

HDI 5000 Field Service Manual

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About This Manual

Audience

This manual supports the field service maintenance and repair of the HDI® 5000 Ultrasound System. The user of this document is a qualified ultrasound electronics technician who has completed training classes on the system and its peripherals.

Manual Format

This manual is in Portable Document Format (PDF), for viewing on a laptop-computer with Acrobat Reader. A list of bookmarks functions as an additional table of contents. Those bookmarks, the table of contents, and cross-references use hypertext links to provide access to the referenced information.

Conventions in This Manual

The following conventions are used in this manual:

- Hypertext links are **blue**.
- All procedures are numbered, and all sub-procedures are lettered. You must complete steps in the sequence they are presented to ensure reliable results.
- Bulleted lists indicate general information about a function or procedure. They do not imply a sequential procedure.
- Control names and menu items or titles are spelled as they are on the system, and they appear in bold text.
- Symbols appear as they appear on the system.
- An English system is assumed.

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Questions or
Comments**

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1 General Information

Introduction

The HDI 5000 Ultrasound System is a general-purpose, mobile, software-controlled, diagnostic ultrasound system. Its function is to acquire, process, and display ultrasound data ([Figure 1-1](#)).

The operator can measure anatomical structures and generate reports for health care professionals. The primary users are physicians and sonographers in clinics and hospital departments that provide diagnostic ultrasound services.

The system has a basic set of imaging modes and measurement tools. There also are modes and measurement tools which are only available when a specific mode or analysis package is purchased and enabled for customer use. Upgrade security is controlled through the use of system-specific passwords and software.

Refer to: [Section 4, "Theory of Operation"](#) for front-end theory; [Section 6, "Performance Tests"](#) for operating parameters; and [Section 13, "Configuration"](#) for compatibility and replacement data.

Figure 1-1

HDI 5000 Ultrasound Systems



HDI 5000 system (classic)



Philips HDI 5000 system

Scanheads

Refer to [Section 15, "Scanheads"](#) for a list of the scanheads.

Physical Description

Frame

The frame provides the primary structural support for the system. It has a one-piece weldment. Front casters are swivel mounted with brake locks. Rear casters are fixed or swivel mounted depending on when the system was manufactured. Casters have integral shock mounts. The frame provides the mounting base and swivel mechanism for the monitor module.

Card Cage

The removable card cage slides into the frame and is secured with screws. It incorporates a center motherboard, or centerplane, with modules inserted from the front and rear. The card cage is designed to allow for future motherboard, power supply, and fan module upgrades. Rear mounted fans provide forced air cooling.

Eight slots are dedicated with appropriate shielding for channel boards. Two additional shielded slots are available for the AIM+ PCB and a spare PCB. External connections are provided through connectors mounted on brackets attached directly to the card cage modules to eliminate cabling to remote connectors. All power supplies, disk drives, and PCBs are slide-in modules with card-edge connectors, switches, and LEDs, as necessary.

Peripherals

For the classic HDI 5000, peripherals are installed into the cart with their control panels accessible to the operator. Some peripheral controls also are available on the system control panel for various OEM functions.

The open peripheral bay will accept a variety of peripherals. Peripherals are mounted by one or more straps on a universal adapter plate. The plate can easily be modified or replaced to accommodate future peripherals. A VCR mounts on top of the monitor or in the OEM bay.

For the Philips HDI 5000, OEMs are mounted on an OEM platform on the rear of the command module. The same OEM controls are located on the control panel as with the classic HDI 5000 system. The open peripheral bay also accommodates peripherals similar to the classic HDI 5000 system.

Control Panels

Operator controls consist of a full-size keyboard, a trackball and an array of pushbuttons, toggle switches, slidepots, and rotary controls. Pressing certain switches displays menus on the video screen. The trackball is then used to select from the menus. Slidepots control TGC. Rotary controls are used for gain control.

Included on the control module assembly are scanhead holders, storage trays at the rear, and the handle used to move the system. The keyboard wrist rest also serves as an ESD ground for the operator.

Monitor

The monitor assembly includes a single 15-inch, 120-Vac, 50/60-Hz non-interlaced all-digital monitor, monitor enclosure, and mounting for the VCR. The VCR and monitor are removable for mobile systems. Video resolution is 512 x 640 pixels in NTSC format and 512 x 768 pixels in PAL format.

The monitor senses the input video format and will also display interlaced video with horizontal sync frequencies, nominally 15 kHz, with vertical sync signal frequencies of 25 Hz and 30 Hz.

The monitor also accepts progressive video with horizontal sync frequencies, nominally 31 kHz, with vertical sync signal frequencies between 50 Hz and 60 Hz.

For the classic HDI 5000 system, the monitor is mounted on a swivel base that is mounted on the frame. For the Philips HDI 5000 system, the monitor is mounted on an articulating arm that allows it to move left or right, to move forward and backward, and to rotate and tilt.

Cables

Internal power cables are routed from the AC Input Module (ACIM) through the right rear of the system (with the observer facing the rear of the system) to the OEM or module requiring power. Internal signal cables are routed from the Internal Interface Module (IIM) through the left rear of the system to each OEM or the monitor. Refer to [Section 11, "Cabling"](#), for more information.

Supplies and Accessories

System-specific and general-purpose ultrasound supplies and accessories, including scanhead biopsy guides, are available from CIVCO Medical Instruments at the addresses and numbers below. Supplies and accessories are no longer available from Philips Ultrasound.

CIVCO Medical Instruments
102 First St. South
Kalona, IA 52247-9589

Phone: (800) 445-6741, Ex. 1 for Customer Service (USA)
(319) 656-4447 (International)
Fax: (877) 329-2482 (USA)
(319) 656-4451 (International)
E-mail: info@civcomedical.com
Internet: www.civco.com

2 Specifications

Physical Dimensions

Classic HDI 5000

- Width: 72 cm (28.35 in)
- Height: 157.5 cm (62 in) with VCR
142 cm (56 in) without VCR
122 cm (48 in) when monitor is removed for transport
- Depth: 110.4 cm (43.45 in)
- Weight: 172-200 kg (380-440 lb) (depends upon system configuration)

Philips HDI 5000

- Width: 73.4 cm (28.9 in)
- Height: 146.1 cm (57.5 in)
- Depth: 111.8 cm (44.0 in)
- Weight: 190.5-226.8 kg (420-500 lb), depends upon system configuration

System Architecture

- Digital broadband beamformer
- Extended signal processing
- Modular microcomputer structure

Imaging Modes

- Gray-scale 2D
- Color 2D
- M-mode

- Color M-Mode
- Doppler (PW and CW)
- Broadband Flow® Imaging
- Contrast Specific Imaging
- Tissue Harmonic Imaging (THI)
- Color Power Angio® Imaging
- Tissue Doppler Imaging (TDI)
- Advanced 3D Imaging
- 3D Color Power Angio (3D CPA)
- 3D Grayscale
- Panoramic Imaging
- Power Motion™ Imaging (PMI)
- SonoCT® Real-time Compound Imaging

Update Methods

- Update or Duplex
- Triple Mode
- Simultaneous

Clinical Options

- Abdominal
- Abdominal Surgery
- Adult Cardiology
- Advanced Breast Imaging
- Cardiology Contrast Specific Imaging (CSI)

- Cerebrovascular
- General Imaging CSI
- Generic
- Gynecological and Fertility
- Musculoskeletal
- Neurosurgery
- Obstetrical
- Pediatric/Fetal Cardiology
- Pediatric General Imaging
- Peripheral Vascular
- Prostate
- Small Parts
- Transesophageal Cardiology
- Transcranial Doppler
- Vascular Surgery

Gain

- Slidepot controls for TGC (b/w, color, and TDI)
- 2D gain rotary control
- Doppler gain rotary control
- Color gain rotary control

Gray Shades	<ul style="list-style-type: none">• 256 in 2D• 64 in M-mode• 256 in Doppler
Image Processing	<ul style="list-style-type: none">• 2D graymaps• 3D CPA and grayscale displays• Chroma® maps• Doppler graymaps• Dynamic range• Color maps• CPA maps• CPA blending• CPA display type• Dynamic Motion Differentiation• XRes™ Visualization Technology
Scan Conversion	<ul style="list-style-type: none">• Sector for phased and curved array scanheads• Rectangular for linear array scanheads, steered for Color and Doppler imaging
Frame Rate	Greater than 500 frames/sec (dependent on field-of-view, depth, and angle)
User Control System	<ul style="list-style-type: none">• Monitor brightness, contrast, lightbar, focus, and background color controls (default settings)• Rotary controls• Slidepot controls

- Keyboard
- Volume control
- Dedicated primary imaging controls
- Menus and superkeys for secondary imaging controls
- Color and tint controls for VCR playback
- Softkeys
- Digital Video Streaming (DVS™) hand controller
- Footswitch

Digital Signal Processing

- Selectable compression (dynamic range)
- Automatic system bandwidth adjustment
- Selectable receive bandwidth patient optimization
- Software-controlled bandwidth, filter, and frequency optimization
- SonoCT Real-time Compound Imaging
- Intelligent Frame Rate Accelerator (multi-line processing)
- XRes Visualization Technology

Image Modification

- Zoom and pan of real-time or frozen 2D image
- Up to eight times magnification of 2D images
- High Definition™ Zoom
- Up to five times M-mode zoom
- 2D persistence
- Color persistence

- Color capture
- Color tag
- Color smoothing
- TDI Blend

Programma- bility

- Application and scanhead optimization
- Optimization for 3D, harmonic imaging, frame rate, and 2D/Color imaging
- Quick Save of user settings by application and scanhead
- On-screen programming for internal and external hardcopy devices
- User-defined acquisition protocols with the DVS option
- Analysis configuration
- Annotation text

Display Annotation

- Patient name and identification
- Institution
- Time and date
- Biopsy guide line
- Title, text, arrows, scanhead position, and body marker annotation
- Tissue specific body markers
- Additional Image Information
- Image Management status
- TI and MI values
- M cursor

Image Presentation

2D

- Doppler sample volume and angle correction
- Graphics control with the DVS option

- Up/down orientation
- Left/right orientation

- Image orientation marker
- Application-specific selectable graymaps
- 2D gain control
- Up to 5 transmit focal zones
- 2D persistence
- Dynamic range (compression curves)
- Chroma maps (gray-scale colorization)
- 2D sector size and steering
- Zoom
- HD Zoom
- 2D PRF control
- SonoCT Real-time Compound Imaging (Survey and Target modes)
- XRes Visualization Technology
- iSCAN Intelligent Optimization

3D

- Calibrated with position sensor and workstation
- Uncalibrated
- Cardiology with the MPT7-4 scanhead

M-Mode

- Four sweep speeds
- Time markers
- M-mode review
- M-mode zoom
- Three display sizes

Doppler

- Digital wall filters (25–1600 Hz)
- Pulsed wave (PRF range: 1.25–22.7 kHz)
- Continuous wave (Sample rate: 1.50–41.7 kHz)
- High PRF
- Adjustable sample volume (1.5–20 mm)
- Adjustable zero baseline
- Normal or inverted display
- Three display sizes
- Four sweep speeds
- Doppler gain control
- Doppler review
- Doppler graymaps
- Low flow capability

Color and Tissue Doppler Imaging

- Equivalent 5-MHz annotation
- High Q® Automatic Doppler Results Display
- Angle correction
- Tissue Doppler Imaging for PW Doppler
- iSCAN Intelligent Optimization

- 2D Color/Tissue Doppler Imaging
- M-Mode Color
- Color gain control
- Selectable color maps
- Velocity, variance, and power displays
- Dynamic Motion Differentiation (DMD)
- Sensitivity
- Priority threshold
- Line density
- Color persistence
- Color smoothing
- Color tag
- Color capture
- Blending
- Frequency or velocity units
- Tissue Doppler Imaging for Color 2D and M-mode

Power and Power Motion Imaging

- 2D Color Power Angio Imaging/Power Motion Imaging
- 3D Color Power Angio Imaging
- Power Motion Imaging
- Selectable maps
- Dynamic Motion Differentiation
- Adjustable background (on or off)
- Display (Topography)
- Background (Blend)
- Dynamic Range
- Persistence
- Sensitivity
- Line Density

Physio

- ECG
- High-Level ECG
- Pulse
- Phono
- Auxiliary

Table 2-1**Physio ECG Performance Characteristics**

Characteristic	Specification
Lower Frequency Cut-off	$0.65 \text{ Hz} \pm 0.06 \text{ Hz}$
Upper Frequency Cut-off	$> 30 \text{ Hz} \pm 3.0 \text{ Hz}$
Nominal Input Amplitude	1 mVp-p
Minimum Sensitivity	$5 \times 10^{-3} \text{ V}$

Table 2-2**Physio High Level ECG Performance Characteristics**

Characteristic	Specification
Lower Frequency Cut-off	$0.0 \text{ Hz} \pm 0.1 \text{ Hz}$
Upper Frequency Cut-off	$> 32 \text{ Hz} \pm 3.2 \text{ Hz}$
Gain Range	$21 \text{ dB} \pm 1 \text{ dB}$
Minimum Sensitivity	$2 \times 10^{-2} \text{ V}$

Table 2-3

Physio Pulse Performance Characteristics

Specifications		
Characteristic	Fukuda Denshi	Other
Lower Frequency Cut-off	0.5 Hz ± 0.1 Hz	0.5 Hz ± 0.1 Hz
Upper Frequency Cut-off	> 50 Hz	> 50 Hz
Gain Range	45 dB ± 1 dB	35.5 dB ± 1 dB
Minimum Sensitivity	50×10^{-6} V	2×10^{-3} V

Table 2-4

Physio Auxiliary Performance Characteristics

Characteristic	Specification
Lower Frequency Cut-off	0.5 Hz ± 0.1 Hz
Upper Frequency Cut-off	> 800 Hz
Gain Range	28.5 dB ± 1 dB
Minimum Sensitivity	5×10^{-3} V

Table 2-5

Physio Phono Performance Characteristics

Phono Filter			Gain Range		Minimum Sensitivity	
	Low Frequency Cut-off	Upper Frequency Cut-off	Fukuda Denshi	Other	Fukuda Denshi	Other
Off	28 ± 2.8 Hz	810 ± 81 Hz	51 ± 1 dB	56 ± 1dB	50 X 10 ⁻⁶ V	50 X 10 ⁻⁶ V
Low	78 ± 7.8 Hz	385 ± 38.5 Hz	51 ± 1 dB	56 ± 1dB	15 X 10 ⁻⁶ V	15 X 10 ⁻⁶ V
Medium	90 ± 9.0 Hz	620 ± 62 Hz	51 ± 1 dB	56 ± 1dB	15 X 10 ⁻⁶ V	15 X 10 ⁻⁶ V
High	180 ± 18 Hz	800 ± 80 Hz	51 ± 1 dB	56 ± 1dB	10 X 10 ⁻⁶ V	10 X 10 ⁻⁶ V

Triggering Modes

- Single (A or B channel)
- Dual (simultaneous A and B channels)
- Timer (A channel only, capture initiated by system clock)

Calculations

- General Imaging
- Cardiology
- Analysis (calcs) Configuration (Power Calcs)

Measurement Tools

- Distance
- Curved distance
- Area
- Time/slope

- Volume
- Volume Flow
- Cardiac Output
- Heart rate
- High Q set region
- High Q mean trace
- High Q peak trace
- Calibration
- Optional hip angle
- Optional d:D ratio
- Optional% diameter reduction
- Optional% area reduction
- Qualitative Wall Motion scoring
- Assisted Border Detection (ABD) requires DVS option

Image Storage and Retrieval

- Cineloop® Image Review, 2D
- Cineloop Image Review, 3D
- Doppler Review
- M-mode Review
- Image Management Option, DEFF-compatible, and for systems with the DVS option, DICOM-compatible
- VCR Playback and Frame Grab
- Digital Video Streaming (DVS) Option

Table 2-6**DiskLink Features and Specifications**

Parameter	Specification
Image size (NTSC/PAL)	308 KB/455 KB black-and-white 917 KB/1330 KB color
MO drive capacity	640 MB (drive size will be smaller on older systems)
MO disk size/maximum number of images stored per disk	128 MB/415 black-and-white or 140 color images (NTSC) 128 MB/281 black-and-white or 96 color images (PAL) 230 MB/745 black-and-white or 250 color images (NTSC) 230 MB/504 black-and-white or 172 color images (PAL) 540 MB/1750 black-and-white or 585 color images (NTSC) 540 MB/1180 black-and-white or 403 color images (PAL)
Maximum number of patients on MO	As limited by disk space
Maximum number of images per patient on MO	As limited by disk space
Image storage on hard drive	2.1 GB
Maximum number of patients on hard drive	150 at approximately 7.5 MB per patient
Maximum number of images/patients on hard drive	100
File formats	DEFF on MO Proprietary format on hard drive
Image types	Black and white Color Duplex

Table 2-6**DiskLink Features and Specifications (Continued)**

Parameter	Specification
Print destination options	Black and White or All to Black and White printer Color or All to Color printer
Image output formats	1, 2, 6, 12, 15 images per page (black-and-white or color)
Capture mode	Single frame on MO Single and multi-frames on hard drive

DICOM Specifications Refer to the following web site for DICOM specifications:
<http://www.medical.philips.com/main/company/connectivity/us/>

Serial Data Transfer

- 9600 baud
- 8 data bits
- No parity
- One stop-bit
- Xon-Xoff protocol

Optional Hardcopy Devices

- Super VHS VCR
- Multi-Image camera
- Color page printer
- Report printer
- Black-and-white page printer

External Connections

- RGB-S (Red, Green, Blue, and Sync) video 50/60 Hz frame rate, non-interlaced for external video monitors: Sub-D 9-pin connector
- RGB-S-CB (Red, Green, Blue, Sync, and Composite Blanking) video 25/30-Hz frame rate, interlaced for external hardcopy devices: Sub-D 15-pin connector (input and output connector)
- Composite gray scale for external hardcopy output: BNC connector
- VCR-S Video input/output: 9-pin DSUB connector
- VCR composite video output: BNC connector
- VCR composite input: BNC connector
- VCR audio output (left/right): dual RCA jacks
- VCR audio input (left/right): dual RCA jacks
- External line printer output, RS-232A: D-sub 9-pin connector
- System diagnostic and network I/O (Ethernet), USD port RS-232A: D-sub 9-pin connector (disconnect cable for systems with DVS option)

Electrical and Video Parameters

NOTE Refer to [Table 5-3](#) for input voltage specifications.

- 100Vac, (V~), at 50 Hz or 60 Hz, 1450 VA
- 120Vac, (V~), at 60 Hz, 1450 VA
- 220-240 Vac, (V~), at 50 Hz, 1450 VA
- 220-240 Vac, (V~), at 60 Hz, 1450 VA
- Integral AC line conditioner
- Power consumption: 800 watts; with optional OEMs, 1150 watts

Monitor

- One 15-inch, high-resolution, color monitor
- Provides a tilt and swivel adjustment
- Adjustable contrast, brightness, and lightbar controls
- Audio speakers
- Safety latches
- Microphone connector

**Languages -
System
Software**

- English
- French
- German
- Italian

**Languages -
User Interface
Assemblies
(Control
Panels)**

- English, upper and lower
- French, upper and lower
- German, upper and lower
- Italian, upper and lower
- Danish, lower (use English upper)
- Norwegian, lower (use English upper)
- Swedish/Finnish, lower (use English upper)

Storage

- Unified cable management system
- Gel bottle
- Footswitch

Temperature, Pressure, and Humidity Limits

- Two general purpose trays
- Storage and Shipping
 - High: 65° C (150° F), Low: -35° C (-31° F)
 - All at 1060 hPa to 303 hPa (1.05 ATM to 0.3 ATM)
 - 15% to 95% relative humidity
- Operating Environment
 - High: 40° C Low: 10° C:
 - All at 1060 hPa to 700 hPa (1.05 ATM to 0.7 ATM)
 - 15% to 95% relative humidity
-

Patient Data Security

Password-protected access to images on the hard drive

Safety Requirements

- Classification:
 - Class I with Type B, BF, and CF applied parts
 - Ordinary Equipment
 - Non-AP/APG
- Electromechanical safety standards met:
 - CSA C22.2 No. 601.1, Canadian Standards Association, Medical Electrical Equipment
 - EN 60601-1, Second Edition, including Amendments 1 and 2, European Norm, Medical Electrical Equipment

- EN 60601-1-2, First Edition, European Norm, Collateral Standard Electromagnetic Compatibility
- IEC 1157:1992, International Electrotechnical Commission, Requirements for the declaration of acoustic output of medical diagnostic ultrasonic equipment
- JIS T-1000 Series, Japanese Industrial Standard, Medical Electrical Equipment
- UL 2601-1, Underwriters Laboratories, Medical Electrical Equipment
- Agency approvals:
 - Canadian Standards Association (CSA)
 - Japanese Ministry of Health and Welfare (pending)
 - ISO 9001, EN46001 Quality Assurance Standard; Certificate #FM28256 issued by the British Standards Institution (BSI) for Quality Systems
 - CE Marked to the European Community Medical Device Directive 93/42/EEC per Annex II, as a Class IIa device, in accordance with Annex IX (BSI Certificate #0604)

Philips Ultrasound reserves the right to change specifications contained herein or discontinue manufacture at any time without prior notice. Current specifications are supplied with each system.

3 Safety

Introduction

Please read this information before using the ultrasound system. It applies to the ultrasound system, scanheads, recording devices, and any optional equipment.

This device is intended for use by, or by the order of, and under the supervision of a licensed physician qualified to direct the use of the device.

In this manual, a **WARNING** describes precautions necessary to prevent injury or loss of life.

In this manual, a **CAUTION** describes precautions necessary to protect the equipment.

Electrical Safety

This equipment has been Certified by a recognized third-party testing agency as a Class I device with Type B non-isolated and Type BF and Type CF isolated patient-applied parts. For maximum safety observe these warnings:

WARNINGS

- Before connecting and applying power, all ACIM (power input panel) mounting screws must be in place and properly secured to complete the system ground path.
- Shock hazards may exist if this system is not properly grounded. Protection against electrical shock is provided by grounding the chassis with a 3-wire cable and plug. The system must be plugged into a hospital-grade three-hole outlet. The grounding wire must not be removed or defeated.
- Do not remove the protective covers on the system; hazardous voltages are present inside. Cabinet panels must be in place while the system is in use. All internal adjustments and replacements must be made by a qualified customer support representative.

WARNINGS

- Do not operate this system in the presence of flammable gases or anesthetics. Explosion can result.
- Always inspect the scanhead or pencil probe face, housing, and cable before use. Do not use the scanhead or pencil probe if the face is cracked, chipped, or torn, the housing is damaged, or the cable is abraded.
- Always disconnect the system from the wall outlet before cleaning the system.
- Connection of optional devices not supplied by Philips Ultrasound could result in electrical shock. When such optional devices are connected to your ultrasound system, ensure the total system chassis risk current does not exceed 100 µA for 120-Vac systems and 500 µA for 230-Vac systems.
- In general, only the area of the scanhead acoustic window is watertight. Except where specified in specific scanhead cleaning instructions, do not immerse the remainder of a scanhead in any liquid.

CAUTIONS

- Always place the system ON/STANDBY switch to STANDBY for five to ten seconds before setting the system I/O circuit breaker to OFF.
- If you intend to power-down and then power-up a system, always wait five to ten seconds after placing the ON/STANDBY switch to STANDBY before placing the switch to ON. A power-down sequence, similar to the initialization that occurs when power is first turned on, saves certain operating parameters and turns off power supplies in a sequential order. Review the power subsystem discussion in “[Theory of Operation](#)” on page 74.

CAUTIONS

- Always verify the power cord voltage label matches the voltage on the device before plugging in the power cord. On 230-Volt systems VCR power is 230 Volts but the monitor is 120 Volts. Applying 230 Volts to the monitor will destroy it.
- This equipment contains components that are electrostatic sensitive. Proper static procedures, protection, and equipment must be used prior to opening and during handling of this equipment. Failure to use ESD procedures will cause damage to these components. Such damage to components is not covered by Philips Ultrasound warranties.

Mechanical Safety

WARNINGS

- Be aware of the casters, especially when moving the system. The system can weigh 200 kg (440 pounds), depending upon configuration, and it could cause injury to you or others if it rolls over feet or into shins.
- Push the system, instead of pulling it, and use special caution when going up or down ramps.
- Position external hardcopy devices away from the system. Ensure they are secure. Do not stack them on the system.

CAUTIONS

- Ensure the scanhead cables are secure. Use the cable management system to ensure the scanhead cables are protected from damage.
- Electrostatic discharge (ESD) can amount to a significant voltage, which may cause damage to PCBs or other system components. The following precautions can reduce ESD: anti-static spray on carpets; anti-static spray on linoleum; anti-static mats; use of a ground wire connection between the system and the patient table or bed; and use of the ESD pads on the system handles and the wrist support of the system keyboard.

Equipment Protection

CAUTIONS

- Excessive bending or twisting of a scanhead or pencil probe cable may cause failure or intermittent operation of the system.
- Do not sterilize a scanhead using gas or heat methods. Never autoclave a scanhead or expose it to temperatures exceeding 55° C (131° F). These sterilization methods may permanently damage the scanhead. For disinfection and sterilization instructions, see the *Using Disinfectants and Gels* manual, part number 4700-0249-XX.
- Inspect the system power cord and plug on a regular basis. Ensure they are not damaged in any way.
- The power supplies continue to operate when the system is in standby. Ensure the circuit breaker is off before unplugging the system from the wall outlet.

CAUTIONS

- The power supplies continue to operate when the system is in standby. Ensure the circuit breaker is off before unplugging the system from the wall outlet.
- For optimal performance, the ultrasound system should be connected to a 15-Ampere dedicated circuit with an isolated ground for 100V/120V systems, or a 7.5-Ampere dedicated circuit with an isolated ground for 220V/240V systems.

Safety Symbol Definitions

The International Electrotechnical Commission (IEC) has established a set of symbols to classify electrical connections and warn of potential hazards on medical electronic equipment.

The following symbols are used on the outside of the system



Grounded patient connection. Protection against electrical shock is provided by connection of chassis to the safety ground.



Isolated patient connection.



Isolated patient connection for applied parts in direct contact with major vessels.
(Type CF)



I and O on the circuit breaker represent ON and OFF.



This symbol on the power switch represents ON and STANDBY.



This symbol identifies a safety note. Ensure you understand the function of this control before using it. Refer to the appropriate section in the Reference Manual for an explanation of the control.



IPX-1

Drip-proof appliance on scanhead, pencil probe, or footswitch. This instrument may be safely handled in a damp environment.



IPX-7

Water-proof appliance (scanheads only). This instrument may be safely immersed.



Identifies equipotential ground (located next to ground stud on the rear panel).

The following symbols are used inside the system



Identifies high-voltage components operating above 750 Vac (RMS) or 750 Vdc.



Identifies the point where the system safety ground is fastened to the chassis.

Save these instructions.

4 Theory of Operation

Introduction

This section describes the electronics of the system and how the echo data flows through it. Also included are descriptions of the control architecture, software architecture, and the packaging.

Operating System

The software operating system is supported by X-Windows software. X-Windows is an industry-standard software system that allows the development of graphical user interfaces, which consist of windows, graphics, and displayed text.

X-Windows is made up of a server and a client. The server resides on the Pixel Conversion Module (PCM), and the client resides on the Central Processing Unit (CPU).

- The server completely controls all input and output devices
- The client communicates with the server using Ethernet, an asynchronous byte-stream protocol
- CPU software controls all ultrasound functions

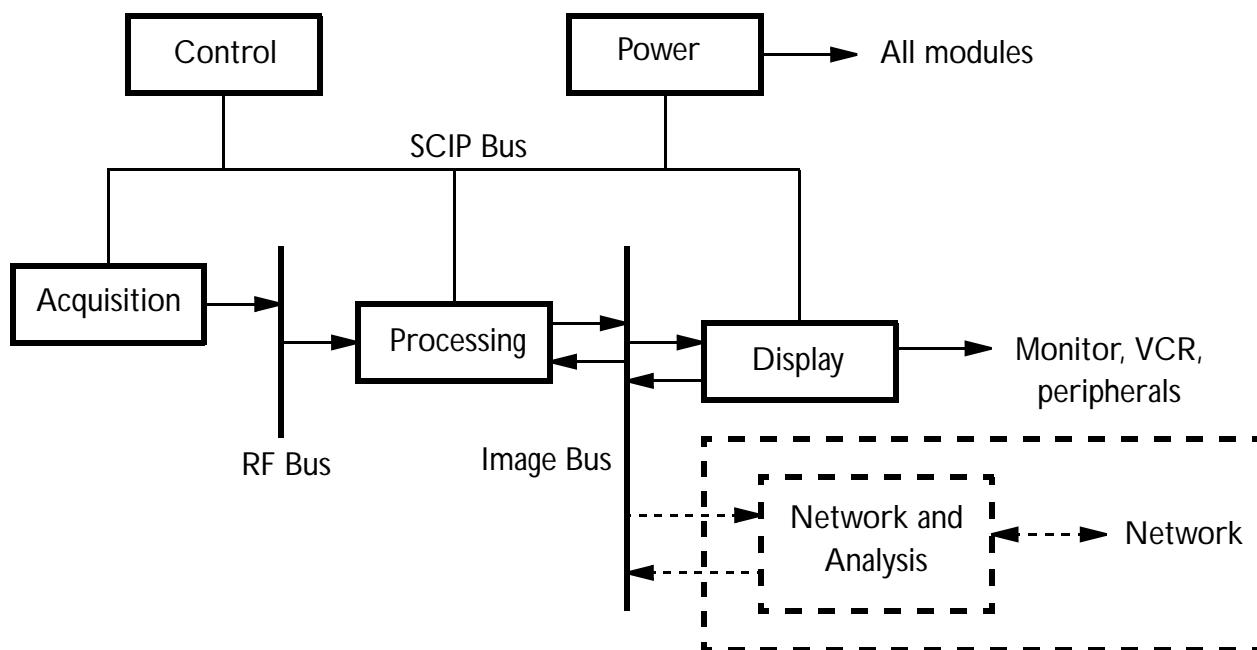
Subsystems

The electronics of the system can be divided into five basic functional subsystems ([Figure 4-1](#)). Each subsystem contains several modules that perform specific functions within the subsystem:

- Power Subsystem
- Control Subsystem
- Acquisition Subsystem
- Processing Subsystem
- Display Subsystem

Figure 4-1

System Block Diagram



Power Subsystem

The Power Subsystem ([Figure 4-2](#)) includes AC Input Module (ACIM) and Power Supply Module (PSM). The power subsystem is monitored by the Front End Controller (FEC) using the Front End Processor (FEP) bus.

System power is not field-configurable. Four versions of the ACIM provide 100-120 Vac/60 Hz, 100-120 Vac/50 Hz, 240 Vac/50 Hz, and 230 Vac/60 Hz configurations.

The Power Subsystem also includes a shielded line cord, On/Off circuit breaker, a ferro-resonant isolation transformer, a linear transformer, resonant filter capacitors, manual ON/STANDBY switch (on user interface), software-controlled power ON/STANDBY switch (controlled by CPU), and overload protection in the individual power supplies (watchdog circuitry on FEC). All power supplies plug directly into the centerplane to supply all DC power.

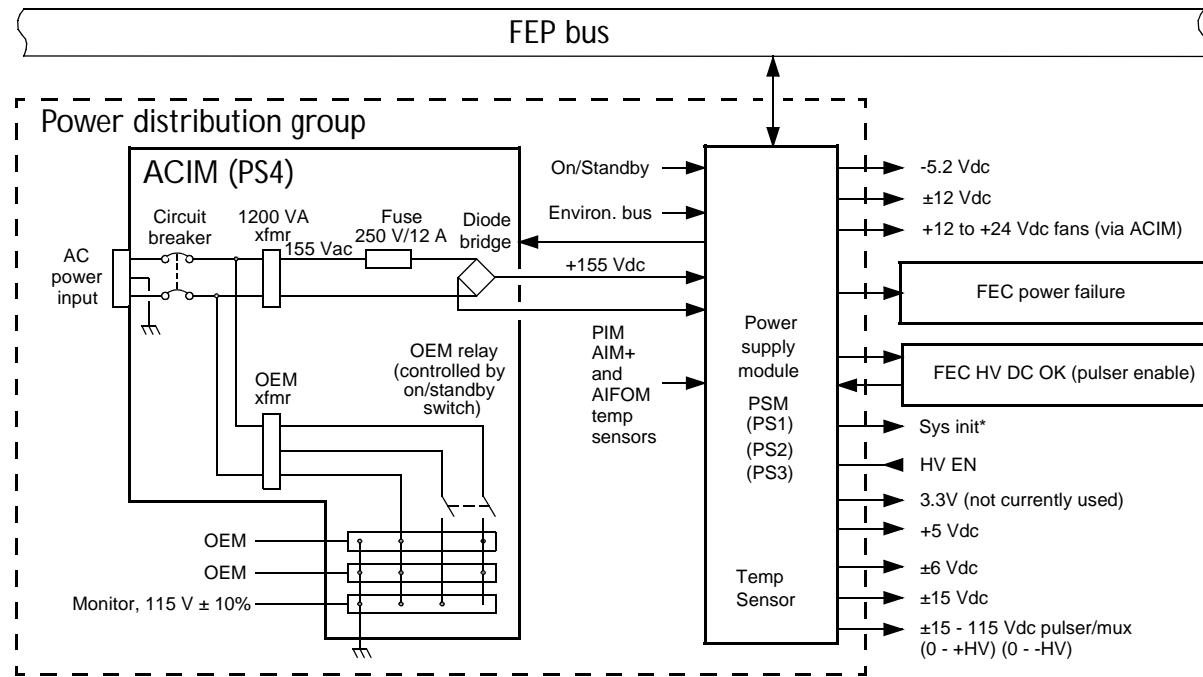
There are no power supply adjustments. The subsystem converts high-voltage AC into DC voltages, and buses these DC voltages over the centerplane to the modules that require them. Status LEDs on the ACIM and PSM are covered in [Section 9, "Troubleshooting"](#). Refer to "[Output Power Monitor Theory](#)" on page 98.

The voltages supplied by the PSM are:

- +5 Vdc
- -5.2 Vdc
- ± 6 Vdc
- ± 15 Vdc
- ± 12 Vdc
- +12 to +24 Vdc (fans)
- ± 115 Vdc (0 to +HV and 0 to -HV for variable pulsers)

Figure 4-2

Power Subsystem



Power Subsystem Operation

The Power Subsystem operates in three modes:

- Power-Up

Brief initialization period after system circuit breaker is turned on.

- STANDBY

ON/STANDBY switch remains in STANDBY. Power supplies on; no power to card cage or internal OEMs; system INIT* set low.

CAUTION

HVDC is present on the Centerplane.

- ON

ON/STANDBY switch set to ON. All power rails turned on, system initialized, no faults detected, OEM voltages enabled.

Refer to "[Output Power Monitor Theory](#)" on page 98 for information about the watchdog circuits mentioned below.

Power-Up Mode – occurs when the system circuit breaker is turned on. During power-on:

- PSM powers its ON/STANDBY circuit
- All Power Subsystem outputs are disabled
- PSM resets latches to enable the Vicor power supplies
- The system is placed into STANDBY mode

STANDBY to On Mode – PSM monitors the ON/STANDBY signal from UIF via the SCIP bus. When the ON/STANDBY switch is set to ON, the following occurs:

- Card cage voltages are enabled and monitored by the FEC for operation within ON mode limits.
- Fans start at full speed. After timeout, speed is adjusted to minimize fan noise while maintaining normal operating temperature.
- +5V Vicor power supply comes up.

- System begins initialization; system INIT* set to high.
- OEM power is enabled.
- PSM watchdog circuit sends data to FEC regarding HV voltages.
- PSM monitors Power Subsystem and airstream temperature.
- FEC interprets the voltage, current, and temperature values and responds by updating ACIM LEDs.
- DVS Module powers up.

On to STANDBY Mode – PSM monitors the ON/STANDBY signal from CPU via the SCIP bus. When the ON/STANDBY switch is set to STANDBY, the system is set to STANDBY mode as follows:

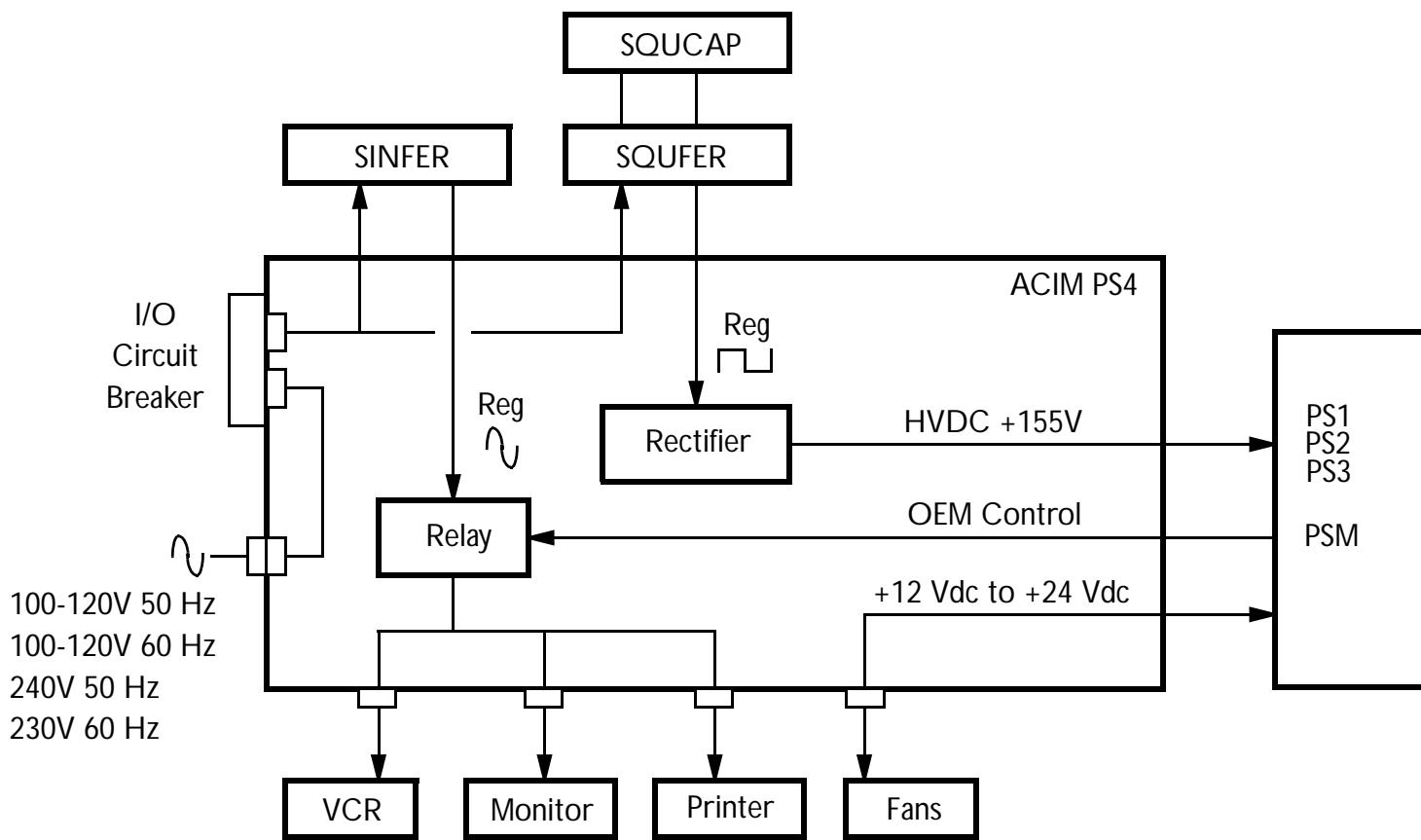
- Contents of static RAM are copied to non-volatile RAM (time, temperature, status).
- DVS Module powers down. System CPU starts time-out for system shutdown.
- FEC requests permission to enter STANDBY mode from CPU via SCIP bus and starts a time-out to prevent software lockup.
- PSM watchdog circuit stops sending data to FEC. If FEC does not respond to PSM watchdog circuit, PSM shuts down HV supply.
- CPU initiates a wait period and saves active operating parameters to non-volatile RAM. If CPU does not respond, FEC proceeds with standby sequence.
- HV supply disabled.
- Power removed from internal OEMs.
- System INIT* is set low to reset the system.
- Card cage voltages are disabled (fans are off).

AC Input Module (ACIM) - PS4

- AC input receptacle ([Figure 4-3](#)), I/O circuit breaker (main power switch), ground stud and LED display
- LEDs provide diagnostic information (See [Section 9, "Troubleshooting"](#))
- Provides power interface to transformers and OEMs
- Provides HVDC to PSM

Figure 4-3

ACIM Module



Power Supply Module (PSM) - PS1, PS2, PS3

- Provides -5.2 Vdc, +5 Vdc, ± 6 Vdc, +3.3 Vdc (not currently used), +12 Vdc to +24 Vdc, ± 12 Vdc, ± 15 Vdc, 0 to +HV, and 0 to -HV
- Monitors thermistors located on PCBs around the card cage (PSM, AIM+, PIM, and AIFOM). Averages temperature from thermistors and controls voltage to system fans. (Power supply is disabled in Standby. Fans are not functional.)
- Provides variable HV. Powers HV pulsers and scanheads with HV multiplexers. Generates voltages from ± 15 Vdc to ± 115 Vdc
- Disables all power supplies if HVDC goes below +90 Vdc
- HV watchdog circuit detects if the FEC fails to monitor the HV voltages/currents. Enables the user to shut down the system if the FEC fails or is not installed
- Monitors HVDC and notifies the CPU if it goes below 100 Vdc. CPU uses this information to protect storage devices against data corruption
- Relays status of HVDC from the ACIM to the FEC
- PSM diagnostics are performed by the FEC, voltage, current, and system temperature monitoring
- Monitors individual power supplies for over-voltage conditions and shuts down faulty power supplies
- Contains system "standby" circuitry
- Enables OEM power

Control Subsystem

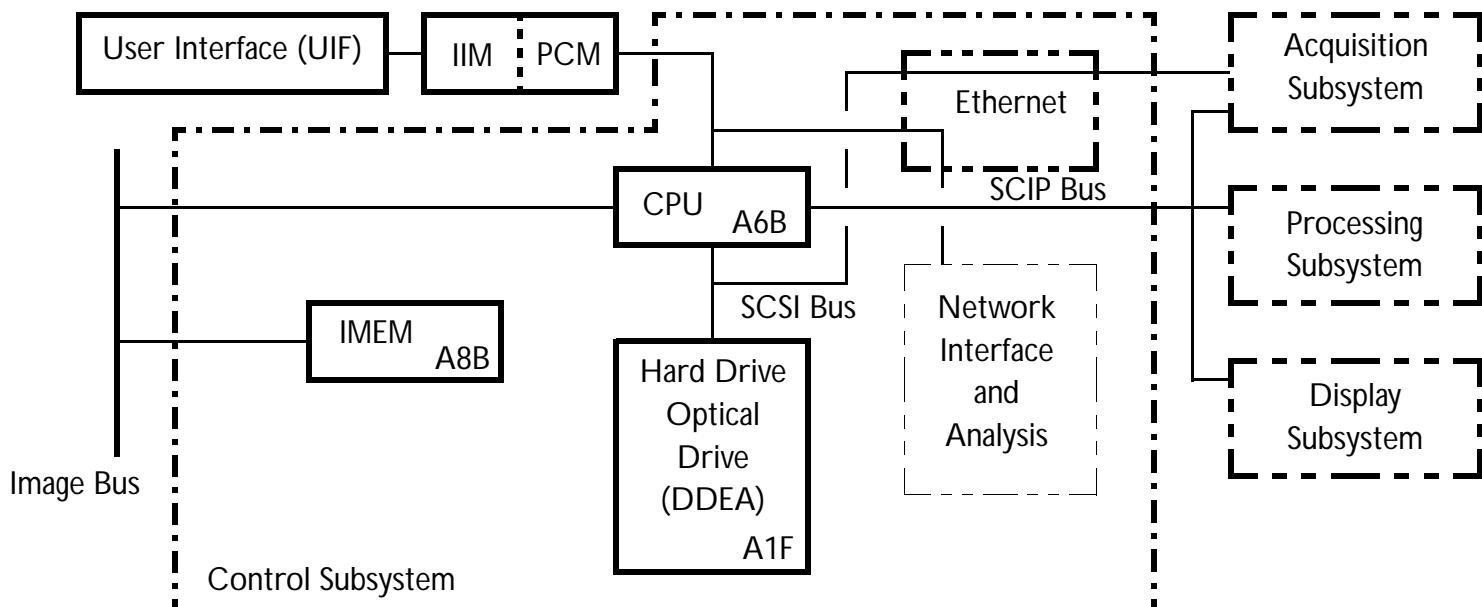
The Control Subsystem ([Figure 4-4](#)) monitors user input, gives status to the user through UIF, provides system coordination, provides data storage, and service access.

The Control Subsystem consists of:

- System CPU Module (CPU)
- Image Memory Module (IMEM)
- Disk Drive ECG Assembly (DDEA)

Figure 4-4

Control Subsystem Block Diagram



System CPU - A6B

- Motorola 68040 microprocessor; VX Works operating system.
- Loads modules requiring operating software at boot-up.
- Transfers scanhead tables to the FEC as needed.
- Generates coefficients and data tables for Processing Subsystem.
- Performs analysis calculations.
- Queries Power Subsystem for Acoustic Power & Intensity (AP&I) status.
- X-bus interface to Display Subsystem (PCM).
- Time and date.
- Stores user setups.
- 32 Mb RAM for Image Management. 48 Mb RAM for systems with Performance 2000 upgrade (17X.XX software). Additional RAM supports addition of the Performance 2000 feature set.
- Verifies major H/W, F/W, S/W revision, upgrade compatibility.
- Performs system diagnostics and stores results.
- Provides Ethernet connection to the DVS module and APM.

Image Memory (IMEM) - A8B

- 64-Mb RAM for data storage
- Provides Image Bus arbitration, control, and timing
- Reports PCB board revision and SIMM data to system CPU

- Stores data from ADAPTR for transfer to PSP or PCM, or both
- Stores data from PCM for transfer to PSP during framegrab
- History buffers for 2D Echo, 2D Color, M-mode Echo, Color M-mode, Scrolling Doppler, Physio, and High Q Analysis

Disk Drive ECG Assembly (DDEA) - A1F

- Houses optical drive and hard drive of varying capacities. All hard drives formatted to 2100 Mb because of operating system constraints.
- Provides SCSI interface to the optical and hard drives.
- Provides +5-Vdc and +12-Vdc power to the optical and hard drives.
- Connects and low-pass filters footswitch signals to the PCM.
- Amplifies and filters ECG, Aux ECG, Respiration, Channel A, and Channel B signals. Routes signals to ADAPTR.
- Reports PCB board revision to system CPU.

Acquisition Subsystem

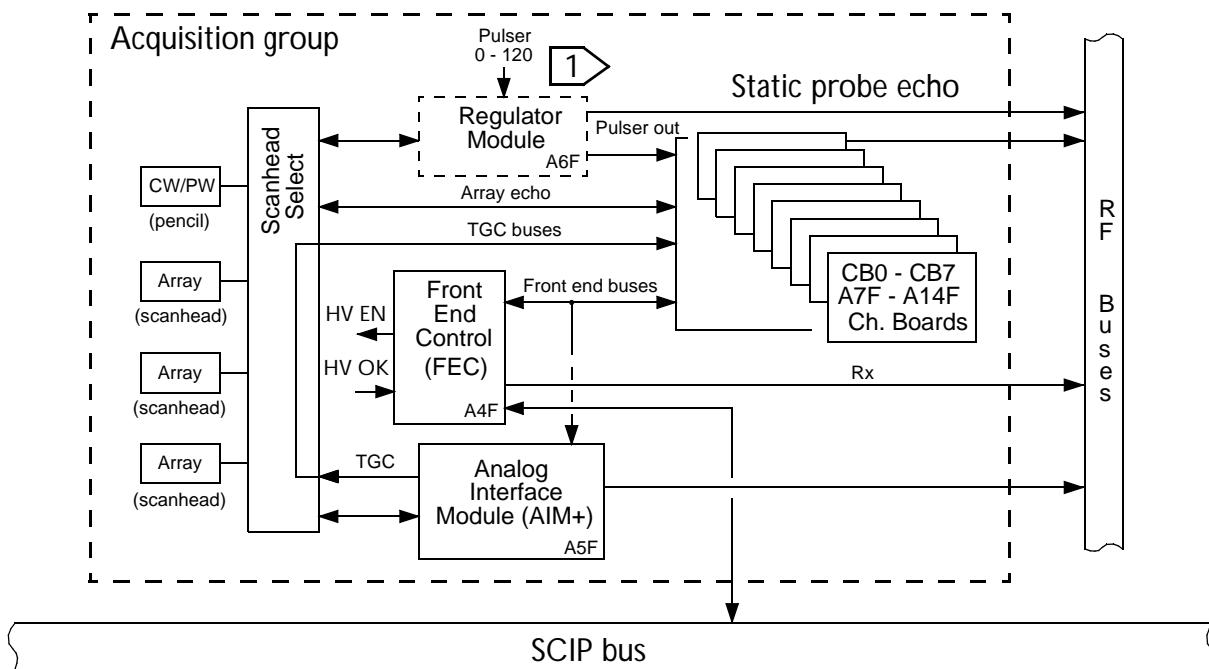
The Acquisition Subsystem ([Figure 4-5](#)) controls the transducer, generates the electrical impulse (pulse) that creates sound waves, and converts the returning echo information into digital data.

The Acquisition Subsystem consists of:

- Front End Controller Module (FEC)
- Scanhead Select Module (S/HSEL)
- Eight Channel Boards (CB0 - CB7)
- Analog Interface Module Plus (AIM+)
- Regulator Module (only in systems with a depopulated AIM+ PCB shipped prior to April 1998, PCB P/N 7500-1026-XX)

Figure 4-5

Acquisition Subsystem



1> Regulator Module functions were moved to the AIM+ PCB for systems shipped after April 1998.

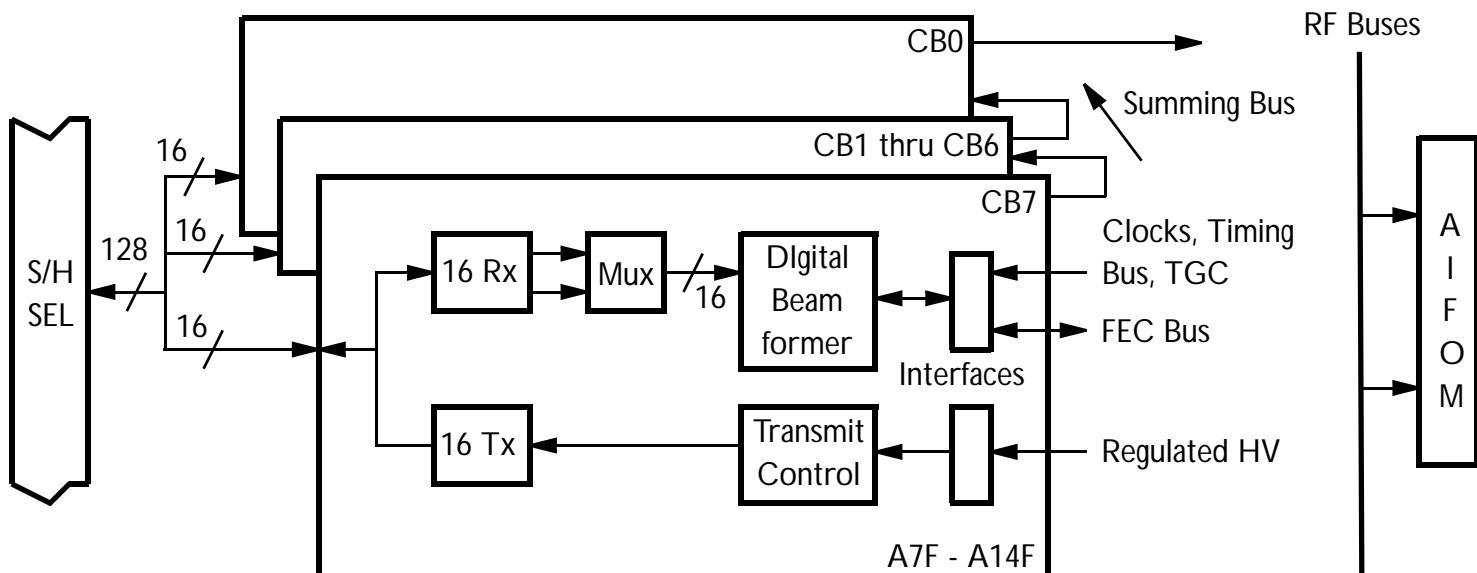
Front End Controller (FEC) - A4F

The FEC downloads operational parameters from CPU and provides real-time control of the front end for transmit, receive, and beamforming functions.

- Interfaces with CPU via SCIP bus to determine scanning sequence and mode of operation.
- Provides timing signals for Tx and Rx cycle.
- Controls scanhead selection, personality, and HV Mux through the AIM+ and S/HSEL.
- Sends scanhead operating parameters to Channel Boards through FEC bus.
- Receives scanning sequence instructions from CPU and generates digital TGC, PRI and other timing sequencing.
- Controls sample volume cursor position to the AIFOM.
- Monitors voltages from PSM via FEP bus.
- Generates RF headers for image data to AIFOM.
- AP&I power monitor control.
- Bus Interfaces: SCSI, FEP, Clock, SHC, TGC, RF, TTag, FEC, Sync, SC, and SCAN (See "[Bus Functions](#)" on page 101).
- Changes to FEC for systems with 170.XX software and higher allow more imaging modes to be selected, such as SonoCT Real-time Compound Imaging.
- Supports dual AIFOMs for systems with 170.XX software and higher.
- Integrated CSI and Pulse Inversion.

Figure 4-6

Channel Boards - A7F through A14F



Channel Boards - A7F through A14F

- Channel Board RAM is loaded with operational parameters for selected scanhead. Parameters define Tx, Rx, and beamforming behavior for each scan line and depth.
- Transfers data under FEC control for each new PRI.
- Transmit apodization/power control under FEC control.
- Transmits to, and receives from, transducer elements under FEC control.

- Digitizes RF, beamforms, adds TGC, and sends digital Rx data to Processing Subsystem over the RF buses for all modes.
- Anti-aliasing filtering.
- Static CW RF receive and mix to baseband (Channel board 0).
- Static PW transmit, receive, and process (Channel board 1).
- Steered CW receive and mix to baseband.
- 512 channels
1024 channels for SonoCT systems.
- Bus Interfaces: Summing, TGC, RF, Clocks, Timing, FEC, and FEP.

Analog Interface Module Plus (AIM+) - A5F

- Generates system clock frequency of 240 MHz
- Subdivides the clock frequency into 120, 80, 60, 48, 30, and 24 MHz
- Supplies clock frequencies (80, 60, 48, 30, and 24 MHz) to centerplane for distribution to other PCBs
- Supplies 120 MHz to S/HSEL
- Receives +5 Vdc, +6 Vdc, ±15 Vdc, ±80 Vdc, and -5.2 Vdc from centerplane and regulates ±15 Vdc to become +10 Vdc, and ±12 Vdc
- Supplies ±80 Vdc, ±12 Vdc, +10 Vdc, and +5 Vdc to S/HSEL.
- Generates and monitors two analog TGC voltages. Supplies TGC signals to S/HSEL for use by Channel PCBs.
- Receives I/Q CW signals from Channel PCBs for steered and static CW processing.
- Thump filter, variable wall filters, and low-pass anti-aliasing filters for I/Q.

- Digitizes I and Q using 16-bit AD converters. Exports I and Q to RF buses.
- Sends S/HSEL status and personality data to FEC via FEP bus.
- Buffers and provides HV Mux selection data to the scanhead.
- FEP bus interface.
- Relay control for desired scanhead on S/HSEL.
- Thermal sensor to monitor internal system temperature for fan speed control.
- Scanhead temperature sensing to FEC via FEP.
- Supplies high voltage to HV Muxes on S/HSEL.
- Supports acquisition with the MPT7-4 scanhead (motor control for 3D acquisition) on Performance 2000 systems (17X.XX software).

Regulator Module - A6F

NOTE The functions listed below were moved to the AIM+ PCB for systems shipped after April 1998.

- Regulates HV from PSM to Channel PCBs
- Controlled by FEP Bus interface

Scanhead Select Module (S/HSEL)

- Selects between the scanhead connectors
- Interfaces between the front-end PCBs and the scanhead
- Connects the TGC control voltages from the AIM+ to the Channel boards
- Connects the baseband CW quadrature current bus from the Channel boards to the AIM+
- Connects the 120-MHz clock signal from the AIM+ to the Regulator Module

- Connection and mux for transducer elements and the channel boards for array transducer
- Provides connection for static CW and TCD transducers

Processing Subsystem

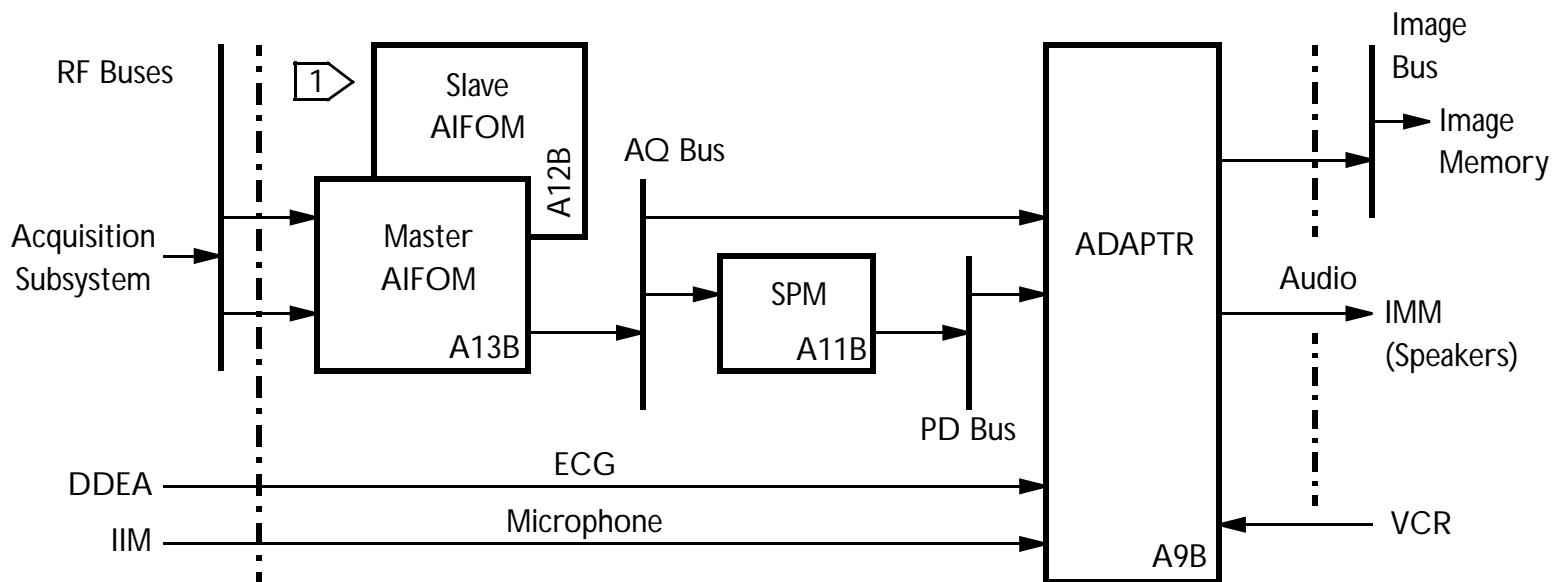
The Processing Subsystem ([Figure 4-7](#)) filters the echo information, and transforms it for display processing. The processing subsystem generates Doppler audio and routes various audio sources to the speakers and VCR. The processing subsystem digitizes, filters, and transforms ECG data for the display. Post-processing and data storage for zoom take place in this subsystem.

The Processing Subsystem consists of:

- Single Advanced IF Output Module (AIFOM) on systems below 17X.XX software
- Dual Advanced IF Output Modules (Master and Slave AIFOMs) on 17X.XX systems
- Signal Processing Module (SPM)
- Advanced Digital Audio and Physio Translator Module (ADAPTR)

Figure 4-7

Processing Subsystem



1 Dual AIFOMs used only in systems with 170.XX software and higher.

Advanced Intermediate Frequency Output Module (AIFOM) - A12B/A13B

- Processes 2D, Color Flow, Spectral Doppler, and M-mode data.
- Synthetic aperture.
- Dynamic Range.

- Demodulates all beamformer data (except CW Doppler) into In-phase and Quadrature data (I and Q).
- Additional processes for 2D and M-mode echo data are amplitude detection, multi-zone reconstruction, and multi-rate filtering.
- CW Doppler passes through AIFOM without being processed.
- Uses 24-MHz clock to time data onto the PCB from the RF buses and control data flow through the PCB.
- Receives 60-MHz and 40-MHz clocks from the centerplane and divides the signals for use in MOP and SCIP circuits.
- Dual AIFOMs installed on systems with 17X.XX software. All other systems have single AIFOM.
- A13 is Master AIFOM. A12 is Slave. Controlled by system software.
- A12 AIFOM is used only for high frame-rate mode and for Intelligent Frame Rate Accelerator operation.

Signal Processing Module (SPM) - A11B

- Processes Color Flow, Spectral Doppler, and M-mode data. Also processes 2D on systems with 124.13 software and up.
- Processes 2D persistence and Dynamic Contrast Enhancement on systems with 124.13 software and up.
- Velocity, variance, and power.
- Color Flow processes include Dynamic Motion Differentiation (DMD), wall filter, 2D auto correlation, and spectral estimation.
- Color Flow processing includes persistence, hole filling, and segmentation.

- Spectral Doppler processing includes wall filter, gain, FFT, gap fill, averaging, interpolation, and High Q Automatic Doppler calculations (mean and peak).
- Doppler processing includes Hilbert Transformation to generate forward and reverse audio.
- M-mode processing includes temporal filtering/decimation.

Signal Processing Module Plus (SPM+) - A11B (170.XX Systems and Above)

- All signal paths go through SPM+. All data path functions are programmed through software
- Contains two daughterboards with DSPs for additional processing power
- Operating speed increased from 32 MHz to 40 MHz
- Performs SonoCT Real-time Compound Imaging functions

Advanced Digital Audio, Physio, and Translator Module (ADAPTR) - A9B

- Translates Acquisition Bus (AQ) or Processed Data (PD) bus headers to image bus addresses as part of the transfer to AQ bus and PD bus data to Cineloop/history buffers in IMEM
- Maintains buffer descriptors in IMEM for all data types output by this module
- Provides bus arbitration, error monitoring, and clock generation for the AQ and PD bus
- Provides ECG A/D conversion, filtering, display gain/positioning
- Triggers front-end acquisition based on ECG R-wave detection
- Sends heart-rate info to CPU based on ECG R-wave detection
- Provides a D/A audio-reproduction path for Doppler audio
- Selects speaker source between Doppler and VCR
- Provides volume control and mute for speakers

- Routes microphone to VCR
- Provides audio connectors for external VCR
- Processes microphone and VCR audio; A/D conversion, gain and filtering

Display Subsystem

The Display Subsystem ([Figure 4-8](#)) formats the echo information for display, and transfers it to the video monitor and peripheral devices.

The Display Subsystem consists of:

- User Interface Module (UIM)
- Pixel Space Processors 1 and 2 (PSP1 and PSP2)
- Pixel Conversion Module (PCM)
- Peripheral Interface Module (PIM)
- Internal Interface Module (IIM)

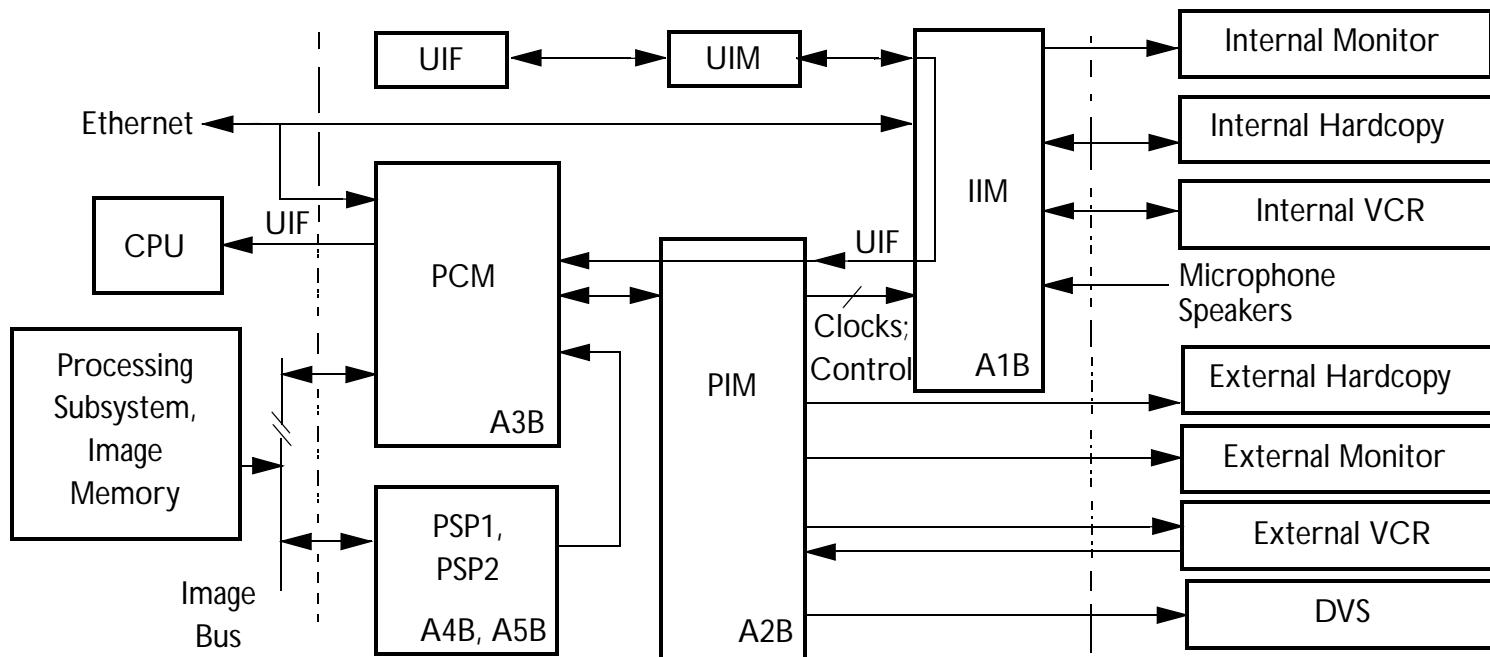
User Interface Module (UIM)

- Upper and lower control panels (UCP and LCP)
- User Interface Module (UIM)
- Controlled by PIM
- User interface for pull down menus for functions that are user options and dedicated controls for functions used during examinations

NOTE System self-diagnostics includes the UIM as part of the Display Subsystem.

Figure 4-8

Display Subsystem



Pixel Space Processor (PSP1 & 2) - A5B, A4B

- Acquires image data from IMEM
- 2D scan conversion
- Zoom
- Static and scrolling graphics
- Freeze (buffer memory located on PSP1)

Pixel Conversion Module (PCM) - A3B

- Controls UIF window displays (X-windows)
- Gray scale and color LUTs (look-up tables)
- Converts non-interlaced 60/50 Hz to interlaced 30/25 Hz for OEMs
- Gray and color bar generator
- Hidden digital data
- Provides image background and image windows
- Monitors user interaction including keystrokes, trackball movement, and footswitch activity
- All graphics and overlay capabilities
- User interface windows, menus, and icons
- Framegrab functions
- Routes DVS overlay graphics from/to the PIM

Peripheral Interface Module (PIM) - A2B

- Controls UIF through UIM (control PIM)
- Encode/Decode NTSC and PAL composite Y/C video (video PIM)

- System video sync (video clock) originates on AIM+ (video PIM)
- Controls internal OEMs through IIM (video PIM)
- Sends digital video to and from the DVS Module (video PIM)
- Routes DVS overlay graphics to the PCM through the PIM and to the monitor (video PIM)

Internal Interface Module (IIM) - A1B

- Routes video signals to and from monitor, hardcopy devices, and VCR (No video processing is done on IIM)
- Buffers and routes audio signals to and from VCR
- Amplifies and routes audio signals to the speakers in the monitor housing
- Routes logic signals to and from the monitor, hardcopy devices, and UIM
- Buffers the signal from the microphone to the system

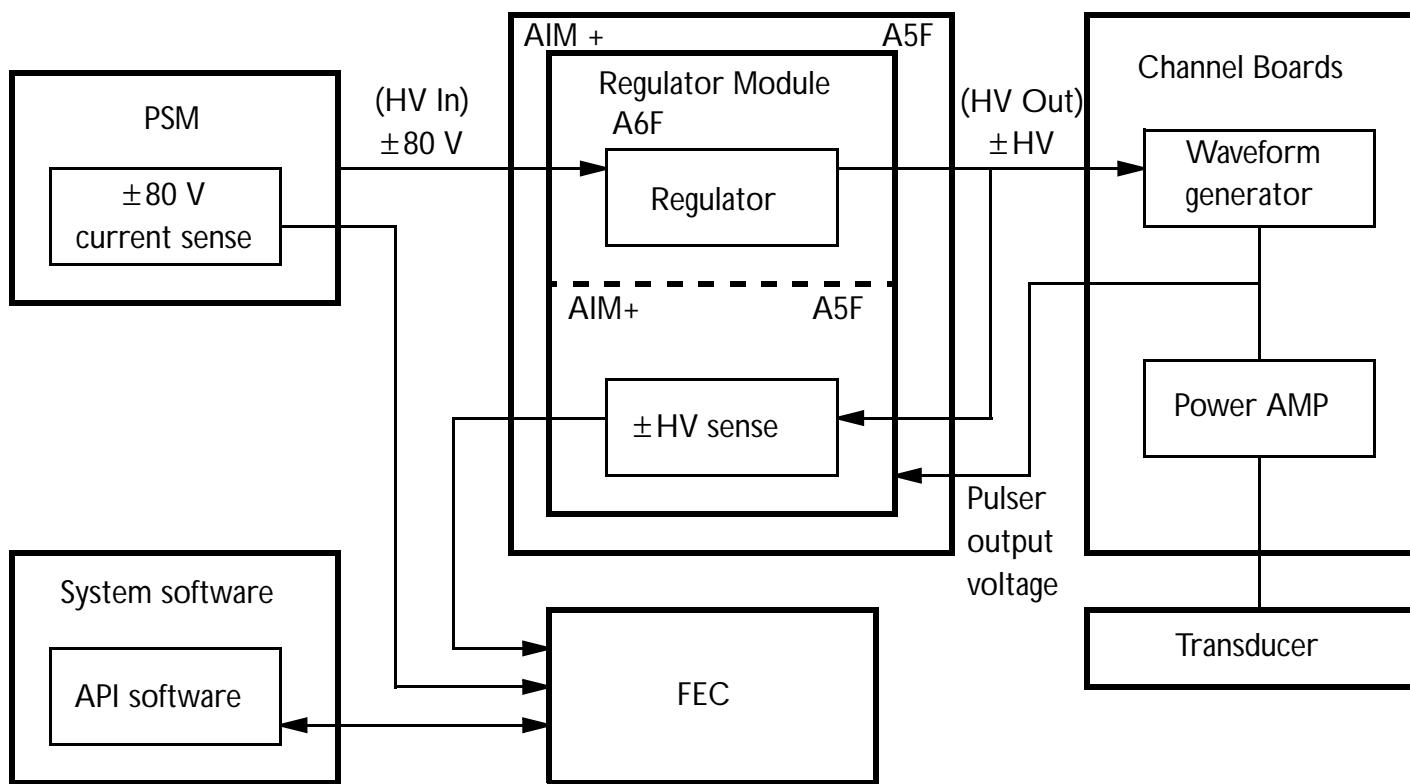
Output Power Monitor Theory

Output power monitor ([Figure 4-27](#)) provides patient safety by ensuring the system is operating within acoustical power and intensity (AP&I) limits. It also protects hardware from destructive or unsafe conditions. It consists of AP&I software, which resides on the System CPU; FEC software; PSM firmware; Power Subsystem monitors in each power supply; Regulator Module; pulser monitors in each channel board; and a beamformer monitor.

The output power monitor is designed to detect any single failure in the system, for example, a faulty power supply, a faulty beamformer, a software failure, a defective scanhead or scanhead data files. Mode information, (PRI, voltage, burst, and so forth) sent to the beamformer is also verified before allowing the beamformer to start. This prevents the system from inadvertently creating a temporary over-power condition.

Figure 4-9

Power Monitor Block Diagram



Both software and hardware watchdogs disable the transmit function when errors are detected. Software watchdogs monitor variable parameters (for example, AP&Is vary from scanhead to scanhead). When the software watchdog in the system CPU receives an error report from a power monitor, it disables the system from transmitting. Hardware watchdog circuits disable or

Theory of Operation: Output Power Monitor Theory

shut down the system when maximum, and in some cases minimum, parameters are exceeded (for example, minimum power supply output voltage or minimum current limits).

The CPU uses the AP&I software program and system control settings to calculate the required power output for the selected transducer and operating mode. These values are sent to the channel boards to control generation of pulsers for the beamformer. Voltage and current monitors compare the measured pulser control values with the allowable limits listed in the AP&I software tables.

NOTE Software AP&I tables contain power maximums for each transducer in its allowed operating modes. AP&I theory is included in the *Scanheads and Safety* manual (P/N 4701-0027-XX). AP&I tables are included in the *Acoustic Output Tables* manual (4706-0027-XX).

The power monitor also provides system and hardware protection through hardware watchdog circuitry for maximum voltage, maximum pulser currents, and output electrical power. When measured parameters exceed allowable values, the power monitor circuitry disables the supply and signals the error to the system CPU.

The beamformer monitors the average pulser voltage supplied to the beamformer, pulser output voltage, and average current. If monitored values exceed the maximums for voltage and pulser currents, maximum pulser output electrical power, and maximum pulser power dissipation, the beamformer software watchdog disables the beamformer and signals the system controller.

Timeouts in the system software verify that the system software can communicate with the FEC and the Power Subsystem. If either subsystem is not active and functioning, the system stops the beamformer and shuts down the pulser supply. Timeouts are initiated at regular intervals and acknowledged by the affected circuits, if operating properly.

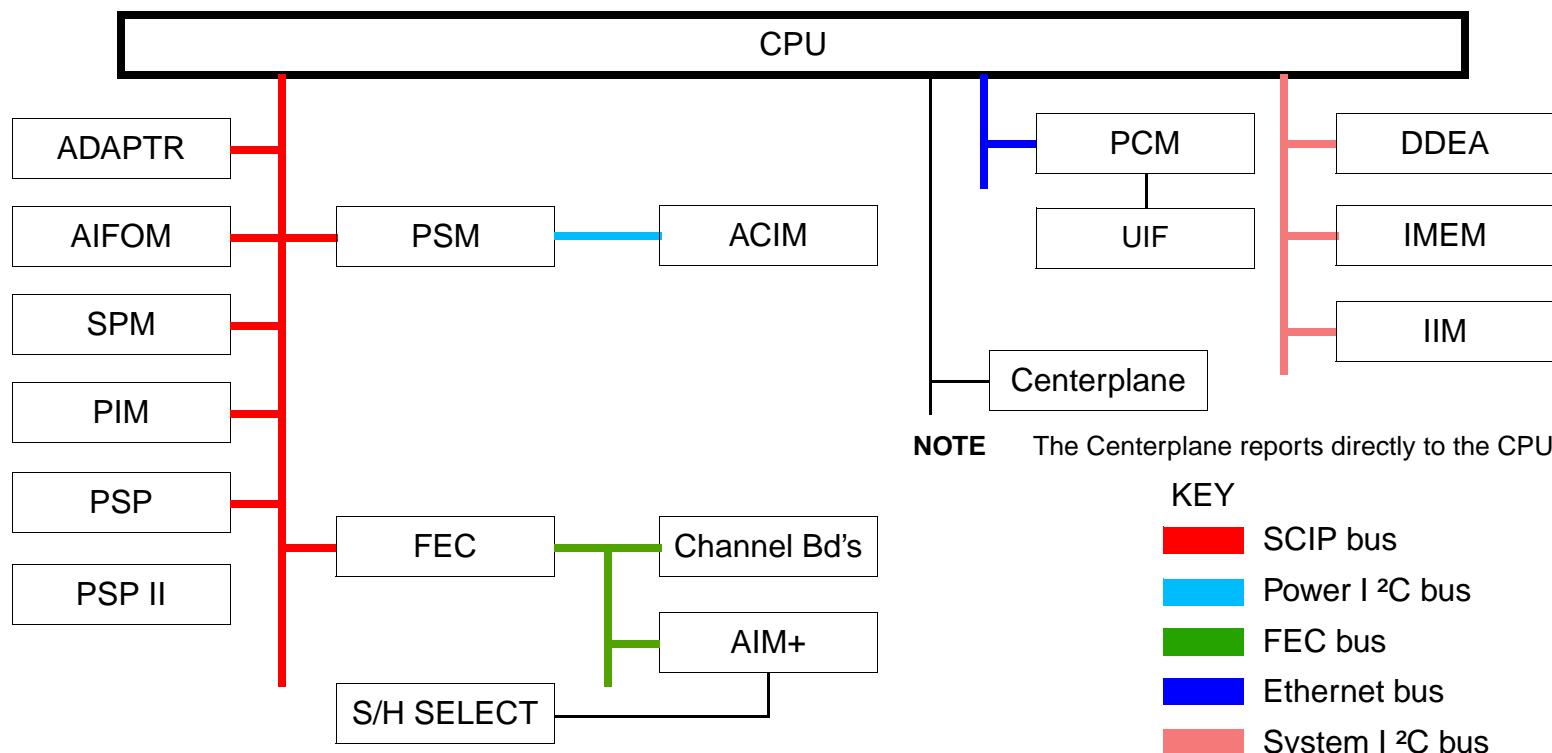
Timeout alerts usually are reset if mode, power, or some other function is changed.

Bus Functions

The HDI 5000 bus structure is illustrated in [Figure 4-10](#).

Figure 4-10

HDI 5000 Bus Structure



Control Subsystem Buses**Serial Control Interface Processor (SCIP)**

- Relieves Module Operation Processor (MOP) in servicing control bus activity
- Master-slave multi-drop communication network

Small Computer System Interface (SCSI)

- Interfaces optical and hard disk drives to CPU
- Provides an external port for future use

Acquisition Subsystem Buses**FEC Bus**

Provides operational parameters, and controls use of them by Channel Boards.

Timing Bus

- Carries real-time control signals to Channel Boards, AIM and DOPACQ.
 - Carefully controlled to ensure sync with front-end clocks
 - Start and stop Tx/Rx cycle
 - Controls output of the front-end ultrasound data on SUM and RF buses

FEC Sync Bus

Transfers real-time motor control sync data between Motor Servo and FEC.

Power Supply Sync Bus

Transfers real-time high-voltage power-supply status between FEC and PSM to sync starting, stopping, and power level changes in the system.

SUM Bus

Daisy-chained bus that passes from Channel Board to Channel Board carrying the partially beamformed sum. Each Channel Board sums its channels. It then sums its result with the sum of the previous Channel Board and passes the result to the next Channel Board.

S/H Control Bus

Unidirectional bus between FEC (master) and AIM.

RF Buses

Carry data from the front end to the AIFOM on two separate RF buses.

Digital TGC Bus

- Carries current digital value of TGC curves and digital values for pulser voltage regulators.
- AIM receives digital TGC values for D-to-A conversion to analog TGC voltages.
- AIM receives digital pulser values for D-to-A conversion to a high-voltage analog DC value for each channel.

Analog TGC Bus

Two differential analog buses on S/HSEL driven by AIM and received by all Channel Boards for two variable gain stages.

CW Sum Bus

- Differential current bus on the S/HSEL driven by Channel Boards.
- AIM receives and processes current representation value of beamformed CW data.

FEP Bus

Extension of CPU bus on FEC bus used for nonreal-time tasks such as output power monitoring and scanhead interface control (controls scanhead personality access, sends relay pulses to the S/HSEL module, and senses the scanhead disconnect status). The FEP bus is an extension of the FEC's CPU bus.

Time Tag Bus (TTag)

Used by digital signal processing modules for time tag data. FEC generates time-tag signals.

Processing Subsystem Buses

Acquisition Bus (AQ)

- Transfers real-time data from AIFOM to SPM or ADAPTR.
- Transfers I/Q test data from ADAPTR to SPM.
- ADAPTR module provides the clocks, bus arbitration, and bus monitoring for AQ bus.

Processed Data Bus (PD)

- Transfers real-time data from SPM to ADAPTR.
- Transfers color-test data from SPM to ADAPTR.
- ADAPTR module provides the clocks, bus arbitration, and bus monitoring for PD bus.

Data Paths

Data path block diagrams are contained in [Figure 4-11](#) through [Figure 4-26](#). The data paths in the illustrations are shown by thick dashed lines. Solid thin lines indicate that a connection exists but is not used for that data path.

Figure 4-11

2D/PW/Color Front End Signal Path

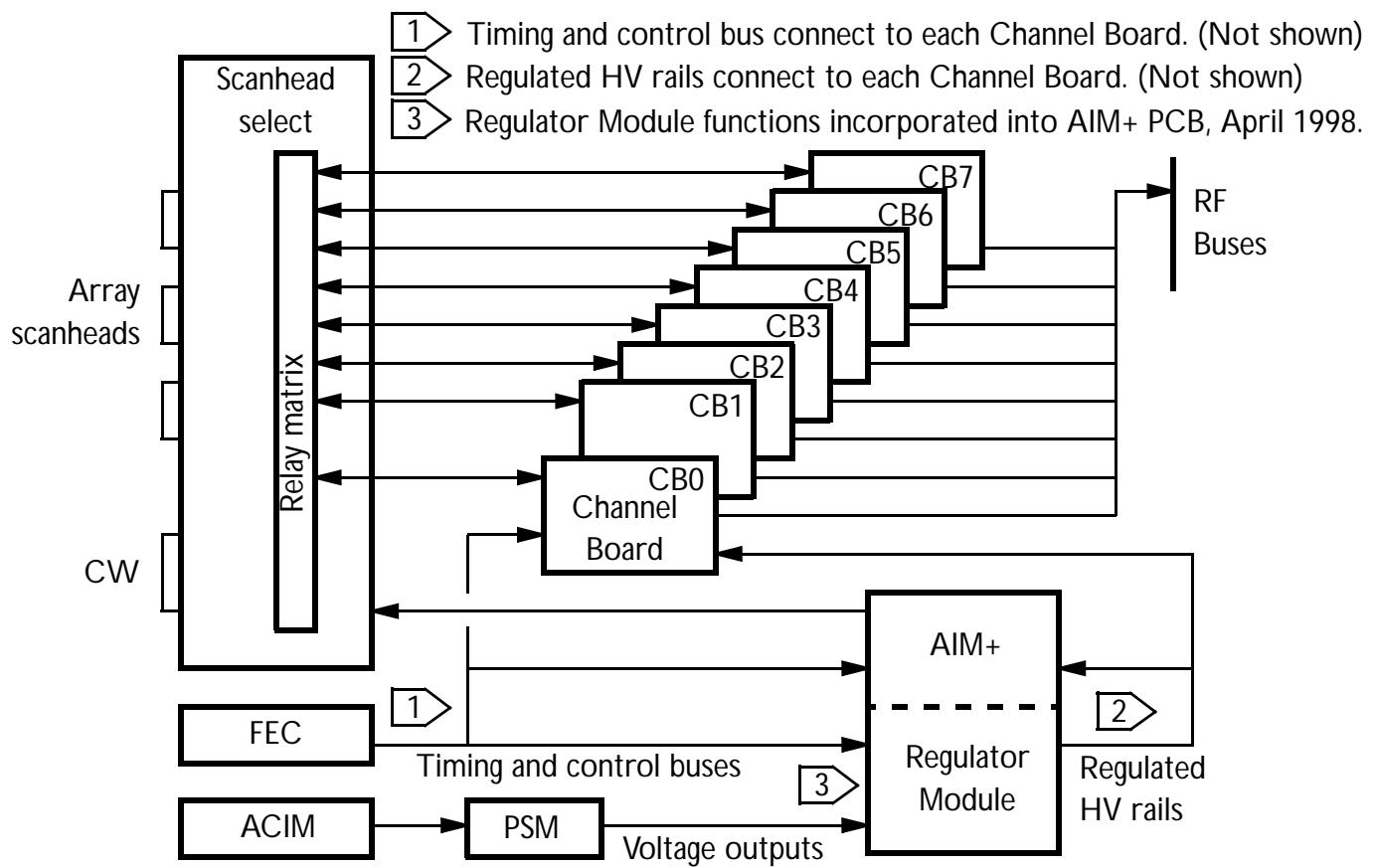


Figure 4-12

2D Signal Path (108.XX Systems and Below)

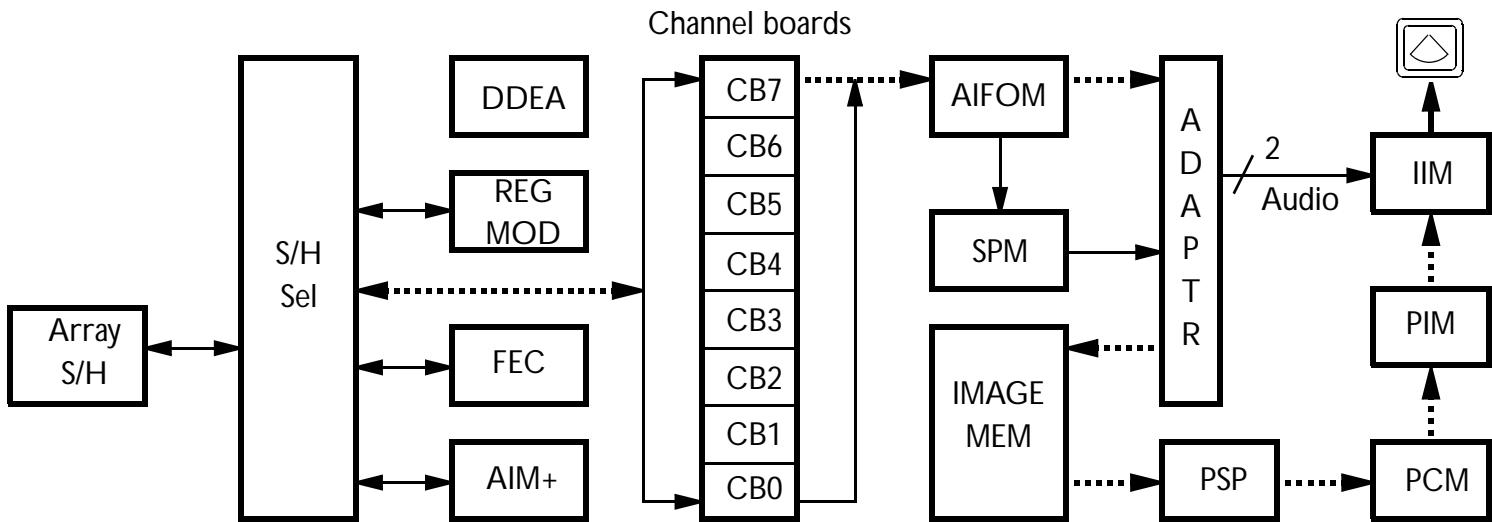


Figure 4-13

2D Signal Path (124.13 through 127.XX Systems)

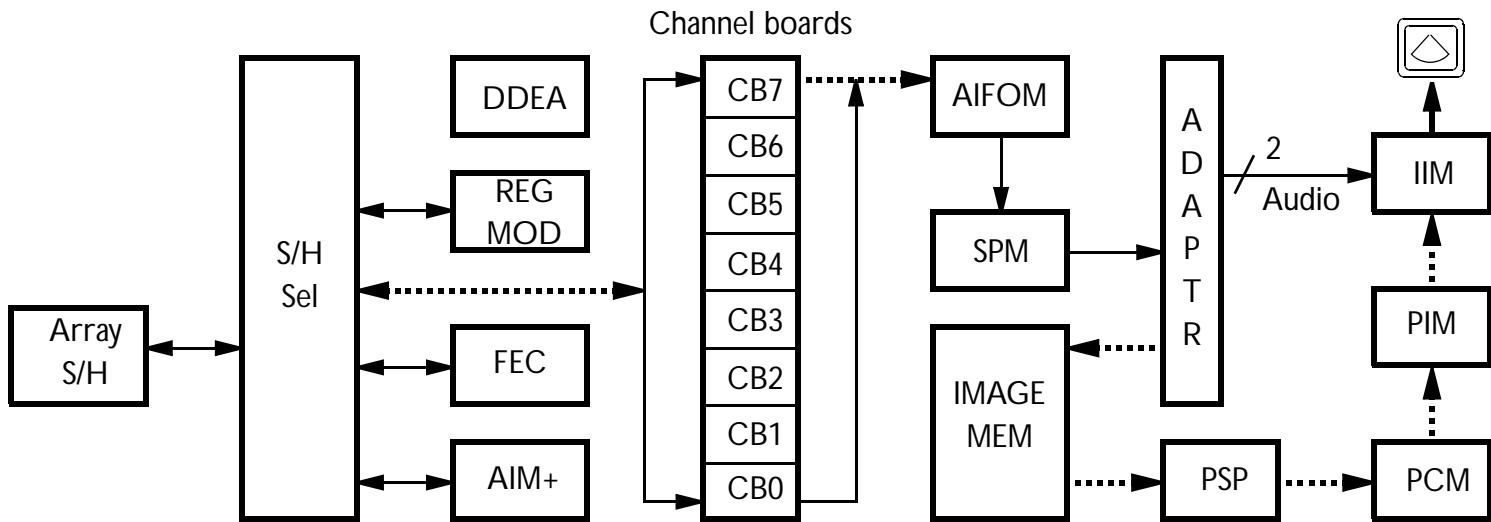


Figure 4-14

2D Signal Path (170.XX Systems and Above)

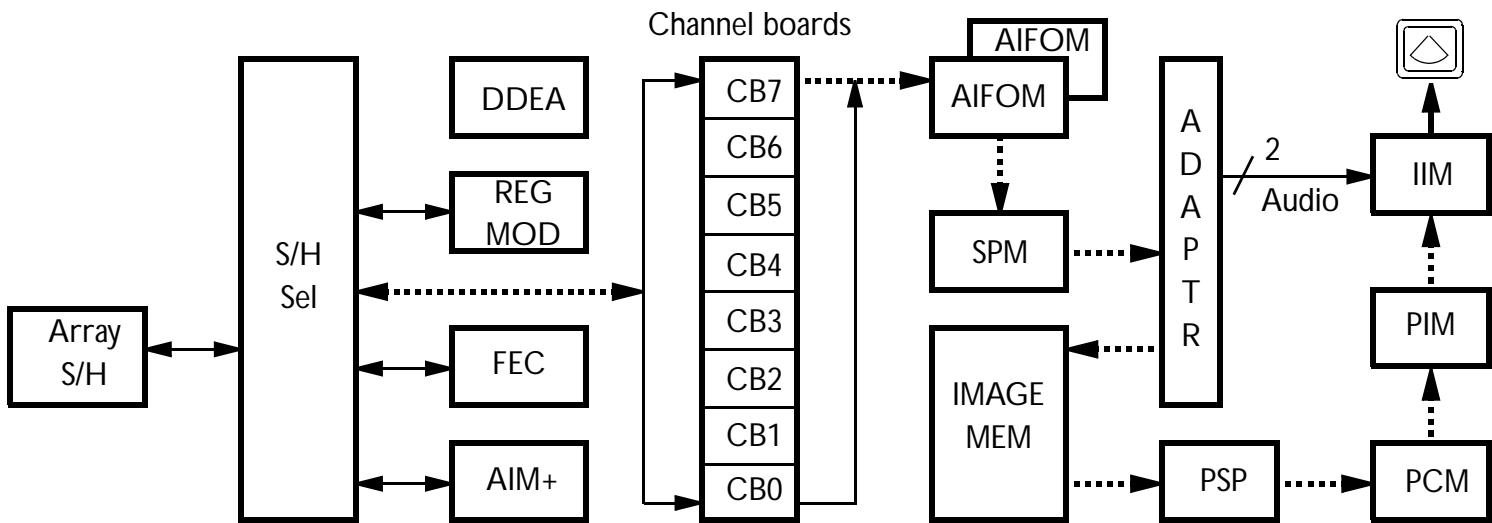


Figure 4-15

PW Doppler and Color Path (108.XX Systems)

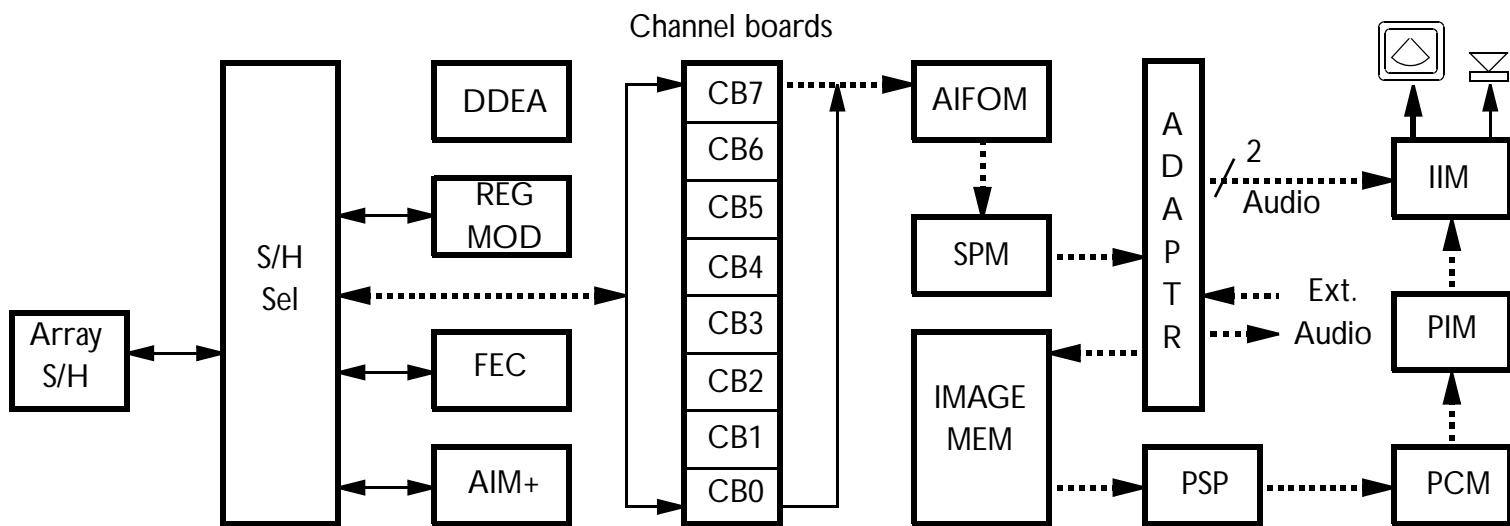


Figure 4-16

PW Doppler and Color Path (124.13 Through 127.XX Systems)

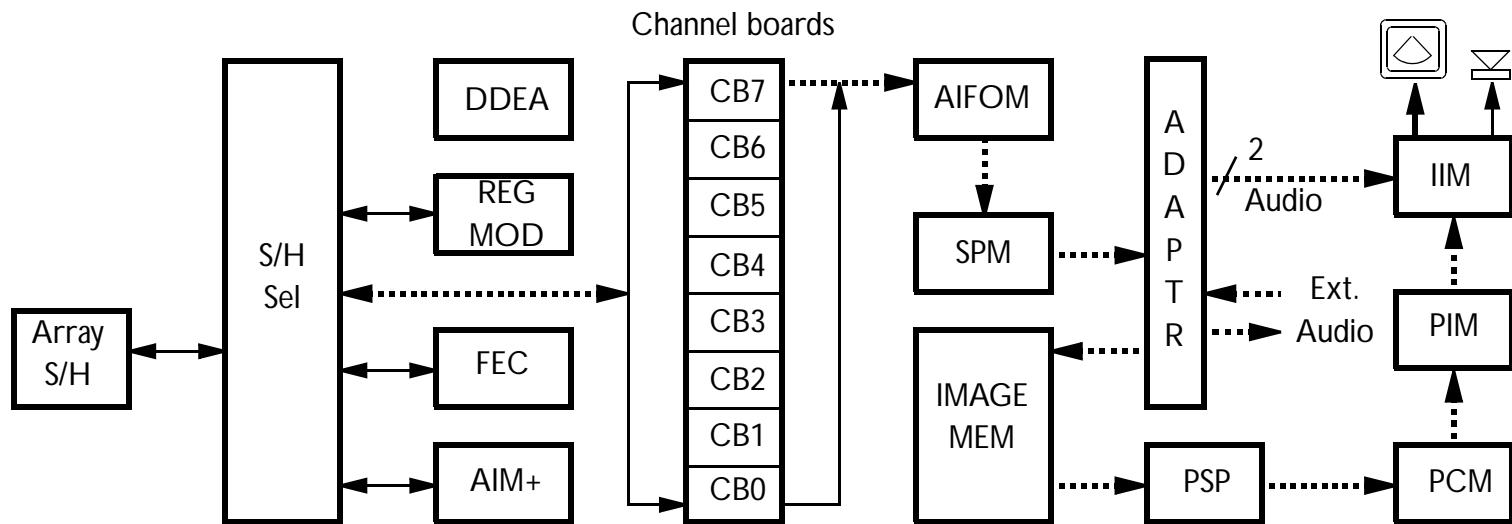


Figure 4-17

PW Doppler and Color Path (17X.XX Systems)

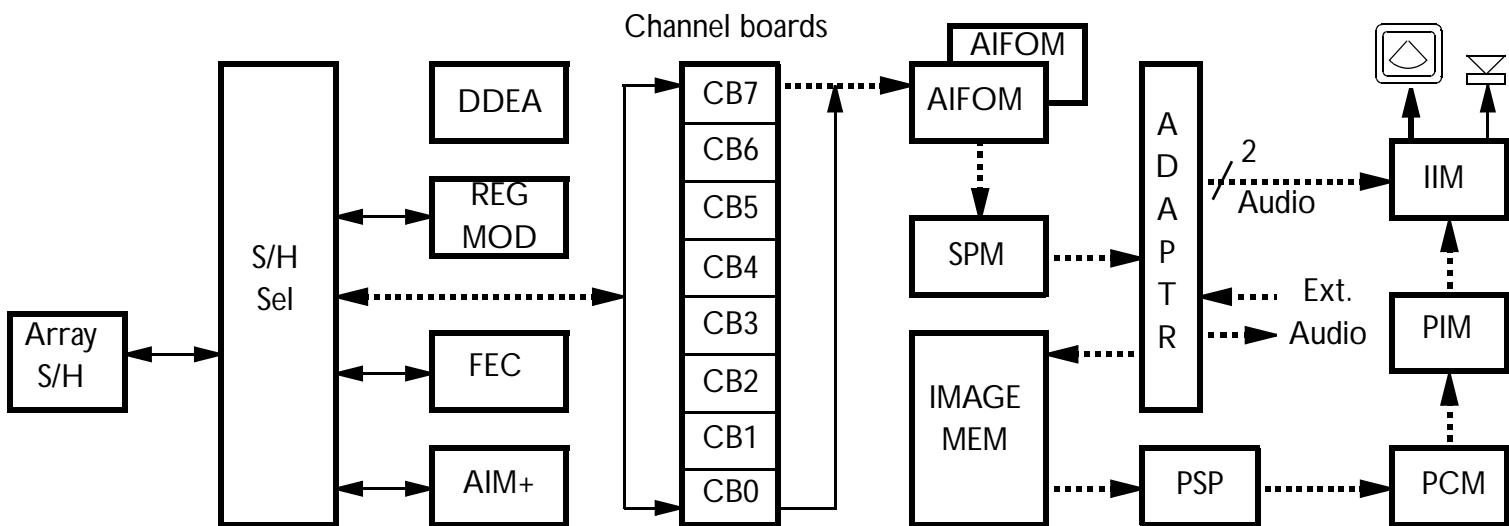


Figure 4-18

Static PW Front End Signal Path

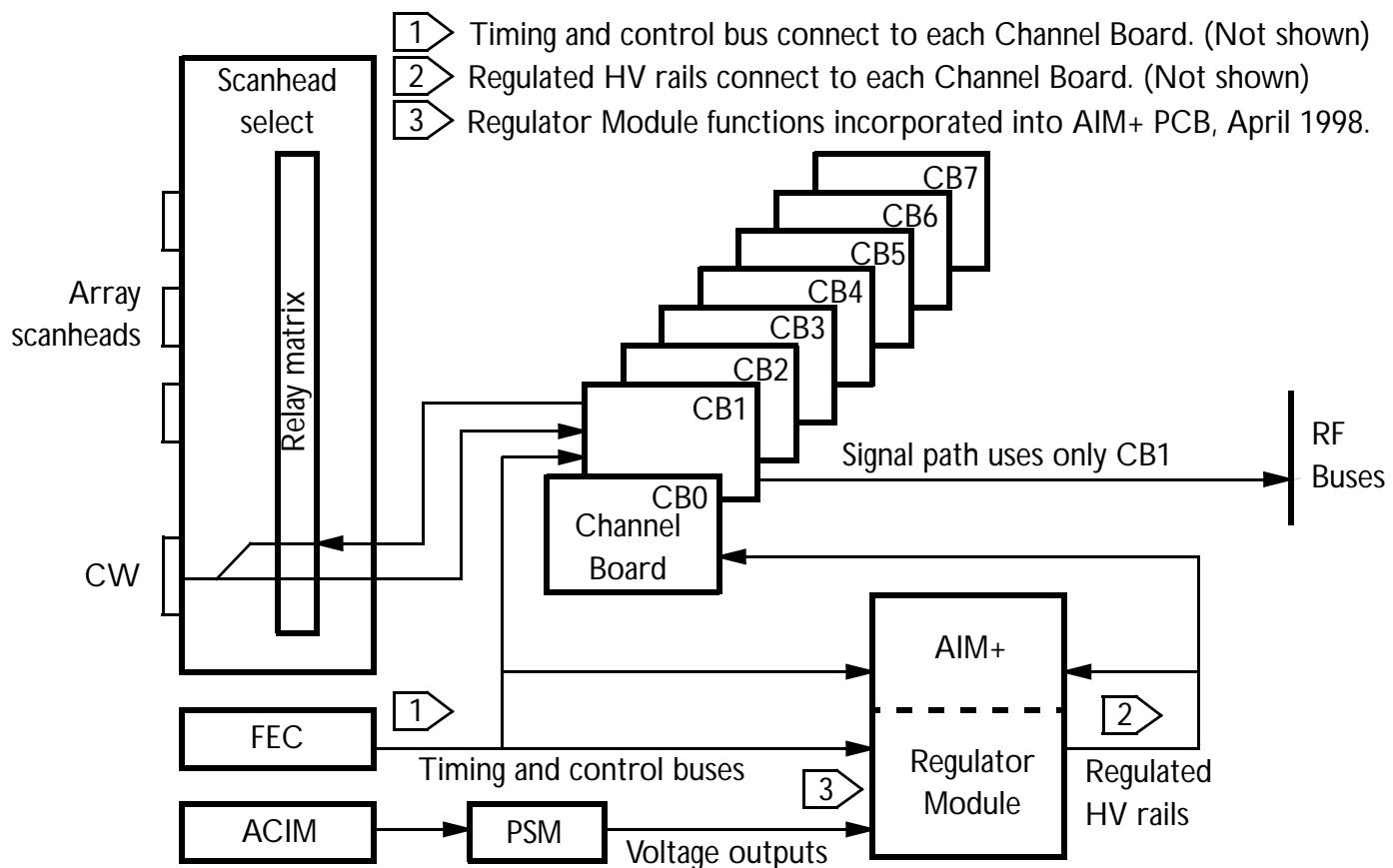


Figure 4-19

CW and Static PW Doppler (TCD) Signal Path (127.XX Systems and Below)

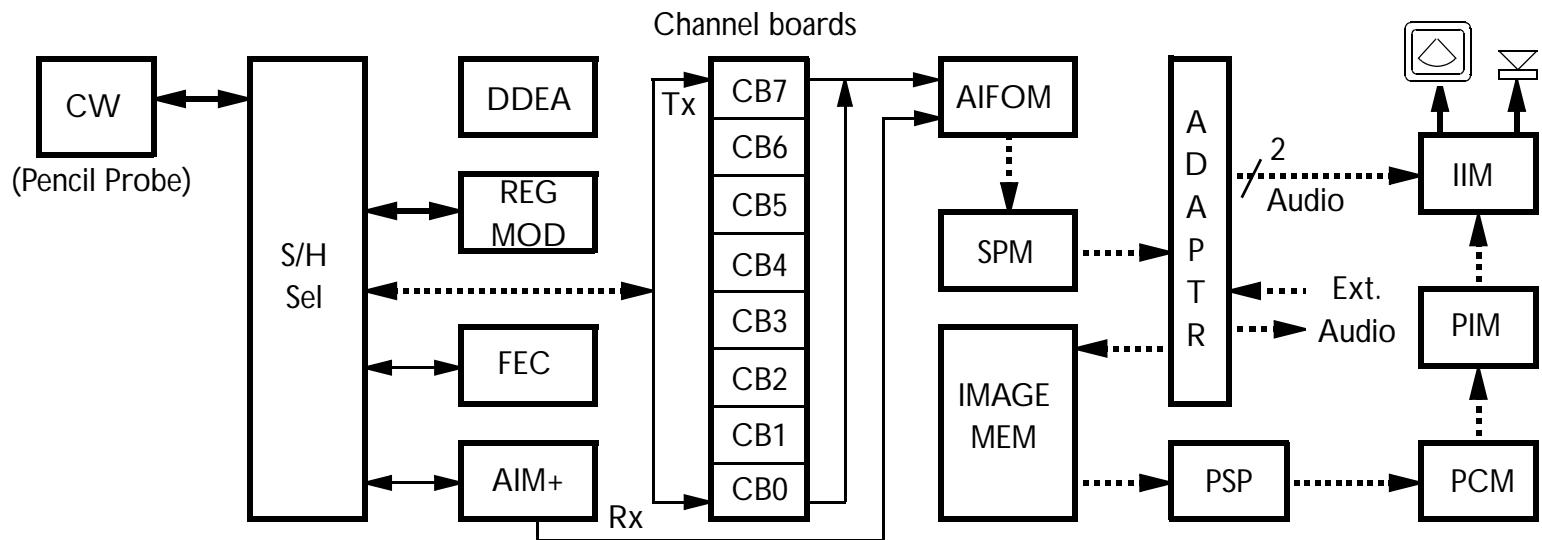


Figure 4-20

CW and Static PW Doppler (TCD) Signal Path (17X.XX Systems)

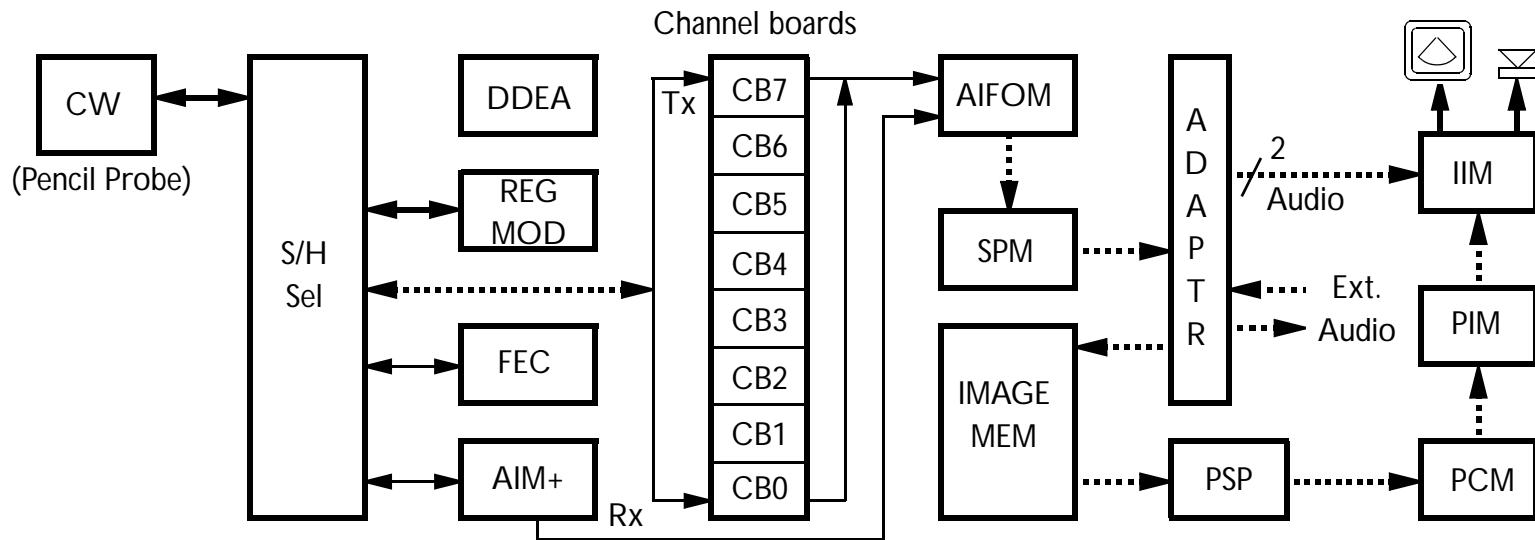


Figure 4-21

Static CW Front End Data Path

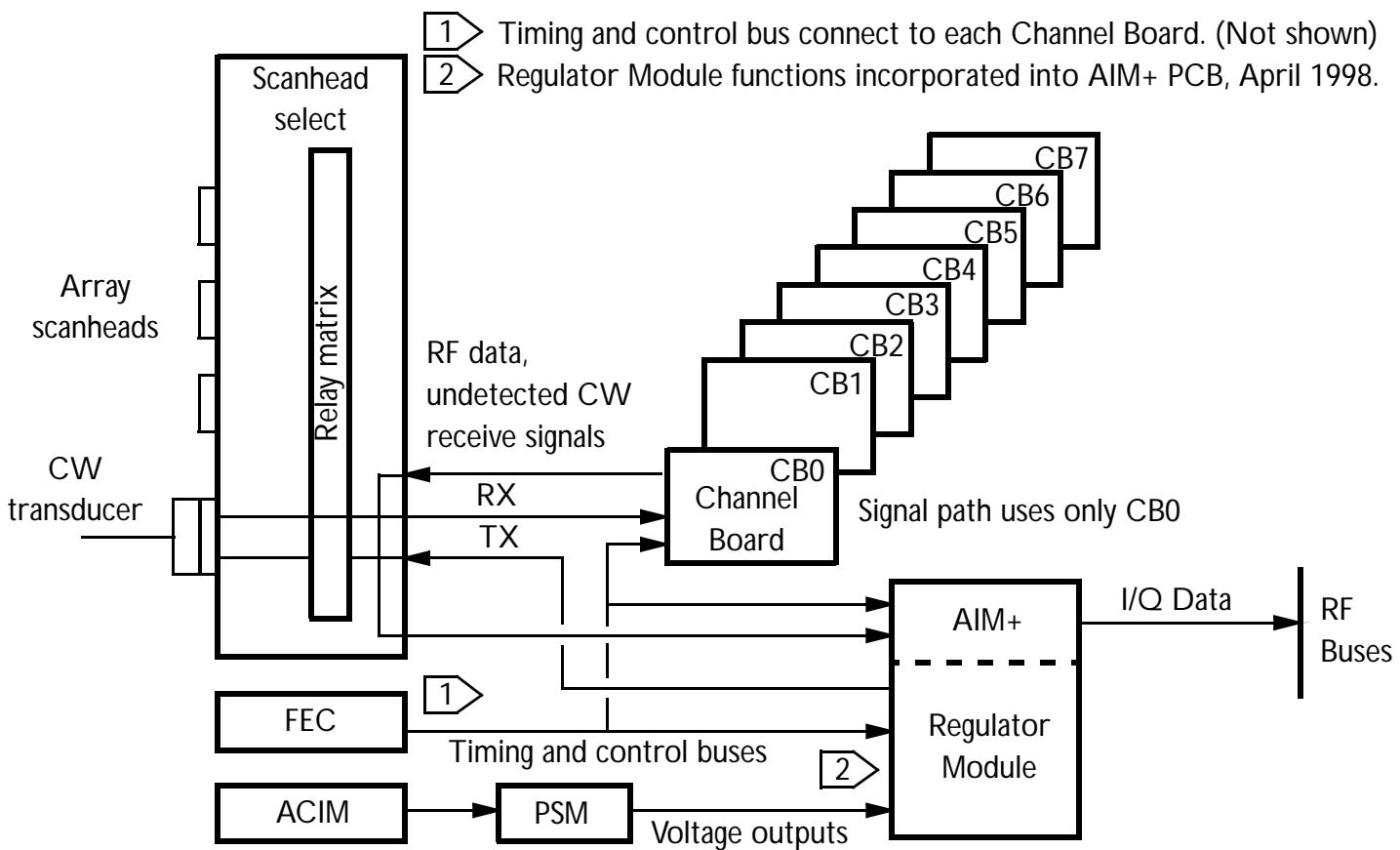


Figure 4-22

Steered CW Front End Signal Path

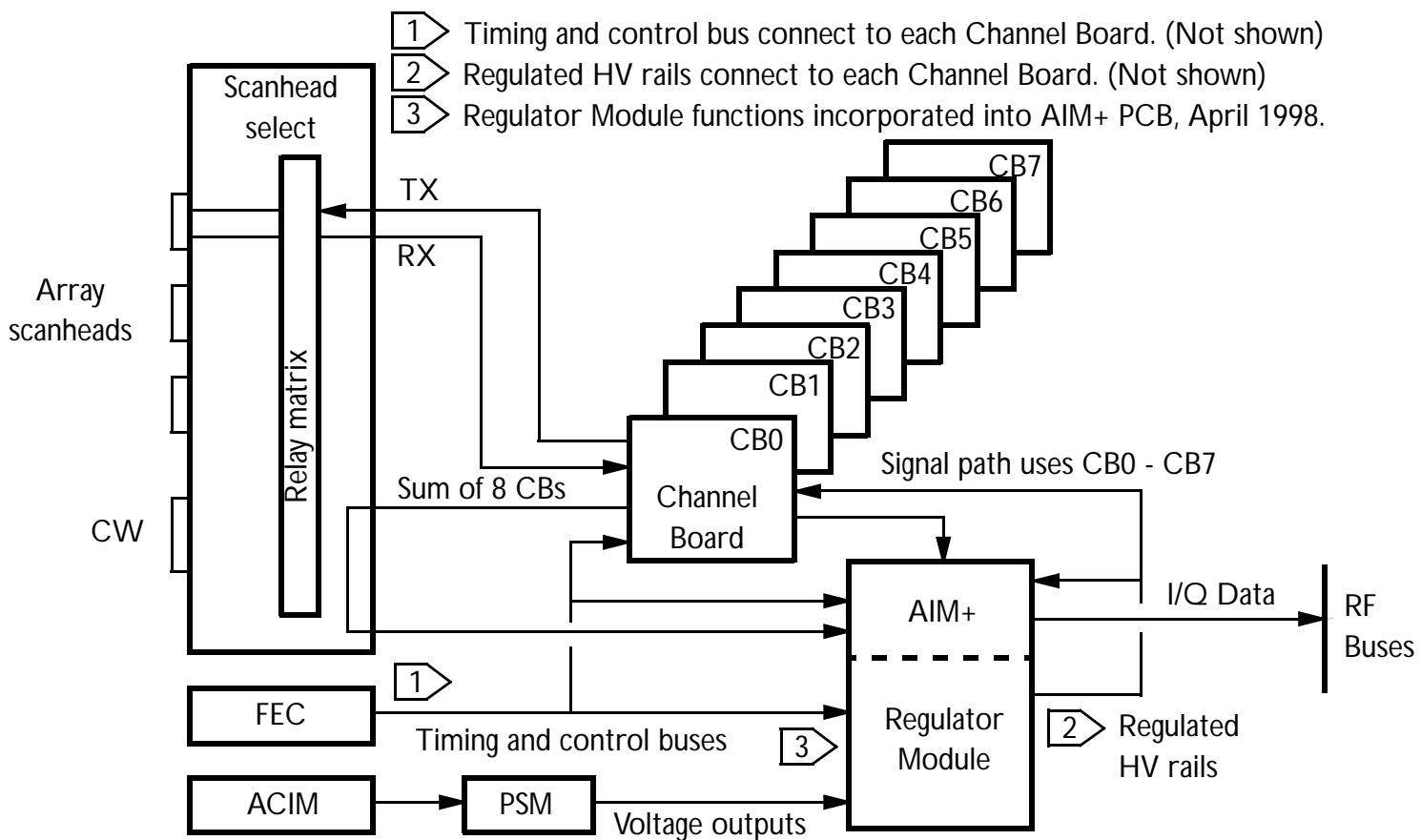


Figure 4-23

M-Mode Echo/M-Mode Color Data Path (127.XX Systems and Below)

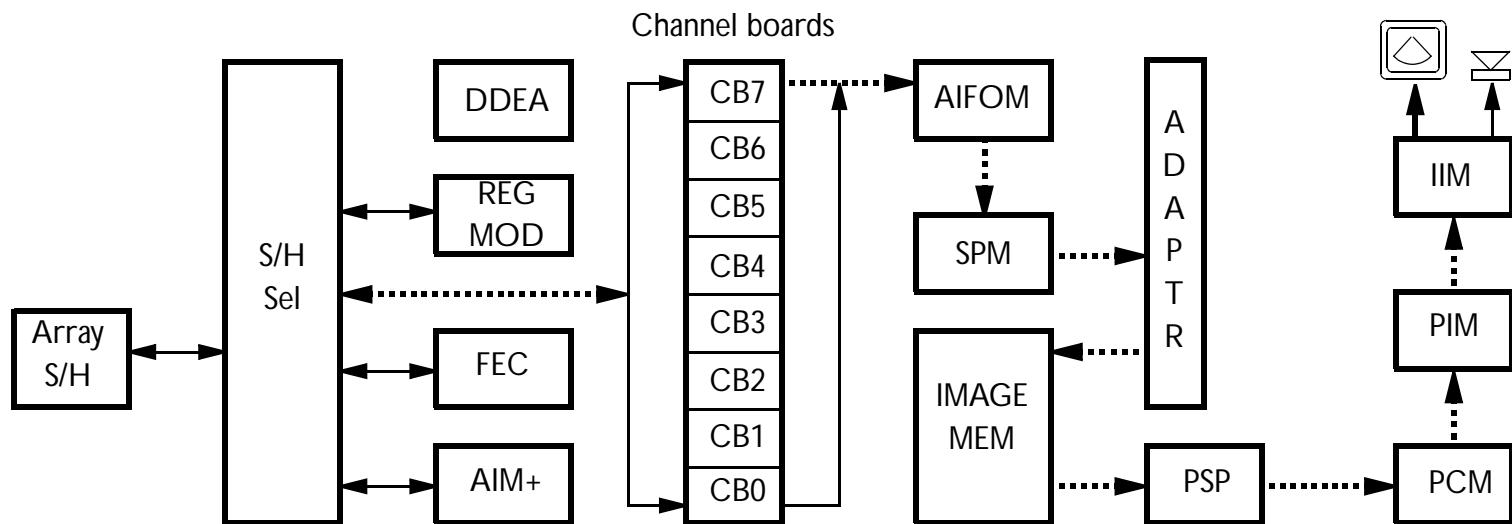
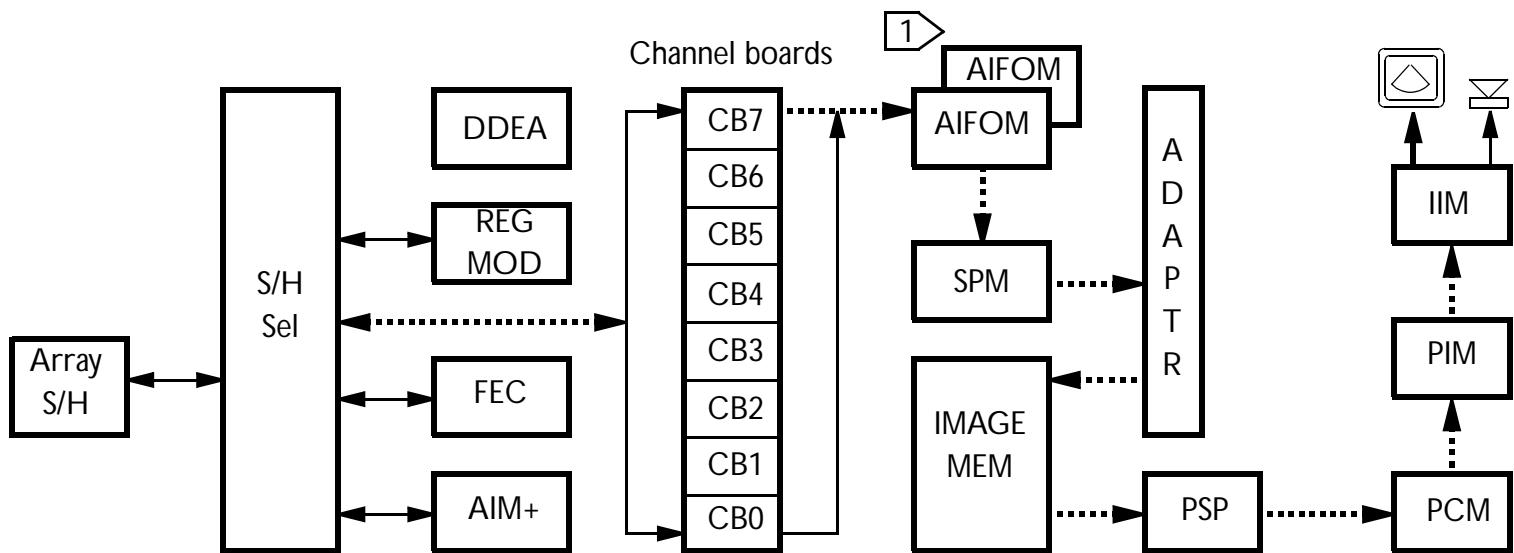


Figure 4-24

M-Mode Echo/M-Mode Color Data Path (17X.XX Systems)



1 Slave AIFOM not used for M-mode or color M-mode.

Figure 4-25

Internal VCR Signal Path

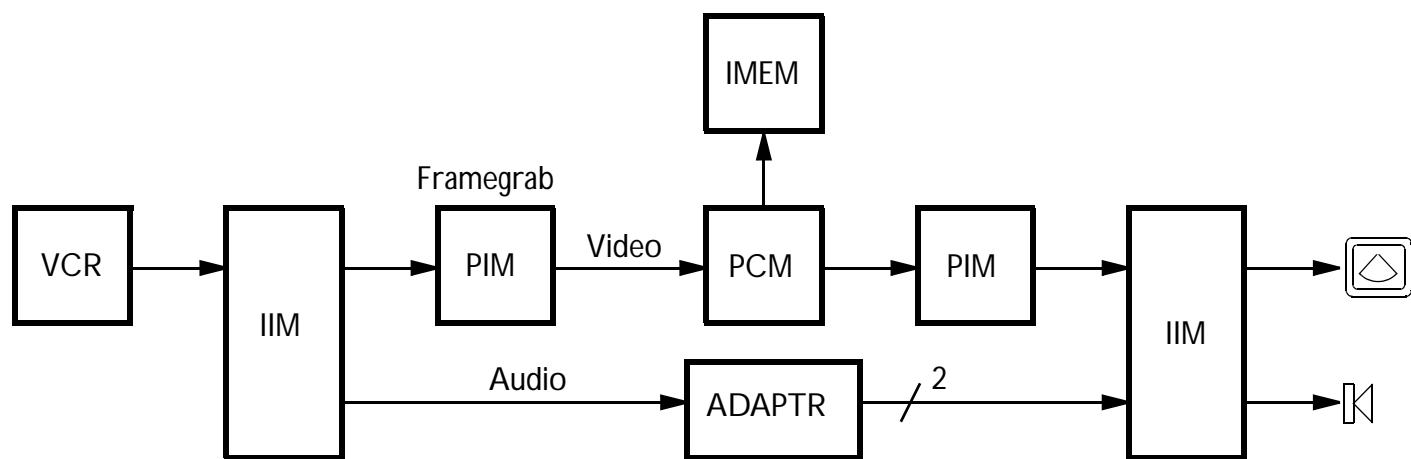


Figure 4-26

External VCR Signal Path

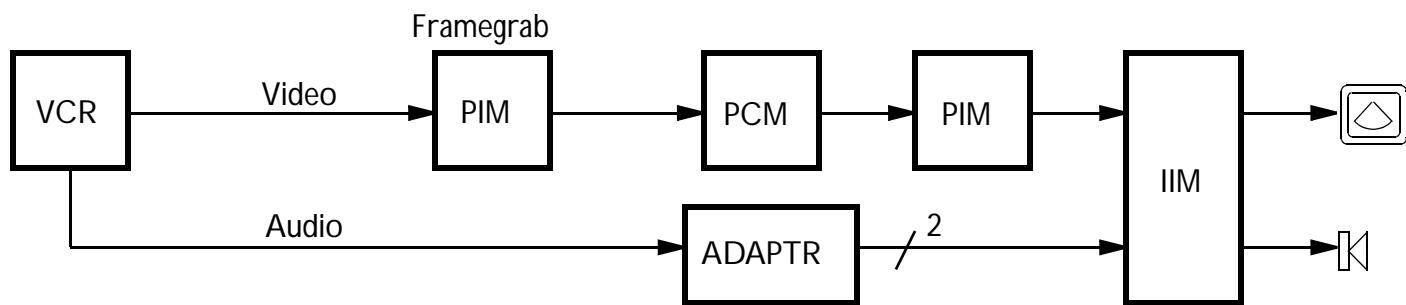


Figure 4-27

Power Monitor Block Diagram

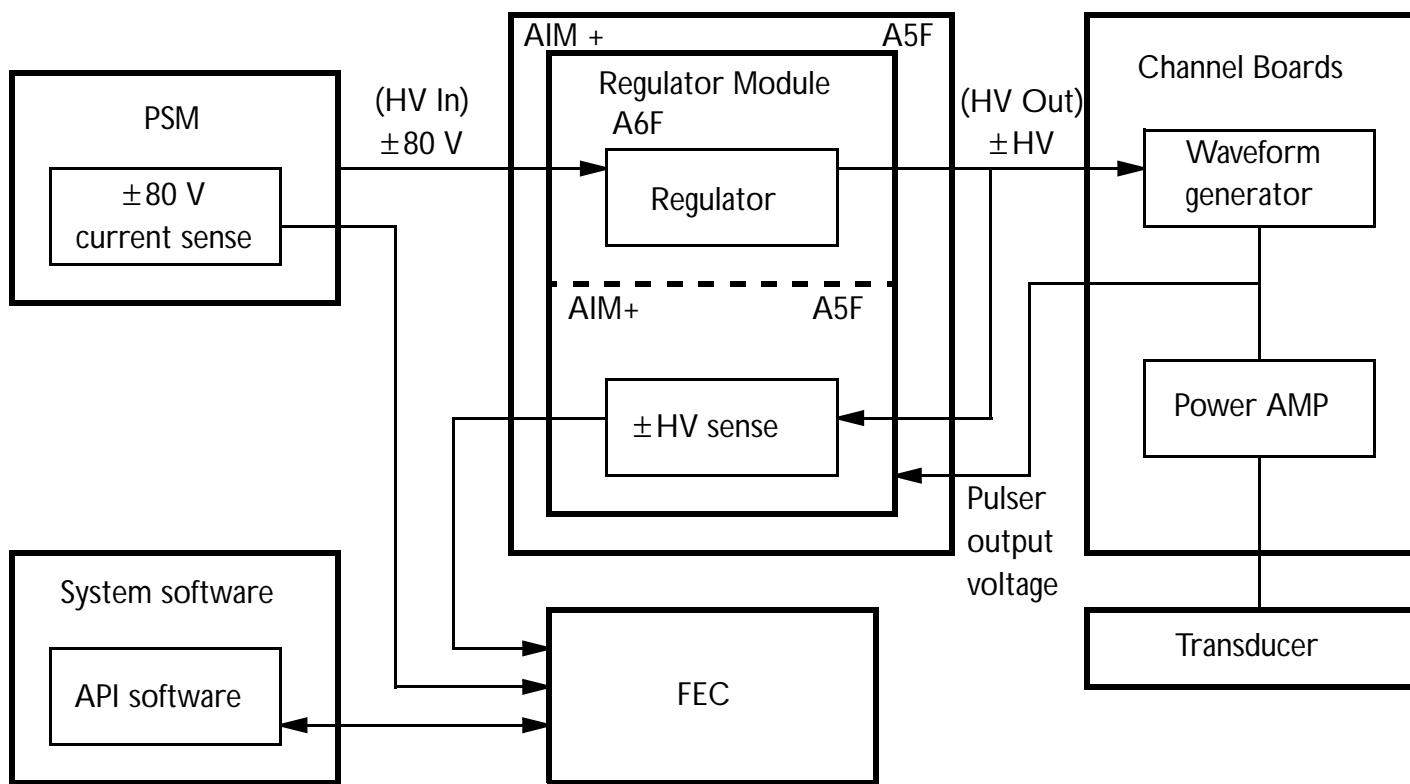


Figure 4-28 HDI 5000 System Functional Block Diagram
(includes systems with DVS option)

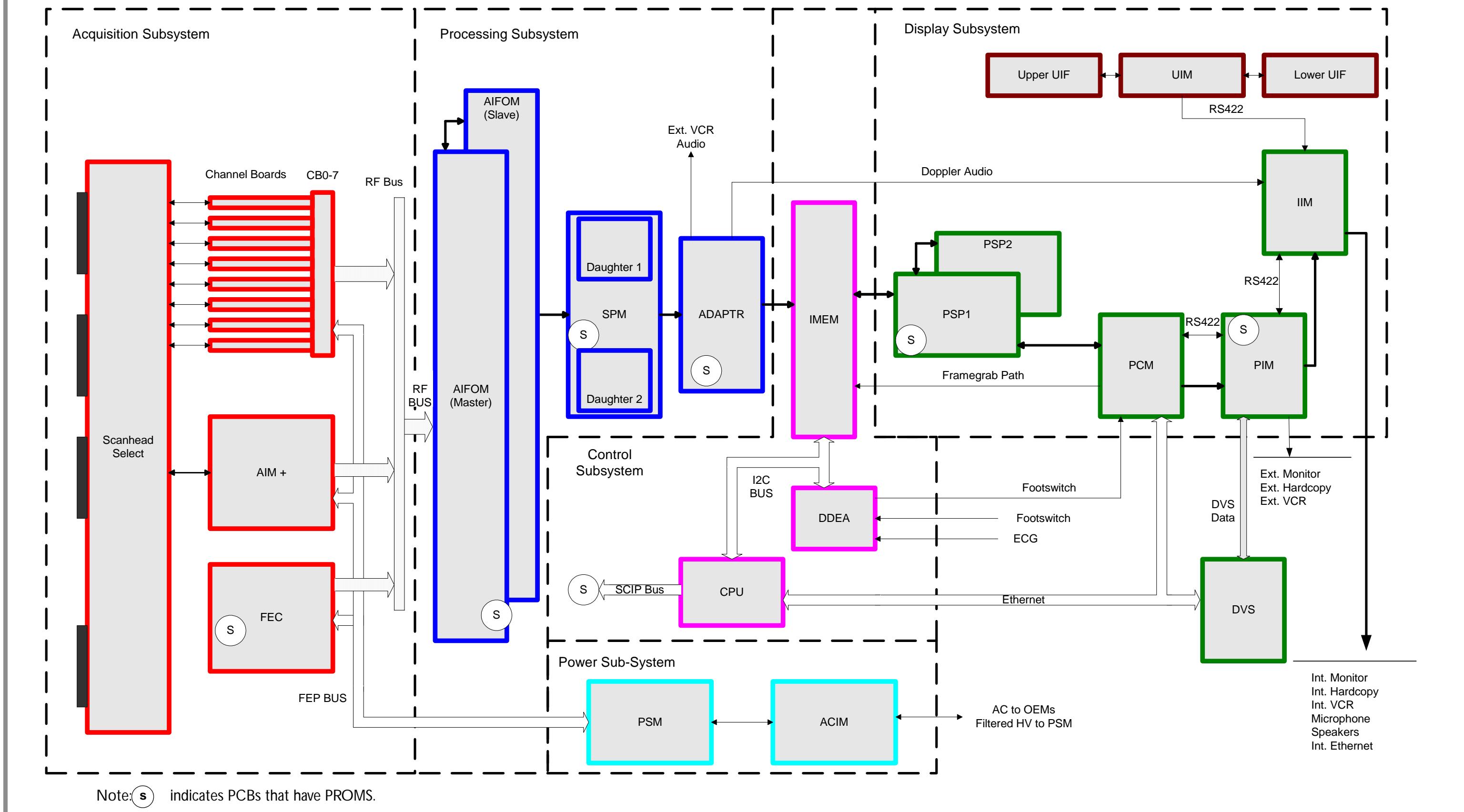


Figure 4-29 HDI 5000 System Functional Block Diagram

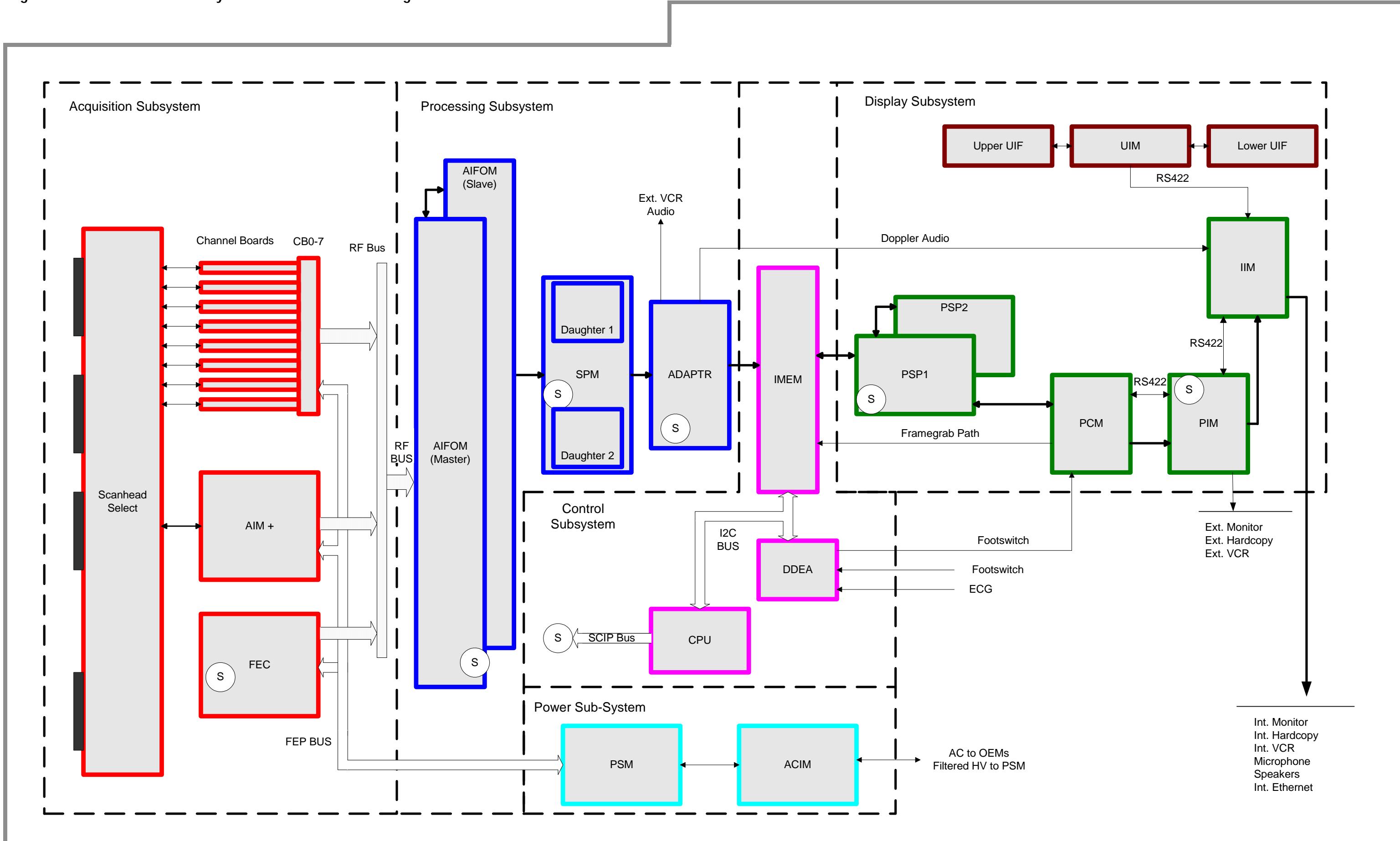


Figure 4-30 Acquisition Subsystem Block Diagram

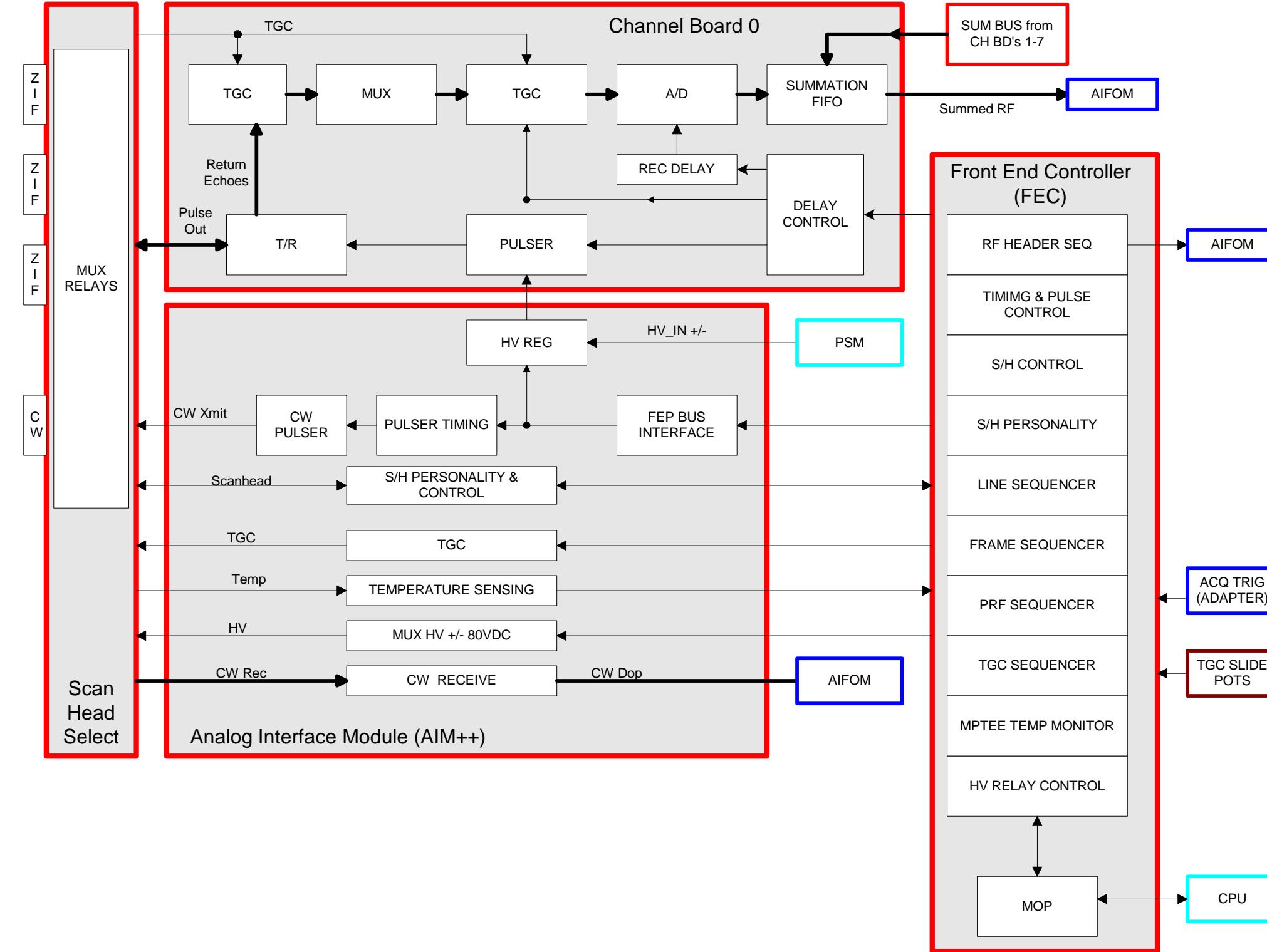


Figure 4-31

Processing Subsystem Block Diagram (17X.XX Systems)

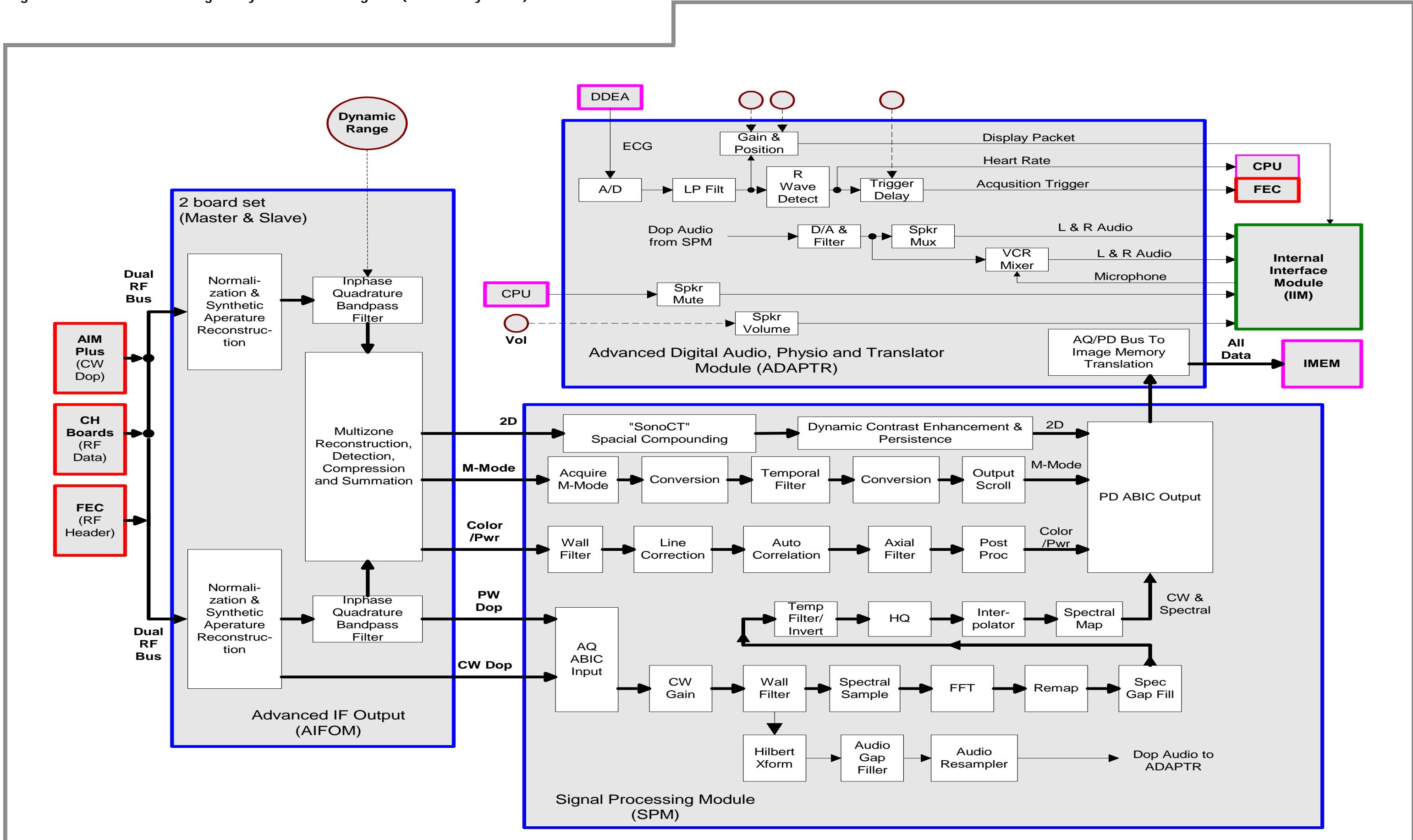


Figure 4-32 Display Subsystem Block Diagram (Systems with DVS Option)

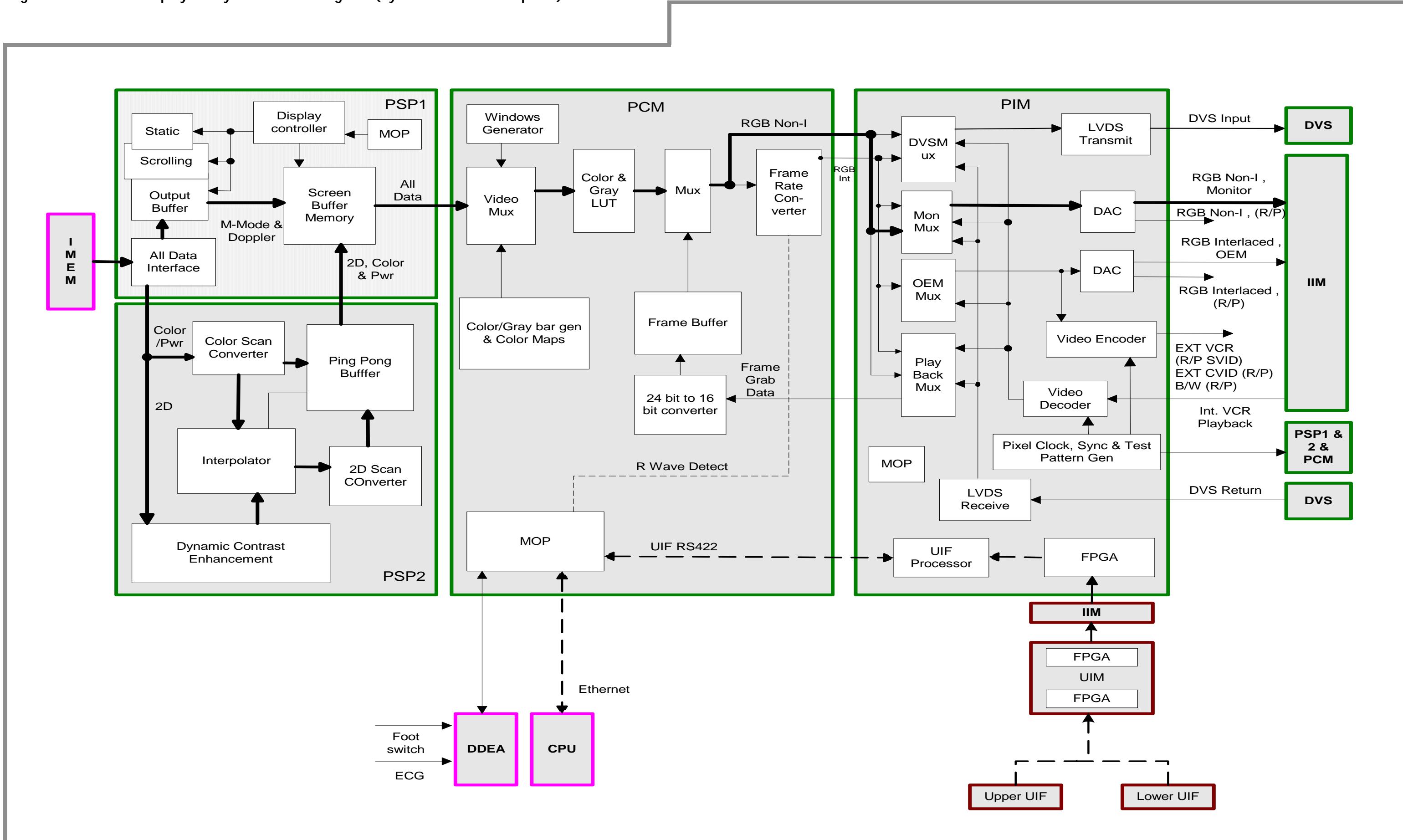


Figure 4-33 Display Subsystem Block Diagram

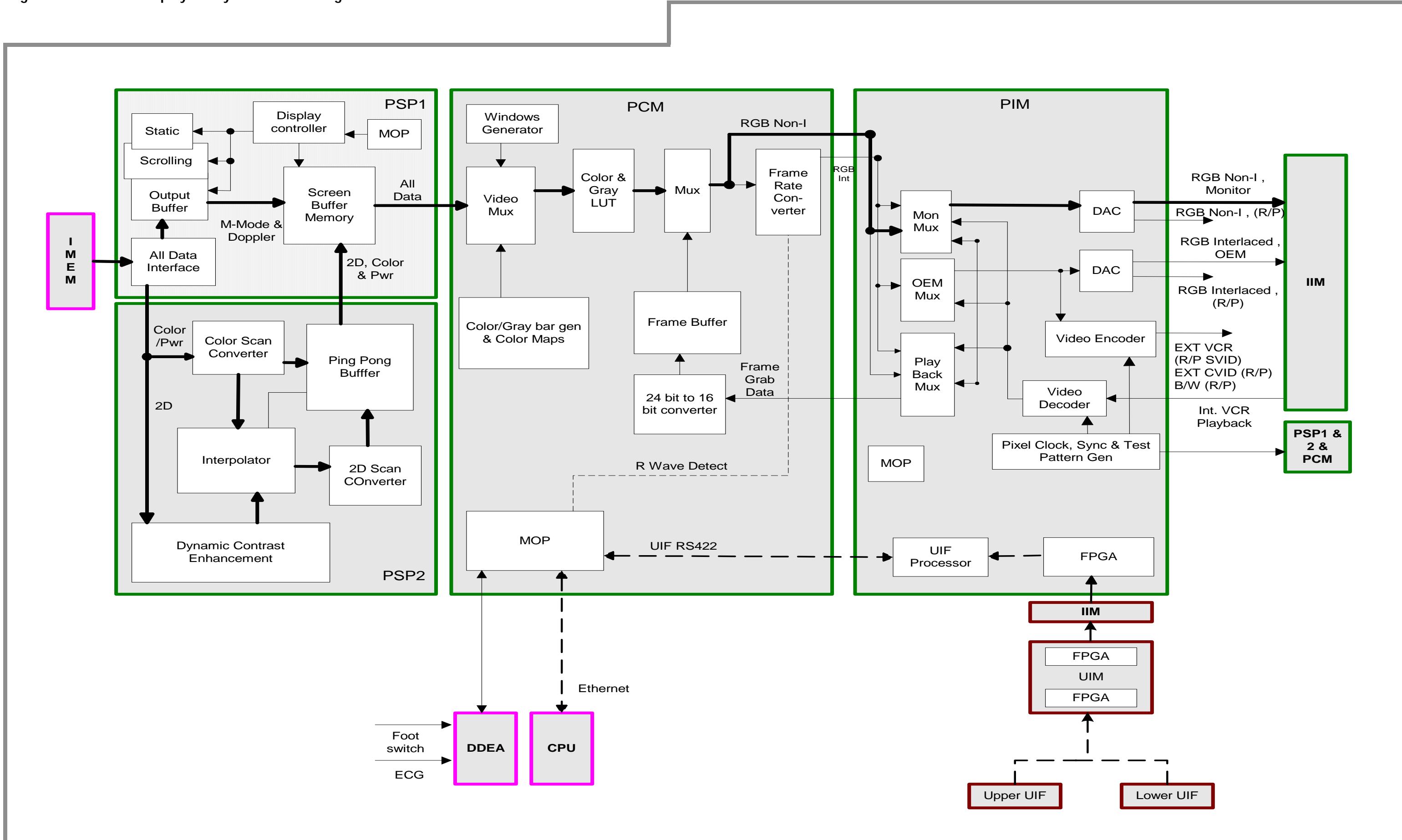


Figure 4-34

Channel Board Signal Path

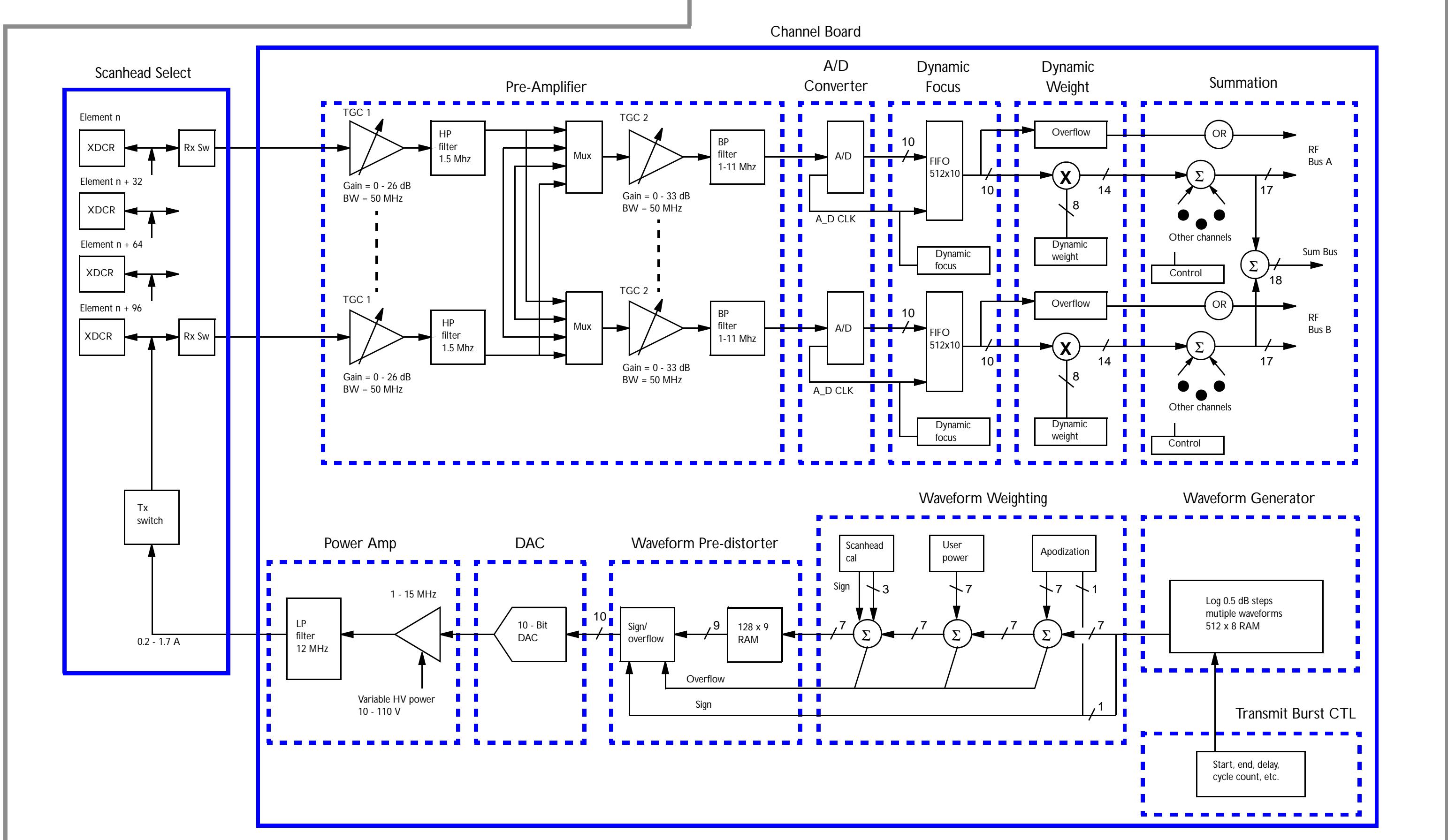


Figure 4-35 CW Doppler Signal Path

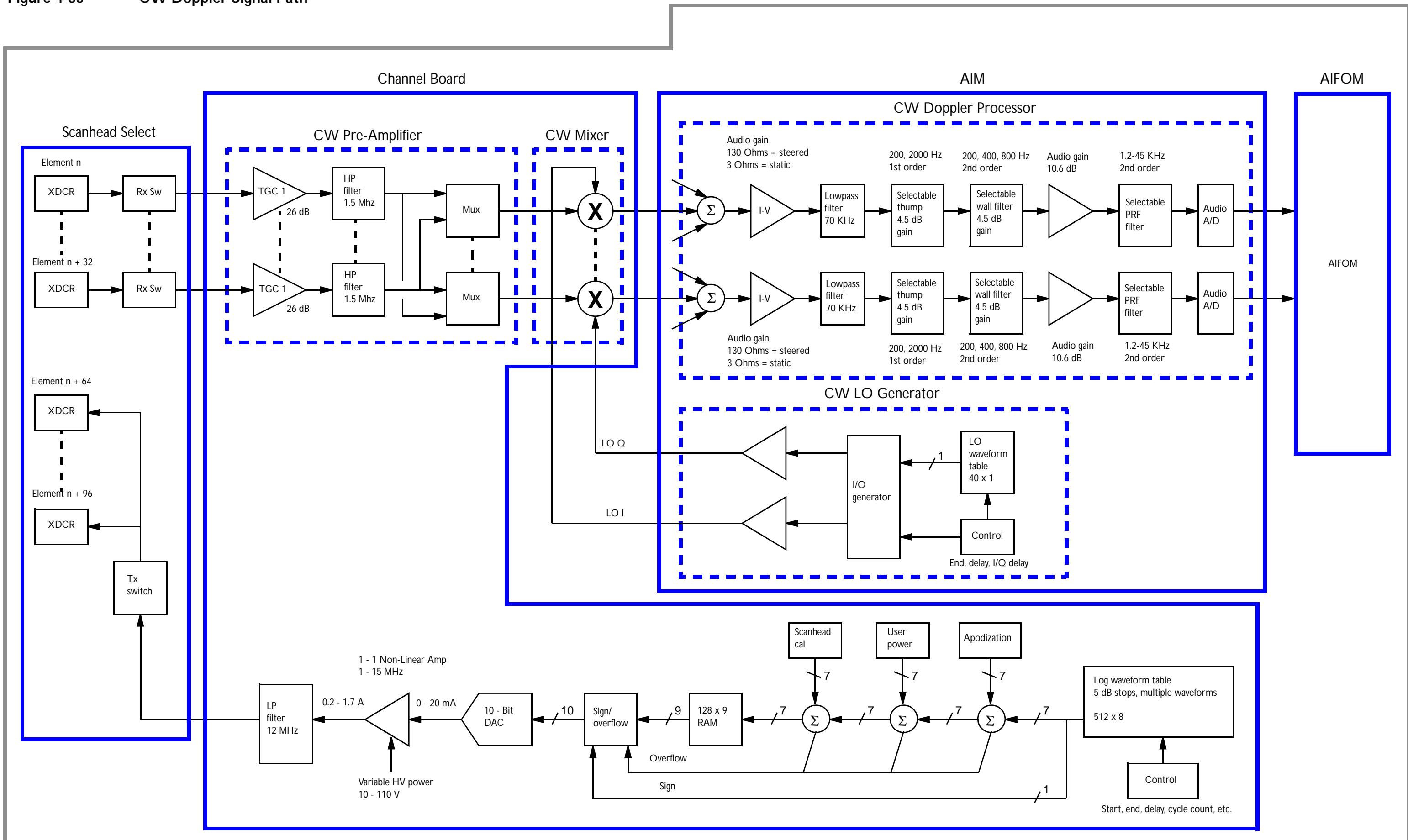
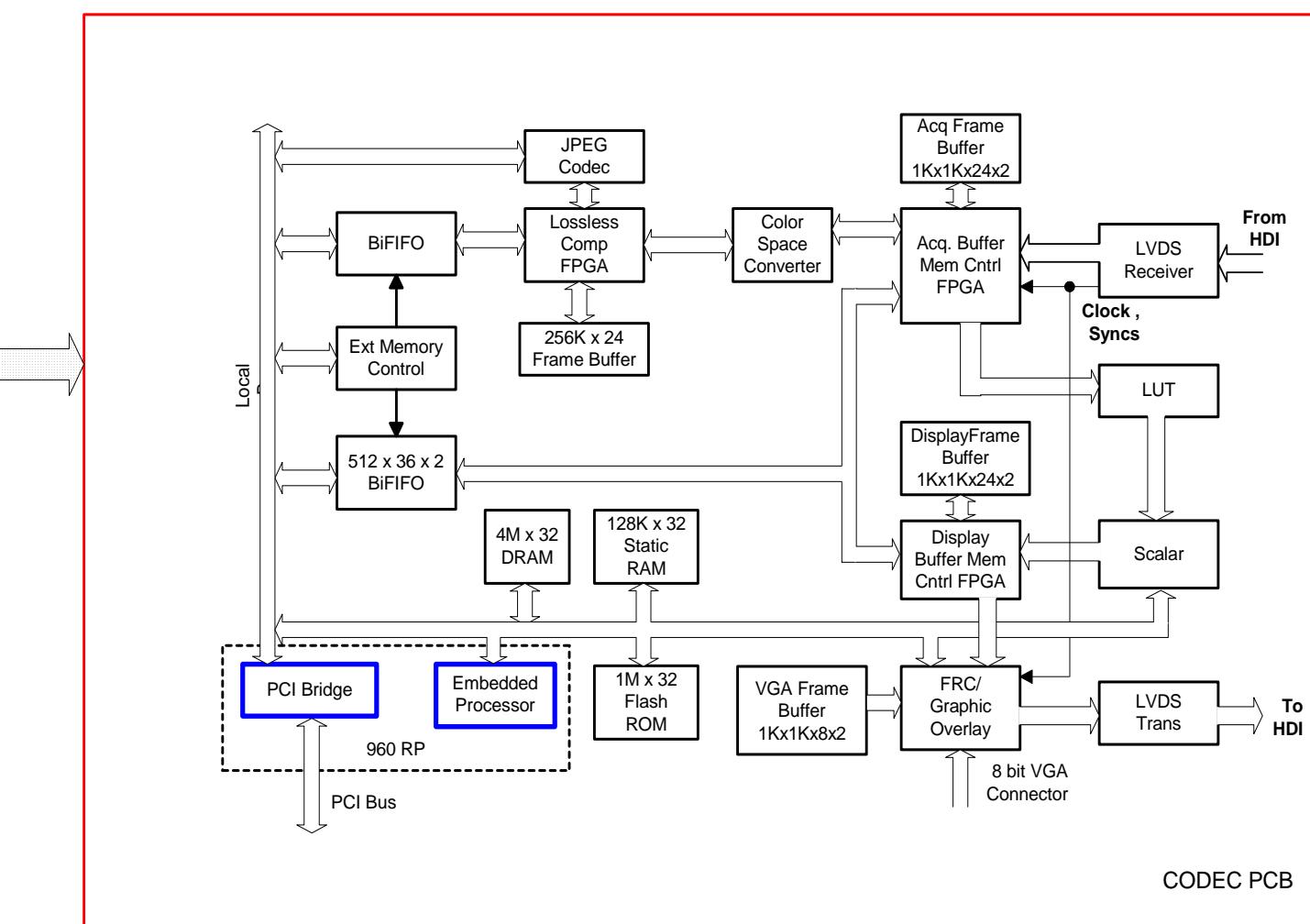
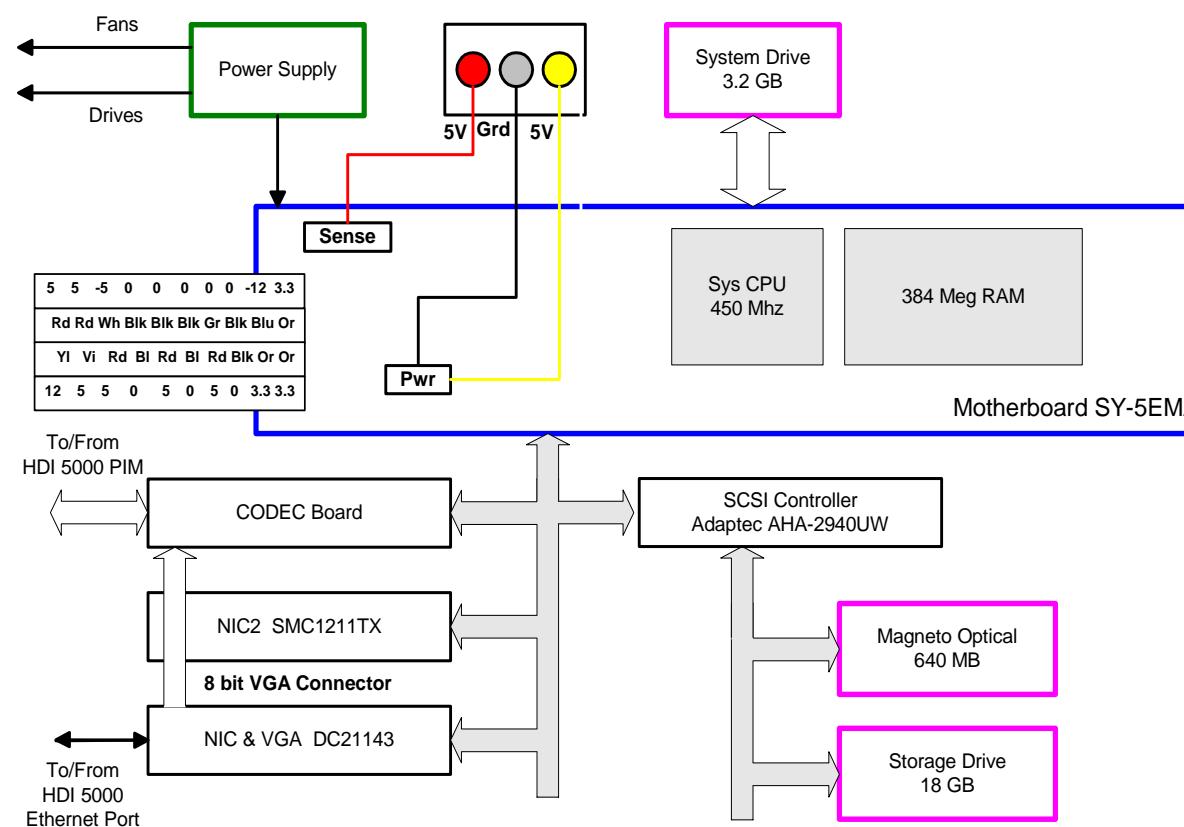


Figure 4-36 DVS/APM Module Block Diagram



5 Installation

Installation Preparation

Introduction

The purpose of the pre-installation on-site evaluation (pre-site) is to ensure a trouble-free installation and to assist the customer in providing an environment that supports the reliable performance of the ultrasound system. These instructions are intended to guide you through a comprehensive inspection that ensures all physical, electrical, and environmental conditions are appropriate for optimal system operation.

Refer to the system specifications in [Table 5-1](#) and [Table 5-3](#) when evaluating the site.

Required Materials

- Tool Kit and Digital Voltmeter (DVM)
- Oscilloscope
- ONEAC Line Viewer
- Three-prong Test Plug (6005-0564-01)
- General Service Manual (4720-0219-XX)
- Power Line Data Sticker (4765-0247-XX)
- Fluke LAN Tester
- Work Order

Environmental Requirements

Verify the system is to be operated in a room that meets the environmental requirements listed in [Table 5-1](#).

Table 5-1

Classic HDI 5000 System Specifications (Crated/Uncrated)

Parameter	Metric Value	U.S. Value
Height ¹	152/136 cm	60/53.6 in
Width	99.7/70.1 cm	39.3/27.6 in
Depth	113.7 / 97.2 cm	44.8/38.3 in
Weight with Peripherals ¹	200 kg	440 lbs
Fully Crated Shipping Weight (VCR separate)	295 kg	600 lbs
Ambient Operational Temperature ³	16 to 40°C	61 to 104°F
Internal Operational Temperature ³	16 to 55°C	61 to 131°F
Internal Operational Humidity	15 to 95% RH (non-condensing)	
Storage Temperature ⁴	-35 to 65°C	-31 to 149°F
Storage Humidity	5 to 95% RH (non-condensing)	
Heat Output ⁵	3,787.4 KJoules/ Hr at 1050W	3590 BTU/Hr at 1050W

1. Height with VCR is 152.0 cm (60 in); height with monitor removed is 106.7 cm (42 in); weight without monitor or peripherals is 172 kg (380 lb).
- 2.
3. Atmospheric pressure must be between 1013 hPa to 709 hPa (1.0 to 0.7 Atm).
4. Atmospheric pressure must be between 1013 hPa to 303 hPa (1.0 to 0.3 Atm).
5. Heat output at current draw listed in [Table 5-3](#). Peripherals will increase heat load. Discuss with the facilities engineer the possible requirement for additional air circulation to handle the heat load from the system.

Table 5-2

Philips HDI 5000 System Specifications (Crated/Uncrated)

Parameter	Metric Value	U.S. Value
Height	146.1 cm	57.5 in
Width	73.4 cm	28.9 in
Depth	111.8 cm	44.0 in
Weight with Peripherals ¹	191-227 kg	420-500 lbs
Fully Crated Shipping Weight (VCR separate)	295 kg	600 lbs
Ambient Operational Temperature ³	16 to 40°C	61 to 104°F
Internal Operational Temperature ³	16 to 55°C	61 to 131°F
Internal Operational Humidity	15 to 95% RH (non-condensing)	
Storage Temperature ⁴	-35 to 65°C	-31 to 149°F
Storage Humidity	5 to 95% RH (non-condensing)	
Heat Output ⁵	4148 KJoules/ Hr at 1150W	3932 BTU/Hr at 1150W

- Atmospheric pressure must be between 1013 hPa to 709 hPa (1.0 to 0.7 Atm).
- Atmospheric pressure must be between 1013 hPa to 303 hPa (1.0 to 0.3 Atm).
- Heat output at current draw listed in [Table 5-3](#). Peripherals will increase heat load. Discuss with the facilities engineer the possible requirement for additional air circulation to handle the heat load from the system.

Electrical Power Requirements

WARNING

For safety and liability reasons, do not disassemble any power outlet or open any electrical panel. Have the facility representative confirm wiring compliance with the criteria specified below.

► To verify a dedicated/isolated line

1. Explain to the facilities representative that the system requires a dedicated and isolated line meeting the power requirements as listed in [Table 5-3](#).
2. Verify the outlet to be used is a dedicated and isolated line:
 - a. Have the facility representative open the circuit breaker.
 - b. With a DVM or three-wire test plug, confirm that power is still applied to all other outlets and hard-wired devices in the immediate area and that power is removed only from the dedicated and isolated outlet box.
3. Verify the proper wiring of the outlet using a three-wire test plug. This plug also tests for the presence of a ground, but it cannot detect neutral/ground reversals.
4. Inform the facility representative of the current draw of the system and its acceptable voltage range. It is the responsibility of the facility representative to determine the proper size of the wire based upon the length of the feed.
5. Using your DVM at the outlet, measure the hot/neutral, hot/ground, and neutral/ground voltages with a comparable load (for example, another ultrasound system) on the line.
6. To determine line loss, if a facility representative is available:
 - a. Have the facility representative measure the voltage at the line's circuit breaker primary in the distribution sub-panel.

- b. Measure the voltage at the wall outlet.
- c. Calculate the percentage of voltage loss across the line using the formula:

$$\text{Percent line loss} = [(A - B)/A] \times 100$$

where A and B are the voltages at the circuit breaker and wall outlet with the system on, respectively.

- d. Continue with [step 8](#).

7. If a facility representative is not available:

- a. Measure the voltage at the outlet with the load on and off.

- b. Calculate the percentage of voltage loss across the line using the formula:

$$\text{Percent line loss} = [(A - B)/A] \times 100$$

where A is the voltage at the wall outlet with the system off and B is the voltage at the wall outlet with the system on.

8. Use an ONEAC line viewer and oscilloscope to measure power-line noise following the procedures specified in Section 3, "Power," of the *General Service Manual* (4720-0219-XX).
Repeat with a load applied, for example, another ultrasound system.

9. Record your power quality observations and measurements.

10. Affix a Power Line Data sticker to the most qualified outlet in each of the primary operating areas. Add the circuit breaker number and location.

11. Review the electrical site evaluation with the facility representative.

Table 5-3

Power Specifications ¹

Measurement (System Only)	100 Vac, 50 Hz	120 Vac, 50 Hz	230 Vac, 50 Hz
	120 Vac, 60 Hz	230 Vac, 60 Hz	230 Vac, 60 Hz
Hot/Neutral	90 - 110 Vac	108-132 Vac	198-264 Vac
Current Draw (normal/peak) ¹	10.9/12.5 A	9.0/10.2 A	4.8/5.5A
Power Draw (normal/peak) ¹	1100/1250 VA 1070/1224 W	1090/1225 VA 1060/1200 W	1105/1265 VA 1050/1220 W
Power Dissipation (maximum/intermittent) ³		1050/1300W	
Neutral-to-Ground		< 3-Vac RMS	
Line Loss		< 3%	
Distortion		< 20%	
Common Mode Noise		< 1.5 Vp-p	
Normal Mode Noise		< 10 Vp-p	

1. Power specifications updated for 10.5 systems with DVS.
2. Current draw and power draw specifications are for the rated voltage ranges. (The "normal" specification includes system operation with VCR recording, all other OEMs at the idle state, and with the system scanning. The "peak" specification includes system operation with OEMs.)
3. Peripherals will increase heat load. (The "maximum" specification includes the system and OEMs during continuous operation. The "intermittent" specification includes the system and OEMs during an intermittent duty cycle, such as a print cycle lasting a minute or less.)

Electrostatic Discharge

During normal system operation, the presence of electrostatic discharge (ESD) can cause system lock-ups and reliability problems.

CAUTION

With system covers or shields removed, ESD *will always* cause component damage. ESD damage is cumulative and may not be apparent at first, as indicated by a hard failure, but can cause degraded performance. Therefore, always use proper ESD handling procedures.

ESD can result from low humidity, carpeting, linen, and clothing. Avoid placing the system directly under or close to HVAC vents. While special equipment is required to measure ESD levels, you can determine the presence of ESD during the following steps.

1. Check for the presence of ESD by walking around where the system will be installed and touching grounded surfaces.
2. Ask the operators if they have experienced static discharge in the work area.
3. Suggest possible ESD minimizing devices and their usage, for example, static mats, humidifiers, and sprays.

Some facts about ESD:

- ESD voltages in excess of 2,000 V cause a shock.
- ESD is audible above 5,000 V.
- ESD is visible above 10,000 V.

Electromagnetic and Radio Frequency Interference

Electromagnetic interference (EMI) and radio frequency interference (RFI) typically cause image noise. EMI and RFI can be generated by a variety of electrical devices and may not be apparent until installation. The interference can be transmitted over power lines or radiated through the air.

- Use an AM radio tuned between stations around 1600 kHz as an EMI/RFI tester while walking around the room.

- Note any obvious or potential noise generators. Typical generating devices include (but are not limited to) gel warmers, coffee pots, air conditioners, fans, photocopiers, computers, printers, electric typewriters, lab equipment, surgical equipment, MRI units, elevators, radios, light dimmers, and refrigerators.

Dust

Air circulation requirements of the system and the location of its air filter can cause dust to accumulate rapidly on the air filter and cause the system to overheat. Advise the customer about the need to maintain a low level of dust in the room. Clean the fan filter, if necessary. Refer to [Section 8, "Preventive Maintenance"](#).

Lighting

Ambient light can interfere with the viewing of video monitors. A darkened room is preferred. Note if there are shades or blinds, small lamps, or dimmer switches in the room that can be used to control ambient light.

System Specifications

Wiring Requirements

The electrical feed to the system must be a dedicated and isolated line (no other equipment on the same line) with a third-wire ground. The ground wire must be an insulated; isolated solid copper conductor bonded to the ground bus of the service panel. The outlet must be a Hospital Grade Receptacle (for installations in North America) or an Isolated Ground Receptacle (International). Proper installation must reflect compliance with the national electrical code.

Image Management Network Requirements

The customer or their contractor will install the network cabling. If in-wall cabling is used, it is the customer's responsibility to install the correct type of cable in accordance with all applicable building and fire codes. It is also the customer's responsibility to maintain the in-wall cabling for the life of the system. The most common type of cable used is CAT5 (Category 5, 10 Base-T unshielded twisted pair).

Category 5 is the highest rating for network cabling.

► **Perform the following steps before installing the NetLink option**

1. Identify the system administrator (and backup person, if possible).
2. Obtain the following information from the system administrator:
 - A list of all equipment that is part of the Image Management network. Also include device type, model number, and software version applicable to each piece of equipment.
 - Logical diagram of the network showing topology, subnets, and so forth.
 - Locations of equipment.
 - Locations of all NetLink LAN attachment points.
 - Locations of power outlets and connector types.
 - Locations of any dedicated analog phone lines.
 - All necessary Internet Protocol (IP) addresses and subnet information.
3. Determine the type of network cabling installed.
4. Identify OEM equipment installers and contact them regarding the installation.
5. Check device compatibility prior to connecting new devices (such as, printers or archive devices) to the network.

System Installation

Introduction

This section contains inspection and installation procedures.

NOTE Some parts of this section include policies, equipment requirements, and procedures that may apply only to U.S. field use. Distributors, affiliates, or other authorized service personnel should use their equivalent document.

Perform a site inspection as described in [Installation Preparation](#). After you have completed the inspection and installation of the system, verify correct operation as described in "[Performance Tests](#)" on page 182.

Materials and Equipment

- Three-prong Test Plug (6005-0564-01)
- FSE Tool Kit
- Oscilloscope
- ONEAC Line Viewer
- DVM (digital volt meter)
- Installation Work Orders
- RMI Model 413 Tissue Equivalent Phantom (199-12204-00)
- RMI Model 406 Dual Attenuation Phantom (2100-1610-01)
- Quality Assurance Audit (PM) label (4100-0941-XX) and label overlay (4100-0941-XX)
- Service manuals for the peripheral devices included in the system

Preliminary Inspection

► **Inspect the shipping crate before unpacking the system**

1. Examine the shipping crate for damage caused by rough handling. Look for evidence that the crate was opened.
2. Verify that the Shockwatch and Tiltwatch indicators on the outside of the carton have not been activated. If the indicators appear red in color, check the system for further damage.
3. Report any damage or pilferage to the carrier and to the Philips Ultrasound traffic department.

Uncrating Instructions

Wood Crate

CAUTION

Before uncrating the system, ensure the area in front of the shipping crate ramp is clear for at least nine feet. (The ramp is the front side and is labeled "OPEN THIS END".)

► To uncrate the system from a wood crate

1. Remove the four bolts securing the top and remove the top ([Figure 5-1](#) and [Figure 5-2](#)).
2. Remove the six bolts securing the ramp (the crate front).
3. Lower the hinged ramp.
4. Remove the front and side cardboard/foam panels.
5. Remove the front caster chock.
6. Verify the upper UIF panel is securely latched (slide button is in the up position) on the left side of the UIF panel.
7. Verify the monitor is correctly installed and latched:
 - a. Grasp the monitor under one speaker and lift. If the latch is properly latched, the monitor will not raise.
 - b. Repeat step a on the opposite side of the monitor.
 - c. If the monitor is not secured properly, remove the VCR, then remove the monitor from the system.
 - d. Re-install the monitor ensuring the monitor mounting prongs mate into both latches.
 - e. Repeat steps a and b to verify the monitor assembly is secure. Refer to [Figure 5-3](#) for the monitor latch positions.

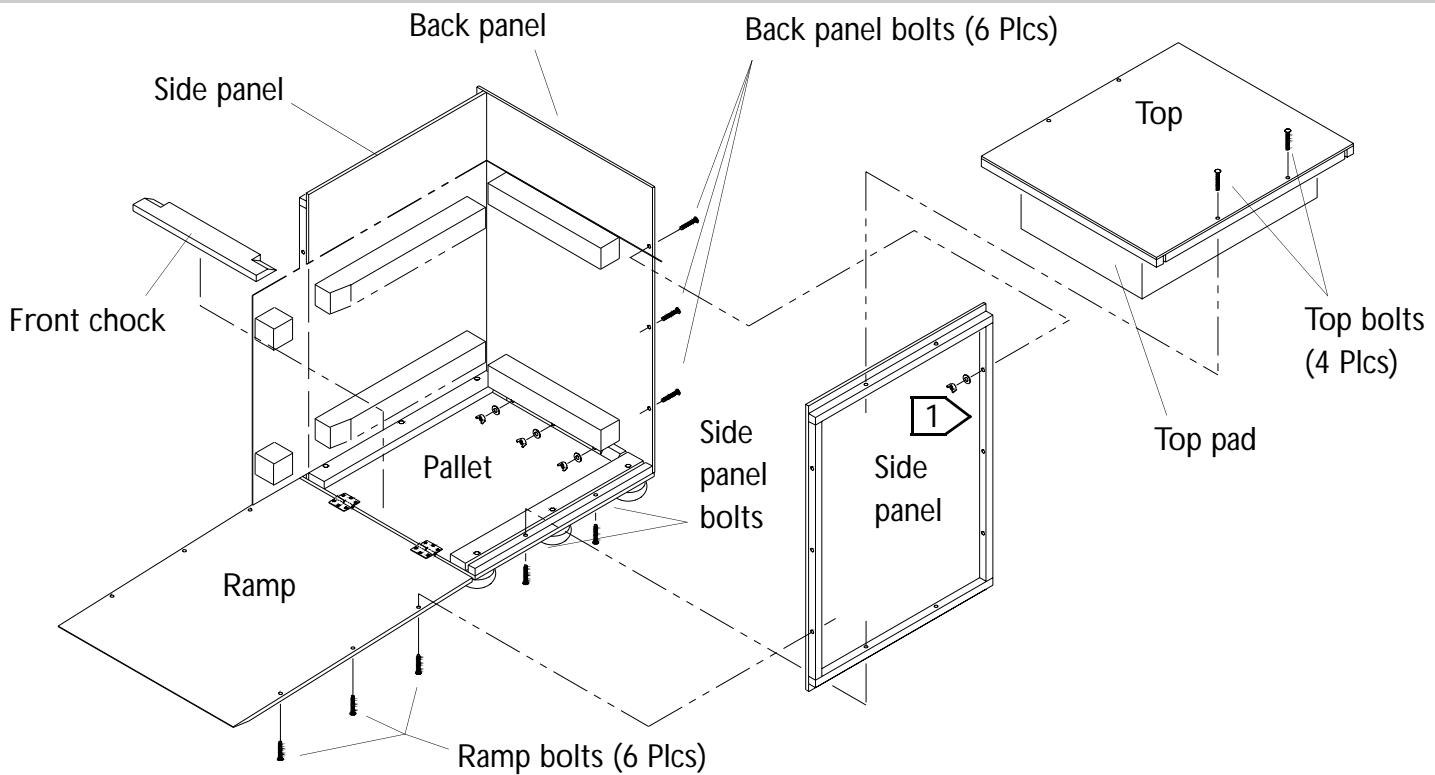
WARNINGS

- It is possible for the monitor to be installed in the tilt swivel base without the locking prongs mating with the latches. In this case, the latches can still be placed in the correct latching positions, but the monitor will not be secure.
- The monitor locking latches are for removal of the monitor only and not to assist in loosening the monitor for ease in positioning. Leaving the monitor latches in the unlocked position will allow the monitor and VCR (if attached) to fall from the system. Monitor latches should remain locked unless removing the monitor from the system.
- Use care when moving the system down the ramp. Serious injury or equipment damage can result if the system becomes out of control.

-
8. Verify the caster brakes are released and roll the system down the ramp.
 9. Knock the wood crate down flat and return to the shipping location.

Figure 5-1

HDI 5000 Wooden Crate Details

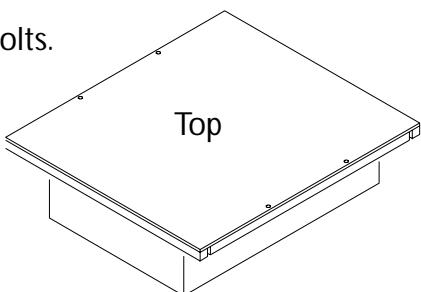


[1] All bolts are secured with a flat washer and a wing nut.

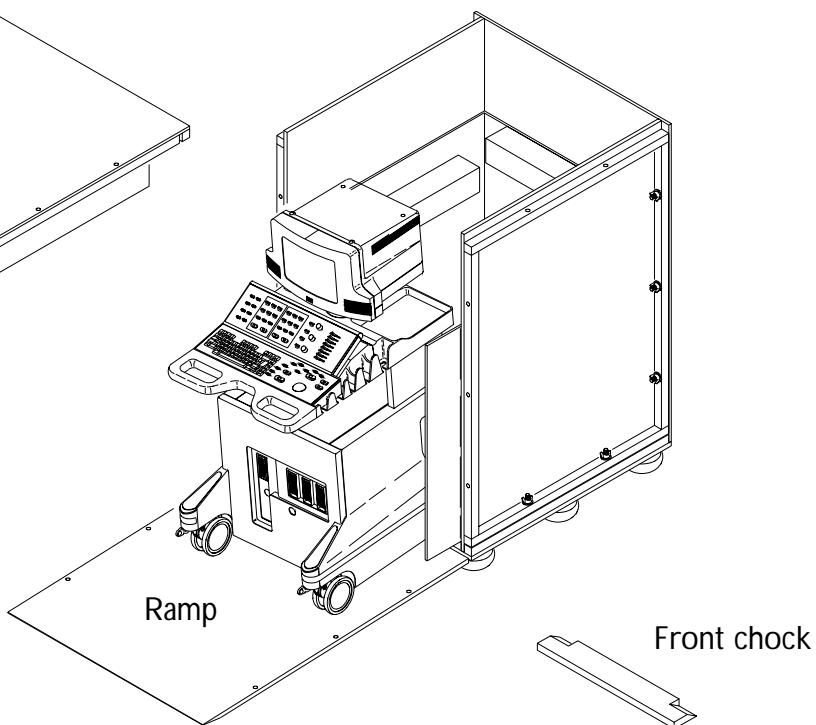
Figure 5-2

Unpacking Details

- (1) Remove ramp bolts.
and the top bolts.



- (2) Lift top off the crate and
lower the ramp.



- (3) Remove front chock.
Roll out the system.

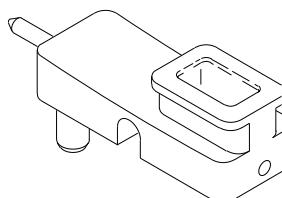
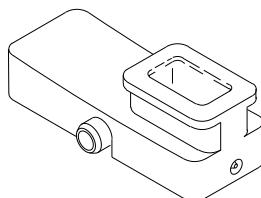
Figure 5-3

Monitor Latch Positions

LOCKED



UNLOCKED



Corrugate Crate

CAUTION

Before uncrating the system, ensure the area in front of the shipping crate ramp is clear for at least nine feet. (The ramp is the front side and is labeled "OPEN THIS END.")

► To uncrate the system from a corrugate crate

WARNING

Use caution when removing the strapping bands securing the shipping container. These bands are under enough tension to cause injury if removed carelessly.

1. Remove (cut) the two plastic strapping bands from around the corrugate container (Figure 5-4).

2. Remove the top cover from the corrugate crate.
3. Remove any accessories placed on the corrugate tray in front of the monitor ([Figure 5-5](#)).
4. Cut the taped edges of the container and remove the two-piece corrugate box from around the system.
5. Remove accessories and other loosely-packed items.
6. Remove the two 9/16-in bolts securing the front section of the inner crate to the pallet. This front section also serves as a ramp.
7. Position the tall end of the ramp so that it butts up against the pallet at the front of the system with the beveled end of the ramp sloping to the floor.

WARNING

Use care when moving the system down the ramp. Serious injury or equipment damage can result if the system becomes out of control.

8. Verify the upper UIF panel is securely latched (slide button is in up position) on the left side of the UIF panel.
9. Verify the monitor is correctly installed and latched:
 - a. Grasp the monitor under one speaker and lift. If the latch is properly latched, the monitor will not raise.
 - b. Repeat step a on the opposite side of the monitor.
 - c. If the monitor is not secured properly, remove the VCR, then remove the monitor from the system.
 - d. Re-install the monitor, ensuring the monitor mounting prongs mate into both latches.
 - e. Repeat steps a and b to verify the monitor assembly is secure. Refer to [Figure 5-3](#) for the monitor latch positions.

WARNINGS

- It is possible for the monitor to be installed in the tilt swivel base without the locking prongs mating with the latches. In this case, the latches can still be placed in the correct latching positions, but the monitor will not be secure.
 - The monitor locking latches are for removal of the monitor only and not to assist in loosening the monitor for ease in positioning. Leaving the monitor latches in the unlocked position will allow the monitor and VCR (if attached) to fall from the system. Monitor latches should remain locked unless removing the monitor from the system.
-

10. Carefully pull the system off the pallet and down the ramp.
11. Properly dispose of the shipping materials. Do not return these materials to Philips Ultra-sound, Bothell.

Figure 5-4

Corrugate Crate Details

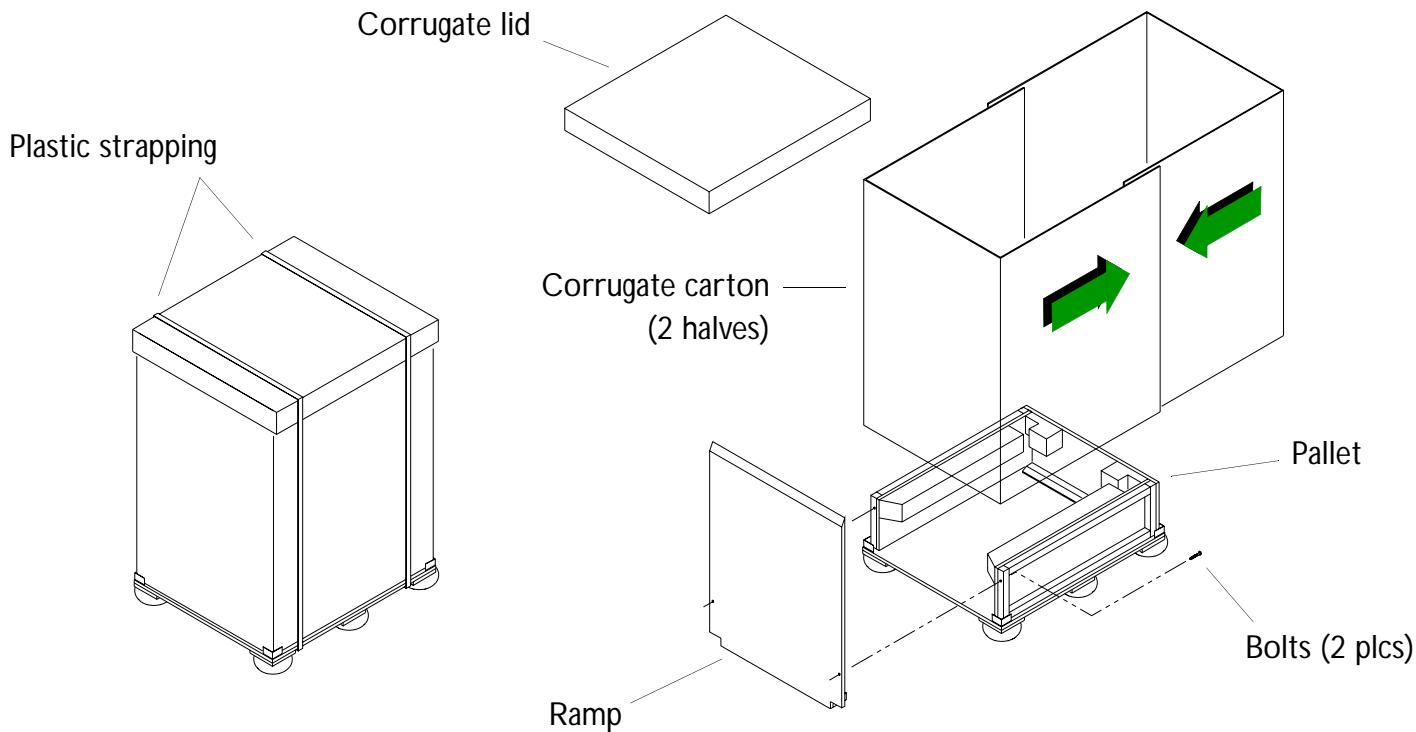
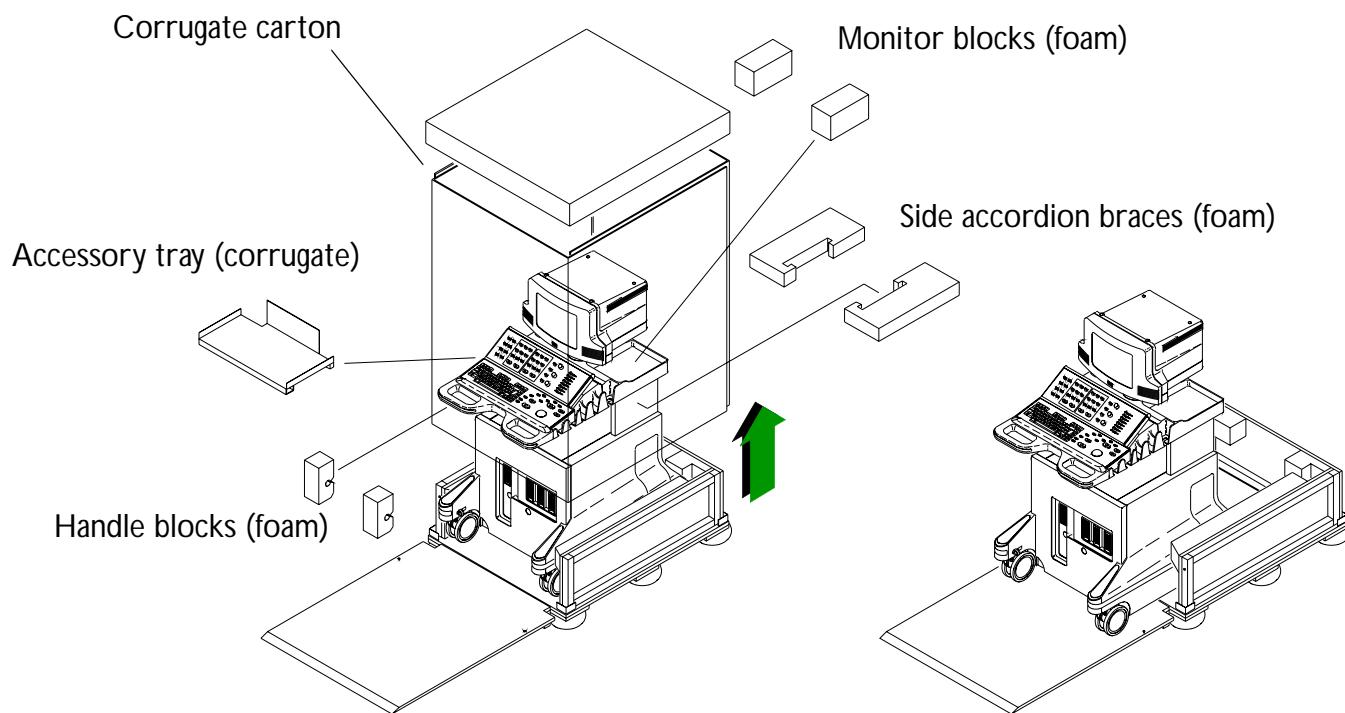


Figure 5-5

Corrugate Crate Unpacking Details



General Inspection

WARNING

Dangerous voltages are present inside the system. Do not connect the system to AC line voltage until correct line voltage has been verified and a thorough inspection of the system has been performed.

1. Inventory the shipment against the packing list.
2. Inspect the video monitor for damage.
3. Mount the monitor on the system. (See [Section 10, "Disassembly".](#))
4. Connect power and signal cables to the monitor. Verify the *shorter* power cord, labeled "120 Volts" and "MONITOR," is connected to the monitor.

CAUTION

The VCR power cord can be connected to the monitor by mistake. On 230-Volt systems, this will apply 230 Volts to the 120-Volt monitor, which will damage the monitor.

5. Verify the monitor swivels correctly on its base from left to right and up and down.
6. Inspect the outside surfaces of the system for damage.
7. Verify the system rolls and turns smoothly on its casters.
8. Remove the front, rear, and right side covers.
9. Verify the hardcopy device is undamaged and firmly fastened to the system.
10. Inspect the VCR and mount it securely on top of the monitor.
11. Remove any loose packing material, dust, or debris from the interior of the system.

Mechanical Inspection

CAUTION

Do not damage cables connected to modules or peripherals.

1. Verify all modules are secure.
2. Inspect the remaining fasteners.
3. Seat and tighten modules and connectors as necessary.

Electrical Inspection

The electrical inspection may require reference to the power distribution wiring and cabling diagrams ([Section 11, "Cabling"](#)). The parts list also contains information on PCB locations and part numbers [Section 14, "Parts"](#)). The configuration section contains current information on module and PROM replacement revision levels ([Section 13, "Configuration"](#))

1. Remove the rear cover from the system.
2. Verify the VCR and hardcopy device power cords are plugged into the ACIM.
3. Verify that all transformer and power connections are secure.
4. Remove the control panel lock bar. Verify the ribbon cable connections on the UIM are correct and secure.
5. Verify the connections on the VCR and video printer are secure and correct.
6. Refer to the *VCRs and Report Printers* service manual and verify the VCR is set up correctly.
7. Refer to the *Color Video Printers* service manual and verify the color video printer is set up correctly.

NOTE Use the inspection procedure appropriate to the hardcopy device installed in the system.

Reassembly

CAUTION

Use extreme care when reassembling the system to avoid pinching, stretching, or otherwise damaging the system signal and power distribution cables. Also, use care to avoid damage to the air filter latch.

Reassemble the control panels and replace all covers.

Setup

1. Dispose of packing materials and clean up the unloading area.
2. Move the system to the installation location.
3. Verify proper wall outlet wiring and voltage levels with a three-prong test plug and a DVM.

WARNING

Do not plug the system in if a wiring fault is discovered. Advise the customer immediately and proceed only after the fault has been corrected.

4. Connect scanheads, peripheral cables, and the power cable.
5. Set the monitor brightness control to 20 and contrast to 80.
6. Verify the system fans are operating.
7. Verify proper system operation with the procedures in “[Performance Tests](#)” on page 182.

VCR Control Settings

NOTE To ensure proper system operation, turn on all OEMs prior to checking system functionality.

Panasonic AGMD830P VCR

The VCR can be programmed using the on-screen programming menu or the VCR front panel display screen. To use the VCR's front panel screen, refer to the OEM manual or the *VCR and Report Printers Field Service Manual*, P/N 4720-0223-XX.

1. Press Setups and select Peripherals, Internal VCR, and Panasonic MD830. Select Close at the bottom of the display.
 2. Set the MENU switch on the VCR to SET. Set the MODE LOCK switch to OFF ([Table 5-4](#)).
 3. Press Superkey and Video simultaneously to toggle through the on-screen menus (internal VCR, internal color printer, and so forth). The VCR menu lists on-screen menu items from [Table 5-5](#).
 4. Verify the VCR parameter settings. Refer to [Table 5-6](#) for VCR front panel control functions while in programming mode.
 5. Press Setups and change the VCR configuration to SVHS to return to normal configuration.
 6. Set VCR Menu switch to OFF.

Table 5-4 VCR Programming Control Settings

Parameter	Setting
Audio Out	Mix
Audio Out	Normal
Input	S-Video
S-VHS	Auto

Table 5-4 VCR Programming Control Settings (Continued)

Parameter	Setting
Menu	Set (During programming) Off (During normal operation)
Mode Lock	Off

Table 5-5 Panasonic AGMD830P NTSC/PAL 120 V VCR Setup

Parameter	Setting
Tilt Down Panel	
MODE LOCK	OFF
MENU	SET
On Screen Menu	
VISS	Off
Tape Select	T-120 (NTSC) or E-180 (PAL)
Auto Back	On
Tape In Mode	Stop
Tape End Mode	Stop
REC Tape End	Stop
STBY Off Time	5 Min
Bit Length	8 Bit
Stop Bit	Stop-1
Parity	None

Table 5-5**Panasonic AGMD830P NTSC/PAL 120 V VCR Setup**

Parameter	Setting
Baud Rate	9600
Hour Meter	XXXX Hr
HI-FI REC	On
Audio Dub	CH1
Edit (NTSC only)	Off
YC Filter (NTSC only)	Off
Notch (PAL only)	Off

Table 5-6**VCR Programming Control Functions**

VCR Control	Programming Operation
Stop	Moves the selection item cursor forward
Rewind	Moves the selection item cursor backward
Play	Returns to the previous menu page
Record	Advances to the next menu page
Fast Forward	Moves the menu selection to the item below
Inside Search Dial	Moves the menu selection to the item above or below

Printer Control Settings

For printers that use on-screen programming, use the following procedure to setup the printer menus.

1. Press Menu on the printer front panel.
2. Press Superkey and Video simultaneously to toggle through the on-screen menus.

3. Set the printer control settings as specified in the printer setup tables below ([Table 5-7](#) through [Table 5-17](#)).
4. Set the menu switch to OFF.

Table 5-7 Sony UP-5250 Color Video Printer Setup (Early Model)

Parameter	Setting
Sony UP-5250 early model used for HDI 3000 systems upgraded to HDI 5000 systems only	
Menu 1	
Print QTY	001
Multi Pix	1
Separate	****
Input SEL	RGB
FRM/FLD	Frame
Sharpness	M
Menu 2 (Color Adjust)	
Display	Full
Preset	1
Red	0
Green	0
Blue	0
Dark	-1
Light	1

Table 5-7 Sony UP-5250 Color Video Printer Setup (Early Model)

Parameter	Setting
Select SETUP menu to verify the following settings	
Size	Wide
H Shift	0
V Shift	0
Monitor	E To E
Display	On
Remote 2	M & Print
Baud Rate	Not Used
LCD CONTR	0

Table 5-8 Sony UP-5250MD Color Video Printer Setup

Parameter	Setting
Front Panel	
Manual/Auto	Manual
Gain	Center detent
Color	Center detent
Source/Memory	S
Memory Page	1A1B
Rear Panel	
RGB/R-Y/Y/B-Y	RGB

Table 5-8

Sony UP-5250MD Color Video Printer Setup (Continued)

Parameter	Setting
RGB 75Ω Termination	ON
NTSC 75Ω Termination	ON
Monitor RGB	Center detent
Menu 1	
Print Quantity	001
Multi Pix	1
Separate	Asterisks show if 1 is selected for Multi Pix, otherwise set this feature to OFF.
Input SEL	R Appears as RGB when selected.
FRM/FLD	Frame
Sharpness	M
Menu 2	
Display	Full
Preset	1
Red	-1
Green	0
Select SETUP menu to verify the following settings:	
Size	Wide
H Shift	6 Dots Right (or adjust image for best fit to Print out)
V Shift	0 Lines (or adjust image for best fit to print out)

Table 5-8**Sony UP-5250MD Color Video Printer Setup (Continued)**

Parameter	Setting
Monitor	E To E
Display	On
Remote 2	M & Print
Baud Rate	Not Used
LCD CONTR	0
Blue	0
Dark	+1
Light	0

Table 5-9**Sony UP-5600 Color Video Printer Setup**

Parameter	Setting
Color Adjustment Setup Menu	
Preset	1
Red C-R	R5
Green M-G	G5
Blue Y-B	B5
Dark	-5
Light	+5
Save	1

Analog Setup Menu

Table 5-9

Sony UP-5600 Color Video Printer Setup (Continued)

Parameter	Setting
Hue (NTSC only)	0
Color	0
Gain	0
AGC	OFF
Moni C-R	0
Moni M-G	0
Moni Y-B	0
System Setup Menu	
Display	ON
Beep	ON
LCD	ON
LCD-CNTR	0
Baud Rate	9600
Monitor	EE
User Set	1
Print Setup	
H-Shift	-24 Dots (NTSC) -16 Dots (PAL)
V-Shift	-8 Lines (NTSC) -10 Lines (PAL)

Table 5-9

Sony UP-5600 Color Video Printer Setup (Continued)

Parameter	Setting
H-Size	952 Dots (NTSC) 924 Dots (PAL)
V-Size	480 Lines (NTSC) 576 Lines (PAL)
Setups	
Separate	ON
Dup-Image	OFF
Sharpness	+4
System Function Menu	
Remote2	C&Print
Remote3A	Print (Does not matter. Used only with Sony footswitch)
Remote3B	Back-Sp (Does not matter. Used only with Sony footswitch)
Remote3C	CAP/SRC (Does not matter. Used only with Sony footswitch)
Remote3E	Capture
Clear	Part
Capture	Single
Timer	OFF

Table 5-9 Sony UP-5600 Color Video Printer Setup (Continued)

Parameter	Setting
Control Panel Button Setups	
Motion Correct	OFF
Input Select	RGB
Multi-Picture	1
Print QTY	1
User Preset	1
Display P in P	OFF
Caption ON/OFF	OFF
Rear Panel Switches	
R/G/B/Sync 75 Ohm	ON
S-Video 75 Ohm	OFF
NTSC/PAL	Set to appropriate video format

Table 5-10 Mitsubishi CP700 Color Video Printer Setup

Parameter	Setting
Color Adj	
BRT	0
CONT	-8
R-Sub	0
B-Sub	0

Table 5-10

Mitsubishi CP700 Color Video Printer Setup (Continued)

Parameter	Setting
Center	OFF
Analog Adj	
BRT	0
CONT	0
R-Sub	0
B-Sub	0
Center	OFF
Signal Set	
Input	RGB
Field	Normal
AFC	OFF
Additional	
Strobe	OFF
Multi: 1 for 1	OFF
Print	
Mode	L (large)
Grad	ECHO
APT	H1
Comment	OFF
Mirror	OFF

Table 5-10

Mitsubishi CP700 Color Video Printer Setup (Continued)

Parameter	Setting
System	
Size	USER
H-Posi	0
Copy	OFF
Top	-8
Bottom	10
Left	-16
Right	6
Page Inc	ON
Live Sel	DIGITAL
Convert	ON
Buzzer	ON
Rear Panel Switch Settings	
IMPEDANCE - RGB	75 Ω
IMPEDANCE - SYNC	HIGH

Table 5-11

Mitsubishi CP700 Color Video Printer Memory SW Menu Control Settings

Parameter	Setting
Time	
Month	Not used with ultrasound systems.
Date	
Year	
Hour	
Minute	
Second	
Key Set	
KEY LOCK	OFF
MEM&PRN	ON
MEM&STOP	OFF
MEM&MON	OFF
PRINT&CLR	OFF
CLEAR KEY	ONE
Signal Set	
IN Sync	0.3 V
OUT Sync	0.3 V
Sync	NEGA
RGB SOG OUT	OFF

Table 5-11

Mitsubishi CP700 Color Video Printer Memory SW Menu
Control Settings (Continued)

Parameter	Setting
H Start	NORMAL
Spcl Timing	OFF
MON R-Sub	0
MON B-Sub	0
Print Set	
PRN DIR	NORMAL
PRN Speed	NORMAL
Margin Cut	OFF
V Position	34
Echo Gamma Adj.	a: (64, 0) b: (128, 0) c: (192, 0)
System Setting	
PRG All Init	OFF
Baud Rate	9600
Command Type	A
Response	RETURN
Remote Busy	H

Table 5-12

Mitsubishi CP800 Color Video Printer Setup

Parameter	Setting
Color Adj	
BRT	+5
CONT	0
R-Sub	0
B-Sub	0
Center	0
Analog Adj	
Color	N/A
Tint	N/A
BRT	0
CONT	0
R-Sub	0
B-Sub	0
Center	OFF
Input	
Input	RGB
Additional	
Multi	OFF
Buzzer	T1

Table 5-12

Mitsubishi CP800 Color Video Printer Setup (Continued)

Parameter	Setting
Print	
Mode	AUTO
Grad	ECHO
GAMMA ADJ	
Low Point	64
Mid Point	128
Hi Point	192
Apt	N
Com	OFF
Mirror	OFF
Comment	[>]
SIZE/TIMING	
H-Posi	0
H-Start	NOR
Size	W

Table 5-13

Mitsubishi CP800 Color Video Printer Memory SW Menu Control Settings

Parameter	Setting
Key Set	
KEY LOCK	OFF
MEM&PRN	ON
MEM&STOP	OFF
MEM&MON	OFF
PRINT&CLR	OFF
Clear Key	PAGE
Keep Moni	OFF
Signal Set1	
Field	NORMAL
AFC	OFF
Sync	EXT
R-Sub	0
B-Sub	0
Signal Set2	
IN Sync	0.3 V
OUT Sync	0.3 V
Sync	NEGA
RGB SOG OUT	OFF

Table 5-13

Mitsubishi CP800 Color Video Printer Memory SW Menu
Control Settings (Continued)

Parameter	Setting
Spcl Timing	OFF
Print Set	
DIR	NORMAL
Margin Cut	OFF
Auto Cut	ON
OP Mode	4P
System Setting	
Page Inc	ON
Live Select	DIGITAL
Convert	ON
Remaining	OFF
Remote Set	
Baud Rate	9600
Command Type	A
Response	RETURN
Busy Level	H
Busy Mode	PRN
V Sync Mem	OFF
Previous Error	

Table 5-13

Mitsubishi CP800 Color Video Printer Memory SW Menu Control Settings (Continued)

Parameter	Setting
Mecha Error	NOTHING
PRG All Init	OFF
Rear Panel Switch Settings	
IMPEDANCE - RGB	75 Ω
IMPEDANCE - SYNC	75 Ω

Table 5-14

Sony UP1850 Color Video Printer Setup

Parameter	Setting
Sony UP1850 used for upgraded HDI 3000 systems only	
Menu 1	
Print QTY	1
Input Sel	RGB
FRM/FLD	FRAME
Sharpness	0
Color Adjust	
Load	1
Red	0
Green	0
Blue	0

Table 5-14

Sony UP1850 Color Video Printer Setup (Continued)

Parameter	Setting
Dark	+1
Light	-2
Check	N/A
Save	1
Signal Adjust	
Color	0
Gain	0
Offset	0
AGC	OFF
Multiplex	
Split Mem	OFF
Interval	OFF
Separate	OFF
DUP Image	OFF
Image Size	L
Mirror	OFF
Pick Image	N/A
Set Up	
H Shift	0 DOT
V Shift	0 DOT

Table 5-14

Sony UP1850 Color Video Printer Setup (Continued)

Parameter	Setting
RM2 Mode	M&P
RM2 ACT	1ACT
LIVE MODE	OFF
Monitor Adjust	
Moni Red	0
Moni Blue	0
Display	OFF
Monitor	E to E
Sync on G	OFF
Rear Panel Dip Switches	
75 OHM	ON
SW1	ON
SW2 - SW8	OFF

Table 5-15

Sony UP860/870 Video Printers

Parameter	Setting
Sony UP860/870 used for upgraded HDI 3000 systems only	
Front Panel	
Contrast	Center
Brightness	Center

Table 5-15 Sony UP860/870 Video Printers (Continued)

Parameter	Setting
Thru/EE Switch	Thru
Posi/Neg Switch	Posi
Rear Panel	
Dip Switches	All ON, except switch 1 OFF
I II III Switch	II
D Adj	Center

Table 5-16 Sony UP890 Video Printer

Parameter	Setting
Front Panel	
Print Size	NORMAL
Contrast	10:00
Brightness	11:30
Thru/EE Switch	EE
STD/SIDE	STD
Rear Panel	
Dip Switches	All ON
GAMMA	II
Paper Type	IV

Table 5-17**Sony UP910 Video Printer**

Parameter	Setting
Front Panel	
Dip Switches, NTSC	All OFF
Dip Switches, PAL	All OFF, except switch 5 ON
Contrast	Center
Brightness	Center
Rear Panel	
75 Ohm	ON

Table 5-18**Aspect Multi-Image Camera**

Parameter	Setting
Brightness	35
Contrast	45
Polarity	+

Table 5-19**System Setups for Video Printers and Aspect MIC**

Parameter	Setting
Use Print Button To	Print Local (Internal)
Environment	Print All

Table 5-19 System Setups for Video Printers and Aspect MIC

Parameter	Setting
Print Color Images to B&W Printer	Yes
Store to Optical Disk During Exam	OFF

DVS Module

The DVS Module is physically installed in the system prior to system shipment from Bothell. However, DVS cabling is disconnected during system shipment to prevent connector damage from boxes packed around the system in the shipping crate. Use the following procedure to connect the DVS cabling.

► To connect DVS cabling

1. Remove the disconnected cabling (P/N [3500-2921-01](#) and [2275-0402-01](#)) from the OEM bay.
2. Remove bubble wrap from the connectors.
3. Connect the cabling to the system.
4. Test the system per the procedures in “[Performance Tests](#)” on page 182.

**Final Inspection
and
Documentation**

1. Perform an inspection if one was not previously completed. Record all pertinent information on the work orders.
2. Verify electrical power quality using the system and its peripherals as the final load. Also, compare your pre-install observations of ambient temperature, RFI, and ESD conditions to present conditions. Record all measurements and observations on the Installation Work Order.
3. Ensure the Manual Updates and Operating Notes are with the user manual set. Have the user manuals available for review by the system operator so that questions can be answered during the system presentation.

4. Complete a Quality Assurance Audit (PM) sticker and attach it to left side of the monitor.
5. Tell the facilities representative that the system is installed and ready for any safety tests that they normally conduct.

System Presentation

When the system and the customer documents are ready, present them to the operators using the following in-service procedure.

1. Review the customer order with the customer to familiarize them with the system and its options and to assure them they have received what they ordered.
2. Present the user manuals and operating notes. Describe these publications and emphasize that all information needed to operate the system and peripherals is in them. As questions come up, guide the operators through these publications.
3. Show the operators how to turn on the system and any external OEMs. Explain the differences between the main circuit breaker and the ON/STANDBY switch.
4. Describe the initialization process and explain that the system programs itself during this process.
5. Explain why it is important for them to never remove covers from the system because of ESD and warranty considerations.
6. Explain the reasons for the following cautions:

CAUTIONS

-
- Always place the system ON/STANDBY switch to STANDBY for five to ten seconds before setting the system I/O circuit breaker to OFF.
 - Always wait five to ten seconds after placing the system ON/STANDBY switch to STANDBY before placing the switch back to ON. A power-down sequence, similar to the initialization

that occurs when power is first turned on, saves certain operating parameters and then turns off power supplies in a sequential order.

- This equipment contains components that are electrostatic sensitive. Proper static procedures, protection, and equipment must be used prior to opening and during handling of this equipment. Failure to use ESD procedures *will* cause damage to these components. Such damage to components *is not* covered by Philips Ultrasound warranties.

-
7. After the system is fully initialized, give the operators a brief demonstration of system controls. Limit the discussion of the MENU buttons to the concept that pull-down menu boxes contain higher-level commands for the functions selected by the mode buttons. Review the following:

- How to set Time and Hospital Name
- How to enter patient data
- Mode buttons
- Rotary controls
- Up/Down spring-loaded control switches
- Trackball and SELECT control, including their use with pull-down menus
- Volume control
- VCR and hardcopy device operation
- Signal ports, including scanheads

8. Instruct the operator on how to optimize image quality using the control settings in the ["Image Optimization" on page 178](#) paragraph.
9. Describe and demonstrate system maintenance procedures to be performed as needed:

- Fan filter cleaning
- System cleaning
- Scanhead disinfection and sterilization (refer to *Using Disinfectants and Gels*, P/N 4700-0249-XX)
- B/W printer head cleaning
- Other peripherals, as necessary

Image Optimization

Image optimization on the HDI 5000 system uses different settings than those used on other Philips Ultrasound systems. Set the system to the following settings for optimum image quality.

- Monitor brightness to 20 and contrast to 80. (Higher brightness levels produce flat images.)
- TGC slidepots in a straight line. Then, adjust as necessary for patient habitus. Set slidepots before setting a new TSI.
- Compression curve to C2. Lowering compression decreases image noise. You may need to increase compression for THI images.
- Gray Maps as required by customer. (Dedicated gray maps exist for General Imaging and Cardiac Imaging.)
- Power as required. (Reduce to decrease artifacts.)

Completing the Installation

1. Discuss the present status of the system with your customer and review the hardcopy prints that were taken during the system check out. Be sure to cover any environmental concerns as well, making suggestions as appropriate.
2. Ask your customer if there are any questions they have about the new system or Philips Ultrasound.
3. Review the customer procedures for them to place a service call or to call for technical assistance.

NetLink Installation

4. Complete the work order.

NetLink is installed by programming the HDI 5000 host table with the proper network configuration. The following steps summarize the installation process:

1. Determine configuration information: all IP addresses, model IDs, subnet masks, gateway addresses, port numbers, and device aliases. Obtain the information from the network administrator.
2. Use the configuration information to program the host table using the ultrasound system to edit, install, and copy the configuration files. Refer to the *Reference Manual*.
3. Verify the accuracy of the syntax of these files by selecting the Save option from the bottom of the display. If there are no errors, then the files are syntactically correct; otherwise, they are not, and the problem is described in an error message. Edit the files, fix the syntax, and apply until no errors occur.
4. Use the Image Management Network Configuration setups to verify the network configuration (host table, device table, and device files). From the Printer Selection option, verify the printers are displayed in the appropriate lists on the B/W and Color Printer setups panels. Verify the ultrasound system appears in the Ultrasound System Net ID and that all of the archive devices appear in the archive list.
5. Select Image Management Configuration Files and create a backup copy of the configuration files on the system hard disk.
6. Select the correct printer and archive devices using Printer Selection and Network Configuration. Refer to [Section 6, "Performance Tests"](#), to create an exam, take several images, and end the exam. Verify the images are printed and the exam appears on all archive devices.
7. If devices are to be added to the device table after the original network installation, load the site disk obtained from TSG and copy the new configuration files.

8. Backup the network configuration files after upgrades or modifications to the host or device tables.

Detailed instructions for installing NetLink are contained in the "Image Management" section of the *HDI 5000 Reference Manual*, part number 4703-0027-XX.

Host Table, Device Table, and Device Files

The host table must contain the correct alias, IP address, port number, model ID, title, and subnet for each device on the network. The device table maps each model ID in the host table to a file that describes the capability of that device. These capabilities include such things as printer type, film size, film type, orientation, destination, density, and so forth.

NOTE Communications errors will result from improper IP address syntax. Enter IP addresses with leading zeroes exactly as specified by the customer's IP addresses. For example, if the customer's IP addresses are listed as 192.168.001.100, you would use the laptop address as 192.168.001.101.

Most of the attributes or capabilities listed in the printer device file appear as setups on the Image Management Net Admin: B/W Printers and Color Printers system setups screens. From these screens you can select the settings for the desired print attributes. You must first select a printer type before setting the other print attributes.

The information in the host table, device table, and device files establishes the network configuration. This information must be consistent, or an error message will be displayed on the system monitor when the configuration files are saved.

The host table, device table, and device files establish the following relationships and must be setup to reflect the network configuration:

- TCP/IP addressing for server and clients on the network
- DICOM print connections

- Print media selection
- Print media size selection
- Print film type selection
- Print orientation selection
- Print contrast and density settings
- Print format

Once the network configuration has been established and setup, create a site disk by copying the host table, device table, and device files.

6 Performance Tests

Introduction

This section contains a series of performance tests to be performed on the system following installation, upgrade, or repair. The purpose of these tests is to verify the correct operation of the system (hardware and firmware). The checklist included at the end of this section can be used to ensure that all tests are performed.

The major test sections in this procedure are organized to follow a logical progression through each of the major system modes. It is not a requirement to perform the sections in any particular order. However, it is best to perform the tests in their written order to promote a thorough and consistent testing process.

WARNINGS

- Measurement accuracy must be verified after installation, after every repair involving PCB or power supply module replacement, and during every preventive maintenance inspection. If measurements are inaccurate, misdiagnosis may result in harm to patients.
- Wrist straps should *not* be worn when working on a system with its power turned on. The +5 Vdc supply is a very-high current supply. Use caution when troubleshooting.

NOTE Before performing these tests, the site power should be inspected in accordance with the pre-site inspection procedures detailed in the "Site Inspection" section of the *General Field Service Manual*.

Test Equipment and Materials

- FSE Tool Kit (193-90003-01)
- RMI Model 413 Tissue Equivalent Phantom (199-12204-00)
- RMI Model 406 Dual Attenuation Phantom (2100-1610-01)
- Leakage Tester/ECG Simulator (6005-0555-01)

Initial Setup

WARNING

The following series of tests require applying power to the system while protective covers are removed. Dangerous voltages are present. Use extreme caution.

The initial setup procedure consists of observing system power-up and initialization, verifying system configuration against the customer order acknowledgement (COA), and adjusting the monitor for optimal viewing.

System Power Up and Initialization

This section verifies the status of system power supply voltages as reported by the power supply boards.

NOTE Before proceeding, refer to [Section 3, "Safety"](#), and ["Power Subsystem" on page 75](#), and review the discussion of the three power states (Off, Standby, and On).

1. Turn system off and disconnect power cord before proceeding.
2. Perform the system electrical inspection as described in [Section 5, "Installation"](#).
3. Connect an array scanhead to the system.
4. Turn on all OEMs prior to checking system functionality.
5. Load OEM paper or film, as required.

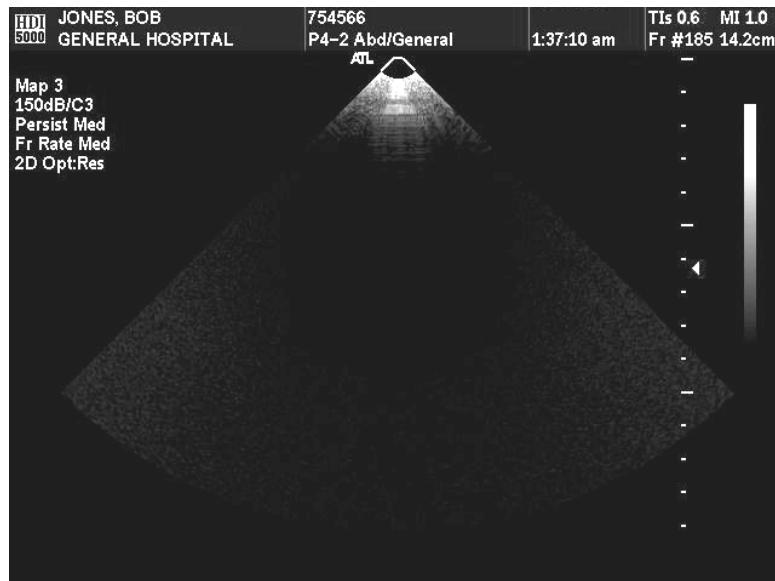
6. Connect the system power cord to a hospital grade AC outlet: specifically, a single branch circuit, 15- or 20-Ampere, 120-Vac, with an isolated and insulated ground wire (or the equivalent International circuit).
7. Set the system circuit breaker to ON.
8. Wait 15 seconds, then set the ON/STANDBY switch to ON.
9. Verify that LEDs 6 and 7 on the ACIM are constantly lit.
10. Verify power indicators are illuminated on internal peripherals.
11. Turn on power to all external peripherals and verify power indicators are illuminated.

NOTE Observe the required warm-up period for each peripheral before conducting image quality tests. Refer to the OEM manual supplied with the peripheral or the appropriate peripheral field service manual.

12. After completion of the initialization process, verify the following:
 - The scanhead connected in <Blue>step 3 of this procedure is selected and enabled.
 - A real-time 2D image is displayed on the monitor ([Figure 6-1](#)).
13. Throughout the performance tests, verify the following:
 - The image is correctly placed on the video display.
 - The LEDs associated with the buttons on the control panel are lit when that feature is activated.
 - Toggle switches, slidepots, trackball, and other moveable controls operate smoothly and efficiently.

Figure 6-1

Power-up Displays



System Configuration

Refer to ["Show Installed Options" on page 270](#) to check the installed system options against the COA.

Monitor

The following procedure is used to set up the monitor for optimal viewing, and to check the range of contrast and brightness of the monitor:

1. Set the background color  to midrange for all three colors (Color 1, Color 2, or Color 3).
2. Set brightness  and contrast  to minimum. Verify the video display has a flat black appearance.
3. Set contrast  to maximum. Verify the level of contrast varies.
4. Adjust the brightness of the lightbar from maximum to minimum.
5. Set the background color, brightness, contrast, and light bar intensity to the factory default settings by simultaneously pressing and holding the up and down controls for each parameter.

NOTES —

- Do not change the focus adjustment for this procedure. Monitor focus does not usually require field adjustment.
- You must wait for longer than 30 seconds, after changing control settings on 3500-2532-XX monitors (Brightness, Contrast, and Light Bar Intensity), for the settings to be retained in the monitor EEPROM. Turning off the monitor power during this period will require you to reset the control settings.

User Interface Tests

The following tests verify various system defaults and user-selectable configuration items, and selection of scanheads and applications:

NOTE Some controls listed in this section are feature-dependent and will not show up on all systems.

Keyboard Controls

1. Press Text or Title. Title allows annotation entry in the upper part of screen; Text enters characters at cursor's active position.
2. Press each alphanumeric key and verify the appropriate character is displayed.
3. Press Shift and the arrow keys and verify the appropriate symbols are displayed.
4. Press Shift and verify the shift functions for keys with shift characters.
5. Press remaining keys and dedicated pushbuttons and verify proper operation.
6. Rotate the trackball and verify the cursor moves evenly and without hesitation.

Softkeys

The softkeys are operational only when certain machine options have been installed. The machine options include: VCR, NetLink, 3D CPA, 3D Grayscale, and Advanced 3DI. If a machine option has been installed on the system and that particular mode of operation has been selected, the softkey LEDs display commands available for that particular mode. Refer to the *HDI 5000 Reference Manual* (P/N 4703-0027-XX) for the softkey functions.

Footswitches

Footswitch function can be operator-set using Footswitch setup in the Peripherals setups. Check which option is setup for each footswitch and verify the operation.

**Installation
Defaults Setup**

1. Press the Setups key and click on Display.
2. Enter the appropriate Institution name, date, and time. Click on the diamonds to select desired time and date formats.
3. Exit Setups.

**Patient Data on
Systems without
Worklist
Feature**

1. Press Patient Data.
2. On systems with 127.05 and lower software, continue with <Blue>step 3. On systems with 170.XX software and higher, select Patient Data.
3. Enter your name in the New Patient field.
4. Enter the system sales order (SO) number in the ID field.
5. Select Study Data. Enter your birth date in Date of Birth.
6. Verify your age is displayed correctly.

NOTE The Accession number is an optional 16-digit field used to track patient exams on systems with Image Management. It is unnecessary to enter anything into that field for this procedure.

7. Select Previous Exam and Close. Then close the Patient Data menu.

**Patient Data on
Systems with
Worklist
Feature**

Systems with the Worklist feature are capable of automatically entering patient data in preparation for an exam. The worklist server and ultrasound system must be properly configured and communicating over a network. The worklist server must also have a worklist to transfer to the ultrasound system. Refer to *Manual Set Update* (P/N 4706-0027-06) for information on how to use the Worklist feature.

Scanhead Initialization

1. Press the Scanhead key.
2. Connect the following scanheads or equivalents as shipped with the system:
L12-5 C8-4v P4-2 D5CW
3. Verify the scanheads connected are correctly displayed.
4. Select the desired scanhead and scanhead application. Verify the correct scanhead is identified at the top of the screen.
5. Verify the patient data and other information is correctly displayed and the clock is updating.

2D

Primary Controls

2D Gain

NOTE The TGC graphic on the display does not correlate to the TGC slidepot positions. The TGC graphic on the display represents the actual curve used by the beamformer.

1. Scan the phantom while performing these steps.
2. Connect any phased or curved array scanhead to the system.
3. Select the Generic/General optimized preset and select 2D mode.
4. Set all TGC slidepots to the center position.
5. Verify adjusting 2D GAIN from minimum to maximum moves the displayed TGC line from a flat line at the left edge of the depth markers to a flat line at the right edge of the display.
6. Verify that as 2D GAIN is increased and decreased, there is a corresponding increase and decrease in echo intensity.
7. Set 2D GAIN to mid-range.

TGC Slide Pots

1. If the TGC display is not present, press Setups, select Display, and turn TGC Display ON. (Moving a TGC slidepot will only bring up the TGC display for three seconds.)
2. Set 2D GAIN to mid-range or higher.
3. Verify adjusting each TGC slidepot from minimum to maximum moves the corresponding portion of the displayed TGC line from the left edge of the depth markers to the right edge of the display.
4. Verify increasing and decreasing the TGC gain results in a corresponding increase and decrease in echo intensity (depends on overall gain settings).
5. Set all TGC slidepots to the center position.

Focal Zones (number of focal zones)

1. Verify pressing ZONES up increases the number of focal zones (the number of Zones varies with scanhead type) or changes the distance between zones.
2. Verify pressing ZONES down decreases the number of focal zones (the number of Zones varies with scanhead type) or changes the distance between zones.

Focus

1. Verify pressing FOCUS up moves the focal zone up (positioned at shallower depths).
2. Verify pressing FOCUS down moves the focal zone down (positioned at deeper depths).

Depth

1. Verify pressing DEPTH up decreases the displayed depth and that the frame rate increases.
2. Verify pressing DEPTH down increases the displayed depth and that the frame rate decreases.

Output

1. Verify pressing OUTPUT up increases the echo intensity.
2. Verify pressing OUTPUT down decreases the echo intensity.

Top/Bottom

1. Verify pressing TOP/BOT up or down inverts the image top to bottom.
2. Verify that depth markers, focal zone marker, and the orientation marker change their orientation with the sector orientation.
3. Verify adjusting the top TGC slidepot still controls the near field part of the image while the image is inverted.

L/R Invert

1. Place the scanhead on the phantom with the orientation marker to the left. Verify the image orientation marker corresponds to the orientation mark on the scanhead.
2. Verify pressing L/R INVERT switches the image and the orientation marker left to right.

Compress

1. Press COMPRESS up or down.
2. Verify the dynamic range compression curve annotation changes from C1 to C6.

Sector Width

1. With a sector scanhead, verify that pressing SEC WIDTH down decreases the sector width.
2. Verify the frame rate increases as the sector width is decreased.
3. Verify pressing SEC WIDTH up increases the sector width.
4. Verify the frame rate decreases as the sector width is increased.

Zoom

1. Verify pressing ZOOM up increases the image magnification.
2. Verify the image orientation marker repositions to the far upper left of the display.
3. Verify the depth markers re-scale with the zoomed image.
4. Verify moving the trackball allows all portions of the image to be viewed.
5. Set the Zoom to normal magnification.
6. Verify the image, image orientation marker, and depth markers return to the normal state.

Cursor

1. Press CURSOR.
2. Verify a dotted line with a depth cursor is displayed.
3. Verify the trackball moves the dotted line and the depth cursor.

HD Zoom

1. Press HD ZOOM and verify the Zoom box is displayed and the trackball will position the box anywhere within the image.
2. Verify pressing SELECT fixes the position of the upper left corner of the box and the trackball now positions the lower right corner of the box to size it.
3. Position and size the box to surround a distinct feature (cysts or pins) within the phantom.
4. Press HD ZOOM and verify the image zooms so the area defined within the box is displayed to fill the image. Verify the HD ZOOM LED is lit.
5. Press HD ZOOM and verify the image returns to normal magnification and the box is no longer displayed.

Dual

1. Press DUAL and verify the sector is displayed on the left half of the display and is updating.
2. Press UPDATE and verify another sector is displayed on the right half of the display.
3. Verify the right sector is updating and the left sector is frozen.
4. Press UPDATE to toggle the live and frozen images from the left sector to the right and the right sector to the left.
5. Verify that adjusting any imaging control (except HD ZOOM, GAIN, TGC, and OUTPUT) affects only the live sector and each sector independently retains its imaging control settings from the last time it was active.
6. Press DUAL and verify a single full size sector is displayed.

SonoCT Real-Time Compound Imaging

1. Connect an L12-5 to the system.
2. Select a clinical option and a Tissue Specific™ preset. Verify the system defaults to 2D imaging.
3. Press SonoCT. Verify Compound imaging begins, and image information indicates Fr Rate:Surv or Fr Rate:Targ.
4. Press FR RATE to alternate the image information between Fr Rate:Surv and Fr Rate:Targ. Verify each setting has a different ultrasound beam scanning geometry.

NOTE To change frame rate during SonoCT Real-Time Compound Imaging, use the 2D PRF menu option on the 2D/M-mode menu.

5. Select the one that provides the best image quality.
6. Press SonoCT to return the system to its previous state. Entering any other imaging mode cancels compound imaging. Returning to 2D imaging automatically activates compound imaging if you had it selected.

Secondary Controls

Setup

1. Connect any phased or curved array scanhead to the system.
2. Select the Generic/General optimized preset.
3. Select 2D mode and the desired scanhead.
4. Press 2D/M M to call up the 2D secondary control menu.
5. Scan the phantom while performing these steps.

Gray Maps

Verify that selecting - or + GMAP# changes the gray map number, the gray scale assignment of the gray bar, and the image data.

Chroma

1. Select Chroma.
2. Verify that when Chroma 1 or Chroma 3 is selected, the image and gray bar are colorized to a reddish hue.
3. Verify that when Chroma 2 or 4 is selected, the image and gray bar are colorized to a bluish hue.
4. Set Chroma OFF.

Persistence

It may be easier to see any changes in the Persistence if the scanhead is uncoupled from the phantom and the 2D Gain is turned up so the Far Field is saturated with noise.

Verify that increasing persistence smooths the image and mid-level echoes move in slow motion in response to scanhead movement.

Array Channel Test (Tower Test)

1. Select 2D mode and an L12-5 scanhead. (If an L12-5 scanhead is not available, use another linear or curved array scanhead.) Set OUTPUT, 2D GAIN and TGC to maximum, # Focal Zones to 1, and FOCUS to less than maximum depth.
2. Slowly slide the narrow edge of a six-inch metal ruler from one end of the face of the scanhead to the other.
3. Verify a single vertical band of echoes moves across the image in coordination with the motion of the ruler.

Penetration

NOTE While performing the steps in this section, scan the phantom.

1. Select a cardiology scanhead and the Adult Card - Gen Adult Card application.
2. Select 2D and scan the phantom to obtain an image that clearly shows both the horizontal and vertical rows of pins.
3. Press DISTANCE to activate a cursor.

NOTES

- Do not place the cursor under cysts or pins.
 - Always apply the phantom reference value and tolerance to the measurement.
-

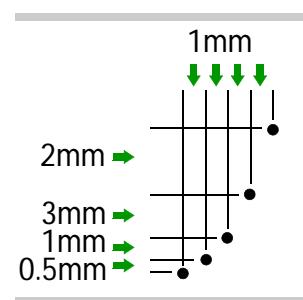
4. Set the cursor at the deepest vertical position where the scatter echoes start to break up and tissue definition is lost.
 5. Verify scanhead performance.

Image Quality

1. Adjust the position of the scanhead on the phantom and 2D controls to obtain an image that clearly shows both the horizontal and vertical rows of pins.
 2. Verify the image presents a uniform homogeneous echo pattern from the point of closest focus to the limit of penetration.
 3. Adjust the focal zone position to correspond to the depth of a cyst.
 4. Verify the cystic structure at the focal zone is echo free, round, and with sharp wall definition.

Axial Resolution

Obtain a phantom image of a set of axial resolution pins. Refer to the diagram (right). Distances between the pins may vary by phantom model. See the *General Service Manual*, P/N 4720-0219-XX, or reference your phantom service manual for details.



Axial Measurement Accuracy

1. Connect a P3-2 or P4-2 scanhead to the system. Select the Generic/General preset.
 2. Select 2D mode.
 3. Adjust the position of the scanhead on the phantom and 2D system controls to obtain an image that clearly shows both the horizontal and vertical rows of pins.
 4. Press FREEZE to freeze the image.
 5. Press DISTANCE to display the measurement cursor.

6. Measure the distance between the center of two pins that are vertically spaced 6 cm apart.
7. Verify and record the distance measured is 6.00 cm + 0.06 cm.

Lateral Measurement Accuracy

1. Perform [step 1](#) through [step 5](#) of the [Axial Measurement Accuracy](#) procedure.
2. Measure the distance between the center of two pins that are horizontally spaced 6 cm apart.
3. Verify and record the distance measured is 6.00 cm + 0.12 cm.
4. Press FREEZE to unfreeze the system.

Registration Accuracy

1. Connect a P3-2 or P4-2 scanhead to the system and select the Generic/General preset.
2. Select 2D mode. Set the depth to 15.2 cm.
3. Press DISTANCE to display the measurement cursor.
4. Place the cursor on the center of the top depth marker.
5. Press SELECT and place the second cursor on the center of the 13-cm depth marker.
6. Verify/record the distance measured is 13.00 cm + 0.26 cm.
7. Press Del Meas to remove all measurement cursors.

Cineloop Manual Playback

1. Slowly slide the scanhead across the phantom.
2. Press FREEZE.
3. Verify the trackball movement left or right scrolls through the captured Cineloop frames.

Cineloop Automatic Playback

1. Display the Cineloop menu.
2. Verify the Play/Pause starts and pauses Cineloop, and the image data indicates loop.
3. Verify selecting + Speed increases the playback speed.
4. Verify selecting - Speed decreases the playback speed.

5. Verify selecting Sweep/Loop changes between sweep and loop mode, and the image data reflects the current mode selected.
6. Verify selecting Trim displays the Cineloop trim graphic.
7. Verify trackball and SELECT allow positioning of both trim markers.
8. Verify selecting Play/Pause loops through the frames defined by the trim markers.

Annotation

1. Verify pressing Body Marker sequences through the available body markers and the marker can be positioned anywhere within the image.
2. Verify pressing Superkey + SH Pos displays the scanhead marker on the body marker.
3. Verify the trackball can position the scanhead marker anywhere within the body marker and can rotate the scanhead marker.
4. Verify pressing Erase Screen clears the body marker, and the scanhead marker.
5. Verify pressing Title displays the cursor in the default home position.
6. Verify data can be entered into the title field and pressing Erase Line clears all entered data.
7. Verify pressing Text displays the cursor in the default home position.
8. Verify data can be entered into the text field and pressing Erase Text clears all entered data.
9. Verify pressing Arrow creates a pointer.
10. Verify the trackball can position the arrow anywhere within the image.
11. Verify pressing Erase Arrow clears the pointer.

2D Color

Primary Controls

Setup

1. Connect a scanhead to the system.
2. Select the Generic/General optimized preset.
3. Select 2D Color mode.
4. Acquire a Doppler image.

Color Gain

1. Increase and decrease Color Gain.
2. Verify that as Color Gain is increased and decreased the amount of color noise displayed within the color box increases and decreases.
3. Set Color Gain to mid-range.

Color Box

1. Verify the Color annotation is displayed.
2. Verify the trackball will position the Color Box anywhere within the image.
3. Verify that pressing SELECT fixes the position of the upper left corner of the box and that the trackball now positions the lower right corner of the box to size it.

Steer (Linear Scanheads Only)

1. Press STEER. Verify the color box changes shape shifting left or right pivoting around its center.
2. Press STEER again several times. Verify the system cycles through the various steering angles on the display.

Baseline

1. Press BASELINE up and verify the baseline of the color bar moves to the top of the color bar and the color scale updates accordingly.
2. Press BASELINE down and verify the baseline of the color bar moves to the bottom of the color bar and the color scale updates accordingly.

Scale

Verify that pressing SCALE up and down will increase and decrease the range of the color bar scale image data.

Wall Filter

Verify that pressing FILTER up and down changes the wall filter setting from low, medium, high, to max.

Invert

Verify that pressing INVERT up and down changes the color map from top to bottom.

Priority

1. Press PRIORITY up and verify the write priority mark on the gray bar moves to the top of the bar and color overwrites the corresponding gray shades.
2. Press PRIORITY down and verify the write priority mark on the gray bar moves to the bottom of the gray bar and gray shades overwrite the color.

NOTE Allow the PRIORITY to update between key depressions. Pressing PRIORITY rapidly in succession will cause the system to lockup.

Secondary Controls

Setup

1. Connect any phased, curved, or linear scanhead to the system.
2. Select the Generic/General optimized preset.
3. Select Color mode.
4. Display the color annotation.
5. Press COLOR MENU.

Color Maps

1. Select Color Maps.
2. Verify that selecting each of the color maps changes the color assignment of the color bar.

Persistence

1. Select Persistence.
2. Verify that selecting higher settings slow the color image update rate and that the annotation is updated.

Post Processing - Color Capture

Verify that selecting Capture turns the feature on and off.

Post Processing - Color Tag

NOTE The color tag range depends on the color settings.

1. Set the system parameters as indicated in [Table 6-1](#).
2. Press FREEZE.

3. Repeatedly select Color Tag and verify the feature turns on and off.
4. Verify the parameters for position and size of Color Tag are operational and the display updates accordingly.

Table 6-1 Color Tag Parameter Settings

Parameter	Setting
Color Velocity	1-128
Position	Increments by 8
Size	Increments by ± 2 from center position
Velocity/Variance	1 - 32
Position	Increments by 2
Size	Increments by ± 1 from center position

Line Density

Verify selecting higher settings increases the image sharpness and the annotation is updated.

Color Smoothing

1. Select Smooth.
2. Verify the setting changes from low, medium, high to off, and the displayed color transitions accordingly.

Mode

1. Select Mode.
2. Verify the setting changes from V+V, Vel, to Pwr and the color bar changes accordingly.

Color Display

1. Press Superkey and CDisp.
2. Verify the color bar and the image color data are not displayed.
3. Press Superkey and CDisp.
4. Verify the color bar and the image color data are displayed.

DMD (Dynamic Motion Differentiation)

Verify selecting DMD turns the feature on or off.

Units

Verify selecting Freq or Vel changes the scaling annotation of the color bar.

NOTE Units do not apply to Power mode.

Color Power Angio

- ## Setup
1. Connect an L10-5 or L12-5 scanhead to the system.
 2. Select the Generic/General optimized preset.
 3. Select Power Imaging mode.
 4. Obtain a Doppler image that clearly shows fluid flow.
 5. Verify the power imaging background is of uniform color and texture.
 6. Verify the colorized Doppler information is displayed within the vessel.
 7. Display the PWR secondary menu.

Power Maps

1. Select Power Maps.
2. Verify selecting each of the color maps changes the color assignment of the color bar and the power imaging background.

Persistence

1. Select Persistence.
2. Verify selecting higher settings slows the color image update rate.

Line Density

Verify selecting higher settings increases the image sharpness.

3D CPA

1. Adjust the scanhead position to obtain an image that clearly shows fluid flow.
2. Press 3D and acquire data. For systems with 124.13 software and above, press 3D UNCAL.
3. Press FREEZE.
4. Press 3D/CINE to display the 3D/Cine secondary menu.
5. Select Create 3D.
6. Verify the system indicates it is rendering a 3D image.
7. When rendering is complete, verify the system is sweeping through the 3D Cineloop.
8. Press FREEZE.

Doppler**Primary Controls****Setup**

1. Select and initialize an L12-5 scanhead.
2. Select the Generic/General optimized preset.
3. Press PULSED.
4. Acquire a Doppler image.

5. Verify the Doppler image information is displayed.
6. Press UPDATE.
7. Verify the Doppler display is scrolling.

Wall Filter

Press FILTER up and verify the wall filter annotation changes from low to medium to high.

Baseline

Press BASELINE up and down to verify the Doppler baseline can be positioned from the top to the bottom of the scale.

Scale

Press SCALE up. Verify the range displayed on the Doppler scale changes.

Angle Correction

1. Press 0/60 \times and verify the M Line changes from +60 \times to -60 \times to 0 \times .
2. Press ANG COR. Verify the angle correction graphic moves and the annotation graphics update by 2 \times increments.

Sample Volume Size

Press SV SIZE and verify the displayed sample volume changes size and the annotation is updated with the new size.

Invert

Press Invert and verify the Doppler spectral data and the scale inverts relative to the baseline.

Footswitch

1. Press Patient Data and enter "Y" to select New Patient.
2. Enter your name in the Name field.
3. Press Patient Data to begin the new exam.
4. Connect a footswitch assembly to the system.
5. Configure the system to store an image to the hard disk or to print to an internal printer to activate the footswitch print function.
6. Press the left footswitch and verify the system prints or stores an image.
7. Press the middle footswitch and verify 2D freezes and the UPDATE LED is not lit. Press it again and verify 2D is updating and the UPDATE LED is on.
8. Press the right footswitch and verify the system freezes and the FREEZE LED is lit. Press it again and verify the system begins updating and the FREEZE LED is not lit.
9. Disconnect the footswitch assembly from the system and delete any exams saved to the hard disk.

Secondary Controls

Setup

1. Connect any phased, curved, or linear scanhead to the system.
2. Select the Generic/General optimized preset.
3. Press PULSED.
4. Press DOPPLER MENU to display the Doppler secondary control menu.
5. Acquire a Doppler image.

Doppler Gray Maps

1. Select Gray Maps.
2. Verify selecting each of the gray maps changes the grayscale assignment of the Doppler data.
3. Verify the selected grayscale map is displayed in the Doppler annotation.

Chroma

1. Select Chroma.
2. Verify that when Chroma 1 is selected, the image and gray bar are colorized to bluish-yellow.
3. Verify that when Chroma 2 is selected, the image and gray bar are colorized to violet-yellow.
4. Verify that when Chroma 3 is selected, the image and gray bar are colorized to blue.
5. Verify that when Chroma 4 is selected, the image and gray bar are colorized to gold.
6. Set Chroma OFF.

Scale Units

Verify the Doppler scale displays the scale units selected.

Doppler Sweep Speed

1. Select each Doppler sweep speed.
2. Verify the right to left display movement (sweep speed) changes accordingly.

Display Format

1. Select the Small, Medium, and Large display formats and verify the Doppler display changes accordingly.
2. Select 2D.

**PW Doppler
Noise Bands**

1. Connect a P3-2 or P4-2 scanhead to the system.
2. Select the Generic/General optimized preset.
3. Select Pulsed Doppler mode.
4. Set the system controls as indicated in [Table 6-2](#).
5. Reduce DOP GAIN just until the background noise disappears.
6. Observe the spectral display for noise bands.
7. Obtain a Doppler spectral trace.
8. Increase and decrease the PRF and observe the display for noise bands.
9. Repeat [Step 5](#) through [Step 8](#) for sample volume sizes of 2, 3, and 5 mm.

Table 6-2 PW Doppler Noise Band Control Settings

Control	Setting
Output	Maximum
Sample Volume Depth	9.0 cm
Sample Volume Size	1.5 mm

**Steered CW
Doppler Noise
Bands**

1. Disconnect all scanheads.
2. Use the ON/STANDBY switch to cycle system power OFF, then ON.
3. Press Superkey + 0 to display the Machine Diagnostics login dialog box.
4. Login as "CSR" to the Machine Diagnostics interface. The password is "USER."
5. Select Test, Utils, from the Diagnostics menu.
6. Double-click Machine, and select Doppler Ultrasound and Tests and Utils.
7. Execute CW Calibration Utility, and verify it reports a passing condition.

8. Reboot the system using the ON/STANDBY switch.
 9. Connect a P3-2 or P4-2 scanhead to the left scanhead receptacle. Keep the face of the scanhead dry and uncoupled for performance of this test.
 10. Select the Generic/General Tissue Specific preset.
 11. Select Pulsed Doppler mode.
 12. Set the system controls as indicated in [Table 6-3](#).
 13. Press CW. Press UPDATE.
 14. Adjust DOP GAIN to obtain clearly visible background noise in the scrolling display.
 15. Adjust the D-line ± 15 degrees around the centerline of the 2D image to locate the position that produces the most CW noise.
 16. Adjust DOP GAIN according to [Table 6-4](#), and verify the spectral display is clear of noise bands.
 17. Repeat this procedure using the P5-3 scanhead connected to the right scanhead receptacle.

Table 6-3 Steered CW Doppler Noise Band Parameter Settings

Parameter	Setting
Output	Maximum
Depth	P3/P4-2: 17.7 cm, P5-3: 17.5 cm
Sample Volume Depth	P3/P4-2: 16 cm, P5-3: 10 cm
Doppler Gray Map	Map 2
Doppler Display Format	Large

Table 6-4

Steered CW Noise Detection Thresholds

PRF (Hz)	Doppler Gain (%)
50,000	53
41,667	54
31,250	54
25,000	55
20,000	56
15,625	56
14,286	57
11,905	57
10,000	57
8,333	58
5,000	5
3,731	6
2,500	6
1,515	7

M-mode

Primary Controls

Setup

1. Connect any phased, curved, or linear scanhead to the system.
2. Select the Generic/General optimized preset.
3. Select M-mode.
4. Acquire an image.

M-Line

Verify the trackball smoothly moves the M-line from the left image edge to the right image edge.

Secondary Controls

Setup

Press 2D/MM to display the 2D/M-mode secondary control menu.

Sweep Speed

1. Select Speed.
2. Verify that as higher and lower settings are selected, the M-mode display rate correspondingly increases and decreases with the setting.

Display Format

Select the Small, Medium, and Large display formats and verify the M-mode display changes accordingly.

Simultaneous Modes

Setup

1. Connect an L12-5 scanhead to the system.
2. Select the Cerebrovascular/Carotid optimized preset.

2D + PW Doppler

1. Press PULSED.
2. Press DOPPLER MENU to display the Doppler secondary control menu.
3. Select 2D UPDATE.
4. Select Simul.
5. Verify both 2D and Doppler are active.

2D + PW Doppler + Color

1. Select Color mode.
2. If the Doppler secondary control menu is not displayed, press DOPPLER MENU.
3. Select 2D UPDATE.
4. Select Simul.
5. Verify 2D, Doppler, and Color are active.

2D + PW Doppler + CPA

1. Press PULSED.
2. If the Doppler secondary control menu is not displayed, press DOPPLER MENU.
3. Select 2D UPDATE.
4. Select Simul.
5. Select Power Imaging.
6. Verify 2D, Doppler, and CPA are active.

DiskLink

Begin Exam

1. Press Patient Data.
2. Select New Patient.
3. Enter your name in the name field.
4. Press Patient Data to begin the new exam.

Storing Black/ White Images

1. Press Print to store the image to the hard disk.

CAUTION

During rapid printing to disk (one print every 7-10 seconds) the image memory will fill to capacity and the system appears to lock up. However, the system will fully recover after the images are stored. Do not turn off system power during image storage. Turning off system power may result in damage to the hard drive and necessitate replacement.

2. Verify the system freezes the image.
3. Verify the system beeps.
4. Verify the system unfreezes the image.
5. Verify the BW# and/or PG# annotation on the left side of the display increments one number to indicate a black and white image has been stored.
6. Press FREEZE.
7. Press PRINT to store six additional images.
8. Press DEL IMG.

9. Select Delete.
10. Verify the BW# and/or PG# decrements one number indicating an image has been deleted.

Storing Color Images

1. Select Color mode.
2. Increase the COL GAIN until color pixels are displayed.
3. Press PRINT to store the image to the hard disk.
4. Verify the system freezes the image.
5. Verify the system beeps.
6. Verify the system unfreezes the image.
7. Verify the COL# and/or PG# annotation on the left side of the display increments one number to indicate a color image has been stored.
8. Press FREEZE.
9. Press PRINT to store 4 additional images.
10. Press DEL IMG.
11. Select Delete.
12. Verify the COL# and/or PG# indicates the last color image has been deleted.
13. Press END EXAM.

Storing Loops

1. Select Color mode.
2. Increase the COL GAIN until color pixels are displayed.
3. Press FREEZE.
4. Use the trackball to scroll through each frame of the loop.
5. Verify there are no image artifacts in each frame.

6. Press CAPTURE.
7. Verify the frame number increments indicating the loop is being stored.
8. Press END EXAM.

Reviewing Images

1. Press NET/DISK.
2. Select Hard Disk to display the exam directory on the hard disk.
3. Verify the information entered for the exam just completed is correct.
4. Select the exam just completed.
5. Select Review Images.
6. Select the Zoom Graphic on one of the stored images.
7. Verify the image is displayed in one-on-one format.
8. Select Meas/Edit.
9. Verify the image appears like a normal acquisition screen.
10. Press REVIEW.
11. Verify the image is displayed in multi-image format.

Copying Images

1. Begin a new exam.
2. Press PRINT to store an image.
3. Press END EXAM.
4. Insert a formatted optical disk in the system drive.
5. Select Exam Dir to display the list of exams on the hard disk.
6. Select the last exam.
7. Select Copy To, then select OK to copy the image to the optical disk.

NOTE When copying images to the optical disk, two patients cannot have the same ID number. If this happens, both sets of images will be stored under the first patient name and will reference the same ID number. Always use a unique ID number for each patient.

8. Display the Exam Directory on the optical disk. Verify the image was copied from the hard disk to the optical disk.
9. Delete the image from the hard disk (before copying from the optical disk to the hard disk).
10. Select the exam just copied to the optical disk.
11. Select Copy To, then select OK to copy the image to the hard disk.
12. Display the Exam Directory on the hard disk.
13. Select the exam just copied to the hard disk.
14. Select Review Images.
15. Verify the image quality of each of the images is the same, and the image quality has not degraded.
16. Press Patient Data.
17. Select New Patient. Do not enter data in the Name or ID fields.
18. Press Patient Data to begin the new exam.
19. Display the Exam Directory on the hard disk.
20. Delete all exams.
21. Display the Exam Directory on the optical disk.
22. Delete all exams.
23. Press Setups.
24. Select Image Management.

25. Select Printer Selection to display the Image Management Printer setup panel.
26. Set the printer setup options as indicated in [Table 6-5](#).

NOTE If "Printed Image Destination" is set to "All to B/W Printer", the images stored to the optical disk will be black and white images only.

27. Select Setups Directory.
28. Select Image Management.
29. Select General Options.
30. Select Close.
31. Press NET/DISK and eject the optical disk by selecting Eject Disk.

Table 6-5 **DiskLink Printer Setup Options**

Option	Setting
B&W Film Format	1 x 2
Color Film Format	2 x 3
Printed Image Destination	All to B/W Printer

NetLink

1. Press Setups.
2. Select Image Management and press SELECT.
3. Select Printers and press SELECT.
4. Select a B&W print destination. Also, select whether the B&W images are to be sent to the color printer.
5. Select Close and press SELECT.
6. Press Patient Data.

7. Select New Patient.
8. Enter your name in the name field.
9. Press Patient Data to begin the new exam.
10. Scan a phantom.
11. Press PRINT to save the image.
12. Press END EXAM to end the exam.
13. Verify the image has been printed on the network printer.

WebLink Connectivity

1. Establish an IP address for the system at the site.
2. Verify the system is connected to site network.
3. Verify the WebLink™ option is enabled in setups. (Setups > Image Management > Network Configuration > WebLink On)
4. Connect a PC or Workstation at the site to the network and have a Web browser (Netscape or Internet Explorer) available.
5. Open a connection to the system by typing the IP address of the system directly at the Web browser's location prompt. For example:

<http://149.59.240.75/>

NOTE Use proper IP address syntax with leading zeroes consistent with the rest of the network.

6. Verify a prompt is displayed requesting a user name and password for WebLink connectivity.
7. If this is the first time WebLink has been used, enter "admin" for the user name, and "WebLink" for the password.

8. Select OK.
 9. Verify a Web page is displayed.
1. Power up the laptop and set up HyperTerminal as indicated in [Table 6-6](#).
 2. Connect the hardware as indicated in [Figure 6-2](#).

Table 6-6 HyperTerminal Settings for Serial Data Transfer Test

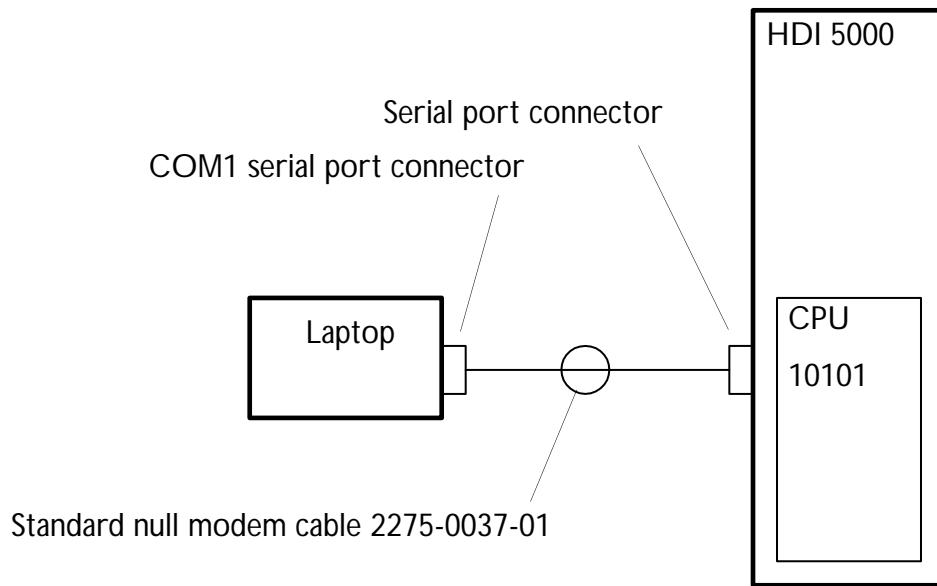
Parameter	Setting
Baud rate	9600
Data bits	8
Parity	None
Stop bits	One
Protocol	Xon-Xoff

3. Press Setups on the system.
4. Select Peripherals.
5. Select Data Transfer under serial port output section.
6. Create a report and select Send.
7. Verify the report is sent to the destination.

Serial Data Transfer Test

Figure 6-2

Laptop to HDI 5000 HyperTerminal Connection Diagram



ECG

Setup

1. Connect a P3-2 or P4-2 scanhead to the system.
2. Select the Adult Card/General preset.
3. Connect an ECG cable to the system.
4. Set the Leakage Tester/ECG simulator as indicated in [Table 6-7](#).
5. Verify the ECG R wave is a positive going pulse.
6. Verify the measured heart rate stabilizes at 180 BPM +5 BPM.
7. Set the ECG simulator Rate to 120 BPM.
8. Verify the measured heart rate stabilizes at 120 BPM +1 BPM.
9. Set the ECG simulator Rate to 60 BPM.
10. Verify the measured heart rate stabilizes at 60 BPM +1 BPM.
11. Display the Physio secondary control menu.
12. Increase the ECG Gain and verify the amplitude of the ECG waveform increases.
13. Decrease the ECG Gain and verify the amplitude of the ECG waveform decreases.
14. Increase the ECG Position and verify the ECG waveform moves up on the display.

15. Decrease the ECG Position and verify the ECG waveform moves down on the display.
16. Select Configure.

Table 6-7 Leakage Tester/ECG Simulator Setup Options

Parameter	Setting
Output	2.0 mV
Rate	180
OFF/ECG/PULSE	ECG

Triggering

1. Set the ECG trigger type A and B to ON.
2. Slowly increase A Delay and verify the A trigger moves to the right above the ECG waveform.
3. Slowly decrease A Delay and verify the A trigger moves to the left.
4. Slowly increase B Delay and verify the B trigger moves to the right.
5. Slowly decrease B Delay and verify the B trigger moves to the left.
6. Position both triggers so they are clearly visible on the ECG waveform.
7. Press UPDATE to enable triggering mode. Verify the UPDATE submenu appears in the lower left of the monitor.
8. Slide the scanhead across the phantom. Verify the image is updated at each trigger.
9. Slide the scanhead across the phantom. Press FREEZE and verify the UPDATE submenu disappears.
10. Verify the trackball movement scrolls the Cineloop marker along the ECG waveform and the image updates as the marker crosses each trigger.
11. Press FREEZE, then UPDATE. Verify the image updates continuously.

12. Select M-mode.
13. Center the ECG waveform vertically on the M-mode display.
14. Set the ECG simulator rate to 30 BPM.
15. Verify the measured heart rate stabilizes at 30 BPM +1 BPM.
16. Immediately after a new QRS waveform is displayed, press FREEZE.
17. Press ADV MEAS to display the Meas Tools menu.
18. Select Time/Slope.
19. Position the cursor on a distinctive location on the QRS waveform and press SELECT.
20. Position the second cursor on the corresponding location on the next QRS waveform (left or right).
21. Verify the measured time interval is 2.00 +0.04. seconds (less than 2 percent error.)
22. Press DEL MEAS.

Multi-Frame Triggering

1. Press 2D, then TRIGGERS.
2. Press + and - Frames. Verify the Frames setting increments.
3. Press + and - to increase and decrease the Frame Interval. The Frame Interval is used to select a delay between frames if there are multiple frames for each trigger. FR is the normal frame rate.
4. Disconnect the ECG simulator.

Multiplane TEE Scanhead Face Temperature

Refer to the *Multiplane TEE Scanhead Service Manual* (4730-0292-XX) to determine whether the particular ultrasound system and scanhead are capable of detecting a scanhead over-temperature condition.

ISEM

System Setup

1. Press Setups.
2. Select Peripheral from the Directory of Setups.
3. Set the Internal Printer option to Select Sony Color.
4. Exit Setups.
5. Connect a P3-2 or P4-2 scanhead to the system.
6. Select the Adult Card/General preset.
7. Select 2D Color mode.
8. Display a large color box filled with color.

ISEM Setup

1. If the shipping disk is installed, eject the disk.
2. Verify the system LED is lit on the video control box.
3. Select Stress Echo as the video source. Verify the ISEM menu bar is displayed above a blue screen, and the Stress Echo LED is lit.
4. Select Digital/Live. Verify the system video is displayed.
5. Select Setup on the menu bar.
6. Select Input Source.

7. Set the video source options as indicated in [Table 6-9](#).
8. Select OK.
9. Select Setup on the menu bar, then select Video Calibration.
10. Set the video calibration settings as indicated in [Table 6-8](#).
11. Select OK.
12. Select Setup on the menu bar, then select Control Panel.
13. Set the date and time setup options as indicated in [Table 6-10](#).
14. For NTSC systems, click DONE to close the Control Panel window.
15. For PAL systems, click on the system video to close Control Panel window.
16. Press CNTL+N to begin a new patient.
17. Enter your name into the name field.
18. Enter a made-up ID number into the ID field.
19. Select OK.

Table 6-8**ISEM Video Calibration Settings**

Parameter	Setting	
	NTSC	PAL
Audible ECG	On	On
ECG Threshold	23%	23%
Brightness	60%	63%
Contrast	50%	47%
Graphics	68%	68%

Table 6-9**ISEM Video Source Settings**

Parameter	Setting
Video Source	RGB
Video Sync Type	Composite
ECG Source	Hidden
Machine Type	HDI 3000

Table 6-10**ISEM Date and Time Setup Options**

Parameter	Setting
Date Format	Month-Day-Year
Time	Current Time
Date	Current Date
Mouse Tracking Speed	Default Value

**ISEM
Footswitch**

1. Press ALT+A and select Page-full, then OK. Verify the footswitch icons are displayed.
2. Press the left footswitch and verify the system indicates that images are being captured.
3. Press the middle footswitch and verify the system indicates it is preparing the image for storage.
4. Press the right footswitch and verify the footswitch icons and the status bar disappear.

**ISEM Hand
Controller**

1. Press ALT+A and select Page-full, then OK. Verify the footswitch icons are displayed.
2. Press the  key on the hand controller and verify the system indicates that images are being captured.

3. Press the  key on the hand controller and verify the system indicates it is preparing the image for storage.
4. Capture several more images.
5. Press the  key on the hand controller and verify the footswitch icons and the status bar disappear.
6. Select 2D mode.

Image Review

1. Select Patient Files then select Patient Directory.
2. Select the patient name entered in [Step 17](#) of the ISEM Setup test procedure.
3. Select Load.
4. Verify the menu bar indicates image x of y, where x is the image number and y is the number of images captured.
5. Press the left and right arrow keys on the hand controller to sequence through the images. Verify each of the images accurately reflect the system image.

Hard Disk Clean-up

1. Select Display, then select Close all Collections, and then select Yes.
2. Select Patient Files, then select Patient Directory, and OK.

NOTE Do not delete the patient files named "TEST, NTSC (or PAL), and Monitor Setup.

3. Highlight the patient entries created during this test, then select Delete, and OK.
4. Verify the selected files have been deleted.

5. Select Cancel.
6. Select System as the video source. Verify the system monitor is no longer displaying ISEM video, and the System LED is lit.

DVS/APM

Refer to [Section 16, "DVS/APM Supplement"](#), for DVS/APM performance tests.

OEMs

OEMs are only tested for basic functionality and their interface to the system.

VCR

1. Press COLOR on the system.
2. Press Play + REC and verify the VCR begins recording. (For internal VCRs, use the on-screen controls or the VCR control panel. External VCRs do not have on-screen controls.)
3. Record several minutes of image data and audio.
4. Rewind the cassette and press PLAY.
5. Verify the playback image is stable.
6. Adjust Doppler gain and color gain. Verify color hue and intensity is adjusted on the monitor.
7. Verify the audio plays back.
8. Pause the image during playback.
9. Verify the paused image is stable.
10. While in the Pause mode, verify the VCR will search forward and reverse where the speed of the search is dependent on the directional movement of the VCR search control.
11. Verify the positive flow audio is on the left speaker, and negative flow is on the right speaker.
12. Verify the audio volume can be varied with the volume control.
13. Press STOP on the VCR.
14. Select 2D mode.

15. Set Depth to 15.2 cm.
16. Adjust the position of a scanhead on the phantom and the 2D system controls to obtain an image that clearly shows both the horizontal and vertical rows of pins.
17. Record a few minutes of the 2D image.
18. Rewind the tape and play the recorded 2D image.
19. Press FREEZE.
20. Verify the VCR image displayed is frozen.
21. Verify the VCR has paused.
22. Using the trackball, verify each of the grabbed images can be displayed.
23. Press DISTANCE to display the calibration menu.
24. Calibrate the measurement cursors using the depth markers.
25. Place the cursor on the center of one of two pins vertically spaced 6 cm apart.
26. Press SELECT and place the second cursor on the center of the other pin that is 6 cm apart vertically.
27. Verify the distance measured is 6.00 cm + 0.12 cm (+2%).
28. Press DEL MEAS to remove the measurement cursors.
29. Press FREEZE.
30. Verify the VCR resumes playback.
31. Press STOP, then EJECT, and remove the tape.

Verify that pressing PRINT initiates a B/W hardcopy print.

**Color Video
Printer**

1. Select Color Doppler mode and obtain a color image.
2. Press PRINT to take a print.
3. Verify the print LED blinks when Print is pressed, and 45 to 90 seconds later, blinks again three times to indicate completion of print (refer to color printer service manual).
4. Verify the prints have the correct image size, blanking, and color reproduction.

**Multi-image
Camera**

1. Acquire an image using a phantom.
2. Set the system depth, TGC, and gain controls to mid-range. Adjust the 2D maps to achieve a mid-level gray.
3. Press FREEZE.
4. Take a print of a positive 2D image and a print of a scrolling video display (M-mode or Doppler).
5. Take six exposures for each sheet of film. After the sixth exposure, verify the camera alternately displays "Complete" then "Remove Cassette".
6. Re-install the dark slide with the black border of the dark slide outward, and remove the film cassette from the camera.
7. Process the film and verify the following:
 - a. There is no video blanking visible within 1.0 mm of any image border.
 - b. The gray bar transitions evenly from white to black.
 - c. The print graphics are clear, legible, and not cut-off.
 - d. The print density is even throughout the print.
 - e. There are no fogging, chemical marks, roller scratches, smudges, or light leaks.

**Performance
Test Checklist**

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- Brightness
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“2D + PW Doppler” on page 212	<input type="checkbox"/>
“2D + PW Doppler + Color” on page 212	<input type="checkbox"/>
“2D + PW Doppler + CPA” on page 212	<input type="checkbox"/>
“DiskLink” on page 213	<input type="checkbox"/>
“Begin Exam” on page 213	<input type="checkbox"/>
“Storing Black/White Images” on page 213	<input type="checkbox"/>
“Storing Color Images” on page 214	<input type="checkbox"/>
“Reviewing Images” on page 215	<input type="checkbox"/>
“Copying Images” on page 215	<input type="checkbox"/>
“NetLink” on page 217	<input type="checkbox"/>
“WebLink Connectivity” on page 218	<input type="checkbox"/>
“ECG” on page 221	<input type="checkbox"/>
“ECG” on page 221	<input type="checkbox"/>
“Triggering” on page 222	<input type="checkbox"/>
“Multi-Frame Triggering” on page 223	<input type="checkbox"/>
“Multiplane TEE Scanhead Face Temperature” on page 224	<input type="checkbox"/>
“ISEM” on page 224	<input type="checkbox"/>
“System Setup” on page 224	<input type="checkbox"/>
“ISEM Setup” on page 224	<input type="checkbox"/>
“ISEM Footswitch” on page 226	<input type="checkbox"/>
“ISEM Hand Controller” on page 226	<input type="checkbox"/>
“Image Review” on page 227	<input type="checkbox"/>

“Hard Disk Clean-up” on page 227	<input type="checkbox"/>
OEMs	<input type="checkbox"/>
“VCR” on page 228	<input type="checkbox"/>
“B/W Video Printer” on page 229	<input type="checkbox"/>
“Color Video Printer” on page 230	<input type="checkbox"/>
“Multi-image Camera” on page 230	<input type="checkbox"/>
Phased Array Scanhead	<input type="checkbox"/>
Scanhead Control	<input type="checkbox"/>
Focal Zones and Focal Depth	<input type="checkbox"/>
Sector Angle	<input type="checkbox"/>
Image Quality	<input type="checkbox"/>
Linear Array Scanhead	<input type="checkbox"/>
Scanhead Control	<input type="checkbox"/>
Focal Zones and Focal Depth	<input type="checkbox"/>
Image Quality	<input type="checkbox"/>
Curved Array Scanhead	<input type="checkbox"/>
Scanhead Control	<input type="checkbox"/>
Focal Zones and Focal Depth	<input type="checkbox"/>
Image Quality	<input type="checkbox"/>

7 Adjustments

Power Supply Voltage Adjustments

There are no power supply voltage adjustments. The voltages can be measured directly on the PSM rear panel or remotely using UpLink. Refer to [Section 9, "Troubleshooting"](#), for the test point locations, or to the UpLink manual (P/N 4730-0236-XX). If a voltage is out of tolerance, the system will not automatically shut down, but may attempt to cycle power continuously until the system is manually shut off, and the PSM is replaced. Voltages are monitored by the FEC.

Monitor Adjustments

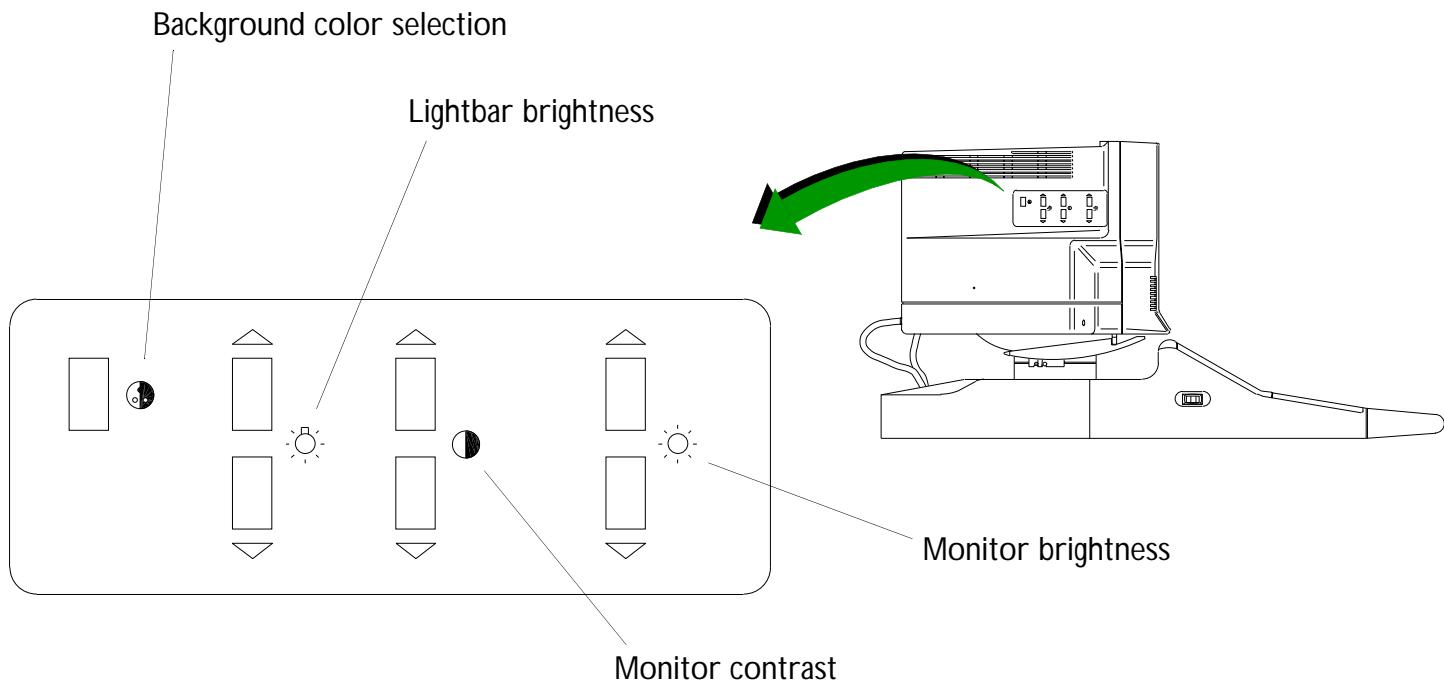
Monitor field adjustments include contrast, brightness, color background, and lightbar brightness ([Figure 7-1](#)). The adjustments can be set to factory default settings or to any setting desired by the user.

The adjustment settings are retained in an EEPROM in the monitor. However, to limit the number of settings written to the EEPROM, there is a delay of 30 seconds between the time the adjustment is made and the time the settings are stored. If the ultrasound system is powered down before the monitor has stored the new settings to the EEPROM, the previous control settings will be used the next time the monitor is powered up.

When a control is pressed, the current control setting is displayed for approximately 3 seconds. All other monitor adjustments are microprocessor-controlled. The procedures and the software required to manually adjust the microprocessor-controlled adjustments are currently being developed.

Figure 7-1

Monitor Control Locations



► **To set the monitor controls to the factory default settings**

1. Simultaneously press the up and down contrast controls twice to set the monitor to the factory default of 80.

2. Simultaneously press the up and down brightness controls twice to set the monitor to the factory default of 20.
3. Simultaneously press the lightbar controls twice to set the monitor to factory default of 16.
4. Press the background color control to select the background color on the display. Color 1 is the factory default option. (Color 1 adds a blue tint to the background, Color 2 is neutral, and Color 3 adds a red tint.)
5. Press the lightbar brightness control to adjust control panel illumination.
6. To store the factory default settings in the monitor EEPROM, wait 30 seconds before powering down the system.

► **To set the monitor controls to user-defined settings**

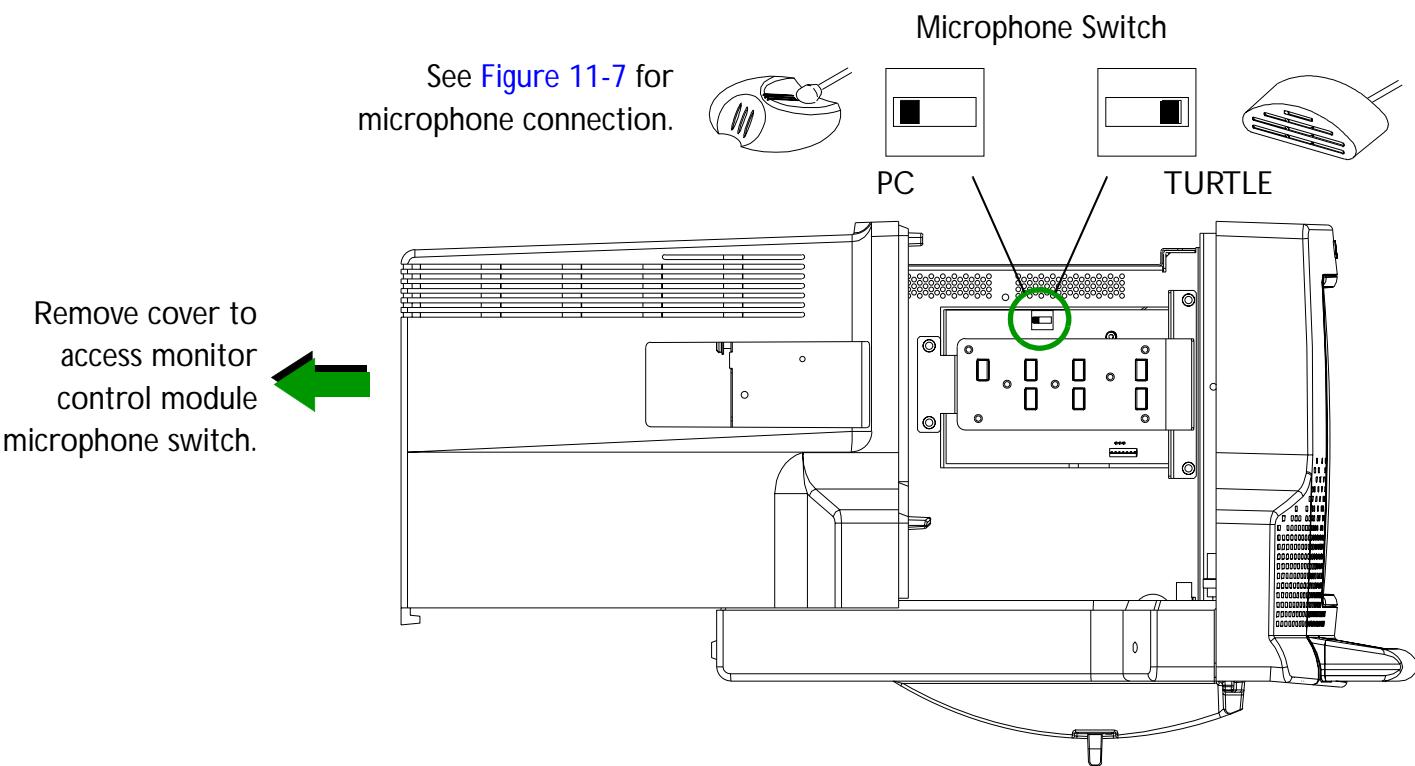
1. Refer to the control locations in [Figure 7-1](#) and adjust the contrast, brightness, color background, and lightbar brightness to the control settings desired by the user.
2. Wait 30 seconds before powering down the system to retain the factory default settings in the monitor EEPROM.

Monitor Microphone Switch Settings

The Monitor Control PCB has been redesigned for compatibility with the standard PC "Plug in Power" electret microphones. The monitor will also accept the Legacy HDI 3000/3500/5000 microphone assembly. Microphone selection is done using the switch located at the top of the Monitor Control PCB, ([Figure 7-2](#)). If the switch is in the wrong position for the microphone connected (i.e. PC position for the Legacy microphone), no audio will be captured by the microphone. However, no damage will occur to the microphone or the circuitry.

Figure 7-2

Monitor Control PCB Microphone Switch Selection (Philips Monitor Shown)



► To set the microphone selection switch on the monitor control pcb

1. Remove the top cover of the monitor ([Figure 7-2](#)).

NOTE It may be possible to change the switch position without removing the cover, but this is not recommended.

2. Set the switch to the "Turtle" position for the Legacy HDI 5000 type microphone.
3. Set the switch to the "PC" position for the commercially available microphones.

8 Preventive Maintenance

Introduction

Preventive maintenance inspections are part of the Customer Service Quality Assurance (QA) Program.

Fan Filter

1. Remove the filter from under the front of the system.
2. Vacuum and reinstall the filter. If there is a spare filter, install the spare filter into the system. Clean the dirty filter with soap and water and allow time to dry before reinstalling.
3. Demonstrate the filter cleaning procedure to customer.

Optical Disk Drive Head Cleaning

The recommended interval for cleaning the lens (head) internal to the (optional) optical disk drive is once every six months. The procedure for head cleaning is to insert a head cleaning cartridge (P/N 2100-1419-01) into the optical drive with power applied. The head cleaning cartridge will load, automatically clean the head, and automatically unload when the cleaning cycle has completed (approximately 10 seconds).

The condition of the head cleaning cartridge is important to the process. Inspect the condition of the cleaning brush by opening the shutter of the cleaning cartridge. Check to see if the tip of the cleaning brush is open. If it is, use a newer head cleaning cartridge.

Other Maintenance

1. Verify screws are securely in place on all PCB hold-down tabs (PIM, CPU, ADAPTR, ACIM, DDEA, and IIM).
2. Verify all screws are securely in place on the Scanhead Select PCB. Tighten the screws in the correct sequence ([Figure 10-9](#)). Do not over-tighten. Damaged screws or PEM nuts may require card cage replacement.
3. Clean the trackball.

4. Verify all cooling fans are operational.
5. Inspect the casters for signs of cuts or excessive wear. Replace if necessary. Verify the caster hubcaps are not missing. Verify the front caster brakes are operational. If broken, order brake lever knob P/N 1065-2611-02.
6. Verify the OEM bay contains no OEMs that are hard-wired to the ACIM.
7. Re-attach loose rubber bumpers and touch up paint scratches.
8. Run the Machine Comprehensive Test, verify system functionality, and check image quality.
9. If the system has the DVS option, inspect the cabling to and from the DVS module.
10. Perform other cleaning and inspection procedures per Customer Service policy.
11. Fill out a quality assurance label. Attach it to the system per Customer Service policy. Cover the label with a label overlay. (P/Ns: Label, 4100-0940-01. Overlay, 4100-0941-01.
12. Complete a work order.

9 Troubleshooting

Introduction

The HDI 5000 Ultrasound System contains extensive software and hardware diagnostic capabilities. However, the system must boot up before the operator has access to diagnostics. This section contains information on the core bootup fault isolation procedure, system alerts, general fault isolation, and system diagnostics.

Core Bootup Fault Isolation

The HDI 5000 system requires the following PCBs for core bootup: ACIM, PSM, AIM+, UIM, IIM, PIM, PCM, SYSCPU, DDEA, and CTRBRD. It also requires the control interface module cables, the video cable, and the monitor for core bootup.

NOTE Core bootup may take up to 25 minutes if there are malfunctioning PCBs or missing PCBs.

► **The core bootup fault isolation procedure is as follows**

1. Set the ON/STANDBY switch to STANDBY and circuit breaker to OFF. Unplug the system power cord.

CAUTION

Ensure the circuit breaker is set to OFF before removing PCBs.

2. Verify all card cage PCBs required for bootup (ACIM, PSM, AIM+, CPANEL, IIM, PIM, PCM, SYSCPU, and DDEA) are securely seated into the CTRBRD.
3. Verify all cables to the IIM and ACIM are properly connected.
4. Set the circuit breaker and the ON/STANDBY switch to ON.

5. If the system does not boot from the hard drive, insert the backup disk into the optical drive and attempt to boot the system from the optical drive. If the system does not bootup, continue with [step 8](#).
6. If the system boots up from the optical drive, reload system software.
7. If reloading system software is not successful, replace the hard drive. The hard drive should be loaded with 107.10 software or higher.
8. If the system does not boot from the hard drive, turn the circuit breaker to OFF, and remove the PSP1, PSP2, FEC, IMEM, SPM, ADAPTR, AIFOM, CB0-7 (all Channel Boards), SHSEL, and Regulator Module. Reboot the system.

If the system boots up with the PCBs removed, one of the removed PCBs was preventing other PCBs from accessing a bus. Replace the PCBs individually until you determine the faulty PCB.

NOTES

- It will take several minutes (up to 25 minutes) for the system to boot without the PSP1, PSP2, FEC, IMEM, SPM, ADAPTR, AIFOM, CB0-7 (all Channel Boards), SHSEL, and Regulator Module.
- With the FEC removed, the system will turn on, but not turn off. Use the circuit breaker to turn the system off.

-
9. Check the LEDs on each PCB. Refer to [Figure 9-1](#), [Figure 9-2](#), [Table 9-1](#) and [Table 9-2](#).

NOTE The system monitors the power supply enable voltages to ensure they are within tolerance. If the voltages are not within the tolerances listed in [Figure 9-3](#), the system will shut down. If the system shuts down, none of the voltages will be enabled (all voltages will be 0V). If the system shuts down because of a power supply failure, check the PSM LEDs referring to [Figure 9-1](#) and [Table 9-2](#). Refer to [Figure 9-3](#) and [Figure 9-4](#), for PCB voltage locations.

Figure 9-1

Card Cage PCB LED Locations (Front)

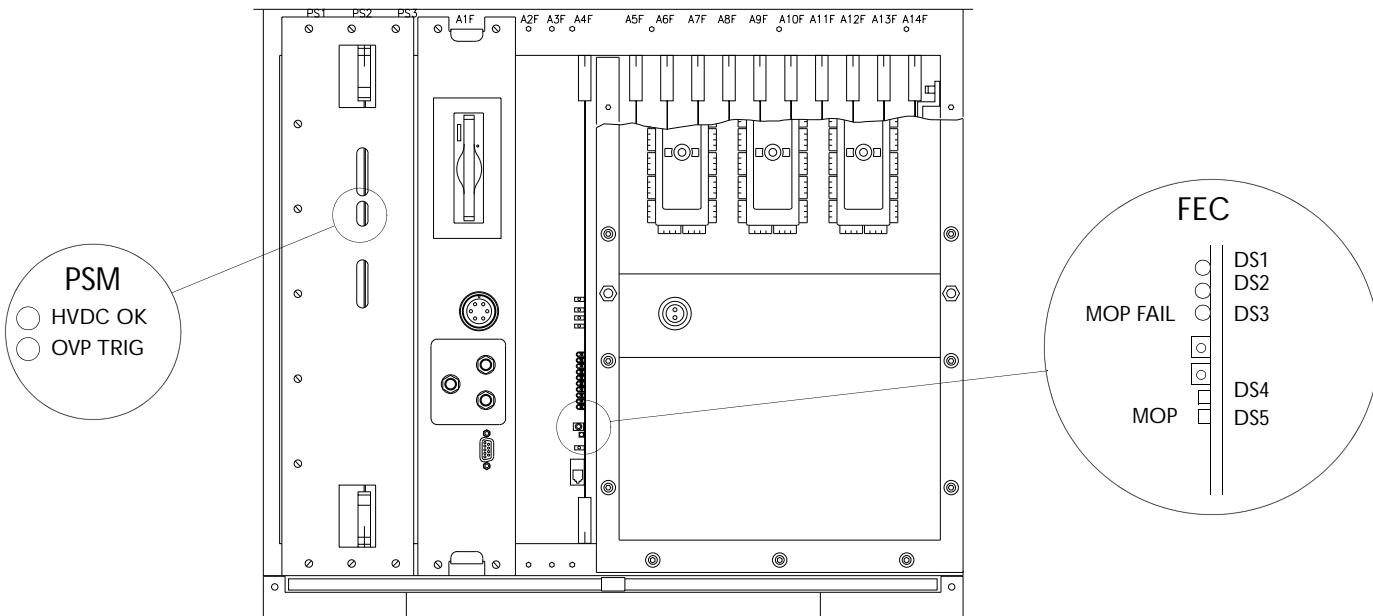


Figure 9-2

Card Cage PCB LED Locations (Rear)

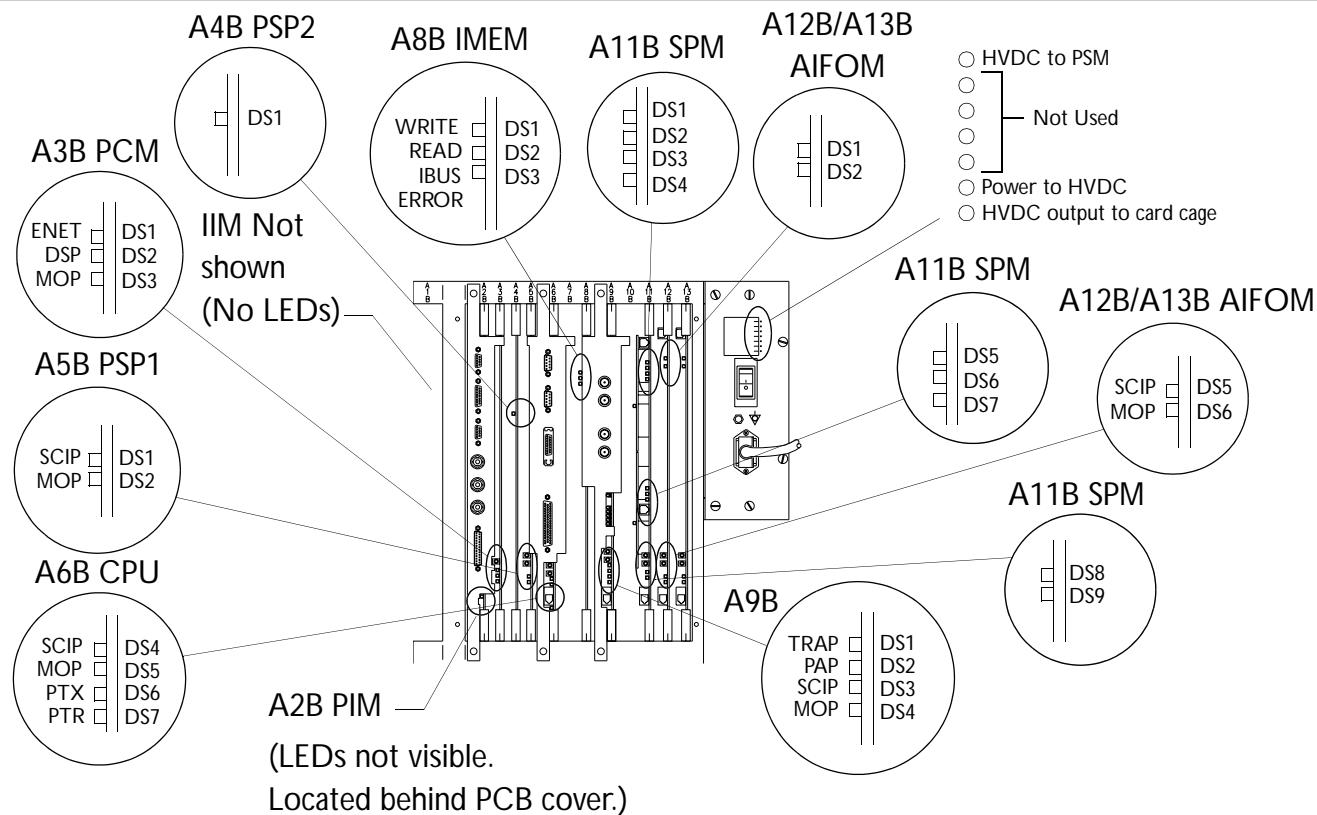


Table 9-1

Normal Core Bootup and PCB LED Sequence

Core Bootup Sequence	Field Replaceable Unit - Visual Indication ¹
Main power switch off, ON/STANDBY switch off <ul style="list-style-type: none">AC power to ACIM	ACIM - all LEDs off.
Main power switch on, ON/STANDBY switch off <ul style="list-style-type: none">HVDC to PSMConnection made to ON/STANDBY switch	ACIM - LEDs #6 and #7 are lit continuously. #6 indicates power to HVDC transformer after internal fuse F1 (ACIM input). #7 indicates HVDC to PSM (ACIM output).
Main power switch on, ON/STANDBY switch on (system power on) <ul style="list-style-type: none">Individual power supply voltages are turned on 2-3 seconds after Main Power switch or ON/STANDBY switch is turned onPCBs get power and begin initializingPIM generates test patternCPNL, UIM, IIM, PIM, PCM data path establishedHD loads applications and operating system to CPUCPU completes bootupCPU/PCM establish client/server (Ethernet)PCM test pattern generated	CPNL - LEDs lit for 5 seconds, flash 4 times, then off. PCM - DS2 flickers, 1 Hz after 5 seconds. PIM - DS2 flickers, 1 Hz after 5 seconds CPU - SCIP quick flash, 1 Hz after 5 seconds. SCIP flickers at 1 Hz, MOP flickers at 2 Hz PCM - DS1 on, all others pulse Monitor - color test pattern, blank screen, gray pattern Subsystem PCBs - refer to Figure 9-2 for SCIP and MOP information Fans - full speed for 2 seconds, 3/4 speed until bootup, then controlled speed.

Table 9-1

Normal Core Bootup and PCB LED Sequence (Continued)

Core Bootup Sequence	Field Replaceable Unit - Visual Indication ¹
System Initialization	CPU - SCIP flickers at 1 Hz, MOP flickers at 2 Hz PCM - top LED stays on, all others pulse Monitor - Splash screen SHSEL - relays energize. System bootup time is approx. 1.5 minutes ACIM - LED #1 flickers at 1 Hz
Core bootup complete	Subsystem PCBs - refer to Table 9-2 Monitor - displays 2D image and static graphics (Static graphics displayed only if scanhead is connected to system during bootup) Fans - Fan speed depends on the card cage temperature averaged from 4 thermistors located on PCBs throughout the card cage. Correct fan voltage is sent from PSM to the fans (0 Vdc - +24 Vdc)

1. The sequence described is the normal sequence of events during core bootup. If these visual indications are not observed, refer to the ["Core Bootup Fault Isolation" on page 242](#) procedure.

Table 9-2

PCB LED Functions and Status after Core Bootup

PCB	Slot Location	LED Status
Card Cage, Front		
PSM	PS1	DS1 - HVDC OK - Normally lit. Indicates that 155 Vdc is present to the PSM
	PS2	
	PS3	
FEC	A4F	DS2 - OVP TRIG - When lit, indicates that +6V or -6V have higher than normal voltage, or -5.2V current limiting has been activated (-5.2V circuits are drawing more than 14.3A). DS1 - not used DS2 - not used DS3 - MOP Fail - When lit, indicates MOP did not bootup DS4 - MOP LED ¹ DS5 - SCIP LED ²
Card Cage, Rear		
PIM	A2B	DS1 - Control panel interface processor LED DS2 - SCIP / MOP LED ¹
PCM	A3B	DS1 - Flickers when Ethernet communications with the CPU are active DS2 - DSP LED, flickers during image bus processing DS3 - MOP LED ¹

Table 9-2

PCB LED Functions and Status after Core Bootup (Continued)

PCB	Slot Location	LED Status
PSP2	A4B	DS1 - During power up, is momentarily on while its program is loaded from PSP1. After bootup, is an activity indicator (glows according to how busy the PSP2 is.) During high frame rates/color the LED should stay lit. Flickers when scan converting.
PSP1	A5B	DS1 - SCIP LED ² DS2 - MOP LED ¹
CPU	A6B	DS1 through DS3 - not used DS4 - SCIP LED ² DS5 - MOP LED ¹ DS6 - PTX, flickers during Ethernet communications with CPU DS7 - PTR, flickers during Ethernet communications with CPU DS8 through DS11 - not used
IMEM	A8B	DS1 - Write LED, flickers during scanning DS2 - Read LED, flickers during scanning DS3 - IBUS ERROR LED, is normally off
ADAPTR	A9B	DS1 - TRAP (Translation Processor) LED, flickers in all scanning modes. In 2D or Doppler the rate is so fast, the LED appears constantly on. In Color the rate is visible DS2 - PAP (Physio-Audio Processor) LED, off in all modes DS3 - SCIP LED ² DS4 - MOP LED ¹

Table 9-2

PCB LED Functions and Status after Core Bootup (Continued)

PCB	Slot Location	LED Status
SPM	A11B	DS1 through DS7 - not used
		DS8 - SCIP LED ²
		DS9 - MOP LED ¹
		DS10 - not used (located behind DS5, DS6, and DS7)
		DS11 - not used (located behind DS5, DS6, and DS7)
AIFOM	A12B	DS1 - not used
	A13B	DS2 - not used
		DS5 - SCIP LED ²
		DS6 - MOP LED ¹ , Blinks at one-second intervals during system bootup and two-second intervals when loading flash code.
ACIM	PS5	DS1 - After system bootup, flashes at approximately 1 Hz. Indicates HVDC to PSM after system bootup.
		DS2 - not used
		DS3 - not used
		DS4 - not used
		DS5 - not used

Table 9-2

PCB LED Functions and Status after Core Bootup (Continued)

PCB	Slot Location	LED Status
ACIM	PS5	DS6 - Normally lit (after system circuit breaker is set to on). Indicates power to HVDC after internal fuse F1. DS7 - Normally lit (after system circuit breaker is set to on). Indicates HVDC +155 Vdc from rectifier to card cage PCBs.

1. The Module Operation Processor (MOP) controls PCB operation. The MOP LED blinks at one-second intervals during system bootup, and at a two-second rate after bootup.
2. The Serial Communications Interface Processor (SCIP) communicates between the PCB and the CPU. The SCIP LED blinks at one-second intervals after bootup.

Figure 9-3

PSM Voltage Measurement Locations (PS1, PS2, PS3)

	Test Points	Tolerances
P2	GND	
	-15 V	±0.45 Vdc
	+15 V	
	-12 V	±0.36 Vdc
	+12 V	
	-6 V	±0.12 Vdc
	+6 V	
	-5.2 V	±0.104 Vdc
	+5 V	±0.10 Vdc
	GND	
P3	GND	
	-HV/10	-HV X 0.0991 ±2%
	+HV/10	+HV X 0.0991 ±2%
	FAN	0+0 +24V
	+3.3 V	Not currently used
	REF +5 V	±0.10 V
	REF 2.5 V	±0.05 V
	+5 V STBY	±0.10 V
	+2.5 V STBY	±0.05 V
	GND	

When lit, indicates HVDC is present. — ● HVDC OK

When lit, indicates over voltage protection is on or -5.2V current limiting has been activated.

— ● OVP TRIG

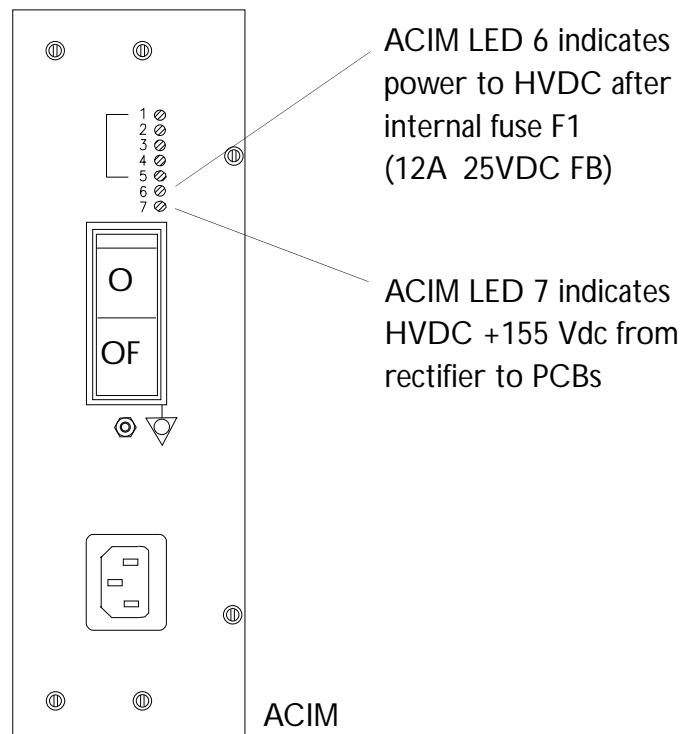
Figure 9-4

ACIM Voltage Measurement Locations (PS5) 3500-1578-02/03, 3500-1579-02/03,
3500-1580-01

CAUTION: Remove power to the system by disconnecting the power cord and wait 15 seconds before removing or replacing power supply PCBs. Otherwise, damage to PCBs and motherboard will result.

ACIM LED 1 indicates HVDC to PSM when the system has booted up

ACIM LEDs 2–5 are not used



Alert Information

Alerts indicate the system has detected a performance problem ([Figure 9-5](#)). These performance problems are caused by hardware faults or by system sensitivity to a particular series of key-strokes made by the operator. Alerts have a blue banner across the top of the dialog box.

► To remove the alert from the display

1. Simultaneously press Superkey and F6 (the sixth key to the right in the top row of keys on the lower user interface) to display a second page of error information ([Figure 9-6](#)).
2. Print or record the information on the second page. The second page of error information identifies the file and the line of software code containing the error.
3. Repeat [Step 1](#) to remove the alert message from the display and to continue scanning or other diagnostic procedures.
4. On systems with 170.XX software and up, press Superkey and Print to save the alert information to the hard drive for later retrieval with UpLink (version 2.0 or higher).

Figure 9-5

Typical Alert Message

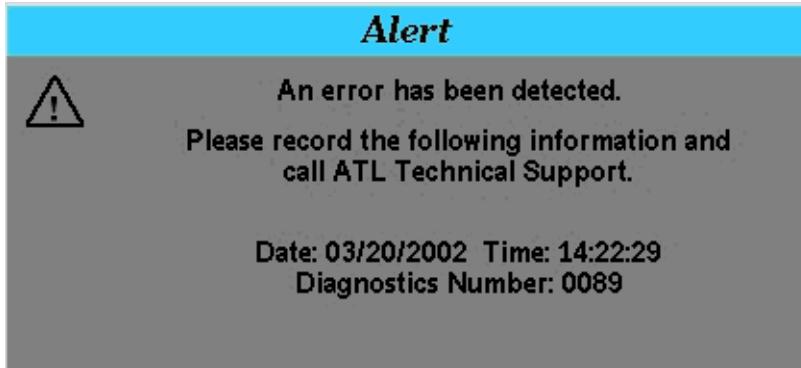
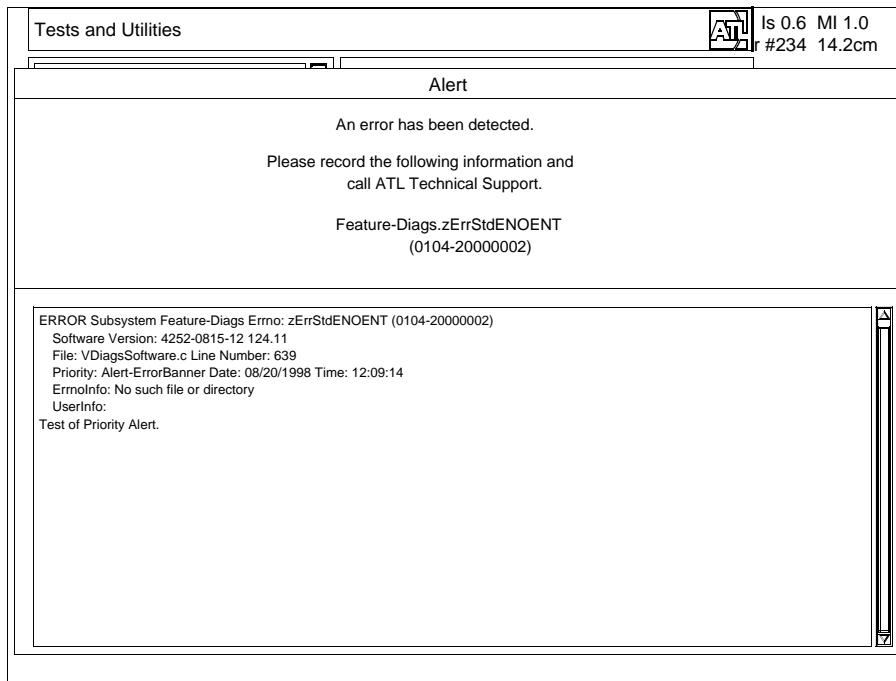


Figure 9-6

Alert with Second Page of Information Displayed



Miscellaneous Diagnostic Information

User Event Log

The user event log is helpful in determining the cause of system lockups by recording the sequence of user events (keystrokes or control activations) that resulted in the system lockup. The log records the last 500 keystrokes or control activations and the time they were entered from the system control panel. The event sequence is retained even if the system power switch and the circuit breaker are turned off. Any one of 10 pages of user events are displayed with 50 events on each page (2 columns of 25). The user events may include keystrokes, slidepot changes, control knob rotations, or trackball movements.

1. Verify the system has booted up.
2. Simultaneously press and hold the Superkey and Shift keys. Press the characters indicated in [Table 9-3](#) to display the user event log for the desired language. Page 10 is displayed with the previous 50 events listed.

Table 9-3

User Event Log Language Differences

Test	Keystrokes Required		
	English	French	German
User Event Log	=	=	"spacebar"

3. Select the Next button on the bottom of the display to display the next page or the Prev button to display the previous page. Press SELECT. The display appears similar to [Figure 9-7](#).
4. Select the Reset Log button to clear all entries from the event log. Press SELECT.

5. To exit, select the Close button on the bottom of the display. Press SELECT. The display returns to the previous imaging mode.

Figure 9-7

User Event Log

User Log				
08/20/98 11:47:35	Timeout	08/20/98 12:20:03	Start	Diags
08/20/98 12:07:44	PushBtn	OK	08/20/98 12:20:08	PushBtn
08/20/98 12:07:44	End	ConfirmDialog	08/20/98 12:20:12	PushBtn
08/20/98 12:07:51	Superkey	Diags	08/20/98 12:21:04	PushBtn
08/20/98 12:07:51	Start	Diags	08/20/98 12:23:52	PushBtn
08/20/98 12:07:58	PushBtn	OK	08/20/98 12:23:57	PushBtn
08/20/98 12:08:06	PushBtn	Tests, Utils.	08/20/98 12:24:00	PushBtn
08/20/98 12:08:58	PushBtn	Execute	08/20/98 12:24:15	PushBtn
08/20/98 12:09:14	PushBtn	Execute	08/20/98 12:24:22	PushBtn
08/20/98 12:09:45	Button	3D	08/20/98 12:24:27	PushBtn
08/20/98 12:17:20	Button	3D	08/20/98 12:24:29	PushBtn
08/20/98 12:17:23	PushBtn	Hide	08/20/98 12:24:32	End
08/20/98 12:17:29	PushBtn	Error Log	08/20/98 12:24:32	PushBtn
08/20/98 12:17:58	PushBtn	Close	08/20/98 12:24:35	Start
08/20/98 12:18:01	PushBtn	Close	08/20/98 12:24:39	PushBtn
08/20/98 12:18:13	End	Diags	08/20/98 12:24:47	PushBtn
08/20/98 12:18:14	Start	ProgressDialog	08/20/98 12:24:48	PushBtn
08/20/98 12:19:30	PowerUp	-----	08/20/98 12:24:48	PushBtn
08/20/98 12:19:40			08/20/98 12:54:50	Acquiring
08/20/98 12:19:41	Start	ConfirmDialog	08/20/98 12:54:50	Timeout
08/20/98 12:19:58	ModeChange	2d	08/20/98 13:24:51	Timeout
08/20/98 12:19:58	Acquiring	2d	08/20/98 13:54:53	Timeout
08/20/98 12:19:59	PushBtn	OK	08/20/98 14:14:23	Button
08/20/98 12:19:59	End	ConfirmDialog	08/20/98 14:14:23	Acquiring
08/20/98 12:20:03	Superkey	Diags	08/20/98 14:18:43	Start
				UserLog

10 of 10

Formatting a Blank Optical Disk

► To format a blank optical disk

1. Boot up the system.
2. Verify DiskLink is enabled.

NOTE This procedure will not work without DiskLink.

3. Press NET/DISK.
4. Verify the blank optical disk is not write-protected (not write-protected = notch closed).
5. Insert the disk into the optical drive.
6. Select the Format Disk option displayed at the top left of the display. The optical drive LED will light during formatting.
7. Select the Eject Disk option to eject the formatted disk.
8. Press NET/DISK again to return to the previous imaging mode, or select Close at the bottom of the menu and press SELECT.

Formatting an Optical Disk/ Copying Presets

► To format a blank optical disk and copy Tissue Specific Presets to the optical disk

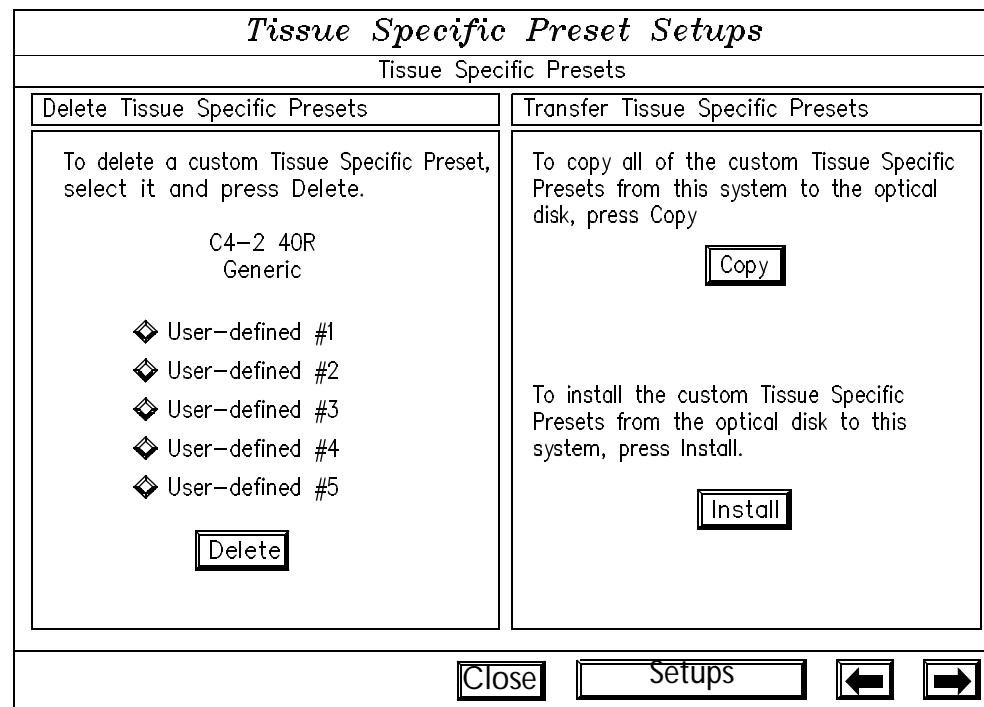
1. Boot up the system.
2. Press Setups. The Directory of Setup Options is displayed.
3. Verify the blank optical disk is not write-protected (not write-protected = notch closed).
4. Insert the disk into the optical drive.
5. Select Tissue Specific Presets. Press SELECT. The display appears as in [Figure 9-8](#).
6. Select Copy and press SELECT. The process of formatting and copying the presets to the optical disk takes several minutes.

NOTE If the optical disk is not formatted, the system will display prompts asking you whether you wish to format it. If you choose to format, the prompts will also be displayed to guide you through the format procedure. If you have formatted the disk, repeat [step 6](#) and continue with the procedure.

-
7. To copy the presets from the optical disk to the hard drive, select Install and press SELECT.

Figure 9-8

Formatting Optical Disk/Copying Tissue Specific Presets



Core Dump Utilities

The core dump utilities are used to simultaneously store error data to the hard disk and the optical disk, or to the hard disk only. This procedure is similar to the [Remote Diagnostics](#) procedure and applies to U.S. FSEs. Other service personnel should contact their respective Technical Support Group prior to performing the procedure.

► **To use the core dump utilities to backup data**

1. Verify the system clock is updating. (A sector or linear image is displayed.)
2. Verify the blank formatted optical disk is not write-protected (not write protected = notch closed).
3. Insert the blank disk into the optical drive. Refer to the [Formatting a Blank Optical Disk](#) procedure.
4. To write files first to the hard disk then copy them to the optical disk, refer to [step a](#). To write files only to the hard disk, refer to [step b](#).
 - a. Simultaneously, press Superkey, Shift, and Text C. This procedure will take approximately 5 minutes. The LED on the optical drive will be lit continuously as the drive is storing data to the disk. The optical disk will be automatically ejected when the data transfer has been completed.

NOTE When performing this task, the system clock stops, and there is no dialog box or message displayed.

- b. Simultaneously, press Superkey, Shift, and Text D. This procedure will take approximately 3 minutes. The core files will be automatically transferred to an optical disk the next time the [Remote Diagnostics](#) procedure is performed.
5. Label the disk with the following information:
 - Service Order (S.O.) number
 - Machine ID number
 - Chassis ID number
 - Account name

- Install date
- FSE number

NOTE Mark your FSE number on the disk with an indelible marker. The disk will be returned for re-use.

6. Return the disk to the Technical Support Group at Bothell.

Accessing User Diagnostics

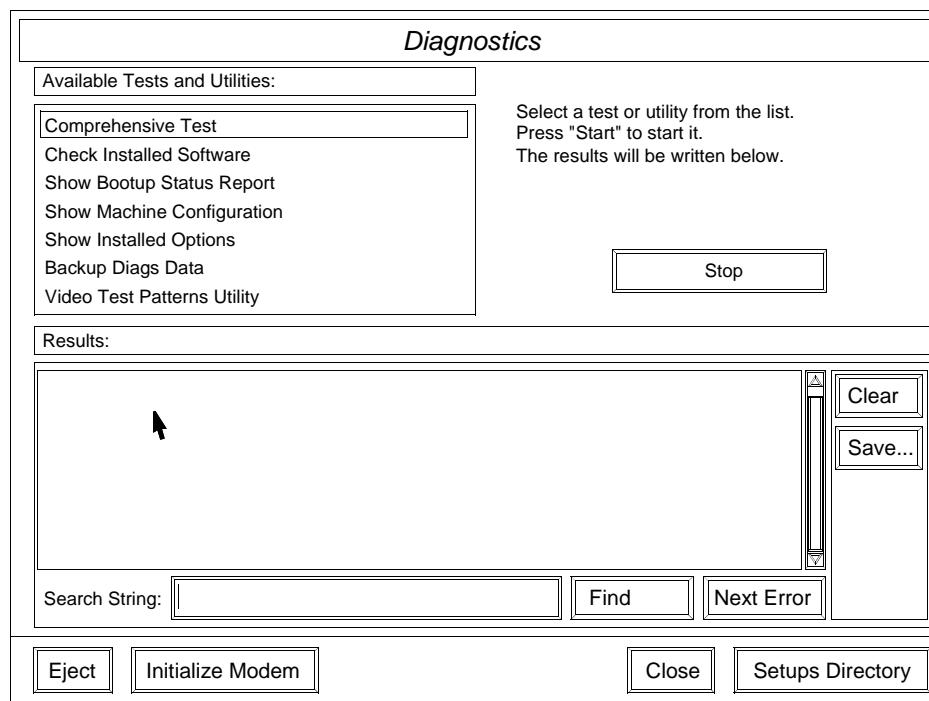
The user diagnostics enable the user to access several diagnostic capabilities. These capabilities enable the user to quickly diagnose system operational status or acquire the information needed to assist others in system diagnosis.

► To access the user diagnostics

1. Boot up the system.
2. Press Setups. The Directory of Setup Options is displayed.
3. Use the trackball to move the cursor to Diagnostics in the lower left corner of the display.
4. Press SELECT. The display appears as in [Figure 9-9](#).
5. Move the cursor to the desired test or option. If the test or option is not highlighted with reverse video, press SELECT to highlight it.
6. Refer to the [Comprehensive Test](#) procedure to run the Comprehensive Test. For all other tests or options, move the cursor to Start and press SELECT to initiate or display the results. Information on the other tests and options is listed in ["Comprehensive Test" on page 264](#) through ["Remote Diagnostics" on page 281](#).

Figure 9-9

User Diagnostics Menu

**Comprehensive Test**

The Comprehensive Test ([Figure 9-10](#)) is used to determine system operational status. The test comprises numerous sub-tests. If a sub-test fails, the system completes the remaining sub-tests. When the Comprehensive Test has been completed, the results are displayed on the monitor.

If a sub-test fails, a failure code is displayed.

The Comprehensive Test should be run any time a system error is displayed, or if the user suspects problems with the system. If an error message is displayed during the test, reboot the system with the ON/STANDBY switch.

The test takes from 15 to 20 minutes to run, depending on which software version is installed in the system.

► **To invoke the Comprehensive Test**

1. Verify there are no scanheads connected.
2. Perform [step 1](#) through [step 4](#) of [Accessing User Diagnostics](#) to access the Comprehensive Test.
3. Move the cursor to Comprehensive Test. If the Comprehensive Test is not highlighted with reverse video, press SELECT to highlight it.
4. Move the cursor to the START button. Press SELECT. A windowed message is displayed stating:

This test will take more than fifteen (15) minutes. Also, the display will appear to be 'corrupted' at times (or blank) but it should return to normal after several minutes. Should I continue?

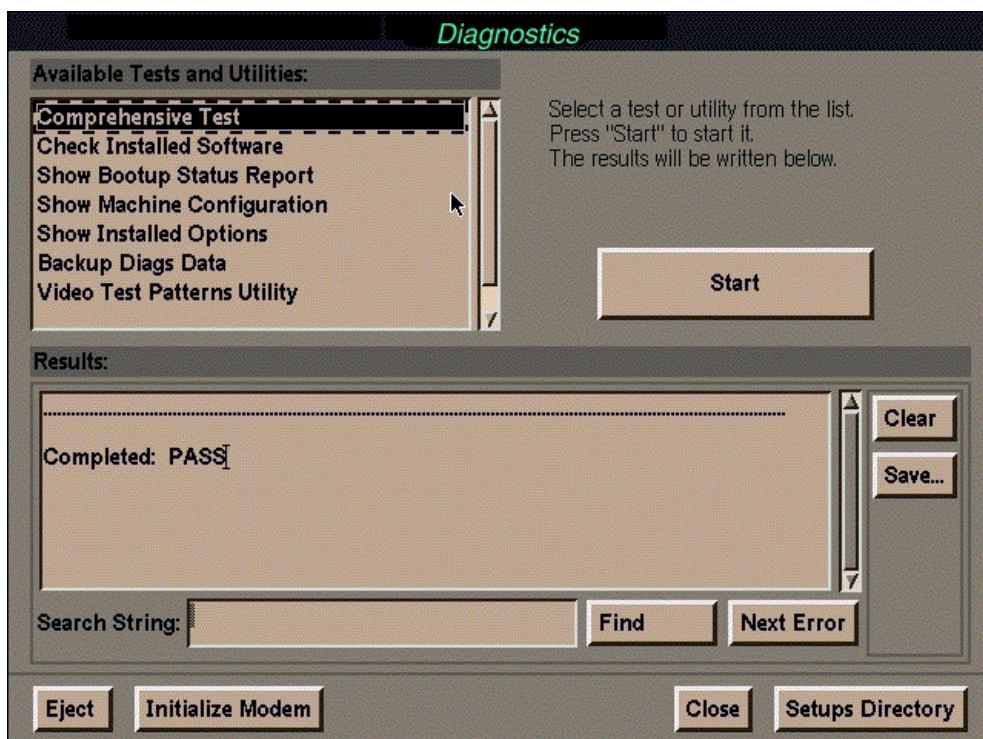
5. Move the cursor to the Continue button. Press SELECT. The test status is indicated by a row of "periods" across the results window. If a failure occurs, an error code is displayed.
6. To exit the Diagnostics Menu, use the trackball to select Close. Press SELECT. The following note is displayed:

NOTE System parameters have changed. It is necessary to reboot the machine before further scanning can be done.

7. Use the trackball to select the Reboot option. Press SELECT to reboot the system.

Figure 9-10

Comprehensive Test



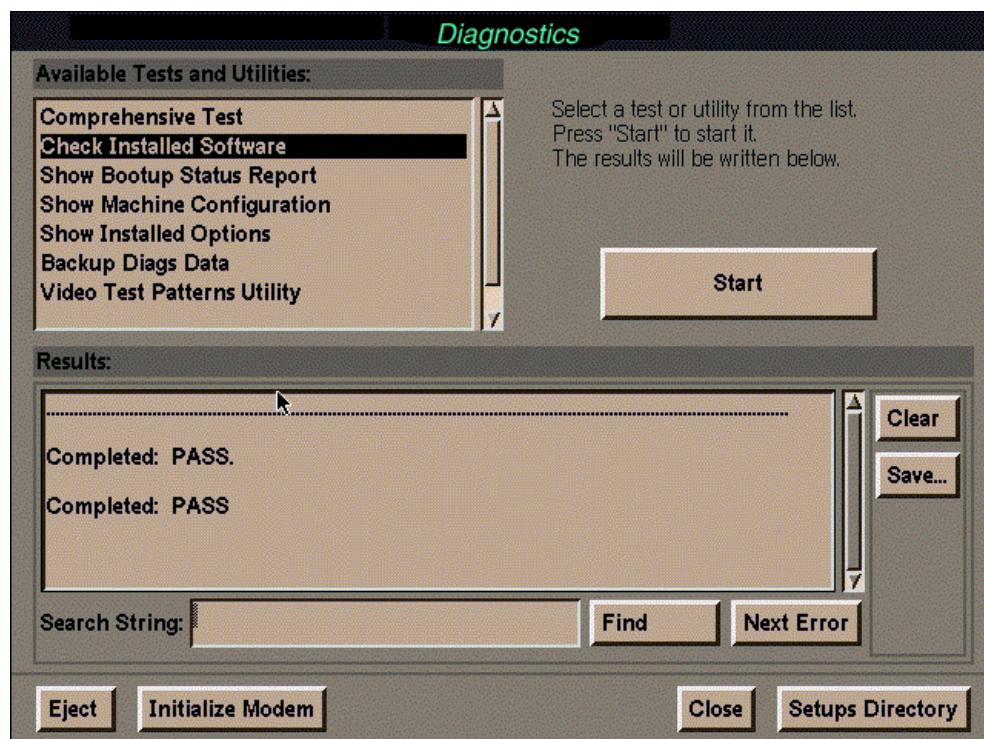
Check Installed Software

This test comprises Cyclic Redundancy Checks (also known as CRCs) of all read-only system software files (Figure 9-11). If a CRC fails, it may indicate a disk drive problem. If this is the case, re-install the system software and check the DDEA PCB.

1. Perform [step 1](#) through [step 4](#) of [Accessing User Diagnostics](#).
2. Move the cursor to Check Installed Software.
3. Press SELECT to highlight the option with reverse video.
4. Move the cursor to Start. Press SELECT. A message is displayed stating, "Please wait, this process will take approximately 2 minutes."
5. Use the trackball to select OK. Press SELECT. The Start button changes to a Stop button. When the test is complete, the results are displayed in the results window, and the Stop button turns into the Start button again. The results are displayed as "Completed: PASS" (or FAIL).
6. Press Stop to abort the test if needed.

Figure 9-11

Check Installed Software

**Show Bootup Status Report**

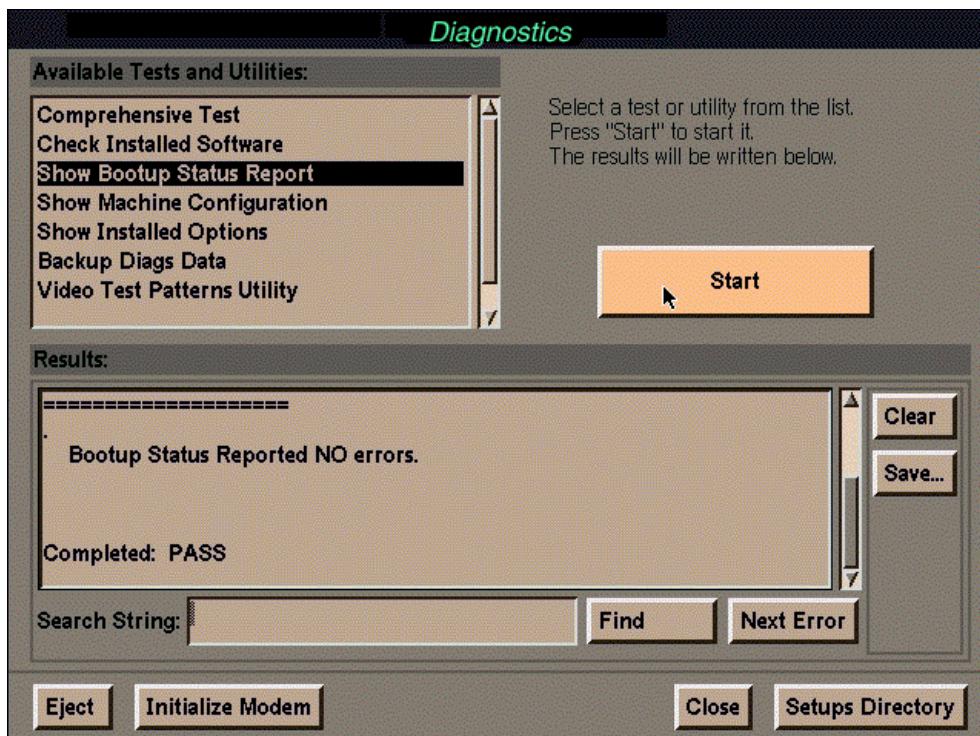
During system bootup, the CPU queries the individual PCBs and displays the bootup status on the monitor (Figure 9-12).

1. Perform [step 1](#) through [step 4](#) of [Accessing User Diagnostics](#).
2. Move the cursor to Show Bootup Status Report.

3. Press SELECT to highlight the option with reverse video.
4. Move the cursor to Start. Press SELECT to initiate the option. The system instantaneously displays a note stating the "Bootup status reported NO errors." Test results are displayed as "Completed: PASS" (or FAIL).

Figure 9-12

Show Bootup Status Report



Show Machine Configuration

The Show Machine Configuration option displays the machine ID number, hard disk part number, and software version (software build) number. The machine ID number is a unique number assigned to each system and is programmed into a chip on the SYSCPU PCB. All machine options to be installed onto a particular system must contain the correct machine ID number for that particular system or no options will be enabled.

1. Perform [step 1](#) through [step 4](#) of [Accessing User Diagnostics](#).
2. Move the cursor to Show Machine Configuration.
3. Press SELECT to highlight the option with reverse video.
4. Move the cursor to Start. Press SELECT to initiate the option. The results are displayed as:

Machine ID: 0000005fXXXX

Hard-Disk Software: 4252-0XXX-XX 1XX.XX ("X" indicates a numerical placeholder)

Show Installed Options

The Show Installed Options selection displays the system options that are installed on a particular system, whether those options were purchased when the system was ordered or for an upgrade. Refer to the COA (Customer Order Acknowledgement) for the customer ordered features, and check the installed options list for the options configured for the system. If there is a discrepancy, order a Machine Options Configuration disk for that particular system. Re-install the files from the new machine options disk onto the hard drive and check the configuration again.

1. Perform [step 1](#) through [step 4](#) of [Accessing User Diagnostics](#).
2. Move the cursor to Show Installed Options.
3. Press SELECT to highlight the option with reverse video.
4. Move the cursor to Start. Press SELECT to initiate the option.

5. Refer to [Table 9-4](#) for a list of the machine options possible with each released software version. Machine options will be added as the system matures through the product life cycle.

NOTE If there are no machine options listed for a particular software version, that software version is not listed in the following table.

Table 9-4

Machine Options/Software Build Compatibility Matrix

	Part Number	Description	Software Version												Notes
			127.13	170.31	177.13	190.10	195.25	198.06	200.23	200.24	210.14				
1.	8501-8523-01	English Language/UIF	●	●	●	●	●	●	●	●	●				
2.	8501-8524-01	German Language/UIF	●	●	●	●	●	●	●	●	●				
3.	8501-8525-01	French Language/UIF	●	●	●	●	●	●	●	●	●				
4.	8501-8523-03	English Language	●	●	●	●	●	●	●	●	●				
5.	8501-8524-03	German Language	●	●	●	●	●	●	●	●	●				
6.	8501-9648-01	Italian Language	●	●	●	●	●	●	●	●	●				
7.	8501-9645-01	Danish Language	●	●	●	●	●	●	●	●	●				
8.	8501-9646-01	Norwegian Language	●	●	●	●	●	●	●	●	●				
9.	8501-9647-01	Swedish Language	●	●	●	●	●	●	●	●	●				
10.	8501-9341-01	Finnish Language	●	●	●	●	●	●	●	●	●				
11.	8501-8525-03	French Language	●	●	●	●	●	●	●	●	●				
12.	8501-8533-01	Voltage/Video 120/NTSC	●	●	●	●	●	●	●	●	●				
13.	8501-8534-01	Voltage/Video 230/NTSC	●	●	●	●	●	●	●	●	●				
14.	8501-8536-01	Voltage/Video 230/PAL	●	●	●	●	●	●	●	●	●				
15.	8501-8536-02	Voltage/Video 230/PAL IEC-601-1	●	●	●	●	●	●	●	●	●				
16.	8501-9503-01	NTSC Video	●	●	●	●	●	●	●	●	●				

Table 9-4

Machine Options/Software Build Compatibility Matrix (Continued)

Table 9-4

Machine Options/Software Build Compatibility Matrix (Continued)

Table 9-4

Machine Options/Software Build Compatibility Matrix (Continued)

Table 9-4

Machine Options/Software Build Compatibility Matrix (Continued)

Table 9-4

Machine Options/Software Build Compatibility Matrix (Continued)

Software Version															
	Part Number	Description	127.13	170.31	177.13	190.10	195.25	198.06	200.23	200.24	210.14				Notes
81.	8501-8703-01	Stress Echo			●	●	●	●	●	●	●				1
82.	8501-9641-01	A3DI Ready	●	●	●	●	●	●	●	●	●				1
83.	8501-9651-01	High PRF	●	●	●	●	●	●	●	●	●				
84.	8501-9652-01	Simultaneous 2D/CW	●	●	●	●	●	●	●	●	●				
85.	8501-9050-01	Auto Scaling	●	●	●	●	●	●	●	●	●				
86.	8501-9051-01	DICOM Scaling	●	●	●	●	●	●	●	●	●				
87.	8501-9494-01	DiskLink	●	●	●	●	●	●	●	●	●				2
88.	8501-9495-01	NetLink	●	●	●	●	●	●	●	●	●				
89.	8501-9496-01	WebLink	●	●	●	●	●	●	●	●	●				2
90.	8501-9742-01	Spatial Compounding (SonoCT)	●	●	●	●	●	●	●	●	●				
91.	8501-9774-01	3D Card Acquisition	●	●	●	●	●	●	●	●	●				
92.	8501-9775-01	Modality Worklist	●	●	●	●	●	●	●	●	●				
93.	8501-9833-01	Echo Multi-line (Intelligent Frame Rate Accelerator)		●	●	●	●	●	●	●	●				
94.	8501-9986-01	Capability, C8-5, ATL	●			●	●	●	●	●	●				
95.	8501-9765-01	Capability, CL15-7			●	●	●	●	●	●	●				

Table 9-4

Machine Options/Software Build Compatibility Matrix (Continued)

	Part Number	Description	Software Version									Notes
			127.13	170.31	177.13	190.10	195.25	198.06	200.23	200.24	210.14	
96.	8501-9984-01	Capability, Panoramic Imaging				●	●	●	●	●	●	
97.	8501-9985-01	Capability, Advanced 3D				●	●	●	●	●	●	4
98.	8501-1183-01	XRES Image Processing				●	●	●	●	●	●	
99.	8501-1184-01	Assisted Border Detection				●	●	●	●	●	●	
100.	8501-8775-01	Modality Worklist				●	●	●	●	●	●	
101.	8501-1187-01	Capability, BPTRT9-5				●	●	●	●	●	●	
102.	8501-1341-01	Capability, P4-1				●	●	●	●	●	●	
103.	8501-9766-01	Capability, P12-5				●	●	●				
104.	8501-1397-01	HIPAA				●	●	●				
105.	8501-1483-01	iSCAN				●	●	●				
106.	8501-1186-01	Capability, Endo 12-5				●	●	●				
107.	8501-1344-01	2D Auto Optimization					●	●				
108.	8501-1345-01	Automated Doppler					●	●				
109.	8501-1540-01	Speed Up Option					●	●				4
110.	8501-1342-01	Structured Reporting						●				
111.	8501-1669-01	CD Writer						●				

1. A3DI must be turned off if Digital Echo or Stress Echo are enabled.
2. DiskLink and WebLink will be enabled, but will not function when used with DVS option
3. Speed Up option is used on Philips HDI 5000 systems (10.5.1 hardware and 200.24 software).
4. Advanced 3D requires DiskLink.

Backup Diags Data

This option saves the error log, the results of the last Comprehensive Test, the user event log, and other diagnostic information to a blank formatted optical disk. The Backup Diags Data option can be performed using UpLink by FSEs, or the following procedure by biomedical technicians and end-users. Questions about use of the procedure should be directed to the Technical Support Group.

Refer to [Core Dump Utilities](#) for a similar procedure, which allows you to store data on the optical or hard drives or both.

► To backup the diagnostic data to an optical disk

1. Perform [step 1](#) through [step 4](#) of [Accessing User Diagnostics](#).
2. Move the cursor to Backup Diags Data. Press SELECT. The Backup Diags Data option is highlighted with reverse video.
3. Verify the blank formatted optical disk is not write-protected (not write-protected = notch closed).
4. Insert the blank disk into the optical drive. Refer to the [Formatting a Blank Optical Disk](#) procedure.
5. Move the cursor to Start. Press SELECT. The results are displayed as "Completed: PASS." The process takes approximately 20 seconds to complete.

NOTE If a disk has not been inserted in the drive, a dialog box is displayed. The LED on the optical drive is lit, and the Start button changes to Stop while data is being transferred, however, the Stop function has not been implemented.

6. Move the cursor to Eject in the lower left of the display. Press SELECT to remove the disk from the drive.
7. Label the disk with the following information:
 - Service Order (S.O.)
 - Machine ID number (Base ID)
 - Chassis ID number
 - Account name
 - Install date
 - FSE number

NOTE Mark your FSE number on the disk with an indelible marker. The disk will be returned for re-use.

8. Return the disk to the Technical Support Group.

The Video Test Pattern Utility is used to isolate monitor, printer, and VCR video problems.

1. Perform [step 1](#) through [step 4](#) of [Accessing User Diagnostics](#).
2. Move the cursor to Video Test Patterns Utility. The option is highlighted with reverse video.
3. Move the cursor to Start. Press SELECT. A note is displayed stating:

The test patterns will be displayed one at a time. Press the spacebar to view the next pattern, 1 through 0 to view a specific pattern, or any other key to quit.

Video Test Patterns Utility

4. Move the cursor to OK. Press SELECT. A grayshade test pattern is displayed.
5. Use the spacebar to move through the individual test patterns, or refer to the test pattern numbers in [Table 9-5](#) and press the appropriate number to obtain the desired test pattern.

Table 9-5**Video Test Patterns**

Test Pattern Number	Description
1	Sixteen grayshade bars displayed vertically. White bars on left, black on right
2	Eight color bars displayed vertically. White, yellow, light blue, green, purple, red, dark blue, and black
3	Cross hatch pattern. Black background, with white grid
4	Entire screen displays the letter "y" in every character position. White letters on a black background
5	Quartered display with circle in the center of the display. Black background with white pattern
6	Quartered display with circle in the center of the display. White background with black pattern
7	White rectangle on black background
8	White screen
9	Flat black screen
0	Flat black screen with grid of white dots

Remote Diagnostics

The HDI 5000 system has a full suite of remote diagnostic capabilities. Contact your local technical support center for more information.

10 Disassembly

WARNING

Always turn power off, disconnect the main power cord from the wall outlet, and wait at least 30 seconds before removing or installing any PCB, module, or component.

CAUTION

Always use correct ESD procedures. ESD damage is cumulative and may not be noticeable at first. ESD symptoms may be first exhibited as a slight degradation of performance or image quality.

NOTE Do not pull and reinsert PCBs or other modules while main circuit breaker is ON. To reset PCBs, use the reset button provided on the card edge of many modules.

Card Cage PCBs and Modules

► To remove most PCBs and modules

1. Turn off the system circuit breaker and disconnect power cord.
2. Remove covers as necessary to gain access to the part requiring replacement.
3. Loosen captive screws on those boards with shields, or loosen the retaining clips as necessary.

CAUTION

Several modules require that adjacent modules be removed in order to provide ease of removal or allow correct alignment. For example, remove the PIM to correctly align the IIM module by hand to prevent misalignment of the PCB and centerplane.

► To remove the IIM

1. Remove the right side panel in addition to rear panel.
2. Remove all cable connectors from both the IIM and PIM.
3. Remove modules immediately to the right (to slot A3B).
4. Remove the IIM.

► To insert the IIM

1. Remove both modules immediately to the right (to slot A3B).
2. Use your right hand to align the IIM with the card guides and to ensure the connectors mate correctly with the centerplane.

CAUTION

Use caution when inserting the IIM into the centerplane. If connector pins are bent during insertion of the IIM, damage to the IIM or centerplane may result.

3. Replace the PIM and PCM.
4. Tighten all fasteners to ensure proper EMI/RFI shielding.

Monitor

NOTE Always place the monitor on its back to prevent damage to the locking tabs when the monitor is not installed on the system. (Four plastic feet are on the back of the monitor.)

► **To install the monitor**

1. Turn off the system circuit breaker and disconnect power cord.
2. Place the monitor on the system with the tabs inserted into the latching assemblies.
3. Slide the retaining levers forward to engage the locking tabs.
4. Rotate the retaining levers out and up to secure the monitor.
5. Connect the video/audio (monitor signal) cable and engage the slide lock.
6. Connect the power cord to the monitor and rotate the cable lock to secure the connector to the monitor.

► **To remove the monitor**

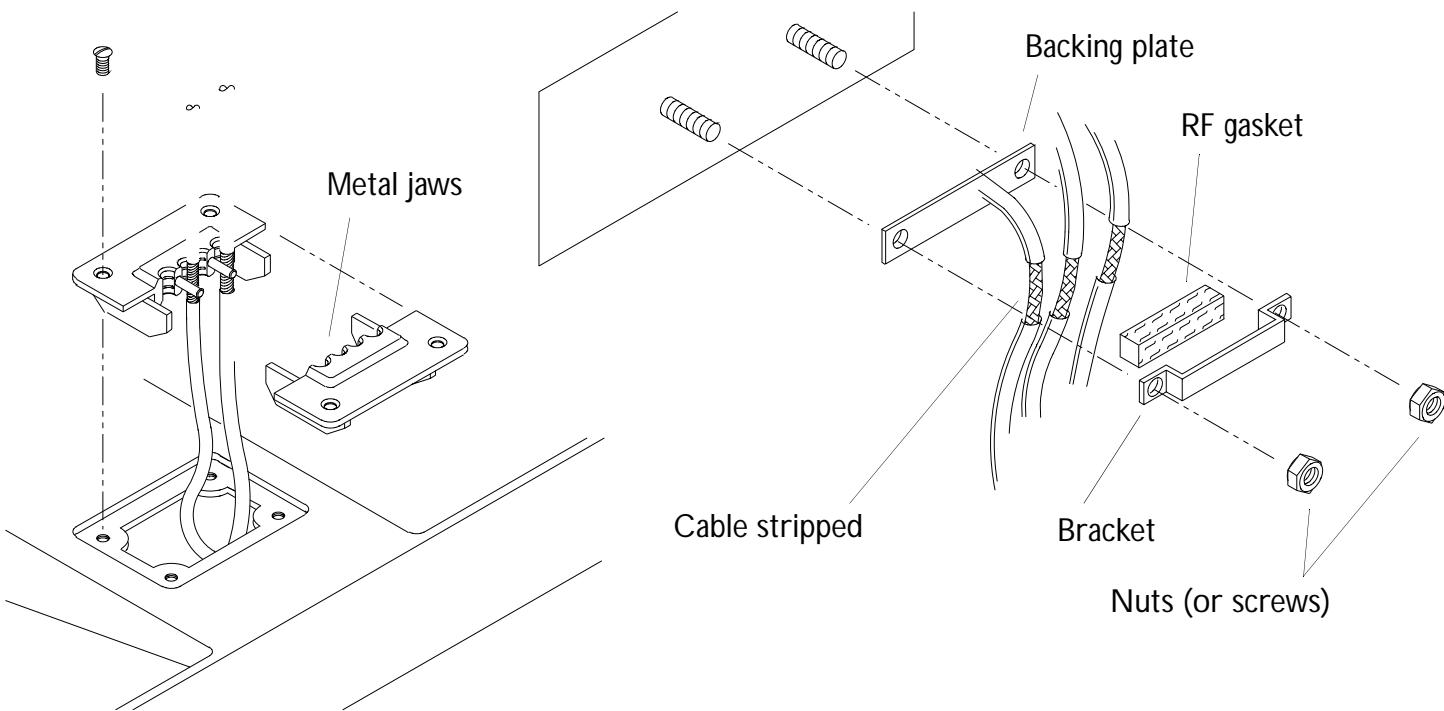
1. Turn off the system circuit breaker and disconnect power cord.
2. Remove the VCR (HDI 5000 systems (classic) only).
3. Release the cable lock on the power cord connector on the lower rear of the monitor by rotating it to the rear of the system.
4. Disconnect the power cord from the monitor.
5. Slide the locking plate on the video/audio (monitor signal) cable to the left.
6. Disconnect the video/audio cable connector from the monitor.
7. Rotate down and slide to the rear the retaining levers under each side of the monitor to release the monitor tabs.
8. Lift the monitor up and off of the system.

► To remove monitor cable clamps

Refer to [Figure 10-1](#) to remove the monitor cable clamps.

Figure 10-1

Monitor Cable Clamp Installation



Monitor Latching Labels

WARNING

Monitors not properly secured with the monitor latches may fall off causing damage to the system or personal injury.

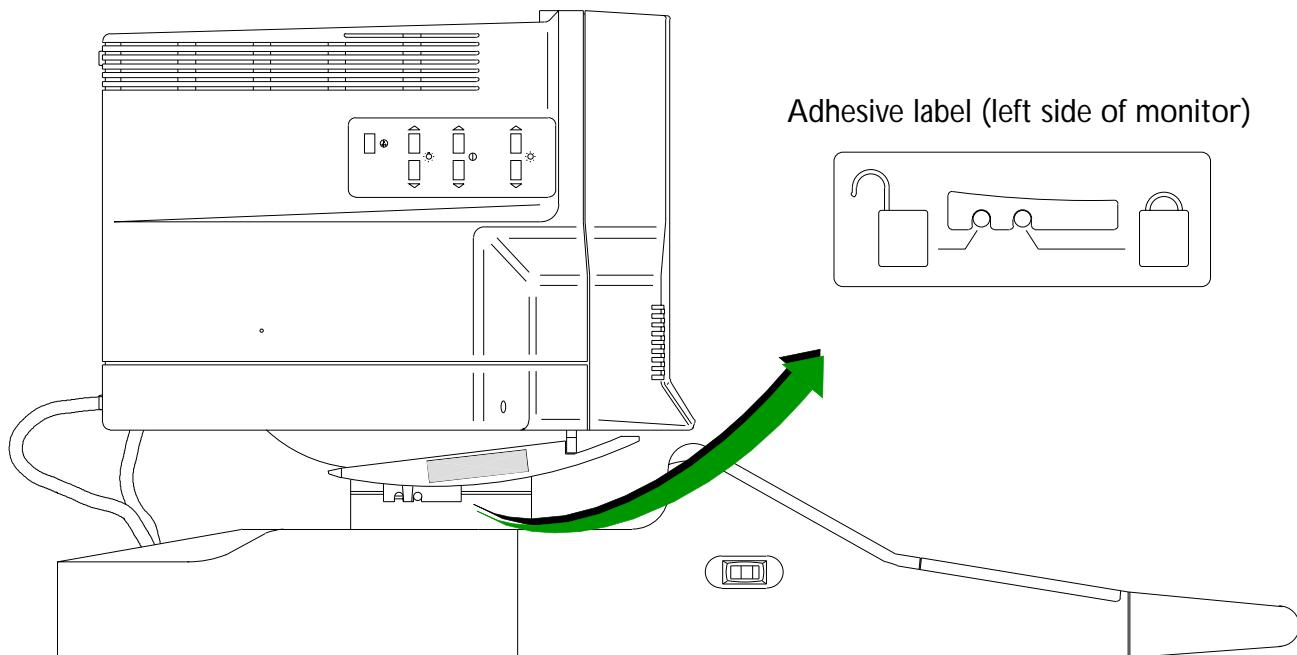
► To apply monitor latching labels

1. Use isopropyl alcohol to clean the area that will be immediately under the new label.
2. Remove the adhesive backing from the label and install the labels as in [Figure 10-2](#).

NOTE The locked position is to the front of the monitor on both latches.

Figure 10-2

Monitor Latching Labels



Monitor Articulating Arm, Philips HDI 5000

Refer to "[Monitor](#)" on page 284 for instructions for removal of the video monitor before attempting to remove the articulating arm assembly.

► **To remove the articulating monitor arm on the Philips HDI 5000**

1. Remove video monitor.
2. Remove the three Allen-head screws securing the arm assembly to the support ([Figure 10-3](#)).

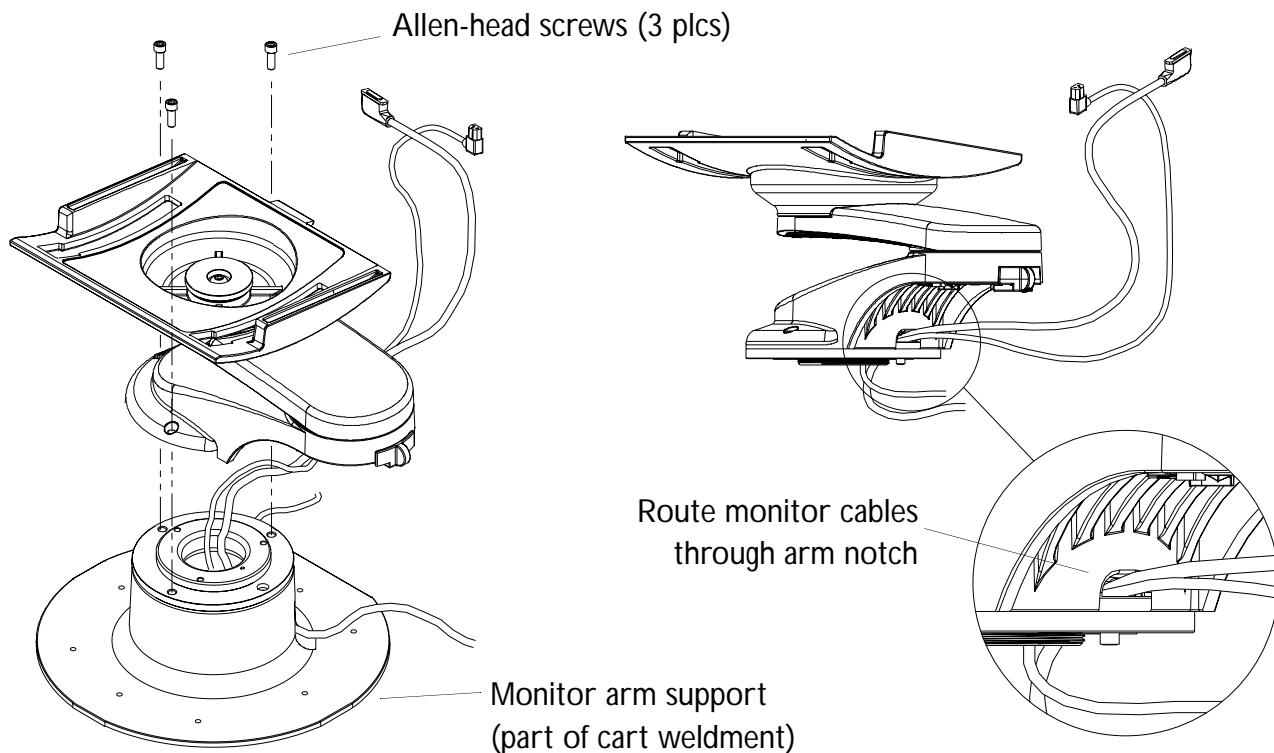
NOTE Support the arm assembly with one hand when removing the last screw, or the weight of the arm will cause it to topple over.

► **To Install the articulating monitor arm on the Philips HDI 5000**

1. Ensure the cords are properly routed thru the cable notch ([Figure 10-3](#)).
2. Support the arm assembly with one hand while installing the three Allen-head screws that secure the arm assembly to the cart support.
3. Ensure the arm is seated and the screws are snug.
4. Install the video monitor and reconnect the cables.

Figure 10-3

Articulating Monitor Arm Installation/Removal, Philips HDI 5000



Control Panel PCBs and On/ Standby Switch

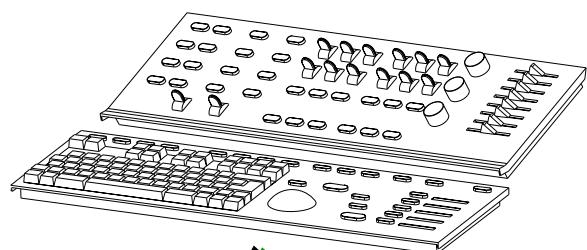
► To remove the Control Panel PCBs and On/Standby switch

1. Turn off the system circuit breaker and disconnect the power cord.
2. Use a small, common screwdriver to push in the locking bar latch release on the left rear of the upper user interface assembly (step 1 in [Figure 10-4](#)).
3. Slide the lock bar to the right and remove it (step 2).
4. Lift the top edge of the upper user interface assembly and remove the assembly to gain access to the UIM or the lower user interface assembly (step 3).
5. Remove the Control Panel PCBs or the On/Standby switch as necessary.

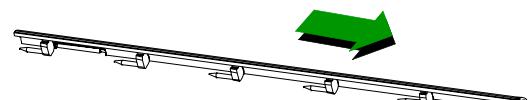
Figure 10-4

Control Panel Details

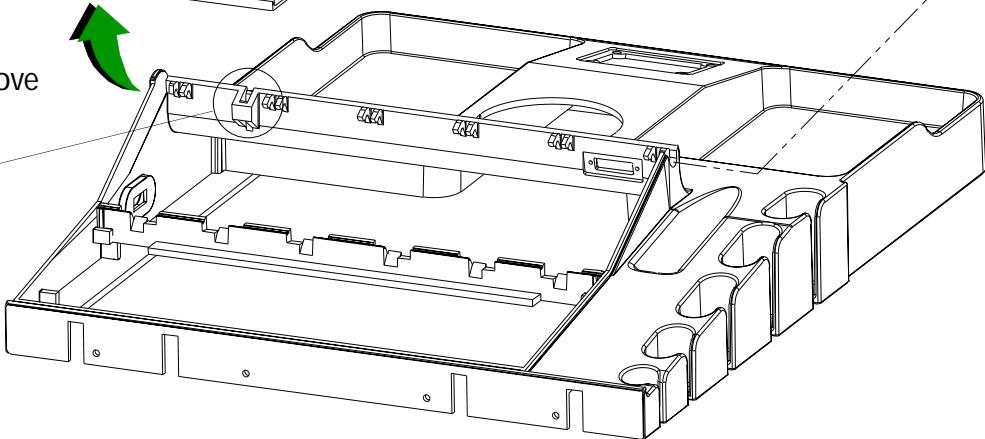
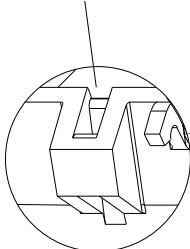
1. Push in with common screwdriver



2. Slide, then remove



- 3 Lift and remove



Trackball

► To replace the trackball

1. Remove the upper and lower user interface assemblies by performing step 1 through step 4 of "To remove the Control Panel PCBs and On/Standy switch" on page 290.
2. Remove the old trackball and bracket.

3. If using a new style trackball (P/N 2100-1505-01), carve away the inside corner of the PCB closest to the trackball cable connector using a utility knife. (Squaring-off the corner provides clearance for the new trackball.) If using an older style trackball, continue with [step 6](#).
4. Verify the trackball moves freely and has a snug protective seal.
 - a. Adjust the tension on the trackball by turning the trackball seal ring counterclockwise to loosen or clockwise to tighten. Wear a surgical glove to enhance your grip on the plastic ring.
 - b. If the trackball movement is difficult, remove spacer rings by disassembling the trackball and removing rings as required.
5. Reassemble the user interface assembly.
6. Install the upper and lower user interface assemblies and the control panel lock bar.
7. Power up system.
8. Check the trackball for proper operation.

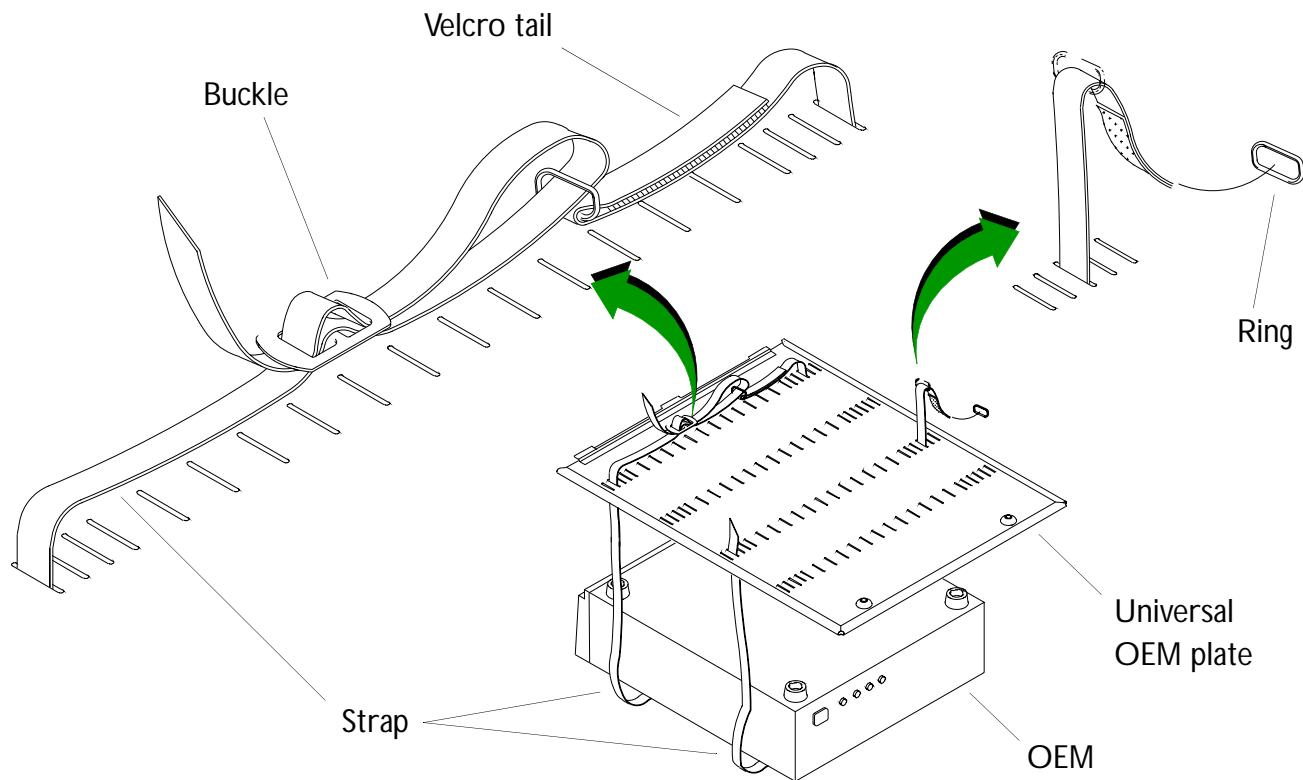
Internal OEMs

► To install an Internal OEM

1. Lay two straps on a flat surface; place OEM device upside down on straps ([Figure 10-5](#)).
2. Place OEM plate upside down on OEM. Refer to [Figure 10-6](#) for OEM orientation.
 - Center the OEM between the sides of the tray with the captive screw to the rear of the OEM ([Figure 10-5](#)).
 - The front of the tray should slightly overhang the OEM.

Figure 10-5

Internal OEM Installation (Strapping)

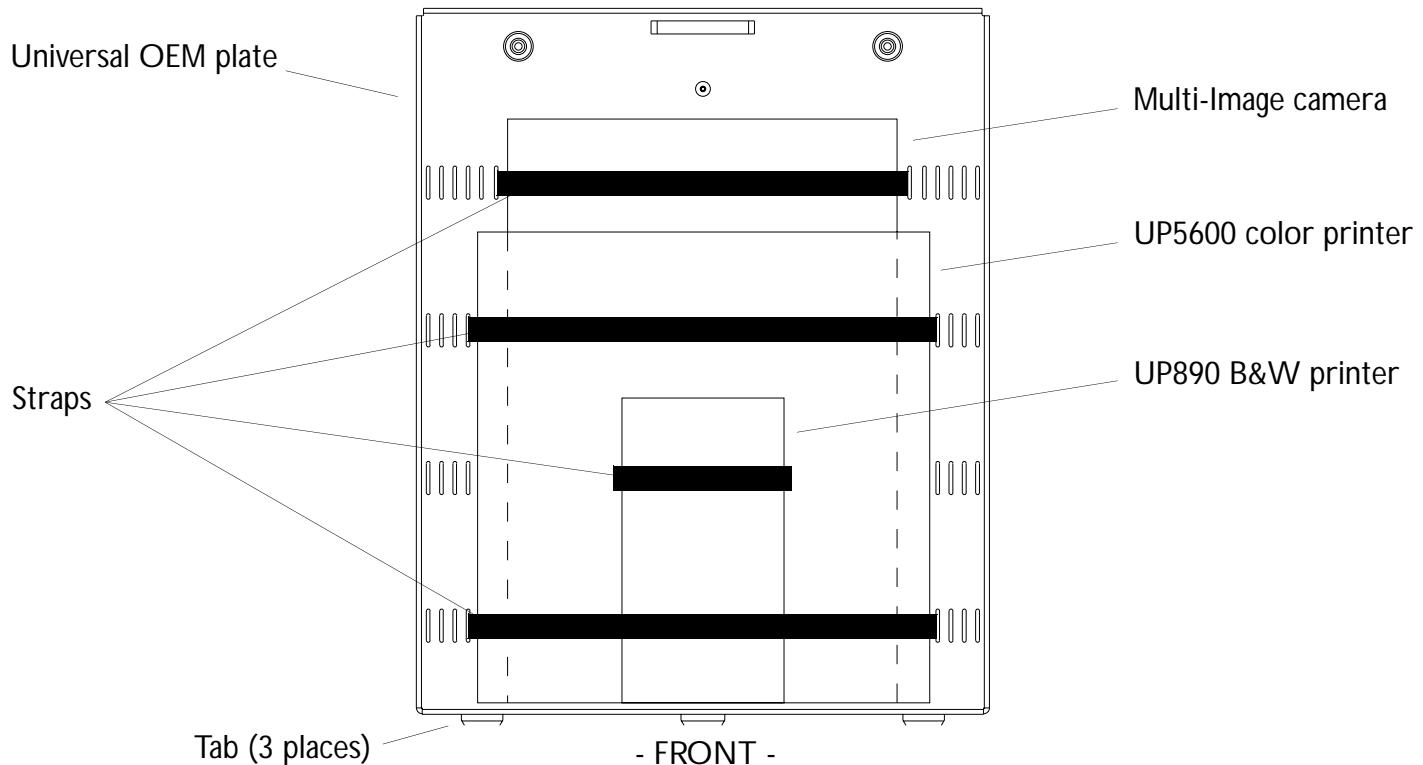


3. Pass straps through the first slots outside of the OEM with the ring, velcro, and buckle as shown.
4. Adjust buckle as tight as possible.
5. Loosen velcro, pull on both ends of the strap until snug, and reattach velcro.

6. Repeat step 5 for the remaining strap.
7. Secure tray in OEM bay with tabs in slots.

Figure 10-6

OEM Orientation on Universal OEM Plate



Scanhead Select Module Access, Philips HDI 5000

► To access the Scanhead Select Module on the Philips HDI 5000

1. Remove the four screws securing the system front cover and lift the cover off ([Figure 10-7](#)).
2. Remove the four screws securing the right card cage shield and set the shield aside.
3. Remove the two Philips-head screws securing the upper portion of the right front inner bumper ([Figure 10-8](#)).
4. Loosen but don't remove the Allen-head screw securing the bottom of the right front inner bumper.
5. Slide and remove the bumper from the cart frame.
6. To remove or install the Scanhead Select Module, refer to [Figure 10-9](#).

Figure 10-7

Front Cover and Right Card Cage Shield Removal

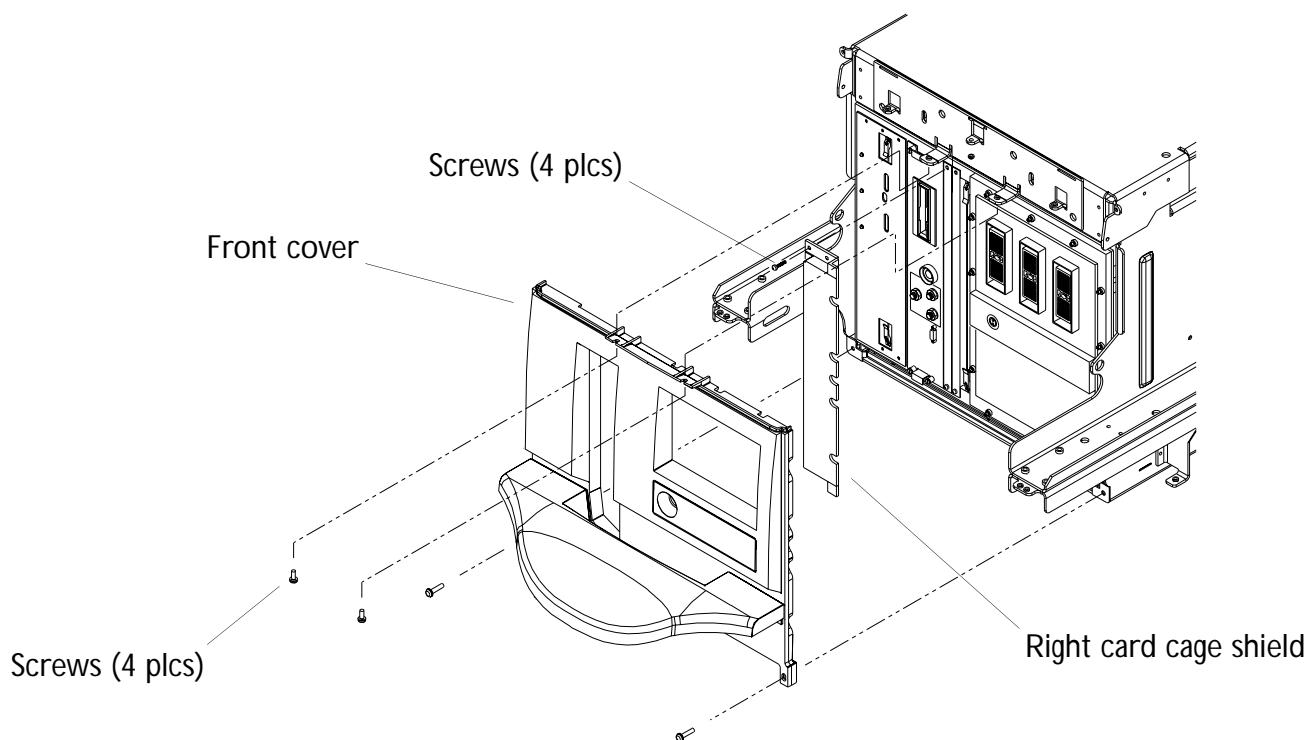
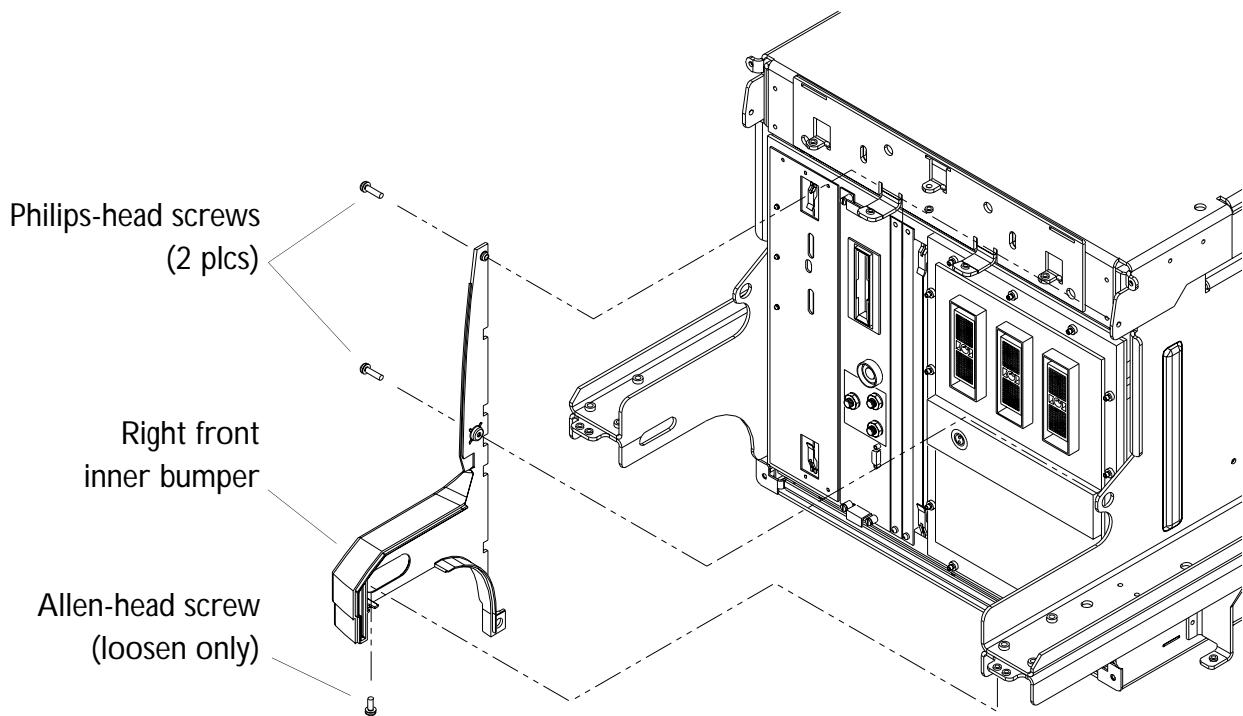


Figure 10-8

Right Front Inner Bumper Removal

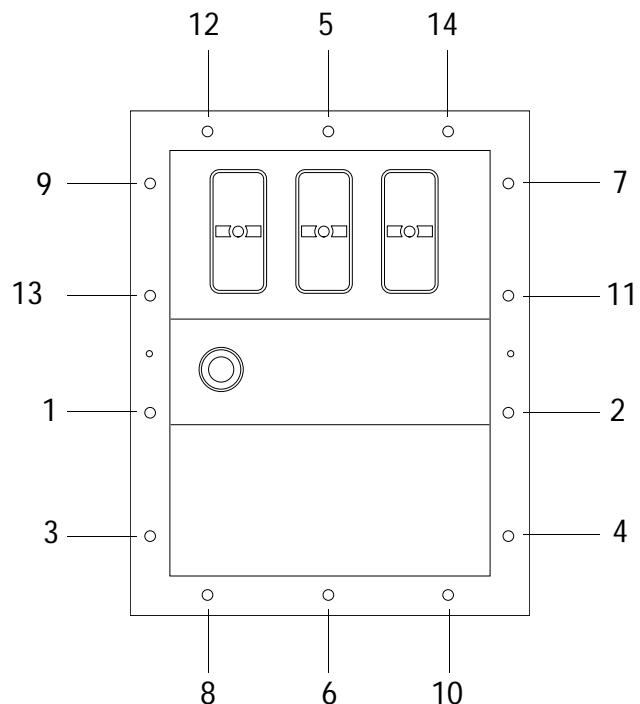


Scanhead Select Module

Figure 10-9

Refer to [Figure 10-9](#) for information on removing and installing the Scanhead Select Module.

S/HSEL Removal/Installation Details



Removal

1. In the reverse order shown, use a 7/64 Allen wrench to loosen screws 1 turn at a time. Repeat until all screws are loose.
2. Remove S/HSEL Module, and inspect for damage.

Installation

CAUTION: Carefully align the S/HSEL Module over the Channel Boards. Do not damage the RF gasket.

1. Hand tighten screws (P/N 1563-0258-01) in the order shown.
2. Use a 7/64 Allen wrench to tighten the screws an additional 1/4 turn in the order shown.

Hubcap Replacement

Hubcaps on older systems may fall off due to inadequate adhesive. Use the following procedure to replace hubcaps.

1. Remove adhesive tape from caster. Scrape with a dull blade if necessary.
2. Clean adhesive from caster using alcohol and let dry.
3. Carefully remove the adhesive liner from the new hubcap by pulling on the tab. If the tape starts to peel from the hubcap, peel using the other tab.
4. Verify that the tape is not wrinkled or torn. Replace damaged hubcaps.
5. Place the hubcap on the caster and apply firm pressure evenly on the hubcap for three to five seconds.

ECG Connector

Replace the ECG connector using the following procedure:

1. Remove the DDEA module from the system.
2. Remove the four screws securing the ECG connector to the DDEA bracket.
3. Unsolder the connector wires (blue, green, black and brown) attaching the ECG connector to the DDEA.
4. Remove and replace the ECG connector with connector P/N 3100-0274.
5. Insert the screws securing the connector to the bracket.
6. Assemble the DDEA and insert it in the system.
7. Verify ECG operation.

Transceiver Retaining Clip

The DVS or network transceiver may be loose or have an intermittent connection to the system. This may cause intermittent network connections or "0084" error messages on HDI 5000 systems with DVS. Order kit part number 2950-0615-01 and replace the transceiver retaining clip using the following procedure:

► **To replace the transceiver retaining clip**

1. Locate the clip on the E-net connector on the CPU PCB.
2. Loosen (but do not remove) both screws on the "D" connector.
3. Slide the old clip off the screws.
4. Position the new clip with the most open side toward the PCB and with the small screw hole to the top.
5. Slide the clip over the screws.
6. Tighten the screws and verify that the slide works.
7. Verify that the transceiver can be securely attached to the CPU.
8. If other parts need to be replaced, remove the PCB from the card cage to replace them.

Transceiver Support Bracket

If the transceiver is not properly supported, network communications may be interrupted. On systems with a metal rear cover that has network communication problems, order P/N 1065-5704-01 to replace the rear cover. On systems with a plastic rear cover, install a transceiver support bracket using the following procedure.

► **To install a transceiver support bracket**

1. Disconnect cabling and remove the rear panel.
2. If the panel has holes for the support bracket, proceed with [step 8](#) to install the bracket. If the panel does not have holes continue with [step 3](#).
3. Mark the holes on the cover using a template.
 - Metal template: Order P/N 1200-0355-XX.
 - Paper template ([Figure 10-10](#)): Verify the dimensions are as indicated before cutting out the template and using it.

4. Place the template on the rear panel as shown in [Figure 10-11](#).
5. Drill 1/8-inch (3.2 mm) pilot holes in each hole location, remove the template, and re-drill with 1/4-inch (6.4 mm) drill bit.
6. Remove the material vertically between the holes.
7. Using an indelible pen, re-mark the rear panel part number.
 - On systems with four swivel casters, change the number to 1065-2892-04 (from 1065-2892-03).
 - On systems with two swivel casters, change the number to 1065-5704-01 (from 1065-2892-02).
8. Insert the stud bracket into the cover [Figure 10-12](#).
9. Install the support bracket over the studs.
10. Loosely install the KEPS nuts on the studs.
11. Install the rear panel.
12. Clean the bracket and the transceiver with isopropyl alcohol.
13. Remove the adhesive strips from the Velcro. Attach the Velcro to the bracket and the transceiver. (Keep the Velcro halves separated.)
14. Connect the transceiver to the PCB connector and secure it with the retaining clip.
15. Snug the bracket to the PCB and secure the Velcro halves to each other.
16. Tighten the KEPS nuts.
17. Verify system operation.

Figure 10-10

Transceiver Support Bracket Template

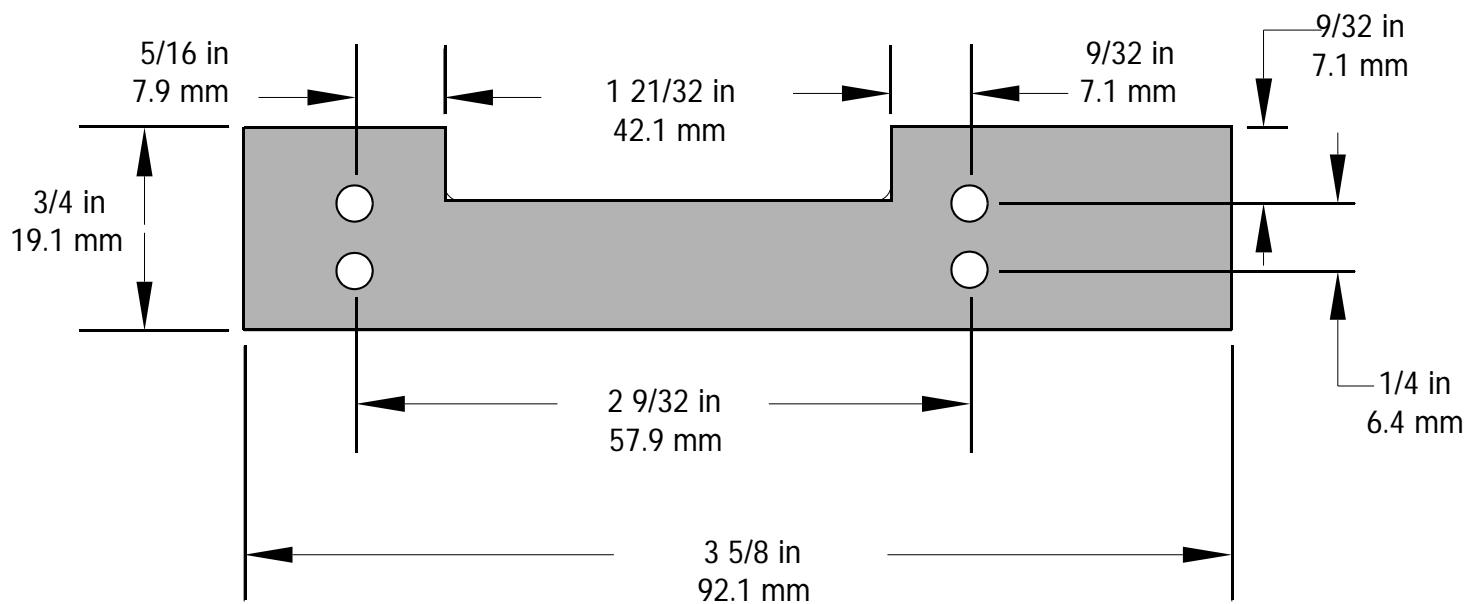


Figure 10-11

Positioning the Transceiver Support Bracket

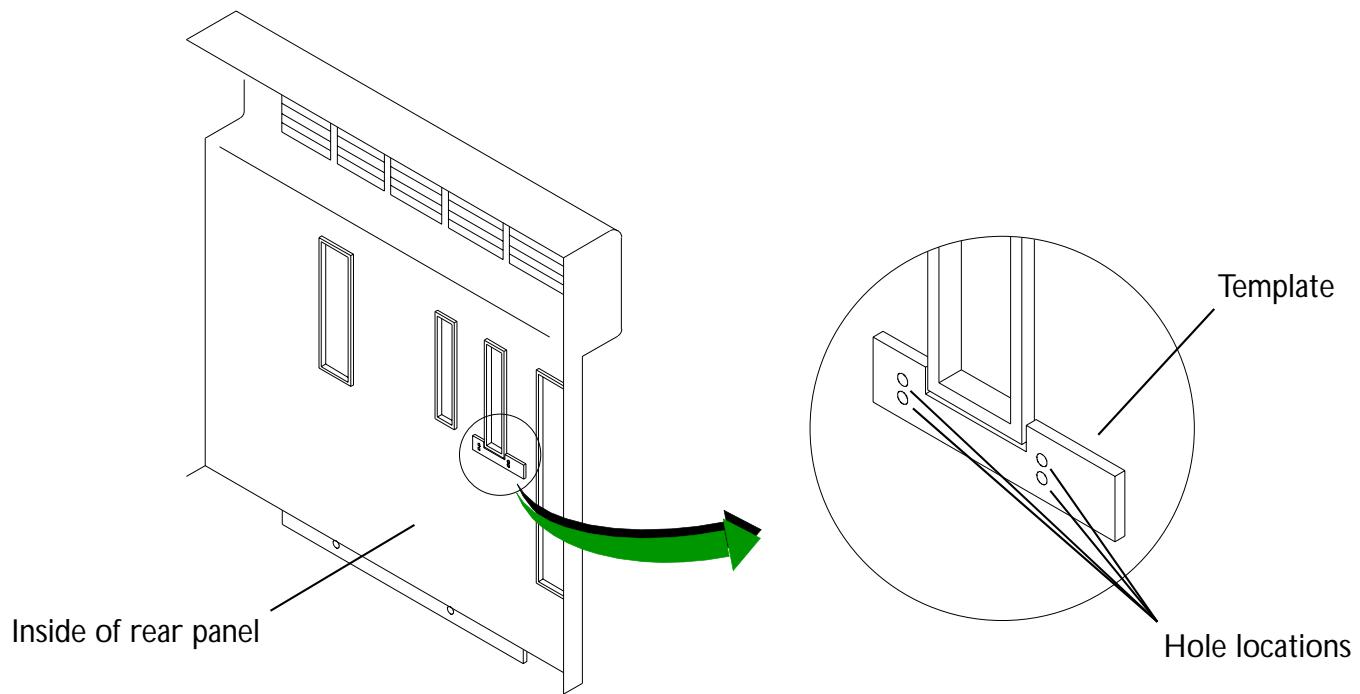
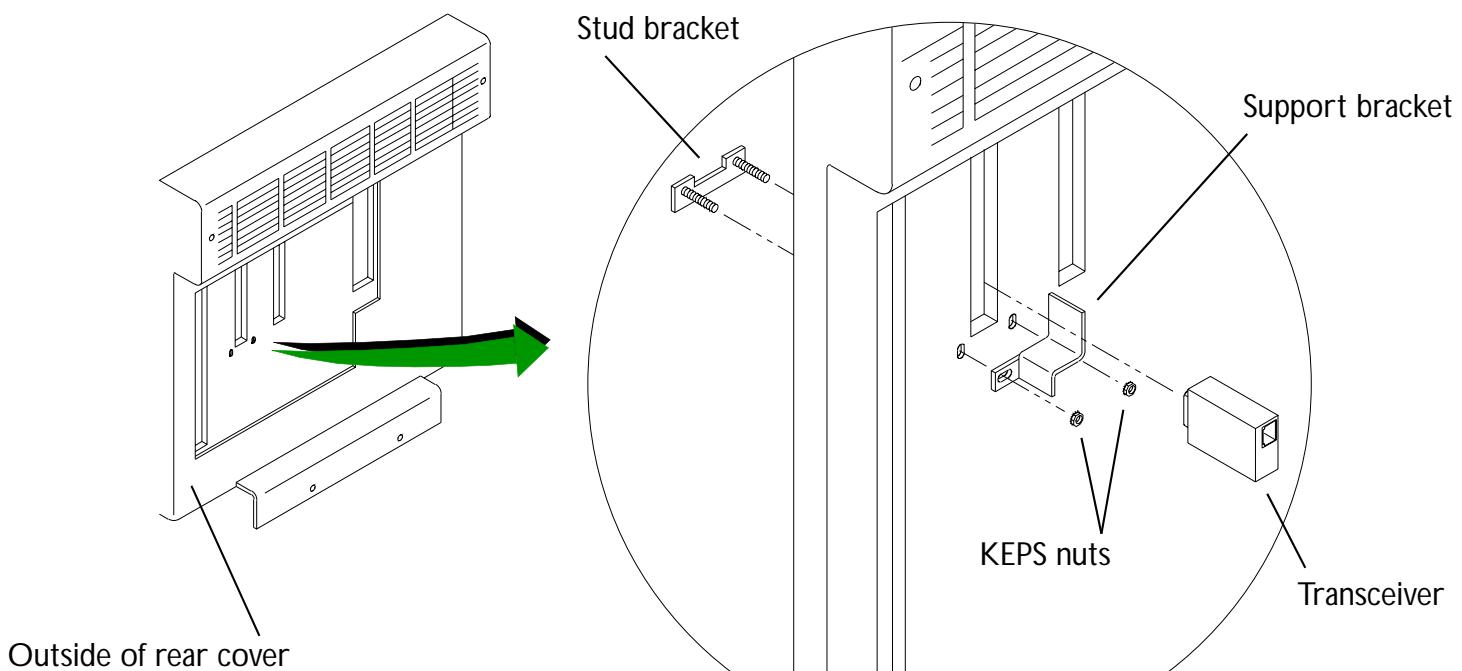


Figure 10-12

Installing the Transceiver Support Bracket



11 Cabling

Introduction

This section contains system cabling and connector information. Use the figures and parts tables [Table 11-1](#) and [Table 11-2](#) in this section to locate and identify system cables and their part numbers. Part numbers are shown on the illustrations and listed and described in the corresponding tables. Figures are keyed to the tables and the tables to the figures, as applicable.

System Connectors and Cabling

[Figure 11-1](#) through [Figure 11-5](#) are illustrations of the system primary connector assemblies. [Figure 11-6](#) shows the numbering pattern of the centerplane and PCB connectors. [Figure 11-7](#) shows the monitor microphone placement and its connector location. Also shown is the general layout of PCBs, the general locations of test points, LEDs, and reset and interrupt switches.

Signal Cables

System and OEM (internal and external) signal cables are illustrated in [Figure 11-10](#) through [Figure 11-33](#). pin-out information for these cables are provided in [Table 11-3](#) through [Table 11-25](#).

Power Cables

System and OEM (internal and external) power cables are illustrated in [Figure 11-34](#) through [Figure 11-38](#). pin-out information for these cables is provided in [Table 11-26](#) through [Table 11-29](#).

Monitor Internal Cabling

Monitor internal cabling is illustrated in [Figure 11-39](#).

NOTE Some of the cables within the video monitor assembly are field-replaceable, and some are not. Cables within the OEM monitor assembly ([2100-1346-08](#) [2100-1346-09](#) [2100-1471-01](#) [2100-1589-03/04](#) [2100-1589-05](#)P/N 2100-1346-XX) are not field-replaceable. If one of the cables in the OEM monitor assembly is bad, order the video monitor assembly (P/N 3500-2532-XX). Refer to [Figure 11-39](#) to determine which cables are included with the OEM monitor assembly.

System Inter-connect Cabling

Notes for the classic system interconnect cabling diagrams are provided in [Figure 11-40](#). Classic system signal and power cabling are illustrated in [Figure 11-41](#) and [Figure 11-42](#). Philips HDI 5000 system signal and power cabling are illustrated in [Figure 11-43](#) and [Figure 11-44](#).

Cable Part Numbers

[Table 11-1](#) is a parts list of the interconnect cables. [Table 11-2](#) is a parts list of the power distribution cables. Refer to [Table 14-3](#) for additional information on peripherals and applicable cables.

Table 11-1 **HDI 5000 Signal Interconnect Cables**

Part Number	Cable Description	Notes/Reference
3500-2921-01	Cable Assy, 10 Base 2, Coax, MISEM	Diagram: Figure 16-39
2275-0402-01	Cable Assy, 18TWPR, w/Shield, SCSI, M/M, 1 MI	Diagram: Figure 16-39
2275-0327-01	Cable Assy, AAM Input, Internal	Diagram: Figure 11-41
2275-0394-01	Cable Assy, AAM-In, Ext, Level 10	Diagram: Figure 11-41
2275-0395-01	Cable Assy, AAM-Out, Int, Level 10	Diagram: Figure 11-41
2275-0396-01	Cable Assy, AAM-Out, Ext, Level 10	Diagram: Figure 11-41
3500-1540-04	Cable Assy, B&W Page Printer	Diagram: Figure 11-41 , Figure 11-43

Table 11-1

HDI 5000 Signal Interconnect Cables (Continued)

Part Number	Cable Description	Notes/Reference
3500-1483-03	Cable Assy, Disk Drive Signal, DDEA	Internal to DDEA
3500-3333-01		Illustration: Figure 14-14 , Figure 14-15 , Figure 14-17 Diagram: Figure 11-41 , Figure 11-43
3500-1851-01	Cable Assy, Disk Drive, Signal, No MO	See Figure 14-18
3500-2920-01	Cable Assy, Eide Drive, MISEM (50 Pin Connector)	DVS Diagram: Figure 16-36 and Figure 16-37
4500-5512-01	Cable Assy, External Disk Drive Test	
3500-3334-01		
2275-0326-01	Cable Assy, External OEM	Diagram: Figure 11-41 , Figure 11-43
3500-2642-01	Cable Assy, External SVHS VCR	Diagram: Figure 11-41
3500-2644-01	Cable Assy, External RGB Printer	Diagram: Figure 11-41
3500-2923-01	Cable Assy, Floppy Disk Drive, MISEM	DVS Diagram: Figure 16-36 and Figure 16-37
3500-2771-01	Cable Assy, IIM to P2 UIM	Illustration: Figure 14-41 Diagram: Figure 11-41 , Figure 11-43
3500-3572-01	Cable Assy, IIM to UIM, Off-shore	Illustration: Figure 14-41 Diagram: Figure 11-41 , Figure 11-43
3500-2772-01	Cable Assy, ISEM Adapter	Diagram: Figure 11-41

Table 11-1

HDI 5000 Signal Interconnect Cables (Continued)

Part Number	Cable Description	Notes/Reference
3500-2770-01	Cable Assy, J1 LCP to P1 UIM	Illustration: Figure 14-41 Diagram: Figure 11-41 , Figure 11-43
3500-1835-01	Cable Assy, Jack, Physio, DDEA	Internal to DDEA Illustration: Figure 14-14 , Figure 14-15
2275-0393-01	Cable Assy, LED, 3mm Conn, 8-inch L	Internal to monitor (3500-2532-XX monitor only) Illustration: Figure 14-30 Diagram: Figure 11-39
3500-2632-02	Cable Assy, Microphone	-03 is 6-in longer for FIMI monitor
3500-2632-03		Illustration: Figure 14-37 Diagram: Figure 11-41
3500-2752-01	Cable Assy, Microphone, Internal, Mon	Internal to monitor Illustration: Figure 14-30 Diagram: Figure 11-39 , Figure 11-41 , Figure 11-43
3500-2643-01	Cable Assy, Mitsubishi RGB Printer	Diagram: Figure 11-41

Table 11-1

HDI 5000 Signal Interconnect Cables (Continued)

Part Number	Cable Description	Notes/Reference
3500-2614-02	Cable Assy, Monitor, Lower Bezel	Internal to monitor Illustration: Figure 14-32 , Figure 14-33 , Figure 14-74 Diagram: Figure 11-39 , Figure 11-41 , Figure 11-43
3500-3464-01	Cable Assy, Monitor, Signal	Philips HDI 5000 system Diagram: Figure 11-43
3500-2613-01	Cable Assy, Monitor, Upper Bezel	Internal to monitor Illustration: Figure 14-30 Diagram: Figure 11-41
3500-1539-03	Cable Assy, Multi-Image Camera (MIC)	Diagram: Figure 11-41
3500-2639-01	Cable Assy, On/Standby Switch	Illustration: Figure 14-42 Diagram: Figure 11-41 , Figure 11-42 , Figure 11-43 , Figure 11-44
3500-2741-01	Cable Assy, Remote Control Port	Illustration: Figure 14-41 , Figure 14-48 Diagram: Figure 11-41 , Figure 11-43
3500-2918-01	Cable Assy, SCSI Drive, MISEM (68 Pin Connector)	DVS Diagram: Figure 16-36

Table 11-1

HDI 5000 Signal Interconnect Cables (Continued)

Part Number	Cable Description	Notes/Reference
2275-0496-01	Cable Assy, SCSI, Narrow, Int, 50C	DVS/APM Diagram: Figure 16-37
2275-0497-01	Cable Assy, SCSI, Lvd Ultra2, 68C, 2Drv, w/Term	DVS Only Diagram: Figure 16-37
3500-2641-02	Cable Assy, Sony RGB Printer	Diagram: Figure 11-41
3500-2633-02	Cable Assy, System Monitor, 64-inch	Diagram: Figure 11-39 , Figure 11-41
3500-2919-01	Cable Assy, Vesa Feature, MISEM	DVS Diagram: Figure 16-36 and Figure 16-37
3500-1404-06	Cable Assy, VCR	Diagram: Figure 11-41
3500-3466-01	Cable Assy, VCR, Signal	Philips HDI 5000 system Diagram: Figure 11-43
3500-3573-01	Cable Assy, VCR, Signal, Off-shore	Diagram: Figure 11-43
3500-3571-01	Cable Assy, VCR, Signal, Off-shore	Philips HDI 5000 system Diagram: Figure 11-43
2275-0176	Cable, BNC, M/M, GFT, RG 59B/U, 750HM	Diagram: Figure 11-41
2275-0267-01	Cable, RCA-RCA, Stereo, Molded, GFT	Diagram: Figure 11-41
3100-2309-01	Connector, DSUB Saver, 15C, W/Slide Latch	(Standoff adapter) For Network Connection Illustration: Figure 11-4 or Figure 14-49

Table 11-1

HDI 5000 Signal Interconnect Cables (Continued)

Part Number	Cable Description	Notes/Reference
2950-0615-01	Slide Latch, DSUB, Size 2, W/Hardware	For Network Connection Illustration: Figure 11-4 or Figure 14-49
2100-1418-01	Transceiver, 10 Base-T, Module	For Network Connection Illustration: Figure 11-4 or Figure 14-49

Table 11-2

HDI 5000 Power Distribution Cables

Part Number	Cable Description	Notes/Reference
3500-1873-02	Cable Assy, 100-120 VAC, Dual Hardcopy	Diagram: Figure 11-42 , Figure 11-44
3500-2397-03	Cable Assy, 230 VAC, Dual Hardcopy	Diagram: Figure 11-42
3500-1482-03	Cable Assy, Disk Drive Power, DDEA	Illustration: Figure 14-13 , Figure 14-14 , Figure 14-18 Diagram: Figure 11-42 , Figure 11-44
3500-3030-01	Cable Assy, DVS Power-On Module	DVS Diagram: Figure 16-38
3500-1514-03	Cable Assy, Fan, 24 Vdc	Illustration: Figure 14-22 Diagram: Figure 11-42

Table 11-2

HDI 5000 Power Distribution Cables (Continued)

Part Number	Cable Description	Notes/Reference
3500-3427-01	Cable Assy, Fan, Power	Philips HDI 5000 system Illustration: Figure 14-96 Diagram: Figure 11-44
3500-3518-01	Cable Assy, Monitor, Power, 115V, Long	Philips HDI 5000 system Diagram: Figure 11-44
3500-1517-04	Cable Assy, Power, 115V, Hardcopy	Diagram: Figure 11-42
3500-1516-05	Cable Assy, Power, 115V, VCR	
3500-2780-01	Cable Assy, Power, 115V, VCR, HDI 5000	Diagram: Figure 11-42
3500-1547-05	Cable Assy, Power, 230V, Hardcopy	Diagram: Figure 11-42
3500-2781-01	Cable Assy, Power, 230V, VCR, HDI 5000	Diagram: Figure 11-42
3500-2616-01	Cable Assy, Power Monitor, Electrohome	Diagram: Figure 11-42
3500-3465-01	Cable Assy, VCR, Power	Philips HDI 5000 system Diagram: Figure 11-44
3500-3467-01	Cable Assy, VCR, Power, 230V	Philips HDI 5000 system Diagram: Figure 11-44
2265-0274-01	Cord, 3X14 AWG, 4.5ML, Unshielded, UL/CSA	Supports Japanese systems Illustration: Figure 14-24
2275-0373-01	Cord, PC Adapter, 10A/125V, 12-inch	
2275-0324-01	Power Cord, Harmonized, CEE-22 & 7 (240V, 10A)	Illustration: Figure 14-23
2275-0391-01	Power Cord, Unshld, Hosp lug, 15'L (120V)	Illustration: Figure 14-23

System Connector Illustrations

Figure 11-1

Connector Locations, Front Panel

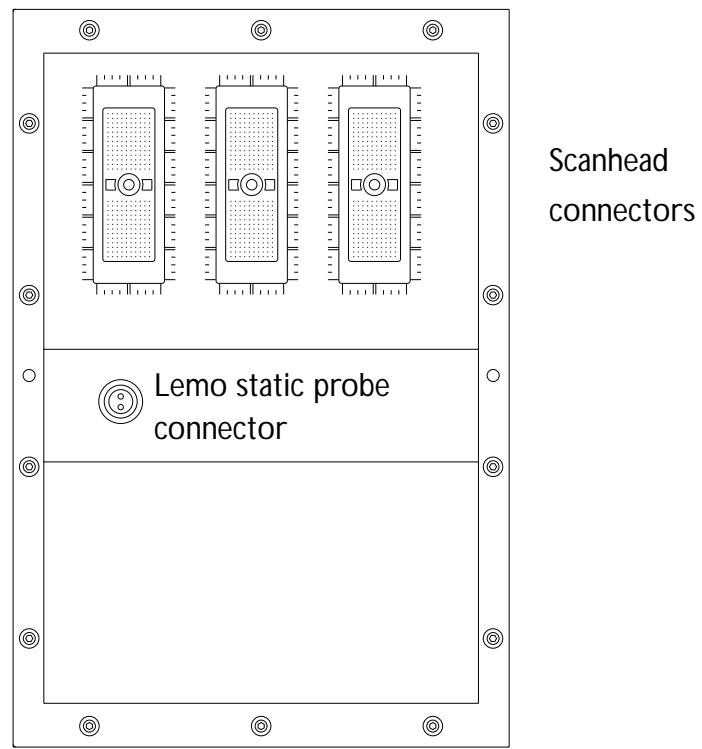
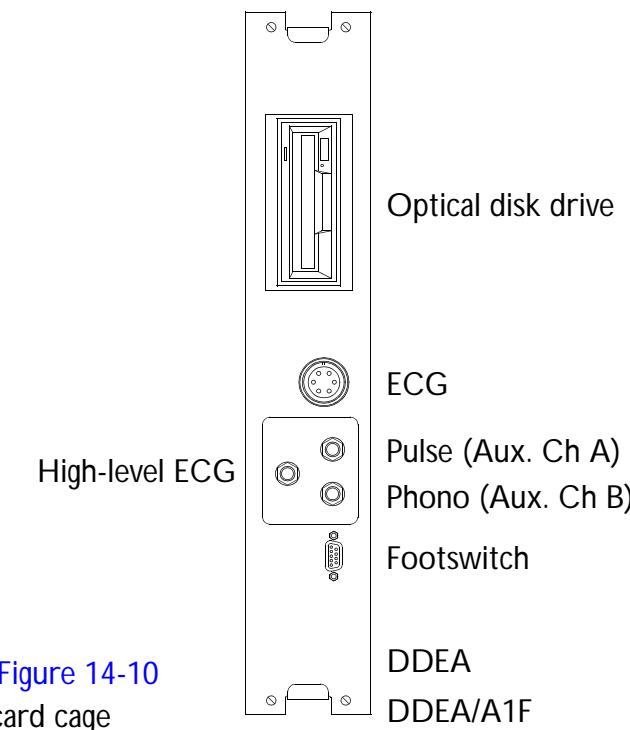


Figure 11-2

Connector Locations, Rear Panel (1 of 2)

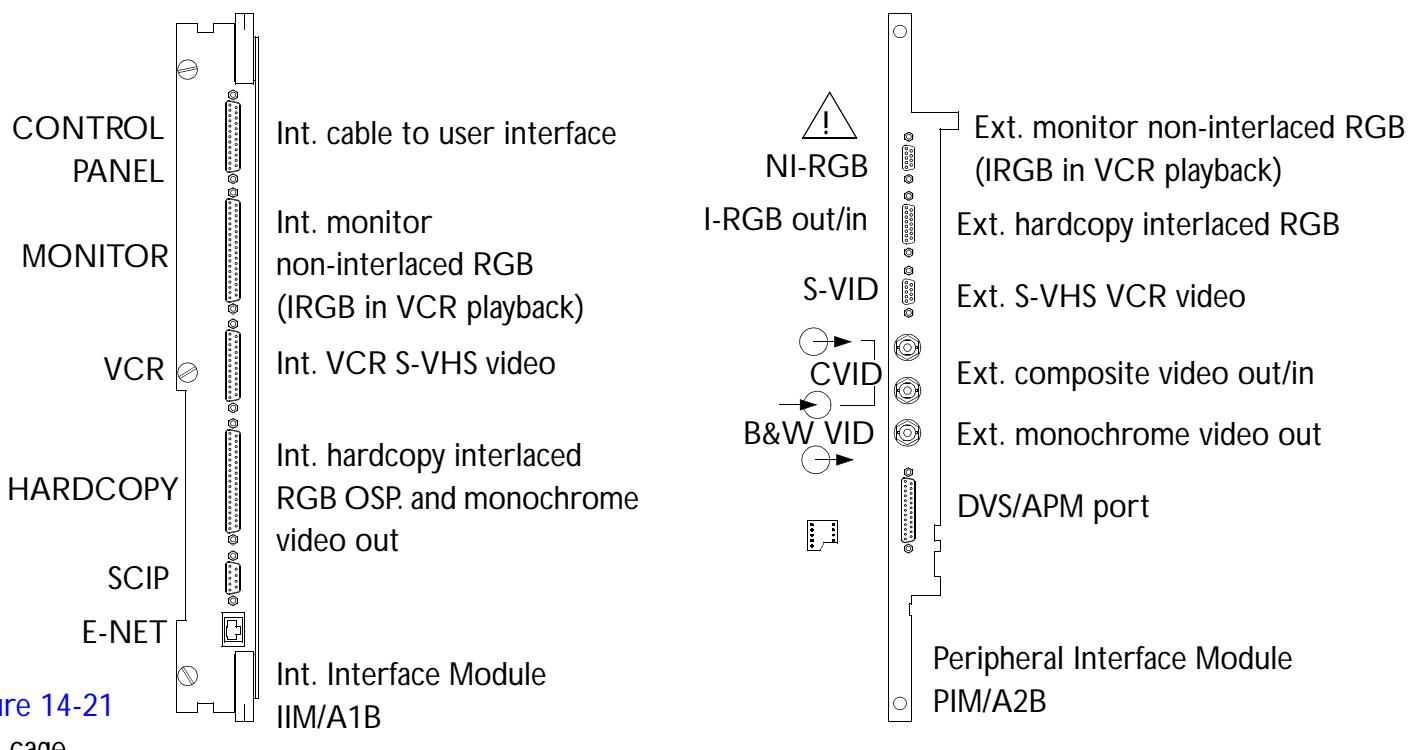


Figure 11-3

Connector Locations, Rear Panel (2 of 2)

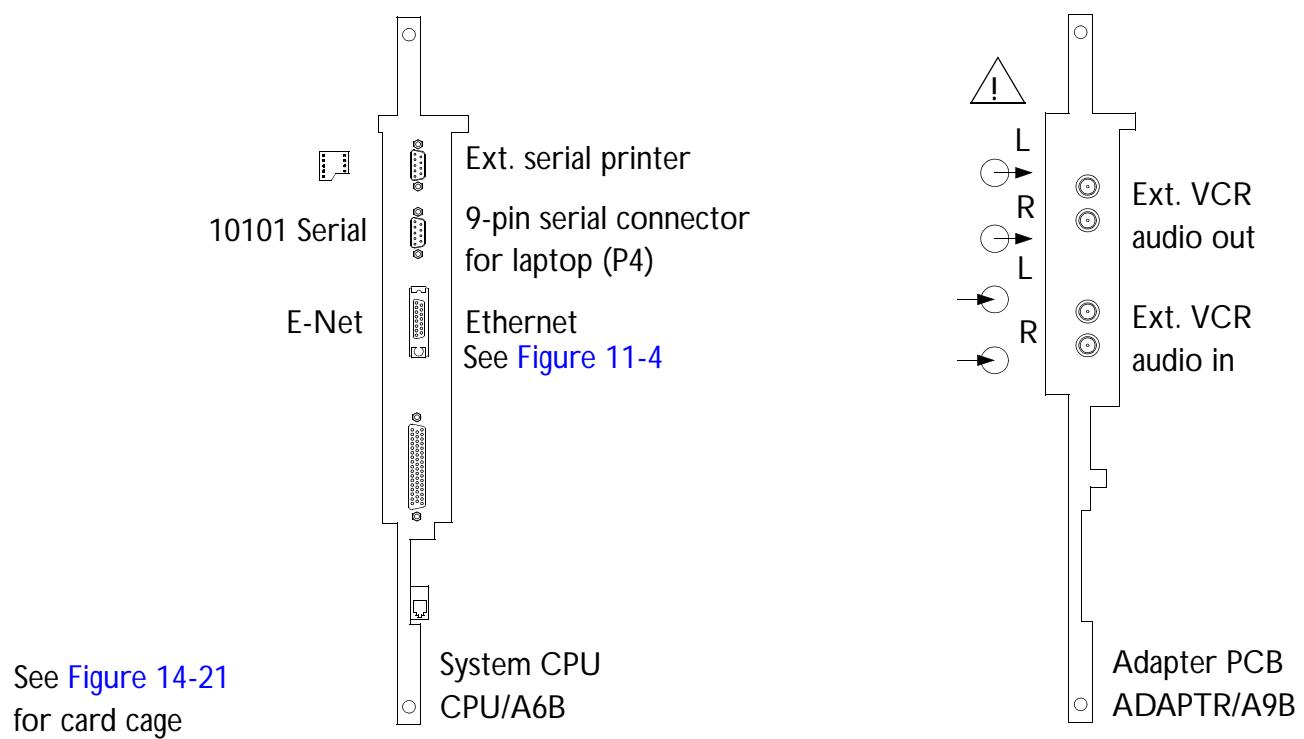
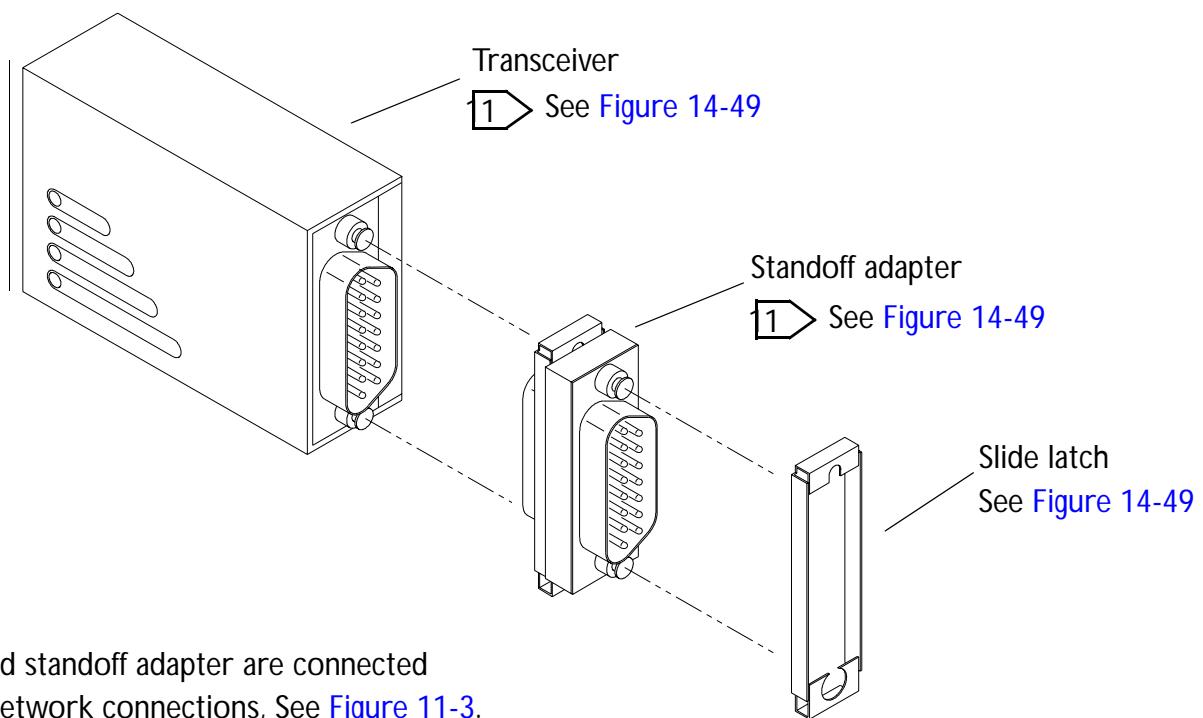


Figure 11-4

Networking Transceiver Detail



1 Transceiver and standoff adapter are connected to E-Net for network connections, See [Figure 11-3](#).

Figure 11-5

AC Input Module (ACIM) Connector Locations

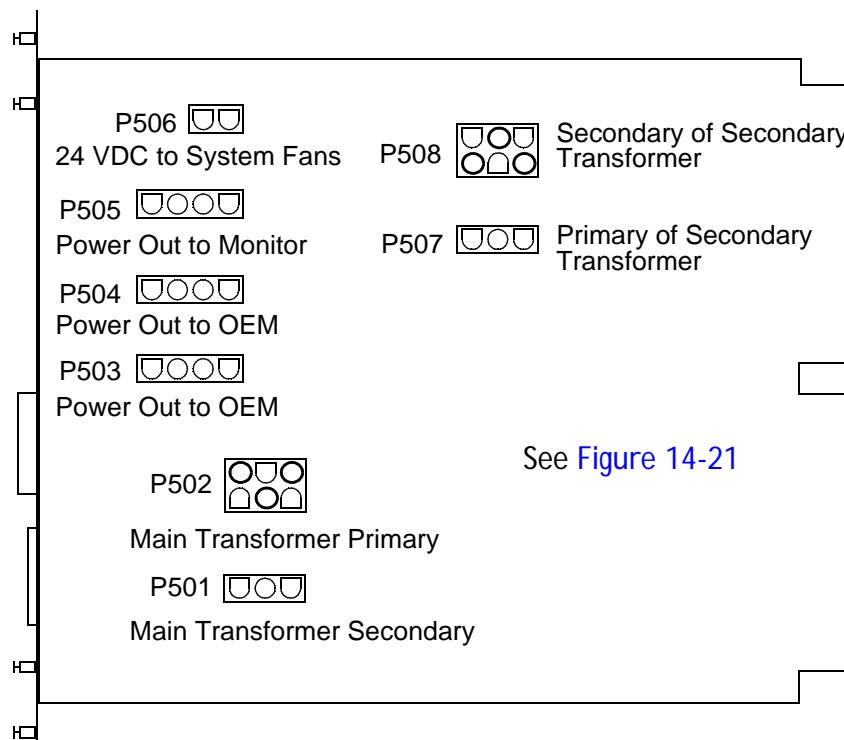


Figure 11-6

Centerplane Connector and Card Edge Features

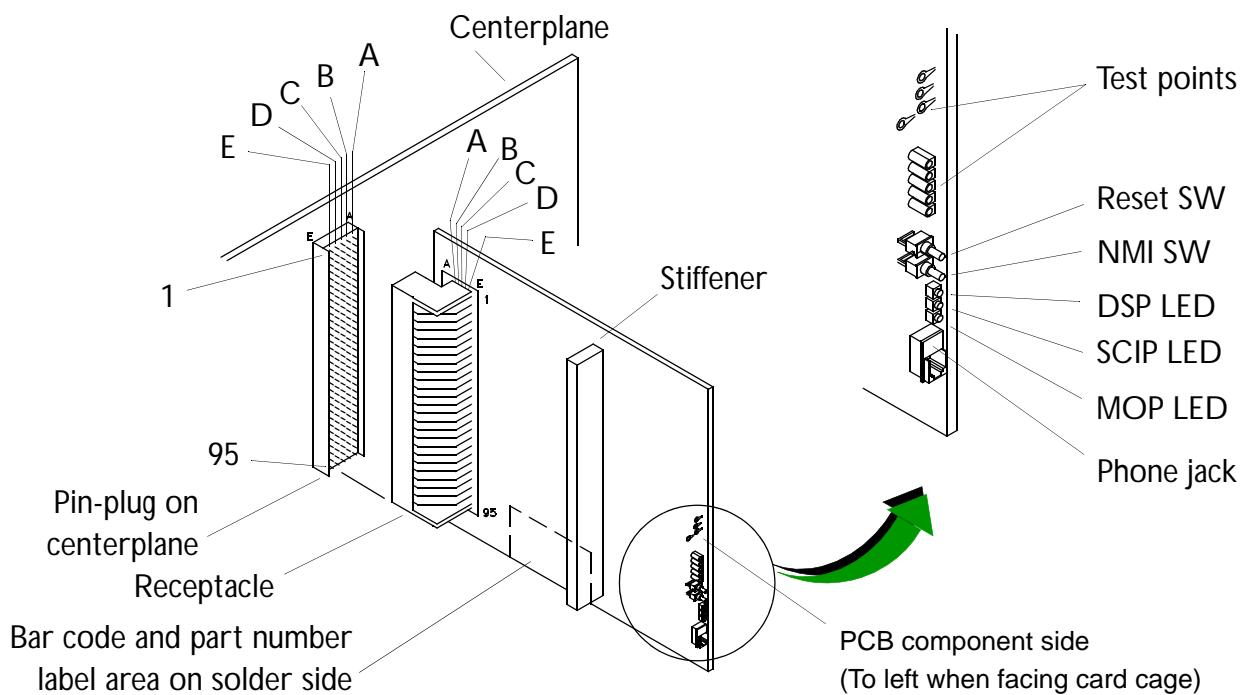
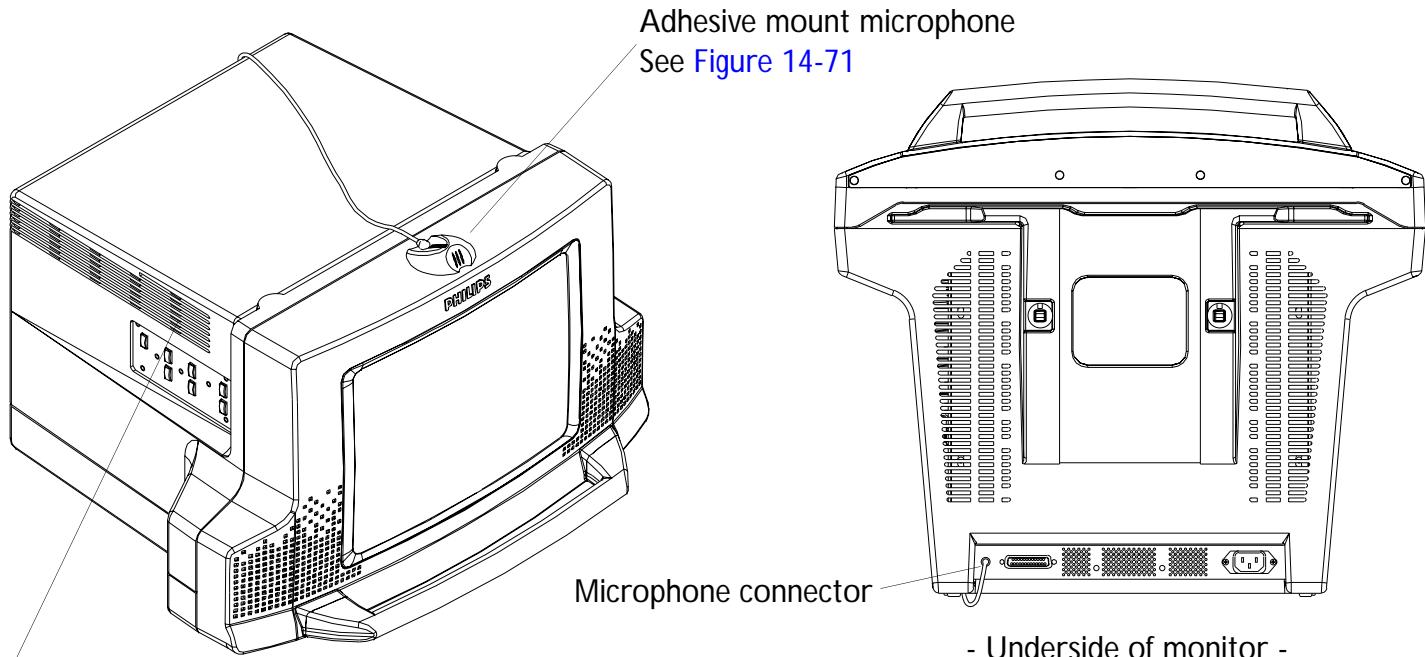


Figure 11-7

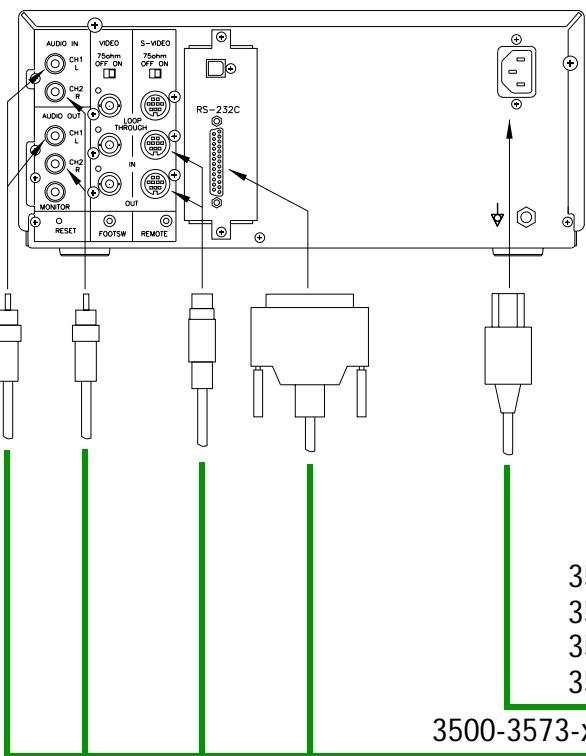
Monitor Mount Microphone Connection (Philips Monitor Shown)



See [Figure 7-2](#) for microphone switch settings.

Figure 11-8

HS-MD3000U/E Mitsubishi VCR Cabling Diagram, Internal



NOTE: These connections are the same for the OEM bay or top mount VCR.

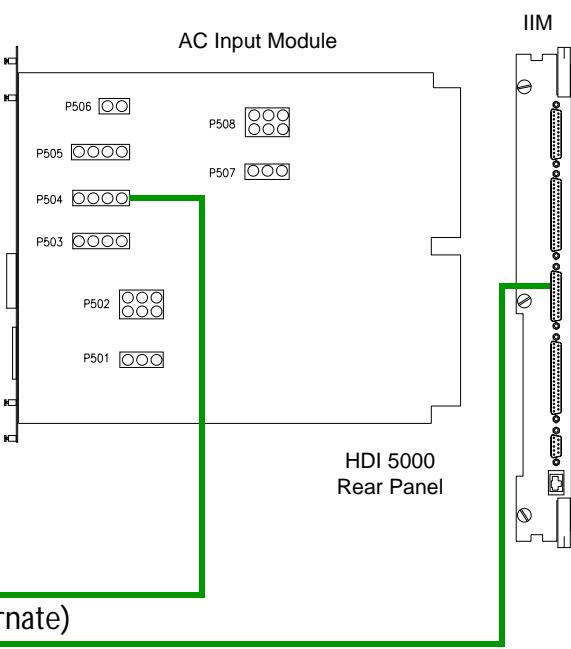
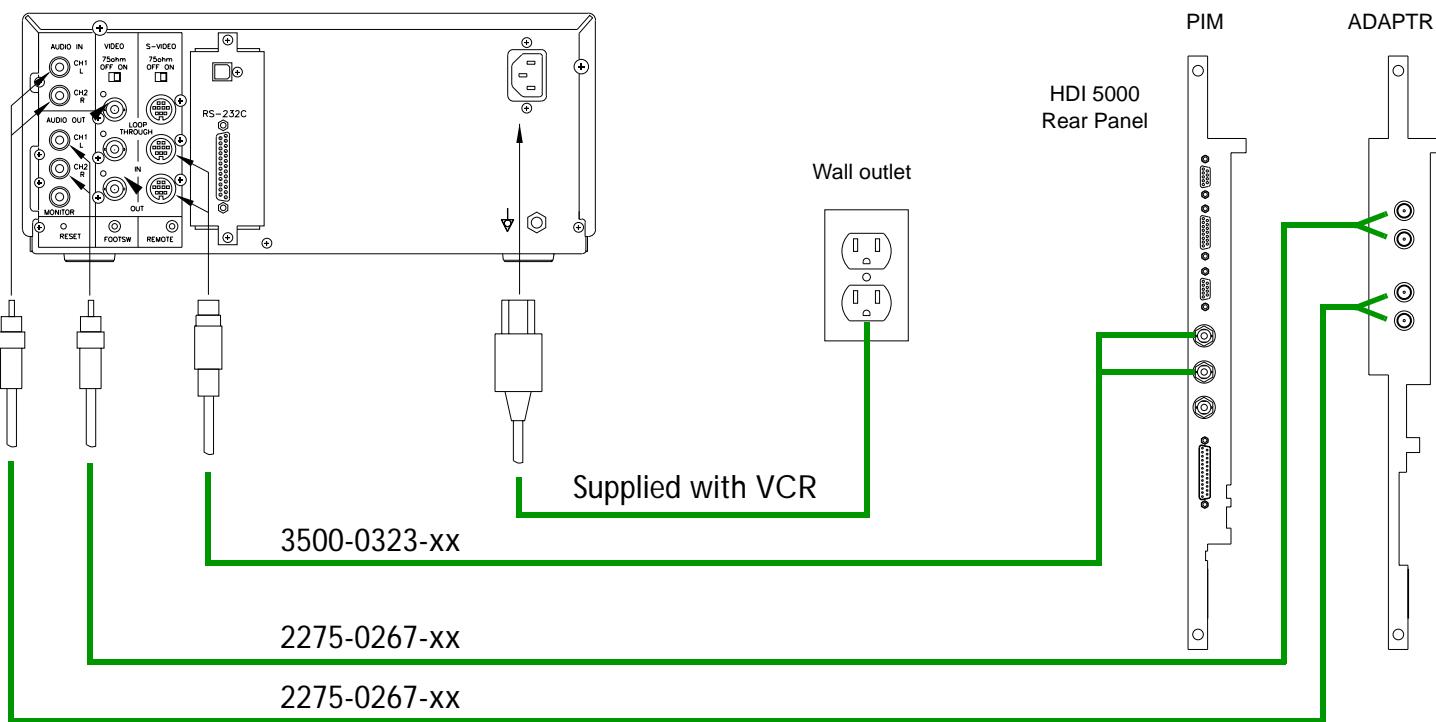


Figure 11-9

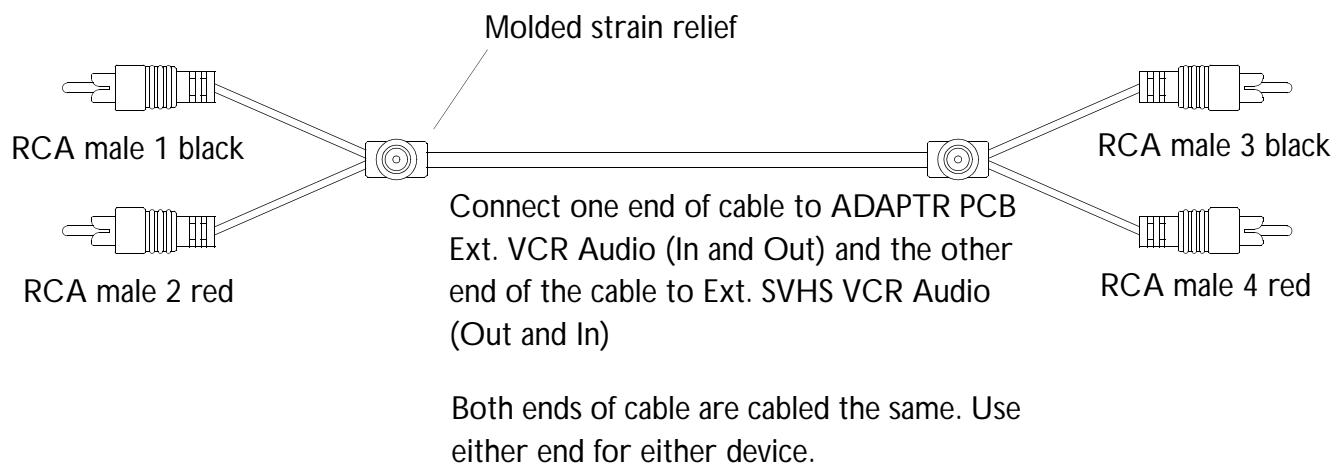
HS-MD3000U/E Mitsubishi VCR Cabling Diagram, External



System Cable Illustrations and Pin-Out Tables

Figure 11-10

RCA-RCA, Stereo Cable Assembly (P/N 2275-0267-XX)



Pin-out [Table 11-3](#)
Cable [Table 11-1](#)

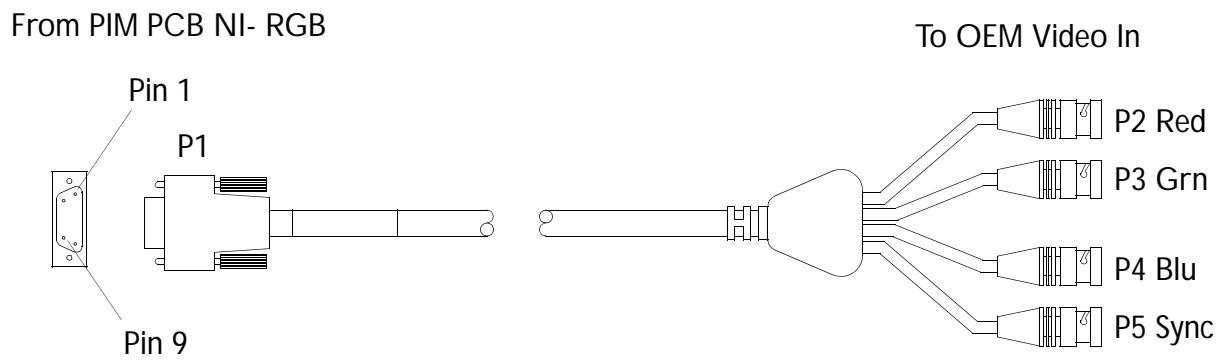
Table 11-3

RCA-RCA, Stereo Cable Assembly (P/N 2275-0267-XX)

From ADAPTR PCB Audio In/Out	To External VCR Audio Out/In	Function
MALE 1 TIP	MALE 3 TIP	R-AUDIO
MALE 1 RING	MALE 3 RING	R-AUDIO GND
MALE 2 TIP	MALE 4 TIP	L-AUDIO
MALE 2 RING	MALE 4 RING	L-AUDIO GND

Figure 11-11

OEM Cable Assembly, External (P/N 2275-0326-XX)



Pin-out [Table 11-4](#)

Cable [Table 11-1](#)

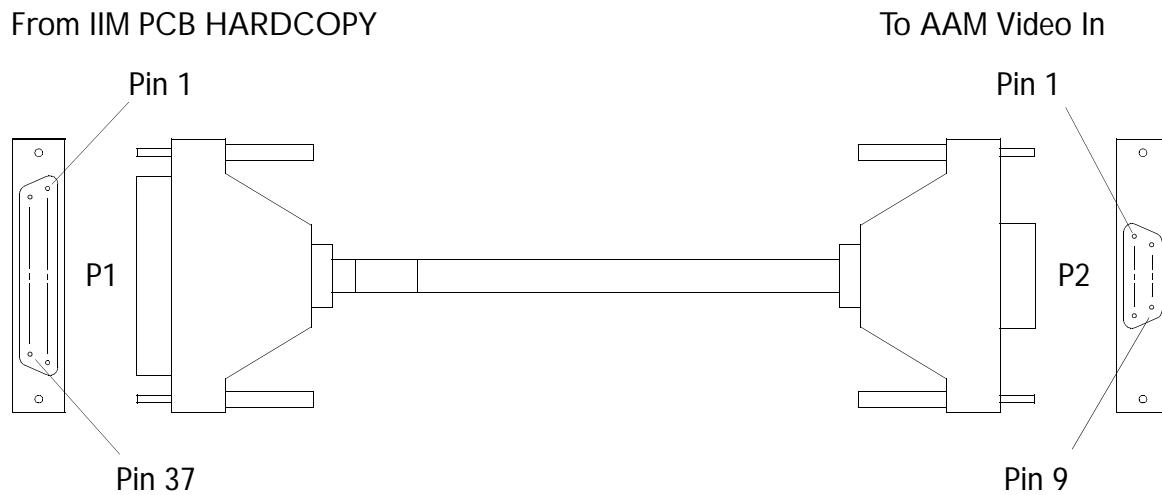
Table 11-4

OEM Cable Assembly, External (P/N 2275-0326-XX)

From PIM PCB	To OEM Video In Connectors	Function
P1-1	P2 CENTER	RED SIGNAL
P1-6	P2 SHIELD	RED_RETURN
P1-2	P3 CENTER	GREEN SIGNAL
P1-7	P3 SHIELD	GREEN_RETURN
P1-3	P4 CENTER	BLUE SIGNAL
P1-8	P4 SHIELD	BLUE_RETURN
P1-4	P5 CENTER	SYNC SIGNAL
P1-9	P5 SHIELD	SYNC_RETURN

Figure 11-12

AAM Video Input Signal Cable Assembly, Internal (P/N 2275-0327-XX)



Pin-out [Table 11-5](#)

Cable [Table 11-1](#)

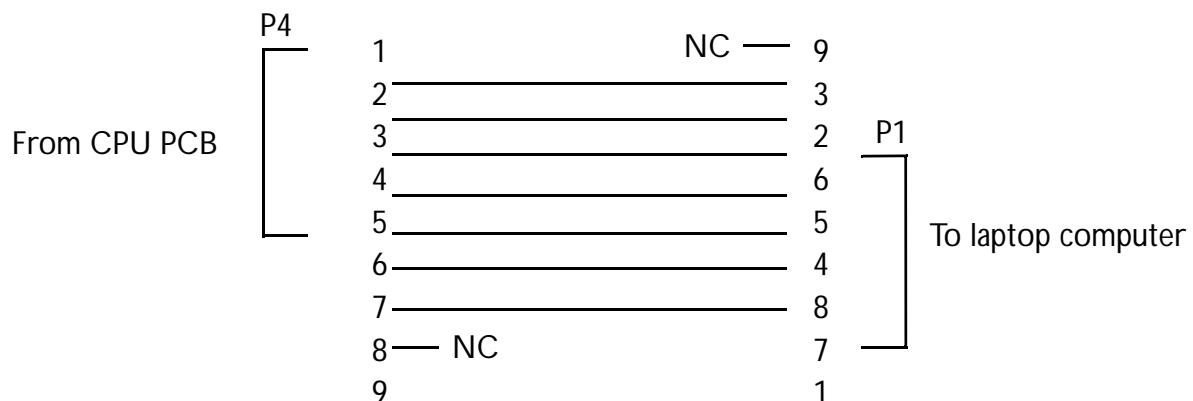
Table 11-5

AAM Video Input Signal Cable Assembly, Internal (P/N 2275-0327-XX)

From IIM (HARDCOPY)	To AAM (Video In)	Function
P1-1	P2-5	RED SIGNAL
P1-20	P2-4	RED_RETURN
P1-2	P2-3	GREEN SIGNAL
P1-21	P2-4	GREEN_RETURN
P1-3	P2-1	BLUE SIGNAL
P1-22	P2-2	BLUE_RETURN
P1-4	P2-6	SYNC SIGNAL
P1-23	P2-2	SYNC_RETURN

Figure 11-13

Serial Data Cable Assembly (P/N 2275-0337-XX)



P4 is the second connector from the top of the CPU PCB (9 pin Dsub, male).

Either end of the cable may be used on the HDI 5000 or the laptop connectors.

The only wires needed for communication between the HDI 5000 and a laptop computer are the TX, RX, and GND wires.

Pin-out [Table 11-6](#)

Cable [Table 11-1](#)

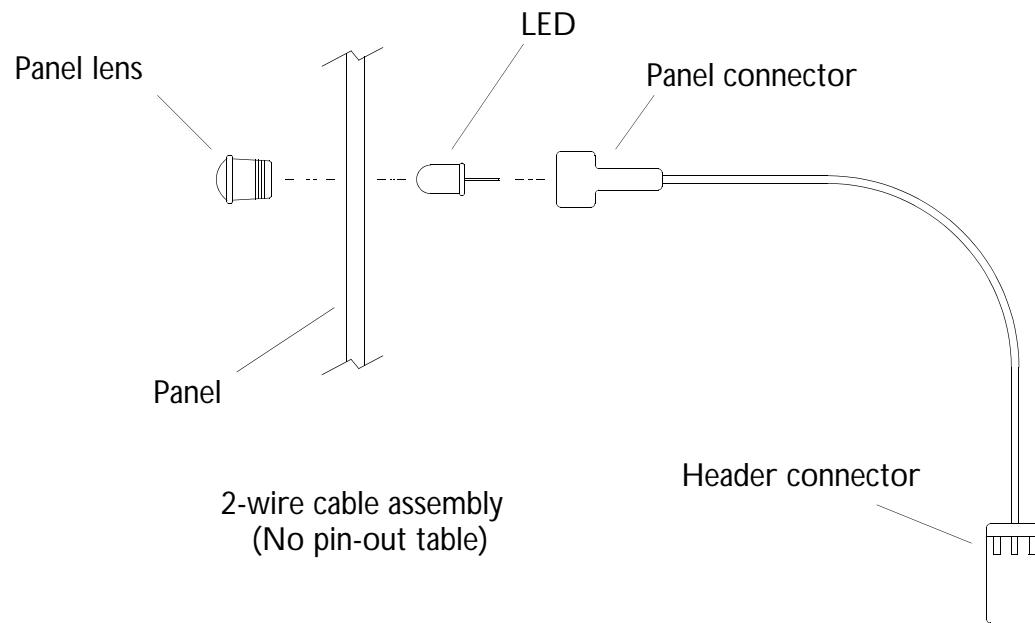
Table 11-6

Serial Data Cable Assembly (P/N 2275-0337-XX)

From CPU	To Laptop	Signal Function (P4 on CPU)
P4-1 to P4-6	-	CD
P4-2	P1-3	RX
P4-3	P1-2	TX
P4-4	P1-6 to P1-1	DTR
P4-5	P1-5	GND
P4-6	P1-4	DSRn
P4-7	P1-8	RTS
P4-8	P1-7	CTS
P4-9	-	NO CONNECTION
-	P1-9	

Figure 11-14

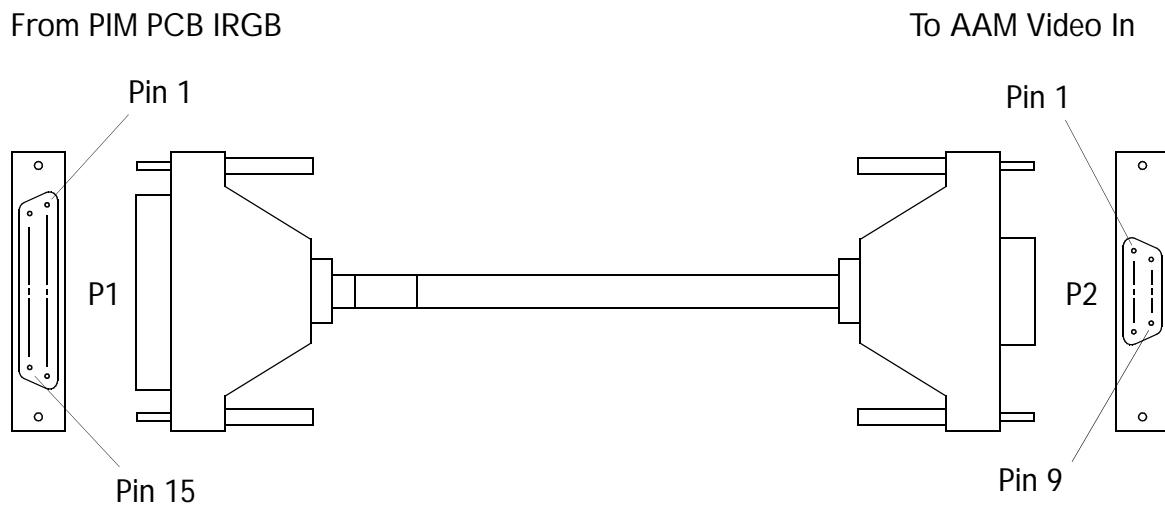
LED Cable Assembly (P/N 2275-0393-XX)



Cable assembly is located in the monitor. The LED is positioned above the monitor controls and may be seen through holes in the monitor cover.

Figure 11-15

AAM Input Cable Assembly, External (P/N 2275-0394-XX)



Pin-out [Table 11-7](#)

Cable [Table 11-1](#)

Table 11-7

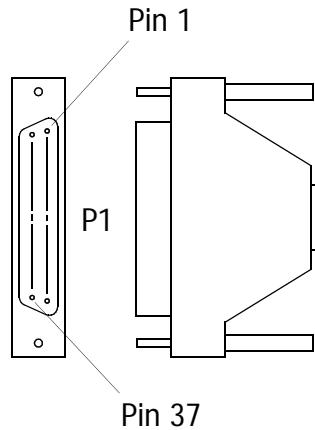
AAM Input Cable Assembly, External (P/N 2275-0394-XX)

From PIM (IRGB)	To AAM (Video In)	Function
P1-1	P2-5	RED SIGNAL
P1-9	P2-4	RED RETURN
P1-2	P2-3	GREEN SIGNAL
P1-10	P2-4	GREEN RETURN
P1-3	P2-1	BLUE SIGNAL
P1-11	P2-2	BLUE RETURN
P1-4	P2-6	SYNC SIGNAL
P1-12	P2-2	SYNC RETURN

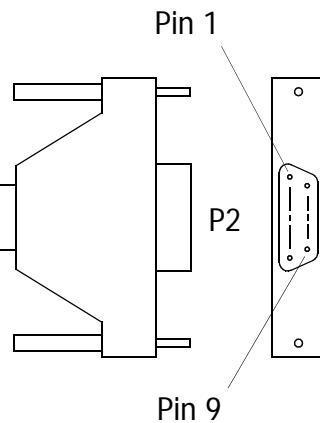
Figure 11-16

AAM Output Cable Assembly, Internal (P/N 2275-0395-XX)

From IIM PCB HARDCOPY



To AAM Video In



[Pin-out Table 11-8](#)
[Cable Table 11-1](#)

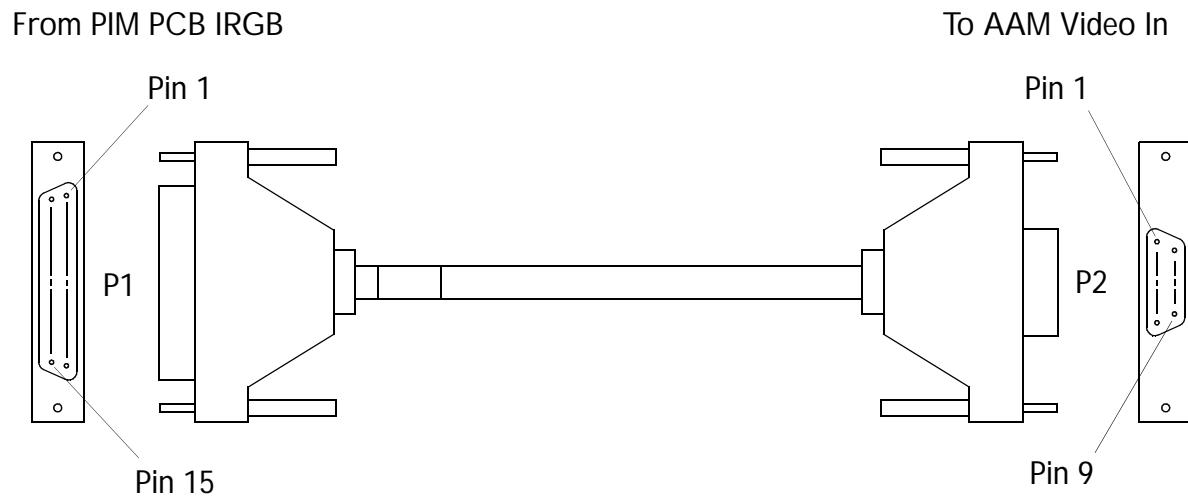
Table 11-8

AAM Output Cable Assembly, Internal (P/N 2275-0395-XX)

From IIM (HARDCOPY)	To AAM (Video In)	Function
P1-9	P2-3	Y-SIGNAL
P1-10	P2-8	Y-RETURN
P1-15	P2-4	C-SIGNAL
P1-5	P2-9	C-RETURN

Figure 11-17

AAM Output Cable Assembly, External (P/N 2275-0396-XX)



[Pin-out Table 11-9](#)

[Cable Table 11-1](#)

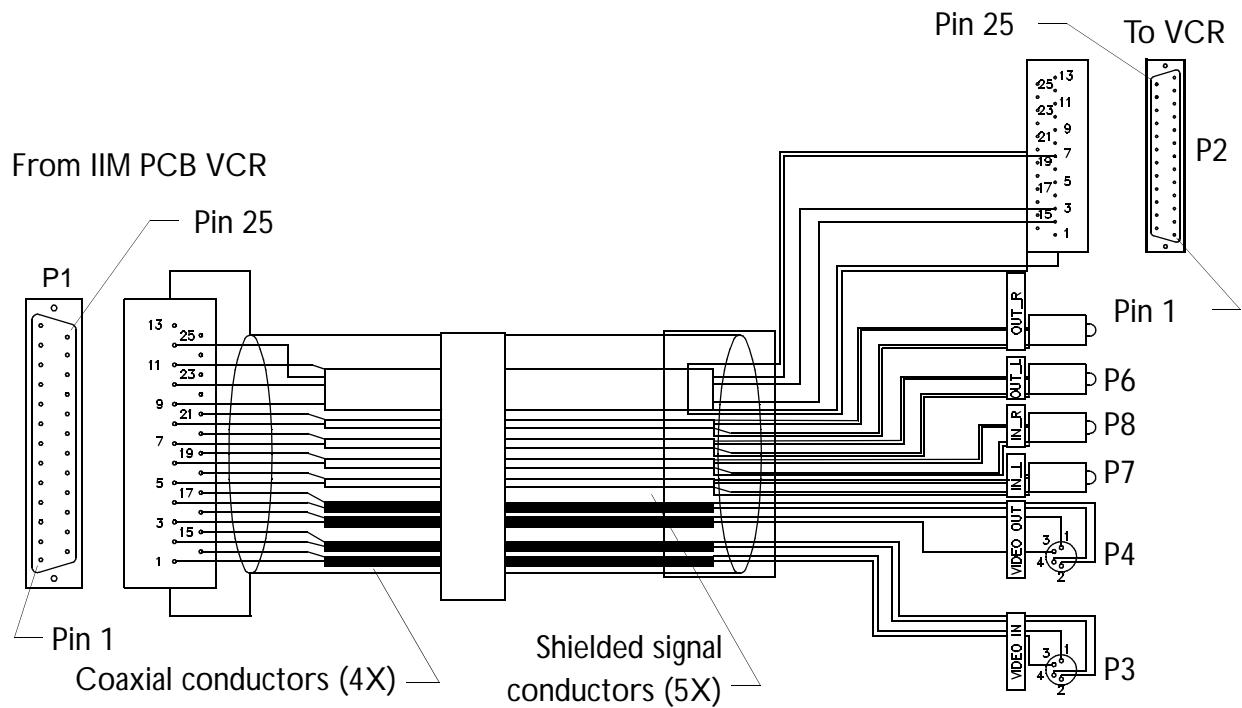
Table 11-9

AAM Output Cable Assembly, External (P/N 2275-0396-XX)

From PIM (IRGB)	To AAM (Video In)	Function
P1-9	P2-3	Y-SIGNAL
P1-10	P2-8	Y-RETURN
P1-15	P2-4	C-SIGNAL
P1-5	P2-9	C-RETURN

Figure 11-18

VCR Signal Cable Assembly, Internal (P/N 3500-1404-XX)



[Pin-out Table 11-10](#)

[Cable Table 11-1](#)

Table 11-10

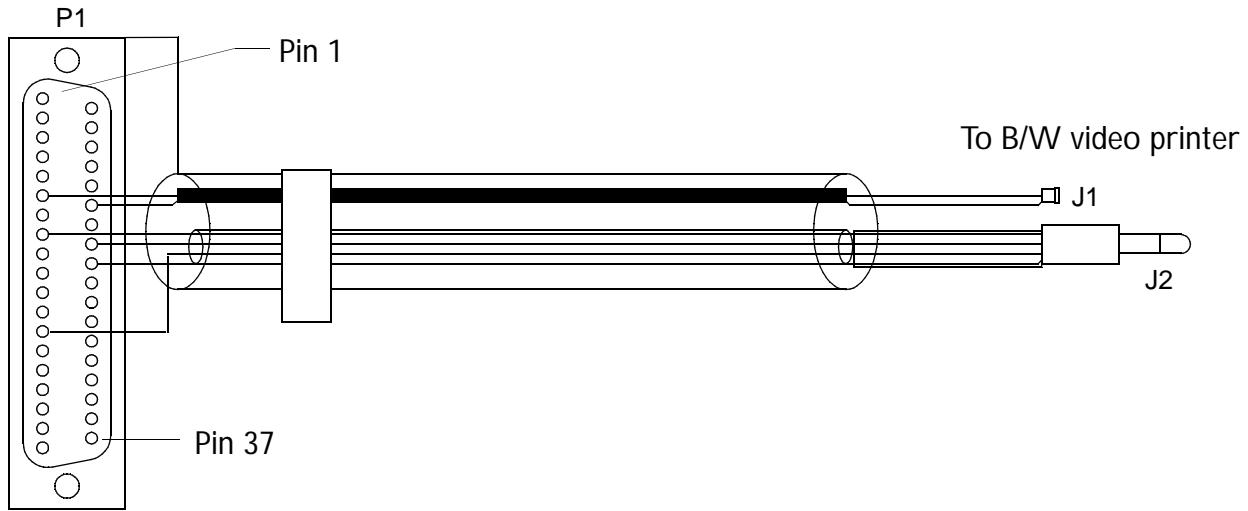
VCR Signal Cable Assembly, Internal (P/N 3500-1404-XX)

From IIM (VCR)	To VCR	Function
P1-1	P3-3	VCR_IN_Y
P1-14	P3-1 (Shield)	VCR_IN_Y return
P1-2	P3-4	VCR_IN_C
P1-15	P3-2 (Shield)	VCR_IN_C return
P1-9	P2-2	TX
P1-10	P2-3	RX
P1-12	P2-7	Return
P1-11	P2-Shell	Shield
P1-3	P4-3	VCR_OUT_Y
P1-16	P4-1 (Shield)	VCR_OUT_Y return
P1-4	P4-4	VCR_OUT_C
P1-17	P4-2 (Shield)	VCR_OUT_C return
P1-5	P7-Center	IN_L
P1-18	P7-Shield	IN_L_RET
P1-6	P8-Center	IN_R
P1-19	P8-Shield	IN_R_RET
P1-7	P6-Center	OUT_L
P1-20	P6-Shield	OUT_L_RET
P1-8	P5-Center	OUT_R
P1-21	P5-Shield	OUT_R_RET

Figure 11-19

B/W Video Printer Signal Cable Assembly, Internal (P/N 3500-1540-XX)

From IIM PCB HARDCOPY



Pin-out [Table 11-11](#)

Cable [Table 11-1](#)

Table 11-11

B/W Video Printer Signal Cable Assembly, Internal (P/N 3500-1540-XX)

From IIM (HARDCOPY)	To B/W Video Printer	Function
P1-6	J1 Center	VIDEO
P1-25	J1 Shield	VIDEO_RETURN
P1-8	J2 Tip	PRINT
P1-13	J2 Ring	READY
P1-27	J2 Housing	RETURN
P1-28	J2 Shell	(Drain wire)

Figure 11-20

RGB Printer Signal Cable Assembly, Internal (P/N 3500-1541-XX)

From IIM PCB HARDCOPY

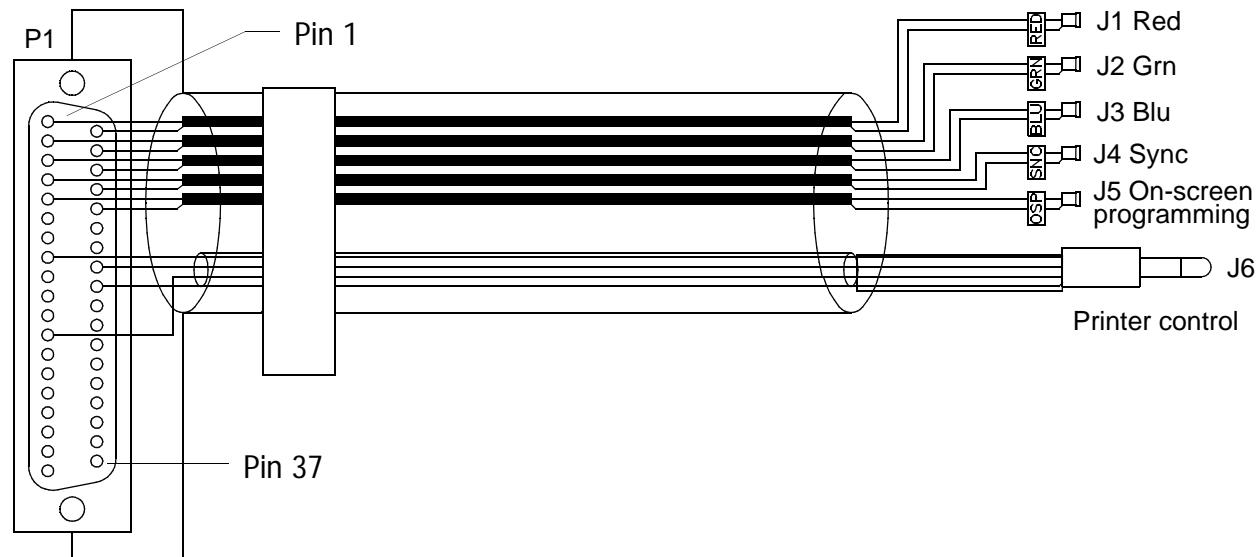
[Pin-out Table 11-12](#)[Cable Table 11-1](#)

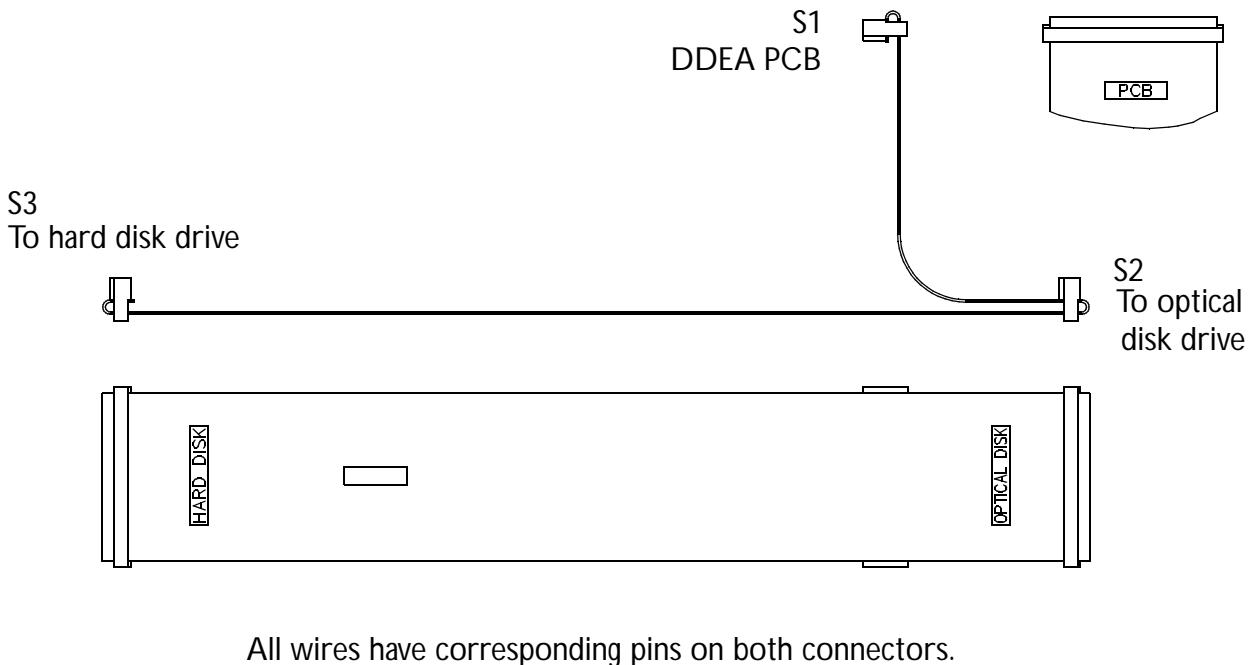
Table 11-12

RGB Printer Signal Cable Assembly, Internal (P/N 3500-1541-XX)

From IIM (HARDCOPY)	To RGB Printer	Function
P1-1	J1 Center	RED (R)
P1-20	J1 Shield	RED_RETURN
P1-2	J2 Center	GRN (G)
P1-21	J2 Shield	GRN_RETURN
P1-3	J3 Center	BLU (B)
P1-22	J3 Shield	BLUE_RETURN
P1-4	J4 Center	SNC (Sync)
P1-23	J4 Shield	SNC_RETURN
P1-5	J5 Center	OSP (VIDEO OUT)
P1-24	J5 Shield	OSP_RETURN (VIDEO OUT RETURN)
P1-8	J6 Tip	-
P1-12	J6 Ring	-
P1-27	J6 Housing	-
P1-28	Shield (Drain)	(Shield connected to housing at J6)

Figure 11-21

Disk Drive Signal Cable Assy (P/N 3500-1483-XX)



Pin-out [Table 11-13](#)

Cable [Table 11-1](#)

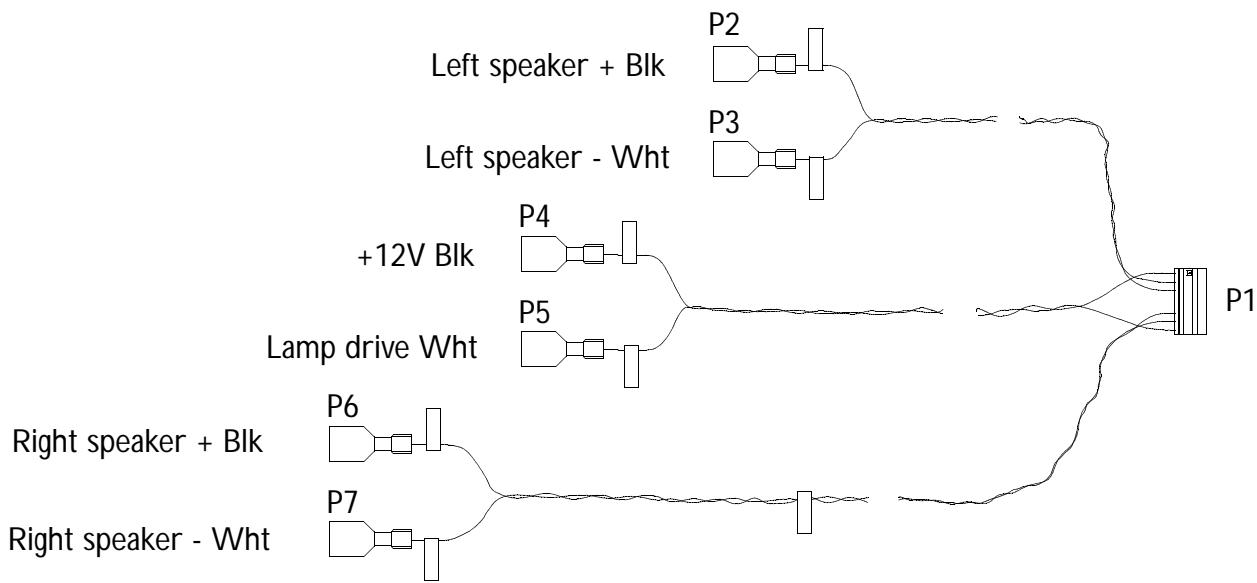
Table 11-13

Disk Drive Signal Cable Assembly (P/N 3500-1483-XX)

From DDEA	To Optical Drive	To Hard Drive
S1-1	S2-1	S3-1
S1-2	S2-2	S3-2
S1-3	S2-3	S3-3
S1-X	S2-X	S3-X
S1-49	S2-49	S3-49
S1-50	S2-50	S3-50

Figure 11-22

Monitor Lower Bezel Cable Assembly (P/N 3500-2614-XX)



Pin-out [Table 11-14](#)

Cable [Table 11-1](#)

Table 11-14

Monitor Lower Bezel Cable Assembly (P/N 3500-2614-XX)

P1	P2	P3	P4	P5	P6	P7	Function
1	-	-	1	-	-	-	+12V (black)
2	1	-	-	-	-	-	Left Speaker+ (black)
3	-	1	-	-	-	-	Left Speaker- (white)
4	-	-	-	-	-	-	Ground (not used)
5	-	-	-	-	1	-	Right Speaker+ (black)
6	-	-	-	-	-	1	Right Speaker- (white)
7	-	-	-	1	-	-	Lamp Drive (white)

Figure 11-23

Monitor Signal Cable Assembly (P/N 3500-2633-XX)

From IIM PCB MONITOR

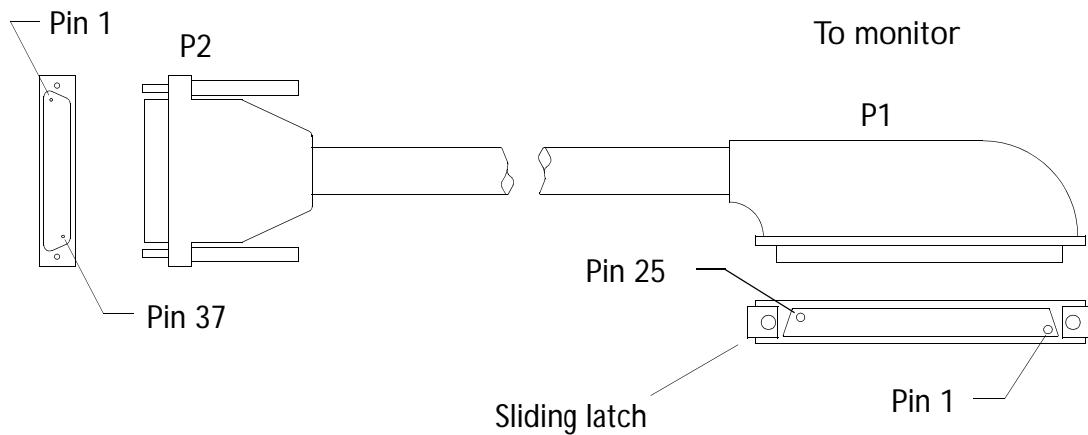
[Pin-out Table 11-15](#)[Cable Table 11-1](#)

Table 11-15

Monitor Signal Cable Assembly (P/N 3500-2633-XX)

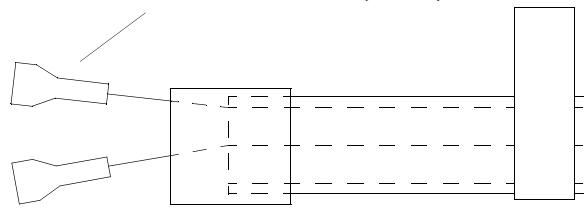
From IIM (MONITOR)	To Monitor	Function
P2-1	P1-10	GND
P2-20	P1-9	L_SPKR
P2-2	P1-22	GND
P2-21	P1-21	R_SPKR
P2-14	-	AUDIO SHIELD
P2-11	P1-11	MICR+
P2-30	P1-13	MICR-
P2-12	P1-12	MICR_SHIELD
P2-33	P1-17	CSYNC_INTMON
P2-15	P1-4	GND
P2-17	P1-16	BLUE_INTMON
P2-35	P1-3	BLUE_INTMON_REF
P2-18	P1-15	GREEN_INTMON
P2-36	P1-2	GREEN_INTMON_REF
P2-19	P1-14	RED_INTMON
P2-37	P1-1	RED_INTMON_REF

Figure 11-24

On/Standby Switch Cable Assembly (P/N 3500-2639-XX)

To ON/STANDBY switch

Rear connector (Black)



Center connector (Red)

To UIM PCB ON/STANDBY

P1

1
2
3

Unconnected

[Pin-out Table 11-16](#)

[Cable Table 11-1](#)

Table 11-16

On/Standby Switch Cable Assembly (P/N 3500-2639-XX)

From UIM PCB	To ON/STANDBY Switch	Function
	Spade Lugs	
P1-1	Spade Lug (Black wire)	GROUND
P1-2	Spade Lug (Red wire)	IIM_P2-8
P1-3	Drain - No Connection (Gnd)	GROUND

Figure 11-25

Sony RGB Printer Cable Assembly (P/N 3500-2641-XX)

From IIM PCB HARDCOPY

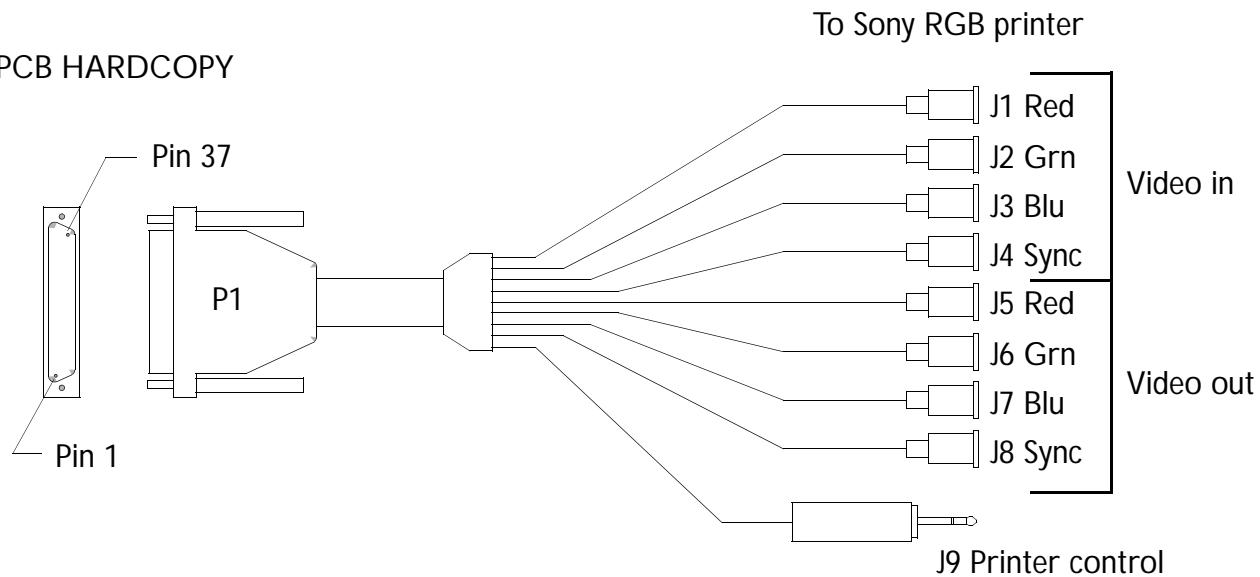
[Pin-out Table 11-17](#)[Cable Table 11-1](#)

Table 11-17

Sony RGB Printer Cable Assembly (P/N 3500-2641-XX)

From IIM HARDCOPY	To Coax Connectors	Function
P1-1	J1 Center	PIM_RED_INTHRDCPY
P1-20	J1 Shield	RED_OUT_RETURN
P1-2	J2 Center	PIM_GRN_INTHRDCPY
P1-21	J2 Shield	GRN_OUT_RETURN
P1-3	J3 Center	PIM_BLUE_INTHRDCPY
P1-22	J3 Shield	BLUE_OUT_RETURN
P1-4	J4 Center	PIM_CSYNC_INTHRDCPY
P1-23	J4 Shield	CSYNC_OUT_RETURN
P1-14	J5 Center	INTHRDCPY_RED_PIM
P1-25	J5 Shield	RED_IN_RETURN
P1-15	J6 Center	INTHRDCPY_GRN_PIM
P1-26	J6 Shield	GRN_IN_RETURN
P1-16	J7 Center	INTHRDCPY_BLUE_PIM
P1-27	J7 Shield	BLUE_OUT_RETURN
P1-17	J8 Center	INTHRDCPY_CSYNC_PIM
P1-28	J8 Shield	CSYNC_IN_RETURN
P1-8	J9 Tip	PIM_CNTRL_0_INTHRDCPY
P1-12	J9 Ring	INTHRDCPY_STATUS_0_PIM
P1-29	J9 Housing	GROUND
P1-30	J9 Housing	SHIELD

Figure 11-26

SVHS VCR Cable Assembly, External (P/N 3500-2642-XX)

From PIM PCB S-VID

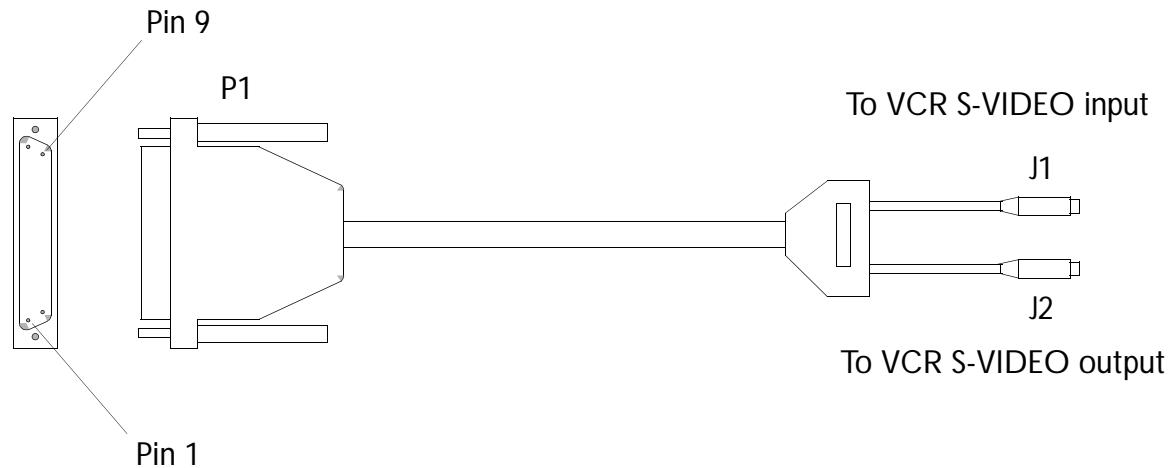
[Pin-out Table 11-18](#)[Cable Table 11-1](#)

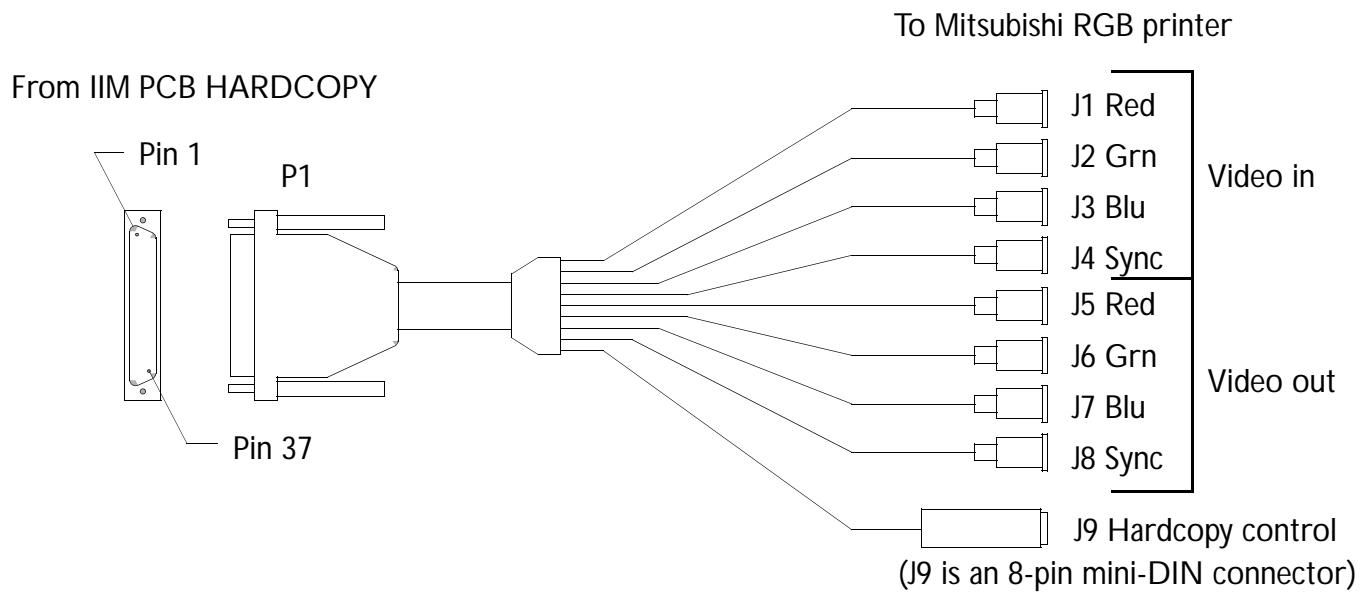
Table 11-18

SVHS VCR Cable Assembly, External (P/N 3500-2642-XX)

From PIM SVID	To J1/J2	Function
P1-1	J1-3	PIM_LUMA_EXTVCR
P1-5	J1-1	PIM_LUMA_EXTVCR_RETURN
P1-2	J1-4	PIM_CHROMA_EXTVCR
P1-6	J1-2	PIM_CHROMA_EXTVCR_RETURN
P1-3	J2-3	EXTVCR_LUMA_PIM
P1-7	J2-1	EXTVCR_LUMA_PIM_RETURN
P1-4	J2-4	EXTVCR_CHROMA_PIM
P1-8	J2-2	EXTVCR_CHROMA_PIM_RETURN

Figure 11-27

Mitsubishi RGB Printer Cable Assembly (P/N 3500-2643-XX)



Pin-out [Table 11-19](#)
Cable [Table 11-1](#)

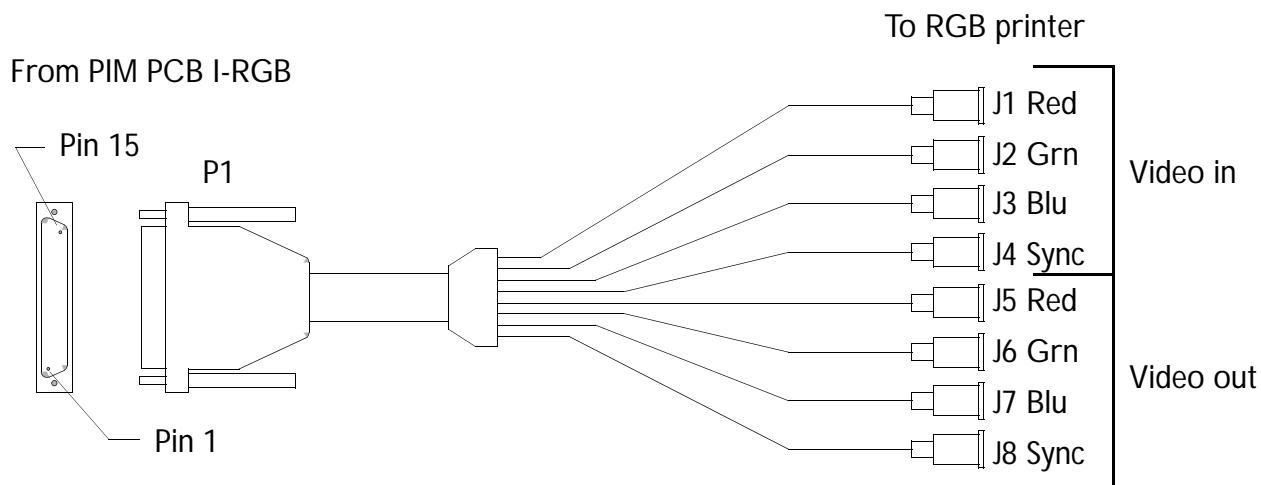
Table 11-19

Mitsubishi RGB Printer Cable Assembly (P/N 3500-2643-XX)

From IIM HARDCOPY	To Coax Connectors	Function
P1-1	J1 Center	PIM_RED_INTHRDCPY
P1-20	J1 Shield	RED_OUT_RETURN
P1-2	J2 Center	PIM_GRN_INTHRDCPY
P1-21	J2 Shield	GRN_OUT_RETURN
P1-3	J3 Center	PIM_BLUE_INTHRDCPY
P1-22	J3 Shield	BLUE_OUT_RETURN
P1-4	J4 Center	PIM_CSYNC_INTHRDCPY
P1-23	J4 Shield	CSYNC_OUT_RETURN
P1-14	J5 Center	INTHRDCPY_RED_PIM
P1-25	J5 Shield	RED_IN_RETURN
P1-15	J6 Center	INTHRDCPY_GRN_PIM
P1-26	J6 Shield	GRN_IN_RETURN
P1-16	J7 Center	INTHRDCPY_BLUE_PIM
P1-27	J7 Shield	BLUE_OUT_RETURN
P1-17	J8 Center	INTHRDCPY_CSYNC_PIM
P1-28	J8 Shield	CSYNC_IN_RETURN
P1-8	J9-5	PIM_CNTRL0_HRDCPY
P1-9	J9-2	PIM_CNTRL1_HRDCPY
P1-12	J9-4	HRDCPY_STATUS0_PIM
P1-29	J9 Shield	SHIELD

Figure 11-28

RGB Printer Cable Assembly, External (P/N 3500-2644-XX)



[Pin-out Table 11-20](#)

[Cable Table 11-1](#)

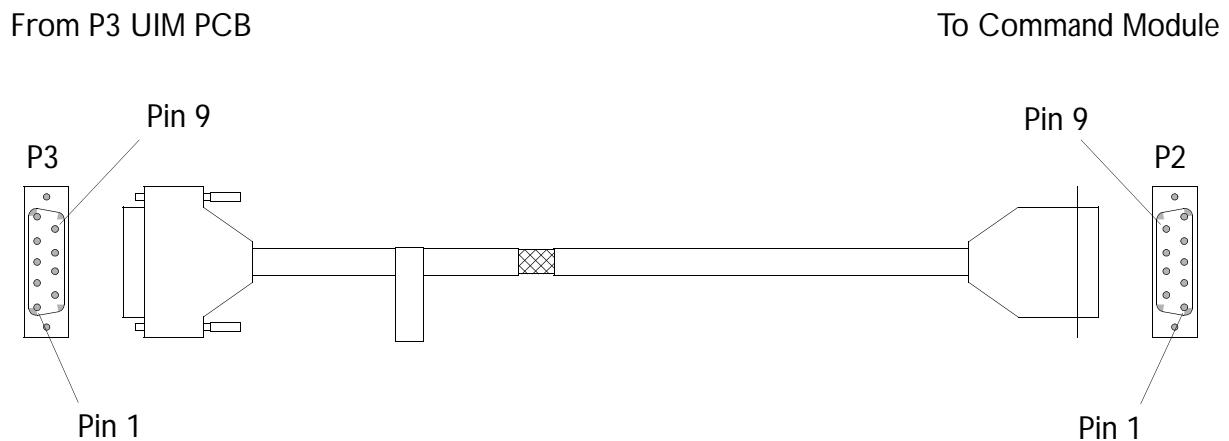
Table 11-20

RGB Printer Cable Assembly, External (P/N 3500-2644-XX)

From PIM IRGB	To Coax Connectors	Function
P1-1	J1 Center	PIM_RED_EXTHRDCPY
P1-9	J1 Shield	RED_OUT_RETURN
P1-2	J2 Center	PIM_GRN_EXTHRDCPY
P1-10	J2 Shield	GRN_OUT_RETURN
P1-3	J3 Center	PIM_BLUE_EXTHRDCPY
P1-11	J3 Shield	BLUE_OUT_RETURN
P1-4	J4 Center	PIM_CSYNC_EXTHRDCPY
P1-12	J4 Shield	CSYNC_OUT_RETURN
P1-8	J5 Center	EXTHRDCPY_RED_PIM
P1-13	J5 Shield	RED_IN_RETURN
P1-7	J6 Center	EXTHRDCPY_GRN_PIM
P1-14	J6 Shield	GRN_IN_RETURN
P1-6	J7 Center	EXTHRDCPY_BLUE_PIM
P1-15	J7 Shield	BLUE_OUT_RETURN
P1-5	J8 Center	EXTHRDCPY_CSYNC_PIM
P1-15	J8 Shield	CSYNC_IN_RETURN

Figure 11-29

Remote Control Port Cable Assembly (P/N 3500-2741-XX)



Pin-out [Table 11-21](#)

Cable [Table 11-1](#)

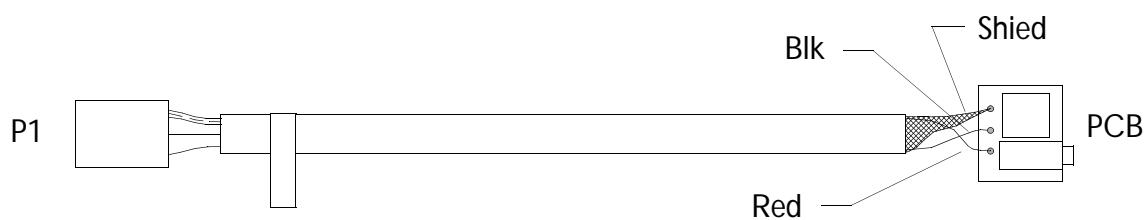
Table 11-21

Remote Control Port Cable Assembly (P/N 3500-2741-XX)

From P3 UIM	To P2 Command Module	Function
P3-9	P2-9	+5 VOLT
P3-8	P2-8	+5 VOLT
P3-7	P2-7	GROUND
P3-6	P2-6	GROUND
P3-5	P2-5	GROUND (Not used)
P3-4	P2-4	RMOTE_DATA_UIF
P3-3	P2-3	PIM_CLOCK_UIF
P3-2	P2-2	PIM_STROBE_UIF
P3-1	P2-1	UIF_DATA_RMOTE

Figure 11-30

Microphone Internal Monitor Cable Assembly (P/N 3500-2752-XX)



Pin-out [Table 11-22](#)

Cable [Table 11-1](#)

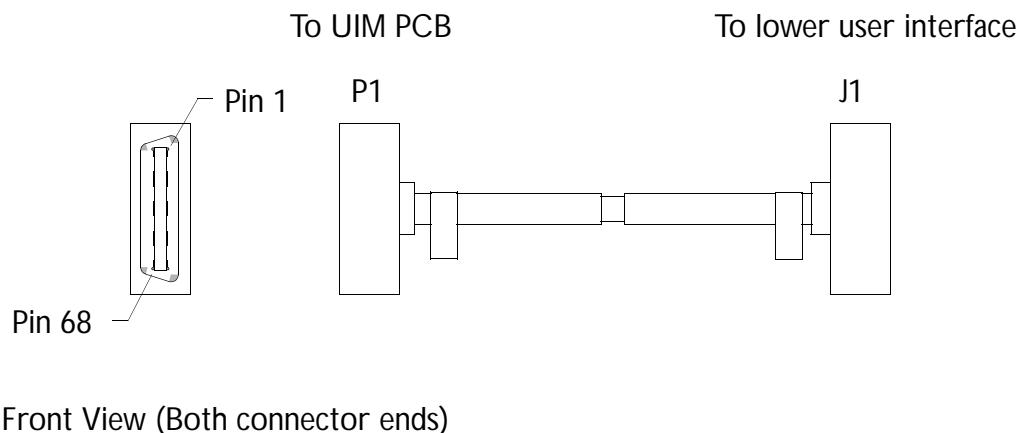
Table 11-22

Microphone Internal Monitor Cable Assembly (P/N 3500-2752-XX)

From P1	To PCB	Function
P1-3	RED	MIC+
P1-2	BLACK	MIC-
P1-1	SHIELD	SHIELD

Figure 11-31

UIM to Lower User Interface Cable Assembly (P/N 3500-2770-XX)



Front View (Both connector ends)

Pin-out [Table 11-23](#)

Cable [Table 11-1](#)

Table 11-23

UIM to Lower User Interface Cable Assembly (P/N 3500-2770-XX)

From P1 UIM PCB	To J1 Lower UIF	Function
P1-1	J1-1	L_SENSE_12
P1-2	J1-2	L_SENSE_11
P1-3	J1-3	L_SENSE_09
P1-4	J1-4	L_SENSE_04
P1-5	J1-5	L_SENSE_07
P1-6	J1-6	L_SENSE_06
P1-7	J1-7	L_SENSE_00
P1-8	J1-8	L_SENSE_01
P1-9	J1-9	L_SENSE_03
P1-10	J1-10	TB_YA
P1-11	J1-11	TB_XB
P1-12	J1-12	TB_XA
P1-13	J1-13	L_LED_1
P1-14	J1-14	L_SENSE_15
P1-15	J1-15	L_SCAN_5
P1-16	J1-16	L_SCAN_3
P1-17	J1-17	L_SCAN_0
P1-18	J1-18	L_SCAN_2
P1-19	J1-19	L_SCAN_6
P1-20	J1-20	L_SENSE_14
P1-21	J1-21	L_LED_2

Table 11-23

UIM to Lower User Interface Cable Assembly (P/N 3500-2770-XX) (Continued)

From P1 UIM PCB	To J1 Lower UIF	Function
P1-22	J1-22	DA_4
P1-23	J1-23	DA_5
P1-24	J1-24	DCS1n
P1-25	J1-25	DCS2n
P1-26	J1-26	DCS4n
P1-27	J1-27	AND_CLK
P1-28	J1-28	DD_1
P1-29	J1-29	DD_2
P1-30	J1-30	DD_4
P1-31	J1-31	DD_5
P1-32	J1-32	DA_0
P1-33	J1-33	DD_7
P1-34	J1-34	DA_1
P1-35	J1-35	L_SENSE_10
P1-36	J1-36	GROUND
P1-37	J1-37	L_SENSE_08
P1-38	J1-38	GROUND
P1-39	J1-39	L_SENSE_05
P1-40	J1-40	GROUND
P1-41	J1-41	L_SENSE_02
P1-42	J1-42	GROUND

Table 11-23

UIM to Lower User Interface Cable Assembly (P/N 3500-2770-XX) (Continued)

From P1 UIM PCB	To J1 Lower UIF	Function
P1-43	J1-43	TB_YB
P1-44	J1-44	-12 VOLT
P1-45	J1-45	L_LED_3
P1-46	J1-46	-12 VOLT
P1-47	J1-47	L_SENSE_13
P1-48	J1-48	L_SCAN_7
P1-49	J1-49	L_SCAN_1
P1-50	J1-50	+5 VOLT
P1-51	J1-51	L_SCAN_4
P1-52	J1-52	+5 VOLT
P1-53	J1-53	L_LED_8
P1-54	J1-54	+5 VOLT
P1-55	J1-55	DA_3
P1-56	J1-56	+5 VOLT
P1-57	J1-57	DCS0n
P1-58	J1-58	+5 VOLT
P1-59	J1-59	DCS3n
P1-60	J1-60	+5 VOLT
P1-61	J1-61	DD_0
P1-62	J1-62	GROUND
P1-63	J1-63	DD_3

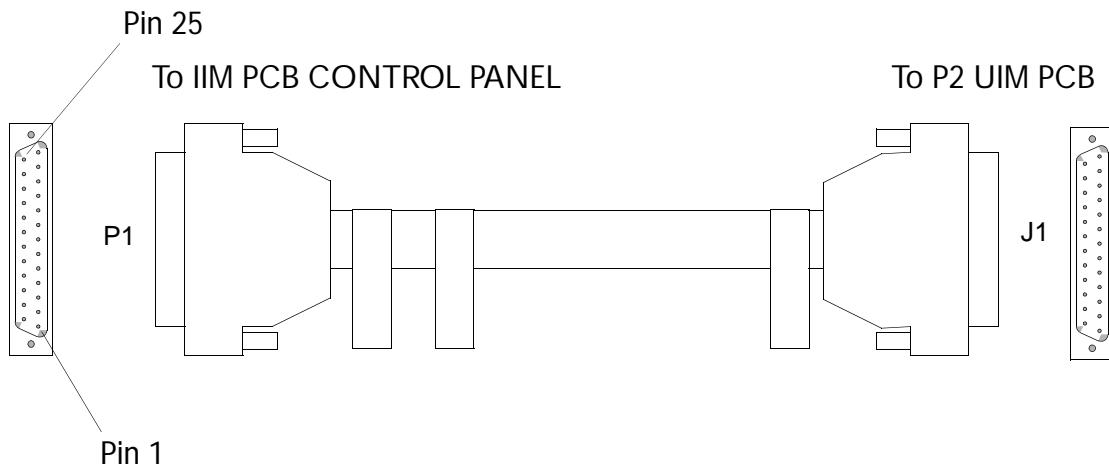
Table 11-23

UIM to Lower User Interface Cable Assembly (P/N 3500-2770-XX) (Continued)

From P1 UIM PCB	To J1 Lower UIF	Function
P1-64	J1-64	GROUND
P1-65	J1-65	DD_6
P1-66	J1-66	GROUND
P1-67	J1-67	DA_2
P1-68	J1-68	GROUND

Figure 11-32

IIM to UIM Cable Assembly (P/N 3500-2771-XX)



Pin-out [Table 11-24](#)
Cable [Table 11-1](#)

Table 11-24

IIM to UIM Cable Assembly (P/N 3500-2771-XX)

To IIM PCB CONTROL PANEL	To P2 UIM PCB	Function
P1-1	J1-1	+5 VOLT
P1-2	J1-2	+5 VOLT
P1-3	J1-3	+5 VOLT
P1-4	J1-4	+5 VOLT
P1-5	J1-5	+12 VOLT
P1-6	J1-6	-12 VOLT
P1-7	J1-7	No Connection
P1-8	J1-8	ON/STANDBY SWITCH-2
P1-9	J1-9	No Connection
P1-10	J1-10	No Connection
P1-11	J1-11	GROUND
P1-12	J1-12	PIM_CLOCK_UIF
P1-13	J1-13	PIM_DATA_UIF
P1-14	J1-14	GROUND
P1-15	J1-15	GROUND
P1-16	J1-16	GROUND
P1-17	J1-17	GROUND
P1-18	J1-18	GROUND
P1-19	J1-19	GROUND
P1-20	J1-20	SPEAKER LS1
P1-21	J1-21	GROUND

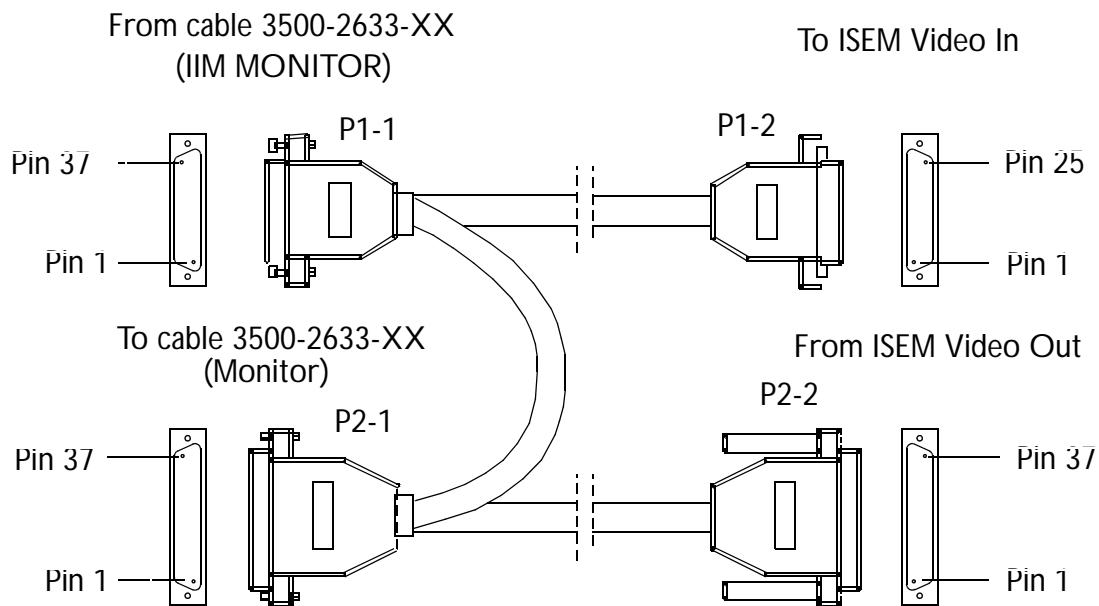
Table 11-24

IIM to UIM Cable Assembly (P/N 3500-2771-XX) (Continued)

To IIM PCB CONTROL PANEL	To P2 UIM PCB	Function
P1-22	J1-22	No Connection
P1-23	J1-23	No Connection
P1-24	J1-24	PIM_STROBE_UIF
P1-25	J1-25	UIF_DATA_PIM

Figure 11-33

ISEM Adapter Cable Assembly (P/N 3500-2772-XX)



[Pin-out Table 11-25](#)

[Cable Table 11-1](#)

Table 11-25

ISEM Adapter Cable Assembly (P/N 3500-2772-XX)

From P1-1 IIM MONITOR	To P1-2 ISEM Video In	Function
14	14	RED_VIDEO
1	1	RED_RETURN
15	15	GREEN_VIDEO
2	2	GREEN_RETURN
16	16	BLUE_VIDEO
3	3	BLUE_RETURN
17	17	COMPOSITE_SYNC
4	4	SYNC_RETURN
21	21	RIGHT_SPEAKER+
22	22	RIGHT_SPEAKER-
9	9	LEFT_SPEAKER+
10	10	LEFT_SPEAKER-
4	4	GROUND
11	11	UPHONE+
13	13	UPHONE-
12	12	UPHONE_SHIELD

Table 11-25

ISEM Adapter Cable Assembly (P/N 3500-2772-XX) (Continued)

From P2-1 Monitor	To P2-2 ISEM Video Out	Function
19	19	RED_VIDEO
37	37	RED_RETURN
18	18	GREEN_VIDEO
36	36	GREEN_RETURN
17	17	BLUE_VIDEO
35	35	BLUE_RETURN
33	33	COMPOSITE_SYNC
15	15	SYNC_RETURN
21	21	RIGHT_SPEAKER+
2	2	RIGHT_SPEAKER-
20	20	LEFT_SPEAKER+
1	1	LEFT_SPEAKER-
3	3	GROUND
11	11	UPHONE+
30	30	UPHONE-
12	12	UPHONE_SHIELD

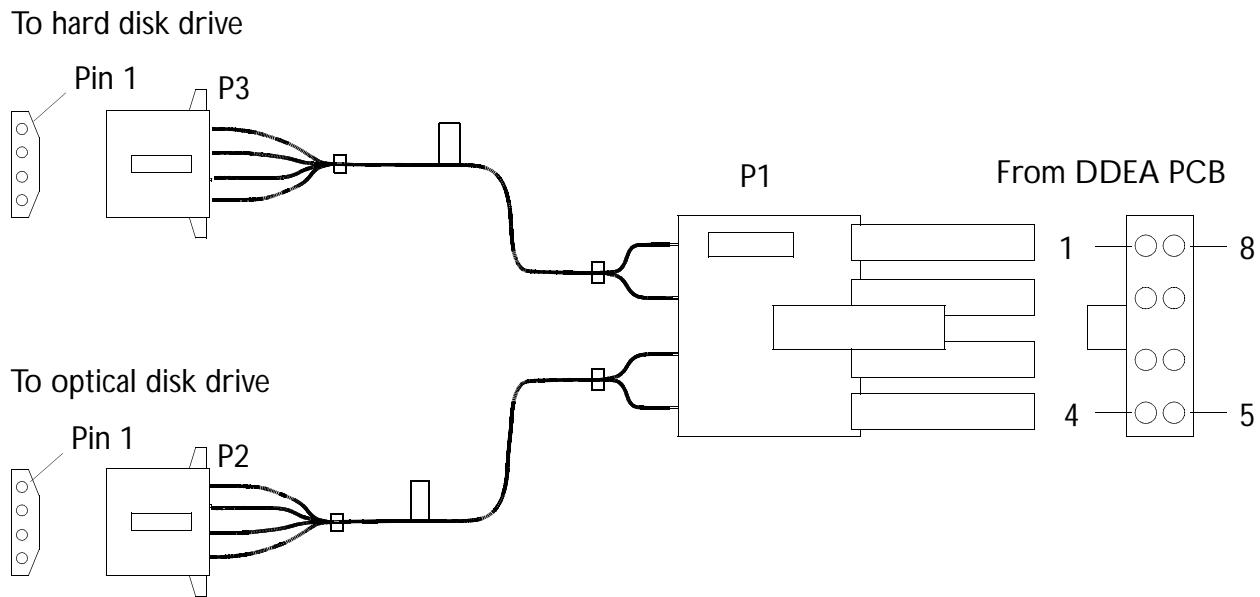
Table 11-25

ISEM Adapter Cable Assembly (P/N 3500-2772-XX) (Continued)

From P1-1 Pin	JUMPER To P2-1 Pin	Function
5	7	+12 VOLT
8	6	GROUND
24	5	-12 VOLT
6	4	+5 VOLT
NO CONNECTION	25 CONNECT P2-1 PIN 6	GROUND
19	8	SCL
18	27	SDA
20	9	GROUND

Figure 11-34

Disk Drive Power Cable Assy (P/N 3500-1482-XX)



[Pin-out Table 11-26](#)

[Cable Table 11-2](#)

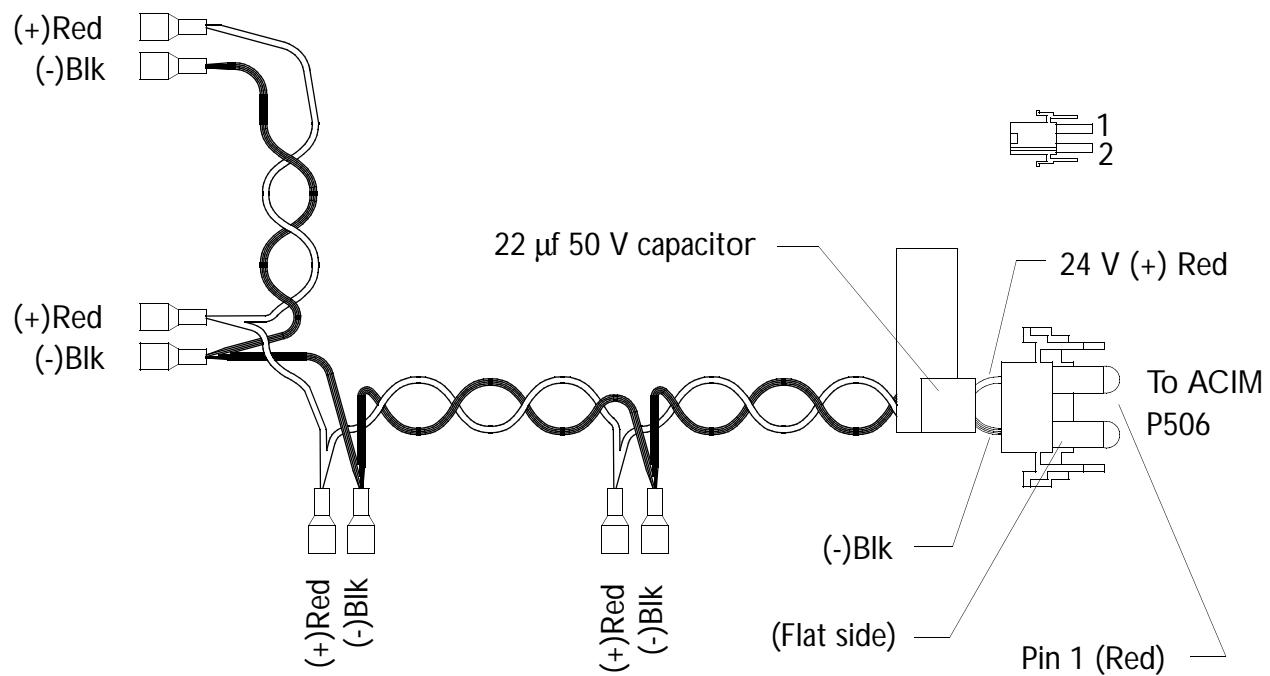
Table 11-26

Disk Drive Power Cable Assembly (P/N 3500-1482-XX)

From DDEA PCB	To Optical Drive	To Hard Drive	Function
P1-1	P2-1	-	+12 VDC
P1-2	P2-4	-	+ 5 VDC
P1-3	-	P3-1	+ 12 VDC
P1-4	-	P3-4	+ 5 VDC
P1-5	P2-2	-	+ 12 VDC Return
P1-6	P2-3	-	+ 5 VDC Return
P1-7	-	P3-2	+ 12 VDC Return
P1-8	-	P3-3	+ 5 VDC Return

Figure 11-35

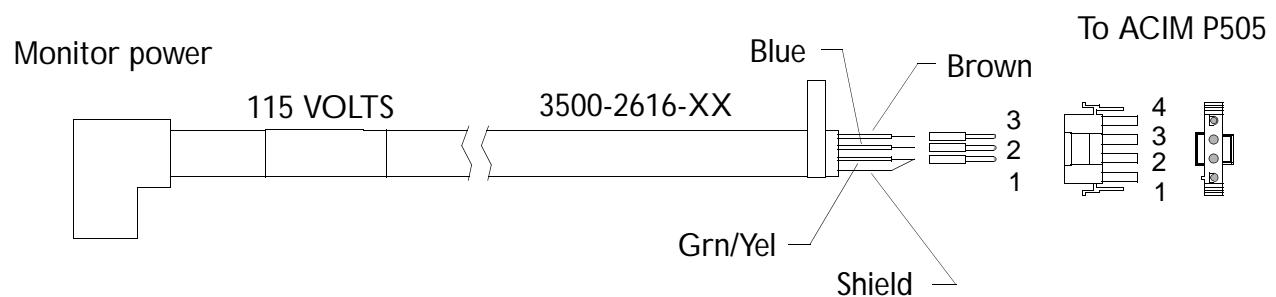
Fan Power Cable Assembly (P/N 3500-1514-XX)



All Black and Red wire pairs go to individual fans.

Figure 11-36

Monitor Power Cable Assembly (P/N 3500-2616-XX)



Pin-out [Table 11-27](#)

Cable [Table 11-2](#)

Table 11-27

Monitor Power Cable Assembly (P/N 3500-2616-XX)

From P505 on ACIM	To Monitor Power Connector	Function
Pin 1	Pin 1	GND from ACIM (Green/Yellow)
Pin 2	Pin 2	Neutral (Blue)
Pin 3	Pin 3	Line Voltage (Brown) 115V

Figure 11-37

OEM Power Cable Assembly, 115 VAC, Internal

3500-1517-XX - AAM

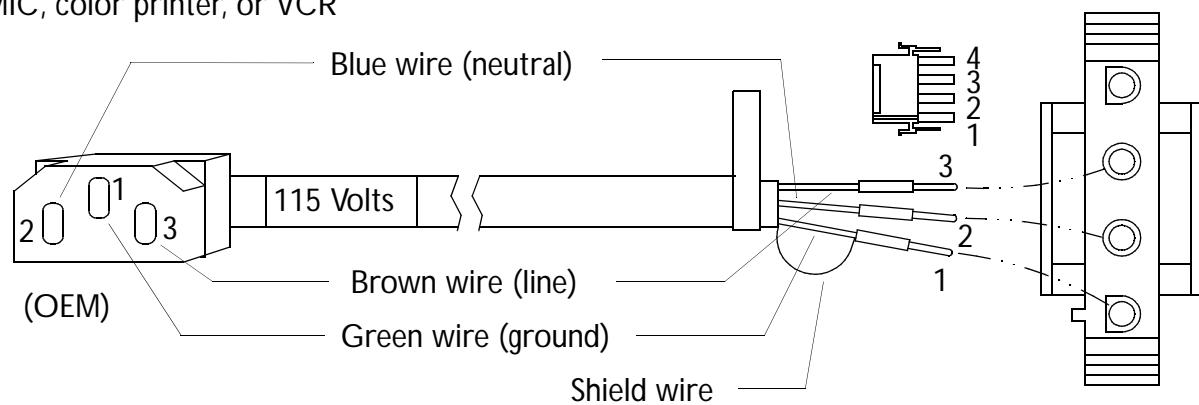


3500-1873-XX - MIC or Hardcopy

3500-2780-XX - VCR

To 3500-1578 ACIM:
Hardcopy - P503
VCR - P504

To AAM, MIC, color printer, or VCR

Pin-out [Table 11-28](#)Cable [Table 11-2](#)

Power cables are not interchangeable. Lengths will vary.

Table 11-28

OEM Power Cable Assembly, 115 VAC, Internal

From P503/P504 on ACIM	To OEM Power Connectors	Function
Pin 1	Pin 1	GND from ACIM (Green/Yellow)
Pin 2	Pin 2	Neutral (Blue)
Pin 3	Pin 3	Line Voltage (Brown) 115V

Figure 11-38

OEM Power Cable Assembly, 230 VAC, Internal

3500-1547-XX - Mitsubishi Color Printer

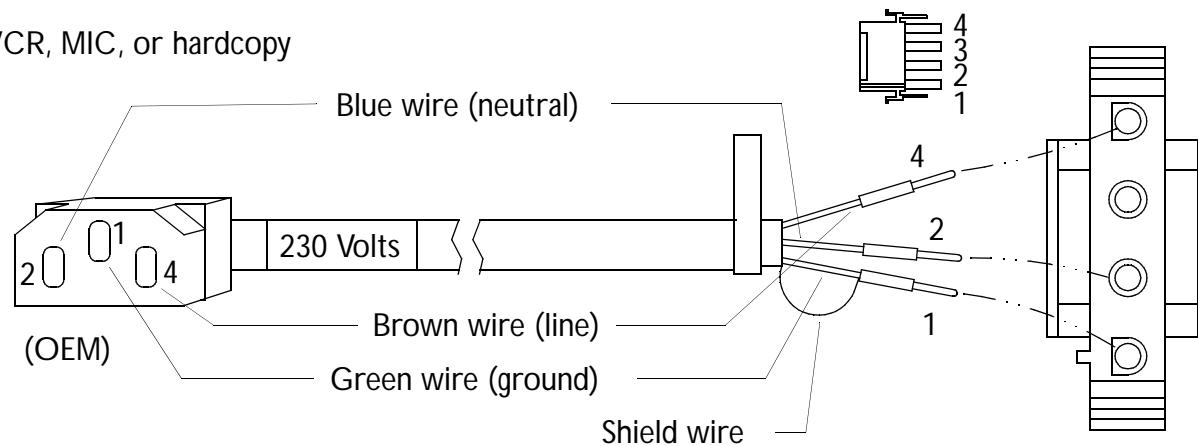


3500-2397-XX - MIC or Hardcopy

3500-2781-XX - VCR

To 3500-1579/1580 ACIM:
Hardcopy - P503
VCR - P504

To VCR, MIC, or hardcopy

Pin-out [Table 11-29](#)
Cable [Table 11-2](#)

Power cables are not interchangeable. Lengths will vary.

Table 11-29

OEM Power Cable Assembly, 230 VAC, Internal

From P503/P504 on ACIM	To OEM Power Connectors	Function
Pin 1	Pin 1	GND from ACIM (Green/Yellow)
Pin 2	Pin 2	Neutral (Blue)
Pin 4	Pin 4	Line Voltage (Brown) 230V

Figure 11-39 Monitor Internal Cabling Diagram

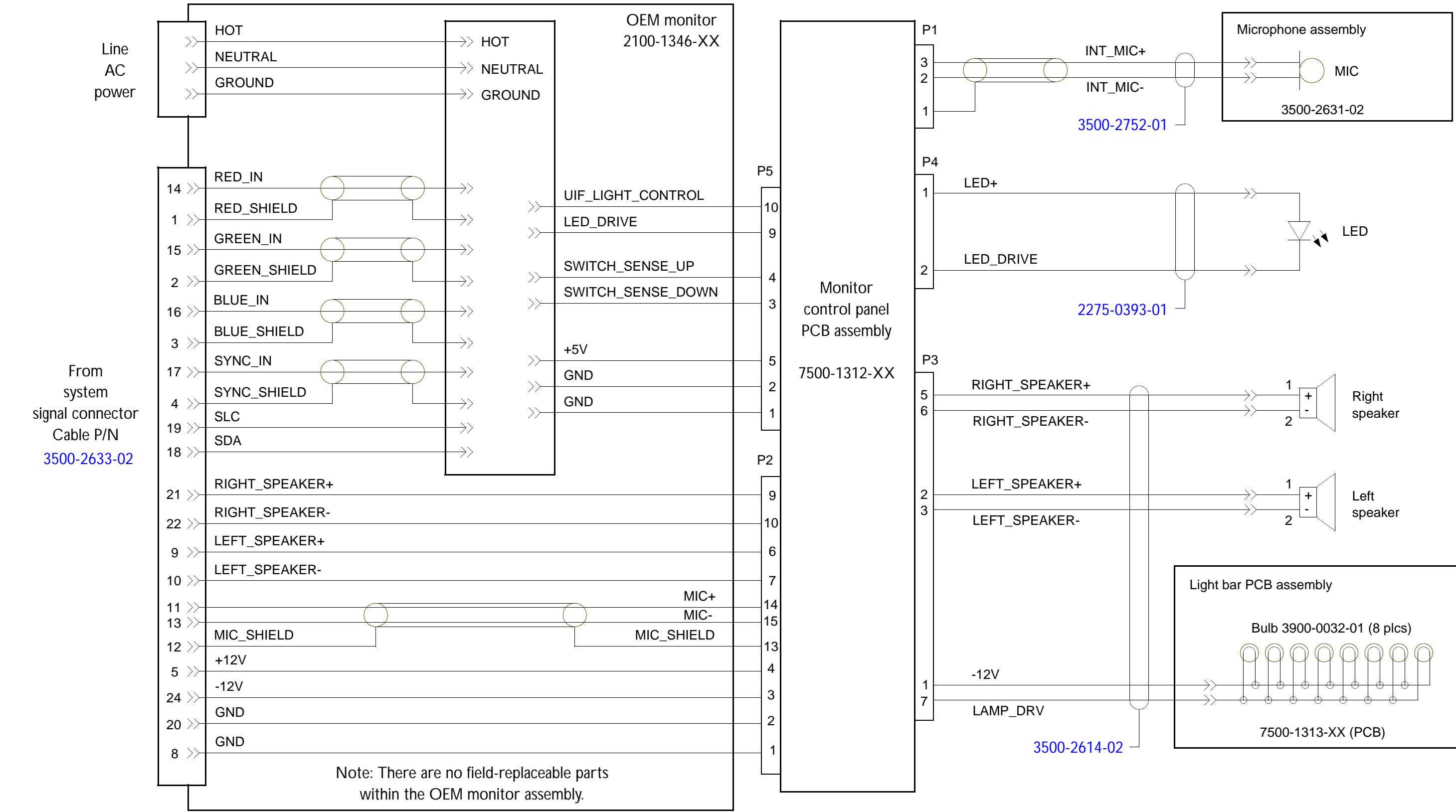


Figure 11-40 Notes for HDI 5000 (Classic) Signal/Power Diagrams

- [1] 2275-0327-XX and 2275-0394-XX = Internal installation 2275-0395-XX and 2275-0396-XX = External installation
- [2] Do not connect external printer to printer connector on PIM PCB.
- [3] Part number 4500-5512-01 is an external disk drive test cable.
- [4] To obtain video loop-through when the ISEM is installed, video is routed from the monitor connector on the IIM PCB to the ISEM Video In and out the ISEM Video Out connector to the monitor. (Two 3500-2633-XX cables are required.)
- [5] When the ISEM is not installed, only one 3500-2633-XX is required.
- [6] Mitsubishi printer only.
- [7] Connect this end to P503 or P504 for UP5600 printer installation.
- [8] If a UP5600 is installed, disconnect the main transformer connector to P501 on the ACIM. Connect the UP5600 as shown.
- [9] ON/STANDBY switch controls system logic voltage to turn ultrasound system ON & OFF.

Figure 11-41 HDI 5000 (Classic) System Signal Interconnect Diagram

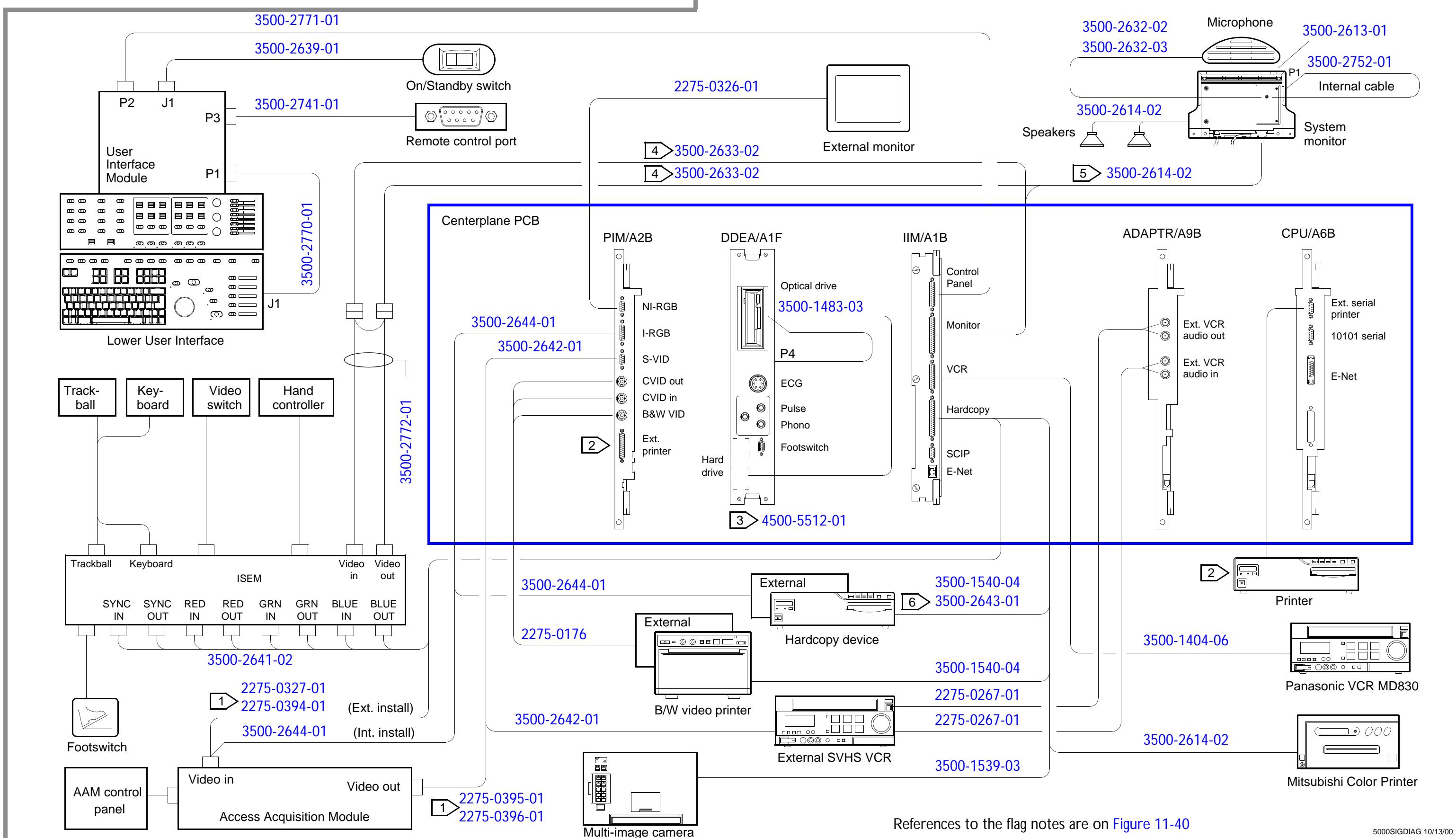


Figure 11-42 HDI 5000 (Classic) System Power Distribution Diagram

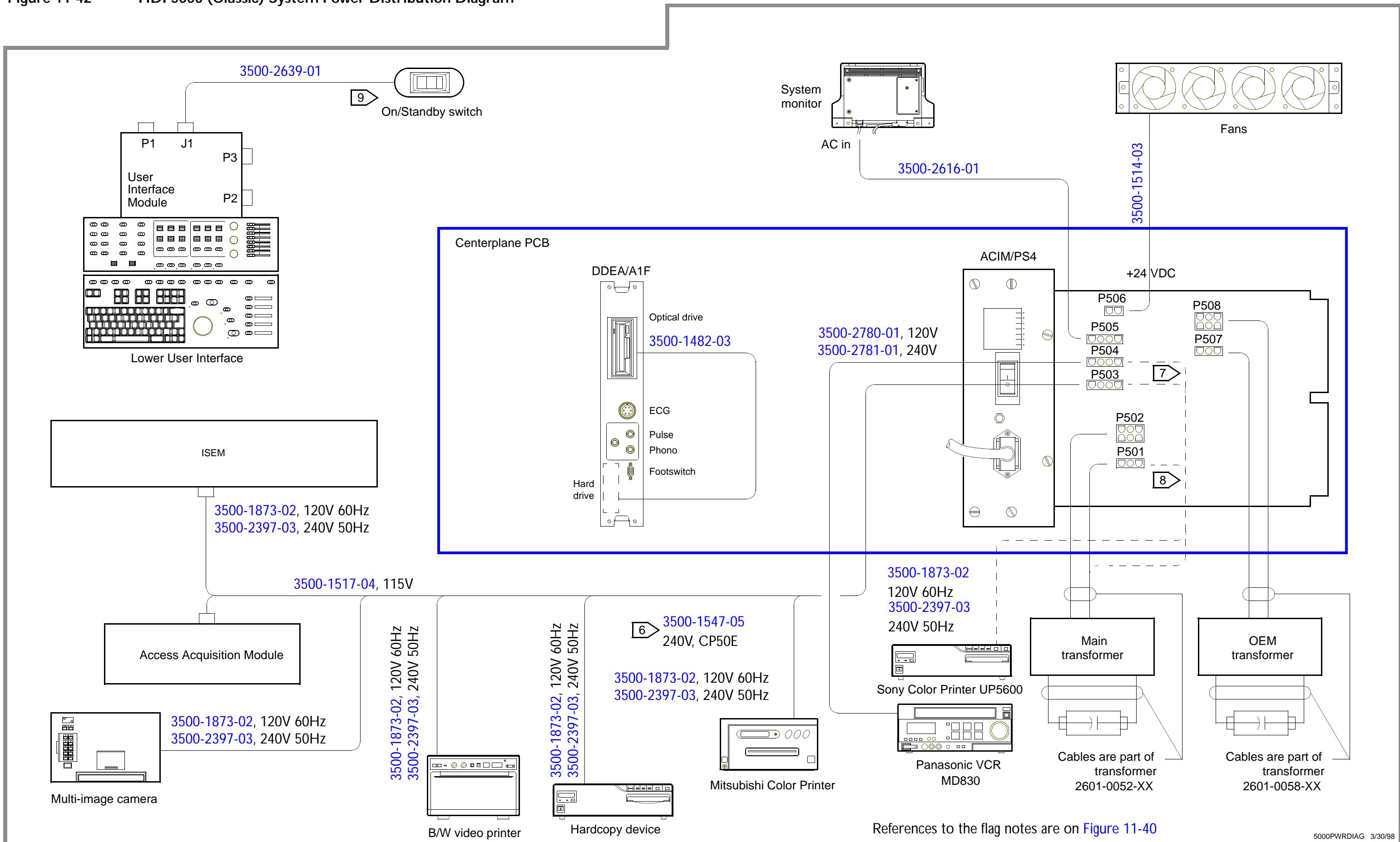


Figure 11-43 Philips HDI 5000 System Signal Interconnect Diagram

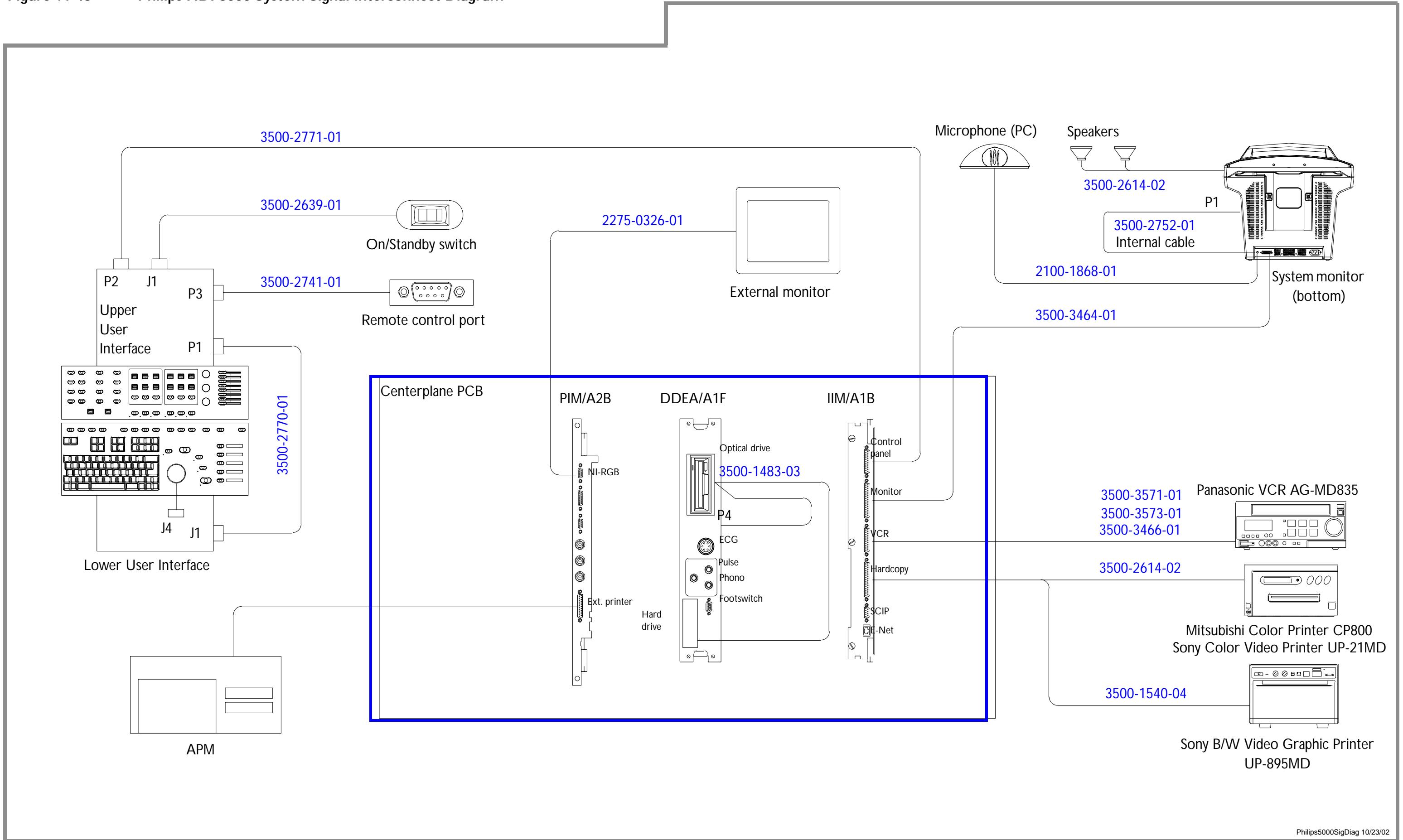
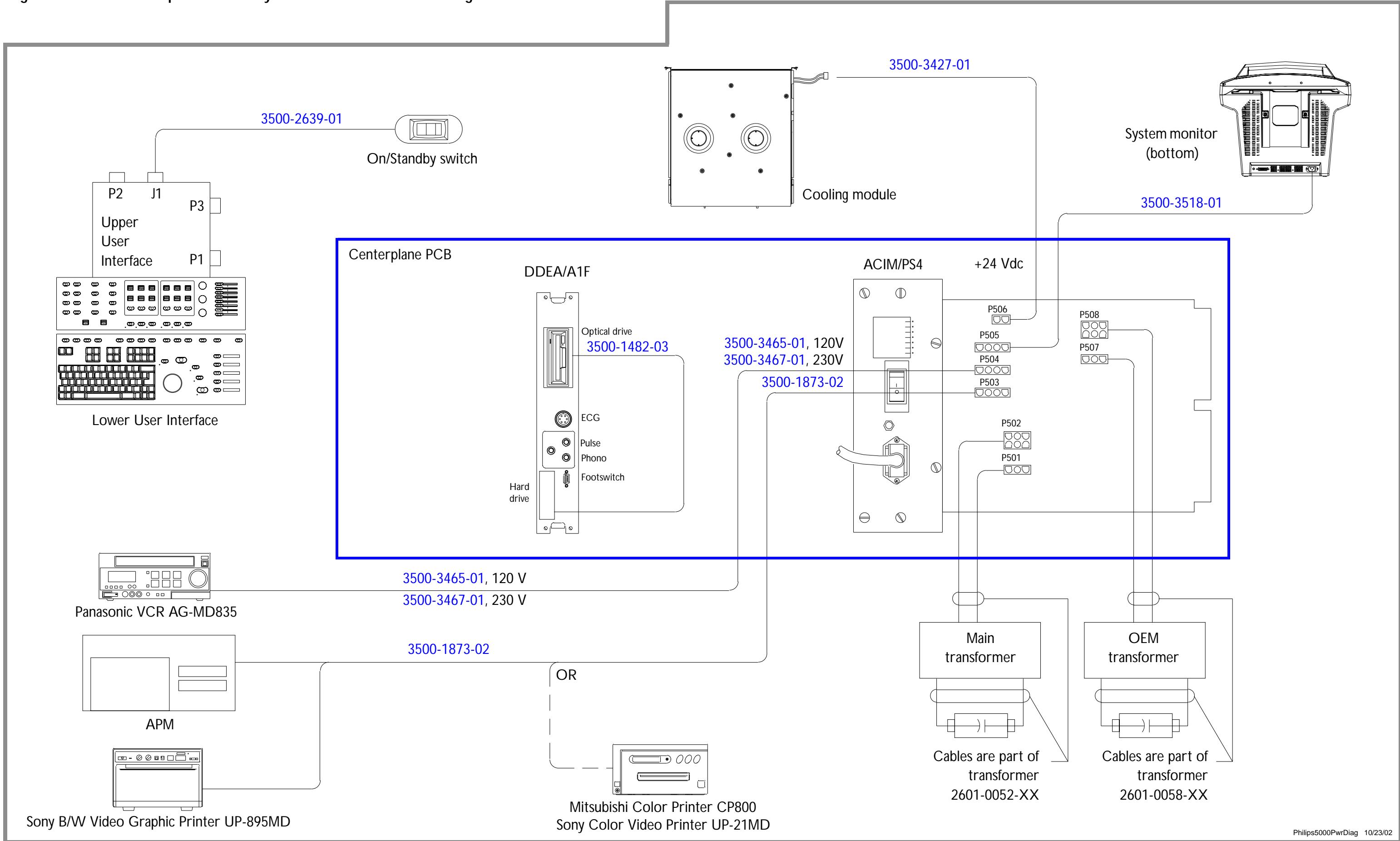


Figure 11-44 Philips HDI 5000 System Power Distribution Diagram



12 Change History

This section lists the software and hardware changes associated with a specific software release number. Unless noted under the Hardware Changes paragraph, the hardware changes are not required for that particular software release.

The part numbers listed after the software versions are the optical disk part numbers for that software version.

107.X Software Releases

107.10 (10.0)

Released 4252-0799-11 on November 7, 1997

New Features

- Broadband Phased Array Scanheads
 - P3-2 20 mm
 - P5-3 (Radiology applications not supported for initial release.)
 - P6-3
 - P7-4
 - MPT7-4 Multiplane Transesophageal Scanhead
- Broadband Linear Array Scanheads
 - L7-4 40 mm
 - L12-5 38 mm

- Broadband Curved Array Scanheads
 - C5-2 40R
 - C7-4 40R
 - C8-4v 11mm
 - C8-5 14R
 - C9-5 ICT 8 mm Intracavity Scanhead (GYN applications not supported for initial release.)
- Doppler Transducers
 - TCD Static D2 TC
 - D2 Static D2 CW
 - D5 Static D5 CW
 - D10 Static D10 CW
- Miscellaneous Features
 - 3D Grayscale
 - Tissue Harmonic Imaging (P3-2 only)
 - Cardiac Output/Volume Flow

Features Not Supported

- Broadband Phased Array Scanheads
 - P4-2
 - P5-3 (radiology applications)
- Linear Array Scanheads
 - L10-5 38 mm Broadband
 - LI9-5 Intraoperative Scanhead
 - CL10-5 Compact Linear Intraoperative Scanhead

- Broadband Curved Array Scanheads
 - C4-2 40 mm
 - CT8-4
 - C9-5 ICT 8 mm Intracavity Scanhead GYN applications
- Miscellaneous Features
 - Surgical/Intraoperative applications
 - General Imaging CSI
 - Laparoscopic/Endoscopic imaging
 - Pediatric Biplane TEE
 - Soft keys on the lower-user interface assembly

Problems Corrected

Not applicable.

Known Problems

Refer to Operating Notes:

4707-0027-01	English
4787-0027-01	French
4777-0027-01	German

Hardware Changes

This is the initial release. There are no hardware changes.

4252-0810-01	Software files disk
4252-0808-01	Bootable image disk and system software, 230 MB
4252-0809-01	Bootable image disk without software, 128 MB

New Features

Not applicable.

Features Not Supported

Same as previous software build.

Problems Corrected

Raises the system over-temperature limits to prevent extraneous over-temperature messages from being displayed and allows the system to continue normal operation.

Known Problems

Refer to Operating Notes:

4707-0027-02	English
4787-0027-02	French
4777-0027-02	German

Hardware Changes

There are no hardware changes associated with this release.

108.X Software Releases

108.15 (10.0.1) Released January 29, 1998.

4252-0811-09	Software files disk
4252-0813-04	Bootable Image disk with system software
4252-0814-04	Bootable Image disk without system software

New Features

- C4-2 40 mm Broadband Curved Array
- L10-5 38 mm Broadband Linear Array
- CL10-5 Compact Linear Intraoperative Scanhead
- P5-3 Broadband Phased Array (Radiology applications)
- C9-5 ICT 8 mm Broadband Intracavity Scanhead (OB/GYN applications)
- C5-2 CSI
- C5-2 THI

Features Not Supported

- CT8-4 Scanhead
- LI9-5 Scanhead
- Soft keys on the lower-user interface assembly

Problems Corrected

- Corrects German and French translations of terms used for THI and CSI (Tissue Harmonic Imaging and Contrast Specific Imaging).
- Improves system monitoring of over-temperature conditions and fan speed control.
- Synchronizes image updates and scaling information during image zoom.
- Corrects thermal index values in AP&I calculations for 2 MHz static scanheads (D2 TC and D2 CW). There were no patient safety issues because thermal index values limited output power.
- Corrects a system lockup issue when using a page printer and attempting to print OB graphs three times.
- Increases color-frame rates when using ECG. Previously, the image-update rate was irregular with ECG turned on. (The frame rate slowed down for approximately one second every two or three seconds.)
- Adds several ResearchLink enhancements.
- Adds functionality of THI control by adding a new lower interface assembly.
- Displays the following message in a dialog box if the upgrade disk is write-protected:
“Removable disk is write protected. Enable writing disk then cycle power.”
- Enables the system to run the CW Cal test if the system is configured for radiology. Previously, if the system was not configured for the P3-2 and the D2 CW, the CW calibration would fail.
- Displays body markers that were not visible upon initial bootup in any mode of system operation. The body markers were displayed upon the subsequent bootup.

- Corrects a system error (run-time alert) when using the P3-2 scanhead and TCD during triple mode.
- Prevents an SPM false error (1202-5402-400A) from being entered into the error log when the SPM is queried by the CPU.
- Corrects a bootup error with the 3500-2636-05 Lower User Interface Assembly. The bootup error is reported to the USD port and may be displayed during diagnostics, but it is not displayed on the system monitor.
- Enables the HDDRIVE test to be executed by means of remote diagnostics. Previously, the test was stopped because of the display of a dialog box that requested a user response.

Known Problems

Refer to Operating Notes:

4707-0027-04	English
4787-0027-04	French
4777-0027-04	German

Hardware Changes

Software version 108.15 supports Tissue Harmonic Imaging (THI). Functionality of the THI key requires a new lower interface assembly for English, French, and German systems.

Other than the lower-user interface assembly, there are no other hardware requirements for HDI 5000 systems with 108.15 software; however, a new AIM+ PCB (P/N 7500-1431-02) has been simultaneously released with 108.15 software. The new AIM+ combines the circuitry of the previous AIM+ PCB (P/N 7500-1026-03) and the Regulator Module (P/N 7500-1421-01). There are no new features added to make the new AIM+. The new AIM+ PCB is forward compatible only. Remove the Regulator Module from systems with the new AIM+ (P/N 7500-1431-02).

Also, simultaneously released with (but not required for) 108.15 software is the 7500-1316-05 PIM PCB. This PCB was released to correct for a blue tint artifact during VCR playback. The artifact was also displayed during image zoom.

108.16 (10.0.2)

Released April 24, 1998.

4252-0811-10	Software files disk
4252-0813-05	Bootable Image disk with system software
4252-0814-05	Bootable Image disk without system software

New Features

None.

Features Not Supported

Same as previous software build.

Problems Corrected

- Implements scaling changes when using the C5-2 scanhead after switching to harmonic imaging and selecting HD ZOOM while in simultaneous 2D/M-mode.
- Implements changes to the 2D and M-mode gain settings when in Tissue Harmonic Imaging (THI).

Known Problems

Refer to Operating Notes:

4707-0027-07	English
4787-0027-07	French
4777-0027-07	German

Hardware Changes

There are no hardware changes associated with this release.

108.17 (10.0.3)

Released July 31, 1998.

4252-0811-11 Software files disk

4252-0813-06 Bootable Image disk with system software

4252-0814-06 Bootable Image disk without system software

New Features

None.

Features Not Supported

Same as previous software build.

Problems Corrected

Implements a new conversion factor for manually calibrated images (VCR or DiskLink) when making measurements using the AREA key. Software version 108.17 releases a ship hold associated with this issue.

Known Problems

Refer to Operating Notes:

4707-0027-13 English

4787-0027-13 French

4777-0027-13 German

Hardware Changes

There are no hardware changes associated with this release.

108.18 (10.0.4)

Released October 15, 1998.

- | | |
|--------------|---|
| 4252-0811-12 | Software files disk |
| 4252-0813-07 | Bootable Image disk with system software |
| 4252-0814-07 | Bootable Image disk without system software |

New Features

None.

Features Not Supported

Same as previous software build.

Problems Corrected

- Corrects measurement units displayed after a report has been edited. Previously, under certain conditions, measurement units from a second measurement replaced units from a first measurement, even though the numerical value of the first measurement did not change.
- Increases the DiskLink frame capacity from 100 frames per exam to 200.
- Prevents L10-5 scanhead mux damage when scanning with a static CW probe with the L10-5 connected to the right-most scanhead port.
- Corrects color M-mode scaling errors when entering color M-mode from color with a small color box zoomed.
- Corrects a measurement error in PW Doppler calculations after switching from CW Doppler.

Known Problems

Refer to Operating Notes:

4707-0027-18	English
4787-0027-18	French
4777-0027-18	German
4847-0027-14	Brazilian (Portuguese)
4887-0027-14	Danish
4807-0027-14	Dutch
4837-0027-14	Finnish
4907-0027-14	Greek
4827-0027-14	Italian
4877-0027-14	Portuguese (Europe)
4797-0027-14	Spanish
4817-0027-14	Swedish

NOTE Operating notes for English, French, and German software were revised to -18. Operating notes for all other languages were not.

Hardware Changes

There are no hardware changes associated with this release.

108.19 (10.0.5)

Released January 28, 2000.

4252-0811-13	Software files disk
4252-0813-08	Bootable Image disk with system software
4252-0814-08	Bootable Image disk without system software

New Features

None.

Features Not Supported

Same as previous software build.

Problem Corrected

Corrects an intermittent problem that results in the Doppler spectral trace not being updated when the sample volume cursor is moved.

Known Problems

Refer to Operating Notes:

4707-0027-26 Rev A English

4787-0027-26 Rev A French

4777-0027-26 Rev A German

Hardware Changes

There are no hardware changes associated with this release.

124.X Software Releases

124.13 (10.1)

Released September 9, 1998.

4252-0815-14 Software files disk

4252-0828-03 Bootable Image disk with system software

4252-0829-03 Bootable Image disk without system software

New Features

- P4-2 Phased Array Scanhead
- Tissue Doppler Imaging (TDI)
- High Pulse Repetition Frequency (HPRF) Doppler Imaging
- Simultaneous 2D/CW
- Pulse Inversion 2D Harmonic Imaging
- Harmonic Imaging
- Advanced 3DI option (only demo systems released - require additional hardware)
- Adult Cardiology clinical option for the CL10-5 scanhead
- Bowel TSI with the Small Parts clinical option for the C7-4, C8-5, L12-5, L10-5, and L7-4 scanheads
- P4-2, P5-3, and P7-4 biopsy guide brackets
- Retrospective loops with CAPTURE softkey
- VCR CTRL softkeys
- 3D UNCAL softkey

Features Not Supported

- DiskLink/NetLink features
 - Capture of Doppler/M-mode loops
 - R-wave to R-wave automatic capture
 - Prospective loops
 - Capture of loops to optical disk
 - Automatic scaling for images recalled from the hard disk

- Power Harmonic® Imaging on the C5-2 scanhead
- The following features of the Advanced 3DI option are not supported (A3DI option will be released with 125.X software)
 - Doppler, triple mode, and M-mode
 - Image acquisition with the MPT7-4 scanhead
 - Image acquisition with the L12-5 scanhead connected to the position sensor
- Graphics key
- PROTOCOL, PARAMS, TIMER, and TOOLBAR controls on the lower-user interface assemblies
- Image storage to the MO drive
- VCR & Hardcopy Source setup
- 3D OPTIMIZATION control on the lower-user interface assembly is operational on demo systems only

Problems Corrected

- DiskLink/NetLink
 - Adds short loops that enable the operator to store retrospective captures of 2D or 3D frames with or without ECG data, to the hard disk or DICOM archive server. The maximum number of frames per loop (selectable in Setups menu) is listed in [Table 12-1](#).
 - Increases the number of patients that can be stored on the hard drive from 100 to 200.
 - Increases the number of images that can be stored in rapid succession from 10 to 27.
 - Adds printer/archive device compatibility with several printers and archive devices.

- Improves DICOM compatibility by supporting VOI Look up table (LUT), Pixel aspect ratio, image type attribute, and a new ultrasound SOP class.

Table 12-1 Maximum Number of DiskLink/NetLink Frames per Short Loop

Type of Short Loop	Number of Frames per Loop	
	NTSC	PAL
Black and white	90	60
Color	45	30

- Contrast Specific Imaging (CSI)
 - Adds Card CSI to the P4-2 and P5-3 scanheads.
 - Adds Pulse Inversion 2D Hrm, OPTISON™, and Levovist® TSIs to the Adult Card CSI clinical option. Also includes Myocardium, LV Opac/Myocard.
 - Adds 2D Harmonics and Pulse Inversion 2D Harmonics tissue specific presets for the C5-2 scanhead with the General Imaging CSI clinical option.
- Color Flow imaging
 - Improves the appearance of color flow images. Images now have smoother edges, softer transition between color and grayscale, improved texture, better vessel delineation, and reduction of dark hues created by persistence.
 - Improves axial and lateral resolution in cardiology applications.
 - Makes several changes to existing application-specific color maps.
 - Adds eight-color maps for TDI.

- Increases the frame rate in cardiology applications. (No frame rate increase for other applications.)
- Changes the system default to velocity plus variance (instead of velocity only) to increase color resolution. A smoother color presentation can be obtained by turning variance off.
- Increases the default PRF to 4,000 Hz (from 3,500 Hz) to increase the frame rate.
- Changes the default wall filter to High to improve jet definition and frame rate.
- Lowers the ensemble lengths to improve the frame rate.
- Adds TGC for Power Motion Imaging (PMI) and TDI. In these modes the TGC slidepots affect only the color. Display of the TGC gain curve and gain values are available through Setups. Color TGC is also applicable to M-mode images. TGC values are used to ensure consistent gain for serial CSI studies.
- Harmonic Imaging
 - Adds support for Harmonic imaging on the P5-3, P4-2, and L7-4 scanheads.
 - Changes Harmonic optimization labels for the P5-3 and P4-2 scanheads for cardiology applications.
 - Changes Harmonic optimization labels for the P4-2, C5-2 and L7-4 scanheads for general imaging applications.
- New Fonts
 - Changes the font style on NTSC and PAL systems to improve readability (especially on hardcopies) and to improve optical character recognition.
 - Increases the font size on PAL systems.
- Echocardiography Enhancements
 - Reduces display format to 95% of the previous size.

- Improves penetration on the P3-2 scanhead.
- Replaces Chroma maps 1 and 2.
- General Imaging Enhancements
 - Improves C5-2 performance by reducing near-field gain for fundamental imaging, balancing focal-zone gain for fundamental imaging, and changing wave-shaping for Harmonic imaging to increase resolution and penetration
 - Replaces Chroma maps 3 and 4. Swaps map 2 with map 1.
- Cineloop Image Review
 - Increases the maximum number of frames in a loop to 800.
 - Calculates the number of frames to be captured based on the imaging mode.
 - Captures up to 120 frames in a 3D loop.
 - Captures at least 25 seconds of non-triggered Doppler or up to 120 frames of a 3D loop.
- Expanded Dual Image
 - Extends the field of view from 36 mm to 76 mm at 30 mm depth with a seamless display when using linear scanheads.
 - Uses the full aperture of array in Dual imaging.
 - Returns the system to regular dual imaging (with a seam) if the image is zoomed.
- System Response Time
 - Decreases the amount of time required to change between imaging modes (that is, from 2D color to PW Doppler) by approximately twenty percent.
 - The amount of time required to bootup the system or to change scanheads has not changed.
- Miscellaneous Changes

- Changes the New Patient entry on the Patient Data Entry screen. Several changes have been made, including allowance of up to 64 characters for the patient name (now conforms to the DICOM standard).
- Changes system operation so that PISA (proximal isovelocity surface area calculation) is accessible in 2D.
- Allows up to 18 characters in the Accession number field.
- Makes numerous changes to the text annotation process.

Known Problems

Refer to Operating Notes:

4707-0027-17	English
4787-0027-17	French
4777-0027-17	German
4827-0027-17	Italian
4847-0027-17	Brazilian (Portuguese)
4887-0027-17	Danish
4807-0027-17	Dutch
4837-0027-17	Finnish
4907-0027-17	Greek
4877-0027-17	Portuguese (Europe)
4797-0027-17	Spanish
4817-0027-17	Swedish

Hardware Changes

Software version 124.13 requires a new version of upper- and lower-user interface assembly for English, French, and German languages. The new upper-user interface assemblies have several

control-location changes and add dedicated controls for Tissue Doppler Imaging and 2D imaging. The new lower-user interface assemblies add optimization keys for 2D/Color, Harmonic, and 3D imaging, and enable functionality of the softkeys (programmable LED keys). The softkeys are programmed by system software to provide multiple functions for each key. There is no longer a LOOP control on the user interface. Refer to [Section 13, "Configuration"](#), for part numbers of the user interface assemblies required for 124.13 software.

Software version 124.13 requires four FEC PROMs to improve P4-2 performance. The part numbers are listed below.

4201-1994-04	PROM Assy, FEC 1, U35
4201-1995-04	PROM Assy, FEC 2, U34
4201-1996-04	PROM Assy, FEC 3, U37
4201-1997-04	PROM Assy, FEC 4, U36
8000-1504-01	PROM Kit, FEC

Also, the following PCBs are simultaneously released with software version 124.13:

7500-1398-03	PIM PCB
7500-1408-02	PCM PCB
7500-0713-14	PSP1 PCB
7500-1413-01	AIFOM PCB
7500-0911-08	Channel Board

These PCBs are required to support future features, but are not required for system operation with 124.13 software.

125.X Software Releases

125.09 (10.1.1)

Released November 6, 1998.

4252-0840-05

Software files disk

4252-0841-05

Bootable Image disk with system software

4252-0842-05

Bootable Image disk without system software

New Features

- Italian language software, control panels, and manuals.
- Scandinavian keycap set.
- Scandinavian lower-user interface assemblies to support Danish, Finnish, Norwegian, and Swedish languages. Support for these languages is limited to display of the three characters on the new keycaps. (System software has not been translated.)

Features Not Supported

Same as software build 124.13.

Problems Corrected

- Measurement Corrections
 - Corrects measurement units displayed after a report has been edited. Previously, under certain conditions, measurement units from a second measurement replaced units from a first measurement, even though the numerical value of the first measurement did not change.

- Corrects a measurement error in PW Doppler calculations after switching from CW Doppler.
- Connectivity
 - Modifies device files for Kodak printers and the Imation 3M 959 printer.
 - Restores DiskLink compatibility with PAL versions of ImageVue DCR.
 - Implements chunky conversion before sending the image to a network device. Chunky conversion is the ordering of the RGB pixel information before transferring the data to an archive device. The standard method up to this time has been planar. Planar data transfer is sending all the red data in one packet, all the green in another, and all the blue in another (or in another color order). With chunky conversion, the data is sent in a group of data with the RGB data in packets (red, with green, and blue). Chunky and planar data conversion is turned on with the device files. With this change, the HDI 5000 system is compatible with all Siemens MagicView and MagicStore products.
 - Changes system operation so when the A3DI option is enabled, the user is able to move from one patient data field to another using the Return key. On systems with 124.13 software, use of the trackball was required.
- Translations
 - Changes translations of the terms "Contrast Specific Imaging" and "Tissue Harmonic Imaging" from German, French, and Italian back to English. European translations of these terms were confusing.
- Miscellaneous
 - Returns the machine-option dash numbers for English, French, and German languages, P5-3 and P7-4 scanheads, and ResearchLink to the dash numbers existing prior to release of 124.13 software. The dash numbers had been inadvertently changed with this release.

- Corrects FEC PCB firmware that causes the system to stop scanning after incorrect HVdc calibration.
- Corrects an ACIM configuration error and power monitor errors that randomly occur during system bootup.
- Prevents L10-5 scanhead MUX damage when the scanhead is connected to the right-hand scanhead receptacle and the system is scanning with a static CW scanhead.
- Fixes a radial line artifact in 2D/color after the system enters triple mode.
- Corrects triggering when using Advanced 3DI calibrated acquisition.

Known Problems

Refer to Operating Notes:

4707-0027-16	English
4787-0027-16	French
4777-0027-16	German
4827-0027-16	Italian
4847-0027-16	Brazilian (Portuguese)
4887-0027-16	Danish
4807-0027-16	Dutch
4837-0027-16	Finnish
4907-0027-16	Greek
4877-0027-16	Portuguese (Europe)
4797-0027-16	Spanish
4817-0027-16	Swedish

Hardware Changes

There is no new hardware required to support software version 125.09. However, Italian upper- and lower-user interface assemblies were released to support the Italian language. Also, Danish, Norwegian, Swedish/Finnish lower-user interface assemblies (P/Ns 3500-2633-01, 3500-2634-01, and 3500-2635-01) have been released to support the respective languages. (Swedish and Finnish languages use the same lower-user interface assembly.) English upper-user interface assemblies (P/N 3500-2635-05) are used with the Danish, Norwegian, and Swedish/Finnish lower-user interface assemblies.

Three keycaps are required to support Danish, Norwegian, and Swedish/Finnish languages on the lower-user interface assembly. These nine keycaps have been released in a keycap set (P/N 4400-0096-01) with a tool to remove existing keycaps. To change a system to Danish, Norwegian, Swedish, or Finnish, the respective 8501 machine options file must be installed, and three keycaps changed on the existing lower-user interface assembly. The remaining six keycaps in the keycap set may be discarded.

NOTE The Scandinavian keycaps allow use of Scandinavian characters in patient data headers and image annotations. The system software has not been translated into these languages.

You must have a machine options file for the appropriate language to change the system language. Changing the user interface assembly or the keycaps alone will not change the system language. If you have the machine options file for the appropriate language, you may order the user interface assembly for the appropriate language or the Scandinavian keycap set.

Two CPU PROMs have been released simultaneously with 125.09 software. The CPU PROMs are required to support a new CPU ID chip (replaces P/N 2070-1188-01) that will be released at a later date. The new ID chip requires the new PROMs. The old ID chip will work with the old or

new PROMs. The new CPU ID chip and CPU PROMs require software version 125.09 and above. Refer to the PROM part numbers below.

4201-2015-01	PROM Assy, CPU HI, U68
4201-2016-01	PROM Assy, CPU LO, U59
8000-1663-01	PROM Kit, CPU HI/LO

125.10 (10.1.1.1)

Released February 10, 1999.

4252-0840-06	Software files disk
4252-0841-06	Bootable Image disk with system software
4252-0842-06	Bootable Image disk without system software

No systems were shipped with this software version.

125.11 (10.1.1.2)

Released February 16, 1999.

4252-0840-07	Software files disk
4252-0841-07	Bootable Image disk with system software
4252-0842-07	Bootable Image disk without system software

New Features

None.

Features Not Supported

Same as software build 125.09.

Problems Corrected

- Corrects a 2D alignment error when making measurements across dual images using scan-heads that support harmonic imaging, when one image was made using fundamental frequencies and the other was made using harmonics.

- Corrects XIO errors (PSP1 pointer out of bounds ErrID:2108:0105) associated with PCM crashes. The PCM crashes resulted in display of a vertical gray line pattern on the monitor that degenerated into several faint color screens. When the error occurred, the system circuit breaker had to be reset to clear the error. PCM send error ErrID:1f00:0005 is also associated with these errors.
- Prevents a blue banner error when booting up the system with a 3DI Position Sensor Adapter connected to a scanhead connector.
- Eliminates a blue banner error condition that occurs under certain conditions after selecting a D2CW probe while using a P4-2 or P3-2 scanhead. The error incorrectly states that the scanhead should be reselected. Cycling system power is actually required to clear the error.
- Prevents LMP, height, weight, and other patient information from the previous patient from being displayed in the current patient's report.

Known Problems

Refer to Operating Notes:

4707-0027-22	English
4787-0027-22	French
4777-0027-22	German
4827-0027-22	Italian
4847-0027-22	Brazilian (Portuguese)
4887-0027-22	Danish
4807-0027-22	Dutch
4837-0027-22	Finnish
4907-0027-22	Greek
4877-0027-22	Portuguese (Europe)

4797-0027-22	Spanish
4817-0027-22	Swedish

Hardware Changes

There are no new hardware requirements for software version 125.11.

The 4201-2015/2016 -XX CPU HI\LO PROMs released for software version 125.09 and higher are not supported for software version 125.11 because of issues with the planned release of the new CPU ID chip. Use the previously released CPU PROMs listed below instead.

4201-1931-06	PROM Assy, CPU HI, U68
4201-1932-06	PROM Assy, CPU LO, U59
8000-1308-01	PROM Kit, CPU HI/LO

127.X Software Releases

127.04 (10.1.2)

Released August 30, 1999.

4252-0867-04	Software files disk
4252-0868-03	Bootable Image disk with system software
4252-0869-03	Bootable Image disk without system software

New Features

- L12-5 50 mm scanhead and Small Parts, Pediatric, Advanced Breast, Cerebrovascular, Peripheral Vascular, Musculoskeletal, and Generic clinical options
- L12-5 50 biopsy guide
- Abdominal surgery clinical option on the LI9-5, LAP L9-5, and CT8-4 scanheads

- Neurosurgery clinical option on the C8-5, P7-4, and CL10-5 scanheads
- CSI improvements to the P4-2 scanhead
- High PRF, TDI, and THI improvements to the MPT7-4 scanhead

Features Not Supported

- Power Harmonics on the C5-2 scanhead
- Graphics key on lower-user interface
- 3D Optimization key on lower-user interface

Problems Corrected

- Networking
 - Corrects an issue where the ultrasound system rebroadcast network messages sent by other network devices.
 - Improves system slowdowns with NetLink and DiskLink configured.
 - Prevents DICOM images from being sent to the wrong patient's study at the DICOM workstation, when the previous patient's exam is reviewed and images are stored using the PRINT control.
 - Displays the thumbnail images in the thumbnail boxes when using Microsoft Internet Explorer with WebLink. Previously, when clicking on the empty thumbnail box, the full image was displayed.
 - Adds NetLink compatibility with the Kodak MLP-190 printer.
 - Corrects communications issues between the HDI 5000 system and the Sterling (Polaroid) Helios, Digital 200, Digital 400, HPS 400, and solid inkjet printers. Also, corrects communication issues between the HDI 5000 system and the Sterling DPS server.

- Allows control of DICOM scaling from the device files. This allows Field Service Engineers to disable DICOM scaling when setting up the system with a network device, if difficulties are encountered during the setup process.
- Miscellaneous
 - Prevents the left image from disappearing behind the right image when the image is frozen or zoomed, or when panning during dual imaging.
 - Adds a low-level magneto-optical disk format capability to the user diagnostics menu. The low-level format capability alleviates system slowdown issues because of slow read/write times.
 - Decreases the amount of time required to retrieve patient data on systems with DiskLink.
 - Corrects an issue causing irrecoverable operation when using an L12-5 38 mm scanhead with the Small Parts clinical option and the Breast Tissue Specific preset.
 - Removes an extraneous orange diagonal line from the scan plane indicator, which occurs under certain circumstances while using the MPT7-4 scanhead.
 - Adds the ability to select the Hadlock or Custom estimated fetal weight (EFW) percentile calculation method. The Custom option enables the user to select the modified Hadlock EFW percentile that was removed with the system software version 107.11. The selection is made in Setups under OB measurements.

Known Problems

Refer to Operating Notes:

4707-0027-23	English
4787-0027-23	French
4777-0027-23	German

4827-0027-23	Italian
4887-0027-23	Danish
4807-0027-23	Dutch
4837-0027-23	Finnish
4907-0027-23	Greek
4877-0027-23	Portuguese
4797-0027-23	Spanish
4817-0027-23	Swedish

Hardware Changes

There is no new hardware required to support software version 127.04 or the scanheads released for software version 127.04.

127.05 (10.1.3)

Released December 6, 1999.

4252-0867-05 Software files disk

4252-0868-04 Bootable Image disk with system software

New Features

None.

Features Not Supported

Same as those for the previous software version (127.04 software).

Problems Corrected

- Corrects an intermittent problem that results in the Doppler spectral trace not being updated when the sample volume cursor is moved.

- Prevents the system from hanging after deleting images from the hard disk if one of the images is not readable. Unreadable images may be caused by turning off the system before the image has been fully saved to a disk, a hard disk error, or a power supply problem.
- Modifies the system software-installation application, updating it for 10.1.3 software.

Known Problems

Refer to Operating Notes:

4707-0027-25	English
4787-0027-25	French
4777-0027-25	German
4827-0027-25	Italian
4887-0027-25	Danish
4807-0027-25	Dutch
4837-0027-25	Finnish
4907-0027-25	Greek
4877-0027-25	Portuguese
4797-0027-25	Spanish
4817-0027-25	Swedish

Hardware Changes

There is no new hardware required to support software version 127.05.

127.09 (10.1.4)

Released December 5, 2000.

4252-0867-08 Software files disk

4252-0868-07 Bootable Image disk with system software

New Feature

Redesigned C8-5 curved array scanhead.

Features Not Supported

Same as those for the previous software version (127.05 software).

Problems Corrected

- Changes the process of moving the scanhead position marker on body markers from the trackball to a hardkey control.
- Blue banner error message and loss of image data caused by inadvertent system power-down while spooling images to the hard drive under certain conditions are prevented.
- System hang-ups caused when the date rolls (at 12:01 AM) while the OB report is displayed are prevented.
- Changes system operation so the **Patient Data Entry** form does not automatically reset to “no” for the twins setting for French, German, and Italian languages, even if a “yes” is not entered.
- Eliminates errors caused by the system being unable to update after a menu selection, following selection of another menu item.
- Prevents system hang-ups caused under certain conditions when a measurement protocol is used and **SELECT** is pressed when the cursor is in a scroll bar.
- Modifies the User Event Log so it contains all keystroke data. Previously, when the **Backup Diags Data** option was used, keystrokes were missing for the current day, even though errors were registered in the error log on that day.
- Fixes an error in the graphing function that prevented OB graphs from automatically displaying in the year 2000.

- Fixes intermittent crashes occurring after the bootup splash screen.
- Fixes an intermittent blue banner error message, "FILE:VPM clock monitor. Line Number 400," occurring on system bootup.
- Corrects a condition causing an inability to steer PW Doppler after viewing a VCR tape, using DiskLink, or using **Superkey+Video (P)**.
- Corrects issues causing the 3500-2761-06 DDEA PCB (containing the 7500-1020-08 PCB) to fail the Machine Comprehensive Test.
- Prevents system crashes caused when writing to defective MO disks.
- Adds important crash data to the Backup Diags utility. The customer can save this data to a disk and send it to Customer Service.
- Decreases bootup time required for systems with a full hard disk.
- Corrects abnormal system behavior under certain operating conditions when the system is in dual imaging and you reselect a scanhead.
- Corrects an issue preventing the time from displaying on the monitor during system bootup. Previously, performing a system reboot corrected the problem, but you had to use the circuit breaker to reboot the system.

Known Problems

Refer to Operating Notes:

4707-0027-33	English
4787-0027-33	French
4777-0027-33	German
4827-0027-33	Italian
4887-0027-33	Danish

4807-0027-33	Dutch
4837-0027-33	Finnish
4907-0027-33	Greek
4877-0027-33	Portuguese
4797-0027-33	Spanish
4817-0027-33	Swedish

Hardware Changes

There is no new hardware required to support software version 127.09.

127.13 (10.1.5)

Released October 22, 2001.

4252-0867-12 Software files disk

4252-0868-11 Bootable Image disk with system software

New Features

None.

Features Not Supported

Same as those for the previous software version (127.09 software).

Problems Corrected

- Changes system operation so that if you remove the selected scanhead during image review and connect and select a new scanhead, the original clinical options and presets will not appear on the scanhead **Select** display. Previously, selecting one of those options or presets caused the scanhead-select process to fail; the new scanhead could not be selected until it was disconnected and reconnected.
- Improves handling of network-device-association aborts.

- Corrects an error in the Italian translation of the system software. ("Calibrata II" was listed as "calibrata.nll.")
- Enables a customer to enter the correct (estimated) LMP date for an overdue OB patient. Previously, the oldest LMP and gestational age accepted by the HDI 5000 system was 40 weeks. The problem mostly occurred if an estimated date of delivery was entered prior to the current date.
- Corrects the system error log on PAL systems so that the most-current errors are displayed. (NTSC systems displayed the error log correctly.)
- Eliminates many XIO errors from Pixel Conversion Module (PCM) crashes by upgrading PCM flash RAM.
- Corrects inaccurately averaged Peak E values when using the In Flow protocol if Peak E and Peak A are manually measured and Peak E is less than Peak A. During velocity time integral measurements, the highest peak in the waveform is chosen for Peak E, and this number is averaged with the manually derived Peak E value in the report. All calculations using the averaged Peak E number are incorrect.
- Prevents the system from displaying an error message if the exam date is the patient's birth date.
- Enables CRC check as an option during upgrade.
- Prevents the system from Pegasus task crashing when selecting **Final Report** after editing the analysis report. This resolution affects only customers who have an Okidata report printer selected in the **Peripherals** setups.
- French translation error performing the calculation dP/dt, Mitral Regurg.
- Prevents the system from locking up when entering color M-mode, enabling the cursor, and moving the cursor to the outer edge of the sector outside the color box.

- Fixes incorrect gray shades and improves dull images sent to network devices and spooled to the MO disk. This change does not affect images displayed on the system monitor. The FSE must enable this feature by creating a file on the system hard drive. To create the file, type **Skcreat "/hd0/peg_hd/site/netcfg/brighten","0"** into the VxWorks command line. To delete the feature, type **Skrm "/hd0/peg_hd0/site/netcfg/brighten"**.
- Changes network and server IP addresses to support Philips network policies (not used by customer service or seen by customers).
- Decreases trackball sensitivity while in text mode.
- Corrects an issue preventing the duplex Doppler display from shifting when frozen.

Known Problems

Refer to Operating Notes:

4707-0027-39	English
4787-0027-39	French
4777-0027-39	German
4827-0027-39	Italian
4887-0027-39	Danish
4807-0027-39	Dutch
4837-0027-39	Finnish
4907-0027-39	Greek
4877-0027-39	Portuguese
4797-0027-39	Spanish
4817-0027-39	Swedish

Hardware Changes

There is no new hardware required to support software version 127.13.

170.XX Software Releases

170.23 (10.2 Demo Release)

Released October 8, 1999.

4252-0851-19

Software files disk

4252-0874-01

Bootable Image install disk with system software

4252-0873-01

Bootable Image disk installation MO disk

Features Not Supported

Same as those for the previous software version (127.04 software).

New Features

Refer to software version "[170.30 \(10.2 RFD Release\)](#)" on page 428.

Problems Corrected

- Miscellaneous
 - Adds a missing "OK" box to a banner message that occurs if the operator attempts to cycle system power while spooling images, if the patient data fields are full. Recovery required the system to be allowed to finish spooling, then be rebooted.
 - Adds a low-level format option for the optical drive to the user diagnostics display. The format option enables the end-users to format optical disks and speed up drive access time.
 - Resizes large text on OB reports when the reports are printed on an Okidata 600e printer.

- Corrects a condition causing an inability to steer PW Doppler after viewing a VCR tape, DiskLink, or using the Superkey Video keys.
- Labels the depth markers.
- Puts the scanhead position function key back on hardkey.
- Translations
 - Corrects default settings in the Italian Image Management window. Settings were listed as B/W = 90, Color = 45. The settings should be listed as 60 and 30, respectively.
 - Translates various untranslated English phrases and corrects inconsistent translated phrases appearing in German system software. Also, correctly displays the "@" symbol when this key is depressed. Previously, depression of this key resulted in display of the "&" symbol.
- Analysis
 - Enables the customer to access the diameter and area reduction tools with the P4-2 and C4-2 for abdominal studies.
 - Corrects default settings in the Italian Image Management window. Settings were listed as B/W = 90, Color = 45. The settings should be listed as 60 and 30, respectively.

Known Problems

Refer to Operating Notes:

4707-0027-24 Rev A	English
4787-0027-24 Rev A	French
4777-0027-24 Rev A	German
4827-0027-24 Rev A	Italian
4887-0027-24 Rev A	Danish

4807-0027-24 Rev A	Dutch
4837-0027-24 Rev A	Finnish
4907-0027-24 Rev A	Greek
4877-0027-24 Rev A	Portuguese
4797-0027-24 Rev A	Spanish
4817-0027-24 Rev A	Swedish

Hardware Changes

Software version 170.23 requires the following hardware and firmware to support the released features.

- Centerplane PCB (P/N 3500-1720-05). Changes were made to the Centerplane PCB to accommodate two AIFOM PCBs and SPM with daughtercards, and to support future features.
- Additional AIFOM - (P/N 7500-1413-02). The additional AIFOM was added to support future features. The additional AIFOM is located in slot A13B.
- Signal Processing Module PCB (SPM) - (P/N 3500-2998-01). Two daughtercards were added to the 7500-1119-XX SPM PCB to make the 3500-2988-01 SPM+. The daughtercards double the processing capability of the 7500-1119-XX PCB and are required for SonoCT Real-Time Compound Imaging. Also, the operating speed of the SPM was increased from 32 MHz to 40 MHz.
- Front End Controller PCB (FEC) - (P/N 7500-1567-01/02). Changes to the FEC allow more imaging modes to be selected. These changes are required for SonoCT Real-Time Compound Imaging.
- FEC PROM kit (P/N 8000-1575-01) to allow selection of additional imaging modes.

- System CPU (P/N 3500-3070-01). An additional 16 MB of memory was added to the 32 MB CPU PCB to support SonoCT Real-Time Compound Imaging and future features.
- CPU PROM kit (P/N 8000-1663-05) to support 48 MB CPU PCB.
- Upper and lower UIF assemblies. The new UIF assemblies add keys for compound imaging and frame rate. Several other controls have been relocated. Refer to [Section 13, "Configuration"](#), for part numbers of the user interface assemblies required for 170.23 software.

170.30 (10.2 RFD Release)

Released November 22, 1999.

4252-0851-26

Software files disk

4252-0874-06

Bootable Image install disk with system software

4252-0873-05

Bootable Image disk installation MO disk

New Features

- All features released with 127.xx software
- SonoCT Real-Time Compound Imaging on the L12-5 38 mm and L12-5 50 mm scanheads for breast, musculoskeletal, vascular, and small parts imaging applications
- Extended gain-range on selected
- 3D acquisition with the MPT7-4 scanhead and the ability to export data for off-line rendering (TomTec or other vendors)
- Biplane TEE (BPT9-5) for pediatric cardiac applications
- Connectivity enhancements including Worklist (automatic input of patient header information from hospital HIS/RIS systems)
- Analysis and calculations enhancements (Power Calcs)
- THI on the P6-3 and C7-4 scanheads for radiology applications

- Real-Time Perfusion Imaging on P4-2
- THI improvements to the C5-2 and L7-4 scanheads
- TDI improvements (blending control and improved lateral gain compensation)
- UpLink enhancements (supports version 2.0)
- Temporary options capability
- ECG trigger user interface improvements
- New high performance color processing
- Color Smoothing control
- Power Harmonics on the C5-2 scanhead
- Graphics key on lower-user interface
- 3D Optimization key on lower-user interface
- CPA Dynamic Motion Differentiation
- Color box behavior changed so the system continues to scan at the previous location until the color box movement stops
- Added a faster sweep speed ([Table 12-2](#)).

Table 12-2**Sweep Speeds Available with 17X.XX Software**

Setting	PAL	NTSC		
20 msec/column	Low	16 mm/sec	Low	19 mm/sec
10 msec/column	Medium	32 mm/sec	Medium	38 mm/sec
5 msec/column	High	63.5 mm/sec	High	76 mm/sec
3 msec/column	Maximum	106 mm/sec	Maximum	127 mm/sec

Features Not Supported

Same as those for the previous software version (170.23 software).

Problems Corrected

All problems corrected were unnoticeable in field-based systems.

Known Problems

Refer to Operating Notes:

- 4707-0027-24 Rev C English
- 4787-0027-24 Rev C French
- 4777-0027-24 Rev C German
- 4827-0027-24 Rev C Italian
- 4887-0027-24 Rev C Danish
- 4807-0027-24 Rev C Dutch
- 4837-0027-24 Rev C Finnish
- 4907-0027-24 Rev C Greek
- 4877-0027-24 Rev C Portuguese

4797-0027-24 Rev C Spanish

4817-0027-24 Rev C Swedish

Hardware Changes

There are no new hardware or firmware requirements for this software version.

170.31 (10.2.1)

Released December 30, 1999.

4252-0851-27 Software files disk

4252-0874-07 Bootable Image install disk with system software

4252-0873-06 Bootable Image disk installation MO disk

New Features

None.

Features Not Supported

Same as those for the previous software version (170.30 software).

Problems Corrected

- Changes the size of the scanplane movement (in degrees) to match the system specifications when acquiring images using the 3D Cardiology feature.
- Corrects for a significant loss of 2D gain during cardiology contrast imaging when turning Flash off from the high- or low-power setting. The values and display gain return to normal when the 2D gain is adjusted by the gain control or the TGC slide controls.
- Decreases the amount of digital noise in harmonic imaging when TGC is increased and overall 2D gain is decreased. The noise was most prevalent when using the P4-2, P5-3, and P7-4 scanheads in cardiology applications, or the P6-3, C7-4, L12-5 38 mm, and L12-5 50 mm in general imaging applications.

- Fixes grayscale acquisition when acquiring data using the A3DI Position Sensor. Previously, under certain conditions, use of the position sensor caused acquisition of an incomplete and distorted data set. Freehand and color acquisitions were not affected.
- Corrects the issue of the system not recognizing 2/29/00, as a leap-year day for an LMP and age. (The system now accepts 2/29/2000 or 2/29/00 as valid dates.)
- Prevents the system from hanging if rapid keystrokes are entered after CALCS is pressed.
- Prevents the system from crashing at midnight if you are in VCR Raster Playback or Review Image display source.
- Corrects L12-5 38 mm and L12-5 50 mm scanhead center frequencies when transmitting at 9.0 MHz using Tissue Doppler Imaging (TDI).

Known Problems

Refer to Operating Notes:

4707-0027-27 Rev A	English
4787-0027-27 Rev A	French
4777-0027-27 Rev A	German
4827-0027-27 Rev A	Italian)
4887-0027-27 Rev A	Danish
4807-0027-27 Rev A	Dutch
4837-0027-27 Rev A	Finnish
4907-0027-27 Rev A	Greek
4877-0027-27 Rev A	Portuguese
4797-0027-27 Rev A	Spanish
4817-0027-27 Rev A	Swedish

Hardware Changes

There are no new hardware or firmware requirements for this software version.

177.13 (10.2.5)

Released May 4, 2000.

4252-0878-19 Software files disk

4252-0888-06 Bootable Image install disk with system software

4252-0865-20 Software for DVS 1.0 HW Configuration

New Features

- Digital Video Streaming (DVS) option
 - Streaming of compressed digital data to and from the DVS hard drive (up to one minute of video at 30 Hz rate)
 - Digital and Stress Echo options
 - Flexible protocol engine
 - JPEG compression
 - RLE (Run Length Encoding) compression for DICOM
 - DICOM disk support
 - Seamless video switching
 - Control of DVS features using the ultrasound system user interface
 - Seamless passing of patient demographics
 - Calibration of images for measurement
- Intelligent Frame Rate Accelerator (Multi-line feature)
- DICOM Modality Performed Procedure Step (MPPS) feature (on non-DVS systems)
- DICOM Storage Commit (SC) feature (on non-DVS systems)

Features Not Supported

- Same as those for the previous software version (170.31 software).
- Quantification of DVS images.
- With the DVS option installed, all ultrasound system networking functionality is disabled: including DiskLink, NetLink, WebLink, and ResearchLink. For customers who have DiskLink, NetLink, WebLink, and ResearchLink, the features will remain enabled, but non-functional. Customers who order DVS are not able to order DiskLink, NetLink, WebLink, or ResearchLink.

Problems Corrected

- Corrects the High Q algorithm when making acceleration time measurements on a specific type of waveform.
- Corrects an SPM timing error (0304-20000102) while using the BPT9-5 scanhead in pediatric cardiology applications when in CPA with a large color box.
- Reduces digital noise when TGC slidepot gain is increased and the 2D gain is decreased. Also, improves noisy images when using Tissue Harmonic Imaging.
- Eliminates a blue banner message (0021) after freezing a VCR image and attempting calibration.
- Corrects an issue preventing the time from displaying on the monitor during system bootup. Previously, performing a system reboot corrected the problem, but system reboot had to be accomplished with the circuit breaker.
- Eliminates a power dissipation error when using P1 PEN (with the P4-2 scanhead) at the maximum mechanical index during triggered imaging.
- Fixes an intermittent blue banner error message occurring on system bootup.

- Prevents the system from crashing when saving a user-defined Tissue Specific preset with SonoCT Real-Time Compound Imaging enabled.
- Eliminates errors caused by the system being unable to update after a menu control is activated following activation of another menu control.
- Fixed intermittent crashes occurring after the bootup splash screen.

Known Problems

Refer to Operating Notes:

4707-0027-28 Rev B	English
4787-0027-28 Rev B	French
4777-0027-28 Rev B	German
4827-0027-28 Rev B	Italian
4887-0027-28 Rev B	Danish
4807-0027-28 Rev B	Dutch
4837-0027-28 Rev B	Finnish
4907-0027-28 Rev B	Greek
4877-0027-28 Rev B	Portuguese
4797-0027-28 Rev B	Spanish
4817-0027-28 Rev B	Swedish

Hardware Changes

There is no new hardware required to support software version 177.13, but DVS functionality requires software version 177.13, the DVS Module, and the following HDI 5000 hardware:

- PIM (P/N 7500-1398-06) Updated board level PROMs were installed for compatibility with the DVS Module.

- DDEA (P/N to be released later). Increases ECG gain and changes the ECG input filtering. DVS functionality requires the DDEA module have the 7500-1020-08 DDEA PCB.
- PCM (P/N 7500-1408-04). Changes to the PCM improve video timing required for DVS. The -04 PCM was released previously and is now required for the DVS option.

178.04 (10.2.6)

Released July 14, 2000.

4252-0899-03

Software files disk

4252-0900-03

Bootable Image install disk with system software

New Features

None.

Features Not Supported

Same as those for the previous software version (177.13 software).

Problems Corrected

- Prevents the system from “hanging” while using an L12-5 scanhead (38 mm or 50 mm) under certain conditions when enlarging the color box from the upper right to the lower left of the display.
- Fixes corrupted 2D images when transitioning from Tissue Doppler Imaging TDI low PRF to M-mode.
- Disables the 3D calibrate softkey in non-3D capture modes (Doppler and M-mode).
- Eliminates a system power supply warning related to the SPM PCB while using Color Power Angio (CPA) Imaging with the line density set to B on PAL systems.
- Reduces Pegasus task crashes and keyboard freezes while using the alphanumeric keys.

- Prevents the system from crashing while using the MPT7-4 scanhead with large sample volume sizes in simultaneous 2D/PW mode after decreasing depth.
- Fixes an error in the graphing function that prevented OB graphs from automatically displaying in the year 2000.
- Corrects a Worklist/patient data entry data mix-up that caused the second page of a patient study to be inserted into the previous patient's file on the AGFA Impax archiving device and on the system hard drive.
- Corrects an intermittent bus conflict on the SPM PCB while using CPA.
- Improves CPA image quality when entering PW Doppler using the C5-2 and P6-3 scanheads.
- Fixes erratic trackball movement during Doppler and M-mode measurements while using Power Calcs.
- Eliminates the scanhead reselect error banner while using a L12-5 or L7-4 scanhead during Color or CPA imaging under certain conditions, when changing the steering angle.
- Prevents Color/CPA artifacts and color misregistration while using the C9-4v or C9-5 scanheads with a reduced sector size when resizing or repositoning the region of interest (ROI) box.
- Corrects various M-line cursor and Doppler sample volume cursor issues.
- Restores missing M-mode fields to the cardiology report on NTSC systems. The missing fields include IVS(D), LVD(D), IVS(S), and LVPW(S).
- Modifies the data transfer software to support the Body Part Examined attribute for DICOM.
- Deletes Digital Video Streaming measurements that persist after starting a new patient, or appending to a different patient selected from the patient directory.

- Eliminates the Doppler graybar that is displayed in spectral Doppler when the sample volume cursor is moved.
- Eliminates a power supply warning during SPM PCB stand-alone diagnostics on the 3500-2988-02 SPM.
- Fixes 2D and Color End-to-End test failures that occur after the selection of a Cardiology clinical option.
- Fixes intermittent DDEA test failures that occur when measuring the high-pass frequency on both physio channels.

Known Problems

Refer to Operating Notes:

4707-0027-32 Rev A	English
4787-0027-32 Rev A	French
4777-0027-32 Rev A	German
4827-0027-32 Rev A	Italian
4887-0027-32 Rev A	Danish
4807-0027-32 Rev A	Dutch
4837-0027-32 Rev A	Finnish
4907-0027-32 Rev A	Greek
4877-0027-32 Rev A	Portuguese
4797-0027-32 Rev A	Spanish
4817-0027-32 Rev A	Swedish

Hardware Changes

There are no new hardware or firmware requirements for this software version.

185.XX Software Release

185.21 (10.3 RFD Release)

Released November 6, 2000.

4252-0901-13 Software files disk

4252-0902-09 Bootable Image install disk with system software

New Features

- P12-5 Phased Array Scanhead
- Redesigned C8-5 curved array scanhead
- SonoCT Real-time Compound Imaging for L7-4, C5-2, and C7-4 Scanheads is added
- The number of multi-line apertures maximized for the P5-3 and MPT7-4 scanheads
- Multi-line support added on the C8-4v and C5-2 scanheads
- 2D Enhancements
 - Addition of Tissue Harmonic Imaging on the P4-2 scanhead for General Imaging, and on the C8-4v scanhead
 - Improved penetration on the P4-2, C5-2, and C8-4v scanheads
 - Addition of OB Tissue Specific presets to the L12-5 38 mm and L12-5 50 mm scanheads
- Contrast Enhancements
 - Two Tissue Specific presets added for the P4-2 scanhead: Power Pulse Inv. 1 (for Optison contrast agents); and Power Pulse Inv. 2 (for Definity contrast agents)

- Low mechanical index (MI) value for the P4-2 scanhead is now displayed, and can be changed, while using Flash Imaging
- Power Pulse Inversion added for the L7-4 and the C5-2 scanheads
- The HRES setting uses multi-line for the C5-2 scanhead

Features Not Supported

This software version does not support the DVS option and the non-supported features of the previous software version (178.04).

Problems Corrected

- ECG
 - System task crashes when setting up ECG trigger in 3D cardiology with the MPT7-4 scanhead is eliminated.
 - Corrected ECG triggering so when the user presses **UPDATE** to initiate triggering, the triggering actually starts on the next consecutive beat.
- Measurements
 - Allows the user to edit user-defined time measurements in Cardiac Doppler. Previously, if a time value over 1 second was entered, the time value was displayed as asterisks in the printed report and could not be edited.
 - Allows three-digit user-defined time values to be edited in cardiac M-mode. Previously, in some situations, only two digits could be edited.
 - Aligns the calculation analysis package, Reset-to-Factory-Default selection, so it is clearly displayed and accessible to the user.

- Corrects the OB report when it is printed on an Okidata printer. Previously, when using the P4-2 scanhead in Color M-mode and saving a measurement to the OB report, some of the text on the report was overlaid by other text or graphics.
- Changes the results of the user-defined calculations to preclude velocity measurements from displaying as negative values.
- Translation Issues
 - Corrects truncated display of various Italian phrases associated with fetal M-mode ejection fraction calculations, and temporary options setups. Also, fixes display of test results overlaid on Peak Gradient text when in Adult Card/General/Pulmonic Valve calcs menu.
 - Changes system operation so the Patient Data Entry form does not automatically reset to **N** for the twins setting for French, German, and Italian languages, even if a **Y** is not entered.
- Doppler
 - Trims the Doppler line while using the L12-5 50 mm scanhead with 2D imaging when the image is steered to the right or left, and the image is inverted when using HD Zoom.
 - Corrects a “dead spot” when increasing depth while using the BPT9-5 scanhead in continuous-wave Doppler imaging at 12 cm.
- Scanheads
 - Corrects low-gain values for distant elements while using the P6-3 scanhead.
 - Assigns an alternate scanhead surface-temperature algorithm as defined by the AP&I Theory of Operation Specification.
 - Corrects abnormal system behavior under certain operating conditions when the system is in dual imaging and a scanhead is reselected.

- Miscellaneous Issues
 - Corrects the FEC PCB interleave ratio of 2D lines to M-mode lines. If the number of 2D lines in a frame is not an integer multiple of the interleave ratio, the FEC pads the number of 2D lines to have a regular repeating sequence for the entire frame. (For example, if there is an interleave ratio of five 2D lines to one M-mode line, a sector width of 57 lines is padded to make 60 2D lines.) Incorrect interleave ratios cause the average PRF to be underestimated.
 - Eliminates a blue banner error message caused while using the P4-2 scanhead during Card/Gen imaging with 2D at the maximum depth, and using scrolling M-mode when changing the frame rate (2D PRF).
 - Assigns error banner numbers to 3 error banners (in uMisems.c) that had the same error number.
 - Changes the default number of focal zones to a single zone for use with SonoCT Real-time Compound Imaging in musculoskeletal applications.
 - Adds additional echo multi-line apertures for the P5-3 and MPT7-4 scanheads.

Known Problems

Refer to Operating Notes:

4707-0027-35 Rev C	English
4787-0027-35 Rev C	French
4777-0027-35 Rev C	German
4827-0027-35 Rev C	Italian
4887-0027-35 Rev C	Danish
4807-0027-35 Rev C	Dutch
4837-0027-35 Rev C	Finnish

4907-0027-35 Rev C	Greek
4877-0027-35 Rev C	Portuguese
4797-0027-35 Rev C	Spanish
4817-0027-35 Rev C	Swedish

Hardware Changes

There are no new hardware or firmware requirements for this software version.

190.XX Software Releases

190.13 (10.3.5 RFD Release)

Released February 15, 2001.

4252-0913-11	Software files disk
4252-0914-11	Bootable Image install disk with system software
4252-0925-10	APM OS + Combo MO, Version 8.1
4252-0923-06	Software for DVS 2.0 HW Configuration
4252-0917-12	Software for DVS 1.0 HW Configuration

New Features

- Intraoperative CL15-7 Broadband Linear Array Scanhead
- C5-2 penetration improvement
- Advanced Processing Module (APM)
- Panoramic Imaging (requires APM)
- Advanced 3D Imaging on all scanheads except biplane (requires APM)

- DVS DICOM Store
- DVS Automatic Scaling
- DVS enhanced Trim
- DVS 2.0 HW Option (includes 850 MHz CPU, new motherboard, CPU fan, and a new SCSI card to speed up system response)

Features Not Supported

Same as those for the previous software version (185.21 software)

Problems Corrected

- Ultrasound system
 - Prevents a Quick Save of Tissue Doppler Imaging (TDI) settings from causing a scan-head-reselect banner when using L12-5 scanheads with the custom preset selected.
 - Prevents the sample volume depth from defaulting to 5.2 cm when the 2D depth is adjusted to minimum and Doppler is selected.
 - Changes the current software upgrade procedure to allow FSEs to select whether a Cyclic Redundancy Check (CRC) of the system software files is performed on the backup and new software during the upgrade process. This feature will allow FSEs to reduce the amount of time it takes to perform a software upgrade.
 - Prevents the system from Pegasus Task crashing when selecting **Final Report** after editing the analysis report. This resolution only affects customers who have an Okidata report printer selected in the **Peripherals** setup menu.
 - Prevents the system from removing international characters from the beginning of patient names when patient data is sent to DICOM storage devices.

- Prevents the M-cursor or sample-volume-cursor position from moving when transitioning from a straight-linear image to a right-steered image, when the system is in Doppler imaging.
- DVS Option
 - Adds a page number to images when using the Best Beat selection of full disclosure.
 - Prevents the system from locking up after pressing **3D UNCAL**, when using Cine playback, and after pressing **FREEZE** to unfreeze the image.
 - Adds Contrast Pharmacological to the existing protocols to support contrast perfusion.
 - When **TOOLBAR** is pressed, the system now removes the DVS Timer so it does not obscure the distance measurement calipers, PW velocity calipers, M-mode calipers, or a portion of the image while in dual imaging. The DVS Timer will re-appear when **TOOLBAR** is pressed a second time.
 - Allows the Patient Directory to be closed after selecting a patient or study, selecting Info, and pressing **Patient Data**.
 - Sends the age of the current patient (if a date of birth was entered) from the system to the DVS module.
 - Maintains 2D sector width while imaging with the P4-2 scanhead and using the **Adult Card** clinical option and **General** preset in Color, with a narrow sector width and going in and out of pulsed Doppler. Previously, the sector width decreased, and the frame rate increased.
 - Displays freeform captured images in chronological order when loading them from the Patient Directory. Previously, images were intermittently loaded in a random order.
 - Ensures uniqueness of each image instance when coding for DVS images using DICOM standards.

- Prevents DVS disconnect errors (blue banner 0084) if the Patient Data Entry form is printed before the patient name has been entered into the DVS database.
- Corrects intermittent issues with the patient database not being initialized upon system bootup.

Known Problems

Refer to Operating Notes:

4707-0027-36 Rev B	English
4787-0027-36 Rev B	French
4777-0027-36 Rev B	German
4827-0027-36 Rev B	Italian
4887-0027-36 Rev B	Danish
4807-0027-36 Rev B	Dutch
4837-0027-36 Rev B	Finnish
4907-0027-36 Rev B	Greek
4877-0027-36 Rev B	Portuguese
4797-0027-36 Rev B	Spanish
4817-0027-36 Rev B	Swedish

Hardware Changes

There are no new hardware requirements for software version 190.13. However, Advanced 3D Imaging and Panoramic Imaging on the APM require specific PCBs for proper functionality.

- Advanced 3D Imaging requires installation of the 7500-1769-XX PCM PCB (currently at -01). Systems at 190.13 software without Advanced 3D Imaging can use existing PCBs (P/N 7500-1408-XX or 7500-0683-XX).
- Panoramic Imaging on the APM requires installation of the 7500-1398-XX PIM PCB.

- DVS 2.0 HW Option requires a new DVS motherboard, CPU, CPU fan, and a SCSI adapter module. The addition of this hardware speeds up system response. DVS 2.0 HW Option is not backward compatible with DVS 1.0 HW Option (released with HDI 5000 software version 177.13).

190.14 (10.3.6 RFD Release)

Released April 06, 2001.

4252-0913-12 Software files disk

4252-0914-12 Bootable image install disk with system software

New Features

None.

Features Not Supported

Same as those for the previous software version (190.13 software)

Problems Corrected

- Prevents the system from displaying comm-failure messages when the network store devices have timed-out because of system DICOM inactivity (dropped-association) and automatically retries the connection. Previously, the displayed comm messages required the operator to acknowledge the message before continuing communications.
- Fixes incorrect gray shades and improves dull images sent to network devices and spooled to MO disk. Images displayed on the system monitor will not be affected by this change. This feature must be enabled by creating a file on the system hard drive. To create the file, type `Skcreat "/hd0/peg_hd/site/netcfg/brighten","0"` into the VX Works command line. To delete the feature, type `Skrm "/hd0/peg_hd/site/netcfg/brighten"`.

- Allows video on DVS systems to switch to VCR playback when a sidebar menu or CALCS menu is displayed.

Known Problems

Refer to Operating Notes:

4707-0027-37 Rev A	English
4787-0027-37 Rev A	French
4777-0027-37 Rev A	German
4827-0027-37 Rev A	Italian
4887-0027-37 Rev A	Danish
4807-0027-37 Rev A	Dutch
4837-0027-37 Rev A	Finnish
4907-0027-37 Rev A	Greek
4877-0027-37 Rev A	Portuguese
4797-0027-37 Rev A	Spanish
4817-0027-37 Rev A	Swedish

Hardware Changes

There are no new hardware requirements for software version 190.14.

Compatibility Issues

Software for DVS 1.0 and 2.0 HW configurations, and software for the APM, are compatible with 190.14 software.

190.16 (10.3.7 FCD Release)

Released January 17, 2002.

4252-0913-14	Software files disk
4252-0914-14	Bootable image install disk with system software

4252-0925-11	APM OS + Combo MO, Version 8.1
4252-0923-10	Software for DVS 2.0 HW Configuration
4252-0917-13	Software for DVS 1.0 HW Configuration
4252-0932-01	Software for DVS 1.0 HW IDE IBM-Drive Re-config floppy disk

New Features

None.

Features Not Supported

Same as those for the previous software version (190.14 software)

Problems Corrected

- Changes system operation so that if you remove the selected scanhead during image review and connect and select a new scanhead, the clinical options and presets for the previously selected scanhead will not appear on the scanhead-select display. Previously, selecting one of those options or presets caused the scanhead-select process to fail; the new scanhead could not be selected until it was disconnected and reconnected.
- Enables a customer to enter the correct (estimated) LMP date for an overdue OB patient. Previously, the longest LMP and gestational age accepted by the HDI 5000 system was 40 weeks. The problem mostly occurred if an estimated date of delivery was entered prior to the current date.
- Eliminates many XIO errors from Pixel Conversion Module (PCM) crashes by upgrading PCM flash RAM.
- Disables the Peak E to Peak A ratio in the VTI Cardiac Report. The measurement can be re-enabled by the user so that the Peak E and Peak A measurements can be manually measured if there is flow reversal.

- Prevents systems with the DVS option from using future or invalid birth dates when you select **Close** on the **Patient Data Entry** form before pressing **Return**.
- Prevents the system from locking up under certain conditions when the VCR is playing and you press **REC**.
- Prevents the system from displaying an error message if the exam date is the patient's birth date.
- Prevents Pegasus task crashes when you select **Update List** twice, causing a graphic artifact. The system crashed if the artifact was selected.
- Corrects several **Quick Save** problems when using SonoCT Real-time Compound Imaging and the C7-4 scanhead.
- Displays a distance measurement from the skin line to the first measurement caliper when using SonoCT Real-time Compound Imaging.
- Corrects the displayed sample volume position with relationship to the spectral Doppler. Previously, the sample volume placement may have been in the center of the frozen 2D image but the spectral Doppler was acquired from the last spot before going into the image review.
- Prevents Pegasus task crashes (error 0021) when using the P4-2 scanhead with the **Abdomen** clinical option and **Renal** Tissue Specific preset while using **Calcs** under certain conditions.
- Prevents the system from locking up after entering color M-mode and moving the cursor to the outer edge of the sector outside the color box.
- Eliminates multiple random horizontal lines in M-mode and continuous-wave (CW) and pulsed-wave Doppler images.
- Enables the user to select patients from the second page of the patient directory if there are exactly enough patients to fill to the end of the second page.

- Eliminates blue banner error message (0021) when using the Contrast Specific Imaging clinical option and the General Tissue Specific preset with the P4-2 scanhead, changing from **Harmonics** to **P1 Pen**, and then entering M-mode.
- Prevents system crashes when selecting a scanhead from the same scanhead family as the currently connected scanhead, using **Superkey+1, 2, or 3**, while in Panoramic Imaging.
- Resolves error banners in simultaneous 2D/CW Doppler mode with the P5-3 scanhead using the **Ped-Card/General** clinical option.
- Prevents live APM video from interacting with 3D data recalled from an MO disk.
- Prevents scanhead reselect messages from occurring when transitioning from the C5-2 to the P5-3 scanhead under certain conditions.
- Fixes the **3 Distances** volume measurement tool. Previously the tool did not work after changing sector width.
- Corrects sensitivity issues when using the C5-2 scanhead in Color Power Angio imaging and triple mode on systems with 190.13 software.
- Reformats the vascular report for ease of use and to reflect how the exam was performed. Previously, the left side measurements were displayed first in the report.
- Decreases trackball sensitivity in text mode.
- Decreases the system response time to perform image brightness calculations and consequently speeds up the time required to archive to network devices or MO disks.
- Displays cardiac output in l/min instead of ml/min.
- Prevents the system from locking up (error 0043) after changing the steering angle while using the MPT7-4 scanhead.

- Shifts the Doppler display when the system is in simultaneous 2D/PW, switched to 2D/PW duplex, and the image is frozen. Previously, the user was able to erroneously measure from the oldest column on the display to the newest column.
- Changes the error reporting status for the Image Memory Module (IMEM) bootup test to avoid intermittent blue banner messages. Errors are noted in the bootup status results in the user diagnostics and documented in the description field of the NVRAM non-volatile memory log during system power down.
- Installs a new driver for the SMC 1211TX Ethernet Card to facilitate the installation process of DVS Modules. (The APM driver will be available during a subsequent software release.)

Known Problems

Refer to Operating Notes:

4707-0027-41 Rev A	English
4787-0027-41 Rev A	French
4777-0027-41 Rev A	German
4827-0027-41 Rev A	Italian
4887-0027-41 Rev A	Danish
4807-0027-41 Rev A	Dutch
4837-0027-41 Rev A	Finnish
4907-0027-41 Rev A	Greek
4877-0027-41 Rev A	Portuguese
4797-0027-41 Rev A	Spanish
4817-0027-41 Rev A	Swedish

Hardware Changes

There are no new hardware requirements for software version 190.16.

Compatibility Issues

None.

190.17 (10.3.8) FCD Release)

Released May 24, 2002.

4252-0913-15

Software files disk

4252-0914-15

Bootable image install disk with system software

4252-0925-12

APM OS + Combo MO

4252-0923-11

Software for DVS 2.0 HW Configuration

New Features

None.

Features Not Supported

Same as those for the previous software version (190.16 software)

Problems Corrected

- Prevents blue banner error messages (0062) associated with an FEC PCB error.
- Eliminates horizontal bands of white dots when in SonoCT Real-Time Compound Imaging. The white dots are caused by memory access issues on the 75001736-03 SPM2000 PCB.
- Corrects a video problem on the CODEC PCB (DVS/APM) causing the overlayed graphics (menus) to periodically jump to the left (jitter).
- Corrects default gray maps for the C7-4 (OB/Gen), CL15-7 (Musc/Knee), and CL15-7 (ACard/Coronary Artery) scanheads when quick-saving SonoCT Real-Time Compound Imaging. This issue was seen primarily on systems with 190.15 (10.3.7) software.

- Prevents displayed text from jumping to the left approximately 6-8 pixels every ten seconds if a high contrast image is displayed (for example, an image with white background and a large amount of black text).

Known Problems

Refer to Operating Notes:

4707-0027-47 Rev B	English
4787-0027-47 Rev B	French
4777-0027-47 Rev B	German
4827-0027-47 Rev B	Italian
4887-0027-47 Rev B	Danish
4807-0027-47 Rev B	Dutch
4837-0027-47 Rev B	Finnish
4907-0027-47 Rev B	Greek
4877-0027-47 Rev B	Portuguese
4797-0027-47 Rev B	Spanish
4817-0027-47 Rev B	Swedish

Hardware Changes

There are no new hardware requirements for software version 190.17.

Compatibility Issues

None.

195.XX Software Releases

195.25 (10.4 FCD Release)

Released October 8, 2001.

4252-0946-22

Software files disk

4252-0947-16

Bootable image install disk with system software

4252-0944-14

APM OS + Combo MO, Version 8.1

4252-0943-10

DVS OS + AP Combo MO

New Features

- BPTRT9-5 Broadband Dual Array Scanhead
- XRes Image Processing
- Panoramic Imaging measurements
- Curved distance measurements
- Pediatric clinical option for the P12-5 scanhead
- Assisted Border Detection tool
- Worklist
- Qualitative Wall Motion Scoring
- Contrast imaging enhancements

Features Not Supported

Same as those for 190.13 (10.3.5) or 190.14 (10.3.6) software version.

Problems Corrected

- Enables a customer to enter the correct (estimated) LMP date for an overdue OB patient. Previously, the longest LMP and gestational age accepted by the HDI 5000 system was 40 weeks. The problem mostly occurred if an estimated date of delivery was entered prior to the current date.
- Eliminates many XIO errors from Pixel Conversion Module (PCM) crashes by upgrading PCM flash RAM.
- Disables the Peak E to Peak A ratio. The measurement can be re-enabled by the user so that the Peak E and Peak A measurements can be manually measured if there is flow reversal.
- Prevents the VCR record control from locking up the system when using the C7-4 scanhead during a pediatric kidney exam.
- Prevents the system from displaying an error message if the exam date is the patient's birth date.
- Prevents Pegasus task crashes when **Update List** is selected twice, causing a graphic artifact to be displayed. The system crashed if the artifact was selected.
- Corrects several **Quick Save** problems when using SonoCT Real-time Compound Imaging using the C7-4 scanhead.
- Installs a new driver for the SMC 1211TX ethernet card to facilitate the installation process of DVS modules. (The APM driver will be available during a subsequent software release.)
- Displays a distance measurement from the skin line to the first measurement caliper when using SonoCT Real-time Compound Imaging.
- Creates a user setup parameter for controlling image brightness (located under **Setups > Image Management > General Options**).

- Removes the **START (AVVIA)** softkey on Italian systems. Previously, in Panoramic Imaging, pressing **START (AVVIA)** caused a recoverable error message (error 0084).
- Prevents the system from locking up after entering color M-mode and moving the cursor to the outer edge of the sector outside the color box.
- Eliminates multiple random horizontal lines in M-mode and continuous-wave (CW) and pulsed-wave Doppler images.
- Enables the user to select patients from the second page of the patient directory if there are exactly enough patients to fill to the end of the second page.
- Eliminates blue banner error message (0021) when using the **Contrast Specific Imaging** clinical option and the **General** preset with the P4-2 scanhead, changing from **Harmonics** to **P1 Pen** mode, and then entering **M-mode**.
- Eliminates blue banner error message 0084 when using 3D and reviewing frozen images under certain conditions.
- Resolved lockups in simultaneous 2D/CW Doppler mode with the P5-3 scanhead.
- Removes the **Topo** setting from the **PWR** menu.
- Enables the system to correctly identify the scanhead ports and report them correctly to the **Sys Data** error log subdirectory. Previously, the middle port was identified as Port 0, the right port as Port 1, and the CW connector as Port 2. The left port did not identify any scanhead.
- Adds additional output power control settings for contrast applications.
- Corrects blue banner error message 0002 when using the P6-3 scanhead, troubleshooting with the Channel Walk utility, and selecting **Y**.
- Adds dots at 0.5 mm increments on the biopsy guide graphics.

- Adds the capability to speed up transfer of ResearchLink files from image memory to the hard drive in contrast applications.
- Displays Cardiac Output in L/min instead of ml/min.
- Prevents 0043 and 0044 SPM PCB error messages after a time delay or control activation. That problem was most frequently seen with the MPT7-4 and P4-2 scanheads when using a multi-line imaging modality.

DVS/APM

- Prevents systems with the DVS option from using future or invalid birth dates by selecting **Close** before pressing **Return** on the **Patient Data Entry** form.
- Changes DVS operation so that the DVS Module can save more than 512 images or loops to the root directory when the MO disk is not full.
- Prevents DVS quad and dual regions of interest (ROIs) for beats per image and images per view from being inherited from time-only-based acquisitions.
- Displays frames when calculations are performed during review after changing the play mode from systole or first-half diastole and scrolling past the original number of frames displayed.
- Enables MO disks to be formatted on DVS modules and recognized by viewer software and PCs using the Windows 2000 operating system.
- Corrects intermittent “No disk found” errors on the APM module when loading or saving 3D images.
- Enables the user to log in to APM systems using UpLink.
- Prevents system crashes when selecting a scanhead from the same scanhead family as the currently connected scanhead using **Superkey+1, 2, or 3** while in Panoramic Imaging.

- Reassigns trackball control to the ROI when advancing the view from full-screen to quad capture during a protocol. Previously, the ROI control was reassigned when capture was started.

Known Problems

Refer to Operating Notes:

4707-0027-40 Rev A	English
4787-0027-40 Rev A	French
4777-0027-40 Rev A	German
4827-0027-40 Rev A	Italian
4887-0027-40 Rev A	Danish
4807-0027-40 Rev A	Dutch
4837-0027-40 Rev A	Finnish
4907-0027-40 Rev A	Greek
4877-0027-40 Rev A	Portuguese
4797-0027-40 Rev A	Spanish
4817-0027-40 Rev A	Swedish

Hardware Changes

The following changes were made to the Upper UIF assembly (3500-33XX-XX) to accommodate the XRes feature:

- The **XRes** control is added where **CURSOR** was.
- **CURSOR** moved to the former **VCR CTRL** location.
- **VCR CTRL** moved to the former **3D OPT** location.

- The **3D OPT** control is removed from the control panel. A **3D OPT** setting is now available on the **3D/CINE** menu.
- **COMP IMAG** is now called **SonoCT**.

The DVS and APM modules require the 3500-3199-03 motherboard for the new features released with this software version.

Compatibility Issues

The 3500-33XX-01 Upper UIF assemblies are required for all 10.4 software upgrades.

Software for DVS 2.0 and APM hardware configurations are compatible with software version 195.25. DVS/APM Motherboard Assembly (P/N 3500-3199-03) was previously released and is required for this software version. There are no other hardware changes for the DVS 2.0 or APM module. Systems with DVS 1.0 hardware will not support 10.4 features.

195.27 (10.4.1 FCD Release)

Released November 16, 2001.

4252-0946-24 Software files disk

NOTE There are no upgrades for this software version. The boot image disk with system software cannot be ordered. If you need to order system software, order a hard drive with the software pre-installed.

New Features

None.

Features Not Supported

Same as those for 195.25 software version.

Problems Corrected

Changes the error reporting status for the Image Memory Module (IMEM) bootup test to avoid intermittent blue banner messages. Errors are noted in the bootup status results in the user diagnostics and documented in the description field of the NVRAM non-volatile memory log during system power down.

Known Problems

Refer to Operating Notes:

4707-0027-42 Rev A	English
4787-0027-42 Rev A	French
4777-0027-42 Rev A	German
4827-0027-42 Rev A	Italian
4887-0027-42 Rev A	Danish
4807-0027-42 Rev A	Dutch
4837-0027-42 Rev A	Finnish
4907-0027-42 Rev A	Greek
4877-0027-42 Rev A	Portuguese
4797-0027-42 Rev A	Spanish
4817-0027-42 Rev A	Swedish

Hardware Changes

There are no new hardware requirements for software version 195.27.

Compatibility Issues

None.

**195.29 (10.4.2
FCD Release)**

Released February 2, 2002.

4252-0946-26

Software files disk

4252-0946-20

Bootable image install disk with system software

4252-0944-17

APM OS + AP Combo MO

4252-0943-12

DVS OS + AP Combo MO

New Features

None.

Features Not Supported

Same as those for 195.27 software version.

Problems Corrected

- Adds a new driver for the SMC 1211TX Ethernet Card to facilitate APM installation. Hot Tip 2001-16 explains how to install the card and driver. (The driver was previously released for the DVS Module.)
- Prevents the APM from disconnecting after you press **XRes** during Panoramic image rebuilding.
- Eliminates blue banner error message (0084) during image transfer from optical disk to the APM.
- Corrected a gain imbalance between harmonic and fundamental imaging modes in conventional imaging and SonoCT Real-Time Compound Imaging.
- Adds instructions to the user manual set on how to enter new patient data when the system is configured for Modality Worklist.

- Changes system operation so that DVS/APM combo disks support new high-capacity hard drives.
- Prevents blue banner messages (0084) when using the C8-5 scanhead when using HD Zoom and the color box under certain conditions.
- Clears distance measurements while in Panoramic imaging, if the image is zoomed.
- Prevents blue banner messages requesting reselection of the BPTRT9-5 scanhead during 2D imaging. The issue was noted when decreasing depth using the Prostate and Generic clinical options on the linear array with SonoCT Real-Time Compound Imaging.
- Replaces **2D Opt:HPen** with fundamental **2D Opt:Gen** for background 2D when using harmonic Color imaging on the C5-2 scanhead with the Abdominal clinical option.
- Prevents the biopsy guide message from being displayed on top of the 3D toolbar when using the APM. Previously, you had to move the cursor under the biopsy message and press **SELECT** to use the toolbar.
- Disables XRes image processing for the **TCD** clinical option on the P4-2 scanhead, because it did not provide any clinical value.

Known Problems

Refer to Operating Notes:

4707-0027-43 Rev A	English
4787-0027-43 Rev A	French
4777-0027-43 Rev A	German
4827-0027-43 Rev A	Italian
4887-0027-43 Rev A	Danish
4807-0027-43 Rev A	Dutch
4837-0027-43 Rev A	Finnish

4907-0027-43 Rev A	Greek
4877-0027-43 Rev A	Portuguese
4797-0027-43 Rev A	Spanish
4817-0027-43 Rev A	Swedish

Hardware Changes

There are no new hardware requirements for software version 195.29.

Compatibility Issues

None.

195.31 (10.4.3 FCD Release)

Released March 22, 2002.

4252-0946-28	Software files disk
4252-0947-22	Bootable image install disk with system software
4252-0944-19	APM OS + AP Combo MO
4252-0943-14	DVS OS + AP Combo MO

New Features

None.

Features Not Supported

Same as those for 195.29 software version.

Problems Corrected

- Eliminates horizontal bands of white dots when in SonoCT Real-Time Compound Imaging.
The white dots are caused by memory access issues on the 7500-1736-03 SPM PCB.

- Corrects a video problem on the CODEC PCB (DVS/APM) causing the overlayed graphics (menus) to periodically jump to the left of the display.
- Prevents incorrect scaling information from being sent to the serial port during Panoramic Imaging when **Cine** or **Trim** is selected.

Known Problems

Refer to Operating Notes:

4707-0027-44 Rev A	English
4787-0027-44 Rev A	French
4777-0027-44 Rev A	German
4827-0027-44 Rev A	Italian
4887-0027-44 Rev A	Danish
4807-0027-44 Rev A	Dutch
4837-0027-44 Rev A	Finnish
4907-0027-44 Rev A	Greek
4877-0027-44 Rev A	Portuguese
4797-0027-44 Rev A	Spanish
4817-0027-44 Rev A	Swedish

Hardware Changes

There are no new hardware requirements for software version 195.29.

Compatibility Issues

None.

198.XX Software Releases

198.06 (10.4.5 Released May 31, 2002.

FCD Release)

4252-0963-03

Software files disk

4252-0964-03

Bootable image install disk with system software

4252-0944-21

APM OS + AP Combo MO

4252-0943-15

DVS OS + AP Combo MO

New Features

P4-1 Broadband abdominal phased array scanhead and dual track biopsy guide

Features Not Supported

Same as those for 195.31 software version.

Problems Corrected

- Prevents errors associated with intermittent loss of communication with the APM on bootup. The errors include MISEM socket errors and blue banner message 0089 (DVS power up errors).
- Prevents control activation during the Panoramic Imaging rebuilding process. Previously, it was possible to attempt to make measurements during the rebuild process. It was also possible to turn on the **XRes** LED but not go into XRes mode.
- Corrects DVS communication issues caused by an Assisted Border Detection (ABD) crash during apical four-chamber or apical two-chamber captures. Previously system reboot was required to recover.

- Prevents errors associated with disconnecting a scanhead during Panoramic Imaging with XRes turned on.

Known Problems

Refer to Operating Notes:

4707-0027-46 Rev A	English
4787-0027-46 Rev A	French
4777-0027-46 Rev A	German
4827-0027-46 Rev A	Italian
4887-0027-46 Rev A	Danish
4807-0027-46 Rev A	Dutch
4837-0027-46 Rev A	Finnish
4907-0027-46 Rev A	Greek
4877-0027-46 Rev A	Portuguese
4797-0027-46 Rev A	Spanish
4817-0027-46 Rev A	Swedish

Hardware Changes

There are no new hardware requirements for software version 198.06.

Compatibility Issues

None.

198.06 (10.4.5.1)

Released October 1, 2002.

4252-0943-17	DVS OS + AP Combo MO
4252-0944-23	APM OS + AP Combo MO

NOTE System software remains at 4252-0963-03 (198.06) for this release.

New Features

None.

Features Not Supported

Same as those for the previous DVS/APM software version.

Problems Corrected

This software version addresses an image flicker issue on the 3500-2819-08 Codec PCB in DVS/APM modules. The flicker is noticeable when high-contrast images are displayed, such as the system configuration menu (white background with a lot of black text). A portion of the image jumps to the left approximately eight pixels every 10 seconds. Hardware changes to the Codec PCB were made to support the new software.

Known Problems

There are no Operating Notes for this software build.

Hardware Changes

Changes to the Codec PCB increase the pixel-clock-driver signal strength to adequately drive the pixel clock network.

Compatibility Issues

None.

200.XX Software Releases

200.23 (10.5 RFD Release)

Released October 22, 2002.

4252-0977-07

Software files disk

4252-0978-07

Bootable image install disk with system software

4252-0980-08

APM 1.0 OS + AP Combo MO

4252-0981-07

APM 2.0 OS + AP Combo MO

4252-0983-04

DVS OS + AP Combo MO

New Features

- iSCAN Intelligent Optimization
- XRes imaging on the CL15-7, CL10-5, P6-3, C8-5, C8-5 (ATL), C9-5, P12-5, and BPTRT scanheads
- XRes performance enhancements (for PAL systems only, requires APM 2.0)
- Contrast Enhancements
 - Contrast on CT8-4 scanhead
 - Contrast on P4-1 scanhead
 - P4-1 Power Pulse Inversion harmonic imaging and Pulse Inversion Harmonic imaging
 - Image enhancement on the P4-1, P4-2, C5-2, L7-4, and L12-5 scanheads
 - P4-2 and C5-2 scanhead contrast improvements
 - L7-4 scanhead breast contrast improvements

- Agent Detection Imaging (ADI)
- Optimized contrast defaults
- SonoCT Real-time Compound Imaging for C8-5, C8-5 (ATL), C9-5, and C8-4v scanheads
- Password-protected access to images on the hard drive
- Endo 12-5 Endoscopic scanhead capability for non-revenue systems (sales demo and marketing)
- Penetration improvements on the C8-4v scanhead (Fundamental PEN)
- Connectivity performance enhancements
- New Philips bootup screen

Features Not Supported

MicroVascular Imaging (MVI) and Extended Loop Capture (ELC) are not supported on this release. These features will be supported on a subsequent release.

Problems Corrected

- Eliminates duplication of images, series, or studies and prevents the same from interrupting workflow and taking up extra space on archive devices. Previously, images were assigned an identifier every time the image was sent or written. Identifiers now stay with the image regardless of the number of times the image is transferred, unless the patient name is changed. If the name is changed, all identifiers for that patient are changed. DICOM specifications required only one identifier.
- Warns the user when database storage is getting low and prevents the user from adding patients to preclude subsequent HDI DVS communication time-outs when accessing patient data from large DVS databases.

Known Problems

Refer to Operating Notes:

4707-0027-48 Rev B	English
4787-0027-48 Rev A	French
4777-0027-48 Rev A	German
4827-0027-48 Rev A	Italian
4887-0027-48 Rev A	Danish
4807-0027-48 Rev A	Dutch
4837-0027-48 Rev A	Finnish
4907-0027-48 Rev A	Greek
4877-0027-48 Rev A	Portuguese
4797-0027-48 Rev A	Spanish
4817-0027-48 Rev A	Swedish

Hardware Changes

HDI 5000 Ultrasound System

New hardware requirements for software version 200.23 enhance connectivity performance. These enhancements require the 7500-1918-01 or -02 CPU PCB. Also, CPU boot PROMs (4252-2015-06 and 4252-2016-06) were moved to board level.

APM (PAL systems only)

XRes performance improvements require several changes to the APM (APM 2.0), including a new motherboard, processor, and additional memory (512 MB). The SCSI card and MO disk drive were removed in favor of an EIDE MO disk drive. Changes have also been made to the enclosure assembly to improve cooling of the P4 motherboard and to accommodate future

upgrades. There are no changes to the user interface. The cooling improvements are achieved via mechanical and flow modifications to the APM covers.

The external MO drive cannot be used to load APM software due to removal of the SCSI card. Instead, load APM software using the internal MO drive. When the software has been loaded, the disk will be automatically ejected.

APM 2.0 colors were also changed to adhere to Philips standards.

DVS Module

The APM motherboard and processor changes have not been incorporated into the DVS Module, Systems with DVS will continue to ship with the existing DVS configuration Due to this change, dual DVS and Level 10.5 APM demo systems will no longer be supported.

Compatibility Issues

Level 10.5 systems may have APM 1.0 (NTSC only) or APM 2.0 (supports PAL video). All APM features and enhancements released with this software version, except for the improved PAL XRes video performance, are backwards compatible to the existing APM modules.

Software versions 10.4 and lower are not compatible with 10.5 hardware and software.

200.24 (10.5.0.5 RFD Release)

Released October 31, 2002.

4252-0977-08	Software files disk
4252-0978-08	Bootable image install disk with system software

NOTE Part numbers for DVS and APM software did not change from the previous software version 200.23.

New Features

- MicroVascular Imaging (MVI)
- Extended Loop Capture (ELC)

Features Not Supported

Not applicable.

Problems Corrected

None.

Known Problems

Refer to Operating Notes:

4707-0027-52 Rev A	English
4787-0027-52 Rev A	French
4777-0027-52 Rev A	German
4827-0027-52 Rev A	Italian
4887-0027-52 Rev A	Danish
4807-0027-52 Rev A	Dutch
4837-0027-52 Rev A	Finnish
4907-0027-52 Rev A	Greek
4877-0027-52 Rev A	Portuguese
4797-0027-52 Rev A	Spanish
4817-0027-52 Rev A	Swedish

Hardware Changes

None.

Compatibility Issues

There are no new hardware requirements for 200.24 software. The hardware requirements for 200.23 are still applicable.

10.5.1 Hardware-Only Release

Released November 18, 2002.

The 10.5.1 release is a hardware-only release. System software remains at 200.24.

New Features

- Ergonomic and cosmetic changes
 - Monitor forward/backward and side-to-side (rotation) articulation capabilities
 - Built-in monitor handle
 - Integrated handles on the front and rear of the system
 - Front foot rest
 - OEM platform on the rear of the command module
 - Scanhead cable hooks below the lower user interface
 - Power cable hook on the rear of the command module
- HDI speed-up option (includes new CPU and SPM PCBs)
- DVS 2.0 or APM 2.0
- Redesigned fan module
- Philips colors and branding

Features Not Supported

Not applicable.

Problems Corrected

None.

Known Problems

The operating notes for 10.5.0.5 software (200.24) apply to this release.

Hardware Changes

In addition to the ergonomic and cosmetic hardware, changes were made to the system CPU and the SPM PCBs. The processing speed of the system CPU has been increased by 25 percent. On the SPM PCB, the DSP RAM has been doubled by replacing 2 megabit RAM chips with 4 megabit chips.

Part numbers for 10.5.1 ergonomic and cosmetic changes are listed in [Section 14, "Parts"](#)

Compatibility Issues

Level 10.5.1 systems must have the new CPU PCB (P/N 7500-1972-XX) and SPM PCB (P/N 7500-1952-X) to use the HDI speed-up option.

210.XX Software Releases

210.14 (10.5.5 RFD Release)

Released May 2, 2003.

4252-0996-07

Software files disk

4252-1009-07

Bootable image install disk with system software

4252-0997-12	APM 1.0 OS + AP Combo MO
4252-0998-12	APM 2.0 OS + AP Combo MO
4252-0983-04	DVS OS + AP Combo MO

New Features

- DICOM Structured Reporting
- CD Writer on the APM
- Standard Display Format
- Contrast enhancements
- Connectivity enhancements
- SonoCT Imaging and biopsy guide for the C9-5 Scanhead
- P4-1 Scanhead Tissue Specific Preset

Features Not Supported

Same as those for the previous software version.

Problems Corrected

- Returns the system to the initial sector width when using the C5-2 scanhead with SonoCT imaging. Previously, if the 2D sector width was reduced and Color was activated, the sector went to full size and remained at full size, even if Color was turned off.
- Returns the system to live video when exiting VCR playback or “**Superkey+Video**” mode without an active (imaging) transducer.
- Prevents system lockup when using VCR playback or an alternate video source using **Superkey + Video (P)** keys after disconnecting a scanhead in Color or Doppler.

- Changes the acoustic power and intensity file to prevent blue banner message 0002 in simultaneous CW with minimum sector width focused at 10 cm. The issue occurred mainly on the P4-2 scanhead.
- Prevents a blank 2D image display and an XRes initialization error (blue banner message 0084) from occurring when selecting a SonoCT and XRes Tissue Specific preset (TSP) from a contrast TSP when flash triggering was used.
- Prevents file corruption when disconnecting scanheads during transfer of MicroVascular Imaging (MVI) or Extended Loop Capture (ELC) images to an MO disk. Previously, the issue only occurred if the user did not heed the green banner instructing them to wait until image spooling was completed. If the user waited until the images were properly spooled the files were not corrupted.
- Corrects system and APM operation to allow MicroVascular Imaging (MVI) or Extended Loop Capture (ELC) images to be saved to the APM hard drive or the MO drive, when the system is powered down. Previously, the APM powered down before the files were completely saved, resulting in lost or corrupted files.
- Removes the Panasonic MD830 VCR from the OEM setup menu and replaces it with **Supported VCR**.
- Complies with Integrated Healthcare Enterprise (IHE) Year 3 and Year 4 regulations. The IHE initiative is a project designed to advance the state of data integration in health care. Sponsored by the Radiological Society of North America and the Healthcare Information and Management Systems Society, it brings together medical professionals to standardize methods of sharing information in support of optimal patient care.
- Fixes labels in the **Patient Data Entry** form on Italian and French systems with patient data security (password-protected access to images on the hard drive). Previously, the translated labels were too long and made the **New Patient** and **Edit** selections unusable.

- Fixes a scaling error that can occur after exiting a non-ultrasound video source—for example, VCR playback, image review, and **Superkey + Video (P)**—without an active transducer and then selecting a transducer.
- Prevents blue banner message 0021 from being displayed during system power down on systems with one or more NetLink devices enabled. The blue banner messages were caused by suspended tasks and were benign.
- Displays the DVS softkeys when Cardiology Contrast applications are enabled.
- Corrects aortic valve area measurements displayed on a report page. Previously, if a global cardiology calculation had been disabled and subsequently an aortic valve area measurement was made, the valve area was calculated based on values from a previous measurement. This issue was originally documented in 4707-0027-50a and 4707-0027-51a operating notes.

Known Problems

Refer to Operating Notes:

4707-0027-54 Rev B	English
4787-0027-54 Rev B	French
4777-0027-54 Rev B	German
4827-0027-54 Rev B	Italian
4887-0027-54 Rev B	Danish
4807-0027-54 Rev B	Dutch
4837-0027-54 Rev B	Finnish
4907-0027-54 Rev B	Greek
4877-0027-54 Rev B	Portuguese
4797-0027-54 Rev B	Spanish
4817-0027-54 Rev B	Swedish

Hardware Changes

HDI 5000 Ultrasound System

Systems with the connectivity enhancements (10.5.5 systems with the 9.1-GB drive) have two drive partitions; the normal partition containing system software (HD0) and a 1.0-GB drive partition (HD1) used for swap space and performance optimization during connectivity functions. The 1.0-GB partition is automatically checked during bootup, and a successful checkdisk entry is made in the error log. The checkdisk entry is not an error and requires no troubleshooting. Systems with hard drives smaller than 9.1 GB do not perform a checkdisk during bootup as there is no HD1 partition. The larger partition (HD0) performs a checkdisk only during improper power-down conditions.

Minimum hardware requirements have been established to play Cineloop images written to a CD on a PC or a Mac. If the hardware requirements are not met, the images will play, but with unacceptable playback quality. The hardware requirements are listed in [Table 12-3](#).

Table 12-3

Minimum Hardware Requirements to Play Cineloop Images from a CD Writer

Parameter	PC Requirements	Mac Requirements
Processor	450 MHz Pentium	450 MHz G4
RAM	256 MB	256 MB
Video Card	8 MB AGP	8 MB AGP
Hard Drive	20 GB HD @ 7200 RPM	20 GB HD @ 7200 RPM
CD-ROM Drive	24x	24x
MO Drive	640 MB 3.5"	640 MB 3.5"
Operating System	Windows NT, 2000 or XP	Mac O/S 9.2.2
Additional Requirements	None	QuickTime 5.0.2

APM (PAL systems only)

A CD writer is supported on the APM with this release.

When installing a CD Writer upgrade in the field, review the APM configuration to determine the Codec Module part number. If the Codec Module is 3500-2819-06 or below:

- upgrade billable customers on a "billed call" basis and only using the 3500-2819-07, -08, -09 or -10 Codec Module ordered from Service, or;
- order the 8000-2311-01 Codec Module Upgrade Kit for all other customers.

NOTE DO NOT order the 8000-2311-01 upgrade kit for billable customers.

For additional information regarding the Codec Module upgrade refer to Service Bulletin DVS-05.

DVS Module

There are no new hardware requirements for the DVS module.

Compatibility Issues

None.

210.16 (10.5.6 RFD Release)

Released August 18, 2003.

4252-0996-08	Software files disk
4252-1009-08	Bootable image install disk with system software
4252-0997-14	APM 1.0 OS + AP Combo MO
4252-0998-14	APM 2.0 OS + AP Combo MO
4252-0999-15	APM Application Software

New Features

None.

Features Not Supported

Same as those for the previous software version.

Problems Corrected

System

- Corrects a gain balance issue causing 2D images to become dark when going to color from Renal or Transplant TSI with the C5-2 scanhead. This issue can also be seen when exiting SonoCT when in the Renal or Transplant TSIs. The problem only occurs on systems with 200.23, 200.24, and 210.14 software. Refer to Service Bulletin 5000-19 for more information.
- Prevents a lockup that occurs when selecting **PRINT**, **END EXAM**, or **New Patient** on systems with the Worklist feature enabled. The issue occurs only on systems with 10.5.5 software. Refer to Service Bulletin 5000-18 for more information.
- Increases the default gain setting 2-3 dB for grayscale Pulse Inversion when using contrast imaging.
- Prevents an XRes Initialization (error banner #84) failure from occurring upon transducer select of a TSI with XRes as a default. This problem only occurs if the user makes the transducer selection directly from either the Hard Drive or Optical Disk exam directory.
- Prevents an intermittent Pegasus Task Crash lockup (error banner 21), from occurring when entering "Patient Data Entry", selecting "New Patient" or "Update Worklist" on a system with the Worklist feature enabled.

APM Software

- Changes the French translation of the **RESET** softkey from **RETABLIR** to **REMISE O.** Previously, there was confusion regarding whether the analysis results were being reset to zero.
- Fixes an intermittent APM bootup problem that would result in a Codec Initialization failure (error banner #84) when entering XRes mode. Previously, the system would indicate that the system was in XRes, when in fact, XRes and APM features were not functioning. Also, if the system fails on bootup and does not bootup into a TSI with XRes turned on, the same blue banner message 0084 would be displayed when an XRes TSI is selected.

Known Problems

Refer to Operating Notes:

4707-0027-55 Rev B	English
4787-0027-55 Rev B	French
4777-0027-55 Rev B	German
4827-0027-55 Rev B	Italian
4887-0027-55 Rev B	Danish
4807-0027-55 Rev B	Dutch
4837-0027-55 Rev B	Finnish
4907-0027-55 Rev B	Greek
4877-0027-55 Rev B	Portuguese
4797-0027-55 Rev B	Spanish
4817-0027-55 Rev B	Swedish

Hardware Changes

There are no hardware changes for the ultrasound system, DVS or APM modules.

210.16 (10.5.6.1 RFD Release)	Released September xx, 2003.
4252-0997-15	APM 1.0 OS + AP Combo MO
4252-0998-15	APM 2.0 OS + AP Combo MO
4252-0999-16	APM Application Software

NOTE System software remains at 4252-0996-08 (210.16) for this release.

New Features

None.

Features Not Supported

Same as those for the previous software version.

Problems Corrected

Creates a patch to prevent DVS/APM vulnerability to the W32 Blaster worm. There are no changes to ultrasound system operation.

Known Problems

There are no Operating Notes with this software build.

Hardware Changes

There are no hardware changes required for this software build.

13 Configuration

Compatibility

The part number, dash level, and firmware software level of each PCB is determined by the CPU at boot up.

The system software contains a hardware and software configuration file that lists the part numbers and dash levels of installed PCBs and PROMs. If a different dash level PCB or PROM is installed, and "Save as Installed" is then selected, this file is updated. This should only be done if the replacement has been determined to be compatible with the system configuration. *The original configuration information cannot be retrieved after this file is modified. Refer to Section 9, "Troubleshooting", for more information.*

Hardware configuration and compatibility must be based on information in the HDI 5000 Master Compatibility Matrix (P/N 9150-0592) and the PROM replacement matrices located in this section. Hardware configuration involves verifying the PCBs and PROMs are compatible with the specific system software. Refer to the Master Compatibility Matrix. See [Figure 13-1](#) and [Figure 13-2](#) for PCB locations by name.

Primary PCB Locations

The HDI 5000 primary PCB locations are shown in [Figure 13-1](#) (front card cage) and [Figure 13-2](#) (rear card cage).

NOTE See the HDI 5000 Master Compatibility Matrix for part numbers.

Figure 13-1

Primary System PCB Names and Locations (Front Card Cage)

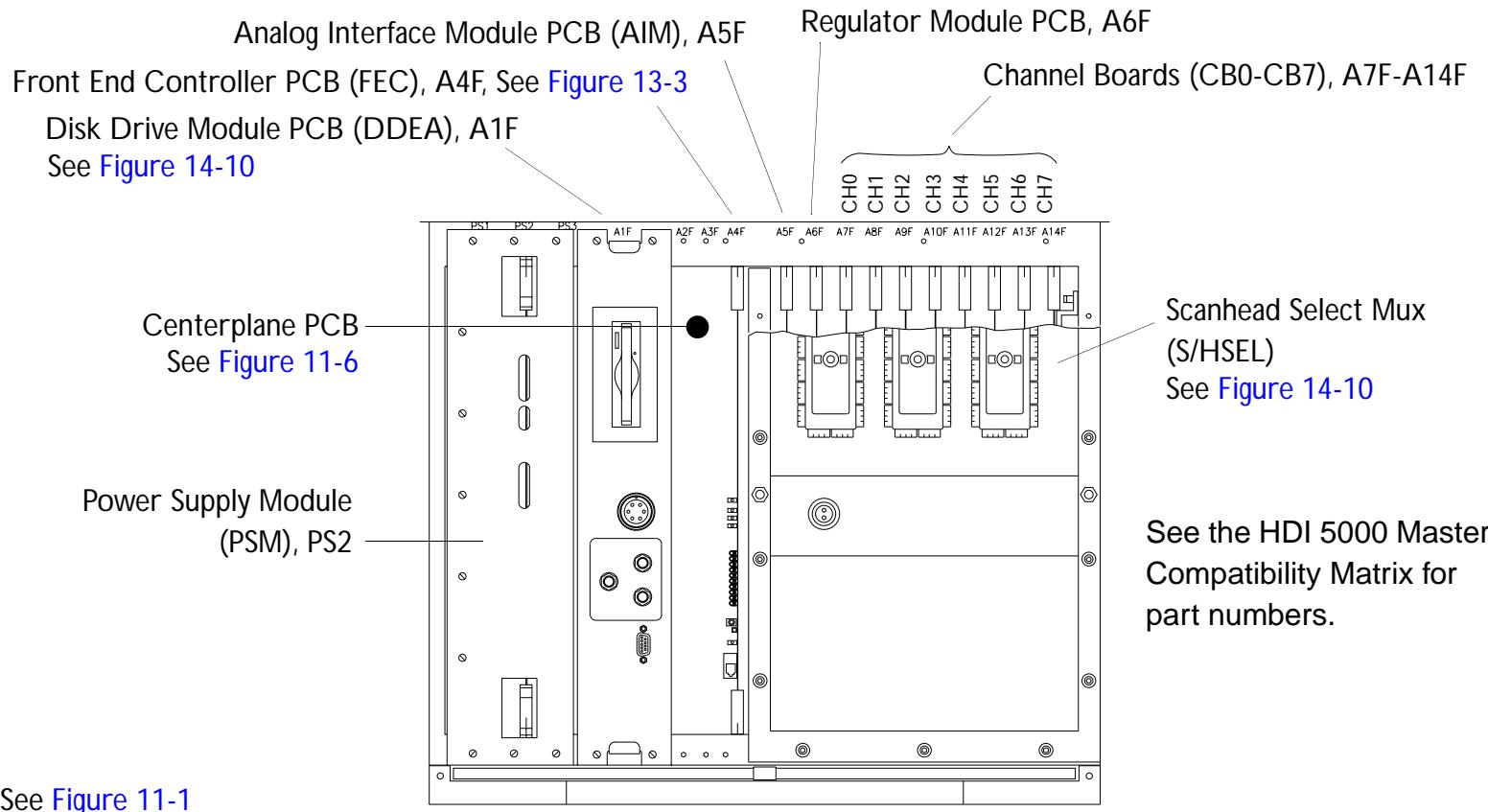


Figure 13-2

Primary System PCB Names and Locations (Rear Card Cage)

Pixel Space Processor 1 PCB (PSP1), A5B, See [Figure 13-6](#)

Pixel Space Processor 2 PCB (PSP2), A4B

Pixel Conversion Module PCB (PCM), A3B

See [Figure 13-5](#)

Peripheral Interface
Module PCB (PIM), A2B
See [Figure 13-4](#)

Internal Interface
Module PCB (IIM), A1B

See the HDI 5000 Master
Compatibility Matrix for
part numbers.

System CPU PCB (SYSCPU), A6B, See [Figure 13-7](#)

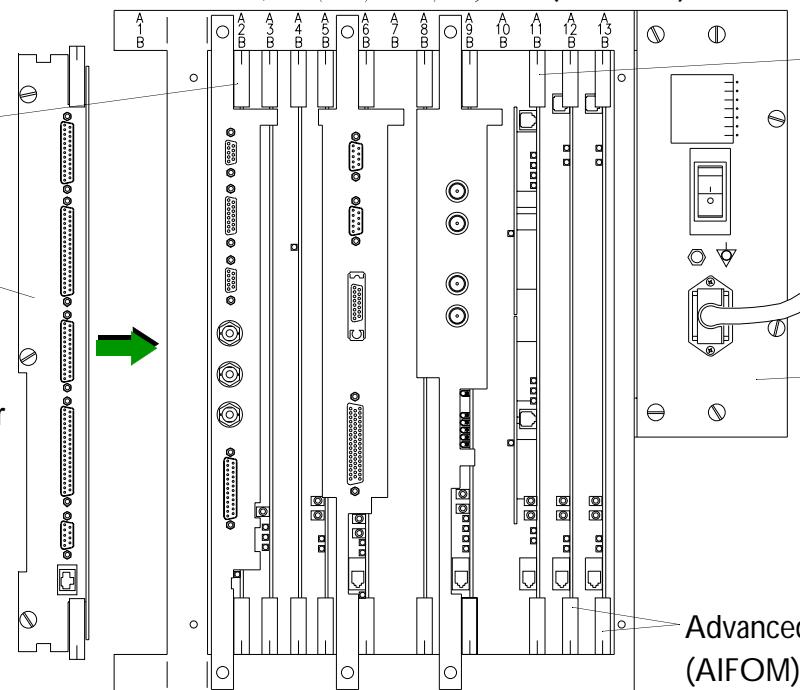
Image Memory PCB (IMEM), A8B

Advanced Digital/Audio/Physio and Translator PCB
(ADAPTR), A9B, See [Figure 13-8](#)

Signal Processor Module
PCB (SPM), A11B
See [Figure 13-9](#)

AC Input Module
(ACIM), PS4/PS5
See [Figure 11-5](#)
See [Figure 14-23](#)

Advanced IF Output Module PCB
(AIFOM), A12B/A13B See [Figure 13-10](#)



Usage Rules for PROM Matrices

A number of PCBs require operating software PROMs (firmware). The software for the CPU determines the overall system software level (for example, 107.10). The software on other PCBs will never be higher than that of the CPU, and can be at a lower level.

System features may or may not be compatible with a specific PCB revision. The different codes that can be found here are:

Y - yes, feature is compatible with this PCB dash level,

N - no, feature is not compatible with this PCB dash level.

Order the software PROM kit required by the PCB part number being ordered.

Usage Rules for Jumper and PROM Diagrams

- There are no switches that require configuration by field service representatives.
- There are no diagrams for PCBs that do not have jumper headers or firmware PROMs installed.
- The relative positions of firmware PROMs and certain jumpers are shown on the jumper and PROM diagrams.
- Only those jumpers requiring headers are shown on these diagrams.
- Jumpers requiring a jumper header are shown only for reference when verifying their integrity.
- If the jumper has three pins, the physical position of the header is shown.
- It is understood that if jumpers are not shown on the diagram, they are either hard-wired or are not jumpered with a header.

Ordering/ Installing System Software

[Table 13-1](#) lists part numbers of system software files disks and upgrade disks. The part number of the software files disk is listed for reference because the part number is displayed on the system monitor (Setups > Diagnostics > Show Machine Configuration). The part number is also used on the Operating Notes. Beginning with software version 107.11, the software files disk no longer contains files to enable system bootup. If system software is to be ordered, order the system upgrade disks with the system software. Refer to [Table 13-1](#) for upgrade disk part numbers.

Upgrade disks with system software (230-MB or larger optical disks) automatically back-up the old system software and machine options, copy the new software, perform the software integrity scan, and transfer user presets. Messages are displayed on the system monitor to provide status of the installation process. If an error is detected during the installation process, the system automatically restores the previous software. Upgrade disks with system software are used to upgrade from one level of HDI 5000 software to another.

Upgrade disks without system software (128-MB optical disks) are used only to transfer system presets. The disk is inserted into the drive and the user presets (OB tables and hospital name) are transferred to the disk. The hardware is then updated and the presets are copied to the hard drive. Upgrade disks without system software are used to transfer user presets (not TSI presets) when upgrading from an HDI 3000 to an HDI 5000. (System software files are already installed on the hard drive of the new DDEA module.)

To summarize the use of upgrade disks, use the 128-MB MO disk to transfer presets from an HDI 3000 to an HDI 5000. Use the 540-MB MO for transferring presets or installing software on any HDI 5000. If a system has a DDEA with a 640-MB MO drive, use a 230-MB upgrade disk. Use 540-MB disks for systems with software versions 170.30 or higher.

Ordering Replacement Hard Drives

Defective hard drives are to be replaced with pre-loaded drives (drives containing system software). Use the following procedure to order a hard drive with the correct software version.

CAUTION

Improper handling of hard drives causes physical and electronic damage. Avoid shock damage and ESD damage to the hard drives during removal and installation. Use the procedure below to prevent drive damage.

1. Use proper ESD procedures when removing or installing the hard drive.
2. Place the drive on a soft surface to prevent shock damage. The end-caps in the drive packaging may be used.
3. Order hard drive part number 3500-3066-04 if replacing a Quantum hard drive, or 3500-3129-02 if replacing an IBM hard drive. (Do not order a blank hard drive P/N 2100-XXXX-XX.)
4. Specify the current software level and base ID number.
5. Return the damaged drive in the replacement drive packaging. Drives returned that are not in this packaging will be scrapped and billed to your service region.
6. If required, order the Machine Options (MO) files using the procedure in “[Ordering/Installing System Features](#)” on page 490.

Ordering/ Installing System Features

If features or scanheads are to be added to a particular system, Machine Option (MO) files must be ordered for that system. Install features or scanheads directly into the system (if you are in front of the system) or remotely using UpLink PC Based Remote Diagnostics. Refer to the *UpLink* manual (P/N 4720-0236-XX) for remote installation. If you are in front of the system, use the following procedure to order and install features or scanheads:

1. Order Machine Options optical disk P/N 4252-0738-01.
2. Specify the CPU ID number for that particular system. A Machine Options optical disk will be created for that system ID and sent to you.
3. Insert the Machine Options disk into the MO drive and power up the system.
4. Follow the system prompts to install the feature.

DVS/APM Hardware

Refer to the HDI 5000 Master Compatibility Matrix for DVS/APM hardware part numbers.

PCB PROM/ Jumper Information

Refer to [Table 13-3](#) through [Table 13-10](#) for PROM kit part numbers, PROM part numbers, reference designators, checksums, and CRCs. [Figure 13-3](#) through [Figure 13-10](#) illustrate the PROM and jumper locations.

Disk Drive Jumper and Switch Positions

Jumper and switch positions for the hard drives and optical drives are listed in [Table 13-11](#) and [Table 13-12](#). The drive part numbers are listed for reference when checking or changing the jumper positions, however, these part numbers cannot be ordered.

Table 13-1 Software Files and Upgrade Disk Part Numbers (10.2.1 and Below)

Software Level	Build Level	Software Files ¹	Upgrade Disk w/o System S/W	Upgrade Disk w/ System S/W	Notes
10.0	107.10	4252-0799-11	4252-0801-06	4252-0800-06	2
10.0b	107.11	4252-0810-01	4252-0809-01	4252-0808-01	
10.0.1	108.15	4252-0811-09	4252-0814-04	4252-0813-04	
10.0.2	108.16	4252-0811-10	4252-0814-05	4252-0813-05	
10.0.3	108.17	4252-0811-11	4252-0814-06	4252-0813-06	
10.0.4	108.18	4252-0811-12	4252-0814-07	4252-0813-07	
10.0.5	108.19	4252-0811-13	4252-0814-08	4252-0813-08	
10.1	124.13	4252-0815-14	4252-0829-03	4252-0828-03	
10.1.1	125.09	4252-0840-05	4252-0842-05	4252-0841-05	
10.1.1.2	125.11	4252-0840-07	4252-0842-07	4252-0841-07	
10.1.2	127.04	4252-0867-04	4252-0869-03	4252-0868-03	
10.1.3	127.05	4252-0867-05	4252-0869-04	4252-0868-04	
10.1.4	127.09	4252-0867-08	-	4252-0868-07	
10.1.5	127.13	4252-0867-12	-	4252-0868-11	
10.2	170.30	4252-0851-26	4252-0873-05	4252-0874-06	2
10.2.1	170.31	4252-0851-27	4252-0873-06	4252-0874-07	2

1. The part numbers in this column are for reference only. The part numbers are of no use to field personnel.
2. Initial system release. Upgrade disk with system software is to upgrade systems requiring a new hard drive.
3. Due to increased system software size, use only the 540-MB disks included with the upgrade kits, or an unformatted 3.5-inch optical disk (P/N 2100-1409-01) to create backups.

Table 13-2 Software Files and Upgrade Disk Part Numbers (10.2.5 and Above)^{1,2}

Software Level	Build Level	Software Files ³	Upgrade Disk w/System S/W	DVS Software	APM Software	Notes
10.2.5	177.13	4252-0878-19	4252-0878-06	4252-0892-05	-	
10.2.6	178.04	4252-0899-03	4252-0900-03	4252-0892-05	-	
10.3	185.21	4252-0901-13	4252-0902-09	-	-	
10.3.5	190.13	4252-0913-11	4252-0914-11	4252-0917-12 (1.0) 4252-0923-09 (2.0)	4252-0925-10	
10.3.6	190.14	4252-0913-12	4252-0914-12	4252-0917-12 (1.0) 4252-0923-09 (2.0)	4252-0925-10	
10.3.7	190.16	4252-0913-14	4252-0914-14	4252-0917-13 (1.0) 4252-0923-10 (2.0)	4252-0925-11	
10.3.8	190.17	4252-0913-15	4252-0914-15	4252-0917-16 (1.0) 4252-0923-12 (2.0)	4252-0925-12	
10.4	195.18	4252-0946-15	4252-0947-09	4252-0943-10 (2.0)	4252-0944-12	
10.4	195.25	4252-0946-22	4252-0947-16	4252-0943-10 (2.0)	4252-0944-14	
10.4.1	195.27	4252-0946-24	-	4252-0943-10 (2.0)	4252-0944-14	
10.4.2	195.29	4252-0946-26	4252-0947-20	4252-0943-12 (2.0)	4252-0944-17	
10.4.3	195.31	4252-0946-28	4252-0947-22	4252-0943-14 (2.0)	4252-0944-19	

Configuration: Disk Drive Jumper and Switch Positions

Software Level	Build Level	Software Files ³	Upgrade Disk w/System S/W	DVS Software	APM Software	Notes
10.4.5	198.06	4252-0963-03	4252-0964-03	4252-0943-15 (2.0)	4252-0944-21	
10.4.5.1	198.06	4252-0963-03	4252-0964-03	4252-0943-17 (2.0)	4252-0944-23	⁴
10.5	200.23	4252-0977-07	4252-0978-07	4252-0983-04 (2.0)	4252-0980-08	
					4252-0981-07	
10.5.0.5	200.24	4252-0977-08	4252-0978-08	4252-0983-04 (2.0)	4252-0980-08	
					4252-0981-07	
10.5.1	200.24	4252-0977-08	4252-0978-08	4252-0983-04 (2.0)	4252-0980-08	⁵
					4252-0981-07	
10.5.5	210.14	4252-0996-07	4252-1009-07	4252-0983-04 (2.0)	4252-0997-12	
					4252-0998-12	
10.5.6	210.16	4252-0996-08	4252-1009-08	4252-0983-04 (2.0)	4252-0997-14	
					4252-0998-14	
10.5.6.1	210.16	4252-0996-08	4252-1009-08	4252-0983-05 (2.0)	4252-0997-15	⁴
					4252-0998-15	

1. Part number for upgrade disk without system software is no longer supported. There is no upgrade or boot image disk for this software version. If you need to order the software, order the hard drive with the software pre-installed.
2. Due to increased software size, use only the 540-MB disks included with the upgrade kits, or an unformatted 3.5-inch optical disk (P/N 2100-1409-01) to create backups.
3. The part numbers in this column are for reference only. The part numbers are of no use to field personnel.
4. System software did not change for this software version.
5. System software did not change for 10.5.1 software. The 10.5.1 release was hardware only (Philips HDI 5000)

Table 13-3

A4F Front End Controller PCB (FEC) PROMs

PCB P/N	PROM Kit P/N		Location, P/N, Dash		Chk-sum	CRC	Notes	
7500-0932	03	8000-1317	02	U35	4201-1951	04	A822	0000
				U34	4201-1952	04	2CD7	0000
				U37	4201-1953	04	73D4	0000
				U36	4201-1954	04	5A8A	0000
				U10	4201-1582	08	4C23	CCA3
	8000-1504	01	01	U35	4201-1994	04	6724	4CB0
				U34	4201-1995	04	524A	4CB0
				U37	4201-1996	04	9767	4CB0
				U36	4201-1997	04	83C3	4CB0
				U10	4201-1582	08	4C23	CCA3
7500-1567	03	8000-1575	01	U38	4201-2006	01	F5DB	DB1A
				U37	4201-2007	01	701C	DB1A
				U40	4201-2008	01	95D9	DB1A
				U39	4201-2009	01	FE9C	DB1A
				U10	4201-1582	08	4C23	CCA3

Table 13-3

A4F Front End Controller PCB (FEC) PROMs (Continued)

PCB P/N	PROM Kit P/N	Location, P/N, Dash			Chk-sum	CRC	Notes
8000-1575	02	U38	4201-2006	01	F5DB	DB1A	
		U37	4201-2007	01	701C	DB1A	
		U40	4201-2008	01	95D9	DB1A	
		U39	4201-2009	01	FE9C	DB1A	
		U10	4201-1582	10	27A9	2534	
7500-1567	05	U38	4201-2006	01	F5DB	DB1A	PROMs are board-level.
		U37	4201-2007	01	701C	DB1A	
		U40	4201-2008	01	95D9	DB1A	
		U39	4201-2009	01	FE9C	DB1A	
		U10	4201-1582	10	27A9	2534	

Figure 13-3

FEC Jumper and PROM Locations

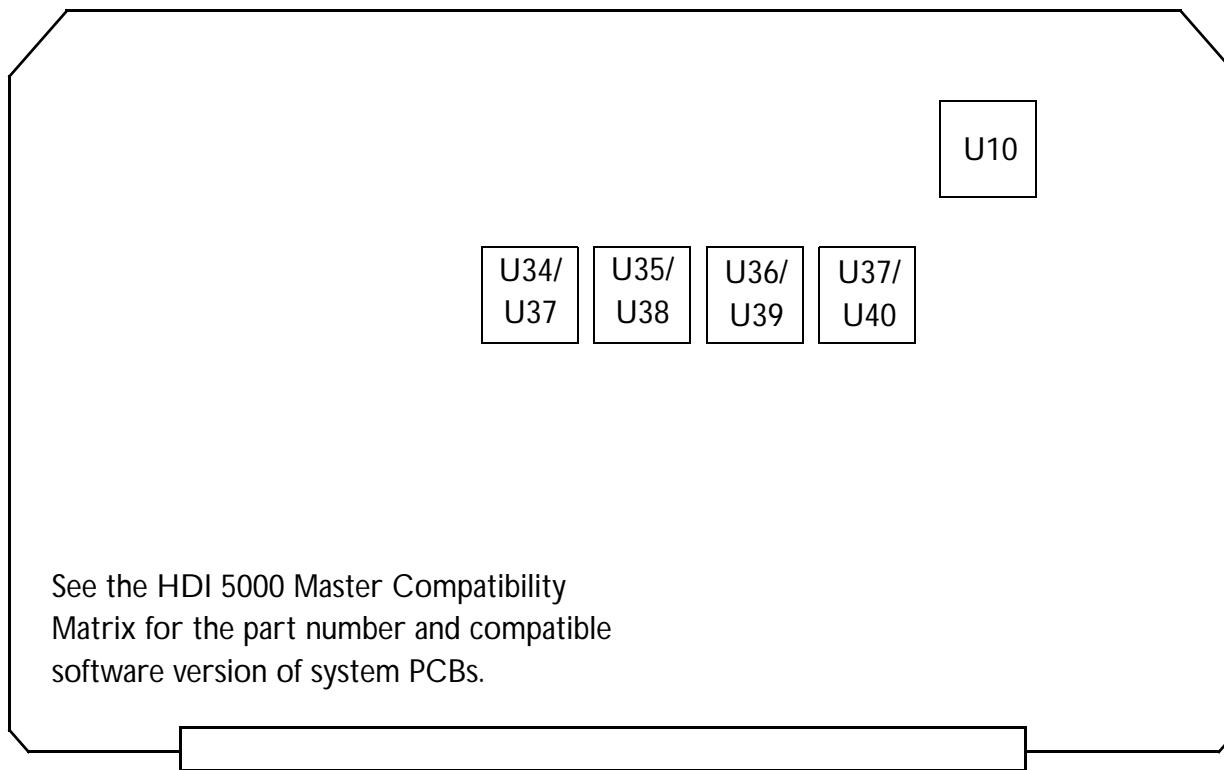


Table 13-4

A2B Peripheral Interface Module PCB (PIM) PROMs

PCB P/N	PROM Kit P/N	Location, P/N, Dash			Chk-sum	CRC	Notes
		02	U44	4201-1958			
7500-1316	All	8000-1375	02	U44	4201-1958	03	B398 0A8B
7500-1398	All			U56	4201-1959	06	95FE 1E50
7500-1917	01 02			U56	4201-1959	06	95FE 1E50
							PROMs are board-level PROMs are board -level

Figure 13-4

PIM PROM Location

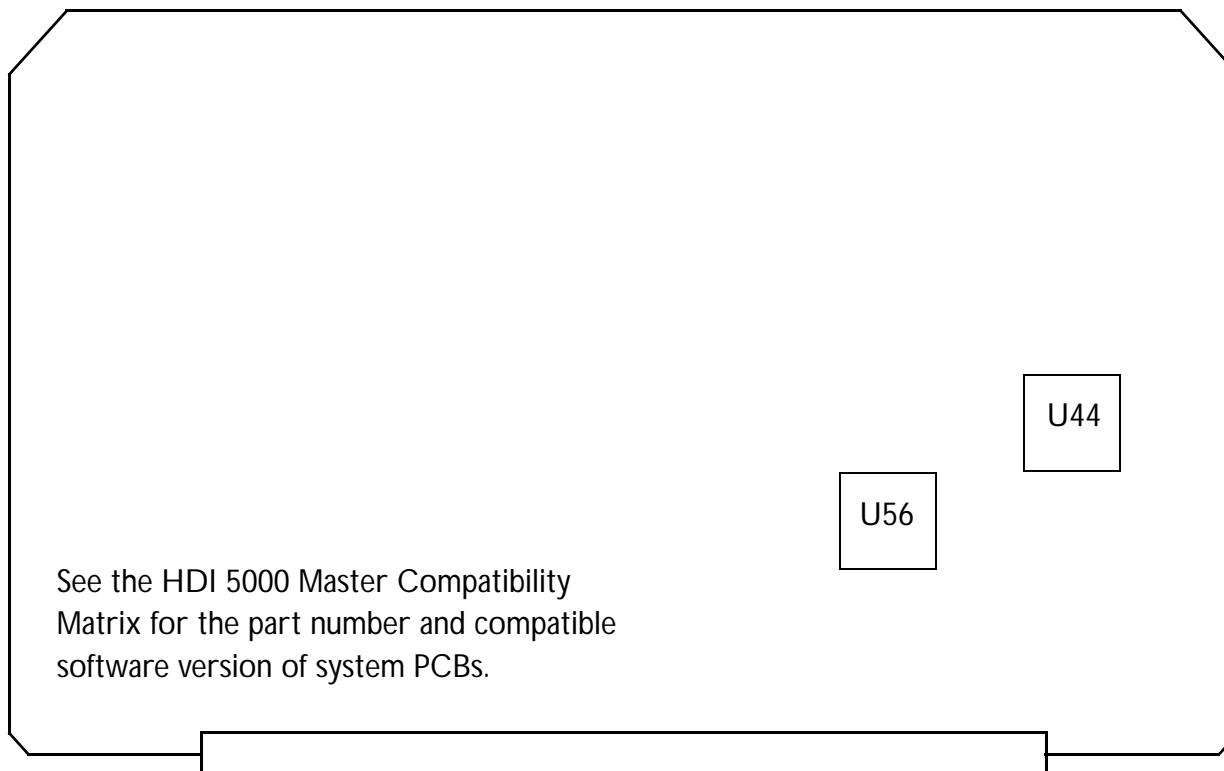


Table 13-5

A3B Pixel Conversion Module (PCM) PROMs

PCB P/N	PROM Kit P/N	Location, P/N, Dash			Chk-sum	CRC	Notes
7500-0683	All	8000-0991	03	U35	4201-1718	09	CAD5 F557
7500-1408	All			U35	4201-1718	09	CAD5 F557
7500-1769	All			U35	4201-1718	09	CAD5 F557

PROM is board-level.

PROM is board-level.

Figure 13-5

PCM Jumper and PROM Locations

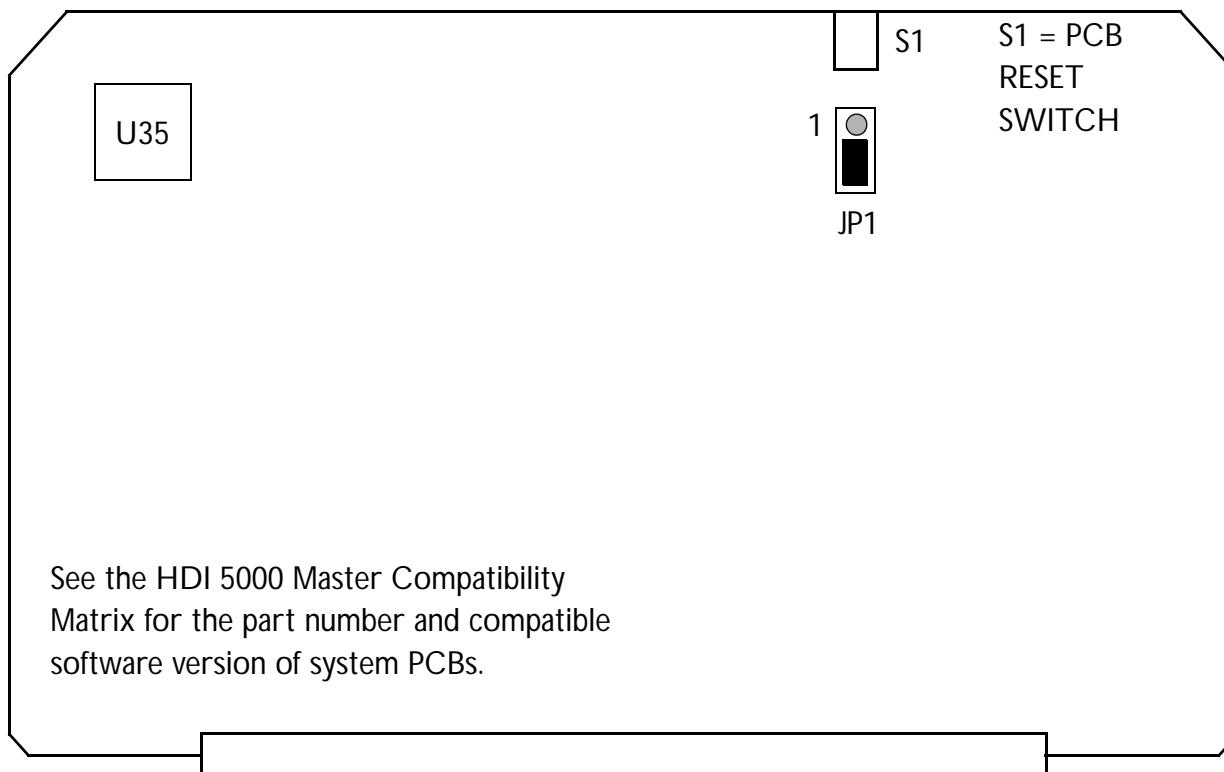


Table 13-6

A5B Pixel Space Processor 1 (PSP1) PROMs

PCB P/N	Dash No.	PROM Kit P/N		Location, P/N, Dash		Chk-sum	CRC	Notes
7500-0713	18 - 20	8000-0992	04	U55	4201-1697	13	03E3	B4B9
				U134	4201-1582	08	4C23	CCA3
	21-23	8000-0992	05	U55	4201-1697	13	03E3	B4B9
				U134	4201-1582	10	27A9	2534
7500-0213	21-23			U55	4201-1697	13	03E3	B4B9
				U134	4201-1582	10	27A9	2534
7500-2033	01			U55	4201-1697	13	03E3	B4B9
				U134	4201-1582	10	27A9	2534

Figure 13-6

PSP1 Jumper and PROM Locations

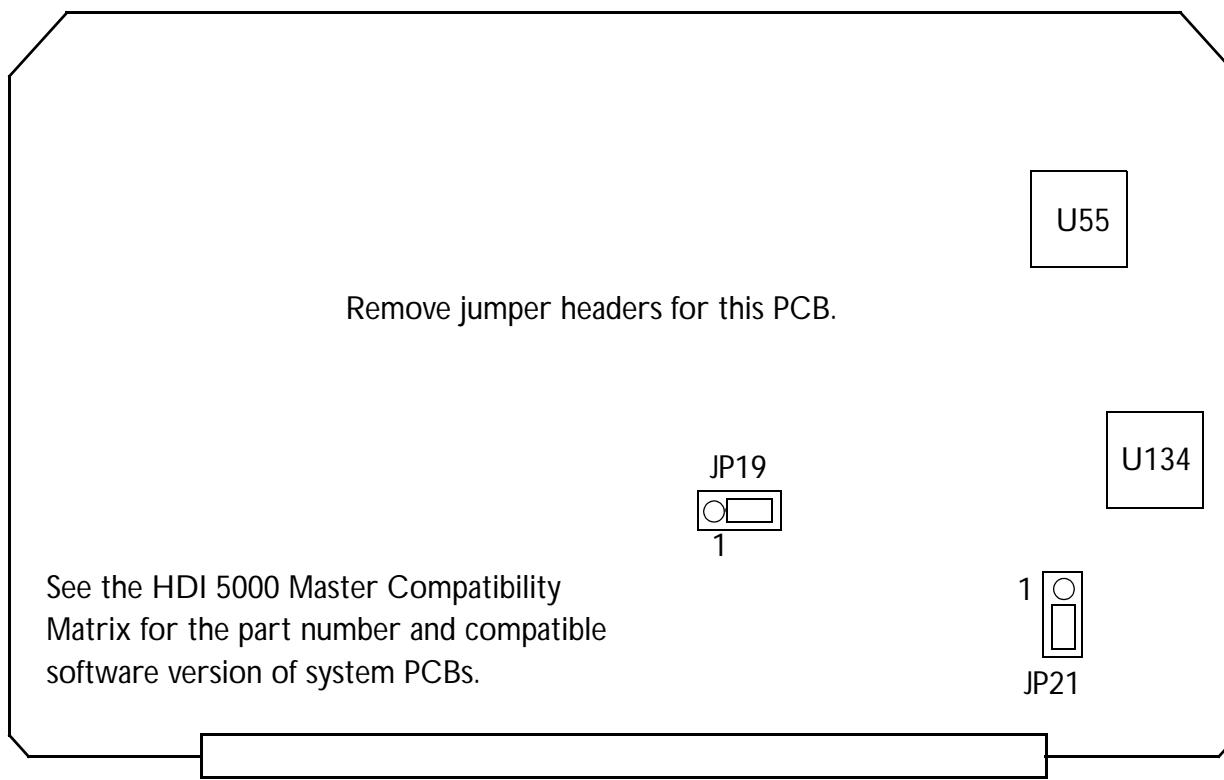


Table 13-7

A6B System CPU (CPU) PROMs

PCB P/N	PROM Kit P/N		Location, P/N, Dash			Chk-sum	CRC	Notes
3500-2677	01 - 06	8000-1308	01 ¹	U68	4201-1931	06	3BOF	4BBB
				U59	4201-1932	06	29C3	4BBB
				U57	4201-1582	08	4C23	CCA3
	04 ²	8000-1688	04 ²	U68	4201-2015	05	3B6E	5D66
				U59	4201-2016	05	D8D3	5D66
				U57	4201-1582	10	27A9	2534
3500-3070	01 02	8000-1688	04 ²	U68	4201-2015	05	3B6E	5D66
				U59	4201-2016	05	D8D3	5D66
				U57	4201-1582	10	27A9	2534
3500-3070	03	3		U68	4201-2015	05	PROMs are board-level	
				U59	4201-2016	05		
				U57	4201-1582	10		
7500-1918	01 - 04	3		U68	4201-2015	06	PROMs are board-level	
				U59	4201-2016	06		
				U57	4201-1582	08		
7500-1918	05, 06	3		U68	4201-2015	06	PROMs are board-level	
				U59	4201-2016	06		
				U57	4201-1582	10		

Table 13-7

A6B System CPU (CPU) PROMs

PCB P/N	PROM Kit P/N	Location, P/N, Dash			Chk-sum	CRC	Notes
7500-1972 ⁴	01 - 04	3	U68	4201-2015	07		PROMs are board-level
			U59	4201-2016	07		
			U57	4201-1582	08		
7500-1972 ⁴	05 - 06	3	U68	4201-2015	08	5	PROMs are board-level
			U59	4201-2016	08	5	
			U57	4201-1582	08	5	
7500-1972 ⁴	07 - 08	3	U68	4201-2015	08	5	PROMs are board-level
			U59	4201-2016	08	5	
			U57	4201-1582	10	5	

1. Use the 7500-1026-04 AIM+ only with the Regulator Module (7500-1421-01). Supports systems with old CPU ID chip.
2. Valid for systems with the old or new CPU ID chip.
3. PROMs moved to board level.
4. Increases CPU bus speed from 24 to 30 MHz.
5. PROMs support a new CPU ID chip.

Figure 13-7

CPU PROM Locations

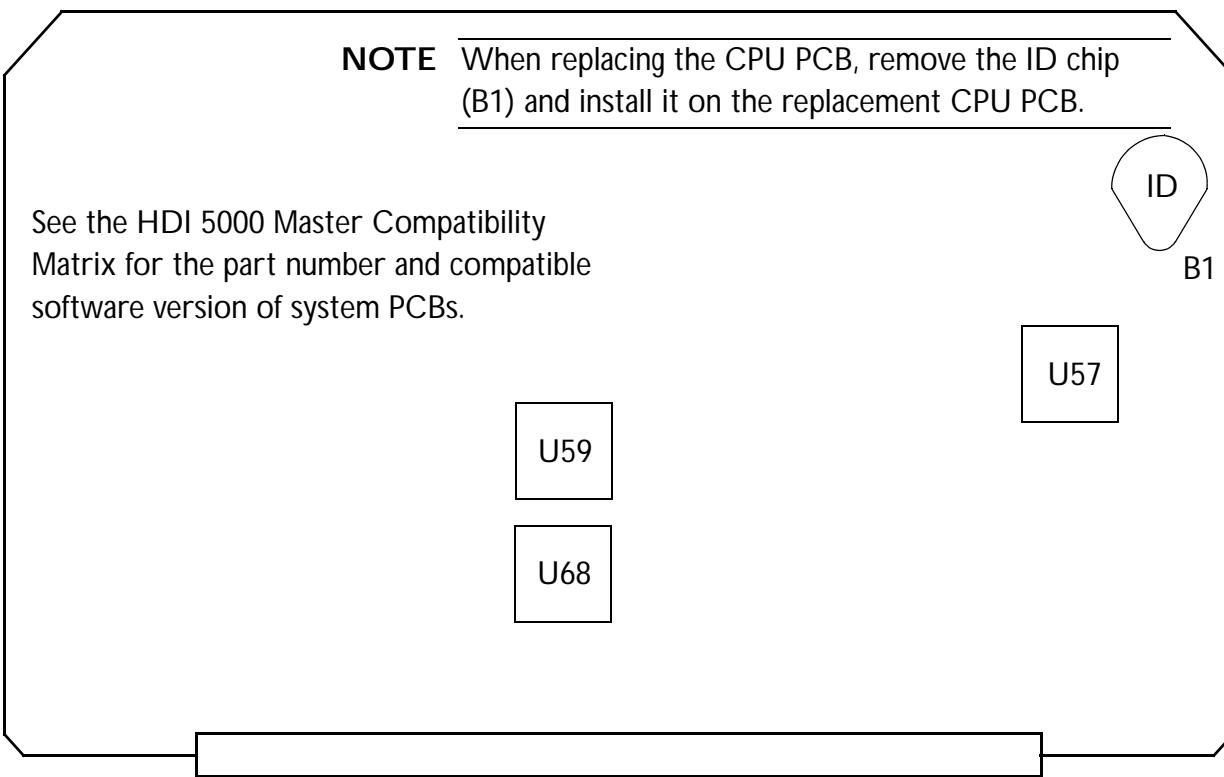


Table 13-8

A9B Advanced Digital, Audio, Physio, and Translator (ADAPTR) PROMs

PCB P/N	Dash	PROM Kit P/N		Location, P/N, Dash		Chk-sum	CRC	Notes
7500-1328	01 - 05	8000-0995	03	U52	4201-1693	08	71CB	63A5
				U56	4201-1582	08	4C23	CCA3
	06 - 08			U52	4201-1693	08	71CB	63A5
				U56	4201-1582	10	27A9	2534

PROMs are board-level.

Figure 13-8

ADAPTR Jumper and PROM Locations

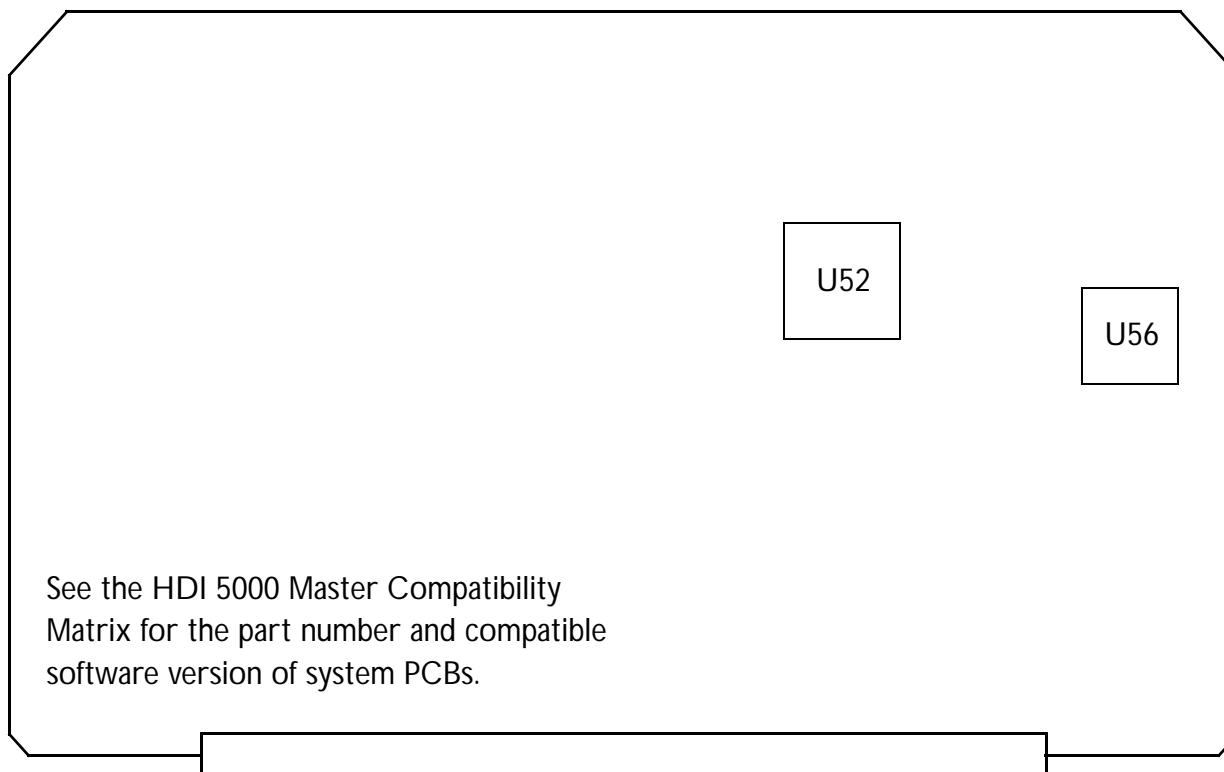


Table 13-9

A11B Signal Processing Module (SPM) PROMs

PCB P/N	PROM Kit P/N		Location, P/N, Dash			Chk-sum	CRC	Notes
7500-1119	04, 05	8000-1377	02	U96	4201-1963	03	6694	E247
3500-2988	02 - 09			U131	4201-1582	08	4C23	CCA3
7500-1119	04, 05	8000-1377	03	U96	4201-1963	03	6694	E247
3500-2988	02 - 09			U131	4201-1582	10	27A9	2534
3500-2988	10, 11			U131	4201-1582	08	4C23	CCA3
	12, 13			U131	4201-1582	10	27A9	2534
7500-1736	02			U131	4201-1582	08	4C23	CCA3
	03 - 11			U131	4201-1582	08	4C23	CCA3
	12 - 15			U131	4201-1582	10	27A9	2534
7500-1952	01 - 04			U131	4201-1582	08	4C23	CCA3
	05, 06			U131	4201-1582	10	27A9	2534
								PROMS are board-level
								PROMS are board-level
								PROMS are board-level
								PROMS are board-level

Figure 13-9

SPM PROM Locations

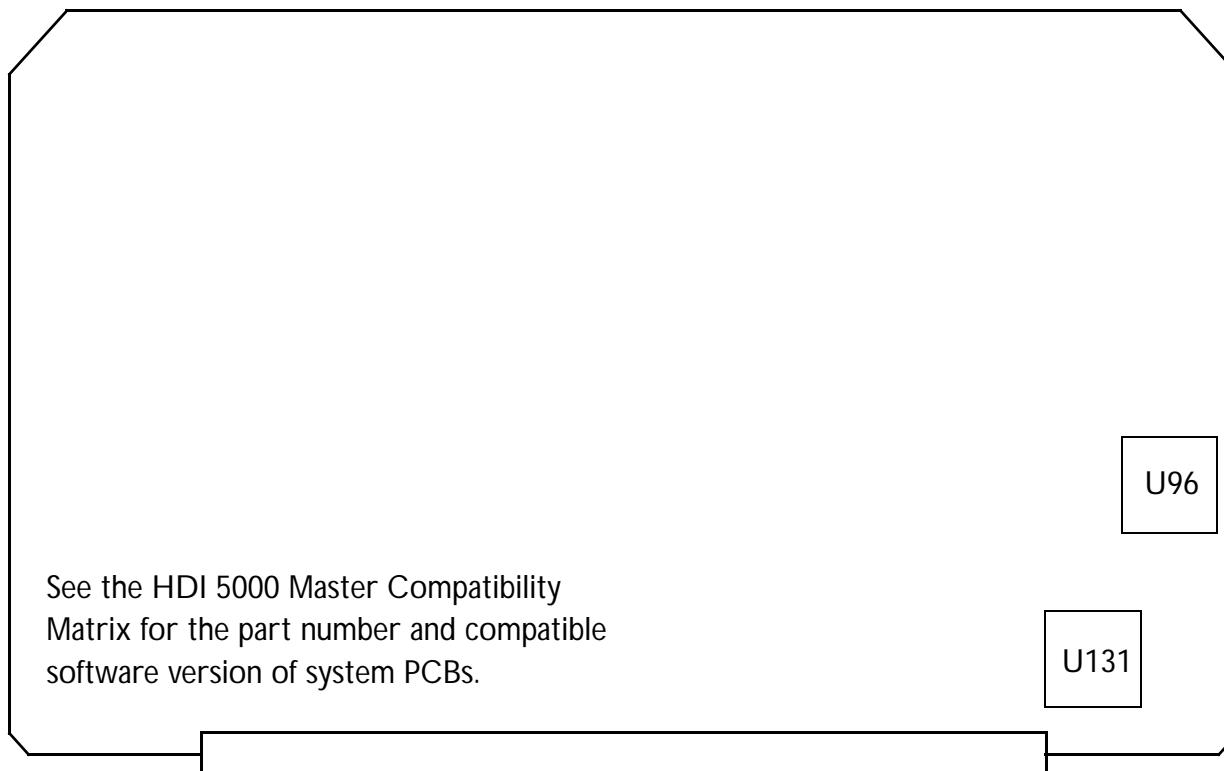


Table 13-10

A12B/A13B¹ Advanced IF Output Module (AIFOM) PROMs

PCB P/N	PROM Kit P/N		Location, P/N, Dash			Chk-sum	CRC	Notes		
7500-1272	04	8000-1374	01	U28	4201-1961	01	0844	540C		
				U22	4201-1962	01	67D0	540C		
				U50	4201-1582	08	4C23	CCA3		
7500-1413	01 - 03	8000-1374	01	U26	4201-1961	01	0844	540C		
				U20	4201-1962	01	67D0	540C		
				U49	4201-1582	08	4C23	CCA3		
	04, 05	8000-1374	02	U26	4201-1961	01	0844	540C		
				U20	4201-1962	01	67D0	540C		
				U49	4201-1582	10	27A9	2534		
7500-1413				U26	4201-1961	01	0844	540C		
				U20	4201-1962	01	67D0	540C		
				U49	4201-1582	10	27A9	2534		

1. A second AIFOM is installed in A13B only on systems with 170.30 and higher software (10.2 systems). The AIFOM in slot A12B is considered the "master" AIFOM and the AIFOM in A13B the "slave."

Figure 13-10

AIFOM PROM Locations

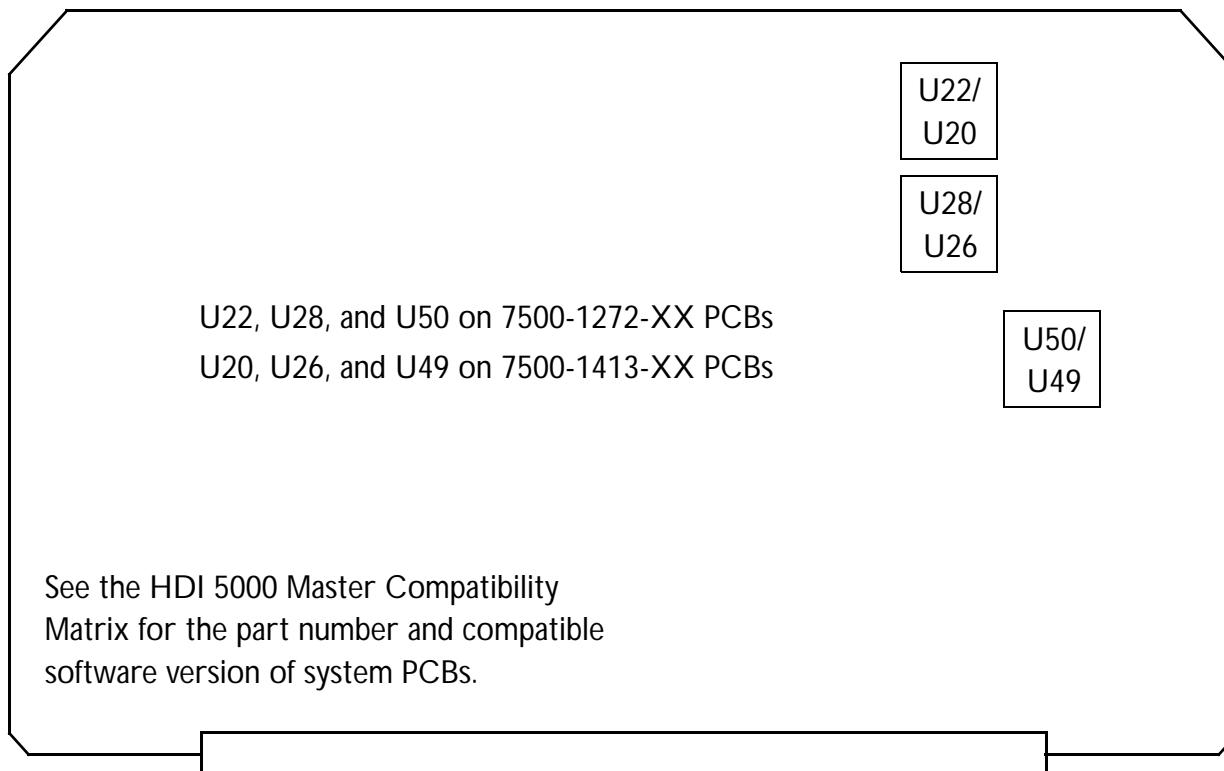


Table 13-11

Hard Drive Reference Information

Drive Part Number	Drive Manufacturer/Model No.	Drive Size (GB) ²	Jumper/LED Status ¹								Replacement Drive Part Number
			A0	A1	A2	A3	P0	PK	TE	LED	
2100-1324-01	Quantum/Fireball	1.28	OFF	OFF	OFF	-	-	OFF ³	ON	-	3500-3066-04 ⁶
2100-1445-01 ⁴	Quantum/ QM32100SE-S	2.1	OFF	OFF	OFF	-	ON	OFF	ON	OFF	
2100-1517-01 ⁴	Quantum/ QM33240	3.2	OFF	OFF	OFF	-	ON	OFF	ON	OFF	
2100-1636-01 ⁵	IBM/ Ultrastar 18ES	9.1	OFF	OFF	OFF	JP4-1	JP4-6	JP4-5	JP6-G	-	3500-3129-02 ⁶
2100-1931-01	IBM/Ultra 320	36.7				OFF	ON	ON	ON		

1. The dashes indicate that particular jumper does not exist on that particular drive.
2. All drives have been formatted to 2.1 GB or less.
3. The Quantum 1280 Fireball TM does not have the PK jumper; however, the 1280 Fireball does.
4. The reserved jumper for the 2100-1445-01 hard drive is not installed. The other hard drives in this table do not have this jumper.
5. The IBM hard drives require the 3100-2867-01 68 to 50 pin adapter. Hard drive jumper positions are the same for DDEAs with or without MO drives installed. If no MO drive is installed, connect a terminator to the connector on the front of the DDEA module. NOTE: the IBM drive is associated with a loss of system clock and failure to go into standby mode when using the power switch on PAL systems with 170.30 and 170.31 software. The issue is related to faster hard drive operating speed and system software. Use the system circuit breaker until the system is upgraded to 178.04 or higher software.
6. Refer to ["Ordering/Installing System Software" on page 488](#).

Table 13-12

Magneto-Optical Drive Switch/Jumper Positions

Drive Part Number	Drive Manufacturer/ Model No.	Drive Size (MB) ¹	Switch/Jumper Position								
			Switch/ Jumper	1	2	3	4	5	6	7	8
2100-1416-01	Fujitsu/ CG01000-608201	540/640	SW1	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
			SW2	OFF							
			CNH	OFF	OFF	OFF	-	-	-	-	-
2100-1512-01	Fujitsu/ MCC3064SS	640	SW1	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
			CNH	1-2	3-4	5-6	-	-	-	-	-
				OFF	OFF	ON					
2100-1646-01 ²	Fujitsu/ MCF3064SS	640	SW1	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
2100-1928-01 ²	MCM3064SS ³		CNH	1-2	3-4	5-6	-	-	-	-	-
				OFF	OFF	OFF					

1. Do not use 640 or 128 MB disks. Use of 128 MB disks could result in "backup failed" error messages. Use 540 MB or 230 MB disks instead.
2. All jumpers are removed if a Quantum hard drive is used. If an IBM hard drive is used, jumper 5-6.
3. The 2100-1928-01 MO drive uses metric mounting hardware.

14 Parts

Introduction

This section contains parts information for the HDI 5000 and Philips HDI 5000 systems. For replacement parts that are dependent upon system features and software versions (PCBs and certain hardware assemblies), see the HDI 5000 Master Compatibility Matrix (P/N 9015-0592).

Use the figures and parts table in this section to locate and identify system parts. Part numbers are shown on the illustrations as well as listed and described in the corresponding tables. Figures are keyed to the tables and the tables to the figures, as applicable. Use the part number and description provided as needed to order a part. Verify the level of replacement for a given part is in accordance with current service philosophy before ordering the part.

Refer to ["Using the Figures and Tables" on page 515](#).

Parts Ordering Information

Field Service Engineers

For parts ordering procedures, FSEs should refer to their standard operating procedures.

Customers

Customers may order parts through an FSE or directly from the Customer Service Order Processing Department. Customers ordering parts through an FSE will need to provide the following information:

- Shipping address
- Purchase order number of equipment
- Part numbers or sales order numbers
- Part descriptions and quantity needed

How to Find a Part Number

In this section, part numbers in the exploded view system illustrations (figures) point to the system parts. The part numbers in these figures link to the parts table ([Table 14-1](#)) containing descriptive information about the part. The parts table, arranged as follows, is alphabetized by description for your convenience. Separate tables list system accessories ([Table 14-2](#)) and peripherals ([Table 14-3](#)).

Using the Figures and Tables

► How to use the figures and tables in this section

- Start your parts search by navigating to one of the system parts locator “maps.”
 - [Figure 14-1](#) provides links to the HDI 5000 (classic) parts. A button in the lower left corner of this figure links to the Philips parts locator map.
 - [Figure 14-69](#) provides links to the Philips HDI 5000 parts. A button in the lower left corner of this figure links to the classic parts locator map.
- If you need a part number, find the drawing of the part in the appropriate figure. The part number, or reference to a detail figure where the part number appears, points to the drawing. If you need the part description, clicking the blue part number hypertext link takes you to the corresponding item in the parts table where the description is provided.
- If you have the part number and want to look up the description in the table, use Acrobat Reader’s **Find** function to locate the part number. Then, clicking that blue hypertext link takes you to the corresponding item in the parts table.
- If you are using a printed version of this manual and need more than just the part number shown on the figure, use the alphabetization feature of the parts table: Consider the part name and look it up in the description column.

Parts Table Definitions

Located On This column lists all of the figures on which the part is found.

Part Number This column lists the part number for an item. Use this number when ordering parts from Philips Ultrasound. If a table is referenced in this column, the part number is on that table. Cable part numbers may be in [Section 11, "Cabling"](#).

Part Description The name or common description of the item is listed here. Where appropriate, the description column also includes size, tolerance, type or model, and material data for the part. [Table 14-1](#) and [Table 14-2](#) are alphabetized by this column. [Table 14-3](#) is alphabetized by OEM Description.

Attaching parts must be ordered separately. They are not provided with the assembly, subassembly, or component being attached.

Notes/Reference Manufacturer's part numbers, sometimes alternate part numbers, special applications, and other information pertaining to a specific part are listed in the Notes/Reference column. For top assemblies containing many replaceable parts, the applicable figure or table for further breakdown of parts is listed here.

Figure Definitions

[3500-0000-00](#)

Part Number The part number for each part or subassembly shown in an illustration is a hypertext cross-reference linking to the parts/cable tables containing parts descriptions and additional information.

See [Figure 14-X](#)

See Figure "See Figure" is a hypertext cross-reference link to a detail (sub-assembly) figure. In the sub-assembly figure you will find either the part number, reference to another detail figure, or a reference to the table containing parts descriptions and additional information.

SYSTEM VIEW

System View Illustration Label The "SYSTEM VIEW" (System Parts Locator Map), [Figure 14-1](#), and [Figure 14-69](#) contain links to "PARENT VIEW" illustrations.

PARENT VIEW

Parent View Illustration Label "PARENT VIEW" indicates an illustration that provides links to additional parts breakdown, indicated with a "See Figure" reference.

[System View](#)

System View Button The "System View" button is a hypertext cross-reference link to the "SYSTEM VIEW" (System Parts Locator Map). You can return to the "SYSTEM VIEW" (System Parts Locator Map) by clicking the "System View" button in the lower left corner of any figure in this section.

[Parent View](#)

Parent View Button The "Parent View" button is a hypertext link to the parent-part or "PARENT VIEW" illustration.

[Parts List](#)

Parts List Button The "Parts List" button (located on the "System Parts Locator Maps" only) is a hypertext cross-reference linking to the "Parts Table" containing parts descriptions and additional information. The "Parts List" can also be accessed by clicking on one of the blue part numbers in any of the figures in this section.



Green Arrow The green arrows found throughout the parts illustrations are used to indicate movement (assembly, disassembly, rotation), or point to a specific area (details, breakdowns).

Illustrations

Figure 14-1

HDI 5000 (classic) Ultrasound System Parts Locator Map (Front and Rear Ends)

SYSTEM VIEW

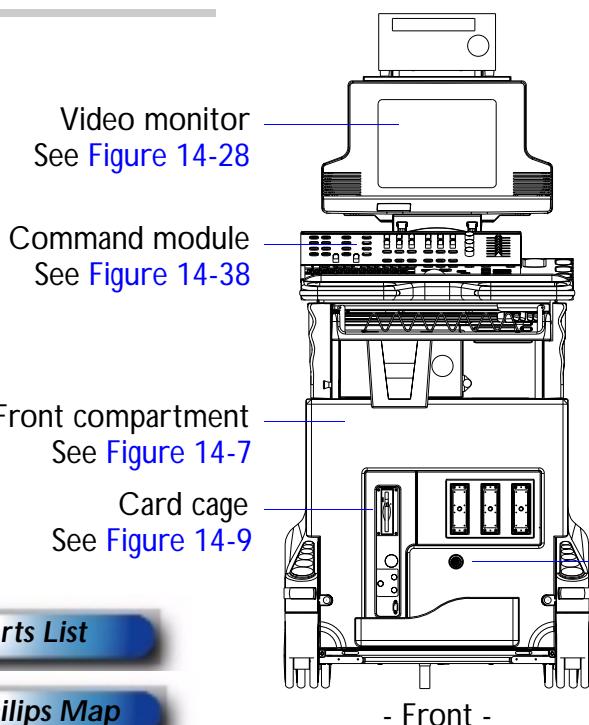
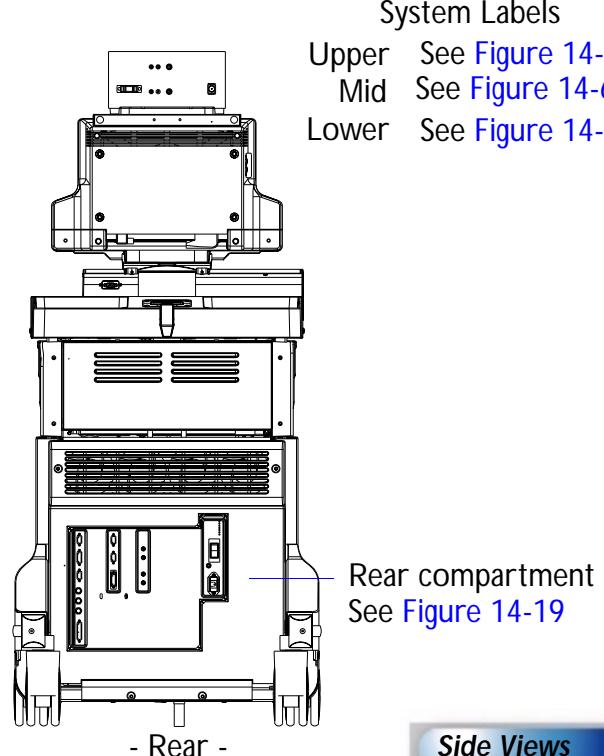
**Parts List****Philips Map**Footswitch
See Figure 14-65**Side Views**

Figure 14-2

HDI 5000 (classic) Ultrasound System Parts Locator Map (Left and Right Sides)

SYSTEM VIEW

Power switch
See [Figure 14-42](#)

System options (OEM bay)
See [Figure 14-3](#)
See [Figure 14-4](#)

Pads and bumpers
See [Figure 14-5](#)

Side panels and covers
See [Figure 14-6](#)

Casters, axle type
See [Figure 14-64](#)

Parts List

Philips Map

End Views

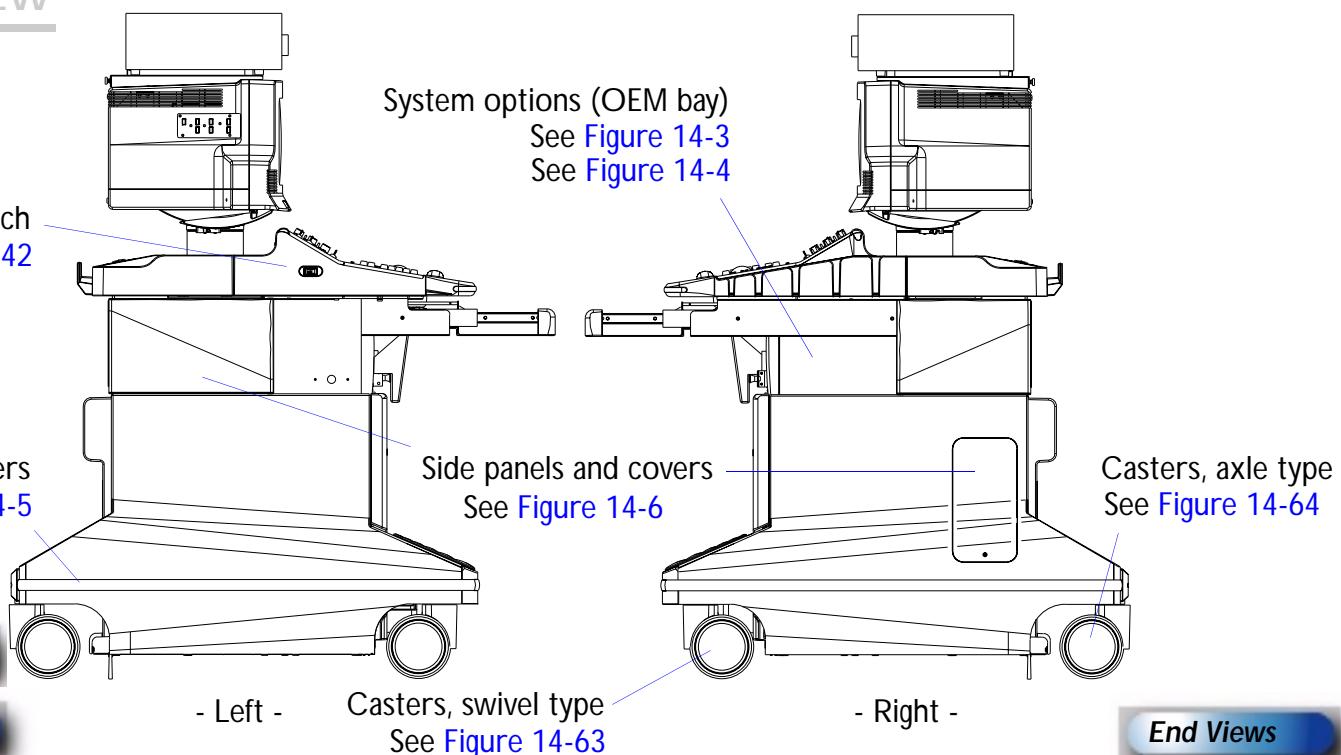
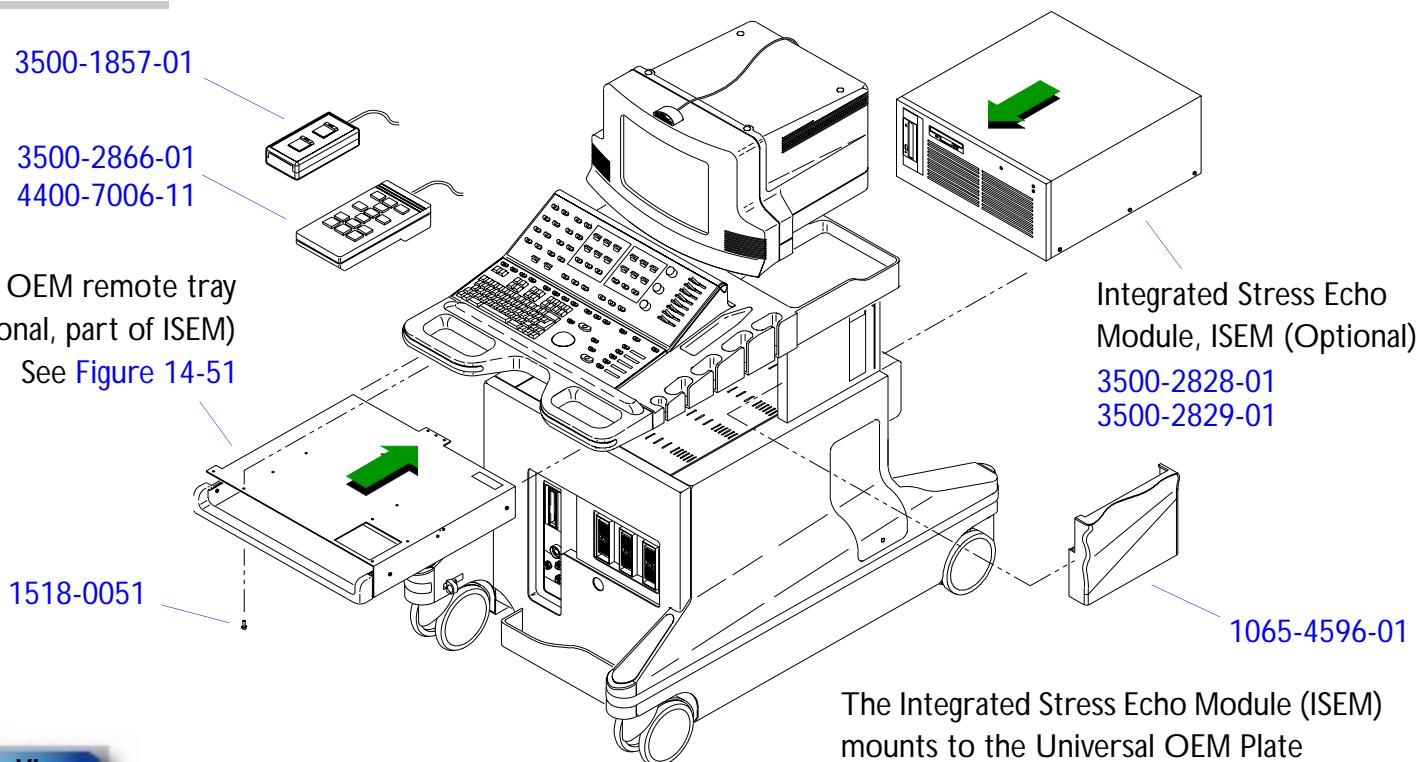


Figure 14-3

HDI 5000 System Options (1 of 2)

PARENT VIEW



System View

Figure 14-4

HDI 5000 System Options (2 of 2)

PARENT VIEW

Mitsubishi CP700/800
OEM tray (Optional)

See [Figure 14-53](#)

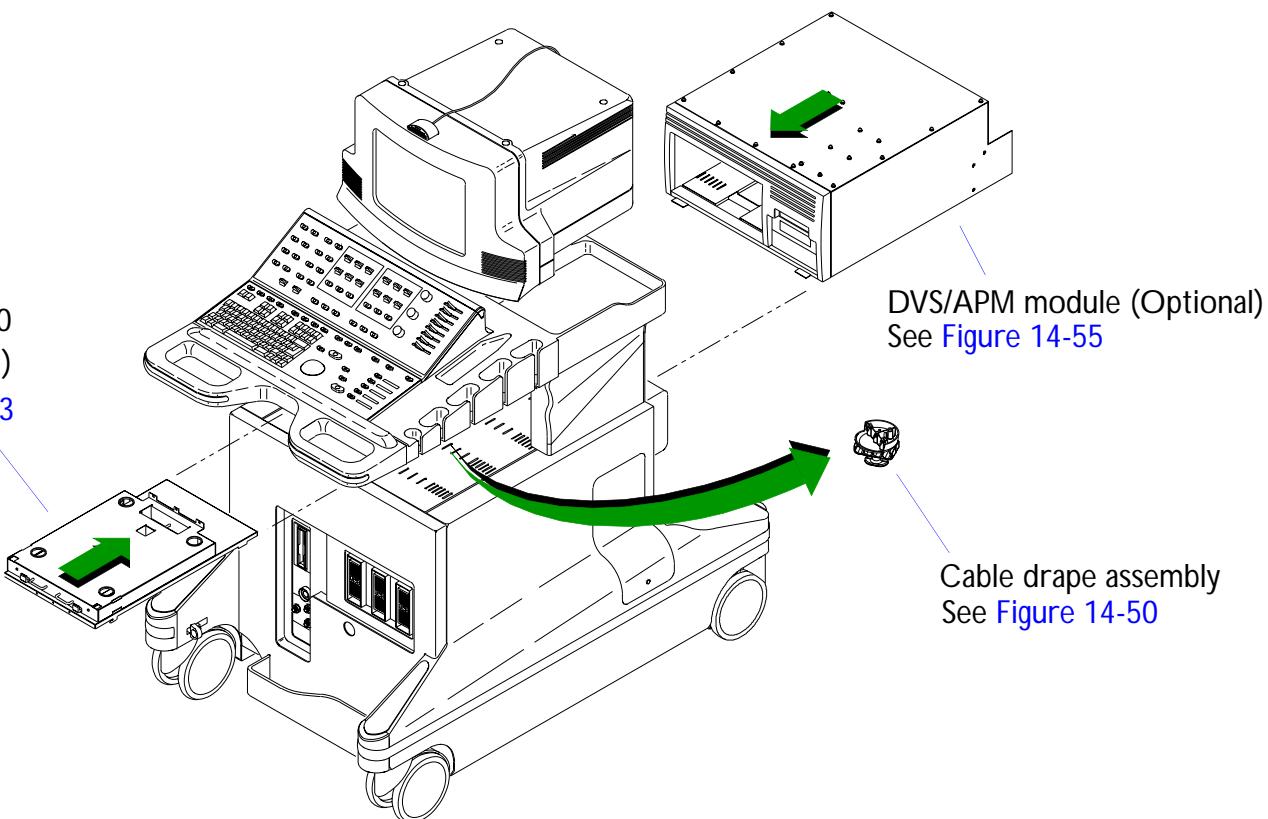


Figure 14-5

Pads and Bumpers

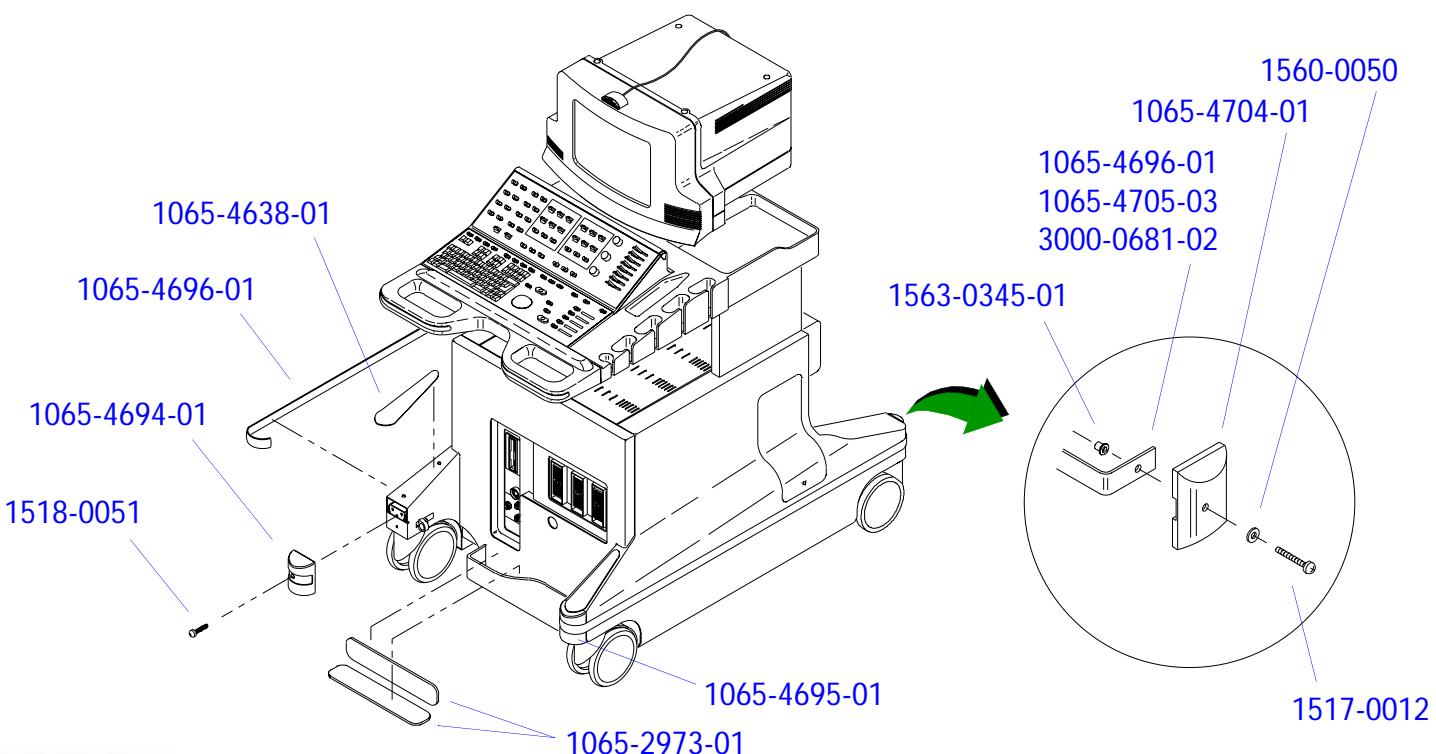
**System View**

Figure 14-6

Side Panels and Covers

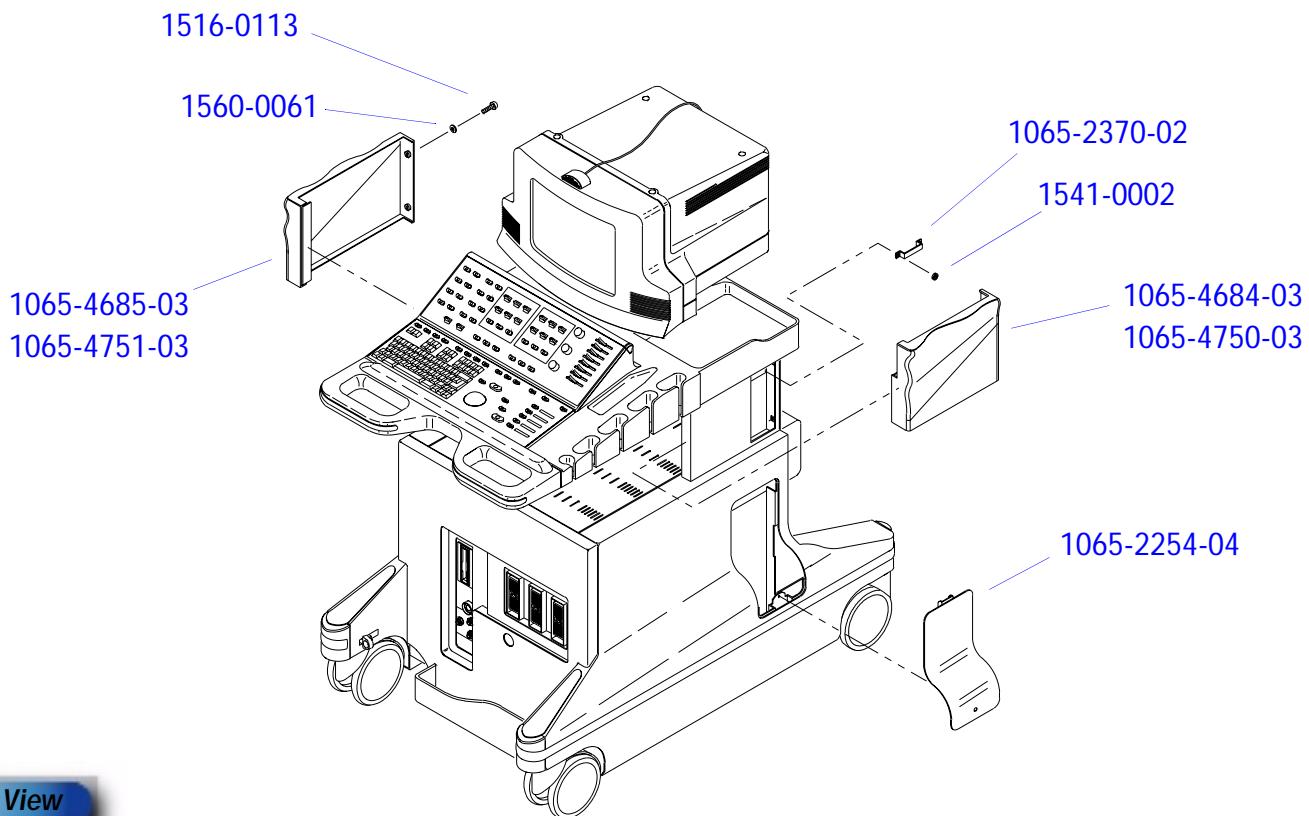
**System View**

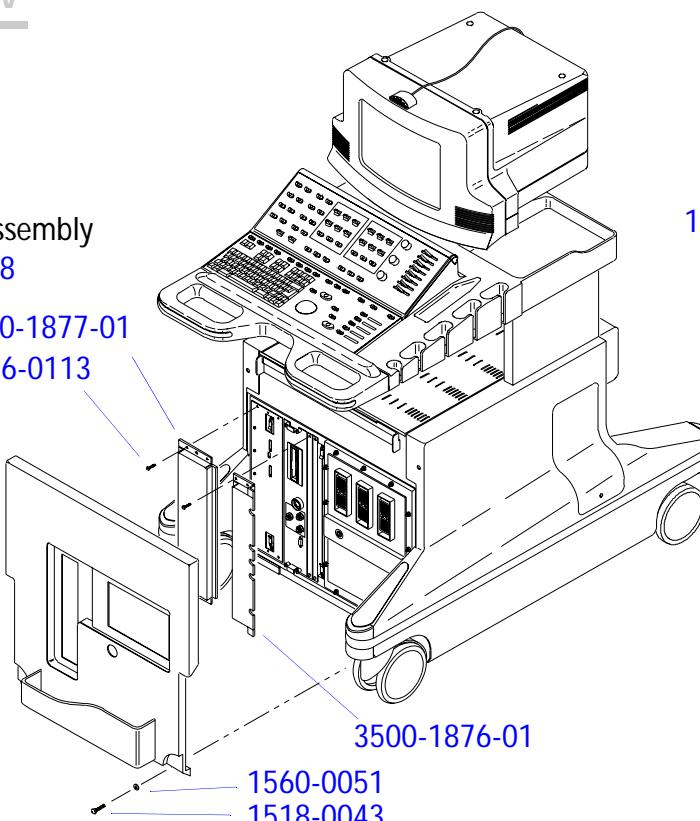
Figure 14-7

Front Compartment

PARENT VIEW

Front cover assembly
See [Figure 14-8](#)

3500-1877-01
1516-0113



1516-0113

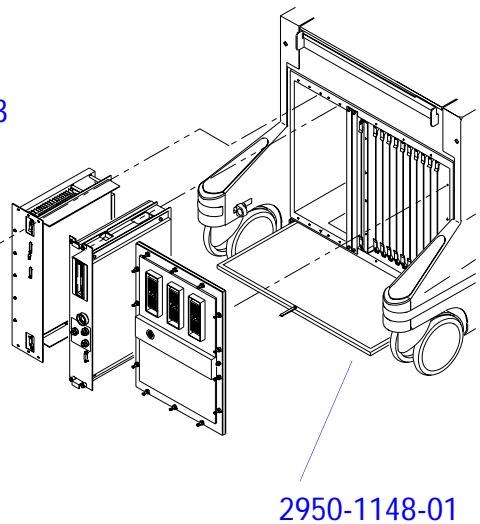


Figure 14-8

Front Cover Assembly

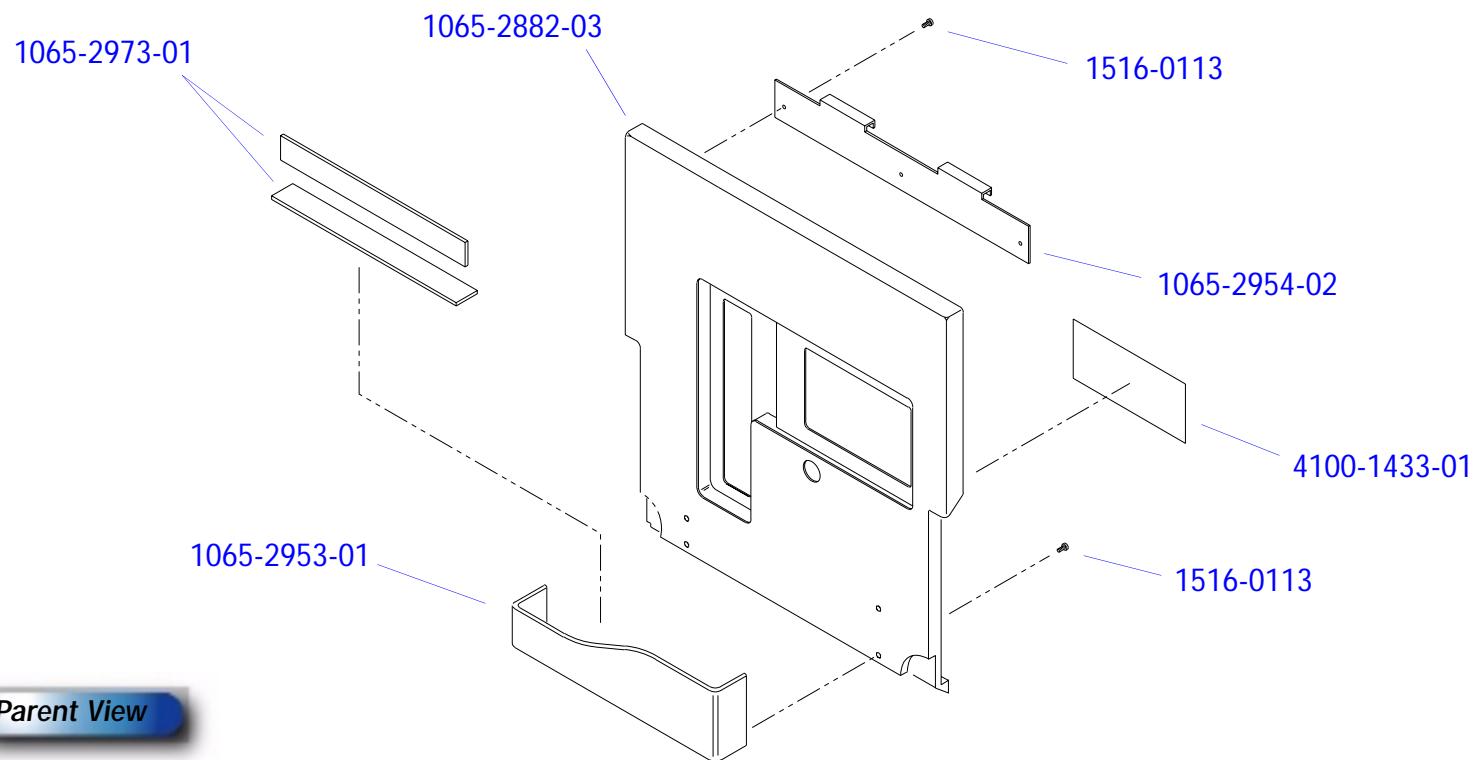
**Parent View****System View**Front cover assembly
3500-2850-02

Figure 14-9

Card Cage

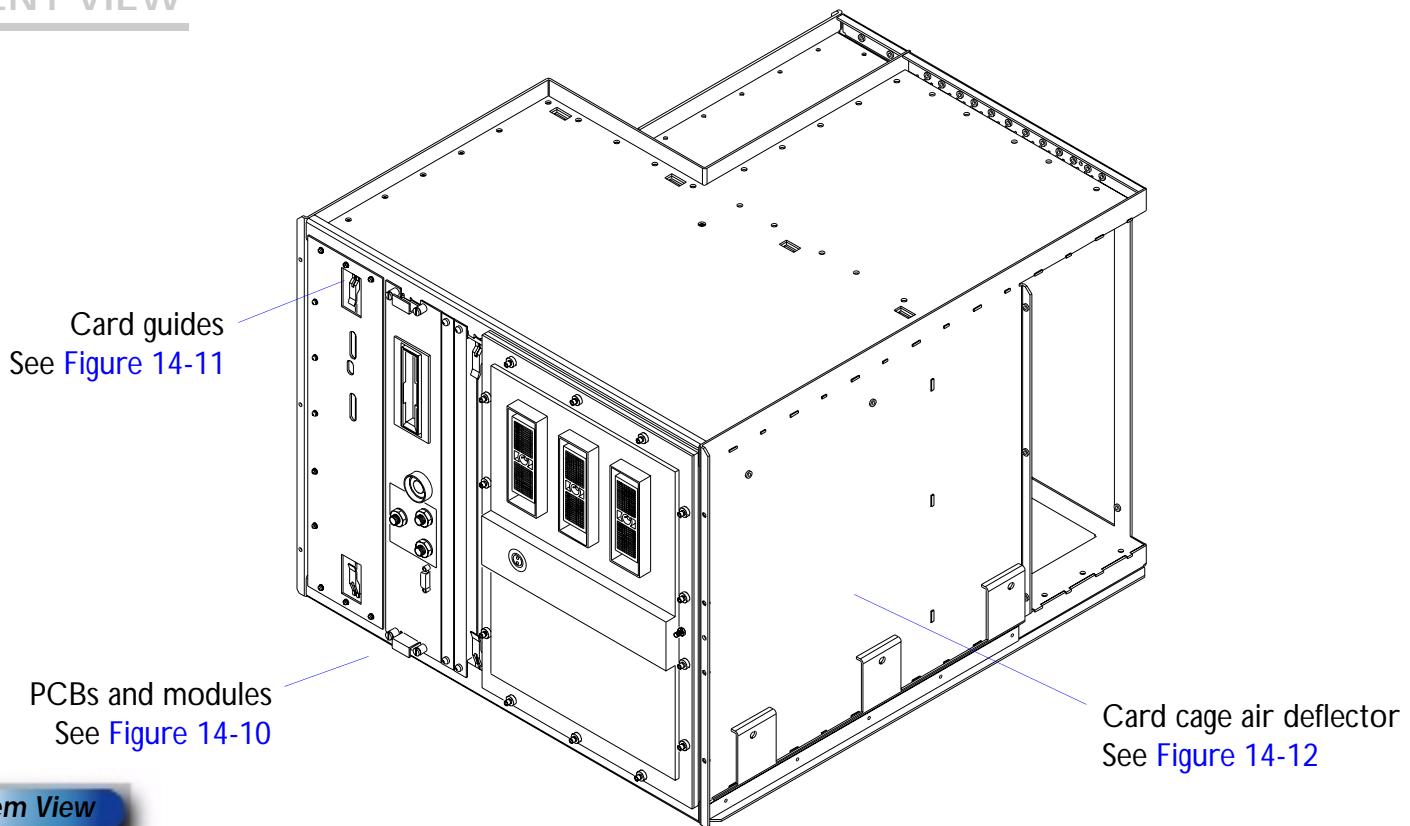
PARENT VIEW**System View**

Figure 14-10

PCBs and Modules (Front Card Cage)

DDEA module assembly

Without ECG

See [Figure 14-13](#)

Physio

See [Figure 14-14](#)

Without MO drive

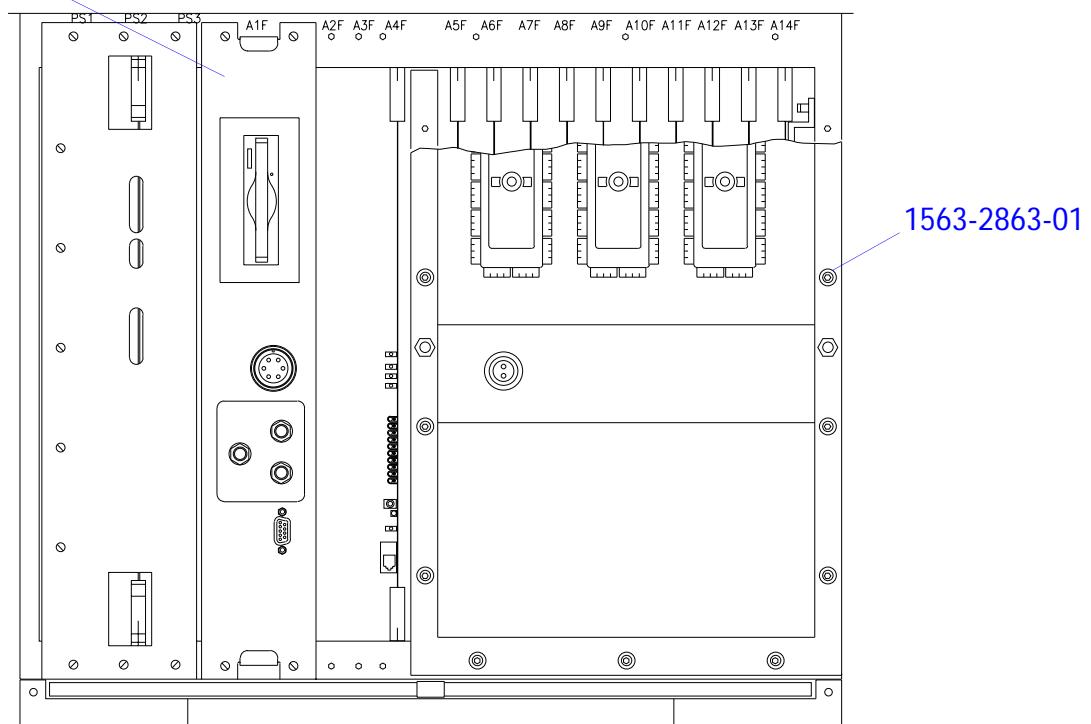
See [Figure 14-15](#)

Without ECG, MO and physio

See [Figure 14-16](#)

See the HDI 5000 Master

Compatibility Matrix for
part numbers

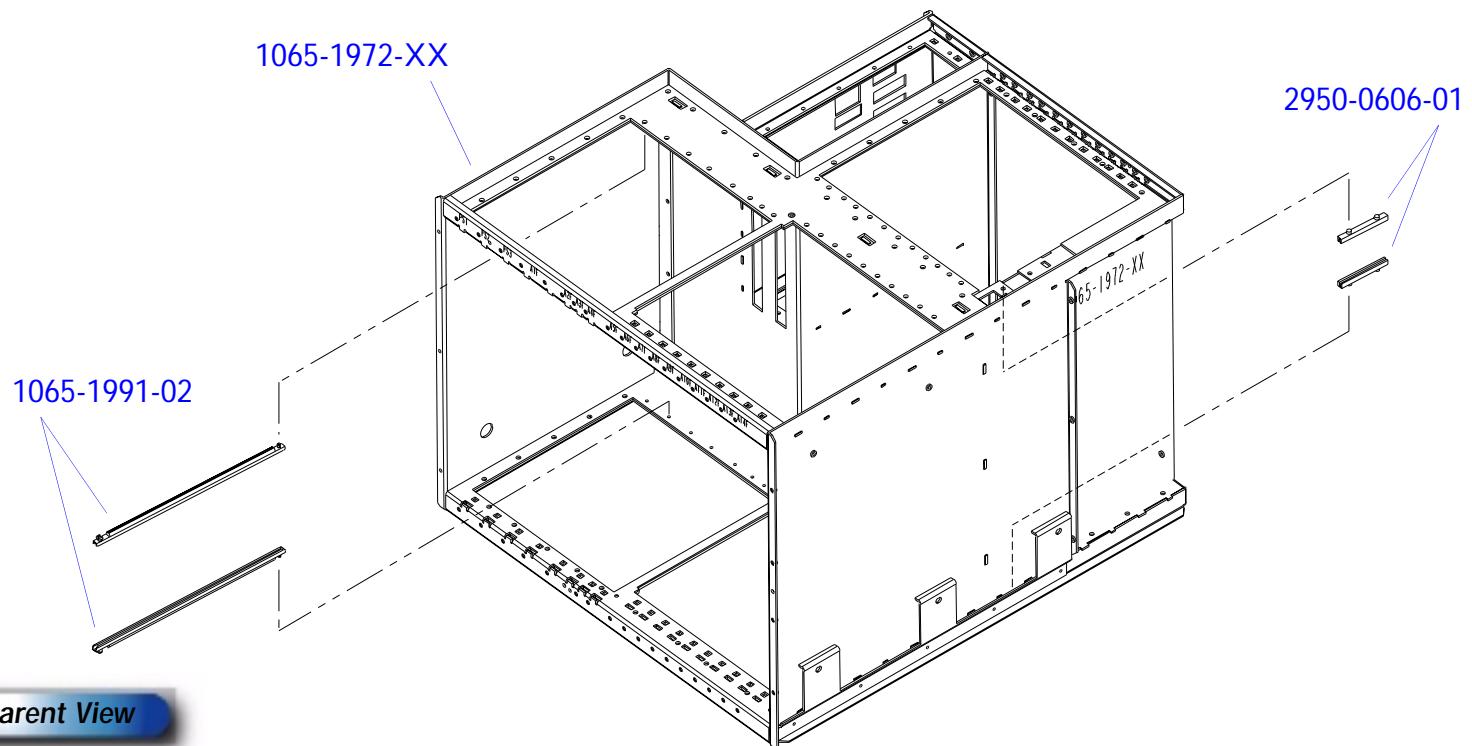


Parent View

System View

Figure 14-11

Card Guides

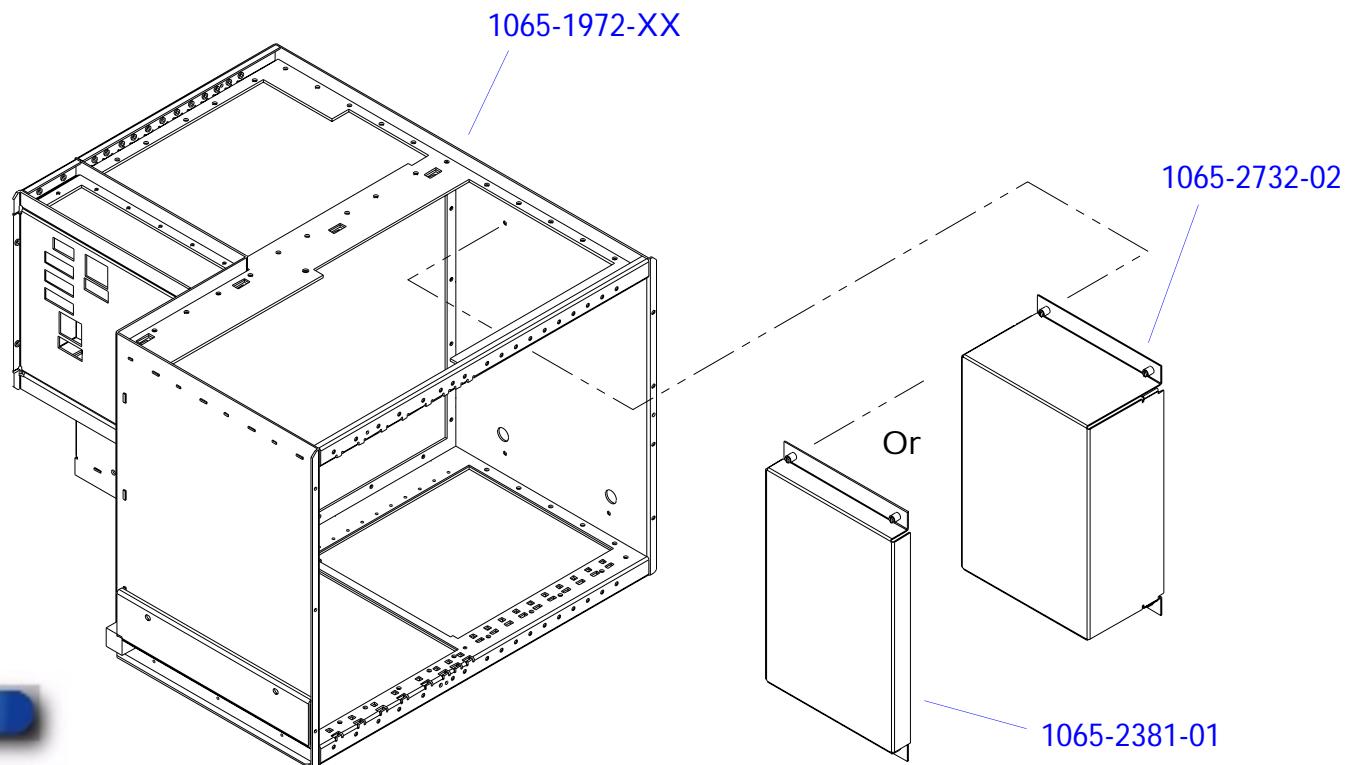


Parent View

System View

Figure 14-12

Card Cage Air Deflector



Parent View

System View

Figure 14-13

DDEA Module Assembly (Without ECG)

Dependency Kits

8000-1900-01

8000-2001-01

8000-2574-01

1065-1946-05

1065-5949-01

MO drive
See Figure 14-17

3500-1482-03

1541-0002

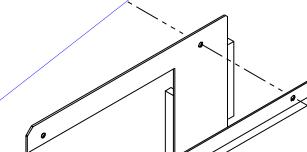
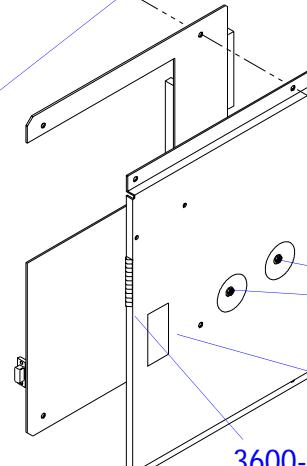
1065-4681-01

1065-6004-01

2950-1041-01

2950-1040-01

3100-1387-01

3500-3066-04
3500-3129-02

1516-0113

1065-1947-03

1541-0002

9903-0338-02

3600-0246-01

Disk Drive Module Assy,
without ECG

Parent View

System View

Figure 14-14

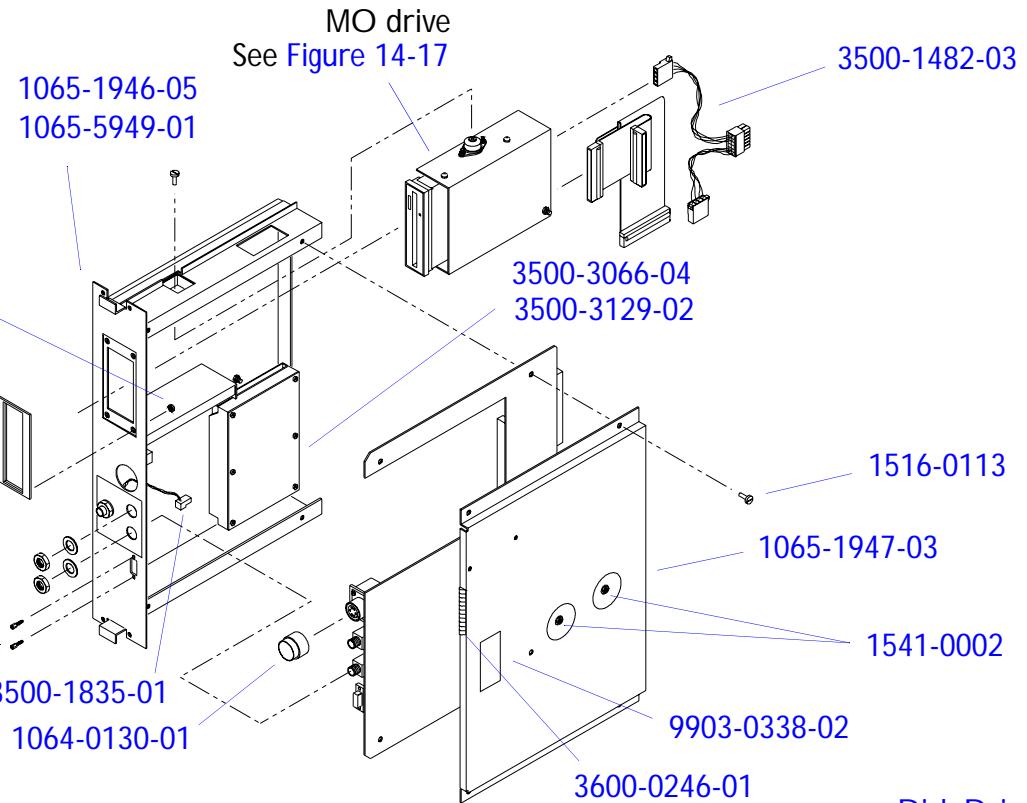
DDEA Module Assembly (Physio)

Dependency Kits

8000-1900-01

8000-2001-01

8000-2574-01



Parent View

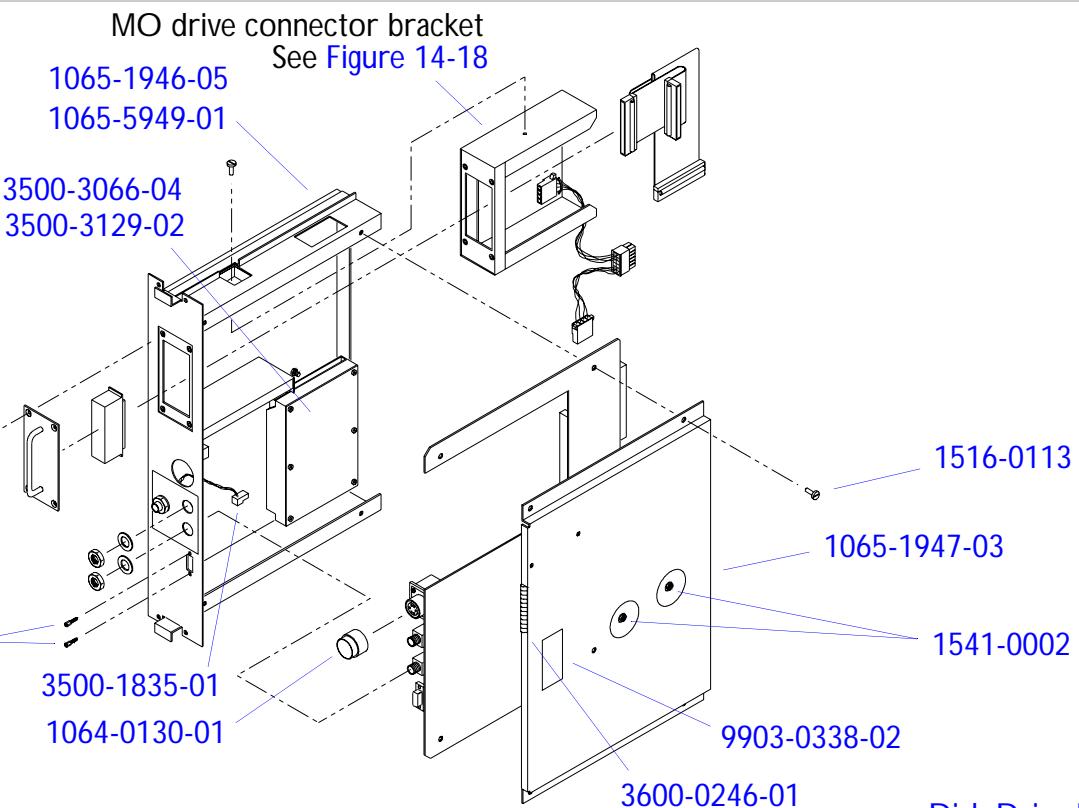
System View

Disk Drive Module Assy,
Physio

Figure 14-15

DDEA Module Assembly (Without MO Drive)

Dependency Kits
8000-1900-01
8000-2001-01



Parent View

System View

Figure 14-16

DDEA Module Assembly (Without ECG, MO Drive and Physio)

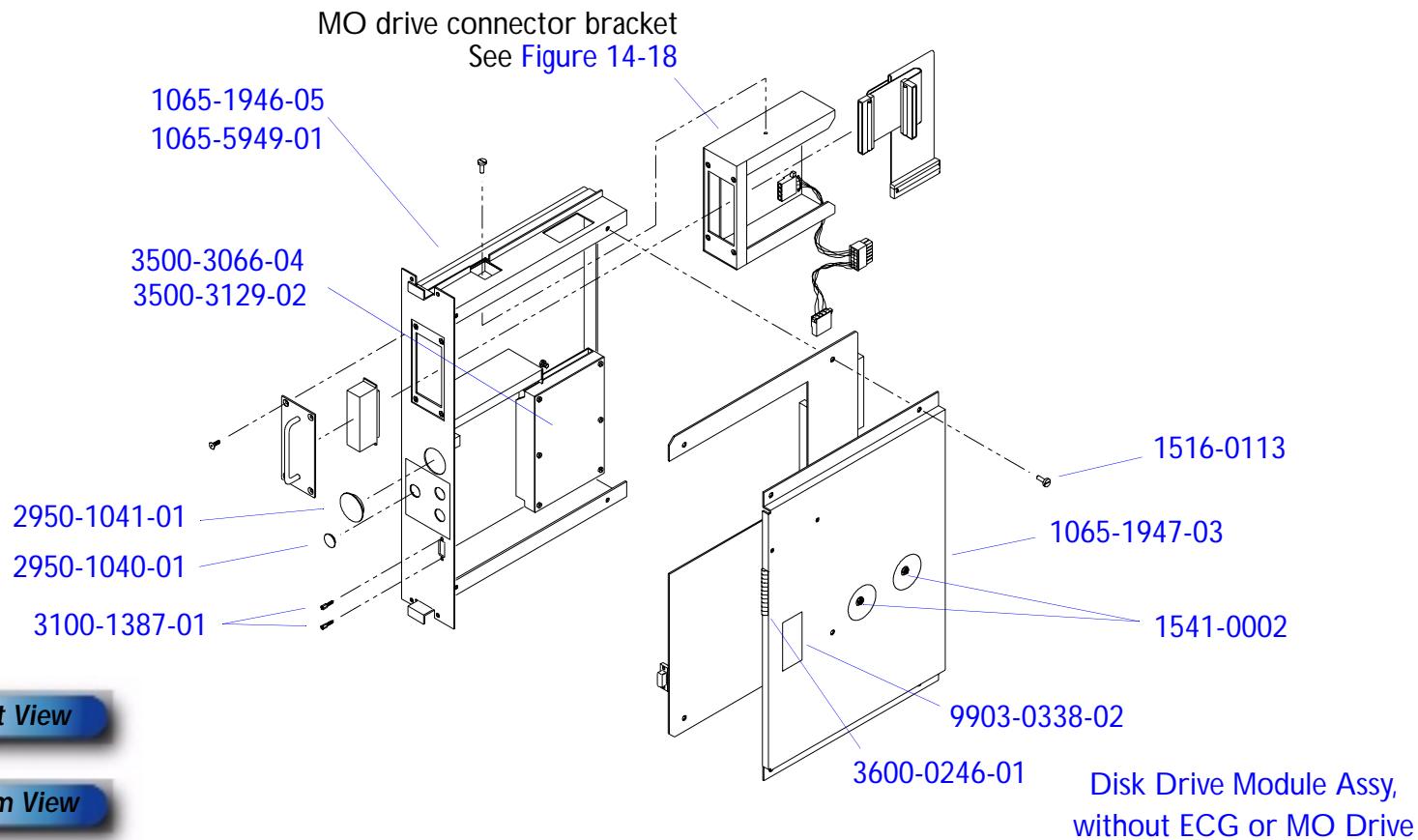
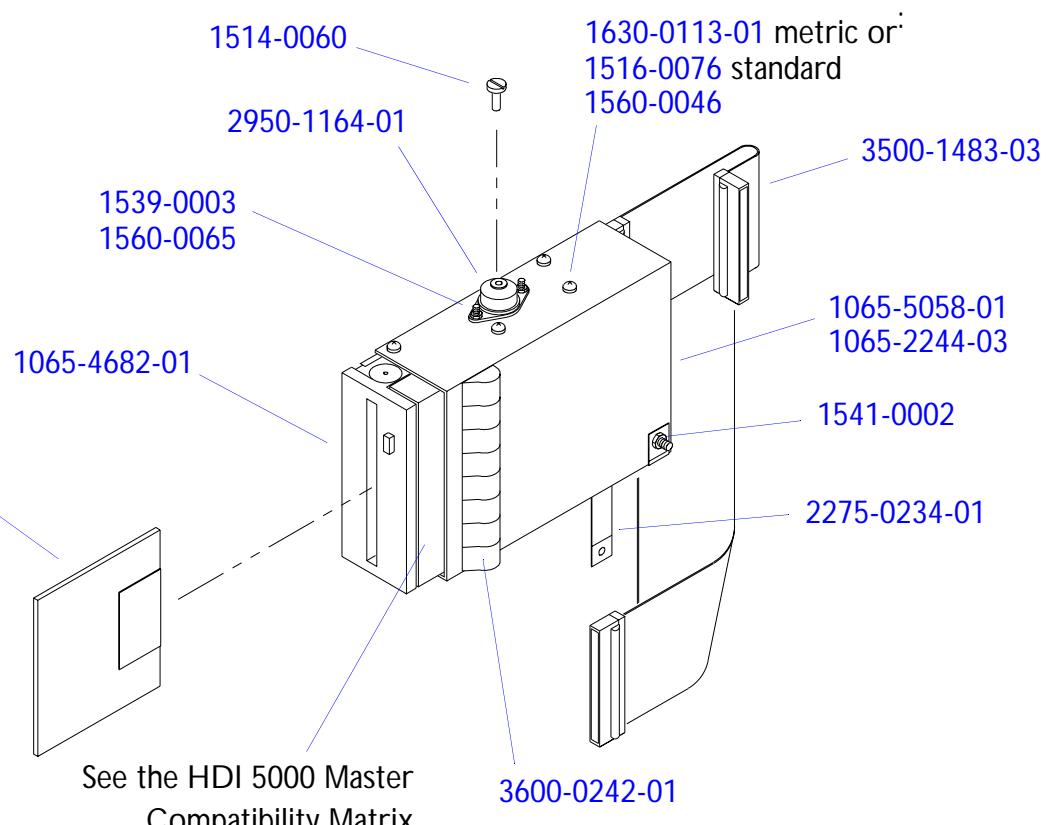
**Parent View****System View**

Figure 14-17

MO Drive (DDEA Module)

Dependency Kits

8000-1900-01
8000-2001-01
8000-2574-01



Parent View

System View

Figure 14-18

Non-MO Drive Connector Bracket (DDEA Module)

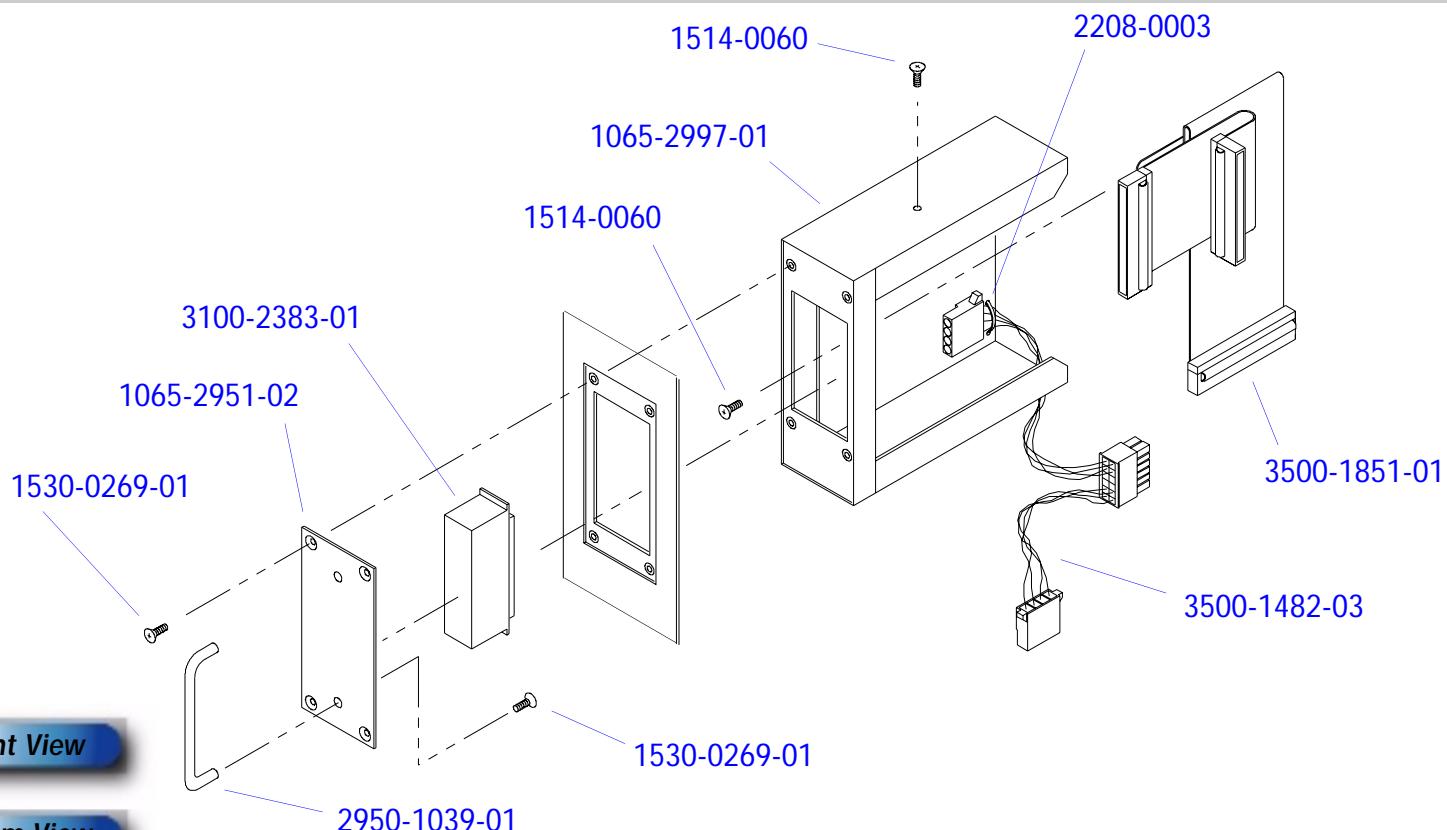


Figure 14-19

Rear Compartment

PARENT VIEW

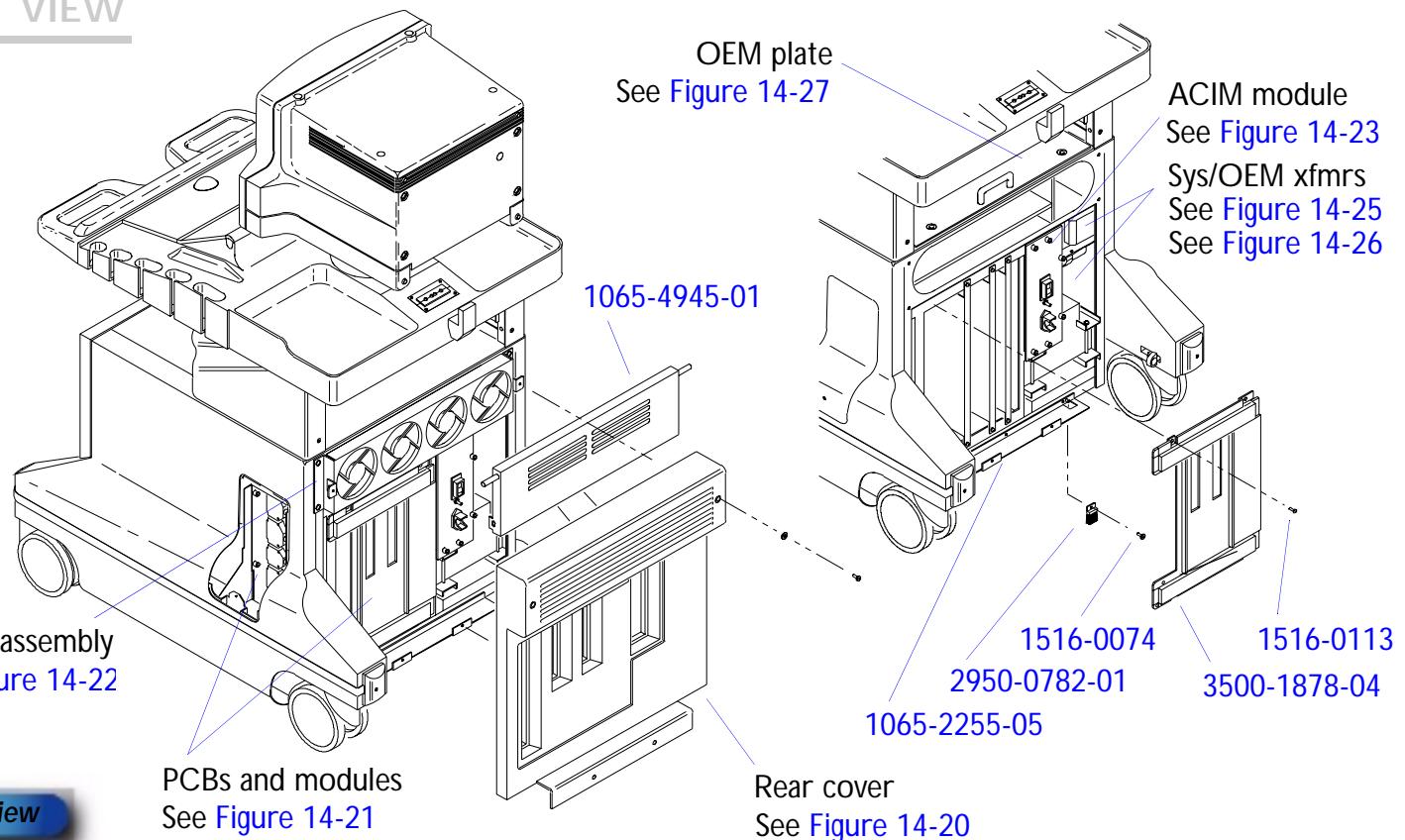


Figure 14-20

Rear Cover Assembly

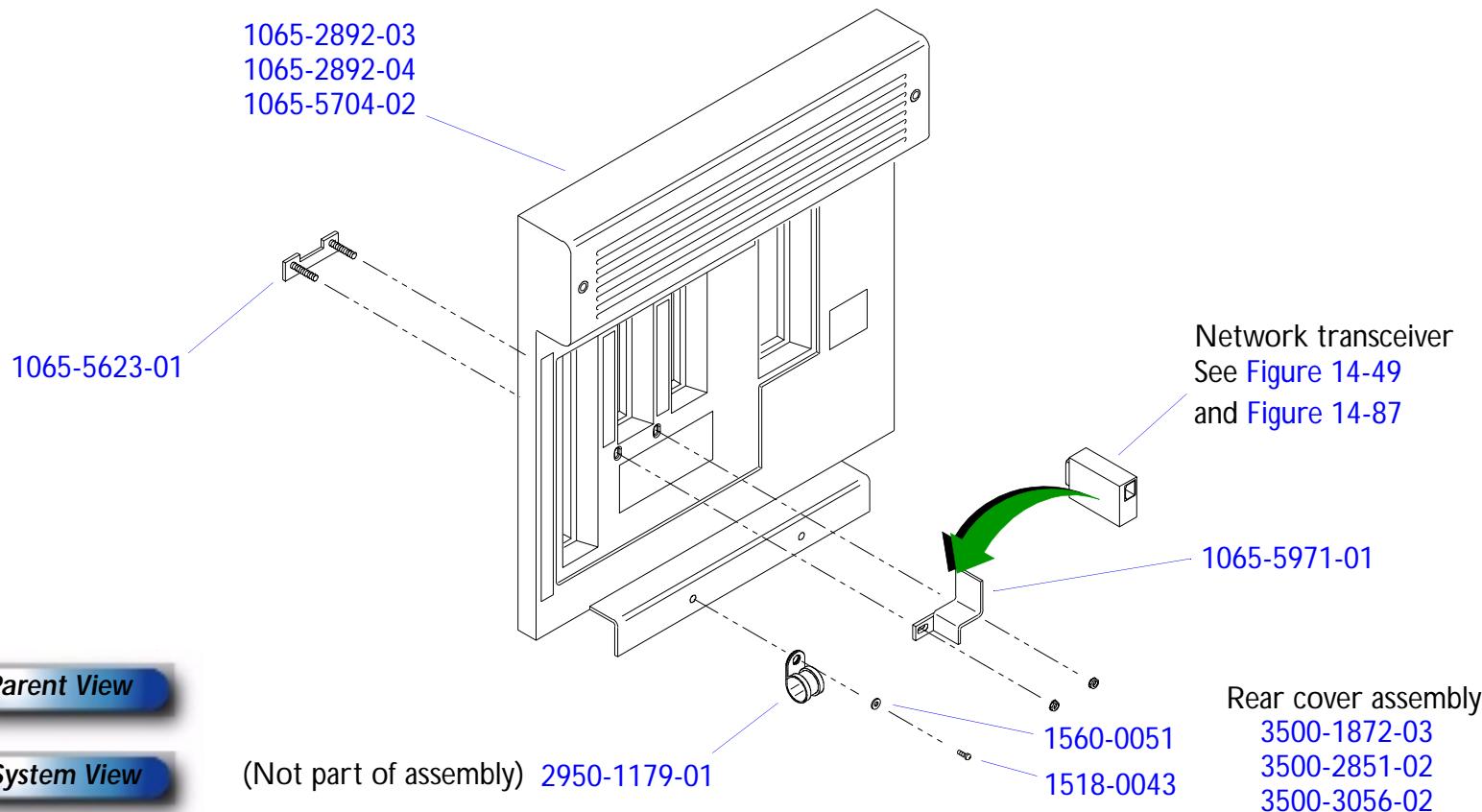
**Parent View****System View**

Figure 14-21

PCBs and Modules (Rear Card Cage)

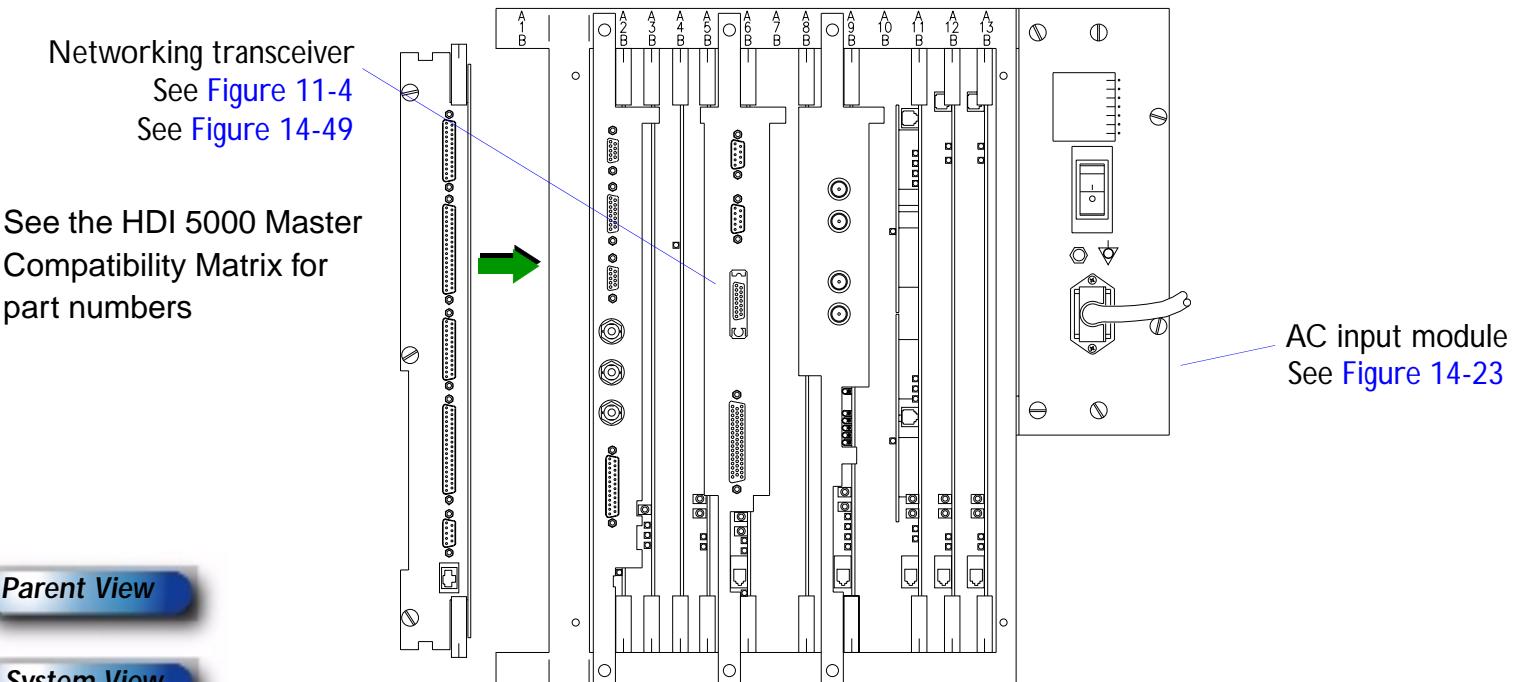
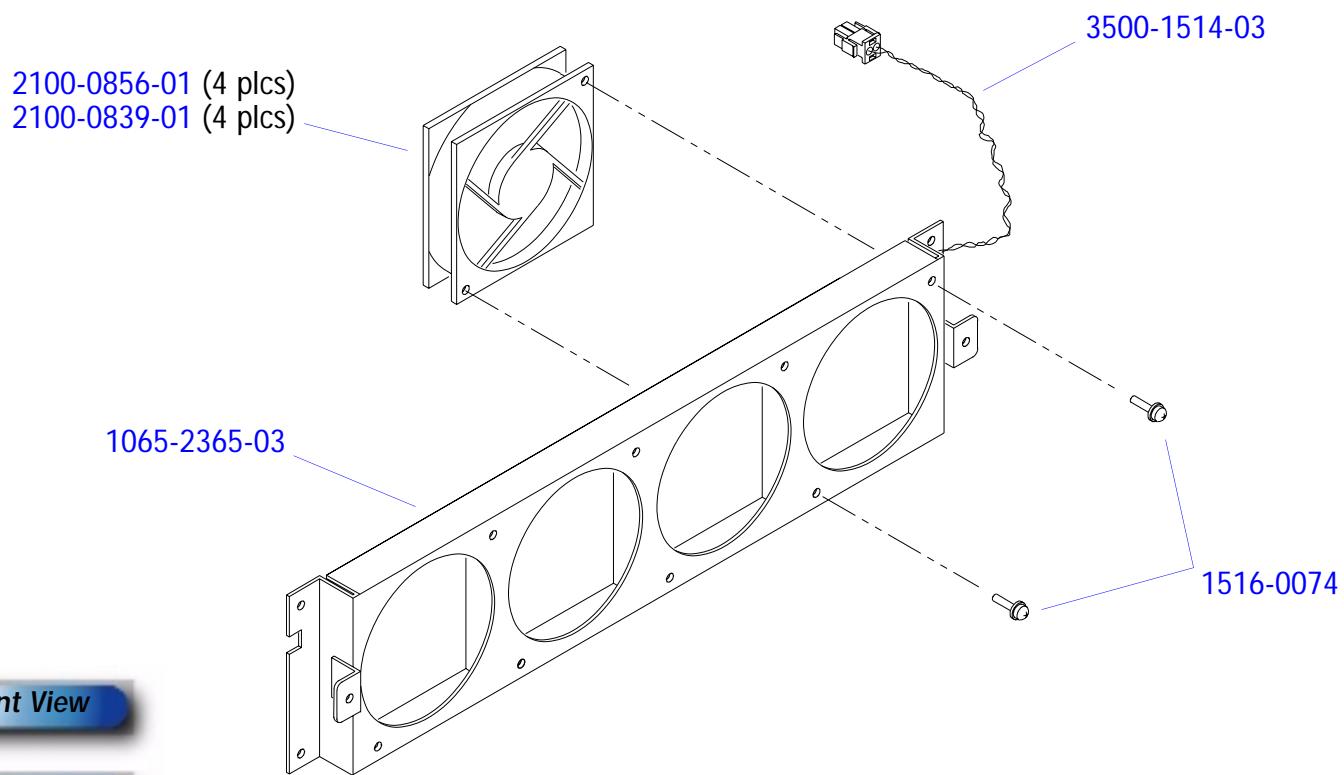


Figure 14-22

24 Vdc Rear Fan Assembly



Parent View

System View

Figure 14-23

AC Input Module (ACIM) PS4

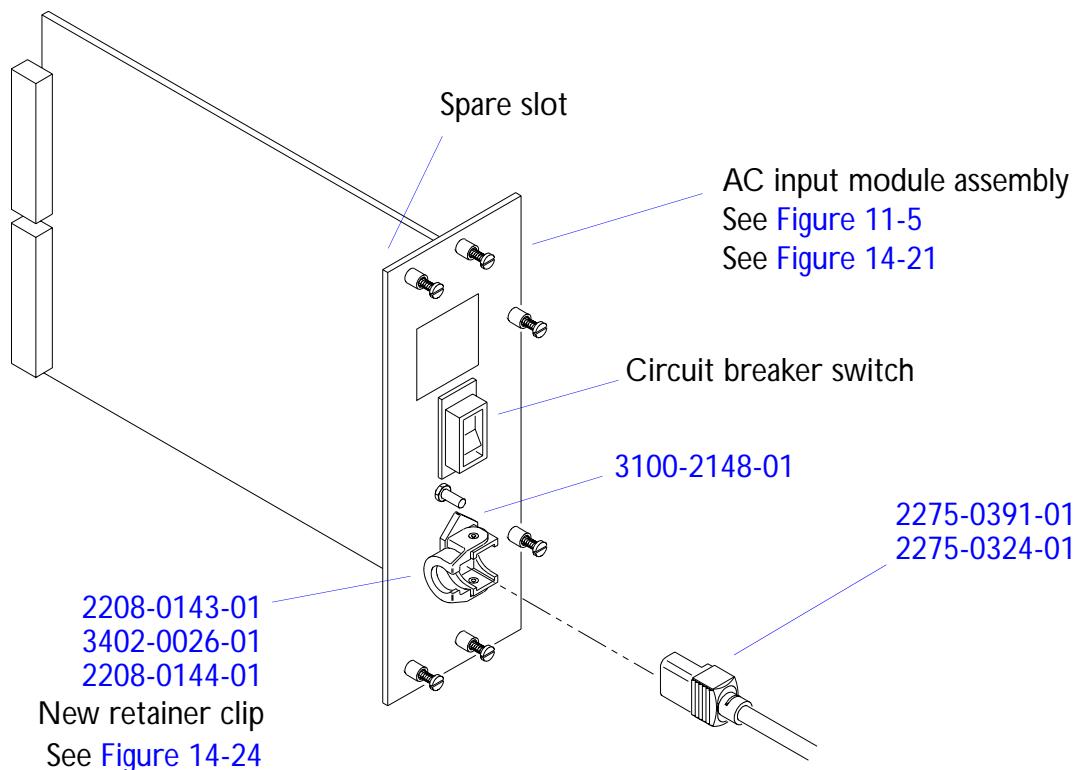
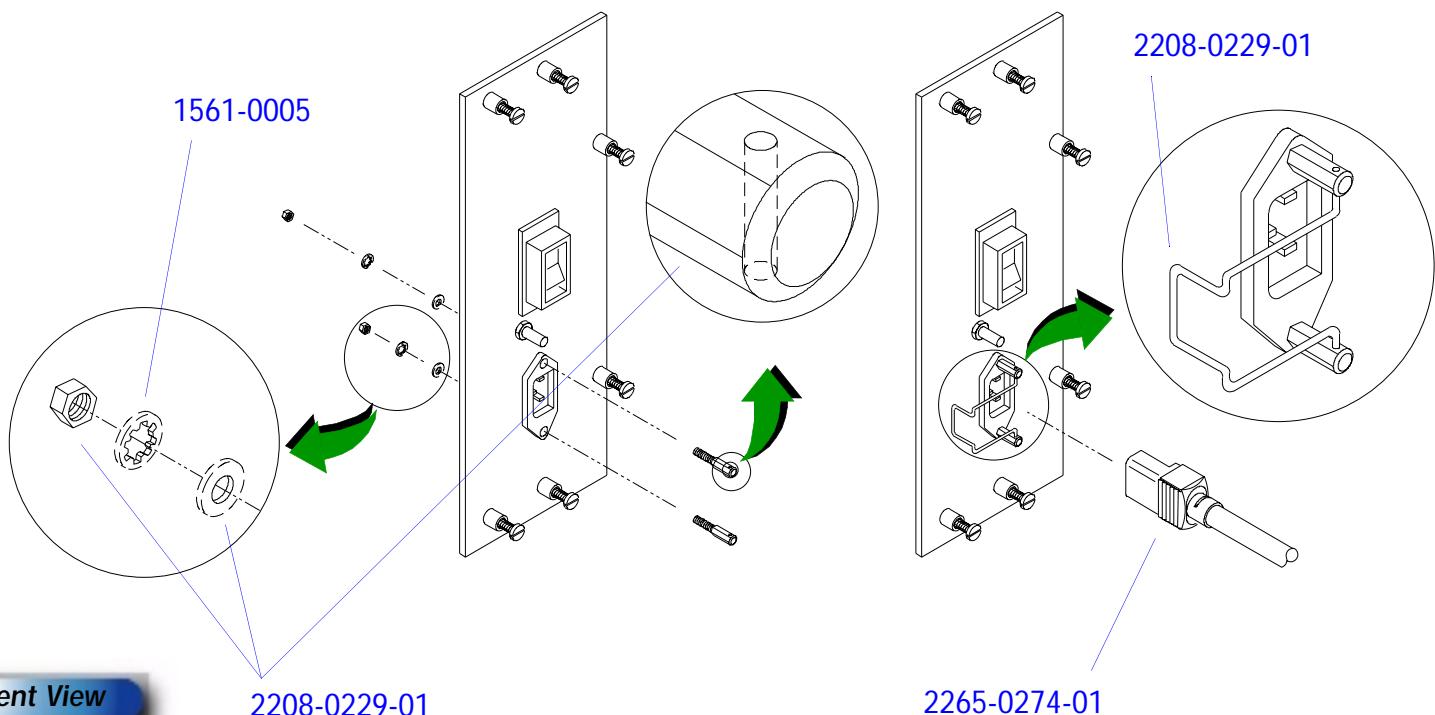
**Parent View****System View**

Figure 14-24

AC Input Module (ACIM), New Retainer Clip

**Parent View**

2208-0229-01

2265-0274-01

System View

Figure 14-25

System Power Transformer

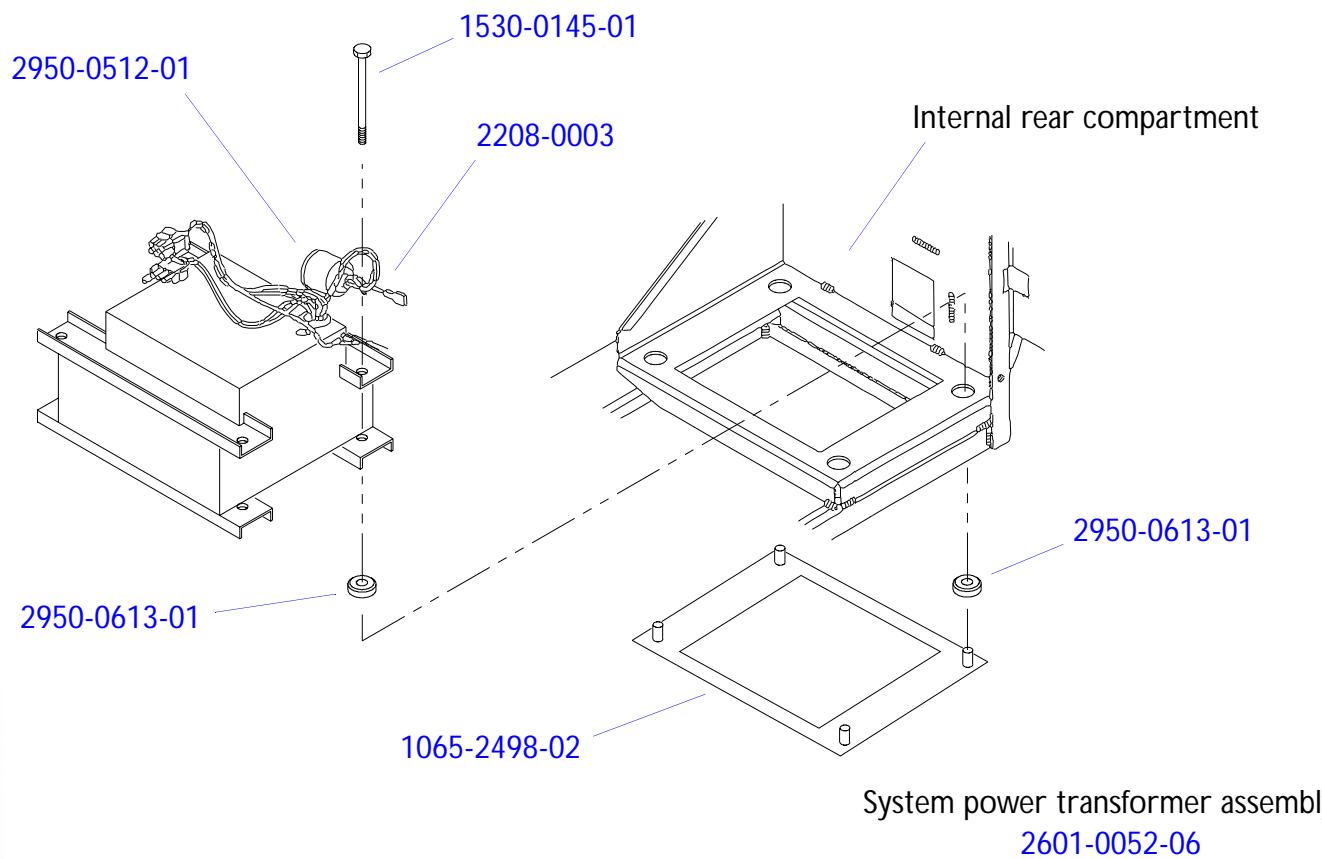


Figure 14-26

OEM Power Transformer

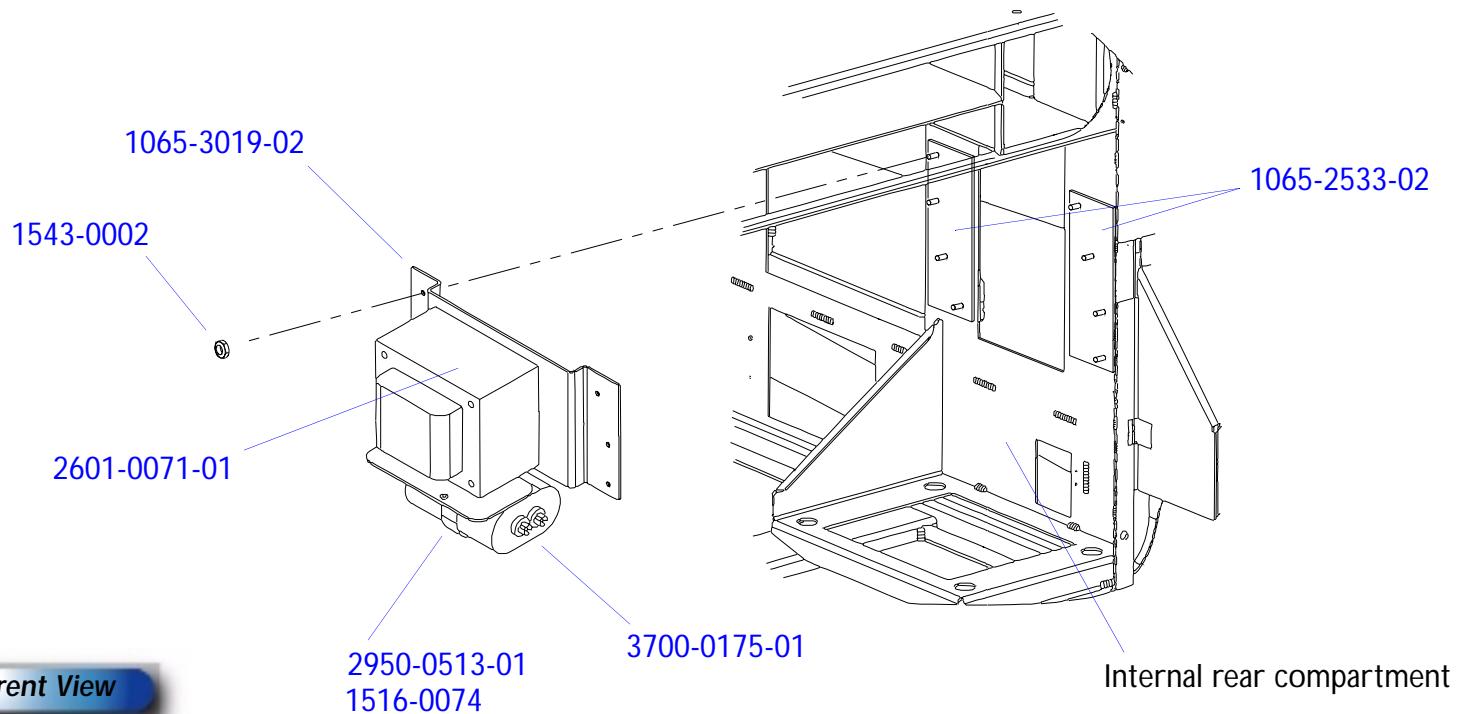
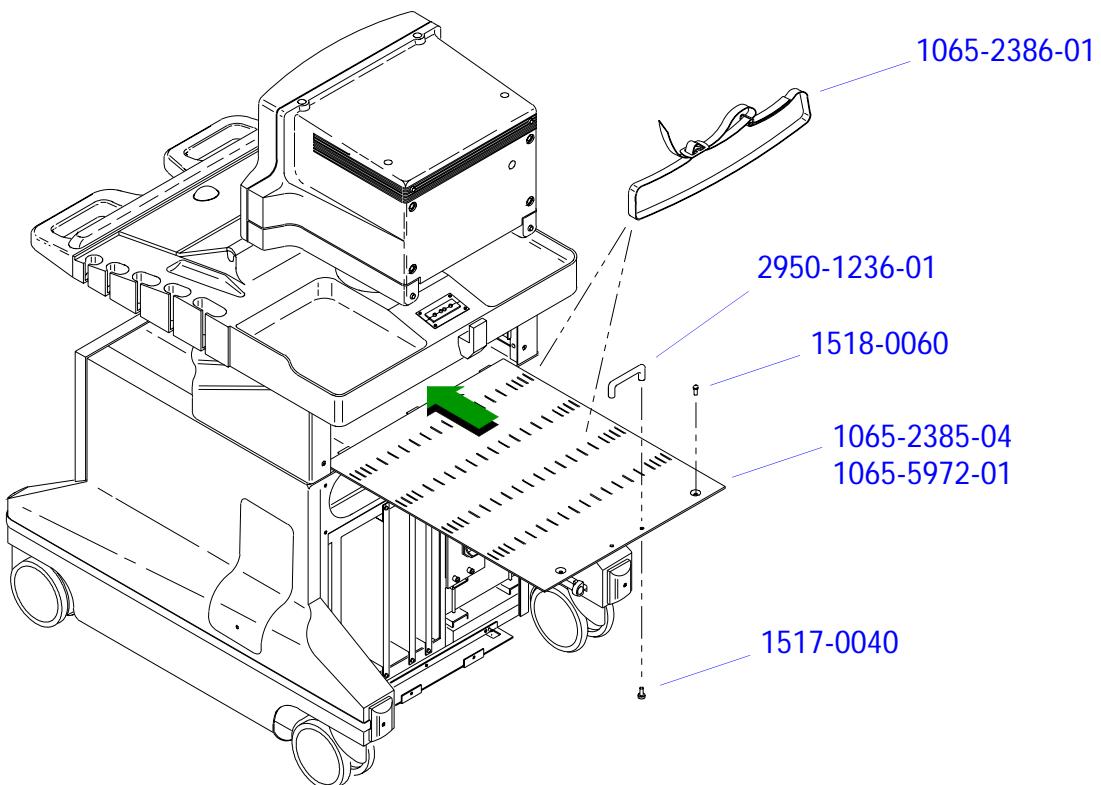
**Parent View****System View**

Figure 14-27

Universal OEM Plate



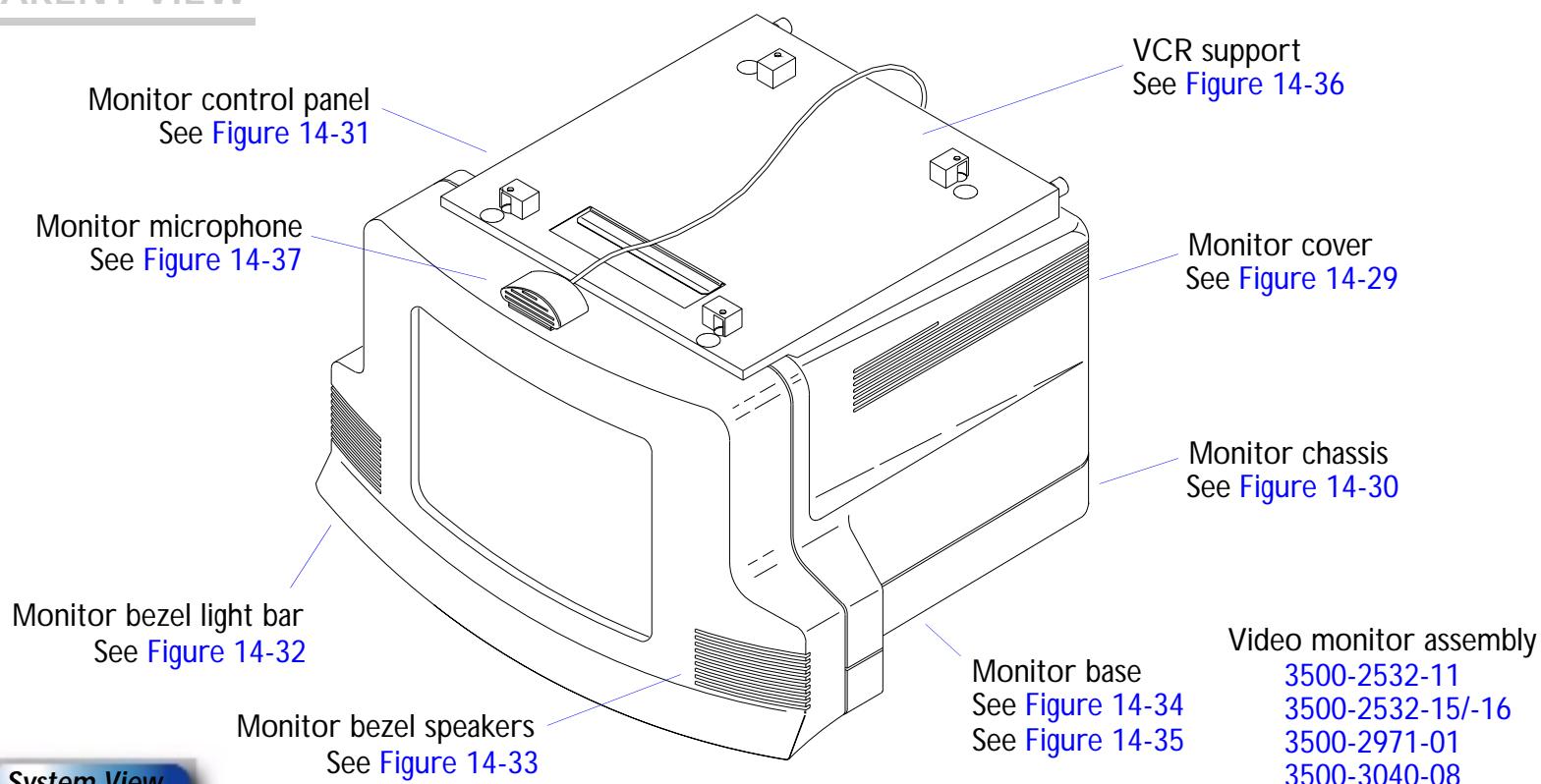
Parent View

System View

Figure 14-28

Video Monitor Assembly

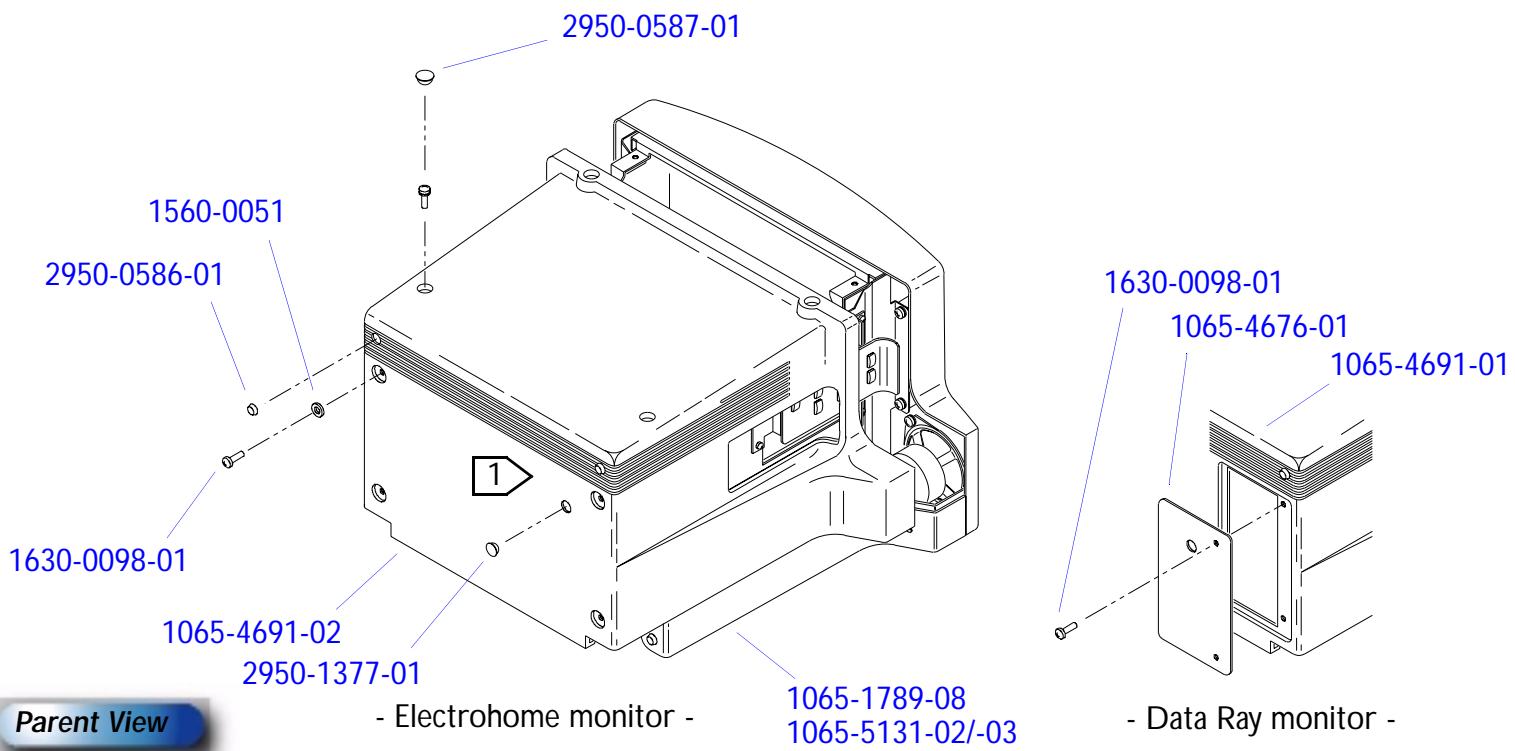
PARENT VIEW



System View

Figure 14-29

Video Monitor Cover



1 See Figure 14-30 for FIMI monitor microphone jack location.

Figure 14-30

Video Monitor Chassis

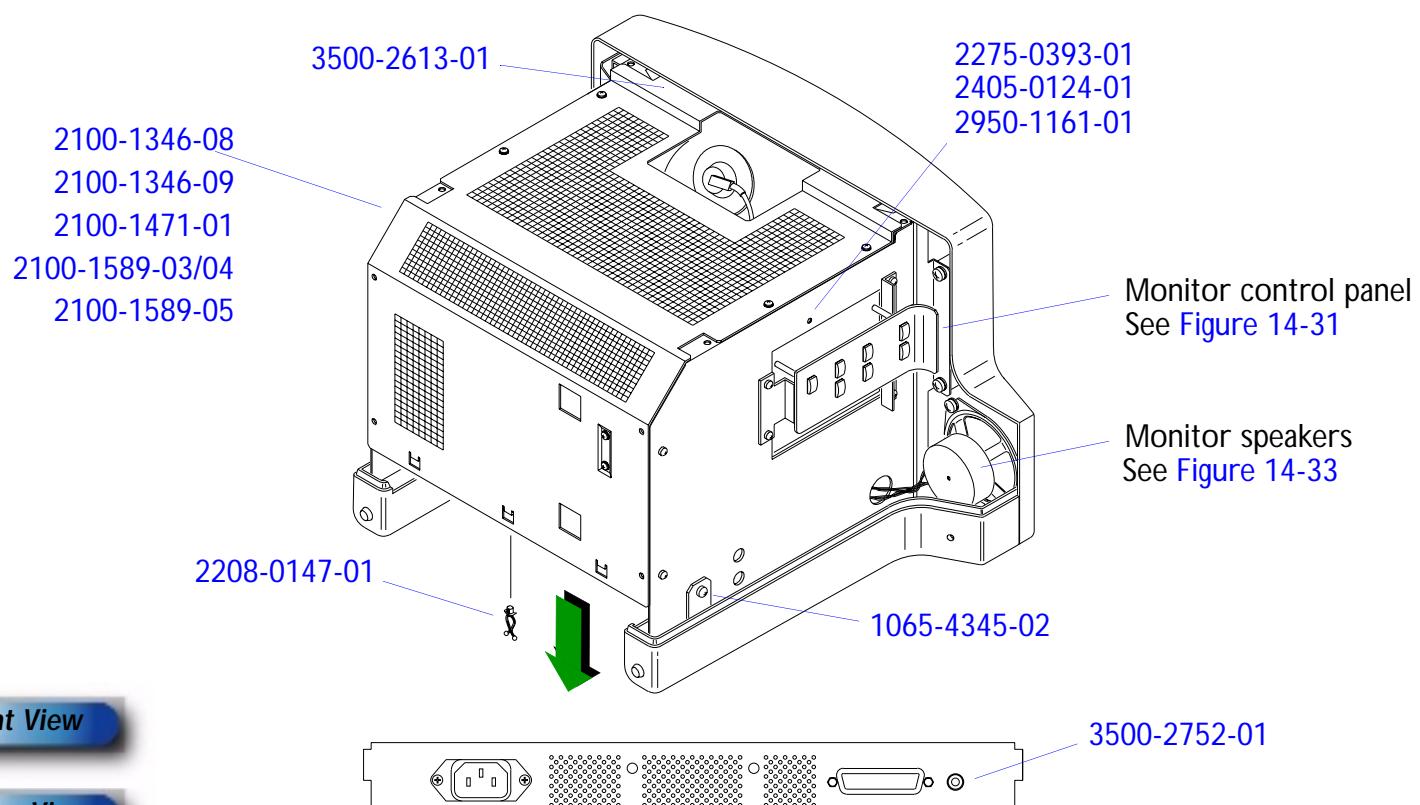
**Parent View****System View**

Figure 14-31

Video Monitor Control Panel

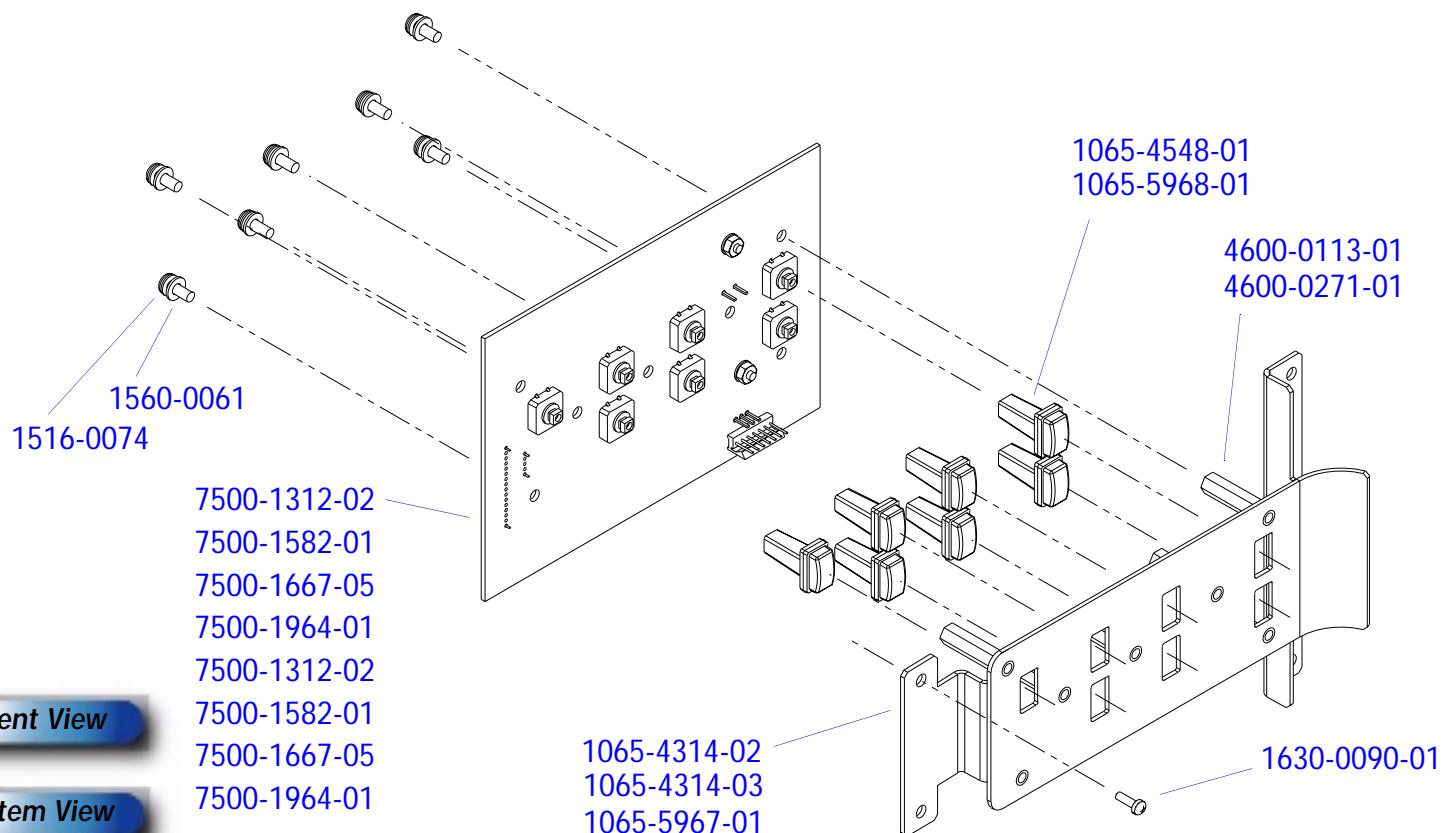
**Parent View****System View**

Figure 14-32

Video Monitor Bezel (Light Bar)

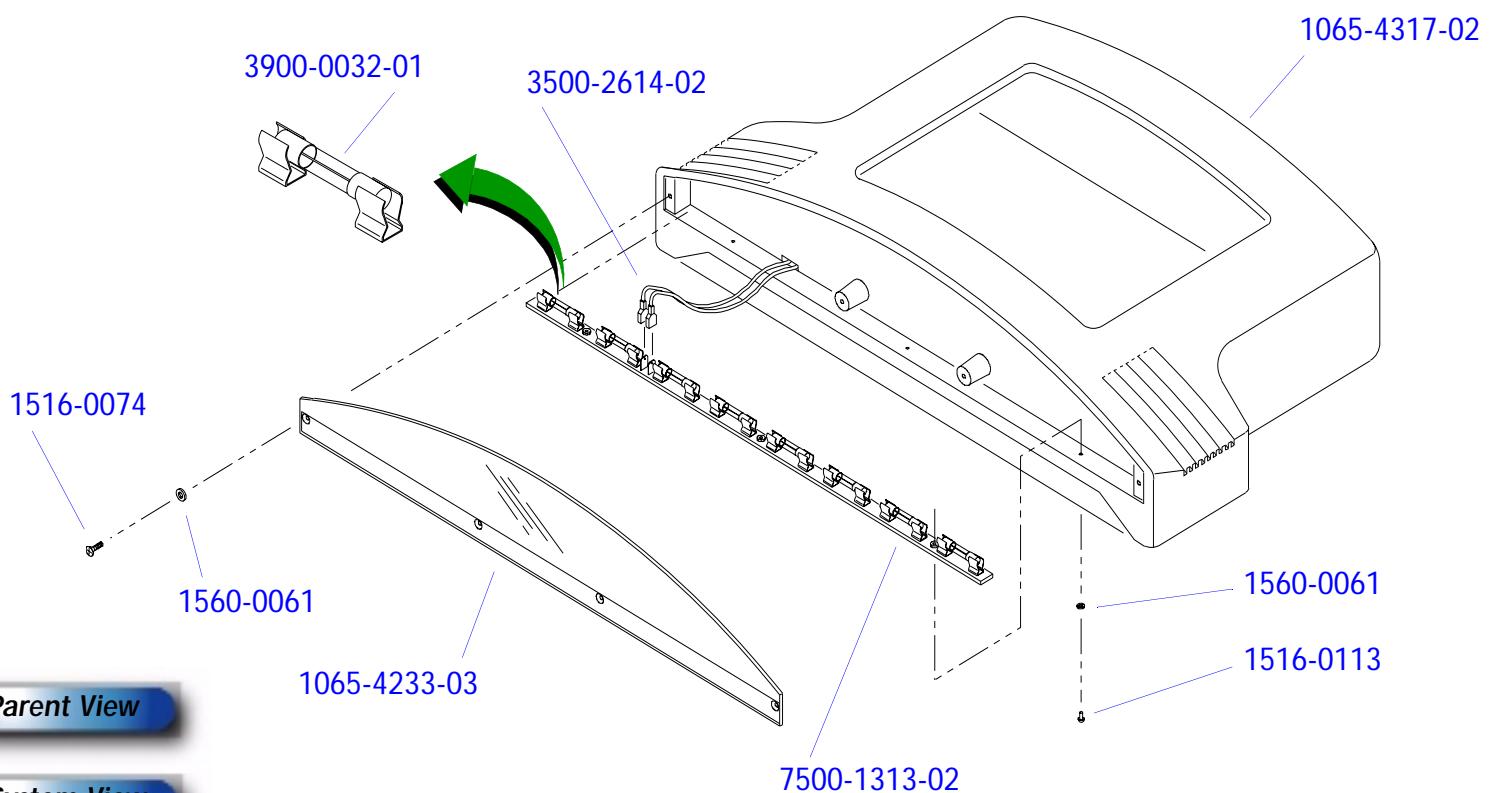
**Parent View****System View**

Figure 14-33

Video Monitor Bezel (Speakers)

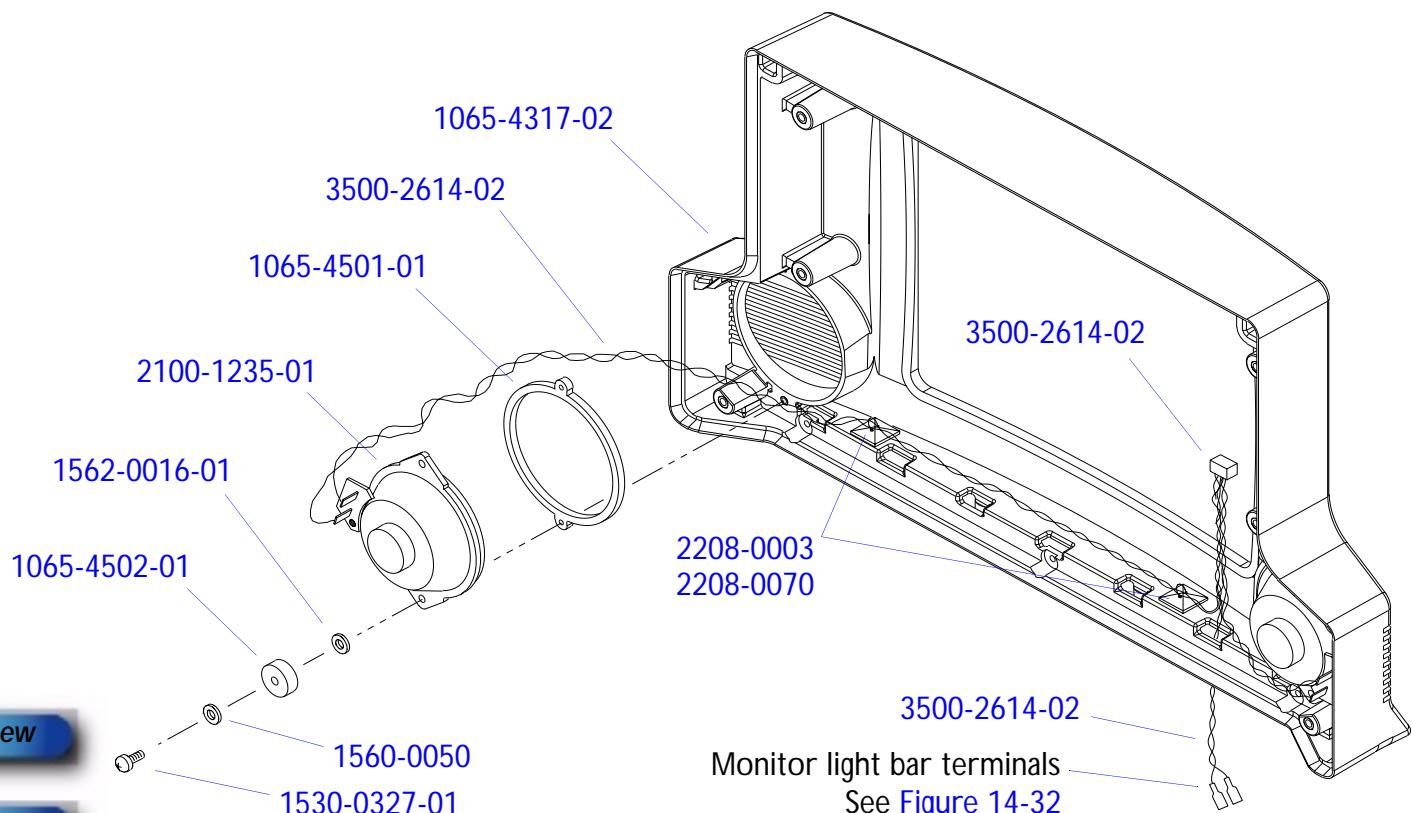


Figure 14-34

Video Monitor Base Assembly

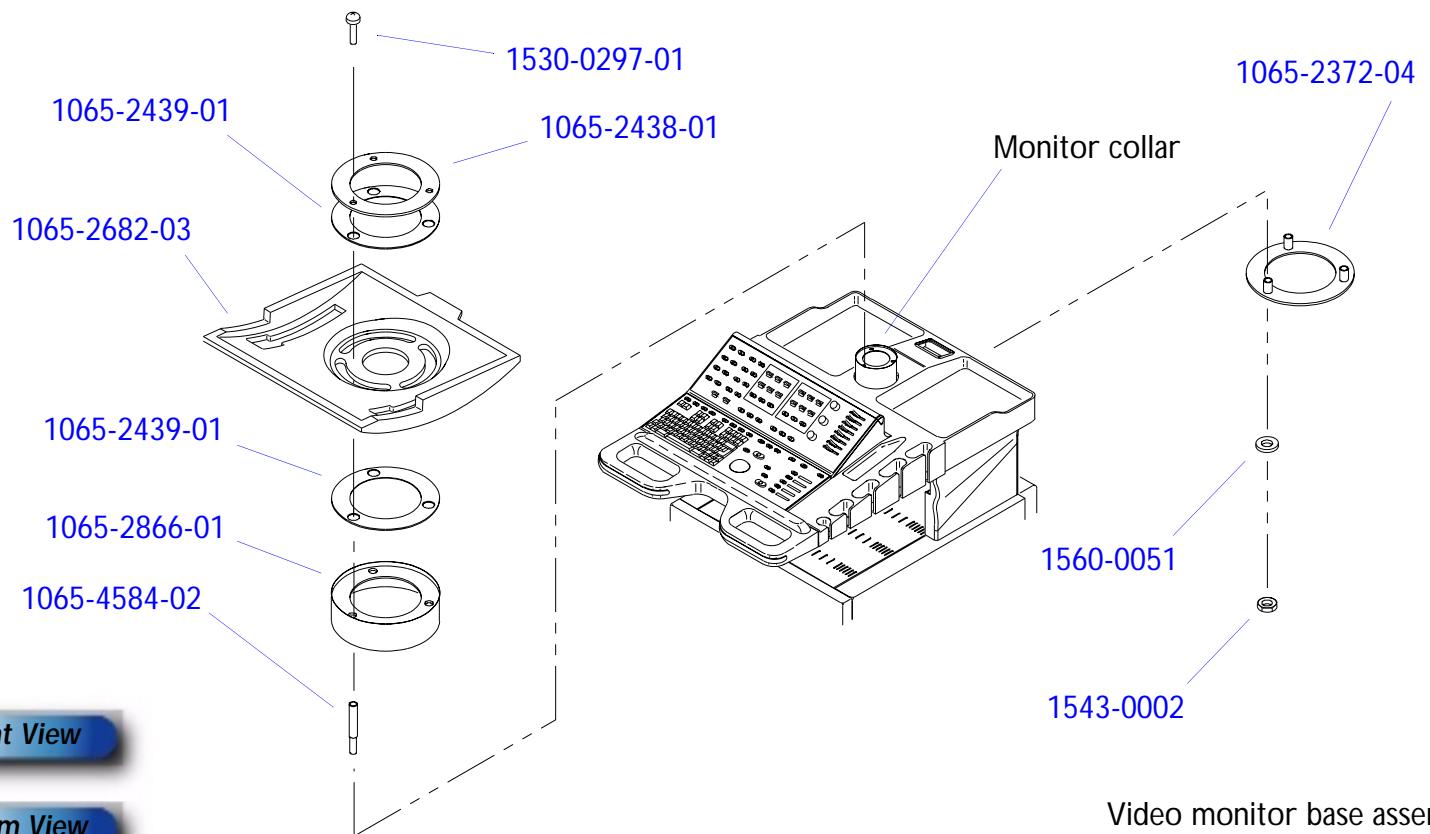
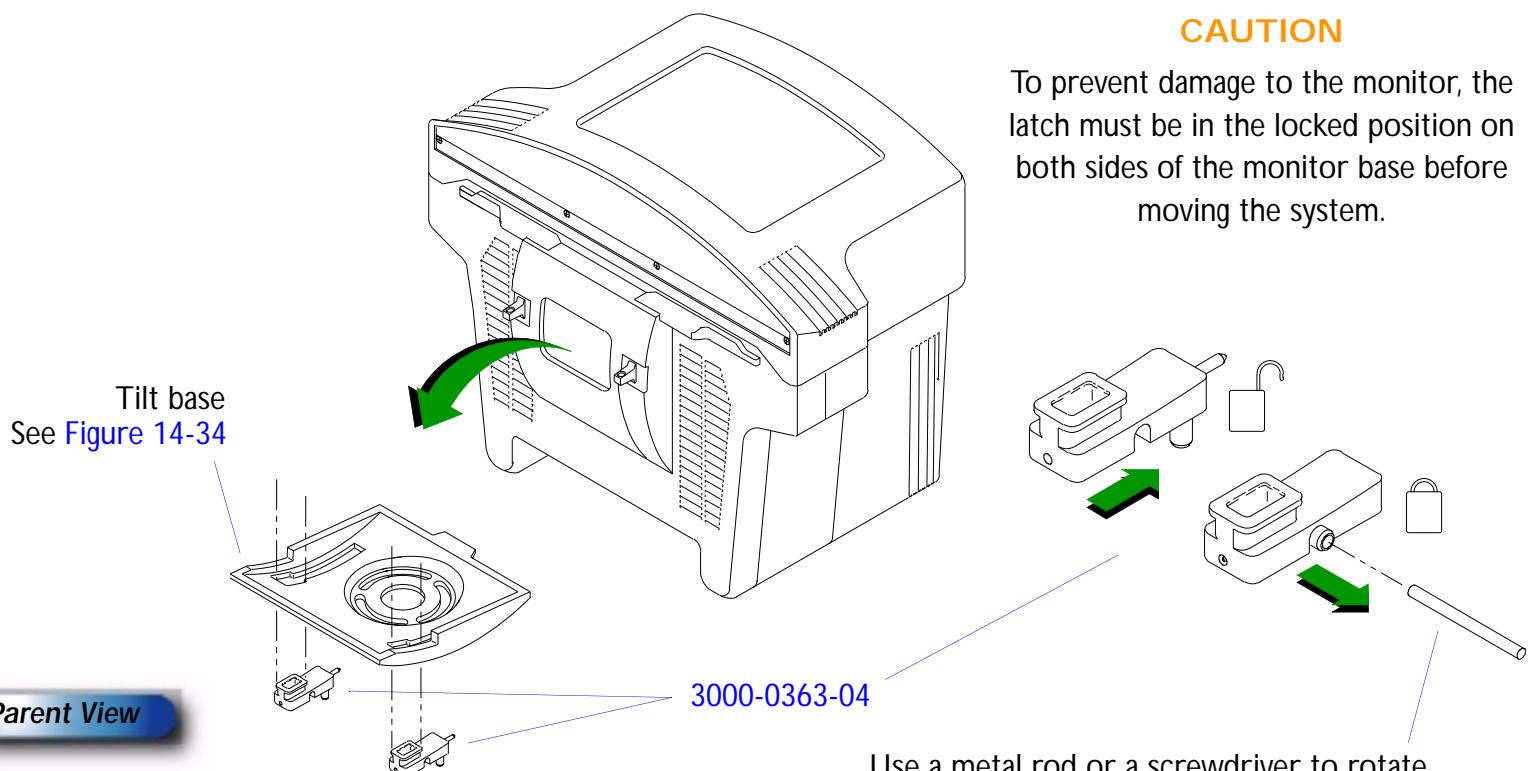


Figure 14-35

Video Monitor Base Lock



Parent View

System View

Use a metal rod or a screwdriver to rotate the latch handle to lock or unlock the latch.

Figure 14-36

Video Monitor VCR Support

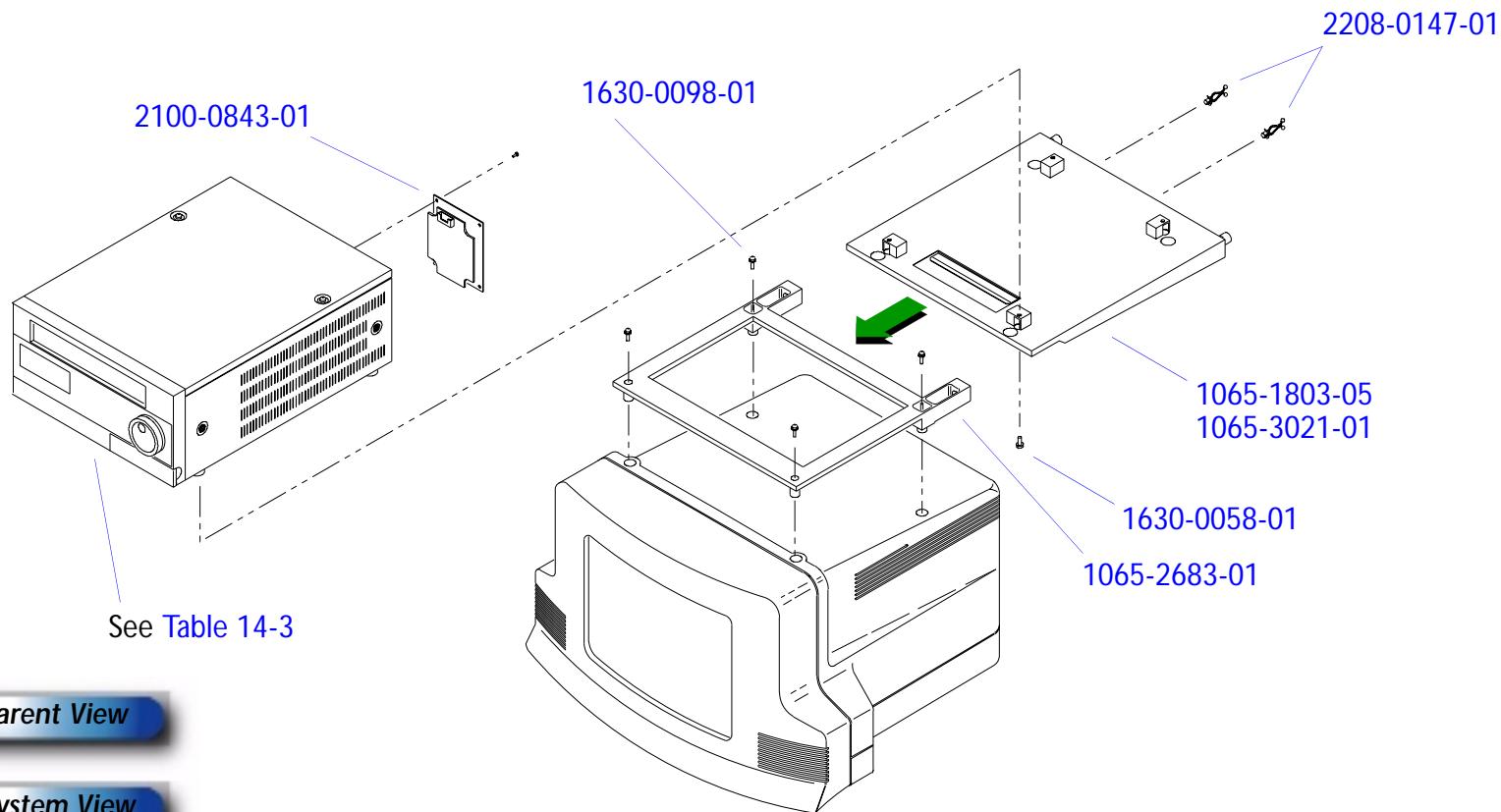
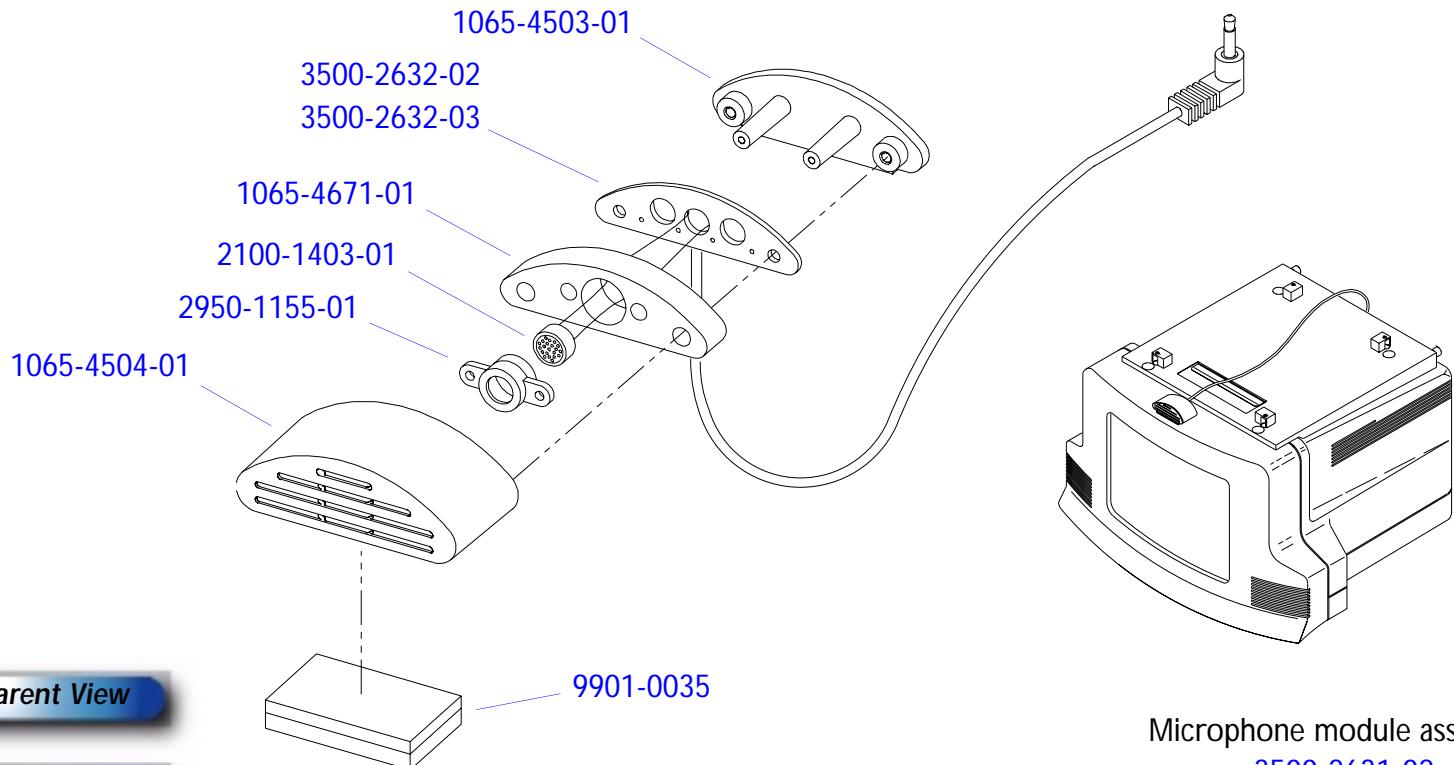
**Parent View****System View**

Figure 14-37

Microphone Module Assembly (Turtle)



Microphone module assembly

3500-2631-02
3500-2631-03**Parent View****System View**

Figure 14-38

Command Module

PARENT VIEW

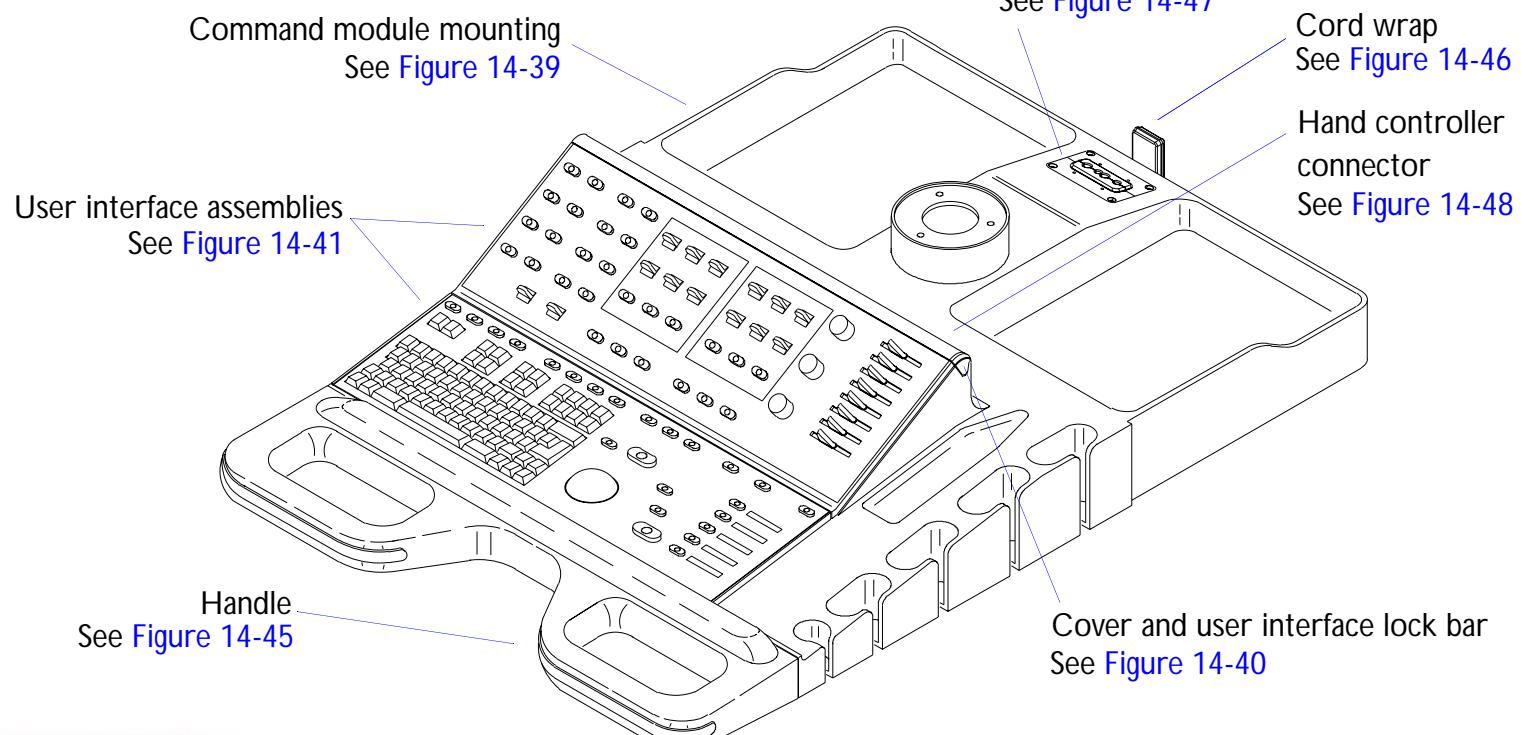
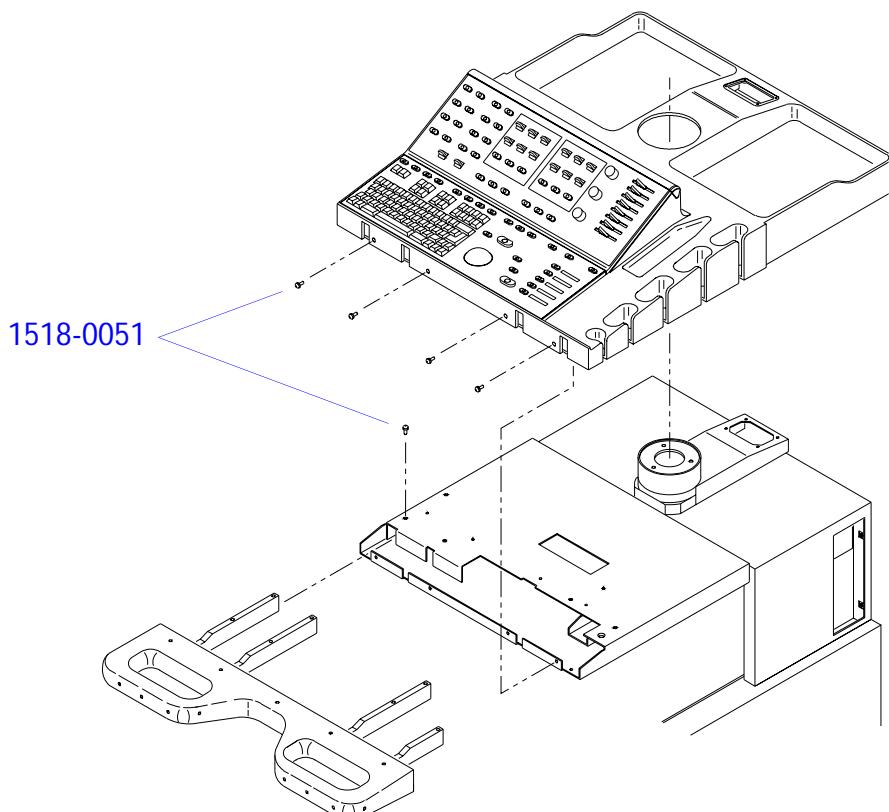
**System View**

Figure 14-39

Command Module Mounting

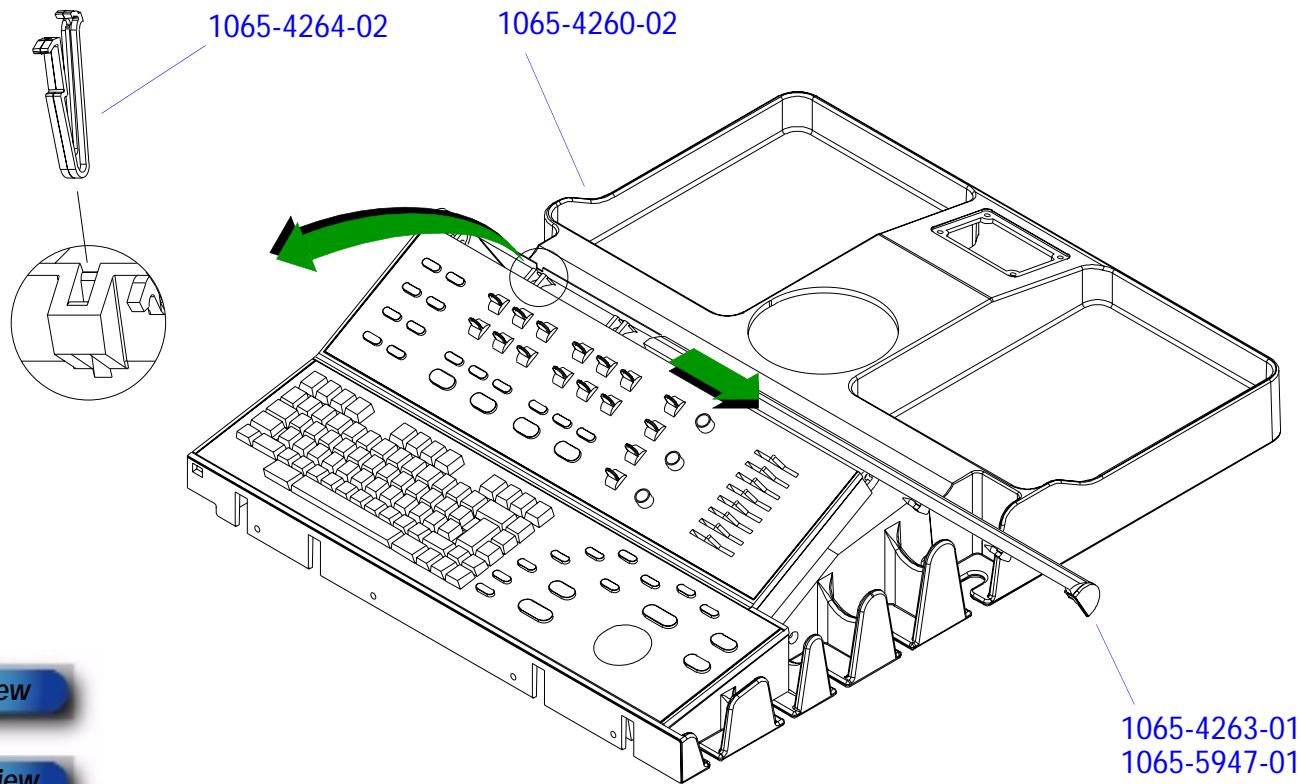


Parent View

System View

Figure 14-40

Cover and User Interface Lock Bar



Parent View

System View

Figure 14-41

User Interface (Control Panel) Assemblies

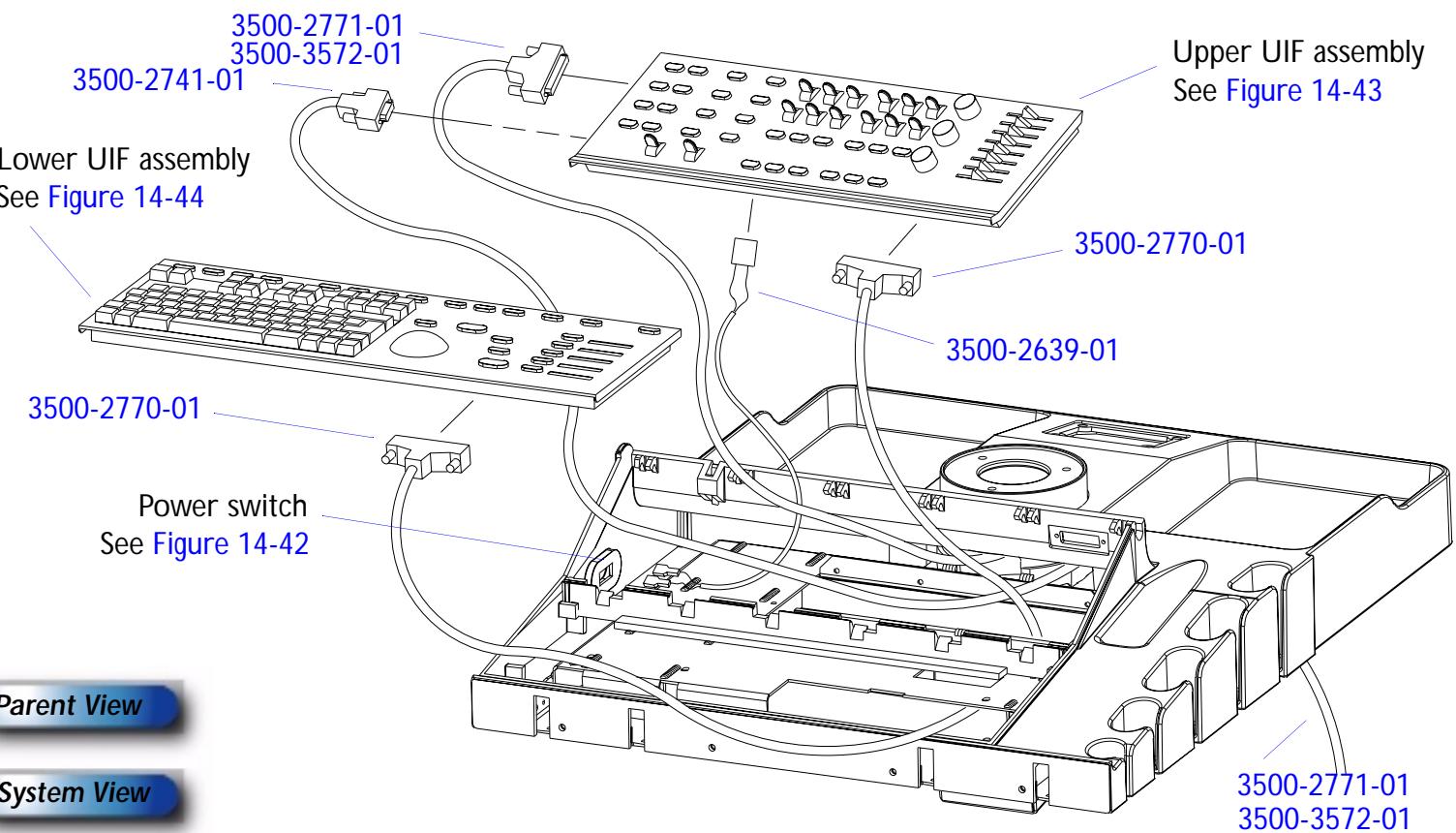
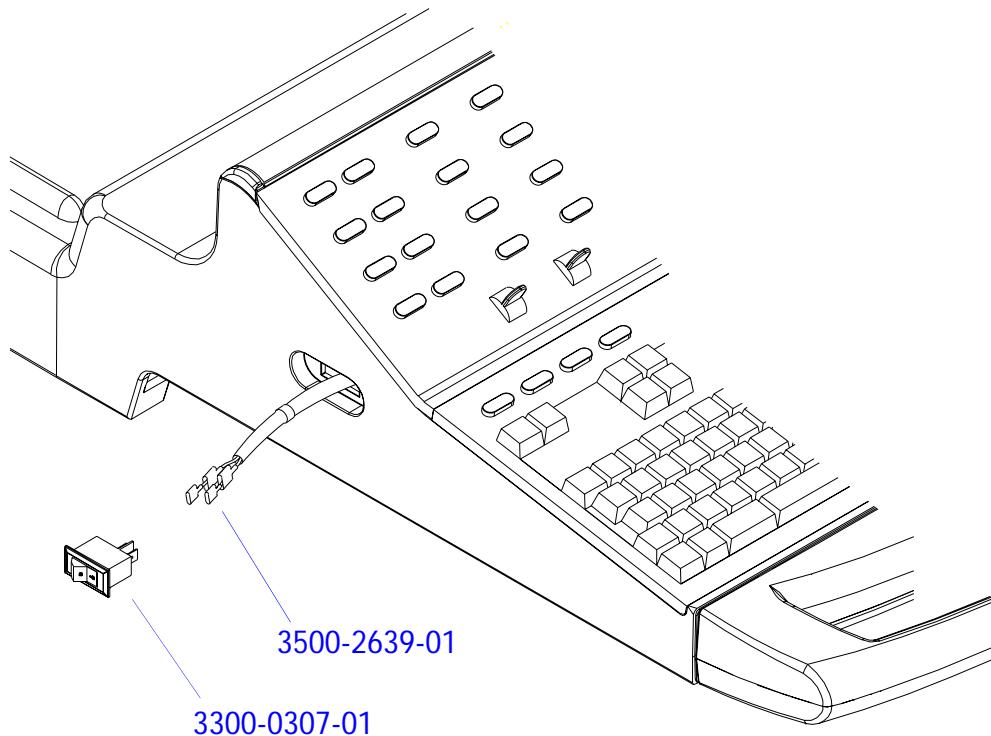
**Parent View****System View**

Figure 14-42

Power Switch



Parent View

System View

Figure 14-43

Upper User Interface Assembly

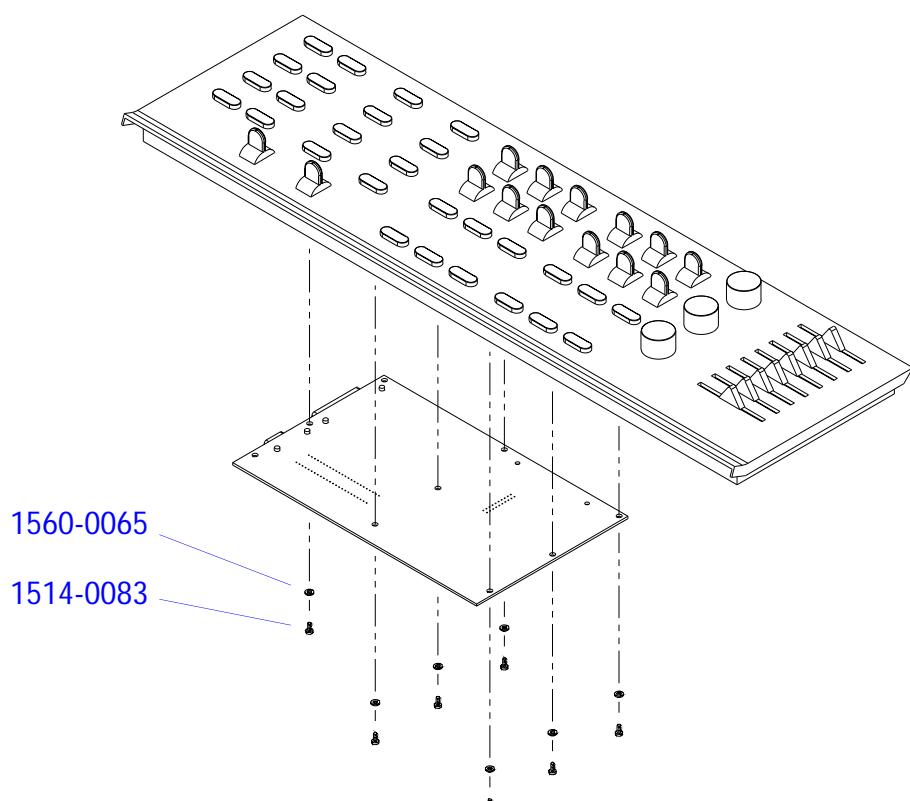
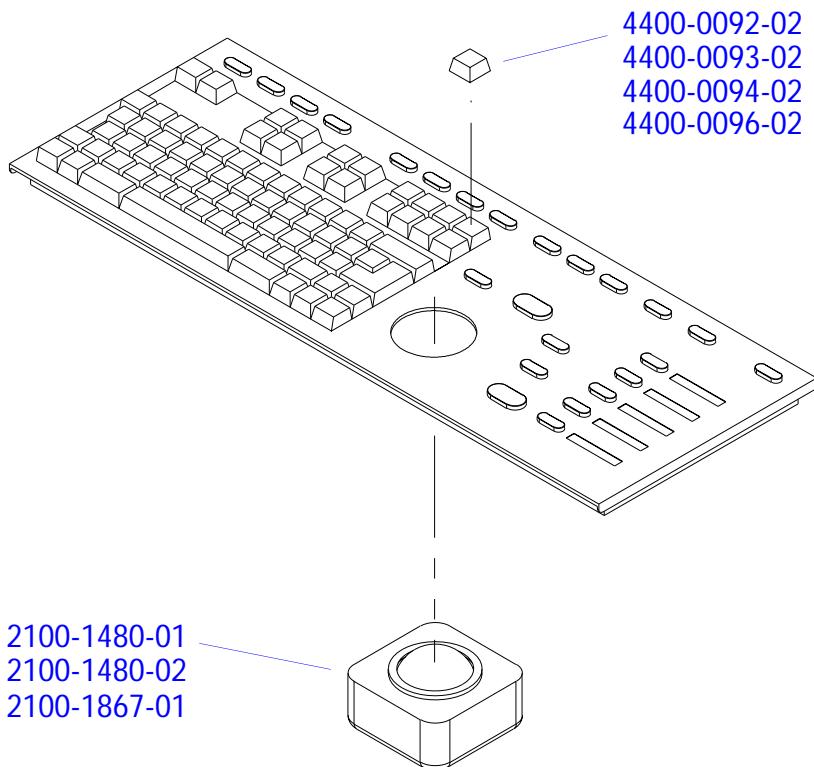
**Parent View****System View****User Interface Assy, Upper (UCP)**

Figure 14-44

Lower User Interface Assembly

**Parent View****System View**

User Interface Assy, Lower (LCP)

Figure 14-45

Handle Casting and Bumpers

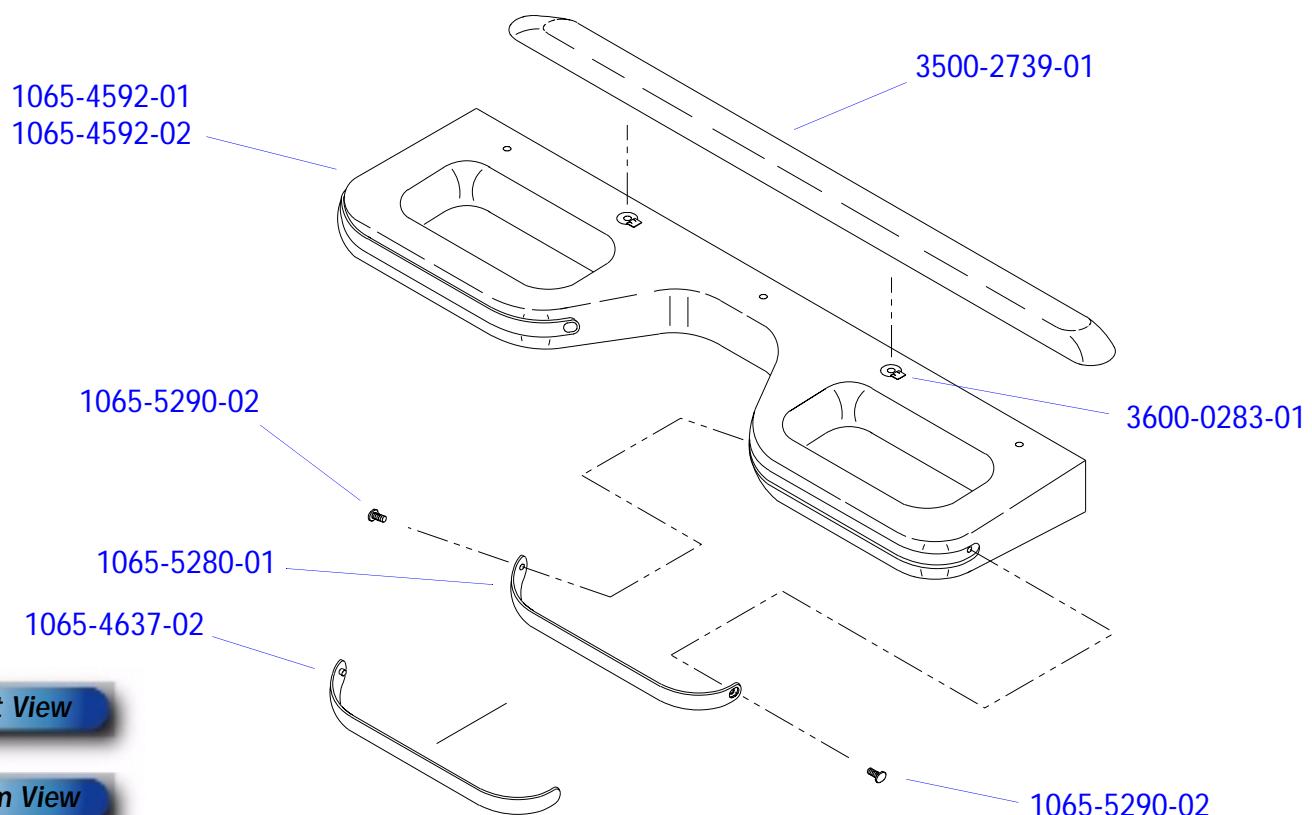
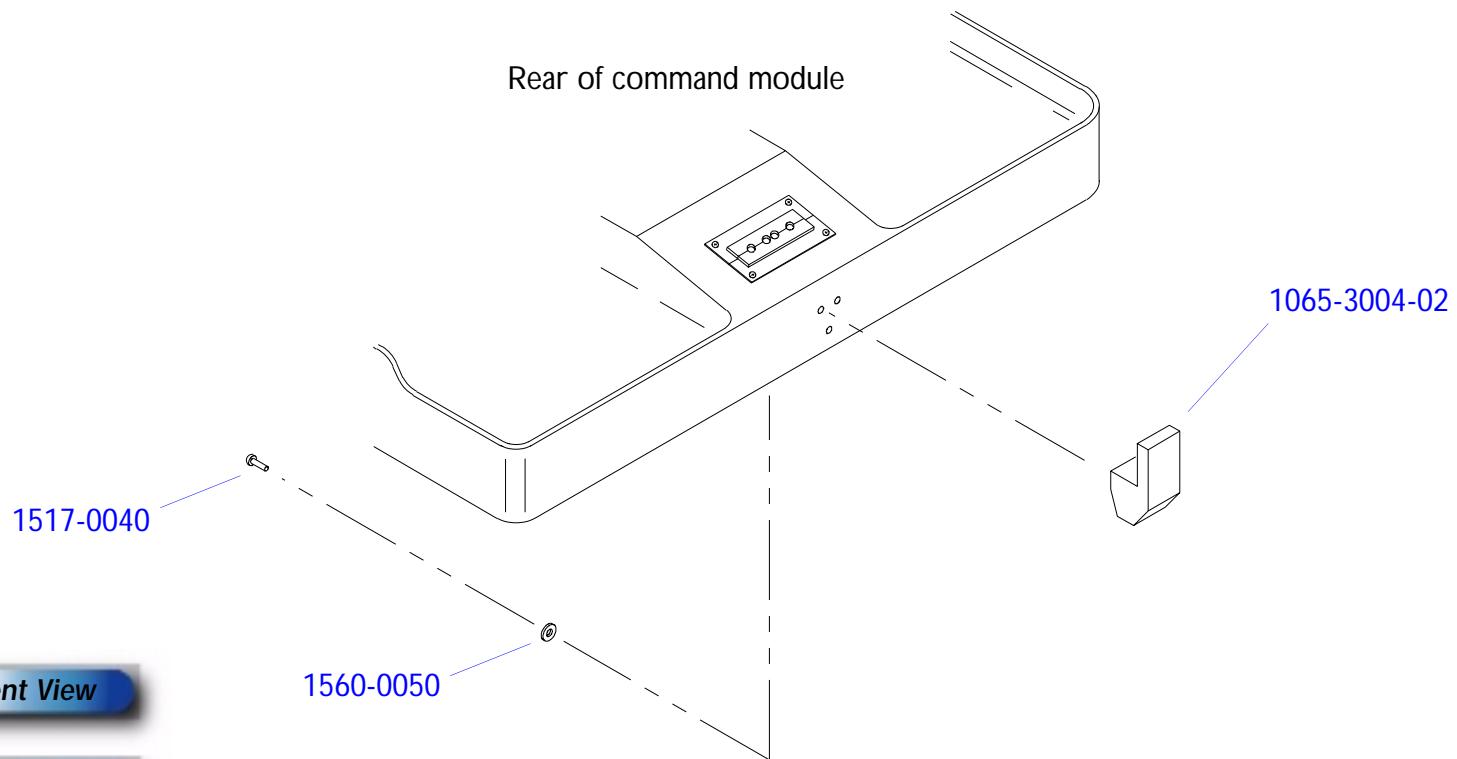
**Parent View****System View**

Figure 14-46

Cord Wrap

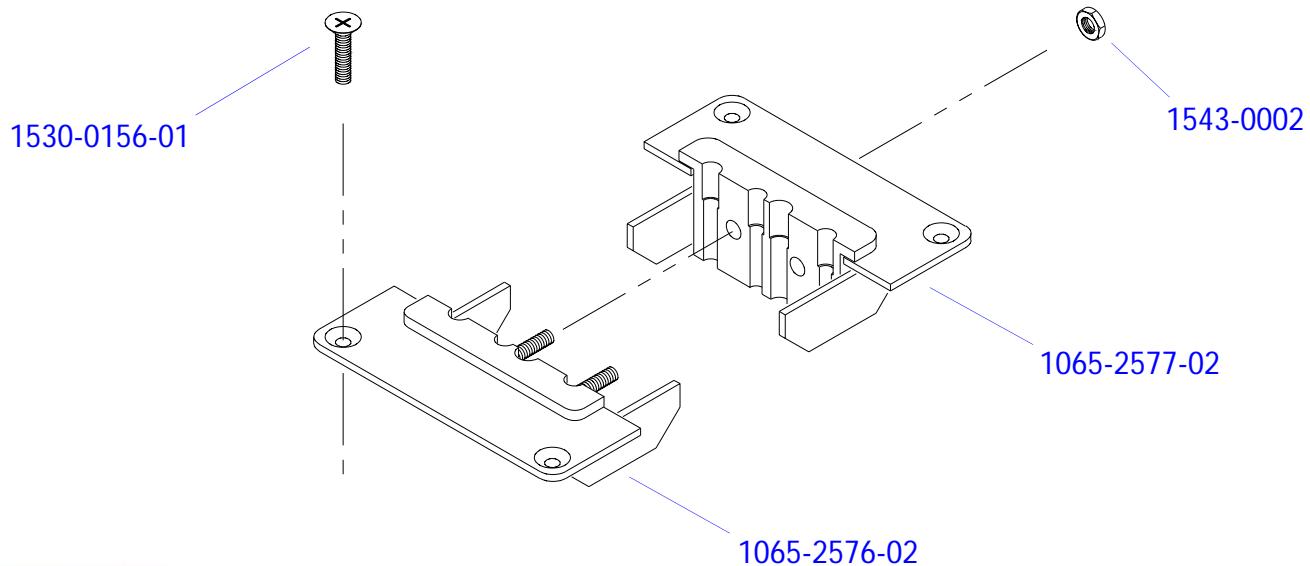


Parent View

System View

Figure 14-47

Cable Clamp Assembly



Parent View

System View

Cable clamp assembly
3500-2721-02

Figure 14-48

Hand Controller (Remote Control) Connector

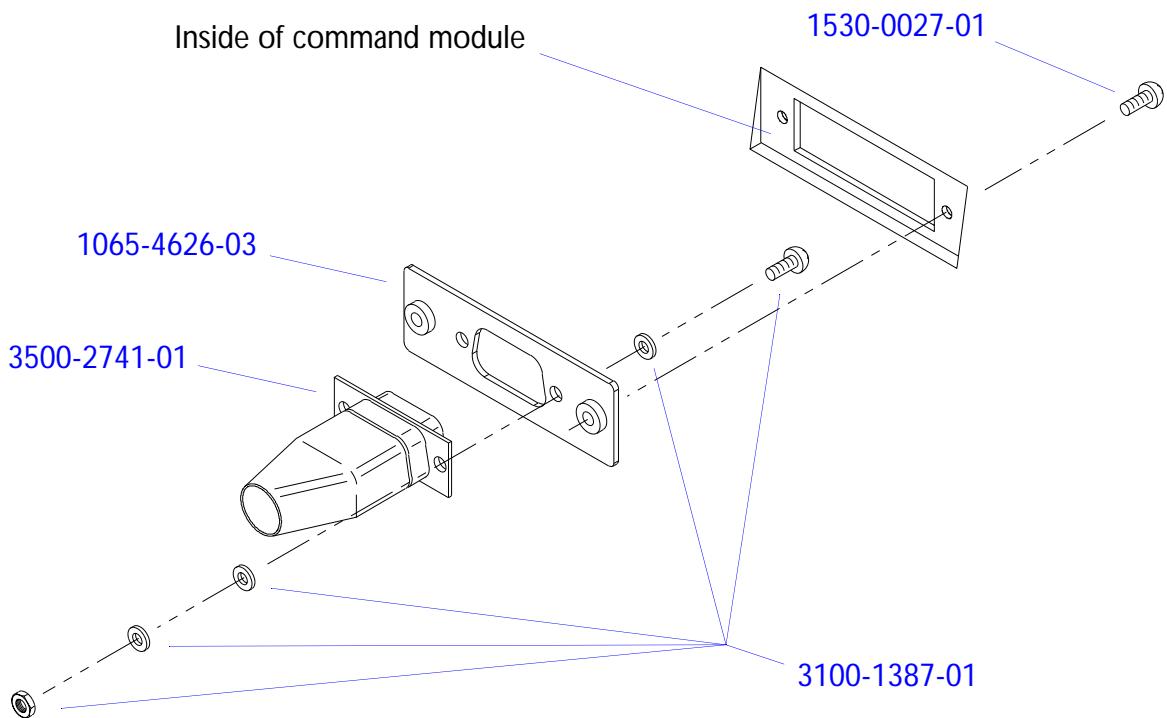
**Parent View****System View**

Figure 14-49

Networking Transceiver

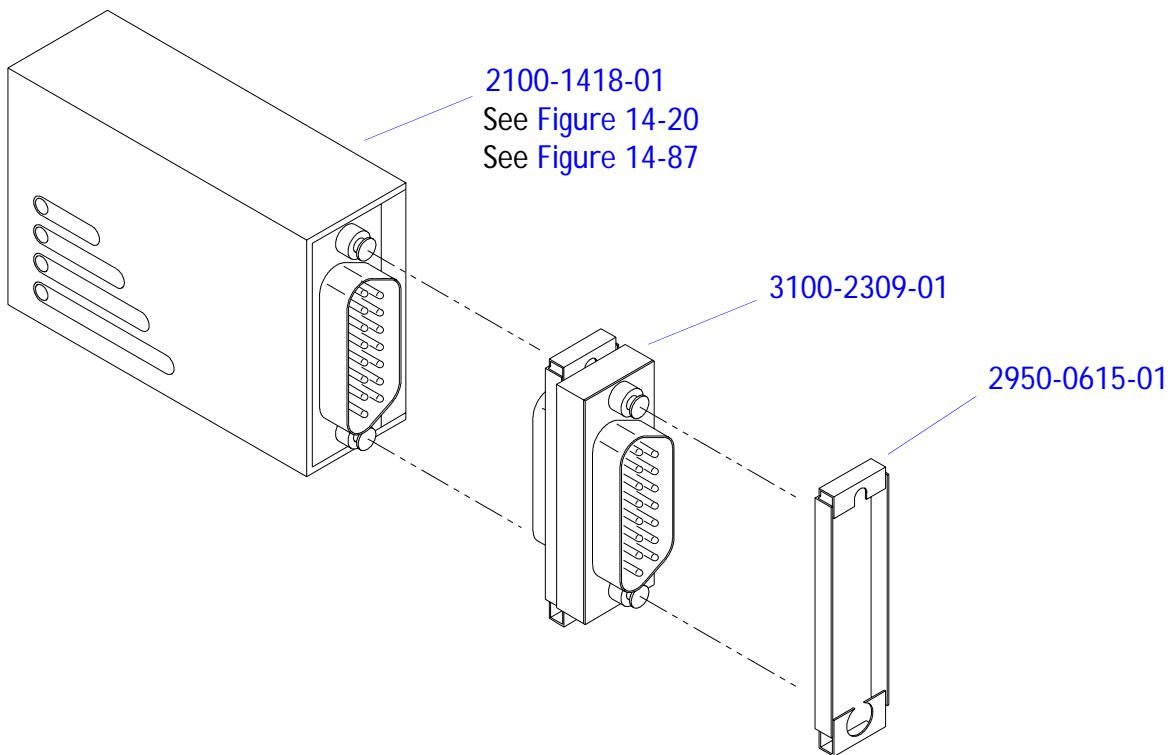
**System View**

Figure 14-50

Cable Drape Assembly

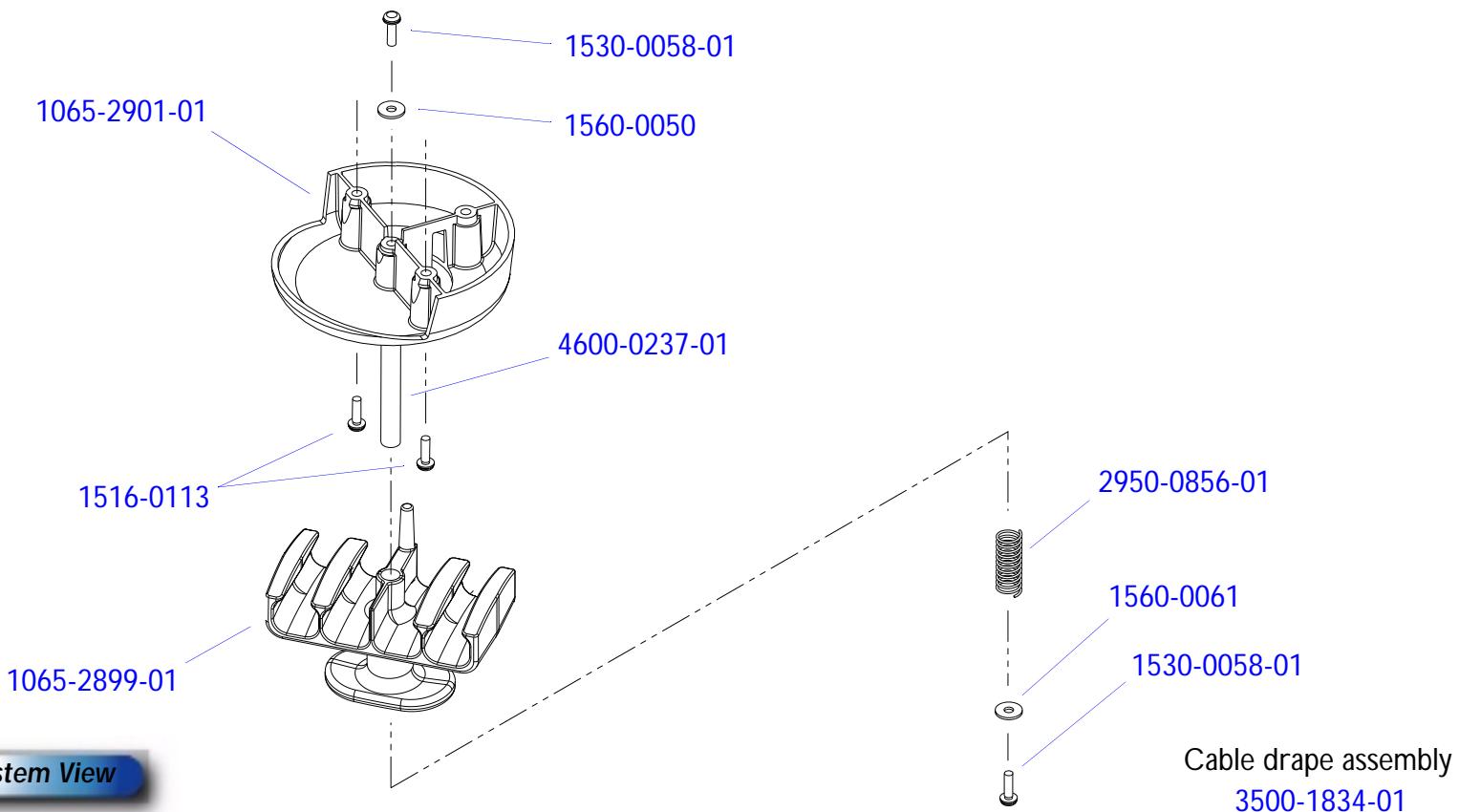


Figure 14-51

OEM Remote Tray Assembly (ISEM)

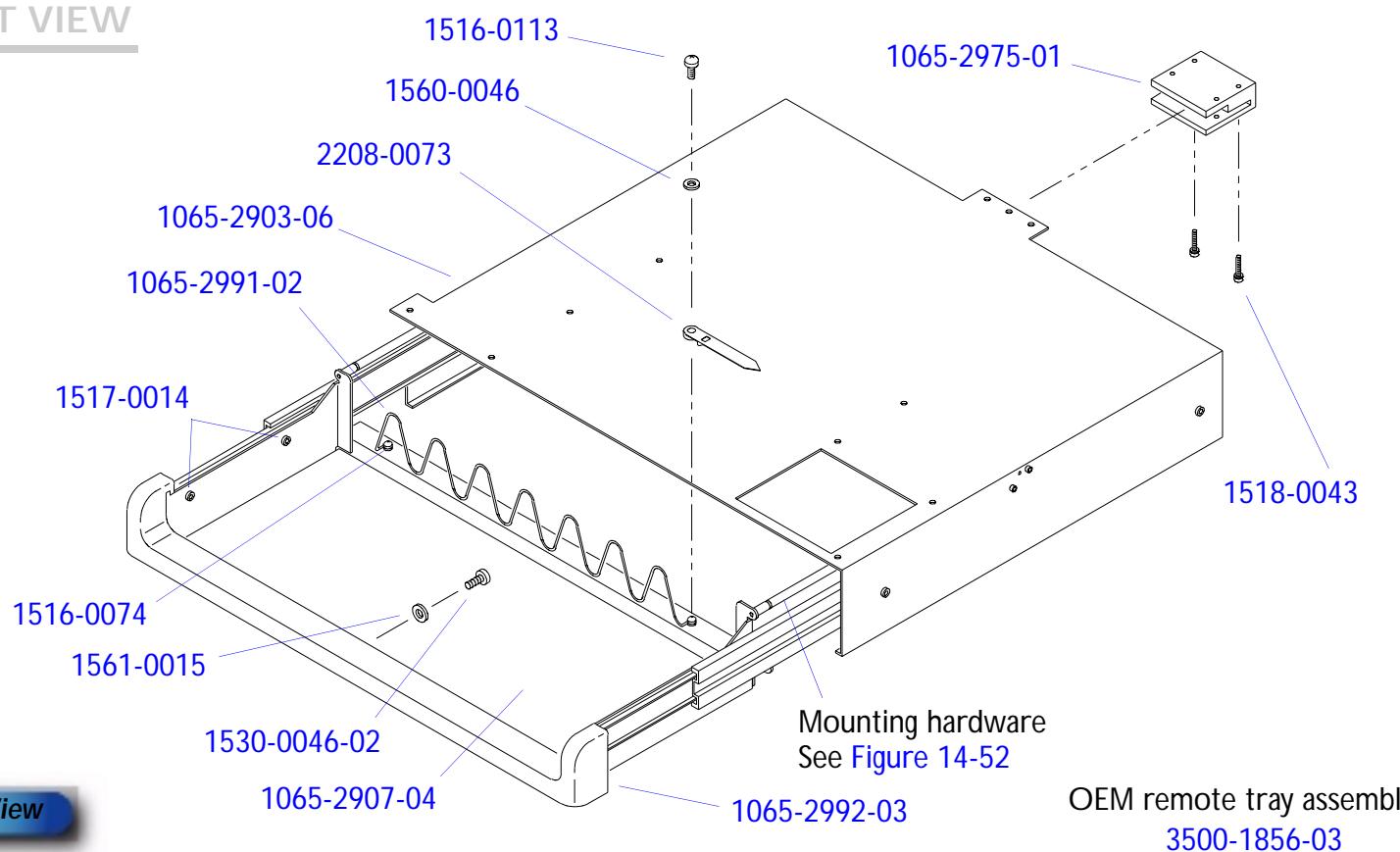
PARENT VIEW**System View**

Figure 14-52

OEM Remote Tray Mounting Hardware

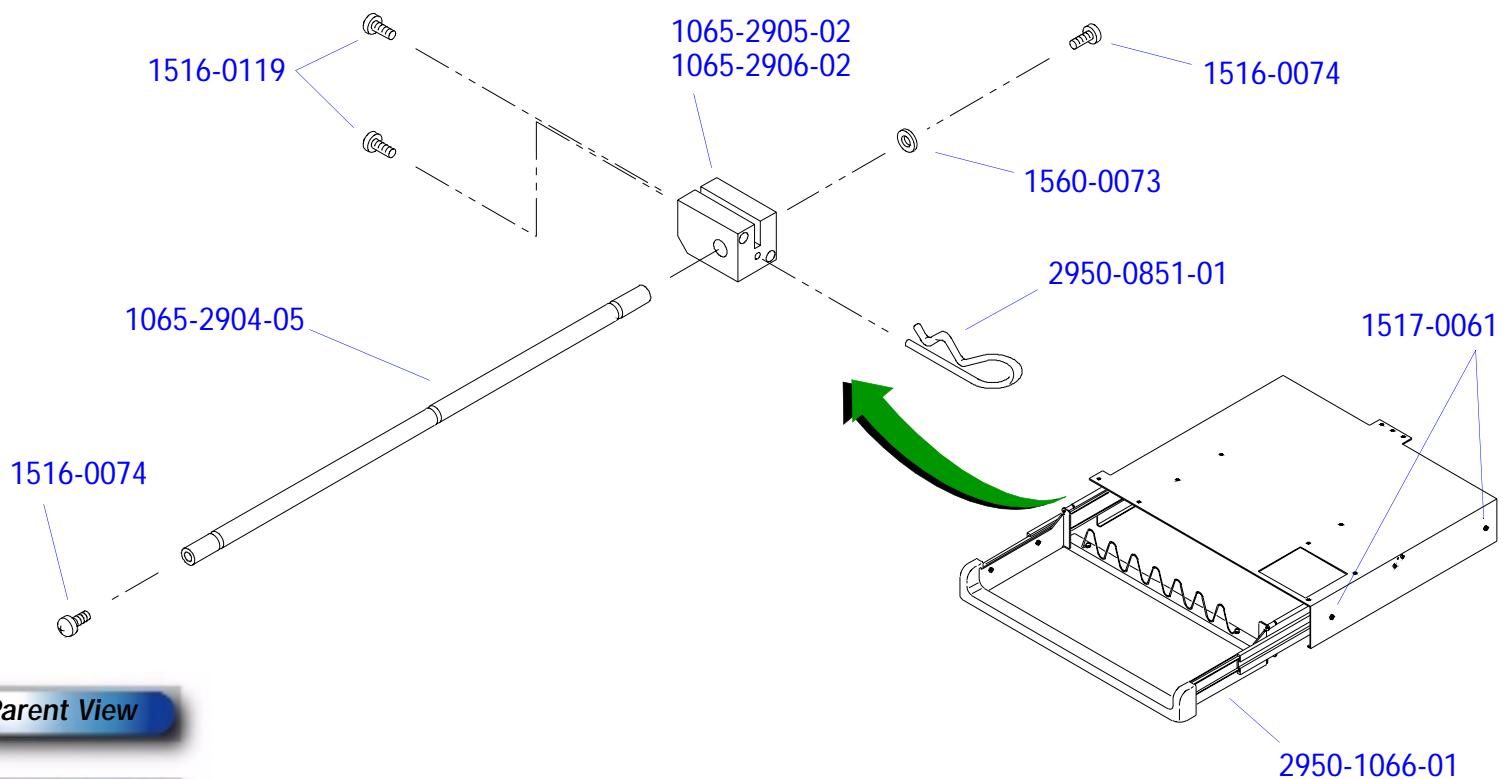
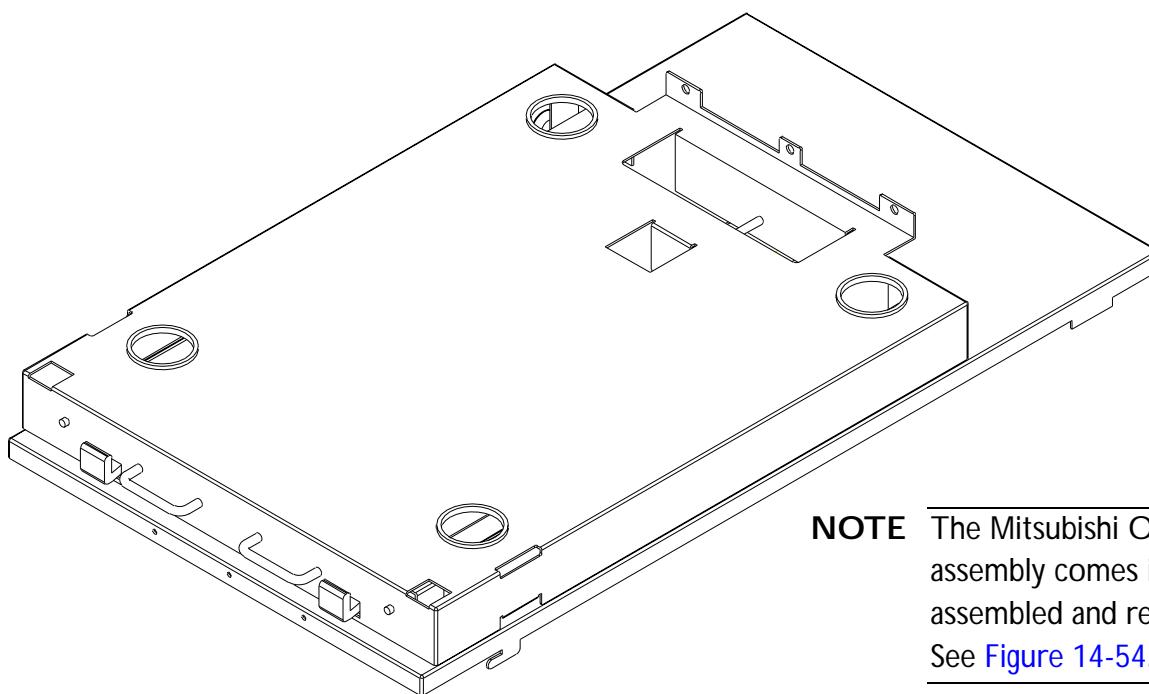
**Parent View****System View**

Figure 14-53

Mitsubishi CP700/800 OEM Tray Assembly



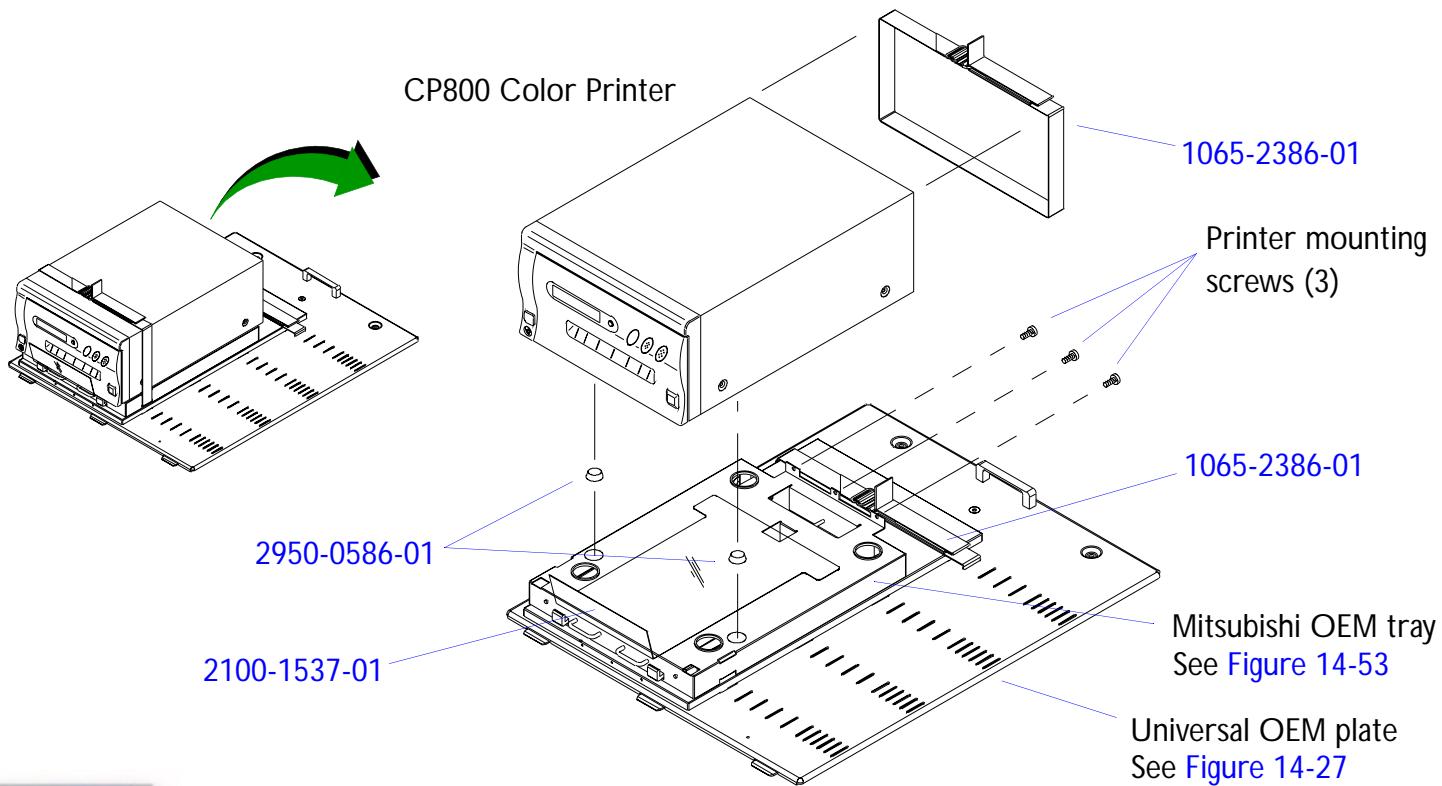
NOTE The Mitsubishi OEM tray assembly comes in a kit fully assembled and ready to install, See [Figure 14-54](#).

System View

Mitsubishi OEM tray assembly
2100-1743-01

Figure 14-54

Mitsubishi CP700/800 OEM "Printer-to-Tray" Hardware

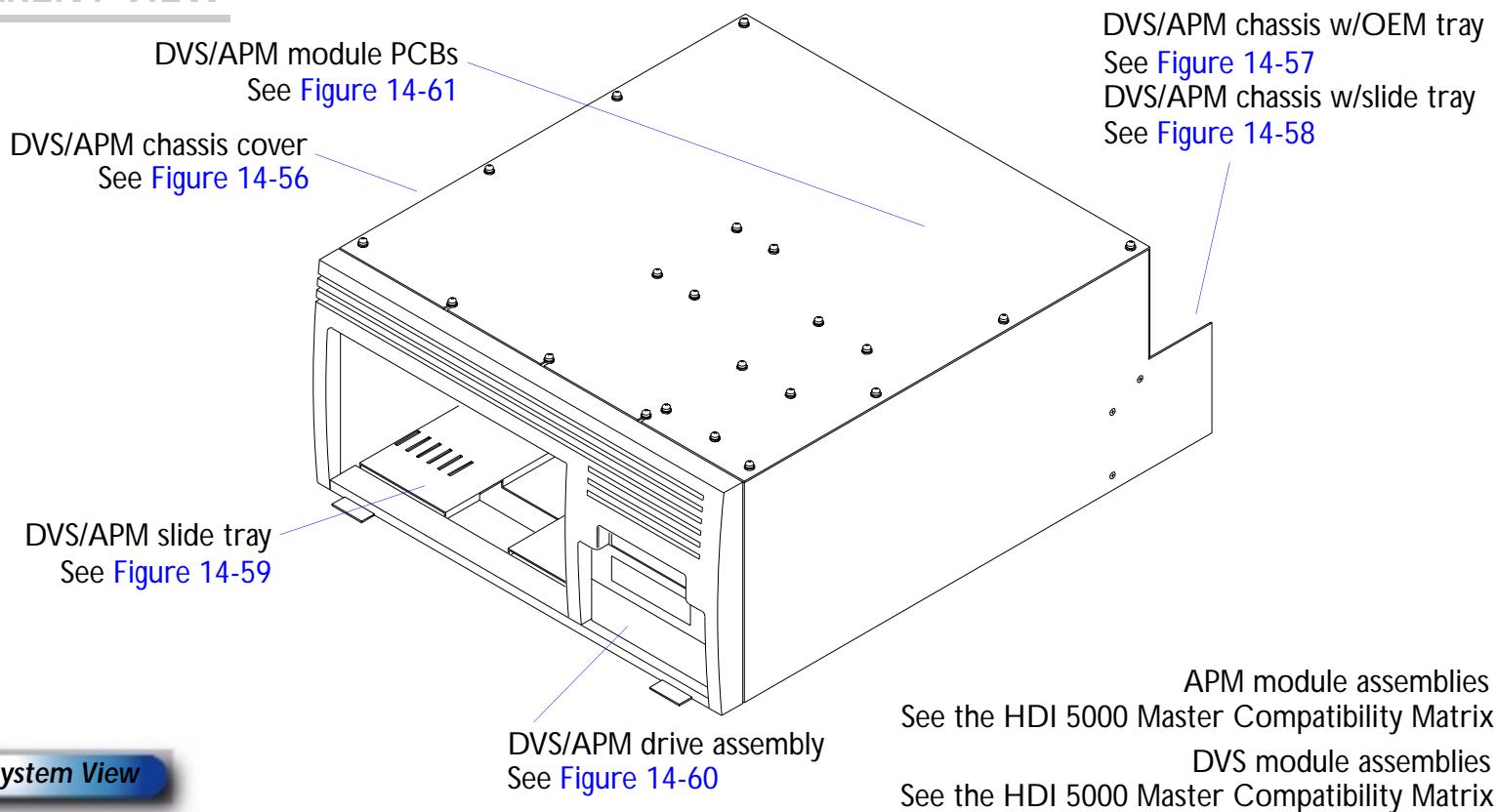


System View

Figure 14-55

DVS/APM Module Assembly

PARENT VIEW



System View

Figure 14-56

DVS/APM Module Assembly (Chassis Cover)

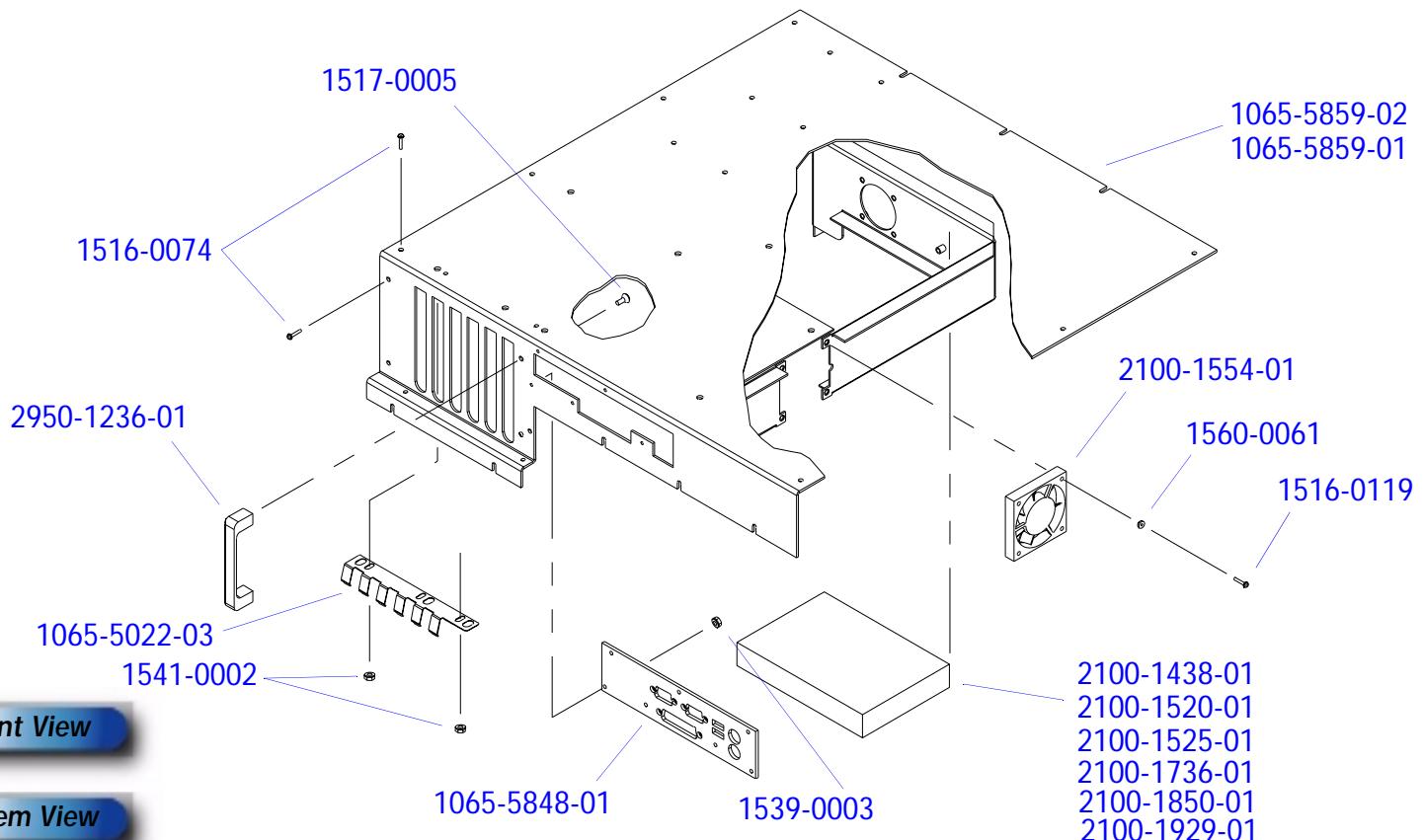
**Parent View****System View**

Figure 14-57

DVS/APM Module Assembly (Chassis with OEM Tray)

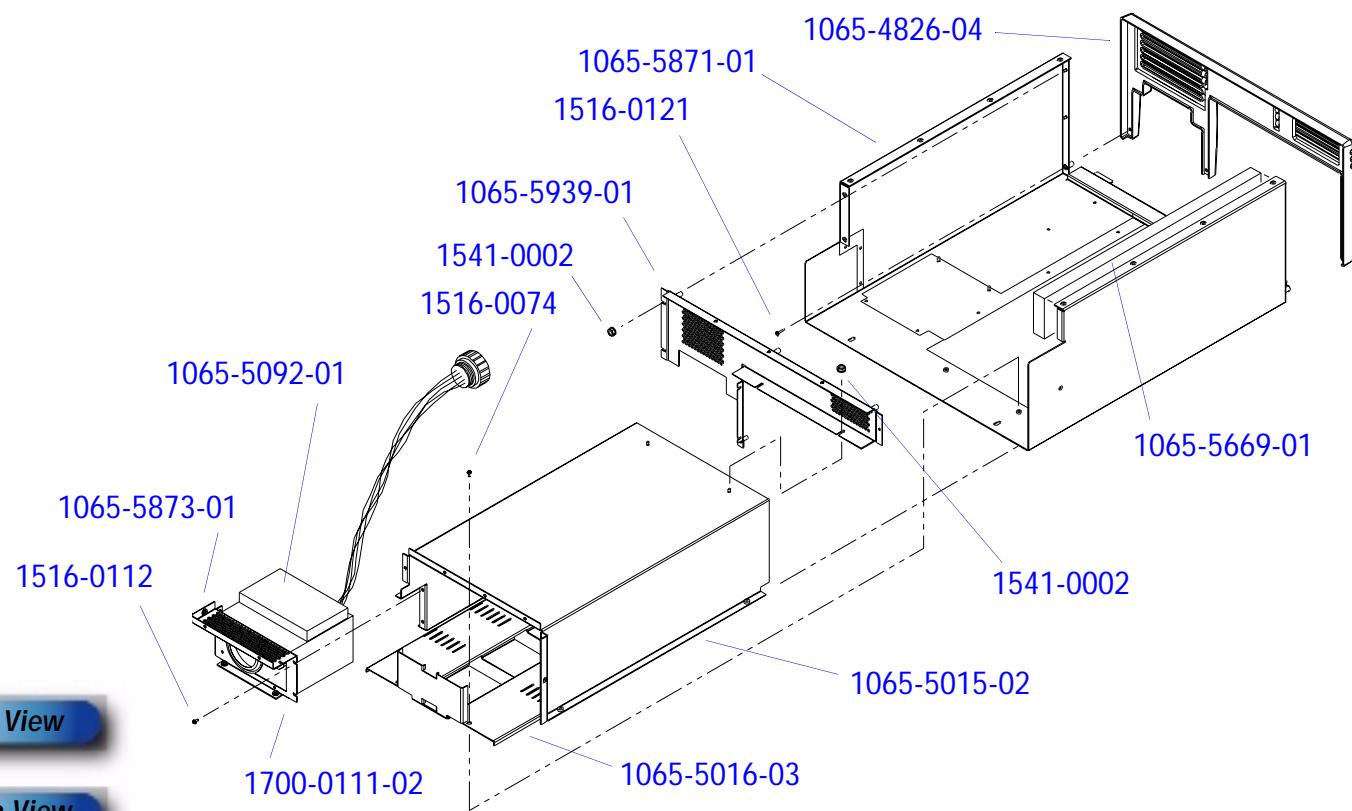


Figure 14-58

DVS/APM Module Assembly (Chassis with Slide Tray)

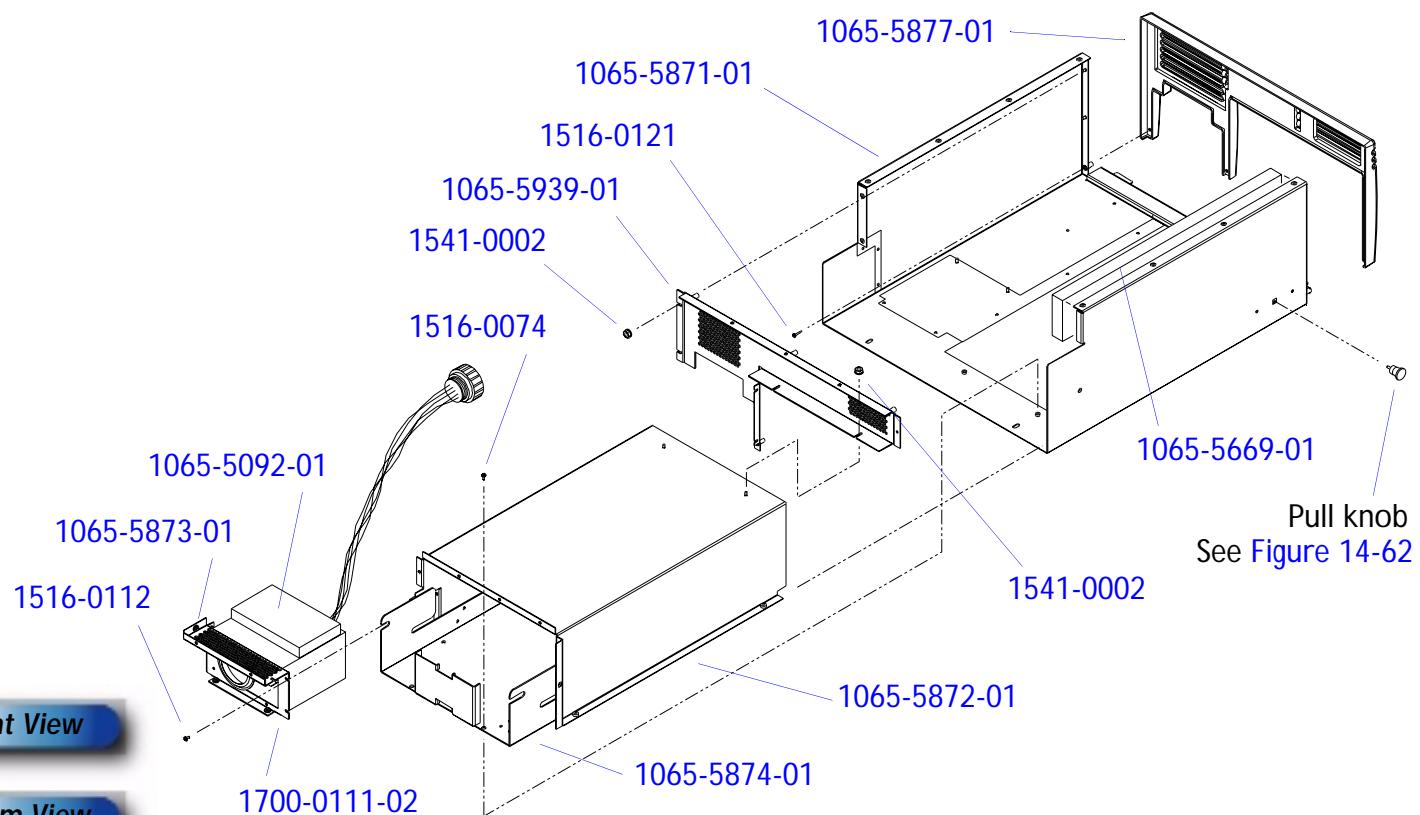


Figure 14-59

DVS/APM Module Slide Tray

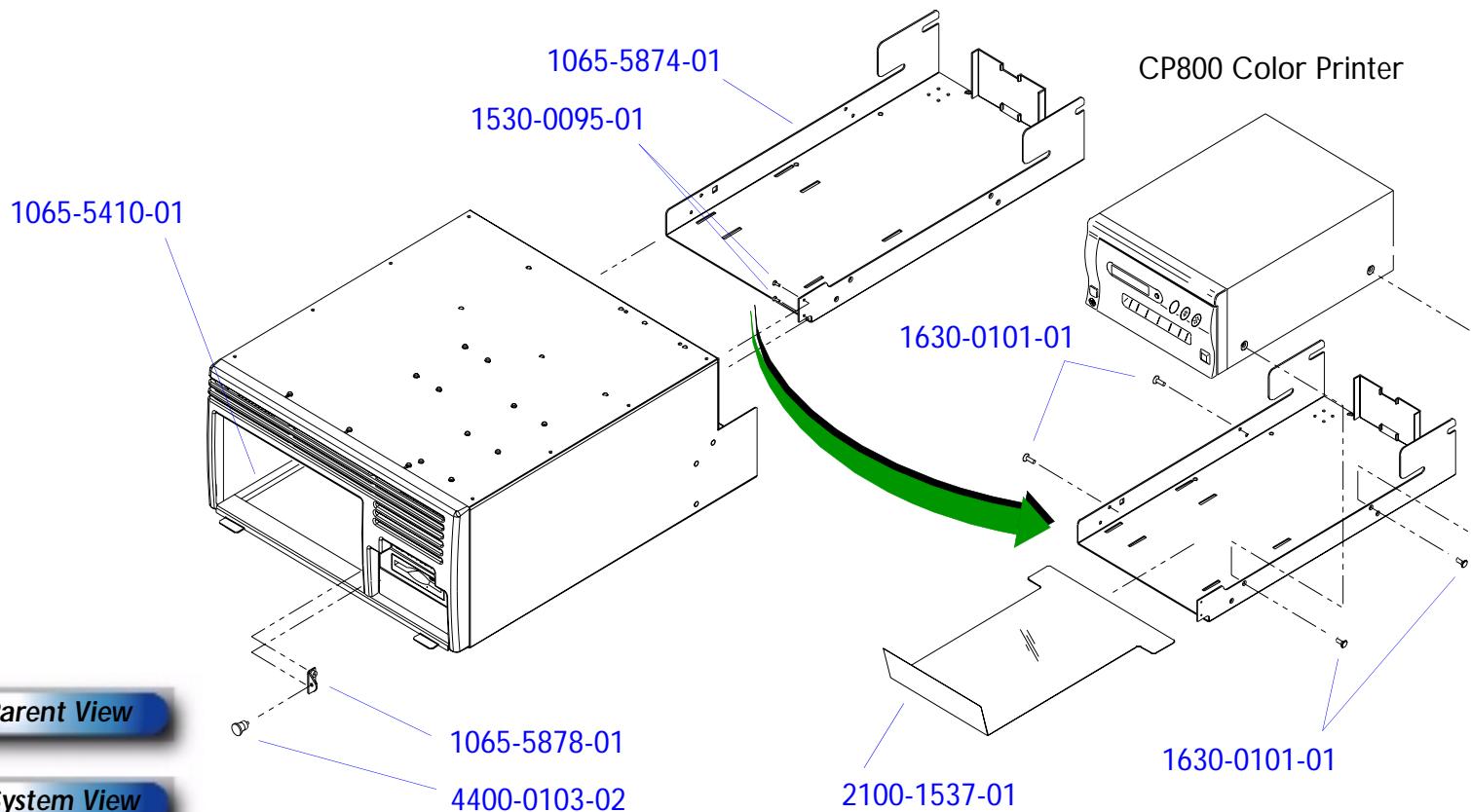


Figure 14-60

DVS/APM 1.0 Module Drive Assembly

Check Dependency Kits for drive mtg hardware

8000-2575-01
8000-2573-01

See the HDI 5000
Master
Compatibility
Matrix

Parent View

System View

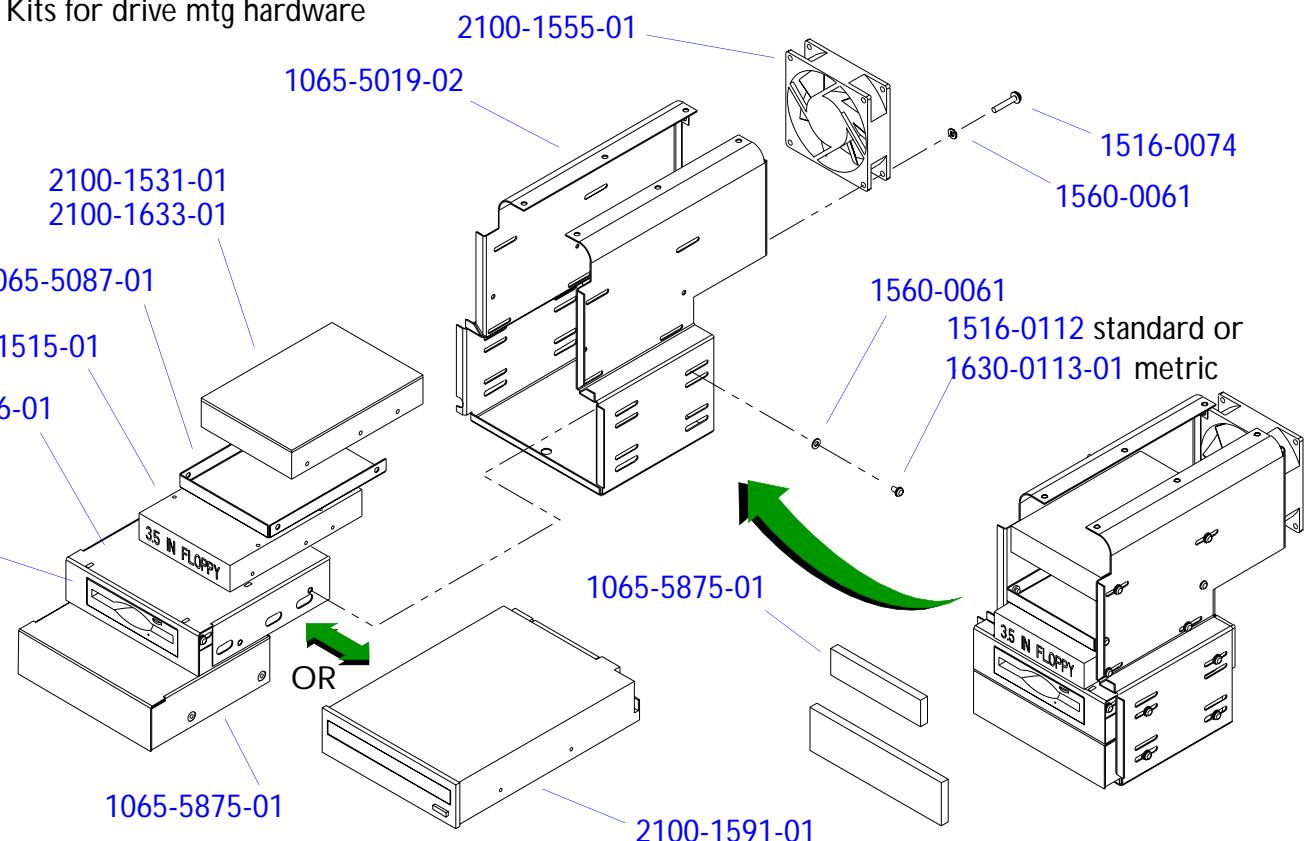
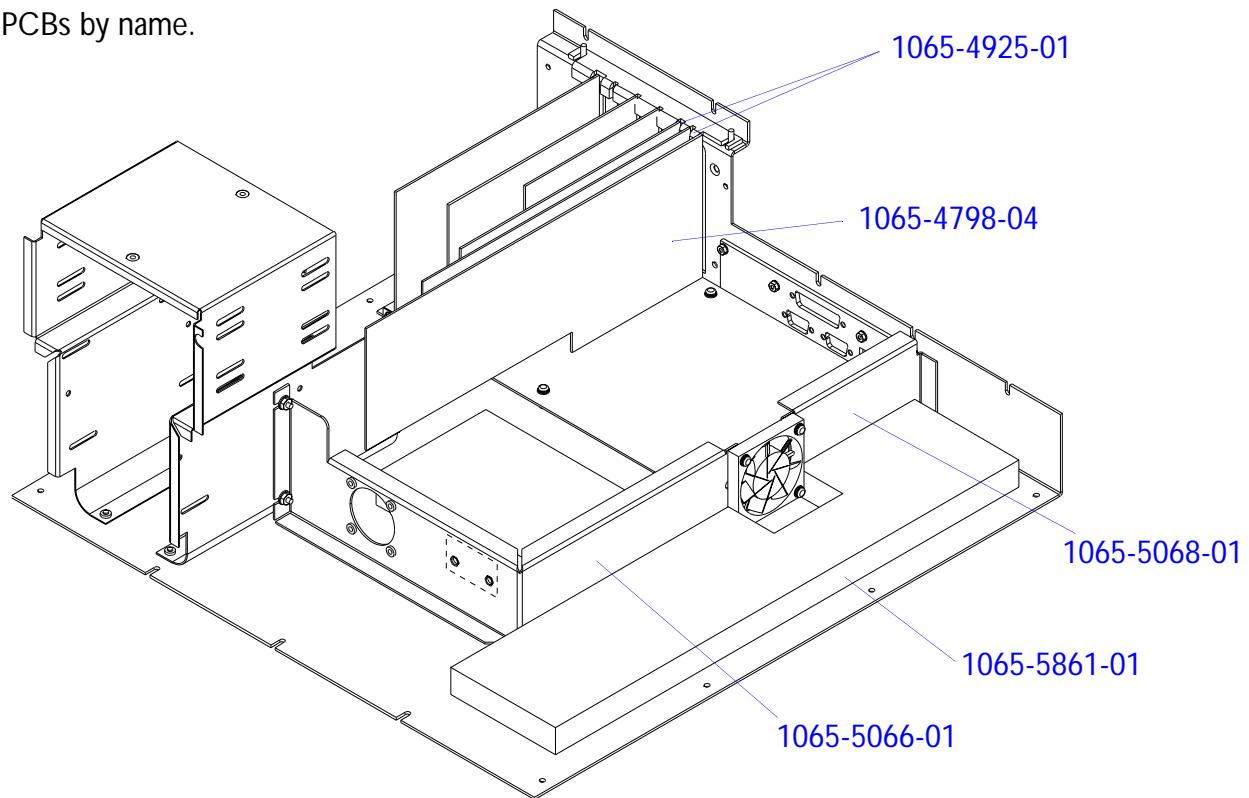


Figure 14-61

DVS/APM Module PCBs

See the Master Compatibility Matrix for part numbers.

See [Figure 16-34](#) for PCBs by name.

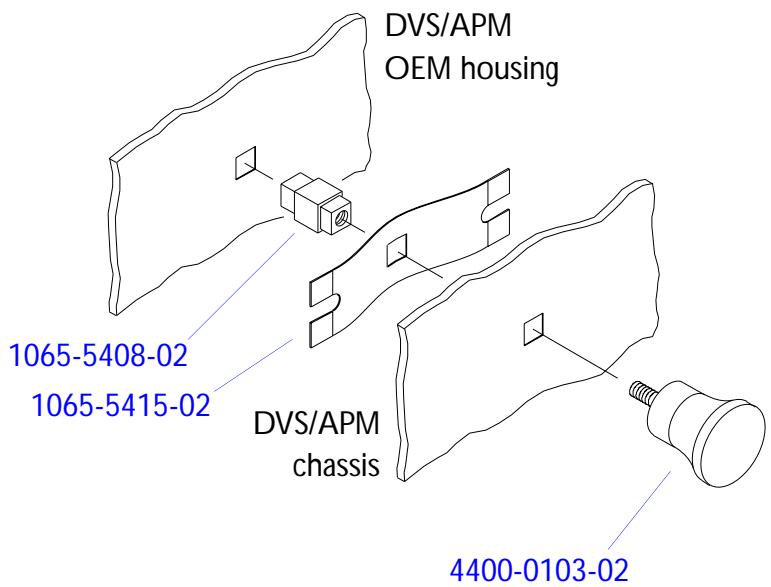
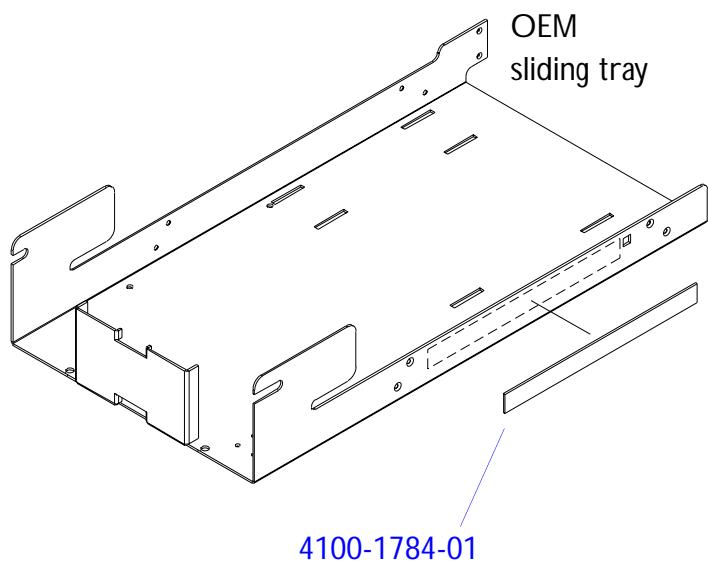


Parent View

System View

Figure 14-62

Slide Tray Pull Knob (DVS/APM Module)



Parent View

System View

Figure 14-63

System Casters, Swivel Type (Front and Rear)

Front caster assembly

2950-0657-09 (Light gray)

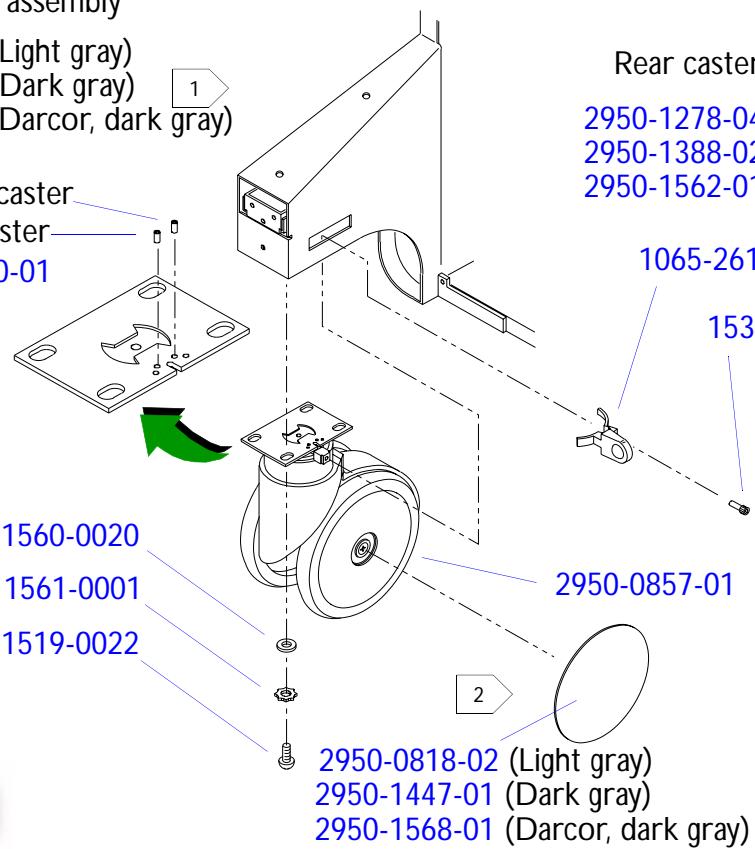
2950-1389-02 (Dark gray)

2950-1564-01 (Darcor, dark gray)

Right side caster

Left side caster

1530-0360-01



Rear caster assembly

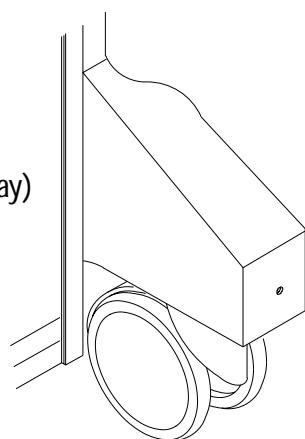
2950-1278-04 (Light gray)

2950-1388-02 (Dark gray)

2950-1562-01 (Darcor, dark gray)

1065-2611-02

1530-0347-01



1 Can mix and match new style Darcor casters with old style casters. May also use light gray casters from Figure 14-98.

2 Darcor casters come with hubcaps. The old style caster does not.

System View

Figure 14-64

System Casters, Axle Type (Rear)

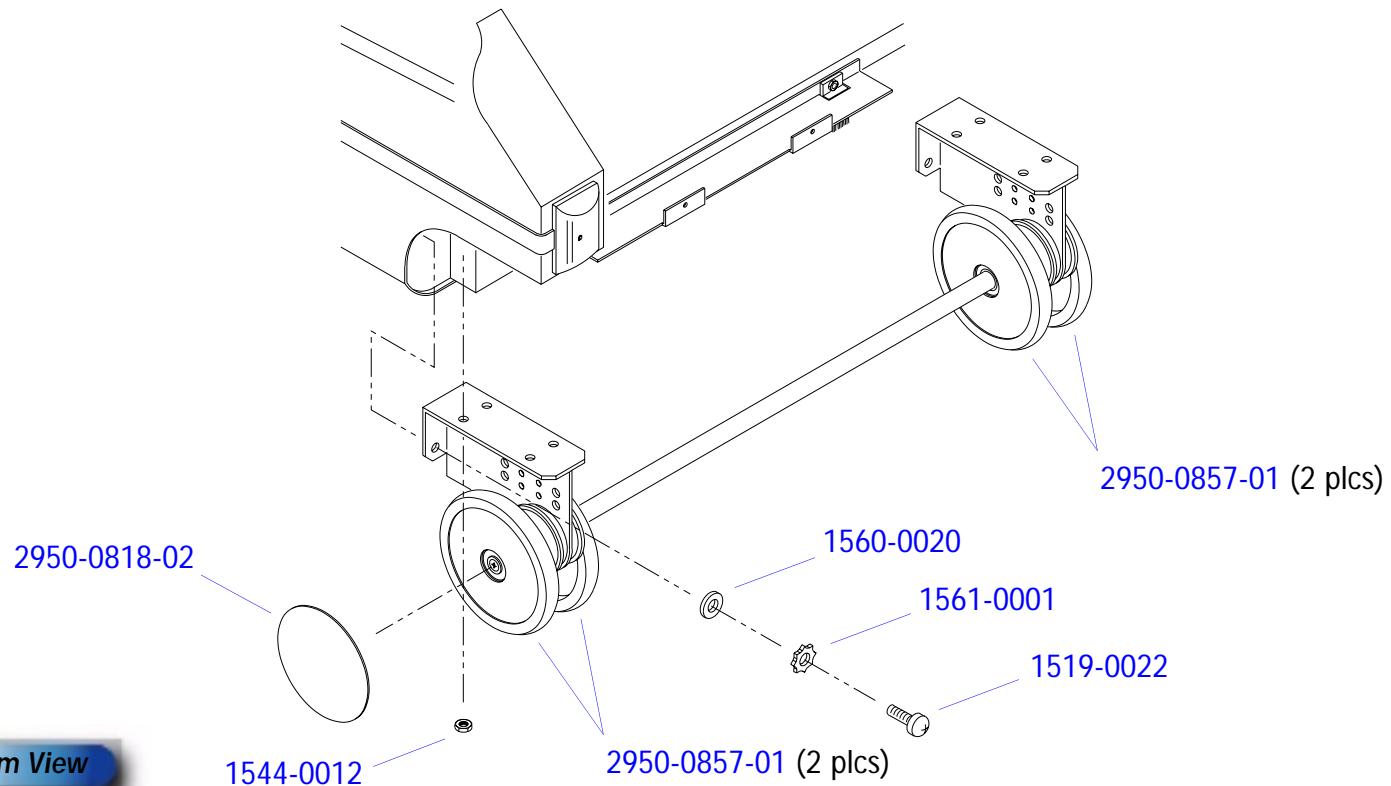
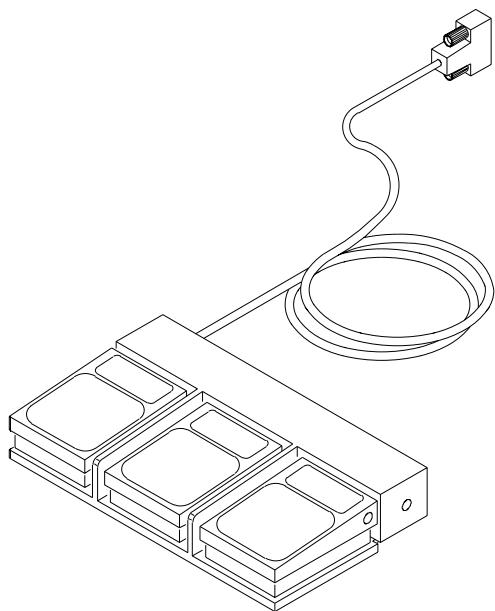


Figure 14-65

Footswitch Assemblies



Footswitch assembly
3300-0312-01

Classic Map

Philips Map

Footswitch assembly
3500-1461-02

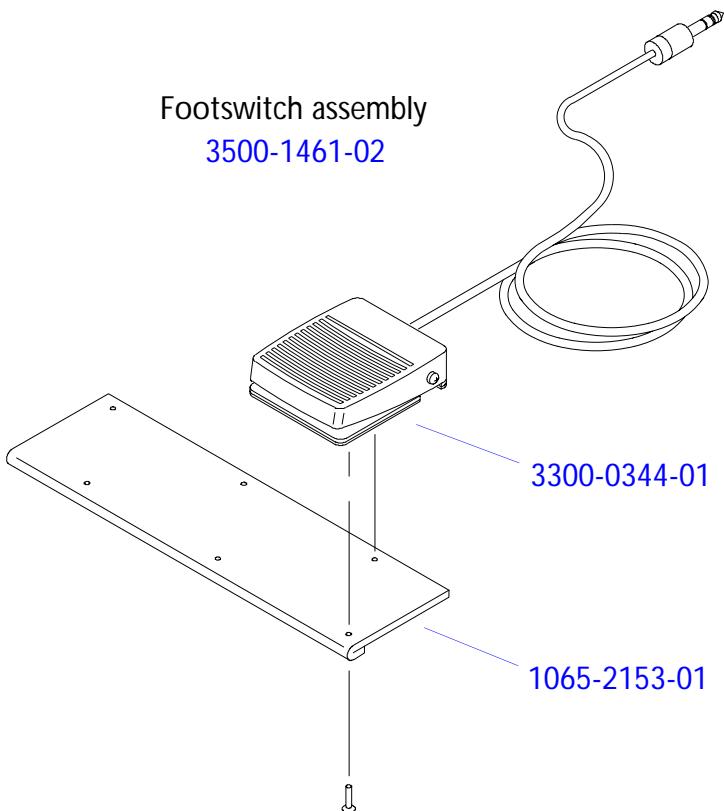


Figure 14-66

Labeling, Upper System

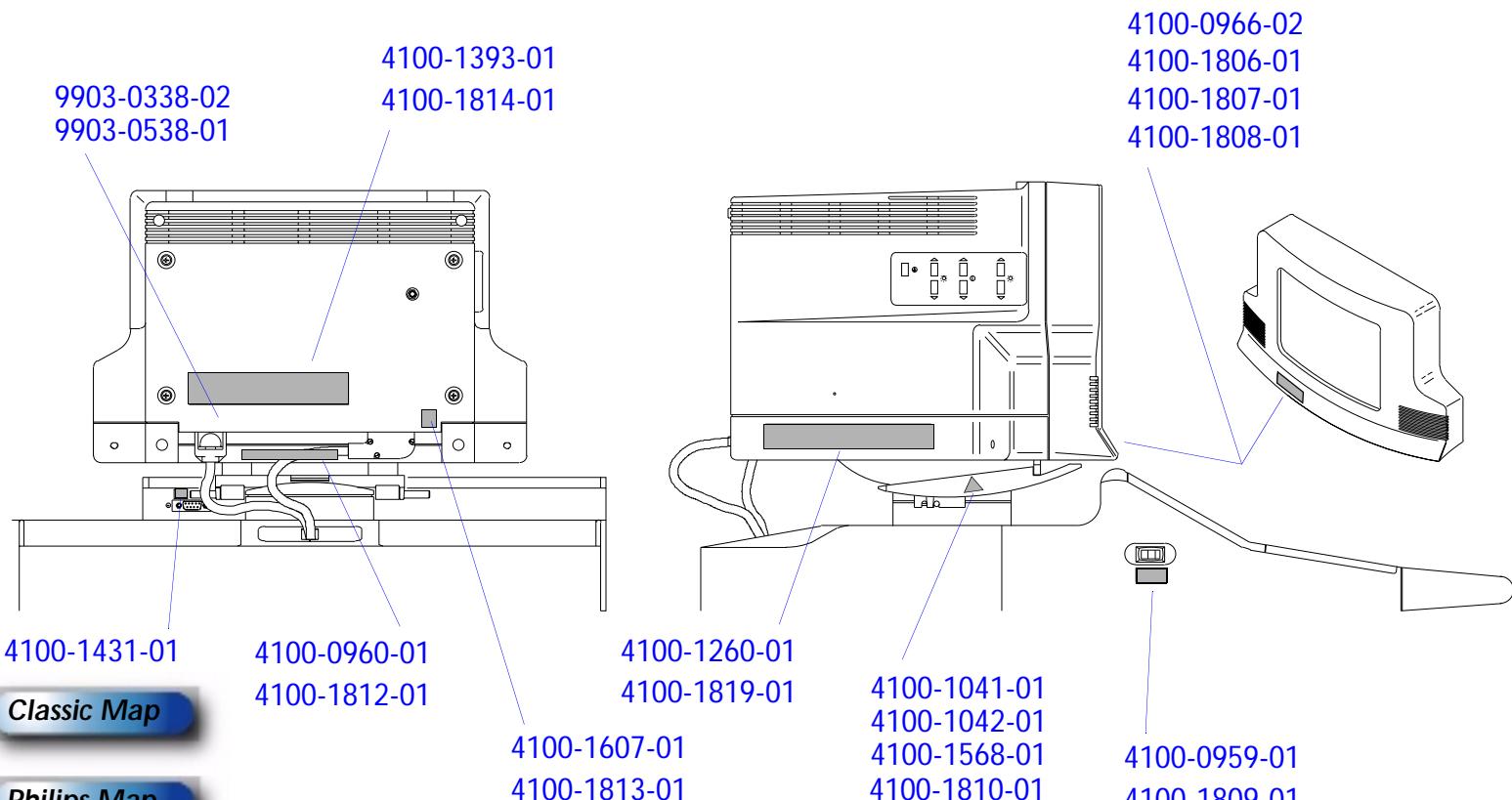


Figure 14-67

Labeling, Mid System

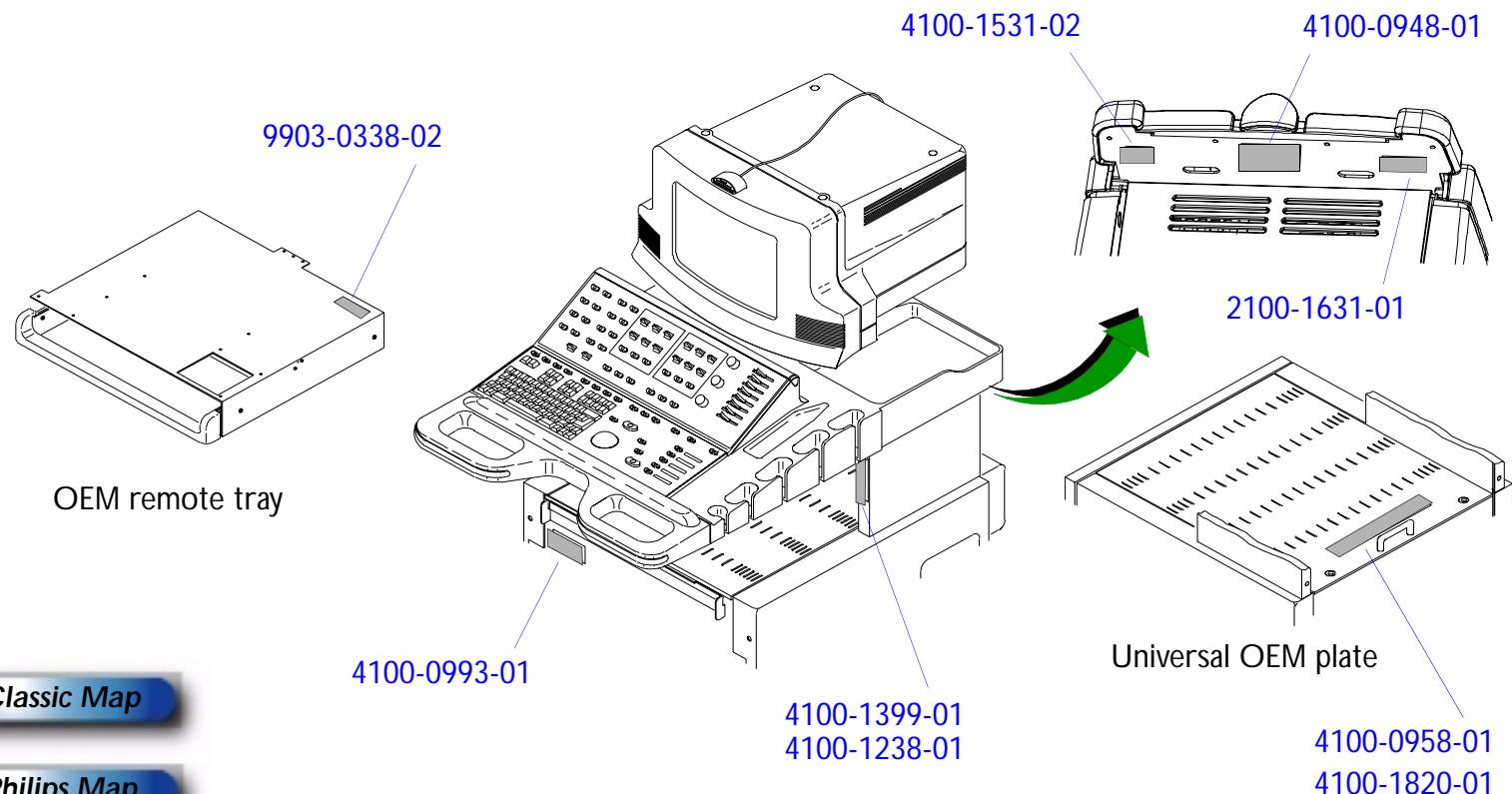
**Classic Map****Philips Map**

Figure 14-68

Labeling, Lower System

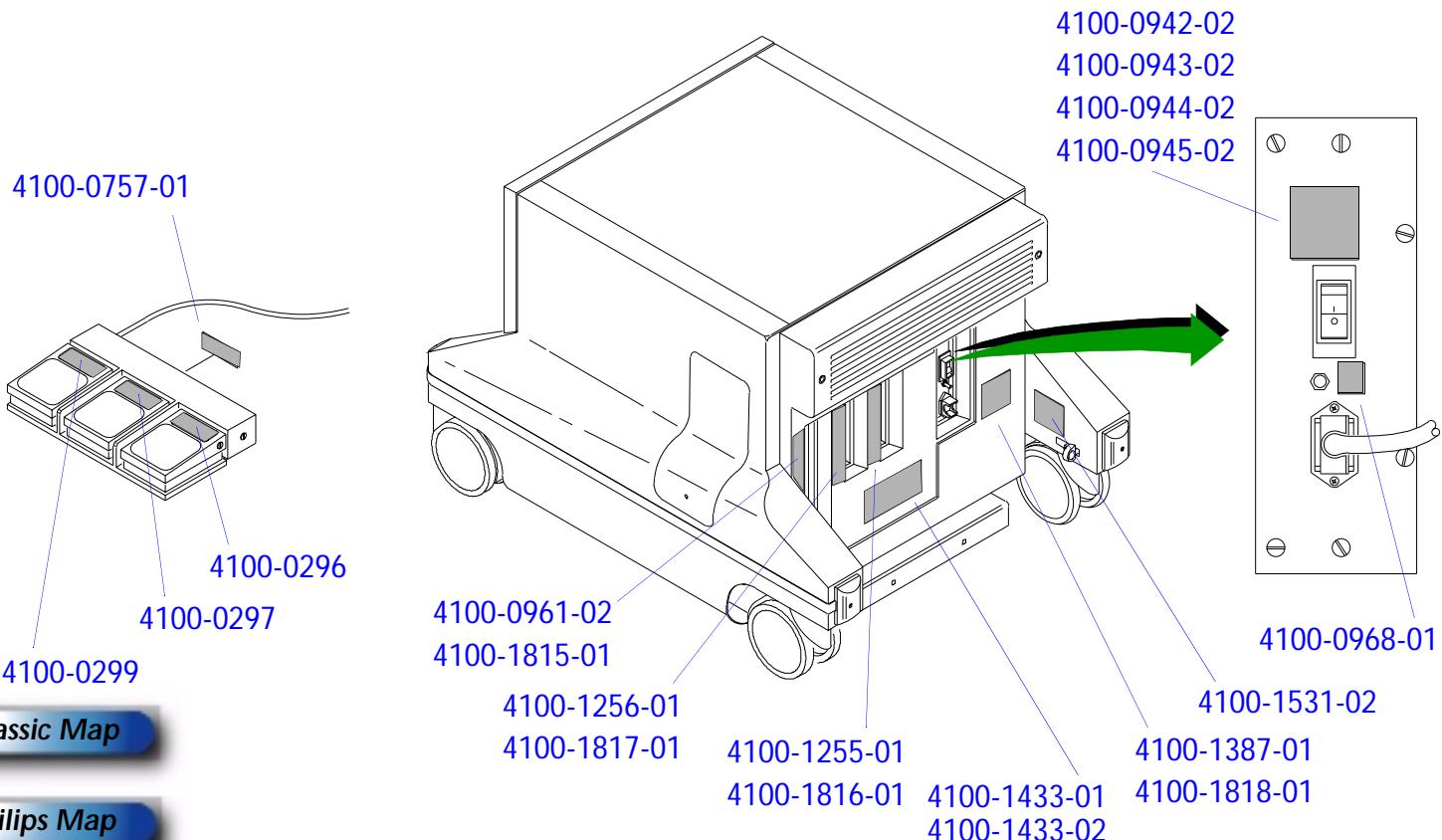


Figure 14-69

Philips HDI 5000 Ultrasound System Parts Locator Map (Front and Rear Ends)

SYSTEM VIEW

Video monitor
See [Figure 14-71](#)

Command module
See [Figure 14-79](#)

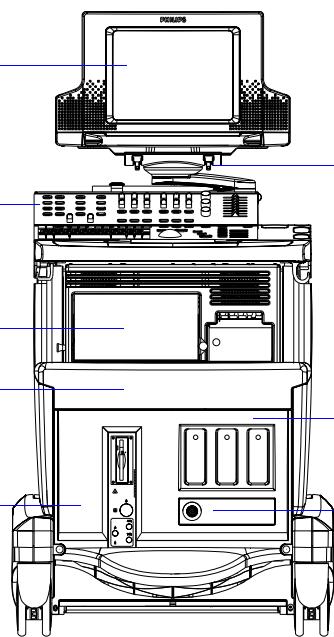
OEM bay
See

Enclosure covers
See [Figure 14-84](#)

Card cage
See [Figure 14-9](#)

Parts List

Classic Map

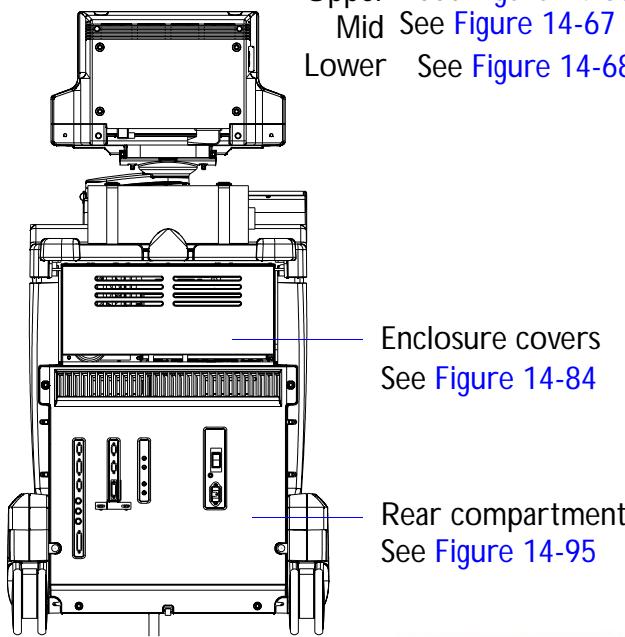


- Front -

Monitor arm
See [Figure 14-75](#)

Front compartment
See [Figure 14-7](#)

Footswitch
See [Figure 14-65](#)



- Rear -

System Labels

Upper See [Figure 14-66](#)

Mid See [Figure 14-67](#)

Lower See [Figure 14-68](#)

Enclosure covers
See [Figure 14-84](#)

Rear compartment
See [Figure 14-95](#)

Side Views

Figure 14-70

Philips HDI 5000 Ultrasound System Parts Locator Map (Left and Right Sides)

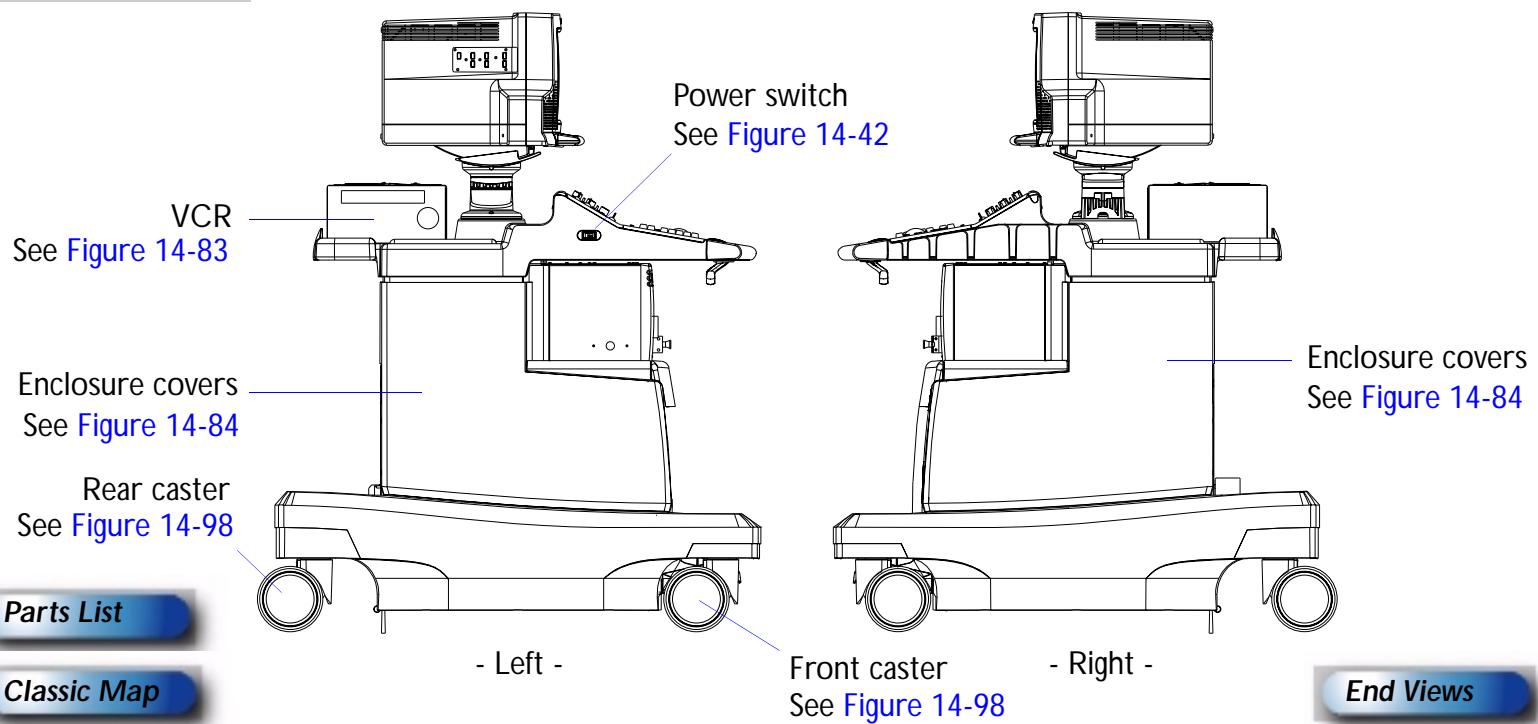
SYSTEM VIEW

Figure 14-71

Video Monitor Assembly, Philips HDI 5000

PARENT VIEW

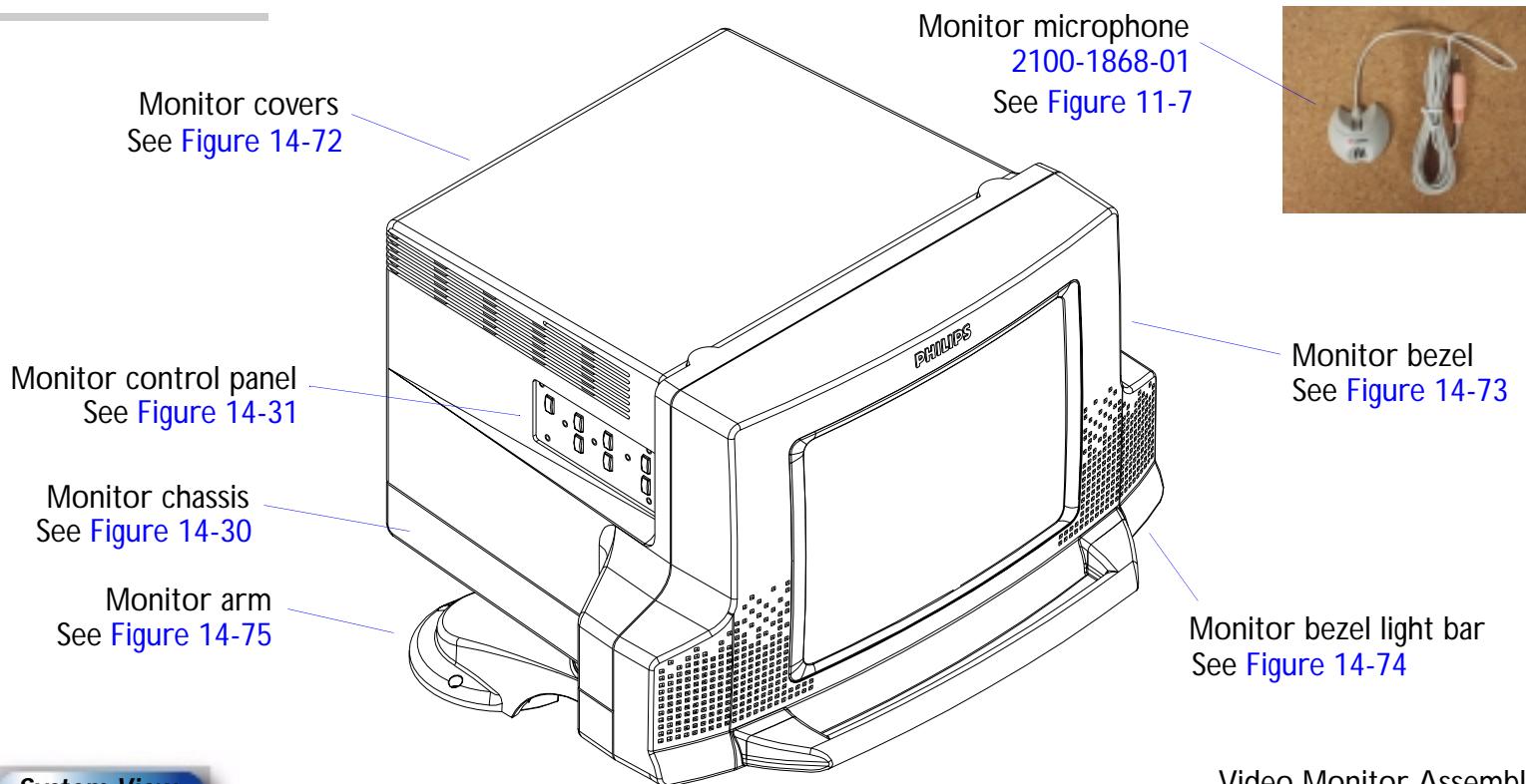


Figure 14-72

Video Monitor Covers, Philips HDI 5000

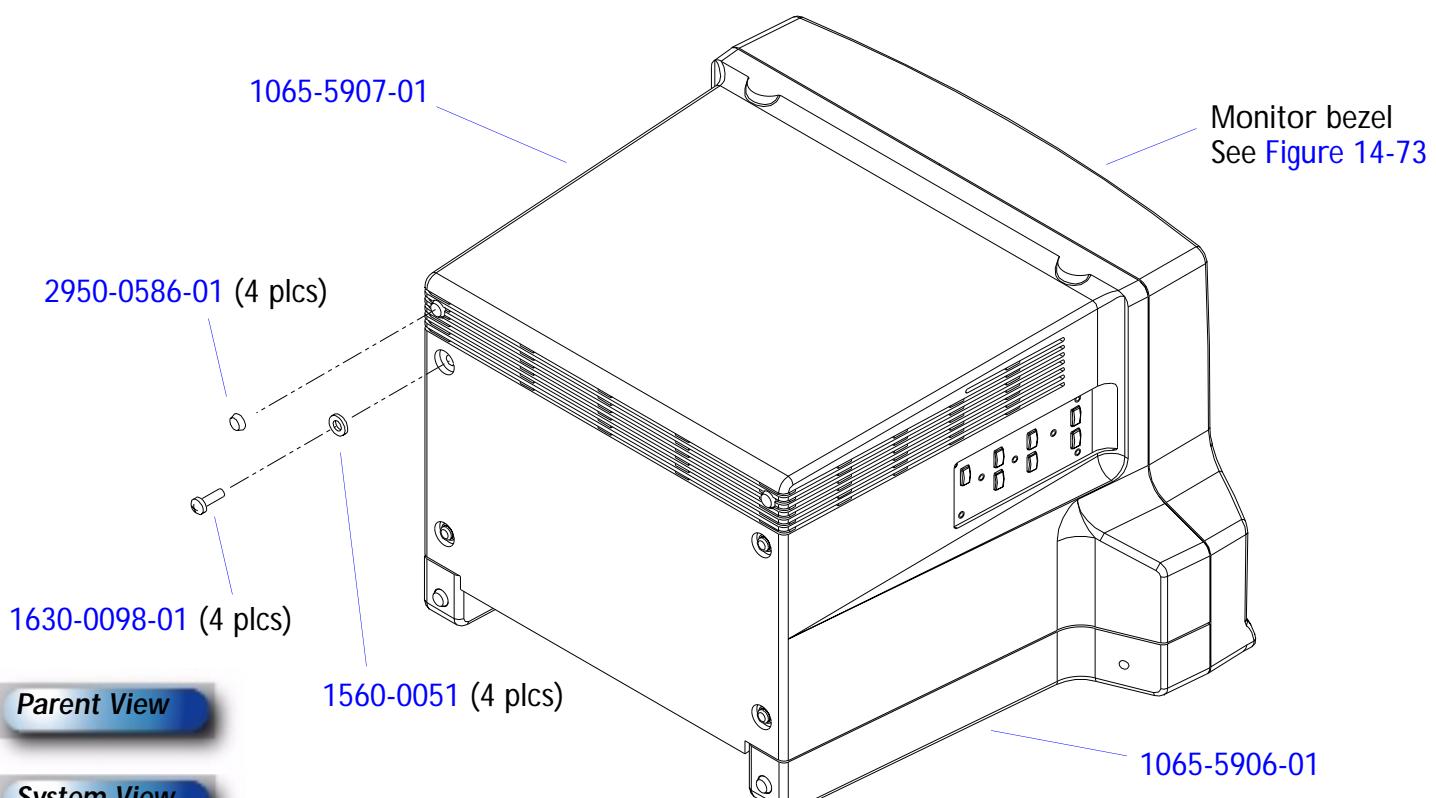


Figure 14-73

Video Monitor Bezel, Philips HDI 5000

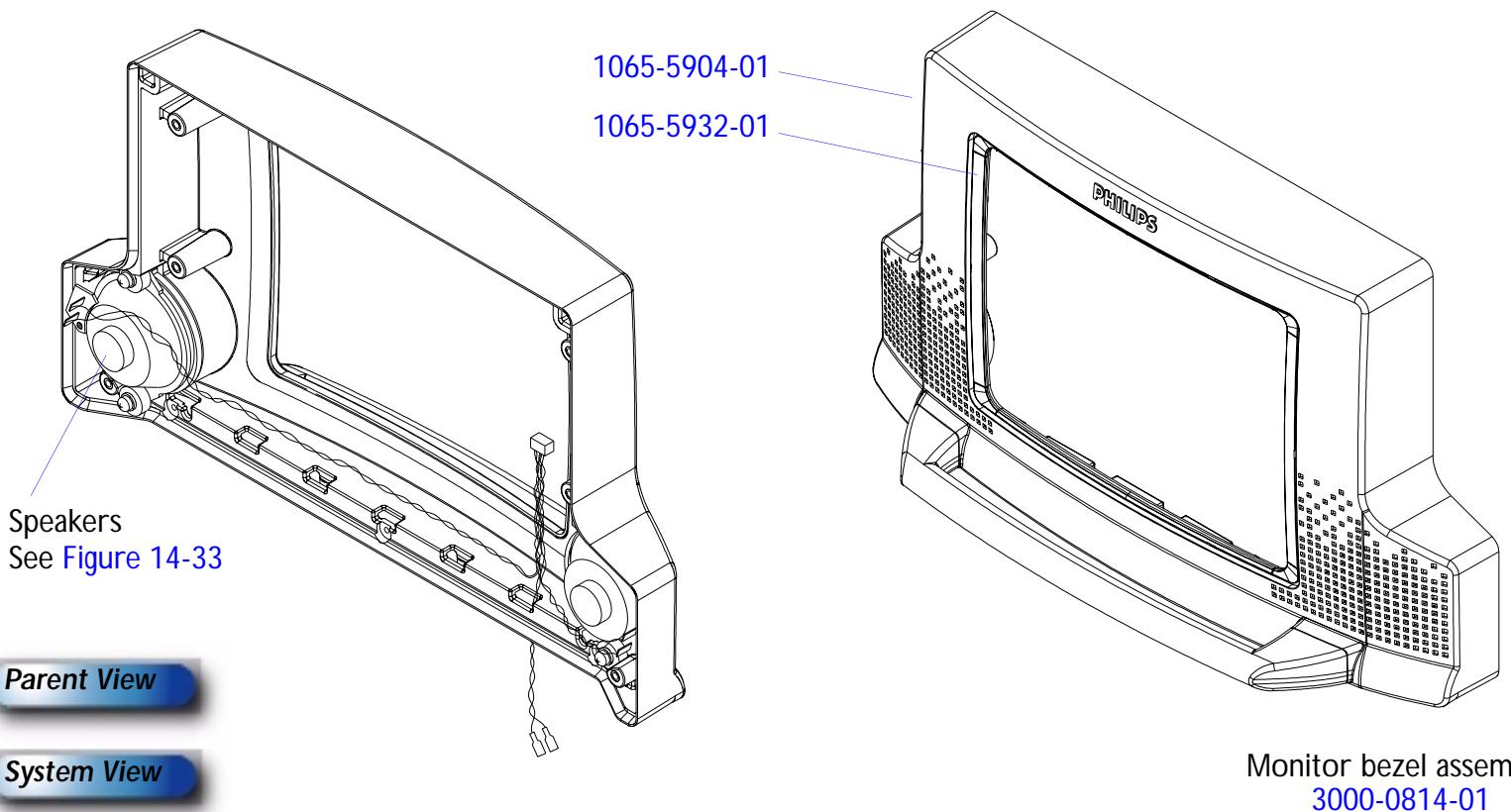


Figure 14-74

Video Monitor Bezel Light Bar, Philips HDI 5000

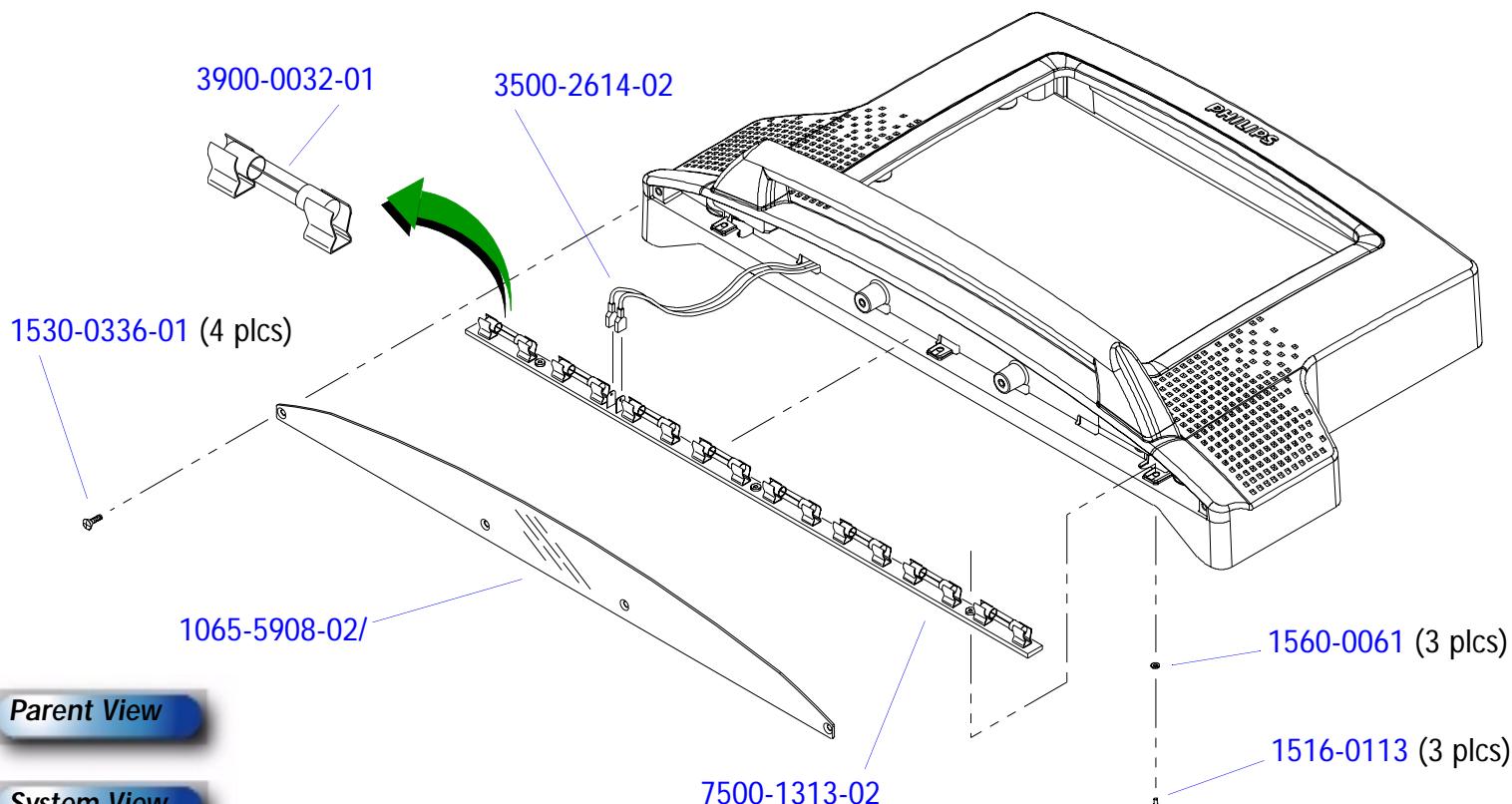
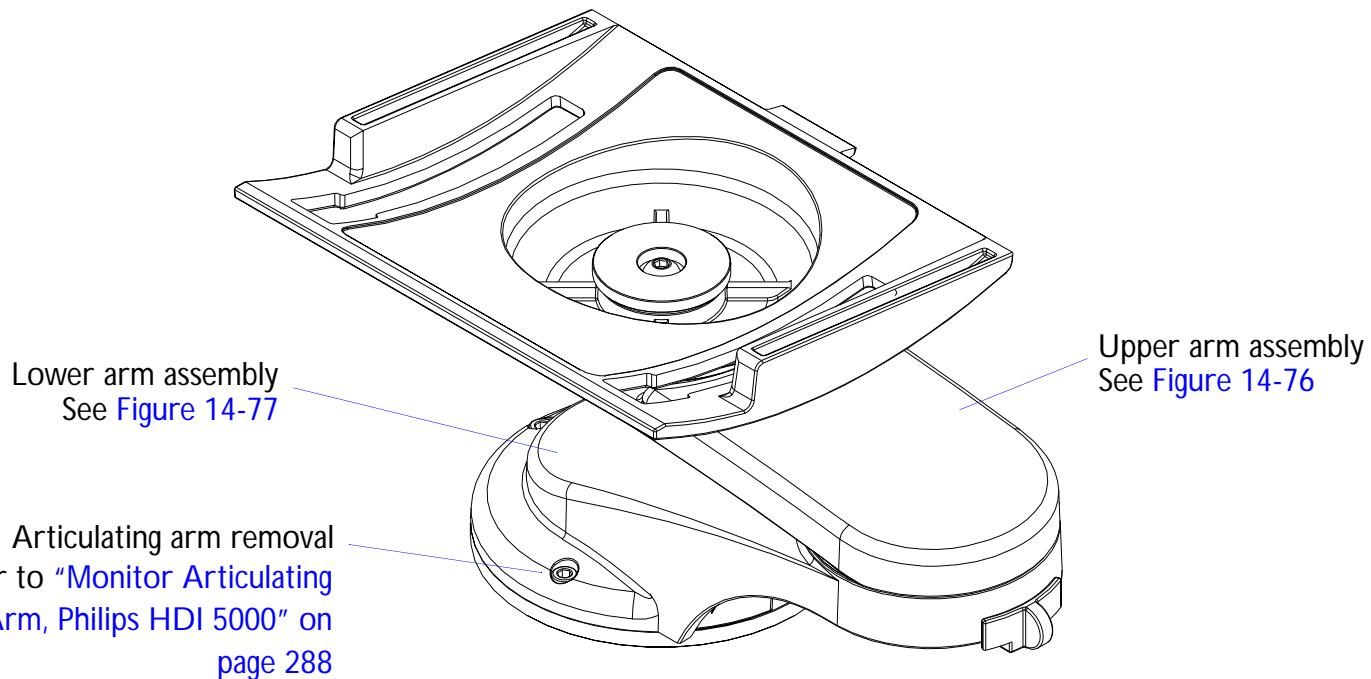
**Parent View****System View**

Figure 14-75

Monitor Articulating Arm Assembly, Philips HDI 5000

PARENT VIEW



System View

Articulating arm assembly
3500-3423-03

Figure 14-76

Monitor Articulating Arm Assembly (Upper), Philips HDI 5000

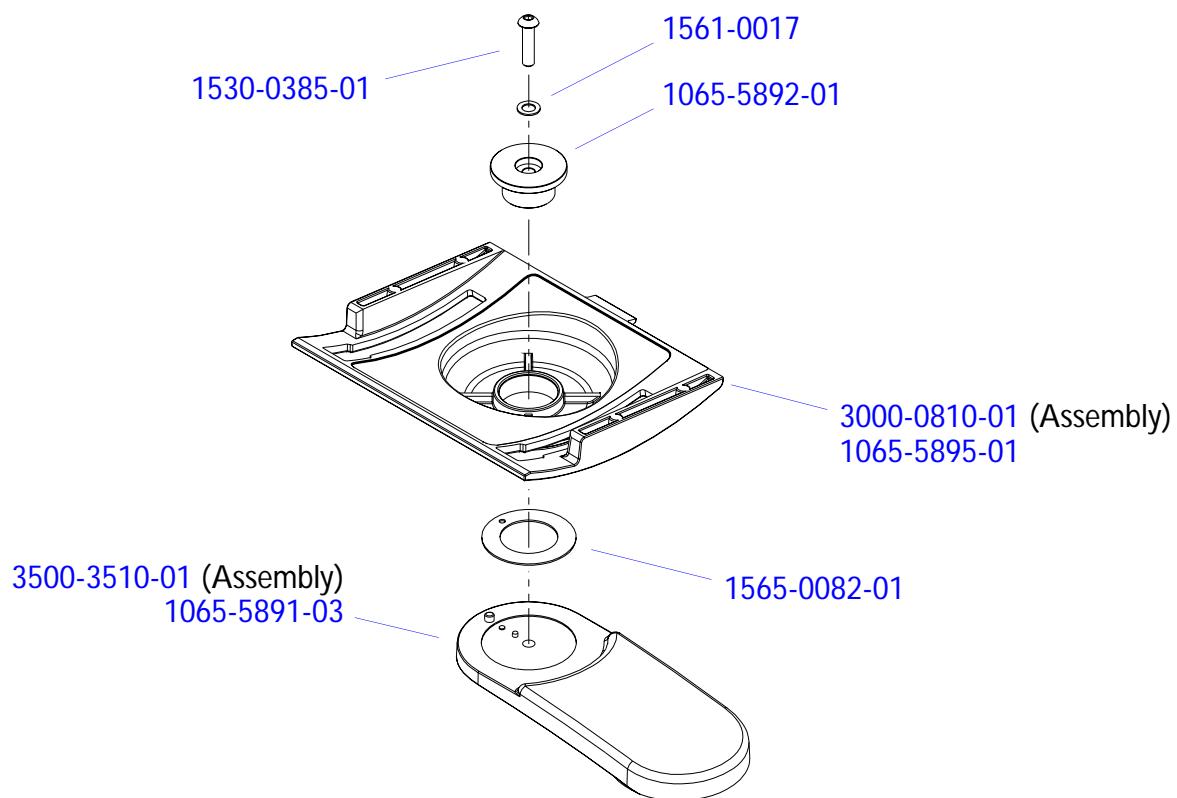
**Parent View****System View**

Figure 14-77

Monitor Articulating Arm Assembly (Lower), Philips HDI 5000

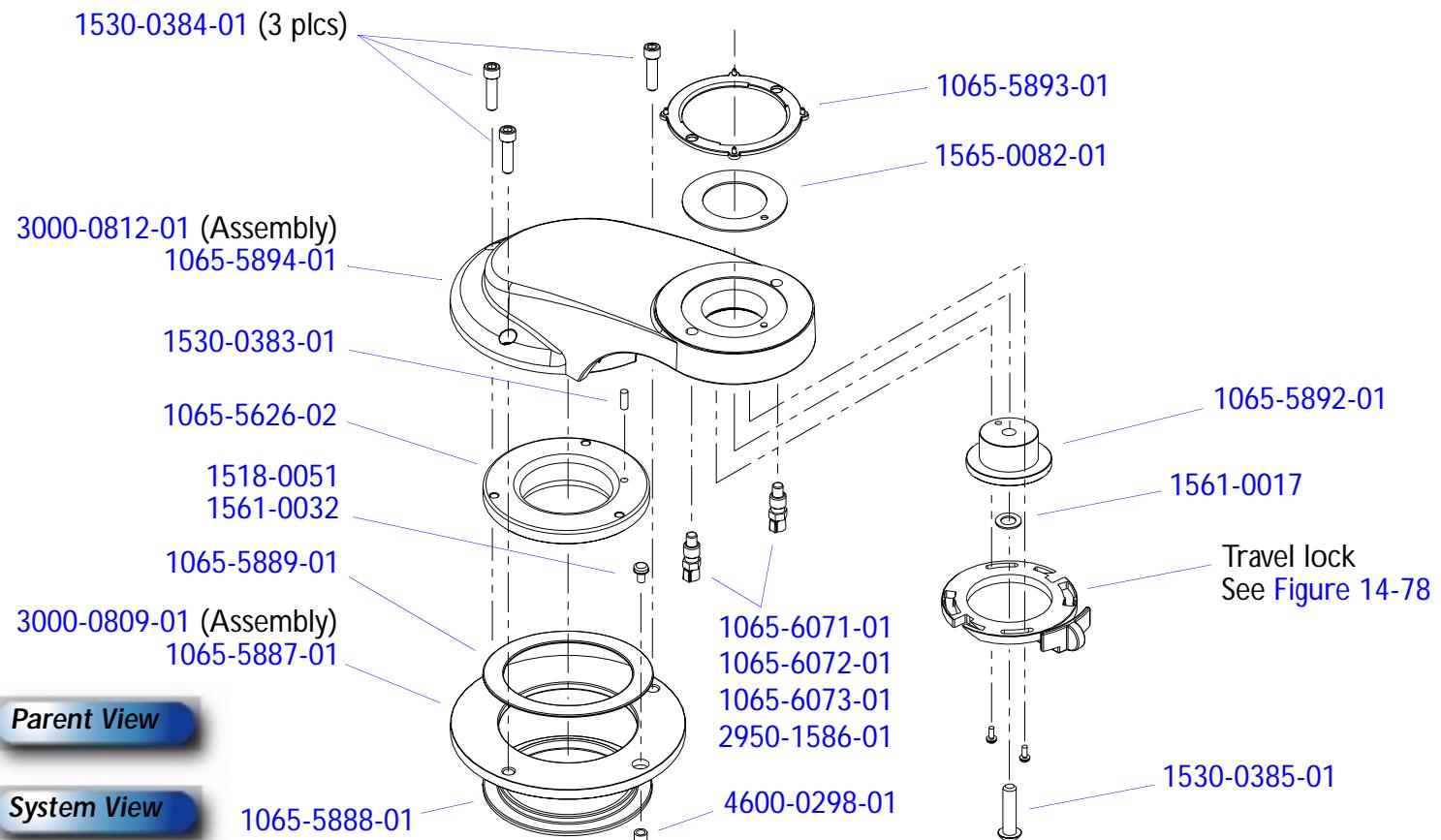


Figure 14-78

Articulating Arm Travel Lock, Philips HDI 5000

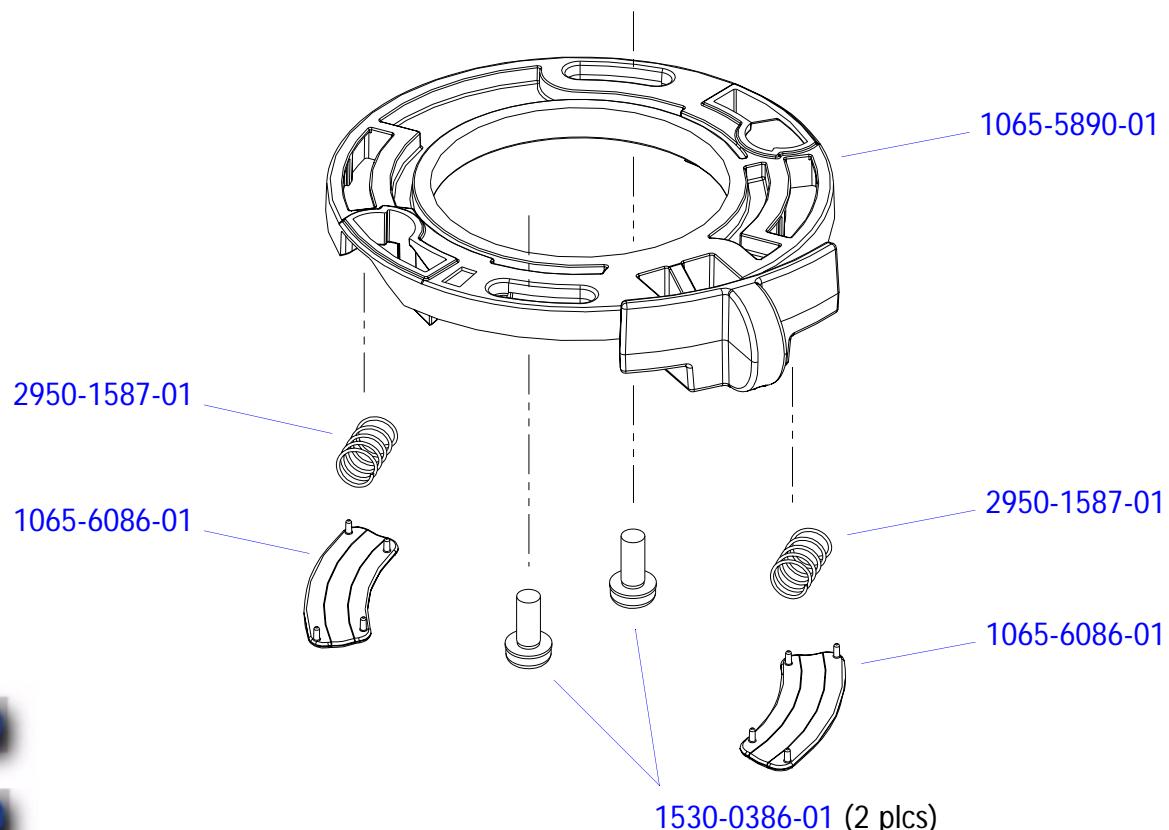
**Parent View****System View**

Figure 14-79

Command Module, Philips HDI 5000

PARENT VIEW

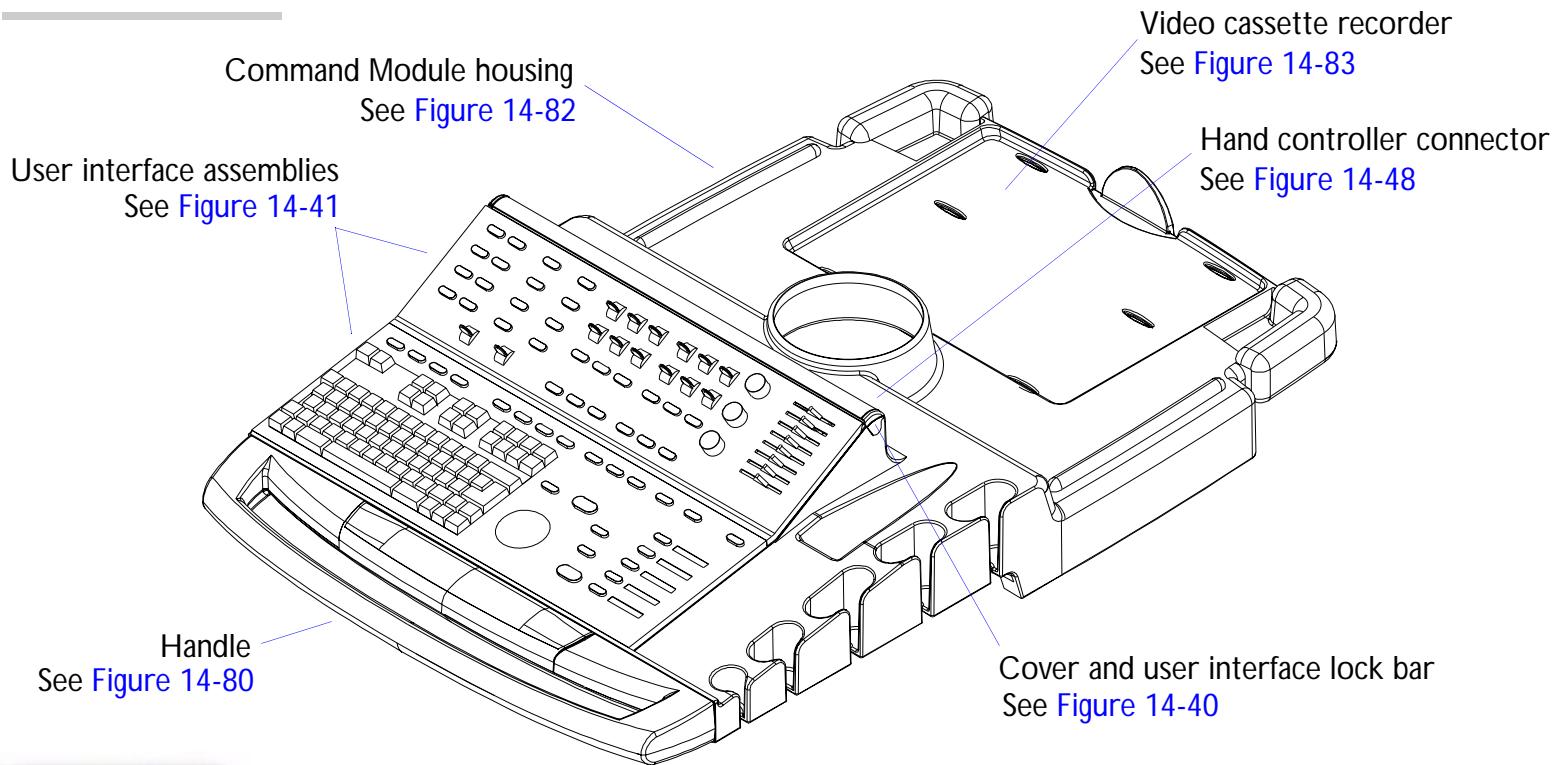
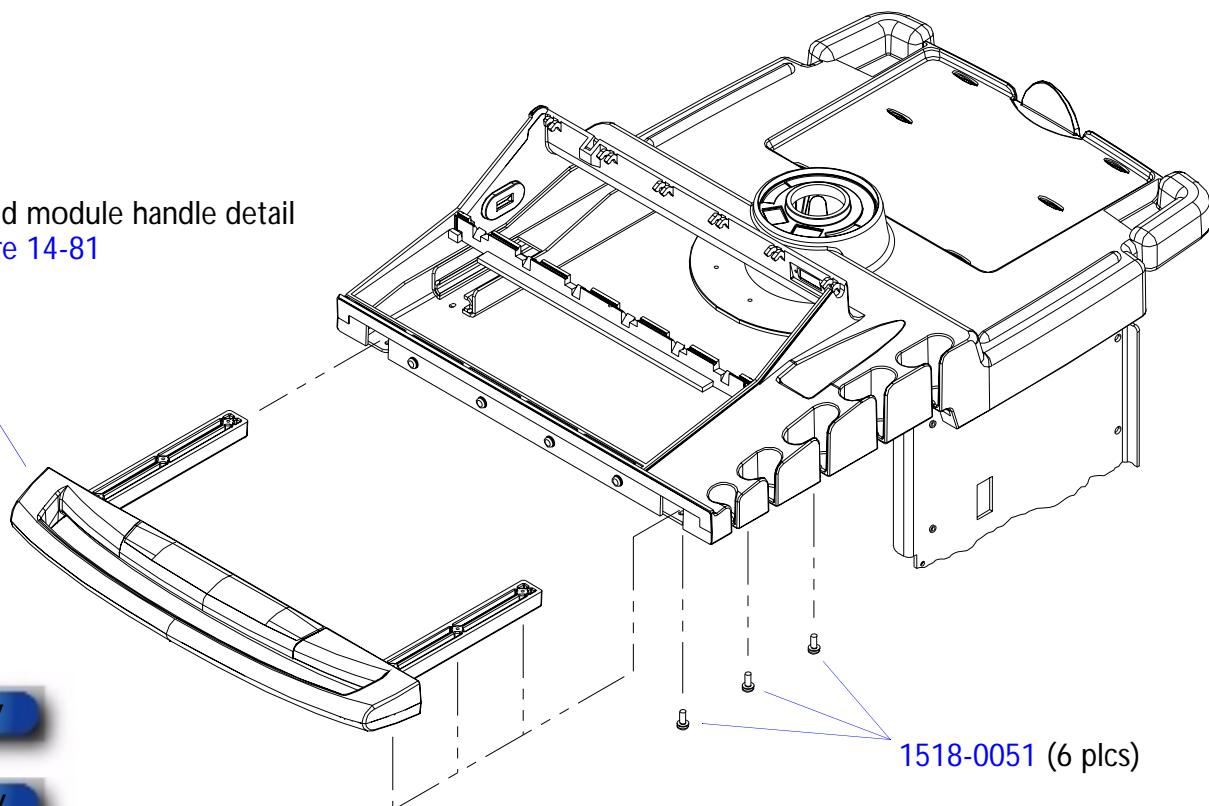
**System View**

Figure 14-80

Command Module Handle, Philips HDI 5000

Command module handle detail
See [Figure 14-81](#)



Parent View

System View

Figure 14-81

Command Module Handle Detail, Philips HDI 5000

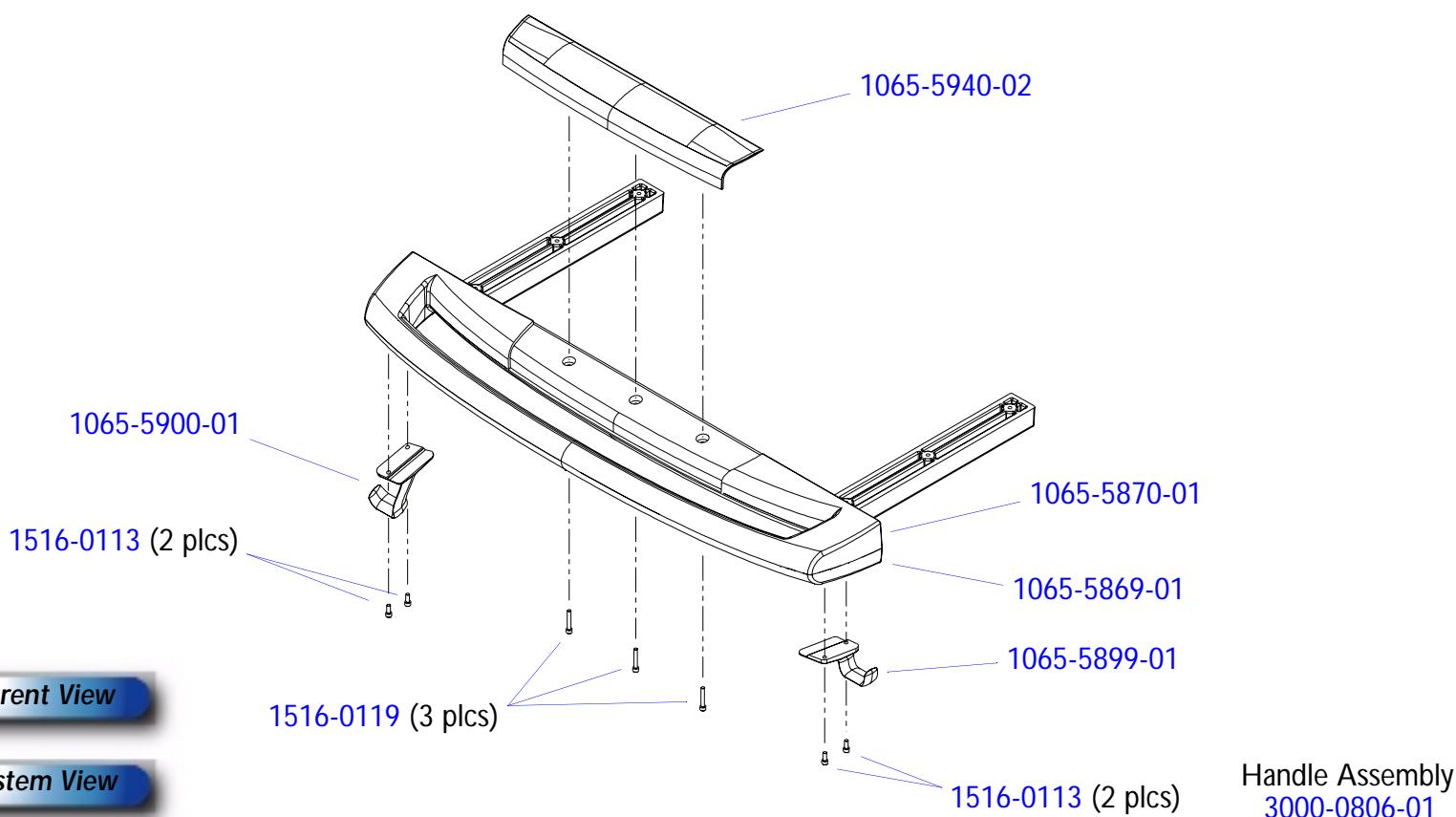
**Parent View****System View**

Figure 14-82

Command Module Housing, Philips HDI 5000

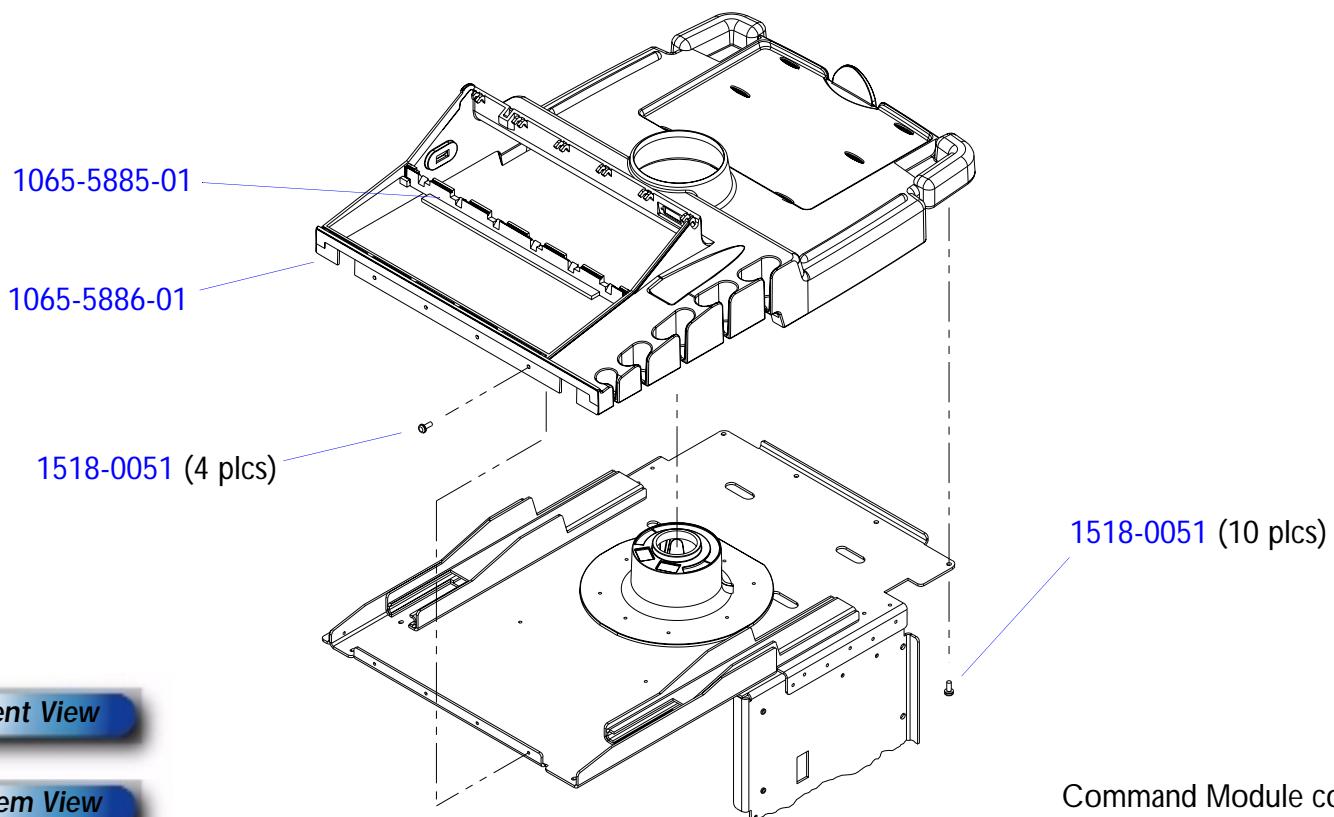
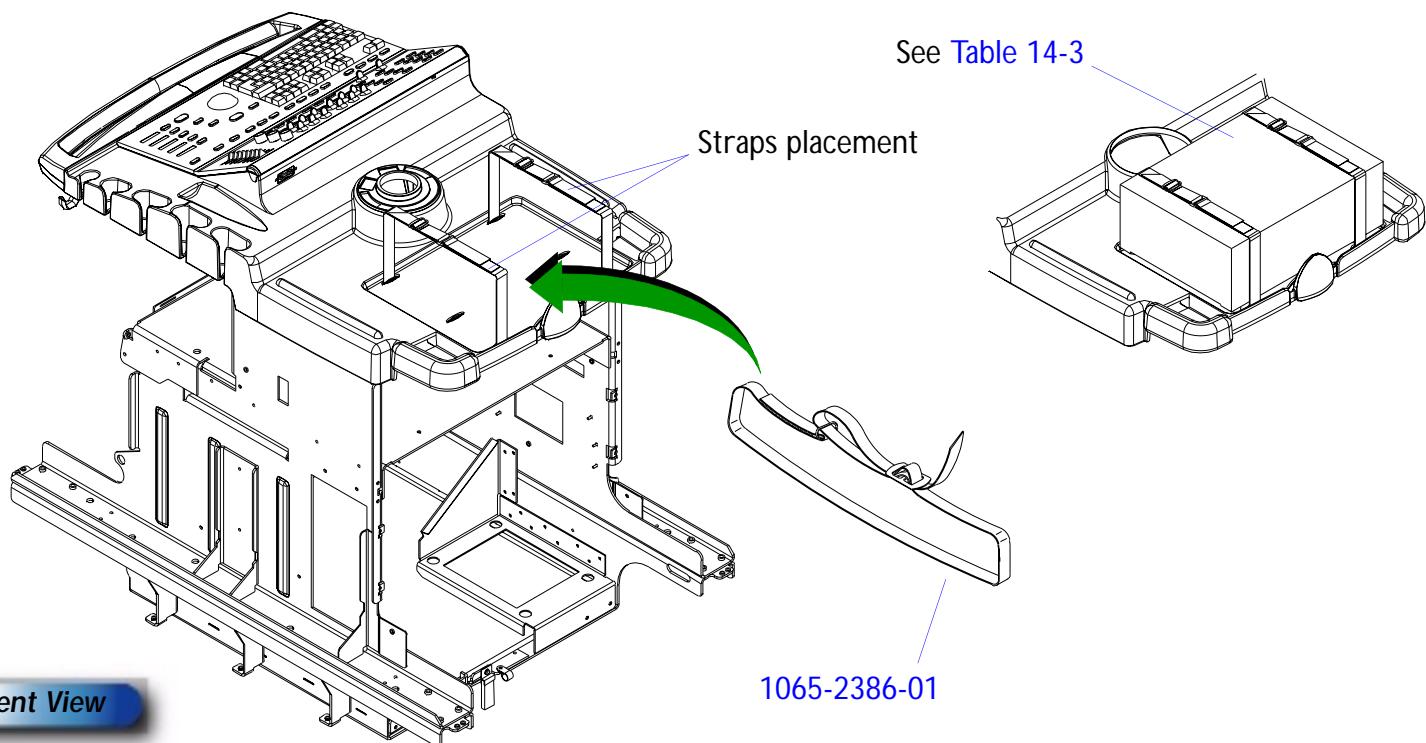
**Parent View****System View**

Figure 14-83

Video Cassette Recorder (VCR), Philips HDI 5000



Parent View

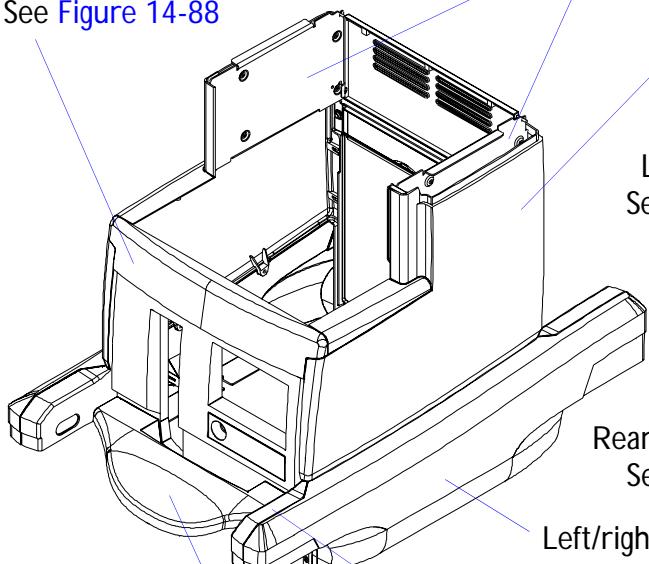
System View

Figure 14-84

Enclosure Covers, Philips HDI 5000

PARENT VIEW

Front shield

See [Figure 14-88](#)

System View

Front cover

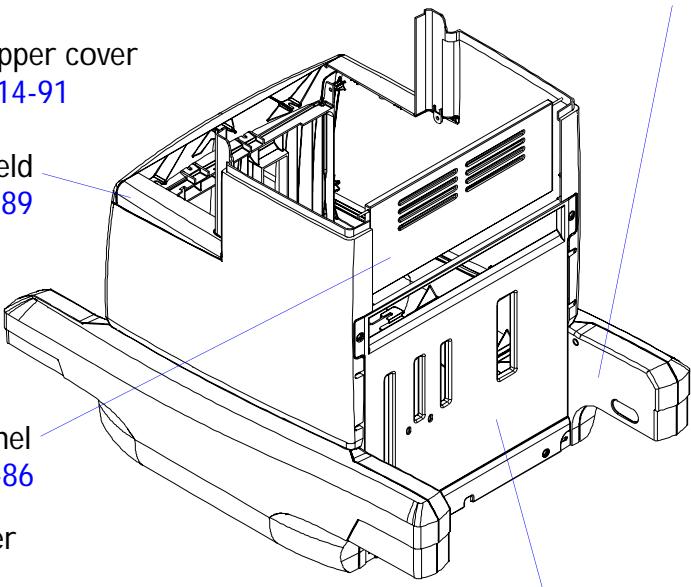
See [Figure 14-85](#)Left/right inner upright covers
See [Figure 14-94](#)Left/right upper cover
See [Figure 14-91](#)Left/right shield
See [Figure 14-89](#)Rear opening panel
See [Figure 14-86](#)Left/right lower cover
See [Figure 14-90](#)Left/right front inner bumper
See [Figure 14-92](#)Left/right rear inner bumper
See [Figure 14-93](#)Rear cover
See [Figure 14-86](#)

Figure 14-85

Front Cover, Philips HDI 5000

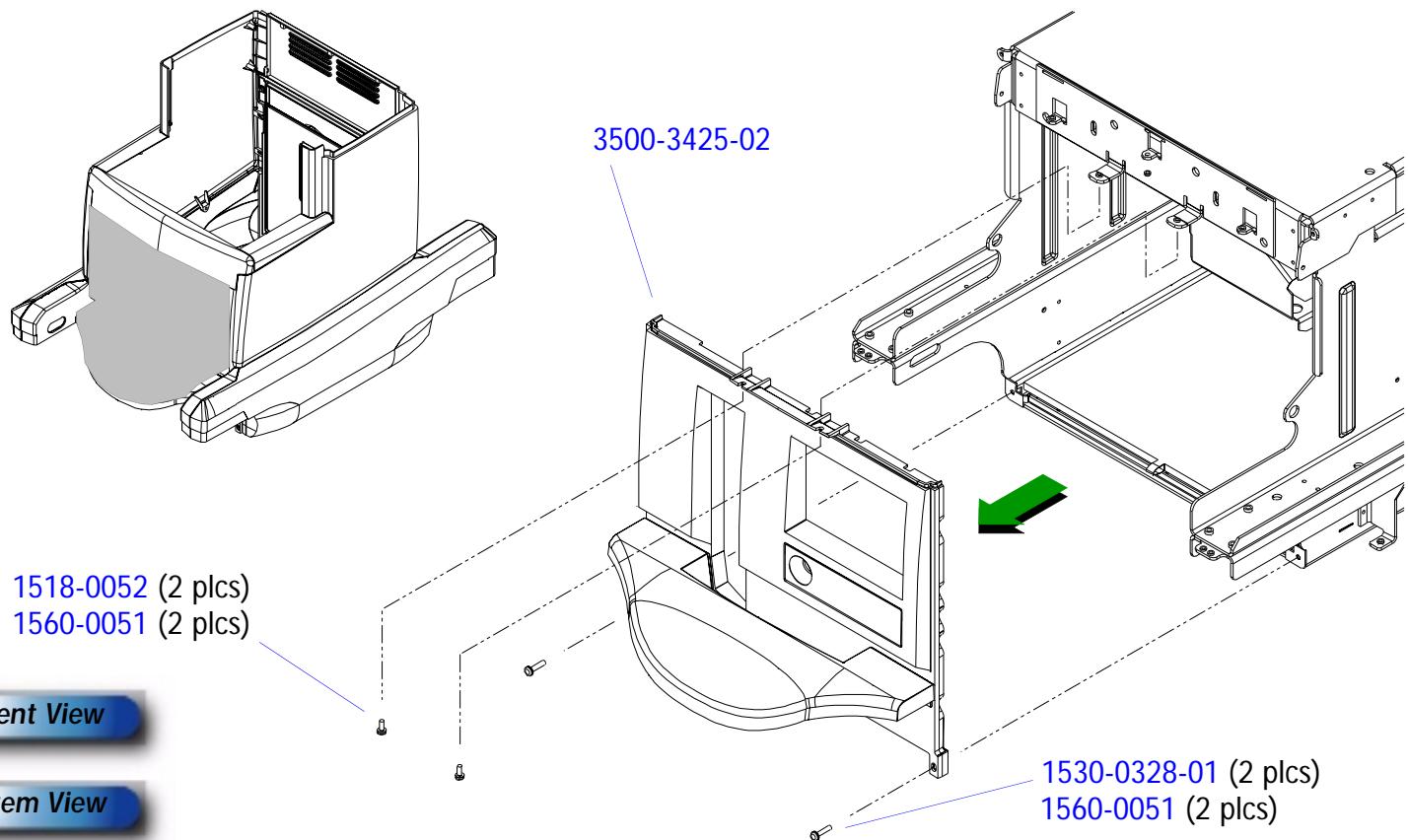


Figure 14-86

Rear Cover and Rear Opening Panel, Philips HDI 5000

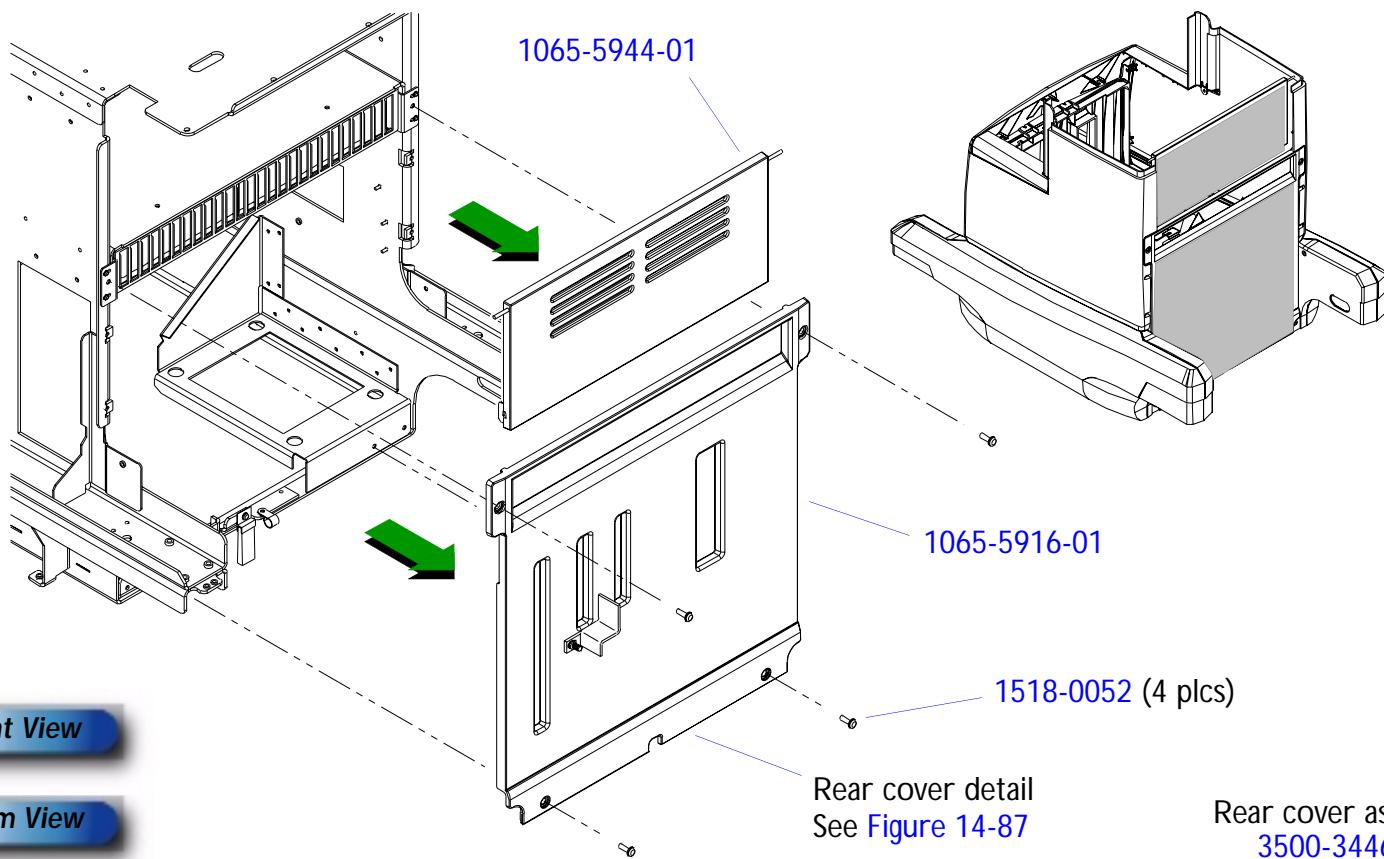
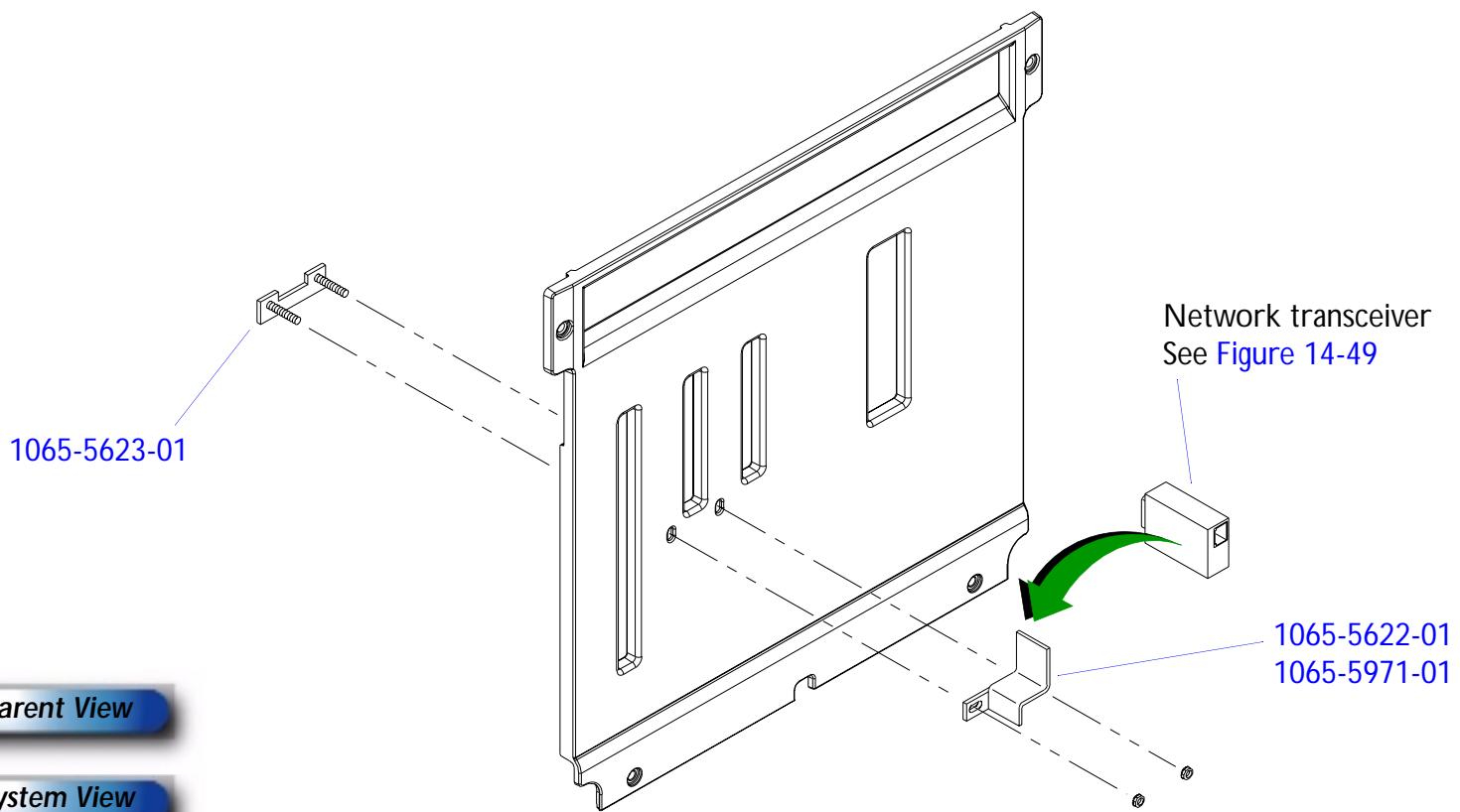
**Parent View****System View**

Figure 14-87

Rear Cover Detail (Transceiver Bracket)



Parent View

System View

Figure 14-88

Front Shield, Philips HDI 5000

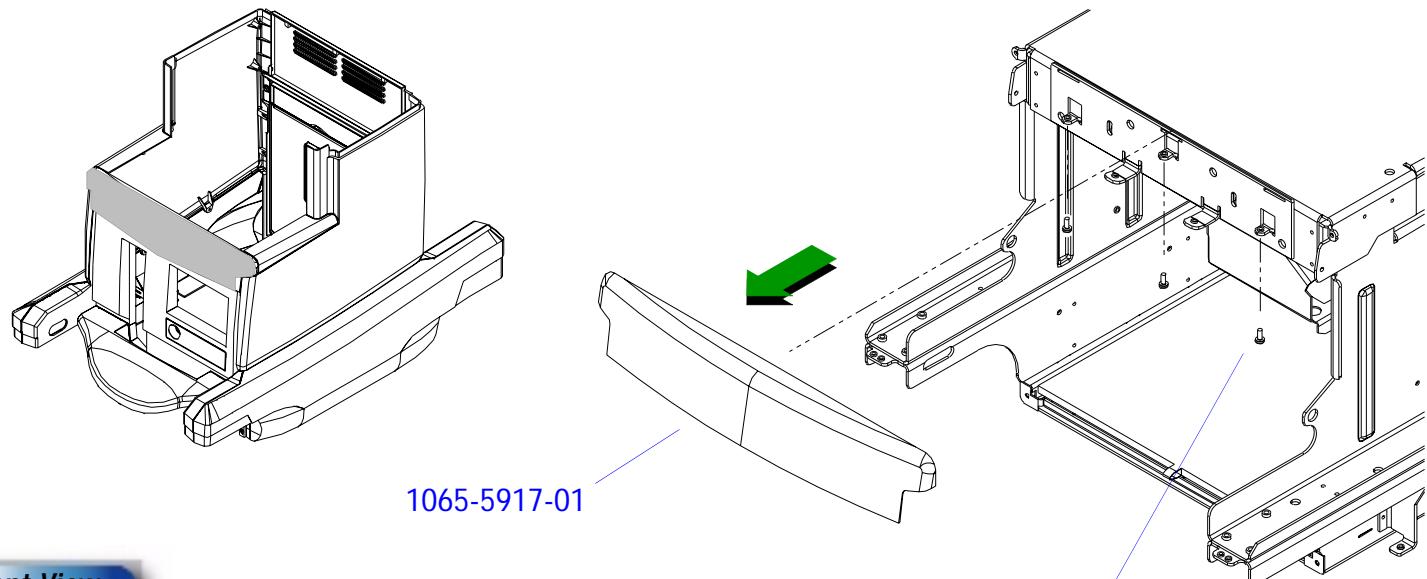
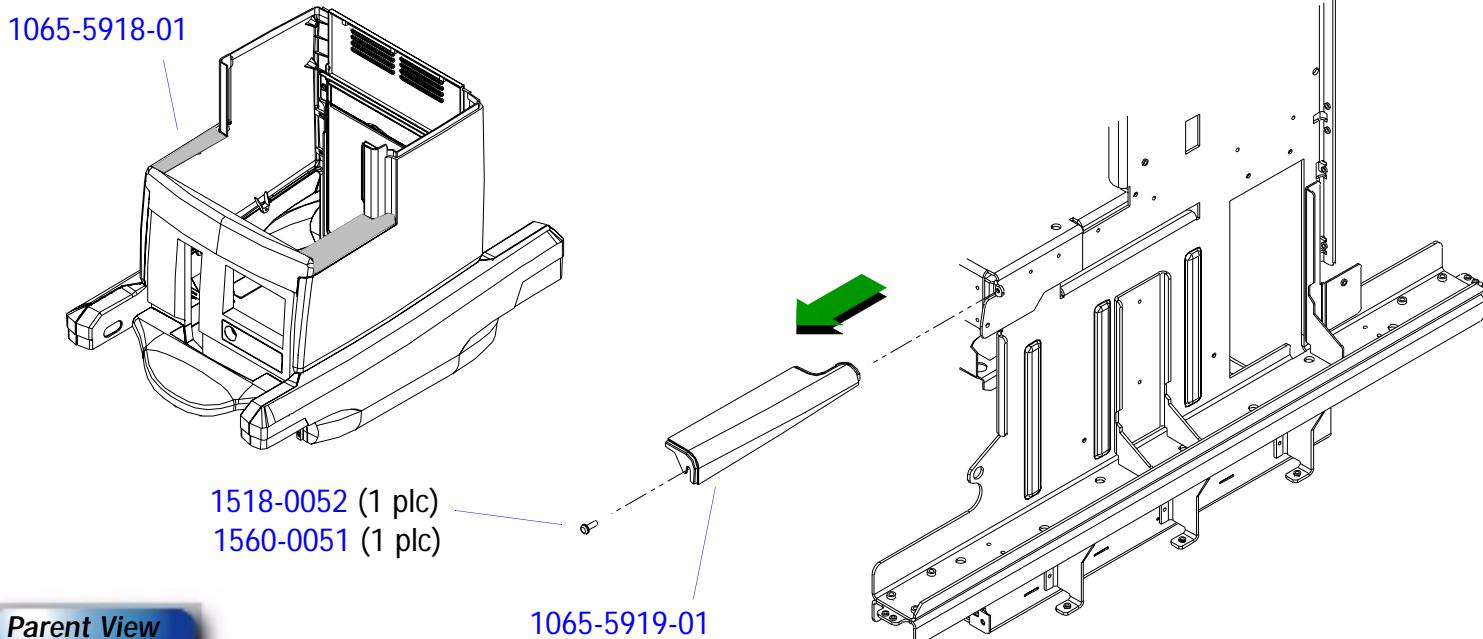
**Parent View****System View**

Figure 14-89

Left/Right Shield (Right Shown), Philips HDI 5000

NOTE Left shield installation is identical.



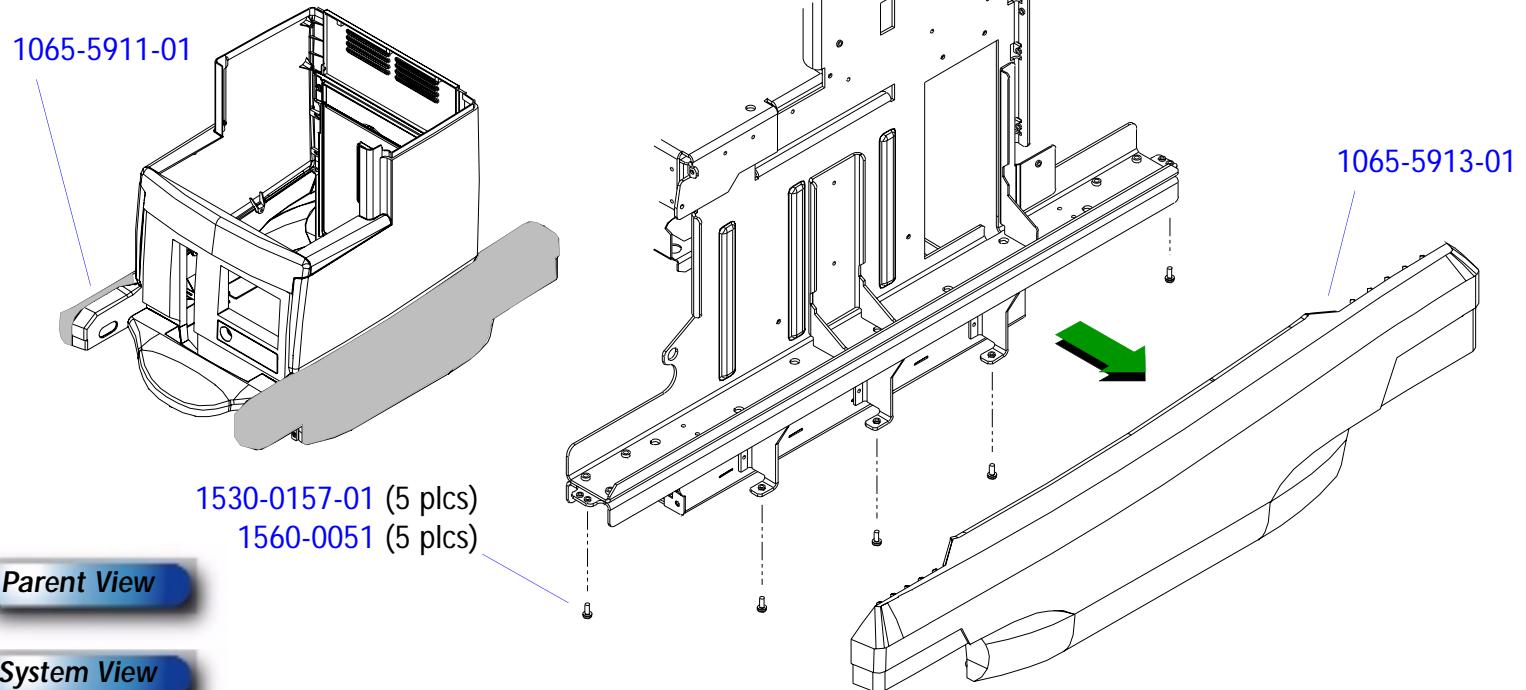
Parent View

System View

Figure 14-90

Left/Right Lower Cover (Right Shown), Philips HDI 5000

NOTE Left lower cover installation is identical.



Parent View

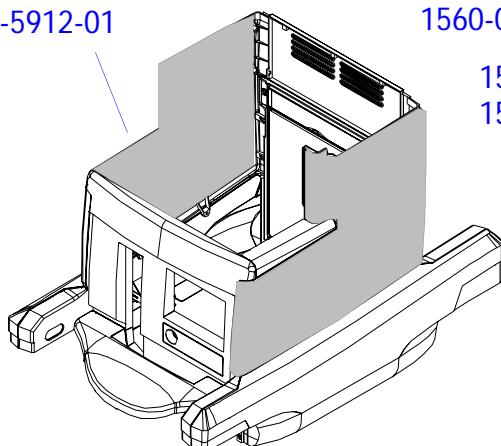
System View

Figure 14-91

Left/Right Upper Cover (Right Shown), Philips HDI 5000

NOTE Left upper cover installation is identical.

1065-5912-01



1518-0052 (7 plcs)

1560-0051 (7 plcs)

1518-0043 (1 plc)

1560-0051 (1 plc)

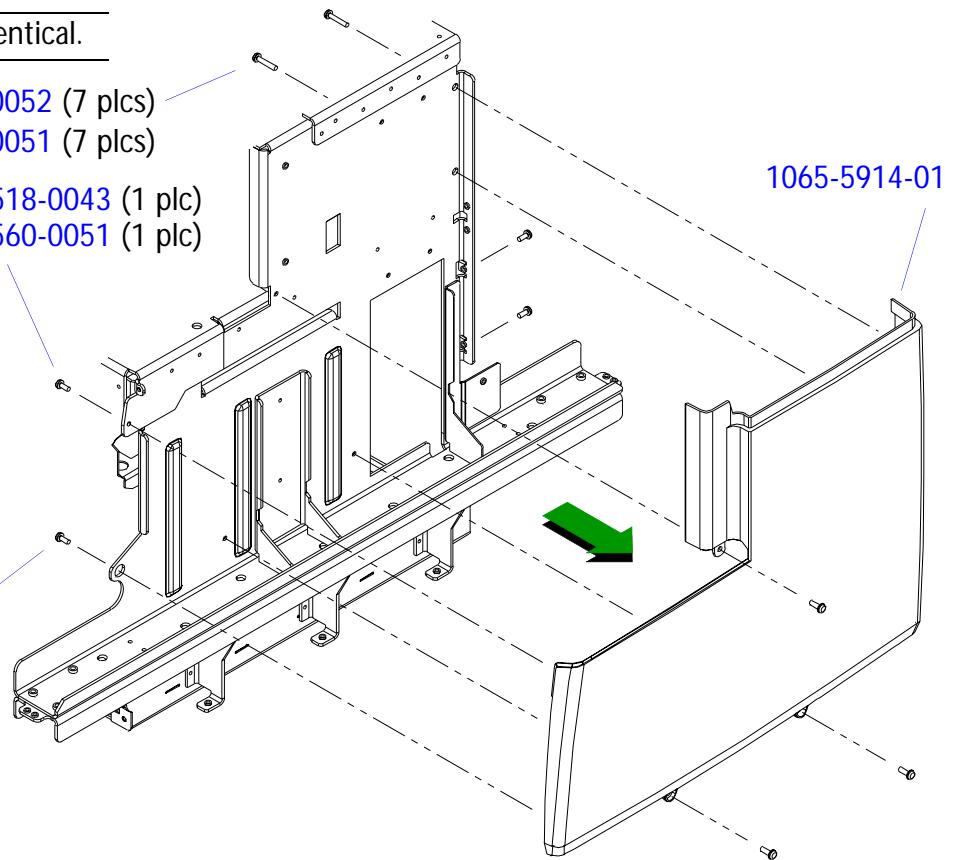
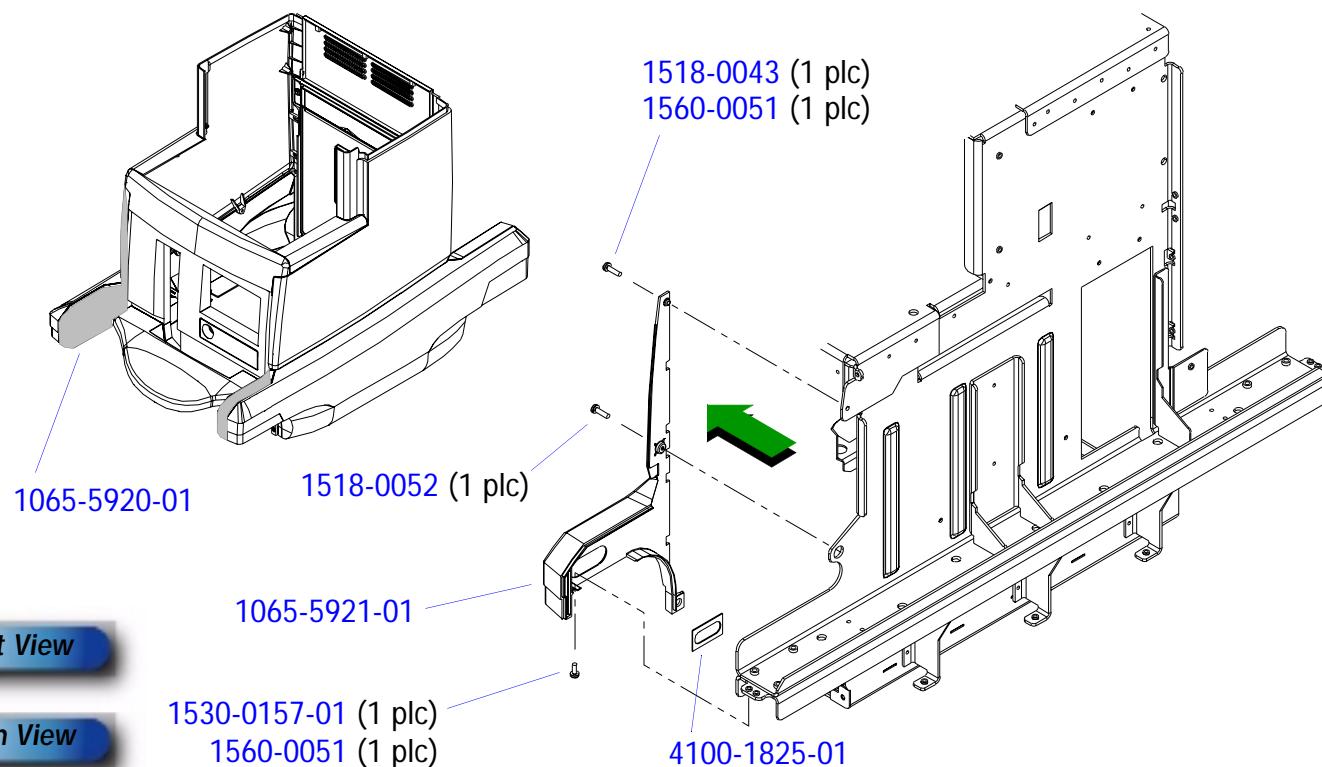
**Parent View****System View**

Figure 14-92

Left/Right Front Inner Bumper (Right Shown), Philips HDI 5000

NOTE Left front inner bumper installation is identical.



Parent View

System View

Figure 14-93

Left/Right Rear Inner Bumper (Right Shown), Philips HDI 5000

NOTE Left rear inner bumper installation is identical.

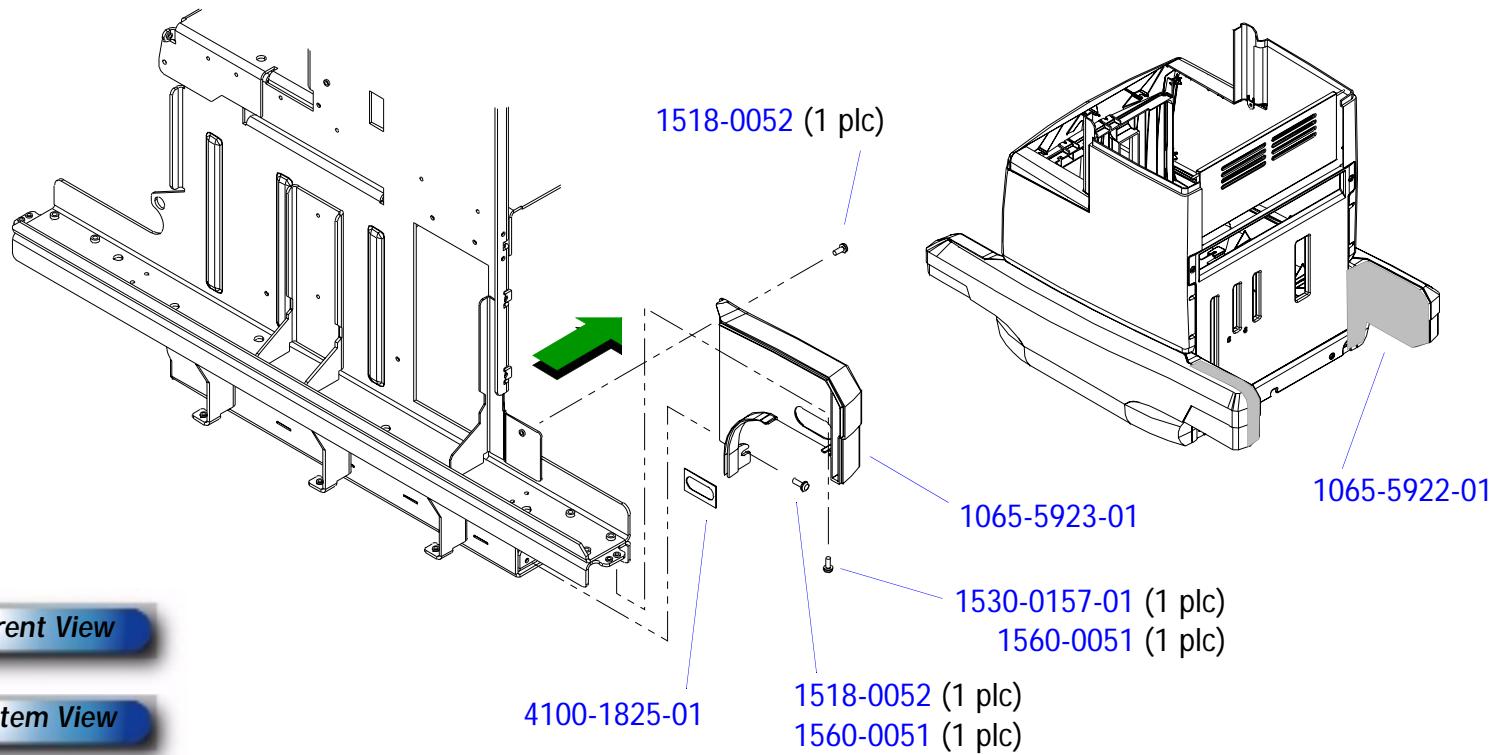


Figure 14-94

Left/Right Inner Upright Cover, Philips HDI 5000

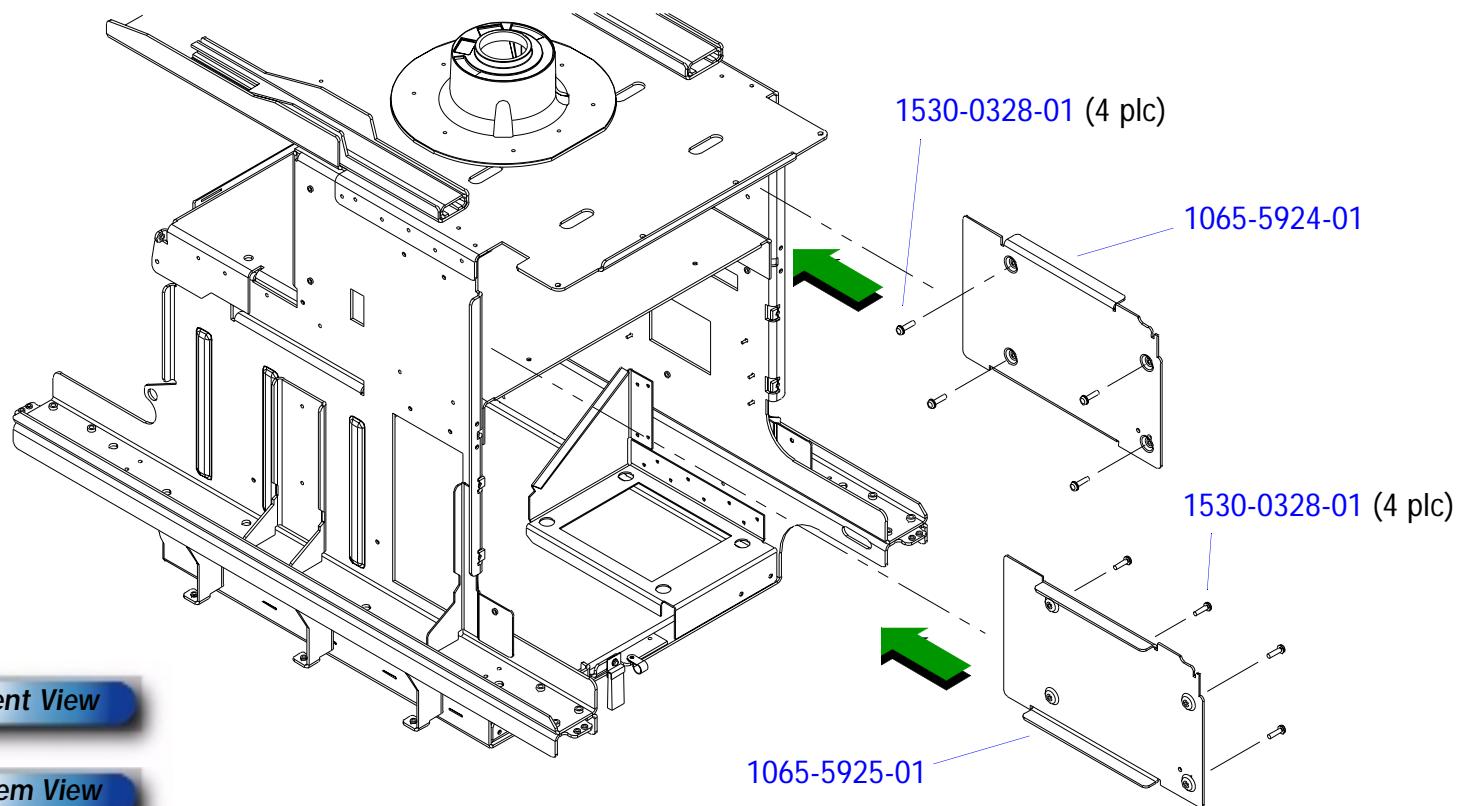
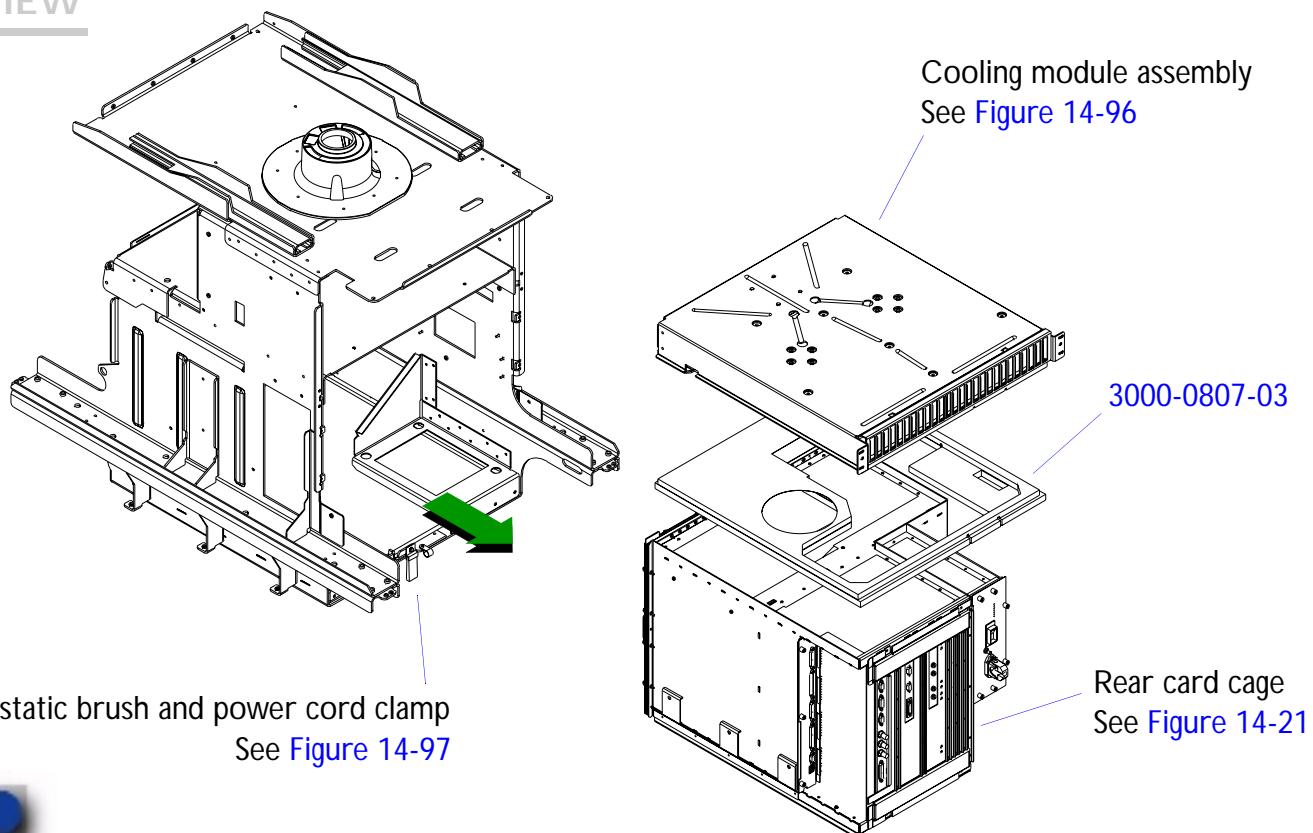
**Parent View****System View**

Figure 14-95

Rear Compartment, Philips HDI 5000

PARENT VIEW



System View

Figure 14-96

Cooling Module Assembly, Philips HDI 5000

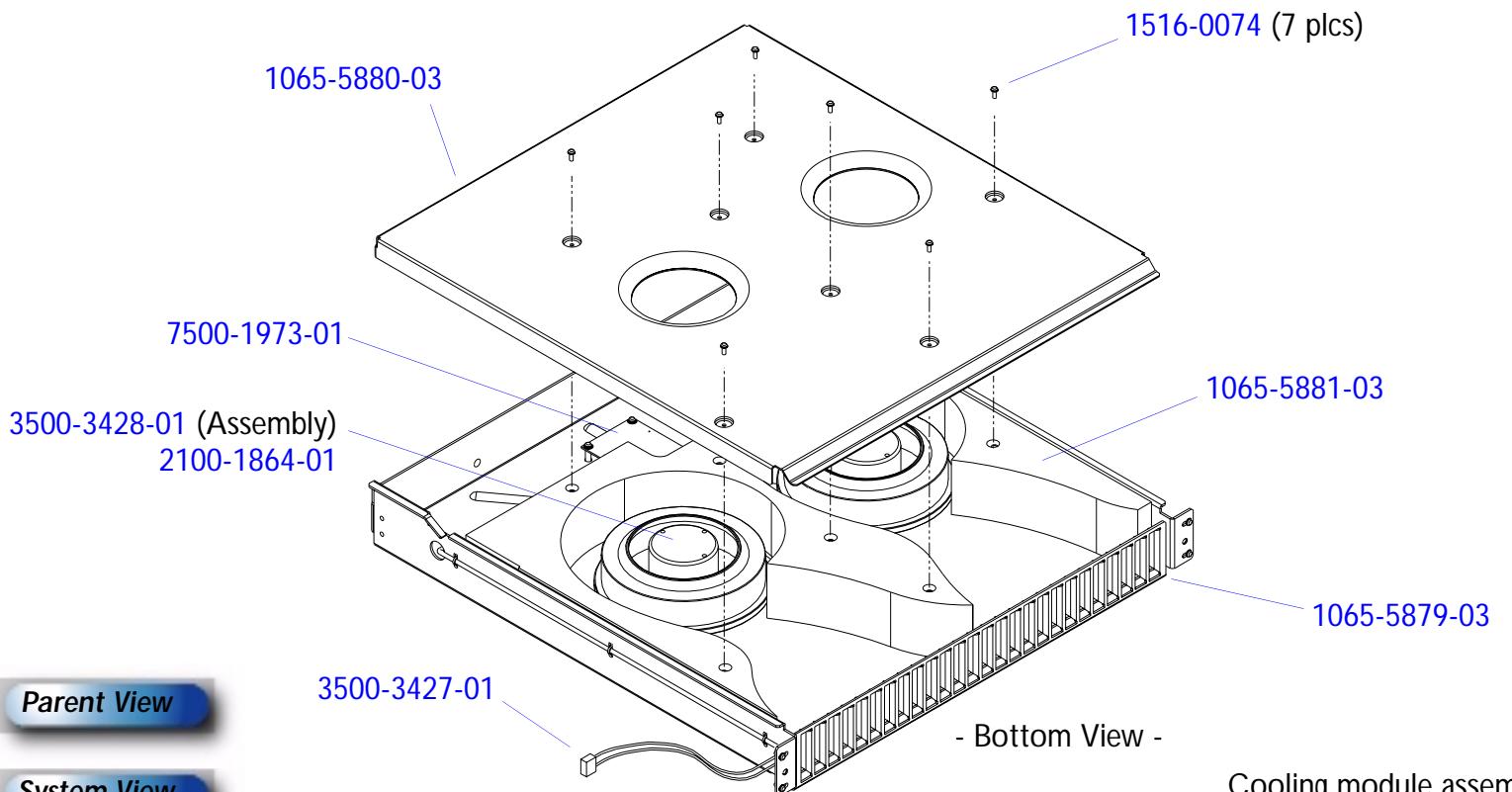


Figure 14-97

Antistatic Brush and Power Cord Clamp, Philips HDI 5000

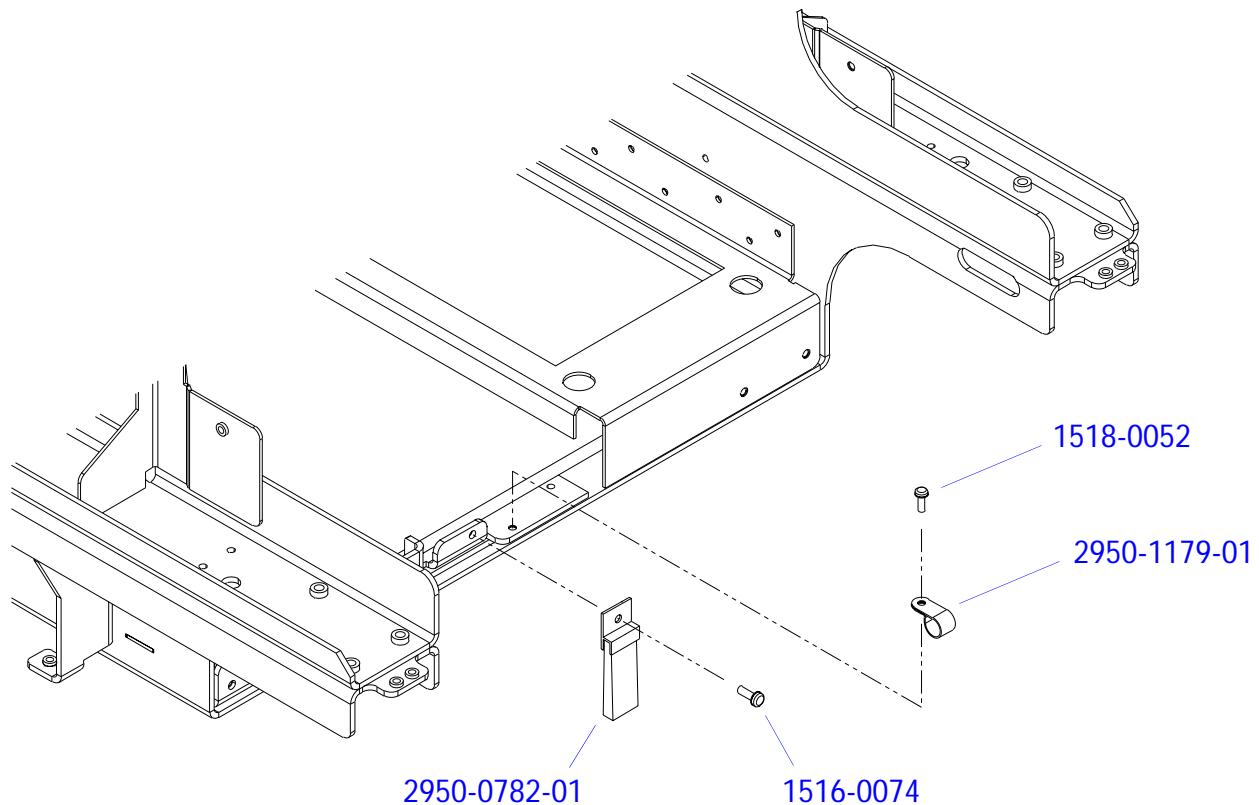
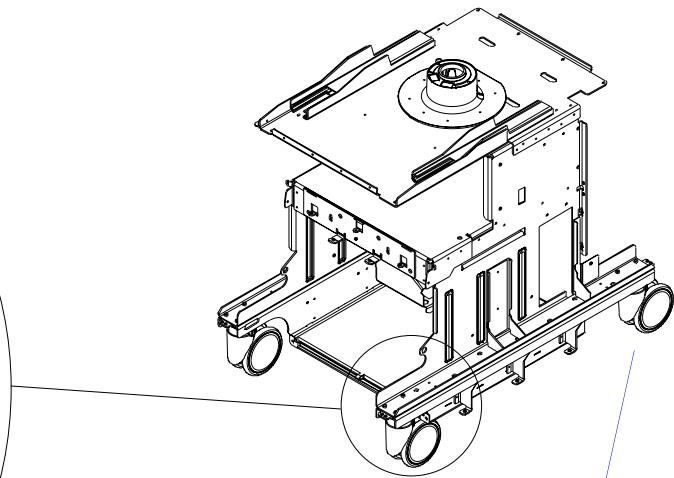
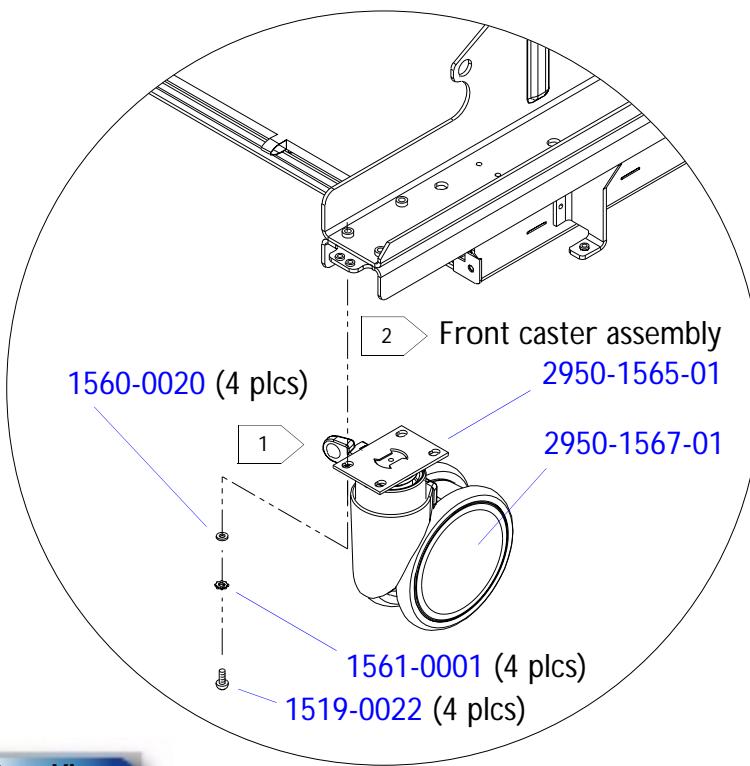


Figure 14-98

Caster Assemblies, Philips HDI 5000



- 1 See Figure 14-63 for generic parts.
- 2 The casters illustrated here come with hubcaps.

System View

Parts List

Table 14-1 HDI 5000/Philips 5000 System Parts List

Located On	Part Number	Part Description	Notes/Reference
Figure 14-57	1065-5669-01	Acoustic Foam, Chassis	DVS/APM module
Figure 14-58			
Figure 14-61	1065-5861-01	Acoustic Foam, Cover	DVS/APM module
Figure 14-34	1065-2866-01	Adapter, Monitor Height	For older systems/system upgrades only. The new monitor collar on the cart weldment is taller and replaces this part.
Figure 14-36	2100-0843-01	Adapter, Serial Interface, RS-232	
Figure 14-12	1065-2381-01	Air Deflector, Card Cage	
Figure 14-12	1065-2732-02	Air Deflector, Card Cage, 4 Board Set	
Figure 14-7	2950-1148-01	Air Filter, Plastic	
Figure 14-55	See the HDI 5000 APM Module Assemblies Master Compatibility Matrix		
Figure 14-75	3500-3423-03	Arm Assembly, Articulation	Philips HDI 5000 system
Figure 14-77	1065-5894-01	Arm, Lower	Philips HDI 5000 system
Figure 14-77	3000-0812-01	Arm, Lower, Assembly	Philips HDI 5000 system
Figure 14-76	1065-5891-03	Arm, Upper	Philips HDI 5000 system
Figure 14-76	3500-3510-01	Arm, Upper, Assembly	Philips HDI 5000 system
Figure 14-61	1065-5066-01	Baffle, Fan	DVS/APM module

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-40	1065-5947-01	Bar, UIF Locking	New color Philips HDI 5000 system
Figure 14-34	3500-2812-03	Base Assembly, Tilt with Adapter	
Figure 14-76	3000-0810-01	Base Assembly, Yoke and Tilt	Philips HDI 5000 system
Figure 14-29	1065-1789-08	Base, HDI, Color Monitor	Use with 3500-2532-11 monitor
Figure 14-37	1065-4503-01	Base, Microphone Module	
Figure 14-72	1065-5906-01	Base, Monitor	Philips HDI 5000 system
Figure 14-29	1065-5131-02/-03	Base, Monitor, with Machined Studs	Use with 3500-2532-15/14, 3500-1589-01, and 3500-3040-01 monitors
Figure 14-76	1065-5895-01	Base, Tilt	Philips HDI 5000 system
Figure 14-34	1065-2682-03	Base, Tilt Mechanism, Fog	
Figure 14-35			
Figure 14-30	1065-4345-02	Beam, Mounting, Rear, Monitor	
Figure 14-34	1065-2439-01	Bearing, Monitor Swivel	
Figure 14-73	3000-0814-01	Bezel Assembly, Monitor	Philips HDI 5000 system
Figure 14-13	1065-4681-01	Bezel, DDEA	
Figure 14-14			
Figure 14-58	1065-5877-01	Bezel, Front	DVS/APM module (for slide tray)
Figure 14-73	1065-5932-01	Bezel, Inner, Monitor	Philips HDI 5000 system

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-13	1065-6004-01	Bezel, MO Drive, DDEA, L10.5	New color
Figure 14-14			Philips HDI 5000 system
Figure 14-73	1065-5904-01	Bezel, Monitor	Philips HDI 5000 system
Figure 14-32	1065-4317-02	Bezel, Monitor, 15-in, Color	
Figure 14-33			
Figure 14-57	1065-4826-04	Bezel Rework, Front, MISEM	DVS/APM module
Figure 14-52	1065-2905-02	Block, Detent, Left	
Figure 14-52	1065-2906-02	Block, Detent, Right	
Figure 14-63	1519-0022	Bolt, 1/4-20 x 3/4, Hex, St, Zn	
Figure 14-64			
Figure 14-98			
Figure 14-25	1530-0145-01	Bolt, 1/4-20 x 4-1/2, Hex, St, Zn	
Figure 14-26	2950-0513-01	Bracket, Capacitor	
Figure 14-18	1065-2997-01	Bracket, Connector, Disk Drive Module	
Figure 14-31	1065-4314-02	Bracket, Controls, Monitor, 15-in, Color	Use only with 1065-4691-01 cover
	1065-4314-03		Use only with 1065-4691-02 cover
			See kit 8000-1462-01
Figure 14-46	1065-3004-02	Bracket, Cord Wrap	
Figure 14-60	1065-5019-02	Bracket, Disk Drive, MISEM	DVS/APM module
Figure 14-17	1065-5058-01	Bracket, Disk Drive, Optical	See kit 8000-1682-01
Figure 14-17	1065-2244-03		Alternate

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-22	1065-2365-03	Bracket, Fan Mount	Rear system four fan bracket HDI 5000 classic system
Figure 14-61	1065-5068-01	Bracket, Fan Mounting	DVS/APM module
Figure 14-60	1065-5876-01	Bracket, Mfg, Disk Drive	DVS/APM module
Figure 14-8	1065-2954-02	Bracket, Mounting, Front Cover	
Figure 14-19	1065-2255-05	Bracket, Mounting, Rear Cover	
Figure 14-26	1065-3019-02	Bracket, Mounting, Transformer	
Figure 14-51	1065-2903-06	Bracket, Mounting Tray	
Figure 14-59	1065-5878-01	Bracket, Mounting, Tray Knob	DVS/APM module (for slide tray)
Figure 14-57	1065-5873-01	Bracket, Power Supply	DVS/APM module
Figure 14-48	1065-4626-03	Bracket, Remote D-SUB	
Figure 14-25	1065-2498-02	Bracket, Sinewave Xfmr	
Figure 14-20	1065-5623-01	Bracket, Stud, Transceiver	
Figure 14-87	1065-5622-01	Bracket, Transceiver Support	
Figure 14-20	1065-5971-01	Bracket, Transceiver Support, L10.5	New color, Philips HDI 5000 system
Not shown	1065-4980-01	Bracket, UIF, Ferrite	User interface
Figure 14-36	1065-1803-05	Bracket, VCR Mounting	
	1065-3021-01	Bracket, VCR Mounting, for Sony SVO-9500MD VCR	Hitachi systems

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-19 Figure 14-97	2950-0782-01	Brush, Antistatic	
Figure 14-32 Figure 14-74	3900-0032-01	Bulb, Light Bar, T2, GF710, 12V, 0.1A, 1/4-in D x 1-1/4-in L	
Figure 14-29 Figure 14-54 Figure 14-72	2950-0586-01	Bumper, 5DX.14H, Clr Vinyl, Adhesive Back	
Figure 14-5	1065-4695-01	Bumper Cap, Front, Left	
Figure 14-5	1065-4694-01	Bumper Cap, Front, Right	
Figure 14-5	1065-4704-01	Bumper Cap, Rear, Dark Gray	
Figure 14-45	1065-4637-02	Bumper, Handle, Self-Adhesive, Dark Gray	
Figure 14-45	1065-5280-01	Bumper, Handle with Clip Holes	
Figure 14-92	1065-5920-01	Bumper, Left Front, Inner	Philips HDI 5000 system
Figure 14-92	1065-5921-01	Bumper, Left Rear, Inner	Philips HDI 5000 system
Figure 14-93	1065-5922-01	Bumper, Right Front, Inner	Philips HDI 5000 system
Figure 14-93	1065-5923-01	Bumper, Right Rear, Inner	Philips HDI 5000 system
Figure 14-5	1065-4696-01	Bumper, Side Strap, Dark Gray	Requires adhesive
	1065-4705-03	Bumper, Side Strap, Dark Gray	Alternate
	3000-0681-02	Bumper, Side Strap, W/Extension	Extended cart
Figure 14-31	1065-5968-01	Button, Monitor Control	New color Philips HDI 5000 system

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-31	1065-4548-01	Button, Push, Monitor Control	
Figure 14-78	1065-5890-01	Button, Travel Lock	Philips HDI 5000 system
Figure 14-33	2208-0070	Cable Anchor, 3/4-in Sq, 70C, Adhesive Back	Secures 3500-2614-XX cable assy to bezel
Figure 14-47	3500-2721-02	Cable Clamp Assembly	
Figure 14-50	3500-1834-01	Cable Drape Assy	For ISEM installations the cable drape assy mounts to the bottom of the OEM remote tray
Figure 14-81	1065-5899-01	Cable Hook, Right	Philips HDI 5000 system
Figure 14-81	1065-5900-01	Cable Hook, Left	Philips HDI 5000 system
Figure 14-51	1065-2991-02	Cable Retainer, OEM Remote Tray	
Figure 11-42	Table 11-2	Cables, Power Distribution	
Figure 11-41	Table 11-1	Cables, Signal Interconnect	
Figure 14-51	2208-0073	Cable Strap, #8 Mount, 6-inch Long	
Figure 14-18	2208-0003	Cable Tie, 3 7/8-in Long, Ny	Secures 3500-2614-XX cable assy to bezel
Figure 14-25			
Figure 14-33			
Figure 14-26	3700-0175-01	Cap, 30 µf, 660VAC 10%, Xfmr Res Paper	
Figure 14-77	1065-6072-01	Cap, Spring Plunger	Philips HDI 5000 system
Figure 14-63	2950-0657-09	Caster Assy, Swivel/Brake, Shock Absorbing Front (Light Gray)	

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-63	2950-1278-04	Caster Assy, Swivel/Lock, without Brake, 6-inch Diameter	Rear (Light Gray)
Figure 14-63	2950-1388-02	Caster Assy, Swivel/Lock, without Brake, Bumper Gray	Rear (Dark Gray)
Figure 14-63	2950-1562-01	Caster Assy, Swivel/Lock, without Brake, Bumper Gray (Darcor)	Rear (Dark Gray) Comes with Darcor hubcaps
Figure 14-98	2950-1563-01	Caster Assy, Swivel/Lock, without Brake, Light Gray (Darcor)	Rear (Light gray), Philips HDI 5000 system, comes with Darcor hubcaps
Figure 14-63	2950-1389-02	Caster Assy, with Wheel Brake, Bumper Gray	Front (Dark Gray)
Figure 14-63	2950-1564-01	Caster Assy, with Wheel Brake, Bumper Gray (Darcor)	Philips HDI 5000 system, comes with Darcor hubcaps
Figure 14-98	2950-1565-01	Caster Assy, with Wheel Brake, Light Gray (Darcor)	Front (Light gray), Philips HDI 5000 system, comes with Darcor hubcaps
Figure 14-57	1065-5871-01	Chassis, APM/DVS	DVS/APM module
Figure 14-58			
Figure 14-13	1065-5949-01	Chassis, DDEA, L10.5	New color, Philips HDI 5000 system
Figure 14-14			
Figure 14-15			
Figure 14-16			
Not shown	2070-1188-01	Chip, SYSCPU ID, 6-Digit	Requires specific MO files to reflect the machine ID number

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Not shown	2208-0198-01	Clamp, CA, 0.187ID, 0.218 Mtg Hole, ST	User interface
Not shown	2208-0199-01	Clamp, CA, 0.25ID, 0.218 Mtg Hole, ST	User interface
Not shown	1065-4800-01	Clamp, Cable	User interface, See kit 8000-1668-01
Figure 14-20	2950-1179-01	Clamp, Cable, 3/8D, 1/2W, 1/4, Ins	
Figure 14-97			
Figure 14-6	1065-2370-02	Clamp, Cable, IIM	
Figure 14-35	3000-0363-04	Clamp Lock Assy, Monitor	
Figure 14-51	1065-2975-01	Clamp, Retaining, OEM Remote Tray	
Figure 14-18	3100-2383-01	Connector, Terminator, SCSI, Plug, 2x25	
Figure 14-82	3000-0808-01	Cover Assembly, Command Module	Philips HDI 5000 system
Figure 14-8	3500-2850-02	Cover Assy, Front	
Figure 14-20	3500-2851-02	Cover Assy, Rear	Contains the 1065-2892-03
Figure 14-20	3500-3056-02	Cover Assy, Rear, 10.2	Contains the 1065-2892-04
Figure 14-20	3500-1872-03	Cover Assy, Rear, 10.5	Contains the 1065-5704-02
Figure 14-6	1065-4685-03	Cover, Cable, Left	Non-CV systems
Figure 14-6	1065-4751-03	Cover, Cable, Left	CV systems
Figure 14-6	1065-4684-03	Cover, Cable, Right, Notched	Non-CV systems
Figure 14-6	1065-4750-03	Cover, Cable, Right, Notched	CV systems
Figure 14-3	1065-4596-01	Cover, Cable, Right, Notched	For ISEM option only

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-56	1065-5859-02	Cover, Chassis, APM	Preferred for APM 2.0. Must use -02 for DVS
	1065-5859-01		Alternate for APM 2.0
Figure 14-40	1065-4260-02	Cover, Command Module	
Figure 14-82	1065-5886-01	Cover, Command Module	Philips HDI 5000 system
Figure 14-13	1065-1947-03	Cover, Disk Drive Module	
Figure 14-14			
Figure 14-15			
Figure 14-16			
Figure 14-85	3500-3425-02	Cover, Front, Assembly, L10.5	Philips HDI 5000 system
Figure 14-8	1065-2882-03	Cover, Front Enclosure	
Figure 14-94	1065-5924-01	Cover, Inner Upright, Left	Philips HDI 5000 system
Figure 14-94	1065-5925-01	Cover, Inner Upright, Right	Philips HDI 5000 system
Figure 14-90	1065-5911-01	Cover, Lower Left Side	Philips HDI 5000 system
Figure 14-90	1065-5913-01	Cover, Lower Right Side	Philips HDI 5000 system
Figure 14-86	3500-3446-01	Cover, Rear, Assembly, L10.5	Philips HDI 5000 system
Figure 14-91	1065-5912-01	Cover, Upper Left Side	Philips HDI 5000 system
Figure 14-91	1065-5914-01	Cover, Upper Right Side	Philips HDI 5000 system
Figure 14-37	1065-4504-01	Cover, Microphone Module	
Figure 14-72	1065-5907-01	Cover Monitor	Philips HDI 5000 system

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-29	1065-4691-02	Cover, Monitor, 15-in Color	Without rear panel cover, use with 1065-4314-03 controls bracket, See kit 8000-1462-01
	1065-4691-01	Cover, Monitor, 15-in Color	With rear panel cover, use with 1065-4314-02 controls bracket
Figure 14-20	1065-2892-03	Cover, Rear Enclosure	Part of 3500-2851-02
Figure 14-20	1065-2892-04	Cover, Rear Enclosure	Part of 3500-3056-02
Figure 14-20	1065-5704-02	Cover, Rear Enclosure	Part of 3500-1872-03
Figure 14-92	4100-1825-01	Cover, Slot, Brake Lever	Adhesive back label
Figure 14-93			Philips HDI 5000 system
Figure 14-32	1065-4233-03	Diffuser, Light, Monitor	
Figure 14-74	1065-5908-02/03	Diffuser, Light, Monitor	Philips HDI 5000 system
Figure 14-60	2100-1515-01	Disk Drive, Floppy, 3.5-in, Sony, Dr Sel 1	DVS/APM module
Figure 14-13	3500-3066-04	Disk Drive, Quantum HD Replacement	Refer to Table 13-11 for information
Figure 14-14	3500-3129-02	Disk Drive, IBM HD Replacement	
Figure 14-15			
Figure 14-16			
Figure 14-56	2100-1736-01	Disk Drive, Hard, 15.3-GB, 7200RPM, Ultra, ATA100	DVS module drive

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-56	2100-1438-01	Disk Drive, Hard, IDE, 2.1-GB, Quantum	DVS module drive
	2100-1520-01	Disk Drive, Hard, IDE, 2.5-GB, Quantum	DVS module drive
	2100-1525-01	Disk Drive, Hard, IDE, 3.2-GB, Quantum	DVS module drive
	2100-1850-01	Disk Drive, Hard, IDE, 40-GB, Ultra	DVS module drive
	2100-1929-01	Disk Drive, Hard, IDE, 60-GB, ATA100	DVS module drive
Figure 14-60	2100-1531-01	Disk Drive, Hard, NFND, 18.2-GB, 3.5-in	DVS module
Figure 14-60	2100-1633-01	Disk Drive, Hard, SCSI, 18.2-GB, 3.5-in, Ultra2	DVS module
	See the HDI 5000 Master Compatibility Matrix for part numbers	Disk Drive Module (DDEA), A1F	See Figure 13-1 for PCB locations by name
Not shown		Disk Drive Module Assy, Generic, ECG, 10.5.1	Philips HDI 5000 system. See Figure 13-1 for PCB locations by name.
Not shown		Disk Drive Module Assy, Physio, ECG (color change)	Philips HDI 5000 system. See Figure 13-1 for PCB locations by name.
Figure 14-14		Disk Drive Module Assy, Physio	See Figure 13-1 for PCB locations by name
Figure 14-14		Disk Drive Module Assy, Physio	
Figure 14-15		Disk Drive Module Assy, Physio, No MO	
Figure 14-13		Disk Drive Module Assy, without ECG	
Figure 14-16		Disk Drive Module Assy, without ECG or MO Drive	

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-17		Disk Drive, Optical, 3.5-in, 640-MB	See kits 2100-1419-01 and 8000-1682-01 .
Figure 14-60	2100-1591-01	Disk Drive, Optical, 5.25-in	DVS module
Figure 14-55	See the HDI 5000 DVS Module Assy Master Compatibility Matrix		
Figure 14-96	2100-1864-01	Fan, 12-28VDC, 141CFM, 6.9-inch RND	Impeller Type Philips HDI 5000 system
Figure 14-22	2100-0856-01	Fan, 24 Vdc, 120 CFM, 4.7-in Square TB, w/6-32	
	2100-0839-01	Fan, 24 Vdc, 120 CFM, 4.7-in Square UL/CSA	Alternate
Figure 14-96	3500-3428-01	Fan Assembly	Philips HDI 5000 system
Figure 14-56	2100-1554-01	Fan Assy, 12V, 27CFM, 2.36-in, Bd, with connector	DVS/APM module
Figure 14-60	2100-1555-01	Fan Assy, 12V, 60CFM, 3.6-in, Bd, with connector	DVS/APM module
Figure 14-45	1065-5290-02	Fastener, Clip, Nylon, 0.250-inch	
Not shown	2604-0121-01	Ferrite Core/Case, 0.25D CA, 275z@100, PAL only	For ISEM assy

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Not shown	2604-0119-01	Ferrite Core/Case, 0.39D CA, 225z@100, PAL only	Goes on 3500-2616-XX cable assembly, ISEM
Not shown	2604-0120-01	Ferrite Core/Case, 0.50D CA, 250z@100, PAL only	Goes on 3500-2633-XX and 3500-2741-XX cable assemblies, ISEM
Not shown	1065-4843-01	Filter Frame, ISEM	For ISEM assy
Figure 14-23	3402-0026-01	Filter, Power, Line, 15A, 250V, Pnl Mt	
Figure 14-5	1065-2973-01	Foam, Bottom, Footswitch Tray	
Figure 14-8			
Figure 14-65	3300-0344-01	Footswitch, 2-Stage, with Cable and Plug	
Figure 14-65	3500-1461-02	Footswitch, Assy, with Plate	
Figure 14-65	3300-0312-01	Footswitch, Triple, with Base and Cable Assembly	
Figure 14-13	3600-0246-01	Gasket, RFI, Finger Clip, BE-CU, 2.5-in	
Figure 14-14			
Figure 14-15			
Figure 14-16			
Figure 14-17	2275-0234-01	Ground Strap, Insul, 6.01 x 0.5W	
Figure 14-11	1065-1991-02	Guide, Card	Do not install card guides in empty slots (PS1,PS3,A2F,PS5, A7B,A10B)
Figure 14-11	2950-0606-01	Guide, Card, 2.5-in L,2 Deep, Snap-in	
Figure 14-3	4400-7006-11	Hand Controller	Fits on OEM remote tray

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-3	3500-2866-01	Hand Control Assy, Remote, DMM, English	
Figure 14-27	2950-1236-01	Handle, 3.0LX, 0.5W, 0.87T, Int 8-32, AL,	
Figure 14-56		Anodz	
Figure 14-81	3000-0806-01	Handle Assembly, Cart	Philips HDI 5000 system
Figure 14-81	1065-5869-01	Handle, Cast, Bottom	Philips HDI 5000 system
Figure 14-81	1065-5870-01	Handle, Cast, Top	Philips HDI 5000 system
Figure 14-45	1065-4592-01	Handle Casting	
Figure 14-45	1065-4592-02	Handle Casting	
Figure 14-18	2950-1039-01	Handle, MO Drive Cover Plate, DDEA	
Figure 14-51	1065-2992-03	Handle, OEM Remote Tray	
Figure 14-37	2950-1155-01	Holder, Microphone	
Figure 14-96	1065-5879-03	Housing, Air Plenum	Philips HDI 5000 system
Figure 14-77	1065-6073-01	Housing, Spring Plunger	Philips HDI 5000 system
Figure 14-63	2950-1447-01	Hubcap, Caster, Bumper Gray	Front and Rear, 2 each caster
Figure 14-63	2950-0818-02	Hubcap, Front, Caster Assy	2 each caster
Figure 14-64		Hubcap, Rear, Axle Assy	1 each side
Figure 14-63	2950-1568-01	Hubcap, 6" wheel, steel, bumper gray	2 each Darcor caster
Figure 14-98	2950-1567-01	Hubcap, 6" wheel, steel, light gray	Philips HDI 5000 system 2 each Darcor caster
Figure 14-5	1563-0345-01	Insert, 8/32, Wellnut, 0.015-0.156 Grip	
Figure 14-96	1065-5881-03	Insert, Fan, Cooling	Philips HDI 5000 system

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-37	1065-4671-01	Insert, Foam, Forward, Mic Module	
Figure 14-3	3500-2828-01	ISEM Assy, EMI PAL, 3.5-in MO Drive, 32-MB	The ISEM mounts to the universal OEM plate.
	3500-2829-01	ISEM Assy, EMI PAL, 5.25-in MO Drive, 32-MB	
Not shown	2100-1370-03	ISEM, 1.61 Software, 3.5-in 540-MB MO Drive, 32 MB, PAL	
	2100-1369-02	ISEM, 1.61 Software, 5.25-in MO Drive, 32-MB, PAL	
	2100-1434-02	ISEM, 3.0 Software, 3.5-in 540MB MO Drive, 64-MB, NTSC	
	2100-1435-02	ISEM, 3.0 Software, 5.25-in MO Drive, 64-MB, NTSC	
	2950-1164-01	Isolator, 3.1Lb Min, 5 Lb Max Load	
Figure 14-33	1065-4501-01	Isolator, Speaker, Monitor	
Figure 14-25	2950-0613-01	Isolator, Vibration, Xfrm	
Figure 14-44	4400-0092-02	Keycap Set, English	Use on 3500-2636-XX keyboard
	4400-0093-02	Keycap Set, French	Use on 3500-2525-XX keyboard
	4400-0094-02	Keycap Set, German	Use on 3500-2527-XX keyboard
	4400-0096-02	Keycap Set, Scandinavian	Use on 3500-2527-XX keyboard
Figure 14-24	2208-0229-01	Kit, Retainer Clip, Linecord	Kit includes screw, flat-washer and nut.

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-63	1065-2611-02	Knob, Brake Lever	
Figure 14-59	4400-0103-02	Knob, Push-Pull, 3/4D, Stud/Nylok, Blk	DVS/APM module
Figure 14-62			(for slide tray), 2 Plcs
Figure 14-13	9903-0338-02	Label, 1.0 x 0.5, Plystr, Wht, Ammo-pak	Behind panel
Figure 14-14			
Figure 14-15			
Figure 14-16			
Figure 14-66			
Figure 14-67			
Figure 14-68	4100-0299	Label, 2D/TM, 4000B, Footswitch	
Figure 14-68	4100-0942-02	Label, ACIM Voltage, 100-120V/60-Hz	
	4100-0943-02	Label, ACIM Voltage, 100-120V/50-Hz	
	4100-0944-02	Label, ACIM Voltage, 230-240V/50-Hz, 7.5A	
	4100-0945-02	Label, ACIM Voltage, 230V/60 Hz, 7.5A	
Figure 14-68	4100-1255-01	Label, ADAPTR	
	4100-1816-01		Philips HDI 5000 system
Not shown	4100-1811-01	Label, APM Remote	Philips HDI 5000 system
Not shown	4100-1821-01	Label, Blanking, Scanhead Select	Philips HDI 5000 system
Figure 14-67	4100-0993-01	Label, Caution, PCB Removal	
Figure 14-67	4100-1531-02	Label, Chinese ID	
Figure 14-68			

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-68	4100-1256-01	Label, CPU	Philips HDI 5000 system
	4100-1817-01		
Figure 14-66	9903-0538-01	Label, DHHS Radiation Compliance, 1-7/8 x 5/8-in, Domestic systems only	
Figure 14-68	4100-0757-01	Label, Footswitch, Water-resistant	
Figure 14-67	4100-1399-01	Label, Frame OEM Upright, Dark Grey	
Figure 14-68	4100-0296	Label, Freeze Frame, 4000B, Footswitch	
Figure 14-68	4100-0968-01	Label, Ground and AC Input	
Figure 14-66	4100-1041-01	Label, Latching Monitor, Right-Hand	
Figure 14-66	4100-1042-01	Label, Latching Monitor, Left-Hand	
Figure 14-66	4100-1607-01	Label, Microphone Symbol	Behind panel
	4100-1813-01		Behind panel, Philips HDI 5000 system
Figure 14-66	4100-1431-01	Label, MISEM Connector, Remote	
Figure 14-67	4100-0958-01	Label, OEM Baseplate	Philips HDI 5000 system
	4100-1820-01		
Figure 14-68	4100-1433-01	Label, PCB Slot ID	Located inside of front cover, outside of rear cover
	4100-1433-02	Label, PCB Slot ID, 170.XX systems and above	
	4100-0961-02	Label, PIM	Philips HDI 5000 system
	4100-1815-01		

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-66	4100-0960-01	Label, Power Input, Monitor	
	4100-1812-01		Philips HDI 5000 system
Figure 14-67	4100-1238-01	Label, Right Side Cover	Alternate to 4100-1399-01
	2100-1631-01	Label, Software, Windows NT WS MLP, WINNT 4.0	Software license
Figure 14-66	4100-0966-02	Label, System ID	
	4100-1807-01	Label, System ID, CV	Philips HDI 5000 system
	4100-1806-01	Label, System ID, General Imaging	Philips HDI 5000 system
	4100-1808-01	Label, System ID, Sono CT	Philips HDI 5000 system
Figure 14-67	4100-0948-01	Label, System Serial Number	
Figure 14-66	4100-0959-01	Label, System Standby-On	
	4100-1809-01		Philips HDI 5000 system
Figure 14-68	4100-0297	Label, VCR, 4000B, Footswitch	
Figure 14-66	4100-1393-01	Label, Warning, High Voltage	
	4100-1814-01		Philips HDI 5000 system
Figure 14-66	4100-1260-01	Label, Warning, Monitor Latch	
	4100-1819-01		Philips HDI 5000 system
Figure 14-66	4100-1568-01	Label, Warning, Monitor Lock	
	4100-1810-01		Philips HDI 5000 system
Figure 14-68	4100-1387-01	Label, Warning, Power Cord	
	4100-1818-01		Philips HDI 5000 system

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-40	1065-4264-02	Latch, Lock Bar	
Figure 14-30	2405-0124-01	LED, Green, T1, 4MCD, Clear, PCB	
Figure 14-30	2950-1161-01	Lens, LED, 3MM, Green, Low Profile	
Figure 14-40	1065-4263-01	Lock Bar, Control Panel	
Figure 14-37	2100-1403-01	Microphone Cartridge, Cond., Electret	
Figure 14-37	3500-2631-02	Microphone Module Assy	Turtle style
	3500-2631-03		-03 is used for FIMI monitor
Figure 14-71	2100-1868-01	Microphone, Monitor Mounted	Labtec Compatible with both HDI 5000 and Philips HDI 5000 system monitors
Figure 14-82	1065-5885-01	Midwall, Command Module Cover	Philips HDI 5000 system
Figure 14-61	See the HDI 5000 Master Compatibility Matrix for part numbers	Module, CODEC Combo, with Digital Interface	DVS/APM module See Figure 16-34 for PCB locations by name
Figure 14-96	3500-3443-02	Module, Cooling, L10.5	Philips HDI 5000 system
Figure 14-30	2100-1346-08	Monitor, 15-inch, Color, Open Chassis	Use 2100-1346-08 with 3500-2532-11 monitor assy, 2100-1346-09 with 3500-2532-14, 2100-1471-01 with 3500-2971-01, and 2100-1589-01 with 3500-3040-01
	2100-1346-09		
	2100-1471-01		
	2100-1589-03/04		
	2100-1589-05		

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-71	3500-3434-02	Monitor Assembly, 15-inch, with Handle	Philips HDI 5000 system
Figure 14-64	1544-0012	Nut, 1/4-20, Keps, St, Zn	
Figure 14-17	1539-0003	Nut, 4-40, Keps, St, Zn	
Figure 14-56			
Figure 14-6	1541-0002	Nut, 6-32, Keps, St, Zn	
Figure 14-13			
Figure 14-14			
Figure 14-15			
Figure 14-16			
Figure 14-17			
Figure 14-56			
Figure 14-57			
Figure 14-34	1543-0002	Nut, 10-32, Keps, St, Zn	
Figure 14-26			
Figure 14-47			
Figure 14-57	1065-5015-02	OEM Housing	DVS/APM module
Figure 14-58	1065-5872-01	OEM Housing	DVS/APM module (for slide tray)
Figure 14-26	2601-0071-01	OEM Power Transformer, 350VA, 1 Pri/ 2Sec, Shielded	
Figure 14-27	1065-2386-01	OEM Strap, Universal	
Figure 14-54			
Figure 14-83			

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Not shown	4100-1764-01	Overlay, Upper UIF	English, French, German, Italian
	4100-1765-01		(10.4 systems)
	4100-1766-01		
	4100-1767-01		
Not shown	4100-1802-01	Overlay, Upper UIF, L10.5	English, French, German, Italian
	4100-1803-01		(Philips HDI 5000 system)
	4100-1804-01		
	4100-1805-01		
Figure 14-81	1065-5940-02	Overmold, Palm Rest (Wrist Support)	Philips HDI 5000 system
Figure 14-5	1065-4638-01	Pad, Foot Rest, Dark Gray	Requires adhesive
Figure 14-60	1065-5875-01	Panel, Blanking, Drives, Bracket	DVS/APM module
Figure 14-61	1065-4798-04	Panel, Face, PCB, CODEC	DVS/APM module
	1065-4798-03		Alternate
Figure 14-56	1065-5848-01	Panel, I/O Motherboard, P4	DVS/APM module
Figure 14-6	1065-2254-04	Panel, IIM Access	
Figure 14-31	1065-5967-01	Panel, Monitor Control, L10.5	New color Philips HDI 5000 system
Figure 14-29	1065-4676-01	Panel, Monitor Cover	Use with 1065-4691-01 cover
Figure 14-57	1065-5939-01	Panel, Mount, Front Bezel	DVS/APM module

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-13	1065-1946-05	Panel, Mounting, Disk Drive Module	
Figure 14-14			
Figure 14-15			
Figure 14-16			
Figure 14-86	1065-5916-01	Panel, Rear	Philips HDI 5000 system
Figure 14-19	1065-4945-01	Panel, Rear, Dark Gray	
Figure 14-86	1065-5944-01	Panel, Rear Opening	Philips HDI 5000 system
Figure 14-88	1065-5917-01	Panel, Shield, Front Section	Philips HDI 5000 system
Figure 14-89	1065-5918-01	Panel, Shield, Left Section	Philips HDI 5000 system
Figure 14-89	1065-5919-01	Panel, Shield, Right Section	Philips HDI 5000 system

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-21	See the HDI 5000 Master	PCB Assy, Adv. Digital/Audio/Physio and Translator (ADAPTR), A9B	See Figure 13-2 for PCB locations by name
Figure 14-21	Compatibility Matrix for part numbers	PCB Assy, Adv. IF Output Module (AIFOM), A12B or A12B/A13B	
Figure 14-23		PCB Assy, AC Input Module (ACIM), PS4/PS5, All voltage and freq. configurations	
Figure 14-10		PCB Assy, Centerplane, Front	
Figure 14-10		PCB Assy, Centerplane, Rear	
Figure 14-10		PCB Assy, Channel Board	
Figure 14-10		PCB Assy, Channel Boards (CB0-CB7), A7F-A14F	
Figure 14-61		PCB Assy, CODEC Module	DVS module See Figure 16-34 for PCB locations by name
Figure 14-14		PCB Assy, Disk Drive Module, with Physio	See Figure 13-1 for PCB locations by name
Figure 14-15			
Figure 14-13		PCB Assy, Disk Drive Module, without ECG	
Figure 14-16			
Figure 14-61		PCB Assy, DVS Power-On	DVS/APM module See Figure 16-34 for PCB locations by name

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-61	See the HDI 5000 Master Compatibility Matrix for part numbers	PCB Assy, Ethernet Board, 10/100 Base TX	DVS/APM module See Figure 16-34 for PCB locations by name
Figure 14-96	7500-1973-01	PCB Assy, Fan Limiter	Philips HDI 5000 system
Figure 14-10	See the HDI 5000 Master	PCB Assy, Front End Controller (FEC), A4F	See Figure 13-1 for PCB locations by name
Figure 14-21	Compatibility Matrix for part numbers	PCB Assy, Image Memory (IMEM), A8B, 64-Mb	16 Mb x 4 SIMMS See Figure 13-2 for PCB locations by name
Figure 14-21		PCB Assy, Internal Interface Module (IIM), A1B	See Figure 13-2 for PCB locations by name
Figure 14-61		PCB Assy, MISEM Digital Interface	DVS/APM module See Figure 16-34 for PCB locations by name
Figure 14-31	7500-1312-02 7500-1582-01 7500-1667-05 7500-1964-01	PCB Assy, Monitor Control	Use 7500-1312 for 3500-2532-XX monitor, 7500-1667 for 3500-3040-XX, and 7500-1582 for 3500-2971-XX
Figure 14-32	7500-1313-02	PCB Assy, Monitor Light Bar	
Figure 14-74			

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-61	See the HDI 5000 Master Compatibility Matrix for part numbers	PCB Assy, Motherboard, DVS, with 450-MHz Processor	DVS module See Figure 16-34 for PCB locations by name Alternate
Figure 14-61		PCB Assy, Motherboard, DVS/APM	See Figure 16-34 for PCB locations by name
Figure 14-21		PCB Assy, Peripheral Interface Module (PIM), A2B	See Figure 13-2 for PCB locations by name
Figure 14-21		PCB Assy, Pixel Conversion Module (PCM), A3B	
Figure 14-21		PCB Assy, Pixel Space Processor 2 (PSP2), A4B	
Figure 14-21		PCB Assy, Pixel Space Processor 1 (PSP1), A5B	
Figure 14-10		PCB Assy, Power Supply Module (PSM), PS1	See Figure 13-1 for PCB locations by name
Figure 14-10		PCB Assy, Regulator Module A6F	
Figure 14-10		PCB Assy, Scanhead Select, L10.5	Philips HDI 5000 system, see Figure 13-1 for PCB locations by name

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-61	See the HDI 5000 Master Compatibility Matrix for part numbers	PCB Assy, SCSI Controller	DVS/APM module, see Figure 16-34 for PCB locations by name
Figure 14-21		PCB Assy, Signal Processor Module SPM2X, A11B	See Figure 13-2 for PCB locations by name
Figure 14-21		PCB Assy, Signal Processor Module (SPM), A11B	
Figure 14-21		PCB Assy, System CPU, A6B,	
Figure 14-43		PCB Assy, User Interface Module	
Figure 14-61	See the HDI 5000 Master Compatibility Matrix for part numbers	PCB Assy, Video/Ethernet Board	DVS/APM module. See Figure 16-34 for PCB locations by name
Figure 14-57	1065-5092-01	PCB Snubber	DVS/APM module
Figure 14-62	1065-5408-02	Pin, Detent, OEM Tray, Sliding	Use with wear strip 4100-1784-01
Figure 14-52	2950-0851-01	Pin, Hitch, 0.07 Wire, 0.38/0.5 Shaft, St,	
Figure 14-77	1065-6071-01	Pin, Spring Plunger	Philips HDI 5000 system
Figure 14-96	1065-5880-03	Plate, Air Inlet	Philips HDI 5000 system
Figure 14-47	1065-2576-02	Plate, Cable Clamp, Left	

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-47	1065-2577-02	Plate, Cable Clamp, Right	
Figure 14-18	1065-2951-02	Plate, Cover, OD Drive, DDEA	
Figure 14-65	1065-2153-01	Plate, Footswitch	
Figure 14-77	1065-5887-01	Plate, Lower Arm	Philips HDI 5000 system
Figure 14-34	1065-2372-04	Plate, Monitor Swivel	
Figure 14-77	3000-0809-01	Plate, Mount, Lower Arm Assembly	Philips HDI 5000 system
Figure 14-26	1065-2533-02	Plate, Stud, Sinewave Transformer	
Figure 14-27	1065-2385-04	Plate, Universal OEM	
Figure 14-27	1065-5972-01	Plate, Universal OEM, L10.5	New color Philips HDI 5000 system
Figure 14-77	1065-5893-01	Plate, Upper Arm Mount	Philips HDI 5000 system
Figure 14-29	2950-0587-01	Plug, Hole, 0.562D, 1/8 Max, Pnl, Wht, Nylon	Without VCR
Figure 14-29	2950-1377-01	Plug, Hole, 0.5Dia, 0.67Head Dia, Nyl Nat	
Figure 14-13	2950-1041-01	Plug, Hole, ECG, Painted	
Figure 14-16			
Figure 14-13	2950-1040-01	Plug, Hole, Physio, DDEA, Painted	
Figure 14-16			
Figure 14-23	2208-0143-01	Plug Lock, Inside, Detach Power Cord	For 3100-2148-01
Figure 14-23	2208-0144-01	Plug Lock, Outside, Detach Power Cord	For 3402-0026-01
Figure 14-57	1700-0111-02	Power Supply	DVS/APM module Figure 16-38

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-25	2601-0052-06	Power Transformer Assy, Ferro-Res, 1200 VA, w/Shld	50-60 Hz
Figure 14-23	3100-2148-01	Receptacle, IEC, Male, 10A, Pnl/PCB	
Figure 14-77	1065-5626-02	Retainer, Lower Bearing	Philips HDI 5000 system
Figure 14-56	1065-5022-03	Retainer, PCB	DVS/APM module
Figure 14-78	1065-6086-01	Retainer, Spring	Philips HDI 5000 system
Figure 14-34	1065-2438-01	Ring, Clamping, Monitor Swivel	
Figure 14-52	1065-2904-05	Rod, Detent, Tray	
Figure 14-34	1065-4584-02	Rod, Spacer, Monitor Installation	For older systems/system upgrades only. The new monitor collar on the cart weldment is taller and replaces this part.
Figure 14-50	1065-2899-01	Rotor, Cable Manager	
Figure 14-77	1530-0384-01	Screw, 1/4 - 20x1/2, Skt, Cap, Ft, Hd, Ss	Philips HDI 5000 system
Figure 14-43	1514-0083	Screw, 4-40 x 1/4, Pnh, Sems, Pd, Ss	Attaches user interface PCB assy
Figure 14-48	1530-0027-01	Screw, 4-40 x 1/2, Flh, Pd, 82D, St, Wht	
Figure 14-59	1530-0095-01	Screw, 4-40 x 3/8, Flh, Pd, 100D, Ss, Pas	Attaches knob mounting bracket to DVS/APM module slide tray
Figure 14-78	1530-0386-01	Screw, 4-40 x 3/8, Pnh, Pd, Nylok, St, Zn	
Figure 14-17	1514-0060	Screw, 4-40 x 3/8, Pnh, Sem, Pd, St, Zn	
Figure 14-18			

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-76	1530-0385-01	Screw, 5/16 - 24x1.25, Bh, Hd, Astm F835	Philips HDI 5000 system
Figure 14-77			
Figure 14-74	1530-0336-01	Screw, 6-32 x 1/4, Flh, 100D, Pd, Nylk, Stzn	
Figure 14-57	1516-0112	Screw, 6-32 x 1/4, Pnh, Sem, Pd, St, Zn	
Figure 14-60			
Figure 14-77	1530-0383-01	Screw, 6-32 x 1/4, Set, Skt, Cone, St, Zn	
Figure 14-51	1517-0014	Screw, 8-32 x 1/4, Pnh, Pd, St, Zn	
Figure 14-52	1517-0061	Screw, 8-32 x 1/4, Pnh, Sems, Pd, St, Zn	
Figure 14-22	1516-0074	Screw, 6-32 x 3/8, Pnh, Sem, Pd, St, Zn	
Figure 14-26			
Figure 14-31			
Figure 14-32			
Figure 14-96			
Figure 14-97Fi			
gure 14-51			
Figure 14-52			
Figure 14-56			
Figure 14-57			
Figure 14-60			
Figure 14-18	1530-0269-01	Screw, 6-32 x 1/2, Flh, Pd, 100D, Ss, Fogwhite	

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-6	1516-0113	Screw, 6-32 x 1/2, Pnh, Sem, Pd, St, Zn	
Figure 14-7			
Figure 14-8			
Figure 14-32			
Figure 14-13			
Figure 14-14			
Figure 14-15			
Figure 14-16			
Figure 14-50			
Figure 14-51			
Figure 14-74			
Figure 14-81			
Figure 14-17	1516-0076	Screw, 6-32 x 5/16, Pnh, Int Sems, Pd, Ss	
Figure 14-50	1530-0058-01	Screw, 6-32 x 7/16, Pnh, Nylok, Pd, Ss	
Figure 14-33	1530-0327-01	Screw, 6-32 x 3/4, Pnh, Pd, Nylock, St, Zn	
Figure 14-57	1516-0121	Screw, 6-32 x 7/8, Pnh, Sems, Pd, St, Zn	
Figure 14-10	1563-2863-01	Screw, 6-32 x 1, Captive, HD, St, Zn	Attaches scanhead select module (14 places)
Figure 14-52	1516-0119	Screw, 6-32 x 1-1/4, Pnh, Sem, Pd, St, Zn	
Figure 14-56			
Figure 14-81			
Figure 14-56	1517-0005	Screw, 8-32 x 3/8, Flh, Pd, 100D, St, Zn	

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-81	1516-0119	Screw, 6-32 x 1-1/2, Pnh, Sem, Pd, St, Zn	
Figure 14-27	1517-0040	Screw, 8-32 x 3/8, Pnh, Sems, Pd, St, Zn	
Figure 14-46			
Figure 14-63	1530-0360-01	Screw, 8-32 x 3/8, Set, Hd, Flat, Pt, Zn	Requires a 5/64-in Allen wrench
Figure 14-5	1517-0012	Screw, 8-32 x 1, Pnh, Pd, St, Zn	
Figure 14-85	1530-0328-01	Screw, 10-32 x 1/4, Pnh, Pd, Sems, St, Zn	
Figure 14-94			
Figure 14-51	1530-0046-02	Screw, 10-32 x 5/16, Pnh, Pd, St, Zn	
Figure 14-27	1518-0060	Screw, 10-32 x 1/2, Pnh, Pd, St, Wht	
Figure 14-3	1518-0051	Screw, 10-32 x 1/2, Pnh, Sem, Pd, St, Zn	
Figure 14-5			
Figure 14-39			
Figure 14-77			
Figure 14-80			
Figure 14-82			
Figure 14-63	1530-0347-01	Screw, 10-32 x 1/2, Skh, Cap, Hd, Nylok, Zn	

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-85	1518-0052	Screw, 10-32 x 5/8, Pnh, Sem, Pd, St, Zn	
Figure 14-86			
Figure 14-88			
Figure 14-89			
Figure 14-91			
Figure 14-92			
Figure 14-93			
Figure 14-97			
Figure 14-90	1530-0157-01	Screw, 10-32 x 5/8, Skh, Cap, Hd, Nylok, Zn	
Figure 14-92			
Figure 14-93			
Figure 14-7	1518-0043	Screw, 10-32 x 3/4, Pnh, Pd, St, Zn	
Figure 14-20			
Figure 14-51			
Figure 14-91			
Figure 14-92			
Figure 14-47	1530-0156-01	Screw, 10-32 x 1, Flh, Pd, Fog White	
Figure 14-34	1530-0297-01	Screw, 10-32 x 1, Pnh, Pd, Sems, St, Zn	
Figure 14-17	1630-0113-01	Screw, M3 x 6, Pnh, Pd, Int Sems, Ss, Bz	See kit 8000-2574-01
Figure 14-31	1630-0090-01	Screw, M4 x 6, Pnh, Pd, Int Sems, Ss, Bo	See kit 8000-1462-01
Figure 14-36	1630-0058-01	Screw, M4 x 10, Pnh, Pd, Sems S/R Lk, St, Zn	

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-59	1630-0101-01	Screw, M4 x 12, Flh, Pd, St, Zn	Attaches CP800 Color Printer to DVS/APM module slide tray, 4 Plcs
Figure 14-29	1630-0098-01	Screw, M5 x 12, Pnh, Pd, Int Sems, St, Bo	
Figure 14-36			
Figure 14-72			
Figure 14-13	3100-1387-01	Screwlock, 0.18-25H, 0.31L Stud, Pair	
Figure 14-14			
Figure 14-15			
Figure 14-16			
Figure 14-48			
Figure 14-95	3000-0807-03	Seal Assembly, Foam, Cooling	Comprises parts 1065-5882-03, 1065-5883-03, and 1065-5884-03. Comes assembled from vendor. Philips HDI 5000 system
Figure 14-17	1065-4682-01	Seal, Support, MO Drive, DDEA	
Figure 14-76	1065-5892-01	Shaft, Yoke Bearing	Philips HDI 5000 system
Figure 14-77			
Figure 14-7	3500-1877-01	Shield Assy, Card Cage, Front Left	
Figure 14-7	3500-1876-01	Shield Assy, Card Cage, Front Right	
Figure 14-19	3500-1878-04	Shield Assy, Card Cage, Rear	
Figure 14-60	1065-5087-01	Shield, EMI, Disk Drive, MISEM	DVS/APM module

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-45	3600-0283-01	Shield, Strip, Finger, 0.34W, 0.07H	Part of 2950-1179-01, Figure 14-20
Figure 14-17	3600-0242-01	Shield, Strip, Finger, 1.13x4.0L	
Not shown	1065-5849-02	Shroud, Fan, ATX Motherboard	DVS/APM module
Figure 14-59	1065-5410-01	Slide, OEM Tray, Sliding	DVS/APM module
Figure 14-52	2950-1066-01	Slides, No Lock, 3-Section, 17-in Travel, Left/Right	Come in pairs
Figure 14-14	1064-0130-01	Spacer, Connector, Plastic	
Figure 14-15			
Not shown	1065-4199-01	Spacer/Shield, Centerplane	
Not shown	1065-2986-02	Spacer/Shield, Centerplane (170.XX systems)	
Figure 14-33	2100-1235-01	Speaker, 3.5-in, 8-Ohm, SHLD, 8W, Ex, Rng	
Figure 14-78	2950-1587-01	Spring, Comp, .21D, .75L, 3.3LBF/in, Mw	Philips HDI 5000 system
Figure 14-77	2950-1586-01	Spring, Comp, .24D, .75L, 1.9LBF/in, Mw	Philips HDI 5000 system
Figure 14-50	2950-0856-01	Spring, Comp, .42 OD, 1.5L, K=8.75, Ss	
Figure 14-62	1065-5415-02	Spring, Detent, OEM Tray	DVS/APM module
Figure 14-31	4600-0113-01	Standoff, 6-32, 1.0L, 1/4 Hex, F/F, AL	See kit 8000-1462-01
Figure 14-31	4600-0271-01	Standoff, 6-32, 1.0L, 1/4 Hex, F/F, Nylon	See kit 8000-1462-01
Figure 14-50	4600-0237-01	Standoff, 6-32, 2.5L, 5/16 Rnd, F-F, Ss	

Table 14-1 HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-77	4600-0298-01	Standoff, 10-32, 0.125L, 1/4RND, F/F, NY	Philips HDI 5000 system, Limits rotation of monitor arm to prevent OEMs from being knocked on the floor.
Figure 14-61	1065-4925-01	Standoff, MOD	DVS/APM module
Figure 14-30	2208-0147-01	Standoff, Wire, 3/16, Push-in, Twist, Ny	
Figure 14-36			
Figure 14-50	1065-2901-01	Support, Cable Manager	
Figure 14-36	1065-2683-01	Support, VCR	
Figure 14-42	3300-0307-01	Switch, Rocker, Spst, 1A, 28V, Blk/Blk, Pnl	
Not shown	2604-0119-01	Tape, Velcro, 1-in W, Blk, Type 400, 3/4-in L	Secures ferrite core on 3500-2614-XX cable assy to monitor
Figure 14-25	2950-0512-01	Terminal Boot, Cap Insulator, Rubber	
Figure 14-44	2100-1480-01	Trackball, 480C/Rev, 2-in, Sealed, Pnl	
Figure 14-44	2100-1480-02	Trackball, 480C/Rev, 2-in, Sealed, Pnlmt	
Figure 14-44	2100-1867-01	Trackball, 480C/Rev, 2-in, Sealed, Pnlmt	Philips HDI 5000 system
Figure 14-8	1065-2953-01	Tray, Enclosure	
Figure 14-57	1065-5016-03	Tray, OEM	DVS/APM module
Figure 14-53	2100-1743-01	Tray, OEM, Mitsubishi, CP700/CP800	Mounts to Universal OEM Plate
Figure 14-51	1065-2907-04	Tray, OEM Remote	
Figure 14-51	3500-1856-03	Tray, OEM Remote, Assy	Part of ISEM

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-58	1065-5874-01	Tray, OEM, Sliding	DVS/APM module
Figure 14-59			
Figure 14-54	2100-1537-01	Tray, Paper Catch, Clr, Printer, CP800	Catch Tray comes supplied with four felt pads for the printer feet.
Figure 14-59			
Figure 14-41	See the HDI 5000	User Interface Assy, Upper (UCP)	
Figure 14-43	Master		
Figure 14-41	Compatibility	User Interface Assy, Lower (LCP)	
Figure 14-44	Matrix		
Figure 14-37	9901-0035	Velcro, Hook & Loop, Wht.1-in Wd	
Figure 14-28	3500-2971-01	Video Monitor Assy, HDI 15-in	
	3500-3040-08	Video Monitor Assy, HDI 15-in Color, (FIMI)	Replaces -05
	3500-3040-09	Video Monitor Assy, HDI 15-in Color, (FIMI)	Replaces -06
	3500-3040-10	Video Monitor Assy, HDI 15-in Color, (FIMI)	Replaces -07
	3500-2532-11	Video Monitor Assy, HDI 15-in Color, (Microvitek)	Alternate to -15/16
	3500-2532-15/-16	Video Monitor Assy, HDI 15-in Color, (Microvitek)	
Figure 14-3	3500-1857-01	Video Switch Assy	Fits on OEM remote tray

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-77	1561-0032	Washer, Ext Lock, #10, .410OD, .025T, St, Zn	
Figure 14-5 Figure 14-33 Figure 14-46 Figure 14-50	1560-0050	Washer, Flat, 0.17ID, 0.438OD, 0.032T, St, Zn	
Figure 14-17 Figure 14-43	1560-0065	Washer, Flat, #4, 0.122ID, 0.28OD, 0.03T,	Attaches user interface PCB assy
Not shown	1560-0031	Washer, Flat, #6, 0.156ID, 0.38OD, 0.015T, SS	Attaches centerplane PCB
Figure 14-17 Figure 14-51	1560-0046	Washer, Flat, #6, 0.156ID, 0.375OD, 0.049T, St, Zn	
Figure 14-6 Figure 14-31 Figure 14-32 Figure 14-50 Figure 14-56 Figure 14-60 Figure 14-74	1560-0061	Washer, Flat, #6, 0.312OD, 0.32T, St, Zn	
Figure 14-52	1560-0073	Washer, Flat, #8, 0.185ID, 0.437OD, 0.062T, Ny	

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-7	1560-0051	Washer, Flat, #10, 0.203Id, 0.500D, 0.04T, St, Zn	
Figure 14-20			
Figure 14-29			
Figure 14-34			
Figure 14-72			
Figure 14-85			
Figure 14-88			
Figure 14-89			
Figure 14-90			
Figure 14-91			
Figure 14-92			
Figure 14-93			
Figure 14-63	1560-0020	Washer, Flat, 1/4, 0.6250D, 0.065T, St, Zn	
Figure 14-64			
Figure 14-98			
Figure 14-63	1561-0001	Washer, Internal Lock, 1/4, 0.4780D, 0.025T	
Figure 14-64			
Figure 14-98			
Figure 14-24	1561-0005	Washer, Internal Lock, #4, .270OD, .019T, St, Zn	Part of hardware used for mounting the new retainer clip on the AC Input Module.
Figure 14-51	1561-0015	Washer, Internal Lock, #10, 0.38OD x 0.025T, St, Zn	

Table 14-1

HDI 5000/Philips 5000 System Parts List (Continued)

Located On	Part Number	Part Description	Notes/Reference
Figure 14-76	1561-0017	Washer, Internal Lock, 5/16, .610OD, .034T, St, Zn	Philips HDI 5000 system
Figure 14-77			
Figure 14-33	1065-4502-01	Washer, Isolation, Speaker, Monitor	
Figure 14-77	1065-5888-01	Washer, Lower Shoulder	Philips HDI 5000 system
Figure 14-77	1065-5889-01	Washer, Lower Thrust	Philips HDI 5000 system
Figure 14-33	1562-0016-01	Washer, Shoulder, #6, 0.14ID, 0.17SD, 0.29OD, Ny	
Figure 14-76	1565-0082-01	Washer, Thrust, Selflube, 620D, 38Id	Philips HDI 5000 system
Figure 14-77			
Figure 14-62	4100-1784-01	Wear Strip, Sliding Tray	Use with Detent Pin 1065-5408-02
Figure 14-11	1065-1972-XX	Weldment, Card Cage	
Figure 14-12			
Figure 14-63	2950-0857-01	Wheel, Axle Assy	2 each side
Figure 14-64		Wheel, Caster Assy	2 each caster
Figure 14-45	3500-2739-01	Wrist Support, Self-Adhesive, Dark Gray	

Accessories

Parts List

Table 14-2

HDI 5000 System Accessories Parts List (Not Illustrated)

Part Number	Part Description	Notes/Reference
4252-0898-01	DVS Diagnostics MO Disk, 1.0 Software	
4252-0898-03	DVS Diagnostics MO Disk, 2.0 Software	
2100-1887-01	Universal Modem, MultiTech MT5634ZBA-V92	Ships on Philips HDI 5000 systems by request of Customer Service
8500-9116-01	Kit, Accessory Tool	Hitachi system
9905-0396-01	Screwdriver, #1 Phillips, 3-1/8-in Shaft	
9905-0397-01	Screwdriver, 7/64-in Ball Hex, 6-in Shaft	
9903-0517-01	Bag, Zipper, Ring Binder, 9.5 x 6-in	
8000-1257-02	Kit, Caster Assy, with Hubcap	
2100-1419-01	Kit, Cleaning, Optical Drive, Fujitsu	Use with drive 2100-1416-01
8000-1682-01	Kit, Dependency 1512 MO Drive with Bracket	Contains: 2100-1512-01, 1065-5058-01
8000-1969-01	Kit, Dependency, 1646 MO DDEA Drive w/Bracket (w/standard hardware)	Contains: 2100-1646-01, 1065-5058-01
8000-2573-01	Kit, Dependency, 1928 MO DDEA Drive wo /Bracket (SCSI w/metric hardware)	Contains: 2100-1928-01
8000-2574-01	Kit, Dependency, 1928 MO DDEA Drive w/Bracket (SCSI w/metric hardware)	Contains: 2100-1928-01, 1065-5058-01
8000-2575-01	Kit, Dependency, 1928 MO DVS Drive w/Bracket (SCSI w/metric hardware)	Contains: 2100-1928-01, 1065-5058-01

Table 14-2 HDI 5000 System Accessories Parts List (Not Illustrated) (Continued)

Part Number	Part Description	Notes/Reference
8000-2163-01	Kit, Dependency, IBM, 15.3-GB with Software Utility	Contains 2100-1736-01,
8000-2001-01	Kit, Dependency, IBM, Adapter, Adhesive Clamp, Ops Notes	Contains 2100-1636-01
8000-1900-01	Kit, Dependency, IBM Assembly and Adhesive Clamp	Contains 3500-3077-01 (2100-1636-01)
8000-1906-02	Kit, Dependency, Monitor/Microphone	
8000-1671-02	Kit, Dependency, Rear Cover, 2 Swivel Casters	
8000-1462-01	Kit, New Dependency, Monitor Cover	Contains: 1065-4691-02 , 1065-4314-03 , 1630-0090-01 , 4600-0271-01
8000-1278-02	Kit, Plastic Rear Cover, 4 Swivel Casters	
8000-1668-01	Kit, UIF Cable Clamps	Alternate to 1065-4800-01
8000-2235-01	Kit, XCVR Support Bracket	
2100-0792-01	Optical Disk, 3.5-in 128-MB (blank)	
2301-0700-01	Paint, Touch Up, Fog White, 1 oz. Bottle	
2301-0701-01	Paint, Touch Up, Fog White, 16 oz. Aerosol	

Peripherals

Parts List

Table 14-3

Peripherals and Applicable Cables (Not Illustrated)

OEM Description	Part Numbers		
	OEM	Power Cable	Signal Cable
Access Acquisition Module, 115V, NTSC, Internal Installation.	2100-7071-01	3500-1517-05	2275-0327-01 2275-0395-01
Access Acquisition Module, 115V, NTSC, External Installation.	2100-7071-01	3500-1517-05	2275-0394-01 2275-0396-01
Camera, Aspect MIC, 120V, NTSC, English	3500-1664-01	3500-1873-02	3500-1539-03
Camera, Aspect MIC, 240V, PAL, English	3500-1665-01	3500-2397-03	3500-1539-03
Camera, Aspect MIC, 240V, PAL, French	3500-1671-01	3500-2397-03	3500-1539-03
Camera, Aspect MIC, 240V, PAL, German	3500-1667-01	3500-2397-03	3500-1539-03
DVS Module	3500-XXXX-XX	3500-3030-01	3500-2921-01 2275-0402-01
External OEM with coax connector (P/N is for BNC cable, 6 ft. length).	-	-	2275-0176
External OEM with coax connector (P/N is for I-RGB cable).	-	-	3500-2644-01
External OEM with coax connector (P/N is for NI-RGB cable).	-	-	2275-0326-01
ISEM, 3.5-in/32-MB, PAL	2100-1370-03	3500-2397-03	3500-2641-02 3500-2633-01

Table 14-3

Peripherals and Applicable Cables (Not Illustrated) (Continued)

OEM Description	Part Numbers		
	OEM	Power Cable	Signal Cable
ISEM, 3.5-in/64-MB, NTSC	2100-1434-02	3500-1873-02 3500-2633-01	3500-2641-02
ISEM, 5.25-in/32-MB, PAL	2100-1369-02	3500-2397-03 3500-2633-01	3500-2641-02
ISEM, 5.25-in/64-MB, NTSC	2100-1435-02	3500-1873-02 3500-2633-01	3500-2641-02
Monitor, Video (power cable is 115V with right angle connector on monitor end)	3500-2532-XX	3500-2616-01	2275-0325-03
Printer, B&W, Mitsubishi P91, 120/230V, NTSC/PAL (use either power cable)	2100-1680-01	3500-1873-02 3500-2397-03	3500-1540-04
Printer, B&W, Sony UP890, 120/230V, NTSC/PAL (use either power cable)	2100-0862-01	3500-1873-02 3500-2397-03	3500-1540-04
Printer, B&W, Sony UP895MD, 120/230V, NTSC/PAL (use either power cable)	2100-1855-01	3500-1873-02 3500-2397-03	3500-1540-04
Printer, B&W, Sony UP910CE, Large Format, 240V, 50-Hz, PAL	2100-0759-01	3500-2397-03	3500-1540-04
Printer, B&W, Sony UP910MD, 120V, NTSC	2100-0701-01	3500-1873-02	3500-1540-04
Printer, Codonics NP1660MD, NetLink, North America	2100-1566-01	-	2275-0335-01
Printer, Codonics NP1660MD, NetLink, International	2100-1567-01	-	2275-0335-01

Table 14-3

Peripherals and Applicable Cables (Not Illustrated) (Continued)

OEM Description	Part Numbers		
	OEM	Power Cable	Signal Cable
Printer, Color, Mitsubishi, CP700, 120V (3500-3071-01 is printer with feet)	3500-3071-01 2100-1327-01	3500-1873-02	3500-2641-02
Printer, Color, Mitsubishi, CP700, 240V (3500-3072-01 is printer with feet)	3500-3072-01 2100-1328-01	3500-2397-03	3500-2641-02
Printer, Color, Mitsubishi, CP800, 120V (3500-3063-01 is printer with feet)	3500-3063-01 2100-1535-01	3500-1873-02	3500-2641-02
Printer, Color, Mitsubishi, CP800, 240V (3500-3064-01 is printer with feet)	3500-3064-01 2100-1536-01	3500-2397-03	3500-2641-02
Printer, Color, Mitsubishi, CP50E, 240V	-	3500-1547-05	3500-2643-01
Printer, Color, Sony UP-21MD NTSC/PAL	2100-1852-01	3500-1873-02	3500-2641-02
Printer, Color, Sony UP5600-60-Hz, 155Vac, NTSC	2100-0847-01	3500-1873-02	3500-2641-02
Printer, Color, Sony UP5600-60-Hz, 120Vac, NTSC (Domestic US use only)	2100-1476-01	3500-1873-02	3500-2641-02
Printer, Color, Sony UP5600-50-Hz, 155Vac, PAL	3500-1694-01	3500-2397-03	3500-2641-02
VCR, w/RS232 Interface, AGMD830P, 120V, Figure 14-36	3500-1662-02	3500-2780-01	3500-1404-06
VCR, w/RS232 Interface, AGMD830P, 240V, Figure 14-36	3500-1663-01	3500-2781-01	3500-1404-06

Table 14-3

Peripherals and Applicable Cables (Not Illustrated) (Continued)

OEM Description	Part Numbers		
	OEM	Power Cable	Signal Cable
VCR, Assy, W/RS232, AGMD835P, 120V	3500-3234-01	3500-2780-01	3500-1404-06
VCR, Assy, W/RS232, AGMD835E, 240V, PAL	3500-3235-01	3500-2781-01	3500-1404-06
VCR, Sony SVO-9500MD	3500-1875-01	3500-2780-01	3500-1404-06
VCR, Mitsubishi, HSMD3000, 120V	3500-3542-01	3500-2780-01	3500-1404-06
VCR, Mitsubishi, HSMD3000, 240V	3500-3543-01	3500-2780-01	3500-1404-06

15 Scanheads

Scanheads

[Table 15-1](#) contains the scanhead name that appears on the system monitor, the scanhead label, the scanhead frequency, and the Doppler frequency of system scanheads.

[Table 15-2](#) contains a summary of scanhead types, capabilities, and advantages. In addition to the scanheads listed in the table, the system is also capable of using the Endo 12-5 Endoscopic Scanhead manufactured by Olympus. This scanhead is not sold by Philips and does not have a part number.

Scanhead

Matrix

Not all scanhead types may be supported by a specific system software level.

- Order scanheads by scanhead type or name and part number and current dash level.
- Backward compatible ([Bkwd Comp.](#)) indicates the previous versions which the latest dash level replaces.

Scanhead

Biopsy Guides

Scanhead biopsy guides can no longer be purchased from Philips Ultrasound. Supplies and accessories are now available from CIVCO Medical Instruments. Refer to "[Supplies and Accessories](#)" on page 47 for information.

Table 15-1 Scanhead Information

Scanhead Name	No. Elems.	Scanhead Label	Operating Frequency	Doppler Frequency
L7-4 38 mm	128	Linear Array L7-4	7.0 - 4.0 MHz	4.0 MHz
LI9-5	128	Linear Array LI9-5	9.0 - 5.0 MHz	5.0 MHz
LAP L9-5	128	Linear Array L9-5	9.0 - 5.0 MHz	6.0 MHz
L10-5 38 mm	192	Linear Array L10-5	10.0 - 5.0 MHz	6.0 MHz
L12-5 38 mm	192	Linear Array L12-5	12.0 - 5.0 MHz	6.0 MHz
L12-5 50 mm	256	Linear Array L12-5	12.0 - 5.0 MHz	6.0 MHz
CL10-5	128	Compact Linear Array CL10-5	10.0 - 5.0 MHz	6.0 MHz
CL15-7	128	Broadband Linear Array CL15-7	15.0 - 7.0 MHz	6.0 MHz
C4-2 40 mm	128	Curved Array C4-2	4.0 - 2.0 MHz	2.5 MHz
C5-2 40 mm	128	Curved Array C5-2	5.0 - 2.0 MHz	2.5 MHz
C7-4 40 mm	128	Curved Array C7-4	7.0 - 4.0 MHz	4.0 MHz
CT8-4 40 mm	128	Curved Array CT8-4	8.0 - 4.0 MHz	6.0 MHz
C8-4v 11 mm	128	Curved Array C8-4v	8.0 - 4.0 MHz	5.0 MHz
C8-5	128	Curved Array C8-5	8.0 - 5.0 MHz	5.0 MHz
C9-5 ICT 8 mm	128	Curved Array C9-5	9.0 - 5.0 MHz	5.0 MHz
P3-2 20 mm	64	Phased Array P3-2	3.25 - 1.75 MHz	2.0 MHz
P4-1 20 mm	128	Phased Array P4-1	4.0 - 1.0 MHz	2.0 MHz
P4-2 20 mm	64	Phased Array P4-2	4.0 - 2.0 MHz	2.0 MHz
P5-3 16 mm	64	Phased Array P5-3	5.0 - 3.0 MHz	3.0 MHz
P6-3 28 mm	128	Phased Array P6-3	6.0 - 3.0 MHz	3.0 MHz

Table 15-1

Scanhead Information (Continued)

Scanhead Name	No. Elems.	Scanhead Label	Operating Frequency	Doppler Frequency
P7-4 16 mm	64	Phased Array P7-4	7.0 - 4.0 MHz	4.0 MHz
MPT7-4 10 mm	64	Phased Array MPT7-4	7.0 - 4.0 MHz	4.0 MHz
BPT9-5	2x64	Phased Array BPT9-5	9.0 - 5.0 MHz	6.0 MHz
BPTRT9-5	2x128	Broadband Dual Array	9.0 - 5.0 MHz ¹	6.0 MHz ¹
TCD Static	1	D2 TC		2.0 MHz
D2 Static	2	D2 CW		2.0 MHz
D5 Static	2	D5 CW		5.0 MHz
D10 Static	2	D10 CW		10.0 MHz

1. The operating frequency and the Doppler frequency are the same for the curved and linear arrays for this scanhead.

Table 15-2

Scanhead Types, Capabilities, and Advantages

Type	Capabilities	Advantages
Linear Array		
- L7-4 40 mm	- 2D, M-mode, pulsed Doppler, Power, and Color	- Dynamic receive focus for optimal lateral resolution
- LI9-5 33 mm		- Multiple transmit focal zones
- LAP L9-5		- Wide field of view
- L10-5 38 mm		- High frame rate
- L12-5 38 mm		- Excellent tissue definition and contrast resolution
- L12-5 50 mm		- Excellent small parts imaging
- CL10-5		
- CL15-7		
- BPTRT9-5		
Curved Array		
- C4-2 40R	- 2D, M-mode, pulsed Doppler, Power, and Color	- Combines the advantages of phased array and linear array scanheads
- C5-2 40R		- Multiple transmit focal zones
- C7-4 40 mm		- Sector format with wide field of view at skin surface
- C8-4v		- Aperture size consistent across sector results in good lateral resolution
- CT8-4		- Dynamic receive focus
- C8-5		- Excellent resolution and detail
- C9-5 8 mm		- Design is lightweight and easy to use
- BPTRT9-5		- C5-2 has Contrast Specific Imaging capability

Table 15-2

Scanhead Types, Capabilities, and Advantages (Continued)

Type	Capabilities	Advantages
Phased Array		
- P3-2 20 mm	- 2D, M-mode, pulsed Doppler, CW	- Multiple transmit focal zones
- P4-2 20 mm		- Dynamic receive focus
-) P4-1 20 mm	Doppler (except P6- 3), Power, Color, and Color M-mode	- MPT7-4 for transesophageal applications
- P5-3 16 mm		- P3-2, P4-2, and P5-3 have Contrast Specific Imaging capability
- P6-3 28 mm		
- P7-4 16 mm		
- MPT7-4 10 mm		
- BPT9-5		
Pencil Probes		
- D2 CW	- CW Doppler	- Good continuous-wave Doppler sensitivity
- D5 CW		
- D10 CW		
- D2 TC	- Pulsed Doppler	- Good pulsed Doppler sensitivity

Table 15-3

Scanhead Software Compatibility Matrix

Scanhead	Part Number	Dash Number			No. Elel.	Hardware Notes	S/W Comp. ²
		Cur- rent	Bkwd Comp. ¹	EMC ³			
PHASED ARRAY							
P3-2 20 mm	4000-0287	04	03	04	64		107.10
P4-1 20 mm	4000-0900	01	-	01	128	Supports biopsy guide ⁴	198.06
P4-2 20 mm	4000-0660	02	-	02	64	Supports biopsy guide ⁴	124.13
P5-3 16 mm	4000-0316	05	-	05,04	64	Supports biopsy guide ⁴	107.10
P6-3 mm	4000-0647	02	01	02	128	Supports biopsy guide ⁴	107.10
P7-4 8 mm	4000-0322	02	-	02	64	Supports biopsy guide ⁴	107.10
MPT7-4	4000-0317	17	16, 11, 10	16,	64	-16 supports 3D	107.10
				11		on 170.30	
BPT9-5	4000-0420	01	-	01	2x64	Supports biopsy guide ⁴	170.30
BROADBAND LINEAR ARRAY							
L7-4	4000-0318	09,08	05	05	128	Supports biopsy guide ⁴	107.10
LAP L9-5	4000-0658	04	-		128		127.04
LI9-5	4000-0408	01	-		128		127.04
L10-5 38 mm	4000-0263	06	-		192	Supports biopsy guide ⁴	170.30
L12-5 38 mm	4000-0396	05	04	02 ⁵	192	Supports biopsy guide ⁴	107.10

Table 15-3

Scanhead Software Compatibility Matrix (Continued)

Scanhead	Part Number	Dash Number			No. Elel.	Hardware Notes	S/W Comp. ²
		Cur- rent	Bkwd Comp. ¹	EMC ³			
L12-5 50 mm	4000-0762	03	02	01	256	Supports biopsy guide ⁴	127.04
CL10-5	4000-0315	06	05	05,04	128		108.15
CL15-7	4000-0765	02	-	-	128		190.13
BPTRT9-5	4000-0903	01	-	01	2x128	Has curved and linear arrays Supports biopsy guide ⁴	195.25
CURVED ARRAY							
C4-2	4000-0320	07	05, 03	03-06	128	Supports biopsy guide ⁴	108.15
C5-2 40R	4000-0574	03	02, 01	01	128	Supports biopsy guide ⁴	107.10
C7-4 40R	4000-0301	07, 06	06	04-06	128	Supports biopsy guide ⁴	107.10
C8-4v 11mm	4000-0409	02	-	02	128	Supports biopsy guide ⁴	107.10
CT8-4 40 mm	4000-0390	04, 03	03	-	128	Supports biopsy guide ⁴	127.04
C8-5 14R	4000-0676	05	04	03,02	128	Supports biopsy guide ⁴	107.10
C8-5 14R	4000-0820	01	-		128	Supports biopsy guide ⁴	127.09
C9-5 ICT	4000-0280	17, 18	15, 16	14,15, 16	128	Supports biopsy guide ⁴	107.10
BPTRT9-5	4000-0903	01	-	01	2x128	Has curved and linear arrays	195.25

Table 15-3

Scanhead Software Compatibility Matrix (Continued)

Scanhead	Part Number	Dash Number				S/W Comp. ²
		Cur- rent	Bkwd Comp. ¹	EMC ³	No. Elem.	
STATIC CW						
D2 TC	4000-0310	02	-	02	1	107.10
D2 CW	4000-0307	05	04	03	2	107.10
D5 CW	4000-0308	02	-	02	2	107.10
D10 CW	4000-0309	02	-	02	2	107.10

1. The "Bkwd Comp." column lists dash numbers that are backward compatible with the listed scanhead.
2. The "S/W Comp." column lists the minimum software build level required for use of the listed scanhead.
3. The "EMC" column lists dash numbers of scanheads which may be ordered worldwide (must use EMC scanheads for Europe). Non-EMC scanheads may be ordered for domestic U.S. and other countries.
4. Refer to ["Supplies and Accessories" on page 47](#).
5. Scanhead part number 4000-0396-01 should not be used.

16 DVS/APM Supplement

General Information

The Digital Video Streaming (DVS) option refers to a process that allows real-time digital video to be compressed and streamed to and from the hard drive. The Advanced Processing Module (APM) is a hardware module similar to the DVS module, but is used to support image processing for Advanced 3D Imaging, Panoramic Imaging, and XRes. The image processing includes 3D volume and multi-planar views.

The DVS module supports the cardiology market and may be configured with various MO and hard drives. The APM supports the general imaging market and is configured only with a 3.5-in MO drive and without a SCSI hard drive. Although the APM module and the DVS module use similar hardware, they have different functions.

The APM module is used for image processing and does not store images. RLE images (Run Length Encoded) are compressed into RAM for Advanced 3D, Panoramic Imaging, and XRes image processing. The images are stored, transferred, and archived using the ultrasound system. The DVS module is for digital video streaming and image storage. A patient name must be entered to acquire images. Both modules use specialized compression hardware for "on-the-fly" compression capabilities. The APM and DVS options cannot be simultaneously configured on the same ultrasound system.

The DVS and APM modules are located in the HDI 5000 OEM bay and are designed to allow installation of various OEMs including an MD830 VCR or a CP700 or CP800 printer. Both the DVS and APM modules are operated using the system control panels, however, the DVS module can also be operated using an optional hand controller. Both modules use the Windows NT operating system and are similarly connected to the HDI 5000 system with a bidirectional digital RGB video interface.

With the DVS option configured, DiskLink, NetLink, and WebLink networking functionality are disabled, however, DICOM store and WorkList capabilities are still functional if they are properly configured in the MO file.

ResearchLink is functional on DVS systems, however, data transfer is via MO disk. Data transfer is not available through the network when using ResearchLink on DVS systems.

Refer to [Table 16-1](#) for DVS/APM hardware specifications and to [Section 2, "Specifications"](#), for system specifications.

Table 16-1 DVS/APM Hardware Specifications

Parameter	Specification	DVS 1.0	DVS 2.0	APM 1.0	APM 2.0
Motherboard	SOYO SY-5EMA+	X			
	American Predator,		X	X	
	Raptor ATX/2				
Processor	MSI (Microstar International)				X
	645 UltraC				
	AMD K6-2/450 MHz	X			
	Pentium III 850 MHz		X	X	
	Pentium IV 2.2 GHz				X
Memory	384 MB SDRAM	X	X	X	
	512 MB SDRAM (2x256)				X
Network Interface Cards	DC21143, SMC1211TX	X	X	X	X
SCSI Adapter	Adaptec AHA-2940UW	X			
	Adaptec AHA-19160		X	X	

Table 16-1 DVS/APM Hardware Specifications (Continued)

Parameter	Specification	DVS 1.0	DVS 2.0	APM 1.0	APM 2.0
EIDE Interface					X
Custom Video Card	CODEC Module		X	X	X
Operating System	Windows NT 4.0		X	X	X
Disk Drives	3.2 GB IDE (C:)		X		
	15.3 GB IDE (C:)			X	X
	18 GB SCSI (D:)	X	X		
	40 GB EIDE (D:)				X
Applications Software	Captures prospective loops		X	X	
	Panoramic Imaging			X	X
	Advanced 3D Imaging				
	XRes				

Safety

There are no safety requirements specific to the DVS or APM modules. Refer to [Section 3, "Safety"](#), for general safety requirements.

DVS/APM Theory of Operation

Power Supply

- Single-phase, 250-Watt, 6-output connectors to various devices
- 115/230 Vac input selector switch
- Supplies the motherboard, disk drives, and fans

Motherboard

- AMD K6-2 CPU 450 MHz (DVS 1.0), Pentium III CPU 850 MHz (DVS 2.0 and APM 1.0), or Pentium IV CPU 2.2 GHz (APM 2.0)
- 3x128 MB SDRAM (384 MB RAM)
2x256 MB SDRAM (512 MB RAM)
- Supports 4 PCI slots (only 3 are filled)
- Generates overlay graphics
- Receives and transmits overlay graphics to and from the PIM
- Converts RLE (Run Length Encoding) information to digital RGB

CODEC Module

- Real-time compression and decompression of digital images
- Video streaming

Video Ethernet Card

- SVGA compatible with a VESA feature connector to CODEC Module
- Supports 10 Base2, 10 BaseT, and 100 BaseTX network capabilities
- PCI Interface

Ethernet Card

- Supports 10/100 BaseT networking to HDI 5000 system

SCSI Disk Controller

- Controls SCSI hard drive (DVS only), internal MO drive, and external MO drive (if connected on DVS 1.0/2.0 and APM 1.0, not used on APM 2.0)

- Supports 16-bit and 8-bit SCSI devices
- PCI interface

EIDE Hard Drive

- Uses 16-bit EIDE bus
- Stores the operating system, general application, and configuration files

SCSI Hard Drive (on DVS only)

- Video streaming and image storage

MO Drive

- Internal 3.5-in, 640 MB, internal 5.25-in 5.2 GB (DVS only), or external drive (DVS 1.0/2.0 and APM 1.0)
- 8-bit SCSI bus interface for DVS 1.0/2.0 and APM 1.0, or EIDE interface for APM 2.0
- Removable video image storage for large files

Floppy Disk Drive

- 1.44 MB
- General purpose file transfer and upgrading device drivers

Installation

Refer to DVS/APM upgrade instructions on the customer service CD ROM.

NOTE To prevent cabling damage during system shipments, the DVS/APM cabling may have been removed from the system, wrapped in bubble-wrap, and stored in the OEM bay. The cables include the LVDS cable (2275-0402-01) and the 10 Base 2 Coax Cable Assy for MISEM (3500-2921-01).

DVS Performance Tests

Setup

► To set up the DVS module for performance tests

1. Power up the system.
2. Verify the system is configured for the DVS option (8501-8703-XX, Stress Echo, and 8501-9606-XX, Digital Echo).
3. Connect a laptop to the system using a serial connection.
4. Start UpLink.
5. Click Connection, Connect, and the Serial Port tab.
6. Verify the Auto-Login box is checked.
7. Click Continue and No.
8. Click the Bootup Parameters button.
9. Verify the NVRAM parameters are setup as indicated in [Table 16-2](#).
10. Disconnect the laptop and exit UpLink.
11. Power down the system.
12. Verify the DVS Module is properly connected to the ultrasound system ([Figure 16-39](#)).
13. Power up the system and the DVS Module.
14. Verify the compression timer is displayed (indicating the DVS Module has booted correctly).
15. Press Patient Data.
16. Select New Patient.

17. Enter a patient name and other information into the data fields.
18. Close the Patient Data Entry form.
19. Verify the Digital Echo and Stress Echo options are enabled (["Show Installed Options" on page 270](#)).
20. Connect and select a phased array scanhead.
21. Select the Adult Card/General preset.
22. Press COLOR.
23. Increase COL GAIN until color pixels are displayed.
24. Press BASELINE up repeatedly until blue color pixels are displayed.
25. Press Setups.
26. Select Acquisition Parameters.
27. Select Configure Clips in the User Options menu.
28. Set the capture parameters as indicated in [Table 16-3](#).
29. Select Close.

Table 16-2**DVS NVRAM Parameter Settings**

NVRAM Parameter	Setting
Boot Device	scsi
Processor Number	0
Host Name	
File Name	/hd0/peg_hd/pegasus.st
Inet on Ethernet	149.59.48.3:ffffff00
Inet on Backplane	
Host Inet	
Gateway Inet (g)	
User (u)	vxboot
FTP Password	
Flags (f)	0x28
Target Name (tn)	standalone
Startup Script (s)	/hd0/peg_hd/boot.vsh

Table 16-3**DVS Module Capture Parameter Settings**

Parameter	Setting
Capture Format	Dual
Accept Prior to Save	On
ECG Trigger	On
Capture Length	Time/15 sec
Compression	Lossy High

Image Capture

► To capture an image

1. Connect an ECG simulator to the system.
2. Set the simulator to 60 or 120 bpm.
3. Press INVERT.
4. Use the trackball to position the region of interest (ROI) to the left side of the display.
5. Press CAPTURE.
6. Verify the capture has completed.
7. Press ACCEPT.
8. Press CAPTURE and PAUSE.
9. After about 30 seconds, press RESUME.
10. Verify the capture has been completed.
11. Press ACCEPT.
12. Move the ROI to the right side of the display.
13. Press CAPTURE.
14. Verify the capture process has been completed.
15. Press REJECT.
16. Move the ROI to the center of the display.
17. Press CAPTURE and DONE.
18. Press ACCEPT.
19. Press M MODE and UPDATE.
20. Press PRINT.
21. Press INVERT and PRINT.

22. Press PROTOCOL.

23. Select End.

Image Review

► **To review an image**

1. Press NET/DISK.
2. Select Directory.
3. Select the patient name from the Hard Drive subdirectory.
4. Select the date of the study listed in the patient's subdirectory.
5. Select Freeform under the date of the subdirectory.
6. Select the clips and frames in the right window of the Patient Directory menu.
7. Select Load at the bottom of the display.
8. Press TOOLBAR to load image review tools.
9. Select X on the toolbar repeatedly until the image appears.

Image Management

► **To perform image management functions**

1. Insert an MO disk into the DVS Module drive.
2. Press NET/DISK.
3. Select Directory.
4. Select the patient name from the list.
5. Select Copy To and OK. A confirmation message appears when the clips and frames have been copied.
6. Select the arrow to the right of Hard Drive on the NET/DISK menu.
7. Select Optical.
8. From the Optical subdirectory select the patient name.

9. Select Copy To and OK.
10. Select the arrow to the right of the Optical menu and Hard Disk.
11. Select the last date under the patient subdirectory.
12. Select Freeform under the date subdirectory.
13. Highlight the clips or frames and select Load.
14. Verify the clips are displayed.
15. Press REVIEW until the 2D image is displayed.
16. Reboot the system with the ON/STANDBY switch.
17. Press NET/DISK.
18. Select Directory.
19. Highlight the patient data.
20. Select OK, and then Close.
21. Press NET/DISK.
22. Select Format Disk.
23. Select Optical.
24. Select Format.
25. Select OK.
26. Press NET/DISK.
27. Select Eject Disk.
28. Select Optical.
29. Select Eject Disk.

APM Performance Tests

Panoramic Imaging

► To set up the APM for testing

1. Power up the system.
2. Verify the system is configured for 8501-9984-01, Panoramic Imaging.
3. Connect a laptop to the system using a serial connection.
4. Start UpLink.
5. Click Connection, Connect, and the Serial Port tab.
6. Verify the Auto-Login box is checked.
7. Click Continue and No.
8. Click the Bootup Parameters button.
9. Verify the NVRAM parameters are setup as indicated in [Table 16-4](#).
10. Disconnect the laptop and exit UpLink.
11. Power down the system.
12. Verify the APM is properly connected to the ultrasound system ([Figure 16-39](#)).
13. Power up the system

► To set up the ultrasound system for APM tests

1. Press Setups.
2. Select Image Management and press SELECT.
3. Select General Options and press SELECT.
4. In the Use Print Button To box, select Store To Disk.

5. Click Close to exit Setups.
6. Press the PANORAMA softkey. Verify the following message is displayed:
"Patient name and ID required. Press Patient Data key, and enter the patient name and ID."
7. Select OK.
8. Press Patient Data.
9. Select New Patient.
10. Enter a patient name and other information into the data fields.
11. Click close to exit the Patient Data Entry form.

Table 16-4

APM NVRAM Parameter Settings

NVRAM Parameter	Setting
Boot Device	scsi
Processor Number	0
Host Name	
File Name	/hd0/peg_hd/pegasus.st
Inet on Ethernet	149.59.48.3:fffff00
Inet on Backplane	
Host Inet	
Gateway Inet (g)	149.59.48.2
User (u)	vxboot
FTP Password	
Flags (f)	0x28
Target Name (tn)	standalone
Startup Script (s)	/hd0/peg_hd/boot.vsh

► To verify Stand-by Live operation

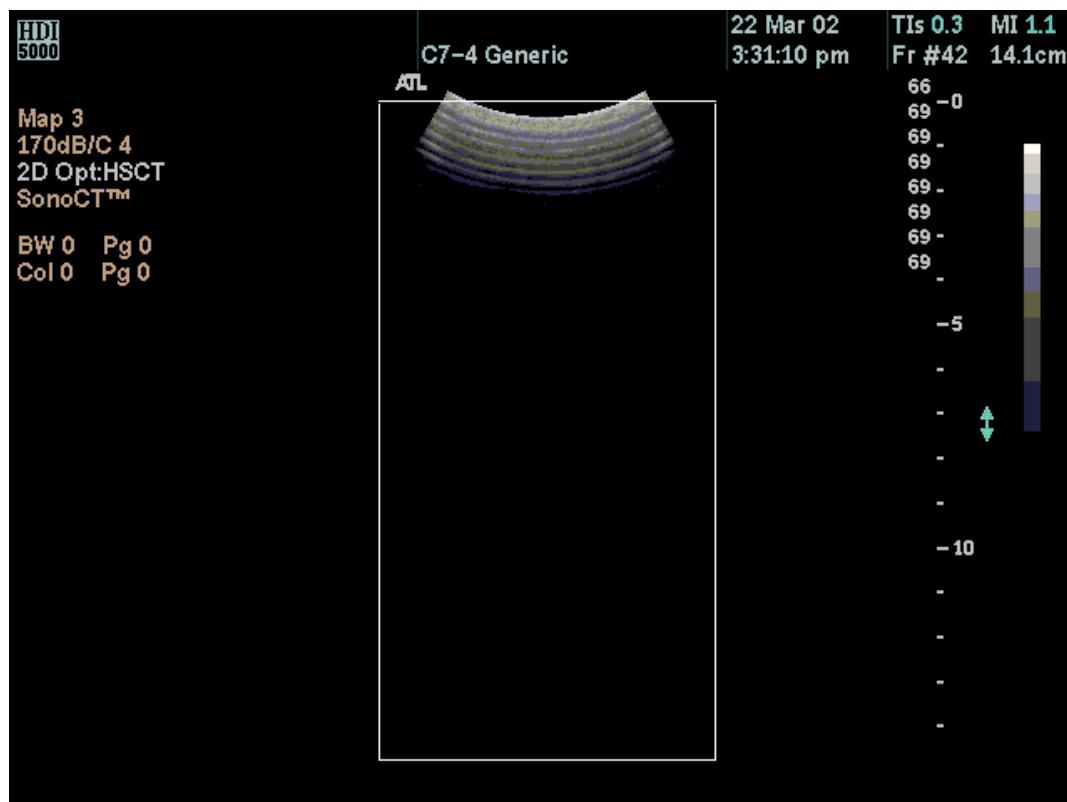
NOTE When using Stand-by Live, the system switches to a 2D image format, turning off features such as Physio /ECG trace, biopsy line and the M mode cursor.

1. Connect a C5-2 scanhead to the left scanhead connector.
2. Press Scanhead and select the Generic/General preset.
3. Press the PANORAMA softkey. A capture window is displayed in the sector ([Figure 16-1](#)).

4. Verify the EXIT and START softkeys are displayed and the Persistence value is removed from the non-essential annotation. Repeatedly press Superkey+E to change the persistence.
5. Press the EXIT softkey.
6. Press HARMONIC to enable THI.
7. Press PANORAMA softkey. Verify only one focal zone is displayed in the Stand-by live image.
8. Press the EXIT softkey.
9. Verify that pressing the EXIT softkey returns the system to Live 2D.
10. Verify the Persistence value is displayed in the non-essential annotation.
11. Verify the Persistence value returns to what was set prior to entering Panoramic Imaging, or what was selected using the Superkey E key.
12. Press HARMONIC to exit THI mode.

Figure 16-1

Stand-by Live Capture Window



► **To change modes**

1. Verify Panoramic Imaging can be entered (by means of the softkey) from other imaging modes.
2. Change from live 2D Stand-by image to Color mode.
3. Press the PANORAMA softkey. Verify the system changes back to live 2D imaging.
4. Press FREEZE. Verify the PANORAMA softkey is no longer displayed.
5. Press the EXIT softkey.

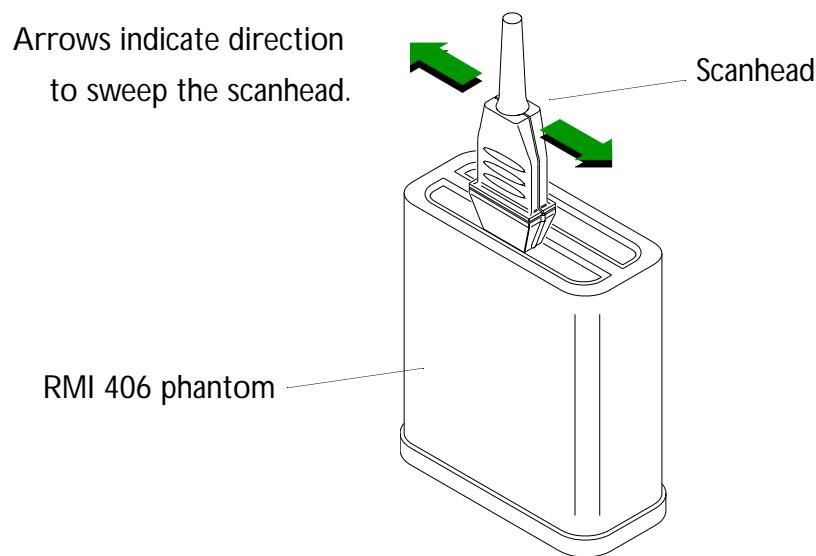
► **To acquire an image**

1. Press the PANORAMA softkey.
2. Obtain an RMI phantom and apply enough water to the phantom surface to prevent "drag" (i.e., erratic movement across the phantom).
3. Couple the scanhead to the phantom.
4. Press the START softkey.
5. Move the scanhead over the surface of the phantom slowly and evenly ([Figure 16-2](#)).

NOTE Seams may result in the image if the scanhead is moved unevenly, twisted during movement, or moved too fast. Blurring may result from tilting the scanhead.

Figure 16-2

Panoramic Imaging Scanhead Sweep Direction



6. Verify the Compounding Box is displayed in the composite image.
7. Move the scanhead along the width of the image. Verify that as the composite image is being formed, the right portion of the image reaches the right boundary, then moves off the display.
8. Move the scanhead in the reverse direction. Verify a portion of the composite image has been erased.

NOTE Follow the original scanning path to avoid creating a seam at the point where the retrace begins.

► **To terminate Panoramic image acquisition**

1. Press FREEZE. Verify the acquired panoramic image size is reduced to fit within the display.
2. Verify the ATL® logo is displayed in the acquired image and there is no tearing, drop-out, or degradation in the acquired image.
3. Press FREEZE to unfreeze the image. Verify the capture area box is displayed.

► **To capture and review an image**

1. Acquire an image by moving the scanhead across a phantom surface. Continue scanning until the cine buffer is filled.
2. Verify the system goes into FREEZE when the buffer is filled.
3. Verify the acquired image size is reduced to fit within the display, the ATL Logo is displayed, and there is no tearing or drop-out in the acquired image.
4. Verify the CALCS, DISTANCE, AREA, and ADV MEAS buttons are disabled and no measurement cursors or calcs sidebars are displayed on the screen.
5. Verify the text, annotation, body marker, scanhead position and arrow buttons are enabled.

► **To verify primary softkey menu functions**

1. Verify the Primary Softkey menu is displayed with the AUTO FIT, ZOOM, PAN, ROTATION, and NEXT options.
2. Press the ZOOM softkey.
 - a. Verify rotating the trackball up or to the left zooms the image up, and rotating down or to the right decreases the size of the image.
 - b. Verify the image remains centered as it is being zoomed up or down and there is no tearing, drop-out, or degradation in the image as it is being zoomed, or after the image is returned to the AUTO FIT format.

- c. Zoom the image up. Press SELECT. Verify the trackball is no longer attached to the Zoom function.
3. Press the PAN softkey.
 - a. Verify rotating the trackball up or down moves the image up or down, and rotating left or right moves the image right or left.
 - b. Verify there is no tearing or degradation in the image as it is being panned.
 - c. Press SELECT. Verify rotating the trackball no longer pans the image.
4. Press the AUTO FIT softkey. Verify the image is resized and re-centered to fit within the display and there is no tearing, drop-out, or degradation in the image.
5. Press the ROTATION softkey.
 - a. Verify rotating the trackball rotates the image.
 - b. Verify the size and location of the image with respect to the display boundaries is unchanged as the image is rotated.
 - c. Verify there is no tearing, drop-out, or degradation in the image as the image is being rotated.
 - d. Press SELECT. Verify rotating the trackball no longer affects the rotation of the image.
6. Press the NEXT softkey. Verify the Secondary Softkey Menu is displayed.

► **To verify secondary softkey menu functions**

1. Verify the Secondary Softkey Menu is displayed with the REBUILD, SMOOTH, CINE, TRIM, and PREVIOUS options.

NOTE Using the image acquired in the previous steps (or acquiring a new panoramic image).

2. Press the REBUILD softkey.

- a. Verify the system restores the acquired image by replicating the scan as it occurred during initial acquisition.
 - b. Verify the Compounding Box is displayed during the image rebuilding process and no soft-keys are displayed.
 - c. Verify there is no tearing, drop-out, or image degradation in the image after the rebuild is complete and the system displays the Primary Softkey menu once the rebuilding is complete.
3. Press the NEXT softkey to display the Secondary Softkey menu.
 4. Press SMOOTH to cycle through each of the Smooth values (1-7).
 5. Verify a portion of the image is smoothed for each softkey depression.

► **To verify CINE softkey menu functions**

1. From the Secondary Softkey Menu, press CINE. Verify the CINE softkey menu is displayed with the PLAY and CINE OFF options.
2. Verify the system displays the panoramic image in a frozen state and is divided into two sections.
3. Verify the left side of the display contains individual full-scale frames of the panoramic image ("linear" image). Also, verify the right side of the display contains the panoramic image in the Auto Fit format and contains a reference box at one end of the image.
4. Rotate the trackball. Verify the reference box moves along the length of the panoramic image with trackball movement.
5. Verify the linear image in the left portion of the display updates with trackball movement.
6. Press the PLAY softkey. Verify the play softkey menu is displayed with the SPEED, PAUSE and CINE OFF options.

- a. Verify the capture box automatically moves through the panoramic image.
 - b. Verify the "linear" (left) image is constantly updated as the reference box moves through the auto fit panoramic image and there is no tearing, drop-out, or degradation of the panoramic image or the linear image as the reference box moves.
7. Press the SPEED softkey repeatedly to cycle through each setting (1 – 3). Verify the playback speed increases with each selection (i.e., the speed at which the reference box moves through the image should increase as the speed is increased).
 8. Press the CINE OFF softkey. Verify the system returns to the Review Stage.
 9. Verify the Primary Softkey menu is available, the panoramic image is displayed in the Auto Fit format, and there is no tearing, drop-out, or degradation of the panoramic image after exiting the cine review stage.

► **To verify Trim softkey menu functions**

1. From the Secondary Softkey Menu, press the TRIM softkey.
 - a. Verify the Trim softkey menu is displayed with the CANCEL, SET, and CUT options.
 - b. Verify a trim marker is displayed at one end of the panoramic image.
2. Use the trackball to move the trim marker through the image. Verify the trim marker can be moved to the opposite end of the image but not to the very edge.
3. Move the trim marker back to the edge of the image where it was initially displayed, but not to the very edge.
4. Press the SET softkey.
 - a. Verify a second trim marker is displayed.
 - b. Verify the first trim marker is anchored to its position and is no longer controlled by the trackball.

5. Move the second trim marker toward the center of the image.
6. Press the SET softkey and reposition the first trim marker. Repeat with the second trim marker.
7. Verify the prompt changes depending on which trim marker is active.
8. Press the CUT softkey.
 - a. Verify the system trims the outer edges of the panoramic image defined by the trim markers.
 - b. Verify the system prompts are removed from the display, and the Primary Softkey Menu is displayed, and there is no tearing, drop-out, or degradation in the trimmed section of the panoramic image.
9. Press the TRIM softkey.
10. Move the first trim marker toward the center of the image. Press the CUT softkey and verify the primary softkey menu is displayed.
11. Verify the system trims the image from the edge closest to the position the first trim cursor originated, to the position it was last placed.
12. Verify there is no tearing, drop-out, or degradation in the panoramic image after being trimmed. Verify the trimmed image can be zoomed, panned and rotated.

► **To verify PREVIOUS softkey function**

From the Secondary Softkey Menu, press the PREVIOUS softkey. Verify the system returns to the Primary Softkey Menu.

Advanced 3D

► **To verify Advanced 3D operation**

1. Power up the system.
2. Verify the system is configured for 8501-9985-01 Advanced 3D.

3. Acquire a 2D image using the L12-5 50 mm scanhead with any preset.
4. Press 3D UNCAL softkey and allow the buffer to fill at least 25 percent of capacity. Press FREEZE.
5. Verify a Secondary Softkey Menu consists of the first window containing CAPTURE second blanked out; the third containing STORE VL; the fourth containing REVIEW and the last with LABEL VL.
6. Press REVIEW and note the softkey menu will blank temporarily and a message will appear on the screen, "Processing 3D Data Please wait", followed by a 4-on-1 3D presentation.

NOTE Only the #3 frame is the 3D image. The other frames are X, Y, Z two-dimensional presentations of the 3D image.

7. Verify a Secondary Softkey Menu appeared consisting of EXIT, PAN, QUAD, LAYOUT, and X-HAIR.
8. Move the cursor and select the 3D frame (#3). Press Select again to manipulate the image.
9. Rotate or manipulate the 3D image using the trackball. Move the image up, down, right, and left. Verify the other frames rotate accordingly.
10. Press EXIT and FREEZE to unfreeze the system.

► **To verify XRes Image Processing operation**

1. Power up the system.
2. Verify the system is configured for 8501-1183-01 XRes Image Processing.
3. Connect a C5-2 scanhead to the system.

NOTE The C5-2 is preferred, however, XRes is also supported on the CL15-7, CL10-5, P6-3, C8-5, C8-5 ATL, C9-5 ICT, P12-5, and BPTRT9-5 scanheads.

4. Select the Generic/General optimized preset and select 2D mode.
5. Scan a phantom and verify that a normal 2D image is displayed with no artifacts.
6. Select XRes. Verify that the XRes LED is lit.
7. Verify that the XRes annotation is displayed on the mid-left side of the monitor and that the focal zone marker is annotated with an X.
8. Verify that the image is visibly different than the image acquired in [step 5](#).
9. Verify that XRes is operational in dual 2D imaging and in SonoCT Real-Time Compound Imaging.
10. Verify that XRes is functional on frozen images.
11. Select XRes to exit.

MicroVascular Imaging

This feature enhances the visibility of very low velocity flows and is available only with the L7-4.

► To verify MicroVascular Imaging operation

1. Power up the system.
2. Insert an MO disk into the APM MO drive.
3. Press Patient Data.
4. Select New Patient.
5. Enter a patient name and other information into the data fields.
6. Close the Patient Data Entry form.
7. Verify the system is configured for Advanced Contrast Imaging.

NOTE Advanced Contrast requires DiskLink to write to MO.

8. Connect an L7-4 scanhead to the system.
9. Select the General Imaging Contrast/General optimized preset and select 2D mode.
10. Verify a normal 2D image is displayed and that the system is acquiring data.
11. Adjust 2D GAIN so the background is visible.
12. Press the MVI softkey. Note the secondary EXIT and START softkeys are displayed.
13. Press the START softkey. Verify a real-time dual image is displayed on the right side of the display and the buffer box is being filled at the bottom of the image.
14. Tap the side of the scanhead and note the images updating.
15. Press the CLEAR softkey.
16. Tap the side of the scanhead and note the right image rebuilding.
17. Press FREEZE. A secondary softkey menu is displayed.
18. Press the SAVE softkey and wait for the prompt to disappear.
19. Press the EXIT softkey to return to 2D imaging.
20. Remove the MO disk and transfer the disk to a PC with a MO drive.
21. Select the Media Player located on the PC desktop shortcut. Bypass the Proxy Authorization request.
22. Select File, Open, and select the E drive.
23. Select the saved file for review and note the file plays automatically. Delete the file(s) as necessary to maintain sufficient memory on the MO disk.
24. Exit the Media Player.

Preventive Maintenance

► To perform DVS/APM preventive maintenance

1. Remove the video cable from the PIM PCB and the transceiver cables from the CPU PCBs.
2. Remove the module from the system.
3. Remove the top cover from the module (["Removing the DVS/APM Module Cover" on page 753](#)).
4. Clean the fan filter.
5. Vacuum dirt and lint from the rest of the module.
6. Replace the cover.
7. Install the module into the system.
8. Connect the video and transceiver cables.
9. Wipe and swipe the module exterior. Touch up as necessary.
10. Verify module operation for the DVS module (cardiac functions) and for the APM (Advanced 3D and Panoramic Imaging).

Diagnostics

This section covers the tools available to troubleshoot the DVS/APM modules. The diagnostic tools and troubleshooting methodology are the same for the DVS and APM modules. The differences between the DVS and APM diagnostics have been noted in the individual sections.

Required Tools and Equipment

- Laptop with UpLink, HyperTerminal, and VNC Viewer installed.
- Loop-back Connector (P/N 4500-6978-01) to check LVDS circuits on PIM and CODEC boards
- PROM Puller (P/N 198-12385-00)
- DVS Diagnostic MO Disk (P/N 4252-0898-03) to check PC components and to restore database, backup/restore user defined protocols on all DVS and APM configurations.

- DVS and APM Bootable MO Disk to reload Windows NT and Application software.

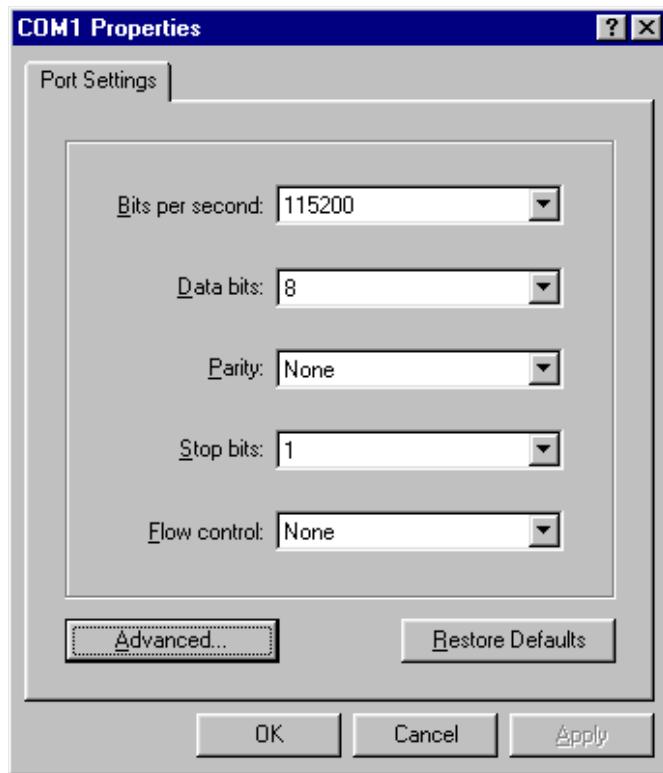
Laptop Setup

► To set up the laptop for HyperTerminal

1. Use the laptop to access the COM1 Properties dialog box and set the parameters to the values shown in [Figure 16-3](#).

Figure 16-3

DVS/APM COM1 Properties for HyperTerminal Setup



2. Use the laptop to access the DVS/APM Properties dialog box and set the parameters as shown in [Figure 16-4](#).
3. Connect the laptop to the DVS/APM as shown in [Figure 16-5](#).

Figure 16-4

DVS/APM Properties for HyperTerminal Setup

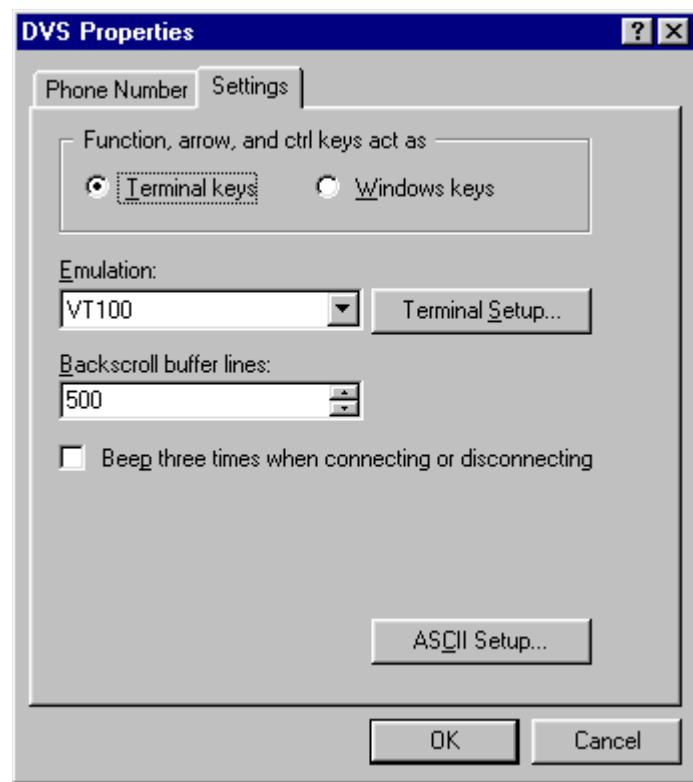
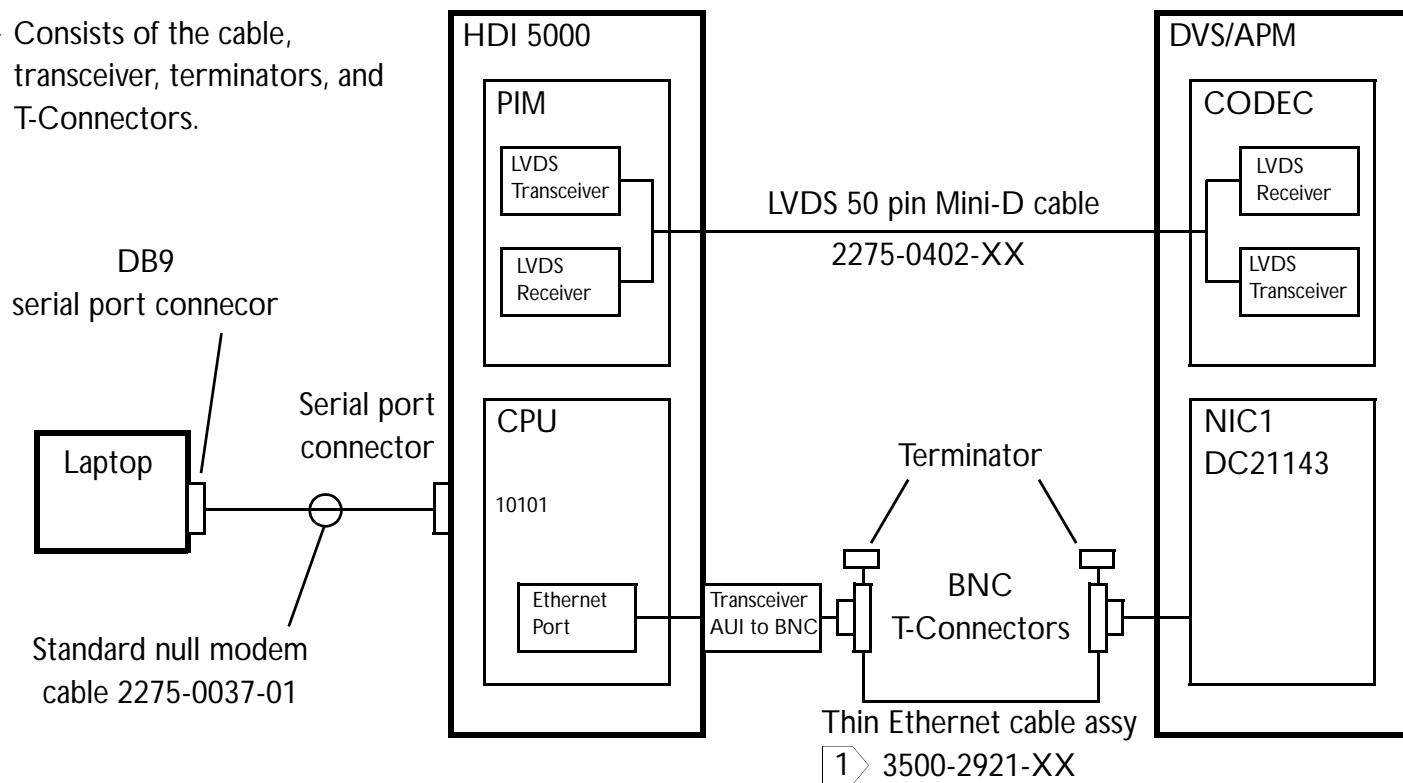


Figure 16-5

DVS/APM Serial Port Laptop Connection Diagram

- 1 Consists of the cable, transceiver, terminators, and T-Connectors.



► To install VNC Viewer

1. Verify the Service CD is at the most current level.
2. Insert the CD in the drive and install the VNC Viewer using the normal installation process.
3. Verify the network adapter card is installed in the laptop.

4. From the Windows desktop, right-click Network Neighborhood and click Properties.
5. Under the “Protocols” tab, highlight TCP/IP.
6. Click Properties, then click Specify IP Address.
7. Set the subnet mask to 255.255.255.0, then set the IP address to 10.10.10.11. Click OK.

NOTE If the DVS or APM modules were connected to the hospital network, record the system IP address and use a similar address for the laptop. For example, system IP address 192.168.1.100, and laptop address 192.168.1.101.

NOTE Communications errors will result from improper IP address syntax. Enter IP addresses with leading zeroes exactly as specified by the customer's IP addresses. For example, if the customer's IP addresses are listed as 192.168.001.100, you would use the laptop address as 192.168.001.101.

8. Reboot the laptop when prompted by Windows.

DVS/APM Power-up Errors

Refer to [Figure 16-6](#) through [Figure 16-17](#) to troubleshoot DVS/APM errors. Click on the links located in the individual blocks to navigate to the appropriate procedures.

Figure 16-6

DVS/APM Troubleshooting Diagram (1 of 12)

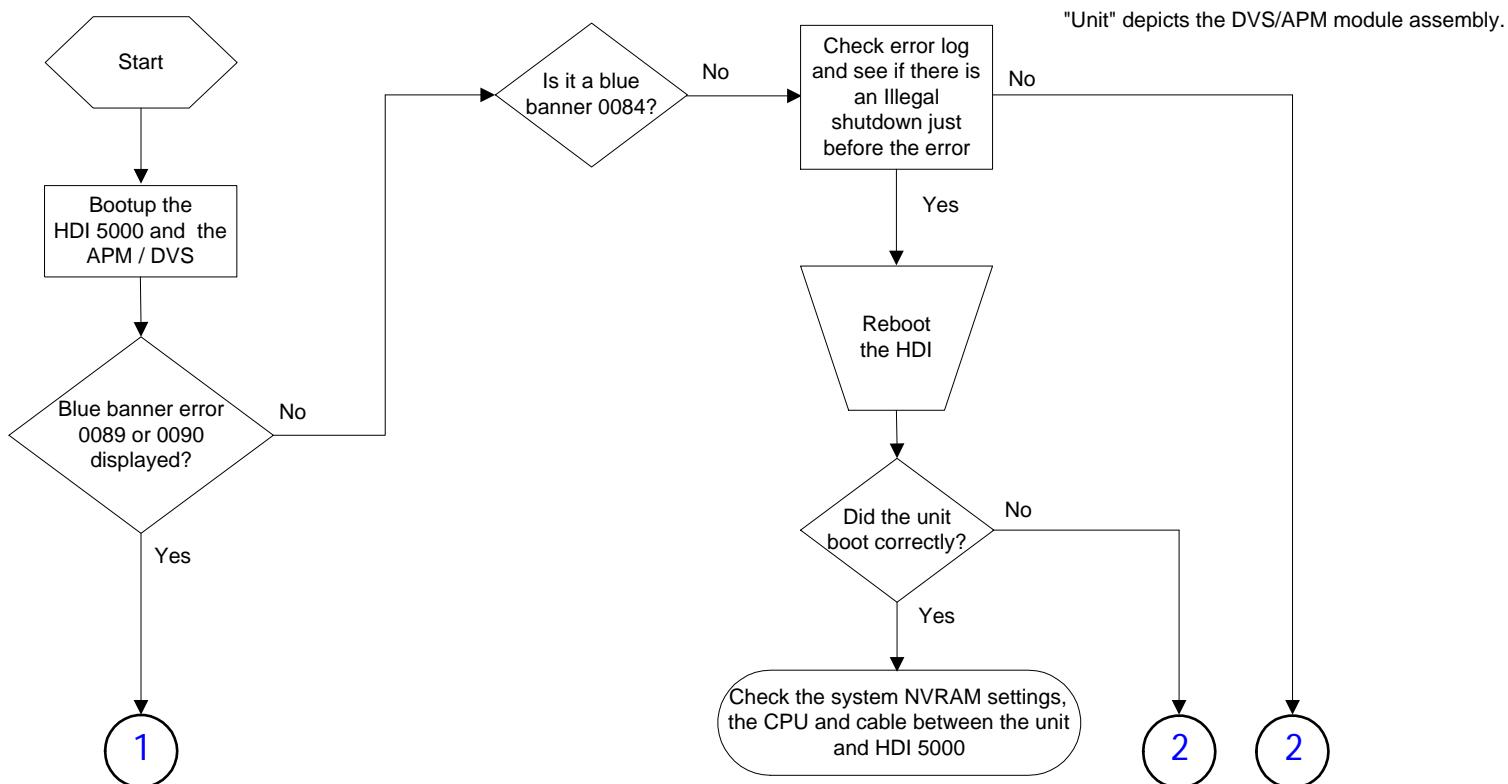


Figure 16-7

DVS/APM Troubleshooting Diagram (2 of 12)

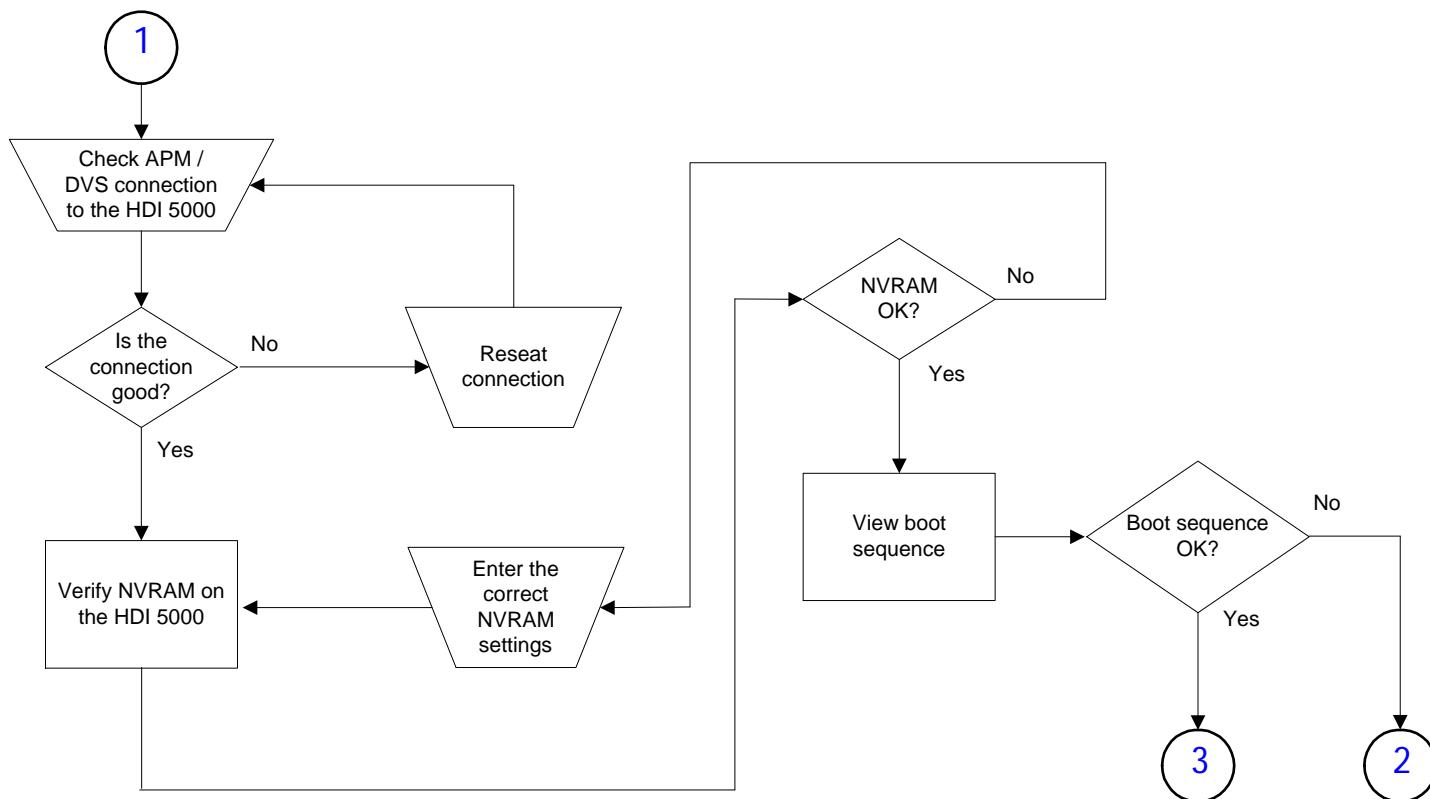


Figure 16-8

DVS/APM Troubleshooting Diagram (3 of 12)

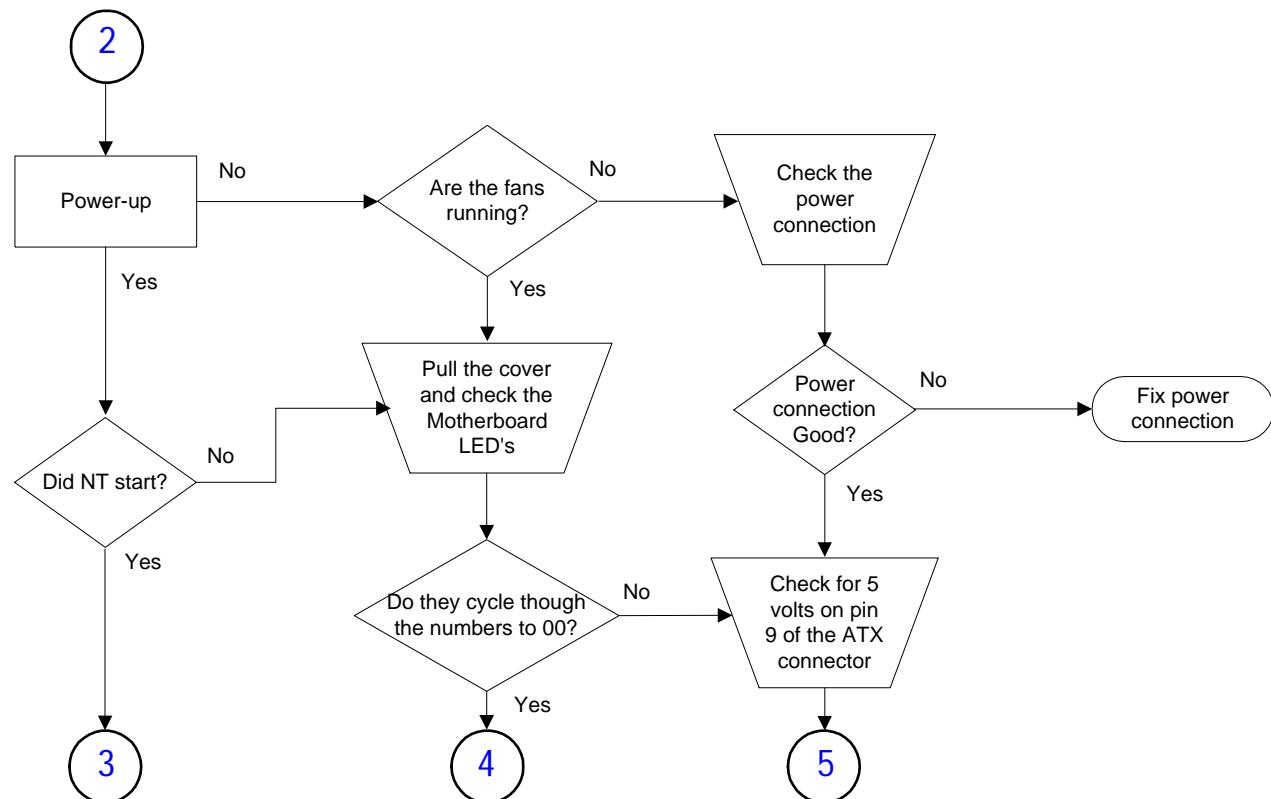
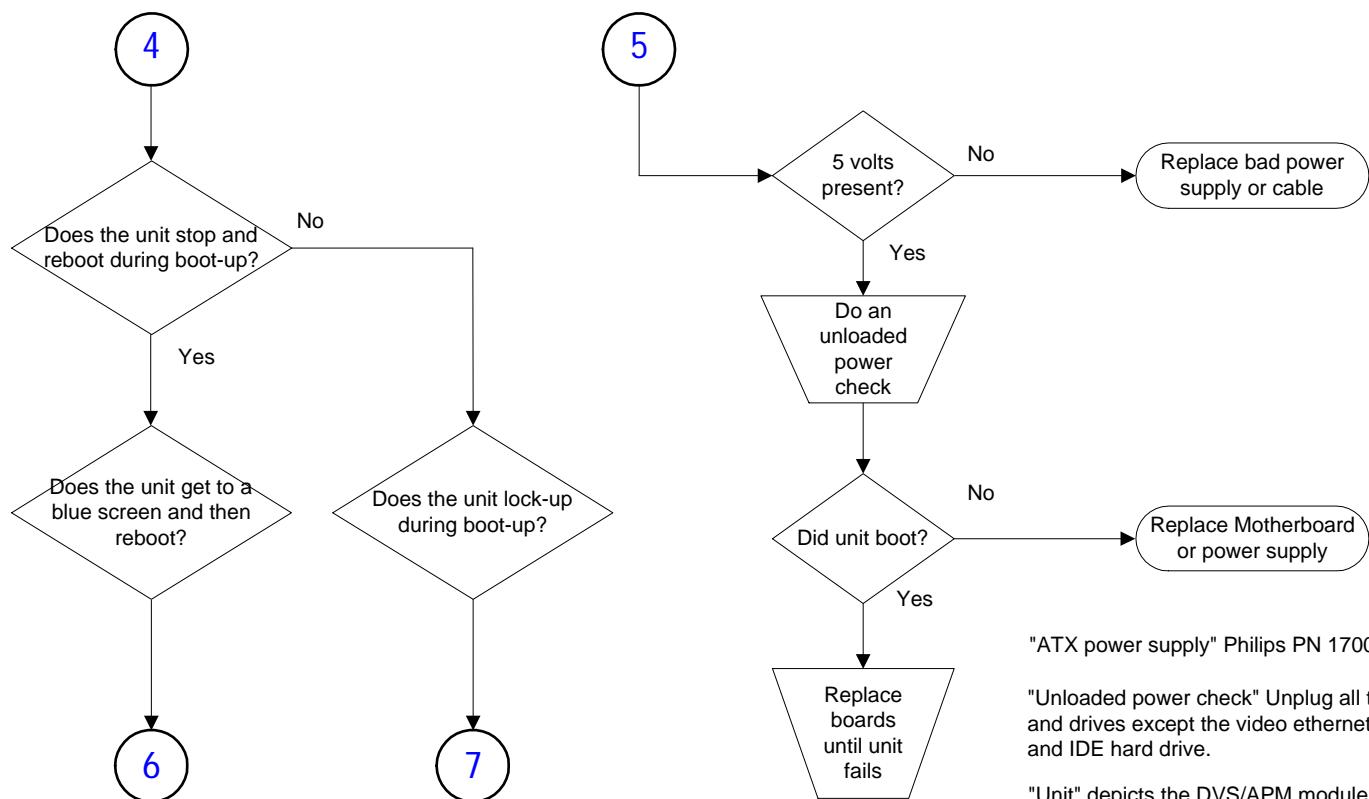


Figure 16-9

DVS/APM Troubleshooting Diagram (4 of 12)



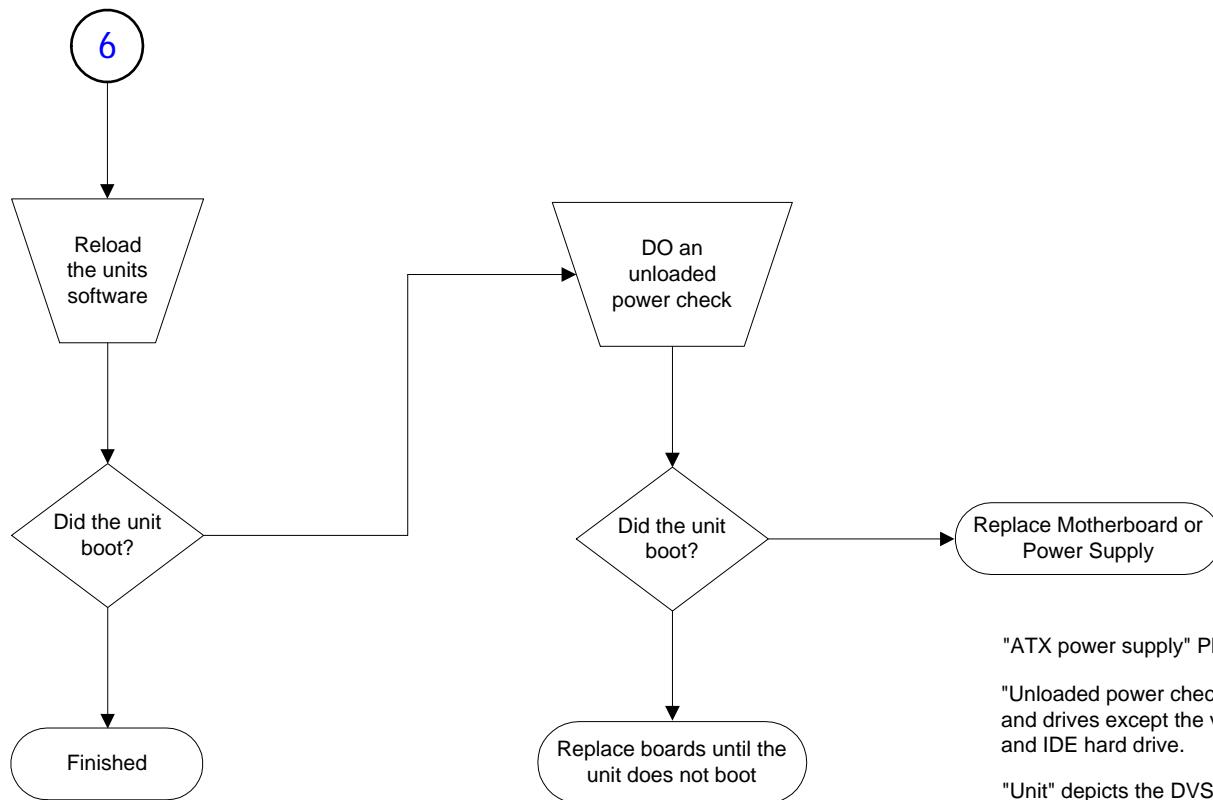
"ATX power supply" Philips PN 1700-0111-xx.

"Unloaded power check" Unplug all the PCBs and drives except the video ethernet board, and IDE hard drive.

"Unit" depicts the DVS/APM module assembly.

Figure 16-10

DVS/APM Troubleshooting Diagram (5 of 12)



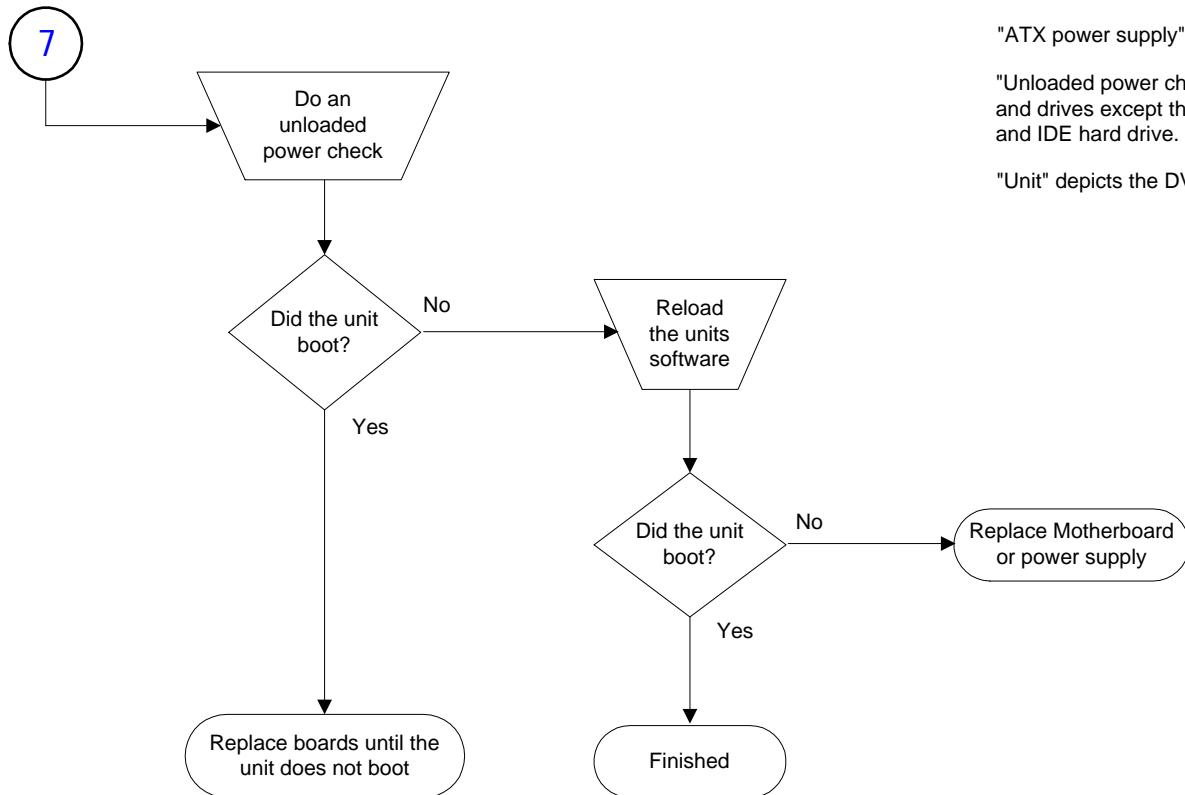
"ATX power supply" Philips PN 1700-0111-xx.

"Unloaded power check" Unplug all the PCBs and drives except the video ethernet board, and IDE hard drive.

"Unit" depicts the DVS/APM module assembly.

Figure 16-11

DVS/APM Troubleshooting Diagram (6 of 12)



"ATX power supply" Philips PN 1700-0111-xx.

"Unloaded power check" Unplug all the PCBs and drives except the video ethernet board, and IDE hard drive.

"Unit" depicts the DVS/APM module assembly.

Figure 16-12

DVS/APM Troubleshooting Diagram (7 of 12)

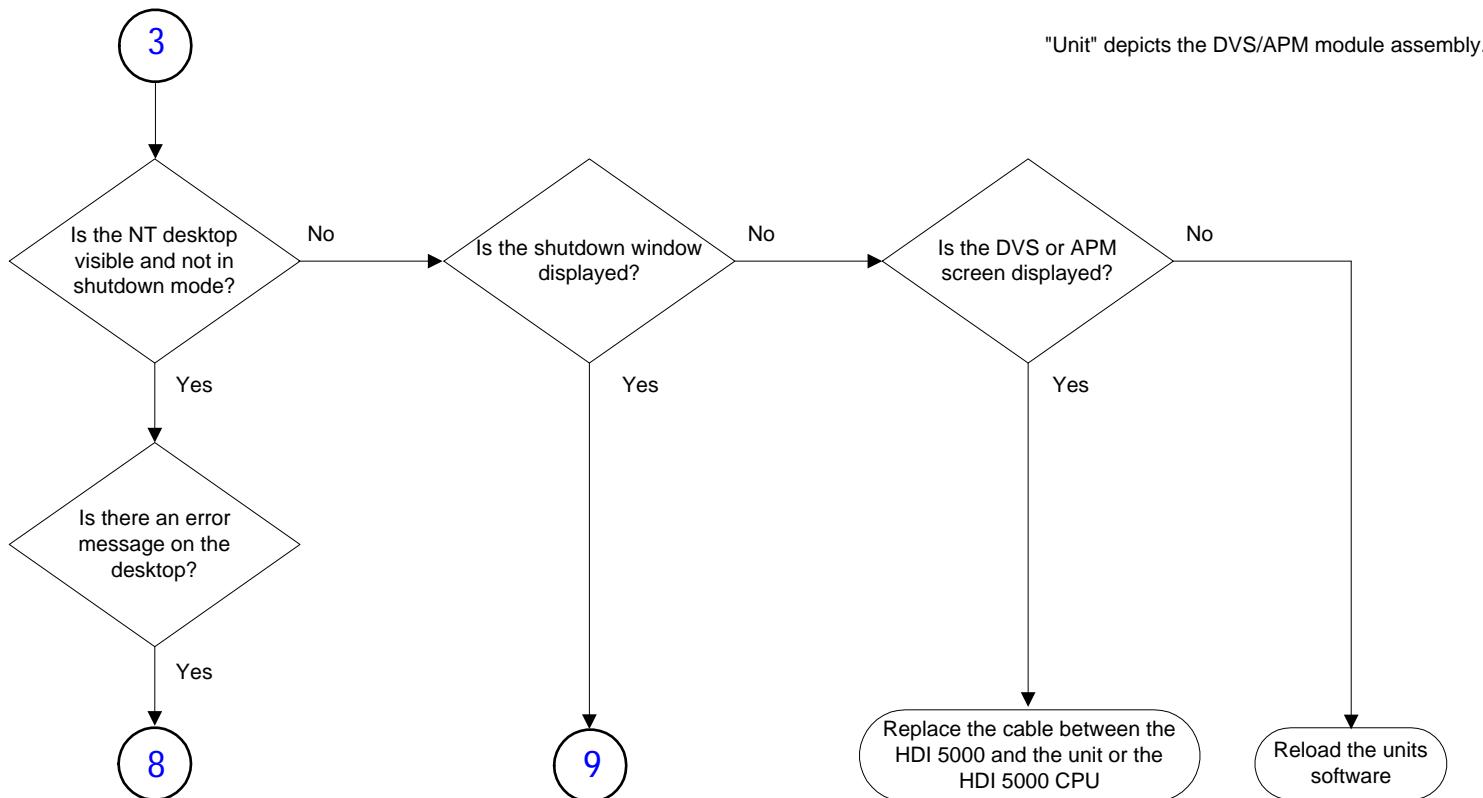


Figure 16-13

DVS/APM Troubleshooting Diagram (8 of 12)

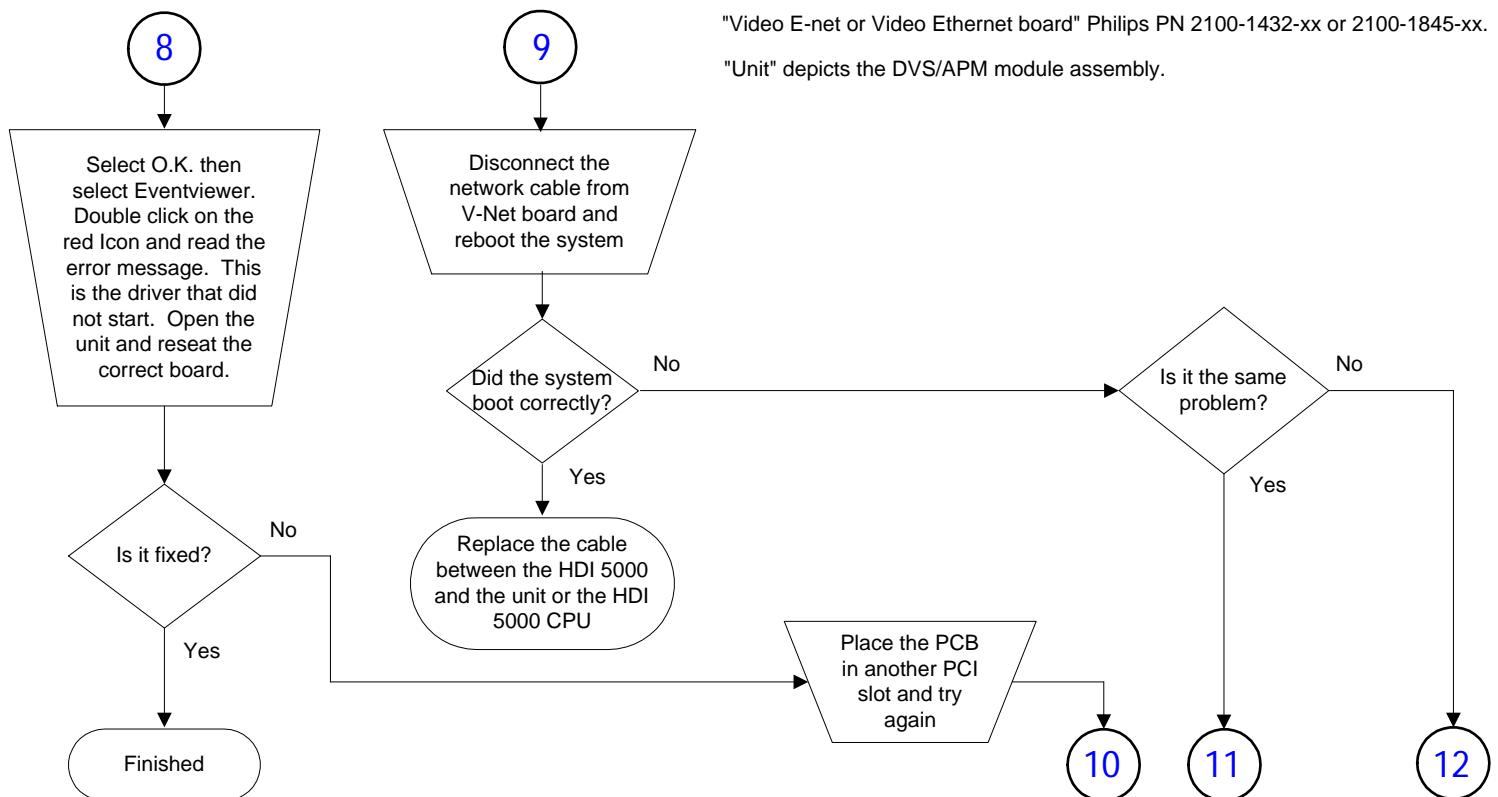


Figure 16-14

DVS/APM Troubleshooting Diagram (9 of 12)

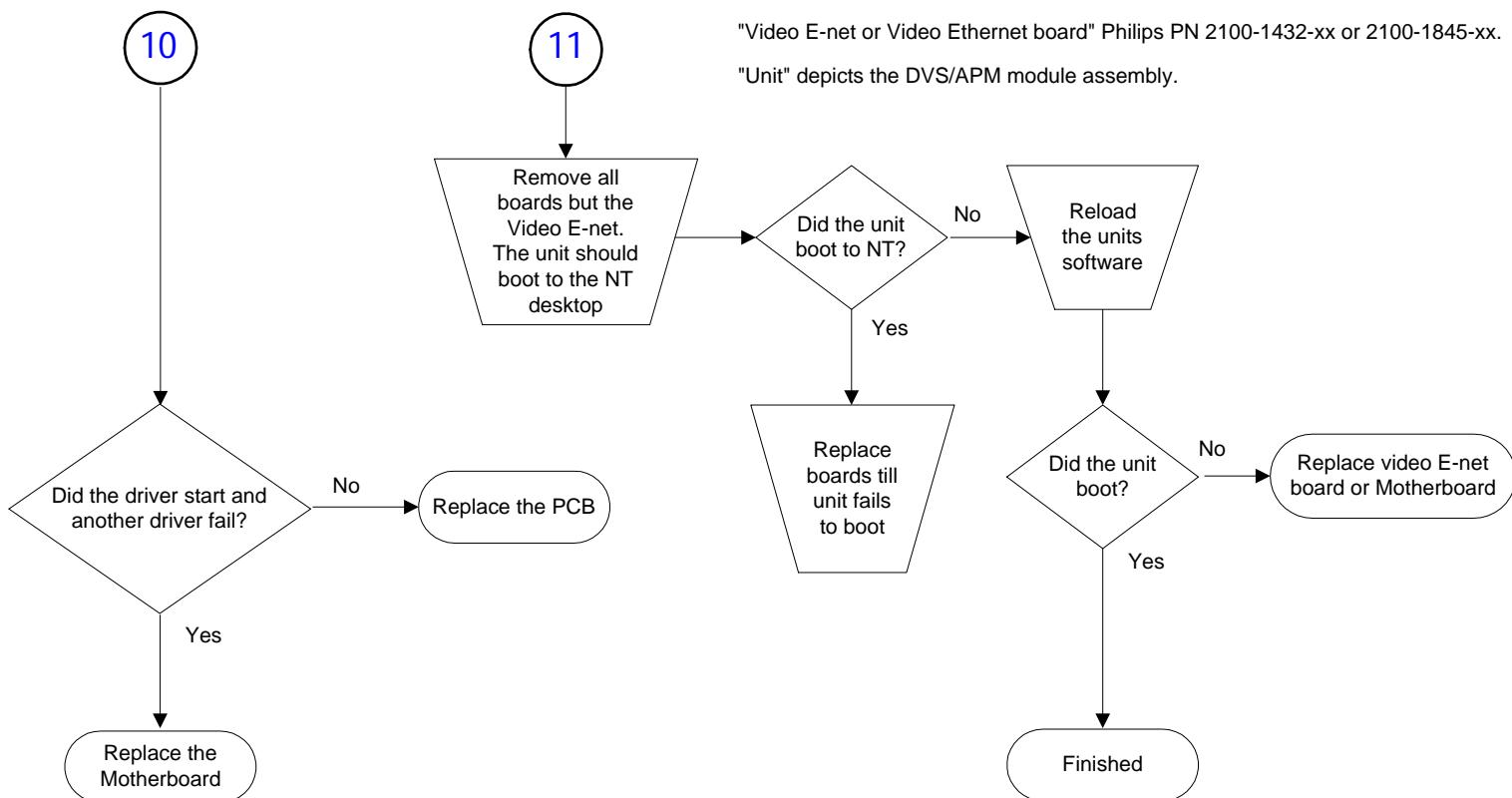


Figure 16-15

DVS/APM Troubleshooting Diagram (10 of 12)

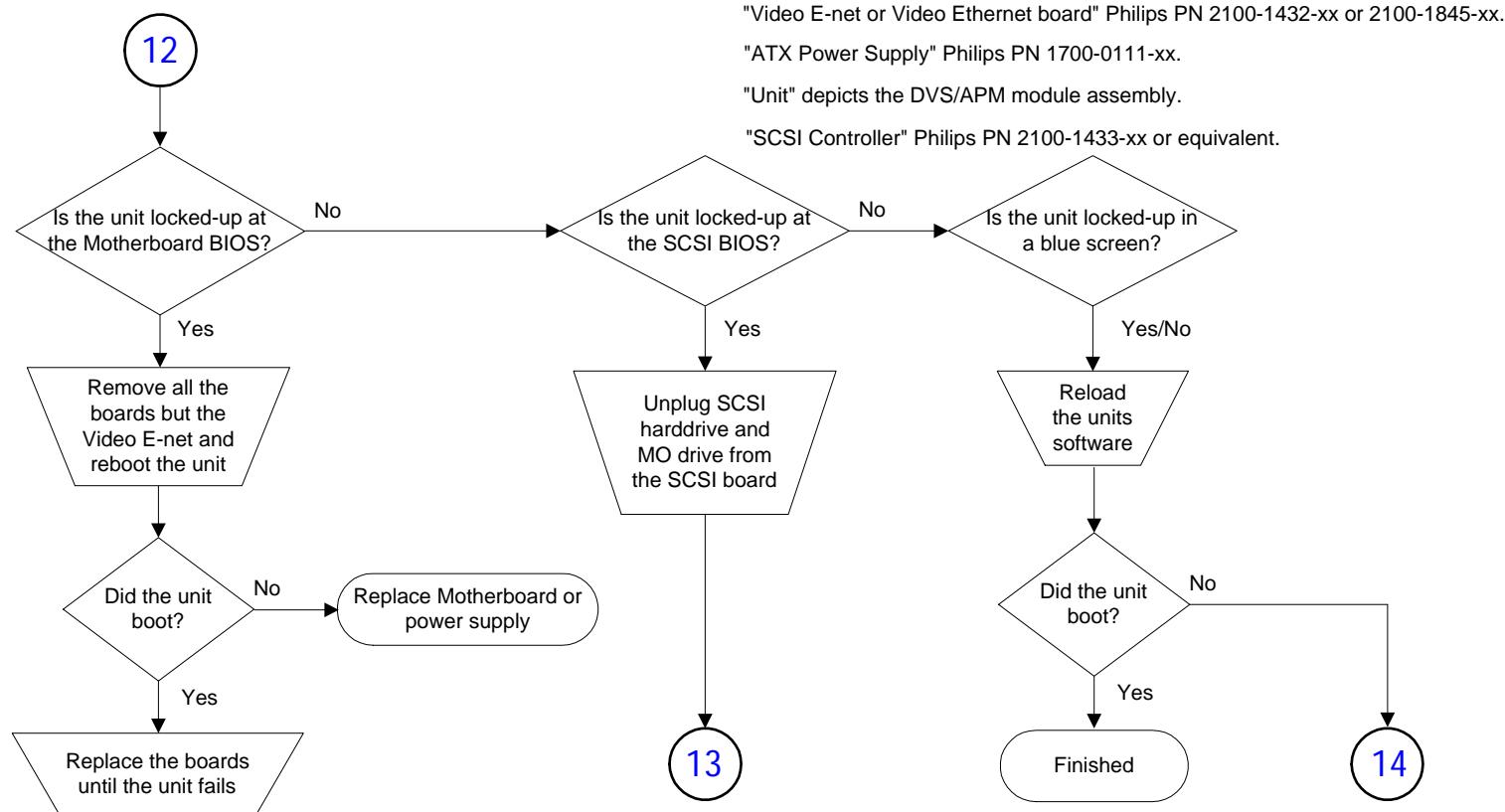
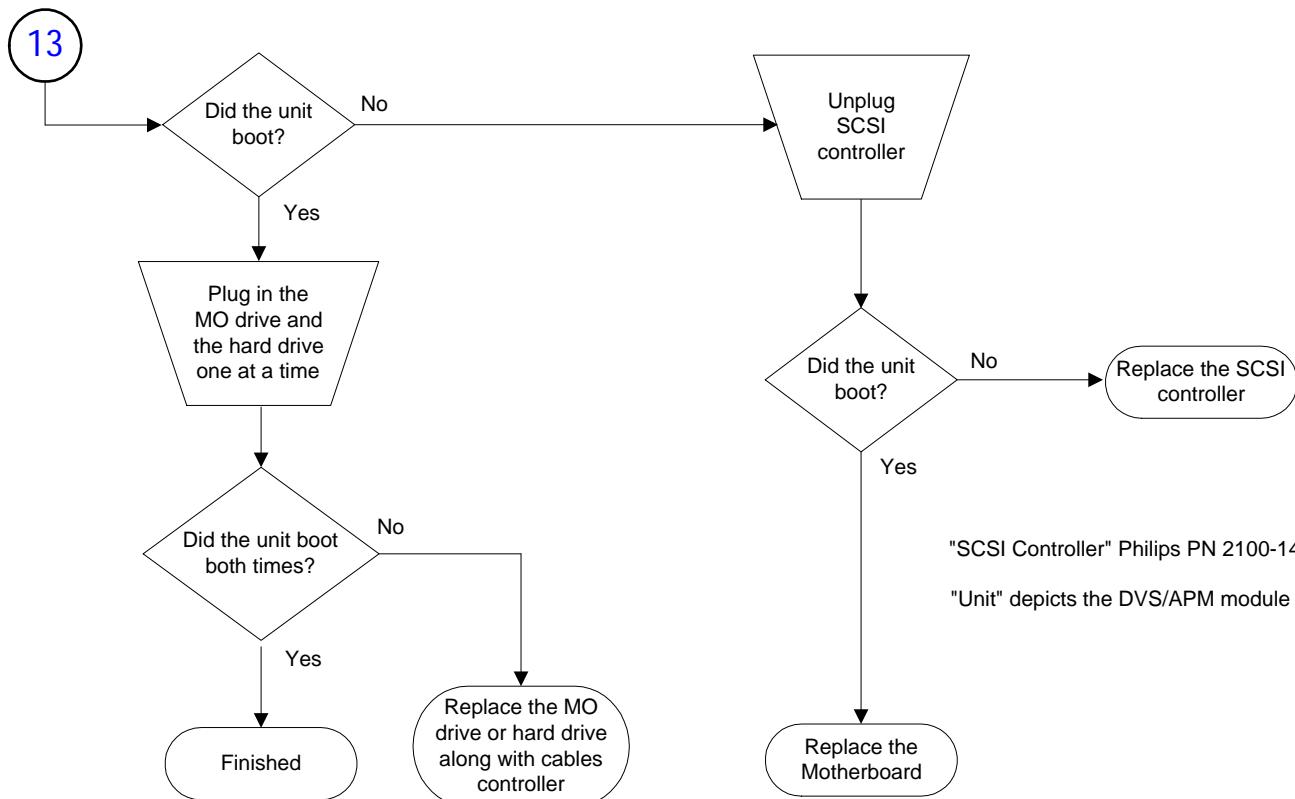


Figure 16-16

DVS/APM Troubleshooting Diagram (11 of 12)

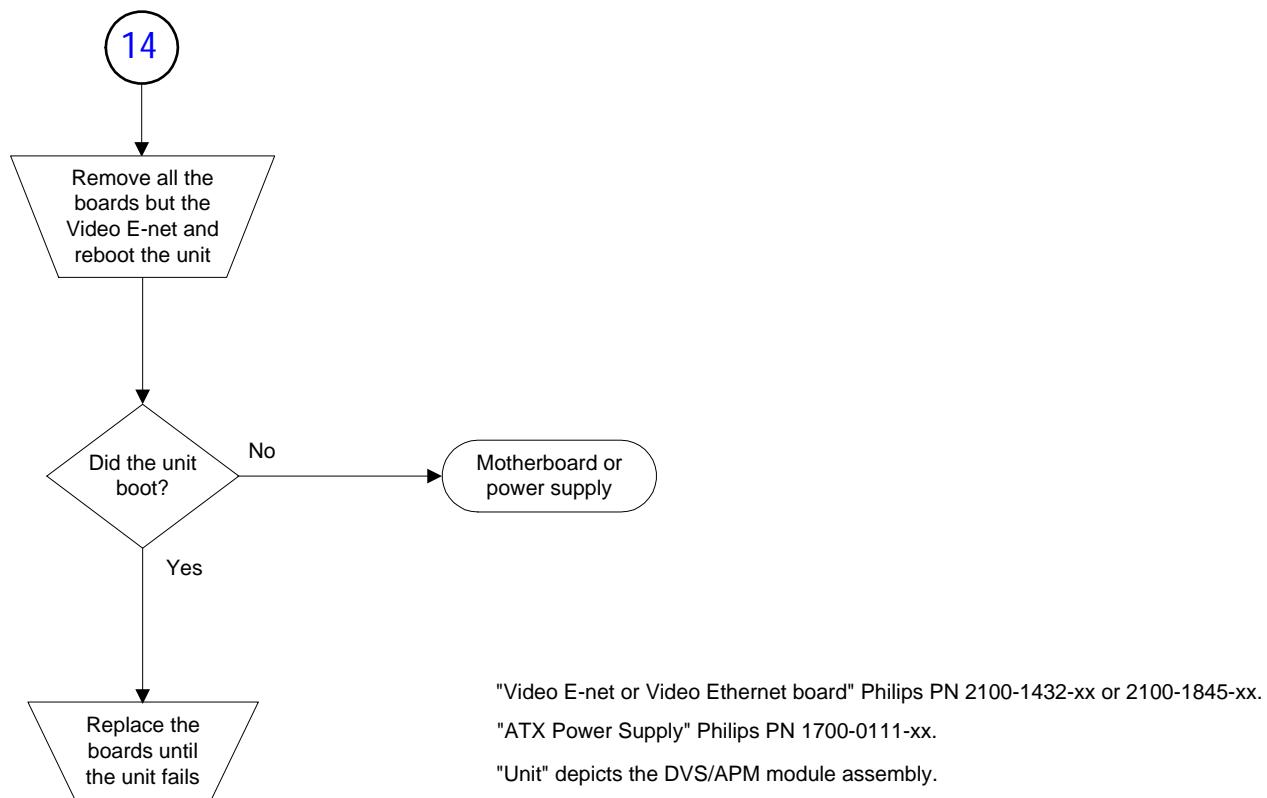


"SCSI Controller" Philips PN 2100-1433-xx or equivalent.

"Unit" depicts the DVS/APM module assembly.

Figure 16-17

DVS/APM Troubleshooting Diagram (12 of 12)



► To verify HDI 5000 NVRAM settings

1. Boot the HDI 5000 ultrasound system.
2. Connect the laptop to the system with a serial connection and log into the system with UpLink.
3. Click the Boot-up Parameters button.
4. Refer to [Figure 16-18](#) and change the NVRAM to the settings indicated in the figure.
5. If changes are made, click Update.
6. Disconnect UpLink and reboot the system.

Figure 16-18

NVRAM Bootup Parameters

NVRAM Bootup Parameters:

Boot Device	scsi
Processor Number	0
Host Name	
File Name	/hd0/peg_hd//pegasus.st
Inet on Ethernet	149.59.48.3:ffffff00
Inet on Backplane	
Host Inet	
Gateway Inet	
User	vxboot
FTP Password	
Flags	0x28
Target Name	standalone
Startup Script	/hd0/peg_hd//boot.vsh
Other	

➤ **To check DVS/APM boot sequence**

1. Perform [step 1](#) through [step 12](#) of "Accessing Windows NT Using On-Screen Viewing" on [page 749](#).

NOTE The APM does not have a "D" Drive to access during the bootup sequence. Also, the APM screen goes blank when bootup is complete.

2. Connect the DVS/APM power cord and power up the DVS/APM module. The boot sequence is displayed on the HDI 5000 monitor. After the Windows NT O/S and the DVS, or APM application launches, the screen goes black. The engineering test panel is behind the black screen.
3. Restore the ultrasound video using the trackball and select key, or reboot the system.
4. Reboot the HDI 5000 twice to reconfigure for PAL video when finished testing.

➤ **To reload DVS software**

NOTE Contact the customer before reloading DVS software. Custom protocols and images will be lost during the software reloading process unless they are saved using [step 1](#) and [step 2](#) below.

1. Save patient images (if you do not need to save patient images, proceed to [step 2](#)).
 - a. Go to the NT desktop ("Accessing Windows NT Using On-Screen Viewing" on [page 749](#)).
 - b. Select Explore.
 - c. Select the D: drive.
 - d. Select the misem_db.mdb file.

- e. Right click on the file and rename it misem_db.mdb1.
2. Save custom protocols (if you do not need to save custom protocols, proceed to step 3).
 - a. Verify the NT desktop is displayed. ("Accessing Windows NT Using On-Screen Viewing" on page 749).
 - b. Select Explore.
 - c. Select Program Files on the C: drive.
 - d. Select ATL Ultrasound.
 - e. Select the Protocols folder.
 - f. Right click on it and select Copy.
 - g. Select the D: drive.
 - h. Select File New Folder.
 - i. Name it Backups.
 - j. Paste the Protocols folder in the Backups folder.
3. Turn the system power off.
4. Disconnect the DVS/APM power cord.
5. Disconnect the transceiver BNC cable.
6. Boot the ultrasound system.
7. Simultaneously press Superkey, Shift, and Spacebar. The Engineering Panel sidebar is displayed.
8. Check Misem, then Video Config, then Image. The system monitor displays a white screen.

NOTE HDI 5000 systems must be configured for NTSC video for the video to be useful for this procedure.

9. For NTSC systems, proceed to [step 15](#). For PAL systems, continue with the following steps to temporarily change the system to NTSC video.

NOTE The following four steps ([step 10](#) through [step 14](#)) will not work with certain software versions. These versions include, but may not be limited to systems with 190.XX and 195.XX software. The issue is expected to be fixed in a future software build.

10. Connect the laptop to the system with a serial connection and log into the system with UpLink.
11. Verify Auto Connect is disabled.
12. Log into VX Works.
13. Type in the command: **SscbMsgToScbus “242c0300000100”**. (Note the command is case sensitive.) Press Enter.
14. Verify the system responds with “value = 0 = 0x0”. After the system responds with this message, the video is configured for NTSC. If the system does not respond with this message, repeat [step 13](#).
15. Set the SCSI ID of the external MO drive to ID2.
16. Connect the external MO drive to the DVS module.
17. Power up the MO drive.
18. Refer to [Table 16-5](#) for the part number of the bootable disk.
19. Insert the DVS or bootable disk into the MO drive.
20. Power up the DVS Module (with the DVS power cord). The DVS module will boot into Windows 95 and automatically launch the GHOST program, which will install the software. When the installation is complete, the screen will go to a C: prompt.

21. Remove the disk from the MO drive after the software installation is completed.
22. Reboot the DVS module.
23. Go to the DVS Windows NT screen (["Accessing Windows NT Using On-Screen Viewing" on page 749](#)).
24. If you saved patient images with [step 1](#), continue with [step 25](#). If not, skip to [step 35](#).
25. Select Explore.
26. Select the C drive.
27. Delete the misem_db.mdb file.
28. Select the D drive.
29. Delete the misem_db.mdb file.
30. Select the misem_db.mdb1 file.
31. Rename it misem_db.mdb.
32. Select misem_db.mdb and copy it.
33. Select the C drive and paste the file to it.
34. If you saved custom protocols proceed to [step 35](#). If not skip to [step 43](#).
35. Select Explore.
36. Select the D: drive
37. Select backups folder.
38. Right click on it and select copy.
39. Select Program Files on the C: drive.
40. Select ATL Ultrasound.
41. Paste the Protocols folder in the ATL Ultrasound folder.

42. Choose Yes to overwrite the previous file.
43. Close all windows.
44. Double-click on the Network icon on the bottom of the display.
45. Select Change.
46. Select Computer Name.
47. Enter the serial number of the DVS module.
48. Close all windows.
49. Connect the BNC cable to the transceiver.
50. Reboot the system and verify that there are no errors.

► **To reload APM software**

1. Turn the HDI 5000 power off.
2. Disconnect the DVS/APM power cable.
3. Boot the ultrasound system.
4. Simultaneously press Superkey, Shift, and Spacebar. The Engineering Panel sidebar is displayed.
5. Click Misem, then Video Config., then Image. The system monitor displays a white screen.

NOTE HDI 5000 systems must be configured for NTSC video for the video to be useful for this procedure.

6. For NTSC systems, proceed to [step 12](#). Continue with the following steps to temporarily change a PAL system to NTSC video.

NOTE The following four steps ([step 7](#) through [step 11](#)) will not work with certain software versions. These versions include, but may not be limited to systems with 190.XX and 195.XX software. The issue is expected to be fixed in a future software build.

7. Connect the laptop to the system with a serial connection and log into the system with UpLink.
8. Verify Auto Connect is disabled.
9. Log into VX Works.
10. Type in the command: **SscbMsgToScbus “242c0300000100”**. (Note the command is case sensitive.) Press Enter.
11. Verify the system responds with “value = 0 = 0x0”. After the system responds with this message, the video is configured for NTSC. If the system does not respond with this message, repeat [step 10](#).
12. Proceed with [step 13](#) for systems with APM 1.0 and [step 17](#) for systems with APM 2.0.
13. Set the SCSI ID of the external MO drive to ID2.
14. Connect the external MO drive to the APM module.
15. Power up the MO drive.
16. Refer to [Table 16-5](#) for the part number of the bootable disk.
17. Insert the APM Bootable disk into the external MO drive for systems with APM 1.0 or the internal MO drive of systems with APM 2.0.
18. Power up the APM Module by plugging in the APM power cord. The APM will boot into Windows 95 and automatically launch the GHOST program, which will install the software. When the installation is complete, the screen will display a C: prompt.

19. Remove the disk from the MO drive after the software is installed.
20. Reboot the APM module.
21. Go to the APM Windows NT screen (["Accessing Windows NT Using On-Screen Viewing on page 749"](#)).
22. Double-click the Network icon at the bottom of the display.
23. Select Change.
24. Select Computer Name.
25. Enter the APM serial number.
26. Select OK.
27. Close all windows. If you have a message stating "Device Failed to Start" continue with the following step. If there is no message, connect the transceiver BNC cable, reboot the APM and verify that there are no bootup errors. If there are no errors, the installation is complete.
28. Double-click the Device Icon at the bottom of the desktop.
29. Select ADUP160 and verify that Started Automatic is displayed. If it is not displayed, select Startup and Disable.
30. Select AIC78xx, select Startup and select Boot.
31. Close all windows.
32. Connect the transceiver BNC cable, reboot the APM and verify there are no bootup errors..

Table 16-5

DVS Software Files

Part Number	HDI 5000 Compatibility
DVS Hardware Option 1.0	
4252-0865-20	177.13 (10.2.5)
4252-0917-12	190.13 (10.3.5)
4252-0917-16	190.17 (10.3.8)
DVS Hardware Option 2.0	
4252-0923-06	190.13 (10.3.5)
4252-0923-12	190.17 (10.3.8)
4252-0943-15/17	198.06 (10.4.5 or 10.4.5.1)
4252-0983-04	200.23 (10.5)
4252-0983-04	200.24 (10.5.0.5 or 10.5.1)

► To verify motherboard BIOS settings

1. During bootup, press DELETE to access the utility.
2. Use the ARROW buttons to select MENU.
3. Press PAGE UP/DWN to select the menu options.
4. To change the motherboard BIOS settings for Soyo motherboards (DVS 1.0), refer to [Table 16-6](#) for the proper settings. To change the motherboard BIOS settings for American Raptor motherboards (DVS 2.0 and APM 1.0 systems), refer to [Table 16-7](#) for the proper settings. Refer to [Table 16-8](#) for the for the BIOS settings for MSI MS6547 motherboards (APM 2.0).
5. Press ESCAPE to return to MENU

Table 16-6

Soyo SY-5EM+ Motherboard (DVS 1.0)

1. Standard CMOS Setup	Setting
Date and Time set	
Primary Master	Auto
Primary Slave	None
Secondary Master	None
Secondary Slave	None
Drive A	1.44-Mb, 3.5-in
Drive B	None
Floppy 3 Mode Support	Disabled
Video	EGA/VGA
Halt on	All, but Disk/Key
2. Bios Features Setup	Setting
Virus Warning	Disabled
CPU Internal Cache	Enabled
External Cache	Enabled
Quick Pwr on Self Test	Enabled
Boot Sequence	SCSI, C, A
Swap Floppy Drive	Disabled
Bootup Numlock Status	On
Gate A20 Option	Fast

2. Bios Features Setup	Setting (Continued)
Memory Parity/ECC check	Enabled
Typematic Rate Setting	Enabled
Typematic Rate (chars/sec)	30
Typematic Delay (mSec)	250
Security Option	Setup
PCI/VGA Palette Snoop	Disabled
OS Select for DRAM >64Mb	Non-OS2
Report No FDD for WIN95	No
RTC Y2K H/W ROLLOVER	Disabled
Video BIOS Shadow	Enabled
C8000 – CBFFF	Disabled
CC000 – CFFFF	Disabled
D0000 – D3FFF	Disabled
D4000 – D7FFF	Disabled
D8000 – DBFFF	Disabled
DC000 – DFFFF	Disabled

3. Chipset Features Setup	Setting
Dimm 1 Dram Timing 0/1	SDRAM 10ns
Dimm 2 Dram Timing 2/3	SDRAM 10ns
Dimm 3 Dram Timing 4/5	SDRAM 10ns

3. Chipset Features Setup		Setting (Continued)
Dram Read Pipeline	Enabled	
Cache RD + CPU Wt Pipeline	Enabled	
Video BIOS Cacheable	Enabled	
System BIOS Cacheable	Enabled	
Memory Hole At 15 Mb Address	Disabled	
AGP Aperture Size	64Mb	
AGP - 2X Mode	Disabled	
Onchip USB	Disabled	
Spread Spectrum Modulated	Enabled	
4. Power Management Setup		Setting
ACPI FunctionDisable		
Power Management	User Define	
PM Control By APM	No	
Video Off Option	Always On	
Video Off Method	V/H Sync + Blank	
Modem use IRQ	3	
Soft Off by PWRBTN	Instant - Off	
HDD Power down	Disable	
Doze Mode	Disable	
Suspend Mode	Disable	

4. Power Management Setup	Setting (Continued)
VGA	Off
LPT & Com	None
HDD & FDD	Off
DMA & Master	Off
Modem Ring Resume	Disable
RTC Alarm Resume	Disable
Primary INTR	ON
IRQ3 (COM2)	Primary
IRQ4 (COM1)	Primary
IRQ5 (LPT2)	Disabled
IRQ6 (Floppy Disk)	Primary
IRQ7 (LPT1)	Primary
IRQ8 (RTC Alarm)	Disabled
IRQ9 (IRQ2 Redir)	Secondary
IRQ10 (Reserved)	Secondary
IRQ11 (Reserved)	Secondary
IRQ12 (PS/2 Mouse)	Primary
IRQ13 (coprocessor)	Primary
IRQ14 (Hard Disk)	Primary
IRQ15 (Reserved)	Disabled

5. PnP/PCI Configuration	Setting
PnP OS Installed	NO
Resources Controlled By	Manual
Reset Configuration Data	Disabled
IRQ - 3 Assigned to:	Legacy ISA
IRQ - 4 Assigned to:	Legacy ISA
IRQ - 5 Assigned to:	PCI/ISA PnP
IRQ - 7 Assigned to:	PCI/ISA PnP
IRQ - 9 Assigned to:	PCI/ISA PnP
IRQ - 10 Assigned to:	PCI/ISA PnP
IRQ - 11 Assigned to:	PCI/ISA PnP
IRQ - 12 Assigned to:	PCI/ISA PnP
IRQ - 14 Assigned to:	PCI/ISA PnP
IRQ - 15 Assigned to:	PCI/ISA PnP
DMA - 0 Assigned to:	PCI/ISA PnP
DMA – 1 Assigned to:	PCI/ISA PnP
DMA - 3 Assigned to:	PCI/ISA PnP
DMA - 5 Assigned to:	PCI/ISA PnP
DMA - 6 Assigned to:	PCI/ISA PnP
DMA - 7 Assigned to:	PCI/ISA PnP
CPU To PCI Write Buffer	Enabled
PCI Master Broken Timer	Disabled

5. PnP/PCI Configuration		Setting (Continued)
PCI IRQ Active by		Level
Assign IRQ for USB		Disabled
Assign IRQ for VGA		Enabled

6. Load Setup Defaults - (SKIP)	

7. Load BIOS Defaults - (SKIP)	

8. Integrated Peripherals		Setting
Onchip IDE First Channel		Enabled
Onchip IDE Second Channel		Enabled
IDE Prefetch Mode		Enabled
IDE HDD Block Mode		Enabled
IDE Primary Master PIO		Auto
IDE Primary Slave PIO		Auto
IDE Secondary Master PIO		Auto
IDE Secondary Slave PIO		Auto
IDE Primary Master UDMA		Auto
IDE Primary Slave UDMA		Auto
IDE Secondary Master UDMA		Auto
IDE Secondary Slave UDMA		Auto

8. Integrated Peripherals		Setting (Continued)
Init Display First		PCI Slot
Onboard FDC Controller		Enabled
Onboard UART 1		3F8/IRQ4
Onboard UART 2		2F8/IRQ3
Onboard UART 2 Mode		Standard
Onboard Parallel Port		378/IRQ7
Parallel Port Mode		Normal
9. Supervisor Password		(SKIP)
10. User Password		(SKIP)
11. IDE HDD Auto Detection		(SKIP)
12. Save & Exit Setup		'Y' (Yes)
13. Exit without Saving		(SKIP)

Table 16-7**American Predator Raptor ATX/2 Motherboard
(DVS 2.0/APM 1.0)**

1. Auto-Detect Hard Disks	DO THIS FIRST!
Same as Standard CMOS Setup	
2. Standard CMOS Setup	
Floppy A:	1.44-MB, 3.5-in
Floppy B:	Not Installed
Pri Master: Type, 32 Bit Mode	Auto, Off
Pri Slave:	Not Installed
Sec Master:	Not Installed
Sec Slave:	Not Installed
Boot Sector Virus Protection	Disabled
3. Advanced CMOS Setup	
Quick Boot	Disabled, Enabled
Pri Master ARMD Emulated as	Auto
Pri Slave ARMD Emulated as	Auto
Sec Master ARMD Emulated as	Auto
Sec Slave ARMD Emulated as	Auto
1st Boot Device	Floppy, SCSI
2nd Boot Device	1st IDE-HDD, 1st IDE-HDD

3. Advanced CMOS Setup	Setting (Continued)
3rd Boot Device	XXXX, ATAPI CDROM
4th Boot Device	Disabled
Try Other Boot Devices	Yes
Initial Display Mode	BIOS
Floppy Access Control	Read-Write
Hard Disk Access Control	Read-Write
S.M.A.R.T for Hard Disks	Disabled
Bootup Num-Lock	On
Floppy Drive Swap	Disabled
Floppy Drive Seek	Disabled
PS/2 Mouse Support	Enabled
Typmatic Rate	Fast
System KeyBoard	Present, Not Present
Primary Display	VGA/EGA
Password Check	Setup
Boot To OS/2	No
Wait for 'F1' if Error	Enabled, Disabled
Hit 'DEL' Message Display	Enabled
Internal Cache	Writeback
System BIOS Cacheable	Enabled
CPU ECC	N/A***
C000,16k Shadow	Enabled

3. Advanced CMOS Setup	Setting (Continued)
C400,16k Shadow	Enabled
C800,16k Shadow	Disabled
CC00,16k Shadow	Disabled
D000,16k Shadow	Disabled
D400,16k Shadow	Disabled
D800,16k Shadow	Disabled
DC00,16k Shadow	Disabled

4. Advanced Chipset Setup	Setting
USB Function	Disabled***
USB KB/Mouse Legacy Support	Disabled***
Port 64/60 Emulation	Disabled
SERR#	Disabled
PERR#	Disabled
WSC# Handshake	Enabled
USWC Write Post	Enabled
BX/GX Master Latency Timer - clks	64
Multi-Trans Timer (Clks)	32
PCI-1 to PCI-0 Access	Disabled
Aperture Access Global Enable	Disabled
PCI-0 Agent to Aperture Access	N/A***

4. Advanced Chipset Setup	Setting (Continued)
Memory Autosizing Support	Auto
DRAM Integrity Mode	N/A***
DRAM Refresh Rate	15.6 us
Memory Hole	Disabled
SDRAM CAS#	Auto, 3 DCLKS
SDRAM RAS# to CAS# delay	Auto
SDRAM RAS# Precharge	Auto
SDRAM Precharge Control	Miss
Power Down SDRAM	Disabled
ACPI Control Register	Disabled
Gated Clock	Enabled
Graphics Aperture Size	64-MB
Search for MDA Resources	Yes
AGP Read Sync	Disabled
AGP Snoopable Write	Enabled
AGP Multi-Trans Timer (AGP Clks)	32
AGP Low-Priority Timer (AGP Clks)	16
AGP SERR	Disabled
AGP Parity Error Response	Disabled
8-bit I/O Recovery Time	Disabled
16-bit I/O Recovery Time	Disabled
PIIX4 SERR#	Disabled

4. Advanced Chipset Setup		Setting (Continued)
USB Passive Release	Enabled	
PIIX4 Passive Release	Enabled	
PIIX4 Delayed Transactions	Enabled	
TypeF DMA Buffer Control1	Disabled	
TypeF DMA Buffer Control2	Disabled	
DMA-0 Type	Normal ISA	
DMA-1 Type	Normal ISA	
DMA-2 Type	Normal ISA	
DMA-3 Type	Normal ISA	
DMA-5 Type	Normal ISA	
DMA-6 Type	Normal ISA	
DMA-7 Type	Normal ISA	
Memory Buffer Strength	Strong	
Manufacture Setting	Mode 0	

5. Power Management Setup		Setting
Power Management Mode	APM, Disabled	
Power Management/APM	Enabled	
Power Button Function	On/Off	
Green PC Monitor Power State	Suspend	
Video Power Down Mode	Suspend	

5. Power Management Setup	Setting (Continued)
Hard Disk Power Down Mode	Suspend
Hard Disk Time Out (minute)	Disabled
Power Saving Type	Sleep
Standby/Suspend Timer Unit	4 min
Standby Time Out	Disabled
Suspend Time Out	Disabled
Slow Clock Ratio	50% - 62.5%
Display Activity	Ignore
Device 6 (Serial Port 1)	Monitor
Device 7 (Serial Port 2)	Ignore
Device 8 (Parallel Port)	Ignore
Device 5 (Floppy Disk)	Ignore
Device 0 (Primary Master IDE)	Monitor
Device 1 (Primary Slave IDE)	Ignore
Device 2 (Secondary Master IDE)	Ignore
Device 3 (Secondary Slave IDE)	Monitor
LAN Wake-Up	Disabled

6. PCI/Plug and Play Setup	Setting
Plug and Play Aware O/S	No
PCI Latency Timer (PCI Clks)	64

6. PCI/Plug and Play Setup	Setting (Continued)
PCI VGA Palette Snoop	Disable
Allocate IRQ to PCI VGA	No
PCI IDE BusMaster	Disable
Offboard PCI IDE Card	Auto
Offboard PCI IDE Primary IRQ	Disable***
Offboard PCI IDE Secondary IRQ	Disable***
PCI Slot1 IRQ Priority	Auto
PCI Slot2 IRQ Priority	Auto
PCI Slot3 IRQ Priority	Auto
PCI Slot4 IRQ Priority	Auto
DMA Channel 0	PnP
DMA Channel 1	PnP
DMA Channel 3	PnP
DMA Channel 5	PnP
DMA Channel 6	PnP
DMA Channel 7	PnP
IRQ3	PCI/PnP
IRQ4	PCI/PnP
IRQ5	PCI/PnP
IRQ7	PCI/PnP
IRQ9	PCI/PnP
IRQ10	PCI/PnP

6. PCI/Plug and Play Setup Setting (Continued)	
IRQ11	PCI/PnP
IRQ12	ISA/EISA***
IRQ14	PCI/PnP
IRQ15	PCI/PnP
Reserved Memory Size	Disabled
Reserved Memory Address	C800***
PCI Device Search Order	First-Last
Default Primary Video	AGP, PCI

7. Peripheral Setup Setting	
CPU Fan	tbd, actual fan rpm's
Secondary Fan	N/A***
Thermal Control Fan	N/A***
OnBoard FDC	Auto
Onboard Serial Port1	Auto
OnBoard Serial Port2	Auto
Serial Port Mode	Normal
IR Transmission Mode	N/A***
Receiver Polarity	N/A***
Transmitter Polarity	N/A***
OnBoard Parallel Port	Auto

7. Peripheral Setup	Setting (Continued)
Parallel Port Mode	ECP
EPP Version	N/A***
Parallel Port IRQ	Auto***
Parallel Port DMA Channel	Auto***
OnBoard IDE	Both

Table 16-8 MSI MS-6547 Motherboard AMI Bios Settings (APM 2.0)

1. Standard CMOS Features	Setting
System Date	Current Date
System Time	Current Time
Primary IDE Master	Auto
Primary IDE Slave	Auto
Secondary IDE Master	Not Installed
Secondary IDE Slave	Not Installed
Floppy Drive A	1.44 MB 3.5-in
Floppy Drive B	Not Installed
Boot Sector Virus Protection	Disabled

2. Primary IDE (Master and Slave) Setting

Type	Auto
Cylinders	19710
Heads	16
Write Precompensation	
Sectors	255
Maximum Capacity	41173 MB
LBA Mode	On
Block Mode	On
Fast Programmed I/O Modes	4
32 Bit Transfer Mode	On

3. Secondary IDE (Master and Slave) - Not Installed

4. Advanced BIOS Features Setting

Quick Boot	Enabled
Full Screen LOGO Show	BIOS
1st Boot Device	ARMD-FDD
2nd Boot Device	IDE-0
3rd Boot Device	Floppy
Try Other Boot Devices	Yes
S.M.A.R.T. for Hard Disks	Disabled

4. Advanced BIOS Features		Setting (Continued)
Bootup Num-Lock		On
Floppy Drive Swap		Disabled
Floppy Drive Seek		Disabled
Security Option		Setup
Boot OS/2 for DRAM>64MB		No
CPU L1, L2 Cache		WriteBack
System BIOS Cacheable		Disabled
APIC Select		Enable
MPS Revision		1.4

5. Advanced Chipset Features		Setting
DRAM CAS# Latency		By SPD
Timing Setting Mode		Normal (1)
MA 1T/2T Select		Delay IT
Host to Memory Latency		Normal (1)
Graphic Win Size		64 M
AGP Fast Write		Disabled

6. Power Management Features		Setting
IPCA Function		Yes
Sleep State		S1/POS

6. Power Management Features Setting (Continued)

Power Management/APM	Enabled
Unit VGA BIOS from S3	Enabled
Power/Sleep LED	Single LED
Suspend Time Out	Disabled
Pentium 4 Thermal Monitor	Enabled
Power Button Function	Power Off
After AC Power Lost	Power On
Set Wake Up Events...	(See Below)

7. Set Wake Up Events Setting

Wake Up On Ring	Enabled
Wake Up On PME#	Enabled
Wake Up On Codec	Disabled
Resume By USB Device	Enabled
Resume By PS/2 Mouse	Disabled
Resume By Keyboard	Any key
Resume By Alarm	Disabled
Alarm Date	Everyday
Alarm Hour	12
Alarm Minute	30
Alarm Second	00

8. PNP/PCI Configurations	Setting
Clear ESCD	No
Primary Graphics Adapter	PCI
PCI VGA Palette Snoop	Disabled
PCI IDE BusMaster	Enabled
PCI Slot1/3 IRQ	5
PCI Slot 2/6 IRQ	10
PCI Slot 4 IRQ	11
PCI Slot 5 IRQ	Auto
Set IRQs to PCI or ISA	(PCI/PnP for all)
Set DMAs to PnP or ISA	(PnP for all)

9. Integrated Peripherals	Setting
USB Device	Disabled
USB Device Legacy Support	Disabled
Audio Device	Disabled
Modem Device	Disabled
On-Chip IDE	Both
Ultra DMA Mode Support	100 MHz
Set Super I/O	(See Below)

10. Set Super I/O	Setting
Floppy Controller	Auto
Serial Port A	Auto
Serial Port B	Auto
Serail Port B Mode	Normal
IR Pin Select	IRRX/IRTX
Parallel Port	Auto
Parallel Port Mode	ECP
EPP Version	N/A
Parallel Port IR	Auto
Parallel Port DMA	Auto
OnBoard Midi Port	Disabled
Midi IRQ Select	5
OnBoard Game Port	200h

11. PC Health Status (2)	Setting
CPU Fan Speed	nnn RPM
SYSTEM Fan Speed	nnnn RPM
CPU Temperature	nnC/nnF
SYSTEM Temperature	nnC/nnF
Vcore	n.nnn V
+3.3 V	n.nnn V

11. PC Health Status (2) Setting (Continued)

+5.0 V	n.nnn V
+12.0 V	n.nnn V
-12.0 V	-n.nnn V
-5.0 V	-n.nnn V
Battery Voltage	n.nnn V

12. Frequency/Voltage Control Setting

Detect CPU FSB Clock	Manual
CPU FSB Clock (MHz)	100 MHz
CPU:DRAM Clock Ratio	3:4
DRAM Frequency	266 MHz
CPU Ratio Selection	Locked
Spread Spectrum	Enabled
Unused PCI Slot/DIMM Clk	Stop
CPU Vcore Adjust (V)	Auto
DRAM Vcore Adjust (V)	2.6V

► To use PC diagnostics

NOTES

- During the diagnostic tests, the program does not identify the CPU processor speed correctly; however, this has no effect on the test results.
- If you have an APM 2.0, skip [step 1](#) through [step 4](#) of the following procedure, insert the diagnostic disk into the internal MO drive, and continue with [step 5](#).

1. Set the SCSI ID of the external MO drive to ID2.
2. Connect the external MO drive to the DVS/APM module.
3. Power up the external MO drive.
4. Insert the write enabled PC Diagnostic MO Disk 4252-0898-03 into the external MO drive.
5. Power up the DVS/APM module (with the HDI 5000 power switch).
6. The DVS/APM module boots into Windows 95 and automatically launches the AMI Diagnostics program displaying the following menu on HyperTerminal (refer to "[To set up the laptop for HyperTerminal](#)" on page 696):
 1. Run Quick DVS PC HW Diagnostics (takes approximately 20 minutes).
 2. Run Exhaustive DVS/APM PC HW Diagnostics (requires more than 2 hours).
 3. Run Exhaustive DVS/APM PC HW Diagnostics (Loops continuously).
 4. Run AMIDIAG Utility Interactively. (Controlled by external PS2 keyboard and mouse)
 5. View AMIDIAG Log File (refer to "[Interpreting the AMIDIAG Log File](#)" on page 745).
 6. Test DEC21143 Ethernet (Part of combo Ethernet/Video).
 7. Test SMC1211 Ethernet.
 8. Exit.
7. Select the desired test and use the following procedure to interpret the test results.

Interpreting the AMIDIAG Log File

The Run AMIDIAG Utility Interactively option is used to run individual tests. When running tests, the HyperTerminal screen will be refreshed more slowly than a regular monitor and the display will have some irregularities.

[Table 16-9](#) lists the titles of the tests run by the AMIDIAG program. As each test is run, the log will have several items displayed. The second to the last line item will indicate the result of that test. Before replacing any component suggested by the table, visually inspect and re-seat the connectors.

Table 16-9 **AMIDIAG Utility Tests**

Test	Assembly Tested
1 [System : Basic Functionality Test 1.12]	Motherboard
2 [System : Processor Speed Test 1.12]	Motherboard
3 [System : CPU Protected Mode Test 1.12]	Motherboard
4 [System : Coprocessor Test 1.12]	Motherboard
5 [System : DMA Controller Test 1.12]	Motherboard
6 [System : Interrupt Controller Test 1.12]	Motherboard
7 [System : Timer Test 1.12]	Motherboard
8 [System : Real Time Clock Test 1.12]	Motherboard
9 [System : CMOS Validity Test 1.12]	Motherboard
10 [System : PCI System Test 1.10]	Motherboard
11 [System : Plug-n-Play Test 1.10]	Motherboard
12 [System : MMX Test 1.03]	Motherboard
13 [System : 3DNow! Test 1.03]	Motherboard

Table 16-9

AMIDIAG Utility Tests (Continued)

Test	Assembly Tested
14 [Memory : BIOS ROM Test 2.09]	Mother Board: Reseat memory on PCB
15 [Memory : Parity Test 2.09]	Mother Board: Reseat memory on PCB
16 [Memory : Refresh Test 2.09]	Mother Board: Reseat memory on PCB
17 [Memory : Data Bus Test 2.09]	Mother Board: Reseat memory on PCB
18 [Memory : Cache Memory Test 2.09]	Mother Board: Reseat memory on PCB
19 [IDE : IDE HDD Read Test 2.03]	IDE Hard drive
20 [IDE : IDE HDD Verify Test 2.03]	IDE Hard drive
21 [IDE : IDE HDD Seek Test 2.03]	IDE Hard drive
22 [IDE : IDE HDD Boot Sector Test 2.03]	IDE Hard drive
23 [SCSI : SCSI Disk Buffer Test 2.08]	SCSI Controller
24 [SCSI : SCSI Disk Self Test 2.08]	SCSI Hard Drive
25 [SCSI : SCSI Disk Read Test 2.08]	SCSI Hard Drive
26 [SCSI : SCSI Disk Boot Sector Test 2.08]	SCSI Hard Drive
27 [SCSI : SCSI Disk Bad Block Repair 2.08]	SCSI Hard Drive
28 [Video : Video Memory Test 1.10]	VGA Network Card
29 [Video : Graphics Mode Test 1.10]	VGA Network Card

Service Diagnostic Tool

The Service Diagnostic Tool can be launched from the PC Diagnostic MO Disk (P/N 4252-0898-03), or from the DVS NT screen if the HDI 5000 is 190.13 software or higher. Launching the program brings up the screen as shown in [Figure 16-19](#).

User-Defined Protocols:

Copy to MO Copies User Defined Protocols to the DVS internal MO drive. Insert the intended MO disk into the internal drive. If you launched the program from this drive, replace the disk before copying the files.

Retrieve from MO Copies previously recorded protocol files from an MO disk in the internal drive to the DVS hard drive.

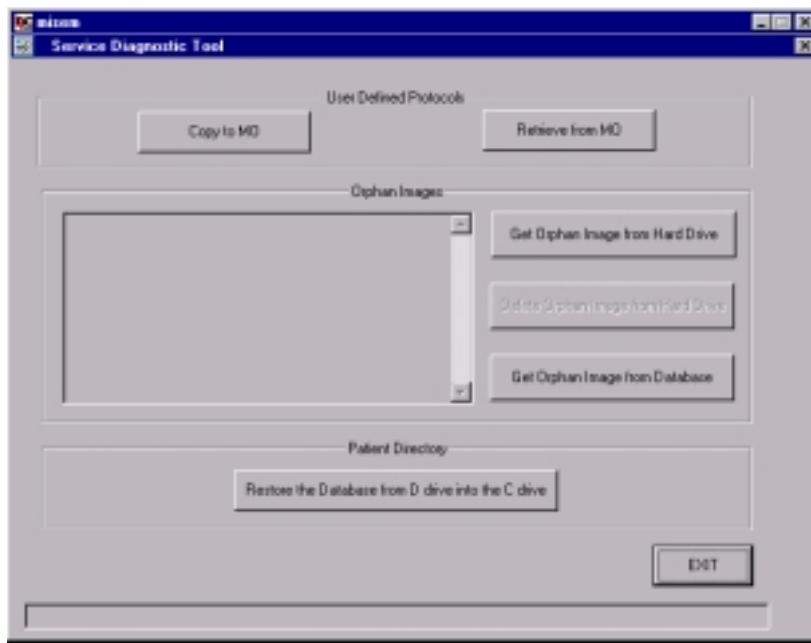
Orphan Images:

Get Orphan Images from Hard Drive Identifies images that no longer have association with the patient database, which are occasionally left on the hard drive.

Delete Orphan Images from the Hard Drive Deletes images that are no longer associated with the patient database.

Figure 16-19

MISEM Service Diagnostics Tool



Get Orphan Images from Database Identifies database files that no longer have an image associated with them. If files are identified here, attempt a database restore.

Patient Directory:

During normal power down, patient data is transferred from drive C to drive D. If file corruption occurs, or if drive C is replaced, this feature will restore the last archived database. Only information stored after the last successful power down will be missing.

Accessing Windows NT Using On-Screen Viewing

► To access Windows NT using on-screen viewing

1. Turn the HDI 5000 power off.
2. Disconnect the DVS/APM power cable.
3. Connect the PS2 keyboard and mouse to the DVS/APM module.
4. Boot the ultrasound system.
5. Simultaneously press Superkey, Shift, and Spacebar. The Engineering Panel sidebar is displayed.
6. Click Misem, then Video Config., then Image. The system monitor displays a white screen.

NOTE HDI 5000 systems must be configured for NTSC video for the video to be useful for this procedure.

7. For NTSC systems, proceed to [step 13](#). Continue with [step 8](#) through [step 12](#) to temporarily change a PAL system to NTSC video.

NOTE It is not possible to temporarily change a PAL system to NTSC video with certain software versions. These versions include, but may not be limited to systems with 190.XX and 195.XX software. The issue is expected to be fixed in a future software build.

8. Connect the laptop to the system with a serial connection and log into the system with UpLink.
9. Verify Auto Connect is disabled.
10. Log into VX Works.
11. Type in the command: **SscbMsgToScbus “242c0300000100”**. (Note the command is case sensitive.) Press Enter.

12. Verify the system responds with "value = 0 = 0x0". After the system responds with this message, the video is configured for NTSC. If the system does not respond with this message, repeat [step 11](#).
13. On systems with the DVS module press Alt-F4. On systems with the APM module, press the spacebar and minimize the ATL Radman application.

Accessing Windows NT Using VNC Viewer

► To access Windows NT using VNC Viewer

1. Connect the laptop LAN to the DVS or APM modules:

NOTE The module is configured with two network interface cards; one with a BNC and an RJ45 connector, the other with a single RJ45 (the SMC EX adapter) port. Use the card with the single RJ45 port to connect to the laptop using one of the following methods:

- Using an Ethernet crossover cable, connect one end to the DVS module SMC EZ RJ45 port and the other end to the laptop network adapter.
 - Using a hub and two standard Ethernet cables, connect one end to the module SMC EZ RJ45 port and the other end to the hub. Connect the other cable to the laptop network adapter and the hub. Ensure the hub is powered and the "Normal/UpLink" switch is in the "Normal" position.
2. Ensure the link lights at the laptop network adapter card, hub (if used), and SMC EZ network adapter card are lit.
-
- NOTE** If link lights are not lit, disconnect and reconnect the Ethernet cables.
3. To launch the VNC Viewer, click Start, then Programs, and then VNC. Click Run vncviewer.

4. At the VNC server dialog box type "10.10.10.10" and click OK. If the DVS or APM modules were connected to the hospital network, use the IP Address of the HDI 5000 the same as in the Host Table.
5. At the session dialog box type "misem" and click OK.
6. On the DVS module:
 - a. Right-click on the Window Title Bar.
 - b. Click on Send Ctrl-Alt-Del.
 - c. Click on Task Manager.
 - d. Highlight DVS and click on End Task.
 - e. Close the Task Manager window.
7. On the APM module:
 - a. Press Spacebar.
 - b. Minimize the ATL-RadMan program.
 - c. Connect the keyboard, mouse, and monitor to the DVS/APM.
 - d. Power up the DVS/APM.
8. On the DVS, press Alt+F4. On the APM, press Spacebar and minimize the ATL RadMan program.

DVS/APM Video Problems

► To use the CODEC board diagnostics

1. From the DVS/APM Windows NT screen click Start, then Settings, then Control Panel.
2. Double-click on Devices.
3. Scroll down to MISEM Codec Device Driver and click Stop.
4. Click Yes to stop the Codec Device Driver.

5. Click Start to re-start the Codec Device Driver.
6. Close the Devices window.
7. Close the Control Panel window.
8. Double-click *diag*.
9. Select POST Tests from the Diagnostics menu.
10. Select all tests and click on Execute.
11. After the tests are finished, close the POST Tests window. The test results will be displayed in the main diagnostic window.
12. If one of the tests fail, replace the CODEC board.

► **To perform the LVDS Test**

1. From the DVS/APM Windows NT screen click Start, then Settings, then Control Panel.
2. Double-click on Devices.
3. Scroll down to MISEM Codec Device Driver. Click Stop.
4. Click Yes to stop the Codec Device Driver.
5. Click Start to re-start the Codec Device Driver.
6. Close the Devices window.
7. Close the Control Panel window.
8. Double-click *diag*.
9. Select LVDS Tests from the Diagnostics menu.
10. Connect the Loopback Connector (P/N 4500-6978-01) to the CODEC PCB and click Run Test.
11. After the test has finished, click Cancel to close the LVDS Tests window.

12. If the LVDS test fails, reboot the DVS/APM and run the test again. If the test still fails, replace the CODEC Board.

PIM Test on HDI 5000

► To perform the PIM test

1. Using the HDI 5000 diagnostics, log into "Tests and Utils".
2. Double-click Machine and Display Subsystem.
3. Highlight PIM and click Tests and Utils.
4. Highlight FW MISEM Loop-back Test and click Execute.
5. If the test fails, replace the PIM.

Disassembly

Removing the DVS/APM Module Cover

► To remove the DVS/APM Module Cover

1. Position the module so you can access the screws on the bottom (left detail of [Figure 16-20](#)).
2. Remove the two flathead screws securing the drive assembly at the left front of the unit.
3. Position the module so you can access the cover screws on the top and the rear of the unit (right detail of [Figure 16-20](#)).
4. Remove the 11 panhead screws on the top of the module and the 8 panhead screws on the rear.
5. Lift the cover off the unit from the rear and rotate the cover clockwise 90 degrees ([Figure 16-21](#)).
6. Reach under the cover and remove the power supply cable from the cable clamp ([Figure 16-22](#)).
7. Disconnect the cable.
8. Lift the cover off the unit.

Figure 16-20

DVS/APM Module Cover Removal (1 of 3)

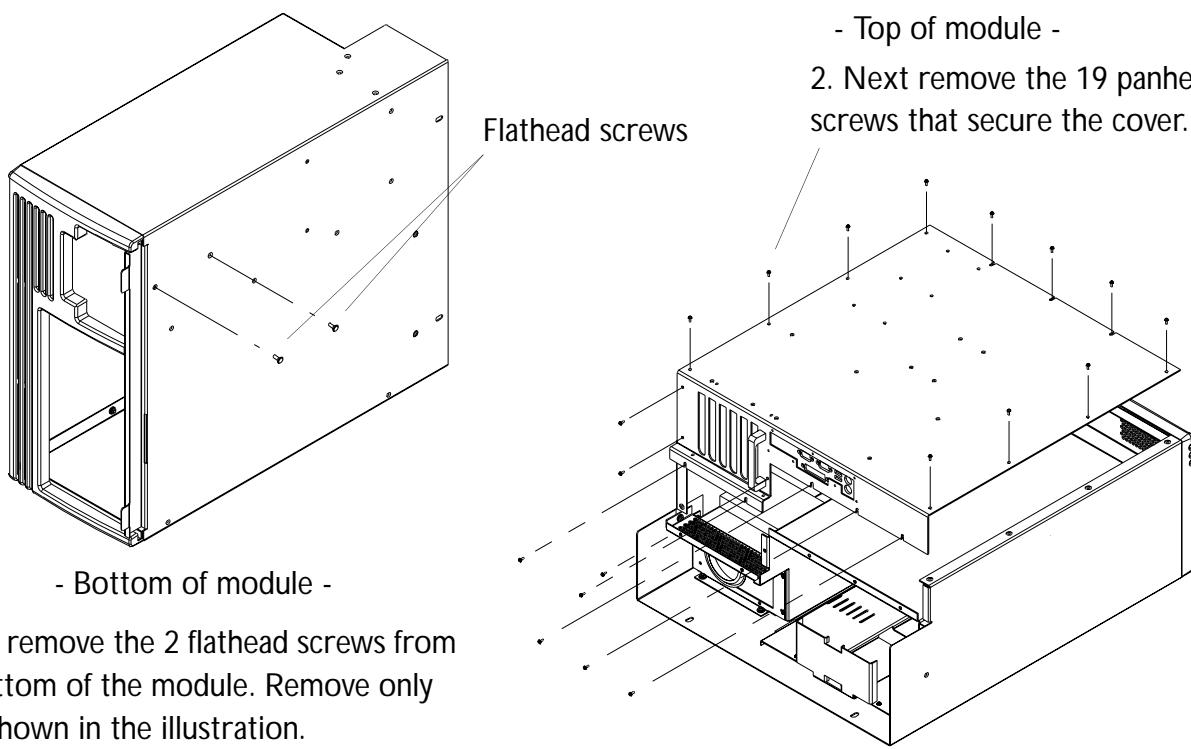


Figure 16-21

DVS/APM Module Cover Removal (2 of 3)

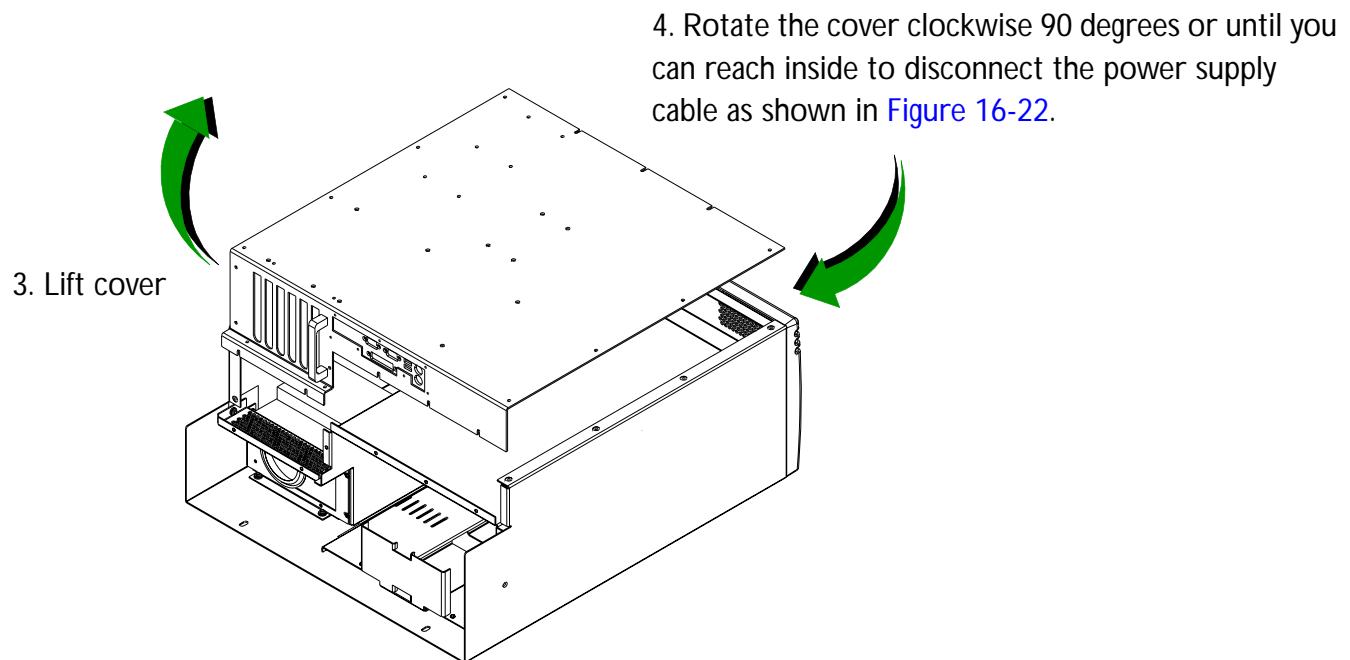
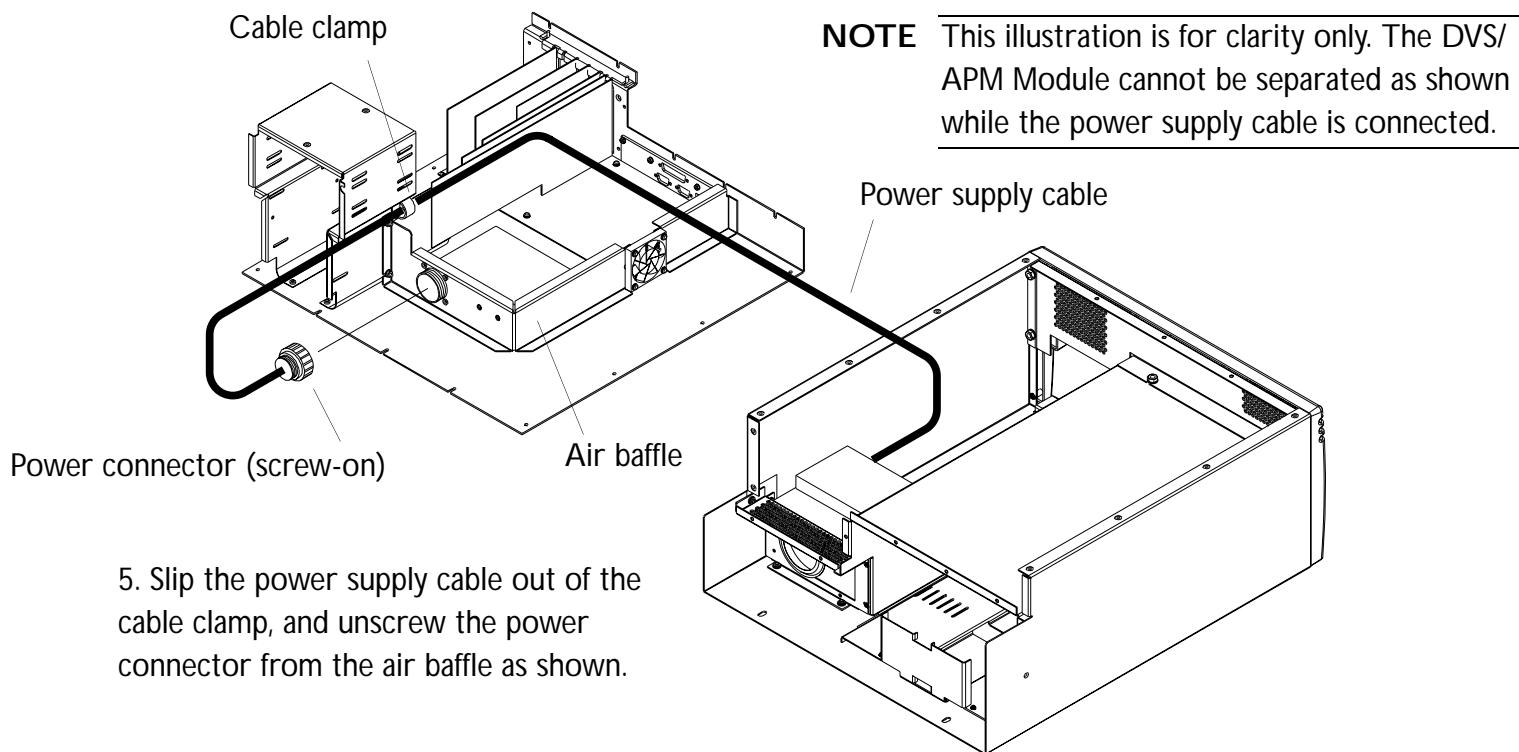


Figure 16-22

DVS/APM Module Cover Removal (3 of 3)

**Installing the
DVS/APM
Module Cover****► To install DVS/APM module cover**

1. To connect the power supply cable, place the cover on the unit lifted and rotated as shown in [Figure 16-21](#).
2. Reach under the cover, connect the power supply cable, and secure the cable in the clamp.

3. Place the cover on the unit.
4. Loosely install the screw to the right of the handle on the rear of the unit.
5. Loosely install the four screws on the top corners of the unit.
6. Position the unit so you can access the screws on the bottom.
7. Install the two flathead screws into the drive assembly.
8. Position the unit so you can access the screws on the top and rear.
9. Install the remaining panhead screws.
10. Tighten all screws.

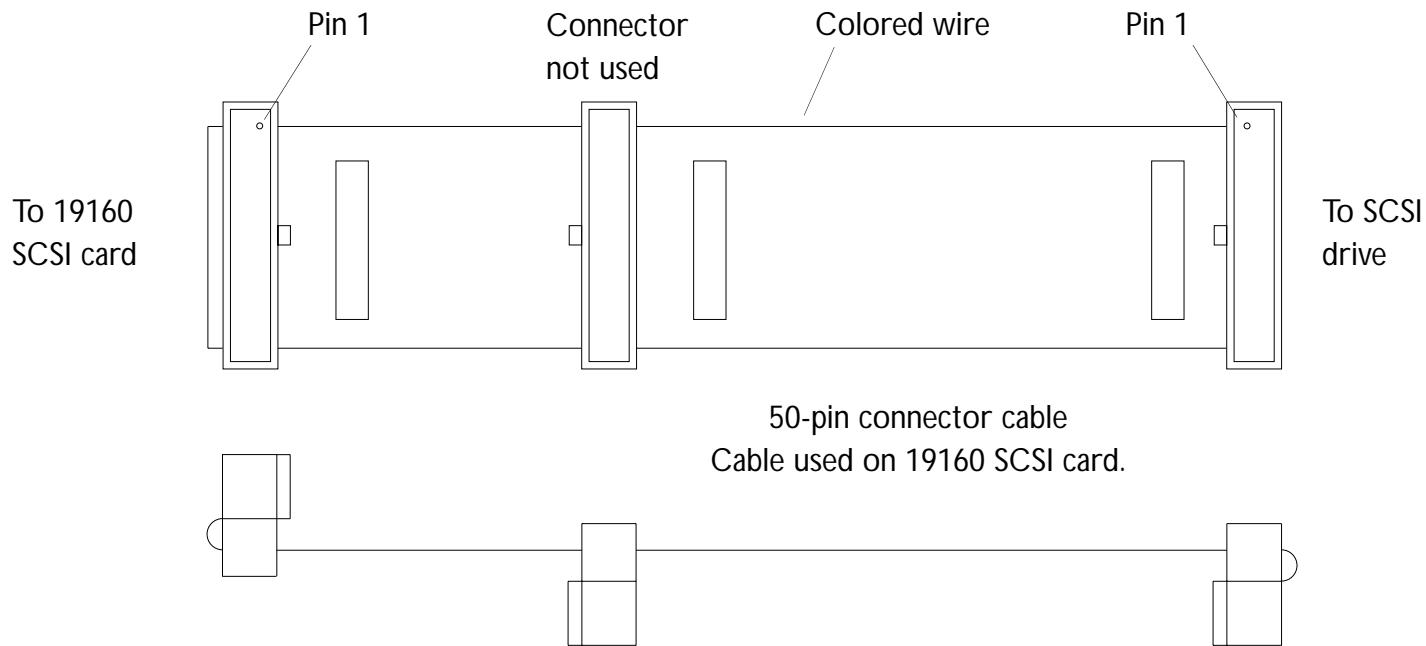
DVS/APM Cabling and Connectors

With the exceptions noted in the figures, the cabling and connectors for the DVS and APM modules are the same. Refer to [Figure 16-25](#) through [Figure 16-28](#) for the signal cable diagrams. Refer to [Figure 16-29](#) for the power cable diagrams. Connector locations are found on [Figure 16-30](#) through [Figure 16-33](#).

DVS Signal Cabling

Figure 16-23

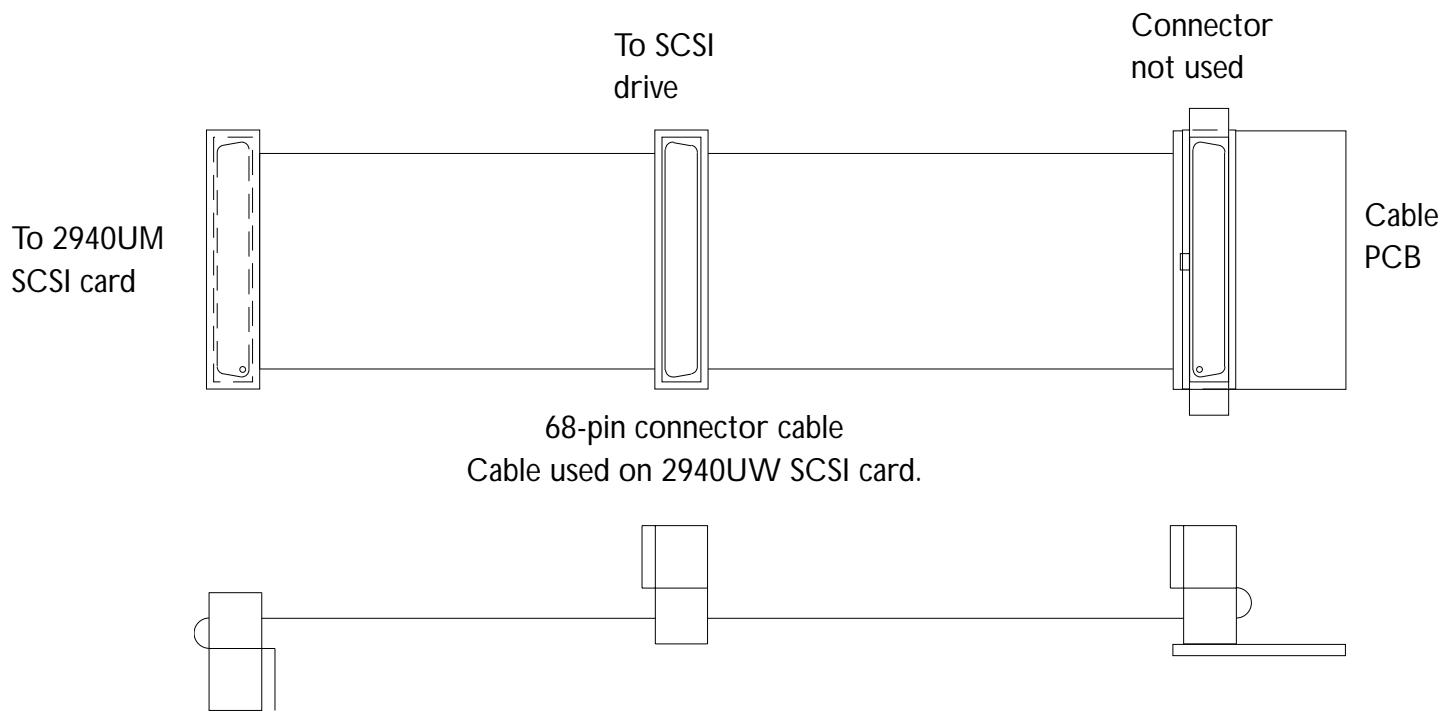
DVS/APM SCSI Drive Cable Assembly (P/N 2275-0496-XX)



[Cable Table 11-1](#)

Figure 16-24

DVS SCSI Drive Cable Assembly (P/N 2275-0497-XX) (DVS Module Only)

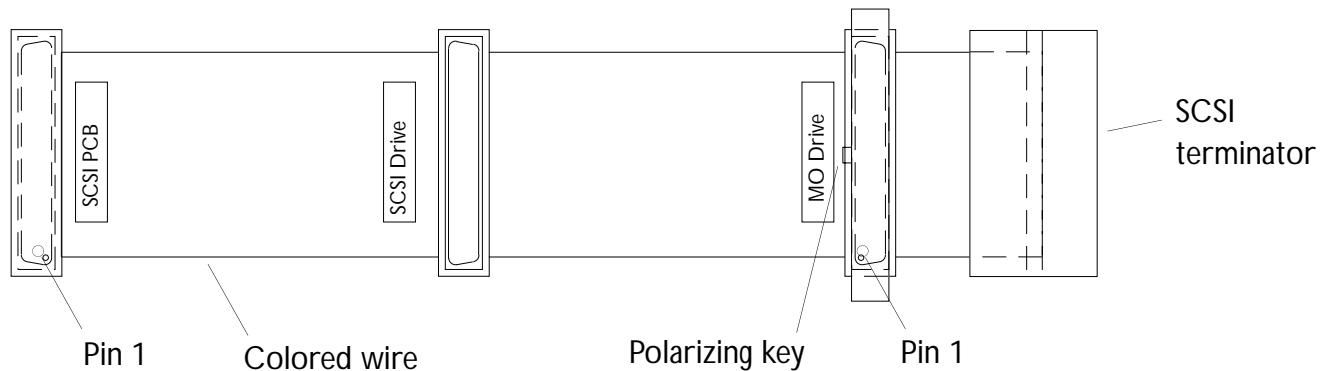


Cable [Table 11-1](#)

Figure 16-25

SCSI Drive Cable Assembly (P/N 3500-2918-XX)

NOTE The APM does not use the SCSI hard drive connector.



Cable Table 11-1

All wires have corresponding pins on both connectors.

Figure 16-26

VESA Feature Cable Assembly (P/N 3500-2919-XX)

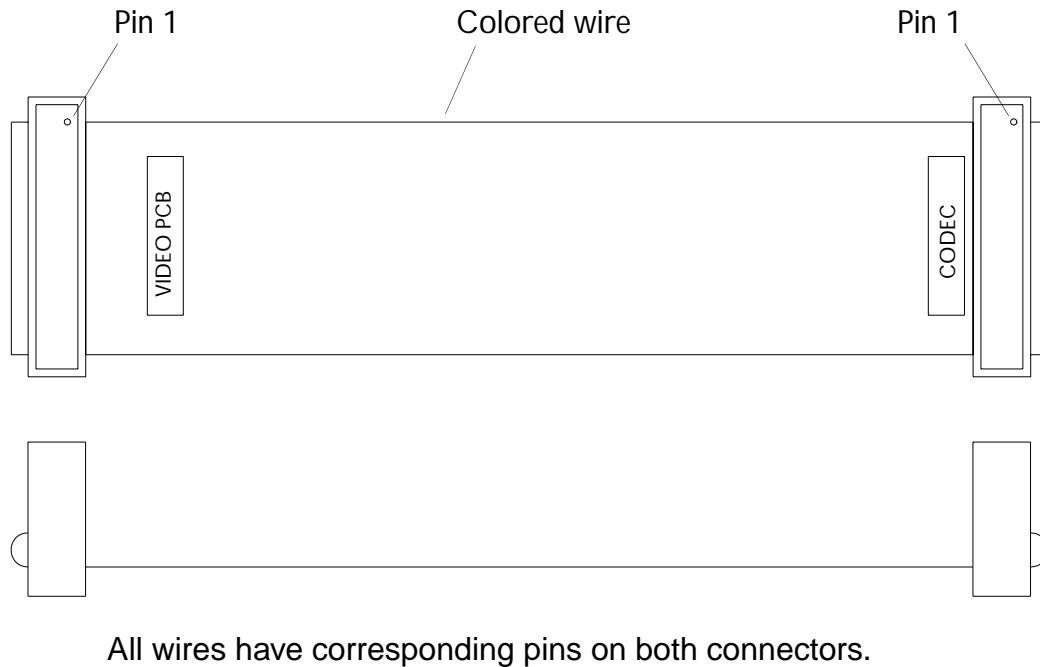
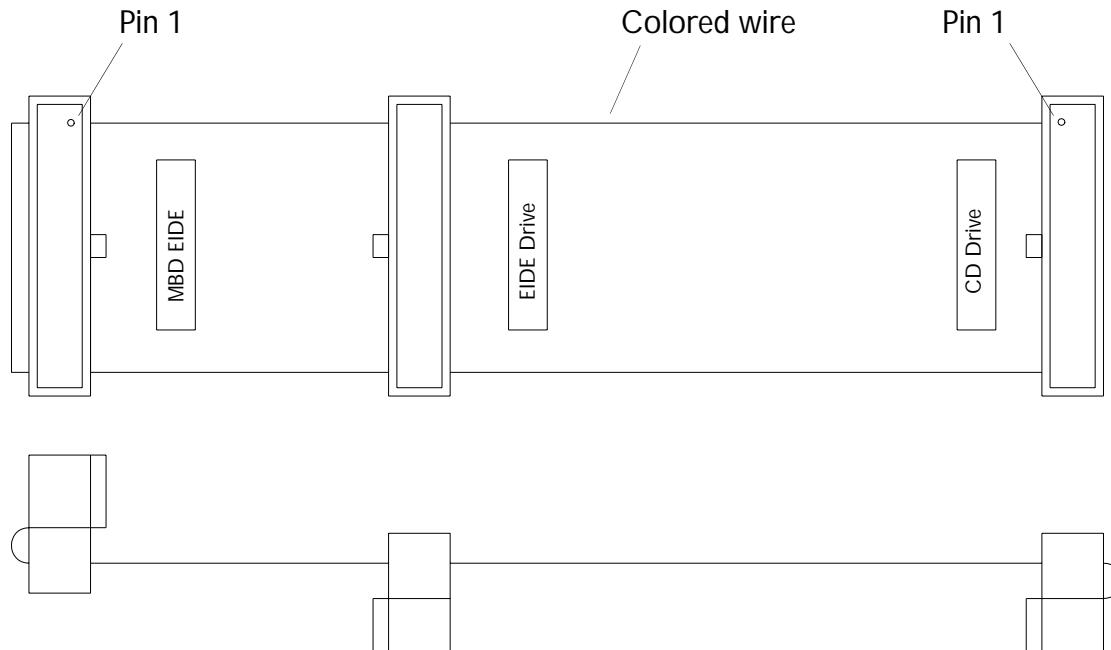
Cable [Table 11-1](#)

Figure 16-27

EIDE Drive Cable Assembly (P/N 3500-2920-XX)

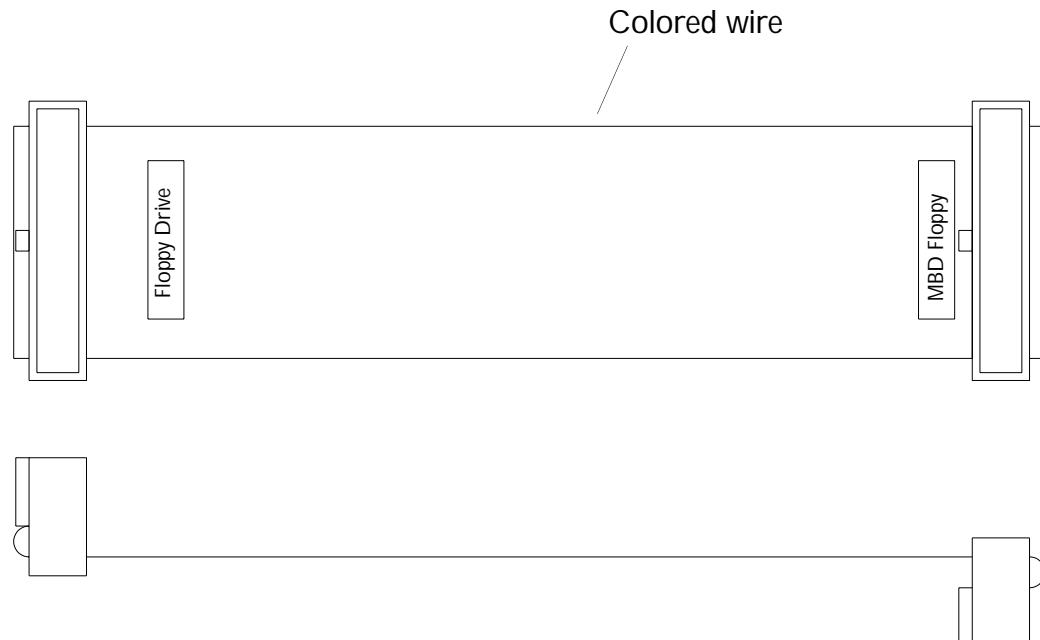


Cable Table 11-1

All wires have corresponding pins on both connectors.

Figure 16-28

Floppy Disk Drive Cable Assembly (P/N 3500-2923-XX)



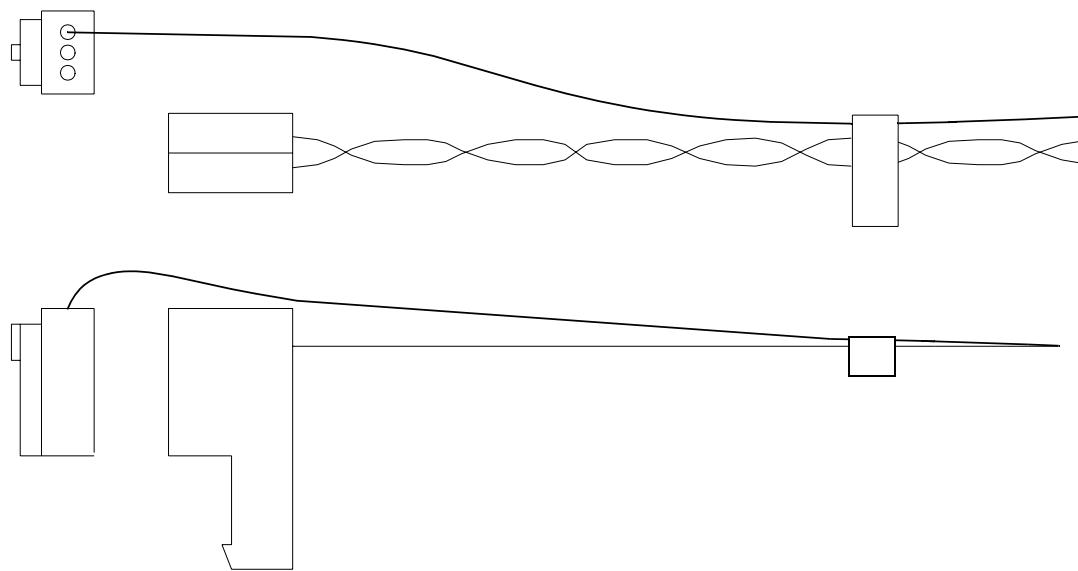
Cable Table 11-1

All wires have corresponding pins on both connectors.

Power Cabling

Figure 16-29

Power-On Cable Assembly (P/N 3500-3030-XX)



Cable Table 11-2

Interconnect Cabling

Figure 16-30

External Connector Locations

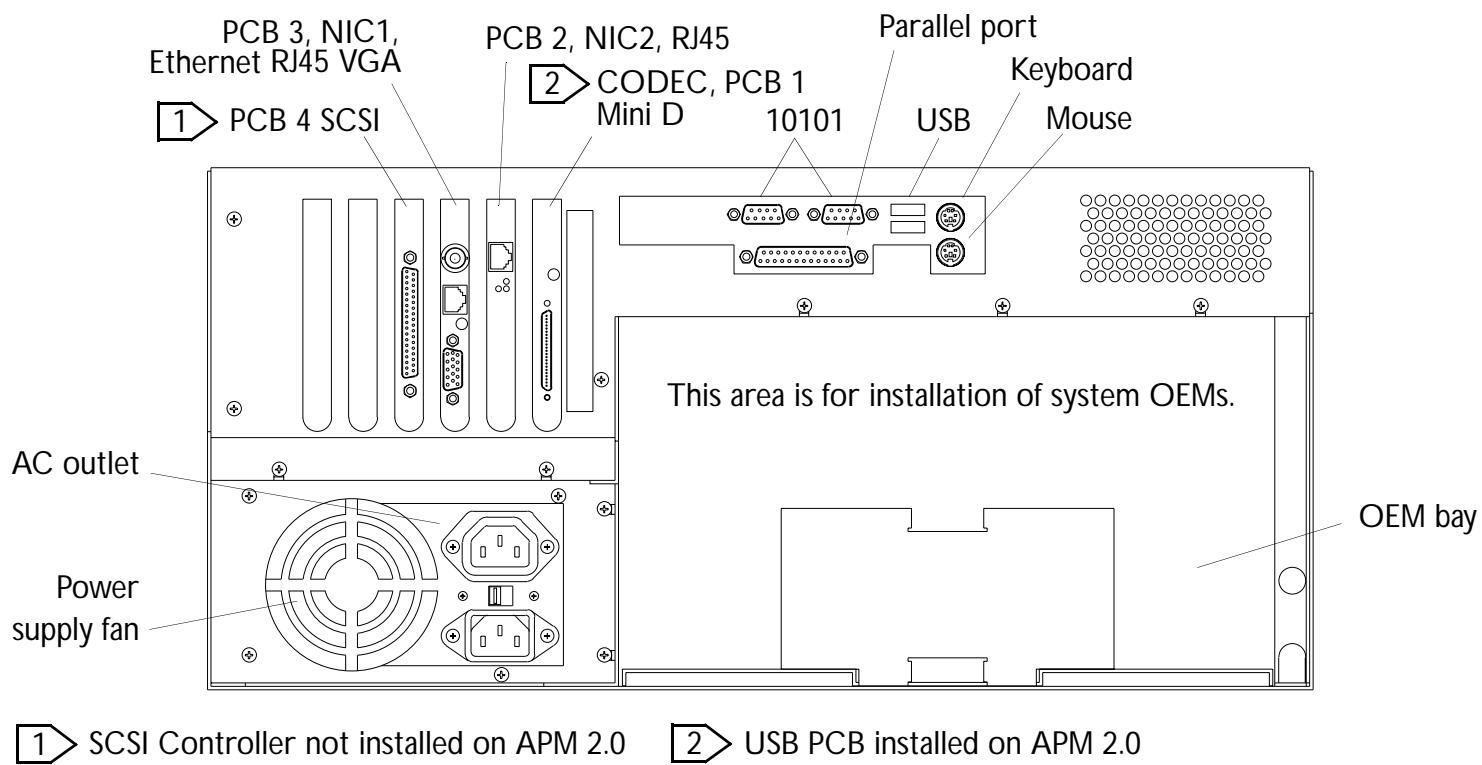


Figure 16-31

Motherboard Connectors - Soyo SY-5EM+ (DVS 1.0)

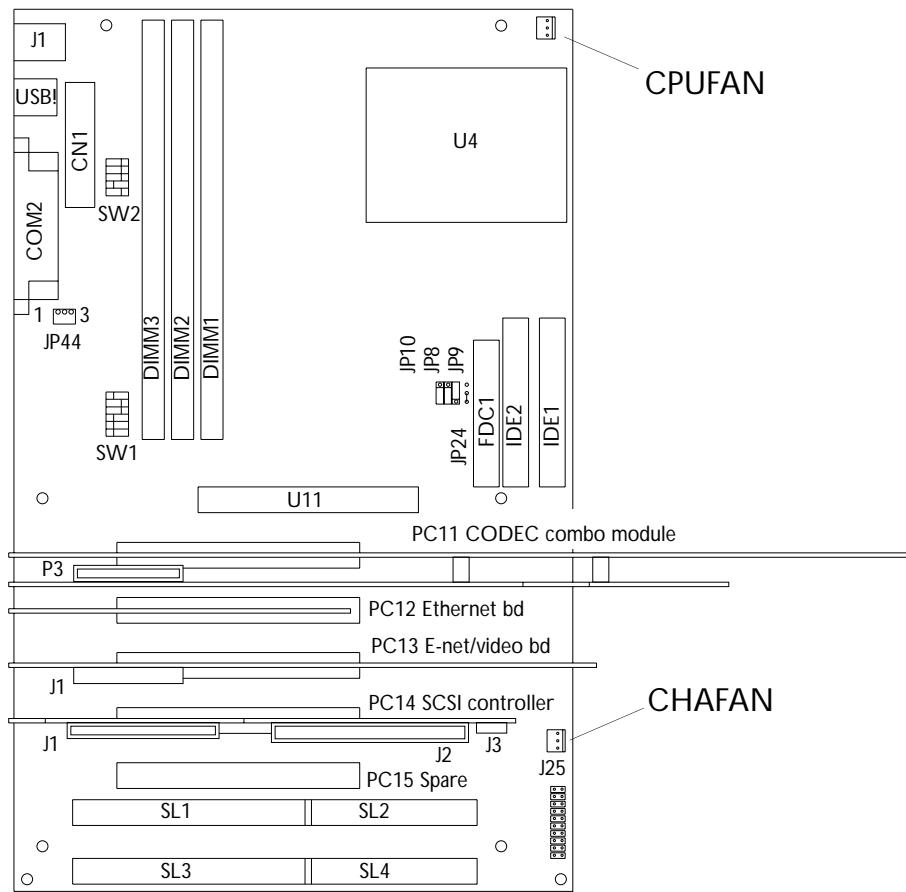


Figure 16-32

Motherboard Connectors - American Predator Raptor ATX/2 (DVS 2.0/APM 1.0)

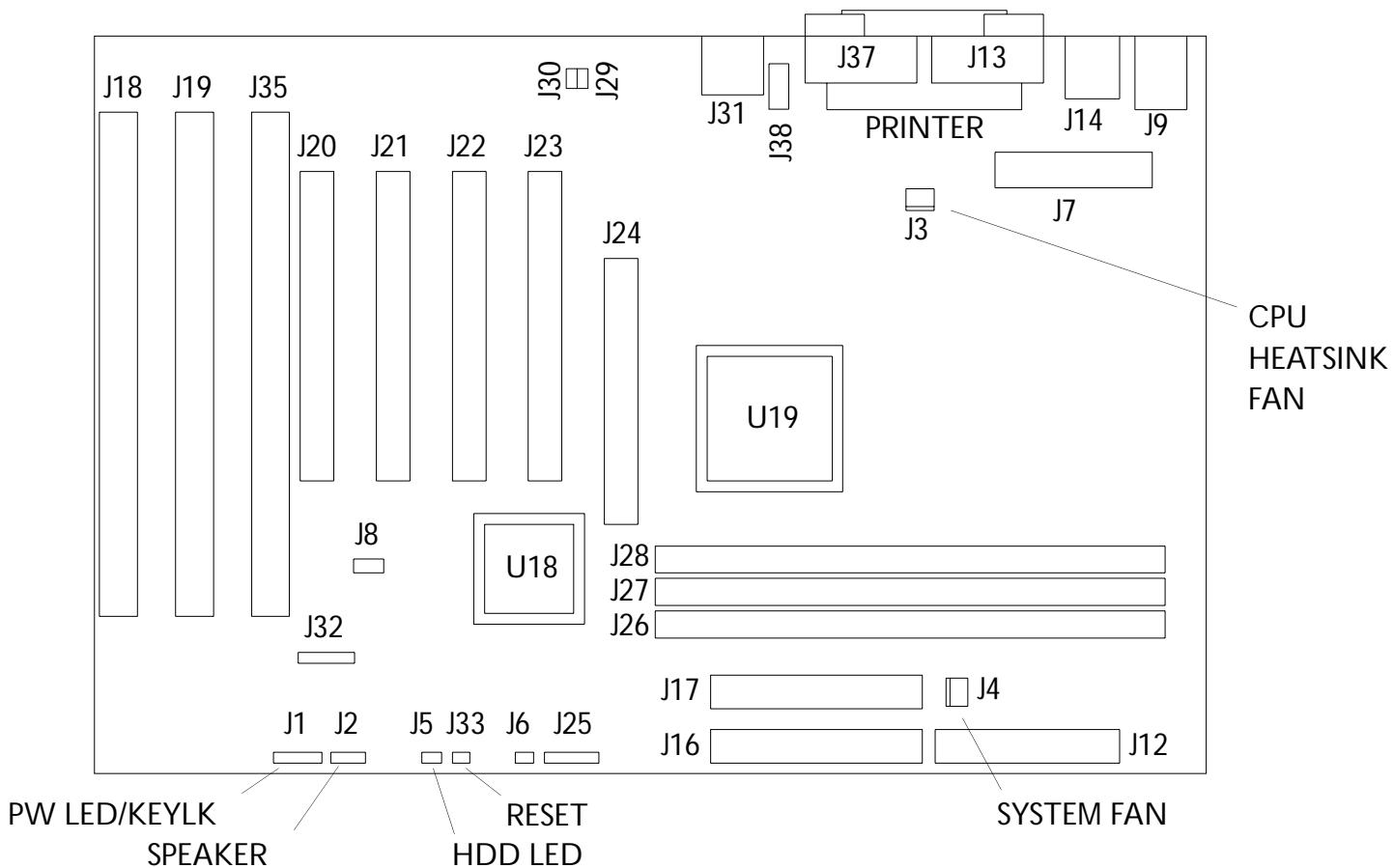
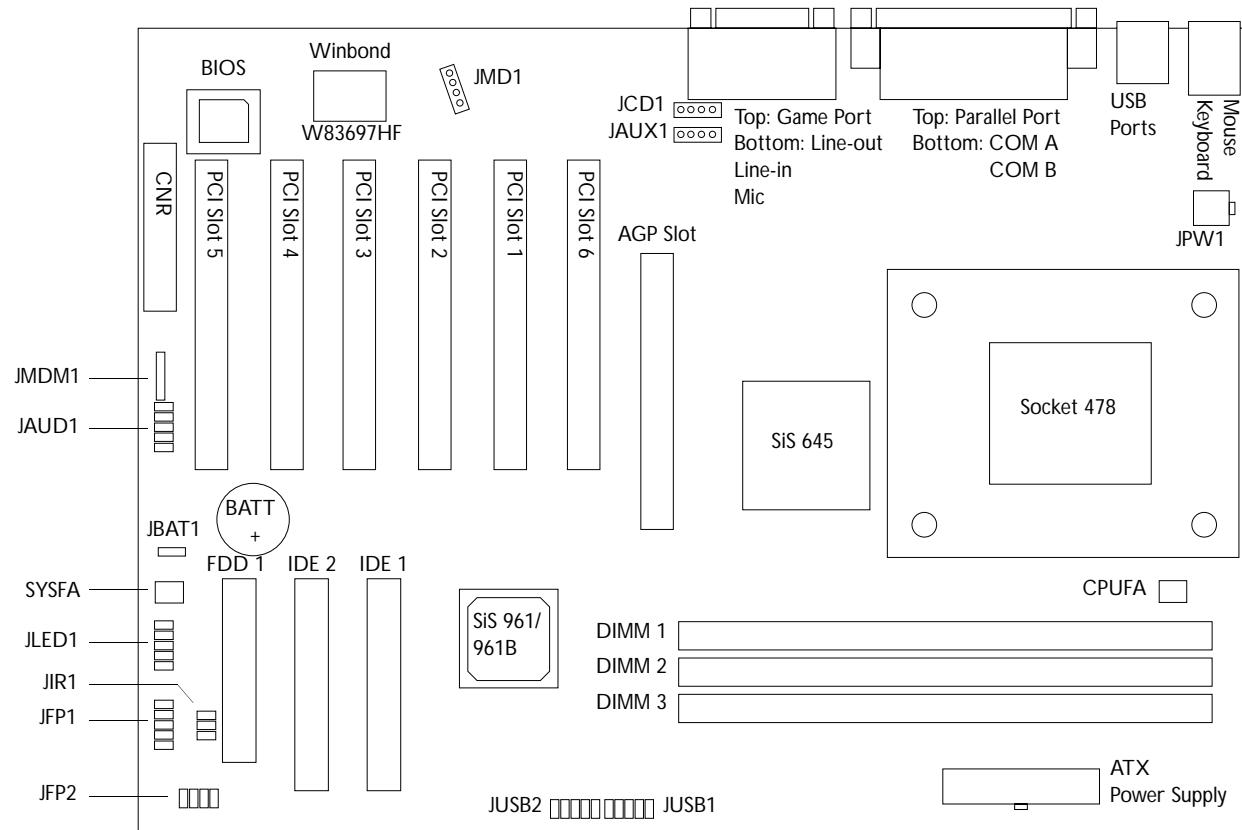


Figure 16-33

MSI MS6547 Motherboard Connectors - (APM 2.0)



Change History

Since the DVS/APM products are directly related to the HDI 5000 system hardware and software, the DVS/APM change history is covered in the system change history. Before linking to the change history section, first determine the HDI 5000 software and hardware associated with the DVS/APM using “[Configuration](#)” on page 769. Then refer to [Section 12, “Change History”](#), for more information.

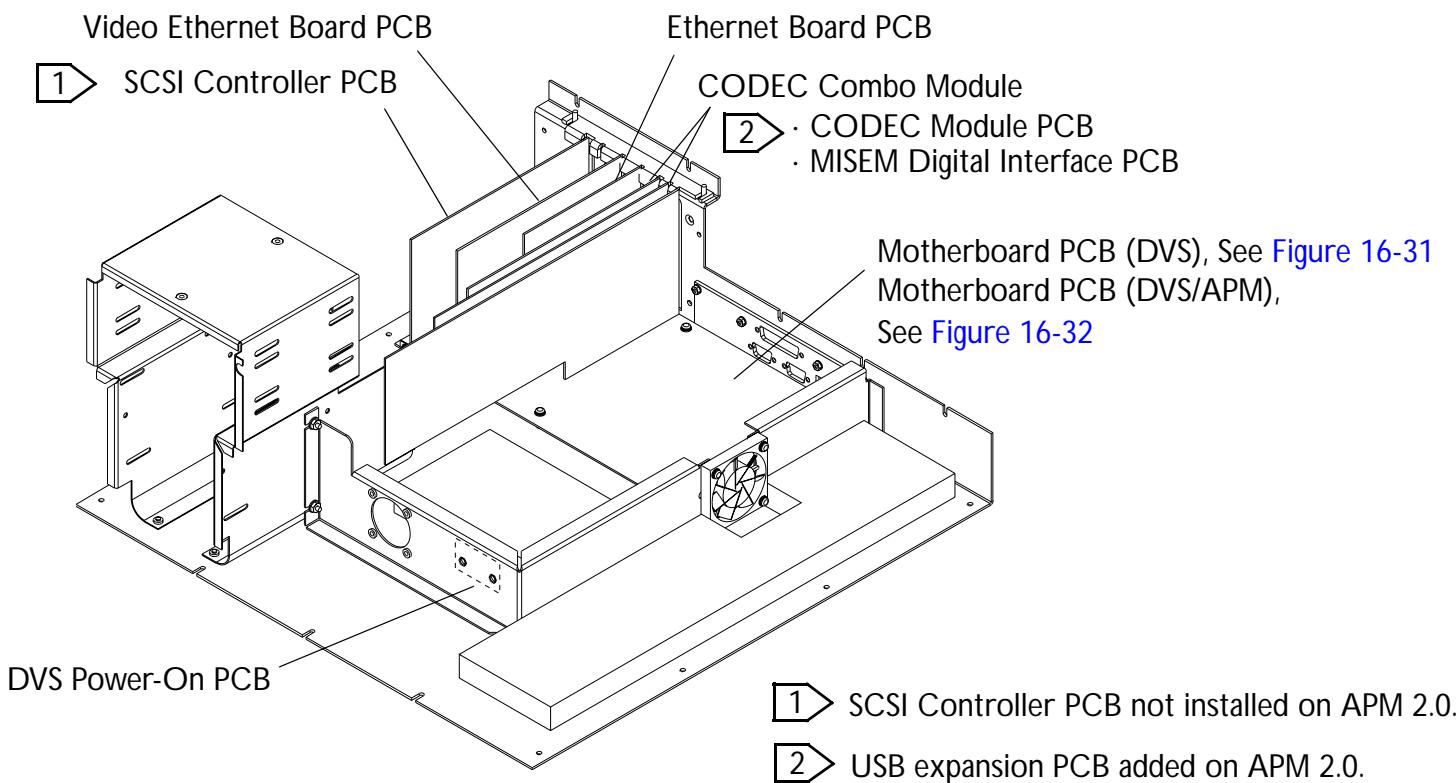
Configuration

DVS software must be used with the corresponding hardware option. Reference the hardware and software part numbers in the HDI 5000 Master Compatibility Matrix.

Reference DVS/APM PCB locations in [Figure 16-34](#). Jumper locations on the American Raptor motherboard are shown in [Figure 16-35](#).

Figure 16-34

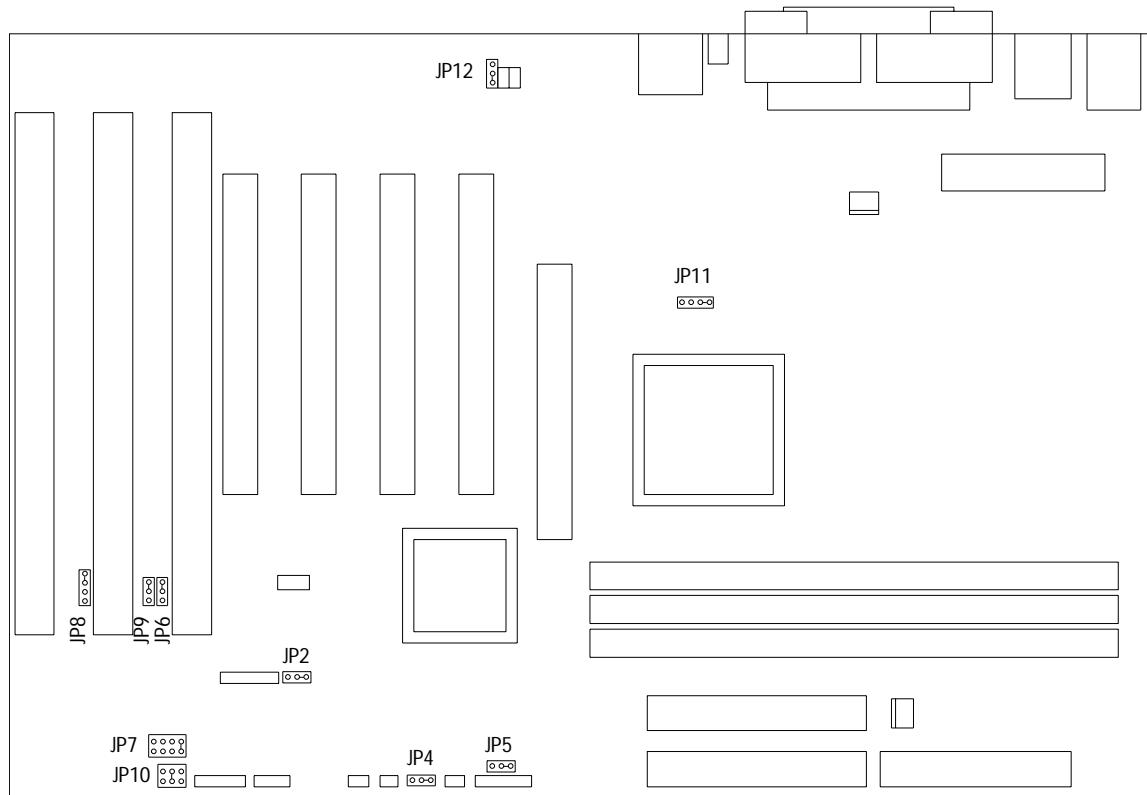
DVS/APM Module PCB Locations



Refer to [Figure 16-20](#), [Figure 16-21](#) and [Figure 16-22](#) for proper disassembly of the DVS/APM module.

Figure 16-35

Motherboard Jumpers - American Predator Raptor ATX/2 (DVS 2.0/APM)



DVS/APM Drive Jumper and Switch Positions

DVS/APM drive jumper and switch positions for the optical drives are listed in [Table 16-10](#) and [Table 16-12](#).

Table 16-10

Internal 5.25-in Sony MO Drive (SMO-F551) Switch/Jumper Positions

Drive Part Number	Drive Size (MB)		Jumper Position									
			Jumper	A1, A2		A3	A4-A8		A9	A10	A11	A12
	640	SW1		OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
2100-1591-01	640	SW1		OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF

Table 16-11

Hard Drive Reference Information

Table 16-12

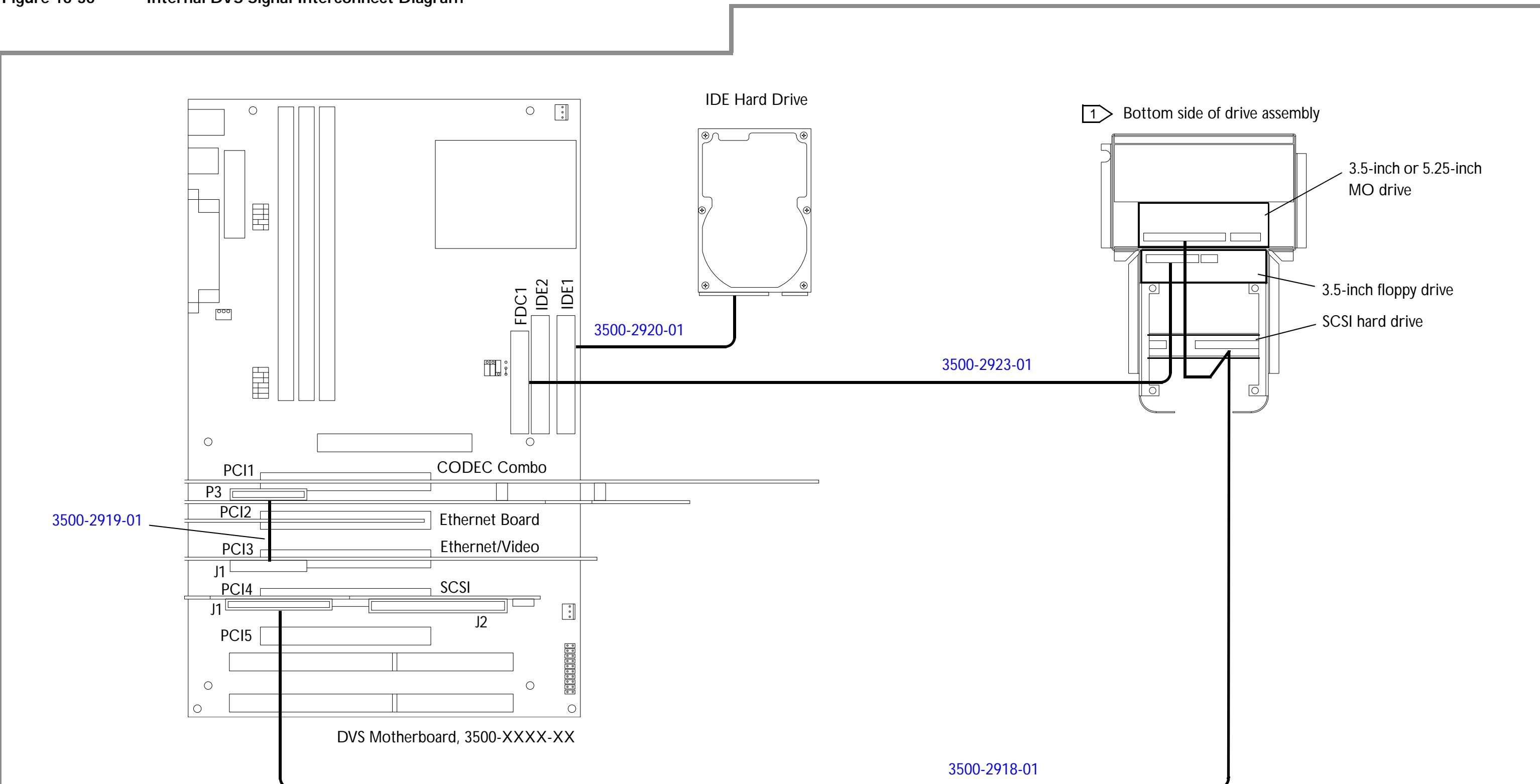
Internal 3.5-in Fujitsu MO Drive Switch/Jumper Positions

Drive Part Number	Drive Size (MB)	Model No.	Drive Type	Switch/Jumper	Switch/Jumper Positions							
					1	2	3	4	5	6	7	8
2100-1646-01	640	MCF3064SS	SCSI DVS/ APM 1.0	SW1	OFF	OFF	ON	ON	OFF	ON	OFF	OFF
2100-1928-01		MCM3064SS		CNH	1-2	3-4	5-6	-	-	-	-	-
					OFF	ON	ON					
2100-1853-01	640	MCF3064AP	IDE	SW1	OFF	OFF	ON	ON	OFF	ON	OFF	OFF
2100-1861-01		MCM3064AP	APM 2.0	CNH	1-2	3-4	5-6	-	-	-	-	-
					OFF	ON	OFF					

**DVS/APM
Parts**

Refer to [Section 14, "Parts"](#) for DVS/APM parts information.

Figure 16-36 Internal DVS Signal Interconnect Diagram



① The drive assembly is attached to the cover of the DVS Module and is shown as you would see it when it is removed.

Figure 16-37 Internal DVS/APM Signal Interconnect Diagram

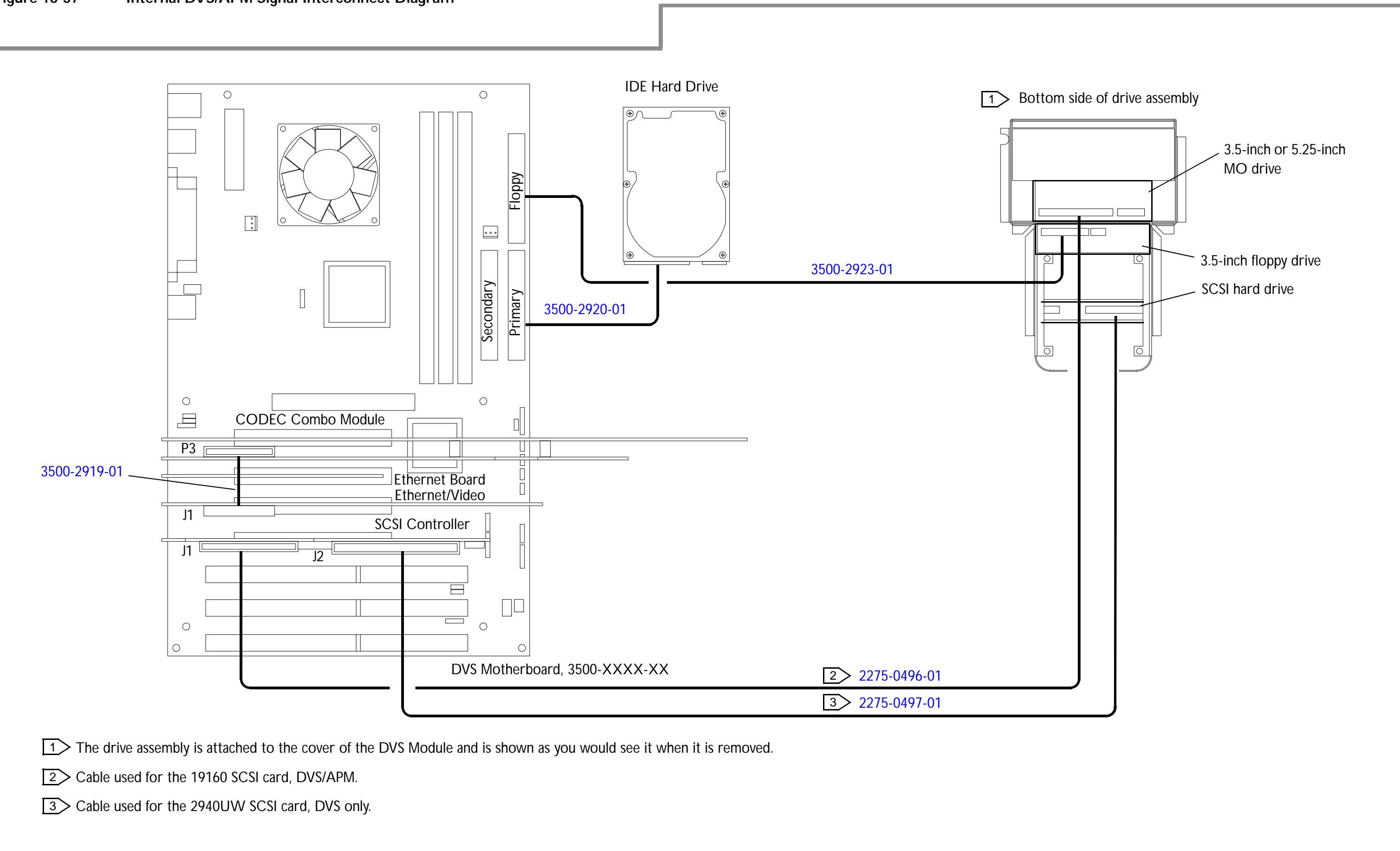
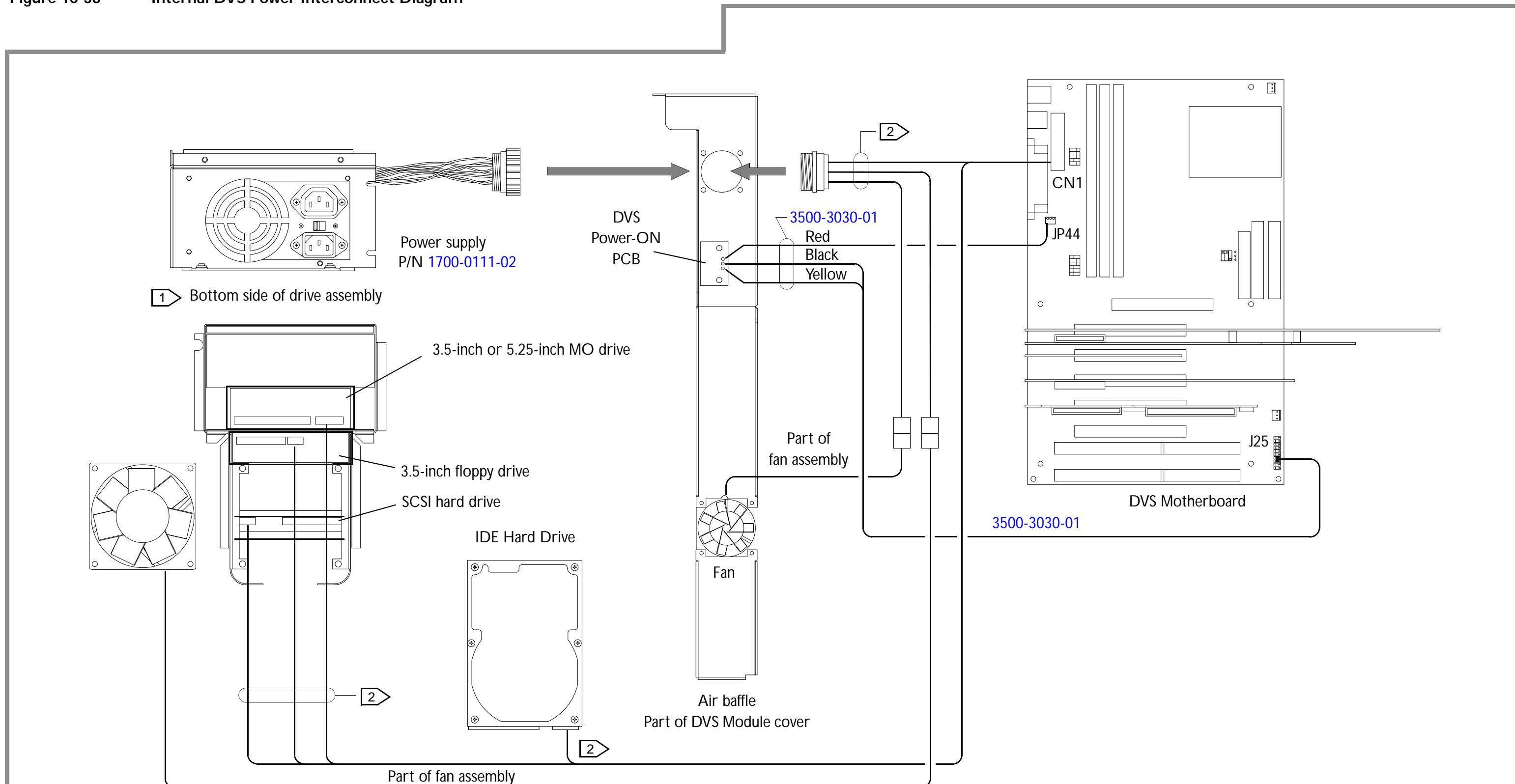
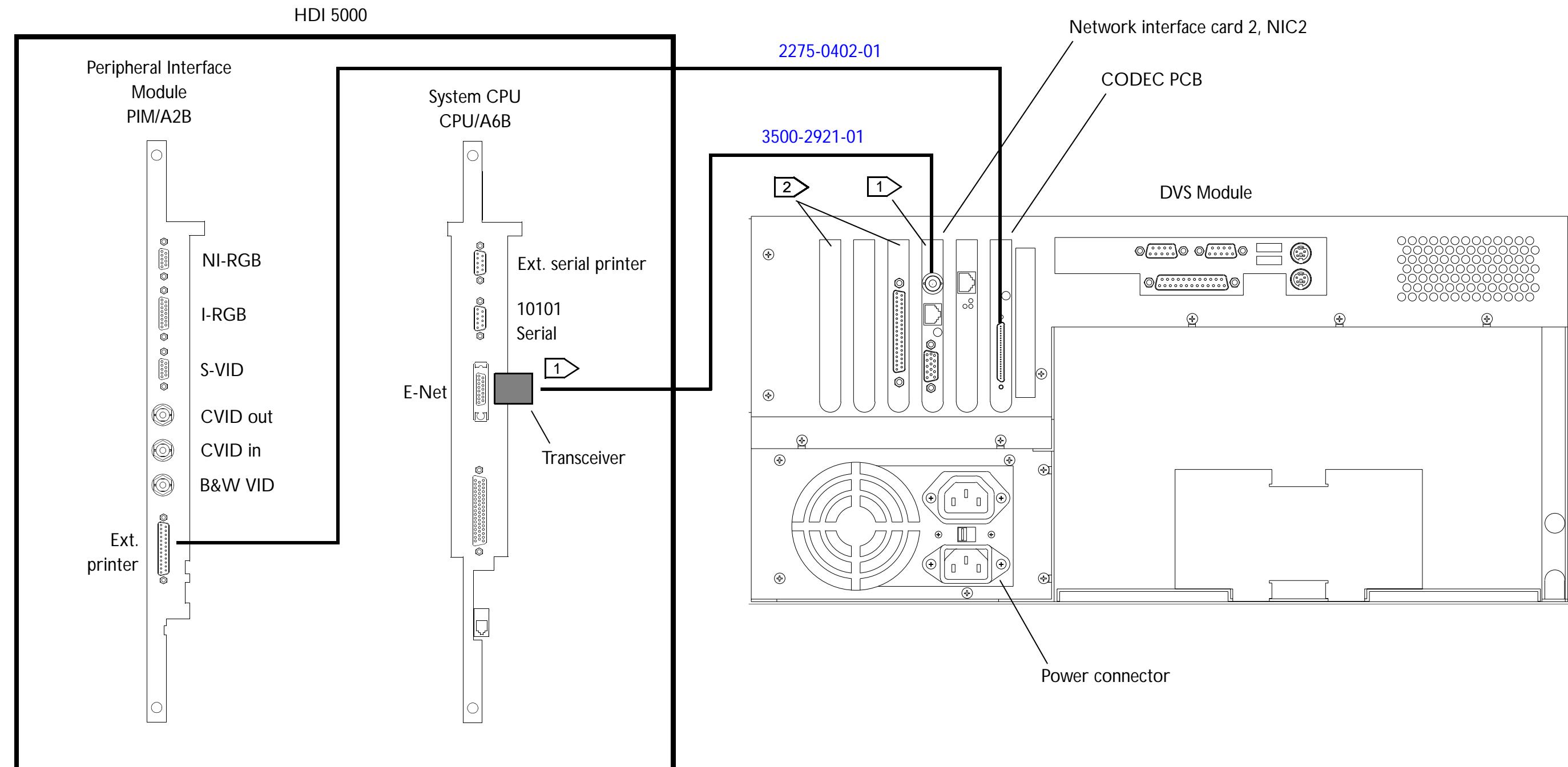


Figure 16-38 Internal DVS Power Interconnect Diagram



- 1 The drive assembly is attached to the cover of the DVS Module and is shown as you would see it when it is removed.
- 2 Part of power supply (P/N 1700-0111-XX)

Figure 16-39 DVS/APM Module to HDI 5000 System Interconnections



1 Requires BNC coax plus connector and 50 Ohm terminator.

2 APM 2.0 has a USB expansion card in slot 1, and slot 3 is empty.

17 Glossary

Abbreviations

4V²	Peak Pressure Gradient
A	Amps
A1B	A1B - A13B and PS1 - PS4 identify card cage slot positions
AC	Alternating Current
ACIM	AC Input Module (main power input panel)
A/D	Analog-to-Digital Conversion
ADAPTR	Advanced Digital, Audio, Physio and Translator (module)
AIFOM	Advanced IF Output Module
AIM+	Analog Interface Module Plus
AI	Aluminum
AP&I	Acoustical Power and Intensity
APM	Advanced Processing Module
AQ	Acquisition (bus)
AQ Bus	Acquisition Bus
Assy	Assembly
AT	Acceleration Time; Averaging Time

Blk	Black
CB, Ch Bd	Channel Board
CFM	Cubic Feet per Minute
Conn	Connector
CPI	Control Panel Interface (module)
CPU	System CPU (system controller module)
D	Diameter
DAC	Digital-to-Analog Converter
D/A	Digital-to-Analog Conversion
DC	Direct Current
DDEA	Disc Drive, ECG and Audio (module)
DHHS	Department of Health and Human Services (U.S.)
DT	Deceleration Time
DVS	Digital Video Streaming
ECG	Electrocardiograph
ESP	Extended Signal Processing
FI / FIh	Flat / Flathead
FEC	Front End Controller (module)
FOOTSW	Footswitch

F/W	Firmware
GB	Gigabyte
H	High
Hd	Hex drive
HDI	High Definition Imaging
Hosp	Hospital
HR	Heart Rate
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
H/W	Hardware
Hz	Hertz
ID	Inside diameter (screws or hardware); or system identification number
IF	Intermediate Frequency
IIM	Internal Interface Module
IMEM	Image Memory (module)
Ins	Inside
Int	Internal
ISEM	Integrated Stress Echo Module
L	Long

lb	Pound
lb/min	Pounds per minute
LCP	Lower Control Panel (module)
Lk	Lock
LED	Light Emitting Diode
LEP	List of Effective Pages
LUT	Look-Up Table
Max	Maximum
MB	Megabyte
MDF / EDF	Minimum / End Diastolic Velocity and Frequency
MO	Magneto-Optical (drive); or Machine Option (files)
MON	Monitor
Mt	Mounting
Mux	Multiplexer
NTSC	National Television Standard Committee (video standard)
Ny	Nylon
OD	Outside diameter
OEM	Original Equipment Manufacture: peripheral device such as a printer, VCR, or camera
Oz	Ounces

PAL	Phased Alteration by Line (European video standard)
PCM	Pixel Conversion Module
PD / Pd	Processed Data (bus); Phillips drive (screw)
PI	Pulsatility Index
PIM	Peripheral Interface Module
PLL	Phase Loop Locking
Pnh	Panhead
Pnl	Panel
Plystr	Polyester
PS1	A1B - A13B and PS1 - PS4 identify card cage slot positions
PSM	Power Supply Module
PSP1, PSP2	Pixel Space Processor (module)
PSV/PSF	Peak Systolic Velocity and Frequency
RF	Radio Frequency
RFI	Radio Frequency Interference
RI	Resistive Index
Rkr	Rocker (Switch)
Rx	Receive, Receiver
SBY	Standby

SCSI	Small Computer Serial Interface
S/D	Systolic/Diastolic Ratio
S/H	Scanhead
Shld	Shield or shielded
S/HSEL	Scanhead Select (module)
Skh	Socket head
SPM	Signal Processing Module
Spst	Single pole, single throw (switch)
Ss	Stainless Steel
St	Steel
S-VHS	Super VHS: a VCR video format
Sw	Switch
S/W	Software
T	Thick
TAF	Time-Averaged Frequency
TAM	Time-Averaged Mean Velocity
TAP	Time-Averaged Peak Velocity
TGC	Time Gain Compensation
TOC	Table of Contents

TTag	Time Tag (bus)
Tx	Transmit, Transmitter
UCP	Upper Control Panel (module)
UIF	User Interface (LCP, UCP and CPI)
UIM	User Interface Module
Unshld	Unshielded
VA	Volt amps
Vac	Volts AC
Vdc	Volts DC
VTI	Velocity-Time Integral
W	Wide (refers to a distance measurement); or Watt (unit of electrical power)
w	with
Wht	White
w/o	without
Xfmr	Transformer
Zn	Zinc

Terms

Artifact	An undesirable imaging anomaly created as the result of acoustic effects or system processing.
Box	An image made up of a sequential set of columns that is usually smaller than the sector size would allow. Most commonly refers to the color-flow image-color box.
Burst	The transmitted waveform.
Drain	Usually a wire included in a coaxial or shielded cable that is in contact with the shield's braid or foil for the length of the cable. It is used to make the mechanical attachment and consequently the electrical path from the shield to the connector or plug.
FFT	Fast Fourier transformation; a mathematical method used with Doppler shift data to calculate the frequency spectrum, which results in the Doppler display.
Interlaced	Video format where two fields make up one 30 Hz frame. Video rows (scan lines) of the raster are interlaced, that is, field one provides rows 1, 3, 5, then field two fills in rows 2, 4, 6, and so on. See "non-interlaced".
MOP	Module Operations Processor; A board-level microprocessor dedicated to carrying out the functions of its hardware module. Communicates with the system CPU via a SCIP bus. Typically runs tasks such as initialization of registers, self-test, interpreting commands from the System CPU, and orchestrating real-time tasks on the hardware module.
Noise band	Any level of random background noise when the system speaker (not headphone) volume is set for a typical user setting (generally just above a mid-range setting). Also, any regular line or trace that clearly appears in the scrolling display (as three pixels/inch or more) at a level that is greater than the background noise.

Non-interlaced	Video format where the video rows are processed in sequence (1, 2, 3, 4, 5, 6, . . .) and updated at a 60 Hz rate. See "interlaced".
NTSC	National Television Standards Committee – 525-line, 60Hz, composite video, usually color.
OEM	Original Equipment Manufacturer; A peripheral device (VCR, printer, camera)
PAL	Phased Alteration by Line; 625-line, 50-Hz composite video, usually color.
PRI	Pulse repetition interval; the time between ultrasound pulses. This time determines how much processing can take place and still keep up with the data acquisition.
PRF	Pulse Repetition Frequency; rate at which ultrasound pulses are sent into the tissue. Based primarily on depth desired, but also depends on other variables such as dead time.
SCIP, SC	System Control Interface Processor; a set of processors that reside on all modules that communicate with the CPU PCB. SCIP refers to the communication system which includes protocol, firmware, and hardware.
UART Port	Universal Asynchronous Receiver Transmitter; a serial communication port located on the card edge of the FEC. Also called Debug Port or Diagnostic Port.
Watchdog	A level detector, a comparator circuit, or a time-out circuit, which ensures the proper functioning of a supply, a regulator, or other circuitry, and disables the monitored circuit if it is out of specification or the timer is not reset.