



MityDSP™ Document



Document: MityDSP™ CLUB Users Guide

Revision: 3.0

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CLUB Overview

The Bootloader for the MityDSP™ platform has been significantly upgraded. The new Critical Link Unified Bootloader, or CLUB, provides a single Bootloader application that may be used across all MityDSP™ variants. In addition to the functionality of the previous Bootloader, the CLUB adds the following features:

- Ability to communicate to the target platform via Ethernet (local subnet only).
- Enhanced USB serial interface support.
- Improved checksum features to guarantee the integrity of any images downloaded.
- Ability to download application software and FPGA images from a web server (locally, or via the Internet if the target MityDSP has access).
- Store multiple images on the same FLASH and choose the one to activate.
- The capability to jump from one application to another.

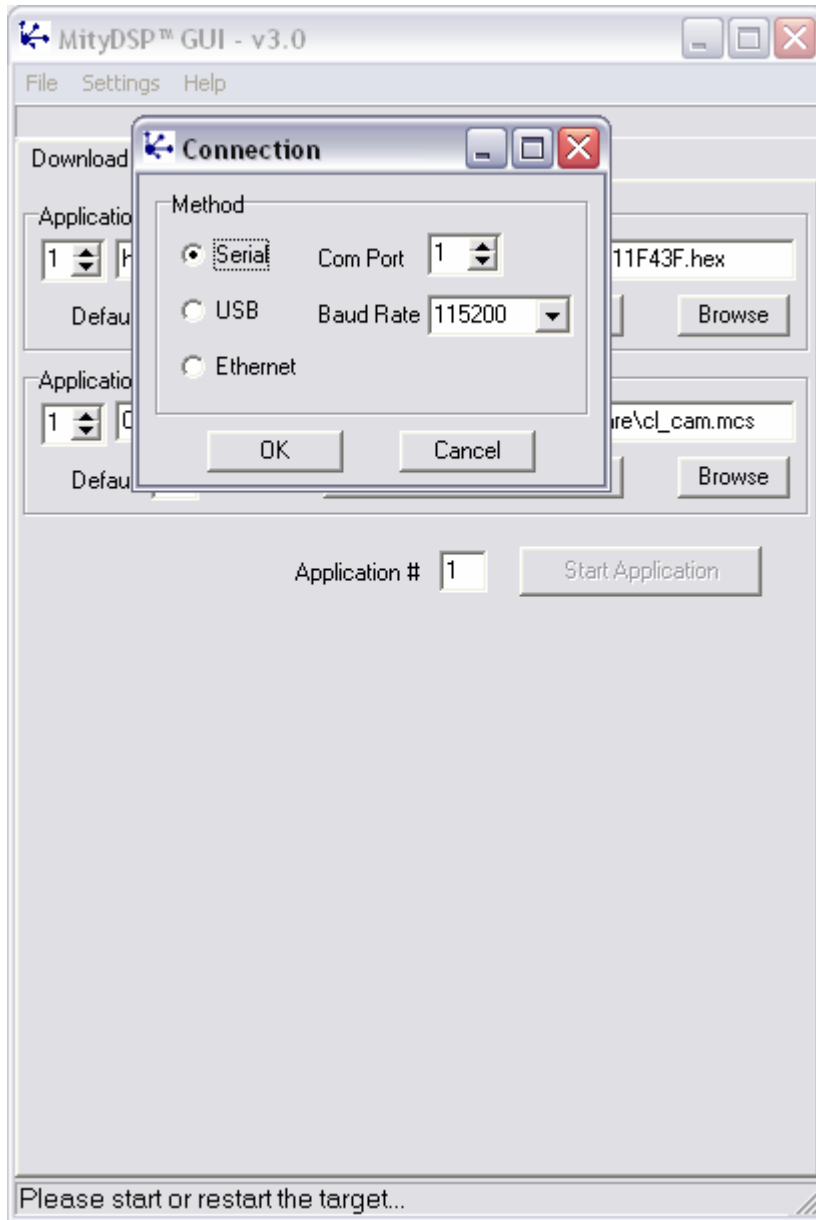
Users with large applications to download will especially notice the web download capability. Images that took over a half hour to download previously can now be downloaded in a matter of seconds. Even without access to the internet, a simple web server can be set up on any PC using readily available, free web server utilities (see <http://www.aprelium.com/> for an example of one product).

MityDspGUI Overview

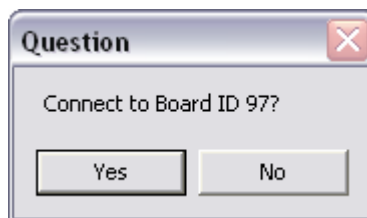
The MityDSP™ GUI is a Graphical User Interface program that runs on the PC under Windows. It communicates with the MityDSP™ Bootloader program residing in the embedded MityDSP™ device. Its purpose is to provide an easy to use utility, which automates the downloading process of images to the target MityDSP™ device. In addition it provides a means for editing the MityDSP™ board configuration. The MityDspGUI fully supports the new CLUB Bootloader, as well as the legacy MityDSP™ Bootloader.

MityDspGUI Operation

Communication between the MityDspGUI and the CLUB may be via RS-232 serial, a USB serial interface, or via Ethernet (if the MityDSP™ hardware has Ethernet capability). To choose the appropriate connection method, start the MityDspGUI and select the Settings->Connection menu as shown in the following screen shot. Choose Serial, USB, or Ethernet interface (and port number / baud rate for serial or USB).



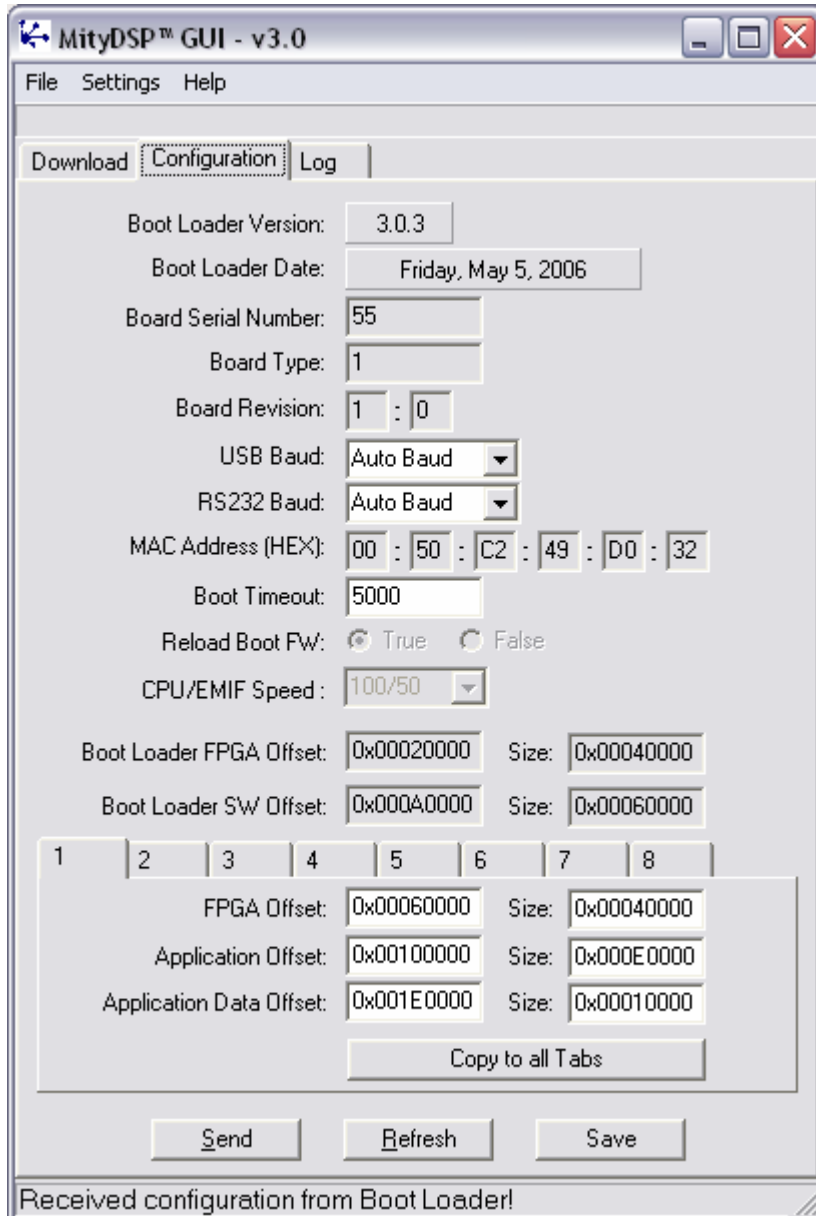
When using a serial interface, communication with the target MityDSP™ is established automatically. When using Ethernet, a confirmation dialog is displayed asking the operator to verify that the board about to be configured is indeed the desired target MityDSP™. Connection is established if the operator selects “Yes”. The MityDSP™ is released to continue its normal boot-up if the operator selects “No”, and the MityDspGUI goes back to look for another target.



After communication is established the download buttons are enabled, the configuration parameters are received and displayed and the log will display all messages received from the Bootloader as well as any errors. See the following sections for detailed information on using each of the MityDspGUI tabs. See the troubleshooting section if having trouble communicating between the GUI and MityDSP™.

Configuration Tab

After establishing communication with the MityDSP™, the MityDspGUI requests and displays the current board configuration parameters, as shown in the following screen shot.



The MityDspGUI may modify fields shown with a white background. Use the "Send" button to update the MityDSP™ with any desired changes. Use the "Save" button to save the configuration to a file on the PC. Use

“Refresh” to get an updated copy of the configuration from the connected MityDSP™. The fields on the Configuration tab are described in the following paragraphs:

Boot Loader Version / Boot Loader Date: Indicates the version and creation date of the MityDSP™ Bootloader. Versions 3.0 and above contain the CLUB enhancements.

Board Serial Number: The serial number of the connected MityDSP™.

Board Type: The MityDSP™ board type.

Value	Meaning
0	Indicates board type has not been set
1	Indicates a standard MityDSP (8 MB RAM, 2 MB FLASH)
2	Indicates an extended memory (XM) MityDSP (32 MB RAM, 16 MB FLASH)

Board Revision: The MityDSP™ hardware revision (major and minor) numbers.

USB Baud: Selects the baud rate that the MityDSP™ Bootloader will use for the USB interface. CLUB supports a setting of “Auto Baud”, which will cause the Bootloader to match the baud rate setting of the MityDspGUI. Besides Auto Baud, acceptable rates are 19200, 38400, 57600, 115200, 230400, 460800, and 921600. Updated rates do not take effect until the next time the Bootloader is activated.

RS232 Baud: Selects the baud rate that the MityDSP™ Bootloader will use for the RS-232 serial interface. CLUB supports a setting of “Auto Baud”, which will cause the Bootloader to match the baud rate setting of the MityDspGUI. Besides Auto Baud, acceptable rates are 19200, 38400, 57600, and 115200. Updated rates do not take effect until the next time the Bootloader is activated.

MAC Address: The hardware address of the MityDSP Ethernet device (if equipped).

Boot Timeout: The number of milliseconds the MityDSP™ Bootloader will look for an interrupt from the MityDspGUI after a reset. The minimum allowed timeout is 500 milliseconds.

Reload Boot FW: This is a debug feature to prevent the CLUB from reloading application firmware when a new software image is started. It is useful when running firmware via an emulator. For normal operation, this should be set to “Yes”.

CPU/EMIF Speed: Current clock settings for the MityDSP™ (in MHz). The normal mode of operation is 100/50. Running at 200/100 requires a MityDSP™ I/O Board with higher capacity power supply.

Boot Loader FPGA Offset/Size: Specifies the location of the Bootloader’s FPGA image on the FLASH device. This location must not conflict with any other images stored on the FLASH device.

Boot Loader SW Offset/Size: Specifies the location of the Bootloader software image on the FLASH device. This location must not conflict with any other images stored on the FLASH device.

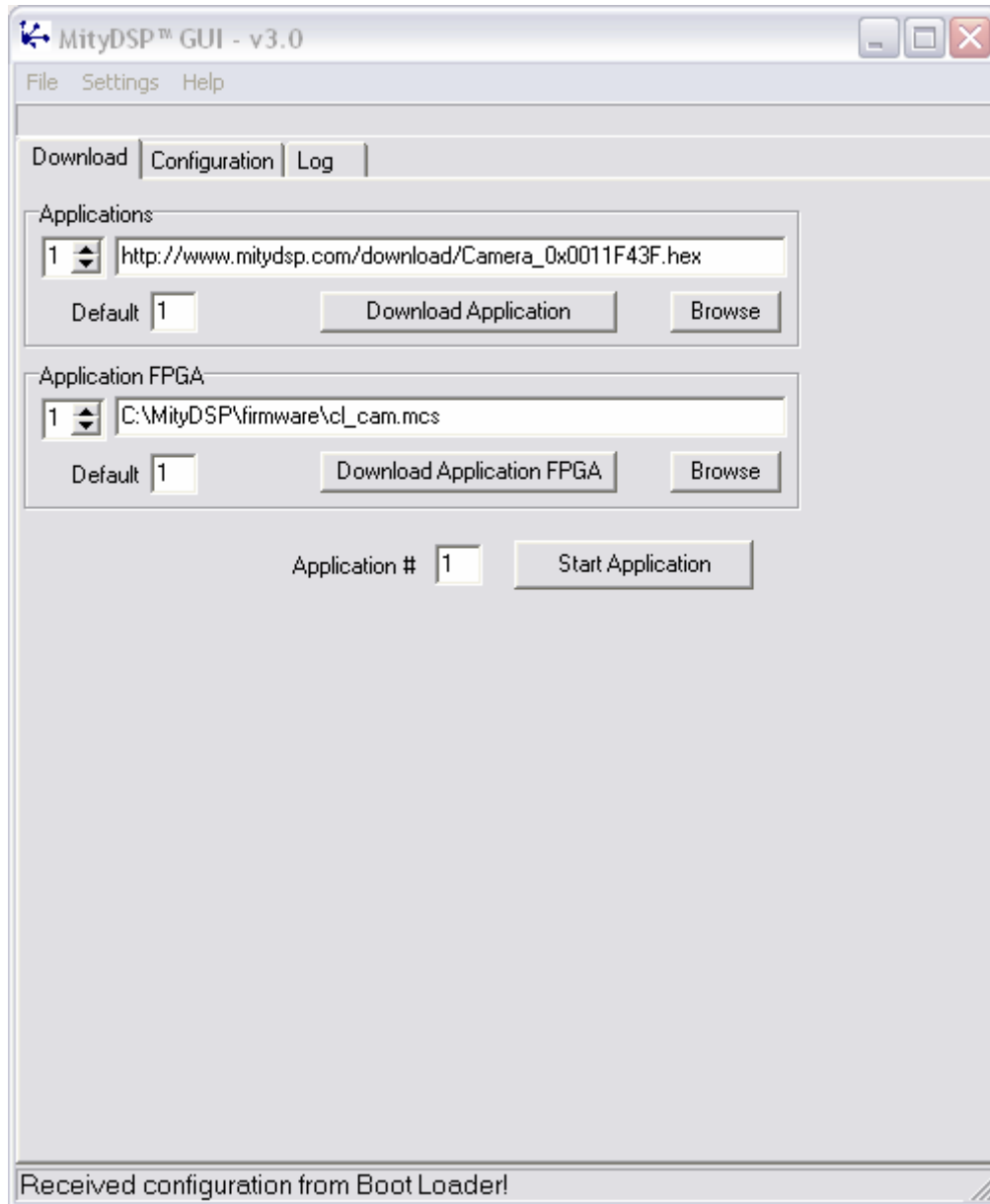
The last section on the Configuration tab contains information on the areas where up to 8 applications may be stored in FLASH (space allowing). Each application consists of an FPGA image, application software, and application-specific data area. The rules for setting up these application areas are simple, but provide a great deal of flexibility. Each separate FPGA image must either be unique, or an exact duplicate of another application’s FPGA image. The same applies for the software and data areas. This allows for completely unique applications, or the same FPGA image to be used with multiple software applications, or the same application FPGA and software with different user data blocks, or any combination of the above.

1	2	3	4	5	6	7	8
FPGA Offset:		0x00060000		Size:		0x00040000	
Application Offset:		0x00100000		Size:		0x000E0000	
Application Data Offset:		0x001E0000		Size:		0x00010000	
<input type="button" value="Copy to all Tabs"/>							

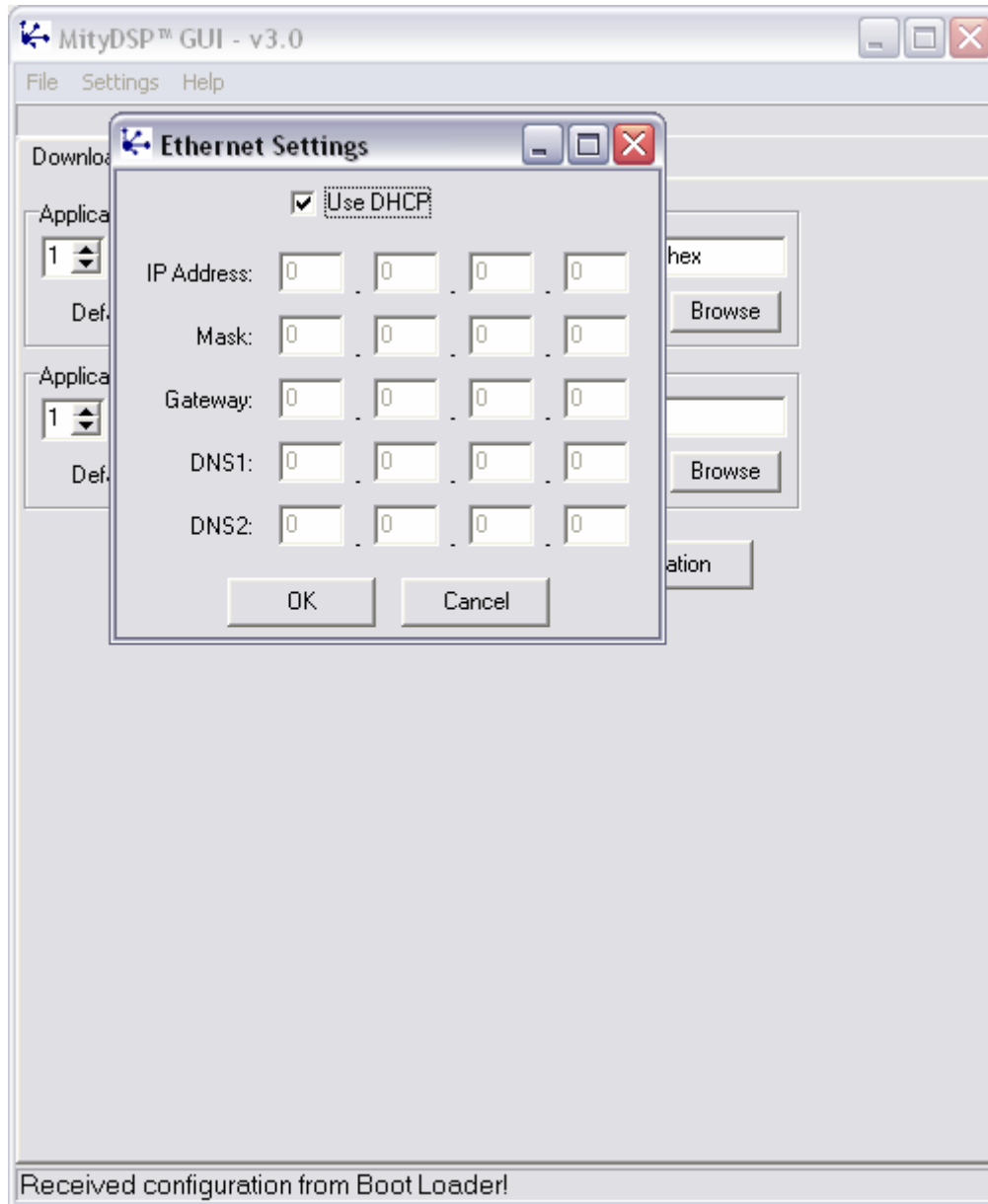
To set up a single application, provide an offset and size for the FPGA image, the software, and the user data areas that are unique and do not overlap each other or any of the Bootloader areas. Then use the “Copy to all Tabs” button to copy this information across all 8 application ID’s. Note that creating images with zero size is not allowed. Instead, use the “Copy to all Tabs” button to make all 8 applications point to the same images. This is equivalent to having only one image present.

Download Tab

The MityDspGUI Download tab is used to transfer application software and FPGA images to the connected MityDSP™. When used with the CLUB running on the MityDSP™, up to 8 images may be downloaded (only a single image to legacy Bootloaders). Fields also exist to allow the user to choose the default FPGA image and software to start. This is the application loaded whenever the MityDspGUI does not intervene in the normal boot process. The MityDspGUI also provides a “Start Application” button to override the defaults and start an alternate application. A screenshot of the Download tab is shown below:



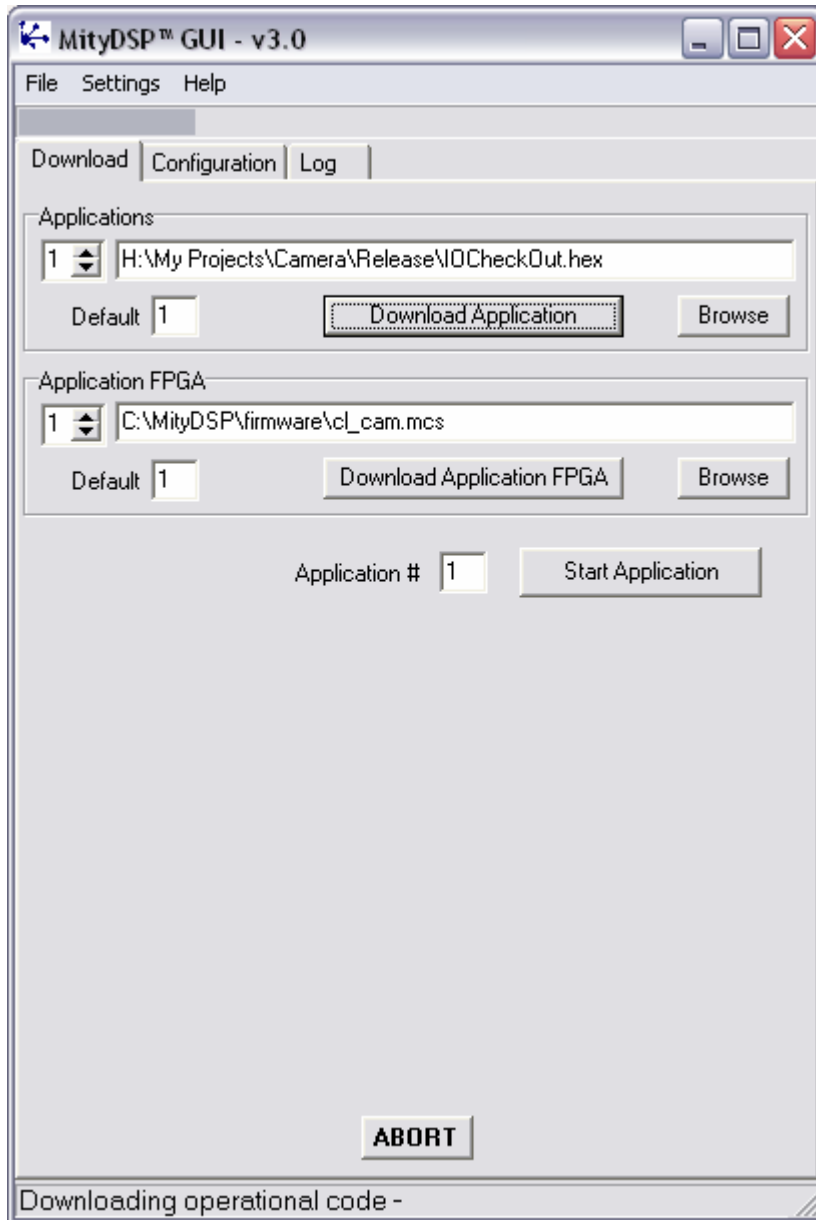
The MityDspGUI can download an image via two methods. If a file name is provided, the application software or FPGA image will be sent to the MityDSP™ Bootloader via the existing connection in Intel Hex format. A faster alternative is to provide a URL (starting in <http://>), which will allow the MityDSP™ CLUB to fetch its own image off of the specified web server. This is valid only with the CLUB and a MityDSP™ with an Ethernet connection. To support this HTTP download, the MityDSP™ is given a temporary IP configuration. This configuration is determined by the Ethernet Settings menu, found under Settings->Ethernet, and shown in the following screen shot.



In order to obtain an application from a remote web server, the MityDSP™ must have a local IP address and network mask, a gateway to reach locations off the local subnet, and one or more DNS servers to translate machine names to IP addresses. Optionally, this information may be obtained from a DHCP server if one exists on the local network. Check the DHCP box to activate this feature (all other inputs are dimmed when this box is checked). Also note that this IP configuration is stored with the MityDspGUI and not the CLUB. This allows the same IP address to be used to configure multiple MityDSP's, which is especially handy in a production environment. The MityDSP™ will only “own” this IP address while it is actively connected to the MityDspGUI.

The steps for downloading either the Application software or FPGA image are the same. First, use the spin-edit box to select an application ID (from 1-8). Next, enter either the file name or URL of the image to download. A “Browse” button is provided to graphically navigate to a file on the local machine. Finally, press the “Download Application” or “Download Application FPGA” button to begin the transfer process. For file downloads, a status bar is displayed across the top of the screen, and success or failure is indicated in the status area at the bottom of the screen. For web downloads, the status area shows the number of bytes currently downloaded, and success or failure after the

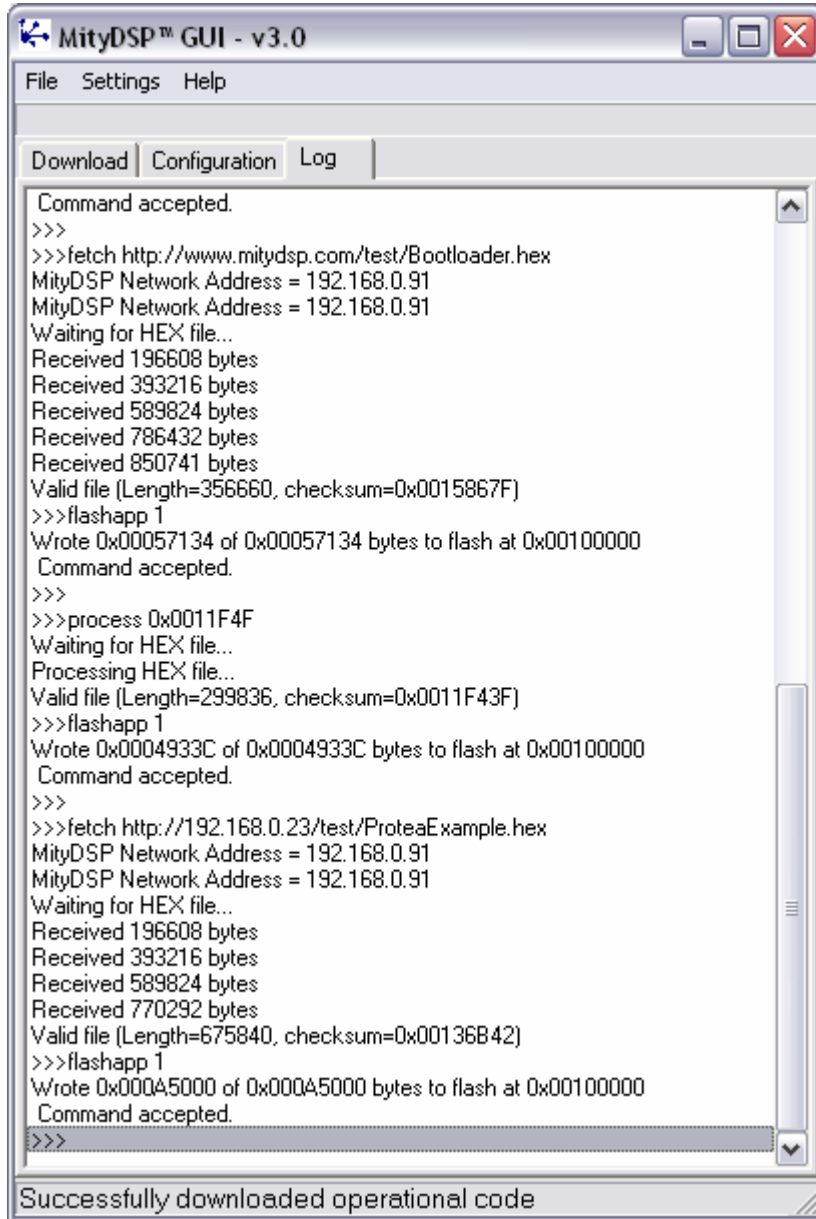
transfer is complete and the image is written to FLASH. **Do not cycle power on the MityDSP™ while the FLASH is being written!**



A download may be aborted (by pressing the “ABORT” button) up until the FLASH update actually begins. Once FLASH update has started it must run to completion, or corruption of the MityDSP™ FLASH may occur. Note that the MityDspGUI, when run in concert with the CLUB, provides enhanced data integrity compared to previous versions of the Bootloader. Overall checksums are provided to the CLUB by the MityDspGUI for all downloaded files. If the checksum computed by the CLUB does not match the target checksum, the download fails. This is an additional level of security over and above the line-by-line checksums inherent in an Intel Hex file.

Log Tab

The MityDspGUI Log tab contains a display of all commands exchanged between the MityDSP™ Bootloader and the GUI. The data is for information and troubleshooting only, no user interaction is possible.



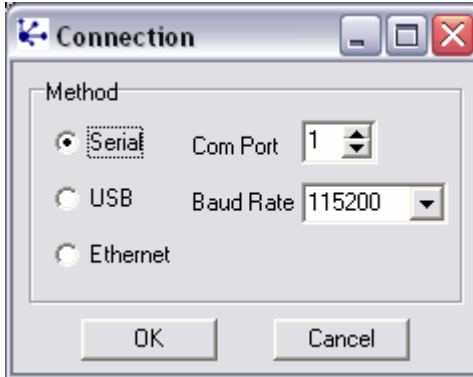
Troubleshooting

Communications between the MityDspGUI and the MityDsp™ Bootloader are usually very reliable. If you are having trouble, please consult the following tips:

Cannot Establish Communication – Serial or USB

- Ensure that all cables are connected properly.

- If using RS-232, ensure the proper type of cable for the target hardware (Null modem vs. straight) is connected between the PC and MityDSP™.
- On the Settings->Connection menu, check to make sure that the proper Com Port and Baud rate are selected. The default baud rate for the MityDSP™ downloader is 115,200.



Cannot Establish Communication – Ethernet

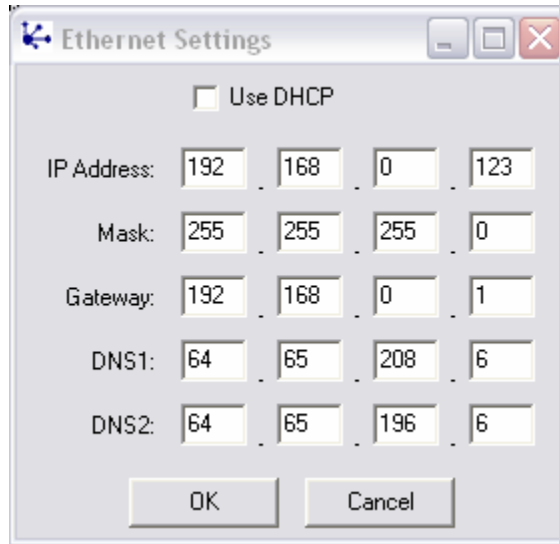
- Both the PC and the MityDSP™ must be connected to the same network. There cannot be any routers in-between the two devices.
- Make sure that both the PC and the MityDSP™ have link lights illuminated on their Ethernet connectors.
- The default MityDSP™ Bootloader firmware does not contain Ethernet support. If the link light is not illuminated on the target hardware, and all connections have been verified, you may need to download application-specific firmware to enable the Ethernet interface.

File-Based Downloads are Unreliable

- Check the integrity of all cables. Check shielding and grounding of all cables. Swap with known working cables, if possible.
- For serial interfaces, the current baud rate may be too high for the cable length / noise environment. Reduce the baud rate and try again.
- For Ethernet interfaces, if the network is half-duplex collisions may be occurring. Try full duplex network hardware or wait until there is less network activity. Web downloads will be more reliable because they use TCP protocol.

Cannot Perform Downloads From a Web Server

- Make sure that the MityDSP™ has a link light illuminated on its Ethernet connector.
- The default MityDSP™ Bootloader firmware does not contain Ethernet support. If the link light is not illuminated on the target hardware, and all connections have been verified, you may need to download application-specific firmware to enable the Ethernet interface.
- On the Settings->Ethernet menu, verify that all network configuration settings are complete. If attempting to communicate off the local subnet, verify that the Gateway setting is correct. If trying to access a machine by name (rather than IP address), ensure that the DNS addresses are correct as well.



- Check the URL being entered and verify that it is correct.