

NONINVASIVE BLOOD PRESSURE CALIBRATION WITH ACQKNOWLEDGE 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, *AcqKnowledge* and **NIBP100D** work together to provide automated, continuous, noninvasive blood pressure measurements.

EQUIPMENT

- BIOPAC MP System with *AcqKnowledge* 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.

ACQKNOWLEDGE SOFTWARE SETUP

ACQKNOWLEDGE 4.1 and ABOVE

1. In the *AcqKnowledge* software, click MP150 > Setup Channels.
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 and calibrated.

ACQKNOWLEDGE 4.0 and BELOW

1. In the *AcqKnowledge* 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 *AcqKnowledge* 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, please refer to Application Note #110 - [AMPLIFIER BASELINE OFFSET ADJUSTMENT](#) (available online at www.biopac.com). After doing this, set the scaling for the channel back to:

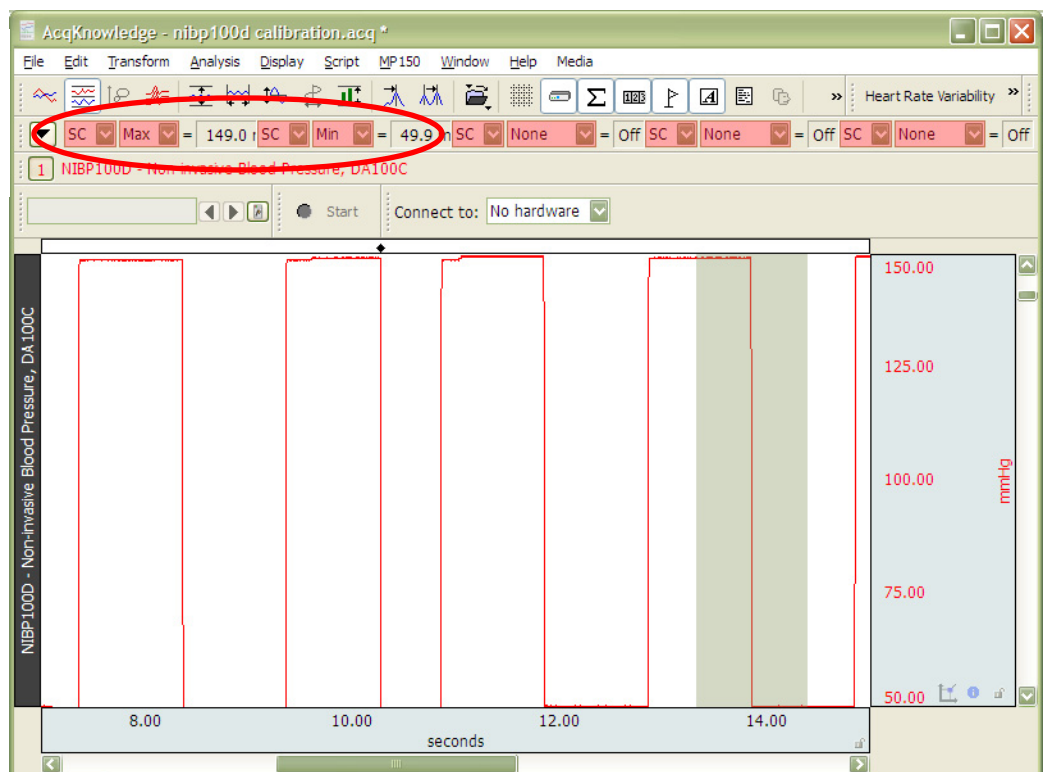
CAL1 = 1 SCALE VALUE = -130 UNITS LABEL = mmHg
 CAL2 = 0 SCALE VALUE = -30

- 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 TEST setting.
 - e) Scroll and choose the CHECK UP IBP setting.
 - f) Scroll and Choose RECTANGLE.
- 4) In AcqKnowledge, run the graph until you see a similar waveform.

- The values should reflect the square wave value of 50 and 150 mmHg. →



- 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. If necessary, set the scaling 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.
- 6) Enter these values in CAL1 and CAL2 Volts, and enter 50 and 150 in SCALE VALUE 1 and SCALE VALUE 2 respectively.