Long Term Data Storage (PCMCIA)

The CPP-3794 and the CPP-2001 have provisions for long term data storage, using a PCMCIA card. At the Main Menu prompt select the Cartridge Recordings set up. The CPP allows various types of data to be recorded to a cartridge. The CPP responds with;

1. Cartridge Recordings
2. Chns 1-10 =1, Chns 1-20 = 2, All = A, = 2 **1<cr>**
3. Prelim = N **<cr>**
4. Interim = N **<cr>**
5. Final = N **Y<cr>**
6. Alarms = N **<cr>**
7. Events = N **<cr>**
8. Calibrations = **Y <cr>**
9. Digital I/O = N **<cr>**

Line 2 is asking how many channels of data are to be recorded on the cartridge. If a one is input, then channels 1 through 10 will be recorded on the cartridge. If a two is input, then channels 1 through 20 will be recorded on the cartridge. If an **A** is entered, then all channels supported by the CPP will be recorded on the cartridge. It takes one half the cartridge memory to store only the first 20 channels as it does to store all channels. Likewise, it only requires one half the memory to store 10 channels as it does to store 20 channels.

Lines 3 through 5 are asking which of the averages being formed by the CPP are to be recorded on the cartridge. It takes the same amount of memory to store a preliminary average as it does to store a final average. To store 24 hours, for 20 channels, of one minute data requires 180K of memory. In contrast, this same amount of memory will store 60 days of hourly averages. If only 10 channels are being stored then this 180K of memory will store 120 days of hourly averages. Any, all or none of the averages being formed can be directed to the cartridge.

Line 6 asks if alarms are to be stored. If so, then the time and value of a channel entering an alarm condition is stored, along with the time and value of the channel leaving the alarm condition. Status flags stored with the data points can also be used to determine alarm conditions.

Line 7 is asking if events are to be stored on the cartridge. If so, then any change in the digital I/O gets recorded along with the time.

Line 8 is asking if the results of calibrations are to be stored..

Line 9 is asking if the digital I/O settings are to be stored. If so, along with each data average stored, a snapshot of the digital I/O is recorded as well.

In the above example, the user set the CPP up to record the final averages calculated for the first 10 channels and calibration results. The CPP supports two types of long term data storage. The first uses internal RAM memory and the second uses a removable RamPack cartridge.

Internal Ram
The CPP has 512K of internal RAM. A portion of this RAM is used to configure the CPP and for system operation. Some of the RAM is used for relatively short term data storage. By default, the CPP stores 3 hours of preliminary averages in internal memory, 4 hours of interim averages in internal memory, and 8 periods of final averages. If hourly averages are being formed as final averages, then 7 plus days of data is being stored. If thirty minute averages are being formed, the 3½ plus days are being stored. If fifteen minute averages are being formed, then 1¾ days are being stored. Some memory is reserved for future usage.

The remainder of the internal memory (≈200K) can be used as longer term data storage. Referencing the above, any of the averages being formed can be directed to the cartridge/internal memory. The remainder of internal memory can store 24 hours of minute averages for 20 channels, or 125 hours of five minute averages, or 10 days of ten minute averages, or 15 days of fifteen minute averages, or 60 days of hourly averages. These will vary if other activities are also being stored. These times will double if only 10 channels are being saved to the memory.

If an external RamPack is not installed, then the CPP stores data in internal memory. If a RamPack is installed, then the CPP stores data in the RamPack, and not in the excess internal memory. The current data is always being stored.

Removable RamPack
The CPP supports a removable RAM pack as long term data storage. The RamPack plugs into a PCMCIA slot on the CPP front panel, and is available in 1, 2, 4, or 6 megabytes of memory. One megabyte of memory will store about 5 days of minute averages for 20 channels, or 45 days of fifteen minute averages, or approximately ¾year of hourly averages. Approximately 1⅛ year of data can be stored for 10 channels in a 1 megabyte RamPack.

Data Recovery
The CPP can also read and output data stored in the cartridge. This data can be retrieved serially over comm ports 1 or 4. These transfers are in space/comma delimited blocks, and are ASCII characters. Reference Tech Note TN19. H2NS offers a program to retrieve data stored on a cartridge. Given the large amounts of data that can be stored on a cartridge, to speed up data downloads to computers, data can also be output over the parallel printer port. H2NS offers a PC program to request and store data downloaded over the parallel port.

Reading data from the cartridge is conducted in an on line mode. The CPP continues to collect, average, and store data, even to the cartridge. Likewise, a central computer can be simultaneously polling the CPP on another comm port.

H2NS also offers a separate RamPack reader. This allows the RamPack to be exchanged and returned to a central facility for downloading data. The reader has two serial ports for data outputs and user interfacing, one printer port for printing data records, and one parallel port for data downloading.

Reading A Cartridge

The CPP will respond to read commands over comm port #4. Although these commands are intended for computer data dumps, they can be keyed in for local reviewing of the stored data. These commands are presented in Tech Note TN19, Space/Comma Delimited ASCII Data Transfers. Computer requested transfers should follow the protocols presented in tech note Tn19.

Given the large size of cartridges, and the large amounts of data stored in the cartridges, serial transfers can be time consuming. For example, to download an entire 1M cartridge at 9600 Baud would take about 35 minutes. The approach presented above allows the user to select and output only the data that is needed. Over the parallel port, this same transfer will take about 30 seconds.

An output can be aborted by inputting an Escape character. The way data is packed into the transmitted outputs, and the interfacing commands are provided in tech note TN19. Please contact H2NS.

Long Term Data Storage
Presented below in Table 1.0 is storage times versus number of channels being stored.

Table 1.0
Long Term Data Storage

# of Channels	Average	Internal Memory	1Mb RamPack
10	1 min	40 Hrs	10 Days
10	5 min	200 Hrs	50 Days
10	15 min	25 Days	150 Days
10	60 min	100 Days	600 Days
20	1 min	20 Hrs	5 Days
20	5 min	100 Hrs	25 Days
20	15 min	12 Days	75 Days
20	60 min	50 Days	300 Days

These times will vary depending on what other information is being recorded with the data.