# **GNAT Cross Compiler Installation for M68020**

Here’s a simple, step-by-step guide for setting up an M68020 cross-compilation toolchain on a Windows machine. We’ll use MinGW with Cygwin to make this as straightforward as possible.

## **Step 1: Install Cygwin**

1. Download Cygwin:

* Go to Cygwin’s website and download the installer (setup-x86\_64.exe).

1. Install Cygwin:

* Run the installer.
* During installation, select a download mirror close to your location.
* When prompted to select packages, search for and add the following:
* Devel → gcc-core (GCC compiler)
* Devel → gcc-g++ (G++ compiler)
* Devel → make (Make utility)
* Devel → binutils (Assembler and linker)
* Devel → libgmp-devel (GMP library)
* Devel → libmpfr-devel (MPFR library)
* Devel → libmpc-devel (MPC library)
* Devel → texinfo (Texinfo documentation)
* Complete the installation.

## **Step 2: Download the Toolchain Source Code**

1. Download Binutils:

* Visit the GNU Binutils download page and get the latest stable version.

1. Download GCC:

* Go to the GCC website and download the GCC source code that includes Ada (gnat) and C.

## **Step 3: Build and Install Binutils**

1. Open Cygwin Terminal:

* Navigate to the directory where you downloaded the binutils source:

*cd /cygdrive/c/your/download/directory*

1. Extract Binutils:

*tar -xvf binutils-<version>.tar.gz*

*cd binutils-<version>*

1. Configure and Build Binutils:

* Create a build directory:

*mkdir build-binutils*

*cd build-binutils*

* Run the configuration command:

*../configure --target=m68020-elf --prefix=/opt/m68020-toolchain --disable-nls --disable-werror*

* Build and install:

make

make install

## **Step 4: Build and Install GCC**

1. Extract GCC:

* Go to the directory where you downloaded the GCC source:

*cd /cygdrive/c/your/download/directory*

*tar -xvf gcc-<version>.tar.gz*

*cd gcc-<version>*

1. Configure and Build GCC:

* Create a build directory:

*mkdir build-gcc*

*cd build-gcc*

* Run the configuration command:

*../configure --target=m68020-elf --prefix=/opt/m68020-toolchain --enable-languages=c,ada --without-headers --disable-nls --disable-libssp --disable-shared --disable-threads --disable-multilib*

* Build and install:

*make all-gcc*

*make install-gcc*

## **Step 5: Add the Toolchain to the System PATH**

1. Add to PATH:

* In the Cygwin terminal, run:

*export PATH=/opt/m68020-toolchain/bin:$PATH*

* Alternatively, add this path permanently by editing your .bashrc or .bash\_profile file.

## **Step 6: Verify Installation**

1. Check the Toolchain:

* Run the following command to ensure everything is set up correctly:

*m68020-elf-gcc --version*

* If successful, this will display the GCC version for the M68020 architecture.

## **Step 7: Compile Your Ada Code**

You can now compile your Ada "Hello World" program using the cross-compiler:

*m68020-elf-gnatmake hello.adb*

## **Summary**

This step-by-step guide walks you through installing and setting up an M68020 cross-compilation toolchain on Windows using Cygwin. By following these steps, you can compile Ada programs for the M68020 architecture on your Windows machine.