



Apogee® 800PLUS Ultrasound System Specifications

Applications

- Abdominal
- Obstetrics
- Gynecology
- Adult cardiology
- Pediatric cardiology
- Vascular
- Transcranial
- Small parts
- Prostate

Imaging Modes

- 2D
- M-mode
- Color Doppler
- Color Power Angio™ Imaging
- Pulsed wave Doppler
- Continuous wave Doppler
- High PRF Doppler (HPRF)
- Triple mode simultaneity
- Chroma® Imaging

Physical Dimensions

- Width, 27 in/68.6 cm
- Height, 57.1 in/145.1 cm
- Depth, 34 in/86.4 cm

- Height without monitor, 43.9 in/111.4 cm
- Weight without peripherals, <310 lbs/141 kg

System Architecture

- User-selectable multifrequency beamformer (transmit/receive) for imaging, Doppler and color Doppler modes
- Broadband compatibility
- Front-end bandwidth from 2 to 14 MHz
- User-variable transmit "stepless" focus
- Adjustable focal span in multizone focus
- Continuous dynamic receive focusing
- Dynamic apodization
- Dynamic aperture
- Support for 192 elements/expandable (curved, linear and convex phased arrays)
- Support for 8 rings/expandable (symmetric phased array)

Image Presentation

- Full screen: 2D, M-mode, color Doppler and M-mode, Doppler spectrum
- Top/bottom split screen: 2D with Doppler spectrum or M-mode, Color Doppler with Doppler spectrum, M-mode or color M-mode





Image Presentation *continued*

- Dual image
 - 2D/2D (includes seamless linear)
 - 2D/color Doppler
 - Color Doppler/color Doppler
 - Color Doppler/CPA
 - 2D/2D zoom
 - Color Doppler/color zoom
- Split screen
 - Live 2D/live color Doppler
 - Live 2D for reference/live 2D zoomed

Display Annotation

- On-screen annotation of all pertinent imaging parameters: scanhead type and frequency, display depth, TGC curve, grayscale or color map, frame rate, dynamic range, color imaging mode, hospital and patient ID information
- User-defined image annotation selection
- Movable results box
- Movable, pre-defined body markers (application specific anatomic annotation) on single and dual display images
- Multiple trackball driven annotation arrows
- Real-time display of ISPTA output

Image Processing

- 256 2D gray shades
- 128 M-mode gray shades
- Bilinear interpolation of 2D and color
- Variable line density up to 256 lines
- 2D and color persistence
- 2 to 24 cm depth settings in 1 cm increments, depending on scanhead
- 20° to 150° sector angles in 5° increments, depending on scanhead
 - Reduced sector image steerable throughout image display
- 1, 2 or 4 second sweep speeds (25/50/100 cm/sec)
- High resolution, real-time zoom in all imaging modes
- Pan and zoom capabilities
- Chroma imaging for colorization of 2D, M-mode and spectral displays
- Tissue Tagging for clearer differentiation of individual textures

General Formats

- Dual image display including color and CPA
- Freeze frame

- Left/right reverse
- Video invert for scrolling displays
- Apex invert
- ECG with variable and auto gain (with color option)
- Second physiologic trace (with cardiac option)

Scanheads

- Electronic switching of 4 connected scanheads
- User-selectable transmit frequency
- Broadband scanheads
 - Frequency range: 2 to 11 MHz
 - 128 color hues
 - Steerable color flow
 - Angles: $\pm 20^\circ$ increments
 - Sample volume sizes from 1.3 to 29.2 mm
- Symmetric phased array scanheads
 - 128 color shades
 - Color sectors from 20° to 90°
 - Steerable color flow
- Biopsy guides
 - Disposable guides available for broadband scanheads: linear array (11-5 L40, 7-4 L40), curved array (5-2 C40, 7-3 C40, 5-2 C76), convex phased array (4-2 C15, 6-3 C13, 8-5 C11)
 - Sterilizable/reusable guide available for 9-5 Endo 8 intracavitary scanhead
 - Biopsy guide path overlay on displayed image
- 11-5 L40 *Broadband Linear Array*
 - User-selectable bandwidth frequency 3.7 to 11.3 MHz
 - High density, 192-element, high resolution linear array
 - 11-5 MHz extended operating frequency range
 - Steerable pulsed Doppler, HPRF and color Doppler, and Color Power Angio imaging
 - High resolution superficial applications including vascular and small parts imaging
- 7-4 L40 *Broadband Linear Array*
 - User-selectable bandwidth frequency 2.9 to 8.3 MHz
 - 7-4 MHz extended operating frequency range
 - Steerable pulsed Doppler, HPRF and color Doppler, and Color Power Angio imaging
 - General vascular and superficial imaging applications

- 5-2 C40 *Broadband Curved Array*
 - User-selectable bandwidth frequency 1.9 to 6.0 MHz
 - 5-2 MHz extended operating frequency range
 - Pulsed, color and HPRF Doppler, and Color Power Angio imaging
 - General purpose abdominal, obstetrical and gynecological applications
- 5-2 C76 *Broadband Curved Array*
 - User-selectable bandwidth frequency 1.9 to 5.4 MHz
 - 76 mm radius of curvature
 - Pulsed, color and HPRF Doppler, and Color Power Angio imaging
 - Obstetrical, gynecological and abdominal applications
- 7-3 C40 *Broadband Curved Array*
 - User-selectable bandwidth frequency 2.7 to 8.0 MHz
 - 7-3 MHz extended operating frequency range
 - Pulsed, color and HPRF Doppler, and Color Power Angio imaging
 - High resolution abdominal, pediatric, obstetrical and gynecological applications
- 9-5 Endo 8 *Broadband Intracavitary Curved Array*
 - User-selectable bandwidth frequency 3.5 to 9.0 MHz
 - End-fire convex, 8 mm radius of curvature, 140° field of view
 - Pulsed, color and HPRF Doppler, and Color Power Angio imaging
 - Endovaginal and endorectal applications
- 4-2 C15 *Broadband Convex Phased Array*
 - User-selectable bandwidth frequency 1.4 to 4.1 MHz
 - 4-2 MHz extended operating frequency range
 - Steerable pulsed and CW Doppler, HPRF and color Doppler, and Color Power Angio imaging
 - Adult cardiology, abdominal, vascular and transcranial applications
- 6-3 C13 *Broadband Convex Phased Array*
 - User-selectable bandwidth frequency 2.5 to 7.0 MHz
 - 6-3 MHz extended operating frequency range

- Steerable pulsed and CW Doppler, HPRF and color Doppler, and Color Power Angio imaging
- Adult cardiology and abdominal applications
- **8-5 C11 Broadband Convex Phased Array**
 - User-selectable bandwidth frequency 3.5 to 9.5 MHz
 - 8-5 MHz extended operating frequency range
 - Steerable pulsed and CW Doppler, HPRF and color Doppler, and Color Power Angio imaging
 - Small parts, vascular and pediatric/neonatal cardiology applications
- **MPTEE Multiplane Transesophageal**
 - Symmetric phased array
 - User-selectable bandwidth frequencies from 2.7 to 6.8 MHz
 - Steerable pulsed and CW Doppler, HPRF and color Doppler, and Color Power Angio imaging
 - Rotation through 180°
 - Adult cardiology applications
- **2.75 S19 Symmetric Phased Array**
 - User-selectable bandwidth frequency 1.3 to 4.1 MHz
 - Steerable pulsed and CW Doppler, HPRF and color Doppler, and Color Power Angio imaging
 - Abdominal, obstetrical, gynecological, vascular and adult cardiology applications
- **3.5 S19 Symmetric Phased Array**
 - User-selectable bandwidth frequency 1.5 to 5.3 MHz
 - Steerable pulsed and CW Doppler, HPRF and color Doppler, and Color Power Angio imaging
 - Abdominal, obstetrical, gynecological, vascular, and adult and pediatric cardiology applications
- **5.0 S19 Symmetric Phased Array**
 - User-selectable bandwidth frequency 2.5 to 6.6 MHz
 - Steerable pulsed and CW Doppler, HPRF and color Doppler, and Color Power Angio imaging
 - Abdominal, obstetrical, gynecological, vascular, adult and pediatric cardiology, and pediatric/neonatal applications
- **7.5 S15 Symmetric Phased Array**
 - User-selectable bandwidth frequency 3.7 to 8.8 MHz

- Steerable pulsed and CW Doppler, HPRF and color Doppler, and Color Power Angio imaging
- Small parts, vascular and pediatric applications
- **Non-imaging Doppler-only scanheads**
 - 2.0, 5.0 and 10.0 MHz pencil probes for vascular and cardiac applications
 - 2.0 MHz TCD probe for transcranial Doppler exams

2D Imaging

- User-selectable transmit frequency
- Acoustic output power variable in 3 dB steps (or percent power)
- Adjustable sector size: 20° to 150° in 5° increments
- Adjustable linear image width
- Image depth from 2 to 24 cm in 1 cm increments
- Dynamic range: 4 steps up to 55 dB
- 8 post-processing curves
- 4 user-defined post-processing curves
- Line density/frame rate optimization
- Apex invert
- Left/right reverse
- High resolution zoom with multiple magnification levels
- Cineloop® image review
- All annotation tools
- Sector size and steering control
- Selectable line density
- Dual image display
- Chroma image colorization with multiple color maps
- Exam presets
- User-defined presets

M-mode

- Available with all imaging scanheads
- Selectable scrolling rates: 1, 2 or 4 seconds
- Cineloop review history: minimum 30 seconds
- Color M-mode
- Chroma colorization with multiple color maps, independent of 2D

Color Doppler

- Available with all imaging scanheads
- Cineloop image review
- Adjustable wall filters
- Adjustable color sensitivity
- Trackball controlled color region of interest, size and position
- Velocity and variance displays

- Controls for angle, gain, span, PRF, color map, variance on/off, baseline shift, line density, sample size, prioritization, color capture
- User-selectable color maps: 16
- User-defined color maps: 4

Color Power Angio Imaging (CPA)

- Highly sensitive mode for visualization of small vessels
- Available on all imaging scanheads
- Fully user-configurable
- Cineloop image review
- User-definable presets
- Multiple maps
- Individual controls for gain, filters, sensitivity, echo write priority and color invert
- Adjustable CPA region of interest, size and position
- Background on/off

Doppler

- Display annotations include Doppler mode, scale (cm/sec, m/sec or kHz), Nyquist limit, pulse repetition frequency, wall filter setting, acoustic output status, sample volume size, normal/inverted, angle correction, grayscale curve
- Angle correction with automatic adjustment of velocity scale
- Adjustable frequency/velocity display ranges
- Adjustable wall filter settings
- 8 selectable grayscale curves
- Spectral invert
- Angle correction
- 16-position zero baseline shift
- Operating frequency range: 2 to 10 MHz
- Controls for gain, reject, vertical scale (PRF)
- Selectable display speeds: 1, 2 or 4 seconds
- Complex discrete Fourier transform
- 1 millisecond transform computation time
- Spectral averaging of 2, 4 or 8 spectra
- Automatic gain control with dynamic tracking reject
- 128 by 512 pixel resolution
- 128 gray shades
- Selectable filtering of low frequency signals with adjustable wall filter settings
- Selectable display format (1/3-2/3, 1/2-1/2, 2/3-1/3, full screen scrolling)

Doppler continued

- Cineloop review for retrospective analysis of Doppler data
- Chroma colorization
- Wall motion filters
 - General imaging: 50, 100, 200, 300 Hz
 - Cardiology: 180, 360, 720, 1440 Hz
 - Multimodality: 50, 150, 500 or 1500 Hz

High PRF (HPRF) Doppler

- Available with all imaging scanheads
- Adjustable sample volume size: 1.2 to 29.5 mm
- Pulsed wave PRF to 35 kHz

Continuous Wave (CW) Doppler

- Available on all convex phased array, symmetric phased array and non-imaging Doppler scanheads
- Maximum velocity range: 13.5 m/sec

Image and Data Memories

- Full resolution freeze frame
- 50 saved 2D images
- 128 frames of Cineloop 2D images
- 50 saved color images
- 128 frames of Cineloop color images
- 8, 16 or 32 seconds of Doppler or M-mode memory

Cineloop Review

- Acquisition, storage in memory and display in real-time and duplex modes
- Trackball control of image selection
- Variable playback speed
- Choice of loop or sweep playback
- Trim capability
- Functions in:
 - 2D
 - M-mode
 - PW, CW and color Doppler
 - Color Power Angio imaging
 - Dual modes

Calculations and Analysis

- Measurements and analysis capabilities
 - measurements may be performed on-line or off-line (video playback). Simple on-screen, general measurements and detailed comprehensive measurements are automatically entered into patient reports.
- Reports - printed on off-line serial printers
 - Obstetric (includes growth charts)
 - Gynecology
 - Vascular
 - Transcranial
 - Cardiac
 - Abdominal
 - Neonatal
 - Peripheral arterial
 - Peripheral venous
 - Fetal echo
 - Breast
 - Prostate
- General measurements include distance, area, circumference, slope, volume, ellipse, angle, velocity, frequency, pressure half-time, mean velocity and pressure, mean frequency and acceleration
- Obstetric patient report
 - Growth tables (charts)
 - Patient obstetric history
 - Fetal observations
 - Input of previous exam data
 - GS, CRL, BPD, OFD, HC, AC, TAD, APD, FL, CI, yolk sac, cerebellum, tibia, fibula, radius, ulna, humerus, OOD, LV/HW, EFW, cisterna magna
 - Derived ages from a variety of author nomograms with a selection of tables, growth rates, various ratios

• Vascular patient report

- Area reduction, diameter reduction, S/D ratio
- Volume flow
- ICA/CCA ratio
- PI, RI
- Transcranial Doppler
- Lower extremity venous
- Abdominal vascular
- Cardiac patient report
 - 2D: BSA, valve area, SV, EF, percent diameter change, LV mass
 - Doppler: dP/dt, QP:QS, regurgitant volume, regurgitant fraction, acceleration, deceleration, pressure gradients
 - Color Doppler: PISA, jet heights, regurgitant jet area
 - M-mode: LV mass, cardiac output, stroke volume, ejection fraction

Exam Documentation

- Color printers
- Black and white printers
- Multifunction cameras
- SVHS VCR: NTSC or PAL

Standards Compliance

- Canadian Standard CSA C22.2 No. 601.1
- French National Standard NF C74-010
- European National Standards IEC 601-1 and IEC 601-1-2
- U.S. National Standard UL544

Electrical Specifications

- 105 to 125 VAC, 10 A, 45-65 Hz
- 190 to 250 VAC, 5 A, 45-65 Hz

Specifications subject to change without prior notice.

"Apogee", "Chroma" and "Cineloop" are U.S. registered trademarks and "Color Power Angio" is a trademark owned by ATL Ultrasound, Inc.

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