**831C Final Assembly and Test**

**1.0 PURPOSE AND SCOPE**

The purpose of this document is to provide the detail and instruction necessary to perform the final assembly and test of the 831C product. This process also serves as a verification that the product continues to meet the specifications and criteria established by Engineering.

**2.0 AFFECTED DEPARTMENTS**

Manufacturing

**3.0 REFERENCE DOCUMENTS**

* D0001.8421 831C Final Checklist template
* D0001.8375 METCAL Procedure Instructions
* D0001.8399 A831.11 Board Test Procedure
* D0001.1126-1 Quality Records Matrix
* A831.11, A831.13 Schematics and assembly drawings
* S831C.xx Case assembly drawings

**4.0 RESPONSIBILITIES & AUTHORITY**

The technician has the following responsibilities and authority:

* Verify compliance of the product under test to specification.
* Troubleshoot and correct product as required.
* Communicate concerns to Supervisor or Quality Assurance.
* Request management review of product concerns.
* Use proper ESD protective equipment.

**5.0 SAFETY PRECAUTIONS**

* Safety Glasses are required when soldering, lead clipping, or testing power supplies.
* Follow general electrical precautions for working with energized, low voltage circuits.

**6.0 EQUIPMENT & MATERIALS**

* 4 each - Alkaline and Nickel Metal Hydride (NIMH) AA batteries
* 0621.0095 - USB cable
* ADP090 12pF BNC to Preamplifier Adapter
* ADP042
* MET/CAL test station equipped with equipment for Signal and Acoustic testing.
* Test CAL200 or CAL250 Calibrator
* CBL093 BNC male to 5-pin male Switchcraft cable
* CBL140, 831 control/power cable
* Adjustable power supply 0 – 12vdc

**7.0 INSPECTION**

Inspect the parts for nonconformities as they are assembled and tested.

1. **INSTRUCTIONS**

*Note: Board level tests, are performed by the contract manufacturer (CM) so they are only performed “in-house” on an occasional basis to ensure that the CM tests are being done properly. Fully test 1 set of boards from each batch received. This is generally sufficient, unless problems found.*

1. Case up the unit following the assembly drawing instructions.
2. Install four NIMH batteries into the unit
3. Check the battery operation and charging function.
	1. Press the power key, to turn instrument on. Press power key again to open **Power Control** dialog.
	2. Verify that there is a battery voltage reading, and there is a battery symbol on the screen at the top.
	3. Plug the USB cable into the unit and verify that the battery symbol at the top of the screen changed to a lightning bolt and ‘USB Powered’ came on and reads a voltage.
	4. Press the **TOOLS,** key, arrow down three times to **System Properties**, press **ENTER**. If not already, highlight the **Battery Type** setting, press **ENTER** and change it to “**NIMH**”. The 831C **Charger** setting changes to “**On**” also. Press Close key, **ENTER** to apply changes, press **Close** soft key twice, turn instrument off and wait for it to shut down.
	5. Check that the (power on key) **Green LED** is on, this indicates the instrument is charging the batteries.
	6. Remove batteries, Green LED will go off, install **alkaline**, turn instrument back on, and repeat step 4 and this time select the ”**Alkaline**” setting. Observe on the instrument that the **Charger** setting changes to “**Off**”.
	7. Close out of menu and select “**Yes**” to apply changes. Press **Close** key. Turn unit off and this time the green LED will not go on. Remove batteries.
4. Assign a Serial Number, set Manufactured Date and adjust LCD Contrast. Update to current Firmware and, enable Default options.)
	1. Connect the instrument to the computer through the USB cable.
	2. Run the **G4 LD Utility** program.
	3. Under File, select **Upgrade Firmware or Options**.
	4. Verify serial number matches, and click on connect key.
	5. Verify version of Firmware is correct and select **Upload firmware**.
	6. Close out G4.
	7. Run the **LxTTest** program.
	8. Click on **Tools** then **Instrument Setup.**
	9. Select **831C**
	10. Enter the serial number into the **Serial Number** field.
	11. To set the **Manufacture Date**, click the down arrow icon and click on **Today**.
	12. Open the **LDKeyGen** program.
	13. Input serial number and click on **Refresh**, select OB3, if already selected, select another option. Select **Upload Generated Option File to Connected Meter** and click on **Generate.**
	14. After meter upgrades successfully, (check changes made) close program
	15. Check that the unit is in charging mode and not in the PRE-charge mode.
	16. Test Touchscreen

Verify that the touchscreen is functional by doing the following:

* Press and hold down the Tools, Enter, and the Left Soft key until the screen changes to the test mode (~3 seconds) as shown below.



* Press firmly with your thumb on the plastic around the touchscreen and make sure the screen does not detect any “touches”.
* Using a stylus, push the “Draw” button.
* Trace a line around the edges of the screen and through the middle to ensure all areas track the stylus tip.
* If either of these tests fail, the top case must be re-worked.
* Press “Quit” to exit and allow meter to reboot.
* If screen is unresponsive, hold down power button until meter reboots.
1. Check Control port
	1. Apply 12.0 Vdc. From the adjustable power supply to the CBL140 cable.
	2. Plug the CBL140 cable into the control port on the instrument, the instrument will turn on. If not, check for problems.
	3. Press the power key, the power menu screen will come up, press any key to activate display and do not press a key for backlight to turn off (time out). Observe current draw on adjustable power supply as follows:

|  |  |  |
| --- | --- | --- |
|  | **LCD/Brightness** | **Model 831C** |
|  | Off (timed out) | < 100 mA |
|  | On / 100% | < 225 mA |
|  |  |  |

* 1. Power Down:
	2. Connect the instrument to the computer through the USB cable, go into Tools-System utilities, and perform a “format restore defaults.

 Verify backup battery safe power–off functionality by removing the **USB cable** and then the **CBL140** **cable** and observing that the display blanks, the power key LED flashes rapidly indicating power–down, and then it powers off after ≈ 8 seconds. Note: **There must not be batteries in the instrument or USB power for this test to work.**

1. Install Labels
	1. Place the Calibration label in the recessed location in the battery compartment (print on stock M770.0042), after certification testing. An example shown at the right.
2. Create a Final Checklist, an on-line [LD database](http://mypcb.pcb.com/ldproducts/) entry, and an asset in the Metteam database per (D0001.8375), for each 831C. ( Include Manufacture date)

Store instrument until a customer sales order received, then complete procedure.

1. Input Voltage Calibration
2. Connect the output of the test system to the input of the instrument using the CBL093, connect USB cable to UUT and turn on.
3. On the **LxTTest** program, make sure the **831C Calibrate - No Preamp** control file is loaded. If it is not, click Tests, Select, Control File and Select the file:
4. Run the **Calibrate** and **Gain** tests.
5. Resolve any testing issues.
6. Run the **MET/CAL** tests for this instrument (D0001.8375, D0001.8378 & D0001.8384)
7. Connect an ADP090 to the PRM831 preamplifier.
8. Connect the output of the test system to an ADP042 and then to the ADP090.
9. Perform **MET/CAL** electrical test (D0001.8378) and verify that they all passed. Resolve any issues.
10. Perform **MET/CAL** acoustical test (D0001.8384).
11. Print out test results as required by sales order.
12. Program the options ordered into the instrument.
13. Run **LDKeyGen** program
14. Enter your **LDKeyGen** specific user name and password.
15. Enter the Model and Serial Number of the instrument and press **Refresh**.
16. From the sales order, determine which options need to be installed. Select the options to be programmed into the instrument.
17. Make sure **Upload file to connected instrument** is checked.
18. Press **Generate**. This takes a few minutes and the instrument will reboot.
19. Verify options in the **About** menu match those on the order.
20. Save a copy of the Certification document to R:\Provo\Logistics\ORDERS\ORDERS in a folder named by the order number, complete the final checklist, and enter the customer order information in the on-line [LD database](http://mypcb.pcb.com/ldproducts/), apply calibration label per step **F.1**.
21. Deliver completed order to Technician for inspection.
22. Technician to deliver to shipping.
23. **RECORDS**
* When the checklist is completed, it is stored in the Production area per the Quality Records Matrix, D0001.1126-1.
* Model and Serial Number information entered into the database.
* Test data is stored electronically in an 831 database or Metrology database, per the Quality Records Matrix.

**10.0 INSPECTION**

1. Remove the battery door and verify that the certification date matches the certificate of calibration, and that the instrument specific battery warning label is in place.
2. Verify that the PRM831 listed on the instrument’s certificate of calibration is correct, and that the PRM831 certification label matches its certificate. Verify that the Acoustic certification has the correct Preamplifier and Microphone serial numbers listed.
3. Install four AA batteries.
4. Turn the instrument on.
5. Verify the date of certification.
6. Press **TOOLS**, then using the navigational keys move over to the ‘**Calibrate**’ icon and press **ENTER**.
7. Arrow ►over three times and verify the **Performed** date matches the certificate of calibration.
8. Press **CLOSE** then move down to the ‘About’ icon, and press **ENTER**.
9. Verify the firmware revision matches the final checklist.
10. Verify the options programmed into the instrument.
11. Press the next tab arrow key ►twice.
12. This screen will show the options programmed into the instrument.
13. Verify options as listed on the sales order and the final checklist.
14. Turn the instrument **OFF** by pressing **CLOSE** twice, then press and hold the **ON/OFF** key.
15. Remove the batteries.
16. Look at the final checklist, and verify that all information related to the order, has been completed. Fill out Technician inspection slip.
17. Deliver to Logistics

**11.0 DISTRIBUTION**

This instruction is available to employees electronically via the online Document Control area.

**12.0 REVISION HISTORY**

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| --- | --- | --- | --- | --- |
| **DCO #** | **REV** | **DATE** | **INITIALS** | **CHANGES MADE** |
| 1884 | A | 09Apr2019 | RH | New procedure specifically for the 831C |
| ECO 4898 | B | 8/19/2019 | DPW | Added instruction to save certification on network |
| DCO 1944 | C | 3/11/2020 | DPW | Added reference for MET/CAL acoustical test procedure in section “I” heading.  |