

ANYtronics smartDIM

12 Channel Dimming System

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ANYtronics Ltd
Units 5/6,
Hillside Industrial Estate
London Road
HORNDEAN
Hants
PO8 0BL
UK

Tel : +44 (0) 2392 599410

Fax : +44 (0) 2392 598723

Email : sales@anytronics.com

Web : www.anytronics.com

1.0 Introduction

SmartDIM at a glance

SmartDIM enhances the features of the tried and tested 1225 dimming system by providing twelve channels of 12Amp/channel phase controlled triac dimming with circuit breaker protection in a sturdy rack mount unit which is 3U high. Channels are arranged into four-channel blocks so that each block may be supplied from a separate phase, or all blocks from the same phase of the mains supply. All input and output connections are made through the back of the unit, a variety of output connection regimes being available including hardwired connections, 2 or 4 Socapex sockets, 12 or 24 IEC sockets or 2 or 4 Harting sockets.

SmartDIM combines DMX, analogue (0-10v), preheat and local level control inputs so that each channel is controlled by the highest input level present. Each channel can be configured for either for dimming with a linear, linear power (incandescent) or cold cathode (neon) dimming curve and individually set preheat level, or for zero voltage switching operation.

SmartDIM also offers scene setting with four programmable scenes selected by four additional inputs. These +5v inputs can be pulled low (via switch or contact closure) to demand the corresponding preset scene. When a scene is demanded by these inputs, the scene will override all other inputs or settings and will be gently faded in. If all the scene inputs are pulled low, then smartDIM will cycle through the scenes in sequence, fading from one to the next.

Key Features

- 12A/channel dimming or zero voltage switching
- four preset dimming curves : linear, linear power, cold cathode and switching curves
- merged DMX512 and analogue 0-10V inputs
- local level controls
- preheat control for each channel
- LCD bargraph display for channel monitor and status indication
- C13 circuit breaker protection on all channels
- Load present/good indicators on all channels
- Phase connected indicators
- Four programmable scenes
- Scene cycling facility
- front panel mounted fuse holder for 'electronics' fuse for ease of access
- programmable DMX failure modes and programmable default scene
- proportional cooling fan control
- wide range of connection regimes available (as for 1225/193 models)

All **users** will appreciate the robust construction, circuit breaker protection, the flexible and comprehensive input and control arrangements and the fully featured, easy to use menu system.

Installers will value the product reliability, and the ability to lockout user access to the main menu system, local level controls or DMX address change as appropriate, together with the facility of an installer's message which can be programmed with emergency contact details.

Hire companies will value the proven robustness and reliability of ANYtronics products and will find features such as the one touch 'return to factory default settings' particularly useful in reducing hiring turnaround times. The programmable message is a useful method of displaying contact details to hirers (and usefully this is not cleared by the 'return to defaults' command).

2.0 Installation

2.1 Mains Supply

To make internal input supply connections, first remove the lid of the dimmer by removing the fixing screws. In order to encourage your further and future custom, **ANYtronics strongly recommend that a proper earth connection to the earth bus bar (behind the input supply connector) is in place before any other connections are made.**

SmartDIM will work automatically with any order of supply phasing. It is designed for three phase (star) connection, but will also work from a single phase supply. The supply cabling should be routed through the large cable gland fitted to the 40mm hole in the back panel. Mounting facilities are provided on the back panel for a 5 way (3L+N+E) CEE form input socket if required.

Once the earth connection to the PCB mounted brass bus bar has been made, the supply cable should be connected into the clearly labelled four way (3 live and one neutral) DIN rail mounted terminal block. The contacts on this block are rated at 150A, but even if using a bridging bar, good practice suggests that a single phase supply should still be connected via separate cables to all three of the live terminals. (ANYtronics can supply a bridging bar rated at 90A for use in this connector when the supply is single phase.)

2.2 Output connection

The output terminals are PCB mounted at the back of the dimmer. Live, neutral and earth connections should be made to all load equipment. The basic hardwired output option comes with a punched output plate with six 20mm holes fitted with grommets for cable access. Other options (eg Socapex) will have a different mounting plate, and the IEC socket options are factory installed and will already have the required output sockets wired and fitted to the rear of the unit.

2.3 Input connections

Male and female DMX standard 5 pin XLR connectors are provided on the back panel for 'in' and 'through' connections. This will also facilitate use of a low impedance terminator if the dimmer is the last equipment on the DMX line. All five pins of the sockets are through wired for ease of use.

Analogue inputs (standard 0 to +10V) are provided in the form of two 8 pin ring-locking DIN sockets which are conventionally wired for compatibility with our own lighting desks as well as with those of many other suppliers. These sockets also include a dc supply output at +22V which can be used to power small lighting desks which draw less than the 150mA maximum supply current.

A locking 5 pin DIN socket and screw terminals are provided for the four scene inputs and 0V connection. To select a scene connect the relevant scene input to ground. The current drawn will be 2-3mA. All four scene inputs can be grounded to select a 'scene cycle' for dynamic lighting effects. The circuit shown below will enable all four scenes as well as the scene cycle to be selected by switches or contact closure.

Pin connection diagrams for the input sockets are shown on the equipment lid.

3.0 Operation

Powering Up

On powering up, smartDIM will briefly show the model number on the LCD display and will then display the Installer's message (typically contact details) for four seconds. It should then start normal operation.

Operating Features

SmartDIM is controlled via a simple to use menu system using an LCD display. This system has three main sections :-

normal operation where the current output levels are displayed in the LCD top line as a bargraph display and status information in the bottom line of the display,

user menu where

local level controls,

DMX address

LCD contrast level,

and LCD backlight levels can be set.

[Note that the installer may disable user access to local level or to DMX address setting.]

installer menu where the installer may set :-

dimming curve and preheat for each channel,

DMX address and DMX failure mode,

scene levels,

user access to local level controls and DMX address,

installer's message and other display features.

[Note that the installer may disable access to this menu.]

3.1 Normal operation

During normal operation, DMX, analogue, local control levels and scene inputs are combined to derive the required output levels. These output levels are shown on a bargraph display on the top line of the LCD and are used to control the twelve triac outputs.

Normally the DMX, analogue and local level inputs are compared and the highest level for each channel used to control that channel and displayed on the bargraph. The preset preheat levels are then added and the resultant composite level used to control the channel triacs outputs through the selected dimming curve for that channel. *Note therefore that the effects of preheat and of dimming curves are not shown in the bargraph display.*

If any of the four scene inputs are pulled low, these will override all other inputs and menu selections and the corresponding scene will be faded in to control the twelve channels. If two or three scene inputs are pulled low then the scene with the lowest number will take effect. If all four scene inputs are pulled low, the four scenes will be selected in sequence, fading gently from one to the other in a 'scene cycle'.

During normal operation, status information is displayed on the bottom line of the LCD. This is usually DMX status (ie whether signal present or not) and the current DMX address. If a scene has been selected from the scene inputs, then the scene number is shown instead. *Note that DMX status is displayed whether or not the DMX input is enabled (ie even if address is set to off).*

Holding down any front panel button for a second will enter the User's Menu system.

3.2 User's Menu

The User's Menu system allows access to the following features :-

- Local level controls,
- DMX address set,
- LCD contrast,
- LCD backlight levels,
- Exit (to normal mode).

Note that the installer may disable access to the first two of these.

The four front panel buttons are labelled left arrow, down arrow, up arrow and right arrow. The two central buttons (up and down) are used to change the value in a menu selection. Pressing these will cycle backwards or forwards through the user menu features listed above (except those disabled by the installer). Pressing the right arrow button will enter the menu feature shown. The left arrow button does nothing at this level. Taking the above features in reverse sequence (ie in increasing order of complexity).

Exit

If the bottom line of the display shows this selection, pressing the right arrow button will accept this selection and act on it, returning to the normal display. Pressing the up or down arrow button will change the selection to one of the others listed above. The left arrow button does nothing at this level.

LCD Backlight

Pressing the right arrow button to accept this selection will change the display to show the backlight level as a percentage. This level can be changed using the up and down arrow buttons. The resultant new value will take immediate effect and will be displayed as a changed percentage. The left arrow button does nothing at this level, but the right button moves on to a new menu level to ask if you want to change to this new backlight level permanently. Here the up and down buttons do nothing as there is no value to change. The left button will return to the previous mode where the backlight value can be readjusted. Pressing the right arrow button will save this new backlight level and return to the next user's menu item.

LCD Contrast

This menu operates exactly as the LCD backlight menu above but changes the LCD contrast.

DMX address

The DMX address setting menu operates in the same way as the two above, changing the DMX address from Off to 1 through to 501 maximum, using the up and down arrow buttons. Pressing the right arrow button will offer to save the new value, and again you can return to readjust the address by pressing the left arrow button, or accept and save the new value by pressing the right arrow button which returns you to the user's menu

Note that the change of DMX address is not effective until it is saved.

Local Level Controls

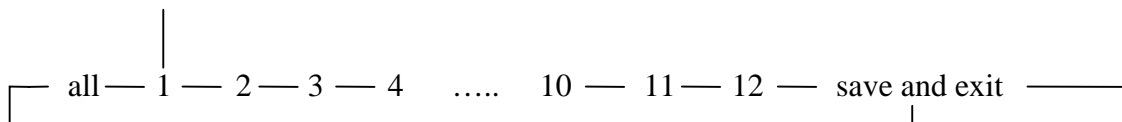
On entering the local level control setup menu a bargraph of the current local control levels is displayed on the top line of the LCD. Any external input levels present are not shown in this display. Note however that the channel outputs will still be driven by any DMX, analogue or scene inputs and by any preheat levels which will not be shown in this local level control bargraph display. To edit the local control levels, either look just at the bargraph display or else remove any other inputs to view the effect of the controls 'live'.

Channel change

When this display comes up, a flashing cursor will appear on the bargraph position for channel 1, showing that the level on this channel can be changed. By pressing the right (or left) arrow buttons the flashing cursor can be moved right (or left) along the bargraph display to allow editing of the local control level on each channel in turn. The corresponding channel number and the channel's local control level will be displayed in the bottom line of the LCD.

Right of the position for channel 12 is the 'save and exit' position. A further single press of the right arrow button will save the local control settings and exit this menu item. Pressing the left button will return to channel 12 position to continue editing instead.

Left of the position for channel 1 is an 'all' position (where the flashing cursor disappears). This allows the user to change the levels on all channels to the same value, and to change that value. Pressing the right arrow button will return to the channel 1 editing position and the flashing cursor will re-appear on channel 1 position of the bargraph. Pressing the left arrow button will roll round directly to the 'save and exit' position right of channel 12. *Note that pressing the right arrow button in 'save and exit' will not roll back to 'all', it will save the set local control level values and then exit to the user menu*



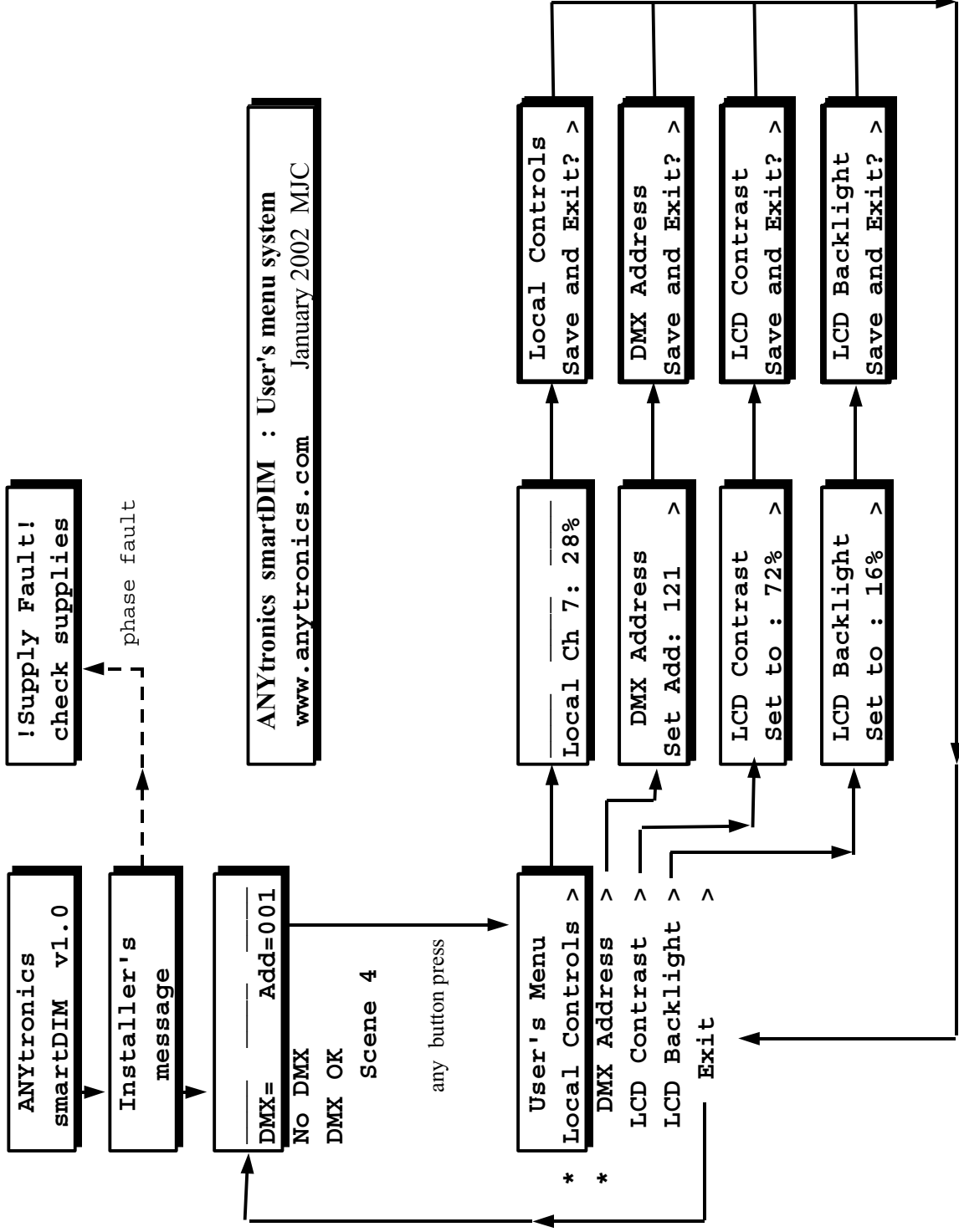
Value change

The set local control level for any selected channel can be adjusted by using the up and down arrow keys to immediately change the local control level passed to the channel outputs. Both the displayed value and the bargraph display will change accordingly to match the local control level forwarded to the channel outputs. Channels which have been set for switching operation will switch on and off rather than ramp up and down. *Note that the value may be displayed in the LCD either as a percentage or as a DMX level (depending on the installer's settings). If shown as a percentage (from 0-100%) the percentage sign (%) will follow the number, if shown as a DMX level only the number (from 0-255) will be displayed.*

After using the right arrow button with 'save and exit?' displayed, the newly set local control levels will be saved to memory and the display will return to the user menu. From here 'exit' (to return to the normal display) can be selected using the down arrow button before pressing the right arrow key to accept this selection.

A diagram summarising the user's menu system is shown overleaf

ANYtronics smartDIM : User's menu system



* NB these features may have been disabled by the Installer

Note to Installers

Pages forward of this point may be separated and passed to the end user for use as an operating manual.

3.3 Installer's menu

Please read through and try out the previous section on the User's menu before proceeding to the Installer's menu as this will explain several key operating features of the menu systems.

Enter the Installer's menu by depressing all four front panel buttons together for one second. This four button press is used to make it unlikely that unauthorised personnel will know how to access the menu system to make adjustments to the setup of the dimmer. As a more secure means of preventing such access, an internal jumper is fitted with positions DI (disable installer menu) and EI (enable installer).

If the enabling internal jumper is not in position EI this menu will not be accessible.

The Installer's Menu system allows access to the following features :-

- | | |
|------------------------|--|
| Channel settings | - dimming curve and preheat levels, |
| DMX settings | - address and default operation set, |
| Scene settings | - edit scenes or capture external inputs, |
| Options | - number display format as percentage or DMX level,
- control User access to DMX address set
- control User access to local controls,
- change or restore original Installer's message,
- restore settings to original factory set default values. |
| Exit (to normal mode). | |

The Installer's menu is summarised with the initial factory settings in the table overleaf.

SmartDIM Installer's menu summary

menu	next level selection	action or choices	Factory settings
Channel			
	Load Curve	) linear dimming	Linear
		) linear power dimming curve (for incandescent lighting	
		) cold cathode dimming curve (for neon lighting)	
		) switching	
	Preheat	0-24% (0-63 as DMX level) except switching channels	0%
	Exit	back to main installer's menu	
DMX	set DMX address	address off, or set between 1 and 501	1
	DMX defaults	) hold last values	
	ie if DMX fails	) fade to zero	hold
		) fade to standby scene	
	Exit	back to main installer's menu	
Scenes	set using either	) Select and set : DMX standby scene	
	local controls	) Scene 1	
	or	) Scene 2	
	external (analogue	) Scene 3	
	and DMX) inputs	) Scene 4	
		Exit (to installer's menu)	
Options	Number Format	display levels as : Percentage 0-100%	percent
		DMX data 0-255	
	Local Controls	User access to controls : On	On
		Off	
	DMX address access	User access to address : On	On
		Off	
	Installer's Message	change / edit message	
		restore original message	
		exit to Options menu	
	Restore Settings	restores original factory settings, as shown in next	column

Channels menu

This section of the Installer's menu allows setting of the dimming curve and of the preheat level for each channel or exiting back to the Installer's menu.

Load Curves

Selecting the 'Load Curves' menu item by pressing the right arrow button brings up a bargraph type display of the current dimming curve settings along the top line of the display.

Here:

- L represents a linear dimming curve,
- P a linear power curve (useful for incandescent loads),
- C a curve designed for use with neon and cold cathode lighting,
- S a conventional switching characteristic for On/Off control of loads.

The Linear Power and Cold Cathode dimming curves are designed to expand the most sensitive centre portion of the normal linear DMX range to provide the maximum useful slider travel on the controlling desk in different applications. The effects of these curves on the channel outputs are not shown on the bargraph display which displays the command inputs as equivalent raw DMX data.

Starting at channel 1, the right and left arrow buttons will move the flashing cursor right and left along the display from one channel to the next. This will display the currently selected curve for that channel in the bottom line status display, and allow the setting to be changed by using the up and down arrow buttons to cycle round the four options. If the cursor is moved right until it 'falls off' the bargraph display to position 13, the 'save and exit' option will be offered. Pressing the left arrow button will return to the curve setup bargraph display, but pressing the right arrow button will save the channel settings and return to the channel setup menu.

If instead the flashing cursor is allowed to move left until it 'falls off' the bargraph display at the left end into the 'all channels' selection, the settings for all the channels can be changed at the same time to the same value using the up and down buttons. A further press of the left arrow button will roll round to the 'save and exit' display, from where the dimming curve settings can be saved.

Preheat

If the preheat menu item is selected, a bargraph of the current preheat settings will be shown in the top line of the display with channel 1 highlighted by the flashing cursor and the preheat level for this channel shown on the bottom line display. This level will be shown as a percentage (in which case the number will be followed by a % sign) or as a DMX level. The preheat level for each channel can be set in the range 0-24% or 0-63. *Note that the channels set for switching operation cannot have preheat levels assigned to them and that these channels are indicated in the bargraph display with an 's'.*

Preheat levels are only visible in the bargraph display (on an exaggerated scale) whilst setting preheat. They are not included in the other bargraph display levels during normal operation.

DMX menu

This section of the Installer's menu allows setting of the DMX address and of the action to be taken if the DMX input data stops arriving. It also allows exit back to the Installer's menu.

DMX address

The DMX address setting menu operates as explained in the User's menu section 3.1. The DMX address can be changed from Off (disabling DMX input) to 1 through to 501 maximum.

Note that the change of DMX address is not effective until it is saved.

DMX defaults

Once DMX input data has been detected, smartDIM expects that it will keep on arriving. If the DMX data stops arriving, the action that smartDIM will take can be selected from three available options. If DMX data starts to arrive again, this default action will cease and the new DMX levels will be faded in. The three options are :-

1. As with other ANYtronics products, the normal default action is to hold the last DMX values input for all channels indefinitely (ie until DMX data begins to arrive again).
2. Alternatively a gradual fade out to zero level on all channels can be selected. This would allow complete emergency control of the dimmer from a desk connected to the analogue inputs.
3. A further option is to select a fade to a preset 'Standby Scene' where the default level for each channel is defined. This scene is set in the scene setting menu and will be held indefinitely or until DMX data input is restored.

Note that even after DMX data failure, the default selection can be changed with immediate effect using this menu item. If the menu selection was previously 'hold last values', the pack will hold the last DMX values and output them, so that a desk connected to the analogue inputs will not be able to reduce these last DMX levels, but just exceed them (highest value takes precedence). So if it is then wished to take over control of smartDIM using an analogue desk, changing the default action to 'fade to zero' will fade the DMX levels to zero, allowing complete control from the desk. Note that the last input DMX levels will be lost if this action is selected

Scene Setting

The four externally selectable scenes and the DMX standby scene can all be set using this menu item. The first choice that has to be made on entering this menu item is whether to edit the existing scenes using local level controls, or to capture new scenes from the combined analogue and DMX inputs. Select the appropriate option using the up and down arrow buttons, then press the right arrow button to accept the selection.

Next decide which scene is to be set and select this scene using the up and down buttons, accepting this choice with a right arrow button press.

Local control scene set

On selecting and accepting which scene to set, the existing scene in memory will be faded in to control the channel outputs and will be displayed as a bargraph on the LCD with a flashing cursor over channel 1. The data for this channel can be altered using the up and down arrow buttons, the effects of the change being seen on the channel outputs, on the bargraph display and on the status display line underneath this. The right and left arrow buttons allow the flashing cursor to be scrolled right and left to edit the levels on other channels.

As with the local level controls, an 'all' position (to the left of channel 1) allows all channel levels to be changed to the same value simultaneously. Scrolling the cursor right to position 13 off screen brings up the 'save and exit' option where the new scene will be saved. Pressing the left arrow button here will return to the channel edit bargraph display.

External Input scene set

If a desk is available, it can be used to set the scenes quickly and efficiently. On selecting which scene is to be set, a bargraph display showing the highest of the current DMX and analogue input levels for each channel is shown. Preheat and dimming curve settings remain effective but are not shown on the display. Any local level control settings will be faded out however, so that the external inputs have complete control of the channel levels.

Pressing the right arrow button will bring up the 'save and exit' option, and pressing it again will save the input levels at that instant as the new scene. Pressing the left arrow button will return to the bargraph scene display.

Note that if the DMX input data is disconnected during external input scene setting, the DMX default condition will replace the DMX input (eg with standby scene or last input levels held) and so these levels cannot be altered from the analogue inputs. To overcome this, exit this part of the menu system and change the DMX default action to 'fade to zero' to remove these stored levels. A desk connected to the analogue inputs will now have complete control of channel levels. These defaults will not become active if no DMX has been connected to the smartDIM since it was powered up.

A-B scene setting comparison

During either of the above scene setting operations, the existing scene settings held in memory may be viewed 'live' (ie output to the channel outputs) by pulling down the relevant scene select input to 0V to fade in that scene. Toggling this line high and low will allow a direct comparison of the previous scene still held in memory (when scene input is low) with the new scene being edited (when the scene input is high). The bargraph will display the new settings being edited throughout, and the edit functions will remain active even if the scene in memory is being output instead of the edited scene.

Note that scenes are saved without preheat information. When calling up a scene from the external scene select inputs, the currently set levels of preheat are applied to the stored scene. If preheat levels have been changed after saving a scene, the new preheat levels will be used with that scene, rather than the preheat levels that were in force when the scene was saved. This means that preheat levels (which are not usually visible) can be adjusted on site independently of the scene settings.

Stored scenes do not include information on dimming curves either. If the dimming curve for a channel is changed, a previously stored scene will still output the same command level, but the change in dimming curve may give a change in power level at the load. Since a change in dimming curve is most likely to be made to match a change in connected load, the scene would presumably have to be altered in any event to reflect the change in new lighting load.

Installer's Option Menu

This menu area allows the Installer to customise smartDIM operation to suit the intended operational use of the dimmer. The options available are as follows:-

Number Format	- number display format as percentage or DMX level,
Local Controls	- User access local controls enable /disable,
DMX address	- User access to DMX address set enable/disable,
Install Message	- change or restore to original Installer's message,
Factory Presets	- restore settings to original factory set default values.

Number Format

This option is largely a matter of personal choice. Where channel level is displayed, it can be displayed either as a percentage (number followed by % sign) or as a DMX level 0-255. The factory default setting is for display as a percentage.

Local controls

Local controls are available from the User's menu system and the factory default is for them to be accessible. They can be locked at their current settings by selecting the disable option here. The local controls will be then removed from the User's menu options.

DMX address set

The factory default is for DMX address setting to be normally accessible from the User's or Installer's menu systems. User access to address setting can be disabled using this selection.

Installer's Message

Normally ANYtronics contact details are displayed in this message at switch on. By selecting the edit option, the current message is displayed with an underline cursor which can be scrolled left and right across the two lines of the message. The up and down arrow buttons can be used to change the character displayed at each location. Scrolling left off the top line, or right off the bottom line will bring up the 'save and exit' display, from where it is possible to return to the editing mode by pressing the left arrow button, or to save the new message by pressing the right arrow button.

A large number of characters are available for inclusion in the message, making it sometimes difficult to find the desired character quickly. To help overcome this, a table of characters in order of appearance is shown below. Characters appear in sequence from left to right, then down to the start of the next line.

SmartDIM Installer’s Message character matrix

	!	“	#	\$	%	&	‘	()	*	+	,	-	.	/
0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
P	Q	R	S	T	U	V	W	X	Y	Z	{	¥	}	^	_
`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
p	q	r	s	t	u	v	w	x	y	z	{	|	}	->	<-

Factory Presets

When smartDIM leaves the factory, all local control, preheat and scene levels are set to zero. User access to local controls and DMX address setting is enabled, all dimming curves are set to linear and the DMX default action is ‘save last values’. Using this menu option the factory settings can be reinstated. (These settings are listed in the far right column of the Installer’s menu summary table on page 8.) This will be a useful function for clearing equipment returning from hire. Note that the Installer’s message is not cleared, but can be reset to the original if necessary using the menu option explained above.

Installer’s Mode Enable/Disable

Once the dimmer has been commissioned, the Installer’s mode enable/ disable jumper (which will prevent further access to the Installer’s menu features) can be accessed by removing the top plate of the dimmer. The jumper is on the top edge of the front panel PCB and is the leftmost one nearest the transformer on the PCB. The Installer’s menu is enabled if the jumper is in the position closest to the edge of the PCB labelled EI, and disabled if in the position labelled DI away from the PCB edge.



