HT Panel Protocol *Version 1.0*

Document History

Version	Date	Reason	Author
0.0	30.04.09	First Draft	Alan Hall
0.8	25.06.09	Power Up Text added	Alan Hall

This is a generic protocol for use with several panel products. Peripheral devices vary from panel to panel, and some commands in this document will be irrelevant to some products. Please refer to individual product datasheets for mapping of logical button numbers, LED numbers etc to physical locations.

The protocol operates over a bi-directional serial link with communications format 38400,o,8,1.

Commands and responses are encapsulated within VDCP packet framing:

<0x02> <BC> <CMD1> <CMD2> <DATA1>….<DATAn> <CS>

See the VDCP specification for a detailed explanation of the format.

The panel sends data to the host in response to user physical INPUTS such as button and wheel operations. These transmissions are not acknowledged by the host.

The host sends commands to the panel to control OUTPUT devices, such as LEDs and GPOs, and to control the operating mode of certain peripherals such as the jog/shuttle wheel. The host must not send a new command until the panel has finished processing the previous one. As the time to process a command can vary, the recommended way to achieve this is to listen for the panel's response. (Note that some commands return information that the host may require in any case.)

Alternatively, the host can simply wait for about 50mS (in practice most commands execute much faster than this). If a host is listening for a response, it should timeout on a similar timescale, and take whatever action it deems appropriate (retransmit, ignore, alarm etc).

Since a panel may initiate transmission of a user event packet at any time, this places some constraints on the host:

- The link must operate full duplex.
- Although a panel will not *start* transmission of a new event packet once it has begun reception of a host command packet, it is still possible that such a transmission will overlap with a host transaction – for example it may already be in the course of transmission when the host proceeds to send, or there may be a delay between the host application deciding to send and the actual transmission commencing. Etc etc.
- The host must therefore be able to receive and process or buffer one user event packet from the panel while engaged in a host-initiated transaction and waiting for a response to its command.

Inputs – 0x01:0xXX				
	Host to Panel		Panel to Host	
	Cmd1/2		Rsp1/2	Data
Key Changes			01:80	Key change code(s)
GPI Changes			01:90	GPI change code(s)
Wheel Status			01:A0	Wheel mode Wheel position Wheel ID
TBAR Position			01:A8	TBAR position
NAV Position			01:A9	NAV position

Key or GPI change codes are sent spontaneously by the panel ASAP after the event.

Key change code(s) — List of changed keys, one byte per key
Up to 24 in one report packet
Key gone down: 0x01 = button 1, 0x02 = button 2 etc
Key gone up: 0x81 = button 1, 0x82 = button 2 etc

GPI change code(s) — List of changed GPIs, one byte per GPI
Up to 24 in one report packet
GPI activated: 0x01 = GPI 1, 0x02 = GPI 2 etc
GPI deactivated: 0x81 = GPI 1, 0x82 = GPI 2 etc

Wheel status is sent spontaneously by the panel ASAP after a change of wheel position or mode.

Wheel mode — 1 byte: 0 = jog (free rotating)
1 = shuttle (end limits and centre detent)
2 = full range (end limits, no centre detent)

Wheel position — 1 byte, interpretation depends on mode:

Jog:	0 to 255, wraps around, no absolute position reference Approximately 4 turns for full cycle.
Shuttle	Limits as requested by SET WHEEL MODE command
Full range:	Limits as requested by SET WHEEL MODE command

Wheel ID — 1 byte, unsigned value maintained by the panel.
Incremented on receipt of SET WHEEL MODE command.
Returned in response to SET WHEEL MODE command.

If a wheel position packet is received at about the same time as the wheel mode has been changed or reset, there may be ambiguity as to whether the packet relates to the wheel status before or after the mode change / reset. The wheel ID allows this ambiguity to be resolved.

TBAR and NAV position are sent spontaneously by the panel ASAP after a change.

TBAR position — 1 byte, unsigned, 0 (bottom) to 255 (top)
NAV position — 1 byte, unsigned, 0 to 255 wrap-around, clockwise increasing

Outputs – 0x02:0xXX				
	Host to Panel		Panel to Host	
	Cmd1/2		Rsp1/2	Data
Set LED(s)	02:00	New LED state(s)	02:80	0 = success, 1 = failure
Set Beeper	02:0F	Beeper state	02:8F	0 = success, 1 = failure
Set GPO(s)	02:10	New GPO state(s)	02:90	0 = success, 1 = failure
Set Wheel Mode	02:20	Mode Initial position Lower detent Centre detent Upper detent	02:A0	0 = success, 1 = failure Wheel ID
Set Display Text	02:40	Start Line # Start column # Text	02:C0	0 = success, 1 = failure

LED state(s)

Specify LED (s) to change, 1 byte per LED
Up to 24 in one command
LED on: 0x01 = LED 1, 0x02 = LED 2 etc
LED off: 0x81 = LED 1, 0x82 = LED 2 etc

Beeper State

0: Off
255: On
1 – 254: Timed "on" in units of 250uS

Recommended values: 1 / 10 / 50 for quiet / medium / loud beep

GPO states(s)

Specify GPO (s) to change, 1 byte per GPO
Up to 24 in one command
GPO on: 0x01 = GPO 1, 0x02 = GPO 2 etc
GPO off: 0x81 = GPO 1, 0x82 = GPO 2 etc

Wheel Mode

1 byte: 0 = jog (free rotating)
1 = shuttle (end limits and centre detent)
2 = full range (end limits only)

Initial position

1 byte, range appropriate to mode, sets initial position.

Additional params

Jog mode: none
Shuttle and full modes:
1 byte, signed, -ve limit position
1 byte, signed, centre detent position
1 byte, signed +ve limit position

Start line #
1 byte, 0 = line 1, max value product dependant

Start Column #
1 byte, 0 = column 1, max value product dependant

Text
ASCII text (some accented and graphic chars available)

System /Config Commands – 00:XX				
	Host to Panel		Panel to Host	
	Cmd1/2	Data	Rsp1/2	Data
Query System	00:00		00:80	Protocol Version Product Description Software Version Hardware Serial Number BootLoader Version
Set Power-up Text	H0:32	Power-up text	H0:B2	0 = success, 1 = failure

Protocol Version	2 bytes major/minor version e.g. 0x0105 = Version 1.05
Product Description	Null-terminated string, max length <tbd>
Software Version	Null-terminated string, max length <tbd>
Hardware Serial Number	4 bytes big endian
Bootloader Version	2 bytes big endian major/minor version e.g. 0x0101 = Version 1.01
Power-up Text	ASCII text to be displayed at powerup Text is written from top left with wrap-around Pad each line with spaces to get to next line Empty text entry reverts to factory default