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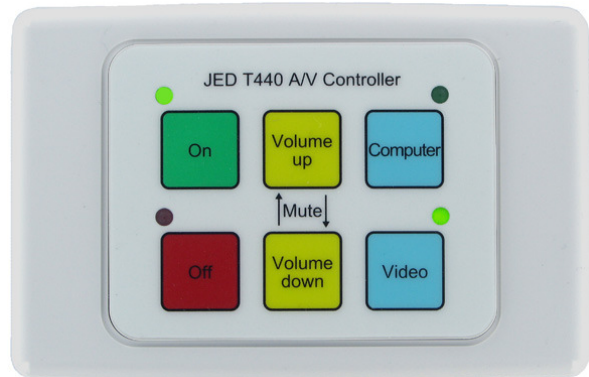
T440 Simple Projector Controller

(Ed Schoell rev: June 29th 2009)

This device is a budget-priced wired (RS232 and limited IR) remote controller for video projectors and flat panels, allowing simple On-Off control, channel/source selection and optionally, audio level control or freeze/mute functions.

Ease of setup and installation has been an important design criterion, and this has been achieved by providing a data-base of pre-coded projector code families in all units, so all have identical software (which is field up-dateable). At install time, or whenever options (or projectors) are changed in a room, the changes are made by selecting device families with hex switches on the back of the unit.

Except for a major code upgrade for totally new devices, a laptop is never needed at install/setup time. There is ¼ Mbyte of memory in the unit for data-base storage.



Pre-made keyboards.

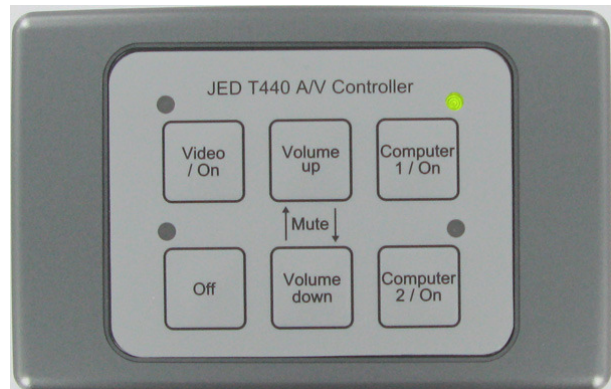
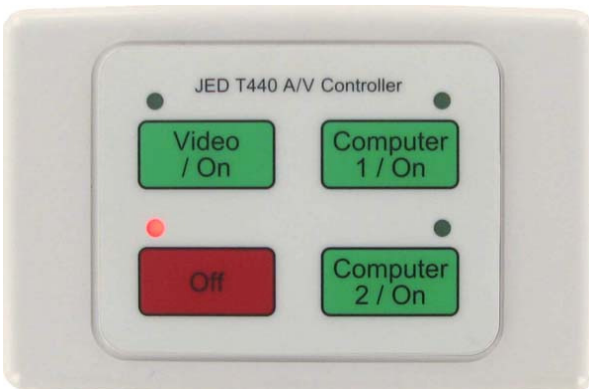
The keyboard is pre-made for the options needed and so there is no need to cut out bits of paper and slide them into switches, or print custom front key-legend sheets and fit them into windows ... there are a series of standard layouts pre-made out of high quality, rear-printed polycarbonate matt material, and the key option is set on another hex switch.

The switches are tactile domes which give a good “feel” to the user.

LEDs indicate system states.

A number of coloured LEDs are associated with keys, and these are steady or flashed to signal to the user the current state of the system. (Note: No feedback from the projector is possible in the IR mode, no red LED flash status indication is possible, and because there is no absolute source selection with the initial IR device done, there is no initial channel selection possible during warm-up.) The system shows operation as follows:

- On power on (not IR), (or whenever a user presses the OFF button in the OFF state), the T440 polls the projector/flat panel for a status response indicating it, too is in the OFF state. A “Power Off” transmission is sent, to



make sure the system is synchronised to the controller. At this point, the RED LED associated with the OFF key flashes once, if a proper “Off status OK” is received, and three times if it is not. (Some projectors don’t respond in the “Off” state so for these, the OFF LED just goes on.) The RED LED then stays ON to show the user the status of the whole system. This is a valuable test for users and installers, as it is so easy to test communications, with just one button press;

- When the user presses the ON key, a “Power On” command is sent, and the projector warms up for the pre-programmed time for that family. The GREEN ON LED flashes at a one-second rate during this time. During this time, the OFF key is locked out, but the channel/source (to be sent at the end of the warm-up can be pre-selected) (not IR);
- As the T440 warm-up time finishes, the GREEN ON LED remains ON (still) and the channel which was last used is re-sent to the projector (not IR) (unless this was changed by pre-selecting during the warm-up period.) The particular channel LED is ON from the start of warm-up, and it blinks and then continues to show the current channel;
- During the ON time, as the user changes channels, the GREEN CHANNEL LEDs follow the selection, and, as the command is sent, they blink in acknowledgement as a command is sent;
- If OPT4 option is selected on the DIP switch, on keyboards with just one Computer and one Video key, a secondary channel can be selected by pressing the key a second time, eg for a laptop or a S-Video channel;
- At the end of a lesson/show, the user presses the OFF button, and the RED OFF LED then flashes once per second for the programmed cool-down period of that device. (With IR, the “Power” command is sent twice to simulate the request to push the “Power” key on an IR hand-held remote twice.) All other LEDs are turned OFF and keys are locked out; and
- At the end of the cool-down time, we are back at the start, with the OFF LED flashing once/twice/three times as a communications check occurs (not IR).

PIR input for automatic turnoff

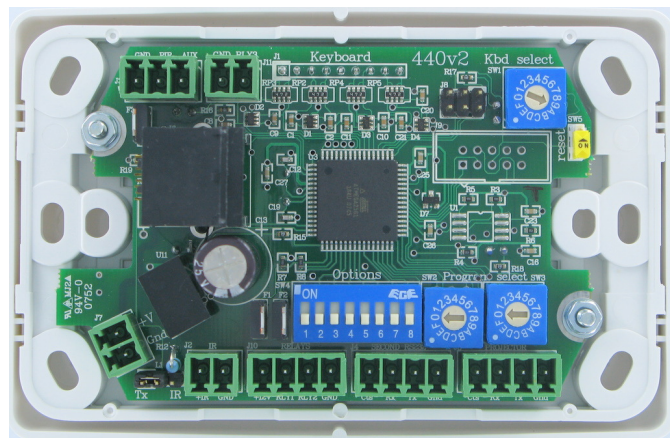
A contact-close/open input allows an infra-red “people-detector” to sense whether all the class and presenter has left the building, leaving the video equipment running. The nominal time is one hour to closedown without a contact interruption, but this time can be programmed using the switches. (PIR stands for “Passive Infra-Red”.)

Rear-view of the T440

Looking at the back of the T440 shows the setup switches and the connections:

Switches:

- Two hex switches providing “Program Select” to select an entry in the data-base of projector/flat panels. It needs a screwdriver to select codes from 00 to FF. These switches are also used for constant entry (closedown time controlled via PIR, warm-up times, alternate channel selections etc);
- One hex switch (at the top) to select the keyboard type installed, from the choice of 4, 6 or 8 key units;
- One 8-position “Option” switch, selecting options, eg alternate video source, auto-send of pixel align, triggered startup from PIR or Timer or switch, double-key on channels, T461 audio select, etc;
- One “Reset” switch yellow slide switch or push-button switch, used to enter “program re-load” or manually set options like time delays, etc.



Connections:

Across the bottom, right-to-left, are Phoenix plug-in screw terminals for wiring to the outside world. (shown without the plug-in part) They are:

- Projector RS232 serial connection: same pinout as the T460, with Ground, Tx (data out), Rx (projector reply) and CTS (optional, infrequently used);
- Auxiliary RS232 serial connection: used for download but could be used for future external serial connections, eg to the T461 audio controller;
- At the far left is the power input, in the range of 9 to 30 volts. Current is under 50mA but depends on voltage;
- Optional: Relay drive out, intended for screen control.
- Optional: IR transmitter output: now implemented for Epson X5/X5e;
- At the top left is three-terminal connection with two inputs, one for the PIR input the other is unallocated at the moment. This could be used as a security (key) or card reader input.
- Just to the right of this is a two-pin connector with a drive to a third relay for audio system or other power control.

Just below this input connector is a CAT5 socket. This is a quick wiring option for the communications/power/PIR to the T447 "cable-top" box which provides terminations to the projector (DB9), power in socket, and PIR screw terminals. (It is NOT an Ethernet connection.)



On one end of the T447 is a CAT5 connector to a CAT5 pre-terminated cable which is the only wiring to the T440 down on the operator's wall or desk. ALL wiring needed passes through this CAT5 cable. On the left is a signal display showing transmit and receive data paths, green LEDs showing the RS232 negative rest state, and flashing red and yellow LEDs for the two transmissions, to the projector and the projector reply.

At the other end of the T447 are three connectors:

- A circular connector for the standard 2.1mm centre positive 12V plug pack;
- A 4-pin Phoenix connector for the PIR, the Passive Infra-Red Detector for monitoring room occupancy, and closing down the A/V system when everyone has left the room (power, ground and two relay contacts); and
- A D9 RS232 connector to go to the projector. (JED supplies cables to order to suit various projectors, all of which plug into this standard connector, which is pinned out with the same pin allocation as a PC's RS232 connector.)

T441 Audio mixer/ switcher

Audio signals can either be controlled in the projector (default) but if OPTION:7 switch is ON, audio control signals are fed out from the T440 second serial port to control either a T441 (quad stereo audio mixer) or this box, a two-channel stereo mixer/attenuator.

Two line stereo line inputs at one end are switched, mixed and volume set, and the line out from the other end goes to the room PA system.

It can also mix four mono channels to one output, or a mix of two mono and one stereo (eg Computer 1, Computer 2 (both mono) plus a Video (stereo)) can be mixed to the line outputs.

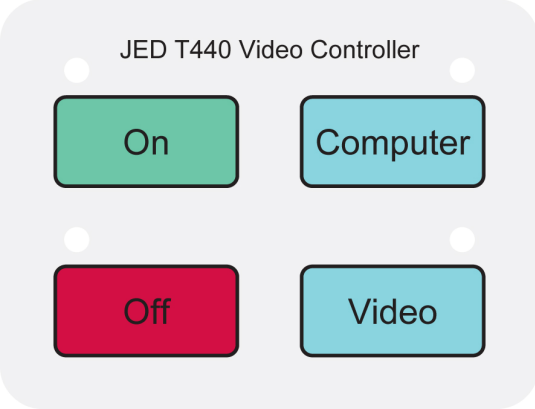
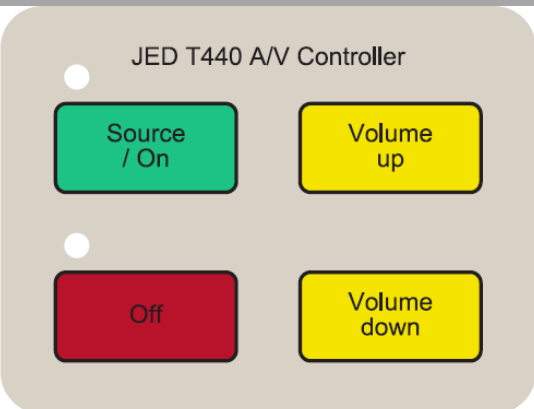
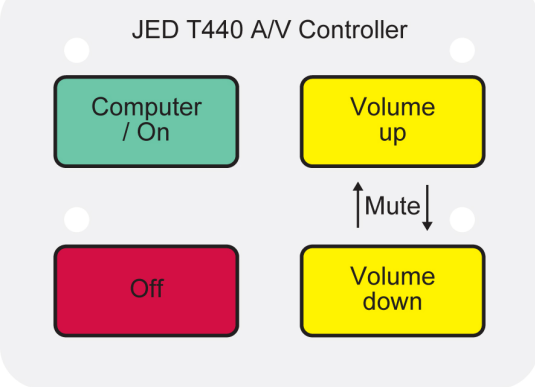
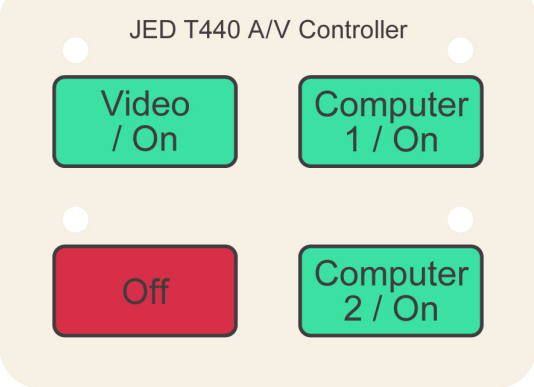
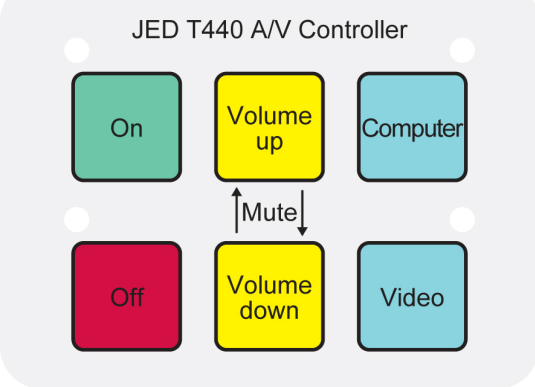
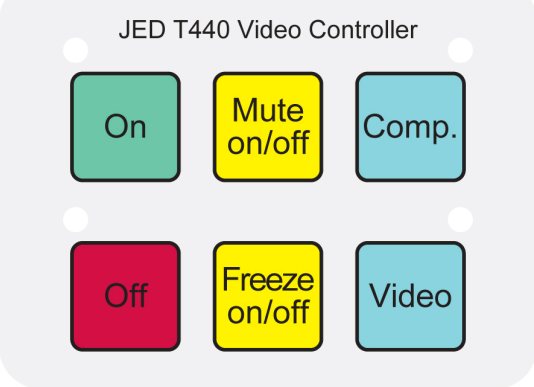


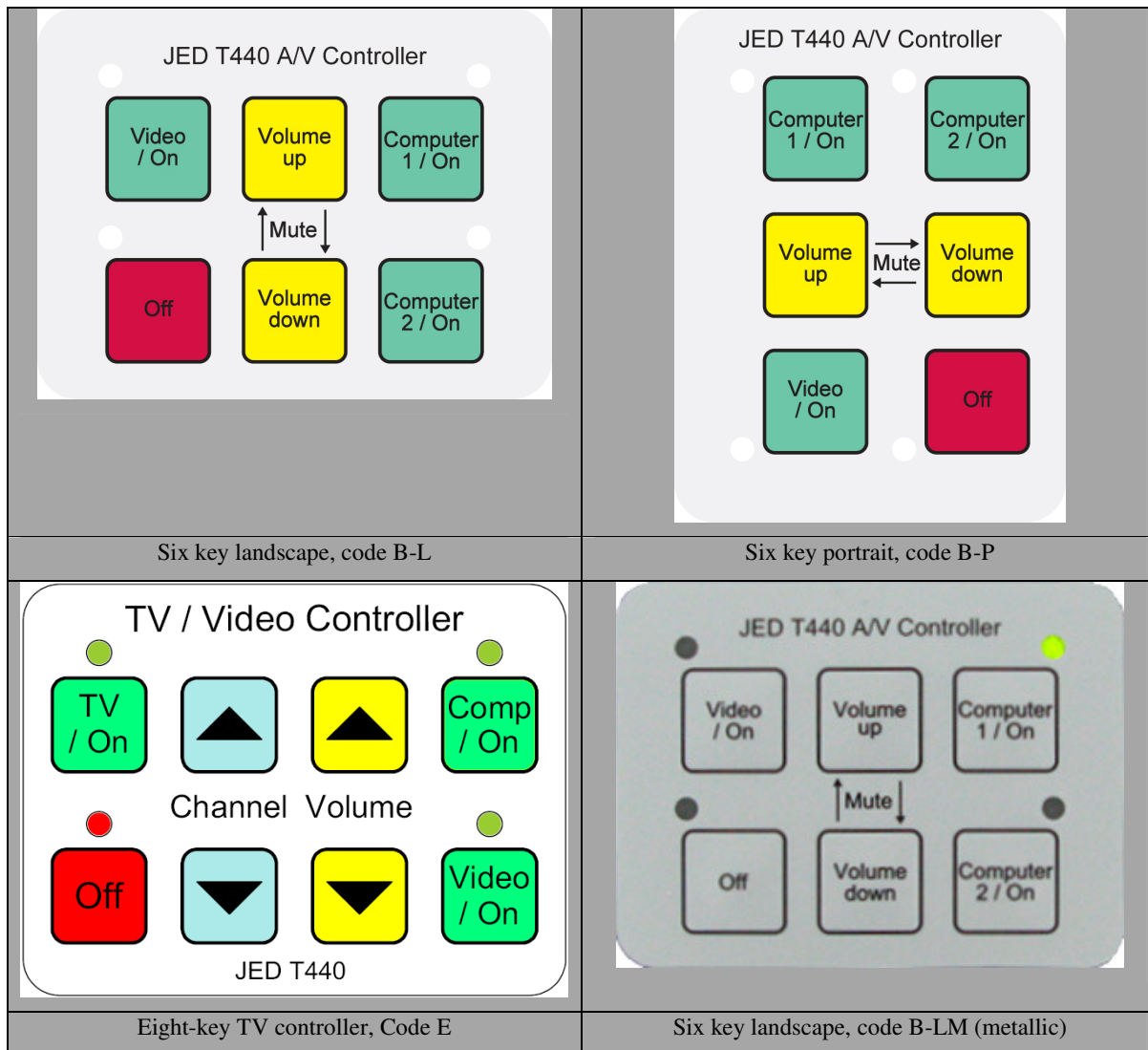
T439 USB switcher for use with whiteboards

See http://www.jedmicro.com.au/USB_Switcher.htm

Keyboards

Following are keyboard options listed by ordering code:

<p>JED T440 Video Controller</p> 	<p>JED T440 A/V Controller</p> 
<p>Four key, code 0</p>	<p>Four key, code 1 (for IR only)</p>
<p>JED T440 A/V Controller</p> 	<p>JED T440 A/V Controller</p> 
<p>Four key, code 2</p>	<p>Four key, code 5</p>
<p>JED T440 A/V Controller</p> 	<p>JED T440 Video Controller</p> 
<p>Six key, code 9</p>	<p>Six key, code A</p>



(The 8-key TV controller option controls LCD or Plasma display/TV systems.)

Projector families supported

The projector codes are selected by the two-digit hex switches on the back, and many projectors are supported by a particular driver. Minor variations are supported by allocating adjacent codes (eg supporting absolute or incremental audio volume setting or different reply or channel codes.)

As at Rev023 the supported families are:

Acer PD727, P1165, P1265, P5260, P5270, P5280, P5370
 BenQ MP5/7xx, SP820, Opt 771
 Dell
 Epson VP21, X5 via IR
 HP projector
 Hitachi proj
 Infocus
 LG LCD/Plasma TV
 Mitsubishi
 NEC LCD TV (& Sherwood), Plasma
 and NEC Projector

Optoma (various)
 Panasonic Projector
 Plus U5, U7 Projector
 Sanyo LCD TV, projector
 Sharp
 Sony projector
 Toshiba projector
 Taxan projector