



National Semiconductor  
 Application Note, **Confidential**  
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# LMX9820x Modules In-System-Programming (ISP) Instructions for PC-Based CRISP Downloader

## 1.0 Scope

This document outlines how to perform a PC-based In System Programming (ISP) of the LMX9820x serial port modules. These steps must be followed in their entirety once initiated or corruption of the Flash memory of the National device being used may result. ISP version 3.00 or later must be used.

## 2.0 Required Files

The following steps were tested with Kanda Software CRISP (version 1.4.3. modified for LMX9820x). An update file for the module firmware is also required. This file is provided by National Semiconductor.

File list:

- CRISP executable: crisp.exe
- Update file with .xpr or .hex file extension. For example: LMX9820A\_V600.hex

## 3.0 Hardware Configuration

- 1) Remove power from the Texas board.

- 2) Configure the module to start in ISP mode. ENV0 pin to logical 0 and ENV1 pin to logical 1.
- 3) Attach the power to the Texas board.
- 4) Connect the UART cable between the development board and the PC. The COM port speed is determined by the settings in CRISP software. The LMX9820A firmware uses autobaud rate detection to configure the hardware UART.

## 4.0 Software Download

- 1) Launch the CRISP software. This can be done with the installed short cut or double click crisp.exe. (Figure 4-1 on page 1)
- 2) Load the module firmware for download. *File->Load->Flash Program Memory File*. The data will appear under the "Flash Program Memory" tab.(Figure 4-2 on page 2). Depending on the firmware update file being used, the data displayed may differ from that shown in the figure. The load status is indicated at the bottom of the tool's window.

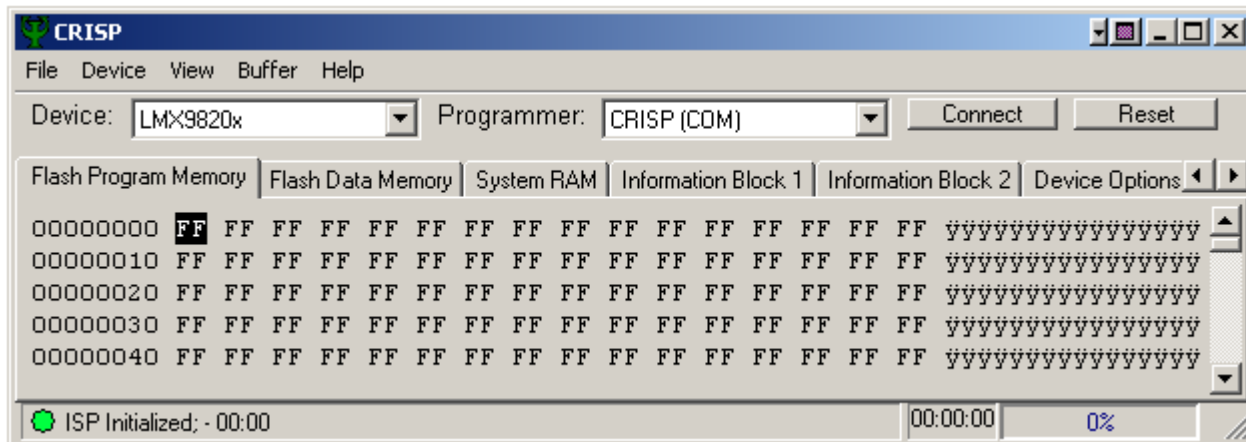
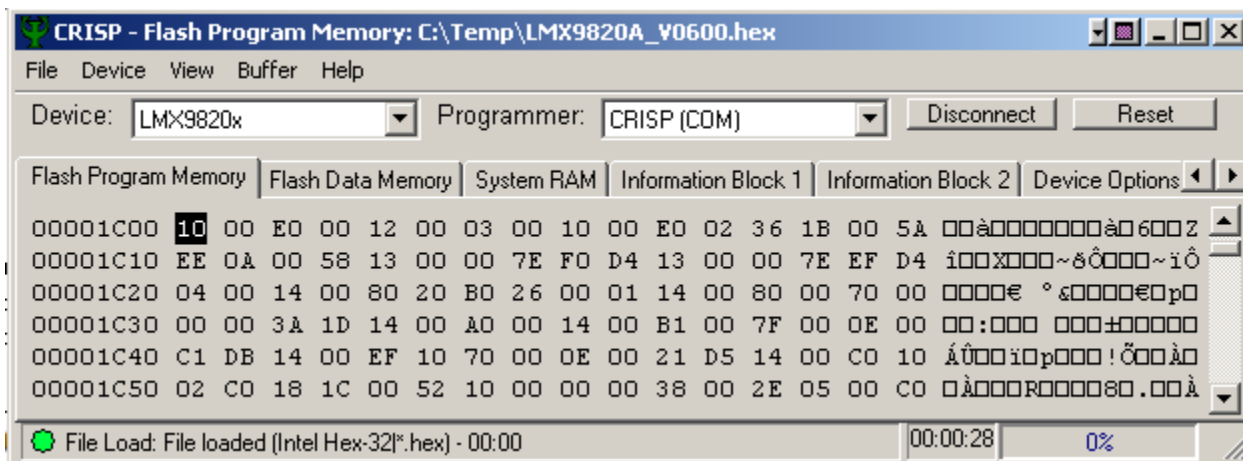


Figure 4-1. CRISP Application

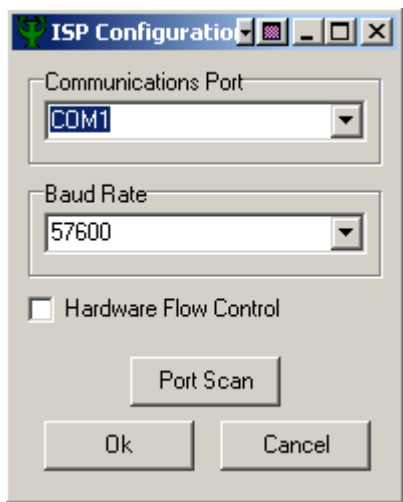
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## Software Download (Continued)



**Figure 4-2. CRISP Program Memory File Loader**

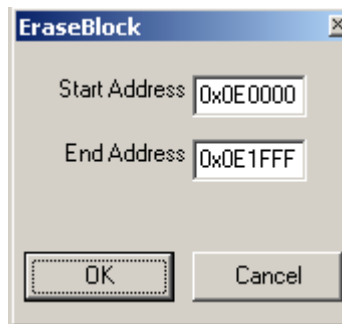
- 3) Click the *Connect* button. A popup box labeled *ISP Configuration* will appear (Figure 4-3 on page 2).



**Figure 4-3. CRISP In System Programming (ISP) Configuration**

- 4) Choose the *Communications Port* the board is connected to (Figure 4-3 on page 2).
- 5) Select the baud rate from the pulldown menu (Figure 4-3 on page 2).
- 6) Click *Ok*. The tab in CRISP will change to *Device Options* and a connected status is indicated at the bottom of the tool's window. Do not change any values on this tab (Figure 4-5 on page 3).

- 7) Program the device. *Device->Program->Program Flash Program Memory*. A status bar (0% to 100%) at the bottom of the tool's window will indicate status. A message will be displayed to indicate a successful download.
- 8) Verify the device (optional). *Device->Verify->Verify Flash Program Memory*. A status bar (0% to 100%) at the bottom of the tool's window will indicate status. A message will be displayed to indicate a successful verification.
- 9) Select the memory location by selecting the *Flash Data Memory* tab.
- 10) Erase the data flash. *Device->Erase Block*. Confirm that the correct memory range (Figure 4-4 on page 2). A status bar (0% to 100%) at the bottom of the tool's window will indicate status. A message will be displayed to indicate a successful erase.



**Figure 4-4. Erase memory location**

## Software Download (Continued)

- 11) Disconnect the tool. Click *Disconnect*.
- 12) Remove power from the Texas board.
- 13) Configure the module to start in firmware mode. ENVO pin to logical 1 and ENV1 pin to logical 1.
- 14) Attach power to the Texas board.
- 15) Verify operation with Simply Blue Commander or with your application circuit.

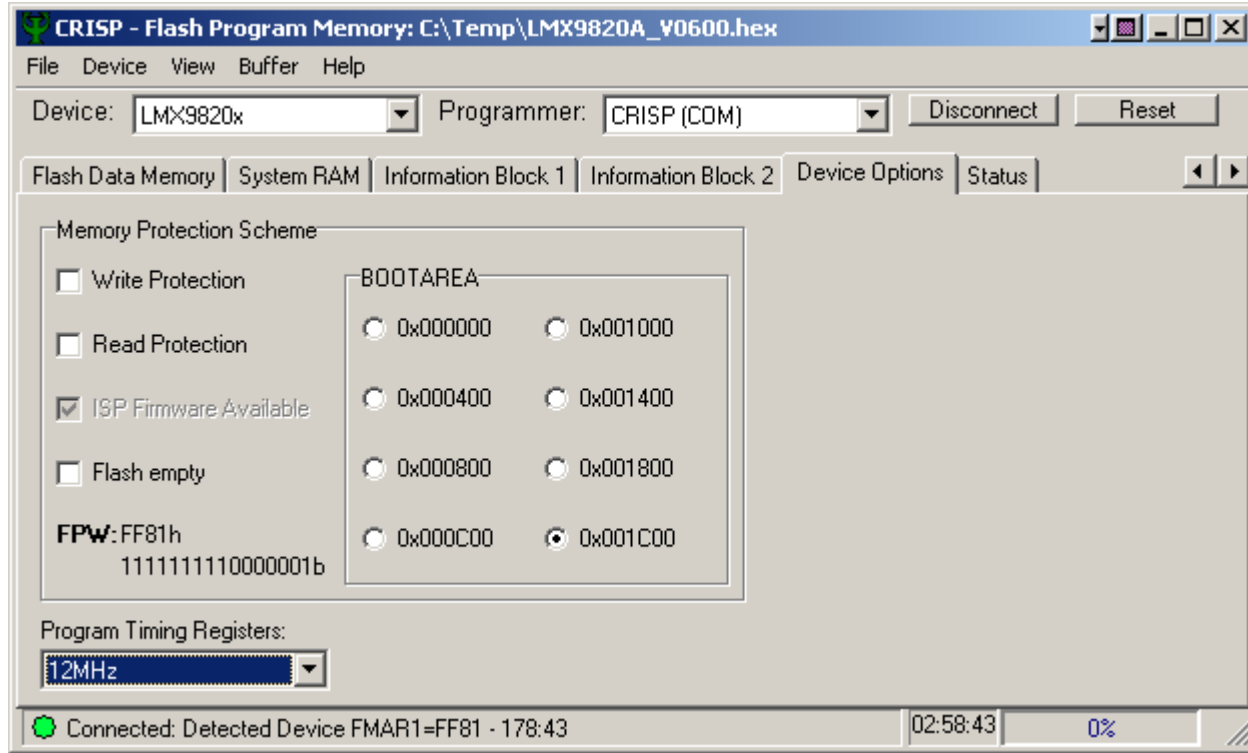


Figure 4-5. CRISP Device Connected

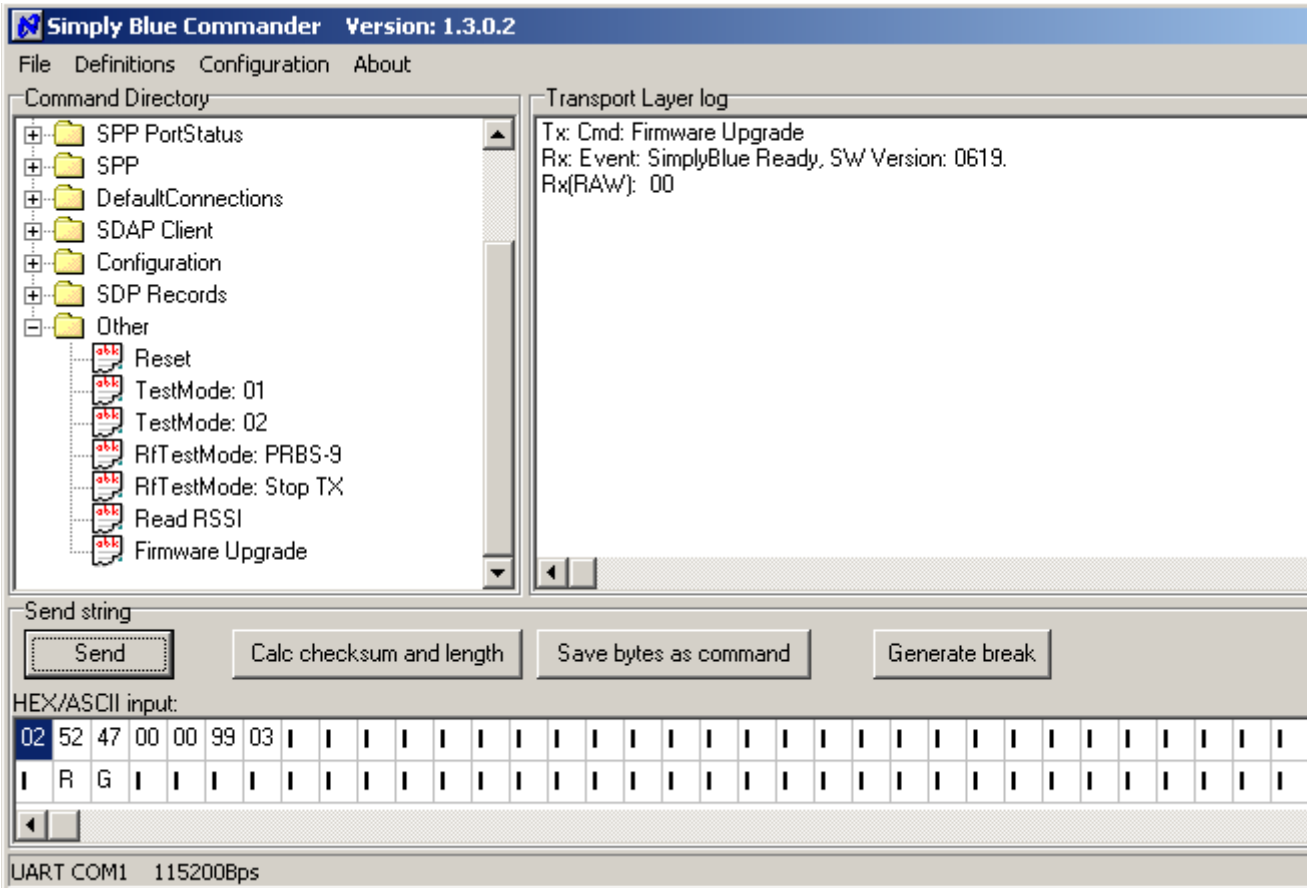
## ISP without ENV pin control - Firmware Upgrade Command using Simply Blue Com-

### 5.0 ISP without ENV pin control - Firmware Upgrade Command using Simply Blue Commander

The Simply Blue Commander can be used to issue a *Firmware Upgrade* command to the LMX9820A. This command will allow the CRISP tool to talk to the device without

changing the ENV pin settings. The steps must be followed in strict order and the process **can not** be terminated before completing all steps.

- 1) Connect the LMX9820A system to the Simply Blue Commander tool (Figure 5-1 on page 4).

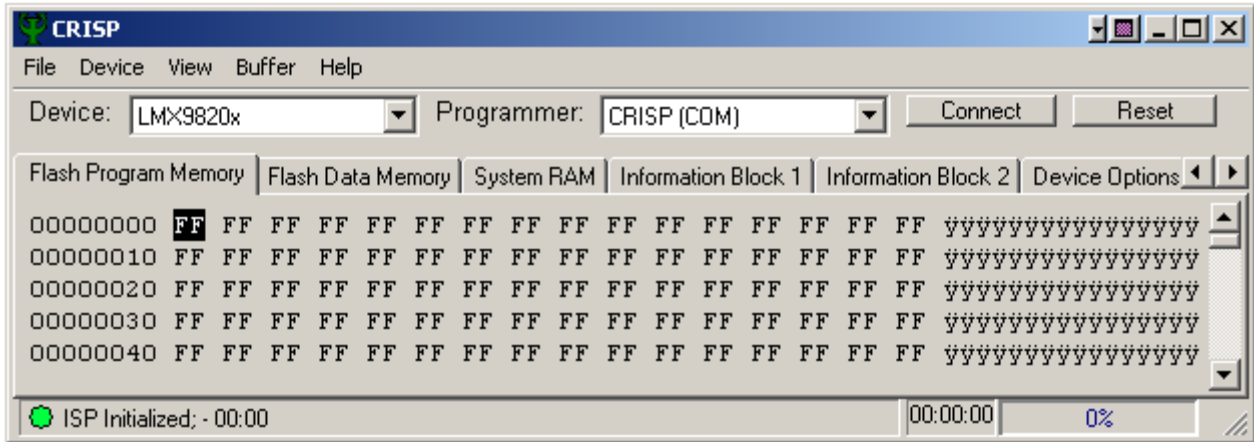


**Figure 5-1. Simply Blue Commander**

- 2) Send the *Firmware Upgrade* command(Figure 5-1 on page 4).
- 3) Close the Simply Blue Commander tool. This will release the COM port on the PC.

## ISP without ENV pin control - Firmware Upgrade Command using Simply Blue Com-

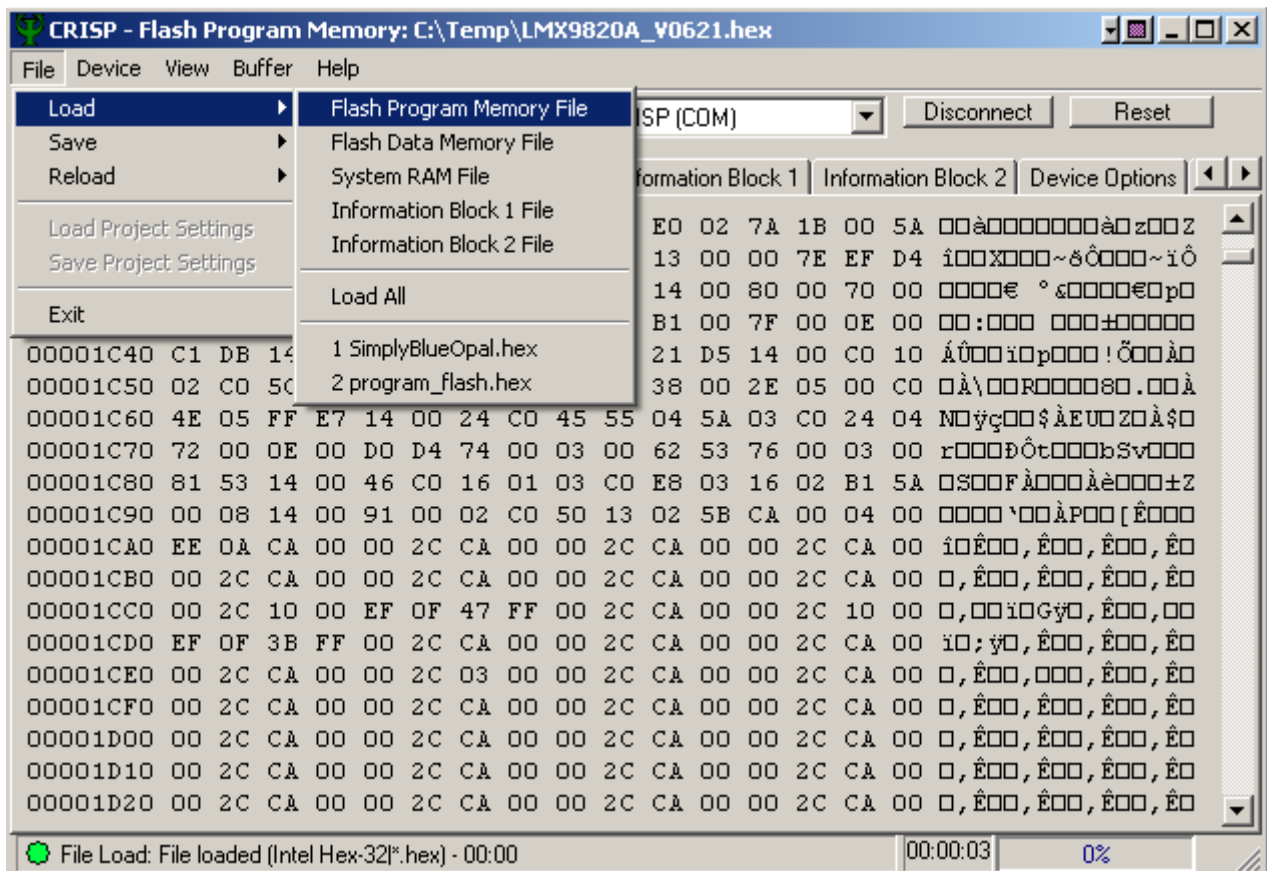
- Launch the CRISP software. This can be done with the installed short cut or double click crisp.exe. (Figure 5-2 on page 5)



**Figure 5-2. CRISP Application**

- Load the module firmware for download. *File->Load->Flash Program Memory File*. The data will appear under the “Flash Program Memory” tab.(Figure 5-3 on page 5). Depending on the firmware update file being used, the data displayed may differ from that shown in

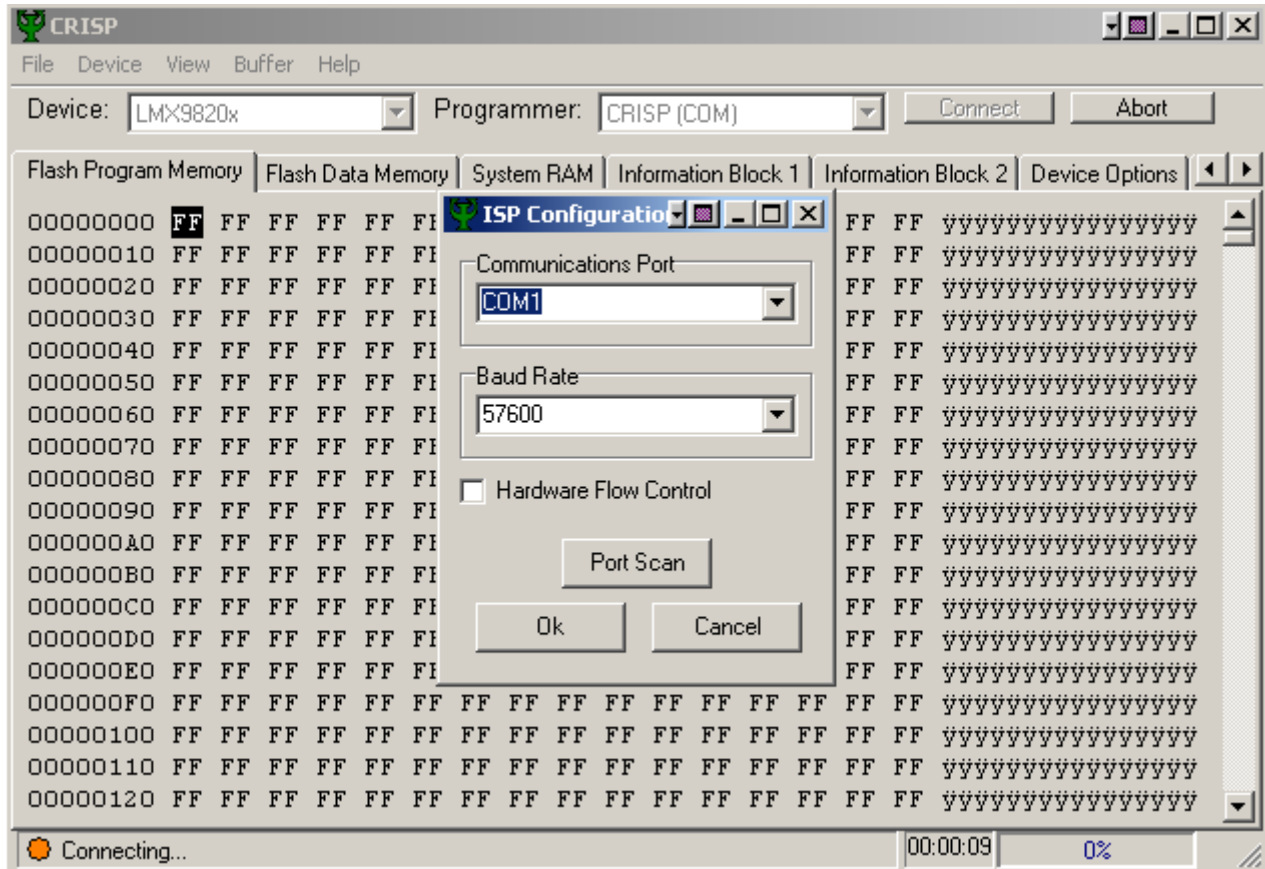
the figure. The load status is indicated at the bottom of the tool's window.



**Figure 5-3. CRISP Program Memory File Loader**

## ISP without ENV pin control - Firmware Upgrade Command using Simply Blue Com-

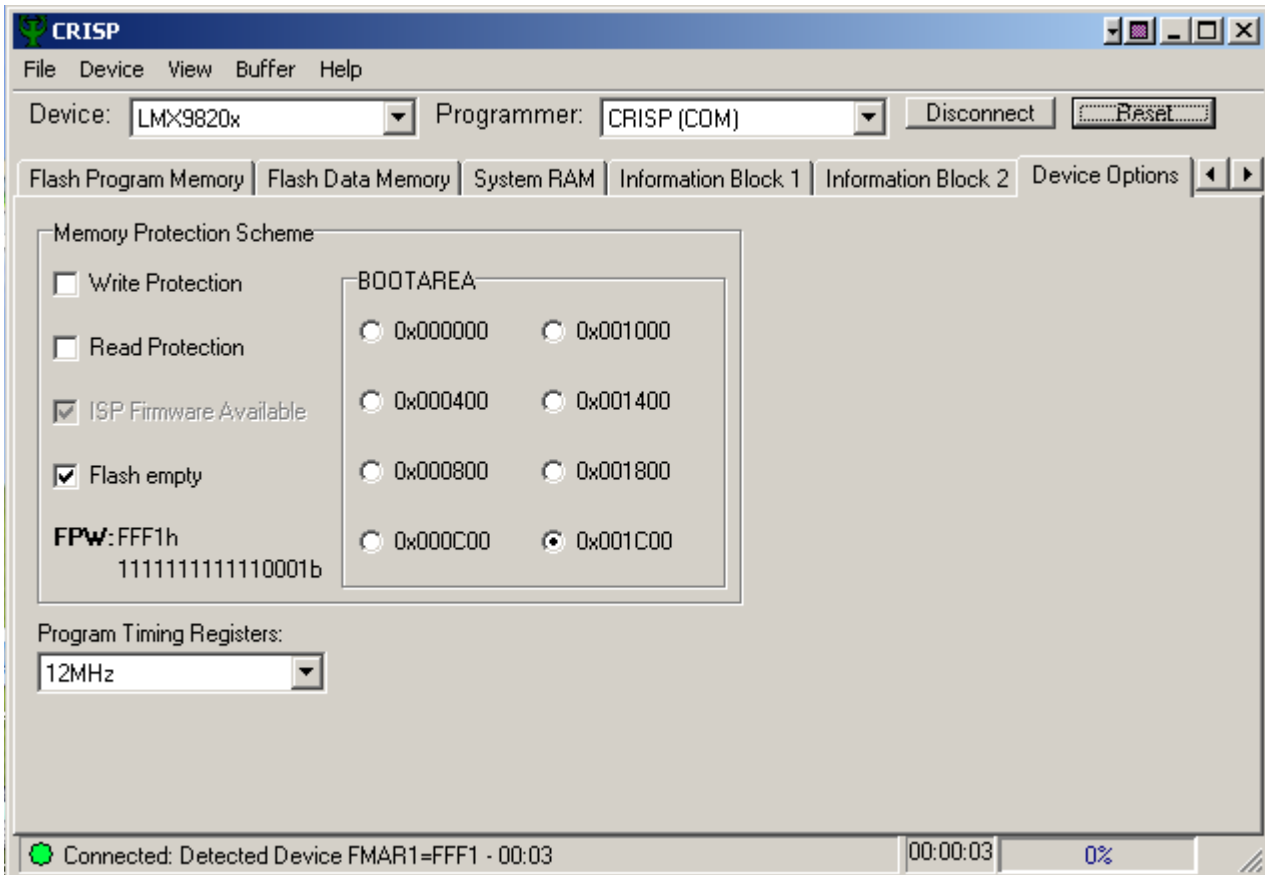
- 6) Click the *Connect* button. A popup box labeled *ISP Configuration* will appear (Figure 5-4 on page 6).
- 7) Choose the *Communications Port* the board is connected to (Figure 5-4 on page 6).
- 8) Select the hardware configured baud rate from the pulldown menu(Figure 5-4 on page 6).



**Figure 5-4. CRISP Port Connection**

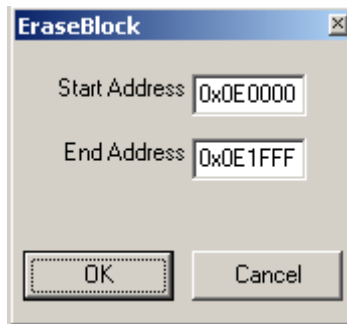
- 9) Click *Ok*. The tab in CRISP will change to *Device Options* and a connected status is indicated at the bottom of the tool's window. **Do not change any values on this tab** (Figure 5-5 on page 7). The *Flash Empty Bit* is set to allow for software ISP.

**ISP without ENV pin control - Firmware Upgrade Command using Simply Blue Com-**



**Figure 5-5. CRISP Device connected**

- 10) Program the device. *Device->Program->Program Flash Program Memory*. A status bar (0%to 100%) at the bottom of the tool's window will indicate status. A message will be displayed to indicate a successful download.
- 11) Select the memory location by selecting the *Flash Data Memory* tab.
- 12) Erase the data flash. *Device->Erase Block*. Confirm that the correct memory range (Figure 5-6 on page 7).A status bar (0%to 100%) at the bottom of the tool's window will indicate status. A message will be displayed to indicate a successful erase.



**Figure 5-6. Erase memory location**

## ISP without ENV pin control - Firmware Upgrade Command using Simply Blue Com-

- 13) Finish the ISP by sending the *Go* command. *Device->Go*. (Figure 5-7 on page 8) This command is mandatory as it configures the flash for program execution.

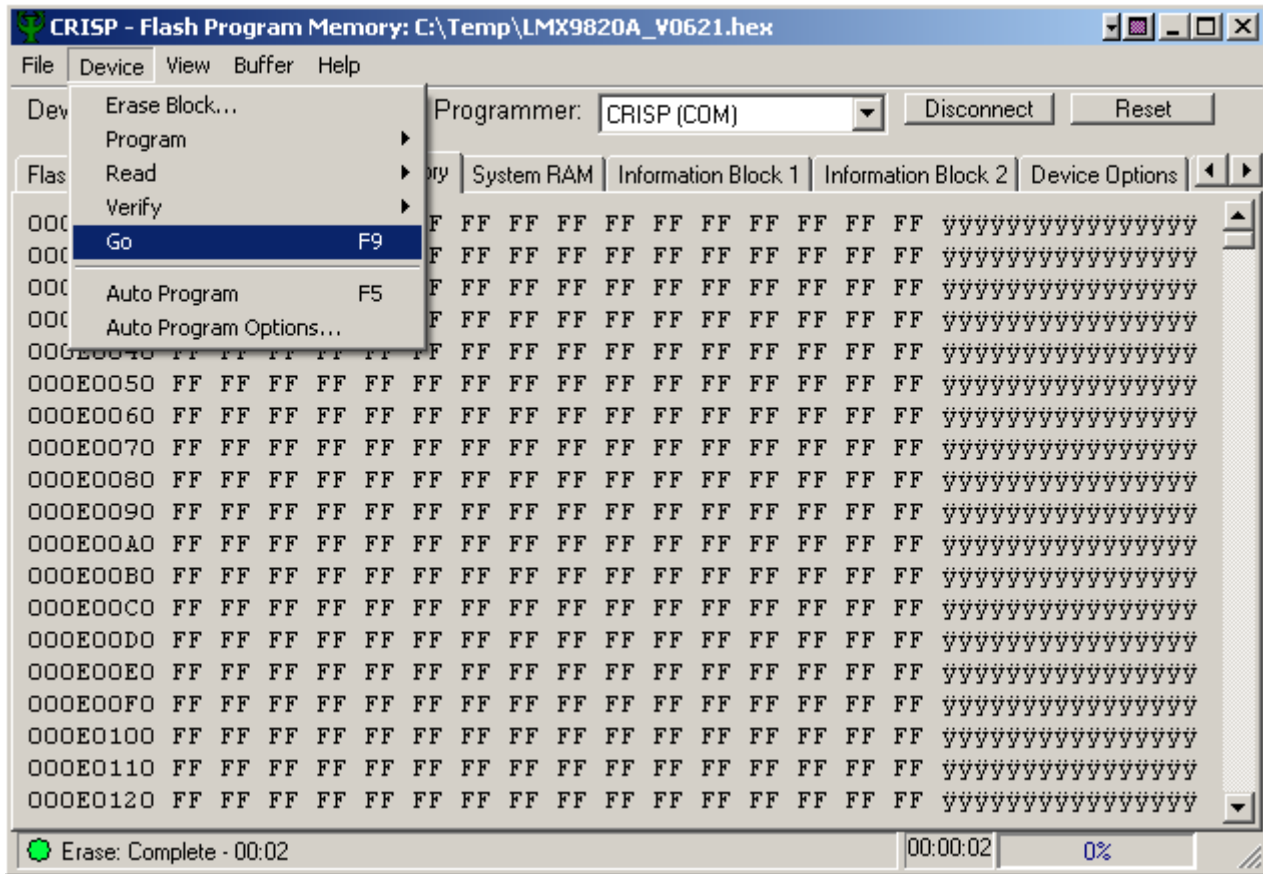
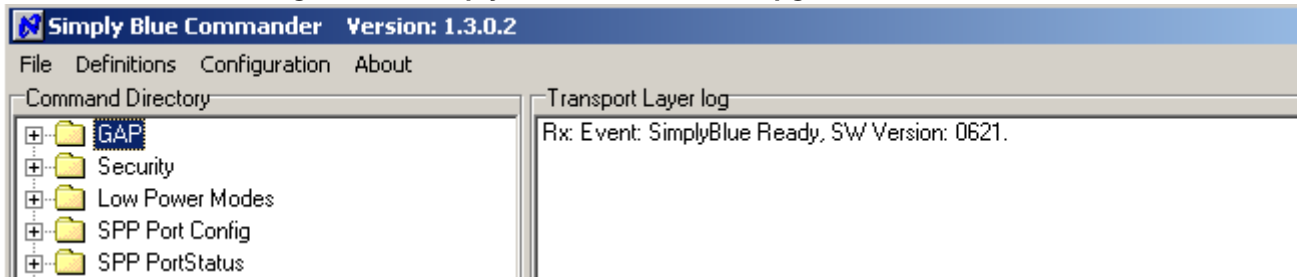


Figure 5-7. CRISP - GO Command

- 14) Confirm the operation of the LMX9820A by connecting it to the Simply Blue Commander tool.(Figure 4-3 on page 2)

Figure 5-8. Simply Blue Commander - Upgrade Confirmation



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