Instructions for Field Programming SmarT-Trigger4 interface unit

BACKGROUND INFORMATION

This Document outlines six simple steps to re programming the smart trigger4 interface box in the field using firmware and software downloaded from the Rovtec Systems Web site (http::/www/rovtec-systems.com) for all trigger units with firmware revision 4:00 and later,

The document also gives some details behind the operation of the boot loader program.

The Master and Slave firmware files will be on the same page of the web site clearly marked as to their version number and with any major new features outlined. Each firmware upgrade package contains two files.

This document is also enclosed together with the BOOTLOADER package.
The "Tiny Bootloader" software was written by Mr Claudiu Chiculita details of which can be found on his web site linked here . http://www.etc.ugal.ro/cchiculita/software/picbootloader.htm

This "Tiny Bootloader" was chosen over many others as it is the smallest PIC boot loader in the world. (Smallest memory space used) The PC icon of the application is shown below (" tinybldWin")

 tinybldWin
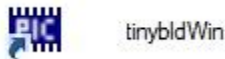
The PIC processor firmware side of this application has been modified for the SmarT-Tirgger system to enable the master processor to re program itself via the serial port as per normal boot loader operation, but to also pass on the data to either of the four slaves, across the internal data bus, when particular codes are selected in the tinybldWin program, directing the new binary file to be sent to either slave 1 to slave 4 depending on the particular code sent across to the interface box at boot up time.

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How it works !

Before using the program It may be useful to understand how this particular boot loader works , when the PIC processor in the Interface box boots up, it spends a certain amount of time looking for a particular code sent over on the RS232 line after it powers up ,

If it sees this code it replies to the boot loader program and receives over the next 10 -15 seconds the new HEX binary file which it writes to its own flash memory and by so doing, re programs itself with the new file sent by the boot loader.

So it can be seen that in order to get the boot loader to let the Processor know it wants to send a new file, one has to press the send button on the boot loader and within just a few seconds later, (approx 7 seconds) turn on the interface box , this way you will ensure the interface will pick up the special signal sent by the boot loader program and will begin to re program its flash with the received binary file.

Once either the master or any of the slaves is being re programmed, none of the other processors will boot up, they all wait for the boot loader to complete its task before booting up, The master processor controls all of the box boot loader so no matter which processor is being re programmed, all others will wait for this process to complete, while re-programming is in process, all front panel led's should be off.

With every version of firmware for the SmarT-Trigger there are two binary files used in the interface box , one for the Master processor , downloaded once , and one for the slaves downloaded four times. The are always two binary files associated with a firmware upgrade and these will be downloaded from the Rovtec Systems web site the files used are normally named as follows ...... "**Master_Ver4_xxxx.HEX" and   "Slave_Ver4_xxx.HEX**"

Now that we understand how it is going to work , we need simply to select the files and send them to the interface box using the boot loader program for in field box re programming !

<p align="center">**Trigger System block diagram**</p>
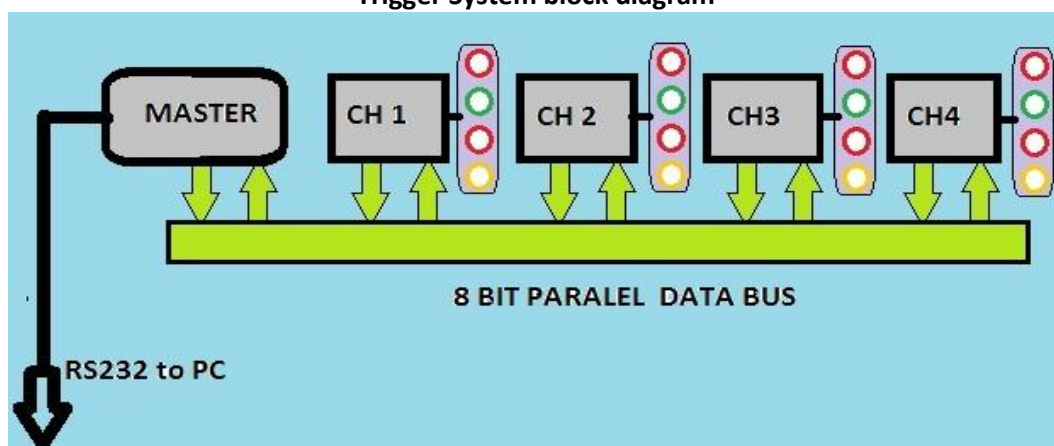
Only the master channel is connected to the outside world by a standard RS232 connection to the PC control software, the other channels are connected to the master via an 8 bit internal data bus.
The Master channel has to re-program itself as well as handle the data for the slaves from the PC.

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STEP ONE
Down load and install the BOOTLOADER package from the software downloads section of the Rovtec Systems Web site   , it would be normal to install this software to the PC that runs the SmarT-Trigger unit.

STEP TWO

Ensure the PC control program that normally runs the SmarT-Trigger is not running and the serial port normally used to communicate with the Interface box, is free for use on the PC.

Ensure the interface box is switched off , and that the serial lead is connected at the rear of the interface box, as for normal trigger box operation.

STEP THREE
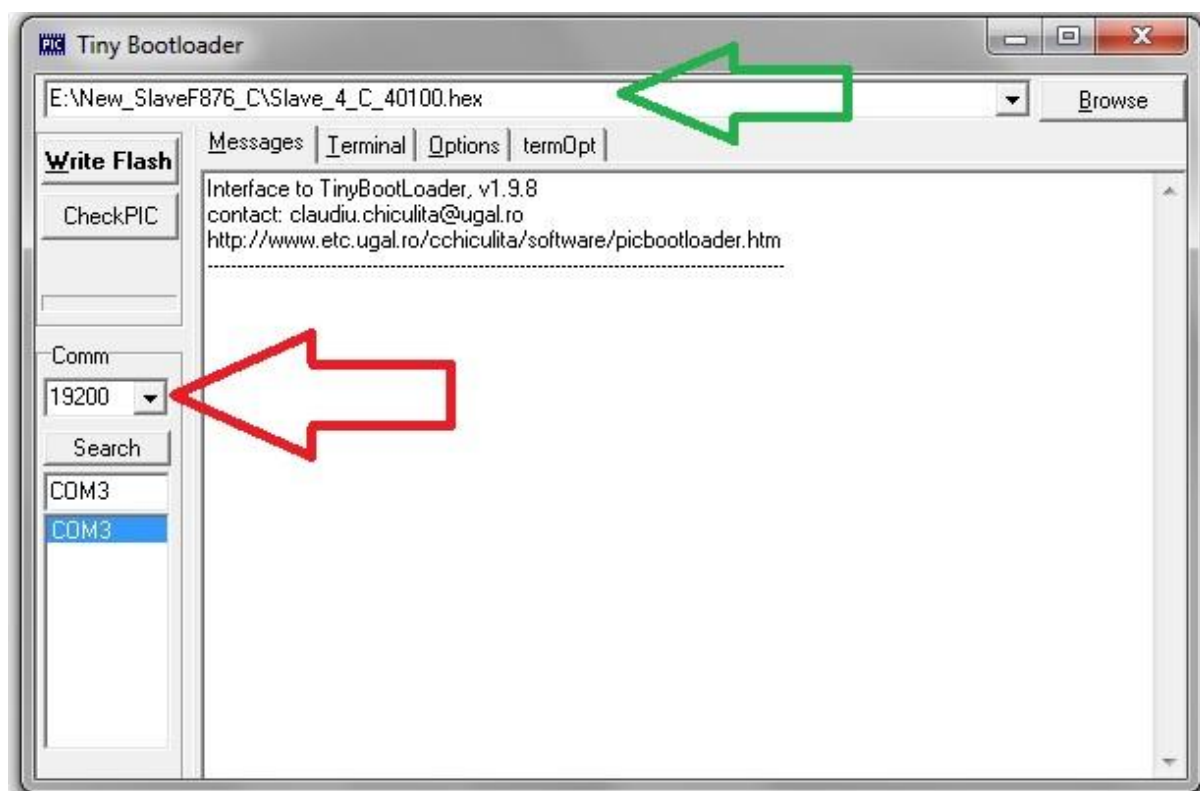
Once the application runs, it will look exactly as shown above. Using the "Browse" Button the user will first select the master hex file from whatever location it has been stored on the PC , and also ensure the com port has been detected (if not press the Search Button) and select the baud rate of 19200 , once these have been selected , the application will save these settings for the next time it runs. Once you are certain the application has the correct Com port selected and the baud rate is set to 19200 then proceed to Step 4.

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STEP FOUR

The most crucial step is to select the correct address of the Chip to send the data to.
From the four application tabs "Message ,Terminal , Options , termOpt" select the OPTIONS tab
and enter the code "30h" into the ID CODE window as seen in the image below .
Do not change any of the other settings on this page with the possible exception of
"Search Delay".
(Delay set for 7 Sec's, the time it spends looking for a PIC after "Write Flash" is pressed)
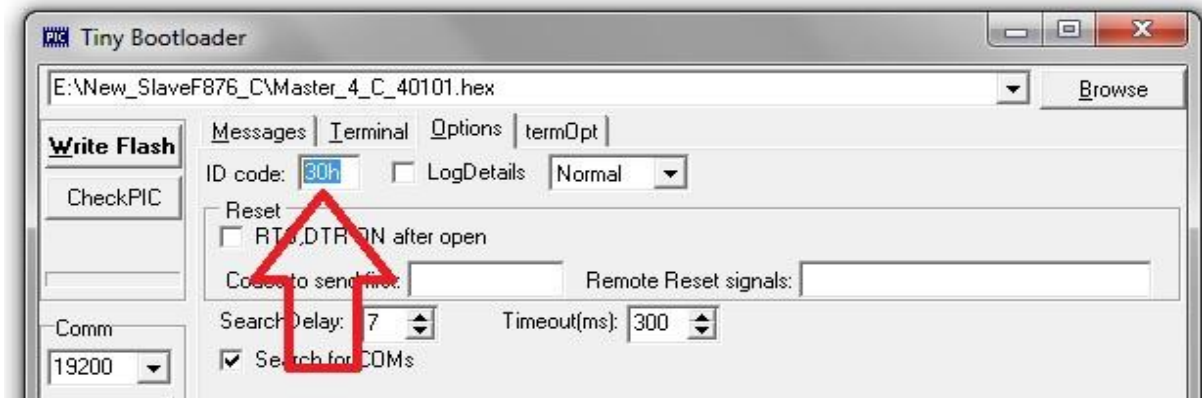
"30h" is the special address for the Master processor , as can be seen above the code selected is a
master hex file version 40101 and this will be sent to the master processor when the "Write Flash"
button is pressed , it is important that all address codes are entered with a small "h" at the end.

STEP FIVE

Press "Write Flash" button and immediately turn on (within seven seconds) the interface box
the message window will show that it is looking for the PIC as seen below   ....
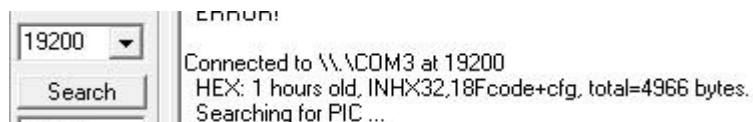
If you have turned the interface box on in time , you will see that it should find a PIC "18F" device

The progress bar of the file download should move towards completion, and the screen will show
after 10-15 seconds, the completion message will appear as below and the interface box will be
observed to boot with all slaves showing the start condition with the flashing extra LEDS (waiting to
be set up)

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STEP SIX

There are only five valid addresses for this boot loader, 30h for the master and 31h for slave 1 and going up to 34h for slave 4 , selecting any other address will not work.

Now select the file for the SLAVE hex file by once again using the "BROWSE" button, and once the salve binary file is selected then you should change the ID code to "31h" for the slave 1 repeat the operation ensuring before your press the "Write Flash" button that the interface box is again switched off , and as soon as you press the "Write Flash" button you switch on the box once more , following this you can select 32h for slave 2 and 33h for slave 3 and 34h for slave 4 leaving the Slave hex file go to each of the four slave processors in turn , each time it should catch and detect a PIC device and program each of the slave processors in turn with similar window message displays as for the master processor shown in the previous steps.

Important to note:

NB: It is of vital importance when upgrading firmware , that all four processors are re-programmed One after the other, and that no slave is left out of the process, holding an older version of firmware. This <u>will</u> lead to erratic operation.

if these six simple steps are followed strictly , taking care to send the correct files to the correct address's , then the operation of box re-programming should be straight forward and not take more than two minutes in total.

Once the new version has been loaded the box should report its new version to the PC the first time it boots, the number can be seen below the Rovtec Sytems logo at the bottom right hand corner of the PC control software screen.

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D Hayes Rovtec-Systems