

GE Healthcare

# LOGIQ<sup>®</sup> 9

The LOGIQ 9 is our leadership ultrasound imaging system designed for abdominal, vascular, obstetrics, gynecology, pediatrics, neonatal, urology, musculoskeletal, transcranial, and small parts applications. It is available with a CRT or LCD monitor.

## System Architecture

**TruScan Architecture** - GE's exclusive, software-intensive platform provides vast computational power, image-manipulation capability, workflow flexibility and product upgrade-ability. The LOGIQ 9 excels in the following areas:

**Image Quality** - is achieved through the use of CrossXBeam, SRI-HD, coded techniques and world-class transducers.

**Raw Data** is GE's unique technology that allows a virtual rescan on archived images by applying many of the same scan controls available during the original exam.

**Productivity** features to make the LOGIQ 9 one of the most productive U/S system - including Automatic Optimization.

**Ergonomics** provides the user one of the most ergonomic U/S systems available - including VoiceScan.



## General Specifications

### Dimensions and Weight

(Dimensions given with floating keyboard stowed for transport)

- Height - Min: 140.3 cm (55.25 in)
  - Min (LCD): 127 cm (50 in)
  - Max: 160.7 cm (63.25 in)
- Width: 64 cm (25.2 in)
- Depth: 89.9 cm (35.4 in)
- Weight (no peripherals), CRT: 185kg (408 lb), LCD: 171kg (376 lb)

### Electrical Power

- Voltage: 100-120 Vac or 220-240 Vac
- Frequency: 50/60 Hz
- Power Consumption: 1.2KVA with on-board peripherals, 0.7KVA without peripherals
- Thermal Output: 4095 BTU/hr with on-board peripherals, 2390 BTU/hr without peripherals
- Stand-by Mode - System will retain state for 15 minutes for portable applications

### Console Design

- 4 Active Probe Ports
- Integrated HDD (80 GB)
- Integrated DVD-R drive
- On-board storage for peripherals
- Wheels
  - Wheel diameter:
    - Front: 175 mm
    - Rear: 175 mm
- Integrated locking mechanism that provides rolling lock and caster swivel lock
- Integrated cable management
- Front and rear handles
- Easily removable air filter

## User Interface

### Operator Keyboard

- Floating keyboard adjustable in three dimensions:
  - Height: 76.2 - 96.5 cm (30 - 38 in)
  - Rotation: +/-75° from center
  - Extension: 31.8 cm (12.5 in) from console
    - Full-sized, backlit alphanumeric keyboard
- Ergonomic hard key layout
- Interactive back-lighting
- Integrated recording keys for remote control of up to 4 peripheral or DICOM devices
- Integrated gel warmer

### Touch Screen

- 10.4 in High Resolution, Color, Touch, LCD screen
- Interactive dynamic software menu
- Brightness adjustment
- User-configurable layout

### CRT Monitor

- 17" High-Resolution non-interlaced scan flat CRT
- Center of monitor height adjustable (with keyboard): 125.7 - 146.1 cm (49.5 - 57.5 in)
- Tilt/Rotate Adjustable Monitor
  - Tilt Angle: Down 10°, Up 10°
  - Rotate Angle: 90° right, 90° left
- Integrated high-fidelity speakers
- Brightness & contrast adjustment

### LCD Monitor

- 17" High-Resolution LCD
- LCD translation (independent of console)
  - Height adjustable: ± 15 cm (± 6 in)
  - Side to side: ± 50 cm (± 19 in)
- Tilt/Rotate Adjustable Monitor
  - Tilt Angle: Down 10°, Up 10°
  - Rotate Angle: 90° right, 90° left
- Integrated premium speakers
- Digital brightness adjustment
- Fold-down and lock mechanism for transportation
- Brightness & contrast adjustment

## System Overview

### Applications

- Abdominal
- Obstetrical
- Gynecological
- Breast
- Small parts
- Vascular / Intraoperative/ Peripheral
- Transcranial
- Pediatric and Neonatal
- Musculoskeletal
- Urological

### Operating Modes

- B-Mode
- M-Mode
- Color Flow Mode (CFM)
- Continuous Wave Doppler
- Extended Field of View (LOGIQView)
- Power Doppler Imaging (PDI) with topographic and directional maps

- PW Doppler with high PRF
- B-Flow Mode
- M-Color Flow Mode
- Volume Modes (3D/4D):
  - 3D Static
  - 4D Real Time

### Scanning Methods

- Electronic Sector
- Electronic Convex
- Electronic Linear
- Mechanical Volume Sweep

### Transducer Types

- Sector Phased Array
- Convex Array
- Micro convex Array
- Linear Array
- Matrix Arrays
- Split Crystal
- Volume Probes (4D)
  - Convex Array
  - Micro convex Array
  - Linear Array

### System Standard Features

- State-of-the-art user interface with high resolution 10.4 inch LCD touch panel
- Automatic Optimization
- CrossXBeam
- Speckle Reduction Imaging (SRI-HD)
- Fine Angle Steer
- Coded Excitation
- Coded Harmonic Imaging
- Virtual Convex
- Patient information database
- Image Archive on integrated CD/DVD and hard drive
- Advanced 3D
- Raw Data Analysis
- Real-time automatic Doppler calcs
- OB Calcs
- Fetal Trending
- Multigestational Calcs
- Hip Dysplasia Calcs
- Gynecological Calcs
- Vascular Calcs
- Urological Calcs
- Renal Calcs
- iLinq™ capability
- On-board electronic documentation

### Peripheral Options

- Integrated options for:
  - Digital B&W thermal printer
  - Digital color thermal printer
  - Digital A6 color thermal printer
  - Analog S-VHS VCR
  - DVR
- External USB printer connection

- Support for Xerox 8200/8400 and Tally 8006 networked color laser printers
- Video & audio connections

### Display Modes

- Live and Stored Display Format: Full size and split screen - both w/ thumbnails. For still and CINE
- Review Image Format: 4x3, and "thumbnails". For Still and CINE.
- Simultaneous Capability
  - B or CrossXBeam /PW
  - B or CrossXBeam /CFM or PDI
  - B/M
  - B/CrossBeam
  - Real-time Triplex Mode (B or CrossXBeam + CFM or PDI/PW)
  - B-Flow + PW
- Selectable alternating Modes
  - B or CrossXBeam /PW
  - B or CrossXBeam + CFM (PDI)/PW
  - B-Flow/PW
- Multi-image (split/quad screen)
  - Live and/or frozen
  - B or CrossXBeam + B or CrossXBeam /CFM or PDI
  - PW/M
  - Independent Cine playback
- Time line display
  - Independent Dual B or CrossXBeam /PW Display
  - CW
  - Display Formats
    - Top/ Bottom selectable format (Size: 1/2:1/2; 1/3:2/3; 2/3:1/3)
    - Side/Side selectable format (1/2:1/2; 1/3:2/3; 0:1)
- Virtual Convex

### Visualization Modes

- Tomographic Ultrasound Imaging (TUI)

### Display Annotation

- Patient Name: First, Last and Middle name each store 64 characters. Up to 64 total characters displayed.
- Patient ID: Up to 64 total characters displayed on the title bar.
- Age, Sex and Birth Date (optional)
- Hospital Name: 23 Characters.
- Date: 2 Types selectable MM/DD/YY, DD/MM/YY
- Time: 2 types selectable: 24 hours, 12 hours
- Gestational Age from LMP/EDD/GA/BBT
- Probe Name
- Map names
- Probe Orientation
- Depth Scale Marker

provided for other devices such as Multi-format cameras, laser cameras, and

- Lateral Scale Marker
- Focal Zone Markers
- Image Depth
- Zoom Depth
- B-Mode
  - Gain
  - Dynamic Range
  - Imaging Frequency
  - Edge Enhance
  - Frame Averaging
  - Gray Map
- M-Mode
  - Gain
  - Dynamic Range
  - Time Scale
- Doppler Mode
  - Gain
  - Angle
  - Sample Volume Depth and Width
  - Wall Filter
  - Velocity and/or Frequency Scale
  - Spectrum Inversion
  - Time Scale
  - PRF
  - High PRF
  - Doppler Frequency
- Color Flow Doppler Mode
  - Line Density
  - Frame Averaging
  - Packet Size
  - Color Scale: 3 types
    - Power, Directional PDI, and Symmetrical Velocity Imaging
  - Color Velocity Range and Baseline
  - Color Threshold Marker
  - Color Gain
  - PDI
  - Spectrum Inversion
  - Doppler Frequency
- TGC Curve
- Acoustic Frame Rate
- CINE Gage, Image Number / Frame Number
- VCR/DVR Counter
- VCR/DVR Status
- VCR/Playback Counter
- Body Pattern: Up to 90 human types plus 13 animal types
- Application Name
- Measurement Results
- Operator Message
- Displayed Acoustic Output
  - TIS: Thermal Index Soft Tissue
  - TIC: Thermal Index Cranial (Bone)
  - TIB: Thermal Index Bone
  - MI: Mechanical Index
- % of Power output

- other peripherals
- Foot Switch, with programmable functionality
- Console Protective Cover
- Biopsy Guide Line and Zone

## General System Parameters

### System Setup

- Pre-programmable Categories
- User Programmable Preset Capability
- Factory Default Preset Data
- Languages: English, French, German, Spanish, Italian, Portuguese, Russian, Greek, Swedish, Danish, Dutch, Finnish, Norwegian
- OB Report Format: 5 Types, Tokyo Univ., Osaka Univ., USA, Europe, and ASUM
- EFBW: 8 types, Tokyo University, Osaka University, USA and Europe (Shephard, Merz, Hadlock/Shephard, Williams, Brenner)
- Multiple programmable parameters
- Body Patterns
- Customized Comment Home Position

### Complete User Manual available on board through Help (F1)

User Manual and Service Manual are included on CD with each system. A printed manual is available upon request.

### CINE Memory/Image Memory

- Standard CINE Memory: 128 MB - maximum number of frames 280,000 and maximum time of 270 seconds
- CINE Review Speed: 9 types (1/1, 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9)
- Selectable CINE Sequence for CINE Review
- Measurements/ Calculations &

- Annotations on CINE Playback
- Scrolling timeline memory

### Image Storage

- On-board database of patient information from past exams
- Storage Formats:
  - DICOM - compressed/
  - USB Hard Drive support for Import, Export and EZ Back-Up
  - DVD -R storage: 4.6GB
  - Hard drive image storage: ~56 GB

### Connectivity & DICOM

- Ethernet network connection
- RS-232 serial data output
- DICOM 3.0 (optional)
  - Verify
  - Print
  - Store
  - Modality Worklist
  - Storage Commitment
  - Modality Performed Procedure Step (MPPS)
  - Media Exchange
  - Off network / mobile storage queue
  - Query / Retrieve
- Structured Reporting - compatible with vascular and OB standard
- Media store of Structured Reporting
- iLinq capability

### Report Writer (optional)

- Customizable Report Generation

### VoiceScan™ (optional)

- Provides for Voice control of scanner
- Over 150 voice commands
- Voice training per user
- Separate training file per user
- Training file moveable between systems
- Wired microphone attached as USB device
- Wireless microphone
  - 518-554 MHz adjustable range
  - 30mW output power

### Scanning Parameters

- Digital Beamformer
- 18,432 Maximum Virtual Channels
  - Frame Rate: 1038Hz Maximum
- Displayed Imaging Depth: 0 - 36 cm
- Minimum Depth of Field: 0 - 2 cm

- uncompressed, single/multiframe, with/ without Raw Data
- Export JPEG, WMV and AVI formats
- DICOM Still Image Storage Size:
  - Gray Image: ~300K to ~1.3 MB
  - Color Image: ~900K to 1.9 MB
  - Volume: ~8 MB
- (Zoom) (probe dependent)
- Maximum Depth of Field: 0 - 36 cm (probe dependent)
- Transmission Focus
  - 1- 8 Focus Points selectable (probe and application dependent)
  - Focal Zone position, up to 12 steps
- Continuous Dynamic Receive Focus / Continuous Dynamic Receive Aperture
- Multi-Frequency/Wideband Technology
- Frequency Range 1 to 15 MHz
- 256 shades of gray
- 212 dB Dynamic Range
- Adjustable Field of View (FOV)
- Image Reverse: Right/ Left
- Image Rotation: 4 steps, Rotation: 0°, 180°

### Digital B-Mode

- B Acoustic Power: 25 - 100 %
- B Gain: 120 dB range, 1 dB steps, (includes slide pots)
- B Displayed Dynamic Range: 36 - 102 dB, 3-6 dB steps
- B Frame Averaging: 7 steps
- B Gray Scale Map: 18 types
- B Edge Enhancement: 6 steps
- Frequency Selection
- Line Density: up to 5 steps
  - Scanning Size (FOV or Angle - depending on the probe, see probe specifications)
- B Colorization: 4 color settings
- Image Softener: 4 steps
- Reject: 6 steps
- Suppression: 6 steps

### Digital M-Mode

- M Acoustic Power: 25 - 100 %
- M Gain: 120 dB range, 1 dB steps, includes slide pots.
- M Displayed Dynamic Range: 36 - 102 dB, 3-6 dB steps
- M Gray Scale Map: 18 types
- M Edge Enhancement: 6 step-
- M Sweep Speed: 8 types
- M Colorization: 4 colors
- CFM/M-Mode capability

### Anatomical M-Mode

- M-mode cursor adjustable at any

- Storage devices:
  - USB Memory Stick: 64MB to 512MB (for exporting individual images/clips)
  - CD-RW storage: 700MB

plane

- Can be activated from a CINE loop from a live or stored image
- M & A capability

### Digital Spectral Doppler Mode

- PW Acoustic Power: 0 - 100 %
- PW Gain: 72 dB range, 1 dB step
- PW Displayed Dynamic Range: 24 - 40 dB, 4 dB step
- PW Gray Scale Map: 5 types
- PW Wall Filter: up to 10 steps, PRF (velocity scale) dependent
- PW Colorization: 4 steps
- Color Tag
- PRF: 1.0 - 30.0 kHz
- Velocity Scale Range:
  - PD/HPRF +/- 5 m/sec (0°), +/- 10 m/sec (60°) (Probe Dependant)
- Digital Wall Filter Frequency: 25 Hz to 1800 Hz
- PW Sweep Speed: 8 types
- Sample Volume Length: 1 - 16 mm
- Angle Correction: ± 0-90°, 1° step Available before Freeze and after Freeze
- Steered Linear: 0° - 20° (Probe Dependant)
- Spectrum Inversion
- Baseline Shift: 9 steps
- Doppler Auto Trace
- Time Resolution: 2 to 25 msec, typically 10 msec

### Digital Color Flow Mode

- Symmetrical Velocity Imaging for optimized 3D color images
- Color Maps: 8 velocity maps; 4 velocity-variance maps
- CFM Gain: 80 dB range, 1 dB steps
- CFM Velocity Scale Range:
  - less than +/- 0.2 cm/s
  - max: +/- 3.0 m/s
- Wall Filter: 40 - 3500 Hz
- 8, 10, 12, 14 or 16 packets
- Line Density: 3 steps
- CFM Spatial Filter: 6 selections
- CFM Window Size (same as B-Mode):
  - Convex 5° - 120°
  - Sector 10° - 90°
  - Linear 5 mm - 46 mm (Depending on the probe)
- Maximum Steerable Angle

- (Slant Scan): +/- 20 °
- CFM Spectrum Inversion
- CFM Baseline Shift: 11 steps
- Pre-settable and independently adjustable B-Mode Gain in B/CFM-Mode
- CFM Frame Average: 7 steps
- CFM Threshold: 0 - 100%
- Real time Triplex Mode: B or CrossXBeam + CFM/PW at all depths and PRFs
- Accumulation mode and period

## Digital Power Doppler Imaging

- Power Doppler Maps: 10 maps
  - 1 Directional map
- Power Doppler Gain: 0-80 dB in 1 dB steps
- PDI Frame Averaging: 7 steps
- PDI Color Threshold: 0 - 100%
- Wall Filter: 3 steps
- Simultaneous Real-time Triplex Mode
  - B or CrossXBeam +PDI/PW in any depth, at any PRF
- 8, 10, 12, 14 or 16 packets
- Line Density: 3 steps
- Accumulation mode and period

## Automatic Optimization

- Optimize B-Mode, B-Flow image to improve contrast resolution.
- Selectable amount of contrast resolution improvement (low, medium, high)
- Auto-TGC in B-Mode and Color -
- Optimize Spectral Waveform - adjusts baseline, invert, PRF (on live image), and angle correction
- Algorithm works on focal zone/ number and depth changes
- B-Mode Auto-TGC is available on stored or live image
- Available in B-Mode, B-Flow, PW Doppler, Color, and PDI

## B-Flow (optional)

- Available on the following probes: 3.5C, 4C, M7C, E8C, 8C, 7L, 10L, i12L, M12L, 9L, i739, t739
- Image Reverse: left/right
- B-Flow sensitivity: 5 steps
- Background ON/OFF
- Displayed Dynamic Range: 36 - 102 dB
- Line Density: up to 3 steps
- Frame Averaging: 7 steps
- Map: 18 selectable
- Edge Enhance: 6 steps

- Flow Settings: Low / High
  - Accumulation mode and period

## Coded Excitation

- Available on the following probes: 10S, M7C, 8C, E8C and 10L

## Coded Harmonic Imaging

- Available on all 2D probes

## Continuous Wave Doppler (optional)

- Includes 5 and 8 MHz transducers

## Coded Contrast Imaging (optional - available only outside the United States)

- Available on 3.5C, 3.5CS, 4C, 4S, M7C, 7L, t739, 9L, 10L and M12L
- Contrast Timer
  - Timed Updates: 0.5 - 10 seconds
  - 3 fundamental frequencies on 3.5C, 4C, 4S, M7C, t739, 10L, and M12L
  - 2 fundamental frequencies on 7L, 9L
  - Up to 4 B-mode harmonic settings:
    - Coded Harmonic Angio - Resolution and Penetration
    - Coded Phase Inversion - 1
    - Coded Phase Inversion - 2
  - TruAgent Detection - High MI (3.5C, 3.5CS, 4C, 4S)

- TruAgent Detection - Low MI (3.5C, 4C, 7L, 9L, 10L, t739)
- Accumulation mode and period
- Multiple selections for CHA tissue background
- Maximum Enhance Mode
- Time Intensity Curve (TIC) Analysis
- The LOGIQ 9 is designed for compatibility with commercially available ultrasound contrast agents. Because the availability of these agents is subject to government regulation and approval, product features intended for use with these agents may not be commercially marketed nor made available before the contrast agent is cleared for use. Contrast related product features are enabled only on systems for delivery to an authorized country or region of use.
- Coded Contrast on 4D probes 4D16L, 4D3C

## LOGIQView (optional)

- Extended Field of View Imaging (Improved Functionality)
- Available on the following probes:

4S, 10S, 9L, 3.5C, 4C, M7C, 8C, E8C, 7L, 10L, M12L, i12L, i739 & t739

- For use in B-Mode
- CrossXBeam is available on linear probes
- Auto detection of scan direction
- Pre or post-process zoom to 10X
- Rotation
- Auto best fit on monitor
- Measurements in B-Mode
- Up to 60 cm scan length

## 3D

- Allows unlimited rotation, planar and angular translations
- 3D reconstruction from CINE sweep

## Advanced 3D

- Acquisition of Color data
- Automatic rendering
- 3D Landscape technology
- 3D Movie
  - Static 3D color
- Main Mode
  - Volume SRI-HD

## Tru3D (optional)

- Available on the 4S, 3.5C, 4C, M7C, E8C, 10L & M12L probes
- Sensor-based acquisition
- Display of data in: Main-, Parallel-, Angular-Mode
- Render Modes: Gray Surface, Texture, Min-, Max-, Average-Intensity
- Measurements: distance, angle, area, volume
- 3D Movie

## Real Time 4D (optional)

- Acquisition Modes:
  - Real Time 4D
  - Static 3D
- Visualization Modes:
  - 3D Rendering (diverse surface and intensity projection modes)
  - Sectional Planes (3 Section planes perpendicular to each other)
  - Volume Contrast Imaging-Static (optional)

- Render Mode:
  - Surface Texture, Surface Smooth, max-, min- and X-ray (average intensity projection), mix mode of two render modes
- Curved 3point Render start
- 3D Movie
- Scalpel: 3D Cut tool
- Display Format:
  - Quad: A-/B-/C-Plane/3D
  - Dual: A-Plane/3D
  - Single: 3D or A- or B- or C-Plane
- Max 30 4D Volumes/sec
- Automated Volume Calculation - VOCAL II (optional)
- Frame Cine

### Virtual Convex

- Provides a convex field of view
- Compatible with CrossXBeam
- Available on all linear and sector transducers: 4S, 10S, M12L, 10L, 9L, 7L, i12L, i739, t739, 4D10L, & 4D16L

### CrossXBeam™

- Provides 3,5,7, or 9 angles of spatial compounding
- Live Side by Side Display
- Compatible with:
  - Color Mode
  - PW
  - SRI-HD
  - Coded Harmonic Imaging
  - Virtual Convex
- Available on the following probes: 3.5C, 4C, M7C, 8C, E8C, M12L, 10L, 9L, 7L, i12L, i739, t739, 4D3C, 4DE8C, 4D8C, 4D10L, & 4D16L

### SRI-HD

- Speckle Reduction Imaging
- Provides 4 levels of speckle reduction
- Compatible with Side by Side Display
- Compatible with ALL linear, convex and sector transducers
- Compatible w/ B-Mode, B-Flow, Color, Contrast Agent and 3D/4D images
- Volume SRI-HD
- SRI-HD with OSI

### Pre-Processing

- Write Zoom up to 4x
- B/M/CrossXBeam-Mode
  - Gain
  - TGC
  - Dynamic Range
  - Acoustic Output
  - Transmission Focus Position

- Transmission Focus Number
- Edge Enhancement
- Smoothing Control
- Line Density Control
- Sweep Speed for M-Mode
- Number of Angles for CrossBeam
- PW-Mode
  - Gain
  - Dynamic Range
  - Acoustic Output
  - Transmission Frequency
  - PRF
  - Wall Filter
  - Spectral Averaging
  - Sample Volume Gate Length Depth
  - Velocity Scale
- Color Flow Mode
  - CFM Gain
  - CFM Velocity Range
  - Acoustic Output
  - Wall Echo Filter
  - Packet Size
  - Frame Rate Control
  - CFM Spatial Filter
  - CFM Frame Averaging
  - CFM Line Resolution
  - Frequency / Velocity Base Line Shift

### Post-Processing w/ Raw Data

- Automatic Optimization
- SRI-HD - Selectable level
- CrossXBeam - Display non-compounded and compounded image simultaneously in split screen
- 3D reconstruction from a stored CINE loop
- B/M/CrossXBeam Mode
  - Gray Map Optimization
  - TGC
  - Colorized B and M
  - Color Gain (loops only)
  - Dynamic Range
  - Anatomical M Mode
- Max Read Zoom to 8x
- Base Line Shift
- Sweep Speed
- PW Mode
  - Gray Map
  - Post Gain
  - Baseline shift
  - Sweep Speed
  - Invert Spectral wave form
  - Compression
  - Rejection
  - Colorized Spectrum
  - Color Tag
  - Display Format
- Color Flow
  - Overall Gain (loops only)

- Color Map
- Transparency Map
- Frame Averaging (loops only)
- Flash Suppression
- CFM Velocity Tag
- CFM Display Threshold
- Angle Correct (PW mode)
- Quick Angle Correct (PW mode)
- Auto Angle Correct (PW mode)
- Spectral Invert for Color/Doppler
- Anatomical M-Mode on cine loop
- 4D
  - Gray Map, Colorize
  - Post Gain
  - Change display - single, dual, quad sectional or rendered

## Measurements / Calculations

### General B-Mode

- Depth & Distance
- Circumference (Ellipse / Trace)
- Area (Ellipse / Trace)
- Volume (Ellipsoid)
- % Stenosis (Area or Diameter)
- Angle between two lines

### General M-Mode

- M-Depth
- Distance
- Time
- Slope
- Heart Rate

### General Doppler Measurements/Calculations

- Velocity
- Time
- A/B Ratio (Velocities / Frequency Ratio)
- PS (Peak Systole)
- ED (End Diastole)
- PS/ED (PS/ED Ratio)
- ED/PS (ED/PS Ratio)
- AT (Acceleration Time)
- ACCEL (Acceleration)
- TAMAX (Time Averaged Maximum Velocity)
- Volume Flow (TAMEAN and Vessel Area)
- Heart Rate

- PI (Pulsatility Index)
- RI (Resistivity Index)

## Real-time Doppler Auto Measurements / Calculations

- PS (Peak Systole)
- ED (End Diastole)
- MD (Minimum Diastole)
- PI (Pulsatility Index)
- RI (Resistivity Index)
- AT (Acceleration Time)
- ACC (Acceleration)
- PS/ED (PS/ED Ratio)
- ED/PS (ED/PS Ratio)
- HR (Heart Rate)
- TAMAX (Time Averaged Maximum Velocity)
- PVAL (Peak Velocity Value)
- Volume Flow (TAMEAN and Vessel Area)

## OB Measurements / Calculations

- Gestational Age by:
  - GS (Gestational Sac)
  - CRL (Crown Rump Length)
  - FL (Femur Length)
  - BPD (Biparietal Diameter)
  - AC (Abdominal Circumference)
  - HC (Head Circumference)
  - APTD x TTD (Anterior/Posterior Trunk Diameter by Transverse Trunk Diameter)
  - LV (Length of Vertebra)
  - FTA (Fetal Trunk Cross-sectional Area)
  - HL (Humerus Length)
  - BD (Binocular Distance)
  - FT (Foot Length)
  - OFD (Occipital Frontal Diameter)
  - TAD (Transverse Abdominal Diameter)
  - TCD (Transverse Cerebellum Diameter)
  - THD (Thorax Transverse Diameter)
  - TIB (Tibia Length)
  - ULNA (Ulna Length)
- Estimated Fetal Weight (EFW) by:
  - AC, BPD
  - AC, BPD, FL
  - AC, BPD, FL, HC
  - AC, FL
  - AC, FL, HC
  - AC, HC
- Calculations and Ratios
  - FL/BPD
  - FL/AC
  - FL/HC
  - HC/AC

- CI (Cephalic Index)
- AFI (Amniotic Fluid Index)
- Measurements / Calculations by: ASUM, Chitty, Hadlock, Hansmann, JSUM, Jeanty, Merz, Shinozuka, Moore, Tokyo, Eik-Nes, Kurtz, Osaka, Rempen, Paris, Yarkoni, Nelson, Robinson, Hohler, Mayden, CFEF, Hill, Shepard, Goldstein, Brenner and Williams
- Fetal Graphical Trending
- Growth Percentiles
- Multi-Gestational Calculations (4)
- Fetal Qualitative Description (Anatomical survey)
- Fetal Environmental Description (Biophysical profile)
- Programmable OB Tables
- Over 20 selectable OB Calcs
- Expanded Worksheets

## GYN Measurements/ Calculations

- Right Ovary Length, Width, Height
- Left Ovary Length, Width, Height
- Uterus Length, Width, Height
- Ovarian Volume
- ENDO (Endometrial thickness)
- Ovarian RI
- Uterine RI
- Follicular measurements
- Summary Reports

## Vascular Measurements/ Calculations

- SYS DCCA (Systolic Distal Common Carotid Artery)
- DIAS DCCA (Diastolic Distal Common Carotid Artery)
- SYS MCCA (Systolic Mid Common Carotid Artery)
- DIAS MCCA (Diastolic Mid Common Carotid Artery)
- SYS PCCA (Systolic Proximal Common Carotid Artery)
- DIAS PCCA (Diastolic Proximal Common Carotid Artery)
- SYS DICA (Systolic Distal Internal Carotid Artery)
- DIAS DICA (Systolic Distal Internal Carotid Artery)
- SYS MICA (Systolic Mid Internal Carotid Artery)
- DIAS MICA (Diastolic Mid Internal Carotid Artery)
- SYS PICA (Systolic Proximal Internal Carotid Artery)
- DIAS PICA (Diastolic Proximal Internal Carotid Artery)
- SYS DECA (Systolic Distal External Carotid Artery)
- DIAS DECA (Diastolic Distal External Carotid Artery)
- SYS PECA (Systolic Proximal

- External Carotid Artery)
- DIAS PECA (Diastolic Proximal External Carotid Artery)
- VERT (Systolic Vertebral Velocity)
- SUBCLAV (Systolic Subclavian Velocity)
- Summary Reports
- IMT

## Urological Calcs

## Renal Calcs

## Hip Dysplasia Calcs

## Probes (All Optional)

### 3.5C Convex Probe

- Applications: Abdomen, OB Gyn, Urology, Vascular
- Maximum Band Width (-20dB): 2 - 5.2 MHz
- Number of Elements: 128
- Convex Radius: 40 mm
- FOV: 68°
- Foot Print: 52 x 17 mm
- Fundamental Frequencies: 2.5, 3, 4 MHz
- Harmonic Frequencies: 3, 4, 5 MHz
- Color Frequencies: 2.5, 3.1, 3.8 MHz
- Doppler Frequency: 2.5 MHz
- Biopsy Guide: Single-Angle, Reusable (E8385MG)

### 3.5CS Convex Probe

- Applications: Abdomen, OB Gyn, Urology, Vascular
- Probe Band Width: 2 - 5.2 MHz
- Number of Element: 128
- Convex Radius: 40 mm
- FOV (Max): 68°
- Physical Foot Print: 53 x 13 mm
- Fundamental Frequencies: 2.5, 3, 4 MHz
- Harmonic Frequencies: 3, 4, 5 MHz
- Color Frequencies: 2.5, 3.1, 3.8 MHz
- Doppler Frequencies: 2.5 MHz
- Biopsy Guide: Single Angle, Reusable (E8385MG)

### 4C Convex Probe

- Applications: Abdomen, OB Gyn, Urology, Vascular
- Maximum Band Width (-20dB): 1.5 - 4.6 MHz
- Number of Elements: 128
- Convex Radius: 60 mm
- FOV: 58°
- Foot Print: 61mm x 17 mm
- Fundamental Frequency: 2,3,4 MHz
- Harmonic Frequencies: 3, 4, 4.7,

- 5 MHz
- Color Frequency: 1.8, 2.5, 3.1, 4.0 MHz
- Doppler Trans Frequency: 1.9 MHz
- Biopsy Guide: Multi-Angle, Reusable (E8385NA)

**M7C Matrix Array Convex Probe**

- Applications: Abdomen, OB Gyn, Pediatrics
- Maximum Band Width (-20dB): 2.6-7.7 MHz
- Number of Elements: 960
- Convex Radius: 50 mm
- FOV: 21°
- Foot Print: 58 x 18 mm
- Fundamental Frequencies: 6,7,8 MHz
- Harmonic Frequencies: 7 MHz
- Color Frequencies: 3.1, 3.8, 5 MHz
- Doppler Frequencies: 3.1 MHz
- Biopsy Guide: Multi-angle, Reusable (E8385RF)

**E8C Micro convex Probe**

- Applications: OB/Gyn
- Maximum Band Width (-20dB): 3.5 - 11.4 MHz
- Number of Elements: 128
- Convex Radius: 11 mm
- FOV: 133°
- Foot Print: 30 x 9 mm
- Fundamental Frequencies: 5,6,8 MHz
- Harmonic Frequencies: 8 MHz
- Color Frequencies: 4, 6.3 MHz
- Doppler Frequencies: 4.4 MHz
- Biopsy Guide: Single Angle, Disposable (E8385MY)

**8C Micro convex Probe**

- Applications: Neonatal, Pediatrics
- Maximum Band Width (-20dB): 3.5 - 11.4 MHz
- Number of Elements: 128
- Convex Radius: 11 mm
- FOV: 133°
- Foot Print: 30 x 9 mm
- Fundamental Frequencies: 5,6,8 MHz

- Harmonic Frequencies: 8 MHz
- Color Frequencies: 4, 6.3 MHz
- Doppler Frequencies: 4.4 MHz

**3S Sector Probe**

- Applications: TCD, Abdomen,
- Maximum Band Width (-20dB): 1.4 - 3.3 MHz
- Number of Elements: 64
- FOV: 90°
- Foot Print: 21 x 15 mm
- Fundamental Frequencies: 2.0, 2.5, 3.0 MHz
- Harmonic Frequencies: 4 MHz
- Color Frequencies: 1.8, 2.5 MHz
- Doppler Frequencies: 1.7, 2.0 MHz
- Harmonic Frequency: 2.8, 3.0, 3.2, 3.6 MHz

**4S Wide Band Sector Probe**

- Applications: Abdomen, OB Gyn, TCD
- Maximum Band Width (-20dB): 1.5 - 5 MHz
- Number of Elements: 128
- FOV: 90°
- Foot Print: 32 x 18 mm
- Fundamental Frequencies: 2,3,4 MHz
- Harmonic Frequencies: 4 MHz
- Color Frequencies: 1.8, 2.5 MHz
- Doppler Frequencies: 1.9 MHz
- Biopsy Guide: Multi-angle, Reusable (E8385RH)

**10S Sector Probe**

- Applications: Neonatal, Small Parts, Abdomen, Pediatrics
- Maximum Band Width (-20dB): 4.0 - 10.5 MHz
- Number of Elements: 96
- FOV: 90°
- Foot Print: 14 x 10 mm
- Fundamental Frequencies: 8,9,10 MHz
- Harmonic Frequencies: 10 MHz
- Color Frequencies: 5,6.3 MHz
- Doppler Frequencies: 5 MHz

**i12L Intraoperative Linear Probe**

- Applications: Intraoperative, Small Parts, Vascular, Pediatrics
- Maximum Band Width (-20dB): 4.4 - 11.5 MHz
- Number of Elements: 96
- FOV: 25 mm
- Foot Print: 29 x 10 mm
- Fundamental Frequencies: 9,10 MHz

- Harmonic Frequencies: 10 MHz
- Color Frequencies: 5,6.3 MHz
- Doppler Frequencies: 5 MHz
- Steered Angle: Max. 30°

**7L Linear Probe**

- Applications: Vascular, Small Parts
- Maximum Band Width (-20dB): 2.6 - 7.1 MHz
- Number of Elements: 192
- FOV: 46 mm
- Foot Print: 53 x 11 mm
- Fundamental Frequencies: 5, 6 MHz
- Harmonic Frequencies: 7 MHz
- Color Frequencies: 4.4, 5 MHz
- Doppler Frequencies: 3.8 MHz
- Steered Angle: Max. 30°
- Biopsy Guide: Multi- Angle, Reusable (E8385PC)

**9L Linear Probe**

- Applications: Vascular, Small Parts, Pediatric, Abdomen
- Maximum Band Width (-20dB): 2.5 - 8 MHz
- Number of Elements: 192
- FOV: 44mm
- Foot Print 49mm x 9mm
- Fundamental Frequencies: 8 MHz, 6 MHz
- Harmonic Frequencies: 8 MHz
- Color Frequencies: 4.4 MHz, 5.0 MHz
- Doppler Frequencies: 3.8 MHz
- Steered Angle: Max. 30°
- Biopsy guide starter kit (H4906BK)

**10L Linear Probe**

- Applications: Vascular, Small Parts, Neonatal, Pediatrics
- Band Width (-20dB): 3.5 - 10.5 MHz
- Number of Elements: 192
- FOV: 39 mm
- Foot Print: 44 x 10 mm
- Fundamental Frequencies: 6.3, 7.5, 10 MHz
- Harmonic Frequencies: 9, 9.5 MHz
- Color Frequencies: 3.8, 5 MHz
- Doppler Frequencies: 4.4 MHz
- Steered Angle: Max. 30°
- Biopsy Guide Available: Multi-Angle, Reusable (E8385RJ)

**M12L Matrix Array Linear Probe**

- Applications: Small Parts, Vascular, Neonatal, Pediatrics
- Band Width (-20dB): 4.7- 13 MHz
- Number of Elements: 960



- FOV: 39 mm
- Foot Print: 45 x 10 mm
- Fundamental Frequencies: 9,10,12 MHz
- Harmonic Frequencies: 10,14 MHz
- Color Frequencies: 5,6.3, 7.5 MHz
- Doppler Frequencies: 5.6 MHz
- Steered Angle: Max. 30°
- Biopsy Guide Available: Multi-Angle, Reusable (E8385RG)

#### **i739 Intraoperative Linear**

- Applications: Intraoperative, Small Parts, Vascular, Pediatrics
- Band Width (-20 dB): 3.5 - 9.5 MHz
- Number of Element: 192
- FOV: 39 mm
- Physical Foot Print: 44 x 10 mm
- Fundamental Frequencies: 6.3, 7.5, 10 MHz
- Harmonic Frequencies: 9, 9.5 MHz
- Color Flow Frequencies: 3.8, 5.0 MHz
- Doppler Frequency: 4.4 MHz
- Steered Angle: 30° Max.

#### **t739 Intraoperative Linear**

- Applications: Intraoperative, Small Parts, Vascular, Pediatrics
- Band Width (-20 dB): 3.5 - 9.5 MHz
- Number of Element: 192
- FOV: 39 mm
- Physical Foot Print: 44 x 10 mm
- Fundamental Frequencies: 6.3, 7.5, 10 MHz
- Harmonic Frequencies: 9, 9.5 MHz
- Color Flow Frequencies: 3.8, 5.0 MHz
- Doppler Frequency: 4.4 MHz
- Steered Angle: 30° Max.

#### **4D3C-L Convex Volume Probe**

- Applications: Abdomen, OB
- Band Width (-20dB): 2 - 5 MHz
- Number of Elements: 192
- Convex Radius: 40.5 mm
- Volume Sweep Radius: 20,15mm
- FOV: 68° (B), 85° x 80° (Volume scan)
- Foot Print: 53 x 41mm
- Fundamental Freq: 3,4 MHz
- Harmonic Frequencies: 4 MHz
- Color Frequencies: 2.5,3.1 MHz
- Doppler Frequencies: 2.5 MHz

#### **4DE7C Convex Volume Probe**

- Applications: OB GYN, Urology
- Band Width (-20dB): 3.3-10 MHz
- Number of Elements: 192
- Convex Radius: 11.6 mm
- Volume Sweep Radius: 11.6 mm
- FOV: 116° (B), 146°\*90° (Volume scan)
- Foot Print: 32 x 27 mm
- Fundamental Frequencies: 5,7 MHz
- Harmonic Frequencies: 7 MHz
- Color Frequencies: 4.4,6.3 MHz
- Doppler Frequencies: 4.4 MHz

#### **4D8C Convex Volume Probe**

- Applications: Neonatal, Pediatrics
- Band Width (-20dB): 3.3-9.1MHz
- Number of Elements: 192
- Convex Radius: 15.4 mm
- Volume Sweep Radius: 15.4 mm
- FOV: 120° (B), 120°\*90° (Volume scan)
- Foot Print: 32 x 29mm
- Fundamental Frequencies: 8.0 MHz, 6.0 MHz
- Harmonic Frequencies: 8.0 MHz
- Doppler Frequency: 4.4 MHz
- Color frequencies: 6.3 MHz, 4.4 MHz

#### **4D10L Linear Volume Probe**

- Applications: Small Parts, Peripherals. Vascular, Pediatrics,
- Band Width (-20dB): 3.5-11 MHz
- Number of Elements: 192
- Volume Sweep Radius: 33 mm · FOV: 37.4 mm (B); 37.4 mm \* 29° (Volume scan)
- Foot Print: 50 x 58 mm
- Fundamental Frequencies: 7,9,10 MHz
- Harmonic Frequencies: 10 MHz
- Color Frequencies: 3.8, 5 MHz
- Doppler Frequencies: 4.4 MHz
- Steered Angle: Max. 30°

#### **4D16L Linear Volume Probe**

- Applications: Small Parts, Peripherals. Vascular, Pediatrics,
- Band Width (-20dB): 4-16.5 MHz
- Number of Elements: 192
- Volume Sweep Radius: 33 mm · FOV: 37.4 mm (B); 37.4 mm \* 29° (Volume scan)
- Foot Print: 50 x 58 mm
- Fundamental Frequencies: 8,12,15 MHz

- Harmonic Frequencies: 12,15 MHz
- Color Frequencies: 5,6.3,7.5 MHz
- Doppler Frequencies: 6.3 MHz
- Steered Angle: Max. 30°

#### **P5D Non-imaging peripheral CW-Pencil Probe**

- Application: Peripheral Vascular
- Frequency: 5.3MHz
- Foot Print (Diameter): 11mm
- Active Diameter: 9mm

#### **P8D Non-imaging peripheral CW-Pencil Probe**

- Application: Peripheral Vascular
- Frequency: 8.0MHz
- Foot Print (Diameter): 8mm
- Active Diameter: 5mm

## External Inputs and Outputs

(not including on-board peripherals)

- SVGA Video Out
- Composite Color
- Composite b/w
- S-Video
- Audio Stereo Out
- Remote Expose (2)
- 3 Position Footswitch
- RS-232 serial port for Line Printer
- Ethernet
- External microphone

iLinq™ Modem Connection

## Safety Conformance

### The LOGIQ 9 is:

- Classified to UL 60601-1 by a Nationally Recognized Test Lab
- Certified to CSA 22.2, 60601.1 by an SCC accredited Test Lab
- CE Marked to Council Directive 93/42/EEC on Medical Devices
- Conforms to the following standards for safety:
  - EN 60601-1 Electrical medical equipment
  - EN 60601-1-1 Electrical medical equipment
  - EN 60601-1-2 Electromagnetic compatibility
  - EN 60601-1-4 Programmable medical systems
  - EN 60601-2-37 Particular requirements for the safety of ultrasonic medical diagnostic and monitoring equipment
  - ISO 10993 Biological evaluation of medical devices
  - NEMA UD3 Acoustic output display (MI, TIS, TIB, TIC)
  - EMC Emissions Group 1 Class B device requirements as per Sub-clause 4.2 of CISPR 11 - CRT
  - EMC Emissions Group 1 Class A device requirements as per Sub-clause 4.2 of CISPR 11 - LCD

### Service Pack 2