

***PRISM 3002  
Series Mainframes  
and  
2510 TestLab  
Mainframe***

***SERVICE MANUAL***

# Table of Contents (cont.)

<b>Section 4</b>	<b>Theory of Operation</b>	
	LOGIC CONVENTIONS .....	4-1
	MAINFRAME SYSTEM OVERVIEW .....	4-2
	MODULE DESCRIPTIONS .....	4-2
	KEYBOARD MODULE .....	4-2
	Keyboard Communications.....	4-3
	Keyboard to MPU Board.....	4-3
	MPU Board to Keyboard.....	4-4
	Keycode Charts.....	4-4
	COLOR DISPLAY MONITOR.....	4-5
	Monitor Interconnect Diagram .....	4-5
	Monitor Troubleshooting Information .....	4-5
	FLAT-PANEL DISPLAY .....	4-6
	Flat-Panel Operational Overview .....	4-7
	Power Converter.....	4-7
	POWER SUPPLY (119-2498-XX).....	4-10
	Power Supply General Description .....	4-10
	+12 V POWER SUPPLY (119-3118-XX) .....	4-11
	+12 V Power Supply General Description .....	4-11
	Cycling Power After an Overvoltage Condition.....	4-12
	Floating Supplies .....	4-12
	POWER SUPPLY (650-2210-XX).....	4-12
	Power Supply General Description .....	4-12
	FLOPPY-DISK UNIT .....	4-13
	Floppy-Disk Unit Read, Write, and Control Timing.....	4-13
	HARD DISK CONTROLLER (HDC) BOARD.....	4-16
	HARD DISK DRIVE UNIT.....	4-18
	EXPANSION MAINFRAME INTERFACE BOARD.....	4-18
<b>Section 5</b>	<b>Verification and Adjustment Procedures</b>	
	REQUIRED TEST EQUIPMENT .....	5-1
	OPERATING A MAINFRAME IN THE SERVICE POSITION...	5-2
	FUNCTIONAL CHECK PROCEDURES .....	5-3
	PERFORMANCE VERIFICATION PROCEDURES .....	5-3
	DC Voltage Power Supply Checks.....	5-4
	ADJUSTMENT PROCEDURES .....	5-6
	Flat-Panel Display Adjustment.....	5-6
	VPOS Voltage .....	5-6
	Adjustment Procedure.....	5-8

## Table of Contents (cont.)

<b>Section 6</b>	<b>Disassembly/Assembly</b>	
	GENERAL DISASSEMBLY/ASSEMBLY PRECAUTIONS.....	6-1
	MAINFRAME DISASSEMBLY/ASSEMBLY.....	6-2
	MODULE DISASSEMBLY/ASSEMBLY PROCEDURES .....	6-12
	Keyboard Disassembly/Assembly Procedures .....	6-12
	Replacing the Keyboard Cable.....	6-15
	Flat-Panel Display Disassembly/Assembly Procedures.....	6-15
	Power Converter Assembly Removal .....	6-15
	Flat Panel Display Removal .....	6-18
	PHYSICAL PLACEMENT OF MODULES FOR TROUBLESHOOTING.....	6-20
<b>Section 7</b>	<b>Maintenance</b>	
	MAINTENANCE TOOLS.....	7-2
	MAINTENANCE PRECAUTIONS.....	7-2
	Color Display Monitor.....	7-2
	Soldering.....	7-3
	Static Precautions .....	7-3
	AC Voltage Select Switch.....	7-4
	PREVENTIVE MAINTENANCE.....	7-4
	Exterior Cleaning.....	7-5
	Interior Cleaning.....	7-5
	Inspection .....	7-5
	CORRECTIVE MAINTENANCE.....	7-6
	Obtaining Replacement Parts .....	7-6
	Circuit Board Pin Replacement.....	7-7
<b>Section 8</b>	<b>Troubleshooting</b>	
	TROUBLESHOOTING EQUIPMENT .....	8-1
	TROUBLESHOOTING PRECAUTIONS .....	8-2
	Component Handling.....	8-2
	The Color Display Monitor.....	8-2
	PHYSICAL PLACEMENT OF MODULES FOR TROUBLESHOOTING.....	8-3
	GENERAL TROUBLESHOOTING .....	8-3
	Troubleshooting System Power.....	8-3
	Power Distribution.....	8-3
	Power Supply Troubleshooting Chart.....	8-4
	Troubleshooting Thermal Conditions .....	8-5
	Keyboard Troubleshooting.....	8-7
	Keyboard Cable .....	8-7
	Keyboard Power .....	8-7
	Disk Drive Troubleshooting.....	8-7

## Table of Contents (cont.)

	Color Display Monitor Troubleshooting.....	8-8
	Flat-Panel Display Troubleshooting .....	8-8
	COMM Pack Troubleshooting .....	8-10
	Expansion Module Interface Board Troubleshooting .....	8-10
<b>Section 9</b>	<b>Electrical Parts List</b>	
<b>Section 10</b>	<b>Diagrams</b>	
<b>Section 11</b>	<b>Mechanical Parts List</b>	

## List of Figures

Figure 1-1.	Configuration diagram.....	1-5
Figure 2-1.	Mainframe physical dimensions.....	2-3
Figure 2-2.	Physical dimensions of Mainframe with flat-panel display.....	2-4
Figure 2-3.	Physical dimensions of flat-panel display.....	2-5
Figure 2-4.	Video signal timing.....	2-22
Figure 3-1.	MPU connectors and pin keying.....	3-2
Figure 3-2.	Video Connector (J820) for MPU boards .....	3-3
Figure 3-3.	119-2498-xx power supply module connectors.....	3-5
Figure 3-4.	119-3118-xx +12 V Power Supply module connectors.....	3-7
Figure 3-5.	650-2210-xx +12 V Power Supply module connectors.....	3-8
Figure 3-6.	Expansion Interface board connectors and pin keying.....	3-10
Figure 4-1.	Flat-Panel Display block diagram.....	4-6
Figure 4-2.	Relationship of VID0 - VID3 signals to pixel position.....	4-7
Figure 4-3.	Flat-Panel video timing.....	4-9
Figure 4-4.	Floppy-Disk read timing.....	4-13
Figure 4-5.	Floppy-Disk write timing.....	4-14
Figure 4-6.	Floppy-Disk control signal timing.....	4-15
Figure 4-7.	Hard Disk Controller basic block diagram.....	4-17
Figure 5-1.	Power Supply test points on MPU board.....	5-4
Figure 5-2.	VPOS voltage.....	5-7
Figure 5-3.	VPOS adjustment and test point locations.....	5-9
Figure 6-1.	Preparing the Mainframe cover for removal.....	6-2
Figure 6-2.	Removing the Mainframe cover.....	6-3
Figure 6-3.	Removing Acquisition module(s).....	6-4
Figure 6-4.	Module locations with Acquisition modules removed.....	6-5
Figure 6-5.	Removing the Floppy Disk Drive and Auxiliary Fan.....	6-6
Figure 6-6.	Removing the Hard Disk Controller board and Hard Disk Drive.....	6-7
Figure 6-7.	Removing the MPU board.....	6-8
Figure 6-8.	Removing the Expansion Mainframe Interface board.....	6-9
Figure 6-9.	Removing the Power Supply connectors.....	6-10

## List of Figures (cont.)

Figure 6-10. Removing the Power Supply.....	6-11
Figure 6-11. Replacing keycaps. ....	6-13
Figure 6-12. Keycap template.....	6-14
Figure 6-13. Disassembling the Flat Panel module.....	6-16
Figure 6-14. Disassembling the Power Converter Board Assembly. ....	6-17
Figure 6-15. Display Panel cabling.....	6-19
Figure 6-16. MPU Board in troubleshooting position.....	6-21
Figure 7-1. Circuit board pin replacement.....	7-8
Figure 8-1. Power supply troubleshooting chart.....	8-4
Figure 8-2. Thermal sensor wiring. ....	8-6
Figure 8-3. Color Monitor troubleshooting chart.....	8-9

## List of Tables

Table 2-1 PHYSICAL CHARACTERISTICS.....	2-2
Table 2-2 ENVIRONMENTAL SPECIFICATIONS .....	2-6
Table 2-3 RELIABILITY .....	2-7
Table 2-4 INSTALLATION REQUIREMENTS .....	2-7
Table 2-5 119-2498-xx POWER SUPPLY PERFORMANCE REQUIREMENTS (3002).....	2-8
Table 2-6A 119-3118-xx +12 V POWER SUPPLY PERFORMANCE REQUIREMENTS (2510).....	2-10
Table 2-6B 650-2210-xx POWER SUPPLY PERFORMANCE REQUIREMENTS (2510).....	2-14
Table 2-7 FLOPPY DISK UNIT FUNCTIONAL SPECIFICATIONS .....	2-16
Table 2-8 KEYBOARD PERFORMANCE SPECIFICATIONS.....	2-17
Table 2-9 QWERTY KEYBOARD KEY CODES .....	2-18
Table 2-10 FUNCTION KEY CODES .....	2-19
Table 2-11 KEYPAD KEY CODES (HEX) HARD DISK FUNCTIONAL SPECIFICATIONS .....	2-20
Table 2-12 HARD DISK FUNCTIONAL SPECIFICATIONS.....	2-20
Table 2-13 COLOR DISPLAY MONITOR FUNCTIONAL SPECIFICATIONS .....	2-21
Table 2-14 FLAT-PANEL DISPLAY FUNCTIONAL SPECIFICATIONS .....	2-22
Table 5-1 REQUIRED TEST EQUIPMENT .....	5-2
Table 5-2 DC VOLTAGE TOLERANCES .....	5-5
Table 6-1 KEYBOARD CABLE PINOUT AND COLOR CODE .....	6-15

# GENERAL SAFETY SUMMARY

The general safety information in this summary is for operating and servicing personnel. Specific warnings and cautions can be found throughout the manual where they apply, and may not appear in this summary.

## TERMS IN THIS MANUAL

**CAUTION**

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

**WARNING**

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

## TERMS AS MARKED ON EQUIPMENT

CAUTION indicates a hazard to property, including the equipment itself, and could cause minor personal injury.

WARNING indicates solely a personal injury hazard not immediately accessible as you read the marking.

DANGER indicates a personal injury hazard immediately accessible as you read the marking.

## SYMBOLS AS MARKED ON EQUIPMENT



DANGER—High voltage.



Protective ground (earth) terminal.



ATTENTION—REFER TO MANUAL.

## GROUNDING THE PRODUCT

This product is intended to operate from a power source that does not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground.

**WARNING:** This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle. A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation. (I.E.C. Safety Class I)

## **DANGER ARISING FROM LOSS OF GROUND**

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that may appear to be insulated) can render an electric shock.

## **POWER DISCONNECT**

The main power disconnect is by means of the power cord or, if provided, an ac power switch.

## **USE THE PROPER POWER CORD**

Use only the power cord and connector specified for your product. Use only a power cord that is in good condition. CSA Certification includes the equipment plus those power cords appropriate for use on the North America power network. All other power cords supplied are approved for the country of use.

## **USE THE PROPER FUSE**

To avoid fire hazard use only a fuse of the correct type, voltage rating, and current rating.

## **USE THE PROPER VOLTAGE SETTING**

Make sure the line selector is in the proper position for the power source being used.

## **REMOVE LOOSE OBJECTS**

During disassembly or installation procedures, screws or other small objects may fall to the bottom of the mainframe. To avoid shorting out the power supply, do not power up the instrument until such objects have been removed.

## **DO NOT OPERATE WITHOUT COVERS**

To avoid personal injury or damage to the product, do not operate this product with covers or panels removed.

## **USE CARE WITH COVERS REMOVED**

To avoid personal injury, remove jewelry such as rings, watches, and other metallic objects before removing the cover. Do not touch exposed connections and components within the product while the power cord is connected.

## **REMOVE FROM OPERATION**

If you have reason to believe that the instrument has suffered a component failure, do not operate the instrument until the cause of the failure has been determined and corrected.

## **DO NOT OPERATE IN EXPLOSIVE ATMOSPHERES**

To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.

# SERVICE SAFETY SUMMARY

*Only qualified personnel should perform service procedures. This Service Safety Summary and the General Safety Summary should be read before performing service procedures.*

## **DO NOT SERVICE ALONE**

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

## **USE CARE WHEN SERVICING WITH POWER ON**

To avoid personal injury from high current, remove jewelry such as rings, watches, and other metallic objects, before servicing the instrument. Do not touch exposed connections and components while power is on. Disconnect power before soldering, removing protective panels, or replacing components.

## **USE CAUTION WHEN SERVICING THE CRT**

The CRT assembly should be replaced only by qualified personnel familiar with CRT servicing procedures and precautions. CRTs retain hazardous voltages for long periods of time after power-down. Before attempting any work inside the monitor, discharge the CRT by shorting the anode to chassis ground. When discharging the CRT, connect the discharge path to ground and then the anode. Use extreme caution when handling the CRT, rough handling may cause it to implode. Do not nick or scratch the glass or subject it to undue pressure during removal or installation. When handling the CRT, wear safety goggles and heavy gloves for protection.



# Section 1

## GENERAL INFORMATION

### ABOUT THIS MANUAL

This manual contains service information for the Tektronix PRISM 3002 Series and 2510-electronic measurement and analysis mainframes; hereafter referred to as Mainframe. The basis of either system is a mainframe that contains a single-host MPU board and up to two acquisition module boards. In addition, a Mainframe contains a floppy disk drive, a hard disk drive, a keyboard, and either a color monitor or flat-panel display. With application software, the result is a custom electronic measurement system tailored to a user's applications.

The information in this manual explains how to verify, service, troubleshoot, and repair the various Mainframes and their internal modules. (Service information for the MPU Board and acquisition modules is provided in separate manuals.)

This manual contains the following service information:

**Section 1, *General Information***, briefly describes related manuals, mainframe configurations (and related modules), and system software.

**Section 2, *Specifications***, describes functional characteristics and performance requirements (with supplemental information) for the Mainframes and associated modules.

**Section 3, *Connectors and Cabling***, provides an Interconnect Diagram to illustrate electrical connections between internal electrical modules and chassis-mounted electrical components. Also explains where additional connector and cabling information is located in this manual.

**Section 4, *Theory of Operation***, provides descriptions of Mainframe modules. For those modules not repaired at the user site, general descriptions are provided, sufficient to guide the technician to a faulty module. Where component-level repair is supported, detailed theoretical descriptions of the module are provided.

**Section 5, *Verification and Adjustments***, describes how to verify the functional performance of the Mainframe and how to perform adjustments.

**Section 6, *Disassembly/Assembly***, describes how to remove and replace Mainframe modules.

**Section 7, *Maintenance***, describes how to perform maintenance on the Mainframes.

**Section 8, *Troubleshooting***, describes general troubleshooting procedures for Mainframe modules.

## General Information

**Section 9, *Electrical Parts List***, lists all the electrical parts associated with the Mainframes and their part numbers. Parts for modules supported with separate service manuals are not included.

**Section 10, *Diagrams***, contains block diagrams, interconnect wiring/signal diagrams, and schematics for the Mainframes and selected modules.

**Section 11, *Mechanical Parts List***, lists the mechanical parts for the Mainframes and their part numbers.

## RELATED MANUALS

The Mainframe documentation consists of the standard accessory user's manual and optional accessory service manuals. The service manuals assume that the reader is familiar with the Mainframe and its user's manual.

Service information for a signal analyzer system is contained in several different service manuals. Thus, a service manual package and service kit accessories will vary depending on the particular mainframe and installed acquisition modules. Service information is contained in the following types of service manuals.

### Mainframe Service manuals

These manuals provide service information for the different mainframe mechanical enclosures and associated chassis-mounted components. Mainframe service manuals also contain service information for some system peripherals, such as keyboard, power supplies, and hard disk controller.

### MPU Board Service Manual

The *671-0058-XX MPU Board Service Manual* provides detailed service information for the MPU Board. It contains descriptions of functional circuits on the MPU board, as well as detailed system-level troubleshooting information. The *Troubleshooting* section describes how to troubleshoot an MPU Board and associated modules using power-up and kernel diagnostics. The *System Diagnostic Software* section describes how to run the hardware diagnostic tests. Here you will find explanations on how to enter and exit Diagnostic mode and how to use diagnostics for system verification and/or troubleshooting. A detailed description of each diagnostic test is also provided.

### Acquisition Module Service Manuals

A mainframe can contain any of several different acquisition modules. Each acquisition module is supported with its own service manual.

Acquisition module service manuals also provide service information for probes and leadsets.

## Test Fixture Service Manuals

Special test fixtures are available to aid low-level servicing of the MPU board and selected acquisition boards. Instruction manuals describe how to use and service this special test equipment.

## How to Order Manuals

Manuals not shipped as a standard accessory with your product may be ordered individually or as part of a service kit. Contact your Tektronix Representative for a complete list of related manuals and service kits for your particular mainframe configuration.

## MAINFRAME CONFIGURATIONS

The Mainframe is the main electronic enclosure for an instrumentation system. There are four PRISM Mainframe configurations and several TestLab configurations:

- **3002C**—Mainframe with MPU board, power supply, color monitor, keyboard, floppy drive, and hard disk drive.
- **3002P**—Mainframe with MPU board, power supply, flat-panel display, keyboard, floppy drive, and hard disk drive.
- **3002E**—Expansion Mainframe with power supply and Expansion Mainframe Interface board (no display, no keyboard, no disk drives and no MPU board).
- **2510 TestLab**—Mainframe with MPU board, power supply, color monitor or flat-panel display, floppy drive, and hard disk drive.

All Mainframes have things in common. The enclosure is basically the same, differing only in the top panels used by the color monitor and the flat-panel display. All have power supplies. The following provides a short description of each mainframe and its associated modules.

### 3002C—Mainframe With Color Monitor

This Mainframe is a stand-alone, portable configuration with a color CRT monitor as the display device. It is used for general test and signal acquisition tasks. As shown in Figure 1-1, it can be configured with up to two acquisition modules.

### 3002P–Mainframe With Flat-Panel Display

This Mainframe is a stand-alone, portable configuration with a flat-panel display. It is exactly the same as the 3002C except for the flat-panel display and mainframe top cover.

### 3002E–Expansion Mainframe

This Mainframe is used to attach additional application modules to 3002C or 3002P Mainframes. An Expansion Mainframe contains a power supply, an Expansion Mainframe Interface Board, and up to two acquisition modules.

### 2510 Mainframe

The 2510 is a general-purpose, multi-channel analyzer mainframe. This mainframe is basically the same as the 3002-Series Mainframes with some differences; the 2510 mainframe uses different acquisition modules, power supply, and operating software.

## HARDWARE MODULE DESCRIPTIONS

The following provides a brief description of each electrical module as you might find it configured in a Mainframe system. Refer to Section 4, *Theory*, for functional descriptions of the various modules used in the Mainframe configurations. Refer to Figure 1-1 when reading the following.

### MPU Board

The MPU board is a single-board host computer that provides central control and memory for an instrumentation system.

The MPU board provides a modified RS-232C port for keyboard communications and a standard RS-232C port for host communications. It also provides a Tektronix 1200-Series COMM Pack port for RS-232C, GPIB, and printer interfacing. A 640 x 400, non-interlaced display output provides connection for an external monitor. A hard disk can also be attached to the MPU for mass storage purposes.

All modules within a Mainframe system connect to either an MPU board or an expansion interface board.

Refer to the 671-0058-XX MPU Board Service manual for MPU board service information.

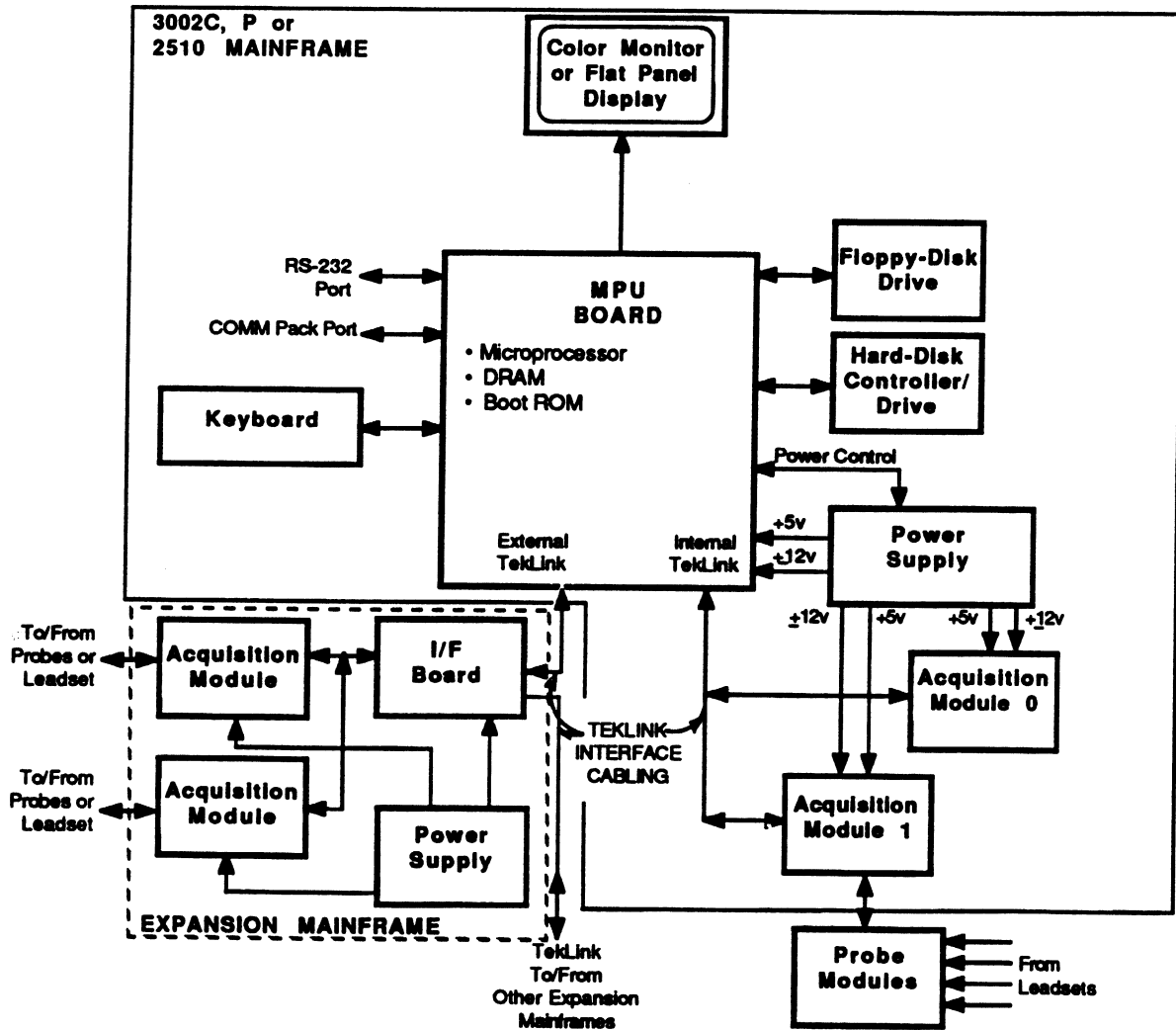


Figure 1-1. Configuration diagram.

### Keyboard

The keyboard consists of a standard QWERTY keyboard, special-function keys, and a control knob.

### Display Units

The MPU board provides a 640 X 400 pixel, non-interlaced display output to drive either a color monitor or a flat-panel display.

### Acquisition Modules

Acquisition modules interface to the MPU board through special interface hardware and communications protocol (TekLink). Separate but functionally identical links are provided by the MPU board for internal and external acquisition modules. Internal acquisition modules reside in Mainframes that contain an MPU board. External acquisition modules reside in an Expansion Mainframe and connect to the MPU board using external TekLink cabling. Service information for the MPU board, and acquisition modules is provided in separate service manuals. (See *Related Manuals* for an explanation of related manuals and ordering information.)

### Disk Drives

A 3.5-inch, hard-shell disk drive provides storage for the operating system software, diagnostics software, applications software, and data files.

A hard disk drive with controller board is provided for mass storage. The hard disk controller board provides interfacing between the MPU board and the hard disk drive.

### Expansion Mainframe Interface Board

An Expansion Mainframe Interface board occupies the physical space of the MPU board in a 3002E Expansion Mainframe. Its purpose is to interface acquisition modules in an Expansion Mainframe to an MPU board in another Mainframe. This interface board also daisy-chains TekLink signals between Expansion Mainframes. Up to four Expansion Mainframes can be connected to an MPU board via an Interface board in each Expansion Mainframe and external TekLink cabling.

### Power Supplies

The Mainframe power supply provides +5 Vdc and  $\pm 12$  Vdc to power mainframe modules. The MPU board and acquisition modules receive power directly from the Power Supply using separate distribution buses. All other mainframe modules receive power distributed by the MPU board.

## **Probe Modules and Leadsets**

Different probe modules are available for connecting an application module to the system under test (SUT). The probe module used depends on the physical requirements of the circuitry to be observed or tested. A probe module uses a leadset to physically connect the probe to the system under test. Again, different leadsets are available depending on the specific probe and physical requirements of the system to be observed or tested. Service information for probes and leadsets is provided in application module service manuals.

## **DIAGNOSTIC SOFTWARE**

Comprehensive diagnostic software supports both automatic power-up tests and menu-driven self-tests. For more information about diagnostic software refer to your system user's manual.





## Section 2 SPECIFICATION

This section lists two types of specifications: (1) those that are classified as environmental, physical, or "static" specifications (specifications that cannot be verified by the user); and (2) those that are actual operational parameters (specifications that are user verifiable). Refer to the Verification and Adjustment procedures in Section 5 for procedures that verify the performance specifications. For safety and regulatory specifications, refer to the appropriate module user's manual.

The following terms are used in the specification tables:

*Characteristic:* A property of the product.

*Performance Requirement:* The primary performance characteristics of the product that can be verified using verification procedures.

*Supplemental Information:* Statements that describe typical performance for characteristics of secondary importance (those that are not usually verified using verification procedures) or statements that further explain related performance requirements.

### CHARACTERISTICS/SPECIFICATIONS

The performance characteristics in this section are valid under the following conditions:

1. The Mainframe must be operating in an environment as specified in Table 2-1, Environmental Specifications.
2. A warm-up period of at least 20 minutes must precede the verification/operational procedures.
3. The Mainframe power supplies must meet specified power requirements as in Power Supply Specifications, Table 2-5 and 2-6.

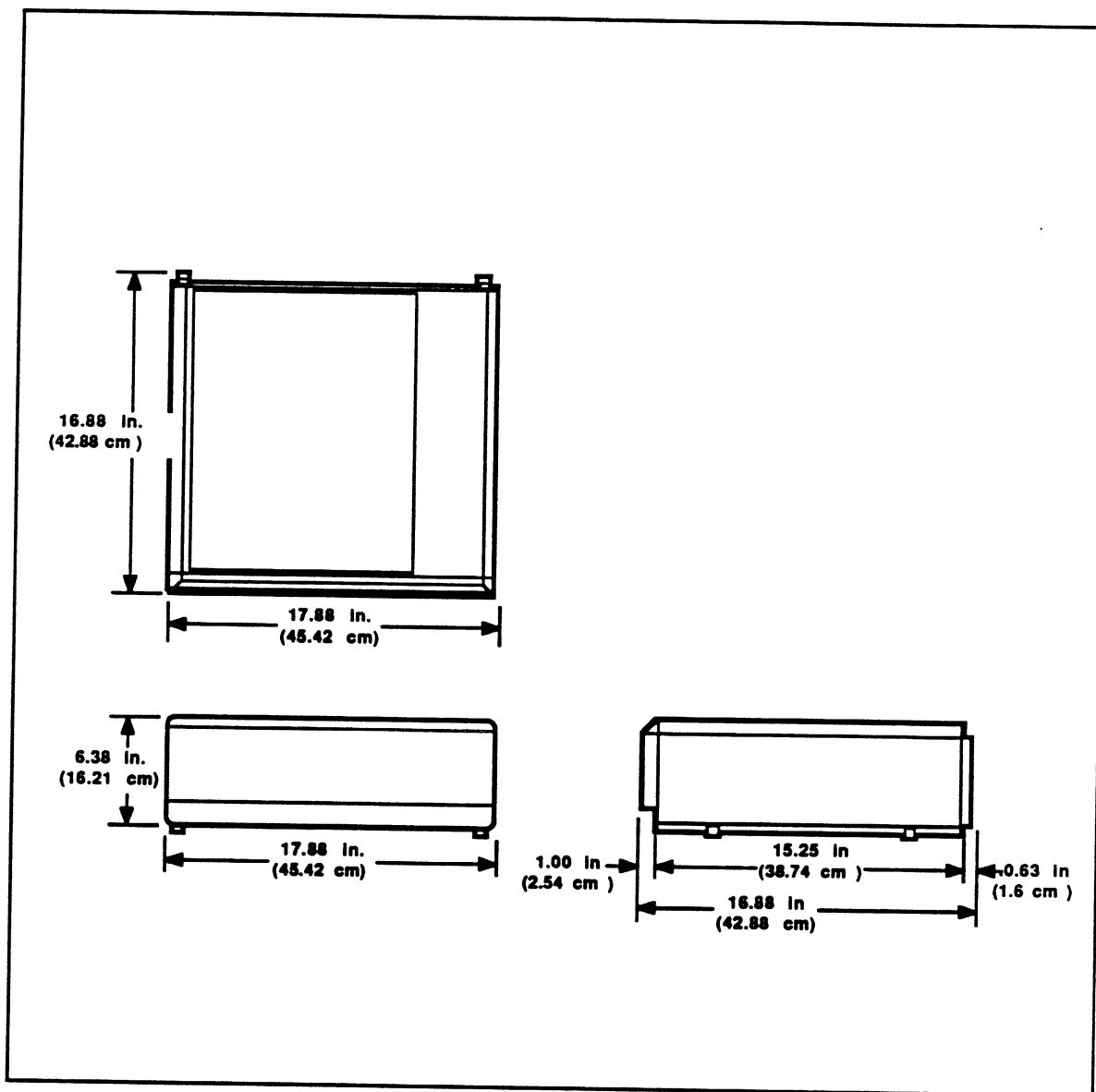
## Specification

The following tables list the specifications and performance characteristics of the Mainframes:

- 2-1 Physical Characteristics
- 2-2 Environmental
- 2-3 Reliability
- 2-4 Installation Requirements
- 2-5 119-2498-xx Power-Supply Performance Requirements
- 2-6A 119-3118-xx Power-Supply Performance Requirements
- 2-6B 650-2210-xx Power-Supply Performance Requirements
- 2-7 Floppy Disk Functional Specifications
- 2-8 Keyboard Performance Specifications
- 2-9 QWERTY Keyboard Key Codes
- 2-10 Function Key Codes
- 2-11 Keypad Key Codes
- 2-12 Hard Disk Functional Specifications
- 2-13 Color Monitor Functional Specifications
- 2-14 Flat-Panel Display Functional Specifications

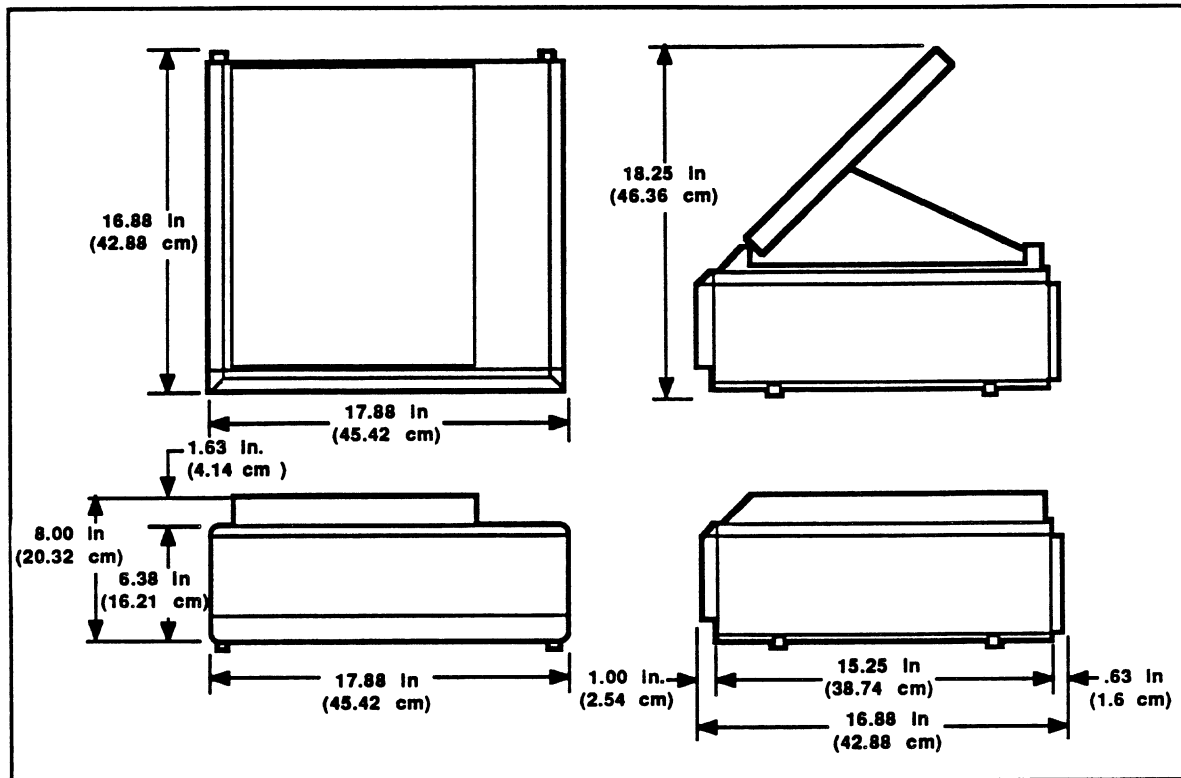
**Table 2-1  
PHYSICAL CHARACTERISTICS**

<b>Characteristic</b>	<b>Description</b>
<b>WEIGHT</b>	
Mainframes (with two acquisition modules)	
3002C (with color display monitor)	62.5 lbs (28 kg)
3002P (with flat-panel display)	38.0 lbs (17 kg)
3002E	22.5 lbs (10 kg)
2510 (without any display module)	26.8 lbs (12 kg)
Hard Disk Drive (with controller board)	2.5 lbs (1.1 kg)
Flat-Panel Display	8.0 lbs (3.6 kg)
<b>DIMENSIONS</b>	See Figures 2-1, 2-2, and 2-3



**Figure 2-1. Mainframe physical dimensions.** (Without color monitor or flat panel.)

# Specification



**Figure 2-2. Physical dimensions of Mainframe with flat-panel display.**

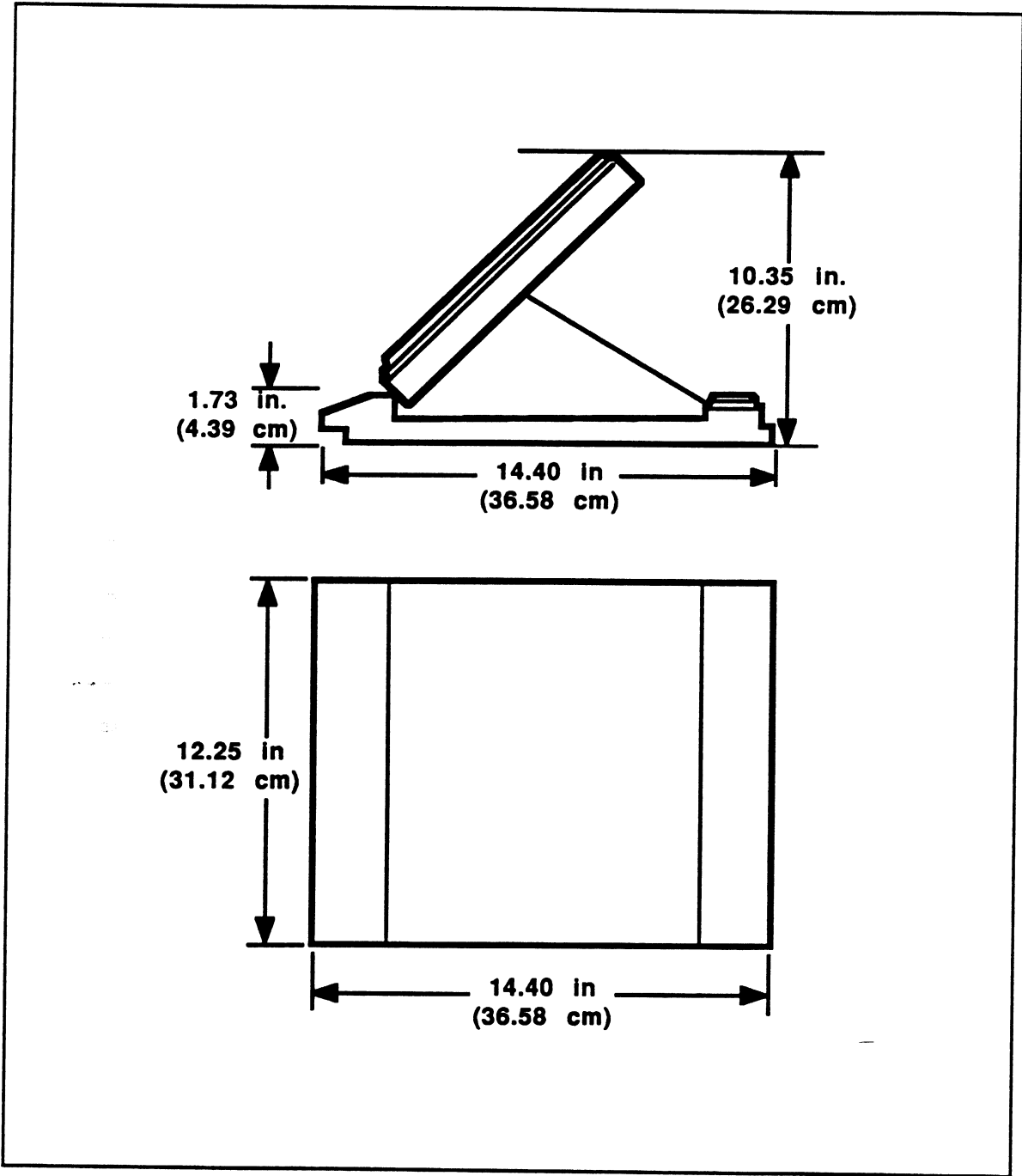


Figure 2-3. Physical dimensions of flat-panel display.

## Specification

**Table 2-2  
ENVIRONMENTAL SPECIFICATIONS**

Characteristic	Description
Temperature	
operating	+10° C min. +40° C max.
non-operating	-10° C min. +50° C max.
Humidity	
max wet bulb	26° C
operating	20% min. 80% max.
non-operating (relative humidity)	10% min. 80% max. (non-condensing)
Altitude	
operating	10,000 ft. (3.0 km)
non-operating	10,000 ft. (3.0 km)
Vibration	
operating	0.02 inches p-p displacement @ 5-22 Hz 0.5 gs @ 22-55 Hz
non-operating	0.02 inches p-p displacement @ 5-22 Hz 0.5 gs @ 22-55 Hz
Shock	
operating	2 gs @ 10 ms
non-operating	40 gs @ 10 ms
Electrostatic Discharge	No permanent damage from a discharge of 20 kV through a 1 kΩ resistor in series with a 500 pF capacitor.
Electromagnetic Susceptibility	RS01, RS02, RS03 CS01, CS02, CS06

**Table 2-3  
RELIABILITY**

<b>Characteristic</b>	<b>Description</b>
Mean Time Between Failures (MTBF)	2500 hrs. (calculated) (includes MPU board, display unit, power supply, floppy disk, hard disk, and keyboard)

**Table 2-4  
INSTALLATION REQUIREMENTS**

<b>Characteristic</b>	<b>Description</b>
<b>MAINFRAME</b>	
Heat Dissipation (3002 only)	
Typical	1000 BTU/hr.
Max. Load	1700 BTU/hr.
Surge Current (3002 only)	27 A typical power at turn on 30 A maximum
Cooling Clearance	6 inches on sides (The flat panel display requires 6 inches above when either opened or closed.)
<b>COLOR MONITOR</b>	
Cooling Clearance	Do not block (cover) any cooling vents on top, bottom, or sides. Maximum ambient temperature near the monitor should not exceed 40° C.
Distance from EMI sources	The monitor should be as far removed as possible from electromagnetic sources.

**Specification**

**Table 2-5  
119-2498-xx POWER SUPPLY PERFORMANCE REQUIREMENTS (3002)**

Characteristic	Performance Requirement	Supplemental Information
Description		A 275 watt switching power supply with triple outputs for +5, -12, and +12 VDC.
AC Power Input Voltage	90-127 VAC 180-250 VAC	switch selectable switch selectable
Frequency	48-63 Hz	
Input Power		500 VA. max.
Line Fuse	115/230 VAC	8 A Fast blo fuse
Holding Time		≥ 60 ms (The time it takes the +5 V output to drop to 4.5 V after the POWER FAIL signal occurs.)
Turn-on Time		≤ 200 ms (The time it takes the +5 V output to reach 4.5 V after application of the REMOTE ON signal.)
Thermal Shutdown		If fan stops, or if over-temperature condition in power supply, power supply shuts down to prevent failure of electrical modules
DC Power Output +5 VDC Regulation Ripple Output Current	+5 Vdc +.05%/-2.5%  <100 mV p-p	Measured differently  10 A max. MPU Board. Foldback current limit between 8 and 10 A.



**Table 2-5(CONT.)  
119-2498-xx POWER SUPPLY PERFORMANCE REQUIREMENTS (3002)**

Characteristic	Performance Requirement	Supplemental Information
Max required current		30 A max each acquisition module. Foldback current limit between 25 and 30 A. each Acquisition Module. Recovery from current limit requires recycling front panel POWER switch.
Over-voltage protection	+6 V +5%	Over-voltage condition shuts down supply.
+12 VDC		
Regulation	12 V ±5%	
Ripple	100 mV p-p	
Output Current		5.6 A
Current Limit		Protected by 7 A fuse
-12 VDC		
Regulation	-12 V ±5%	
Ripple	100 mV p-p	
Output Current		4.0 A
Current Limit		Protected by 7 A fuse

**Specification**

**Table 2-6A  
119-3118-xx +12 V POWER SUPPLY PERFORMANCE REQUIREMENTS (2510)**

Characteristic	Performance Requirement	Supplemental Information
Description		A 150 watt, remote start, switching power supply with output voltages +5, +12, and -12 VDC. Supply can be powered from 115/230 VAC line voltage or +11 VDC to +22 VDC
AC Power Input Voltage (Switch Selectable)		
115 VAC	87-132 VAC (115 V nom.)	
230 VAC	134-250 VAC (230 V nom.)	
Frequency	47-63 Hz	
Line Fuse	115 VAC 4 A (3AG) 230 VAC 2 A (3AG)	
DC Power Input Voltage		
Voltage	+11 to +22 VDC (12.6 VDC nominal)	
Fuse	+DC lead 30 A -DC lead 30 A	
Holding Time		60 ms (min.). Holding time is the time it takes the +5 V output to drop to 4.5 V after the POWER FAIL signal occurs. Holding time is circumvented if supply is running on DC and DC power cord is removed.
Turn-on Time		≤200 ms (min) Turn-on time is the time it takes the +5 V output to reach 4.5 V after application of the REMOTE ON signal.

**Table 2-6A (CONT.)**  
**119-3118-xx +12 V POWER SUPPLY PERFORMANCE REQUIREMENTS (2510)**

Characteristic	Performance Requirement	Supplemental Information
<p><b>+5 VDC</b></p> <p>Regulation</p> <p>Ripple</p> <p>Output Current</p> <p>Overvoltage Protection</p> <p>Overcurrent Protection</p>	<p><b>+5.0 VDC +3.5%,-1.5%</b></p> <p><b>&lt;100 mV</b></p>	<p><b>+2.0 A (max.)</b>  <b>+0.75 A (min.)</b>  <b>Fused at 10 A to MPU Board</b></p> <p><b>6.75 V (max.)</b> Overvoltage condition shuts down supply</p> <p><b>22 to 26 A nominal.</b>  <b>26 A maximum ±10%</b> (Power Supply typically set for lower level of current limit).</p>
<p><b>+12 VDC (System Supply)</b></p> <p>Regulation</p> <p>Ripple</p> <p>Output Current</p>	<p><b>+12 VDC ±5.0%</b></p> <p><b>&lt;100 mV</b></p>	<p><b>5 A (max.)</b>  <b>0.0 A (min.)</b></p>
<p><b>-12 VDC (System Supply)</b></p> <p>Regulation</p> <p>Ripple</p> <p>Output Current</p> <p>Overcurrent Protection</p>	<p><b>-12 VDC ±5.0%</b></p> <p><b>&lt;100 mV</b></p>	<p><b>1.5 A (max.)</b>  <b>0.0 A (min.)</b></p> <p><b>1.8 to 3.0 A nominal</b></p>
<p><b>+12 VDC (Floating Supply #1)</b></p> <p>Regulation</p>	<p><b>+12 VDC ±5.0%</b></p>	

**Specification**

**Table 2-6A (CONT.)  
119-3118-xx +12 V POWER SUPPLY PERFORMANCE REQUIREMENTS (2510)**

<b>Characteristic</b>	<b>Performance Requirement</b>	<b>Supplemental Information</b>
Ripple	<100 mV	
Output Current		1.5 A (max.) 0.0 A (min.)
Overcurrent Protection		1.8 to 3.0 A nominal
-12 VDC (Floating Supply #1)		
Regulation	-12 VDC $\pm$ 5.0%	
Ripple	<100 mV	
Output Current		1.5 A (max.) 0.0 A (min.)
Overcurrent		1.8 to 3.0 A nominal
+12 VDC (Floating Supply #2)		
Regulation	+12 VDC $\pm$ 5.0%	
Ripple	<100 mV	
Output Current		1.5 A (max.) 0.0 A (min.)
Overcurrent Protection		1.8 to 3.0 A nominal
-12 VDC (Floating Supply #2)		
Regulation	-12 VDC $\pm$ 5.0%	
Ripple	<100 mV	
Output Current		1.5 A (max.) 0.0 A (min.)
Overcurrent		1.8 to 3.0 A nominal

**Table 2-6A (CONT.)**  
**119-3118-xx +12 V POWER SUPPLY PERFORMANCE REQUIREMENTS (2510)**

Characteristic	Performance Requirement	Supplemental Information
<p>LOW BATTERY Signal</p> <p>DC Thermal Shutdown</p>		<p>LOW BATTERY Signal to MPU Board is activated when battery voltage falls below about 11.5 VDC.</p> <p>Thermal Switch provides a "soft" shutdown (POWER FAIL Signal activated) if safe operating temperature of supply is exceeded due to overcurrent/overvoltage condition. To recycle power, push STANDBY/ON switch to standby, disconnect all power cables for 10-15 seconds. Re-install cables, then cycle power via STANDBY/ON switch.</p>

**Specification**

**Table 2-6B  
650-2210-xx POWER SUPPLY PERFORMANCE REQUIREMENTS (2510)**

<b>Characteristic</b>	<b>Performance Requirement</b>	<b>Supplemental Information</b>
Description		A 140 watt, remote start, switching power supply with output voltages +5, +12, and -12 VDC.
AC Power Input Voltage (Switch Selectable)		
115 VAC	90-132 VAC (115 V nom.)	
230 VAC	180-264 VAC (230 V nom.)	
Frequency	47-63 Hz	
Line Fuse	115 VAC 3 A (3AG) 230 VAC 2 A (3AG)	
+5 VDC		
Regulation	+5.0 VDC ±1%	
Ripple		<50 mV
Output Current		+20 A (max.) +2 A (min.) Fused at 5 A to MPU Board
Overvoltage Protection		6 - 6.5 V (max.) Overvoltage condition shuts down supply
Overcurrent Protection		Recovery from current limit requires cycling input power

**Table 2-6B (CONT.)  
650-2210-xx POWER SUPPLY PERFORMANCE REQUIREMENTS (2510)**

Characteristic	Performance Requirement	Supplemental Information
<b>+12 VDC (System Supply)</b> Regulation Ripple Output Current  Overcurrent Protection	+12 VDC $\pm 5\%$ <120 mV	5 A (max.) 7 A (peak) 0.5 A (min.) Fused at 5 A to MPU Board  Recovery from current limit requires cycling input power
<b>+12 VDC (Floating Supply)</b> Regulation Ripple Output Current Overcurrent Protection	+12 VDC $\pm 0.5\%$ <100 mV	3 A (max.)  Foldback current limit. Recovery from current limit is automatic upon removal of load
<b>-12 VDC (Floating Supply)</b> Regulation Ripple Output Current Overcurrent Protection	-12 VDC $\pm 0.5\%$ <100 mV	3 A (max.)  Foldback current limit. Recovery from current limit is automatic upon removal of load

**Specification**

**Table 2-7**  
**FLOPPY DISK UNIT FUNCTIONAL SPECIFICATIONS**

<b>Characteristic</b>	<b>Description</b>
Description	Half-height, 3.5 inch, 1.0 megabytes (unformatted), double sided.
Unformatted Capacity	
Per Disk	1 megabytes
Per Surface	512 kilobyte
Per Track	6.25 kilobyte
Formatted Capacity	
Per Disk	720 kilobytes
Per Track	4.096 kilobytes
Per Sector	0.256 kilobytes
Transfer Rate	250 kilobits/second
Access Time	
Track-to-track	3 ms max.
Average	100 ms max.
Settling Time	15 ms max.
Input Power	
DC Voltage	+5 V +5%
Input Current	0.32 A Typical (1.1 A max.)
Ripple	100 mV
Standby	9 mA



**Table 2-8  
KEYBOARD PERFORMANCE SPECIFICATIONS**

<b>Characteristic</b>	<b>Performance Requirement</b>	<b>Supplemental Information</b>
Description		QWERTY typing keyset with hex pad and function keys
Clock	19.2 Kiloherztz $\pm 3\%$	
Serial Data Protocol	19.2 kilobaud, synchronous	One start bit, eight data bits, one stop bit, no parity.
Programmable parameters		
Clock Rate		The number of degrees the knob is rotated before the keyboard signals the MPU that the knob has been turned.
Period		The time period over which the clicks are accumulated.
Mode		Forces keyboard into normal keyboard mode as opposed to knob mode.
Repeat Key Lag	0.5 seconds.	
Repeat Key Rate	10 per second	
QWERTY Key Codes	ASCII/North American	See Table 2-9.
Function Key Codes		Hexadecimal. See Table 2-10
Keypad Key Codes		Hexadecimal. See Table 2-11
Input Power		
DC Voltage	+5 V $\pm 5\%$	Regulation occurs within the keyboard circuitry.
DC Current	1 A max	

Specification

Table 2-9  
 QWERTY KEYBOARD KEY CODES  
 (for PRISM and TestLab keyboard)

Key	Unshifted	Shifted	Control	Control-Shift	Caps Lock
BACKSPACE	08	08	08	08	08
TAB	09	D2	09	D2	09
RETURN	0D	0D	0D	0D	0D
ESC	1B	1B	1B	1B	1B
SPACE	20	20	20	20	20
'(apostrophe	27	22	98	99	9A
, (comma)	2C	3C	9B	9C	2C
- (dash)	2D	5F	9D	1F	2D
. (period)	2E	3E	9E	9F	2E
/	2F	3F	A0	A1	2F
0	30	29	A2	29	30
1	31	21	A7	A8	31
2	32	40	B1	00	32
3	33	23	B2	B3	33
4	34	24	B4	B5	34
5	35	25	B6	C5	35
6	36	5E	C6	1E	36
7	37	26	C7	26	37
8	38	2A	C8	2A	38
9	39	28	C9	28	39
:	3B	3A	CA	CB	CC
=	3D	2B	CD	CE	3D
[	5B	7B	CF	D0	D1
\	5C	60	F7	1C	5C
]	5D	7D	F8	1D	5D
A	61	41	01	01	41
B	62	42	02	02	42
C	63	43	03	03	43
D	64	44	04	04	44
E	65	45	05	05	45
F	66	46	06	06	46
G	67	47	07	07	47
H	68	48	08	08	48
I	69	49	09	09	49
J	6A	4A	0A	0A	4A
K	6B	4B	0B	0B	4B
L	6C	4C	0C	0C	4C
M	6D	4D	F9	FA	FB
N	6E	4E	0E	0E	4E
O	6F	4F	0F	0F	4F
P	70	50	10	10	50
Q	71	51	11	11	51
R	72	52	12	12	52
S	73	53	13	13	53
T	74	54	14	14	54
U	75	55	15	15	55
V	76	56	16	16	56
W	77	57	17	17	57
X	78	58	18	18	58
Y	79	59	19	19	59
Z	7A	5A	1A	1A	5A
	7C	7E	FC	FD	7C
RUBOUT (DEL)	7F	7F	7F	7F	7F
PRINT	E9	E5	E9	E5	E9

**Table 2-10**  
**FUNCTION KEY CODES**  
**(for PRISM and TestLab keyboards)**

Key Label		Unshifted	Shifted	Control	Control-Shift
PRISM	TestLab				
F8	F8	90	F6	90	F6
F7	F7	91	F5	91	F5
F6	F6	92	F4	92	F4
F5	F5	93	F3	93	F3
F4	F4	94	F2	94	F2
F3	F3	95	F1	95	F1
F2	F2	96	F0	96	F0
F1	F1	97	EF	97	EF
SELECT (KNOB)	SELECT (KNOB)	EE	ED	EE	ED
START/STOP	STOP	EC	E8	EC	E8
AUTO	SINGLE	EB	E7	EB	E7
CONT	ROLL	EA	E6	EA	E6
PRINT SCREEN	PRINT SCREEN	E9	E5	E9	E5
NEXT	NEXT	C4	BD	C4	BD
PREV	PREV	C3	BC	C3	BC
HOME	HOME	C2	BB	C2	BB
UP-ARROW	UP-ARROW	C1	BA	C1	BA
DOWN-ARROW	DOWN-ARROW	C0	B9	C0	B9
LEFT-ARROW	LEFT-ARROW	BF	B8	BF	B8
RIGHT-ARROW	RIGHT ARROW	BE	B7	BE	B7
SETUP	SETUP	B0	AC	B0	AC
DSPL	DISPLAY	AF	AB	AF	AB
EDIT	CONFIG	AE	AA	AE	AA
UTIL	UTILITY	AD	A9	AD	A9
UP	UP	A6	A4	A6	A4
DOWN	DOWN	A5	A3	A5	A3

**Specification**

**Table 2-11  
KEYPAD KEY CODES (HEX)  
(for PRISM and TestLab keyboards)**

Key Label		Unshifted	Shifted	Control	Control-Shift
PRISM	TestLab				
0	0	80	D3	80	D3
1	1	81	D4	81	D4
2	2	82	D5	82	D5
3	3	83	D6	83	D6
4	4	84	D7	84	D7
5	5	85	D8	85	D8
6	6	86	D9	86	D9
7	7	87	DA	87	DA
8	8	88	DB	88	DB
9	9	89	DC	89	DC
A	m	8A	DD	8A	DD
B	μ	8B	DE	8B	DE
C	n	8C	DF	8C	DF
D	HELP	8D	E0	8D	E0
E	AUTOSET	8E	E1	8E	E1
F	HOME MENU	8F	E2	8F	E2
X	X	E3	E4	E3	E4
HELP NOTES	.	EE	ED	EE	ED

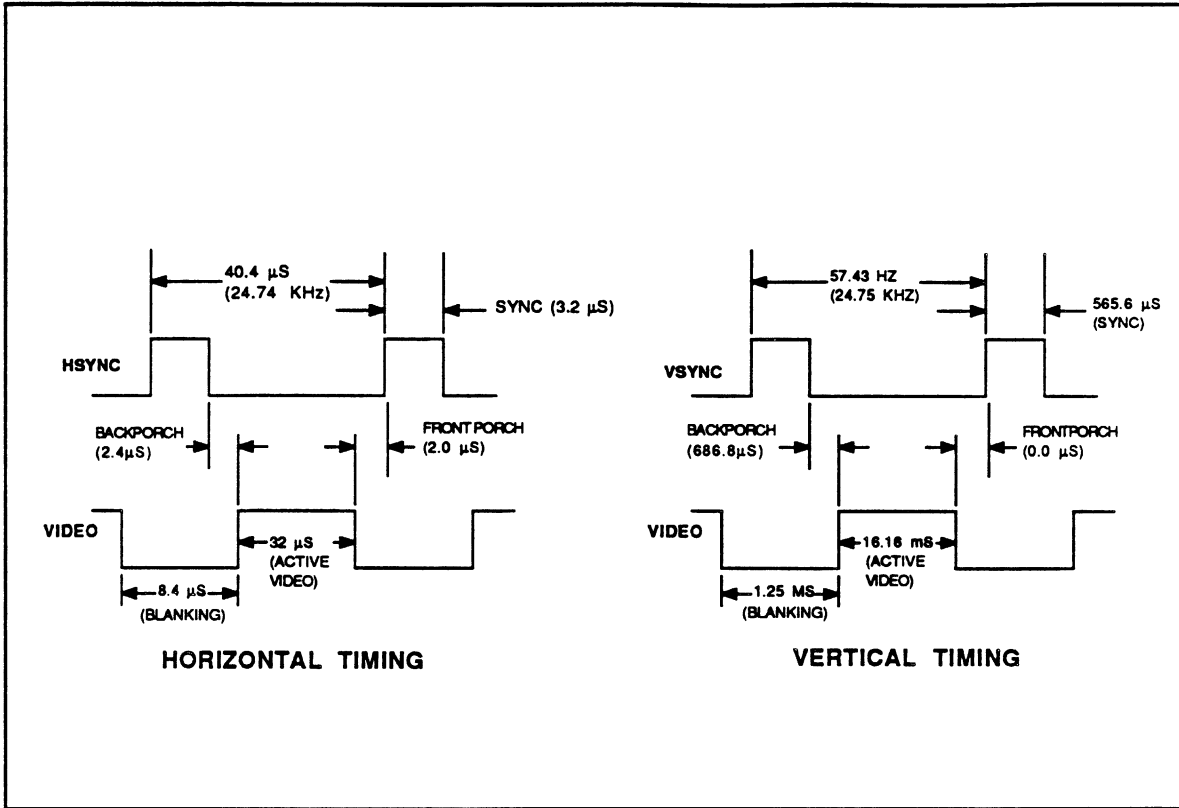
**Table 2-12  
HARD DISK FUNCTIONAL SPECIFICATIONS**

Characteristic	Description
Description	Half-height, random access, 95 mm, rigid media disk drive using Winchester <sup>®</sup> technology.
Transfer Rate	5.0 Megabits/second
Power Requirements	
+12 V Input	+12 V ±5%
+5 V Input	+5 V ±5%

**Table 2-13**  
**COLOR DISPLAY MONITOR FUNCTIONAL SPECIFICATIONS**

<b>Characteristic</b>	<b>Description</b>
Video Input	See Figure 2-5
Input Voltage	0.0 to 3.8 V
Input Coupling	Input must be AC coupled and clamped on back porch
Input Connector	9-pin D Subminiature connector
Sync Input	0.0 to 3.8 V with sync pulse positive true
Horizontal Timing	
th (Total time)	40.40 ms
tha (Active time)	32 micros
thbl (Blanking time)	8.4 ms
thfb (Front Porch)	2.8 micros
thsw (Sync width)	3.2 micros
thbp (Back Porch)	2.4 micros
Vertical Timing	
tv (Total time)	17.415 ms
tva (Active time)	16.16 ms
tvbl (Blanking time)	1.25 ms
tvfb (Front Porch)	0.0 sec.
tvsw (Sync width)	565.6 micros
tvbp (Back Porch)	646.8 micros

**Specification**



**Figure 2-4. Video signal timing.**

**Table 2-14  
FLAT-PANEL DISPLAY FUNCTIONAL SPECIFICATIONS**

Characteristic	Description
Video Input	Refer to Theory of Operation for timing diagram
Active Area	4.8 X 7.68 inches
Pixel Size	0.0087 X 0.0087 inches
Pixel Matrix	640 X 400 pixels
Viewing angle	≥120%
Contrast Ratio	5:1 min.: 15:1 max.
Scan Rate	24,000 lines per second
Brightness	70 cd/sq. meter (typical)
Half-life	50,000 hours
Input Power	+12 VDC ±5%

## Section 3

# CONNECTORS AND CABLING

This section describes the signal interconnections for the various mainframe modules. Use this information to trace signal flow between the various electrical modules. Signal and connector information is provided for the following mainframe modules:

- MPU Board
- Expansion Mainframe Interface Board
- Keyboard
- Color Display Monitor
- Flat Panel Display Monitor
- 3002 Series Mainframe Power Supply
- 2510 Mainframe +12 Vdc Power Supply
- Floppy Disk Drive
- Hard Disk Drive

References are made to the Signal Interconnect Diagrams in the *Diagrams* section as appropriate.

A description of interconnect signals is provided in Section 13, *Glossary*, in the 671-0058-XX MPU Board Service manual.

### MPU BOARD CONNECTORS

Signal connectors for most MPU boards will be as shown in Figure 3-1. This illustration shows the location of each connector with the board viewed component side up. Note that the pin-numbering convention is provided for each connector. Refer to the Signal Interconnect Diagrams in Section 10 for detailed cabling information.

Version 671-0058-00 of the MPU board is part of the 672-1304-00 circuit board assembly. This assembly also contains a 671-0980-00 Video Filter circuit board. This small circuit board is mounted in series with the Video connector (J820) and the MPU board as shown in Figure 3-2A. Figure 3-2B shows that J820 is mounted upside down compared to MPU boards which do not have the Video Filter board.

#### NOTE

*The Video Filter circuit components are incorporated onto the 671-0058-01 MPU board.*

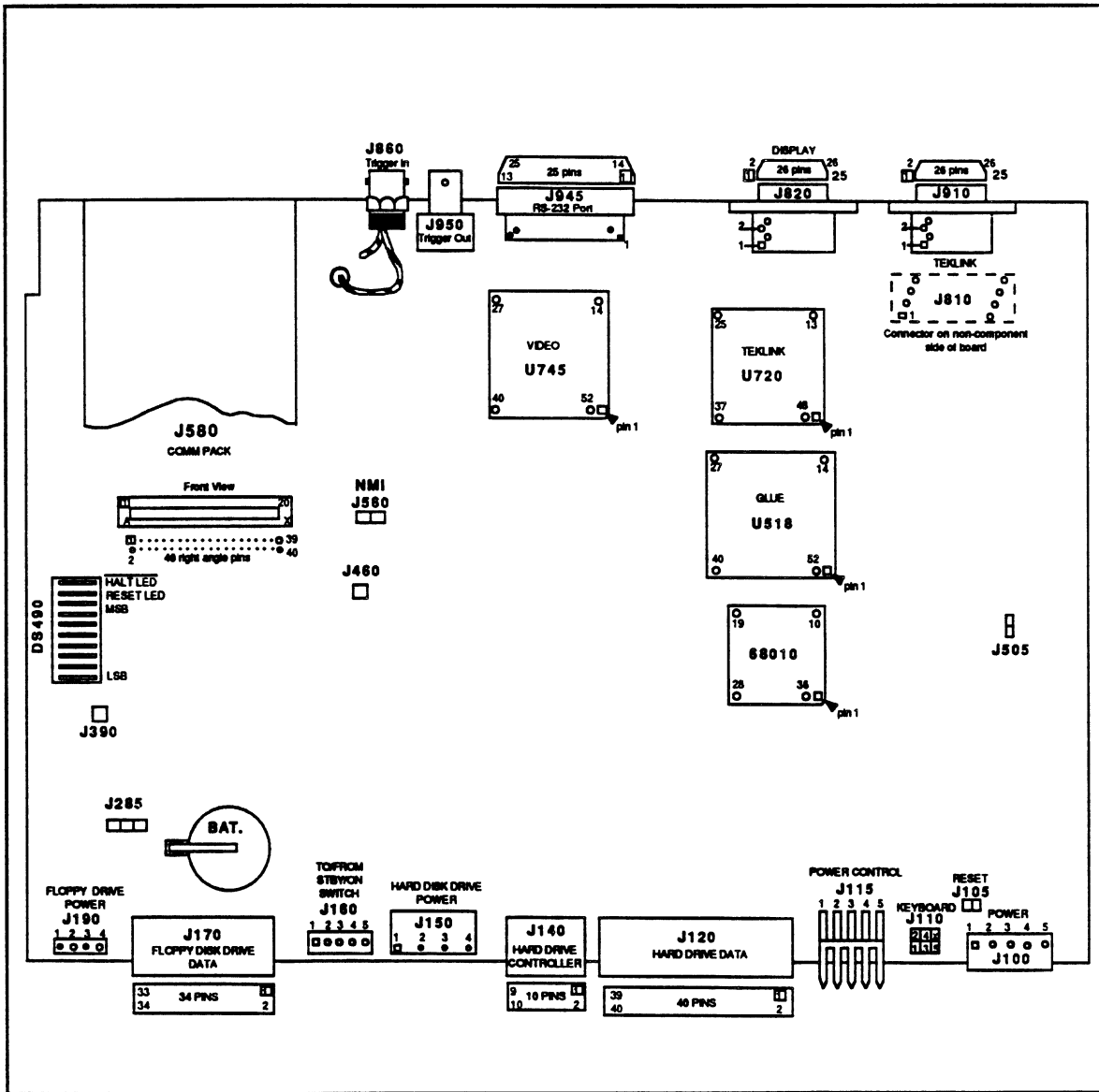
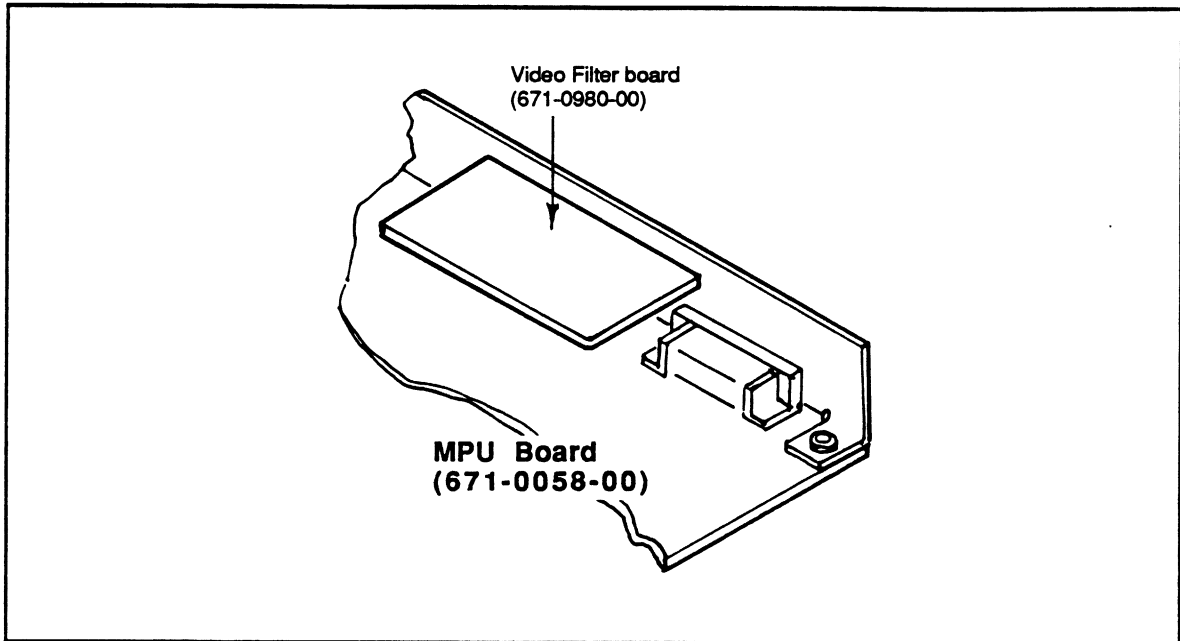
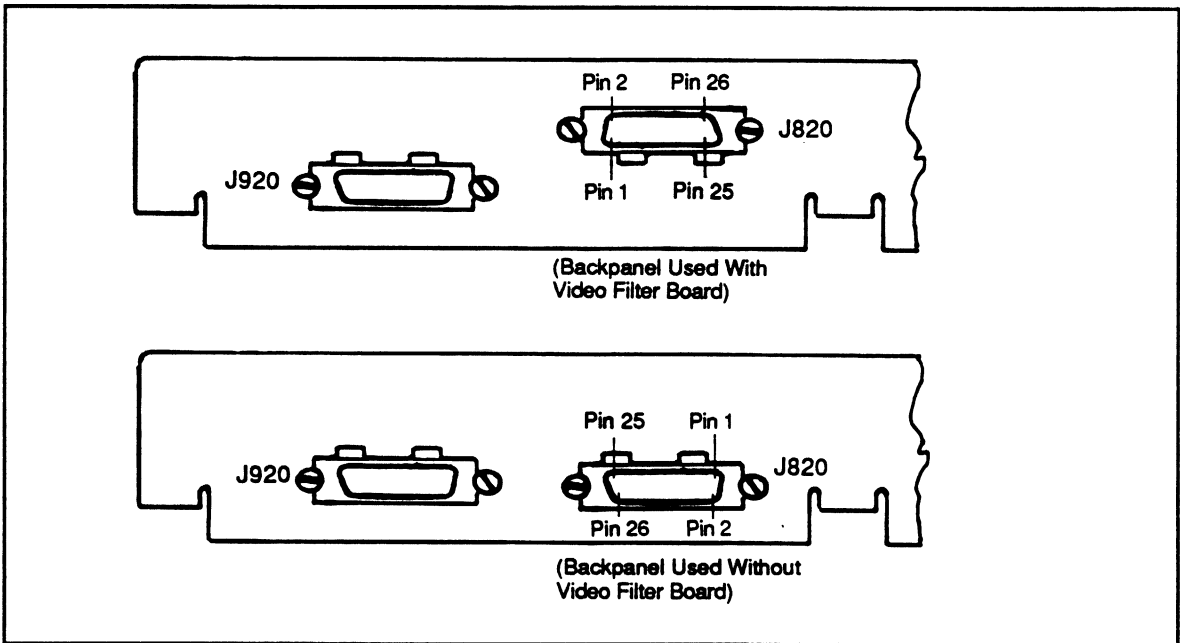


Figure 3-1. MPU connectors and pin keying.





A. 671-0058-00 MPU board with Video Filter board.



B. J820 back-panel mounting with and without Video Filter board. Note that the MPU connector bracket is shown component side up.

Figure 3-2. Video Connector (J820) for MPU boards with and without Video Filter board.

### KEYBOARD CABLES AND CONNECTORS

The keyboard cable is soldered to the keyboard and held in place with a strain relief. To replace a keyboard cable, refer to the Keyboard Disassembly/Assembly procedures in Section 6. Refer to the Keyboard Interconnect Diagram in Section 10 for detailed cabling information.

### FLAT PANEL CABLES AND CONNECTORS

Refer to the Keyboard Interconnect Diagram in Section 10 for detailed cabling information. Also, in the flat panel disassembly instructions, in Section 6, is an assembly drawing that shows routing of the flat panel signal cables.

### POWER SUPPLY CABLES AND CONNECTORS

Figures 3-3, 3-4, and 3-5 show the connections for the 119-2498-xx power supply, the 119-3118-xx power supply, and the 650-2210-xx power supply respectively. The connector and pin assignments are shown on the Power Supply Interconnect Diagram in Section 10.

#### 119-2498-xx Power Supply

Figure 3-3 shows the location of each connector on the 119-2498-xx power supply module. The pin-numbering convention is provided for each connector.

The power supply consists of the following connectors:

- **MPU Board Power Connector.** The MPU board receives its power from power supply connector P4.
- **Power Control Connector.** The power supply is controlled by the MPU board's power control circuitry. This circuitry connects to the power supply using P115 on the MPU board and the P1 on the power supply.
- **Acquisition Module Power Connectors.** Acquisition modules receive their power from two identical connectors P2 and P3, one connector for each module.

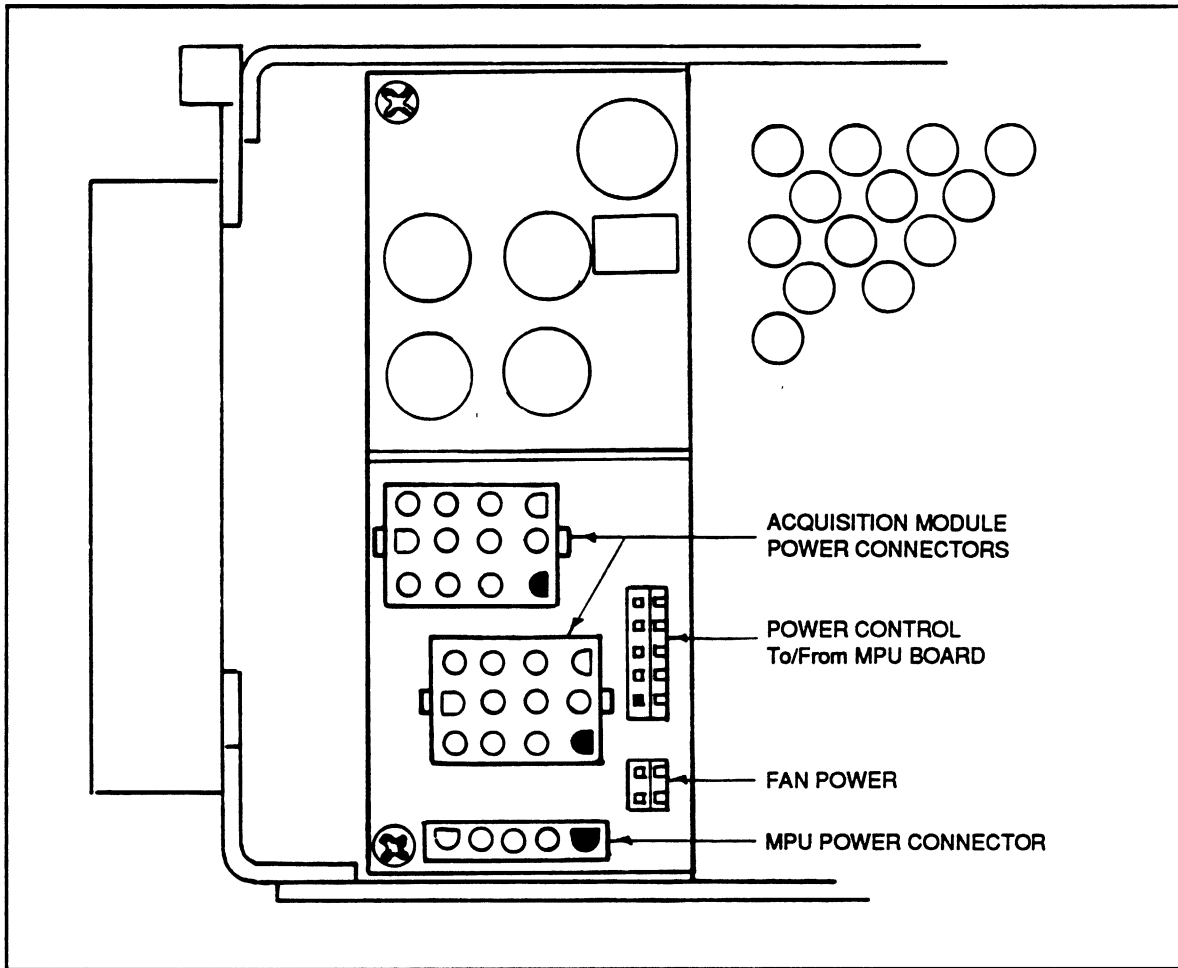


Figure 3-3. 119-2498-xx power supply module connectors.

### 119-3118-xx Power Supply

Figure 3-4 a and b shows the power input and output connectors, respectively, for the 119-3118-xx power supply module. This power supply is used on 2510 Mainframes with serial numbers below B020000.

The power supply consists of the following connectors:

- **MPU Board Power Connector.** The MPU board receives its power from power supply connector P4.
- **Power Control Connector.** The power supply is controlled by the MPU board's power control circuitry. This circuitry connects to the power supply using P115 on the MPU board and the P1 on the power supply.
- **Acquisition Module Power Connectors.** Acquisition modules receive their power from two identical connectors P2 and P3, one connector for each module.
- **DC Power Connector.** The 119-3118-xx Power supply module uses a three-wire dc power cable. One end plugs into the dc power input connector on the rear panel. The other end (as shipped from the factory) consists of three wires that the customer uses to connect the module to the dc power source. These wires are:

GREEN	SAFETY EARTH
RED	+12 Vdc IN
BLACK	DC RETURN

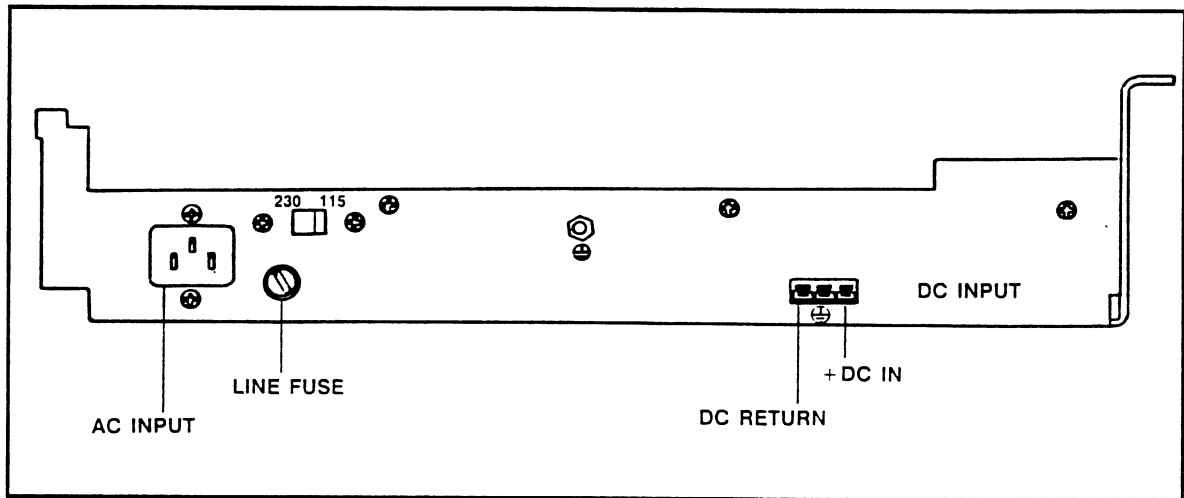
Figure 3-4a shows the connector locations for the dc power source.

### 650-2210-xx Power Supply

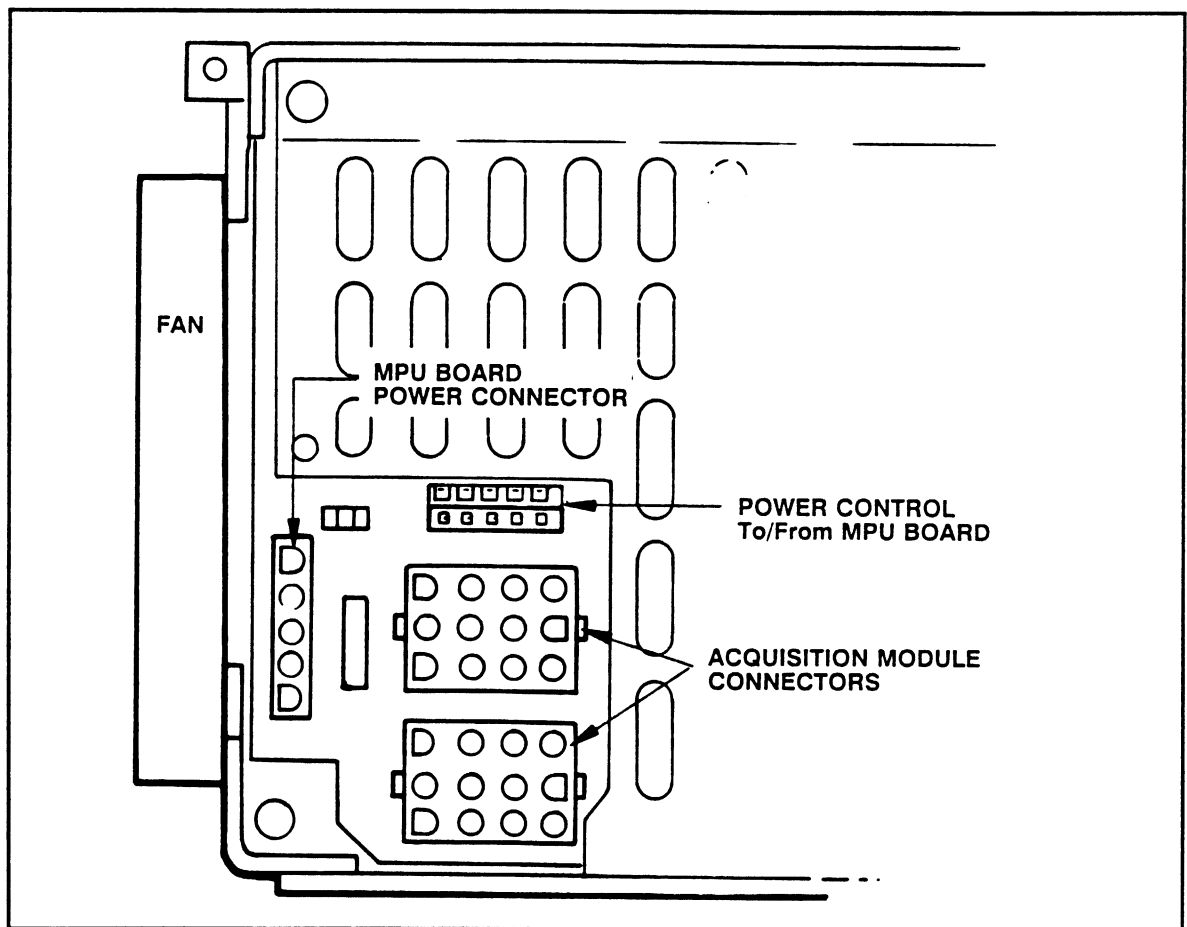
Figure 3-5 a and b shows the power input and output connectors, respectively, for the 650-2210-xx power supply module. This power supply module replaces the 119-3118-xx power supply module on the 2510 mainframes and is used on all 2510 mainframes with serial numbers B020000 and above.

With the exception of the DC Power Connector, the 650-2210-xx power supply uses similar connectors as the 119-3118-xx +12V Power Supply. Refer to Figure 3-5 a and b for the locations of the power supply connectors.

## Connectors and Cabling



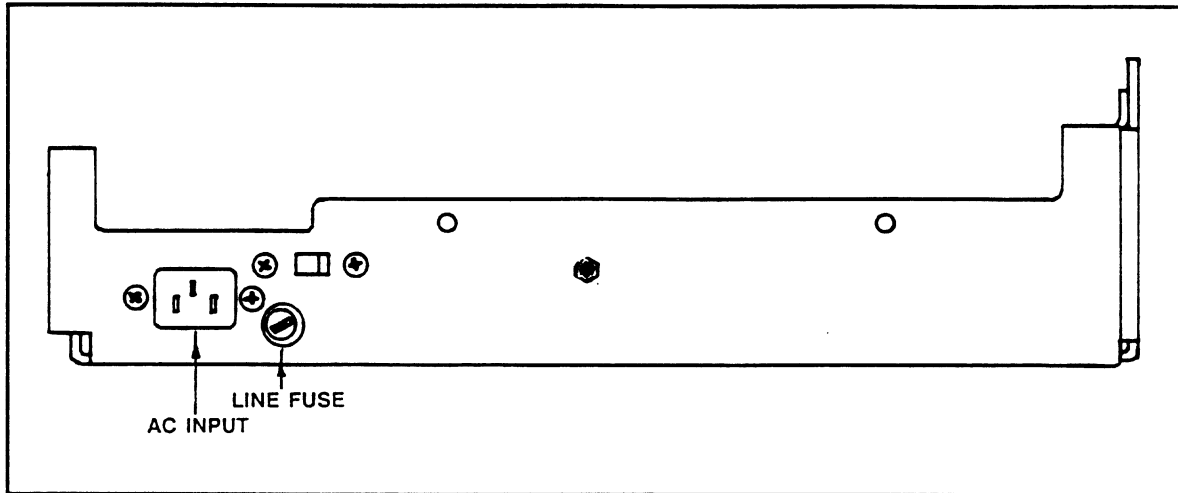
**a. Input Power connectors.**



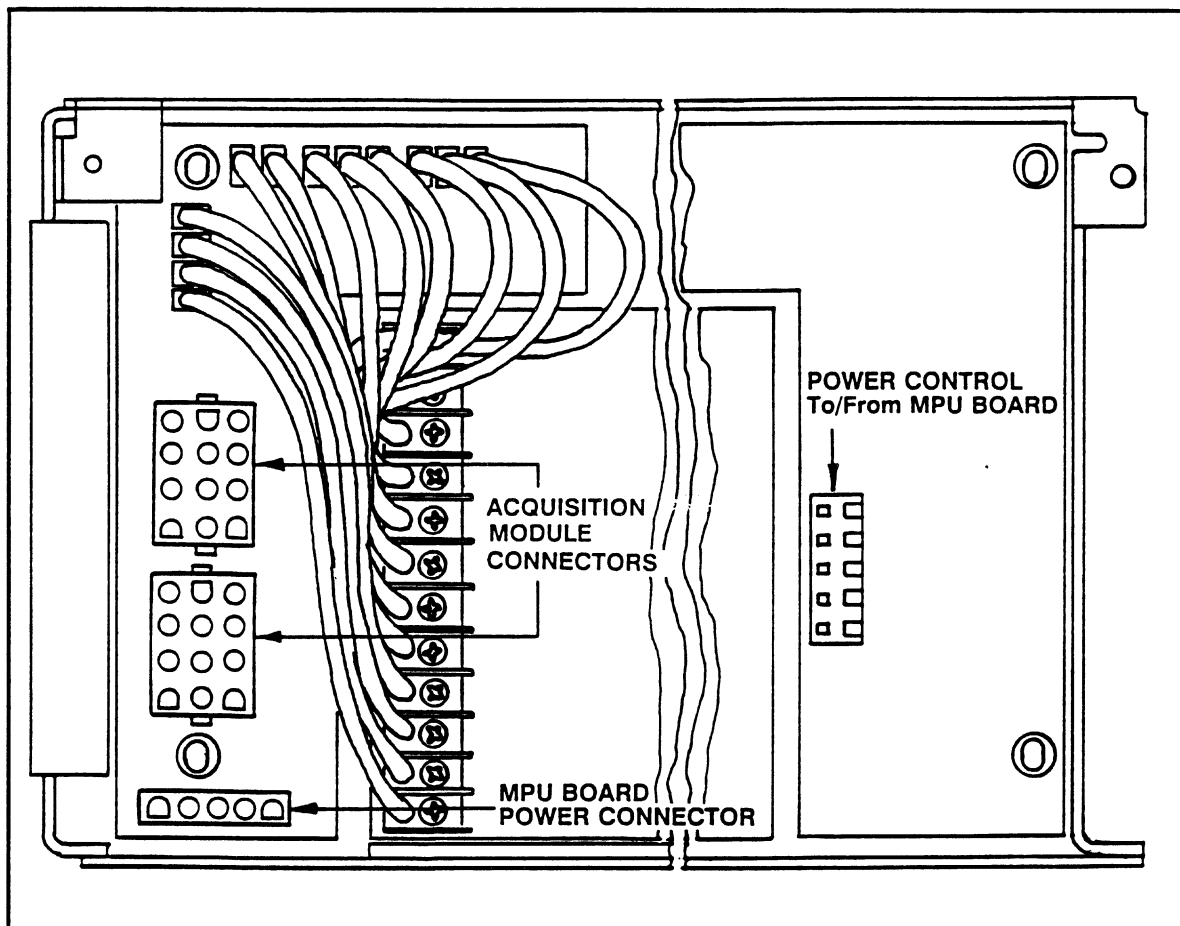
**b. Output Power connectors.**

**Figure 3-4. 119-3118-xx +12 V Power Supply module connectors.**

## Connectors and Cabling



**a. Input Power connectors.**



**b. Output Power connectors.**

**Figure 3-5. 650-2210-xx +12 V Power Supply module connectors.** This module is available on 2510 mainframes with serial numbers B020000 and above.

## **DISK DRIVE CABLES AND CONNECTORS**

The Floppy Drive Interconnect diagram in the Diagrams section shows the interconnect cabling and connector pin assignments for the Floppy Disk Drive.

The Hard Drive Interconnect drawing in the Diagrams section shows the cabling and connector pin assignments for the control and data connectors (P1 and P2) and the cabling connector configuration for the power connector, P3.

## **EXPANSION MAINFRAME INTERFACE BOARD CABLES AND CONNECTORS**

Figure 3-6 shows the location of each connector on the Expansion Mainframe Interface board. Note that the pin-numbering convention is provided for each connector. Refer to the Signal Interconnect Diagrams in Section 10 for detailed cabling information.

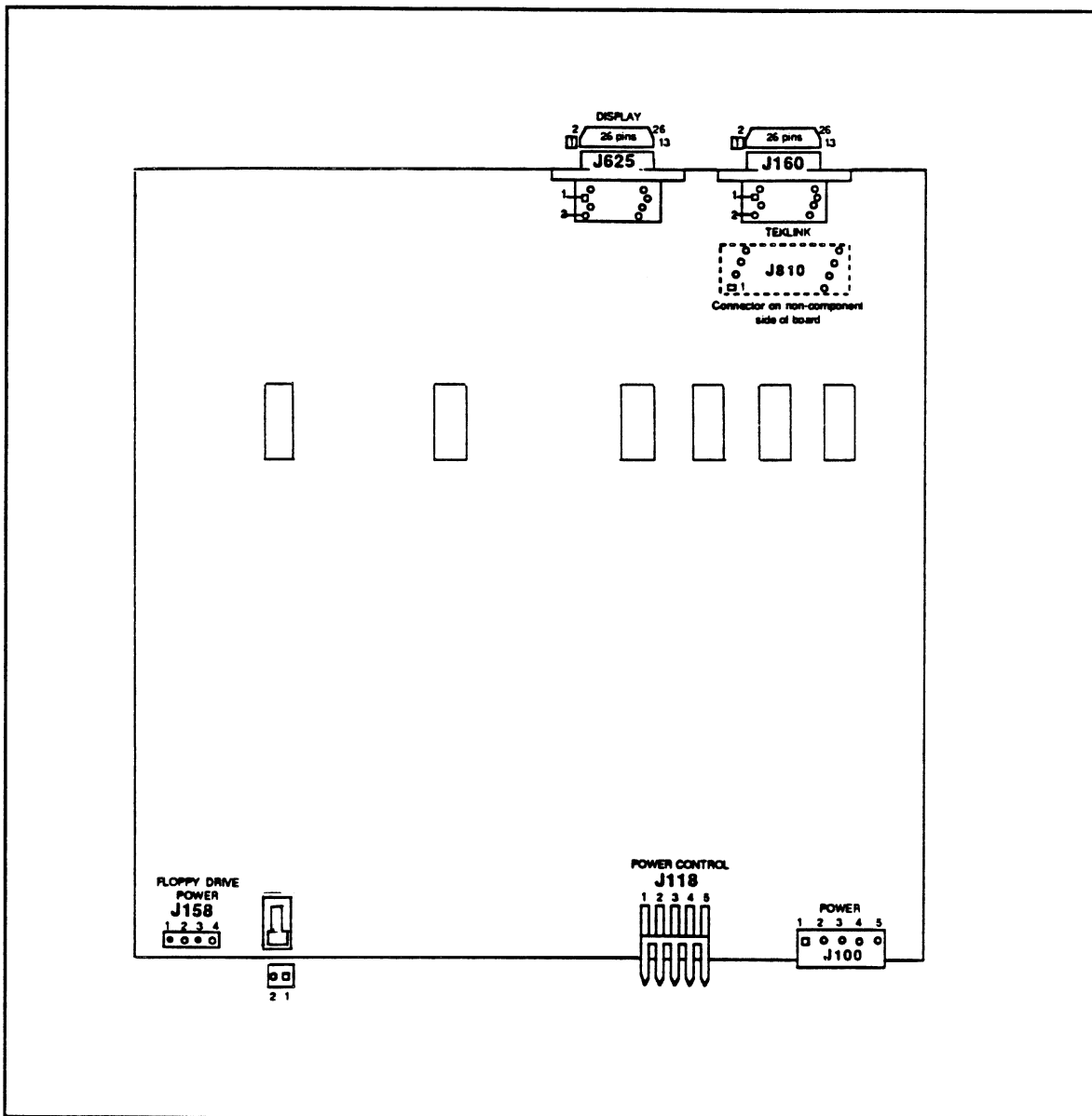


Figure 3-6. Expansion Interface board connectors and pin keying.



## Section 4

# THEORY OF OPERATION

This section describes the electrical operation of the Mainframe. The discussion goes from the general to the specific. These descriptions, together with the troubleshooting/diagnostics section, and appropriate test equipment enable you to isolate a problem to the faulty module.

This section contains the following:

- *Logic Conventions* describe how logic functions are performed and represented in this manual.
- *Mainframe System Overview* describes the major modules that can be associated with a Mainframe.
- *Module Descriptions* provides functional explanations of Mainframe modules.

## LOGIC CONVENTIONS

Digital logic techniques are used to perform logic functions within electrical circuits. The functions and operations of the logic circuits are represented by standard logic symbols and terms. Logic functions are described using the positive logic convention. (Where voltages above the logic threshold voltage are the true, or 1 state, and the voltages below the threshold are the false, or 0 state.)

In logic descriptions, the logic true state voltages are referred to as high; whereas, the logic false states are referred to as low.

### NOTE

*The specific voltages that constitute a high or low state vary between different families of electronic devices (e.g., ECL, CMOS, and TTL logic).*

Active-low signals are indicated by either an (L), a slash (/), or a tilde (~) following or preceding the signal name. Signal names without indicators are considered to be either active-high or to have both active-high and active-low states.

## **MAINFRAME SYSTEM OVERVIEW**

Figure 1-1 shows the various electrical modules that can be associated with a Mainframe.

### ***NOTE***

*Specific information regarding the MPU board and Acquisition modules is explained in separate service manuals.*

## **MODULE DESCRIPTIONS**

The remainder of this section provides functional descriptions for the Mainframe modules. Mainframe modules are described in the following order:

- Keyboard Module
- Color Display Monitor
- Flat-Panel Display
- Power Supplies
- Floppy Disk Drive
- Hard Disk Controller Board
- Hard Disk Drive
- Expansion Mainframe Interface Board

## **KEYBOARD MODULE**

The detachable keyboard includes a standard QWERTY typing keyset, special keys, and a control knob.

The names of several keyboard keys are different for the 119-2401-xx and 119-3515-xx keyboards. (The 119-2401-xx keyboard is used with the PRISM 3002C, P, and 3001 Mainframes. The 119-3515-xx keyboard is used with the 2510 TestLab Mainframes.) Though some keycap names are different, the keycodes are identical for both keyboards.

The keyboard is connected to the Mainframe by a shielded five-wire, coiled cable with a 6-pin, 2 x 3 Dupont Latch-n-Lock connector. Power to run the keyboard is distributed by the MPU board through the keyboard connector. The keyboard Interface is designed so that the keyboard may be connected or disconnected from the Mainframe while power is applied without damage to either the keyboard or to the MPU board.

The keyboard contains a power-on detection reset circuit.

In some troubleshooting cases, it may not be obvious if the keyboard or if the MPU keyboard interface circuits are at fault. Information about the keyboard interface circuitry is provided in Section 4 of the *MPU Board Service* manual.

As a further aid to keyboard/MPU troubleshooting, the following subjects are described:

- Keyboard Communications
  - Keyboard to Mainframe Communications
  - Mainframe to Keyboard Communications
- Keycode Charts

## Keyboard Communications

The keyboard communicates with the MPU board using TTL components and a UART. (Refer to Section 4 in the *MPU Board Service* manual for a detailed description of the keyboard interface circuitry.)

Communication with the MPU board is bi-directional. The sustained transfer rate is 19,200 baud. (The keyboard generates a clock frequency of 19.2 kHz +/- 3.0%.) The keyboard is able to accept reprogramming of its programmable parameters (such as click rate, period, and operating mode) at any time.

The following is a brief description of communications to and from the MPU board.

### Keyboard to MPU Board

The serial data protocol is 19,200 baud, synchronous, with a sequence of one start bit, eight data bits, one stop bit and no parity.

The keyboard sends the following information to the MPU board:

- Standard ASCII key codes for the QWERTY keyboard, function keys, hex key pad and dedicated function keys. If a key remains depressed more than 0.5 second, the QWERTY, hex key pad and cursor movement keys repeat at a rate of 10 characters per second, as long as the key remains pressed.
- A special notification byte to the MPU board indicating that the keyboard mode is changing. This occurs whenever the user changes from using keys to using the knob, or vice versa. Valid values for keyboard codes and knob values range from 0 to 250 to allow for command bytes.
- The knob value is returned as an 8-bit number. Bit 7 identifies the direction the knob is rotated. If bit 7 is set to one (logic high), then the knob is being rotated counterclockwise. Bit 7 set to zero (logic low), then direction of rotation is clockwise.

## Theory of Operation

### MPU Board to Keyboard

The data protocol is 19,200 baud synchronous with one start bit, eight data bits, one stop bit, and no parity.

The MPU board sends the following information to the keyboard (this information is reprogrammable depending on the user interface):

- **A click rate.** The click rate is a programmable parameter that the MPU board sends to the keyboard. A click rate is the number of degrees the knob is rotated before the keyboard signals the MPU board that the knob has been turned. The click rate is the number of basic resolutions (tics) that make up each click. There are at least 100 tics (equal arcs) provided for one knob revolution.

#### *NOTE*

*The size of a tic is a hardware constant and is not programmable.*

- **Period.** The time period over which clicks are accumulated is a programmable parameter. The keyboard accumulates clicks over a period of time, then transmits the knob value to the MPU. The period of time can range from 8 ms to 40 ms, in 1 ms increments.
- **Mode Change.** The MPU sends a command to the keyboard to force it into normal keyboard mode, as opposed to knob mode.

### Keycode Charts

The QWERTY keyboard uses ASCII/North American Keyboard key codes as listed in Table 2-9. The function keys and hex keys use hex key codes as shown in Tables 2-10 and 2-11, respectively.

## COLOR DISPLAY MONITOR

Information in this manual supports servicing the monitor to the module level only. If the display monitor malfunctions, it must be returned (with power cord) to the factory for servicing.

### **WARNING**

*Serious shock hazards exist within the Color Monitor. Do not open the covers under any circumstances. There are no user- or field-serviceable components inside.*

Refer all servicing to qualified service personnel. Unplug the monitor from the power outlet immediately and notify the service technician if the following occurs:

- Liquid has been spilled into the monitor
- The monitor has been exposed to rain or water
- The monitor has been dropped or the cabinet damaged
- Fuses continue to blow
- The power cord is frayed or damaged
- A distinct change from normal operation is apparent

## Monitor Interconnect Diagram

Section 10, *Diagrams*, contains a Color CRT to Mainframe (MPU) Signal Interconnect diagram. This diagram shows the connector pin assignments for each interconnect signal.

## Monitor Troubleshooting Information

Refer to Section 8, *Troubleshooting*, for additional troubleshooting information. This information can help you determine whether the Color Monitor Module or other Mainframe electrical modules are either causing or contributing to a Display Monitor problem.

Also, refer to the *671-0058-XX MPU Board Service* manual for the following information:

- Section 4, *Theory*, describes the functional operation of the video controller circuitry
- Section 8, *Troubleshooting*, describes diagnostic tests for the video controller and for the color display monitor.

## FLAT-PANEL DISPLAY

The flat-panel display consists of two modules as shown in Figure 4-1. The power converter assembly is made up of two circuit boards that interface the data and control signals from the MPU board to the display panel assembly and provides drive voltages for the display panel. The display panel assembly consists of an electro-luminescent flat-panel display attached to a circuit board.

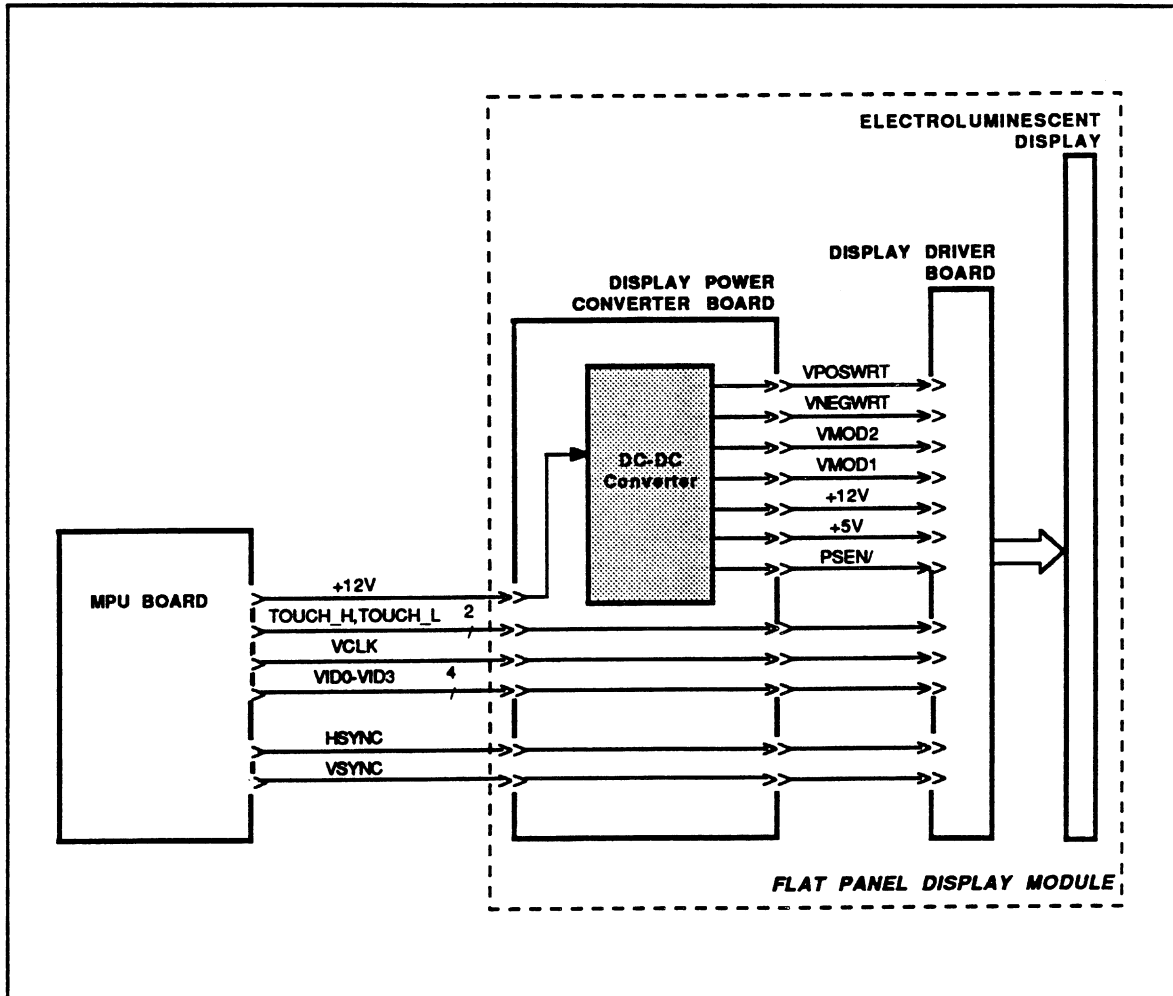


Figure 4-1. Flat-Panel Display block diagram.

The entire flat-panel display module can be removed and replaced as a complete module.

**NOTE**

*This manual does not support troubleshooting and repair of the Display Panel assembly to the component level.*

## Flat-Panel Operational Overview

**NOTE**

*Refer to the Video Controller theory in Section 4 of the MPU board service manual for details on how the sync and video signal lines are generated and controlled.*

### Power Converter

Refer back to Figure 4-1. The power converter receives video signals, control signals, and power from the MPU board via connector J820.

The power converter receives seven signals from the MPU's display controller, buffers them, and outputs them to the display panel.

The video input line, VID0, contains pixel information. Each line provides the pixel information for every fourth pixel on a display line (See Figure 4-2). For example, VID0 has serial data for pixels 1, 5, 9, 13, etc. Input lines VID1, VID2, and VID3 are as described except they start with pixels 2, 3, and 4, respectively.

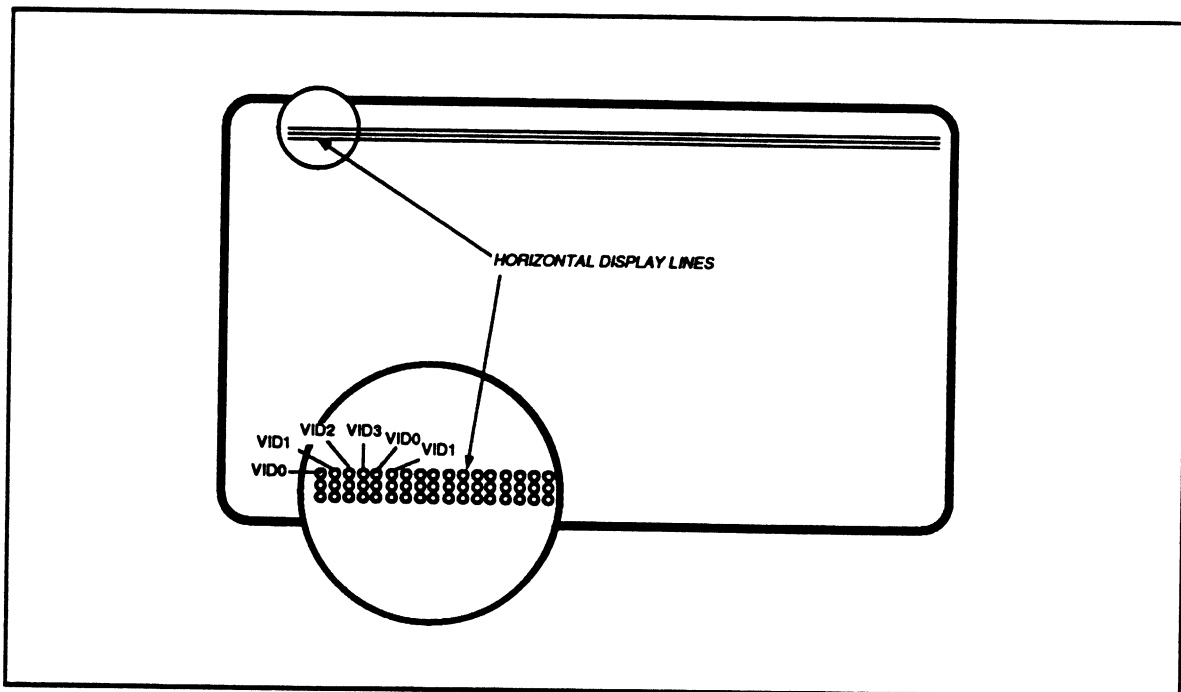


Figure 4-2. Relationship of VID0 - VID3 signals to pixel position.

## **Theory of Operation**

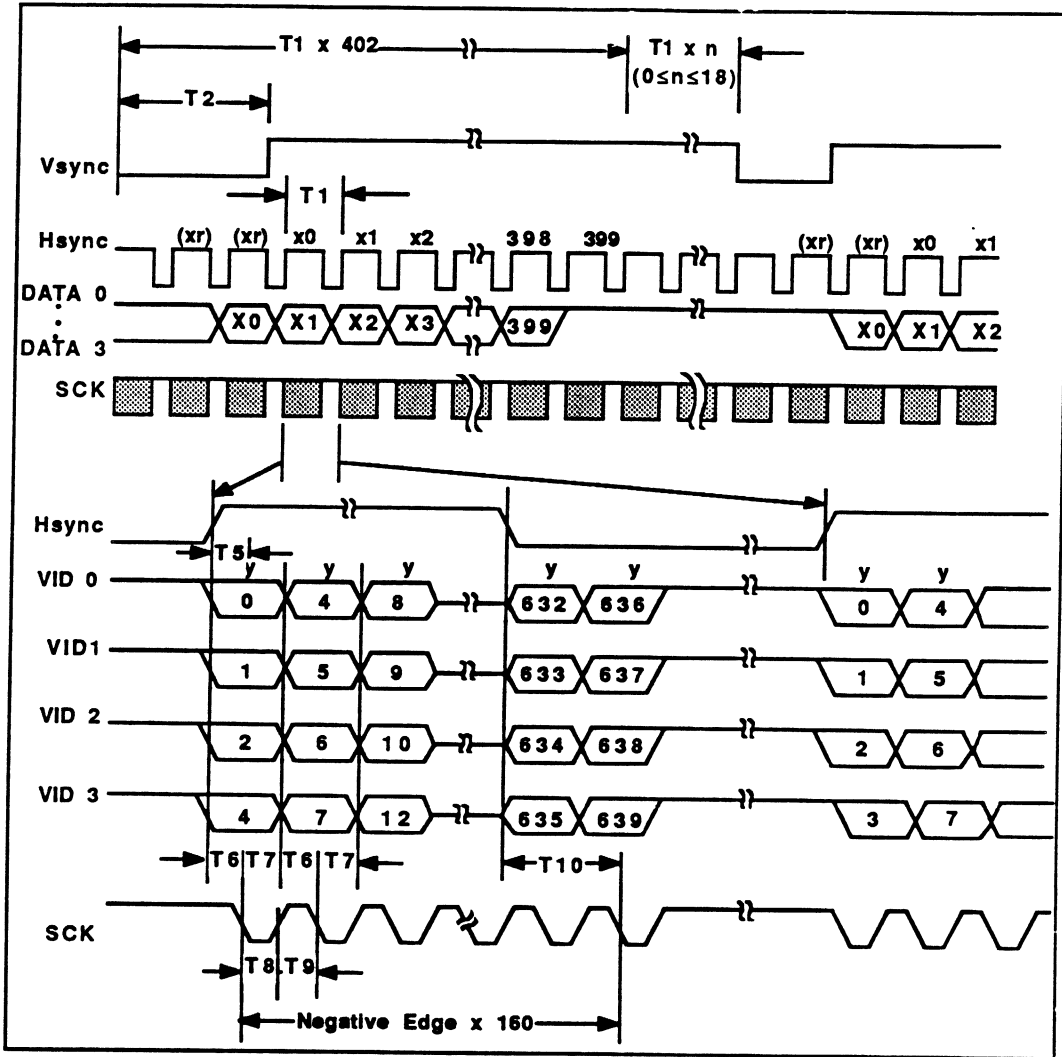
The clock line, VCLK, latches the data on the four video lines into the display panel. See Fig. 4-3.

The rising edge of HSYNC marks the beginning of video data for each line of the display.

The rising edge of VSYNC marks the beginning of video data for the top line of the display.

VIDPOL, from the power converter to the display panel, selects the polarity of the video. When VIDPOL is high, the video is non-inverted; that is, a logic "one" (or high) applied to a video input results in a corresponding "LIT" pixel on the display panel. Conversely, when VIDPOL is a low, a logic low applied to a video input results in a corresponding "LIT" pixel on the display screen. (If left open, the circuit is pulled high internally, resulting in the non-inverting mode being selected.)





	Min.	Max.	Unit
T1*	39.6	41.7	μs
T2	10	12	μs
T3	40	160	μs
T4	-5	5	μs
T5	-100		ns
T6	20		ns
T7	100		ns
T8	90		ns
T9	90		ns
T10		6.5	μs

\*Refresh Cycle:

$$T1 = 39.6\mu s \longrightarrow \frac{1}{420 \times 39.6 \times 10E-6} = 60 \text{ Hz}$$

$$T1 = 41.7\mu s \longrightarrow \frac{1}{420 \times 41.7 \times 10E-6} = 57 \text{ Hz}$$

Figure 4-3. Flat-Panel video timing.

## POWER SUPPLY (119-2498-XX)

### WARNING

*Line voltage is always present in the power supply even when the STANDBY/ON switch is in STANDBY. Be sure to disconnect the power cord from the rear panel of the Mainframe before servicing the power supply in order to avoid accidental death or injury due to electrical shock.*

### CAUTION

*Do not attempt to operate the instrument from a 230 Vac voltage with the VOLTAGE SELECTOR switch (rear panel) in the 115 Vac position, or vice versa; otherwise, your power supply will be damaged.*

## Power Supply General Description

The power supply (119-2498-xx) is a 275 watt switching power supply that generates 5.0 and +/- 12 Vdc supplies. It has three output connectors that provide power for the MPU board and up to two application modules within a Mainframe module--one power connector for each board. The supply has remote ON/OFF control via control signals from the MPU board.

The MPU board and acquisition modules receive power from the supply as shown in the Power Supply Interconnect drawing in Section 10. The foldback current limit is between 25 A and 30 A at connectors P2 and P3, and between 8 A and 10 A at connector P4. To recover from a current limit condition, you must remove and reconnect the rear panel power cord.

All other Mainframe modules receive power from the supply distributed by the MPU board. Refer to the *MPU board service* manual for module power fuse locations. Refer to the Signal Interconnect diagrams in Section 10 for diagrams that show power distribution.

## +12 V POWER SUPPLY (119-3118-XX)

### **WARNING**

*Line voltage is always present in the power supply even when the STANDBY/ON switch is in STANDBY. Be sure to disconnect the power cord from the rear panel of the Mainframe before servicing the power supply in order to avoid accidental death or injury due to electrical shock.*

### +12 V Power Supply General Description

The 119-3118-xx mainframe Power Supply has output characteristics similar to the 119-2498-xx supply with the exception that output power is 150 watts rather than 275 watts. Power input characteristics are the primary difference between the two supplies. The 119-3118-xx operates from either ac line voltage or +11 to +22 Vdc (+12.5 Vdc nominal).

This supply also has three output connectors that provide power for the MPU board and up to two acquisition modules within a Mainframe module--one power connector for each board. The supply has remote ON/OFF control via control signals from the MPU board.

The MPU board and acquisition modules receive power from the supply as shown in the Power Supply Interconnect drawing in Section 10. The foldback current limit for the +5 V supply is between 22 A and 26 A. To recover from a current limit condition, you must remove the ac and/or dc power cords from the rear panel.

All other Mainframe modules receive power from the supply distributed by the MPU board. Refer to the *671-0058-XX MPU Board Service* manual for module power fuse locations. Refer to the Signal Interconnect diagrams in Section 10 for diagrams that show power distribution.

When connected to both dc and ac power sources, this supply can be used as a continuous power source in the case of ac power failure. The supply pulls proportionately from both. For example, with the dc supply at nominal voltage, the supply pulls equally from both the dc and ac input sources. Upon ac line failure, the supply pulls exclusively from the dc source.

### Cycling Power After an Overvoltage Condition

If an overvoltage/current condition shuts down the supply when operating from a dc source, power cannot be recycled using the STANDBY/ON switch. An overvoltage/current condition when operating from a dc power source causes the supply to "latch up." Under this condition you must press the STANDBY/ON switch to standby position, remove the dc power cable, wait 10-15 seconds, reconnect the power cable, then recycle power using the STANDBY/ON switch.

### Floating Supplies

All + and -12 Vdc supplies for acquisition modules are rated at 1.5 A and are three-terminal, floating supplies.

## POWER SUPPLY (650-2210-XX)

### WARNING

*Line voltage is always present in the power supply even when the STANDBY/ON switch is in STANDBY. Be sure to disconnect the power cord from the rear panel of the Mainframe before servicing the power supply in order to avoid accidental death or injury due to electrical shock.*

### CAUTION

*Do not attempt to operate the instrument from a 230 Vac voltage with the VOLTAGE SELECTOR switch (rear panel) in the 115 Vac position, or vice versa; otherwise, your power supply will be damaged.*

### Power Supply General Description

The 650-2210-xx mainframe Power Supply has output characteristics similar to the 119-2498-xx supply with the exception that output power is 140 watts rather than 275 watts.

This supply also has three output connectors that provide power for the MPU board and up to two acquisition modules within a Mainframe module--one power connector for each board. The supply has remote ON/OFF control via control signals from the MPU board.

The MPU board and acquisition modules receive power from the supply as shown in the Power Supply Interconnect drawing in Section 10. To recover from a current limit condition, you must remove the ac power cord from the rear panel.

All other Mainframe modules receive power from the supply distributed by the MPU board. Refer to the *671-0058-XX MPU Board Service* manual for module power fuse locations. Refer to the Signal Interconnect diagrams in Section 10 for diagrams that show power distribution.

## FLOPPY-DISK UNIT

The Floppy-Disk Drive is a 3.5 inch, floppy-disk drive that has a storage capacity of 1 megabyte unformatted data and 720 kilobytes formatted. It uses diskettes prepared according to ANSI X3B8 draft, double-sided, 135 TPI, and certified up to track 79.

The unit is connected to the MPU board using two cables: a 34-conductor ribbon cable for data input/output, and a 4-conductor ribbon cable for power input.

### Floppy-Disk Unit Read, Write, and Control Timing

Figures 4-4, 4-5, and 4-6 show typical timing characteristics of read, write, and control functions, respectively.

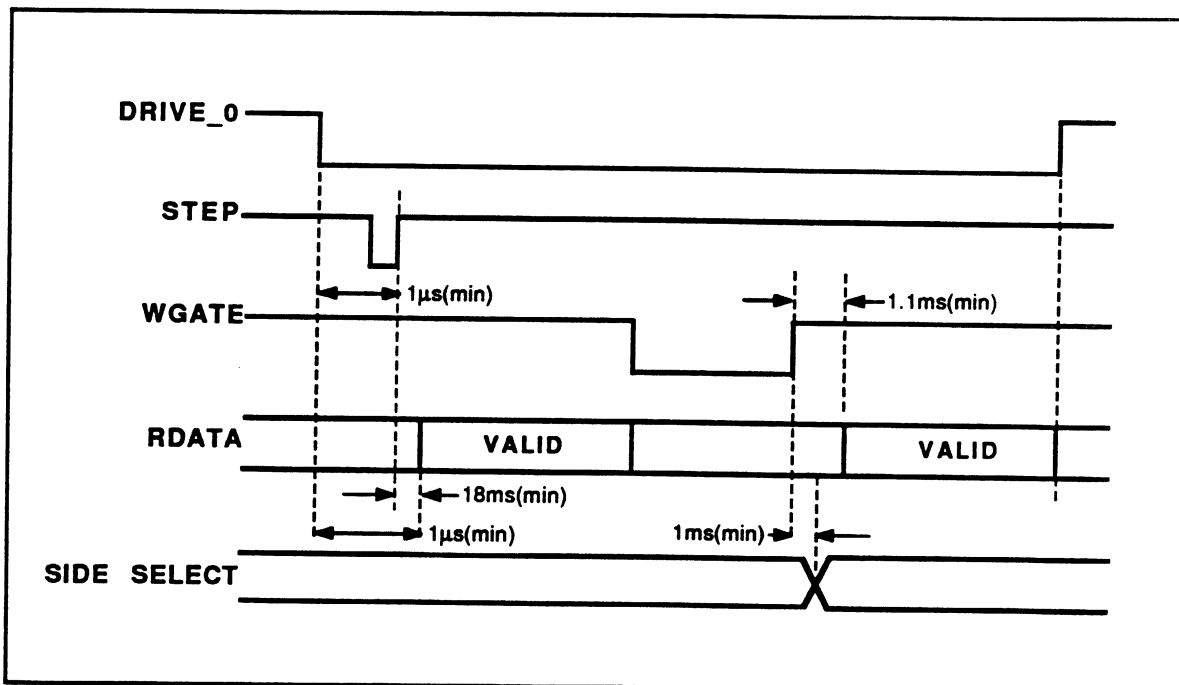


Figure 4-4. Floppy-Disk read timing.

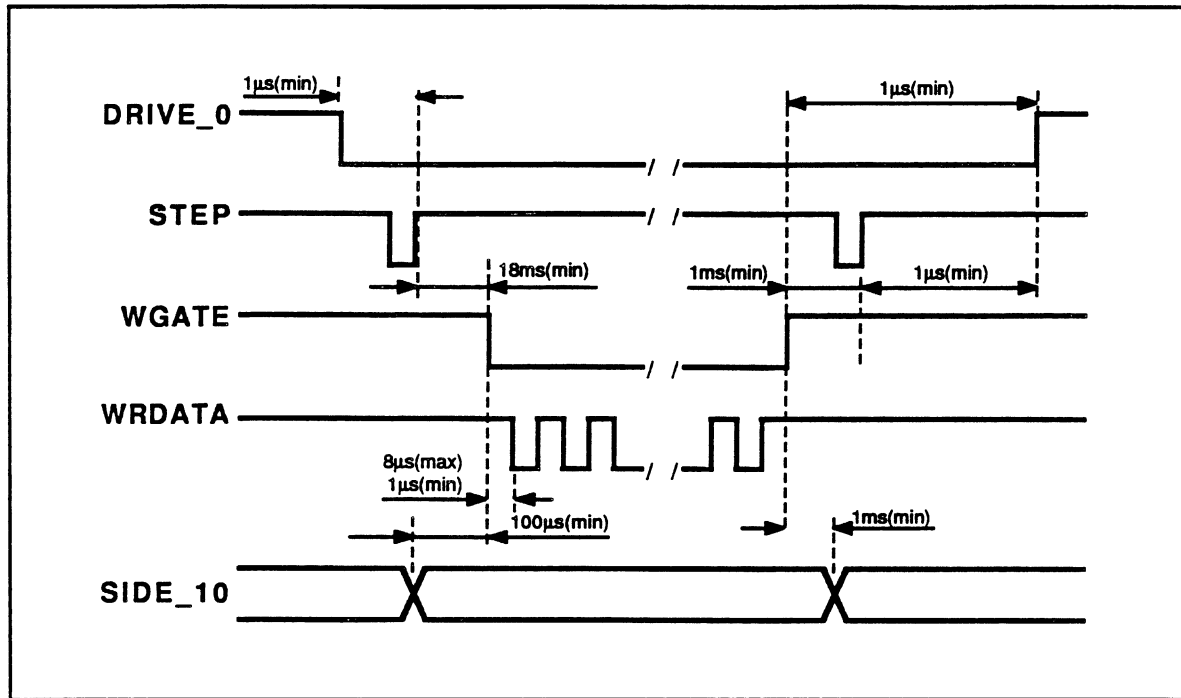


Figure 4-5. Floppy-Disk write timing.

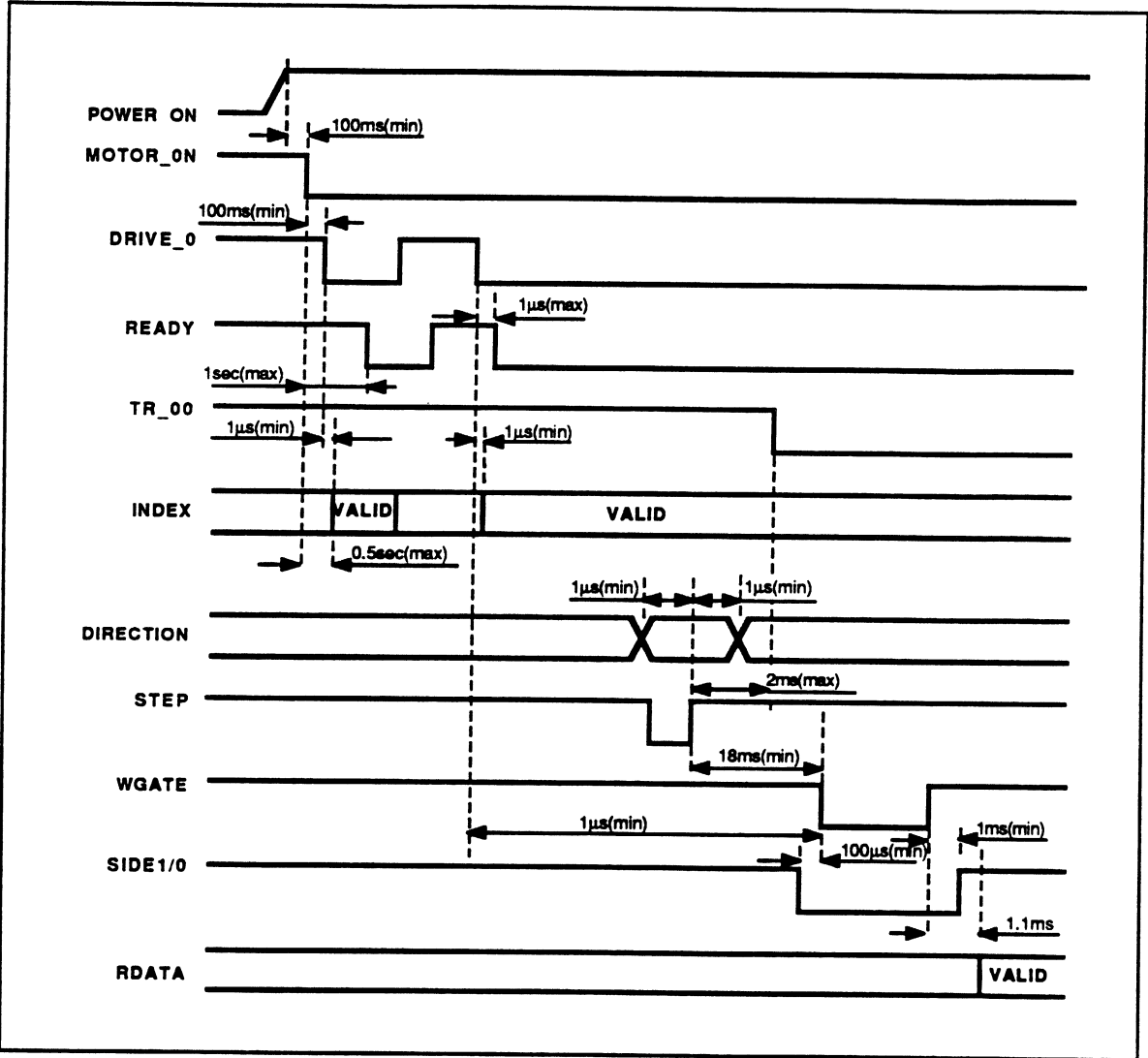


Figure 4-6. Floppy-Disk control signal timing.

## **HARD DISK CONTROLLER (HDC) BOARD**

The Hard Disk Controller manages the transfer of data between the MPU board and the Hard Disk unit. It consists of functional circuitry as shown in Figure 4-7. The three basic functional areas are:

- **WD2010 Hard Disk Controller.** The Western Digital WD2010-05 Hard Disk Controller/Formatter is the central component on the board. It manages data transfer between the Hard Disk Drive and the MPU board.
- **MPU Board Interface.** The MPU side of the WD2010 consists of decode and timing PALS, RAM, and several read/write control circuits.
- **Hard Disk Unit Interface.** The Hard Disk Interface side of the WD2010 includes the write and read control line buffers, a write compensator, and a data (read) separator.

The basic operation of the hard disk controller is as follows:

The Hard Disk Controller is a memory-mapped I/O device that uses the MPU board's buffered data bus, BD [00-15], to read and write data to/from the WD2010 and/or the sector RAM. The sector RAM consists of a static RAM and address counter. Since the WD2010 makes the bus active when accessing the sector RAM, data bus transceivers are used to isolate the MPU during this time.

Whenever the WD2010 is not using the sector RAM, it turns control of the sector RAM and data bus over to the MPU. This causes the decode and timing PALs to de-select the sector RAM and switch the data transceivers.



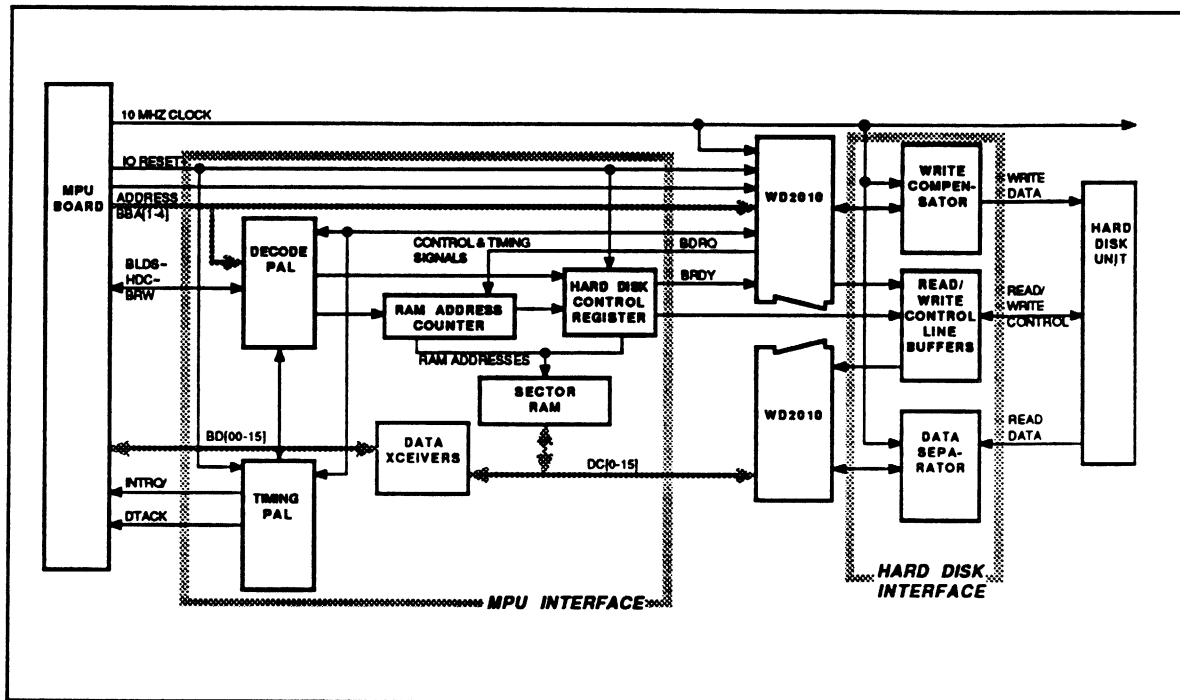


Figure 4-7. Hard Disk Controller basic block diagram.

When the MPU wants to access the sector RAM it sets BBA 1, 2, and 3 to 0 (logic low). The timing PAL then asserts timing and control signals corresponding to the requested read, write, or format command as explained in the following paragraphs.

During write sector commands, the MPU sets up task-related instructions in a "task File" within the WD2010. The MPU then asserts a write sector command and the WD2010 asserts BCR/. This causes control signals from the decode PAL to zero the RAM address counter. The WD2010 then generates a status byte to inform the MPU that it can load the sector RAM with the data to be written.

When the RAM address counter reaches its maximum count, it asserts BRDY, informing the WD2010 that the sector RAM is full. The WD2010 then asserts BCS/ causing the MPU bus to be disconnected from the data transceivers. The WD2010 outputs read or write control signals to allow it access to the sector RAM. When the WD2010 is done using the sector RAM, it removes (deasserts) BCS/, again allowing the MPU to access the DC [0-15] bus.

The read sector command operates in a manner similar to write sector, except that the sector RAM is loaded by the WD2010 instead of the MPU.

## HARD DISK DRIVE UNIT

There are various hard drives, of different sizes and vendors, used in PRISM and TestLab mainframes. Diagnostics may be used to isolate a failed hard drive module. The hard drive can then be replaced as a unit.

## EXPANSION MAINFRAME INTERFACE BOARD

The Expansion Mainframe Interface board occupies the physical space of the MPU Board in an 3002E Expansion Mainframe. Its purpose is to interface acquisition modules in an expansion mainframe to an MPU board in another PRISM 3000 Series mainframe configuration. This Interface board also daisy-chains TekLink signals between expansion mainframes. Up to four expansion mainframes can be connected to an MPU board (using an Expansion Mainframe Interface board in each expansion mainframe and external TekLink cabling).

Figure 1-1 shows the basic configuration of an Expansion Mainframe Interface board in an analyzer system. The TekLink System Interconnect schematic in *Diagrams* section of the *MPU Board Service* manual shows the following:

- TekLink signal interconnects and drive/buffer circuitry on the MPU board
- TekLink signal routing and interconnects on the Expansion Interface board
- TekLink Signal Termination block and signal termination circuitry for several acquisition modules

Circuitry on the Interface board serves two purposes:

1. Provides termination for TekLink Signals.
2. Provides standby/on power control for acquisition modules.

As long as the Expansion Mainframe remains connected to a mains supply voltage, the power supply will be in a "power-up" condition. The STANDBY/ON indicator will not be lit in this condition. The Expansion Mainframe Interface board senses a +5 Vdc line from the host Mainframe. When both the host Mainframe is powered-up and the Expansion Mainframe is connected to a mains voltage, +5 Vdc and  $\pm 12$  Vdc are applied to acquisition modules installed in the Expansion Mainframe. The STANDBY/ON indicator will be lit under these conditions.

Refer to the Tektronix instruction sheet titled *PRISM 3002E Expansion Mainframe* for additional details regarding the Expansion Mainframe Interface board. Refer to the *Diagrams* section of this manual for detailed Interface board circuit schematics.

## Section 5

# VERIFICATION AND ADJUSTMENT PROCEDURES

This section contains three parts: *Functional Check Procedures, Performance Verification Procedures, and Adjustment Procedures*. This information allows a qualified service technician to verify module operation and to perform selected module adjustments.

### NOTE

*In most cases, a Mainframe will contain an MPU board and one or two acquisition modules. The verification procedures in this manual do not provide a detailed verification for these modules. Refer to their respective service manuals for related procedures.*

The following provides a brief definition for each type of procedure:

- **Functional Check Procedure.** These procedures may be used as an incoming inspection to verify that a Mainframe system is functioning properly.
- **Performance Verification Procedures.** These procedures provide a detailed check of the product specifications. Specifications listed in the performance requirements column of Specifications, Section 2, can be verified using these procedures. Under normal circumstances, the Functionality Checks within these Performance Verification Procedures provide an adequate test of product performance. (The actual performance verification procedures may be both time-consuming and costly due to their procedural detail and equipment requirements.)
- **Adjustment Procedures.** These procedures describe how to adjust the selected Mainframe modules to meet module specifications. If the Module cannot be adjusted to meet product specifications, then repair is necessary.

## REQUIRED TEST EQUIPMENT

Table 5-1 shows the test equipment required to perform the procedures listed in this section. Specifications given for the test equipment are the minimum necessary for accurate verification and adjustment of this module. All test equipment must be accurately calibrated and operating within the given specifications. If equipment is substituted, it must meet or exceed the specifications of the recommended equipment. Common hand tools used in these procedures are not listed.

Table 5-1  
REQUIRED TEST EQUIPMENT

Equipment Instrument	Specification	Equivalent
2-Channel oscilloscope with two 1.3 meter probes	350 MHz	Tektronix 2467 or equivalent with two P6106 probes
Digital Multimeter	4 digits 0.1% DC equivalent	Tektronix DM502A or equivalent

## OPERATING A MAINFRAME IN THE SERVICE POSITION

As stated earlier, the MPU board and up to two acquisition modules will usually be installed in a Mainframe. In most cases, you must place these boards in a "servicing position" to perform troubleshooting and servicing functions. You need to observe specific guidelines when operating an MPU board and/or acquisition modules in the service position. Refer to *Physical Placement of Modules for Troubleshooting* in Section 6 for instructions on how to place these modules in a service position.

### WARNING

*After removing the top cover, the cooling fan blades are not completely shielded. Guard against injury by keeping fingers and loose objects away from the moving blades when operating the instrument in the service position.*

### CAUTION

*When operating a mainframe in the service position, the fans do not provide adequate cooling for some installed / connected application module(s). To provide adequate cooling, position another fan to move air across the application module(s).*

## FUNCTIONAL CHECK PROCEDURES

At power-up, both the 3002 Series and 2510 products automatically perform functional checks on compute kernel hardware. For additional functional testing, power down the Mainframe and insert the System Diagnostic Disk.

### NOTE

*The diagnostics from the System Diagnostic Disk mentioned above verify the operation of the MPU board, keyboard, floppy disk drive, and CRT display module. Acquisition modules are not verified during power-up. Refer to applicable acquisition module service manuals for descriptions of related diagnostic tests.*

Refer to the 671-0058-XX MPU Board Service manual for a detailed description of how to verify your system using System Diagnostic Software.

## PERFORMANCE VERIFICATION PROCEDURES

Performance verification procedures check specifications listed in the performance requirements column of the Specifications section. (Items listed in the performance requirements columns are specifications that a Mainframe must meet.) If verification of the listed electrical specifications is required for incoming inspection or other purposes, perform the appropriate procedures outlined in this part of the Verification and Adjustment section.

## DC Voltage Power Supply Checks

The MPU board receives +5 Vdc and  $\pm 12$  Vdc from a power supply module to power its electrical circuitry. Voltage and ripple levels can be checked at test points on the MPU board.

Use a DMM and oscilloscope to check the dc voltages at the MPU board test points shown in Figure 5-1.

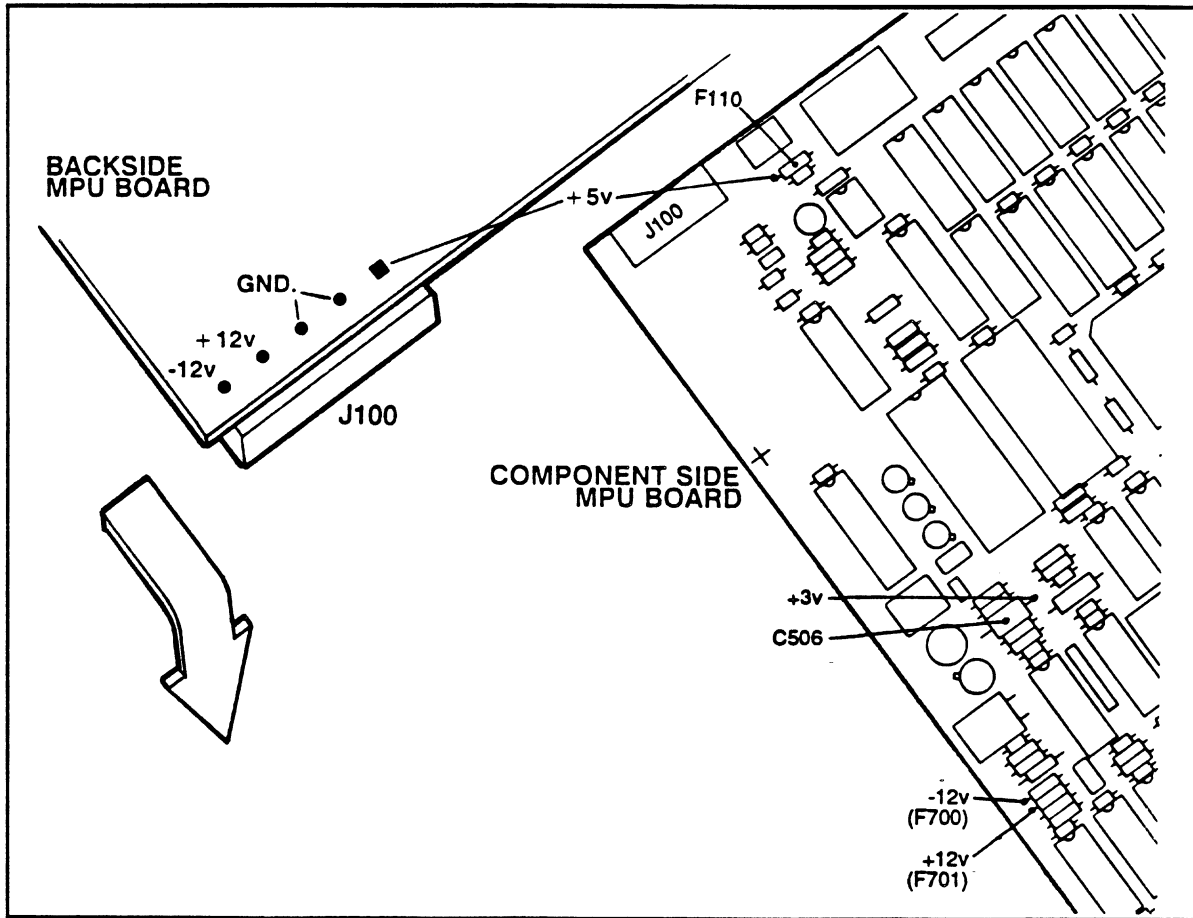


Figure 5-1. Power Supply test points on MPU board.

1. Set the DMM, or oscilloscope CH 1 Vertical Input, to 20 V and verify voltages according to the specifications listed in Table 5-2.

**Table 5-2  
DC VOLTAGE TOLERANCES**

Voltage	Voltage Minimum	Voltage Maximum	Ripple
+5V	+4.725	+5.025	100 mV-pp
+12V	+11.4	+12.6	100 mV-pp
-12V	-12.6	-11.4	100 mV-pp
+3V	+2.6	+3.2	100 mV-pp

2. Check voltage ripple (noise) specification in the following manner:
  - a. Connect a 10X P6106 Probe to the oscilloscope Channel 1 input connector and to the +5 V test point.
  - b. Connect a second 10X probe to the oscilloscope Channel 2 input connector and ground (metal strip down center of MPU board).
  - c. Connect the probe ground clips together.
  - d. Set the oscilloscope controls as follows:
    - Sweep Speed                      5 ms/div
    - Volts                                      0.2 V/div
    - Coupling
      - CH 1                                      ac
      - CH 2                                      ac
    - CH 2
      - Invert                                      ON
    - Add Mode                                      ON
    - Bandwidth Limiter                      ON
    - Triggering
      - Source                                      Line
      - Slope                                      + (plus)
      - Mode                                      Automatic
      - Coupling                                      ac

## Verification and Adjustment Procedures

- e. Check +5 V for an oscilloscope display within the ripple limits listed in Table 5-2.
- f. Repeat step e for the +12 and -12 voltages.
- g. Disconnect the oscilloscope.

## ADJUSTMENT PROCEDURES

Several Mainframe modules contain adjustments. These adjustments are located on the MPU board, Color Monitor, and Flat-Panel Display. The MPU board has its own service manual that describes how to adjust its circuits. Refer to documentation specific to your Color Monitor for information about Color Monitor adjustments.

### Flat-Panel Display Adjustment

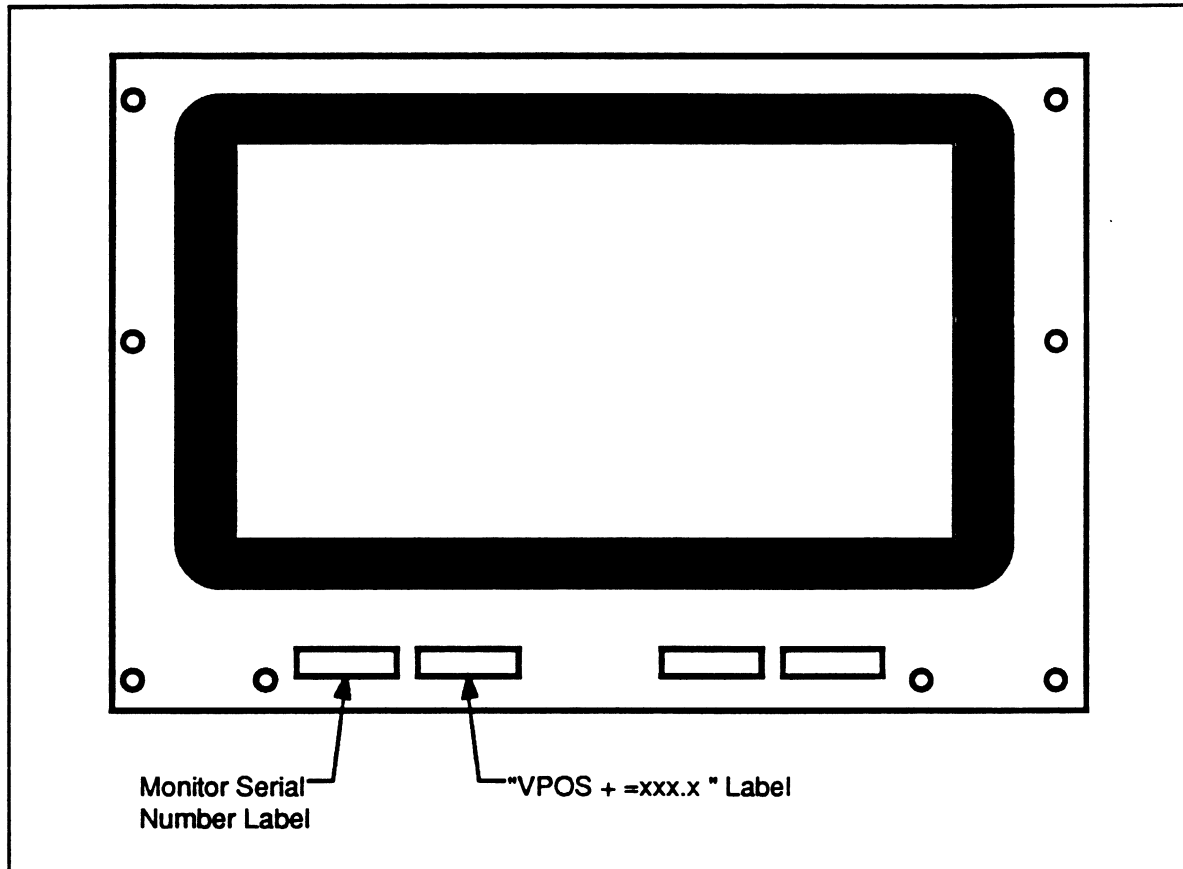
The following instructions describe how to adjust the Flat-Panel Display on the 3002 series mainframes (with serial numbers B010648 and below) and the field installable Flat-Panel Displays (serial numbers B010125 and below). The Flat-Panel Display adjustments are factory-set on the 3002 series mainframes with serial numbers B010649 and above (and 30F01 field installable Flat-Panel Displays serial numbers B010126 and above) and do not require further adjustments; if adjustments are necessary, the display must be returned to Tektronix.

A threshold voltage (VPOS) adjustment on the Power Converter board compensates for small operating variations in the electroluminescent display panels. This adjustment is made at the factory to provide optimal display performance. If either the Electroluminescent Display Panel or the Power Converter board is replaced, the VPOS adjustment must be made. This is not a periodic adjustment and should only be performed as part of the initial installation procedure.

### VPOS Voltage

The voltage to which the VPOS adjustment is to be set, is written on a small white label affixed to the bottom front edge of the Display Panel. See Figure 5-2. (You must disassemble the Display Panel assembly to access the voltage label. Refer to Disassembly/Assembly procedures in Section 6.) Before placing a replacement Display Panel in the front bezel assembly, note the VPOS voltage on the white label affixed to the lower-front edge of the panel. Or, if the Power Module was replaced, remove the Display Panel from the front bezel assembly and note the VPOS voltage. (Refer to Flat-Panel Disassembly/Assembly procedures as needed.)





**Figure 5-2. VPOS voltage.** The Flat-Panel Display adjustment is only applicable for 3002P series mainframes with serial numbers B010648 and below and on the field installable Flat-Panel Displays with serial numbers B010125 and below.

**WARNING**

*High voltages capable of causing serious shock are present during this procedure. Only a qualified service technician should perform this procedure.*

**CAUTION**

*Do not remove or install flat-panel cables with system power on. Doing so may damage the flat-panel circuitry.*

## Verification and Adjustment Procedures

### Adjustment Procedure

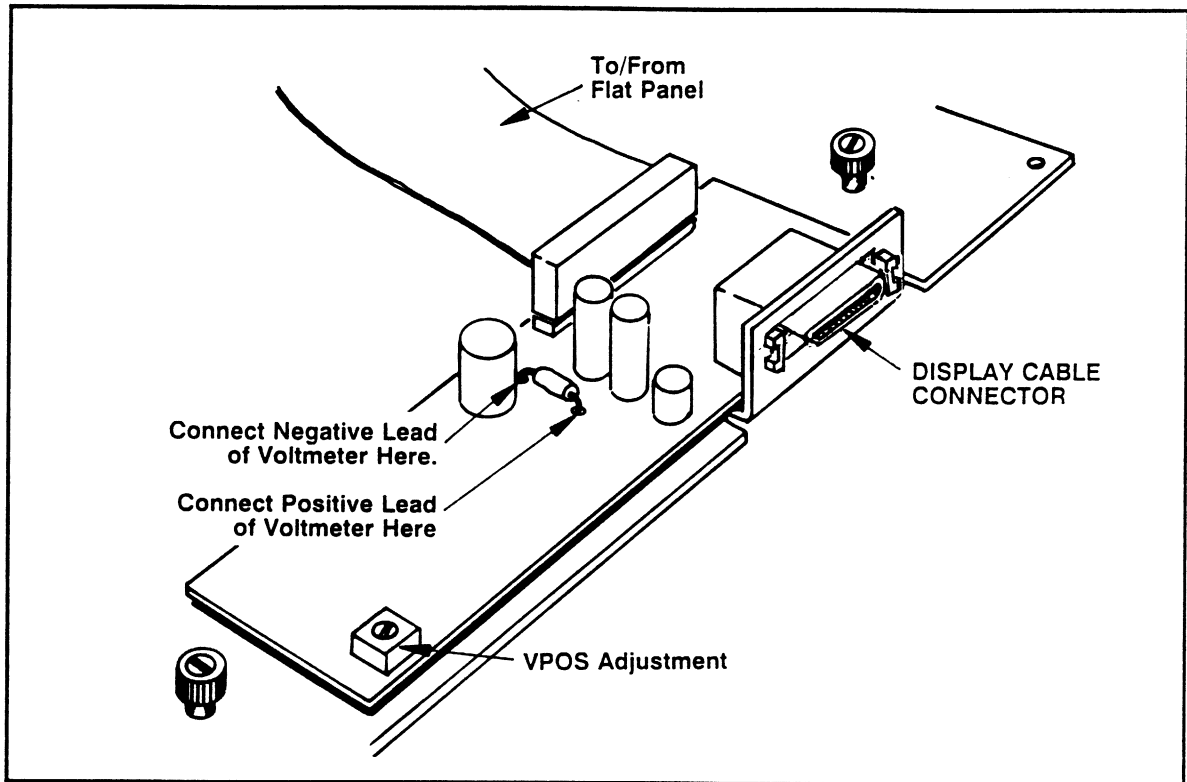
With the Flat Panel's display base disassembled to expose the Power Converter board, proceed as follows:

1. Disconnect the power cord from the Mainframe. If connected to both ac and dc power sources, remove both power cords.
2. Verify that cables are properly connected between the Power Converter and the display connector on the MPU Board, and between the Power Converter and the Display Panel.
3. Set VPOS fully counter clockwise (minimum voltage setting). See Figure 5-3.
4. Connect a DMM (must have 0.2% accuracy or better) to the 240 k $\Omega$ , 1/2 Watt resistor shown in Figure 5-3.
5. Reconnect the power cord(s).
6. Install the System Diagnostic Disk and set STBY/ON switch to ON.
7. Select and run the "all pixels lit" diagnostic test to display a full-on (all pixels lighted) display. (For instructions on how to run the test, refer to the set of display tests entitled *Manual Display Test Area* in Section 9 of the 671-0058-XX MPU Board Service manual.)

**CAUTION**

*Do not adjust the VPOS voltage above the value listed on the label or permanent damage to the display panel may result.*

8. Slowly increase the VPOS adjustment (clockwise) until a reading as noted under VPOS Voltage is obtained. The allowable tolerance is 0.5 V.
9. Turn the power off, eject the System Diagnostic Disk, remove the DMM leads, and reassemble the Flat Panel Module.



**Figure 5-3. VPOS adjustment and test point locations.** The Flat-Panel Display adjustment is only applicable for 3002P series mainframes with serial numbers B010648 and below and on the field installable Flat-Panel Displays with serial numbers B010125 and below.



## Section 6

# DISASSEMBLY/ASSEMBLY

In the following procedures, directional terms (top, bottom, left, right, etc.) are based on the assumption that your instrument is in a normal, upright position and that you are facing the front of the instrument.

Installation or reassembly procedures are the reverse of the disassembly procedures unless otherwise noted. In some cases, installation hints are provided to aid in assembly procedures.

### WARNING

*Dangerous electric-shock hazards inside the mainframe may be exposed when the covers are removed. Be sure the power cord is disconnected before removing the covers. Disassembly procedures should only be attempted by qualified service personnel.*

This section describes the following:

- General disassembly/assembly precautions
- How to remove and install each Mainframe module
- How to disassemble/assemble selected modules to support their respective Field Service Strategy
- How to position the MPU Board and associated acquisition modules for troubleshooting

## GENERAL DISASSEMBLY/ASSEMBLY PRECAUTIONS

### CAUTION

*To avoid electrical shock or damage to the instrument, DO NOT attempt any disassembly or installation procedures if power is ON.*

### CAUTION

*DO NOT operate the instrument with the cabinet removed unless additional instrument cooling is provided. Without proper cooling, components may overheat and fail.*

## MAINFRAME DISASSEMBLY/ASSEMBLY

Disassembly/assembly information consists of a series of illustrations that show you how to remove and install modules associated with the various mainframes. The modules are:

- Acquisition Modules
- Floppy Disk Drive
- Auxiliary Fan
- Hard Disk Controller Board
- Hard Disk Drive
- MPU Board
- Expansion Mainframe Interface Board
- Power Supply
- Keyboard
- Flat-Panel Display

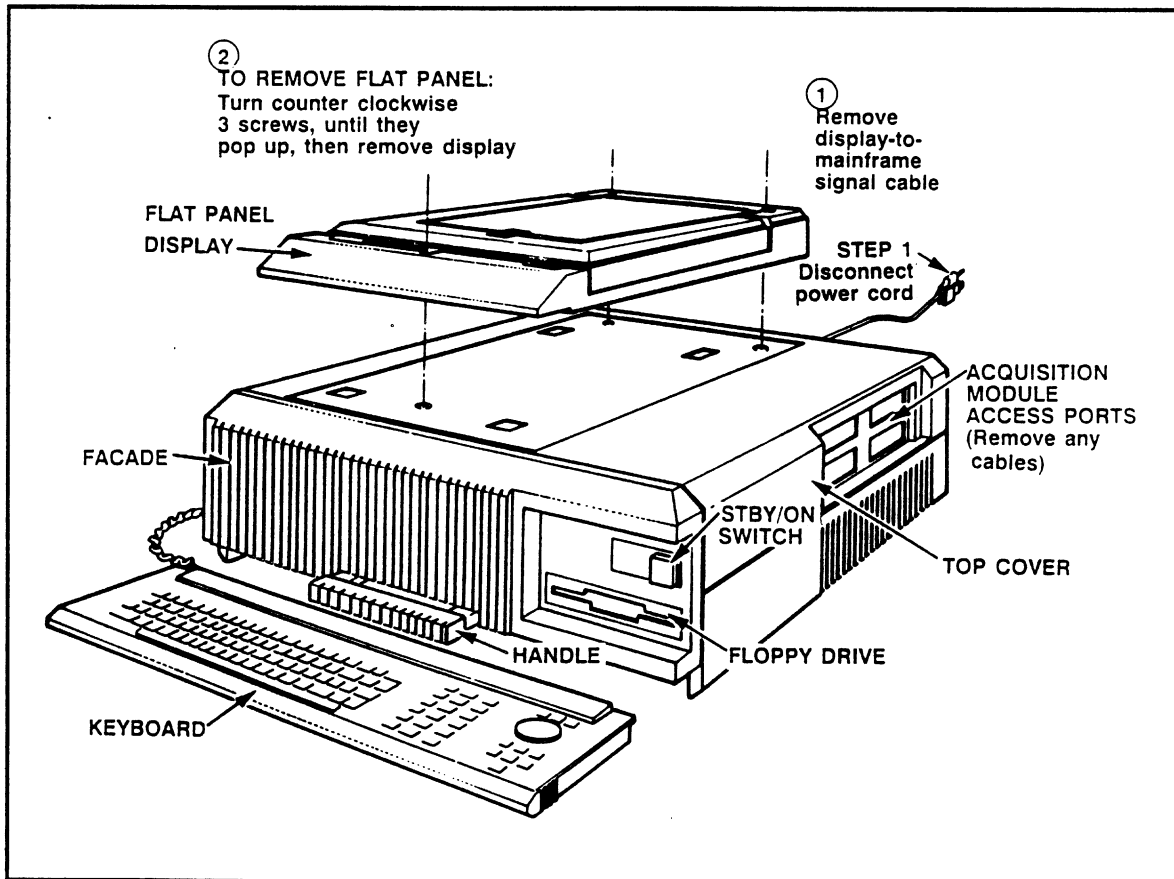


Figure 6-1. Preparing the Mainframe cover for removal.

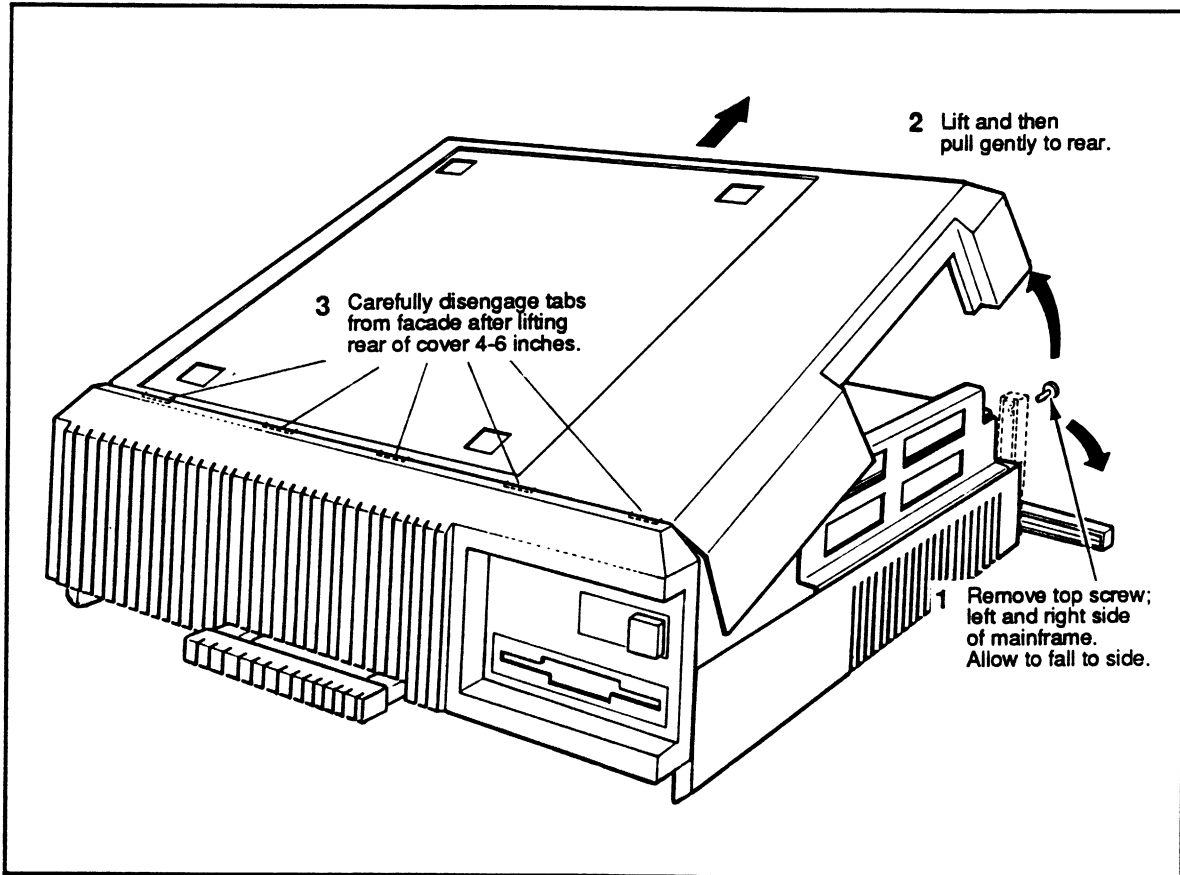


Figure 6-2. Removing the Mainframe cover.

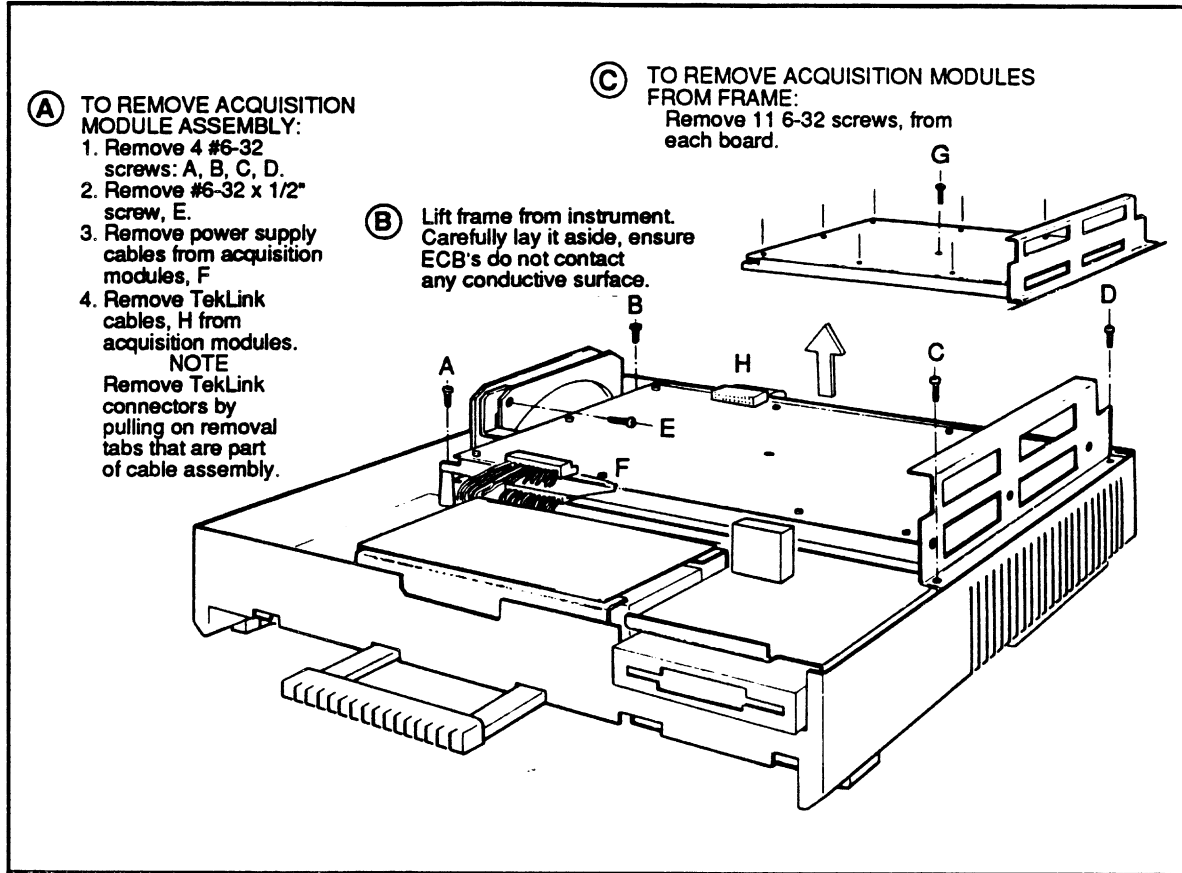


Figure 6-3. Removing Acquisition module(s).



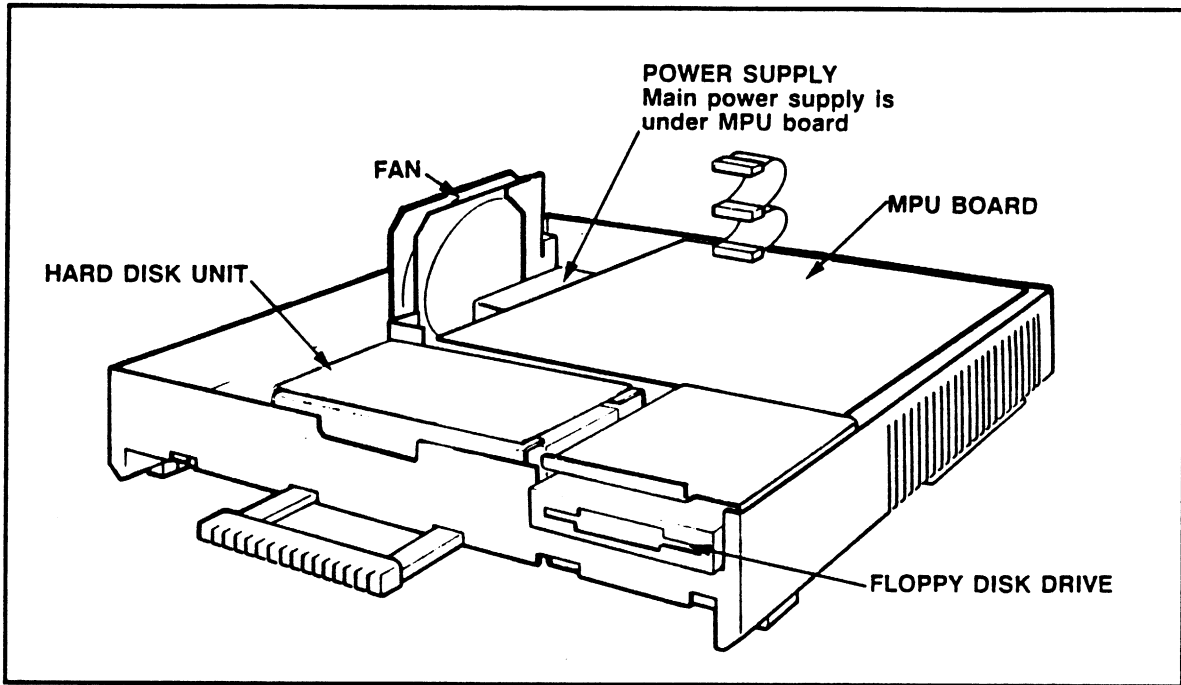


Figure 6-4. Module locations with Acquisition modules removed.

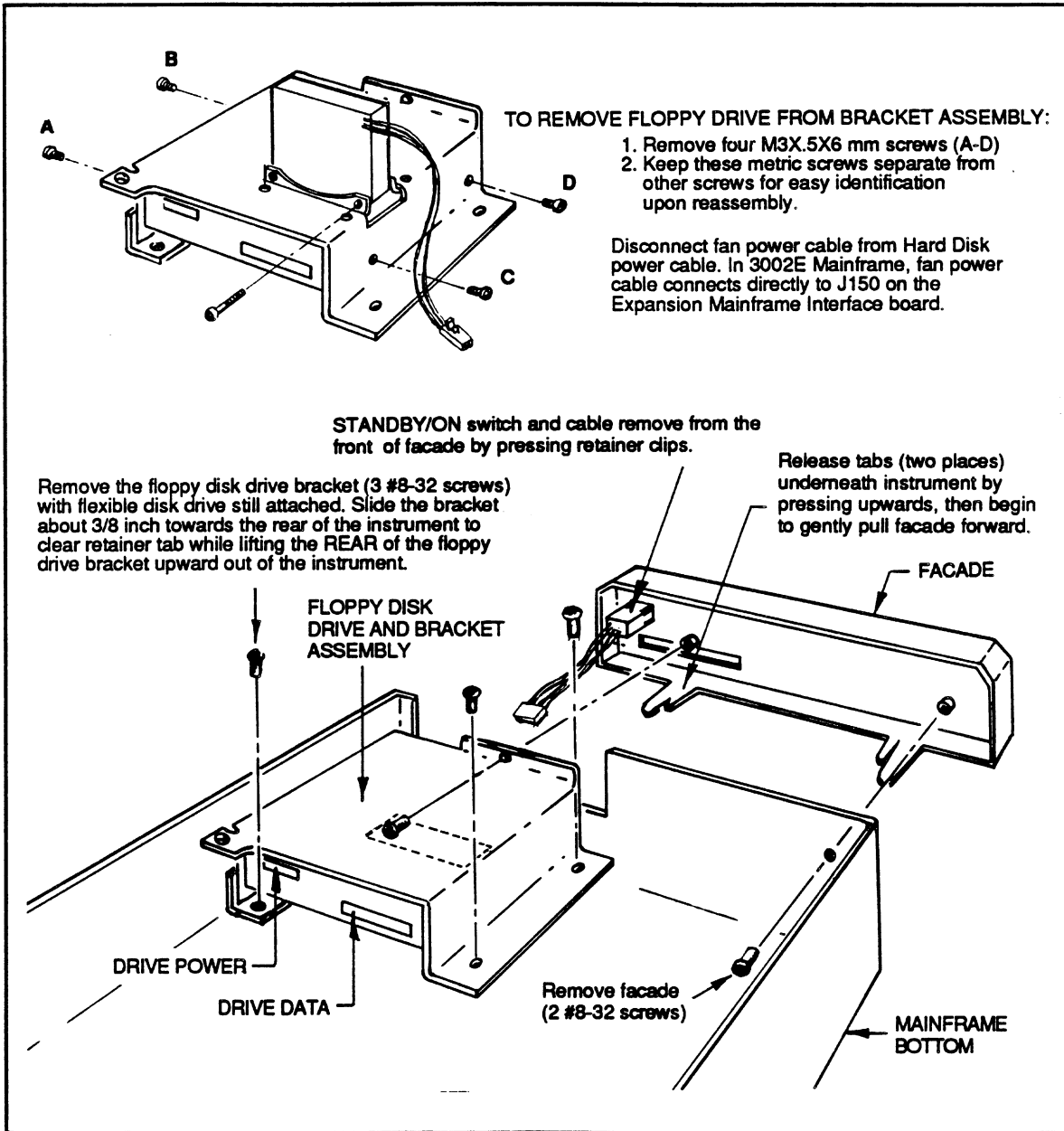


Figure 6-5. Removing the Floppy Disk Drive and Auxiliary Fan.

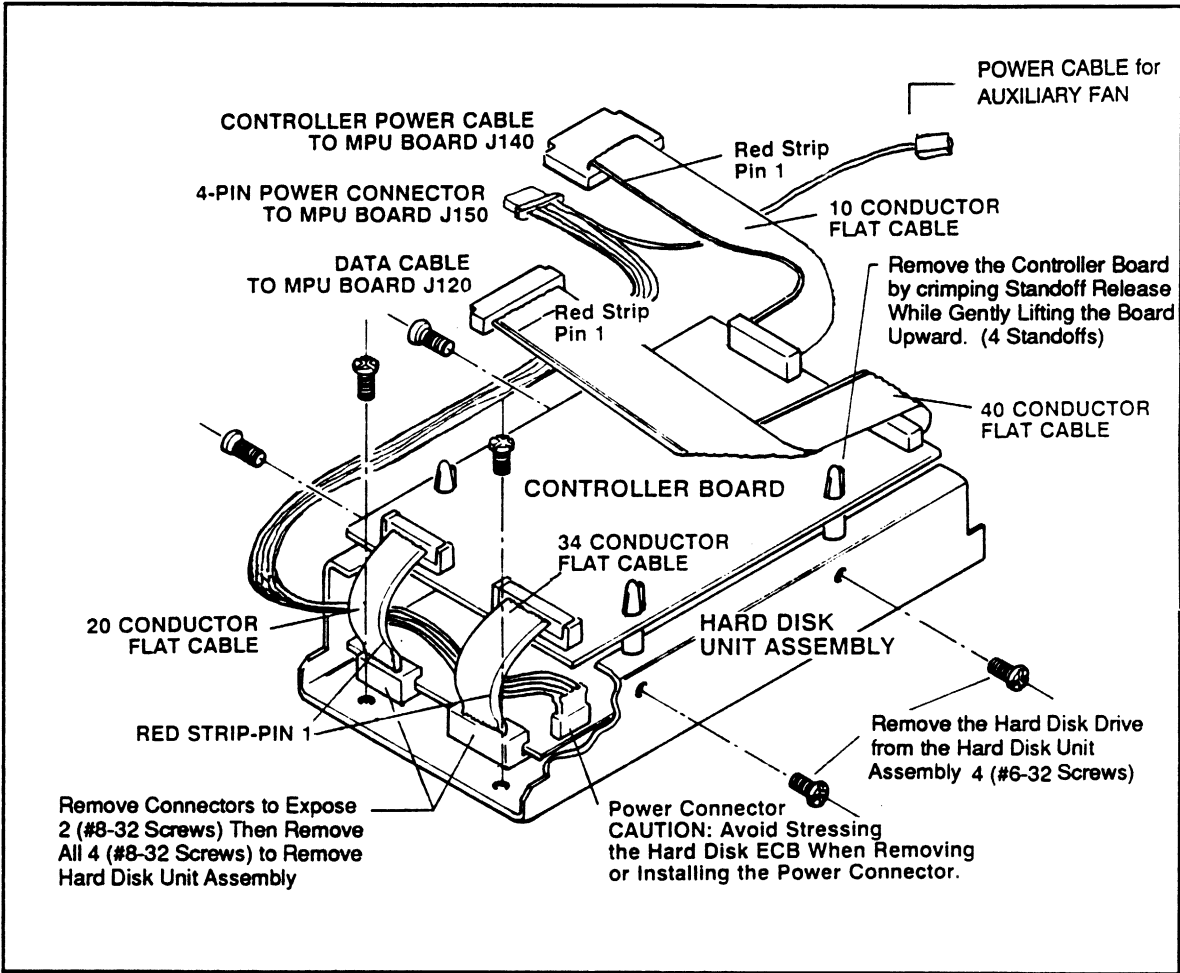
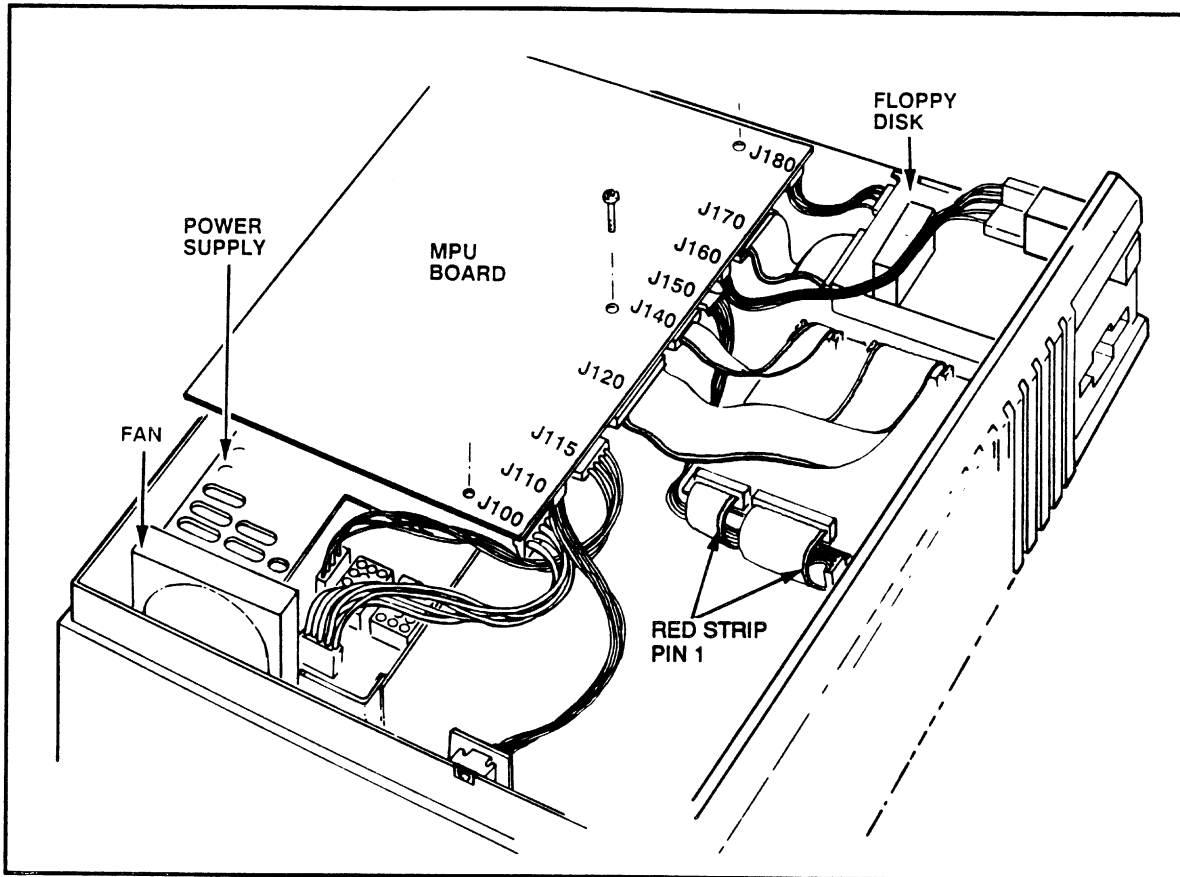


Figure 6-6. Removing the Hard Disk Controller board and Hard Disk Drive.



**Figure 6-7. Removing the MPU board.** (The Expansion Mainframe Interface Board occupies this position in a 3002E Expansion Mainframe.)

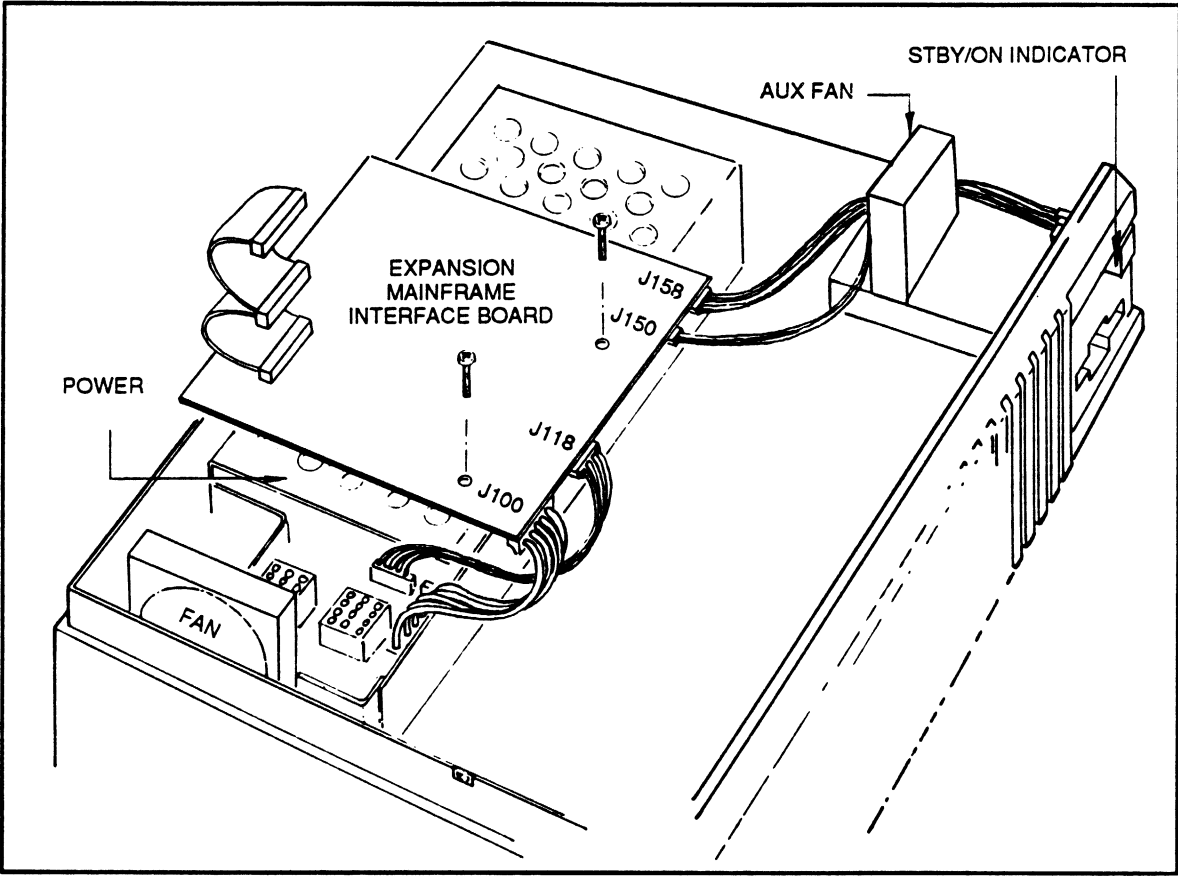
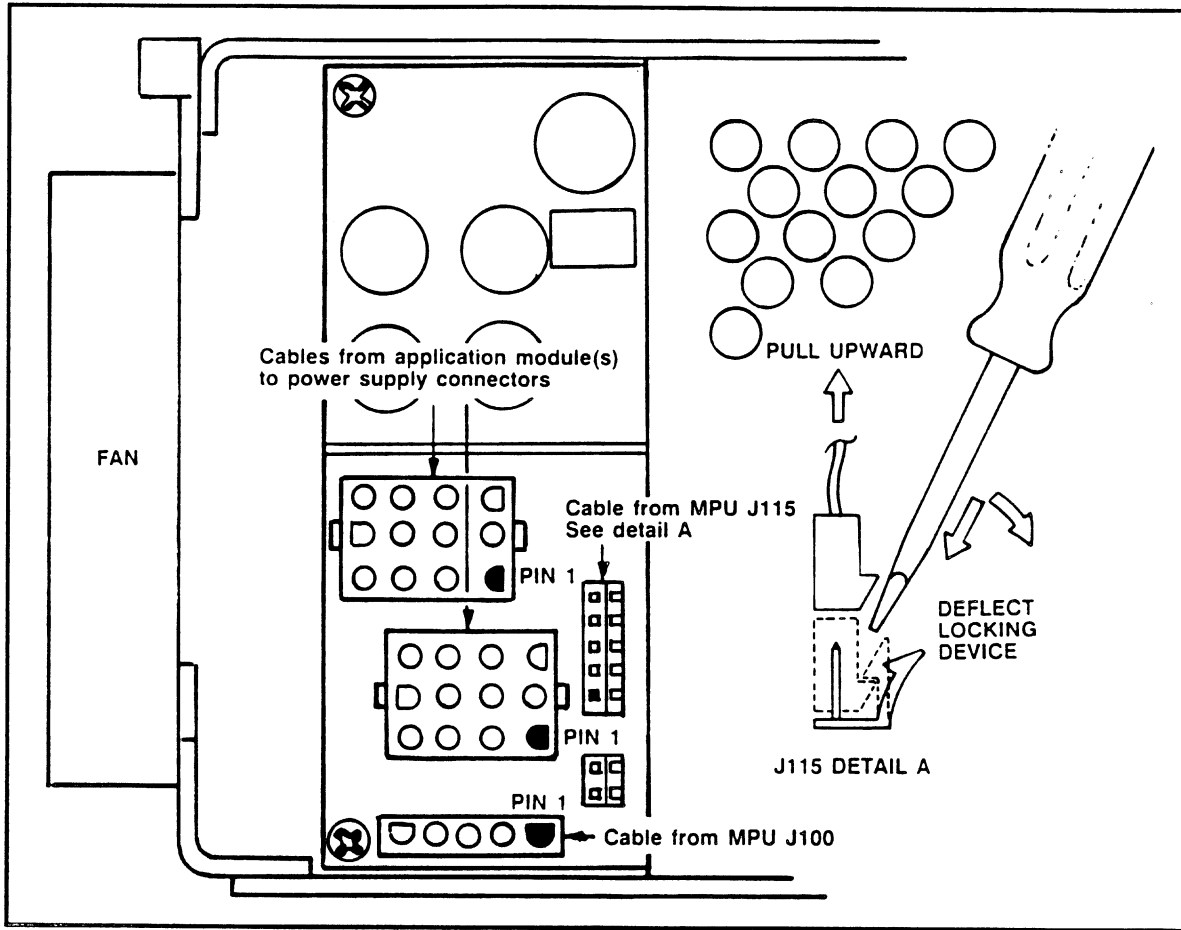
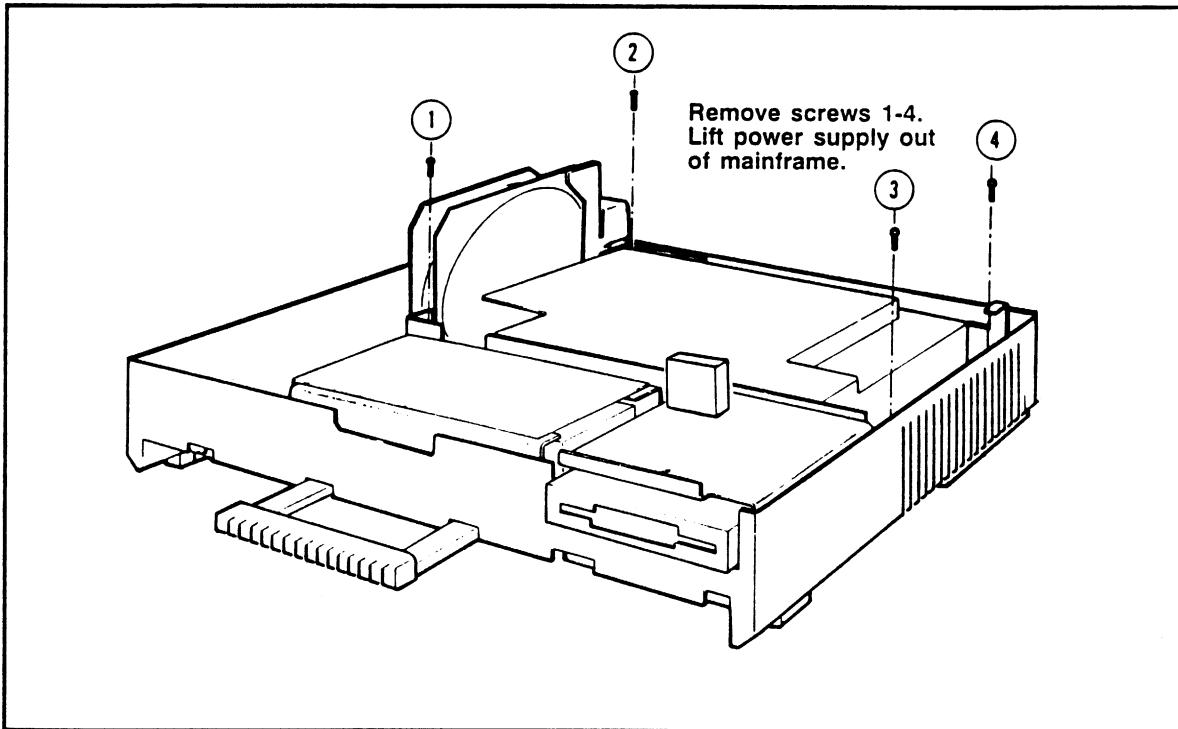


Figure 6-8. Removing the Expansion Mainframe Interface board.



**Figure 6-9. Removing the Power Supply connectors.** (Note that location of connectors for 119-3118-xx are different from locations shown in this figure.)



**Figure 6-10. Removing the Power Supply.**

## MODULE DISASSEMBLY/ASSEMBLY PROCEDURES

The following Mainframe modules can be serviced to the component level and may require disassembly. Refer to their respective service manuals for related disassembly information.

- MPU Board
- All Application Boards
- Color CRT Monitor

The Keyboard and Flat-Panel Display modules are not normally serviceable to the component level. However, some disassembly is required to perform field-level maintenance. These procedures are described in this section.

### Keyboard Disassembly/Assembly Procedures

**QWERTY Keys.** All QWERTY keys can be removed without removing the backplate. See Figure 6-11 when performing the following procedures.

First, place a small flat-blade screwdriver behind the desired cap. Using another screwdriver, gently pry up on the front of the keycap. The keycap will pop off. If the retaining sleeve comes off with it, pry the sleeve off the cap and re-insert the sleeve into the keyboard. To install a new keycap, push it into place until it makes a gentle snap.

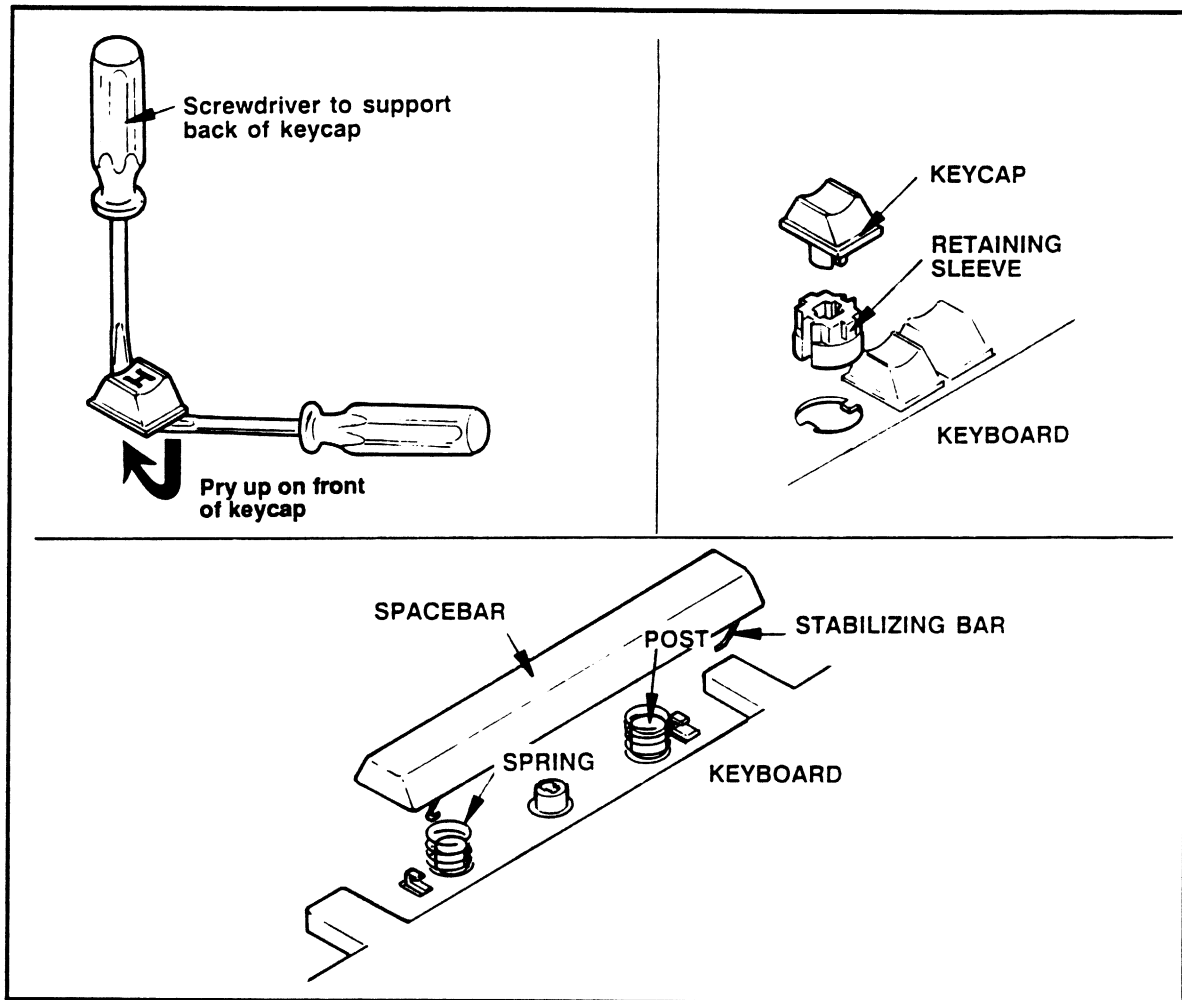
The space bar has two springs that fit on two posts. Be sure they are installed when replacing space bar. Also, be sure to properly connect the stabilizing bar to the two hooks on the keyboard.

#### *NOTE*

*When removing the keyboard backplate, keep the keyboard face down or all of the keys will fall out.*

*Be careful when positioning the keyboard with the assembly removed from its mechanical enclosure. The keycaps can easily fall from their assigned holes. If this happens, refer to Figure 6-12. This figure illustrates the assigned positions for each keycap.*



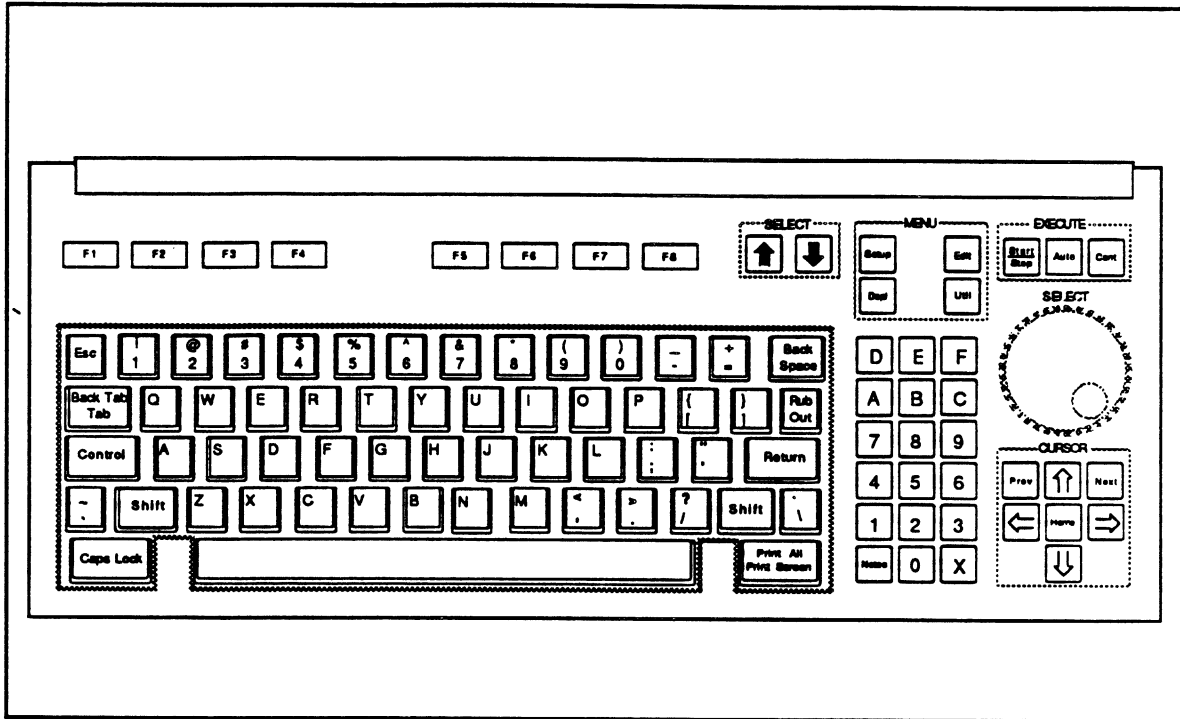


**Figure 6-11. Replacing keycaps.**

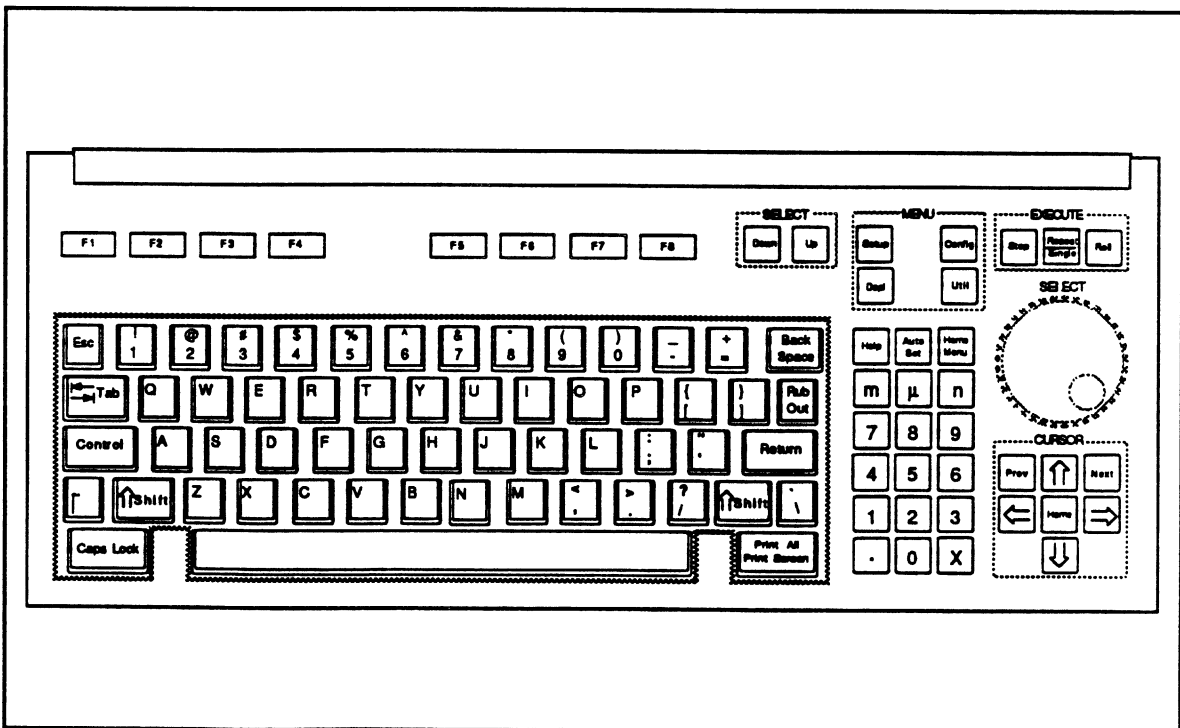
**Non-QWERTY Keys.** To remove the non-QWERTY keys (including the SEL knob), turn the keyboard upside-down and remove the 11 POZIDRIV screws that secure the backplate.

Next, remove the backplate, circuit board, and elastomer switch pad, noting their original position. To remove the non-QWERTY keys, push them out of their holes and lift them out the back of the keyboard.

To remove the SEL knob, unscrew the POZIDRIV screw on the back of the SEL knob and pull the knob out the front of the board. When reinstalling the SELECT Knob, you may have to experiment with the correct screw torque in order obtain the best rotational feel.



A. 3002 Series Keyboard.



B. TestLab Keyboard.

Figure 6-12. Keycap template.

### Replacing the Keyboard Cable

Turn the keyboard upside down and remove the backplate as described in the preceding paragraphs. The backside of the circuit board will be visible. Desolder the old cable and solder in the new cable. Pin keying is silk screened on the circuit board. Table 6-1 shows the cable pinout and wire color-code.

**Table 6-1**  
**KEYBOARD CABLE PINOUT AND COLOR CODE**

Pin Number	Wire Color
1	orange
2	red
3	yellow
4	brown
5	white
6	black (shield)

### Flat-Panel Display Disassembly/Assembly Procedures

The following procedures describe how to remove and replace the Power Converter and Display Panel subassemblies.

Before servicing the Flat-Panel Display, remove the Flat-Panel Module from the mainframe top cover and disconnect the control cable from the back of the display as shown earlier in Figure 6-1.

#### Power Converter Assembly Removal

Depending on the serial number of your mainframe, there are two different Power Converter Board Assemblies. Figure 6-13 shows the steps involved for disassembling the Flat-Panel Display for the 3002 series mainframes with serial numbers B010648 and below. Figure 6-14 shows the steps involved for removing the Power Converter Assembly for 3002 series mainframes with serial numbers B010649 and up.

For all displays, remove the eight #6 flathead POZIDRIV screws that secure the bottom plate of the Flat-Panel Display assembly as shown in Figure 6-13.

Remove the Power Converter board by disconnecting the 34-conductor ribbon cable and unscrewing the mounting screws. Reassembly is the reverse order of this procedure.

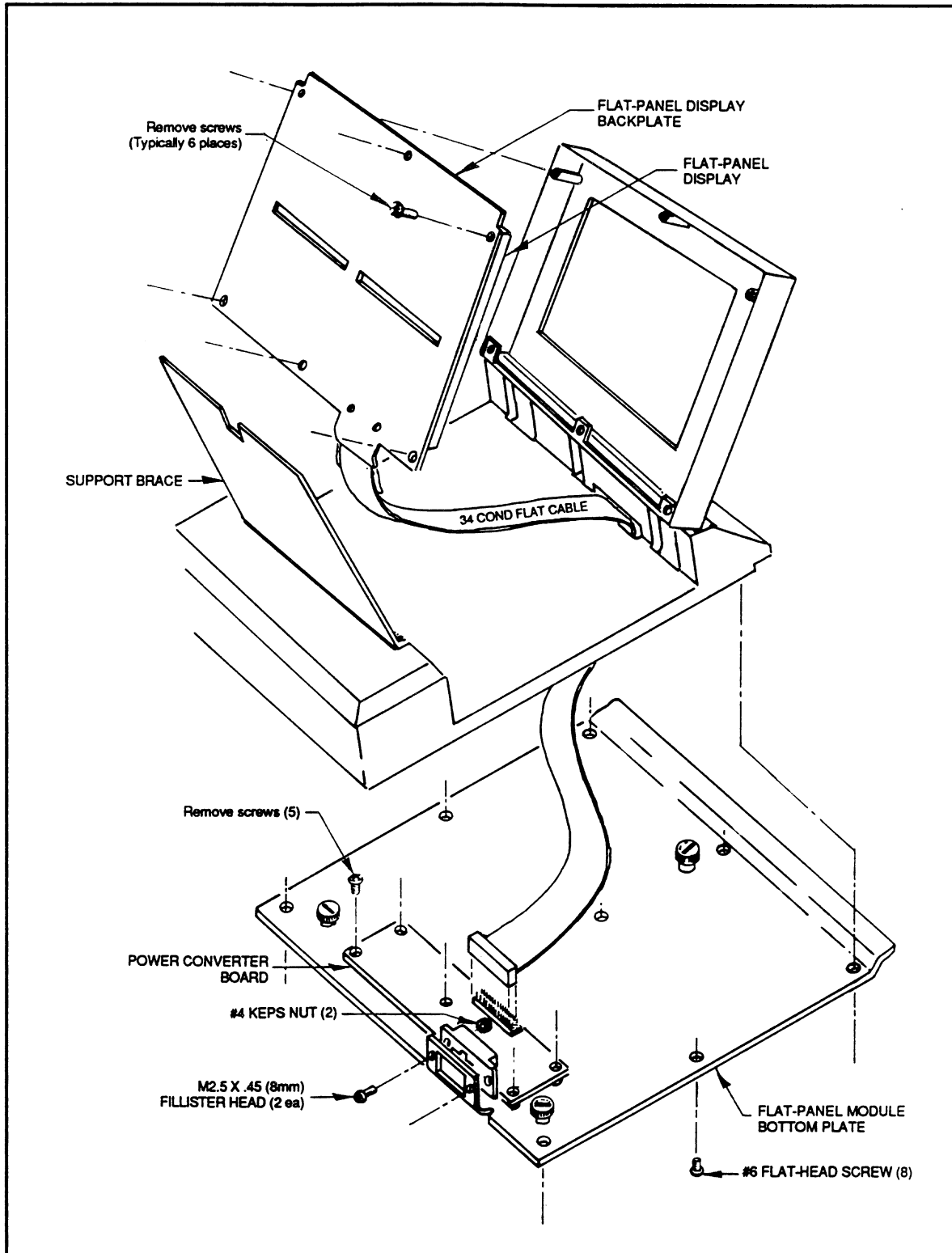
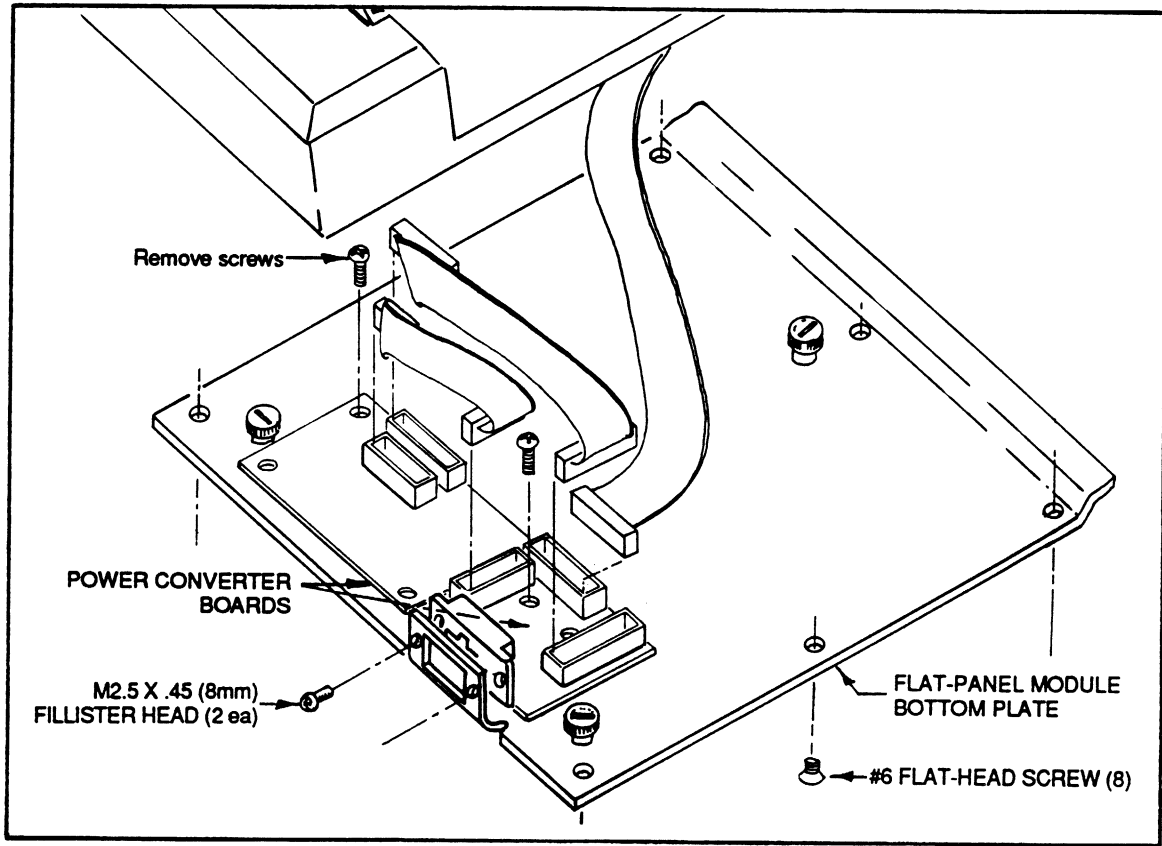


Figure 6-13. Disassembling the Flat Panel module.



**Figure 6-14. Disassembling the Power Converter Board Assembly.** Refer to this illustration for disassembling the Power Converter Boards for 3002 series mainframes with serial numbers B010649 and up.

## Flat Panel Display Removal

To remove the Flat Panel Display, perform the following:

1. Remove the six #6 POZIDRIV screws that secure the backplate of the Flat-Panel Display (See Figure 6-13). Note how the cable is connected to the Display Panel circuit board; this will aid reassembly.

### NOTE

*You may want to fold the support brace down when removing the Flat Panel.*

2. Disconnect the 34-conductor ribbon cable from the Display Panel. See detailed drawing in Figure 6-15 regarding ribbon cable clamp. Also, note how the cable is connected to the Display Panel circuit board; this will aid in reassembly.
3. Remove the Flat Panel and circuit board assembly by removing the six #4 screws as shown in Figure 6-15.
4. To install a flat-panel display, perform the preceding procedures in reverse order.

### NOTE

*On reassembly, make sure that the EMI cable shield is completely under the cable clamp at the flat-panel circuit board.*

### CAUTION

*During reassembly, use care not to damage the ribbon cable or the EMI shield. Make sure the cable connectors fit snugly into the board connectors and curve the cable to allow for hinge movement. See the cable dressing inset in Figure 6-15.*

It is easier to install the Display Panel assembly if you leave the panel face up when inserting it back into the plastic frame.

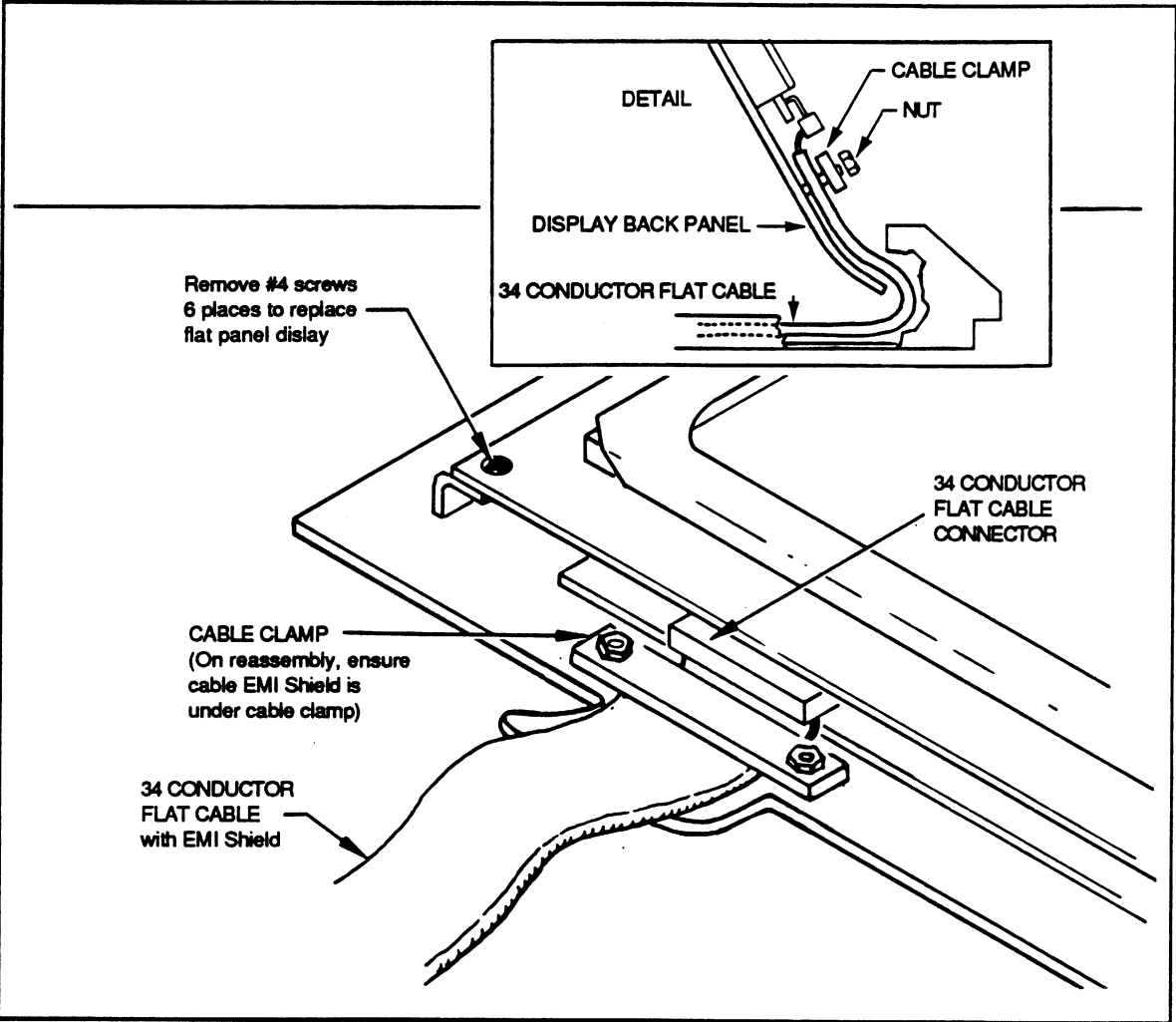


Figure 6-15. Display Panel cabling.

## PHYSICAL PLACEMENT OF MODULES FOR TROUBLESHOOTING

Figures 6-3 and 6-4 show the relative positions of the electronic circuit modules in a Mainframe. As installed, these positions permit limited access to the MPU board and to one of two acquisition modules for troubleshooting purposes. However, these modules can be positioned to allow full access to the component side of each module. You can access Mainframe modules as follows:

- You can troubleshoot the top acquisition module in the acquisition module frame without removing the module.
- You can troubleshoot the bottom acquisition module in one of two positions.
  1. Remove the top module to access the lower one, or
  2. Exchange the modules in the module assembly so that the bottom module is on top and vice versa.

**CAUTION**

*ACQUISITION MODULES REQUIRE AIR MOVEMENT FOR COOLING. If you troubleshoot an acquisition module outside the mainframe for an extended period, position a cooling fan to blow air across the module to prevent components from overheating. With the mainframe cover removed, the Power Supply's fan cannot cool the modules.*

- You can troubleshoot the MPU module by removing acquisition modules (with frame) from the Mainframe and then positioning the MPU board as shown in Figure 6-16.

**CAUTION**

*To prevent damaging the MPU board, ensure that the bottom of the board does not contact any conductive surface. Place a non-conductive pad under it as shown in Figure 6-16.*



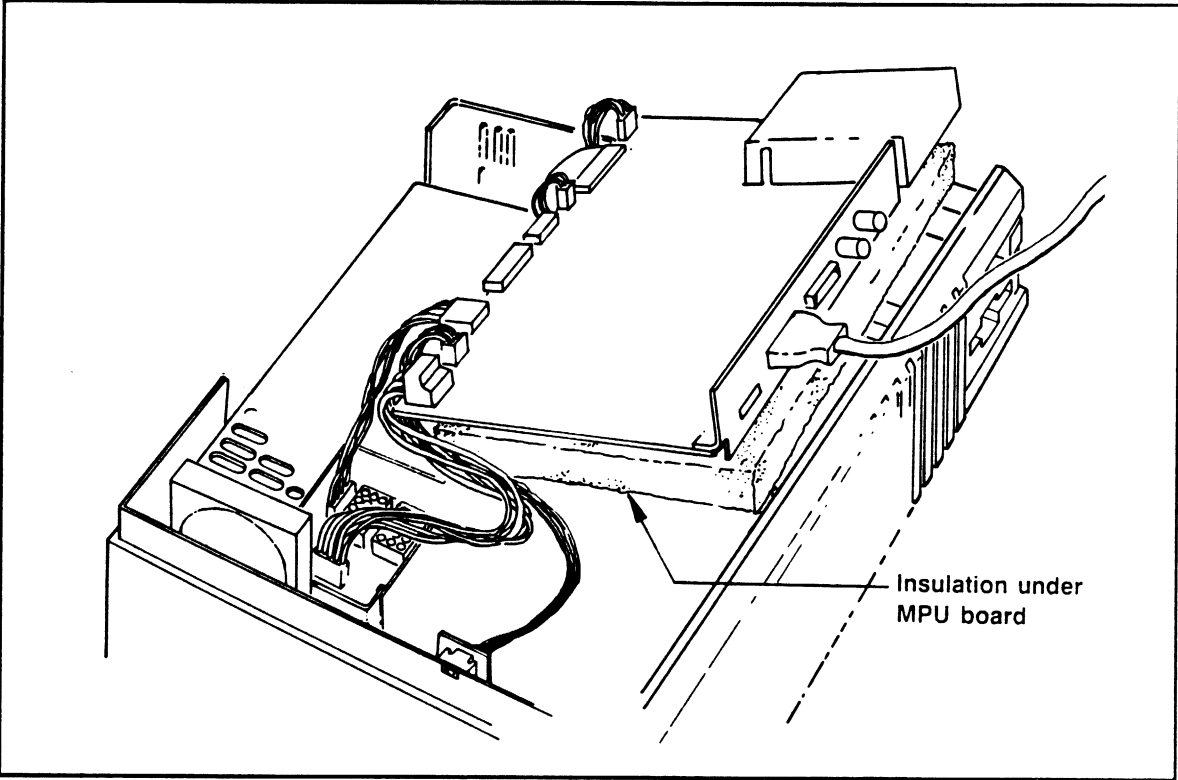


Figure 6-16. MPU Board in troubleshooting position.



## **Section 7 MAINTENANCE**

This section contains the following information:

- Maintenance Tools
- General Maintenance Precautions
- Preventive Maintenance Information
- Corrective Maintenance Information

All modules can be ordered as replaceable assemblies. Modules can then be repaired at field service centers or at factory repair facilities.

Most Mainframe modules can be ordered only as replaceable modules. Thus, information for component-level repair is not provided. These modules are:

- Floppy-Disk Drive
- Hard Disk Drive
- Power Supply Modules
- Color CRT Monitor

Two modules can be repaired at a sub-assembly level. These modules are:

- Keyboard
- Flat-Panel Display

The keyboard is typically replaced as a unit, with two exceptions:

1. The keyboard cable can be replaced.
2. Keycaps can be replaced.

Refer to the Keyboard Disassembly/Assembly instructions in Section 6 for removal/replacement procedures for the keycaps and cable.

Refer to Flat-Panel Display Disassembly/Assembly instructions in Section 6 for removal/replacement procedures.

This manual supports the troubleshooting and repair of three circuit boards:

1. Hard Disk Controller board
2. Expansion Module Interface board
3. Keyboard Signal EMI Filter board

Each board is supported with detailed schematic diagrams, component location illustrations, and parts lists.

## Maintenance

Finally, many mechanical parts and chassis-mounted electrical parts and cables can be ordered as replaceable parts. Check the *Electrical and Mechanical Parts* lists for a complete listing of replaceable parts. Refer to *Obtaining Replaceable Parts* later in this section for additional information.

## MAINTENANCE TOOLS

The tools most often needed when servicing an MPU board are those typically found in an electronic technician's tool kit. Special tools and supplies include:

- 15 W soldering iron
- 60/40 rosin core solder
- IC desoldering tool

## MAINTENANCE PRECAUTIONS

### WARNING

*Be sure to observe standard electrical precautions if the MPU board is in the service position when connected to other instrument modules (application modules, power supply, disk drives, etc.). Dangerous electric-shock and mechanical hazards are exposed when Mainframe and Power Supply covers are removed. The fan is also exposed. Section 6 describes how to place the MPU and application modules in service positions.*

## Color Display Monitor

### WARNING

*Serious shock hazards are present within the Color Monitor. Do not open these covers under any circumstances. There are no user- or field-serviceable components inside.*

Refer all servicing to qualified service personnel. Unplug the Monitor from the power outlet immediately and notify the service technician if the following occurs:

- Liquid has been spilled into the Monitor
- The Monitor has been exposed to rain or water
- The Monitor has been dropped or the cabinet damaged
- Fuses continue to blow
- Power cord is frayed or damaged
- A distinct change from normal operation is apparent

## Soldering

Most electrical components are soldered in place.

**CAUTION**

*If it is necessary to replace a soldered part, use a 15 W soldering iron to prevent heat damage to the circuit board or components. Excessive heat will lift circuit runs on the circuit board.*

Refer replacement of soldered, multi-pin gate arrays to a Tektronix Service center where appropriate desoldering tools are available.

The flux in solder may leave a residue on the circuit board that can provide a high-resistance leakage path and affect electrical operation. Be sure to clean off this residue. Isopropyl alcohol is recommended.

## Static Precautions

**CAUTION**

*Static discharge can damage any semiconductor on this circuit board.*

Observe the following precautions to avoid damage:

- Minimize handling of static-sensitive components.
- Transport and store static-sensitive components in their original containers, on a metal rail, or on conductive foam. Label any package that contains static-sensitive components.
- Discharge static voltage from your body by wearing a wrist strap when handling these components. Servicing static-sensitive components should be performed only at a static-free workstation by qualified service personnel.
- Don't put anything capable of generating or holding a static charge on the workstation surface.
- Avoid handling components in areas that have a floor or work-surface covering capable of generating a static charge.
- Keep component leads shorted together whenever possible.
- Pick up components by the body, never by the leads.
- Do not slide components over any surface.
- Use a soldering iron that is connected to an earth ground.
- Use only special anti-static suction type or wick desoldering tools.

**NOTE**

*Damage to electrical components may not be immediately apparent. Always follow the precautionary measures previously listed when handling static-sensitive components.*

**AC Voltage Select Switch**

**CAUTION**

*Be sure that the VOLTAGE SELECT switch on the Mainframe's Power Supply and the Color CRT Monitor are set for the ac voltage being used. If not set to match the ac voltage, power supplies can be damaged.*

**PREVENTIVE MAINTENANCE**

Preventive maintenance consists of periodic cleaning and inspection. Accumulation of dust on components acts as an insulating blanket and prevents efficient heat dissipation. This condition can cause overheating and component breakdown. Periodic cleaning and inspection reduces instrument breakdown and increases instrument reliability.

The Mainframe and associated modules should be cleaned as often as the operating environment requires. A convenient time to perform these procedures is immediately prior to troubleshooting or other maintenance-related activity. Perform these procedures more often if required by the operating environment.

**CAUTION**

*Do not wash the front panel STANDBY/ON switch. Cover the STANDBY/ON switch during washing procedures to avoid damaging the switch.*

*Spray-wash dirty parts with a cleaning solution listed under Interior Cleaning, then use deionized water to THOROUGHLY WASH all parts. IMMEDIATELY DRY all parts with a low-speed air blower.*

*DO NOT use fluorocarbon-based spray cleaners, or chlorinated hydrocarbon cleaners; they may damage the circuit board material or plastic parts, and they may leave a dust-collecting residue.*

*To prevent damage from electrical arcing, ensure that all circuit board connectors are completely dry. Do this by heating the board in an oven at 75° C (176° F) for 15 minutes before installing into a mainframe and applying power.*

## Exterior Cleaning

Dust the exterior surfaces with a dry, lint-free cloth or a soft-bristle brush. If hard dirt remains, use a cloth or swab dampened with 50% mild detergent and warm water solution. The swab is also useful for cleaning in narrow spaces around controls and keys. Use the detergent solution for cleaning the display screen also. Do not use abrasive compounds on any part of the Mainframe.

### CAUTION

*To prevent damage to the equipment from water getting inside during external cleaning, use only enough water to dampen the cloth or swab.*

*DO NOT use chemical cleaning agents as they may damage the plastics used in the Mainframes. In particular, avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.*

## Interior Cleaning

To gain access to internal parts of a Mainframe, refer to the Disassembly and Assembly procedures in Section 6 of this manual.

Internal cleaning should be done with a clean, dry, low-velocity stream of air; however, take care not to aim the air stream directly at any other electrical modules that may be part of the instrumentation mainframe. A soft-bristle brush is useful for cleaning around components. If a liquid must be used for minor cleaning, use isopropyl alcohol, denatured ethyl alcohol, or a solution of 1% mild detergent and 99% deionized water.

## Inspection

Inspect internal modules for broken connections, poorly seated components, leaking capacitors, damaged hardware, and heat-damaged components.

Repair any obvious problems. However, take particular care if you find any heat-damaged parts. Overheating usually indicates other circuit problems. To prevent recurrence of the damage, find and correct the cause of the overheating. Note that replacement of electrical components may necessitate readjustment of circuitry. Refer to the *Replaceable Electrical Parts* in Section 11 for a list of part and component descriptions.

## **CORRECTIVE MAINTENANCE**

Corrective maintenance describes the following:

- Obtaining replacement parts
- Replacing circuit board pins

### **Obtaining Replacement Parts**

Electrical and mechanical parts for Mainframe modules can be obtained through your Tektronix field office or representative. However, many of the standard electrical components can be obtained locally. Before purchasing an ordinary part, check the *Replaceable Electrical Parts* section for a listing of value, rating, and description.

#### *NOTE*

*Check the parts lists before replacing electrical components. If the part is called out as screen or burned-in, the replacement part must also be screen or burned-in or the repair will not be effective.*

*When selecting replacement parts, remember that the size and shape of a component may affect its performance. All replaceable parts should be direct replacements.*

Some of the mechanical and electrical parts are manufactured by Tektronix. Some parts are manufactured or selected by Tektronix to satisfy particular design requirements or are manufactured to certain specifications for Tektronix. To determine the manufacturer of a part, refer to the Parts List Cross Index of Code Number to Manufacturer. This is found in the *Replaceable Electrical Parts* section.

When ordering replacement parts from Tektronix, include the following information:

- Instrument type
- Instrument serial number
- Description of the part (if electrical, include the component number)
- Tektronix part number



## Circuit Board Pin Replacement

On occasion, it may be necessary to repair a circuit board connector pin. A circuit-board pin replacement kit, including the necessary tools, instructions, and replacement pins with attached spare ferrules, is available from Tektronix. Contact your Tektronix service representative for ordering information.

### CAUTION

*Use extreme care when replacing circuit board pins. Most circuit boards have conductive paths between the top and bottom board layers. All soldering, removal, and re-insertion of pins must be done with care to prevent breaking any electrical paths on the board.*

Refer to Figure 7-1 when performing the following pin procedures:

1. Use a 15 W soldering iron to desolder the pin while pushing it out of the board with a pair of pliers. If the pin is too short to use pliers, push it out with any round device not over 0.28 inches in diameter.
2. If the ferrule remained in the board, go to step 3. If the ferrule came out with the pin, go to step 4.
3. If the ferrule remained in the board, perform the following:
  - a. Carefully ream the solder out with a 0.31 inch drill.
  - b. Remove the ferrule from a new pin and insert the pin into the old ferrule in the same orientation as the old pin.
  - c. Go to step 5.
4. If the ferrule came out with the pin, do the following:
  - a. Clean the excess solder out of the hole with a solder-removing wick and a scribe.
  - b. Insert the new pin with ferrule in the same orientation as the old pin.
  - c. Go to step 5.
5. When the new pin is properly positioned, carefully solder it on both sides of the board.
6. Clean any remaining residue from the board according to the Cleaning instructions given earlier in this section.

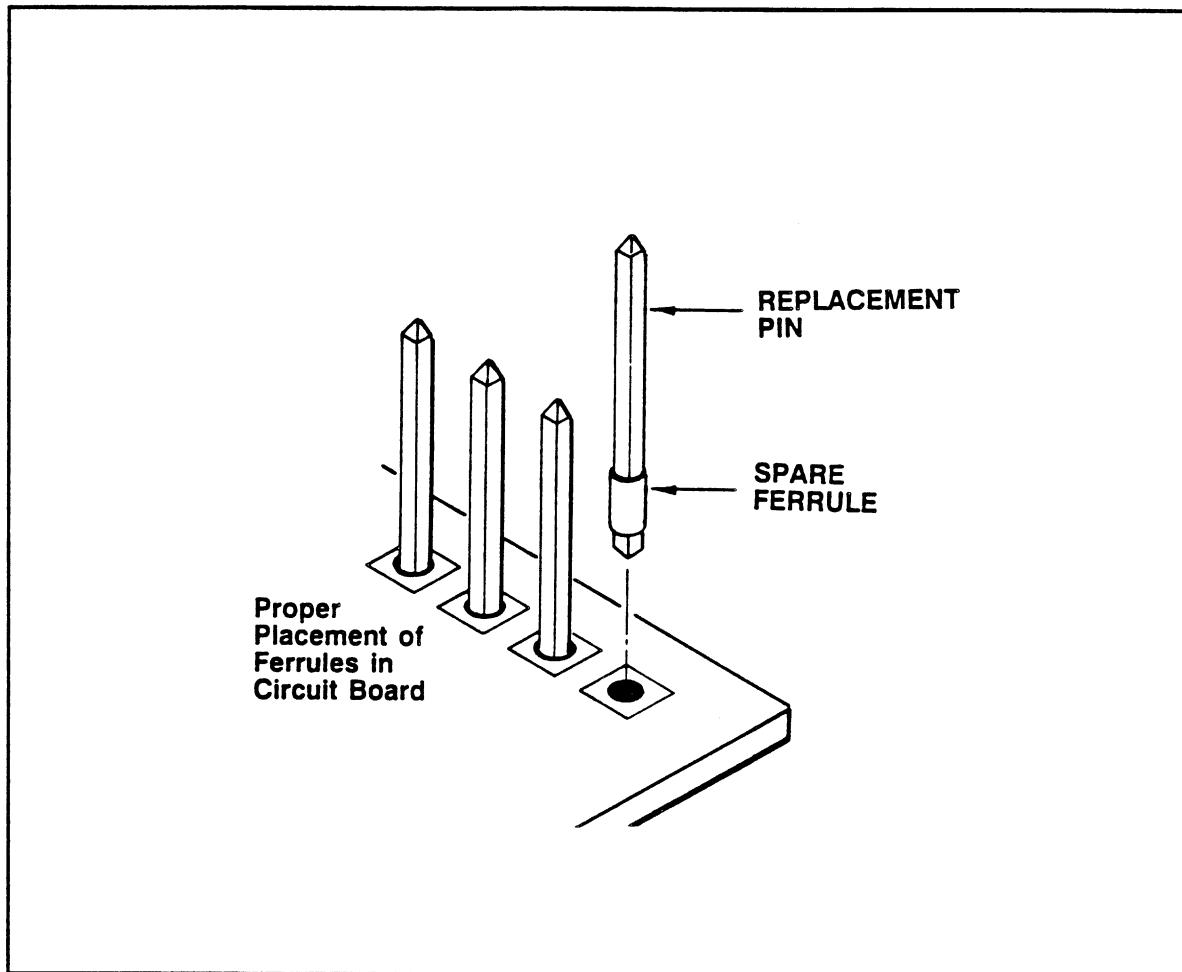


Figure 7-1. Circuit board pin replacement.

## **Section 8**

# **TROUBLESHOOTING**

As described in Section 1, there are several Mainframe configurations. Except for the Expansion Mainframe, all other configurations have an MPU board and a mass storage device(s) installed. Power-up diagnostics are included as part of the MPU board system firmware. Power-up diagnostics verify the performance of the MPU board's compute kernel circuits. Diagnostic software is also available to test and verify the performance of the Floppy Drive, the Hard Disk Drive, the Keyboard, and the Display Unit. Refer to the *671-0058-XX MPU Board Service* manual and acquisition module service manuals for descriptions of diagnostic firmware and software. In most cases, these tests will identify the faulty Mainframe module and aid troubleshooting to the component level. The rest of the information in this section provides general troubleshooting guidelines for Mainframe modules not supported with diagnostics firmware or software.

Not all troubleshooting information is presented in this section. As required, this section references information in other parts of this manual or information in separate manuals.

Before you begin troubleshooting, read through this section to familiarize yourself with its contents. Topics covered in this section include:

- Troubleshooting Equipment
- Troubleshooting Precautions
- Physical Placement of Modules for Troubleshooting
- General Troubleshooting Information

## **TROUBLESHOOTING EQUIPMENT**

Refer to Table 5-1 for recommended test equipment. Tools required to service these instruments are those commonly found in an electronic technician's tool kit.

## TROUBLESHOOTING PRECAUTIONS

Review the following precautions before troubleshooting a mainframe.

### Component Handling

If repair of the Mainframe is to a lower level than board or module replacement, refer to Section 7 of this manual for cautionary guidelines and recommended practices regarding the special handling required for static sensitive devices.

**CAUTION**

*Static discharge can damage any semiconductor component in this instrument.*

### The Color Display Monitor

Refer servicing of the Color Monitor to qualified service personnel. Always observe the following precautions when working on the CRT.

**WARNING**

*CRTs retain hazardous voltages for long periods of time after power-down. The CRT should be serviced only by qualified personnel familiar with CRT servicing procedures and precautions.*

*Before attempting any work on the CRT, discharge the CRT by shorting the anode connection to chassis ground using a plastic-handle screwdriver. When discharging, place the metal blade of the screwdriver against chassis ground. Then, slipping the screwdriver tip under the CRT anode cup, contact the anode.*

*Use extreme caution when handling the CRT. Rough handling may cause it to violently implode. Do not nick or scratch the glass or subject it to undue pressures during removal or installation. When handling the CRT, wear safety goggles and heavy gloves for protection.*

## PHYSICAL PLACEMENT OF MODULES FOR TROUBLESHOOTING

Refer to the *Disassembly/Installation* section, for instructions on how to physically position the MPU board and acquisition modules for troubleshooting.

## GENERAL TROUBLESHOOTING

The following provides general troubleshooting guidelines for circuitry and modules not supported with diagnostics firmware/software. Information presented here explains how to troubleshoot power supply problems and problems related to Mainframe modules that are usually replaced as a unit (Power Supplies, Keyboard, Flat-Panel Display, Floppy Disk Drive, and Hard Disk Drive). Refer to the *671-0058-XX MPU Board Service* manual for detailed system troubleshooting guidelines and System Diagnostics Software usage.

### Troubleshooting System Power

There are several things to keep in mind when troubleshooting a system power problem.

First check the obvious:

- Ac line cord properly installed
- Front panel STBY/ON switch in ON position (lighted)
- Rear panel line selector switched to proper position
- Rear panel ac line fuse in good condition

If the obvious checks do not identify the problem, then the following information may prove helpful.

### Power Distribution

The Power Supply module distributes +5 Vdc and  $\pm 12$  Vdc supplies to the MPU board and up to two acquisition modules. All modules that connect to the MPU board receive their power via the MPU board. Refer to the Power Interconnect Diagram in Section 10 for power distribution drawings. Refer also to Section 8 in the *671-0058-XX MPU Board Service* manual for MPU board fuse locations and ratings.

### Power Supply Troubleshooting Chart

When the system power troubleshooting items have been checked and the power supply still won't come up, use the power supply troubleshooting chart in Figure 8-1. This chart will assist you in locating the problem area. Refer also to information, immediately following, titled *Troubleshooting Thermal Conditions*. Figure 5-1 shows power supply test points on the MPU board.

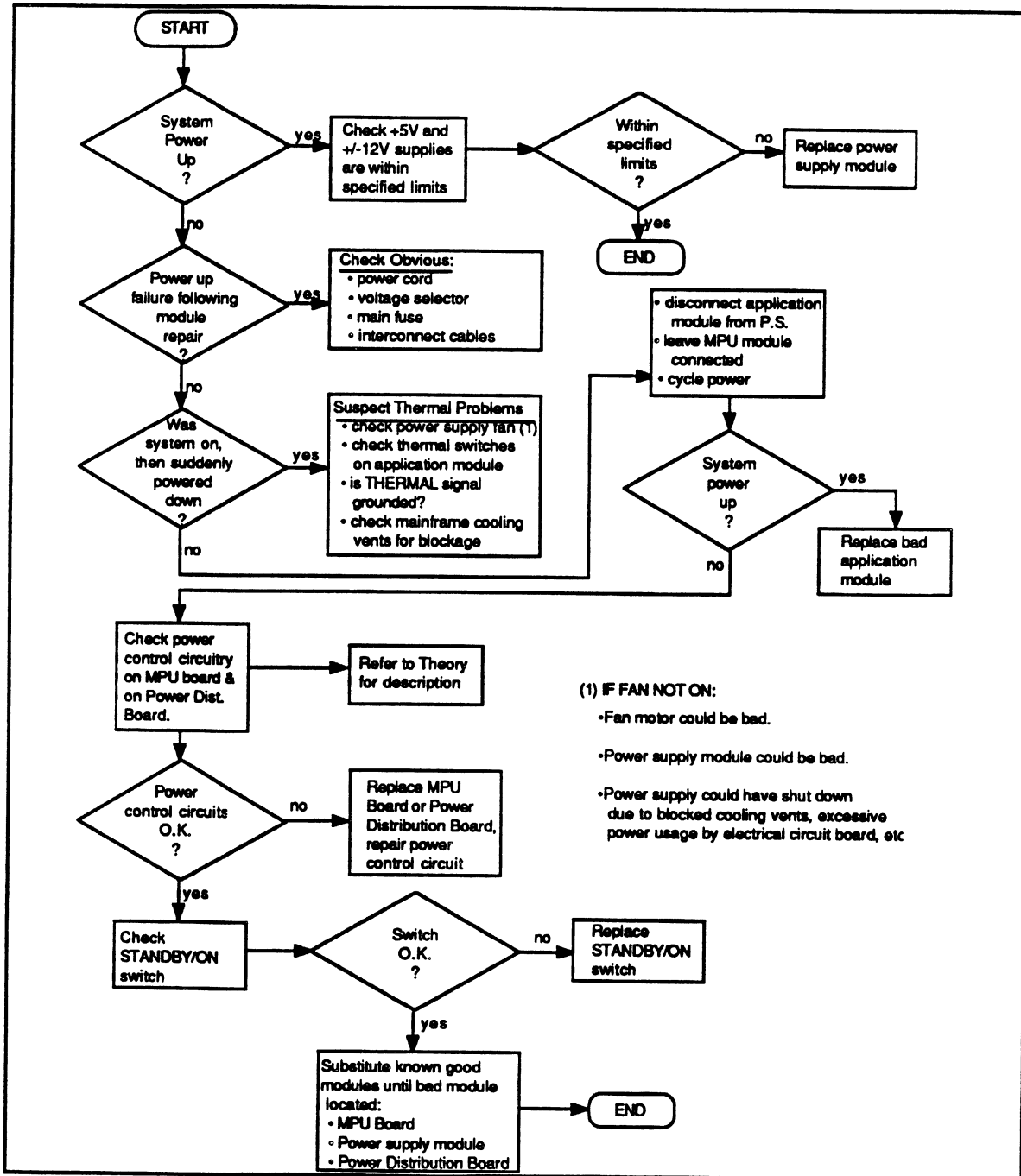


Figure 8-1. Power supply troubleshooting chart.

## **Troubleshooting Thermal Conditions**

If air flow is insufficient, ambient temperature rises inside the mainframe enclosure. An over-temperature condition can be caused by any of the following:

- Cooling vent obstruction
- Fan failure
- Fan voltage too low
- Excessive drain on power supply

Most acquisition modules use thermal switches to protect critical circuits on the module. If the ambient temperature exceeds the thermal rating of a switch, the switch will short to ground. This action grounds the THERM signal, shutting down the power supply via the power control circuit on the MPU board. Any acquisition module connected to an MPU board can shut down the mainframe power supply in this manner. Figure 8-2 shows how a thermal switch is wire-ORed to the MPU's THERM signal line.

Refer to the applicable acquisition module service manual for location of thermal switches. Once a suspected switch is located, cool it with cool spray and recycle power. If the system powers-up, then strongly suspect an excessive temperature problem. Check the problem further by ensuring that all cooling vents are cleared of obstructions before operating the instrument. If power supply fails again, suspect faulty circuitry. The thermal switch may be bad or circuitry in the area of the thermal switch may be using excessive power. Low-level troubleshooting is needed.

A mainframe's Power Supply module may also provide some control and protection from an over-temperature condition inside a mainframe enclosure.

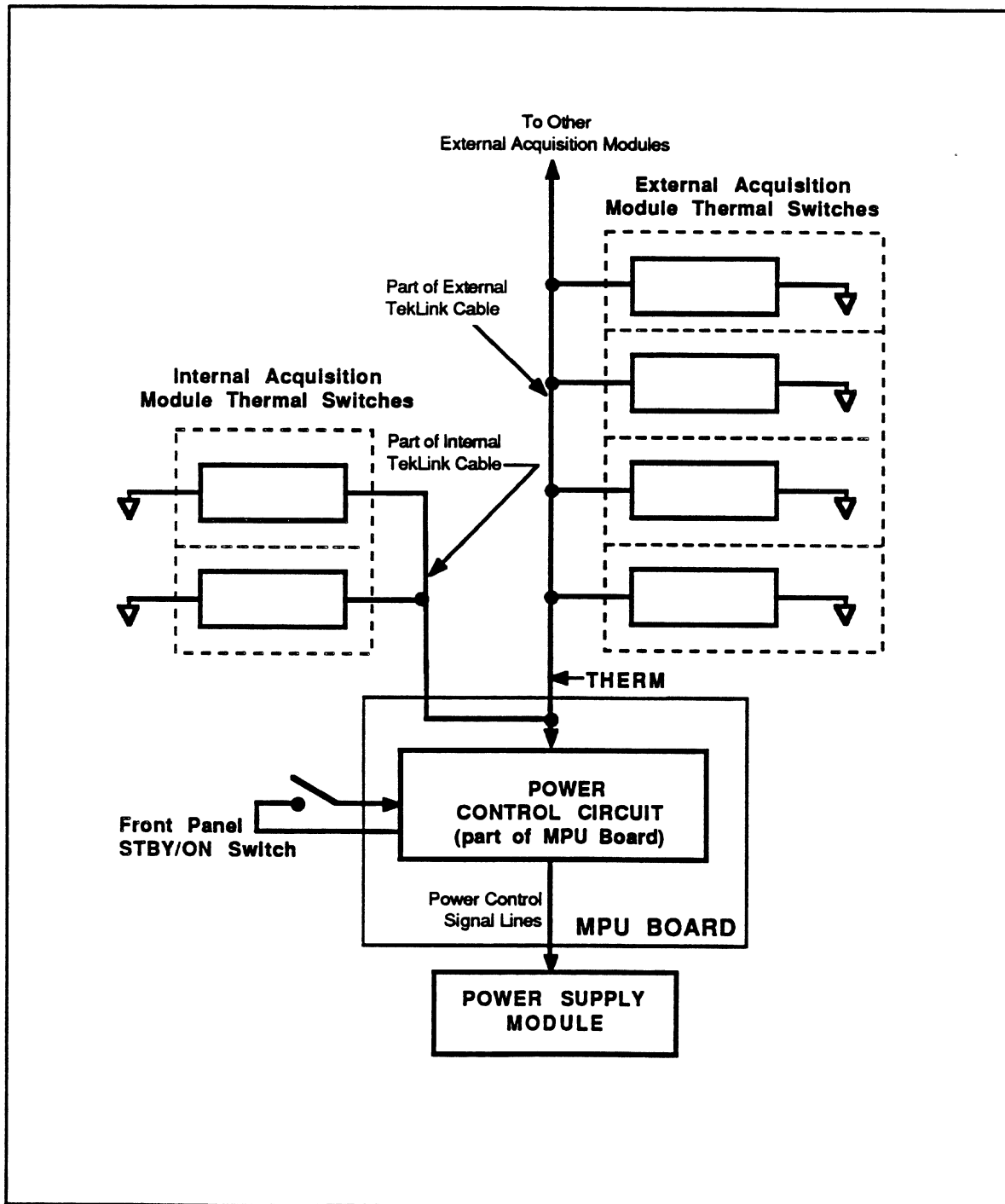


Figure 8-2. Thermal sensor wiring.



## Keyboard Troubleshooting

If the Keyboard works, but you suspect it is faulty (intermittent keys, etc.), refer to *Diagnostics Software* in the *671-0058-XX MPU Board Service manual*. The manual Keyboard routine in the diagnostic test software produces a screen drawing of the keyboard or control panel. When a key is pressed, the corresponding screen key reverses video. Each key and the scrolling knob can be checked in this manner.

If the Keyboard doesn't work at all, suspect either the interconnect cable, power, or the keyboard circuitry.

### Keyboard Cable

Refer to the Interconnect Diagram in the *Diagrams* section and check the Keyboard Cable for opens and shorts. If faulty, replace the cable. Refer to Keyboard Disassembly/Assembly in Section 6 for cable replacement procedures.

### Keyboard Power

The Keyboard receives +5 Vdc power from the MPU module. Check the +5 V fuse on the MPU module and replace it if necessary. See the *671-0058-XX MPU Board Service manual* for fuse location.

## Disk Drive Troubleshooting

The MPU board system diagnostics software provides low-level tests for both the floppy and hard disk controller circuits. Refer to *Diagnostics Software* in the *671-0058-XX MPU Board Service manual* for test descriptions.

Both the Flexible and Hard Disk drives receive power from the MPU board. Refer to the Interconnect Diagram in the *Schematics* section for power cable routing and to the *671-0058-XX MPU Board Service manual* for fuse locations.

If a drive unit failure is suspected, refer to the drive descriptions in the *Theory of Operations* section. With the information provided there and with the Interconnect Diagram, you can confirm whether the disk drive or interconnect cabling is at fault. If faulty, return the drive to Tektronix for repair and/or replacement.

### Color Display Monitor Troubleshooting

As stated in previous sections of this manual, there are no user- or field-serviceable components inside the CRT monitor. A malfunctioning Monitor must be returned to Tektronix for servicing.

Use the Color Monitor Troubleshooting Chart in Figure 8-3 to verify the operation of the Color Monitor.

Refer to Section 4, Theory of Operation in the *671-0058-XX MPU Board Service* manual for a description of the MPU board's video controller circuitry with timing diagrams.

### Flat-Panel Display Troubleshooting

The MPU board system diagnostics software provides power-up and manual tests that verify the operation of the MPU board's display controller circuitry. Refer to Diagnostics Software in the *671-0058-XX MPU Board Service* manual for detailed procedures.

The Flat-Panel Display consists of two basic modules: a Power Converter circuit board assembly and the Display Panel assembly. If the Display Panel (and/or its attached circuit board) have failed, return the complete Flat-Panel Display Module (including Power Converter circuit boards) to Tektronix for replacement and/or repair. If the Power Converter boards are known to have failed, they can be replaced. Refer to the Disassembly/Assembly section in this manual for instructions on how to access the Power Converter boards.

If a flat-panel fails to power up, check the KEH and KEL lines. These lines should produce VSYNC rate pulses; one normally low, the other normally high. If these are missing, a shift register on the Flat Panel may have failed and the MPU board consequently thinks it is connected to a CRT display.

Refer to the Flat-Panel Display description in the *Theory of Operations* section and the Interconnect Diagram in the *Schematics* section for information that will help you isolate a problem to either the Power Converter boards, the Flat Panel, or the interconnecting cables.

The Flat-Panel Display receives power from the MPU board. Power is fused on the MPU board. Refer to the *671-0058-XX MPU Board Service* manual for fuse locations.

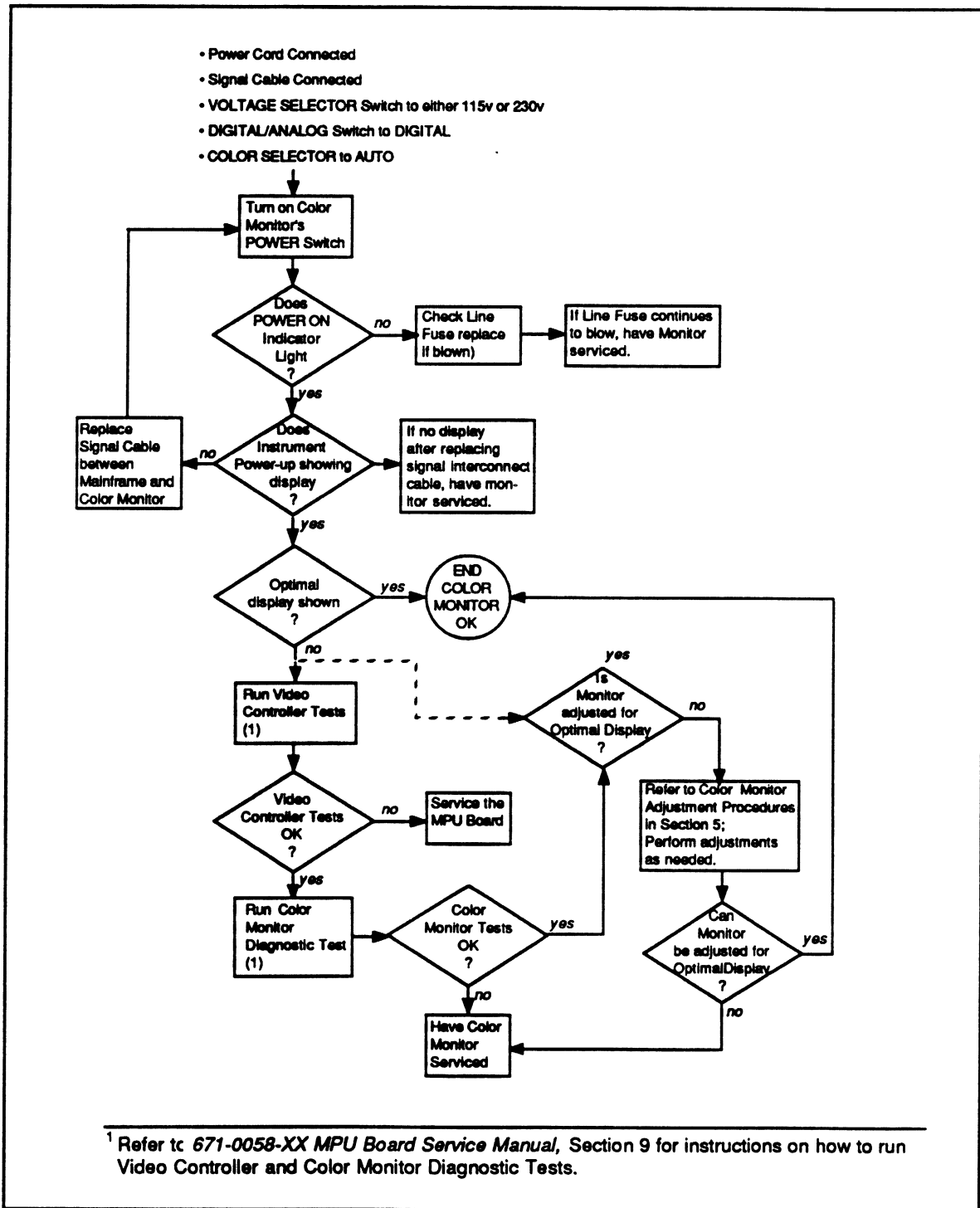


Figure 8-3. Color Monitor troubleshooting chart.

## Troubleshooting

### CAUTION

*Do not connect the display cable when the Mainframe power is on. Doing so may cause F703 on the MPU board to blow.*

The display power fuse, F703, may blow if the flat panel display cable is connected when Mainframe power is on. If the display is not operating, and you know the Mainframe power is OK. Check for +12 Vdc at pin 1 of J820. If +12 Vdc is not present, turn off power and disconnect the power cord. Disassemble the instrument to access the component side of the MPU board. Check the condition of F703. If blown, replace the fuse.

### NOTE

*Refer to Section 8 of the MPU Board Service manual for fuse value and location on the MPU Board.*

## COMM Pack Troubleshooting

The diagnostics software provides tests for the various 1200 Series COMM Packs. Service information for both the RS-232C and GPIB Comm Packs is described in the *1240 / 1241 Service Manuals Vol I and Vol II*; refer to these documents for service information.

The *Theory of Operation Section* in the MPU Board service manual provides a detailed description of the MPU board's COMM Pack interface circuitry. That description will help you isolate a problem if interface circuitry is at fault.

COMM Packs receive +12 and - 12 Vdc power from the MPU board. Refer to the *Interconnect Diagram* for power interconnects and the *671-0058-XX MPU Board Service manual* for fuse locations.

## Expansion Module Interface Board Troubleshooting

The Expansion Mainframe Interface board is used in Expansion Mainframes only. It serves two purposes:

1. It interfaces, via External TekLink cabling, up to two acquisition modules in an Expansion Mainframe to an MPU board in another Mainframe configuration.
2. It daisy-chains the TekLink signals to other Expansion Mainframes.

For additional information refer to the Expansion Mainframe Interface board schematics, interconnect diagrams, and component location drawing in Section 10.

# Section 9

## Replaceable Electrical Parts

### PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

#### LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

#### CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

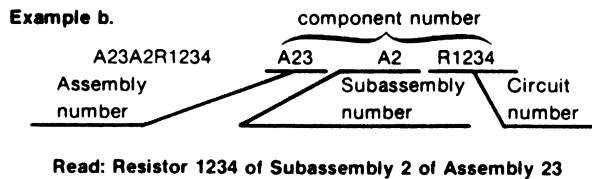
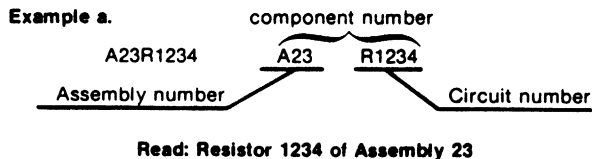
The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

#### ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

#### COMPONENT NUMBER (column one of the Electrical Parts List)

A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following:



Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the Mechanical Parts List. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

#### TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

#### SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

#### NAME & DESCRIPTION (column five of the Electrical Parts List)

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

#### MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

#### MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

## Replaceable Electrical Parts

### CROSS INDEX – MFR CODE NUMBER TO MANUFACTURER

Mfr Code	Manufacturer	Address	City, State, Zip Code
00222	ESC ELECTRONICS CORP	534 BERGEN BLVD	PALISADES PARK NJ 07650-2322
00779	AMP INC	2800 FULLING MILL	HARRISBURG PA 17105
00853	SANGAMO WESTON INC COMPONENTS DIV	SANGAMO RD PO BOX 128	PICKENS SC 29671-9716
01121	ALLEN-BRADLEY CO	1201 S 2ND ST	MILWAUKEE WI 53204-2410
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPY PO BOX 655012	DALLAS TX 75265
01961	VARIAN ASSOCIATES INC PULSE ENGINEERING SUBSIDIARY	7250 CONVOY CT P O BOX 12235	SAN DIEGO CA 92112
03888	KDI ELECTRONICS	60 S JEFFERSON RD	WHIPPANY NJ 07981-1001
04099	CAPCO INC	1328 WINTERS AVE	GRAND JUNCTION CO 81502
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC	5005 E MCDOWELL RD	PHOENIX AZ 85008-4229
08261	SPECTRA-STRIP	7100 LAMPSON AVE	GARDEN GROVE CA 92642
0JR03	ZMAN AND ASSOCIATES	7633 S 180th	KENT WA 98032
0JR04	TOSHIBA AMERICA INC	2692 DOW AVE	TUSTIN CA 92680
11236	CTS CORP	406 PARR ROAD	BERNE IN 46711-9506
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125-4632
12954	MICROSEMI CORP - SCOTTSDALE	8700 E THOMAS RD	SCOTTSDALE AZ 85252
14752	ELECTRO CUBE INC	1710 S DEL MAR AVE	SAN GABRIEL CA 91776-3825
15636	ELEC-TROL INC	26477 N GOLDEN VALLEY RD	SAUGUS CA 91350-2621
17856	SILICONIX INC	2201 LAURELWOOD RD	SANTA CLARA CA 95054-1516
18324	SIGNETICS CORP	4130 S MARKET COURT	SACRAMENTO CA 95834-1222
18796	MURATA ERIE NORTH AMERICAN INC	1900 W COLLEGE AVE	STATE COLLEGE PA 16801-2723
19701	PHILIPS COMPONENTS DISCRETE PRODUCTS	PO BOX 760	MINERAL WELLS TX 76067-0760
1W344	UNITED CHEMI-CON INC	9801 W HIGGINS	ROSEMONT IL 60018-4704
20933	KAPPA NETWORKS INC	765 ROOSEVELT AVE	CARTERET NJ 07008
22526	DU PONT E I DE NEMOURS AND CO INC	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
23875	M-TRON INDUSTRIES INC	100 DOUGLAS ST	YANKTON SD 57078-4430
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701-3737
24931	SPECIALTY CONNECTOR CO INC	2100 EARLYWOOD DR	FRANKLIN IN 46131
26769	PHILIPS COMPONENTS DISCRETE PRODUCTS	5900 AUSTRALIAN AVE	WEST PALM BEACH FL 33407-2330
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051-0606
27264	MOLEX INC	2222 WELLINGTON COURT	LISLE IL 60532-1613
31433	KEMET ELECTRONICS CORP	PO BOX 5928	GREENVILLE SC 29606
32997	BOURNS INC	1200 COLUMBIA AVE	RIVERSIDE CA 92507-2114
34335	ADVANCED MICRO DEVICES HARRIS SEMICONDUCTOR PRODUCTS GROUP	901 THOMPSON PL PO BOX 883	SUNNYVALE CA 94086-4518
34371	HARRIS CORP	200 PALM BAY BLVD	MELBOURNE FL 32919
34899	FAIR-RITE PRODUCTS CORP	1 COMMERCIAL ROW	WALLKILL NY 12589
50434	HEWLETT-PACKARD CO	370 W TRIMBLE RD	SAN JOSE CA 95131
51791	STATEK CORP	512 N MAIN ST	ORANGE CA 92668-1102
52840	WESTERN DIGITAL CORP	3128 RED HILL AVE	COSTA MESA CA 92626-4525
53387	MINNESOTA MINING MFG CO	PO BOX 2963	AUSTIN TX 78769-2963
55680	NICHICON /AMERICA/ CORP	927 E STATE PKY	SCHAUMBURG IL 60195-4526
57668	ROHM CORP	8 WHATNEY	IRVINE CA 92713
59660	TUSONIX INC	7741 N BUSINESS PARK DR	TUCSON AZ 85740-7144

CROSS INDEX – MFR CODE NUMBER TO MANUFACTURER

Mfr Code	Manufacturer	Address	City, State, Zip Code
60705	CERA-MITE CORPORATION	1327 6TH AVE	GRAFTON WI 53024-1831
61058	MATSUSHITA ELECTRIC CORP OF AMERICA PANASONIC INDUSTRIAL CO DIV	ONE PANASONIC WAY PO BOX 1502	SECAUCUS NJ 07094-2917
61271	FUJITSU MICROELECTRONICS INC	2985 KIFER RD	SANTA CLARA CA 95051-0802
61429	FOX ELECTRONICS	PO BOX 1078	CAPE CORAL FL 33910-1078
61857	SAN-O INDUSTRIAL CORP	85 ORVILLE DR	BOHEMIA LONG ISLAND NY 11716-2501
61892	NEC ELECTRONICS USA INC MICROCOMPUTER DIVISION	1 NATICK EXECUTIVE PARK	NATICK MA 01760
62786	HITACHI AMERICA LTD	1800 BERING DRIVE	SAN JOSE CA 95122
63791	STAR MICRONICS INC DIV OF COOPER INDUSTRIES INC	200 PARK AVE PO BOX 14460	NEW YORK NY 10166-0001
71400	BUSSMANN	114 OLD STATE RD	ST LOUIS MO 63178
71468	ITT CANNON	666 E DYER RD	SANTA ANA CA 92702
75378	CTS KNIGHTS INC	400 REIMANN AVE	SANDWICH IL 60548-1846
75915	LITTELFUSE INC	800 E NORTHWEST HWY	DES PLAINES IL 60016-3049
76381	MINNESOTA MINING AND MFG CO	3M CENTER	ST PAUL MN 55101-1428
78189	ILLINOIS TOOL WORKS INC	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR	BEAVERTON OR 97077-0001
91637	DALE ELECTRONICS INC	2064 12TH AVE	COLUMBUS NE 68601-3632
TK1471	PHENIX CONTACT INC	1900 GREENWOOD ST	HARRISBURG PA 17104
TK2153	PLANAR SYSTEMS INC	1400 NW COMPTON DRIVE	BEAVERTON OR 97006-1992
TK2156	ACACIA/DEANCO	7763 SW CIRRRUS RD	BEAVERTON OR 97005-6452

## Replaceable Electrical Parts

Component No.	Tektronix Part Number	Serial Effect	Number Discont	Part Name & Description	Mfr Code	Mfr Part Number
A1	672-1304-00	B010100	B010154	CIRCUIT BD ASSY:MPU	80009	672-1304-00
A1	671-0058-01	B010155	B010164	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-01
A1	671-0058-02	B010165	B010166	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-02
A1	671-0058-03	BB01067	B010183	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-03
A1	671-0058-04	B010184	B010196	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-04
A1	671-0058-06	B010197	B010223	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-06
A1	671-0058-07	B010224	B010224	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-07
A1	671-0058-09	B010225		CIRCUIT BD ASSY:MPU MAIN PROCESSING (2510 ONLY)REFER TO 070-7413-XX FOR DETAILS	80009	671-0058-09
A1	671-0058-03	B010100	B010173	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-03
A1	671-0058-04	B010174	B010220	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-04
A1	671-0058-05	B010221	B010224	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-05
A1	671-0058-06	B010225	B010255	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-06
A1	671-0058-07	B010256	B010345	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-07
A1	671-0058-08	B010256	B010345	CIRCUIT BD ASSY:MPU MAIN PROCESSING	80009	671-0058-08
A1	671-0058-09	B010346		CIRCUIT BD ASSY:MPU MAIN PROCESSING (3002 ONLY)REFER TO 070-7413-XX FOR DETAILS	80009	671-0058-09
A1A1	671-0058-00	B010100	B010154	CIRCUIT BD ASSY:M.P.U.	80009	671-0058-00
A1A2	671-0980-00	B010100	B010154	CIRCUIT BD ASSY:VIDEO FILTER (2510 ONLY)	80009	671-0980-00
A4	671-0979-00			CIRCUIT BD ASSY:KEYBOARD FILTER	80009	671-0979-00
A6	670-9664-00			CIRCUIT BD ASSY:HARD DISK CONTROLLER (2510 ONLY)	80009	670-9664-00
A6	670-9664-00	B010100	B010852	CIRCUIT BD ASSY:HARD DISK CONTROLLER	80009	670-9664-00
A6	670-9664-01	B010853		CIRCUIT BD ASSY:HARD DISK CONTROLLER (3002 ONLY)	80009	670-9664-01
A8	610-0767-00	B010100	B010255	CHASSIS ASSY:FLAT PANEL DISPLAY	80009	610-0767-00
A8	610-0767-01	B010256		CHASSIS ASSY:FLAT PANEL DISPLAY (2510 ONLY)	80009	610-0767-01
A8	610-0767-00	B010100	B010569	CHASSIS ASSY:FLAT PANEL DISPLAY	80009	610-0767-00
A8	610-0767-01	B010570	B010648	CHASSIS ASSY:FLAT PANEL DISPLAY	80009	610-0767-01
A8	610-0767-02	B010649		CHASSIS ASSY:FLAT PANEL DISPLAY (3002 ONLY)	80009	610-0767-02
A8A1	119-2748-00	B010100	B010569	FLAT PNL DISPLY:3002P (2510 ONLY)	TK2153	996-0053-00
A8A1	-----	B010256		FLAT PNL DSPLY:3002P (2510 ONLY) NOT REPLACEABLE;USE 610-0767-01		
A8A1	119-2748-00	B010100	B010569	FLAT PNL DISPLY:3002P (3002 ONLY)	TK2153	996-0053-00
A8A1	-----	B010570	B010648	FLAT PNL DSPLY:3002P (3002 ONLY) NOT REPLACEABLE;USE 610-0767-01		
A8A1	-----	B010649		FLAT PNL DSPLY:3002P (3002 ONLY) NOT REPLACEABLE;USE 610-0767-02		
A8A2	119-2747-00	B010100	B010183	CONN,DSPL PWR:7.425 L X 2.0 W	TK2153	996-0069-01
A8A2	119-2747-01	B010184	B010255	CONN,DSPL PWR:7.425 L X 2.0 W (2510 ONLY)	80009	119-2747-01
A8A2	-----	B010256		CONN,DSPL PWR:7.425 L X 2.0 W,POWER (2510 ONLY) NOT REPLACEABLE;USE 610-0767-01		
A8A2	119-2747-01	B010100	B010569	CONN,DSPL PWR:7.425 L X 2.0 W (3002 ONLY)	80009	119-2747-01
A8A2	-----	B010570	B010648	CONN,DSPL PWR:7.425 L X 2.0 W,POWER (3002 ONLY) NOT REPLACEABLE;USE 610-0767-01		
A8A2	-----	B010649		CONN,DSPL PWR:5.25 L X 2.0 W.POWER (3002 ONLY) NOT REPLACEABLE;USE 610-0767-02		
A8A3	-----	B010649		CIRCUIT BD ASSY:PS ADAPTER;;389-0943-XX (3002 ONLY) NOT REPLACEABLE;USE 610-0767-02		
A10	671-0556-00			CIRCUIT BD ASSY:3002E EXPANSION	80009	671-0556-00



## Replaceable Electrical Parts

Component No.	Tektronix Part Number	Serial Number Effect	Discont	Part Name & Description	Mfr Code	Mfr Part Number
A18	-----	B010256		CIRCUIT BD ASSY:CONVERSION (2510 ONLY) NOT REPLACEABLE;USE 610-0767-01		
A18	-----	B010570	B010648	CIRCUIT BD ASSY:CONVERSION (3002 ONLY) NOT REPLACEABLE;USE 610-0767-01		
A19	-----	B010649		CIRCUIT BD ASSY:VIDEO SIGNAL CONDITIONER; (3002 ONLY) NOT REPLACEABLE;USE 610-0767-02		
A6	670-9664-00			CIRCUIT BD ASSY:HARD DISK CONTROLLER (2510 ONLY)	80009	670-9664-00
A6	670-9664-00	B010100	B010852	CIRCUIT BD ASSY:HARD DISK CONTROLLER	80009	670-9664-00
A6	670-9664-01	B010853		CIRCUIT BD ASSY:HARD DISK CONTROLLER (3002 ONLY)	80009	670-9664-01
A6C100	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C110	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C112	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C114	281-0765-00	B010853		CAP,FXD,CER DI:100PF,5%,100V	04222	SA102A101JAA
A6C116	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C120	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C120	283-0084-02	B010853		CAP,FXD,CER DI:270PF,5%,1000V,DISC	60705	562CRE102EF271JA07
A6C130	283-0341-00	B010853		CAP,FXD,CER DI:0.047UF,10%,100V	04222	SR301C473KAA
A6C132	283-0167-00	B010853		CAP,FXD,CER DI:0.1UF,10%,100V	04222	SR211C104KAA
A6C134	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C136	285-1036-00	B010853		CAP,FXD,PLASTIC:0.2UF,20%,2000V	04099	TEK-18
A6C140	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C150	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C160	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C163	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C180	283-0730-00	B010100	B010852	CAP,FXD,MICA DI:274PF,1%,500V	00853	D155F2740F0
A6C180	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C190	283-0341-00	B010100	B010852	CAP,FXD,CER DI:0.047UF,10%,100V	04222	SR301C473KAA
A6C190	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C191	283-0167-00	B010100	B010852	CAP,FXD,CER DI:0.1UF,10%,100V	04222	SR211C104KAA
A6C200	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C210	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C240	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C260	283-0631-00	B010100	B010852	CAP,FXD,MICA DI:95PF,1%,500V	00853	D155F950F0
A6C290	285-1306-00	B010100	B010852	CAP,FXD,PLASTIC:1.0UF,1%,50V	14752	65001A105F
A6C290	290-1075-00	B010853		CAP,FXD,ELCTLT:47UF,16V	1W344	KMC16VB47RM6X11LL
A6C291	290-1075-00	B010100	B010852	CAP,FXD,ELCTLT:47UF,16V	1W344	KMC16VB47RM6X11LL
A6C300	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C310	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C320	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C330	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C350	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C360	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C370	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C380	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C390	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C395	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C400	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C410	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C420	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C430	281-0913-00			CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C440	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C450	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C460	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C470	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT

# Replaceable Electrical Parts

Component No.	Tektronix Part Number	Serial Effect	Number Discont	Part Name & Description	Mfr Code	Mfr Part Number
A6C480	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C490	281-0913-00	B010100	B010853	CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6C495	281-0913-00	B010853		CAP,FXD,CER DI:0.1UF,50V,AXIAL	18796	RPA10Z5U104Z50VPT
A6DL300	119-1825-00	B010100	B010852	DELAY LINE,ELEC:60NS,TAPPED,14 DIP	00222	14TD60
A6DL310	119-1825-00	B010853		DELAY LINE,ELEC:60NS,TAPPED,14 DIP	00222	14TD60
A6J190	131-4303-00			CONN,RCPT,ELEC:HEADER,VERT,2 X 5	22526	65692-001
A6J200	131-4304-00			CONN,RCPT,ELEC:HEADER,VERT,2 X 10	22526	65692-007
A6J390	131-4306-00			CONN,RCPT,ELEC:HEADER,STR,2 X 20,0.1 CTR	22526	65692-025
A6J400	131-4305-00			CONN,RCPT,ELEC:HEADER,VERT,2 X 17	22526	65692-019
A6R100	315-0101-00	B010853		RES,FXD,FILM:100 OHM,5%,0.25W	57668	100 5% 0.25w
A6R110	321-0258-01	B010853		RES,FXD,FILM:4.75K OHM,0.5%,0.125W,TC=TO	19701	5033RD4K750D
A6R111	315-0821-00	B010853		RES,FXD,FILM:820 OHM,5%,0.25W	19701	820 5% 0.25w
A6R112	315-0821-00	B010853		RES,FXD,FILM:820 OHM,5%,0.25W	19701	820 5% 0.25w
A6R113	321-0193-01	B010853		RES,FXD,FILM:1K OHM,0.5%,0.125W,TC=TO	19701	5033RD1K000F
A6R130	315-0102-00	B010100	B010852	RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R130	315-0111-00	B010853		RES,FXD,FILM:110 OHM,5%,0.25W	57668	110 5% 0.25w
A6R161	315-0821-00	B010100	B010852	RES,FXD,FILM:820 OHM,5%,0.25W	19701	820 5% 0.25w
A6R162	315-0102-00	B010100	B010852	RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R163	321-0258-01	B010100	B010852	RES,FXD,FILM:4.75K OHM,0.5%,0.125W,TC=TO	19701	5033RD4K750D
A6R190	315-0111-00	B010100	B010852	RES,FXD,FILM:110 OHM,5%,0.25W	57668	110 5% 0.25w
A6R190	315-0102-00	B010853		RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R210	315-0102-00	B010100	B010852	RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R211	315-0101-00	B010100	B010852	RES,FXD,FILM:100 OHM,5%,0.25W	57668	100 5% 0.25w
A6R212	315-0102-00	B010100	B010852	RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R213	315-0102-00	B010100	B010852	RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R214	315-0102-00	B010100	B010852	RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R220	315-0151-00	B010853		RES,FXD,FILM:150 OHM,5%,0.25W	57668	150 5% 0.25w
A6R222	315-0470-00	B010853		RES,FXD,FILM:47 OHM,5%,0.25W	57668	47 5% 0.25w
A6R260	315-0821-00	B010100	B010852	RES,FXD,FILM:820 OHM,5%,0.25W	19701	820 5% 0.25w
A6R260	315-0102-00	B010853		RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R261	321-0193-01	B010100	B010852	RES,FXD,FILM:1K OHM,0.5%,0.125W,TC=TO	19701	5033RD1K000F
A6R262	315-0102-00	B010853		RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R264	315-0471-00	B010853		RES,FXD,FILM:470 OHM,5%,0.25W	57668	470 5% 0.25w
A6R340	315-0102-00	B010853		RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R360	315-0470-00	B010100	B010852	RES,FXD,FILM:47 OHM,5%,0.25W	57668	47 5% 0.25w
A6R370	307-0540-00	B010100	B010852	RES NTWK,FXD,FI:(5)1K OHM,10%,0.7W	11236	750-61-R1KOHM OR 770
A6R370	315-0471-00	B010853		RES,FXD,FILM:470 OHM,5%,0.25W	57668	470 5% 0.25w
A6R372	315-0102-00	B010853		RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R380	315-0151-00	B010100	B010852	RES,FXD,FILM:150 OHM,5%,0.25W	57668	150 5% 0.25w
A6R380	315-0102-00	B010853		RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R381	315-0102-00	B010100	B010852	RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R382	315-0471-00	B010100	B010852	RES,FXD,FILM:470 OHM,5%,0.25W	57668	470 5% 0.25w
A6R382	315-0102-00	B010853		RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R383	315-0471-00	B010100	B010852	RES,FXD,FILM:470 OHM,5%,0.25W	57668	470 5% 0.25w
A6R384	315-0102-00	B010100	B010852	RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R385	315-0102-00	B010100	B010852	RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6R400	307-0993-00			RES NTWK,FXD,FI:330/390 OHM,10 DIP	01121	710E331391
A6R450	307-0540-00	B010100	B010852	RES NTWK,FXD,FI:(5)1K OHM,10%,0.7W	11236	750-61-R1KOHM OR 770
A6R470	307-0540-00	B010853		RES NTWK,FXD,FI:(5)1K OHM,10%,0.7W	11236	750-61-R1KOHM OR 770
A6R472	315-0102-00	B010853		RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A6U100	156-1315-00			IC,DIGITAL:LSTTL,BUFFER;QUAD DIFFERENTIAL	27014	26LS32
A6U110	156-1681-00	B010100	B010852	IC,DIGITAL:LSTTL,DRIVER;QUAD DIFFERENTIAL	27014	DS26LS31CNA+
A6U120	156-1756-00	B010100	B010852	IC,DIGITAL:ALSTTL,FLIP FLOP;DUAL D-TYPE	01295	74ALS74
A6U120	156-2030-01	B010853		IC,LINEAR:ASTTL,DATA SEPARATOR;HARD DISK	27014	8465

## Replaceable Electrical Parts

Component No.	Tektronix Part Number	Serial Effect	Number Discont	Part Name & Description	Mfr Code	Mfr Part Number
A6U130	156-2389-00	B010100	B010852	IC,DIGITAL:ASTTL,COUNTER;SYNCH 8-BIT	01295	74AS867
A6U140	156-2066-00	B010100	B010853	IC,MEMORY:CMOS,SRAM;8K X 8,120NS;,DIP28.3	61271	6264P
A6U150	156-2066-00	B010100	B010853	IC,MEMORY:CMOS,SRAM;8K X 8,120NS;,DIP28.3	61271	6264P
A6U150	156-1611-00	B010853		IC,DIGITAL:FTTL,FLIP FLOP;DUAL D-TYPE;74F74	04713	74F74
A6U160	156-1756-00	B010853		IC,DIGITAL:ALSTTL,FLIP FLOP;DUAL D-TYPE	01295	74ALS74
A6U170	156-2389-00	B010853		IC,DIGITAL:ASTTL,COUNTER;SYNCH 8-BIT	01295	74AS867
A6U180	156-2030-01	B010100	B010852	IC,LINEAR:ASTTL,DATA SEPARATOR;HARD DISK	27014	8465
A6U180	156-2066-00	B010853		IC,MEMORY:CMOS,SRAM;8K X 8,120NS;,DIP28.3	61271	6264P
A6U190	156-2066-00	B010853		IC,MEMORY:CMOS,SRAM;8K X 8,120NS;,DIP28.3	61271	6264P
A6U200	156-0994-00	B010100	B010852	IC,DIGITAL:LSTTL,MUX;8-INPUT DATA SELECTOR	01295	SN74LS151N
A6U200	156-1681-00	B010853		IC,DIGITAL:LSTTL,DRIVER;QUAD DIFFERENTIAL	27014	DS26LS31CNA+
A6U210	156-0994-00	B010853		IC,DIGITAL:LSTTL,MUX;8-INPUT DATA SELECTOR	01295	SN74LS151N
A6U220	160-5236-00	B010100	B010852	MICROCKT,DGTL:STTL,QUAD 16 INP REG,PRGM	80009	160-5236-00
A6U300	156-0467-00	B010853		IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS38N
A6U310	156-0467-00	B010100	B010852	IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS38N
A6U320	156-0383-00	B010100	B010852	IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NOR	01295	SN74LS02N
A6U320	156-0392-00	B010853		IC,DIGITAL:LSTTL,FLIP FLOP;QUAD D-TYPE,	01295	SN74LS175N
A6U330	160-5235-00	B010100	B010853	MICROCKT,DGTL:OCTAL 20 INP AND/OR,PRGM	80009	160-5235-00
A6U330	156-1722-00	B010853		IC,DIGITAL:FTTL,GATES;HEX INV;74F04,DIP14.3	04713	74F04
A6U340	156-2148-00	B010100	B010852	IC,PROCESSOR:NMOS,CONTROLLER;DISK, SCRN	52840	2010
A6U340	160-5236-00	B010853		MICROCKT,DGTL:STTL,QUAD 16 INP REG,PRGM	80009	160-5236-00
A6U350	156-0844-00	B010100	B010852	IC,DIGITAL:LSTTL,COUNTER;SYNCH 4-BIT BINARY	01295	SN74LS161AN
A6U350	160-5235-00	B010853		MICROCKT,DGTL:OCTAL 20 INP AND/OR,PRGM	80009	160-5235-00
A6U360	156-1722-00	B010100	B010852	IC,DIGITAL:FTTL,GATES;HEX INV;74F04,DIP14.3	04713	74F04
A6U360	156-2148-00	B010853		IC,PROCESSOR:NMOS,CONTROLLER;DISK, SCRN	52840	2010
A6U370	156-1611-00	B010100	B010852	IC,DIGITAL:FTTL,FLIP FLOP;DUAL D-TYPE;74F74	04713	74F74
A6U380	156-0844-00	B010853		IC,DIGITAL:LSTTL,COUNTER;SYNCH 4-BIT BINARY	01295	SN74LS161AN
A6U390	156-1111-00	B010853		IC,DIGITAL:LSTTL,BUS TRANSCEIVER;OCTAL,	01295	SN74LS245N
A6U395	156-1111-00	B010853		IC,DIGITAL:LSTTL,BUS TRANSCEIVER;OCTAL,	01295	SN74LS245N
A6U400	156-0645-00			IC,DIGITAL:LSTTL,SCHMITT TRIG;HEX INV	01295	74LS14
A6U410	156-0467-00	B010100	B010852	IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS38N
A6U420	156-0392-00	B010100	B010852	IC,DIGITAL:LSTTL,FLIP FLOP;QUAD D-TYPE,	01295	SN74LS175N
A6U420	156-0467-00	B010853		IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS38N
A6U430	156-0392-00	B010100	B010852	IC,DIGITAL:LSTTL,FLIP FLOP;QUAD D-TYPE,	01295	SN74LS175N
A6U430	156-0865-00	B010853		IC,DIGITAL:LSTTL,FLIP FLOP;OCTAL D-TYPE,	01295	74LS273
A6U440	156-0383-00	B010853		IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NOR	01295	SN74LS02N
A6U450	156-0865-00	B010100	B010852	IC,DIGITAL:LSTTL,FLIP FLOP;OCTAL D-TYPE,	01295	74LS273
A6U450	156-0382-00	B010853		IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	74LS00
A6U460	156-1111-00	B010100	B010853	IC,DIGITAL:LSTTL,BUS TRANSCEIVER;OCTAL,	01295	SN74LS245N
A6U470	156-1111-00	B010100	B010853	IC,DIGITAL:LSTTL,BUS TRANSCEIVER;OCTAL,	01295	SN74LS245N
A6U480	156-0392-00	B010853		IC,DIGITAL:LSTTL,FLIP FLOP;QUAD D-TYPE,	01295	SN74LS175N
A6U490	156-1111-00	B010100	B010853	IC,DIGITAL:LSTTL,BUS TRANSCEIVER;OCTAL,	01295	SN74LS245N
A6U495	156-1111-00	B010853		IC,DIGITAL:LSTTL,BUS TRANSCEIVER;OCTAL,	01295	SN74LS245N
A10	671-0556-00			CIRCUIT BD ASSY:3002E EXPANSION	80009	671-0556-00
A10C110	290-0745-00			CAP,FXD,ELCTLT:22UF,+50-20%,25WVDC	1W344	SM63VB22RMBX11LL
A10C400	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C401	281-0563-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	MA405E474MAA
A10C403	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C430	281-0563-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	MA405E474MAA
A10C441	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	SA201C103KAA
A10C529	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	SA201C103KAA
A10C530	281-0808-00			CAP,FXD,CER DI:7 PF,20%,100V	04222	SA101A7ROCAA
A10C543	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	SA201C103KAA
A10C601	281-0563-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	MA405E474MAA

## Replaceable Electrical Parts

Component No.	Tektronix Part Number	Serial Number Effect	Discont	Part Name & Description	Mfr Code	Mfr Part Number
A10C630	281-0808-00			CAP,FXD,CER DI:7 PF,20%,100V	04222	SA101A7ROCAA
A10C631	281-0808-00			CAP,FXD,CER DI:7 PF,20%,100V	04222	SA101A7ROCAA
A10C633	281-0563-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	MA405E474MAA
A10CR441	152-0141-02			SEMICON DVC,DI:SW,SI,30V,150MA,30V,DO-35	27014	1N4152
A10J100	131-3969-00			CONN,RCPT,ELEC:HEADER,5 POSITION	TK1471	MSTBA1.5/5-G-5.08-AU
A10J118	131-4262-00			CONN,RCPT,ELEC:HDR,PCB,MALE,RTANG,1 X 5	27264	26-48-2056
A10J150	131-4799-00			CONN,PLUG,ELEC:HDR,PCB,MALE,RTANG,1 X 2,0.1	00779	103904-1
A10J158	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD PL	22526	48283-036
A10J610	131-4495-00			CONN,RCPT,ELEC:CKT BD,26 CONTACT,RTANG	53387	1202JLOA2JL
A10J625	131-4495-00			CONN,RCPT,ELEC:CKT BD,26 CONTACT,RTANG	53387	1202JLOA2JL
A10K505	148-0079-00			RELAY,REED:2 FORM A,110MA,28VDC,COIL 5VDC	15636	RA30382051-99
A10K510	148-0079-00			RELAY,REED:2 FORM A,110MA,28VDC,COIL 5VDC	15636	RA30382051-99
A10K515	148-0079-00			RELAY,REED:2 FORM A,110MA,28VDC,COIL 5VDC	15636	RA30382051-99
A10K518	148-0079-00			RELAY,REED:2 FORM A,110MA,28VDC,COIL 5VDC	15636	RA30382051-99
A10K530	148-0079-00			RELAY,REED:2 FORM A,110MA,28VDC,COIL 5VDC	15636	RA30382051-99
A10L602	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L603	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L605	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L608	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L609	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L610	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L611	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L614	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L615	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L616	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L617	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L618	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L619	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L620	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L621	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L625	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L627	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L628	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L629	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L630	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L631	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10L632	108-0864-00			COIL,RF:FIXED,71NH	OJR03	108-0864-00
A10Q441	151-0302-00			TRANSISTOR:NPN,SI,TO-18	04713	2N2222A
A10R140	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	10 5% 0.25w
A10R141	315-0240-00			RES,FXD,FILM:24 OHM,5%,0.25W	57668	24 5% 0.25w
A10R142	315-0240-00			RES,FXD,FILM:24 OHM,5%,0.25W	57668	24 5% 0.25w
A10R402	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	120 5% 0.25w
A10R407	315-0620-00			RES,FXD,FILM:62 OHM,5%,0.25W	19701	62 5% 0.25w
A10R408	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	120 5% 0.25w
A10R409	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	120 5% 0.25w
A10R410	315-0620-00			RES,FXD,FILM:62 OHM,5%,0.25W	19701	62 5% 0.25w
A10R411	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	120 5% 0.25w
A10R412	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	120 5% 0.25w
A10R414	315-0620-00			RES,FXD,FILM:62 OHM,5%,0.25W	19701	62 5% 0.25w
A10R415	315-0620-00			RES,FXD,FILM:62 OHM,5%,0.25W	19701	62 5% 0.25w
A10R416	315-0620-00			RES,FXD,FILM:62 OHM,5%,0.25W	19701	62 5% 0.25w
A10R431	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25W	57668	270 5% 0.25w
A10R432	315-0111-00			RES,FXD,FILM:110 OHM,5%,0.25W	57668	110 5% 0.25w

## Replaceable Electrical Parts

Component No.	Tektronix		Serial Number		Part Name & Description	Mfr Code	Mfr Part Number
	Part Number	Effect	Discont				
A10R433	315-0271-00				RES,FXD,FILM:270 OHM,5%,0.25W	57668	270 5% 0.25w
A10R441	315-0271-00				RES,FXD,FILM:270 OHM,5%,0.25W	57668	270 5% 0.25w
A10R524	315-0271-00				RES,FXD,FILM:270 OHM,5%,0.25W	57668	270 5% 0.25w
A10R525	315-0470-00				RES,FXD,FILM:47 OHM,5%,0.25W	57668	47 5% 0.25w
A10R526	315-0470-00				RES,FXD,FILM:47 OHM,5%,0.25W	57668	47 5% 0.25w
A10R527	315-0271-00				RES,FXD,FILM:270 OHM,5%,0.25W	57668	270 5% 0.25w
A10R541	315-0331-00				RES,FXD,FILM:330 OHM,5%,0.25W	57668	330 5% 0.25w
A10R542	315-0102-00				RES,FXD,FILM:1K OHM,5%,0.25W	57668	1000 5% 0.25w
A10R543	315-0272-00				RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	2700 5% 0.125w
A10R601	315-0121-00				RES,FXD,FILM:120 OHM,5%,0.25W	19701	120 5% 0.25w
A10U529	156-1640-00				IC,DIGITAL:ECL,RECEIVER;TRIPLE LINE;10H116	04713	10H116
A10U538	156-1381-00				IC,LINEAR:BIPOLAR,TRANSISTOR ARRAY;THREE	34371	CA3096AE
W100	174-0599-00				CA ASSY,SP,ELEC:5,14 AWG,6.5 L,RIBBON (A1J100 MPU BD TO P4 POWER SUPPLY BD)	80009	ORDER BY DESCRIPTION
W110	174-0744-00				CA ASSY,SP,ELEC:3,28 AWG,10.0 L,RIBBON (A1J110 MPU BD TO A4 KYBD FILTER BD)	TK2156	62966
W115	174-0600-00				CA ASSY,SP,ELEC:5,22 AWG,10.0 L (A1J115 MPU BD TO P6 POWER SUPPLY BD)	TK2156	62967
W120	174-0592-00				CA ASSY,SP,ELEC:40,28 AWG,9.0 L,RIBBON (A1J120 MPU BD TO A6J390 HD CONTROLLER BD)	TK2156	62899
W140	174-0597-00				CA ASSY,SP,ELEC:10,28 AWG,5.5 L,RIBBON (A1J140 MPU BD TO A6J190 HD CONTROLLER BD)	TK2156	62909
W150	174-0590-01				CA ASSY,SP,ELEC:4,18 AWG,14.0 L,RIBBON (3002 ONLY;FROM A1J150 TO P3 HARD DISK DRV)	80009	174-0590-01
W150	174-0590-00	B010100	B010169		CA ASSY,SP,ELEC:4,18 AWG,14.0 L,RIBBON (2510 ONLY;FROM A1J150 TO P3 HARD DISK DRV)	80009	174-0590-00
W150	174-0590-01	B010170			CA ASSY,SP,ELEC:4,18 AWG,14.0 L,RIBBON (2510 ONLY;FROM A1J150 TO P3 HARD DISK DRV)	80009	174-0590-01
W160	174-0593-00				CA ASSY,SP,ELEC (A1J160 MPU BD TO S160,ON/STBY SWITCH)	80009	174-0593-00
W170	174-0598-00				CA ASSY,SP,ELEC:34,28 AWG,6.0 L,RIBBON (FROM A1J170 TO J1 FLOPPY DISK DRIVE)	TK2156	62910
W190	174-0596-00				CA ASSY,SP,ELEC:4,28 AWG,6.0 L,RIBBON (A1J190 MPU BD TO J2 FLOPPY DISK DRIVE)	80009	174-0596-00
W200	174-0591-00				CA ASSY,SP,ELEC:20,28 AWG,3.5 L,RIBBON (A6J200 HD CONTROLLER BD TO P2 HD DRIVE)	80009	174-0591-00
W400	174-0594-00				CA ASSY,SP,ELEC:34,28 AWG,3.50 L,RIBBON (A6J400 HD CONTROLLER BD TO P1 HD DRIVE)	80009	174-0594-00

# DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

## SYMBOLS

Graphic symbol and class designation letters are based on ANSI Y32.14, 1973 in terms of positive logic. Logic symbols are depicted according to the manufacturer's data book information (not according to function).

Letter symbols for quantities used in electrical science and electrical engineering are based on ANSI Y10.5, 1968.

Drafting practices, line conventions, and lettering conform to ANSI Y14.15, 1966 and ANSI Y14.2, 1973.

Abbreviations are based on ANSI Y1.1, 1972.

You can inquire about these ANSI standards by contacting:

American National Standard Institute  
1430 Broadway  
New York, New York 10018

## COMPONENT VALUES

Electrical components shown on the diagram are in the following units unless noted otherwise:

Capacitors = Values one or greater are in picofarads (pF)  
Values less than one are in microfarads (μF)

Resistors = Ohms (Ω)

## ACTIVE-LOW SIGNAL INDICATORS

A common convention used for indicating an active-low signal (a signal performing its intended function when it is in a low state) is an overbar, as shown in the signal name RESET. The overbar may be used in this manual whenever a reference is given to an active-low signal. However, the same active-low signal is indicated on the schematic with a tilde (~), or a slash (/) following the signal name (e.g., RESET~ or RESET/).

The information and special symbols below may appear in this manual.

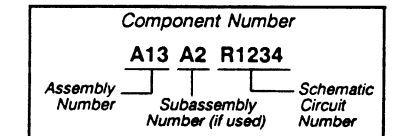
## ASSEMBLY NUMBERS

Each assembly in the instrument is assigned an assembly number (e.g., A5). The assembly number appears in the title of each:

- schematic diagram (lower right corner)
- circuit board component location illustration
- schematic or circuit board component location look up table (when shown).

The Replaceable Electrical Parts list is arranged by assemblies in numerical order. The components are listed alphabetically by component location numbers. Look at the following example to see how to construct a component number.

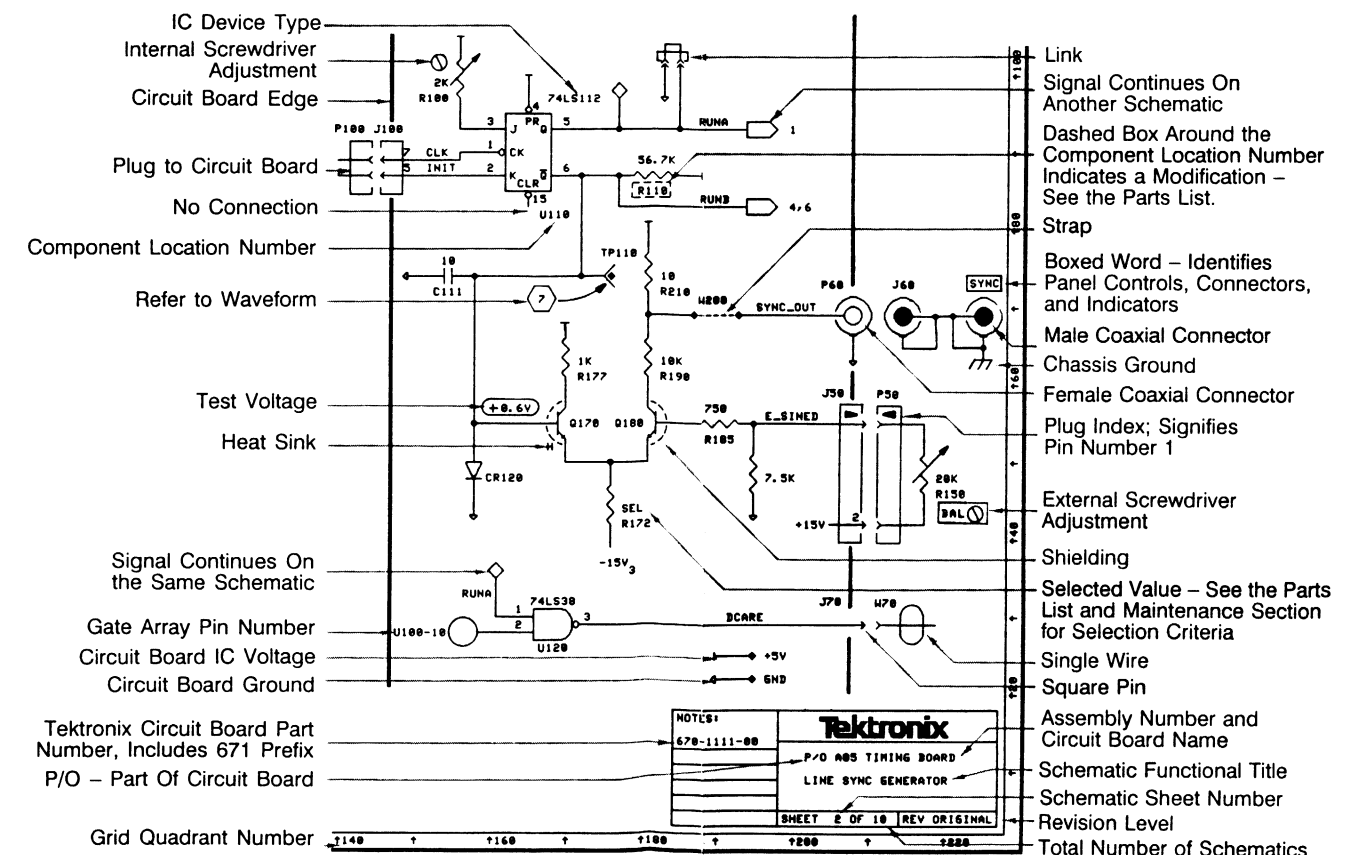
## COMPONENT NUMBER EXAMPLE

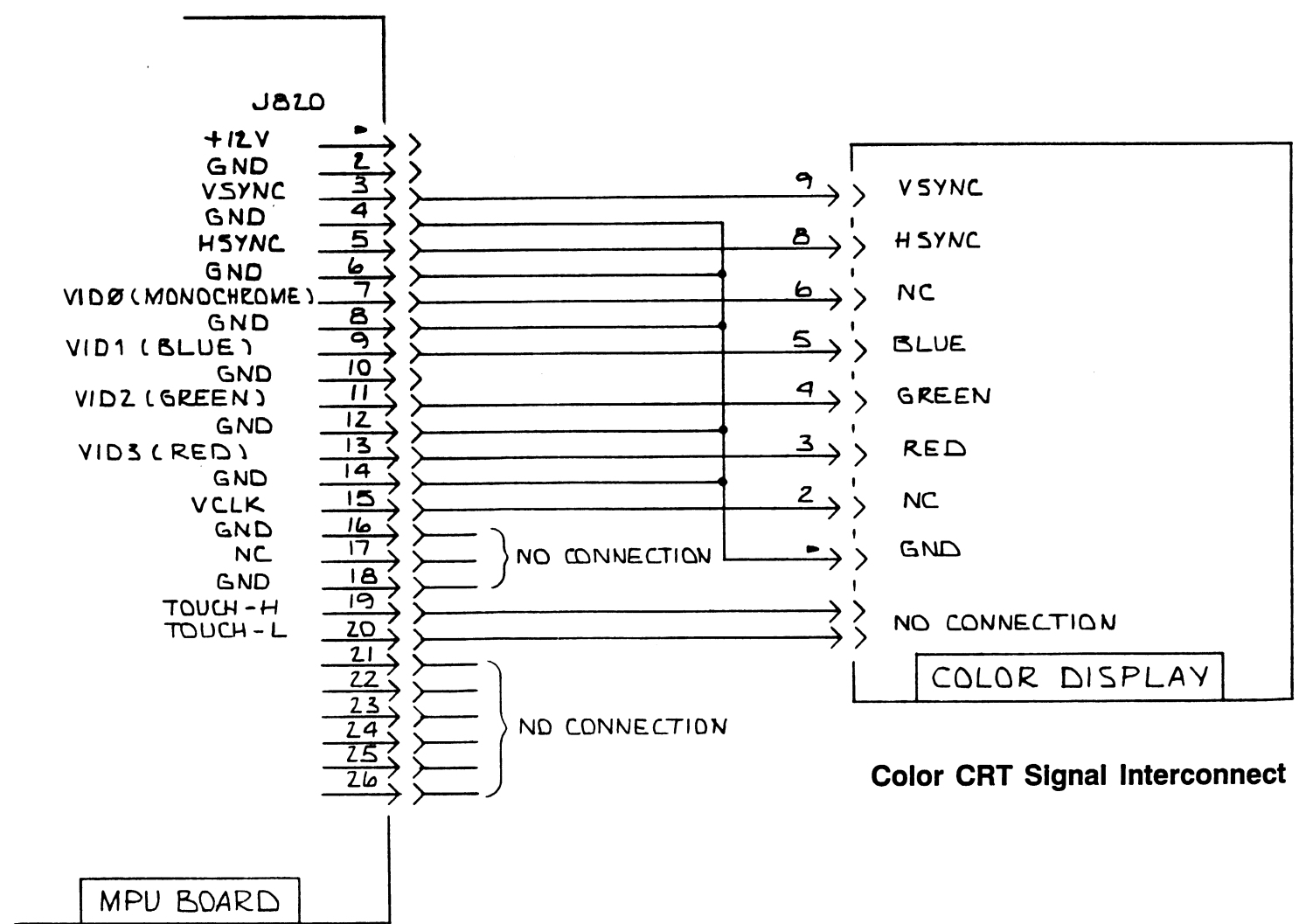
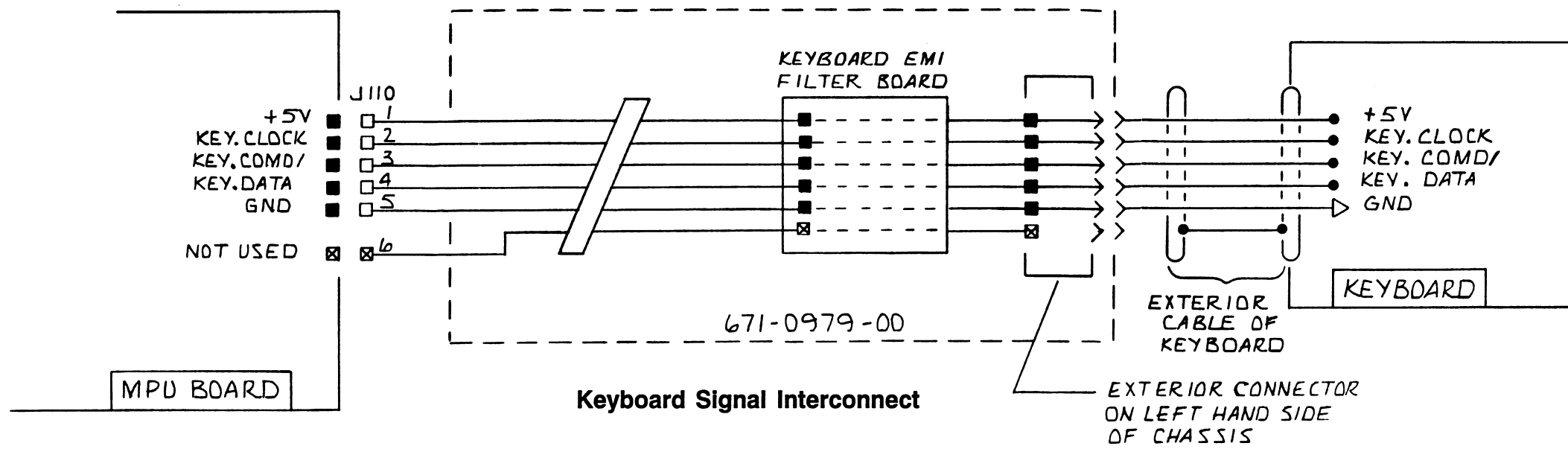


Chassis mounted components have no Assembly Number prefix - see end of Replaceable Parts List.

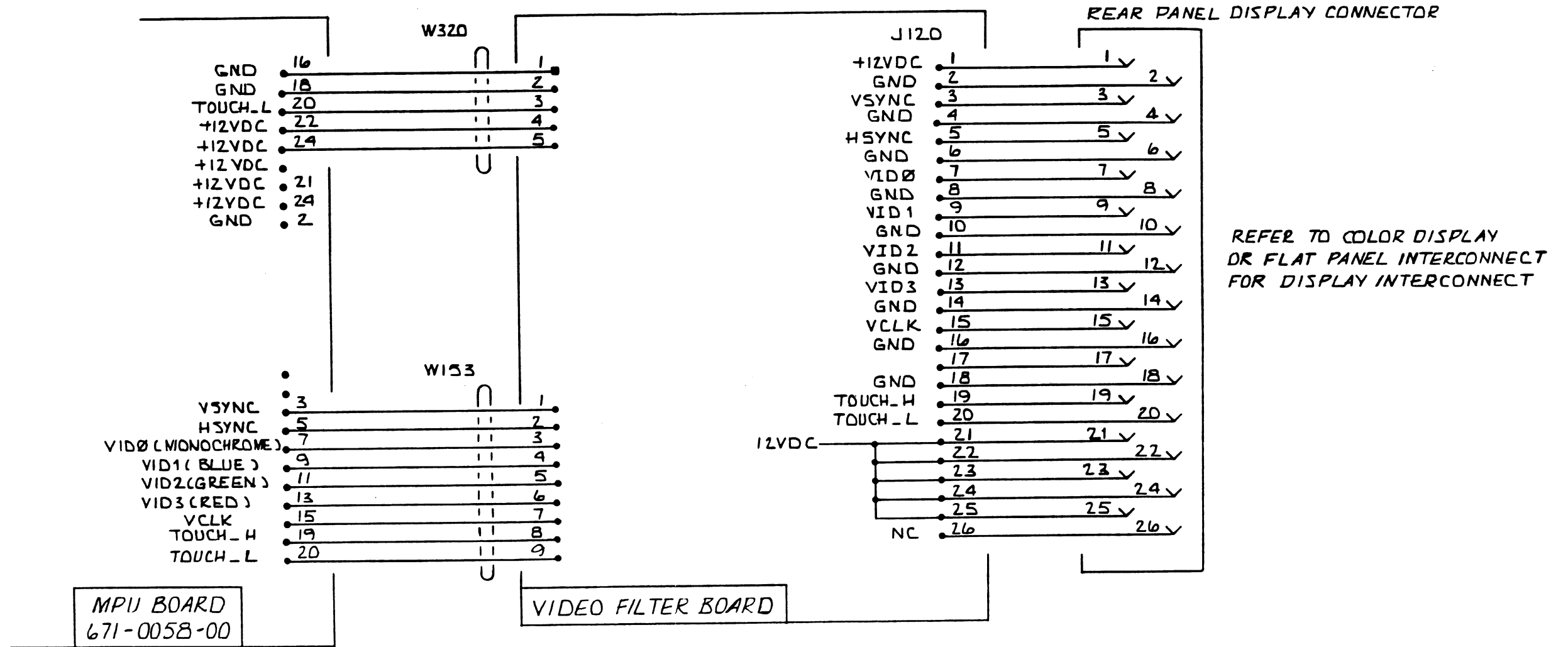
## GRID COORDINATES

The schematic diagram(s) and circuit board component location illustration both have grids. A look up table (when shown) provides grid coordinates for ease of locating components. There may be two tables for each assembly: one for the circuit board component location illustration and one for the schematic diagram(s).





**Keyboard and Color CRT Signal Interconnect**

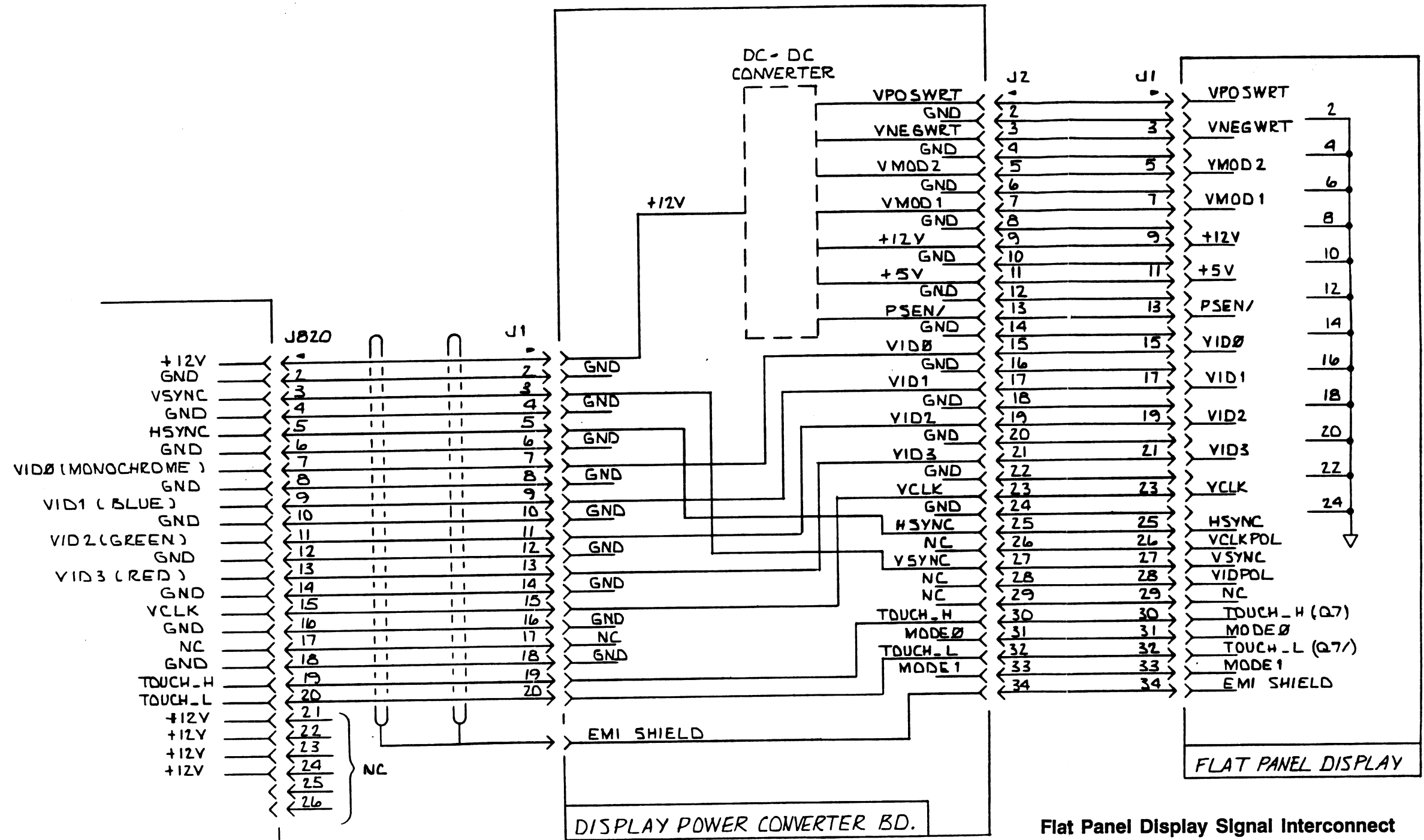


REFER TO COLOR DISPLAY OR FLAT PANEL INTERCONNECT FOR DISPLAY INTERCONNECT

Video Filter Board Signal Interconnect

Video Filter Board Signal Interconnect



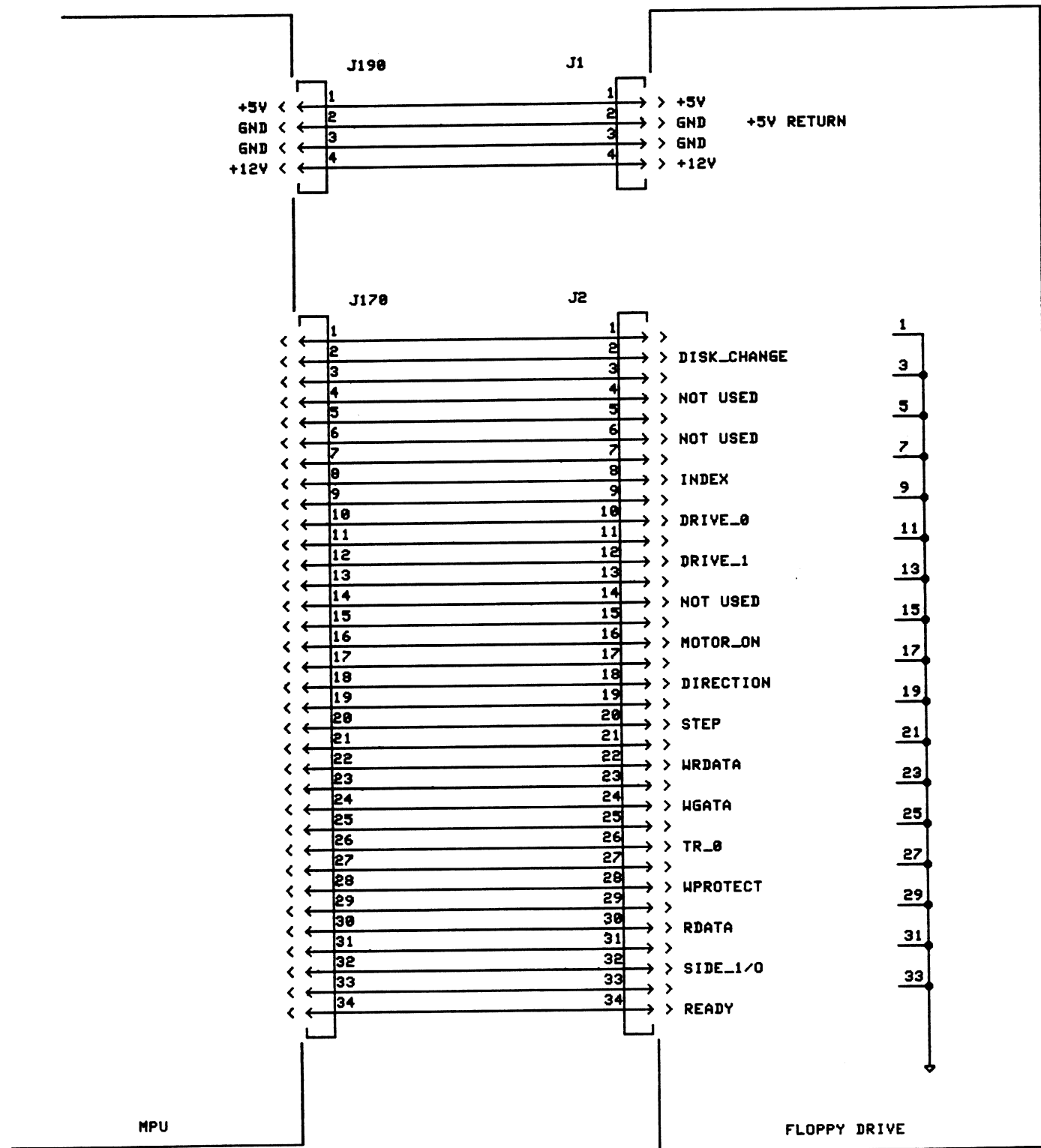


NOTE 1 J820 MOUNTLY DIRECTLY ON MPU BOARD IF OPTIONAL EMI DAUGHTER BD. IS NOT INSTALLED.

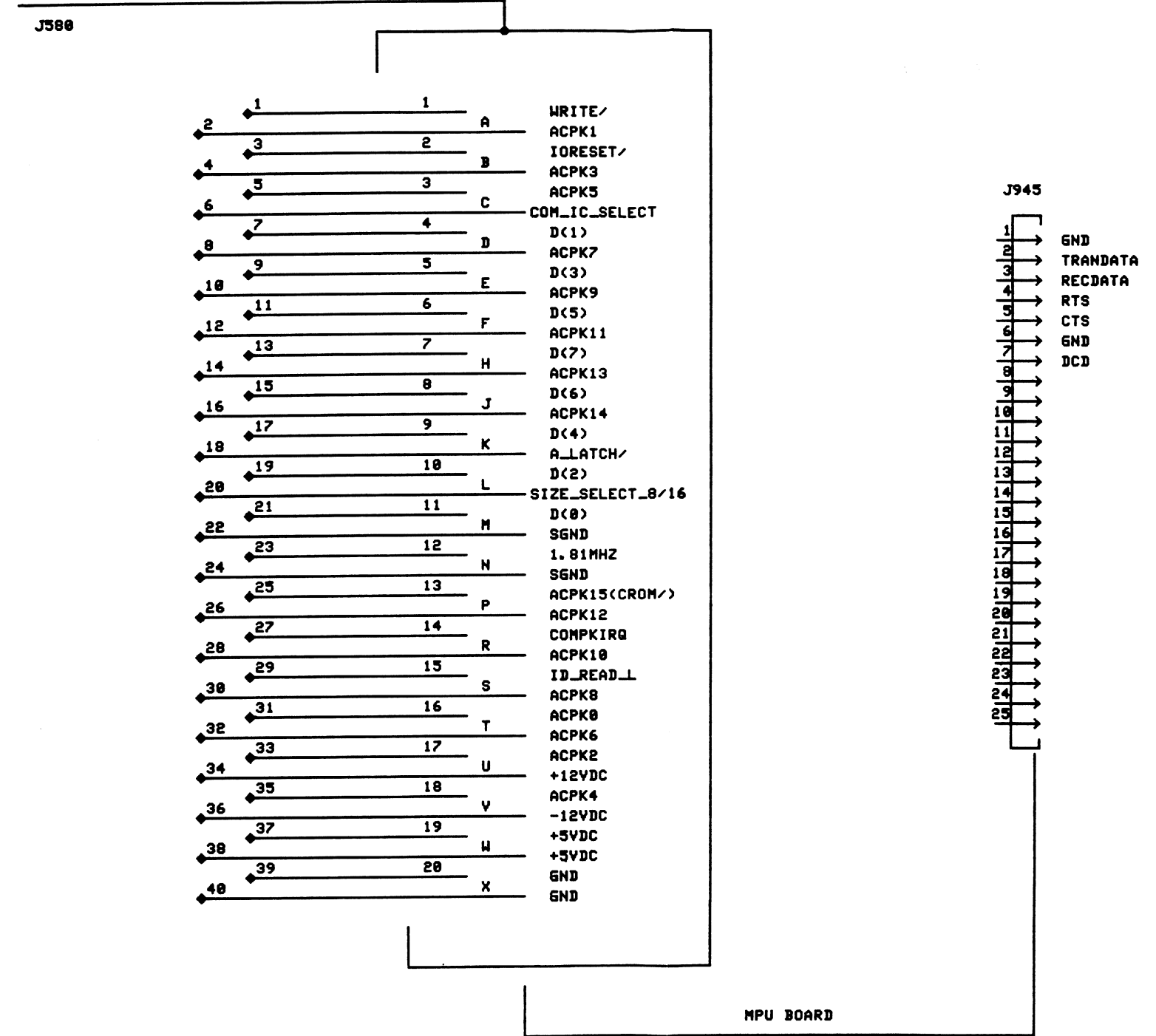
NOTE 2 J820 PIN/SIGNAL ASSIGNMENTS ARE IDENTICAL FOR FLAT PANEL AND COLOR MONITOR CABLE.

Flat Panel Display Signal Interconnect

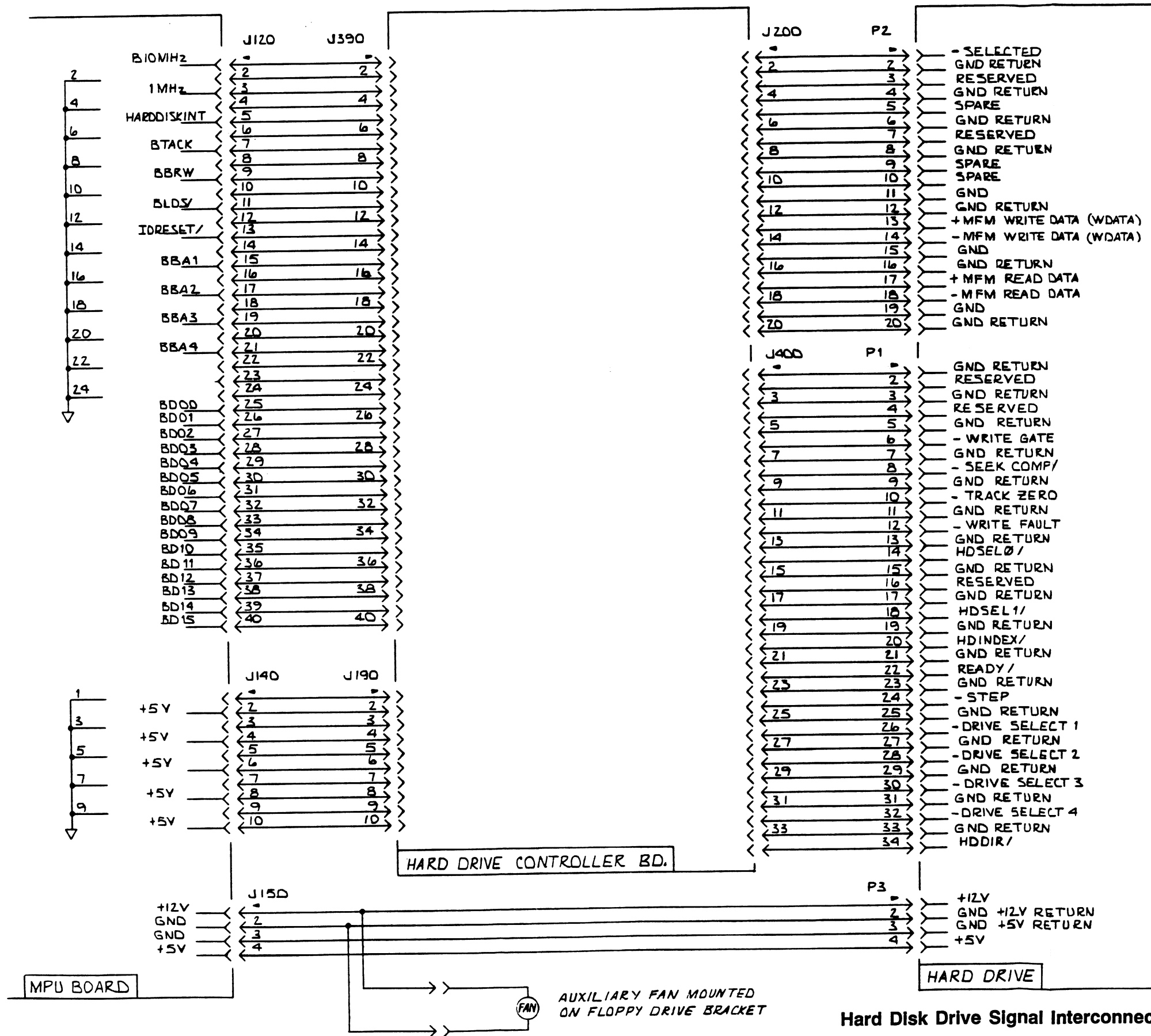
Flat Panel Display Signal Interconnect



Floppy Drive Signal Interconnect

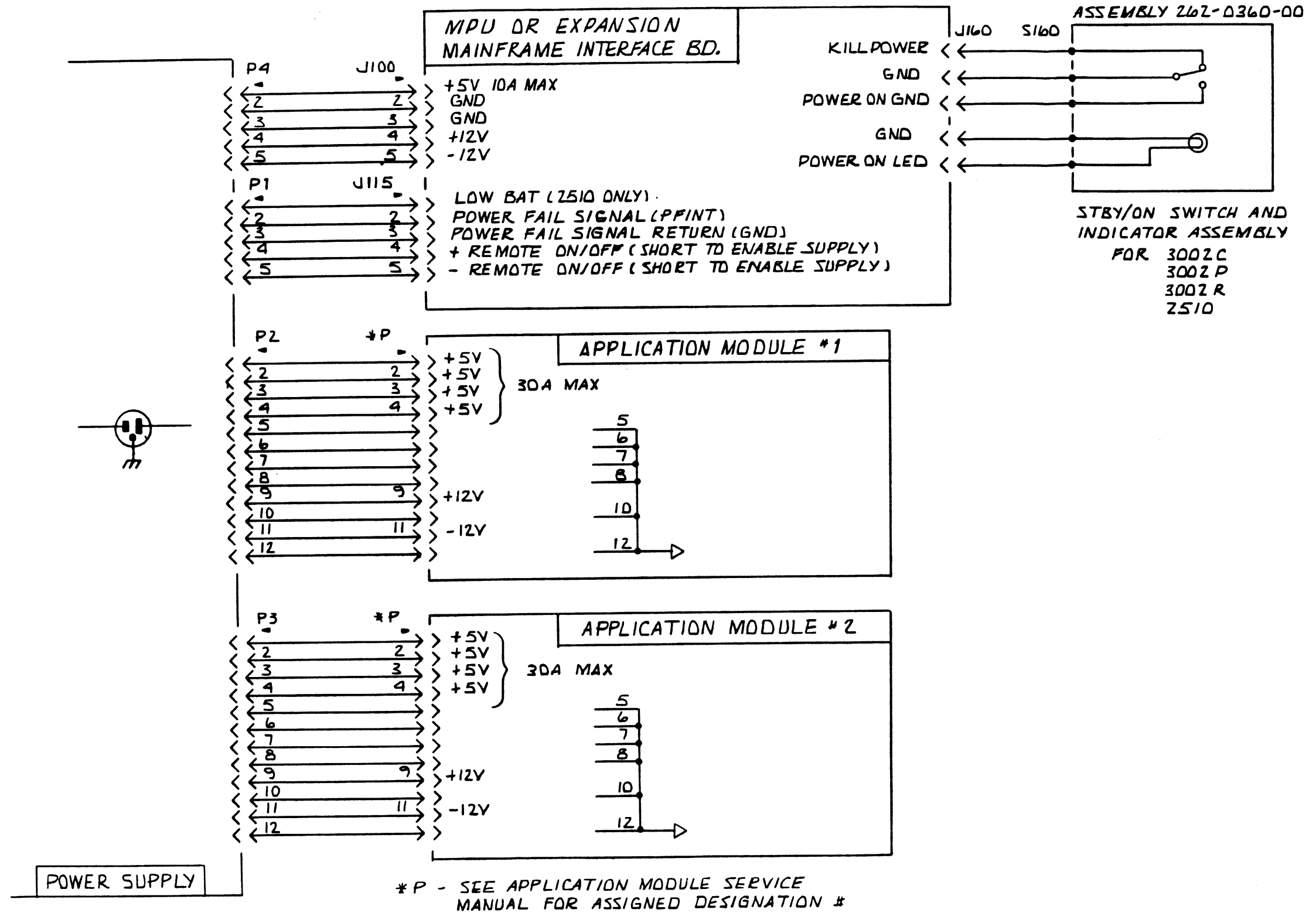


COMM Pack, and RS-232 Signal Interconnect

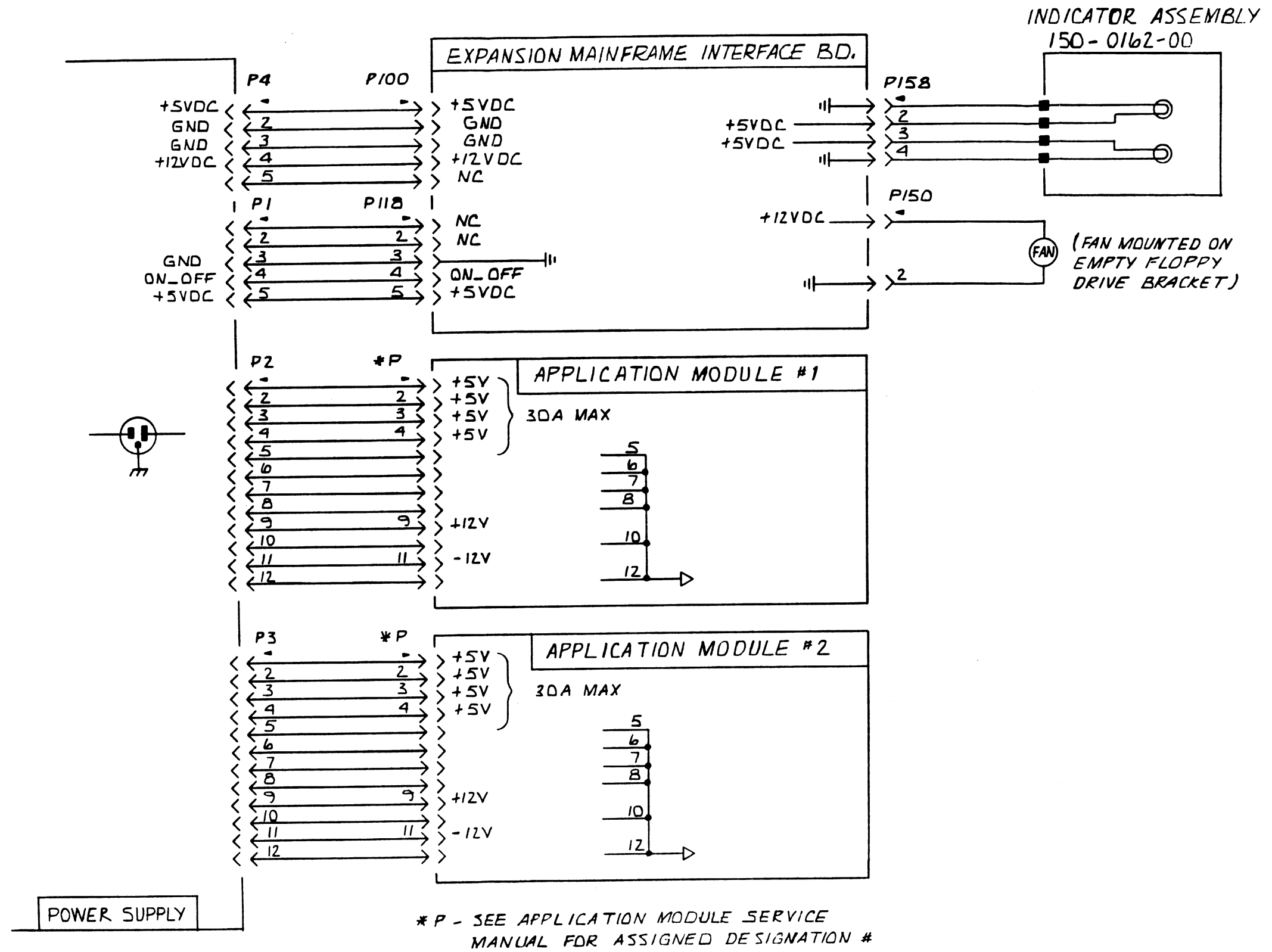


Hard Disk Drive Signal Interconnect

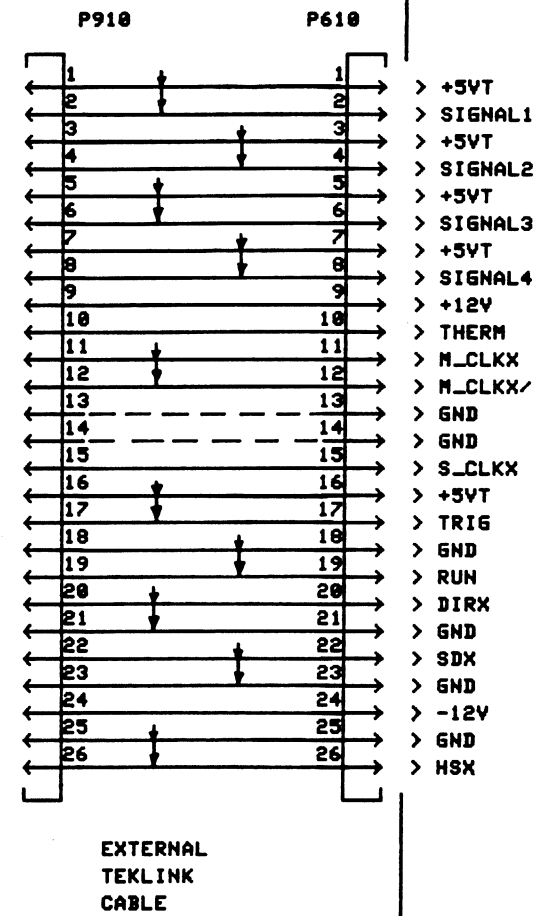
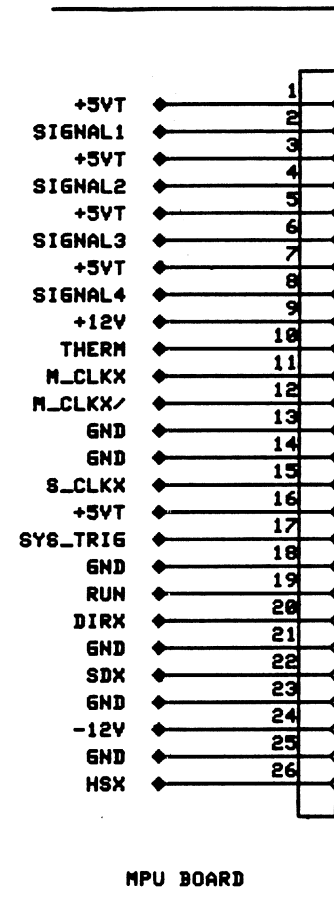
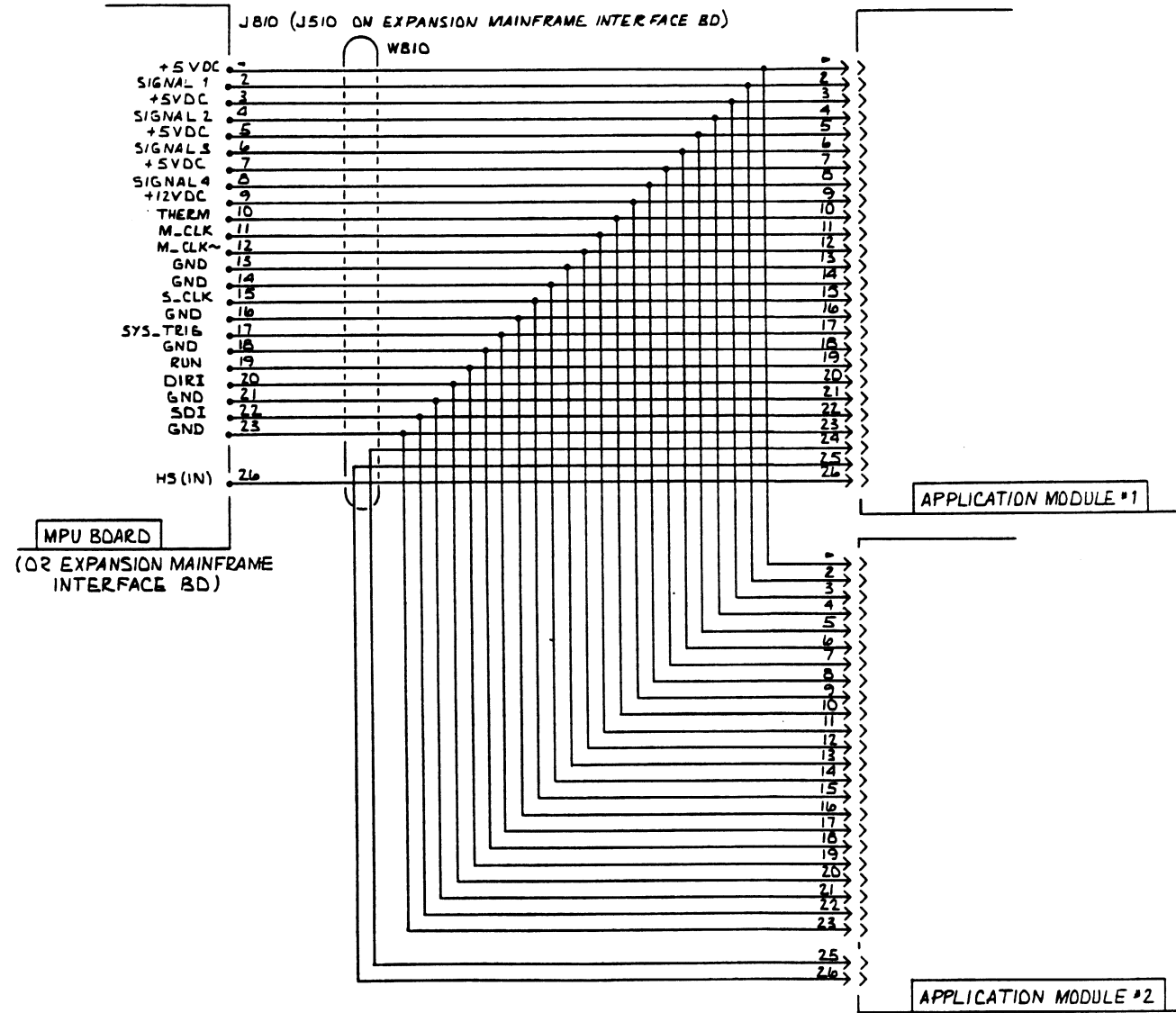
Hard Disk Drive Signal Interconnect



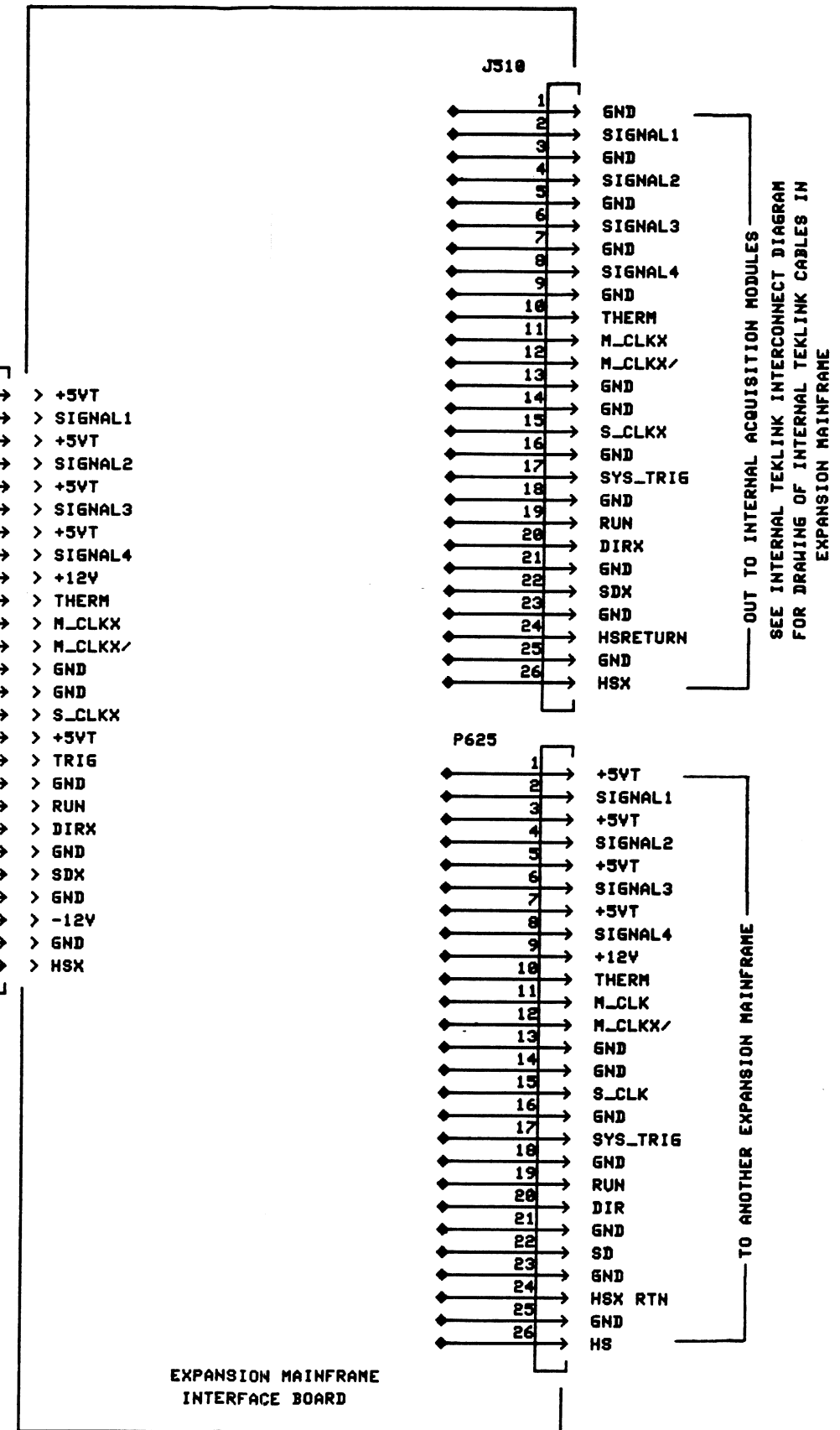
3002C/P/R and 2510 Mainframe Power Interconnect



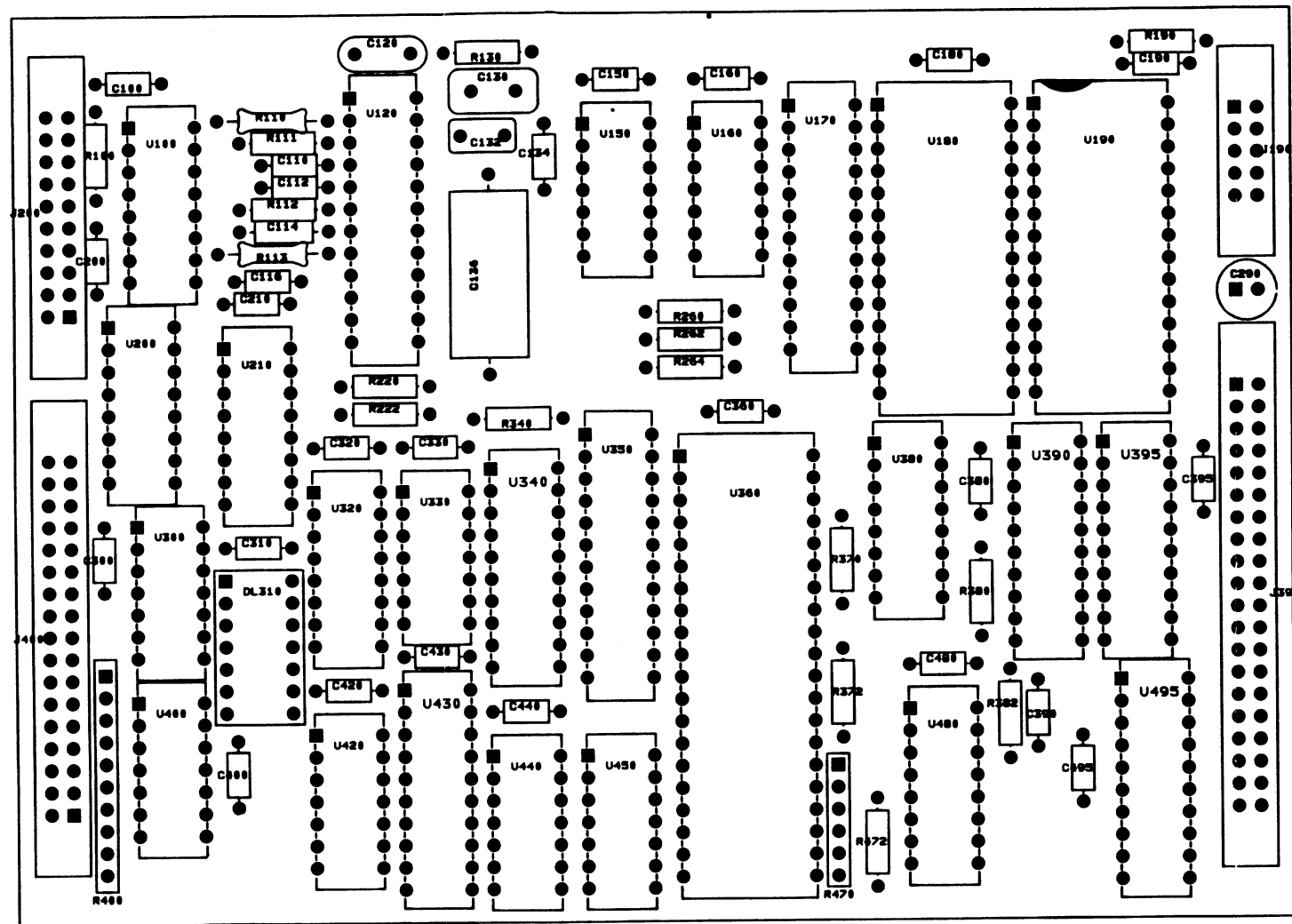
3002E Mainframe Power Interconnect



External TekLink Signal Interconnect

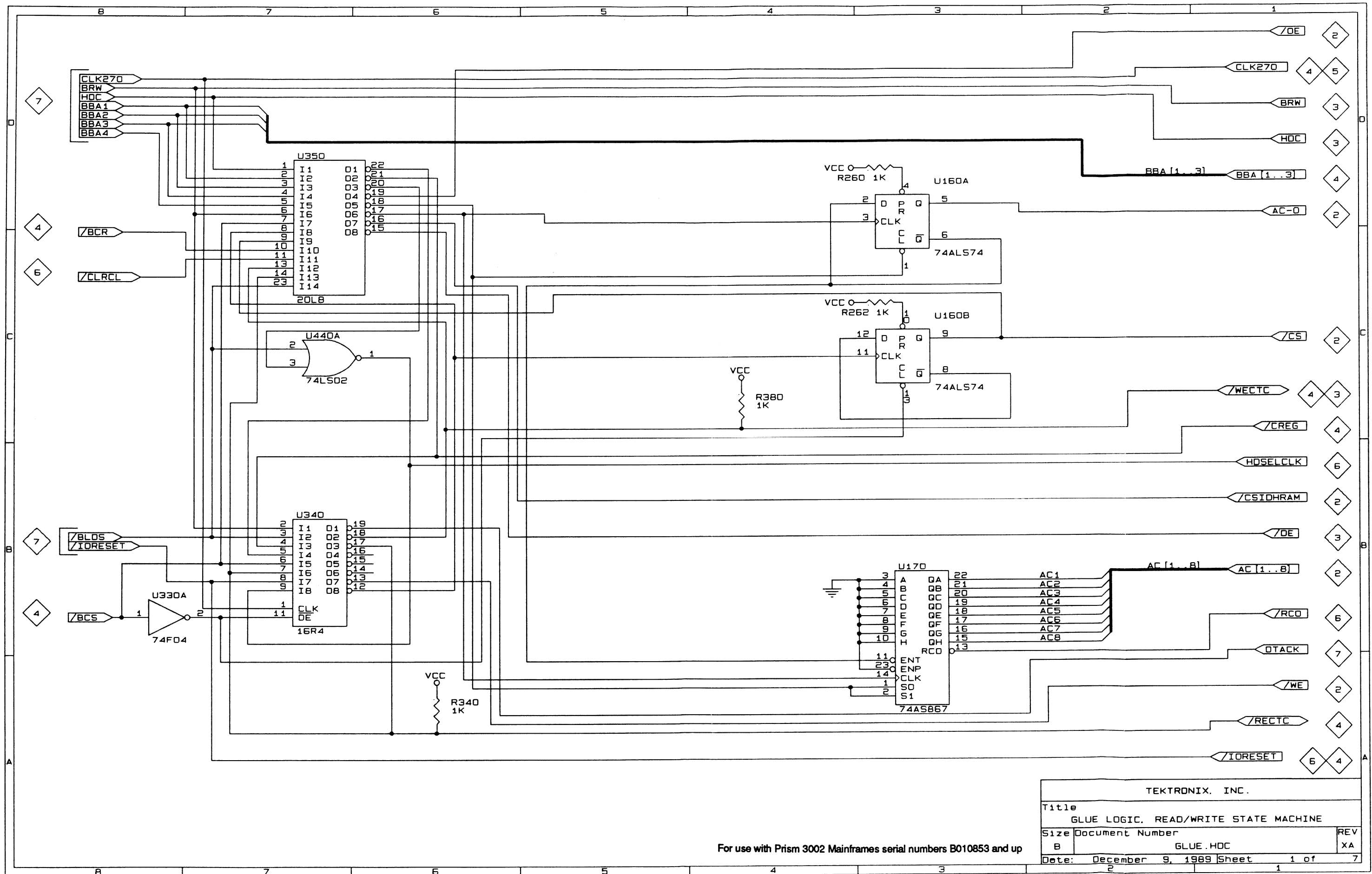


TekLink Signal Interconnect



For use with Prism 3002 Mainframes serial numbers B010853 and up

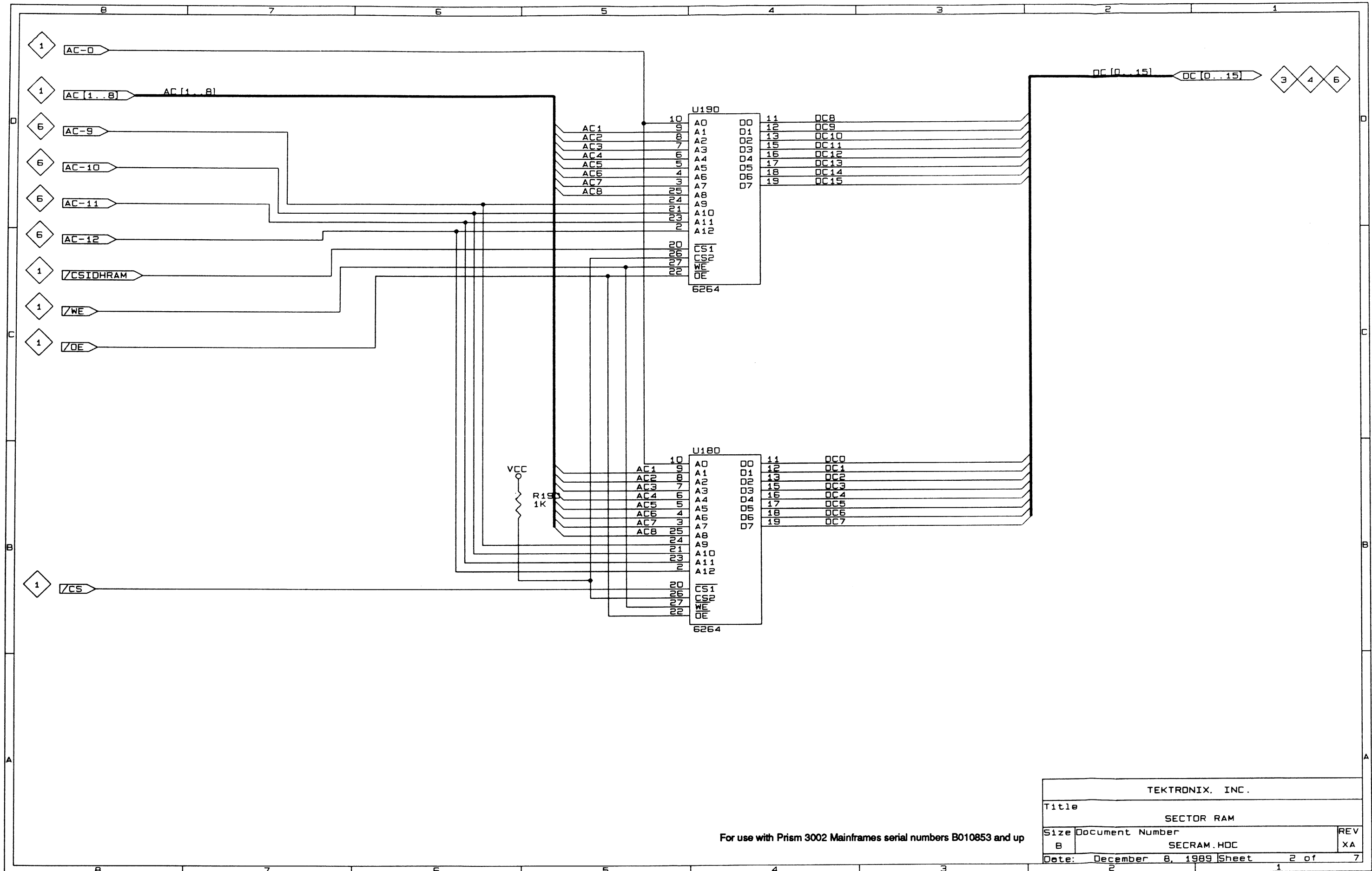
**Hard Disk Controller Board  
Component Locations**



For use with Prism 3002 Mainframes serial numbers B010853 and up

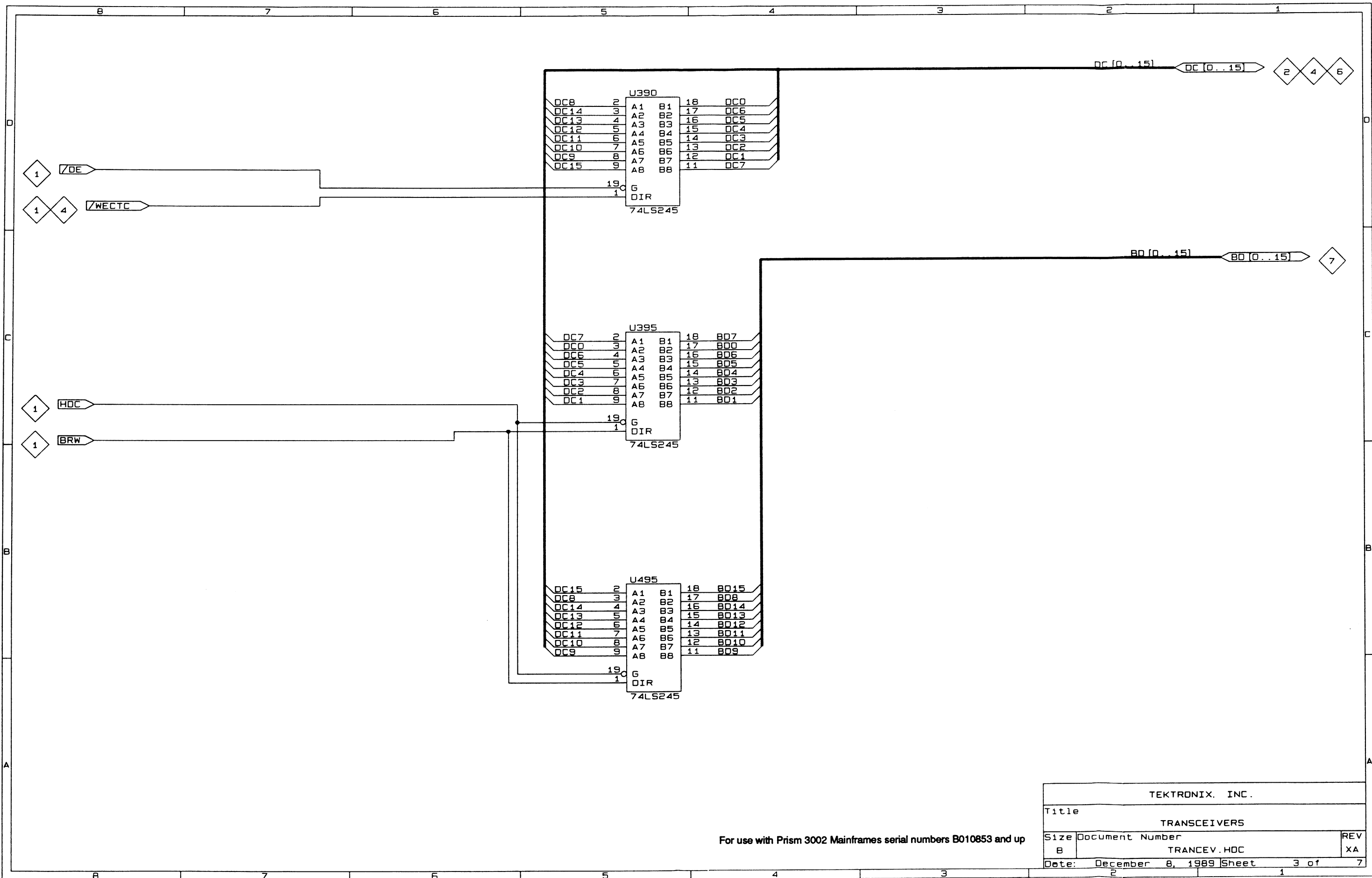
TEKTRONIX, INC.		
Title GLUE LOGIC, READ/WRITE STATE MACHINE		
Size B	Document Number GLUE.HOC	REV XA
Date: December 9, 1989	Sheet 1 of	7





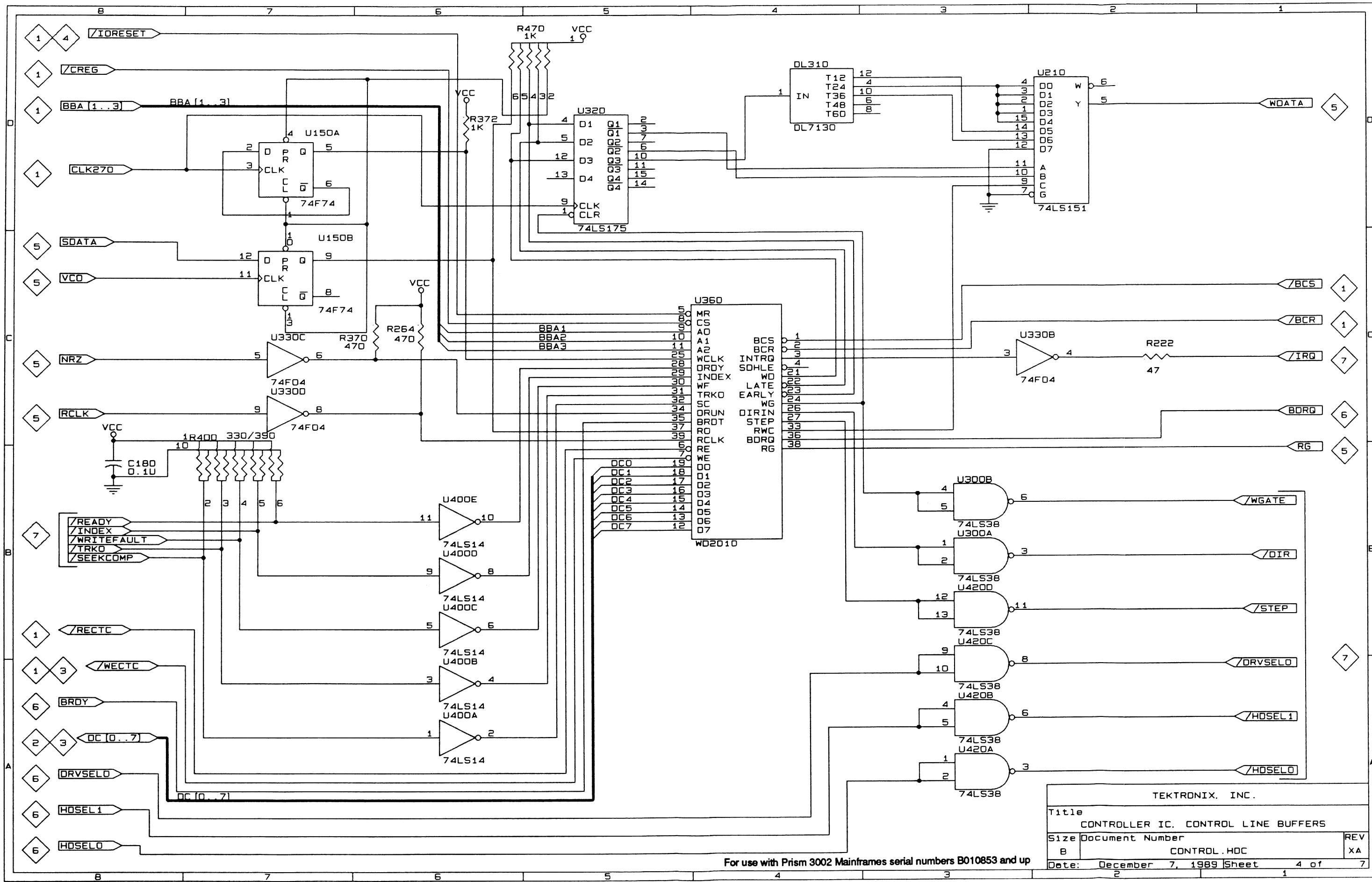
For use with Prism 3002 Mainframes serial numbers B010853 and up

TEKTRONIX, INC.			
Title			
SECTOR RAM			
Size	Document Number	REV	
B	SECRAM.HOC	XA	
Date:	December 8, 1989	Sheet	2 of 7



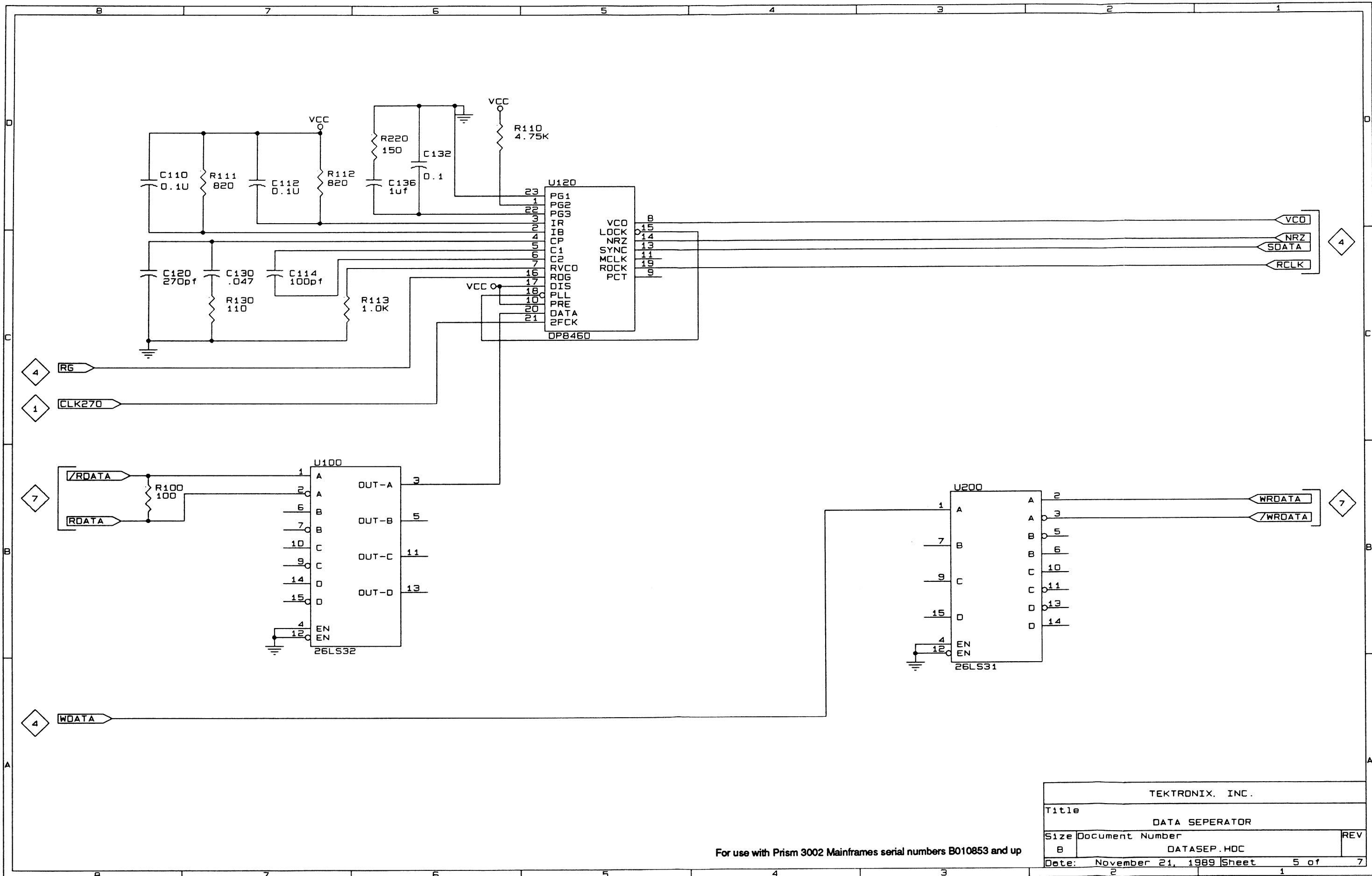
For use with Prism 3002 Mainframes serial numbers B010853 and up

TEKTRONIX, INC.			
Title			
TRANSCIVERS			
Size	Document Number	REV	
B	TRANCEV.HOC	XA	
Date:	December 8, 1989	Sheet	3 of 7



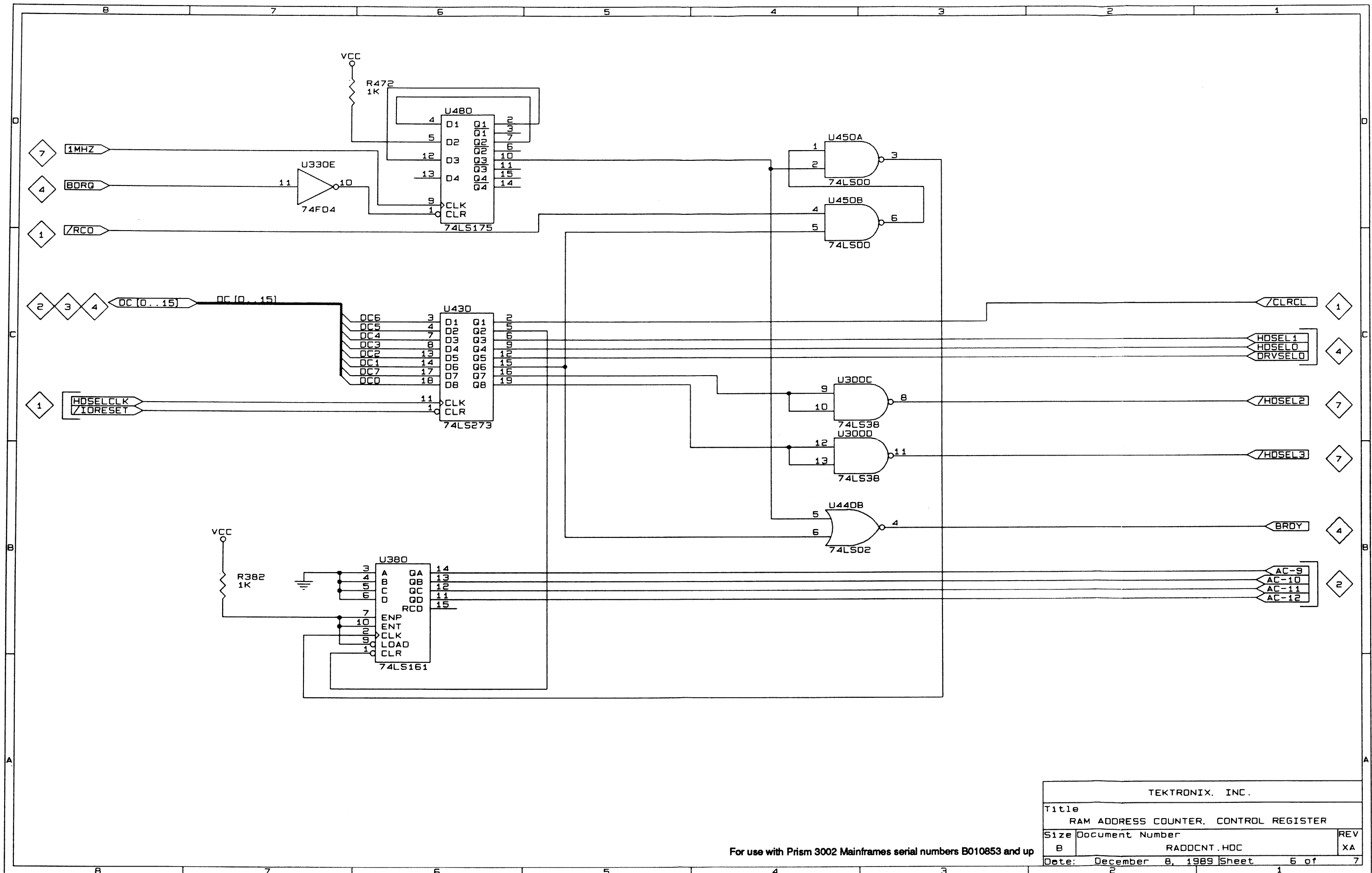
For use with Prism 3002 Mainframes serial numbers B010853 and up

TEKTRONIX, INC.		
Title	CONTROLLER IC. CONTROL LINE BUFFERS	
Size	Document Number	REV
B	CONTROL.HDC	XA
Date:	December 7, 1989	Sheet 4 of 7



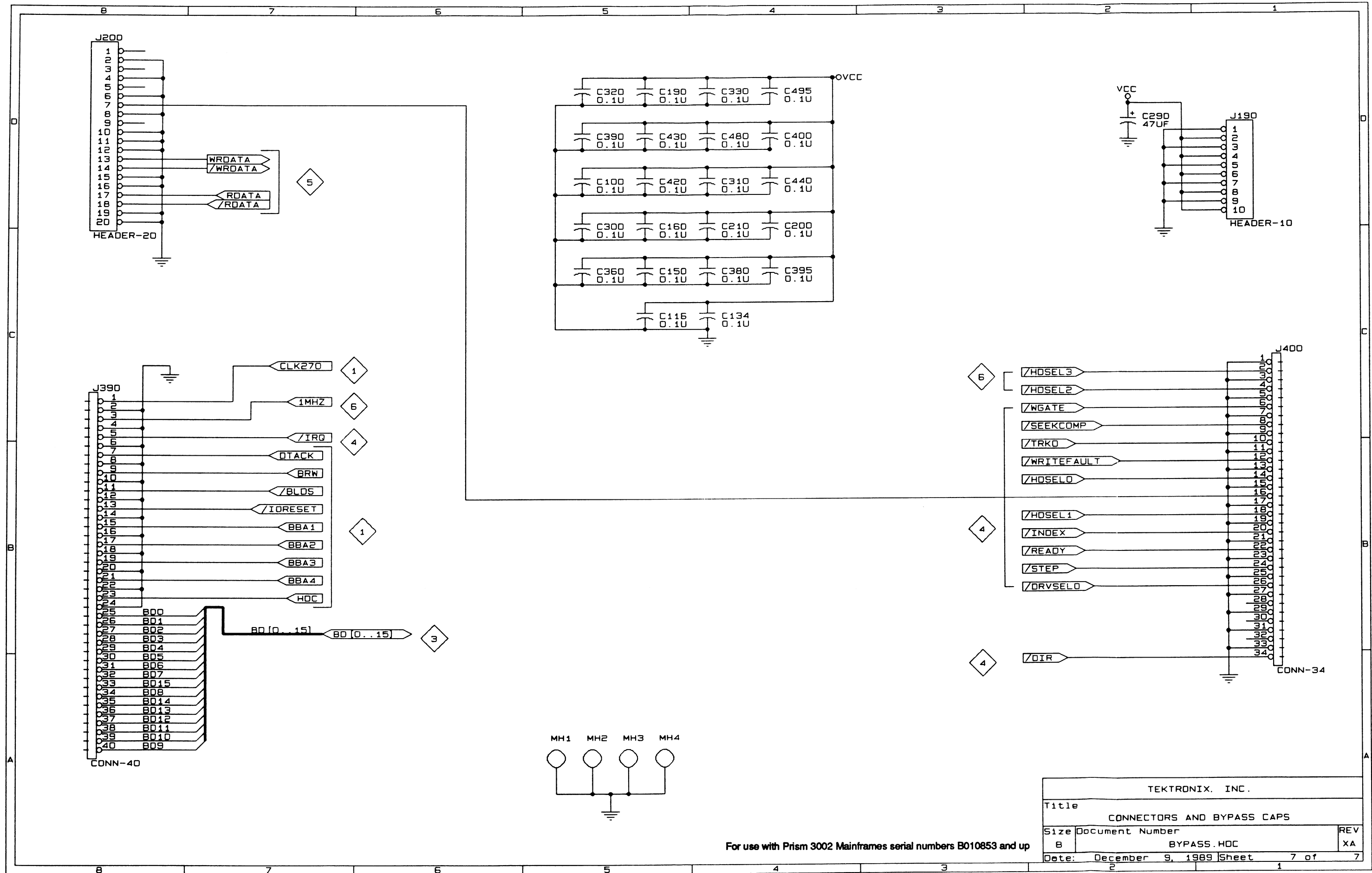
For use with Prism 3002 Mainframes serial numbers B010853 and up

TEKTRONIX, INC.		
Title		
DATA SEPERATOR		
Size	Document Number	REV
B	DATASEP.HOC	
Date:	November 21, 1989	Sheet 5 of 7



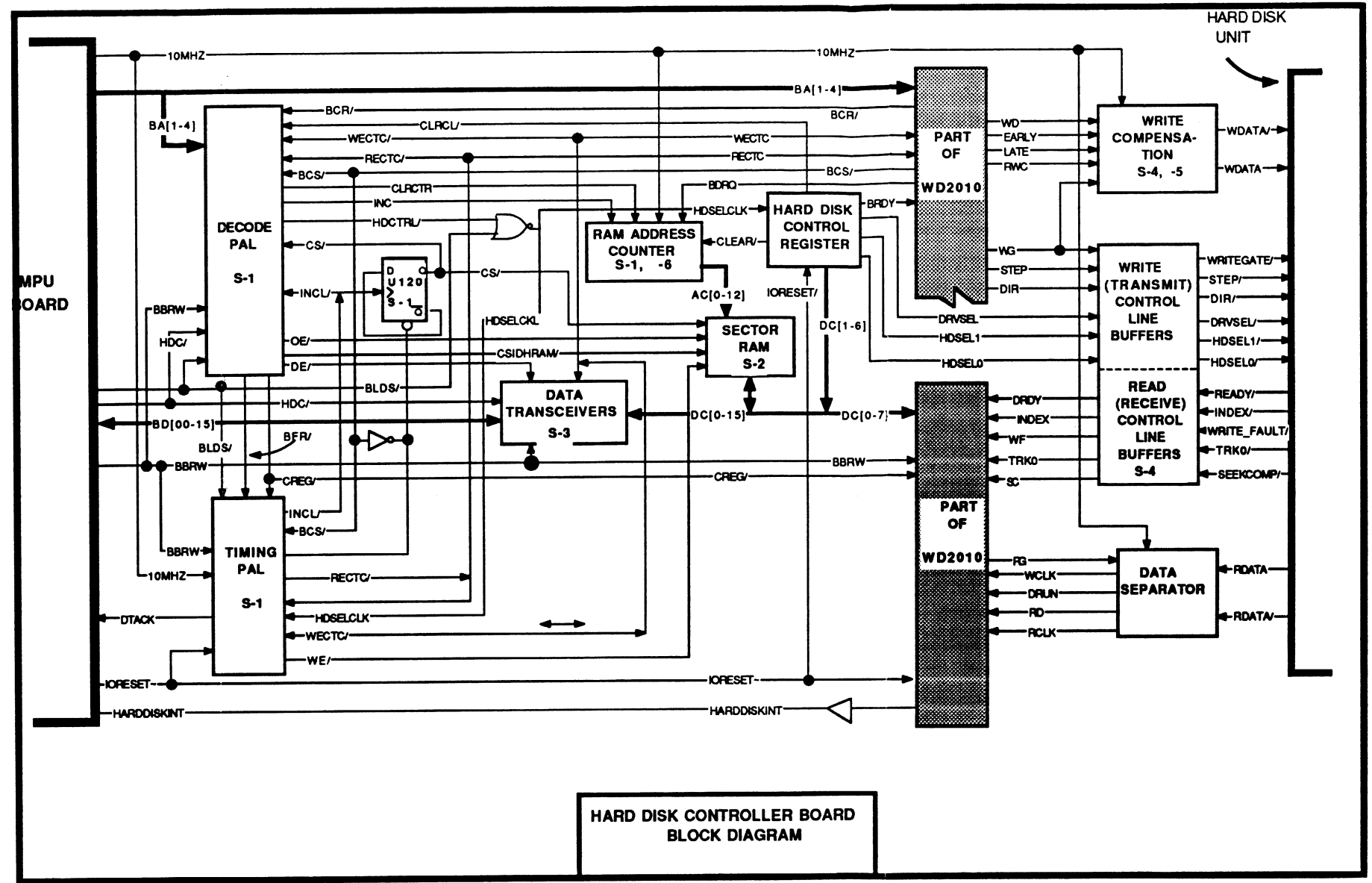
For use with Prism 3002 Mainframes serial numbers B010853 and up

TEKTRONIX, INC.		
Title RAM ADDRESS COUNTER, CONTROL REGISTER		
Size	Document Number	REV
B	RADCNT.HOC	XA
Date:	December 8, 1989	Sheet 6 of 7



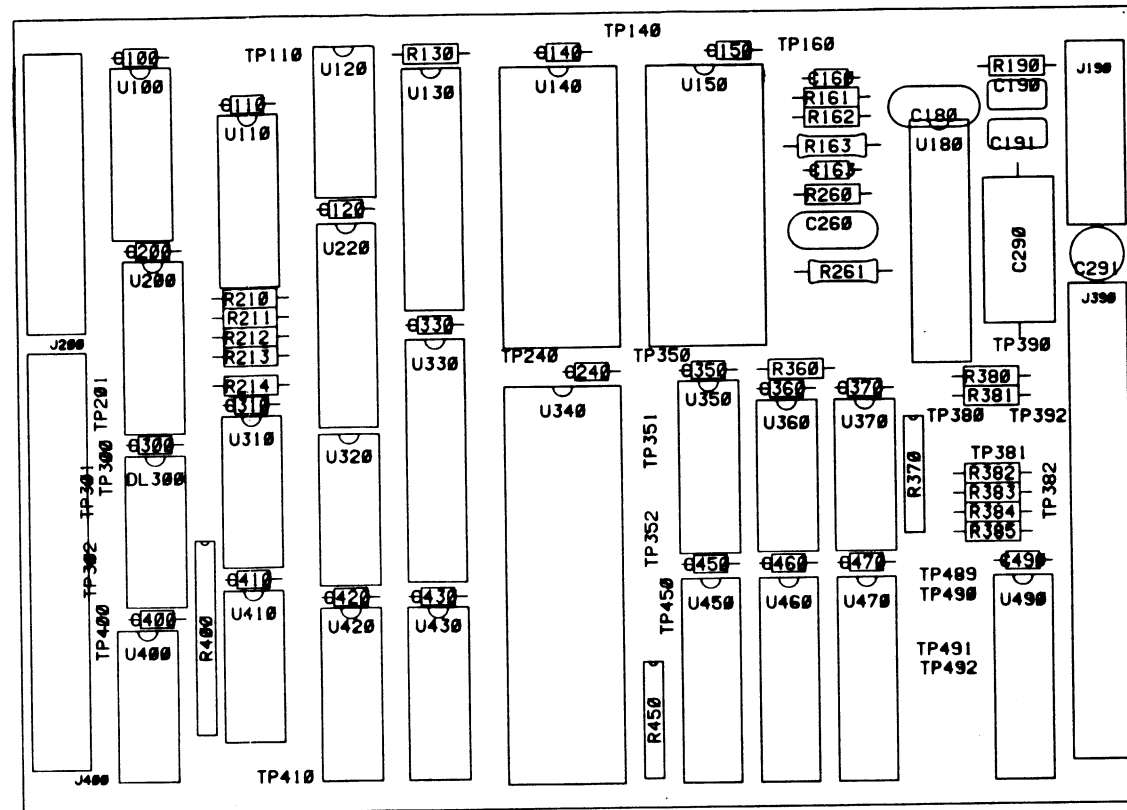
For use with Prism 3002 Mainframes serial numbers B010853 and up

TEKTRONIX, INC.		
Title CONNECTORS AND BYPASS CAPS		
Size B	Document Number BYPASS.HDC	REV XA
Date: December 9, 1989	Sheet 7 of	7



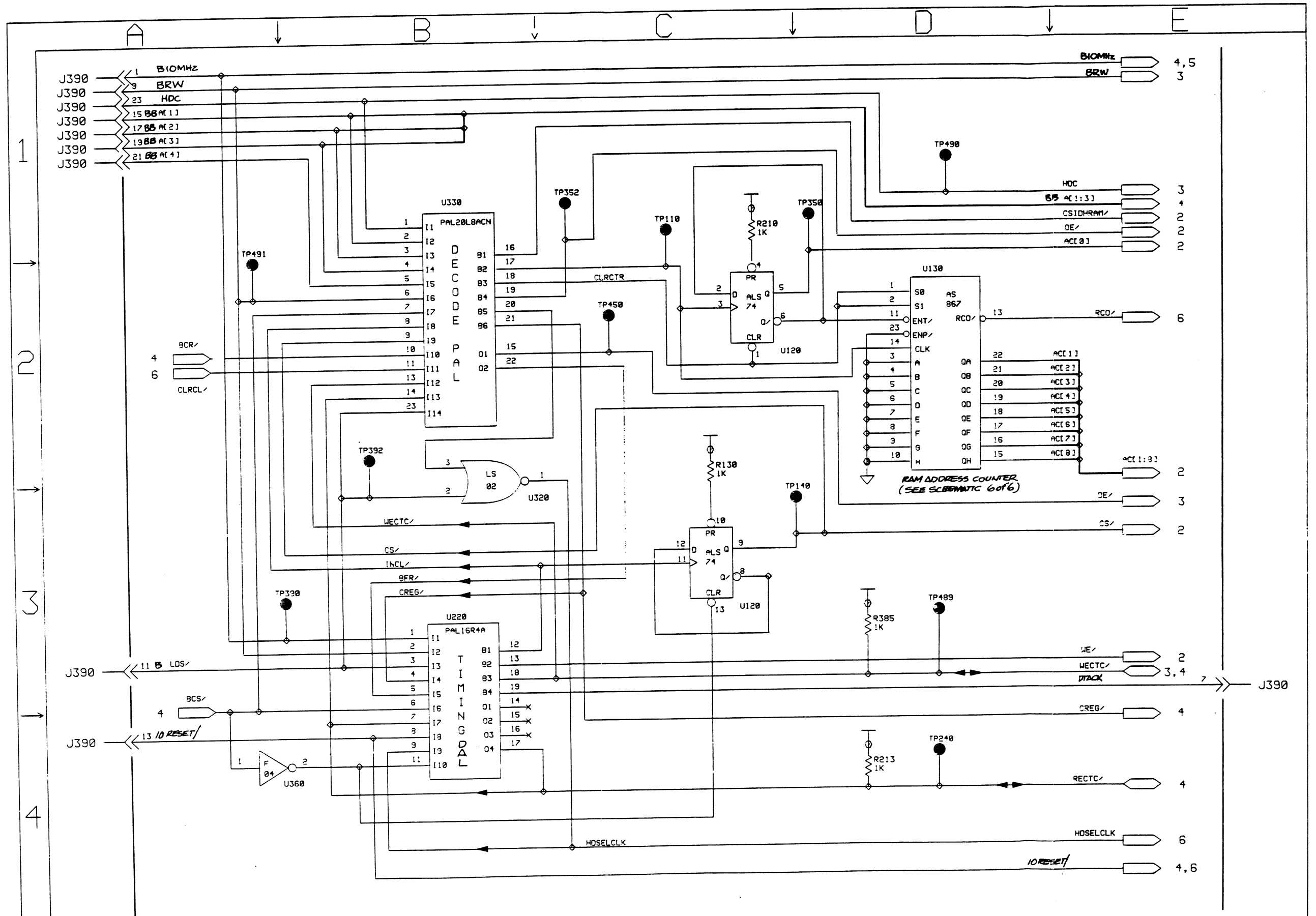
HARD DISK CONTROLLER BOARD  
BLOCK DIAGRAM

Hard Disk Controller  
Board Block Diagram



**Hard Disk Controller  
Board Component Locations**



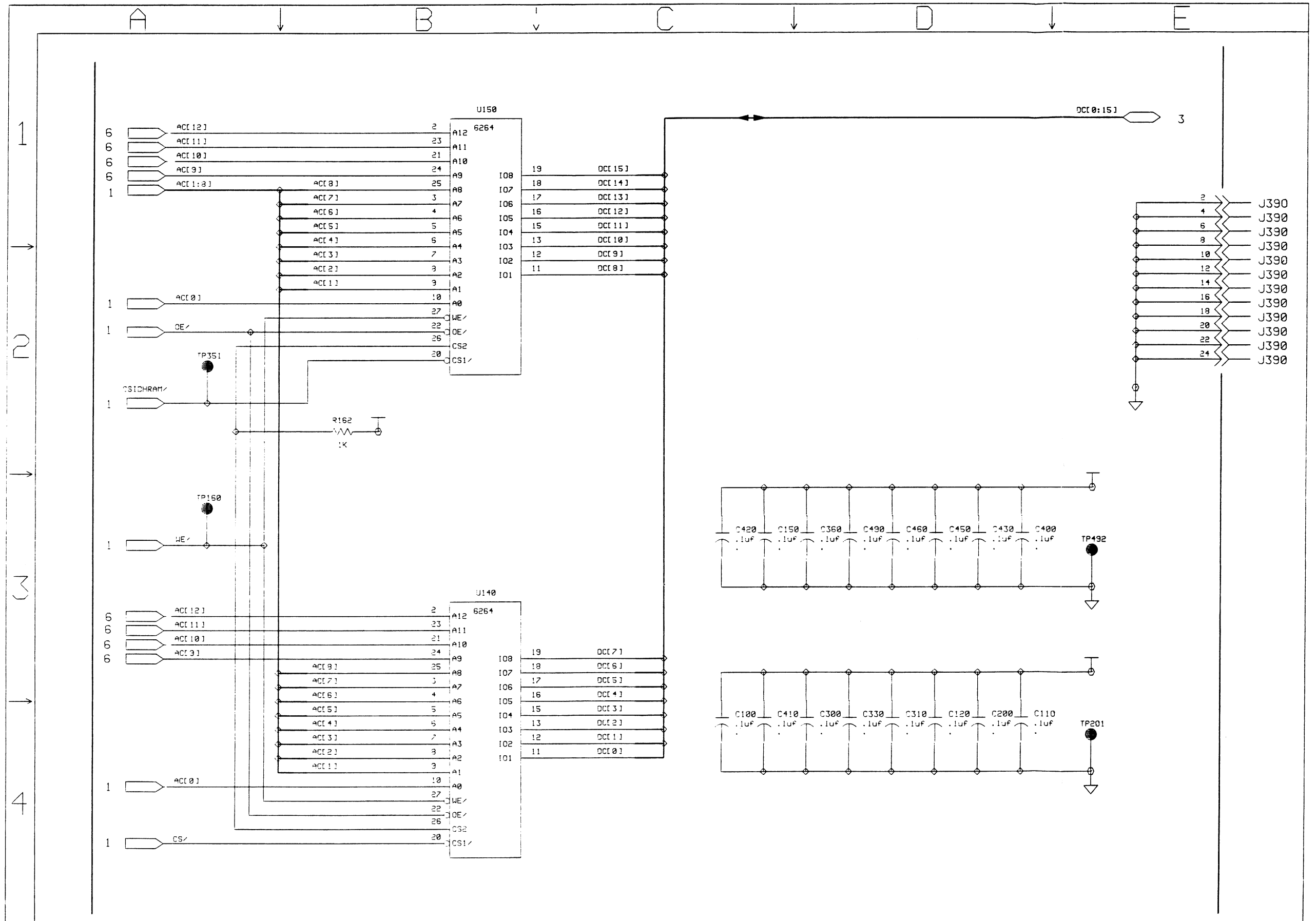


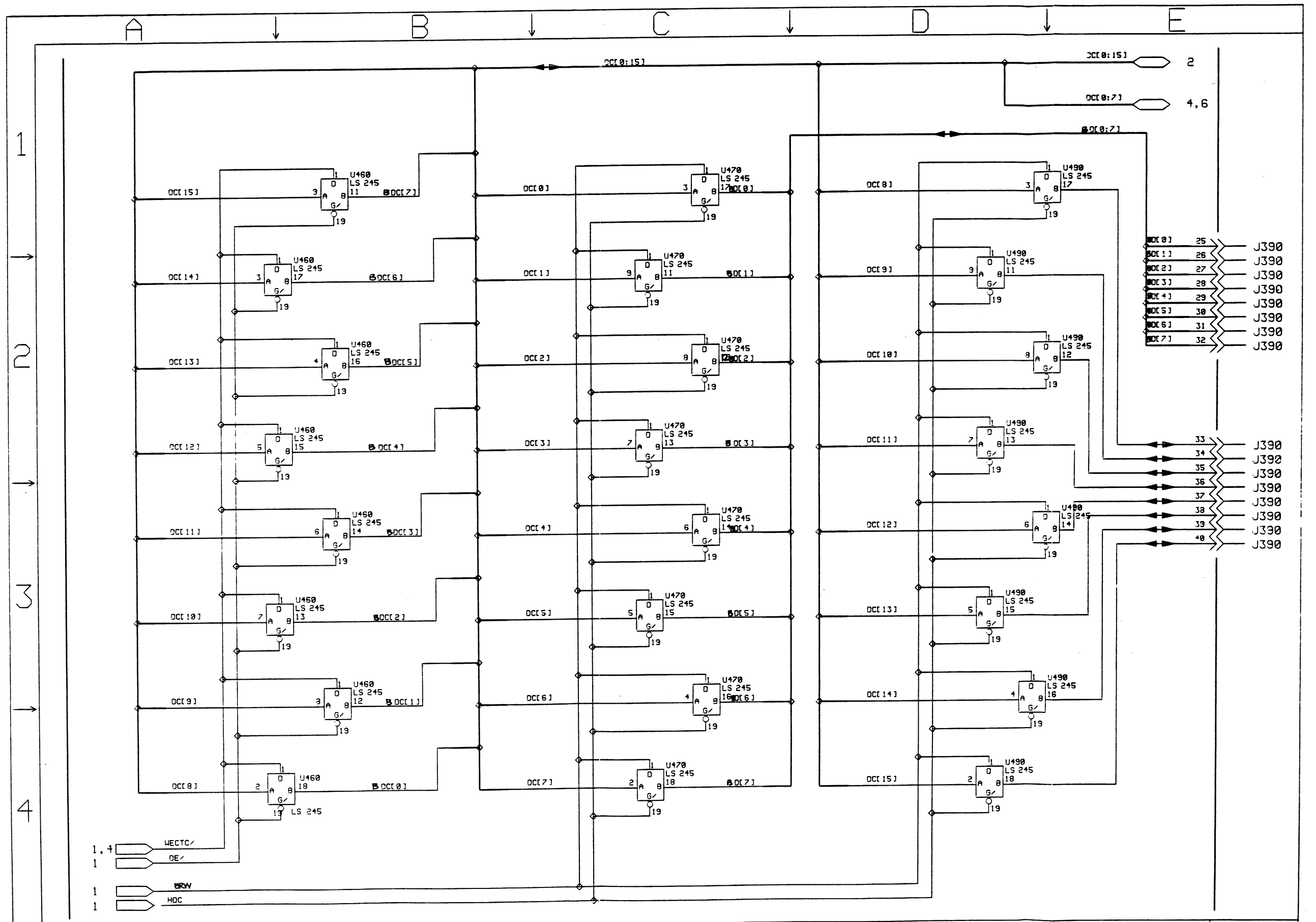
TEKTRONIX  
1260 SERVICE

NOTES:

HARD DISK CONTROLLER BOARD  
GLUE LOGIC, READ/WRITE STATE MACHINE

Hard Disk Controller  
Schematic Sheet 1  
of 6.



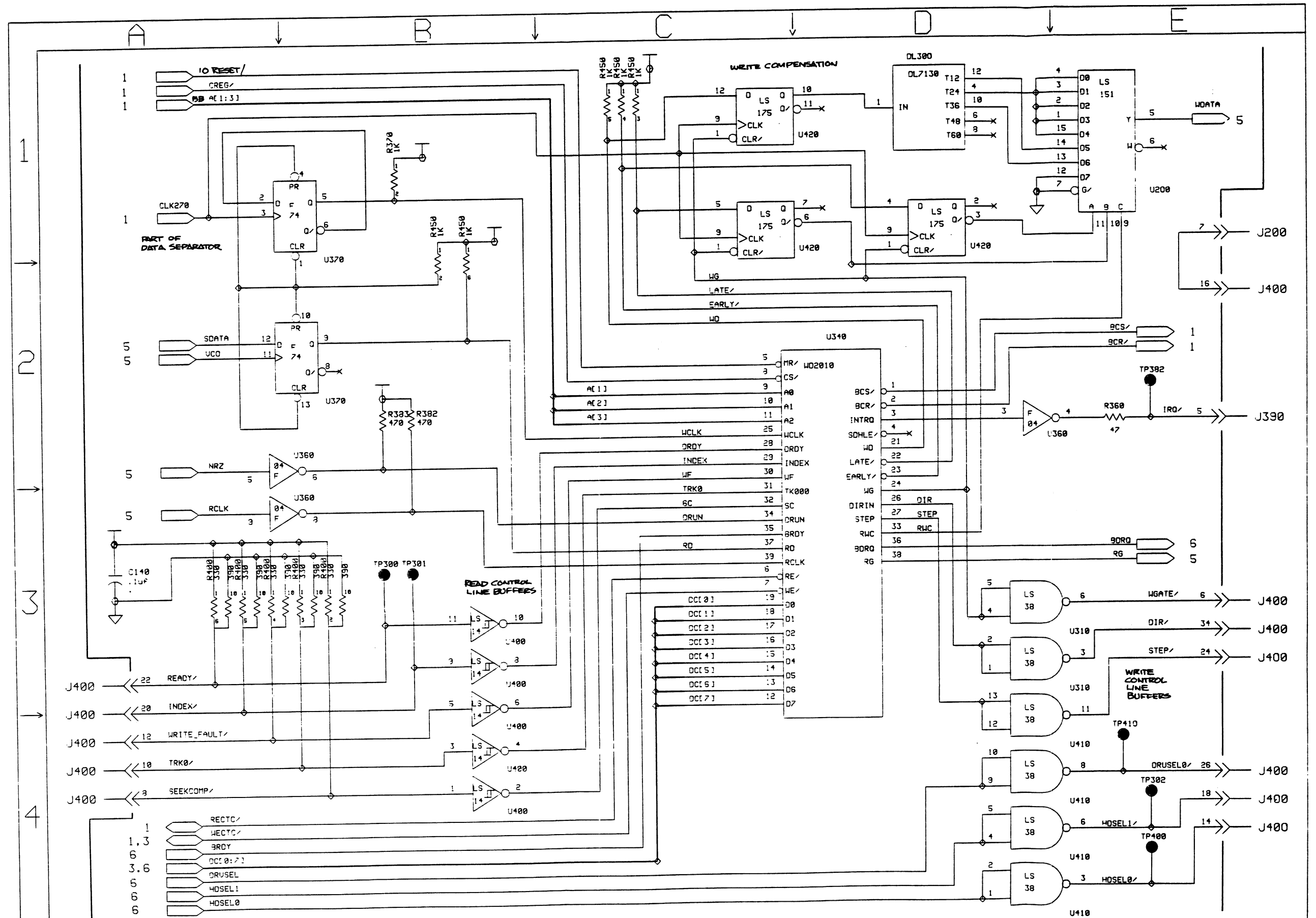


TEKTRONIX  
1260

NOTES:

HARD DISK CONTROLLER BOARD  
TRANSCIVERS

Hard Disk Controller  
Schematic Sheet 3  
of 6.

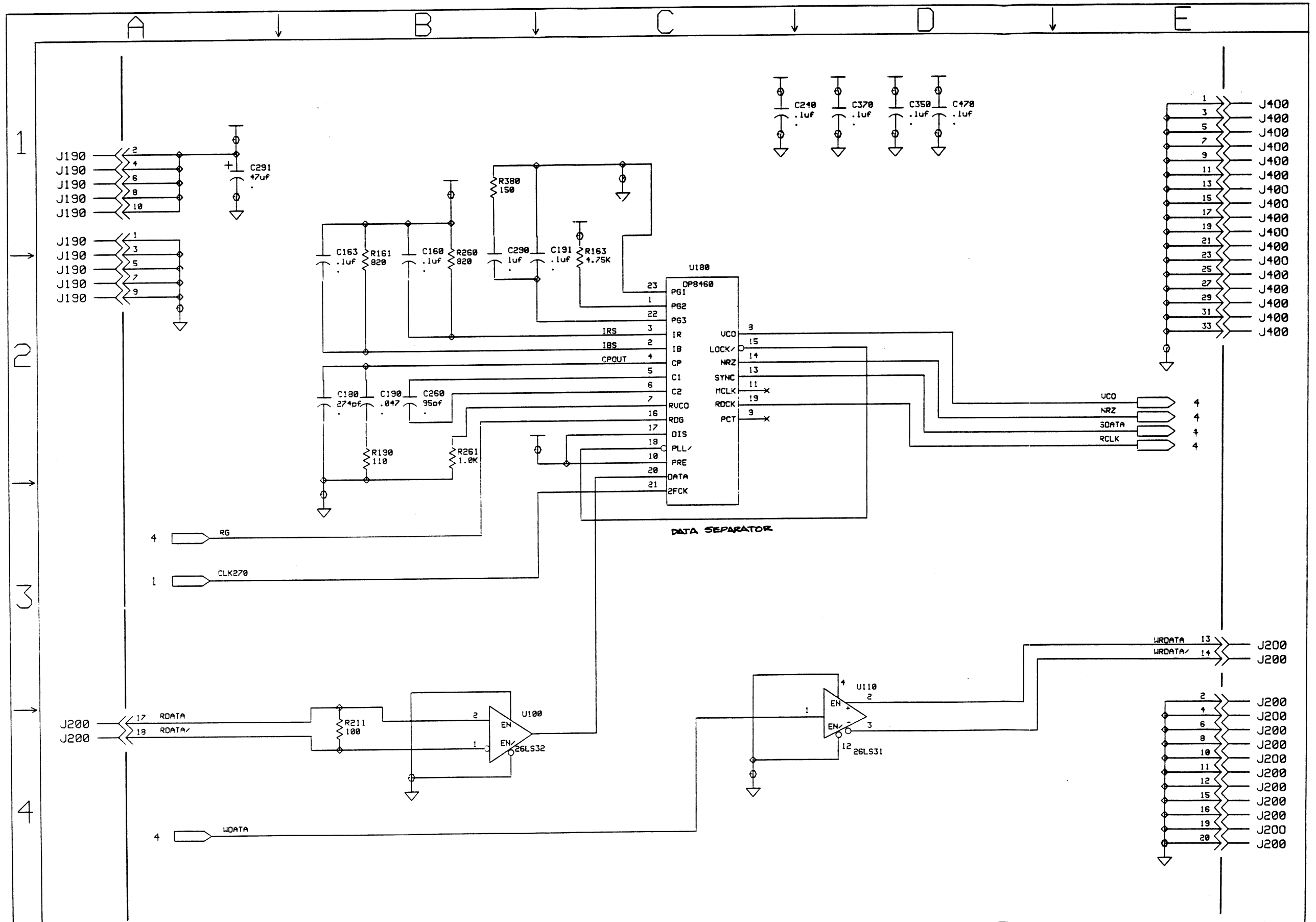


TEKTRONIX  
1260

NOTES:

HARD DISK CONTROLLER BOARD  
CONTROLLER IC. CONTROL LINE BUFFERS.  
WRITE COMPENSATION. CLOCK GENERATOR

Hard Disk Controller  
Schematic Sheet 4  
of 6.



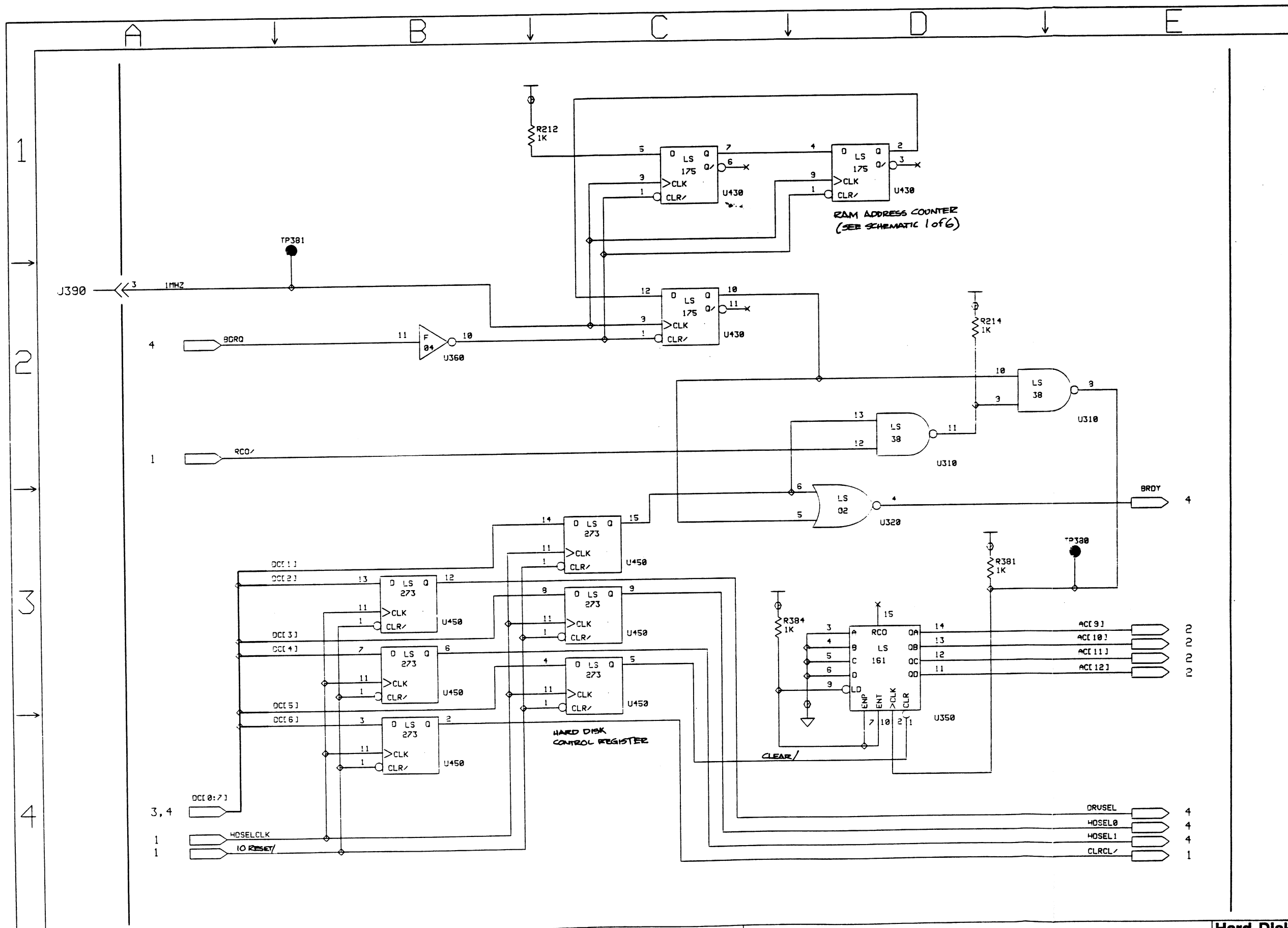
TEKTRONIX  
1260

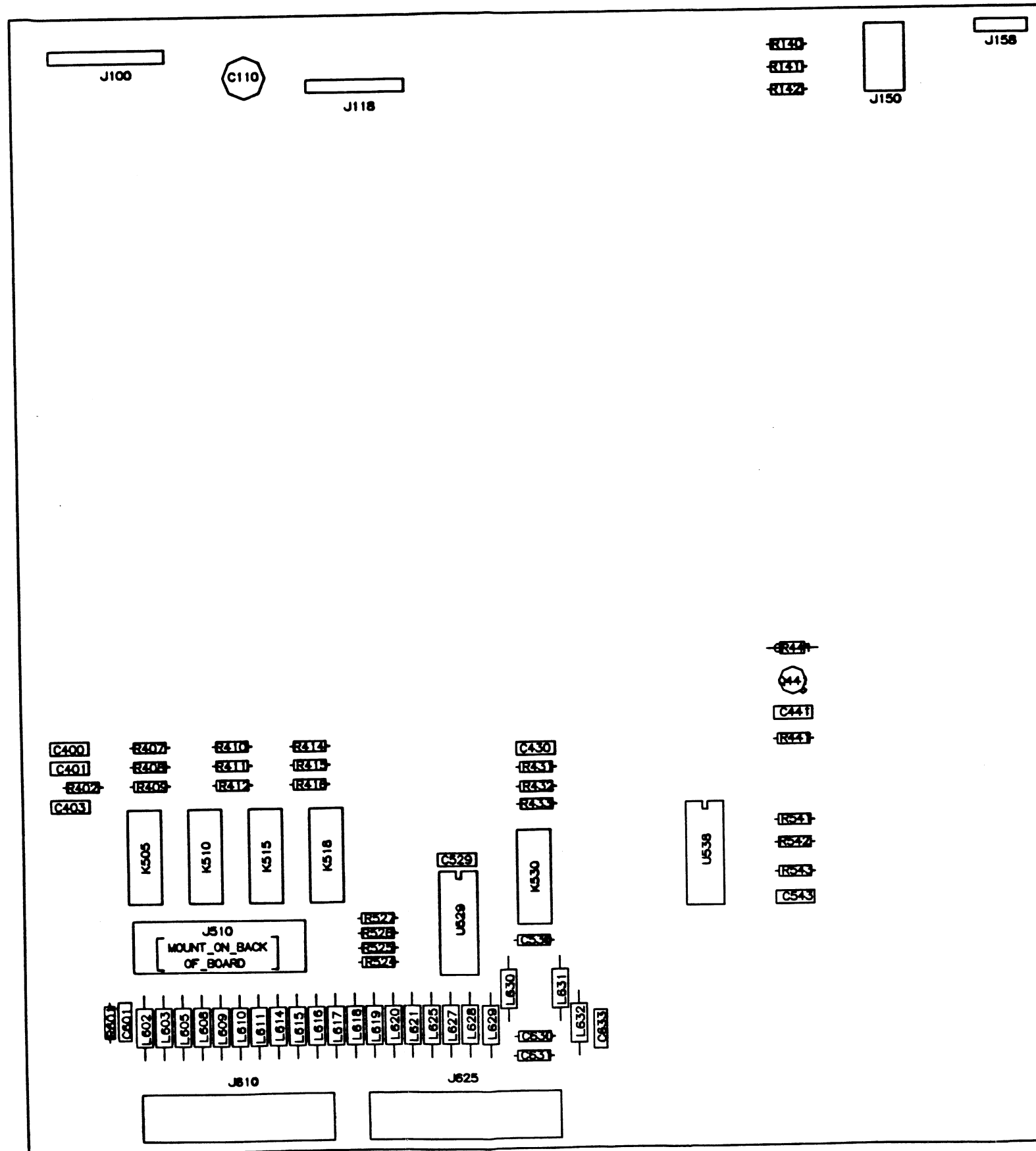
NOTES:



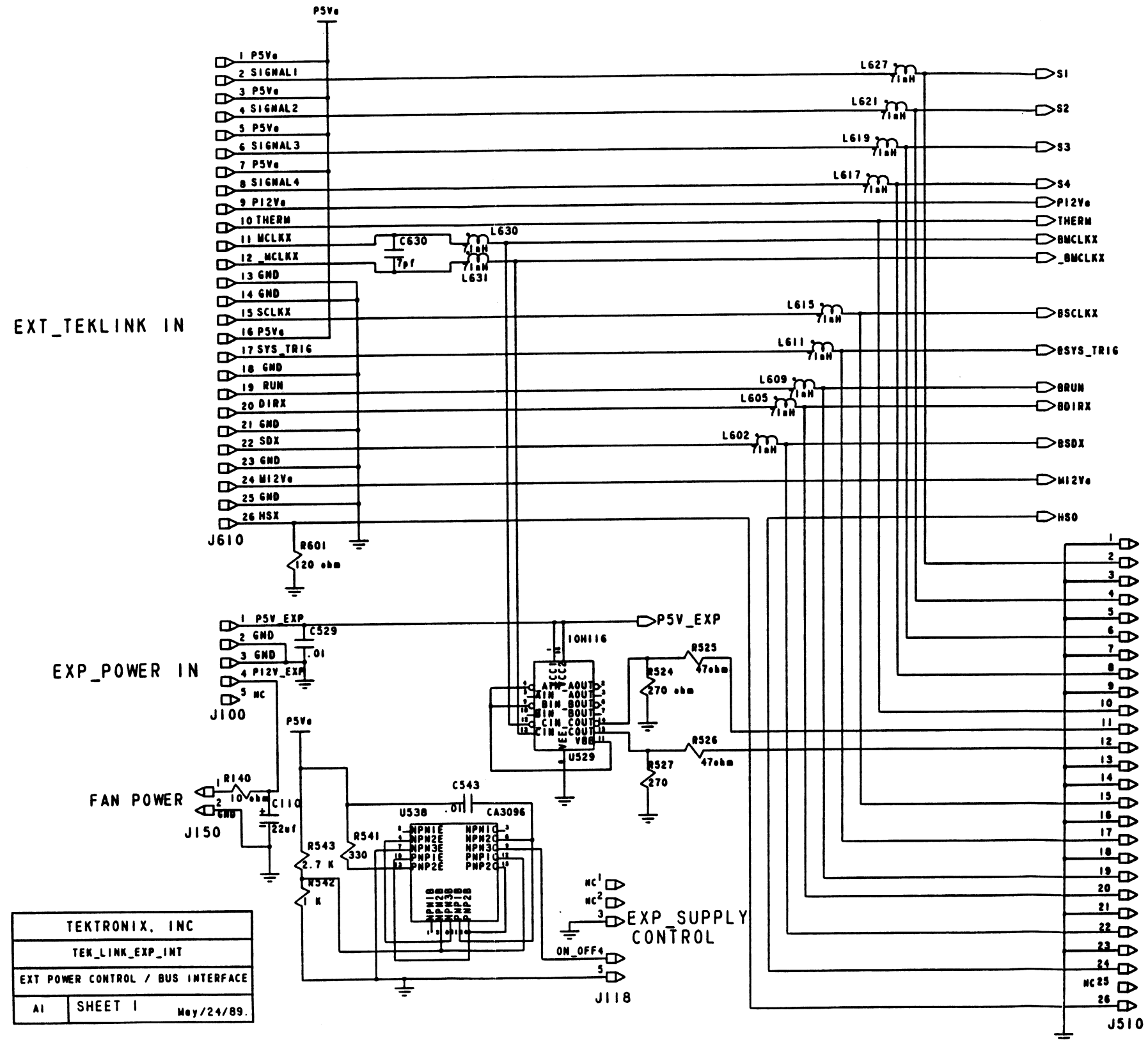
HARD DISK CONTROLLER BOARD  
DATA SEPARATOR

Hard Disk Controller  
Schematic Sheet 5  
of 6.





Expansion Mainframe  
Interface Board  
Component Locations



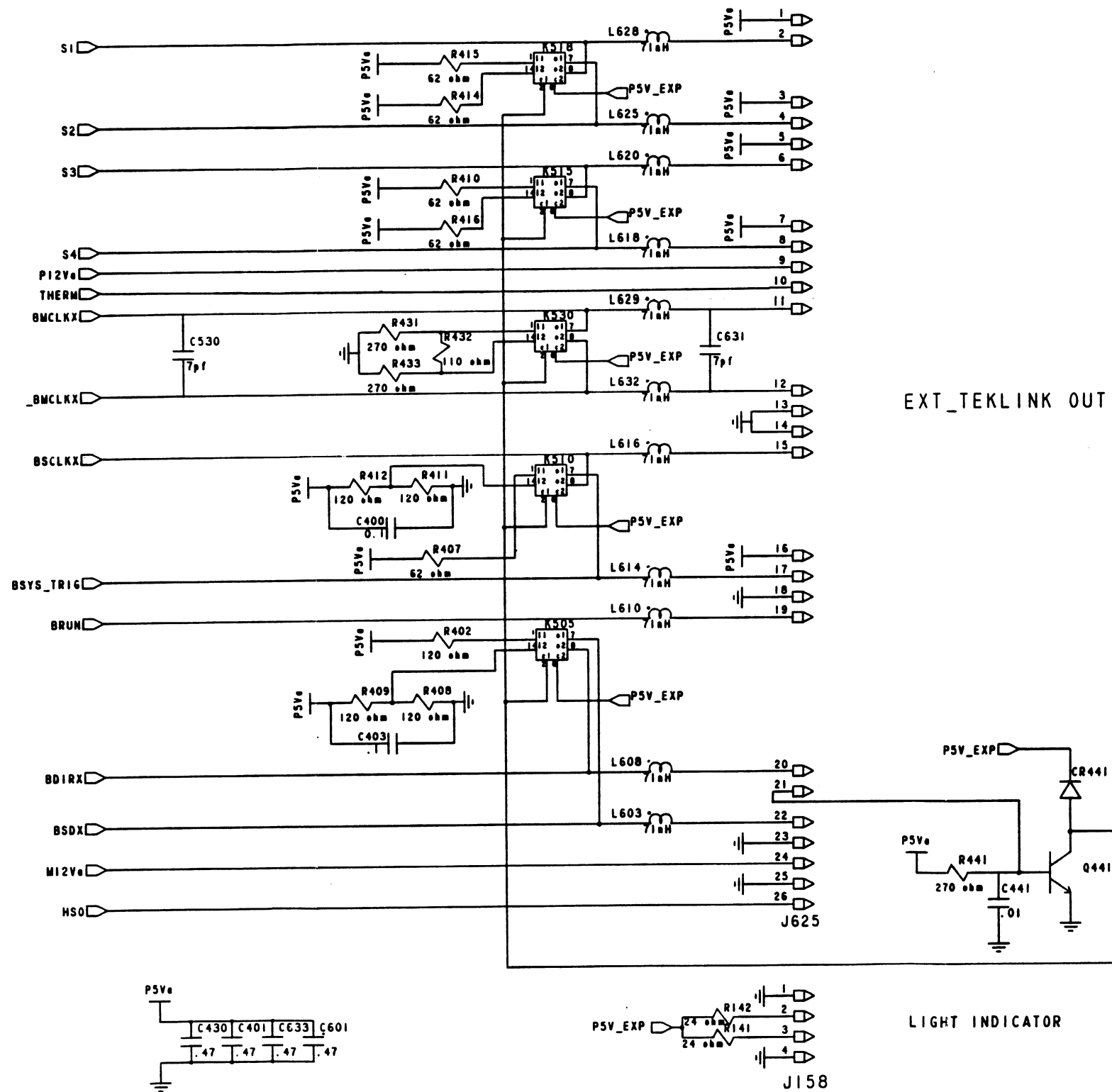
TEKTRONIX, INC		
TEK_LINK_EXP_INT		
EXT POWER CONTROL / BUS INTERFACE		
AI	SHEET 1	May/24/89.

TO SHEET 2

TO MODULES



FROM SHEET 1



TEKTRONIX, INC	
TEK_LINK_EXP_INT	
TERMINATION / BUS OUT	
AI	SHEET 2 May/23/89.

# Section 11

## Replaceable Mechanical Parts

### PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

### ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

### FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

### INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

```

1 2 3 4 5           Name & Description
Assembly and/or Component
Attaching parts for Assembly and/or Component
      **** END ATTACHING PARTS ****
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
      **** END ATTACHING PARTS ****
Parts of Detail Part
Attaching parts for Parts of Detail Part
      **** END ATTACHING PARTS ****
  
```

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - \* - - - indicates the end of attaching parts.

## ABBREVIATIONS

"	INCH	ELECTRN	ELECTRON	IN	INCH	SE	SINGLE END
#	NUMBER SIZE	ELEC	ELECTRICAL	INCAND	INCANDESCENT	SECT	SECTION
ACTR	ACTUATOR	ELECTLT	ELECTROLYTIC	INSUL	INSULATOR	SEMICOND	SEMICONDUCTOR
ADPTR	ADAPTER	ELEM	ELEMENT	INTL	INTERNAL	SHLD	SHIELD
ALIGN	ALIGNMENT	EPL	ELECTRICAL PARTS LIST	LPHLDR	LAMPHOLDER	SHLDR	SHOULDERED
AL	ALUMINUM	EQPT	EQUIPMENT	MACH	MACHINE	SKT	SOCKET
ASSEM	ASSEMBLED	EXT	EXTERNAL	MECH	MECHANICAL	SL	SLIDE
ASSY	ASSEMBLY	FIL	FILLISTER HEAD	MTG	MOUNTING	SLFLKG	SELF-LOCKING
ATTEN	ATTENUATOR	FLEX	FLEXIBLE	NIP	NIPPLE	SLVG	SLEEVING
AWG	AMERICAN WIRE GAGE	FLH	FLAT HEAD	NON WIRE	NOT WIRE WOUND	SPR	SPRING
BD	BOARD	FLTR	FILTER	OBD	ORDER BY DESCRIPTION	SQ	SQUARE
BRKT	BRACKET	FR	FRAME or FRONT	OD	OUTSIDE DIAMETER	SST	STAINLESS STEEL
BRS	BRASS	FSTNR	FASTENER	OVH	OVAL HEAD	STL	STEEL
BRZ	BRONZE	FT	FOOT	PH BRZ	PHOSPHOR BRONZE	SW	SWITCH
BSHG	BUSHING	FXD	FIXED	PL	PLAIN or PLATE	T	TUBE
CAB	CABINET	GSKT	GASKET	PLSTC	PLASTIC	TERM	TERMINAL
CAP	CAPACITOR	HDL	HANDLE	PN	PART NUMBER	THD	THREAD
CER	CERAMIC	HEX	HEXAGON	PNH	PAN HEAD	THK	THICK
CHAS	CHASSIS	HEX HD	HEXAGONAL HEAD	PWR	POWER	TNSN	TENSION
CKT	CIRCUIT	HEX SOC	HEXAGONAL SOCKET	RCPT	RECEPTACLE	TPG	TAPPING
COMP	COMPOSITION	HLCPS	HELICAL COMPRESSION	RES	RESISTOR	TRH	TRUSS HEAD
CONN	CONNECTOR	HLEXT	HELICAL EXTENSION	RGD	RIGID	V	VOLTAGE
COV	COVER	HV	HIGH VOLTAGE	RLF	RELIEF	VAR	VARIABLE
CPLG	COUPLING	IC	INTEGRATED CIRCUIT	RTNR	RETAINER	W/	WITH
CRT	CATHODE RAY TUBE	ID	INSIDE DIAMETER	SCH	SOCKET HEAD	WSHR	WASHER
DEG	DEGREE	IDENT	IDENTIFICATION	SCOPE	OSCILLOSCOPE	XFMR	TRANSFORMER
DWR	DRAWER	IMPLR	IMPELLER	SCR	SCREW	XSTR	TRANSISTOR

## Replaceable Mechanical Parts

### CROSS INDEX – MFR CODE NUMBER TO MANUFACTURER

Mfr Code	Manufacturer	Address	City, State, Zip Code
0B445	ELECTRI-CORD MFG CO INC	312 EAST MAIN ST	WESTFIELD PA 16950
0DMM6	MICRO POWER ELECTRONICS	7973 SW CIRRIUS DRIVE	BEAVERTON OR 97005
0J9P9	GEROME MFG CO INC	PO BOX 737	NEWBURG OR 97132
0J260	COMTEK MANUFACTURING OF OREGON	PO BOX 4200	BEAVERTON OR 97076-4200
0JR05	TRIQUEST CORP	3000 LEWIS AND CLARK HWY	VANCOUVER WA 98661-2999
OKB01	STAUFFER SUPPLY CO (DIST)	810 SE SHERMAN	PORTLAND OR 97214
2K262	BOYD CORP	6136 NE 87th AVE	PORTLAND OR 97220
8X345	NORTHWEST SPRING AND MFG CO	WILLOW LANE	LAKE OSWEGO OR 97034-5343
00779	AMP INC CAMCAR DIV	2800 FULLING MILL 1818 CHRISTINA ST	HARRISBURG PA 17105
01536	TEXTRON INC		ROCKFORD IL 61108
06915	RICHCO PLASTIC CO	5825 N TRIPP AVE	CHICAGO IL 60646-6013
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039-2410
12324	DUPREE INC STAKE FASTENER CO DIV	14395 RAMONA PO BOX 1797	CHINO CA 91703
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125-4632
22526	DU PONT E I DE NEMOURS AND CO INC	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
22670	G M NAMEPLATE INC	2040 15TH AVE WEST	SEATTLE WA 98119-2728
27264	MOLEX INC	2222 WELLINGTON COURT	LISLE IL 60532-1613
30817	INSTRUMENT SPECIALTIES CO INC	EXIT 53 RT 80	DELAWARE WATER GAP PA 18327
50356	TEAC CORP OF AMERICA	1590 OAKLAND RD	SAN JOSE CA 95131
52152	MINNESOTA MINING AND MFG CO	3M CENTER	ST PAUL MN 55144-0001
52814	TECH-ETCH INC	45 ALDRIN RD	PLYMOUTH MA 02360
53387	MINNESOTA MINING MFG CO	PO BOX 2963	AUSTIN TX 78769-2963
57177	PROMPTUS ELECTRONIC HARDWARE ING	520 HOMESTEAD AVE	MT VERNON NY 10550-4620
59666	ADVANCED INPUT DEVICES	WEST 250 A I D DR	COEUR D ALENE ID 83814
61852	BOSCHERT INC	384 SANTA TRINITA AVE	SUNNYVALE CA 94086-3911
61857	SAN-O INDUSTRIAL CORP	85 ORVILLE DR	BOHEMIA LONG ISLAND NY 11716-2501
62559	SCHROFF INC DIV OF COOPER INDUSTRIES INC	170 COMMERCE DR PO BOX 14460	WARWICK RI 02886-2430
71400	BUSSMANN	114 OLD STATE RD	ST LOUIS MO 63178
78189	ILLINOIS TOOL WORKS INC	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR	BEAVERTON OR 97077-0001
83385	MICRODOT MFG INC	3221 W BIG BEAVER RD	TROY MI 48098
93907	TEXTRON INC	600 18TH AVE	ROCKFORD IL 61108-5181
94222	SOUTHCO INC	210 N BRINTON LAKE RD	CONCORDVILLE PA 19331
S3109	FELLER	72 Veronica Ave	Summerset NJ 08873
S3629	SCHURTER AG H	2015 SECOND STREET	BERKELEY CA 94170
TK0196	ALMAC-STROUM ELECTRONICS (DIST)	1885 NW 169TH PLACE	BEAVERTON OR 97006
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609-3320
TK1039	PUGET CORP	2101 MILDRED STREET WEST	TACOMA WA 98466
TK1151	QUALITY PLASTIC INC	2101 CRESTVIEW DR	NEBERG OR 97132-9518
TK1163	POLYCAST INC	9898 SW TIGARD ST	TIGARD OR 97223
TK1373	PATELEC-CEM (ITALY)	10156 TORINO	VAICENTALLO 62/45S ITALY
TK1456	PAPST MECHATRONIC CORP	AQUIDNECK INDUSTRIAL PK	NEWPORT RI 02840
TK1471	PHOENIX CONTACT INC	1900 GREENWOOD ST	HARRISBURG PA 17104
TK1905	PUGET CORP OF OREGON	7440 S W BONITA	TIGARD OR 97223
TK2153	PLANAR SYSTEMS INC	1400 NW COMPTON DRIVE	BEAVERTON OR 97006-1992
TK2156	ACACIA/DEANCO	7763 SW CIRRIUS RD	BEAVERTON OR 97005-6452
TK2162	DERBY	24350 STATE ROAD 23	SOUTH BEND IN 46614
TK2195	MINISCRIBE CORP	1861 LEFTHAND CIRCLE	LONGMONT CO 80501

**CROSS INDEX – MFR CODE NUMBER TO MANUFACTURER**

<b>Mfr Code</b>	<b>Manufacturer</b>	<b>Address</b>	<b>City, State, Zip Code</b>
TK2265	TEKTRONIX INC	PO BOX 1000	WILSONVILLE OR 97070-1000
TK2279	ACER INC	602 MIN SHENG EAST RD	TAIPEI TAWAN ROC
TK2298	SONY CORPORATION OF AMERICA	16450 W BERNARDO DR	SAN DIEGO CA 92127
TK2321	FAME PLASTICS INC	1845 HOLSONBACK DR	DAYTONA BEACH FL 32017
TK2361	MULTIPOWER INC	3005 SW 154, TERRANCE #1	BEAVERTON OR 97006

## Replaceable Mechanical Parts

Fig. & Index No.	Tektronix Part Number	Serial Number Effect	Number Discont	Qty	1245 Part Name & Description	Mfr Code	Mfr Part Number
1-1	386-5664-00			1	PANEL, TOP:	0J260	386-5664-00
-2	212-0172-00			3	SCREW, MACHINE: 8-32 X 0.312, 100 DEG FLH	12324	FH8C5DL38GY
-3	200-3290-00			1	COVER, MAINFRAME:	TK2321	200-3290-00
-4	348-0947-00			2	BUMPER, REAR:	TK1905	ORDER BY DESCRIPTION
-5	212-0004-00			4	SCREW, MACHINE: 8-32 X 0.312, PNH, STL	TK0435	ORDER BY DESCRIPTION
-6	337-3545-00			1	SHIELD, ELEC: COVER, SIDE PROBE (USED ONLY WHEN 1 APP MODULE INSTALLED)	0J9P9	ORDER BY DESCRIPTION
-7	211-0658-00	B010100	B010169	2	SCR, ASSEM WSHR: 6-32 X 0.312, PNH, STL, POZ	78189	S51-060545-0X
	211-0661-00	B010170		6	SCR, ASSEM WSHR: 4-40 X 0.25, PNH, STL, POZ (2510 ONLY)	01536	821-01655-024
	211-0661-00			6	SCR, ASSEM WSHR: 4-40 X 0.25, PNH, STL, POZ (3002 ONLY)	01536	821-01655-024
-8	386-5631-00	B010100	B010169	1	CARD CAGE ASSY: ALUMINUM	80009	386-5631-00
	386-5631-01	B010170		1	CARD CAGE ASSY: ALUMINUM (2510 ONLY)	0J260	386-5631-01
	386-5631-01			1	CARD CAGE ASSY: ALUMINUM (3002 ONLY)	0J260	386-5631-01
-9	211-0504-00			2	SCREW, MACHINE: 6-32 X 0.250, PNH, STL	TK0435	ORDER BY DESCRIPTION
-10	211-0511-00			1	SCREW, MACHINE: 6-32 X 0.5, PNH, STL	TK0435	ORDER BY DESCRIPTION
-11	214-4046-00	B010100	B010169	20	PIN, SHLDR, HD: 0.575 L X 0.312 HEX, SST	80009	214-4046-00
-12	211-0661-00	B010170		22	SCR, ASSEM WSHR: 4-40 X 0.25, PNH, STL, POZ (2510 ONLY) USED TO SECURE APP MODULES.	01536	821-01655-024
	211-0661-00			22	SCR, ASSEM WSHR: 4-40 X 0.25, PNH, STL, POZ (3002 ONLY) USED TO SECURE APP MODULES.	01536	821-01655-024
-13	386-5441-00	B010100	B010169	1	P INTFC SUBPANE: ALUMINUM	80009	386-5441-00
	386-5441-01	B010170		1	P INTFC SUBPANE: ALUMINUM (2510 ONLY)	0J260	386-5441-01
	386-5441-01			1	P INTFC SUBPANE: ALUMINUM (3002 ONLY)	0J260	386-5441-01
-14	211-0504-00			5	SCREW, MACHINE: 6-32 X 0.250, PNH, STL	TK0435	ORDER BY DESCRIPTION
-15	348-1087-00			1	SHLD GSKT, ELEK: CONTACTS, CU BE, 7.875 L	52814	348-1087-00
-16	672-1304-00	B010100	B010154	1	CIRCUIT BD ASSY: MPU CKT BD ASSY INCLUDES:	80009	672-1304-00
	671-0058-00	B010100	B010154	1	.CIRCUIT BD ASSY: M.P.U.	80009	671-0058-00
	671-0980-00	B010100	B010154	1	.CIRCUIT BD ASSY: VIDEO FILTER	80009	671-0980-00
	671-0058-01	B010155	B010164	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-01
	671-0058-02	B010165	B010166	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-02
	671-0058-03	B010167	B010183	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-03
	671-0058-04	B010184	B010196	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-04
	671-0058-06	B010197	B010223	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-06
	671-0058-07	B010224	B010224	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-07
	671-0058-09	B010225		1	CIRCUIT BD ASSY: M.P.U. (2510 ONLY) REFER TO 070-7413-XX FOR DETAILS	80009	671-0058-09
	671-0058-03	B010100	B010173	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-03
	671-0058-04	B010174	B010220	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-04
	671-0058-05	B010221	B010224	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-05
	671-0058-06	B010225	B010255	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-06
	671-0058-07	B010256	B010345	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-07
	671-0058-08	B010256	B010345	1	CIRCUIT BD ASSY: M.P.U.	80009	671-0058-08
	671-0058-09	B010346		1	CIRCUIT BD ASSY: M.P.U. (3002 ONLY) REFER TO 070-7413-XX FOR DETAILS	80009	671-0058-09
-17	211-0658-00			3	SCR, ASSEM WSHR: 6-32 X 0.312, PNH, STL, POZ	78189	S51-060545-0X
-18	119-3118-00	B010100	B019999	1	POWER SUPPLY:	TK2361	PL151-7
	650-2210-00	B020000		1	POWER SUPPLY ASSY (2510 ONLY)	80009	650-2210-00
	119-2498-00			1	POWER SUPPLY: 5V, 47.5A, +12V, 4A, -12V, 4A, OUT (3002 ONLY)	61852	700052-01
-19	212-0004-00			4	SCREW, MACHINE: 8-32 X 0.312, PNH, STL	TK0435	ORDER BY DESCRIPTION
-20	159-0195-00			1	FUSE, RADIAL LD: 7A, 125V, 0.125 SEC	61857	SP7-7A
-21	159-0165-00			1	FUSE, CARTRIDGE: 3AB, 8A, 250V	71400	ABC8
-22	200-2264-00			1	CAP, FUSEHOLDER: 3AG FUSES	S3629	FEK 031 1666
-23	119-1725-01			1	FAN, TUBEAXIAL: 8 14.5VDC, 6W, 3200RPM, 106CFM	TK1456	4112 KX
-24	407-3500-00	B010100	B010169	1	BRACKET, MTG: FLOPPY	80009	407-3500-00
	407-3500-01	B010170		1	BRACKET, MTG: FLOPPY (2510 ONLY)	0J260	407-3500-01

## Replaceable Mechanical Parts

Fig. & Index No.	Tektronix Part Number	Serial Number Effect	Discont	Qty	1244 Part Name & Description	Mfr Code	Mfr Part Number
1-24	407-3500-01			1	BRACKET,MTG:ALUMINUM,FLOPPY (3002 ONLY)	0J260	407-3500-01
-25	212-0004-00			17	SCREW,MACHINE:8-32 X 0.312,PNH,STL	TK0435	ORDER BY DESCRIPTION
-26	407-3885-00			2	BRACKET,FAN:ALUMINUM (3002 ONLY)	0J260	407-3885-00
-27	211-0614-00			4	SCR,ASSEM WSHR.:6-32 X 0.250,PNH,STL,CD PL (3002 ONLY)	83385	ORDER BY DESCRIPTION
-28	119-3581-00			1	FAN,VENTILATING:12V,1.26W,4200 RPM,16.61 (3002 ONLY)	0DMW6	PANOFLO # FBK-06A12H
-29	211-0529-00			2	SCREW,MACHINE:6-32 X 1.250,PNH,STL (3002 ONLY)	93907	ORDER BY DESCRIPTION
-30	119-2571-00			1	DISK DRIVE:FLOPPY,.;3.5 INCH,1.0 MEGABYTE	50356	FD-235F-112-U
-31	211-0452-00			4	SCREW, MACHINE:M3 X 0.5 X 6MM L,PNH,STL	OKB01	ORDER BY DESCRIPTION
-32	105-0992-00			2	LATCH KEYBOARD:DELTRIN	TK1039	105-0992-00
-33	211-0421-00			2	SCREW,SHOULDER:4-40 X 0.531 L,0.25 OD,SST	57177	290-03-SS-4-40
-34	386-5419-00			1	PLATE,MOUNTING:WINCH,SST	0J260	386-5419-00
-35	212-0004-00			4	SCREW,MACHINE:8-32 X 0.312,PNH,STL	TK0435	ORDER BY DESCRIPTION
-36	348-1085-00			2	SHLD GSKT,ELEK:EMI,0.003,CU BE,2.75 L	30817	97-521-19-2.75
-37	670-9664-00			1	CIRCUIT BD ASSY:HARD DISK CONTROLLER (2510 ONLY)	80009	670-9664-00
	670-9664-00	B010100	B010852	1	CIRCUIT BD ASSY:HARD DISK CONTROLLER	80009	670-9664-00
	670-9664-01	B010853		1	CIRCUIT BD ASSY:HARD DISK CONTROLLER (3002 ONLY)	80009	670-9664-01
-38	361-1478-00			4	SPACER,CKT BD:0.375	06915	LCBS-TF-6-01
-39	119-2572-00			1	DISK DRIVE:WINCHESTER,HARD;3.5 INCH 20MEG	TK2195	8425-030841
-40	211-0503-00			4	SCREW,MACHINE:6-32 X 0.188,PNH,STL	93907	ORDER BY DESCRIPTION
-41	671-0979-00			1	CIRCUIT BD ASSY:KEYBOARD FILTER	80009	671-0979-00
-42	134-0229-00			1	PLUG,HOLE:1.22 X 0.090,POLYCARBONATE,SMOKE (3002E ONLY)	0JR05	134-0229-00
-43	200-3344-00			1	COVER,BOTTOM:ENCLOSURE,1260	TK2321	200-3344-00
-44	334-7411-00			1	MARKER,IDENT:MARKED CONFIGURATION	07416	334-7411-00
-45	334-6931-00			1	LABEL:MARKED CAUTION	07416	334-6931-00
-46	214-4078-00			2	SPR,CONICAL COM:1.15 L X 0.75,SST	8X345	214-4078-00
-47	101-0113-00			1	TRIM,DECORATIVE:POLYCARBONATE	TK2321	101-0113-00
-48	212-0004-00			2	SCREW,MACHINE:8-32 X 0.312,PNH,STL	TK0435	ORDER BY DESCRIPTION
-49	334-7395-00			1	MARKER,IDENT:MARKED 3002 PRISM SERIES (3002 ONLY)	22670	334-7395-00
-50	367-0352-00			1	HDL,MAINFRAME:POLYCARBONATE	TK1163	367-0352-00 REV C
-51	262-0360-00			1	SWITCH ASSEMBLY:SPDT,PUSH,ALT,0.1A,125V	TK0196	046262-0360-00
	150-0162-00			1	LIGHT,INDICATOR:5V INCANDESCENT(WHITE) (3002E ONLY)	TK0196	150-0162-00
-52	200-3675-00			1	COVER,FACADE:PLASTIC W/ADH,SMOKE TAN (3002E ONLY)	0J260	200-3675-00
-53	348-0776-00			6	PAD,CAB.FOOT:POLYURETHANE	80009	348-0776-00
-54	610-0767-00	B010100	B010255	1	CHASSIS ASSY:FLAT DISPLAY	80009	610-0767-00
	610-0767-01	B010256		1	CHASSIS ASSY:FLAT DISPLAY (2510 ONLY) REFER TO FIG. 2 FOR DETAILS	80009	610-0767-01
	610-0767-00	B010100	B010569	1	CHASSIS ASSY:FLAT DISPLAY	80009	610-0767-00
	610-0767-01	B010570	B010648	1	CHASSIS ASSY:FLAT DISPLAY	80009	610-0767-01
	610-0767-02	B010649		1	CHASSIS ASSY:FLAT DISPLAY (3002 ONLY) REFER TO FIG. 2 FOR DETAILS	80009	610-0767-02
-55	119-2402-00			1	KEYBOARD ASSY:3002C/3002P (3002C ONLY) REFER TO FIG. 3 FOR DETAILS	59666	9395-0137-301

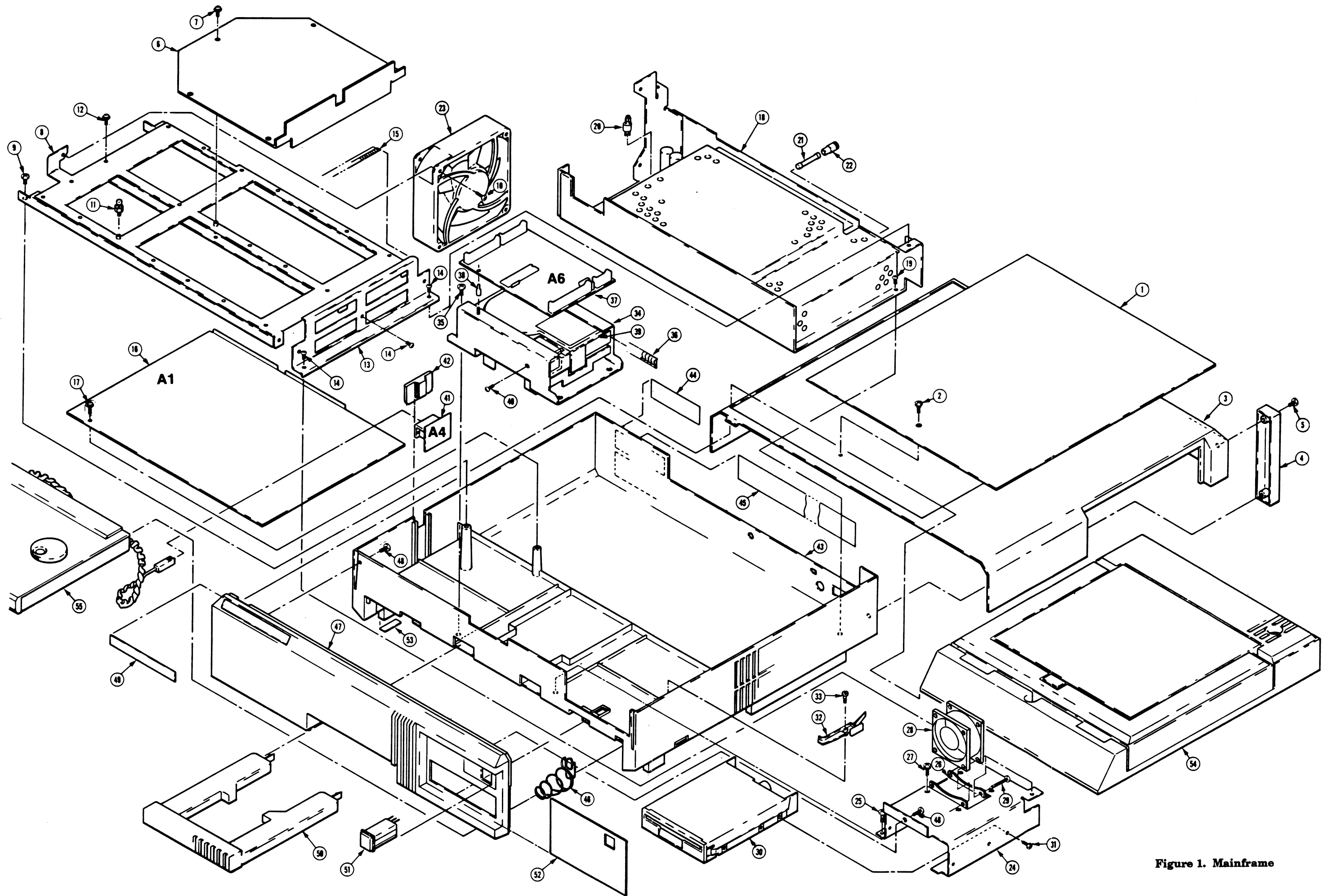


Figure 1. Mainframe

## Replaceable Mechanical Parts

Fig. & Index No.	Tektronix Part Number	Serial Effect	Number Discont	Qty	12445 Part Name & Description	Mfr Code	Mfr Part Number
2-1	118-7444-04			1	MONITOR:RGB,MULTISYNC/C (2510 ONLY)	TK2279	ORDER BY DESCRIPTION
	118-7444-04	B010100	B010220	1	MONITOR:RGB,MULTISYNC/C	TK2279	ORDER BY DESCRIPTION
	119-3840-01	B010221	B010517	1	MONITOR KIT:W/TEK LABEL,110V	80009	119-3840-01
	119-4011-00	B010518		1	MONITOR:COLOR MONITOR,SONY,MULTI SYNC CPD (3002C ONLY,110V OPERATION)	TK2298	CPD1302 WITH CTG535L
	118-7444-04	B010100	B010317	1	MONITOR:RGB,MULTISYNC/C	TK2279	ORDER BY DESCRIPTION
	119-3852-01	B010317	B010683	1	MONITOR KIT:W/TEK LABEL,220V	80009	119-3852-01
	119-4012-00	B010684		1	MONITOR:COLOR MONITOR,SONY,MULTI SYNC CPD (3002C OPT A1-A5 ONLY,220V OPERATION)	80009	119-4012-00
-2	174-1299-00			1	CA ASSY,SP,ELEC:13 TR PR,28 AWG,72.0 L	53387	TO BE ASSIGNED
	610-0767-00	B010100	B010255	1	CHASSIS ASSY:FLAT DISPLAY	80009	610-0767-00
	610-0767-01	B010256		1	CHASSIS ASSY:FLAT DISPLAY (2510 ONLY)	80009	610-0767-01
	610-0767-00	B010100	B010569	1	CHASSIS ASSY:FLAT DISPLAY	80009	610-0767-00
	610-0767-01	B010570	B010648	1	CHASSIS ASSY:FLAT DISPLAY	80009	610-0767-01
	610-0767-02	B010649		1	CHASSIS ASSY:FLAT DISPLAY (3002 ONLY)	80009	610-0767-02
-3	200-3337-10			1	.COVER,DISPLAY:POLYCARBONATE	80009	200-3337-10
-4	200-3461-00			1	.COVER,BEZEL:PLASTIC,3002P	TK2321	200-3461-00
-5	105-0993-00			1	.LATCH,DSPL COV:1.0 X 0.445	TK1151	105-0993-00
-6	407-3648-00			1	.BRACKET,HINGE:BEZEL,ALUMINUM	QJ260	407-3648-00
-7	211-0504-00			2	.SCREW,MACHINE:6-32 X 0.250,PNH,STL	TK0435	ORDER BY DESCRIPTION
-8	214-4004-00			2	.HINGE:	94222	E6-99-112-20
-9	212-0008-00			4	.SCREW,MACHINE:8-32 X 0.5,PNH,STL	93907	MACHINE SCREW: 8-32
-10	212-0004-00			4	.SCREW,MACHINE:8-32 X 0.312,PNH,STL	TK0435	ORDER BY DESCRIPTION
-11	378-0315-00			1	.FLTR,POLARIZED:ACRYLIC	2K262	378-0315-00
-12	119-2748-00	B010100	B010255	1	.FLAT PNL DSPLY:3002P (2510 ONLY)	TK2153	996-0053-00
	-----	B010256		1	.FLAT PNL DSPLY:3002P (2510 ONLY) NOT REPLACEABLE;USE 610-0767-01		
	119-2748-00	B010100	B010569	1	.FLAT PNL DSPLY:3002P (3002 ONLY)	TK2153	996-0053-00
	-----	B010570	B010648	1	.FLAT PNL DSPLY:3002P (3002 ONLY) NOT REPLACEABLE;USE 610-0767-01		
	-----	B010649		1	.FLAT PNL DSPLY:3002P (3002 ONLY) NOT REPLACEABLE;USE 610-0767-02		
-13	211-0661-00	B010100	B010165	6	.SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ (2510 ONLY)	01536	821-01655-024
	211-0244-00	B010166		6	.SCR,ASSEM WSHR:4-40 X 0.312,PNH STL CD PL (2510 ONLY)	01536	821-02775
	211-0244-00			6	.SCR,ASSEM WSHR:4-40 X 0.312,PNH STL CD PL (3002 ONLY)	01536	821-02775
-14	-----	B010256		1	.CIRCUIT BD ASSY:CONVERSION (2510 ONLY) NOT REPLACEABLE;USE 610-0767-01		
	-----	B010570	B010648	1	.CIRCUIT BD ASSY:CONVERSION (3002 ONLY) NOT REPLACEABLE;USE 610-0767-01		
	-----	B010649		1	.CIRCUIT BD ASSY:VIDEO SIGNAL CONDITIONER; (3002 ONLY) NOT REPLACEABLE;USE 610-0767-02		
-15	129-0339-00	B010256		4	.SPACER,POST:0.28 L,4-40 TAP/STUD,BRS,CU SN (2510 ONLY)	80009	129-0339-00
	129-0339-00	B010570		4	.SPACER,POST:0.28 L,4-40 TAP/STUD,BRS,CU SN (3002 ONLY)	80009	129-0339-00
-16	210-0851-00	B010256		4	.WASHER,FLAT:0.119 ID X 0.375 OD X 0.025,ST (2510 ONLY)	12327	ORDER BY DESCRIPTION
	210-0851-00	B010570		4	.WASHER,FLAT:0.119 ID X 0.375 OD X 0.025,ST (3002 ONLY)	12327	ORDER BY DESCRIPTION
-17	210-0586-00	B010256		4	.NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL (2510 ONLY)	78189	211-041800-00
	210-0586-00	B010570		4	.NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL (3002 ONLY)	78189	211-041800-00
-18	211-0729-00	B010256		1	.SCR,ASSEM WSHR:6-32 X 0.437,PH,STL,CD PL (2510 ONLY)	01536	ORDER BY DESCRIPTION
	211-0729-00	B010570		1	.SCR,ASSEM WSHR:6-32 X 0.437,PH,STL,CD PL (3002 ONLY)	01536	ORDER BY DESCRIPTION



# Replaceable Mechanical Parts

Fig. & Index No.	Tektronix Part Number	Serial Number Effect	Number Discnt	Qty	12345 Part Name & Description	Mfr Code	Mfr Part Number
2-19	129-1373-00	B010256		6	.SPACER, POST:0.635 L X 0.25 HEX X 4-40 (2510 ONLY)	0J260	129-1373-00
	129-1373-00	B010570		6	.SPACER, POST:0.635 L X 0.25 HEX X 4-40 (3002 ONLY)	0J260	129-1373-00
-20	200-3474-00	B010100	B010255	1	.COVER, REAR: BEZEL, ALUMINUM	0J260	200-3474-00
	200-3474-01	B010256		1	.COVER, REAR: BEZEL, ALUMINUM (2510 ONLY)	0J260	200-3474-01
	200-3474-00	B010100	B010569	1	.COVER, REAR: BEZEL, ALUMINUM	0J260	200-3474-00
	200-3474-01	B010570		1	.COVER, REAR: BEZEL, ALUMINUM (3002 ONLY)	0J260	200-3474-01
-21	211-0502-00			6	.SCREW, MACHINE: 6-32 X 0.188, FLH, 100 DEG, STL	TK0435	ORDER BY DESCRIPTION
-22	174-1154-00	B010100	B010237	1	.CA ASSY, SP, ELEC: 34, 28 AWG, 13.5 L	80009	174-1154-00
	174-1154-01	B010238		1	.CA ASSY, SP, ELEC: 34, 28 AWG, 13.5 L (2510 ONLY)	80009	174-1154-01
	174-1154-00	B010100	B010412	1	.CA ASSY, SP, ELEC: 34, 28 AWG, 13.5 L	80009	174-1154-00
	174-1154-01	B010413	B010648	1	.CA ASSY, SP, ELEC: 34, 28 AWG, 13.5 L	80009	174-1154-01
	174-1154-02	B010649		1	.CA ASSY, SP, ELEC: 20, 28 AWG, 13.5 (3002 ONLY)	80009	174-1154-02
-23	337-3722-00	B010649		1	.SHIELD, ELEC: CABLE	80009	337-3722-00
-24	210-0457-00			2	.NUT, PL, ASSEM WA: 6-32 X 0.312, STL CD PL	78189	511-061800-00
	343-1400-00			1	.CLAMP, CABLE: 2.85 L X 0.5 H, ALUMINUM	0J260	343-1400-00
-26	432-0156-00			1	.BASE, DISPLAY:	TK2321	432-0156-00
-27	348-1085-00	B010100	B010189	1	.SHLD GSKT, ELEK: EMI, 0.003, CU BE, 2.75 L	30817	97-521-19-2.75
	348-1085-00	B010190		5	.SHLD GSKT, ELEK: EMI, 0.003, CU BE, 2.75 L (2510 ONLY)	30817	97-521-19-2.75
	348-1085-00			5	.SHLD GSKT, ELEK: EMI, 0.003, CU BE, 2.75 L (3002 ONLY)	30817	97-521-19-2.75
-28	119-2747-00	B010100	B010183	1	.CONN, DSPL PWR: 7.425 L X 2.0 W	TK2153	996-0069-01
	119-2747-01	B010184	B010255	1	.CONN, DSPL PWR: 7.425 L X 2.0 W (2510 ONLY)	80009	119-2747-01
	-----	B010256		1	.CONN, DSPL PWR: 7.425 L X 2.0 W, POWER (2510 ONLY) NOT REPLACEABLE; USE 610-0767-01		
	119-2747-01	B010100	B010569	1	.CONN, DSPL PWR: 7.425 L X 2.0 W (3002 ONLY)	80009	119-2747-01
	-----	B010570	B010648	1	.CONN, DSPL PWR: 7.425 L X 2.0 W, POWER (3002 ONLY) NOT REPLACEABLE; USE 610-0767-01		
-29	211-0658-00			5	.SCR, ASSEM WSHR: 6-32 X 0.312, PNH, STL, POZ (2510 ONLY)	78189	S51-060545-0X
	211-0658-00	B010100	B010648	5	.SCR, ASSEM WSHR: 6-32 X 0.312, PNH, STL, POZ (3002 ONLY)	78189	S51-060545-0X
-30	211-0402-00			2	.SCREW, MACHINE: M2.5 X 0.45 X 8, SLOTTED	62559	21100-140
-31	-----	B010649		1	.CONN, DSPL PWR: 5.25 L X 2.0 W, POWER CONVERTER (3002 ONLY) NOT REPLACEABLE; USE 610-0767-02		
-32	211-0661-00	B010649		4	.SCR, ASSEM WSHR: 4-40 X 0.25, PNH, STL, POZ	01536	821-01655-024
-33	-----	B010649		1	.CIRCUIT BD ASSY: PS ADAPTER (3002 ONLY) NOT REPLACEABLE; USE 610-0767-02		
-34	211-0661-00	B010649		2	.SCR, ASSEM WSHR: 4-40 X 0.25, PNH, STL, POZ	01536	821-01655-024
-35	174-2326-00	B010649		1	.CA ASSY, SP, ELEC: 16, 28 AWG, 4.8 L	TK2156	65666
-36	174-2327-00	B010649		1	.CA ASSY, SP, ELEC: 20, 28 AWG, 6.125 L	TK2156	65667
-37	200-3338-00			1	.COVER, BOTTOM: DISPLAY (2510 ONLY)	0J260	200-3338-00
	200-3338-00	B010100	B010648	1	.COVER, BOTTOM: DISPLAY	0J260	200-3338-00
	200-3338-01	B010648		1	.COVER, BOTTOM: DISPLAY (3002 ONLY)	80009	200-3338-01
-38	211-0502-00			8	.SCREW, MACHINE: 6-32 X 0.188, FLH, 100 DEG, STL	TK0435	ORDER BY DESCRIPTION
-39	348-0910-00			4	.FOOT, CKT BD HSG:	52152	SJ5007
-40	174-0947-00	B010100	B010253	1	.CA ASSY, SP, ELEC: 26, 28 AWG, 10.0 L	22526	82374-001
	174-0947-01	B010254		1	.CA ASSY, SP, ELEC: 26, 28 AWG, 10.0 L, D-CONN, 3M (2510 ONLY)	53387	80-6104-2322-2
	174-0947-00	B010100	B010528	1	.CA ASSY, SP, ELEC: 26, 28 AWG, 10.0 L	22526	82374-001
	174-0947-01	B010529		1	.CA ASSY, SP, ELEC: 26, 28 AWG, 10.0 L, D-CONN, 3M (3002 ONLY)	53387	80-6104-2322-2

## Replaceable Mechanical Parts

Fig. & Index No.	Tektronix Part Number	Serial Number		Qty	12245 Part Name & Description	Mfr Code	Mfr Part Number
		Effect	Discont				
3-	119-2402-00			1	KEYBOARD ASSY:3002C/3002P	59666	9395-0137-301
-1	118-8507-00			1	.KEYBOARD ASSY:RUBBER MATRIX/KEYBOARD PCB	59666	9303-00004-001
-2	118-8508-00			1	.CABLE ASSEMBLY:3002C	59666	9147-50019-001
-3	118-8509-00			1	.COMPONENT KIT:KEYBOARD,MISC PARTS	59666	9303-00005-001
					KIT INCLUDES:		
					..PLASTIC STAND		
					..KEYTOP SET		
					..ENCODER KNOB ASSY		
					..KEYPAD POST		
					..SPACE BAR POST		
					..WIRE GUIDE		
					..WIRE RETAINER		
					..LEVELING WIRE, SPACE		
					..LEVELING WIRE, RETURN		
					..SPRING		
					..SCREW		

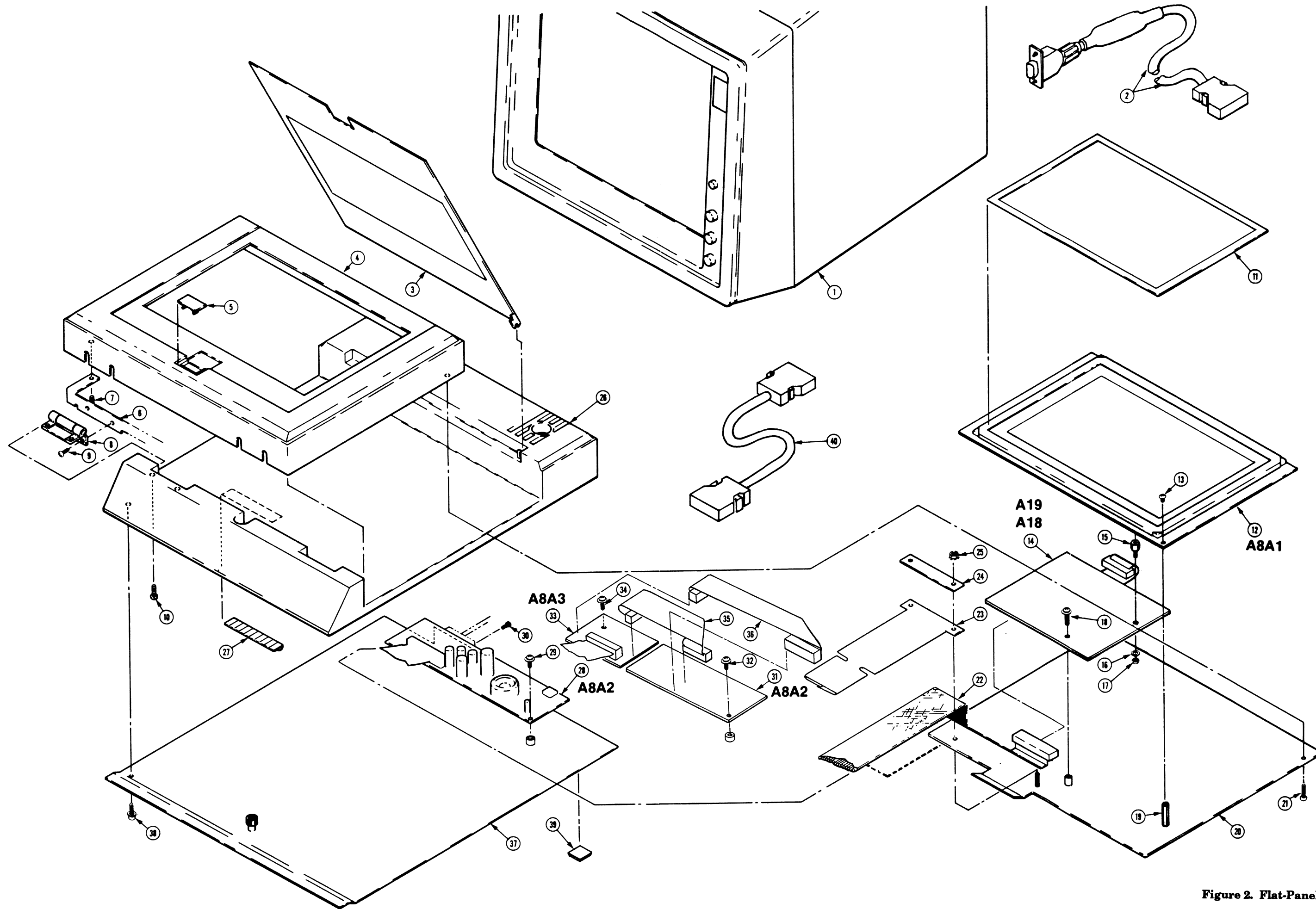


Figure 2. Flat-Panel Display

## Replaceable Mechanical Parts

Fig. & Index No.	Tektronix Part Number	Serial Number		Qty	12345 Part Name & Description	Mfr Code	Mfr Part Number
		Effect	Discont				
4-1	161-0104-00			1	CABLE ASSY,PWR,:3 WIRE,98.0 L,W/RTANG CONN (STANDARD,NORTH AMERICAN,120V PLUG)	08445	MC6 -3 CGB6
-2	161-0104-06			1	CABLE ASSY,PWR,:3 X 0.75MM SQ,220V,98.0 L (OPTION A1;UNIVERSAL EURO,220V PLUG)	TK1373	ORDER BY DESCRIPTION
-3	161-0104-07			1	CABLE ASSY,PWR,:3 X 0.75MM SQ,240V,98.0 L (OPTION A2;UK,240 V PLUG)	TK1373	A25UK-RA
-4	161-0104-05			1	CABLE ASSY,PWR,:3,18 AWG,240V,98.0 L (OPTION A3:AUSTRALIAN,240V PLUG)	S3109	SAA/3-003CCFC3X0, 75
-5	161-0154-00			1	CABLE ASSY,PWR,:3,1.00MM SQ,250V,10A (OPTION A5:SWITZERLAND,220V PLUG)	S3109	12-H05VVF3G 00-5 0
-6	671-0556-00			1	CIRCUIT BD ASSY:3002E EXPANSION (3002E ONLY)	80009	671-0556-00
-7	131-3969-00			1	.CONN,RCPT,ELEC:HEADER,5 POSITION	TK1471	MSTBA1.5/5-G-5.08-AU
-8	131-4262-00			1	.CONN,RCPT,ELEC:HDR,PCB,MALE,RTANG,1 X 5	27264	26-48-2056
-9	131-4799-00			1	.CONN,PLUG,ELEC:HDR,PCB,MALE,RTANG,1 X 2,0.	00779	103904-1
-10	131-0608-00			4	.TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD P	22526	48283-036
-11	386-5598-00			1	.STIF,CIRCUIT BD:	0J260	386-5598-00 TEK META
-12	131-4495-00			2	.CONN,RCPT,ELEC:CKT BD,26 CONTACT,RTANG	53387	1202JLOA2JL
-13	211-0402-00			4	.SCREW,MACHINE:M2.5 X 0.45 X 8,SLOTTED	62559	21100-140
-14	407-3705-00			1	.BRKT,CONN MTG:ALUMINUM	0J260	407-3705-00
-15	211-0661-00			2	.SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-16	386-5975-00			1	.STIFFENER:EXPANSION MAIN FRAME	0J260	386-5975-00
-17	210-0457-00			2	.NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
-18	211-0658-00			1	.SCR,ASSEM WSHR:6-32 X 0.312,PNH,STL,POZ	78189	551-060545-0X
-19	337-3624-00			1	.SHIELD,ELEC:CIRCUIT BD,BE-CU	TK2265	337-3624-00
-20	174-0595-01			1	.CA ASSY,SP,ELEC:26,28 AWG,4.0 L,RIBBON	TK2156	62908
					*****STANDARD ACCESSORIES*****		
	062-9892-01			1	SOFTWARE PKG:3000 SERIES SYSTEM SOFTWARE	80009	062-9892-01
	063-0165-01			1	SOFTWARE PKG:3002 SERIES SYSTEM DIAGNOSTICS	80009	063-0165-01
	070-7006-00			1	MANUAL,TECH:USERS,PRISM 3002 SYSTEM	80009	070-7006-00
	070-7007-00			3	MANUAL,TECH:REF GUIDE,PRISM 3002 SERIES	80009	070-7007-00
	070-7967-00			1	MANUAL,TECH:INSTR,3002C,PRISM 3002 READ ME	80009	070-7967-00
					*****OPTIONAL ACCESSORIES*****		
	016-0909-01			1	CASE,CARRYING:SOFTSIDED FOR 3002C,P,R,25	TK2162	0587
	070-7412-02			1	MANUAL,TECH:SERVICE, 3002 & 2510 MAINFRAME	80009	070-7412-02
	070-7413-01			1	MANUAL,TECH:SERVICE,MPU CKT BD,671-0058-XX	80009	070-7413-01

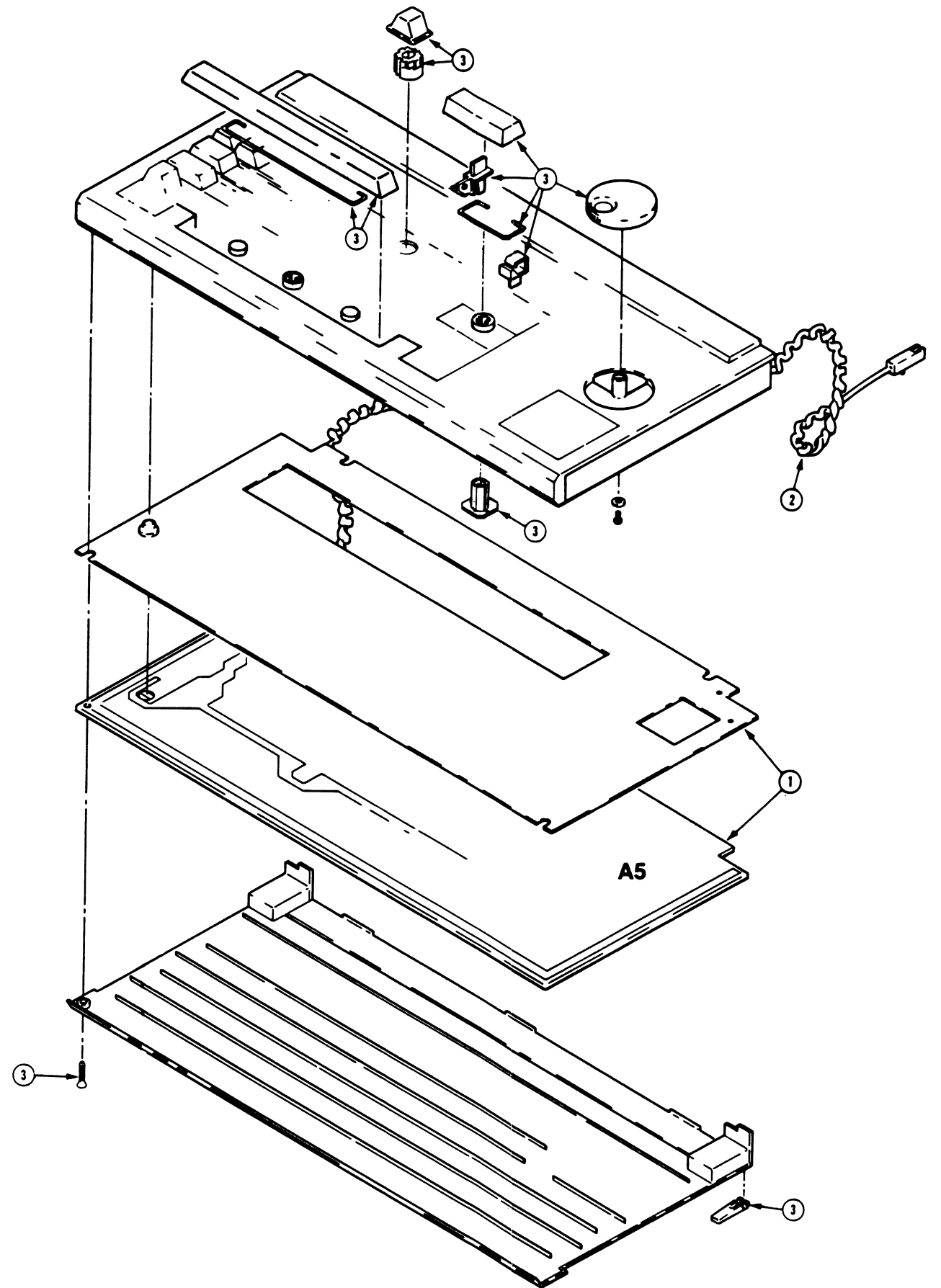


Figure 3. Keyboard Assembly

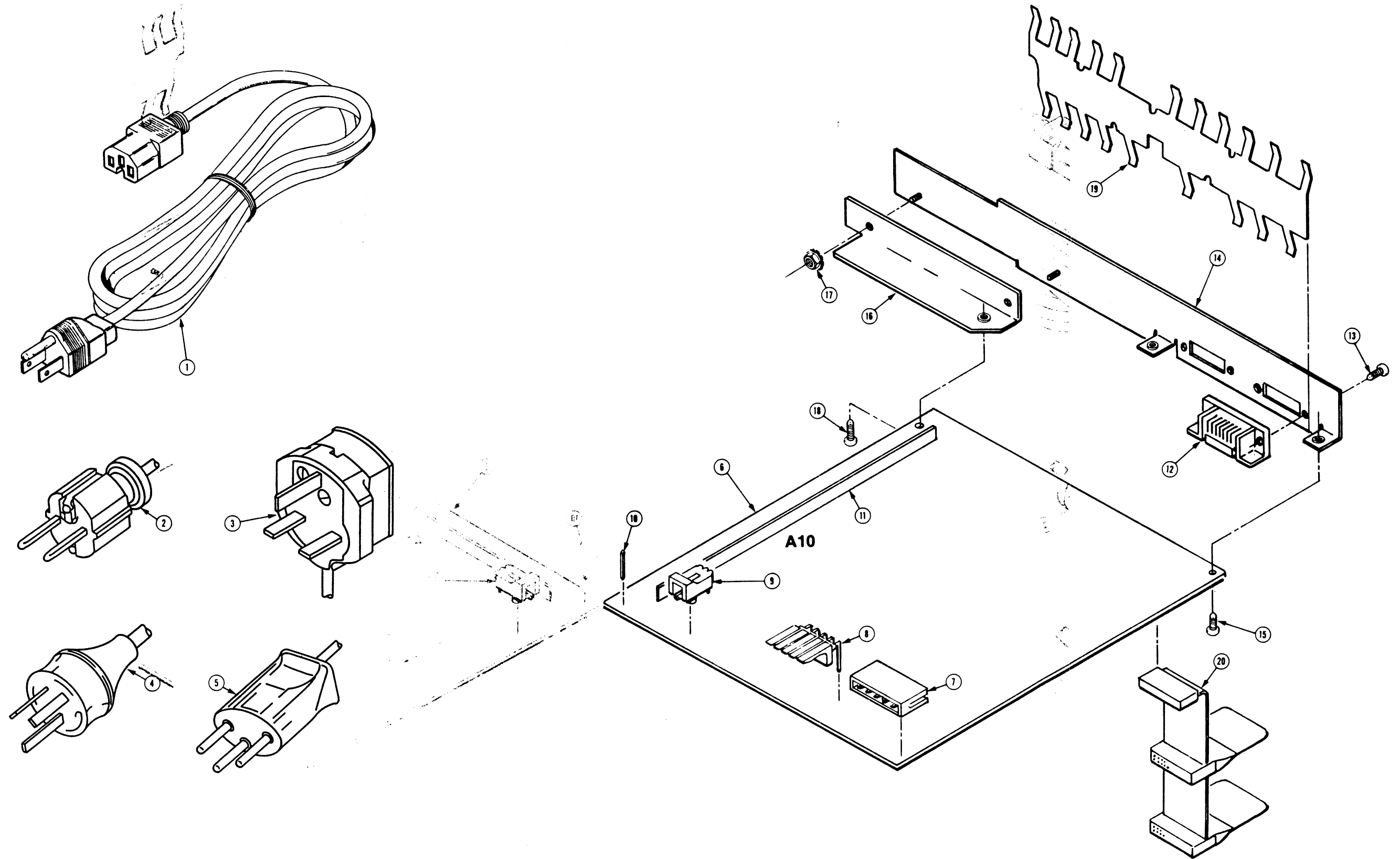


Figure 4. Accessories & Expansion Ckt Bd