

# smartpack

## *User Manual*

### *Introduction – Please read this first*

Thank you for choosing ETC Smartpack digital dimmers. We are sure that you will be pleased with Smartpack, and wish you a long and happy association with our company and its products.

We at ETC have done everything we can to ensure that your new dimmers will function perfectly, will be easy to install, and will give you many years of reliable service.

This manual contains detailed instructions for installing, using and maintaining ETC Smartpack dimmers. Please follow them carefully, to guarantee best results. Neither ETC Ltd nor its distributors can accept any liability whatsoever arising from the guidelines in this manual not being followed.



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# smartpack

## USER MANUAL

### 1. *Digital dimming explained*

There are good reasons why users of professional dimming equipment are now only willing to accept true digital dimming equipment, such as ETC Smartrack and Smartpack. They are:

- Accuracy – digital dimmers are able to regulate output levels to reproduce precisely recorded intensities, even when mains power is fluctuating.
- Reliability – with fewer electronic components, digital dimmers literally have less things to go wrong.
- Smarts – with processing power on board, digital dimmers can perform tasks previously impossible with analogue techniques. These include diagnostic functions, individual dimmer profile and response speed settings, and more.
- Cost – a well designed digital dimmer typically uses fewer electronic components and is therefore cheaper to manufacture

The key to the accuracy of digital dimmers is regulation. This means that the dimmer is constantly measuring the rms voltage of each supply phase (a total of 12,800 times per second in the case of ETC Smartpack) to build up an accurate picture of the condition of the mains supply to each dimmer. Using this information, the power devices are precisely controlled, to compensate for any mains voltage fluctuations and produce a constant voltage output for any given control level.

Of course, in an age where virtually all lighting control consoles output the same internationally accepted digital control signal (USITT DMX512/1990), another plus with digital dimmers is that no expensive demultiplexer stage is required. The digital signals from the lighting console are simply connected directly to the dimmers.

## 2. About Smartpack

Smartpack is a range of top quality portable professional digital dimming equipment, offering a very wide range of system options in a compact package, with many significant advantages over its competitors:

- Compact size
- Competitive price/performance
- Highly flexible configuration options
- Choice of low frequency filters
- CE17, Schuko and French socket variants
- CE17 5-pole 63amp appliance inlet option
- Optional steel grab hoops
- Three phase operation
- Optional RCD facility
- All-digital – high reliability, high accuracy

Smartpack is unique in that it offers competitive system solutions at all levels in the professional end of the portable dimming market, and versions exist to cover all requirements, right up to top level broadcast applications.

### 2.1. Mechanical

Each Smartpack is a steel and aluminium enclosure, measuring 58cm wide, 25cm high and 35cm deep, comprising 30kW of dimming, as either 12 x 2.5kW, 6 x 5kW or 3 x 10kW dimmers. Front panel controls are recessed for protection, and optional steel grab hoops may be fitted, for ease of handling and added protection in transit.

All power, load and signal connectors are located on the rear panel, keeping the front surface clear for access to the control panel. Smartpack may be stacked up to six units high.

All controls for pack configuration are mounted on the front panel, and the start address of the pack is normally displayed, along with power, DMX512 and thermal status indicators.

## 2.2. Electrical

Smartpack is designed for operation on three phase supplies at 230Vac  $\pm 12.5\%$ . Single phase and delta supply versions of the 5kW and 10kW packs may also be supplied to special order.

Each Smartpack may optionally be supplied with earth leakage (RCD) protection, when used for three phase operation only.

Power devices are generously overrated solid state switching devices, encapsulated into quad 2.5kW, dual 5kW and single 10kW modules.

Individual dimmer circuits are normally protected by single pole miniature circuit breakers, rated at 13A (2.5kW), 25A (5kW) and 50A (10kW). Single pole with neutral disconnect mcbs and double pole mcbs are also available to special order. See the Smartpack specification for more detailed electrical information.

## 2.3. Filtering

Smartpack dimmers comply with the requirements of EN55014: 1987, the usually accepted European norm specifying RFI interference suppression requirements. In addition, low frequency filtering is achieved to different levels, depending on the choke specified. Two different choke styles are available, offering different current risetimes, as required for different types of work. Generally speaking, the higher the risetime the more the interference generated by the dimmer is suppressed, but it is unwise to specify a higher risetime than that actually required, since there are weight, thermal and cost penalties as you go up the scale.

### 2.3.1 Standard risetime choke

The standard choke is wound on a 2.5" toroidal iron powder core, and produces a risetime in excess of 200 $\mu$ S. This should be adequate for theatre and most video production work, and complies with the BBC's PID171 standard for 2.5kW dimmers.

### *2.3.2 High risetime choke*

The High Risetime choke is wound on a 4" toroidal iron powder core, and produces a risetime in excess of 400 $\mu$ S. This is a requirement of the Nordic Television Authorities for 2.5kW dimmers, and complies with the BBC PID171 standard for 5kW and 10kW dimmers. It is recommended where acoustic requirements may be critical.

## *2.4. Pack control*

One 45mm fader is provided to control each dimmer channel, and a master fader, with level indicator LED, is also provided. Remote control input from both USITT DMX512/1990 and analogue 0–10 Vdc (positive or negative) is fitted as standard, and the three control methods all pile on, in a highest takes precedence manner.

Smartpacks receive DMX512 dimmer drive signals from a very wide range of lighting controllers, including all ETC Expression, Impression, Insight, MicroVision, Connection and Reflection systems. Standard XLR5 DMX in and DMX out connectors are fitted on the rear panel, enabling large temporary installations to be wired together quickly, using standard DMX512 cables.

The control panel on each Smartpack enables the user to set and display a start address for the pack, as well as to select, for each or all dimmers:

### *2.4.1 Dimmer profile*

Any dimmer may be set to any one of 12 preprogrammed curves, including three non-dims and a 'hot' setting (permanently on). This should take care of the requirements of the vast majority of entertainment and architectural applications, and custom profiles may be generated if required.

### 2.4.2 Response speed

A dimmer's response speed is the time it takes for the dimmer's output to arrive at a new level, following the reception of a new level instruction by the dimmer's control electronics, and is measured in milliseconds. Don't confuse response speed (in milliseconds) with risetime (in microseconds).

Smartpack ships with a default 100mS response speed set for all dimmers, but allows the user the choice, for any or all dimmers in a pack, of 30, 100, 300 or 500mS.

Thus, a studio with RCDs and a lot of 5kW loads might function happily with all dimmers set to 300mS response time, while individual circuits for chasers or practicals might be set to 30mS for special effects work. A touring system used for concert lighting, on the other hand, might be set globally to 30mS, but with the odd 10kW dimmer at 500mS.

IMPORTANT: A slower response speed will also have beneficial effects on lamp life, since the shock to cold filaments will be reduced, as the time period required to ramp them to full brightness is increased.

### 2.4.3 Local faders

Any or all dimmers may be selected and set to a level, using the individual channel faders and master fader, with level indicator LED. These local faders may be sufficient to handle simple film and display lighting requirements, without the need to use an external lighting control console.

### 2.4.4 Reference voltage

Smartpack needs to know the voltage expected by the user for full on (100%), to which all other levels are scaled. This reference voltage is set by the user or installer, using the pack controls.

## 2.5. Thermal management

Smartpack runs remarkably cool, and uses a computer controlled brushless dc fan to do so with minimum noise and maximum fan life. Air is drawn very efficiently over the chokes and power device heatsinks before being exhausted through the side of the case.

One thermal sensor is provided for each power device, and constantly feeds back temperature status information to the central processor (CPU). The CPU uses this information to decide when it is necessary to switch on the fan for any given power assembly. In the event that a power device should run hot, an amber warning signal is lit on the front panel. If the device overheats, it will be shut down and the warning LED will flash red.

### 3. Installation

If your Smartpacks are fitted with the CE17 appliance inlet option, you can just plug them in and start working. If not, you have some simple wiring to do first. In either case, please take care to observe the environmental requirements for running Smartpacks, especially if they will be fully loaded.

#### 3.1. Environmental considerations

Care must be taken to ensure that the ambient temperature around the Smartpack stays within the range 0 – 35° Celsius. In some cases, this will require air extraction or air conditioning.

Smartpack's air inlets are through the base and lower sides. Never place Smartpack directly on carpet or soft ground, since the air inlets may become blocked.

Smartpack's air outlet is on the right side of the enclosure. Always allow a gap of at least 30cm to the right of a Smartpack, to allow unimpeded exhaust air-flow.

Relative humidity should be kept below 80%, non-condensing.

#### 3.2. Power wiring

Smartpack is primarily intended for use on five wire services, where the phase to neutral voltage is 230 VAC  $\pm$ 12.5%.

6 x 5kW and 3 x 10kW Smartpacks for use on single phase or delta supplies are available to special order. Contact your ETC dealer or ETC Ltd for details.

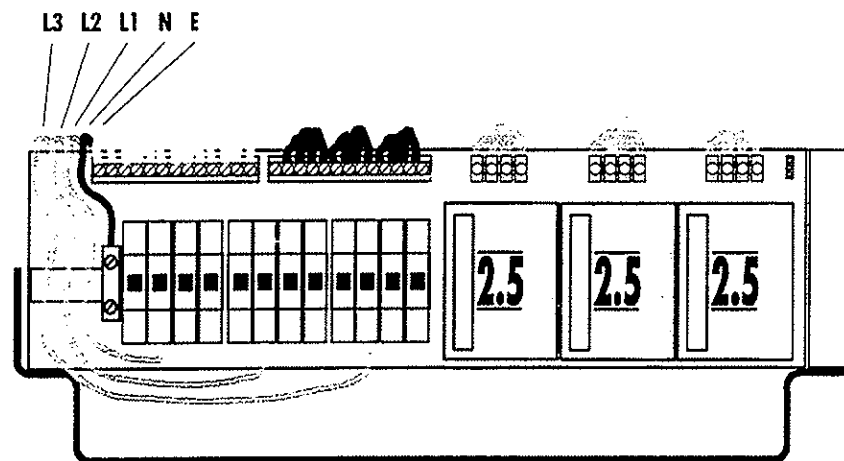
NOTE: Adequate protection must be installed upstream in the supply wiring to each Smartpack.

##### 3.2.1 Smartpack with CE17 appliance inlet

If your Smartpacks are fitted with a CE17 63amp 5-pole appliance inlet, you need simply connect to a suitable fused supply, using a flexible 5-core 10mm<sup>2</sup> cable, terminated with a mating 63amp 5-pole connector.

### 3.2.2 Standard Smartpack

Standard Smartpacks, operating on three phase 220/380 or 240/415v supplies require a five wire supply, usually comprising a short flexible 5-core 10mm<sup>2</sup> cable, terminated to the power terminals inside the Smartpack, and routed through the cable gland on the rear panel to a suitable mains plug. This procedure must be carried out by a qualified electrician. Follow the maximum torque settings given in section 6 – Routine Maintenance.



Three phase and neutral wires terminate in DIN terminals provided. The earth wire should be terminated directly to the earth bar.

Note that a bootlace ferrule must be used to protect the strands of the earth wire.

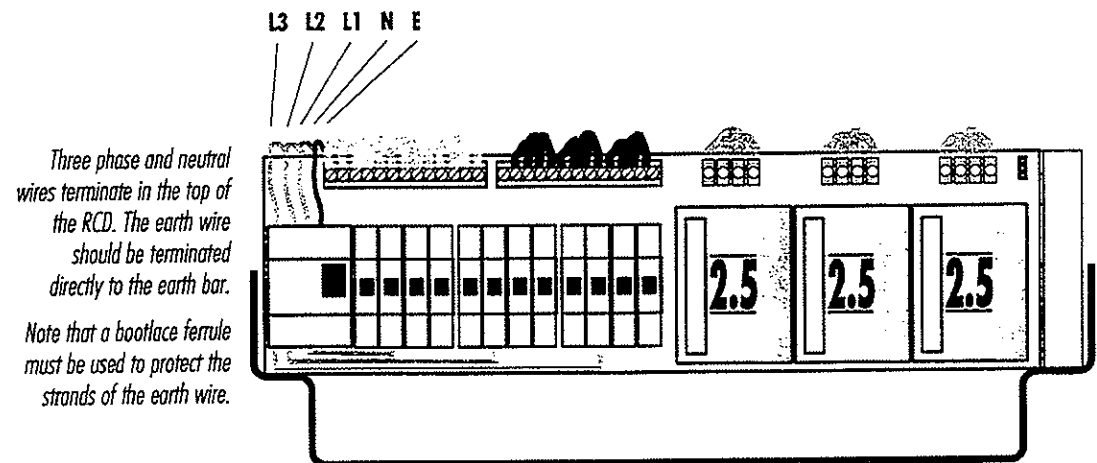
- a) Remove the front panel screws, and lay the panel flat on a soft surface.
- b) Remove the top three screws on the rear panel, and the screws securing the ends of the top cover.
- c) Remove the top cover.
- d) Thread the supply cable through the cable gland, and strip back approximately 50cm of the outer sheath.
- e) Strip back insulation and terminate the three phase feed cables into the lower terminals of the mcbs. In a 12 channel pack, terminate to mcbs 2, 6 and 10. In a 6 channel pack, terminate to mcbs 1, 3 and 5. Ensure that the busbar (fitted under the screw heads of the lower mcb terminals) remains in position after tightening these screws.

- f) Strip back the earth wire, fit a bootlace ferrule, and terminate into the earth bar above the circuit breakers.
- g) Tighten the cable gland on the rear panel, and reassemble the case.
- h) Terminate the end of the flexible cable with a suitable 5-pole plug.

### 3.2.3 Standard Smartpack, with RCD (Residual Current Device)

Standard Smartpacks, operating on three phase 220/380 or 240/415v supplies require a five wire supply, usually comprising a short flexible 5-core 10mm<sup>2</sup> cable, terminated to the terminals of the RCD inside the Smartpack, and routed through the cable gland on the rear panel to a suitable mains plug. This procedure must be carried out by a qualified electrician.

- a) Remove the front panel screws, and lay the panel flat on a soft surface.
- b) Remove the top three screws on the rear panel, and the screws securing the ends of the top cover.
- c) Remove the top cover.
- d) Thread the supply cable through the cable gland, and strip back approximately 30cm of the outer sheath.

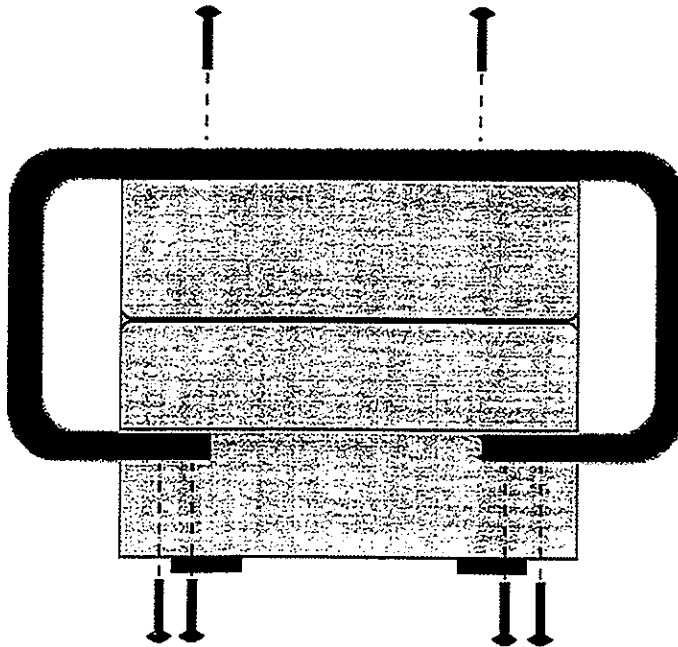


- e) Strip back and terminate the three phases into the three RCD terminals marked L1, L2 and L3. Strip back and terminate the neutral wire into the neutral terminal.
- f) Strip back the earth wire, fit a bootlace ferrule, and terminate into the earth bar above the circuit breakers.
- g) Tighten the cable gland on the rear panel, and reassemble the case.
- h) Terminate the end of the flexible cable with a suitable 5-pole plug.

### 3.3. Assembling optional grab hoops

If the optional steel grab hoops are to be used, you will need to fit them to the pack.

- a) Remove the four plastic plugs in the top panel.
- b) Slide the hoops into place, with the open side below the 'step' in each side of the Smartpack.
- c) Using the screws provided, screw the hoop in place. Note there should be four screws under each hoop, and two on the top side.



### 3.4. Connecting control wiring

Smartpack may be connected simultaneously to both USITT DMX512/1990 and analogue wire-per-dimmer control signals. The two will function together on a highest takes precedence basis.

A unique feature of Smartpack's analogue inputs is that they may be used with either positive or negative 0–10v control signals, without any adjustment by the user. Analogue control input impedance is >100k $\Omega$ .

#### 3.4.1 DMX512 cables

Connect standard DMX in and out cables to the DMX in and out connectors on the rear panel.

Connector type: XLR5

Pinout:

Pin 1	Signal common (shield)
Pin 2	Dimmer drive complement (data -)
Pin 3	Dimmer drive true (data +)
Pin 4	Spare
Pin 5	Spare

Cable type: Shielded twisted pair with overall screen, approved for RS422/485, eg Belden 9841, Alpha 5271, or Proplex 222P or 224P.

#### 3.4.2 Analogue control cables

One cable is needed for each six channels of dimming. Note that 8-pin DIN audio plugs may be used, but will not lock in Smartpack's Bleecon sockets.

## Pinouts

Chassis connectors: Bleecon 8-pin chassis socket, latching

### 12 x 2.5kW Pack:

#### Channels 1 to 6

Pin 1	Channel 1
Pin 2	Channel 2
Pin 3	Channel 3
Pin 4	Channel 4
Pin 5	Channel 5
Pin 6	Channel 6
Pin 7	+12V (nom) DC output (see note below)
Pin 8	Signal ground

#### Channels 7 to 12

Pin 1	Channel 7
Pin 2	Channel 8
Pin 3	Channel 9
Pin 4	Channel 10
Pin 5	Channel 11
Pin 6	Channel 12
Pin 7	+12V (nom) DC output (see note below)
Pin 8	Signal ground

**Note:** The total current drawn from pin 7 of both connectors must not exceed the maximum current rating of 100mA. This supply is protected from thermal damage by a fusible resistor mounted on the Processor PCB, R54. If this resistor is blown open circuit, then replace ONLY with the same device, Philips NFR25 series, value: 4R7.

**6 x 5kW Pack:**

Pin 1	Channel 1
Pin 2	Channel 2
Pin 3	Channel 3
Pin 4	Channel 4
Pin 5	Channel 5
Pin 6	Channel 6
Pin 7	+12V (nom) DC output (100mA max.)
Pin 8	Signal ground

**3 x 10kW Pack:**

Channels 1 to 3, inputs

Pin 1	Channel 1
Pin 2	Channel 2
Pin 3	Channel 3
Pin 4	Loop through to Analogue Out pin 1
Pin 5	Loop through to Analogue Out pin 2
Pin 6	Loop through to Analogue Out pin 3
Pin 7	+12V (nom) DC output (100mA max.)
Pin 8	Signal ground

Channels 4 to 6, loop – through outputs

Pin 1	Channel 4 (from pin 4 Analogue Input)
Pin 2	Channel 5 (from pin 5 Analogue Input)
Pin 3	Channel 6 (from pin 6 Analogue Input)
Pin 4	Not used
Pin 5	Not used
Pin 6	Not used
Pin 7	Not used
Pin 8	Signal ground

Analogue Signal Cable Specification:

any flexible, unshielded, 8 core signal cable. Typical core size:  
7/0.2mm<sup>2</sup>.

### 3.5. Smartpack CPU pcb jumper settings

All jumpers on the CPU pcb are set correctly at the factory and should never need to be moved. For your reference, the settings are:

#### Jumper Settings

- J1** Set to position **12, 6** (middle) or **3**, to match number of channels in this Smartpack
- J2** Set to position **12**
- J3** Set to position **12**
- J4** Set to position **P**
- J5** Set to position **B**  
**Caution:** *never remove J5, not even for a moment. J5 connects the SRAM support battery to the three SRAM ics. If it is removed, then all factory calibration data will be lost and the unit will not function correctly. It will need re-calibration before it can be used normally again.*
- J6** Set to position **U** = unterminated DMX input
- J7** Open circuit. A momentary short on J7 will force the system to reset
- J8** Open circuit, all elements. Reserved for future expansion

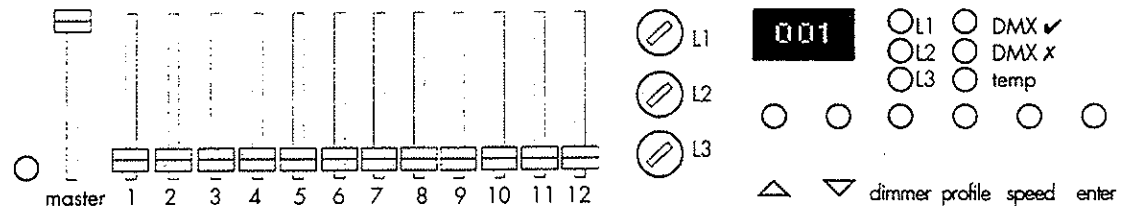
## 4. Commissioning and configuration

### 4.1. Switching on

- For the first switch-on only, first set all MCBs and RCDs (if fitted) to the off (down) position.
- Switch on power to the pack, and check that the three yellow power supply leds L1, L2 and L3 are on, indicating that power from all three phases is reaching the power supply section. If not, switch off, check wiring and repeat.
- If RCDs are fitted, switch them on. If any RCDs trip at this stage, there is a wiring fault in the Smartpack.
- Switch on MCBs, one by one. If any RCDs or MCBs trip at this stage, there is a wiring fault in the Smartpack.

### 4.2. Power and signal indicators

The following status indicators are provided on the control panel. Check that their status is correct before continuing:



- Power LEDs L1, L2 and L3 (yellow). Should be on, indicating power from three phase terminals reaching power supply section of CPU. Note that, in single phase installations, all three LEDs should still light, though they will be connected to the same supply phase.
- DMX512 good data LED (green) – indicated with a ✓ – on if good DMX512 data is being received. It is not necessary to receive DMX512 at this stage in the commissioning process.

The three states of this LED are:

- Off**                Bad DMX512 data – see below.
- Steady Green**    Valid DMX512 data is being received and is relevant to the pack's DMX512 address setting.
- Flashing Green**   Valid DMX512 data is being received but the pack's DMX512 address is set higher than the total number of dimmer data bytes transmitted in each DMX512 packet. (Change the pack's address or configure the DMX512 source for more dimmers).

- c) DMX512 bad data LED (red) – indicated with a ✘ – on if DMX512 data is missing or corrupted, in which case it will be ignored by Smartpack. It is not necessary to receive DMX512 at this stage in the commissioning process, so, providing the Smartpack's DMX512 source is not on, a red DMX512 indicator is fine.

The three states of this LED are:

- Off**                Valid DMX512 data – see above.
- Steady Red**        No valid DMX512 data received since power-on.
- Flashing Red**     Valid DMX512 has been received since power-on, but DMX512 is now invalid or absent.

- d) Temperature status LED (tricolour). This LED should normally show green, indicating that all power devices are within a safe temperature range, and operation is normal. The three states of this LED are:

- Green**             Normal operation.
- Amber**            One or more power devices are getting hot, but operation is safe.
- Flashing Red**    One or more power devices are over temperature and have been closed down. They will resume normal operation when a safe operating temperature has been reached.

### 4.3. Battery supported memory

Smartpack stores its configuration parameters in battery supported memory, which will support settings for up to ten years. The battery will have to be replaced at approximately ten year intervals.

### 4.4. Using offline mode

There are two levels of access to Smartpack's control panel, which is normally safeguarded from accidental operation. The first level is used for dimmer testing, plus changes to dimmer addressing, profiles and response speed. The second level – offline mode – is used for commissioning and service only, and requires a special entry code, which may be withheld from operational staff if desired.

In offline mode, engineers can:

- Check the rms line voltage of L2 phase
- Set the output voltage scale (full output voltage)
- Clear configuration settings to factory defaults

To enter offline mode, it is first necessary to unlock the control panel:

- a) Press **enter** for three seconds. The enter LED lights, indicating that the control panel is unlocked. Note that the control panel has a three minute time-out. This means that the control panel will lock up if no buttons are pressed in normal operating mode, after a period of three minutes. This time-out does not apply in offline mode.
- b) Press and hold the ▲ and ▼ keys for one second. Three dashes appear in the display window, indicating that Smartpack is in offline mode.

Note: in offline mode, the current DMX512 input is set to zero.

- c) Use the ▲ and ▼ keys to move around the offline menu. The menu items are:

---	Offline menu header
<b>AC</b>	Check rms line voltage
<b>CAL</b>	Set full scale output voltage
<b>CLR</b>	Clear stored values to factory defaults

- d) To exit the offline menu, press ▲ and ▼ together from the offline menu.
- e) Then, to lock up the control panel, press **enter**, or wait three minutes for the automatic time-out.

#### 4.4.1 Verifying rms line voltage in offline mode

- a) From the offline menu, Select **AC**, and press **enter**. The display shows the rms voltage for phase L2, eg **220**.
- b) To exit, press the ▲ or ▼ key. The display returns to the **AC** menu header.

#### 4.4.2 Setting the output voltage range in offline mode

- a) From the offline menu, select **CAL**, and press **enter**. The display shows the present rms voltage set for 100% dimmer output, eg **220**. The factory default setting is 230Vac.
- b) Use the ▲ and ▼ keys to change the full scale rms output voltage in steps of one volt. (While the display shows a value different from the present programmed value, the enter LED will flash).
- c) Press **enter** to save the new value (the enter LED stops flashing) and exit to the offline menu.

This function has a very useful by-product: for example, in a TV studio, where the dimmers are being fed from their own transformer, it may make sense to specify say, a 240 VAC supply, where 220V lamps are to be used in the studio. Given that a dimmer insertion loss in the region of 4 VAC can be expected (dependent on load and choke type), plus an average cable loss of, say, 3 VAC (dependent on load and installation), the highest voltage that can be delivered at the lamp will be around 233 VAC. By setting the Smartpack full output voltage to 227 VAC rms, the dimmers will regulate the output to provide a constant 220 VAC rms at the lamp (for full output), even though supply voltage may fluctuate at any level above 227 VAC.

This means that, unlike many digital dimmers, Smartpack is able in these circumstances to regulate accurately over the full output range, not just at levels below 100%.

## 4.6. DMX512 control

Having established that the pack itself is working correctly, the next stage is to verify DMX512 reception from the lighting control system. USITT DMX512 (1990) is an internationally accepted digital protocol for dimmer level communications between lighting consoles and dimmers, and is output from virtually all currently available lighting control consoles.

If you are unsure about the output from your console, please consult your dealer.

### 4.6.1 Terminating the DMX512 line

In order to guarantee correct performance of DMX512, the end of the line must be terminated with a resistor. If the last device in the DMX512 line is a Smartpack, the simplest method is to plug a terminating plug into the Data out socket.

The terminating plug should be a 5-pin XLR male plug, with a 120 $\Omega$  0.25 watt resistor connected between pins 2 and 3. When using other unterminated devices downstream of the Smartpacks, the terminating plug should be connected to the Data Out socket of the last device in the DMX512 line.

### 4.6.2 Good/bad data

Check the DMX512 cable connection to the Smartpack(s), and switch on the control console. Check that the DMX512 status leds on the Smartpack front panel(s) change from the red ✘ to the green ✔ indicator, showing that valid DMX512 data is being received.

### 4.6.3 Setting the pack address

- a) If the control panel is locked (enter LED off), press **enter** for three seconds to gain access.
- b) Press ▲ or ▼ to set the desired start address for the pack. The start address must lie in the range 1–512. Note that, for example, if a twelve channel pack is set with an address of 505, only the first eight dimmers in the pack will be addressed (dimmers 505-512 inclusive). The last four dimmers will remain at zero output.

#### 4.6.4 Testing dimmers with DMX512

With DMX512 received and addresses set, check that each dimmer is responding correctly to its DMX512 control signal by bringing up each DMX512 output in turn from the console and checking the actual dimmer output. For this there is no real substitute for going round the installation with a known good light and plugging it into each of the (tested) sockets in turn.

### 4.7. Dimmer profiles

#### 4.7.1 What is a profile?

A dimmer profile is a table of dimmer output levels corresponding to DMX512 input levels. Using different profiles allows different types of load to be connected to the outputs of the Smartpack, and achieve consistent fade results or safe non-dim operation.

Smartpack is shipped with the factory default IES Square Law profile set for all dimmers, which results in linear light output in relation to DMX512 control input, for most types of filament lamps. In most cases there will be no need to alter this default setting.

The table below shows Smartpack's range of dimmer profile settings, which may be applied to all or individual dimmers:

#### 4.7.2 Smartpack standard profiles

Display	Profile Name	Characteristics
<b>IES</b>	IES Square Law	Default setting for most lighting requirements – provides linear light output in relation to DMX512 level for most lighting loads.
<b>SL</b>	"S" Law	Used for some early thyristor dimmers in theatre applications. An unsatisfactory curve, but may be needed to balance mixed dimming installations.

<b>FLU</b>	Fluorescent	Used for four-wire fluorescent circuits. Note that heater circuits should be run to a separate dimmer, which should have a non-dim or hot profile setting.
<b>C-C</b>	Cold Cathode	Use for cold-cathode or neon lighting loads.
<b>Lin</b>	Linear Volts	Linear rms voltage output in relation to DMX levels.
<b>120</b>	120 volt scale	Provides 0–120v output, scaled to 0–100% DMX input.
<b>P03</b>	Preheat 3%	Any DMX level 3% or below results in 3% output. Above 3% as IES square law.
<b>P05</b>	Preheat 5%	Any DMX level 5% or below results in 5% output. Above 5% as IES square law.
<b>N05</b>	Non-Dim 5%	Non-dim – dimmer switches on for 5% DMX level or above. No regulation.
<b>N50</b>	Non-Dim 50%	Non-dim – dimmer switches on for 50% DMX level or above. No regulation.
<b>N95</b>	Non-Dim 95%	Non-dim – dimmer switches on for 95% DMX level or above. No regulation.
<b>Hot</b>	Always On	Dimmer always on, irrespective of DMX512 level. No regulation.

#### 4.7.3 Dimmer profiles versus console profiles

Many modern consoles, such as the ETC Expression and Obsession, have the ability to set dimmer profiles themselves, assuming a linear response from the dimmers. It is certainly more convenient to set dimmer profiles at the console, where the information can be stored with the other information for each show, but there is one important distinction – non-dims:

Please note that, when using non-dim profiles to drive inductive loads such as motors or ballasts for discharge lights, it is desirable to pass through as much of the mains waveform as possible to the load. In some cases, particularly where the output scale voltage is significantly below the pack's

supply voltage, setting a non-dim profile at the console will result in a significantly chopped waveform being seen by the load.

Smartpack does not regulate non-dim or hot profiles, so by setting the non-dims at the pack, a full output waveform can be guaranteed for sensitive loads.

#### 4.7.4 Setting profiles

- a) If the control panel is locked (enter LED off), press **enter** for three seconds to gain access.
- b) Press **dimmer** to enter dimmer mode.
- c) Select all dimmers by pressing **▼**, or select an individual dimmer to set with the **▲** and **▼** keys.
- d) Press **profile** to display the dimmer profiles menu, and scroll to the desired profile for the selected dimmer(s), using the **▲** and **▼** keys. The enter LED flashes, indicating that the profile displayed is not that recorded in memory for the dimmer(s).
- e) Confirm the choice of profile for the selected dimmer(s) by pressing **enter**. This sets the control panel back to dimmer mode, for the selection of the next dimmer to be set.
- f) To exit without saving, press **dimmer** or **speed**.

#### 4.8. Response speed

The response speed is the time taken for a dimmer to ramp from zero to full output in response to a full level received via DMX512. Response speed is measured in milliseconds, and should not be confused with current risetime, measured in microseconds. Smartpack offers a range of four response speeds, which are appropriate for different lighting tasks.

##### *30mS Response speed*

Very fast response, used with light filaments and where dynamic response to bump buttons and chases is essential. The downside is that, in certain circumstances, such a fast response can cause nuisance tripping of MCBs

and RCDs – for example when large cold filaments are suddenly switched to a high level, in an installation with exceptionally low loop impedance.

#### *100mS Response speed*

Factory default setting gives acceptably fast response in most situations, eliminates nuisance tripping in all but most severe circumstances, and prolongs lamp life by reducing thermal shock to cold filaments.

#### *300mS Response Time*

Used mainly in TV studios where most loads are 5kW, further prolongs lamp life by reducing thermal shock to cold filaments. Since 300mS is less than the thermal response delay of a 5kW filament, no visible delay is introduced when using such loads. This setting may also be useful for tuning installations with very low loop impedance where RCD nuisance tripping is a problem.

#### *500mS Response Time*

Used exceptionally to reduce inrush currents on large loads, and to extend lamp life. But note that a half second ramp will probably be visible on all but the largest filaments.

### *4.8.1 Setting response speed*

- a) If the control panel is locked (enter LED off), press **enter** for three seconds to gain access.
- b) Press **dimmer** to enter dimmer mode.
- c) Select all dimmers by pressing **▼**, or select an individual dimmer to set with the **▲** and **▼** keys.
- d) Press **speed** to display the response speed menu, and scroll to the desired speed for the selected dimmer(s), using the **▲** and **▼** keys. The enter LED flashes, indicating that the speed displayed is not that recorded in memory for the dimmer(s).

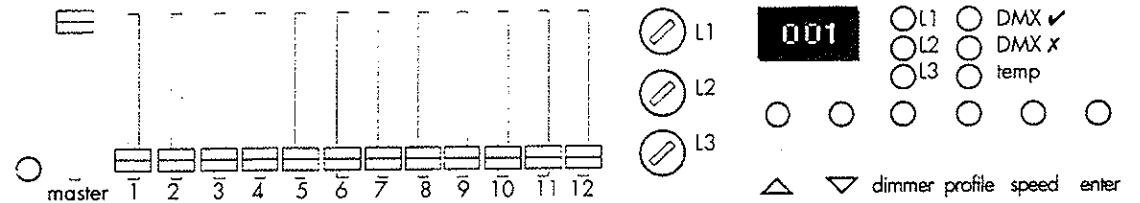
- e) Confirm the choice of response speed for the selected dimmer(s) by pressing **enter**. This sets the control panel back to dimmer mode, for the selection of the next dimmer to be set.
- f) To exit without saving, press **dimmer** or **profile**.

#### *4.9. Important note – exiting from the user interface*

When exiting from the user interface, either following a press on **enter** or Smartpack's automatic timeout, it is important that the pack should not be switched off for at least 2 seconds. When returning to normal operation, Smartpack sets a temporary response time of 2 seconds, so that any changes in DMX512 levels will be implemented gently. If power is lost while this temporary response time is being used, the next time Smartpack is switched on it will retain a 2 second response speed, and show **02** in the display window.

If you do get stuck in this situation, simply go into user mode, select ALL dimmers, and set the desired response speed, using the ▲ and ▼ keys.

## 5. Smartpack operational summary



### 5.1. Accessing the control panel

Smartpack's control panel is normally disabled, to prevent unauthorised access, which could have potentially disastrous results. When the enter LED is off, the control panel is disabled.

To access control panel user mode:

- Press **enter** for three seconds. When the enter LED lights, you are in user mode, with access to the main control panel functions.
- To lock the control panel again, press **enter** any time the enter LED is on, but not flashing.

*NOTE: For security reasons, the control panel will automatically lock and the pack will return to normal operational mode if no key is pressed for a three minute period.*

Whenever the enter LED flashes, it indicates that the displayed value is not the presently programmed value for that parameter. Press **enter** while the enter LED is flashing to store the displayed value and overwrite the previous value.

### 5.2. Address setting

Once accessed, the control panel may be used to set a new starting address for the pack. Note that all dimmers will automatically be numbered in ascending sequence.

- Use the ▲ and ▼ keys to select a new start address for the pack. Note that the enter LED flashes, to indicate that the displayed start address is not that recorded in memory.

- b) Confirm the new start address by pressing **enter**. The enter LED stops flashing, indicating that the new address has been recorded.

### 5.3. Dimmer mode

In dimmer mode you can:

- set dimmer profiles
- set dimmer response speeds

Having accessed the control panel, press **dimmer** to enter dimmer mode. The dimmer LED is now lit.

In dimmer mode, when using the ▲ and ▼ keys, note that Smartpack limits the range of dimmer numbers displayed to the dimmers in the pack, plus **ALL**, where all dimmers in the pack may be tested, or have profile and speed settings changed.

ALL dimmers are selected when the dimmer display is taken out of range, in either direction, using the ▲ and ▼ keys. So, having entered dimmer mode, just press ▼ to select ALL dimmers.

#### 5.3.1 Profile mode

A full explanation of dimmer profiles is given in section 4.7.

To view or change dimmer profile settings:

- a) Press **dimmer** to enter dimmer mode. The dimmer LED is lit.
- b) Select one or all dimmers, using the ▲ and ▼ keys.
- c) Press **profile** to enter profile mode. The profile LED is lit, and the profile for the selected dimmer(s) is displayed.
- d) Select a new profile, using the ▲ and ▼ keys. The enter LED flashes, indicating that the profile displayed is not that recorded for the selected dimmer(s).
- e) Press **enter** to record or **dimmer** to return to dimmer mode without changing the profile setting.

### 5.3.2 Speed mode

For a full explanation of Response Speed settings, see section 4.8.

To view or change response speed settings:

- a) Press **dimmer** to enter dimmer mode. The dimmer LED is lit.
- b) Select one or all dimmers, using the ▲ and ▼ keys.
- c) Press **speed** to enter response speed mode. The speed LED is lit, and the response speed for the selected dimmer(s) is displayed.
- d) Select a new speed, using the ▲ and ▼ keys. The enter LED flashes, indicating that the speed displayed is not that recorded for the selected dimmer(s).
- e) Press **enter** to record or **dimmer** to return to dimmer mode without changing the speed setting.

### 5.4. Offline mode

Smartpack's offline mode is intended for installers and service engineers, and has a separate security level from user mode.

In offline mode, all dimmer levels received via DMX512 are set temporarily to zero. Normal DMX512 operation will be resumed upon exiting offline mode.

Note that there is no timeout from offline mode. You have to exit in order to return to normal operation.

In offline mode you can:

- View supply rms voltage for supply phase L2
- Set the output rms voltage scale for the pack
- Clear down all configuration settings to factory defaults

To enter offline mode:

- a) Access the control panel by pressing **enter** for three seconds.
- b) Press the ▲ and ▼ keys together for one second. the offline symbol --- is displayed.

c) Using the ▲ and ▼ keys, scroll through the offline menu.

To leave offline mode:

a) Return to the offline menu.

b) Press the ▲ and ▼ keys together. The control panel is returned to user mode.

#### 5.4.1 Checking line voltage, phase L2

a) From the offline menu, select **AC** and press **enter**. The display shows the rms voltage for phase L2, eg **220**.

b) To exit, press the ▲ or ▼ key. The display returns to the **AC** menu header.

#### 5.4.2 Setting the output voltage scale

For a full explanation of this function, see section 4.5.2

a) From the offline menu, select **CAL**, and press enter. The display shows the present rms voltage set for 100% dimmer output, eg **220**.

b) Use the ▲ and ▼ keys to change the rms voltage output scale, in steps of one volt.

c) Press **enter** to save the new value and exit to the offline menu.

#### 5.4.3 Clearing configuration settings

It is advisable to set all mcbs off and check each dimmer's profile before using the Memory Clear function. After the operation, all dimmers will be set for IES profile, so, unless all mcbs are off, there is a risk of fading up outputs to non-dim loads. Re-program any dimmers originally set for non-dim or hot profiles before setting their mcbs on.

To clear all configuration settings:

- a) From the offline menu, select **Clr**, then press **enter**. The enter LED will flash (in this case as the sole exception to the general rule) to invite you to confirm the clear command. Press **enter** a second time to clear all configuration settings to factory defaults:

DMX Address = 001

Profile = IES

Response speed = 100ms

Full output voltage = 230Vac rms

The enter LED stops flashing after the second press on enter. Press **▲** or **▼** until the offline menu header (— —) appears.

This operation not only clears configuration settings, it also initialises almost all Smartpack's memory. It is essential to do this after upgrading Smartpack's software or after any service work on the CPU pcb.

## 6. Routine maintenance

The following simple maintenance procedures are recommended, to keep your Smartpack installation in perfect working order throughout its life.

### 6.1. Torque settings

Following first installation, and at regular intervals in situations where dimmers are subjected to vibration, we strongly recommend that all terminal screw torque settings be checked for tightness, using the torque setting table below:

Din Rail Power terminals – 35mm <sup>2</sup>	2Nm
RCD and Circuit breaker terminals	2Nm
Earth and neutral terminals – 10mm <sup>2</sup>	2Nm
Earth and neutral terminals – 2.5mm <sup>2</sup>	1.5Nm
2.5kW load terminals	1Nm
5kW load terminals	2Nm
10kW load terminals	1.2Nm

### 6.2. Cleaning

In average conditions of use, cleaning should be carried out on an annual basis. Rental companies and other heavy duty operators will want to carry out these procedures more frequently.

- a) Clean the outside of the Smartpack case using a spirit-soaked rag, to remove grease and stains.
- b) Switch off supply power and open the pack. Using an air blower, blow dust out of the electronics.
- c) Using a vacuum cleaner with a soft furniture nozzle, clean the inside of the enclosure.

### ***6.3. Control fuse ratings***

1A6 (T) 5 x 20mm (3 per pack)

### ***6.4. Battery replacement***

It will be necessary to replace the battery on the Smartpack CPU which supports configuration settings at approximately ten year intervals. This work should be carried out by an authorised ETC lighting control service representative.

## 7. Technical support

In the event of difficulty during the setup, commissioning or active life of your ETC dimming products, technical support is available at no charge, either from your ETC authorised service agent or from ETC direct.

### 7.1. Who to call

To contact ETC Ltd, please send all relevant information, with a sketch if appropriate, to:

Electronic Theatre Controls Ltd  
London, England  
Phone: +44 (0)181 896 1000  
Fax: +44 (0)181 896 2000

### 7.2. What to tell them

We need to know:

- a) The serial number of the pack concerned.
- b) Who you bought it from.
- c) The software version being run (if known).
- d) The nature of the fault or difficulty.

We shall then treat the job of solving your problem as our highest priority.

## 8. Spare parts

Use this part number guide to order spare parts from your authorised ETC service dealer or from ETC Ltd.

<u>Part No</u>	<u>Description</u>
THY.004	Quad 2.5kW power device
THY.005	Dual 5kW power device
THY.006	Single 10kW power device
MCB.022	Single pole 13amp 'C' characteristic circuit breaker
MCB.023	Single pole 25amp 'C' characteristic circuit breaker
MCB.024	Single pole 50amp 'C' characteristic circuit breaker
PSU.010	Smartpack power supply unit
	CPU circuit board assembly
	Operator interface circuit board assembly
SWI.032	Push-button switch body and cap
FAN.008	Smartpack fan (92mm)
FAN.010	Smartpack fan (120mm)
FUS.008	20mm Fuseholder
	Smartpack local fader pcb assembly – 12 channels
	Smartpack local fader pcb assembly – 6 channels
	Smartpack local fader pcb assembly – 3 channels
FAD.044	Local fader (45mm)
FAD.006	Local fader knob
ICT.001	Thermal sensor
HDD.014	Thermal sensor clip

***Notes:***