



Power Pro System

Backup and Restore Commands

You can backup and restore important parts of Power Pro system memory to a computer. You enter system backup mode through the SET CMD STA menu on your ProCab. Data is sent to your PC, "captured" then saved to a file on the computer. To restore this data to the Power Pro memory you access the restore facility through the SET SMD STA menu on your ProCab then "send" the previously backed up data file to the Power Pro.

Most PCs running Windows have a program called Hyperterminal already installed under the Start->Programs->Accessories->Communications menu.

The backup and restore facility has been tested with PCs running Hyperterminal on WINXP, WINXPpro and WIN98se (so far). Other terminal programs with text file capture and send capabilities should work as well.

With the Power Pro, three backup options are offered. Each one saves different portions of system memory. There is only one restore feature, it automatically restores the data to the correct location in memory.

Macro backup

saves all 256 macros (5120 memory locations from 0xc800 to 0xdbff)

System backup

saves system setup (80 memory locations from 0xdc00 to 0xdc4f)

Consist backup

saves advanced consist tables (1536 locations from 0xf500 to 0xfaff)

HYPERTERMINAL settings for communication with the Power Pro:

CONNECT TO->CONFIGURE menu

9600, 19200 or 38400 baud

No parity

8 data bits

1 Stop bit

Flow Control - none

SETTINGS->TERMINAL MODE menu

ANSI

SETTINGS->ASCII SETUP menu

Echo typed characters locally

Append line feeds to incoming line ends

Line Delay: 10mS

Backing up data with Hyperterminal

1. Place the Power Pro in the selected backup mode by pressing "1" at the appropriate prompt (use the SET CMD STA menu). ***Do not press "6" to start the transfer yet.***
2. Use Hyperterminal's **Capture Text** (transfer menu) to receive backup data to your PC.
3. Press "6" on the Procab to start transfer to the PC
4. When the transfer is finished (PC screen stops scrolling), save the file in a location on your PC that you can easily find later when you want to restore.

Restoring data using Hyperterminal

There is only one restore command. Backed up data is automatically routed to the correct locations in memory when you restore.

1. Place the Power Pro in restore mode (use the SET CMD STA menu). Press "6" to start the restore.
2. Use Hyperterminal's **Send Text File** (found in the transfer menu) to send the backup data file you previously saved on your PC.

TECHNICAL INFO:

For the more technically inclined there is a free terminal program at the following website:
<http://bray.velenje.cx/avr/terminal>

The user interface on the Bray program is not designed for the casual user but offers excellent features for the software writer or experimenter that understands hex codes and scripting.

Data is sent from the DCC system to the terminal program as an ASCII text file.

The format for each line (lines are terminated with CR/LF) of data is:

:aaaa dddd dddd dddd dddd (format for macro and consist data)

or

:aaaa dd dd dd dd dd dd dd (format for system data)

:aaaa = system memory address in hex of the first byte of the line (high byte first)

dd = 8 bit data (high byte first if 16 bit)

dddd = 16 bit data (high byte first if 16 bit)

The data is formatted for easy(?) modification with a text editor. Well, easy if you know how the data in memory is setup and understand hex.

Macro Backup file

Each line of the Macro backup contains the data for one macro. There are ten 2 byte accessory commands on each line. Macro 0 is at memory location c800, macro 1 is at c814. The macro's accessory addresses are in DCC format (Refer to RP-9.2.1)

Consist backup file

Each line of the Consist data holds 8 locomotive addresses. Consist address 0 is not a valid consist. Storage space is provided for address 0 but not used by the system.

- Locations F500-F5FF hold lead loco addresses the first two bytes are consist address 0 (not used) addresses are in DCC format (bits 6,7 of high byte set if long address)
- Locations F600-F6FF hold rear loco addresses the first two bytes are consist address 0 (not used) addresses are in DCC format (bits 6,7 of high byte set if long address)
- Locations F700-FbFF hold mid consist loco addresses the first 8 bytes are up to 4 locos in consist address 0 (not used) addresses are in DCC format (bits 6,7 of high byte set if long address)

System backup file

Each line of the System backup file has 16 bytes of individual system setup 'flags'. (see partial System Setup memory map below). Use care if you change these values as they may not be properly range checked in the system software.

```
Org 0xdc00

;Variable  byte  addr  description
TIME_SCALE  BYTE  ;0xdc00 value reloaded into countdown TIMER_A
TICK_CNT    BYTE  ;0xdc01 1 scale second has elapsed when = 4
            ;    TICK_CNT is incremented every time
            ;    TIMER_A expires
SECONDS     BYTE  ;0xdc02 seconds counter for fast clock
MINUTES     BYTE  ;0xdc03 minutes counter
HOURS       BYTE  ;0xdc04 hours counter
HOUR24      BYTE  ;0xdc05 'A' = AM, 'P' = PM
HOURS12_24  BYTE  ;0xdc06 flag for 12/24 hour clock, 0=12 hours
PROG_TIMES  BYTE  ;0xdc07 number of times to send programming packet
TMP_TIMES   BYTE  ;0xdc08 number of times to send TEMP_Q packet
ACC_TIMES   BYTE  ;0xdc09 number of times to send accessory TEMP_Q packet
STOP_TIMES  BYTE  ;0xdc0a number of times to send speed zero packet
HORN_OFF    BYTE  ;0xdc0b number of "horn off" packets to send
RECALL_NUM  BYTE  ;0xdc0c depth of recall buffer, 6 max
STOP_CLK    BYTE  ;0xdc0d flag for clock stoppage, 0=run
BCAST_MSG   BYTE  ;0xdc0e flag for Cab 0 broadcast message available
TST_IN_USE  BYTE  ;0xdc0f flag to test for loco in use in SEL_LOCO, 1=don't test
CON_FUNC    BYTE  ;0xdc10 1=send function commands to consist address, 0=don't
not_used_dc11  BYTE  ;0xdc11
not_used_dc12  BYTE  ;0xdc12
ESTOP_ENABLE  BYTE  ;0xdc13 1=enable 3x ESTOP test for global stop
RADIO_FIX    BYTE  ;0xdc14 1=enable testing to skip pot value of cab
AIU_BCAST_EN  BYTE  ;0xdc15 1=enable AIU event driven RS-232 broadcast, 0=disable
PING_REFRESH  WORD  ;0xdc16 accessory packet refresh rate (high byte first)
SYS_FLAGS    BYTE  ;0xdc18 backed up system flags
            ;    bit 0 - 1=use direct mode, 0=use paged
            ;    bit 1 - not used
            ;    bit 2 - not used
            ;    bit 3 - not used
            ;    bit 4 - not used
            ;    bit 5 - not used
            ;    bit 6 - not used
            ;    bit 7 - not used
LAST_CS_CAB  BYTE  ;0xdc19 highest cab allowed to access SET CMD STA menu
LAST_AS_CAB  BYTE  ;0xdc1a highest cab allowed to access ASSIGN LOCO menu
LAST_CLK_CAB  BYTE  ;0xdc1b highest cab allowed to access SET CLOCK menu
LAST_PRG_CAB  BYTE  ;0xdc1c highest cab allowed to access USE PROGRAM TRK menu
LAST_OP_CAB  BYTE  ;0xdc1d highest cab allowed to access PROG ON MAIN menu
LAST_CP_CAB  BYTE  ;0xdc1e highest cab allowed to access SET CAB PARMS menu
LAST_OPA_CAB  BYTE  ;0xdc1f highest cab allowed to access PROG ACCESSORY menu
LAST_MAC_CAB  BYTE  ;0xdc20 highest cab allowed to access PROGRAM MACROS menu
BAUD_RATE    BYTE  ;0xdc21 baud rate divisor
CON_MOMENTUM  BYTE  ;0xdc22 1=enable momentum to consists, 0=disable
MOM_MULTIPLE  BYTE  ;0xdc23 multiplier for momentum button, range 0-25
MOM_DEC_RATE  BYTE  ;0xdc24 momentum decel rate. 1=full, 0=half
Unused_4     BYTE  ;0xdc25
Unused_5     BYTE  ;0xdc26
Unused_6     BYTE  ;0xdc27
Unused_7     BYTE  ;0xdc28
```

Bytes at 0xdc29 to 0xdc4f are unused (for now)