



TELEMED

Ultrasound Medical Systems

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ArtUs USS-2H research system

Portable Research System

TELEMED has developed the first portable ultrasound system with flexible research capabilities. The system is unique because it is developed on the basis of the clinical diagnostic ultrasound system with parameters close to scanners used by ultrasound practitioners today. Such a cost-effective system might serve the researchers for the development of novel beamforming algorithms, creation of custom receive weighting methods, custom scanning: transmit-receive focusing programming, creation of advanced digital signal and image processing algorithms, advancement of deep learning-based methods for ultrasonic image formation and minimization of hardware resources to receive the sufficient amount of scanned data to reconstruct diagnostic quality images.



ArtUs USS-2H System Advantages

- Possibility to program custom transmit delay values for individual channels and apertures, allowing for fully custom transmit focusing in terms of delays.
- Possibility to choose active channels from the 64 available (trade-off between frame rate and image quality).
- Possibility to program custom excitation pulses (Tri-state pulser: +A, 0, -A).
- Select arbitrary beams to scan (create a custom sequence of working apertures).
- Adjust analog front-end (anti-aliasing filter, programmable high-pass filter) and analog depth-dependent received echoes amplification parameters.
- Possibility to create custom software based on channel or beamformed RF data by using TELEMED C++ SDK.

ArtUs USS-2H System Limitations

- Users can not program different amplitude and shape excitation pulses, analog front-end, and amplification parameters for individual electronics channels (these parameters are adjustable only for all channels simultaneously).
- It is not possible to access modes other than B (brightness) mode on the ArtUs USS-2H, as Doppler modes and other functionalities are restricted to ensure optimal performance of the channel data device.

System Specifications

General Features

- Real-time access to beamformed and individual channel scanning RF data.
- Supports ultrasound probes up to 192 elements (linear, convex, phased-array, custom).
- 2-transducers ports.
- A super-speed USB 3.0 enables real-time streaming of raw RF data to any modern Windows PC.

Transmit Parameters

- 64 TX channels.
- 3 level pulsers up to 18 MHz frequency with programmable amplitude up to 140 Vpp, 2A max, time delay resolution 6.25 ns.

Receive Parameters

- 64RX channels.
- Sampling rate up to 40 MHz, ADC chips specs 12-bit (RF data output format 16-bit).
- Programmable analog front-end anti-aliasing filter.
- Programmable analog front-end high-pass filter.

Input / Output synchronization capabilities

The system contains installed 6 SMA-type connectors which can be used for:

- Ultrasound Line output
- Ultrasound Frame output
- Ultrasound Line input
- Ultrasound Frame input
- ScanStart output
- ScanStart input



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Power Requirements and Physical Dimension

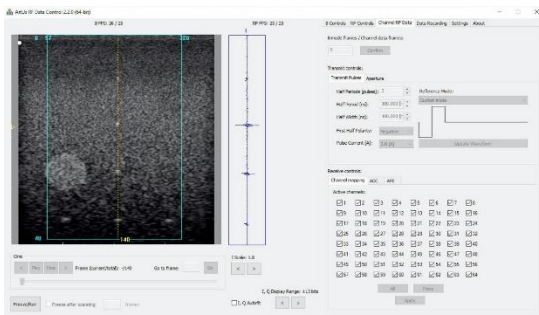
- 100V-240V (50 - 60 Hz) external power supply.
- 12V, 3A power consumption.
- Aluminium enclosure.
- Size 140 x 204.5 x 62 (W x D x H, mm).
- 1.12 kg weight.

Supported Transducers

- MCV9-5N10-A3, 128 element micro convex.
- C6-1H50-A5, 192 element convex.
- C5-2H60-A5, 192 element convex.
- L12-5N40-A4, 128 element linear.
- L15-7H40-A5, 192 element linear.
- L18-7H30-A5, 192 element linear.
- LF9-5N60-A3, 128-element linear.
- LF11-5H60-A3, 182-element linear.
- P5-1S15-A6, 64-element phased array.
- Custom transducer with up to 192 elements. (contact us)

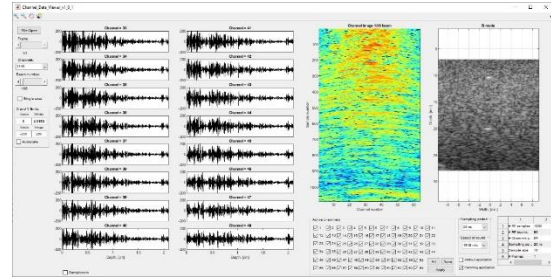
Supporting Software

ArtUs RF Data Control II C++ sample program and source codes. The sample allows programming channel data acquisition parameters and recording channel and beamformed data to files for further processing offline. By using the sample, you can embed your own algorithms for channel data processing (i.e. beamforming, apodization) and program custom scanning parameters (i.e. plane waves)



Channel Data Viewer MATLAB sample program allows users to import recorded channel RF data files into research convenient MATLAB environment. The sample illustrates simple delay-and-sum beamforming and allows to evaluate how the image quality is affected by

parameters such as a number of active channels, speed of sound, and data sampling. The sample can serve as an initial point for custom algorithm development and as a tool to familiarize with data.



TELEMED C++ SDK opens new possibilities to create your software by using a channel RF data-equipped beamformer. Users can program the majority of ultrasound scanning parameters such as imaging depth, scanning frequency, transmit focal depth, and channel data acquisition-related parameters such as transmit delays, arbitrary apertures, analog front-end parameters, and pulser parameters.

ArtUs USS-2H package contents

- ArtUs USS-2H research ultrasound beamformer.
- USB 3.0 cable, power supply, USB memory with manuals/software.
- [Transducer](#), optional, client's choice.

Recommended Computer

- Windows 8/10/11 64-bit operating system.
- 32 GB or more RAM.
- USB 3.0 port.
- MATLAB installed and configured.

Contact Us

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