Service Manual

Tektronix

PQM300
Program QoS Monitor

071-0577-01

This document applies to firmware version 1.0
and above.

Warning
The servicing instructions are for use by qualified
personnel only. To avoid personal injury, do not
perform any servicing unless you are qualified to
do so. Refer to all safety summaries prior to
performing service.

www.tektronix.com

WARRANTY

Tektronix warrants that the products that it manufactures and sells will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If a product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

To Avoid Fire or Personal Injury

Use Proper Power Cord. Use only the power cord specified for this product and certified for the country of use.

Ground the Product. This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Avoid Exposed Circuitry. Do not touch exposed connections and components when power is present.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Provide Proper Ventilation. Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

Symbols and Terms

Terms in this Manual. These terms may appear in this manual:

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

CAUTION. Caution statements identify conditions or practices that could result in damage to this product or other property.

Terms on the Product. These terms may appear on the product:

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

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

Symbols on the Product. The following symbols may appear on the product:

CAUTION
Refer to Manual

WARNING
High Voltage

Protective Ground
(Earth) Terminal

Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

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

Disconnect Power. To avoid electric shock, switch off the instrument power, then disconnect the power cord from the mains power.

Use Care When Servicing With Power On. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.

Preface

This manual contains the servicing information for the PQM300 Program QoS Monitor. This instrument is composed of a mainframe chassis that contains the CPU, the CPU I/O board, and PQM300 hardware PCI modules and supporting circuitry. The CPU runs under the Window NT operating system running the PQM300 application software.

The information included in this manual explains how to verify, service, troubleshoot, and repair the system to the module level:

- *Specifications* describes functional characteristics and performance requirements for the PQM300 Program QoS Monitor.

- *Operating Information* tells you how to install and operate the instrument.

- *Theory of Operation* provides descriptions of the program monitor system modules.

- *Performance Verification* describes how to verify the functional performance of the PQM300 system.

- *Adjustment Procedures* gives the field adjustment procedures.

- *Maintenance* contains the following information:

    - How to safely handle static sensitive modules and components

    - How to remove and replace modules

    - Diagnostic and Troubleshooting information and procedures

- *Options* provides a brief description of the available options for the program monitor system.

- *Replaceable Electrical Parts*. See the *Replaceable Mechanical Parts List*.

- *Diagrams* provides a simplified interconnection block diagram.

- *Replaceable Mechanical Parts List* gives all module and mechanical parts that comprise the program monitor system. Parts are identified on an indexed illustration to make them easier to identify.

- *Appendix A* provides the procedure to follow in the event that the operating system software needs to be repaired. Installing the application software and loading the video test sequences are also explained.

Related Manuals

The PQM300 Program QoS Monitor user documentation consists of the following:

- The *PQM300 Program QoS Monitor User Manual* details how to operate this picture quality monitoring system.

Manual Conventions

The following terms and conventions are used throughout this manual:

- The terms program monitor and PQM300 program monitor are used interchangeably with the more formal term PQM300 Program QoS Monitor.

- The term mainframe refers to the computer platform that hosts the PQM300 Program QoS Monitor.

Introduction

This manual contains maintenance information for thePQM300 Program QoS
Monitor. Take a few minutes to read this short introduction before doing any
repair or service work on the instrument.

Before You Begin

This manual is for servicing the PQM300 Program QoS Monitor. To prevent
injury to yourself or damage to the program monitor system, fulfill the following
requirements before you attempt service:

■ Be sure you are a qualified service person.

■ Read the Safety Summary found at the beginning of this manual.

■ Read the following *Service Strategy* information.

When using this manual to service your program monitor system, be sure to heed
all warning, cautions, and notes.

Service Strategy

This manual contains the following maintenance and repair procedures:

■ Periodic maintenance

■ Performance verification

■ Field adjustments

■ Module removal and replacement

■ Module-level fault diagnosis

Once you isolate a problem with a module, use the *Replaceable Parts List* in this
manual to determine the correct module part number to order from Tektronix.

Tektronix Service Offerings

Tektronix provides service to cover repair under warranty. Other services are available that may provide a cost-effective answer to your service needs.

Whether providing warranty repair service or any of the other services listed below, Tektronix service technicians, trained on Tektronix products, are best equipped to service your program monitor system. Tektronix technicians are appraised of the latest information on improvements to the product as well as the latest product options.

Warranty Repair Service

Tektronix warrants this product for one year from the date of purchase. (The warranty appears after the title page and copyright page in this manual.) Tektronix technicians provide warranty service at most Tektronix service locations worldwide. Your Tektronix product catalog lists all service locations worldwide.

Repair Service

Tektronix offers single per-incident and annual maintenance agreements that provide Depot Service repair of this product.

Of these services, the annual maintenance agreement offers a particularly cost-effective approach to service for many owners of the PQM300 Program QoS Monitor. Such agreements can be purchased to span several years.

Self Service

Tektronix supports repair to the module level by offering a *Module Exchange* program.

Module Exchange. This service reduces down time for repair by allowing you to exchange most modules for remanufactured ones. Tektronix ships you an updated and tested exchange module from the Beaverton, Oregon, service center. Each module comes with a 90-day service warranty.

For More Information. Contact your local Tektronix service center or sales engineer for more information on any of the repair or adjustment services previously described.

Contacting Tektronix

Phone	1-800-833-9200*
Address	Tektronix, Inc. Department or name (if known) 14200 SW Karl Braun Drive P.O. Box 500 Beaverton, OR 97077 USA
Web site	www.tektronix.com
Sales support	1-800-833-9200, select option 1*
Service support	1-800-833-9200, select option 2*
Technical support	Email: techsupport@tektronix.com 1-800-833-9200, select option 3* 1-503-627-2400 6:00 a.m. – 5:00 p.m. Pacific time

* **This phone number is toll free in North America. After office hours, please leave a voice mail message.**
  Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices.

Specifications

Specifications

This section lists the electrical, physical, and environmental characteristics of the PQM300 Program QoS Monitor.

NOTE. Version 2.0 of the PQM300 application software must be installed to support the Alarm Relay board and the Local Control Flat Panel Display options.

Product Description

The program monitor is implemented on a platform that uses Microsoft's Windows NT operating system. Operating an a networked system, the PQM300 program monitor application is configured to begin automatically after the power-on initialization and program loading are completed.

An optional SVGA monitor can be connected for a local display and the program monitor can be controlled using a keyboard and a mouse.

The PQM300 program monitor provides program service quality assessments of live Rec. 601 digital video signals. Quality of Service (QoS) monitoring provides the following assessments and capabilities:

MPEG Defects

■ Real-time MPEG defect (Discrete Cosine Transform based blockiness artifacts) monitoring and reporting when a signal is present. The PDI level (Picture Defect Indicator) provides immediate and continuous indication of the video image quality.

■ Fixed (manual) setting of blockiness period for a given pixel block size for the MPEG defects measurement.

■ Adaptive settings to automatically determine blockiness periods used for the MPEG defects measurement.

■ Period selection to monitor the detected blockiness period. This is a tool to find the correct period for the fixed period setting and to monitor the incoming video for blockiness period changes.

Frozen Frame, Repeated Frames, Loss of Service

■ Video content constant (consecutive fields exactly identical)

- Repeated frame found in a moving sequence

- Absence of a serial digital video signal

- Absence of video content on the input

Uncorrelated Noise

- Indicates the amount of white Gaussian noise in the video signal (such as that injected by analog video circuits)

Alarm Level Monitoring

- Individual alarm settings for all measurements (including blockiness period)

- Level thresholds for amplitude of error

- Time thresholds in number of fields for duration of error condition

- Percentage thresholds for an amount of error within a defined time threshold

Remote Control and Networking

- Web Browser control and monitoring of any program monitor accessible over a TCP/IP network. Access is through the Netscape (4.5 or higher) or the Internet Explorer (4.0 or higher) Web browser. An applet provides a remote user interface to make all the configuration setups and display the measurement results.

- SNMP agent (Simple Network Management Protocol) and MIB (management information base) for integration into an existing SNMP infrastructure to monitor picture quality from a central control point

- Multi-machine networking. A networked Windows NT PC or a PQM300 program monitor with local display, keyboard, and mouse, can be used to control and monitor all PQM300 program monitors accessible over the network.

NOTE. A locally attached SVGA monitor, mouse, and keyboard are used for the initial set up of the PQM300 Program QoS Monitor.

Continuous Measurements

Measurements run continuously to monitor program quality in real-time. An operator at a central control station can control the operation of the program monitor installed in a system network.

Specification Tables

The tables list the specifications for the PQM300 Program QoS Monitor. All specifications are guaranteed unless labeled typical. Typical specifications are provided for your convenience but are not guaranteed. Specifications marked with the ✔ symbol are checked in the *Performance Verification* procedures given in this manual.

The following definitions describe the information you will find in the specification tables.

- **Specification**. A document or a section of a document that lists and describes characteristics and performance requirements of equipment and certain programming material.

- **Characteristic**. A property of the product.

- **Description.** A statement that describes a characteristic usually in limit form. This statement is considered to be binding on the company (seller), and can be verified by performing the appropriate portion of the Performance Verification Procedure, or by a separate and available procedure.

- **Supplemental information.** Statements that explain performance requirements or provide performance information. These are not considered to be statements of guaranteed performance and are not ordinarily supported by a performance check.

Performance Conditions

The Performance requirements are valid within the environmental limits if the instrument was adjusted at $25°$ C $\pm 5°$ C and you allowed a minimum warm-up time of 20 minutes.

Hardware Specifications

Table 1–1: Program monitor DSP board

Characteristic	Description	Supplemental information
Input Signal Format ✔	Receives 270 MB/s serial digital signal	Complies with ITU–R BT.601, BT.656, and SMPTE 259M.
Channel 1: Main In and Main Out		Active loop-through, BNC, 75 Ω terminating
Channel 2: Ref In and Ref Out		Active loop-through SMB, 75 Ω terminating
Channel 1 to Channel 2 Isolation		30 dB to 300 MHz

Table 1–1: Program monitor DSP board (Cont.)

Characteristic	Description	Supplemental information
Channel Synchronization		The two inputs are asynchronous
Input Return Loss		At least 15 dB (1 MHz to 270 MHz), with power on.
Serial Receiver Equalization Range		Proper operation with coaxial cable up to 14.5 dB loss at 135 MHz. Typical operation; to 300 meters with Belden 8281 coaxial cable.
Active loop-through output characteristics		Meets SMPTE 259M levels and rise and fall times. No reclocking is done on loop-through output.
Loop Output Return Loss		At least 15 dB (1 MHz to 270 MHz), with power on.
Output Signal Format ✔	270 MB/s serial digital signal	Complies with ITU–R BT.601, BT.656, and SMPTE 259M. Exception: output frequency accuracy only specified when not referenced to an external input signal.
Output impedance		75 Ω
Return Loss		At least 15 dB (1 - 270 MHz), with power on.
Output level ✔	800 mV ± 50mV	
Rise/Fall		0.3 ns to 1.2 ns, measured 20% to 80%
Jitter – Internal Reference		Less than 0.2 UI, typically 0.3 ns peak-to-peak.
Jitter – External Reference		Depends on the reference input. Typically peaking at 0.05 dB. Jitter attenuation 3 dB point is typically at 650 kHz.
Frequency ✔	270 Mbits/s (27 MHz clock is checked)	
Frequency accuracy		±1.5 ppm over temperature range plus ±1 ppm per year drift, when using the internal oscillator.
Output connector		BNC
DSP memory		256 MB fast SDRAM

Table 1–2: PQM3F01 NTSC/PAL composite decoder board

Characteristic	Performance requirement	Supplemental information
Input Channels		
Video Format ✔	NTSC, NTSC No Setup, PAL (B, D, G, H, and I)	

Table 1–2: PQM3F01 NTSC/PAL composite decoder board (Cont.)

Characteristic	Performance requirement	Supplemental information
Composite Input type		Passive loop-through, 75 Ω, compensated, BNC
Return loss		40 dB up to 6 MHz on composite video
Loop-through insertion loss		0.6 dB Max to 6 MHz for composite video
Input amplitude range		+5%, −20% typical
Hum range	0.5 V peak-to-peak	
Frequency range		±20 ppm
Genlock jitter		0.5 degree on 0 dB signal, −20 dB hum, −50 dB SNR
S-Video Input type		Standard S-Video and connector. No loop-through, terminated.
Return loss		25 dB typical
601 Out (serial digital video)		
Connectors		One BNC, one SMB. Identical signals on both output connectors.
Format ✔	270 MB/s serial component only	Complies with ITU-R BT.601, BT.656, and SMPTE 259M.
Output level ✔	800 mV ± 80 mV	
Rise/Fall ✔	0.4 ns to 1.2 ns, measured 20% to 80%	
Jitter	< 0.2 UI above 10 Hz	
Output impedance		75 Ω, 15 dB return loss 5 to 270 MHz
Frequency		270 Mbit/s nominal, tracks input signal
Output mode		8 bit or 9 bit, not user selectable
Conversion Accuracy		
Gain	1 ± 2% low frequency	
Flatness	1% to 5 MHz for luma, relative to 500 kHz	
Luma linearity		2%
Differential Gain		1%
Differential Phase		1 degree
Black Level Error		10 mV

Table 1–3: PQM3FRB, Option RB, alarm relay board

Characteristic	Description
Relay contact rating	6 A at 15 V
Relay contact resistance	100 milliohms maximum
Relay life expectancy	10,000,000 actuations minimum
Alarm relay output	Two 25-pin male D-sub connector to support alarm relay out. Pin Assignment, see Table 1–4.

Table 1–4: Alarm relay board connectors

Relay number	Relay contact pin out		
Slot 8	Normally closed	Common	Normally open
1	16	3	15
2	5	17	4
3	19	6	18
4	8	20	7
5	22	9	21
6	14	23	10
7	1	24	11
8	2	25	12
Slot 9	Normally closed	Common	Normally open
9	16	3	15
10	5	17	4
11	19	6	18
12	8	20	7
13	22	9	21
14	14	23	10
15	1	24	11
16	2	25	12

System Components

Table 1–5: System components

Characteristic	Supplemental information
Mainframe	Tektronix manufactured, common-platform mainframe
Form Factor	Rack-mountable in standard 19-inch rack. SVGA monitor for local display and mouse and keyboard for UI control are optional.
Processor	Two 400 MHz Pentium II processors
System Memory	256 MB
Real Time Clock	Real-time clock/calendar with a resolution of 1 second or less
Retention Time: Real-time clock, CMOS setup, and PnP NVRAM	Projected battery life is typically 10 years
BIOS	Phoenix BIOS, y2k compliant, field upgradable
Bus	32-bit PCI
Expansion Slots	8 PCI slots
Graphics	1024 × 768 SVGA resolution with 32 k colors minimum
Non-volatile Storage	
Floppy Disk drive	Standard 3.5 inch PC compatible floppy disk drive; 1.44 Mbyte high-density double sided (2HD)
CD-ROM drive	PC compatible half-height IDE CD–ROM drive, 8X
Hard Disk Drives	Standard PC compatible Small Computer Systems Interface (SCSI) HDD. Two drives of 9.1 Gbyte capacity each. Captured video sequences and other user files are striped on both hard drives.
Mainframe Interfaces	One loop-through ethernet port
	One bi-directional RS-232/RS-422/RS-485 port
	One parallel port (printer)
	Two hot-pluggable keyboard ports (located on the rear panel and the left front side panel). Use either connector to connect only one keyboard.
	Two hot-pluggable mouse ports (located on the rear panel and the left front side panel). Use either connector to connect only one mouse.
External Display	
SVGA Monitor	An SVGA monitor may be attached for external display of the user interface.
Digital Picture Monitor Output	An ancillary display may be attached. The output protocol is ITU-R BT.601.
Front Panel	Virtual front panel on external display monitor. Local user input is made using an optional mouse and keyboard.

Table 1–5: System components (Cont.)

Characteristic	Supplemental information
Internal Display (PQM3FLC local control option)	LCD, 6-bit, 250 NIT, CCFL backlight, 0. 264 MM pixel
Size	10. 4 IN Diagonal
Resolution	800 X 600 (SVGA)
Touch Panel	Standard 10.4 in touch panel pointing device mounted on the surface of the TFT display, connecting to the Front Panel Interface Board.

Table 1–6: Rear panel interface

Characteristic	Description
Parallel interface port	Port supports standard Centronics mode, Enhanced Parallel Port (EPP), or Microsoft high-speed mode (ECP) and utilizes a 25-pin D-sub connector.
	Compliant with IEEE P1284–C/D2 for bi-directional Parallel Peripheral Interface for Personal Computers (draft) style 1284–C.
	Pin assignments for compatible mode: 1. STROBE* 14. AUTOLF* 2. D0 15. ERR* 3. D1 16. INIT* 4. D2 17. SELECTIN* 5. D3 18. STROBE* 6. D4 19. GND 7. D5 20. GND 8. D6 21. GND 9. D7 22. GND 10. ACK* 23. GND 11. BUSY 24. GND 12. PaperEnd 25. GND 13. SELECT.
Serial interface port	9-pin male-D-sub connector to support RS232 serial port. Compliant to EIA/TIA 574
	Pin Assignments (RS232): 1. DCD 6. DSR 2. RXD 7. RTS 3. TXD 8. CTS 4. DTR 9. RI 5. GND

Table 1–6: Rear panel interface (Cont.)

Characteristic	Description
Serial interface port (cont.)	Pin Assignments (RS485): 1. RXD– 6. CTS– 2. RXD+ 7. RTS+ 3. TXD+ 8. CTS+ 4. TXD– 9. RTS– 5. GND
SVGA Output Port	15-pin female high density-D-sub SVGA connector. Compliant with EIA RS 343A. Selectable 640 X 480 (VGA), 800 X 600, and 1024 X 768 (SVGA). Pin assignments: 1. Red 9. (key) 2. Green 10. GND 3. Blue 11. NC 4. NC 12. NC 5. GND 13. HSYNC 6. AGND 14. VSYNC 7. AGND 15. NC 8. AGND
USB Port	Series A USB receptacle Pin assignments: 1. Vbus 3. +Data 2. –Data 4. GND
Ethernet Port	10 Base-T/100 Base-T on PCI bus, RJ45 Connector, Plug & Plan compatible, Bus master mode. RJ45 Pin assignments: 1. TX+ 5. NC 2. TX– 6. RX– 3. RX+ 7. NC 4. NC 8. NC

Table 1–7: Side panel interface characteristics

Characteristic	Description
Mouse Port	PS2 compatible mouse port utilizing a mini-DIN connector. Pin assignments: 1. data　　　　　　4. +5V. 2. NC　　　　　　5. clock 3. ground　　　　6. NC
Keyboard Port	PS2 compatible keyboard port utilizing a mini-DIN connector. Pin assignments: 1. data　　　　　　4. +5V. 2. NC　　　　　　5. clock 3. ground　　　　6. NC
USB Port	Series A USB receptacle 　Pin assignments: 　1. Vbus　　　　　3. +Data 　3. +data　　　　　4. GND

Power Characteristics

Table 1–8: AC power source characteristics

Characteristic	Description
Source Voltage	100 VAC to 240 VAC $\pm$ 10% (90 VAC to 264 VAC RMS), 47 Hz to 63 Hz, continuous range CAT II
Fuse Rating	8 A Fast / 250 V
Maximum Power Consumption	330 Watts max, 145 Watts typical
Steady State Input Current	6 Amps max, 1.9 Amps RMS typical
Inrush Surge Current	36 Amps maximum
Power Factor Correction	Yes

Mechanical (Physical) Characteristics

Table 1–9: Mechanical characteristics

Characteristic	Description
Classification	Transportable platform intended for either rackmount or bench/lab based applications.
Overall Dimensions	

Table 1–9: Mechanical characteristics (Cont.)

Characteristic	Description
Height	8.5 inches (w/o feet) (21.6 cm)
Width	17 inches (43.2 cm)
Depth	22 inches (55.9 cm)
Weight	
PQM300	42 lb (19.1 kg)
Shipping Weight	64 lb (29.1 kg)
Construction Materials	Chassis parts are constructed of aluminum alloy and aluminized steel; front panel and trim pieces are constructed of plastic; circuit boards are constructed of glass and/or ceramic-glass laminate

Environmental Characteristics

Table 1–10: Environmental characteristics

Characteristic	Description
Cooling airflow	Intake is from the front and sides of the instrument. Exhaust is to the bottom and rear of the instrument.
Required Clearance	2 in. (50 mm) air space adjacent to the bottom of the instrument is required.
Use Rating	Rated for indoor use only.
Atmospherics Temperature:	
Operating	5°C to 40°C (41°F to 104°F), 30°C (54°F)/hr max gradient, non-condensing (derated 1°C or 1.8 °F per 1,000 ft. or 305 m above 5,000 ft. or 1524 m altitude)
Non-operating	–20°C to 60°C (–4°F to 140°F), 30°C (54°F)/hr max gradient (without disk media installed in disk drives)
Humidity Operating	20% to 80% relative humidity, non-condensing. Max wet bulb temperature: 29.4°C or 84.9°F (derates relative humidity to ~46% at 40°C or 104°F)
Non-operating	8% to 80% relative humidity, non-condensing. Max wet bulb temperature: 40°C or 104°F (derates relative humidity to ~54% at 50°C or 122°F)
Altitude Operating	Up to 10,000 ft. (3,040m), (derated 1°C or 1.8°F per 1,000 ft. [305 m] above 5,000 ft. [1524 m] altitude).
Non-Operating	40,000 ft (12,190 m)

Certification and Compliances

Table 1–11: Electromagnetic Compatibility

Category	Standards or description
EC Declaration of Conformity – EMC	Compliance was demonstrated per EN55103–1/2 Product Family Standard for Audio, Video, Audio-Video, and Entertainment Lighting Control Apparatus for Professional Use (Environment Class E2; rack-mount application), using the following specifications:
	Emissions:
	EN 61000-3-2 Harmonic Currents, Conducted Emissions, AC Power Port
	EN55103-1 Radiated Magnetic Field Emissions, Annex A, rack-mount, Inrush Currents, Conducted Emissions, AC Power Port, Annex B Signal and Control Ports, Conducted Emissions, Annex E
	EN 55022 Class B, Radiated and Conducted Emissions.[1] [2]
	Peak Inrush Currents PQM300 main unit 36 A peak at 240 VAC/50 HZ, 15 A peak at 100 VAC/50 Hz
	[1] PQM300 Option 01 (Analog Composite Video Input) compliance to EN55022 Class B Radiated emissions limits was demonstrated with S-Video cables (Tektronix part number 012-1554-00), each with two clamp-on EMI Suppression Ferrites (Tektronix part number 276-0344-00) attached on the cable at the end connected to the PQM300 Option 01 S-Video input connector.
	[2] Radiated emissions compliance with Option RB, the alarm relay boards, demonstrated with Tektronix part number 174-3562-00 cables attached at the alarm I/O ports, and with these cables twisted together.
	Immunity:
	IEC 61000-4-2 Electrostatic Discharge Immunity, Performance Criterion "B"
	IEC 61000-4-3 RF Electromagnetic Field Immunity, Performance Criterion "A"
	IEC 61000-4-4 Electrical Fast Transient/Burst Immunity, Performance Criterion "B"
	IEC 61000-4-5 Electrical Slow Transient (Surge) Immunity, Performance Criterion "B"
	IEC 61000-4-6 Conducted Radio Frequency Immunity, Performance Criterion "A"
	IEC 61000-4-11 Criterion "C" Voltage Short Interruption Immunity, AC Power Port, Performance
	IEC 61000-4-11 Voltage Dips Immunity, AC Power Port, Performance Criterion "B" and "C"
	EN55103–2 Criterion "A" Radiated Magnetic Field Immunity, Annex A, Rack mount, Performance

Table 1–11: Electromagnetic Compatibility (Cont.)

Category	Standards or description
	Performance Criterion A: The apparatus will continue to operate as intended, in the presence of the disturbing phenomena. The display will remain stable.
	Performance Criterion B: The apparatus will continue to operate as intended after the disturbing phenomena is removed. There will be no change of operating state or stored data.
	Performance Criterion C: Normal function of apparatus is automatically restored when the disturbing phenomena is removed or can be restored by operation of the controls. Apparatus may self-reboot.
Australia Declaration of Conformity	EMC Framework, with compliance demonstrated using the following standard:
	AS/NZS 2064, Australian EMC Emissions Standard for Industrial, Scientific, and, Medical Equipment.
USA, FCC Compliance	Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits.

Table 1–12: Environmental Limits and Use Classification for Safety Certification Compliance

Category	Standards or description
Safety Certification Compliance	
Temperature, operating	+5° C to +40° C
Altitude (maximum operating)	2000 meters
Equipment Type	Test and measuring
Safety Class	Class 1 (as defined in IEC 61010-1, Annex H) - grounded product
Installation (Overvoltage) Category	Overvoltage Category II (as defined in IEC 61010-1, Annex J)
Pollution Degree	Pollution Degree 2 (as defined in IEC 61010-1). Note: Rated for indoor use only.
Supply Voltage Range	100 VAC to 240 VAC $\pm$ 10%, 50/60 Hz, single phase
Fuse Rating	Mains fuse is 8 A, 250 V, Fast; Not operator replaceable. Refer servicing to qualified service personnel.
Current Rating	6.0 Amps maximum
Relative Humidity (maximum operating)	80 % for temperatures up to 31° C, decreasing linearly to 50 % at 40° C
Pollution Degree Definition	A measure of the contaminates that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external. Products should be used only in the environment for which they are rated.
	Pollution Degree 1 No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms.

Table 1–12: Environmental Limits and Use Classification for Safety Certification Compliance (Cont.)

Category	Standards or description	
	Pollution Degree 2	Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.
	Pollution Degree 3	Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind.
European Union Compliance	Compliance was demonstrated to the following specification as listed in the Official Journal of the European Union:	
	Low Voltage Directive 73/23/EEC, amended by 93/68/EEC	
	EN 61010-1/A2	Safety Requirements for Electrical Equipment for Measurement Control and Laboratory Use.
Listing by a U.S. Nationally Recognized Testing Laboratory	ANSI/ISA S82.01	Safety Standard for Electrical and Electronic Test, Measuring, Controlling, and Related Equipment., 1994.
Canadian Certification	CAN/CSA C22.2 No. 1010.1	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.
Additional Compliance	UL3111-1	Standard for Electrical Measuring and Test Equipment.
	IEC61010-1/A2	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.
Installation (Overvoltage) Category	Terminals on this product may have different installation (overvoltage) category designations. The installation categories are:	
	CAT III	Distribution-level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location.
	CAT II	Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected.
	CAT I	Secondary (signal level) or battery operated circuits of electronic equipment.
Laser Classification	This product contains a CD ROM drive which utilizes a Class 1 laser and complies with EN60825–1:94, as well as with the U.S. FDA regulations. The drive is marked with the laser's classification and the date of manufacture, as well as the following information: Complies with the DHHS rules 21 CFR Chapter 1, Subchapter J applicable at the date of manufacture.	

Operating Information

Operating Information

This section provides basic information for installing and turning on the PQM300 Program QoS Monitor. The operating menus are briefly described. For a complete description of the operating menus see the PQM300 Program QoS Monitor User Manual. You can also use the available online help to assist in learning the purpose of the control selections in the configuration menus.

NOTE. Version 2.0 of the PQM300 application software must be installed to support the Alarm Relay board and the Local Control flat panel display options.

Installation

Read this section before attempting any installation procedures. This section describes site considerations, power requirements, and ground connections for your instrument.

Check the Shipping List Verify that you have received all of the parts of your program monitor. Use the shipping lists that came with your instrument to compare against the actual contents of your order. You should also do the following:

- Verify that you have the correct power cord for your geographical area.

- Verify that you have the PQM300 application software CD that contains a backup copy of the installed software. Store the CD in a safe location where you can easily retrieve the software for maintenance purposes.

- Verify that you have a boot disk in case you reformat the hard drive or damage operating system files or drivers.

- Verify that you have a Windows NT software installation kit. This kit should also be stored in a safe location. It will only be needed for maintenance purposes.

- Verify that you have all the other standard and optional accessories that you ordered.

Hardware Installation This section deals with hardware installation. To reinstall software refer to *Appendix C: Software Installation* in this manual.

The instrument comes standard with a rack-mount kit. For proper cooling, at least two inches (5.1 cm) of clearance is recommended on the rear and sides of

the mainframe. Use the instructions provided with the rack-mount kit to install the rack-mount cradle in a standard rack and to install the PQM300 program monitor in the cradle.

⚠️ **CAUTION.** *For rack mounting, the product must be installed in its specified rack cradle. For proper cooling, the air temperature at all air intake vents (inside of the rack) must not exceed 40° C.*

Before you can operate the product, you must connect the provided power cord. Refer to Figure 2–1 and connect the power cord to the instrument. Refer to Table 2–1 for the supply voltage rating and connect the other end of the power cord to the proper source. Do not connect to any power sources other than those for which the instrument is rated.

⚠️ **CAUTION.** *Keep the bottom of the instrument clear of obstructions to ensure proper cooling.*

Operating Requirements

Table 2–1 lists the operating requirements. Refer to *Appendix A: Specifications* for a complete specification list.

Table 2–1: Operating requirements

Requirement	Specification
Source voltage	100 VAC to 240 VAC ± 10% (90 VAC to 264 VAC RMS), 47 Hz to 63 Hz
Steady State input current	6 A_{RMS} maximum, 1.25 A_{RMS} typical
Maximum power consumption	330 Watts max, 145 Watts typical
Temperature	5°C to 40°C (41°F to 104°F), 30°C (54°F)/hr max gradient, non-condensing (derated 1°C or 1.8 °F per 1,000 ft. or 305 m above 5,000 ft. or 1524 m altitude)
Humidity	20% to 80% relative humidity, non-condensing. Max wet bulb temperature: 29.4°C or 84.9°F (derates relative humidity to ～46% at 40°C or 104°F).
Altitude (maximum operating)	Up to 10,000 ft. (3,040m), (derated 1°C or 1.8°F per 1,000 ft. [305 m] above 5,000 ft. [1524 m] altitude).

Interface Connections

The interface connectors on the rear and side of the program monitor, shown in Figure 2–1 and Figure 2–2, provide the interconnection ports for peripheral

devices and networking. Pin assignments for the rear panel and side panel connectors are listed in Table 1–6 and Table 1–7 in *Specifications*.
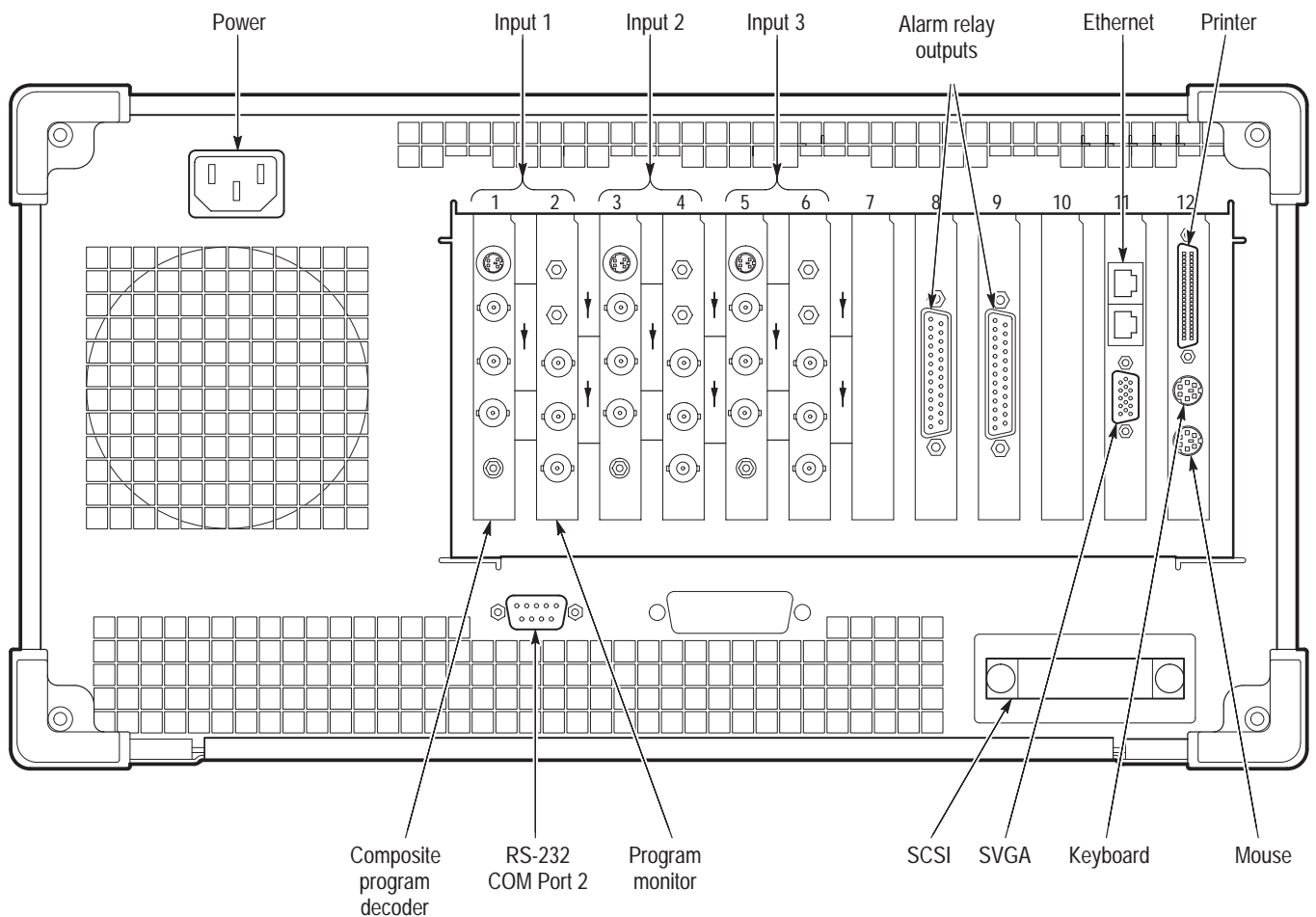
Figure 2–1: Rear panel of the PQM300 program monitor with three composite video channels and alarm relay option

Keyboard and Mouse Connections

Connect a keyboard and mouse either to the rear panel connectors as shown in Figure 2–1 or to the left-hand side of the instrument as shown in Figure 2–2. Do not connect to both. The keyboard and mouse can be plugged in and unplugged while the program monitor is in operation.
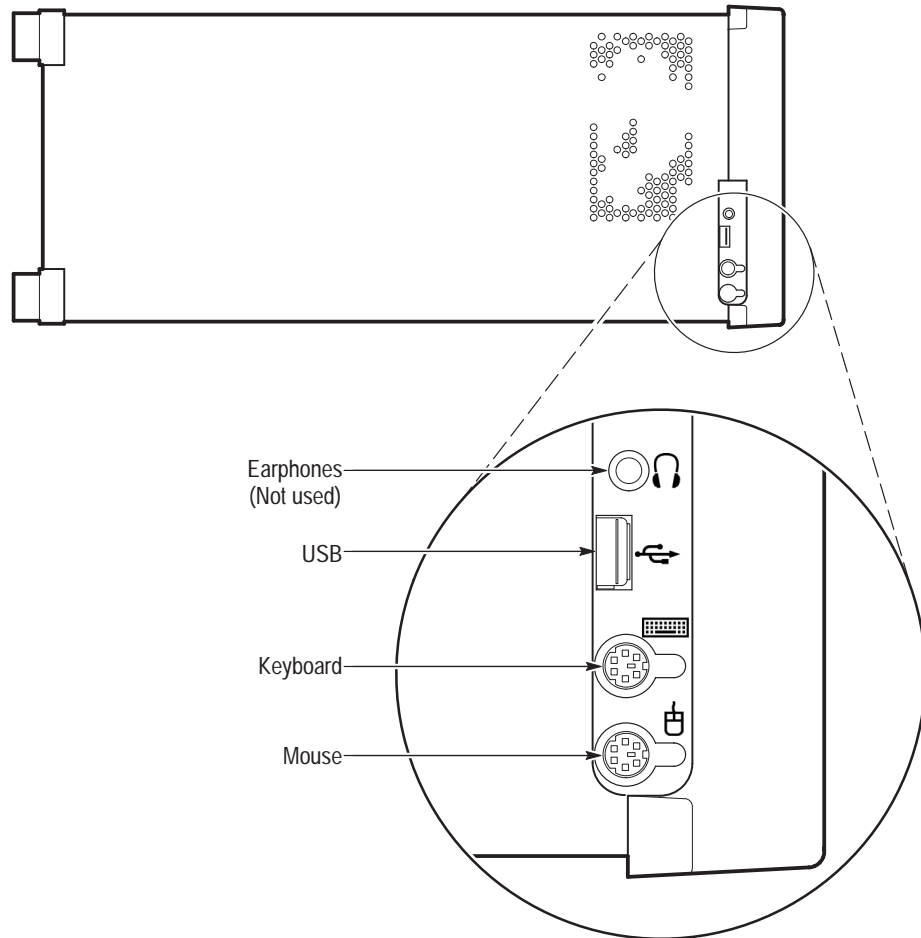
Figure 2–2: Keyboard and mouse connections on the front side panel

Input/Output Capabilities

NOTE. Do not make any cable connections to the SMB connectors on the Program Monitor modules. These ports are not presently used in the program monitor. Connecting cables can cause increased EMI (electromagnetic interference) due to radiated emissions from and to the unused SMB connectors.

Program Inputs and Outputs

The program monitor module input and output channels comply with ITU-R BT.601, BT.656, SMPTE 259M, 272M, and RP165.

A Program Monitor module has the following connectors:

- Channel A Loop In – 270 MB/s serial digital video component input, 75 Ω BNC

- Channel A Loop Out – 270 MB/s serial digital video component active loop through, 75 Ω BNC

- Channel B Loop In – 270 MB/s serial component input 75 Ω SMB (not used in the PQM300 application)

- Channel B Loop Out – 270 MB/s serial component active loop through, 75 Ω SMB (not used in the PQM300 application)

- 601 Auxiliary OUT – 270 MB/s 601 serial digital component output, 75 Ω BNC (not used in the PQM300 application)

Program Channels

One channel of program monitoring is provided for each installed program monitor module in a PQM300. Two Rec. 601 serial digital video monitor channels are included with the standard configuration. Up to six additional program monitor modules can be installed for a total of eight digital video channels. Composite video programming can be monitored using a composite decoder to provide 601 digital video to the program monitor modules. Use either your own high quality decoder or install the Tektronix PQM3F01 composite decoder modules in the PQM300 to handle the composite decoding task. You can choose to install one or more composite decoder modules to provide monitor channels for composite video. Up to four composite decoder/program monitor pairs can be installed in each machine when using the Tektronix composite decoder modules.

Program Monitor Connections

Before you start the PQM300 application, connect the 601 serial digital video program material (either 525 or 625 video standard) to be monitored to the Program Monitor CHANNEL A IN BNC connector as shown in Figure 2–3. The applied signal is either direct 601 serial video program material or it can be a 601 serial video signal obtained from a composite video decoder. When the measurements on a monitored channel start, the video standard connected to the program monitor module input is automatically recognized. The composite decoder does not recognize the applied video standard and must be preset to the correct standard. If you use the composite decoder, select the video standard of the composite video using the decoder initialization dialog box prior to starting the measurements (see *Configuring the Composite Decoder* on page 2–27).

NOTE. Do not change the video standard applied to a Program Monitor module input while the PQM300 measurements are running.

Composite Decoder Connector Label

Composite Program Decoder

Program Monitor Module

Program Monitor Connector Label

S-VIDEO Input

601 Ref In (not used)

CHANNEL B LOOP

601 Ref Out (not used)

Composite Program

601 Program In

COMPOSITE Loop Through

Composite Program

CHANNEL A LOOP Active Loop Through

601 Program Out BNC

601 Program Out

601 Program Out SMB

601 Out Auxiliary (not used)

IN S-VIDEO

IN COMPOSITE LOOP OUT

OUT 601

OUT 601

601 IN CHANNEL B LOOP OUT

601 IN CHANNEL A LOOP OUT

601 OUT AUXILIARY

Figure 2–3: Program monitor connections for composite decoder/program monitor pairs

A simplified block diagram of the program monitor and Tektronix composite decoder module connections is shown in Figure 2–4. Use the CHANNEL A OUT loop-through connector to continue the video signal path to other 601 serial video devices in the system such as a digital video monitor. The 601 Program Out connector of the active loop-through need not be terminated if it is unused. The loop-through signal output can be applied to a serial digital monitor for viewing the program material. The Channel B Loop Ref In and Ref Out SMB connectors and the 601 Out Auxiliary BNC connector are not used for the PQM300 program monitor application.
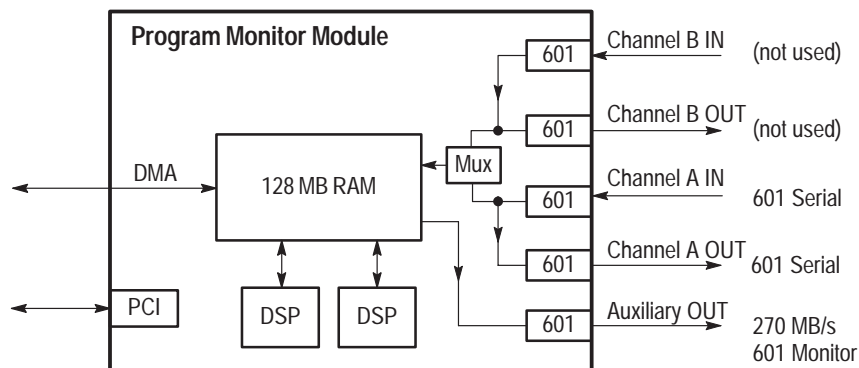
Figure 2–4: Program monitor module simplified block diagram

Composite Decoder Connections

The Tektronix PQM3F01 composite decoder module accepts NTSC, NTSC No Setup, or PAL I video in either composite video or S-Video format. A simplified diagram of the decoder connections is shown in Figure 2–5. The composite video input is output on the loop-through connector. The output of the loop-through must be either terminated by a 75 Ω BNC termination or continued on to a 75 Ω system for proper operation of the decoder. The analog input signal is converted to 601 serial video for application to the Program Monitor module. The 601 serial video is available on both an SMB connector and a BNC connector.
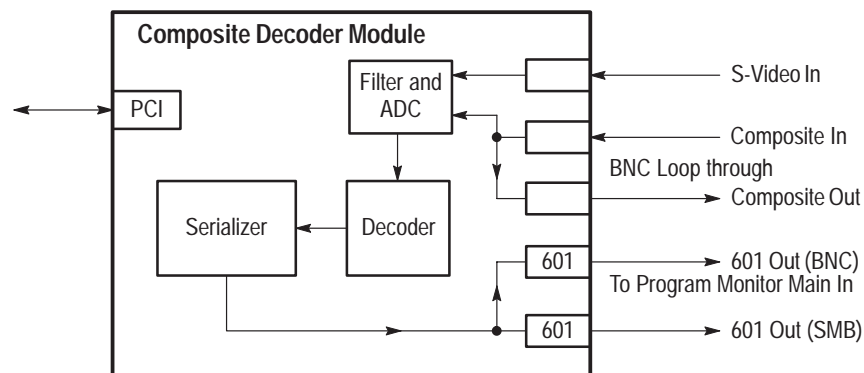
Figure 2–5: Composite decoder module simplified block diagram

The decoder module requires the standard 0 to 1 V input. That input is mapped into decimal 16 to 235 output levels (8-bit mode). Signals with lower amplitude will caused reduced decoder accuracy.

The Decoder module connectors are the following:

■ S-VIDEO IN – Standard S-Video input connector, NTSC or PAL

NOTE. To ensure electromagnetic compliance for S-Video applications, use high quality S-Video cables with two clamp-on EMI suppression ferrites attached at the cable end connected to the Tektronix PQM3F01 composite decoder module S-Video input connector. See Table 1–11 Electromagnetic Compatibility in Specifications, for suggested Tektronix part numbers.

- COMPOSITE – Composite video NTSC/PAL passive loop-through, two BNC connectors. The output BNC (the one not used for input) must be terminated in 75 Ω to operate the decoder. Connect the 75 Ω BNC terminator provided with the option if the loop-through output is not used.

- 601 OUT – Serial digital 601 output, 75 Ω BNC

- 601 OUT – Serial digital 601 output, 75 Ω SMB

Optional Alarm Relay Board

The Tektronix PQM3FRB alarm relay board option uses two 25-pin sub-D male connectors to the relay contacts. The PQM300 program monitor can be ordered with the alarm relay board installed or the board can be added later as an upgrade. If installed as an upgrade, Version 2.0 of the PQM300 application software must also be loaded to support this option.

The alarm relay connector pins described in Table 2–2 are two contacts (one normally open and the other normally closed) and the center (common) connector of each relay. The relay closes during each error recorded by the program monitor channel that is assigned to the relay. More than one channel can be assigned to the same alarm relay, and it also possible to assign the same channel to multiple relays. See Table 2–2 for the pin assignments for the relay board. Refer to *Configuring the Alarm Relay Board* on page 2–30 for information on how to make the channel assignments to the relay contacts.

NOTE. Use the provided alarm board cable, Tektronix part number 174-3562-00 on the alarm board connectors and twist them together to meet the demonstrated EMI performance given in the Specification section of this manual.

Table 2–2: Alarm relay board connectors

Relay number	Relay contact pin out		
Slot 8	Normally closed	Common	Normally open
1	16	3	15
2	5	17	4
3	19	6	18
4	8	20	7
5	22	9	21

Table 2–2: Alarm relay board connectors (Cont.)

Slot 8	Normally closed	Common	Normally open
6	14	23	10
7	1	24	11
8	2	25	12
Slot 9	Normally closed	Common	Normally open
9	16	3	15
10	5	17	4
11	19	6	18
12	8	20	7
13	22	9	21
14	14	23	10
15	1	24	11
16	2	25	12

First Time Operation

This section contains the procedure for powering on the instrument for the first time. After the initial setup to install the program monitor in a network, it is ready to operate. The program monitor can also act as a stand-alone monitoring instrument when configured for local operation as described in the following paragraphs.

Local Operation   For the initial setup, access the controls of the PQM300 locally by connecting an optional SVGA monitor for local display and a keyboard and mouse for entering commands and operating the controls. The mouse cursor and buttons are used to select and activate the on-screen menu selections. Use the keyboard to enter parameter changes, file names, and edit any other user configurations choices that permit keyboard entries. The SVGA monitor connection is on the rear panel as one of the connections from the mainframe controller (see Figure 2–1 on page 2–3). The hot-pluggable mouse and keyboard may be connected either to the left front side connectors on the side of the bezel or to the mouse and keyboard connectors on the rear panel.

If your program monitor was ordered with the local control option, you can use the LCD flat panel display and touch screen on the instrument for the display. Use the keyboard and mouse that are provided with the option to aid in making the data entries and selections needed for the initial setup for operation. Refer to *Local Control Option Front Panel Controls* on page 2–33 for operating instruction for the keypad and touch screen.

To power off the instrument, refer to *Powering off the Program Monitor* on page 2–19.

First Time Power On   Power on the program monitor for the first time as follows:

NOTE. If the PQM300 program monitor has the local control front panel display installed, you do not need to connect an external SVGA monitor.

1. Connect an SVGA monitor for a display and a keyboard and mouse for user command inputs. See Figure 2–1 and Figure 2–2 for the connector locations. You can connect the keyboard and mouse either to the rear panel connectors or to the left side connectors.

2. Press the On/Stby switch to power on the instrument (see Figure 2–6 for the switch location).

    Whenever you power on the program monitor, it goes through the initialization and starts the PQM300 application without the need to enter a user name and password as normally required for a Windows NT operating system.

Tektronix PQM300 Program QoS Monitor

On/Stby switch

STBY   HDD
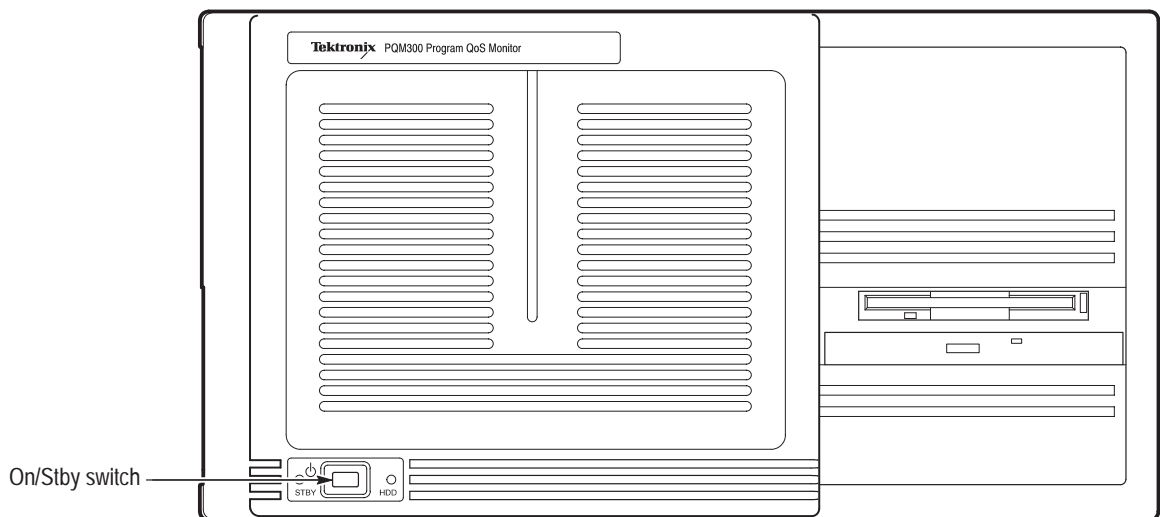
Figure 2–6: On/Standby switch

3. When the PQM300 application has started, click on the X in the upper right corner of the PQM300 application window to stop the PQM300 user interface.

4. In the task bar at the bottom of the display, click on the jre.exe task to display it and click on the X in the upper right corner of the jre task window to quit the task.

5. In the task bar at the bottom of the display, click on the PQM_core task to display the task window. Type exit at the prompt and press enter on the keyboard to exit the PQM_core application. This procedure saves some files and exits the core task in an orderly manner.

NOTE. The PQM300 program monitor uses automatic login, with the user name of TEKMONITOR and the password of TEKMONITOR. The TEKMONITOR user has administrative privileges on the Windows NT operating system built into the PQM300 application. You can load software, change passwords, assign users, and make the Windows NT system setups for the network from the TEKMONITOR log in.

No other user can log in while the autologin property of the application is enabled. If necessary to disable the automatic login, you must run the Regedit (registration edit) program and set the `HKEY_LOCAL_MACHINE\SOFT-WARE\Microsoft\Windows NT\CurrentVersion\ Winlogon\AutoAdminLog` *value to 0. It must be reset to 1 to enable automatic login.*

6. If autologin is disabled as described in the preceding note, use the key sequence CTRL + ALT + Delete to display the log-in dialog box. Login as **TEKMONITOR** and use **TEKMONITOR** as the password.

7. Check and set the program monitor clock to the correct system time.

NOTE. Check and set program monitor clocks against GMT (UTC) for the best accuracy. Do not set the program monitor clock back while the application is running. The time stamps for the history files and defects logs are obtained from the picture monitor clock. If conflicting times are found on the files, an error can occur. If you must reset the time, either set the time ahead, if needed, or wait until the new time setting is later than previous time setting to begin the PQM300 application again.

Configure the Network Properties

The PQM300 program monitor can be used as a stand-alone instrument, but it will seldom be used that way except initially to get the networking configured. To install the program monitor in a network, it must be configured for the network and provided with a network IP address. Specific items that need to be configured in the networking properties can vary depending on the local network requirements.

NOTE. You will need certain information to correctly install the PQM300 program monitor in a network. Ask your network administrator to do the installation, or provide you with the following information:

Computer Name for use on the network (often called Host name)
IP Address
Subnet Mask
DNS address
Default Gateway
Domain Name or Workgroup Name, as applicable

The typical steps to conFigure for the network are as follows:

1. Click on the Start icon in the bottom task bar, select Settings, and open the Control Panel.

2. Double click on the Network icon to open the Network dialog box.

3. Click on Computer name, and then click Change.

4. In the Identification Changes window, enter the Computer (Host) name assigned by the network administrator for the computer you are installing.

5. Enter either the Work Group or the Domain as directed by your network administrator.

6. Click OK to apply the changes.

7. Click on the Protocols tab.

8. Select TCP/IP Protocol if there is more than one choice listed.

9. Click on TCP/IP Properties and click on the IP Address tab.

10. Click on Specify an IP Address.

    Typically, the PQM300 program monitor is to participate on a network with a fixed IP address. Check with the system administrator to see if you need to select Obtain an Address from DHCP Server.

11. Enter the IP address, the subnet mask, and the default gateway addresses you obtained from the network administrator.

12. Click on the DNS tab, and then click on Add to enter a new address in the DNS service Search Order list.

13. Enter the DNS address provided by the network administrator in the edit box, and click on Add to enter the new number in the list.

14. Verify that the Host Name and Domain name are correct. Enter the correct names if necessary.

15. Click on the WINS Address tab.

16. Check that Enable DNS for Windows Resolution is selected.

17. Click on OK. You can ignore the WINS Address setting error message and select Yes to continue.

18. Click on Close to apply the changes.

19. On the prompt to restart the computer, select Yes to restart it.

NOTE. If you change the name of the computer from the factory default, you must also change the name in file used to locate the computer through the Web.

20. Use the explorer to navigate to the **C:\InetPub\wwwroot** folder and open the folder.

21. Use note pad, or other suiTable text editor, to open the **default.htm** file.

22. Find the line that contains the address value: `<PARAM NAME= "Address" VALUE="met63">`

23. Edit the value inside the quote marks to the new computer (host) name used in step 4.

24. Save and close the file.

Networking the PQM300

The PQM300 program monitor must be installed in a network system if it is to be controlled and accessed using remote control features. The IP address, or the computer name assigned to the IP address, identifies the machine location for proper operation within the managed network. Refer to *Configure the Network Properties* on the preceding page.

NOTE. Limit the total number of connections (Web browser, SNMP Network, and ethernet) to a PQM300 program monitor to no more than three for best performance. More connections can be made, but the response of the program monitor server slows down. There is a imposed limit of three Web browser connections to a program monitor.

Web Browser Remote Control

A good choice of a PC for the control and monitor task is one with Pentium processor of 200 MHz or better, 64 Mbytes or more of RAM memory, and with either a direct network connection or a fast modem. Computers with less capability may be used with good results, but expect slower update rates. You can control and monitor the quality of service measurements of any networked PQM300 program monitor through the virtual front panel (UI) using a Web Browser.

Web Browser Requirements. You can use Netscape version 4.5 or higher, or Internet Explorer, version 4.01 with SP2 (Service Pack 2) or higher. To be able to use the Internet Explorer browser, the JVM (Java Virtual Machine) version 5.0 must also be installed. The security setting on the Internet Explorer must also be set low enough to permit the Java applet to run.

Web Browser Access. Access any networked program monitor that is on the internet by starting the Web browser on your PC and entering either the network computer name or IP address for the PQM300 you want to access in the URL Location block. For example, if the host name for the machine on the network is PQM1 and its network address is PQM1.tek.com, enter http://PQM1.tek.com. If its IP address is known, enter that number (for example, http://128.181.39.60). The program monitor must be properly configured in your network. The virtual user interface displayed by the applet provides an interactive window for operating the accessed PQM300 program monitors.

SNMP Remote Control

A second networking approach is to control the program monitor in a networked system using SNMP (Simple Network Management Protocol). Refer to *Appendix D, SNMP Networking* in the *PQM300 Program QoS Monitor User Manual* for information on configuring and installing the program monitor in an SNMP network. You can use third party software for SNMP network control for the management application. If you have an SNMP network manager installed to control your networked devices, the PQM300 MIB and SNMP agent supplied with the application software can be added to the system. Refer to *Installing and Using SNMP Services* on page A–11 in *Appendix A* for important file configuration requirements. Refer to your third party SNMP software instructions for the information needed to install the PQM300 program monitor MIB in your networked system.

SNMP Agent. An SNMP agent is a processing entity that conveys the management information between the agent and the management station. The necessary agent software is provided as part of the PQM300 application software, but it does not start automatically. An SNMP shortcut icon is provided on the desktop. Double click the icon to launch the SNMP agent that enables SNMP network connections.

MIB. The PQM300 management information base (MIB) provides the information needed to control the operation, conFigure the measurements, and monitor the activity of the program monitor from a management station. The management information base for the program monitor is shown in *Appendix D, SNMP Networking* of the PQM300 Program QoS Monitor User Manual.

Network Remote Control

A third network operating choice is multi-machine networking. Access any PQM300 program monitor on the network from a controlling PC or PQM300

program monitor with a local display, keyboard, and mouse connected using the Windows NT networking facilities. Each PQM300 program monitor that is connected through a network to another PQM300 program monitor can be controlled, configured, and monitored by the control PC. Your system administrator must provide the IP addressing and configuration settings needed to properly network PQM300 program monitors in your local network.

DNS Table. To locate the PQM300 program monitors on a local network, a DNS (dynamic name server) Table must be created. If the DNS server is maintained by a centralized administration, that service has to make the appropriate entries to enter the program monitors on the network. For a local network without a centralized administration, the appropriate information must be available on the program monitors in the network. The name server looks at the Host file to find the IP addresses and assigned net names to identify a machine on the network. The Host file, shown in Figure 2–7, is in the **C:\WINNT\system32\drivers\etc** directory.

NOTE. The local machine is listed twice in the Host file; once as the localhost and again with its net name.

Use Notepad to open the file and edit the file to add the machine IP addresses and net names for the PQM300 program monitors on the local net.

```
# Copyright (c) 1993-1995 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows NT.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
#      102.54.94.97      rhino.acme.com          # source server
#      38.25.63.10       x.acme.com              # x client host

128.181.39.68        localhost
128.181.39.66        met66              # control room 1
128.181.39.67        met67              # control room 2
128.181.39.68        met68              # video booth
```

Figure 2–7: Host file for DNS name server

PQM300 Remote Application Program

The PQM300 remote application can be downloaded to a PC from any of the networked PQM300 program monitors using the Web Browser. Once you download the remote application, you can run it on a PC that does not have the PQM300 modules installed. You can use this method of accessing the PQM300 program monitors when the PC is dedicated to monitor and control of the networked program monitors, but it is especially beneficial when you use the PC primarily for other tasks or you monitor through a dial-up modem.

After connecting to the PQM300 program monitor, click on the line "Download PQM300 Remote Application (Self Extracting 7Mb)" to download the application.

You can also load the PQM300 Remote Application execuTable directly from the application CD provided with the program monitor with the following procedure:

1. Place the CD in the CD drive of the PC you want the program loaded on.

2. Cancel the installation process that starts automatically.

3. Open the directory of the CD and locate the PQM300 Remote.exe file.

4. Select the file in the directory and drag it to the desktop of the PC.

5. Double click on the PQM300 Remote application icon to start the installation. The PQM300 Remote application is self extracting and automatically loads to the PC.

After the program is installed, either from the Web download or copied from the CD, double click on the PQM300 icon that is now on your PC desktop to start the application. Operation through the application installed on your PC is the same as operation using the interface that is displayed by the applet, however, the user interface does not have to reload each time you connect to a networked PQM300 program monitor. Simply start the PQM300 application and connect to any PQM300 that is known on the network. Refer to *Making Program Monitor Connections* on page 2–26 for the procedure.

Incoming Inspection

Incoming inspection consists of verifying basic operation of the PQM300 program monitor. The Power-on diagnostics check basic functionality. These diagnostics run every time you power on the instrument. If a failure is detected, the Power-on diagnostics dialog box opens with the failed test indicated. A functional check of the MPEG Defect measurement is provided in the *Performance Verification* section of this manual.

Diagnostics

The PQM300 program monitor has built-in self diagnostics to act as the first level of failure location and to act as part of the functional verification check. The program monitor performs power-on diagnostic testing. This testing consists of running the Windows NT power-on tests for checking the server and the boot-up testing of the program monitor modules. Additional diagnostic tests are performed on all installed Tektronix modules (such as the composite decoder or alarm relay board modules) to determine if they are operational.

Create an Emergency Repair Disk

A disk titled PQM300 Windows NT Emergency Repair Disk is shipped with the instrument. Use this disk to restore system setting for your program monitor in case of a major hardware or software failure. Use the following directions to create a repair disk when software is either added or when software is deleted from the PQM300 program monitor.

1. Mark a High Density 3.5-inch disk clearly as the emergency repair disk for program monitor serial number B01*nnnn* (the serial number of your program monitor), and then continue with step 2.

NOTE. The emergency repair disk is program monitor-specific. Make sure that the emergency repair disk is clearly marked with its program monitor serial number. The serial number of your PQM300 Program QoS Monitor appears on the original emergency repair disk and on the server rear panel, near the power input connector.

2. Choose Run from the Windows NT Start menu.

3. Type `rdisk` in the Run dialog box. The Repair Disk Utility dialog box, as shown in Figure 2–8, opens.
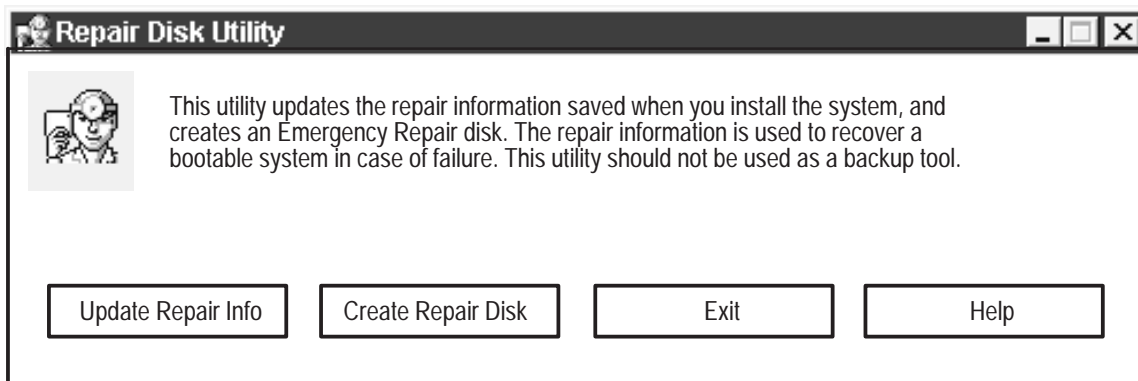
Figure 2–8: The Repair Disk dialog box

4. Click Update Repair Info to save your current configuration. A message appears to remind you that earlier repair information is overwritten. Click Yes to continue.

5. When the process is complete, a message appears to ask if you wish to create an Emergency Repair Disk. Click Yes. The message shown in Figure 2–9 appears.
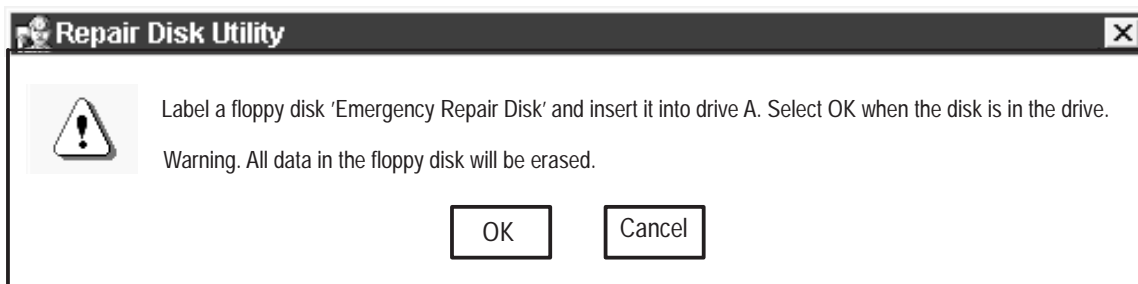
Figure 2–9: All data on the disk will be erased

6. Insert a 3.5-inch disk in drive A and click OK. Rdisk formats the disk and copies the configuration files onto it.

7. When the operation is complete, click Exit in the Repair Disk Utility dialog box. Remove the disk from drive A and keep it in a safe place.

Powering Off the Program Monitor

The normal shutdown procedure for the rack-mounted program monitor without a local user interface or display is with the front panel On/Stby switch. When the program monitor is operating, press and release the On/Stby switch to begin the soft shutdown of the program monitor. Any open processes are closed and files are saved before the operating system shuts down.

If you are operating the PQM300 program monitor with a local UI (monitor or Option LC flat panel display, keyboard, and mouse connected), you can also use the normal Windows NT shutdown procedure (**Start ➥ Shutdown**) to turn off the operating system. Use the On/Stby switch to restart the program monitor. The PQM300 application restarts automatically. Disconnect the AC power cord at the rear panel to remove power from the instrument.

Emergency Shutdown. You can turn off the program monitor in a emergency or other priority situation by holding the On/Stby button in for about 3 or 4 seconds. This method is a hard shutdown that can cause missing or corrupted files. When the program monitor is turned on again after a hard shutdown, the program monitor does an abnormal shutdown error check.

Shutting Down the PQM300 Application

There are three steps to shutting down the PQM300 application. These steps shut down the user interface, the PQM core program, and the server. The best practice is to use an orderly shutdown procedure so that the appropriate data for the application is saved and all the PQM300 processes are stopped. You must be able to control the program monitor operating system either locally (refer to *Local Operation* on page 2–9) or through an appropriate network to shut down the PQM300 application using the following steps:

1. In the PQM300 display, click on File in the display task bar and select Exit to shut down the user interface.

2. Click on the PQM_Core.exe task in the lower task bar to display the task DOS window. At the prompt, type in exit and press the enter (return) key.

3. Right click on the jre.exe task in the lower task bar and select close from the list that is displayed.

To restart the PQM300 application, simply double click on the PQM300 icon. All the PQM300 processes are automatically started, and the user interface is reloaded.

Field Service

If the PQM300 Program QoS Monitor needs repair or adjustment, you may service it yourself or you can have Tektronix service it.

If you have the ability to diagnose and repair module level defects, the service manual will aid you in module-level trouble isolation. Once a problem module is identified, you can order an exchange replacement module. You will then have to install the module, conFigure the mainframe, and calibrate the program monitor as necessary.

If you prefer to have Tektronix or a Tektronix authorized service center diagnose and repair the PQM300 Program QoS Monitor, contact your local Tektronix representative to arrange for either local service or shipment to Customer Service.

A field service or factory service technician performing the repairs will replace the defective module, verify instrument functionality, and ship it back to the customer. Defective modules are returned to a central repair facility for component-level repair where the boards are repaired, tested, and recalibrated if necessary to support the exchange repair program. Refer to *Contacting Tektronix* in the *Preface* of this manual for information on obtaining additional customer support.

Operating Controls

Across the top of the views there are user task choices. These choices are File, View, Configure, and Help. Click on the task name to display the drop-down menu with a list of the choices. Click on a choice in the menu to make a task selection.

Icon Toolbar

A toolbar, shown in Figure 2–10, was added with Version 2.0 software. The toolbar provides icon shortcuts to switch between views and select some common operator tasks. Turn the toolbar display on or off by clicking on the Toolbar selection in the View menu. A check mark shows that the toolbar display is enabled. Move the the mouse cursor over an icon in the toolbar to display the tool-tip help for the icon. Look in Table 2–3 for a longer description of the task done by the icon shortcut. Click on the task icon to start its associated task.

Figure 2–10: Toolbar shortcut icons

Table 2–3: Task shortcut icons

Task icon	Shortcut task
	Switches to Alarm Monitor view, Monitor by Connections
	Switches to Alarm Monitor view, Monitor all Connections
	Switches to the Overlay Monitor Chart, line graph display
	Switches to the Overlay Monitor Chart, bar graph display
	Switches to the Defect Log Monitor
	Indicates the system access is either locked or unlocked. Click on the icon to toggle between system access locked and system access unlocked. When the system access is locked, a user can view the program monitor, but cannot make configuration changes without an access code. If the access is not locked, all users have viewing and configuration change privileges.
	Screen captures a bit-mapped image of the current display and prepares to send it to a selected network or connected printer. The printer setup dialog box is displayed for making the printer selection.
	Accesses the online help system for the PQM300 application.

File   The File menu choices are as shown below.

```
File  View  Configure  Help
  Export Defect Log
  Export Results
  Clear Alarms
  Clear Log
  Clear Defect Statistics
  Print...
  Exit
```
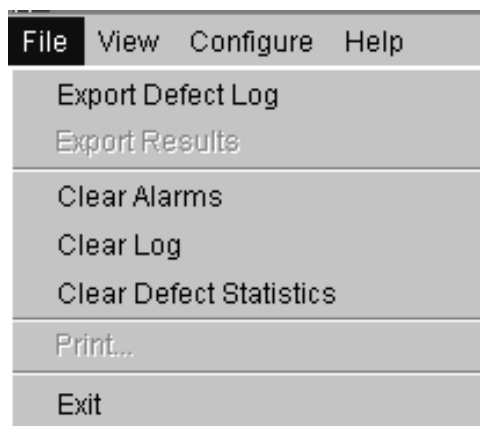
■   **Export Defect Log:** Sends the Defect Log to the DefectLog.txt file for archiving or printing. Each new export of the Defect Log is written to the

DefectLog.txt file. The previous DefectLog.txt file is renamed with a date and time added to the beginning of the file name. The DefectLog.txt file is downloaded to the controlling PC when you click on **Download the PQM300 Defect Log** in the Web browser start-up screen.

■ **Export Results:** Sends the measurement data of all the displayed traces to a Results.txt file for archiving or printing. You can export the Results.txt file to a spread-sheet program for more analysis. The measurement results are exported with a time stamp and machine name for record purposes. Each time the Results data is exported, the previous file is renamed with a date and time added to beginning of the file name. The Results.txt file is downloaded to the controlling PC when you click on **Download PQM300 Results Data** in the Web browser start-up screen.

■ **Clear Alarms:** Clears the current alarm states. Red and amber backgrounds turn green when the alarm is reset, but if the alarm state is still present, the background turns red again as soon as an out-of-limit measurement is made. You can also clear the alarms by clicking on the Clear Alarms button in either of the alarm views or in the Overlay Chart bar graph view.

■ **Clear Log:** Clears the Defects Log to begin a new accumulation of defects. To save the current Defect Log data for your records, export the Defect Log for archiving before clearing the current log.

■ **Clear Defects Statistics:** Clears the accumulated error column of the defects log. The accumulated errors column in the defects log Table shows the total error time seen for a measurement since the last time the column was cleared.

■ **Print:** Captures a bit map image of the screen and prepares to send it to a printer. A printer setup dialog box is displayed to conFigure the printer and make the printer selection.

■ **Exit:** On a remote-viewing PC, Exit closes the PQM300 application window. It has the same effect as clicking on the $\times$ in the upper right corner of the application window. You cannot start or exit the PQM300 application from a remote machine using a Web Browser or SNMP networking. The application must be started or stopped at the local machine.

View   Click on View to select a different view. The menu choices are as shown below.
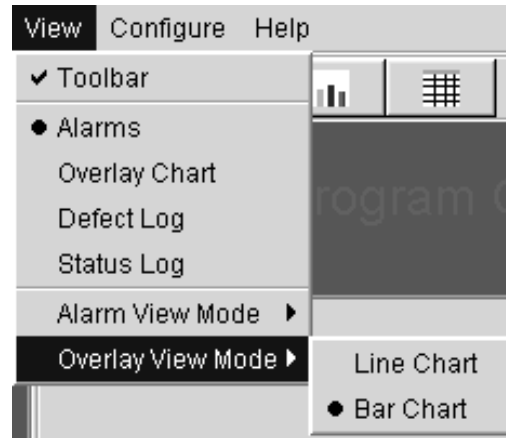
- **Toolbar:** Click on Toolbar choice to toggle the toolbar on or off.

- **Alarms:** Selects the Alarm View window showing the alarm state of the connected program monitors in a small machine-name tab across the top of the display and the program channels of a selected program monitor (machine) in a series of icons in the view display area. Use this view to monitor the alarm state of all connected program monitors.

- **Overlay Chart:** This view is the live graph overlay display of the selected measurements on selected program monitor channels.

- **Defect Log:** This view shows the log for alarm conditions on all monitored program channels for up to the last 1000 defects logged. Use the defect log or the archived DefectsLog.txt files in the D:\PQM300\Defects directory to locate any area of monitored program quality on any channel. Use the Overlay view to select program channels to view history when you want to view the traces (up to one week of trace history is maintained).

- **Status Log:** The operating status of the PQM300 application is recorded in the status log. The information recorded in this log may be helpful for troubleshooting an operation problem, but would not normally require viewing.

Configure   The conFigure choices provide the controls shown below:

Configure Summary. The short summary of the conFigure selections below is supplemented by more detailed explanations following this summary.

- ■ **Connections**: Make program monitor channel connections on all the networked machines you want to monitor from your control point. When the system access is locked, use this screen to enter your access code to make configuration changes.

- ■ **Channels**: Assign program source names to the connected channels for easy identification. The names you assign to the channels are displayed on the channel icons in the alarm monitor views.

- ■ **Measures**: Select measurements and set measurement parameters for each connected program monitor channel.

- ■ **Chart Scale:** This feature was added with Version 2.0 software. Use it to set the vertical scale of the line graph or the bar chart to display the picture quality either in numerical values (PDI) or in words (5 PT). The descriptive words in the 5 PT selections relate to perceived program quality. There are two choices of scale wording available: Very Annoying (high PDI) to Imperceptible (low PDI) and Bad to Excellent.

- ■ **Properties**: Customize the Overlay Chart Monitor and Stack Chart Monitor graph displays for color of the traces in the graph, origin of the traces on the left or right side of the graph, and graph grid on or off. You can also set the audio alarm on or off.

- ■ **Decoder**: Set up the Composite Decoder configuration choices if a Tektronix PQM3F01 composite decoder module is present in the program monitor. If a composite decoder module is not installed, the Decoder selection is grayed out in the menu. Refer to *Configuring the Composite Decoder* on page 2–27 for information on the decoder control menus.

■ **Relays**: Assign the alarm relay contacts of the optional alarm relay board to a channel. If a relay board is not installed, the Relays selection is grayed out in the menu. The relay operates for an alarm condition on the assigned program monitor channel.

■ **Access Code**: Set up or change administrator and user access codes. The default access on a new system is unlocked. Refer to the following *System Security* information. When the access to a system is locked, the user must enter an assigned Access Code in the Connections dialog box to make changes to the configuration. Refer to *Making Program Monitor Connections* that follows.

System Security

With Version 2.0 software installed, the system administrator can set the administrator password and set the user security to monitor only or monitor and configuration access with an access code. When first started, access to the PQM300 application is unlocked.

The application access security is independent of the Windows NT security and any Windows NT password that is setup for system logon of the program monitor As shipped from the factory, the Windows NT login screen requiring a password in bypassed, and the PQM300 application starts automatically after the power-up initialization has completed.

Click on the ConFigure selection to show the ConFigure menu selections as shown in Figure 2–11. Then, select the Access Code choice to display the Change Access Control dialog box as shown in Figure 2–12. You can set or change the Administrator's password and the User Access password. Click on the one you want to set. For a new password setting, enter the new password in two places to set and confirm the password. If you are changing the password, enter the old password, and then enter the new password in two places to set and confirm the change.

NOTE. In the event that the either password (administrator or users) is forgotten, the administrator can restore the factory defaults settings using the Restore Factory Defaults icon. The factory default setting for the passwords is to have the System Access unlocked. New passwords can then be set for the administrator and the users.

Figure 2–11: Configure menu selections
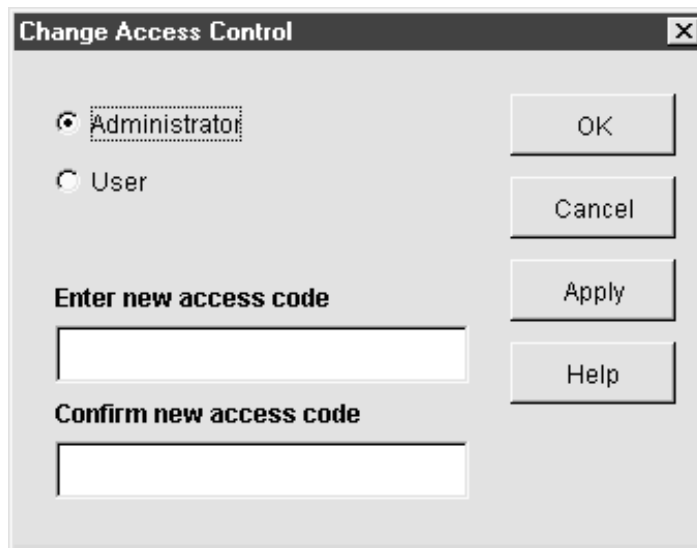
Figure 2–12: Change Access Control dialog

Making Program Monitor Connections

You can connect as many PQM300 program monitors as there are in the installed system. If you access a program monitor either using a Web Browser or running the PQM300 remote application on your PC, you can connect to any other program monitor on the network.

Check with your local system administrator for IP addresses and/or system machine names of the installed PQM300 program monitors. In the task bar, select ConFigure and then Connections to display the Connections Configuration dialog box (shown in Figure 2–13). Enter either the IP address or the assigned network machine name of the program monitor in the Connection box. Click the

Apply button to make the connection. When the connections are made, click on OK to exit the Connections dialog box.
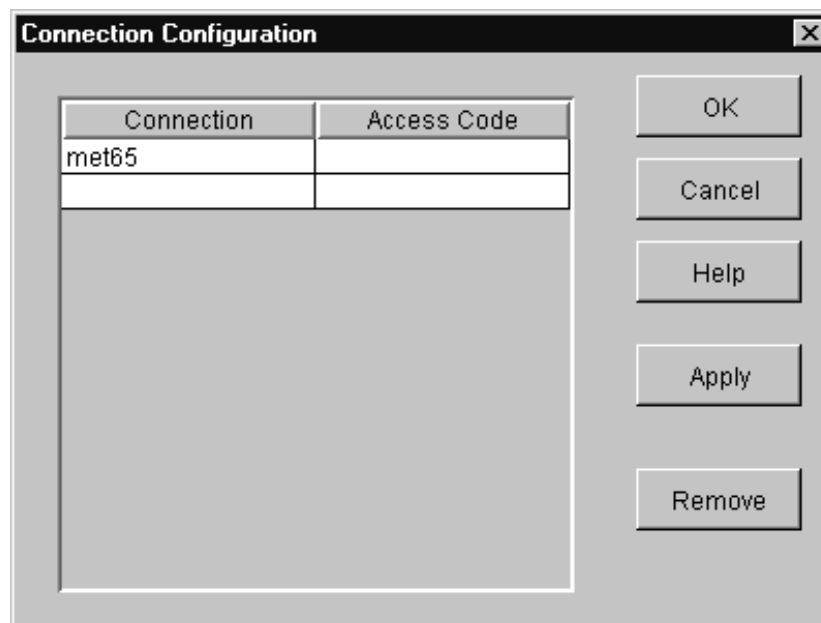
Figure 2–13: Connection Configuration dialog box

If access to a program monitor is locked, you can make the connection and view the operation of the connected program monitors. You must enter the assigned Access Code to make any configuration changes after the connection is made. The PQM administrator assigns access codes for the networked program monitors (refer to *System Security* on page 2–25).

■ **About PQM300:** Find information about the application version number.

Configuring the Composite Decoder

The Tektronix PQM3F01 Composite Decoder module must be set to the applied video standard to apply the correct decoding algorithm. Stop all the measurements on the channel or channels you want to change the video standard on before you change the decoder configuration. The decoder must be set to the correct video standard before the program monitor measurements are started. If there is no signal applied or the wrong standard is connected for the selections made, decoder error messages will be displayed. To avoid the error messages that will occur, do not change the video standard applied to the program monitor channel while the measurements are running.

Use the following procedure to select the video standard and the signal processing for your program monitor operation. The composite decoder configuration changes you make apply to all the installed decoder modules. They can not be configured separately or for different video standards.

1. Click on the ConFigure task choice and select the Measures Configuration menu.
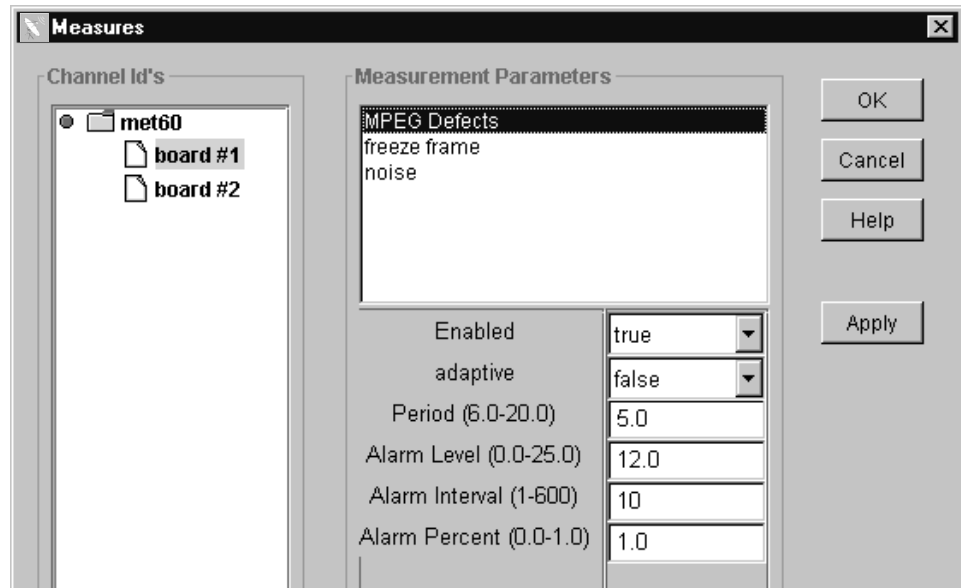
2. Select all the composite video program monitor channels.

3. Select each measurement in turn in the Measurement Parameters window. Set Enabled to false and click Apply for each one.

4. Click OK to exit the Measures Configuration menu.

5. Apply the video signal to the decoder composite input or S-Video input, as appropriate for the source, of each composite video program monitor channel. Terminate the loop-through output of the composite decoder modules using a 75 Ω BNC termination if the signal is not continued to a following 75 Ω system load.

6. Click on ConFigure task choice and select the Decoder Configuration menu. One of the dialog boxes shown below is displayed depending on whether NTSC or PAL and Composite or S-Video is selected for the input source.
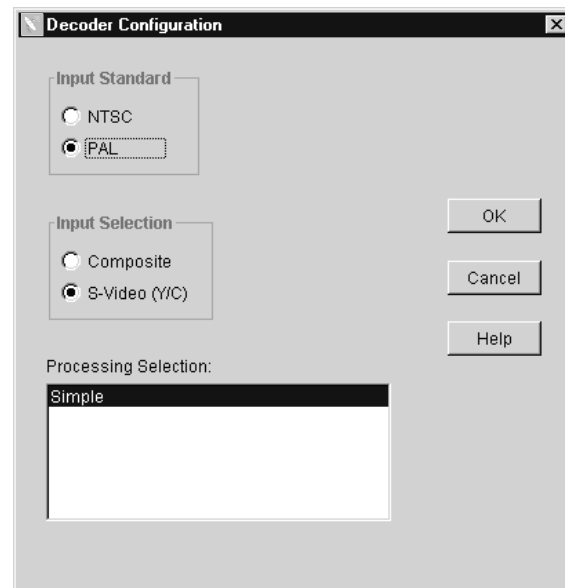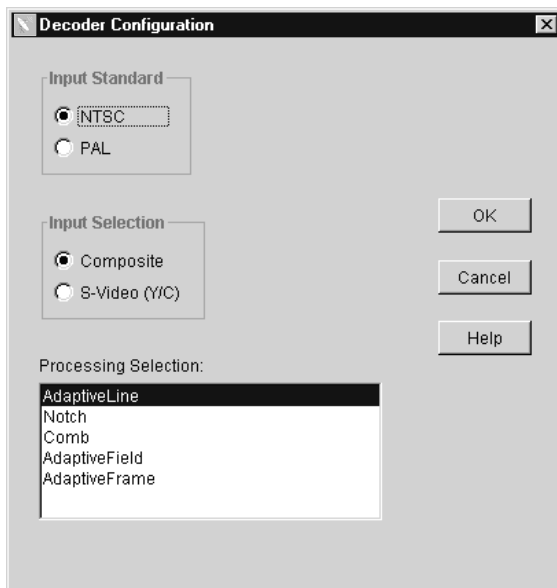
7. Select the appropriate video standard (NTSC or PAL) for the input program material.

8. Select the appropriate input type (either composite or S-Video) for the source of the input program material. After you make that choice, the list of processing selection list shows the types available for the video standard and source selected.

   Composite. Selects the Composite In connector of the decoder module as the source of input signal to convert to 601 digital video.

   S-Video (Y/C). Selects the S-Video connector of the decoder module as the source of input signal to convert to 601 digital video.

9. For composite video, select the Comb filter. The Comb filter minimizes the defect filtering done by the decoder and provides the best match for composite video to 601 digital signal program material and S-Video program material with similar MPEG defect levels.

10. For S-Video, select the Simple filter.

11. Click OK to write the changes to all the composite decoder modules. This exits the Decoder Configuration menu. If any of the channels do not have a signal applied to the decoder module, one or more error messages are displayed to alert you to the missing signal.

12. Click on ConFigure in the task bar and reselect the Measures Configuration menu.

13. Reselect the program monitor channel or channels to re-enable the measurements you want and make any alarm changes you want for the new program content.

14. Click Apply to activate the changes for each measurement. If you do not apply the changes before selecting a new measurement to configure, the changes are not made.

15. After all the changes are made, click OK to exit the Measures Configuration menu.

Configuring the Alarm Relay Board

The PQM3FRB alarm relay board option can be configured to monitor alarm conditions in any program monitor accessible on the local PQM300 network through the Ethernet connection. The program monitor with the relay board hardware can be accessed from either another PQM300 program monitor or a computer running the downloaded PQM300 application. The program monitor with the relay board can also have the local control option installed or have a monitor, mouse, and keyboard connected to access to the relay board configuration dialog. The relay board cannot be configured through a SNMP network.
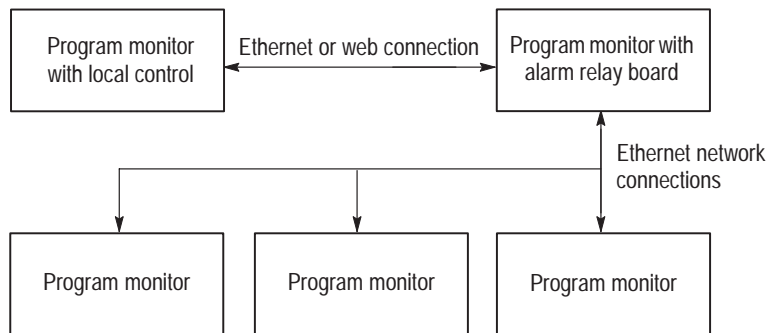
Figure 2–14: Alarm relay control connections

1. Connect to a program monitor with an alarm relay board installed. Use the Connection Configuration dialog box (see Figure 2–15) to make the connection.

If you are making the configuration from the PQM300 program monitor that has the alarm relay board installed, the local machine is connected by default.

If you are making the connection through the network, enter the network name of the program monitor that has the alarm relay board installed, and click on apply to make the connection.
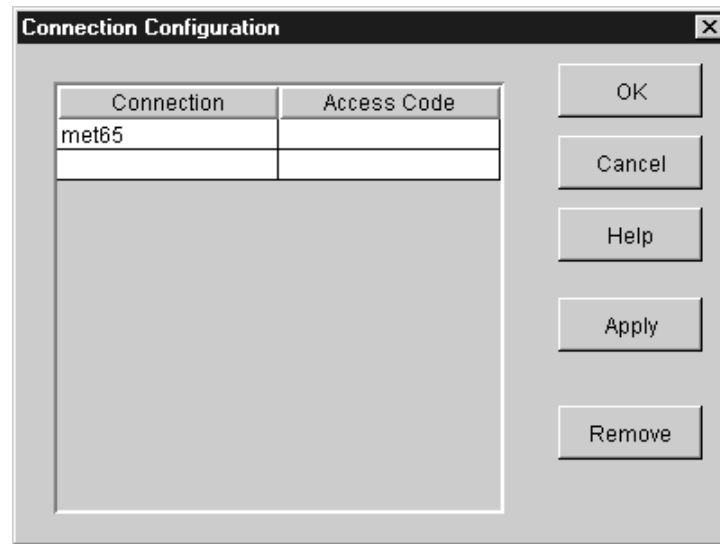
Figure 2–15: Connection Configuration dialog box

2. In the ConFigure choices, select **Relays . . .** to display the Relay Configuration dialog box shown in Figure 2–16.

Figure 2–16: Relay Configuration dialog box

3. Select a program monitor with an alarm relay board to conFigure from the choices in the **PQM300 w/Relay To Configure** box.

4. Click on the arrow in the **Alarms From PQM300** box to display the drop down list of all the connected program monitors.

5. Select a program monitor to assign relay connections. The channel identifications of the selected program monitor are displayed in the **Slot** listings.

6. Click on the arrow in the **Relay Number** box next to the channel name or board number to select a relay from 1 to 16 for that channel.

7. Slide the adjustment bar on the **Relay Time Out** to set the amount of time (from 1 to 20 seconds) that the relays are to remain activated after an alarm state has passed.

   a. Slide the bar all the way to the left to deactivate the relays on the selected PQM300 program monitor. Then, alarms from that program monitor will not activate the relays.

   b. Slide the bar all the way to the right to latch the relays on an alarm. Latched alarms are cleared when the **Clear Alarms** button is clicked. The **Reset** button turns off (opens) the relays and is useful in the Latched relay mode to help catch transient alarms.

8. Click on Apply to activate the relay assignments.

Checking Relay Assignments. Click on the Relay Map button in the Relays dialog box to display the Relay board channel assignment map as shown in Figure 2–17. The PQM300 program monitor with the relay board is listed first, followed by the machine name of a program monitor and relay assignments for the boards in that program monitor. Eight slot assignment positions are shown even if there are only two board slots filled. Empty slots or unassigned slots will be labeled None. Click OK to exit the Relay Associations box.
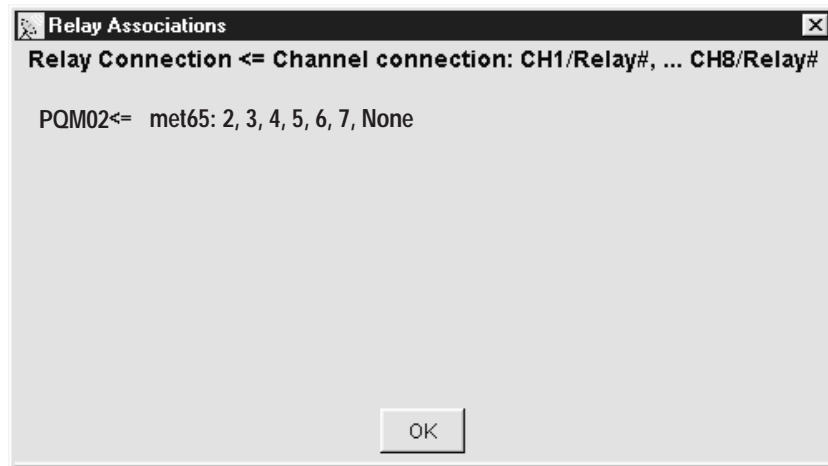
Figure 2–17: Relay board channel map

Local Control Option Front Panel Controls The standard front panel configuration is blank with the exception of the On/Stby button and the 3-1/4 inch floppy disk and CD-ROM drives. If you have the PQM3FLC Local Control front panel option installed, the front panel will look similar to Figure 2–18.
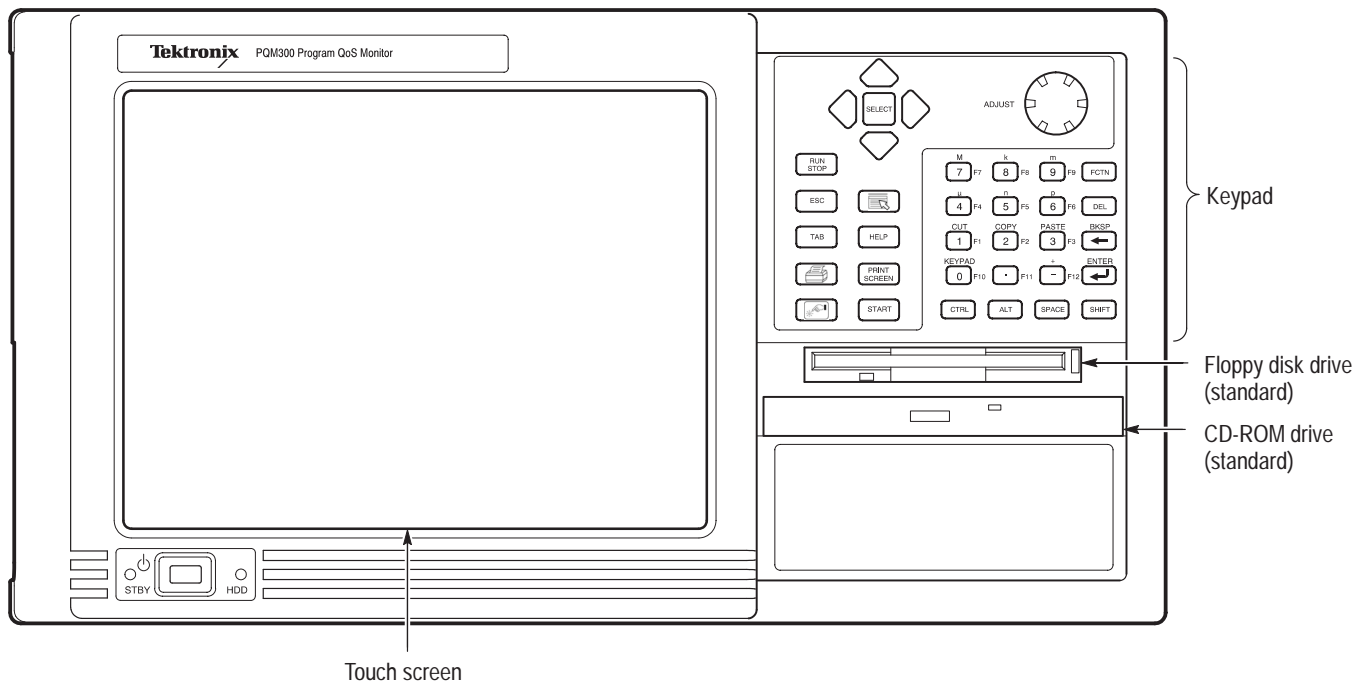
Figure 2–18: Local Control front-panel elements

This section shows how to use the touch screen features. Table 2–4 describes the keypad controls and Table 2–5 lists touch screen techniques for working with the program monitor application.

⚠ **CAUTION.** *Do not touch the touch screen with sharp or abrasive objects. Using sharp or abrasive objects can damage the LCD display.*

A stylus that gives you more precise control over the items you touch on the touch screen is included as a standard accessory with all flat panel display options.

Table 2–4: Front panel-key controls

Control name	Mechanism	Description
Up Arrow	Button	Use to navigate and change focus from one window function to another.
Left Arrow	Button	
Right Arrow	Button	
Down Arrow	Button	
Select	Button	Same as the space key.
Adjust Knob	Knob (Rotary encoder)	Not enabled.
Run/Stop	Button	Not enabled.
Esc	Button	Standard Escape key.
Tab	Button	Standard Tab key.
Print	Button	Prints the current display.
Touch	Button (w/hand icon)	Toggle function not enabled. The touch screen is always on.
Menu (Application key)	Button (w/pointer icon)	Displays shortcut menus for selected items.
Help	Button	Opens the Help contents. Standard F1 key
Print Screen	Button (w/printer icon)	Copies the screen to the clipboard. Alt plus Print Screen copies the active window.
START Key	Button (w/Windows logo)	Opens the Windows Start menu.
Numbers 0 to 9, . (period), and – (minus	Buttons	Standard number keys, most have second (Shift) and third (Function) functions.
Fctn	Button with LED	Modifier for numeral keys to create keys F1 through F12. LED indicates when active.
Del	Button	Deletes selected text or object.
←	Button	Backspace key.

Table 2–4: Front panel-key controls (Cont.)

Control name	Mechanism	Description
↵	Button	Enter key.
Ctrl	Button with LED	Control key. LED indicates when keypad is in control mode.
Alt	Button with LED	Alternate key. LED indicates when keypad is in alternate mode.
Space	Button	Use it like a keyboard space bar or use it as mouse button 1.
Shift	Button with LED	Shift key. LED indicates when keypad is in shift mode. Locked mode key feature.

NOTE. You need an external keyboard and mouse for some of the functions of the operating system.

Table 2–5: Touch screen techniques

Task	Action
Highlighting an item	Touch the item.
Selecting an item	
Making a menu selection	Touch the menu name, and then touch the menu item.
Moving a window	Touch and drag the title bar of the window without lifting the stylus from the touch screen.
Displaying shortcut menus	Touch an icon that has a shortcut menu associated with it (for instance, a multiplex or service icon) and press the Menu button from the keypad.
Checking or clearing option boxes	Touch the option name or check box.
Entering values in text boxes	Touch the text box until a cursor appears in the text box, and then enter values using the keypad. (Only numeric values and the letters *M, k, m, u, n,* and *p* can be entered from the keypad.)
Scrolling through a list	Touch the scrolling list until a cursor appears in the list, and then press the Down Arrow button from the keypad.
Scrolling a window	Touch and drag a scroll bar without lifting the stylus from the touch screen.
Resizing windows	Touch and drag the lower right corner of the window to the desired size without lifting the stylus from the touch screen.
Following links in the online help	Touch the link text.

Table 2–5: Touch screen techniques (Cont.)

Task	Action
Expanding or collapsing a hierarchy	Double-tap the touch screen item at the point you want to expand or collapse a hierarchical display, or touch the Expand/Collapse control next to the item name.
Copying text or other values	Touch and drag over the area you want to copy, and then press the Shift button followed by the Copy button on the keypad.
Pasting text or other values	Touch the area into which you want to paste the contents of the clipboard, and then press the Shift button followed by the Paste button on the keypad.

Touch Screen Control Program

Select **Start** –> **Programs** –> **Touch** –> **TouchScreen Control** to display the Touch Screen Control Program. The touch-screen controls provide customization settings for the touch screen. Refer to the Help in the Touch Screen Control Program for information on any of the control settings for the touch screen.

Touch Screen Calibration

The touch screen is calibrated on installation. From time to time it may need to be recalibrated. Use the following steps to perform the calibration.

1. From **Start** menu, select **Programs**–>**Touch**–>**TouchScreen Control**.

2. In the Touch Screen Control Program screen, click the **Calibrate** button.

3. Follow the on-screen instruction to calibrate the touch screen. Use one of the styluses provided with this kit to touch the screen at the calibration points.

4. Click on the **OK** box using the mouse.

5. Select **Exit** to leave the Touch Screen Control Program**.**

Theory of Operation

Theory of Operation

The PQM300 Program QoS Monitor is a picture quality measurement instrument. The measurement set system consists of modules that are installed in a standard mainframe platform. The mainframe processor has the capability to make the calculations and data transfers required to do the signal measurements. The mainframe circuitry also provides the power and user interface connections to the installed modules. The measurement set modules accept serial digital video signal input and analyze it for picture quality.

Mainframe Operation

The functional operation is divided between the mainframe and the measurement set modules. The functional description starts with the mainframe and its capabilities. A simplified block diagram of the mainframe is shown in Figure 3–1.

The System Bus is contained in a backplane circuit board, The bus directly connects to all applications modules shown in the block diagram. Full system bus connections to the application modules are provided. Power and control signal connections are provided for all the plug in modules and other modules installed in the mainframe lower compartment.

System Busses

The System Bus contains three sub-busses plus other signal wires:

■ Power Sub-Bus

This sub-bus carries power and ground to the applications modules.

■ Control Sub-Bus

The control bus is a PCI bus.

■ Audio Bus

This bus provides a way to route an audio signal generated on any Application Module to the Internal Speaker and the Headphone Jack
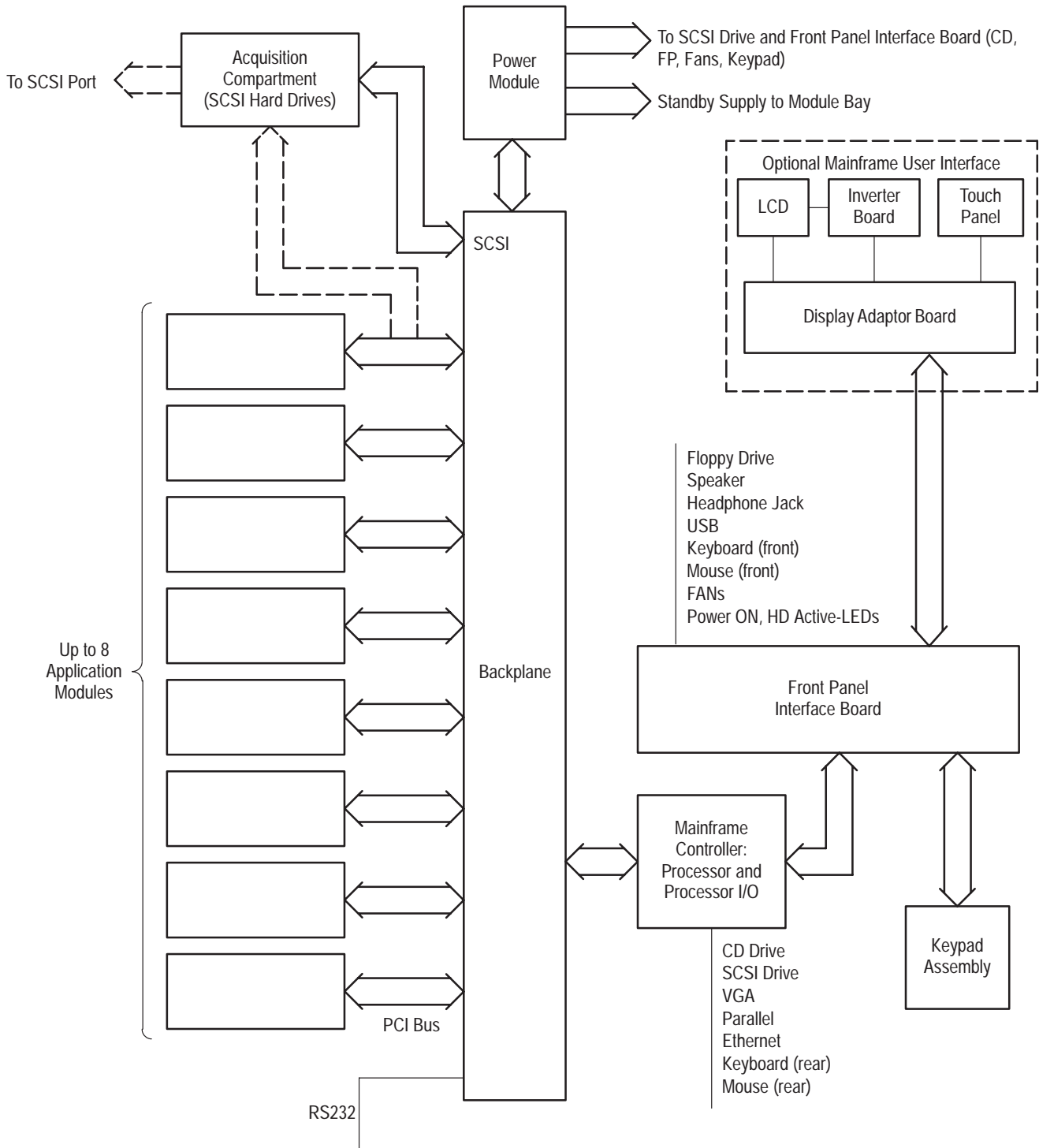
Figure 3–1: Mainframe simplified block diagram

Power Supply
The Power Module consists of the Power Conditioning Board, a purchased power supply, the ac supply connector with line filter, and the power supply cooling fan. The Power Module supplies the PCI bus voltages through the backplane connectors that engage when the module is bolted in place. Other voltages are provided to the mainframe modules through connectors and ribbon cables.

The power conditioning board distributes power from the main power supply to the backplane, to the front panel, and to the SCSI drive connector. The +5 V and +12 V from the main supply are distributed through current limit circuits to meet safety specifications. Voltages to sensitive circuits in the acquisition circuitry are filtered to provide clean voltages. Six additional voltages are generated by dc-to-dc converters on the power conditioning circuit board. These voltages are the +7.5 V, –7.5 V, +3.3 V, +15 V, –15 V, and +33 V supplies. The power conditioning board also does the power on/off switching, generates the line trigger, provides the fan drive voltage, and drives the power good indication circuitry.

A shorted or overcurrent condition on any of the outputs of the main supply will cause a shutdown and cycling of the main power supply. The dc-to-dc converters will foldback for an overcurrent condition and will also cause shutdown of the main supply for a shorted output.

Mainframe Controller
The DTI controller is a high-performance PC based controller that includes SVGA graphics and I/O circuitry. The Internal controller mounts vertically at the left of the mainframe card cage and connects into the PCI backplane through a standard 32-bit PCI connector. A 64-bit PCI connector is used for additional I/O communication to the backplane. Interconnection to other instrument components and rear panel ports is through a Processor I/O board.

PCI Backplane
The PCI backplane supports up to 8 standard PCI modules in addition to the mainframe controller. Custom application modules installed in the module bay provide the PQM300 application features and functionality. The backplane also interconnects the power supply output voltages to the remainder of the system, including the fans. The precision 33 MHz system clock is distributed on the backplane, and all communication to, from, and between the system modules is supported.

Front Panel Interface
The front panel interface assembly interconnects the system controller with the the floppy disk drive, the CD drive, and the mouse, keyboard, and external USB (universal serial bus) ports. The PC speaker audio is also routed from the controller to the speaker through the front panel interface circuit board. The optional mainframe user interface: display, touch panel, and key-pad assembly, are also routed through the front panel interface assembly when installed.

Key Pad

The key pad module has a blank face on the standard PQM300 program monitor. In the PQM300 program monitor with the flat-panel display installed, the key pad and control knob are functional.

Hard Disk Drives

The two hard disk drives (HDD) are standard 9 GB SCSI drives that interface directly to the system controller through a Small Computer Serial Interface (SCSI) extension of the PCI bus. The two hard drives are mounted in the Acquisition compartment.

Floppy Disk Drive

The floppy disk drive is a standard one-half inch drive that supports 3.5-inch, 1.44 Mbyte high density double sided floppy disks.

CD Drive

The CD drive is a half-height drive similar to standard lap top computers. A CD caddy is not needed. The CD drive drawer is manually operated to insert and extract a CD disc from the drive.

Mouse and Keyboard Ports

Plug in a PS2 compliant mouse and keyboard to the ports at the lower left side (as you face it) of the bezel. These port are interfaced through the front panel processors to the mainframe controller.

LCD Flat-Panel Display

The flat-panel display is an option for the PQM300 program monitor. A backlighted 10.4-inch diagonal Active Matrix Thin Film Transistor (TFT) LCD panel provides the internal color display for the PQM3FLC option. To extend the life of the backlight and prevent burning of the TFT LCD screen, the cold-cathode fluorescent backlight can be dimmed to 60% of its maximum brightness with a custom screen-saver or mainframe utilities applet. A DC switching regulator board, included as part of the display assembly, provides the backlight high voltage supply. The LCD display connects to the front panel interface board through a display adapter board in the display assembly.

Touch Panel. The touch panel is a standard 10.4 inch panel mounted over the surface of the flat-panel display. The touch panel is active at the same time as the mouse. A second front panel processor combines the mouse and touch screen signals to generate and receive standard mouse scan-codes from the system controller.

PQM300 Picture Quality Monitor Functional Description

The program monitor application consists of 1 to 8 plug-in DSP modules in a mainframe platform. A simplified block diagram of the modules and the signal interconnection for the standard instrument is shown in Figure 3–2. From 1 to 8 channels of serial digital video can be monitored. Figure 3–3 is a simplified block diagram with the PQM3F03 NTSC/PAL composite decoder installed. From 1 to 4 channels of analog composite video can be monitored.
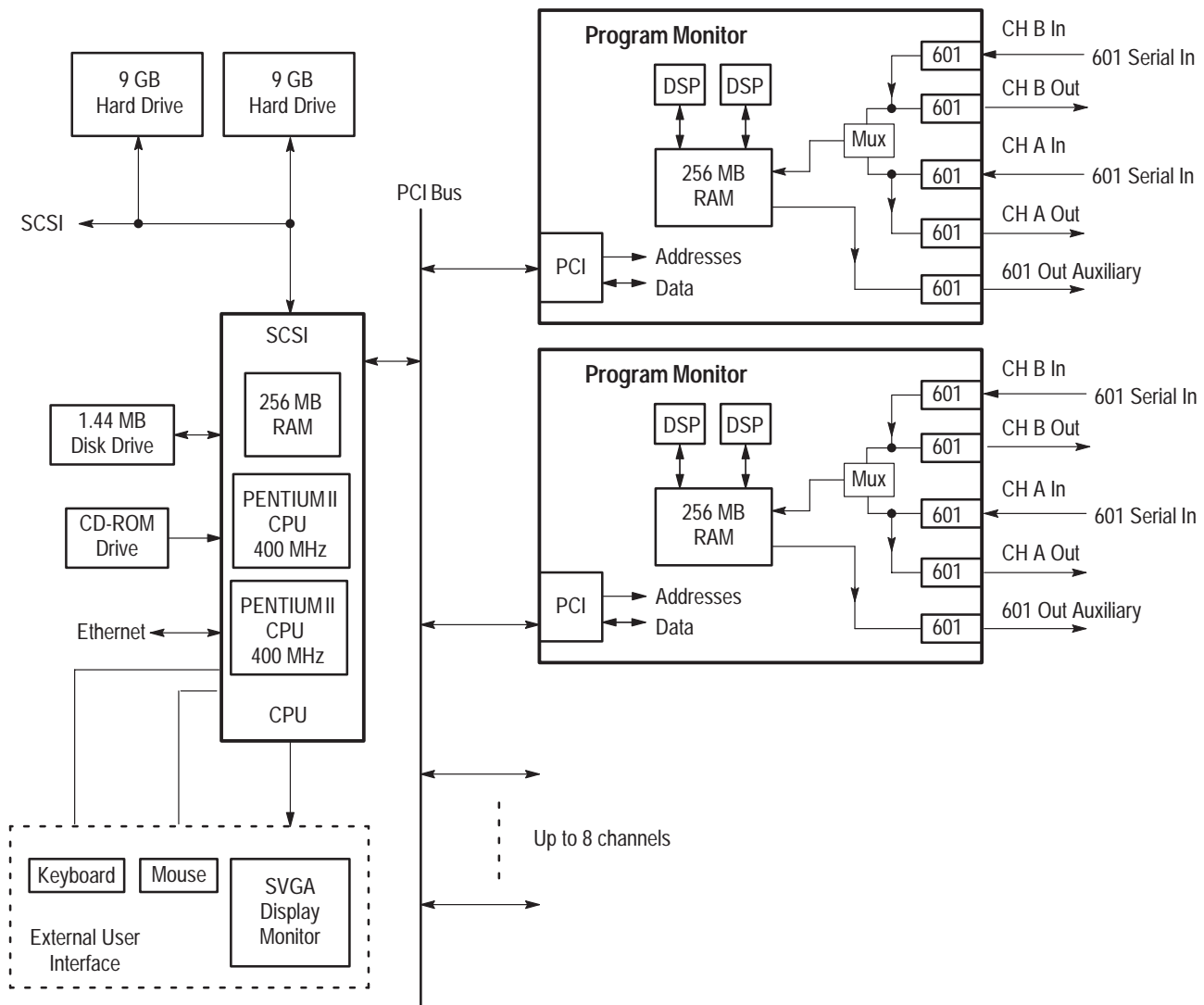
Figure 3–2: PQM300 Program QoS Monitor block diagram
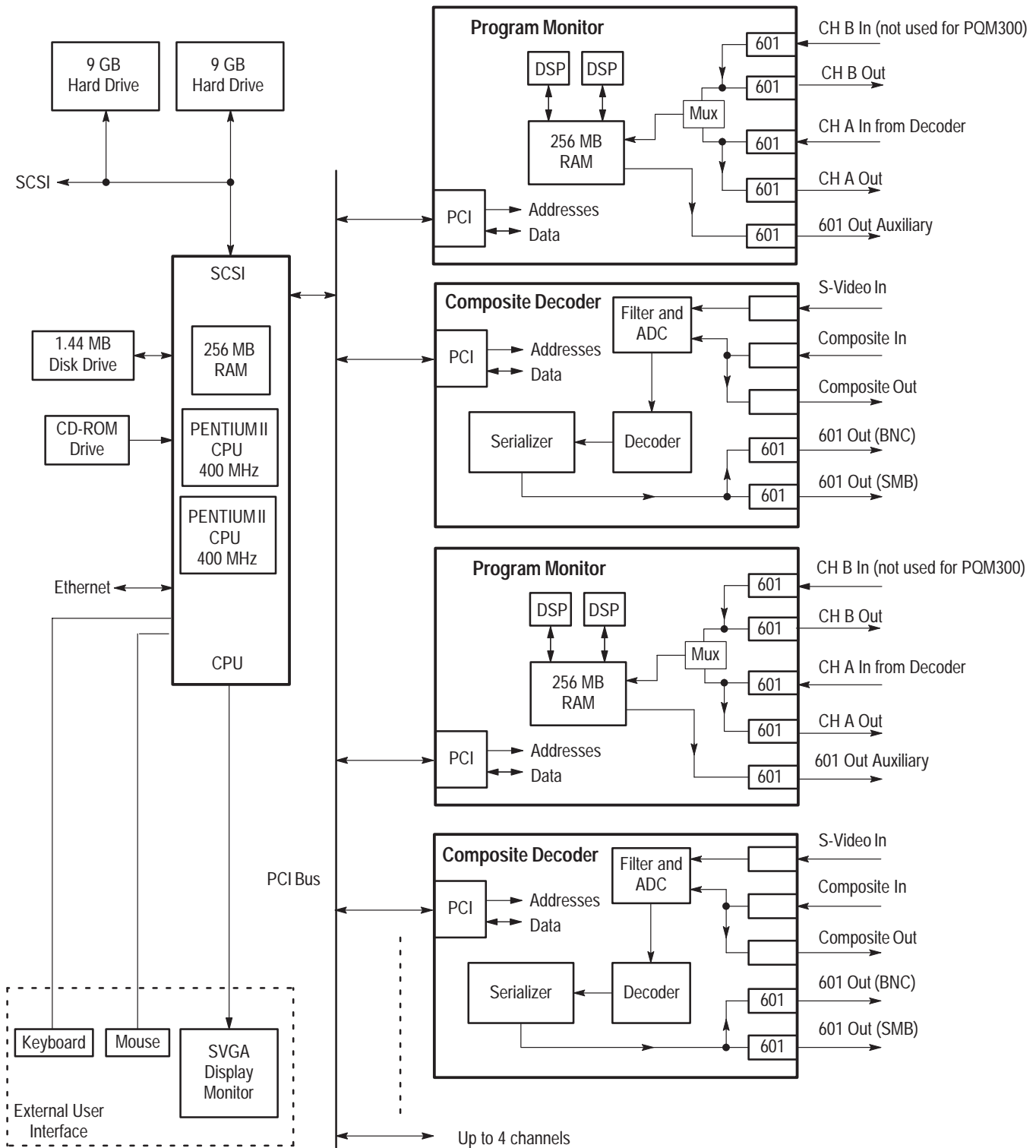
Figure 3–3: PQM300 Program QoS Monitor block diagram with composite decoder modules

Program Monitor Module Operation

The program monitor module processes video data using two on-board DSP processors. The module has a PCI interface, two serial digital video input interfaces with active loop-through outputs (Channel A and Channel B), and a serial digital video output interface. The PCI interface is for control, video data, and DSP program code download. The serial digital video interfaces are for real-time capture of digital video.

Blockiness and noise measurements are made on live incoming digital video signals. When blockiness or noise exceeds prescribed levels or durations, an alarm in indicated. The absence of a video signal (missing frames) or frozen video (duplicate frames) is also monitored to indicate abnormal operation.

The program monitor module can output processed program output video in Rec. 601 serial format. The 601 Out connector provides serial digital component video that can be viewed on a high resolution external digital video monitor.

The DSP system is made up of two DSP processors, 256 MB of single-cycle (SDRAM) main memory, a boot ROM, a 64kB shared memory, some control and status registers, a PCI FIFO (first in, first out), and an I/O Video ASIC. Video from the ASIC (application specific integrated circuit) is transferred in 1Kb blocks into memory to form *fields*.

Serial Digital I/O Block Description

The serial digital I/O system comprises two serial input connectors (Main In and Ref In) and associated deserializers, two serial active loop-through connectors (Main Out and Ref Out) and associated amplifier, a serial output connector (601 Out) and associated serializer, and a clock generator. The Main In, Main Out, and 601 Out connectors are BNC. The Ref In and Ref Out connectors are SMB. A simplified block diagram of the I/O section of the program monitor module is shown in Figure 3–4.
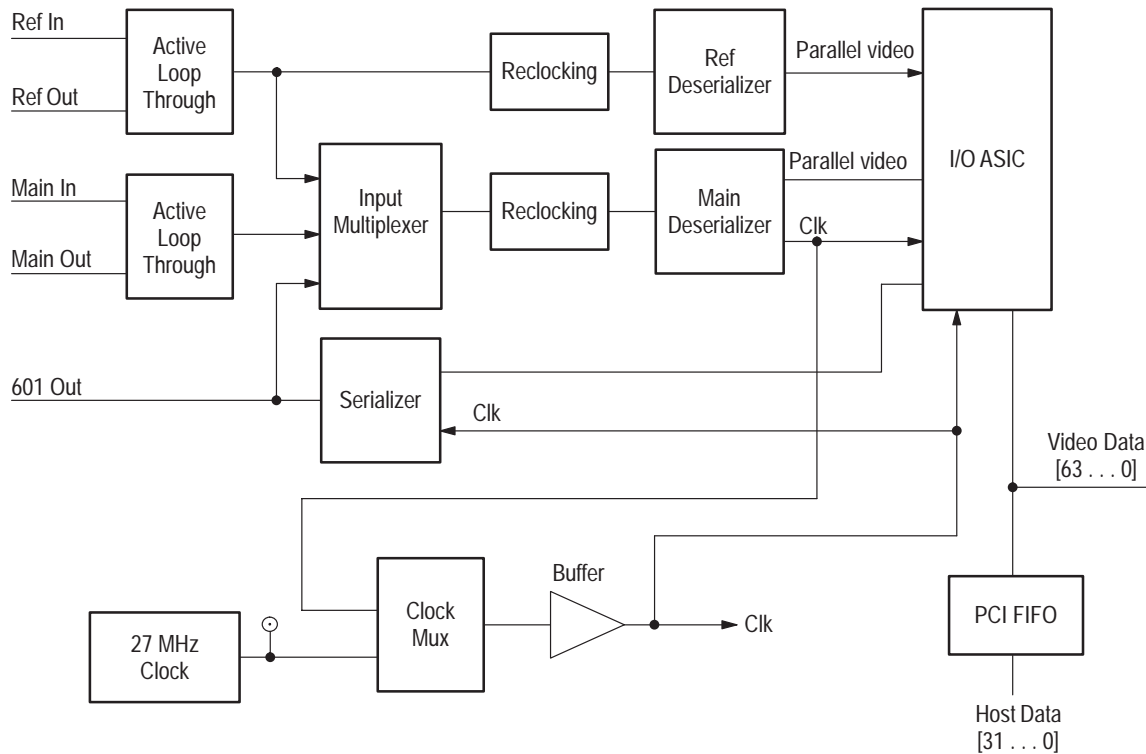
Figure 3–4: Program monitor module I/O section simplified block diagram

Main In. The Main In connector feeds a cable equalizer through a return-loss matching network. A carrier detect output from the cable equalizer is fed to the status port so the system can determine if an input is present. The software looks at the carrier detect bits before attempting to use either the Main In or the Ref In input as the signal source.

The output of the cable equalizer drives the active loop-through output driver and the input multiplexer. The other inputs to the input multiplexer are from the other channel and from the output (to allow loopback for self-test).

Only the primary input to the I/O ASIC has timing extraction. There is a 3:1 input multiplexer into the main deserializer. This allows either input to be used in single channel mode with the data coming through the main deserializer. The second deserializer will only be active in two channel mode. If both input channels are being used simultaneously, they must be identically timed and synchronized to the same clock. The third multiplexer input is a feedback from the serializer that is used for diagnostic testing.

Serial to Parallel Converter. The output of the input multiplexer goes to a reclocking circuit that drives a serial-to-parallel converter (deserializer). The serial-to-parallel converter also does the descrambling. The circuit outputs are

parallel video and clock. Source terminations are used in the lines to the buffer ASIC. The clock goes two places, to the I/O ASIC and to the clock multiplexer.

No precision clocks needed in the DSP section; the I/O functions drive the clock source decisions. The input locks to the incoming stream provided it meets SMPTE 259M specifications. There are no circuit provisions made to lock to very jittery input streams or to attenuate jitter on the active loop-through outputs.

27 MHz Oscillator. An internal 27 MHz oscillator is used when there is no external video signal supplied. The 2:1 clock multiplexer is under software control. There are multiple clock outputs to allow each DSP in the module to have a dedicated clock line.

In internal clock mode (also referred to as free-run mode), the program output must meet the SMPTE 259M frequency accuracy and jitter specifications. To meet these requirements, an accurate crystal oscillator is used as the internal clock source. The oscillator is a 27MHz $\pm$1ppm TCXO. The oscillator drives the clock multiplexer as one of the two possible inputs. The output of the clock multiplexer drives a clock buffer.

Decoder Valid. Status bits from the reclocking circuit and the serial-to-parallel converter are combined to derive the main decoder valid signal (MAIN-DECVAL). This signal is checked by the software before attempting to use the clock or video from the Main input. If the system is deriving the clock from this input, and MAINDECVAL goes low, the clock multiplexer automatically reverts to the internal clock source.

Output. The output serializer drives a connected cable directly. One output of the serializer is fed back to the input multiplexer to for use in a loop-back self-test. The program monitor provides a 270 Mb/s serial digital component video output signal at all times when operating. If video content is absent, the 601 output is video black. If no 601 inputs are connected, the output is free running. If a 601 input is connected to either input, the output is synchronized to the input signal. If a 601 input is connected to both inputs, the channel that the output is synchronized with is designated by software control. (The Channel B loop through inputs are not used for the program monitor application.)

DSP Block Description   The DSP devices are two microcircuits with five processors each. These processors share 128 MB of fast SDRAM. The program monitor DSP accepts serial digital component video inputs that adhere to ITU Recommendation 601 coding formats. A simplified block diagram of the DSP portion of the module is shown in Figure 3–5.
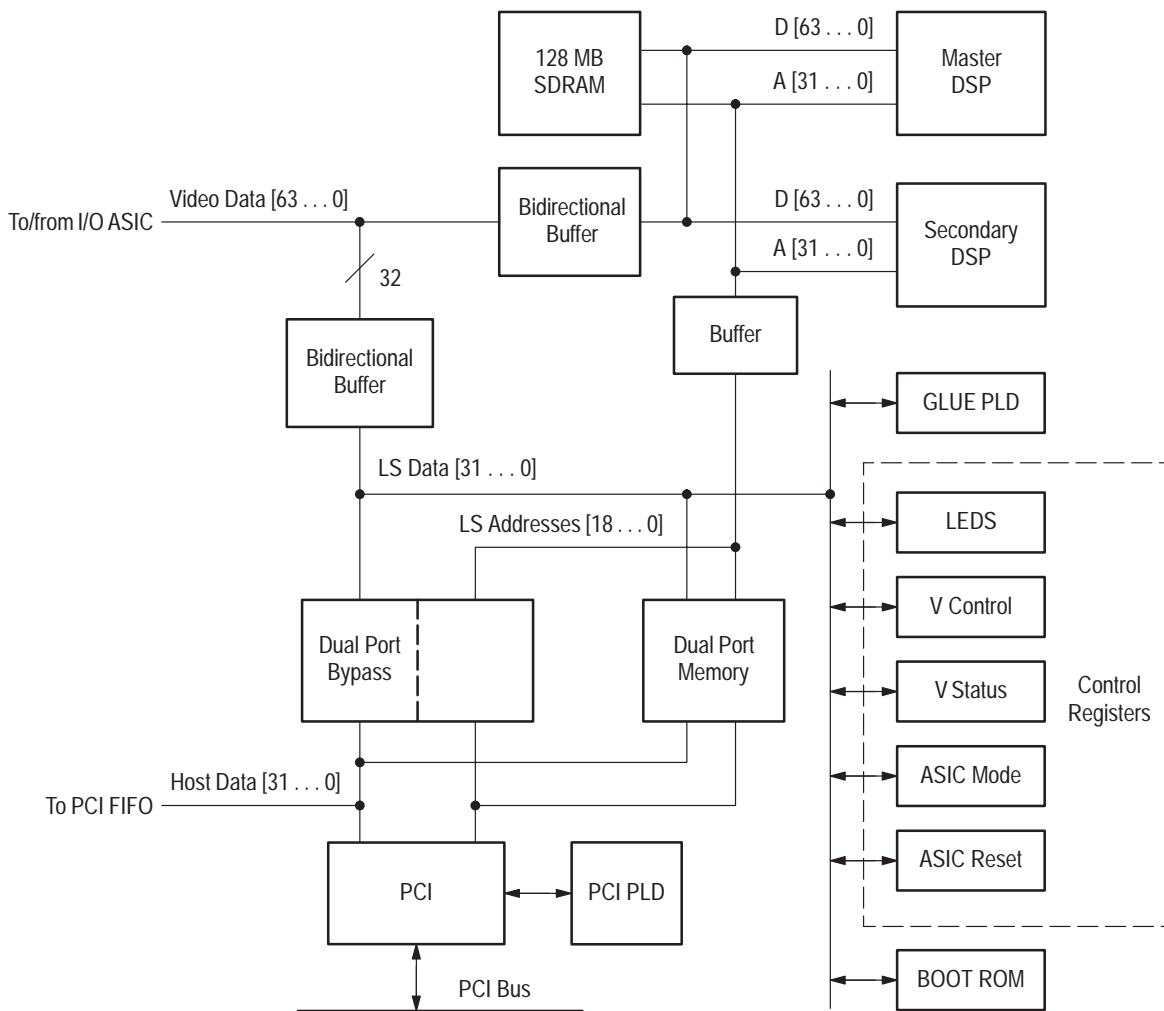
Figure 3–5: Digital signal processor module DSP section simplified block diagram

PCI Bus Interface   PCI is the bus interface between the plug in modules and the server. The PCI system is made up of a PCI interface chip, 64kB of Dual Port shared memory, a discrete status register, PCI FIFOs, and a PCI control circuit (PLD). The program monitor module can generate interrupts onto the PCI bus. The PCI system can also generate interrupts to the program monitor modules.

The PCI system provides setup and control messages to the DSP processors of the program monitor modules through the Dual Port shared memory system. DMA transfers that bypass the Dual Port shared memory can be initiated by the PCI host (mainframe processor) or by the on-board DSP processors.

Boot ROM   The Boot ROM is a 4 Mbit Flash EPROM, 8 bits wide. It contains the boot steps used to start up the DSP module when the server is started. The DSP start up diagnostics are contained in the Boot ROM.

The Boot ROM is not programmable on board the module. It is installed in its socket after programming. The programming stored in the Boot ROM performs the following functions:

- Initializes all hardware devices (for example, it resets the I\O Video ASIC)
- Initializes the DSP processors
- Performs minimal diagnostics:
    - Control port read/write
    - Quick Dual Port Read/Write
    - Quick SDRAM Read/Write

After the reset, the DSP processors wait for a signal from the server (PCI) to start download operation. Once the download is complete, the DSP vectors to the starting address of the downloaded programming.

Composite Decoder

The composite video monitor channel is formed by a serial video program monitor module paired with a composite video decoder module that accepts composite video or S-Video and converts it to 601 video at 270 MHz. The decoder block diagram is shown in Figure 3–6. As are the other modules, the decoder is a plug-in circuit board that communicates with the mainframe processor through the PCI bus.

Input   The PQM3F01 decoder module input accepts standard level analog video. Input can be composite or S-Video. The input consist of clamping circuitry, buffering, and multiplexing switching. Composite video input is buffered and goes to the Luma output that is applied to the sync stripper. With an S-video input signal, the separate chroma and luma video information are buffered outputs. A calibration signal is applied to the third input to the multiplexer.
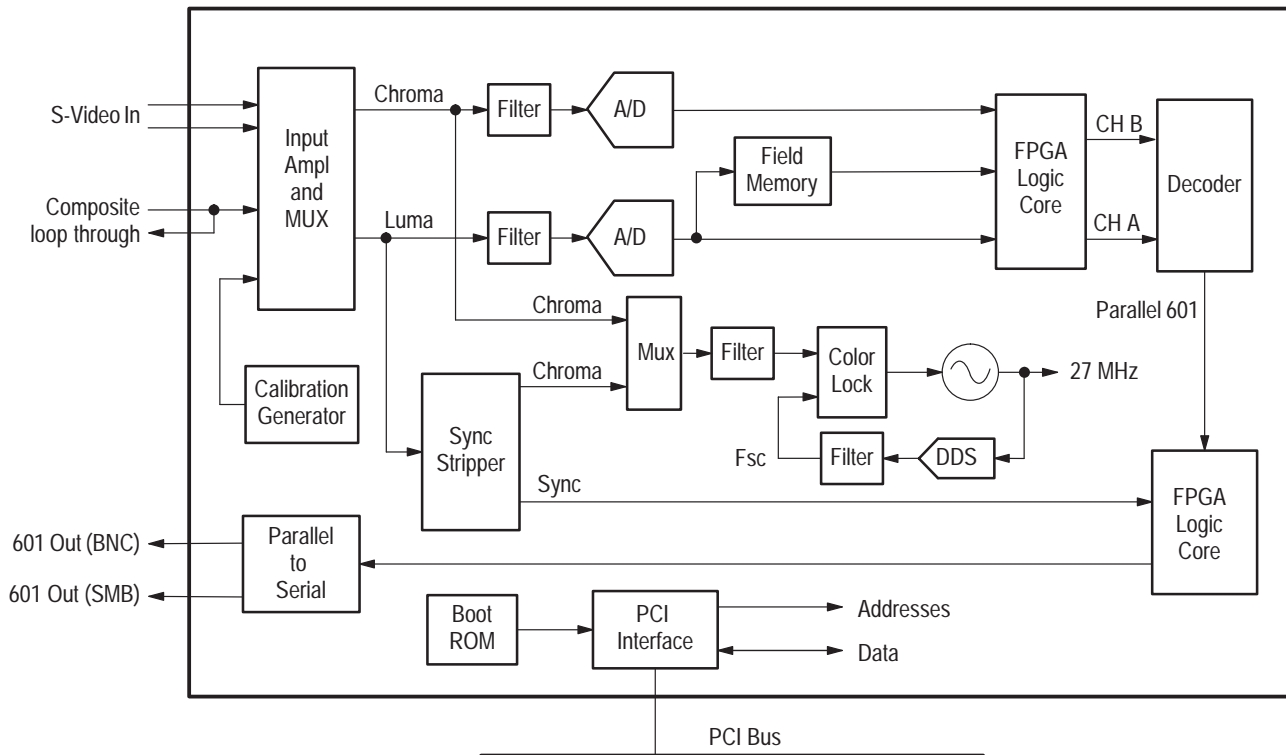
Figure 3–6: Decoder simplified block diagram

Calibration Generator   The calibration circuitry applies accurate 2 and 3 volt DC levels to the video input circuitry. The FPGA (field-programmable gate array) device averages the resulting values from the converters and compares them to an internal constant. The results of the comparison drives an LED indication circuit to show if the relative A/D output value is high or low. There is also a diagnostic mode signal, a 2-V ramp, that can be applied to the video output amplifiers for testing. Calibration and diagnostics modes are normally manually selected by setting the mode switch on the board. However, when the mode switch is set to the run position, the diagnostics routines can drive the DAC circuitry for closed-loop testing.

Sync Stripper   The sync stripper ASIC outputs a signal during the sync portion of the video that is used for coarse timing. The input clamp circuit must be running for this sync stripper to work correctly. The chroma output is applied to 2:1 MUX that selects between the S-Video chroma and the chroma stripped from the composite video signal for the color lock circuit. The sync is applied to the FPGA device.

A/D Converters The analog inputs are attenuated to fill the A/D converter full scale range and are anti-alias filtered for application to the A/D converters. The output of the A/D converters are buffered then decimated by half-band filters before being applied to the decoder device. When converted to 601 format, the standard video input maps into decimal 16 to 235 output levels in 8-bit mode and 32 to 470 levels in 9-bit mode. Signals with lower amplitudes will result in reduced decoder accuracy and signals exceeding the standard amplitude by a certain amount are clipped.

Conversion clocks are derived from a color lock circuit that compares burst from the input to an Fsc (subcarrier signal) developed by a DDS (direct digital synthesizer) device running on the 27 MHz oscillator frequency.

Decoder The Ch A and Ch B decoder inputs are 10-bit data from the FPGA. The standard operating mode of the decoder uses an adaptive notch / 3-line comb filter. The field memory stores a field or frame of data used to develop the optional temporal filtering. Luminance data always goes to channel A of the decoder device. Channel B input can be the chrominance (S-Video mode) or delayed luminance for field and frame comb filter modes. The decoder output is fed back to the FPGA device for rounding, dither, and clipping.

FPGA The input and output of the decoder device goes to a field programmable gate array (FPGA) device that handles switching, clipping, and dithering to reduce truncation effects. The FPGA device is programmed with the logic to handle the operation of the decoder module. Operating modes of the decoder module are set by filling the appropriate registers on the decoder board through the PCI bus at the time a decoder operation is started.

Color Lock The Chroma portion of the clamped video or the chroma from the S-Video signal is applied to a Color Lock ASIC that controls the phase of the 27 MHz VCO (voltage-controlled oscillator). The VCO output is then used throughout the decoder module as the clocking signal. The 27 MHz clock signal also drives a circuit (DDS - direct digital synthesizer) that develops the Fsc (subcarrier frequency). The Fsc circuit is reset every color frame to correct for any slight frequency errors. The Fsc output completes the phase-lock-loop back to the Color Lock ASIC.

Parallel to Serial Converter The data bits are serialized in Rec. 601 format and applied to the 601 Out connector on the rear panel of the decoder module. The 601 serial digital signal is externally connected to program monitor input for service quality monitoring.

PCI Interface The PCI Interface circuitry connects the decoder module to the host (mainframe) processor. A programmable logic device contains the logic circuitry to address the chips on the decoder module. Addressing and data transfers to the devices on the module from the mainframe processor is handled by the PCI interface. The PCI interface is configured from the Boot ROM.

Performance Verification

Performance Verification

This section contains procedures for verifying that the instrument performs according to the characteristics stated in the *Specifications* section. If the instrument is not able to pass these tests, refer to the *Maintenance* section for troubleshooting procedures.

NOTE. *To complete the procedures in this section you need a basic understanding of the Windows NT operating system, and the PQM300 Program QoS Monitor application. For detailed operating instructions, refer to the Windows NT manuals and the* PQM300 Program QoS Monitor User Manual.

Test Interval

Perform the procedure once every 2000 hours of operation or every 12 months to ensure that the performance is within tolerance.

Prerequisites

The tests in this section comprise an extensive, valid confirmation of performance and functionality when the following performance conditions have been met:

- The instrument must be in an environment with temperature, altitude, humidity, and vibration within the operating limits described in the *Specifications* section.

- The instrument must have had a warm-up period of at least 20 minutes.

Equipment Required

Table 4–1 lists the test equipment needed to complete the Performance Verification procedure. The Table identifies examples and minimum tolerances, where applicable. If you substitute other equipment for the examples listed in Table 4–1, the equipment must meet or exceed the tolerances.

Table 4–1: Required equipment list

Test equipment	Minimum requirement	Example
Serial Digital Video Generator	Generate serial digital video test signals	Tektronix TSG601 Serial Component Generator
Test Oscilloscope	Bandwidth DC to 1 GHz	Tektronix TDS 784D Oscilloscope
Matching Pad	75 Ω to 50 Ω matching pad	Tektronix AMT75
Frequency Counter with 1 MΩ probe	Frequency 100 MHz 10-digit resolution; accuracy 0.1 ppm (referenced to WWV, GPS, or with a high accuracy time base)	Hewlett-Packard Model 53131A
75 Ω SMB to BNC adapter cables (2)	BNC male to SMB female, test equipment interconnection, 39.5 in	Tektronix part number 174-3579-00
75 feed-through termination	Termination impedance 75 Ω; connectors BNC male to BNC female	Tektronix part number 011-0051-01
SVGA monitor and monitor cable	Multisync SVGA monitor and connection cable with standard video cable connector	Tektronix part number 119-5696-00
Keyboard	IBM compatible keyboard, 4-pin mini DIN connector	Tektronix part number 119-5193-00
Mouse	Microsoft compatible 3-button mouse	Tektronix part number 119-4330-02
75 Ω coaxial cable	Low-loss video cable, double shielded; BNC male to BNC male, 72 in.	Tektronix part number 012-0159-01
75 Ω coaxial cable	Coaxial cable; BNC male to BNC male, 24 in.	Tektronix part number 012-01339-00
NTSC Composite Video Test Signal Generator (for Composite Decoder test)	Generate NTSC composite video convergence test pattern	Tektronix TSG130A NTSC Multiformat Generator
PAL Composite Video Test Signal Generator (for Composite Decoder test)	Generate PAL composite video convergence test pattern	Tektronix TSG131A PAL Multiformat Generator
75 Ω termination (for Composite Decoder test)	Termination impedance 75 Ω; connector BNC male	Tektronix part number 011-0102-01

Verification Procedures

Program Monitor Channel A Loop-Through Amplitude

The Channel A Out signal amplitude is measured using a test oscilloscope and a 75 Ω to 50 Ω matching pad. The test oscilloscope setup is very important in order to obtain a stable display of on pulse of the serial digital signal so that the positive and negative amplitude values of the waveform can be checked as

accurately as possible. The accuracy limits of the test equipment used precludes checking for the exact amplitude tolerance allowed for the Rec. 601 output (800 mV $\pm$ 80 mV). You can get a more accurate measurement if your test equipment is characterized to allow you to eliminate test equipment uncertainty from the measurement.

1. Connect the program monitor Channel A Out connector through a 75 Ω coaxial cable and the 75 Ω to 50 Ω matching adapter to the CH1 input of the test oscilloscope.
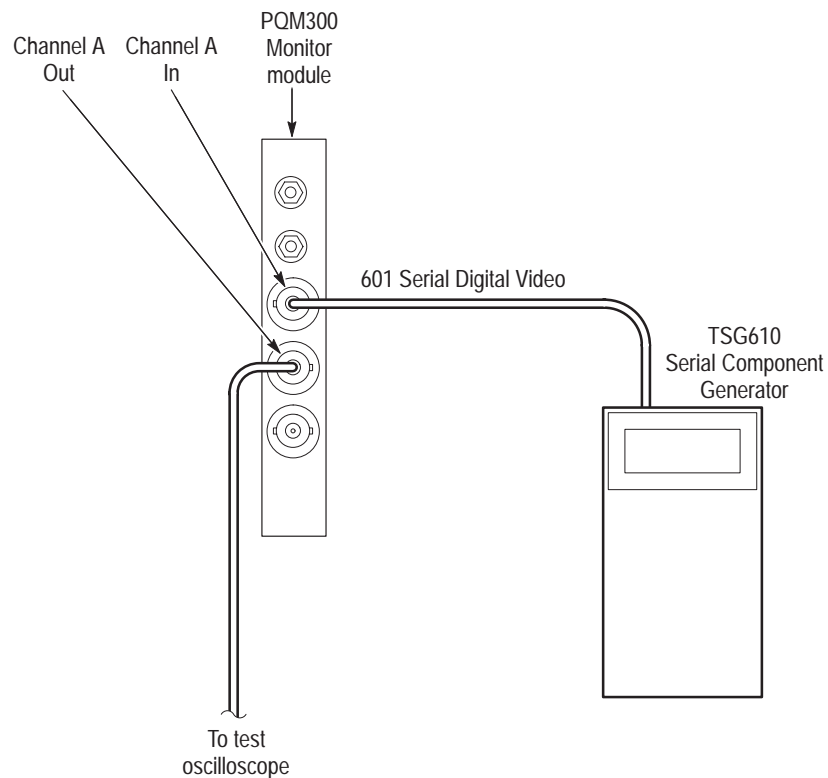
Figure 4–1: Connection for monitor module Main Out loop-through check

2. Connect a 60% Sweep (CRC off, 800 mV amplitude) 601-525 digital video test signal (NTSC) from the serial digital generator to the Channel A BNC loop-through input of the first program monitor module to be tested (see Figure 4–1).

3. Set the test oscilloscope for the settings given in Table 4–2. The parameters shown are for the example test oscilloscope given in the test equipment list. If you use an equivalent oscilloscope of a type other than the example, refer to the operating manual of that oscilloscope to determine the settings.

Table 4–2: Test oscilloscope settings

CH 1 Vertical controls	Setting
Coupling	DC
Bandwidth	Full
Vertical Scale	250 mV/div
Position	0 div
Offset	0 V
Deskew	0 s
Impedance	50 Ω
CH 1	On
Horizontal controls	**Setting**
Time Base	Main at 2 ns
Trigger Position	50%
Record Length	500
Acquisition controls	**Setting**
Mode	Average at 24
Repetitive	Off
Stop After	RunStop Button
Cursors	**Setting**
Function	V Bars
Mode	Independent
Time Units	Seconds
Amplitude Units	Base
Position 1	–5.7 ns
Position 2	–5.6 ns
Measurement	**Setting**
Gating	On
Cursor Type	V-Bar Cursors
Measure 1 Type	High
Measure 2 Type	Low
Measure 3 Type	C1 Rise 20% to 80%
Measure 4 Type	C1 Fall 20% to 80%
Measure 1 Source	CH 1
Measure 2 Source	CH 1
Measure 3 State	ON
Measure 4 State	ON

Table 4–2: Test oscilloscope settings (Cont.)

Measurement	Setting
Method	Minimum
Trigger controls	**Setting**
Type	Pulse
Class	Width
Source	CH1
Polarity	Positive
Trigger When	Within Limits
High Limit	35 ns
Low Limit	14 ns
Level	0 V
Mode	Normal
Holdoff	250 ns

4. The display that results when the setup is completed should look approximately as shown in Figure 4–2.

5. From the test oscilloscope, record the CH 1 High amplitude of the digital waveform. The value is approximately 400 mV.
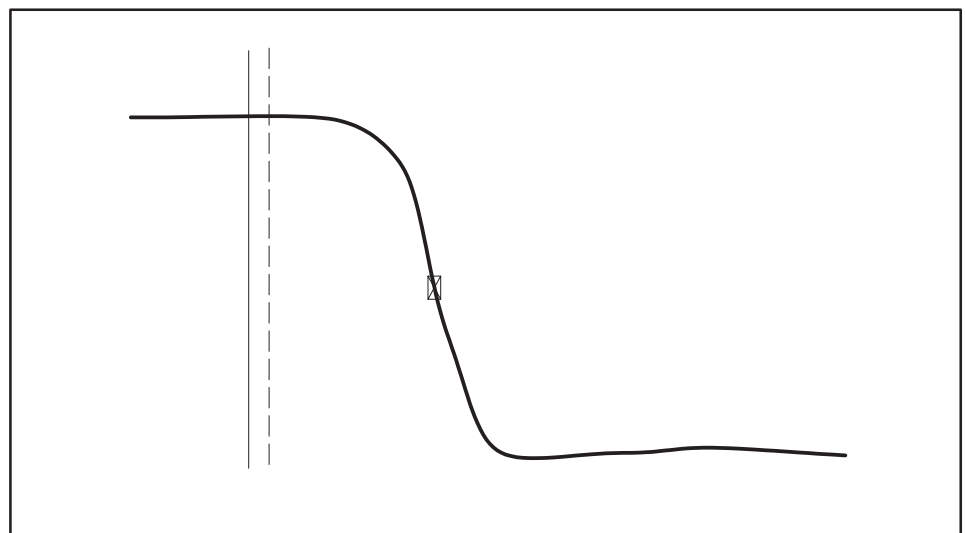
Figure 4–2: CH 1 high amplitude

6. In the test oscilloscope Trigger menu, set the polarity to negative. After the measurement stabilizes, record the CH 1 Low amplitude of the digital signal waveform. The low value should also be approximately 400 mV.
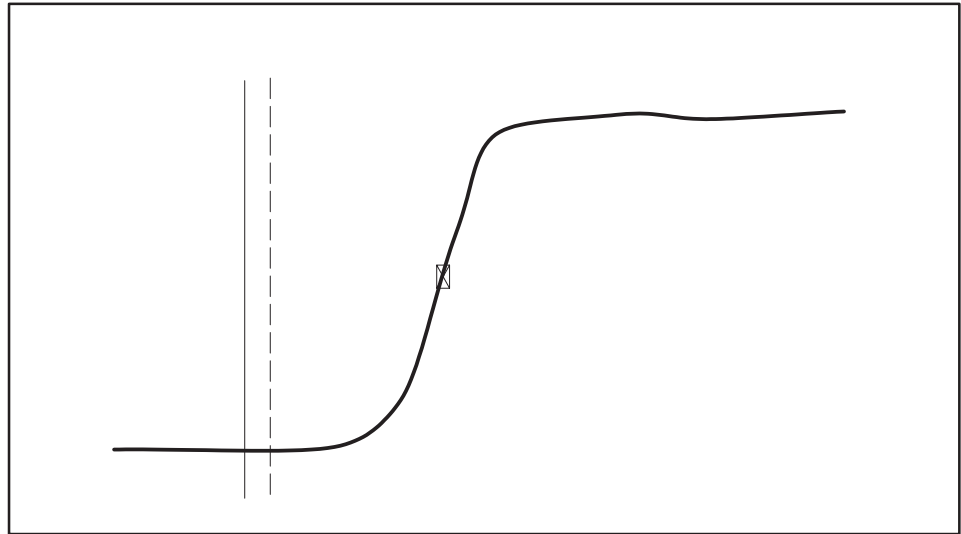
Figure 4–3: CH 1 low amplitude

7. Add the absolute values of the high and the low amplitudes of the waveform.

8. Check that the sum of the high and low amplitude measurements is within the range of 738 mV to 862 mV. The measurement uncertainty due the accuracy of the example test equipment is taken into consideration in this range to verify that the output is within the allowable limits of 800 mV ± 80 mV.

9. Move the right most cursor to a position just after the falling edge as shown in Figure 4–4. The falling edge will be between the two cursors.
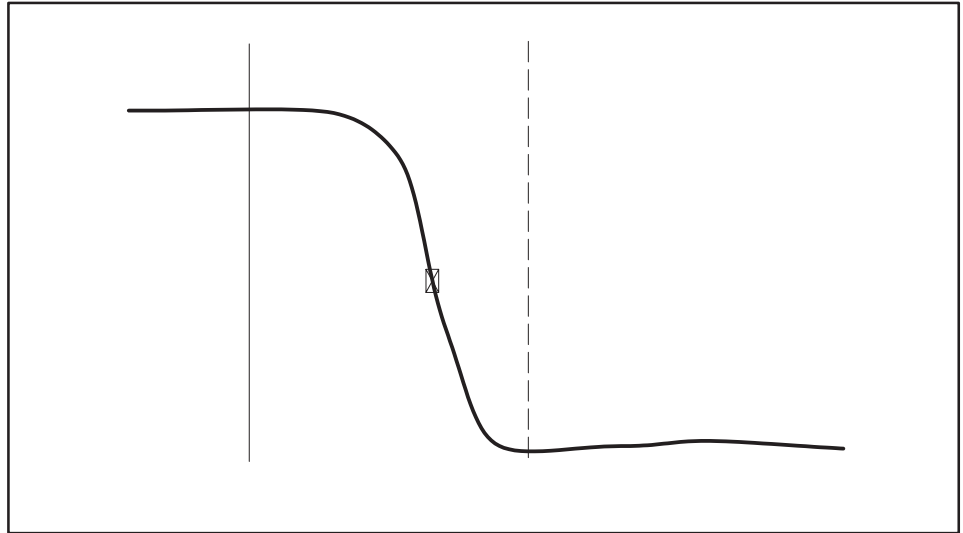
Figure 4–4: CH 1 fall time

10. Verify that the Fall measurement is 1.2 ns or less.

11. Change the test oscilloscope trigger polarity to negative. The display will look approximately as shown in Figure 4–5.

12. Verify for that the Rise measurement is 1.2 ns or less.
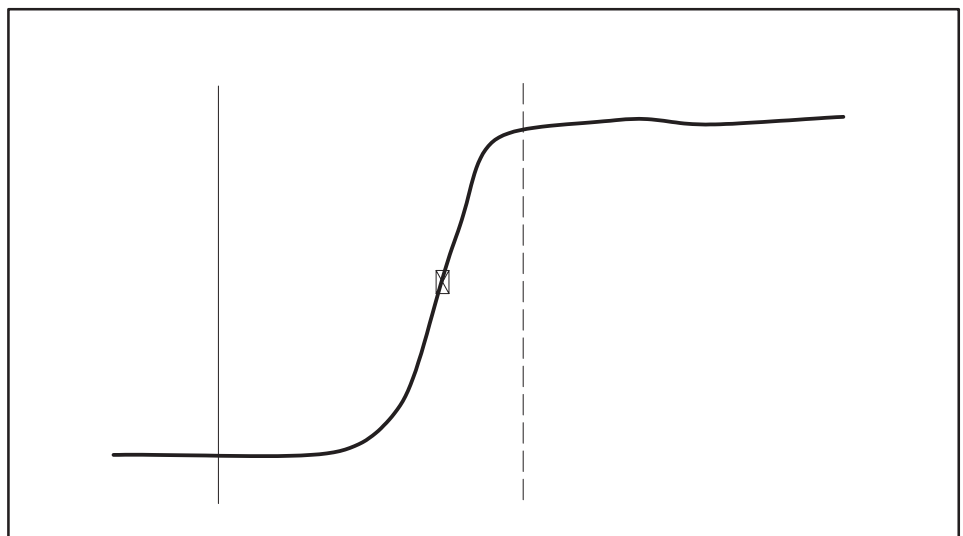
Figure 4–5: CH 1 rise time

Shut Down the PQM300 Application

There are three steps to shutting down the PQM300 application. These steps shut down the user interface, the PQM core program, and the server. The best practice is to use an orderly shutdown procedure so that the appropriate data for the application is saved and all the PQM300 processes are stopped. Use the following steps to shutdown the from the local user interface:

1. In the PQM300 display, click on File in the display task bar and select Exit to shut down the user interface.

2. Click on the PQM_Core.exe task in the lower task bar to display the task DOS window. At the prompt, type in exit and press the enter (return) key.

3. Right click on the jre.exe task in the lower task bar and select close from the list that is displayed.

Run Decoder Diagnostics

1. Use the Windows NT directory tools to locate the diagnostic execuTable file. It is found in the D:\Pqm300\support directory. The diagnostic file name is mmcodecs.exe.

2. Double click on the file name to start the diagnostic routine. A small Encoder/Decoder dialog box is displayed.

NOTE. The Encoder/Decoder diagnostics does not have a help file provided.

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3. In the dialog box, hold the mouse button down on View to display the choices and select the Decoder. The Decoder setting window appears.

4. Set the Input for Composite and the Standard for NTSC.
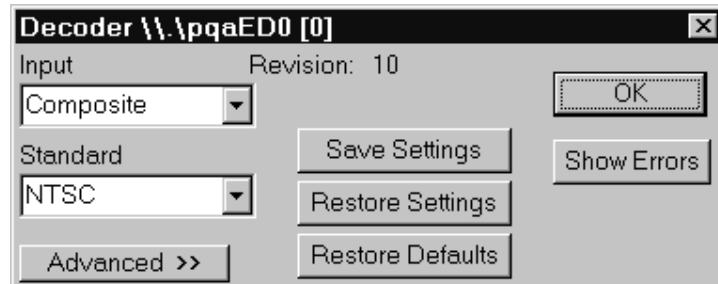
5. Click on Advanced and set the Mode/Processing selection for Notch.
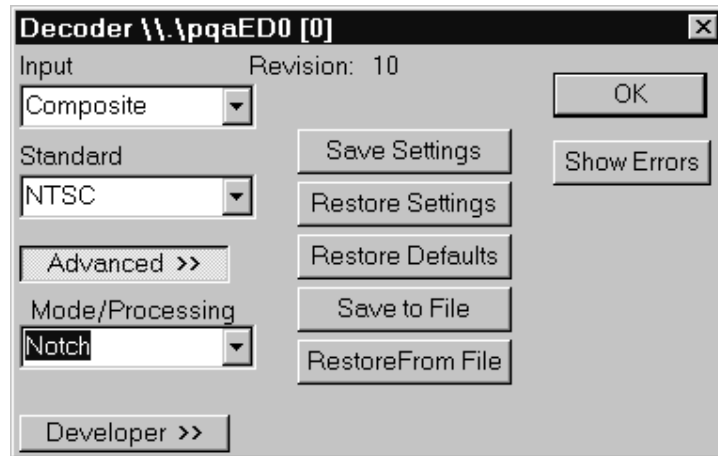
6. Click OK to exit the Decoder settings window.

7. In the dialog box, hold the mouse button down on Option to display the choices and select the decoder diagnostics. The Decoder diagnostic window appears.
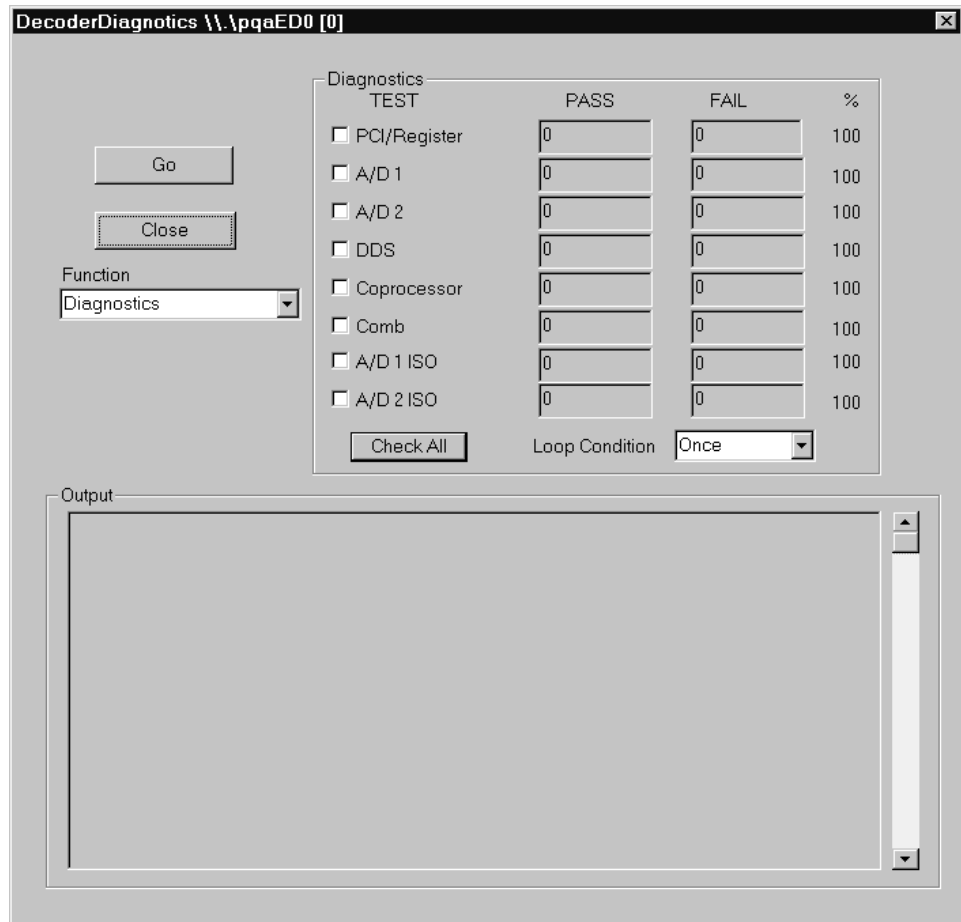
8. Set the Loop Condition for Once to run the diagnostic tests one time.

9. Click the Select All button to enable all the Decoder board diagnostic tests and then click the Go button to start the tests.

As the tests run, the test names are displayed in the Results box with the pass or fail result of the test. Use the scroll bar to view the completed test results.
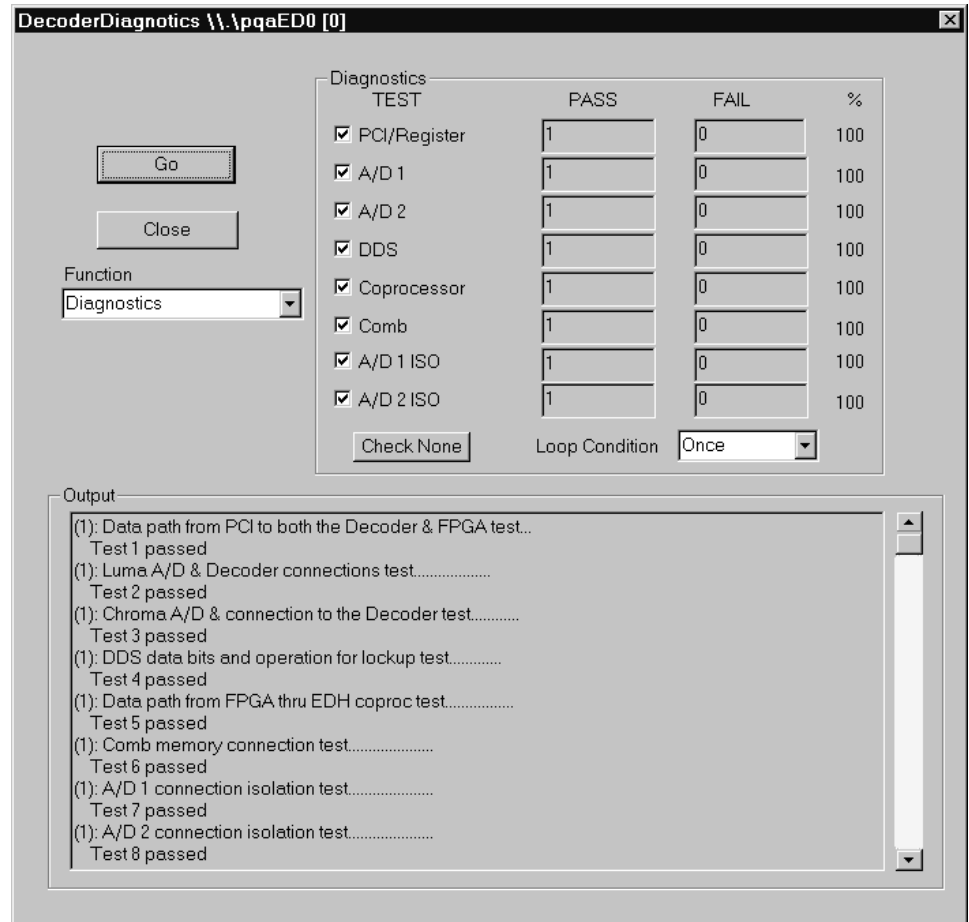
10. If the decoder shows diagnostic failures, perform the decoder adjustment procedure (refer to *Composite Decoder Board Adjustments* on page 5–4) and rerun the Decoder diagnostics again. If the decoder diagnostic failure persist, the decoder module may need to be replaced.

11. Click the Close button to exit the decoder diagnostic window.

12. When finished with the decoder diagnostic testing, click the X in the upper right hand corner of the PQA Encoder/Decoder window to exit.

Decoder 601 Out Amplitude

The 601 Out signal amplitude is measured using a test oscilloscope and a 75 Ω to 50 Ω matching pad. The test oscilloscope setup is identical to that used to test the program monitor module Channel A output amplitude.

1. Connect the decoder 601 Out connector through a 75 Ω coaxial cable and the 75 Ω to 50 Ω matching adapter to the CH1 input of the test oscilloscope. See Figure 4–6 for the PQM300 rear panel connections.

2. Use the BNC-to-BNC coaxial cable to connect a multiburst PAL composite video test signal to the Composite In BNC loop-through input of the decoder module being tested as shown in Figure 4–6.

3. Terminate the decoder Composite loop-through connector using a 75 Ω BNC termination.

4. Set the test oscilloscope for the settings given in Table 4–2. The parameters shown are for the example test oscilloscope given in the test equipment list. If you use an equivalent oscilloscope of a type other than the example, refer to the operating manual of that oscilloscope to determine the settings.
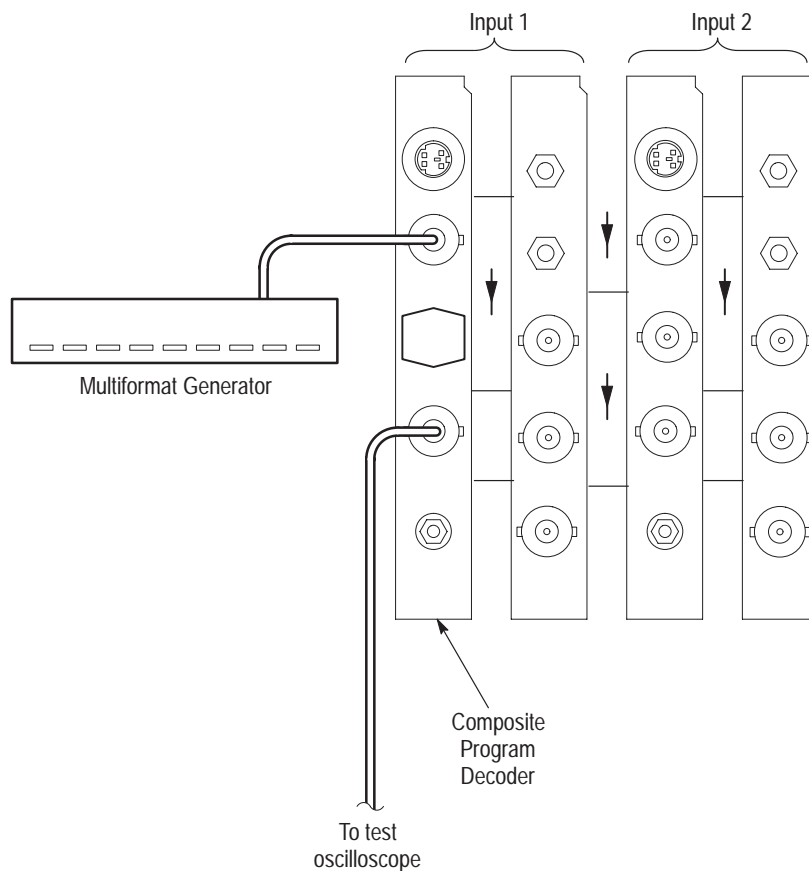
Figure 4–6: Connections for the decoder 601 output check

5. Double click on the PQM300 icon to start the application. All the PQM300 processes are automatically started, and the user interface is reloaded.

6. Click on Configure in the top task bar and select Decoder. This displays the Decoder configuration dialog box.
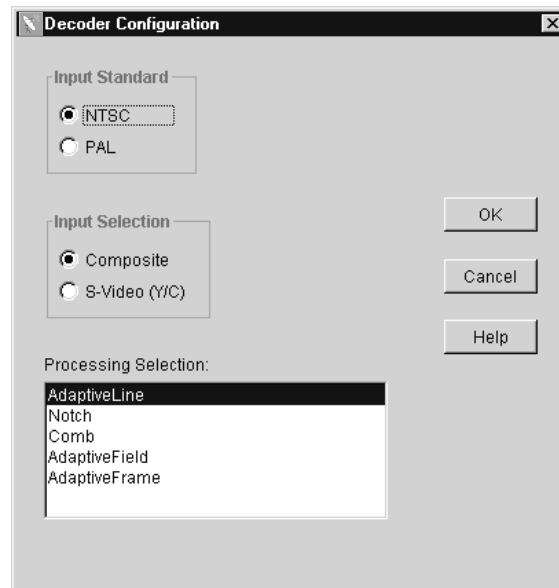
7. Set the Input Standard for PAL and set the Input Selection for Composite.

8. In the Processing window, select Notch filtering.

9. Click OK to apply the changes and exit the Decoder configuration box. The configuration changes apply to all the installed decoders.

NOTE. You will get error messages from any composite decoder modules that do not have a signal applied. Click on OK until all the messages are cleared. The decoder with a signal applied should not have error messages displayed.

10. The display that results when the setup is completed should look approximately as shown in Figure 4–2.

11. From the test oscilloscope, record the CH 1 High amplitude of the digital waveform. The value is approximately 400 mV.

12. In the test oscilloscope Trigger menu, set the polarity to negative. After the measurement stabilizes, record the CH 1 Low amplitude of the digital signal waveform. The low value should also be approximately 400 mV.

13. Add the absolute values of the high and the low amplitudes of the waveform.

14. Check that the sum of the high and low amplitude measurements is within the range of 738 mV to 862 mV. The measurement uncertainty due the accuracy of the example test equipment is taken into consideration in this range to verify that the output is within the allowable limits of 800 mV ± 80 mV.

15. If the 601 output peak-to-peak amplitude is not with the expected limits, perform the Decoder Adjustment procedure. Refer to *Composite Decoder Board Adjustments* on page 5–4.

Check the Program Monitor Module 27 MHz Clock Frequency

Use the following procedure to check the oscillator frequency of the monitor modules.

Test Equipment Setup   **1.** Set up the test equipment.

Table 4–3: Frequency counter setup

Feature	Mode	Status
Measure	Freq	
Limits	Run	
Channel 1		Connected
Trigger	Sensitivity	OFF
Input impedance	50 Ω/1 M	1 MΩ
Input coupling	DC/AC	AC
Attenuation	x10 Atten	OFF
Filter	10 kHz Filter	OFF

2. Be sure that you wear a static grounding wrist strap.

3. Turn off power to the mainframe and disconnect the power cord.

**4.** Remove the mainframe cabinet. Refer to the *Removing the PQM300 Cabinet* on page 6–18 in the *Maintenance* section for the procedure.

5. Connect a 1 MΩ probe to the frequency counter Channel 1 input connector.

6. Connect the probe ground lead to chassis ground of the mainframe.

7. Reconnect the power cord and turn on the mainframe power.

8. After the Windows NT initialization and login process is completed, the PQM300 monitor application should start automatically. If it does not start automatically, double click on the PQM300 icon to start the application.

9. Carefully touch the probe tip to the oscillator 27 MHz Clk test point of the monitor module you are checking. See Figure 4–7 for the location of the test point on the module.
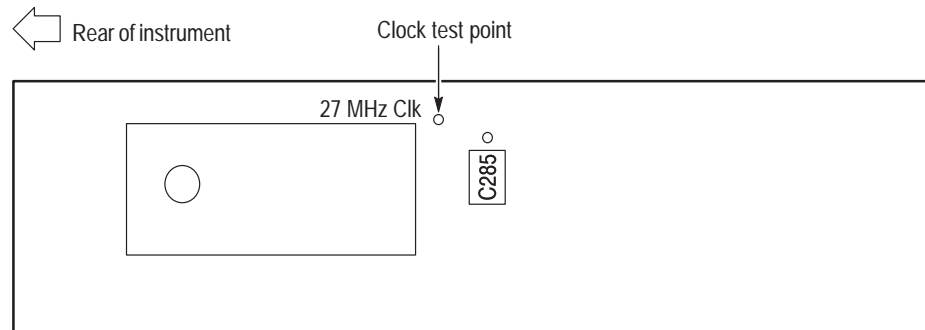
Figure 4–7: Oscillator test point for frequency check

NOTE. This oscillator is temperature sensitive. Allow the mainframe to warm up for 20 minutes before checking the frequency.

10. Check the frequency counter for a reading of 27 MHz $\pm$ 27 Hz (26,999.973 to 27,000,027 Hz).

11. Move the counter probe tip to the next DSP oscillator test point and check the frequency. Repeat for each installed DSP module.

12. Disconnect the test equipment.

Functional Performance Verification

The functional performance verification provides a few simple checks to verify the operation of the PQM300 program monitor modules and the operating software. This procedure is also provided in the *PQM300 Program QoS User Manual* for use as a operational check.

Serial Digital Video Check

Use the following procedure to verify the operation of the serial digital video program monitor modules. If the PQM300 has composite decoder modules installed, perform the *Composite Video Decoder Check* verification procedure on page 4–23 first. If that check is good, operation of the program monitor modules is verified.

1. With the power off, connect an SVGA monitor for a display and a keyboard and mouse for user command inputs. You can connect the keyboard and mouse either to the rear panel connectors (shown in Figure 4–8) or to the left side connectors.

Figure 4–8: Rear panel of PQM300 program monitor with composite decoder modules installed

2. Connect the SVGA monitor power cable to the ac power source.

3. Version 2.0 software changed a measurement algorithm and the test signal was changed to provide a better check of the performance.

   Version 2.0 Software. Connect a Convergence (CRC off, 800 mV amplitude) 601-525 digital video test signal (NTSC) from the serial digital generator to the Channel A BNC loop-through input of the first program monitor module to be tested (see Figure 4–9).

   Version 1.0 Software. Use a 60% Sweep (CRC off, 800 mV amplitude) 601-525 digital video test signal (NTSC) and connect as above.

4. Connect the Channel A BNC loop-through output of the program module in slot 1 to the Channel A BNC loop-through input of the program module in slot 2 as shown in Figure 4–9.
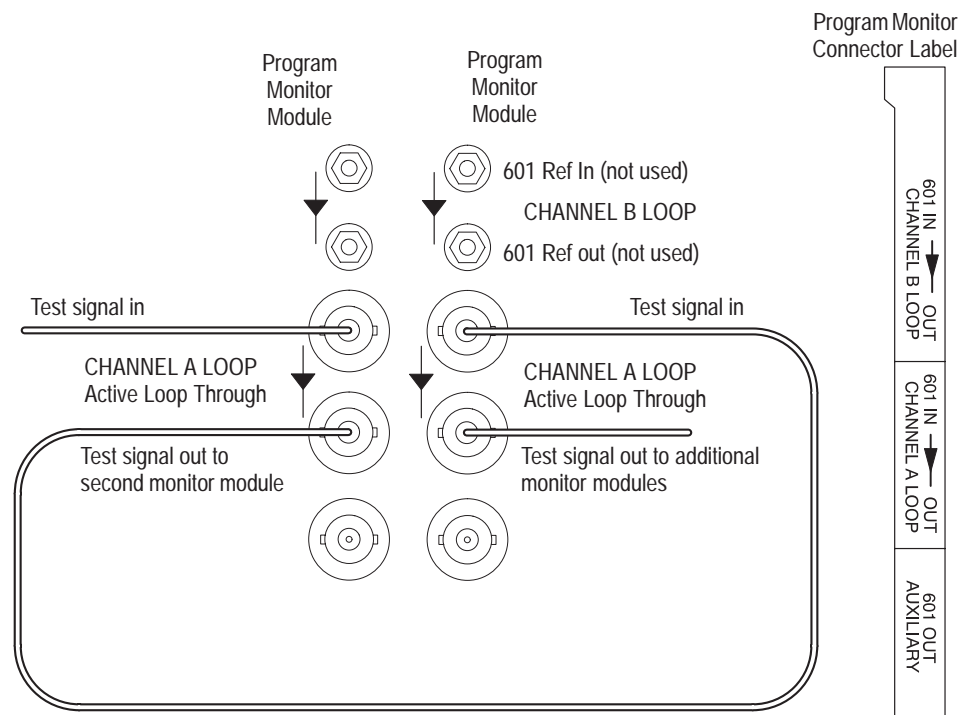
Figure 4–9: Program monitor serial digital video connections

If more than two program monitor modules are installed, to save testing time you can continue to hook up the loop-through signal to the next module in line until the signal is connected to all the modules. The program monitor has an active loop-through and does not need a termination on the last output BNC.

Alternately, you can choose to apply the test signal to one program monitor module at a time without using the loop-through output for a single module test.

5. Press the monitor power switch to apply power to the monitor, and press the On/Standby switch to power on the PQM300 program monitor.

   Whenever you power on the program monitor, it goes through the initialization and the power on diagnostics. If the diagnostics pass, the PQM300 application is loaded and starts without the need to enter a user name and password as normally required for a Windows NT operating system.

6. If the power on diagnostics fail or the PQM300 application fails to start, refer the problem to a qualified service person.

7. Select the Alarm View (click on View, select Alarm) if not already displayed.

8. Use the Configure Measures (click on Configure, select Measures) dialog box to enable all the measurements on all the installed program monitor modules. Set the measurement parameters as follows:

   a. Click on the radio button in front of the program monitor icon to show all the monitor board installed.

   b. Use the mouse cursor and click to select the board number you are testing. If all the boards are connected and have the signal applied, select all the boards (shift, select each one). If only one board has a signal connected, select it alone.
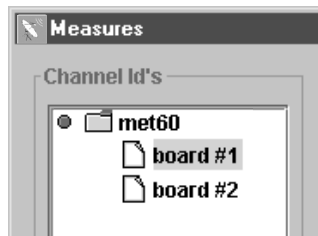
   c. Select MPEG Defects to set the parameters as follows:

   Enabled   true
   Output Type   Fixed

   Version 2.0 Software. Period value set   10.7
   Version 1.0 Software. Period value set   8

   The Alarm settings can remain at the default values.

Measures

MPEG Defects
freeze frame
noise

Enabled	true
Output Type	Fixed
Period (pixels:6.0-20.0)	8.0
Alarm Level (PDI:0.0-25.0)	2.0
Alarm Interval (fields:1-600)	2
Alarm Percent (0-100)	100.0

d. Click Apply to write the changes to the PQM300 program monitor. If you do not apply the changes before you select a new measurement, the setting for the first measurement are not made.

e. Select freeze frame and set Enabled to true.
Version 2.0 Software. Set Input Type to Digital.
Version 1.0 Software. No selection for Input Type.

f. Click Apply to write the change to the program monitor.

g. Select noise and set Enabled to true.

h. Click Apply to write the change to the program monitor.

i. Click OK to exit the Measures dialog box.

9. In the Alarm View, click on the program channel icon of the board number you are testing. The display switches to the Stack Chart Monitor View for that board.
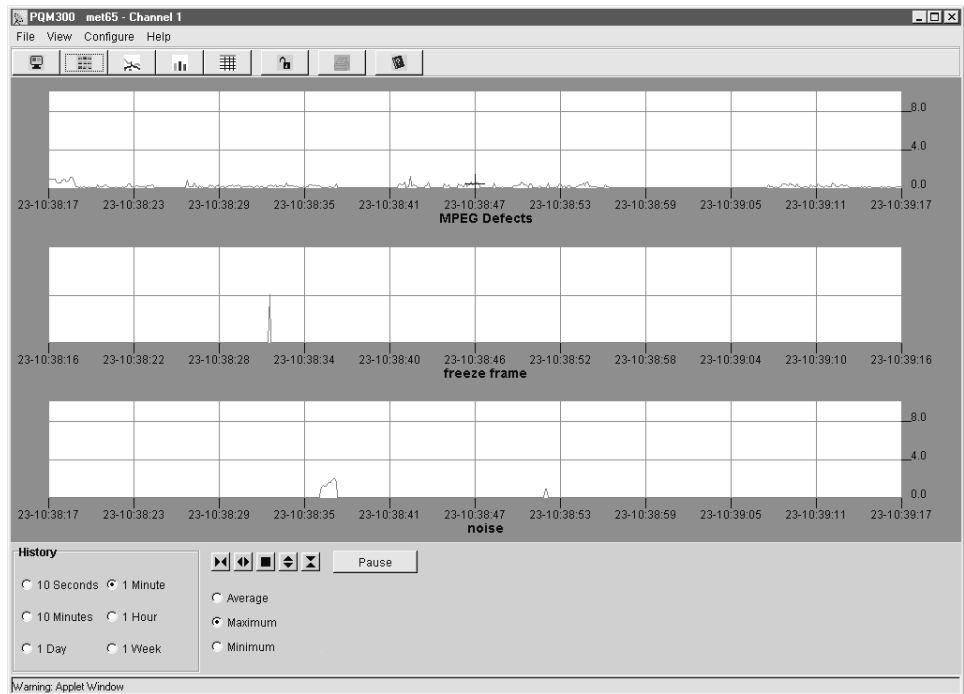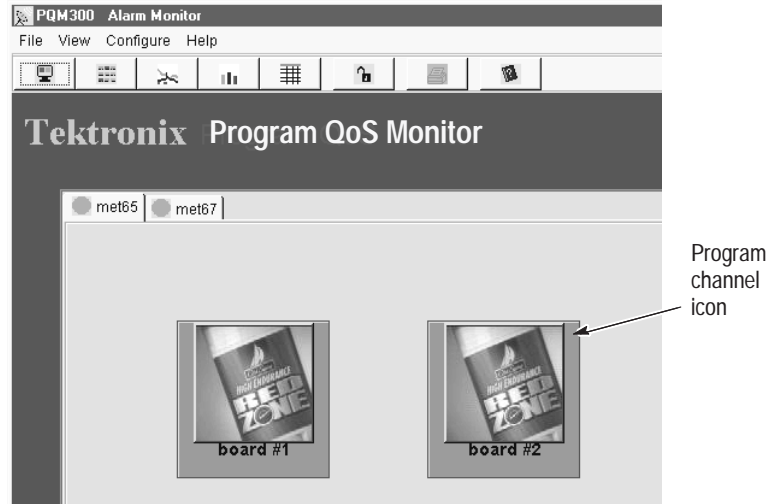
10. Select 10 seconds in the History selection box.
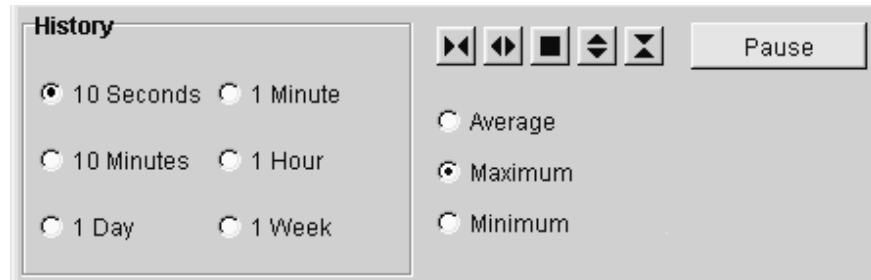
11. Check that a trace is being displayed in each of the three measurement graphs. The noise trace is at the bottom of the noise graph (zero), the freeze frame trace should be a heavy line across the middle of the freeze frame graph, and the MPEG Defect trace should be near the bottom of the graph.

12. Place the mouse cursor on the trace in the MPEG Defect graph box, and click on the measured results trace. Hold the mouse button (either one) down to display the measurement cursor.
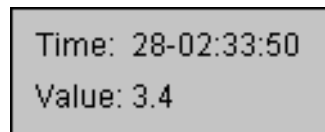
13. Check the cursor readout for value of 3.4 ± 1.0 for 525 (NTSC) input video with Version 2.0 software installed. This is the PDI value for the applied digital signal. For Version 1.0 software, the PDI value should be 4.5 ± 1.0.

14. Click the Alarm View button to return to the Alarm View display.

15. If you have looped the signal to all the channels, repeat step 9 through step 14 for the program monitor channel to be tested (two channels in the standard instrument, but there can be up to eight program monitor modules installed).

16. If you are testing the modules one at a time, move the test signal input to the next module to test and repeat the setup for the measurements given in step 8, and then repeat step 9 through step 14 for the next program monitor channel to be tested.

17. Use the Configure Measures dialog to disable (set to false) all the measurements being made on all the program monitor modules. A screen is displayed telling you that no measures are configured when all the measurements are turned off.

If you are testing one module at a time, there was no signal applied to the next board to test, and Enabled is already set to false on that board. In this case, just move the test signal to the next module to test.

You will also see an error message telling you that the video signal is absent when the signal is disconnected. Click OK to clear each of the error messages after you reconnect the signal.

NOTE. The PQM300 program monitor automatically recognizes the video standard that is applied when the measurements start, but it does not recognize a video standard change if made while the measurements are running.

18. Different signal types are needed for Version 2.0 and Version 1.0 software.

Version 2.0 Software. Change the signal generator to provide a Convergence (CRC off, 800 mV) 601-625 digital video test signal (PAL). Use the following steps to change the video standard on the TSG601 signal generator:

    a. Turn off the signal generator.

    b. Hold down the Lock Out button and press the ON button to display the diagnostic menu.

    c. Use the up and down arrow buttons to scroll through the list of selections available to item 7=Format Select.

    d. Use the left and right arrow buttons to select between 525 and 625.

    e. Press the Test Signals button at the top of the keypad to exit the diagnostic menu and return to normal operation of the TSG601 signal generator.

    f. If Convergence is not the selected signal, press the L button in the keypad to directly select it.

Version 1.0 Software. Change the signal generator to provide a 60% Line Sweep (CRC off, 800 mV) 601-625 digital video test signal (PAL). Use the following steps to change the video standard on the TSG601 signal generator:

    a. Turn off the signal generator.

    b. Hold down the Lock Out button and press the ON button to display the diagnostic menu.

    c. Use the up and down arrow buttons to scroll through the list of selections available to item 7=Format Select.

    d. Use the left and right arrow buttons to select between 525 and 625.

    e. Press the Test Signals button at the top of the keypad to exit the diagnostic menu and return to normal operation of the TSG601 signal generator.

f. If 60% Line Sweep is not the selected signal, press the J button in the keypad to directly select it.

19. In the PQM300 program monitor screen, use the Configure Measures dialog box to enable all the measurements as in step 8.

20. Repeat step 9 through step 14 for all the program monitor channels, and check for a PDI value of 2.2 $\pm$ 1.0 for 625 (PAL) input video with Version 2.0 software. Check for a PDI value of 5.1 $\pm$ 1.0 with Version 1.0 software.

21. If there are no composite decoder modules or an alarm relay board installed, this ends the functional verification testing. Continue with step 22. If there are composite decoder modules installed, continue with the *Composite Video Decoder Check* beginning on page 4–23. If there is an alarm relay board installed, go to *Alarm Relay Board Check* on page 4–30 for that procedure.

22. Press the On/Stby switch to start the shutdown of the PQM300 program monitor.

23. When the program monitor turns off, turn off the SVGA monitor and disconnect the test equipment.

Composite Video Decoder Check

The PQM300 program monitor can also have one or more Tektronix PQM3F01 Composite Video Decoder modules (up to four) installed for four composite video program monitor channels. Use the following procedure to check the operation of any installed composite video decoder modules. Note that this procedure is actually a check of the channel modules consisting of a composite decoder module and a program monitor module. If the channel does not provide the correct PDI value for the test input signal, you can use the previous serial digital video check to verify the operation of the program monitor module for the channel pair.

1. With the power off, connect an SVGA monitor for a display and a keyboard and mouse for user command inputs. You can connect the keyboard and mouse either to the rear panel connectors or to the left side connectors.

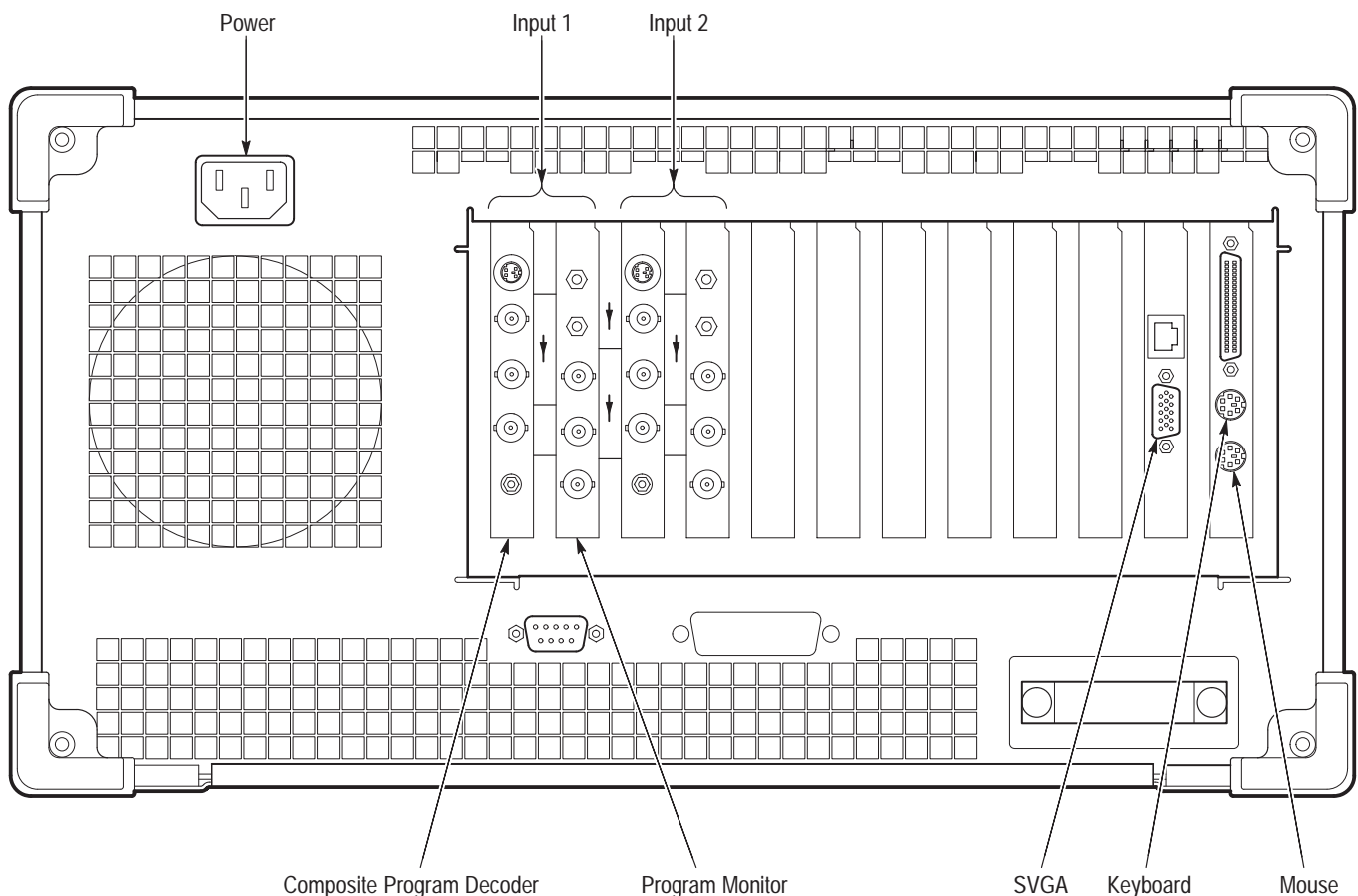**2.** Connect the SVGA monitor power cable to the ac power source.

3. Connect a multiburst PAL composite video test signal to the Composite In BNC loop-through input of the decoder module being tested as shown in Figure 4–10.

4. Terminate the Composite BNC loop-through output of the decoder being tested with a 75 Ω BNC termination.

5. Connect the 601 Program Out BNC connector to the Channel A Loop 601 Program In BNC connector of the Program Monitor Module of the channel pair as shown in Figure 4–10.
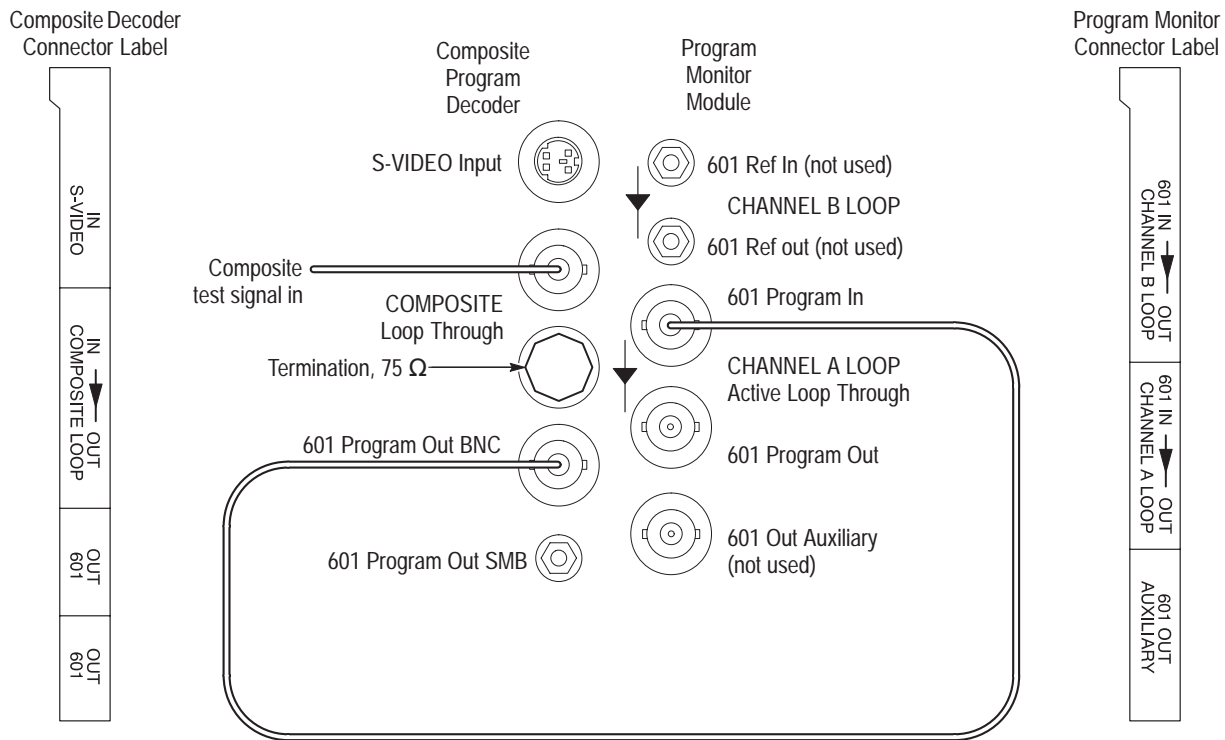
Figure 4–10: Program monitor connections for composite decoder/program monitor pairs

6. Press the monitor power switch to apply power to the monitor, and press the On/Standby switch to power on the PQM300 program monitor.

7. Wait for the initialization to complete and the PQM300 application to start.

8. Click on Configure in the top task bar and select Decoder. This displays the Decoder configuration dialog box.
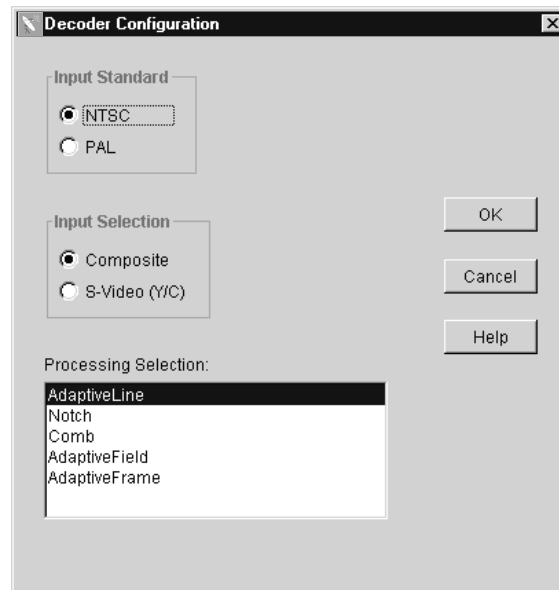
9. Set the Input Standard for PAL and set the Input Selection for Composite.

10. In the Processing window, select Comb filtering.

11. Click OK to apply the changes and exit the Decoder configuration box. The configuration changes apply to all the installed decoders.

NOTE. You will get error messages from any composite decoder modules that do not have a signal applied. Click on OK until all the messages are cleared. The decoder with a signal applied should not have error messages displayed.

12. Click on Configure again and select Measures.

13. Use the Configure Measures dialog box to enable all the measurements on the program monitor channel you are testing as follows:

a. In the Measures Configuration window, click on the radio button in front of the machine name icon to show all the installed program monitor channels. (The slots with composite video decoders installed do not show an installed module. Only the serial digital program monitor boards are displayed.)

b. Select the board number for the composite channel you are testing. (If you try to set up measurements on a board that does not have a signal applied, the measurements for that board will not be enabled.)
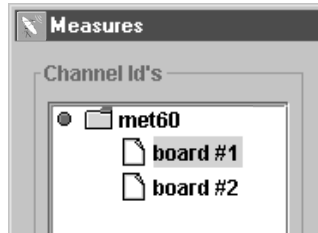
c. Select MPEG Defects to set the parameters as follows:

Enabled	true
Output Type	Fixed

Version 2.0 Software. Period value set   6.7
Version 1.0 Software. Period value set   8

The Alarm settings can remain at the default values.
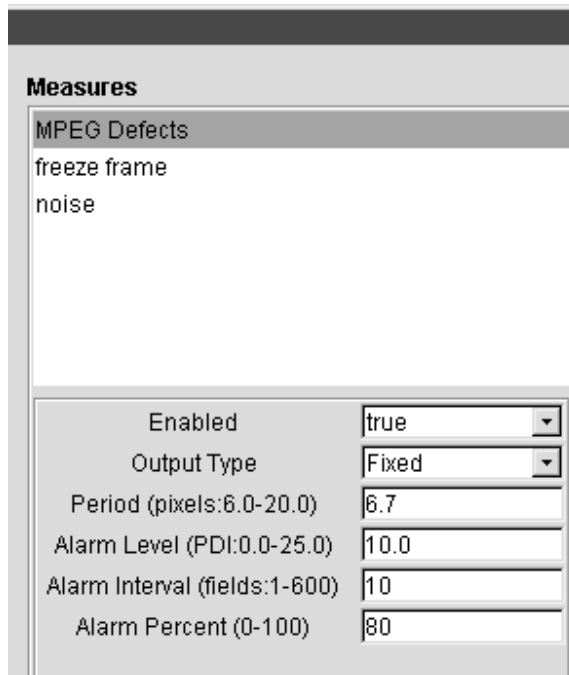
d. Click Apply to write the changes to the PQM300 program monitor. If you do not apply the changes before you select a new measurement, the setting for the first measurement are not made.

e. Select freeze frame and set Enabled to true.

f. Click Apply to write the change to the program monitor.

g. Select noise and set Enabled to true.

h. Click Apply to write the change to the program monitor.

i. Click OK to exit the Measures dialog box.

14. If the Alarm View is not displayed, switch to the Alarm View now.

15. In the Alarm View display, click on the program channel icon that you are testing. The Stack Chart Monitor view for that channel is displayed.
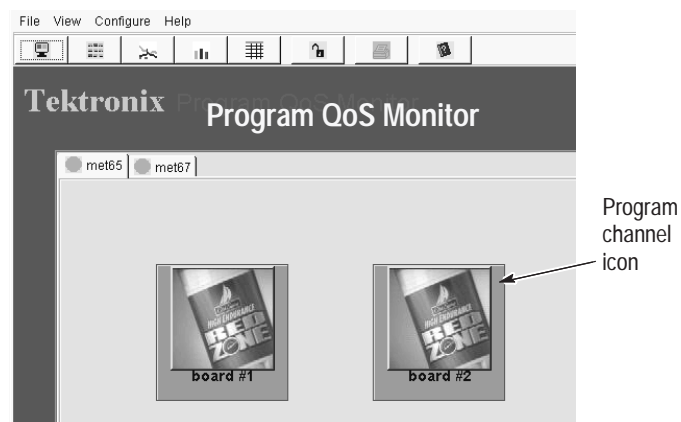
16. Select 10 seconds in the History selection box.
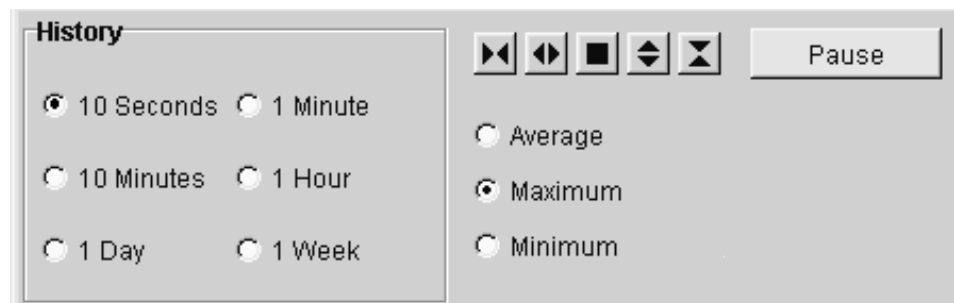
17. Check that a waveform is being updated in each of the three measurement graphs.

18. Check for a frozen frame indication (a solid red line across the middle of the freeze frame graph).

19. In the MPEG Defect chart, place the mouse cursor on the trace and click and hold down the mouse button. (If you want to stop the trace while you are making the check, click on the Pause button.)

20. Check the cursor readout for a PDI level of 3.0 ± 2.0 for 625 (PAL) input video with Version 2.0 software. Check for a PDI level of 7.7 ± 2.0 with Version 1.0 software.

21. Disconnect the signal applied to the first decoder and reconnect it to the second decoder to test. Move the 75 Ω termination to the loop-through output of the second decoder to test.

22. Click on the Configure task in the task bar and select Measures.

23. Enable the measurements and make the MPEG Defects parameters settings as in step 13.

24. Repeat step 15 through step 23 for the second composite decoder module. If more than two composite decoder modules are installed, move the test signal and repeat step 15 through step 23 for each one.

25. Click on Configuration and select Measures.

26. Use the Measures configuration dialog box to disable any measurements that are set to true.

27. Connect a multiburst NTSC composite video test signal to the Composite In BNC loop-through input of the decoder module being tested as shown in Figure 4–10.

28. Click on Configure in the top task bar and select Decoder.

29. Set the Input Standard for NTSC and set the Input Selection for Composite.

30. In the Processing window, select Comb filtering.

31. Click OK to apply the changes and exit the Decoder conFigure window. The configuration changes apply to all the installed decoders. You will get error messages from the decoders that do not have a signal connected. Click OK to clear each of the error messages.

32. Click on Configure again and select Measures.

33. Use the Measures Configuration window to enable all the measurements on the program channel (board#) that is being tested.

    Version 2.0 Software. Verify that the MPEG Defects Period is set for 6.7 and the Freeze Frame Input Type is set to Analog.

    Version 1.0 Software. Verify that the MPEG Defects Period is set for 8. There is no Freeze Frame Input Type selection.

34. In the Alarm view, click on the Program channel icon you are testing to bring up the Stack Chart Monitor view for that channel.

35. Check that a waveform is being updated in each of the three measurement graphs.

36. Check for frozen frame indication (the same video is being generated in each frame).

37. In the MPEG Defect chart, place the mouse cursor on the trace and click and hold down the mouse button. (If you want to stop the trace while you are making the check, click on the Pause button.)

38. Check the cursor readout for a PDI level of 2.0 ± 1.0 for 525 (NTSC) input video for Version 2.0 software. Check for a PDI level of 3.6 ± 1.0 for Version 1.0 software.

39. Disable the measurements on the channel being tested and disconnect the test signal from the decoder module and the program monitor module. Also disconnect the BNC termination.

40. Connect the test signal cables and termination to the next composite channel pair to test as in Figure 4–10 (shown on page 4–24).

41. Repeat step 32 through step 40 for each installed composite decoder module.

42. If the program monitor has an Alarm Relay board installed, go to that procedure (*Alarm Relay Board Check* on page 4–30) to check its operation. If there is no Alarm Relay board, continue with step 43.

43. This completes the functional verification of the PQM300 program monitor.

44. Press the On/Stby switch to start the shutdown of the PQM300 program monitor.

45. When the program monitor turns off, turn off the SVGA monitor and disconnect the test equipment.

Alarm Relay Board Check   Use the following procedure to verify the alarm relay board.

1. Click on **Configure** in the task bar to display the Configure menu selections.

2. Click on the **Relays...** menu selection to display the Relays configuration dialog box.

3. Check that the machine name of the program monitor with the relay board appears in the box labeled **PQM300 w/Relay to Config...**

4. Select the program monitor with an alarm relay board to configure from the choices in the **PQM300 w/Relay To Configure** box.

5. Click on the arrow in the **Alarms From PQM300** box to display the drop down list of all the connected program monitors. The machine name of the local program monitor should appear in the list.

6. Select the local program monitor to assign relay connections. The channel identifications of the selected program monitor are displayed in the **Slot** listings.

7. Click on the arrow in the **Relay Number** box next to the channel name or board number to select a relay from 1 to 16 for that channel. Repeat for all the available channels of the local program monitor.

8. Slide the adjustment bar on the **Relay Time Out** to set the amount of time (from 1 to 20 seconds) that the relays are to remain activated after an alarm state has passed.

    a. Slide the bar all the way to the left to deactivate the relays on the selected PQM300 program monitor. Then, alarms from that program monitor will not activate the relays.

    b. Slide the bar all the way to the right to latch the relays on an alarm. Latched alarms are cleared when the **Clear Alarms** button is clicked. The **Reset** button turns off (opens) the relays and is useful in the Latched relay mode to help catch transient alarms.

9. Click on Apply to activate the relay assignments.

10. Click on the **Relay Map** button to display the Relay Associations screen that displays relay assignments.
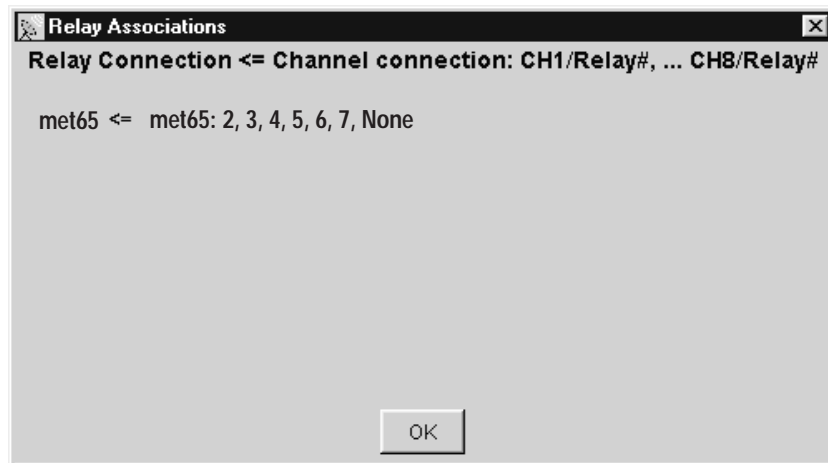
Figure 4–11: Relay board channel associations

The PQM300 program monitor with the relay board is listed first, followed by the machine name of a program monitor and relay assignments for the

boards in that program monitor. Eight slot assignment positions are shown even if there are only two board slots filled. Empty slots or unassigned slots will be labeled **None**. Click **OK** to exit the Relay Associations box.

11. This completes the functional verification of the PQM300 program monitor.

12. Press the On/Stby switch to start the shutdown of the PQM300 program monitor.

13. When the program monitor turns off, turn off the SVGA monitor and disconnect the test equipment.

Adjustment Procedures

Adjustment Procedures

This section provides the recommended field adjustments for the PQM300 Program QoS Monitor.

Equipment Required

Table 5–1 lists the test equipment needed to perform the adjustment procedure. The Table identifies examples and provides the minimum tolerances, where applicable. If equipment is substituted, it must meet or exceed the tolerances listed.

Table 5–1: Required equipment list

Test equipment	Characteristic	Example
Frequency counter with 1 MΩ test probe	Frequency 100 MHz, 10-digit readout, accuracy 0.1 ppm. (Referenced to WWV, GPS, or with a high accuracy time base.)	Hewlett-Packard Model 53131A
Screwdriver with T-15 Torx Tip		Standard tool
Adjustment tool	Plastic handle, small metallic bit. Less than three inches overall.	Tektronix part number 003-1433-01
Digital Voltmeter	DC 1 V to 20 V, accuracy ± 0.5%	Tektronix DM2510 Program-mable Multimeter
PCI circuit board extender	5V, 32-bit PCI bus extender card	Kaitek Engineering Model 34-06-TP Tektronix part number 018-0226-00

Program Monitor 27 MHz Oscillator Frequency Adjustment

Use the following procedure to adjust the oscillator frequency of the PQM300 program monitor modules.

NOTE. It is not necessary to do this adjustment, and it should not be attempted, if the oscillator frequency is within specification when checked in the performance verification procedure.

If the oscillator is not working or cannot be adjusted, refer to the *Maintenance* section on page 6–22 for program monitor module replacement instructions.

Test Equipment Setup

1. Set up the test equipment.

Table 5–2: Frequency counter setup

Feature	Mode	Status
Measure	Freq	
Limits	Run	
Channel 1		
	Trigger Sensitivity	OFF
Input impedance	50 Ω/1 M	1 MΩ
Input coupling	DC/AC	AC
Attenuation	x10 Atten	OFF
Filter	10 kHz Filter	OFF

2. Be sure that you wear a static grounding wrist strap.

3. Turn off power to the PQM300 program monitor.

4. Remove the program monitor cabinet. Refer to the *Removing the PQM300 Cabinet* on page 6–18 for the procedure.

5. Remove the program monitor module that you are going to adjust. Refer to *Removing a PQM300 Plug-In Module* on page 6–22 for the removal procedure.

6. Insert the PCI circuit board extender into the PCI module slot for the module you removed.

7. Insert the program monitor module in the PCI extender board connector.

8. Turn the power to the program monitor back on and wait for the initialization process to complete. It is not necessary to log in or start the PQM300 application.

NOTE. This adjustment is temperature sensitive. The program monitor should be allowed to warm up for 20 minutes before attempting to make the final adjustment to the limits given in step 12. This centers the operating range of the oscillator so that it will remain in specification with aging and temperature variations.

9. Connect a 1 MΩ probe to the frequency counter Channel 1 input connector.

10. Connect the probe ground lead to chassis ground of the program monitor.

11. Carefully touch the probe tip to the oscillator 27 MHz Clk test point of the program monitor module. See Figure 5–1 for the test point location.
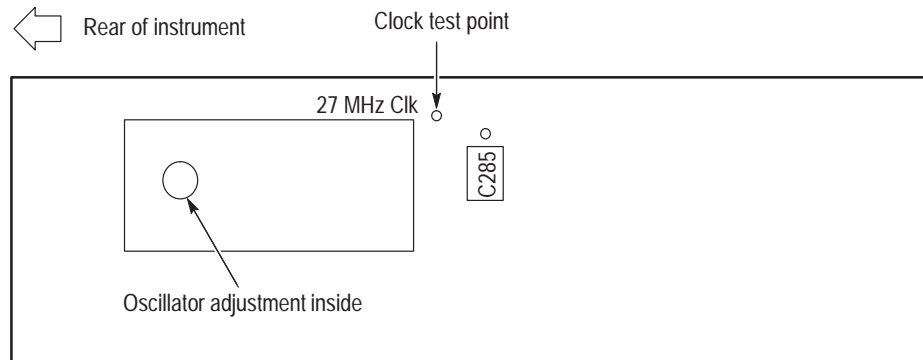
Figure 5–1: 27 MHz clock test point for frequency adjustment

⚠️ *CAUTION. When inserting the metal bit of the adjustment tool in the oscillator adjustment access hole, do not let it slip off the oscillator adjustment. The metal tip can possibly short the +5 V to ground and cause an inductor on the reverse side of the board to open.*

12. Adjust the frequency counter for a reading of 27 MHz $\pm$ 5 Hz (26,999.995 to 27,000,005 Hz).

NOTE. The oscillator frequency specification is $\pm$ 27 Hz, but you must adjust the frequency to $\pm$ 5 Hz or less to allow for temperature variations while operating.

13. Turn off power to the program monitor.

14. Remove the program monitor module from the PCI extender board.

15. Remove the extender board from the board connector.

16. Reinsert the program monitor module in the card cage slot.

17. Align the module connector with the card cage connector and press down firmly to seat the module.

18. Reinstall the module hold-down screws in the top and bottom of the module rear bracket.

19. Repeat step 5 through step 18 for each installed program monitor module.

20. If there are composite decoder modules installed in the PQM300 program monitor, perform the adjustment procedure for those modules. If there are no composite decoder modules, continue with step 21.

21. Reinstall the program monitor cabinet. Refer to *Replacing the PQM300 Cabinet* on page 6–20 for that procedure.

This completes the adjustment procedure for the program monitor modules.

Composite Decoder Board Adjustments

The hardware of the composite decoder module supports a field calibration procedure. The adjustments of the Luma and Chroma gain have built in indicators for showing the accuracy of the adjustments.

Adjust Luma Gain

1. Set the Mode switch to position 1 (see Figure 5–2).
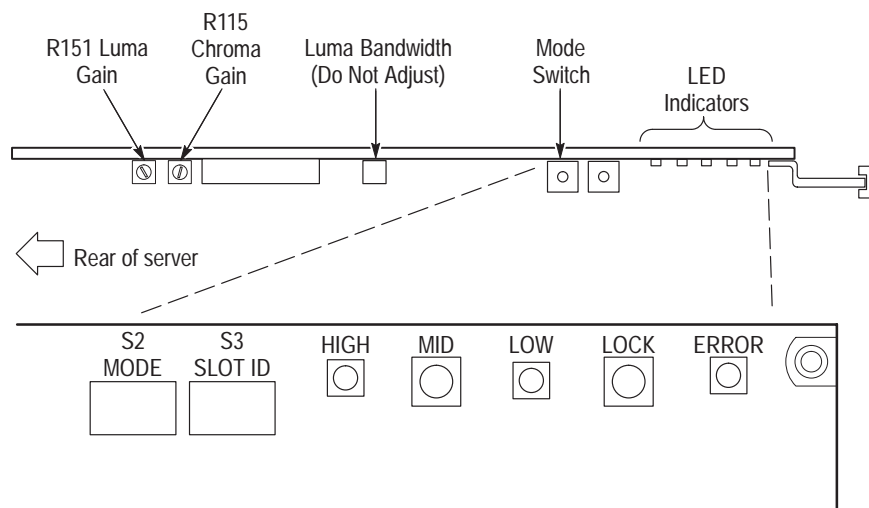
Figure 5–2: Decoder board LED indicator locations

2. Adjust R151 Luma Gain (see Figure 5–3) until the MID (green) LED indicator is on and the LOW and HIGH LED indicators are either equal or off. The Luma Gain adjustment is about one third of the way down from the top of the board.
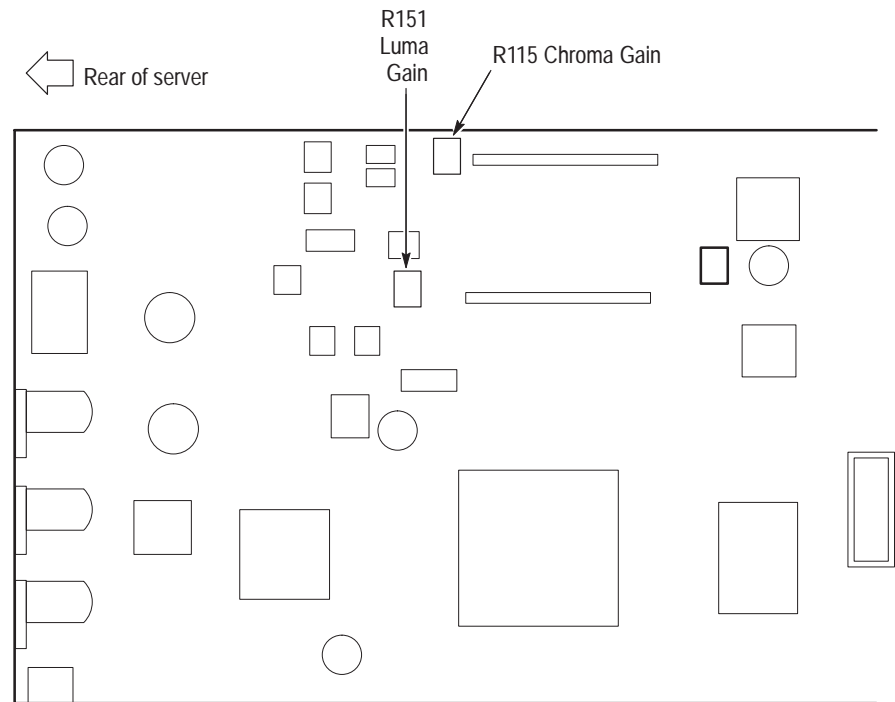
Figure 5–3: Decoder board adjustment locations

Adjust Chroma Gain

1. Set Mode switch to position 2.

2. Adjust R115 Chroma Gain until the MID (green) LED indicator is on and the LOW and HIGH LED (red) indicators are equal or off. The Chroma Gain adjustment is at the top of the board.

3. Set Mode switch to 0 (normal run mode).

4. Check the blanking adjustment on the HIGH and LOW LED indicators. Both red LED indicators should be off but it is normal for them to blink occasionally as the blanking level is adjusted.

5. Disconnect all test equipment.

6. Reinstall the program monitor cabinet. Refer to *Replacing the PQM300 Cabinet* on page 6–20 for that procedure.

This completes the field adjustments for the program monitor.

Run the Decoder Diagnostic

1. Run the decoder diagnostic routine. See *Run Decoder Diagnostics* beginning on page 4–8 in the *Performance Verification* section of this manual for the instructions on running the decoder diagnostics program.

2. Verify that all diagnostics pass. If they do not, refer your instrument to a qualified service person for repairs.

Flat Panel Touch Screen Calibration

If the program monitor has the optional flat panel installed, use the following steps to calibrate the touch screen.

1. From **Start** menu, select **Programs**–>**Touch**–>**TouchScreen Control**.

2. In the Touch Screen Control Program screen, click the **Calibrate** button.

3. Follow the on-screen instruction to calibrate the touch screen. Use one of the styluses provided with this kit to touch the screen at the calibration points.

4. Click on the **OK** box using the mouse.

5. Select **Exit** to leave the Touch Screen Control Program**.**

Maintenance

Maintenance

This section provides the service information for the PQM300 Program QoS Monitor. Information about the following topics is provided: Handling Static-Sensitive Components, Cleaning and Inspection, Removal and Replacement Instructions, Server Diagnostics, and Troubleshooting.

Preparation

These maintenance instructions are for qualified technicians. Be sure to read the Safety Summaries at the front of the manual before beginning service.

Prior to removing the covers from the server, read *Handling Static-Sensitive Components*.

Handling Static-Sensitive Components

This instrument contains electrical components that are susceptible to damage from static discharge. Static voltages from 1 kV to 30 kV are common in unprotected environments. Table 6–1 shows the relative static discharge susceptibility of various semiconductor classes.

Table 6–1: Static susceptibility

Semiconductor class	Voltage
ECL	200 V - 500 V
Shottky Signal Diodes	250 V
Shottky TTL	500 V
HF Bipolar Transistors	400 V - 600 V
JFETs	600 V - 800 V
Linear Microcircuits	400 V - 1000 V
Low Power Schottky TTL	900 V
TTL	1200 V

Observe the following precautions to avoid damaging static-sensitive devices:

1. Minimize handling of static-sensitive components.

2. Transport and store static-sensitive components or assemblies in their original containers, on a metal rail, or on conductive foam. Label any package that contains static-sensitive components or assemblies.

3. Discharge the static voltage from your body by wearing a wrist grounding strap when handling static-sensitive components. Service assemblies containing static-sensitive components at static-free work stations.

4. Remove any device capable of generating or holding a static charge from the work station surface.

5. Whenever possible keep the component leads shorted together.

6. Pick up components by the body, never by the leads.

7. Do not slide components over any surface.

8. Avoid handling components in areas where the floor or work surface covering is capable of generating a static charge.

9. Use a soldering iron that is connected to earth ground.

10. Use only special antistatic suction or wick-type desoldering tools.

Preventive Maintenance

Once a year the electrical performance should be checked and the instrument accuracy certified (calibrated).

Preventive maintenance mainly consists of periodic cleaning. Periodic cleaning reduces instrument breakdown and increases reliability. Clean the instrument as needed, based on the operating environment.

Clean the entire program monitor often enough to prevent dust and dirt from accumulating. Dirt can act as a thermal insulating blanket that prevents effective heat dissipation. In addition, dust buildup can provide high-resistance electrical leakage paths between conductors or components in a humid environment.

Exterior instrument   Clean the exterior surfaces of the instrument with a dry, lint-free cloth or a soft-bristle brush. If dirt remains, use a cloth or swab dampened with a 75% isopropyl alcohol solution. A swab is useful for cleaning in narrow spaces around the controls and connectors. Do not use abrasive compounds on any part of the instrument.

⚠ **CAUTION.** *Avoid getting moisture inside the instrument during external cleaning; and use only enough solution to dampen the cloth or swab.*

Do not wash the front-panel On/Standby switch. Cover the switch while washing the instrument.

Use only deionized water when cleaning. Use a 75% isopropyl alcohol solution as a cleanser and rinse with deionized water.

Do not use chemical cleaning agents; they may damage the instrument. Avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

Compact Disc Drive The compact disc (CD) drive requires routine maintenance to operate at maximum efficiency. Compact discs can be damaged if dirt and dust accumulate on the surface. To prevent damage, a CD should be properly stored in its protective container when not in use.

⚠ **CAUTION.** *Electrostatic discharge (ESD) can damage components in the CD ROM drive. Do not touch either the lens or the exposed metallic parts on the platter.*

Clean the face of the CD drive monthly with a dampened cloth.

⚠ **CAUTION.** *Do not allow moisture to enter the disk drive. When power is applied, the internal components may be damaged.*

Keyboard The optional keyboard may require occasional cleaning to remove lint or oil buildup. Use the following procedure to clean the keyboard.

1. If the product is operating, stop any running applications and shut down the operating system.

2. Unplug the keyboard from the mainframe.

3. Clean all lint and loose debris from the keyboard with either clean, dry, low velocity air or with a clean, soft brush.

4. Clean the external surfaces with a soft cloth dampened with a solution of mild detergent and water. Do not allow solution to run into the keyboard.

⚠ *CAUTION. If liquids such as coffee or soft drinks have gotten into the keyboard, intermittent operation can occur. If this has happened, consider replacing the keyboard.*

5. Reconnect the keyboard to the either keyboard connector (on the left side of the mainframe or to the rear panel I/O board) as needed for your application.

Mouse   Occasional cleaning of a mouse interior is necessary to remove accumulated lint, which hampers smooth ball movement. Use the following procedure to clean the inside of the ball cavity. If the mouse is damaged, replace it.

1. Unplug the mouse from the mainframe.

2. Turn over the mouse and loosen the ball retaining ring by inserting your fingers into the slots and turn in the direction indicated by the arrows (counterclockwise) approximately 45 degrees.

3. Turn the mouse right side up, cupping the bottom of the mouse in your hand, and gently tap until the retaining ring and ball drop into your hand.

4. Clean all lint and loose debris from the ball cavity with either clean, dry, low velocity air or with a clean, soft brush. Next, clean any remaining foreign material from the ball cavity with a soft, clean cloth. Do not use hydrocarbon or chemical-based cleaning solutions inside the ball cavity.

5. Replace the mouse ball and retaining ring. Rotate the retaining ring clockwise (opposite direction to the arrows) until the ring locks into place.

6. Reconnect the mouse to the mouse connector on the left side of the mainframe.

⚠ *WARNING. To avoid any potential of electrical shock, disconnect power before removing the cabinet.*

Interior   Examine the interior of the mainframe for dust build up. If the interior needs cleaning, use low-velocity, dry air to blow away dust or lint. If air alone does not remove all of the dust and lint, use a soft brush to complete the task. Exercise extreme care not to disturb components on the plug-in circuit boards during cleaning.

⚠ **CAUTION.** *This instrument contains static sensitive devices that can be damaged by static discharge. Wear a wrist grounding strap when working on or with modules inside the mainframe cabinet.*

In Case of Problems

This section addresses problems that you may encounter while using the program monitor. This section does not identify specific problems relating to performance verification or adjustments. For information on performance verification procedures or adjustment procedures, refer to those sections of this manual.

Diagnostics

Diagnostics are accessible through the communications port. If the PQM300 program monitor is being serviced outside its system installation, connect an external SVGA monitor, a keyboard, and a mouse to control the program monitor. The following diagnostic tools are available with your program monitor:

■ Power-on diagnostics. These diagnostics run when you first power on the instrument or when you first start the measurement set application. If any diagnostic failures occur during power on, the failure is reported through the communications interface and, if an SVGA monitor is connected, to the monitor screen.

■ Extended diagnostics. These diagnostics test the instrument more thoroughly than the power on diagnostics. You can use the extended diagnostics to isolate problems down to an individual module. The extended diagnostics test routines are provided in the support directory.

Use the diagnostics to isolate problems to software or hardware within the instrument. For additional help on the diagnostics, contact your local Tektronix representative.

Software Problems

Your PQM300 Program QoS Monitor comes with software already installed. For any suspected software problems, try to isolate the problem to the measurement set application software or to other installed software.

Before running any of the diagnostics, you should check the online release notes to verify the instrument software matches the module firmware.

Run the QAPlus diagnostics software to identify hardware or software problems. Follow the QAPlus online help instructions for running the diagnostics software. The diagnostics are located in the Start menu under Programs/ QAPlus_Win-Win.

Many software problems can be due to corrupted or missing software files. In most cases the easiest way to solve software problems is to reinstall the software and follow the on-screen instructions. Refer to *Reinstalling the PQM300 Program QoS Monitor Software* on page A–4 for instructions on reinstalling software.

Refer to Table 6–2 for a list of software and hardware troubleshooting information and recommended action.

If you suspect problems with the software, contact your local Tektronix representative or refer to *Contacting Tektronix* on page xix.

Hardware Problems

Hardware problems can have several causes. The first step to identifying a problem is to review the installation instructions in this manual to verify that you have properly installed the instrument.

If you are certain that you have installed the instrument correctly, run the module diagnostics (testdsp and mmcodecs located in the support directory) to identify any problems with the individual modules.

Table 6–2 lists some of the symptoms of hardware problems and possible solutions.

Table 6–2: Troubleshooting

Symptom	Possible causes and recommended action
Instrument does not power on	Verify that all power cords are connected to the instrument and to the power source.
	Check that the instrument receives power when you press the On/Standby switch; check that fans start and that front-panel indicators light.
	Check that power is available at the power source.
	Instrument failure; contact your local Tektronix service center.
Instrument powers on but does not complete the power-on sequence	Check for CD in CD-ROM drive; make sure instrument boots from the hard disk drive.
	Possible software failure or corrupted hard disk; refer to *Software Problems* on page 6–5.
Power-on diagnostics fail	Isolate problem to faulty mainframe module or to faulty program monitor module. Contact your local Tektronix service center.
Instrument does not recognize accessories such as mouse or keyboard	Check that accessories are properly connected or installed. Try connecting other standard PC accessories or contact your local Tektronix service center.
Windows NT comes up but the program monitor application does not	Instrument not set up to start program monitor application at power on. Start application from the desktop, by double clicking on the PQM300 icon.
	Faulty or corrupt software; reinstall the program monitor application software.
Instrument will not power off with On/Standby switch	The Windows NT operating system may have a problem. Try powering off the instrument using the Windows NT shutdown procedure. If the instrument still does not power off, disconnect the power cord; reconnect it after 10 seconds to reboot the instrument.

Troubleshooting

To troubleshoot the program monitor, try to run the application. If the application runs, you can test the PQM300 program monitor. If the application does not run, either the application software or one of the program monitor modules may have failed. Instructions for *Software Repair* are located in *Appendix B*. Also, refer to *Fault Isolation* on page 6–7 for some suggestions on isolating the fault to a specific area or module.

Before attempting to repair the program monitor, read the *Fault Isolation* information.

Fault Isolation   Use the following fault isolation suggestions to determine the area or module causing a problem.

First Steps.

- Examine the program monitor for non-standard hardware or modules. The addition of modules not part of the program monitor system can lead to compatibility problems.

- Check the system for non-standard software installed on the server. The PQM300 system is not a general purpose computer, and some software can interfere with the operation of the PQM300 operating system firmware.

- Look for failure and error messages. Refer to *Decoder Board Error Messages* on page 6–15 for a description of the error messages and possible action to take to correct the problem. The usual problem is no signal or an incorrect signal.

- Is the system partially operational? Check the portions of the server that are apparently not operating correctly. Run simpler test. For example, check with digital signal only to check the operation of the program monitor modules. Check the program monitor modules and composite decoder modules singly and as a unit to isolate the problem to a module.

- Run the decoder module diagnostics to check for correct or incorrect test results.

- Check the module LED indicators for error codes or correct operation.

Second Level.

- If the system fails to boot up, remove the PQM300 program monitor modules to isolate the problem to either the mainframe or the PQM300 modules. Troubleshoot this problem by removing the mainframe cabinet to check the LED displays on the program monitor and any installed composite decoder boards. If one or the other of the program monitor modules does not

have the LED displays working normally, suspect the module that does not have a correct LED display. Refer to the Program Monitor LED Codes on page 6–13 for a description of the LED boot up error codes and normal operation. If the boot up occurs normally with the suspect PQM300 module removed, you will have to replace the defective program monitor module.

■ If the problem persists, remove the composite decoder modules. Make tests with the program monitor modules only to determine if they are functioning correctly.

■ Run a test with either of the program monitor modules installed. If you have a source of 601 video, supply the program monitor module with a signal and check the active feedthrough and the 601 auxiliary out for correct digital signals.

PQM300 Program Monitor Module Diagnostics

ThePQM300 program monitor diagnostics consist of the boot up tests that are done at power on. If the system boots up and the application runs, the majority of the program monitor module hardware is functional. An area of the circuitry that is not tested by the boot up tests is the PCI DMA operation. That area of operation can be tested using the DMA tests that are included in the testdsp test suite. The diagnostic tests are described in Table 6–3.

DMA Test Description

The tests provided in the testdsp program include various DMA tests. The main objective of these DMA tests is to check the operation of the PCI hardware/software subsystem on the program monitor DSP board. The failure of one or more of these tests may indicate potential problems with PCI subsystem.

During a DMA read, data is transferred from the program monitor module memory to mainframe memory. For a DMA write, date is transferred from the mainframe memory to the program monitor module memory. The following tests are used to verify the DMA (direct memory access) circuitry. The test name is followed by the test number in the testdsp test suite.

Table 6–3: DMA Tests in the testdsp test suite

Test name	Required input	Description	Failure indication
DMA write (test #8)	None	This test writes a single field (field 1) of random numbers to DSP memory using DMA. No checking for the validity of the transferred data is done. It is only looking for a successful DMA write.	Any failure resulting from this test indicates a potential DMA write failure.
DMA write (test #31	None	Same as test #8. Only difference is that it writes field 2.	

Table 6–3: DMA Tests in the testdsp test suite (Cont.)

Test name	Required input	Description	Failure indication
DMA read (test #7)	None	This test writes two fields (field 1 & 2) to DSP memory with known data. The fields are initialized with incremental 16 bit data. In other words, it puts 0 in first pixel, 1 in the next, and so on until the 64K value (16 bit) is reached. This process is repeated until the entire filed is initialized. After a successful DMA write, it reads back the data from DSP memory using DMA read. The validity of the data is checked by comparing both data sets. The comparison should result in zero difference if no errors occurred. This test writes two fields (field 1 & 2) to DSP memory with known data. The fields are initialized with incremental 16 bit data. In other words, it put 0 in first pixel, 1 in next and so on till 64K value (16 bit) is reached. This process is repeated until the entire filed is initialized. After successful DMA write, it reads back the data from DSP memory using DMA read. The validity of the data is checked by comparing both data sets. The comparison should result in zero difference if no errors occurred.	Any failure resulting from this test indicates a potential DMA read or write failure. This may also indicate potential DSP memory failure but it may be unlikely since complete memory test is also done as a part of the DSP boot ROM diagnostics during power up.
DMA performance (test #29)	None	This test writes 30 frames (field 1 & 2) to DSP memory with random data by varying DMA block size from 128K down to 2K. It reads back the data from DSP memory using DMA read. No checking for the validity of the transferred data is done. It is only looking for a successful DMA read/write for various block sizes.	Any failure resulting from this test indicates a potential DMA read or write failure.
DMA test using 601 Capture (test #35)	Any 601 digital video input	This test captures two 601 frames. The captured data is read using a DMA read, and than sent back to DSP memory with a DMA write. After the DMA round trip, the data is played on 601 output.	Any failure resulting from this test indicates a potential DMA read or write failure. Also visual inspection of 601 output data may help detect possible PCI FIFO type problems (vertical stripes or garbage data).

Testdsp Commands   The tests provided by the testdsp command are used for testing the program monitor modules in manufacturing. The testdsp program remains in the PQM300/bin/support directory for use in testing the DMA circuitry that is not tested by the boot up diagnostics. The tests are run from a DOS window by typing the following command:

```
testdsp <options> <test> ...
```

where `<test>` may be the word `all`, `working`, or one or more of the test numbers from Table 6–4. The list of test options is given in Table 6–5.

The command `testDsp working` is equivalent to the following command:

`testDsp 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 18 20 21 22 23 26 29 30 31 32 35 36 47 48 49`

Running the DMA Tests. The DMA tests defined in Table 6–3 are run by using the testdsp command with the appropriate test number or set of numbers. For example, to run the DMA performance test, use the following command:

`testdsp 29`

This runs test 29 on the board 0 program monitor module. To run the same test on a selected board, use the same command with a board argument as follows:

`testdsp -bd 1 29`

Table 6–4: Testdsp test suite

Test number	Test purpose	Test number	Test purpose
1	basic connectivity	31	DMA write (field 2)
2	request flood	32	acquire many, any target
3	single no op	33	acquire many, specific target
4	create sequence	34	acquire, specific target
5	acquire, no target Pattern A	35	capture-play
6	acquire, any target Pattern A	36	capture-play, any target
7	DMA read	37	capture, specific target
8	DMA write	38	loop through
9	dual-port read	39	loop through, any target
10	dual-port write	40	loop through, specific target
11	DMA write (too large)	41	field 1 target, any
12	dual-port performance	42	field 1 target, specific
13	acquire many frames	43	acquire overflow
14	shift detect	44	get info
15	level/gain/crop detect	45	early cancel acquire
16	jnd precompute mem error	46	bad sequence release
17	jnd mem error	47	jnd chroma maps
18	jnd precompute	48	shift detect Pattern B
19	jnd luma	49	level/gain/crop detect pattern B
20	shift correct	50	acquire, any target Pattern B
21	dual-port lockup	51	acquire, specific target Pattern B

Table 6–4: Testdsp test suite (Cont.)

Test number	Test purpose	Test number	Test purpose
22	shift: shift/detect/correct/detect Pattern A	52	shift: shift/detect/correct/detect Pattern B
23	LG: correct/detect/correct/detect Pattern A	53	LG : correct/detect/correct/detect Pattern B
24	playback	54	calibrate port
25	jnd composite	55	encode stripe
26	jnd luma maps	56	decode stripe
27	jnd composite maps	57	capture 1 frame
28	dual-port ^C death	58	unexpected dma write
29	DMA performance	59	unexpected dma read
30	invalid request length		

Table 6–5: Testdsp options

Option	Purpose
-v	produce verbose diagnostics
-i	turn on the interactive mode
-f	flush the request queue (risky)
-bd #	specifies the board number to use (default is 0)
-cpu #	specifies the cpu number to use (use 0 or 1, default is 0)
-async	wait for replies and events with a separate thread
-dsig	use direct signaling through dual-port ram instead of the driver
-reset	reset the processor on startup
-busy	use a busy wait when sleeping instead of the driver
-ntsc	assume ntsc input and output (default)
-pal	assume pal input and output
-target #	specifies target id number for capture tests labeled as a "specific target." The number may be specified as decimal or hex (default is 512)
-port #	specifies input port; A or B (default is A)
-sleep	use the driver to sleep (opposite of -busy). This is the default.
-kick	signal the dsp (through dual-port ram) before sleeping on the request queue
-modulo #	specify the modulo used in createSequence and acquire requests (default is 8)
-load	saturate the cpu while tests are in progress

**Program Monitor Module
Troubleshooting Checks**

If the boot-up diagnostics do not pass because of a possible program monitor module failure, the PQM300 program monitor usually will not complete the power-on initialization. Use the following checks to isolate the problem to a program monitor. module.

1. Wear a static grounding wrist strap and use appropriate static protection procedures when working inside the server.

2. Turn off the power to the server and disconnect the power cord.

3. Remove the cabinet to gain access to the program monitor modules (refer to *Removing the PQM300 Cabinet* on page 6–18).

4. Reconnect the power cord and, while watching the LED indicators located along the top edge at the front of the modules, turn the server power on.

5. Check that the eight LED indicators on the program monitor modules (see Figure 6–1) come on and begin a step pattern as the boot up progresses. The Boot ROM codes are shown in Table 6–6
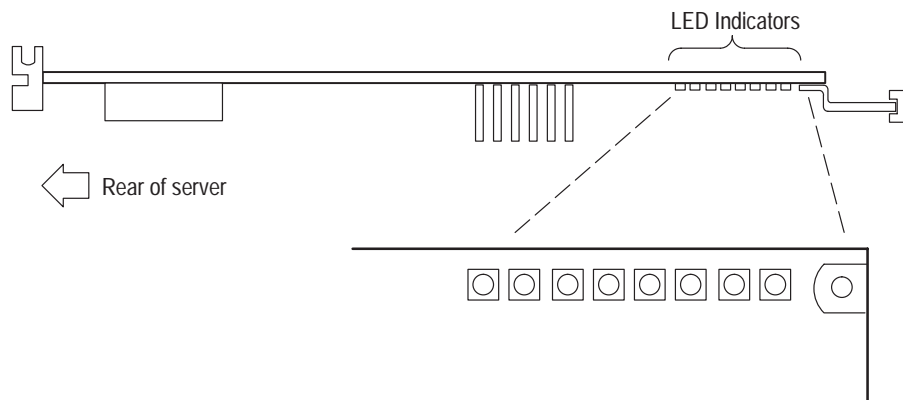
Figure 6–1: LED indicators on the DSP modules

6. Check that at the LED indicators the program monitor modules begin a fast back and forth flash pattern at the end of boot up.

7. If the LED indicators on any installed program monitor modules stop flashing with one or more LED on but not moving, suspect a problem with that module or corrupted application software.

8. Shut down the program monitor. Use control-alt-delete to get the task list server and ask for a shutdown rather than a task termination.

9. Remove the suspect program monitor module. Refer to *Removing a PQM300 Plug-in Module* on page 6–22 for that procedure.

10. Power the server back on and check to see that the server completes the power on initialization correctly. A good program monitor module will show the correct LED indications when it boots up correctly.

11. Test the program monitor modules by applying a digital signal and viewing the active loop through out and 601 auxiliary out serial digital signal to verify that the program monitor module is functional.

Program Monitor Module LED Codes

During Boot up and subsequently to Boot up, the program monitor LED indicators display code patterns. A number of the codes occur as the normal boot up process. Others provide indication of a failure of the normal boot up process. The error codes repeatedly flash with a specific code when a Boot ROM diagnostic fails. The Boot ROM must be functional for these diagnostics to occur. If the module is completely inoperable, the Boot up diagnostic can not run.

To aid in diagnostics of a hardware problem, each test loop continues until it succeeds. Table 6–6 provides a description of the codes that are displayed. Black signifies off; white is on.

Table 6–6: Program Monitor LED codes
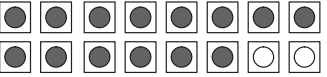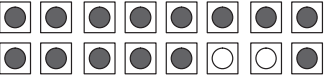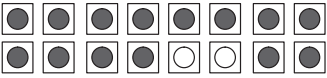
LED Indication	LED code meanings	Description
■ ■ ■ ■ □ □ □ □	Master C80 processor is alive	The right four LED are lit to show that the master C80 processor is alive. If this fails to occur, either the master C80, the Boot ROM, or the bus connecting the parts are suspect.
□ □ □ □ ■ ■ ■ ■	Slave C80 processor is alive	The left four LED are lit to show that the slave C80 DSP processor is alive. If this fails to occur, either the master failed in trying to pass off control to the slave, or the slave C80 DSP or the bus to the C80 DSP is suspect.
■ ■ ■ ■ ■ ■ ■ ■ / ■ ■ ■ ■ ■ ■ □ □	Data bus failure	A flashing pattern of the rightmost two LED (0X03) indicates a likely data bus failure.
■ ■ ■ ■ ■ ■ ■ ■ / ■ ■ ■ ■ ■ □ □ ■	Address bus failure	A flashing pattern of the two LED next to rightmost LED (0x06) indicates a likely address bus failure. The failure pattern is followed by four other flashes that can be used to identify the first address that failed.
■ ■ ■ ■ ■ ■ ■ ■ / ■ ■ ■ ■ □ □ ■ ■	Boot ROM checksum failure	A flashing pattern of 0X0C indicates a failure in the Boot ROM checksum. Suspect a bad Boot ROM.

Table 6–6: Program Monitor LED codes (Cont.)

LED Indication	LED code meanings	Description
	Bypass Port failure	A flashing pattern of 0X55 indicates the Boot ROM is unable to access either the Dual Port RAM interrupts or the PLX-9060 via the Bypass port.
	Dual Port memory failure	A flashing pattern of 0X18 indicates a failure of the dual port memory. The failure pattern is followed by four other flashes that can be used to identify the 32-bit address of the first bad value.
	SDRAM failure	A flashing pattern of 0X30 indicates a failure in the SDRAM.
	DMA FIFO programming failure	A pattern of 0X36 indicates a lockup after programming the DMA. This test cannot be repeated, so the LED do not flash.
	PLD programming failure	A pattern of 0X81 indicates a lockup after trying to program the inhibit bit in the PLD. This test cannot be repeated, so the LED do not flash.
	SDRAM test in progress	The SDRAM is tested after all other diagnostics are passed, and the board is waiting for the DSP application code to download. The LED light in succession to indicate the 16 MB SDRAM is being tested.
	Waiting for download	When the SDRAM test is complete, and a DSP application has not been started, the LED light in turn, making it look like they are bouncing back and forth. This is the normal indication that the DSP devices booted correctly and are operational.
	Downloading	During an application download, all the LED are set on. The LED count down using black for each segment that completes. Under normal circumstances, the download is done quickly and the flash is barely seen.
	Downloading error	If an error occurs that causes the DSP to hang, the halt is indicated by the LED being stuck in some stage of the download. This condition can occur if the application code being downloaded is corrupt in some way.

Table 6–6: Program Monitor LED codes (Cont.)

Normal Operation		
⬤⬤⬤◯⬤⬤⬤◯ ⬤⬤◯⬤⬤⬤◯⬤ ⬤◯⬤⬤⬤◯⬤⬤ ◯⬤⬤⬤◯⬤⬤⬤	Application is idle	The right four LED are the master C80 indicators; the left four are the slave C80 indicators. When both are idle, the four master LED light in order, and the four slave LED light in order, making it look like two LED are flashing back and forth.
	Application is running	As each DSP is called on to perform a task, the LED update for that DSP is halted, so while the master and slave C80 LED start in sync, they do not stay in sync.

Decoder Board Error Messages

When the PQM300 program monitor has composite decoder modules installed, error messages are reported on their operation. Error messages will normally be seen when either no signal or a wrong signal is connected to a decoder module when the measurements for that and other modules are configured. Some decoder board error messages indicate a fatal error that prevents acquisition. Other errors indicate an out-of-range condition, but do not cause the PQM300 system to become inoperative. If the error persists after the corrective action has been tried, refer the problem to a qualified service person.

Table 6–7: Decoder error messages

Error messages	Meaning	Action to take
Blanking	Indicates that the internal digital blanking circuit is making many corrections in one direction and none in the other. This is a normal condition when the circuit is stabilizing, but should not happen for more than an few seconds.	Check that the applied video is within normal range, try connecting a known good signal to test.
Burst Lock	Indicates that the internal timing circuit is not in the slow speed, low jitter mode. In the Version 3.0 software release, Burst Lock is not a fatal error, but a warning. This allows capture and measurement of a slightly jittery signal.	Check that the correct input standard signal is applied. The input signal may not have burst or it may have excessive noise. Apply a known good signal to test.
Burst Present	Indicates that the amplitude of the burst on the input is not sufficient to allow proper timing extraction.	Check the burst on the input signal or apply a known good signal to test.
Input Video Over Range – Check for Proper Termination	This message appears when either A/D converter indicates clipping. This normally occurs if the input is more than about 125% of normal.	Check the input signal amplitude. Check that the loop-through is properly terminated, either into a 75 Ω system or with a 75 Ω termination on the unused loop-through connector.

Table 6–7: Decoder error messages (Cont.)

Error messages	Meaning	Action to take
Master Lock	Indicates a combination of sync present, burst present, burst lock, serial lock, and several more internal timing errors from the board horizontal counters, the vertical counters and color frame decision circuits. The master lock flag is held high until everything is sTable and ready to measure. Master lock is considered a fatal error if it persists. Note: The Burst Lock error is not included in the Master Lock error.	Check that video format is correct (NTSC or PAL). The error will also occur if the input is non-standard video such as from a VCR that has not been time-base-corrected. Apply a known good signal to test.
Serial Lock	Indicates that the output serializer is not locked. The message means that the 601 output from the decoder module is probably not working.	Check all the input and signal interconnections.
Sync Present	Indicates that no sync pulses are being detected on the input. The error happens either when there is no signal connected or when it is very low in amplitude. It can also happen when the signal source is incorrectly selected, such as asking for a S-Video signal when the input is really a composite signal and visa-versa.	Check that the decoder is correctly set for the type of signal applied. Apply a known good signal to test.

Decoder Diagnostics   A diagnostic program to test the decoder module is provided in the support directory. See *Run Decoder Diagnostics* beginning on page 4–8 in the *Performance Verification* section of this manual for the instructions on running the decoder diagnostics program.

Decoder LED Indicators   The decoder module also has LED indicators (shown in Figure 6–2) to indicate normal and abnormal operation. Starting at the front of the encoder module and going to the rear, the LED indicators meanings are shown in Table 6–8.
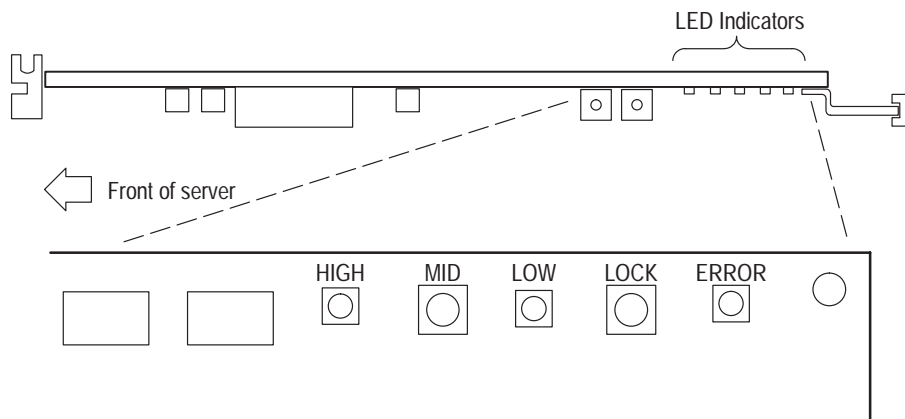
Figure 6–2: Decoder LED indicators

Table 6–8: Decoder LED indicators

LED Indicator	Meaning
Lock	Green LOCK indicates no major errors. If both LOCK and ERROR are on, then the FPGA (field programmable gate array) is not programmed.
Error	Red ERROR indicates any of a combination of sync present, burst present, burst lock, and serial lock errors, plus several more internal timing errors from the board horizontal counters, the vertical counters, and color frame decision circuits. The master lock flag is held high until everything is sTable and ready to measure. Master lock is considered a fatal error if it persists.
Low	In Run Mode, the MID (green) LED should be on, and the red HIGH and LOW LED are off, except for occasional flashes as the blanking is adjusted. If either HIGH or LOW LED is on continuously, a blanking error is indicated.
Mid	In CAL Mode, HIGH and LOW indicate calibration levels. If MID is green then the gain is within 0.3%.
High	

Removal and Replacement Instructions

The following procedures tell you how to remove and replace the PQM300 program monitor modules. Part numbers for the modules are in the *Replaceable Parts List*. In compliance with the EISA standard the PQM300 Program QoS Monitor modules are in the mainframe card bay.

Replaceable PQM300 Modules

The standard PQM300 Program QoS Monitor consists of the following replaceable components:

- Program Monitor DSP module (1 to 8 modules)

- Composite decoder module (PQM3F01) (1 to 4 modules)

The mainframe unit consist of the following replaceable components:

- Processor module (controller board)

- I/O module (controller input/output board)

- Front panel Interface module

- Two SCSI hard disk drives

- Power supply module

- Front panel keypad module (circuit board only, no keypad)

- Floppy disk drive/CDROM drive assembly

- Backplane circuit board

Recommended Tools

The following tools are recommended for PQM300 Program QoS Monitor assembly removal and replacement:

- An anti-static wrist strap for safe handling of assemblies containing static sensitive devices.

- A screwdriver with T10, T15, and T20 Torx tips to remove the cabinet cover and the module mounting screws.

- A 1/4 inch or larger flat tip screwdriver.

- An 8 inch adjusTable wrench or appropriate size open-end wrench (an aid for cabinet removal).

- Smooth jaw pliers (example, KLEIN D306–51/2C).

Removing the Bezel Trim Ring

Remove the bezel trim ring to permit removal of the the key pad assembly, the interface circuit board, and the CD/floppy disk drive assembly. The front bezel snaps onto the chassis. There are three snaps across the top and three across the bottom. Remove the front panel bezel as follows:

1. Use smooth jaw pliers to grasp the On/Stby key and pull straight out on the key to disconnect the key cap from the switch.

2. Use your fingers to lift up on the back edge at the top of the bezel to release the bezel from the snaps. If you use a tool for leverage be careful not to bend the fingers of the EMI shielding strips.

3. After you have released the snaps across the top, pull the top of the bezel toward you slightly to clear the chassis. This should release the bottom of the bezel from the chassis.

4. Lift the bezel off the front of the chassis.

Removing the PQM300 Cabinet

The cabinet must be removed to access any of the program monitor application modules and to access the mainframe modules and cable connectors to the controller board. Use the following procedure to remove the cabinet:

1. Be sure that you are wearing a static grounding wrist strap.

2. Before removing the cabinet, shut down the program monitor and unplug the power cord.

3. Disconnect any cables connected to the rear panel connectors of the measurement set. Note their locations for reinstallation.

4. Put the protective front cover on the measurement set and sit the cabinet upright on the working surface with the rear panel up.

5. Remove the two screws from the handle on the left side of the cabinet (see Figure 6–3). These screws attach to post mounted on the power supply module.
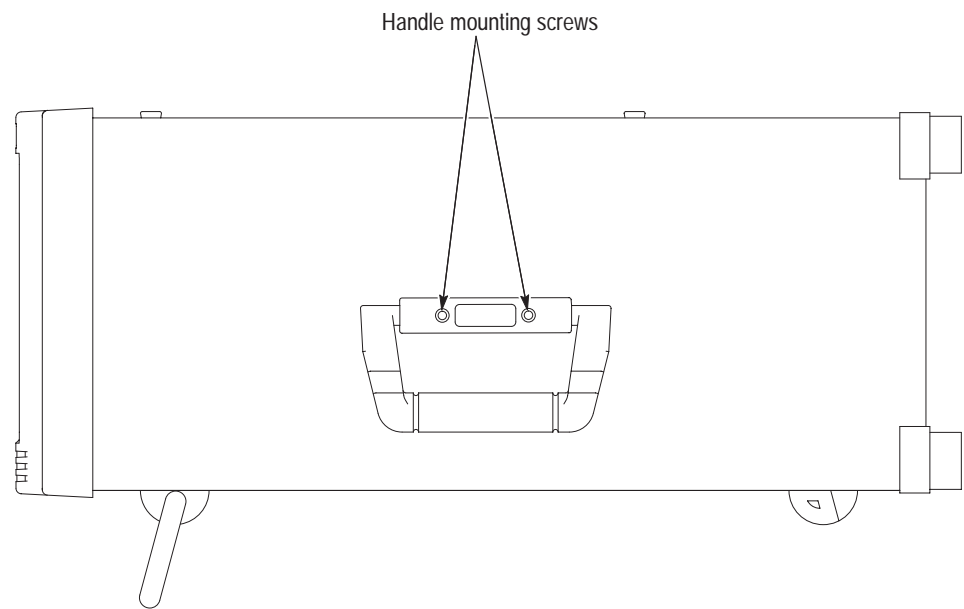
Figure 6–3: Right side handle screws

6. Remove the screws from the four feet on the rear of the mainframe chassis.

Rear feet screws
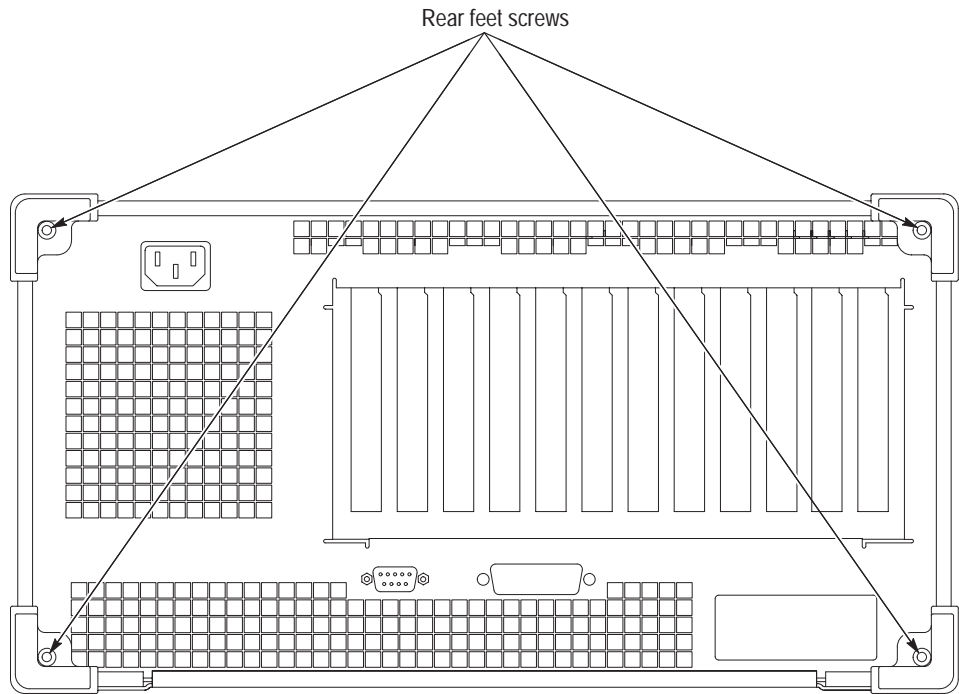
Figure 6–4: Rear panel feet removal

7. Use either an adjusTable wrench or appropriate size open end wrench as a lever to pry the cabinet loose from the chassis. Loosen each side alternately until the cabinet is released from the EMI gasketing.

8. Slide the cabinet up and off the chassis.

⚠ *CAUTION. Use care when touching the EMI shielding strips around the front of the chassis. The fingers of the strip are easily bent and any protruding sharp edges become a potential cutting hazard when you handle the chassis to position it during the remaining remove and replace procedures.*

Replacing the PQM300 Cabinet

1. Place the protective front cover on the face of the program monitor.

2. Position the program monitor face down on a sTable working surface with enough head room to install the cabinet.

3. Position the cabinet correctly to install it, and slide the cabinet over the end of the mainframe chassis.

4. Slide the cabinet evenly down on the chassis making sure all the internal cables are clear and do not catch.

5. When the front of the cabinet comes in contact with the cabinet retaining tabs around the front of the chassis, make sure the edges of the cabinet go under the tabs. You may have to push on the sides of the cabinet to get all the edges under the tabs and over the EMI strips around the front of the chassis.

6. At the rear of the chassis, you may have to push on the sides of the cabinet to get the rear of the cabinet to fit over the edges of the chassis and EMI gasketing.

7. When the cabinet is completely in place on the chassis, install the four rear feet.

8. Position the handle on the left side of the chassis and replace the two screws that attach the handle to the chassis (see Figure 6–3).

Replacing the Bezel Trim Ring

There are three snaps across the top and three across the bottom that hold the bezel to the cabinet. Replace the front panel bezel as follows:

1. If the light pipes are out, replace them now. Insert the light pipes in the light-pipe holes and turn them clockwise until they snap into place.

2. Position the bezel trim ring over the front of the cabinet and engage the three snaps across the top of the cabinet first.

3. After you have engaged the snaps across the top, firmly press the bottom of the bezel onto the cabinet to engage the snaps across the bottom of the bezel.

4. Press on the top of the bezel again to make sure the top snaps are all completely engaged.

5. Using smooth jaw pliers to hold the key cap, position the On/Stby key cap on the switch shaft. Push straight in on the key cap to press it onto the switch shaft.

PQM300 Application Modules

The program monitor plug in modules are located in the mainframe module bay. The SCSI hard disk drives are located in the mainframe bottom compartment. The following procedures start after removal of the cabinet from the mainframe.

Removing a PQM300 Plug-In Module

1. Remove the circuit board retaining plate (see Figure 6–5).

2. Remove the holding screws from the top and bottom of the plug-in module you are going to remove.

3. Carefully pull up on the module to loosen it from the backplane module connectors. You may have to alternate lifting on the front and the rear of the module to work it loose from the from the connectors and the card bay.
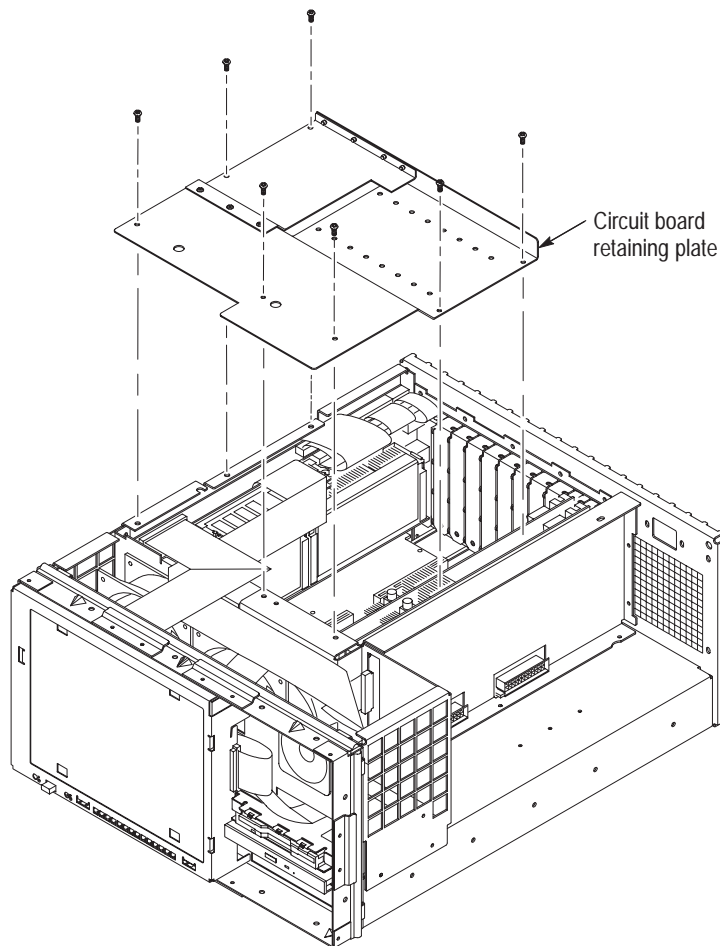
Figure 6–5: Circuit board retaining plate

4. When the module is loose from the connector, lift the module out of the module bay.

5. Place the removed module on a static free work surface or in a anti-static protection bag.

Reinstalling a PQM300 Plug-In Module

1. Insert the module into the module bay at the correct slot position.

2. Carefully align the module edge connector with the backplane connectors.

3. Apply firm pressure to completely seat the module in the connectors.

4. Replace the module holding screws to hold the module in the card bay.

5. Torque the screws to 8 in-lbs.

Mainframe Modules

Removing the bezel permits access to the retaining screws that hold the front panel components in place, so you can remove and replace then without removing the mainframe cabinet. The standard instrument has a blank front panel. The local control option instrument has a flat-panel display and key pad installed. Both procedures are similar, but use the correct one for your PQM300 program monitor.

Removing the Interface Circuit Board Cover

Remove the front panel interface circuit board cover assembly as follows:

1. Remove the front panel bezel (see *Removing the Bezel Trim Ring* on page 6–18 for the removal procedure).

2. Remove the six screws attaching the front panel circuit board cover to the chassis. There are two screws at the top, two at the bottom, and two at the left side of the assembly (see Figure 6–6).
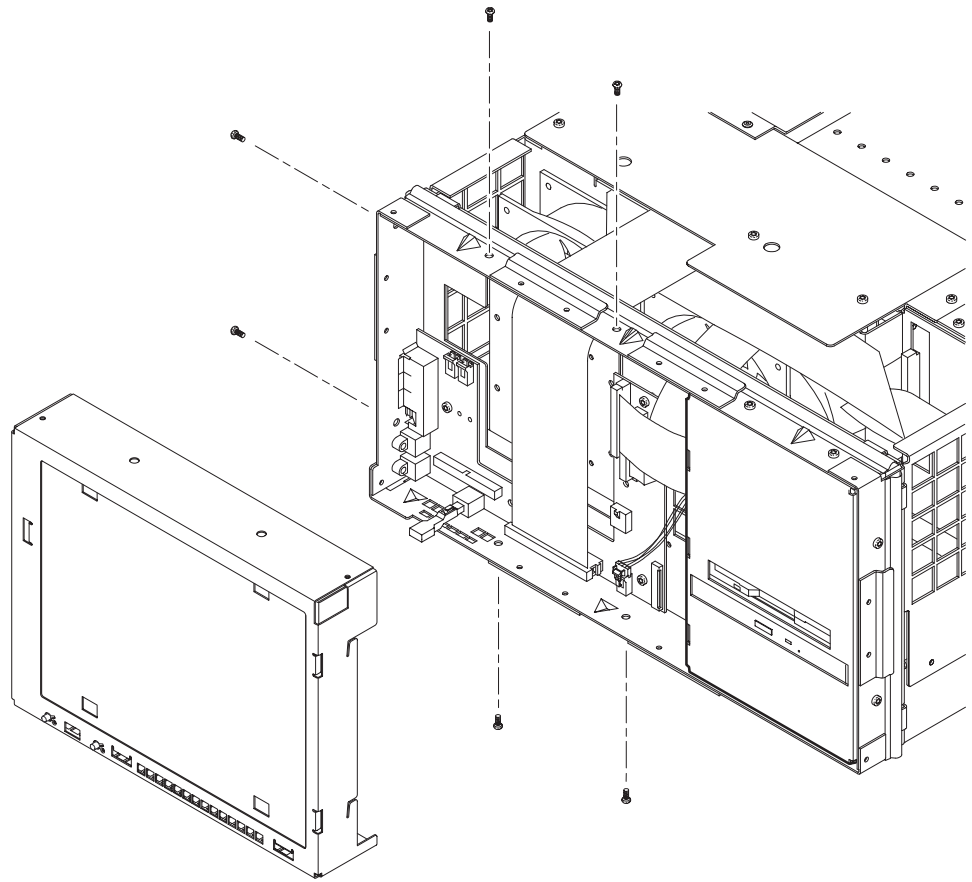
Figure 6–6: Front panel circuit board cover removal

3. Pull the cover assembly away from the chassis.

Reinstalling the Front Panel Interface Circuit Board Cover

Make sure all of the cables to the interface assembly are properly connected before replacing the interface circuit board cover assembly. After that, use the following procedure to replace the cover assembly:

1. Carefully slide the cover assembly into the chassis to align it with the mounting screw holes.

2. Install the six attaching screws; two on the top, two on the side, and two on the bottom of the chassis. Torque to 8 in-lbs.

Removing the Blank Key Pad Assembly

Remove the blank key pad circuit assembly as follows:

1. Remove the front panel bezel (see *Removing the Bezel Trim Ring* on page 6–18 for the removal procedure).

2. Remove the six screws holding the key pad assembly to the mainframe chassis. There are two across the top, two across the bottom, and two on the right side of the assembly (see Figure 6–7).
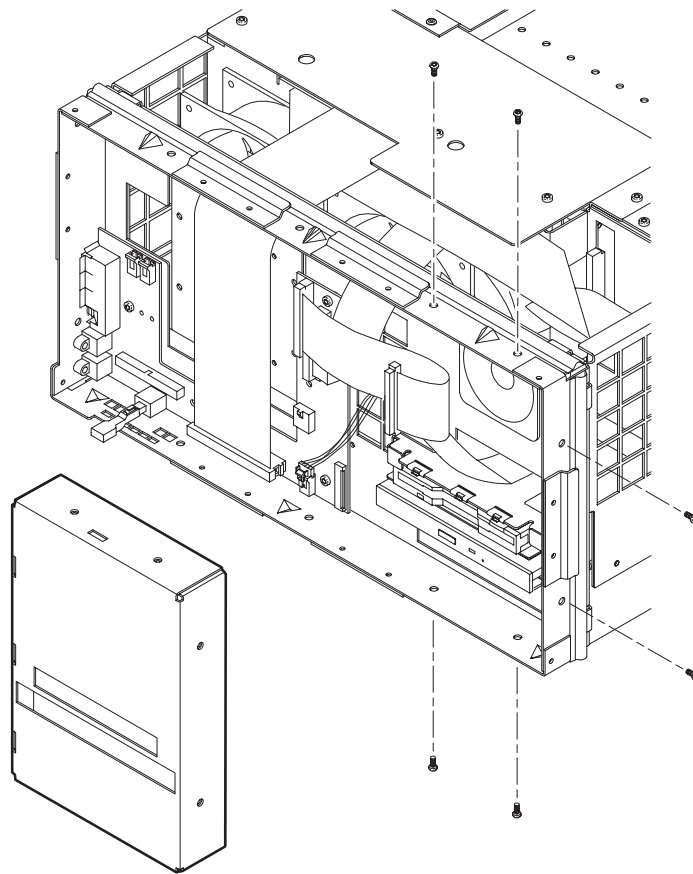
Figure 6–7: Blank key pad assembly removal

3. Slide the key pad assembly out of the chassis far enough to access the interconnection cable connector on the back of the key pad circuit board.

4. Disconnect the key pad interconnection cable to the interface circuit board from the key pad circuit board.

Replacing the Key Pad Assembly

1. Position the key pad assembly to slide it into the chassis.

2. Connect the key pad assembly interconnection ribbon cable to the key pad connector on key pad circuit board.

3. Carefully slide the key pad assembly into place and align the mounting screws holes.

4. Install the six attaching screws.

Removing the Flat Panel Display

The flat panel display assembly of the PQM3FLC option comes as an assembled and tested unit. Remove the flat panel display assembly as follows:

1. Remove the front panel trim ring (see *Removing the Bezel Trim Ring* on page 6–18 for the removal procedure).

2. Remove the six screws attaching the display assembly to the chassis. There are two screws at the top, two at the bottom, and two at the left side of the assembly (see Figure 6–8).

3. Pull the display assembly away from the chassis to expose the connector to the front panel interface circuit board (see Figure 6–8).

4. Disconnect the ribbon cable connector from the front panel interface circuit board.

Reinstalling the Flat Panel Display

1. Make sure that all of the cables to the interface assembly are properly connected (see Figure 6–10).

2. Position the flat panel display with the display assembly interconnection near the front panel interface circuit board. Connect the cable to the display connector on the front panel interface circuit board.

3. Carefully slide the display assembly into the chassis to align it with the mounting screw holes.

4. Install the six attaching screws; two on the top, two on the side, and two on the bottom of the chassis.
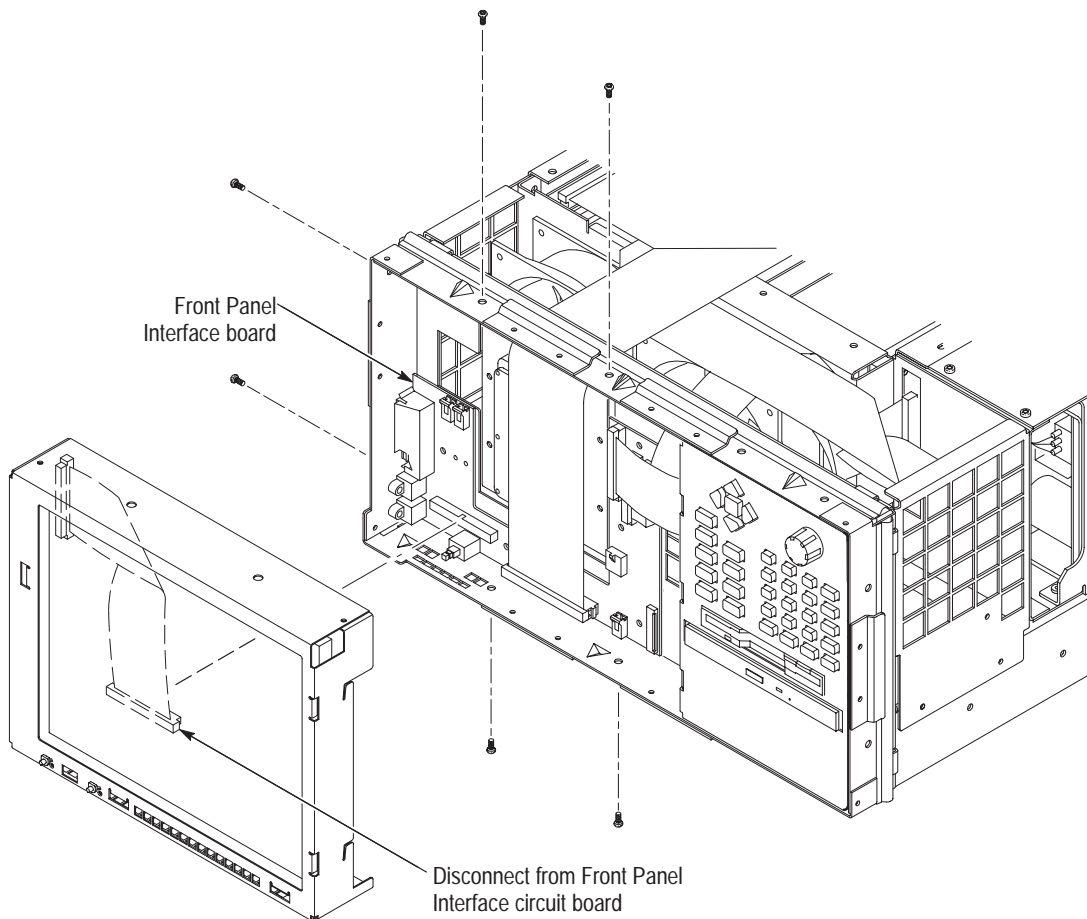
Figure 6–8: Flat panel display removal

Removing the Key Pad Assembly

After removing the front panel bezel and flat panel display assembly, remove the front panel key pad assembly as follows:

1. Remove the six screws holding the key pad assembly to the mainframe chassis. There are two across the top, two across the bottom, and two on the right side of the assembly (see Figure 6–9).
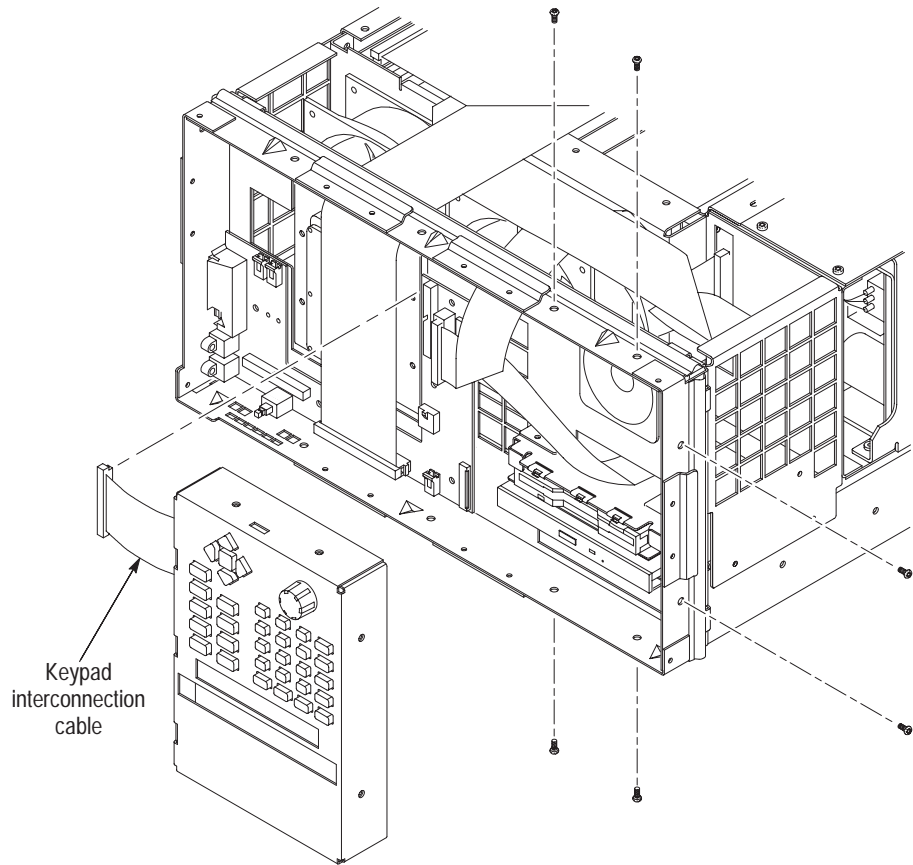
Figure 6–9: Key pad assembly removal

Keypad
interconnection
cable

2. Disconnect the key pad interconnection cable from the front panel interface circuit board.

3. Slide the key pad assembly out of the chassis.

Replacing the Key Pad Assembly

1. Position the key pad assembly to slide it into the chassis.

2. Carefully slide the key pad assembly into place and align the mounting screw holes.

3. Connect the key pad assembly interconnection ribbon cable to the key pad connector on the front panel interface circuit board (see Figure 6–10).

4. Install the six attaching screws.
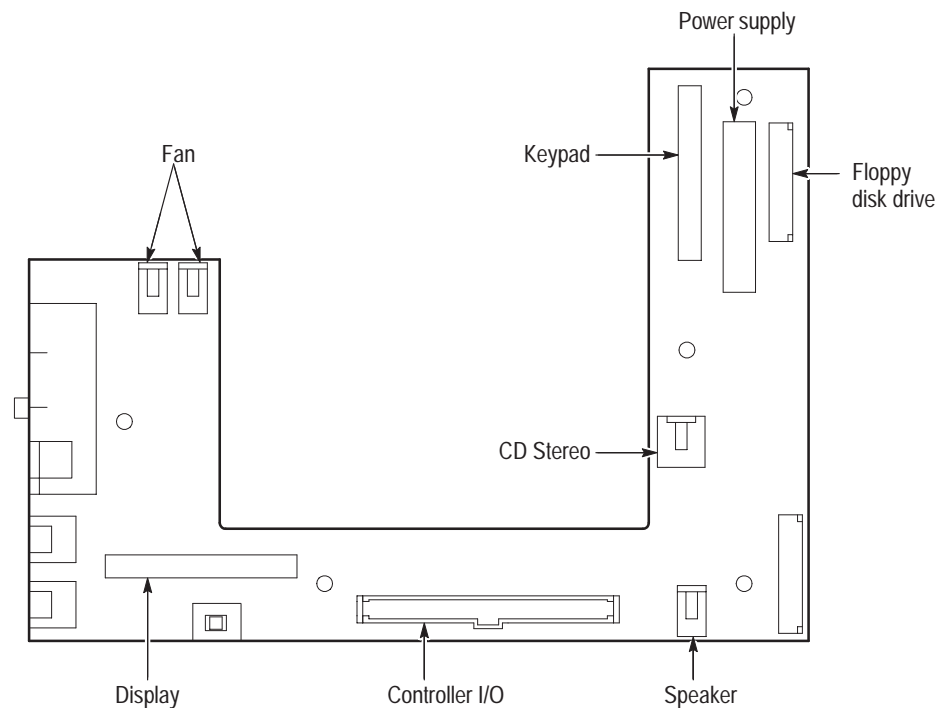
Figure 6–10: Front panel interface circuit board connectors

Removing the CD and Floppy Disk Drive Assembly

The cabinet, front bezel, and key pad assembly must be uninstalled to remove the CD and disk drive assembly for service. The front panel interface cover or the flat panel display assembly must be removed only if you need to change the floppy disk drive interconnection cable or the CD audio cable. Remove the CD and Floppy Disk drive assembly as follows:

1. Remove the mainframe cabinet (see *Removing the PQM300 Cabinet* on page 6–18 for the removal procedure).

2. Remove the front panel bezel (refer to *Removing the Bezel Trim Ring* on page 6–18 for the removal procedure).

3. Remove the front panel interface circuit board cover or the flat panel display assembly as appropriate (refer either to *Removing the Interface Circuit Board Cover* on page 6–23 or to *Removing the Flat Panel Display* on page 6–26).

4. Remove the key pad assembly (refer either to *Removing the Blank Key Pad Assembly* on page 6–25 or to *Removing the Key Pad Assembly* on page 6–27 for the removal procedure).

5. Remove the three screws attaching the CD and Floppy Disk Drive assembly to the chassis. There are two screws on the front of the assembly and one on the rear inside the front panel compartment of the chassis.

6. Disconnect the floppy drive cable from the floppy drive connector. Lift up the locking latch on the floppy drive connector to release the interconnection cable and pull up on the cable to separate it from the connector.

7. Disconnect the audio cable from the CD drive four pin connector (see Figure 6–13).

8. Disconnect the CD drive cable from the Controller board.

9. Disconnect the CD drive cable from the CD drive connector adapter board.

10. Slide the CD and Floppy Disk Drive assembly out through the front of the chassis. You may have to lift the front of the assembly slightly to clear the EMI shielding fingers.

Removing and Replacing the CDROM Drive

The floppy disk drive and the CD drive are assembled in the same unit, but can be separately replaced.

1. Remove the four crosstip screws that hold the CD drive to the chassis.

2. Slide the CD drive out of the lower bay of CD and floppy drive chassis.
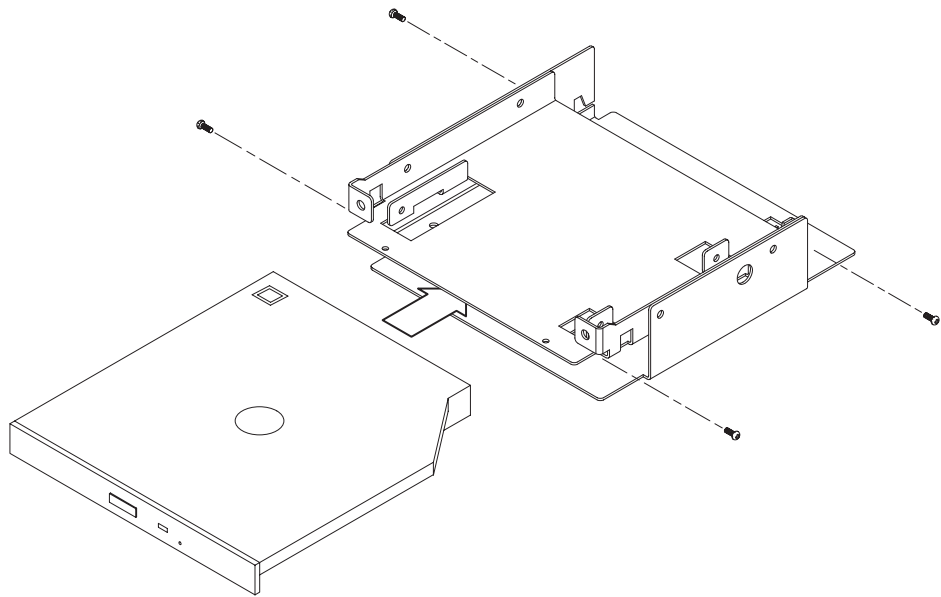
Figure 6–11: Chassis screw locations for CD drive

Reinstall the CD Drive.

1. Install the CD connector adaptor board.

2. Insert CD drive into lower bay of CD and floppy drive chassis.

3. Align CD drive mounting holes with chassis holes.

4. Attach CD drive to chassis with four crosstip screws. Torque the screws to 2 in-lbs.

Removing and Replacing the Floppy Disk Drive

The floppy disk drive and the CD drive are assembled in the same unit, but can be separately replaced.

1. Remove the four cross tip screw holding the floppy disk drive to the assembly.

2. Lift the floppy disk drive up off the chassis as shown in Figure 6–12.
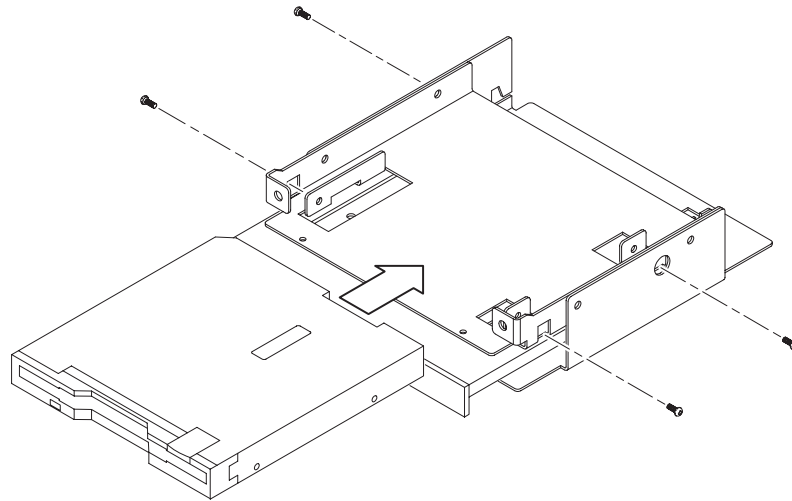
Figure 6–12: Chassis screw locations for the floppy disk drive

Replace the Floppy Disk Drive.

1. Place the replacement floppy drive onto the chassis / CD drive as shown in Figure 6–12.

2. Attach the floppy drive to chassis with three crosstip screws. Torque each screw to 2 in-lbs.

Reinstalling the CD and Floppy Disk Drive Assembly

When the CD and Floppy drive assembly is assembled it can be reinstalled into the chassis.

1. Align the assembly with the slot in the chassis.

2. Slide the assembly part way into the compartment and install the CD cable. Connect the CD drive cable to the CD drive connector adapter board.

3. Attach the audio cable to CD drive four pin connector.

    a. Align the audio cable white colored dot with pin 1 of CD drive four pin connector.

    b. Plug the audio cable onto the CD drive connector (see Figure 6–13).

4. Attach the floppy drive cable to the floppy drive connector.

    a. Lift up floppy drive connector locking latch.

    b. With the contacts of the short end of floppy drive cable facing towards the floppy drive, insert cable into floppy drive connector as shown in Figure 6–13.

    c. Support the edge of the circuit board and push the locking latch closed.
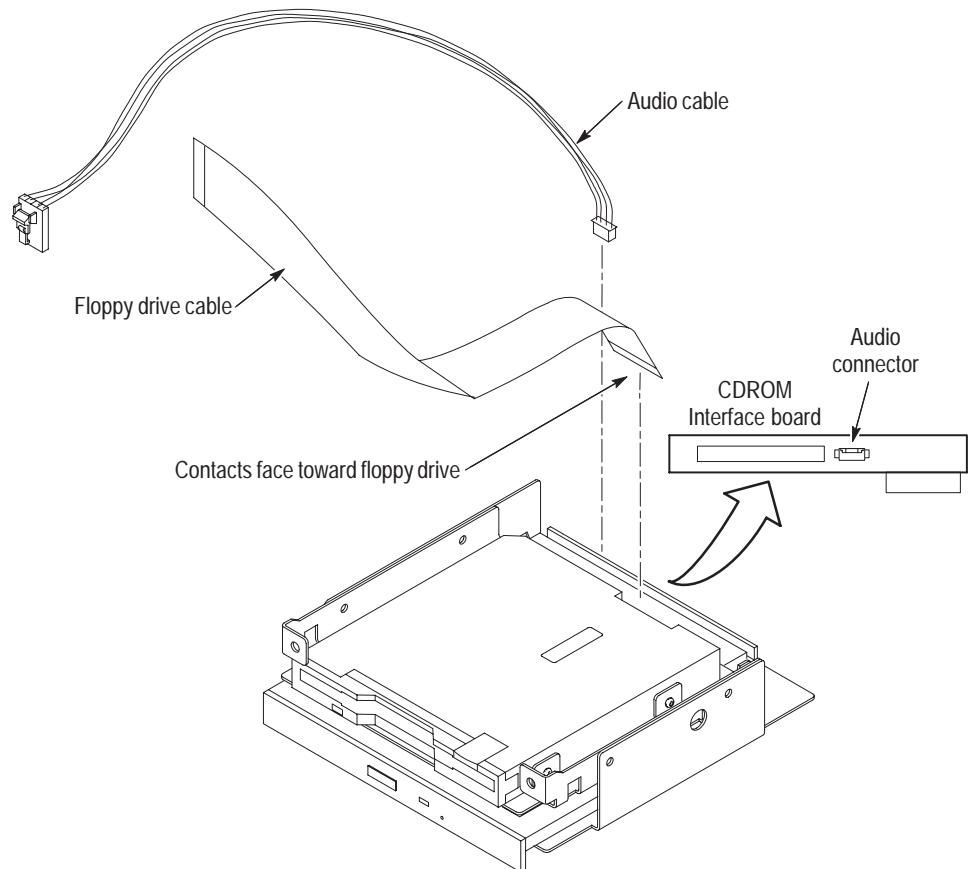
Figure 6–13: Floppy disk drive and CD audio connector installation

5. Line up the attaching screw holes and install the three attaching screws, two in the front and one in the rear of the assembly.

Speaker Removal   The front bezel, front panel interface cover, and key pad assembly must be uninstalled to remove the speaker for replacement.

1. Remove the front panel bezel (refer to *Removing the Bezel Trim Ring* on page 6–18 for the removal procedure).

2. Remove the front panel interface circuit board cover (refer to *Removing Interface Circuit Board Cover* on page 6–23).

3. Remove the blank key pad assembly (refer to *Removing the Blank Key Pad Assembly* on page 6–25).

4. Disconnect the speaker connector from the front panel interface board (see Figure 6–24).

5. Remove the four T15 screws that attach the speaker to the chassis and remove the speaker from the chassis. Note the routing of the speaker cable for reinstallation.

Speaker Replacement   1. Route the speaker wire harness through mainframe chassis hole as shown in Figure 6–14.

2. Attach speaker to chassis with four T15 screws. Torque the screws to 8 in-lbs.
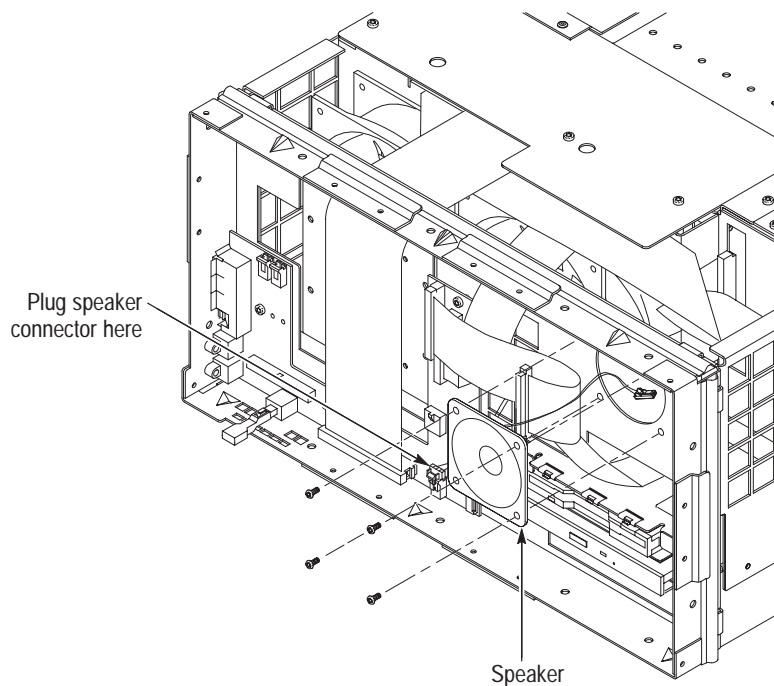
Figure 6–14: Speaker installation and fan locations

3. Route the speaker wire harness through the top-left opening in the front ventilation holes.

4. Reconnect the speaker wire to the front panel interface board Speaker connector J980 (see Figure 6–24).

Removing and Replacing the Dual SCSI Hard Disk Drives

The disk drives are installed in the lower compartment of the mainframe chassis. The mainframe cabinet must be removed to access the disk drive assemblies.

1. Be sure that you are wearing a static grounding wrist strap.

2. Shut down the mainframe and unplug the power cord.

3. Remove the mainframe cabinet (see *Removing the PQM300 Cabinet* on page 6–18 for the removal procedure).

4. Place the mainframe chassis on the work surface so that the bottom side with the SCSI disk drive assembly is facing up.

5. Disconnect the SCSI disk drive cable from both hard disk drives. Unclip the cable from the hold-down clips on the assembly plate. Note the routing and cable dress for reinstallation.

6. Disconnect the power supply cable from both hard disk drives.

7. Remove the six T-15 Torx screws that hold the assembly plate to the mainframe chassis and lift the hard drive assembly out of the main frame.

Reinstall the Disk Drive Assembly. The PQM300 program monitor has 2 SCSI drives. If replacement is necessary, one is replaced with a programmed hard disk drive, the other is replaced with an unprogrammed (blank) hard disk drive. The part numbers for both disk drives (programmed and unprogrammed) are in the *Replaceable Part List* section of this manual. The programmed disk drive has a sticker with it version number on the outside to identify it from the unprogrammed disk drive.

Both drives will have unique jumper settings. (Only visible from the underside.) The jumpers set a unique address for the SCSI devices. The jumper configuration is as follows:

Programmed drive jumper Configuration:
  Connector J4: Jumper on Row 5 only.
  Connector J6: All jumpers removed.

Unprogrammed drive jumper Configuration:
  Connector J4: Jumpers on Rows 4 and 5.
  Connector J6: All jumpers removed.

Use the following procedure to replace the SCSI disk drive assembly:

1. Place the mainframe chassis on the work surface so that the bottom side is facing up.

2. Insert the disk drive assembly into the chassis compartment and line up the mounting screw holes in the assembly plate with the screw holes in the chassis mainframe.

3. Install the six T-15 Torx screws that hold the assembly plate to the mainframe chassis. Tighten to 8 inch pounds of torque.

4. Connect the power supply cable to both hard disk drives.

5. Reroute the SCSI drive ribbon cable and connect the cable connectors to the hard disk drives. Dress the ribbon cable flat and clip the SCSI drive cable into the hold-down clips on the assembly plate.

NOTE. If you are replacing a hard disk drive, follow the instructions provided with the replacement disk drive to restore the software and disk partitioning required for the PQM300 operating system.

Power Supply Removal and Replacement

Use the following steps to remove the power supply module:

1. Turn off and disconnect the main power from the program monitor.

2. Remove the measurement set cabinet (refer to *Removing the PQM300 Cabinet* on page 6–18 for the removal instructions).

3. Remove the five short and two long T15 screws that attach the power supply module to the chassis (see Figure 6–15 for the screw locations).

    a. At the front of the power supply module, remove one short T15 screw. Use a long shafted screwdriver to access the front screw through the hole in the chassis.

    b. At the top of the power supply, remove two short T15 screws.

    c. At the rear of the power supply, remove two short screws and two long T15 screws.
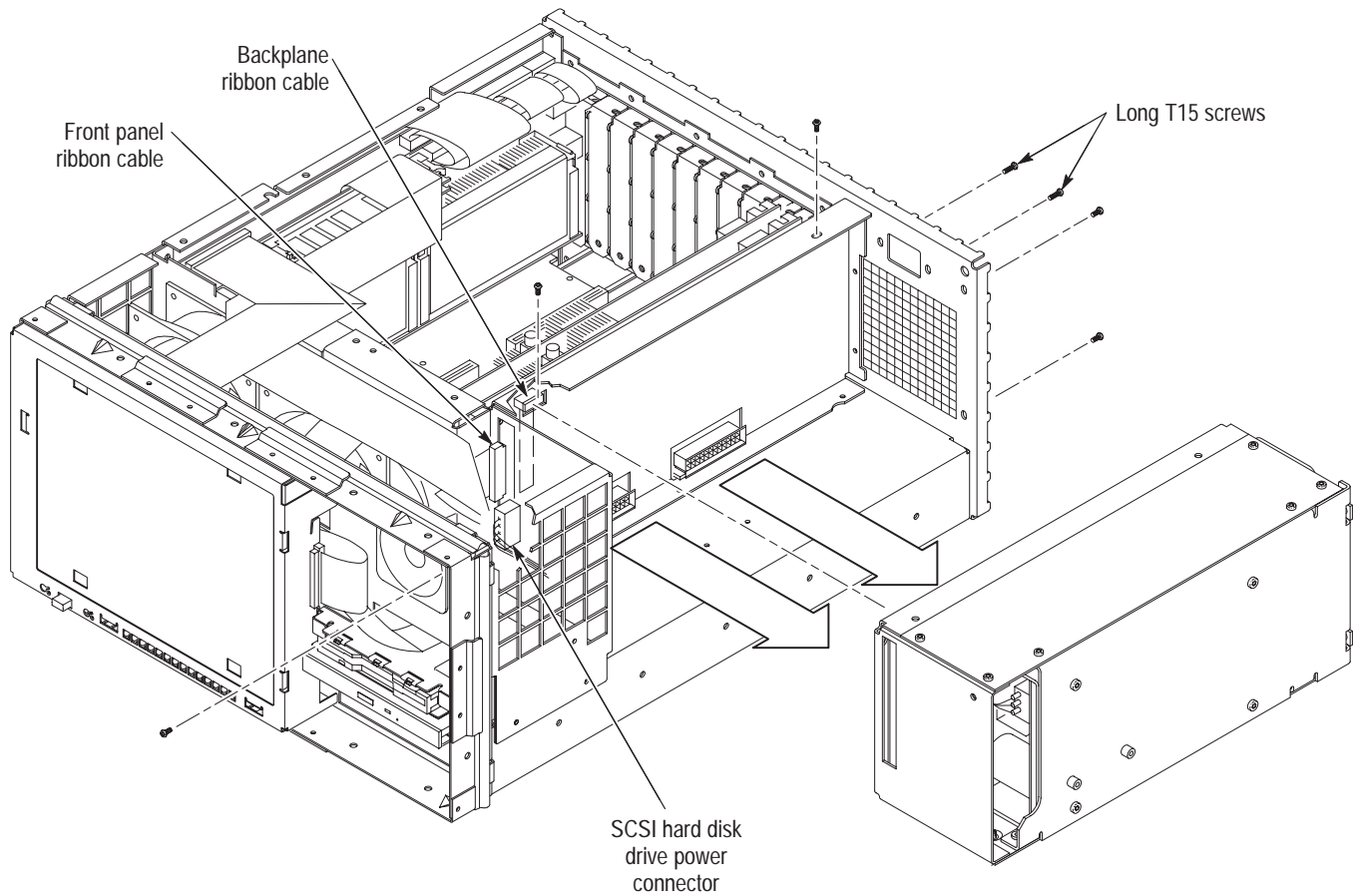
Figure 6–15: Power supply large and small screws locations

4. Disconnect the backplane ribbon cable from the power supply module connector.

5. Release the connector latches on the wide ribbon cable housing and disconnect the front panel ribbon cable from the front of the power supply module.

6. Disconnect the SCSI hard disk drive power cable from the front of the power supply module.

7. Slide the power supply module out of the chassis. Use a flat blade screwdriver as a lever if needed to disconnect the power supply connectors from the backplane connectors.

Reinstall the Power Supply. Use the following steps to reinstall the power supply module:

1. Align the power supply connectors with backplane connectors as shown in Figure 6–15.

2. Press power supply module onto backplane connectors/main chassis.

3. Attach the power supply module to the chassis with five short and two long T15 screws. Torque the screws to 8 in-lbs.

   a. At the front of the power supply module, attach the power supply to the chassis with one short T15 screw.

   b. Attach the top of the power supply to the chassis with two short T15 screws.

NOTE. The long T15 screws are used for attaching the power supply to the chassis at either side of the line filter opening.

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   c. At the rear of the power supply, attach the power supply to the chassis with two short screws and two long T15 screws.

4. Plug in the backplane ribbon cable on the side of the power supply.

5. Plug the wide ribbon cable onto the power supply module connector on the front of the power supply.

⚠ *CAUTION. The power supply ribbon cable connector is difficult to fully plug on. Make sure both retaining latches are fully closed over the connector housing.*

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6. Plug the SCSI power cable onto the power supply connector located beneath the large ribbon cable connector on the front of the power supply chassis.

Controller Board Removal and Replacement

Use the following procedure to remove the controller board.

1. Remove the circuit board retaining plate (see Figure 6–5).

2. Remove the two T15 screws that hold the controller board to mainframe chassis (see Figure 6–16 for the screw locations).

3. Disconnect the SCSI disk drive ribbon cable from the controller board (see Figure 6–21).
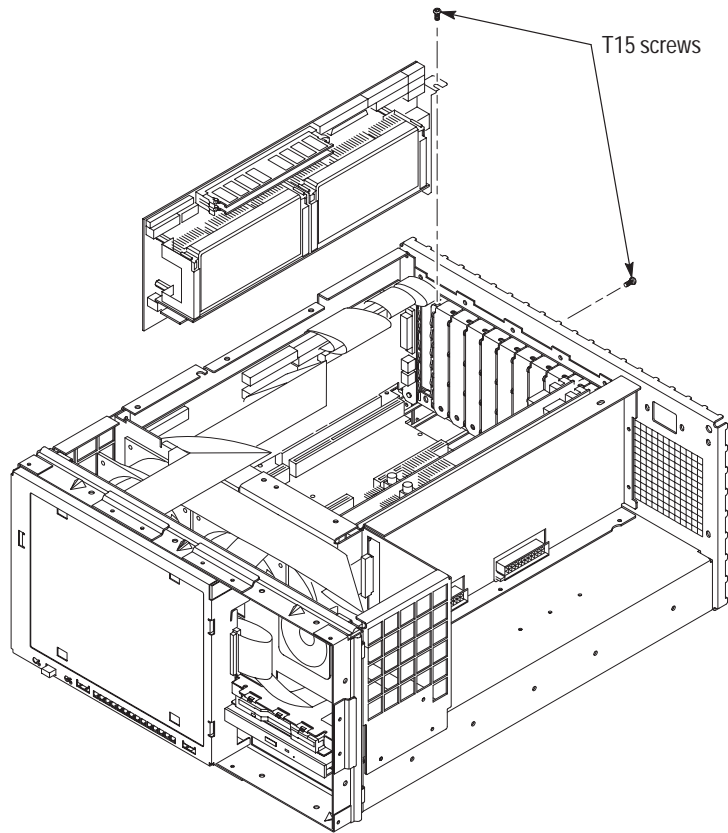
Figure 6–16: Controller board orientation and screw locations

4. Disconnect the two 10-pin connectors (from J290 and J190 on the I/O circuit board) from the controller board.

5. Disconnect the 26-pin connector (from J170 on the I/O circuit board) from the bottom 26-pin connector on the controller board.

6. If the local display option is installed, disconnect the ribbon cable from the J4 connector on the controller board.

7. Carefully pull up on the controller board to loosen it from the backplane connectors.

8. When the board is loose from the backplane connectors, lift the assembly up and out of the module bay. Place the removed circuit board on a static-free surface or in a protective anti-static bag.

Reinstall the Controller Board. Use the following procedure to reinstall the controller circuit board. Refer to *CPU Jumper Settings* on page 6–50 to verify the correct positions of all the jumpers on the Controller board.

1. Position the controller board in the card bay in slot 11, the second slot from the right (when looking at the rear of the mainframe chassis).

⚠️ **CAUTION.** *While handling and installing the controller board, do not press on the memory SIMMs (single inline memory modules).*

2. Lower the controller board into the mainframe while dressing the I/O board to controller board wiring harnesses away from the slot position.

3. Align the controller board edge connectors with the backplane slot connectors and press down firmly on the top edge of the circuit board to seat the controller board in the backplane connectors.

4. Attach the controller board bracket to the mainframe chassis with two T15 screws. Torque the screws to 8 in-lbs.

5. Reconnect the I/O board to controller board cables. Refer to *Connect I/O board to Controller board* on page 6–42 for the connection sequence.

Controller I/O Board Removal and Replacement

The Controller I/O board has many interconnection cables to the controller board that must be disconnected for removal. After removing the cabinet and circuit board retaining plate, use the following procedure to remove the I/O circuit board:

1. Remove the two T15 screws that hold the controller I/O board to mainframe chassis (one on top and the other in the rear panel).

2. Disconnect the SCSI disk drive ribbon cable from the controller board (see Figure 6–17 for location).

3. Disconnect the two 10-pin connectors (from J290 and J190 on the I/O circuit board) from the controller board.

4. Disconnect the 26-pin connector (from J170 on the I/O circuit board) from the bottom 26-pin connector on the controller board.

5. If the local display option is installed, disconnect the ribbon cable from the LCD IN connector on the I/O board.

6. Carefully pull up on the I/O board to loosen it from the backplane connectors.

7. When the board is loose from the backplane connectors, lift the assembly up to gain access to the remaining interconnection cables.

SCSI Ribbon cable plugs onto bottom connector
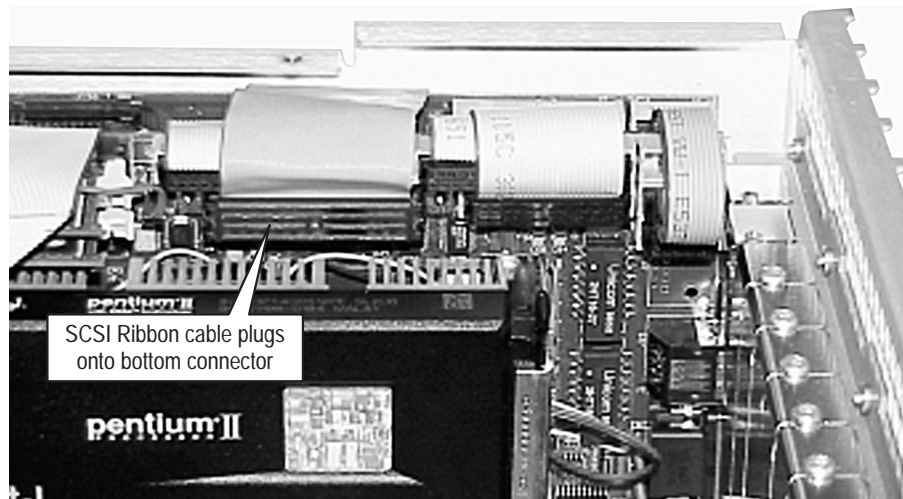
Figure 6–17: SCSI ribbon cable connection location

8. Disconnect the CD drive ribbon cable from J250 of the I/O circuit board.

Reinstall the I/O Board. Use the following steps to insert the I/O circuit board into the slot 12 position in the mainframe card bay.

1. Dress both controller board wire harnesses so that you can insert the I/O circuit board into the first slot as shown in Figure 6–18.

2. Hold the SCSI ribbon cable against the side of the mainframe and insert the I/O board into the slot. Align the front end of the circuit board with the guide rail on the front of the card bay.
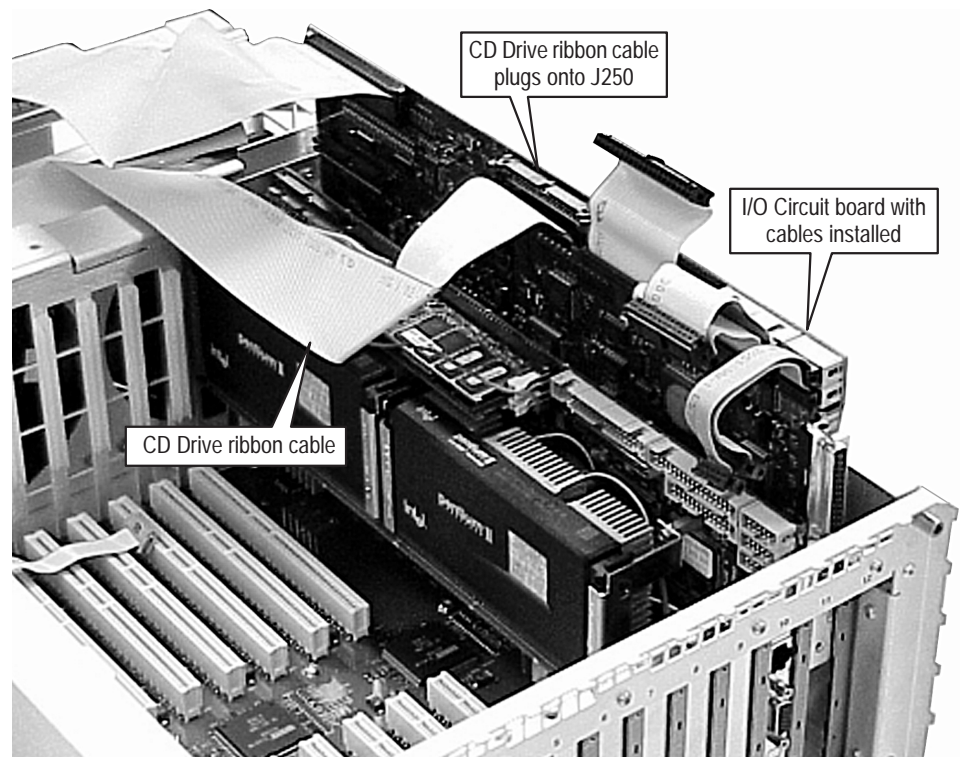
Figure 6–18: Insert I/O board into slot 12

3. Lower the I/O board into the mainframe slot but do not press the board into the backplane connector.

4. Route the CD drive ribbon cable over the I/O board.

5. Lift up the I/O board and (with one hand bracing the circuit board on the backside) plug the CD drive ribbon cable onto J250 of the I/O board.

6. Place your fingers on the top of the I/O board at the locations indicated in Figure 6–19 (directly over the J11 backplane connector) and press down to seat the board into the backplane connector.

Press down on I/O board at these two locations

SCSI Ribbon cable
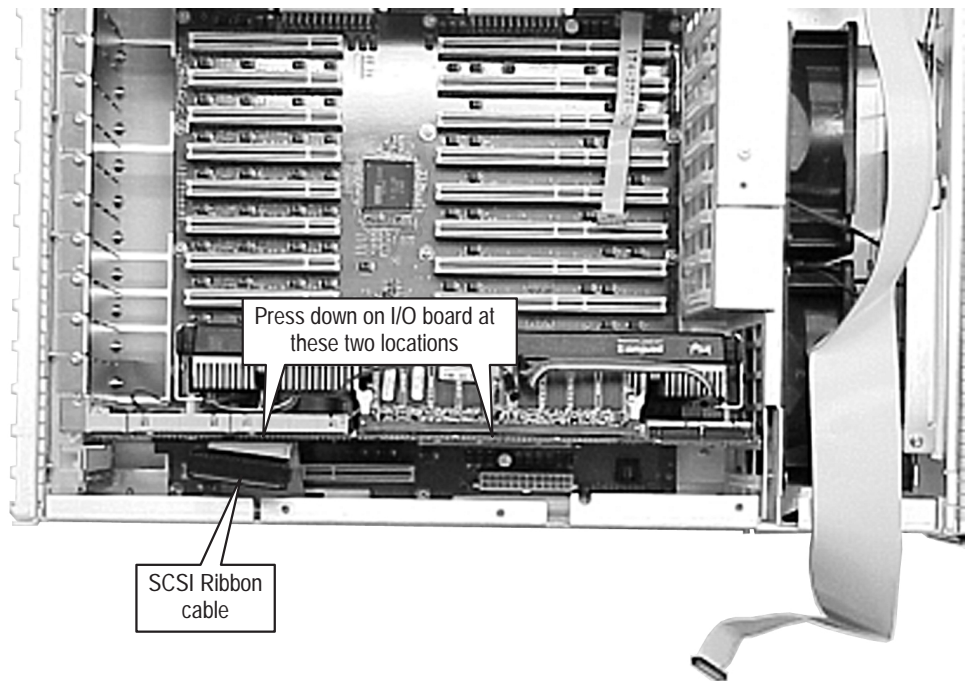
Figure 6–19: Installing the I/O circuit board

Connect I/O board to Controller board. The interconnection cables between the I/O board and the controller board have to be connected in sequence that permits all the cables to be attached. Use the following step to make the cable connections.

1. Plug the ribbon cable from J290 of the I/O board to the center 10-pin connector on the controller board as shown in Figure 6–20.

2. Plug the ribbon cable from J271 of the I/O board to the top 34-pin connector of the controller board.
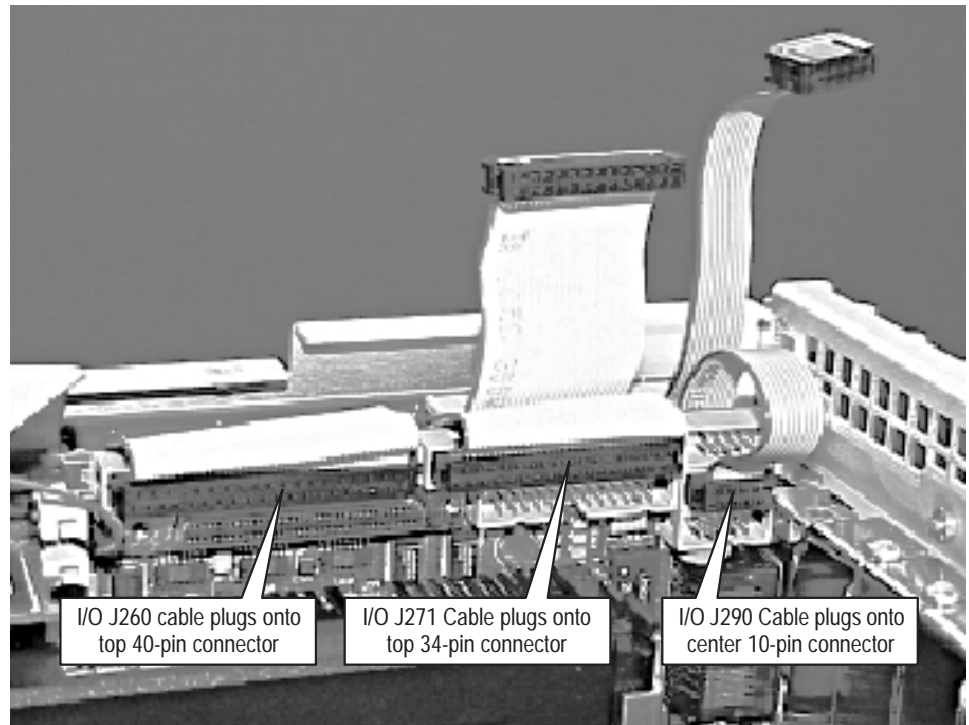
Figure 6–20: I/O to controller board top interconnections

3. Plug the ribbon cable from J260 of the I/O board to the top 40-pin connector of the controller board.

4. Plug the ribbon cable from J190 of the I/O board to the bottom 10-pin connector as shown in Figure 6–21.

5. Plug the ribbon cable from J170 of the I/O board to the bottom 26-pin connector.

6. Plug the SCSI ribbon cable to the controller board bottom connector.

7. If the local display option is installed, connect the flat ribbon cable from J4 on the controller board to the LCD IN connector on the I/O board.
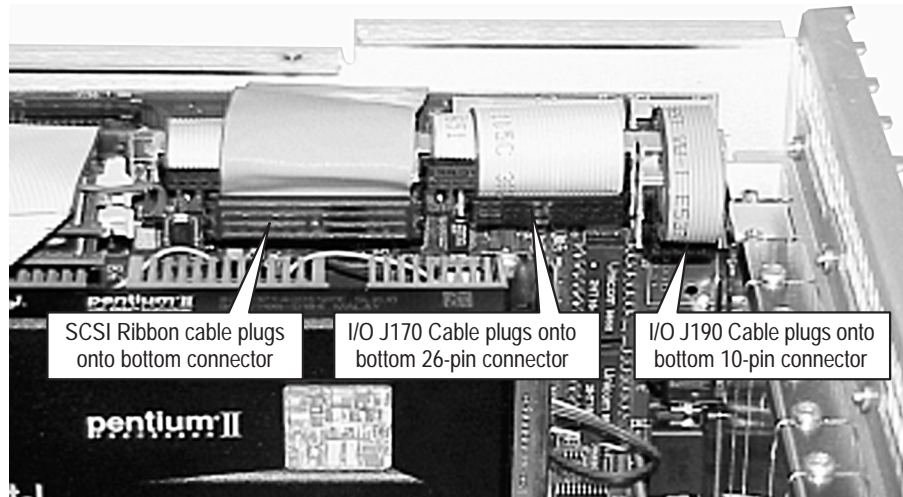
Figure 6–21: I/O to controller board bottom interconnections
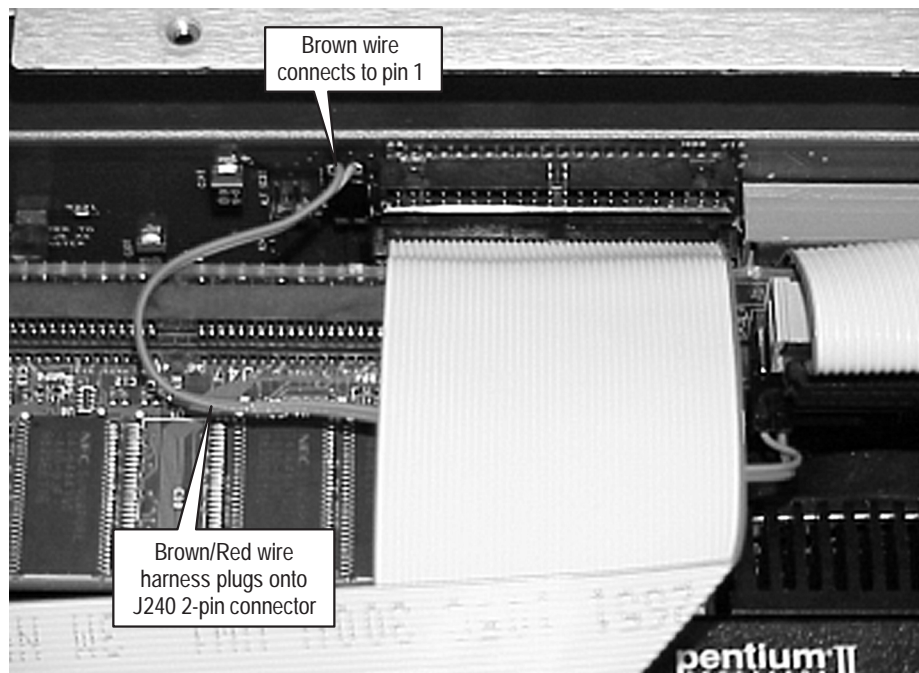
Figure 6–22: Top connection to controller board
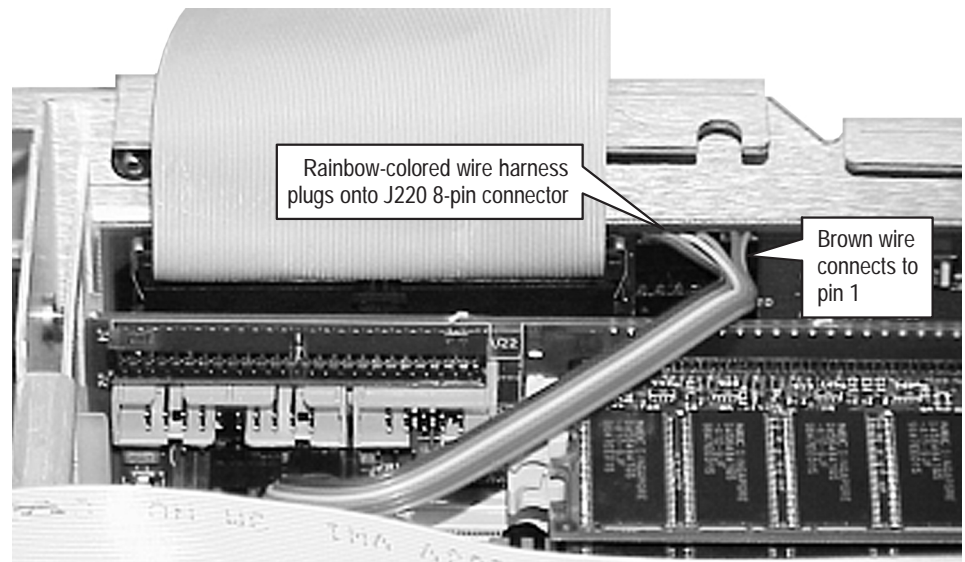
Figure 6–23: Location of J220 connections and wiring orientation

Interface Board Removal and Replacement

Use the following procedure to remove the interface board:

1. Disconnect the speaker wire from the interface board J980 connector (see Figure 6–24).

2. Disconnect the right side fan wire from the interface board J420 (right FAN) connector.

3. Disconnect the left side fan wire from the interface board J410 (left FAN) connector.

4. Disconnect the floppy disk drive flexible circuit board from the interface board disk drive connector.

    a. Release the locking latch on the flexible circuit board connector.
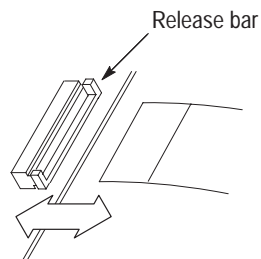
    b. Pull the flexible circuit board straight out of the connector.
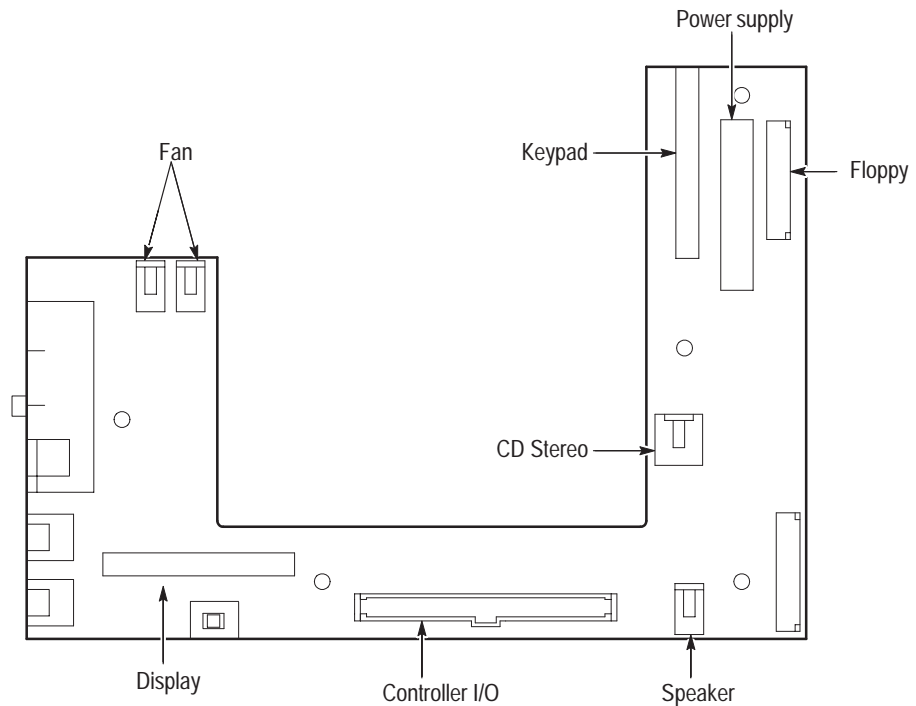
Figure 6–24: Front panel interface circuit board connectors

5. Disconnect the CD audio cable.

6. Disconnect the controller I/O ribbon cable from the interface board.

7. Disconnect the power supply cable.

8. Disconnect the key pad assembly ribbon cable from the interface board.

9. Remove the five T15 screws from the front of the board and the two metric screws on the left side that attach the interface board to the chassis (see Figure 6–25 for the screw locations).

Reinstall the Interface Board. Install the interface board onto the mainframe chassis as shown in Figure 6–25.

1. Orient interface board so that the board components are facing up and the mouse/keyboard connectors are to the left.

2. Align the interface board mounting holes with the chassis studs and place the board onto chassis.
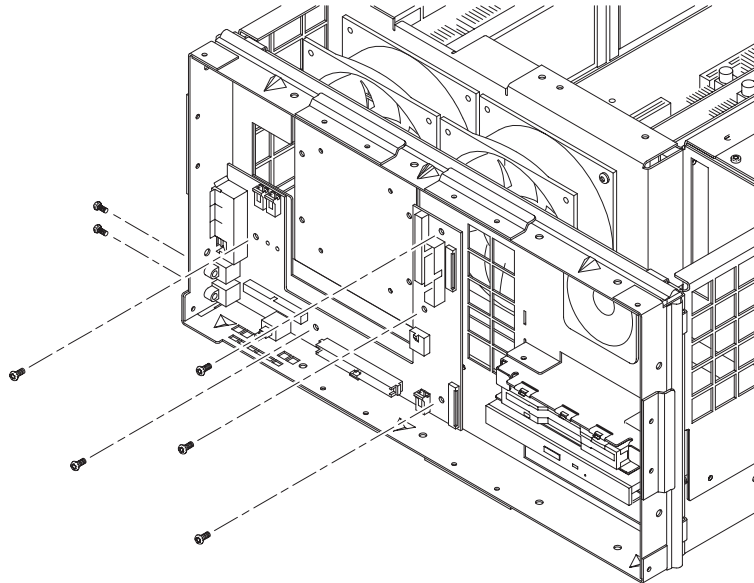
Figure 6–25: Screw locations for the interface circuit board

3. Attach the interface board to chassis with five T15 screws through the front of the board and two metric screws at the side connectors. Torque the T15 screws to 8 in-lbs. Torque the metric screws to 2 in-lbs.

4. Route both fan wire harnesses through slot in chassis as shown in Figure 6–26.

5. Plug the left side fan wire harness into the interface board J410 (left FAN) connector as shown in Figure 6–26.

6. Plug the right side fan wire harness into the interface board J420 (right FAN) connector as shown in Figure 6–26.

7. Route the speaker wire harness through the top/right chassis ventilation hole as shown in Figure 6–26.

8. Plug speaker wire harness into interface board J980 connector as shown in Figure 6–26.

9. Connect the disk drive flexible circuit board to the interface board disk drive connector.
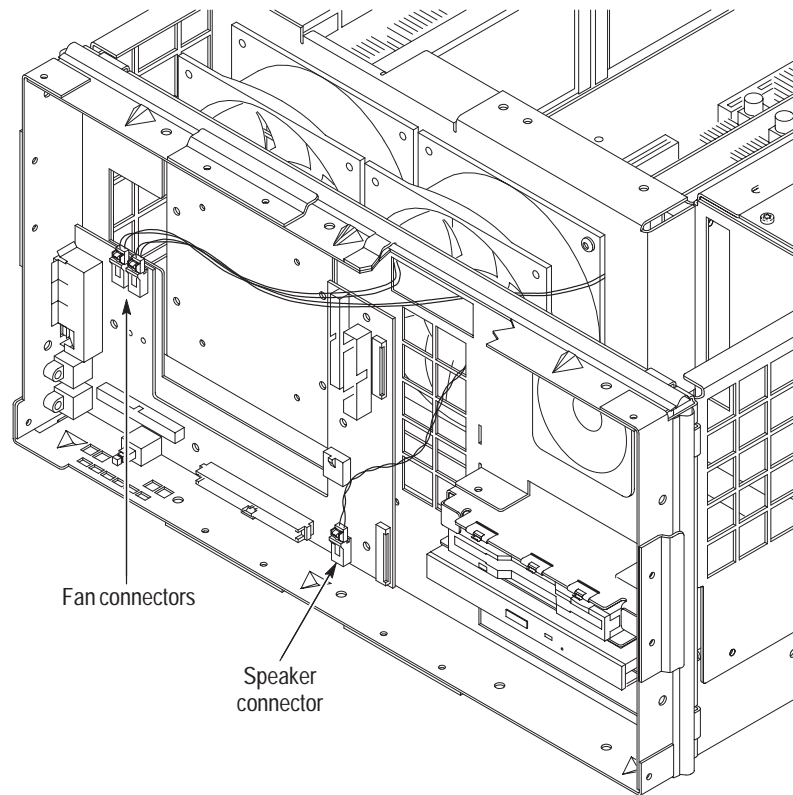
Figure 6–26: Cut-away view showing wire routing of fan and speaker wires

10. Connect the ribbon cable connector from the controller I/O to the interface board controller connector.

11. Connect the CD stereo cable.

12. Connect the power supply cable.

13. Connect the ribbon cable connector from the key pad assembly to the interface board.

14. Reinstall the interface circuit board cover assembly.

Backplane Circuit Board Removal and Replacement

To remove the backplane, the power supply and all of the plug in circuit boards must first be removed.

Remove the Backplane. With the cabinet off the chassis, use the following procedure to remove the backplane:

1. Remove the power supply module (see *Power Supply Removal and Replacement* on page 6–35).

2. Remove all the plug in modules from the card bay (see the PQM300 module removal instructions starting with *Removing a PQM300 Plug-in Module* on page 6–22).

3. Disconnect the RS232 cable connector from the backplane circuit board.

4. Remove the 15 screws holding the backplane board assembly to the chassis with a T15 screw tip screwdriver (see Figure 6–27 for the screw locations).

5. Lift the back plane board assembly out of the chassis.

Power supply connectors
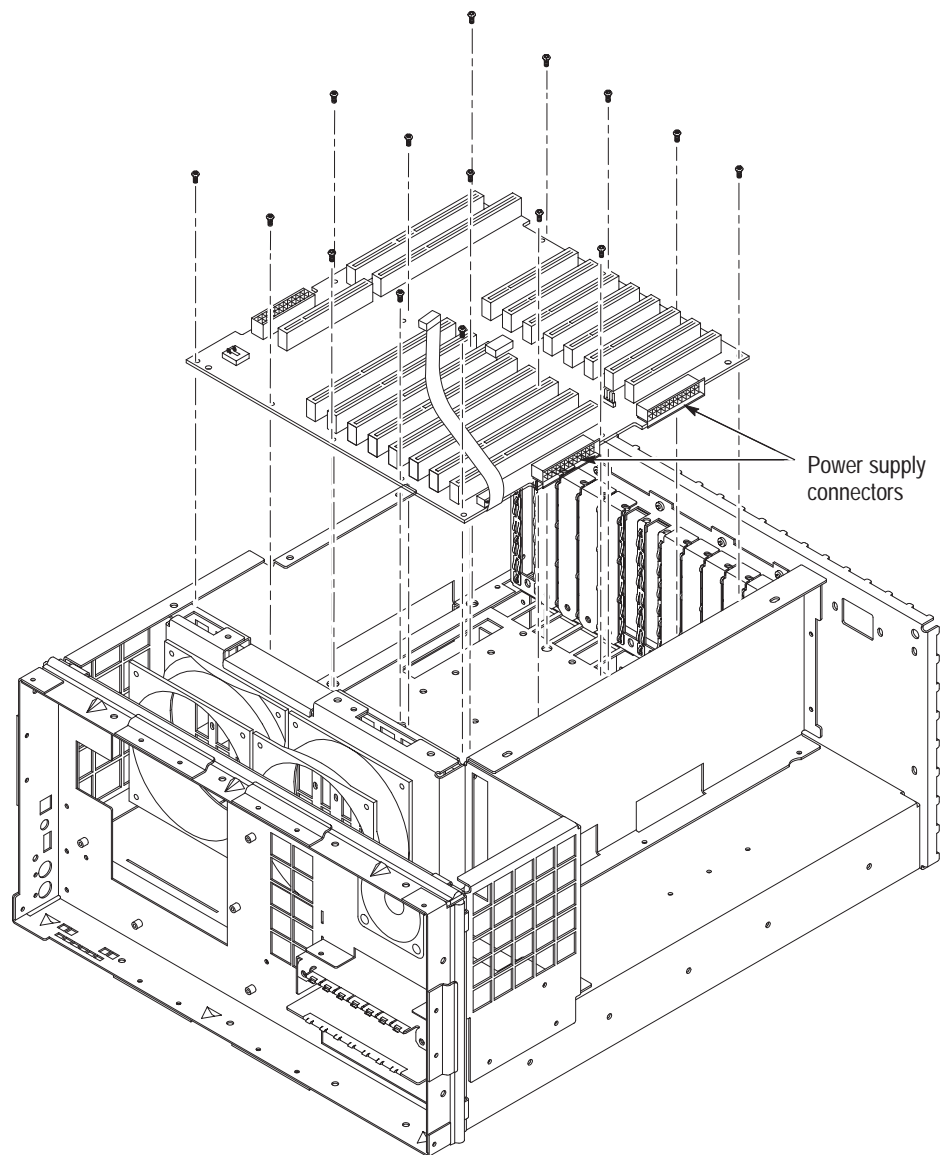
Figure 6–27: Backplane orientation and screw locations

Reinstall the Backplane. Use the following procedure to reinstall the backplane circuit board into the mainframe card bay.

1. Place the backplane board assembly into the mainframe chassis. See Figure 6–27 for orientation of back plane to chassis.

2. Attach backplane board assembly to the chassis with fifteen T15 screws. Torque the screws to 8 in-lbs.

3. Connect the RS232 cable connector to the backplane circuit board.

4. Reinstall the PCI plug in modules using their reinstallation instructions (refer to *Reinstalling a PQM300 Plug-In Module* on page 6–23 and *Controller I/O Board Removal and Replacement* on page 6–39).

5. Reinstall the power supply assembly using its reinstallation instructions (refer to *Power Supply Removal and Replacement* on page 6–35).

6. Reinstall the circuit board retaining plate.

7. Reinstall the cabinet and front bezel to complete the assembly (refer to and *Replacing the PQM300 Cabinet* on page 6–20 and *Replacing the Bezel Trim Ring* on page 6–21).

CPU Jumper Settings

Jumper positions set the CPU clock speed, enable or disable CPU features, or make operational settings for the CPU. The following tables show the jumper settings. Figure 6–28 shows the jumper locations on the CPU board with the jumpers in their factory settings.

CPU and Bus Speed Settings. The CPU speed setting is 266 MHz with a bus speed of 66 MHz.

Table 6–9: CPU Speed settings

CPU Speed	Bus	E1	E2	E3	E4
233 MHz	66 MHz	OFF	OFF	ON	ON
266 MHz	66 MHz	ON	ON	OFF	ON
300 MHz	66 MHz	OFF	ON	OFF	ON
333 MHz	66 MHz	ON	OFF	OFF	ON
350 MHz	100 MHz	OFF	OFF	ON	ON
400 MHz	100 MHz	ON	ON	OFF	ON
450 MHz	100 MHz	OFF	ON	OFF	ON

VGA Display Settings. The VGA display jumpers on the CPU board are set for the default LCD flat panel display provided with Option LC. This is an 800 X 600

LCD display only. To use a 1024 X 768 TFT flat panel display, you need to change the jumper at E10 to "short". If you attempt to use a DSTN flat panel at 1024 X 768, the four jumpers at E10, E11, E12, and E13 must all be on or in the "short" position.

Table 6–10: Flat panel jumper settings

VGA Display	E10	E11	E12	E13
640 X 480 TFT (Sharp)	OFF	ON	OFF	ON
800 X 600 TFT	OFF[1]	OFF[1]	OFF[1]	ON[1]
1024 X 768 TFT	ON	OFF	OFF	ON
1280 X 1020 TFT	OFF	ON	ON	ON
640 X 480 DSTN	ON	OFF	ON	ON
800 X 600 DSTN	OFF	OFF	ON	ON
1024 X 768 DSTN	ON	ON	ON	ON

[1] Default setting for the PQM3FLC flat panel display
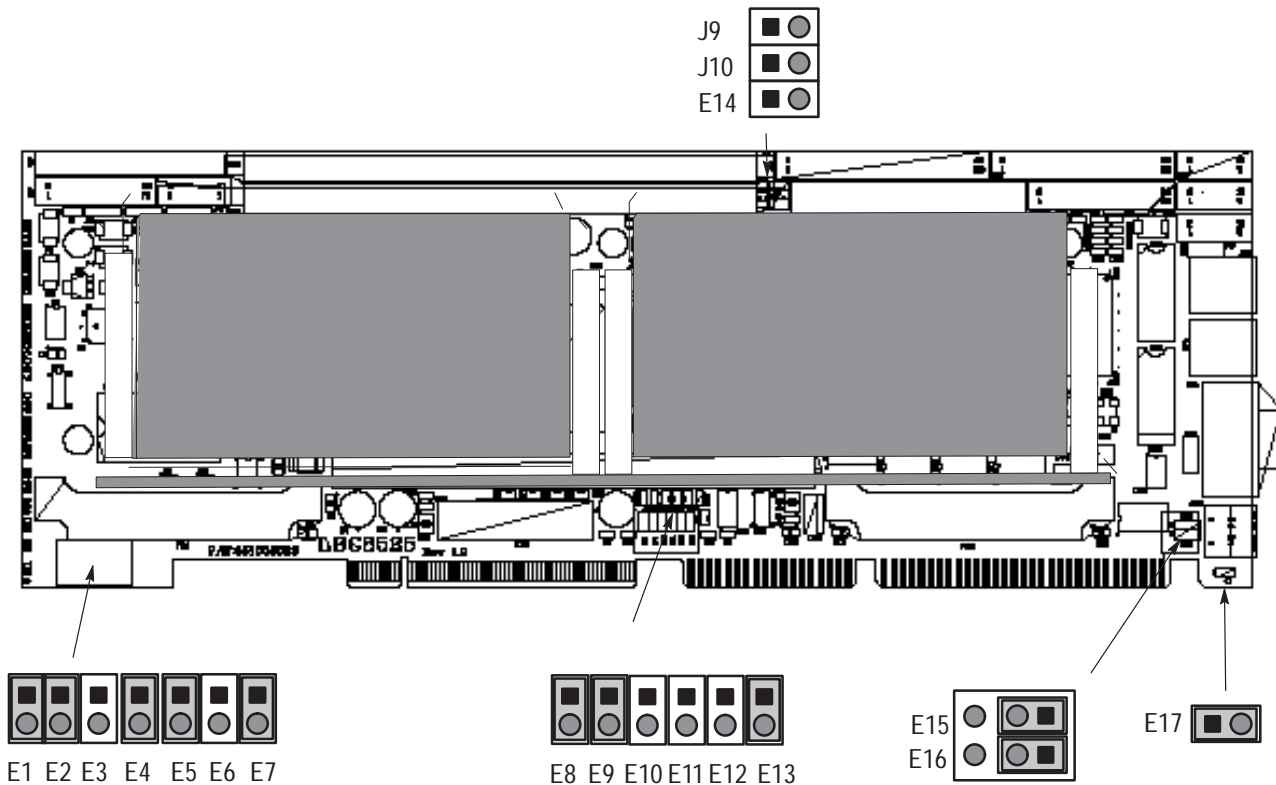
Figure 6–28: CPU Jumper setting locations

Repacking for Shipment

If a instrument is to be shipped to a Tektronix field office for repair, attach a tag to the instrument showing the following:

- Owner's name and address

- Serial number

- Description of the problem(s) encountered and/or service required.

The PQM300 Program QoS Monitor is shipped in cartons designed to provide it with the maximum protection. If you ship the instrument subsequently, you will need to use these cartons, the spacer pads, the protective bag, and the instrument support inserts to provide adequate protection.

NOTE. The PQM300 Program QoS Monitor shipping carton in good condition must be used to return the instrument to Tektronix service centers. We cannot honor the warranties if the program monitor is not shipped in its original carton or in a replacement carton and its supporting packaging material purchased from Tektronix. Contact your Tektronix representative to obtain new packaging.

Obtaining Replacement Packaging

New packaging material is available from Tektronix. The part numbers are in Table 6–11 and in the *Replaceable Mechanical Parts List* in the service manual. Packaging components are shown in Figure 6–30. Each component has an index number, which also appears in Table 6–11. To obtain these items contact your nearest Tektronix office or representative.

Table 6–11: Packaging material

Item	Tektronix part number	Index number
Accessory tray (keyboard)	004-4851-00	
Accessory tray	004-4852-00	
Spacer pad (makes two pads for inner shipping box)	004-4925-01	
Anti-static pouch	006-2427-01	
Protective bag	006-8164-00	
Top tray (cardboard insert)	004-4912-00	1
Instrument support inserts; top and bottom	004-4913-00	2
Inner shipping box	004-4926-00	3
Shipping box	004-4914-00	4

Repackaging Instructions   When the PQM300 is shipped, it is important to provide it with the maximum protection. Figure 6–29 shows how to repackage the program monitor for shipment. As the Figure shows, it is not necessary to have the accessories received with the PQM300 program monitor in the package for reshipment to repair. If you are shipping to another site for reinstallation, the accessories are packed last in accessory trays at the top of the box.

The inner shipping box, pads, and protective bag provide the necessary protection to allow the shipping materials of the outer shipping box to correctly support the product for shipment. Pack the inner shipping box as follows:

1. If you have the original packaging material, start by placing one of the spacer pads in the bottom of the inner box. Position the side of the pad with the smaller, square holes against the side of the box as shown in Figure 6–29.

2. Remove the optional accessory pouch, if installed, and place the protective front cover on the front of the program monitor.

3. Place the program monitor in the protective bag. The bag prevents dust, moisture, or other small packaging debris from entering the cabinet.

4. Fold the top of the bag neatly over the top of the PQM300 to make it as flat as possible and seal with packing tape.

5. Place the bagged PQM300 program monitor in the inner shipping box. The small feet on the bottom of the cabinet go in the square holes in the spacing pad and the larger feet near the front of the program monitor go in the larger rectangular holes. The bezel end of the cabinet fits over the edge of the spacer pad.

Bottom spacer pad
(1/2 of 004-4925-00)

Outside edge of box

Spacer pad
positioned inside the
bottom of the box
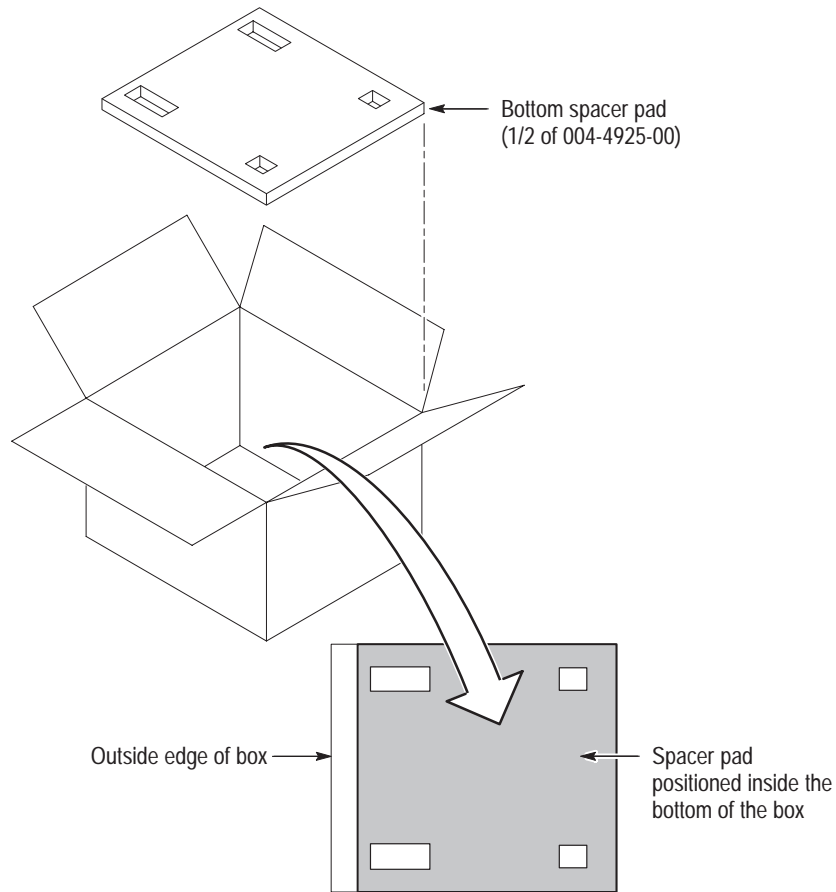
Figure 6–29: Placement of bottom spacer pad in inner shipping box

6. Place the other spacer pad on top of the PQM300. Again, place the side with the small square holes against the side of the box. The protective front cover on the bezel of the PQM300 is not covered by the top spacer pad.

7. Close and tape the inner shipping box.

8. Place one of the support inserts in the bottom of the outer shipping box, film side up as shown in Figure 6–30.

9. Place the sealed inner shipping box in the center of the bottom support insert in the outer shipping box.

10. Put the second support insert over the inner shipping box, film side down.

NOTE. If you are using new packing material purchased from Tektronix, pre-stretch the film in the support inserts by pushing down firmly several times on the top support insert.

11. Place the top tray in the box. If you are not shipping accessories with the measurement set, close and tape the outer shipping box.

12. When shipping the accessories, place the two accessory trays in the top tray, arrange the accessories in the trays, and then close and tape the outer shipping box.

13. Attach the appropriate shipping documents needed to ship the measurement set to its destination (either to Tektronix for repair or to another location).

Note: The keyboard, mouse, and manual boxes do not need to be returned with the program monitor for servicing.
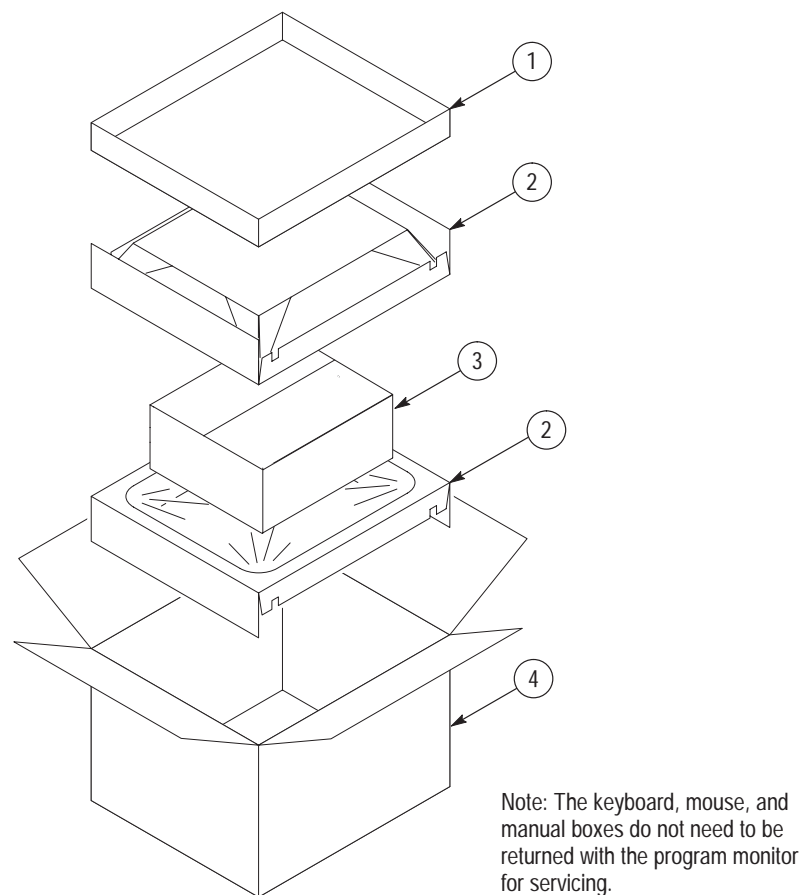
Figure 6–30: Repackaging the program monitor

Options

Options

This section provides the optional configuration information and lists the optional accessories available for the PQM300 Program QoS Monitor at the time of printing of this manual.

Optional Configurations

PQM300   PQ Monitor (two serial digital program monitor channels standard)

PQM3F01   Adds one Composite Analog Decoder to standard configuration (up to four can be added, along with two more program monitor modules, for a total of four composite video program monitor channels)

PQM3F03   Adds one PQM300 Program Monitor module to standard configuration (up to six can be added for a total of eight serial digital program monitor channels)

PQM3FLC   Adds flat panel display with touch screen, keypad, keyboard, and mouse.

PQM3FRB   Adds an alarm relay board with 16 relay contacts.

Optional Accessories
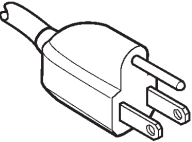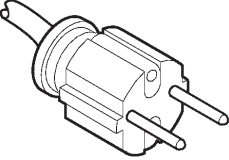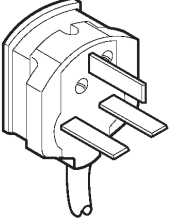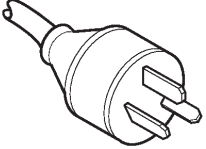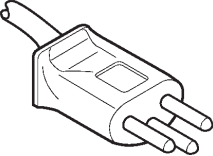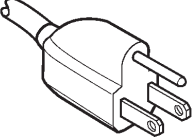
Table 7–1: Optional accessories

Description	Part number
Option 1S: PQM300 Program QoS Monitor Service Manual	071-0577-XX
Power cord options	
Option A1 Universal Euro 220 V	161-0066-09
Option A2 United Kingdom, 240 V	161-0066-10
Option A3 Australian 240 V	161-0066-11
Option A5 Swiss 220 V	161-0154-00
Option A6 Japan 100 V	161-0066-00 WITH 013-0310-00 ADAPTER

Optional Power Cords

The power cord options shown in Table 7–2 are available for the PQM300 Program QoS Monitor.

Table 7–2: Power cord options

Plug configuration	Normal usage	Option number
	North America 115 V	Standard
	Europe 230 V	A1
	United Kingdom 230 V	A2
	Australia 230 V	A3
	Switzerland 230 V	A5
	Japan 100 V with Adapter	A6

Replaceable Electrical Parts

Replaceable Electrical Parts

The replaceable electrical parts are the replaceable plugin modules and the circuit board assemblies. Those parts, along with the interconnection cables, replaceable hardware, and the accessories, are indexed in the mechanical parts exploded view illustrations. The part numbers are listed in the Replaceable Parts list in Section 10 of this manual.

Diagrams

Diagrams

Use the overall block diagram of the PQM300 Program QoS Monitor circuit boards to assist in identifying the interaction between modules when troubleshooting. Use the exploded view diagrams in the *Replaceable Parts List* of Section 10 to locate the modules installed in the PQM300 Program QoS Monitor.
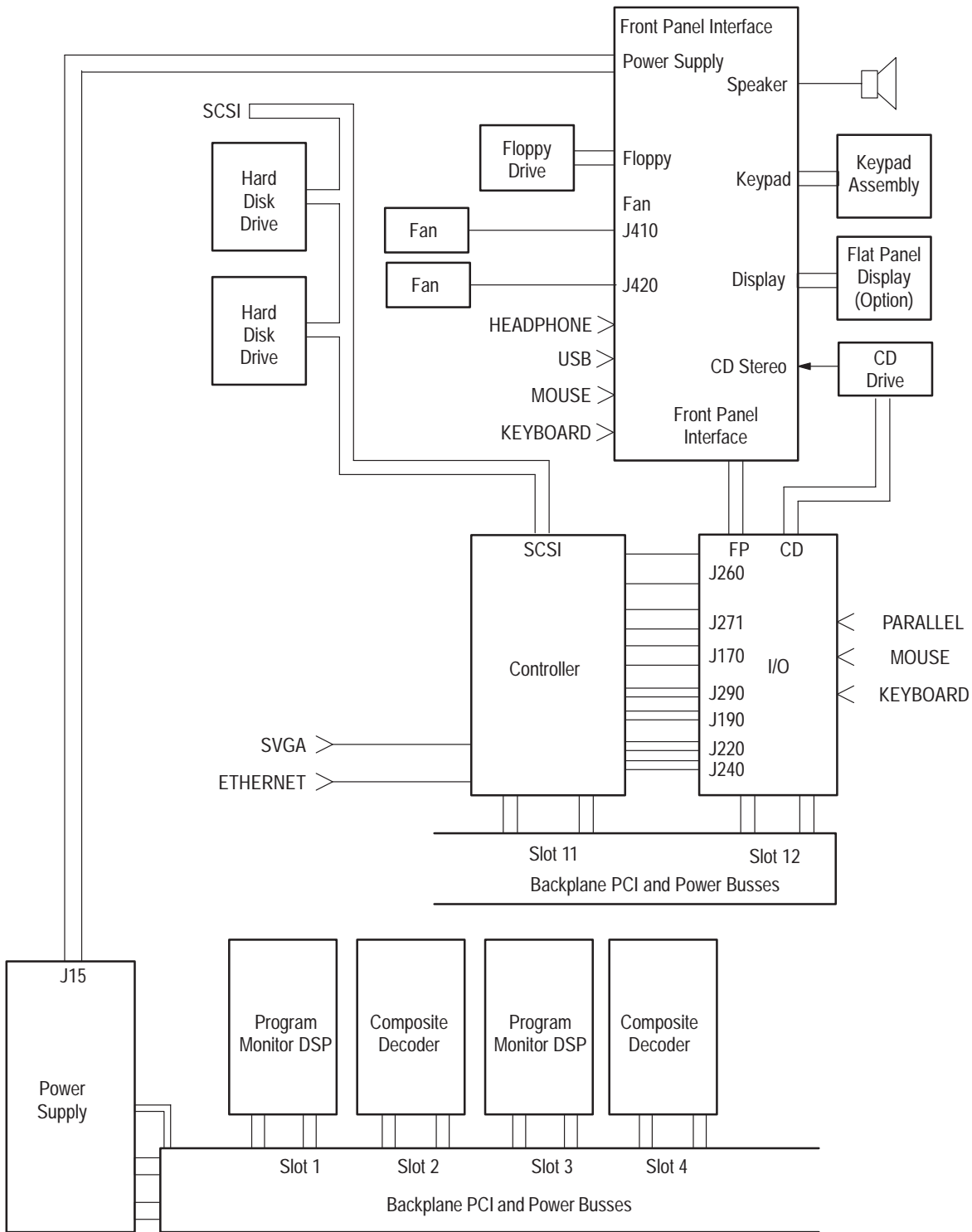
NOTE: Standard PQM300 has two Program Monitor DSP modules installed in slots 1 and 2

Figure 9–1: Simplified interconnection block diagram

Replaceable Mechanical Parts

Replaceable Parts

This section contains a list of the replaceable modules for the <instrument>. Use this list to identify and order replacement parts.

Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix 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.

Module Servicing

Modules can be serviced by selecting one of the following three options. Contact your local Tektronix service center or representative for repair assistance.

Module Exchange. In some cases you may exchange your module for a remanufactured module. These modules cost significantly less than new modules and meet the same factory specifications. For more information about the module exchange program, call 1-800-833-9200. Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices: www.tektronix.com.

Module Repair and Return. You may ship your module to us for repair, after which we will return it to you.

New Modules. You may purchase replacement modules in the same way as other replacement parts.

Using the Replaceable Parts List

This section contains a list of the mechanical and/or electrical components that are replaceable for the <instrument>. Use this list to identify and order replacement parts. The following table describes each column in the parts list.

Parts List Column Descriptions

Column	Column name	Description
1	Figure & Index Number	Items in this section are referenced by figure and index numbers to the exploded view illustrations that follow.
2	Tektronix Part Number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial Number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entries indicates the part is good for all serial numbers.
5	Qty	This indicates the quantity of parts used.
6	Name & Description	An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.
7	Mfr. Code	This indicates the code of the actual manufacturer of the part.
8	Mfr. Part Number	This indicates the actual manufacturer's or vendor's part number.

Abbreviations   Abbreviations conform to American National Standard ANSI Y1.1-1972.

Mfr. Code to Manufacturer Cross Index   The table titled Manufacturers Cross Index shows codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

Manufacturers cross index

Mfr. code	Manufacturer	Address	City, state, zip code
00779	AMP INC.	CUSTOMER SERVICE DEPT PO BOX 3608	HARRISBURG, PA 17105-3608
060D9	UNITREK CORPORATION	3000 COLUMBIA HOUSE BLVD, SUITE 1 20	VANCOUVER, WA 98661
06383	PANDUIT CORP	17303 RIDGELAND AVE	TINLEY PARK, IL 60477-3048
06915	RICHCO	5825 N TRIPP AVE P.O. BOX 804238	CHICAGO, IL 60646
01963	CHERRY ELECTRICAL PRODUCTS CO	3600 SUNSET AVENUE	WAUKEGAN, IL 60087–3214
03ZT7	MOBILE PLANET	9175 DEERING AVE	CHATSWORTH, CA 91311

Manufacturers cross index (Cont.)

Mfr. code	Manufacturer	Address	City, state, zip code
060D9	UNITREK CORPORATION	3000 COLUMBIA HOUSE BLVD, SUITE 1 20	VANCOUVER, WA 98661
0ADN8	DELTA PRODUCTS CORP-DPZ	4405 CUSHING PARKWAY	FREMONT, CA 94538
0B445	ELECTRI-CORD MFG CO INC	312 EAST MAIN STREET	WESTFIELD, PA 16950
0D1M6	NMB TECHNOLOGIES INC	9730 INDEPENDENCE AVE	CHATSWORTH, CA 91311
0KB01	STAUFFER SUPPLY CO	810 SE SHERMAN	PORTLAND, OR 97214-4657
0KB05	NORTH STAR NAMEPLATE INC	5750 NE MOORE COURT	HILLSBORO, OR 97124-6474
12136	PHC INDUSTRIES INC	1643 HADDON AVE PO BOX 1448	CAMDEN, NJ 08103
1AW87	LEWIS SCREW CO.	4300 SOUTH RACINE AVENUE	CHICAGO, IL 60609
22670	GM NAMEPLATE INCORPORATED	2040 15TH AVE WEST	SEATTLE, WA 98119-2783
26233	NYLOK FASTENER CORP	1161 E SANDHILL AVE #D PO BOX 5228	CARSON, CA 90746
2K262	BOYD CORPORATION	6136 NE 87TH AVENUE	PORTLAND, OR 97220
2W733	BELDEN WIRE & CABLE COMPANY	2200 US HWY 27 SOUTH PO BOX 1980	RICHMOND, IN 47374
30817	INSTRUMENT SPECIALTIES CO INC.	SHIELDING WAY PO BOX 650	DELAWARE WATER GAP, PA 18327
3M099	PORTLAND SCREW COMPANY	6520 N BASIN AVE	PORTLAND, OR 97217
46628	LOGITECH INC	6505 KAISER DR	FREMONT, CA 94555
4T165	NEC ELECTRONICS, INC.	2880 SCOTT BLVD PO BOX 58062	SANTA CLARA, CA 95052–8062
50356	TEAC AMERICA INC	7733 TELEGRAPH RD PO BOX 750	MONTEBELLO, CA 90640-6537
52152	3M COMPANY	INDUSTRIAL TAPE DIVISION 3M CENTER	ST PAUL, MN 55144-1000
54407	POWER-ONE INC	740 CALLE PLANO	CAMARILLO, CA 93010
5F520	PANEL COMPONENTS CORP	PO BOX 115	OSKALOOSA, IA 52577-0115
5Y400	TRIAX METAL PRODUCTS INC	1880 SW MERLO DRIVE	BEAVERTON, OR 97006
61058	MATSUSHITA ELECTRIC CORP OF AMERICA	PANASONIC INDUSTRIAL CO DIV TWO PANASONIC WAY	SECAUCUS, NJ 07094
64409	DIVERSIFIED TECHNOLOGY INC	476 HIGHLAND COLONY PKY PO BOX 748	RIDGELAND, MS 39158-0748
7X318	KASO PLASTICS INC	5720-C NE 121ST AVE, STE 110	VANCOUVER, WA 98682
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON, OR 97077-0001
80126	PACIFIC ELECTRICORD CO	747 WEST REDONDO BEACH PO BOX 10	GARDENA, CA 90247-4203
8Z692	INTERMEC TECHNOLOGIES CORP	9290 LESAINT DRIVE	FAIRFIELD, OH 45014
93907	CAMCAR DIV OF TEXTRON INC	ATTN: ALICIA SANFORD 516 18TH AVE	ROCKFORD, IL 611045181
9F560	IBM CORPORATION	420 E SOUTH TEMPLE ST	SALT LAKE CITY, UT 84145
TK0AT	AMP, INC	7-15-14 ROPPONGI MINATO-KU	TOKYO JAPAN,
TK0588	UNIVERSAL PRECISION PRODUCT	1775 NW CORNELIUS PASS RD	HILLSBORO, OR 97124
TK1163	POLYCAST INC	14140 SW 72ND AVE SUITE 100	TIGARD, OR 97224

Manufacturers cross index (Cont.)

Mfr. code	Manufacturer	Address	City, state, zip code
TK1562	XPEDX.	9111 NE COLUMBIA BLVD	PORTLAND, OR 97220
TK1935	ACCRA-FAB INC	11007 NE 37TH CIRCLE	VANCOUVER, WA 98682
TK1943	NEILSEN MANUFACTURING INC	3501 PORTLAND RD NE	SALEM, OR 97303
TK2172	WYLE ELECTRONICS INC	10300 SW NIMBUS AVE BLDG P, SUITE B	PORTLAND, OR 97223
TK2250	ARROW ELECTRONICS INC.	9500 SW NIMBUS AVE, BLDG E	BEAVERTON, OR 97008-7163
TK2383	PANASONIC INDUSTRIAL CO	1600 MC CANDLESS DR	MILPITAS, CA 95035
TK2376	CONDUCTIVE RUBBER TECH	22125 17TH AVE SE, SUITE 117	BOTHELL, WA 98021
TK2383	PANASONIC INDUSTRIAL CO	1600 MC CANDLESS DR	MILPITAS, CA 95035
TK2385	METALCAST ENGINEERING INC	4800 COLISEUM WAY	OAKLAND, CA 94601
TK2411	TEKTRONIX HONG KONG	8/F MAPPIN HOUSE 98 TEXACO RD	TSUEN WAN, N. T., HONG KONG CN
TK2480	WILLAMETTE PLASTIC	1111 NW 5TH PLACE	CANBY, OR 97013
TK2541	AMERICOR ELECTRONICS LTD	UNIT-H 2682 W COYLE AVE	ELK GROVE VILLAGE, IL 60007
TK2548	XEROX CORPORATION	14181 SW MILLIKAN WAY	BEAVERTON, OR 97005
TK2607	VANSTAR CORPORATION	OREGON CORP ACCOUNTS DIVISION 16280 SW UPPER BOONES FERRY RD	PORTLAND, OR 97224
TK2647	INSTRUMENT SPECIALTIES CO INC.	C/O TEMCO NW 1336 SE 51ST STREET	HILLSBORO, OR 97123
TK6074	DYNAPRO THIN FILM PRODUCTS	7025 WEST MARCIA RD.	MILWAUKIE, WI 53223
TK6108	KENT H LANDSBERG CO	27929 SW 95TH, SUITE 101	WILSONVILLE, OR 97070
TK6181	IMC PLASTICS INC	19400 SW TETON AVE	TUALATIN, OR 97062

Replaceable parts list

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
10–1							
1	679-4778-00			1	CIRCUIT BD ASSY: PICMG BACKPLANE. 679-4778-00 TESTED. 389-2828-00 WIRED. 2	80009	671-4778-00
2	211-0722-00				SCREW. MACHINE: 6-32 X 0.250. PNH. STL. CDPL. T-15 TORX DR	0KB01	ORDER BY DESCRIPTION
3	351-1022-00			10	CARD GUIDES: L-3.0(76.2) A-2.5(63.5). NYLON 6/6. RMS-48	06915	RN-300-2
4	441-2180-00			1	CHASSIS ASSY: AL. ETCH & CHROMATE.	TK1943	441-2180-00
5	011-0175-00			1	TERMINATOR: SCSI III. SINGLE ENDED. ACTIVE. SHIELDED. 68 POS. MALE. 0.05 CTR. W/JACK-SCREWS	TK0AT	869516-1
	213-1087-00			2	SPACER. POST: 0.562 L. W/4-40 THD 0.405 L. 2-56 INT THD. 0.157 STAND O.157 STANDOFF. ACCOM SCSI CO	00779	749087-1
	333-4328-00			1	PANEL. REAR: 3.560 X 1.550. 0.062 AL. ETCH AND CHROMATE. SCSI CONNECTOR	5Y400	333-4328-00
6	119-5832-00			1	FILTER. RFI: LINE FILTER. 6A. 50/60 HZ. 115/260 VAC. LEAKAGE CURRENT 0.4MA AT 250VAC/60HZ. 06GENG	0ADN8	06GENG3E
7	378-0454-00			1	FAN GUARD: FAN. GUARD. 4-POSITION	0D1M6	055013
8	119-5694-00			1	FAN. DC: TUBEAXIAL. 12 V. 2.7W. 83 CFM. 56.8 DBA. 2850 RPM. 92MM X 92MM X 25MM. W/2 PIN CONNECT	61058	FBA09A12H
9	650-3760-00		B010147	1	PWR SUPPLY ASSY:	80009	650-3760-00
	671-4124-00		B010147	1	CIRCUIT BD ASSY:POWER CONDITIONING,TESTED,389–2406–00 WIRED	80009	671-4124-00
	650-3760-01	B010148		1	PWR SUPPLY ASSY:	80009	650-3760-01
	671-4124-01	B010148		1	CIRCUIT BD ASSY:POWER CONDITIONING,TESTED,389–2406–00 WIRED	80009	671-4124-01
10	174-3795-00			1	CABLE ASSY. SP: SPEAKER. CPD. 30-26AWG. 10.0 L. 1X2. 0.1 CTR. RCPT. FEMALE. LATCHING. PLZ. MTE. AMP 103961-	060D9	174-3795-00

Figure 10–1: Chassis parts

Replaceable parts list

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
10–2							
1	671-4793-00			1	CIRCUIT BD ASSY: PROCESSOR. IO. 679-4793-00 TESTED	80009	671-4793-00
2	407-4699-00			1	BRACKET PCI PROCESSOR I/O BOARD. 18 GA CRS	TK1943	407-4699-00
3	672-1551-01			1	CIRCUIT BD ASSY: PICMG PCI. CONTROLLER	80009	672-1551-01
4	407-4705-00			1	BRACKET. PCI: 18 GA CRS. DTI PROCESSOR	TK1943	407-4705-00
5	131-0890-01			2	CONN. HARDWARE: DSUB. JACK SCREW. 4-40 X 0.312 L HEX HD. STL CD PL. W/O WASHERS & NUT	00779	205818-2
	210-0054-00			2	WASHER. LOCK #4 SPLIT. 0.025 THK STL CD PL		
6	671-4797-00			2	CIRCUIT BD ASSY: DSP. 389-2848-00 WIRED. PQM300	80009	671-4797-00
7	211-0722-00			80	SCREW. MACHINE: 6-32 X 0.25. 0PN. HST. LCDP. LT-15 TORX DR	0KB01	ORDER BY DESCRIPTION
8	407-4716-00			2	BRACKET: REAR PANEL MOUNT. DSP. AL. NI PLT.	TK1943	407-4716-00
	671-4219-00			1	CIRCUIT BD ASSY: DECODER BD TESTED. PQM3F01	80009	671-4219-00
	407-4752-00			1	BRACKET. CKT BD: REAR PANEL MOUNT. DECODER. AL. PQM300	TK1943	407-4752-00
9	407-4569-00			10	BRACKET: 0.044 C1010/1020 CRS. ZI PLT. BLANK PCI. NO EARS.	TK1943	407-4569-00
	407-4715-00			4	BRACKET: 0.062 AL. SIDE MOUNTING. 5.0L X 0.750. ETCH/CHROMATE	TK1943	407-4715-00
10	211-0747-00			8	SCREW. MACHINE: 6-32 X 0.188. PNH. STL. CDPL. T-15 TORX DR	0KB01	ORDER BY DESCRIPTION
11	407-4710-00			4	BRACKET: SCSI DRIVE MTG. 15.580 X 10.250. 0.062AL. CHROMATE	5Y400	407-4710-00
12	119-6344-00		Sept. 2000	1	DISK DRIVE PQM300. PROGRAMMED VERSION 1.01: WINCHESTER. 3.5 INCH. 9 GBYTE. SCSI. 25L1810	80009	119-6344-00
	119-6344-01	Sept. 2000		1	DISK DRIVE PQM300. PROGRAMMED VERSION 2.0: WINCHESTER. 3.5 INCH. 9 GBYTE. SCSI. 25L1810	80009	119-6344-01
	119-6175-00			1	DISK DRIVE: WINCHESTER. 3.5 INCH. 9 GBYTE. SCSI. 25L1810	9F560	25L1810
13	348-1567-00			6	GASKET. ELEC: CLIP ON. 16 X 0.51. BE CU. BRIGHT NI PLT	TK2647	97-521-19
14	211-1079-00			3	SCREW. MACHINE: 2.6 X 0.45 MM. 3.0L. PNH. STL. NICKEL PL. PHILLIPS. JCIS	0KB01	10310188-0
15	211-0950-00			4	SCREW. MACHINE: M2X3MM. PHL. PNH. STL NI PL	0KB01	0310248-0
16	407-4721-01			1	BRACKET ASSY: DRIVE MOUNTING. 0.040 AL. ALLOY 5052 H32. ETCH/CHROMATE	TK1943	407-4721-01
17	119-6106-00			1	DISK DRIVE: FLOPPY. 3.5INCH. 1.44 MB. 0.5 IN HIGH. BLACK BEZEL. DDDS. 96 X 126 X 12.7MM. FD-05HF563	TK2250	FD-05HF5630

Replaceable parts list (Cont.)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
18	348-1432-00			1	FOOT: 6.5MM W X 43.50MM L. 2MM THK. RUBBER. BLACK. INSTRUMENT SUPPORT	TK2411	348-1432-00
19	119-5728-00			1	DISK DRIVE: OPTICAL. 644MB. CD-ROM. 16.7 MB/SEC. IDE/ATAPI. CD-224E-903.	50356	CD-224E-903
20	671-4377-00			1	CIRCUIT BD ASSY: CD ROM INTERFACE. 389-2561-00 WIRED	80009	671-4377-00
21	407-4515-01			1	BRACKET: HARD DRIVE MTG. 0.040 ALUMINUM. ALLLOY 5052 H34.	TK1943	407-4515-00
22	211-0721-00			2	SCREW. MACHINE: 6-32 X 0.375. PNH. STL. CDPL. T-15 TORX DR	0KB01	ORDER BY DESCRIPTION
	210-0457-00			1	NUT. PL. ASSEM WA: 6-32 X 0.312. STL CD PL. W/LOCKWASHER	0KB01	ORDER BY DESCRIPTION
23	119-5695-00			2	FAN. DC: TUBEAXIAL. 12 V. 3.24W. 2300 RPM. 83 CFM. 119MM X 38MM. 35 DBA. W/2 PIN CONNECTOR.	TK1943	NMB 4715KL-04W-B10-P00
24	407-4700-00			1	BRACKET ASSY: FAN MOUNTING.	TK1943	407-4700-00
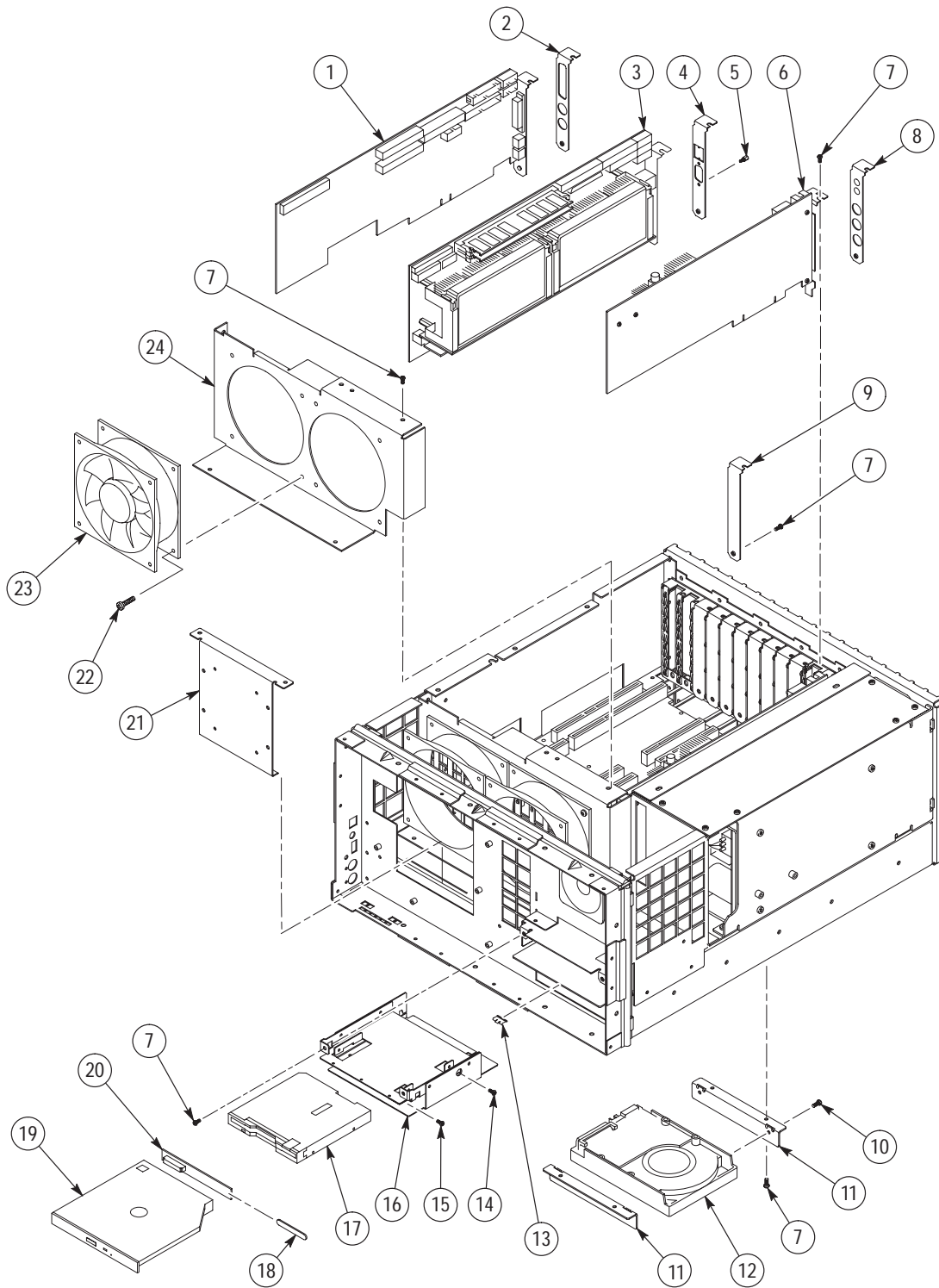
Figure 10–2: Modules and mounting hardware

Replaceable parts list

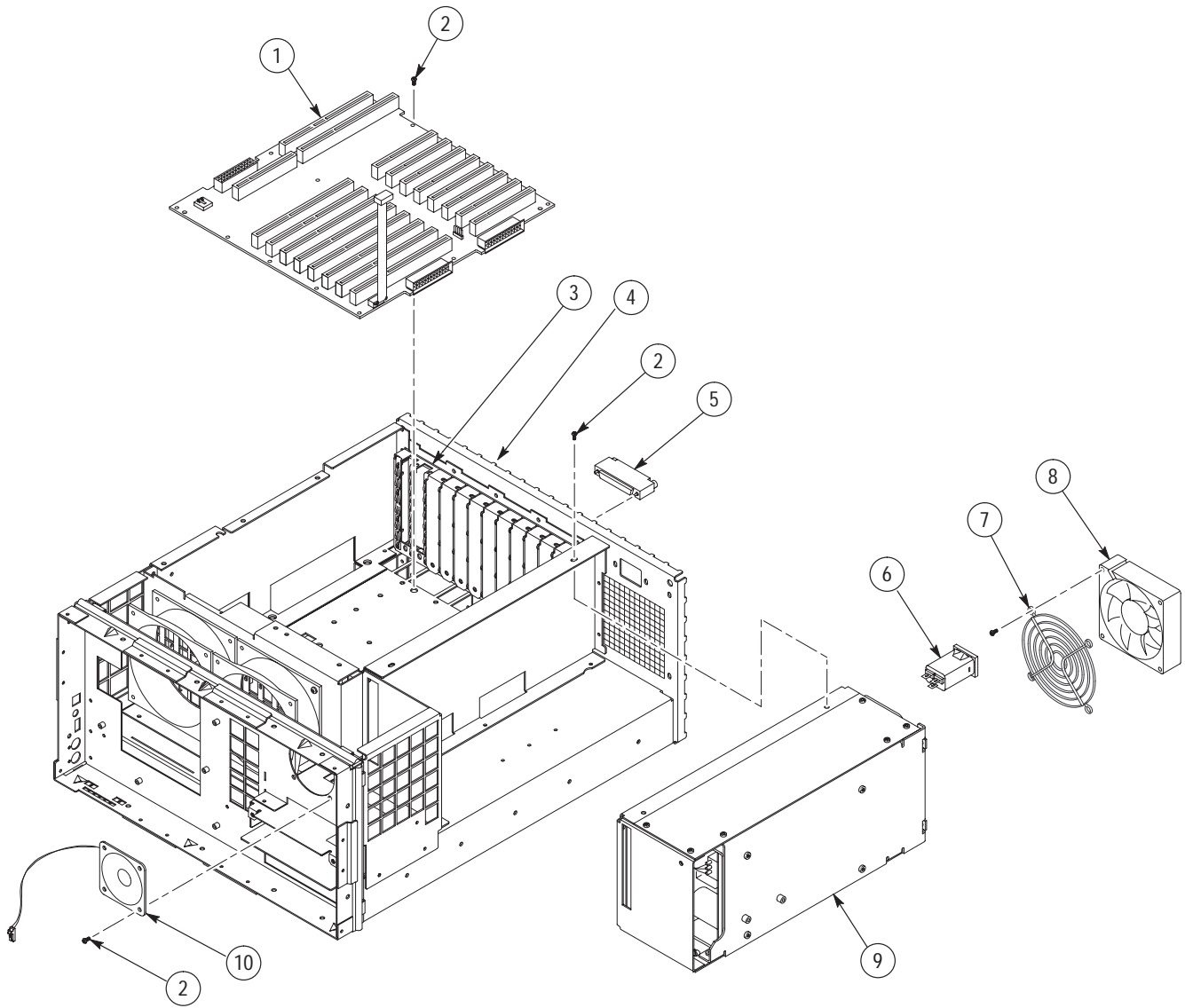| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
10–3							
1	211-0895-00			2	SCREW. MACH: M2.6 X 0.45 X 8MM. PHILLIPS. PNH. ZINC YELLOW	0KB01	211-0895-00
2	211-0722-00			80	SCREW. MACHINE: 6-32 X 0.250. PNH. STL. CDPL. T-15 TORX DR	0KB01	ORDER BY DESCRIPTION
3	679-4125-01			1	CIRCUIT BD ASSY: KEYPAD. TESTED. WIRED	80009	671-4125-01
4	407-4495-00			1	BRACKET: KEYPAD MTG. 0.050 ALUMINUM. ALLOY 5052 H34	TK1943	407-4495-00
	614-0977-01			1	KEYPAD ASSY; BLANK		
	334-9988-01			1	MARKER. IDENT; FRONT PANEL		
5	200-4304-00			1	BEZEL: PC ABS. 9 X 17 X 1.50	TK2385	FRONT TRIM. HOUSING
6	366-0791-00			1	KEYCAP: POWER. 0.2X0.4X1.326. POLYCARBONATE.	7X318	366-0791-00
7	101-0156-00			1	TRIM: INSERT. PC/ABS. 8.7L X 6.6W. TV GRAY.	TK6181	101-0156-00
8	334-9582-00			1	MARKER. IDENT: LABEL. POWER BUTTON. 2.000 X 0.735	0KB05	334-9582-00
9	352-1068-00			2	LENS. LIGHT: CLEAR. ACRYLIC. LIGHT PIPE. 1.729 X 0.140	7X318	352-1068-00
10	407-4074-00			1	BRACKET: DISPLAY ASSEMBLY	TK1943	407-4704-00
11	679-4952-00			1	CIRCUIT BD ASSY: INTERFACE. TESTED. 389-2955-00 WIRED. 2	80009	671-4952-00
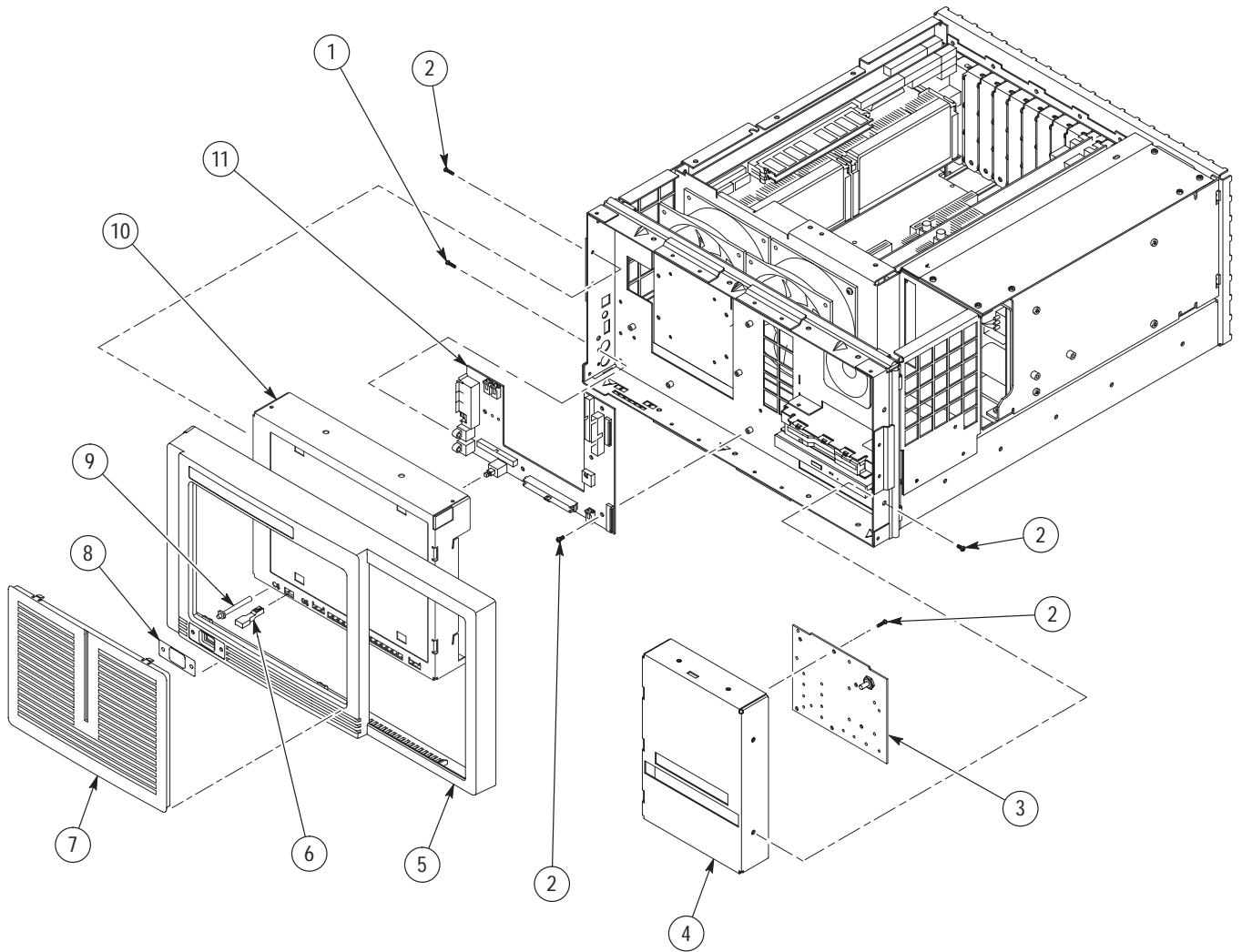
Figure 10–3: Front panel parts

Replaceable parts list

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
10–4							
1	343-1652-00			1	RETAINER: CIRCUIT BOARD	TK1943	343-1652-00
2	174-4229-00			1	CABLE ASSEMBLY: PARALLEL PORT. 2.500 INCHES	060D9	174-4229-00
3	174-4226-00			1	CAB: E ASSEMBLY. PARALLEL PORT. 2 X 13. 2.500 INCHES	060D9	174-4226-00
4	174-4227-00			1	CABLE ASSEMBLY: FLOPPY. 2 X 17. 2.500 INCHES	060D9	174-4227-00
5	174-4225-00			2	CABLE ASSEMBLY: KEYBOARD/MOUSE. COM1. 2 X 5. 3.850 INCHES	060D9	174-4225-00
6	211-0721-00			2	SCREW. MACHINE 6-32 X 0.375. PNH. STL. CDPL. T-15 TORX DR		211-0721-00
7	174-3761-00			1	CA ASSY. SP: RIBBON. RS232. IDC. 9. 3.5 L END TO END. (DSUB. MALE. RTANG. 9 POS. 0.109 CTR. W/THD INSER	060D9	174-3761-00
8	131-0890-01			2	CONN. HARDWARE: DSUB. JACK SCREW. 4-40 X 0.312 L HEX HD. STL CD PL. W/2 FLAT WASHERS. 1 LOCK WASHER. 4	0KB01	131-0890-00
9	174-4260-00			1	CA ASSY: DESCRETE. SCSI POWER. 16AWG. 19.5L. 2 DRIVE VERSION	060D9	174-4260-00
10	343-0775-00			2	CABLE. CLAMP: RIBBON. 1.0 X 1.0. GRAY. POLYVINYL. W/URETHANE FOAM TAPE BACKING. RETAINS 6 RIBBON CABLES	52152	80610029243/3484-1000
11	174-4261-00			1	CA ASSY: SCSI CONTROL. SCSI 68POS MALE X 3. SCSI 68 POS FEMALE PANEL MOUNT	060D9	174-4261-00
12	174-3786-01			1	CA ASSY. SP. LEC: HIGH DENSITY. FLOPPY DRIVE. ZIF. 6. .039 CTR. IN PLATED END FOR ZIF-LINE CONNECTOR	060D9	174-3786-01
13	179-4223-00			1	CABLE ASSEMBLY: FRONT PANEL INTERFACE. 2 X 50. 15.0 INCHES	060D9	174-4223-00
14	174-3814-00			1	CA ASSY. SP. ELEC: RIBBON. IDC. 4. 26-30 AWG. 15.0 L. (FEMALE. STR. 2 X 2. 0.079 CTR (2MM). BERG 69307-004)	060D9	174-3814-00
15	174-3787-00			1	CA ASSY. SP. ELEC: RIBBON. DISPLAY ADAPTOR BOARD. FLX. 50. 28AWG. 6.5 L. (RCPT. 2 X 50. FEMALE. STR. 0.079 C	060D9	174-3787-00
16	174-3789-00			1	CA ASSY. SP. ELEC: RIBBON. FRT PNL POWER. IDC. 30. 28AWG. PVC. 3 FOLDS (2.25 L. 8.5 L. 5.5L. 2.5L). (RCPT. F	060D9	174-3789-00
17	174-4237-00			1	CA ASSY: SP. BR. RIBBON. USB/SPEAKER. 26 AWG. 1 X 6 0.1 CTR X 2 - 1 X 4 0.1 CTR	060D9	174-4237-00
18	174-4224-00			1	CABLE ASSEMBLY: IDE TO CD ROM. 11.200 X 10.400 X 6.800 X 2.850	060D9	174-4224-00
19	174-4262-00			1	CA ASSY: RIBBON. SCSI LED. 26 AWG. 6.500L. 2X BERG P/N 65039-35	060D9	174-4262-00
20	211-0722-00			7	SCREW. MACHINE: 6-32 X 0.250. PNH. STL. CDPL. T-15 TORX DR	0KB01	ORDER BY DESCRIPTION
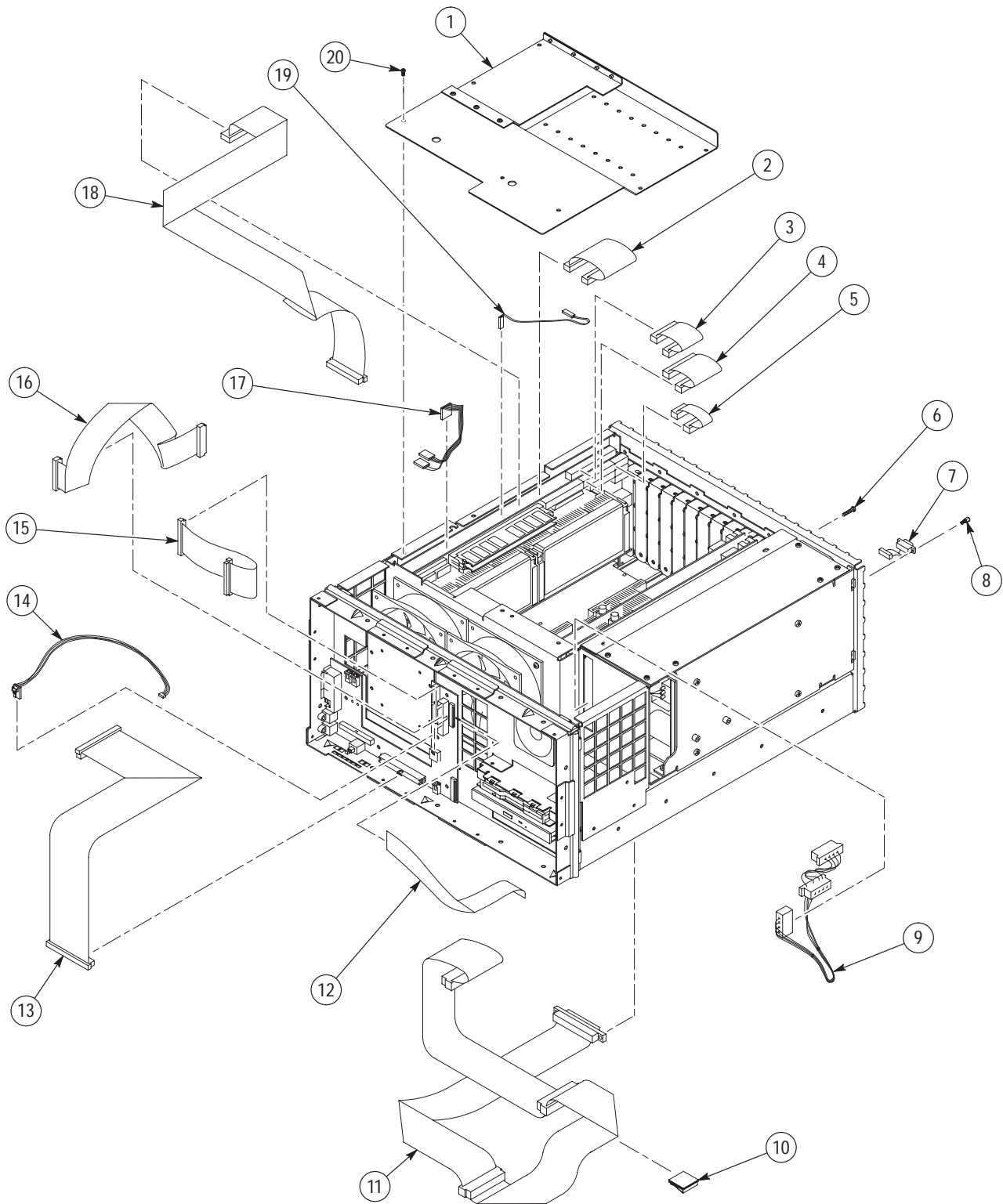
Figure 10–4: Interconnection cables

Replaceable parts list

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
10–5							
1	200-4408-00			1	COVER: PROTECTIVE. 0.125 ABS. BLACK. HAIRCELL TEXTURED GSE. W/ADHESIVE FOAM	TK2480	200-4408-00
2	348-1154-01			4	FOOT. CABINET: POLYCARBONATE. LEXAN940. EARTH BROWN	80009	348-1154-01
3	211-0738-00			4	SCREW. MACHINE: 6-32 X 0.625. PNH. STL BLK ZI. TORX	93907	ORDER BY DESCRIPTION
4	367-0477-00			1	HANDLE. CARRYING: DUAL DUROMETER MOLDED HANDLE. POLYPROPYLENE HANDLE VINYL GRIP SECTION.	12136	PT 3170
5	212-0213-00			2	SCREW. MACHINE: 8-32 X 0.75 L. PNH. STL. BLACK OXIDE PL. TORX	0KB01	212-0213-00
6	161-0066-00			1	CA ASSY. PWR; 3. 18 AWG. 250V/10A. 98 INCH . STR. IEC320. RCPT X NEMA 5-15P. US . SAFTEY CONTROLLED	0B445	ECM-161-0066-00
7	390-1176-00			1	CABINET. WRAPARO: WITH HANDLE AND MTG FEET. 0.050 ALUMINUM. . SAFETY CONTROLED	TK1943	390-1176-00
					ACCESSORIES		
	063-3243-01		Sept. 2000	1	SOFTWARE PKG: PICTURE QUALITY MONITOR APPLICATION. VER 1.01. PQM300	TK2548	063-3243-01
	063-3243-02	Sept. 2000		1	SOFTWARE PKG: PICTURE QUALITY MONITOR APPLICATION. VER 2.0. PQM300	TK2548	063-3243-02
	071-0576-01		Sept. 2000	1	MANUAL. TECH: USER. PQM300 PROGRAM QoS MONITOR	TK2548	071-0576-01
	071-0576-02	Sept. 2000		1	MANUAL. TECH: USER. PQM300 PROGRAM QoS MONITOR	TK2548	071-0576-02
	119-5514-01			1	SOFTWARE PKG: NT V4.0 KIT	TK2172	119-5514-01
	063-2971-00			1	SOFTWARE PKG:WINDOWS NT EMERGENCY REPAIR DISK,BLANK,3.5 HD DISKETTE	TK2548	063-2971–00
	016-1691-00			1	RACKMOUNT KIT: W/075-0372-01 INSTRUCTION SHEET. RFA300. PQM300. COMMON PLATFORM	5Y400	016169100
					OPTIONAL ACCESSORIES		
	071-0577-01			1	MANUAL. TECH SERVICE. PQM300 PROGRAM QoS MONITOR	TK2548	071-0577-01
					POWER CORDS OPTIONS		
	161-0066-09			1	CA ASSY. PWR: 3. 0.75MM SQ. 250V/10A. 99 INCH. STR. IEC320. RCPT. EUROPEAN. A1	2W733	ORDER BY DESCRIPTION
	161-0066-10			1	CA ASSY. PWR: 3. 1.0 MM SQ. 250V/10A. 2.5 METER. STR. IEC320. RCPT X 13A. FUSED UK PLUG(13A FUSE). UNITED KINGDOM. A2	TK2541	ORDER BY DESCRIPTION
	161-0066-11			1	CA ASSY. PWR: 3. 1.0MM SQ. 250V/10A. 2.5 METER. STR. IEC320. RCPT. AUSTRALIA. A3	80126	ORDER BY DESCRIPTION

Replaceable parts list (Cont.)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
	161-0154-00			1	CA ASSY. PWR: 3. 1.0MM SQ. 250V/10A. 2.5 METER. STR. IEC320. RCPT. SWISS. SAFTEY CONTROLLED. A5	5F520	86515030
	161-0066-00			1	CA ASSY. PWR: 3. 18 AWG. 250V/10A. 98 INCH. STR. IEC320. RCPT X NEMA 5-15P. US. SAFTEY CONTROLLED/WITH 013-0310-00. A6	0B445	ECM-161-0066-00
	013-0310-00			1	ADAPTER. CONN: GROUNDING PLUG ADAPTER. FLAT BLADE. 3-WIRE TO 2-WIRE. 112MM GROUNDING WIRE. 15A. P/O A6	5F520	88100010
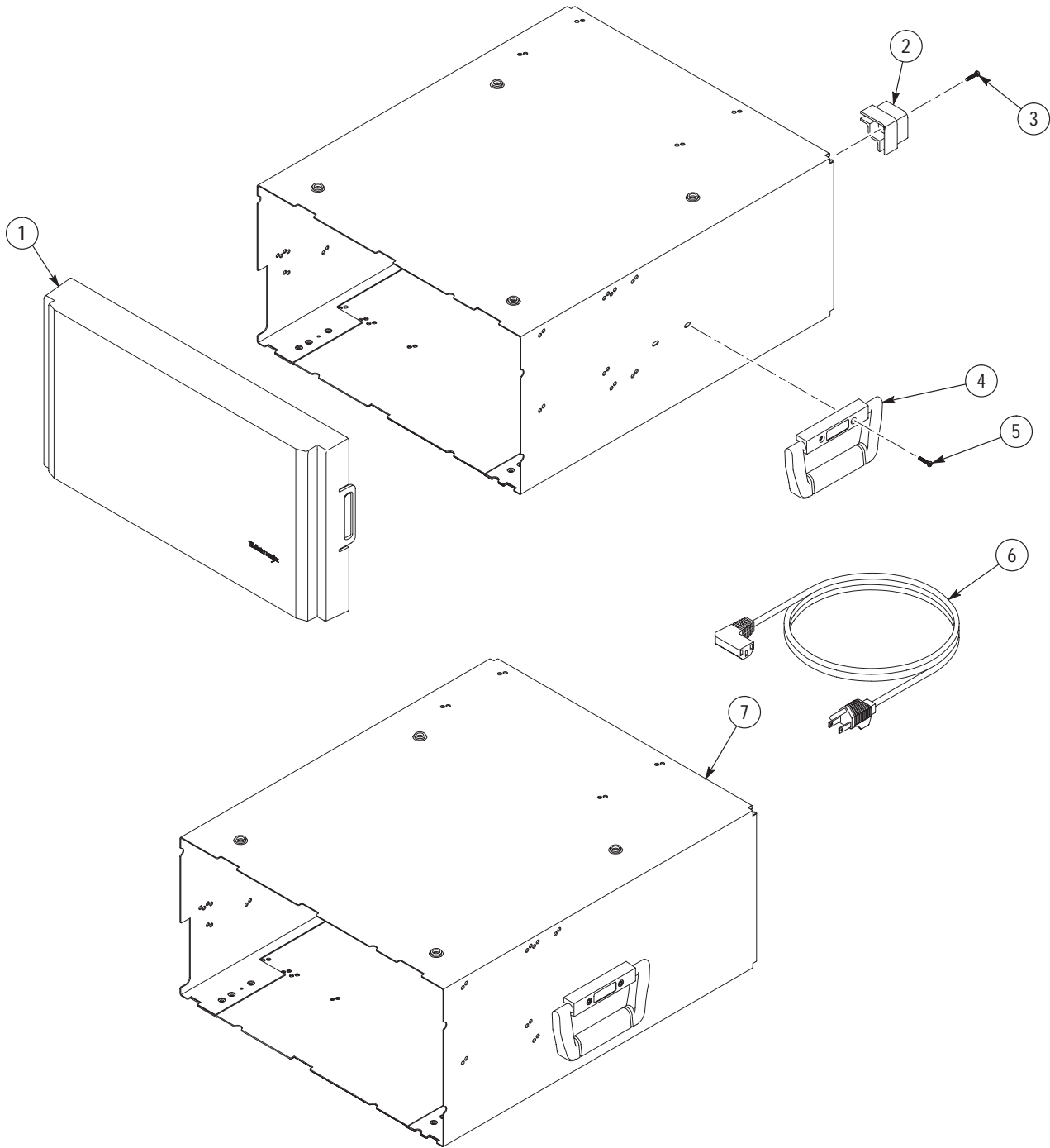
Figure 10–5: Cabinet parts and accessories

OPTIONS

Replaceable parts list (Cont.)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
					OPTIONS		
	PQM3FO1			1	CIRCUIT BD ASSY. COMPOSITE DECODER MODULE. 671-4219-00	80009	PQM3FO1
	PQM3FO3			1	CIRCUIT BD ASSY: PROGRAM MONITOR MODULE. 671-4797-00	80009	PQM3FO3
	PQM3FRB				OPTIONAL ALARM RELAY BOARD	80009	PQM3FRB
	039-0080-00			1	OEM BOARDS:PCI RELAY, 16 CHANNEL, 50-PIN, CYPDISO 16P	9Z609	PCI-PDIS016
	174-4406-00			2	CA ASSY. SP:RIBBON. IDC. 25. 28 AWG. 8.375L. 0.050 CTR. 25 POS D–SUB FEMALE RTANG. 2 X 25 CO	060D9	174–4406–00
	407-4707-00			2	BRACKET:PCI PANEL, 4.625 X 0.850, 18 GA CRS, NICKLE/COPPER FLASH	TK1943	407–4707–00
	335-0195-00			1	MARKER, IDENT:ALARM OUTPUTS LABEL, REAR CKT BD MODULE, 4.0 X0.30, 0.010 POLY	0KB05	335-0069-00
10–6							
	PQM3FLC				OPTIONAL LOCAL CONTROL INTERFACE	80009	PQM3FLC
1	650-4004-01			1	DISPLAY ASSEMBLY: LCD, 800 X 600 (SVGA), 10. 4 IN DIAG, 6-BIT, 250 NIT, CCFL BACKLIGHT, 0. 264 MM PIXEL WITH TOUCH SCREEN	80009	650-4004-01
2	352-1068-00			2	LENS, LIGHT:CLEAR, ACRYLIC, LIGHT PIPE, 1.729 X 0.140	7X318	352-1068-00
3	119-6259-00			1	DISPLAY MODULE:LCD, 800 X 600 (SVGA), 10.4 IN DIAG, 6-BIT, 250 NIT. CCFL BACKLIGHT. 0.264 MM PIXEL	4T165	NL8060BC26-17
4	119-5934-00			1	TOUCH SCREEN:TOUCH PANEL ASSEMBLY, 8-WIRE ANALOG RESISTIVE, FOR 10.4 INCH DISPLAY, DYNACLEAR-8	TK6074	9504 REV E
5	407-4513-00			1	BRACKET DISPLAY: DISPLAY MOUNTING. 0.050 ALUMINUM. ALLOY 5052 H34. SAFETY CONTROLED	TK1943	407-4513-00
6	174-3787-00			2	CA ASSY, SP, ELEC:RIBBON. DISPLAY ADAPTOR BOARD, FLX, 50, 28AWG, 6.5 L, (RCPT, 2 X 50, FEMALE, STR, 0.079 C	060D9	174-3787-00
	119-6260-00			1	POWER SUPPLY:INVERTER BOARD, USE WITH NEC 10.4 IN LCDS, 104PWBR1,	4T165	104PWBR1
	174-3618-00			1	CA, ASSY SP:RIBBON, CPR, 28 AWG, 9.5 L, 1X5, 0.049CTR, LZ SERIES JAE X 1X5, 0.049CTR, MOLEX 50058 S	060D9	OBD
	671-4792-00			1	CIRCUIT BD ASSY:DISPLAY ADAPTER, 679-4792-00 TESTED, 389-2843-00 WIRED	80009	671-4792-00
	200-4395-00			1	SHIELD, ELE:LCD, 7.8720 X 10.0760 X 0.850, 0.050 , AL	TK1943	200-4395-00
	348-1593-00			2	SHIELD, GASKET:CHOMERICS SOFTSHIELD 4000, W/CONDUCTIVE ADHESIVE, DISPLAY, TOUCH PANEL31.85L X 0.25	2K262	348-1593-00

Replaceable parts list (Cont.)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
	348-1594-00			1	GASKET:LCD, DISPLAY, 4701-30-25035-1648, W/254 ACRYLIC PSA, PORON BLACK CELLULAR,	2K262	348-1594-00
	211-0261-01			1	SCREW, CAP:2-56 X 0.125, SCH, SST, PASS, HEX, LOC PATCH	26233	ORDER BY DESCRIPTION
	211-0373-00			6	SCREW, MACHINE:4-40 X 0.250, PNH, STL CD PLT, T10	93907	ORDER BY DESCRIPTION
	211-0691-00			2	SCR, ASSEM WSHR:6-32 X 0.625, PNH, STL, CDPL, T-15 TORX DR, MACHINE	0KB01	ORDER BY DESCRIPTION
	334-9707-00			1	MARKER, IDENT:LABEL, MKD CAUTION CONNEC-TORS, PAPER, 2.00 X 1.00, WHITE BACKGROUND, BLACK LETTERS	0KB05	334-9707- 00
	358-0830-00			1	BUSHING; AL 6061. 0.312 OD. 0.219 L. CHROMATE. DISPLAY MOUNTING	TK0588	358-0830-00
7	211-0722-00			4	SCREW, MACHINE:6-32 X 0.250, PNH, STL, CDPL, T-15 TORX DR	0KB01	ORDER BY DESCRIPTION
8	671-4125-01			1	CIRCUIT BD ASSY:KEYPAD, TESTED, 389-2407-00 WIRED	80009	671-4125-01
9	260-2691-00			1	SWITCH, KEYPAD:ELASTOMEC, TV GRAY & TRANSLUCENT, RESISTANCE>1000OHMS	TK2376	260-2691-00
10	407-4495-00			1	BRACKET:KEYPAD MTG,0.050 ALUMINUM,ALLOY 5052 H34	TK1943	407-4495-00
11	119-4330-02			1	POINTER ASSY:MOUSE, 400 DPI MOUSE, LOGITECH, SAD35-6MD,	46628	850448-0001
12	366-0790-00			1	KNOB:TV GRAY, 0.920 ID X 0.9250 OD X 0.4750 H, PC/ABS BAYBLEND FR110	TK1163	366-0790-00
13	614-0943-02			1	KEYPAD ASSY	80009	614–0943–01
	334-9592-01			1	MARKER, IDENT:LEXAN, OVERLAY,	0KB05	334-9592-01
	348-1574-00			3	SHIELD, GASKET:SLOT MOUNT, 0.532 X0.600, BE CU, 77-020-17	TK2647	77-020-17
	260-1965-00			1	SWITCH, ROCKER:DIP, RAISED ROCKER, 4 POSITION, TOP SEALED, 150MA 30VDC, 76SBO4S	00779	435166-2
14	118-9402-00			1	KEYBOARD ASSY:83 KEY NOTEBOOK KEYBOARD. IBM AT OR PS/2 COMPATIBLE, GRAY	01963	684-4100PAU
	174-4240-00			1	CA ASSY:RIBBON, IDC, 28AWG, 4.450L, BOX. FEMALE, RTANG, 50POS, 2MM CTR CONN	060D9	174-4240-00
	006-2427-01			1	POUCH:6.0 X 8.5 X 1.0, ANTI–STATIC	TK1562	006–2427–01
	119-6107-00			2	STYLUS:STYLUS FOR TOUCH SCREEN. T1100	03ZT7	T1100
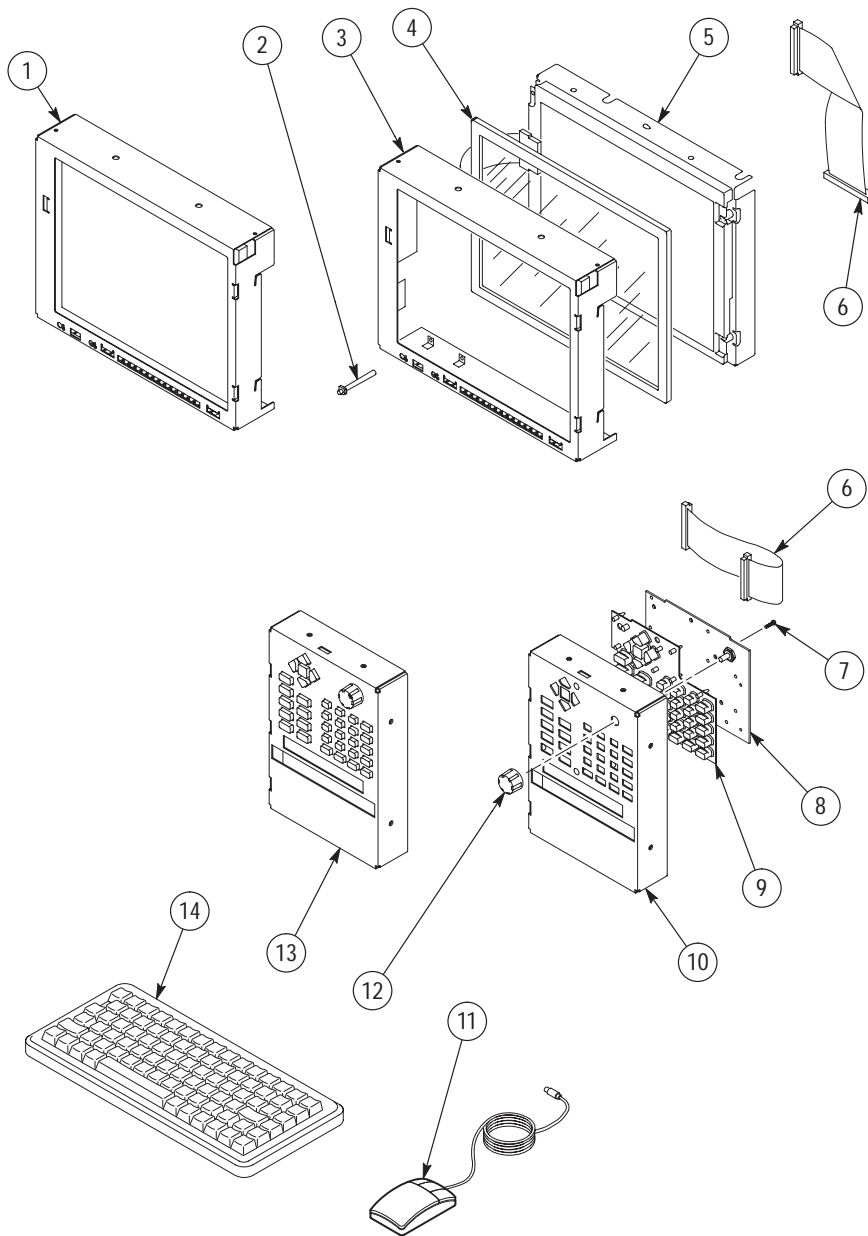
Figure 10–6: PQM3FLC Local Control Option

Appendices

Appendix A: Software Repair

The information in this appendix explains how to create and use an Emergency Repair Disk, gives instructions on reloading the program monitor software, and how to load the video test sequences.

If an Application Locks

As with all software, the application may lock up. In most cases the easiest way out is through the Windows NT End Task utility. The following procedure uses this utility to unlock the application.

1. Press Ctrl+Alt+Del to access the Windows NT Security dialog box.

2. Choose the Task List command button to bring up the Task List dialog box.

3. Click on the locked application.

4. Click on the End Task command button. This should close the locked application.

If this does not close the locked application try performing the following three-step procedure.

1. Press Ctrl+Alt+Del to access the Windows NT Security dialog box.

2. Choose the Shutdown command button to bring up the Shutdown dialog box.

3. Choose the Shutdown and Restart option button and then choose OK.

If this does not end the application or shut down the unit, power the program monitor down for a few minutes, and then proceed with a normal power up.

NOTE. It is not good practice to power down the program monitor without first exiting Windows NT. Only use this method if the normal shut down procedure is not responsive.

Creating and Using an Emergency Repair Disk

An emergency repair disk, specific to the system, is supplied with each PQM300 program monitor. Whenever you upgrade the software or change your password, it is strongly recommended that you also create a new emergency repair disk.

This will minimize the chances that you will need to completely re-load the operating software for a minor problem.

Use the emergency repair disk to restore your system to its initial setup state if your system files become corrupt and you are unable to recover the previous start up configuration (Last Known Good – the Windows NT startup screen option). If you don't have the emergency repair disk, you will have to reinstall Windows NT. Please see the Windows NT System Guide, provided with your back-up copy of Windows NT, for the procedure required to restore your system.

You may also need the emergency repair disk to restore user passwords if they are forgotten. Be sure to update the emergency repair disk each time you add a user or change a password.

CAUTION. The files on the Emergency Repair Disk are program monitor-specific; that is, the disk shipped with an program monitor is the ONLY one that will work with that unit. Do not lose this disk. If you lose the Emergency Repair Disk provided with your program monitor, create a new one as described below.

Create an Emergency Repair Disk

To create an emergency repair disk, mark a high density, 3.5-inch disk clearly as the emergency repair disk for program monitor serial number B01*nnnn* (the serial number of your program monitor), and then perform the following steps.

NOTE. The emergency repair disk is program monitor-specific. Make sure that the emergency repair disk is clearly marked with its program monitor serial number. The serial number of your PQM300 Program QoS Monitor appears on the original emergency repair disk and on the server rear panel, near the power input connector.

1. Choose **Run** from the Windows NT Start menu.

2. Type rdisk in the Run dialog box. The Repair Disk Utility dialog box, as shown in Figure A–1, opens.
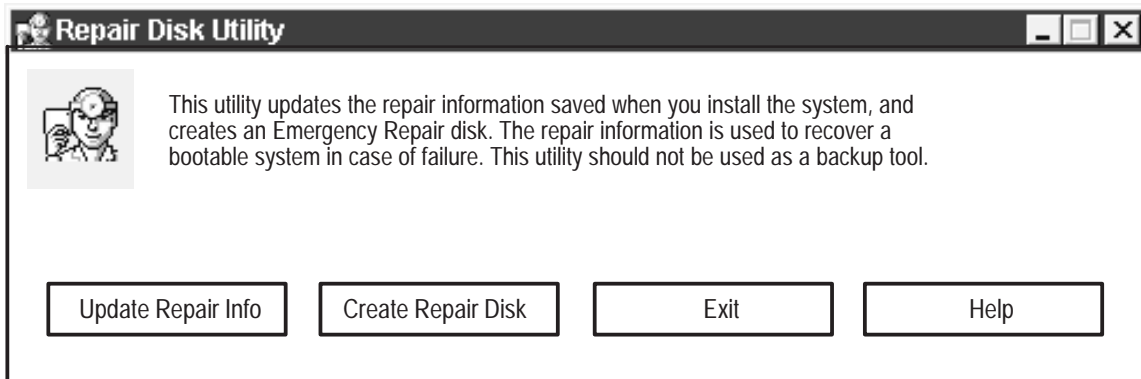
Figure A–1: The Repair Disk dialog box

3. Click **Update Repair Info** to save your current configuration. A message appears to remind you that earlier repair information is overwritten. Click **Yes** to continue.

4. When the process is complete, a message appears to ask if you wish to create an Emergency Repair Disk. Click **Yes**. The message shown in Figure A–2 appears.
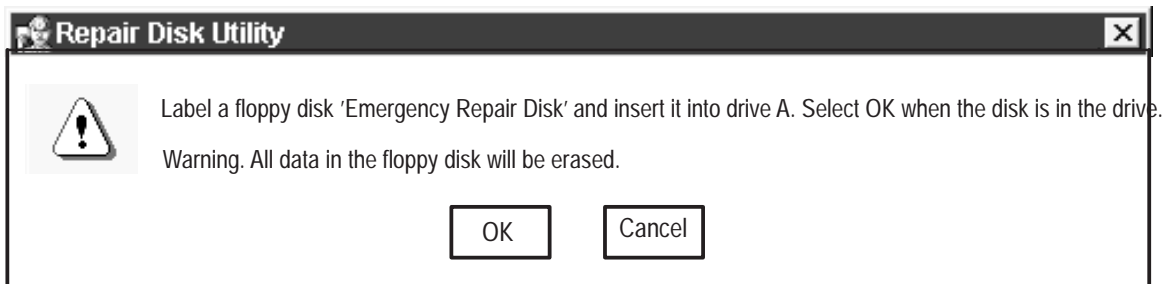
Figure A–2: Repair disk preparation

5. Insert a 3.5-inch disk in drive A and click **OK**. Rdisk formats the disk and copies the configuration files onto it.

6. When the operation is complete, click **Exit** in the Repair Disk Utility dialog box. Remove the disk from drive A and keep it in a safe place.

Using the Emergency Repair Disk

Always refer to the Windows NT documentation if you need more information.

1. Verify that you have a source of setup information available (the Windows NT back-up software package).

2. Insert the Windows NT Setup disk.

3. Restart the program monitor.

4. When the Windows NT Setup Screen appears, press R (repair).

5. When prompted, insert the emergency repair disk.

6. The emergency repair disk performs the following:

   ■ Runs CHKDSK.EXE on the WINNT and SYSTEM partitions.

   ■ Verifies each file in the installation and replaces any that are missing or corrupt.

   ■ Replaces the System, Security, and Security Accounts Manager hives in the registry.

   ■ Reinstalls the Boot Loader (the boot sector, BOOT.INI, etc.).

Reinstalling the PQM300 Program QoS Monitor Software

⚠ *CAUTION. Electrostatic discharge (ESD) can damage components in the CD-ROM disc drive. Do not touch the lens or exposed metallic parts on the platter, with the exception of the center hub when inserting or removing the CD-ROM disc.*

Install the Windows NT Operating System

Start the setup procedure with the Windows NT Setup floppy disk 1 from the Windows NT 4.0 software installation kit provided with this product.

1. With the instrument off, connect the SVGA monitor, keyboard, and mouse to the PQM300 program monitor. The SVGA monitor must be connected to the rear panel display connector; the keyboard and mouse can be connected to either the rear panel or the left side front keyboard and mouse connectors.

2. Insert the **Windows NT Setup Disk #1** in the floppy disk drive.

3. Turn on the PQM300 program monitor.

NOTE. NOTE:During the boot process, two SCSI hard disk drives must be reported on the screen. If not, check that the SCSI terminator is installed and tight, that the SCSI cable to the hard disk drives is connected and tight, and that the SCSI drives receive power. Jumpers on the SCSI drives must be set to designate the drives as SCSI 0 and SCSI 1.

4. Follow the setup directions shown on screen. Refer to the Windows NT User documentation for additional information on installing the Windows NT operating system.

5. When prompted to do so, insert the **Windows NT Workstation** CD-ROM disc into the compact-disc drive and proceed with installation.

6. Use all the default settings and continue to press Enter as prompted to finish the Windows NT installation.

7. Set up a FAT partition of 1004 MB in C drive as follows:

   a. In the Windows NT WorkStation Setup screen, if any partitions are present, delete them.

   b. If the C drive partition is already set for 1004 MB FAT, use it. Otherwise, create a C drive partition of 1004 MB, formatted in FAT.

8. Install Windows NT in the C drive partition in the **\WINNT** directory. The directory will be created if not already present. If Windows NT was previously installed, overwrite it.

9. Choose the typical installation selection.

---

*NOTE. The PQM300 program monitor uses automatic login, with the user name of **TEKMONITOR** and the password of **TEKMONITOR**. The TEKMONITOR user has administrative privileges on the Windows NT operating system built into the PQM300 application. You can load software, change passwords, assign users, and make the Windows NT system setups for the network from the TEKMONITOR log in.*

*No other user can log in while the autologin property of the application is enabled. If necessary to disable the automatic login for reloading the operating system software, you must run the **Regedit** (registration edit) program and set the* `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\Current-Version\ Winlogon\AutoAdminLog` *value to 0. It must be reset to 1 to enable automatic login. See* Configure for Auto Boot Up *on page A–10.*

---

10. If autologin is disabled as described in the preceding note, use the key sequence **CTRL** + **ALT** + **Delete** to display the log-in dialog box.

11. Login as **Administrator** and use **PQM300** as the password.

12. Install the Windows NT components. Use the default components selections.

13. Select **This computer will participate on a network**.

14. Check **Wired to network**.

15. In the Network Adapter, select **Start Search**. The search should find the INTEL 82557 Basic 1–/100 Ethernet PCI Adapter.

16. Select **NO** for DHCP (you may ask the network administrator to verify this choice).

17. Select **TCP/IP**.

18. Click on **TCP/IP Properties**.

19. Enter the IP address, the subnet mask, and the default gateway addresses you obtained from the network administrator.

20. Click on **ADD DNS Service**.

21. Type in the DNS address.

22. Enter the Domain name and click on **Apply**.

23. Click **Next** to start the Network service.

24. Enter a Workgroup name, if applicable (obtained from network administrator).

25. Do not select to make an emergency repair disk in the Startup Disk dialog box and click **Next** to continue. Making an emergency repair disk will be done after all the files are loaded and the registry has been modified.

26. Set the **Date and Time** zone as appropriate for your locale.

27. At the end of the installation, you should be prompted to restart the computer. Select to restart later and remove the CD from the drive.

Install Windows NT Service Pack 4.0

1. Insert the **Windows NT Service Pack 4.0** CD, from the Windows NT 4.0 software installation kit provided with this product, in the CD drive. An HTML install screen, Install Service Pack 4, is displayed.

2. Accept the license agreement and Install.

3. Select **No** when prompted to replace the driver files.

4. At the prompt to restart the computer, remove the CD, and restart the PQM300 program monitor.

Install D Drive

1. Click **Start**–>**Programs**–>**Administrative Tools** and start the **Disk Administrator**. You will see Disk 0 as a C partition in FAT disk format approximately 1 GB in size.

2. Click on the **Disk 0 Free Space**.

3. Hold down the control key and click on the **Disk 1 Free Space** to select both.

4. In Partition, select **Create Stripe Set**.

5. Stripe Set total size will be approximately 15 GB. Click **OK**.

6. In Partition, select **Commit changes now** and **Save**. The final hard drive space allocation is as shown in Figure A–3.

7. If prompted, restart the computer now. You may not see a prompt to restart now depending on the setup conditions present.

8. Click on **Start**–>**Programs**–>**Administrative Tools** and start the **Disk Administrator**.

9. Click on **Partition D-Drive** to select it.

10. Click on **Tool** in the task bar and select **Format**.

9GB Hard drive
designated as SCSI 0
with a jumper selection

Partition C: FAT,
~1GB Windows NT
4.0, SNMP files, etc.

Partition D: NTFS
Striped with
approximately 15GB
storage.

SCSI Ribbon cable

External SCSI
terminator

Rear panel

9GB Hard drive
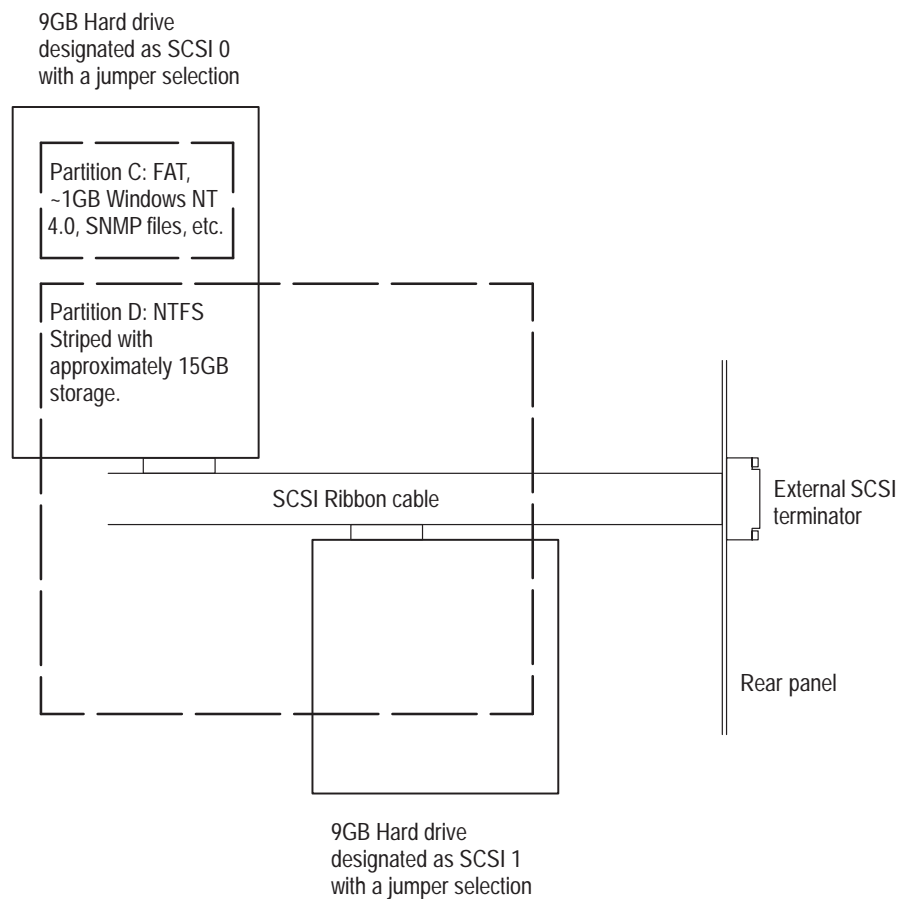designated as SCSI 1
with a jumper selection

Figure A–3: Hard drive partitions

11. Select either **Quick** or **Standard Format**. Standard Format is recommended for the initial installation. A Standard Format takes a long time to complete, because the hard drive media is scanned for defects and mapped.

12. After formatting, close the **Disk Administrato**r.

13. Install a paging file on drive D.

    a. Click **Start**–>**Settings**–>**Control Panel**.

    b. Open the **System** icon and click on the **Performance** tab.

14. Select **Virtual Memory** and click **Change**.

15. Select drive **C**.

16. Set the **Initial** size to **40 MB**, and set the **Maximum** size to **40 MB**.

17. Click **Set**.

18. Select drive **D**.

19. Set the **Initial** size to **400 MB**, and set the **Maximum** size to **400 MB**.

20. Click **OK** and **Close**.

21. At the prompt, restart the program monitor.

Upgrade the Internet Explorer

The upgrade for the Microsoft Internet Explorer is on the PQM300 application CD.

1. Hold down the shift key and insert the PQM300 application CD in the CD drive.

2. Click **Start**–>**Programs** and start the **Windows NT Explorer** application.

3. Explore to select **Drive e**, the CD drive.

4. Open the **PQMRebuild** directory and select the **ie4_2 directory**.

5. Start the **ie4setup.exe** program.

NOTE. Note: Set the View Options to not hide the file extensions if you need to see them to select the executable file.

---

6. The INTERNET EXPLORER 4.01 SP2 screen is displayed. Select **Next**.

7. Accept the license agreement and click **Next**.

8. Accept all the defaults (file location) and click **Next**.

9. After the setup installation has finished loading, disconnect from the internet as prompted if the program monitor is connected to the LAN.

10. Click **OK** for the installation program to finish the setup process.

11. At the prompt, restart the program monitor.

12. Reconnect the LAN connection if the program monitor is installed in a networked system.

Install JAVA Virtual Machine Upgrade

1. Hold down the shift key and insert the PQM300 application CD in the CD drive.

2. Start the Windows NT Explorer.

3. Select **Drive e**, the CD Drive.

4. Open the **PQMRebuild** directory, then open the **javavm** directory.

5. Double click on **msjavx86.exe** to start the installation program.

6. Select **Yes** to install, accept the defaults, and **Finish** to install.

7. When the install has completed, do not reboot.

Install Peer Web Services

1. Click **Start**, select **Settings**, and open the **Control Panel**.

2. Select **Network** and click on the **Services** tab.

3. Click **Add**; select **Microsoft Peer Web Services**.

4. Click **OK**.

5. Hold down the Shift key and insert the **Windows NT 4.0 CD** into the CD drive.

6. Select **e:\i386.exe** to start the Microsoft Peer Web Services setup.

7. Check that all the options are selected and click **OK** to install the service.

8. Remove the Windows NT 4.0 CD.

Install the Custom Ethernet Driver

1. Hold down the shift key and insert the PQM300 application CD in the drive.

2. Insert a blank, formatted floppy disk in the floppy disk drive. Label it Ethernet Drives.

3. Click on the **Start** icon and select **Settings**–>**Control Panel**.

4. Copy the contents of e:\PQMRebuild\EthernetDrivers to the root directory on the A drive.

5. Double click on the **Network** icon to open the Network dialog box.

6. Click on the **Adapters** tab.

7. Remove the existing network adapter (INTEL 82557 Basic 1–/100 Ethernet PCI Adapter).

8. Click on **ADD**. The default source is A:\. Type A:\ into the path dialog box if it is not already there.

9. The Intel EtherExpress PRO Adapter should be found on the A drive floppy disk and installed.

Install the Custom Display Driver

1. Click **Start**, select **Settings** –> **Control Panel**.

2. Open **Display Properties**, and select the **Settings** tab.

3. For Display Type, select **Change**. Click Have Disk and OK.

4. Browse to PQM300 CD in e (the CD drive).

5. Open the PQMRebuild/Video Drivers/WinnNT 4.0 directory.

6. Select **Setup** and **Open**.

7. Select **OK**.

8. Click **Video Accelerator**. Select **Yes** to install the 3rd party driver.

9. At the prompt to reboot after installation, select **No, I will restart my computer later**, and then click **OK**.

Install the Soft Shut Down Driver

1. Use Windows NT Explorer to drag a copy of the Softpower directory from **e:\PQMRebuild\Softpower directory** to **C:\WINNT\System32\drivers**.

2. In the Softpower directory, locate the readme file. Use Notepad to read the file.

```
regini jamsrv.ini
copy jamsrv.exe \winnt\system32
regini jamshut.ini
copy jamshut.sys \winnt\system32\drivers
```

3. Open CMP (a DOS window) and enter the commands as shown in the readme file.

4. The soft shutdown service will start the next time the computer is rebooted.

Configure for Auto Boot Up

1. Click the **Start** icon and select **Programs**.

2. Open **Administrative Tools** and click on **User Manager**.

3. Create **New User TEKMONITOR**.

4. Enter **TEKMONITOR** as the password.

5. Click **Password never expires**.

6. Close the **User Manager** box.

7. Start **Shutdown** and select **Close all programs and log on as a different user**.

8. When prompted to login, change to **TEKMONITOR** and enter **TEKMONITOR** as the password.

9. After you are logged in, click on **Start**, and then select **Run**.

10. Enter **REGEDIT** in the Run edit box and click **OK** to run the program.

11. Select **HKEY Local Machine/Software/Microsoft Windows NT/Current Version/Winlogon**.

12. You should see **TEKMONITOR** as the **Default User Name**.

13. Select **Edit New String Value** and type in **AutoAdminLogon**.

14. **Edit/Modify** this **String Value** and enter **1** in the edit box.

15. Select **Edit New String Value** and type **DefaultPassword**.

16. **Edit/Modify** the **DefaultPassword** and enter **TEKMONITOR** in the edit box.

17. Close the registry editor.

18. Select **Start**–>**Settings**–>**Control Panel** and open the **System** icon.

19. Select **Startup/Shutdown** and set **Show List** to **0** seconds and click **Apply**.

20. Reboot the program monitor to start the new drivers. The program monitor should auto start without a Windows NT login.

Installing and Using SNMP Services

If your system is going to use the SNMP capability to network the PQM300 program monitor the Microsoft SNMP service must be installed from the Microsoft Windows NT CD-ROM. Installing the SNMP service also installs the SNMP TRAP service that is used by the AceComm NP_TRAPS utility to receive and send traps.

NOTE. The NetPlus Auto*Manage network manager from AceComm is a third-party SNMP program used as an example of a low-cost SNMP manager. It is not provided by Tektronix.

---

1. Install the Microsoft SNMP service.

2. Install the SNMP TRAP service from AceComm if the AceComm Manager is used.

3. Copy the **srconf** directory to the **c:\etc directory**. The **c:\etc** directory is required to configure the master agent so that it can recognize the trap/notification message destination systems.

4. After copying the **srconf** folder to the **c:\etc** folder, create two system environment variables from the Control Panel/system/Environment/system variables. These variables are:

SR_AGT_CONF_DIR which is set to the value **c:\etc\srconf\agt**
SR_MGR_CONF_DIR which is set to the value **c:\etc\srconf\mgr**.

5. Modify the **c:\etc\srconf\agt\snmpd.cnf** file using the following steps:

   a. From the dos prompt issue the command **net stop snmp** to stop the Microsoft SNMP service.

   b. Make the SNMP service port assignment as follows:

      Open the file **C:\WINNT\system32\drivers\etc\Services**.

      Change the snmp services port to **8162** instead of **162**.

      Save the file.

   c. From the dos prompt issue the command **snmpdm –stop** to stop SNMP Research Master Agent.

   d. From the dos prompt issue the command **msnsaagt –stop** to stop SNMP Research Master Agent Adapter.

   e. Undo the Read Only properties of **c:\etc\srconf\agt\snmpdm.cnf** file so that you can modify it.

   f. Open the **snmpdm.cnf** file and edit the sections labeled:

      #Entry type: **snmpNotifyEntry**
      #Entry type: **snmpTargetAddrEntry**

      Add as many **snmpNotifyEntry** and **snmpTargetAddrEntry** lines as your notify/trap destinations.

      Make sure the **snmpNotifyTags** are unique integers for each line.

      Follow the same syntax as the previous lines in the file.

Typically, the file changes just made are all that are needed for the SNMP manager to send and receive traps.

For MIB browsing, the only entry that may need to be modified is the **sysName.** That needs to be assigned the same name as the system that it is residing on. For example, the machine name is **MET63**, and that is its network name.

g. Save the **snmpdm.cnf** file. Change its properties back to Read Only.

h. From the dos prompt issue the command **net start snmp** to start the Microsoft SNMP service.

i. From the dos prompt issue the command **snmpdm –start** to start SNMP Research Master Agent.

   Make sure that the path includes the directory:

   ```
   c:\snmp\emanate\sadk\w32.bin
   ```

j. From the dos prompt issue the command **msnsaagt –start** to start SNMP Research Master Agent Adapter.

   Make sure that the path includes the directory:

   ```
   c:\snmp\emanate\sadk\w32.bin
   ```

NOTE. *Steps 6 and 7 are to be followed if you want to use the third-party software, NetPlus Auto*Manage SNMP manager from AceComm, for demonstrating SNMP network management. You may choose not to use the NetPlus Auto*Manage manager if you have another SNMP manager.*

---

6. Install the **NetPlus Auto*Manage** manager from AceComm by running **c:\snmp\winsnmp\Automanage99.exe**.

   The Setup program prompts you for all necessary information and preferences, and copies all the necessary files to your destination disk.

   The **NetPlus Auto*Manage** installation routine does not make changes to any of your system's configuration files (CONFIG.SYS, AUTOEXEC.BAT, WIN.INI, PROTOCOL.INI, SYSTEM.INI).

   For a description of the files installed refer to the NetPlus Auto*Manage Help file under Installation Notes.

7. Make sure that the MIB you want to browse using the AceComm manager is in a known location. The PQM300 MIB is located at c:\Mib and is named WD_V2.mib

   For Windows NT users only:
   The **snmptrap.exe** provided here is a plug-in replacement for the one Microsoft provides.

> *NOTE. To remove and install the services: **snmpdm** and **msnsaagt**, use the following commands:*
> > *> snmpdm –remove*
> > *> snmpfm –install*
> > *> msnsaagt –remove*
> > *> msnsaagt –install*

If you do not already have the SNMPTRAP service installed, then it will auto-install as part of the setup process. You must be logged on as the administrator in order for the service to be installed.

If you install Auto*Manage as a user other than Administrator, you can install the SNMPTRAP service by logging on as Administrator and then running the NP_TRAPS application.

Also note that the SNMP Research utility called **traprcv** needs the SNMP TRAP service to be stopped before it is invoked. The AceComm NP_TRAPS utility needs the SNMP TRAP service be started for its proper usage. When NP_TRAPS is invoked, it automatically makes sure that SNMP TRAP service is installed and started.

Using the AceComm NetPlus Manager

If you install the AceComm NetPlus Manager, use the following procedure to configure the manager for demonstrating the SNMP manager and SNMP networking. The AceCoMM NetPlus SNPM manager is not supported by Tektronix.

1. Run the application **NP_MIB** for MIB compilation. Make sure not to overwrite any RFC***.ini or RFC***.dxt files that **NP_MIB** shows on the output file edit boxes. Just save the files with **WD.ini** and **WD.dxt** names or any other suitable file names.

2. If MIB compiles okay, launch the **NP_BROWZ** application for getting and setting the MIB variables. Make sure you are inquiring to the right context or IP address where the SNMP agent is running.

3. Run **NP_WALK** to do the MIB tree walk and demonstrate the MibII compatibility.

> *NOTE. For further information, refer to the NetPlus Auto*Manage Help file that is included with the NetPlus Auto*Manage software. You can get help by selecting Auto*Manage Help from the NetPlus AutoManage Program Group or by selecting the Help/Contents menu option of any of the NetPlus Auto*Manage applications.*

Set Display Properties

1. Click on **Start**–>**Settings**–>**Control Panel** and open the **Display** icon.

2. Select the **Settings** tab.

3. Set the **Desktop Area** size for **1024 by 768** pixels for external VGA operation only. If the PQM3FLC local control front panel display is installed, set the display size for **800 by 600** pixels.

4. Set the Color Palette to **65536** colors.

5. Set **Font Size** to **Large** fonts.

6. Hold down the shift key and insert the **Windows NT** CD when prompted.

7. After the CD has been read, remove the **Windows NT** CD from the CD drive.

8. Click **Apply** and **Yes** to restart the program monitor.

Setup for Flat Panel Display Boot Up

If you have a local flat panel display installed, the display settings must be selected to boot up in a mode that permits the flat panel display to operate. Use the following steps to make the setup.

1. Select **Start**–>**Settings**–>**Control Panel,** and then open **Display**.

2. In the **Display** screen, select the **Chips** tab, and then select **Both** (both VGA and LCD).
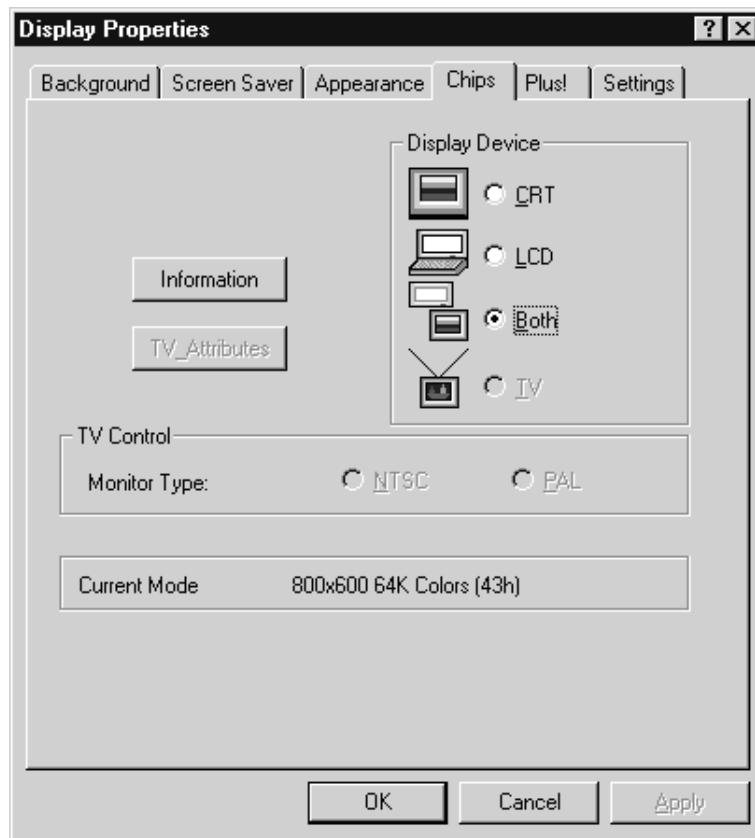
3. Click **Apply** to make the changes, and the click **OK**. This exits the **Display** control panel.

4. Open the **Display** controls again and select the **Settings** tab.

5. Click the **Desktop Area** slider to select **800 by 600** pixel format.

6. Select **65536** in the Color Palette.

7. Click **Apply** to make the change. The computer warns you that the settings have not been tested yet. Click **OK** to accept the changes anyway.

8. Click **OK** again to exit the Display Properties control panel.

9. Select **Start**–>**Shutdown**, and then select to restart the computer.

10. Select **Yes** to shutdown the computer for a restart.

11. While the PQM300 is rebooting, press the **F2** key to enter the bios setup screen.

12. When the setup screen is displayed, press the **F6** key to select **Peripherals**.

13. Use the down arrow key to select the **VGA Boot Display** line.

14. Use the left or right arrow key to select **Simultaneous** (for both the VGA and the LCD flat panel display at boot up).

15. Press **ESC** to go to the main menu.

16. Press **F10** to go to Exit menu.

17. Select the **Exit Saving Changes** entry.

18. Select **Yes** to confirm saving configuration.

COM Port Setting   COM3 and COM4 may not be detected by Windows NT, so they need to be added manually.

1. Select **Start**–>**Settings**–>**Control Panel,** and then open **Ports**.

2. Click the **Add** button to add COM port.

3. Install two communication ports.

4. Configure COM1 as follows:

Input/Output Range:	3F8–03FF
Interrupt Request	10
Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

5. Configure COM2 as follows:

Input/Output Range:	2F8–02FF
Interrupt Request	03
Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

6. Configure COM3 as follows:

Input/Output Range:	03E8–03EF
Interrupt Request	04
Bits per second	2400
Data bits	8
Parity	None
Stop bits	1
Flow control	None

7. Configure COM4 as follows:

Input/Output Range: 02E8–02EF
Interrupt Request   03
Bits per second   9600
Data bits   8
Parity   None
Stop bits   1
Flow control   None

Install the Touch-Base SC3 Touch Screen Driver

1. Insert the PQM300 Application CD into the CD drive.

2. From **Start** menu, run **D:\touchscreen\tnsetup.exe**. Note that if the D drive partition is installed, the files on the CD are in drive e.

3. Select touch screen type:

   DynaPro – Serial, SC3

4. Click **Next** to continue.

5. Ensure that the COM3 port settings are as given in step 6 of the previous *Com Port Settings* procedure.

6. Reboot the system. If the PQM300 has a flat panel display with touch screen installed, continue with the following steps:

7. From **Start** menu, select **Programs**–>**Touch**–>**TouchScreen Control**.

8. In the Touch Screen Control Program screen, click the **Calibrate** button.

9. Follow the on-screen instruction to calibrate the touch screen. Use one of the styluses provided with this kit to touch the screen at the calibration points.

10. Click on the **OK** box using the mouse.

11. Select **Exit** to leave the Touch Screen Control Program**.**

Install the Alarm Relay Board Driver

The relay board driver and the relay user-interface software are loaded as part of the Version 2.0 software. The user inteface software is loaded from the PQM300 application disc when the PQM300 application is loaded. The relay driver is provided by a third party and must be loaded with that suppliers installation software. That installation is provided on the PQM300 application CD.

1. Hold down the shift key and insert the PQM300 application CD in the CD drive.

2. From **Start** menu, select **Run** and type:

   E:\RelayBoard\Setup.exe.

3. When asked if you want to install the Universal Library, select **Yes** and follow the instructions provided.

4. Accept the defaults for the loading instructions with the following exception: install the driver in the **D** drive rather than the default **C** drive.

5. At the prompt to restart the computer, do not restart if you are going to load the PQM300 Application files next.

Install PQM300 Application Files

1. Open and close the CD drive door to start the PQM300 Auto Install routine.

2. Click Next, Next, etc. to load program files. The PQM300 executable files are loaded in the **D:\PQM300\bin** directory.

3. When the files have finished loading, remove the CD from the drive and reboot the computer.

Assign a Community Name to the Program Monitor

If you as going to monitor PQM300 program monitors operating in different locations, it is important that a unique community name be given to each PQM300 program monitor so that they can be readily identified. Set up a community name plan so that you can identify the monitor site and the PQM300 when making connections and channel measurement configurations. Assign the PQM300 program monitor a community name as follows:

1. Use the explorer to navigate to the **D:\PQM300** directory.

NOTE. The following file is generated after the SNMP service is first started.

2. Open the pqm300Snmp.dbsnap file with Notepad and modify the value= line to change the community name from the factory default.

```
names={
  Snmp={
    CommunityName
  }
},
  values={
  Snmp.CommunityName={
    perm=_RWRW,
    DbString={
      value="PQM2"
    }
  }
}
```

3. Save and close the file.