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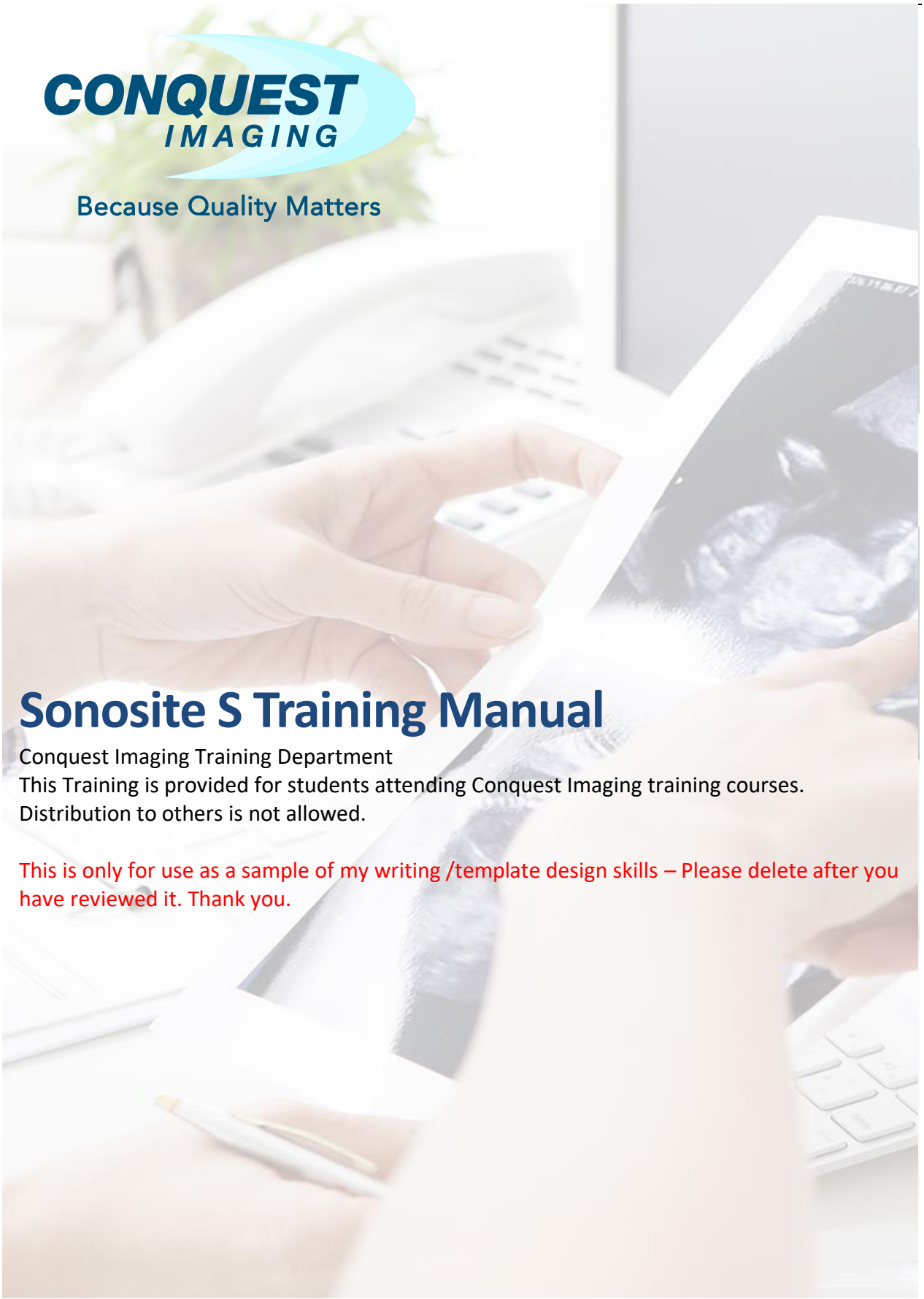

Sonosite S Training Manual

Conquest Imaging Training Department
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Table of Contents

Module 1 Introduction

This manual is specific to the Sonosite systems field service training presented by the Conquest Imaging training department. After completing the training, you will:

- Understand overall system operation.
- Identify the parts, boards and modules.
- Understand the role of each component in the system.
- Be able to perform standard maintenance procedures.
- Have the knowledge to troubleshoot common problems.
- Be able to safely access and replace boards and modules.
- Understand of some of the differences in configuration for different system versions.

Other Course Offerings

This course is one of many ultrasound training courses offered by Conquest Imaging.

The following are some of our current course offerings:

- Basic Ultrasound
- DICOM Standards and Networks

- Preventive Maintenance
- Probe Care and Handling
- NFPA 99 Electrical Safety
- Crash Course
- OEM Platforms

You can use this margin for taking notes.

To see the full descriptions and the scheduling of these courses, please visit our training department website:

http://conquestimaging.com/education/

Sonosite Systems Introduction

In 1999, Sonosite an ATL spin-off, released the industry's first hand-held ultrasound machine. These machines are popular in private practices and ORs because of their durability and lack of moving parts. They have a standard factory warranty period of five years. This course focuses on the M-Turbo, S Series and Edge systems however much of the material applies to older systems also.

The Sonosite Edge is designed for durability, with extra heavy duty cables and a, sealed keyboard. It has options like Power Park cordless charging station, footswitch and the Triple Transducer connect module. (which can be used with the M-Turbo systems also)

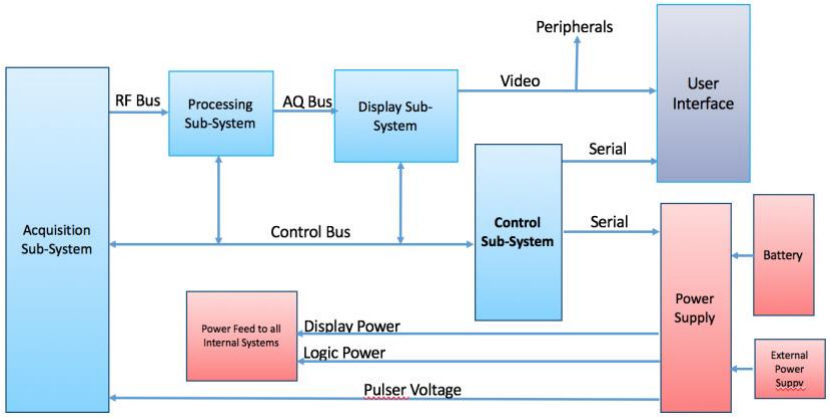
Module 2 System Hardware and Theory

The goal of the System Hardware and Theory Module is to provide you with a solid grounding on the purpose of the Sonosite system's different components and how they function together within the system.

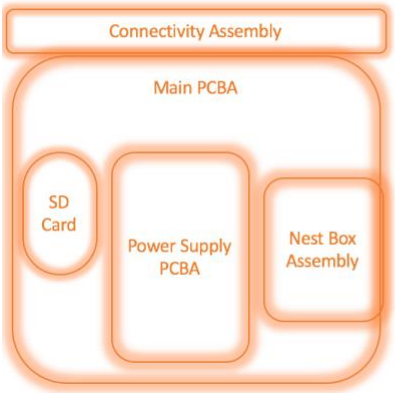
The three major functional blocks in all ultrasound systems are:

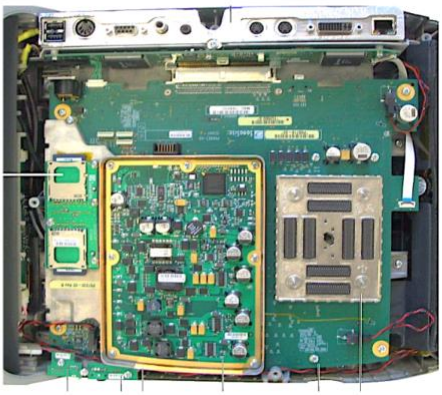
- Front End – Includes transducer analog signal processing functions.
- Back End – Includes user interface and system communication with DICOM systems.
- Power Systems – Generates, regulates and supplies the required voltages to the various parts of the system.

System Block Diagram



System with Cover Removed





System Front End Components

This section covers system frontend topics for the Sonosite systems. Front End is a general term for the parts of the ultrasound system that receive the reflections from acoustic energy that have been transmitted into the body and perform the various signal processing functions on them needed to produce an ultrasound image. The following are some of the components and functions that are found in a typical ultrasound system front end:

- Transducers – Transmit focused acoustic energy and receive the resultant reflections.
- High voltage switches – Used for multiplexing (connects a particular transducer element to a particular transmitter/receiver pair)
- High voltage transmitters – Transmit analog data from the transducers.
- Time Gain Control Amp (TGC) – A variable gain amplifier (VGA) is used to compensate for image variations due to tissue depth.
- Analog to Digital converter and noise filtering.
- Digital Beamformers – Upconverts signals which increases sample rates. The signals are stored in memory, apodized and summed.
- Beamformed Digital Signal Processing – The digital beamformed signals received are processed into visual and audio outputs the process of which depends on if the transducer is B-mode (2D), Doppler, PWD or CWD.

The front end manages the input from the transducers, performs Analog to Digital conversion, Digital to Analog conversion along with many other signal processing functions.

Sonosite Front End

In the Sonosite systems the front end unit's beamforming electronics are contained on the Main PCBA along with the backend functions.

The Nest Assembly is simply the physical port that the transducers plug into and contains no electronics.

The frontend is completely contained in the Main Board and Nest Assembly.

System Backend Components

This section describes the System Back End topics for the Sonosite ultrasound systems. The back end includes system blocks/components on the user interface side that perform functions such as master controller, signal processing, image memory, video layout, peripherals and user interface.

Back End

The Back End contains all software, archives, and is responsible for scan conversion of ultrasound data.

The Sonosite's backend is also housed on the Main Board and SD Card Daughter PCB. These systems do not have a hard drive. It is possible to install up to 4 SD cards.

- Display – This subsystem converts the processed data to pixel data and combines it with the user interface software

to create a video stream which can be accessed at the video port as either NTSC or PAL format.

- Control – This subsystem contains the CPU memory for program, video, permanent image storage and retrieval. It connects to external interface ports and controls. The control software includes an acoustic power and intensity software subsystem, power group monitors and the beamformer monitor which guarantees a level of patient safety by insuring the system is operating within acoustic power and intensity limits.

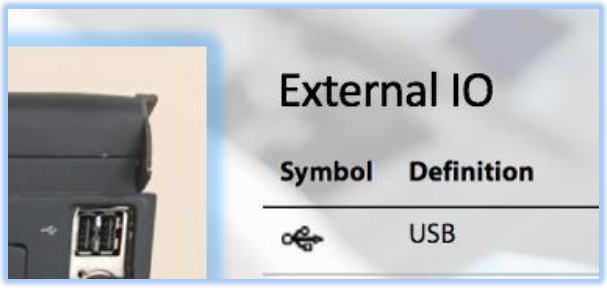
- User Interface – This subsystem provides user controls of the system

Sonosite S Series USB Devices

Do NOT use password enabled USB storage devices with the system They are NOT supported!

The system has two USB ports located on the back of the system and a third one available on the side of the system. For additional ports a USB hub can be connected into any of the USB ports. Images and clips from the system can be exported/archived to a PC using a USB storage device. Images and clips cannot be viewed from a USB device on the system however. It is possible to import and export user accounts and event logs using a USB storage device.

Do not turn off the ultrasound machine or remove the USB device during export to avoid damage to the USB device and loss of patient data.



Sonosite S Series User Interface Console

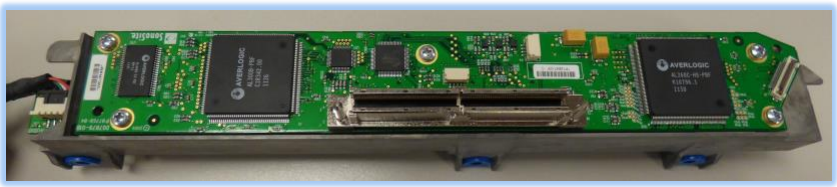
The control console or User Interface(UI) consists of the following electronic sub-assemblies and/or functional components:

- Touch Control Panel PCBA
- IO Board
- Audio IO PCBA

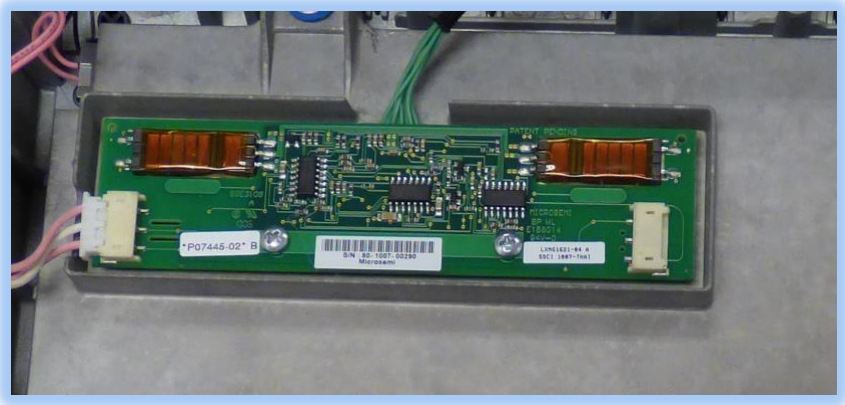
- Display Backlight Inverter PCBA
- TGC PCBA
- LCD Display

Touch Control Panel PCBA

IO Board



The LCD Backlight Board



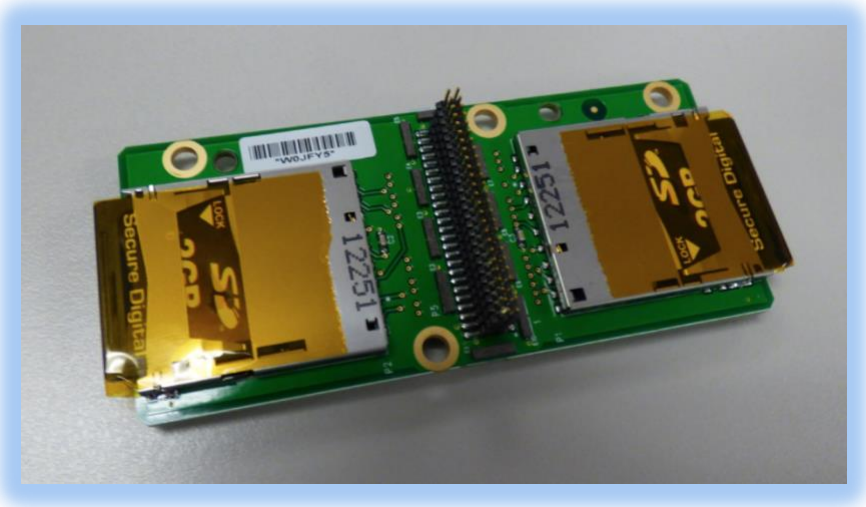
Sonosite S Series SD Daughter Card

SD Card *— A SD Card (Secure Digital Card) is an ultra small flash memory card designed to provide high-capacity memory in a small size.*

These SD cards perform the information storage function that a hard drive does in a larger ultrasound system.

"SD daughter card" refers to the PCB assembly that contains these flash memory cards.

There are four slots available.



Power Distribution Components

The power distribution components in Sonosite systems are described in the following sections.

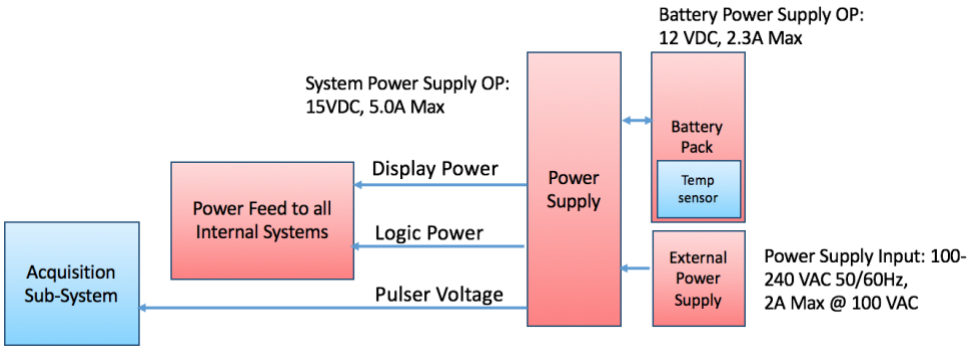
System Power Supply

The Power Supply and Control System consists of:

- On/Off Key
- Standby power regulator
- Power supplies:
    - Digital
    - Analog
    - Display
    - Transducer
- Power Monitor
- Power Control System
- Fan and Temp sensing
- Rechargeable Battery Pack

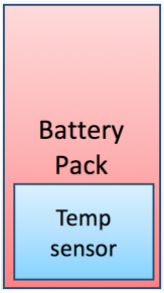
While providing power it also protects against unsafe or destructive conditions through various hardware and software failure detection implementations. If a fault is detected the pulser voltage supply will be disabled.

System Power Supply Block Diagram



Power Supply Board

Battery Pack



The rechargeable battery pack contains 6 lithium-ion cells along with other electronics that include a temperature sensor. The battery charging circuit is routed from the internal power supply to the main board and out to the battery and charges while the system is running.

A fully discharged battery should recharge fully within five hours. The time the battery can run depends on imaging mode

and display brightness and is generally about two hours.

Normal Power On

To power on the system:

- Connect the DC Power cable from the AC power supply to the system.
- Connect the AC power cord to the AC power supply and to a hospital grade electrical outlet.
- To turn the system off or on simply press the on/off button once.
- The system goes into sleep mode to conserve battery charge when the system is on and untouched for a preset amount of time. To wake the system up just press any key or the touchpad.

***Note**: Outlet must be a single phase center tapped supply circuit when it is connected to 240V supply system in the US.*

Module 3 Network Configuration

The following sections provide some basic biomedical networking background information along with information and procedures specific to the xxx ultrasound systems.

DICOM

The Digital Imaging and Communications in Medicine (DICOM) is a standard that specifies a consistent file structure for biomedical images and important associated information that must remain associated with the images such as patient name time, date, institution etc. The DICOM specification identifies the elements required to achieve interoperability between medical imaging computer systems.

DICOM addresses these five general application areas:

- Network image management
- Network image interpretation management
- Network print management
- Imaging procedure management
- Off-line storage media management

Prepare for Network Configuration

You will need to get the facilities network information from the system administrator. You can print out the information needed to configure the system using the Network Configuration Worksheet appended to the end of this manual.

DICOM Location Configuration

The information entered in the following fields must match exactly the information entered in the router setup.

Profile Name — Name of profile set for this location. For each wireless location, you can have up to 10 profiles. **Network Name SSID** — Network Name Service Set Identifier for the router.

Security Policy Security type that authenticates the network:

Module 4 General Safety Precautions

This section is not intended to be an all-inclusive safety procedure guide. It is only a brief overview of best practices that applies to all health care facilities and all types of medical equipment. You should be familiar with the policies and procedures of the facility where you work AND the safety precautions and procedures described in the manufacturer's documentation for a particular OEM.

Electrical Safety

The system is a Class I medical device with Type BF and Type CF isolated patient-applied parts. Only CF isolated transducers can be used for invasive (internal) exams.

The following are warnings recommended by the manufacturer:

- Grounding prevents shock hazards. The chassis is grounded with a three wire plug and cable which must be plugged into a grounded outlet.
- Never connect the system using a power strip or extension cord.
- The ultrasound system should never be connected to the same circuit as life-support devices.
- All devices that have patient contact: transducers, ECG leads and pencil probes that are not specifically labeled as defibrillation proof must be removed from contact with the patient before defibrillation.
- Non-medical peripherals such as printers should not be used within 1.5 meters (5ft) of a patient unless the device is powered with an isolated outlet on the back of the system or an isolated transformer that meets medical safety standards; IEC 60601-1.
- Wrist straps should not be worn when working on a system when the power turned on. The +5 Vdc supply is a

very-high current supply. Use caution when troubleshooting.

Electromagnetic Interference

Electromagnetic Interference (EMI) between wireless electronic transmitting devices and medical equipment can cause degradation of the ultrasound image. The system is in compliance with existing EMI/EMC requirements. However, the use of this system in proximity of an electromagnetic field can cause degradation of the ultrasound image at times. Review the environment in which the system is being used, to identify possible sources of radiated emissions. Sources of these emissions can be from electrical devices used in the same or adjacent room. Communication devices that transmit or receive RF signals; cellular phones, pagers, radio, TV, or microwave transmission equipment located nearby can cause these emissions. If EMI from an outside source is causing disturbances, you may need to relocate your system. Electrosurgical units (ESUs), MRI's and many other medical devices introduce radio frequency (RF) electromagnetic fields to the environment. Because ultrasound imaging frequencies are in the RF range, ultrasound transducer circuits are also susceptible to RF interference. For example, the noise generated by an ESU in use can easily impair or eliminate the ultrasound's ability to capture an image. Some measures to reduce the chance of EMI interference include:

- Three-meter rule – no powered on cell phones, or pagers within three meters of the system while in operation.
- Locate the system away from other imaging equipment such as MRI's that produce strong electromagnetic fields.

Electrostatic Discharge ESD Precautions

Electrostatic discharge (ESD), commonly referred to as a static shock, is a naturally occurring phenomenon. Electrical charges naturally build up on individuals and can create static shocks. The human body can build up a charge as high as 25,000 volts, therefore a discharge from a system user or patient to the ultrasound system can cause damage to the system or

transducers. Digital ICs are particularly vulnerable. Low humidity is a condition that favors the build-up of electrostatic charge.

The following are the most common causes of ESD:

- Moving equipment
- Moving people
- Low humidity (hot and dry conditions)
- Improper grounding
- Unshielded cables
- Poor connections

Use the following precautions in order to reduce ESD:

- Wrist straps
- Antistatic mats
- Antistatic spray on carpets or linoleum

Before handling a board or you can touch a grounded surface such as the power supply housing to discharge any built-up charge.

Fire Safety

The following general fire safety practices are relevant for all electrical equipment:

- If there is any evidence of smoke or fire disconnect system power immediately.

- On electrical or chemical fires use only extingushers that are specified for this use. Using water or other liquids is very dangerous and can lead to injury.

General Cautions

The following are general cautions that apply to all ultrasound systems:

- Batteries must be handled as hazardous waste. Check that the cases are intact and the terminals are clean. Follow your facilities procedures regarding disposal should they

become damaged.

- If the system has been stored below 10°C allow it to reach room temperature before connecting or turning on to prevent damaged caused by internal condensation.

- System transductors cannot be cleaned/decontaminated by any sort of heat process. Refer to manufacturer's specifications and hospital procedures for the particular transducer.

Module 5 Troubleshooting

This module covers common troubleshooting tools and procedures for the systems.

System Power Up

If the system does not turn on:

- Check power connections.
- Remove the DC input connector and battery, wait 10 seconds and then re-install them.
- Ensure that the battery is charged and functional.

Troubleshooting Network Issues

In the event of certain networking issues, the system may display an error message.

"**Socket communication failed**"

Possible causes:

- Invalid network configuration
- Wrong port number.
- Application is not running.
- Printer is offline.

Troubleshooting Procedure:

Use **Ping** to verify the Archiver or printer is connected

If Ping failed check the IP address of the system, the device the system is attempting to communicate with, check the Subnet Mask and the Gateway IP address.

If Ping is successful use the **Verify** function to see if the device is available.

If **Verify** fails:

Check the port on the system used to communicate with the printer or archiver.

Ensure that the Archiver is running the application or that the printer is on-line.

"**Archiver transation failed**"

Possible cause:
Wrong Capture Type selected.

Troubleshooting Procedure:

Verify that the Archiver supports the selected Capture Type setting: US Image, SC Image, US-Ret Image.

"**Printer transaction failed**"

Possible cause:
Wrong Image settings

Troubleshooting Procedure:

Verify that the printer supports the selected Image settings: Color(RGB) or Grayscale(Monochrome)

"**DICOM network communication failed**"

Some devices require that the imaging modality be recognized in order to accept images. The device must be configured to recognize the system in this case.

Possible cause:
Device does not recognize the system and rejected the association.

Troubleshooting Procedure:

Verify the system IP address and/or IP address is configured correctly on the device

"**Internal failure detected**"

Possible cause:
Invalid DICOM Attribute

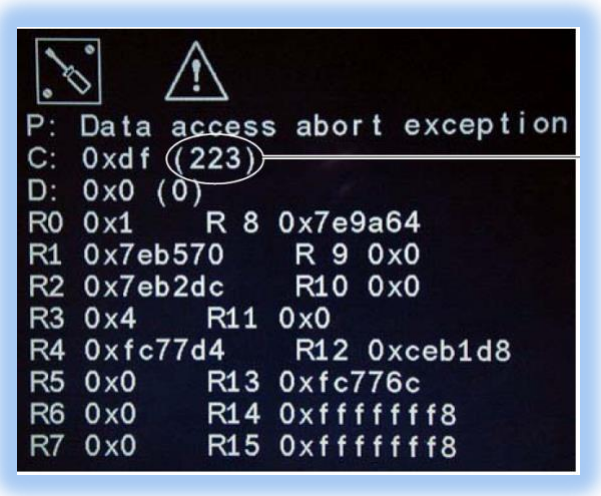
Troubleshooting Procedure:

Check the system Printer DICOM settings to make sure that

film size, format, etc. are correct.

Assert Codes

In the event of a Main PCBA failure an assert screen will be displayed. assert code may be output to the display. The assert code is the bracketed number on line "**C:**"



Hardware or software faults can cause system asserts. Software asserts can be reset to recover the system whereas hardware asserts generally require replacement of damaged PCBAs.

To identify the cause:

If the power button does not function all sources of the power, both the AC and the battery must be removed to let the system power down.

- Record the Assert code.
- Power the system down by holding down the power button.
- Power the system back up:
  - If the system powers up normally it has recovered from a software assert.
  - If the assert remains, then it is likely to be a hardware problem and the next action would be to contact XXXX support and most likely replace the Main PCBA board.

Troubleshooting USB Devices

Possible problems with USB devices are:

USB Device not working:

- If the USB Icon does not appear in the on screen system status area turn off the system and remove the USB device.
- The device may be defective or password protected.
- Use another USB device.

USB Device Full:

- To view information such as space availability about a connected USB device go to the **USB Devices** setup page. You can also specify file formats/compression for the images to be exported.

Note that you can only specify file formats for still images. Clips are in H.264 video and are saved as MP4 files which can be viewed in QuickTime 7.0 or greater.

Module 6 Parts Replacement

Check the model number and other vital information before ordering parts for the system.

This section provides procedures and information for replacing parts on the Sonosite systems. Always follow the standard ESD and safety procedures when replacing parts or modules. Always pay close attention to the part number when replacing parts:

- Most parts are labeled with the part number.
- Always replace like for like or check compatibility.
- Visually inspect all parts before installing.
- Some parts may have different versions.

This course covers mainly replacement procedures for the Sonosite M-Turbo, S Series and Edge portable ultrasound systems. These systems along with the older models are essentially the same in many aspects power supply, battery pack, software, transducers etc.

For each of them the biggest difference is in the case style for example the S Series does not have a physical keyboard except as an option.

Except in cases where there is something special about the re-assembly steps we do not cover the reassembly steps since they are just the disassembly steps in reverse.

System Power Down

Before performing any maintenance on the system follow proper power down procedures and be mindful of proper ESD procedures during any maintenance.

The system should be **completely** powered down before opening the chassis and beginning any parts replacement.

The following steps should be done before beginning any parts replacement on the system:

- Disconnect Power
- Fully Power down the system
- Remove Transducer
- Remove Battery Pack

Transducer Removal and Replacement

To connect a transducer:

- Remove system from docking system and turn it over.
- Pull up the the transducer latch mechanism and rotate clockwise.
- Align and insert the transducer connector to the system connector.
- Turn the latch counter-clockwise and press down to secure it to the system.

To remove a transducer:

- Pull latch up and turn clockwise.
- Gently pull transducer connector straight up away from system connector.

System Battery Pack Removal

Remove the battery by depressing the lock lever and lifting the battery out.

System Disassembly Back Cover Removal

After removing the transducer and battery pack remove these seven screws:

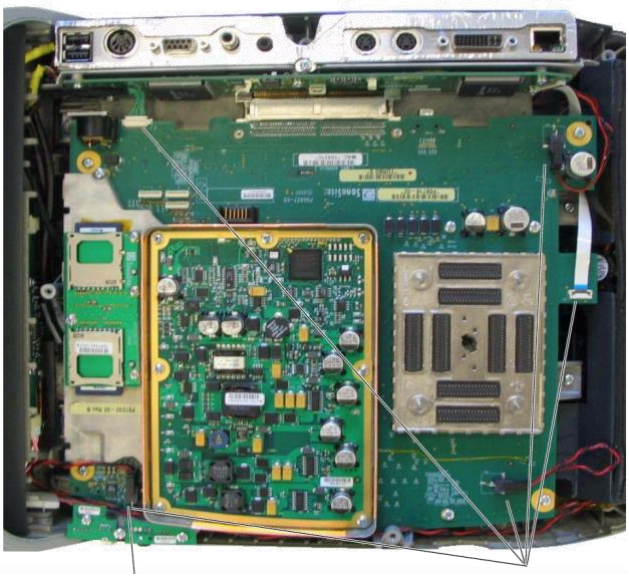
S Series Super Plug Assembly Removal

Note that the Sonosite S Series documentation refers to all the components shown here as the “SuperPlug Assembly”.

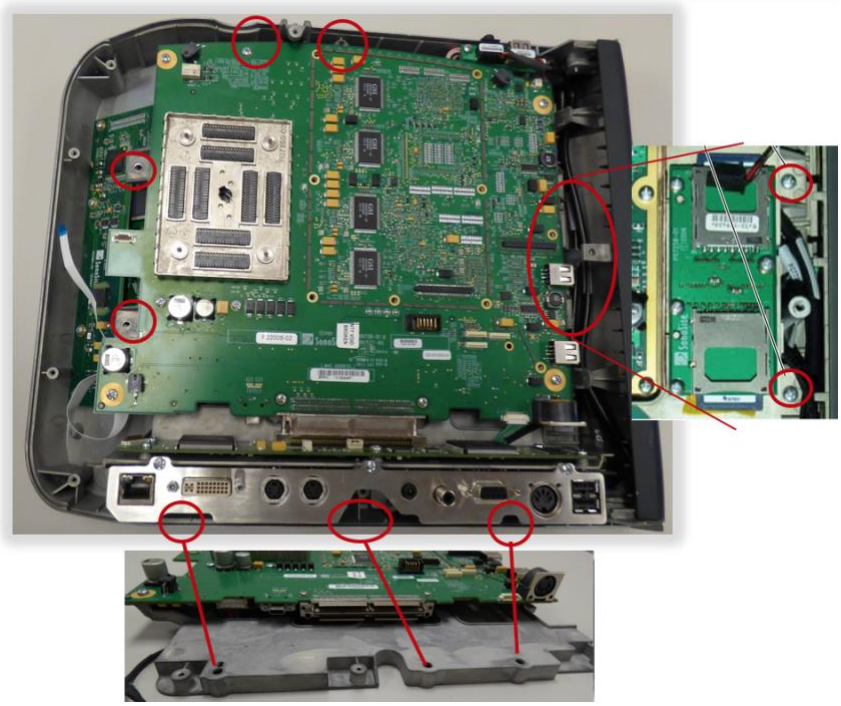
For the S Series II it is referred to as the “Base Assembly”.

It is not a specific part but must be removed to access and replace many of the replaceable components.

After removing the main cover, you will need to carefully disconnect these five different cables:

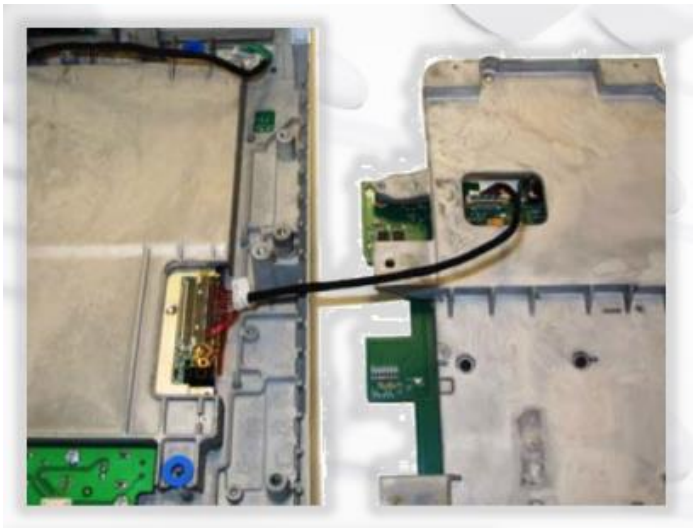


Remove the nine screws that are mostly below the main board that secure the chassis of the “SuperPlug” to the front of the system.



Carefully remove the assembly, disconnect from the IO connector and turn it over. Finally disconnect the display wire harness from the bottom side of the "Super plug" assembly.

Note: Only S Series refers to this as "SuperPlug" Assembly

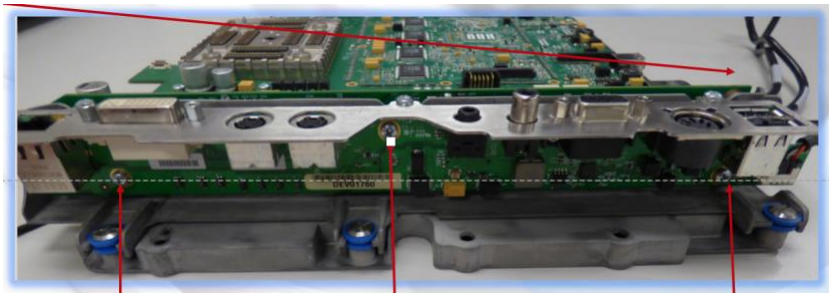


SuperPlug Removed

IO Board Replacement

In previous Sonosite systems this was the Mini-Dock.

- Disconnect the USB IO cable from the assembly.



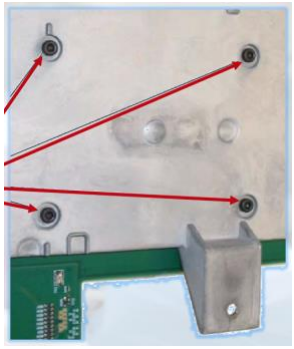
- Remove the three screws.

Main PCB Assembly Replacement

Remove:

- Rear Cover
- SuperPlug Assembly
- Power Supply PCBA
- IO Assembly
- SD Daughter Card

- The following nine screws:



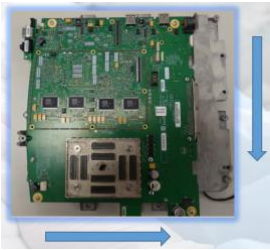
- Turn the SuperPlug assembly over and remove the four screws securing the nest frame assembly.

- Remove the nest frame assembly and the main board from the SuperPlug assembly.

- Place the new Main PCBA on the SuperPlug Assembly frame:

- Loosely install these two Main PCBA screws:

- Stand the SuperPlug Assembly on its side to place the Nest Assembly so that the interposers do not fall out while carefully aligning the Nest Assembly to the Main Board.
- Replace the four 2.5mm cap screws loosely.
- Loosely replace the remaining main board screws.



- With all the remaining screws loosely installed move the main PCBA as far as it will travel in the direction of the arrows.
- Secure the screws and re-install:
  - Power Supply PCBA
  - Mini-Dock Assembly
  - SuperPlug Assembly
  - Rear Cover

Glossary

These Acronyms are color coded according to type:
Standard Electronic Industry terms
DICOM terms
Company Specific Acronym
Standard Ultrasound or Medical Terminology

Apodization – A weighting function used as means of reducing side lobes in the beam.

As Low As Reasonably Achievable – A safety principle of ultrasound. Ultrasound can produce heating effects in tissue which could result in patient injury. Always minimize exposure time and keep ultrasound power levels as low as possible.

Application Entity – A node in a DICOM network.

Back End – System block on the user interface side that contains master controller, signal processing, image memory and video layout, peripheral and user interface.

Beamforming – A common signal processing technique used to enable directionally or spatially selected signals to be sent or received from sensor arrays.

Cine – The cine mode is a series of rapidly recorded images taken sequentially and displayed in a dynamic movie display format.

Digital Imaging and Communications in Medicine – A medical imaging standard for file format and network communications protocol for file sharing between entities capable of sending and receiving patient data and images in DICOM format.

DisplayPort – A digital display interface standard administered by the Video Electronics Standards Association (VESA).

Doppler effect – Change in the frequency of a periodic event (such as sound waves) due to a change in distance between the source and the observer.

Doppler Range Gating – Range gate circuit only allows Doppler shift data from a user specified area to be displayed as output.

Dynamic Host Configuration Protocol – A standardized network protocol used on IP networks for dynamically distributing network configuration parameters. IP addresses and networking parameters are requested automatically from a DHCP server, reducing the need to configure these settings manually.

Electromagnetic Interference – (EMI) is when a radio frequency (RF) transmitting device interferes with the operation of another electronic device. In a healthcare

environment wireless EMI can cause medical equipment to malfunction.

Front End – System block that collects data; probe interface, transmitter/receiver, beamformer, front end controller.

Harmonics – Ultrasound method that generates images using twice the frequency of the transmitted sound.

I^2C – Inter-IC bus, a two wire serial bus for communication between integrated circuits. Developed by Philips in the 1980's it is now an industry standard.

In Plane Switching – A type of thin film transistor LCD screen that has particularly good wide viewing angle and accurate color reproduction.

Loops – Multiframe objects (e.g. video)

M Mode – is also known as T-M mode or time-motion mode. Ultrasound echoes are mapped to a gray scale display by intensity. Is derived from a stationary beam.

Modality Performed Procedure Step – The modality provides information about a performed study, the number of images that were scanned and the status of the exam. The information is shared between a digital modality and the PACS and RIS.

Multiplexing – Multiple signals transmitted over a single medium.

Picture Archive and Communications Systems – DICOM Medical imaging storage server that stores images from diagnostic devices such as MRI, ultrasound and X-rays.

Phased Array Ultrasound (3D imaging) – Sound waves are transmitted at different angles to obtain image.

Physio – Refers to ECG inputs.

Protocol Data Units – Message formats exchanged between peer entities within a layer. A PDU consists of protocol control information and user data.

PS_ON – Refers to an active low signal used with all ATX and newer power supplies that use 20-24 pin motherboard connector. When high all voltages except 5V stand-by are disabled.

Run-Length Encoding – A lossless compression method implemented by specifying the number of times a particular intensity value is repeated.

SD Card – A SD Card (Secure Digital Card) is an ultra small flash memory card designed to provide high-capacity memory in a small size.

Synthetic Aperture – An imaging method that improves

resolution and depth of ultrasound images.

Time Gain Compensation – Uses an array of sliding tabs which control the gain, which compensates for the difference of the strength of the ultrasound returning from varied distances to make the ultrasound image appear uniformly lit from top to bottom.

Thin Film Transistor – A type of LCD display that uses active matrix technology.

Tissue Velocity Imaging – calculates and color-codes the velocities in tissue. The velocity is acquired by sampling of tissue Doppler velocity values at discrete points.

QRS Detect – QRS is ventricular depolarization part of a normal EKG waveform which is easiest to detect to count a single heart beat due to it having the highest amplitude.

Wide eXtended Graphics Array – Non standard resolution based on XGA display standards that have been widened to provide a wide screen aspect ratio.

Acronyms

These Acronyms are color coded according to type:
Standard Electronic Industry terms
DICOM terms
Company Specific Acronym
Standard Ultrasound or Medical Terminology

AC – Alternating Current
ACR – American College of Radiology
AE – Application Entity
ASIC – Application Specific Integrated Circuit
ADC – Analog to Digital Converter
ALARA – As Low As Reasonably Achievable
ATCG – Real Time TGC analog Control bus
ATGC – Advanced Analog Time Gain Compensation
ATX – Advanced Technology eXtended
BE – Back End
BF – Body Floating
B Mode – Brightness Mode
BTU – British Thermal Unit
CF – Cardiac Floating
CFM – Color Flow Mode
CLA – Curved Linear Array (transducer)
CP – Control Panel
CW – Continuous Wave (transducer)
CMOS – Complementary Metal Oxide
DAC – Digital to Analog Converter
DGC – Depth Gain Control (same as TGC)
DHCP – Dynamic Host Configuration Protocol
DICOM – Digital Imaging and Communications in Medicine
DIMM – Dual Inline Memory Module
DMA – Direct Memory Access
DNS – Domain Name Server
DSP – Digital Signal Processing
DTC – Dual Transducer Connect
ECG – Electrocardiogram
EMC – ElectroMagnetic Compatibility
EMI – ElectroMagnetic Interference
ESD – ElectoStatic Discharge
ESU – Electro Surgical Unit
FOV – Field of View
FPD – Flat Panel Display
FPGA – Field Programmable Gate Array
FRU – Field Replaceable Unit
HDD – Hard Disk Drive
HIS – Hospital Information System

IC – Integrated Circuit
HSS – High Speed Serial bus
IEC – International Electrotechnical Commission
IPS – In Plane Switching
IT – Information Technology
LCD – Liquid Crystal Display
MOD – Magneto-Optical Disk
MPPS – Modality Performed Procedure Step
MRI – Magnetic Resonance Imaging
OEM – Original Equipment Manufacturer
PACS – Picture Archive and Communications Systems
PCI – Peripheral Component Interconnect
PECI – Positive Emitter Coupled Logic
PIC – Programmable Intelligent Processor
PS – Power Supply
PWT – Pulsed Wave Transducer
RAM – Random Access MemoryRC – Receive Beamformer and Controller Board
RIS – Radiology Information System
RF – Radio Frequency
RLE – Run Length Encoding
ROI – Region of Interest
SATA – Serial AT Attachment
SCP – Service Class Provider
STC – Single Transducer Connect
SVGA – Super Video Graphics Array
TFT – Thin Film Transistor
TGC – Time Gain Control or Time Gain Compensation
TTL – Transistor Transistor Logic
TVI – Tissue Velocity Imaging
UI – User Interface
UPS – Uninteruptable Power Supply
USB – Universal Serial Bus
VCR – Video Cassette Recorder
VCI – Volume Contrast Imaging
WLAN – Wireless Local Area Network
VGA – Variable Gain Amplifier
WXGA – Wide eXtended Graphics Array

Appendix 1 Network Configuration Worksheets

The DICOM server may need to be configured to recognize the ultrasound system. The storage device vendor needs to know the ultrasound system AET and port number (104).

You can print out these pages to gather information when preparing for network configuration. Most of the necessary information can be obtained from the system administrator or IT department of the facility.

Checklist for Configuring Ultrasound System Network Parameters

You can obtain this information from the facility network administrator or IT department. The service person for the DICOM devices may also have the IP addresses for the subnet mask and gateway.

Parameter	Description
Alias	A unique identifier for the DIMAQ-IP host AE Title. The alias is only used only by the ultrasound system, and not by DICOM, the Alias makes it easier to switch between hosts if the machine is to be used in multiple subnets or networks.
AE Title	The AE Title of the DIMAQ-IP host.
Host Name	The full computer name of the DIMAQ-IP host.
Workgroup	The workgroup name of the DIMAQ-IP. An entry is always required for this parameter.
DHCP	Is Dynamic Host Configuration Protocol used? The parameter value is always either **Yes** or **No**.
Subnet Mask	The IP address of the subnet mask. The system needs this to see other nodes on the network. If no subnet mask is available, use 255.255.255.0

Parameter	Description
Gateway	The IP address for the gateway, which indicates where to direct TCP/IP traffic destined for another subnet. Not all systems require a gateway IP address.
AE Title	The AET for the storage device.
Port	The network port that the storage device uses to communicate with the ultrasound system.
Storage Commitment	Does the device support storage commitment?
Archive	Is the device intended as an archive device?