Technical notes on using Analog Devices DSPs, processors and development tools
Contact our technical support at dsp.support@analog.com and at dsptools.support@analog.com
Or visit our on-line resources http://www.analog.com/ee-notes and http://www.analog.com/processors

Emulator Troubleshooting Guide

Contributed by Kathleen Smith and Linda Gray

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Introduction

DSP Tools Support (dsptools.support@analog.com) handles all initial e-mail requests regarding problems with in-circuit emulators (ICEs). Most problems are resolved by e-mail. Authorization to return units is reserved until all other options have been exhausted. To resolve these issues by e-mail, the support team needs as much information as possible to identify the problem and to provide a solution.

The following troubleshooting guide suggests how to quickly and easily resolve most installation, connection, and software problems. It also highlights the information required by the support team to authorize the return of an emulator for repair.

Installation

The VisualDSP++® toolset includes a full set of documentation in pdf format. These documents can be found under `Help->Contents->Manuals->Hardware Tools->ICEs` in the IDDE. Perform hardware installation and configuration using these documents. When reporting faults, confirm that you followed these procedures and indicate the exact step number that produced an error. Be sure to provide the full details of any error message received.

Emulator Manuals

The latest manuals are also available via download from the ADI Web at the URLs listed below.

HPPCI ICE

HPUSB ICE

USB ICE

http://www.analog.com/dsp/manuals

ADSP-218x EZ-ICE®

http://www.analog.com/processors/processors/ADSP/technicalLibrary/manuals/16BitIndex.html

Summit-ICE™ (now obsolete)

Apex-ICE™ (now obsolete)

http://www.analog.com/processors/resources/technicalLibrary/manuals/legacyManuals/legacy_index.html

Other Equipment

The support team needs to know which operating system, evaluation board, and version of VisualDSP++ you are using. This information is used to confirm compatibility and duplicate the problem. Please indicate whether you have a third-party multiprocessor board, clustered multiple boards, or externally configured memory. All of these factors may affect the configuration of your equipment.

Software

Latest Emulator Drivers

VisualDSP++ 3.5

The emulation tools are included in the base VisualDSP++ 3.5 installation. There is no need for a second ICE software installation procedure as was required in previous versions of VisualDSP++. To install emulator support, select the appropriate components in the installation wizard (they are selected by default). The installer handles the installation and/or update of the emulator hardware device driver.

VisualDSP++ 2.0 and 3.0

The latest upgrade to the emulator software, version 7.0.2, is available to download from the ADI website at the URL listed below. Please ensure that you have these drivers.

http://www.analog.com/processors/resources/crosscore/emulators/archives.html

Be sure to install VisualDSP++ first, and then the emulator software.

Restrictions

The Apex, USB and HPUSB ICEs have a USB interface and are therefore not compatible with Windows NT.

EZ-KIT Lite® licensed versions (the serial number begins with KIT-) of VisualDSP++ do not support emulation or simulation.

Source Code

Ensure that the emulator problems are not caused by programming issues. If in doubt, zip up your project and send it to DSP Tools Support (dsptools.support@analog.com) so that we can try to reproduce the problem ourselves.

Test Connections

ADSP-218x

The ADSP-218x tools do not come with utilities to test the communication between the PC's serial port and your EZ-KIT Lite or between the PC's serial port and your emulator. However, a Microsoft® utility is available. See Appendix A, which is a brief guideline on using the HyperTerminal test to confirm that communications are functioning properly. Perform this test and provide the support team with the results when you report a problem.

All other Platforms

The tools include the following utilities to test communications between the PC's ports and your emulator:

JTAG ICE Configurator – used to configure the ICE SW with the target.

ICETest utility – used to test the communications between the PC, emulator and target.

These are explained in detail in the VisualDSP++ online help and emulator guides (the URLs are listed in the installation section above). Use the guides and explain exactly which step, if any, causes an error. List all received error messages and if there are none please confirm that these utilities have been run with no errors.

Eliminate Other Possibilities

Emulator problems are often difficult to confirm. The process of elimination is often a good way to proceed. Check the hardware in the following list for errors. If all the hardware is OK, the problem may lie with the emulator. Be sure to inform the support team of the checks you made and the results.

Cables – Ensure proper insertion. Replace them with other known working cables, if available.

Ports – Use another port or another known working emulator, if available, on the same port.

PC – Ensure that the PC has adequate resources and is working OK. Use the emulator on another PC, if available.

Code – Try the Examples provided with VisualDSP++ tools.

Custom board – Ensure that it conforms to JTAG regulations as described in EE-68 which can be found at the following link:

http://www.analog.com/ee-notes/

Power Supply – Try another power supply if available.

Other emulators – If available, use other emulators, of the same type or other types to ensure that the problem is not related to the particular unit or an incompatibility of the emulator type.

Debug Session List

Occasionally, a corrupted session key causes the emulator/debugger to stop responding. To correct this, follow the guidelines below. Confirm to the support team that you have tried this, and provide the results.

1. From the Start menu, open VisualDSP++ whilst holding down the `Ctrl` key.
2. When the Session List dialog box appears, delete all sessions currently defined.
3. Immediately define the emulator session required once more and then activate it.

Frequently Asked Questions

It may be useful to look at our DSP knowledgebase on the ADI Web at the following URL:

http://www.analog.com/dsp/knowledgebase

Returns Policy

To enable the support team to issue an RMA number authorizing the return of the emulator for repair, please do *all* of the following:

Basic Troubleshooting

Support must know what trouble-shooting techniques you have carried out and the results. Refer to the above guidelines and provide as much detail as possible. The majority of these issues can be resolved without returning the emulator. Providing the required information at the time of the RMA request greatly speeds up the problem resolution and provides better client service.

Warranty Details and Proof of Purchase

Emulators that are less than one year old are within warranty. Repairs within that period are free of charge. You must supply proof of purchase for all returns that are within warranty. Returns that are outside of this one-year period must be accompanied by a payment order of $300 (US) for full emulator, $160 (US) for POD only repair.

Using an emulator in any way other than its intended purpose invalidates the warranty.

Other Details

Please contact dsptools.support@analog.com for an RMA Form, which must be filled out and returned to them. Information required on this form includes Customer name and Company Address, Serial number of the emulator, Sales Order number, etc.

Issue of RMA Number and Returns Address

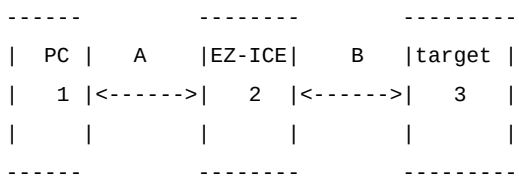
The RMA number is valid only for that particular customer and emulator. Each emulator is processed separately. Do not use an RMA number to send back emulator(s) that you have not been specifically authorized by Analog Devices to send back. Any emulator returned to Analog Devices without an RMA number will not be accepted.

Appendix: HyperTerminal Test

Background Information

The HyperTerminal test is a utility used to test the ADSP-218x EZ-ICE over the serial port interface. The ADSP-218x EZ-ICE requires a serial port to interface with the PC, and will not work with the JTAG ICETest utility.

HyperTerminal does a variety of things. It tests the interface between the "TARGET" (A target is the customer board with a DSP on it), and the EZ-ICE. It tests communications from the EZ-ICE box over the ribbon cable to the target board. HyperTerminal performs other internal tests such as flash tests and RAM tests. As a result of being able to actually perform these tests (see the menu screen from HyperTerminal), a fundamental test of communication between the EZ-ICE and the PC occurs. Think of it as a block diagram where the PC is one block, the EZ-ICE is another, and the target is the third block.



If you can see the HyperTerminal menu screen, you are testing communication path 'A' between 1 and 2. If you can perform the DSP interface test (i), you are testing path 'B' between 2 and 3. The fact that you can actually select the test and see the results tests path 'A'. If you cannot see the HyperTerminal information, there is no possible way to bring up a VisualDSP++ session because path 'A' is not functioning properly. If the DSP interface test fails, there is no way to bring up a VisualDSP++ session because path 'B' has failed and obviously, if path 'A' failed, you could not run the DSP interface test to test path 'B'.

Running the Test

HyperTerminal is a Windows utility, which requires that your target is powered up and connected to your ICE. For Windows 9x/ME, this utility is found under `Start->Programs->Accessories->Communications->HyperTerminal`.

For Windows NT and 2000, it is found under `Start->Programs->Accessories->HyperTerminal->HyperTerminal`.

Do not invoke VisualDSP++ and HyperTerminal at the same time. In other words, do not try to leave HyperTerminal open (or minimized) in the background and bring up VisualDSP++. The COM port has already been allocated to the HyperTerminal software and cannot be shared with VisualDSP++. Consequently, VisualDSP++ cannot communicate with the target at the same time using COM port as HyperTerminal.

To run the HyperTerminal test:

1. With the ICETest utility 1.00.9 installed, you must know what COM port is being used when running the HyperTerminal test.
2. Bring up the HyperTerminal utility and click on the hyperterminal.exe.
3. Fill in any name for the test.
4. Select the COM port connected to your ICE.
5. Select the following COM port properties/ port settings:
   - Bits per second= 9600
   - Data bits= 8
   - Parity = none
   - Stop bits = 1
   - Flow control = hardware
6. Click OK.
7. With the ICE powered up and connected to your target, press the ICE Reset button once. You get the following splash screen:

```
//////////////////////////////////////////
20      Boot code v1.0a May 7, 1997
30      Flash code v1.0N July 14, 2000
40
50       <Enter> for menu (1 sec)
60      $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
70      ENTERING EMULATOR
80
90      jumping to FLASH ROM
100
//////////////////////////////////////////
```

Look at line 50 (in red). Immediately after you press the Reset button on the EZ-ICE, press the Enter key on your keyboard. This opens another menu that looks like this:

```
Boot code v1.0a May 7, 1997
 20
 30  j - jump to emulator in Flash memory
 40  c - Compute CRC of Boot code and Flash code
 50  i - DSP interface test
 60  t - SRAM test
 70  f - Flash memory test
 80  update - update FLASH ROM
 90  erase - erase all FLASH ROM
100  ?-menu
110  $
```

When this menu appears, you can run the tests in the menu items by pressing that letter and then pressing Enter. For example, when you run the i test, the screen might look like:

Testing DSP Emulation Port

```
130  Expect 0x0F5A got 0x0000 - ERROR
140  Expect 0xA5F0 got 0x0000 - ERROR
150
160  Boot code v1.0a May 7, 1997
170
180  j - jump to emulator in Flash memory
190  c - Compute CRC of Boot code and Flash code
200  i - DSP interface test
210  t - SRAM test
220  f - Flash memory test
230  update - update FLASH ROM
240  erase - erase all FLASH ROM
250  ?-menu
260  $
```

Notice line 110. Press 'i' then press Enter and run the interface test. Lines 130 through 140 show that an error occurred. This test writes to a register inside the DSP and then reads it back. If the target board is not connected (or is malfunctioning), this test will fail just like above. This test checks the interface between the "target board" and the EZ-ICE. However, by virtue of being able to see the results in HyperTerminal, you are testing between the PC and the target board.

You can also run the SRAM test, which tests the EZ-ICE system RAM, This test does not test the DSP's SRAM; the EZ-ICE need not be connected to a "target board" to run the test. Run the test by pressing 't' and then Enter.

```
$t

270  Testing SRAM 0xC000..0xEFFF
280  0 error(s) with 0000, 0000, 0000
290  0 error(s) with 5555, 5555, 5555
300  0 error(s) with AAAA, AAAA, AAAA
310  0 error(s) with FFFF, FFFF, FFFF
320  0 error(s) with increment
330
340  Boot code v1.0a May 7, 1997
350
360  j - jump to emulator in Flash memory
370  c - Compute CRC of Boot code and Flash code
380  i - DSP interface test
390  t - SRAM test
400  f - Flash memory test
410  update - update FLASH ROM
420  erase - erase all FLASH ROM
430  ?-menu
```

Lines 270 through 320 show the result of this test. In this example case, the test passed without errors.

By typing 'f' then Enter, the flash test is selected. Typically, flash tests are destructive to the contents of the flash; this is no exception. To get into this test, type 'f', Enter, then Yes and Enter You must type Yes within 1 second of the Enter or the test will not be performed. If you do not do it fast enough, it looks like this:

```
$f

441  The emulator code in Flash will be
     erased and must be reprogrammed
442  Enter 'yes' to continue test
443  $abort
```

A passed test looks like this:

```
$f

450  The emulator code in Flash will be
     erased and must be reprogrammed
460  Enter 'yes' to continue test
470  $yes
480  Testing...
490  passed erase test
```

```
500  passed increment pattern test
510  passed all zero test
520
530  Boot code v1.0a May 7, 1997
540
550  j - jump to emulator in Flash memory
560  c - Compute CRC of Boot code and Flash code
570  i - DSP interface test
580  t - SRAM test
590  f - Flash memory test
600  update - update FLASH ROM
610  erase - erase all FLASH ROM
620  ?-menu
630  $
```

Line 450 warns you that the flash will be erased and will need to be reprogrammed. Lines 490-510 say the flash passed the various different tests.

When you install the emulator software and run this test for the first time, it asks you to press Reset so it can check the firmware version. It then writes this version to the Registry and does not need to check it again. If you run HyperTerminal and select the flash test, the test is destructive to the flash and erases it. If you start VisualDSP++, the `.DLL` is invoked. Unfortunately, the `.DLL` has no way of knowing that the flash was destroyed, so it fails.

To restore the flash in the emulator, perform the following procedure or you will not be able to use the emulator with the debugger.

1) Close the debugger and HyperTerminal.
2) Go to `START > Run` and type in `regedit`.
3) Go to `H_KEY_Current User > Software > Analog Devices > VisualDSP` and delete the `218x` folder.
4) Close the Registry.
5) Restart the VisualDSP++ debugger and select the proper ICE session that represents your target. This assumes you corrected the problem discovered during the HyperTerminal DSP interface test.

By deleting the registry key, the .DLL is forced to go out and recheck the version. When it does, it will be incorrect, and the .DLL will reprogram the flash.

Document History

Revision	Description
Rev 6 – October 22, 2004 *by Linda Gray*	URLs updated according to redesign of ww.analog.com site. Updated to current emulator hardware product offer
Rev 5 – March 26, 2004 *by Kathleen Smith*	Added Price Change and updated emulator software support Added actual DSP Tools Technical Support e-mail address and USB-ICEs
Rev 4 – October 23, 2003 *by Kathleen Smith*	Added POD repair price, also note of invalidating warranty, corrected URLs
Rev 3 – April 01, 2003 *by Kathleen Smith*	Added HPPCI ICE; removed mention of customer serial number
Rev 2 – December 03, 2002 *by Kathleen Smith*	Added Emulator Serial Number
Rev 1 – November 01, 2002 *by Kathleen Smith*	Initial release