0011-01-16-05-000
Using the ZICM35xSPx Programming Fixture with Breakout Connections

Document No:
0011-01-16-05-000 (Issue C)

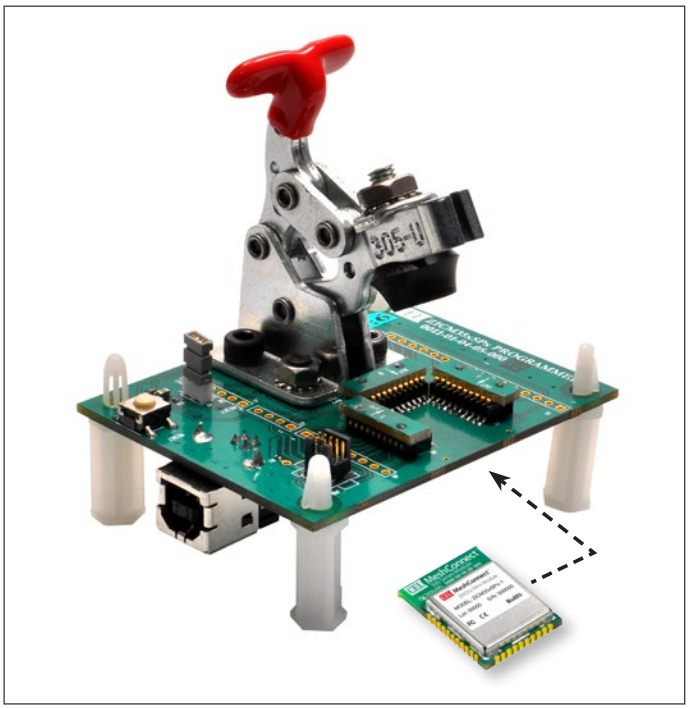
INTRODUCTION

California Eastern Laboratories (CEL) offers a programming assembly to be used with the CEL ZICM35xSPx MeshConnect™ Mini Modules. This is useful for production programming or during application development when multiple firmware images are required to be loaded into a CEL Mini Module for testing and debugging. The assembly includes a USB port connection with a USB transceiver and 3.3V regulator to communicate and power the module during debugging.

For programming, the assembly must be used in conjunction with an Ember Debug/Insight Adapeter (ISA3) from Silicon Labs.

CEL's EM35x Mini Modules combine high performance RF solutions with the market's premier ZigBee stack. These modules can accommodate variable range and performance requirements. The EM35x Mini Modules are certified and qualified, enabling customers to accelerate time to market by greatly reducing the design and certification phases of development.

For more information on the MeshConnect Mini Modules, visit CEL at www.cel.com/MeshConnect.



DESCRIPTION OF FIXTURE ASSEMBLY

The fixture assembly consists of a Printed Circuit Board (PCB), spring loaded connectors with guides and a clamp used to hold the module against the spring loaded fingers. The spring loaded fingers provide electrical contact between the castellation pins on the bottom of the module and the PCB. A 10-pin header makes the connections between the programming pins on the module and the ISA3 through a 10-pin ribbon cable. In addition to the programming connections, the PCB also brings all of the module's signal pins out to the test points on the perimeter of the plastic carrier for easy access. The ISA3 provides DC power to the module (for programming purposes only) by setting the Target Power Switch = Internal. The ISA3 should not be used for powering the module for any application other than programming. Additional test points for V_{CC} and ground exist to allow the user to provide power from an external supply if desired or by using the USB port. The programming fixture connected to an ISA3 is shown in Figure 1 on Page 3.

ORDERING INFORMATION

Part Number	Order Number	Description	Min/Multiple
MeshConnect EM35x Programming Fixture	ZICM35xSPx-PF-1	MeshConnect EM35x Mini Modules (ZICM35xSPx) Programming Fixture	1/1

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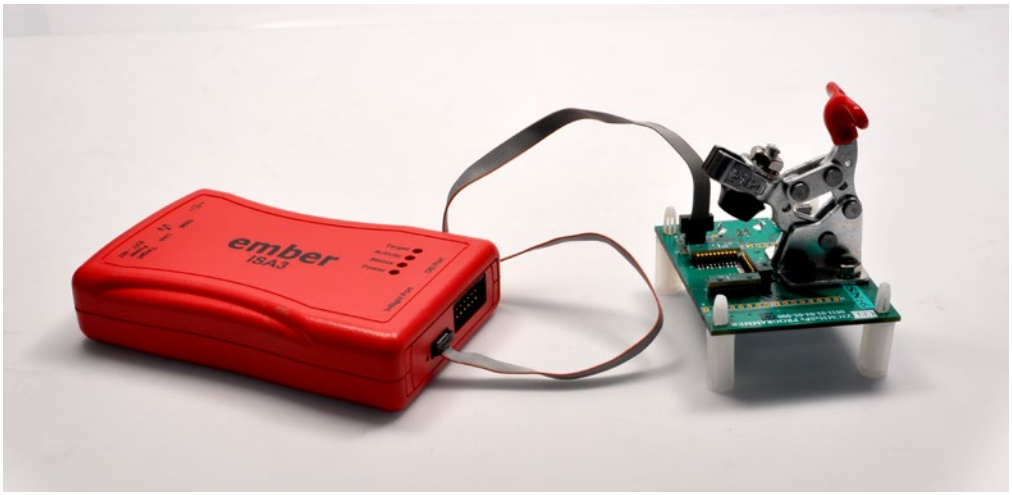

Figure 1 – Programming Fixture

FIXTURE SCHEMATIC

The schematic of the fixture is detailed in Figure 2. Included on the PCB are several decoupling capacitors and a pull-up resistor on the reset line along with the 10-pin programming header. The PCB also brings all of the module connections (excluding RF Out, pin 32) out to the test points for the user's benefit. The test points are labeled in silkscreen on the PCB so that the user can quickly locate the signal pin of interest. This is especially useful for monitoring GPIO or other pin functionality with the new firmware images. A USB port followed by a USB transceiver and 3.3V regulator is also included to allow the flexibility of using the programming board as a breakout board for the module castellation pins.

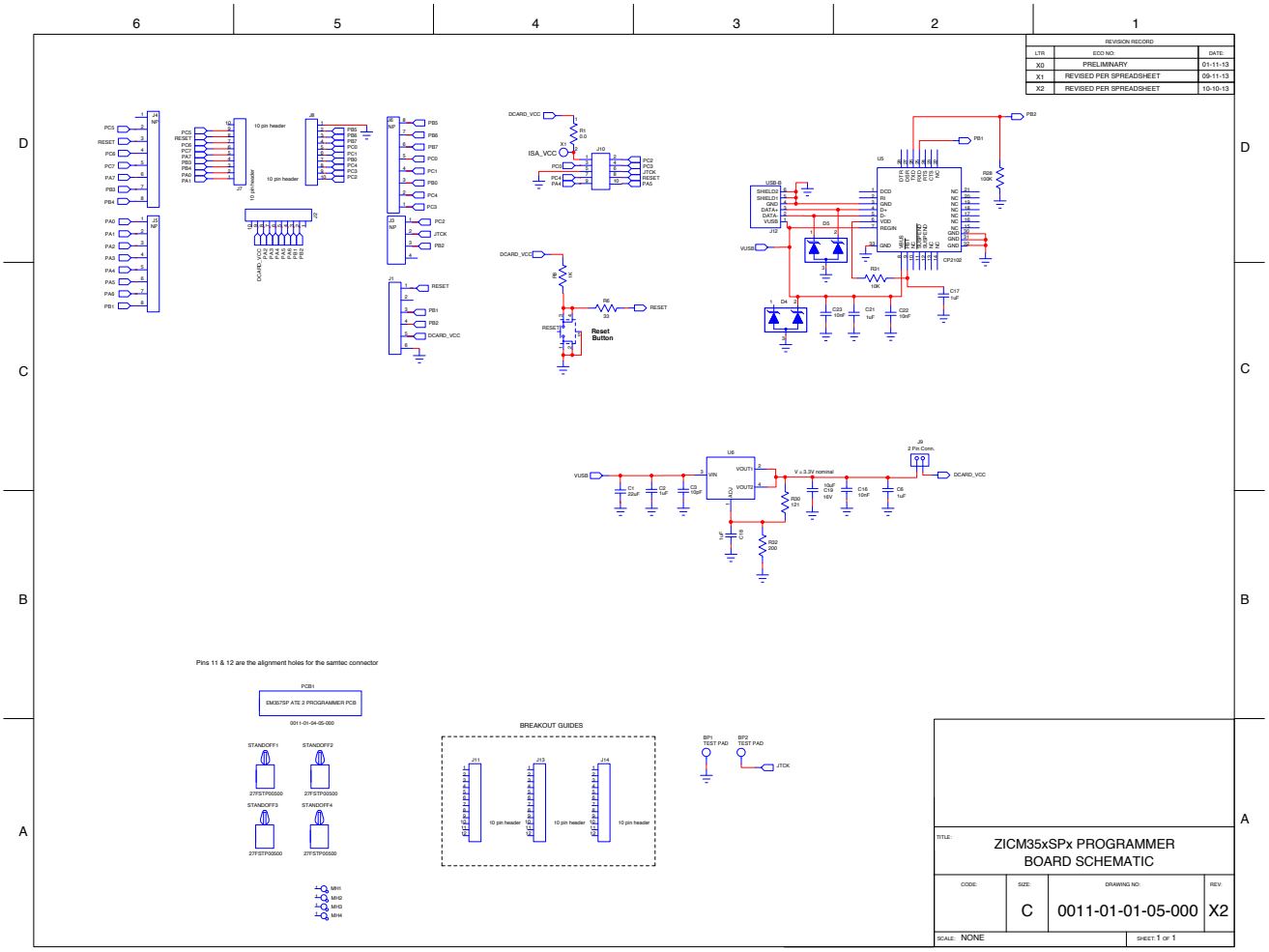

Figure 2 – Fixture Schematic

FIXTURE ASSEMBLY

The programmer fixture assembly is shown in Figure 3.

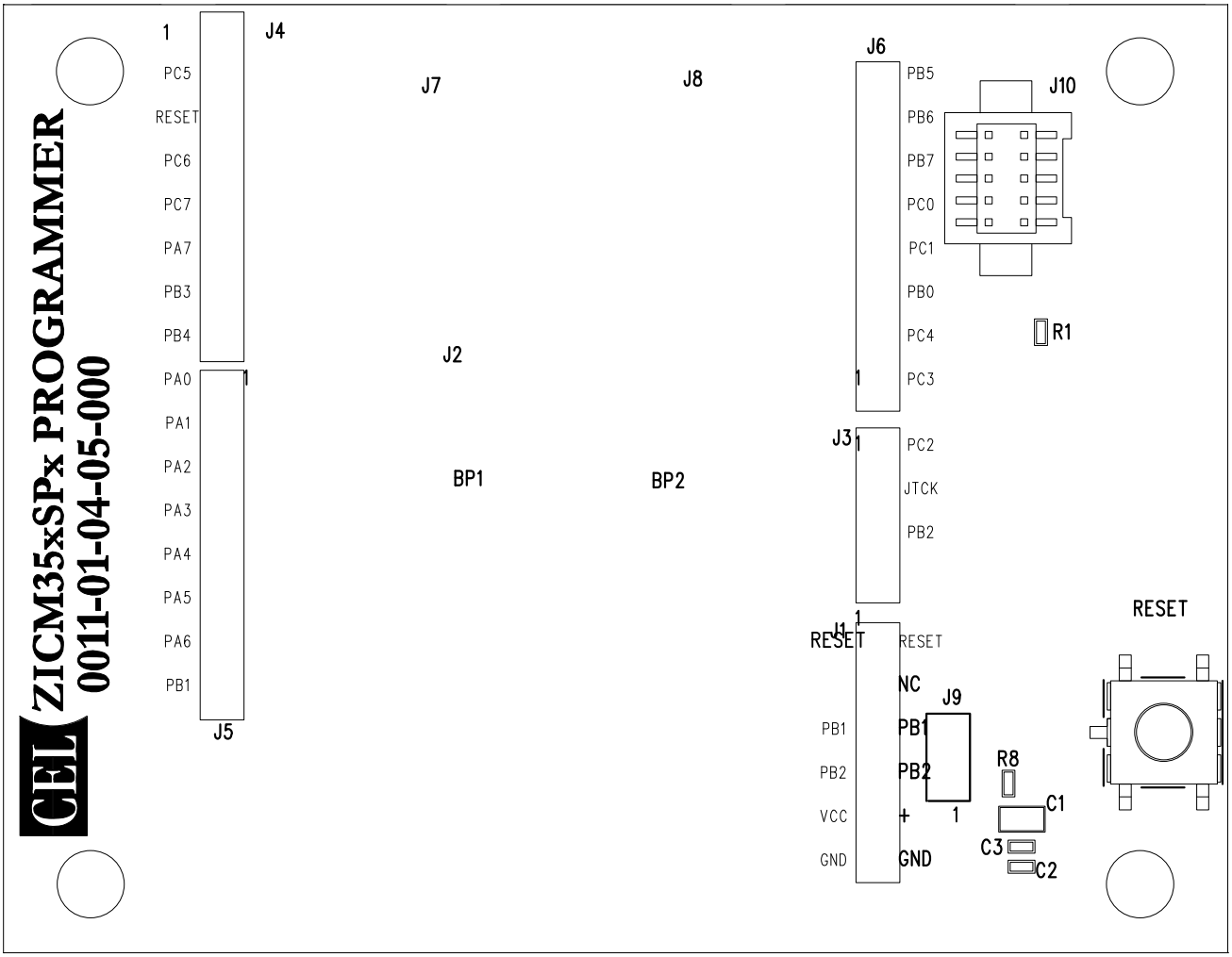

Figure 3 – Fixture Assembly

REQUIRED ITEMS

Using the programming fixture is very straightforward. In addition to the CEL programming fixture, the items required are as follows:

- An ISA3
- A PC
- A USB cable to interface between the PC and the ISA3
- ISA3 Utilities (available via Silicon Labs website, see reference section for link)
- An EM35x compatible firmware image

PROGRAMMING INSTRUCTIONS

Follow the instructions below to successfully program a module:

1. Install the ISA3 utilities on the PC. The default location is acceptable, (i.e. `C:\Program Files\Ember\ISA3 Utilities`).
2. Copy your new firmware image into the folder `C:\...\ISA3 Utilities\bin`
   (Note: to illustrate the procedure within this Application Note, the firmware image to be loaded was called "example.hex").

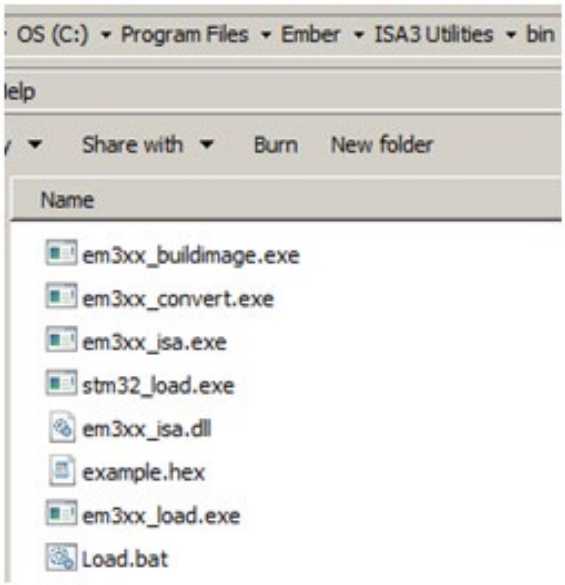

Figure 4 – Create Batch File

3. Create a batch file named `load.bat` using any text editor and save it in the bin folder from above.

4. Edit `load.bat` and copy the following two lines of text:

```
C:> em3xx_load –usb 0 example.hex
```

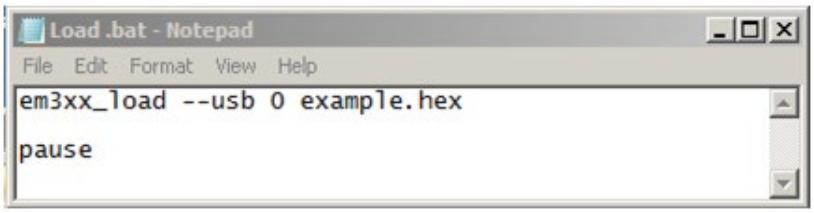

Figure 5 – Screen Capture of Batch File Commands

```
C:> Pause
```

Note: "em3xx_load –usb 0" is the command for the ISA3 indicating that the download will be through the USB port, and to target device "0" which is the default option. The "pause" command keeps a DOS window open to allow the results to be shown. For more details, refer to Silicon Labs document 120-4032-000.

5. Save the batch file and close it.
6. Verify that the 10-pin ribbon cable between the ISA3 and the PCB is connected.
7. Verify that the USB cable is connected between the PC and the ISA3.
8. Verify that the switch on the ISA3 is in the "`INT`" position.
9. Place the module into the fixture, making sure it is seated on the two alignment pins to ensure good contact and correct alignment, and then close the clamp.
10. Double click on `load.bat` to load the firmware image.

While the image is loading into the module, a DOS window will open and the memory address being written to the module will be updated. If the image loads successfully, the last line will show "`Done`", followed by the instructions "`Press any key to continue…`"; pressing any key will close the DOS window and complete the programming sequence.

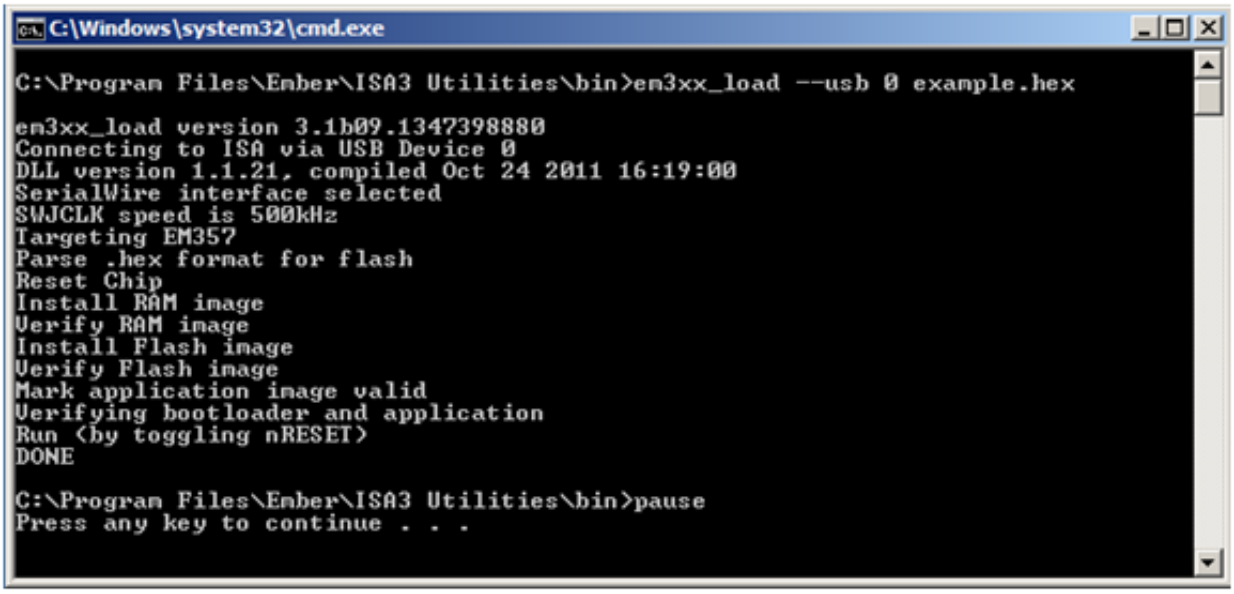

Figure 6 – DOS Window

At this point, another module can be loaded into the fixture and programmed by simply executing the `load.bat` file again. Repeat until all modules are programmed.

REFERENCES

Reference Documents	Download
California Eastern Laboratories	
0011-00-07-00-000 MeshConnect EM35x Mini Modules (ZICM35xSPx) Datasheet	Link
Silicon Labs, Inc.	
120-035X-000 Rev. 1.2 EM351/EM35x Datasheet	
120-2010-000 Ember Debug Adapter (ISA3) Technical Specification	
120-4032-000 Ember EM3xx Utilities Guide for the EM35x SoC Platform	
ISA3 Utilities	Link

REVISION HISTORY

Previous Versions	Changes to Current Version	Page(s)
0011-01-16-05-000 (Issue A) May 2, 2013	Initial Release	N/A
0011-01-16-05-000 (Issue B) July 17, 2013	Updated Product Photography	1, 3
0011-01-16-05-000 (Issue C) July 21, 2014	Updated Product Features and Photography. Updated Fixture Schematic and Assembly Data	1, 3, 4

Disclaimer

For More information

For more information about CEL MeshConnect products and solutions, visit our website at: www.cel.com/MeshConnect.

Technical Assistance

For Technical Assistance, visit www.cel.com/MeshConnectHelp.