Series 32000/EP™

GNX Version - 4.4

C Optimizing Cross-Compiler and Language Development Tools for MS-DOS®

Release Letter

PREFACE

This Release Letter describes the GNX Version 4.4 C Optimizing Cross-Compiler and Language Development Tools package for MS-DOS. Included are a general description of the tools, the installation procedure, and a list of known software limitations.

This Release Letter should be saved for future reference.

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1. GENERAL DESCRIPTION

Version 4.4 of the GNX C Cross-Compiler and Language Development tools for MS-DOS is a new port of the GNX Version 4.4 development tools. National Semiconductor's tools are also available for various kinds of UNIX-based workstations, as well as for VAX/VMS.

The GNX tools require a 386 or 486-based PC, running MS-DOS 3.3, 4.01 or 5.0. At least 11 Mbytes of hard disk memory, are required to install the software. While you can run the GNX tools with 4 Mbytes of main memory, it is recommended that 8 Mbytes are installed.

The release is compatible with the other ports of the GNX Version 4 tools. This Release Letter assumes that you are familiar with the GNX Version 4 reference manuals.

National Semiconductor's Series 32000 GNX Language Tools are a set of software development tools for the *Series 32000/EP*™ microprocessor family. The GNX Language Tools implement AT&T's Common Object File Format (COFF) with extensions by National Semiconductor.

DBUG, the GNX debugger, currently supports the following target systems:

- NSV-FX-CG-EDB, NSV-CG160-EDB, NSV-GX32-EDB, NSV-GX320-EDB, NSV-FX16-FAX-EDB, AM160-EDB, FX164-EDB and CG160LX-LBP evaluation boards.
- HP64772, HP64778 and HP64779 Hewlett Packard In-System Emulators.

National Semiconductor's C Optimizing Cross-Compiler is an advanced optimizing compiler for the *Series 32000/EP*™ microprocessor family.

The C Optimizing Compiler implements the C language as described in the *Programming Language* by Kernighan and Ritchie. It also implements most of the important features in the ANSI C standard such as function prototypes, const and volatile type qualifiers, and the signed keyword. The compiler is fully compatible with the System V C compiler, a compiler derived from the portable C compiler (pcc). In addition, the C Optimizing Compiler includes important extensions for programming embedded applications such as ASIS (Application Specific Instructions) support, interrupt/trap handling in C, and asm statements. For more information refer to the GNX Version 4 C Optimizing Compiler Reference Manual.

2. RELEASE PACKAGE CONTENTS

Part Number	Description
433511225-001 to 433511225-005	Five high density 3 1/2 inch floppy disks labeled "NSW-ASMC-4-BDOS GNX 4.4 Version C + Assembler Package".
424310758-001	Series 32000 Programmer's Reference Manual.
424010497-004	GNX - Version 4 Assembler Reference Manual.
424010507-004	GNX - Version 4 COFF Programmer's Guide.
424010???-004	GNX - Version 4 Commands and Operations Reference Manual
424010516-004	GNX - Version 4 C Optimizing Compiler Reference Manual
424010506-004	GNX - Version 4 Linker User's Guide.
424010508-004	GNX - Version 4 Support Libraries Reference Manual.
424511103-004	GNX - Version 4 Symbolic Debugger (DBUG) Reference Manual.
420510716-004	Development Board Monitor Reference Manual.
424511080-001	NS32CG16 Printer/Display Processor Programmer's Reference Supplement.
419308225-001	The C Programming Language by B.W. Kernigham and D. M. Ritchie
433511225-001	This release letter.

The major software components of this package are:

Name	Description
nmcc.exe	The GNX C Optimizing compiler
nasm.exe	The assembler for GNX assembly language source code.
nmeld.exe	The linker that resolves references between object files and library routines and assigns relocatable addresses to produce *Series 32000/EP* executable files.
nar.exe	The archiver that stores objects in a library for convenient retrieval by the linker.
ncpp.exe	The C preprocessor.
nburn.exe	A PROM programming utility.
nsize.exe	A utility for displaying the size of different sections within a GNX object or executable file.
nstrip.exe	A utility to remove symbol table information from a GNX object or executable file.
nnm.exe	A utility to display the symbol table of a GNX object or executable file.
ncmp.exe	A utility to compare two GNX files.
gts.exe	A menu driven program that constructs a target configuration file.
dbug.exe	A program for downloading and debugging GNX code on *Series 32000/EP* Development Boards, or the HP64772/8/9 In-System Emulator.
sprof.exe	GNX Source level profiler
gx32ed, gx320ed, cg16ed, cg160ed, fx16fax, am160ed, cg160lx, cmon	Monitors for the *Series 32000/EP* Development Boards.
cfig386.exe, switches.doc	Phar Lap configuration utility and documentation.
lib/libm.a, lib/libxm.a, lib/lib381m.a, lib/lib381xm.a, lib/libhm.a	Math libraries for GNX programs.
lib/libhfp.a	A High Performance Floating-Point Emulation library.

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Name	Description
lib/libfpe.a, lib/libxfpe.a	Floating-Point Emulation and Enhancement (FPEE) libraries to support floating-point operations.
lib/libc.a, lib/libxc.a, lib/libhc.a	A C routine library for *Series 32000*/EP based target boards.
lib/cc_fe.exe	GNX C Compiler front end.
lib/opt.exe	GNX common optimizer
lib/cgen_cof.exe	GNX common code generator
lib/libctp.a, lib/libxctp.a, lib/libhctp.a	GNX compiler libraries
lib/pgen.exe	A tool which generates information used by the GNX source level profiler.
lib/pfb_exit.o, lib/xpfb_exi.o	_exit routines - customized version for profile information gathering.
include/ns32000.h, include/cg16.h, include/gx320.h	ASIS include files.

3. INSTALLATION PROCEDURE

At least 11 Mbytes of disk space are required to install the GNX software.

3.1 INSTALLING THE PACKAGE

1. Insert disk #1 of the **NSW-ASMC-4-BDOS** GNX 4.4 Version into the appropriate disk drive.

2. Select this drive (e.g., B: <ENTER>)

3. Enter the command:

        install

4. Carry out the installation procedure as instructed by the interactive install program.

   Install will carry out the following tasks:
   * check for correct operating environment.
   * copy the GNX software to the directory you select within the program.
   * verify that the GNX software has been copied correctly.
   * optionally, change the path variable and set the GNXDIR variable in the autoexec.bat file to include the directory in which the GNX software has been installed.

The software package is now installed in the selected directory.

If, after you reboot the system and the updated autoexec.bat file is executed, the error message

        out of environment space

is issued, there is insufficient environment space available. You should increase the environment space available for your command. For example, to set the environment space to 1024 bytes put the line:

        shell = c:command.com /p /e:1024

in your config.sys file.

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3.2 BUILDING DBUG'S SERIAL I/O CONNECTION TO TARGET

If you are using DBUG for remote debugging through a serial I/O port, no special arrangements are needed. However, you should ensure that there is no inconsistency between the DBUG connection parameters and the board or HP emulator.

You should also ensure that DBUG and the remote board are both set to work with the same baud rate.

3.2.1 Installation for the HP 64772/8/9 ISE Using Serial I/O

1. Connect a serial line from the host to the emulator's port A.

2. Set all switches in the rear of the emulator to 0.

3. Disable the local echo by setting switch S8 to 1.

4. Enable Xon/Xoff protocol by setting switch S13 to 1.

5. Use switches S1 - S3 to change the default baud rate (default is 9600 baud with all three switches set to 0). Refer to the *HP 64700 Emulators Overview/Installation/Support Manual* for additional details.

NOTE: The emulator must be turned OFF and then ON after changing any switch settings in order for these changes to be recognized by the emulator's firmware emulator.

3.3 INSTALLING PC/TCP NETWORK SOFTWARE

If you intend to connect your target board through Ethernet, you must install the Pathway Client NFS package (Version 1.1 or higher) from Wollongong. The NSID for this package is NSW-TCPIP4-BDOS.

3.3.1 Configuring Your IBM/PC to Operate with Ethernet

1. Install the 3COM controller card (Ethernet Link II™, Part Number 3662-00).

2. Install the Pathway from Wollongong - Client NFS package Version 1.1 or higher. This includes the installation of the Drivers and the Kernel.

Drivers Installation:

1. Insert the Drivers diskette into drive A and type:

   ```
   a:
   pwinstal C:
   ```

2. For thick Ethernet installation, add the line:

   ```
   3c503 -T:0 -I:5 -D:1
   ```

   to the `autoexec.bat` file.

   For thin Ethernet installation, add the line:

   ```
   3c503 -T:2 -I:5 -D:1
   ```

   to the `autoexec.bat` file.

3. Add `c:\pathway` to your path in the `autoexec.bat` file.

Kernel Installation:

1. Insert the Kernel diskette into drive A and type:

   ```
   a:
   pwinstal C:
   ```

2. Reboot your PC.

3. Run the CUSTOM program with the command: `custom`

   Set the PC Internet address (option 1).

   Update the network physical- address-translation-cache with your board Internet and Ethernet addresses (enter 6 in the program customization menu and then enter 2).

   Exit and save CUSTOM settings (option 9).

4. Add the line `pwtcp` to the `autoexec.bat` file.

5. Reboot your PC.

6. Add the board and PC names, and the Internet address, to the file `c:\pathway\hosts`

For example:

```
139.187.218.2   pc21
139.187.218.3   fx11
```

7. Test your PC and Board connection using the PING command:

```
ping boardname
```

Refer to the *Pathway Client NFS Installation Guide* for further information.

3.4 BUILDING DBUG'S ETHERNET CONNECTION TO TARGET

If you plan to use DBUG for remote debugging via Ethernet, the following steps must be taken to complete the DBUG and remote target connection:

3.4.1 Hardware Installation of the Series 32000 Development Board

1. Install the Version 4.4 monitor PROMs on your development board.

2. Install the Ethernet controller card (Ethernet Link II™, Part Number 3662-00) on the development board and connect it to your LAN.

3. Set the I/O jumper on the 3COM board to 300.

4. Disable the memory jumper on the 3COM board.

5. Configure the board to the appropriate PROM size (refer to your board reference manual).

6. Configure the board jumpers or DIP switches to Ethernet connection (refer to Appendix A of the *Series 32000 Development Board Monitor Reference Manual*)

3.4.2 Installation of HP 64700 Emulator for Use With LAN Interface

The HP 64700 Series Emulator must be configured with certain network parameters before it can operate on the LAN. These network parameters are held in nonvolatile memory within the HP 64700 Series Emulator. The following is a description of setting the Emulator LAN parameters via the terminal interface. For further information, see *HP 64700 Series Installation/Service/Support Manual*.

To configure LAN parameters via the Terminal Interface:

1. Set all the rear-panel switches to the down position. This will make the HOST port the active port, running at 9600 baud as a DCE.

2. Connect an ASCII terminal to the host port with a 25-pin RS-232-C cable.

3. Turn on the HP 64700 Series Emulator.

4. Type lan and press <return>, You should see the current LAN configuration values.

5. Assign an Internet address to the HP 64700. This address should be supplied by your LAN administrator.

   For example, to assign the Internet address 192.6.94.2 to the HP 64700 emulator, enter:

   ```
   R>lan -i 192.6.94.2 <return>
   ```

   The Internet address, and any other LAN parameters, are stored in nonvolatile memory in the HP 64700 LAN interface. The address you assign will remain the Internet address until a new lan -i command is issued. Turning off the power to the emulator does not change the Internet address

6. Set S16 to ON.

   Set S15 to ON, if you use the AVI connection.

4. COMPATIBILITY ISSUES

This package has been developed and tested on an IBM/PC running MS-DOS 3.3 and MS-DOS 5.0. This package can also be installed and used on an IBM/PC running MS-DOS 4.01 operating system.

All the GNX tools run in the enhanced mode of MS-Windows® Version 3.1.