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Instructions for Dual Transducer Scanning

SUNY Stony Brook Specific

07.03.2017

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HELPFUL HINTS

- CTRL-H pulls up a “context menu” which gives hints and information about most of the objects/buttons/switches/fields as your mouse hovers over them
- When in doubt, restart LabVIEW and/or the system
- There are two errors that the system generates that can be ignored. They issue in a system dialogue box and only have “OKAY” buttons
    - Modal Error Message: Limit switch active in the direction of travel
    - Return Data Buffer not Cleared

LIST OF KEYBOARD SHORT CUTS

Case Insensitive

MOTION SYSTEM	
UP	INC +Y
DOWN	INC – Y
SHIFT + (Above)	INC * 0.1 + (Above)
DATA VIEWING	
Return	Start Scan, or Save Data
Up/Down	Move through Scan Planes
Left/Right	Move through Scan Sets
P	Open Picture App
Space Bar	Take Picture
S	Save Data
1-5	Level of Suspicion (1-5)
DURING SCANNING	
Return	Mark Edge of Node
Space Bar	Return to Center of Node
Left/Right	Move through Scan Sets
G/(Shift)+G	Increase/Decrease Gain
V/(Shift)+V	Increase/Decrease Voltage

Table 1: Keyboard Short Cuts

STARTING THE SYSTEM

1. Turn on system (Refer to Figure 1A)
    a. Computer first
    b. Then pulser and motion box
    c. Ensure that the USB-controlled RF switch is powered and connected
2. Select the SUNY profile

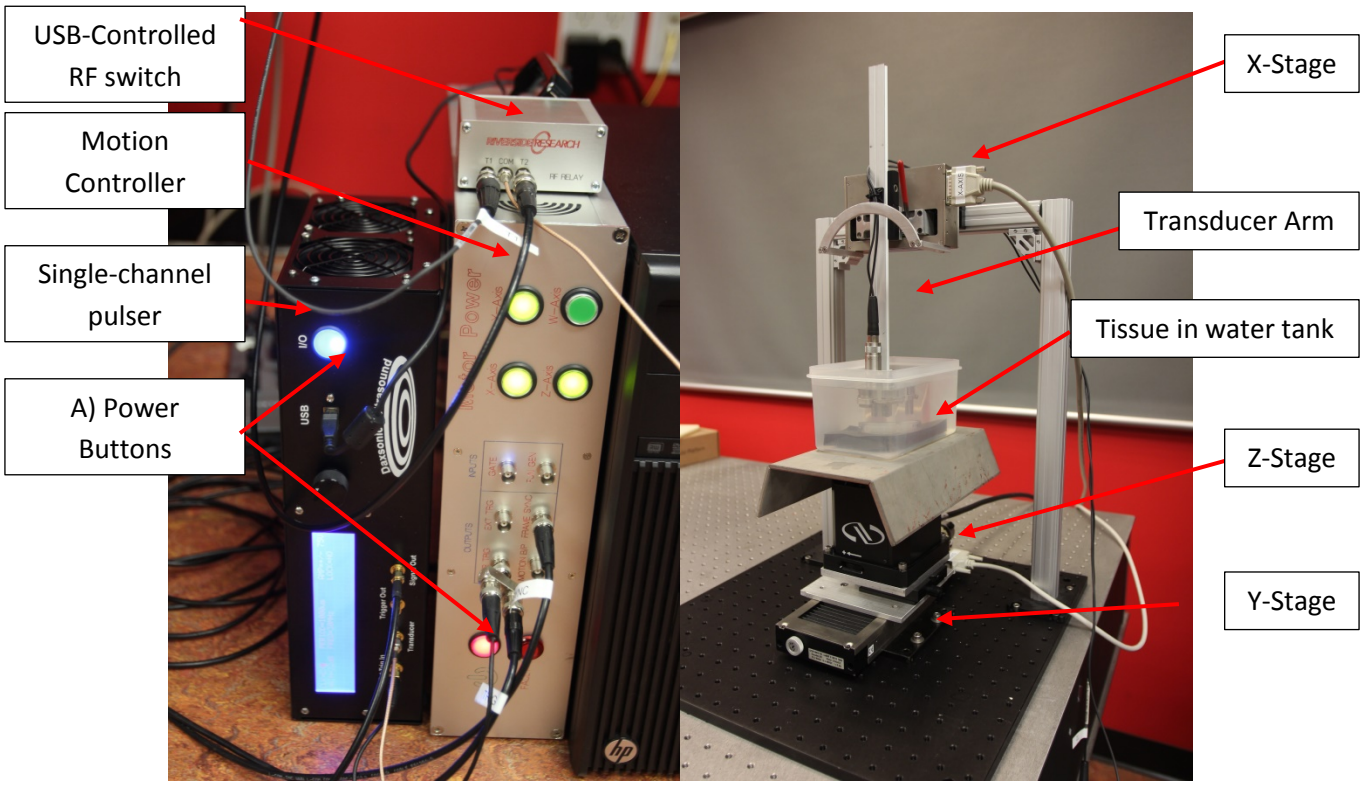


Figure 1: The System Components

LOADING THE SOFTWARE

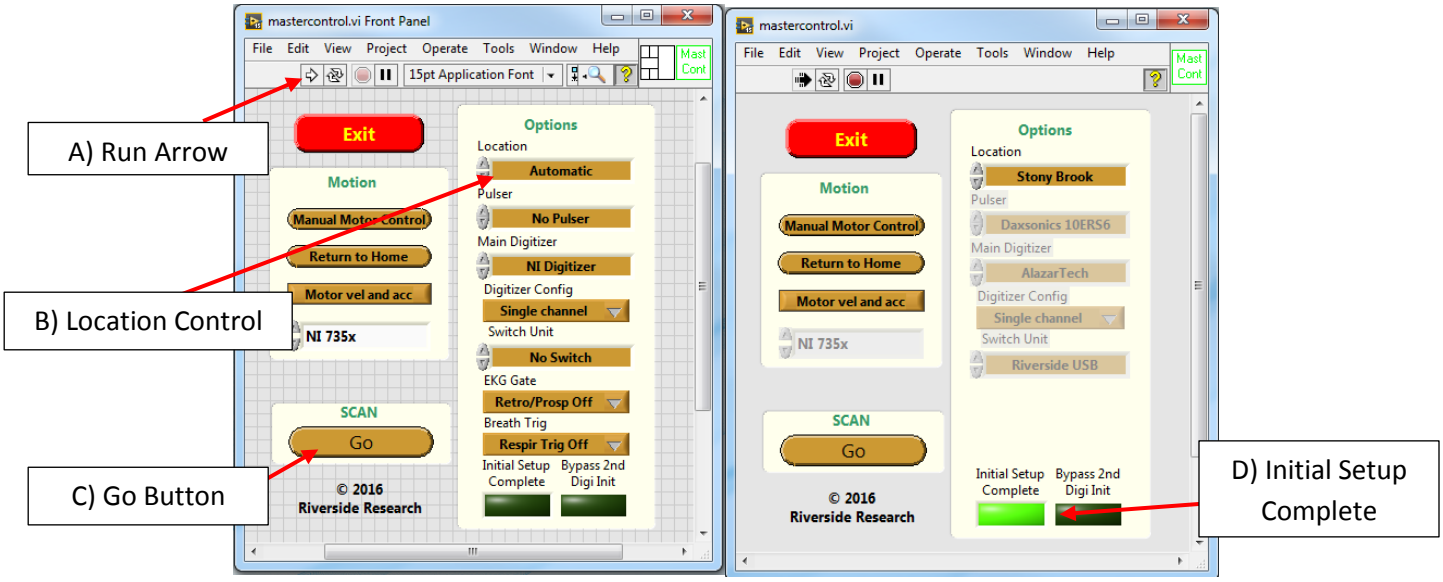
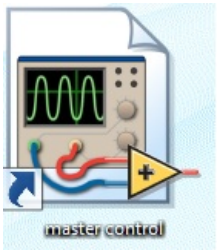


Figure 2: MasterControl.vi Front Panel before and immediately after starting the program

1. Open Master Control from the desktop



2. Insure the Location is: Automatic or Stony Brook (Figure 2B)
3. Click the run arrow (Figure 2A)
    a. Defaults will populate, and the motors will align themselves, and the Initial Setup Complete indicator will light up (Figure 2D)
4. Place the water tank on the platform with the manually raised transducers
5. Lower transducer arm into tank, all the way to the Transducer Arm Stop (Figure 4B), and tighten in place with arm clamp (Figure 4C)
6. Inspect the transducer faces for air bubbles, if present, remove with the provided syringe
7. Before entering the acquisition setup, manually center the tissue below the REAR transducer
8. Click the GO button (Figure 2C)
9. RealTimeSingle will open and begin real-time scanning with image feedback.

FILE NAMING CONVENTION

1. The file name uses the format LL-TT-TL-YYPPPPP-S-NN-NT, where:

LL: Location (SB, HI, RR)
TT: Lymph Node (LN)
TL: Tissue Location (Br - Breast, Ga - Gastric, Co - Colon, Re – Rectal, HN – Head and Neck, OTHER)
YY: Year
PPPPP: Patient Number
S: Node Set (A-Z)
NN: Node Number (01)
NT: Node Type (OA – Whole Node, SA – Sentinel A, SB – Sentinel B, SC – Sentinel C)
Example: SB-LN-Br-1725000-A-02-OA
Meaning of Example:
Stony Brook/Lymph Node/Breast/2017/Patient 25000/Lymph Node 02/Whole Lymph Node

2. The File Name should auto-generate, but it cannot always predict what the experimental conditions are; if it is incorrect, click the Generate New File Name button and correct the fields (Figure 5E)

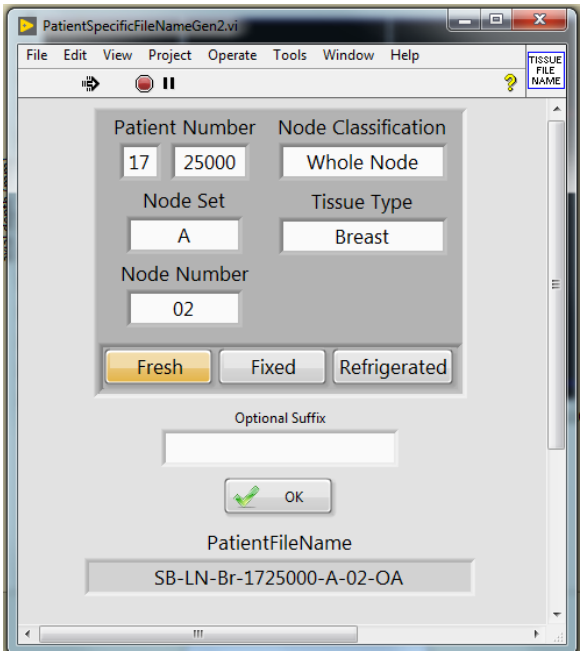


Figure 3: File Name Generation Program

3. There is also the option to re-scan nodes once they have been fixed or refrigerated. Simply click the corresponding button. You can also add to the file name in the “Optional Suffix” window

SETTING UP THE ACQUISITION WINDOW

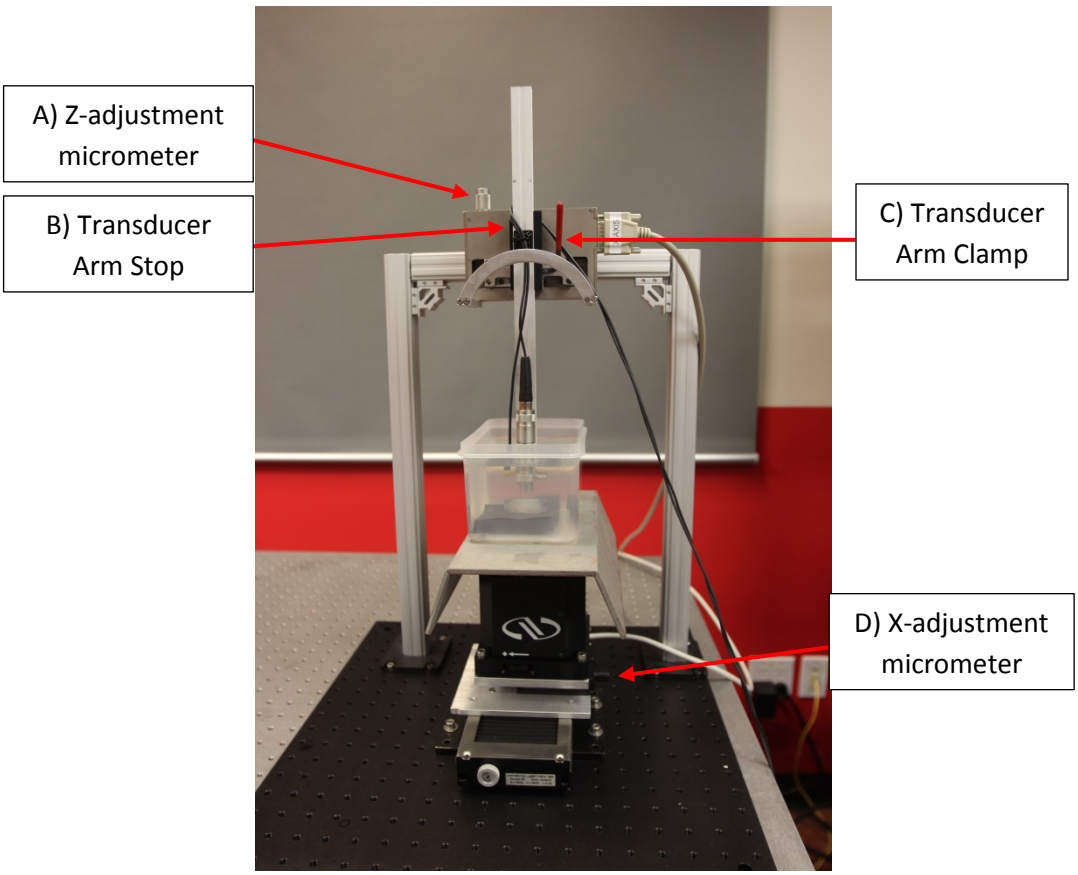


Figure 4: Scanning system hardware

1. Once the real-time feedback has started, use the Z-positioning micrometer (Figure 4A) to place the surface of the lymph node just below the top blue on the acquisition window
2. If the sample is off-center in the image, use the X-adjustment micrometer (Figure 4D) below the platform to adjust

REAL TIME WINDOW: AN OVERVIEW

3. Use the UP arrow key of the keyboard to move the Y-axis until the lymph node is no longer visible on the screen
4. Click End Point Marker or press Enter (Figure 5A)
5. Using the DOWN arrow key, repeat steps 3 and 4 for the other end of the sample
6. Click Center or press Space Bar (Figure 5B)
7. Use the mouse to drag the Blue (Figure 5C) and White (Figure 5D) cursors to just outside of the sample.

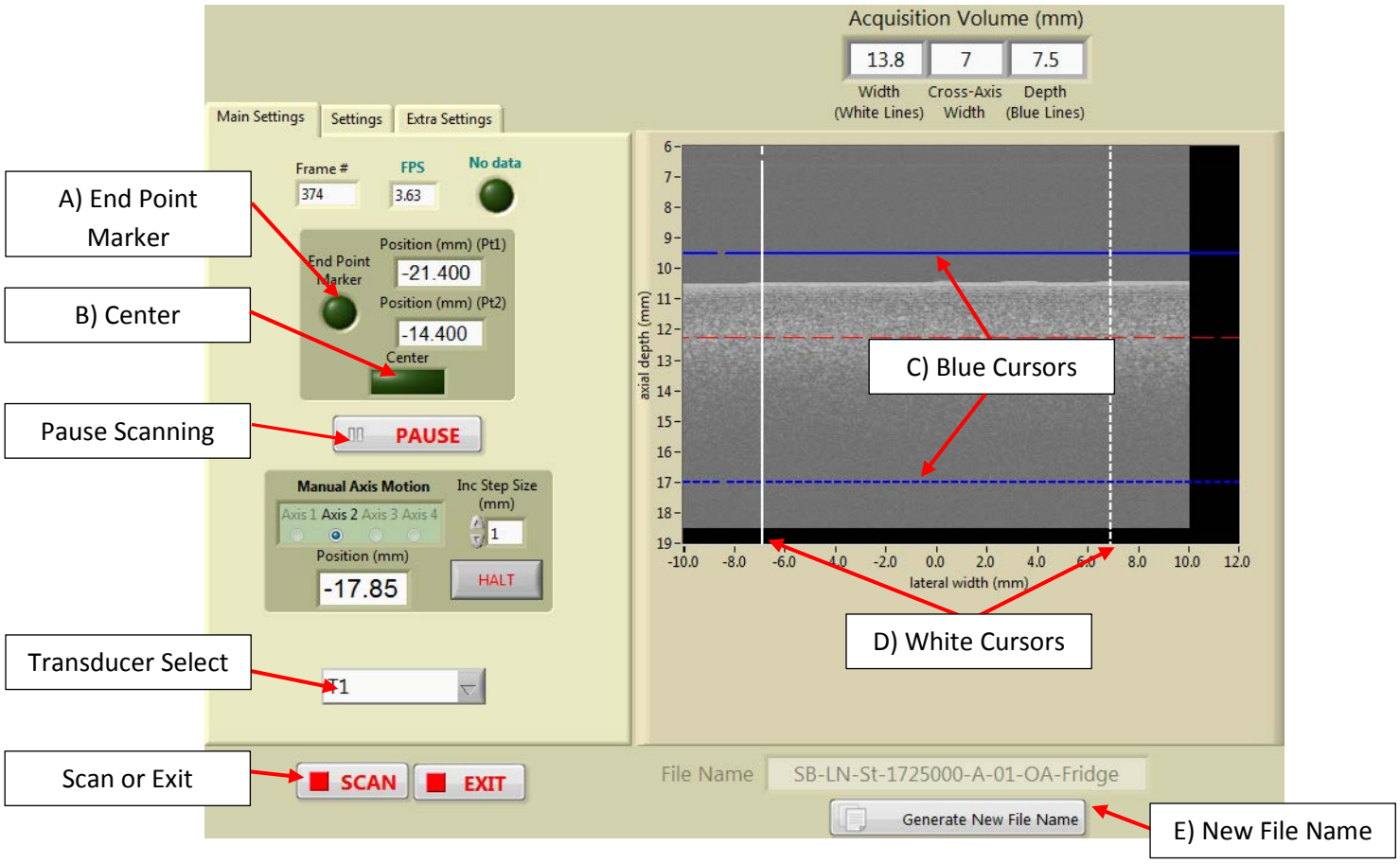


Figure 5: The real-time scan window

FINE TUNING THE ACQUISITION WINDOW

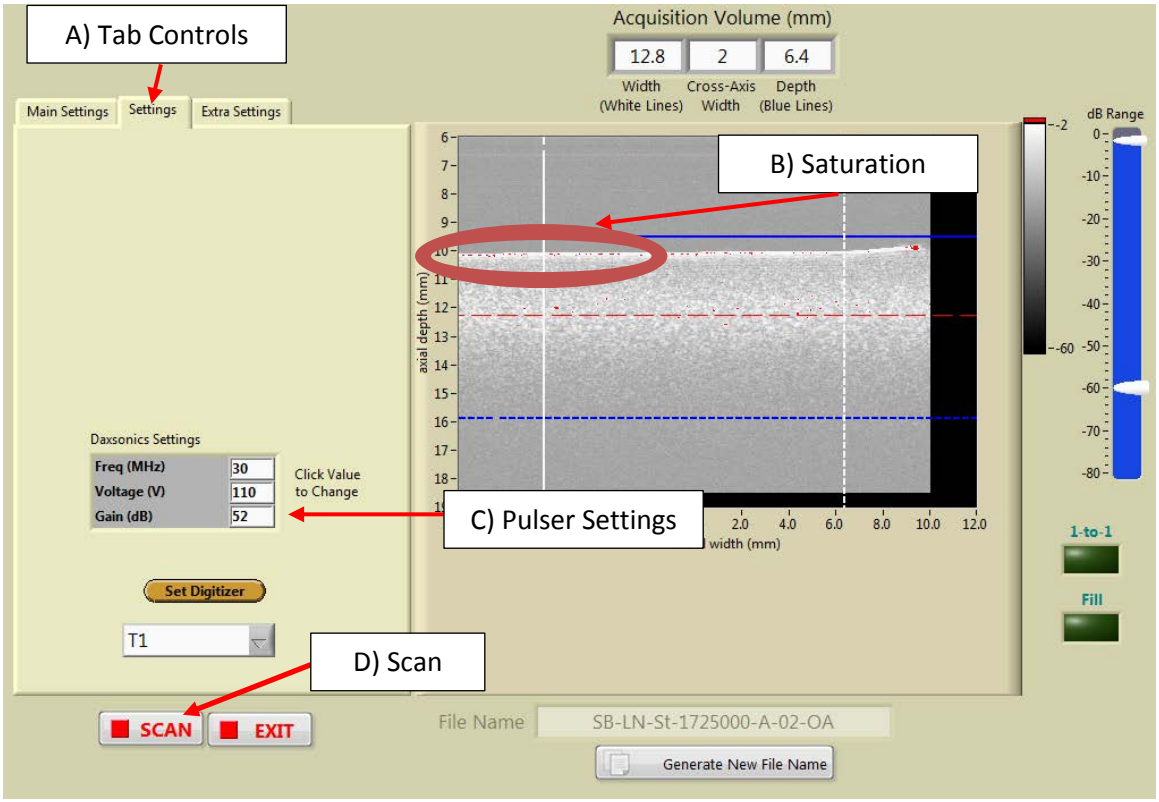


Figure 6: Adjusting the Pulser

1. **Pulser settings must be checked for both transducers independently**
2. Click the Settings Tab (Figure 5A)
3. Saturation is displayed as red points overlaying the Raw Data image (Figure 6B)
4. If saturation is present decrease the amplifier gain (dB gain) until there is no saturation (Figure 6C)
    a. Lowering the gain decreases the signal, reducing the saturation
    b. Raising the gain increases the signal
5. Helpful Hints
    a. Saturation is permissible in the fat or capsule
    b. If you find that you are consistently changing the settings to the same value, you can store the new settings as default by clicking Save Dual Transducer Settings in the Extra Settings Tab
    c. Additionally, you can save the current settings to default or reload previous default settings by clicking Save or Load Defaults under the Extra Settings Tab.

ACQUIRING DATA

1. Clicking the SCAN (Figure 6D) button starts the Dual Transducer Scanning
2. The transducer and sample will move to the starting position and commence scanning
3. Scanning can be stopped at any time by clicking the STOP SCAN button (Figure 7A).

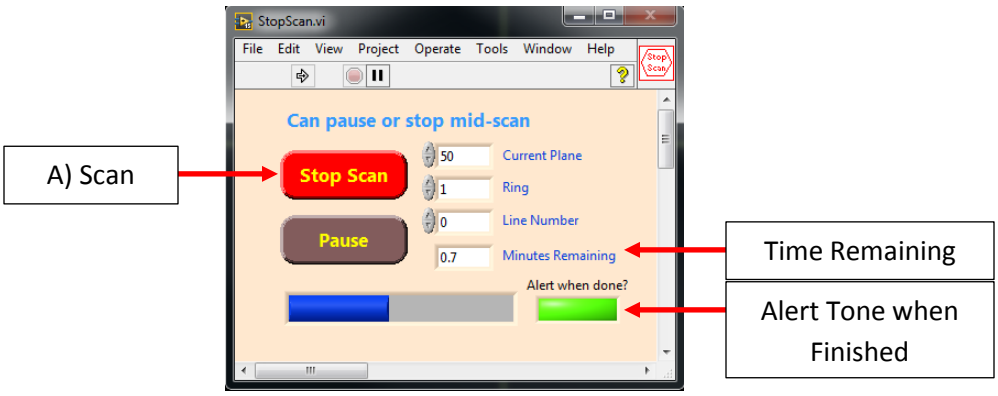


Figure 7: Scan Progress Window

4. The Last Completed Scan Plane will be displayed on the screen (Figure 8)

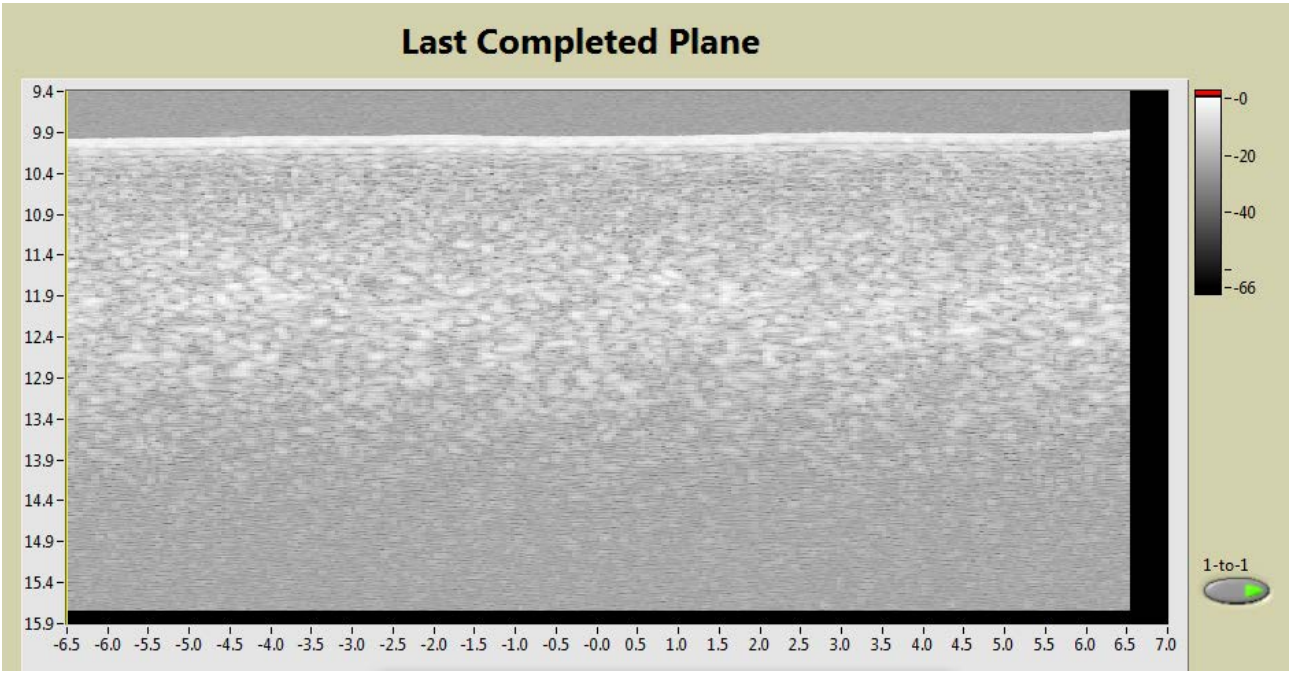


Figure 8: The Last Completed Plane Window

REVIEWING AND SAVING THE DATA

1. The data will be displayed on the screen, possibly with incorrect scaling
2. Click the X or Y buttons, or use the X or Y keyboard keys, to rescale the image in X or Y (Figure 9E)
3. Click the Case to View pull-down menu, or the LEFT and RIGHT keys, to select amongst the scan sets that have not yet been saved (Figure 9B)
4. Increment or type in a value in Scan to View, or use the UP or DOWN keys, to view amongst the scans in Case to View (Figure 9C)

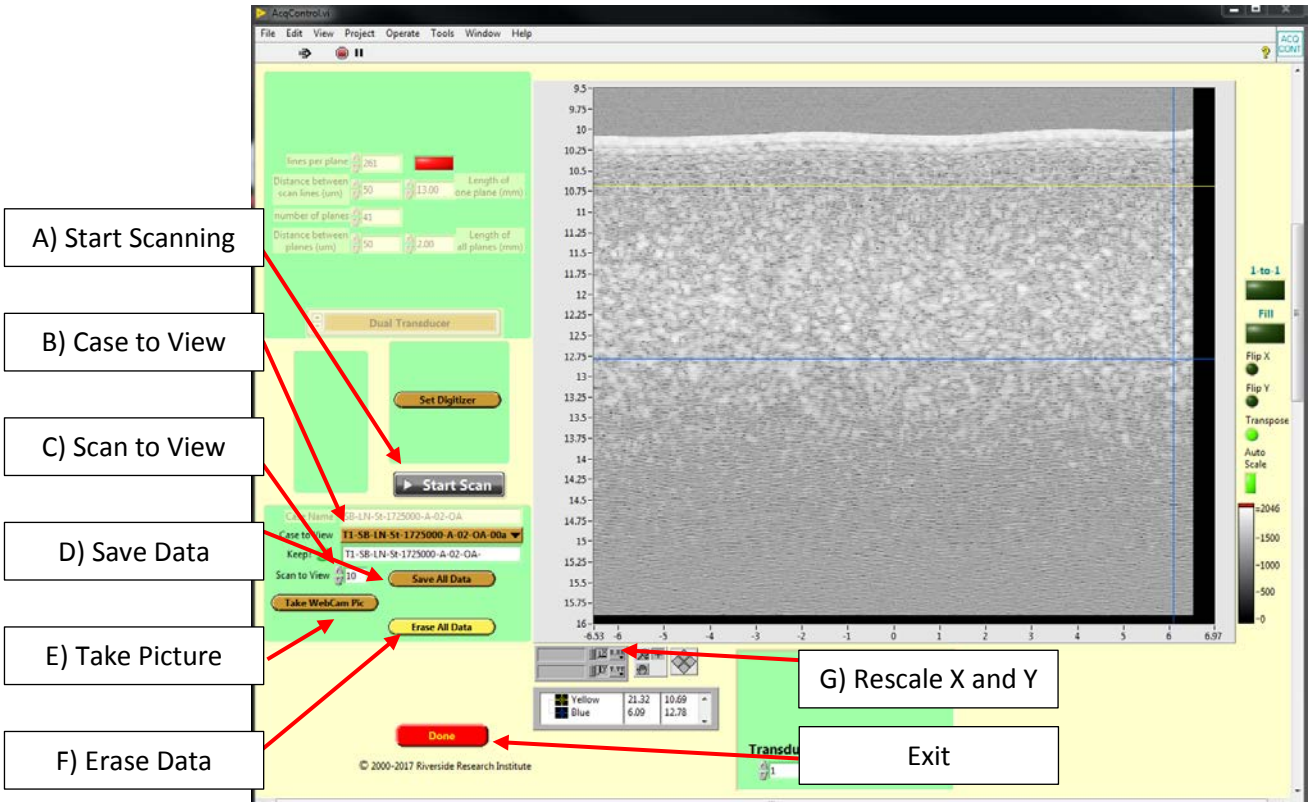


Figure 9: Scan Complete Window

5. Multiple scans can be performed before saving data, but it is better to save as you go to prevent data loss
6. If the data is bad (saturation present or did not collect the correct physical range), click Erase All Data (Figure 9F) and Start Scan (Figure 9A) to begin again
7. When you determine that the data is good, remove the node from the tank and place on picture target. Click "Take Picture" (Figure 9E) and snap a simple picture of the lymph node for scaling purposes
8. Clicking Save All Data (Figure 9D) brings up an interface that allows you to change the save path and/or add comments in the header of the saved files (Figure 10)

9. Ensure that the save path is correct (Figure 10A)
10. Mark the Level of Suspicion of Cancer (Figure 10B)
    a. A scale of 1-5 with 1 being certain that the node is begin and 5 being certain that the node is cancerous
11. Push to save (Figure 10C)
12. Once data is saved, the image screen will turn black until another scan is taken.
13. Helpful Hint: from here you will return to tissue placement with a new sample, or proceeded to data transfer and cleanup.

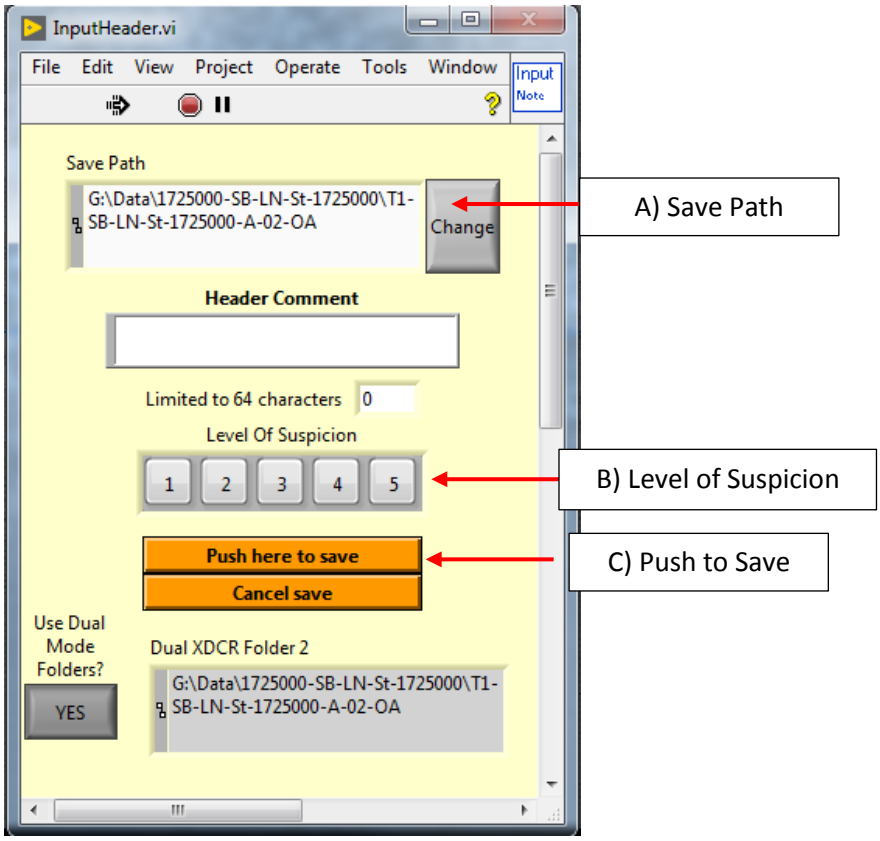
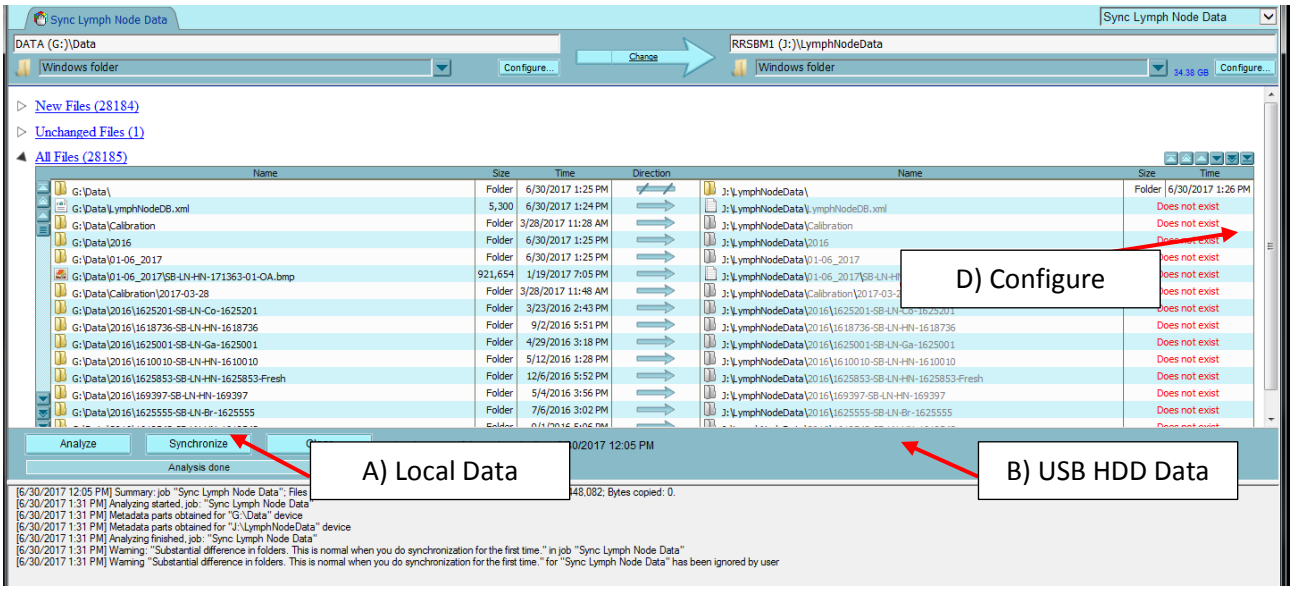


Figure 10: Save Dialogue

TRANSFERRING DATA TO RIVERSIDE RESEARCH

1. Saved data is stored on G: (Data), under date and patient-specific folders
2. The data should be transferred to the provided, encrypted USB Hard Drives after a couple patients or a couple weeks, whichever comes first.
    a. USB HDD encryption password: **biolab2!**



11: File Transfer Program

3. The left-hand window is the local data folder (Figure 11A); the right-hand window is USB HDD (Figure 11B)
4. Click Synchronize (Figure 11C) to synchronize the data
    a. This will happen automatically when you FIRST plug in the HDD
    b. If the HDD is already connected, you must click this button
5. It's possible that you may need to point Allway Sync at the correct drive.
    a. Click "Configure" (Figure 11D)
    b. Change the drive letter to indicate the USB HHD (usually I,J, or K)
6. When the data transfer is complete, simply remove the HDD and place it in the provided pre-paid mailer and drop it in the mail.

SHUTTING DOWN

1. Power off the pulser and motion controller
2. If the file transfer is complete, close all programs and shut down the computer via the windows key
3. Please rinse the transducers with ethanol or water

UPDATING THE SOFTWARE

1. Open a Windows Explorer window
2. Single-Left-click on LabVIEW 2017 Suite in the favorites menu on the left
3. Right click on the now selected folder
4. Select SVN Update from the drop-down menu
5. Click okay when finished

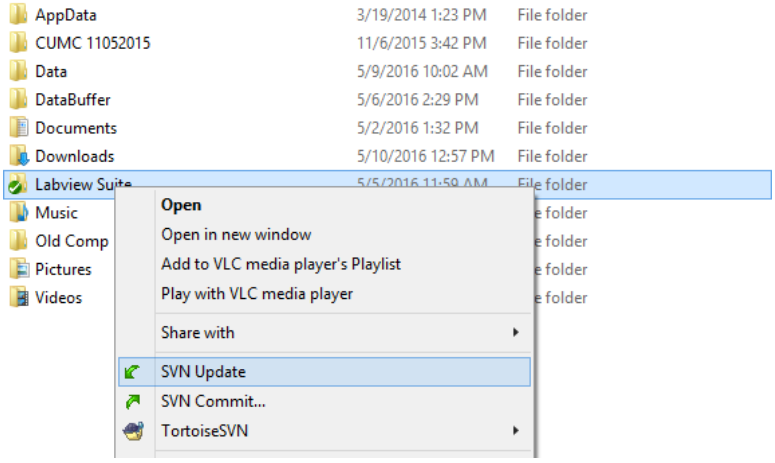


Figure 12 SVN Update Menu