



Stellaris Serial flash loader, Boot loader, LM Flash programmer

StellarisWare™ In-System Programming Options

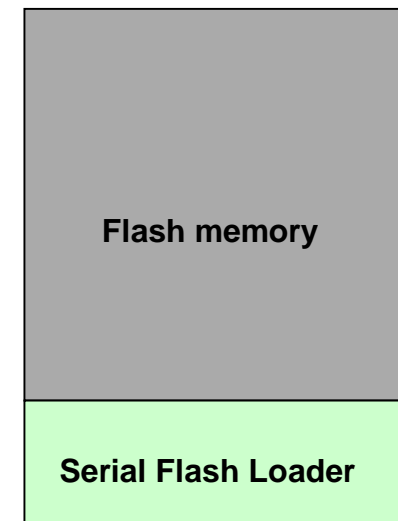
Stellaris Serial Flash Loader

- Small piece of code that allows programming of the flash without the need for a debugger interface.
- All Stellaris MCUs ship with this pre-loaded in flash memory
- Interface options include UART or SSI
- Luminary Micro supplies a Windows™ application (GUI or command line) that makes full use of all commands supported by the serial flash loader (LMflash.exe)
- See application note [AN01242](#)

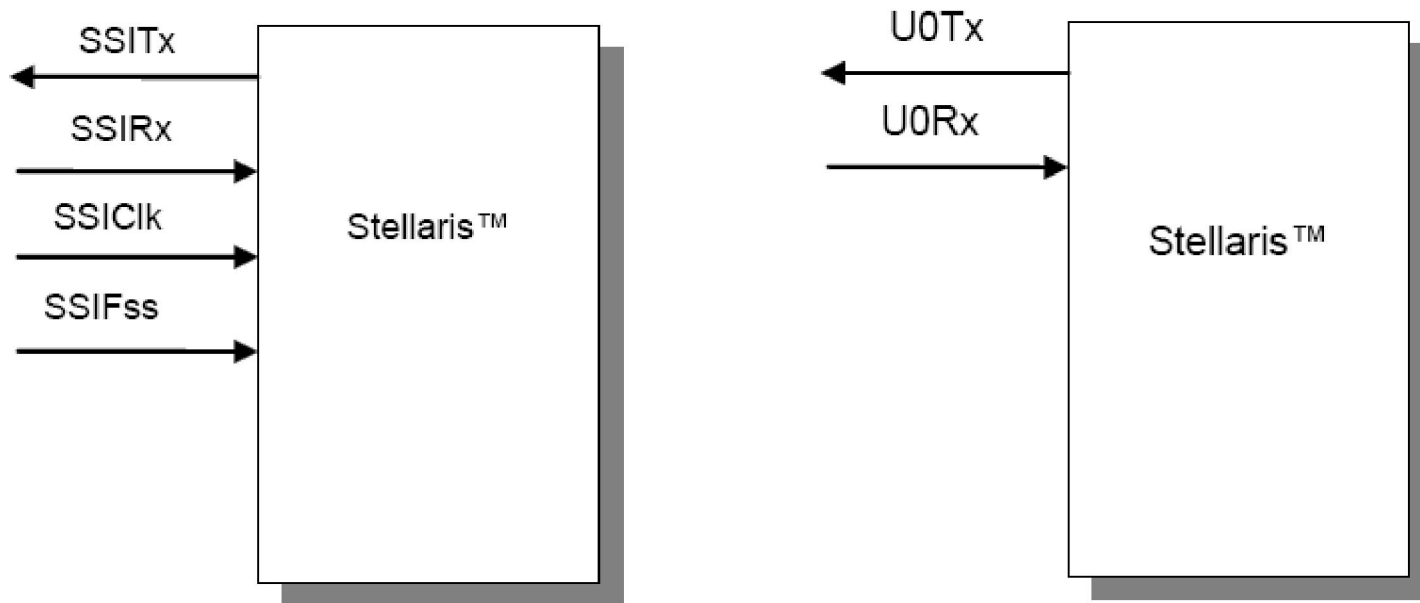
0x1FFFFFFF

0x00000800

0x00000000



SSI and UART connections



Only UART0 support serial flash loader

Command Definitions

- **COMMAND_PING (0x20)**
 - Simply accepts the command and sets the global status to success.
- **COMMAND_GET_STATUS (0x23)**
 - Returns the status of the last command that was issued
- **COMMAND_DOWNLOAD (0x21)**
 - Sent to the flash loader to indicate where to store data and how many bytes to send with the COMMAND_SEND_DATA commands that follow
- **COMMAND_SEND_DATA (0x24)**
 - Should only follow a COMMAND_DOWNLOAD command
- **COMMAND_RUN (0x22)**
 - Tells the flash loader to execute from the address passed as the parameter in this command.
- **COMMAND_RESET (0x25)**
 - Tells the flash loader device to reset

User application

- The first is to completely overwrite the flash loader with a new application.
- The second method involves programming the application to an address not used by the flash loader(0x800 or later), and then executing this application by issuing a “run” command.

Serial flash loader binary file

- Download the binary file **serial_flash_loader.bin** which pre-loaded in flash before factory from web side:
https://www.luminarymicro.com/products/software_updates.html

Home ▶ Products ▶ Software Updates

Software Updates

Here you will find the latest versions of the Luminary Micro StellarisWare Software. If you would like to be notified when new software or updated versions become available you can [set your email preferences](#) and receive instant alerts when changes are posted.




For details on the features of StellarisWare Software please see our [Software Section](#).

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StellarisWare Utilities App Notes Source Code Misc FAQ

Utilities

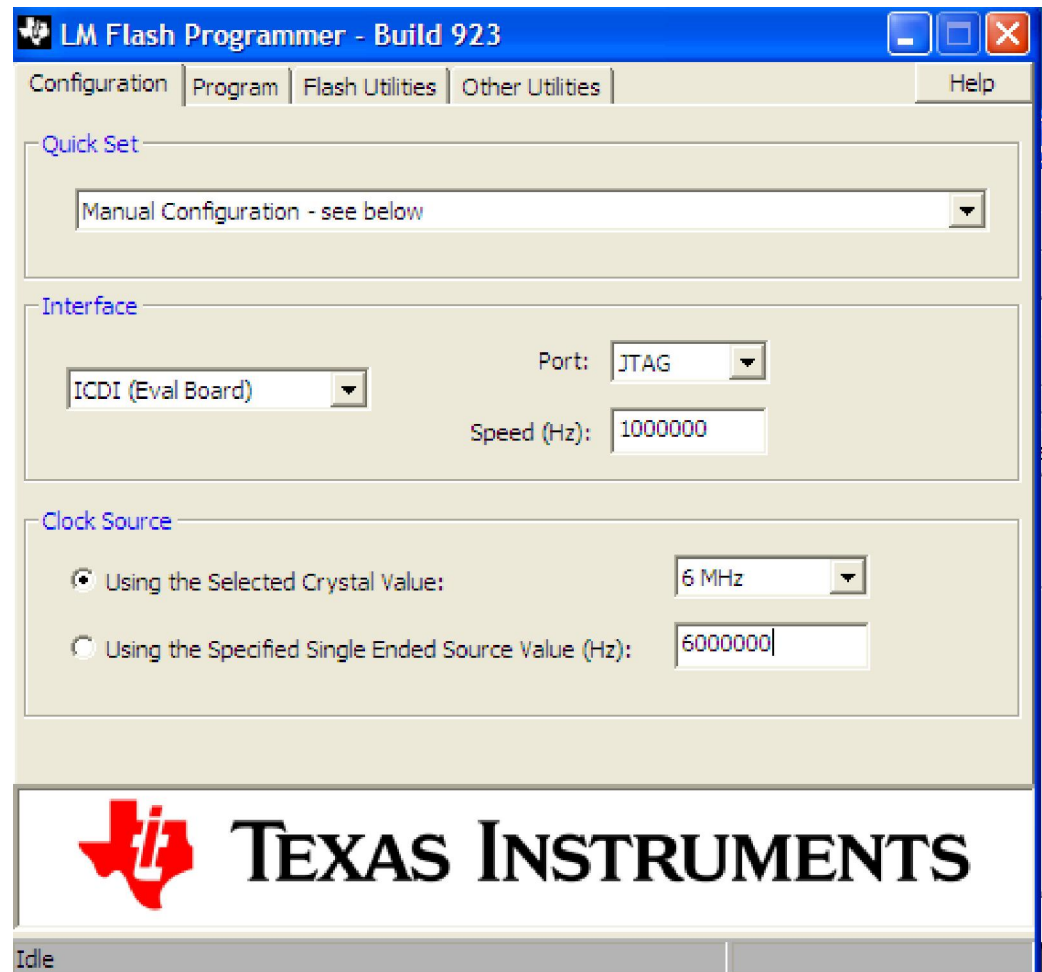
Product	Doc number	Description	Date	Download
All	LMFlashProgrammer-923	GUI and command line flash programmer	12/17/09	 download
All	Serial Flash Loader-00	Serial Flash Loader	01/07/09	 download
Keil uVision	LMIDK-AGDI-33	Keil debug interface DLL for Stellaris ICDI	12/11/09	 download

- Re-program this binary file to the device by LM flash programmer to do the testing(use on-chip Serial Flash Loader to download user code)

Stellaris® Flash Programming GUI

- LM Flash Programming GUI

- Simple graphical user interface
- Support for all Evaluation Kits
- Key features include:
 - Program
 - Verify
 - Erase
 - Read memory
- Available now

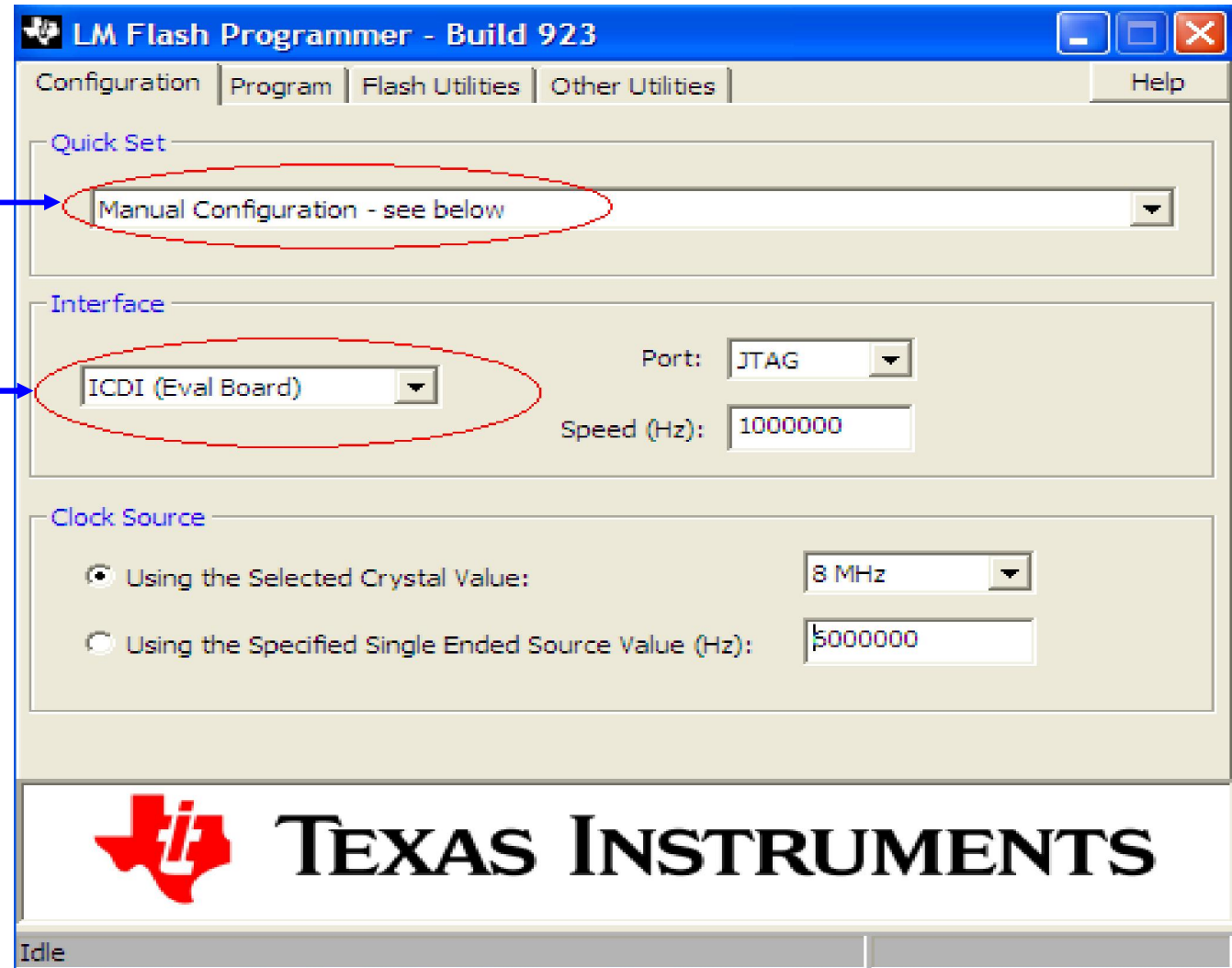


Reprogram device

Reprogram the device with **serial_flash_loader.bin**, which locate at
C:\StellarisWare\Serial Flash Loader\serial_flash_loader.bin

Select
Manual
Configuration

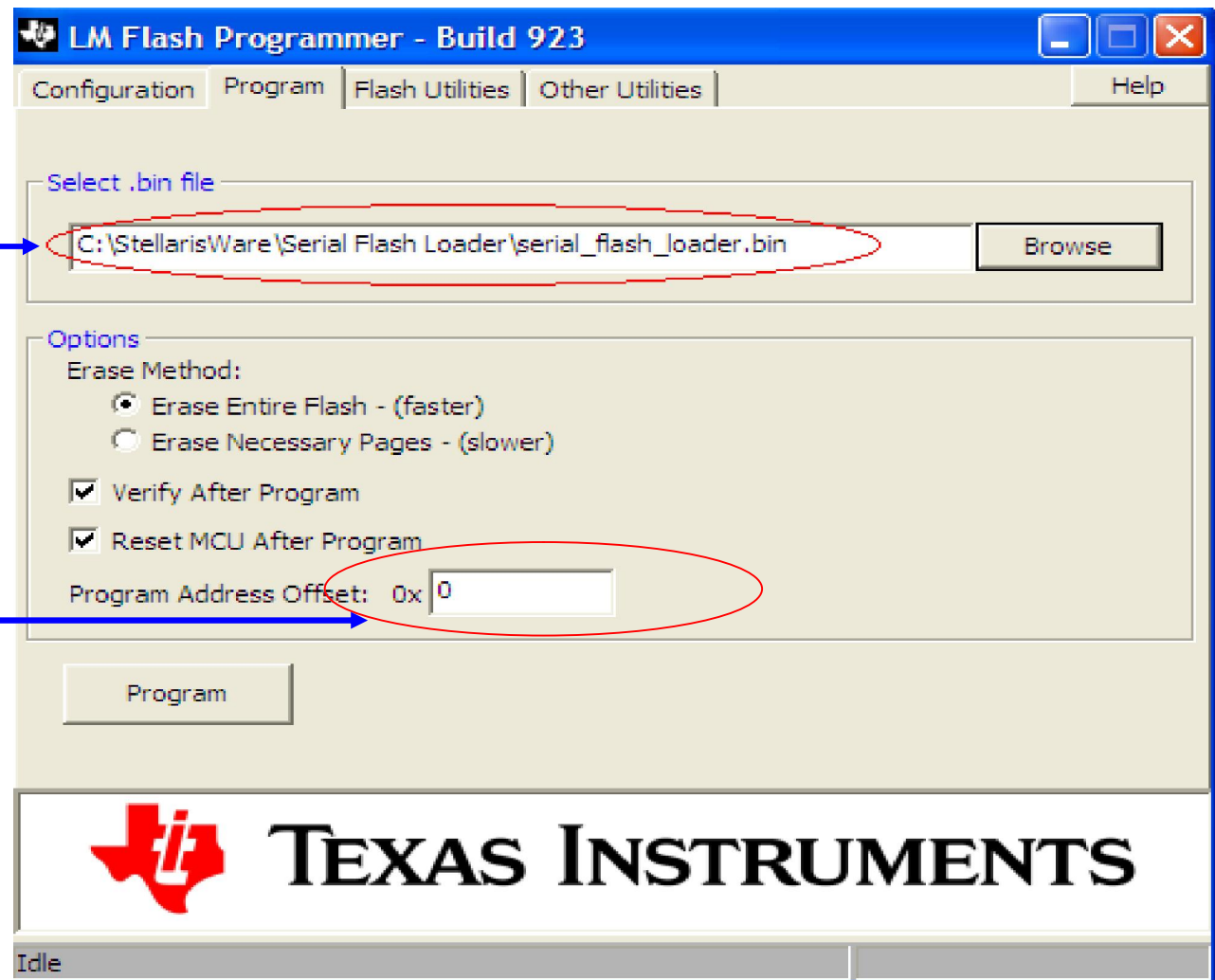
JTAG ICDI



Reprogram device(cnt)

Select the
binary file

Start
address



Use pre-load serial flash loader to download user code

Download user code to flash via pre-load serial flash loader, just like the device with factory default.

The screenshot shows the 'LM Flash Programmer - Build 923' window. The 'Configuration' tab is active. Under the 'Quick Set' section, 'Manual Configuration - see below' is selected. The 'Interface' section contains the following settings:

- COM Port: COM2
- Serial (UART) (selected in the dropdown)
- Baud Rate: 115200
- Transfer Size: 60
- ☐ Disable Auto Baud Support

Annotations with blue arrows point to these settings from the left:

- 'COM2?' points to the COM Port dropdown.
- 'Select Serial(UART)' points to the Serial (UART) dropdown.
- 'Auto baud rate' points to the 'Disable Auto Baud Support' checkbox.
- 'Transfer size=60' points to the Transfer Size input field.

Red circles highlight the COM Port, Serial (UART), Baud Rate, and Transfer Size fields. A 'Device Manager' button is located to the right of the COM Port field.

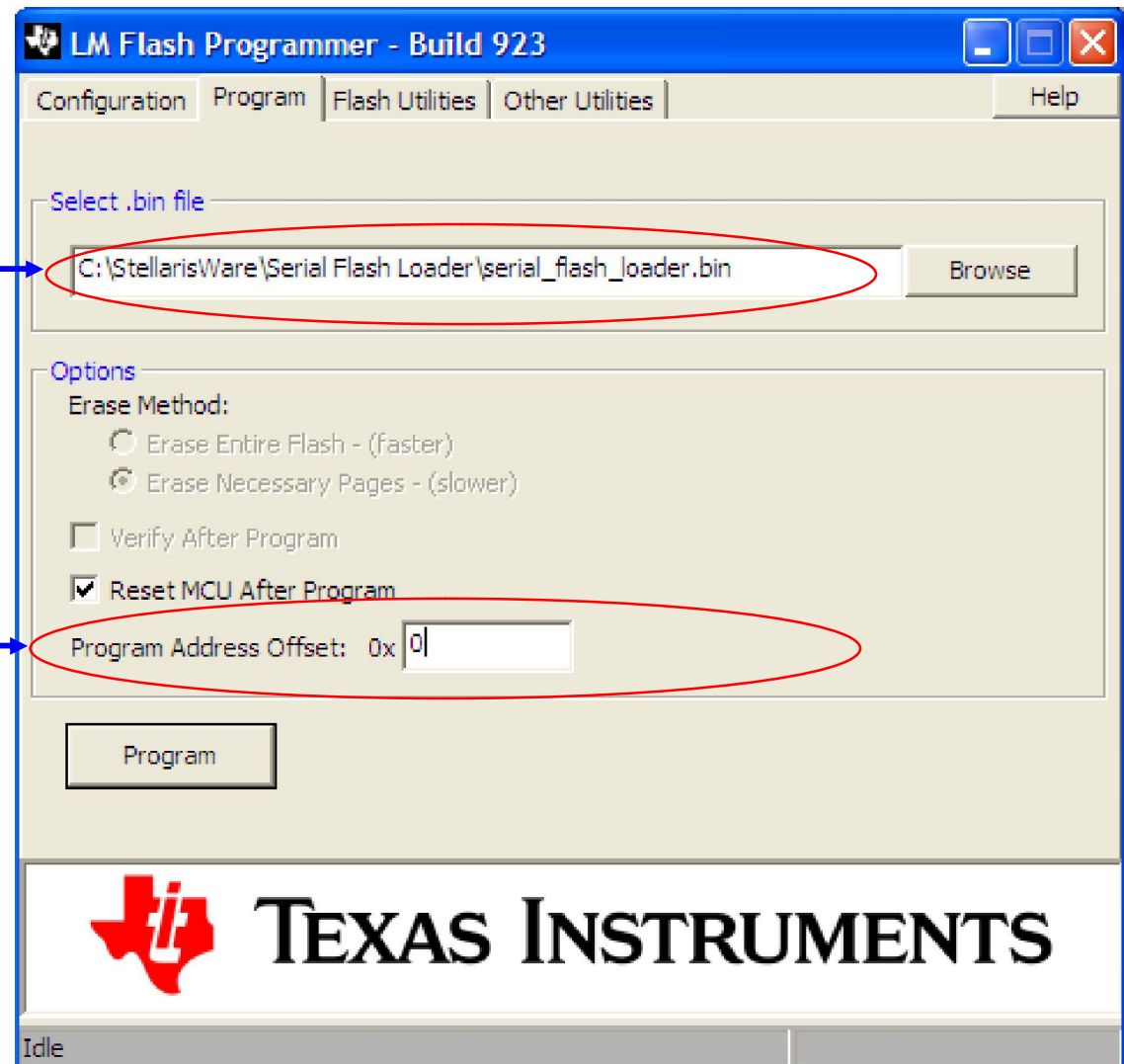
*Use device manager to check your visual COM port

At the bottom of the window, the Texas Instruments logo and the word 'TEXAS INSTRUMENTS' are displayed. The status bar at the very bottom shows 'Idle'.

Use pre-load serial flash loader to download(cnt)

Select your user
code to download

Address will start
from 0x00.



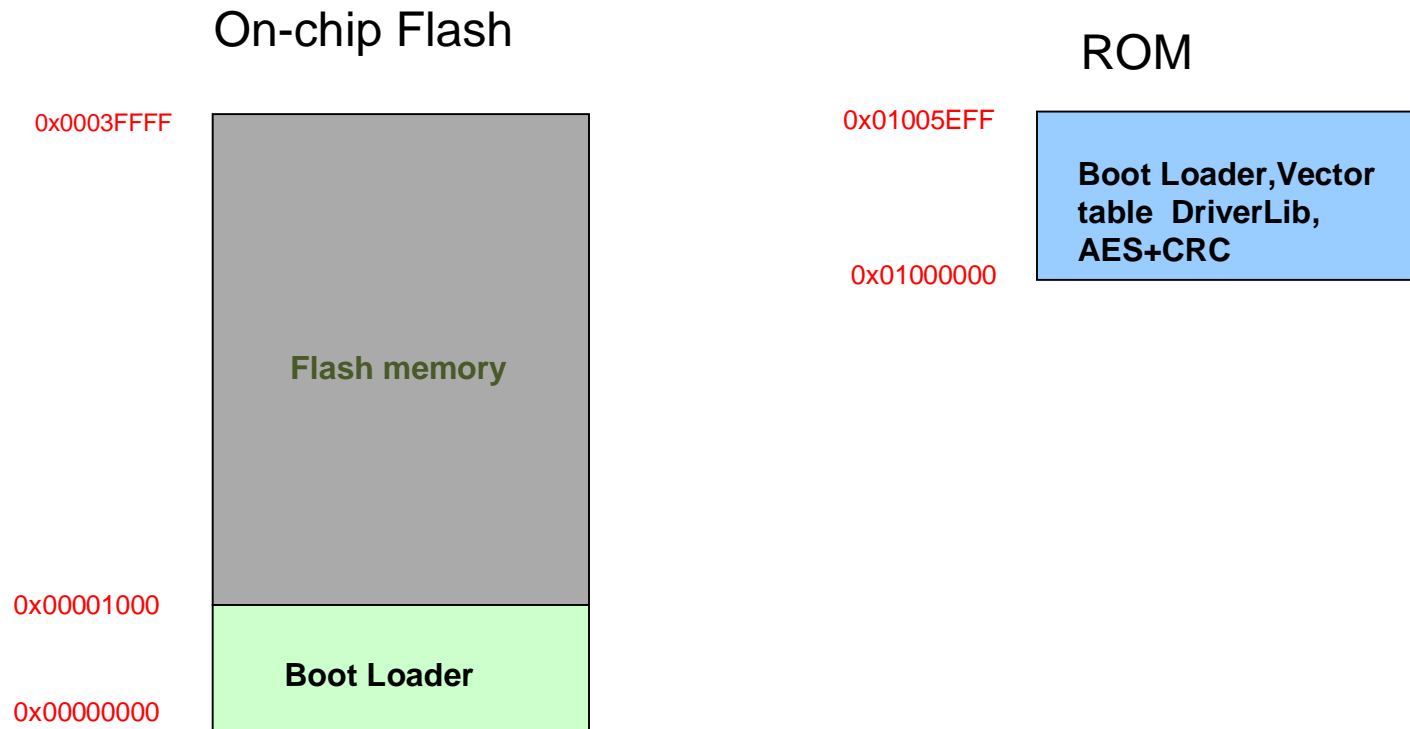
Sflash utility

- The sflash utility that we provide in
C:\StellarisWare\Serial Flash Loader\sflash.exe
- Usage:
 >sflash test.bin -p 0x00 -r 0x00 -c 1
 -p [program address]
 -r [execution address]
 -c [COM port number]

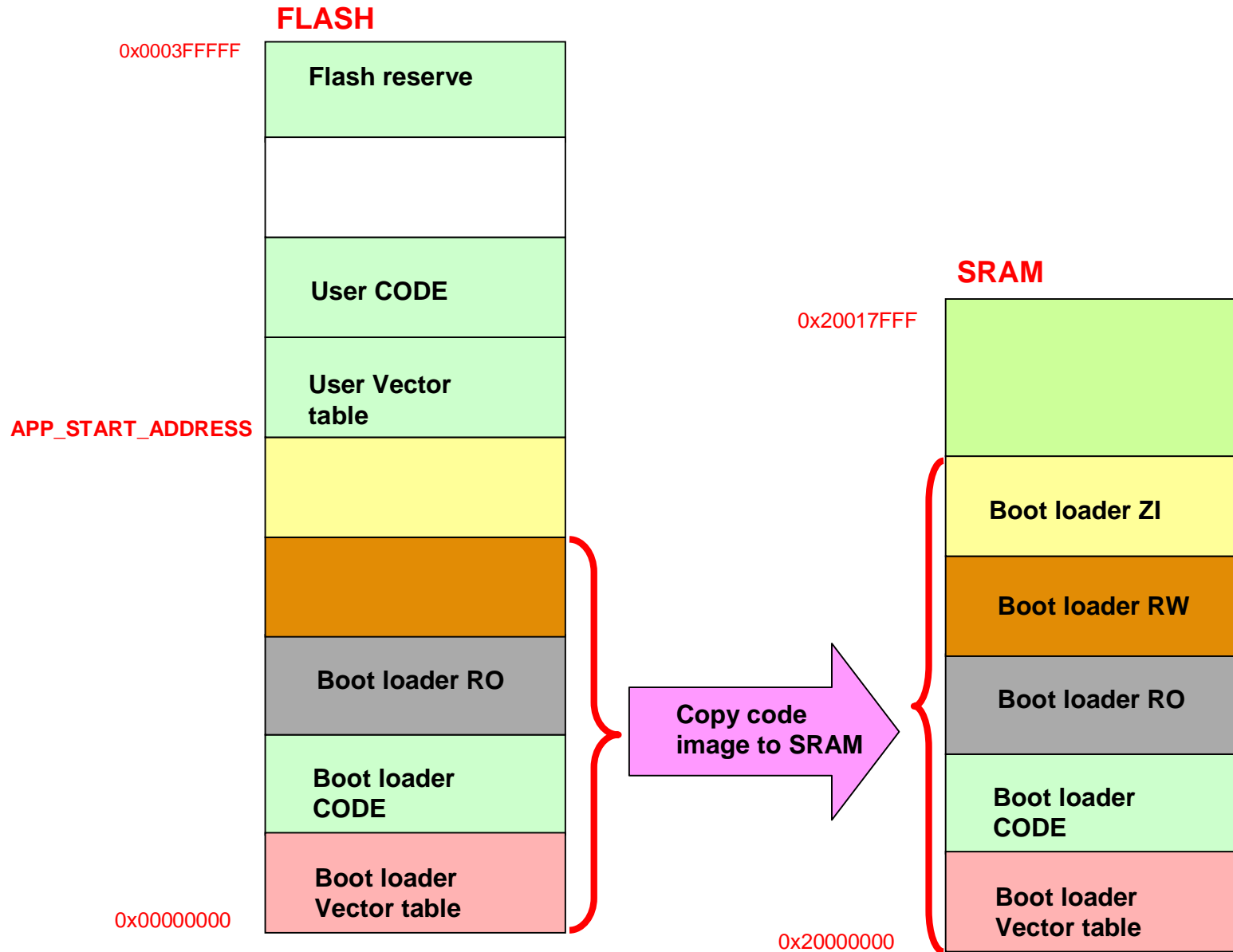
Stellaris Boot Loader

- Small piece of code that can be programmed at the beginning of flash to act as an application loader
- Also used as an update mechanism for an application running on a Stellaris microcontroller.
- Interface options include UART (default), I²C, SSI, Ethernet, USB
- Included in the Stellaris Peripheral Driver Library with full applications examples
- See application note [AN01248](#)
- Preloaded in ROM on select Stellaris

Stellaris Memory map



Boot loader running procedure



User Applications

- On the Stellaris microcontrollers, minimum size of a flash block is 1024-byte, this is a 1024-byte boundary,
- The boot loader at least need one flash block, so it requires that the application start at offset 2048 (0x0800) or more into the flash.

Connection interface

- UART0 (default)
- I²C
- SSI
- Ethernet
- USB(DFU)

Boot loader file

File Name	Description
bl_startup_ewarm.S	Boot Loader start code
bl_config.h	Define Boot Loader option
bl_config.c	
bl_commands.h	Define Updater command
bl_packet.h	Serial data receive/transmit control
bl_packet.c	
bl_enet.c	Ethernet data transmit
bl_uart.h	UART data transmit
bl_uart.c	
bl_autobaud.h	
bl_ssi.h	SSI data transmit
bl_ssi.c	
bl_i2c.h	I2C data transmit
bl_i2c.c	
bl_usb.c	USB data transmit
bl_check.h	Check Updater condition
bl_check.c	
bl_main.c	Updater main

Definition in Bl_config

- CRYSTAL_FREQ Define crystal frequency for BootLoader
- APP_START_ADDRESS Define Application start Address
- FLASH_RSVD_SPACE Define Flash reserve size
- STACK_SIZE Define BootLoader stack
- BUFFER_SIZE Define BootLoader data receive buffer
- ENABLE_BL_UPDATE Enables updates to the boot loader
- FLASH_CODE_PROTECTION Flash code protection,erase the entire flash
- ENABLE_DECRYPTION Enables the call to decrypt
- ENABLE_UPDATE_CHECK Check Updater condition
- FORCED_UPDATE_PERIPH Forced Updater check for GPIO module

Definition in BI_config

- **FORCED_UPDATE_PORT** Forced Updater check for GPIO base address
- **FORCED_UPDATE_PIN** Forced Updater check for GPIO pin
- **FORCED_UPDATE_POLARITY** Define the polarity of the GPIO pin that results in a forced update
- **UART_ENABLE_UPDATE** Enable UART to update Flash
- **UART_AUTOBAUD** Enable auto baud
- **UART_FIXED_BAUDRATE** Define fixed baud
- **SSI_ENABLE_UPDATE** Enable UART to update Flash
- **I2C_ENABLE_UPDATE** Enable I2C to update Flash
- **ENET_ENABLE_UPDATE** Enable Ethernet to update Flash

BI_config.h

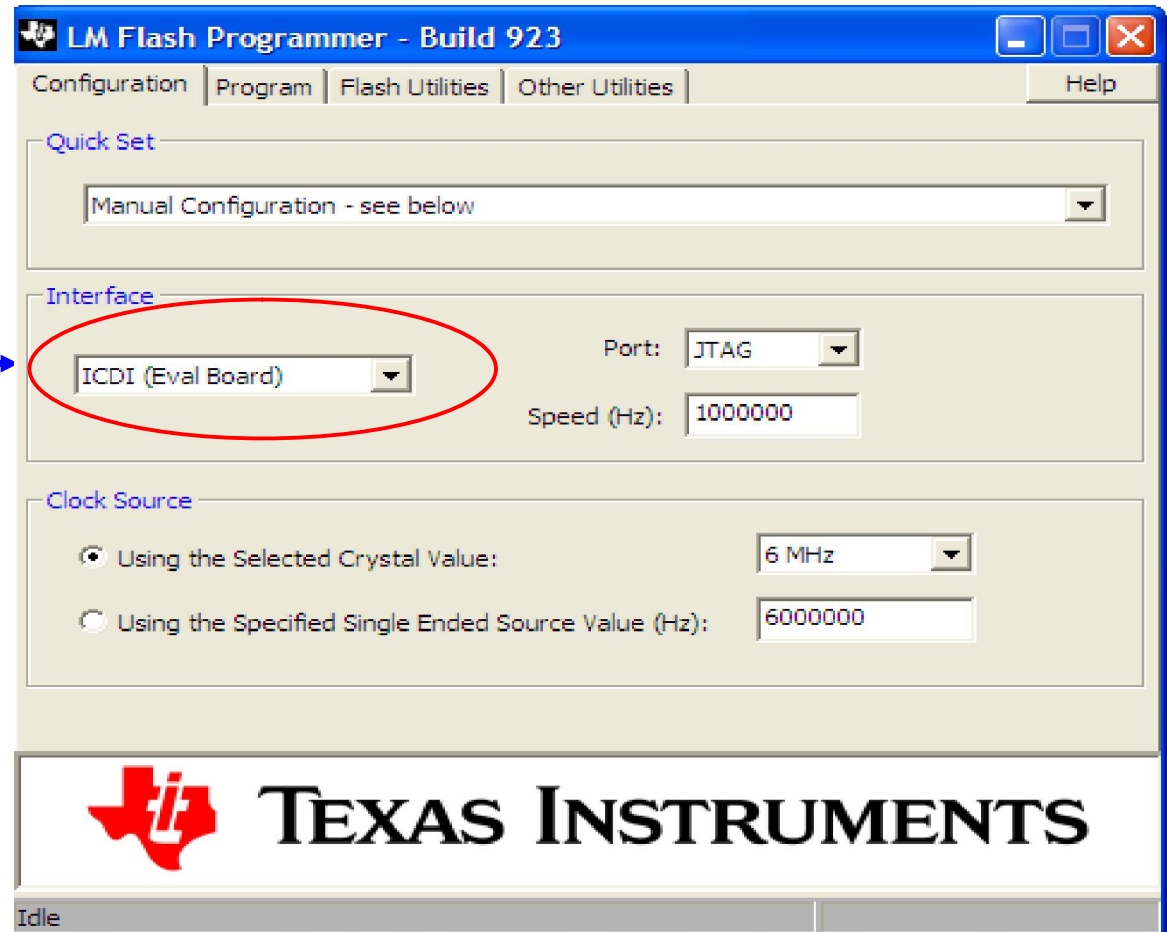
C:\Stellarisware\boards\ek-lm3s8962\boot_serial

- #ifndef __BL_CONFIG_H__
- #define __BL_CONFIG_H__
- #define CRYSTAL_FREQ 8000000
- #define APP_START_ADDRESS 0x1000
- #define STACK_SIZE 48
- #define BUFFER_SIZE 20
- #define UART_ENABLE_UPDATE
- #define UART_FIXED_BAUDRATE 115200

Download user boot loader(serial) to flash

1. You could recompile the boot_serial project to get the binary file
2. Locate at C:\Stellarisware\boards\ek-lm3s8962\boot_serial

JTAG FTDI

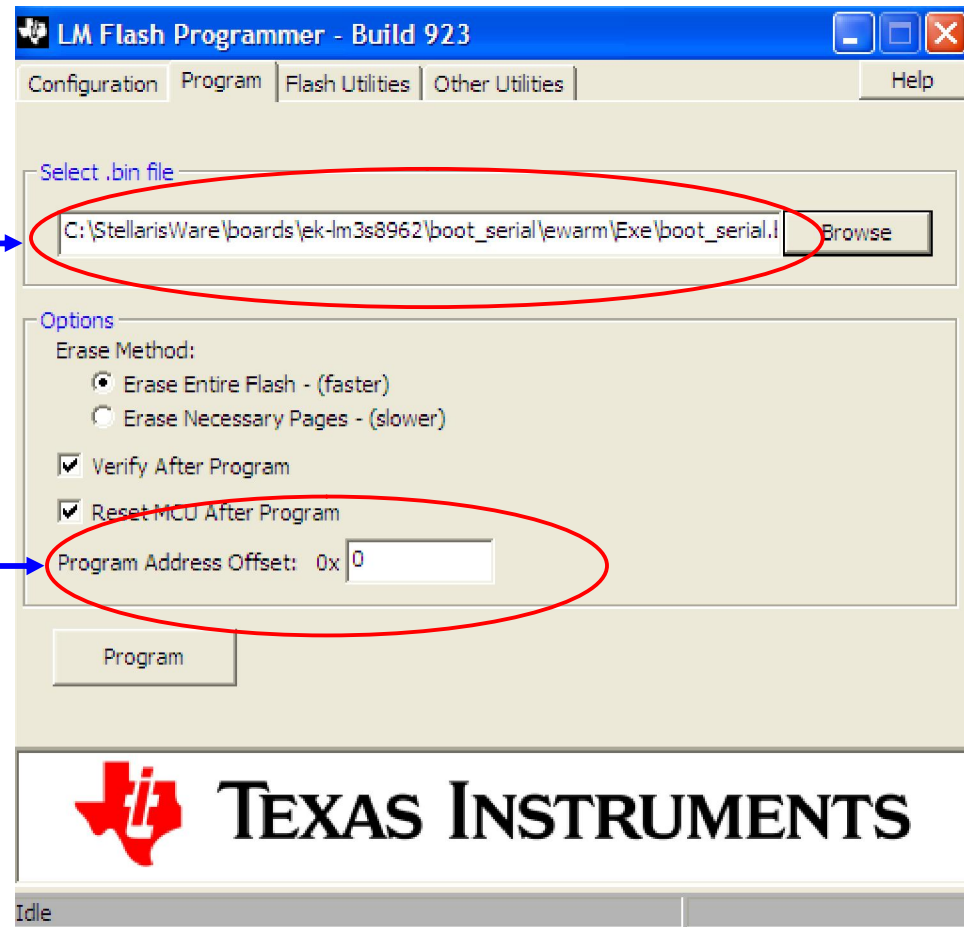


Download user boot loader to flash(cnt)

- Select the user boot loader file from
C:\Stellarisware\boards\ek-lm3s8962\boot_serial

Select user
binary file

Set start
address



Program user code via user boot loader with UART0

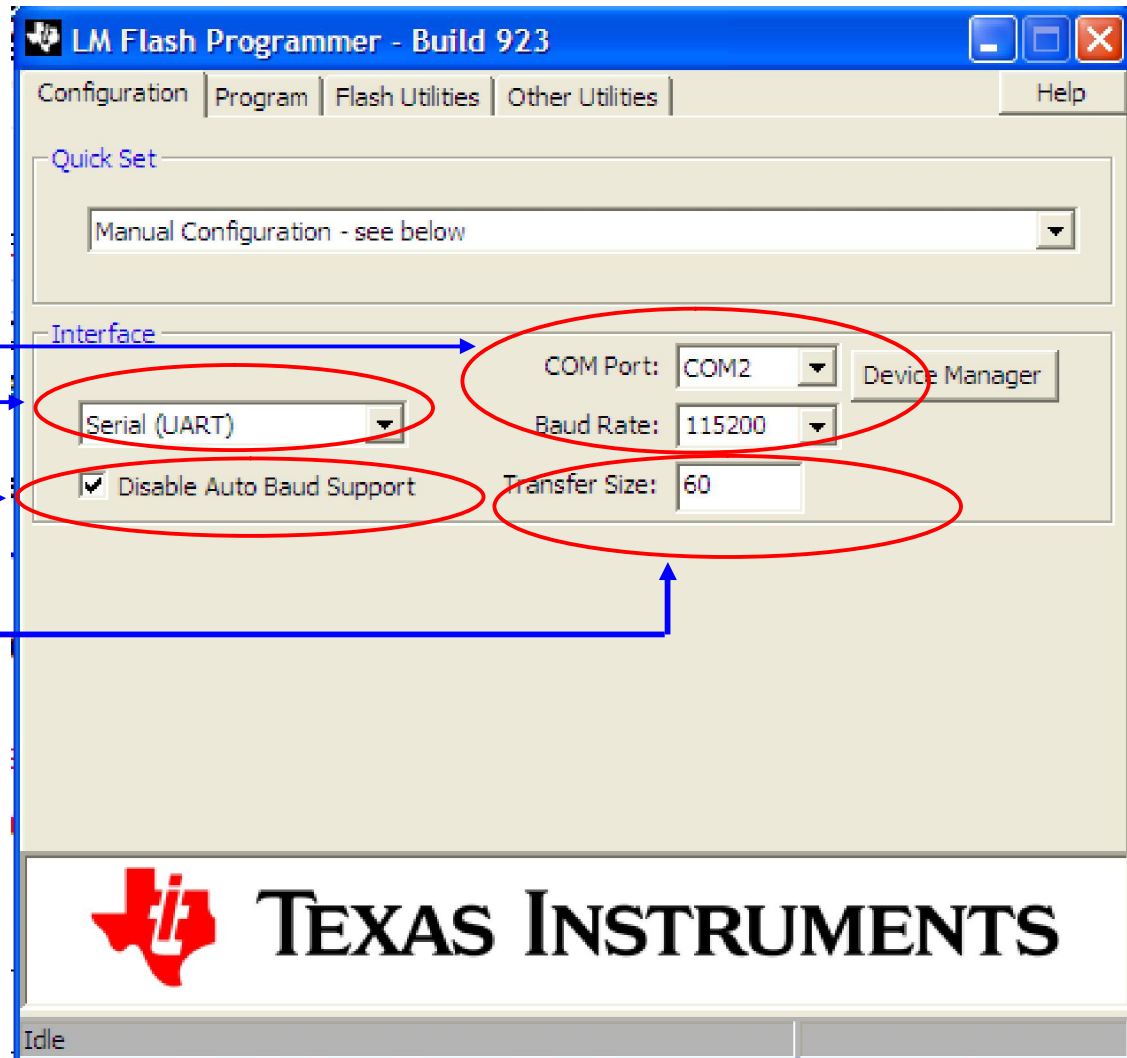
- User code locate at C:\Stellarisware\boards\ek-lm3s8962\boot_demo1

COM2?
Serial(UART)

Dis Auto baud rate

Transfer size=60

***Use device manager
to check your visual
COM port
*ISP function**



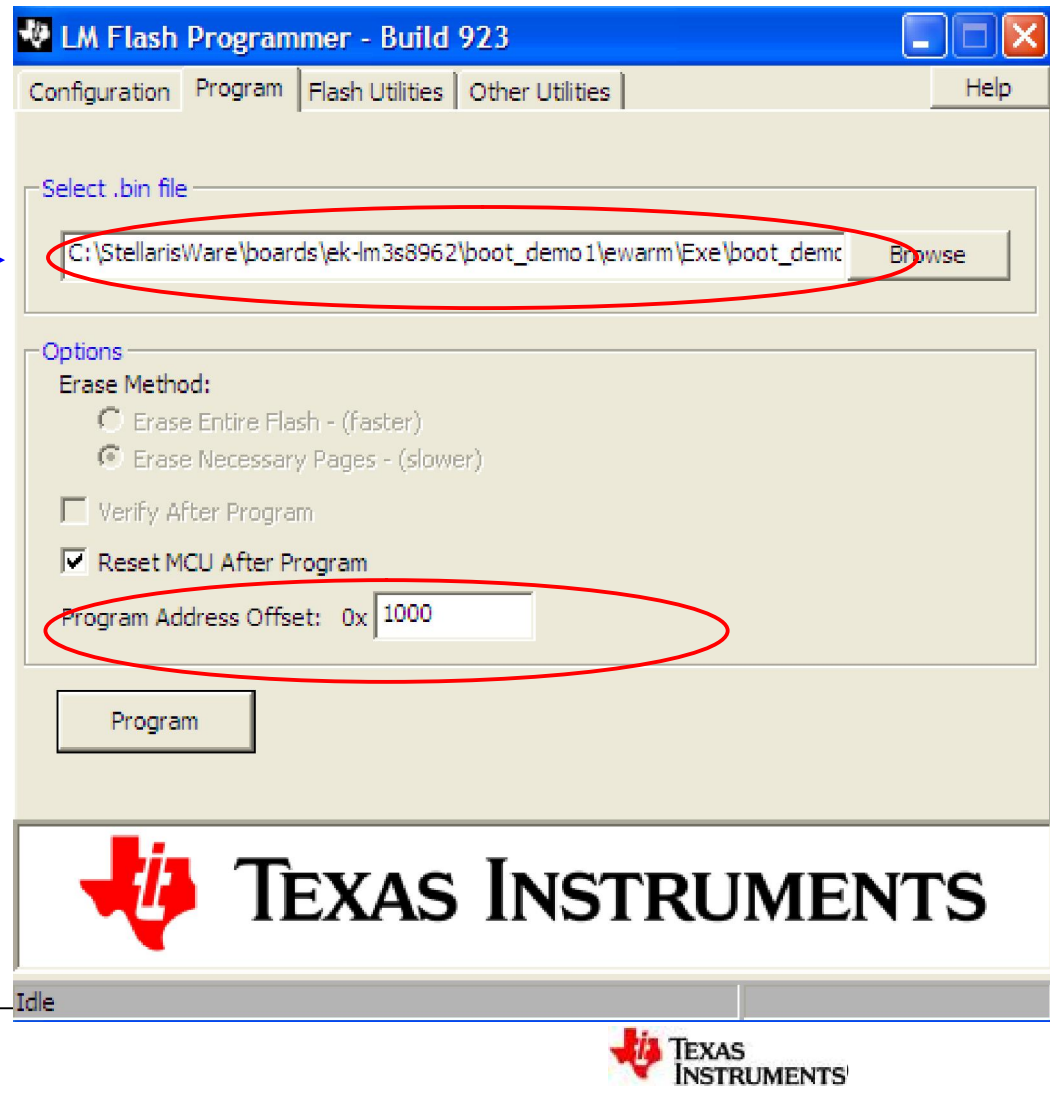
Program user code via user boot loader with UART0 (cnt)

- You could recompile the boot_demo1 project to get the binary file
- Locate at C:\Stellarisware\boards\ek-lm3s8962\boot_demo1

Select your
user code

User code start
address=0x1000

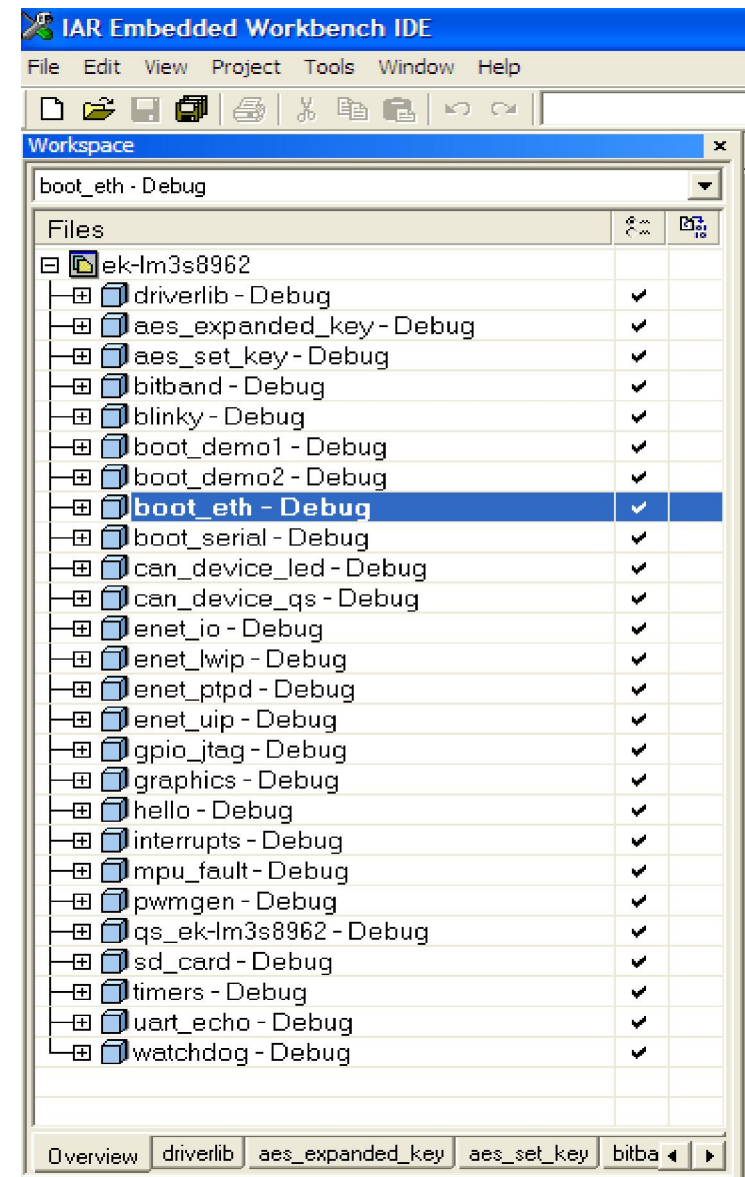
*IAP function



Download user boot loader(Ethernet) to flash

- Import the examples for the EK-LM3S8962
- C:\Stellarisware\boards\ek-lm3s8962\boot_eth

The boot_eth is a small piece of code that can be programmed at the beginning of flash to act as an application loader as well as an update mechanism for an application running on a Stellaris Microcontroller.

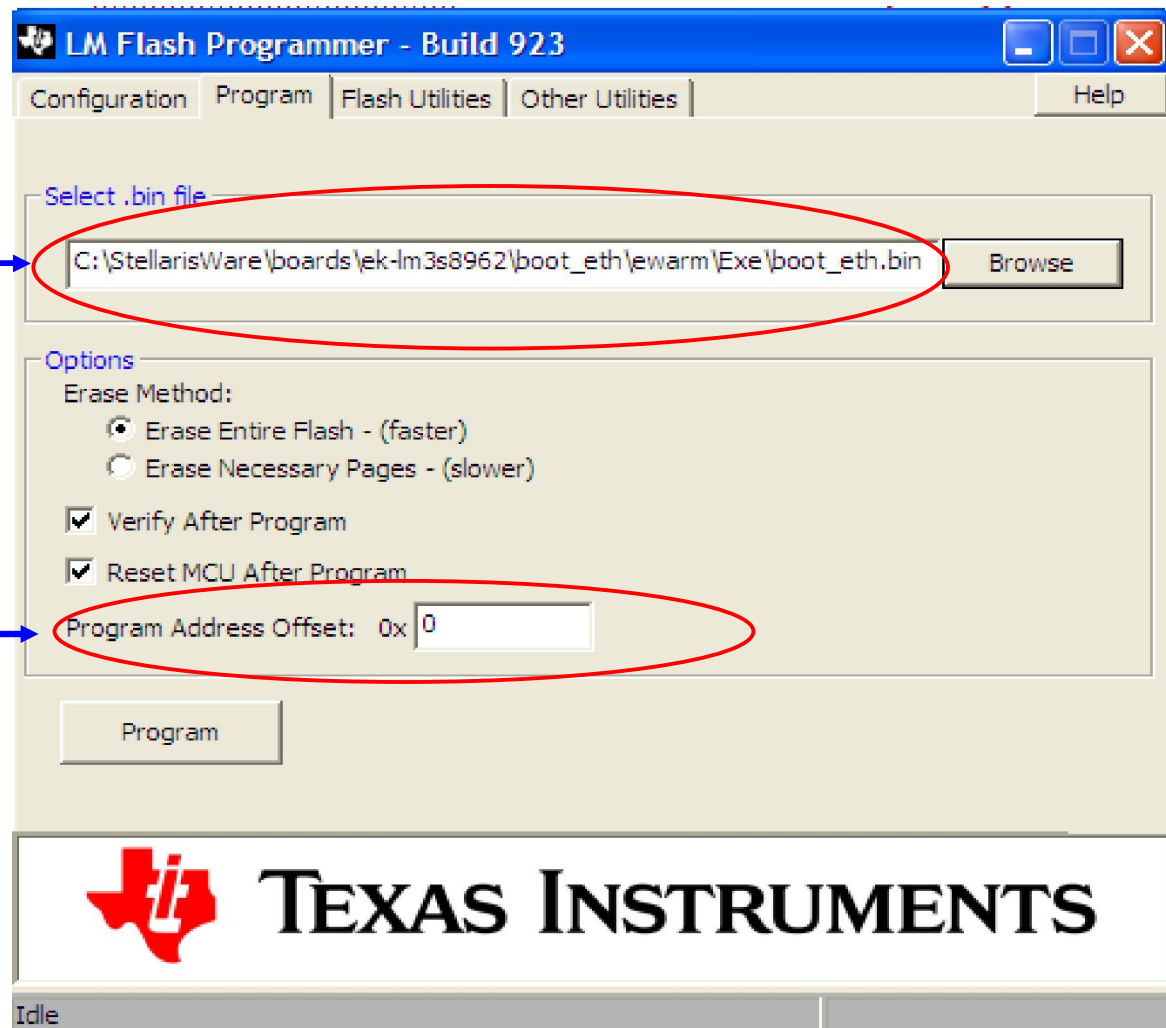


Download boot_eth.bin via LM Flash programmer

- You could recompile the boot_eth project to get the binary file
- Locate at C:\StellarisWare\boards\ek-lm3s8962\boot_eth

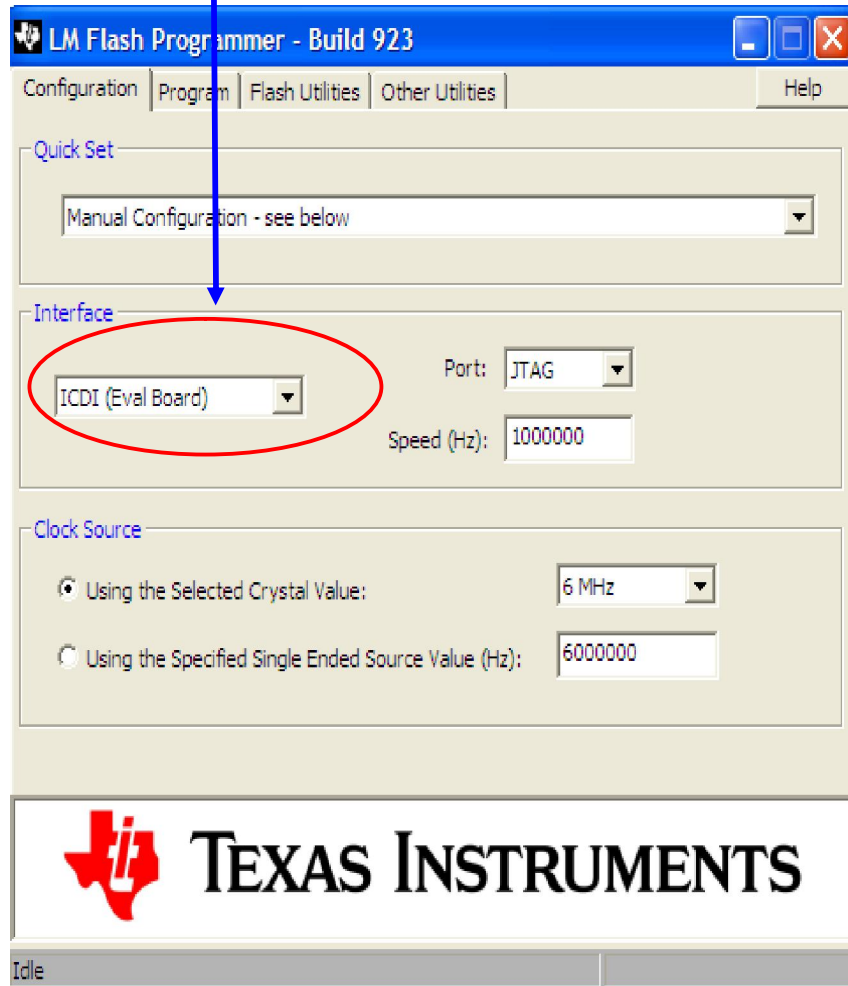
Select the bin file

Set start
address

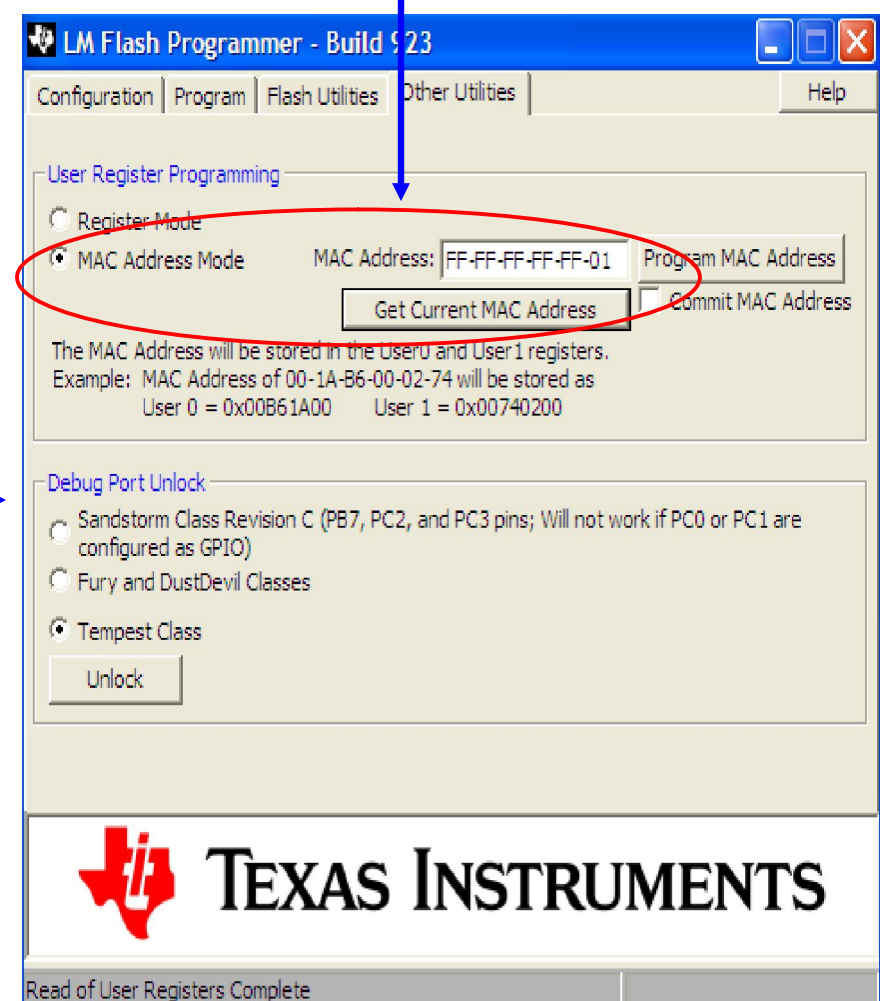


Get current board MAC address

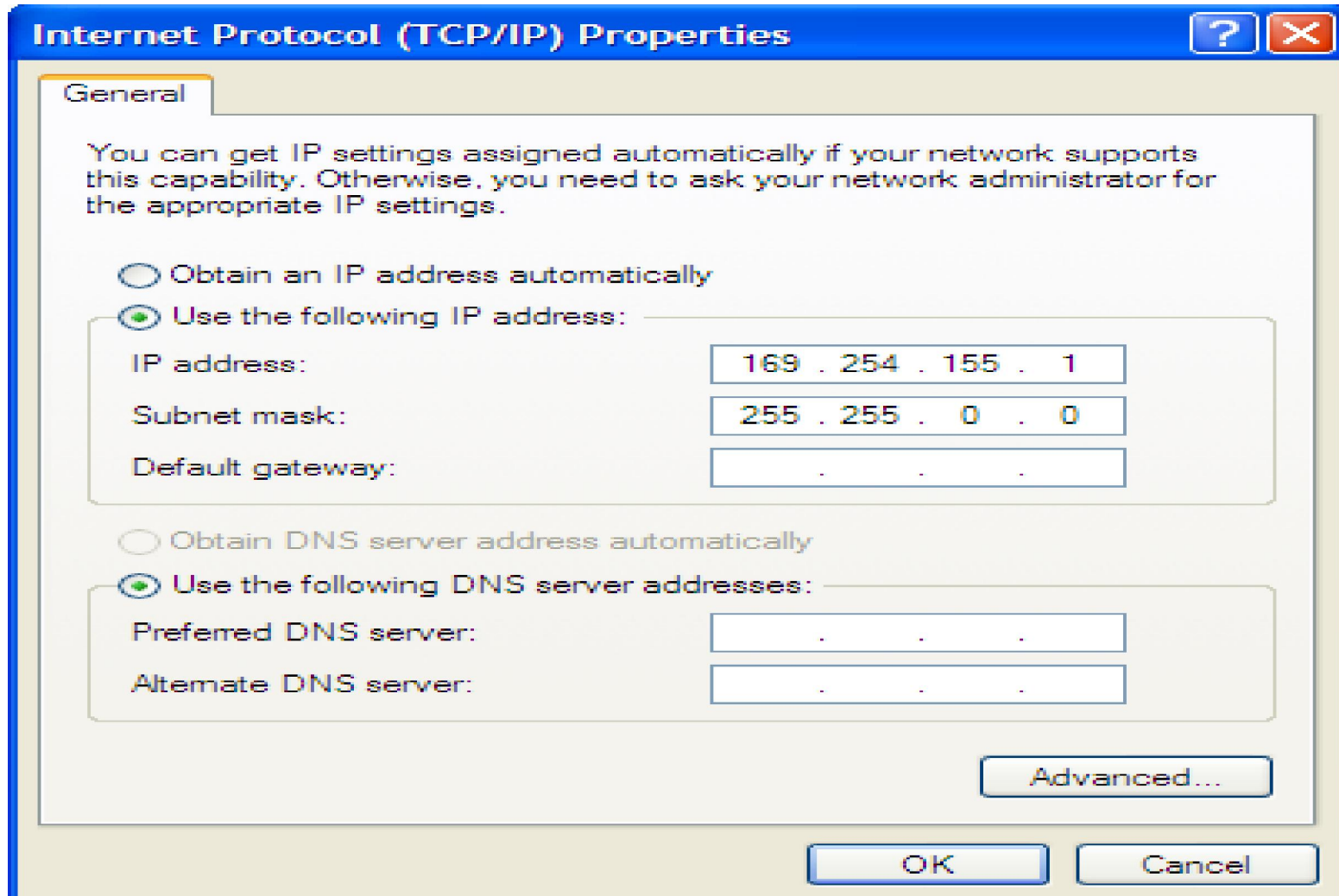
Select ICDI



Get current
MAC address



Configure your PC to static IP



The screenshot shows the 'Internet Protocol (TCP/IP) Properties' dialog box with the 'General' tab selected. The dialog box has a blue title bar with a question mark and a close button. The main area is white with a blue border. It contains a text box explaining that IP settings can be assigned automatically or manually. There are two radio buttons: 'Obtain an IP address automatically' (unselected) and 'Use the following IP address:' (selected). Below the selected radio button are three text boxes for 'IP address:', 'Subnet mask:', and 'Default gateway:'. The 'IP address:' box contains '169 . 254 . 155 . 1', the 'Subnet mask:' box contains '255 . 255 . 0 . 0', and the 'Default gateway:' box is empty. Below these are two more radio buttons: 'Obtain DNS server address automatically' (unselected) and 'Use the following DNS server addresses:' (selected). Below the selected radio button are two text boxes for 'Preferred DNS server:' and 'Alternate DNS server:', both of which are empty. At the bottom right of the dialog box is an 'Advanced...' button. At the very bottom are 'OK' and 'Cancel' buttons.

Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 169 . 254 . 155 . 1

Subnet mask: 255 . 255 . 0 . 0

Default gateway: . . .

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: . . .

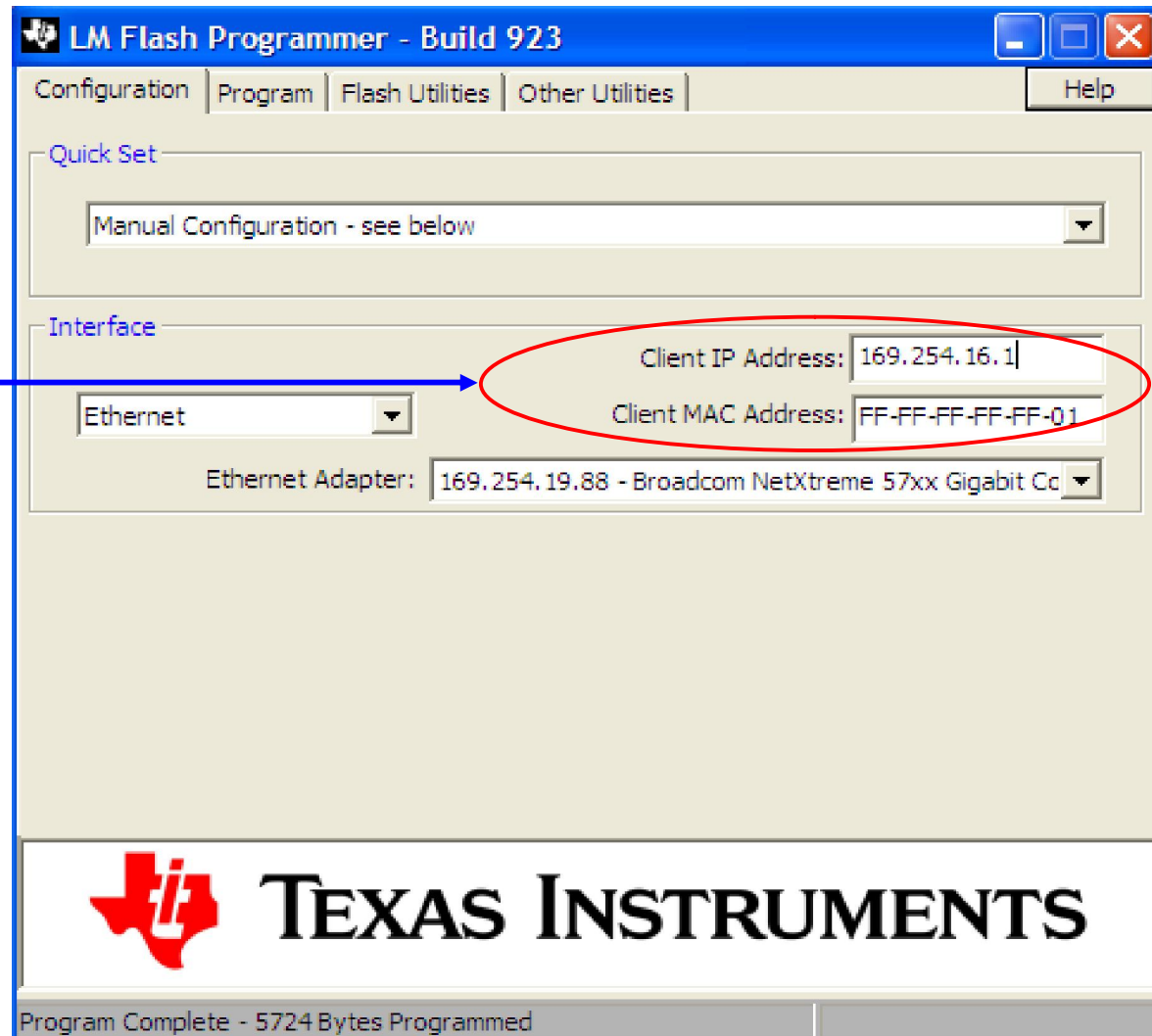
Alternate DNS server: . . .

Advanced...

OK Cancel

Configure the Client IP,MAC address

Configure Client
IP,MAC address



Download user code via Ethernet

- You could recompile the boot_demo1 project to get the binary file
- Locate at C:\Stellarisware\boards\ek-lm3s8962\boot_demo1

Select user code

