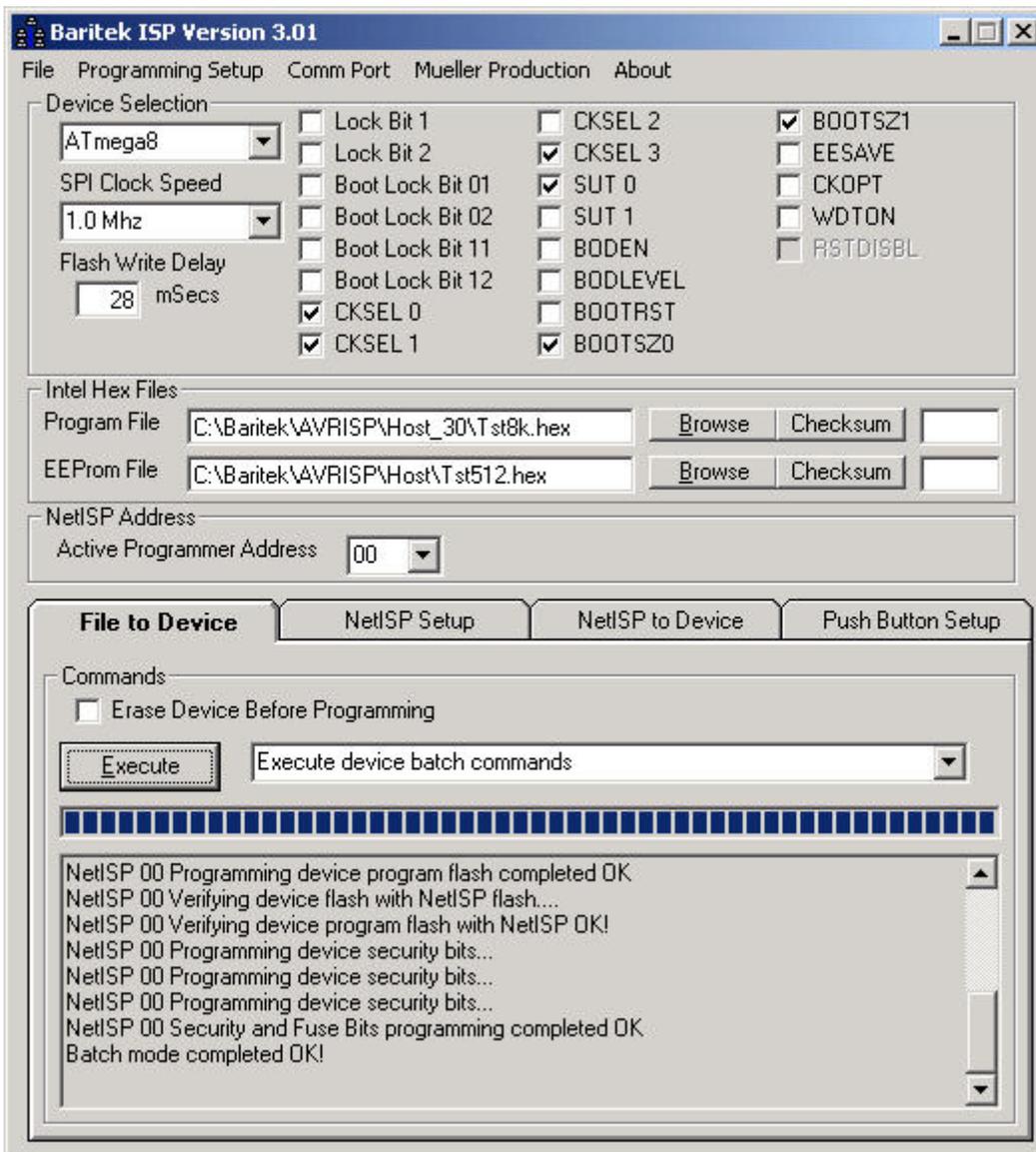


NetISP-A User Interface Manual

The NetISP-A user interface has been developed to run on Windows 95,98,NT4.0 and Windows2000. When designing the user interface we tried to make it as intuitive as possible. We try to have as much information on the main screen as possible. This will keep the user from having to select various menu items to open windows in order to confirm that their settings are correct. The manual is written in the following manner. Screen shots of all the user interface windows with descriptions of each item on the window. Tutorials that describe how to setup and use the NetISP-A to program and verify you target AVR device.

Main Window



Main Window

The following is the descriptions for the main screen items.

File Menu

The File menu has an item **Exit** used to close the NetISP-A application. In future versions of the user interface the **File** menu will have other items for opening or saving project settings.

Programming Setup

The Programming set up menu has the following items.

Programming Batch Setup

This menu item opens the batch programming setup window. Batch programming setup allows the user to execute a number of programming functions with only executing the **Execute device batch commands**.

Push Button programming setup

This menu item opens the push button programming setup window. The push button program window allows the user to configure the NetISP-A for stand alone push button operation.

Comm Port

The Comm Port menu is used to select the serial port that the NetISP-A is connected. The user can choose **Comm1, Comm2, Comm3 or Comm4**. The Comm Port menu also has the **Show Terminal** menu item used to open the Terminal window. The Terminal window show all he raw data flowing between the host PC and the NetISP. The Terminal window is mainly used for diagnostics.

Device Selection Frame Items

The Device selection frame contains various items used to setup the NetISP-A for programing a particular device.

Device

The Device drop down list allows the user to select the device type to be programmed.

SPI Clock Speed

The SPI Clock Speed drop down list allows the user to select the speed of the SPI Clock used is serial programming of the device. The SPI Clock Speed would have to be lowered if a device ran on a slow clock speed or low voltage.

Flash Write Delay

The flash write delay is used to delay before writing the next byte to the device. This is used on devices that do not support data polling of program memory after writing a byte to the device. The next byte will not be written until the delay has time out. The mega devices use paged mode programming. The Flash Write

Delay for paged devices is the length of time to wait after issuing a page write command before continuing after a page write.

Lock and Fuse Bit Check Boxes

The Lock and Fuse check boxes are selected by clicking them with the mouse. When the user selects a new device the user interface rebuilds the Lock and Fuse check boxes to reflect what the current device supports.

Intel Hex Files Frame

Program File

The Program file holds the path and file name the intel hex format file to program the device's flash. The Browse button next to the program file text box opens the file open window to navigate to file location.

EEProm File

The EEPROM file holds the path and file name the intel hex format file to program the device's eeprom memory. The Browse button next to the eeprom file text box opens the file open window to navigate to file location.

File to Device Tab

The File to Device tab contains user controls for programming devices from intel hex files located on the computer. This tab is normally used during the development cycle for programming devices. The firmware engineer can load new code to the device's flash from an intel hex file located one of the machine's drives. The **Execute** command button executes the command selected in the command drop down list. The **Erase Before Programming** check box when checked will erase the target device before programming. The **Execute** command button executes the command selected in the command drop down list. The command drop down list while in the File to Device tab contains the following commands.

Execute device batch commands

This will execute the Batch Mode commands set up by the user. (See Batch Mode Set Up section.)

Erase device program flash

This command erases the device.

Program device program flash from selected file

This command programs the device's flash with the intel hex file selected in the program file text box.

Program device eeprom from selected file

This command programs the device's EEPROM with the intel hex file selected in the EEPROM file text box.

Program device security and fuse bits

This command programs the device's fuse and security bits to the state they are set up as in the **Device Selection Frame**.

Verify device program flash with selected file

This command verifies the device's flash program matches the intel hex file selected in the program file text box.

Verify device eeprom with selected file

This command verifies the device's eeprom matches the intel hex file selected in the EEPROM file text box.

NetISP Setup Tab

The NetISP Setup tab contains user controls for programming the NetISP with intel hex files located on the computer. This tab is normally used after development has been completed to set up the NetISP for programming production runs. The firmware engineer can load new code to the NetISP's device flash and eeprom flash from the intel hex files located on one of the machine's drives. The **Execute** command button executes the command selected in the command drop down list. The **Erase Before Programming** check box when checked will erase the NetISP's device flash or eeprom flash sections before programming. The **Execute** command button executes the command selected in the command drop down list. The command drop down list while in the NetISP Setup tab contains the following commands.

Erase NetISP flash

This command erases the NetISP flash for storing target device programs.

Program NET_ISP with device flash data from selected file

This command programs the NetISP's device flash section with the intel hex file selected in the program file text box.

Program NET_ISP with eeprom data from selected file

This command programs the NetISP's device EEPROM section with the intel hex file selected in the EEPROM file text box.

Verify NET_ISP program flash with selected file

This command verifies the NetISP's device flash section matches the intel hex file selected in the program file text box.

Verify NET_ISP eeprom with selected file

This command verifies the NetISP device eeprom section matches the intel hex file selected in the EEPROM file text box.

NetISP to Device Tab

The NetISP to Device tab contains user controls for programming devices from intel hex files located in the NetISP flash. This tab is normally used during the production line programming of devices. The user can program devices from intel hex files located in NetISP's flash section. The **Execute** command button executes the command selected in the command drop down list. The **Erase Before Programming** check box when checked will erase the target device

before programming. The **Execute** command button executes the command selected in the command drop down list. The command drop down list while in the File to Device tab contains the following commands.

Erase device program flash

This command erases the target device.

Program device flash with NET_ISP device flash data contents

This command programs the device's flash with the intel hex file data stored in the NetISP's device flash section.

Program device eeprom with NET_ISP flash contents

This command programs the device's EEPROM with the intel hex file data stored in the NetISP's eeprom flash section.

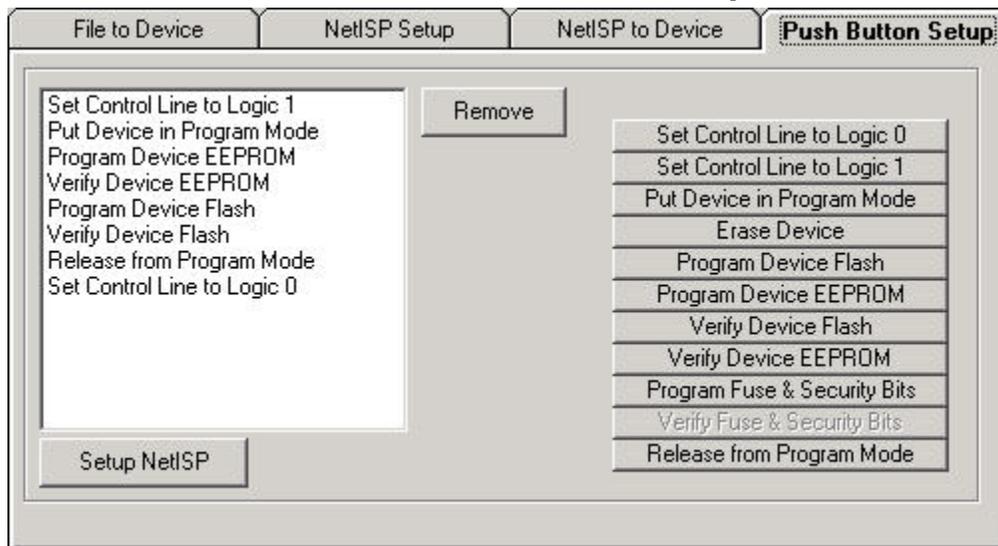
Verify device flash with NET_ISP flash

This command verifies the device's flash program matches the intel hex file data located in the NetISP's device flash section.

Verify device eeprom with NET_ISP eeprom

This command verifies the device's eeprom matches the intel hex file data located in the NetISP's eeprom file section.

Stand Alone Push Button Setup Tab



Stand Alone Push Button Setup Window

The Stand Alone Push Button window is used to setup the NetISP in stand alone mode. A list box shows the current commands to be uploaded to the NetISP is on the left hand side of the window. The commands to load are located on the right hand side of the window. To load a command press the corresponding command button. To remove a command that was mistakenly put in the command list. Highlight the command by clicking on it with the mouse and click on the **Remove** command button to delete the command from the list. An

example to program a device the user would select the commands in the following order.

Put Device in Program Mode

Erase Device

Reset Device

Put Device in Program Mode

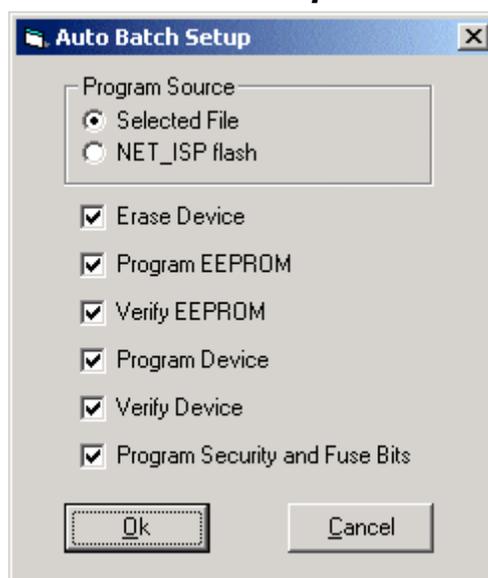
Program Device Flash

Verify Device Flash

Reset Device

The commands above will be uploaded to the NetISP by selecting the **Setup NetISP** command button. The user should see each of the command in the list box become highlighted while they are being transmitted to the NetISP. If the NetISP receives all of the commands correctly the Stand Alone Push Button Setup window will close. Now the user can connect the NetISP to their target board. When the user presses the push button the NetISP will execute the commands that were uploaded. The user will see the RX/PRG led turn on while the device is being programmed. Then the VERIFY led will turn on while the device's flash is being verified. If all the commands are successful the PASS/FAIL led will turn on green. If there is an error the PASS/FAIL led will turn on red.

Auto Batch Setup Window



Auto Batch Setup Window Description

The Auto Batch Setup window is used to select parameters the Execute device batch command will carry out.

The **Program Source** frame contains option buttons to select the location of the intel hex file data. The two options are **Selected Files** and **NetISP Flash**. If the **Select Files** are selected then the target device is programmed with the intel hex

file data locate in the Program File text box. If the **NetISP Flash** is selected the target device is programmed with the intel hex data stored in the **NetISP** flash.

The **Erase Device** check box when checked will erase the device before the next auto batch command is executed. If the **Erase Device** check box is not checked the erasing the device is not executed.

The **Program EEPROM** check box when checked will program the target device's eeprom. If the **Program EEPROM** check box is not checked the program device's eeprom is not executed.

The **Verify EEPROM** check box when checked will verify the device eeprom with the intel hex file data selected in the **Program Source** frame. If the **Verify EEPROM** check box is not checked then verifying the device eeprom is not executed.

The **Program Device** check box when checked will program the target device. If the **Program Device** check box is not checked the program device is not executed.

The **Verify Device** check box when checked will verify the device flash with the intel hex file data selected in the **Program Source** frame. If the **Verify Device** check box is not checked then verifying the device flash is not executed.

The **Program Security and Fuse Bits** check box when checked will execute programming the security and fuse bits of the device. If the **Program Security and Fuse Bits** check box is not checked then programming the security and fuse bits is not executed.

Programming a Device from a file Tutorial

The following is a list of steps the user needs to perform in order to program and verify an AT90S8515. This may look like quite a few steps but most are common sense items listed so the user has a reference in case something does not work. The user should become quite familiar with the operation of the NetISP user interface in very little time.

Note: If the user has already established a working session with the NetISP then steps 1 through 7.

1. Make sure the serial cable is connected from the computer to the NetISP.
2. Make sure programmer header cable is plugged into the target board.
3. Make sure the power supply is plugged into the back panel location of the NetISP.
4. If the target board has its own power supply set the NetISP front panel toggle switch to **Isolated**. If the target board is going to be powered from the NetISP then select the target voltage using the front panel toggle switch (5.0V or 3.5V).
5. Turn on power to NetISP with the toggle switch located on the back panel.
6. Start the NetISP application.
7. Select the communications port the NetISP is connected to from the **Comm Port** menu.
8. Select the AT90S8515 from the device drop down list.
9. Select the intel hex file to program the target device with by using the **Browse** command button associated with the **Program File** text box.
10. Select the **File to Device** tab.
11. Select **Erase device program flash** from the command drop down list and then click the **Execute** command button.
12. Select **Program device program flash from selected file** from the command drop down list and then click the **Execute** command button.
13. The status text box prompts the user that programming is completed OK or that an error occurred.
14. Select **Verify device program flash with selected file** command from the command drop down list and then click the **Execute** command button.
15. The status text box prompts the user that verifying completed OK or that an error occurred.
16. You have just completed programming and verifying your target device.

Programming an intel hex file to the NetISP Tutorial

The following is a list of steps the user needs to perform in order to program and verify loading an intel hex file to the NetISP flash. This may look like quite a few steps but most are common sense items listed so the user has a reference in case something does not work. The user will become quite familiar with the operation of the NetISP user interface in very little time.

Note: If the user has already established a working session with the NetISP then steps 1 through 7.

1. Make sure the serial cable is connected from the computer to the NetISP.
2. Make sure programmer header cable is plugged into the target board.
3. Make sure the power supply is plugged into the back panel location of the NetISP.
4. Turn on power to NetISP with the toggle switch located on the back panel.
5. Start the NetISP application.
6. Select the communications port the NetISP is connected to from the **Comm Port** menu.
7. Select the target device type from the device drop down list.
8. Select the intel hex file to program the target NetISP flash with by using the **Browse** command button associated with the **Program File** text box.
9. Select the **NetISP Setup** tab.
10. Select **Erase NET_ISP flash** from the command drop down list and then click the **Execute** command button.
11. The status text box prompts the user that erasure completed OK.
12. Select **Program NET_ISP with device flash data from selected file** from the command drop down list and then click the **Execute** command button.
13. The status text box prompts the user NetISP programming completed OK.
14. Select **Verify NET_ISP program flash with selected file** command from the command drop down list and then click the **Execute** command button.
15. The status text box prompts the user that verifying completed OK.
16. You have just completed programming and verifying the NetISP flash storage.

Setting up the NetISP for Push Button Operation Tutorial

The following is a list of steps the user needs to perform in order to setup the NetISP for push button operation. The target device is going to be an AT90S8515. This may look like quite a few steps but most are common sense items listed so the user has a reference in case something does not work. The user will become quite familiar with the operation of the NetISP user interface in very little time.

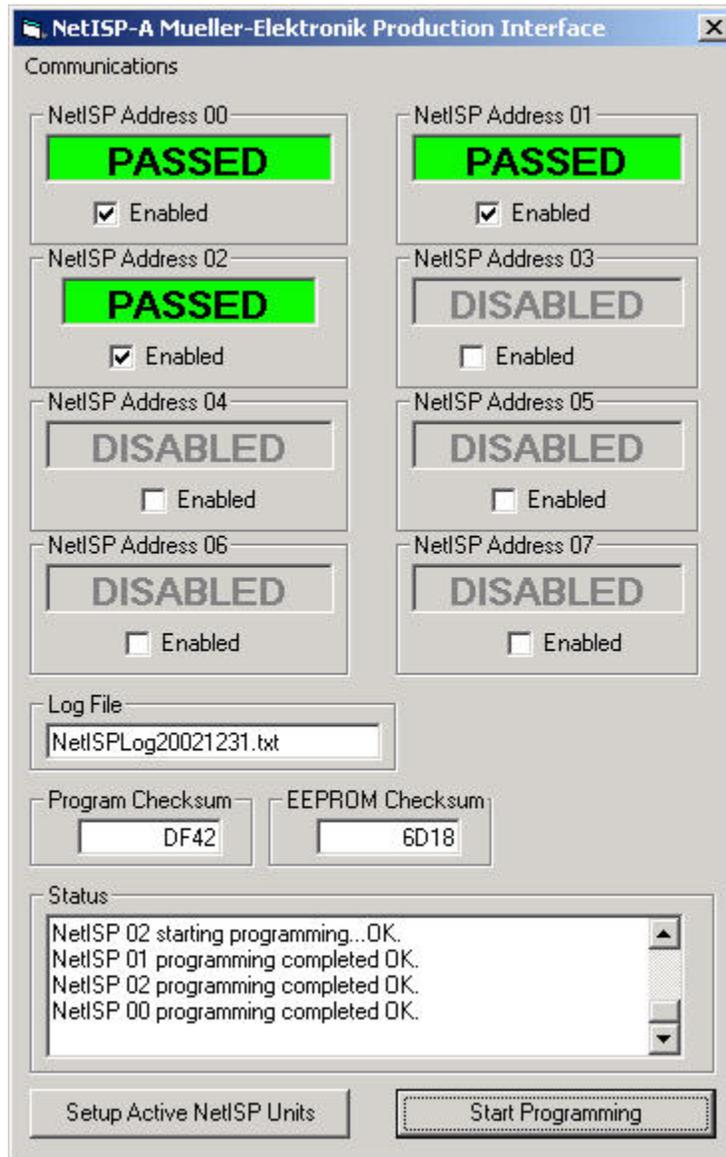
Note: If the user has already established a working session with the NetISP then steps 1 through 7.

1. Make sure the serial cable is connected from the computer to the NetISP.
2. Make sure programmer header cable is plugged into the target board.
3. Make sure the power supply is plugged into the back panel location of the NetISP.
4. Turn on power to NetISP with the toggle switch located on the back panel.
5. Start the NetISP application.
6. Select the communications port the NetISP is connected to from the **Comm Port** menu.
7. Select the AT90S8515 device type from the device drop down list.
8. Select **Push Button programming setup** from the **Programming Setup** menu.
9. Select the **Put Device in Program Mode** command button. The command list box should be updated with this command at the top.
10. Select the **Erase Device** command button. The command list box should be updated with this command below the previous entered command.
11. Select the **Release from Program Mode** command button. The command list box should be updated with this command below the previous entered command.
12. Select the **Put Device in program Mode** command button. The command list box should be updated with this command below the previous entered command.
13. Select the **Program Device Flash** command button. The command list box should be updated with this command below the previous entered command.
14. Select the **Verify Device Flash** command button. The command list box should be updated with this command below the previous entered command.
15. Select the **Release from Program Mode** command button. The command list box should be updated with this command below the previous entered command.
16. Click the **Setup NetISP** command button. The user should see each item in the command list highlighted as the application uploads the commands to the NetISP. If all commands are programmed OK then the window will close.
17. Plug the NetISP SPI header cable into the target board.
18. If the target board has its own power supply set the NetISP front panel toggle switch to **Isolated**. If the target board is going to be powered from the

NetISP then select the target voltage using the front panel toggle switch (5.0V or 3.5V).

19. Press the red **Program** push button on the front panel of the NetISP. The user should see the **RX/PRG** red led on the NetISP turn on while the target is being programmed. The **VERIFY** red led will turn on while the target is being verified by the NetISP. The **PASS/FAIL** led will turn on green if the NetISP has completed all internal commands successfully. The **PASS/FAIL** led will turn on red if the NetISP has an error trying to execute an internal command.

Production Programming Interface Window



Production Programming Algorithm

The following is a description of how the networked NetISP-A programmers will be implemented for production programming purposes. The flash program code, eeprom data, AVR device, SPI clock speed, flash write delay and fuse–security bits are selected using the normal NetISP-A host interface application. The NetISP-A host application has a special menu item production programming named Production. Selecting this menu item will launch the Production Programming window that interfaces to the multiple NetISP-A's on the RS485 network.

The following is a description of the production programming extension capabilities.

Setup Active NetISP Units

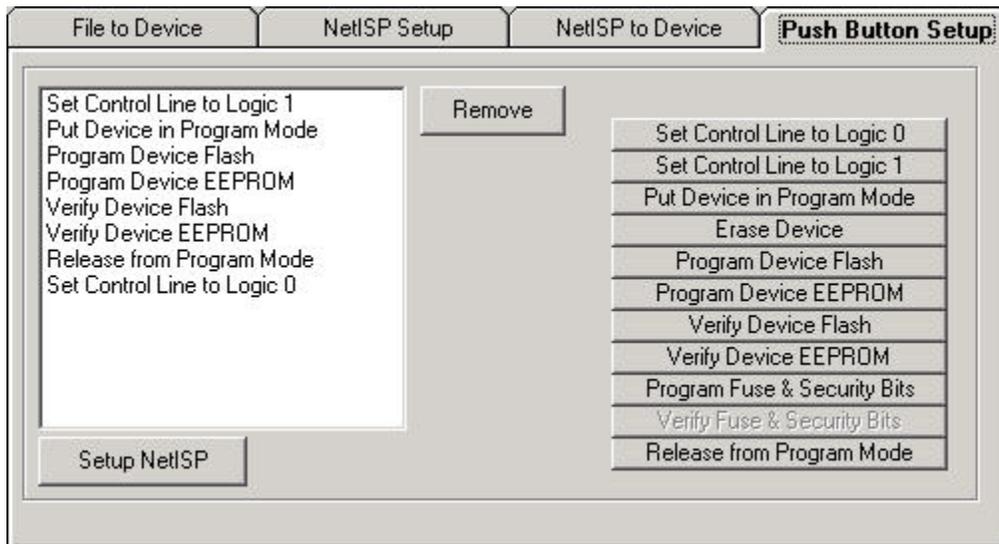
Before a production run of target boards can be programmed the user needs to select this command. This command runs an algorithm that verifies that each active NetISP-A is set up with the correct device flash program, eeprom data, SPI clock speed, flash delay time, AVR device and Push Button programming sequence. Note that the Push Button programming sequence needs to be set up prior to opening the production screen.

Start Programming

This command button does not become enabled until the user has setup the NetISP-A units for the production run by selecting the Setup Active NetISP Units command button. After the NetISP units are set up for the production run the Start Programming will start a programming session with the active NetISP units. The session algorithm issues the run push button programming sequence to each of the active NetISP units. Each NetISP unit is then polled in order to display to the user the current state of the NetISP unit. When the programming of the target code and eeprom data is complete the fuse and security bits are programmed by the production programming code.

NetISP-A Control Line

The NetISP-A control line can be used to select a multiplex on the SPI lines if one is used on the target board. It can also be used to signal push button programming completed OK. This is done when setting up the push button programming sequence. At the start of the programming sequence select Set Control Line to Logic 1. At the end of the programming sequence select Set Control Line to Logic 0. The following is a typical programming sequence.



When the NetISP-A runs the push button programming sequence the first command sets the Control Line to logic 1. If the programming sequence completes with no errors the Set Control Line to Logic 0 will be executed. Monitoring the control line will signal that programming has completed OK. If for some reason an error occurs during the programming sequence the NetISP-A aborts the sequence at the command that had the error. In this case the Set Control Line to Logic 0 will never get executed.

Log File

The log file is an ascii text file that can be used for examining the results of the production programming runs. The file name that is loaded by default is named NetISPLogYYYYMMDD.TXT where YYYY is the current year. MM is the current month of the year. DD is the current day of the month. The user has the option to manually change the name of this file. The items that are logged are as follows.

Setup of the active NetISP-A's

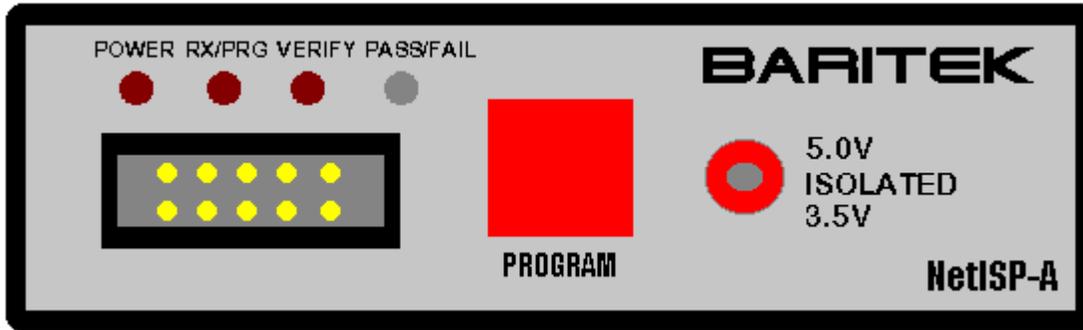
NetISP setup started at 2003/01/07 08:34:25
Program Checksum: DF42
EEPROM Checksum: 6D18
NetISP00 setup OK
NetISP01 setup OK
NetISP02 setup OK
NetISP setup completed at 2003/01/07 08:34:36

Each Batch Programming Run is logged as follows

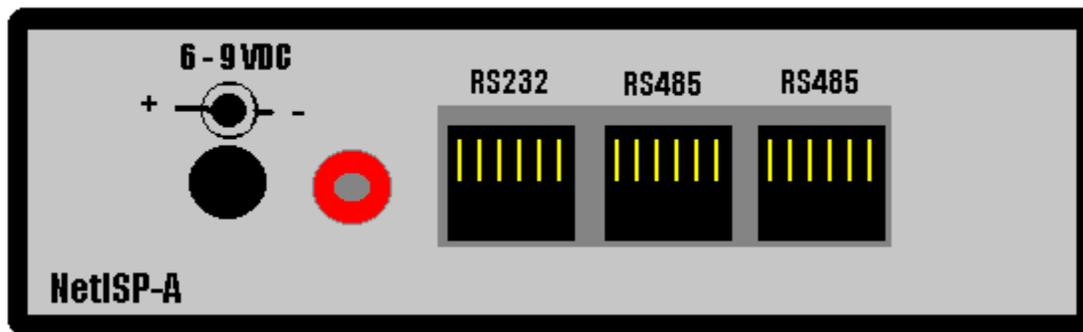
Batch started at 2003/01/07 08:34:59
NetISP00 Programming Passed
NetISP01 Programming Passed
NetISP02 Programming Passed
Batch completed at 2003/01/07 08:35:10

Batch started at 2003/01/07 08:35:24
NetISP01 Programming Passed
NetISP02 Programming Passed
NetISP00 Programming Passed
Batch completed at 2003/01/07 08:35:35

NetISP-A Hardware Description



NetISP-Front Panel



NetISP-A Rear Panel

NetISP-A SPI Connector Pin Assignment

1	MOSI	SPI master out slave in.
2	Vcc	Power from NetISP-A. When front panel toggle switch is set to Isolated this pin is needs Vcc from target.
3	CONTROL	Output line.
4	GND	Signal ground.
5	RESET	Micro reset line.
6	GND	Signal ground.
7	CLOCK	SPI clock.
8	GND	Signal ground.
9	MISO	SPI master in slave out.
10	GND	Signal ground.