Jed T430/T440 Projector Controller user's manual version V169F part B

(Ed Schoell rev 13th. Mar 2025 … Flat panel only code version.)

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Setting T430/T440 systems to control a Projector or LCD device

The default setting is for Projectors

Note: When a unit is re-loaded with a new firmware file, the unit is reset to a "PROJECTOR" setting.

- To set the T430/T440 for **projector** control, set DF on the rotary switches SW2 and SW3 and switch off all option switches.
  Push the Reset button and the green LED blinks for 2 seconds;

- To set the T430/T440 for **LCD/Flat Panel** control, set DF on the rotary switches SW2 and SW3 and turn ON Option SW8 only.
  Push the Reset button and the green LED blinks for 2 seconds

The device is now ready to be set to a code and option setting. Don't forget to press the RESET switch again.

Active2Touch: Code 74

Channel codes are:

```
Input1    :=  89 + 65 + 03 + 0E;     // Computer1 VGA
Input2    :=  89 + 65 + 09 + 08;     // Computer2 HDMI 3

Input3    :=  89 + 65 + 05 + 0C;     // Video1 HDMI 1
Input4    :=  89 + 65 + 07 + 0A;     // Video2 HDMI 2

Input5    :=  89 + 65 + 09 + 08;     // HDMI 3
Input6    :=  89 + 65 + 0B + 06;     // HDMI 4
Input7    :=  89 + 65 + 0E + 03;     // HDMI FRONT

Input8    :=  89 + 55 + 04 + 1D;     // YPbPr

Input9    :=  89 + 55 + 0D + 14;     // AV1
Input10   :=  89 + 55 + 12 + 0F;     // AV2
Input11   :=  89 + 55 + 0A + 17;     // AV3
Input12   :=  89 + 55 + 15 + 0C;     // AV4
```

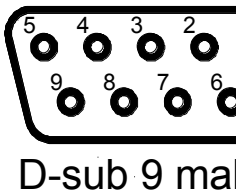
```
Input13    :=  89 + 65 + 0D + 04;      // OPS
Input14    :=  89 + 55 + 19 + 08;      // SV
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported;
- Audio Mute is supported, with a toggle function.

RS232 connections to AHA LCD

These use a 9-pin-D9 female on the panel, male on cable. Communications is at 38400 baud 8N1.

Function/Direction	**T440 "projector" Connection**	**Panel Port Connector**	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to projector	Tx	9-pin D-sub pin 3 (RXD)	
Reply data from projector to T440	Rx **	9-pin D-sub pin 2 (TXD)	
Plus 9 volt CTS/DTR to projector	N/C	N/C	

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

AHA LCD touchscreen, 55”, 65”, 70”, 75”, 84”: Code 9C (similar to LG)
Also Hitachi HITFHD6516/PC, HILF75101 LED interactive (also Code 9C)

These operate at 9600baud with On command of ka 00 01

Channel codes are:

```
Input1   := 'kb 00 07';    //Computer1  RGB-PC
Input2   := 'kb 00 0a';    //Computer2  HDMI-2

Input3   := 'kb 00 0b';    //Video1 HDMI-3 HD
Input4   := 'kb 00 09';    //Video2 HDMI-1

Input5   := 'kb 00 0c';    // DisplayPort

Input6   := 'kb 00 0e';    // OPS On board PC

Input7   := 'kb 00 0d';    // USB  (Arrow keys needed on IR remote to access files on USB)

Input8   := 'kb 00 08';    // DVI-D
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the “Computer” channel and Video1 as the “Video” channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making HDMI-1 the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported;
- Audio Mute is supported, but not Freeze.

An alternate set of strings has been released for the FHD6514, 6514PC and 6516. These resemble the standard Hitachi projector codes. These are accessed with code 3C . (Rev V123)

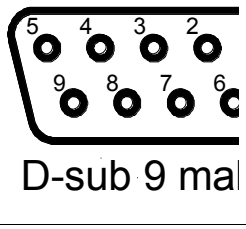
Channel codes are:

```
Input1    := BE + EF + 03 + 06 + 00 + 6E + D2 + 01 + 00 + 00 + 20 + 01 + 00; //Computer1 VGA
Input2    := BE + EF + 03 + 06 + 00 + 0E + D2 + 01 + 00 + 00 + 20 + 03 + 01; //Computer2 HDMI 2

Input3    := BE + EF + 03 + 06 + 00 + 0E + D2 + 01 + 00 + 00 + 20 + 03 + 00; //Video 1 HDMI 1
Input4    := BE + EF + 03 + 06 + 00 + FE + D2 + 01 + 00 + 00 + 20 + 00 + 00; //Video OPS
```

- On panel connection blink codes supported;
- Audio Mute is supported, but not Freeze.

RS232 connections to AHA LCD

These use a 9-pin-D9 female on the panel, male on cable. Communications is at 9600 baud 8N1.

Function/Direction	**T440 “projector” Connection**	**Panel Port Connector**	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to projector	Tx	9-pin D-sub pin 3 (RXD)	
Reply data from projector to T440	Rx **	9-pin D-sub pin 2 (TXD)	
Plus 9 volt CTS/DTR to projector	N/C	N/C	

** Note, the measured return voltage in rest state from the projector is only -0.9 volts, not the usual -5 to -9 volts. However the positive swing of voltage is OK.

BenQ LCD 1 9600: RP550/551/650/651/700+, PL490/552/553/5501/5502: Code 4E
RP652 at 38400, Inc/Dec volume: Code 03.
RP6501 002 Standby command, at 9600: Code 04

RS232 codes have been supplied directly by BenQ Australia.

Channel codes are:

```
Input1   := '801s' + 22h +'000' + 0Dh;      // Computer1 RGB 2: VGA analog-RGB
Input2   := '801s' + 22h +'002' + 0Dh;      // Computer2 HDMI 2

Input3   := '801s' + 22h +'003' + 0Dh;      // Video1 AV          * (OPT1 swaps Video1 & Video 2)
Input4   := '800s' + 22h +'001' + 0Dh;      // Video2 HDMI 1  * (OPT1 swaps Video1 & Video 2)
```

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

```
Input4   := '801s' + 22h +'005' + 0Dh;      //Video2 S-Video

Input5   := '800s' + 22h +'004' + 0Dh;      // YPbPr Component

Input6   := '800s' + 22h +'006' + 0Dh;      // DVI

Input7   := '800s' + 22h +'007' + 0Dh;      // DisplayPort
Input8   := '800s' + 22h +'008' + 0Dh;      // SDI
Input9   := '800s' + 22h +'009' + 0Dh;      // Multimedia

Input10  := '800s' + 22h +'010' + 0Dh;      // Network

Input11  := '800s' + 22h +'011' + 0Dh;      // USB Display

Input12  := '801s' +  22 +'021' +  0D;     // HDMI 3
Input13  := '801s' +  22 +'022' +  0D;      // HDMI 4
Input14  := '801s' +  22 +'023' +  0D;      // HDMI 5

Input15  := '801s' +  22 +'101' +  0D;      // Android
Input16  := '801s' +  22 +'102' +  0D;      // OPS
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the “Computer” channel and Video1 as the “Video” channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making S-Video the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported;
- Audio Mute is supported, but not Freeze.

It is necessary to set the following in the “Tools” menu (4th):

- Control setting -> RS232;
- Monitor ID -> 1;
- Power save -> Off

There is no volume level indication on the LCD image.

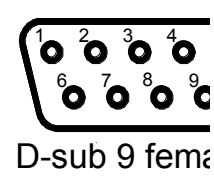
BenQ_LCD4: 115kbaud RM6503/RM7503/RM8603 panels: Code 05 (similar to above)

```
Input1   := '801s' + 22 +'000' + 0D;    // replies "401+<CR>"    // Computer1  VGA analog-RGB
Input2   := '801s' + 22 +'021' + 0D;    // replies "401+"<CR>"   // Computer2 HDMI 2 on back
Input3   := '801s' + 22 +'002' + 0D;    // replies "401+<CR>"    // Video1 HDMI1 on back
Input4   := '801s' + 22 +'001' + 0D;    // replies "401+<CR>"    // Video2 HDMI  on front
Input5   := '801s' + 22 +'007' + 0D;    // replies "401+<CR>"    // DisplayPort
Input6   := '801s' + 22 +'051' + 0D;    // replies "401+<CR>"    // USB C
Input7   := '801s' + 22 +'101' + 0D;    // replies "401+<CR>"    // Android
Input8   := '801s' + 22 +'102' + 0D;    // replies "401+<CR>"    // OPS
Input9   := '801s' + 22 +'107' + 0D;    // replies "401+<CR>"    // BenQ EZWrite
Input10  := '801s' + 22 +'108' + 0D;    // replies "401+<CR>"    // WiFi
```

RS232 connections to BenQ LCD with D9 male on the LCD

The reply signal from the LCD screen is disabled between transmitted messages, so the usual test with a multimeter can give confusing results, as BOTH the LCD Rx (line into the Rx input) and Tx (reply line from the LCD) measure approximately zero volts and both show a DC resistance of about 5K to ground. The LCD Tx line only outputs a +/- 5 volts waveform when a message is replied to, and then goes back to zero.

These use a 9-pin-D9 male on the LCD, female on cable. Comms is at 9600 baud, 8 bits, Odd parity, 1 stop.

Function/Direction	**T440 "projector" Connection**	**"Serial" Port Connector**	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to projector	Tx	9-pin D-sub pin 2 (RXD)	
Reply data from projector to T440	Rx	9-pin D-sub pin 3 (TXD)	

BenQ LCD 2: RP840G: Code 4F at 38400 baud

RS232 codes have not been found on the net, but have been supplied directly by BenQ Australia.

Channel codes are:

```
Input1   := AA + BB + CC + 02 + 03 + 00 + 05 + DD + EE + FF;     // Computer1 VGA 1 analog-RGB
Input2   := AA + BB + CC + 02 + 04 + 00 + 06 + DD + EE + FF;     // Computer2 VGA 2

Input3   := AA + BB + CC + 02 + 02 + 00 + 04 + DD + EE + FF;     // Video1 AV
Input4   := AA + BB + CC + 02 + 06 + 00 + 08 + DD + EE + FF;     // Video2 HDMI 1

Input5   := AA + BB + CC + 02 + 0B + 00 + 0D + DD + EE + FF;     // Computer3 VGA 3

Input6   := AA + BB + CC + 02 + 07 + 00 + 09 + DD + EE + FF;     // HDMI 2
Input7   := AA + BB + CC + 02 + 05 + 00 + 07 + DD + EE + FF;     // HDMI 3

Input8   := AA + BB + CC + 02 + 09 + 00 + 0B + DD + EE + FF;     // HDMI 4? This slot reserved for HDMI 4
Input9   := AA + BB + CC + 02 + 08 + 00 + 0A + DD + EE + FF;     // PC ... Don't know what this is
Input10  := AA + BB + CC + 02 + 0A + 00 + 0C + DD + EE + FF;     // Android, looks like a Network
Input11  := AA + BB + CC + 02 + 0E + 00 + 10 + DD + EE + FF;     // Android+, looks like a Network
Input12  := AA + BB + CC + 02 + 11 + 00 + 13 + DD + EE + FF;     // DisplayPort

TV       := AA + BB + CC + 02 + 01 + 00 + 03 + DD + EE + FF;
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported;
- OPT7 handshake mode is available (but has not been tested to date);
- Audio Mute is supported, but not Freeze.

It may be necessary to set communications active in the LCD panel's menu system.

BenQ LCD 3: Benq RP840G, Clevertouch, eBoard LCD: Code 5E at 9600 baud

Channel codes are:

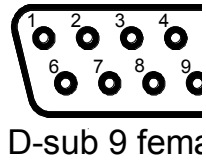
```
Input1   := AA + BB + CC + 02 + 03 + 00 + 05 + DD + EE + FF;     // Computer1 VGA 1 analog-RGB
Input2   := AA + BB + CC + 02 + 07 + 00 + 09 + DD + EE + FF;     // Computer2 HDMI 2

Input3   := AA + BB + CC + 02 + 06 + 00 + 08 + DD + EE + FF;     // Video1 HDMI 1
Input4   := AA + BB + CC + 02 + 05 + 00 + 07 + DD + EE + FF;     // Video2 HDMI 3
```

Inputs 9, 10, 11 and 12 (above) are also covered.

RS232 connections to BenQ LCD with D9 male on the LCD

The reply signal from the LCD screen is disabled between transmitted messages, so the usual test with a multimeter can give confusing results, as BOTH the LCD Rx (line into the Rx input) and Tx (reply line from the LCD) measure approximately zero volts and both show a DC resistance of about 5K to ground. The LCD Tx line only outputs a +/- 5 volts waveform when a message is replied to, and then goes back to zero.

These use a 9-pin-D9 male on the LCD, female on cable. Comms is at 38400 baud, 8 bits, Odd parity, 1 stop.

Function/Direction	**T440 "projector" Connection**	**"Serial" Port Connector**	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to projector	Tx	9-pin D-sub pin 2 (RXD)	
Reply data from projector to T440	Rx	9-pin D-sub pin 3 (TXD)	

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

CommBox LCD monitor with touchscreen interface (IR and RS232)

These screens are interfaced via an IR transmitter or a wired connection sending in an un-modulated pulse sequence identical to an IR transmission (but without the 38khz carrier) into a 3.5mm jack on the back (marked IR).

Code A2 Modulated IR to CommBox , requires an IR bug either sending IR from the front or via a hole in the rear.

Code A3 UnModulated IR-like pulses to CommBox via 3.5mm jack in back.

Code 8E RS232 interfaced control.

IR command codes:

```
Input1FunctionCode   := $0025;  // Computer1: VGA
Input2FunctionCode   := $0026;  // Computer2: DVI

Input3FunctionCode   := $0023;  // Video1: Composite
Input4FunctionCode   := $0027;  // Video2: HDMI 1

Input5FunctionCode   := $0028;  // HDMI 2

Input6FunctionCode   := $0022;  // Component

Input7FunctionCode   := $0024;  // S-Video
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making HDMI 1the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

This can be used with a variety of keyboards:

- With a "Code 9" keyboard, with buttons selecting "Video" and 'Computer;
- With "Code 0" or "Code 5" input-only select keyboards;
- With a "Code B-L" or "Code B-P" keyboard, with buttons selecting "Video" and "Computer1" and "Computer2" with Volume control keys;
- NO Panel connection blink codes and OPT7 handshake modes are available;
- No mute/freeze commands are provided; and
- Volume key presses send 5 consecutive Vol Up or Vol Down commands.

Code 8E, 88, 89 RS232 interfaced control.

The design of this driver is based on this document: **CommBox Interactive and Display RS232 Protocol Revision: 4** available from CommBox directly. **Codes 88, 89 are for V2.** (88 is Abs audio, 89 is incremental.)

Channel codes are:	**Code 8E** Rev 4	**Code 88,89** Rev V2	Function
Input1	!1INPT 111 + 0D	!200INPT 111 + 0D	Computer1 VGA
Input2	!1INPT 212 + 0D	!200INPT 212 + 0D	Computer2 HDMI 2
Input3	!1INPT 131 + 0D	!200INPT 131 + 0D	Video1 Composite Video
Input4	!1INPT 211 + 0D	!200INPT 211 + 0D	Video2 HDMI 1
Input5	!1INPT 121 + 0D	!200INPT 121 + 0D	RGB-BNC
Input6	!1INPT 151 + 0D	!200INPT 151 + 0D	Component
Input7	!1INPT 213 + 0D	!200INPT 213 + 0D	HDMI 3
Input8	!1INPT 214 + 0D	!200INPT 214 + 0D	HDMI 4
Input9	!1INPT 221 + 0D	!200INPT 221 + 0D	DVI-D
Input10	!1INPT 231 + 0D	!200INPT 231 + 0D	DisplayPort
Input11	!1INPT 311 + 0D	!200INPT 311 + 0D	USB

Input12		!1INPT 241 + 0D	OPS
Input13		!1INPT 411 + 0D	Android (HOME)
Input14		!1INPT 261 + 0D	SDI
Input15		!1INPT 271 + 0D	USB C Video
Input16		!1INPT 251 + 0D	TV

(TV function is supported as both an "Input" and for the TV key on a code E keyboard. Channel up/down is not provided at this time.)

Code 8A **Commbox Meeting Room Display** RS232 interfaced control

Channel allocation are as follows:

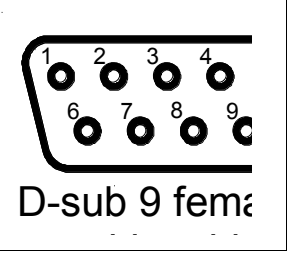
```
Input1   := EA + 07 + 01 + 73 + 50 + 06 + 0D;   //Computer1 VGA
Input2   := EA + 07 + 01 + 73 + 50 + 00 + 0D;   //Computer2 HDMI 1

Input3   := EA + 07 + 01 + 73 + 50 + 00 + 0D;   //Video1 HDMI 1
Input4   := EA + 07 + 01 + 73 + 50 + 01 + 0D;   //Video2 HDMI 2

Input5   := EA + 07 + 01 + 73 + 50 + 05 + 0D;   // USB
Input6   := EA + 07 + 01 + 73 + 50 + 02 + 0D;   // OPS
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes are supported;
- OPT7 handshake mode is available;
- Audio Mute and Freeze are supported with appropriate keyboards.

RS232 connections to CommBox display with RS232

These use a 9-pin-D9 male on the panel, female on cable. Coms is at 9600, 8N1

Function/Direction	**T440 "projector" Connection**	**CommBox "Control" Port Connector**	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to projector	Tx	9-pin D-sub pin 2 (RXD)	
Reply data from projector to T440	Rx	9-pin D-sub pin 3 (TXD)	
Plus 9 volt CTS/DTR to projector	N/C	N/C	

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

HDi32 Panel: Code 76 at 9600 baud

RS232 codes have been supplied by an installer.

Channel codes are:

```
Input1      :=  B2 + 00 + 00 + 3A + 01 + 01 + 10 + 2A;     // Computer1 VGA
Input2      :=  B2 + 00 + 00 + 3A + 01 + 01 + 16 + 2C;     // Computer2 DVI

Input3      :=  B2 + 00 + 00 + 3A + 01 + 01 + 12 + 28;     // Video1 HDMI
Input4      :=  B2 + 00 + 00 + 3A + 01 + 01 + 13 + 29;     // Video2 AV

Input5      :=  B2 + 00 + 00 + 3A + 01 + 01 + 11 + 2B;     // OPS
```

HDi_FLEX Panel: Code 8C at 9600 baud

RS232 codes have been supplied by an installer.

```
Input1 :=  B2 + 00 + 00 + 3A + 01 + 01 + 15 + 2F;      // Computer 1 HDMI 2
Input2 :=  B2 + 00 + 00 + 3A + 01 + 01 + 19 + 23;      // Computer 2 hdmi 1

Input3 :=  B2 + 00 + 00 + 3A + 01 + 01 + 19 + 23;      // Video1 Comp HDNI 1
Input4 :=  B2 + 00 + 00 + 3A + 01 + 01 + 13 + 29;      // Video2 AV

Input5 :=  B2 + 00 + 00 + 3A + 01 + 01 + 18 + 22;      // OPS
```

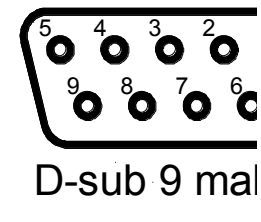
Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- No on panel connection blink codes supported;
- Freeze toggle and Mute toggle are supported with a Code A keyboard

RS232 connections to HDi32 LCD with D9 female on the panel

Comms is at 9600 baud, 8 bits, no parity, 1 stop. Male on cable.

Function/Direction	**T460 "projector" Connection**	**Panel Serial Port Connector**
Ground	Ground	9-pin D-sub pin 5
Data from T440 to panel	Tx	9-pin D-sub pin 3 (RXD)
Reply data from panel to T440	Rx	9-pin D-sub pin 2 (TXD)
Plus 9 volt CTS/DTR to projector	N/C	N/C



After installation wiring of any projector to a T460, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

HDi70 Panel, “23” client ID no.: Code 73 at 115200 baud

RS232 codes have been supplied by an installer.

Channel codes are:

Input1	:= 99 + 23 + 0B + 01 + F4 + AA;	//Computer1 VGA1
Input2	:= 99 + 23 + 0C + 01 + F3 + AA;	//Computer2 VGA2
Input3	:= 99 + 23 + 0E + 01 + F1 + AA;	// Video1 HDMI 1
Input4	:= 99 + 23 + 0F + 01 + F0 + AA;	// Video2 HDMI 2
Input5	:= 99 + 23 + 10 + 01 + EF + AA;	// HDMI 3
Input6	:= 99 + 23 + 08 + 01 + F7 + AA;	// AV
Input7	:= 99 + 23 + 0A + 01 + F5 + AA;	// YPbPr
Input8	:= 99 + 23 + 0D + 01 + F2 + AA;	// VGA3
Input9	:= 99 + 23 + 06 + 01 + F9 + AA;	// VGA4
Input10	:= 99 + 23 + 11 + 01 + EE + AA;	// ops
Input11	:= 99 + 23 + 27 + 01 + D8 + AA;	// USB

HDi73 Panel, code 77 code at 9600 baud

RS232 codes have been supplied by an installer.

Channel codes are:

Input1	:= 02 + 49 + 4E + 50 + 3A + 30 + 30 + 39 + 03;	//Computer1 HDMI 2
Input2	:= 02 + 49 + 4E + 50 + 3A + 30 + 30 + 34 + 03;	//Computer2 PC/OPS
Input3	:= 02 + 49 + 4E + 50 + 3A + 30 + 30 + 38 + 03;	// Video1 HDMI 1
Input4	:= 02 + 49 + 4E + 50 + 3A + 30 + 31 + 36 + 03;	// Video2 USBC (some only)

(No freeze on this model, but absolute volume 0->100)

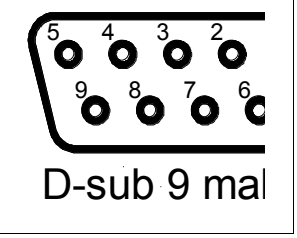
Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the “Computer” channel and Video1 as the “Video” channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- No on panel connection blink codes supported;

RS232 connections to HDi70 LCD with D9 female on the panel

Comms is at 115200 baud, 8 bits, no parity, 1 stop. Male on cable.

Function/Direction	**T460 “projector” Connection**	**Panel Serial Port Connector**
Ground	Ground	9-pin D-sub pin 5
Data from T440 to panel	Tx	9-pin D-sub pin 3 (RXD)
Reply data from panel to T440	Rx	9-pin D-sub pin 2 (TXD)
Plus 9 volt CTS/DTR to projector	N/C	N/C



After installation wiring of any projector to a T460, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Hisense LCD 3 (e.g. 100BM66D): Code 8F at 9600 baud

RS232 codes have been supplied by an installer.

Channel codes are:

```
Input1   :=  DD + FF + 00 + 08 + C1 + 08 + 00 + 01 + 01 + 17 + D9 + C0 + BB + CC;   //Computer1 VGA
Input2   :=  DD + FF + 00 + 07 + C1 + 08 + 00 + 01 + 01 + 0F + C1 + BB + CC;       //Computer2 HDMI2

Input3   :=  DD + FF + 00 + 07 + C1 + 08 + 00 + 01 + 01 + 0E + C0 + BB + CC;       //Video1 HDMI1
Input4   :=  DD + FF + 00 + 07 + C1 + 08 + 00 + 01 + 01 + 0F + C1 + BB + CC;       //Video2 HDMI2

Input5   :=  DD + FF + 00 + 07 + C1 + 08 + 00 + 01 + 01 + 16 + D8 + BB +$CC;       // DP
```

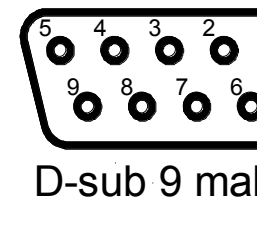
Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- No on panel connection blink codes supported;
- Mute toggle is supported with a Code 9 keyboard

RS232 connections to Hisense LCD 3 (e.g. 100BM66D LCD with D9 female on the panel

Comms is at 9600 baud, 8 bits, no parity, 1 stop. Male on cable.

Function/Direction	**T460 "projector" Connection**	**Panel Serial Port Connector**
Ground	Ground	9-pin D-sub pin 5
Data from T440 to panel	Tx	9-pin D-sub pin 3 (RXD)
Reply data from panel to T440	Rx	9-pin D-sub pin 2 (TXD)
Plus 9 volt CTS/DTR to projector	N/C	N/C



After installation wiring of any projector to a T460, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Hisense RC5-code LCD TV via IR – Code AC

These panels are controlled via an IR emitter. It has the default address for a TV of "00". A typical TV model is 24F33 and family. Unfortunately Hisense do not seem to know which IR codes apply to which model, and insist that this model uses a completely different NEC-format IR protocol, which they supplied. We have verified the RC5 protocol works with the 24F33 model.

An IR code is provided to access the "Source" menu and subsequent presses roll through available sources. Stopping on the selected on automatically selects that one after about a 2 second delay. No OK button or arrow keys are needed for selection. A Code 1 keyboard works well with this (Off, Source/On, Vol. Up, Vol Down). The LED associated with this key blinks OFF momentarily as the function executes.

IR command codes:

SourceFunctionCode := $0038;

On a T440, Code 1 keyboard, the Volume Up and Volume Down keys send a burst of 5 signals, so the volume steps up or down in groups of 5.

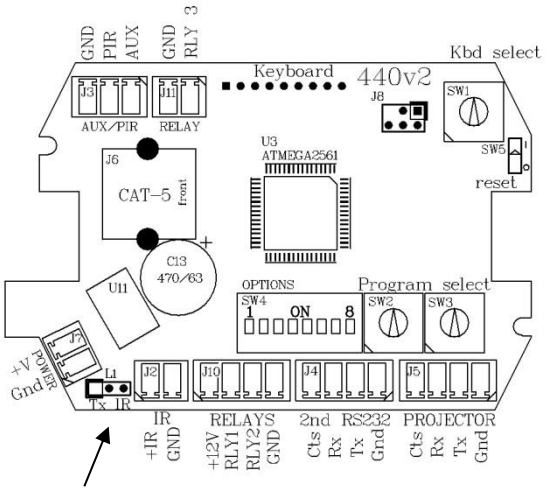
The red and green LEDs follow the current state of the projector. If the projector gets out of step with the controller (eg by the projector being ON when the red OFF led is showing), pressing the ON button will get it back into step, and then pressing OFF once will send the "POWER" IR message twice, with a 1-second separation, leaving both OFF.

Because there is no feedback serial path to the controller, OPT7 status read-back is not possible. (Freeze and mute are not supported. Two-button-mute mode is not supported either.)

Wiring: The IR transmitting bug is wired to the IR output socket J2 with the shield of the cable connected to the ground pin and the centre conductor to the "+IR" pin. The signal is current limited (24mA pulses), so no series resistors are needed in the cable.

As the IR bug wire is only 2M long it will usually be extended, and CAT5 cable is OK for this, but it must be via its own twisted pair (colour plus colour-with-white). (We have successfully tested this with 50M of CAT5E cable.)

If the CAT5 connector and cable is used runs from CAT5 connector J6, the IR signal runs
via a twisted pair of wires via this cable, but link L1 must be moved from Tx (it's position
in RS232 mode) to IR (as needed for IR mode).



T430: If using a T430, the keyboard has an ON/Source key and no Volume keys. The IR functions allow power On/Off and source change only. Operation is the same as above.

If OPT4 is OFF, no source changes occur (for a V1 keyboard).
If OPT4 is ON, then a "source" command is sent with each press of the On / Source key. (V3 keyboard.)

(Note: the IR connector has to be requested at ordering time… it is not part of a normal T430 build.)

Hitachi HITFHD6516/PC, HILF75101 LED interactive Code 9C - See page 3

These operate at 9600baud with On command of ka 00 01

Hitachi HILS65205 Code 09 As above but operate at 38400 baud

Hitachi HILFU75202 LCD touchscreen: (Code 9E) (similar to LG)

This screen is similar to AHA (page 1) but has different codes for VGA and power commands. It communicates at 115200 baud.

Channel codes are:

```
Input1   := 'kb 00 05';    //Computer1  VGA
Input2   := 'kb 00 0a';    //Computer2  HDMI-2

Input3   := 'kb 00 0b';    //Video1 HDMI-3 HD
Input4   := 'kb 00 09';    //Video2 HDMI-1

Input5   := 'kb 00 0c';    // DisplayPort

Input6   := 'kb 00 07';    // OPS On board PC
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making HDMI-1 the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported;
- Audio Mute is supported, but not Freeze.

Hitachi LCD DSxxMU01: Code 3D

RS232 codes are available at: https://www.hitachi.com.au/documents/dps/RS232-Commands-DS55MU01-DS65MU01-DS75MU01.pdf (A connection diagram is included in this manual).

Channel codes are:

```
Input1     := A6 + 01 + 00 + 00 + 00 + 07 + 01 + AC + 05 + 00 + 00 + 00 + 08; //Computer1 VGA
Input2     := A6 + 01 + 00 + 00 + 00 + 07 + 01 + AC + 06 + 00 + 00 + 00 + 0B; //Computer2 HDMI 2

Input3     := A6 + 01 + 00 + 00 + 00 + 07 + 01 + AC + 0D + 00 + 00 + 00 + 00; //Video1 HDMI 1
Input4     := A6 + 01 + 00 + 00 + 00 + 07 + 01 + AC + 0F + 00 + 00 + 00 + 02; //Video2 HDMI 3

Input5     := A6 + 01 + 00 + 00 + 00 + 07 + 01 + AC + 19 + 00 + 00 + 00 + 14; // HDMI 4
Input6     := A6 + 01 + 00 + 00 + 00 + 07 + 01 + AC + 01 + 00 + 00 + 00 + 0C; // Video

Input7     := A6 + 01 + 00 + 00 + 00 + 07 + 01 + AC + 0A + 00 + 00 + 00 + 07; // DP1
Input8     := A6 + 01 + 00 + 00 + 00 + 07 + 01 + AC + 07 + 00 + 00 + 00 + 0A; // DP2

Input9     := A6 + 01 + 00 + 00 + 00 + 07 + 01 + AC + 0C + 00 + 00 + 00 + 01; // USB1
Input10    := A6 + 01 + 00 + 00 + 00 + 07 + 01 + AC + 08 + 00 + 00 + 00 + 05; // USB2
```

- On panel connection blink codes supported;
- Audio Mute is supported, but not Freeze.
- OPT7 handshake mode is available;

IT LCD 1: Code 8C

RS232 codes have not been found on the net, but have been supplied directly by Electroboard Australia.

In codes below an IDT (second byte) of "00" is sent a s a global command to all addressed devices.

Channel codes are:

```
Input1    := 07 + 00 + 02 + 'MIN' +  #00 + 08;    //Computer1 VGA DB15 (Note: #xx indicates a dec. no)
Input2    := 07 + 00 + 02 + 'MIN' +  #10 + 08;    //Computer2 HDMI 2

Input3    := 07 + 00 + 02 + 'MIN' +  #09 + 08;    //Video 1 HDMI 1
Input4    := 07 + 00 + 02 + 'MIN' +  #11 + 08;    //Video 2 HDMI 3

Input5    := 07 + 00 + 02 + 'MIN' +  #12 + 08;    //HDMI 4

Input6    := 07 + 00 + 02 + 'MIN' +  #13 + 08;    //DisplayPort 1
Input7    := 07 + 00 + 02 + 'MIN' +  #16 + 08;    //DisplayPort 2

Input8    := 07 + 00 + 02 + 'MIN' +  #14 + 08;    //IPC/OPS
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported;
- Audio Mute is supported, but not Freeze.

RS232 connections to IT LCD: not available at this time.

Comms is at 115200 baud, 8 bits, Odd parity, 1 stop.

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

LG LCD/Plasma display/TV (Code 90, 91, 93, 94 & 97, 98, 99 and 9A)

In the back of each "Owner's manual" is a list of "input select" codes … examine this table to determine the family. If input select uses "kb" codes, select the codes 18 and 19 below.

If "xb" is shown, use the table on the next page for input select.

"kb" family input select codes

There are over a 100 different displays in the "kb" LG family, and **codes 90 TO XXX** cover the "kb" codes group (see the user manuals).

Group 1 Code 90 on the switches:

PC to "kb 00 0" for PLASMA monitor: MU-40PA15*, 42/50PM1M**, 42PM3MV**, MU-60PZ30***, MU-0PZ40***, MU-42/50PZ41V**, MU-42/50PZ44***, MU-42/50/60PZ90***

Function code	"kb" strings, code 90	Comments
Input1/Computer1	'kb 00 0' + 0D	RGB-PC
Input2/Computer2	'kb 00 4' + 0D	RGB-2 / DVI
Input3/Video1	'kb 00 2' + 0D	AV1 Video/S-Vid * OPT1 swaps Video1 &Video2
Input4/Video2	'kb 00 9' + 0D	HDMI-2* * OPT1 swaps Video1 &Video2
Input5	'kb 00 4' + 0D	Component 1 Video YPbPr
Input6	'kb 00 1' + 0D	Component 2 Video YPbPr
Input7	'kb 00 6' + 0D	RGB-DTV / Component
Input8	'kb 00 9' + 0D	HDMI-2 / DVI-PC

* T440: OPT6 switch ON will use S-Video in place of HDMI/DVI. T430: uses HDMI as Video2.

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

Group 2 Code 91 on the switches for Plasma Monitor/Digital TV:

PC to kb code 5 for PLASMA: MU-50PM10, MU-42PM11, MU-42PM12*, RU-42/50PX10, RU-42/50PX11, RU-42/50PX/20, MW-71PY10*, MW-71PY10**, RT-42/50PZ60/70***, R4U-42/50/60PZ61/71, MU-60PZ95*

Function code	"kb" strings, code 91	Comments
Input1/Computer1	'kb 00 5' + 0D	RGB-PC
Input2/Computer2	'kb 00 6' + 0D	DVI-DTV
Input3/Video1	'kb 00 1' + 0D	AV1 Video/S-Vid * OPT1 swaps Video1 &Video2
Input4/Video2	'kb 00 9' + 0D	HDMI * * OPT1 swaps Video1 &Video2
Input5	'kb 00 3' + 0D	Component 1 Video YPbPr
Input6	'kb 00 4' + 0D	Component 2 Video YPbPr
Input7	'kb 00 7' + 0D	Video 3
Input8	'kb 00 8' + 0D	Video 4
Input9	'kb 00 9' + 0D	HDMI
TV	'kb 00 0' + 0D	TV Digital
TV Channel Up	'mc 00 00' + 0D	Use IR command PR+ CH+
TV Channel Down	'mc 00 01' + 0D	Use IR command PR- CH-

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have

Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels.)

Group 3 Code 93 on the switches for Digital TV (or Monitor only), 94 on the switches for Analog TV:

PC to "kb 00 7" for LCD/PLASMA TV: 42LC2DR, 32/37/42LC7D*, PLASMA: 50PB2DR, 42/50/60PB4D, 42/50PC1***, 42/50PC5D*, 42/50/60PM4M/MA, 50PX1D***, 50PX2DC**, 42PX3D****, 42/50PX4D***, 42PX5D***, 50PX4DR, DU-50PX10*, DU-42PX12X*, *, 50/60PY2DR*, DU-42/50PZ60***, DU-42/50PZ70***

Choice of codes 93h (Monitor or Digital TV) or 94h (Analog TV) determines TV type.

Function code	**"kb" strings, code 90**	**Comments**
Input1/Computer1	'kb 00 7' + 0D	RGB-PC
Input2/Computer2	'kb 00 8' + 0D	HDMI-1 / DVI-DTV
Input3/Video1	'kb 00 1' + 0D	AV1 Video/S-Vid * OPT1 swaps Video1 &Video2
Input4/Video21	'kb 00 9' + 0D	HDMI * * OPT1 swaps Video1 &Video2
Input5	'kb 00 4' + 0D	Component 1 Video YPbPr
Input6	'kb 00 5' + 0D	Component 2 Video YPbPr
Input7	'kb 00 6' + 0D	RGB-DTV / Component
Input8	'kb 00 9' + 0D	HDMI-2 / DVI-PC
TV Channel Up	'mc 00 00' + 0D	Use IR command PR+ CH+
TV Channel Down	'mc 00 01' + 0D	Use IR command PR- CH-

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

```
TV := 'kb 00 0' + 0D;       // TV Digital (Code 93 selects)
TV := 'kb 00 1' + 0D;       // TV Analog (Code 94 selects)
```

Aspect Ratio settings See following for common aspect commands.

"xb" family input select codes

The newer "xb" family, with **codes 97 & 98, 99 & 9A**, and use a two hex digit pair after the ASCII select string, with the top 4 bits (top digit)(5x, 6x, 9x, 2x, 4x) selecting an input type (AV, Component, etc) and the low 4 bits the input number (x0 or x1).

Choice between codes 97 or 98 (and between 99h or 9Ah) determines TV type, Analog or Digital. So 97 and 99 are Digital TV, and 98 and 9A are for Analog TV.

Note re Plasma TV models 42/50PQ10, 42/50PQ11**, 42/50PQ20**, 42/50PQ30**, 42/50PQ31, 42/50PQ60**, 50PS30**, 60PS40**, 50PS60** …** We have two manuals for these, one showing them as 'xb 00 **50**', i.e. Group 4 below, and showing them as 'xb 00 **60**', i.e. group 5 below. We suggest trying both drivers for one that works to select RGB.

Group 4: Codes 97 and 98: (first column in table below) uses code 'xb 00 **50**' + 0D for RGB/VGA PC input used as "Computer1".**LCD:** 32/42/47/52LB9D**, 26/32/37/42LG3***, 32/42/47LG5***, 32/42/47/52LG6**, 42/47/52LG7***

PLASMA: 42/50PQ2***, 42/50PQ6***, 50PS3***, 60PS4***, 60PS6***, 42/50PB4D*, 50/60PY3D**

Group 5: Codes 99 and 9A: (second column in table below) uses code 'xb 00 **60**' + 0D for RGB/VGA PC input used as "Computer1". Typical models are: LCD: 32CL20, 32/42/47CL40, 42/47LB7RF*, 32/42/47/52LB9R*, 26LC2R*, 26/27/32/37/42LC2***, 32/37/42LC2D, 32LC25R*, 26/32LC3R*, 26/32/37/42LC4R*, 26/32/37/42LC7R*, 19/22/26/32LD3**, 32/37/42/47LD4**, 42/47/55LD5**, 32/37/42/47/55LD6***, 32/37/42LE2***, 32LE3*** 32/42/47/55LE4***, 22/26/32/37/42/47/55LE5***, 22/26LE6***, 32/37/42/47/55LE7***, 42/47/55LE8***,

32/37/42/47LF11, 47LF21, 32/37/42LF25**, 32/42/47LF51**, 22/26/32/37/42/47LG1***, 32/37/42LG2***, 19/22//26/32/37/42LG2***, 19/22/26/32/37/42/47LG3, 26/32LG40, 32/37/42/47/52LG5***, 32/37/42/47/52LG60, 32/42/47/52LG70, 47LG90, 42/47LGX, 22/26/32/37/42LH2***, 19/22/26/32/37/42/52LH2***, 32/37/42/47LH3***, 32/37/42/47LH30**, 42/47LH300C, 32/37/42LH35FD, 32/37/42/47/55LH4***, 32/37/42/47/55LH5***, 32/37/42/47LH70**, 47/55LH8***, 42/47/55LH9***, 22/26/32LK3**, 32/37/42/47LK4**, 42/47/55LK5**, 32/39/42/47/55/60LN541C, 32/39/42/47/55/60LN549E, 32/42LP560M, 19/22LS4D*, 19/22LU40**, 19/22/26LU5***, 19/22/26/32LV25**, 26/32/37/42/47/55LV3***, 32/42/47/55LV3***, 32/42/47/55LW45**, 19/22/26/32LV25, 26/32LV30**, 32/42LV33**, 32/37/42/47/55LV35**, 22/26/32/37/42/47/55LV55**, 32/42LV34**, 32/42/47/55LW45**, 42/47LW54**, 42/47LW57**, 42/47/55LW65**, 47/55LW77**, 47/55LW95**, 47/55LW98**, 72LW99**, 32LX2R*, 42/47/55LX6***, 47/55LX9***, 22/29/32/39/42/47/55/60/65LY340C, 42/47/55/65LY540S, 42/47/55LZ96** , 60PC4R*, 32/37/42/47/55SL8***, 42/47SL9***, 42/47/55/60WL30MS, M197WD, M227WD, M237WD, M2901S, M3204C, M3801S, M4212C, M4712C.

PLASMA: 42/50PA45**, 42/50PA49**, 50/60PA65**, 42PC1***, 42PC1RV*, 42/50PC3***, 42PC3D, 42PC3DV, 50PC3D, 42PC3R*, 60PC4R*, 32PC5DVC, 42PC5RV*, 32/42/50PC5***, 42PC7R*, 42/50PG1***, 42/50PG10**, 42/50PG2***, 42/50PG20**, 42/50PG25, 42/50/60PG30**, 50/60PG60, 42/50PJ250, 42/50PJ3**, 42/50PJ550, 42PJ650, 50/60PK2**, 50PK3**, 50/60PK5**, 50/60PK7***, 50/60PK9***, 42/50PM1/3M**, 42/50PQ10, 42/50PQ20, 42/50PQ30**, 42/50PQ31, 42/50PQ35**, 42/50PQ60**, 42PQ65**, 50/60PS10, 42/50PS20**, 50PS30**, 50/60PS60**, 50PS65**, 50/60PS70**, 50/60PS80**, 42/50PT25**, 42/50PT35**, 50/60PV25**, 42/50PW35**, 42/50PW45**, 50/60PX9***, 60PY3RF*, 50/60PZ55**, 50/60PZ57**, 50/60PZ2**, 50/60PZ57**, 50/60PZ95**.

It is recommended that installers examine the RS232 control tables towards the end of all LG manuals and find the "xb" command, and check the allocation for the top 4 bits on the RGB command. Then use Group 1 or Group 2 commands as appropriate. Note: Some panels are listed in two different manuals, with **different** codes allocated. Also, we have found some panels need latest firmware upgrades to communicate at all. If your panel turns on and off but will not change channels, try other codes from this group. If nothing helps, call LG for an upgrade.

We have also found some panels support both "kb" and "xb" command sets. Also, some panels which show "xb" support in the manual ONLY have "kb" support. LG lies!

Another, older, group uses an "i" as a leading character for the source setting string: these are NOT drivable with these drivers, although they could be added if required.

Function code	**Group 4** **"xb" strings, code 97, 98**	**Group 5** **"xb" strings, code 99, 9A**	**Comments** 97 or 99 DTV 98 or 9A ATV
Input1/Computer1	'xb 00 **50**' + 0D	'xb 00 **60**' + 0D	RGB-PC
Input2/Computer2	'xb 00 91' + 0D	'xb 00 91' + 0D	HDMI-2 (Changed at V097)
Input3/Video1	'xb 00 20' + 0D	'xb 00 20' + 0D	AV1 Video/S-Video * OPT1 swaps Video1 &Video2
Input4/Video2	'xb 00 90' + 0D	'xb 00 90' + 0D	HDMI-1 * * OPT1 swaps Video1 &Video2
Input4/Video2	'xb 00 21' + 0D	'xb 00 21' + 0D	AV2 if OPT6 On * OPT1 swaps Video1 &Video2
Input5	'xb 00 30' + 0D	'xb 00 30' + 0D	S-Video (some only)
Input6	'xb 00 40' + 0D	'xb 00 40' + 0D	Component 1 Video YPbPr
Input7	'xb 00 41' + 0D	'xb 00 41' + 0D	Component 2 Video YPbPr
Input8	'xb 00 70' + 0D	'xb 00 70' + 0D	HDMI/DVI (some only)
Input9	'xb 00 80' + 0D	'xb 00 80' + 0D	HDMI/DVI (some only)
Input10	'xb 00 90' + 0D	'xb 00 90' + 0D	Select HDMI-1
Input11	'xb 00 91' + 0D	'xb 00 91' + 0D	HDMI-2 / SDI / DTV
Input12	'xb 00 92' + 0D	'xb 00 92' + 0D	HDMI-3
Input13	'xb 00 93' + 0D	'xb 00 93' + 0D	HDMI-4
Input14	'xb 00 A0' + 0D	'xb 00 A0' + 0D	HDMI-PC (some only)
Input15	'xb 00 A1' + 0D	'xb 00 A1' + 0D	HDMI-2 / SDI / DTV
Input16	'xb 00 B0' + 0D	'xb 00 B0' + 0D	SuperSign

Input17	'xb 00 C0' + 0D	'xb 00 C0' + 0D	DisplayPort(DTV) (some only)
Input18	'xb 00 D0' + 0D	'xb 00 D0' + 0D	DisplayPort(PC) (some only)
TV Channel Up	'mc 00 00' + 0D	'mc 00 00' + 0D	Use IR command PR+ CH+
TV Channel Down	'mc 00 01' + 0D	'mc 00 01' + 0D	Use IR command PR- CH-

* T440: OPT6 switch ON will use AV2 Video in place of HDMI. T430: uses HDMI as Video2.

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

```
TV := 'xb 00 00' + 0D;      // TV Digital (Code 97  or 99  selects)
TV := 'xb 00 10' + 0D;      // TV Analog (Code 98  or 9A  selects)
```

Aspect Ratio settings

Use the procedure shown in Part A of the T430/T440 manual:

```
SetAspect1      := 'kc 00 01' + 0D;   // Normal 4:3
SetAspect2      := 'kc 00 02' + 0D;   // 16:9
```

General comments

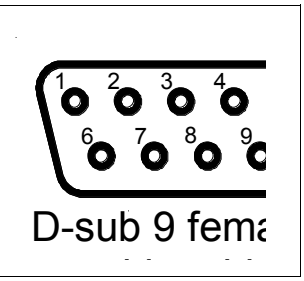
These panels can be used with a number of keyboards:

- With a "Code 9" or "Code B" keyboard, with buttons selecting "Video" and 'Computer", with "Volume Up/Dn";
- With a "Code E" keyboard, with buttons selecting "TV", "Video" and "Computer", with TV channel Up/Down and Volume control keys. (The TV channel commands send incremental (i.e. up and down) commands), so the limits are set in the panel.)
- No OPT7 handshake mode is provided. Power on panel connection blink codes available.
- Freeze command is not available.

RS232 connections to LG LCD, LG Plasma and Zenith flat screens

These use a 9-pin-D9 male on the panel, female on cable. Coms is at 9600, 8N1

Function/Direction	**T440 "projector" Connection**	**Fujitsu "Control" Port Connector**
Ground	Ground	9-pin D-sub pin 5
Data from T440 to projector	Tx	9-pin D-sub pin 2 (RXD)
Reply data from projector to T440	Rx	9-pin D-sub pin 3 (TXD)
Plus 9 volt CTS/DTR to projector	N/C	N/C



After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.
Some have clamp diodes on signal lines so voltages may be limited to -0.7 volts and plus 5v signal pulses.

Some might use reverse 2/3.

LG UN731 TV/LCD panels via IR control: Codes A8 … AA

This is a generic driver, but codes are reputed to be universal.

This driver is just a copy of the Samsung LCD driver via IR with codes A4 to A7, so please see that driver's description later in this manual, including comments re cabling etc.

Code allocations are:

- Code A8 – Toggle power command and direct input sources.
- Code A9 - Separate On/Off commands and direct input sources

(Source rotate mode as in the Samsung is NOT supported. The T430 is not supported. Mute is not supported.

A code 9 keyboard allows for 2 computer channels and 2 video channels, and a code E keyboard supports a TV source selection and provides channel selection.

Channel selections are as follows:

```
Input1FunctionCode  := $00CE;  // HDMI1
Input2FunctionCode  := $00CC;  // HDMI2

Input3FunctionCode  := $00CC;  // HDMI2
Input4FunctionCode  := $005A;  // AV1/Video1

Input5FunctionCode  := $00E9;  // HDMI3 (untested)
```

(These all assume an IR address code of 04FBhex.)

Mitsubishi LCD: LDT321V, LDT323V, LDT422V, LDT461V2, MDT521S, MTD651S, MTD652S: (Code 48)

(MDT321S , LDT462V, LDT551V see NEC Multeos below)

RS232 codes are at:
http://www.mitsubishielectric.com.au/assets/vis/RS232_485_LAN_Serial_Command_Control_MDT652S.doc.pdf

Function code	NEC LCD 00_r/00_v and M40/46 (old codes)	Comments
Input1/Computer1	'00_r3' + 0D	Computer1 RGB 1 VGA analog-RGB
Input2/Computer2	'00_r4' + 0D	RGB/HV into BNC sockets
Input3/Video1	'00_v1' + 0D	Composite Video * OPT1 swaps Video1 &Video2
Input4/Video2	'00_r1' + 0D	HDMI * * OPT1 swaps Video1 &Video2
* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2. S-Video code: '00_v3' + 0D		
Input5	'00_v2' + 0D	Component 1 Video YPbPr (RCA)
Input6	'00_r1' + 0D	HDMI
Input7	'00_r2' + 0D	DVI-D
Input8	'00_r5' + 0D	Network
Input9	'00_v3' + 0D	S-Video

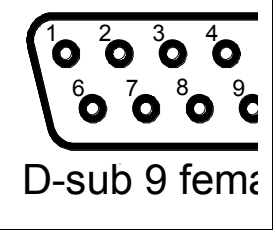
Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making S-Video the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported on M40/M60 and all with new codes;
- OPT7 handshake mode is not available with old codes, but is on M40/M60 and all with new codes;
- Mute and Freeze is not supported at all;

RS232 connections to Mitsubishi LCD with D9 (not sighted, taken from manual)

These use a 9-pin-D9 male on the plasma, female on cable. Comms is at 9600 baud, 8 bits, Odd parity, 1 stop.

Function/Direction	T440 "projector" Connection	"Serial" Port Connector	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to projector	Tx	9-pin D-sub pin 2 (RXD)	
Reply data from projector to T440	Rx	9-pin D-sub pin 3 (TXD)	
Plus 9 volt CTS/DTR to projector	N/C	N/C	



After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

NEC LCD: (Code 60) Old codes for: 3000/3210/4000/4010/4020/4610/4620/ 5220/5710/6520P/L, SC40/SC46, M40/M46 Old T1, Old T2

(See 64/65/66 below for Multeos new drivers.)

NEC Plasma: (Code 60) 42XC10/42XP10, 50XC10/50XP10, 60XC10/60XP10

In the back of each user's manual is a list of typical channel selection messages, and manuals of NEC LCD panels are available at http://www.nec-display-solutions.co.uk/c/g/uk/en/Service/Home/index.html

Function code	NEC LCD 00_r/00_v and M40/46 (old codes)	Comments
Input1/Computer1	'00_r2' + 0D	D-SUB VGA
Input2/Computer2	'00_r3' + 0D	RGB/HV into BNC sockets
Input3/Video1	'00_v1' + 0D	Composite Video 1 * (OPT1 swaps Video1 & Video2)
Input4/Video2	'00_h1' + 0D	HDMI * Some only * (OPT1 swaps Video1 & Video2)
Input5	'00_v2' + 0D	Component DVD/DV on BNC
Input6	'00_v4' + 0D	Video 2 *some only
Input7	'00_r1' + 0D	DVI-D digital
Input8	'00_h1' + 0D	HDMI * Some only
Input9	'00_v3' + 0D	S-Video

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making S-Video the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- No blink codes supported;
- OPT7 handshake mode is not available with old codes, but is on M40/M60 and all with new codes;
- Freeze is not supported at all;
- Turn off ECO mode of the panel to enable On/Off control (some only)
- Switch "INPUT DETECT" to "NONE" to prevent channel changing when non-selected signals come and go;
- "DVI MODE" may need to be setup to control type of input signal expected on that input;
- "S-VIDEO MODE" should be set to "SEPARATE" so users can select between Composite Video and S-Video sources (some only).

NEC LCD: (Code 64 HDMI 1, Code 65 HDMI 2), Mit Code 66, Global 68

Multeos and Multisync models LCD3210, LCD3215, LCD4215, LCD4615, LCD5710, LCD8205, MDT652S, M401/M461/M521, P401, P402, P461, P462, P521, P552, P553, P701, P702, P703, S401, S461, S521, V321, V322, V422, V423, V461, V462, V463, X464UN/UNV, V551, V552, V651, V652, V3212, V801, X431BT, X461HB, X461S, X461UN, X463UN, X551S, X551UN, X554UN/UNS

Mitsubishi MDT321S (no HDMI)

Mitsubishi LCD: LDT462V, LDT551V, MDT652S Code 66 has HDMI as Video 2

In the back of each user's manual is a list of typical channel selection messages.

Function code	M40/46 Multeos	Comments

Input1/Computer1	'00600001'	Select RGB-PC
Input2/Computer2	'00600002'	RGB/HV into BNC sockets
Input3/Video1	'00600005'	Composite Video * (OPT1 swaps Video1 & Video2)
Input4/Video2	'00600004' Code $64	HDMI/DVD * * (OPT1 swaps Video1 & Video2)
Input4/Video2	'00600011' Code $65	HDMI * * (OPT1 swaps Video1 & Video2)
Input4/Video2	'00600003' Code $66	HDMI * * (OPT1 swaps Video1 & Video2)
Input5	'00600006'	Video 2
Input6	'0060000C'	Component 1
Input7	'0060000E'	Component 2
Input8	'00600003'	RGB 1 or 2: DVI-D
Input9	'00600004	HDMI (Set only) * Some only
Input10	'00600011'	HDMI VESA * Some only
Input11	'00600009'	DisplayPort * Some only (OLDER)
Input12	'0060000F'	DisplayPort 1
Input13	'0060000D'	Option
Input14	'00600010'	DisplayPort 2
Input15	'00600012'	HDMI 2
Input16	'00600080'	DisplayPort 3
Input17	'00600082'	HDMI 3
Input18	'00600087'	MP
Input19	'00600088'	Computer Module
TV	'0060000A'	
TV Channel Up	'008B0001'	
TV Channel Down	'008B0002'	

- T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.
- On panel connection blink codes supported with new codes;
- OPT7 handshake mode is available with new codes;
- Audio control (Volume up/down keyboards, codes 2, 9, B, and E) is ONLY supported in M40/M46 Multeos mode and all with new codes (Code 64). **NOTE: Variable audio control and audio mute is only available to the speaker-level drive. It is NOT able to control the line-level audio out to the RCA connectors.** Use on-screen setup to manually allocate audio inputs to channels;
- Two-yellow button “Mute” command is available on “64/65 ” code displays, but ONLY to the audio and only to the speaker drive. No picture mute is provided;
- Freeze is not supported at all;
- Turn off ECO mode of the panel to enable On/Off control (some only)
- Switch “INPUT DETECT” to “NONE” to prevent channel changing when non-selected signals come and go;
- “DVI MODE” may need to be setup to control type of input signal expected on that input;
- “S-VIDEO MODE” should be set to “SEPARATE” so users can select between Composite Video and S-Video sources (some only).
- TV control (keyboard code ‘E’) is only available for M40/M46 in Multeos mode. It uses incremental Up and Down buttons.

NEC LCD E-Series: Code 68 Global version of above, no audio, audio mute or reply mode.

NEC LCD E-Series: Code 67 E324, E424, E464, E554, E654

Control codes for this range are at: http://www.hdtvreview.com/pdf/nec-e654-quickstart.pdf and http://au.nec.com/en_AU/media/docs/products/displays/ExternalControlManual-E-Series_en.pdf

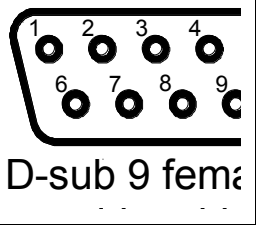
(Unfortunately not all info is in these documents, e.g. reply to GET commands and absolute volume codes.)

Function code	E-series codes	Comments
Input1/Computer1	'00600001'	Select RGB-PC DB15 *(OPT5 swaps Video1 & Video2)
Input2/Computer2	'00600012'	HDMI 2 *(OPT5 swaps Video1 & Video2)
Input3/Video1	'00600005'	Composite Video * (OPT1 swaps Video1 & Video2)
Input4/Video2	'00600011'	HDMI 1 * (OPT1 swaps Video1 & Video2)
Input5	'00600013'	HDMI 3
Input6	'0060000C'	Component Video YPbPr (RCA)
Input7	'00600014'	USB
TV	'0060000A'	Digital TV
TV Channel Up	'008B0001'	
TV Channel Down	'008B0002'	

- On panel connection blink codes supported with new codes. (subject to testing);;
- OPT7 handshake mode is available with new codes. (subject to testing);
- Audio control (Volume up/down keyboards, codes 2, 9, B, and E) is supported in Incremental mode: and sends five Inc. or Dec. commands. NOTE: Variable audio control and audio mute is only available to the speaker-level drive. It is NOT able to control the line-level audio out to the RCA connectors. Use on-screen setup to manually allocate audio inputs to channels;
- No picture mute or freeze is provided;
- Turn off ECO mode of the panel to enable On/Off control (some only)
- Switch "INPUT DETECT" to "NONE" to prevent channel changing when non-selected signals come and go;

RS232 connections to NEC LCD with D9

These use a 9-pin-D9 male on the plasma, female on cable. Comms is at 9600 baud, 8 bits, Odd parity, 1 stop.

Function/Direction	T440 "projector" Connection	"Serial" Port Connector	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to projector	Tx	9-pin D-sub pin 2 (RXD)	
Reply data from projector to T440	Rx	9-pin D-sub pin 3 (TXD)	
Plus 9 volt CTS/DTR to projector	N/C	N/C	

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

NEC NLT-40/46FHD100, Sherwood LF-401-TB5 TV/LCD panel (Codes 95 & 96), (Made by “indtek” in Korea as LC-401EB3 and LC-461EB3, also sold by Grundig.)

There are two drivers for this: these are same for Computer and Video, but the TV function can select Full HD Digital tuner (Code 1C) or analog tuner (Code 1D)

This family has many members with a range of channel messages.

Channel codes are:

```
Input1    := 'kb 00 7' + 0D;          //Computer1 Select PC-RGB
Input2    := 'kb 00 8' + 0D;          //Computer2 Select HDMI-1

Input3    := 'kb 00 2' + 0D;          //Video1 AV1 Comp Video   * (OPT1 swaps Video1 & Video2)
Input4   := 'kb 00 A' + 0D;           // Video2 HDMI              * (OPT1 swaps Video1 & Video2)
```

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

```
Input4    := 'kb 00 5' + 0D;          //Video4 S-Vid *

Input5   := 'kb 00 3' + 0D;           // LG_kb; AV2
Input6   := 'kb 00 4' + 0D;           // LG_kb; AV3

Input7   := 'kb 00 6' + 0D;           // Component
Input8   := 'kb 00 A' + 0D;           // HDMI 3 (option)
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the “Computer” channel and Video1 as the “Video” channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making S-Video the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

```
TV        := 'kb 00 0' + 0D;          // TV Digital (Code 95  selects)
TV        := 'kb 00 1' + 0D;          // TV Analog (Code 96  selects)
```

This panel can be used with a number of keyboards:

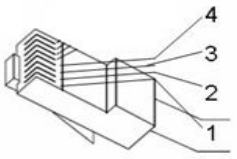
- With “Code 9” or “Code 8 or A” keyboards, with buttons selecting “Video” and ‘Computer”, with either “Volume” (code 9) or “Freeze/Mute” (Code A);
- With a “Code B-L” or “Code B-P” keyboard, with buttons selecting “Video” and “Computer1” and “Computer2” with Volume control keys; or
- With a “Code E” keyboard, with buttons selecting “TV”, “Video” and “Computer”, with TV channel Up/Down and Volume control keys. (The channel commands send incremental (i.e. up and down) commands), so the limits are set in the panel.)

(Keyboards B and E combine channel keys with “On” keys.)

- Panel connection blink codes are available but OPT7 handshake mode is NOT.

RS232 connections to Sherwood TV/LCD panel

These use a RG45 on the LCD, female on cable. Comms is at 9600 baud, 8 bits, no parity, 1 stop.

Function/Direction	**T440 “projector” Connection**	**RG45 Connector EIA568A**	
Ground	Ground	Pin 3 (orange-white) & pin 4 (solid blue)	
Data from T440 to projector	Tx	Pin 1, green-white	
Reply data from projector to T440	Rx	Pin 2, solid green	

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

NEC Plasma PX-42/50/60/61, MP/VM/VP/VR/XM/XR, 2/3/4/5/6 (Code 14)

This family has many members with a range of channel messages.

There is a typical RS232 code Operation Manual at: http://www.prokare.com.tr/pdf2/nec_residental_plasma_rs232.pdf

And http://www.nec-display-solutions.co.uk/c/g/uk/en/Service/Home/index.html

Channel codes are:

```
Input1   := DF + 80 + 60 + 47 + 01 + 07 + 0E;      //Computer1 RGB1 / PC1  DB15
Input2   := DF + 80 + 60 + 47 + 01 + 08 + 0F;      //Computer2 RGB2 / PC2  5 x BNC

Input3   := DF + 80 + 60 + 47 + 01 + 02 + 09;      //Video1 "Video2"  RCA Composite Video*
Input4   := DF + 80 + 60 + 47 + 01 + 0C + 13;      //Video2 RGB3 DVI-D  ) *
* (OPT1 swaps Video1 & Video2)
```

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

```
*Input4  := DF + 80 + 60 + 47 + 01 + 03 + 0A;      //Video2 "Video3"  S-VIDEO DIN-4

Input5   := DF + 80 + 60 + 47 + 01 + 01 + 08;      // "Video1"  BNC
Input6   := DF + 80 + 60 + 47 + 01 + 05 + 0C;      // HD1 3 x RCA DTV1/Component
Input7   := DF + 80 + 60 + 47 + 01 + 06 + 0D;      // HD2 5 x BNC DTV2/Component or SCART1/2
Input8   := DF + 80 + 60 + 47 + 01 + 0C + 13;      // RGB3 / PC3  DVI-D

Input9   := DF + 80 + 60 + 47 + 01 + 0E + 15;      // HD3 DVI/HDMI  (some only)
Input10  := DF + 80 + 60 + 47 + 01 + 1A + 21;      // HD4 DVD/HDMI  (some only)

Input11  := DF + 80 + 60 + 47 + 01 + 03 + 0A;      //Video2 "Video3"  S-VIDEO DIN-4
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the “Computer” channel and Video1 as the “Video” channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making S-Video the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

This panel can be used with a number of keyboards:

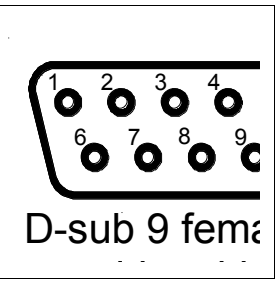
- With a “Code 9” keyboard, with buttons selecting “Video” and ‘Computer”, with “Volume” keys.
- With a “Code B-L” or “Code B-P” keyboard, with buttons selecting “Video” and “Computer1” and “Computer2” with “Volume” control keys. (Keyboards combine channel keys with “On” keys.)
- (There is no point in using a Code 8 or A keyboard, as there is no “Freeze” function on plasma screens.

Panel connection blink codes are available but OPT7 handshake mode in NOT.

Audio mute with 2 Vol keys is available, but not video.

RS232 connections to NEC Plasma with D9

These use a 9-pin-D9 male on the plasma, female on cable. Comms is at 9600 baud, 8 bits, Odd parity, 1 stop.

Function/Direction	**T440 “projector” Connection**	**“Serial” Port Connector**	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to projector	Tx	9-pin D-sub pin 2 (RXD)	
Reply data from projector to T440	Rx	9-pin D-sub pin 3 (TXD)	
Plus 9 volt CTS/DTR to projector	“RTS”	9-pin D-sub pin 8(CTS IN)	

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Panasonic LCD panels: (Codes 56, 57) (Vol 0->100)

There are many displays covered by these drivers, but to determine the appropriate one to use, please examine the pages in the user manual of your display to see which is needed. Do a search (Ctrl "F") for "9600" (the coms baud rate) to get to the page "Serial Terminals connection". This or the next page shows the inputs for this model. Compare these to the table below to see commands needed.

Units with "AV1" available (Code 56):

TH-42LF6U, TH-47LF6U, TH-55LF6U, TH-42LF30U, TH-47LF30U, TH-70LF50W, TH-80LF50W, TH-42LF60U, TH-47LF60U, TH-55LF60U, TH-42LFP30, TH-47LFP30

```
Input1      := 02 + 'IMS:PC1' + 03;              // Computer1  DB15
Input2      := 02 + 'IMS:DV1' + 03;      // Computer2  DVI-D

Input3      := 02 + 'IMS:AV1' + 03;      // Video1 (not all ... overwrite if nec. with HM1 see below)
Input4      := 02 + 'IMS:HM1' + 03;      // Video2   HDMI 1

Input5      := 02 + 'IMS:HM2' + 03;      // HDMI 2

Input6      := 02 + 'IMS:AV2' + 03;      // AV2
Input7      := 02 + 'IMS:AV2YBR' + 03;
Input8      := 02 + 'IMS:AV2RGB' + 03;

Input9      := 02 + 'IMS:SL1' + 03;      // Slot 1
Input10     := 02 + 'IMS:SL1YUV' + 03;   // Slot 1
Input11     := 02 + 'IMS:SL1RGB' + 03;   // Slot 1

Input12     := 02 + 'IMS:S1A' + 03;      // Slot 1A
Input13     := 02 + 'IMS:S1AYUV' + 03;   // Slot 1A
Input14     := 02 + 'IMS:S1ARGB' + 03;   // Slot 1A

Input15     := 02 + 'IMS:S1B' + 03;      // Slot 1B
Input16     := 02 + 'IMS:S1BYUV' + 03;   // Slot 1B
Input17     := 02 + 'IMS:S1BRGB' + 03;   // Slot 1B

Input18     := 02 + 'IMS:DV1YUV' + 03;   // DVI    (These codes suspiciously called DVIYUV
Input19     := 02 + 'IMS:DV1RGB' + 03;   // DVI    (sometimes. This looks like a mis-print.)

Input20     := 02 + 'IMS:DL1' + 03;      // DigitalLink
```

Units with "AV1" un-available (Code 57):

TH-42LF5U, TH-47LF5U, TH-42LFE6E, TH-50LFE6E, TH-47LFT30, TH-47LFX6J

As above, except:

```
Input1      := 02 + 'IMS:PC1' + 03;      // Computer1  DB15
Input2      := 02 + 'IMS:DV1' + 03;      // Computer2  DVI-D

Input3      := 02 + 'IMS:HM1' + 03;      // Video1 overwrite with HDMI 1
Input4      := 02 + 'IMS:HM1' + 03;      // Video2     HDMI 1
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported and OPT7 handshake mode is supported;
- Enable the RS-232 control access by going to "Setup" then to "Network Setup" then "Control I/F Select" and set "RS-232";
- Audio control 0->100 (Volume up/down keyboards, codes 2, 9, B, and E) is available;
- Freeze is not supported at all;

Panasonic Plasma panels: (Codes 50 ... 53) (Vol 0->63)

There are many displays covered by these drivers, but to determine the appropriate one to use, please examine the pages in the user manual of your display to see which needed. Look for a page entitled "SERIAL Terminals" which will list the commands needed by that monitor, and choose the driver that suits. The strings needed are always listed there. Separate, more detailed documents called "PDP Control Command" are available on request from Panasonic, but are not generally held on publicly accessible web sites. (Google will fetch some of these if you search for "PDP Control Command" (note quotes).)

Units with "IIS" commands (Code 50):

```
Input1    := 02 + 'IIS:RG1' + 03;      //Computer1  RGB
Input2    := 02 + 'IIS:YP1' + 03;      //Computer2  Component

Input3    := 02 + 'IIS:VID' + 03;      //Video1     Video
Input4    := 02 + 'IIS:SVD' + 03;      //Video2     S-Video

Input5    := 02 + 'IIS:YP' + 03;       //Video2     Component  (alt)
```

Units with "IMS" commands (Code 51) (early group TH-nnPx3/4/5, TH-61PHW6):

```
Input1    := 02 + 'IMS:RG1' + 03;      //Computer1  RGB
Input2    := 02 + 'IMS:YP1' + 03;      //Computer2  Component

Input3    := 02 + 'IMS:VID' + 03;      //Video1     Video
Input4    := 02 + 'IMS:YP1' + 03;      //Video2     Component
```

Units with slot commands (Code 52) (TH-nnPx6/7/8/9/10/11/12, TH-nnVX100)

```
Input1    := 02 + 'IMS:PC1' + 03;      //Computer1  DB15
Input2    := 02 + 'IMS:SL1' + 03;      //Computer2  Slot 1
Input3    := 02 + 'IMS:SL2' + 03;      //Video1     Slot 2
Input4    := 02 + 'IMS:SL3' + 03;      //Video2     Slot 3

Input6    := 02 + 'IMS:SL1' + 03;      //Slot 1
Input9    := 02 + 'IMS:SL1A' + 03;     //Slot 1
Input10   := 02 + 'IMS:SL1B' + 03;     //Slot 1

Input12   := 02 + 'IMS:SL2' + 03;      //Slot 2
Input13   := 02 + 'IMS:SL2A' + 03;     //Slot 2
Input14   := 02 + 'IMS:SL2A' + 03;     //Slot 2
Input15   := 02 + 'IMS:SL3' + 03;      //Slot 3
```

Units with slot commands (Code 53) (TH-nnPx20)

```
Input1    := 02 + 'IMS:PC1' + 03;      //Computer1  DB15
Input2    := 02 + 'IMS:DV1' + 03;      //Computer2  DVI-D

Input3    := 02 + 'IMS:VD1' + 03;      //Video1     Comp Vid
Input4    := 02 + 'IMS:HM1' + 03;      //Video2     HDMI

Input5    := 02 + 'IMS:YP1' + 03;      //Component/RGB input BNC 20

Input6    := 02 + 'IMS:SL1' + 03;      //Slot 1
Input7    := 02 + 'IMS:S1A' + 03;      //Slot 1
Input8    := 02 + 'IMS:S1B' + 03;      //Slot 1
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making S-Video the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported and OPT7 handshake mode is supported;
- Audio control (Volume up/down keyboards, codes 2, 9, B, and E) is available;
- Freeze is not supported at all;

Male and female D9 connectors are used variously, and pin-out is shown in all manuals.

Panasonic LCD TV / panel, IR interface only: Code A0

Models covered:

65 inch	TH-P65ST50A
50 inch	TH-P50UT 50A
32 inch	TH-L32XMA
50 inch	TH-P50UT 30A

These units use IR only, and we have implemented a basic control via IR for them.

In a simple mode, a **T440 Code6-KB1** keyboard can be used to provide basic On/Off functionality. It has no absolute On and Off commands, so the same command is used for both On and Off (programmed into both keys). Turning Off uses just ONE transmission of the code (not two, as in most other panels.)

In a more complex installation, a **T440-code E** keyboard can be used, with some compromises and re-labelling needed to make it clear what goes on.

This panel has a strange split source selection. A **TV** key on the remote absolutely selects the TV function, and we have mimicked this in the Code E, so the TV button selects the TV mode, and the Channel Up and Channel down (and the Volume Up and Volume Down) functions all work as normal.

However, all the other sources are selected via the **AV** key, and we have mapped this to the "Video" key on the T440. (If you have only single other source, eg Composite Video or HDMI, select just that in the TV / panel, and pressing the Video (now AV function) will select this as the alternative to the TV function. If you need more channels, the "Computer" key has been programmed to send an "OK" code, and the "Channel" keys are reprogrammed away from the TV function to send the (different from Channel) "Up arrow" and "Down Arrow" codes.

So to select any one of a number of (non-TV) sources, press the "AV" button and the source menu will appear on the TV / panel. Then use the Channel Up / Down keys to navigate to the desired source (of many) and then press the "Computer" key (now acting as the "OK") to select and activate that channel.

Yes, it's confusing, but all we can offer at the moment. (The new T470 from JED will have re-label able keys, so will be able to have a correctly labelled set of keys for all the above. Stay tuned!)

Philips BDL series LCD (LED backlit) panels Code 43, 44, 45, 46, 47, 4C, 4D, 59

Code 5F supports BDL Video walls

Philips have a number of different serial protocols in current use and for sale in LCD/LED panels, and there is no central record or listing of which panels use which protocol. It seems that when a panel's software is updated (which can be done via a USB stick) the protocol of that panel can change, as well. (Note: the software revision numbers in the panels bear no relation to the protocol version numbers.) These all run at 9600 8N1, and also use two different connector systems, some a 4-sleeve miniature audio-type jack (supplied by Philips, cabled to a DB9), and some a DB9 male on the panel. (A fifth system protocol, called SerialXpress for HotelTV uses a 10-pin RJ50 connector, and is covered by codes 4A and 4B following.)

Protocol 1.6 (code 44) and 2.0 (code 45) are "non-addressed" protocol strings. If you don't know what protocol a particular panel uses, try 40 or 45 first. If it is a "non-addressed" protocol it will show Comms OK (one red LED blink) when connected and selected for this. If it shows three blinks, try the other two (below) --- it may be an "addressed" protocol that is being used (codes 46 and 47). If it is correctly a "non-addressed" protocol, and several source commands do not work, try the other "non-addressed" one. Similarly, if you have identified the panel as "addressed" (longer messages), and e.g. the HDMI2 command selects VGA, then try the other "addressed" one.

Code 44 (Non-addressed Protocol 1.6): Some models we know of matching this driver are:
BDL4230E/BDL4230ET, BDL4651VH, BDL4675XU, BDL4681XU, BDL4785SL, BDL5530EL, BDL5585XL, BDL6450AT, BDL6531E, BDL6551V Volume range is 0->100

The first group support revision 1.6 of the protocol spec. Channel codes are:

```
Input1    := 08 + 01 + AC + 05 + 00 + 01 + 00 + A1;    //Computer 1: PC Digital VGA
Input2    := 08 + 01 + AC + 09 + 01 + 01 + 00 + AC;    //Computer 2: DVI-D

Input3    := 08 + 01 + AC + 01 + 00 + 01 + 00 + A5;    //Video 1 *   (OPT1 swaps Video1 & Video2)
Input4    := 08 + 01 + AC + 09 + 00 + 01 + 00 + AD;    //Video 2 HDMI 1 * (OPT1 swaps Video1 & Video2)
```

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

```
Input4    := 08 + 01 + AC + 01 + 01 + 01 + 00 + A4;    //Video 2 S-Video

Input5    := 08 + 01 + AC + 03 + 00 + 01 + 00 + A7;    // Component
Input6    := 08 + 01 + AC + 07 + 01 + 01 + 00 + A2;    // DisplayPort
Input7    := 08 + 01 + AC + 08 + 00 + 01 + 00 + AC;    // Card OPS
```

Code 45 (Non-addressed Protocol 2.0) for models **BDL3245E, BDL4245E, BDL4645E,** maybe **BDL4231.**

```
Input1    := 08 + 01 + AC + 05 + 00 + 00 + 00 + A0;    //Computer 1: PC VGA
Input2    := 08 + 01 + AC + 09 + 01 + 01 + 00 + AC;    //Computer 2: DVI-D (unchanged)

Input3    := 08 + 01 + AC + 01 + 00 + 00 + 00 + A4;    //Video 1  AV Input * (OPT1 swaps Video1 & Video2)
Input4    := 08 + 01 + AC + 09 + 00 + 00 + 00 + AC;    //Video 2 HDMI 1 * (OPT1 swaps Video1 & Video2)
```

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

```
Input4    := 08 + 01 + AC + 01 + 01 + 01 + 00 + A4;    //Video 2 S-Video  (undocumented)

Input5    := 08 + 01 + AC + 03 + 00 + 00 + 00 + A6;    // Component 1
Input6    := 08 + 01 + AC + 03 + 01 + 00 + 00 + A7;    // Component 2

Input7    := 08 + 01 + AC + 09 + 01 + 00 + 00 + AD;    // HDMI 2

Input8    := 08 + 01 + AC + 01 + 01 + 00 + 00 + A5;    // Card OPS
```

Code 46 (**Addressed Protocol 1.86)** for BDLxx20QL. Channel codes are: Volume range is 0->100

```
Input1    := 09 + 01 + 01 + AC + 05 + 00 + 01 + 00 + A1;  //Computer 1: PC Digital VGA
Input2    := 09 + 01 + 01 + AC + 05 + 01 + 01 + 00 + A0;  //Computer 2: HDMI 2

Input3    := 09 + 01 + 01 + AC + 01 + 00 + 01 + 00 + A5;  //Video 1*  Video (OPT1 swaps Video1 & Video2)
Input4    := 09 + 01 + 01 + AC + 09 + 00 + 01 + 00 + AD;  //Video 2* HDMI 1 (OPT1 swaps Video1 & Video2)
```

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

```
Input4      := 09 + 01 + 01 + AC + 01 + 01 + 01 + 00 + A4;   //Video 2 S-Video

Input5      := 09 + 01 + 01 + AC + 03 + 00 + 01 + 00 + A7;   // Component
Input6      := 09 + 01 + 01 + AC + 07 + 01 + 01 + 00 + A2;   // DisplayPort 1
Input7      := 09 + 01 + 01 + AC + 06 + 01 + 01 + 00 + A3;   // DisplayPort 2
Input8      := 09 + 01 + 01 + AC + 09 + 01 + 01 + 00 + AC;   // DVI-D
Input9      := 09 + 01 + 01 + AC + 08 + 01 + 01 + 00 + AD;   // USB-A
```

Code 43 (**Addressed Protocol 1.87)** for (at least): BDL6520QL, BDL6526QT, BDL5588XH, BDL5588XL, BDL4677XH, BDL4678XL, BDL4776XL, BDL4777XL, BDL5586XL, BDL5588XH. Volume range is 0->100

Channel codes are:

```
Input1      := 09 + 01 + 00 + AC + 05 + 00 + 01 + 00 + A0;  // Computer 1: PC Digital VGA
Input2      := 09 + 01 + 00 + AC + 05 + 01 + 01 + 00 + A1;  // Computer 2: HDMI 2

Input3      := 09 + 01 + 00 + AC + 01 + 00 + 01 + 00 + A4; // Video 1  Video (OPT1 swaps Video1 & Video2)

Input4      := 09 + 01 + 00 + AC + 09 + 00 + 01 + 00 + AC; // Video 2 HDMI 1  (OPT1 swaps Video1 & Video2)
```

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

```
Input4      := 09 + 01 + 00 + AC + 01 + 01 + 01 + 00 + A5; // Video 2 S-Video

Input5      := 09 + 01 + 00 + AC + 03 + 00 + 01 + 00 + A6; // Component
Input6      := 09 + 01 + 00 + AC + 07 + 01 + 01 + 00 + A3; // DisplayPort 1
Input7      := 09 + 01 + 00 + AC + 06 + 01 + 01 + 00 + A2; // DisplayPort 2
Input8      := 09 + 01 + 00 + AC + 09 + 01 + 01 + 00 + AD; // DVI-D
Input9      := 09 + 01 + 00 + AC + 08 + 01 + 01 + 00 + AC; // USB-1
Input10     := 09 + 01 + 00 + AC + 06 + 00 + 01 + 00 + A3; // USB-2
```

Code 47 (**Addressed Protocol 1.88)** for (at least): BDL3230QL, BDL4330QL, BDL4830QL, BDL5530QL BDL3260EL, BDL4260EL, BDL4660EL, BDL4765EL, BDL5560EL, BDL4280VL, BDL4680VL, BDL5580VL

Code 4C (**Addressed Protocol 1.88, two volume)** Some of these panels need a different format of volume command, because they control internal speaker volume and external audio jack volume with different bytes of a longer message. Code 4C sends this longer message.

Volume range is 0->100 (subject to confirmation.)

Channel codes are:

```
Input1      := 09 + 01 + 01 + AC + 05 + 00 + 01 + 00 + A1;   //Computer 1: PC Digital VGA
Input2      := 09 + 01 + 01 + AC + 06 + 00 + 01 + 00 + A2;  //Computer 2: HDMI 2

Input3      := 09 + 01 + 01 + AC + 01 + 00 + 01 + 00 + A5;  //Video 1*  Video (OPT1 swaps Video1 & Video2)
Input4      := 09 + 01 + 01 + AC + 0D + 00 + 01 + 00 + A9;  //Video 2* HDMI 1 (OPT1 swaps Video1 & Video2)
```

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

```
Input4      := 09 + 01 + 01 + AC + 02 + 00 + 01 + 00 + A6;   //Video 2 S-Video

Input5      := 09 + 01 + 01 + AC + 03 + 00 + 01 + 00 + A7;   // Component
Input6      := 09 + 01 + 01 + AC + 0A + 00 + 01 + 00 + AE;   // DisplayPort 1
Input7      := 09 + 01 + 01 + AC + 07 + 00 + 01 + 00 + A3;   // DisplayPort 2
Input8      := 09 + 01 + 01 + AC + 0E + 00 + 01 + 00 + AA;   // DVI-D
Input9      := 09 + 01 + 01 + AC + 0C + 00 + 01 + 00 + A8;   // USB-A
```

Code 4D (**Addressed Protocol 1.92, two volume)** This also uses two volume data fields, but a different command set for inputs. **55BDL4050D/00** uses this protocol. (Code **59** has same channel set, but ext. vol only.)

Volume range is 0->100.

Channel codes provided are (only a subset are actually implemented):

Input1 := 09 + 01 + 01 + AC + 05 + 05 + 01 + 00 + A4; //Computer 1: VGA (via DVI-I)
Input2 := 09 + 01 + 01 + AC + 06 + 06 + 01 + 00 + A4; //Computer 2: HDMI 2

Input3 := 09 + 01 + 01 + AC + 01 + 01 + 01 + 00 + A4; //Video 1* Video (OPT1 swaps Video1 & Video2)
Input4 := 09 + 01 + 01 + AC + 0D + 0D + 01 + 00 + A4; //Video 2* HDMI 1 (OPT1 swaps Video1 & Video2)

* T440: OPT6 switch ON will use S-Video in place of HDMI 1. T430: uses HDMI 1 as Video2.

Input4 := 09 + 01 + 01 + AC + 02 + 02 + 01 + 00 + A4; //Video 2 S-Video

Input5 := 09 + 01 + 01 + AC + 03 + 03 + 01 + 00 + A4; // Component

Input6 := 09 + 01 + 01 + AC + 0A + 0A + 01 + 00 + A4; // DisplayPort 1
Input7 := 09 + 01 + 01 + AC + 07 + 07 + 01 + 00 + A4; // DisplayPort 2

Input8 := 09 + 01 + 01 + AC + 0E + 0E + 01 + 00 + A4; // DVI-D
Input9 := 09 + 01 + 01 + AC + 09 + 09 + 01 + 00 + A4; // Card DVI-D

Input10 := 09 + 01 + 01 + AC + 0F + 0F + 01 + 00 + A4; // HDMI 3

Input11 := 09 + 01 + 01 + AC + 0C + 0C + 01 + 00 + A4; // USB-1
Input12 := 09 + 01 + 01 + AC + 08 + 08 + 01 + 00 + A4; // USB-2

Input13 := 09 + 01 + 01 + AC + 0B + 0B + 01 + 00 + A4; // Card OPS
Input14 := 09 + 01 + 01 + AC + 10 + 10 + 01 + 00 + A4; // Browser
Input15 := 09 + 01 + 01 + AC + 11 + 11 + 01 + 00 + A4; // Smart CMS
Input16 := 09 + 01 + 01 + AC + 12 + 12 + 01 + 00 + A4; // DMS (Digital media Server)
Input17 := 09 + 01 + 01 + AC + 13 + 13 + 01 + 00 + A4; // Internal storage
Input18 := 09 + 01 + 01 + AC + 17 + 17 + 01 + 00 + A4; // Media Player

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making HDMI the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

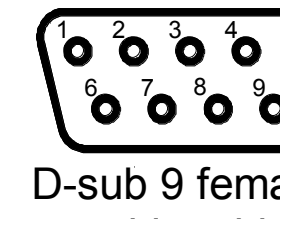
T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2..

- OPT7 handshake mode is provided;
- No Picture and sound mute is available;
- Mute and freeze keyboard code 8 or A is not usable;
- Aspect ratio control is not supported.

RS232 connections to Philips LCD/LED with D9 or JACK

Some use a 9-pin-D9 male on the LCD, female on cable. Others use a **4-sleeve miniature audio-type jack (supplied by Philips, cabled to a DB9).** Comms is at 9600 baud, 8 bits, no parity, 1 stop..

Function/Direction	**T440 "projector" Connection**	**"Serial" Port Connector**
Ground	Ground	9-pin D-sub pin 5
Data from T440 to panel	Tx	9-pin D-sub pin 3
Reply data from panel to T440	Rx	9-pin D-sub pin 2
Plus 9 volt CTS/DTR to panel	N/c	N/c



After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Philips SerialXpress series LCD (LED backlit) panels Code 4A, 4B

This fifth system protocol, called SerialXpress for HotelTV uses a 10-pin RJ50 connector, and runs at 38400 baud 8N1, and takes 66 pages to describe. A protocol document is available from Philips distributors.

Two codes support this series, code 4A does volume control using simple Increment and Decrement commands going one step at a time. Code 4B uses the Absolute Volume commands and each press or step increments by 5 steps.

Channel codes are:

Input1 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 07 + 8B + A5 + A5; //Computer 1: VGA
Input2 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 09 + 85 + A5 + A5; //Computer 2: HDMI 2

Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.

Input3 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 03 + 8F + A5 + A5; //Video 1: AV or Scart 1
Input4 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 08 + 84 + A5 + A5; //Video 2: HDMI 1

Setting OPT1 swaps Video1 & Video2 sources

Input5 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 05 + 89 + A5 + A5; // YPbPr1
Input6 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 06 + 8A + A5 + A5; // YPbPr2 or S-Video

Input7 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 0A + 86 + A5 + A5; // HDMI 3
Input8 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 0C + 80 + A5 + A5; // Side HDMI

Input9 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 04 + 88 + A5 + A5; // AV2 or Scart2 or S-Video
Input10 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 0D + 81 + A5 + A5; // Side AV

Input11 := 0E + 0E + 00 + 00 + 05 + 05 + 00 + 0C + 20 + AC + 0B + 87 + A5 + A5; // USB

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the “Computer” channel and Video1 as the “Video” channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making HDMI the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported;
- **OPT7 handshake mode is supported. Note: because of a watchdog system which will revert the system to a default mode away from the user selection, this panel MUST always be used in handshake mode, with OPT7 turned ON. The T440 will then poll the status every 5 seconds, keeping the communications and user selection current**;
- Picture and sound mute is available;
- Mute and freeze keyboard code 8 or A is not usable;
- Aspect ratio control is not supported; and
- TV mode is supported with a Code E keyboard, providing a TV button and Channel Up/Down keys.

RS232 connections to Philips SerialXpress series

These use a 10-way RJ45 type connector. Comms is at 38400 baud, 8 bits, no parity, 1 stop.

.

Function/Direction	T440 "projector" Connection	"Serial" Port Connector (see table below)
Ground	Ground	Pins 2 & 10
Data from T440 to panel	Tx	Pin 6
Reply data from panel to T440	Rx	Pin 5
Plus 9 volt CTS/DTR to panel	N/c	N/c

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Low Power ECO mode needs to be disabled from within the Professional Menu on the TV;

Enter Professional code (3, 1, 9, 7, 5, 3, MUTE)

Enter Professional Settings Menu

Professional settings -> Professional mode -> ON

Power Settings -> Low Power Standby -> FAST

Control settings -> SXP BaudRate -> 38400

Pinout for the serial connector on the Hotel TV is below:

PIN NO	SIGNAL NAME	SIGNAL NAME EXPLANATION	I/O
1	Status_TV	Power status of TV	O
2	Gnd	Ground	
3	RxD_UART	UART receiver signal to TV (3V3)	I
4	TxD_UART	UART transmitter signal from TV (3V3)	O
5	TxD_RS232	RS232 transmitter signal from TV	O
6	RxD_RS232	RS232 receiver signal to TV	I
7	IRout	IR signal output from TV	O
8	IR_CNTRL	Switch cntl IRin and IRout signals	I
9	IRin	IR signal input to TV	I
10	Gnd	Ground	

Pioneer Plasma panels Code 80

Some models we know of matching this driver are: **PDP-42/50MXE10, PDP-42/50MXE11, PDP-42/50/60MXE20, PDP-43/50MXE1, PDP-425/525CMX, PDP-434/505CMX.** All have same codes.

Channel codes are:

```
Input1   := 02 + '01IN1' + 03;      //Computer1 Select Ch 1 In   VGA DB15
Input2   := 02 + '01IN2' + 03;      //Computer2 Select Ch 2 In   DVI-D

Input3   := 02 + '01IN4' + 03;      //Video1 Select Ch 1 In  Video Composite
Input4   := 02 + '01IN3' + 03;      //Video2 Select Ch 2 In  S-Video

Input5   := 02 + '01IN5' + 03;      // Select Ch 3 In  Component
```

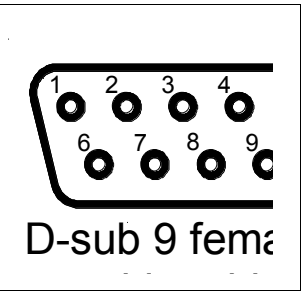
Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making S-Video the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

On startup, the controller resets all existing ID fields and sets up an ID field of "01" for the connected plasma. This ID is then used at the start of each command.

- Power on panel connection blink codes are provided, but OPT7 handshake mode is possibly not available on some older models. Leave OPT7 OFF in this case;
- Auto Pixel Align is NOT available;
- Picture and sound mute is available with two-yellow-button mute mode with a "volume" keyboard;
- Mute and freeze keyboard code 8 or A are available;
- Make sure to turn off "Auto input search" if your panel includes this;
- Make sure to set the baud rate to 9600 and no parity if an adjustment menu is provided.

RS232 connections to Pioneer Plasma with D9

These use a 9-pin-D9 male on the plasma, female on cable. Comms is at 9600 baud, 8 bits, no parity, 1 stop.

Function/Direction	**T440 "projector" Connection**	**"Serial" Port Connector**	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to panel	Tx	9-pin D-sub pin 3	
Reply data from panel to T440	Rx	9-pin D-sub pin 2	
Plus 9 volt CTS/DTR to panel	N/c	N/c	

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Promethean ActivPanel Touch 2 APT70 LCD panels Code 5C, 5D

Data for serial RS232 control is available from Promethean's Knowledge Base, by entering "11178" in the search field. This gives the basic hex codes for commands (three or four bytes long). The complicating fact here is that "Open LAN" and "Close LAN" commands have to be wrapped around each command (except "Power On") with a 1 second space between the Open LAN and the Command, and between the Command and the Close LAN. This is illustrated at the end of the code page.

5C: To add to the confusion, the "Open LAN" and "Close LAN" are unfortunately the SAME. This has the possibility that the controller and the panel can get out of step, where an Open command is interpreted as a Close and so it fails. One can recover from this situation by turning the LCD panel Off with the power button (at the lower left of the panel, so the LED alongside turns RED. Turn off the T440 by pressing Off there too, and then both the controller and the panel with be in sync, and pressing "On" on the T440 will start up both systems in step correctly. Please make sure the end customer understands that this might occasionally be needed.

5D: It would appear Promethean have listened to the problems of system integrators and more recent units shipped have a variation on the above, requiring the LAN command to be sent only once at the end of the warmup time, and removing the requirement to send that wrapping each command. **5D** uses the same channel, on/off and freeze commands as below, but LAN is only sent once. (Older units may accept a download of the new protocol.)

Channel codes (without the Open LAN and Close Lan parts) are:

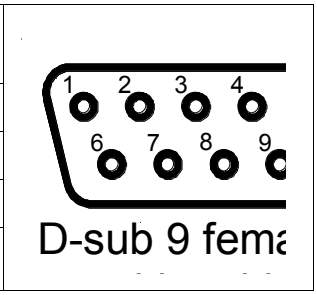
```
Input1   := 89 + 65 + 03 +0E;      //Computer1 Select Ch 1 In   VGA DB15
Input2   := 89 + 65 + 07 +0A;      //Computer2 Select Ch 2 In   HDMI 2

Input3   := 89 + 55 + 0D +14;      //Video1 Select Ch 1 AV
Input4   := 89 + 65 + 05 +0C;      //Video2 Select Ch 2 In  HDMI 1

Input5   := 89 + 55 + 04 +1D;      // Select Component YPbPr

Input6   := 89 + 65 + 09 +08;      // Select HDMI 3

Input7   := 89 + 65 + 0B +06;      // Select HDMI 4

Input8   := 89 + 65 + 0E +03;       //HDMI Front

Input9   := 89 + 65 + 0D +04;       //OPS
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 VGA (above) as the "Computer" channel and Video1 AV as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making HDMI 1 the video default. Setting OPT5 switch ON will swap Computer 1 VGA and Computer 2 HDMI 2 sources.)

- No power on panel connection blink codes are provided, or OPT7 handshake mode are provided;
- Volume keys are supported, including autorepeat. Autorepeat time is just over one second;
- Freeze keyboard code 8 or A are available, but no mute command is provided;
- Make sure to turn off "Auto input search" if your panel includes this;

RS232 connections to Promethean LCD with D9

These use a 9-pin-D9 male on the LCD, female on cable. Comms is at 38400 baud, 8 bits, no parity, 1 stop.

Function/Direction	**T440 "projector" Connection**	**"Serial" Port Connector**	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to panel	Tx	9-pin D-sub pin 3	
Reply data from panel to T440	Rx	9-pin D-sub pin 2	
Plus 9 volt CTS/DTR to panel	N/c	N/c	

After installation wiring of any device to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Samsung LCD and Plasma panels: Code 6C…6E

Code 6C - configure panel to SET ID=Global

Code 6D – configure panel to SET ID=01

Plasma: 42”: P42H(n), P42H-2, PS-42P3ST, SPD-42P3SM, PPM42S2, PPM42S3, PS-42P2ST,
50”:P50H(n), P50FP, P50HP, PPM50H3, PS-50P2HT, PPM50H2, P50F(n), SPD-50P3HM,
63”: P63F(n), P63FP(x), PPM63H3, SPD-63P3HM, Various: PPMxxM5x, PPMxxM7x.
LCD: 23”: 230MXn , 230TSn,
32”:320DX, 320MP(n), 320MX(n), 320P(N), 320PX , 323TSn,
40”: 400CX(n), 400DX , 400DX(n), 400FP(n), 400FX(n), 400MP(n), 400MX(n), 400P(n), 400PX(n), 400TSn, 400TX(n), 400UX(n), 403T, CT40CS(N),
46”: 460CX(n), 460DMn, 460DR(n), 460DX(n), 460FP(n), 460MP(n), 460MX(n), 460P(n), 460PX(n), 460Rn , 460TX(n), 460TS(n), 460UT(n), 460UX(n),
52”: 520DX(n), **57”:** 570DX(n), **65”:** ME65B(n)
70”: 700DX , 700DX(n), 700DRn, 700TSn
75”: ME75B(n)
82”: 820DX, 820DX(n), 820TSn.

DBE/DME/DHE Series: DBxxE, DMxxE, DHxxE

LFD series: ME40A ME46A ME55A, DE40A DE46A DE55A, UE46A UE55A

The protocol is at http://www.samsung.com/us/pdf/MDC_400DXn460DXn570DXn700DXn820DXn460TXn_v1.pdf or Samsung Australia can also supply protocol data.

The messages sent have the third byte $FE, i.e. Global address, so a number of channels can be daisy-chained. (changed from $FF at release V094.)

Function code	**5th Byte of message with command code 14h**	**Comments**
Input1/Computer1	14h	D-SUB 15 RGB-PC
Input2/Computer2	1Eh	RGB into BNC
Input3/Video1	0Ch	Composite Video * (OPT1 swaps Video1 & Video2)
Input4/Video2	21h	HDMI * (OPT1 swaps Video1 & Video2)
Input5	0Dh	Video 2
Input6	08h	Component Video YPbPr (RCA)
Input7	18h	DVI
Input8	1Fh	DVI (HDCP) *get command only
Input9	21h	HDMI 1
Input10	23h	HDMI 2
Input11	31h	HDMI 3
Input12	33h	HDMI 4
Input13	25h	DisplayPort 1
Input14	26h	DisplayPort 2
Input15	27h	DisplayPort 3
Input16	20h	Magicinfo (MagicNet)
Input17	60h	Magicinfo Lite
Input18	50h	Plug In module
Input19	55h	HDBaseT
Input20	62h	Internal/USB

Input21	64h	IWB
TV	40h	Digital TV Some only
TV Channel Up	01h	
TV Channel Down	00h	

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

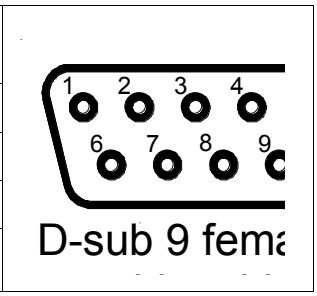
Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making S-Video the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

- On panel connection blink codes supported and OPT7 handshake mode is supported;
- Audio control (Volume up/down keyboards, codes 2, 9, B, and E) is available;
- Two-yellow button "Mute" command is available, but ONLY to the audio;
- Freeze is not supported at all;
- Turn "Energy Saving" to "Off" (to enable RS232 control);
- Make sure to use the correct "In" RS232 port (there are two, an "In", and an "Out", for cascading);
- TV control (keyboard code 'E') is only available for units with digital tuners. It uses incremental Up and Down buttons.

RS232 connections to Samsung panel

These use a 9-pin-D9 male on the panel, female on cable. Comms is at 9600 baud, 8 N1.

Some use a 3.5mm stereo jack to D9 adaptor.

Function/Direction	**T440 "projector" Connection**	**"Serial" Port Connector**	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to projector	Tx	9-pin D-sub pin 2 (RXD)	
Reply data from projector to T440	Rx	9-pin D-sub pin 3 (TXD)	
Plus 9 volt CTS/DTR to projector	n/c	n/c	

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Samsung LCD panels: Code 6F

Family of Samsung HG series of Hospitality Televisions with 68hex code string lead-in.

Function code	**Message**	**Comments**
Input1/Computer1	68 08 04 01 04 79	PC
Input2/Computer2	68 08 04 01 0B 80	HDMI 2
Input3/Video1	68 08 04 01 02 77	AV1 Composite Video * (OPT1 swaps Video1 & Video2)
Input4/Video2 Opt6 off	68 08 04 01 06 7B	HDMI * (OPT1 swaps Video1 & Video2)
Input4/Video2 Opt6 on	68 08 04 01 03 78	S-Video 1 * (OPT1 swaps Video1 & Video2)
Input5	68 08 04 01 05 7A	Component 1
Input6	68 08 04 01 0A 7F	Component 2

Input7	68 08 04 01 08 7D	AV2
Input8	68 08 04 01 09 7E	S-Video2
Input9	68 08 04 01 0C 81	HDMI 3
Input10	68 08 04 01 0D 82	HDMI 4
Input11	68 08 04 01 01 76	SCART
Input12	68 08 04 01 00 75	ISP HBrowser/SINC as per Setting
TV	68 08 04 01 07 7C	RF (TV)
TV Channel Up	68 80 02 02 07 12 05	
TV Channel Down	68 80 02 02 07 10 03	

* T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

- On panel connection blink codes supported and OPT7 handshake mode is supported;
- Audio control (Volume up/down keyboards, codes 2, 9, B, and E) is available;
- Mute and Freeze are not supported.

The RS232 connections are covered in a manual from Samsung called: **Samsung Standalone Control Protocol V1.04** on page 2. There are instructions on each page of this manual (which was supplied to JED by Samsung) warning against and partial or full reproduction of this document, so we suggest that installers contact Samsung for this data directly.

The RS232 cables also seem to be included in an on-line document at: HD450S_470S-EU-ENG-X1.pdf See Page 14.

Samsung LCD panels via IR control: Codes A4 … A7

This is a generic driver, but codes are reputed to be universal.
Models tested at this stage: **UA 24/28/32 J4100AW**

Codes are listed for Samsung Generic on these two sites, and seem to be in agreement with this panel's receiver:

http://www.remotecentral.com/cgi-bin/codes/samsung/tv_functions/

http://www.remotecentral.com/cgi-bin/mboard/rc-discrete/thread.cgi?5780

These are domestic panels, without RS232 control, but these codes allow control via IR from a T440 choosing sources directly, or from a T430 with a "source rotate" function.

- Code A4 – Toggle power command and "source rotate"
- Code A5 – Toggle power command and direct input sources.
- Code A6 – Separate On/Off commands and "source rotate"
- Code A7 - Separate On/Off commands and direct input sources

The published codes allow for direct setting of sources with codes A5 and A7, but a "source rotate" key is provided with codes A4 and A6 which is only operational (T430) if OPT4 switch is set ON. This actually works quite well, as the "source rotate" command advances through one source for each press. The panel will return to the last used source after a power cycle.

If a T430 is used with codes A5 or A7 then the switches on the back can be set to always select one of the sources, or allow toggling between two preset sources exactly the same as any RS232 controller panel or projector.

A Code E keyboard supports DTV functions with channel up/down. A Code 1 keyboard (Off/On source/Vol up/Vol Down) with Opt4 ON will rotate cleanly through sources when the On/Source key is pressed.

Some panels use a common "Power toggle" command for both On and Off (Codes A4 and A5), but some support separate Power on and Power Off (Codes A6 and A7). **Use A6 and A7 for panels UA 24/28/32 J4100AW as they respond to discrete power On and Off codes, giving unambiguous control.**

These all assume an IR address code of 0707hex.

Channel codes are:

```
Input1FunctionCode  := $0069;  // PC/VGA1 (105)
Input2FunctionCode  := $00BE;  // HDMI2 (190)
```

Input3FunctionCode := $0084; // AV1/Video1 (132)
Input4FunctionCode := $00e9; // HDMI1 (233)

Input5FunctionCode := $0086; // Component1 (134)
Input6FunctionCode := $0088; // Component2 (136)
Input7FunctionCode := $00E8; // Component3 (232)

Input8FunctionCode := $00D8; // VGA2 (216)

Input9FunctionCode := $00EB; // AV2/Video2 (235)
Input10FunctionCode := $00EC; //AV3/Video3 (236)

Input11FunctionCode := $00C2; // HDMI3 (194)
Input12FunctionCode := $00C5; // HDMI4 (197)

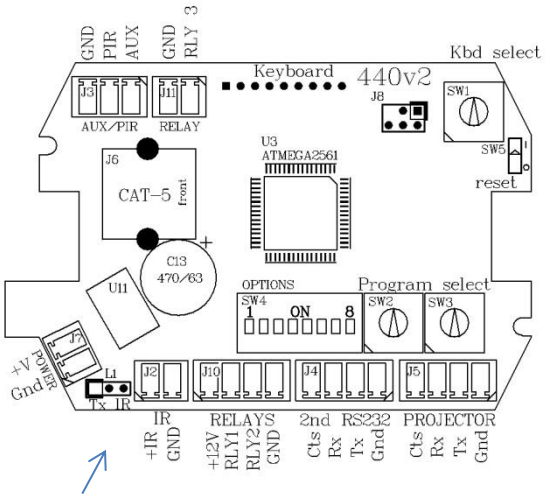
For a T440 code E keyboard only:

TVFunctionCode   := $0043; // DTV (67)
ChannelUpFunctionCode   := $0012; // (18)
ChannelDownFunctionCode := $0010; // (16)

- No mute or blank functions are provided;
- No On panel connection blink codes or OPT7 handshake mode are supported.

If a T430 is used, it needs to have the IR transmitter connection in place. A T440 Code 6 always has this installed. An IR transmitter bug or IR LED needs to be connected between the active line and ground.

Wiring: The IR transmitting bug is wired to the IR output socket J2 with the shield of the cable connected to the ground pin and the centre conductor to the "+IR" pin. The signal is current limited (24mA pulses), so no series resistors are needed in the cable.



As the IR bug wire is only 2M long it will usually be extended, and CAT5 cable is OK for this, but it must be via its own twisted pair (colour plus colour-with-white). We have successfully tested this with 50M of CAT5E cable however take care with routing to avoid interference

If the CAT5 connector and cable is used runs from CAT5 connector J6, the IR signal runs
via a twisted pair of wires via this cable, but link L1 must be moved from Tx (it's position
in RS232 mode) to IR (as needed for IR mode).

T430: If using a T430, the keyboard has an ON/Source key and no Volume keys. The IR functions allow power On/Off and source change only. Operation is the same as above.

If OPT4 is OFF, no source changes occur.
If OPT4 is ON, then a "source" command is sent with each press of the On / Source key.

Sharp LCD display/TV, IAVD family (NON-2012 LE series) Codes 20 to 2E

(2012 LE family following with codes 34-37)

The Sharp LCD TV family use a wide range of allocations for channels, so we have coded them in many groups with the first four "Inputs" (Computer 1 & 2, Video 1 & 2) customised, and shown below against the particular selection codes.

Generic strings provide all options on all panels using all commands "IAVD 1<CR>" through "IAVD 9<CR>"

Generic Channel codes are:

```
Input5  := 'IAVD1  ' + 0D;      //  Generic 1
Input6  := 'IAVD2  ' + 0D;      //  Generic 2
Input7  := 'IAVD3  ' + 0D;      //  Generic 3
Input8  := 'IAVD4  ' + 0D;      //  Generic 4
Input9  := 'IAVD5  ' + 0D;      //  Generic 5
Input10 := 'IAVD6  ' + 0D;      //  Generic 6
Input11 := 'IAVD7  ' + 0D;      //  Generic 7
Input12 := 'IAVD8  ' + 0D;      //  Generic 8
Input13 := 'IAVD9  ' + 0D;      //  Generic 9

TV       := 'IDTV   ' + 0D;     // TV Digital  set this as default

TVChannelUp    := 'DTUP   ' + 0D; //  Digital Up

TVChannelDown := 'DTDW   ' + 0D; //  Digital Down
```

Specific strings allocating "IAVD" codes customised Computer 1 & 2, Video 1 & 2 strings, listed by selection code.

Sharp LCD panel: Code 20 .

(This group do NOT have any of DB15, DVI(-A or -D) so any "Computer" key must use HDMI or Component).

Input1/Computer1	Computer1	'IAVD 4' + 0D	Computer1 HDMI (no-DB15 or DVI screen)
Input2/Computer2	Computer2	'IAVD 1' + 0D	Computer2 Component (no-DB15 or DVI screen)
Input3/Video1	Video1	'IAVD 2' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 3' + 0D	Video2 S-Video / Video

Panel types for this code: LC32BD6X, LC37BD6X, LC26D4U, LC32D4U, LC37D4U, LC26DA5U, LC32DA5U, LC26D6U, LC32D6U, LC37D6U, LC32AX5, LC26GA5X

If other HDMI, component, etc is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 21 .

(This group has DB15 as "Input4" of the panel and HDMI 3 as "Input7" of the panel).

Input1/Computer1	Computer1	'IAVD 4' + 0D	Computer1 DB15
Input2/Computer2	Computer2	'IAVD 7' + 0D	Computer2 HDMI 3
Input3/Video1	Video1	'IAVD 1' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 2' + 0D	Video2 Component/S-Video / Video

Panel types for this code: LC40LE700UN, LC46LE700UN, LC52LE700UN, LC52SB55U, LCC5255U, LC40E67UN, LC40E77UN, LC60E77UN, LC65E77UM, LC42BD80U, LC46BD80U, LC52BD80U, LC46D85UN, LC52D85UN, LCC4677UN, LCC5277UN, LC46E77U, LC52E77U, LC42D65U, LC46D65U, LC52D65U, LC32D44E/S, LC32D65E, LC32DH65E/S, LC37D65E, LC37DH65E/S

If other HDMI, component, etc is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 22 .

(This group has a DB15 as "Input 5" of the panel, and HDMI 2 as "Input 3" of the panel).

Input1/Computer1	Computer1	'IAVD 5' + 0D	Computer1 DB15
Input2/Computer2	Computer2	'IAVD 3' + 0D	Computer2 HDMI 2
Input3/Video1	Video1	'IAVD 2' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 1' + 0D	Video2 Component / S-Video / Video

Panel types for this code: LC32D33X, LC37D33X, LC32D53X, LC37D53X, LC32A33X, LC37A33X, LC32A53X, LC32A53X, LC37A53X, LC42A53X, LC30AA1M, LC37AA+A171M, LC30HV2M, LC30HV4M, LC37HV4/U, LC32AW5X, LC37AW5X, LC32PD5X, LC37PD5X, LC42PD5X, LC32PX5X, LC37PX5X, LC42PX5X

If other HDMI, component, etc is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 23 .

(This group has a DB15 as "Input 6" of the panel, and HDMI as "Input 5" of the panel).

Input1/Computer1	Computer1	'IAVD 6' + 0D	Computer1 DB15
Input2/Computer2	Computer2	'IAVD 5' + 0D	Computer2 HDMI 2
Input3/Video1	Video1	'IAVD 1' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 2' + 0D	Video2 Component / S-Video / Video

Panel types for this code: LC32D33X, LC37D33X, LC32D53X, LC37D53X, LC32A33X, LC37A33X, LC32A53X, LC32A53X, LC37A53X, LC42A53X, LC30AA1M, LC37AA+A171M, LC30HV2M, LC30HV4M, LC37HV4/U, LC32AW5X, LC37AW5X, LC32PD5X, LC37PD5X, LC42PD5X, LC32PX5X, LC37PX5X, LC42PX5X

If other HDMI, component, etc. is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 24 .

(This group has a DB15 as “Input 7” of the panel, and HDMI 2 or 3 as “Input 6” of the panel).

Input1/Computer1	Computer1	'IAVD 7' + 0D	Computer1 DB15
Input2/Computer2	Computer2	'IAVD 6' + 0D	Computer2 HDMI 2/3
Input3/Video1	Video1	'IAVD 1' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 2' + 0D	Video2 Component / S-Video / Video

Panel types for this code: LC42D83X, LC46D83X, LC52D83X, LC65RX1X, LC46D84X, LC52D84X, LC37D85X, LC42D85X, LC46D85X/U, LC52D85X/U, LC37D63X, LC42D63X, LC46D63X, LC42A63X, LC32X20E/S, LC37X20E/S, LC42X20E/S, LC46X20E/S, LC52X20E/S, LC42D64U, LC46D64U, LC52D64U, LC65D64U, LC32GP3U/B/W/R, LC46SE94U, LC52SE94U, LC65SE94U, LC26AD5E/S, LC32AD5E/S.

If other HDMI, component, etc. is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel’s User’s Manual are allocations of ‘IAVD’ codes against physical inputs.

Sharp LCD panel: Code 25 .

(This group has a DB15 as “Input 7” of the panel, and HDMI 2 or 3 as “Input 6” of the panel).

Input1/Computer1	Computer1	'IAVD 7' + 0D	Computer1 DB15
Input2/Computer2	Computer2	'IAVD 6' + 0D	Computer2 HDMI 2/3
Input3/Video1	Video1	'IAVD 1' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 2' + 0D	Video2 Component / S-Video / Video

Panel types for this code: LC42D83X, LC46D83X, LC52D83X, LC65RX1X, LC46D84X, LC52D84X, LC37D85X, LC42D85X, LC46D85X/U, LC52D85X/U, LC37D63X, LC42D63X, LC46D63X, LC42A63X, LC32X20E/S, LC37X20E/S, LC42X20E/S, LC46X20E/S, LC52X20E/S, LC42D64U, LC46D64U, LC52D64U, LC65D64U, LC32GP3U/B/W/R, LC46SE94U, LC52SE94U, LC65SE94U, LC26AD5E/S, LC32AD5E/S.

If other HDMI, component, etc. is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel’s User’s Manual are allocations of ‘IAVD’ codes against physical inputs.

Sharp LCD panel: Code 26 .

(This group has a DB15 as “Input 7” of the panel, and HDMI as “Input 1” of the panel).

Input1/Computer1	Computer1	'IAVD 7' + 0D	Computer1 DB15
Input2/Computer2	Computer2	'IAVD 1' + 0D	Computer2 HDMI
Input3/Video1	Video1	'IAVD 6' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 4' + 0D	Video2 Component / S-Video / Video

Panel types for this code: LC40BL700X, LC46LB700X, LC40LE700X/U, LC52LE700X/U,

If other HDMI, component, etc. is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 2A .

(This group has a DVI-A as "Input 4" of the panel).

Input1/Computer1	Computer1	'IAVD 4' + 0D	Computer1 DVI-A
Input2/Computer2	Computer2	'IAVD 3' + 0D	Computer2 Component / S-Video / Video
Input3/Video1	Video1	'IAVD 1' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 2' + 0D	Video2 Component / S-Video / Video

Panel types for this code: LC26GA3X, LC26GA4X, LC32GA4X, LC37GA4X

Only 4 inputs are available, but they can be moved by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 2B .

(This group has DVI-A as "Input 5" of the panel).

Input1/Computer1	Computer1	'IAVD 5 + 0D	Computer1 DVI-A
Input2/Computer2	Computer2	'IAVD 3' + 0D	Computer2 Component / S-Video / Video
Input3/Video1	Video1	'IAVD 1' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 2' + 0D	Video2 Component / S-Video / Video

Panel types for this code: LC45G1X, LC65G5XOM, TU45GAX, TU65GAX, LC32G1X, TU32GAX, LC37G1X, TU32GAX, LC32G2X, TU32GAX, LC37G2X, TU37GAX.

If other input arrangements are needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 2C .

(This group has DVI as "Input 5 of the panel, HDMI as "Input 4").

Input1/Computer1	Computer1	'IAVD 5' + 0D	Computer1 DVI
Input2/Computer2	Computer2	'IAVD 4' + 0D	Computer2 HDMI
Input3/Video1	Video1	'IAVD 1' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 3' + 0D	Video2 Component / S-Video / Video / HDMI (some)

Panel types for this code: LC37GB5U, LC57D90U, LC65D90U, LC26D7U, LC32D7U, LC37D7U, LC26D5U, LC32D5U, LC37D5U, LC26GD6U, LC32GD6U, LC37GD6U, LC45GD6U, LC45GD5U, LC26GD4U, LC32GD4U, LC37GD4U, LC45GD4U, LC26GA5U, LC32GA5U, LC32G4U, LC37G4U, LC37D90U, LC32D50U.

If other HDMI, component, etc is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 2D .

(This group has a DVI as "Input 6" of the panel, and HDMI as "Input 4" and "Input 5" of the panel).

Input1/Computer1	Computer1	'IAVD 6' + 0D	Computer1 DVI
Input2/Computer2	Computer2	'IAVD 5' + 0D	Computer2 HDMI
Input3/Video1	Video1	'IAVD 1' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 2' + 0D	Video2 Component / S-Video / Video

Panel types for this code: LC42GD7X, LC46GD7X, LC52GD7X, LC42GD7U, LC46GD7U, LC52GD7U, LC46G7X.

If other HDMI, component, etc is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 2E .

(This group has a DVI as "Input 7" of the panel, and HDMI as "Input 4", "Input 5" and "Input 6" of the panel).

Input1/Computer1	Computer1	'IAVD 7' + 0D	Computer1 DVI
Input2/Computer2	Computer2	'IAVD 6' + 0D	Computer2 HDMI
Input3/Video1	Video1	'IAVD 1' + 0D	Video1 Component / Video
Input4/Video2	Video2	'IAVD 2' + 0D	Video2 Component / S-Video / Video

Panel types for this code: LB1085, LC46D92U, LC52D92U, LC65D93U

If other HDMI, component, etc is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD display/TV, IAVD family (2012 LE series) Codes 34 to 36

The Sharp LCD TV family use a wide range of allocations for channels, so we have coded them in many groups with the first four "Inputs" (Computer 1 & 2, Video 1 & 2) customised, and shown below against the particular selection codes.

Special note: Sharp 2012-LE series panels are now shipped with the RS232 interface disabled as a stand-by power saving measure. There is NO menu item to turn it on … it can only be enabled by a special secret command sequence obtainable from Sharp directly after a waiver is signed and sent back to Sharp. This sets "Hotel" mode.

Generic strings provide all options on all panels using all commands "IAVD1 <CR>" through "IAVD9 <CR>" (Note differences with 20-2E setting above with command location of spaces, removing spaces between the IAVD and the digit and padding them in after the digit.)

Generic Channel codes are:

```
Input5          := 'IAVD1  ' + 0D;      //  Generic 1
Input6          := 'IAVD2  ' + 0D;      //  Generic 2
Input7          := 'IAVD3  ' + 0D;      //  Generic 3
Input8          := 'IAVD4  ' + 0D;      //  Generic 4
Input9          := 'IAVD5  ' + 0D;      //  Generic 5
Input10         := 'IAVD6  ' + 0D;      //  Generic 6
Input11         := 'IAVD7  ' + 0D;      //  Generic 7
Input12         := 'IAVD8  ' + 0D;      //  Generic 8
Input13         := 'IAVD9  ' + 0D;      //  Generic 9

TV              := 'IDTV   ' + 0D;      //  TV Digital  only TV option supported

TVChannelUp     := 'DTUP   ' + 0D;      //  Digital Up
TVChannelDown := 'DTDW   ' + 0D;        //  Digital Down
```

Specific strings allocating "IADV" codes customised Computer 1 & 2, Video 1 & 2 strings, listed by selection code.

Sharp LCD panel: Code 34 .

Input1/Computer1	Computer1*	'IAVD7 ' + 0D	Computer1: VGA DB-15
Input2/Computer2	Computer2*	'IAVD1 ' + 0D	Computer2: HDMI 1
Input3/Video1	Video1**	'IAVD4 ' + 0D (OPT6 off) or 'IAVD3 ' + 0D (OPT6 On)	Video1: Composite video (OPT6 Off) or HDMI 3 (OPT6 On)
Input4/Video2	Video2**	'IAVD2 ' + 0D	Video2: HDMI 2

***** Swap Computer1 and Computer2 with OPT5 switch, ** Swap Video1 and Video2 with OPT1 switch

Panel types for this code: LC-40LE530X, LC-46LE530X, LC-60LE630X, LC-40LE700X

If other HDMI, component, etc. is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 35 .

Input1/Computer1	Computer1*	'IAVD8 ' + 0D	Computer1: VGA DB-15
Input2/Computer2	Computer2*	'IAVD1 ' + 0D	Computer2: HDMI 1
Input3/Video1	Video1**	'IAVD6 ' + 0D (OPT6 off) or 'IAVD3 ' + 0D (OPT6 On)	Video1: Composite video (OPT6 Off) or HDMI 3 (OPT6 On)
Input4/Video2	Video2**	'IAVD2 ' + 0D	Video2: HDMI 2

***** Swap Computer1 and Computer2 with OPT5 switch, ** Swap Video1 and Video2 with OPT1 switch

Panel types for this code: LC-60LE632U, LC-70LE632U, LC-70LE732U

If other HDMI, component, etc. is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel: Code 36.

Input1/Computer1	Computer1*	'IAVD8 ' + 0D	Computer1: VGA DB-15
Input2/Computer2	Computer2*	'IAVD4 ' + 0D	Computer2: HDMI 1
Input3/Video1	Video1**	'IAVD1 ' + 0D (OPT6 off) or 'IAVD6 ' + 0D (OPT6 On)	Video1: Composite video (OPT6 Off) or HDMI 3 (OPT6 On)
Input4/Video2	Video2**	'IAVD5 ' + 0D	Video2: HDMI 2

***** Swap Computer1 and Computer2 with OPT5 switch, ** Swap Video1 and Video2 with OPT1 switch

Panel types for this code: LC-70LE735X, LC-40LE830X, LC-46LE830X, LC-52LE830X, LC-60LE632X, LC-40LE835X, LC46LE835X, LC-52LE835X, LC-60LE835X

If other HDMI, component, etc. is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD panel (Vol 0-100): Code 37.

Input1/Computer1	Computer1*	'IAVD8 ' + 0D	Computer1: VGA DB-15 (May be IAVD7)
Input2/Computer2	Computer2*	'IAVD2 ' + 0D	Computer2: HDMI 2
Input3/Video1	Video1**	'IAVD6 ' + 0D (OPT6 off) or 'IAVD3 ' + 0D (OPT6 On)	Video1: Composite video (OPT6 Off) or HDMI 3 (OPT6 On)
Input4/Video2	Video2**	'IAVD1 ' + 0D	HDMI1 with AUDIO RETURN CHANNEL

***** Swap Computer1 and Computer2 with OPT5 switch, ** Swap Video1 and Video2 with OPT1 switch

Audio range was changed to 0->100 for this group.

Panel types for this code: LC-60LE650x, LC-70LE650x, LC-80LE633U, LC-70/60/52LE640U, LC-70/60/52C6400U

If other HDMI, component, etc. is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'IAVD' codes against physical inputs.

Sharp LCD display (no TV), LCM3700, Mitsubishi LDT651L, INPS family Codes 30 to 31

The Sharp LCD TV family use a wide range of allocations for channels, so we have coded them in many groups with the first four “Inputs” (Computer 1 & 2, Video 1 & 2) customised, and shown below against the particular selection codes.

Generic strings provide all options on all panels using all commands “INPS 1<CR>” through “INPS 10<CR>”

Generic Channel codes are:

```
Input5    := 'INPS   1' + 0D;        // Generic 1
Input6    := 'INPS   2' + 0D         // Generic 2
Input7    := 'INPS   3' + 0D;        // Generic 3
Input8    := 'INPS   4' + 0D;        // Generic 4
Input9    := 'INPS   5' + 0D         // Generic 5
Input10   := 'INPS   6' + 0D;        // Generic 6
Input11   := 'INPS   7' + 0D;        // Generic 7
Input12   := 'INPS   8' + 0D;        // Generic 8
Input13   := 'INPS   9' + 0D;        // Generic 9
Input14   := 'INPS  10' + 0D;        // Generic 10
```

Specific strings allocating “INPS” codes customised Computer 1 & 2, Video 1 & 2 strings, listed by selection code.

Sharp LCD panel LCM3700: Code 30 .

Input1/Computer1	Computer1	'INPS 6' + 0D	Computer1 DB15
Input2/Computer2	Computer2	'INPS 7' + 0D	Computer2 VDI
Input3/Video1	Video1	'INPS 1' + 0D	Video1 BNC RGB
Input4/Video2	Video2	'INPS 2' + 0D	Video2 S-Video

If other HDMI, component, etc. is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel’s User’s Manual are allocations of ‘INPS’ codes against physical inputs.

Mitsubishi panel LDT651L, LDT521V with Sharp LCD codes: Code 31 .

Input1/Computer1	Computer1	'INPS 2' + 0D	Computer1 DB15
Input2/Computer2	Computer2	'INPS 1' + 0D	Computer2 VDI
Input3/Video1	Video1	'INPS 4' + 0D	Video1 Composite Video
Input4/Video2	Video2	'INPS 9' + 0D	Video2 S-Video

If other HDMI, component, etc. is needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel’s User’s Manual are allocations of ‘INPS’ codes against physical inputs. (Watch that you don’t try and use inputs which used shared sockets, eg DVI-D, BNC and HDMI.)

Mitsubishi panel LDT651P with Sharp LCD codes: Code 32 .

Input1/Computer1	Computer1	'INPS 2' + 0D	Computer1 DB15
Input2/Computer2	Computer2	'INPS 1' + 0D	Computer2 VDI
Input3/Video1	Video1	'INPS 4' + 0D	Video1 Composite Video
Input4/Video2	Video2	'INPS 3' + 0D	Video2 Component on BNC

If other channels are needed for any of these, it is available by setting constants E0 … E3 with selections from the generic table above. In the back of each panel's User's Manual are allocations of 'INPS' codes against physical inputs. (Watch that you don't try and use inputs which used shared sockets, e.g. DVI-D and BNC.)

This panel can be used with a number of keyboards:

- With a "Code 9" with buttons selecting "Video" and 'Computer;
- With a "Code B-L" or "Code B-P" keyboard, with buttons selecting "Video" and "Computer1" and "Computer2" with Volume control keys; or
- With a "Code E" keyboard, with buttons selecting "TV", "Video" and "Computer", with TV channel Up/Down and Volume control keys. The channel commands send absolute channel commands, so the upper and lower limits must be programmed into Constant:A and Constant:B. (Default is 0 -> 10.)

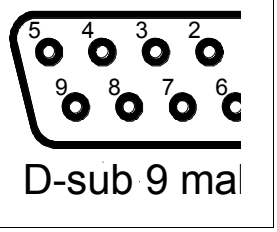
(Keyboards B and E combine channel keys with "On" keys.)

- OPT7 handshake mode not available (yet). Power on panel connection blink codes available.

RS232 connections to Sharp/Mitsubishi (Sharp codes) LCD

These use a 9-pin-D9 (not sure of connector sex). Communications is at 9600 baud 8N1.

Function/Direction	**T440 "projector" Connection**	**Sanyo "Control" Port Connector**
Ground	Ground	9-pin D-sub pin 5
Data from T440 to projector	Tx	9-pin D-sub pin 3 (RXD)
Reply data from projector to T440	Rx	9-pin D-sub pin 2 (TXD)
Plus 9 volt CTS/DTR to projector	N/C	N/C



After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Sharp LCD panel: via LAN **Code 3A**

PN-60/70TA/B3, via LAN RS232 to LAN adaptor

This driver communicates through an xDirect RS232 to LAN "dongle" to the panel using TCP communications.

The Sharp manual is at: http://support.sharp.net.au/downloads/opmanuals/PN70TB3-60TB3_manual_English.pdf

Input1	Computer1	'INPS 2' + 0D;	Computer1 DSUB1(RGB)
Input2	Computer2	'INPS 13' + 0D;	Computer2 HDMI2(PC)
Input3	Video1	'INPS 9' + 0D;	Video1 HDMI1(AV)
Input4	Video2	'INPS 17' + 0D;	Video2 HDMI3(AV)
Input5		'INPS 3' + 0D;	DSUB1(Component)
Input6		'INPS 4' + 0D;	DSUB1(Video)
Input7		'INPS 16' + 0D;	DSUB2(RGB)
Input8		'INPS 10' + 0D;	HDMI1(PC)
Input9		'INPS 12' + 0D;	HDMI2(AV)
Input10		'INPS 18' + 0D;	HDMI3(PC)
Input11		'INPS 14' + 0D;	Disp.Port

Mute is supported but not freeze. Volume goes 0->31.

See JED document:
http://www.jedmicro.com.au/PDF_Docs/Setting%20Up%20LAN%20control%20with%20JED%20controllers%20.pdf

This discusses in detail the setup to the Sharp screen, the xDirect interface, the T460 setup and connections between them.

The HDMI channels seem to have to be setup for PC or AV use. If a channel is commanded to an HDMI-PC the HDMIx PC message appears top right on the screen,(x is HDMI number), even if no signal is present, but if an HDMI-AV channel is selected, the corresponding ID message does NOT appear, even though the panel does switch to it. Weird!

Reply mode is available and works via the LAN interface, polling the panel every 5 seconds, and closing down the T460R if, for instance, the panel is turned off by the IR remote.

(Warmup does take about 30 seconds, even if a picture does appear after only 5 seconds. The panel has a long startup sequence of some sort of about 25 seconds, sending out "wait" messages every 5 seconds during this time. Don't attempt to shorten this.)

Sharp LCD panel: via RS232 at 38400 baud **Code 3B**

PN-60TA3, PN-70TA3, PN-70TB3, PN-70TB3, PN-80TC3

Channel allocations are the same as code 3A above.

RS232 interfacing is via a 3.5mm ring-tip socket. This is covered by a service plate. A document is available from Sharp: http://support.sharp.net.au/downloads/faqattach/RS232C_control_guide.pdf

This shows the protocol and the connections and panels may need to have a software update to support RS232. This is covered by document:
http://support.sharp.net.au/downloads/faqattach/PNx0Tx3_Monitor_Firmware_upgrade_guide.pdf

Device manuals are:
http://support.sharp.net.au/downloads/opmanuals/PN60TA3-PN70TA3_om.pdf,
http://support.sharp.net.au/downloads/opmanuals/PN70TB3-60TB3_manual_English.pdf,
http://support.sharp.net.au/downloads/opmanuals/PN80TC3_Operation_Manual.pdf

Smart LCD flat panel 8055i Code 70 , 8070i Code 71

RS232 manual is at:
http://downloads01.smarttech.com/media/sitecore/en/support/product/sbfpd/8000series/guides/rs232configsbid8070iv22apr2011.pdf and

http://downloads01.smarttech.com/media/sitecore/en/support/product/sbfpd/8055i/guides/roomcontrolsbid8055iv06june12.pdf

Channel codes are:

```
Code 70:  Input1     :=  'set input=VGA1' + 0D;     //Computer 1:Input 1: RGB Digital DB15
Code 70:  Input2     :=  'set input=VGA2' + 0D;     //Computer 2: overwrite

Code 71:  Input1     :=  'set input=VGA' + 0D       //Computer 1: Input 1: RGB Digital DB15
Code 71:  Input2     :=  'set input=RGB/HV' + 0D;//Computer 2: Input 2: RGB Digital

Input3     :=  'set input=Video1' + 0D;      //Video 1  * (OPT1 swaps Video1 & Video2)
Input4     := 'set input=HDMI1' + 0D;        //Video 2   HDMI * (OPT1 swaps Video1 & Video2)

 * T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

 * Input4     := 'set input=S-Video' + 0D;    //  S-video V062

Input5     :=  'set input=DVI' + 0D
Input6     :=  'set input=Video2' + 0D;
Input7     :=  'set input=S-Video' + 0D;

Input8     :=  'set input=DVD/HD1' + 0D;
Input9     :=  'set input=DVD/HD2' + 0D;

Input10    :=  'set input=HDMI2' + 0D;
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the “Computer” channel and Video1 as the “Video” channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

This panel can be used with a number of keyboards:

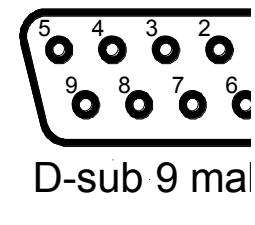
- With a “Code 9” or “Code 8 or A” keyboards, with buttons selecting “Video” and ‘Computer”, with either “Volume” (code 9) or “Freeze/Mute” (Code A);
- With a “Code B-L” or “Code B-P” keyboard, with buttons selecting “Video” and “Computer1” and “Computer2” with Volume control keys;

  (Keyboards B and E combine channel keys with “On” keys.)
- OPT7 handshake mode and power on panel connection blink codes available.

RS232 connections to Smart LCD

These use a 9-pin-D9 male on the projector, male on cable. Communications is at 19200 baud 8N1.

Function/Direction	T440 “projector” Connection	Smart “Control” Port Connector
Ground	Ground	9-pin D-sub pin 5
Data from T440 to projector	Tx	9-pin D-sub pin 3 (RXD)
Reply data from projector to T440	Rx	9-pin D-sub pin 2 (TXD)
Plus 9 volt CTS/DTR to projector	N/C	N/C



After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Smart LCD flat panel Series 2: Code 08

Channel codes are:

Input1	VGA	35+ 62+ 30+ 30+ 31+ 30+ 31+ 30+ 30+ 33+ 0D
Input2	HDMI 2	35+ 62+ 30+ 30+ 31+ 30+ 31+ 30+ 30+ 31+ 0D
Input3	HDMI 1	35+ 62+ 30+ 30+ 31+ 30+ 31+ 30+ 30+ 30+ 0D
Input4	Component	35+ 62+ 30+ 30+ 31+ 30+ 31+ 30+ 30+ 34+ 0D
Input5	Display Port	35+ 62+ 30+ 30+ 31+ 30+ 31+ 30+ 30+ 32+ 0D
Input6	Screen Share	35+ 62+ 30+ 30+ 31+ 30+ 31+ 30+ 30+ 35+ 0D

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

This panel can be used with a number of keyboards:

- With a "Code 9" or "Code 8 or A" keyboards, with buttons selecting "Video" and 'Computer", with either "Volume" (code 9) or "Freeze/Mute" (Code A);
- With a "Code B-L" or "Code B-P" keyboard, with buttons selecting "Video" and "Computer1" and "Computer2" with Volume control keys;

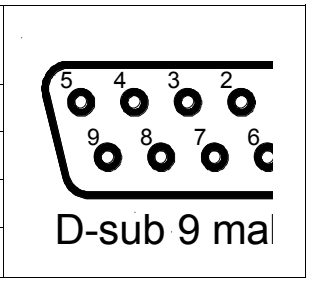
  (Keyboards B and E combine channel keys with "On" keys.)

- OPT7 handshake mode and power on panel connection blink codes available.

RS232 connections to Smart LCD

These use a 9-pin-D9 male on the projector, male on cable. Communications is at 9600 baud 8N1.

Function/Direction	**T440 "projector" Connection**	**Smart "Control" Port Connector**
Ground	Ground	9-pin D-sub pin 5
Data from T440 to projector	Tx	9-pin D-sub pin 3 (RXD)
Reply data from projector to T440	Rx	9-pin D-sub pin 2 (TXD)
Plus 9 volt CTS/DTR to projector	N/C	N/C



After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Smart LCD flat panel MX Series: Code 07

Channel codes are:

Input1	VGA	set input=VGA + 0D
Input2	HDMI 2	set input=HDMI2 + 0D
Input3	HDMI 1	set input=HDMI1 + 0D
Input4	HDMI 3	set input=HDMI3 + 0D
Input5	OPS	set input=OPS + 0D

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

This panel can be used with a number of keyboards:

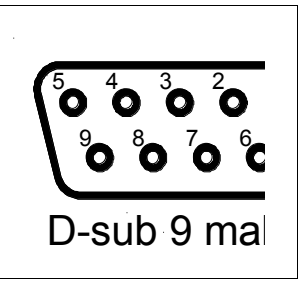
- With a "Code 9" or "Code 8 or A" keyboards, with buttons selecting "Video" and 'Computer", with either "Volume" (code 9) or "Freeze/Mute" (Code A);
- With a "Code B-L" or "Code B-P" keyboard, with buttons selecting "Video" and "Computer1" and "Computer2" with Volume control keys;

  (Keyboards B and E combine channel keys with "On" keys.)

RS232 connections to Smart LCD

These use a 9-pin-D9 male on the projector, male on cable. Communications is at 19200 baud 8N1.

Function/Direction	**T440 "projector" Connection**	**Smart "Control" Port Connector**
Ground	Ground	9-pin D-sub pin 5
Data from T440 to projector	Tx	9-pin D-sub pin 3 (RXD)
Reply data from projector to T440	Rx	9-pin D-sub pin 2 (TXD)
Plus 9 volt CTS/DTR to projector	N/C	N/C



After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

Soniq LCD panel: via RS232 Code 75

The communicates via RS232 with the panel. The panel has a DB9 connector, at 38400, but we do not have wiring details.

Input1	Computer1	55 + 00 + 80 + 05 + da	VGA 1 DB9
Input2	Computer2	55 + 00 + 80 + 09 + de	HDMI 2
Input3	Video1	55 + 00 + 80 + 0c + e1	AV 1 RCA
Input4	Video2	55 + 00 + 80 + 08 + dd	HDMI 1
Input5	Component 1	55 + 00 + 80 + 04 + d9	YPbPr1
Input6	Component 2	55 + 00 + 80 + 10 + e5	YPbPr2
Input7	VGA 2	55 + 00 + 80 + 06 + db	VGA 2 DB9
Input8	VGA 3	55 + 00 + 80 + 07 + dc	VGA 3 DB9
Input9	USB	55 + 00 + 80 + 0f + e4	
Input10	Scart	55 + 00 + 80 + 03 + d8	
Input11	AV2	55 + 00 + 80 + 0d + e2	RCA
Input12	OPS	55 + 00 + 80 + 0b + e0	
Input13	HDMI 3	55 + 00 + 80 + 11 + e6	HDMI
Input14	HDMI Front	55 + 00 + 80 + 0a + dd	HDMI
Input15	DisplayPort	55 + 00 + 80 + 15 + ea	Disp.Port
TV		55 + 00 + 80 + 01 + d6	RF

- No Panel connection blink codes and OPT7 handshake modes are available;
- These panels use a common “Power toggle” command for both On and Off. It may be necessary to press off a second time to re-synchronise the controller to the panel;
- No mute/freeze commands are provided; and
- Volume key presses send 5 consecutive Vol Up or Vol Down commands.

Sony LCD Codes 18 to 1B, 40

This family has many members with a range of channel messages.

RS232 codes are usually in a Sony Protocol Manual and can be found by searching in Google for a PDF file with the LCD model number.

A number of models are covered which share a large number of inputs but we have set up 4 drivers which use selected inputs for Computer 1 & 2 and Video 1 & 2. If any other are needed for these four channels, set input numbers from the common table below into constants E0 to E3.

The Code 40 driver works via an RS232 to HDMI interface box, which allows a commercial panel (without RS232) to work via an RS232 control system.

Channel codes are:

Code 18: Sony LCD FWD-32/40LX1_R, FWD-50PX2 Group 1

```
Input1   := 8C + 00 + 01 + 02 + 0A + 99;    //Computer 1: Input 2: RGB Digital DB15
Input2   := 8C + 00 + 01 + 02 + 20 + AF;    //Computer 2: Input 1: DVI

Input3   := 8C + 00 + 01 + 02 + 0C + 9B;    //Video 1: Option 1: Video
Input4   := 8C + 00 + 01 + 02 + 0D + 9C;    //Video 2: Option 1: S-Video
```

Code19: Sony LCD FDW-32LX2F, FDW-40LX2F, FDW-32LX2X, FDW-40LX2X, KLH-W26, KLH-W32 Group 2

```
Input1   := 8C + 00 + 01 + 02 + 08 + 97;    //Computer 1: Input 1: RGB Digital DB15
Input2   := 8C + 00 + 01 + 02 + 44 + D3;    //Computer 2: Input 2: HDMI RGB Digital

Input3   := 8C + 00 + 01 + 02 + 10 + 9F;    //Video 1: Option 2: Video
Input4   := 8C + 00 + 01 + 02 + 11 + A0;    //Video 2: Option 2: S-Video
```

Code 1A: Sony LCD FWD-42PV1-A/P and 42V1, 42X1, 50PX1 Group 3

```
Input1   := 8C + 00 + 01 + 02 + 0A + 99;    //Computer 1: Input 2: RGB Digital DB15
Input2   := 8C + 00 + 01 + 02 + 20 + AF;    //Computer 2: Input 1: DVI

Input3   := 8C + 00 + 01 + 02 + 10 + 9F;    //Video 1: Option 1: Video
Input4   := 8C + 00 + 01 + 02 + 11 + A0;    //Video 2: Option 1: S-Video
```

Code 1B: Sony LCD FWD-S42/47H1, FWD-S42E1 Group 4 GXD-L52/65H1 Group 5

```
Input1   := 8C + 00 + 01 + 02 + 08 + 97;    //Computer 1: Input 1: RGB Digital DB15
Input2   := 8C + 00 + 01 + 02 + 20 + AF;    //Computer 2: Input 1: DVI

Input3   := 8C + 00 + 01 + 02 + 30 + BF;    //Video 1: Video
Input4   := 8C + 00 + 01 + 02 + 31 + C0;    //Video 2: S-Video
```

Following are alternate input strings … see the individual model RS232 protocol documents to choose appropriate ones:

```
Input5   := 8C + 00 + 01 + 02 + 30 + BF;    //Video, Group 4, Group 5
Input6   := 8C + 00 + 01 + 02 + 31 + C0;    //S-Video, Group 4, Group 5

Input7   := 8C + 00 + 01 + 02 + 20 + AF;    //Input 1: DVI Group 1, Group 3, Group 4, Group 5

Input8   := 8C + 00 + 01 + 02 + 08 + 97;    //Input 1: RGB Digital DB15 Group 2, Group 4, Group 5
Input9   := 8C + 00 + 01 + 02 + 09 + 98;    //Input 1: YUV (Component) DB15 Group 2, Group 4, Group 5

Input10  := 8C + 00 + 01 + 02 + 0A + 99;    //Input 2: RGB Digital DB15 Group 1, Group 3
Input11  := 8C + 00 + 01 + 02 + 0B + 9A;    //Input 2: YUV (Component) DB15 Group 1, Group 3

Input12  := 8C + 00 + 01 + 02 + 0C + 9B;    //Option 1: Video Group 1, Group 2
Input13  := 8C + 00 + 01 + 02 + 0D + 9C;    //Option 1: S-Video Group 1, Group 2
Input14  := 8C + 00 + 01 + 02 + 0E + 9D;    //Option 1: RGB Group 1, Group 2, Group 4
Input15  := 8C + 00 + 01 + 02 + 0F + 9E;    //Option 1: Component Group1, Group 2, Group 4

Input16  := 8C + 00 + 01 + 02 + 10 + 9F;    //Option 2: Video Group 1, Group 2, Group 3
Input17  := 8C + 00 + 01 + 02 + 11 + A0;    //Option 2: S-Video Group 1, Group 2, Group 3
Input18  := 8C + 00 + 01 + 02 + 12 + A1;    //Option 2: RGB Group 1, Group 2, Group 3
Input19  := 8C + 00 + 01 + 02 + 13 + A2;    //Option 2: Component Group 1, Group 2, Group 3
```

```
Input20  := 8C + 00 + 01 + 02 + 44 + D3;    //Input 2: HDMI RGB Digital Group 2
Input21  := 8C + 00 + 01 + 02 + 45 + D4;    //Input 2: HDMI RGB Digital Group 2

Input22  := 8C + 00 + 01 + 02 + 54 + E3;    //Input 3: HDMI RGB Digital Group 2
Input23  := 8C + 00 + 01 + 02 + 55 + E4;    //Input 4: HDMI RGB Digital Group 2

Input24  := 8C + 00 + 01 + 02 + 84 + 13;    //Option: HDMI 1, Group 4, Group 5
Input25  := 8C + 00 + 01 + 02 + 85 + 14;    //Option: HDMI 2, Group 4, Group 5
```

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making S-Video the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

This panel can be used with a number of keyboards:

- With a "Code 9" keyboard, with buttons selecting "Video" and 'Computer", with "Volume" keys;
- With a "Code B-L" or "Code B-P" keyboard, with buttons selecting "Video" and "Computer1" and "Computer2" with "Volume" control keys. (Keyboards combine channel keys with "On" keys);
- (There is no point in using a Code 8 or A keyboard, as there is no "Freeze" function;

Panel connection blink codes are available but OPT7 handshake mode in NOT;

Audio mute with 2 Vol keys is available, but not video mute.

Code 1D: Sony LCD KDL-nnEX500, KDL-nnHX909, KDL-nnXBRx (PRO models only)

RS232 codes are in a Sony Protocol Manual which in only available from Sony by signing a non-disclosure agreement. So below we have only shown the channel selection bytes, not the whole message, to preserve their secrecy.

(However, the Rev 4 of the manual is actually available on Sony's **own** site: by simply Googling "set standby command as enable")

A number of models are covered which share a large number of inputs but we have set up one driver which uses selected inputs for Computer 1 & 2 and Video 1 & 2. If any other are needed for these four channels, set input numbers from the common table below into constants E0 to E3.

Channel codes are:

```
Input1      := xxx + 05 + 01 + CKS   //Computer 1: Input 1: RGB  DB15
Input2      := xxx + 04 + 01 + CKS   //Computer 2: Input 2: HDMI 1

Input3      := xxx + 02 + 01 + CKS   //Video 1
Input4      := xxx + 02 + 02 + CKS   //Video 2 *
```

* Setting T440: OPT6 switch ON will use S-Video in place of HDMI. T430: uses HDMI as Video2.

```
Input5      := xxx + 02 + 03 + CKS   // Video 3

Input6      := xxx + 03 + 01 + CKS   // Component 1
Input7      := xxx + 03 + 02 + CKS   // Component 2
Input8      := xxx + 03 + 03 + CKS   // Component 3

Input9      := xxx + 04 + 01 + CKS   // HDMI 1
Input10     := xxx + 04 + 02 + CKS   // HDMI 2
Input11     := xxx + 04 + 03 + CKS   // HDMI 3
Input12     := xxx + 04 + 04 + CKS   // HDMI 4
Input13     := xxx + 04 + 05 + CKS   // HDMI 5

Input14     := xxx + 06 + 01 + CKS   // Digital media

TV          := xxx + 02 + 01 + CKS   // Dig TV
```

TV channel up/down is supported with the blue keys on a Code:E keyboard.

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the "Computer" channel and Video1 as the "Video" channel.

Setting OPT1 switch ON will swap Video1 and Video2 channels, making S-Video the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

This panel can be used with a number of keyboards:

- With a “Code 9” keyboard, with buttons selecting “Video” and “Computer”, with “Volume” keys;
- With a “Code B-L” or “Code B-P” keyboard, with buttons selecting “Video” and “Computer1” and “Computer2” with “Volume” control keys. (Keyboards combine channel keys with “On” keys);
- (There is no point in using a Code 8 or A keyboard, as there is no “Freeze” function;
- Aspect ratio roll is provided by setting UserFlags (see part A manual);
- Panel connection blink codes are available but OPT7 handshake mode in NOT;
- Audio mute with 2 Vol keys is available, but not video mute.

Code 40: Sony BRAVIA LCD-TVs KDL-HX92x/82x/72x, NX72x, EX72x/62x/52x/46x/42x/32x, CX52x/400

These are commercial panels which, while they don’t have RS232 ports, do allow RS232 control via an interface box feeding commands into the HDMI **C**onsumer **E**lectronics **C**ontrol system. The interface boxes from Sony are called CBX-H10/1 and CBX-H11/1 and have their own power supply.

The panel will not normally startup when sent a Power Up command unless it has previously received a “Standby Command Enable” string. (There is no way of using a panel menu command to set this up manually.) This driver does send a command “Standby Command Enable” just before the Power Down string, so that the panel is then enabled for RS232 commands startup.

So the setup sequence to allow RS232 controlled starts is:

1. Turn panel on manually;
2. Turn T430/T440 on with ON button;
3. Check commands all work, then turn OFF the system using the T430/T440 OFF button (this also sends the “Standby Command Enable”);
4. Now turn on the panel with the T430/T440 ON button … it should now be fully remote-controllable via RS232.

Channel codes are:

```
Input1    := 8C + 00 + 02 + 03 + 05 + 01 + 97  //Computer 1: PC Digital DB15
Input2    := 8C + 00 + 02 + 03 + 04 + 02 + 97  //Computer 2: HDM2

Input3    := 8C + 00 + 02 + 03 + 02 + 01 + 94  //Video 1: Video1
Input4    := 8C + 00 + 02 + 03 + 04 + 01 + 96  //Video 2: HDMI 1

Input5    := 8C + 00 + 02 + 03 + 03 + 01 + 95  // Video 2 Component

Input6    := 8C + 00 + 02 + 03 + 04 + 03 + 98  // HDMI 3
Input7    := 8C + 00 + 02 + 03 + 04 + 04 + 99  // HDMI 4

TV        := 8C + 00 + 02 + 02 + 01 + 91       // DTV
```

TV channel up/down is supported with the blue keys on a Code:E keyboard.

Any one of these codes can be set into Constant:0/Constant:1 for computer codes and Constant:2/Constant:3 for video codes. (The default is to have Computer1 (above) as the “Computer” channel and Video1 as the “Video” channel. Setting OPT1 switch ON will swap Video1 and Video2 channels, making HDMI 1 the video default. Setting OPT5 switch ON will swap Computer 1 and Computer 2 sources.)

This panel can be used with a number of keyboards:

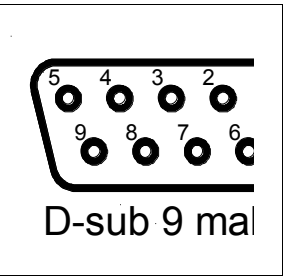
- With a “Code 9” keyboard, with buttons selecting “Video” and “Computer”, with “Volume” keys;
- With a “Code B-L” or “Code B-P” keyboard, with buttons selecting “Video” and “Computer1” and “Computer2” with “Volume” control keys. (Keyboards combine channel keys with “On” keys);

- There is no point in using a Code 8 or A keyboard, as there is no “Freeze” function;
- Aspect ratio roll is provided by setting UserFlags (see part A manual);
- Panel connection blink codes and OPT7 handshake are available;
- Audio/video mute with 2 Vol keys is available.
- As of V107, the ON command is sent twice to turn on latest panels with deep sleep mode, and warm-up time has been increased to 22 seconds to allow panel boot up. Sony advise: For **all** RS232 commands to function on the Android TV models the set must be upgraded to the latest available software which is currently pkg2.465, available to download from sony.com.au /support, or an auto update can be done if the TV is connected to the WWW. One difference is that if the TV has been off for more than 15 minutes it will then be in deep standby which will require the ON command to be sent twice.

RS232 connections to Sony LCD flat panels

These all use a D-sub 9-pin connector, male on cable.

LCD panels, 9600 BAUD, No parity, 1 stop.

Function/Direction	**T440 “projector” Connection**	**Projector Connector (Male on cable)**	
Ground	Ground	9-pin D-sub pin 5	
Data from T440 to projector	Tx	9-pin D-sub pin 2 (RXD)	
Reply data from projector to T440	Rx	9-pin D-sub pin 3 (TXD)	
Plus 9 volt CTS/DTR to projector	N/C	N/C	

After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

2-Touch / CTOUCH LCD touch panel Codes 9D

These are an LG-style panel with touchscreen add-on on the front, in sizes of 46”, 55”, 65”, 70”, 82” and 84”.

Protocol document is at:

http://www.c-tools.nl/Files/Producten/CTOUCH/CTOUCH%20RS232C_Protocol_MODEL%20B%2046_55_65_70_82_3%20HDMI.pdf

Channel codes are:

```
Input1   := 'kb 00 07' + 0D;        // Computer1 VGA DB15
Input2   := 'kb 00 0a' + 0D;        // Computer2 HDMI 2

Input3   := 'kb 00 02' + 0D;        // Video 1 A/V                 * (OPT1 swaps Video1 & Video2)
Input4   := 'kb 00 09' + 0D;        // Video 2 HDMI 1 default * (OPT1 swaps Video1 & Video2)
```

* T440: OPT6 switch ON will use S-Video in place of HDMI2. T430: uses HDMI2 as Video2.

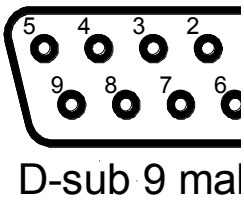
```
Input4   := 'kb 00 03' + 0D;        // Video 2 S-Video

Input5   := 'kb 00 04' + 0D;        // Component

Input6   := 'kb 00 0b' + 0D;        // HDMI 3

TV       := 'kb 00 00' + 0D;        // DTV
```

RS232 connections to 2-Touch / CTOUCH LCD projectors:

D-SUB 9 Female on panel, male on cable. Comms at 9600 8N1.

Note: Connector wiring on 2-Touch and CTOUCH documentation is totally incorrect, (e.g. Gnd on pin 1, links on 8->9) Following has been tested and works correctly. Don’t link pins 8 & 9.

Function/Direction	**T460 “projector” Connection**	**Panasonic Serial Port Connector**
Ground	Ground	9-pin D-sub pin 5
Data from T440 to panel	Tx	9-pin D-sub pin 3 (RXD)
Reply data from panel to T440	Rx	9-pin D-sub pin 2 (TXD)
Plus 9 volt CTS/DTR to projector	N/C	N/C



After installation wiring of any projector to a T460, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.

ViewSonic LCD touch panel Codes 84, 85

Protocol document is at:

https://www.viewsonic.com/assets/164/31203.pdf

Code 84 uses address code setting of 01, which seems to be the default setting. This code uses addressed power on/off and reply codes.

Code 85 as above except it uses NON-addressed power on/off and reply codes. VT2405LED and VT3205LED use this.

Channel codes are:

```
Input1   := '801s"006' + 00D;       // Computer1 VGA DB15
Input2   := '801s"014' + 00D;       // Computer2 HDMI 2

Input3   := '801s"001'+ 0D;         // Video 1 A/V                 * (OPT1 swaps Video1 & Video2)
Input4   := '801s"004'+ 0D;         // Video 2 HDMI 1 default * (OPT1 swaps Video1 & Video2)
```

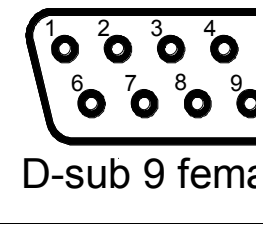
* T440: OPT6 switch ON will use S-Video in place of HDMI2. T430: uses HDMI2 as Video2.

```
Input4   := '801s"002'+ 0D;         // Video 2 S-Video

Input5   := '801s"003'+ 0D;         // Component

Input6   := '801s"024'+ 0D;         // HDMI 3

Input7   := '801s"005'+ 0D;         // DVI
```

RS232 connections to ViewSonic LCD projectors

These use a 9-pin-D9 male on the panel, female on cable. Coms is at 9600, 8N1

Function/Direction	**T440 “projector” Connection**	**Fujitsu “Control” Port Connector**
Ground	Ground	9-pin D-sub pin 5
Data from T440 to projector	Tx	9-pin D-sub pin 2 (RXD)
Reply data from projector to T440	Rx	9-pin D-sub pin 3 (TXD)
Plus 9 volt CTS/DTR to projector	N/C	N/C



After installation wiring of any projector to a T440, use a multimeter to check voltages of –9 on BOTH TX and RX pins in any installation, as described in the troubleshooting part of this manual.