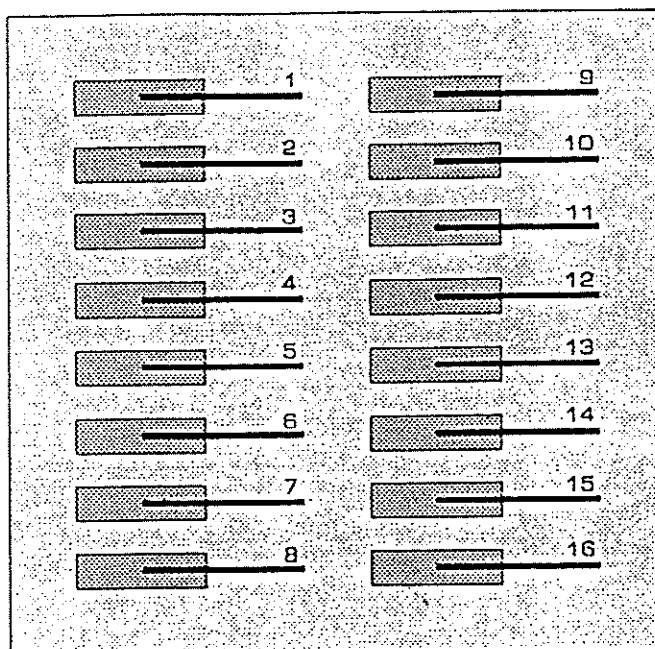
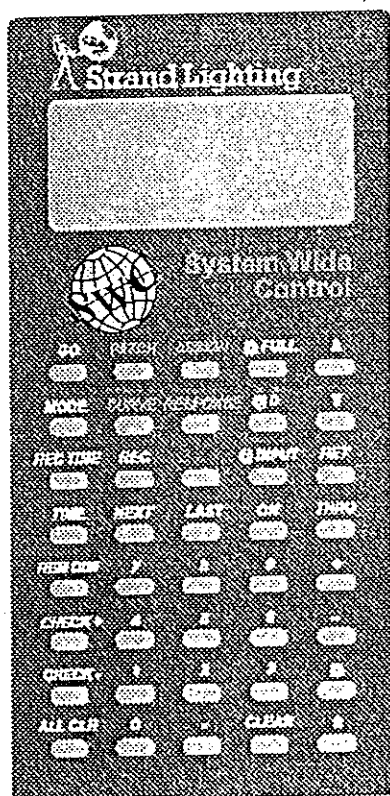




System Wide Control User's Manual



This leaflet describes, or includes references to, the following products:

- 07 001 02: SWC™ programmer.
- 62951: SWC™ 8 Preset panel.
- 62952: SWC™ 16 Preset panel.
- 66074: Remote socket box, XLR 6.
- 66800: 1 gang back-box for 8 Preset panel.
- 66802: 2 gang back-box for 16 Preset panel.
- 66100 Outlook™ Power Supply.
- 66101 SWC™ Power Supply.



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Introduction

This leaflet provides information on the installation and operating procedures for the SWC programmer and preset panels, and their associated power supplies and wiring.

In the interests of continued safe and reliable operation, observe the following guidelines:

- Keep the units at a room temperature of 0-35°C and a relative humidity of 10-95% (non-condensing) during operation.
- Avoid sudden extremes of temperature, rain, direct sunlight, or other heat sources.
- Make sure that wires and cables are routed sensibly and wired in accordance with local regulations.
- DO NOT drop the units or subject them to excessive bumping.
- DO protect the units from excessive dust or liquid contamination.
- Dimmer Racks operate at voltage levels that are potentially lethal. Do not touch any of the internal parts of the equipment unless you are fully aware of the hazards involved and the precautions to be taken.

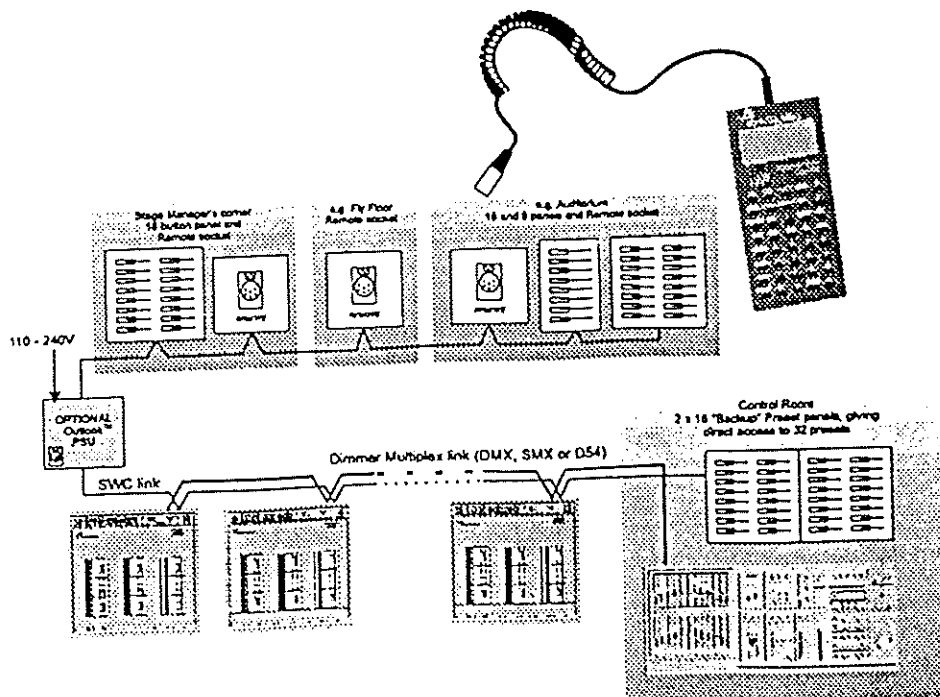


Warning

The SWC Concept

System Wide Control is a concept whereby a number of different control units and dimmers may be daisy chained along a highly reliable SMX communications bus, separate to the MUX control signal(s), allowing sophisticated and independent remote control.

Currently there are two types of SWC control unit, the SWC programmer and the 8 or 16 preset panels. These may be freely intermixed in a system. More than one SWC programmer or panel may be used simultaneously, as shown in the following diagram:



Signal and Power Connections

Signal connections are usually made in a "daisy-chain" with multi-pair cable. It is also possible to "Star" connect the cables subject to the limitations below. Power is also distributed along these cables.

Power for the preset panels must be derived from a DIN rail mounted SWC power supply or an Outlook™ power supply. However, ONE LD90 rack may power ONE SWC programmer, and multiple racks may be paralleled to supply multiple programmers. If you intend to use any preset panels, you must use an SWC or Outlook™ PSU.

Network Configuration

You may connect up to 30 SWC programmers or preset panels in a system.

- 8 preset panels or SWC programmers may be connected to one "bus". To overcome cable voltage drop problems, you must use a second bus if you are using 8 - 16 panels or SWC programmers, and so on.
- Each "bus" must have a maximum length of 500m from the power source (rack or PSU).
- The system may use "Star" connections if the total length of connected cable does not exceed 500m.

Power Requirements

- An SWC programmer requires 9 to 20V DC at an average 0.05A
- A preset panel requires + and - 8 to 15V DC and consumes approx. 0.075A.
- An LD90 rack supplies +10V DC at 0.1A, enough for 1 SWC programmer
- An SWC PSU supplies + and - 12V at 0.5A, enough for 8 panels.
- An Outlook™ PSU supplies + and - 12V DC at 2A, enough for 25 panels.

Cable Types

The recommended types are as follows:

- Belden 9773 or equivalent, 3 twisted pairs, individually shielded, conductors 18 AWG (16 x 30). Conductor resistance 21Ω / km.

If you are only using SWC programmer(s), or less than 4 preset panels / SWC programmers, or cable runs less than 150m, then:

- Belden 8777 or equivalent, 3 twisted pairs, individually shielded, conductors 22 AWG (7 x 30). Conductor resistance 49Ω / km

SWC Programmer & Socket Box Pinout

Pin	Signal	Conductor	Comment
1	Ground + screen	Pair 1 - black & screen wire	
2	+12V (nominal 9-20V)	Pair 1 - red	
3	SMX Data +	Pair 3 - green	RS485 levels
4	SMX Data -	Pair 3 - black	RS485 levels
5	Do Not Connect	-	For factory use
6	Do Not Connect	-	For factory use



The SWC programmer is fitted with a 6 pin male AXR connector, and socket boxes and the Outlook PSU are fitted with 6 pin female AXR's.

Preset Panel Pinout The pinout for the preset panels is identified in the following way on the connector supplied with each panel:

Pin	Signal	Conductor	Comment
V -	- 12V (nominal 8-15V)	Pair 2 - white	
L +	SMX Data +	Pair 3 - green	RS485 levels
L -	SMX Data -	Pair 3 - black	RS485 levels
V+	+12V (nominal 8-15V)	Pair 1 - red	
ID	Do Not Connect		
S	Screen	Pairs 1&2 black & screen wire	

LD90 SWC connections SWC units are connected to an LD90 Processor Unit via 5 way plug-in terminal blocks connected to PL12, marked "REMOTE CTRL". They are supplied with the rack. The pinout is as follows:

Pin	Signal	Conductor	Comment
1	Screen	Drain wire	
2	SMX Data -	Pair 3 - black	RS485 levels
3	SMX Data +	Pair 3 - green	RS485 levels
4	Ground	Pair 1 - black	Use only if powering SWC programmer
5	+10V @ 0.1A	Pair 1 - red	Use only if powering SWC programmer

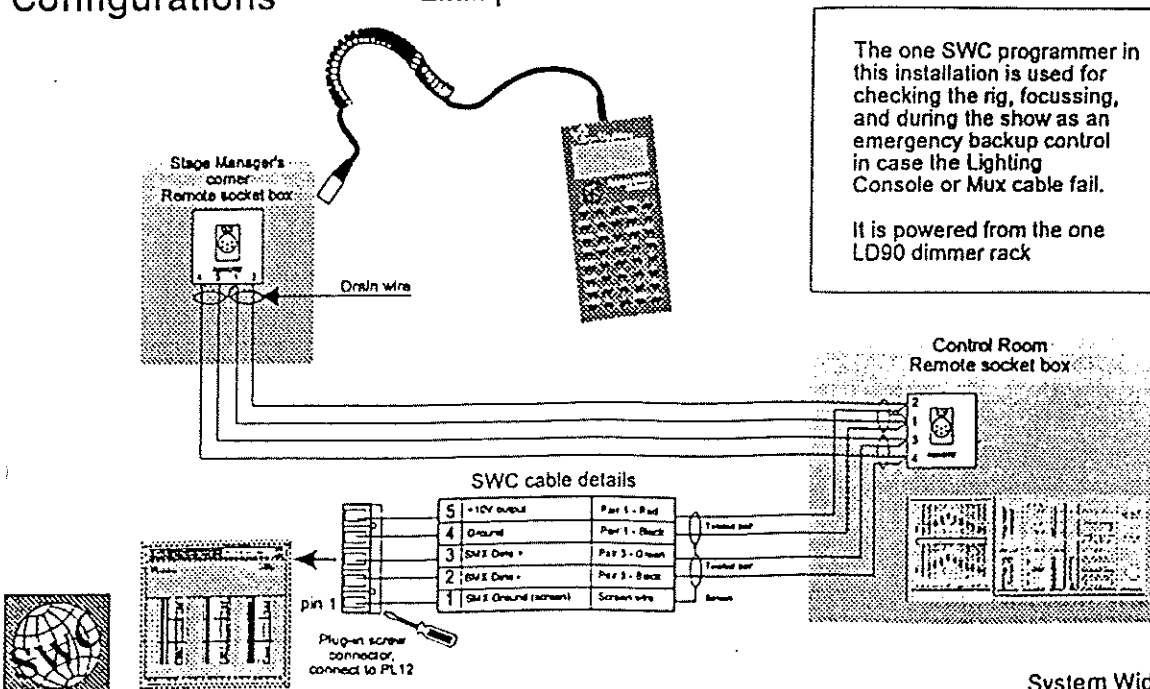
Ensure that the termination link (LK4) is in the unterminated position.



Note: The +10V supply in an LD90 is current limited at 0.1A. It is not advisable to use this supply for an SWC programmer if the supply is ALSO being used for houselight faders etc. (connected to the analogue inputs). The supply would "dip" when the SWC programmer was plugged in, and possibly at other times. Use one of the other PSU arrangements shown if in doubt.

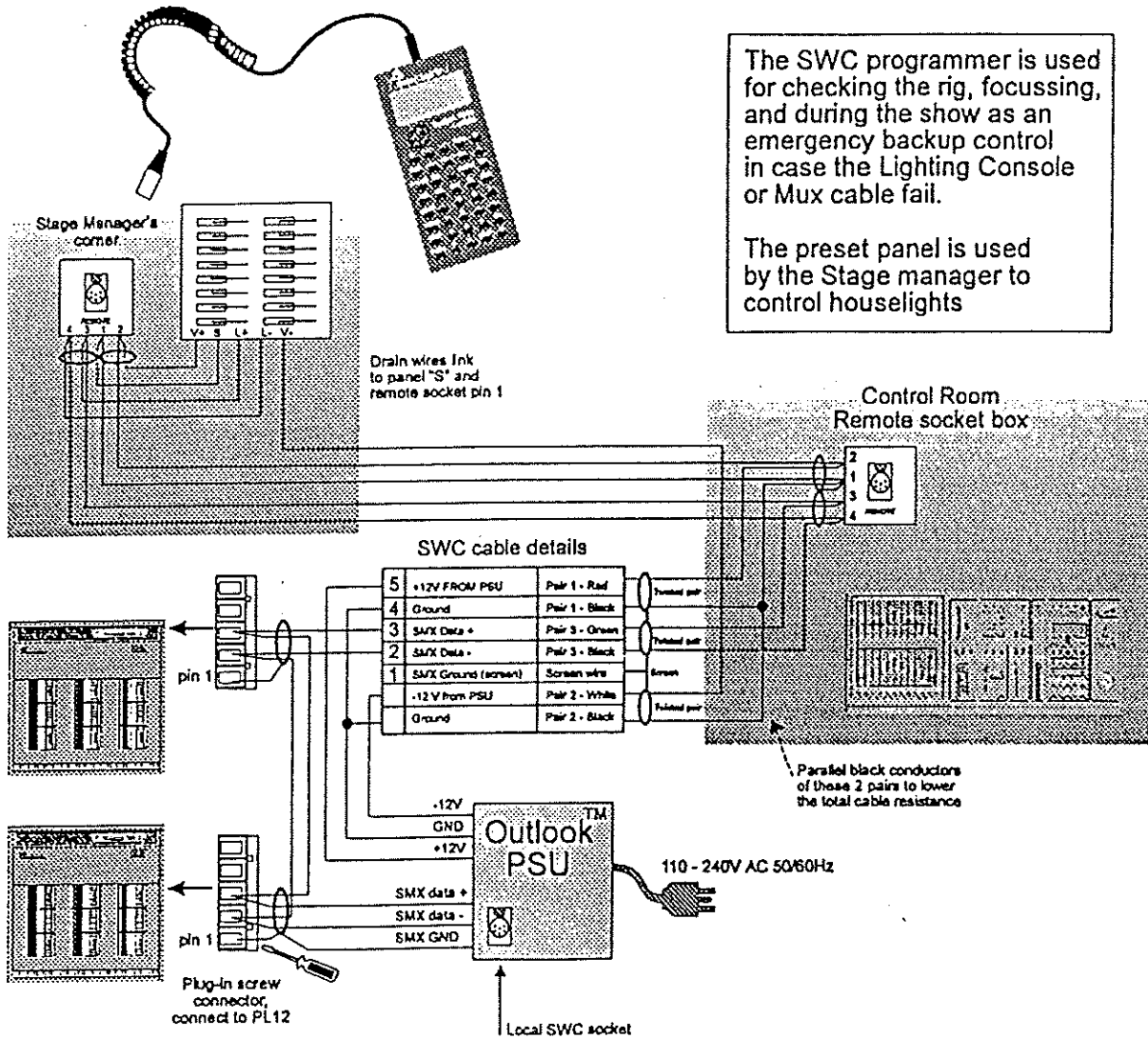
Typical System Configurations

The following are provided as a guide to typical systems:
Example 1:



Example 2:

This system incorporates a preset panel, and so requires a power supply. The Outlook™ power supply was chosen for this example.

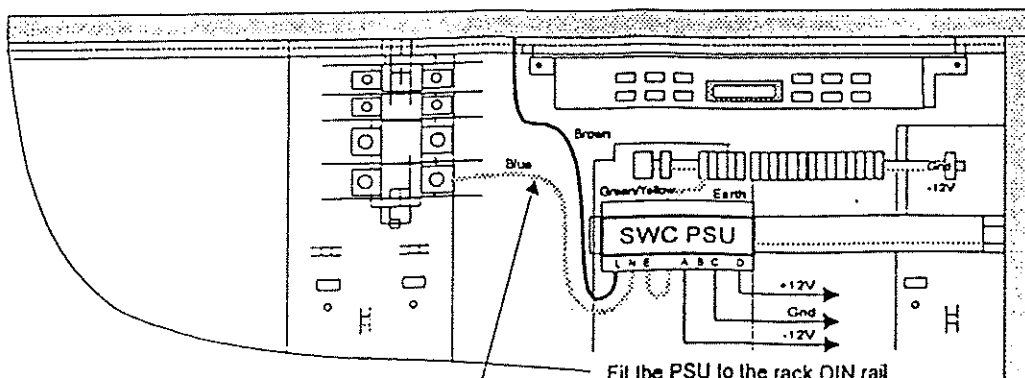


The SWC programmer is used for checking the rig, focussing, and during the show as an emergency backup control in case the Lighting Console or Mux cable fail.

The preset panel is used by the Stage manager to control houselights

SWC Power Supply (LD90 racks only)

The SWC power supply is a DIN rail mounted unit. It fits as shown below. Only 1 can be used in a system; to power more than 8 panels, use an Outlook™ PSU.



Fit the PSU to the rack DIN rail

PSU wiring supplied with rack. Cut off insulating boots, and Connect +12V, -12V and Gnd to the push-button panels in



SWC Preset Panel Information

The 8 and 16 way SWC preset panels allow access to all of the presets held in the dimmer. A 16 way switch on the rear of each unit sets the *range*. The scheme works in the following way:

Switch setting	8 way panel: preset range	16 way panel: preset range
0	1 - 8 with record	1 - 16 with record
1	9 - 16 with record	17 - 32 with record
2	17 - 24 with record	33 - 48 with record
3	25 - 32 with record	49 - 64 with record
4	33 - 40 with record	65 - 80 with record
5	41 - 48 with record	81 - 96 with record
6	49 - 56 with record	97 - 99 with record
7	57 - 64 with record	NO FUNCTION
8	1 - 8 NO record	1 - 16 NO record
9	9 - 16 NO record	17 - 32 NO record
A	17 - 24 NO record	33 - 48 NO record
B	25 - 32 NO record	49 - 64 NO record
C	33 - 40 NO record	65 - 80 NO record
D	41 - 48 NO record	81 - 96 NO record
E	49 - 56 NO record	97 - 99 NO record
F	57 - 64 NO record	NO FUNCTION

If the last 8 positions are chosen, the RECORD function will not operate. This allows the panels to be put in semi-public areas.

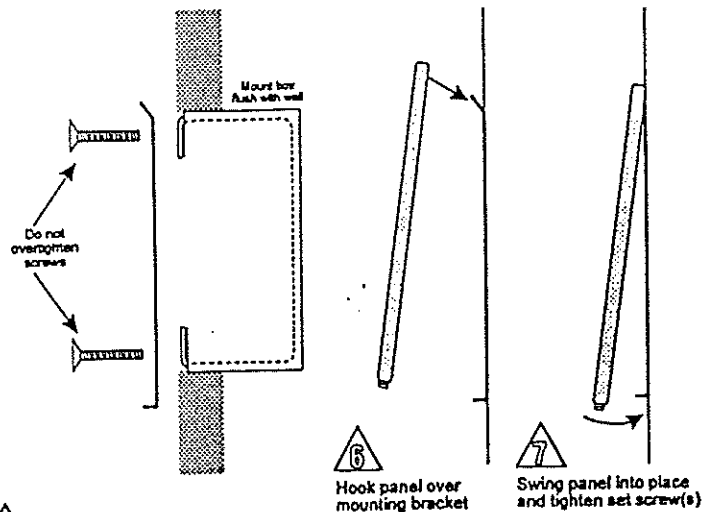
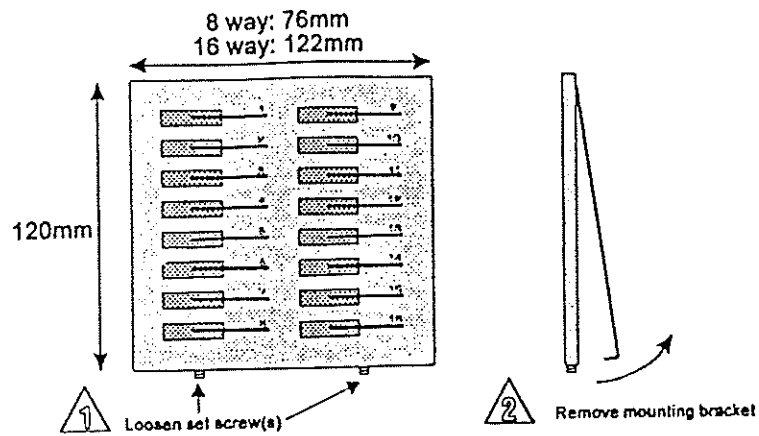
Preset Panel Installation

The push-button panels are usually installed in the optional back-boxes. The back-boxes are US standard. The following text and associated diagrams detail the installation process.

1. Remove the appropriate knock-outs from the back-box and securely screw the back-box into the wall. Make sure it is level so that the panel will be level when installed.
2. Loosen the set screws on the bottom edge of the panel with the Allen key included, and remove the sub-plate by swinging its bottom edge away from the panel.
3. Mount the sub-plate to the back-box with the supplied countersunk screws. Do NOT over tighten the screws as this may bend the sub-plate.
4. Set the preset range required using the rotary switch SW1 on the back of the panel.
5. Connect an earth to the back-box in accordance with National wiring regulations. This earth must be kept separate from the SCREEN (S) terminal.
6. Using the removable screw connector supplied, connect the control signals as detailed above. Connect the plug to the panel.
7. Hook the top of the panel onto the tabs on the sub-plate and swing it down flush with the wall. Do NOT force the panel. If the fit seems too tight, make sure you have the correct back-box, and that you have installed the sub-plate correctly.
8. Make sure that the control cable does not put undue pressure on the panel PCB's or their components.



9. Gently tighten the set screw(s) and keep the Allen key in a safe place.



- 3 Attach mounting bracket to back-box
- 4 Set panel preset range using rotary switch S1 (see text)
- 5 Connect control wires to panel (see above)

Back-Box sizes	
1 gang (for 8 way panel): 89mm deep and 101.6mm square Note this requires extension and reducer plate (supplied) so total depth 98.4mm	2 gang (for 16 way panel): 89mm deep, 95.3mm high, 96mm wide

Preset Panel Operation Both types of push-button panel operate identically and provide the following functions:

1. To select a preset: Briefly press and release the button for the required preset. The LED next to that button will light. Note that panels whose preset ranges overlap will also light their LED's appropriately.
2. To record a preset: Press and hold down the button for the required preset until the LED next to the button starts to flash. At the moment the key is released, the preset is recorded with the current lighting scene.
3. To clear all presets (blackout): Briefly press the button for the currently selected preset (which is next to the illuminated LED).

Note: Preset fade times cannot be recorded from the panels. Times can be set on the individual rack keypads, or by use of the SWC programmer.



SWC Programmer Information

The SWC programmer is designed to provide the user with a similar level of functionality to that of the channel control and basic memory control of a conventional memory lighting console. The unit may therefore be used as a riggers control with direct circuit access, as a backup system for recording and playing back up to 99 presets with recorded or keyed-in fade times, as an override system for setting dimmers to precise levels (including 0), or simply as a mini memory console where a normal console is not required or desirable.

The unit works by sending *high level* command messages, using the SMX protocol, to all dimmers in the system. Because the commands are *high level*, and protected by the data security of SMX, operation is fast and reliable.

The SWC programmer contains its own purpose designed software supporting all common forms of command entry syntax:

- DIRECT 1: Single digit (with optional decimal point) entry, e.g.
 $1+2\equiv 7$ (channels 1&2 at 70% or
 $1+2\equiv 7.7$ (at 77%).
- DIRECT 2: Double digit entry, e.g. $1+2\equiv 70$.
- DIRECT 3: Command mode, requiring * termination of command, e.g.
 $1+2\equiv 7*$.

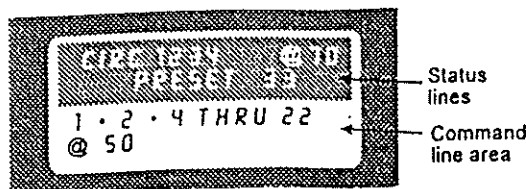
To select your preferred mode, press the **[MODE]** key, select 1, 2 or 3, followed by * to confirm.

An important feature of the SWC programmer is that it accesses dimmers via the "CIRCUIT ID". This is a programmable 5 digit number (4 digits only accessible from the SWC programmer), allowing geographic numbering schemes, channel numbers, or circuit numbers rather than dimmer numbers to be used. Duplicate numbers are allowed, and the range 1 - 9999 is supported. Refer to the dimmer manual for details on setting these.



IMPORTANT: Dimmers are forced to the level set by direct circuit control, regardless of any other external signal inputs or internal theatrical or architectural presets. This means that if a circuit is set to level, including 0, it will stay there until set @INPUT (by rack keypad or programmer) or the RETURN key on the programmer is used.

Display The display is a backlit 4 line by 16 character type, that shows status (last dimmer and preset controlled), and the command line currently entered. The display backlight goes off approx. 30 secs. after the last key entry to conserve display life.



KEY CONCEPT
) esp for multiple
racks Daisy
channel together.

5. The unit "beeps" is an illegal syntax entry is made. Check the selected if in doubt.
6. If the unit "beeps" every time a valid syntax entry is made, then the data lines are shorted, and the fault should be investigated and fixed.



Keyboard syntax

Users of memory lighting consoles will be familiar with the following syntax examples. In all cases, *Direct 1* mode is used, but the principles of all are very similar. Note that circuit control forces dimmers to the specified levels, regardless of other inputs.

Circuit Level Functions

1≡9

1+2+3≡5

1^[THRU]5≡5.5

1^[@FL]

10^[ON]

100^[@0]

1+5^[THRU]100≡7

1+5^[THRU]100≡+1

1+5^[THRU]100≡-2

^[▲]

^[▼]

100^[@INPUT]

100^[THRU]999^[@INPUT]

^[RET]

1^[THRU]100≡6^[REW ON]

^[CHECK+]

100≡2.2^[CHECK+]

^[CHECK+]

^[CLEAR]

^[ALL CLR]

^[MATCH] ^[ASSIGN] ^[CURVE] ^[RESPONSE]

Operation

Sets circuit 1 to 90%

Sets circuit 1,2 & 3 to 50%

Sets circuit 1 to 5 to 55%

Sets circuit 1 to 100%

Sets circuit 10 to 70% (ON is defined as 70%)

Forces circuit 100 to zero, regardless of other inputs.

Sets circuits 1 & 5 to 100 at 70%

Sets circuits 1 & 5 to 100 at 10% above their last controlled level.

Sets circuits 1 & 5 to 100 at 20% below their last controlled level.

equivalent to @+.5. Increases selected level(s) by 5%. Key autorepeats.

equivalent to @-.5. Decreases selected level(s) by 5%. Key autorepeats.

Returns circuit 100 back to control of HTP input sources.

Returns circuits 100 to 999 back to control of HTP input sources.

Returns all circuits back to control of HTP input sources.

Sets circuits 1 to 100 at 60%, and forces all others to 0.

Rig check function. Sets next sequential circuit to the level of the previous selection, allowing rig flash through at any desired level while forcing all other circuits to 0. The key autorepeats.

Sets circuit 100 to 22%, then steps to 101 etc.

Reverse of check +.

Clears last keystroke.

Clears complete command line.

No function with A1 software.

Preset Playback functions

^[GO]

Operation

Replays next preset with recorded fade time. Current Preset is shown on status line 2. Key autorepeats.



20 [GO]

[LAST] [GO]

20 [TIME] 15 [GO]

Preset Recording functions

15 [REC]

) 15 [TIME] 20 [REC]

42 [TIME] 20 [REC TIME]

50 [TIME] 100 [REC TIME]

50 [TIME] 520 [REC TIME]

[REC] 42 *

[REC] 42 [TIME] 20 *

Replays Preset 20 with recorded fade time. Remember the need to use RET or set dimmers under direct control @ INPUT.

Replays Last Preset with recorded fade time.

Replays Preset 20 in 15 seconds, ignoring recorded fade time.

Operation

Records current dimmer output into preset 15. Fade time not changed.

Records current dimmer output into preset 15. with fade time 20s.

Records preset 42's fade time as 20s (Doesn't change recorded dimmer levels).

Records preset 50's fade time as 1 minute (Doesn't change recorded dimmer levels).

Records preset 50's fade time as 5 minutes and 20 seconds (Doesn't change recorded dimmer levels).

(Command line mode (3) only). Records current dimmer output into preset 42. Fade time not changed.

(Command line mode (3) only). Records current dimmer output into preset 42. Fade time changed to 20s.

NOTES:

- The maximum Circuit ID addressed by the SWC programmer is 9999.
- The maximum preset number is 99.
- Only "Whole number" circuit and preset numbers are allowed.
- Enter time using the following minutes/seconds syntax:
 - 30 seconds is "30"
 - 1 minute and no seconds is "100".
 - 5 minutes and 8 seconds is "508".
- The maximum fade time is 9 minutes, 59 seconds, minimum 0 (instantaneous)
- The default fade time is 5 seconds.
- Preset 0 is always a blackout, but may have its fade time re-recorded.
- Leading zero's are always suppressed. 7 = 07 = 007 = 0007 etc.

Operational Hints

1. A fast blackout may be achieved by typing 1 [THRU] 9999 = 0
2. If a preset is selected then it may be removed quickly by recording the fade time on preset 0 as 0. Then type 0 [GO].
3. It is possible to build a very long command line (with at least 20 entries). This "selection" is held locally by the SWC programmer until another selection is made. Hence having selected a whole combination of dimmers at a given level, the user may press [GO] or [ON] etc. without re-typing the selection.
4. Always remember to [RET] before selecting a preset, if all circuits are required to respond!