E614 Postamp/Discriminator Control Board

The Exp. 614 Postamp/Discriminator Control Board provides a method for the user to set the discriminator threshold voltage of each of the 24 Postamp/Discriminator cards in the crate, and to read the threshold voltage, temperature, and supply voltages of each card.

The control cards communicate with the Slow Control System over a 9600 baud RS -232 serial link which is daisy-chained through all control modules in the system. All control modules in the system can receive data from the SCS at any time. If an addressed module must send data to the SCS, it will seize the transmit data line, and disconnect any following modules for the duration of its transmission.

The module will respond to the following commands:

$Scc,nn,-dddd<CR><LF>	Set threshold voltage for crate cc module nn to dddd mV (addressing module 00 will set all modules in the crate) (maximum value is 4095)(Note 3)
$Ucc,nn,+dddd<CR><LF>	Set test pulse drive voltage (addressing module 00 will set all modules in the crate) (maximum value is 2047)
$Vcc,nn<CR><LF>	Read crate cc module nn threshold A voltage
$Wcc,nn<CR><LF>	Read crate cc module nn threshold B voltage
$Xcc,nn<CR><LF>	Read crate cc module nn test pulse voltage
$Tcc,nn<CR><LF>	Read crate cc module nn temperature (nn=00 for max temp in crate)
$Pcc,nn<CR><LF>	Read crate cc module nn power supply voltages
$Dcc,nn<CR><LF>	Disable test pulse for crate cc (slot number is ignored)
$Ecc,nn<CR><LF>	Enable test pulse for crate cc (slot number is ignored)
$Fcc,nn<CR><LF>	Read test pulse enable status (slot number is ignored)
$Zcc,nn<CR><LF>	Enable zero offset compensation (slot number is ignored)
$Ccc,nn<CR><LF>	Disable zero offset compensation (slot number is ignored)
$Icc,nn<CR><LF>	Read firmware ID

Following a read command, the addressed module will respond with the requested information as follows:

#Vcc,nn,-dddd<CR><LF>	Crate cc module nn threshold A voltage in mV
#Wcc,nn,-dddd<CR><LF>	Crate cc module nn threshold B voltage in mV
#Xcc,nn,+dddd<CR><LF>	Crate cc module nn test pulse voltage in mV
#Tcc,nn,+dddd<CR><LF>	Crate cc module nn temperature in units of 0.1 deg. C (n=00 for max temp. in crate)
#Pcc,nn,+dddd,-dddd<CR><LF>	Crate C module n power supply volts (pos, neg, mV)
#Fcc,00,[0/1]<CR><LF>	Test pulse enable status (1 = enabled)

The response to a $I command will be a string like: Vers. 1.00 2000 Nov 6

(cc is crate number (00 – 15), and nn is module number (00 – 24) in crate)

Note 1: The $S and $U commands require a sign, since the threshold voltage was originally bipolar. However, the sign is ignored, since both voltages are now unipolar.

Note 2: The threshold voltage set and measured is the same as that measured at the front panel test point. The voltage at the comparator input should be about 0.21 times this value. The equivalent threshold at the VTX input is about 0.05 times the indicated/set value.

Note 3: The controller will ignore set commands that specify an invalid voltage.

Crate and module numbers and data will be sent as ASCII decimal digits. All messages are in a fixed format, with two digits used for crate and module number, and four plus sign for voltage or temperature. The threshold voltage requested is the DAC output voltage. The DAC output goes to two buffers, one feeding channels 1 – 8, the other feeding channels 9 – 16. The threshold voltage read backs are from the outputs of these two buffers, and may vary slightly from the DAC setting, and from each other.

The control module sees a small negative offset on all readings from the postamps. Each time the control module reads a voltage or temperature from a module, it will also measure this offset, and adjust the reading to compensate. This correction can be enabled or disabled using the Z and C commands. It will be enabled on power-up or reset of the controller.

The control module will read the temperature from all modules in the crate once a minute. The "read max." command will return the maximum temperature observed in the last complete scan. If any module in the crate reports a temperature exceeding a preset limit, the control module will light an "over temperature" LED, and close an alarm contact. The alarm contacts from all crates may be paralleled to provide an alarm to external systems. For wiring convenience, the external alarm connections will be in the same connectors as the RS-232 communications wiring.

The specified tolerance of the temperature sensors is +/- 0.6 deg. C at 25 deg. C

Missing modules will show a temperature reading of –204.8 degrees.

Note that there is no collision detection between the various control modules in the system, so after sending a Read request, the SCS should wait for a response before sending a request to another module. If no response is obtained after 10 mS, the SCS can assume that the addressed module is not responding, and can continue with other operations. Control modules do not make any response to $S, $U, $D, $E or $Z commands.

The crate number is set by a rotary switch (screwdriver adjust) on the control module. The control module has LEDs to indicate when it is receiving or sending data. Another LED will be lit when the test pulse is enabled.

The upper serial port header connects to the computer or “upstream” control modules, while the lower header connects to downstream modules.

If two or more control modules are set to the same crate number, all will respond to commands to that crate, but the computer will only receive responses from the “nearest” crate.

On power-up the DACs will go to zero briefly, then the controller will set all thresholds and test pulse voltages to full scale.