Gloria 4 Final Assembly Testing

Revision 1
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Summary

Connect to Gloria a power cable and an audio cable to a powered speaker. Press Play to turn the power on. Wait for the display test, memory test and calibration. At the encoder test, turn the volume knob one way and then the other, at least two clicks each direction. At the keypad test, check two LEDs on the main PCB, then press Ensemble, Sax, Key Down, Volume Up, Volume Down, 1, 5, 9, Play. Connect a USB memory stick through an adapter cable. Wait for the sounds and music to load. Listen to the chimes through Gloria's speaker and press Play if successful. Listen to the chimes through the external speaker and press Play if successful. At the Test & Setup Done message, press Stop to turn the power off. Disconnect the cables.

Materials

- Gloria 4.
- Power supply / wall adapter.

- USB memory stick (provided by Gloria Music).
- USB adapter cable (provided by Gloria Music).
- Powered speaker with audio cable.
- Audio adapter, ¼” plug to mini phone plug (if necessary).

Procedure

Connect to Gloria a power cable and an audio cable to a powered speaker. Press Play to turn the power on.

Startup

```
** G L O R I A **
```

Display Test

Wait for the display test. The LCD backlight must be on.

```
Display Test
Complete
```

Memory Test

Wait for the memory test.

```
Memory Test
SDRAM Write Test
```

```
Memory Test
SDRAM Read Test
```

```
Memory Test
Flash Read Test
```

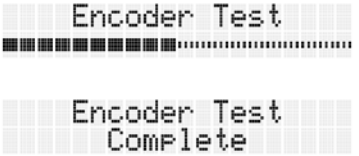
```
Memory Test
Complete
```

Calibration

Wait for the power supply calibration.

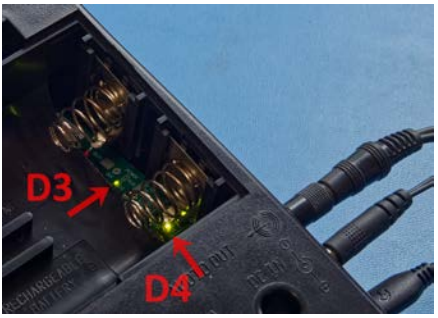
```
Calibrate +16VA
R75:103% Vref:98%
```

Encoder Test



At the encoder test, turn the volume knob on the right one way and then the other, at least two clicks each direction. The bar on screen should move as the knob is turned. Press Stop to cancel the test if there is no movement on the bar.

LED Test



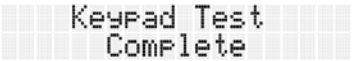
Before doing the keypad test, turn Gloria over and confirm that both green LEDs, D3 and D4, are illuminated (D4 will be brighter). You may need to remove the battery cover.

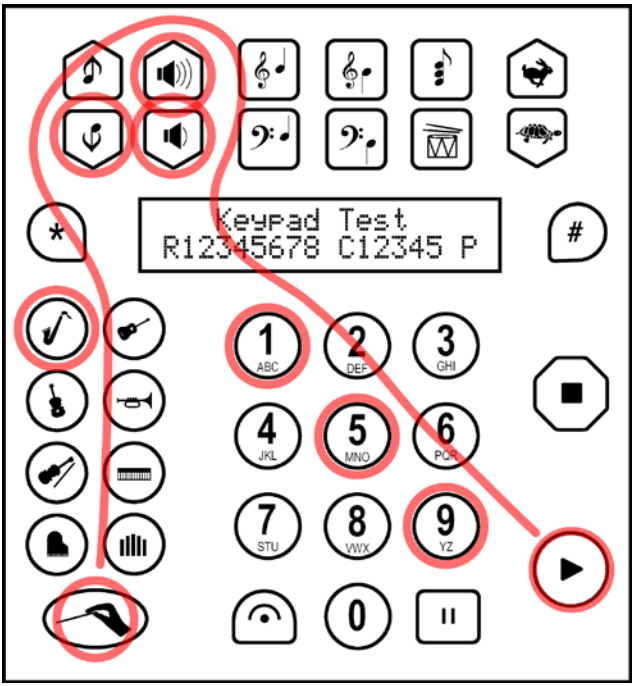
Both LEDs will stay lit during the entire procedure (except during the Speaker and Line Out tests), so as an alternative this step may be verified at the very end, when the screen says “Test & Setup Done”.

Keypad Test

At the keypad test, press Ensemble, Sax, Key Down, Volume Up, Volume Down, 1, 5, 9, Play. See the diagram below.

This sequence is an efficient combination to complete the test, although the specific sequence of keys doesn’t matter (but Stop cancels the test, so don’t press Stop). As each key is pressed, the screen clears the numbered row and column circuits that connect to that key. When all circuits are cleared (tested) the test is complete.





Load Content

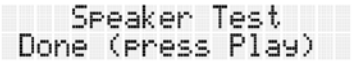
Connect a USB memory stick through an adapter cable. Wait for the USB memory stick to mount, then wait for the sounds and music to load.

```
Test & Setup
Connect USB drive

Load Sounds
G4S16.GMC

Load Sounds
Loaded in 29 sec

Load Music
CSG45.GMC

Load Music
Loaded in 7 sec
```

Speaker Test

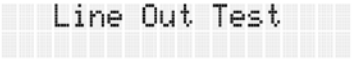
Listen to the chimes through Gloria's speaker and press Play if successful. Press Stop if you did not hear sound.

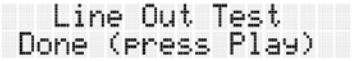
```
Speaker Test
```



Line Out Test

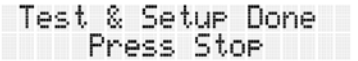
Listen to the chimes through the external speaker and press Play if successful. Press Stop if you did not hear sound.





Procedure Complete

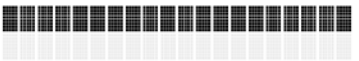
At the Test & Setup Done message, press Stop to turn the power off. Disconnect the cables.



Test Failures & Error Messages

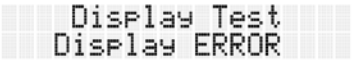
Display Test

Failure: Black bar on top row.
Reason: LCD display failed to initialize.
Cause: Header not making contact with socket; header not soldered to LCD correctly; socket not soldered to main PCB correctly.
Cause: U4 not programmed (blank) or corrupted program; clock failure (X2) or reset failure (U7).



Failure: Blank screen.
Reason: No data sent to LCD.
Cause: Header not making contact with socket; header not soldered to LCD correctly; socket not soldered to main PCB correctly.

Failure: “Display ERROR” message.
Reason: LCD display failed data read-back test.

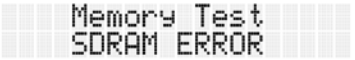


Cause: Header making intermittent contact with socket; header not soldered to LCD correctly; socket not soldered to main PCB correctly.

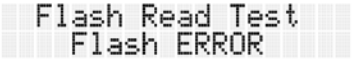
Failure: LCD backlight off.
Reason: No power on pins 15-16 of LCD header.
Cause: Header making intermittent contact with socket; header not soldered to LCD correctly; socket not soldered to main PCB correctly.
Cause: Q2 or R22 missing or faulty.

Memory Test

Failure: "SDRAM ERROR" message.
Reason: Did not read back same data as written.
Cause: U5 faulty; U4 solder connection faulty.



Failure: "Flash ERROR" message.
Reason: Too many flash bad blocks.
Cause: U10 faulty.

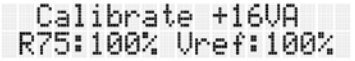


Failure: "Flash memory command failed" message.
Reason: Could not read flash bad block LUT.
Cause: U10 faulty; U4 solder connection faulty.

Failure: "Flash memory read fault" message.
Reason: Could not scan flash for bad blocks.
Cause: U10 faulty; U4 solder connection faulty.

Calibration

Failure: R75 or Vref are 100% over many Glorias.
Reason: Nominal value (100%) set when calibration measurement is out of range.



Cause: R68, R70, or R75 are incorrect components; +16VA power supply failure.
Cause: +3.3V power supply output voltage out of tolerance; test for 3.3V at TP17, TP19, and TP21.

Encoder Test

Failure: Screen bar does not move; test does not complete.
Reason: No encoder signals arrive at U4.
Cause: Encoder SW1 faulty or solder connection faulty; missing R4 or R6; test TP2, TP3 to 3.3V.

Failure: Screen bar moves in big jumps with little or no knob rotation.
Reason: Mechanical or electrical noise from encoder.
Cause: Encoder SW1 faulty.

Keypad Test

Failure: Can't clear row or column number from test screen.
Reason: No signal at U15 keypad scanner.
Cause: Broken connection on keypad ribbon cable; bad connection on keypad connector; solder fault on keypad header.

Wait for USB Memory Stick

Failure: Waits indefinitely when USB stick connected.
Reason: Can't negotiate connection with USB stick.
Cause: USB stick not formatted correctly or corrupted; USB connector J3 or solder faulty; +5V supply faulty; supply switch U18 faulty; USB PHY U16 faulty.

Load Sounds

Failure: "Out of memory" message.
Reason: Firmware fault.
Cause: Firmware on U4 corrupted.

Failure: "Could not load instruments" message.
Reason: Instruments file present on USB stick but could not load.
Cause: File transfer error; connection fault or cable fault; USB stick fault or file corrupted.

Failure: No loading progress bar.
Reason: No instruments file present on USB stick.
Cause: Instruments file missing.

Load Music

Failure: "Out of memory" message.
Reason: Firmware fault.
Cause: Firmware on U4 corrupted.

Failure: "File open error" or "File read error" message.
Reason: Could not load music file from USB stick.
Cause: File transfer error; connection fault or cable fault; USB stick fault or file corrupted.

Failure: "Flash memory full" message.
Reason: Tried to load too many music files; music file(s) too large.
Cause: More than ten files in USB stick Music folder; files in Music folder are larger than flash capacity.

Failure: "Flash memory already clean" message.
Reason: Flash free space defragmenting failed.
Cause: U10 flash faulty.

Failure: "Flash memory write fault" message.
Reason: Could not write music file to flash.
Cause: U10 flash faulty.

Failure: "Settings write fault" message.
Reason: Could not write to EEPROM.
Cause: U3 faulty; short or break on I2C4 bus.

Failure: "Could not load music" message.
Reason: Music file present on USB stick but could not load.
Cause: File transfer error; connection fault or cable fault; USB stick fault or file corrupted; incorrect file loaded in USB stick Music folder.

Failure: No loading progress bar.
Reason: No music file present on USB stick.
Cause: Music file missing.

Speaker Test

Failure: "Could not load instruments" message.
Reason: Instruments file in flash memory is missing or corrupted.
Cause: Flash U10 faulty; fault on file transfer from USB; file on USB corrupted.

Failure: "File open error" message.
Reason: MIDI test file is missing or corrupted.
Cause: Firmware on U4 corrupted.

Failure: No sound from internal speaker.
Reason: Physical connection fault; amplifier fault; +16VA power supply fault.
Cause: Speaker not connected; speaker cable or connector fault.
Cause: Fault on audio amplifier U1 and associated components.
Cause: Fault on +16VA power supply U17 and associated components.

Line Out Test

Failure: "Could not load instruments" message.
Reason: Instruments file in flash memory is missing or corrupted.
Cause: Flash U10 faulty; fault on file transfer from USB; file on USB corrupted.

Failure: "File open error" message.
Reason: MIDI test file is missing or corrupted.
Cause: Firmware on U4 corrupted.

Failure: No sound from external speaker.
Reason: Physical connection fault; headphone amplifier fault.
Cause: Line out jack J2 fault; inter-board cable or connectors fault; filter beads FB7 – FB10 missing or solder fault.
Cause: Fault on audio amplifier U8 and associated components.

Recovery & Re-Testing

Gloria will proceed with the final assembly test steps in order. Each step is flagged as completed when it successfully passes. If a step fails it is briefly noted on the screen, and the test moves on to the next step. At the conclusion of the process "Test & Setup" will display on the screen if any of the steps did not pass.

At this screen, any of the tests may be re-run by pressing the following keys:

Display	# (right menu key)
Memory	Percussion
Calibration	Bass track
Encoder	Faster
Keypad	Synthesizer
Load Sounds	Pitch down
Load Music	Pitch up
Speaker	Volume up
Line Out	Volume down

To automatically repeat the failed steps, cycle the power on Gloria (disconnect the external power, reconnect and press Play to power on). All previously successful steps will be skipped. The

remaining steps will be re-attempted in order. Gloria will not start up to the normal user hymn prompt until all final assembly test steps have completed successfully.

In general, you may remove power from Gloria with no penalty at any point during the final assembly test process. It's probably not a good idea to remove power during a file transfer from USB to flash (Load Sounds / Load Music), although if the process hangs then removing power is the only option.

You may press Stop to cancel the following steps: Encoder, Keypad, Speaker, Line Out. A cancelled step is not flagged as complete, and will have to be repeated.