



QSG100: EM34x Development Kit Quick-Start Guide

Unpacking the Contents



ATTENTION: Observe precautions for handling electrostatic sensitive devices.

Remove components from their packaging:

- Silicon Labs remote control (1)
- Silicon Labs EM35x breakout board (1)
- EM341-MOD-ANT-C (1)
- EM341-MOD-RF-C (1)
- EM346-MOD-ANT-C (1) (Installed on EM35x breakout board)
- EM346-MOD-RF-C (1)
- Silicon Labs Ember Debug Adapter (ISA3) (1)
- Packet Trace Port Cable (1)
- Data Emulation Interface Cable (1)
- Ethernet Cable (1)
- USB Cable (1)
- USB Power Brick (1)
- RF Cable (1)
- AAA Batteries (2)

Note: It is recommended you watch the EM34x Development Kit training video at www.silabs.com/zrcrtraining before proceeding with the setup of the EM34x Development Kit.

Register the Kit on the Support Portal

You must be a registered user of the Silicon Labs Technical Support Portal and EM34x Development Kit must be registered to obtain support and download the latest Silicon Labs development software and stacks.

Go to <https://siliconlabs.force.com/KitRegistration> to log in or create an account.

Download and Installation

Once you have created an account and/or are logged in and have completed registration, click the **[Take me to latest EmberZNet software]** link to access the list of all necessary software.

Download and Install the latest version of the following tools:

- Ember Desktop
- EmberZNet
- ISA3 Utilities
- IAR Embedded Workbench for ARM (version 7.30)

1. Connecting the Ember Debug Adapter (ISA3)

1. Confirm the toggle switch is set to the [INT] position.
2. Insert the other end of the Ethernet cable into an Ethernet port on the network. **Note:** If connecting directly to a developer's PC, a static IP address must be set. See [2. Configuring Static IP Addresses \(optional\)](#). It is recommended that you connect the ISA3 to a DHCP port to simplify setup and development.
3. Insert one end of the Packet Trace Port cable into the Packet Trace Port of the Debug Adapter.
4. Insert one end of the data emulation interface (DEI) cable into the DEI port of the Debug Adapter.



2. Configuring Static IP Addresses (optional)

By default, Ember Debug Adapters are configured to acquire IP addresses using DHCP. If your network environment requires use of static IP addresses, configure the Ember Debug Adapter as follows:

1. Disconnect the Ethernet connection from the Ember Debug Adapter.
2. Connect one end of the USB cable to the Ember Debug Adapter.
3. Connect other end of the USB cable to the PC.
4. Run `em3xx_isa.exe` with these parameters to configure static IP settings.

```
em3xx_isa.exe --admin "ip status IPADDR NETMASK GATEWAY"
```

Replace IPADDR, NETMASK, and GATEWAY with your desired settings.

Example: The following command line changes settings to a static IP address of 192.168.1.100 with a netmask of 255.255.255.0 and gateway of 192.168.1.1

```
em3xx_isa --admin "ip static 192.168.1.100 255.255.255.0 192.168.1.1"
```

Result: Success:IP:after reboot Static 182.168.100 255.255.255.0 192.168.1.1

5. Run `em3xx_isa.exe` one more time with these parameters to disable DHCP:

```
em3xx_isa.exe --admin "ip dhcp off"
```

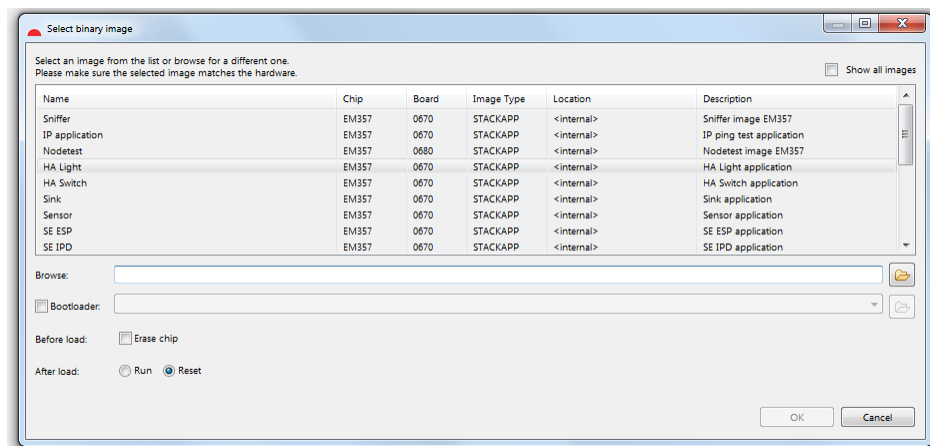
Result: Success:IP: (after reboot) DHCP off

3. Running the Remote Control Sample Application

There are sample applications for both the remote control (ZRC Controller) and the EM35x breakout board (ZRC Target). The sample applications demonstrate basic RF4CE network and ZRC application functionality. The remote application acts as a generic remote control while the EM35x breakout board acts as a target device. Both devices utilize the ZRC Profile plugin to provide core application-level functionality and the GDP and ZRC plugins to provide ZRC2.0 specific behavior.

The target device will automatically start the network. The controller device is responsible for initiating pairing to an existing network. The controller application will disable its receiver automatically to conserve power. This is representative of a sleepy device that is generally a transmit-only device that acts when directed by the user (i.e., a button press). Pressing a button on the controller will result in a command being sent to the target device. The target device will receive the command and send an acknowledgment back to the controller.

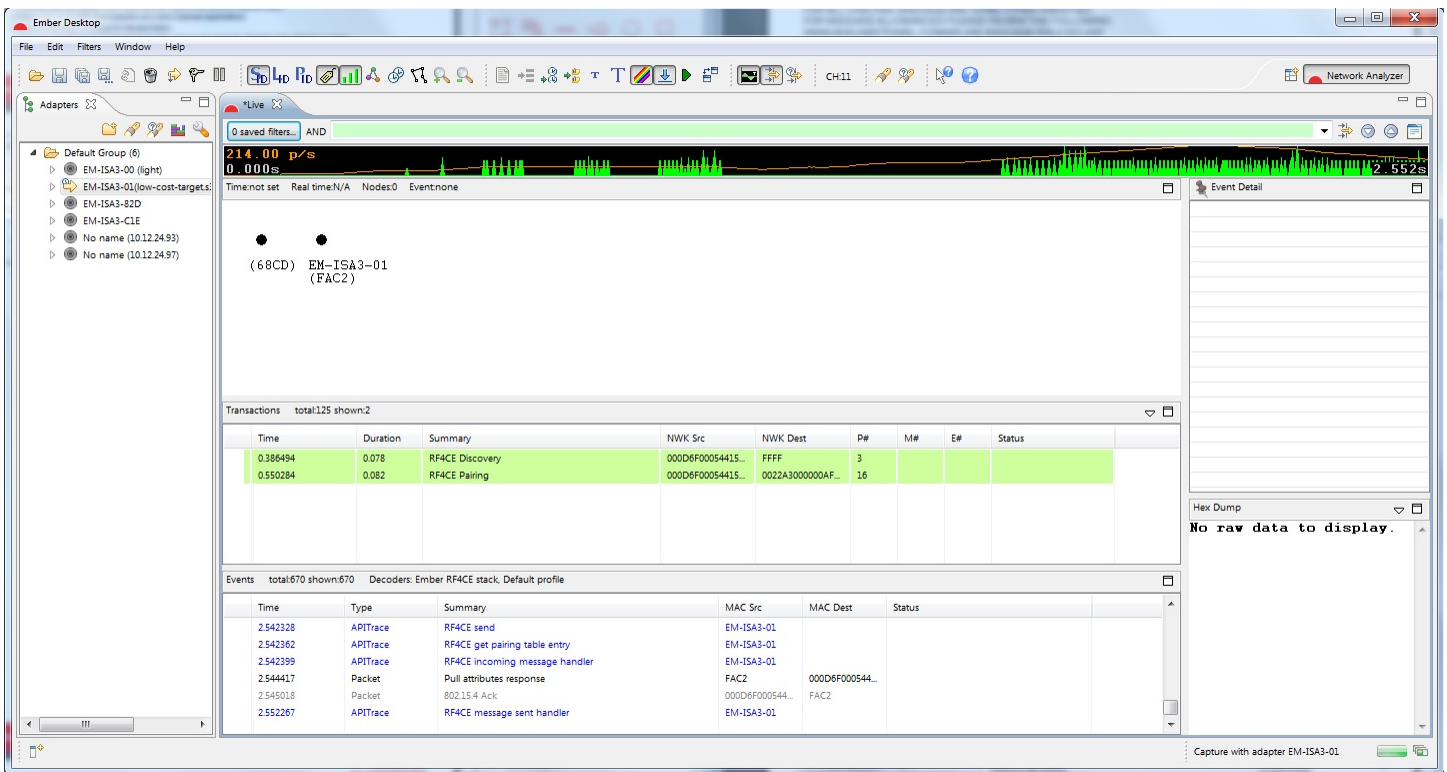
1. Launch Ember Desktop Software.
 - a. Start>All Programs>Ember>Ember Desktop>Ember Desktop
2. Enter the Ember ZigBee support portal username obtained from Silicon Labs support and click **[Save username]** and **[Continue]**. If you don't have a username, click **[Continue]** without registration. Once you have a user name, you can register with Help>Register. If prompted to start the First-Time Setup Wizard, just click **[Continue to Ember Desktop]**.
3. Program the remote control with the low-cost-controller application.
 - a. Remove the battery cover and install the batteries in the remote control. **Note:** The remote control is programmed with the sample application from the factory. Follow the steps below to reprogram the remote control with the sample application.
 - b. Change the ISA Target Power select switch to the EXT position.
 - c. Insert the Packet Trace cable from the ISA3 adapter to the packet trace connector located under the battery cover on the remote control.
 - d. Right click on the **[EM-ISA-00 adapter]** shown in the Adapters window and select **[Connect]**.
 - e. Right click on the **[EM-ISA-00 adapter]** and select **[Upload application]**.
 - f. Click on the folder to browse for the application.



- g. Browse to <znet-install-directory>\app\rf4ce\sample-app\low-cost-controller\ and select the **[low-cost-controller.s37]** file to upload.
- h. Click **[Bootloader]**; browse to <znet-install-directory>\tool\bootloader-em341\app-bootloader\; select **[app-bootloader.s37]**.
- i. Click on the **[Erase chip]** option and click **[OK]**.
- j. Wait until application upload is done and click **[OK]** on the dialog box when complete.
- k. Unplug the Packet Trace cable from the remote control and replace the battery cover.
4. Program the EM35x breakoutboard with the target-zrc20 application.
 - a. Make sure the EM346-MOD-ANT-C module is plugged into the EM35x breakout board.
 - b. Change the ISA Target Power select switch to the INT position. If providing power from USB, the max current limit is 500 mA.

Note: If providing USB power from a PC/Laptop USB port, it may not provide enough current to power both the ISA3 adapter and the EM35x board.
 - c. Connect both the Packet Trace cable and DEI cable to the EM35x breakout board.
 - d. Right click on the **[EM-ISA-00 adapter]** and select **[Upload application]**.
 - e. Click on the folder to browse for the application.
 - f. Browse to <znet-install-directory>\app\rf4ce\sample-app\full-featured-target\ and select the **[full-featured-target.s37]** file to upload.

- g. Click on the **[Erase chip]** option and click **[OK]**.
 - h. Click **[Bootloader]**; browse to <znet-install-directory>\tool\bootloader-em346\app-bootloader\; select **[app-bootloader.s37]**.
 - i. Wait till application upload is done and click **[OK]** on the dialog box when complete.
5. Set up the Capture session to decode ZRC packets.
 - a. Select File>Preferences and then select **[Decoding]**.
 - b. Select the option **[Change the stack version and profile]**.
 - c. Select **[Ember RF4CE stack]** and click **[Apply]** and **[OK]**.
 6. Start the Capture session.
 - a. Right click the **[EM-ISA-00 adapter]** and select **[Start capture]**.
 7. Pair the devices.
 - a. Press and hold down both the **[PAIR]** and **[STB]** buttons on the remote. If a debug cable is attached to the remote, the **[PAIR]** button cannot be used; the **[SETUP]** button must be used instead. The Power button should turn red while it is searching for a target device. Release both buttons.
 - b. Press **[Button1]** on the EM35x breakout board to accept the pairing.
 - c. Once pairing is completed, the Power button on the remote will turn off.
 8. View Capture activity.
 - a. Press buttons on the remote to see the packet information sent over the air with the Ack from the breakout board.



4. For More Information

To better understand Ember Desktop and the network capture activity, refer to www.silabs.com/zrctraining.

For more information on the development kit hardware, refer to the EM34x User's Guide (UG113).

You can also use the Silicon Labs Technical Support Portal at <http://siliconlabs.force.com>



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