**High-resolution ultrasound**  
**VisualSonics Vevo 770**  
Location: C1 011 TMCF

**NEW USER GUIDE**

The VisualSonics Vevo 770 is a high frequency scanner designed to scan small animals. This state-of-the-art scanner provides exquisite high resolution images at ultrasound frequencies of 30-50 MHz. The scanner enables in vivo assessment of anatomical structures and hemodynamic functions in longitudinal studies. It has pulsed-wave Doppler for quantitative blood flow velocity and waveform measurements. The ECG of the animal can be monitored on screen. The M-mode of the scanner monitors tissue motion, which is useful for characterizing blood vessels, heart dynamics and wall thickening. The scanner is equipped with 3D and power Doppler imaging for visualizing blood vessel branching and blood flow patterns spatially and temporally. The scanner’s Mouse Handling Platform maintains animal core temperature, and monitors the ECG and other physiological measurements.

**Imaging Modes:**
- **B-Mode:** real-time imaging
- **M-Mode:** heart dynamics and wall thickening
- Pulsed Wave Doppler: blood flow velocities
- Power Doppler: vasculature around tumors
- Tissue Doppler: myocardial strain

**I. RMV scanhead preparation**

**A. Filling the Nosepiece**

1. Ensure that the acoustic window is securely attached and that the fill port screw is removed (with a ¼” slot screwdriver).
2. Position the RMV scanhead (use the RMV 704 or 706) with the fill port pointing upward.
3. Fill the nosepiece with de-ionized water using the supplied water bottle/syringe until the nosepiece is almost full.
4. Using the thumb, cover the fill port and tap the scanhead several times to dislodge any air bubbles in the nosepiece. Check to ensure that the face of the transducer does not contain bubbles. If bubbles appear, tilt the RMV scanhead to dislodge them. Orient the nosepiece so that the remaining air bubbles are placed under the fill port, and finish filling the nosepiece with the syringe.
5. After removing all the air from the nosepiece, insert and tighten the fill port screw. Be careful to align the fill port screw properly with the threaded hole in the nosepiece. Failure to do so may damage the nosepiece. Do not over-tighten the fill port screw.
B. Connecting the RMV Scanhead

1. Connect the RMV scanhead to the Vevo 770 cart by lining up the two red dots on the cable cuff and RMV scanhead connector. Push the cable cuff into the RMV scanhead connector until it clicks. If required, attach a second RMV scanhead.

C. Securing the RMV Scanhead on the integrated rail system

1. Lift the latch to open the moving arm of the clamp.
2. Align the registration ridge of the RMV scanhead with either the hinge groove or the side groove.
3. Close the moving arm of the clamp while holding up the latch.
4. While holding the arm of the RMV clamp against the RMV scanhead, push the latch down until it locks into place.

II. Start Vevo software

1. In the Scanhead Selection dialog:
   a. In the Measurement Definition list, select the appropriate package, based on the package of measurement protocols you intend to use for the session. For this demo, use VisualSonics Standard Measurements.
   b. In the scanhead selection list, select the appropriate RMV scanhead. To view the properties of the selected RMV scanhead, click View Properties.
   c. Click Initialize. To exit the software start-up process, click Cancel or press <Esc>.

2. The Study Browser is displayed for selecting a study for analysis or for opening a new study for data acquisition. Create a New Operator (for subsequent studies, select an operator from the drop-down list). Select the study type from the Study Browser: Click New to create a new study. Enter the study information in the New Study dialog.

III. Prepare mouse for imaging

1. Anesthetize mouse. (Set 1 L/min flow through induction box with 3.5% isoflurane.) Wait a few minutes until breathing slows down.
2. Transfer flow to stage nose cone and reduce isoflurane to 1.5%.
3. Insert snout into stage nose cone and tape down paws with electrode crème to ensure good conductivity.
4. Turn on both stage monitoring switches.
5. Set temperature using pad or body regulation. (If body, insert rectal probe.)
6. Fine tune anesthesia to maintain a heart rate of >400 BPM. (Heart rate: Adult: 632 +/- 51.3 beats per minute; Newborn: 286 +/- 56.8 beats per minute)
7. Remove hair. (Shave or apply Nair, wait for a few minutes, then wipe off with water and then with ethanol.)
8. Apply ultrasound gel and begin scanning either freehand or with the probe stand.
IV. Imaging

1. Start imaging and acquiring data in the desired mode. Standard default imaging will be B-mode or brightness mode. This instrument is very robust. Feel free to adjust software and rocker switches to better understand the controls. If you get stuck somewhere, just hit the B-mode switch to reset.
2. Capture images and annotate if desired. Save images by pressing *Frame Store* button on keypad.

   • *To store a cine loop, select Study > Cine Store or press <Cine Store>.*
   • *To store a frame, select Study > Frame Store or press <Frame Store>.*
   • *To store a 3D image, select Study > Image Store or press <Frame Store>.*

V. Post-imaging Procedure

1. To close the study, select Study > Close Study, press <Close> or click Close Study from the Data Browser, and click “Commit Session Data”.
2. To copy the study to storage location, from the study browser click Copy To and select a target drive or storage device.
3. Click Exit to close the application.
4. Clean the RMV scanhead with water. Be careful not to scratch membrane.
5. Clean off mouse and return to its cage. Monitor it until it regains consciousness.
6. Log off computer
7. Clean imaging area: wipe contacted surfaces with disinfecting wipes followed by ethanol. Clean stage with water only.

*RMV Specification Overview and Selector Chart*

<table>
<thead>
<tr>
<th>Model</th>
<th>Application</th>
<th>Broadband Freq (MHz)</th>
<th>Center Freq (MHz)</th>
<th>Axial Resolution (um)</th>
<th>Lateral Resolution (um)</th>
<th>Focal Length (mm)</th>
<th>Depth of Field (mm)</th>
<th>Max FOV (mm)</th>
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<tbody>
<tr>
<td>RMV704</td>
<td>Mouse vascular imaging, small mouse cardiac, mouse superficial embryonic, mouse abdominal</td>
<td>Up to 60</td>
<td>40</td>
<td>40</td>
<td>80</td>
<td>6</td>
<td>1.5</td>
<td>14.5</td>
</tr>
<tr>
<td>RMV706</td>
<td>Mouse abdominal, small mouse cardiac, mouse superficial embryonic</td>
<td>Up to 60</td>
<td>40</td>
<td>40</td>
<td>100</td>
<td>6</td>
<td>2.2</td>
<td>14.6</td>
</tr>
<tr>
<td>RMV707B</td>
<td>High frame rate, mouse cardiac, mouse EKV</td>
<td>Up to 45</td>
<td>30</td>
<td>55</td>
<td>115</td>
<td>12.7</td>
<td>2.2</td>
<td>16.5</td>
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