## Import RF data to MATLAB (`import_RFdata2MATLAB.m`)

Function allows to import acquired RF data and main acquisition parameters needed for imaging into MATLAB.

**Inputs of the function:**

*DIR* – directory of the file,
*filename* – name of the file with RF data, *.bin binary file recorded using ArtUS device and artus_rf_test sample.

**Outputs of the function:**

*RF_DATA* – RF data in cell format: 1 × K – number of RF frames, where cells contain *N* (number of RF samples) × *M* (number of scanning lines) × PacketSize (number of repetitions of beam in the same direction).
*RF_DATA_Q* – *RF data* Q component obtained after Hilbert transform in cell format: 1 × K – number of RF frames, where cells contain *N* (number of RF samples) × *M* (number of scanning lines) × PacketSize (number of repetitions of beam in the same direction). Actual for Hilbert transform output.

*HEADER* – RF data acquisition parameters:
- *HEADER{1,K}.number_of_frames* – number of RF frames in a file (!Note: if the file will be recorded using Start/Stop option the field will be 0),
- *HEADER{1,K}.header_size* – header size in bytes,
- *HEADER{1,K}.frame_size* – RF frame size in bytes,
- *HEADER{1,K}.mode – RF scanning mode: 0 – BRF, 1 – CDRF, 2 - PWRF*
- *HEADER{1,K}.source ID* – RF data source ID,
- *HEADER{1,K}.tx_frequency* – ultrasonic wave (transmission) frequency,
- *HEADER{1,K}.Length_of_RF_row* – number of samples in each row of RF window,
- *HEADER{1,K}.Number_of_RF_rows* – number of RF scanning lines in a window,
- *HEADER{1,K}.Sampling_period_ns* – sampling period in ns (25 ns for TELEMED systems),
- *HEADER{1,K}.sample_size* – number of data bits,
- *HEADER{1,K}.DopplerPacketSize* – number of repetitions of beam in the same direction
- *HEADER{1,K}.beam_x* – start point coordinates of each ultrasound beam in cm (sector width direction),
- *HEADER{1,K}.beam_y* – start point coordinates of each ultrasound beam in cm (scanning depth direction),
- *HEADER{1,K}.angle* – angle in radians (the angle is given relative to the perpendicular to the center of the probe's surface).
- *HEADER{1,1}.time_stamps* – time stamps for each ultrasound scanning line

*transducer_code* – type (L – linear, C – convex, P – phased array probe), bandwidth limits (HF…LF), width of probe in *mm*, code of manufacturer,
*flag* – returns 1 if file was successfully imported (otherwise – 0, i.e. empty file).

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**Ultrasound Medical Systems**

Internet page: https://www.pcultrasound.com/
Information E-mail: info@pcultrasound.com
Support E-mail: support@pcultrasound.com