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RESEARCH

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NONINVASIVE BLOOD PRESSURE CALIBRATION WITH ACQ*KNOWLEDGE* AND THE NIBP100D UNIT

The **NIBP100D** is a noninvasive blood pressure system that provides a continuous, beat-to-beat, blood pressure signal recorded from the fingers of a subject. The system outputs a continuous blood pressure waveform that is similar to a direct arterial pressure waveform. The monitor displays values for systolic, diastolic, mean blood pressure, and heart rate.

With just a few easy calibration steps, Acq*Knowledge* and **NIBP100D** work together to provide automated, continuous, noninvasive blood pressure measurements.

EQUIPMENT

- BIOPAC MP System with Acq*Knowledge* software
- BIOPAC NIBP100D (CN Systems CNAP 500 Non-Invasive Blood Pressure Patient Monitor System)
- BIOPAC Systems DA100C amplifier
- BIOPAC Systems TCI105 transducer
- BIOPAC Systems CBLHLT1 cable with F/F RJ11 coupling

HARDWARE SETUP
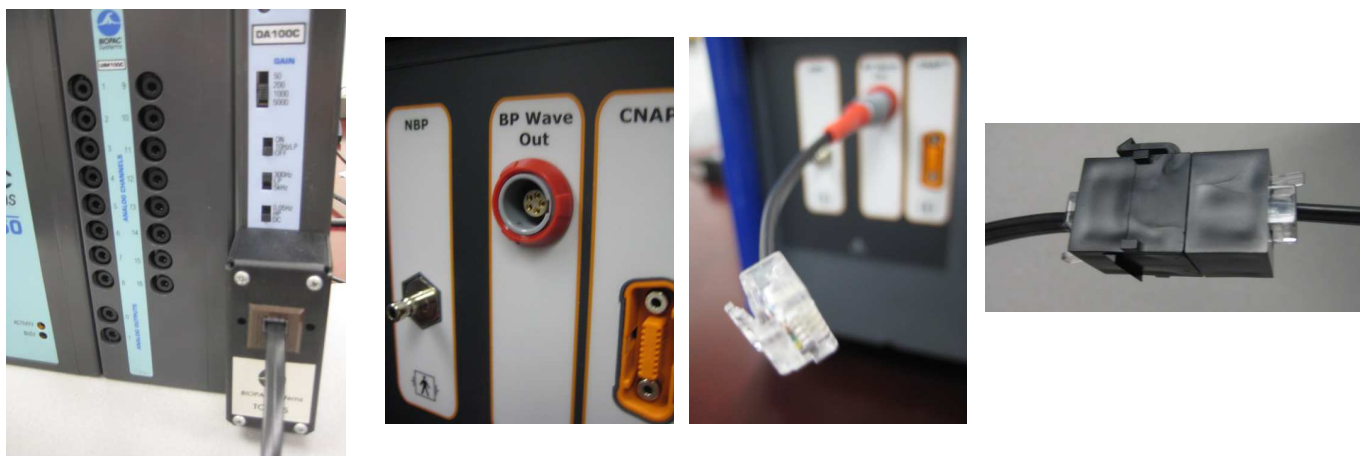
1. Connect the components of the NIBP100D as indicated in the CNAP manual, Quick Setup section.

2. Set the DA100C amplifier switches: Gain to 1000, 10HzLP filter to OFF, 300Hz LP filter ON, and HP filter to DC.

3. Connect the DA100C to the UIM100 module of the MP150 System.

4. Connect the TCI105 to the front of the DA100C.

5. Connect the **CNAP** system to the BIOPAC system using the modular line phone cable between the "BP Wave Out" on the side of the NIBP100D and the TCI105 phone jack input.

ACQ*KNOWLEDGE* SOFTWARE SETUP

ACQ*KNOWLEDGE* 4.1 and ABOVE

1. In the Acq*Knowledge* software, click MP150 > Setup Channels. (MP150 > Set Up Data Acquisition > Channels in Acq*Knowledge* 4.4 and above.)

2. In the Analog tab, click ADD NEW MODULE.

3. Click DA100C and ADD. Choose the appropriate Channel, not in contention with other amplifiers.

4. In the next dialog, set the gain and filter settings to match the DA100C amplifier settings detailed above.

5. CONNECTED TO: NIBP100D Noninvasive Blood Pressure

The unit is now scaled. **If the values are not correct, please follow the ADDITIONAL CALIBRATION NOTES**.

ACQ*KNOWLEDGE* 4.0 and BELOW

1. In the Acq*Knowledge* software, click MP1XX > Setup Channels.

2. Click SETUP to generate the Change Scaling Parameters dialog; use this dialog to calibrate the range of interest of the BP measurements.

3. Set the Gain for the DA100C to 1000 and set Scaling as follows:

    CAL1 = 1   SCALE VALUE = -130   UNITS LABEL = mmHg
    CAL2 = 0   SCALE VALUE = -30

4. Close the Scaling dialog.

5. In the Acq*Knowledge* software, click MP1XX > Setup Acquisition.

6. Set the Sample Rate; recommended Sample rate for BP is 100 samples/second.

7. Close the dialog.

ADDITIONAL CALIBRATION NOTES

The NIBP100D is able to generate a square voltage pulse wave which can be used for further calibration/verification needs. Prior to using this method, make sure the following steps are followed.

1. The DA100C offset must be at zero, with the recommended settings in the Hardware Setup section, step # 5. To do this, refer to Application Note #110 AMPLIFIER BASELINE OFFSET ADJUSTMENT (at www.biopac.com).

2. Use a Voltage meter to verify that the excitation voltage of the DA100C amplifier reads ±2 VDC.

    • Simply plug the leads of the meter into the Vref1 and Vref2 slots on the front of the amplifier and adjust the Vref screw until the voltage meter reads 2 VDC.

3. Complete the following adjustments on the NIBP100D to generate a square wave pulse at 50 and 150 mmHg:
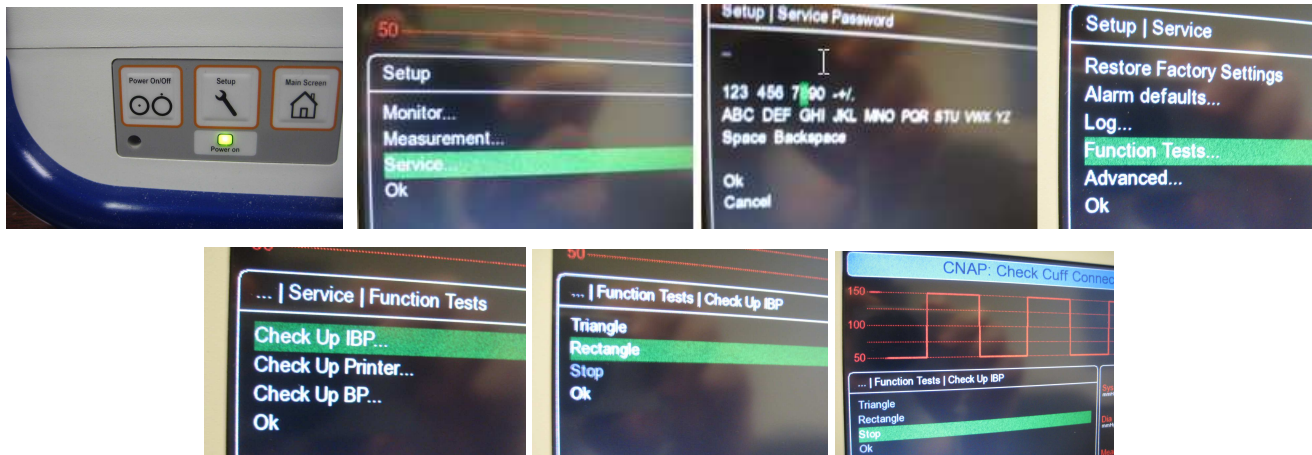
a) Click the SETUP button on the front of the NIBP100D.

b) Using the front dial, scroll to highlight SERVICE and press down on the dial to display the menu.

c) Enter a password to access the service screen. The default password number is 8737. Use the front dial to scroll, and push to enter the digits.

d) Scroll and choose the FUNCTION TESTS setting.

e) Scroll and choose the CHECK UP IBP setting.

f) Scroll and Choose RECTANGLE.

4. In Acq*Knowledge*, set the scaling to default. This can be done in versions 4.1 and above by clicking on the wrench icon when in "setup in modules" mode, walking through the setup, and then choosing "connected to: TCI Custom." The default voltage and Map values will appear. In versions 4.0 and below, click on Setup and change the scaling parameters as follows:

    CAL1 = -10   SCALE VALUE = -10
    CAL2 = 10   SCALE VALUE = 10

5. Run the square wave for a few seconds, then measure the Max and Min values (example shown below).
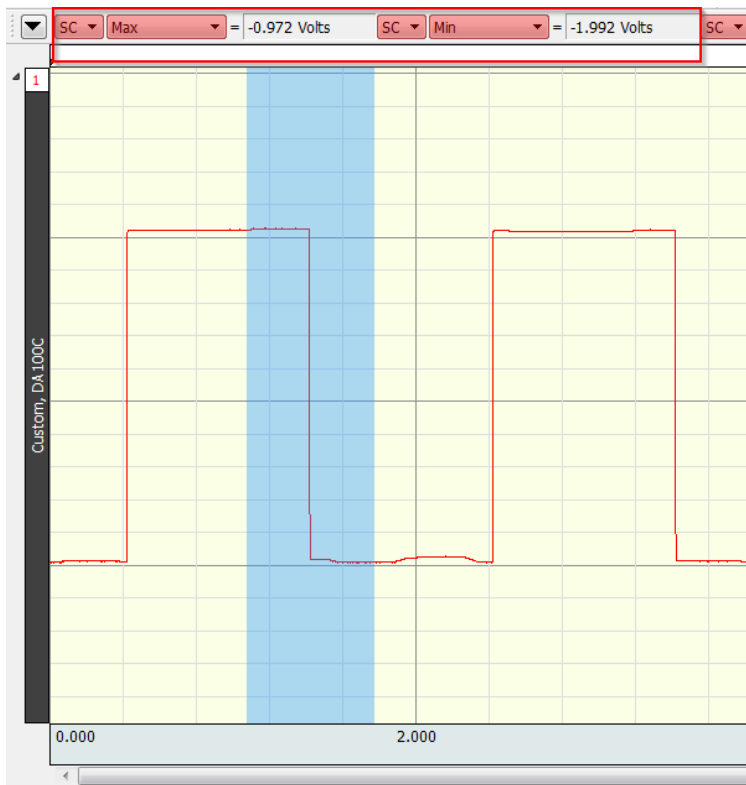
6. Enter the values into the CAL1 and CAL2 voltage value and set the MAP VALUES to 150 and 50. Set units to mmHg (example shown above right).

7. Generally the calibration and actual measure values fall within 1%. If the values exceed your specification, an adjustment can be made to the scaling within the software.

- The values should reflect the square wave value of 50 and 150 mmHg. →
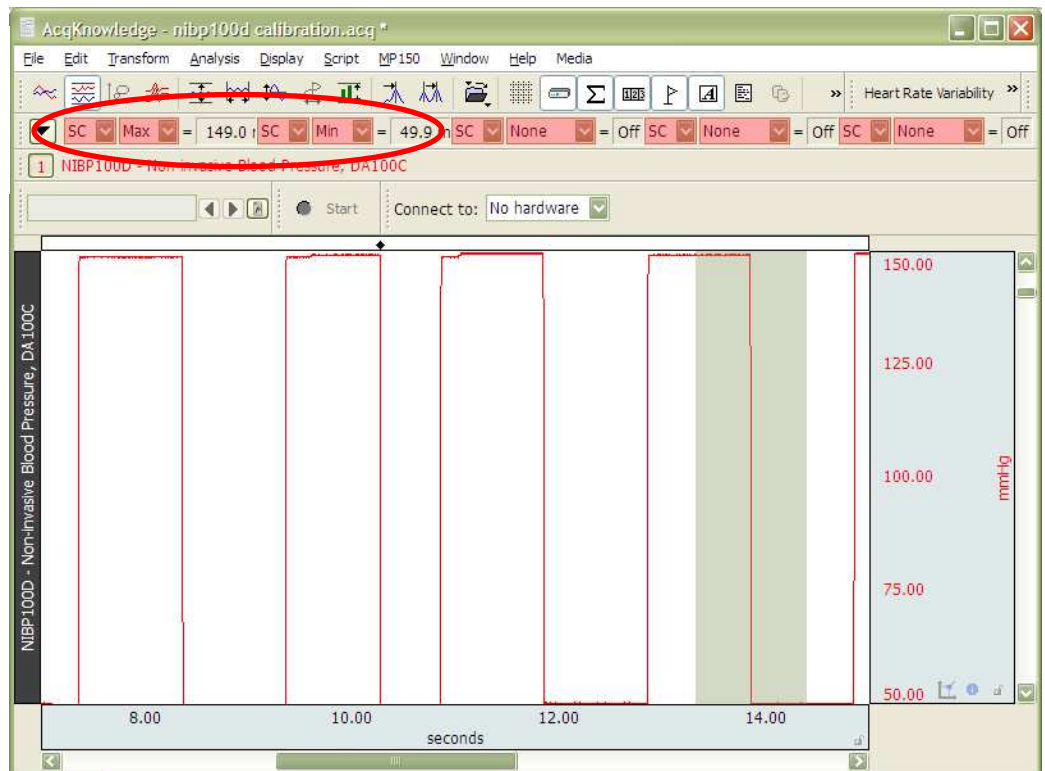
8. Save the graph as a "Graph Template - *.GTL" file so as to preserve the calibration settings.

9. Exit out of the NIBP100D service window and now record data.