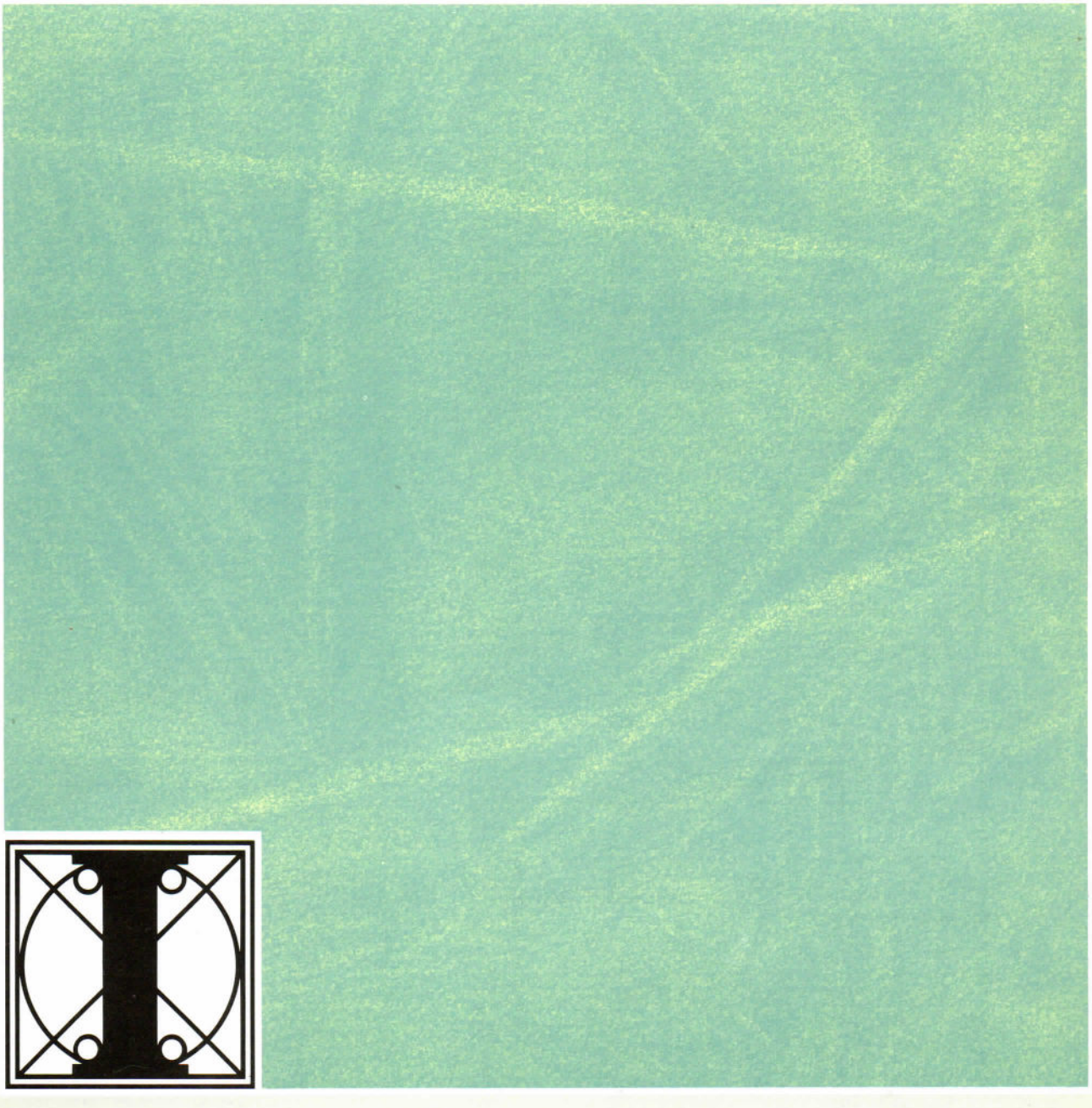
Field Engineering Library

WS 685

General Service Manual



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WS 685

General Service Manual

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PREFACE

This manual is intended for laboratory technicians who repair the Olivetti WS 685 video display terminal.

SECTOR: 1

RANGE: 3

PRODUCT: WS 685

SUMMARY

This manual provides the information required for the electronic repair of the modules making up the Olivetti WS 685 terminal. The first chapter contains general information, including the technical specifications, while chapter two describes the theory of operation for the main subassemblies of the system.

DISTRIBUTION: Limited (L)

FIRST EDITION: March 1987

REFERENCES:

WS 685 - Schematics
WS 685 - Electronic Parts Catalogue
WS 685 - Service Manual

CONTENTS

1. OVERVIEW

CONTENTS

GENERAL DESCRIPTION

The Olivetti WS 685 Video Display Terminal (henceforth referred to simply as the WS 685 or terminal) is a microprocessor-controlled, computer input/output peripheral used in 3B1/3B5 and M28 applications as well as in all "UNIX" environment applications. The terminal operates in either full-duplex or half-duplex; in conversation, block, or line transmission modes, or in local (non-transmission) mode.

Physically, the terminal is composed of three major subassemblies: display unit, keyboard, and pedestal unit. The display unit is a two-piece moulded plastic case, housing a cathode ray tube (CRT) and the electronic circuitry necessary to perform the display functions. The pedestal unit is also a two-piece plastic case. It houses the circuitry necessary to perform the required interfacing and data communications functions of a video display terminal. The keyboard provides the interface between the terminal operator and the display/pedestal units. A single, coiled cable connects the keyboard to the pedestal unit.

TECHNICAL CHARACTERISTICS

The following is a list of technical and operating characteristics for the WS 685 terminal.

Display Screen
14" nonglare screen
Amber or green phosphor
60 or 65 Hz refresh rate (user-selectable via set-up)

Displayed Character Set
24 data lines; 1 user-programmable line
1 display page standard (3 additional pages, optional)
Double-high, double-wide characters

Character Typestyle
7 x 11 matrix with 2-dot lowercase descenders in a 9 x 12 dot field

National Character Sets
North American
United Kingdom
Canada (French)
Denmark
Finland
France (Belgium)
Germany/Austria
Holland
Italy
Norway
Spain
Sweden
Switzerland

Video Attributes
Blinking
Reverse video
Underline
Bold

Cursor
Block or underline
Cursor on/off
Readable and addressable

Cursor Control Keys
↓ , ↑ , ← , → , Tab, Return, Enter

Keyboard
Low profile 30 mm DIN Standard
15 programmable function keys
Audible keyclick (selectable on/off)
Adjustable slope of 7, 11, and 15 degrees
Detached, with coiled cable
Separate numeric keypad
Separate editing keypad
Step-sculptured, selectric-type layout
4 visual (LED) indicators
4 PF keys (general purpose functions keys)

Edit Keys
Find
Insert Here
Remove
Select
Prev Screen
Next Screen
↑
↓
←
→

Emulations
Ampex 220
DEC VT 220, VT 100, VT 52

Operating Modes
Full-duplex/half-duplex
Conversation, block, local
Monitor (Display Control)
Set-up (operator-selectable operating parameters via screen menus)

Display Format
80 or 132 column display
24 lines per page
Split screen
Auto-paging (with optional page added)
Jump scroll
Smooth scroll (4 speeds)

Primary Port and Printer Port Data Transmission Rates
(Independently-selectable)
75, 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19,200 bits per second

Interfaces
Primary Port - RS232 (Standard) serial port
RS422 (optional)
Current loop (optional)
Auxiliary Port - RS232C serial port

Compliance with International Standards
FCC Class A (United States)
UL (United States)
CSA (Canada)
VDE/FT2 (Germany)
GS (United States)

Printer Functions
Print screen
Auto print
Transparent print

Operating Environment
Temperature: 32°F to 104°F (0°C to 40°C)
Humidity: 5% to 95%

Physical Dimensions

	Display Unit	Keyboard
Width:	13.5" (343 mm)	21.2" (538 mm)
Depth:	13.5" (343 mm)	7.6" (193 mm)
Height:	1.45" (369 mm)	1.5" (38 mm)

Power Requirements
115 Vac (+10%, -15%) at 0.5 A, 60 Hz
230 Vac (+10%, -15%) at 0.25 A, 50 Hz

Transmission Protocol
XON/XOFF
DTR High/DTR Low

2. INSTALLATION

CONTENTS

INTRODUCTION

The WS 685 Video Display Terminal may be operated in a wide variety of physical environments. This chapter provides explanations and diagrams to assist the user during installation of these terminals.

SERIAL PORT INTERFACES

The WS 685 terminal uses standard RS232C serial port interfaces for both the primary and printer ports.

PRIMARY PORT INTERFACE

The table below shows the pin signal assignments for the primary port.

PIN	SIGNAL NAME	SIGNAL DIRECTION
1	Chassis Ground	
2	Transmit Data Output	From terminal
3	Receive Data Input	To terminal
4	Request-to-Send Output	From terminal
5	Clear-to-Send Input	To terminal
6	Data-Set-Ready Input	To terminal
7	Signal Ground	
8	Data Carrier Detect	To terminal
12	Speed Indicator	To terminal
20	Data-Terminal-Ready Output	From terminal
23	Speed Select	From terminal

Table 2-1

PARALLEL PRINTER INTERFACE

The table below shows the pin signal assignments for the printer port.

PIN	SIGNAL NAME	SIGNAL DIRECTION
1	Protective Ground	
2	Transmit Data Output	From terminal
3	Receive Data Input	To terminal
4	Request-to-Send	From terminal
5	Clear-to-Send	To terminal
6	Data-Set-Ready	To terminal
7	Signal Ground	
8	Data Carrier Detect	To terminal
20	Data Terminal Ready	From terminal

Table 2-2

USER-INSTALLABLE OPTIONS

The WS 685 allows alternatives to the standard RS232C interface at the primary port. These user-installable options are:

- RS422 Interface
- Current Loop Interface

These options are available in kits provided by Olivetti and may be ordered with the codes in the "Progetto di Gestione".

Refer to Appendix A for installation instructions on these user-installable options.

INSTALLATION REQUIREMENTS

The WS 685 terminal is designed to be placed on a flat, hard surface such as a desk or table top capable of supporting at least 22 lbs (10 kg). Ambient temperature of the operating environment must be within 32°F to 104°F (0°C to 40°C) range.

CAUTION: Do not block any of the air vents on the unit. All air vents of the terminal case must be kept clear in order to provide proper cooling during operation.

SPACE ALLOCATION

The detached keyboard permits considerable flexibility in positioning the unit for use. The figure overleaf illustrates the overall dimensions of the terminal as well as the minimum surface area required for installation.

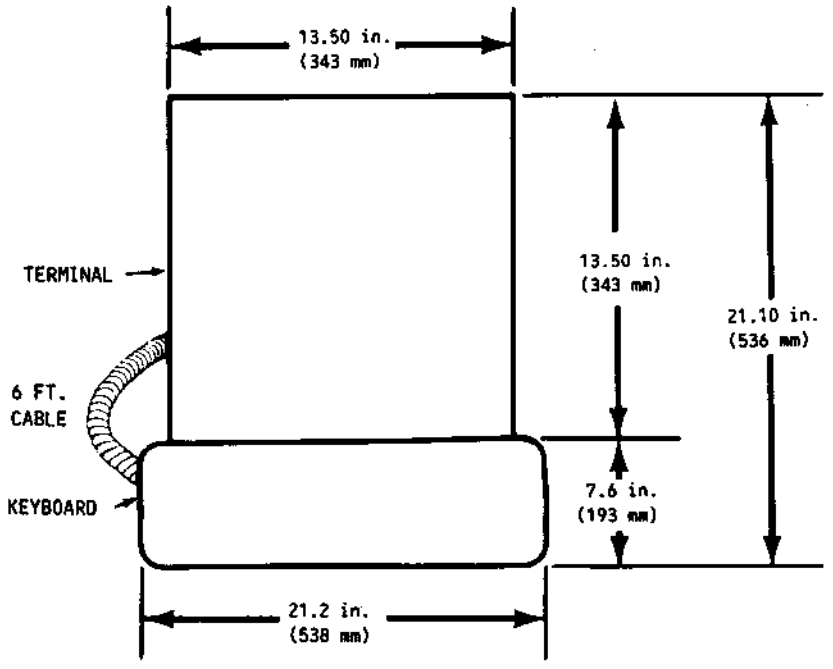


Fig. 2-1 Overall Dimensions

INPUT POWER

The WS 685 is configured at the factory for either 115 or 230 V alternating current (Vac). Installation site power requirements for both versions are listed in the table below.

VERSION	PHASING	FREQUENCY	CURRENT
115 Vac +10% -15%	Single phase	60 Hz ±3%	0.50 A
230 Vac +10% -15%	Single phase	50 Hz ±3%	0.25 A

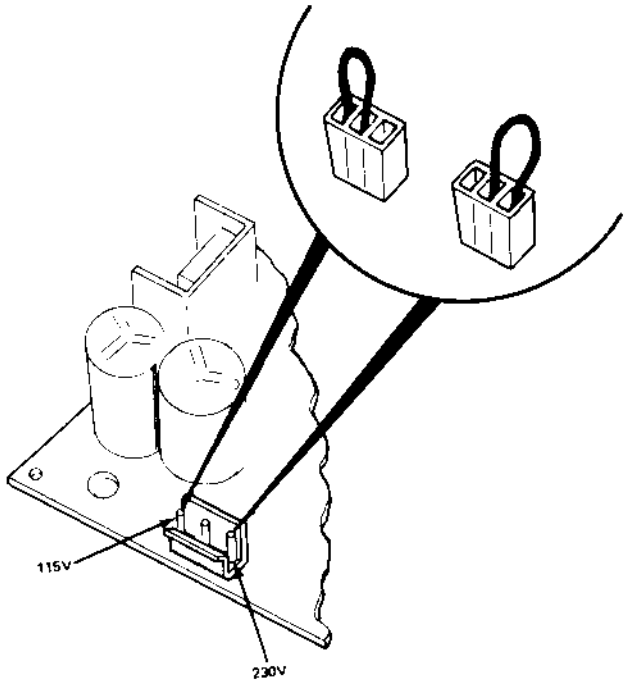
Table 2-3

WARNING: High voltage is present within the case when power is on. Remove the power cable from the AC socket before removing the top cover. Only authorized service personnel should open the case.

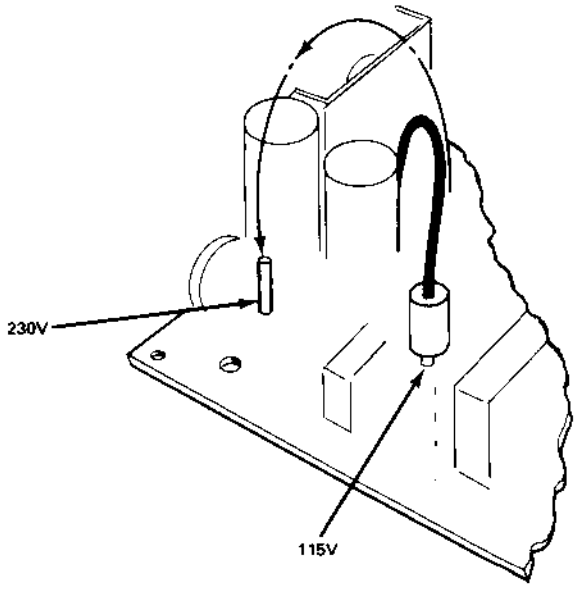
The WS 685 may be strapped for 115 or 230 V. The figures overleaf show the two versions of the strapping plug. Refer to these figures when changing the voltage from 115 V (applicable in the United States) to 230 V (applicable outside the United States) or vice versa.

Note: The fuse, located in the fuseholder on the back panel of the display unit (Fig. 2-3), must be changed when the voltage is changed, as follows:

115 V - Use a 2 A fuse
230 V - Use a 1 A fuse



Version 1



Version 2

Fig. 2-2 Voltage Strapping Plug (Versions 1 and 2)

AC POWER CABLE AND PLUG

Each terminal is shipped with either a 115 Vac/60 Hz power plug (for use in the United States) or a 230 Vac/50 Hz power plug (for use outside the United States). WS 685 terminals in the United Kingdom and Australia may need customized plugs to fit the sockets in these countries.

WARNING: Electric shock may result if the power cable is connected to AC power when the plug is cut off. Be sure to disconnect the cable from AC power before customizing the power plug.

INTERFACE CABLE CONNECTIONS

Figure 2-3 is a view of the back panel of the WS 685 Video Display Terminal. Refer to this figure when attaching the primary port (to computer) and the auxiliary port (to printer) interface cables.

KEYBOARD PORT CONNECTION

Figure 2-4 shows the location of the keyboard cable port. Refer to this figure when attaching the keyboard cable to the display terminal.

CAUTION: Do not connect or disconnect the keyboard to or from the display unit when the power is on. Erratic performance may result.

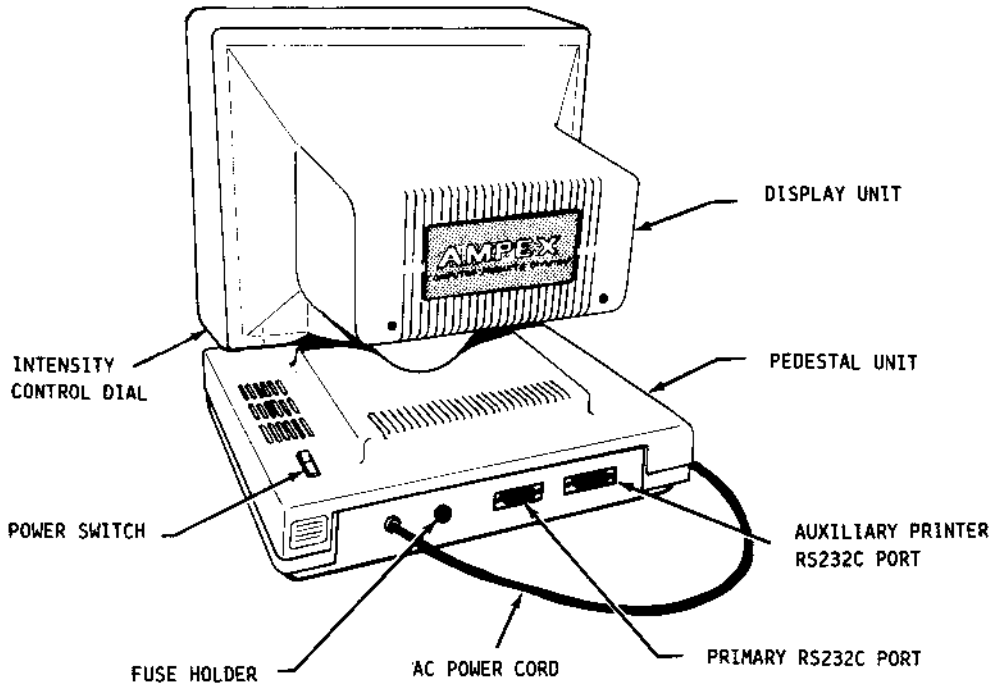


Fig. 2-3 WS 685 Video Display Terminal (Back Panel View)

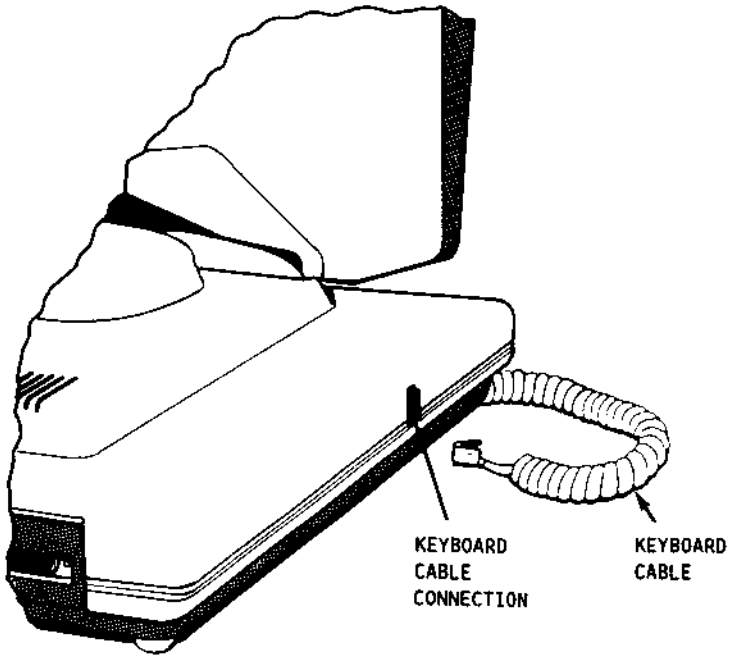


Fig. 2-4 Keyboard Port on Display Terminal

POWER-ON AND RESET

To power on the terminal:

1. Make sure all interface cables are connected properly to their respective ports (refer to the sections on Interface Cable Connections and Keyboard Port Connection).

2. Make sure the power cable is plugged into the proper outlet.

3. Set the on/off switch to on.

4. Within seconds, the unit undergoes its self-test.

5. After the self-test is completed, a "beep" will sound and the message, "WS 685 OK" will appear in the middle of the screen.

6. Adjust the intensity by rotating the intensity control dial, located underneath the right-hand portion of the display unit.

7. The terminal is now ready to begin performing the operations described in the remaining sections of this manual.

To reset the terminal while maintaining power:

1. Enter Set-up mode (press the Set-up key).

2. On the General Set-up Screen, press the down cursor key until the parameter "RESET TERMINAL" is highlighted.

3. Press the ENTER key to reset the terminal.

   Result:

   Most terminal operating features are reset to the default state used by most applications. The message "Done" will be displayed at the bottom of the screen.

SELF-TEST

The self-test feature is activated each time the terminal is powered on. For the most part, the test pattern on the screen cannot be viewed at initial power-on. To view the test pattern, initiate a self-test while the terminal is already on by entering Set-up mode (refer to Section 4) and typing "1".

The self-test operation checks the following:

CMOS RAM (a check sum of the terminal set-up information)
DATA RAM
DISPLAY RAM
PROGRAM ROM
DOWN-LOAD CHARACTER RAM
CHARACTER GENERATOR ROM

Result of Terminal Self-Test

If any component errors are detected, a message will be displayed in the upper portion of the screen.

Possible error messages are:

CMOS RAM CHECKSUM ERROR
DATA RAM ERROR
DISPLAY RAM ERROR
PROGRAM ROM CHECKSUM ERROR
DOWN-LOAD CHARACTER RAM ERROR
CHARACTER GENERATOR ROM ERROR

If any of the above error messages display on the screen:

1. Press ESC [4; 1 y to reset the terminal.
2. Verify any error messages:
   a) If the error message is no longer displayed, the terminal is ready to operate.
   b) If the error message is still displayed, contact an Olivetti service engineer. Do not attempt to correct the problem.
3. Enter Set-up mode and set the parameters. Press SHIFT/S to save the parameters and exit Set-up mode.

3. MAINTENANCE

CONTENTS

INTRODUCTION

This section contains maintenance information for the WS 685 Video Display Terminal. Corrective action for field repair of the terminal should be limited to removal and replacement of subassemblies (Chapter 4). Procedures involving maintenance adjustments and repairs should be performed by service personnel familiar with data terminal and video equipment.

WARNING: Exercise caution while working on the energized video or power supply sections. Avoid physical contact with high voltage leads and connections.

TEST EQUIPMENT

A list of test equipment (equivalent items may be substituted) for use during adjustment and troubleshooting is provided in table 3-1. In addition to the items listed, hand tools commonly used in the repair of electronic equipment will be required.

TEST EQUIPMENT	MANUFACTURER	MODEL OR PART NO.
AC current probe	Tektronix	P6021
Termination for AC current probe	Tektronix	011-0105-00
Oscilloscope	Tektronix	485B
Digital voltmeter	Fluke	8020A

Table 3-1

PERFORMANCE TESTING AND ADJUSTMENTS

The procedure described below can provide an evaluation of terminal performance.

POWER ON SELF TEST

1. Detach the interface cables connected to the primary port and printer port.

2. Apply power to the terminal. Verify the following:

   a) Alarm (beep) sounds within 5 seconds.

   b) The message "WS 685 ok" appears in the center of the screen.

   c) No bad component error messages are indicated on the status line. Bad component error messages are explained in the table below.

MESSAGE	EXPLANATION	CORRECTIVE ACTION
CMOS CK ERROR	CMOS CHECK SUM FAILURE	Replace display controller
DATA RAM ERROR	DATA MEMORY FAILURE	Replace display controller
DISPLAY RAM ERROR	DISPLAY MEMORY FAILURE	Replace display controller
ROM ERROR	PROGRAM MEMORY FAILURE	Replace display controller

Table 3-2

KEYBOARD TEST

1. Turn power off and then turn on again.

2. Place the terminal in local mode (enter Set-up mode).

3. Starting at the upper left-hand corner of the keyboard, press each symbol, number, and letter key (shifted and unshifted) in sequence.

4. Verify that:

   a) Keys do not stick.

   b) Characters appear on the screen as keys are pressed.

   c) The appropriate character appears on screen for the corresponding key (depends upon character set; selectable in Set-up mode).

   d) Only one character appears on the screen when each key is pressed and released once.

VIDEO ADJUSTMENT

Seven adjustments on the video board, as shown in figure 3-1, permit adjustment of the brightness, focus, vertical size, vertical linearity and horizontal size. Note that brightness should be adjusted prior to performing the other adjustments.

BRIGHTNESS

1. Apply power to the terminal. Place the terminal in local mode (enter Set-up mode).

2. Select a reverse video background.

3. Enter SHIFT/S to generate a reverse video display.

4. Turn the intensity control dial (under lower right-hand corner of display screen on exterior of case) to maximum intensity (see figure 2-3).

5. Remove the top cover (see chapter 4).

6. Adjust brightness (VR301 on video board; see figure 3-1) so that the CRT display is at maximum brightness but no raster is visible.

7. Using the intensity control dial, lower the CRT brightness to a comfortable viewing level.

8. Remove power from the terminal.

9. Replace the top cover.

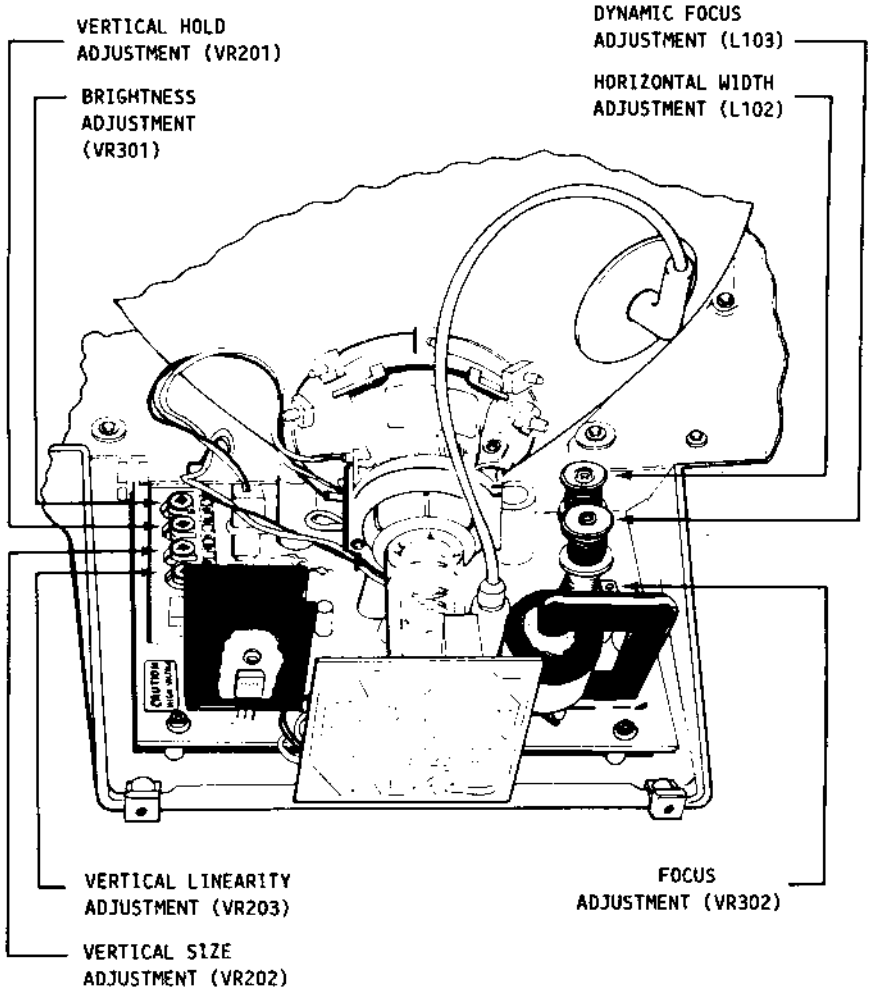


Fig. 3-1 Video Adjustments

FOCUS

1. Apply power to the terminal. Place the terminal in local mode (enter Set-up mode).
2. Fill the screen with exclamation marks (!).
3. Remove the top cover.
4. Adjust focus (VR302 on video board for centre focus; focus coil L103 for edge focus: see figure 3-1) so that the dot of every exclamation mark (in both centre and edge areas of the screen) is clearly separated.
5. Remove power from the terminal.
6. Replace the top cover.

VERTICAL SIZE

1. Apply power to the terminal.
2. Enter Set-up mode and place terminal in local mode.
3. While still in Set-up mode, type the number "0" to generate an alignment pattern.
4. Remove the top cover.
5. Adjust the vertical dimension of the video display (VR202 on the video board: see figure 3-1) to 172 mm (±3 mm).
6. Remove power from the terminal.
7. Replace the top cover.

HORIZONTAL SIZE

1. Apply power to the terminal.
2. Enter Set-up mode and place the terminal in local mode.
3. While still in Set-up mode, type the number "0" to generate an alignment pattern.
4. Remove the top cover.
5. Adjust the horizontal dimension of the video display (L102 on the video board: see figure 3-1) to 239 mm (±5 mm).
6. Remove power from the terminal.

7. Replace the top cover.

VERTICAL LINEARITY

1. Apply power to the terminal.
2. Enter Set-up mode and place the terminal in local mode.
3. While still in Set-up mode, type the number "0" to generate an alignment pattern.
4. Remove the top cover.
5. Adjust vertical linearity (VR203 on the video board: see figure 3-1) so that typical dimensions of any "E" character are within 15% of the dimensions illustrated in figure 3-2.
6. Remove power from the terminal.
7. Replace the top cover.

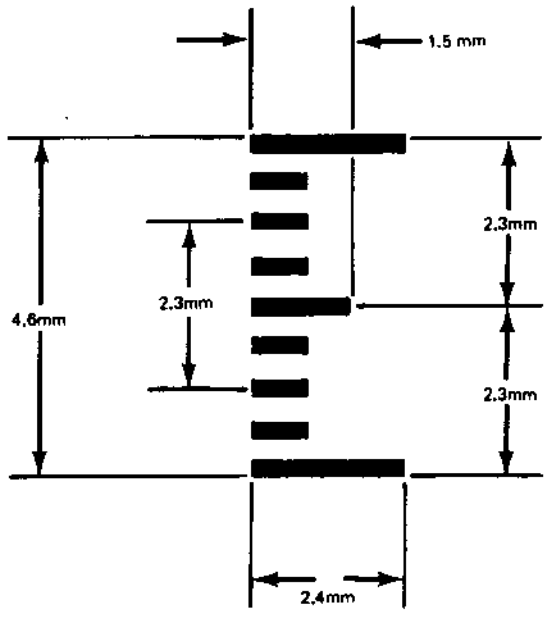


Fig. 3-2 Dimensions of E Character

4. REMOVAL AND REPLACEMENT

CONTENTS

INTRODUCTION

This chapter provides instructions for the removal and replacement of the major replaceable parts of the terminal.

WARNING: There are hazardous voltages inside the pedestal and display units. Extremely high voltages are present on the CRT. The CRT may retain a charge for an indefinite period of time if not discharged. Always discharge the CRT before replacing it or working near it.

SUBASSEMBLY/PARTS LOCATION

Table 4-1 provides a list of removable parts and subassemblies for WS 685 terminals. Figure 4-1 is an exploded view of the location of those parts and subassemblies.

REFERENCE	SUBASSEMBLY/PART
A	Pedestal assembly
B	CRT housing, bottom
	Ground spring assembly
C	Video board
D	CRT housing, top
E	Video board (hard-wired to main board)
F	Pedestal unit, top
G	CRT amber display top
	CRT green display top
	Intensity control assembly
H	Yoke/cable assembly
I	Controller board
J	ON/OFF switch/filter
K	Power supply
	Choke assembly
L	Keyboard cable connector to keyboard assembly
	Keyboard cover
	Keyboard base
	Coil, 6-ft cable

Table 4-1

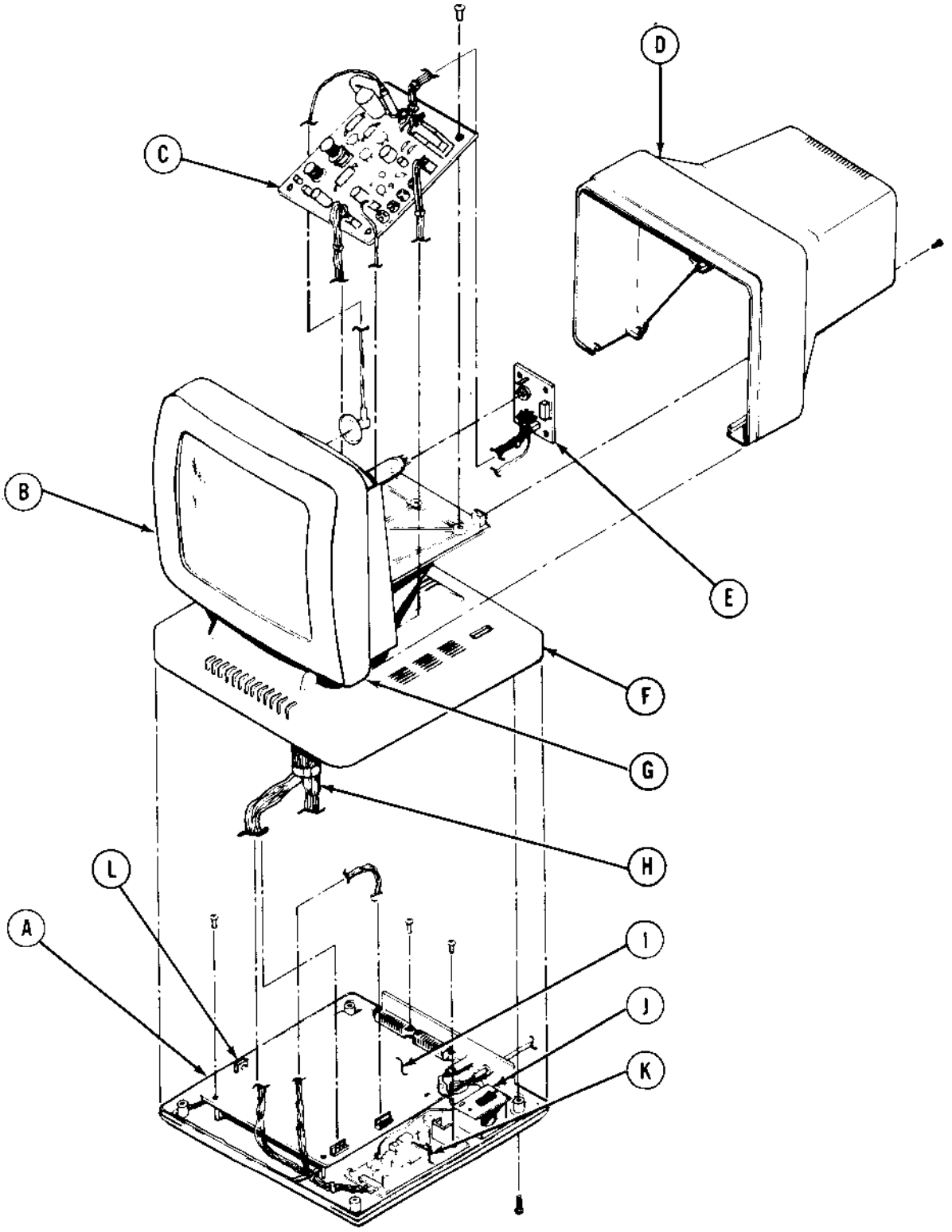


Fig. 4-1 Subassembly Location Diagram

PRELIMINARY PROCEDURE

Before removing or replacing any of the parts of the terminal, turn the power off and unplug power cable. Disconnect the keyboard cable from the display unit. When removing parts with cable or wire connections, it is recommended that the cables or wires are tagged in order to ensure correct replacement.

DISPLAY (BEZEL) COVER REMOVAL AND REPLACEMENT

Using a Phillips screwdriver, remove the two screws at the rear of the display unit. Carefully slide the cover away from the screen (Fig. 4-2). When cover will slide no further, gently tilt cover up and lift off.

To replace the cover, reverse the removal procedure. Ensure that the sides of the cover slide into place before replacing the two screws at the rear of the cover.

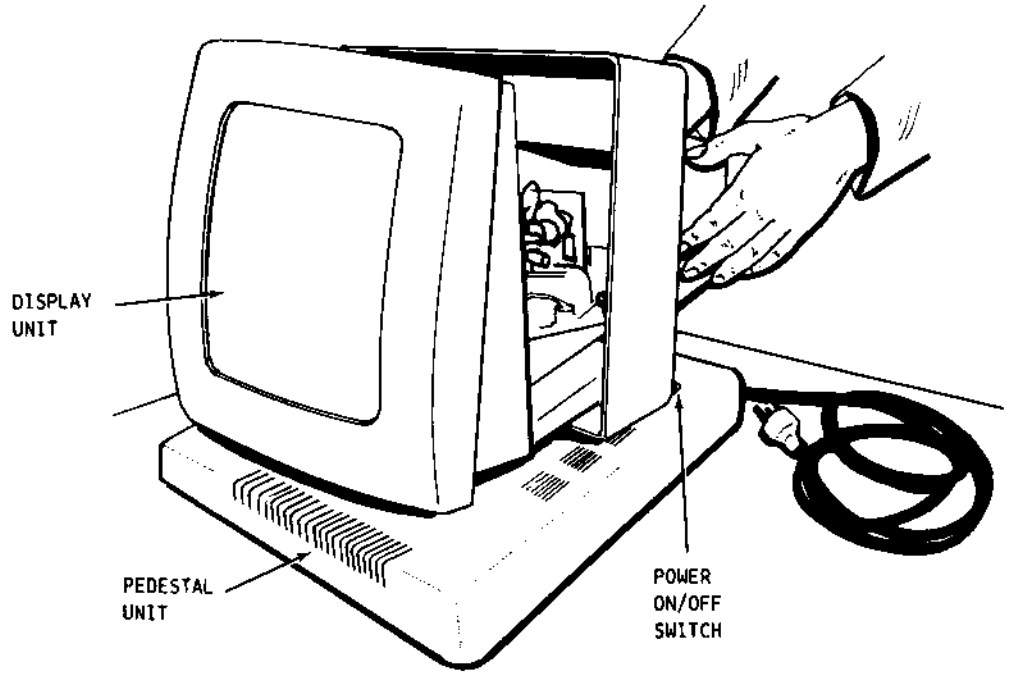


Fig. 4-2 Removing the Display Cover

PEDESTAL COVER REMOVAL AND REPLACEMENT

Tilt the display assembly until the unit is resting on its side.

Using a Phillips screwdriver, remove the four screws on the underside of the pedestal unit. Gently force the bottom cover away from the display (Fig. 4-3).

To replace the cover, reverse the procedure. Make sure that the bottom cover is in place before replacing the four screws.

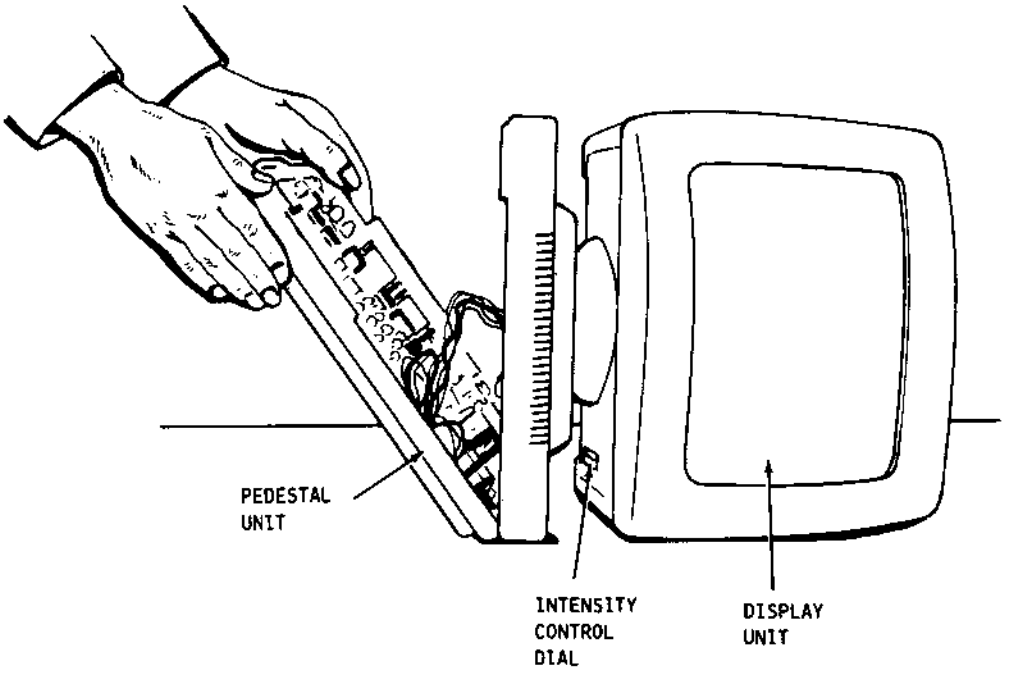


Fig. 4-3 Removing the Pedestal Cover

DISPLAY CONTROLLER REMOVAL AND REPLACEMENT

The display controller board is located in the pedestal unit (refer to figure 4-1).

1. Using a Phillips screwdriver, remove the screws holding the board in place.

2. Tag and disconnect any cables connected to the board.

3. Slowly slide the board away from the two RS232C serial ports. When the serial connectors are free of their ports, lift the board up and out of the unit.

To replace the board, reverse the procedure. Make sure the board is firmly seated before replacing the screws.

POWER SUPPLY REMOVAL AND REPLACEMENT

The power supply board is located in the pedestal unit (see figure 4-1).

1. Using a Phillips screwdriver, remove the four screws holding the power supply board in place.

2. Tag and disconnect any cables connected to the board.

3. Slowly pull the board up and out of the pedestal unit.

To replace the power supply board, reverse the procedure. Make sure the board is firmly seated before replacing the screws.

DISCHARGING THE CRT

WARNING: The CRT anode may stay charged at an extremely high voltage for a long time after power is removed from the terminal. Be sure to follow the CRT discharging procedure carefully. Make sure that a good discharge path is made between the ground wire around the CRT and anode connector beneath the rubber cover.

1. Make sure that power is off and that the power cable is disconnected from the ac power outlet.

2. Using a wire lead with an alligator clip on each end, connect one alligator clip to ground screw and the other clip to a flat-blade screwdriver with an insulated rubber handle (Fig. 4-4).

3. Hold the screwdriver by the insulated handle with one hand and move the other hand away from the unit.

4. Slip the screwdriver blade under the rubber anode cover and touch the end of the anode lead. This action should discharge the CRT through the ground wire.

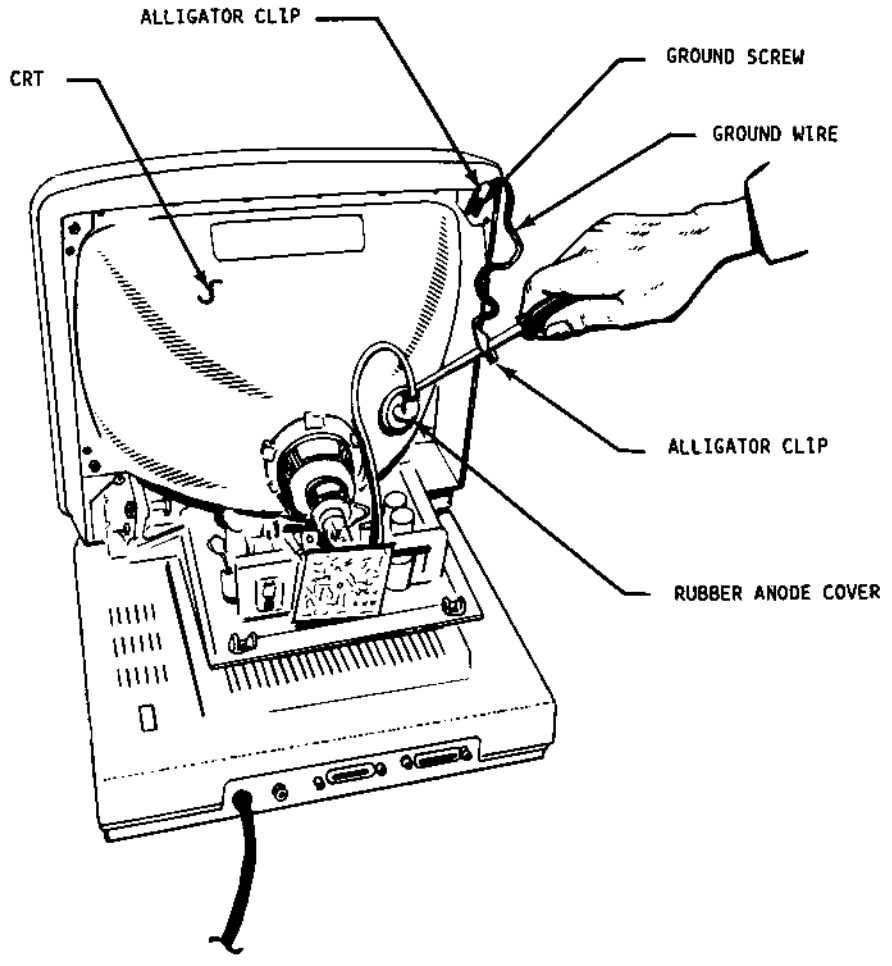


Fig. 4-4 Discharging the CRT

VIDEO BOARD REMOVAL AND REPLACEMENT

The video board is located in the display (bezel) unit (see figure 4-1). Make sure the CRT has been discharged before removing the video board.

1. Pull up on the two back plugs in the corners of the video board until they pop out.

2. Tag and disconnect any cables attached to the board.

3. Gently slide board away from the screen. Then lift up and remove from the bottom of the unit.

To replace the board, reverse the procedure. Make sure the board is firmly seated before replacing the cover of the display unit.

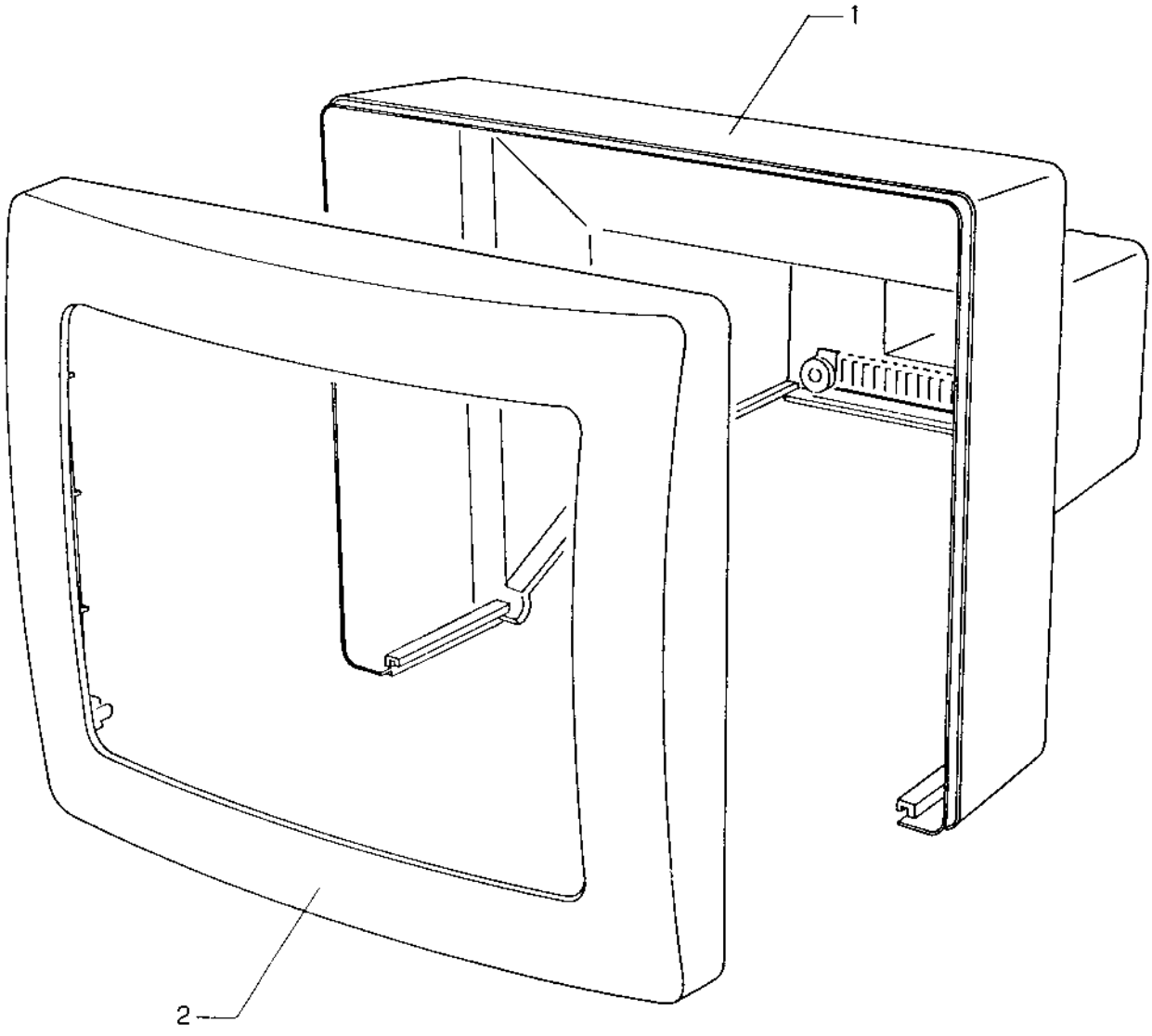
5. SPARE PARTS CATALOGUE

INDEX

PAGE

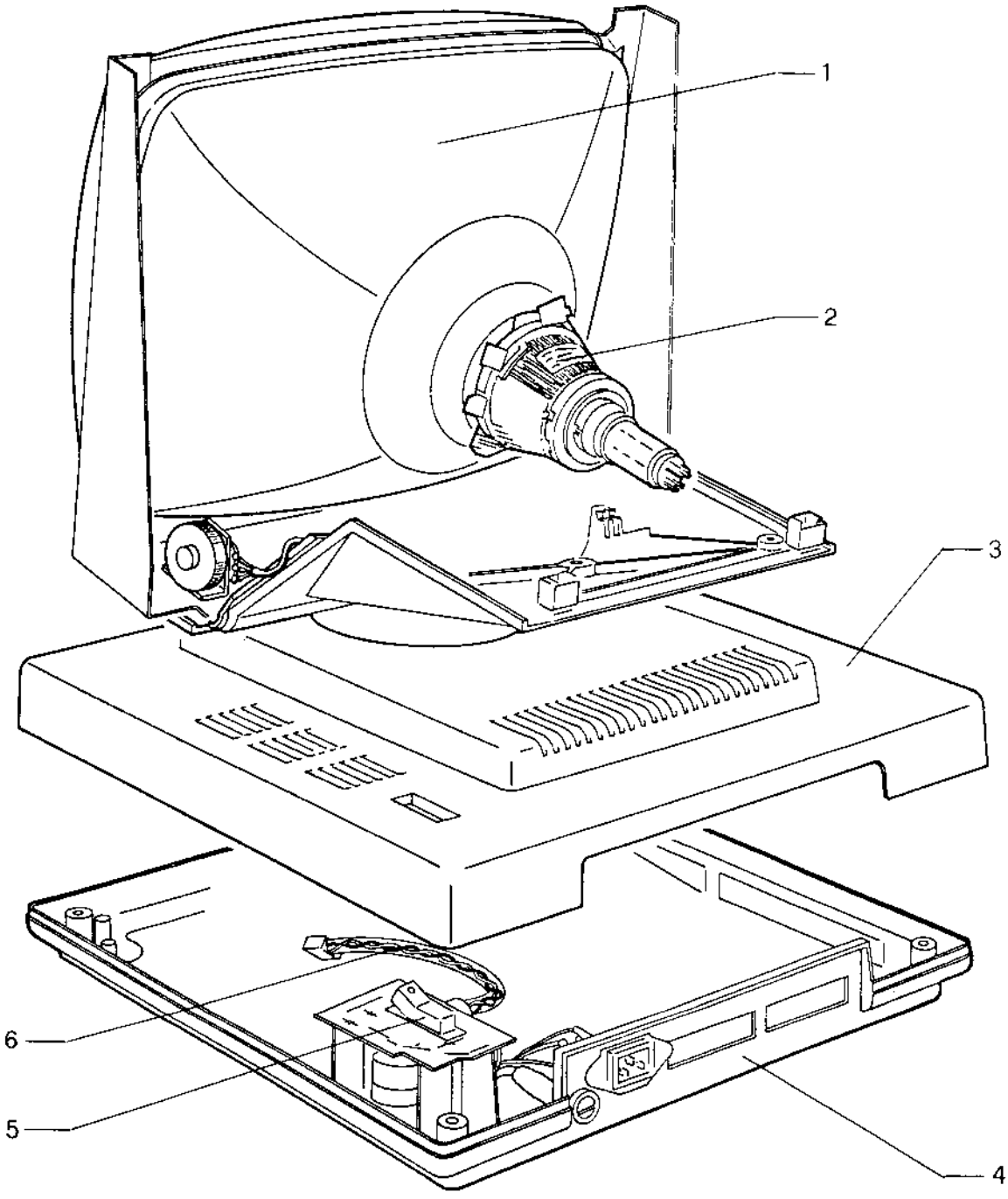
TOP COVER - COPERTURA SUPERIORE

REF.	CODE	DESCRIPTION	DESCRIZIONE	UPDATING	NOTE
1	335766 G	CRT HOUSING TOP	COPERTURA POST. VIDEO		
2	335765 F	CRT HOUSING BOTTOM	COPERTURA ANTE. VIDEO		



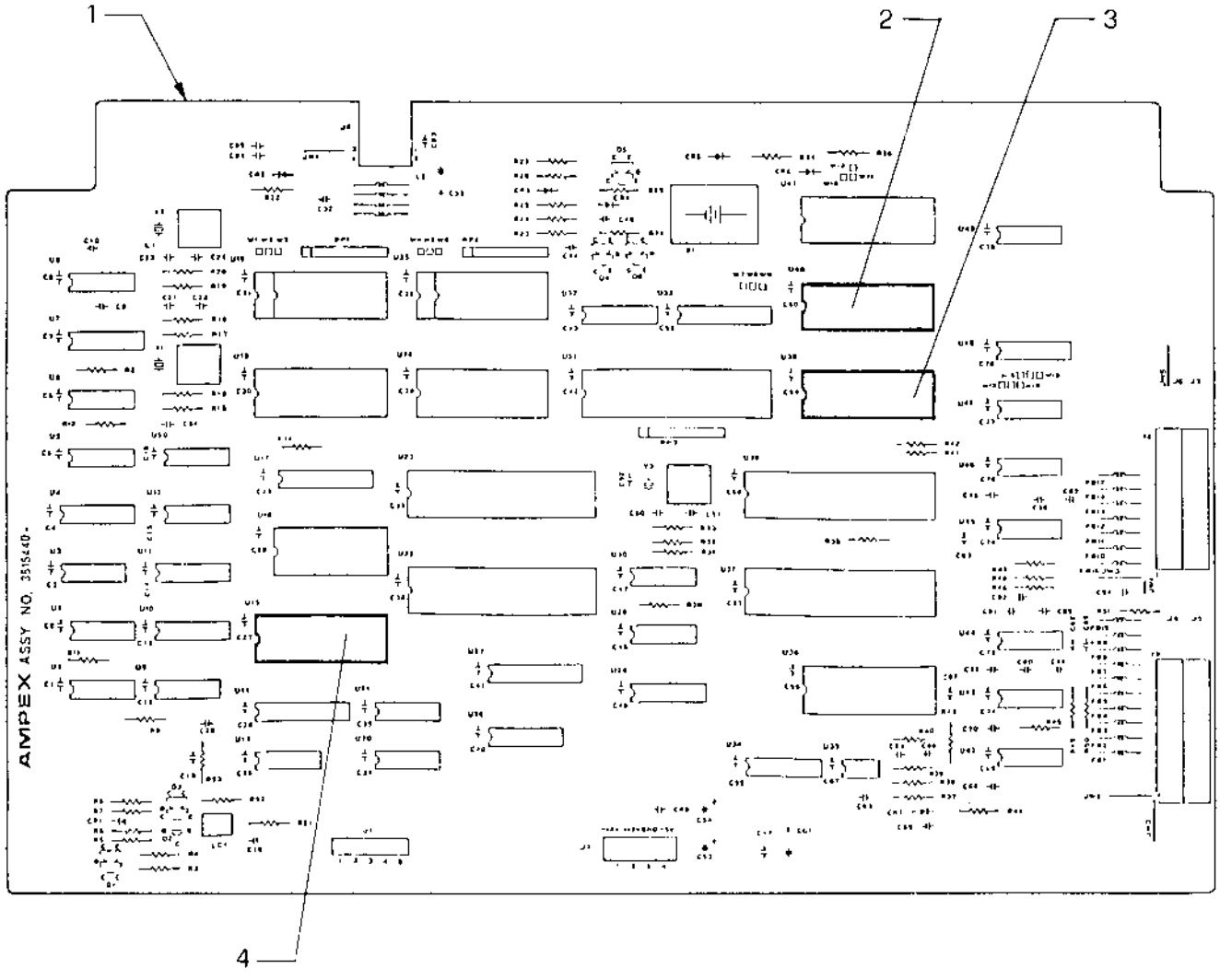
BASE - CRT - SWITCH — BASE - CRT - SWITCH

REF.	CODE	DESCRIPTION	DESCRIZIONE	UPDATING	NOTE
1	335609 L	TUBE AMBER	TUBO 14" AMBRA		
	335610 G	TUBE GREEN	TUBO 14" VERDE		
2	335611 V	YOKE ASSY	GRUPPOGIOGO DEFLESSIONE		
3	335767 H	PEDESTAL TOP	PIEDISTALLO SUPERIORE		
4	335768 J	PEDESTAL BASE	PIEDISTALLO INFERIORE		
5	335614 Y	SWITCH ON/OFF-FILTER	SWITCH ON/OFF-FILTRO		
6	335612 W	AC-POWER CABLE	CAVO AC-POWER		
7	335764 E	INTENSITY CONTROL	GR. POTENZIOM./LUMINOSITÀ		



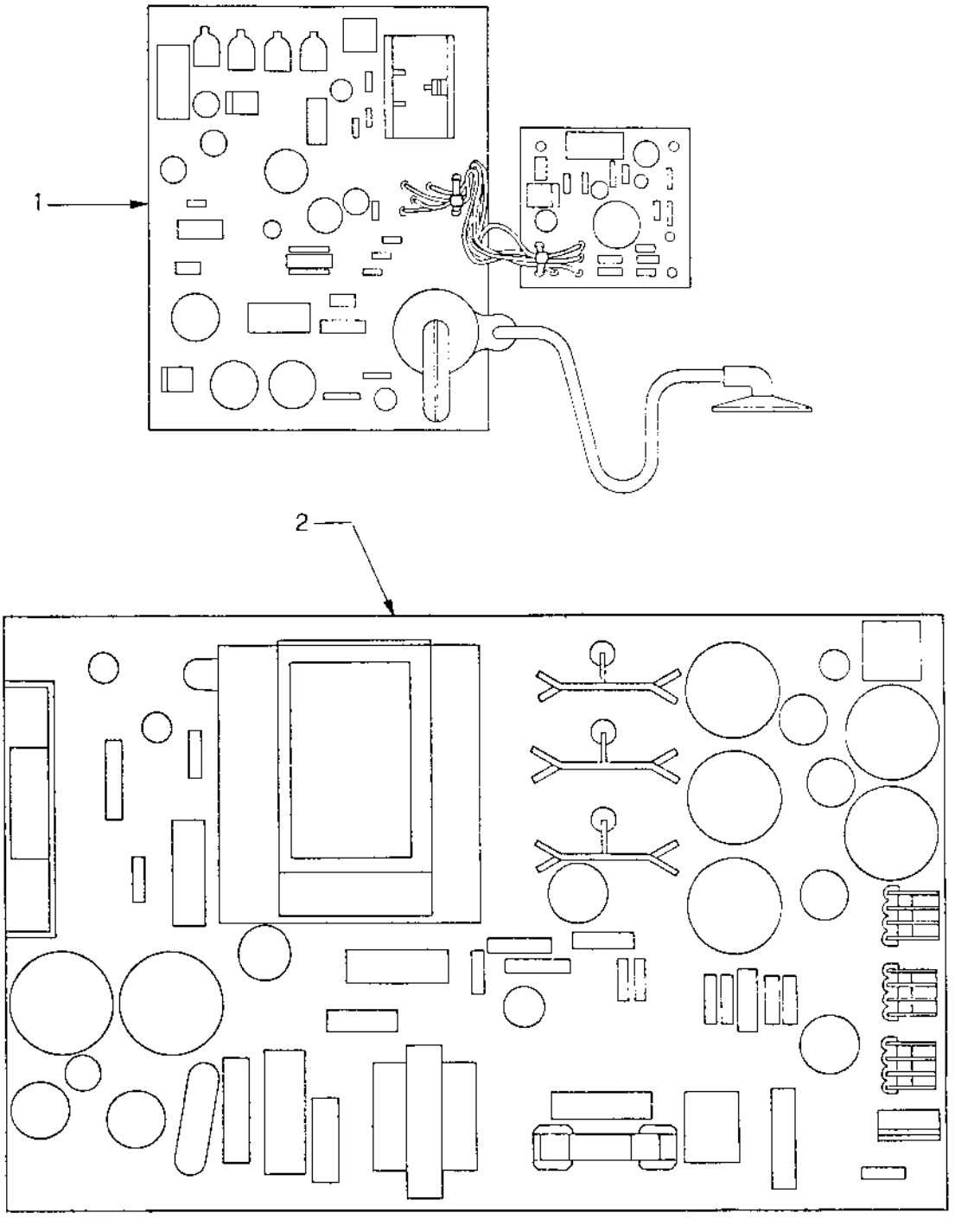
TERMINAL CONTROLLER BOARD — PIASTRA CONTROLLO TERMINALE

REF.	CODE	DESCRIPTION	DESCRIZIONE	UPDATING	NOTE
1	411340 E	TERMINAL CONT. BOARD	PIASTRA CONTR. TERMIN.		
2	143627 V	SYSTEM ROM 2	ROM 2 DI SISTEMA		
3	143628 E	SYSTEM ROM 1	ROM 1 DI SISTEMA		
4	143634 U	CHARGEN. ROM	ROM GEN. CARATTERI		



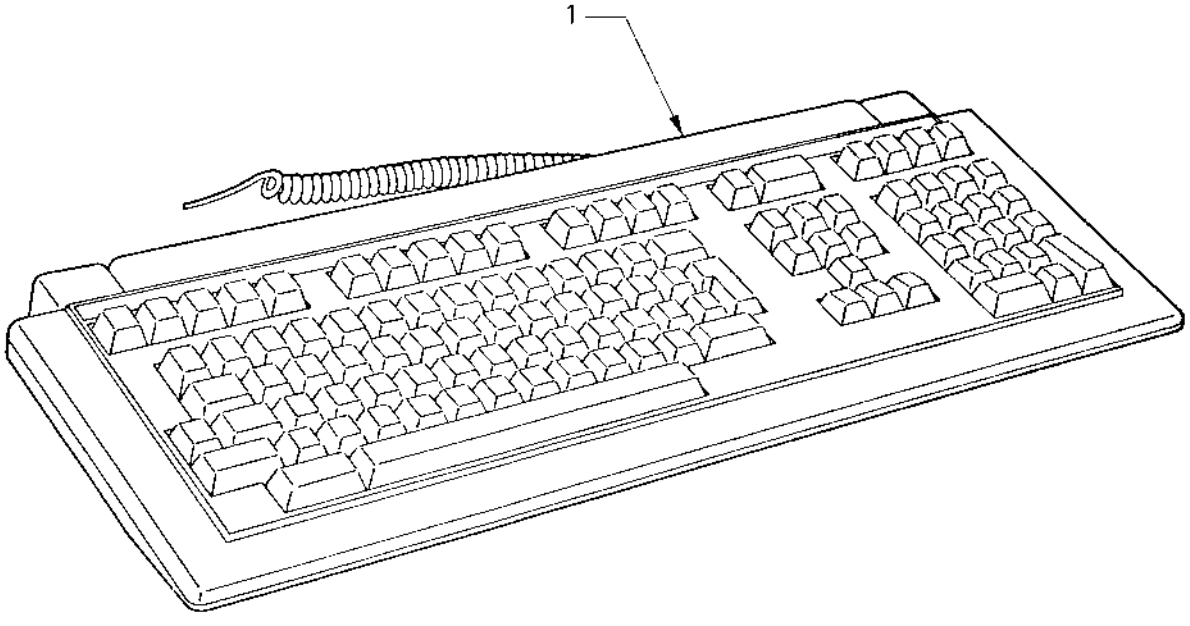
VIDEO BOARD AND POWER SUPPLY — PIASTRA VIDEO E ALIMENTATORE

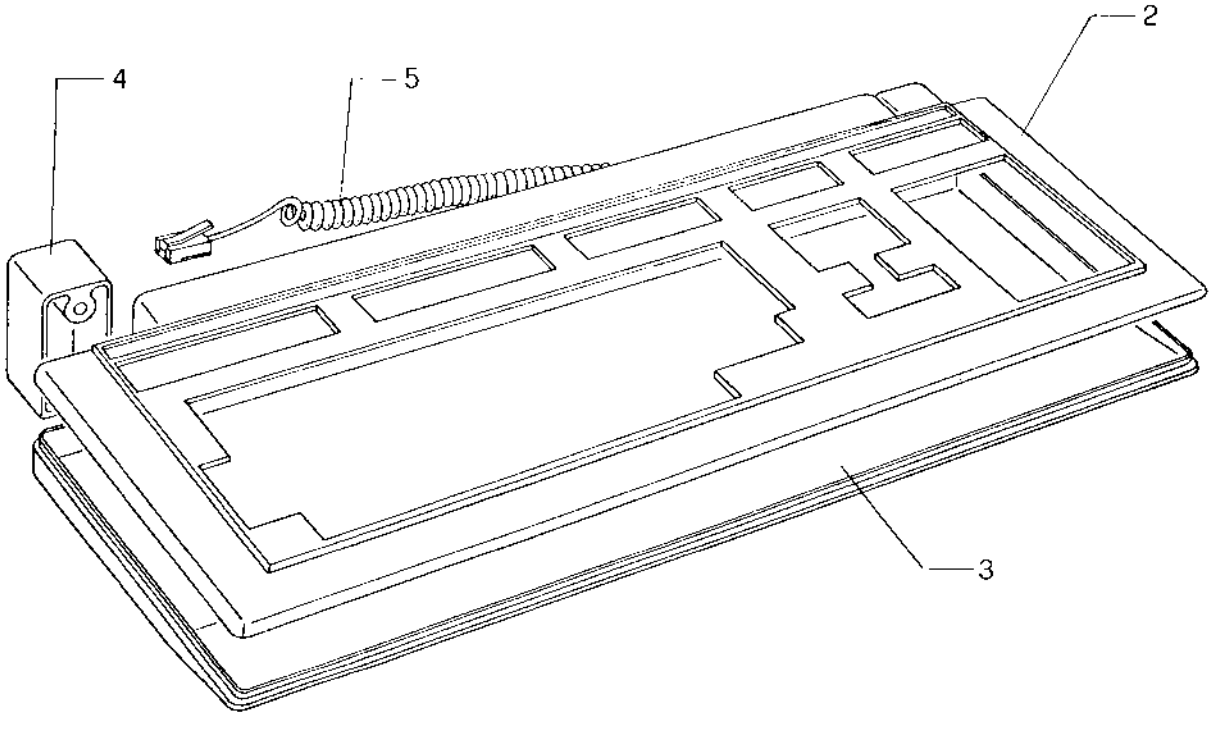
REF.	CODE	DESCRIPTION	DESCRIZIONE	UPDATING	NOTE
1	411341 T	VIDEO BOARD	PIASTRA VIDEO		
2	411342 U	POWER SUPPLY	ALIMENTATORE		



KEYBOARD — TASTIERA

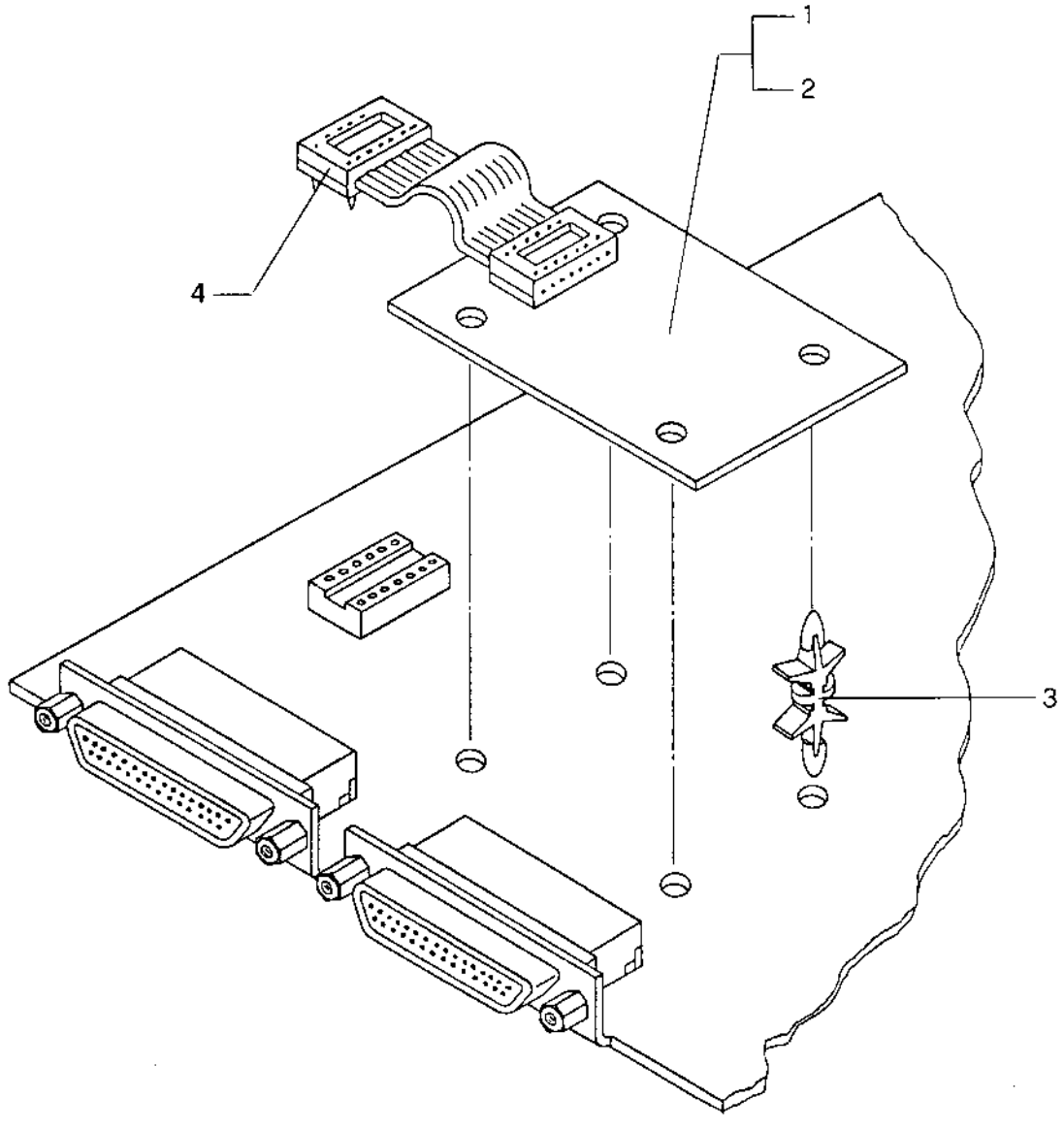
REF.	CODE	DESCRIPTION	DESCRIZIONE	UPDATING	NOTE
1	411343 V	KEYBOARD ASSEMBLY	TASTIERA COMPLETA		
2	335769 K	KEYBOARD COVER	COPERT. TASTIERA SUPER.		
3	335770 Q	KEYBOARD BASE	COPERT. TASTIERA INFER.		
4	335772 E	KEYBOARD FOOT	PIEDINI TASTIERA		
5	335613 X	KEYBOARD CABLE	CAVO TASTIERA		





"CURRENT-LOOP" OPTION — OPZIONE "CURRENT-LOOP"

REF.	CODE	DESCRIPTION	DESCRIZIONE	UPDATING	NOTE
1	335615 Z	INTERFACE RS 422	GRUPPO OPZIONE RS 422		
2	335618 C	INTERF. CURRENT-LOOP	GR. OPZ. CURRENT-LOOP		
3	335617 T	CLIPS FOR INTERFACE	SUPPORTO PER GR. OPZIONI		
4	335616 S	INTERFACE CABLE	CAVO PER OPZ. CURRENT-LOOP/RS 422		



CODICE CODE	PAGINA PAGE	CODICE CODE	PAGINA PAGE	CODICE CODE	PAGINA PAGE
143627V	3				
143628E	3				
143634U	3				
335609L	2				
335610G	2				
335611V	2				
335612W	2				
335613X	5				
335614Y	2				
335615Z	6				
335616S	6				
335617T	6				
335618C	6				
335764E	2				
335765F	1				
335766G	1				
335767H	2				
335768J	2				
335769K	5				
335770Q	5				
335772E	5				
411340E	3				
411341T	4				
411342U	4				
411343V	5				

A. INSTRUCTIONS FOR INSTALLING USER-INSTALLABLE OPTIONS

CONTENTS

RS422 INTERFACE INSTALLATION PROCEDURE

1. Install four snap-on plastic mounting clips into the four mounting holes on the controller board in the bottom of the display unit, as shown in figure A-1. Make sure that the wings of each clip do not interfere with the components of the controller board.

2. Install the RS422 interface board on the controller board, using the newly-installed clips, with U1 on the RS422 interface board towards the left of the controller board, as shown in figures A-1 and A-2.

3. Install the cable assembly between the interface board and U40 of the controller board. Align pin 1 on both ends of the cable to pin 1 of U1 and pin 1 of U40.

4. Make sure both ends of the cable are seated into U1 and U40 properly.

5. Pin signal assignments for the RS422 port are:

15 Receive Data (+)	25 Transmit Data (-)
17 Receive Data (-)	7 Ground
19 Transmit Data (+)	1 Chassis Ground

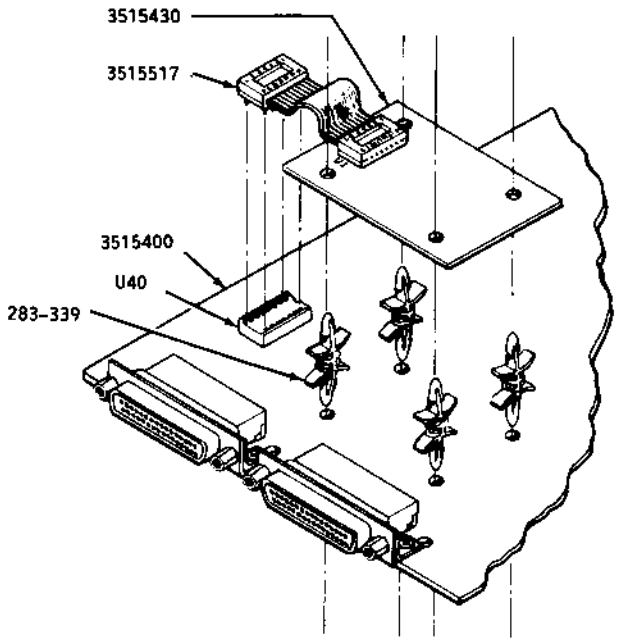


Fig. A-1 Mounting Hole Positions

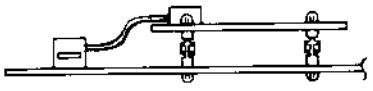


Fig. A-2 Position on Board

CURRENT LOOP INSTALLATION PROCEDURE

1. Install four snap-on plastic mounting clips into the four mounting holes on the controller board in the bottom of the display unit, as shown in figure A-3. Make sure that the wings of each clip do not interfere with the components of the controller board.

2. Install the current loop board on the controller board, using the newly-installed clips, with U1 on the current loop board towards the left of the controller board, as shown in figures A-3 and A-4.

3. Install the cable assembly between the current loop board and U40 of the controller board. Align pin 1 on both ends of the cable to pin 1 of U1 and pin 1 of U40.

4. Make sure both ends of the cable are seated into U1 and U40 properly.

9	20 mA source	15	Receive current (+)
14	20 mA source	24	Receive current (-)
13	Transmit current (-)	7	Ground
25	Transmit current (+)	1	Chassis Ground

(*) If alternate cable assembly is used, use a wire tie to secure excess cable to the lower left-hand mounting clip.

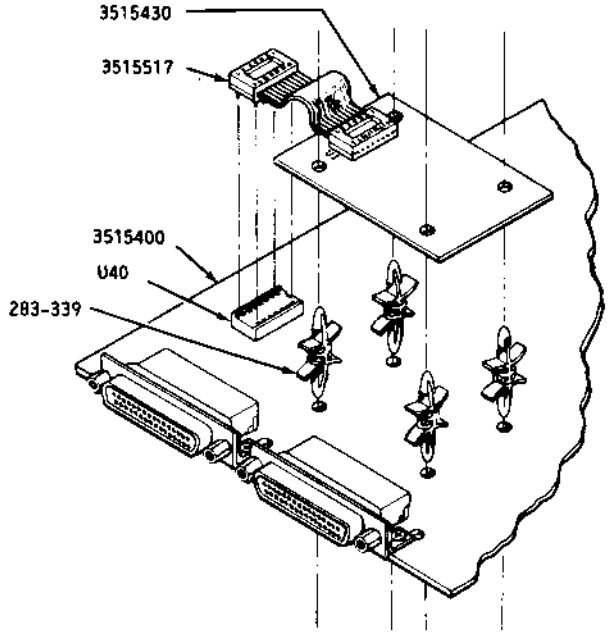


Fig. A-3 Mounting Hole Positions

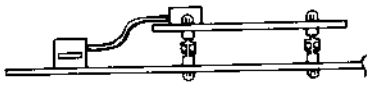


Fig. A-4 Position on Board

DATE	UPDATED PAGES	PAGES	CODE
15-03-87	1st EDITION	47	4111890 P (0)
15-05-87	Pages to be sostitute: A-3, Updating Status Chapter to be added: Chap. 5	13	4111891 Q

Pages marked * must be suppressed

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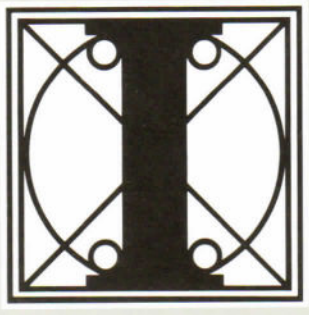

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