

ACQUIDATA FAMILY CALIBRATION PROCEDURE

The calibration procedure for the Acquidata product family is very simple. No special calibration screen or recording phase needs to be selected. Simply open a new recording using the settings file as if recording a urodynamics study. Select the settings with which you wish to check and calibrate the transducers.

CALIBRATION CHECKING

Preparing Transducers

Connect and prepare the transducers you intend calibrating file as follows:

A) External Pressure Transducers:

Check that the electrical transducer cables are connected to the AcquiAmplifier. Connect a vesical pressure catheter to the male port and connect a stopcock to the female port of the external pressure transducer. Connect a 10ml syringe of water to the stopcock, turn the stopcock so as to allow flushing of the pressure transducer and flush out all air bubbles. Close the stopcock to the transducer arm and hold the fluid filled catheters distal end (which is open to ambient pressure) at the same height as the centre of the transducer sensing area.

B) MTC device pressure transducer catheters:

Check that the electrical transducer cables are correctly connected to the AcquiAmplifier. Ready a water filled burette (tube) to a depth of 50 to 80cm. After about five minutes (to allow warm up) immerse the catheter sensing end into the water (to allow wetting) and remove from the water immediately prior to starting the calibration procedure.

C) Fill volume transducer:

Check that the electrical transducer cables are correctly connected to the AcquiAmplifier. Ready the transducer on the pole and hang a validated (accurate) 500g or 1000g weight on the transducer hook.

D) Void Flow:

This is calculated by running the contents of an IV bag of saline from the bag when on the calibrated Fill volume transducer, directly into the primed and zero balanced flow receiving chambers funnel.

Calibration Checking

Start the data scrolling with the start button or by using the key F11. Zero/Balance the channels by using the controls appropriate for either the Minim or Petite/Median/Major models. Note - the Minim has only an 'All Zero' mode. The other models allow global (all) or individual channel (via screen menu) mode.

Ensure that there is enough baseline available (5 to 10mm) to later use before applying the calibrating (flow, pressure or volume) source.

As the re-calibration process is common to all channels only one channel example will be explained below. In that example the channel is urethral pressure which is an A) External Pressure transducer.

- Lift the distal end of the fluid filled catheter from the datum point (where the zero balance was done) to a known height of approximately 70 to 100cm.
- Hold the catheter steady at this known cmH₂O height and allow 10mm duration of the trace at this level.
- Check whether the displayed pressure on the screen is accurate to within +/- 3% of the full scale range.
- Stop the chart scrolling. If the pressure value was within the accuracy desired, then there is no need to move from this calibration check to a calibration correction.

Note: for the other parameters the known calibration source is checked by;

- * B) lower the catheter into the water and measure the depth of the centre of the sensing area(s) below the waters surface meniscus.
- * C) Remove the calibrated weight from the hook
- * D) open the IV bag giving set valve to a maximum and run the giving set directly into the voiding transducers funnel (remember to prime the receiving chamber first).

RECALIBRATION

Select the area of the waveform encompassing the zero baseline and the known pressure application. As in the following Figure 1.

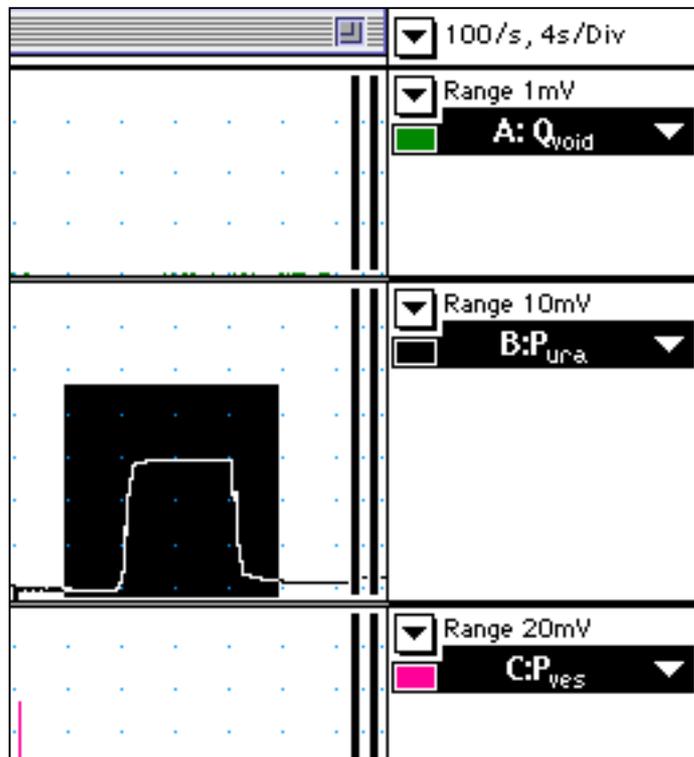


Figure 1

Now open the Units Conversion window for the channel where this data has been selected. This is accessible from the right hand (white) inverted arrowhead in the channel control block (to the right of the end of the waveform). See figure 2

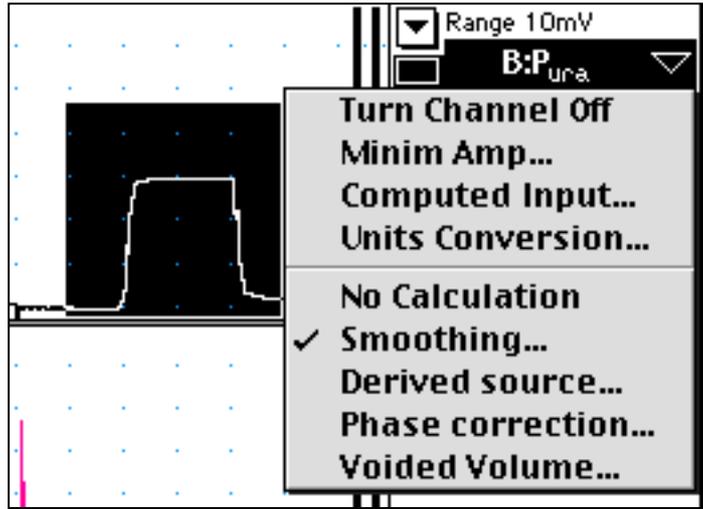


Figure 2

The following Units conversion window will then open – see Figure 3

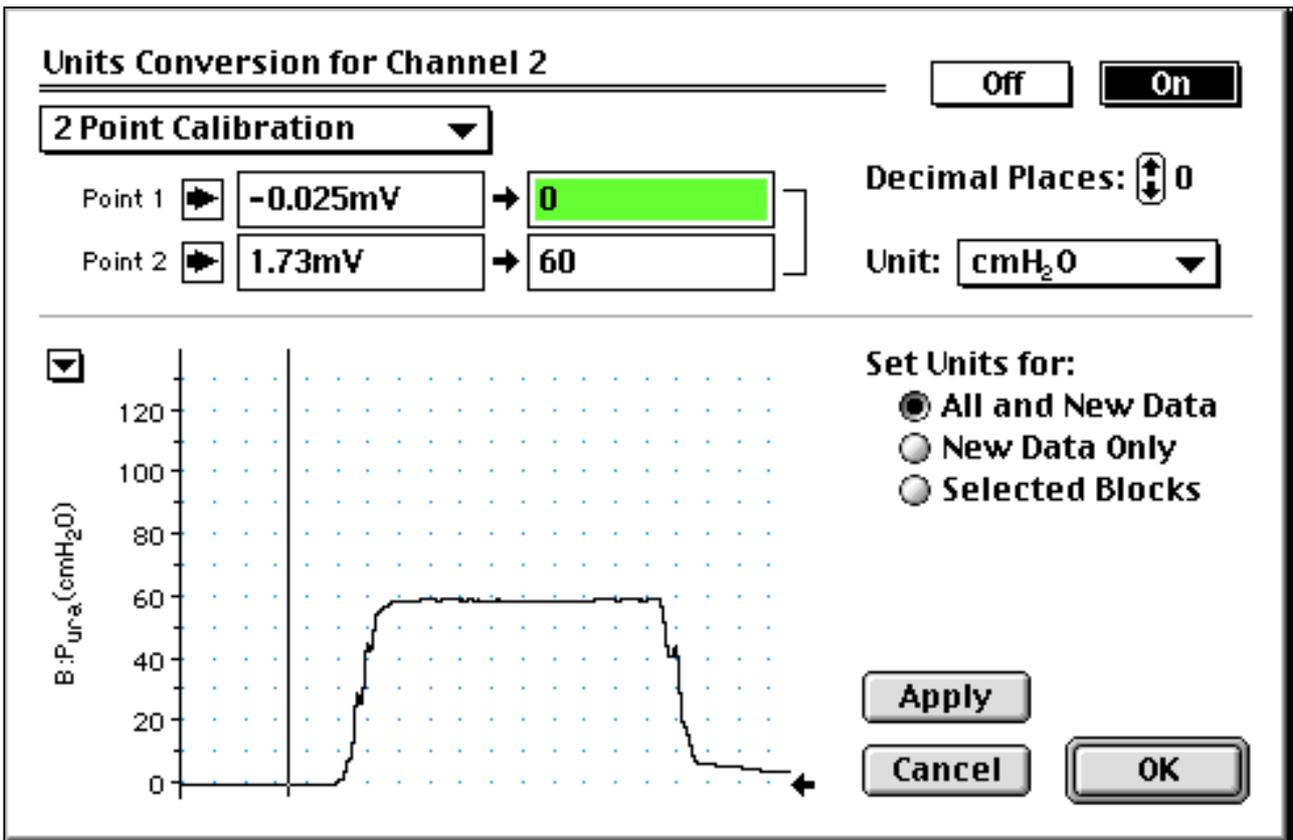


Figure 3

The units conversion window displays the selected part of the waveform. The first step of the calibration process has been carried out in Figure 3. The mouse/cursor is used to 'click place' a vertical cursor on the waveform section representing the zero baseline. Once this is confirmed as the desired location the solid Right Pointing arrow for Point 1 is clicked to transfer the offset voltage which may be present and forces it to display as zero. In this process the right box for Point 1 will highlight.

The second step is to do the same for Point 2 which is the part of the waveform displaying the calibration source. See Figure 4.

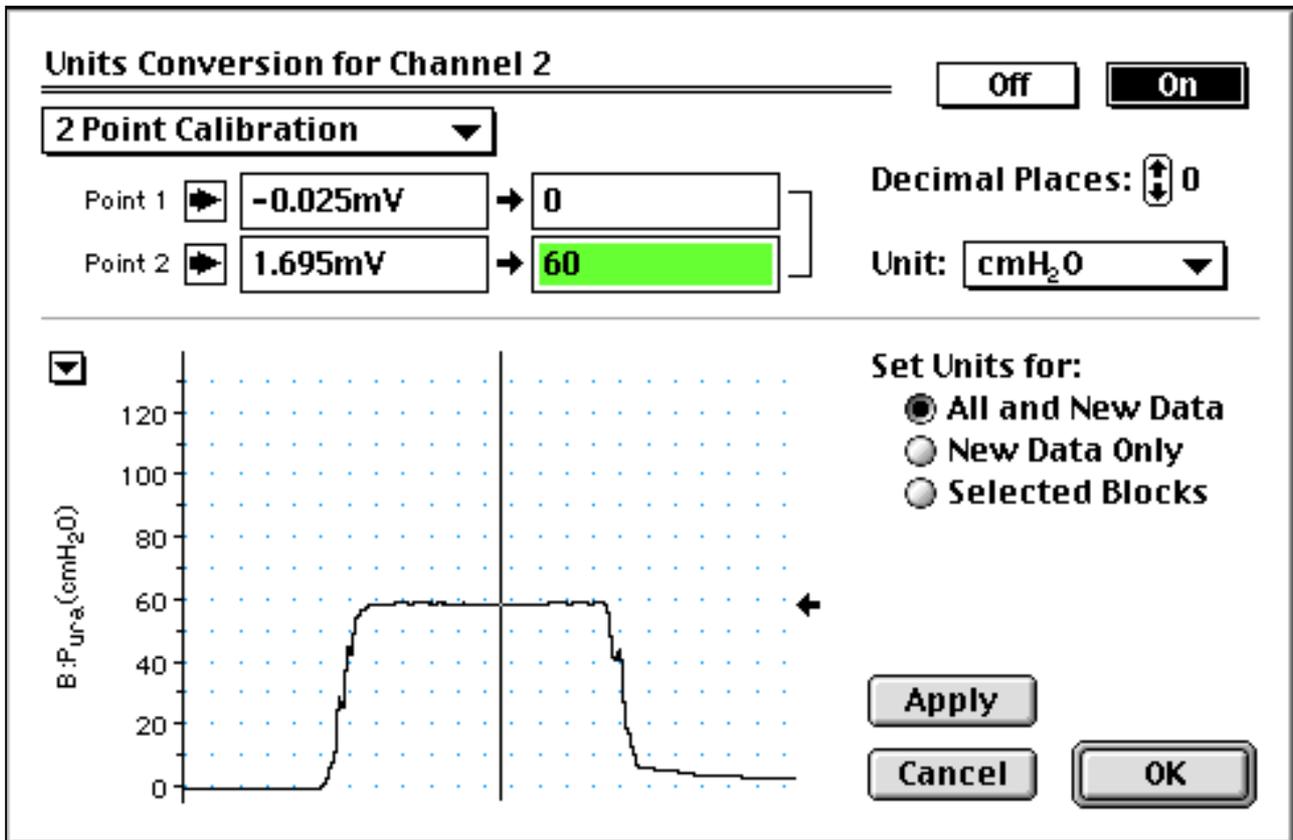


Figure 4

This is done by 'click placing' the cursor on the 'calibration applied' part of the waveform and after confirming this is correct, click the solid Right Pointing arrow for Point 2 to transfer the voltage resulting from the calibration source. In this process the right box for Point 2 will highlight. Type directly into the right box the value of known calibration source (in this case 60cm H₂O).

- The calibration process for that channel is now complete.

FLOW CALIBRATION

The only channel which is more involved to calibrate is the Qvoid (urine flow rate channel). To calibrate this start with the known calibrated Vfill transducer and hang a refillable enteral feeding bag and large bore delivery tube, filled to about 800 ml on the Vfill transducer hook. Place the delivery end of the tube into the flow receiving chamber funnel. Ensure that the receiving chamber is primed as usual (about 200ml of water) and then start the chart scrolling. Zero/balance the system as usual.

Open the feeding bag valve and let the water run into the flow receiving chamber. When finished stop the chart. Observe that the Vfill channel value increases as does the flow channel and results in a flow pattern similar to that shown in Figure 4.

Using the Acquidatas **marker** (labelled **M** in the box at the extreme lower left of the Acquidata window) and using the mouse Cursor drag it to the Vfill waveform and place it on the waveform at a point below where the Qvoid (flow) waveform first plateaued. See Figure 5. Then move the cursor (NOT with the MARKER) to the right until it is under the last of the flow plateau before the flow trace starts to fall toward zero. Note that the Vfill channel value numerals will display Δ Volume and at the top right part of the chart window in the time box will be displayed Δ Time (not shown in Fig 5). Divide the Δ Volume value by the Δ Time value. This will give the flow rate out of the bag which equals the flow rate into the Flowmeter transducer.

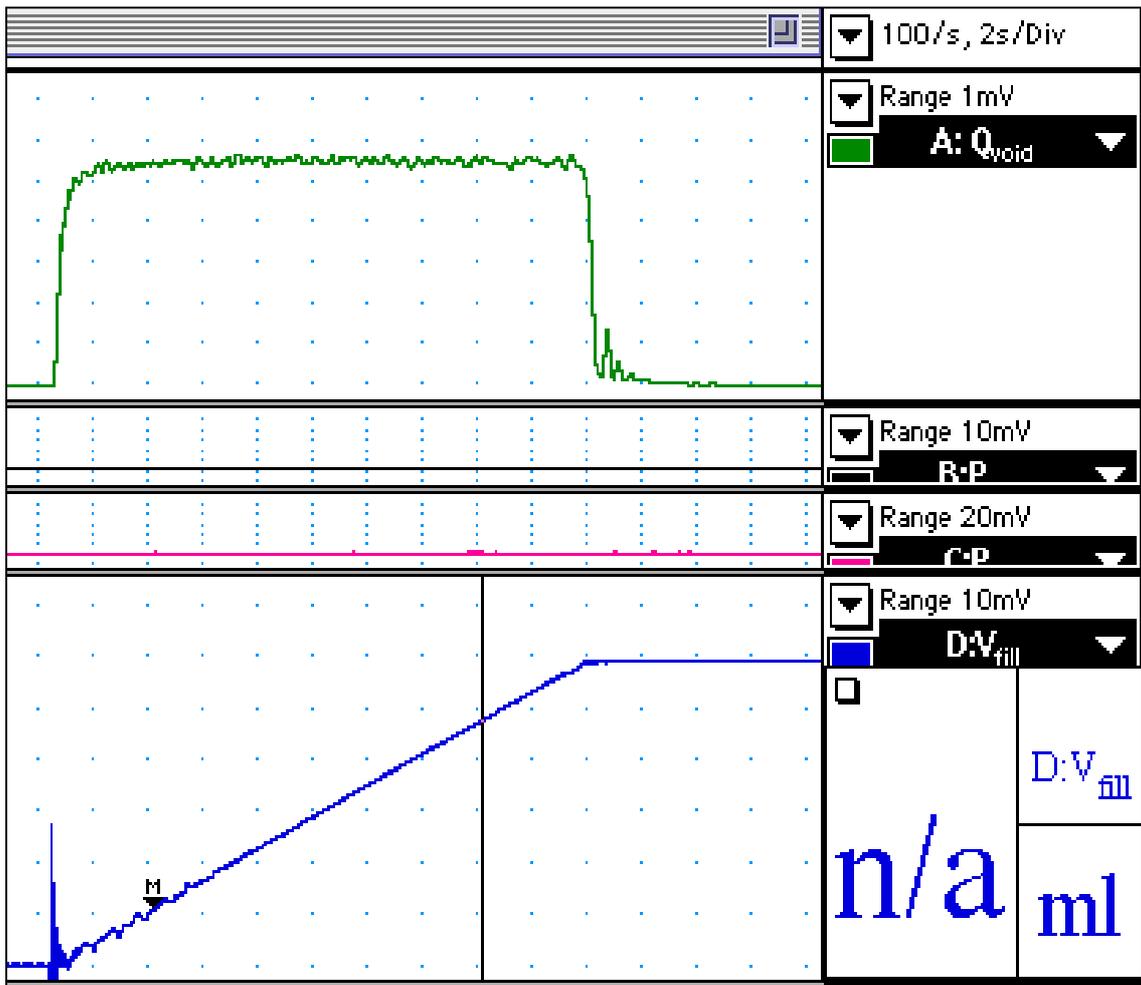


Figure 5

Using the process previously described in the urethral pressure example, select the flow waveform, open the Units Conversion dialogue box and, using the cursors, place Point 1 (pre-flow baseline) and Point 2 (average position along the flow max. plateau). Type in the flow rate value, which you have just calculated from the Vfill channel, into the right hand Point 2 value box. See Figure 6.

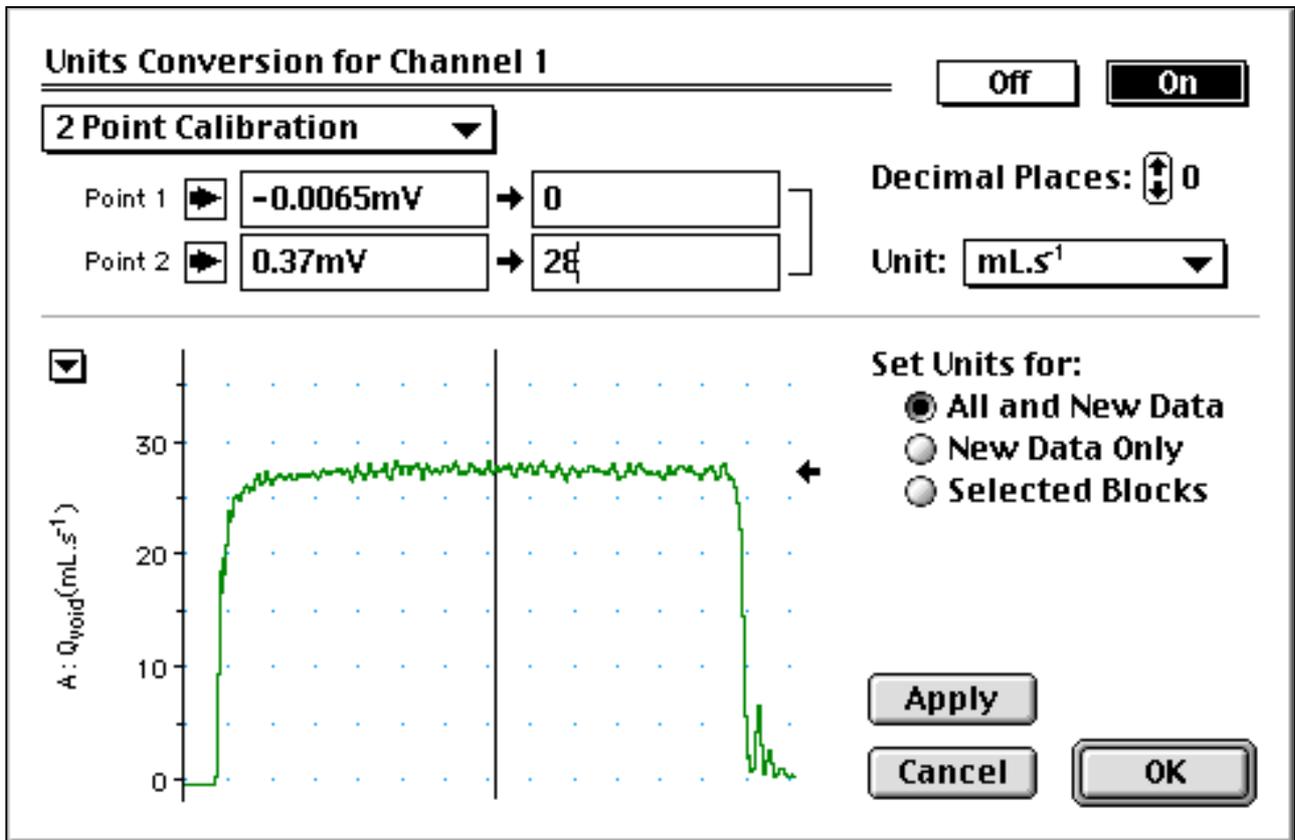


Figure 6

CRITICAL - Although the calibrations you have just carried out are then valid for this file – it is only so until you close the file, upon which no calibration or settings changes which you have made will be saved. To save the calibration and/or any other changes to the settings file you **MUST** save the file as a **SETTINGS FILE**. Follow the detailed instructions in the Uromac User Manual which in summary are:.

1. Open the File Menu item 'Save As'
2. In the dialog box, select format to 'Settings File'
3. Navigate to the destination 'Calibration Folder' – usually either in Documents Folder in the root directory or in the Uromac vXXXX Folder. See Figure 7
4. Save with some sort of recognisable name such as "8chDefaultCalibration1/3/00"

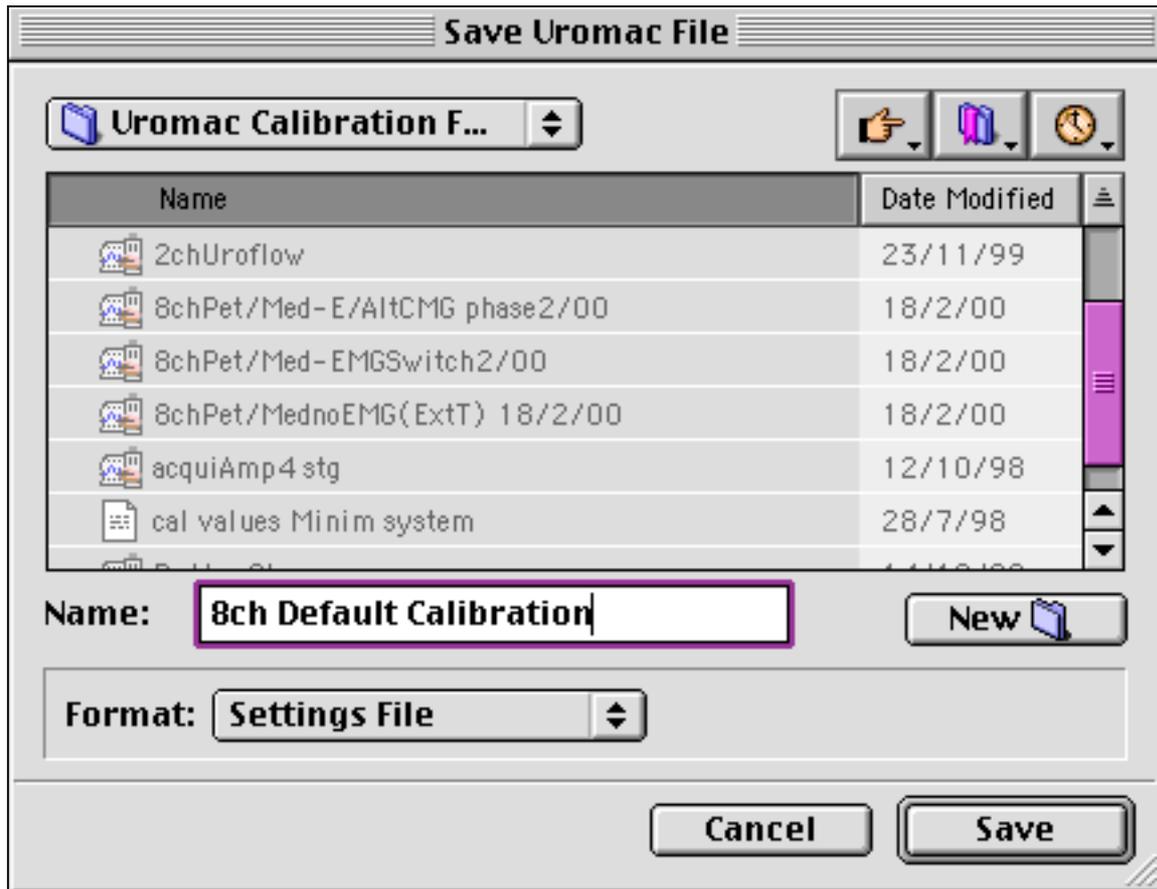


Figure 7

BE AWARE - the all settings associated with the file (layout/sampling rate/Report set up etc) will be saved as part of the settings file, so double check that you have not unintentionally left any other characteristic of the Settings in an undesired state. An example you may have selected a higher than normal chart scrolling speed during calibration. Return it to its normal speed before saving.

- Re-calibration is now completed.

As you can see, for pressures and volumes the process of checking the calibration is very simple and takes about five minutes. Recalibration takes longer. It is good physical measurement laboratory practice to check at least all pressures and volumes at the beginning of each testing session. Flow calibration checking takes on average ten minutes and we suggest it be done monthly.

If you urodynamics laboratory technician is not trained in physical measurement, or is confidently able to carry out such routine calibration checking and re-calibration, contact Neomedix Systems or an appointed distributor or representative for a Qualantee urodynamics laboratory partnering program quotation. Qualantee covers calibration, computer drive maintenance and operator retraining as well as many other user benefits.