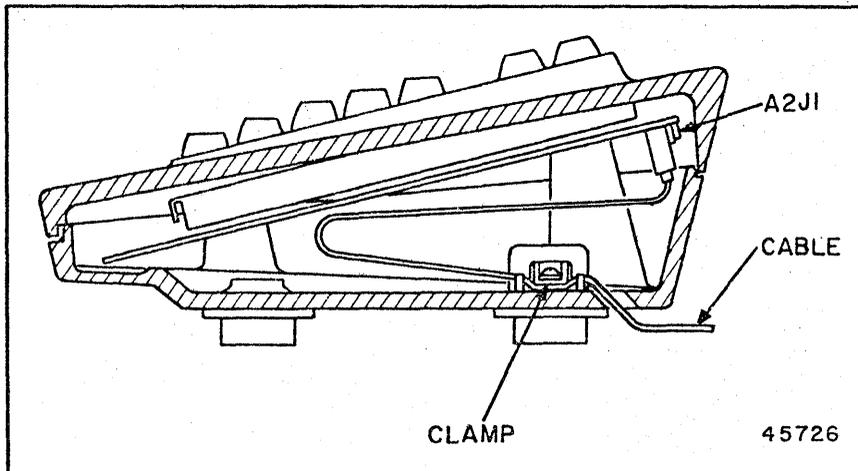


Figure 2-13. Slave Terminal - Keyboard Cabling

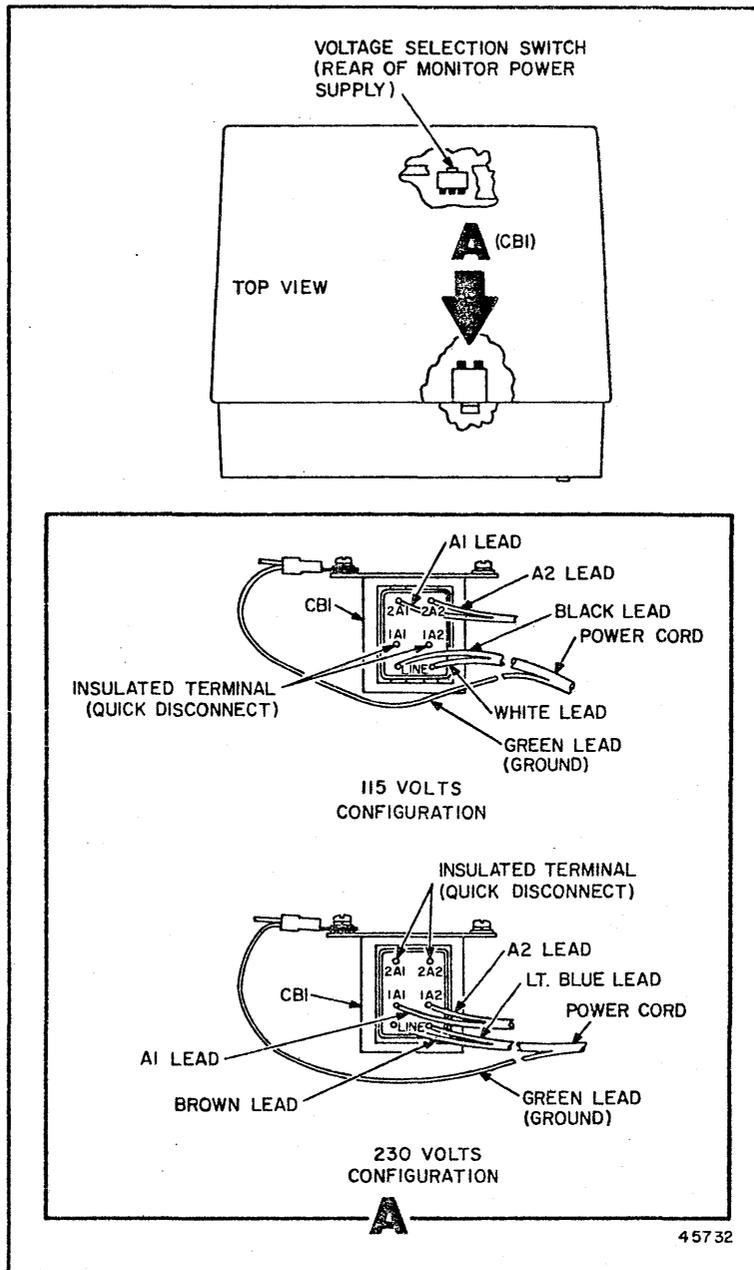


Figure 2-14. Slave Terminal Voltage Selection

Table 2-5. Slave Terminal Installation Procedure (Cont)

Step	Procedure	Reference
9	Check for broken or cracked connectors or terminal boards, and bent or shorted connector pins.	
10	Ensure that all push-on terminals are securely attached to their respective switches, indicators and potentiometers, and so forth.	Figure 2-15 (Foldout)
11	Inspect for metal chips, wire cuttings, solder drippings or other loose particles of foreign material.	
12	Ensure that all cables are properly routed and securely plugged into the appropriate connectors.	Figure 2-15 (Foldout)
13	Set power ON/OFF switch to OFF position.	
	<p style="text-align: center;">NOTE</p> <p>Units are shipped from the factory strapped for 115 VAC 60 Hz with an H. Hubbell 5251, 5252, or equivalent power plug. On units to be used with other power sources, an appropriate primary plug must first be installed.</p>	
14	Use ohmmeter to ensure that AC power input leads are not shorted.	
15	Connect power cord to primary AC power source.	
16	Strap unit as described in Section 3; ensure that 50 or 60 Hz strap selection (character generator module) is properly selected.	
17	Set power ON/OFF switch to ON position. POWER ON indicator (front panel) should light.	

Table 2-5. Slave Terminal Installation (Cont)

Step	Procedure	Reference																	
18	Using volt-ohmmeter, check power supply voltage at following pins on A2P2. Set power ON/OFF switch to ON after meter is connected and to OFF after each voltage check.	Figure 2-16																	
<table border="1"> <thead> <tr> <th colspan="2">Terminals</th> <th rowspan="2">Voltages</th> </tr> <tr> <th>Return</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>A2P2-2</td> <td>A2P2-1</td> <td>-11.4 to -12.6</td> </tr> <tr> <td>A2P2-2</td> <td>A2P2-5</td> <td>4VAC to 12VAC</td> </tr> <tr> <td>A2P2-2</td> <td>A2P2-8</td> <td>+11.4 to +12.6</td> </tr> <tr> <td>A2P2-2</td> <td>A2P2-9</td> <td>+4.9 to +5.3</td> </tr> </tbody> </table>			Terminals		Voltages	Return	Output	A2P2-2	A2P2-1	-11.4 to -12.6	A2P2-2	A2P2-5	4VAC to 12VAC	A2P2-2	A2P2-8	+11.4 to +12.6	A2P2-2	A2P2-9	+4.9 to +5.3
Terminals		Voltages																	
Return	Output																		
A2P2-2	A2P2-1	-11.4 to -12.6																	
A2P2-2	A2P2-5	4VAC to 12VAC																	
A2P2-2	A2P2-8	+11.4 to +12.6																	
A2P2-2	A2P2-9	+4.9 to +5.3																	

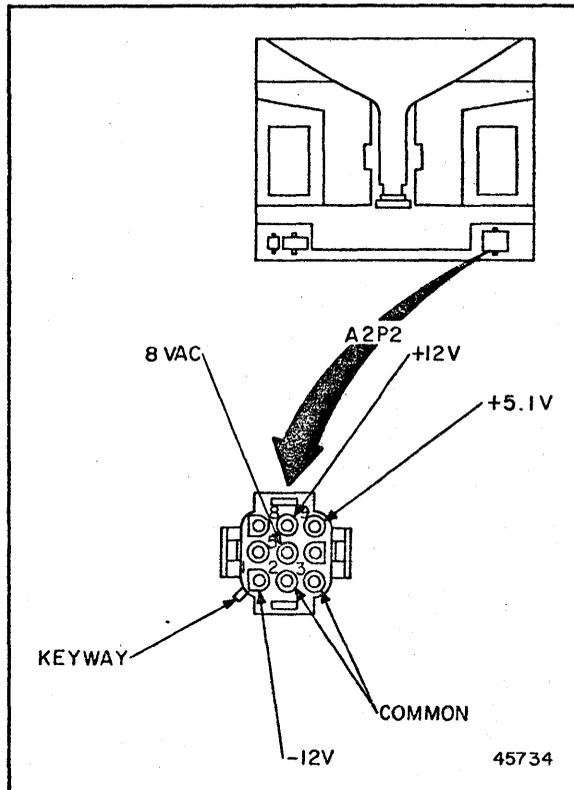
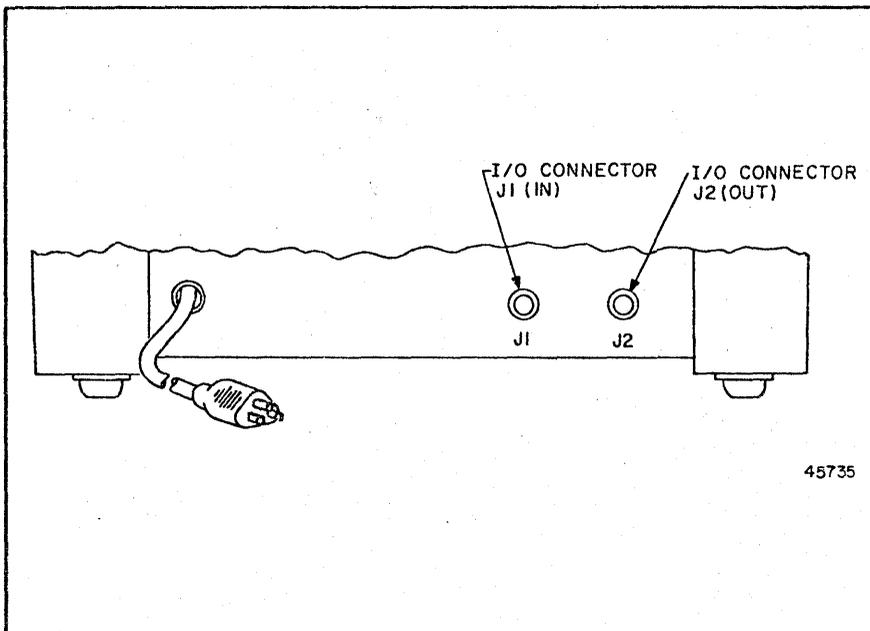


Figure 2-16. Slave Terminal Voltage Checkpoints

Table 2-5. Slave Terminal Installation (Cont)

Step	Procedure	Reference
19	If voltages are not within tolerance, refer to <u>SPERRY UNIVAC Universal Terminal System 400 Functional Analysis and Servicing</u> , MR6087 for adjustment procedures.	MR6087
20	Perform CRT module adjustments as required. Refer to <u>SPERRY UNIVAC Universal Terminal System 400 Functional Analysis and Servicing</u> , MR6087 for adjustment procedures.	MR6087
21	Replace the slave terminal casework.	
22	Connect terminal input cable 2820374-XX between J1 on the slave terminal and either J4, J6, or J8 on the master terminal, or J3, J5, J7, J9, J11, or J13 on the controller terminal.	Figures 2-17, 2-18, 2-19
23	Connect terminal output cable 2820374-XX between J2 on the slave terminal and either J5, J7, or J9 on the master terminal, or J4, J6, J8, J10, J12, or J14 on the controller terminal.	Figures 2-17, 2-18, 2-19
24	Refer to table 2-7 for procedures for connecting peripheral devices and communications connections.	



45735

Figure 2-17. Slave Terminal I/O Connections

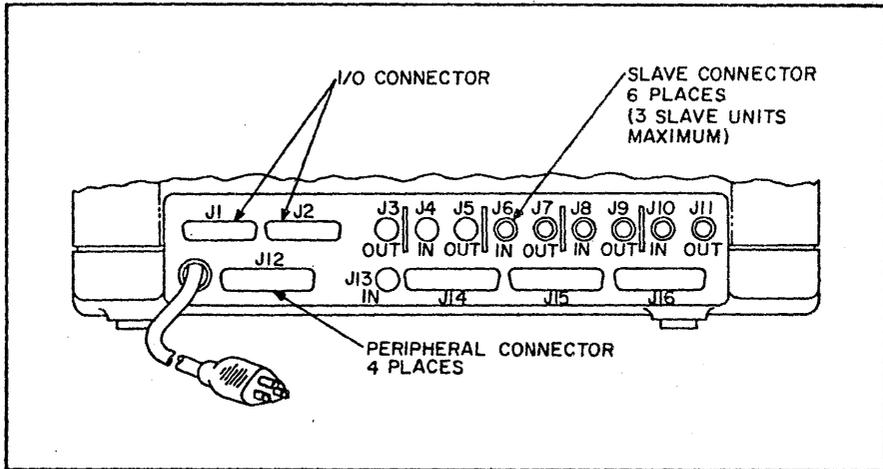
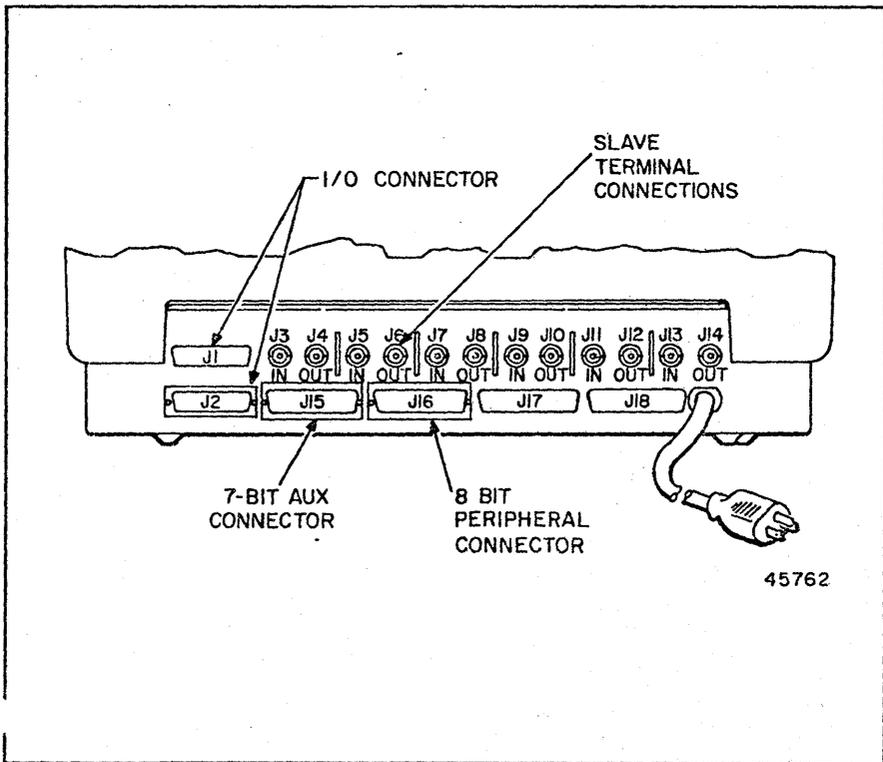


Figure 2-18. Master Terminal I/O Connections



45762

Figure 2-19. Controller Terminal I/O Connections

Table 2-6. Controller Installation

Step	Procedure	Reference
1	Complete unpacking procedures according to table 2-3.	Table 2-3
2	If not already accomplished, remove controller top cover. (Loosen two retaining screws at rear of cabinet and back the screws out about 1/4 inch. Tip the cover and front panel toward the front and lift off.	
3	Check for broken or cracked connectors on terminal boards, and bent or shorted connector pins. Inspect for foreign material.	
4	Ensure that all push-on terminals are securely attached to their respective switches, indicators and potentiometers, etc.	Figure 2-20 (Foldout)
5	Ensure that all internal cables are properly routed and plugged into the appropriate connectors.	Figure 2-20 (Foldout)
	<p style="text-align: center;">CAUTION</p> <p>Two cables in the UTS 400 system require keying. They are:</p> <p>(1) Keyboard cable (W6) P/N 2816519-XX (master and slave) Pin A is keyed on both ends.</p> <p>(2) Monitor signal cable (W10) P/N 2816517-XX Pin A is keyed on both ends.</p> <p>Improper orientation of the noted cables can cause equipment damage.</p>	Figure 2-9 (Foldout)
6	Determine the AC voltage of the operating location. If necessary, remove the cover from power supply module A5A3 (figure 2-3) and strap the power supply as described in section 3.	
7	Replace power supply module cover, if removed.	
8	Check all modules for proper strapping. Strap modules, as necessary, according to the information in section 3. While the modules are removed from the unit, check for broken, loose, or missing ROM elements according to the information in appendix D. Replace modules.	Section 3 and Appendix D
9	Fill out Configuration Description Record shipped with each unit. Follow instructions on form. Keep a record on reverse side of form for all future FCOs installed.	

Table 2-6. Controller Installation (Cont)

Step	Procedure	Reference
10	<p>Set POWER ON/OFF switch on front panel to OFF position.</p> <p style="text-align: center;">NOTE</p> <p>Units are shipped from the factory strapped for 115 VAC 60 Hz with a Hubbell 5251, 5252, or equivalent power plug. On units to be used with other power sources, an appropriate primary power plug must first be installed.</p>	Figure 2-21
11	<p>Use ohmmeter to ensure that AC power input leads are not shorted.</p>	
12	<p>Connect power cord to primary AC power source.</p> <p style="text-align: center;">NOTE</p> <p>The power-on confidence (POC) test is initiated by turning power on to the unit. The READY indicator lights when the test is successfully completed; if not successfully completed, the error condition is displayed on the screen. Refer to <u>SPERRY UNIVAC Universal Terminal System 400 Functional Analysis and Servicing, MR6087</u> for a detailed description of POC test.</p>	
13	<p>Set POWER ON/OFF switch to ON position. POWER ON indicator should light and READY indicator should light at successful completion of POC test.</p>	Figure 2-21

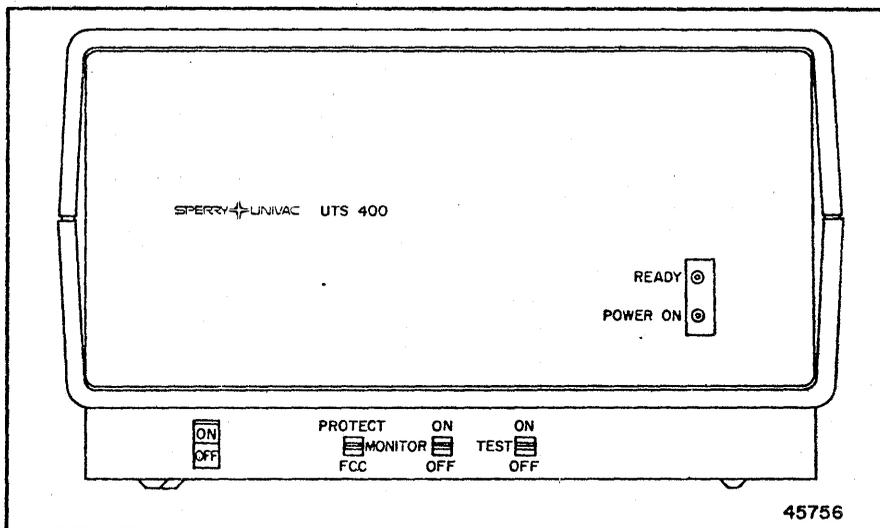


Figure 2-21. Controller Controls and Indicators

Table 2-6. Controller Installation (Cont)

Step	Procedure	Reference																	
14	<p>Using volt-ohmmeter, check power supply voltage at following locations on A1 backplane. Set POWER ON/OFF switch to ON after meter is connected and to OFF after each voltage check.</p> <p style="text-align: center;">NOTE</p> <p>Terminal E1 is not connected to the 6.3 VAC source.</p> <table border="1" data-bbox="470 505 846 742"> <thead> <tr> <th colspan="2" data-bbox="470 505 672 536">Terminals</th> <th data-bbox="672 505 846 536" rowspan="2">Voltages</th> </tr> <tr> <th data-bbox="470 536 571 582">Return</th> <th data-bbox="571 536 672 582">Output</th> </tr> </thead> <tbody> <tr> <td data-bbox="470 582 571 627">E6 (GND)</td> <td data-bbox="571 582 672 627">E2</td> <td data-bbox="672 582 846 627">-10.8 to -13.2</td> </tr> <tr> <td data-bbox="470 627 571 673">E6</td> <td data-bbox="571 627 672 673">E3</td> <td data-bbox="672 627 846 673">-4.5 to -5.5</td> </tr> <tr> <td data-bbox="470 673 571 718">E6</td> <td data-bbox="571 673 672 718">E4</td> <td data-bbox="672 673 846 718">+5.0 to +5.4</td> </tr> <tr> <td data-bbox="470 718 571 742">E6</td> <td data-bbox="571 718 672 742">E5</td> <td data-bbox="672 718 846 742">+10.8 to +13.2</td> </tr> </tbody> </table>	Terminals		Voltages	Return	Output	E6 (GND)	E2	-10.8 to -13.2	E6	E3	-4.5 to -5.5	E6	E4	+5.0 to +5.4	E6	E5	+10.8 to +13.2	Figure 2-22
Terminals		Voltages																	
Return	Output																		
E6 (GND)	E2	-10.8 to -13.2																	
E6	E3	-4.5 to -5.5																	
E6	E4	+5.0 to +5.4																	
E6	E5	+10.8 to +13.2																	

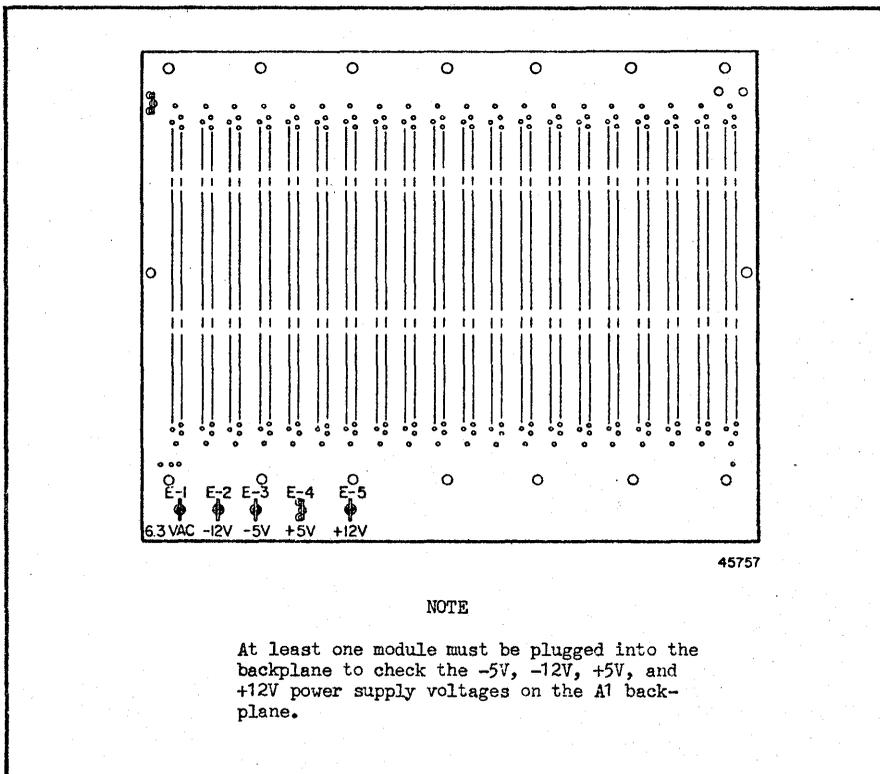


Figure 2-22. Power Supply Voltage Checkpoints - Controller

Table 2-6. Controller Installation (Cont)

Step	Procedure	Reference
15	<p>If voltages are not within tolerance or one or more of the voltages are missing refer to <u>SPERRY UNIVAC Universal Terminal System 400 Functional Analysis and Servicing, MR6087</u> for power supply data.</p> <p style="text-align: center;">NOTE</p> <p>Up to 6 slave terminals may be connected to the master terminal. Unless the controller was originally configured for the maximum number of terminals, it will be necessary to install the required features to accommodate the slave terminals used with the system.</p> <p>Feature F2280-01, Display Control, is required for each slave terminal used with the controller. For every two slave terminals, one feature F2278, Display Driver, is required.</p> <p>Feature F2280-01 consists of a display control module, a 50-pin cable assembly, and a BNC wiring harness, which includes two BNC connectors. Feature F2278 consists of a display driver module.</p>	
16	<p>If slave terminals are to be installed at this time, proceed to the next step; if not, proceed to step 20.</p>	
17	<p>Install feature 2280-00 according to procedures in field instructions for feature installation (FIFI) 2812095. (Feature components are illustrated in appendix A, ROM locations in appendix D, and a wiring diagram in appendix E.)</p>	<p>Appendix A Appendix D Appendix E</p>
18	<p>If a second slave terminal is to be installed, install features 2278-00 and 2280-00 according to field instructions for feature installation (FIFI) 2812094 and 2812095, respectively.</p>	<p>Appendix A Appendix D Appendix E</p>
19	<p>If more than 2 slave terminals are to be installed, install features F2280 and F2278 as required. After installation of features, but before connecting and installing slave terminals, complete steps 20 and 21, and proceed to step 22.</p>	<p>Appendix A Appendix D Appendix E</p>

Table 2-6. Controller Installation (Cont.)

Step	Procedure	Reference
20	If applicable, install 8K RAM or screen bypass features by inserting universal 8K RAM module or modules, as required. Refer to section 3 for all strapping information, and to FIFI 2812142 (8K RAM) or FIFI 2812143 (screen bypass). The module is the feature component; ROM locations are shown in appendix D, and a wiring diagram in appendix E.	Figure 2-1 Appendix D Appendix E
21	If applicable, install communications I/O module (feature 2286-00) according to FIFI 2812096. Install 7-bit auxiliary interface module (F2285-00) according to FIFI 2812093, and 8-bit peripheral interface module (F2285-00) according to FIFI 2812144. Refer to section 3 for all applicable strapping information, including additional features obtained by strapping. Feature components are shown in appendix A, ROM locations in appendix D, and a wiring diagram in appendix E.	Figure 2-1 Appendix A Appendix D Appendix E
	NOTE	
	Connectors J15, J16, J17, or J18 on the rear of the terminal may be used for 7- or 8-bit peripheral connections. It is recommended that J15 be used for 7-bit peripheral connections, and J16 for 8-bit peripheral connections.	
22	If slave terminals are to be connected to the controller, refer to table 2-5 for instructions; if no slave terminals are to be installed, refer to table 2-7 for final installation procedures, including connection of 7- or 8-bit peripheral devices.	Table 2-5 Table 2-7
23	Replace top cover on the controller when installation of modules is complete.	

Table 2-7. Final Checkout and Installation Procedure

Step	Procedure	Reference
1  2  3	<p style="text-align: center;">NOTE</p> <p>If peripheral devices are used with the UTS 400 (master or controller), a communications I/O feature (module) must be installed, as well as the required interface module.</p>	<p>Table 2-4, Table 2-6</p> <p>Figure 2-23, Figure 2-24, Figure 2-25, (foldout) and Appendix B</p>
	<p>Check Communications Interface Feature (F2286-00) installation, and 7-Bit Auxiliary Interface Feature (F2285-00), and 8-Bit Peripheral Interface Feature (F2284).</p>	
	<p>Connect peripheral devices requiring a 7-bit interface to J12 on the master terminal and to J15 on the controller. Use the applicable cable connection as specified in the referenced figures. A typical system equipment arrangement with cabling corrections is shown in figure 2-25.</p>	
	<p>For 7-bit peripherals, install terminating resistor 2807737 on last peripheral in the chain.</p>	
	<p style="text-align: center;">NOTE</p> <p>Electrically, the maximum number of peripheral devices which can be connected to the master or controller terminal is:</p> <p style="margin-left: 40px;">7-bit devices - 8 8-bit devices - 4</p> <p>However, the total number of DIDs available for the peripheral devices is 12. UTS 400 peripheral devices use the following number of DIDs per unit:</p> <p style="margin-left: 40px;">TCS = 4 (2 per transport) Diskette - 4 (2 per drive) COP - 1 800 TP = 1 Printer type 0786 = 1</p> <p>Refer to <u>MR6087, UTS 400 Functional Analysis and Servicing</u> for further configuration details.</p>	

Table 2-7. Final Checkout and Installation Procedure (Cont)

Step	Procedure	Reference
4	<p>Connect peripheral devices requiring an 8-bit interface to J14 on the master terminal or to J16 on the controller terminal. A typical system equipment arrangement with cabling connections is shown in figure 2-25.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Eight bit devices employ the same signal cable (2814880-XX) as the 7-bit devices; however, the cable ends are reversed, as shown in the figures.</p>	<p>Figure 2-23, Figure 2-24, Figure 2-25, (foldout) and Appendix B</p>
5	<p>Install terminating resistor 2821616 on the last 8-bit peripheral in the chain.</p>	
6	<p>Connect system signal cable (modem or multiplexer) 2806096-XX or 2808043-XX to I/O connector J1 on the master or controller.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">If a UTS 400 master or controller is to operate with a UNISCOPE 100 or UNISCOPE 200 terminal on the same SPERRY UNIVAC multiplexer, the multiplexer used must contain a revised control board which provides strapping provisions for extension of the time-out period. See the following step.</p>	
7	<p>For concurrent operation of the UTS 400 and a UNISCOPE 100/200 terminal only, ensure that the following revision board is installed in the applicable multiplexer:</p> <p style="text-align: center;">Control Multiplexer: Control board 2807758-12 or higher dash number</p> <p>(The new printed circuit boards will be factory installed on terminal multiplexers with a serial number of 8000 or above.)</p>	
8	<p>Check operation of unit by performing POC test and back-to-back tests of peripheral modules according to instructions contained in MR6087, <u>SPERRY UNIVAC Universal Terminal System 400 Functional Analysis and Servicing</u> (sections 14 and 17).</p>	

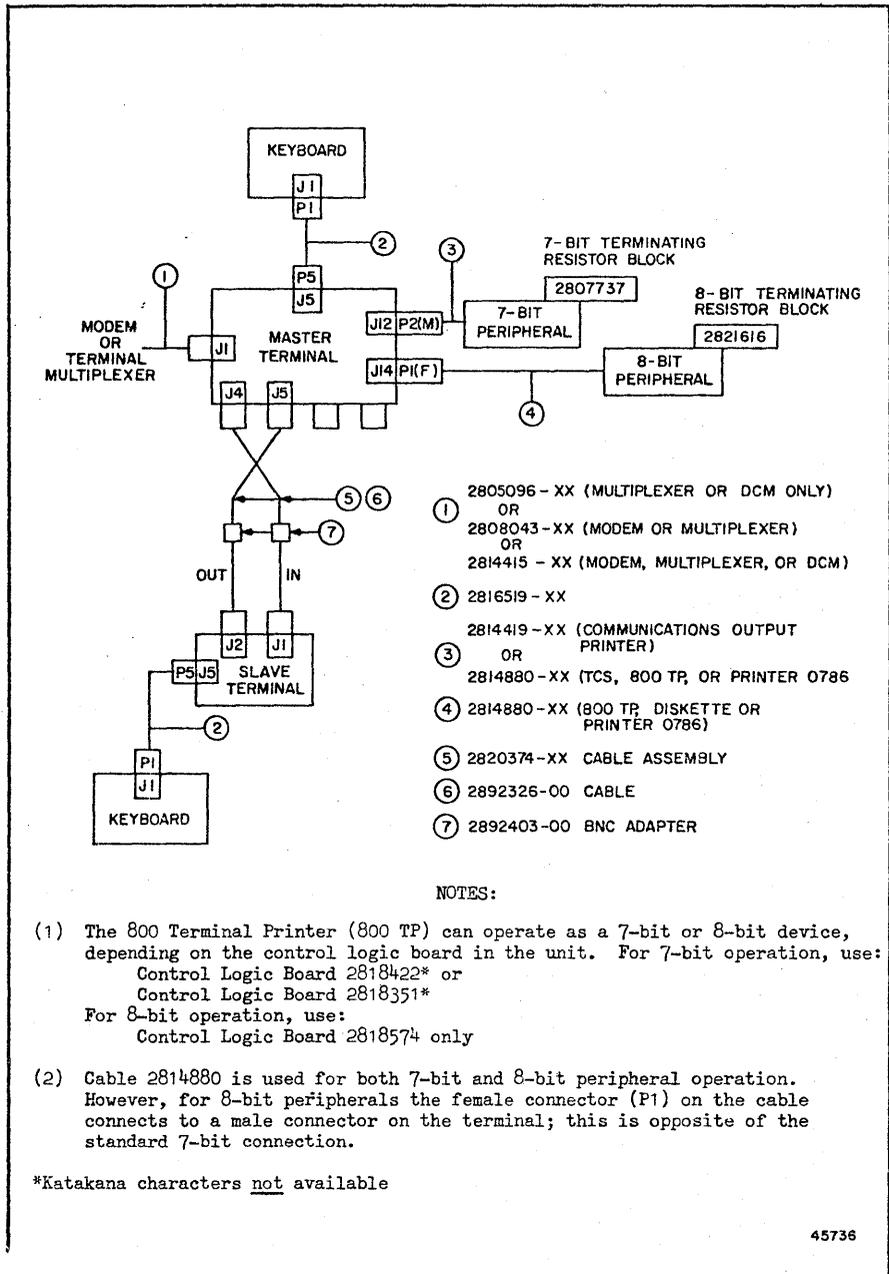


Figure 2-23. Master Terminal - System Cabling

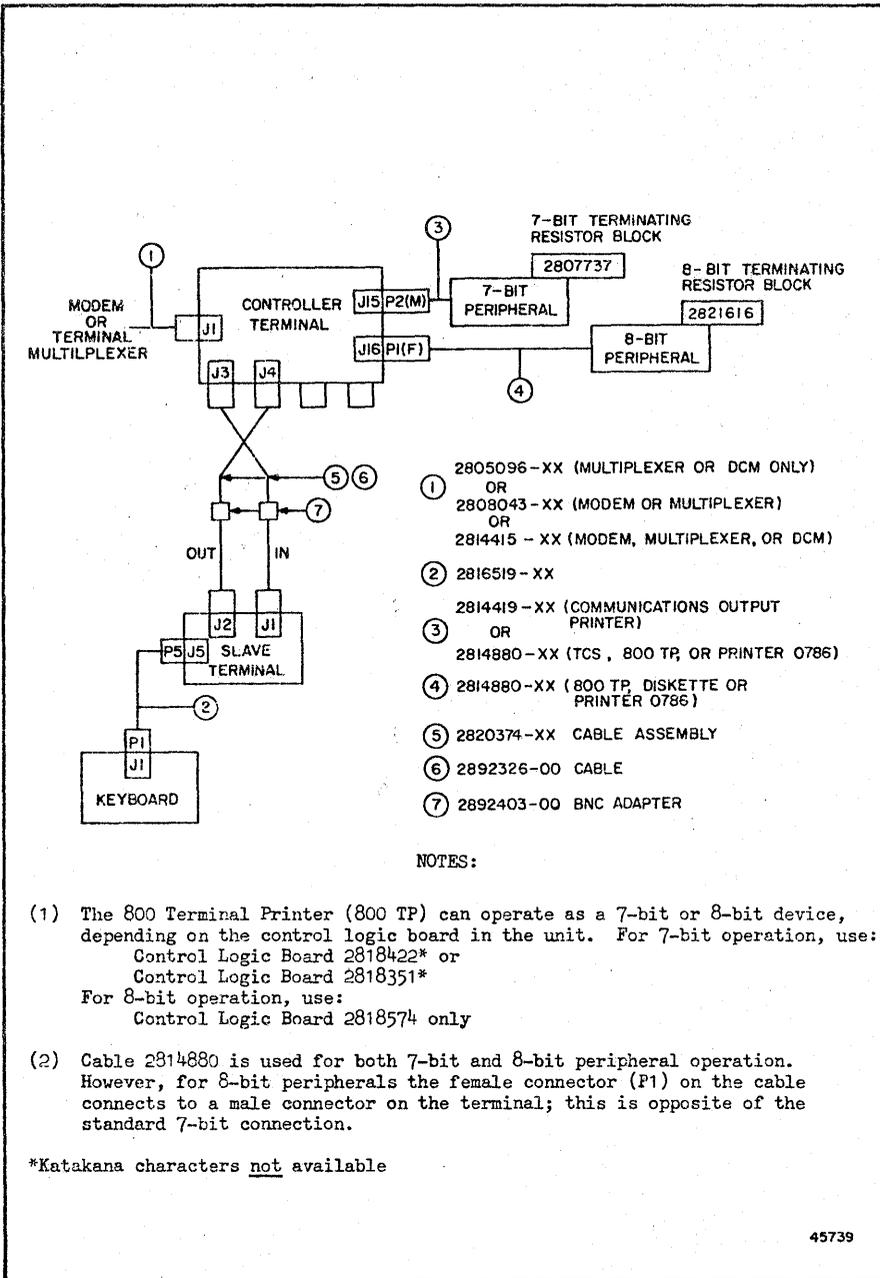


Figure 2-24. Controller Terminal - System Cabling

## SECTION 3

### STRAPPING

#### 3-1. GENERAL

This section contains the strapping information and procedures for the Universal Terminal System 400 (UTS 400). Strapping selections in the UTS 400 are used to select voltages, determine remote identifiers (RIDs), stations identifiers (SIDs) to select device addresses and ROM addresses, to index display control modules, to select DIDs, make programmability selections, select screen bypass module, and other functions outlined in this selection.

The strapping information is presented at a printed circuit board (module) level. All functions that require strapping on each module should be strapped (or checked for proper strapping) at the same time; then the strapping should be performed for the next module. The modules and their strappable functions are listed in table 3-1. Figure 3-1 shows the module locations in the UTS 400 Master; figure 3-2 shows the module locations in the UTS 400 Controller.

#### NOTE

Location of plug-in ROM (firmware) elements on the 10K ROM/Switch, 8K RAM, Communications I/O, and 7-Bit Auxiliary Interface and 8-Bit Peripheral Interface modules should be verified during the strapping procedure by reference to appendix D in this book. The CPU module requires no strapping selections, but does contain ROM elements which should also be verified by reference to Appendix D.

Table 3-1. Strapping

Function	Module Part No./ Ref. Designator	Paragraph	Figure
Power Supply	2036465 (A5A3)	3-4	3-3
10K ROM/Switch Module	2818437-05 (A1A7)	3-5	3-4
ROM Address/Device Address		3-6	3-4
Peripheral Device Selection		3-7	3-5
System Mode Selection		3-8	3-5
Memory Partitioning		3-9	3-6
Screen Bypass Control Page and and Screen Format		3-10	3-6
Character Generator Module	2818481 (A5A1)	3-11	3-7
Display Control Module	2818442 (A1A3) 2818483 (A1A3)	3-12	3-8
8K RAM Module	2818418 (A1A8)	3-13	3-9
Screen Bypass Module	2818418 (A1A8)	3-14	3-10
Communications I/O Module	2818414 (A1A4)	3-15	3-11
Device Address		3-16	3-11
Multiplexer/Modem Selection		3-17	3-11
ROM Enable		3-18	3-11
ROM Address		3-19	3-11
RID and SID		3-20	3-12, 3-13, 3-14
7-Bit Auxiliary Interface Module	2818398 (A1A5)	3-21	3-15
Device Address		3-22	3-15
ROM Enable		3-23	3-15
ROM Address		3-24	3-15
8-Bit Peripheral Interface	2818443 (A1A6)	3-25	3-16
Keyboard Assembly	2892287 or 2892288	3-26	3-17, 3-18

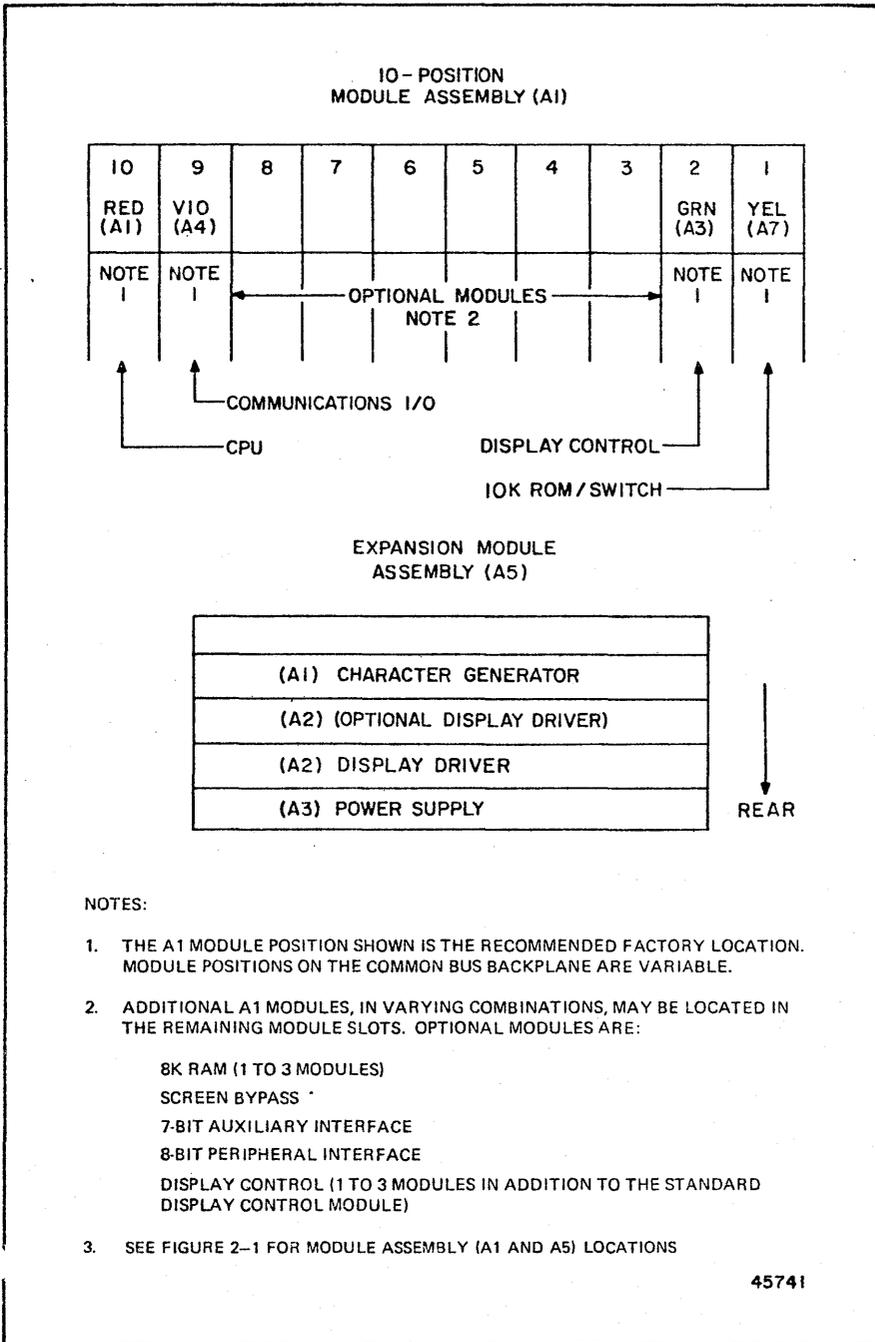


Figure 3-1. Master Terminal Module Locations

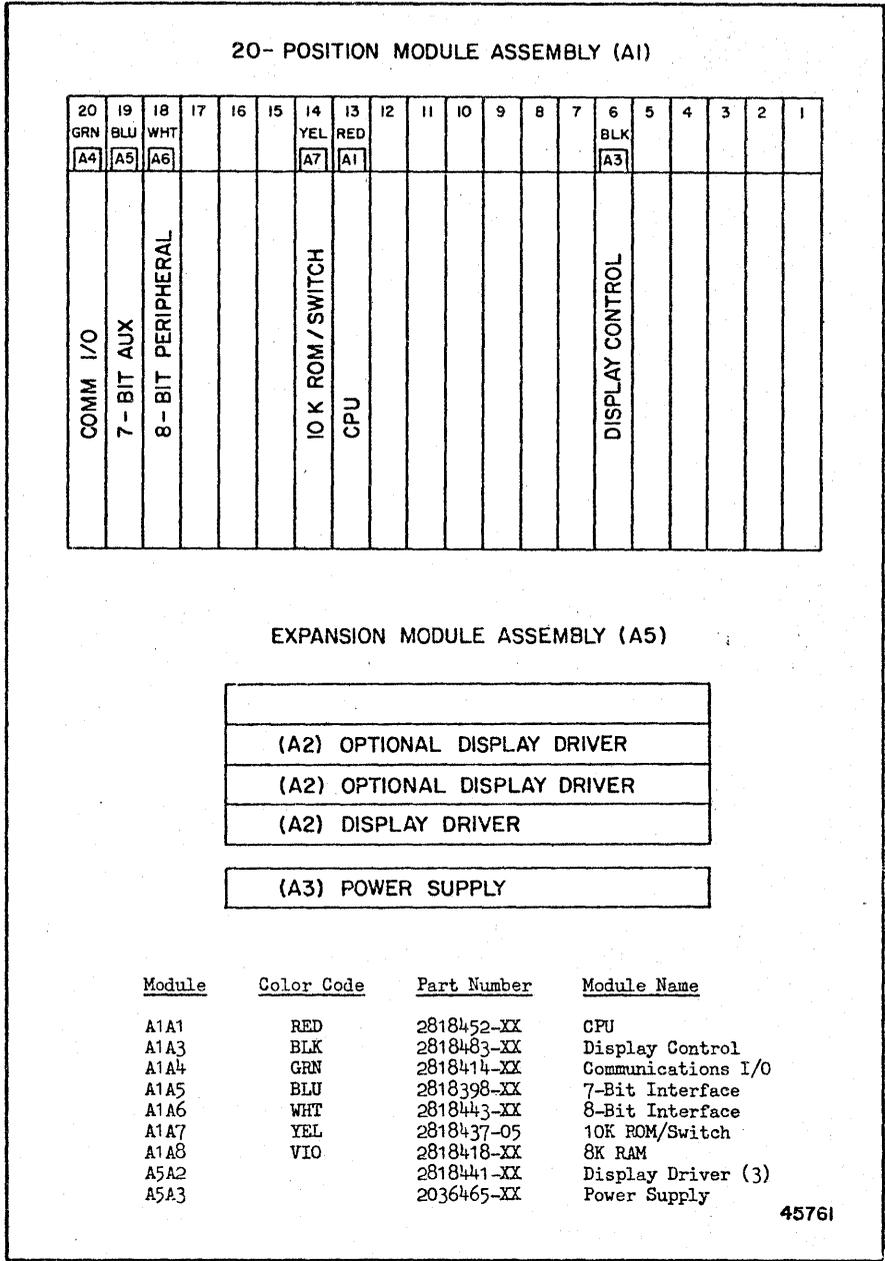
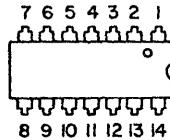


Figure 3-2. Controller Terminal Module Locations

3-2. STRAPPING DEVICES

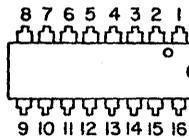
Strapping connectors, links, and plugs ("suitcase" straps) used in the UTS 400 have the following part numbers:

14 contact, dual in-line connector - 2899289-00



46979

16 contact, dual in-line connector - 2899373-00



46980

Link,  $\frac{1}{4}$ -inch length size 24 or 23 - 3007807-00

Plug ("suitcase" strap) 2892325-06 (Black) -07 (Red)

3-3. STRAPPING PROCEDURES

Strapping is accomplished by inserting links or plugs in the printed circuit boards, or by lifting pins on the dual in-line strapping connectors, or setting a switch according to the information given in the referenced tables and figures. Note that strapping connectors resemble integrated circuit packs; however, each pin on one side of a strapping connector feeds through the body of the connector and is electrically common with the corresponding pin on the other side of the connector. Thus, the pins on either side of the connector may be lifted for strapping. However, lifting too many pins on one side of the connector may cause the remaining pins on that side to become disengaged from the socket. Lifting more than four pins on one side of a strapping connector is not recommended.

3-4. POWER SUPPLY STRAPPING

Power supply 2036465 contains a small printed circuit board (A2) which is used to select power line voltage. The voltage selection accommodates the power supply module and the CRT module for nominal line voltages of 115 or 230 VAC in the frequency range of 48 to 62 Hz. Select the voltage according to the instructions in table 3-2 and figure 3-3.

Table 3-2. Power Supply 2036465 Strapping  
(Figure 3-3)

Voltage Selection	Procedure
85 to 125 VAC	Plug A2 into J3 with the part number side of A2 toward the bottom edge of the power supply module <u>and</u> with the end of A2 marked "85-128 VOLTS AT 48-62 Hz" nearest to connector J3.
185 to 255 VAC	Plug A2 into J3 with the part number side of A2 toward the bottom edge of the power supply module <u>and</u> with the end of A2 marked "185-255 VOLTS AT 48-62 Hz" nearest to connector J3.

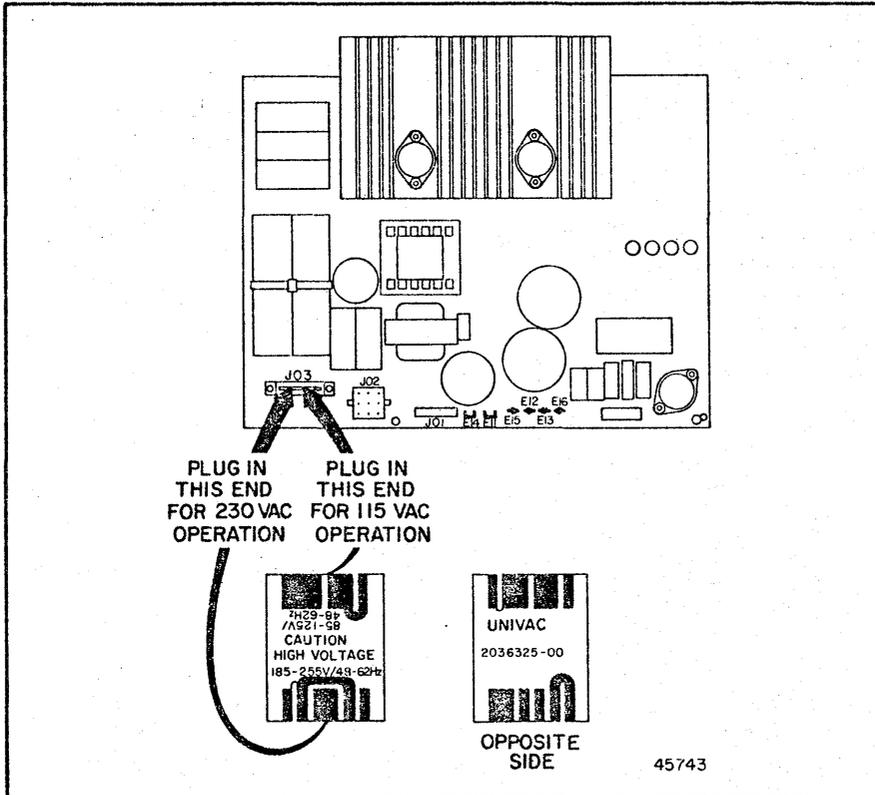


Figure 3-3. Power Supply 2036465 (A1A3) Strapping

3-5. 10K ROM/SWITCH MODULE STRAPPING

The 10 ROM/switch module 2818437 (A1A7) contains 17 switch blocks for strapping the following functions:

- o ROM address range
- o Device address
- o Peripheral device selection and DIDs
- o System modes of operation
- o Memory partitioning (programmability function)
- o Screen bypass control page function
- o Screen format

Switch blocks are designated S0 thru S14 and 62Q5 and 62C5. Switch block S14 is not used.

3-6. ROM ADDRESS AND DEVICE ADDRESS

ROM address strapping is accomplished by specified switch settings on switch blocks 62Q5 and 62C5. The device address is determined from switches on switch block 62Q5, as shown in table 3-3.

The address range of ROMS 0 through 7 (figure 3-4) is strapped using switch block 62Q5; the address range of ROMS 8 and 9 is strapped using switch block 62C5. Within the address range (10K octal or 1K hex) of ROMS 8 and 9, an offset or starting address is also selectable in 2K octal (400 hex) increments. Starting addresses for the UTS 400 are shown in table 3-4.

Select the device address and ROM address ranges by setting the switch blocks as specified in tables 3-3 and 3-4, following.

Table 3-3. 10K ROM/Switch Module - ROM Address Strapping (ROMS 0 thru 7) and Device Address Strapping (Figure 3-4)

Address		Function	Switch Block 62Q5	
Octal	Hex		Switch	Position*
75	3D	Device Address	1	On
		Device Address	2	Off
		-	3-4	Not Used
40,000 to 57,777	4000 to 5FFF	ROM Address	5	On
		ROM Address	6	Off
		ROM Address	7	On
		ROM Address	8	Off

\*On = logical 1

Table 3-4. 10K ROM/Switch Module - ROM Address Strapping - ROMS 8 (39L1) and 9 (39G9) (Figure 3-4)

Starting Address		Function	Switch Block 62C5	
Hex	Octal		Switch	Position*
7400	72000	ROM 39G9 OFFSET	1	ON
		ROM 39G9 OFFSET	2	OFF
7800	74000	ROM 39L1 OFFSET	3	OFF
		ROM 39L1 OFFSET	4	ON
Address Range		ROM ADDRESS	5	ON
From	From			
4000	40,000	ROM ADDRESS	6	ON
to	to	ROM ADDRESS	7	ON
5FFF	57,777	ROM ADDRESS	8	OFF

\*On = Logical 1

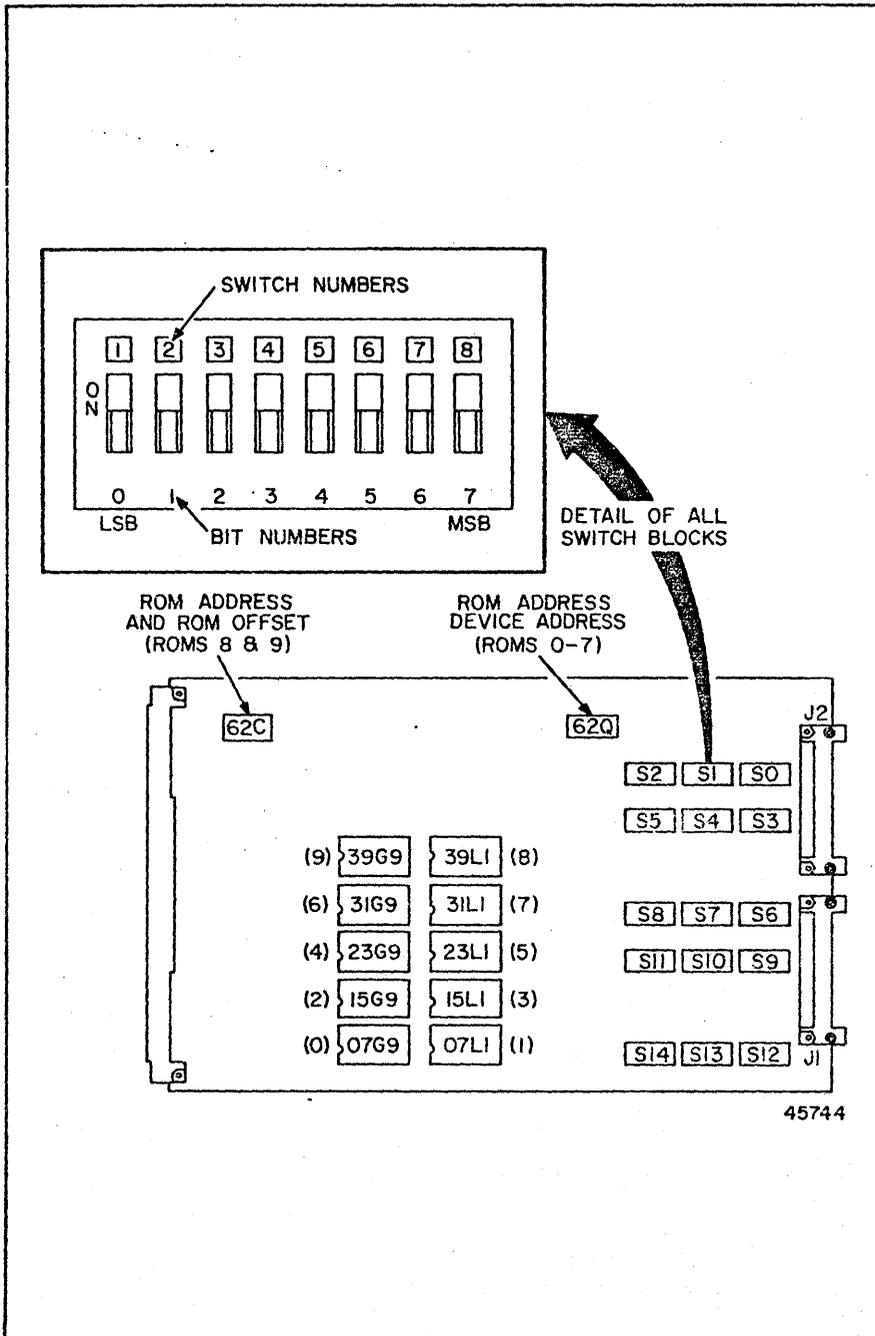


Figure 3-4. 10K ROM/Switch Module 2818437 (A1A7) Strapping

3-7. PERIPHERAL DEVICE SELECTION

Switch blocks S0 through S11 define peripheral device types and peripheral DIDs. Each switch block (S0 through S11) establishes the operating parameters for one peripheral device. The first 4 switches on each switch block select the low order bits of the peripheral device DID; the remaining switches define the device.

The switch blocks can be strapped in variable sequences with the lowest number switch block selecting the first peripheral of that type. If switch block S0 is strapped for a printer, the printer is automatically designated P1 on the control page. The next switch block strapped for a printer will automatically be designated P2. If switch block S1 is strapped for a tape cassette unit, the cassette unit is automatically designated C1 on the control page. The next switch block strapped for a cassette will automatically be designated C2. All unused switches on the switch blocks must be set to the OFF position. The peripheral device switch blocks S0 through S11 are strapped as shown in table 3-5.

Table 3-5. 10K ROM/Switch Module - Peripheral Device Strapping (Figure 3-5)

Switch Block	Hex	Octal	Switch Number	Function (If On)	
	Address				
S0 through S11	5FF0	57760 thru 57773	1	Switches 1 thru 4 select the least significant bits of the DID and must match the actual device. If switch 7 is pressed ON (read/write device selection), the DID selected by switches 1 thru 4 is the write DID for the device. A read DID one number greater than the write DID is selected by system firmware functions.	
			2		
			3		
			4		
			5	Off: selected DID defines first drive of diskette.	On: selected DID defines second drive of diskette.
			6	On: device is retryable (TCS and diskette).	Off: device is not retryable (printers)
			7	On: read/write device (TCS and diskette)	Off: write only device (printers)
			8	On: device on 8-bit interface	Off: device on 7-bit interface

3-8. SYSTEM MODE SELECTION

Switch block S12 provides strapping provision for selecting the various system modes of operation and is strapped as shown in table 3-6.

Table 3-6. 10K ROM/Switch Module - System Mode Selection (Figure 3-5)

Switch Block	Address		Switch Number	Function* (If On)
	Hex	Octal		
S12	5FFC	57774	1	Cycle power-on confidence (POC) test.
			2	Run Comm Back-to-Back test in POC.
			3	Run Peripheral Back-to-Back test in POC.
			4-5	Time selection for Auto Answer/Hangup feature.
				SW 4    SW 5    Time
				OFF    OFF    1.3 min.
				ON    OFF    3.4 min.
				OFF    ON    6.8 min.
	ON    ON    10.2 min.			
		6	Enable DLE 6 response on initialize.	
		7	Enable Auto Answer/Hangup feature.	
		8	Enable retry of peripheral operations initiated online.	

\*On = logical 1

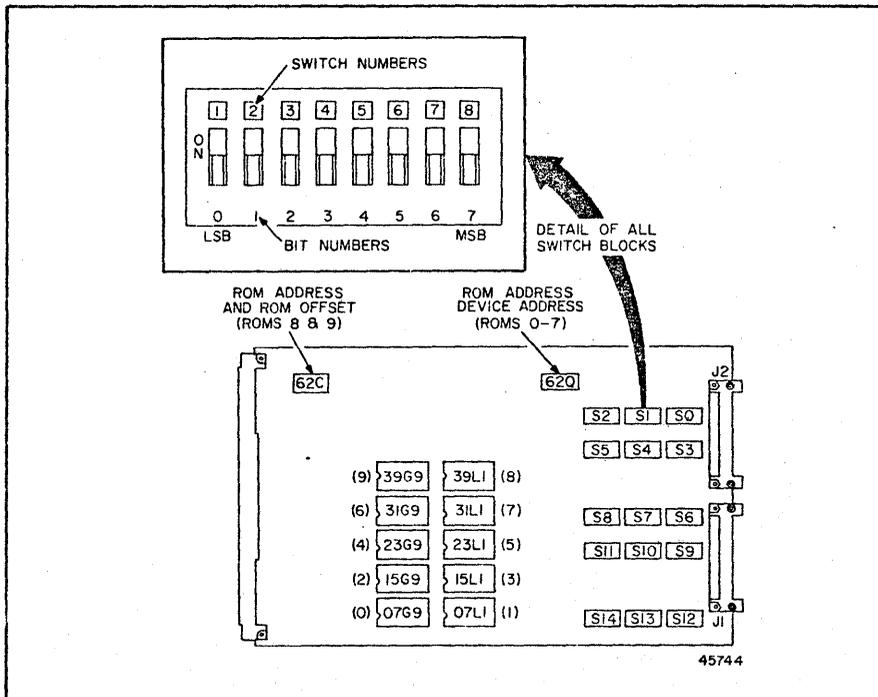


Figure 3-5. 10K ROM/Switch Module 2818437 (A1A7) Strapping

3-9. MEMORY PARTITIONING

The system RAM is shared by both user programs (P) and peripheral output buffering (B) and may be expanded to 24K in 8K increments. The RAM can be partitioned into 4K units allowing a maximum of 6 units to be allocated to either user programs or peripheral output buffering. The RAM partitioning is defined by switch block S13 on the 10K ROM switch module as shown in table 3-7.

Table 3-7. 10K ROM/Switch Module - Memory Partitioning (Figure 3-6)

Switch Block	Address		Switch 3 2 1	Increments 1 2 3 4 5 6	User RAM (P) =
	Hex	Octal			
S13	5FFD	57775	0 0 0	B B B B B B	0K
			0 0 1	P B B B B B	4K
			0 1 0	P P B B B B	8K
			0 1 1	P P P B B B	12K
			1 0 0	P P P P B B	16K
			1 0 1	P P P P P B	20K
			1 1 0	P P P P P P	24K
			1 1 1	B B B B B B	OK

3-10. SCREEN BYPASS CONTROL PAGE AND SCREEN FORMAT

Switch block S13 also contains the switch (6) which allows the master station (or primary slave) to enter the control page in the screen bypass memory. (See note.)

Switch block S13 also contains strapping for the UTS 400 screen format. Refer to table 3-8 and select switches 6, 7, and 8 as required. Set switches 4 and 5 to OFF.

NOTE

The screen bypass memory should be indexed (paragraph 3-26) as the last refresh memory in the system. Switch 6 actually enables the master station or primary slave operator to set the control page in the last indexed memory, which is normally screen bypass. Do not set switch 6 on if the screen bypass feature is not present.

Table 3-8. 10K ROM/Switch Module - Screen Bypass Control Page and Screen Format Strapping (Figure 3-6)

Switch Block S13		Function
Switch	Position*	
4, 5	OFF	Not Used
6	ON	Enable control page function
6	OFF	Control page (offline function) disabled
7, 8	7 8	Screen Format as follows:
	OFF OFF	24 X 80
	ON OFF	24 X 64
	OFF ON	12 X 80
	ON ON	16 X 64

\*ON = logical 1

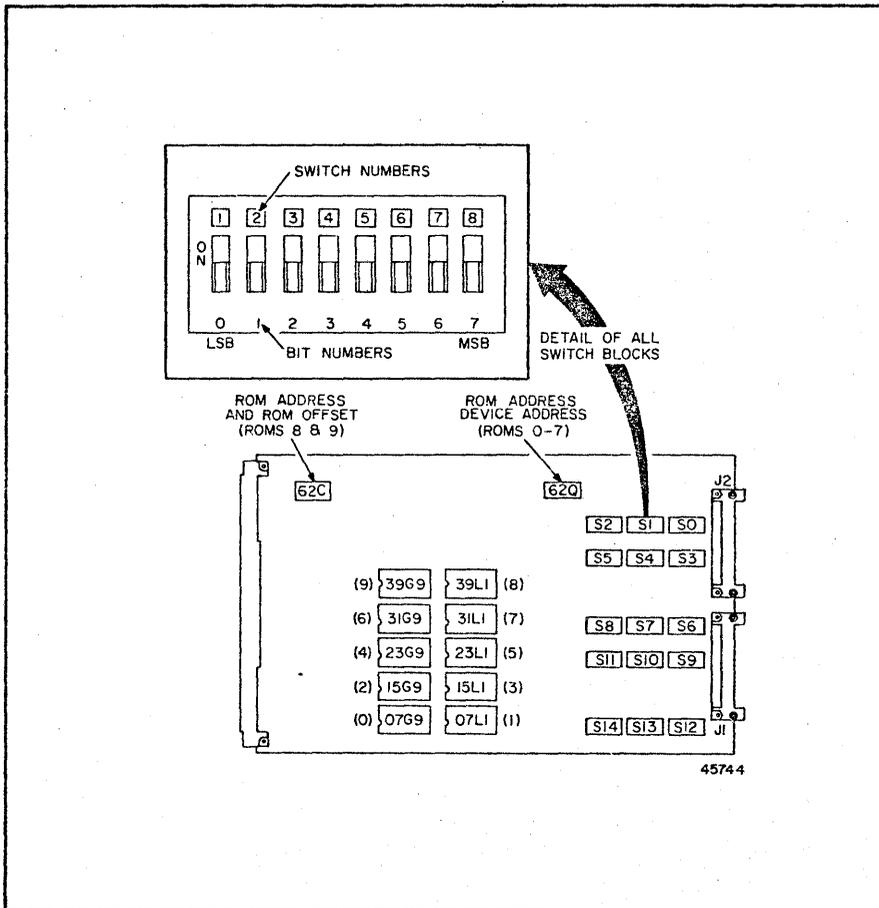


Figure 3-6. 10K ROM/Switch Module 2818437 (A1A7) Strapping

3-11. CHARACTER GENERATOR MODULE STRAPPING

The character generator module 2818481 (A5A1) is strapped for:

- o AC input
- o 64 or 96 characters selection
- o Katakana selection

Strap the module as shown in table 3-8.

Table 3-9. Character Generator Module Strapping (Figure 3-7)

Function	Strap Location (Strap In)
96 Character Selection	E3 - E4
64 Character Selection	E3 - E5
50 Hz Selection	E1 - E2 and E7 - E8 (E2 - E9 is not a functional location - for strap storage only)
60 Hz Selection	E6 - E7
Katakana Selection	E10 - E12
All other language Options and domestic	E10 - E11

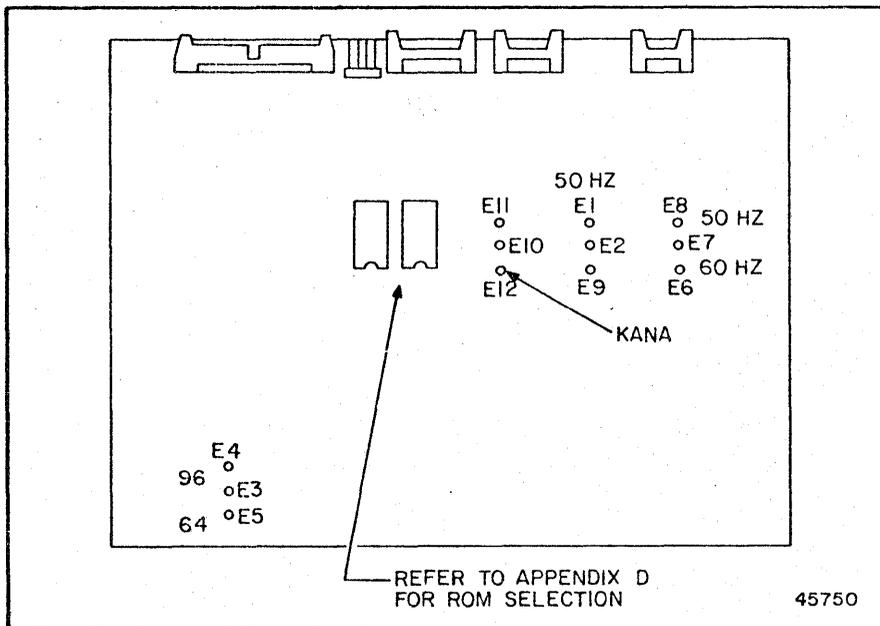


Figure 3-7. Character Generator Module 2818481 (A5A1) Strapping

3-12. DISPLAY CONTROL MODULE STRAPPING

The Display Control Module 2818442 or 2818483 (A1A3) contains a switch block for strapping Display Control module identification. Strapping provisions are identical for both part numbered modules.

The Display Control module provides screen refresh for the display CRT. In a basic system configuration, refresh capability is provided for the master terminal only. If slave terminals are part of the system configuration, an additional Display Control module must be installed in the master for each slave terminal in the system. The switches on switch block 06Q5 provide the selection identification for each of the Display Control modules. (A write only index register on each module reflects the state of the lower six data bits according to the switch settings.) Only one switch should be closed on each module and the switches must be in sequential order from module to module. Switch 6 must be closed for the first Display Control module, switch 5 for the second module, and so on. If a gap is left in the switch sequence, all slave terminals strapped to a higher index number will not be selected. The switch settings on the Display Control modules are made as shown in table 3-10.

Table 3-10. Display Control Module Identification Strapping  
(Figure 3-8)

Index	Switch Block 06Q5	Description
	Switch ON	
0	06Q5 - 6	1 - Master
1	06Q5 - 5	2 - First slave
2	06Q5 - 4	3 - Second slave
3	06Q5 - 3	4 - Third slave

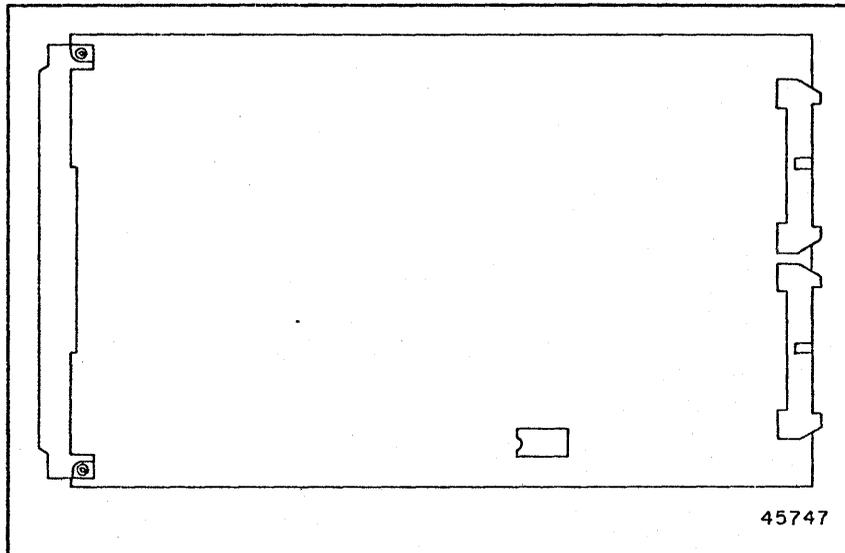


Figure 3-8. Display Control Module 2818442 or 2818483 (A1A3) Strapping

3-13. 8K RAM MODULE STRAPPING

By means of strapping selections, the universal 8K RAM module 2818418 (A1A8) can be configured to function as a general purpose RAM, or as the screen bypass module for the UTS 400. This paragraph defines the strapping for the general purpose RAM, designated as the 8K RAM module. (Refer to paragraph 3-26 for screen bypass module strapping.)

Both the master terminal (type 3544) and the controller (type 8594) may accommodate up to three universal 8K RAM modules used as general purpose RAM (8K RAM modules). In the master unit, the recommended location for the modules is in slots 3 through 8 (figure 3-1); in the controller, the modules should be placed in slots 7 through 12 or 15 through 17. (See figure 3-2).

Strap the 8K RAM modules according to the information in tables 3-11 and 3-12. The modules are strapped according to the number of 8K RAM modules used in the system, as indicated by the tables. Strap the first module according to the column labeled "1st module" in each table. If there are two modules, strap one module according to the column labeled "1st module," and the second module according to the column labeled "2nd module." If all three modules are used, strap each module according to the information in the tables.

NOTE

Switch 5 on each module must be in the OFF position for the 8K RAM selection. The ON position is for screen bypass selection.

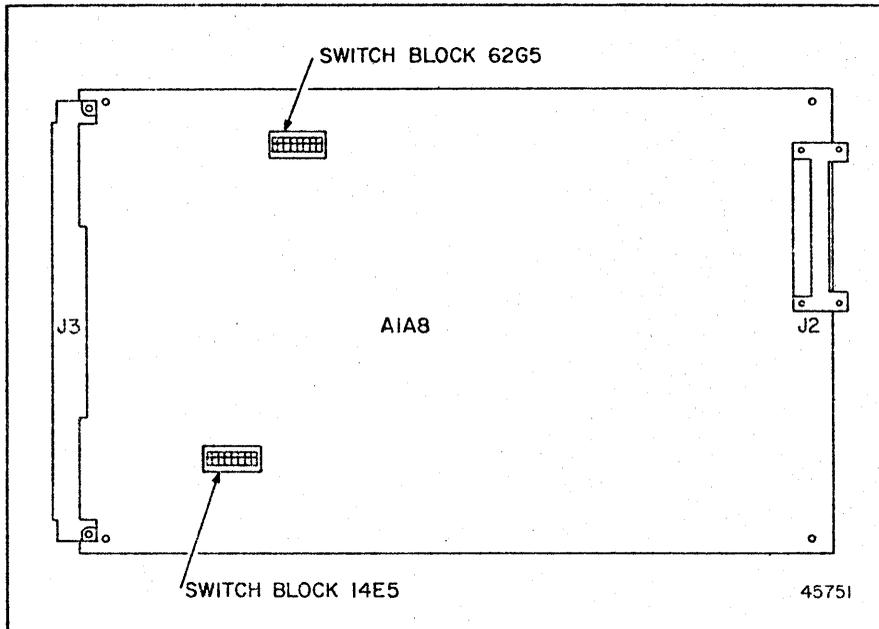


Figure 3-9. 8K RAM Module 2818418 (A1A8) Strapping

Table 3-11. 8K RAM Module Strapping - Switch Block 62G5 (Figure 3-9)

Function	Block 62G5	Switch Position		
	Switch	1st Module	2nd Module	3rd Module
Address range bit 15	1*	OFF	OFF	OFF
Address range bit 14	2*	ON	OFF	OFF
Address range bit 13	3*	OFF	ON	OFF
Address range (not used for 8K RAM)	4*	OFF	OFF	OFF
Screen bypass enable/8K RAM	5	OFF	OFF	OFF
8K RAM/4K RAM enable	6	OFF	OFF	OFF
Enable device read (ON)	7	ON	OFF	OFF
Force selection (ON); Enable device address function to select (OFF)	8	ON	ON	ON

\*OFF = logical 1; bit 0 is least significant bit.

Table 3-12. 8K RAM Module Strapping - Switch Block 14E5 (Figure 3-9)

Function	Block 14E5	Switch Position		
	Switch	1st Module	2nd Module	3rd Module
	1	OFF	OFF	OFF
	2	OFF	OFF	OFF
	3	OFF	OFF	OFF
	4	OFF	OFF	OFF
	5	OFF	OFF	OFF
Maint. Ind. Bit (3rd module)	6	OFF	OFF	ON
Maint. Ind. Bit (2nd module)	7	OFF	ON	OFF
Maint. Ind. Bit (1st module)	8	ON	OFF	OFF

3-14. SCREEN BYPASS MODULE STRAPPING

By means of strapping selections, the universal 8K RAM module 2818418 (A1A8) can be configured to function as the screen bypass module for the UTS 400. This paragraph defines the strapping required to configure the module for the screen bypass function.

The recommended location for installing the screen bypass module in the master unit (type 3544) is in slots 3 through 8 in the A1 module assembly (figure 3-1); in the controller, the recommended slots are 7 through 12 or 15 through 17 (figure 3-2).

NOTE

To enable the screen bypass control page function, switch 6 on switch block 13 (ROM/switch module) must be set to ON. This function allows the operator at the master station (or primary slave) to change the control page in the screen bypass memory. The switch should not be set to ON if the screen bypass feature is not present.

Set the switches on switch blocks 13, 62G5, and 14E5 according to the information in tables 3-8, 3-13, and 3-14.

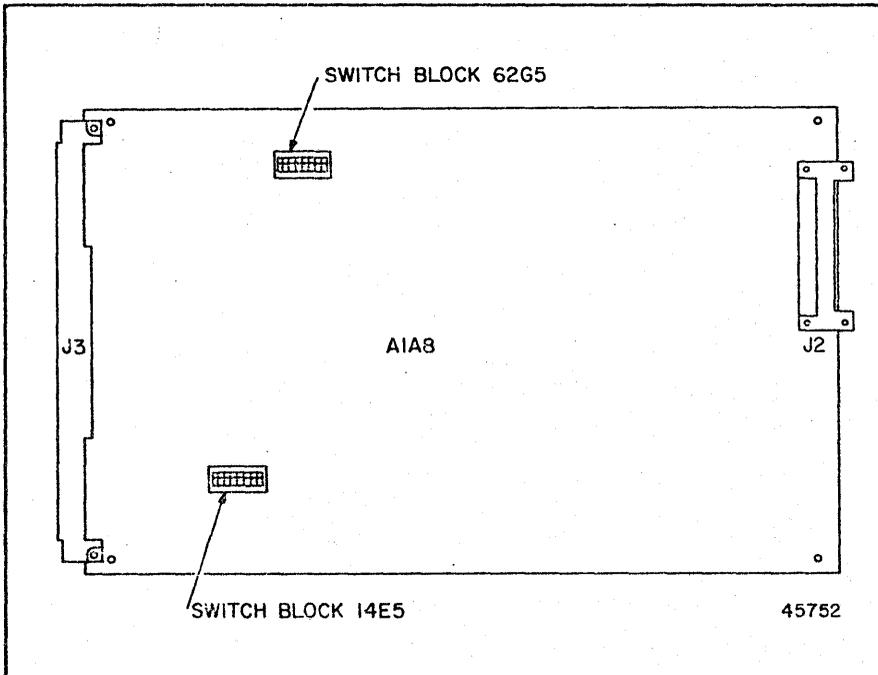


Figure 3-10. Screen Bypass Module 2818418 (A1A8) Strapping

Table 3-13. Screen Bypass Module Strapping (Figure 3-10)

Function	Switch Block 62G5	
	Switch	Position
Address range bit 15	1*	ON
Address range bit 14	2*	ON
Address range bit 13	3*	OFF
Address range bit 12	4*	OFF
8K RAM enable/screen bypass	5	ON
8K RAM/4 RAM enable	6	ON
Enable device read (ON)	7	ON
Force selection (ON); Enable device address 1 function to select (OFF)	8	OFF

\* OFF = logical 1; bit 0 is least significant bit

Set the switches on switch block 14E5 by placing the switches ON or OFF according to the information given in table 3-14.

Table 3-14. Screen Bypass Module Strapping (Figure 3-10)

Display Control Modules	Switch Block 14E5	
	Switch	Position
1 Module installed	7	ON - all other switches off
2 Modules installed	6	ON - all other switches off
3 Modules installed	5	ON - all other switches off
4 Modules installed	4	ON - all other switches off
5 Modules installed	3	ON - all other switches off
6 Modules installed	2	ON - all other switches off

### 3-15. COMMUNICATIONS I/O MODULE (SYNCHRONOUS) STRAPPING

The Communications I/O Module (Synchronous) 2818414 (A1A4) contains strapping connectors or switches for strapping the following functions:

- o Device address
- o Multiplexer/Modem selection
- o ROM enable (strapping plug)
- o ROM address range
- o RID and SID selections

The strapping is described in the following paragraphs and illustrated in figure 3-11.

NOTE

Except for the ROM enable strap, functions specified in the following paragraphs may be strapped using either strapping connectors or switches, depending on the module dash number. Communications I/O Modules 2818414-00 through -03 contains strapping connectors; modules with dash numbers 04 and higher contain switch blocks.

3-16. DEVICE ADDRESS

Strapping for the Communications I/O module address is accomplished by either lifting pins on a strapping connector or setting switches on the specified switch block at module coordinates 14Q. Both methods are shown in table 3-10.

As indicated by the following tabular information, only the initial device address in the address range is determined by strapping. Selection of the device addresses within the established address range is accomplished by the system firmware. Note that the modules containing strapping connectors are designed to provide the device address with all of the applicable connector pins lifted (open); however, the modules containing switches require a specified switch setting.

Table 3-15. Communications I/O Device Address Strapping (Figure 3-8)

Device Address	Description	Block 14Q		Connector Pins (14Q)
		Switch	Position	
10-15	ADR3, (Bit 3)	14Q-3	Off	3 or 12 lifted
	ADR4, (Bit 4)	14Q-4	On	4 or 11 lifted
	ADR5, (Bit 5)	14Q-5	Off	5 or 10 lifted

3-17. MULTIPLEXER/MODEM SELECTION

The multiplexer/modem selection is strapped as shown in table 3-11. The strapping connector or switch block is located at coordinates 14Q.

Table 3-16. Communications I/O Multiplexer/Modem Strapping (Figure 3-8)

Description	Block 14Q		Connector Pins (14Q)
	Switch	Position	
Multiplexer	14Q-6	On	6 and 9 in 7 or 8 lifted
	14Q-7	Off	
Modem	14Q-6	Off	6 or 9 lifted 7 and 8 in
	14Q-7	On	

3-18. ROM ENABLE

Connect the ROM enable strap between E1 and E2 at module coordinates 40E (figure 3-1).

3-19. ROM ADDRESS

The Communications I/O module ROM address strapping selects the ROM starting address. Selection of the addresses in the address range is accomplished by firmware functions. This means that all ROM elements must be inserted sequentially on the module. For example, if only two ROMs are used, they must be installed in positions 1 and 2. Refer to table 3-17 for strapping information.

Table 3-17. Communications I/O ROM Address Strapping (Figure 3-11)

Address Range	Description	Switch Block 62E		Connector Pins
		Switch	Position	
1000 to 1FFF	ADR12 (Bit 12)	62E-7	On	7 or 8 lifted
	ADR13 (Bit 13)	62E-6	Off	6 or 9 lifted
	ADR14 (Bit 14)	62E-5	Off	5 or 10 lifted
	ADR15 (Bit 15)	62E-4	Off	4 or 11 lifted

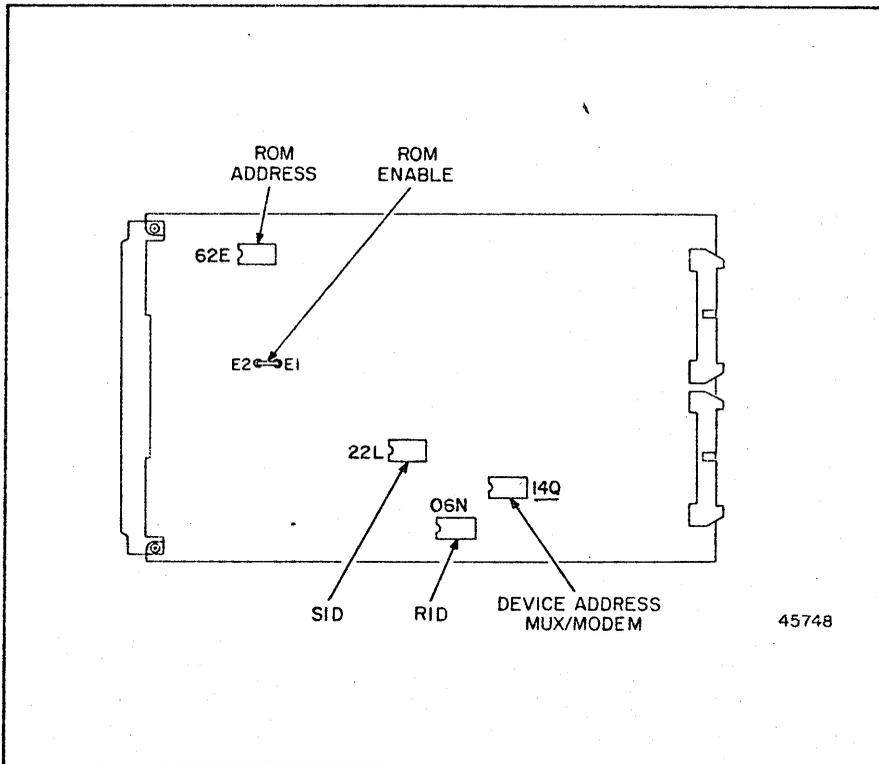


Figure 3-11. Communications I/O Module (Synchronous) 2818414 (A1A4)

3-20. RID AND SID

The RID and SID functions are strapped in an identical manner, either through switches or strapping connectors. Module locations and coordinate designations for switch blocks or connectors are shown in figure 3-12.

For the module containing strapping connectors (2818414-00, to -03), the lifted pins are interpreted as binary ones; pins 7 or 8 of the connector correspond to bit 0 (least significant bit) and pins 1 or 14 correspond to bit 6 (most significant bit).

For modules containing switch blocks (2818414-04 and up), the off position of the switches is interpreted as a binary one. Since the switch blocks contain eight usable switches, it is possible to strap the device for a Remote identifier (RID) between 00 and 7F (000 to 177 octal), and to strap the device between 00 and FF (000 to 377 octal) for a station identifier (SID). Switch 8 corresponds to bit 0 (least significant bit) and switch 1 corresponds to bit 7 (most significant bit). The address may be decoded by reading the binary bit positions on the switch or strapping connector. (Refer to Appendix C, ASCII Conversion Chart, for RID and SID codes).

Sample RID and SID strapping configurations are shown for switch blocks 06N (RID) and 22L (SID) in figure 3-13.

NOTE

The RID selection for communications modules using switches for strapping must be prefixed by a bit 7 (switch 1) selection. Setting switch 1 ON indicates that the module is synchronous; setting switch 1 OFF indicates that the module is asynchronous. The switch must be set for each communications module used in the system.

Ensure that switch 1 (bit 7) on RID switch block 06N is set to ON for the synchronous communications module.

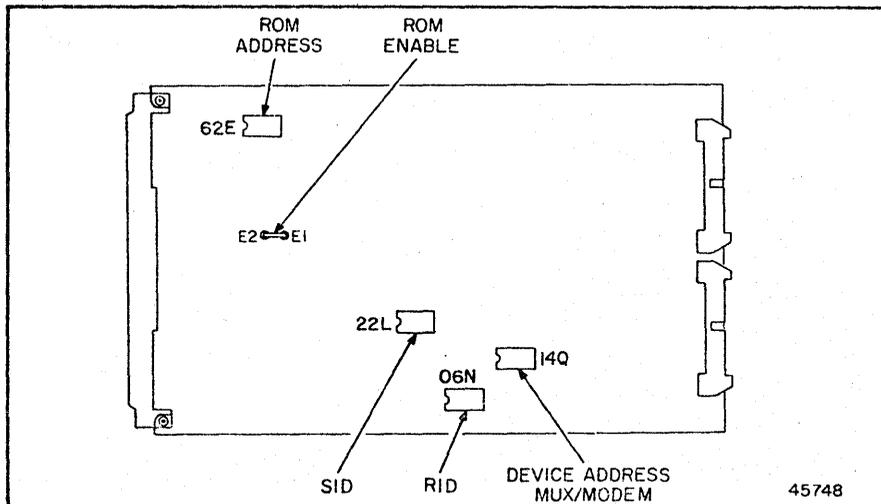


Figure 3-12. Communications I/O Module (Synchronous) 2818414 (A1A4) Strapping

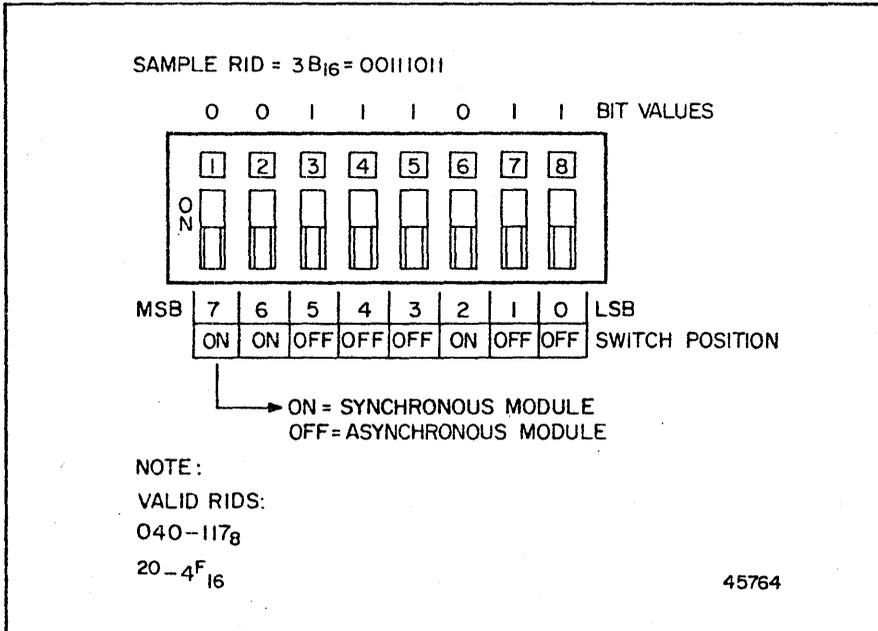


Figure 3-13. Communications I/O Module - Sample RID

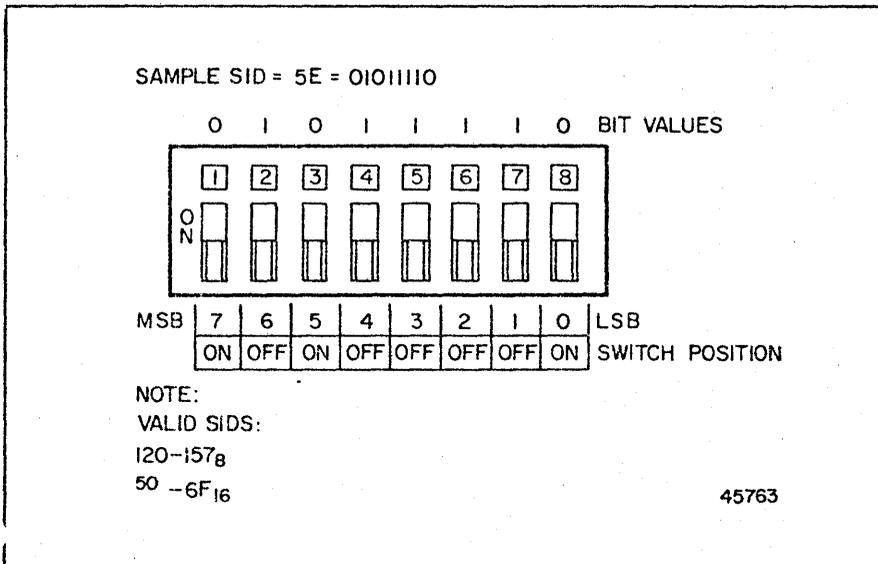


Figure 3-14. Communications I/O Module - Sample SID

3-21. 7-BIT AUXILIARY INTERFACE MODULE STRAPPING

The 7-bit auxiliary interface module 2818398 (A1A5) contains strapping connectors or switches for strapping:

- o Device address
- o ROM enable
- o Peripheral ROM address

3-22. DEVICE ADDRESS

Strapping for the device address is accomplished by lifting pins on a connector, or setting switches on the specified switch block.

As indicated by the following tabular information (table 3-13), the initial device address in the range is determined by strapping; firmware functions select device addresses. The strapping device is located at coordinates 46J.

Table 3-18. 7-Bit Peripheral Interface Device Address Strapping (Figure 3-15)

Device Address	Description	Switch Block 46J		Connector Pins
		Switch	Position*	
20-21	ADR1 (Bit 1)	1	Off	1, 14 lifted
	ADR2 (Bit 2)	2	Off	2, 13 lifted
	ADR3 (Bit 3)	3	Off	3, 12 lifted
	ADR4 (Bit 4)	4	Off	4, 11 lifted
	ADR5 (Bit 5)	5	On	5, 10 lifted

\*On = Logical 1

3-23. ROM ENABLE

Connect the ROM enable strap at coordinate 42E (from terminals E1 to E2) to enable ROM operation.

3-24. ROM ADDRESS

The 7-bit peripheral interface module address strapping selects the ROM starting address. Selection of the addresses in the addresses range is accomplished by firmware functions. Strap the ROM address as shown in table 3-14.

Table 3-19. 7-Bit Peripheral Interface ROM Address Strapping (Figure 3-15)

Address Range	Description	Switch Block 62S		Connector Pins
		Switch	Position*	
2000 to 2FFFF	ADR12 (Bit 12)	7	Off	7, 8 lifted
	ADR13 (Bit 13)	6	On	6, 9 lifted
	ADR14 (Bit 14)	5	Off	5, 10 lifted
	ADR15 (Bit 15)	4	Off	4, 11 lifted

\*ON = logical 1

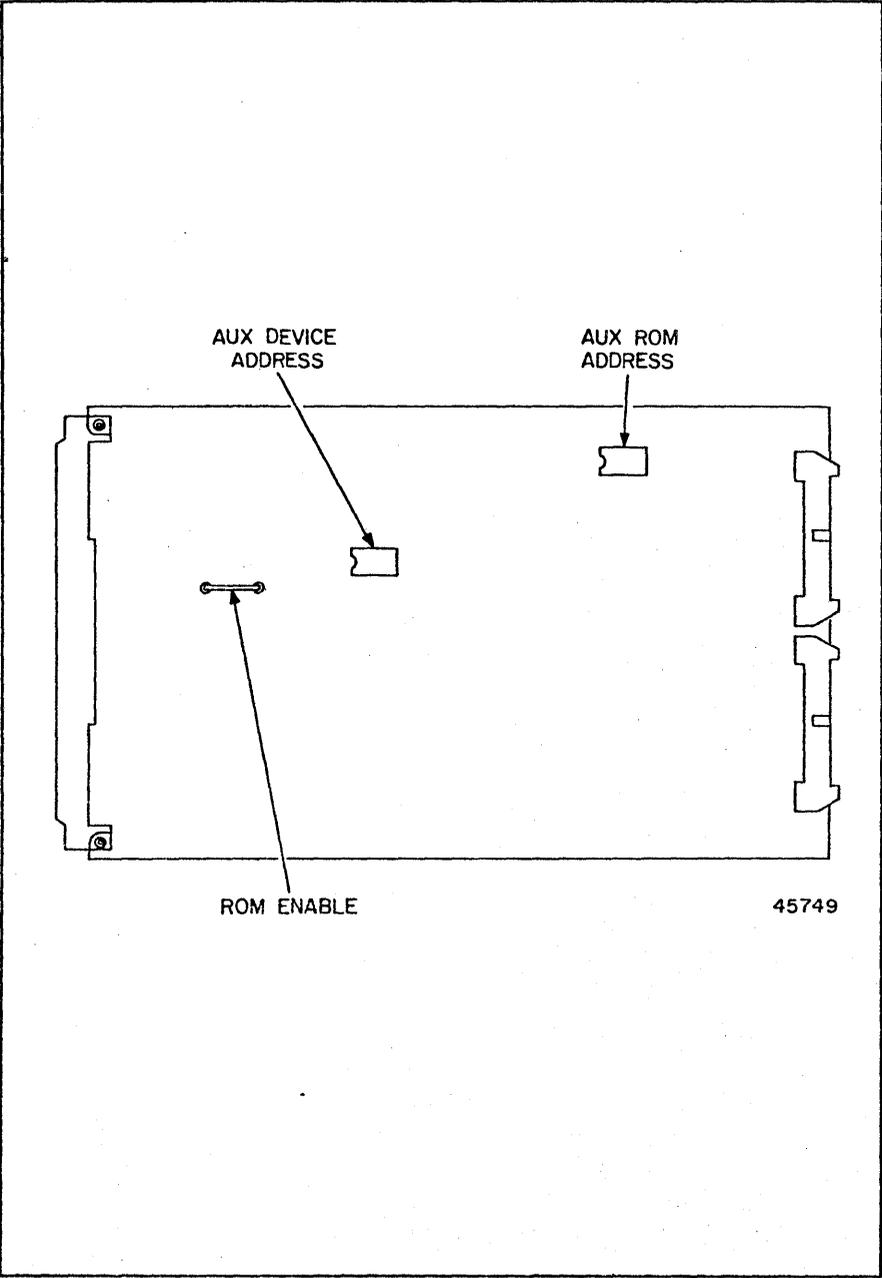


Figure 3-15. 7-Bit Peripheral Interface Module 2818398 (A1A5) Strapping

3-25. 8-BIT PERIPHERAL INTERFACE STRAPPING

The eight-bit peripheral interface module 2818443 (A1A6) contains a ROM enable strap (E1 to E2) and a memory address selection strap (E3 to E4). Insert the ROM enable strap between E1 and E2. For the UTS 400, the memory selection strap is removed to select a memory address range and device (port) addresses as shown in table 3-20.

Table 3-20. 8-Bit Peripheral Address Strapping (Figure 3-16)

E3 - E4 Strap Removed

Function Memory or Register Name	Hex. Memory Address Selection	Octal Memory Address Selection
4K ROM Firmware for 8-Bit Peripheral IF Module	6000 to 6FFF	60,000 to 67,777
1K RAM Read/Write Buffer and DMA area	7000 to 73FF	70,000 71,777
Port Address Selection		
Status Register (Read)	28	50
Control Register 1 (Write)	28	50
Control Register 2 (Read)	29	51
Command Register (Writes)	29	51
Address Pointer Register - Lower Bits (Read/Write)	2A	52
Address Pointer Register - Upper Bits (Read/Write)	2B	53

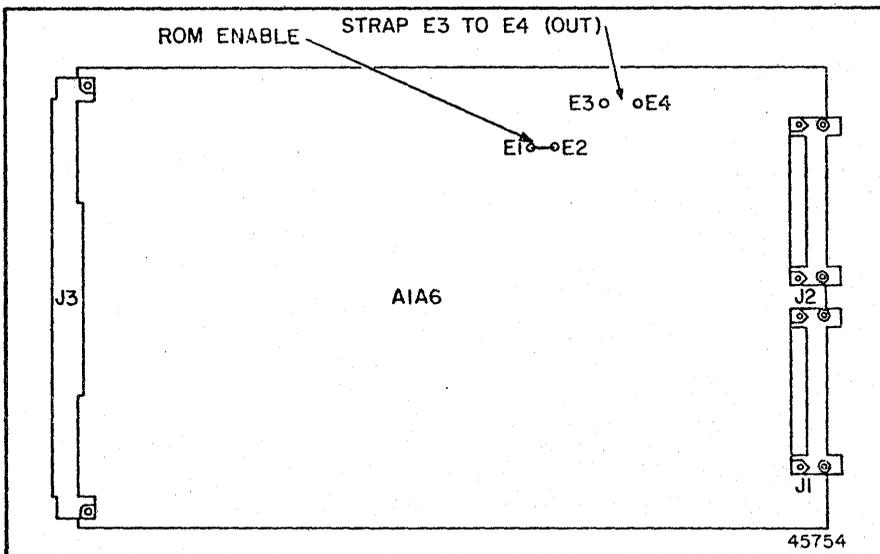


Figure 3-16. 8-Bit Peripheral Interface 2818443 (A1A6) Strapping

3-26. KEYBOARD STRAPPING

The UTS 400 keyboard assembly (2892287 or 2892288) contains strapping for the following functions:

- o 64 or 96 character selection
- o Spare bar option
- o Nationality (language) options (except Katakana)

## NOTE

The Katakana keyboard is a separate option (selection). Part numbers are 2892411 (or 2892412). No strapping options are required, except the spare bar selection as noted in table 3-22.

The two keyboard assemblies, which are functionally identical, are manufactured by different vendors. Strapping functions may, therefore, contain different circuit board locations, but all nomenclature or reference designators used for strapping are printed identically on each assembly (see figure 3-17 and 3-18).

The following strapping information (tables 3-21 and 3-22) includes required strapping for optional language selections. Note that 64 or 96 character selections for language options may differ from the standard selections characterized as "domestic".

Specific language options also require installation of translation ROMs A and B (table 3-23). (Appendix D provides ROM A and B selection part numbers.) In addition, a resistor pull-up pack (RES 1) and an OPTION switch must be in place on the printed circuit board when the translation ROMs are installed.

Table 3-21. Domestic Keyboard Strapping (Figures 3-17 and 3-18)

Function	Strap
64 character selection	E1 to E2 in
96 character selection	E2 to E3 in
Space bar output	E4 to E5 in
150 (68 hex.)	E4 to E5 in
40 (20 hex.)	E5 to E6 in
Nationality strap	E7 to E8 in
OPTION switch block (if installed)	All switches ON

Table 3-22. Space Bar Strapping (Figures 3-17 and 3-18)

Function	Language	Strap
Space Bar Output		
150 (68 hex.)	All except Katakana	E4 to E5 in
40 (20 hex.)	All except Katakana	E5 to E6 in
150 (68 hex.)	Katakana*	E1 to E2
40 (20 hex.)	Katakana*	E2 to E3

\*The space bar output is the only strappable option for a Katakana keyboard which is a separate selection.

Table 3-23. Keyboard Strapping - Nationality Options (Figures 3-17 and 3-18)

Nationality	Character Selection	Character Strap in	Nationality Strap in	Translation ROM Required*	OPTION Switch	RES 1 Installed
Domestic	64	E1 to E2	E7 to E8	No	All ON	No
Domestic	96	E2 to E3	E7 to E8	No	All ON	No
France	64	E1 to E2	E7 to E8	No	All ON	No
France	96	E2 to E3	E7 to E8	No	All ON	No
U. K.	64	E1 to E2	E7 to E8	No	All ON	No
U. K.	96	E2 to E3	E7 to E8	No	All ON	No
Sweden	64	E2 to E3	E8 to E9	ROM A and B	All OFF	Yes
Sweden	96	E2 to E3	E8 to E9	ROM A and B	All OFF	Yes
Germany	64	E2 to E3	E8 to E9	ROM A and B	All OFF	Yes
Germany	96	E2 to E3	E8 to E9	ROM A and B	All OFF	Yes
Spain	64	E2 to E3	E7 to E8	ROM A and B	All OFF	Yes
Spain	96	E2 to E3	E7 to E8	ROM A and B	All OFF	Yes
Denmark/ Norway	64	E2 to E3	E8 to E9	ROM A and B	All OFF	Yes
Denmark/ Norway	96	E2 to E3	E8 to E9	ROM A and B	All OFF	Yes

\*See appendix D for translation ROM part numbers.

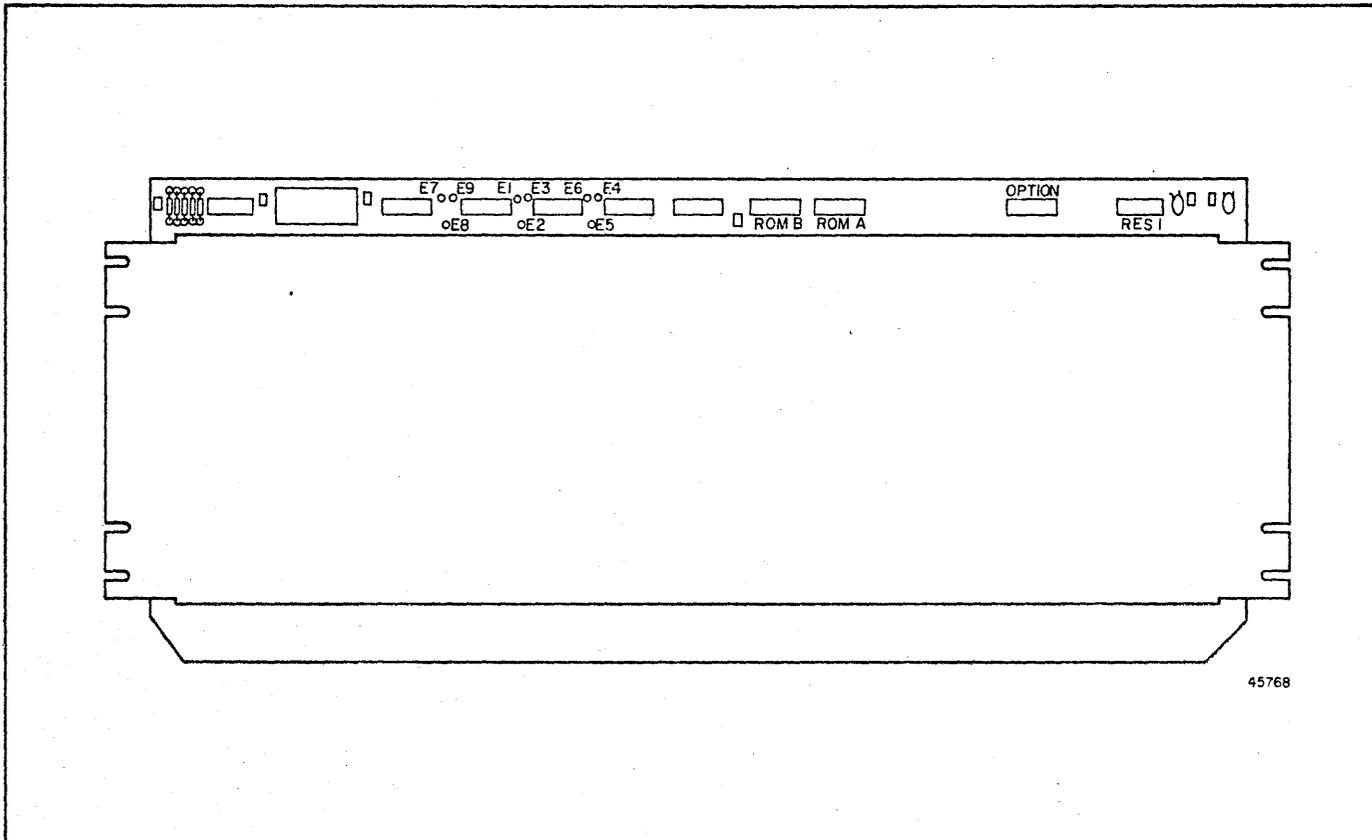


Figure 3-17. Keyboard 2892287 - ROM Locations and Strapping

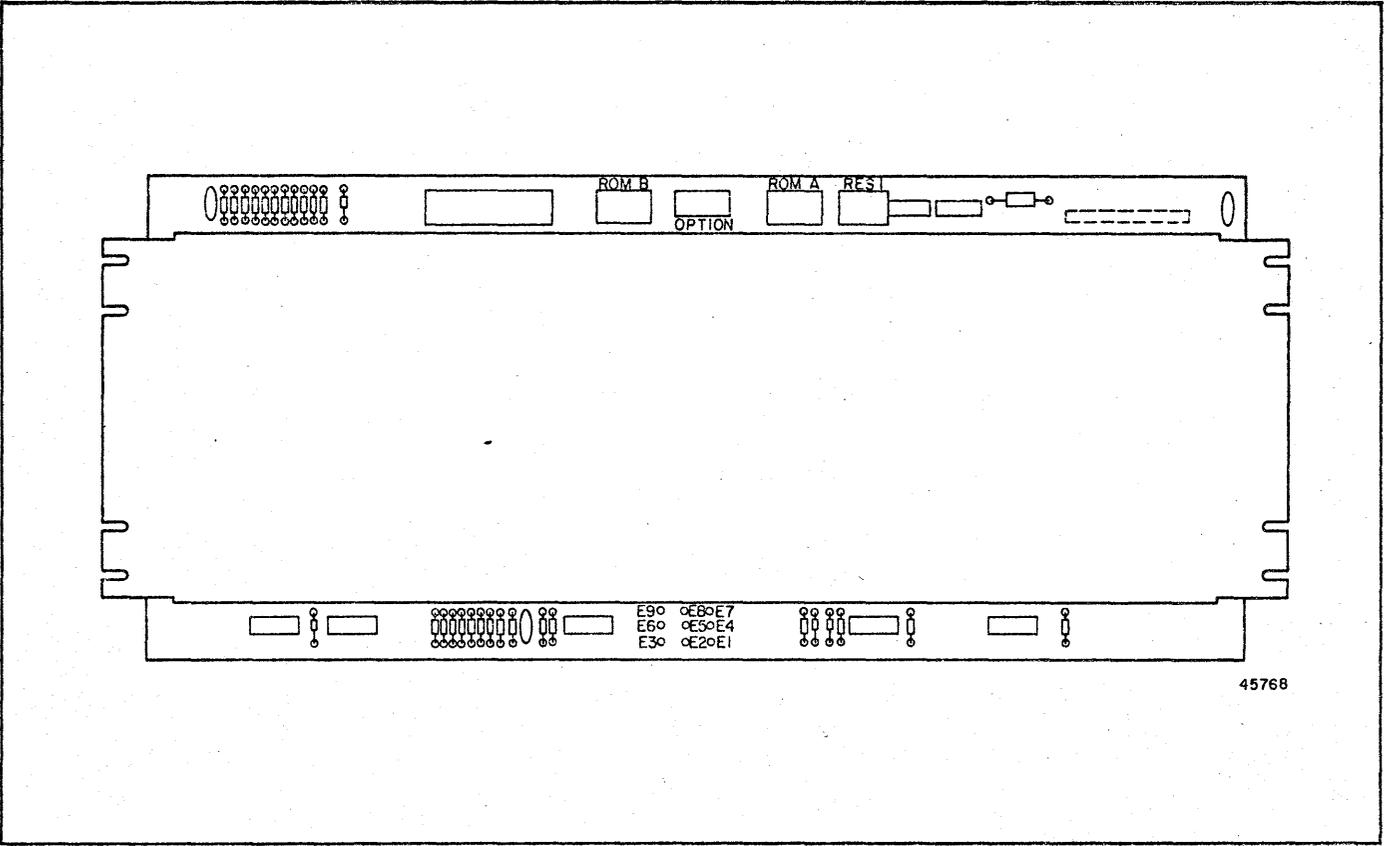


Figure 3-18. Keyboard 2892288 - ROM Locations and Strapping