



## AMC1210MB-EVM Test Procedure

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### Table of Contents

<b>1</b>	<b>Equipment and Supplies .....</b>	<b>2</b>
1.1	Test Equipment .....	2
1.2	Supplies (per board).....	2
1.3	Test Software .....	2
<b>2</b>	<b>Jumpers .....</b>	<b>3</b>
<b>3</b>	<b>Hardware Power Supply Testing and Configuration .....</b>	<b>3</b>
<b>4</b>	<b>Software Installation .....</b>	<b>5</b>
<b>5</b>	<b>EVM Firmware Preparation and Driver Installation.....</b>	<b>5</b>
<b>6</b>	<b>EVM Functionality Testing .....</b>	<b>9</b>
<b>7</b>	<b>Final Board Configuration.....</b>	<b>14</b>
<b>8</b>	<b>Preparation for shipment .....</b>	<b>15</b>
<b>9</b>	<b>Contact Information .....</b>	<b>15</b>

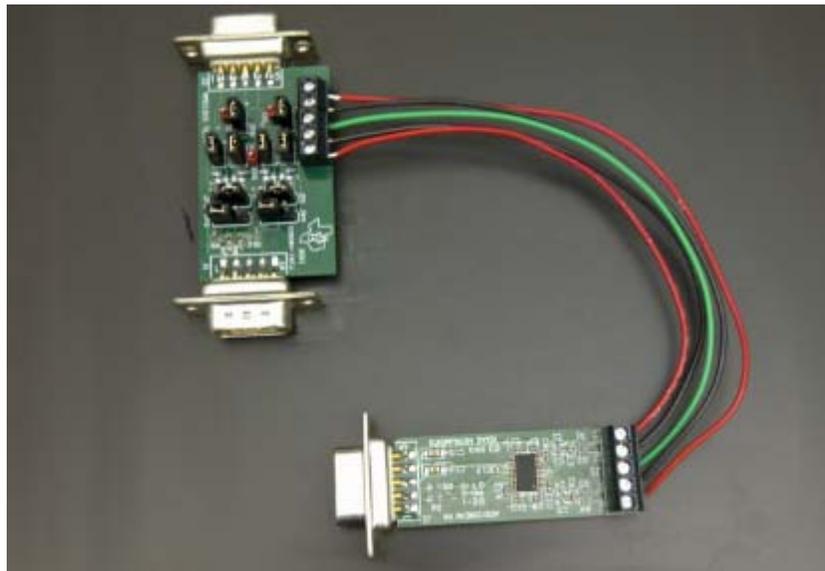
### Figures

<b>Figure 1.</b>	<b>AMC1210MB-EVM Test Fixture .....</b>	<b>2</b>
<b>Figure 2.</b>	<b>AMC1210MB-EVM Assembly Drawing .....</b>	<b>3</b>
<b>Figure 3.</b>	<b>On Board Acceptable Voltage Rails .....</b>	<b>4</b>
<b>Figure 4.</b>	<b>Off Board Acceptable Voltage Rails .....</b>	<b>4</b>
<b>Figure 5.</b>	<b>AMC1210MB-EVM Software Installation .....</b>	<b>5</b>
<b>Figure 6.</b>	<b>Flash Programmer Configuration Settings.....</b>	<b>6</b>
<b>Figure 7.</b>	<b>NI-VISA AMC1210MB-EVM Driver Installation .....</b>	<b>7</b>
<b>Figure 8.</b>	<b>NI-VISA AMC1210MB-EVM Automatic Installation.....</b>	<b>7</b>
<b>Figure 9.</b>	<b>NI-VISA AMC1210MB-EVM Driver Installing .....</b>	<b>8</b>
<b>Figure 10.</b>	<b>NI-VISA AMC1210MB-EVM Driver Installation Complete.....</b>	<b>8</b>
<b>Figure 11.</b>	<b>NI-VISA AMC1210MB-EVM Driver Verification .....</b>	<b>9</b>
<b>Figure 12.</b>	<b>AMC1210MB-EVM Mode Control .....</b>	<b>9</b>
<b>Figure 13.</b>	<b>AMC1210MB-EVM Software In Test Mode .....</b>	<b>9</b>
<b>Figure 14.</b>	<b>Acceptable AMC1210MB-EVM Pattern Generator Output .....</b>	<b>10</b>
<b>Figure 15.</b>	<b>Acceptable AMC1210MB-EVM Test Mode Pattern Output .....</b>	<b>10</b>
<b>Figure 16.</b>	<b>AMC1210MB-EVM and Test Fixture Connections .....</b>	<b>11</b>
<b>Figure 17.</b>	<b>Current Shunt Settings .....</b>	<b>12</b>
<b>Figure 18.</b>	<b>Acceptable Current Shunt Module Data Capture .....</b>	<b>13</b>
<b>Figure 19.</b>	<b>Acceptable Resolver Demo Module Data Capture .....</b>	<b>14</b>

## 1 Equipment and Supplies

### 1.1 Test Equipment

- AMC1210MB-EVM test fixture – TI supplied, see figure 1.
- Power supply with +15V and -15V outputs
- USB A to B and USB A to Mini A Cables
- 6-7V Wall Adaptor
- PC running Microsoft Windows XP and 2 free USB ports
- Test software – see software section
- LM3S811 Eval Board



**Figure 1. AMC1210MB-EVM Test Fixture**

### 1.2 Supplies (per board)

- AMC1210MB-EVM
- 2 shorting jumpers

### 1.3 Test Software

The AMC1210MB-EVM test procedure uses the AMC1210MB-EVM evaluation software ([ftp://ftp.ti.com/pub/data\\_acquisition/ADCPro/Plugins/amc1210mb-evm-1.0.1.exe](ftp://ftp.ti.com/pub/data_acquisition/ADCPro/Plugins/amc1210mb-evm-1.0.1.exe)). See the software installation section of this document for more details.

## 2 Jumpers

JP1 and JP2 should be shorted in the 1-2 position, as shown in Figure 2.

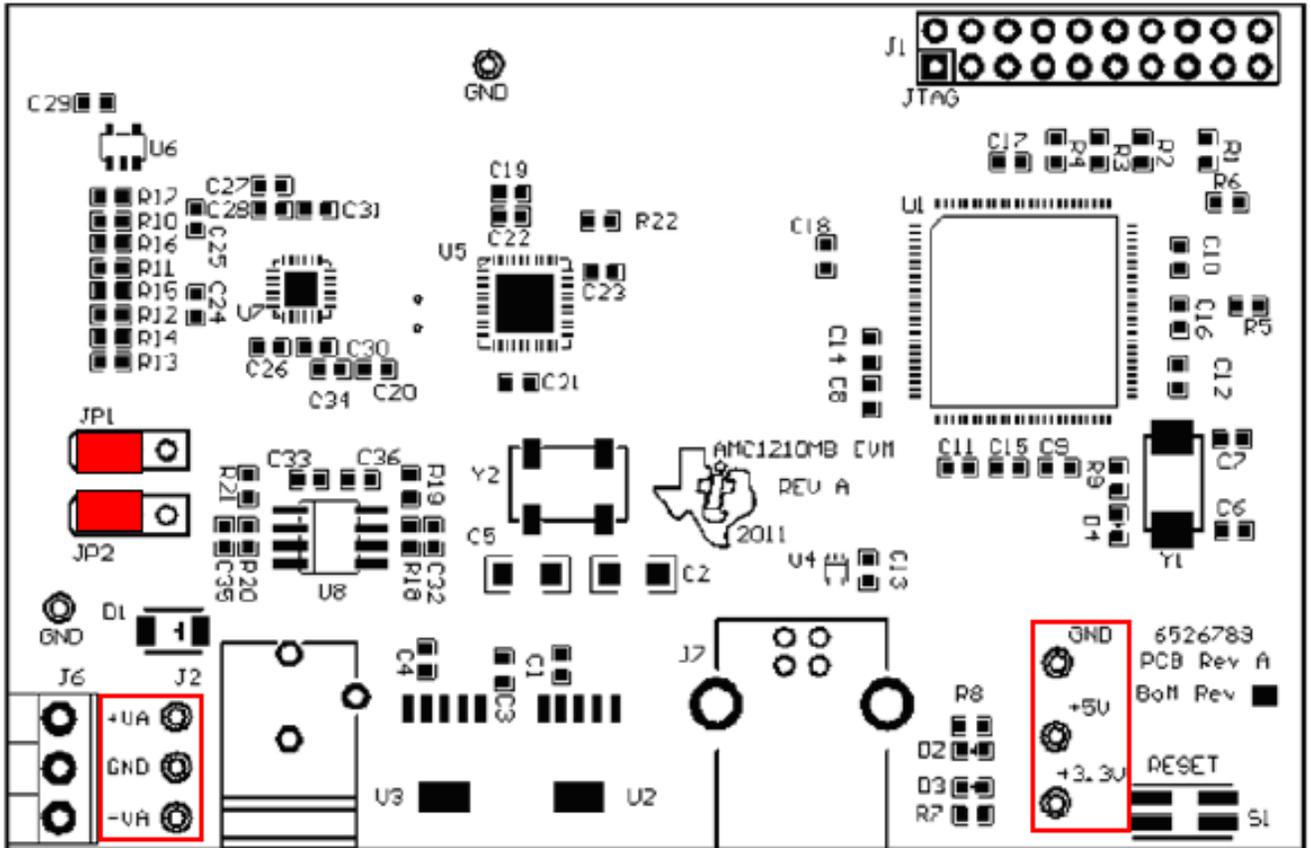


Figure 2. AMC1210MB-EVM Assembly Drawing

**Note:** The test points highlighted in figure 2 will be used in the next step to verify power supplies.

## 3 Hardware Power Supply Testing and Configuration

Without the AMC1210MB-EVM test fixture and USB cable connected to the AMC1210MB-EVM, apply power to the AMC1210MB-EVM by connecting the wall adaptor at J2. Using the test points highlighted on the bottom right of Figure 2, verify that 5V and 3.3 V are present and stable as shown in Figure 3. A +/- 10mV tolerance is acceptable.

Next, connect an external power supply to terminal block J6 as marked on silkscreen. Connect +15V to the +VA terminal, supply ground to the GND terminal, and -15V to the -VA terminal. All supplies should be current limited to 200mA. Use the test points highlighted on the bottom left of Figure 2 to verify that these voltages are present and stable, as shown in Figure 4. +/- 500mV tolerance is acceptable.

Once all voltages have been verified disable all supplies and continue to section 4.

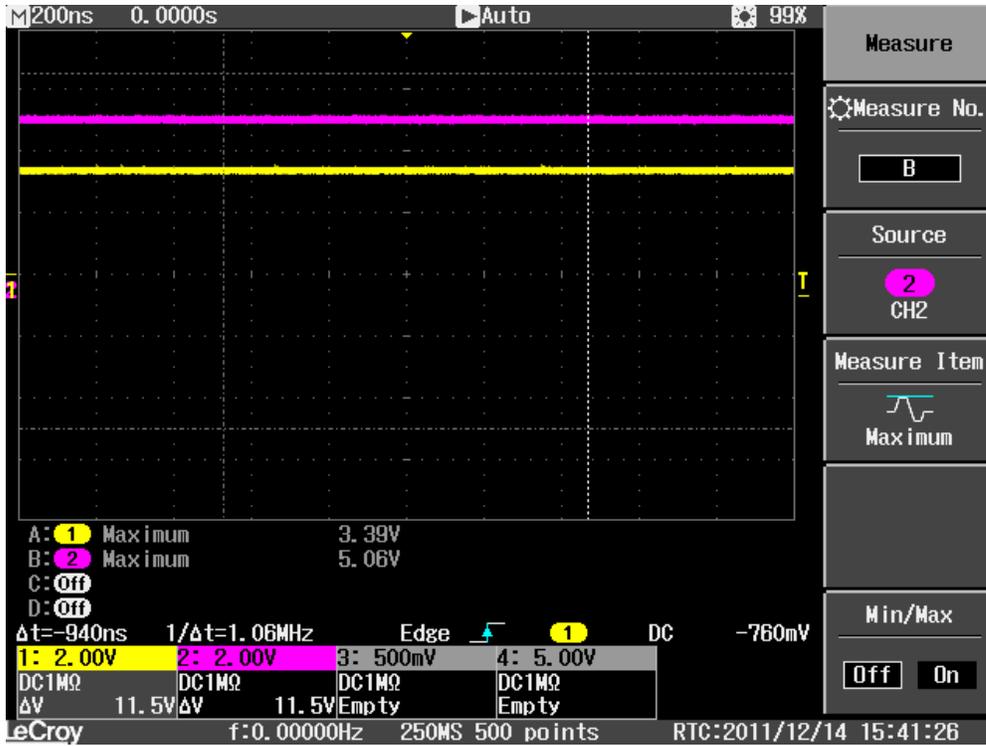


Figure 3. On Board Acceptable Voltage Rails

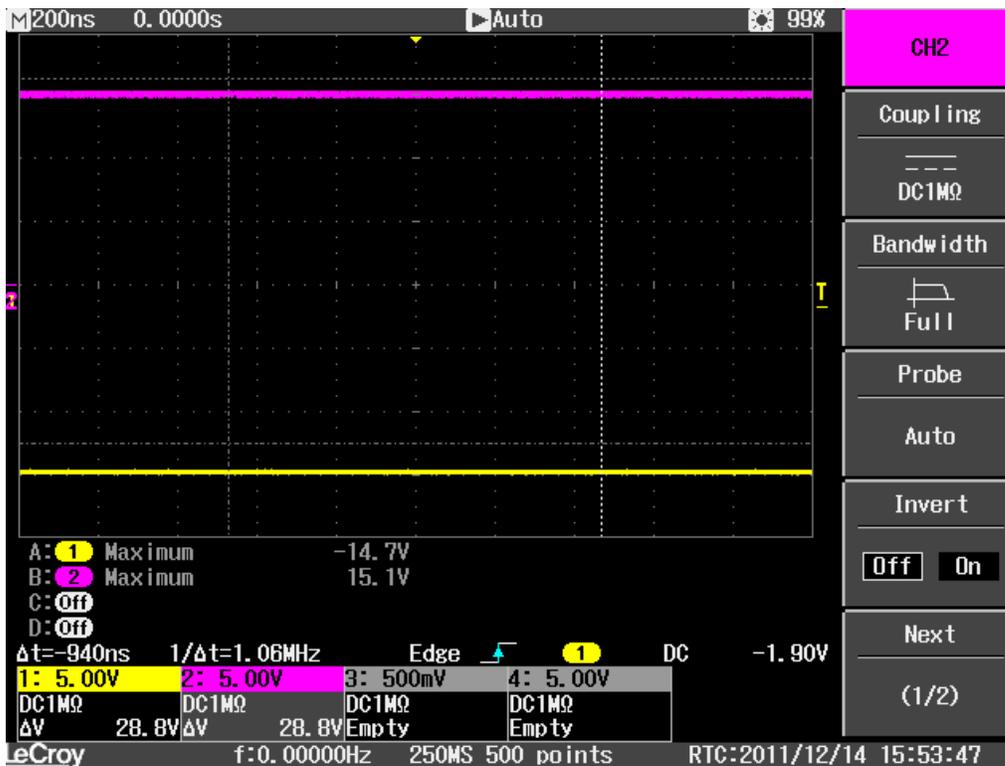


Figure 4. Off Board Acceptable Voltage Rails

## 4 Software Installation

Download the AMC1210MB-EVM evaluation software from the link in section 1.3. Follow the steps below to complete installation – this process only needs to be done once per PC utilized in the test procedure. The software and driver will work with all AMC1210MB-EVMs under test.

Install the AMC1210MB-EVM software and LabVIEW runtime environment. The screen shown in Figure 5 appears as you begin this process.

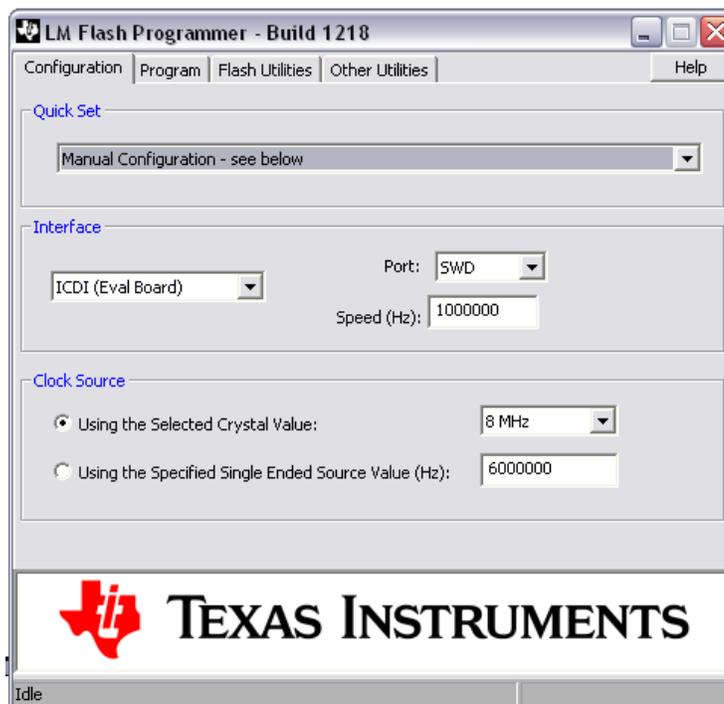


Figure 5. AMC1210MB-EVM Software Installation

## 5 EVM Firmware Preparation and Driver Installation

Before proceeding with the test procedure the board must be flashed with firmware. Visit <http://www.ti.com/tool/lmflashprogrammer> and click on 'Get Software' to download the Luminary Flash Programmer. The Luminary Flash Programmer requires installation of an additional FTDI ICDI USB driver which can be downloaded here: [http://www.ti.com/tool/lm\\_ftdi\\_driver](http://www.ti.com/tool/lm_ftdi_driver)

Start the flash programmer and select 'Manual Configuration – see below' in the Quick Set drop down. In the 'Interface' section select "ICDI (Eval Board)", Port: SWD, and Speed 1000000. In the Clock Source section select 'Using the Selected Crystal Value: 8 MHz'. The Configuration tab should look like Figure 11.



**Figure 6. Flash Programmer Configuration Settings**

Next, connect the LM3S811 eval board to an available PC USB port. Apply power to the AMC1210MB-EVM, then connect the LM3S811 JTAG port on the right of the board to the AMC1210MB-EVM JTAG connector on the top right of the board. The JTAG key should be facing the inside of the AMC1210MB-EVM.

Navigate to the 'Program' tab of the LM Flash Programmer. In the options pane select 'Erase Entire Flash', check 'Verify After Program', check 'Reset MCU After Program', and do not apply any program address offset. In the 'Select .bin file' pane select browse and navigate to the AMC1210MB-EVM software directory (C:\Program Files\AMC1210EVM by default). Select the binary file located in AMC1210EVM\fw\ named 'AMC1210MB-EVM.bin'. Next select the 'Program' button and the LM Flash Programmer should begin flashing the AMC1210MB-EVM with firmware.

After the AMC1210MB-EVM has been flashed with firmware, apply all power supplies to the EVM and connect the EVM to an available PC USB port. The computer should recognize new hardware and begin installing the driver. Accept the default settings. Figures 6-9 illustrate this process.



Figure 7. NI-VISA AMC1210MB-EVM Driver Installation

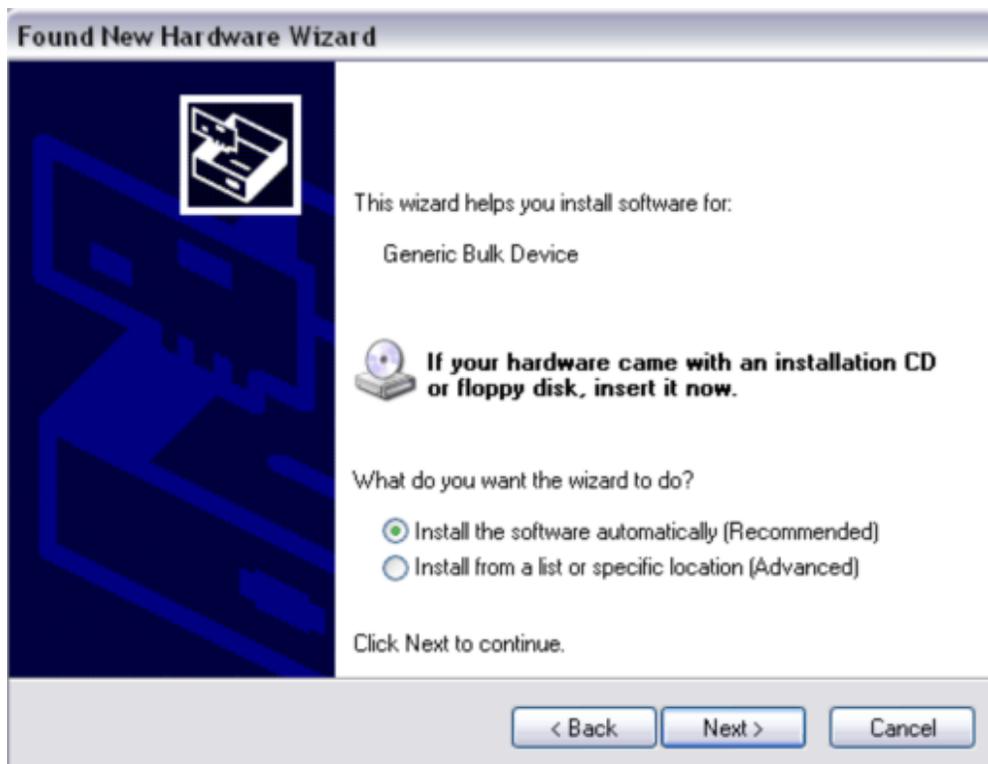
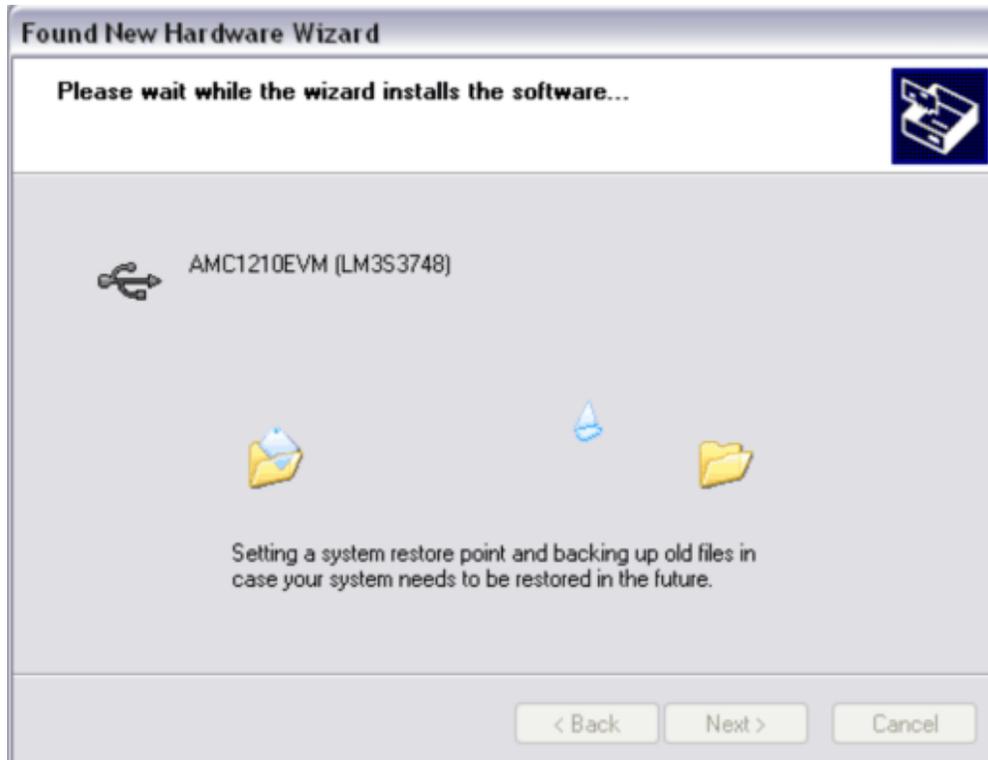
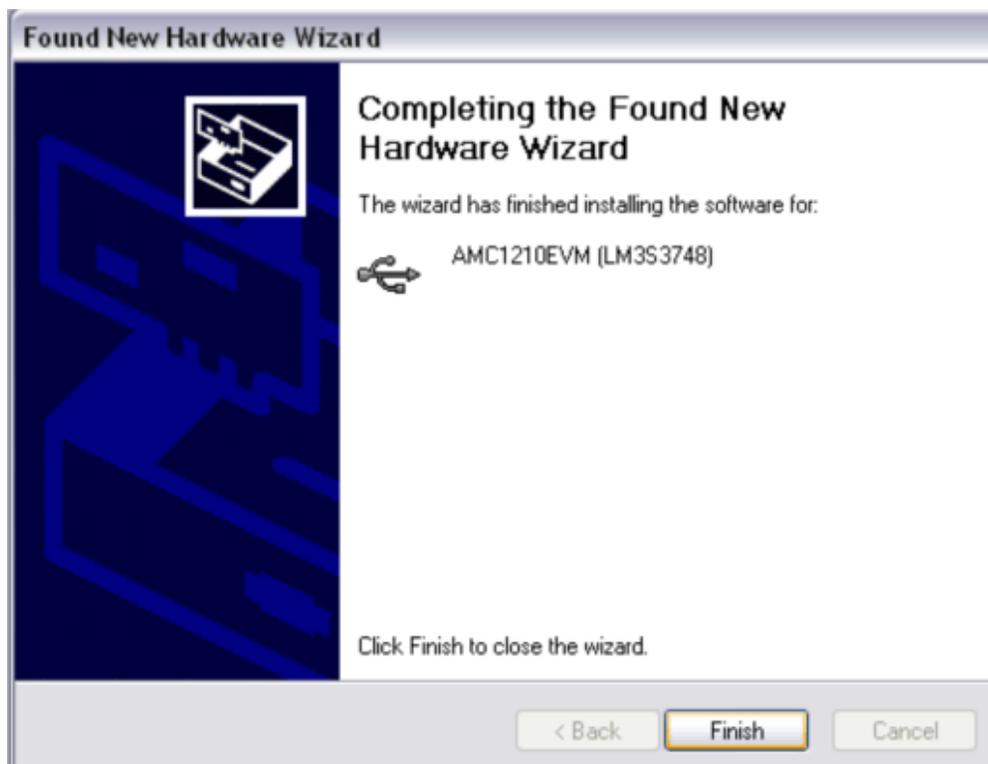


Figure 8. NI-VISA AMC1210MB-EVM Automatic Installation



**Figure 9. NI-VISA AMC1210MB-EVM Driver Installing**



**Figure 10. NI-VISA AMC1210MB-EVM Driver Installation Complete**

Verify that installation is completed successfully by opening the Windows Device Manager and locating the driver as shown in Figure 10.



**Figure 11. NI-VISA AMC1210MB-EVM Driver Verification**

## 6 EVM Functionality Testing

With the AMC1210MB-EVM power supplies connected and configured as described in Section 2 of this document and USB cabled connected, launch the AMC1210MB-EVM software. The AMC1210MB-EVM test fixture should not be applied.

When the software launches, click the Mode control to switch the EVM to 'Resolver Demo' mode. This control is shown in Figure 12.



**Figure 12. AMC1210MB-EVM Mode Control**

Switch to the 'Resolver Demo' tab and click the 'Acquire' button. The data returned is not relevant to this test procedure but begins exercising the AMC1210 pattern generator and OPA1632. Probe the shorting bar on the jumpers applied at J1 and J2 position 1-2 or, remove the jumpers applied at J1 and J2 and probe pin 1 of each to verify the pattern generator output. The output should resemble Figure 14, with reasonable tolerances applied for amplitude and frequency.

Once this output has been verified, press Ctrl+Shift+F1 while in the AMC1210MB-EVM evaluation software window. An indicator should appear at the top of the window as shown in Figure 13 that indicates the software is now in test mode. With J1 and J2 still probed, verify that the output has changed and resembles figure 15. The output quality of this signal will be significantly lower than that of the previous test.



**Figure 13. AMC1210MB-EVM Software In Test Mode**

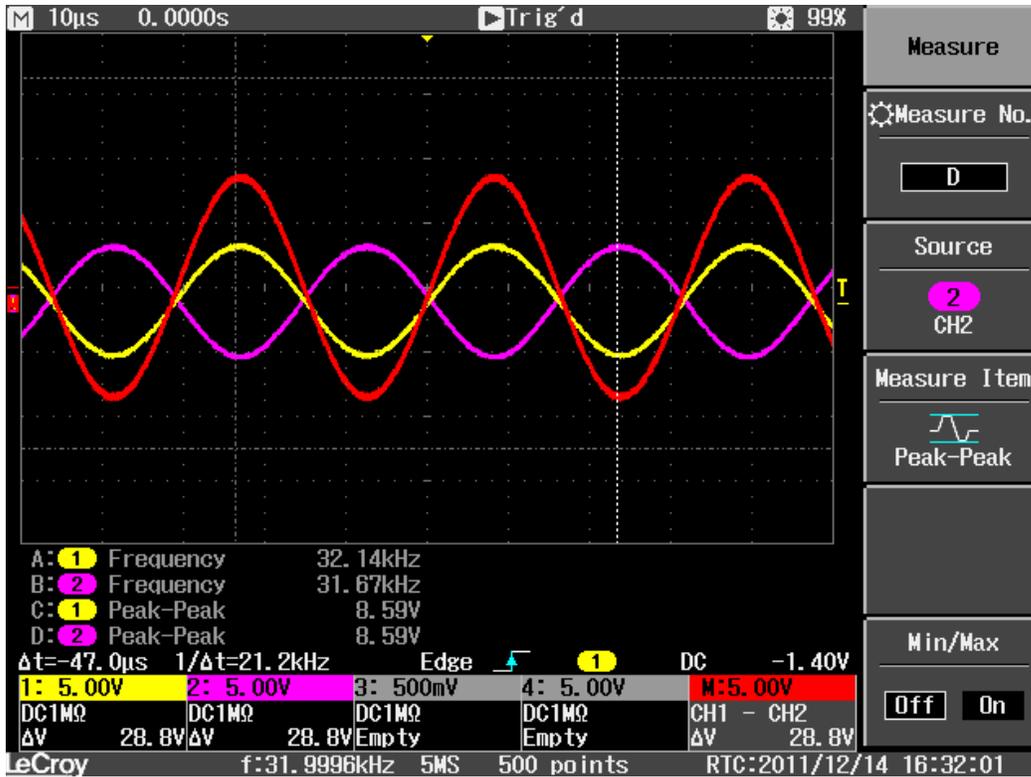


Figure 14. Acceptable AMC1210MB-EVM Pattern Generator Output

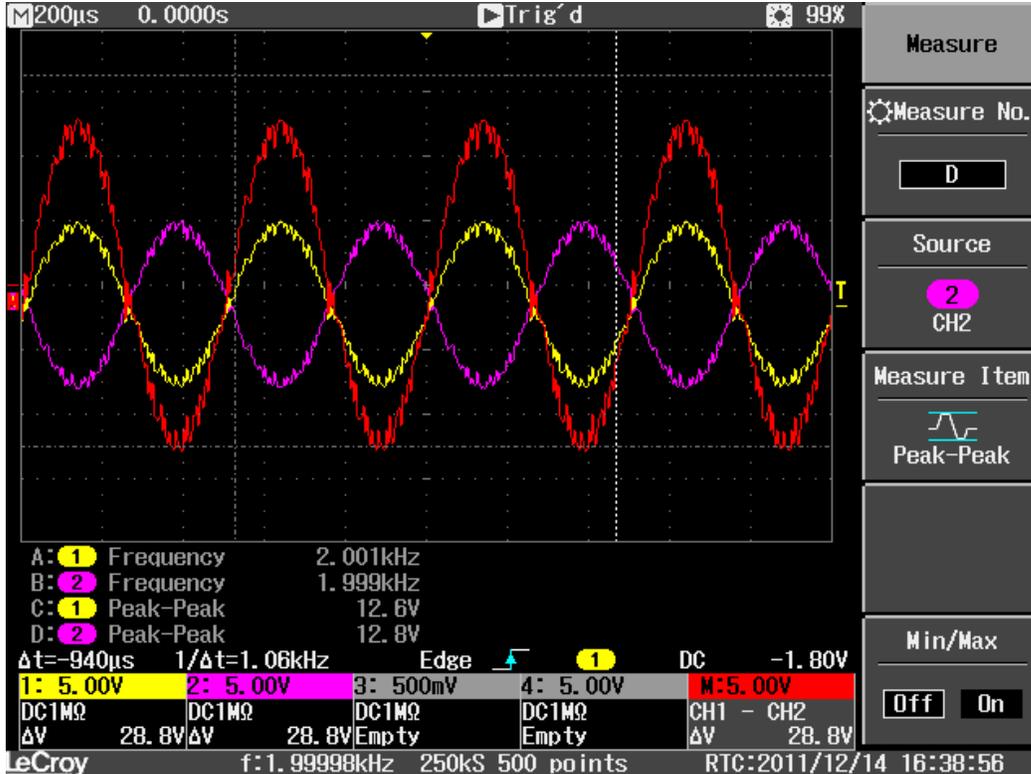
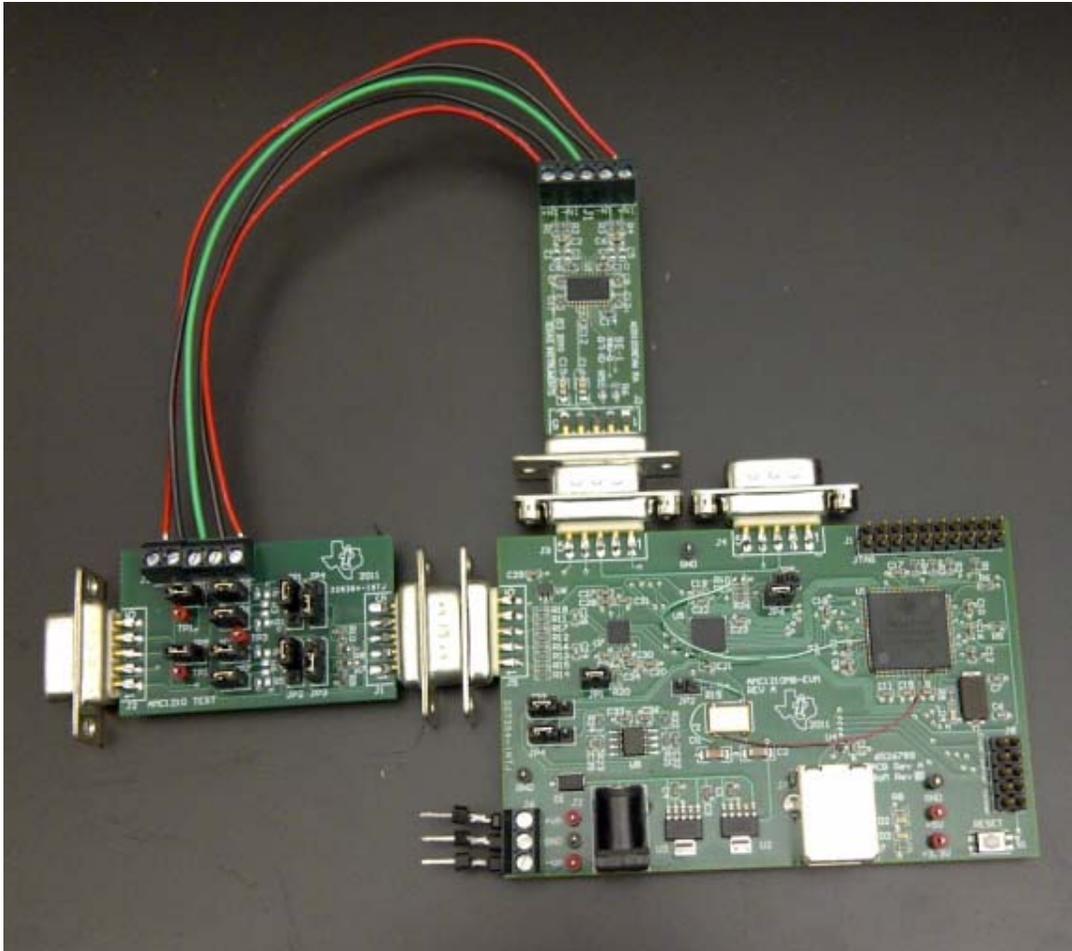


Figure 15. Acceptable AMC1210MB-EVM Test Mode Pattern Output

With the previous steps completed, disconnect and disable all power supplies and close the AMC1210MB-EVM software. Then, connect the AMC1210MB-EVM test fixture. The male end of the test fixture connector connects to the AMC1210MB-EVM at J5, the female end connects at J3. See figure 16 for reference.



**Figure 16. AMC1210MB-EVM and Test Fixture Connections**

With the test fixture connected, apply all power supplies and start the AMC1210MB-EVM software. When the software starts press Ctrl+Shift+F1 again to enter test mode. On the 'Current Shunt Settings' tab configure filter module 1 & 2 as described below and pictured in Figure 17. **Care should be taken to ensure that the software module enable buttons are also selected.**

- **Clock Direction:** Input
- **Sample-and-Hold:** Signal SH1
- **Time Measure Mode:** Between Rising Edges
- **Modulator Mode:** Clock at data rate from Modulator
- **Filter Structure:** Sinc3

- **ACK Enable:** Enable
- **Filter Enable:** Enable
- **SOSR:** 127
- **Shift:** 9
- **Data Format:** 16-bit
- **Integrator Mode:** Oversampling Mode
- **Integrator Enable:** Enabled
- **Demodulation Enable:** Disabled
- **IOSR:** 0

The screenshot shows the 'AMC1210 Evaluation Tool' interface. At the top, there are navigation tabs: 'Current Shunt Settings' (selected), 'Current Shunt Data', 'TestMode?' (with a green indicator), 'Mode: Current Shunt EVM', 'View AMC1210 Product Folder', and 'Visit the TI E2E Community'. Below the tabs is a descriptive text: 'This tab allows for modification of the filter module settings for filter modules 1 & 2 on the AMC1210 for current-shunt applications. The only fields made available are fields related to the control register, sinc filter, and integrator register. Because real-time streaming data is not supported, alarm functionality is not included in this EVM.'

The main area is divided into two columns for 'Filter Module 1' and 'Filter Module 2'. Each column contains three sections of settings:

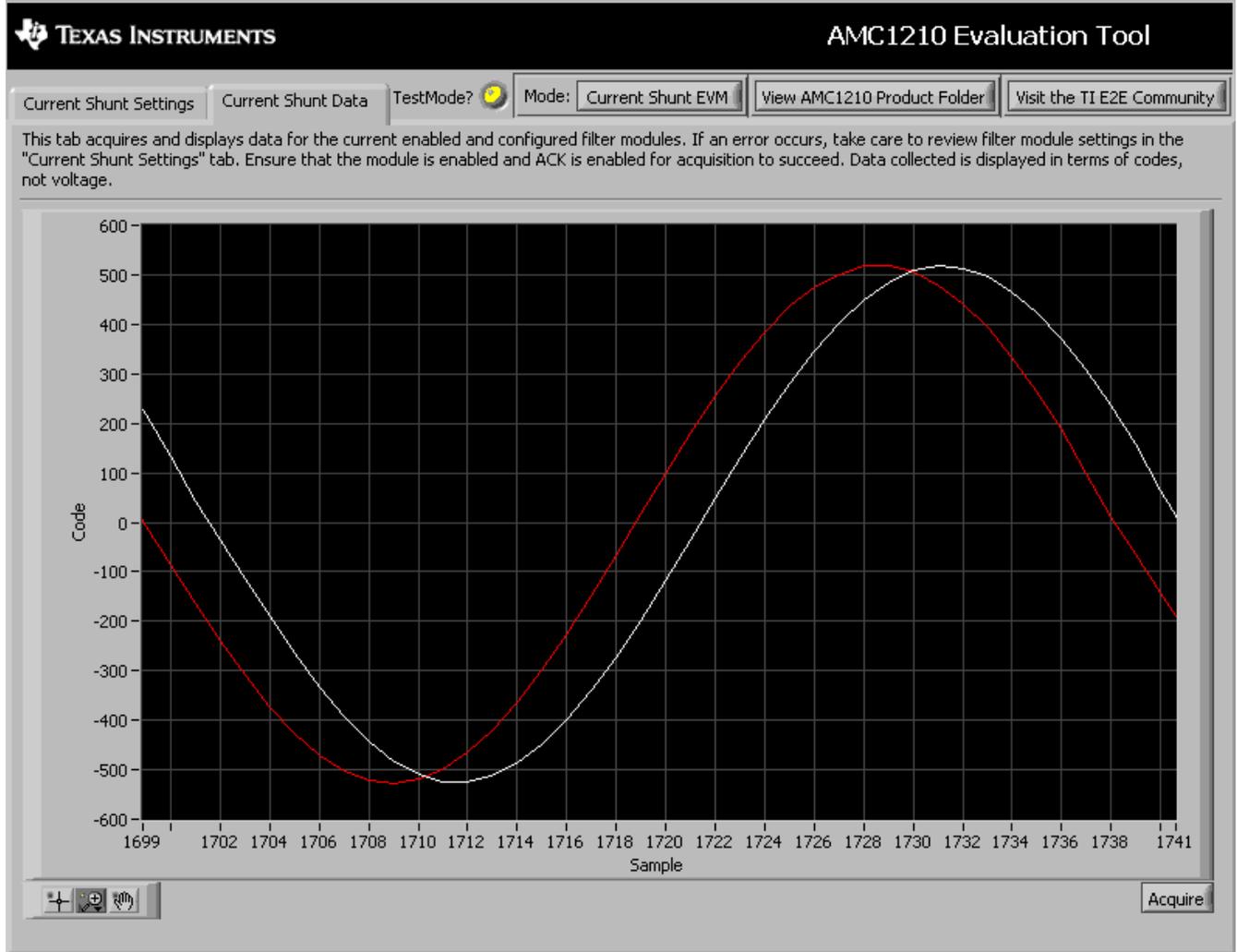
- Module Control Registers:** Includes 'Clock Direction' (set to 'Input'), 'Sample-and-Hold' (set to 'Signal SH1'), 'Time Measure Mode' (set to 'Between Rising Edges'), and 'Modulator Mode' (set to '00: Clock at data rate from Modulator').
- Module Sinc Filter Registers:** Includes 'Filter Structure' (set to '11: Sinc3'), 'ACK Enable' (set to 'Enable'), 'Filter Enable' (set to 'Enable'), and 'SOSR' (set to '127').
- Module Integrator Filter Registers:** Includes 'Shift' (set to '9'), 'Data Format' (set to '16-bit'), 'Integrator Mode' (set to 'Oversampling Mode'), 'Integrator Enable' (set to 'Enabled'), 'Demodulation Enable' (set to 'Disabled'), and 'IOSR' (set to '0').

At the bottom of each column, the 'Module Status' is shown as 'Enabled'.

**NOTE:** ACK Enable and the Enable button for a module must both be enabled for data to be collected properly. ACK can be enabled while the module enable button is set to disabled for an acquisition cycle to preserve module settings during evaluation.

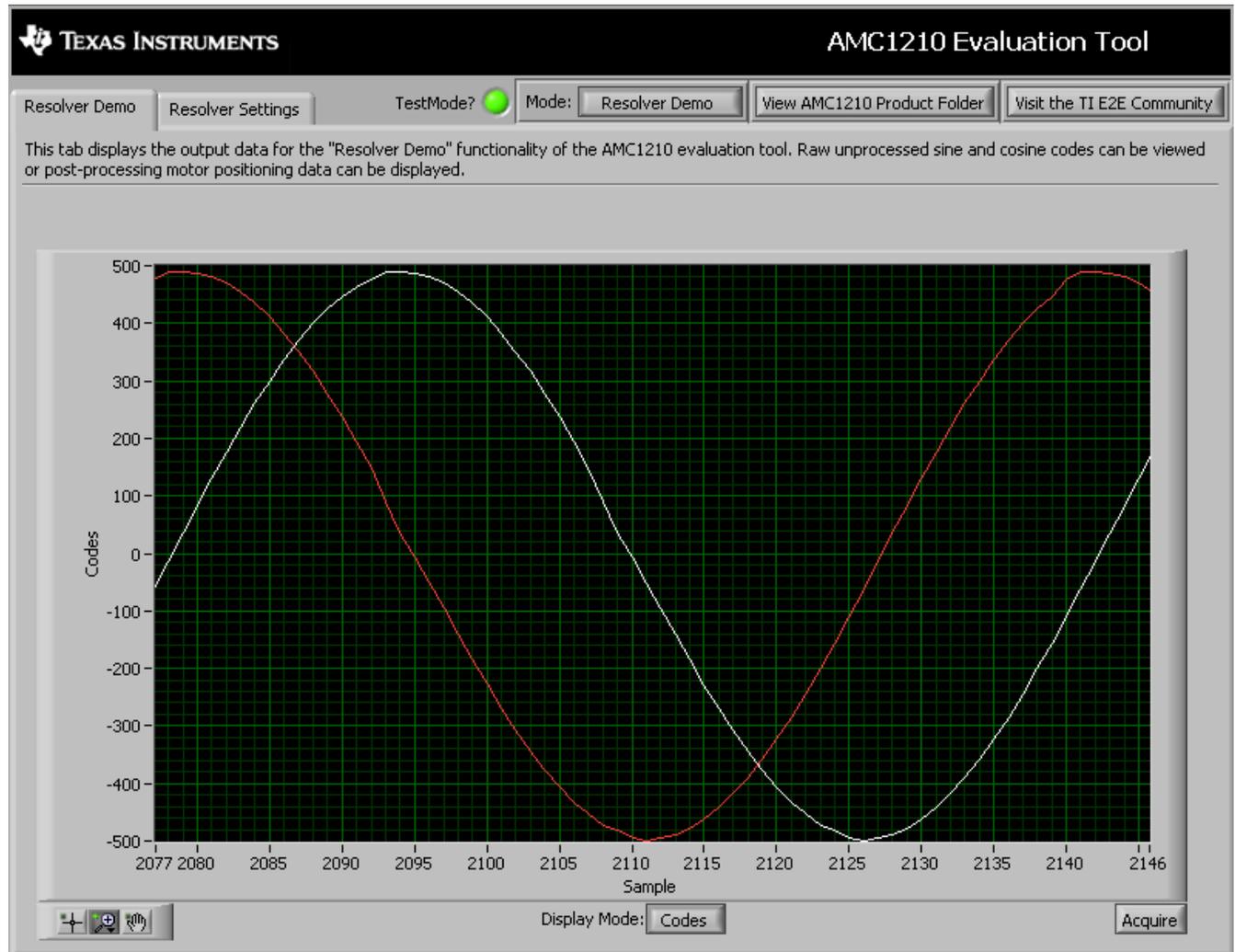
**Figure 17. Current Shunt Settings**

With the filter module registers configured appropriately, switch to the 'Current Shunt Data' tab and push the acquire button. Use the manipulation toolbar at the bottom left of this window to zoom in on the data and verify that a sine wave similar to Figure 18 has been captured.



**Figure 18. Acceptable Current Shunt Module Data Capture**

Next, push the Mode button previously shown in Figure 12 to switch to Resolver Demo mode. Switch to the 'Resolver Demo' tab and press the 'Display Mode' button to switch the display mode to codes. Push acquire and use the view manipulation tools in the bottom left of this window to zoom in on the data and verify that it looks similar to figure 19.



**Figure 19. Acceptable Resolver Demo Module Data Capture**

## 7 Final Board Configuration

Make sure that JP1 and JP2 are installed as shown in Figure 2.

## 8 Preparation for shipment

All functional tests are now complete. Before packaging EVM for shipment, verify the following:

1. Remove all test equipment and temporary jumpers.
2. Ensure all final jumpers are securely seated.
3. Mark the board appropriately, indicating that it has passed the functional/visual test.
4. Place/seal the tested board in an anti-static bag.
5. Label the bag with the appropriate EVM name (i.e., AMC1210MB-EVM) according to the device installed on the board before shipment to distribution center.

## 9 Contact Information

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