Spectrum Digital XDS560V2 STM Configuration Utility

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1 OVERVIEW

Spectrum Digital XDS560v2 Configuration utility (Sd560v2Config) is a convenient utility used to scan, test or setup a Spectrum Digital XDS560v2 STM emulator connected on to an USB port or an Ethernet port.

2 PREREQUISITES

System Requirements: Windows XP/Vista/Windows 7, .NET framework 2.0 and above. (Refer to Troubleshooting under section 8 for installing .NET).
Tools Required: CCS v4.2.0.07xxx or higher.

3 INSTALLATION

Sd560v2Config utility is installed as a part of Spectrum Digital's emulation driver installation. In CCS 4.2 or higher, Spectrum Digital drivers are automatically installed with CCS installation. Sd560v2Config.exe can be found under CCS_INSTALL_DIR\ccsv4\common\uscif folder.

4 Sd560v2Config GUI

Sd560v2Config GUI is as shown in Figure 1 below. The application is divided visually into seven tabs. We will go into detail various tests performed on a tab by tab basis in the description section.
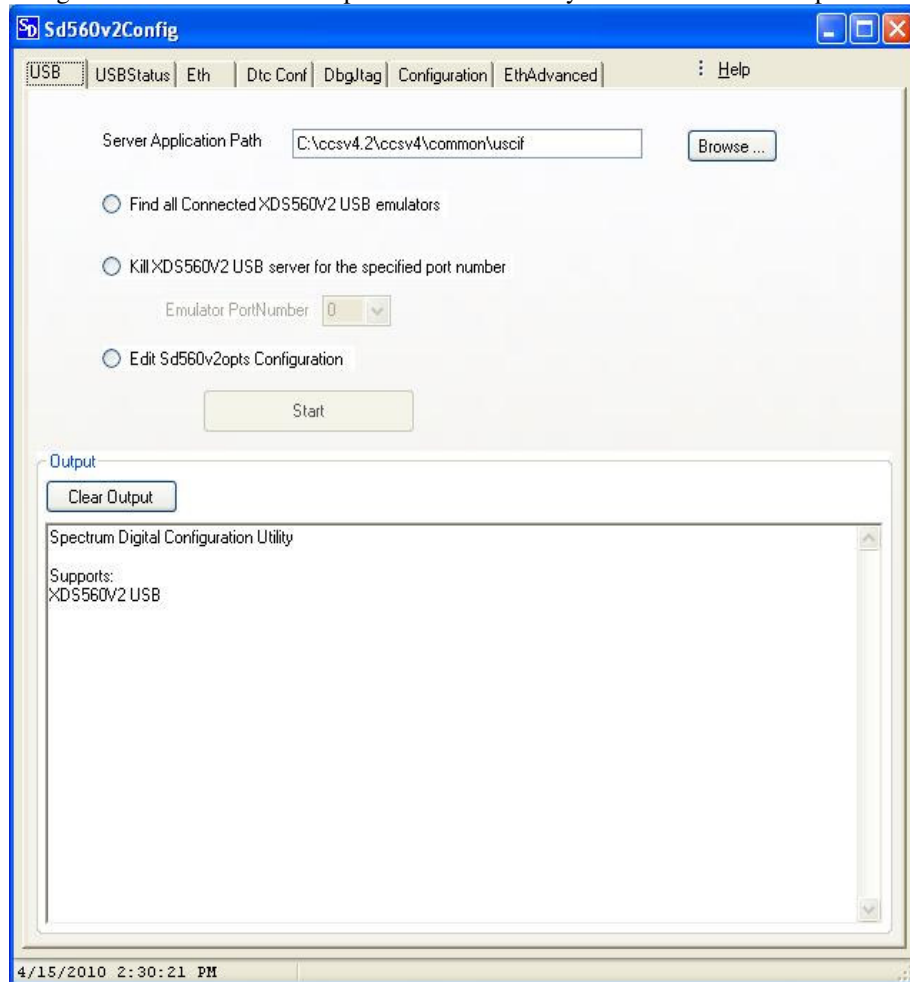

FIGURE 1: Sd560v2Config Utility

5 DESCRIPTION

5.1 USB Tab

The first tab in the configuration utility is USB tab. This tab is mainly used to start/kill USB server, edit the USB XDS560V2 STM configuration file, and to find the serial numbers of the USB device(s) connected.

5.1.1 USB Tab – Start USB Server

- This test serves for dual purposes: (1) to start USB server on the XDS560v2 and (2) to find serial numbers of USB device(s) connected.
- Connect XDS560V2 STM via USB to the PC you are testing on.
- Enable the "Find all Connected XDS560V2 USB emulators" radio button and click on the Start button.
- If the USB server was not started already, a pop up window as shown in figure 2 below appears. Choose which port number to start the server on and click the Start button to start the server.

FIGURE 2: Pop up window to start the server

- Output showing a successful connection to the XDS560v2 can be seen in Fig. 3, below.
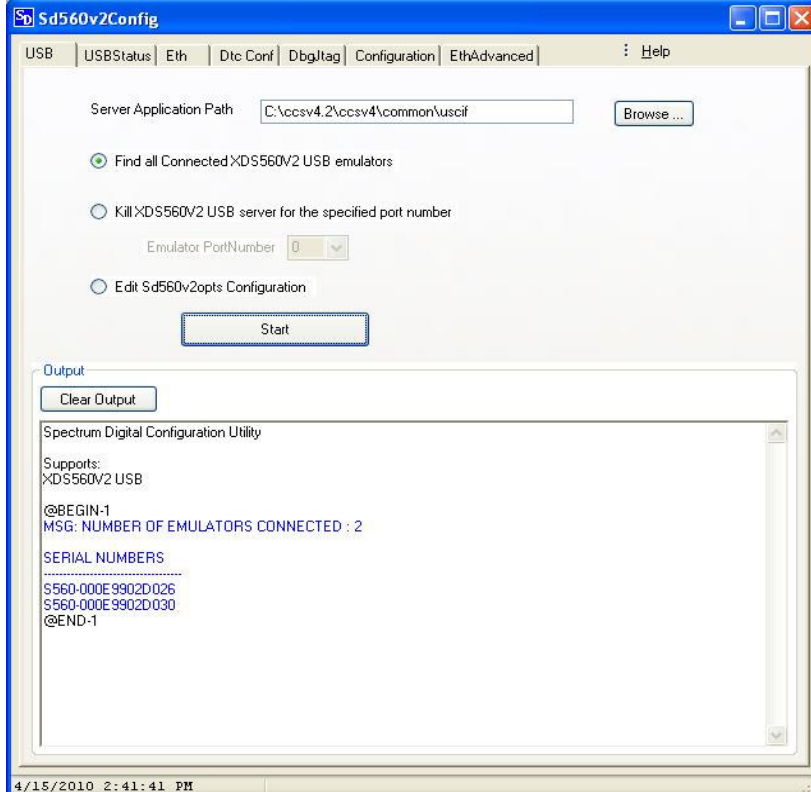

FIGURE 3: Sd560v2Config utility to find all Connected XDS560V2 STM USB emulators

5.1.2 USB Tab – Kill USB Server

- Connect XDS560V2 STM via USB to the PC you are testing on.
- Select 'Kill XDS560V2 USB server for the specified port number' radio button.
- Select the port number to kill the server on and press on Start button
- The output is as shown in figure 4 below.
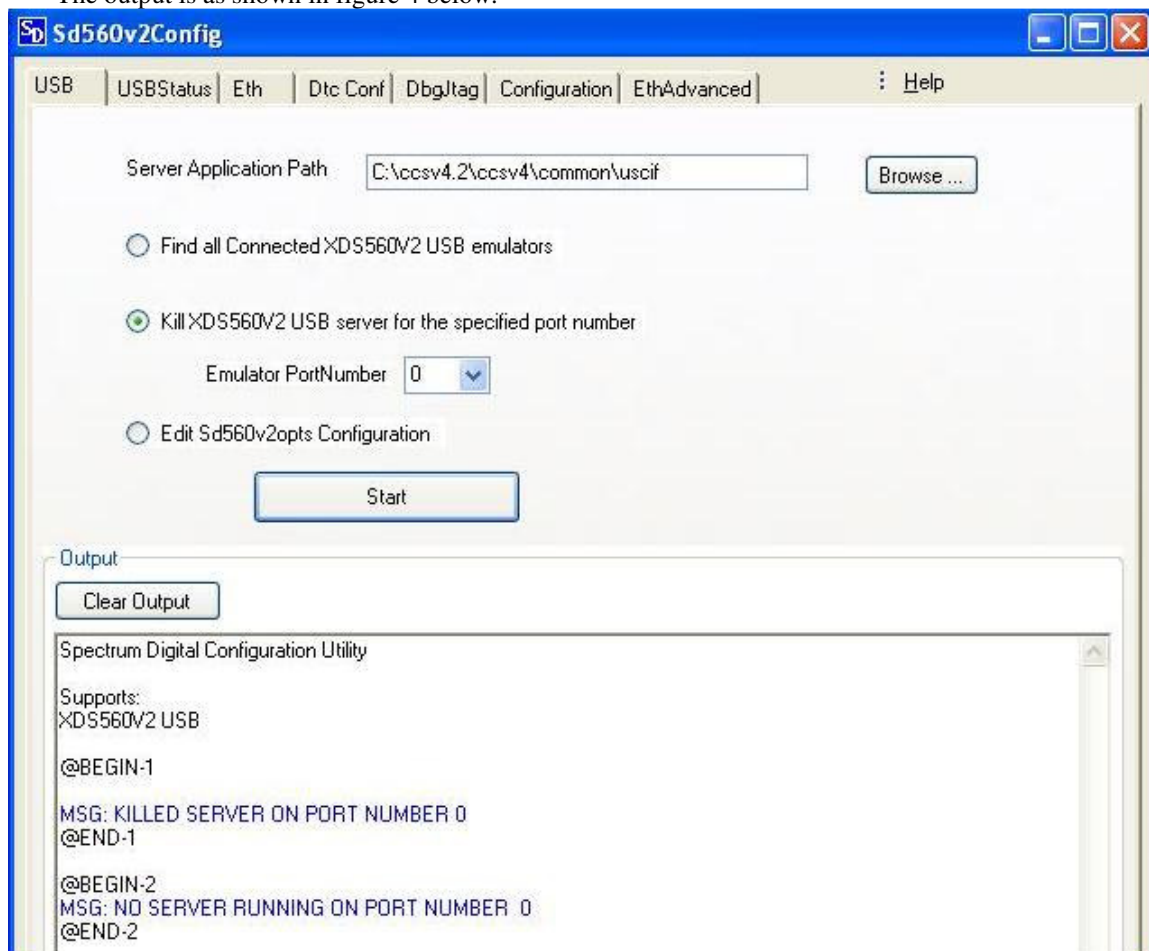
FIGURE 4: Sd560v2Config utility to kill the USB server.

5.1.3 USB Tab – EDIT Sd560v2opts.cfg File

- Select the 'Edit Sd560v2opts Configuration' radio button and click on the start button.
- By default, the sd560v2opts.cfg opens in a notepad. The default editor can be changed on the configuration tab under the option 'Sd560v2opts Configuration File Editor' as shown in Figure 5 below.
- This will open sd560v2opts.cfg file from the Server Application path if the configuration file exists.
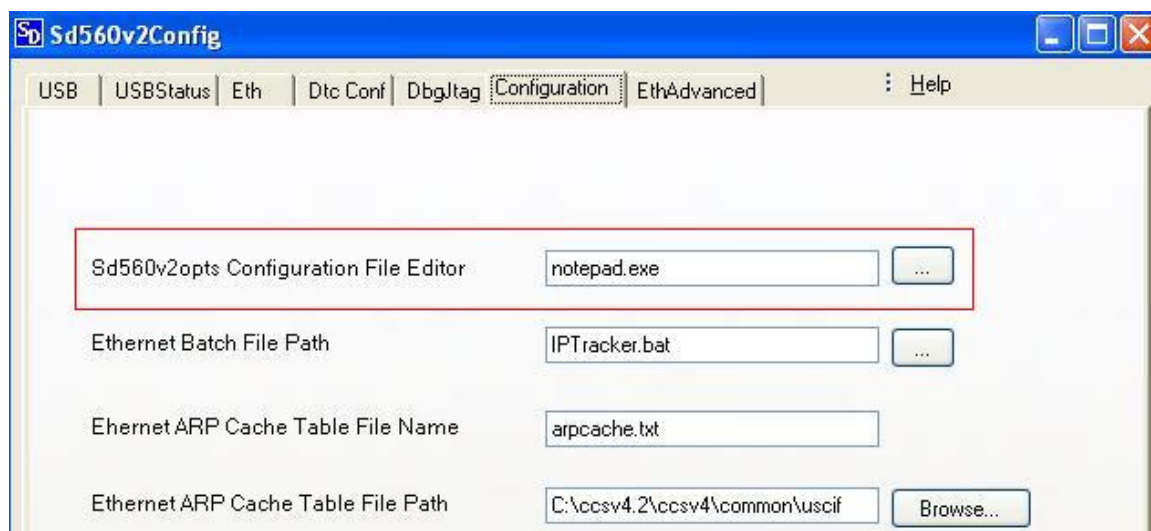
FIGURE 5: Sd560v2Config Configuration tab

5.2 USB Status Tab

The second tab in the configuration utility is USB Status tab. This tab is used to do a simple loopback on USB link, print statistics on the USB link and to force an EEOS on the target mostly used for internal purposes.

5.2.1 USB Status Tab – Loop Back Test

- Connect a XDS560V2 STM via USB to the PC you are testing on.
- Select the port number to which the USB is connected to.
- Enable the 'USB Test Loopback' radio button.
- Enter a valid Loop Count value.
- Press the start button.
- The results are shown in Figure 6 below.
- This test confirms that the USB link between the PC and XDS560v2 STM is functional.
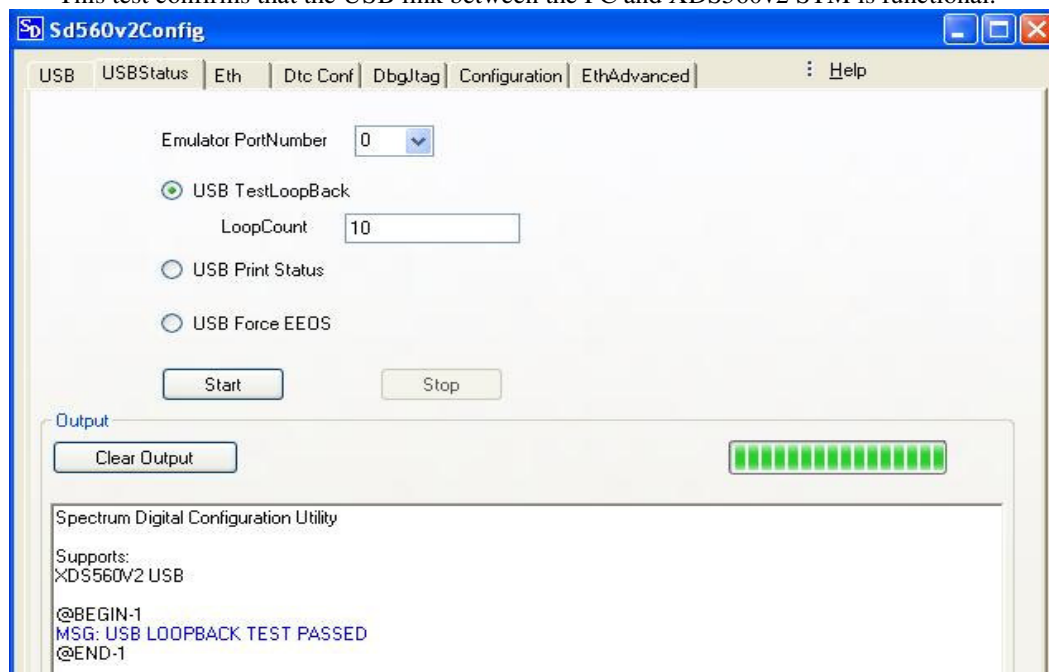
FIGURE 6: Sd560v2Config utility to test USB Loop Back

5.2.2 USB Status Tab – Print USB Statistics

Another feature of the Config utility is to print current statistics on the USB link. As an example, while running CCS on USB we can get the latest statistics on who is connected and number of packets transferred from host to target and vice versa. Click on the 'USB Print Status' radio button and click 'Start' to begin printing the statistics. A sample of the statistics output screen is shown in figure 7 below.

FIGURE 7: Sd560v2Config utility printing USB statistics

5.2.3 USB Status Tab – USB Force EEOS

The Force EEOS is used to simulate the unplugging of the USB cable. When selected a signal will be sent to the XDS560v2 STM to close and re-open its communications links in hopes 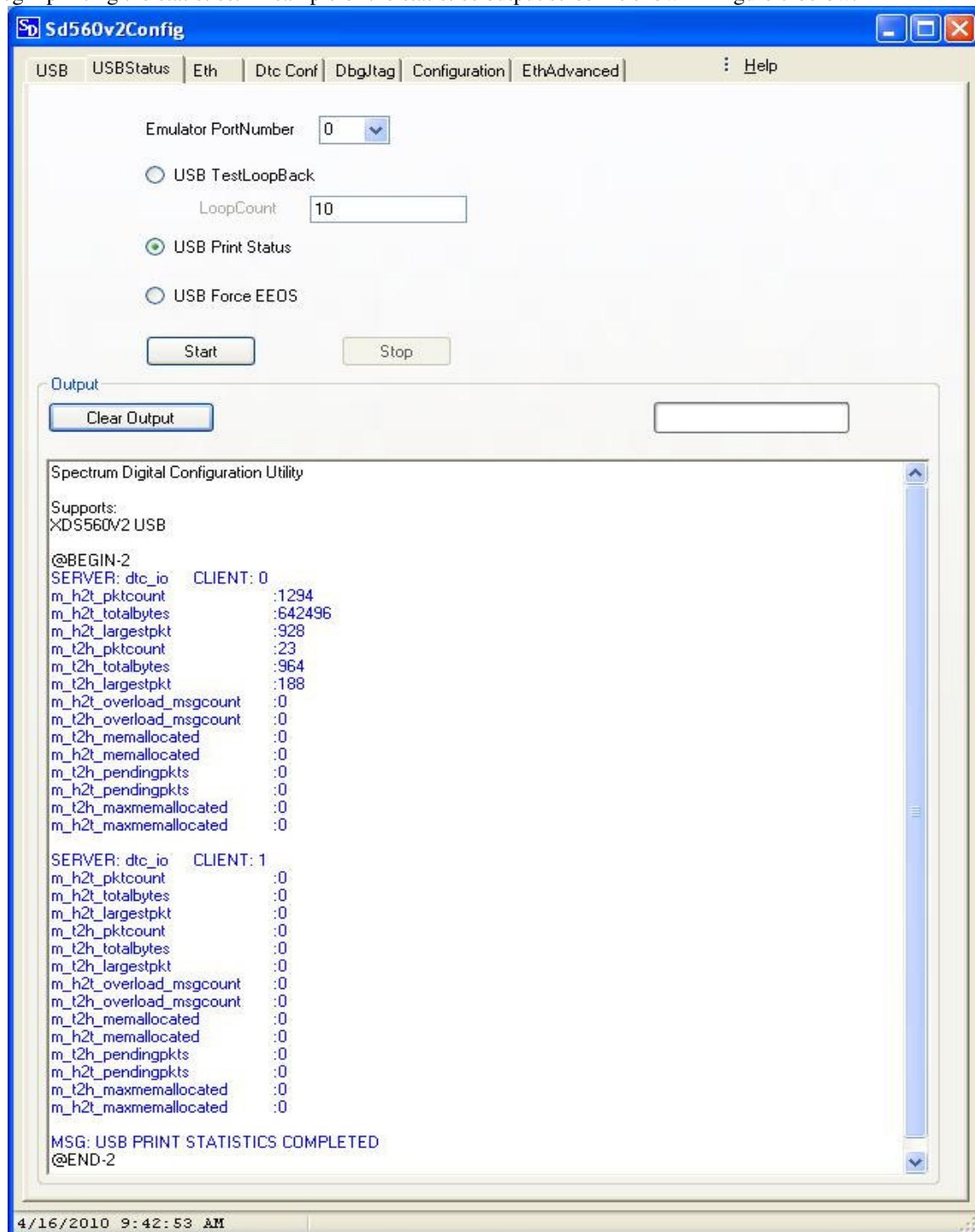of clearing emulation drivers that have been abandoned by CCS. Select the USB Force EEOS option and click on the start button. The output is as shown in figure 8 below.
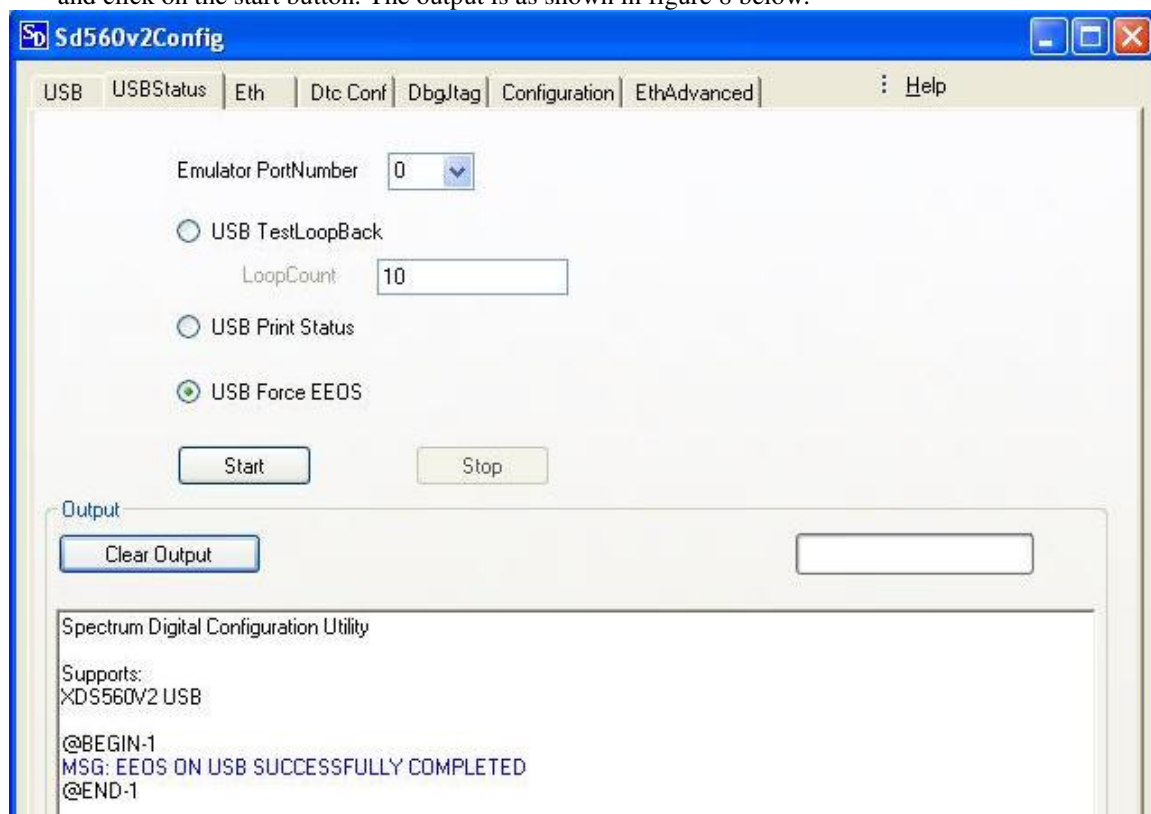

FIGURE 8: Sd560v2Config utility to force EEOS.

5.3 Eth Tab

Sd560v2Config utility has two tabs for Ethernet: one is 'Eth' and the other is 'EthAdvanced'. The main purposes of these tabs are to determine the ipAddresses of XDS560V2 STM emulators connected to your local area network.   In most cases the Eth tab can be used to find your ipAddresses and requires minimal knowledge of your underlying company network.   However the Eth tab does fast scans whose output is based on current entries in the Address Resolution Protocol (ARP) cache. This output is not guaranteed to be up to date at all the times. The EthAdvanced tab does a detailed search by rescanning and recreating the entries in the Address Resolution Protocol (ARP) cache whose results will be up to date and accurate. However, this detailed scan can take significantly longer to complete. Due to the complexity of the EthAdvanced tab it will be covered in a later section.

Another method to find the ipAddresses of a single XDS560v2 is to use the USB port and the Dtc Conf tab which will also be covered in a later section.

Click on the Find Ethernet Devices button. The results are as shown in figure 9 below.
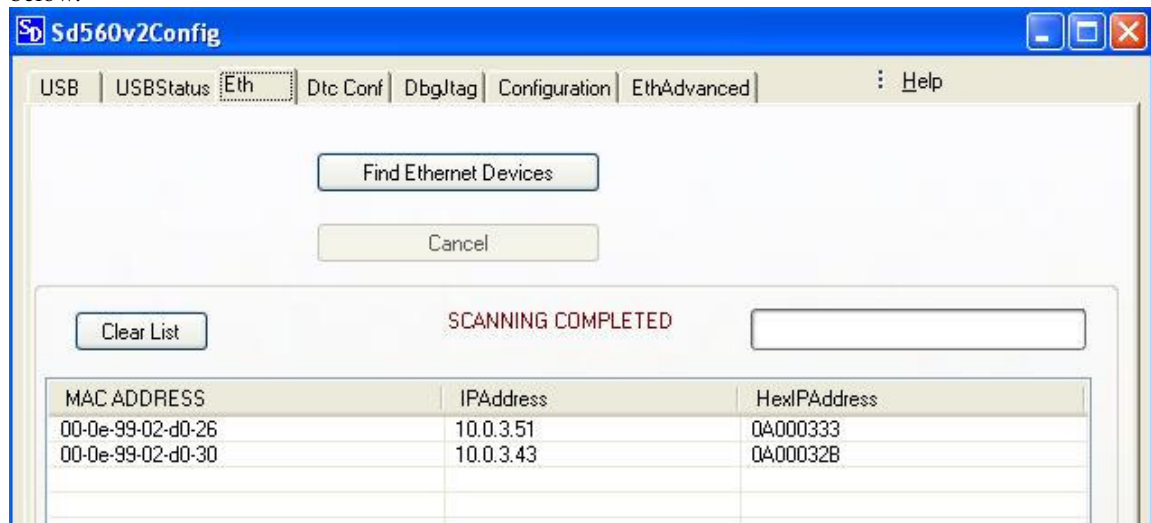

FIGURE 9: Sd560v2Config Eth Tab

The MAC Address is assigned by Spectrum Digital at the factory and is used to identify your XDS560v2 STM. When shipped the MAC Address is printed on the product label located on the bottom of your XDS560v2 STM unit. When configuring CCS v4 the IPAddress field is required when you create your target configuration and input into the "The Emulator IP Address" field. The HexIPAddress field is used by command line utilities like DbgJtag.exe.

5.4 Dtc Conf Tab

Dtc Conf tab commands are similar to Texas Instrument's command line DTC configuration utility used mainly to get, set, and restore configuration variables on the emulator via USB or Ethernet. This is also used to update the emulator with the latest firmware via USB or Ethernet. There are three primary uses of the Dtc Conf Tab:

1. Get basic configuration information about your XDS560v2 STM.
2. Configure your Ethernet setting for static ipAddress vs. dynamic ipAddress (default).
3. Update your XDS560v2 STM firmware.

In general, other capabilities are not for everyday use so exercise some caution.

5.4.1 Dtc Conf Tab – get command

Procedure to get the emulator's configuration variables from Dtc Conf tab is listed below:
1. Select the get command from the COMMAND drop down box.
2. Select the ADAPTER (sd560v2u for USB sd560v2e for Ethernet) from the ADAPTER drop down box.
3. Select the adapter address. For USB select the port addresses (0-15) on which USB is connected. For Ethernet, select the emulator's ipAddress from the drop down box. Click on RUN DTC_CONF. A sample output is as shown in figure 13 below.
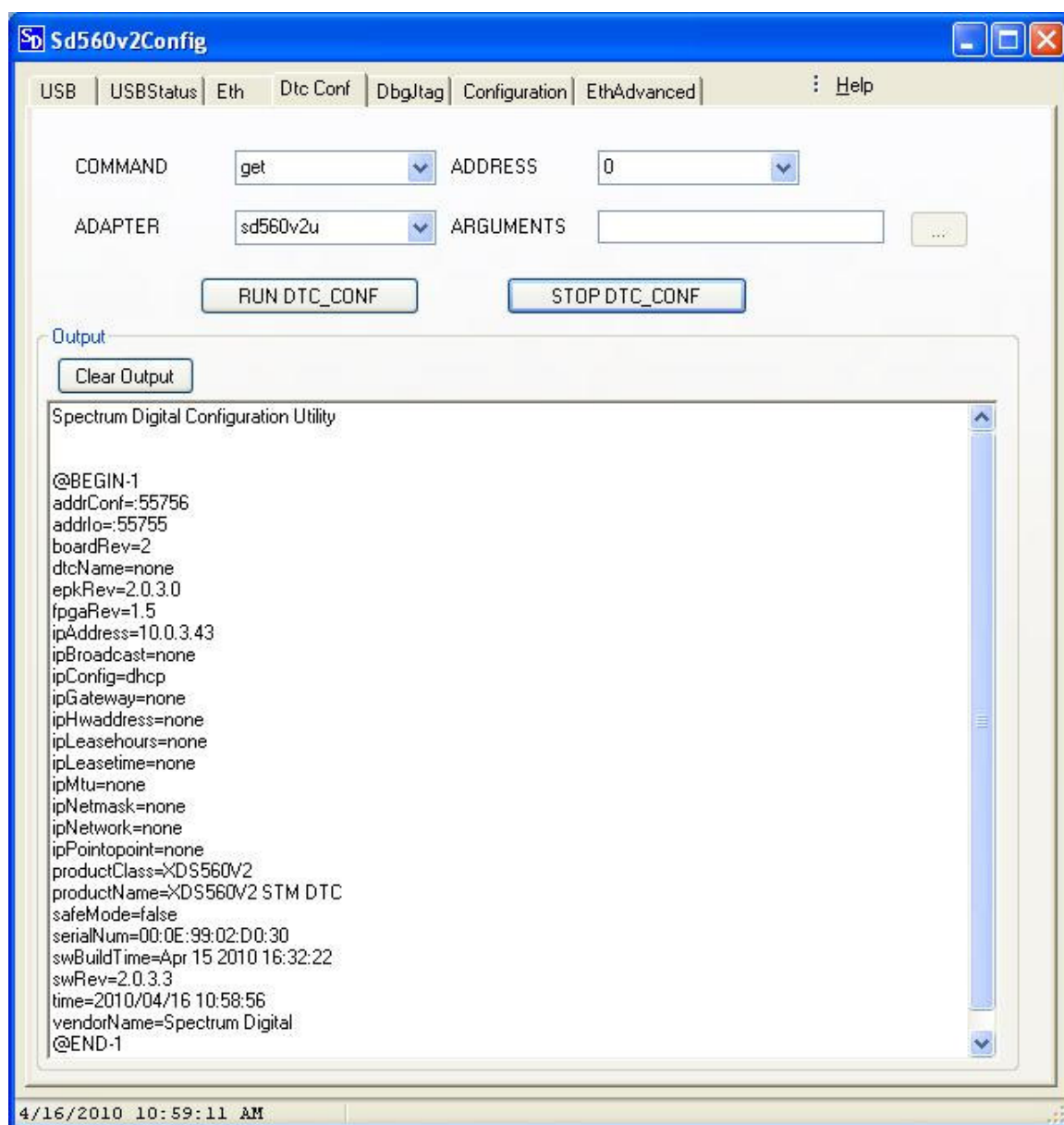
FIGURE 13: Sd560v2Config – DtcConf tab to get configuration variables

5.4.2 Dtc Conf tab – get Ethernet ipAddress

Below is the procedure to get XDS560V2 STM Ethernet ipAddress using dtc_conf get command via USB.

1. Select the get command from the COMMAND drop down box.
2. Select the ADAPTER (sd560v2u for USB) from the ADAPTER drop down box.
3. Select the port addresses (0-15) on which USB is connected to the PC.
4. Set the ARGUMENTS field to ipAddress.
5. Click on RUN DTC_CONF. A sample output is as shown in figure 14 below.
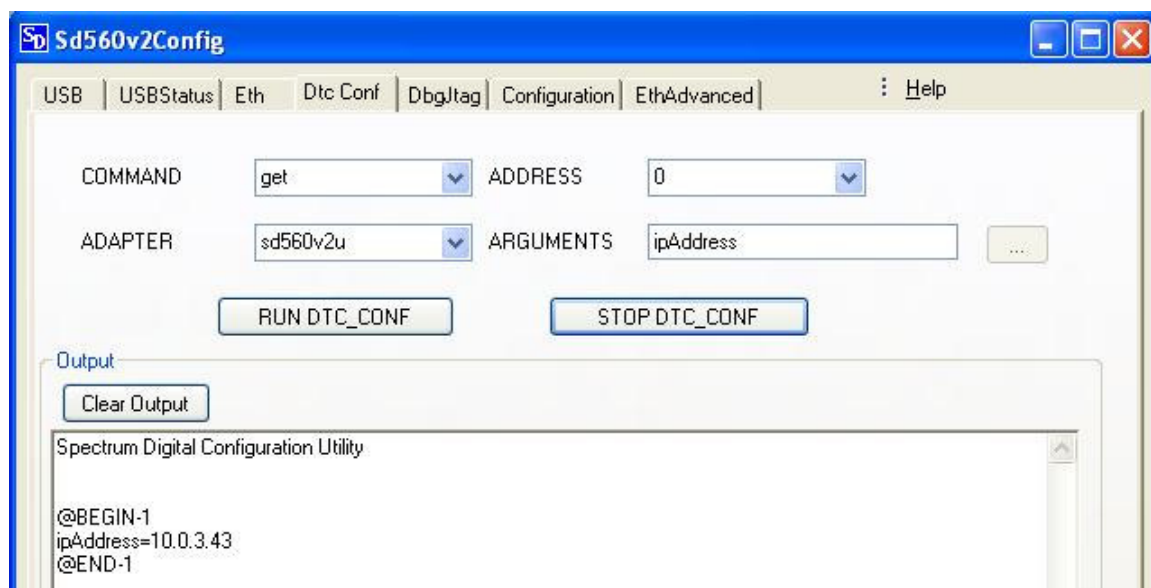
FIGURE 14: Sd560v2Config – DtcConf tab to get Ethernet ipAddress.

5.4.3 Dtc Conf Tab – set command

Below is the procedure to set a configuration variable to a specific value.
1. Select the set command from the COMMAND drop down box.
2. Select the ADAPTER (sd560v2u for USB sd560v2e for Ethernet) from the ADAPTER drop down box.
3. Select the adapter address. For USB select the port addresses (0-15) on which USB is connected. For Ethernet, select the emulator's ipAddress from the drop down box or enter your own ipAddress. In the ARGUMENTS field, enter a variable (name=value) to set.
4. Click on RUN DTC_CONF. Figure 15 below elucidates how to set dtcName variable as an example.
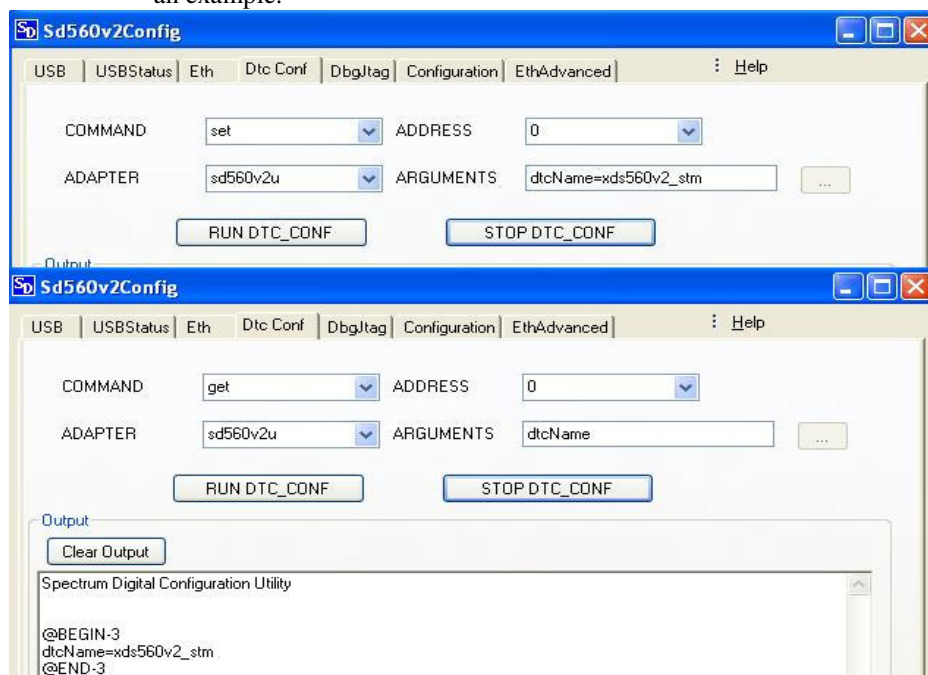

FIGURE 15: Sd560v2Config – DtcConf tab set command

5.4.4 Dtc Conf Tab – restore command

Below is the procedure to restore configuration variables to factory defaults.
1. Select the restore command from the COMMAND drop down box.
2. Select the ADAPTER (sd560v2u for USB sd560v2e for Ethernet) from the ADAPTER drop down box.
3. Select the adapter address. For USB select the port addresses (0-3) on which USB is connected. For Ethernet, select the emulator's ipAddress from the drop down box or enter your own ipAddress.
4. Click on RUN DTC_CONF. A pop-up window as displayed in figure 16 below appears. Click on yes to restore the variables. A "defaults restored" messaged will be printed to the output window on command completion as shown in figure 17 below.
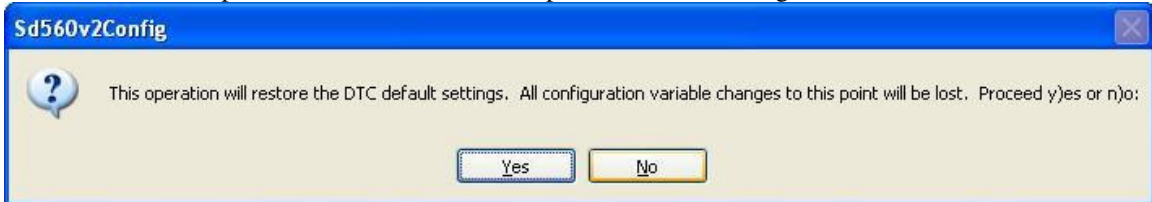
FIGURE 16: Sd560v2Config – DtcConf tab Restore Command
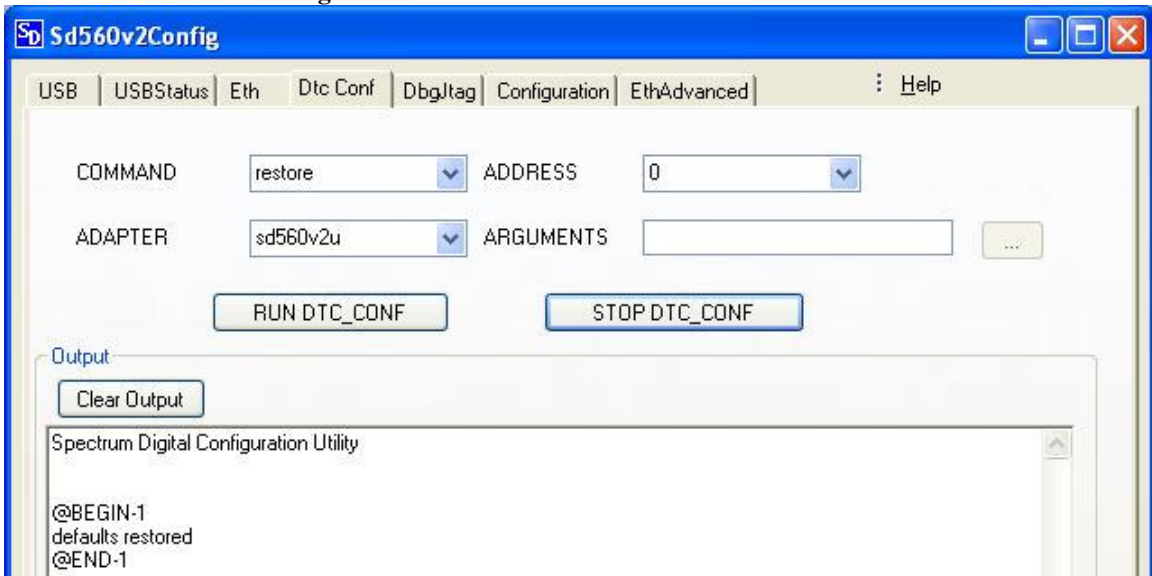
FIGURE 17: Sd560v2Config – DtcConf Tab Restore Command

5.4.5 Dtc Conf Tab – boot command

Below is the procedure to reboot XDS560V2 STM emulator from dtc_conf.
1. Select the boot command from the COMMAND drop down box.
2. Select the ADAPTER (sd560v2u for USB sd560v2e for Ethernet) from the ADAPTER drop down box.
3. Select the adapter address. For USB select the port addresses (0-3) on which USB is connected. For Ethernet, select the emulator's ipAddress from the drop down box or enter your own ipAddress.
4. Click on RUN DTC_CONF. This will reboot the emulator which takes approximately 45 seconds to boot. A sample output is shown in figure 18 below.
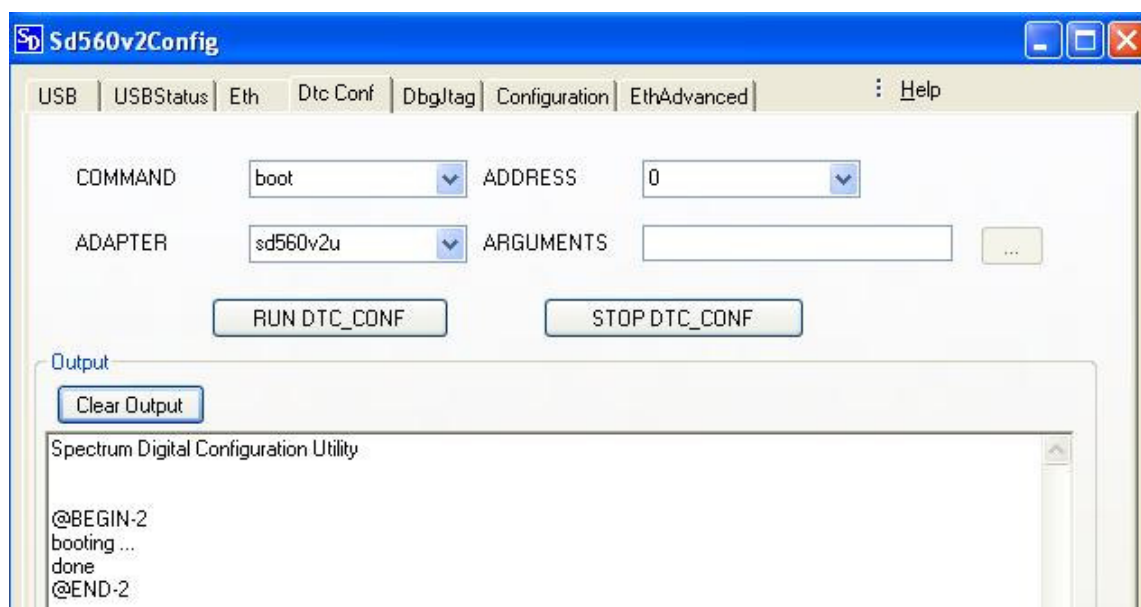
FIGURE 18: Sd560v2Config – Dtc Conf Tab Boot Command

5.4.6 Dtc Conf Tab – update Command

Below is the procedure to update the emulator with new firmware.
1. Select the update command from the COMMAND drop down box.
2. Select the ADAPTER (sd560v2u for USB sd560v2e for Ethernet) from the ADAPTER drop down box.
3. Select the adapter address. For USB select the port addresses (0-15) on which USB is connected. For Ethernet, select the emulator's ipAddress from the drop down box or enter your own ipAddress.
4. The appropriate firmware image is automatically populated in the ARGUMENTS box filtered based on the epk version and software version located at <CCSV4-INSTALLDIR>\ccsv4\common\uscif\sd560v2_updates directory. Click on the browse button to browse to any firmware image other than default if needed.
5. Click on RUN DTC_CONF. A pop-up window as displayed in figure 19 below appears. Click on yes to update the firmware. A successfully completed output message is as elucidated in figure 20 below.
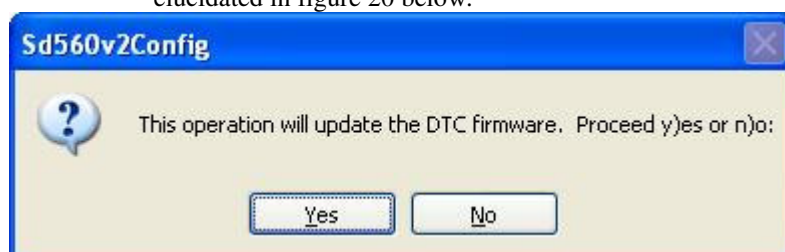

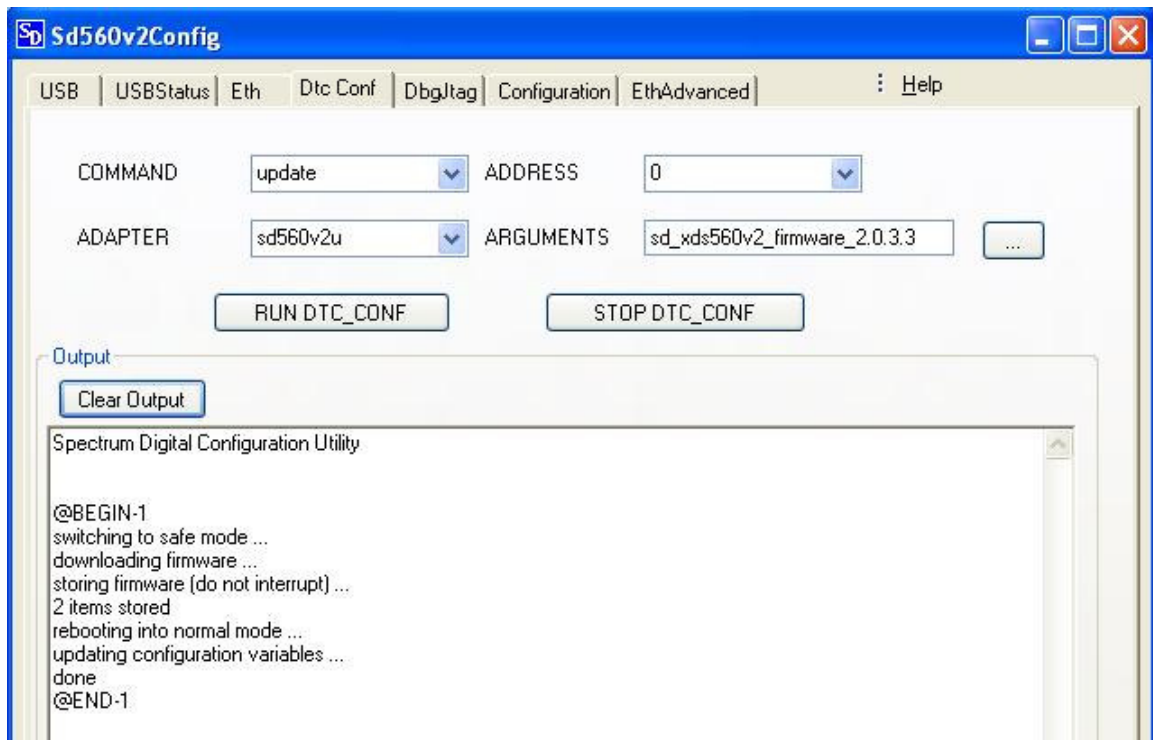**FIGURE 19: Sd560v2Config – Dtc Conf Tab update command popup window.**

FIGURE 20: Sd560v2Config – Dtc Conf Tab update command.

5.5 DbgJtag Tab

DbgJtag tab is a GUI wrapper to Texas instrument's dbgjtag.exe command line utility which is used to develop, test and evaluate TI and 3rd party hardware that uses JTAG scan-controllers, cables, routers and targets. Sd560v2Config's DbgJtag tab facilitates the use of most commonly used commands reset, path length, and integrity and frequency test from the GUI. It also has an option for the user to enter any command just like tested from the command line.

Note: The DbgJtag utility can take a board file generated by CCS v4. Finding that board file can be a bit challenging in CCS releases 4.2.0.08xxx and higher. You also have to launch your CCS target configuration before the file is generated. As this is a fluid topic in CCS v4 please check the CCS v4 wiki for current workings of board files.

5.5.1 DbgJtag Tab – Reset, pathlength, and integrity Command

1. Select the ADAPTER (sd560v2u for USB sd560v2e for Ethernet) from the ADAPTER drop down box.
2. Select the adapter address. For USB select the port addresses (0-15) on which USB is connected. For Ethernet, select the emulator's ipAddress from the drop down box or enter your own ipAddress.
3. Select one or more of the reset, pathlength, and/or integrity checkboxes.
4. Select the 'board file' checkbox if needed to add the boards file option to the command. The default location of the board file is at
   <INSTALL_DIR>\ccsv4\DebugServer\bin\win32\BrdDat\ccBoard0.dat.
5. Click on the START button. The output for reset and pathlength is as shown in figure 21 below.
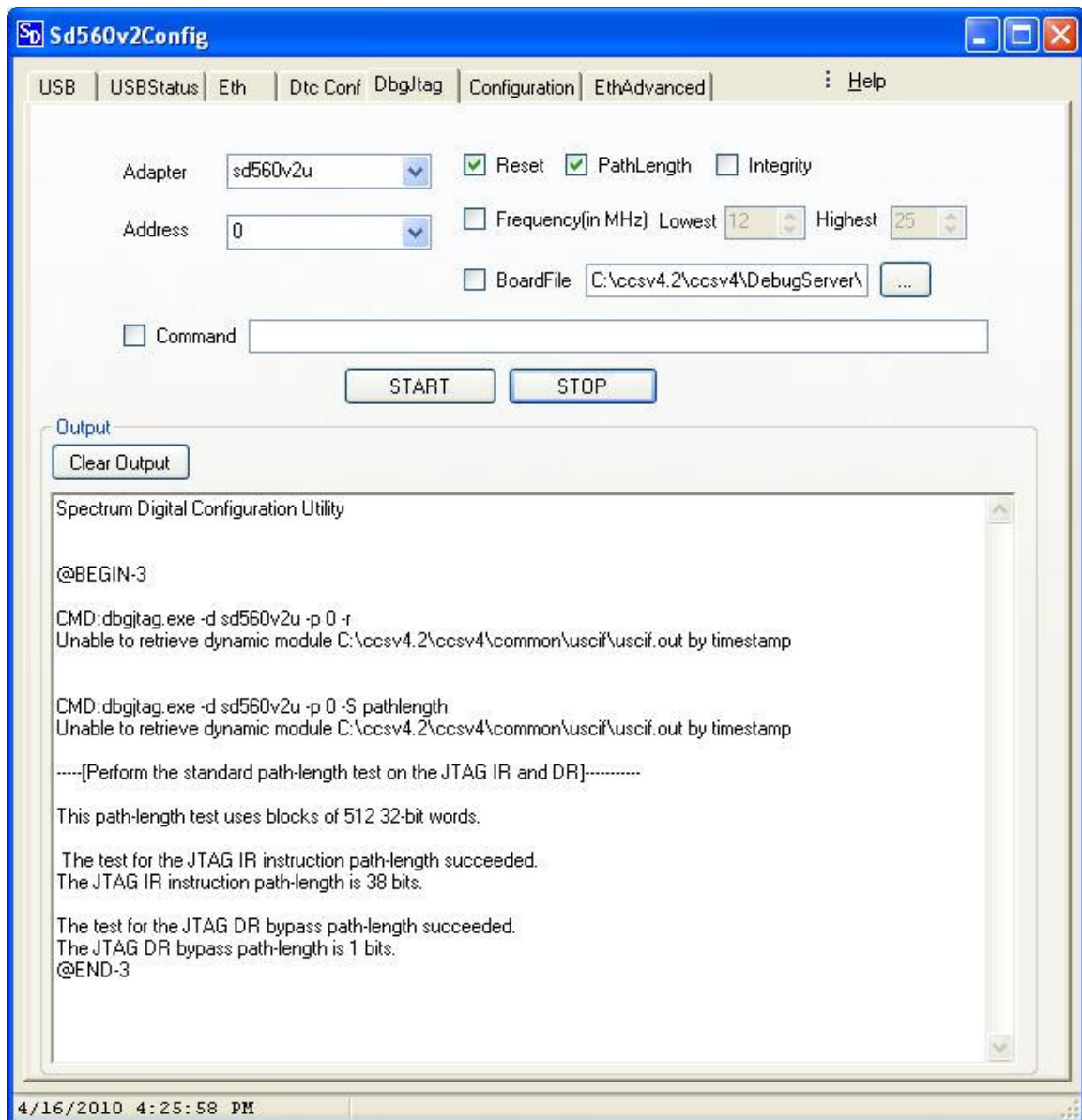
FIGURE 21: Sd560v2Config – DbgJtag Tab Reset and pathlength command.

5.5.2 DbgJtag Tab – Frequency test command

1. Select the ADAPTER (sd560v2u for USB sd560v2e for Ethernet) from the ADAPTER drop down box.
2. Select the adapter address. For USB select the port addresses (0-15) on which USB is connected. For Ethernet, select the emulator's ipAddress from the drop down box or enter your own ipAddress.
3. Select the frequency test checkbox.
4. Edit the lowest and the highest frequency values in MHz as required.
5. Select the 'board file' checkbox if needed to add the boards file option to the command. The default location of the board file is at <INSTALL_DIR>\ccsv4\DebugServer\bin\win32\BrdDat\ccBoard0.dat.
6. Click on the START button. The output is as shown in figure 22 below.
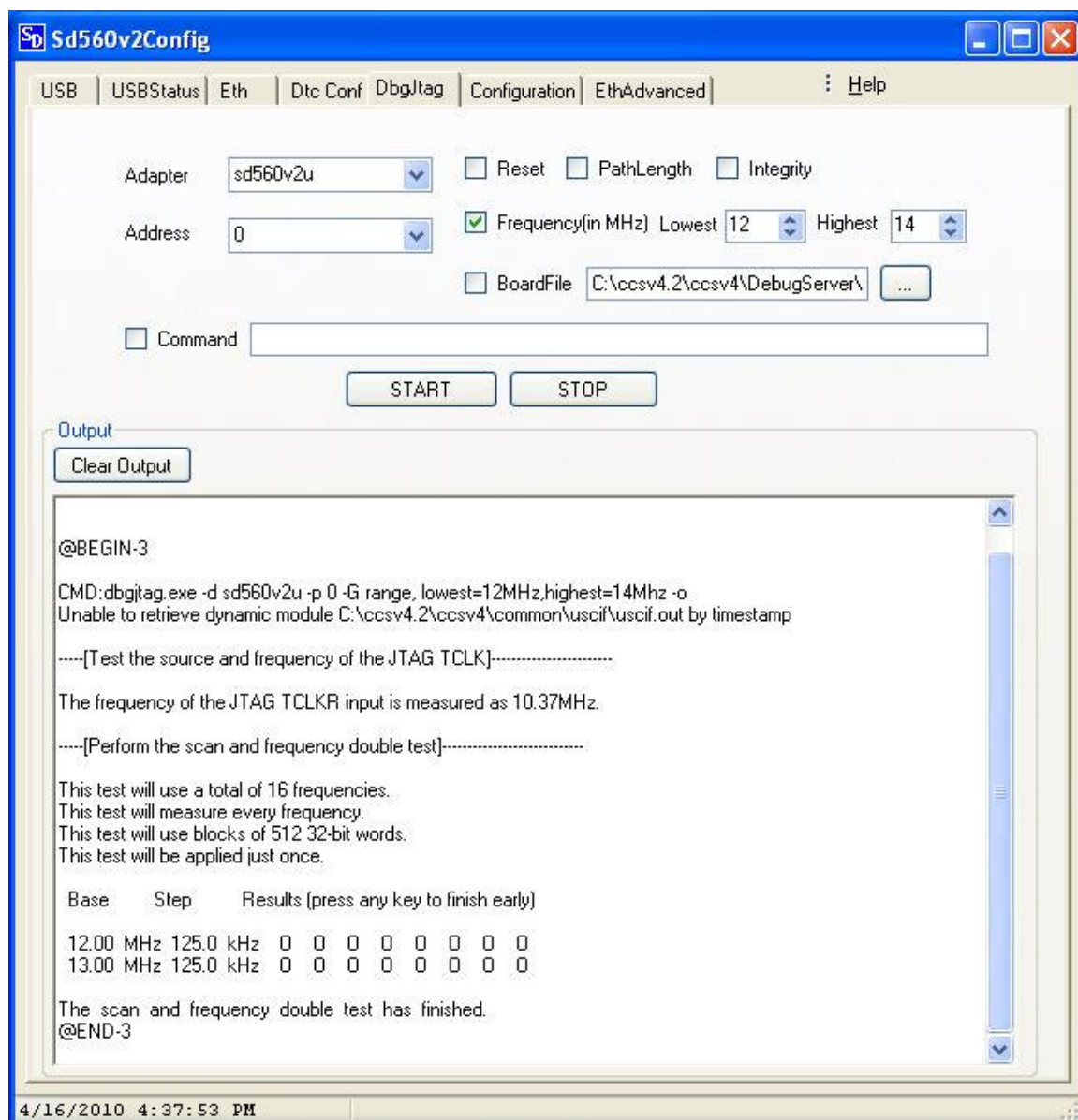
FIGURE 22: Sd560v2Config – DbgJtag Tab frequency command.

5.5.3 DbgJtag Tab – Generic command

This option can be used to enter any command just like entered on the command line into the text box. Click on Command checkbox and click on the start button. The output is as shown in figure 23 below.

NOTE: Every command that is sent from this utility is appended with a –o option. DbgJtag's –o option is to suppress backspace characters normally used to generate rolling busy flags and rolling test scores on the console output . But that doesn't work as mentioned in the documentation. Hence if a generic command is used the user may see special characters displayed on the output window. For additional information about the DbgJtag.exe, please refer to the DbgJtag user's guide on the Texas Instruments website.

Figure 23: Sd560v2Config – DbgJtag Tab command.

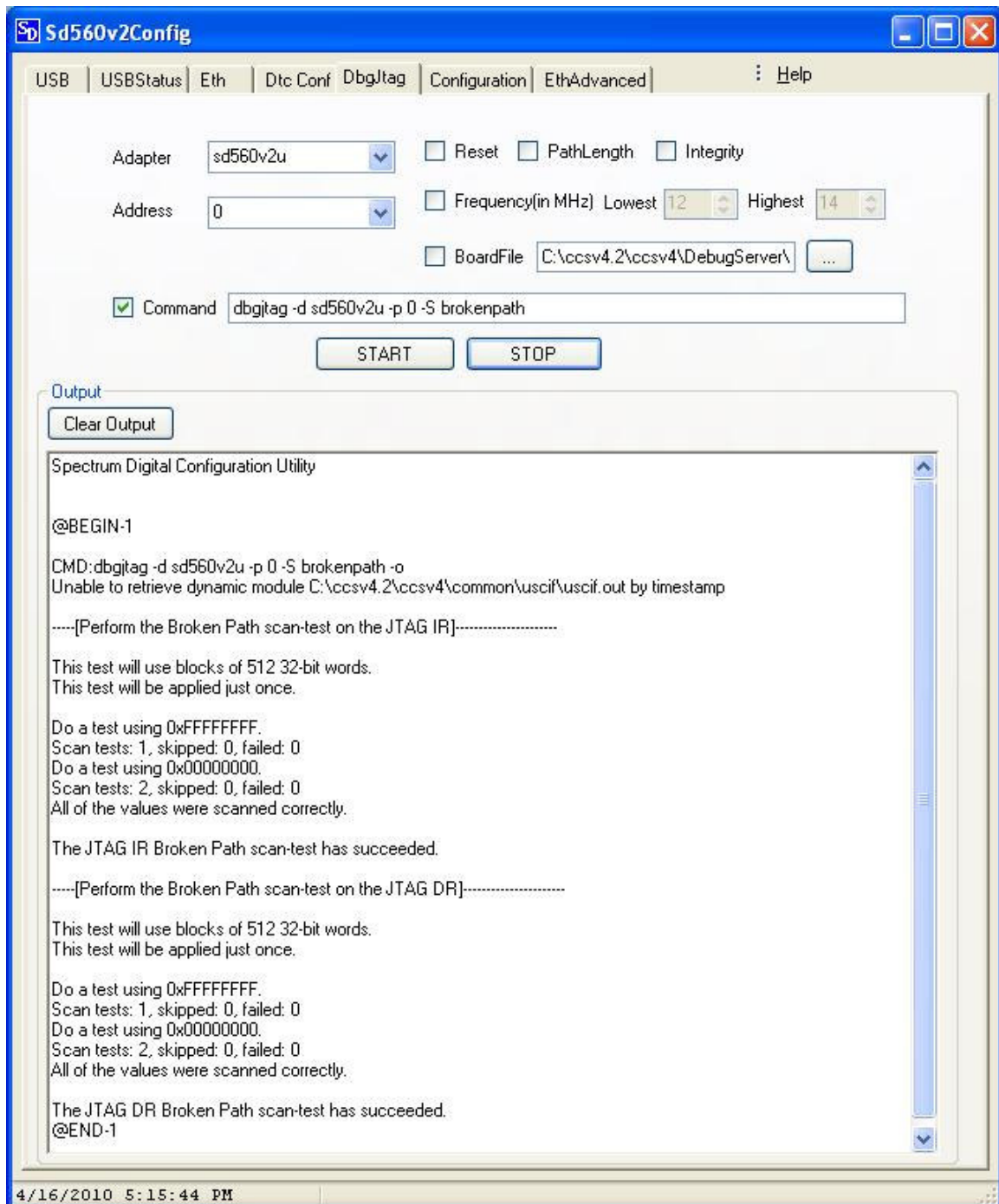## *5.6 EthAdvanced Tab*

As mentioned earlier the EthAdvanced tab can be used to perform a detailed scan of your network to find connected XDS560v2 STM units. In general this tab should be used when:

1. You have a good understanding of your network and what filters may need to be changed.
2. The fast scan Eth tab did not find your XDS560v2 STM and you just want a detailed scan without changing any filters.
3. You cannot use the USB link and Dtc Conf tab to find your ipAddress.

The remainder of this section provides details on how advanced searches are performed a how you might change the flow for your particular network. You should probably consult your network administrator before attempting to change the search flow.

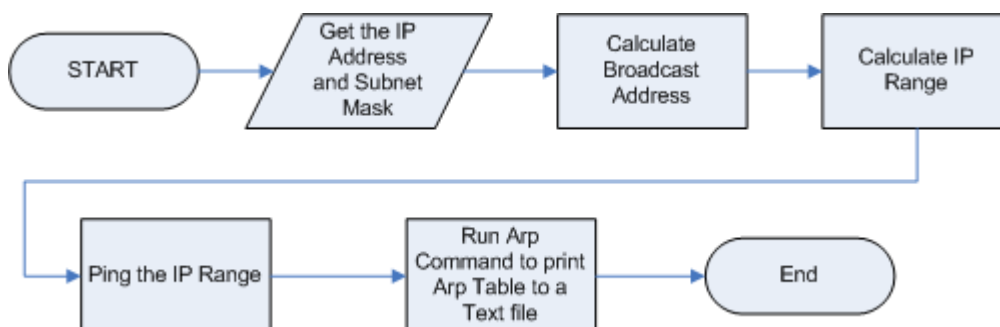### 5.6.1.1 EthAdvanced Tab - INNER PICTURE

FIGURE 10: Flowchart for calculating IP Addresses.

The logic behind EthAdvanced tab is detailed in figure10 shown above. This logic is implemented in a batch file (IPTracker.bat) mainly to facilitate the users to run either stand alone from the command line or from the utility. The output from the batch script is a text file.

The batch script IPTracker.bat runs arp command (short form for Address Resolution Protocol), a protocol used with the IP protocol for mapping a 32-bit Internet Protocol address to a MAC address that is recognized in the local network specified in RFC 826. Once recognized, the server or networking device returns a response containing the required address.

Sd560v2Config utility sends the IP address and subnet mask as an input to the batch file (IPTracker.bat), runs the batch script in the background and filters the IP addresses generated from the arp table based on the MAC addresses, and outputs to the screen. By default, the batch file and output from the batch script is located under <CCS_INSTALL_DIR>/ccsv4/common/uscif directory. These locations can be modified from the utility's Configuration tab as shown in figure24 below.

5.6.1.2 EthAdvanced Tab – Test Procedure

- Enter the range of mac addresses (starting mac address and ending mac address).
- Enter IP address of the PC you are running on.
- Enter Subnet Mask of the PC you are running on.
- Click on the 'Configuration' tab and modify the path to Ethernet Batch File Path (IPTracker.bat) if necessary. By default it is at <INSTALL_DIR>\ccsv4\common\uscif as shown in figure 24.
- arpcache.txt is the default output file name generated after running the batch script. If needed, modify the configuration tab's 'Ethernet ARP Cache Table File Name' field as shown in figure 24.
- The default directory where the output of the batch script is generated is <INSTALL_DIR>\ccsv4\common\uscif directory. If needed, modify the configuration tab's 'Ethernet ARP Cache Table File Path' field as shown in figure 24.
- Click on the 'EthAdvanced' Tab, press on the 'Find IPAddress' button, and wait for the SCANNING COMPLETED message on the output window. A sample output is as shown in figure 25 below.
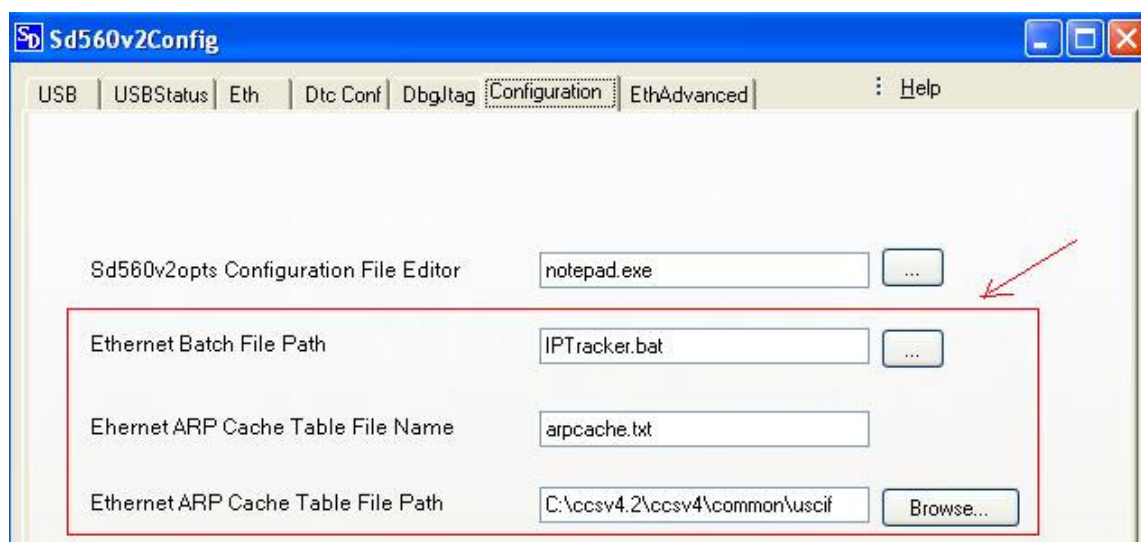
FIGURE 24: Sd560v2Config Configuration tab – Ethernet settings
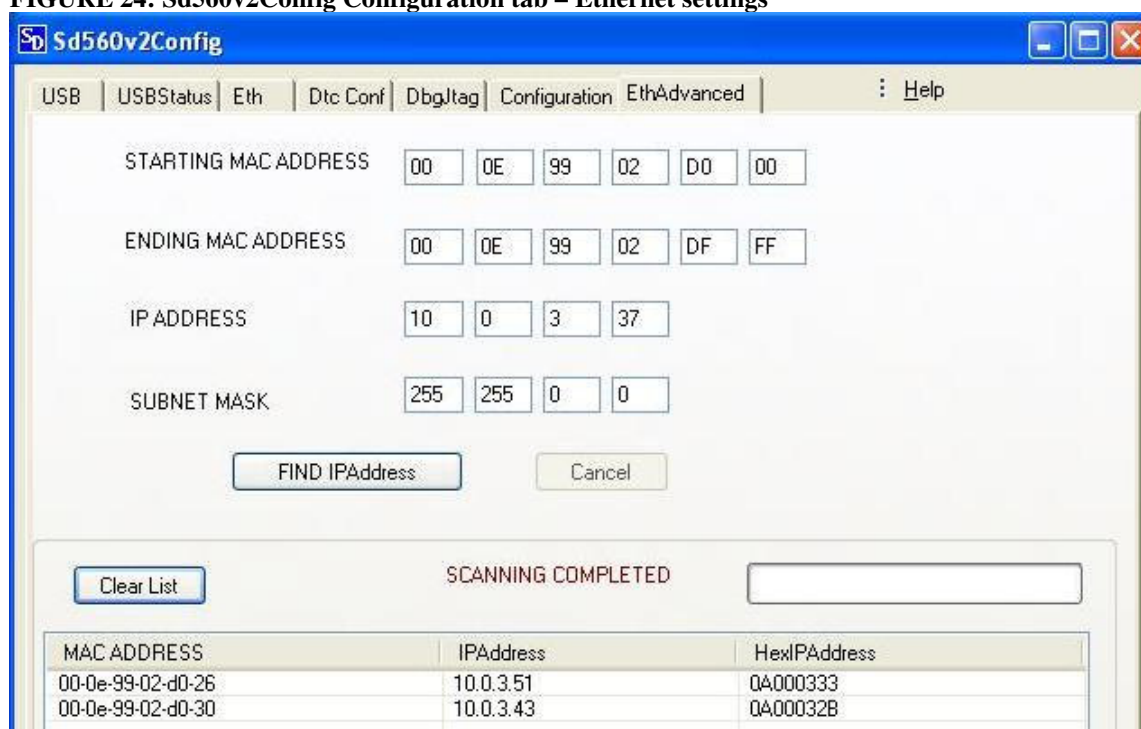
FIGURE 25: Sd560v2Config utility – EthAdvanced tab.

6 DETERMINING THE IP ADDRESS OF XDS560V2 STM

As discussed previously are three ways of determining the IP addresses of XDS560V2 STM emulators connected to Local Area Network, which are run from Sd560v2Config utility. As this task can be a bit challenging it is worth repeating starting from the simplest method, using the USB link and Dtc Conf tab, the Eth tab, and last the EthAdvanced tab. If your network administrator will allow it you can also just set a static ipAddress for your XDS560v2 STM which is often the best solution long term.

6.1 DTC CONF TAB

The first method is by reading XDS560V2 STM's ipAddress configuration variable via the USB port. This method is the preferred as it is fast and accurate but requires that both the Ethernet an USB cables be plugged in.

- • Activate DtcConf Tab.
- • Select the get command from the COMMAND drop down box.
- • Select sd560v2u from the ADAPTER drop down box.
- • Select the port address (0) on which USB is connected to the PC.
- • Click on RUN DTC_CONF. A sample output is as shown in figure 26 below.
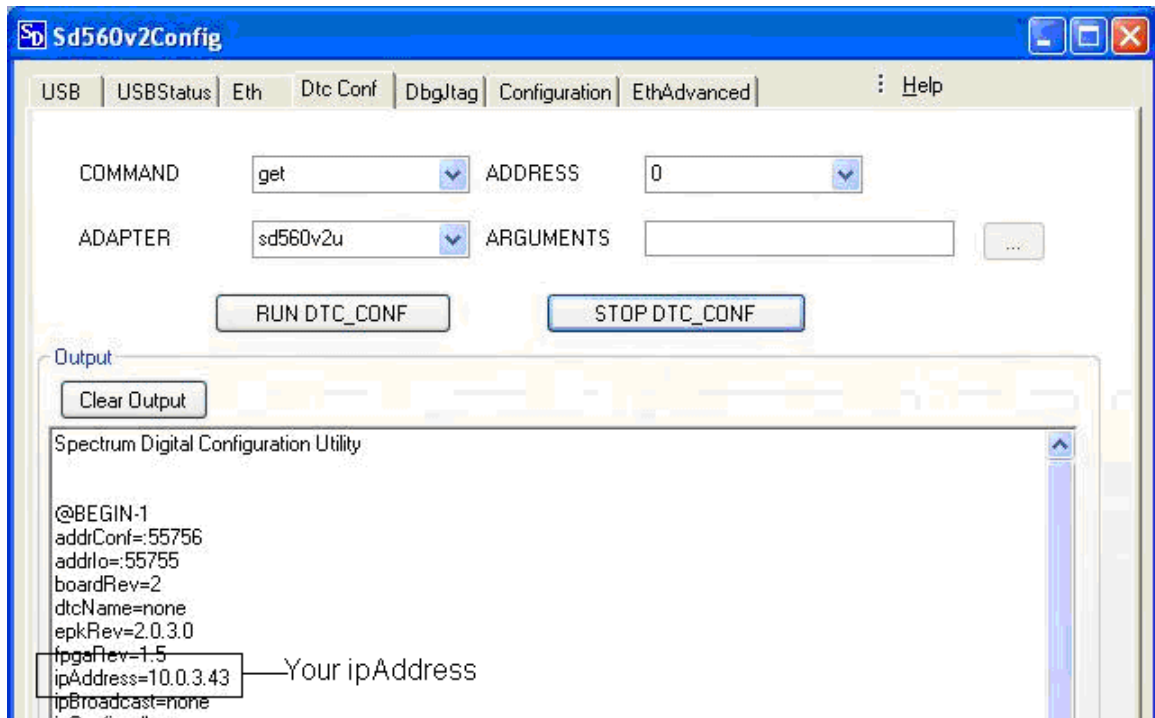
FIGURE 26: Sd560v2Config – DtcConf tab to get Ethernet ipAddress.

6.2 ETH TAB

The second method is from the Sd560v2Config's Eth Tab. This can be used to find ipAddresses of multiple emulators connected to the local area network.

- • Activate Eth Tab
- • Click on the 'Find Ethernet Devices' button. The results are as shown in figure 27 below.
- • Match the MAC Address found to the MAC address of your XDS560v2 STM. The XDS560v2 MAC address is printed on the back of your XDS560v2.

FIGURE 27: Sd560v2Config Eth Tab

6.3 ETHADVANCED TAB

The third method is from EthAdvanced tab. A detailed explanation of theory behind EthAdvanced tab can be found under section 5.6.

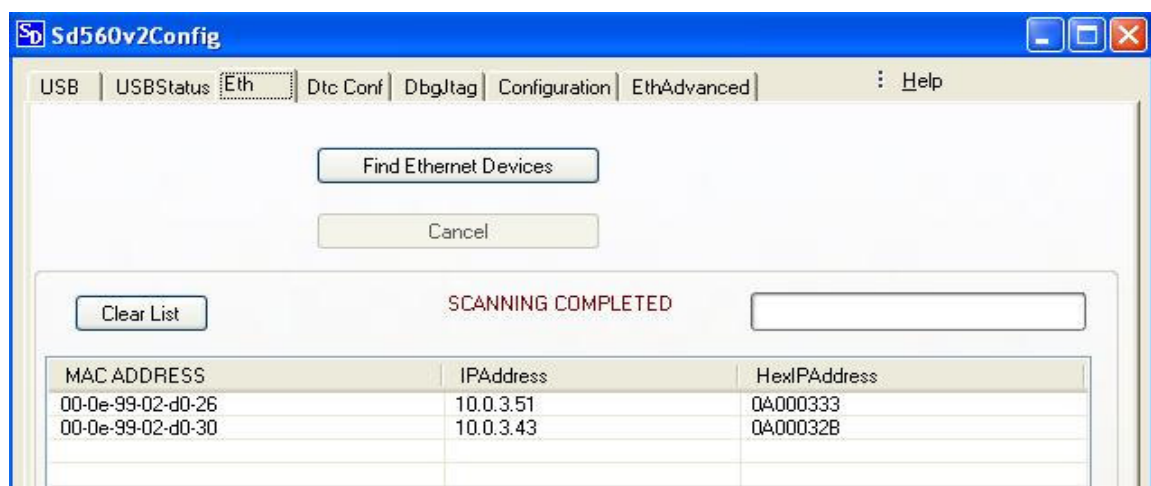- Activate the 'EthAdvanced' Tab.
- Optional: Enter the range of mac addresses (starting mac address and ending mac address). You can narrow or expand the range based on the MAC address of your unit.
- Optional: Enter IP address of the PC you are running on. By default this is automatically populated. If you do not know your PC MAC address, then from a DOS command prompt enter "ipconfig".
- Optional: Enter Subnet Mask of the PC you are running on. By default this is automatically populated. If you do not know your PC Subnet Mask, then from a DOS command prompt enter "ipconfig".
- Press on the Find IPAddress button and wait for the SCANNING COMPLETED message on the output window. A sample output is as shown in figure 28 below.
- Match the MAC Address found to the MAC address of your XDS560v2 STM. The XDS560v2 STM MAC address is printed on the back of your XDS560v2 STM.
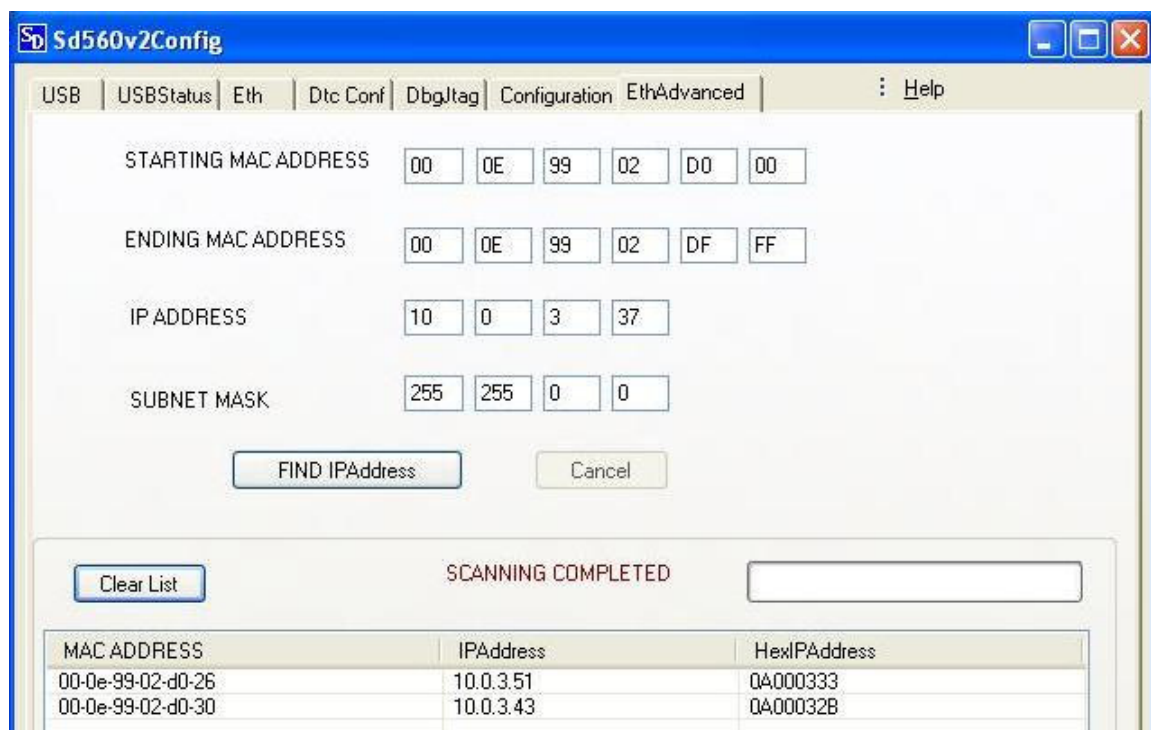
FIGURE 28: Sd560v2Config utility – EthAdvanced tab.

7 CONFIGURE XDS560V2 FOR STATIC IP ADDRESS

The Spectrum Digital XDS560v2 STM can be configured to run over static IP Address using the USB port. This method of ipAddress assignment may be preferred because it will be static vs. dynamic. In CCS and with other utilities you have to supply an ipAddress so that the utilities can find your XDS560v2 STM. If configured for a dynamic ipAddress it is possible that your ipAddress changes from day to day depending on your network configuration. In this case you would have to continually update your CCS target configurations for the current ipAddress. The procedure to set a static ipAddress is detailed below. It may be necessary that you contact your company's network administrator to help with this process.

- Activate DtcConf tab.
- Select the 'set' command from the COMMAND drop down box.
- Select sd560v2u from the ADAPTER drop down box.
- Select the port address (0) on which USB is connected to the PC.
- Enter the ARGUMENTS field as ipConfig=<x.x.x.x> where x.x.x.x is the new static IP as shown in figure 29 below. The ipAddress shown is an example. You should contact your network administrator to get the proper static ipAddress for your company network.
- Click on RUN DTC_CONF.
- Select the 'boot' command from the COMMAND drop down box. The XDS560v2 STM needs to reboot for the new ipAddress configuration to activate.
- The boot command takes about 45 seconds to boot the XDS560v2.
- Once the boot command is completed, select the 'get' command from the COMMAND drop down box and click on RUN DTC_CONF.
- The ipAddress configuration variable should display the newly set static IP address.
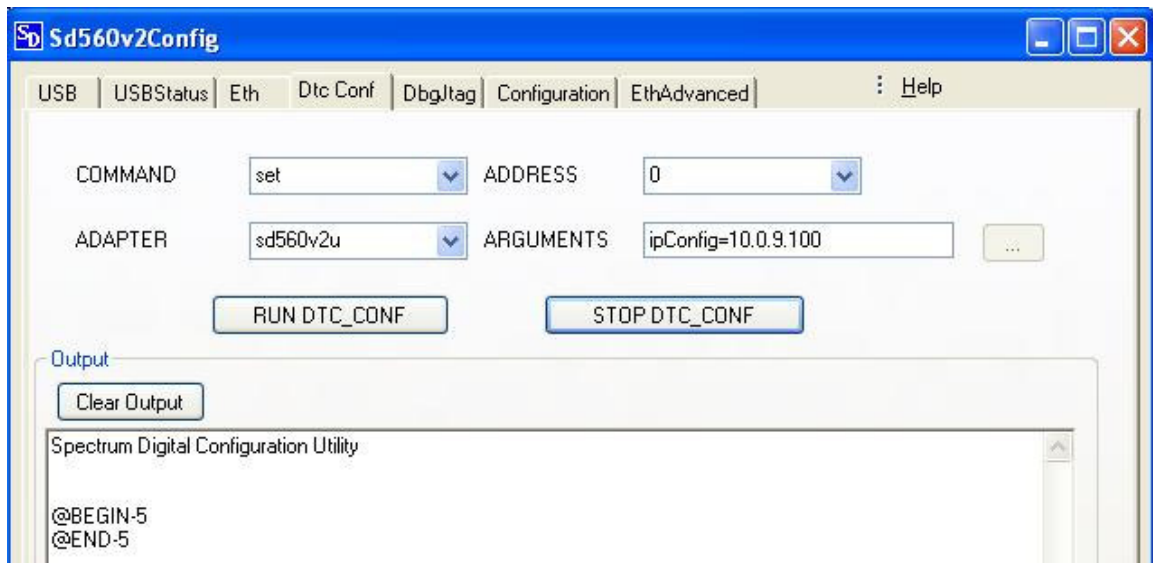
FIGURE 29: Sd560v2Config to set static IP

8 TROUBLE SHOOTING

8.1 .NET Framework

Sd560v2Config Utility is a C# application which requires .net framework v2.0.50727 or above to run. If the system you are running this application on doesn't have .NET installed the error pops up as shown in figure 30 below.

FIGURE 30: .NET framework Initialization error

Install the latest .NET from the link below if your system is connected to the internet.
http://www.microsoft.com/downloads/details.aspx?FamilyId=333325FD-AE52-4E35-B531-508D977D32A6&displaylang=en
If the system is not connected to the internet, you can install it from the CD provided.

8.2 XDS560v2 STM Boot Progress

When power is applied to the XDS560v2 STM it will begin booting its OS and provide a visual indication of its progress and also indicate if booting for normal operation or into safe mode. The boot manager will go to Safe Mode if it detects a problem during OS boot or a potential hardware problem with the XDS560v2 STM. When in Safe Mode you cannot run CCS instead you can use the

Sd560v2Config utility to diagnose the problem and return to normal boot mode. The following sequences with approximate timings are provided for reference. From the sequences you can see that it may take the XDS560v2 around 60 seconds to boot so during this time do not power cycle the unit.

Normal Boot Progress:

POWER........ON time0

ACTIVITY-1...ON time0 + 3 seconds: Linux+Application booting

STATE-2......ON time0 + 39 seconds: FPGA loaded

STATE-3......ON time0 + 41 seconds: Communications application running

ACTIVITY-1...OFF time0 + 41 seconds: Boot process complete

Safe Mode Boot Progress:

POWER........ON time0

ACTIVITY-1...ON time0 + 3 seconds: Linux+Application booting

STATE-3......ON time0 + 4 seconds: Linux boot to Safe Mode

ACTIVITY-3, ACTIVITY-2, STATE-1 Blinking time0 + 41 seconds: Safe Boot process complete

8.3 CCS Fails to Connect

There are any numbers of reasons why CCS may fail to connect. To diagnose the problem you can use the Sd560v2Config utility and go through a step by step process as described below:
- If using USB Run the Loop back test to verify the USB link between the PC and XDS560V2 STM.
- If using Ethernet use the Eth tab and verify that you can find your ipAddress.
- At this point either of the communications mediums should be active. From the Dtc Conf tab run a "get" command. This ensures the next level of communication with the XDS560v2 STM is functional.
- Make sure you have the XDS560v2 STM connected to your target and your target is powered. From the DbgJtag tab you should run the Reset and PathLength tests and confirm that both succeed without error. By running these tests successfully you would have verified that the emulation processor, emulation controller (FPGA) and target cable are functional. If the tests do not pass then refer to the TI WIKI for diagnosing scan problems.
- There are a few special circumstances where DbgJtag will fail and it is not related to a scan chain or target problem. In general these occur when the USCIF component of the TI driver stack is in a confused state following a CCS abnormal termination. When this occurs the typical errors are -120, -121 or RPC related errors. If using USB then you may be able to clear it up with a "Force USB EEOS" from the USB Status tab and then re-run DbgJtag. If the errors persist then you can reboot the XDS560v2 STM with the "boot" command from the Dtc Conf tab.

The XDS560v2 is running the Linux OS so pulling the power plug to restart the emulator should be done as a last resort. In the XDS560v2 STM implementation the USB, Ethernet link and Dtc Conf components are running on the Linux processor. The emulation drivers, USCIF and ultimately DbgJtag are running on the emulation processor. So while CCS or DbgJtag may show failures USB, Ethernet and Dtc Conf may

continue to be fully operational. Before pulling the power plug on the XDS560v2 STM to clear up catastrophic errors first attempt a "boot" command through the Dtc Conf tab.