



Jim Rickner presents:

## **Troubleshooting Techniques and Tips for the New Philips Epiq 5/7 Systems**

Sponsored by: Conquest Imaging



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Wednesday, November 18, 2015, 2:00pm ET

**PRESENTER:** JIM RICKNER, TRAINING DIRECTOR AT CONQUEST IMAGING



Jim Rickner is the Training Director for Conquest Imaging. He has over 20 years of experience working on variety of electronic equipment. His experience includes repairing and operating flight simulators, specialty aircraft avionics, destructive material testing instruments and a variety of ultrasound systems. He has worked for Conquest Imaging over nine years and was the Senior Field Service Engineer prior to becoming the Training Director.

This 75-minute presentation will enable attendees to understand basics troubleshooting techniques and tips for the new Philips Epiq 5/7 systems. The discussion will begin with an external overview followed by system architecture including image formation, processing, display and power subsystems. Signal flows and basic troubleshooting techniques; such as reading LED status indicators, voltage and functionality checks, will also be covered.

### **DON'T MISS THE WEBINAR WEDNESDAY'S Q&A**

Jim Rickner will end today's webinar with a Q&A session. If you have a question for Jim, please submit it early by emailing [webinar@mdpublishing.com](mailto:webinar@mdpublishing.com).

All questions will be addressed at the end of today's presentation or the presenter will follow up with you offline.



## Ultrasound Applications for Service Engineers

Choose the answer(s) (there may be more than one) that best answers the following questions:

**1. How often should I back up my system?**

- a. Never – the OEM did it already
- b. During PMs
- c. After option or network changes
- d. When it first arrives

**2. When the power light on the control panel is not illuminated, what is the power status**

- a. Standby
- b. Sleep mode
- c. No power
- d. Powered on

**3. Which of the following boards is not part of the Epiq systems?**

- a. SSD
- b. ACB
- c. FEC
- d. VIO

**4. How many host hard drives does the Epiq system have?**

- a. 0
- b. 1
- c. 2
- d. 3

**5. Where are the power switches located on the Epiq systems?**

- a. Control Panel
- b. Acquisition Control Board
- c. Backplane
- d. Platform Power Module

**6. How can you isolate the control panel on the Epiq systems?**

- a. Remove the serial cable going to the control panel
- b. Remove the control panel
- c. Remove the USB cable between the control panel and the AIO
- d. None of the above

- 7. What do the three lights on the left side of the Power Supply indicate?**
- a. Battery Status
  - b. 24 VDC is ready
  - c. ATX PC voltages are ready
  - d. All of the above
- 8. Which items need to be cleaned during a PM?**
- a. Monitor/touch panel
  - b. Trackball
  - c. Air filter
  - d. Probes
  - e. All the above
- 9. Which imaging modes need to be tested during a PM?**
- a. 2D
  - b. Color Doppler
  - c. PW
  - d. All available imaging modes
- 10. If the power button on the control panel is blinking, what does it indicate?**
- a. System is ready for use
  - b. Imaging is frozen
  - c. System is in sleep mode
  - d. None of the above

Key: 1: b,c / 2: c / 3: c / 4: b / 5: c / 6: c / 7: d / 8: e / 9: d / 10: c

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**For more information visit [www.conquestimaging.com](http://www.conquestimaging.com).**

“These webinars have been VERY helpful. They are usually spot-on to what we need to know in our field. For those of us who have to have Professional Engineering hours, the CEU credits are very helpful too.”

-Ben W.




**SMILE – SNAP – AND SHARE!**


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### Troubleshooting Techniques and Tips for the Epiq 5/Epiq 7

Presented by: Jim Pridmore, Director of Training  
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Technician Webinar Wednesday  
November 18, 2015



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### Agenda

Topics

- Preventative Maintenance
- General Information
- Troubleshooting Power Issues
- Troubleshooting Tools



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### Preventative Maintenance



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### Backup/Restore Procedures

- Backup! Backup! Backup!
- Anytime you are in front of System
- Backup is not complete if it doesn't include printouts
- To create backup on the Epiq systems
  - Support → System Management → Backup/Restore
  - Support → System Management → System Information
  - Setups → About → Additional License Options
  - Setups → About → Licensed Transducers

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### Backup/Restore



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### Preventative Maintenance

- Cleaning the Air Filter – Located on left side under the system
- Service the Brake/Steering locks Mechanism
- Check the Monitor Articulation Mechanism
- Check Control Panel Articulation
- Clean the Trackball
- Clean the Monitor and Touch Screen
- Clean Exterior System Surfaces

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**Preventative Maintenance**

- Complete Performance Tests – Check all imaging modes
- Exam Start Tests
- 2D Imaging Test
- Test Color and CPA Imaging
- Test PW, CW and M-mode
- Test Live 3D (if available)
- Test Connectivity and Review

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**Preventative Maintenance**

- Test Annotations and Body Markers
- Measurement and Analysis Test
- Query Retrieval Test
- Peripheral Tests

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**Service Adjustments**

- Adjusting the Articulation Arm Buoyancy
- Check monitor buoyancy do determine sensitivity
- Remove left/right articulation arm covers
- On end of arm closest to the monitor, loosen the Phillips locking screw
- Adjust the other screw to add or reduce tension
- Tighten the locking screw
- Test operation
- Replace articulation arm covers

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### Service Adjustments



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### Service Adjustments

- Adjusting Swivel Knuckle Tension
- Rotate monitor left/right to determine ease of rotation
- Tighten or loosen the screw at the bottom of knuckle
- Readjust as needed

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### Service Adjustments



Adjustment Screw

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**General Information**

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**Power Status**

- No Power
- Standby
- Powered On
- Sleep Mode (Light Blinks)



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**Board Names and Abbreviations**

Board Names	Abbreviations
Acquisition Control Board	ACB
Audio Input/Output	AIO
Channel Board	CB
Control Panel	CP
Display Port	DP
Extended Input/Output	EIO
Motor Controller Board	MC

Board Names	Abbreviations
Motherboard	MB
Platform Power Module	PPM
System Management Bus	SMB
Power Regulator Board	POW_Reg
Solid State Drive	SSD
Transducer Select Board	TSB
DC System Voltage	VDC_SYS
Video Input/Output	VID

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### Access to E-Module

- Locate peripheral bay release mechanism on each side of system
- Slide release mechanism towards back of system
- Lift peripheral bay up and back
- Remove card cage cover using two rotating locks

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### Access to E-Module



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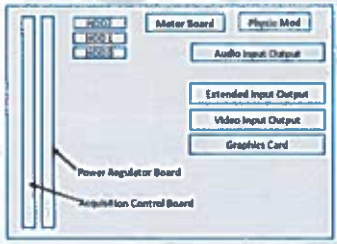
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### E Module Board Layout



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### E Module Board Layout



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### Operating System

- Windows 7 Embedded
- Allows for customized components and system operation
- The OS is mostly used for system interaction with the user or network
- The OS is also a platform from which to launch the application software which determines ultrasound system operation

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### Power Subsystem

- Platform Power Module
- Auto-switching AC power for all voltages world-wide
- Provides isolated AC output for multiple peripherals for patient and operator safety
- When put into sleep mode, optional batteries provide up to 20 minutes of low power for relocation of the system.
- If after 20 minutes the AC power has not been restored, the system goes through an orderly shutdown.

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### Power Subsystem

- Power Regulator Board
  - Receives +24 Vdc input voltage. If out of tolerance (+21.6 Vdc to +30 Vdc) input voltage is disabled
  - It outputs the Power Good signal when the +24 Vdc is in tolerance which notifies the CB that it may begin drawing power
  - Receives PPM monitored air temp info from the ACB for fan control
  - Controls fan speed by applying +10.2 to 13.8 Vdc
  - Controls the Resident Self Test

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### Power Subsystem

- Power Distribution Board (There is no active circuitry on board)
- Receives Power from the PPM and distributes them to several connectors
  - Solenoid Contr of Module Power connector
  - Three standard PC ATX connectors
  - Backplane Power connector
  - Backplane Signal connector

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### Front End Boards

- The front end consists of the following boards:
  - Acquisition Control Board (ACB). This board acts as the front end controller.
  - Channel Board (CB). This board is responsible for the transmit and receive functions. Additionally it does the digital beamforming and analog to digital conversion. The 160 MHz master clock is located on this board.
  - Transducer Select Board (TSB). Has four ports plus one for CW. It is responsible for Probe Identification.

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**Back End**

- Standard PC with Intel chipset
- Contains two hex-core processors
- Two standard 2.5 inch hard drives for patient data
- One solid-state hard drive for operating system and applications software. Allows for faster startup time
- Supports up to three graphics heads on graphics board that includes monitor, Aux Video, and control panel/touch screen

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**Back End**

- Audio Input/Output (AIO) Module
- Audio source for CW, PW, microphone, physio, and PC
- Passes the power-on switch signal to control panel and other modules with processing
- Amplifies the audio signals and delivers them to two high frequency speakers and a sub-woofer

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**Back End**

- Video Input/Output (VIO) Module
- Contains the system IButton. The IButton contains the Chip ID serial number associated with the licensed options
- Creates video signal outputs for two S-Video outputs and a DisplayPort output for additional Aux video
- Configures S-Video outputs based on selected resolution

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### Back End

- Extended Input/Output (EIO) Module
- Acts as a bridge from the motherboard to the Acquisition Control Board (ACB)
- Controls the activation of solenoids that lock control-panel position
- Solenoids are only activated if the brake pedal is fully down

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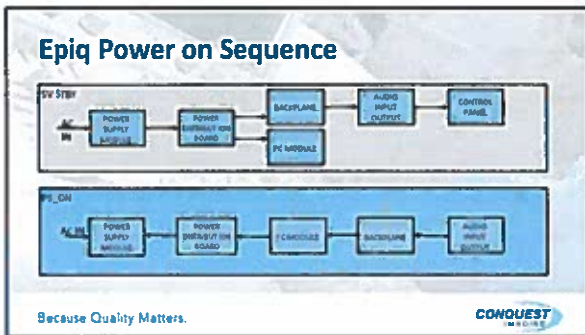
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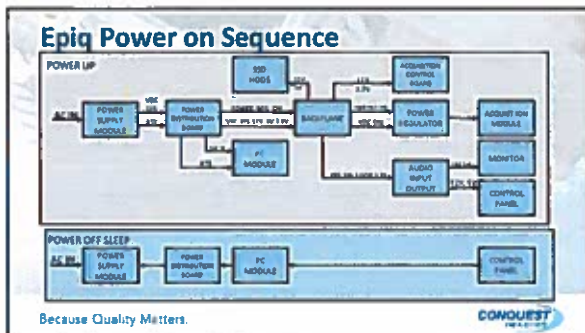
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### Troubleshooting Power Issues

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### Troubleshooting Power Issues

- Click the LED at the on/off switch – If it is white, the 5Vstby is present
- Next power on the system using the Power Switch on the backplane
- If the Power comes on, check the AIO, control panel or the cabling



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### Troubleshooting Power Issues

#### Isolating the Control Panel

- Disconnect the DC power cable connecting the control panel to the AIO
- This isolates the control panel
- Use the PWR SW on backplane to see if system starts



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### Troubleshooting Power Issues

LEDs located on Power Supply

1. AC Power present
2. Battery Status (see table)
3. 24V – VDC-SYS is ready
4. ATX – PC voltages are ready



Battery Status LED	STATUS
OFF	AC is not present, battery not present, battery system not enabled
Flash Yellow and Green (Alternate)	Calibration process is being conducted
Solid Yellow	Battery system is enabled but charge is too low
Blinking Yellow	Battery system is enabled but not available due to fault
Blinking Green	Battery system is enabled, partially charged and available for use
Solid Green	Battery system is enabled, fully charged, available for use

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### Troubleshooting Tools



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### Troubleshooting

LEDs on Power Regulator



Immediately after powering on      Normal State

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**Troubleshooting**



- NEONs Core Voltage to Channel Board
- Acquisition Control Board logic voltages
- Voltage Inputs 12V and 3.3V
- Argon Configuration at power up
- XENON Configuration at Splash Screen
- NEON1 Configuration at Splash Screen
- NEON0 Configuration at Splash Screen
- BP Cell
- PCIe Link to PC - Happy State - Runway

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**Troubleshooting**



LEDs on Acquisition Control Board

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**Troubleshooting**



LEDs on Channel Board

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**Troubleshooting**

Board	Min Config without video	Minimum Config to run AS IT
Power Supply Module	Yes	Yes
HDD	Yes	Yes
SSD	Yes	Yes
Control Panel	No	Yes
Graphics Card	No	Yes
LCD	No	Yes
AOI	No	Yes
ESD	No	No
YAC	No	No
Batteries	No	No
ACS	No	No
Power Regulator	No	No
TSR	No	No
Chassis Board	No	No
Motor Controller	No	No
Physic Module	No	No

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Presented by: Jim Rickner, Director of Training  
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Tech Nation Webinar Wednesday  
November 18, 2015

Thank you for your participation in our Webinar!

**Question & Answer**

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