

# SMT6012

User Manual Version 4.6



Certificate Number FM 55022

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## List of abbreviations

CC	Code Composer
CCS	Code Composer Studio
cPCI	Compact PCI
DSP	Digital signal processor
EPK	Emulation porting kit
PCI	Peripheral Component Interconnect
SMT	Sundance Multiprocessor Technology Ltd.
TIM	Texas Instruments Module



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## 2 Introduction

The **SMT6012** provides the drivers required to use Code Composer (**CC**) and Code Composer Studio (**CCS**) with the following Sundance Multiprocessor Technology range of carrier boards:

Texas Instruments software, if purchased through Sundance, will include the **SMT6012**.

Sundance carrier board	Description
SMT300	Single TIM cPCI carrier board
SMT300Q	4 TIM cPCI carrier board
SMT310	Single TIM PCI carrier board
SMT310Q	4 TIM PCI carrier board
SMT320 (Obsolete)	4 TIM PCI carrier board
SMT327 (Obsolete)	4 TIM cPCI carrier board

**Table 1** - Sundance hardware supported by the SMT6012

The SMT300, SMT300Q, SMT310 and SMT310Q carrier boards all use the driver for the SMT310. Similarly, the SMT320 and SMT327 both use the driver for the SMT320. For the remainder of this document, SMT310 will refer to the SMT300, SMT300Q, SMT310 and the SMT310Q. The SMT320 will refer to the SMT320 and the SMT327.

If you are using a SMT320, check to make sure which version of the SMT320 you are using. The version number of a SMT320 is written on the PCB, near the blue handle and next to the serial number (ADC4-xxxx).

This document describes how to select a **CC** or **CCS** driver based on:

- The carrier board you use.
- The version of **CC** or **CCS**.
- On-board or off-board debugging requirement.



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You need to have at least the following version of **CC** or **CCS** installed.

Processor type	CC or CCS version required
C4x	<b>CC</b> version 4.3
C6x	<b>CCS</b> version 1.0 or higher (The FULL VERSION, not the limited version supplied with an evaluation board).

### 3 System requirements

#### 3.1 Software

- The PC Operating System must be Windows 9x / NT 4.0 / Windows 2000 or above.
- On a Windows NT / Windows 2000/ XP system, you **must be logged in as a user with administrative rights**.

#### 3.2 Hardware

- The PC **must supply 3.3V** on the PCI bus. If you are not sure, please check the voltage between a mounting hole of your carrier card And a Ground from a PC power cable. Only a few C4x TIMs do not require 3.3V.
- Ensure that the bolt makes contact with the metal ring of the mounting hole. See the user manual of your carrier board for the details.

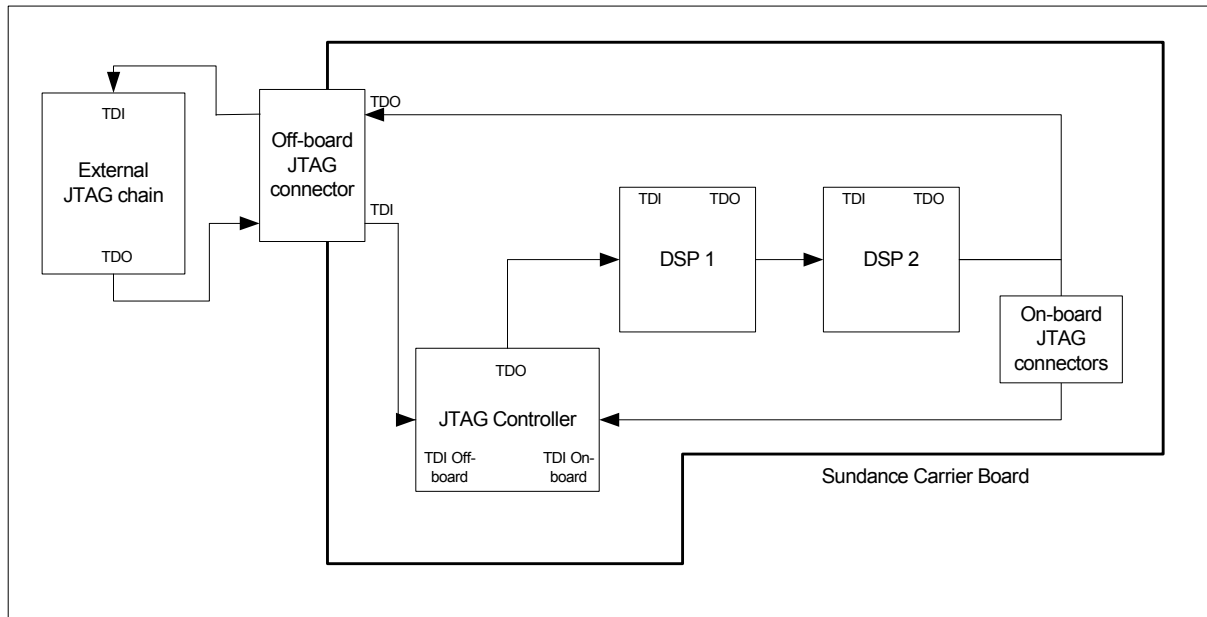


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## 4 Debug configurations

The Sundance carrier board includes a JTAG controller chip. This chip enables the various processor elements on the carrier board to communicate information between each other.

**CC and CCS** uses the JTAG chain to debug processors. The JTAG chain interconnects hardware elements as shown in Figure 1 - **JTAG Chain**.



**Figure 1 - JTAG Chain**

On-board and off-board debugging refers to the way the JTAG chain is used.

For on-board debugging the JTAG chain is local to the carrier board. The JTAG controller selects the input from the “TDI On-board” pin. This effectively disables the external JTAG chain.

For Off-board debugging, the JTAG controller chip selects its input from the external connector. This implies that the JTAG chain now includes the external JTAG chain. This configuration is useful when you want to debug external hardware using the carrier board as a master.

If you are connecting the carrier board to other carrier boards located in the same system, you can use the on-board JTAG connector to make their JTAG paths part of the JTAG chain of the master carrier board.

Please refer to the user manual of the carrier board that you are using for the details on how to connect the carrier board with an external JTAG chain.

**CCS** detects the carrier board with the highest I/O address first. On each of the carrier boards, the processor in TIM site 1 is detected first and then the processor on TIM site 2 etc.



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## 5 Software Installation and Setup

Insert the SMT6012 CD into your CD drive. If the setup program does not start automatically, then open explorer, browse to the CD and run Setup.exe.

### 5.1 Driver directory structure

The **CC** and **CCS** drivers are installed to your PC under the “..\System32” directory. During the setup of **CC** or **CCS**, you will need to refer to these drivers. For CCS version 2.x the .cfg files needed to set up CCS are installed as shown in the figure.

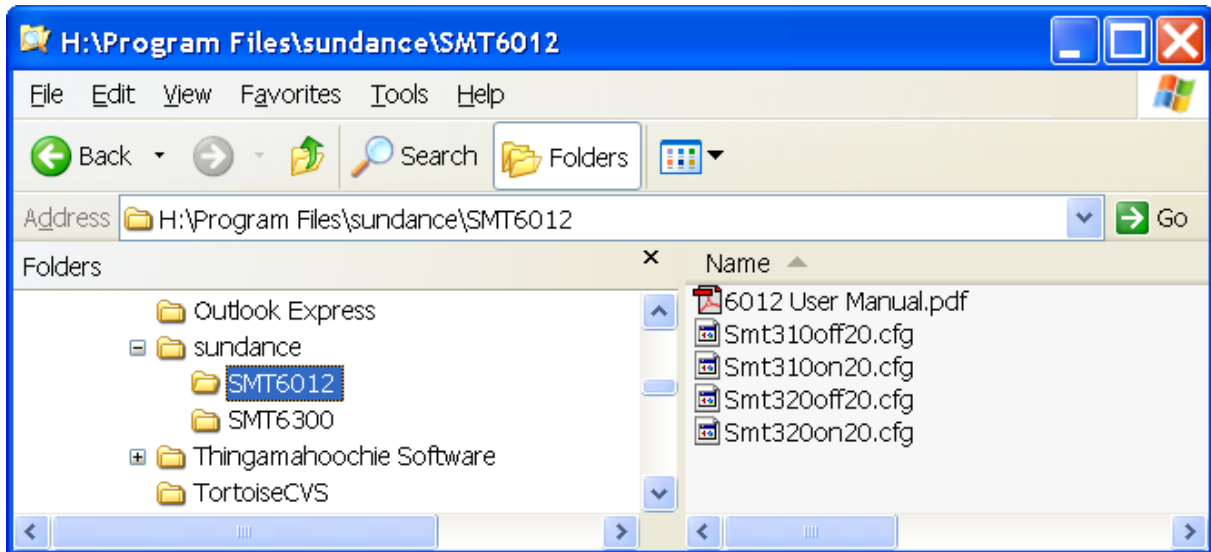


Figure 2 - Directory structure of CC and CCS drivers

### 5.2 Determining the I/O address of your carrier board

After installing the **SMT6012** software, you will need to find the base I/O address of the Sundance carrier board. This address is required to set-up **CC** or **CCS**. You can use the SMTBoardInfo.exe application that is supplied along with the **SMT6300** software.

### 5.3 Setting up code composer studio version 2.x

- Run the Code Composer Setup program. Select the “Install a device driver” link on the right hand side window. Browse to the driver’s directory under your **CCS** directory. This is normally “C:\ti\drivers”. Next select the relevant XDS driver file. The driver file you select will depend on the specifics of the DSP you have. (For C62 and C67 type processors, this is typically the “tixds6000.drv” and for C64 processors it is typically “tixds6400.drv”.) Refer to the TI documentation for which driver to use. Note that the

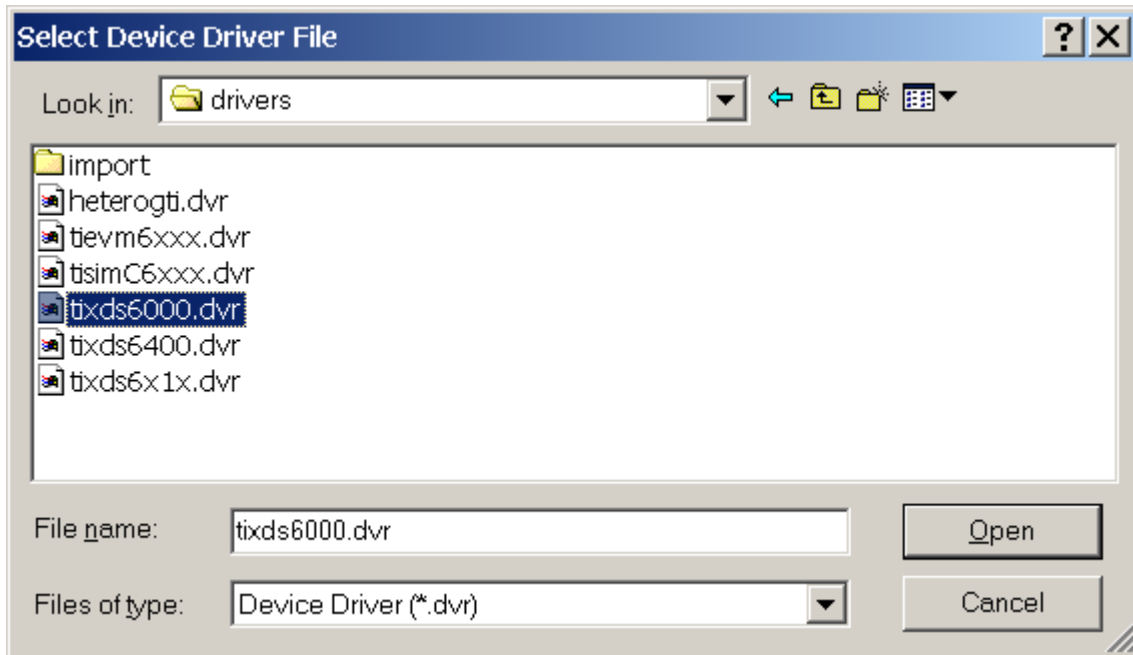


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driver you should use may depend on the silicon rev of the processor you are using.

- Note: For illustrative purposes **only**, we are using the "tixds6000.drv" file.

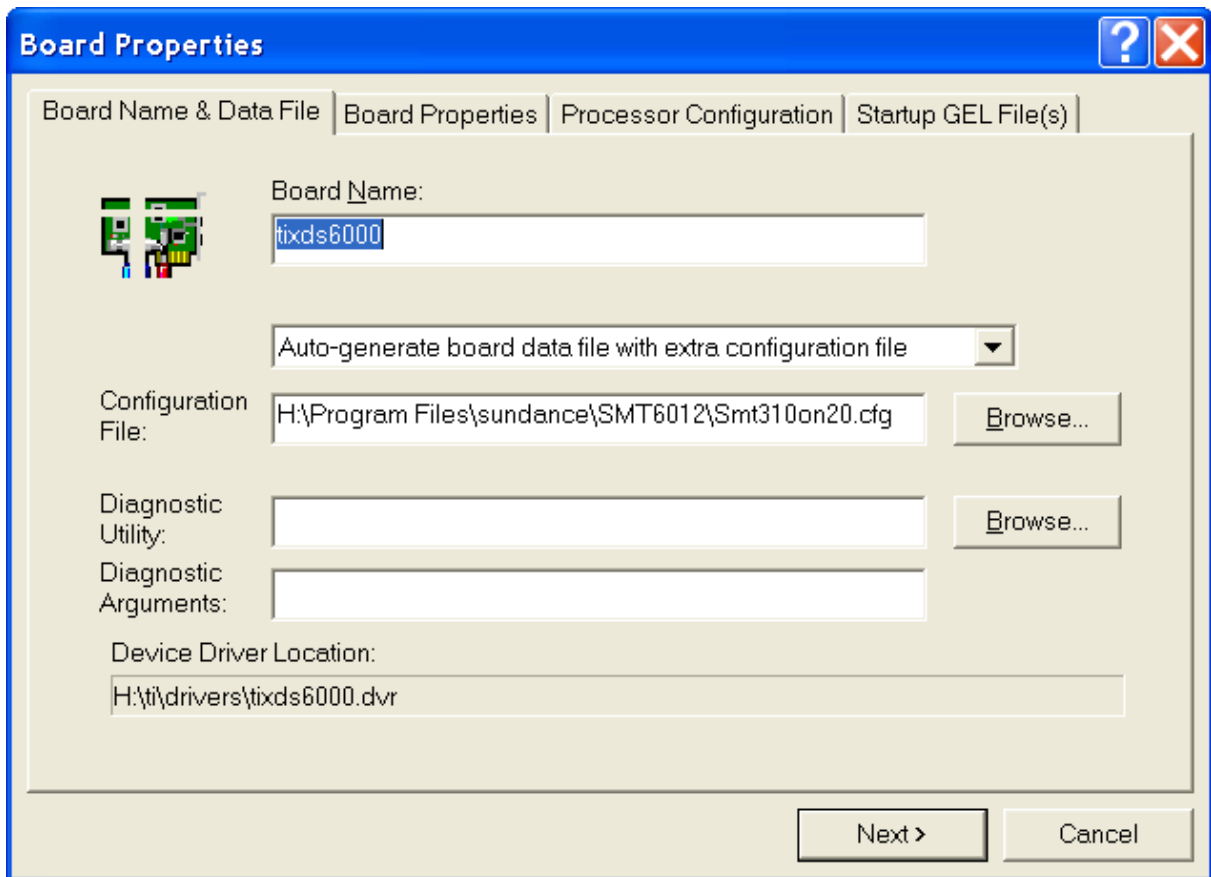


**Figure 3** - Selecting the standard XDS driver

- In the "Device driver properties" window, click OK.
- In the "Available Boards/ Simulator types" window, double-click the relevant driver file.



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**Figure 4** - Specifying the driver configuration file

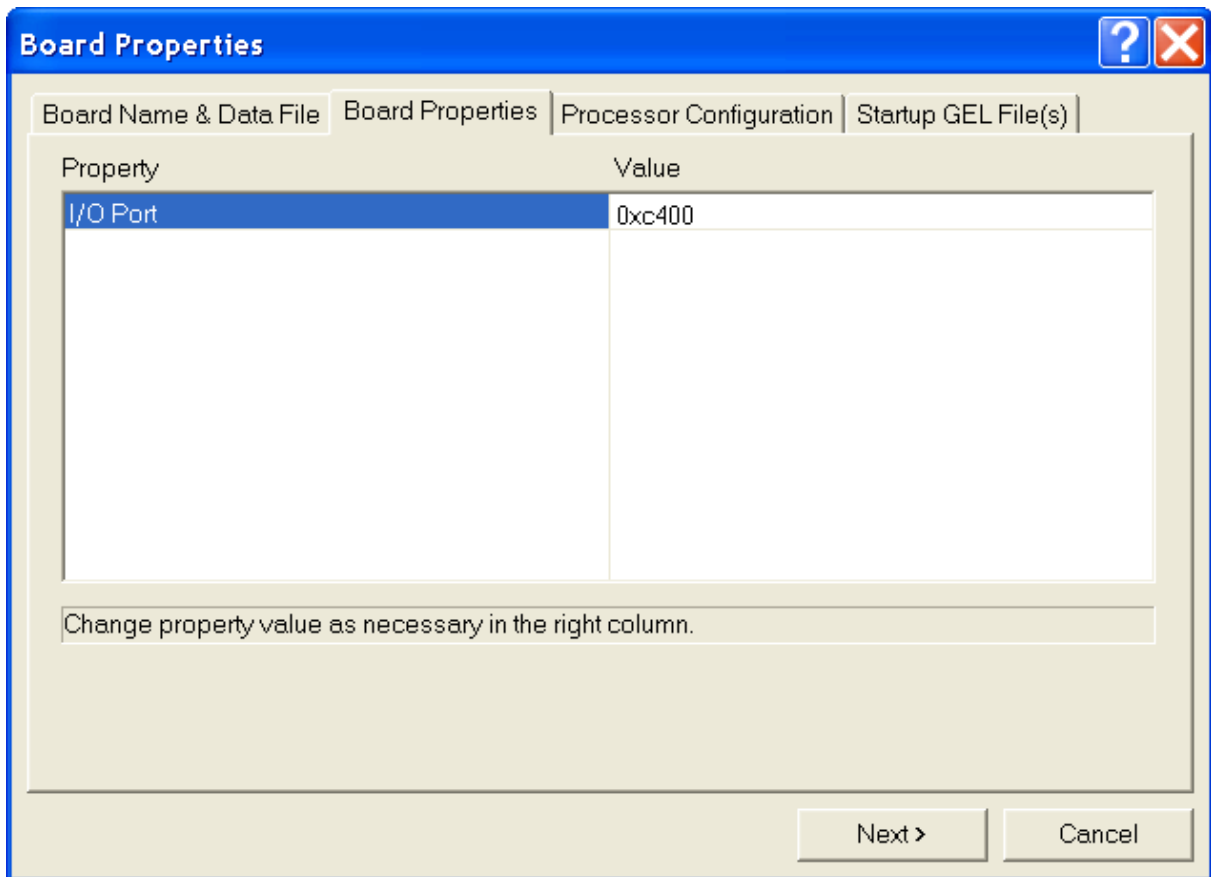
- Select the “Auto-generate board data file with extra configuration file”. Select “Browse” to browse to the directory where the **SMT6012** is installed. This is normally “C:\Program Files\Sundance\SMT6012”. Refer to the table below for the relevant configuration file for your board. Click “Next”.

Board	On-board	Off-board
<b>SMT310</b>	SMT310On20.cfg	SMT310Off20.cfg
<b>SMT310Q</b>	SMT310On20.cfg	SMT310On20.cfg
<b>SMT320-V4</b>	SMT320On20.cfg	SMT320Off20.cfg
<b>SMT320-V3</b>	SMT320On20.cfg	SMT320Off20.cfg

**Table 2** – CCS 2.0 driver configuration file selection



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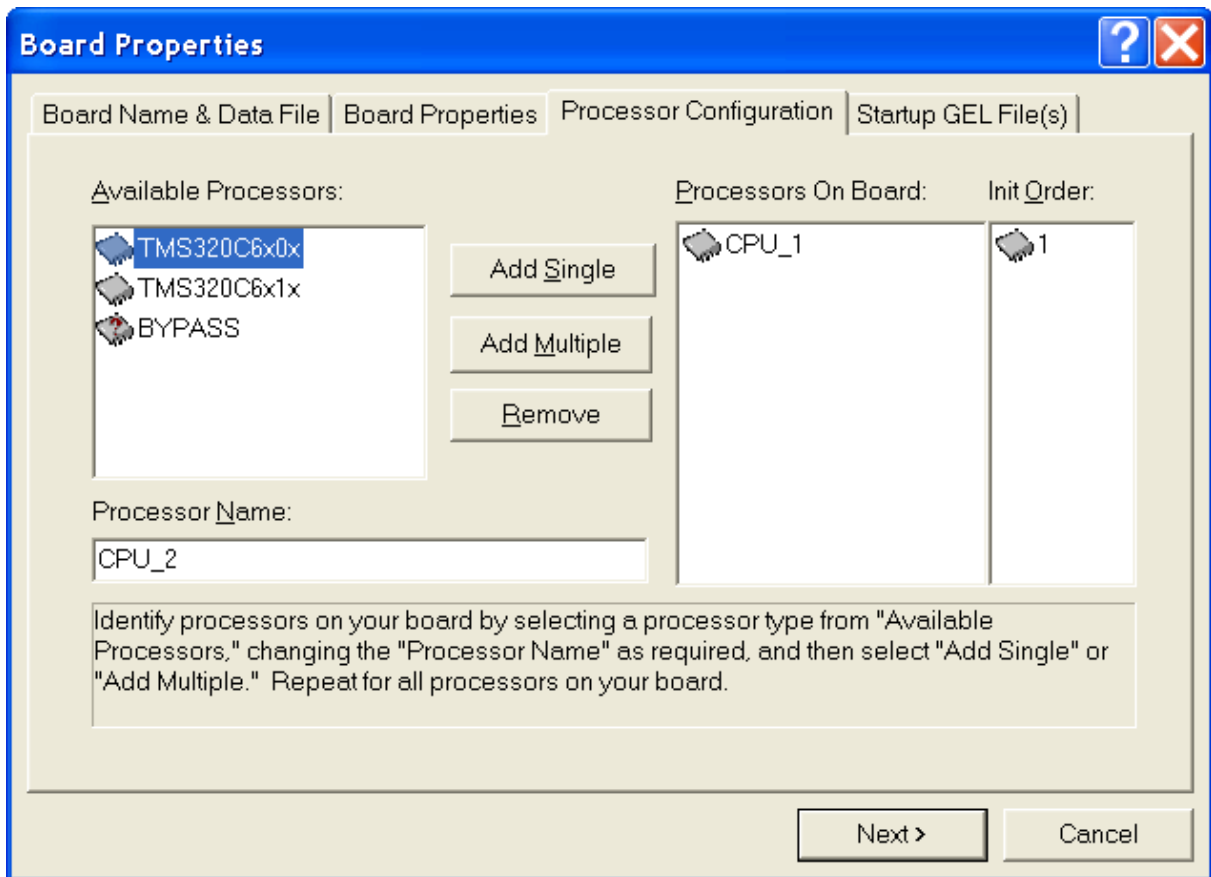


**Figure 5** - Setting the I/O Port address.

- Now change "Value" to the I/O Port address that can be determined with the SMTBoardInfo.exe application. Click "Next".



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**Figure 6** - Specifying the processors

- Select the processors that you have on your carrier board. If you have any C4x processors, they need to be specified as “Bypass” with “Number of bits in the instruction register” set to 8.
- Click “Next”



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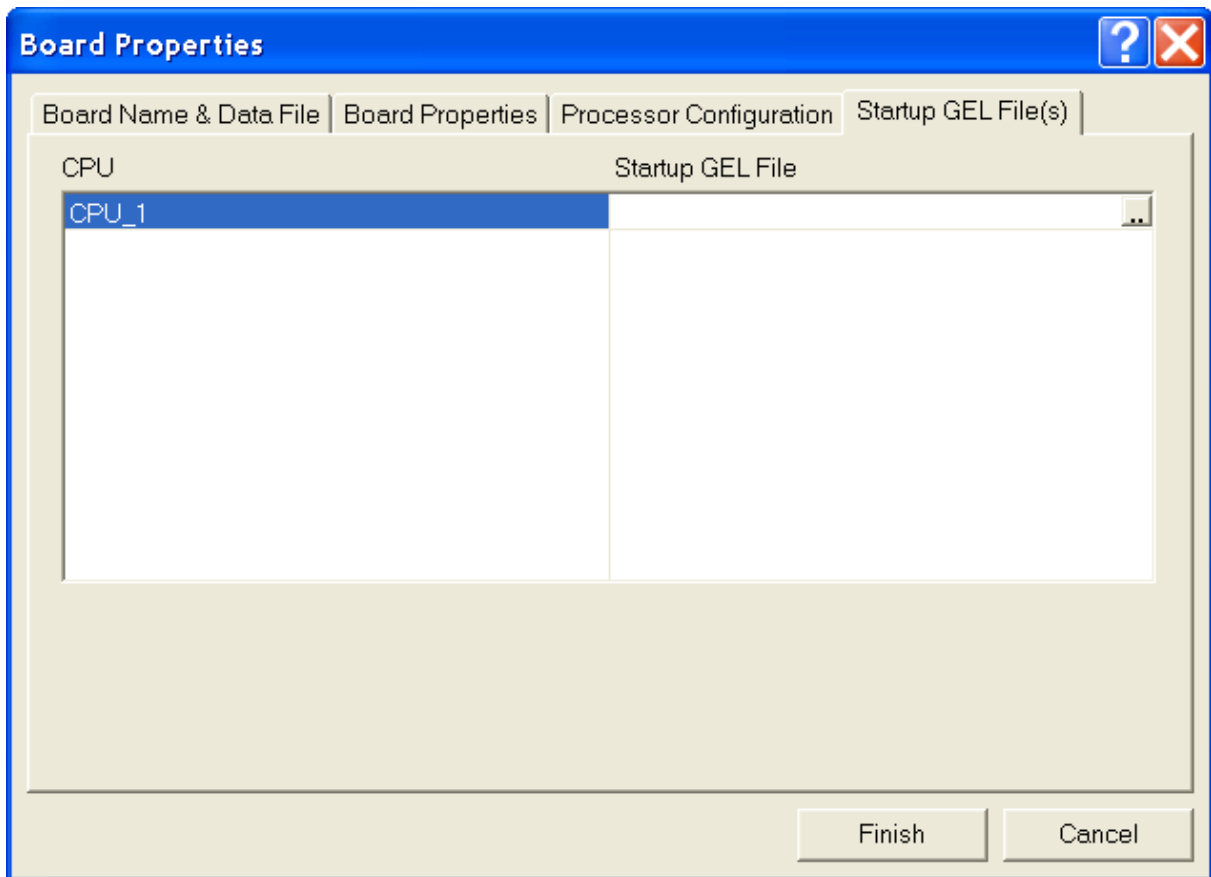


Figure 7 - Specifying the GEL file

- If you are using a GEL file, you can specify it at this stage.
- Click on “Finish”
- Save and exit the **CCS 2.x** setup program.
- You are now ready to run **CCS 2.x**

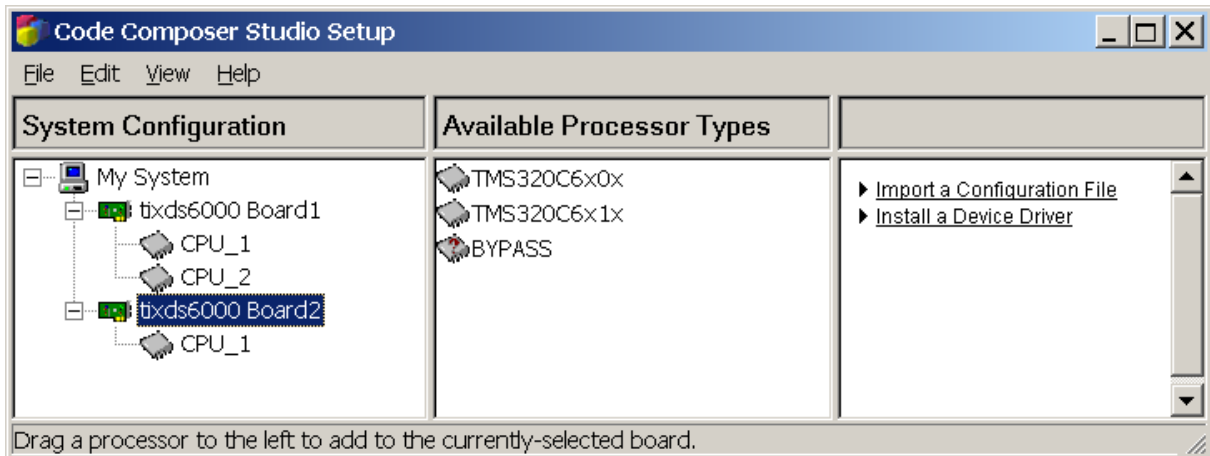
Note that If you are using multiple independent boards (i.e. boards that are not connected via the JTAG chain) you should have a board entry for each of the boards. This is not possible in CCS 1.2 to specify 2 independent boards, and you will have to use CCS 2.x to accomplish this.

You can add more carrier boards to the system by repeating the procedure outlined above. For each board you add, specify a unique board name.

The figure below shows the configuration for CCS 2.x for multiple independent boards.



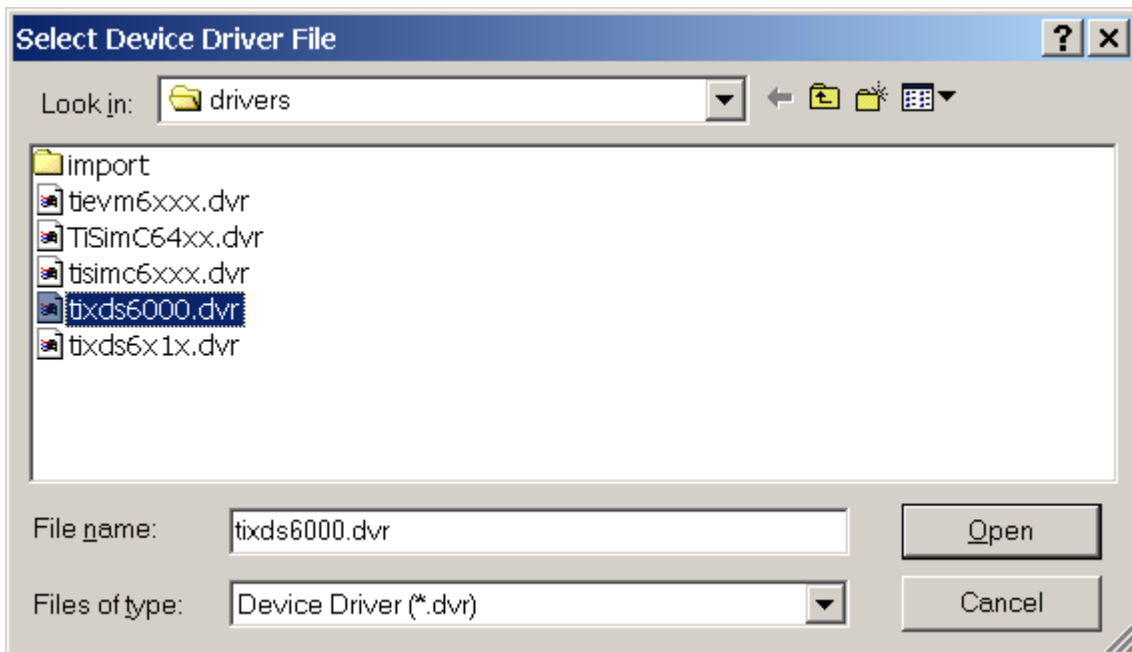
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**Figure 8** - Multiple independent boards

#### 5.4 Setting up Code Composer Studio version 1.2

- Run the Code Composer Setup program. Select the “Install a device driver” link on the right hand side window. Browse to the drivers directory under your Code Composer directory and for the C62 and C67 type processors, select the “tixds6000.drv” file as shown in Figure 9. This is typically “C:\ti\drivers”.



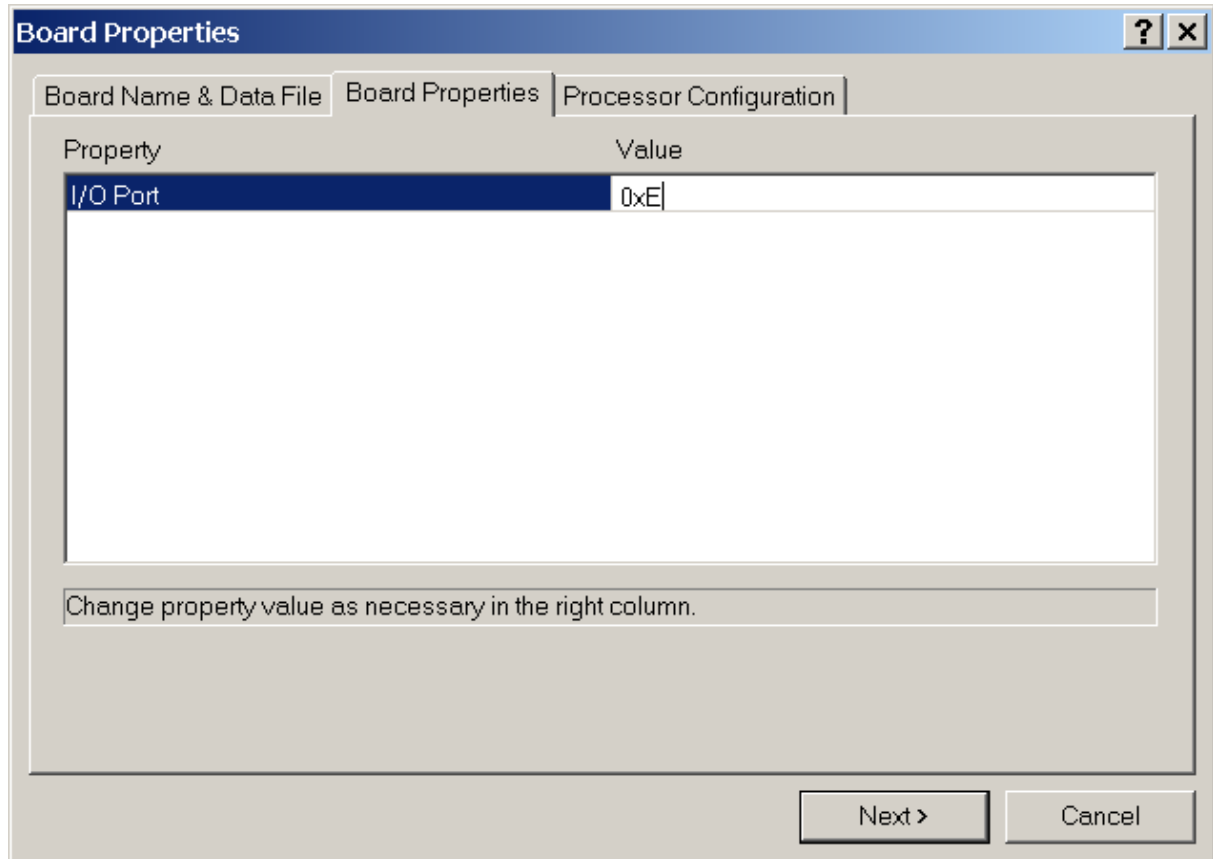
**Figure 9** - Selecting the standard XDS driver

- In the “Device driver properties” window, click OK.



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- In the “Available Boards/ Simulator types” window, double-click the “tixds6000” driver.
- Click “Next”

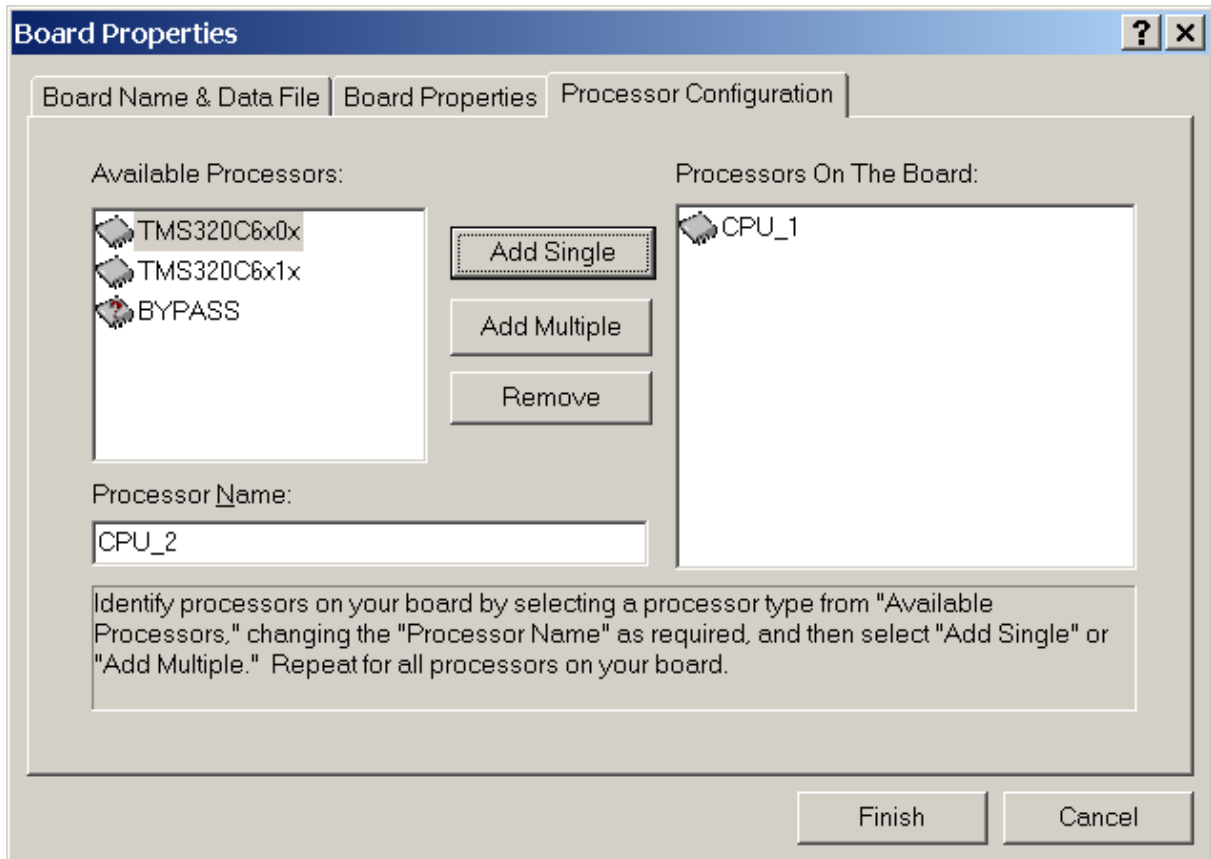


**Figure 10** - Setting the I/O Port address to 0xE

- Now change “Value” to 0xE as shown above, and click “Next”.



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**Figure 11** - Specifying the processors

- Select the processors that you have on your carrier board. If you have any C4x processors, they need to be specified as "Bypass" with "Number of bits in the instruction register" set to 8.
- Click on "Finish"
- Save and exit the **CCS 1.2** setup program.

### For Windows NT4/2000

- Add the following lines to your Windows NT environment. To do this, right click on "My Computer" on the desktop, and select properties. Go to the advanced tab and select "Environment variables".

UNIFY_PODDRVR_E	<b><i>DLLNAME</i></b>
UNIFY_PODPORT_E	<b><i>ADDRESS</i></b>



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## For Windows 95/98

- Add the following entries in your "Autoexec.bat" file.

```
SET UNIFY_PODDRVR_E = DLLNAME
SET UNIFY_PODPORT_E = ADDRESS
```

- Where **DLLNAME** is the driver DLL name as described in the table below. For example, SMT310On12.DLL. **ADDRESS** is the I/O base address returned by the SMTBoardInfo.exe program. For example "0x2000"

Board	On-board	Off-board
<b>SMT310</b>	SMT310On12.dll	SMT310Off12.dll
<b>SMT310Q</b>	SMT310On12.dll	SMT310On12.dll
<b>SMT320-V4</b>	SMT320On12.dll	SMT320Off12.dll
<b>SMT320-V3</b>	SMT320On12.dll	SMT320Off12.dll

**Table 3** - CCS1.2 Driver selection

- You are now ready to run **CCS 1.2**.
- **Note:** It is not possible to configure CCS 1.2 to use two or more independent carrier boards. If this is your requirement, then use CCS 2.0.

## 5.5 Setting up Code Composer Studio version 1.0

- Open **CCS Setup**.
- Click on "Install Device Driver" and Browse to the directory where the **SMT6012** is installed. Refer to the table below to select the relevant driver file for your board.

Board	On-board	Off-board
<b>SMT310</b>	SMT310C6xOn.drv	SMT310C6xOff.drv
<b>SMT310Q</b>	SMT310C6xOn.drv	SMT310C6xOn.drv
<b>SMT320-V4</b>	SMT320C6xOff.drv	SMT320C6xOn.drv
<b>SMT320-V3</b>	SMT320C6xOn.drv	SMT320C6xOff.drv

**Table 4** - CCS1 Driver selection



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- The selected driver should now be displayed in the "Available Board/Simulator Types" panel. Click and drag it into the "System Configuration" panel. This triggers the "Board Properties" window to come up.
- Click on Next. Enter the I/O Port value for your Sundance carrier board. (As obtained using the SMTBoardInfo.exe application). Click Next.
- You now must enter the number of processors plugged into the Sundance carrier board as well as any devices to bypass (if there are any). Once done click Finish.
- Code Composer Studio is now ready to use. Save and exit the setup.

## 5.6 Setting up Code Composer version 4.3

- Select the relevant **CC** driver files from the driver directory as described in the table below and copy them into the **CC** directory.

Board	On-board - C4x	Off-board – C4x	On-board - C62	Off-board – C62
<b>SMT310</b>	SMT310C4xOn.dll	SMT310C4xOff.dll	Not supported	Not supported
<b>SMT310Q</b>	Not supported	Not supported	Not supported	Not supported
<b>SMT320-V4</b>	SMT320C4xOn.dll	SMT320C4xOff.dll	SMT320C62Off.dll	SMT320C62On.dll
<b>SMT320-V3</b>	SMT320C4xOn.dll	SMT320C4xOff.dll	SMT320C62On.dll	SMT320C62Off.dll

**Table 5 – CC 4.3 Driver selection**

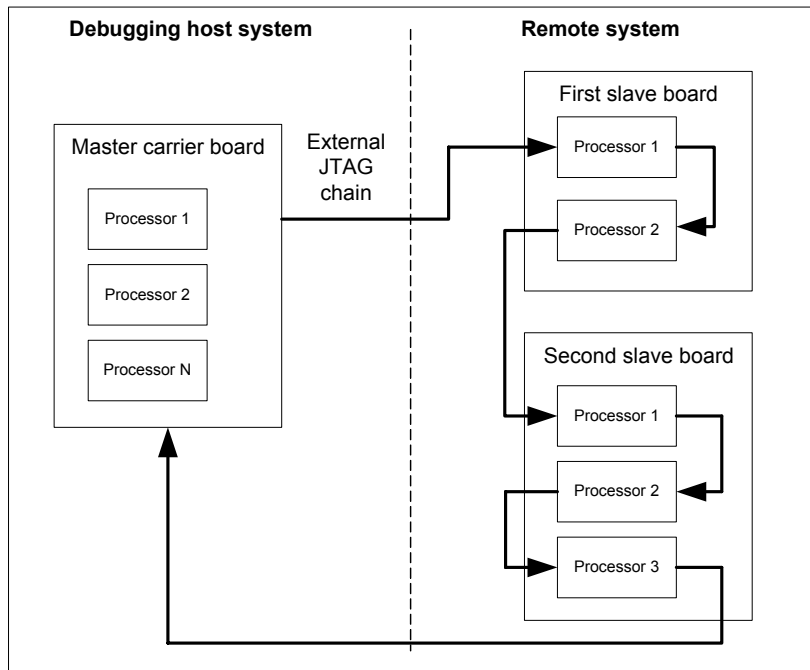
- Open **CC** Set-up.
- In the General Tab, click "Add Driver" and select the relevant driver file.
- Still in the General Tab, enter the I/O Port address for your Sundance carrier board as obtained using the SMTBoardInfo.exe application.
- Next click the "Multi-processor" tab. Declare each C4x processor by entering a suitable unique processor name, for instance, 'p1', (Take care not to use any capital letters in the name), then click "Insert". This adds the processor in the Processor List.
- Click OK twice to exit **CC** Setup.
- **CC** is now ready to use.



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## 6 Master/Slave configuration

It is possible to use a carrier board as a master board that is used to debug a slave board in a remote system. In this case the slave boards have to be part of the JTAG chain of the master board. The figure below shows such a configuration. Each processor on the slave boards has to be specified in the CCS setup. Ensure that CCS is set up to point to the master carrier board.



**Figure 12 - Master/Slave configuration**

The figure below shows the CCS setup for the sample configuration shown above.



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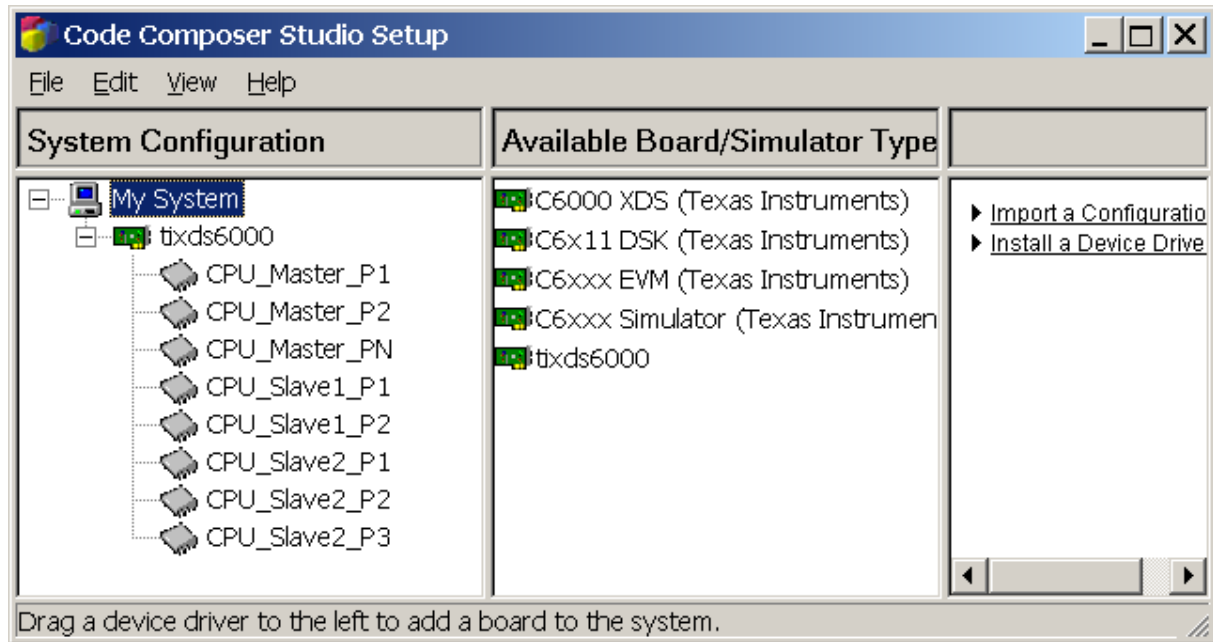


Figure 13 - CCS setup for the sample configuration

## 7 Problematic configurations

### 7.1 Using C4x type processors with Code Composer Studio

**CCS** does not support the C4X range of processors. If you are using C4x type processors, then you need to declare them as “Bypass” processors in the **CCS** setup. The “Number of bits in the instruction register” must be set to 8. This will cause **CCS** to know about the processors in the JTAG chain.

Sundance’s non-DSP module must not be set, neither as CPU nor as Bypass as they don’t have any scan path, i.e., TDI is routed directly to TDO. This means that they won’t appear in the System Configuration window.

However, if the non-DSP module has a scan path, then it must be added as a bypassed module with a “Number of bits in the instruction register” set as specified in its User Manual.

For further information about how to bypass devices that are not recognized by your **CCS** driver, please refer to the help.

Example:

The user has a SMT320 with a C6x TIM in site 0 (root), a C6x TIM in site 1, a C4x TIM in site 2 and a non-DSP TIM (from Sundance) in site 3.

The setting for CCS 2.0 should look like this:



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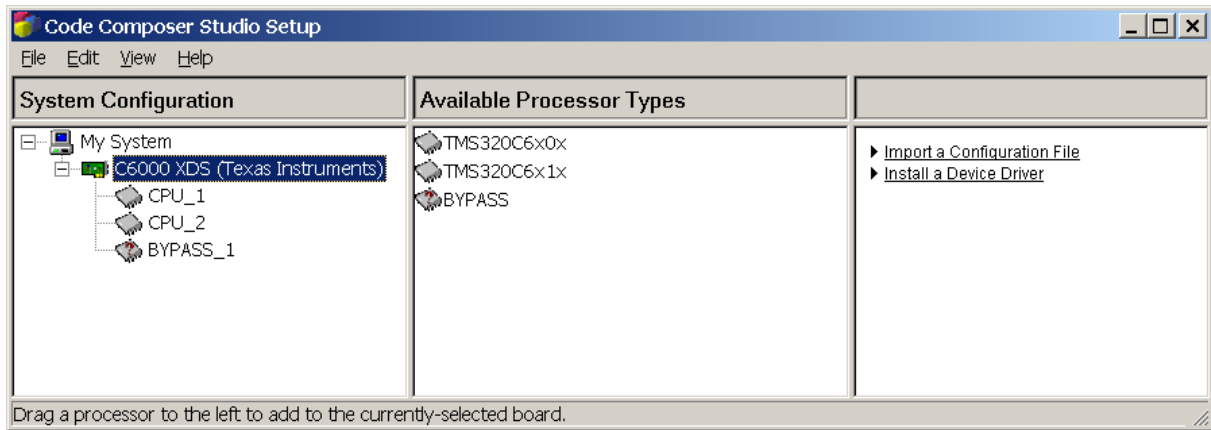


Figure 14 - Example setup for mixed C4x and C6x processors

## 7.2 Code Composer Studio setup for mixed C62-C67 configuration

**CCS** version 2.0 allows the use of mixed C62 and C67 processors. If this is your requirement, we recommend you to update to **CCS** version 2.0.

## 7.3 Code Composer Studio Setup for multiple carrier boards

If you have more than one Sundance carrier board in your system, that you would like to use independently, you will need to setup **CCS** version 2.0 or later.

## 7.4 Mixed C4x/C6x Configuration

The C4x module must be bypassed with "number of bits in the instruction register" set to 8. This is what **CCS** Setup should look like:

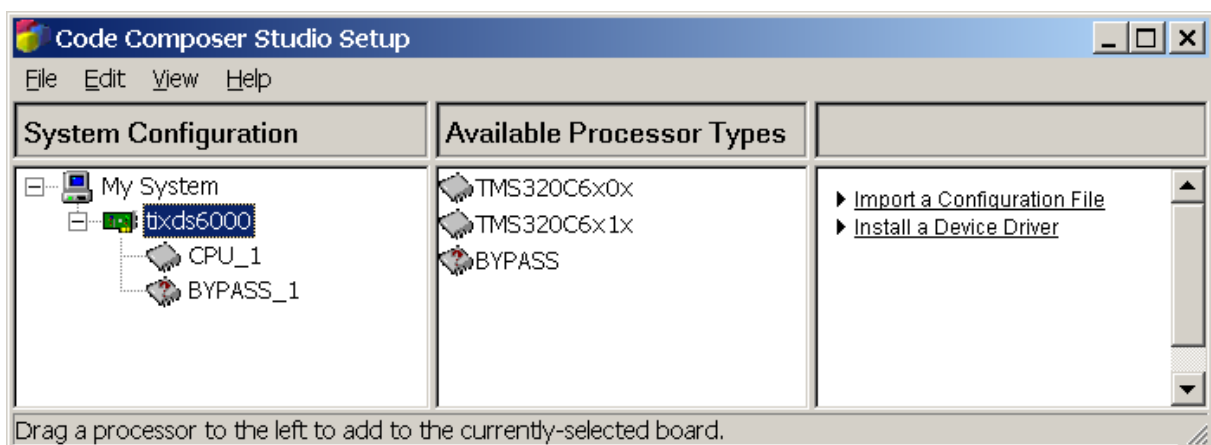


Figure 15 - Using a C6x and a C4x processor on the same carrier board



## 7.5 Using a C6x to program a C4x (Hex Loader)

It is possible to boot a C4x using a C6x processor. For an example of this, please contact [support@sundance.com](mailto:support@sundance.com).

## 8 Trouble Shooting

### 8.1 Using Code Composer and Code Composer Studio:

- If there is an error during compilation, it could mean that T.I. Compiler/linker and environment settings are not configured properly. Please refer to T.I. documentation.

If Code Composer doesn't open it may be because:

- Code Composer was not setup properly. Check the I/O port address and the driver used are correct.
- Sundance hardware was not installed properly. Check that the board is plugged properly and that it is supplied with 3.3V if required (bolt must make contact with the mounting hole ring).
- Ensure you are using the CCS driver.

## 9 Known Issues

### 9.1 Code Composer Studio

#### 9.1.1 Exit

When exiting CCS, always ensure that the CPU is running free. To do this, click Debug→Run Free before closing your CCS session.

Failure to do this will result in the DSP being halted, which would cause the DSP to stop responding to other applications. If you now reset the TIM module, the DSP will not load the boot loader.

To recover from the condition described above, open CCS again, and select Debug->Run Free from the menu.



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