



COP8 OTP/ROM PROTOTYPING KIT

QUICKSTART MANUAL for COP8-PRO-COB1

INTRODUCTION

The COP8-PRO-COB1 Prototyping Kit provides a low cost, easy-to-use environment for quickly starting the development and debugging of COP8 OTP/ROM applications.

The development environment includes a Windows IDE, with COP8 Assembler, Linker, Librarian, Instruction Simulator, and COP8 Code Generator and C-Compiler demos. Use the comprehensive documentation and sample source code to quickly develop and simulate your application.

Download your code to any COP8 OTP/EPROM programmer for updating the COP8 device on the COBALT (COP8 Breadboarding and Learning Tool) Prototyping/Target board for 10MHz real-time execution and pin probing. Or you can skip the OTP/EPROM device, and download to an optional COP8 Emulator for real-time debugging.

The COBALT Prototyping Target board accommodates all the hardware necessary to prototype, test, and debug a wide variety of applications. It can also be used as your final target environment, enclosed in an optional enclosure.



COP8-PRO-COB1 OTP/ROM Prototyping Kit

Includes:

- COP8 COBALT Target Board with 10MHz crystal
- Socketed COP8SGR740Q3 Windowed Sample
- COP8-NSDEV Development CD
- QuickStart Manual
- COBALT User's Manual

SOFTWARE INSTALLATION

The enclosed CD contains the COP8 IDE tools, and other COP8 tools and demos, app notes, example source code files, and documentation. All you need is a standard PC running WIN OS, with minimum 32MB of disc space

1. COP8 IDE, Assembler/ Linker/ Librarian, Simulator, and ISP software. Insert the CD, click on "Install Tools", and follow directions. All are automatically installed and configured under the Windows COP8 IDE.

2. Tools Demos. Insert the CD and browse to the /tools folder to install the tools demos:

- a. Aisys DriveWay Device Driver Development Tool (/tools/aisys/setup.exe)
- b. Byte Craft C-Compiler demo (/tools/cop8c/Win16 or Win32)
- c. IAR Embedded Workbench with COP8 Assembler only, or C-Compiler demo version: (/tools/iar/./ewcop8...)

3. Software Source Code Modules, and Applications Source Code. Insert the CD and browse to the /software folder:

- a. App notes source files (/software/an....sw)
Source code for many of the app notes.

- b. Sample .asm and C source utilities
(/software/utility)
- c. Other sample source code and apps.
(/software/misc)

4. Technical Documentation and Literature.

Insert the CD, click on “Read docs”. Select the desired documentation and save to your disk as a .pdf file. Other documents of interest:

- a. COP8 COBALT Board Manual with Schematics and Drawings.
(/tools/cob1/cobaltusers.pdf)

- b. COP8 Feature Family User’s Manual
(/manuals/feature.pdf)
- c. COP8SA Designer’s Guide (Applies to COP8SE/SG/AJ/AK also)
(/manuals/Cop8SAx_des_gd.pdf)
- d. COP8 Assembler User’s Manual
(/manuals/asm.pdf)
- e. Creating a correct programmer .hex file
(/appnotes/AppDM4.PDF)

6. Getting the latest documentation and software. Go to: www.national.com/cop8

HARDWARE SETUP

No physical connection between the COBALT board and your PC is necessary, unless you are using an optional COP8 emulator, or are planning to interface to an application-driven serial interface on the COBALT board.

The board, as configured, requires any 8-16v AC/DC, regulated/unregulated power supply (including a 9v battery), with a standard 1/8” barrel-type connector. Optionally, you can connect a 5v, DC supply directly to the GND and VCC connections on the target board. Check that the green power LED is on.

When power is applied with the pre-programmed COP8SGR7 installed, LEDs 1-8 should begin to flash sequentially. This confirms that the board is electrically operational, with the clock running at 10MHz. Pressing the RESET switch should turn off all LEDs, and when released, the LEDs should resume flashing.

The board comes with a pre-programmed, erasable COP8SGR7Q3 40DIP device installed in the on-board socket. You can use this device, or any other COP8 OTP device of your choice

(such as the COP8Sax7), in 28 or 40 DIP. 20 DIP requires an optional device socket. OTP versions can be sampled for free, and Erasable EPROM versions can be purchased from National’s web site.

If you will be using an optional COP8 OTP/ROM Emulator, remove the COP8 and connect the DIP emulation cable to the 40 pin socket on the target board, otherwise you must use an OTP/EPROM programmer with your PC for re-programming the erasable COP8SGR7Q3 device.

If your application requires RS232 or EEPROM, you will have to install the appropriate IC and interface cables.

You are now ready to develop, download, and debug code!

NOTE: The COBALT board comes pre-configured for 5v/10MHz operation, with fixed LEDs and Switches for I/O, MicroWire Interface connections, and unstuffed RS232 and EEPROM locations. Refer to the User’s Manual for details on customizing the board’s configuration, and operating voltage/frequency.

DEVELOPING CODE

For more information on developing COP8 code, COP8 architecture, and designing with COP8SA/SG/AJ/AK devices, refer to our

“COP8 Feature Family User’s Manual”, “COP8SA Designer’s Guide”, and our “COP8 Assembler/Linker/Librarian User’s Manual.”

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First, set up your environment for code development. Refer to the IDE Help files for information and tutorials. National's COP8 IDE supports a complete set of tools, including Simulator, COP8-EM/DM Emulator Debugger, Aisys' DriveWay COP8 (optional), and Byte Craft C-Compiler (optional).

Options for starting code development:

- 1) Browse the CD for app notes and existing source code that match your desired application. Use and modify as needed.
- 2) Browse the CD for source code example modules to build your application in pieces. (Start with the COP8 Utilities code samples). Mix and match as needed.
- 3) Start from scratch using the COP8 Assembler (or optional C-Compiler).

DOWNLOADING CODE

You have two methods of downloading your simulated code to the COBALT board for test and debug:

1. Real-time Emulator - Communication between the COP8-EM/DM emulator and your PC is via the RS232 interface.

- a. Remove the 40DIP COP8SGR7 from the COBALT board, and connect the emulator cable to the empty 40 pin DIP socket.
- b. From the COP8 IDE, execute the emulator Debugger software. The debugger is used to download your source code file into the emulator, for execution and debug.

2. OTP/EPROM Programmer – A wide variety of programmers from National and other third-party vendors are available. The COP8-PM-00 Engineering Programmer from National

is an ideal solution. In addition to the procedure below, there are other methods of creating a programmer .hex file (refer to: AppDM4.PDF):

- a. Remove the 40DIP COP8SGR7Q3 from the COBALT board, and erase for at least 15-30 minutes under a standard UV eraser.
- b. Confirm that the ECON is correctly declared in your assembly source code file.
- c. Use the PROMCOP.exe utility to create an INTEL .hex file. Make sure you add the ECON directive, so the ECON data is properly added to the .hex file (The default is no ECON).
- d. Download the resulting INTEL .hex file to any programmer that supports the COP8SGR740 DIP device.
- e. Re-insert the programmed device into the 40DIP socket on the COBALT board.

TARGET DEBUG

After your code is downloaded into the target COP8, the COBALT target board is ready for stand-alone operation and test probing. If you are using a COP8 emulator, then the emulator is left installed for interactive debugging.

The COBALT target board has a 10MHz crystal for real-time operation, with an onboard Reset pushbutton (SW1) for easy Reset/Restart.

LEDs and Switches are provided for I/O stimulus and visual debug. Test connections for

each of the device's 40 pins are brought out for easy probing, or connection to external circuits.

A Microwire/PLUS interface, and an RS232 connector are provided for external serial communications, along with a variety of I/O connections and probe points.

If you are not using an emulator, when you are ready to download another version of the code, you must remove and erase the COP8, re-program and re-install in the on-board socket.