

The Macraigor GNU Tools Suite (MGTS) is an implementation and packaging of several of the open-source GNU tools and utilities along with a program called OcdRemote that provides an interface between the GDB debugger and a Macraigor On-Chip debug device. The GNU packages that are included with the MGTS are: binutils (version 2.18), gcc (version 4.3.2), and gdb (version 6.8). Macraigor provides two versions of the gdb debugger: *-elf-gdbtui which has a simple text windowed user interface, and *-elf-gdb with the standard gdb command line interface. Our pre-built Eclipse project examples show how to integrate *-elf-gdb into the free, open-source Eclipse 3.5 (Galileo) IDE. Taken together, these tools and the Eclipse framework provide a complete environment for cross development targeted at several families of embedded processors. Macraigor distributes versions of the MGTS for the following processors:

- ARM (ARM7/9/11/Cortex)
- ColdFire
- MIPS (32 and 64 bit)
- PowerPC
- XScale
- X86

This document gives instructions for installing and configuring the MGTS and Eclipse Galileo so that a Macraigor JTAG/BDM device can be used as the debug connection to the target processor. Under Windows, the following Macraigor devices are supported with this environment:

- Wiggler (windows only)
- Raven (windows only)
- usb2Demon
- usb2Sprite
- usbWiggler
- mpDemon

In addition to the tools and development environment, Macraigor also supplies pre-built Eclipse projects for many industry-standard evaluation boards. These projects provide a simple way to get the cross-development environment up and running on actual hardware. The user can then modify and expand these demos to work with other target hardware and more complex application development.

2. Required Components

There are several components that must be present or downloaded and installed on your host PC in order to get the Macraigor GNU Tools Suite working with Eclipse 3.5 (Galileo). All of the following components (except the Java Runtime) are either available from the Macraigor web site (www.macraigor.com/eclipse) or from links found there. The versions of these components that Macraigor posts on their web site have been tested and are known to work together. If you want to try using a newer or alternate version of any of these components, Macraigor will be unable to assist you if something doesn't work properly.

WINDOWS/VISTA 32/Windows 7 32 HOST :

The Windows/Vista 32/Windows 7 32 host required components are as follows:

- 0. Cygwin environment**
- 1. GNU C/C++ compiler, GDB and utilities for your target processor**
- 2. Macraigor OCDRemote**
- 3. SUN Java Runtime**
- 4. Eclipse 3.5 (Galileo) IDE for C/C++ Developers (bundled with CDT 5.0) + Plug-ins used by Macraigor JTAG Devices**

Installation of each component is explained in detail in the following sections.

2-0 (Windows) Cygwin Environment


Cygwin is a free package that provides a Linux-like environment under Windows. This environment is required in order to run the gnu compiler, debugger and the Macraigor OCRemote interface. Go to www.cygwin.com and select the “Install or update now! (using setup.exe)” link, download/run setup.exe and make the following choices in the “Cygwin Setup” dialogs:

1. Choose Installation Type : Select “Install From Internet”
2. Choose Installation Directory : Specify: Root Directory : “c:\cygwin”, Install For : All Users, Default Text File Type : unix/binary
3. Select Local Package Directory: Specify : “c:\”
4. Select Connection Type : Specify your Internet connection type
5. Choose download sites : Select a site to download from

6. Select Packages :


a) Expand the “Devel” category by clicking on the “+” sign then scroll to:

- “make : The gnu version of the make utility”

click the arrows icon  to replace "skip" with a version number

b) Expand the “Libs” category by clicking on the “+” sign, scroll to:

- “expat: XML parser library”
- “libexpat0: XML parser library written in C”,
- “libgmp3 : Run time Library for GMP arbitrary precision arithmetic”
- “libmpfr1: A library for multiple precision floating point arithmetic with exact rounding”

Click the arrows icon  to replace “skip” with their version numbers.

Clicking the NEXT button in the "Select Packages" dialog box will start the Cygwin Installation.

7. Once Cygwin is installed, open a Cywin bash shell window (by clicking the Cywin icon on your desktop) and enter the following command:

```
chmod -R a+w /usr/local
```

This command makes the /usr/local directory (and it's subdirectories) write-able so we can install our software packages there.

2-1 (Windows) GNU C/C++ compiler, GDB and Utilities

Macraigor provides pre-built, installable builds of the gnu tools suite (gcc, binutils, and gdb) for cross-development with several families of target processor, including ARM (which also works for Intel XScale), i386 (for Intel Atom), MIPS, M68K (which works for Coldfire processors) and PowerPC. The tools for each architecture are packaged separately. Choose the appropriate package from the following links:

ARM: <http://www.macraigor.biz/gnu/gnutools-arm-elf-4.4.3.exe>

M68K: <http://www.macraigor.biz/gnu/gnutools-m68K-elf-4.4.3.exe>

MIPS: <http://www.macraigor.biz/gnu/gnutools-mips-elf-4.4.3.exe>

PowerPC: <http://www.macraigor.biz/gnu/gnutools-powerpc-elf-4.4.3.exe>

X86: <http://www.macraigor.biz/gnu/gnutools-i386-elf-4.4.3.exe>

and download and install the tools for your target processor. Note that all of these packages can coexist, so feel free to install all the versions of the tools that you might need for various projects.

2-2 (Windows) Macraigor OCDRemote

In order to connect the gdb debugger to a target processor using a Macraigor JTAG or BDM interface device, a utility called OCDRemote is required. This utility starts up and listens on a TCP/IP port for a connection from gdb and then translates gdb commands into JTAG/BDM actions for the target processor using the Macraigor hardware interface device. Go to

http://www.macraigor.biz/gnu/hw_support_8.9.exe

download and install the OCDRemote Hardware Support Package. This installation package also includes several Macraigor utilities that can be helpful in debugging and correcting connection issues when using Eclipse and the gnu tools. These utilities are:

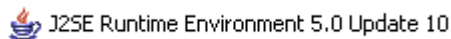
- OCDCommander – a low-level, assembly-only debugger that can be used to check proper connection of a Macraigor JTAG/BDM interface to the target processor.
- usbDemon Finder – a utility to detect and license Macraigor USB interface devices that are connected to the host PC.
- JTAG Scan Chain Analyzer – a utility that attempts to analyze a JTAG scan chain and determine the number of devices present and the identity of any processors that are found.
- DccTerminal – a terminal emulator that when configured with the TCP/IP address/port of an ocdremote Debug Communion Port lets the user send/receive ascii data to to/from and application running on the debug target

These utilities will be available to launch directly from within Eclipse once the environment has been correctly configured.

Installing this package will also create the demo Eclipse projects that will be used later. These files will be placed, by default, into \Program Files\Macraigor Systems\EclipseDemos.

2-3 (Windows) SUN Java Runtime

The Eclipse IDE is written entirely in JAVA and requires that the Java Runtime Environment (JRE) be installed on the host computer. Many Windows hosts already have the JRE installed. You can check for an installed JRE by looking in the Windows Control Panel under “Add or Remove Programs”. If the JRE is installed, there will be an entry here that looks like the following:



If you do not have the JRE installed, it can be obtained for free from www.java.com. Follow the directions to download and install the software and then check again under “Add or Remove Programs” to be sure that the J2SE Runtime Environment is available.

LINUX (Fedora Core 4–12) HOST :

The Linux host required components are as follows:

- 1 GNU C/C++ compiler, GDB and utilities for your target processor**
- 2. Macraigor OCDRemote**
- 3. SUN Java Runtime**
- 4. Eclipse 3.5 (Galileo) IDE for C/C++ Developers (bundled with CDT 6.0.2) plug-ins used by Macraigor JTAG Devices**

Installation of each component is explained in detail in the following sections.

2-1 (Linux) GNU C/C++ compiler, GDB and Utilities

Macraigor provides pre-built, installable builds of the gnu tools suite (gcc, binutils, and gdb) for cross-development with several families of target processor, including ARM (which also works for Intel XScale), i386 (for AMD embedded processors), MIPS, M68K (which works for Coldfire) and PowerPC. The tools for each architecture are packaged separately. Choose the appropriate package from the following links:

ARM: <http://www.macraigor.biz/gnu/mcgr-arm-gnutools-4.2-0.i386.rpm>

x86: <http://www.macraigor.biz/gnu/mcgr-x86-gnutools-4.2-0.i386.rpm>

MIPS: <http://www.macraigor.biz/gnu/mcgr-mips-gnutools-4.2-0.i386.rpm>

M68K: <http://www.macraigor.biz/gnu/mcgr-m68k-gnutools-4.2-0.i386.rpm>

PowerPC: <http://www.macraigor.biz/gnu/mcgr-powerpc-gnutools-4.2-0.i386.rpm>

to download the tools for your target processor. Note that all of these packages can coexist, so feel free to install all the versions of the tools that you might need for various projects. Users on Fedora systems typically download rpm files into the /usr/src/redhat/RPMS/i386 directory. They then cd to this directory and use the following command to install the tools contained in the rpm file:

```
rpm -i mcgr-<cpu type>-gnutools-4.2-0.i386.rpm
```

NOTE: The command “rpm -e mcgr-<cpu type>-gnutools-4.2.0” uninstalls these packages/

These rpm files install the gnutools into /usr/local/bin.

2-2 (Linux) Macraigor ocdremote

In order to connect the gdb debugger to a target processor using a Macraigor JTAG or BDM interface device, a utility called ocdremote is required. This utility starts up and listens on a TCP/IP port for a connection from gdb and then translates gdb commands into JTAG/BDM actions for the target processor using the Macraigor hardware interface device. It also can be configured to set up

ARM7/9/Xscale Data Communication Channel ports that let an external program such as DccTerminal send and receive data packets to/from target via the JTAG DCC channel.
Download:

<http://www.macraigor.biz/gnu/mcgr-hwsupport-8.4-0.i386.rpm> (Linux 32)

http://www.macraigor.biz/gnu/mcgr-hwsupport-8.1-0.x86_64.rpm (Linux 64)

into \$HOME/Download. “cd” to this directory and install the the

mcgr-hwsupport<version>.rpm package with the following command:

```
rpm -i mcgr-hwsupport-8.1-0.i386.rpm.
```


NOTE : The command “rpm -e mcgr-hwsupport-8.1-0” uninstalls all of the mcgr-hwsupport software and drivers.

This installation package also includes several Macraigor utilities that can be helpful in debugging and correcting connection issues when using Eclipse and the gnu tools. These utilities are:

- OCDCCommander – a low-level, assembly-only debugger that can be used to check proper connection of a Macraigor JTAG/BDM interface to the target processor
- OcdCommander.jar – a java (and therefore more Linux friendly) version of the OCD Commander.
- usbDemon Finder – a utility to detect and license Macraigor USB interface devices that are connected to the host PC.
- JTAG Scan Chain Analyzer – a utility that attempts to analyze a JTAG scan chain and determine the number of devices present and the identity of any processors that are found.
- DccTerminal – a terminal emulator that when configured with the TCP/IP address/port of an ocdremote Debug Communion Port lets the user send/receive ASCII data to/from an application running on the debug target
- ErasePIC32 – utility used to erase the PIC32 CPU’s on-board FLASH memory.

These utilities will be available to launch directly from within Eclipse once the environment has been correctly configured.

Installing this package will also create the demo Eclipse projects that will be used later. These files will be placed, by default, into \usr\local\macraigor\EclipseDemos.