

1. General Information

- **Equipment:** Ultrasound Machine with Color Doppler.
 - **Intended Use:** High-resolution diagnostic imaging and blood flow analysis.
 - **Clinical Use:** General abdominal sonography, vascular studies, obstetrics/gynecology (OB/GYN), and basic cardiology.
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2. System Architecture & Display

- **Platform:** State-of-the-art all-digital beamformer for superior spatial and contrast resolution.
 - **Physical Form:** Integrated lightweight mobile cart for easy maneuverability between clinics or bedside.
 - **Display:** Minimum 17-inch high-resolution LED/LCD monitor; must include tilt and swivel adjustments for viewing in various light conditions and angles.
 - **User Interface:** * Alpha-numeric keyboard with backlit controls.
 - High-precision trackball for measurement and navigation.
 - Independently selectable gain controls (including Time Gain Compensation).
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3. Imaging Modes & Performance

The system must support a comprehensive suite of imaging modalities across all active probes:

- **Core Modes:** 2D (B-Mode), M-Mode, and Tissue Harmonic Imaging (THI) for enhanced border detection.
 - **Doppler Suite:** Color Flow Imaging, Power Doppler (for low-velocity flow), and Pulsed Wave (PW) Doppler.
 - **Advanced Features:** Triplex imaging (simultaneous 2D, Color, and PW Doppler) and minimum 256 grayscale levels for subtle tissue differentiation.
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4. Probes (Transducers)

The system must feature **three active electronic ports** for rapid probe switching. The following broadband transducers are required:

Probe Type	Frequency Range	Application
Convex Probe	2.0 – 5.0 MHz	General abdominal and OB/GYN imaging.
Linear Array	8.0 – 12.0 MHz	Vascular, small parts, and musculoskeletal imaging.
Trans-Vaginal	4.0 – 9.0 MHz	Endocavitary (OB/GYN) with $\geq 140^\circ$ Field of View.
Phased Array	2.0 – 4.0 MHz	Cardiac package (Sector probe).
Trans-Rectal	4.0 – 9.0 MHz	Side-firing probe for urological imaging (if available).

5. Software & Connectivity

- **Analysis Package:** Extensive calculation software for General, Vascular, and OB/GYN (including Nuchal Translucency - NT measurements).
- **Measurement Tools:** Automated and manual tools for distance, area, volume, and circumference.
- **Data Management:** * Internal storage: >500 GB Hard Disk.
 - Export: Integrated DVD/Blue-Ray writer and multiple USB ports.
 - Documentation: Thermal printer with paper pack; option for external PC printer.
- **Networking:** Full DICOM 3.0 compliance for seamless PACS integration (no additional hardware/software required).

6. Power & Safety Standards

- **Electrical:** 200–240V AC, 50 Hz.
- **Backup:** Pure sine wave online UPS with minimum 30 minutes of battery backup for the entire system.

- **Compliance:** CE (Notified Body) or US FDA cleared; electrical/functional safety testing per ERTL/STQC standards.

BIOMEDICAL ENGINEERING DEPARTMENT