

Code Composer™

Quick Start Guide

Before You Begin

- Check for old versions of Code Composer (CC) on your system
- Uninstall all old CC applications
- Delete old path statements and environment variables in your autoexec that are related to any previous CC installs

Installing CC Using CD-ROM

- Invoke CC installation
- Follow the install wizard's instructions
- Choose Full install with electronic document installation
- Allow the install wizard to modify your autoexec (recommended)
- Register for future upgrades
- Finish install
- View release notes and allow Code Composer Setup to autoinvoke at restart (recommended)

Note: If you are using an XDS510PP, proceed to the next section. All other users should restart their PC and go to the Setting Up Code Composer section.

Install the Spectrum Digital XDS510PP Driver

Note: XDS510 users can skip this step.

- If the CC software was purchased as part of an EVM bundle, the appropriate driver is included in the bundle; otherwise, go to site <http://www.spectrumdigital.com/service/trouble.asp>

to request the appropriate driver. Be sure to specify your target device and the version of CC that is being used. Once the driver is obtained, proceed to the next step.

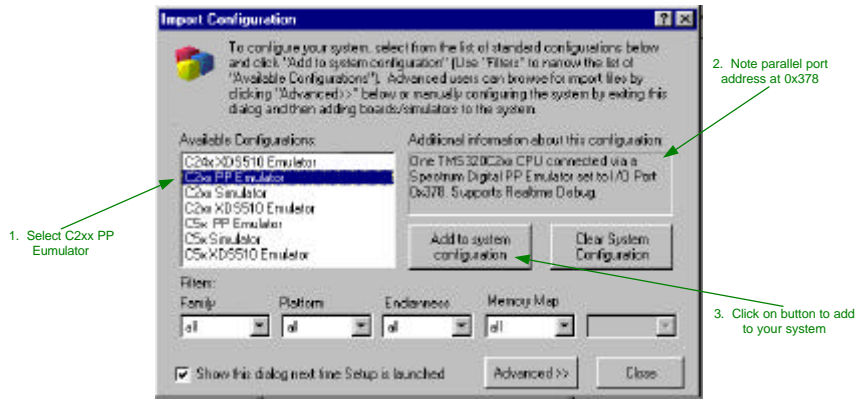
- Request "SetupCC2x.exe" (this is the installer and driver)
- Execute the driver install wizard
- Follow instructions (defaults recommended)
- Restart your PC

Setting Up Code Composer

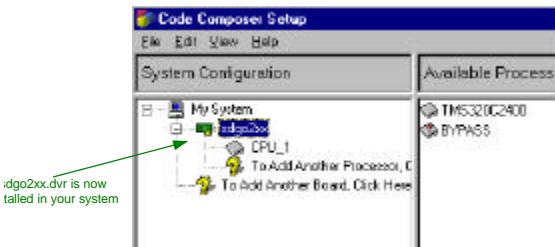
- After restart, CC Setup should start automatically. If not, invoke via the SetupCC icon that appears on your Windows desktop.
- If the Import Configuration dialog box appears, select the C2xxPP Emulator under Available Configurations. Then select Add to System Configuration. This will automatically import the default configuration of 0x378 along with one processor.
- Select the Close button to close this box.

Note (1): I/O port address 0x378 is the most common; however, 0x278 and 0x3bc may also be valid. Please check your PC's configuration.

Note (2): XDS510 (C24x XDS510 Emulator) and 2xx Simulator (C2xx Simulator) users can follow the procedures in this section with a slight change. Select the appropriate driver (either C24x XDS510 Emulator or C2xx Simulator).



- The 510PP driver (sdgo2xx.dvr) is now installed in Code Composer's system. Exit Code Composer Setup from the file menu and save changes to your system configuration.



Starting Code Composer

- Verify you have power to your target device and that the JTAG pod is connected to the JTAG header on your target. If you are using the 510PP, verify that the parallel port cable is connected to your PC.
- Invoke Code Composer by double-clicking the desktop icon CC 'C2000. If Code Composer is working, the motorcycle graphic should appear

Note: If an error dialog box appears, go to the end of this start guide for troubleshooting suggestions.

Running Code Composer – Real Time Tutorial for C24xx DSPs

- Open project *Real24xx.mak* :
Menu bar -> Project -> open
Type:

C:\ti\c2xx\c2000\tutorial\realtime\ Real24xx.mak

Click -> open

Note: You may need to browse for this file if you installed Code Composer in a directory other than the default *c:\ti2xx directory*.

- Edit *x24x_app.h* to select the appropriate DSP as shown below –

```
x240      .set    0      ; C/F240
x243      .set    1      ; C/F243
x2407     .set    0      ; F2407
```

The above example selects TMS320F243. In order to choose TMS320LF2407 device set 1 for x2407 and put 0 for x243.

- Build Project (Assemble and link code)

Menu bar > Project > Rebuild All

Output window status should read:

“Build complete, 0 Errors, 0 Warnings”

- Download tutorial example code to EVM board

Menu bar > File > Load Program

Select *Real24xx.out* from the dialog box and click on Open.

Note: If you receive a loading error, verify you have the target jumpers set for running out of RAM with watchdog disabled (*JP5 = 2-3, JP6=1-2*).

- Reset the DSP

Menu bar > Debug > Reset DSP

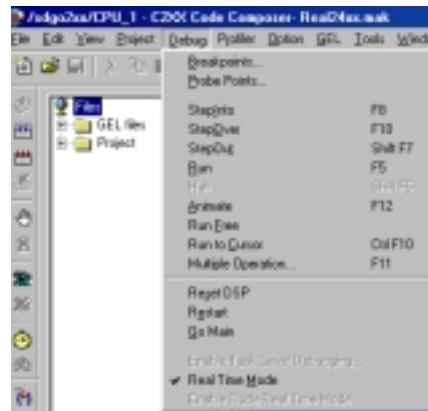
- To Run code emulation in real-time mode

Type go MON_GO in Command Window and execute -



Click Real Time Mode from Debug

Menu bar > Debug > Real Time Mode



After selecting Real Time Mode run the software -
Menu bar > Debug > Run

The DSP should now be running in Real Time Mode.

DSP is now running in Real Time mode



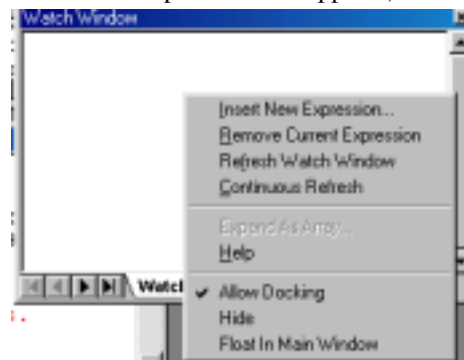
Adding Watch Windows

- Add Watch windows:

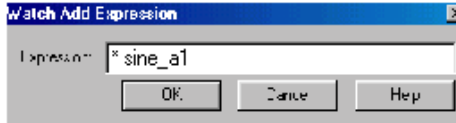
Menu bar > View > watch Window

- Declare variables or peripheral registers to watch:

Note: Cursor should be on watch window
Right-mouse click on Insert New Expression
(the watch Add Expression box appears)



type * sine_a1

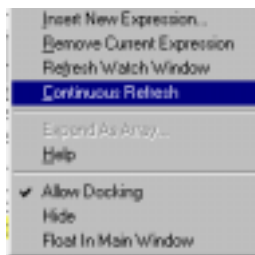


Repeat for variables:

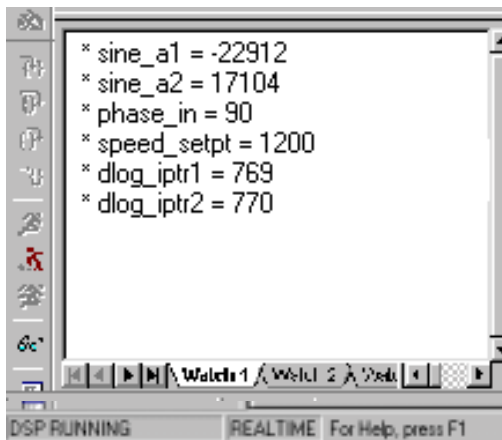
- * sine_a2
- * phase_in
- * speed_setpt
- * dlog_iptr1
- * dlog_iptr2

Allow continuous refresh of watch variable:

Right-mouse click on > Continuous refresh (in watch Window)



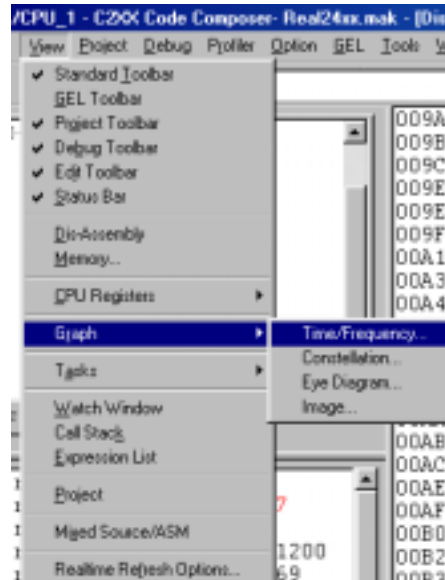
sine_a1, sine_a2 should now be incrementing (updating rapidly). The complete watch window is shown below –



Adding Graph View

- Add Graph Window

Menu > View > Graph > Time/Frequency

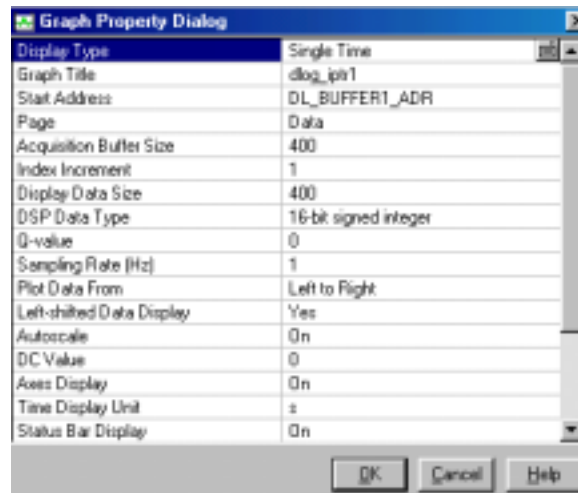


Graph Property Dialog box will open.

Modify the following in Graph Property Dialog box –

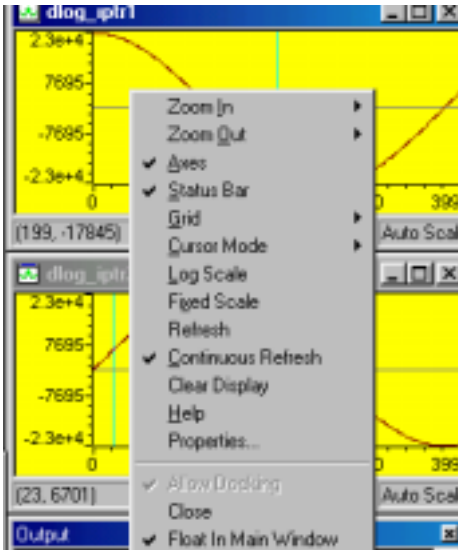
- Start Address > DL_BUFFER1_ADR
- Acquisition Buffer Size > 400
- Display data Size > 400
- DSP Data Type > 16-bit signed integer

The modified Graph Property Dialog box is shown below –



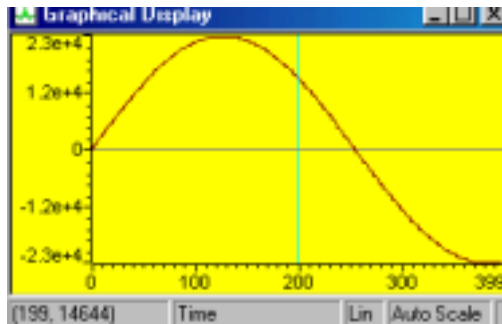
Click OK.

Right Click on Graph Window and

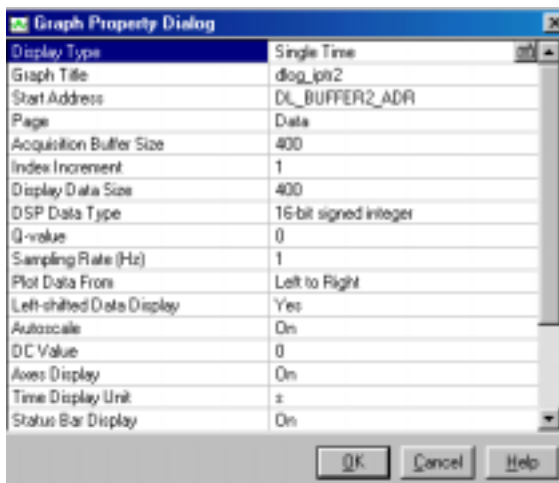


click on > Continuous refresh- as shown below -

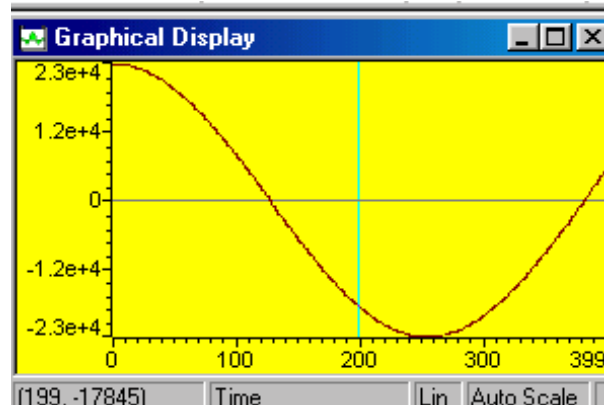
Graph Window should be displaying a Sine Wave at this time – as shown below.



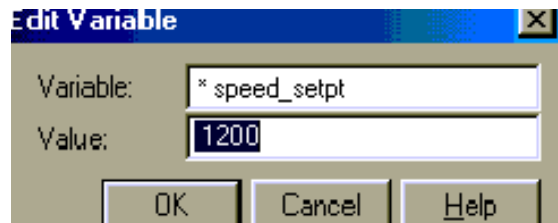
- Add a second Graph Window similar to the first Window.
- The second Graph Window should have DL_BUFFER2_ADR as its Starting Address as shown below –



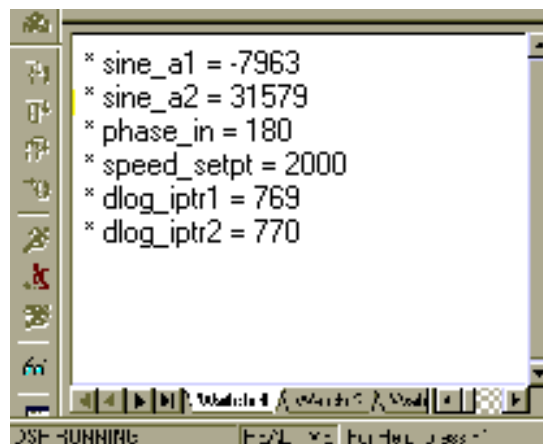
- Click OK on Graph Property Dialog box for Second Graph Window.
- Right Click on Graph Window and click on > Continuous refresh
- Second Graph Window should now be displaying a Cosine wave as shown below –



- The frequency of these waveforms can be changed by putting a different value for the variable speed_setpt in the Watch Window.
- Double-click on speed_setpt in watch Window to Edit the variable in the following Dialog Box –

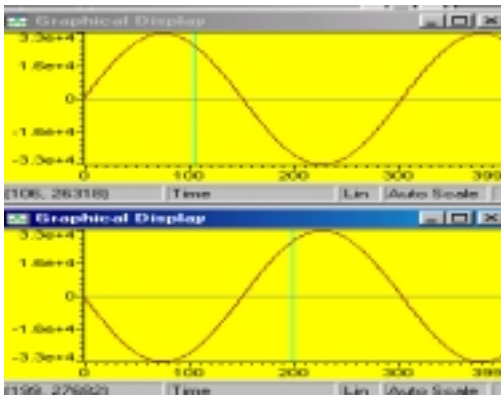


- Change speed_setpt to 2000 and watch the graph windows change accordingly.
- The phase angle between these waves can be changed by modifying the variable phase_in in the Watch Window.
- The following graph shows a waveforms at

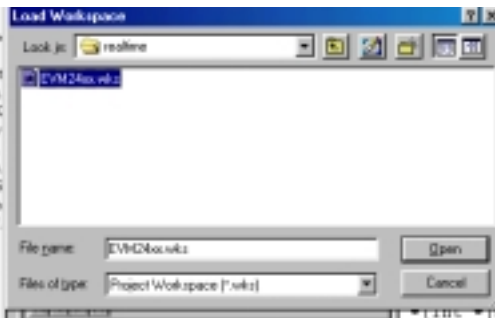


speed_setpt=2000 and phase_in=180 –

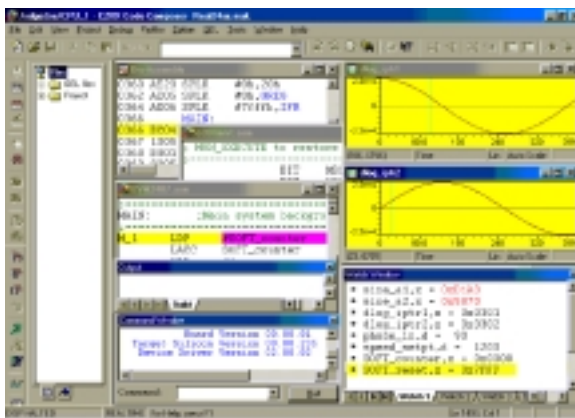
- The corresponding Watch Window is shown above -



- Real Time Tutorial for C24xx DSPs also provides work space example. In order to utilize example work space –
- Open work space EVM24xx.wks:
- Menu bar > File > Workspace > Load Workspace
- Type
C:\tic2xx\c2000\tutorial\realtime\EVM24xx.wks



- The resulting workspace is shown below –



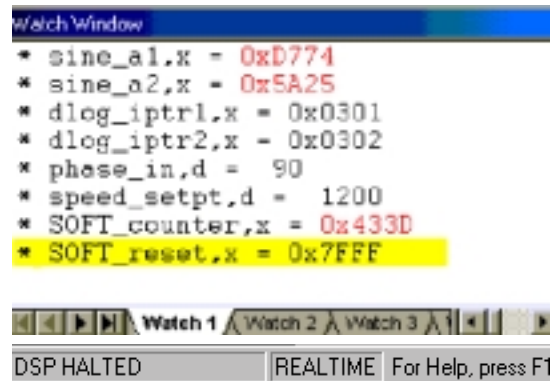
Single Stepping with Real Time Debugging

- It is possible to utilize Single Step feature to debug the code residing outside the interrupt service routines.
- The software within the interrupt service routine keeps on operating in real-time mode.
- The following steps show this feature in detail.
- The following code is added outside the interrupt service routine –

```
MAIN: ; Main system background loop
```

```
M_1  LDP  #SOFT_counter
      LACC SOFT_counter
      ADD  #1
      SACL SOFT_counter
      LACC SOFT_reset
      SUB  SOFT_counter
      BCND resett, LEQ
      B    MAIN
resett SPLK #0, SOFT_counter
      B    MAIN
```

- One can set a break point at M_1 and single step through this piece of code while the rest of the system keeps running in real-time mode.
- Add SOFT_counter & SOFT_reset in the watch window as shown below –



- The variable SOFT_counter increments until its value equals to SOFT_reset and then SOFT_counter resets to zero.
- One can change SOFT_reset value to observe the change in SOFT_counter.

- It can be noted that during single stepping the foreground task is halted but the background (interrupt service routines) tasks are not halted.