



Document Name 7K Firmware Loader User Manual
Revision: 1.0

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7K Firmware Loader User Manual

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1.0 Definition

The 7K firmware loader is a software utility that is used to load firmware components into the embedded subsystems of the 7K Sonar. The firmware loader can run on any Windows host equipped with the necessary ports. The target subsystem can be programmed while directly connected to the host via a debug board or through the in-system communication link if the loader is running on the 7-P.

2.0 Software Installation

2.1 Host Computer Requirements

The firmware loader runs on any Windows host. For in-system loading, the host is the 7-P computer. For debug board programming, any Windows machine equipped with the necessary ports will work. The necessary ports include one parallel port and one serial com1 port.

2.2 Retrieving the Loader

The loader is archived under 7K_Firmware_Loader with Visual Source Safe at <\\Multibeam\VSSDatabase\SoftwareEng\7K>.

The loader is archived in the form of a self-extracting installer executable and is named 7K_Firmware_Loader_x.x_install.exe.

2.3 Installing the Loader

The loader is installed by executing the installer file retrieved from archive. A shortcut is automatically placed on the desktop.

2.4 Installing the Xilinx Impact Tool

The Xilinx Impact tool is archived for convenience under 7K_Firmware_Loader with Visual Source Safe at <\\Multibeam\VSSDatabase\SoftwareEng\7K>.

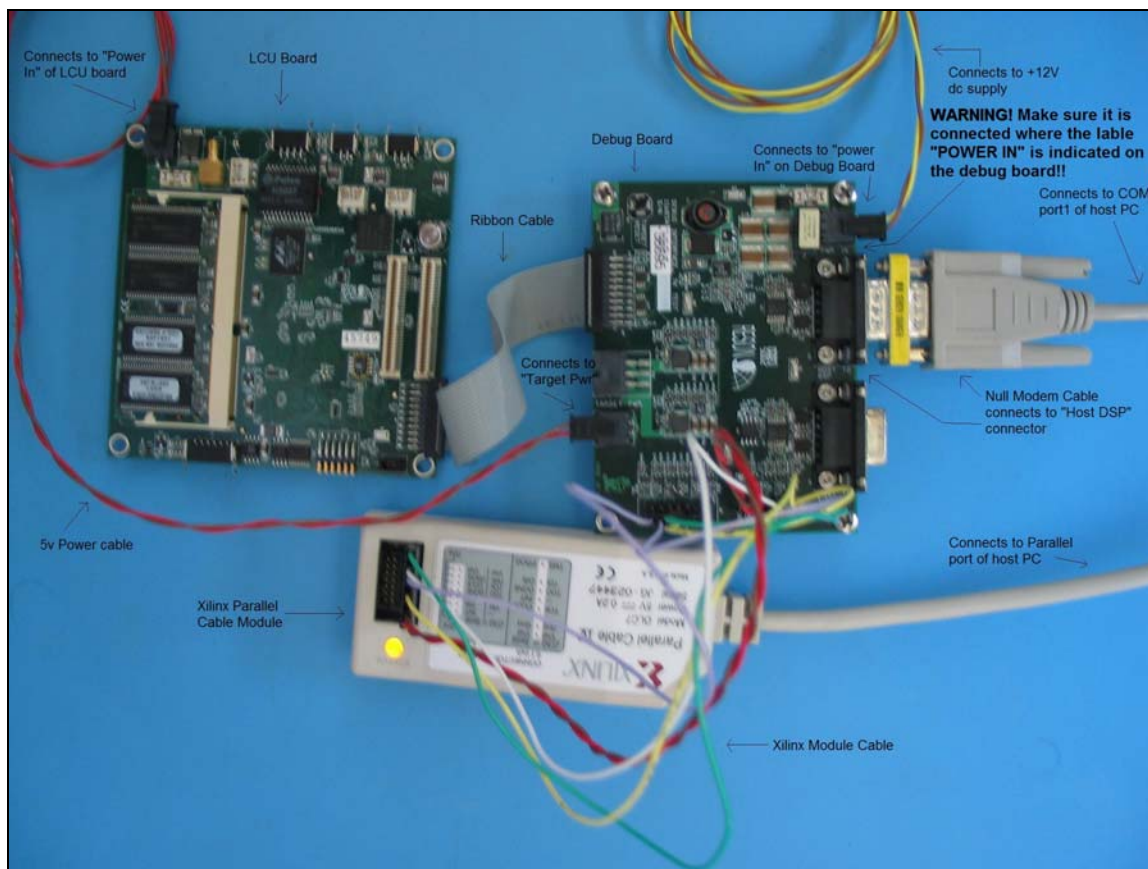
This tool must be installed for the PLD programming function of the loader to work. The file name of the installer is WebPACK_71_fcp_i.exe.

Execute the installer file and follow the instructions on the screen. This step is not necessary if the loader is strictly going to be used for in-system programming.

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3.0 Debug Board Setup

A debug board setup is necessary to program the PLD component and to initialize blank target modules such as newly manufactured modules or modules that have been erased. A debug board setup is necessary to completely erase any previous firmware from a target module. For modules previously initialized it is possible to update all firmware components except for the PLD using the in-system method. No debug board setup is necessary for in-system programming.

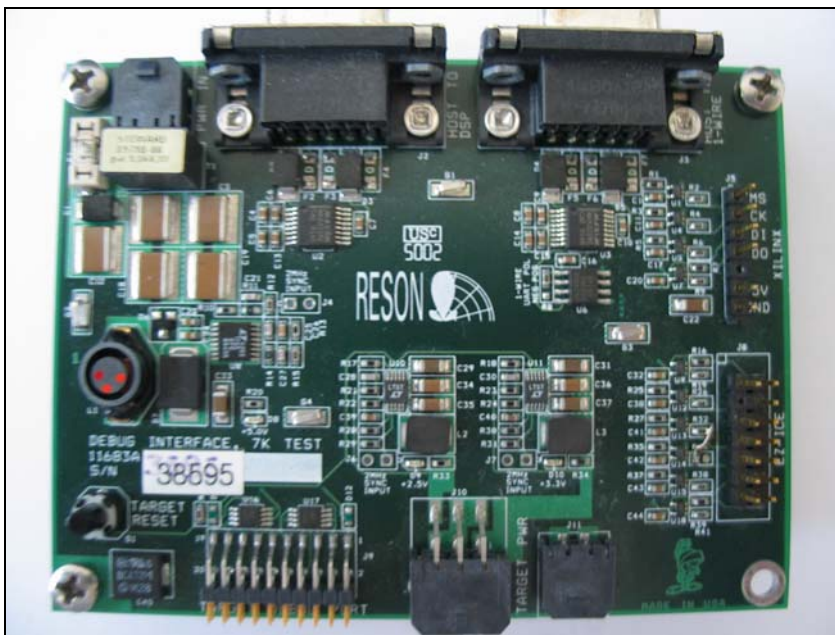


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3.1 Debug Board Description

The debug board is stock item **11683A** from RESON manufacturing. A copy of the schematic (debug_board_11683A.pdf) can be found in the VSS archive under 7125_Firmware_Loader at <\\Multibeam\VSSDatabase\SoftwareEng\7K>.

Notice the 12V inlet connector **J1** in the upper left corner.



3.2 Providing Power to the Debug Board

A 12 V harness feeds the debug board from an external source. It connects to **J1** at the debug board. Beware that there is another receptacle on the debug board that physically accepts the 12 V harness plug.

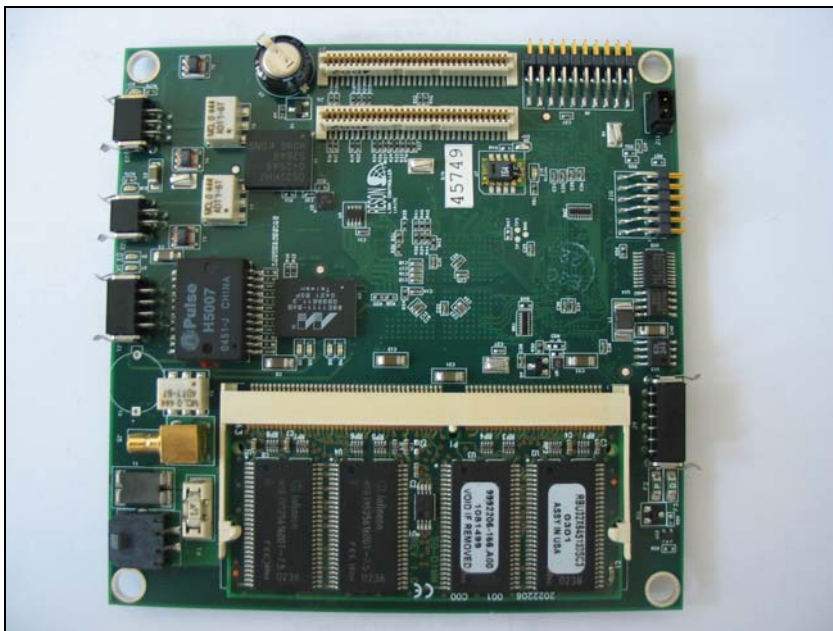
CAUTION: Connecting 12V into the wrong receptacle will destroy the debug board.



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3.3 Target Module

Pictured below is an example of a target module. In this case, a link controller module is shown. Notice the debug header in the upper-right corner and the 5V power inlet at the lower-left corner



3.4 Providing Power to the Target Module

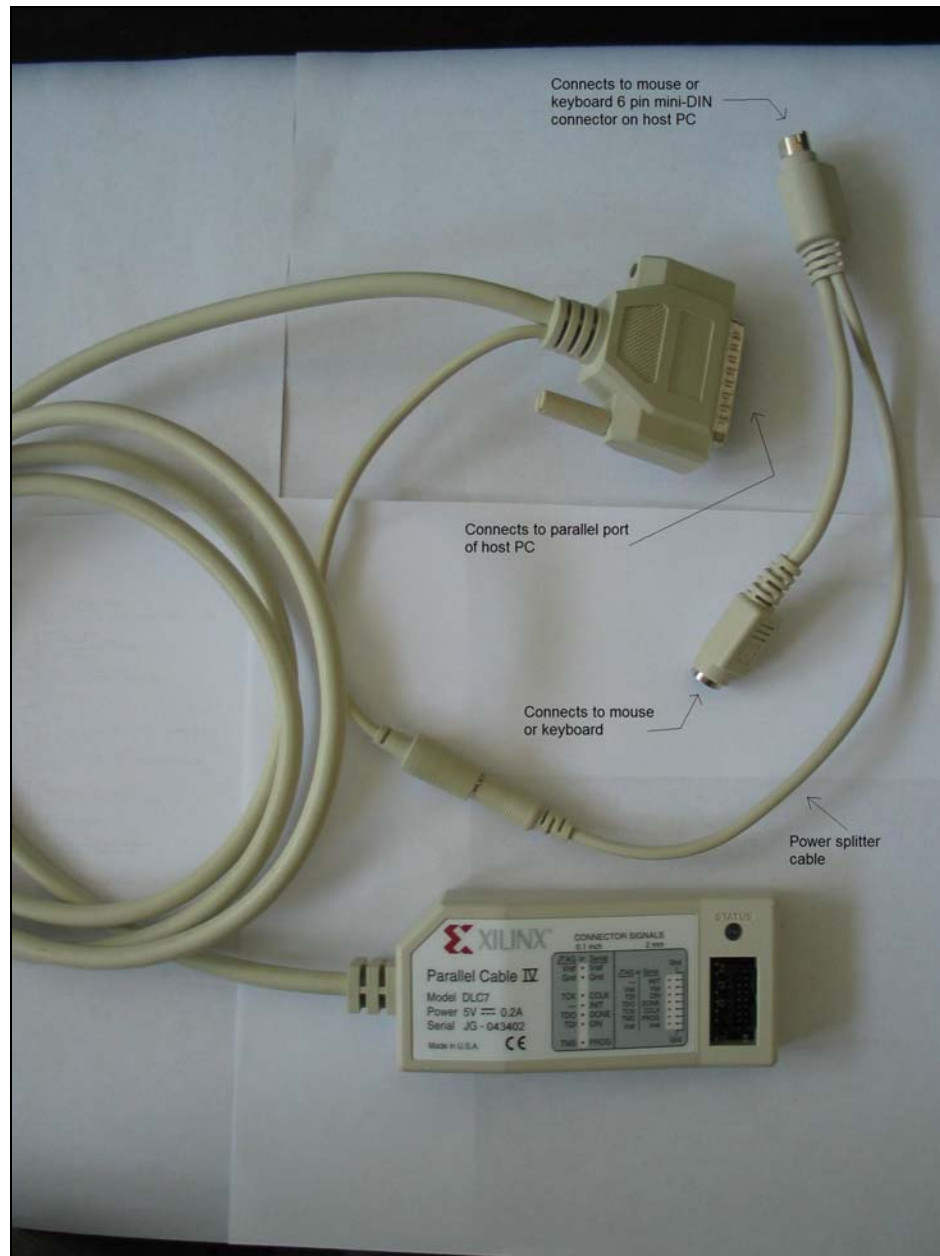
The debug board has a 5V outlet at location **J11**. This can be used to power the LM or LCU target module. Other modules need to be powered externally by other means. A harness such as the one pictured below is used when powering the target directly from the debug board.



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3.5 Xilinx Programming Pod Connection

The Xilinx parallel cable receives its +5V DC power from the mouse or keyboard 6-pin mini-DIN connector on the host PC via a splitter cable.



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3.6 Null Modem Cable Connection

One end of the null modem cable connects at the “HOST DSP” connector on the debug board and the other end connects to COM PORT 1 of the host PC.



3.7 Ribbon Harness Connection

The ribbon harness connects the target to debug board. The harness is connected pin 1 to pin 1.

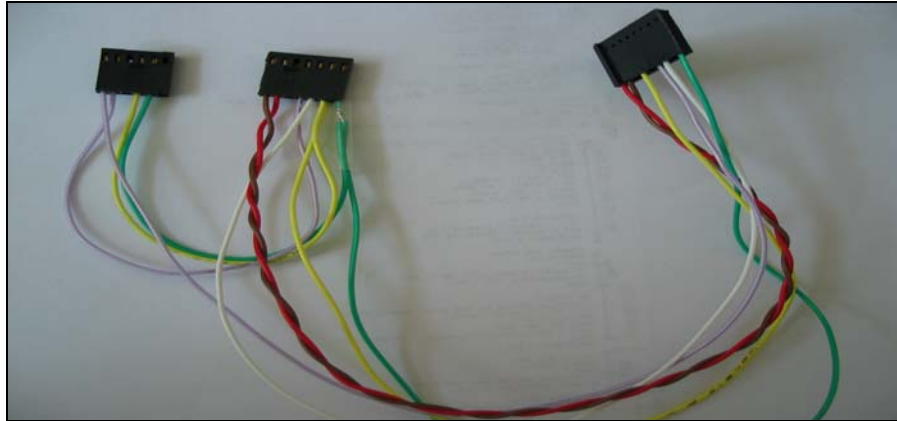


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3.8 JTAG Harness

The JTAG harness is not a stock item and needs to be assembled. A copy of the assembly diagram (debug_board_jtag_harness.pdf) can be found in the VSS archive under 7K_Firmware_Loader at:

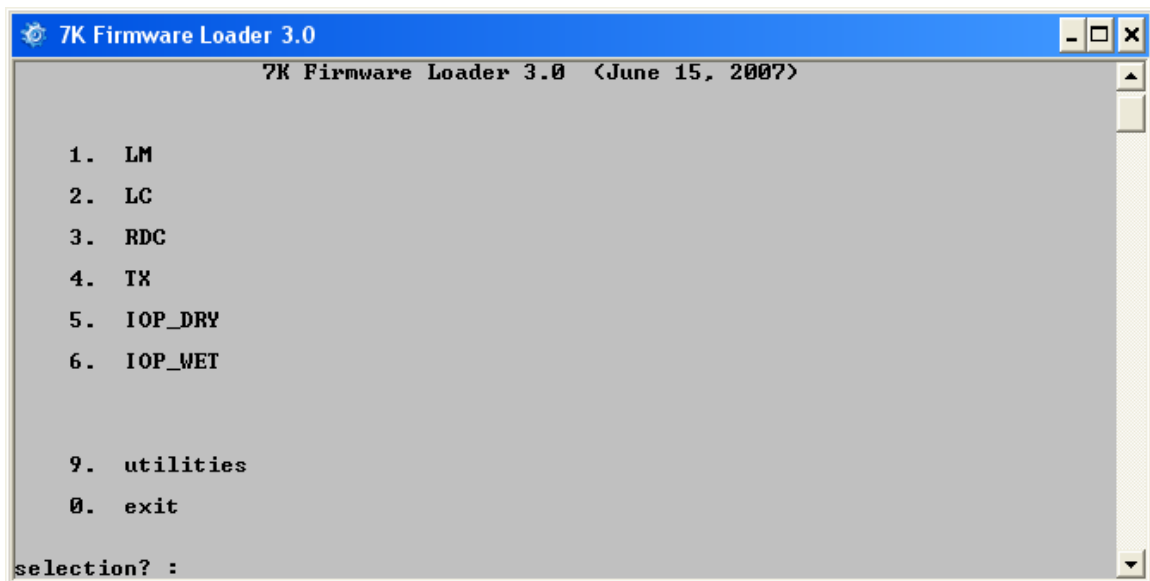
<\\Multibeam\VSSDatabase\SoftwareEng\7K>



4.0 Using the Loader

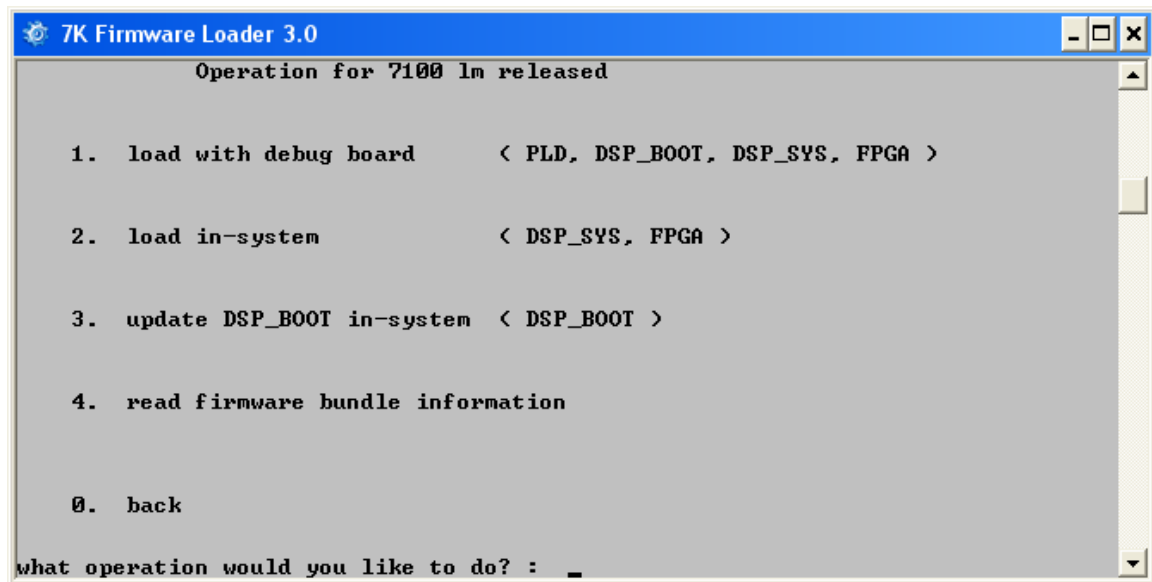
4.1 Main Menu

From the main menu a target module type can be selected for subsequent programming operations or one of the utility menus can be selected to get to functions other than regular programming.



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4.2 Programming Operations



4.2.1 Loading with the Debug Board

Loading with the debug board completely erases the flash and the cPLD and loads all firmware components for the selected module.

4.2.2 Loading In-System

Loading in-system only loads the DSP system and FPGA components. These are functionality-rich components and are the ones most likely to be in need of updates in the field from time to time.

4.2.3 Updating DSP Boot In-System

It is also possible to update the DSP boot component in-system. However, this is not likely to be required very often (if ever) and is kept as a separate operation from the DSP_SYS /FPGA in-system load operation. It is preferable not to do this unnecessarily since there is a very small, but potential, risk of boot sector corruption associated with this operation.

4.2.4 Reading firmware bundle operation

This operation can be used to read any release not files associated with each of the firmware component directories. It is also used to find out the path and name of the selected bundle.

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4.3 Test Utilities



4.3.1 Viewing COM1 Output

This function opens a terminal window to the com 1 host port, which in turn is connected to the debug UART of the target module's DSP through the null modem cable. Selecting this option and then pressing the reset button on the debug board will cause the DSP to reboot and print out greeting information that identifies revision number of the firmware components.

4.3.2 Sending Ping Commands with the Debug Board

This function sends 12 ping-all commands to the debug UART port of the target DSP. If the later is running, the red LED should toggle for each ping received.

4.3.3 Sending Ping Commands In-System

This function sends 12 ping-all commands in-system. All connected downstream modules should toggle their red LED as a result. This is a good way of inquiring into the health of downlink connectivity and of DSP running state in general.

4.3.4 Last operation log

This function opens a window on a detailed log of the last operation.

4.3.5 Turning debug on/off

This function used with the debug board sends a debug command to the DSP, opens a terminal window and prints out all commands received by the DSP.

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