JED T440 Projector Controllers

The T440 is a lower cost RS232 remote controller for LCD and DLP video and data projectors, LCD and Plasma flat panels, for budget installations in lecture theatres, classrooms, churches or conference rooms.

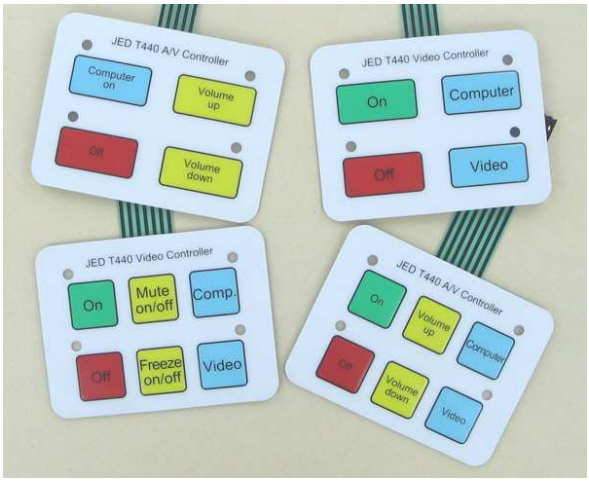
The simplicity of operation of the T440 is its major advantage when installed in locations where a number of users/teachers/lecturers who are unfamiliar with A/V equipment, and without an audio/visual assistant/operator, need to run a "show".

Ideal where the there is the need to power up the projector, select a source, run a video or computer presentation or demonstrate some other program, or display a feed from a document or microscope camera on the video screen, and then close the system down again. Contrast the four buttons on this unit with the 20 or 30 on some IR remote controls, each one different from room to room. This unit is identical from room to room, even with a mix of different projectors.

And when the show is over, T440 controller does not walk out the door in the lecturer's pocket like IR remote controllers often do!

Keyboards

The normal keyboard background colour is off-white, or "beige", as the photos show. Other colours and key layouts can be produced if a quantity are needed.



The T440 has a choice of keyboard labels ... many different layouts can be accommodated, with up to eight keys, and up to four LEDs (always in the positions shown.)

In some layouts, a separate On and Off key is provided, having green and a red LEDs as state indictors. During warmup the green On LED flashes. During cooldown, the red Off LED flashes. A channel LED comes on steady to indicate the channel to start with after warm-up. (This can be preselected by pressing other buttons)

Audio mute function

Pressing both Volume keys together mutes the sound and picture, on most projectors (some don't have support for this).
(Either yellow key, or the current channel key, restores the picture/sound).

The audio keys auto Increment/Decrement the audio level if a yellow key is held down. (Times are programmable.)

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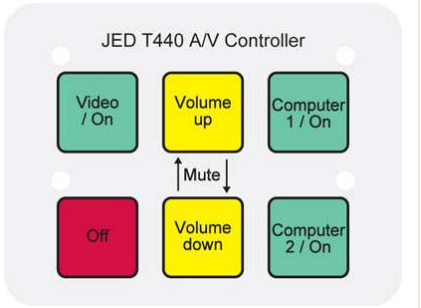
Keyboards with combined Channel function and Power On

In layouts which combine a channel button with the "On" function, the selected channel LED flashes during warmup. (The channel can still be changed during warmup.)

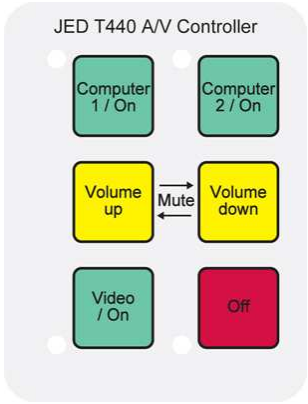
On some layouts, a "portrait" or vertical format can be chosen.

New TV/LCD keyboard

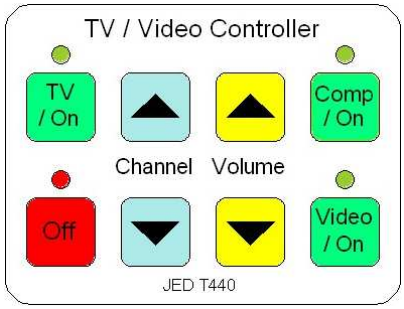
The right-hand keyboard following is a new control panel for LCD or Plasma TV, which adds a Channel Up/Down to the other functions.



6-Key with three channels, Landscape



6-key with three channels, Portrait



TV/LCD/Plasma 8-Key controller keyboard (artwork)

Audio control

The control of audio level is usually done in the projector, and audio control signals are sent to the projector along with the video source and power control signals.

This assumes:

1. The projector has enough, and appropriate, audio input connectors for the video & computer channels to be used;
2. There is a line level audio output connector on the projector to drive the room amplifier and speakers; and
3. The projector actually controls the audio level **of the output audio** via RS232 (not just the projector's internal tiny speakers).

If all of these three are NOT true, you will need a T461 to control the audio.
If a T461 audio rack is installed, it is controlled with a second serial port on the T440, and the T461 selects and controls the audio levels in step with "source select" signals sent to the video projector.

T461 audio attenuator/mixer

The T461 is a 1RU high 19-inch rack mount unit, with four line level stereo RCA pairs as inputs and one line level RCA pair as output. It has an RS232 input and a 240 volt IEC mains connector. A 12-volt power output can power the T440. All connections are on the rear, and on the front are four LED channel indicators and screw-driver adjustable prescaler trim pots.

This photo has T460s rather than T440s

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Operation

The operation of the T440 is very logical:

1. Turn the system on by pressing the **ON** key. or a combined **Video / On** or **Computer / On** or **TV / On** key . The projector starts, and a green LED blinks for the warm-up time. At this point the channel LED shows the last used signal source;

2. If a different source is needed, press an alternate source key until the desired source LED turns on;

3. When running, use the yellow **VOLUME UP** and **VOLUME DOWN** keys to set the desired audio level for that source. In absolute source volume systems, or, in systems using the JED T461 audio attenuator/mixer, the last used setting is remembered channel by channel and recalled when that source is re-selected. In "incremental" systems, the projector usually displays the varying audio level on the screen. Pressing both volume keys together causes a **picture/sound mute;**

   (In some alternate layouts, other functions are performed by the yellow keys, eg control "**picture/sound mute**", or "**picture freeze**", if selected);

4. When the show is finished, pressing the **OFF** key ramps the audio down and turns off the projector. The red Off LED flashes for the cooldown period.

   The proper warm-up and cool-down and lockout times are set for the projector, until the unit goes to standby mode for the next cycle. (Red LED on non-flashing.)

5. Pressing the **OFF** key in the standby mode will re-poll the projector, and if the projector communications is responding, the red LED with blink three times.

PIR input for automatic closedown

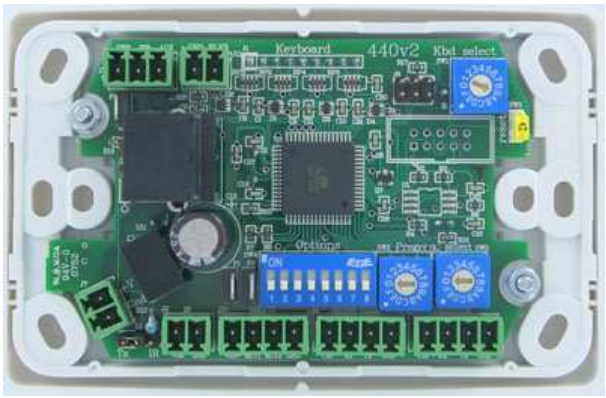
The relay contact from a PIR (Passive InfraRed) detector in the room is sensed by a T440. This can be used for a reset of a time-out on the projector power, so that while people are in the vicinity, the projector keeps running until manually turned off. Users can set a time-out period after which the projector automatically powers down if no activity is detected on the keyboard or via the PIR. The Run-time is adjustable from zero (disabled) to sixteen hours.

(As the system is about to close down, red and green LEDs flash in a distinctive manner, and a green or channel key press cancels the closedown.)

This option is intended for classrooms and theatres where manual turnoff might be missed, to save lamp hours.

Installation

The wiring for the T440 system is very straightforward:



1. Mount the T440 in or on a panel or Clipsal 2000 base on the wall. A cut-out drawing is supplied in the user manual. All wiring to the T440 is via plug and socket Phoenix connectors to the rear, and the wiring is into screw terminals, so no soldering is needed at this end. Plugs are provided with the unit, and wires are simply stripped and fixed into plug holes with grub screws. Changeover of a unit is pull-out/plug-in, and just needs a screwdriver for the mounting screws;
2. In the simplest case, the units needs a 9 to 25 volt DC plug pack or bench supply connected to one plug (labelled +V, Gnd). Current consumption is under 25mA. **A 12 volt plug pack is supplied with units in Australia or new Zealand.**
3. Connect a three wire RS232 cable (TX, RX Ground) from the plug labelled "Projector". Wire the other end of the cable to the projector RS232 control socket input. (A fourth line, CTS is an RS232 output, always HIGH, available for some projectors which need a CTS or DTR input at a logic "1");
4. If the JED T461 remote audio attenuator/mixer is needed, the connections between the T440 and T461 consist of three more RS232 lines (TX, RX and Ground) from the "Second RS232" connector to the rear of the T461, and power to the T440;
5. Wire the PIR into the T440 3-pin plug, or jumper these two contacts if no PIR used, so the timer function operates.

Setup

Setting up the T440 is also very straightforward and done from rear with a small screwdriver.

Note: Every T440 holds all codes for supported projectors and flat-panels.

Just set the pair of rotary numbered switches (called "Program select") to the specified family code.

The option DIP switches allow for some special functions, eg to automatically send a "pixel align" command after a "computer" channel select or when the computer button is re-pressed. Option switches also allow swapping some video channel allocations.

The top, single rotary switch is used to set the keyboard configuration.

(By using a combination of settings, a number of variables such as warmup and cooldown times and PIR time-to-poweroff can be loaded into non-volatile memory of the T440 at install time. Normally these are preset times, but can be changed if desired by setting a function number, eg F0 onto the program select switches, and a value into the keyboard select switch, and toggling the yellow reset switch to load the value.)

It does not need a complicated lap-top based programming setup on site.

Reprogramming

The microprocessor in the T440 can be easily reprogrammed in situ via a serial cable from a laptop or notebook in a couple of minutes, if a projector is changed. Updates are posted on this web site, along with details of the download cable (in the User's Manual) and the download utility. As new projectors are added to the list, the version number will be incremented. Covered projectors are listed on their support pages in the latest user's manual below.

Downloads

A data sheet in PDF form: **T440DS.pdf**

The latest binary code is available on request by email from JED: **jed@jedmicro.com.au**

The latest list of included projectors and families is at: T440: **T440 Included projectors at V019.pdf**

The latest user's manual in PDF form: **T440V019.pdf**

Angle mounting bracket

This mounts a T440 on a desk or on a wall at a 45 degree angle to the desk (or wall). It is finished in white or black power coating and has mounting screw holes and a cable entry hole in one panel, allowing it to mount on a desk with holes and mounts through the bottom, or to mount on a wall with cable and mounting screws through the back. Photo. The standard colours are matt white or matt black.

T465 Microphone and radio input line mixer

This unit, mounted in a matching Clipsal panel similar to the T440, has two volume controls on the front, and is positioned in the stereo line output from the T461 (or projector audio output) to the PA amplifier. This allows a lectern microphone and an audience participation / roving radio mic channel input as well. Mic and radio audio operates independently of the T440 On or Off state.

It is powered by a 12 volt source, eg the 12 volt regulated power available from the back of a T461, or a PAK12/300 plug-pack. (It draws 75mA)

The left hand volume control is for the microphone input, and this is added to both channels equally. Rear preset switches allows the gain for the microphone channel to be preset in 6 steps of 10dB (0 to 50db). Inputs can be balanced or unbalanced (a switch on the back can ground one channel). Phantom power at 12 volts can be connected to the balanced microphone inputs to power a phantom-powered microphone preamplifier. Another switch controls a base-cut switch to reduce breath pops, etc.

It also takes a radio microphone input, and mixes it to both channels as well, via the right-hand volume control.

The advantage of such an audio control panel is that the lecturer does not need access to mic volume controls on the audio amplifier (which might be across the room in a secure rack), and can control the roving mic channel from the lectern as well.

A rear stereo log pot allows the T461/projector input level to be preset. (This signal level is adjustable via the "volume" buttons on the T440.)

A second stereo output is available to feed a cassette tape recorder to allow taping of lectures.

A photo is available here: T465.jpg

A data sheet is available for download: **T465DS1.pdf**

What's inside the T440

The T440 is based on the Atmel ATmega2561 CPU. The T440 system is also available, with a custom keyboard, for any application which needs remote control of systems via an RS232 connection. Contact JED to discuss.