PC/104 - Description of the PC/104 configuration used by UNAVCO

436 Beth Bartel July 7, 2009 PC/104 9528

UNAVCO PC/104 Configuration

Version 1.0
Last Modified: 10/26/2000
Author: Oivind Ruud

1.0 UNAVCO PC-104, Revision 1a Configuration

Facing new projects with limited power constraints, limited available equipment space and remote and inaccessible locations, UNAVCO configured a PC-104 to overcome these constraints and still be able to deploy a reliable, robust and user friendly computer.

1.1 Hardware Configuration

Standard PC-104 components were selected from Winsystems Inc. including a PCM-586, 133MHz Pentium processor card with 32 MB DRAM and 16 bit IDE interface, and floppy and keyboard support. A VGA monitor card was included to make the configuration process easier and allow for monitor connections in the field if needed. An additional serial card was added with four ports (only two are being used at this time) in addition to the two on the processor board. The PCM-NE2000-BNC Ethernet card was chosen, as the application for this first revision required a BNC connection. The PC-104 computer can easily be fitted with a 10-Base-T (RJ45) connector as was done in revision 1b. The computer is using the PCM-DC/DC card allowing for a wide range of input voltages (9-15VDC for revision 1a, and 6-40VDC for revision 1b), while supplying the other PC-104 boards with a protected and regulated 5 V DC source. The memory (hard drive) card is a flash drive from SanDisk. The 192Mb flash drive is very low power, very rugged and its solid-state design eliminates any moving parts keeping the whole PC-104 configuration environmentally rugged. The whole PC-104 is placed inside a metal casing on a sliding rack, making disassembly and card replacements easy. The front side of the casing has customized punch-outs for the four serial ports, one parallel port, the BNC-Ethernet, monitor, keyboard, and power connectors, and a red power indicator LED and a recessed reset button. The back side can be removed as well, allowing for easy access to flat cables with connections for a IDE CD-ROM and floppy drive, and power cables for these devices. Any standard CD-ROM and floppy drive will work with the PC-104 cards and the unit can be configured with new OS or software using the external devices as with any computer.

1.2 OS/Software Configuration

The PC-104 is running a limited RedHat LINUX 5.2 (kernel 2.0.36-0.7) installation. Only the Network Workstation option was installed on one root partition, keeping the installation to about 100Mb. Some

additional packages and services had to be installed by hand, including Secure Shell, ftp daemon, a uucp package, and the ntp timeserver package. In addition, the mgetty program was needed and had to be copied into the /sbin directory. The details of the computer BIOS settings and OS installation can be found in the "PC-104 RedHat LINUX 5.2 Installation Procedures".

The computer is running a JPL coded GPS data offload program and a MET-pack recording program off its two first serial ports. The third serial port is dedicated to serial communication with another PC (e.g. a field laptop) allowing for a telnet window to configure the PC-104 without using a separate keyboard and monitor. This serial port is running an mgetty program listening for the laptop serial connection.

For the rev. 1a application, the second serial port is dedicated to the MET-pack and wired to provide power to the instrument eliminating the need for a separate MET-pack power source or supply.

2.0 UNAVCO PC-104 Performance

The PC-104 was configured for an upcoming installation in Uganda in collaboration with JPL and IRIS. The installation site is in a remote area of Uganda and the only available power is solar power. IRIS has already installed and is operating a MEISSA VSAT system at the site and UNAVCO/JPL will be operating an Ashtech GPS receiver and stream the data back through the VSAT to JPL via the PC-104 located on-site.

2.1 Hardware Performance

Due to the limited and costly installation, low power along with rugged and reliable operation was essential to the success of the site. IRIS is operating their seismic and VSAT equipment independent from the GPS operations and a separate solar power array will be installed to run the GPS equipment. The PC-104 power consumption is less than 8 Watts in continuous operation mode, including the MET-pack. And with the Ashtech receiver consuming another 12-14 Watts, the whole power budget came in at less than 25 Watts when accounting for some system loss.

2.2 Software Performance

The streaming software from JPL (RTNT) relies on a fast processor as it reads GPS data sampled at one (1) second and streams the data back to JPL in real-time. Currently, the processor card performance is meeting the requirements processing one-second epochs in less than 0.7 seconds. The meteorological data is recorded every five minutes and does not pose any strain on the CPU.

3.0 Changes on UNAVCO PC-104, Revision 1b

On the second PC-104 configuration (rev 1b), the PCM-DC/DC card has been replaced with an UPS/Power Supply card from Tri-M Engineering. This card uses an irq level request to shut down the computer gracefully in case of a power failure. The on-board battery backup can also be set to run the computer for a set amount of time before the shutdown commences. The 192MB flash hard drive from SanDisk was also replaced with a 256 MB unit. And, lastly the BNC Ethernet card was replaced with a

10-Base-T (RJ45) card.

Online URL:
https://kb.unavco.org/article/pc-104-description-of-the-pc-104-configuration-used-by-unavco-436.html