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ABSTRACT

This document contains information to assist in troubleshooting and maintaining the SLD Series Dimmer racks.

DOCUMENT CHANGE HISTORY

Issue	Draft	Date	Description
00	0.1	11/02/02	Preliminary
01		09/03/02	Training release
02		02/02/02	Training (Feb 2004) release
02.1		06/02/04	Minor typos corrected
02.2		27/04/04	further minor typos corrected.
02.3		01/10/05	Updated to reflect 2.4.2 s/ware changes.

1. Contents

2. Introduction

2.1 Safety

Mains voltages at high current capacity are present inside the dimmer rack enclosure. They are also accessible (by tool) on the top right connector finger for each module position. The system may only be operated with covers removed when suitable measures have been taken to prevent unauthorised access. Access should only be granted to those persons directly involved with any work to be carried out. While such work is being carried out the area should not be used as a general thoroughfare.

When working on *any* dimmer rack personal safety is dependent upon all operatives having a proper understanding of the hazards presented by electrical energy.

It is dangerous (and most unwise) to work alone with *any* dimmer rack.

The dimmer rack is engineered to comply with current safety standards within both the USA & Europe. To avoid compromising compliance any part dismantled must be reassembled correctly. Particular care must be taken to ensure insulation covers & earthing wires are replaced correctly. Power supply components may only be replaced by approved items. 800 amp fuses protect the supply to each phase busbar. 4 amp (8 amp for 120 volts) fuses protect the electronics module power supply. In case of their failure, they must only be replaced by approved types. The SELV supplies are distributed via the CIC PCB mounted on the rear of the processor chassis. This PCB contains several (normally self resetting) thermal fuses. These devices can also be found on the processor & backplane PCB's. In the event of their total failure they **must not** be repaired using tin/lead solder or bypassed by any means.

2.2 General

The SLD range shares a number of concepts from EC90sv. The majority of the latter's features are retained, a few new ones have been added. The most significant of these is Mains Waveform Compensation. This allows the dimmer output to compensate for any glitches present in the supply waveform. Such glitches may only effect a 1 volt difference -expressed over an entire mains period. When a dimmer is running at a low conduction angle such a glitch can represent some 20 or more [load] volts.

The user interface will be familiar to those that have experience with EC90sv. The operating platform is however completely new; and runs on totally different hardware.

Use of 2 processors is supported, with the second running as a tracking backup. DC power for the processors, fans and a limited supply for use with external panels is provided from a plug in PSU module containing 2 series connected 12 volt 100 watt switch mode power units.

A full size rack houses 48 dimmer modules (16 per phase). A half size rack housing 24 dimmer modules is also available. Logical [dimmer] numbering is across the rack, but any individual dimmer channel may be patched to any DMX, Outlook or analogue input. The, current carrying, neutral conductor passes through each module. This considerably simplifies delta connection of the supply (often a requirement for marine use). Dimmer modules are available in 10 [fluorescent] 15, 20, 25, 50 & 100 amp ratings. The 15 - 25 amp modules contain 2 circuits and utilise custom firm fired inverse parallel SCR's. They are also available as true (contactor) Non-Dims. Circuit protection is by hydraulic damped magnetic MCB. Double pole and RCD options are available. The 50 amp module carries just a single circuit. Double pole protection is available for this, but not RCD nor contactor options. The 10 amp fluorescent module is 230 volts only, 15 – 50 amp dimmer modules are universal operating on 90 – 270 volts 50/60Hz. Contactor modules feature internal links for 230 / 120 volts operation. The 100 amp module is for 120 volt supplies only. Keyways, removable on installation, prevent higher current rated modules from being fitted to rack positions with lower current outgoing wiring connections.

An electronics module containing the processor & power supplies mounts in the centre of a 96 way or top of a 48 way rack.

Interfaces are provided for 2 DMX inputs, Outlook / System Wide Control and Reporter. 12 analogue fader inputs are also provided. As with EC90 signals from these interfaces can be patched to any dimmer. An RS232 port on the processor is for software downloading.
Internal comm's is by SBUS. This carries dimmer level / status data to / from the dimmer processors that are located on PCBs behind the dimmer modules. Each dimmer processor supports 4 dimmer modules.
An external SBUS port is provided for future use.

An SN110 node may be installed within the electronics module to provide Ethernet connectivity for DMX & Reporter signals.

For guidance on general operation & installation reference should be made to the SLD user & installation manuals. Certain key information from these publications is however repeated in this document.

2.3 Static Electricity

In common with all microchip based electronic apparatus the circuit boards may suffer damage if a static charged body is discharged via them. Work should not be undertaken on the product in areas where high static charges are liable to build up.

Before picking up a circuit board (or component) ensure that you yourself are relatively free from any static charge (by first touching something like a radiator or an earthed electrical appliance). Next, take a firm grasp on to whatever the circuit board / component is "sitting" on and then, preferably with the other hand, pick up the item. When putting the item down first grasp, with your free hand, whatever surface you are placing the item upon and then put the item down.

By adopting the above procedure, you avoid transferring any static charge via the circuit board / component. Such a procedure is far more effective at avoiding static damage then many well intentioned, but incorrectly conceived, "static free" work areas.

3. Mechanics

3.1 Introduction

Up to April 2002 the rack structure was of a design referred to as C type. These feature 4 sheet steel "egg crate" assemblies that retain the modules on the front of the rack. It is necessary to remove these in order to gain access to the load wiring & dimmer processor PCBs.

Cooling is provided by 2 fans mounted at the base of the rack.

Mains input connections and busbar fuses (800 amps) are located at the top of the rack.

All racks supplied in this format have been full size (48 module) capacity.

In April 2002 a revised design, known as D type was introduced. This is of open front design, considerably easing access to the load wiring and dimmer processor cards. The modules are supported by lips on the inter-column dividers. Cooling is also improved, the full size rack is fitted with 4 fans (2 top,2 bottom). These fans are slightly smaller then those fitted to the C rack. The 24 module (½ size) rack was introduced at this time.

Mains input connection is at the centre of the full size rack (top of ½ size rack) behind the electronics module. The busbar fuses are also located here.

The design of the electronics module changed. The component parts are not directly interchangeable –but can be adapted to fit.

The centre module mounting bay is easily removed to aid the drawing in of the mains supply and load cables. If preferred the rear panel, if accessible, may be removed for this purpose.

Supply & load cables can enter from both top & bottom of the rack.

For illustrations of the general mechanical assembly please refer to SLD (C rack) installation manual or SLD (D rack) installation manual, on the Service CD-ROM (issue 2)

3.1.1 Removal / replacement of "Egg crate" assemblies

This procedure is only applicable to C type racks.

Remove all 12 dimmer modules located within the appropriate rack section. Remove the 2 pins securing the rack door and the hinge plate (4x No. 2 pozi screws). Disconnect the earth cable at the top left of the "egg crate" assembly. Remove the 4 screws (No. 3 pozi) from each internal corner of the assembly (a small flashlight may be useful to see). Lift the egg crate from the support dowels. If removing more then 1 egg crate assembly ensure that they are replaced in their original positions on their respective racks.

3.1.1.1 Replacement

If more then 1 egg crate has been removed complete the replacement of the lower one of a pair first.

Ensure that all 12 pockets are square & undamaged. Locate the assembly on the dowels and loosely fit the 4 securing screws to each corner. Between the 1st & 2nd and 3rd & 4th module rows on the connector moulding there are horizontal H alignment indents. It is most important that the horizontal runs of the egg crate assembly are correctly located within these indent marks. When correct further (but not fully) tighten the 4 securing screws.

Replace the dimmer modules starting with all those in the centre section followed by those in the 2 central positions of the outside sections. Tighten the securing screws and fit the remaining 4 modules.

3.1.2 Dimmer Module alignment

If difficulty is experienced when fitting dimmer modules **do not** use excessive force or you risk damage to the electrical connectors. Ensure that the connector blades in the rack moulding are properly square & central within their housing. If required use a small pair of pliers or screwdriver to straighten.
Warning:- do not attempt this with power switched on.

Should difficulty still be experienced try another module. Ensure that you are not attempting to fit a 25 amp module to a slot keyed to only accept a 15 amp module. If other modules fit correctly, the circuit board may be misaligned within the module. Misalignment will be visible as a twisting of the connector receptacles relative to the vertical plane. This may be corrected by dismantling the dimmer module (see 6.2).

In some instances a module may be totally reluctant to fit it's slot. If this remains the case after careful attention to the points above then a certain amount of controlled force may need to be applied to identify the point of obstruction. If the module is blocked with about 20mm or more of insertion still to go then the most likely cause is miss alignment of the PCB finger carrying the control signals. Check that the board is square within the rack and that it is located correctly on it's mounting studs. Another common cause of miss fitting in this area is if the egg crate on a C rack is not correctly aligned on the "H" alignment indents on the connector moulding. This is true even if other modules within the crate appear to fit without difficulty.

Warning:- Incorrect alignment of an egg crate can put excessive strain on the dimmer processor card. This can result in fracture of the soldered connections to the micro-controller. See 3.1.6.2

If the module fit is obstructed within the last 10mm of insertion, the cause is most possibly one of the load output fingers (the 4 furthest to the left of the PCB finger). Careful straightening and removal of any evidence of a twist will normally resolve the problem.

Blockage of the module insertion for the last 2-3mm of travel is usually due to the phase or neutral supply pins being bent. These are the 2 pins closest to the PCB finger. This damage should be obvious on close inspection.

Should the above still fail then a good hard shove of the module into place is called for. This may either work –or the relevant receptacle on the module (or rack pin) becomes bent. At least one now knows where the problem is and can make amends. With care damaged module connectors can usually be straightened. If not then it must be replaced. These are not listed as spares –but are available from Strand London office.

3.1.3 Replacement of Fans

The C rack contains 2 fans mounted at the base. They can be reached after removal of the filter assembly (4x No. 2 pozi screws). Access is somewhat tight but possible. They are fixed by 4 screws (No. 2 pozi). A short stubby, or right-angled driver will be required.

Disconnect the power cable. There are 3 conductors, red +ve - pwr (24V nom), blue – gnd,. white - tacho. On some racks there may be a zenner diode fitted between the blue & white wires (+ve – blue). It is not necessary to fit this diode onto a replacement fan.

The D rack contains 4 fans, 2 at the top & 2 at the bottom. They may be reached after removal of the 2 filter assemblies (2 x No. 2 pozi screws each) located on the inside top & bottom edges of the rack. The fans are directly behind with no restrictions to access, secured with 2 No. 2 pozi screws. There are just 2 electrical connections on these fans. Note the polarity (+ is marked on the fan body). Ensure a new fan is correctly connected

3.1.4 Processor chassis. C Rack.

Remove the processor(s) & PSU along with the blanking plate (or SN110 if fitted).

Disconnect the 3 ribbon cables at the lower right and the fan cable at upper right. Remove the earth wire from the stud on the left-hand side. Disconnect DMX & other I/O cables from the connectors on the left hand side.

Remove the 4 screws (No. 3 pozi), located in each internal corner. The chassis is located on dowels, so should not fall. Take care not to drop the screws, or their washers, into the rack.

Part lift away the chassis and disconnect the power connector at the rear.

3.1.4.1 Motherboard removal

Remove the 5 screws at the rear securing the plastic insulation shield and then remove the remaining screws along the top edge securing the motherboard. The lower edge of the motherboard is located by horizontal keyhole slots. With the lower edge towards you and looking at the rear, move the motherboard to the right to release.

3.1.5 Processor chassis. D Rack.

Remove the processor(s) & PSU along with the blanking plate (or SN110 if fitted). Disconnect the cables as described in 3.1.4 above but note there is no separate earth wire. It is not necessary to disconnect the 9 way power connector at the centre of the PCB.

The processor chassis is secured in the rack by 4 screws (No. 2 pozi) on the top & bottom surfaces. These screws can be accessed by removing the row of modules immediately above & below the processor chassis. Remove these and draw the chassis forward. An in line 9 way multi con will be seen towards the right hand side. Disconnect this, the chassis may now be lifted away.

Behind the processor chassis is an insulation plate. Do not remove this unless access is required to the main busbar connections or fuses.

To remove the insulation plate first detach the ribbon cable connectors to the backplane cards. The 4 screws (No. 2 pozi) on the (metal) side flanges of the insulation plate may now be removed and the plate lifted away. The processor supply cable passes through the top right slot. The fan cable passes through the hole in the right hand side flange. Take great care to ensure neither of these cables are snagged when refitting.

Warning The insulation plate **must be** replaced before the rack is placed back in service.

3.1.5.1 Motherboard removal

Disconnect the 9 way power connector towards the centre. Remove the 7 screws (No. 2 pozi) The motherboard may now be lifted from the chassis.

Important:- If the 2nd from right top screw is fitted (8 screws in total) remove it along with the PCB. Place a piece of tape across the mounting post and replace the PCB with just 7 screws.

3.1.6 Dimmer processor card removal / replacement

Remove the dimmer modules and the relevant egg crate assembly (C racks only) to gain access to the dimmer processor card. Disconnect the ribbon cable(s) from the connectors at each end of the card. The card is

attached to the plastic moulding within the rack by 3 keyhole slots together with a circular hole at the bottom that locates over a dowel peg. Gently bend the lower edge of the card outwards and then lift upwards. The card can now be lifted clear.

The individual cards are addressed by the centrally mounted DIP switch. Ensure that any card replaced is set to the correct address for it's location in the rack in accordance with 3.1.6.1.

3.1.6.1 Address switch settings

Because the upper & lower sections of a rack are on a separate SBUS the switch settings shown in the table are applicable to both rack sections.

Card 1	1 0 0 0	Card 3	1 1 0 0	Card 5	1 0 1 0
Card 2	0 1 0 0	Card 4	0 0 1 0	Card 6	0 1 1 0

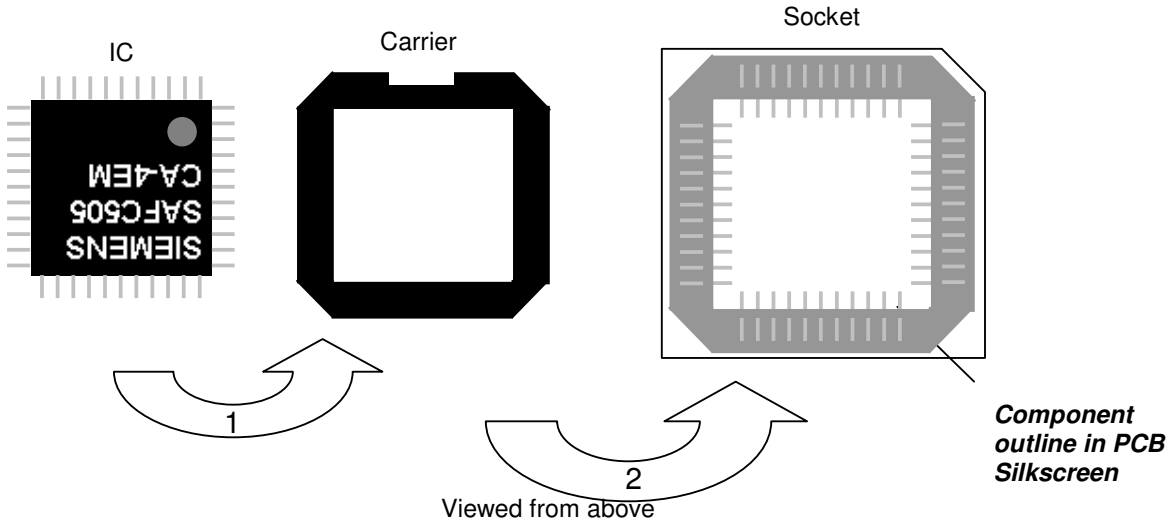
1 represents the switch set to ON. LSB is the figure to the left.

3.1.6.2 C505 micro-controller fitment

Carefully prise off the cover plate. Take great care not to lever the cover plate upwards without ensuring that the locating barbs are free on at least 2 adjacent sides. Do_not use force. It is all too easy to tear the main socket assembly away from the PCB. If this happens, the board may be a write off. You might be lucky in that the PCB pads have not been torn from the board. In this event it may be possible (with great care and good eyesight) to re-solder the socket. Alternatively it may be easier to solder the C505 directly to the PCB.

A sharp pointed tool is best for freeing the cover plate retaining barbs.

When fitting C505CA processors into their sockets, the orientation of the IC, carrier and socket is as follows:



When fitting the IC to the carrier, ensure all the IC's legs are located in the grooves.
When refitting the cover plate ensure that the barbs have fully clicked into place on all four sides.

Note:- REF2121 PCBs supplied since June 2003 have the C505 chips soldered directly in place.

Random unexplained failures in respect of dimmer modules are most likely caused by poor contacts within the C505 socket. In an extreme case the socket connections to the PCB may have fractured. If the trouble is persistent the dimmer processor is best replaced with a post June 2003 item.

3.1.7 Fuses

On a C rack the main busbar fuses are located at the top of the rack. They can be reached after removal of the top cover plate (4 x No. 2 pozi screws). A 17 mm socket and short OE spanner are required to remove the bolts securing the fuses. The bolts are not tapped into the busbar. Take care not to drop them into the rack.

The sub fuses for the electronics module are located in the holder on the left hand side

On a D rack the main busbar fuses are mounted behind the processor. For access this must first be removed along with the insulation sheet as described in 3.1.5

The fuse securing bolts may now be removed as described in the first paragraph.

The sub fuses for the processor are located on the processor chassis along with the RFI suppression components.

The bolts securing the main fuses on D racks are captive in the busbar.

The fuse & busbar bolts are a bit awkward to access with the rack built up but with appropriate tools no great difficulty should be encountered.

17 & 19 mm deep sockets (3/8 drive) a 17 / 19mm cranked ring spanner together with 17 & 19 mm ratchet combination spanners permit the task of fuse replacement or the checking of busbar bolts to be performed with ease. A 10mm ratchet combination spanner is also useful for the bolts connecting the module busbars.

4. Electronics

4.1 User I/O interface (REF2120 CIC card)

Terminations for DMX (A&B), Reporter, & SWC are provided along with termination headers. All these signals are RS485. The actual (opto isolated) interface circuitry is located on the REF2123 processor card.

Other interface ports for 12 analogue inputs (+\- 10 volts) and remote panic activation are provided. This latter may be interconnected to a fire alarm system so as to permit predefined circuits to turn on at full in an emergency situation. In order to first define the selected circuits the Rack processor must be functional. Subsequent activation of the circuits is independent of the state of either processor. The default “panic mode” is to activate upon processor failure, but this may be changed to “contact only”.

3 phase mains is connected via TB6. At this point the 3 neutral connections are kept separate so as to facilitate delta connection at the rack busbars should this be required. Sub fusing for these supplies is provided at the top of the rack (C type) or at the rear of the processor chassis (D type).

6 diodes provide a DC rail that supplies the PSU chassis via PL3. This ensures the PSU can operate provided any individual supply phase is present.

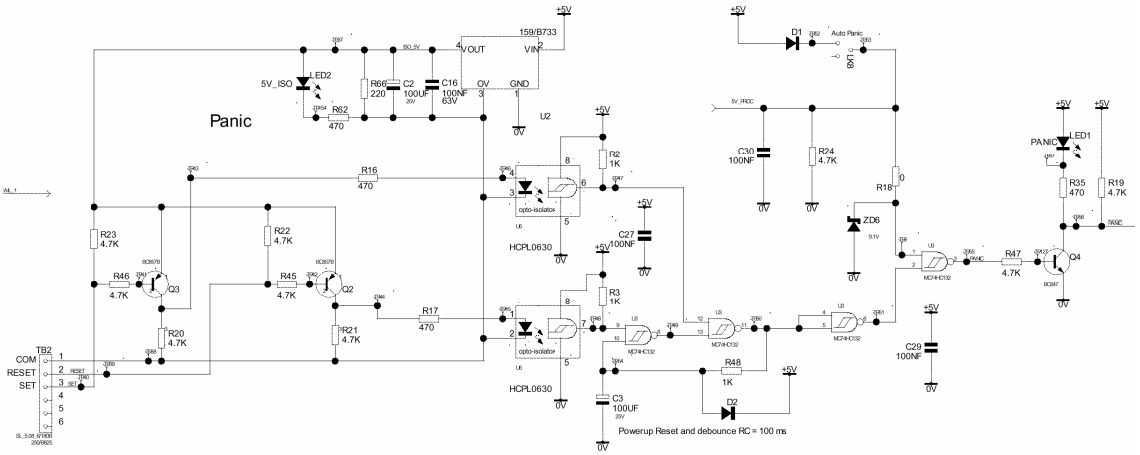
3 transformers provide SELV AC for zero cross timing on the processor(s) along with measurement of supply voltage for the feed forward control of dimmer output.

The current version (/5) features brown encapsulated transformers. An earlier version (/4) can be identified by the presence of naked torrids. There are also prototype versions (fitted with black encapsulated transformers) None of the latter should be in the field.

The rack fans are driven via FET’s U1 & U8. U1 conducts when the input “fan drive 2” (from the processor) is high. This puts 12 volts across the fans, representing the idle state. When further cooling is demanded a PWM signal (from the processor) is applied to “fan drive 1”. The “on time” of this signal is regulated according to cooling demand. This signal is in the opposite sense to “fan drive 2” (active low). Tacho feed back from the fans is presented to Q8 & Q9. From software 1.3c onwards these signals are not used. The fans used in the D rack have no tacho output –so these inputs are not connected on those racks. With software prior to 1.3c failure of the tacho signal from a fan could cause a rack to shut down. Should this problem be experienced the problem can be resolved by upgrading the software. Should this not be immediately possible fan sensing may be disabled from the processor “Engineering menu”. See 5.2.1 for details.

On pre /5 boards the panic input from the processor is susceptible to damage. This results in the rack being jammed permanently in the panic condition –and inoperable. To resolve U3 needs to be replaced. In an emergency you can either short the base & emitter of Q4 –or remove Q4 entirely. Please note that doing this will render the panic feature non-operational. On /5 boards a 9 volt zenner diode (ZD6) is fitted (+ve U3 pin 1 –ve [anode] gnd.) offering some protection to the chip. This mod may usefully be applied to /4 boards. Unless this has been done the hot plugging of processors into /4 CIC boards should be avoided.

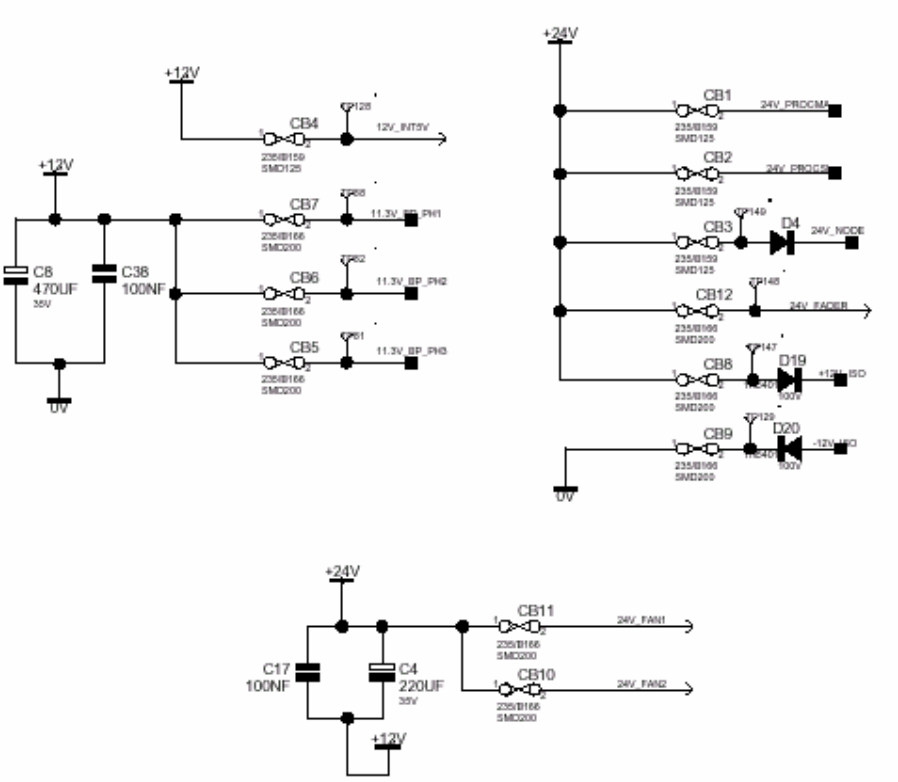
4.1.1.1 **Diagram 1** schematic -panic circuit



4.1.2 Fuses

12 thermal (self resetting) fuses protect the supplies to the various parts of the rack. Diagram 2 indicates the circuits they protect.
Note that CB3 (24 volt Node) is not in fact used for this purpose, the node being supplied from CB8 (+12_ISO) & CB9 (-12_ISO)
See 4.2 for explanation of apparent voltage rail errors.

4.1.2.1 **Diagram 2** schematic -power distribution fuses



4.2 Power supply

2 series connected 12 volt 100 watt (7.5 amp) switch mode power supplies provide overall system power. They accept 90-264 volts AC input and may also operate from 90 – 330 volts DC which, as previously explained, is the case here.

So far as the SLD use of these supplies is concerned the zero volt reference is the -ve pole of the lower supply with the centre tap being +12v and +ve of the upper supply +24v.
The external reference (for SWC power) is center tap 0v with upper & lower poles +12v & -12v.

The (optional) SN110 node draws more power then was originally provisioned for. Consequently node power is taken from the SWC supplies (labelled +\- 12v) from CB8 & CB9 rather then via CB3 as shown in 4.1.2.1

Sub regulators located on the CIC card, processor & dimmer backplane cards provide 5 volts for their respective logic systems. 2 DC-DC converters provide isolated rails for the DMX, SWC, Reporter interfaces and the external panic interface. +/- 12 volts, from the main PSU's, provide power for SWC / Outlook wall-stations and the SN110 Ethernet node.

The power supply modules are not directly interchangeable between C & D type racks –but will fit in an emergency. It is a simple task to transfer the actual power supplies (complete with the wiring to the DIN connector block) onto the appropriate metal work.

4.3 Mains Power connection

On C racks this is a 9 pin connector (TB6) mounted on the rear of the PCB. D racks use the same PCB but with the connector mounted on the front side of the PCB..

Unfortunately both PCBs share the same build reference –which means that effectively C type PCBs are no longer available. It is not difficult to remove the connector and refit it on the reverse side of the PCB to enable a new PCB to be fitted in a C rack. The orientation of the connector is as per the silk screen legend –it is the D rack that suffers from mirror image connections to that originally documented.

If you use a loose connector lead for bench testing take care not to forget this difference. You need 2 separate leads. Ensure they are well labelled.

4.4 Rack Processor (REF 2123)

The design of this has changed during the introduction of the D rack –but both are electrically identical. C rack processors will not fit D racks but in an emergency the card guides can be popped out from the (rack) chassis which will permit fitting. D rack processors will fit C racks without any problems.

4.4.1 C167 Processors.

There are 2 processors located on the board U30 & U31. Both are Infineon C167's. Each are provided with their own Flash memory for program storage & RAM for workspace. Dual port RAM provides for common storage & Comm's between the 2 systems.

U31 is designated "Main processor", supported by U47 (Flash), U48 (RAM). Also associated with the Main processor is NV-RAM (battery backed) U46, EE-PROM U38 & a Real Time Clock (RTC) U32.

U30 is designated Co processor" supported by U43 (Flash) & U44 (RAM). U24 is a packaged crystal clock (8Mhz) driving both processors.

The C167 chip contains a PIO interface and an A/D converter.

The Main processor (U31) has executive control and handles the user interface and all external interfaces except MUX B. It is also responsible for compensating the phase lag introduced by the Zero Cross noise filters (see later). Trim coefficients for the latter, reference values for mains voltage measurement, along with other calibration parameters are stored in EE-PROM U38. User entered tables IE patch data are stored in NV RAM U46.

The Main processor also drives CAN ports 1 & 3. CAN 1 supports the dimmer processor cards in the upper half of the rack. CAN 3 is reserved for future use.

The Co processor handles external interface MUX B and also drives CAN port 2. This supports the dimmer processor cards in the lower part of the rack. Mains waveform compensation is also handled by the Co processor

The above descriptions of processor tasks are not exhaustive. They are intended as a general guide to aid trouble-shooting when problems are encountered.

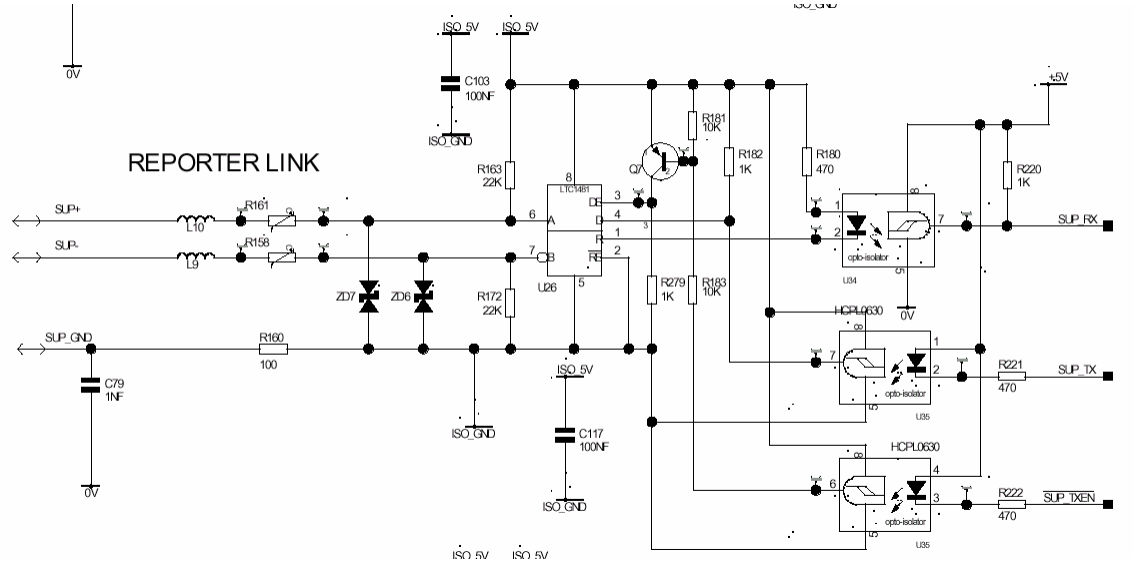
4.4.2 I/O

There are 4 RS485 external interfaces. 2 (Rx only) provide 2 DMX inputs. 2 bi-directional interfaces support Reporter & SWC / Outlook. All 4 of these interfaces are opto isolated. 4.4.2.1 (Diagram 3) illustrates the bi-directional Reporter interface.

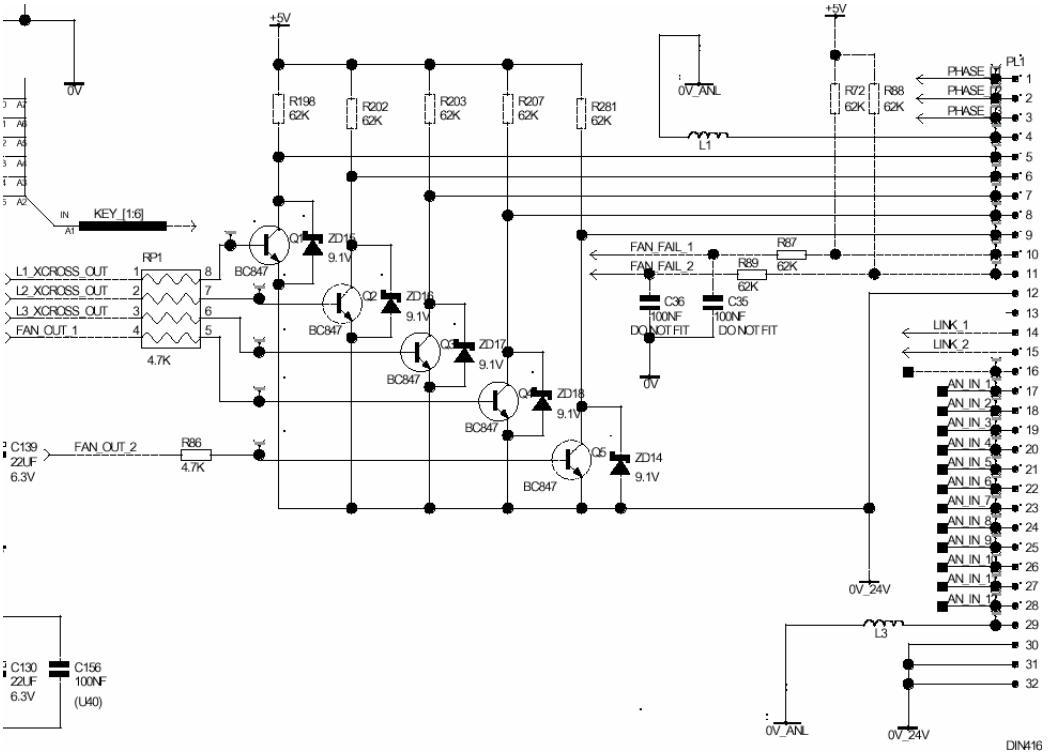
A 2692 DUART (U42) interfaces the serial data streams to the Main processor. The Reporter port is directly connected to the DUART, the other 3 ports along with a local RS232 port for software downloading are connected to the DUART via multiplexer U29.

CAN transceivers U15 (upper), U16 (lower), interface the dimmer processor cards. U17 is the 3rd (external) CAN interface (for future use).

4.4.2.1 **Diagram 3** schematic –Reporter RS485 interface



4.4.2.2 **Diagram 4** schematic –zero cross & fan drive (control)



4.4.3 Analogue stages

The analogue stages generate a zero crossing signal for each of the 3 phases and also full wave rectified & average?? scale mimics of the 3 phase supply voltage. See 4.4.3.1 (diagram 5a) & 4.4.3.2 (diagram 5b) for the general arrangement. The average (??) signals are used for feed forward voltage compensation. The full wave signals are used by the Co processor for mains waveform compensation.

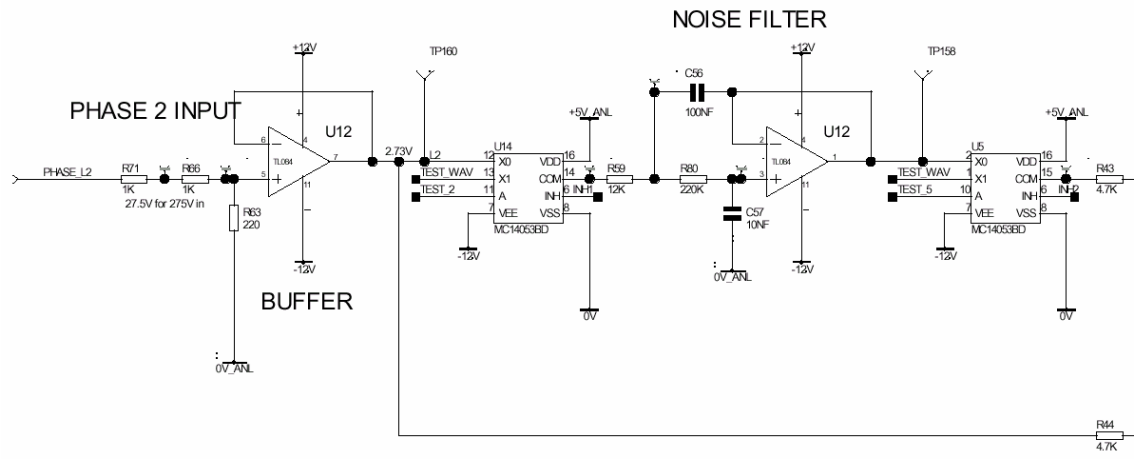
Zero cross signals are required at the dimmer processor cards because it is here that the actual PWM control takes place. These 3 signals plus the 2 fan drive signals (FAN OUT 1 & FAN OUT 2), direct from the Main processor I/O port, are buffered by Q1 – Q5. see 4.4.2.2 (Diagram 4)

The 2 fan fail signals seen in the diagram are no longer used.

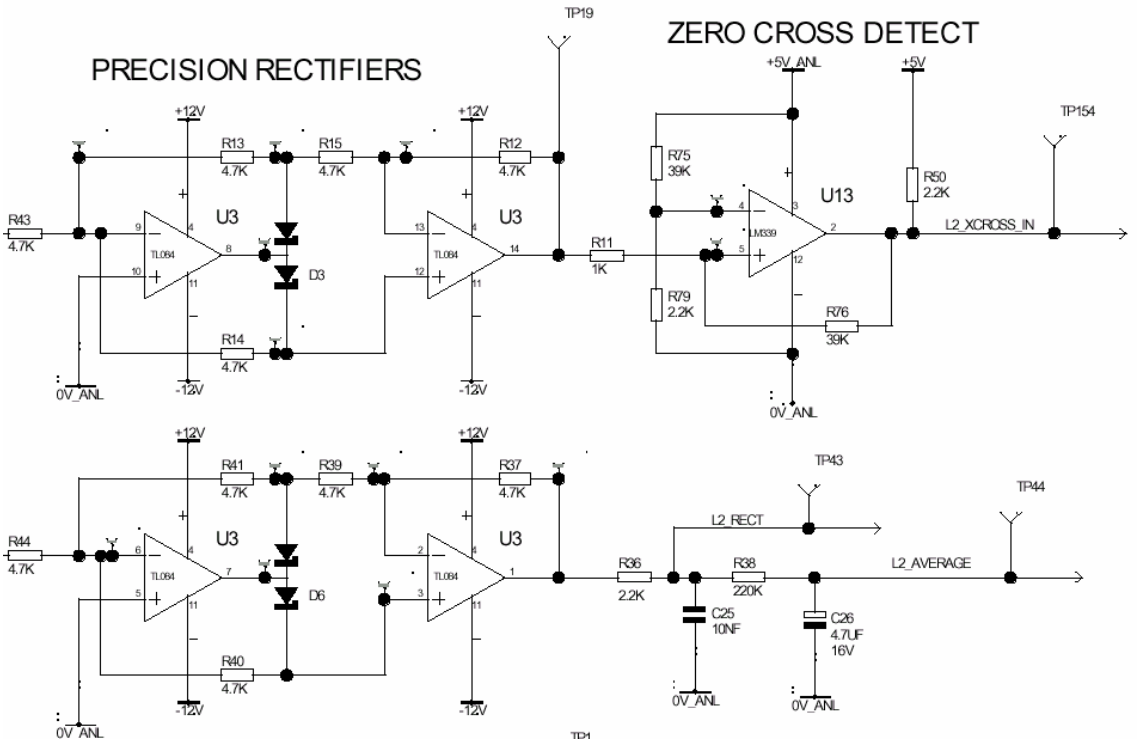
12 analogue inputs (0 - +/- 10 volts) are multiplexed by U19 & U22 (14051's) and fed to U18. 2 elements of U18 form a full wave rectifier. The 4 remaining inputs sample the 5 volt analogue reference (twice) the NiCad battery voltage & the output from U20 an LM50 temperature sensor.

An D/A converter (U11) .is driven from the data bus via data latch U10 to provide an accurate AC signal to measure the group delay of the noise filters (part of U6 & U12) during the calibration process. U5 & U14 (14053 multiplexers) switch the test signal into the stage.

4.4.3.1 Diagram 5a schematic –phase reference buffer & noise filter



4.4.3.2 Diagram 5b schematic –rectifiers, zero cross detect & V(avg.)



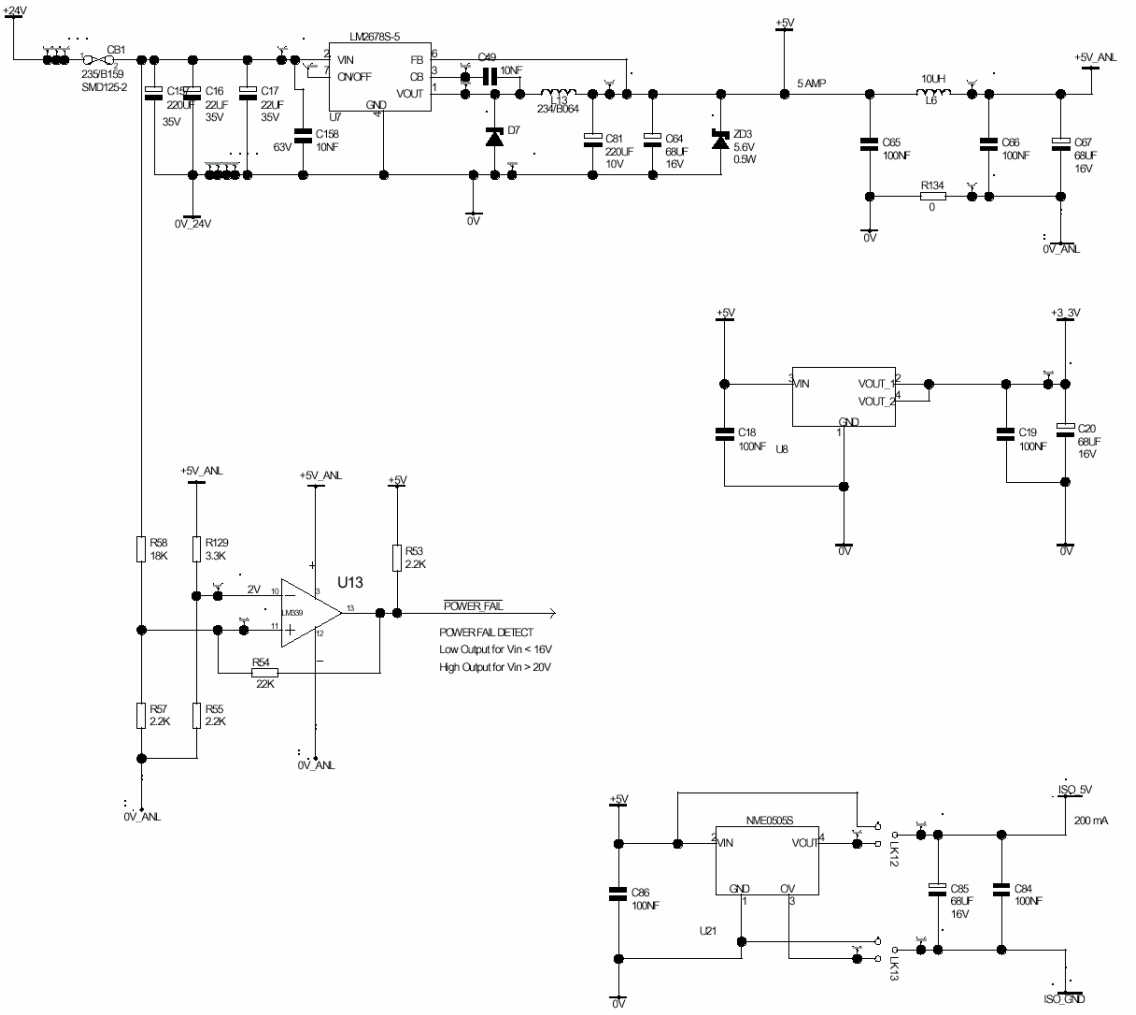
4.4.4 Power supplies

A 5 volt “simple switcher” generates 5 volt from the main 24 volt supply This main supply is monitored by U13. The output of this IC when active (low) forces an NMI on the Main processor. The intention is so that on power failure there is sufficient time to “tidy things up” before power is actually lost.

From the 5v volt rail U8 provides a 3.3 volt supply. It is presently unused –but was provided because their was a risk that during the development period the (5 volt) FLASH memory might have become superseded with a 3.3 volt device.

Two DC – DC converters U21 & U9 provide isolated rails for the RS485 transceivers & also the +/- 12 volt rails of the analogue circuitry.

4.4.4.1 **Diagram 6** schematic –powerfail detect & power sub regulators



4.5 Dimmer processor card (REF2121)

The heart of this card is the C505 microcontroller. 2 are employed per card, each supports 2 dimmer modules –a total of 4 dimmer circuits.

This micro controller **is not** the same as that used in 300 consoles. At one time commonality was intended –and is so stated within the 300 console maintenance manual.

4.5.1 Rack interface

See diagram 4.5.4.1 (7a)

The SBUS transceiver (U1) transfers dimmer ID data, level data & status data to / from the rack processor. The C505 converts the level data into a phase related PWM signal to drive the dimmer module thyristors.

Zero cross & Panic signals from the main processor are individually connected to each C505.
A bank of 4 switches (SW1) sets the card address in binary notation.

4.5.2 Dimmer interface

See diagram 4.5.4.2 (7b)

An analogue signal from a potential divider in each dimmer module is multiplexed to an analogue port on each C505 by Q19, 20 & Q1, 2. This is used to identify module type.

Each module contains 2 LED's (1 on 50 & 100 amp modules). These are driven from the C505. The signals, along with the PWM drive to the thyristors is buffered by Q17, 18, 16, 15; Q4, 5, 14, 3; Q6, 9, 7, 8 & Q12, 13, 10, 11. Current transformers, within each module measure load current. The signals are passed to the C505's via resistor networks RP8, 7, 6, 5. A bias resistor to 5 volts ensures an over-scale reading in the event of a CT open circuit.

Also within each module is an LM35 temperature sensor. The output is passed to the C505 via R69, 71, 73, 75.

In the absence of signals from the main processor the C505 processors are programmed to flash the LEDs on all modules. Without a signal from the main processor the PWM (TRIGGER) outputs will not be active unless the panic line is active and the panic status for the individual dimmer module has been (previously) set to on.

The buffered outputs on the edge connector are all high (+5 volts) active. They are not short circuit protected.

4.5.3 Panic mode

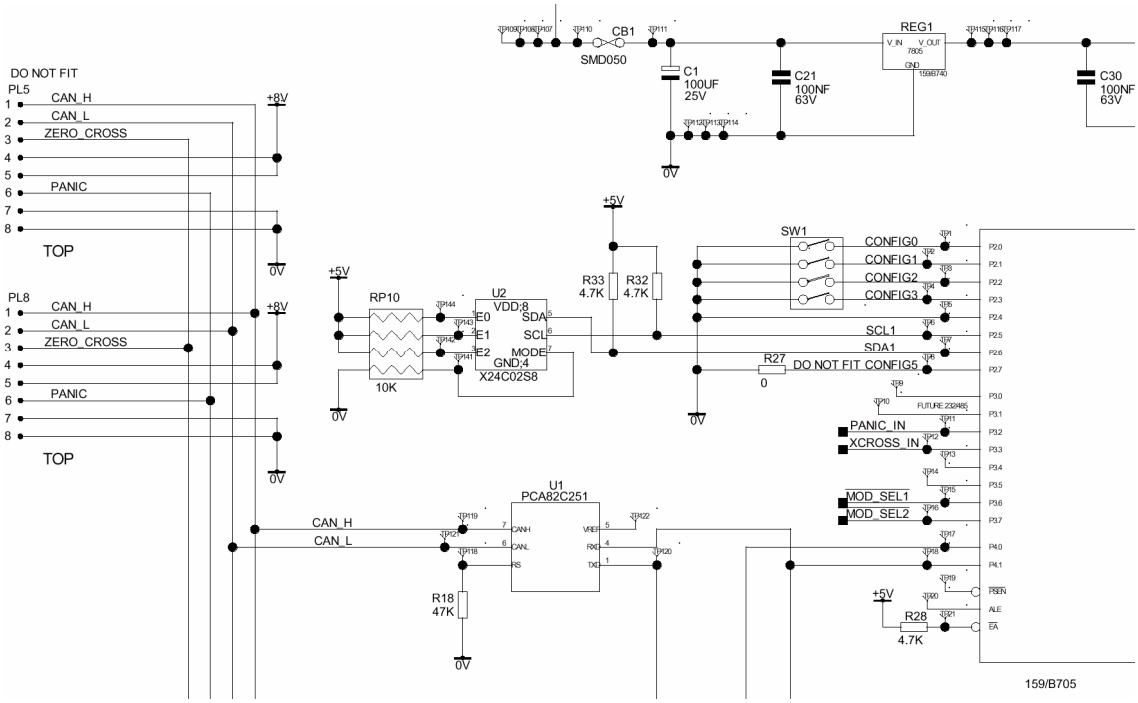
Data relating to dimmer modules that have been selected to "turn on" under panic conditions is uploaded from the rack processor upon power up. This data is stored within the serial EE-PROM devices U2, 3. When the panic signal is asserted the appropriate "TRIGGER" outputs are driven active.

Naturally the appropriate C505's need to be functional for this to work. There is however no dependence on the rack processor for panic activation.

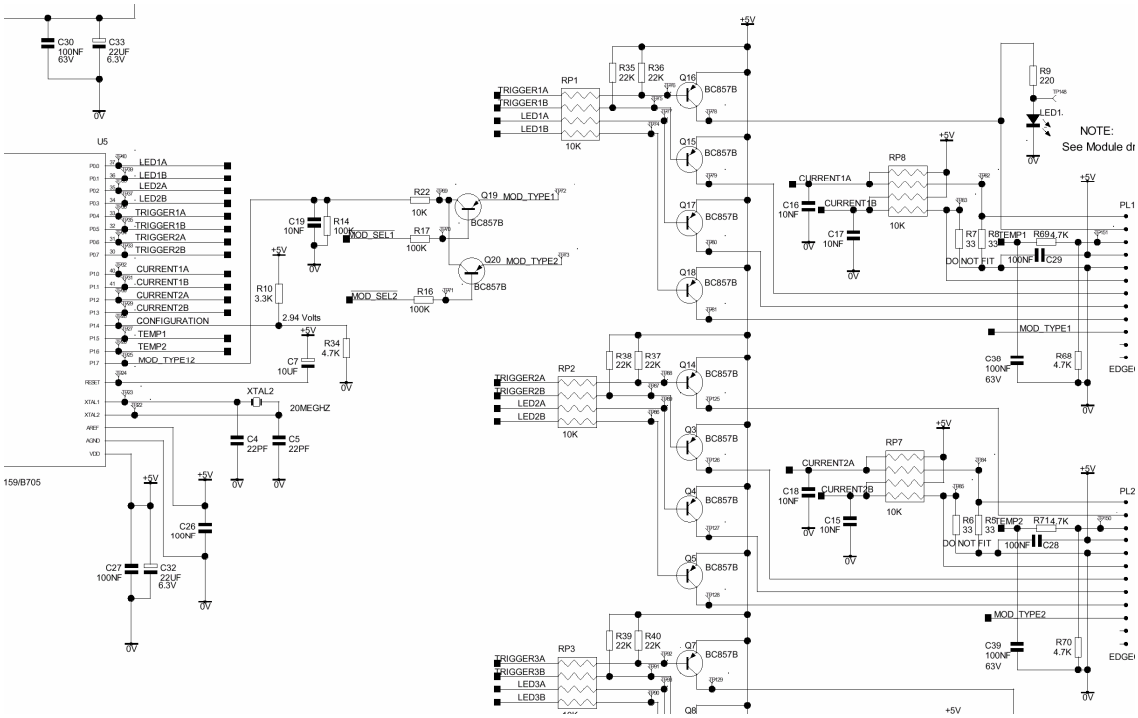
4.5.4 Power supply

A 5 volt linear regulator provides power from a 12 volt rail carried along the SBUS ribbon cables. This rail is incorrectly identified as +8 volts on the REF2121 circuit diagram.. A local self resetting thermal fuse (CB1) is mounted on board. The incoming supplies (1 per column) are (thermal) fuse protected on the REF2120 CIC card. The relevant fuses on the REF2120 PCB are CB5 – 7.

4.5.4.1 **Diagram 7a** schematic –CAN interface & card ID



4.5.4.2 **Diagram 7b** schematic –dimmer I/O



5. Set-up & configuration

5.1 Loading software

Reloading / updating SLD rack & SN110 software is a straightforward enough process but must be carried out without shortcuts.

Particularly with the SLD processor persons may be tempted to omit certain of the described steps because (in their eyes) “they don’t seem to be necessary”. It cannot be stressed strongly enough that:- **It is essential to reinitialise the rack database following a software reload**. Omitting this step may not appear to matter but be assured that omission will cause severe trouble at a later date.

5.1.1 SLD processor

The software loading process can cause occasional single cycle conduction of all dimmers. If this may be a problem ensure all module circuit breakers are switched off.

All configuration data will be lost following the upgrade. You may wish to upload the configuration to ReporterPro (see section 8) before proceeding with the upgrade.

The SLD processor contains 2 processors, each with its own Flash program storage & RAM. Software is loaded separately into both processors when the loading process is invoked. The main processor takes a while, the 2nd (Co) processor only a few moments.

5.1.1.1 Nature of archive

The software can be downloaded from the Strand website http://www.strandlighting.com
The downloaded file (sldinst.exe) is a self extracting zip archive. Please read release.txt –which may supersede the procedure to be described here at a future date. The extracted files will all fit on a 1.44Mb floppy if necessary.

5.1.1.2 PC requirements

The loader software is designed for a DOS environment. It may (machine dependent) run from a Windows XP command prompt. It does not like Windows 9x. If necessary copy the files to a bootable floppy and use that to boot your shiny XP powered PC.

Apart from a serial port (COM1 or COM2) and 640Kb RAM nothing special is required. The machine must have a real serial port. A USB - RS232 converter is unlikely to work.

5.1.1.3 Procedure

If fitted remove the backup processor
The software must be separately loaded to the back-up processor (and re-birthed / calibrated) before it is re-inserted back into the rack with the main processor.
Connect the rack to the PC with a straight through RS232 cable.
Turn off all module MCBs if desired.

Press and hold Left arrow, Right arrow, Up arrow. –The LCD display should show all blocks
If not check the serial cable is correctly connected. If still a problem see 5.1.1.4 Forced load..

On the PC (in the directory containing the files) type:- load <and press enter>
(load /COM2 if using COM port 2)

If the Russian language strings are required add the switch /rus to the end of the command
load /rus

The SLD software load screen appears. Press Y to accept the licence agreement. The rest of the process is automatic. When finished the rack will have rebooted and the PC screen will say” press any key to terminate the program”.

If an error message is shown on the rack LCD don’t worry at this stage –the internal database is all “at sea”.

Carry out the initialisation process described in 5.1.1.5

5.1.1.4 Forced load

Fit a jump header on the link LK1.
(on r/hand side of the board just behind the connector for the LCD)

Re-insert the processor and connect the cable to the RS232 port.
The LCD should show all blocks.

On the PC (in the directory containing the files) type:- load /COM1 /main
(load /COM2 /main if using COM port 2)

The Russian language switch can be added to the end if required:- load /COM1 /main /rus

When the download is complete remove the processor and fit the jumper on LK2.

Re-insert the processor and connect the cable to the RS232 port.. The LCD will show the normal top level menu structure.

On the PC type:- load /COM1 /co
(load /COM2 /co if using COM port 2)

When the download is complete remove LK2 and perform the initialisation process (5.1.1.5).

5.1.1.5 Initialising database

Remove the processor and fit a jump header to LK15 right-hand end of PCB in centre.
Older processors have a white 14 pin Molex connector in this position. Pins 4 & 5, counting from the front edge of the PCB, are the ones to link in this case. Do not make a mistake –you will destroy the processor.

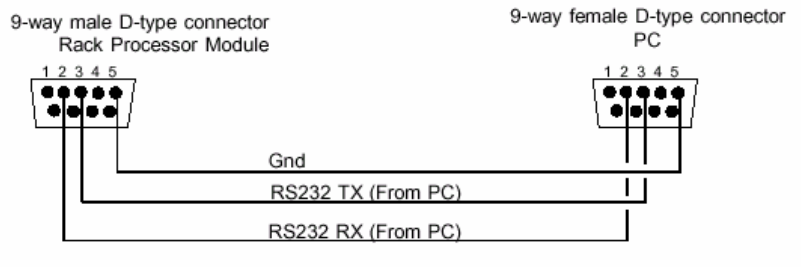
Power up. Setting database will be displayed followed by the processor serial number.
Press the Right arrow key to move the cursor through the number to the right-hand end. Time, followed by date will be displayed. Move the cursor through the figures as previous. (Up / down arrow keys may be used to correct the time & date, confirming with OK).

The processor will then run a series of tests –press Esc when the message “press any key” is displayed. Display should read “Birth no errors”. (If “MOD fault” is displayed it is most likely a dimmer processor (REF2121) PCB fault –don’t worry at this stage.

Remove the link and reboot –Display will show “Mains voltage changed must re-calibrate Please confirm”. Press OK – display will show “Set all default Y” Press OK –the processor will reboot. On restart display will read “Mains voltage changed” Press Esc.-display reads “clear error log” Press OK. –The normal banner appears, along with an error message if a 48 way rack.

Now perform the calibration process described in 5.1.3

5.1.1.6 Serial download cable connections



5.1.2 SN110 node

The procedure below may look daunting if you are not too familiar with computing. It is actually a lot simpler to perform then describe.

Any existing configuration data in the SN110 node is preserved during the upgrade.

5.1.2.1 Nature of archive

The software can be downloaded from the Strand website http://www.strandlighting.com
The downloaded file has a .chk extension. The actual file name may vary. Note the actual name because you will later need to type it exactly. If by any chance it contains a space rename it to DOS legal rules

5.1.2.2 PC requirements

A PC with an NIC (with operational TCP/IP protocol) ftp client & telnet client are required to load software onto the SN110. To configure the node Microsoft internet explorer (version 5.5 up) is required. Other web clients may work but their use is not supported.
The above software will be present on a Windows 98SE upwards PC.

A hub is required to interconnect the SN110 & PC. A crossed network cable is unlikely to work correctly.

5.1.2.3 Procedure

Configure the PC with a static IP address in the range that the node is set (displayed on node LCD when booted). Have the SN110 software sn110.chk (or whatever other name) available on the machine.
Connect the PC to the network the node is connected to.
Keep on the same subnet establishing a route between 'nets can be tricky on the fly.

In this section everything you type is shown in **bold text**. All items typed must be followed by pressing the enter key. Items in < > are variables that you supply. Do not type the < >

Telnet to the node **telnet <node IP address>**
(type this in the "Run" box on your PC –press OK and a telnet window will open. If you get an error ensure you typed the IP address correctly)

In the telnet window type /usr/bin/mkspace.sh
this creates space within the flash memory to install the new software. Should the installation process fail the old software will be restored automatically when the node is rebooted

Open a command window and navigate to the directory containing sn110.chk

FTP to the node **ftp <node IP address>**
Type the line in the command window

At the end of the line starting User **ftp**
this is the user name

"Password" is displayed **ftp** (no characters will be seen)
this is the password

The following commands are typed at the ftp prompt that should now be displayed.

binary (mode set to 1 is displayed)

put sn110.chk /tmp/sn110.chk
this transfers the sn110.chk file on the PC to the node. If the file name on the PC is not sn110.chk type the actual file name instead. (the destination name must remain sn110.chk)

When complete, should only be a few seconds, type **quit**
this closes the ftp session

Return to the telnet window

Type **/usr/bin/flashsw.sh**
this runs a command on the node to actually install the software you have just put there

A licence agreement is displayed. The node LCD will display "Loading software"
When complete the display will change to "Rebooting if not rebooted in 30 seconds then power cycle" On the PC will be displayed "please close this telnet window" –do so.

During the 30 second pause, the display may go blank, but remain lit. After 30 seconds. it is safe to power cycle should the node fail to reboot by its-self.

5.1.3 Calibration

Enter the calibration menu (see 5.2 for menu structure).-Calibrate the phase filters, then calibrate the voltage on all 3 phases. Use a test meter to measure the actual voltage for each phase & adjust the displayed value on the LCD to match.
Important:- you must press the OK key for each phase in the voltage calibration menu even if no changes have been made.

If the processor is fitted / to be fitted in a ½ size rack ensure the rack type is set to SLD48. Failure to do so will case errors to be generated together with possible inconsistent operation.

Ensure the rack number is correctly set. Avoid connecting ReporterPro (see later) until the rack numbers have been set.

Power cycle the rack. It should restart without any errors.

Prior to software version 1.4 "Set all Defaults". had a bug. If invoked the system would believe that 120 volts is "Max volts out" -despite what may be subsequently set. The only way forward from this situation is a re-birth and repeat of the calibration process.

It is possible in some circumstances for a database corruption to invoke a value of 120 volts out, even if the parameter is set to another value. The exact cause is presently unknown –but having main & backup processors in a rack with differing software is one probable cause.
The only way forward is a re-birth & recalibration. You may wish to try "Set all defaults" first.

Ensure other rack configuration items are set to their correct values. All patch data will have been lost with the re-birth process and will have to be re-entered. SWC presets will not operate correctly until all CIDs within the system are unique.

Once rack numbers have been defined patch data may be downloaded from ReporterPro. If the previous configuration (from earlier rack software) had been uploaded to ReporterPro ensure that you only download DMX & CID patch data.
Profile & other data (uploaded from ver 1.6 rack s/ware) has been seen to give severe trouble if downloaded on to 1.12.1 rack software.

5.1.4 Notes on patching

Patching instructions are contained in the user manual. The notes here are only a supplement.

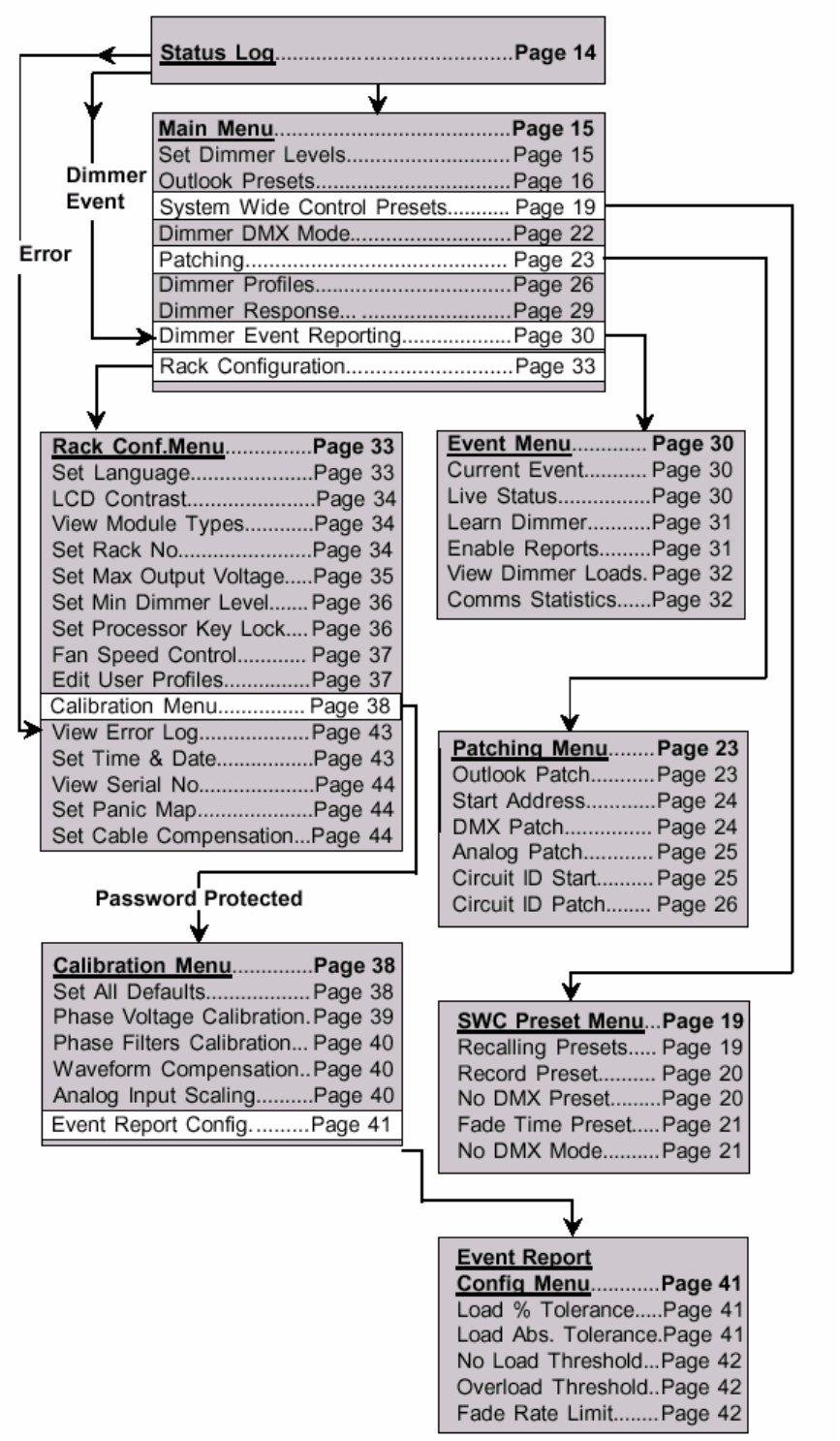
From software 1.8.1 the patch menu has been extended to permit a horizontal & vertical patch from a given Start address. The option Gaps will patch through the entire rack including positions where no modules are fitted. The option No Gaps will set positions without modules fitted to Park (not assigned).

Please remember that the Gaps option always assigns sequential patch data to all dimmer positions regardless of type. Where single channel modules (Fluorescent, 50 amp, SineWave) are fitted. the resultant patch data will inevitably be other then what is wanted. Using the No Gaps option will give the required result. With single channel dimmer modules the active channel is the (nominal) 2nd within the module (even logical dimmer number). If desired the inactive channel on a fluorescent module may be patched to a real DMX (& CID) number to facilitate operation should a dual module be subsequently fitted. It is not appropriate to replace a 50 amp module with a dual channel module because both output poles are paralleled.

Prior to release 1.8.1 it was not possible to park unused CID positions. As all CIDs must be unique this made for an awkward situation. Unused CIDs may now be set to None. In ReporterPro prior to release 5.0.0 this translates to 0 –and is reported on the ReporterPro patch screen as a duplicate. Provided the only duplicates are 0 the error may be safely ignored.

5.2 Menu structure.

The menu structure is reproduced here for convenience. For full details of the configuration menus please see the SLD user manual. The page numbers below refer to that manual.



The password for the calibration menu is 2606

5.3 Some common problems

This is not intended to be an exhaustive list –but all are real problems I have encountered.

5.3.1 Error message –but rack operational

If a system fitted with backup processors displays an error message on either processor the most likely cause is a database inconsistency between the 2 processors. Check to see if each processor operates correctly in isolation. Do they both actually carry the same user data (they should). Ensure the installed software is in fact the same.

If a “bad chk sum error is displayed re-load the software and re-initialise. (If you choose to return it to Strand that is all that will first be done so you may just as well try it yourself).

5.3.2 Outputs will not go beyond 50%

It is sometimes possible for the 120 volt flag to become set –but not directly obvious from the display. Symptom is that the max output voltage is 120 volts (regardless of what is set). re-initialisation will clear this problem up.

This problem has been completely resolved with the latest software revision (2.4.2)

5.3.3 No control –possibly some circuits stuck at full

Is Panic state set?

If rack is stuck in Panic first ensue it is not from external source (pull off the connector if wired). Disconnect the S-BUS ribbon cables to all dimmer processors. If now OK re-connect one at a time. Then selectively disconnect dimmer processor cards (one is most likely holding the panic line down)
If panic is set with all S-BUS ribbons disconnected then fault is most likely on REF2120 CIC card (try another processor first) If REF2120 U3 is most likely culprit. Q4 can be removed to resolve in hurry but panic facility is then non-operational.
If rack external panic inputs are paralleled then all must be powered. One rack without power will “panic” remaining racks.

5.3.4 Loss of one column of dimmer modules.

Supply phase missing.

If OK but phase indication on processor absent REF2120 CIC card fault or processor supply fuse blown. Check appropriate low voltage transformer (T1, T2, T3) on REF2120

Odd behaviour from dimmer module (or block of 4 modules) Poor connection with C505 chip(s) on appropriate dimmer processors. If found during commissioning check dimmer processor address switches.

5.3.5 Fans run full speed 30 seconds after power up.

Dimmer processor card faulty or disconnected.
View Live dimmer status for each dimmer. Dimmer with stupid reading for current / temperature is where fault is located.
Most likely cause is poor connection. Not likely to be an actual faulty dimmer module.

Faulty dimmer processor card can cause above even without dimmer fitted. If no dimmer available to try in blank positions view Dimmer / 505 status from Debug menu. 5.3.4.1
Status bits should be 12 for positions where no module is fitted. Any other value is a fault. Positions with dimmers should read 00 for when no control and no load current.

5.3.6 Circuits flash off for 2 seconds, sometimes returning at a different level.

Some dual dimmer modules (those made in USA) have a different type code reference value. An upgrade to 2.4.2 software should resolve this problem. If flash / flicker problems continue the associated REF2121 PCB is suspect.

5.3.7 “Mains voltage error cannot continue” error message.

A supply phase was missing at power up (all 3 phases must be present at power up, after power up only a single phase is required to maintain processor operation)

Fault on REF2120 preventing the phase voltage reference reaching the processor or fault on REF2123 processor PCB.

If fault is only present with a backup processor fitted upgrading to software version 2.4.2 will cure the problem.

5.3.8 Zero cross error.

Most possible cause faulty REF2121 PCB on associated phase. Isolate which one (of 4) by selective disconnection. If not REF2121 fault is most likely with REF2123 processor PCB.

Debug menu

This becomes available when LK9 is fitted. It is intended for development use only. It is however useful for displaying the presenc / health of the 505 chips mounted on the dimmer processor (REF2121) PCBs

Below is described how to reach View Dimmer / C505 status. Please do not fiddle with anything else.
Should you do so and "eat" the PLD configuration the processor will be rendered useless.
Any repair for such a fault will be chargeable –regardless of warranty status.

With LK9 fitted the LCD will display an @ symbol at top right. Move to Set dimmer level and press up arrow key. Debug Menu should be shown –press right arrow to enter.

Navigate to View dimmer / 505 status and press right arrow to enter. The number of 505 chips (the dimmer processors) detected is shown top right. Each dimmer processor card contains 2 C505 chips so 24 should be displayed for a 96 way rack 12 for a 48 way.

Each dimmer status is read by scrolling the dimmer number. Value should be 00 with no control. Circuit faults will give different values -but such faults are best observed from "Live dimmer status".

With no dimmer module inserted the value should be 12. Any other number is a fault with either the appropriate dimmer processor card or a connection problem.

5.4 Error messages

The error strings are similar to those for EC90sv. The tables below have been reproduced in good faith –but the opportunity has not arisen to verify all of the strings. Some are a hangover from EC90sv –and not relevant to SLD

Code	Message	Description
	Error Status Messages	
	Invalid Error Code	Invalid error code
	Error nnnnn (see codes below)	Error string
	Tests OK	All Tests OK
	Please Birth!	Please Birth!
	Release EXIT key	Release EXIT key
	Finished testing	Finished testing
	Error Log Empty	Error Log Empty
	Error Log End	Hit Error Log End
	Error Log Start	Hit Error Log Start
	Testing ... Wait	Tests in progress
	Test OK	Test passed
	Setting Database	Initialising Db
	Setting Arch Db	Initialising Architecture Db
	Clear Error Log?	Clear Error Log?
	Upgrade SR Cfg	Upgrading FRP Db
	Error Messages	
04224:	A/D Timeout	A/D faulty
04225:	A/D Timeout	A/D faulty
04226:	Dghtr ID Unknown	Daughter ID Unknown
04227:	Conf Lvn Unknown	Config Link Unknown
04228:	Volt RtgChanged > MaxVoltsReset	Volt Rating Changed
04229:	Wiring Changed > SlotMap Reset	Wiring Type Changed
04230:	Phasing Changed > SlotMap Reset	Phases Fitted Changed
04231:	RackTypeChanged > SlotMap Reset	Rack Type Changed
04233:	Main ID Unknown	Main Processor ID Unknown
04234:	Co Proc Reset	Co Processor Reset
04235:	Co Proc Missing	Co Processor Missing
04480:	LCD Failed	LCD failure
04481:	ANSI error	Invalid escape sequence
05632:	Invalid Db Rqst > nn nn nn nn nnnn	Invalid database request
05762:	Clock Access	TOY Clock access error

n=number, c= character

Code	Message	Description
06016:	I2C bus error	I2C bus error
06017:	R/W FailCalib > EEAdd: nnW:nnR:nn	EEPROM write error
06020:	RT ClockStopped	Real Time Clock stopped
06021:	RT ClockFast	Real Time Clock running fast
06022:	Proc A/D NotConv	Processor A/D not converting
06023:	Proc A/DFailure > Half-Way=n.nnV Min:n.nnMax:n.nn	Processor A/D failure on reading Half-Way signal
06024:	A/D No Conv	A/D not converting
06025:	A/DFailure Half-Way=n.nn Min:n.nnMax:n.nn	A/D failure on reading Half-Way signal
06026:	A/D No Conv	A/D not converting
06027:	A/DFailure > Half-Way=n.nnV Min:n.nn Max:n.nn	UPP5 A/D failure on reading Half-Way signal
06028:	An.InputMuxFail > An.Mux n = n.nnV Min:n.nnMax:n.nn	Analogue Input Multiplexer failure
06029:	PrecRectBoard n > Reading=n.nnV Min:n.nnMax:n.nn	Precision Rectifier on Board 1/2 error
06030:	Real RMSMainsEr Phase n=nnnV Min:nnnVMax:nnnV	Real RMS mains input error
06031:	LCD ContRegistr > Reg:nn W:nnR:nn	LCD Controller Test write/read error
06032:	Battery Not Det > Reading=n.nnV Min:n.nnMax:n.nn	Battery missing
06033:	X-Cross GrossEr > Phase n nnn.nHz nnn.nHz nnn.nHz	Zero Cross gross error
06034:	X-Cross Not Sym > Phase n O:nnnnusE::nnnnus	Zero Cross not symmetrical
06035:	X-Cross MainsEr > Phase n nnn.nHz nnn.nHz nnn.nHz	Zero Cross Mains error
06036:	Panic IPStuckLo	Panic test input signal stuck low
06037:	Panic IPStuckHi	Panic test input signal stuck high
06038:	ExtCon nn StuckLo	External Contact signal stuck low
06039:	ExtCon nn StuckHi	External Contact signal stuck high
06040:	10V ISO Level > Reading =n.nnV Min:n.nnMax:n.nn	Isolated 10V level error
06041:	An.In nn StuckLo	Analogue Input stuck low
06042:	An.In nn StuckHi>DimOutnn	Analogue Input stuck high
06043:	Bad Ser.Config.	Serial setup given wrong configuration data
06044:	RS232 No Tx > Tx c	RS232 no transmitter activity
06045:	RS232 No Rx > Tx c Rx c	RS232 no receiver activity

n=number, c= character

Code	Message	Description
06046	RS232 NoRxNow TX c Rx c	RS232 data received when not expected
06047	RX232 Rx Bad Tx ccccccccccccc Rx ccccccccccccc > Tx Data cccccccc Rx Data cccccccc	RS232 corrupt data received
06048	RS485 No Tx Tx c	RS485 no transmitter activity
06049	RS485 No Rx	RS485 no receiver activity
06050	RS485 Rx Bad > Tx c Rx c Tx Data c > Rx Data c	RS485 corrupt data received
06055:	Bad EE Csum > Now:nn Ref:nn	EEPROM calculated checksum does not match stored value
06056:	BadFLASHCsum > Now:nnnnRef:nnnn	FLASH calculated checksum does not match stored value
06058:	BadNVRAMCsum > PnnAnnnnW:nnR:nn	Bad NVRAM checksum
06059	FLASH no NMI	FLASH NMI not detected during write
06060:	FLASH NMI det.	FLASH NMI was incorrectly detected
06061:	FLASH Bad wrt	FLASH write was bad
06063:	SRAM Pattern > A:n:nnnnW:nnR:nn	SRAM pattern test failure
06064:	NVRAM Pattern > A:n:nnnnW:nnR:nn	NVRAM pattern test failure
06065:	Battery Empty > Reading=n.nn Min:n.nnMax:n.nn	Battery empty
06066:	RT ClockNo Int	No real time clock interrupt detected
06067:	Main CalData ??	Main calibration data may be suspect
06068:	Fan1 outError	Fan1 test error
06069: 06070:	Fan2 outError X-Cros n Timeout	Fan2 test error Zero Cross n timeout error
06071:	MFilt n Error	Mains Filter error
06072:	Pwr FailStuckLow	Power Fail input stuck low
06075:	NVRAM no NMI	NVRAM NMI not detected during write
06076:	NVRAM NMI det.	NVRAM NMI was incorrectly detected
06077:	An.In nnStuckHi > An.Out nn	Analogue input stuck high
06078:	SlaveTx No Tx	Slave tx error
06079:	SlaveRx No Rx	Slave rx timeout error
06080:	SlaveRx Bad > Tx Data cccccccc Rx Data cccccccc	RS485 corrupt data received
06082:	SlaveClkStuck Lo	Slave clock line stuck low
06083:	SlaveClkStuck Hi	Slave clock line stuck high
06084:	SlaveRstStuck Lo	Slave reset stuck low
06085:	SlaveRstStuck Hi	Slave reset stuck high

n=number, c= character

Code	Message	Description
06087:	FanFailnStuckLo	Fan Fail input stuck low
06088:	FanFailnStuckHi	Fan Fail input stuck high
06089:	PANIC swStuckHi	Panic input stuck high
06090:	PANIC swStuckLo	Panic input stuck low
06091:	An.In nn Shorted > DimOut nn	Analogue Input Shorted
06404:	NMI Detected > Ad=n nnnn	Unexpected NMI
06658:	In delay=nnnnnn > Lo/Hi=nnnn/nnnn	Phase delay out of range
06659:	EEP LoadError	Can't load from calibration EEPROM
06660:	EEP SaveErro	Can't save to calibration EEPROM
06661:	EEP CsumError	Invalid checksum in calibration EEPROM
06662:	CAL CsumError	Invalid checksum in main calibration EEPROM
06663:	CAL DataUpdated	Cal Data updated from EEP
10170:	StackRAMfailPat	Stack RAM pattern test failure
10496:	A/D busy	A/D stuck busy
10497:	Invalid opcode > Ad=n nnnn	Invalid opcode
10498	Stack under > Ad=n nnnn	Stack underflow
10499	Stack overflow > Ad=n nnnn	Stack Overflow
10500:	Assert failed > File: ccccccccccc Line: nnnn	Assert failed
17282	smx: ccb not rd	smx: ccb not ready
21377	smx init lnk	smx: link
21379:	smx: init sys	smx: init. system
23168:	Wbox nnnn	Wall box Error
23296:	Reporter nnnn	Reporter Error
23552:	Arch Err nnnn	Architecture Wbox Error
26241:	Wdog nn timeout	Watchdog timed out

n=number, c= character

5.4.1 Low battery

If you are installing a system that has been on-site for a long period of time (more than 5 months), have a new rack processor which has spent time in store or the dimmer rack has been without power for a long while, the battery may be low. You may get error #06065 (battery empty), or this error with an additional error #06058 (bad NVRAM checksum)

A "Battery Empty" error indicates that the battery is low (less than 3.0VDC). If you do not also have error #06058, no information has been lost. Clear the error log and leave the dimmer rack ON for at least 12 hours.

The "Bad NVRAM Checksum error indicates that the data stored in non-volatile RAM within the processor has been corrupted. This message will appear if the battery voltage drops below about 2.2VDC. At this level, data cannot be maintained. When the system is powered up, the RAM memory is checked to make sure that it has not changed. If it has, the system automatically resets all data to default values. If this message is displayed the rack configuration will have been lost.

Please bear in mind that other problems could also result in NVRAM data corruption.

6. Dimmer modules

6.1 Introduction.

Table 2 lists all the available dimmer modules. if no voltage is specified the module is universal 120 / 230 volt operation.
230/120 entry means the operating voltage is internally adjustable.
A single entry means the module is only available for that voltage.
* <voltage> indicates approval only for <voltage> but can operate on the alternate voltage.

Table 2

Description	Voltage	Type	Strand part number
15A Single Pole Dimmer		Dual	75700
15A Double Pole Dimmer		Dual	75701
15A Double Pole RCD Dimmer	230	Dual	75709
15A Single Pole Hi-Rise Dimmer		Dual	75702
15A Double Pole Hi-Rise Dimmer		Dual	75703
15A Double Pole Hi-Rise RCD Dimmer	230	Dual	75704
15A Single Pole Non-Dim Contactor	230 / 120	Dual	75705 / 75745
15A Double Pole Non-Dim Contactor	230 / 120	Dual	75706 / 75746
15A Double Pole Non-Dim Contactor RCD	230	Dual	75707
15A Single Pole Constant Voltage Module		Dual	75760
15A Double Pole Constant Voltage Module		Dual	75761
20A Single Pole Dimmer 120V	* 120	Dual	75710
20A Double Pole Dimmer 120V	* 120	Dual	75711
20A Single Pole Hi-Rise Dimmer	* 120	Dual	75712
20A Single Pole Non-Dim Contactor	* 120	Dual	75747
20A Double Pole Non-Dim Contactor	* 120	Dual	75748
20A Single Pole Constant Voltage Module	* 120	Dual	75763
20A Double Pole Constant Voltage Module	* 120	Dual	75764
5Kw Single Pole Dimmer	* 230	Dual	75720
5Kw Double Pole Dimmer	* 230	Dual	75721
5Kw Single Pole Hi-Rise Dimmer	* 230	Dual	75722
5Kw Double Pole Hi-Rise Dimmer	* 230	Dual	75723
5Kw Double Pole Hi-Rise RCD Dimmer	230	Dual	75724
5Kw Double Pole RCD Dimmer	230	Dual	75729
5Kw Single Pole Non-Dim Contactor	* 230	Dual	75725
5Kw Double Pole Non-Dim Contactor	* 230	Dual	75726
5Kw Double Pole Non-Dim Contactor RCD	230	Dual	75727
5Kw Single Pole Constant Voltage Module	* 230	Dual	74766
5Kw Double Pole Constant Voltage Module	* 230	Dual	74767
50A Single Pole Dimmer	* 120	Single	75730
10Kw Single Pole Dimmer	* 230	Single	75730/CE
50A Double Pole Dimmer	* 120	Single	75731
10Kw Double Pole Dimmer	* 230	Single	75731/CE
50A Single Pole Hi-Rise Dimmer	* 120	Single	75732
10Kw Single Pole Hi-Rise Dimmer	* 230	Single	75732/CE
50A Double Pole Hi-Rise Dimmer	* 120	Single	75733
10Kw Double Pole Hi-Rise Dimmer	* 230	Single	75733/CE
3Kw Fluorescent	230	Single	75775
3Kw Fluorescent RCD	230	Single	75766
3Kw Sinewave	230	Single	
15A Sinewave	120	Single	

All modules with the exception of the 50A & Sinewave versions are dual circuit. The fluorescent module has circuit 1 as contactor, circuit 2 as dimmer, both operate simultaneously from the control source assigned to circuit 2 and share a single (10amp) MCB.

Sinewave, fluorescent and Non-Dim modules are voltage specific, either 230 or 120 volts. All others are 120 – 240 volt rating.

The Sinewave module is not released at the time of this document issue and is not discussed further.

The Standard rise modules use open style toroid chokes mounted in stacked pairs. Hi rise modules use either encapsulated or open toroids. The same toroid assembly (234/B078) s used in all Standard modules. The High rise modules use unique chokes:- 234/B087 (15amp), 234/B078 (20 amp) & 25A 234/B079 (25amp & 5Kw) The 50A module uses 2x 234/B079 in parallel. The PCB assembly for all dual dimmer modules is identical - 161/B090. The 50 amp PCB is 161/B091. Non-Dim 161/B092.

The chokes are in series with the mains side of the SCR's.

All of the module circuit boards are 3rd party designed brought in items.

6.2 Dismantling & re-assembly

Remove the module lid (3 No. 2 pozi screws). On some Hi-rise modules there is a screw that runs straight through the chokes + a nut. Take care not to loose the long insulation sleeve between the MCB's & PCB. Lift out the front panel. On an RCD module pull off the test button knob and remove the nut (8mm AF) securing the test push. Remove the screw on the underside of the module. (Not on some Hi-rise modules) The complete assembly, with the chokes attached, may now be lifted out. Take care not to loose the module key pin (fitted in all modules above 20 amp rating).

The rear of the internal plastic housing is removed by releasing the plastic barb on the outside edge (away from the chokes). Then release the 2 barbs next to the chokes (a small screwdriver may assist). The rear moulding can now be lifted clear. The moulding containing the MCB's can now be pulled off the PCB mounted receptacles. With an RCD module 2 PCB's containing the sense coils will need to be pried clear of the main PCB receptacles with a small screwdriver.

Avoid unnecessary disturbance to the LED's (attached with double sided tape) and the test switch wiring on an RCD module (similarly attached)

6.2.1 Re-assembly

Ensure the screws securing the MCB connector blades to the base of the MCB's are tight Also ensure that the blades are square. Make remedies as required. Make sure that the insulation sleeves in the bores of the current transformers are in place & undamaged.

On single pole modules do not forget to first fit the neutral strap –if separate from the main MCB assembly.

Relocate the blades of the MCB's on to the PCB receptacles. With an RCD module first ensure that the insulation shield is in place on the module PCB and locate the sense PCB blades into position. Refit the choke connections, if removed.

See that the LED's are correctly fitted in place. The connection from the lower set on the PCB is towards the left (channel 1)

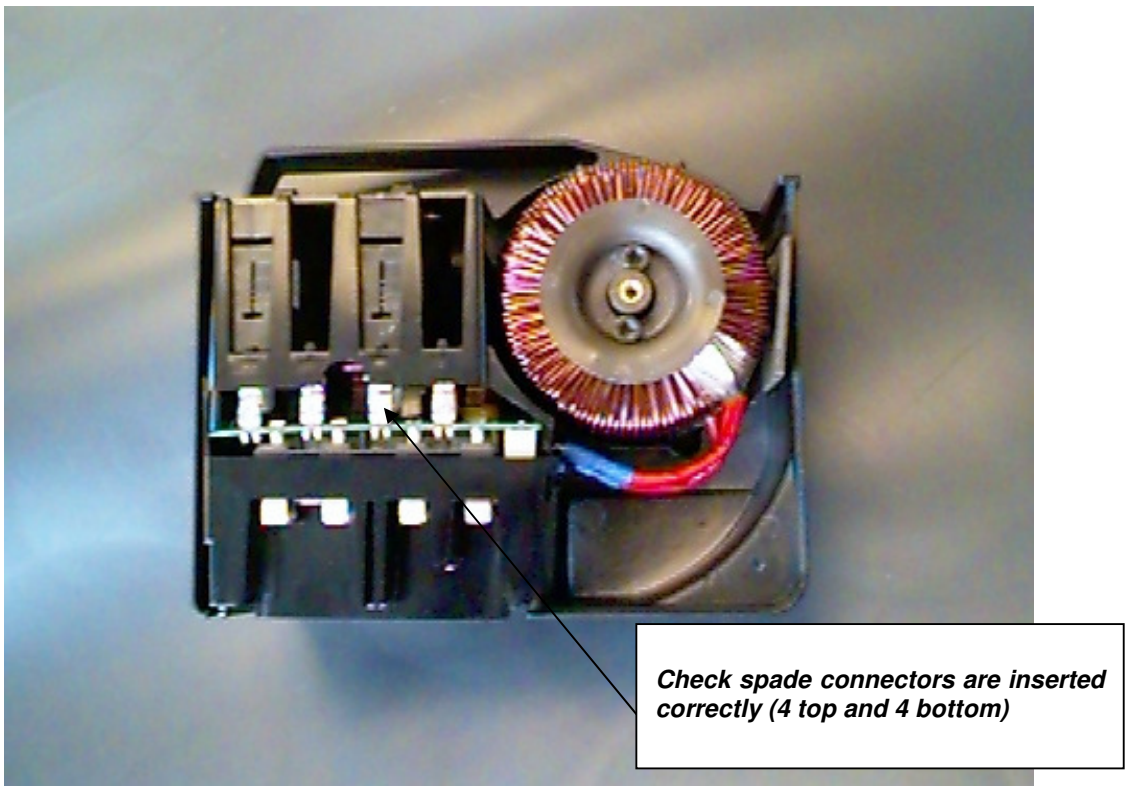
Important:- Ensure that the MCB blades are correctly located in the PCB receptacles. See photo 1

Refit the rear plastic moulding. Replace the module key pin (if fitted). With an RCD module guide the test switch into place and refit the nut & button. Lower the MCB assembly (with chokes attached) into the module shell. Ensure the MCB's are correctly fitted and then let the chokes drop into place.

With the MCB's in "on" posistion offer up the front plate easing the lower lip into place in the module base. As you do this allow the MCB's to flip to the off state. The front panel should now be correctly in place. Ensure the LED's are not displaced.

Drop the long insulation sleeve into place between the MCB's & PCB. Fit the top cover. Using eithr the long screw or a thin screwdriver joggle the insulation sleeve into place. Refit the long screw and it's nut. Fit the top & bottom screws + washers (or single screw & nut + washers for Hi-Rise modules) that run through the chokes. Fit the screw + nut at the rear left.

6.2.2 Photo 1 –fitting of MCB connector blades



6.3 Circuit description

All the module PCB's are 3rd party manufactured and may possibly be sourced from alternate vendors. The component references below are subject to change.

This section refers to a dual dimmer module. Later subsections detail the variances for other module types

Current versions of the PCB have an epoxy coating over much of the PCB. This is to help prevent any arc from an electrical flashover on mains circuitry from reaching low voltage circuits. If desperate it can be chipped away to effect repairs. However it is generally best to deal with any faults by way of a PCB exchange. Individual PCB components are not officially available as spares.

The dimmer modules utilise back to back SCR's not Triacs. These are in turn driven by an IL420 opto device. This is an inverse parallel pair of photo sensitive SCR's rather then a triac, which is more usual for a device of this type. It is the same part as used on LD90. The drive from the dimmer processor to the opto sources current from a +5 rail. It is not short circuit proof.

A generic term given for the SCR drive method is "Firm Firing". The drive voltage for the gate(s) of the main devices is a function of load current flowing. Sufficient voltage for the main SCR to fire is obtained at a load current of about 90mA.. This is well within the rating of the IL420 pilot device. A series resistor in the pilot circuit (R1 & R2) is designed to fuse open if the pilot current becomes too high IE if the main SCR fails to conduct. This prevents the IL420 from passing excess current –which would possibly destroy the isolation barrier within.

A current transformer around the terminal of each MCB provides a measure of current. The connections come straight out to the edge connector. Except for the burden resistors (R13 & 14) there are no other associated components.

The 2 status LEDs are wired direct to the edge connector via series resistors R9 & R10. Again the dimmer processor sources current, not short circuit protected, from a +5 rail.

An LM35 temperature sensor, in contact with the heatsink, directly connects to the connector. There is a bypass cap (C3) across it's supply pins.

R15 (0Ω) shunts out a thermal switch that was fitted to early modules

R11 & R12 form a potential divider that defines the dimmer type. On the dual board just R11 is fitted as a pull up. The values shown on the schematics for the other modules are not correct. At the time of writing the values for all these parts has not been ascertained..

RFI suppression is by the 2 filter chokes & C1 & C2.. 3 capacitors wired across the phase / neutral busbars in the rack along with small (4700pf) capacitors between each phase & earth complete the suppression arrangements.

The 1st channel in the module is driven by IC2.

6.3.1 Component replacement

As previously stated Spares for the PCB's are not available. The MCB's, chokes and complete PCB's are available as spare parts.

In the event of failures on the circuit board it is preferred that the entire PCB be replaced. Naturally over time it will become possible to salvage major components from boards previously swapped out.

Should you chose to replace any PCB mounted power carrying component –such as an SCR assembly-take great care to ensure the tracking & through hole plating are not damaged. Sufficient heat must be applied to pads where the power tracks are carried on the top side to ensure that the joints are properly wetted through.

The insulation box wrapped around the SCR's must be undamaged & replaced correctly.

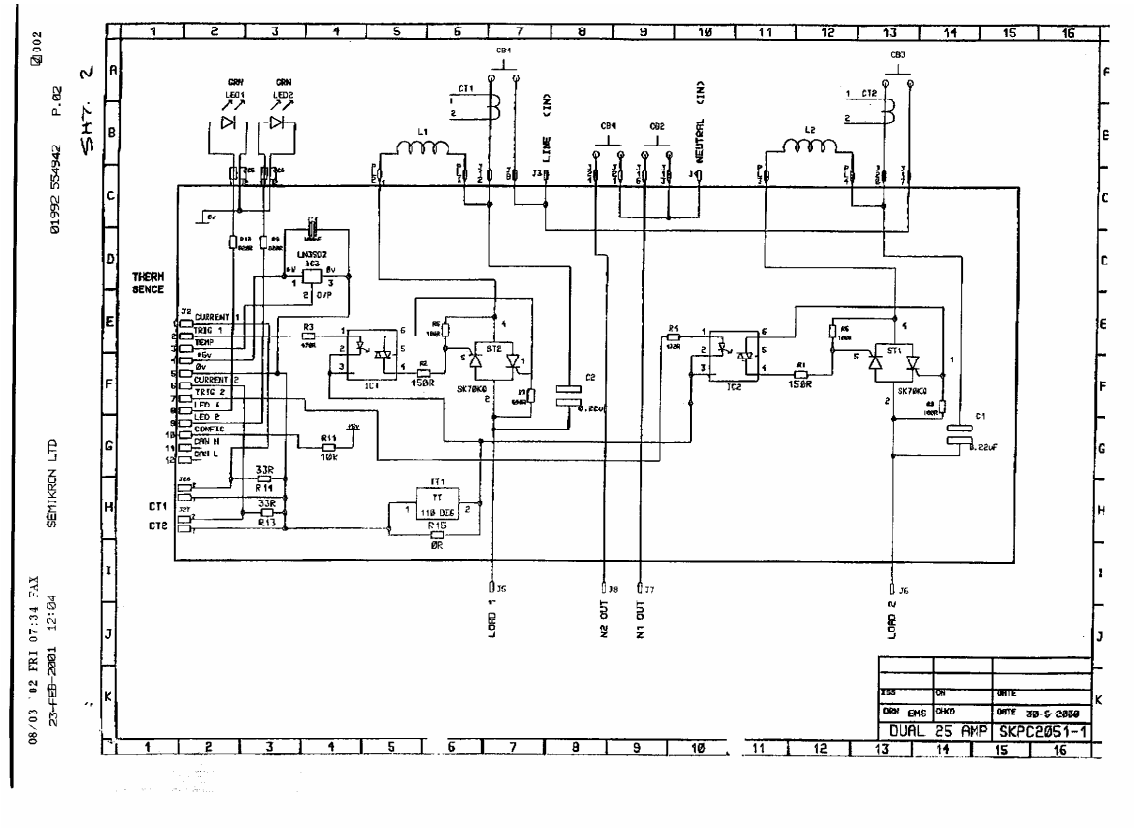
Lack of attention to these points risks a potentially catastrophic blow out at some future date.

The socket connectors that locate with the rack connector blades may easily be removed and replaced if necessary. Although spares are not officially available a stock of these connectors is held at the London service centre.

The Non-Dim contactor is an Omron G7L-1A P 24 VDC.

This is not listed as a spare but stock is held at London.

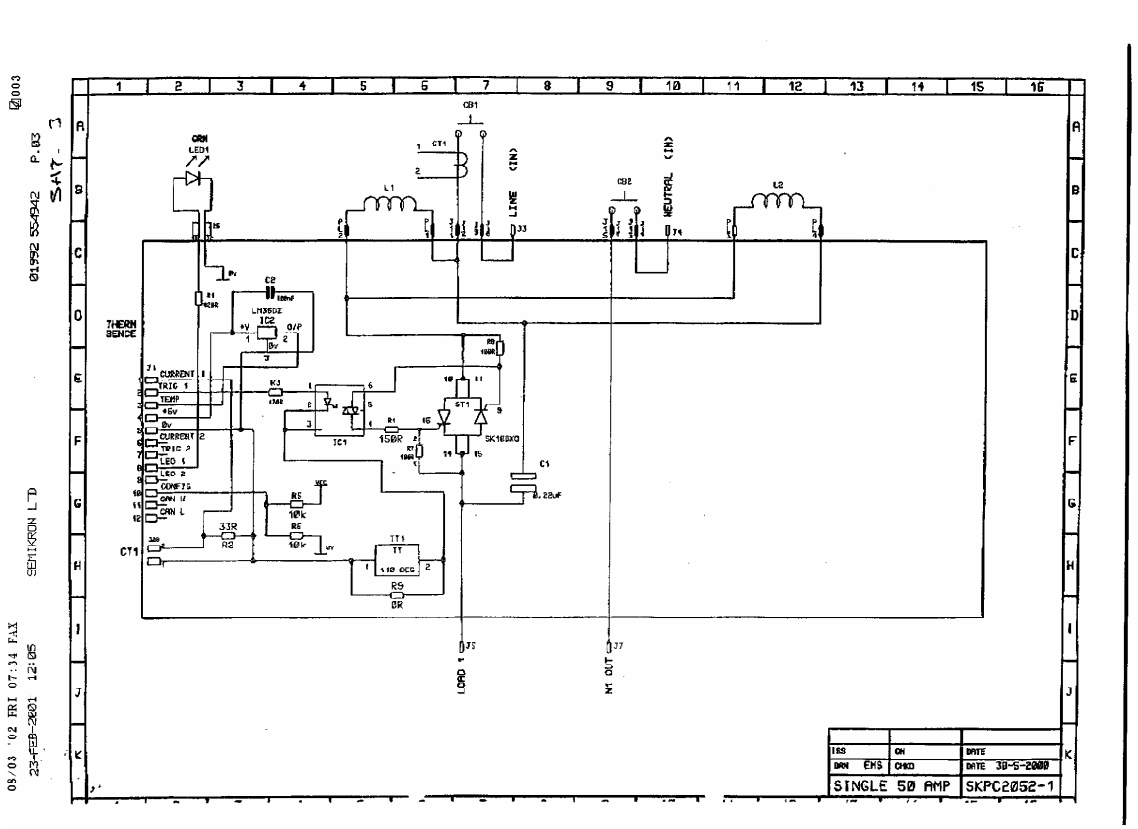
6.3.1.1 **Diagram 8** (dual dimmer module schematic)



6.3.2 Circuit description (single dimmer modules)

The main difference with the single module is heavier main circuit tracks –as one might reasonably expect. The 2 sets of output connectors are in parallel and the connection receptacles for the MCB are doubled up. The circuit layout is obvious on inspection –given an understanding of the dual module and does not bear repetition here.

6.3.2.1 **Diagram 9** (single dimmer module schematic)



6.3.3 Circuit description (non-dim modules)

A small transformer (17volts sec.) provides 24volts DC for the contactor coils. BR1 & C1 being the rectifier & filter cap. The transformer has twin 120 volt primary windings. Connection pads on the PCB allow for series / parallel connection for 230 / 120 volt use. I have seen 2 different linking styles. It is best you work it out for yourself rather then for a description to be written which is at variance with what you have.

Originally the main current path was fitted with series 50mΩ resistors that were mounted on the heatsink. The design has subsequently been modified to omit these.

An LM35 temperature sensor, as per the dimmer module, is fitted. Although excess temperature rise is most unlikely within a non-dim module the retention of the sensor avoids any status problems that may arise due to it's non presence.

R13 (0Ω) shunts out the thermal switch fitted to early modules.

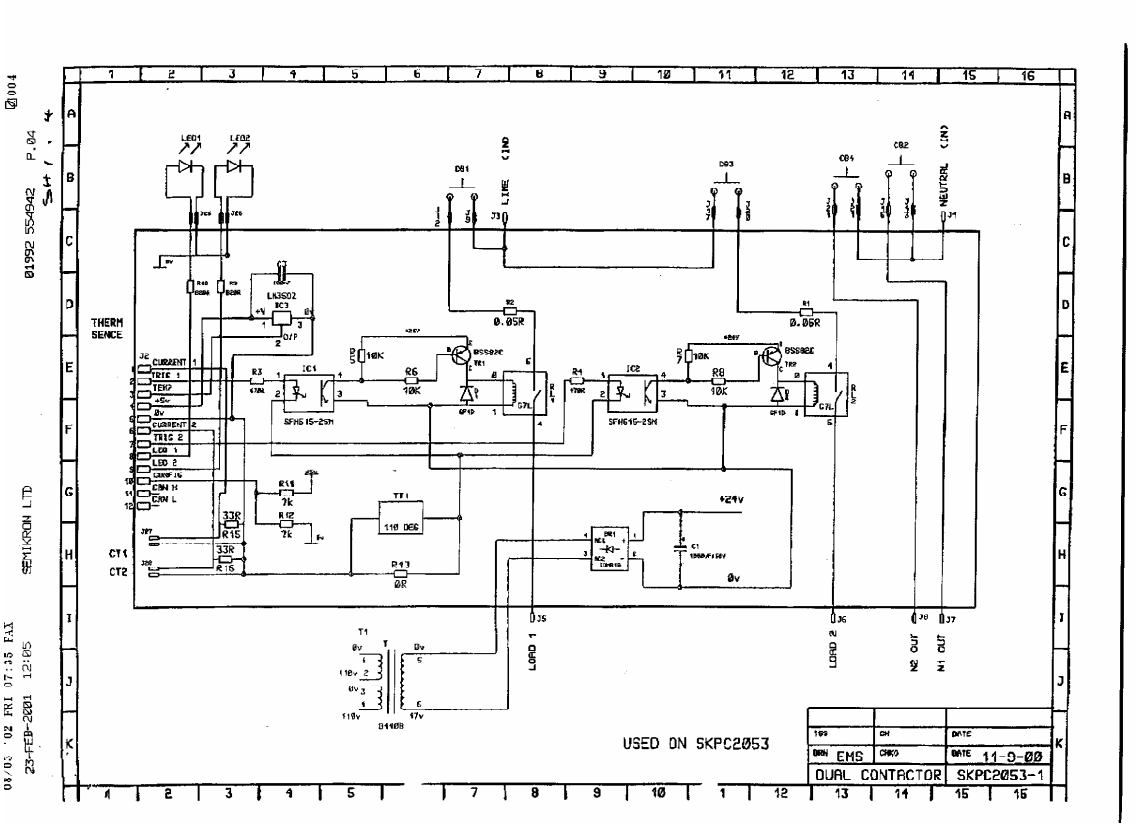
R11 & 12 set the module type.

The 2 opto's (IC1 & 2) are driven directly from the dimmer processor as are 2 LED's. There are also 2 CT's for current measurement.

The driver circuitry for the contactor coils are made up from IC1, TR1 R5 & R6 with D1 to catch the flyback. IC2 TR2 R7 & R8 .with D2 as flyback catch make up the other channel.

The 1st channel in the module is represented by IC2 etc, which drives the upper relay of the pair.

6.3.3.1 **Diagram 10** (Non-Dim module schematic)



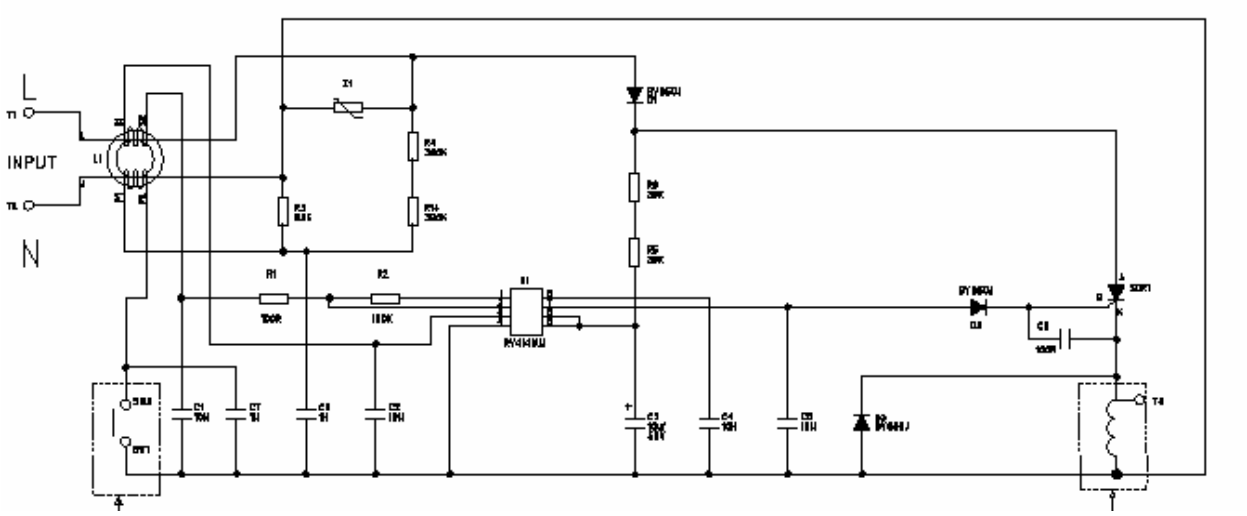
6.3.4 Circuit description (RCD option)

The RCD function is provided by fitting a pair of double pole MCB's equipped with a shunt trip coil. A pair of additional circuit boards (164/B067) each carries a current transformer and amplifier. These boards are attached to the main module PCB by connector blades that locate on the receptacles which normally take the outgoing MCB blades. Flyleads from these blades pass through the CT and connect direct to the MCB terminal screws. A further flylead picks up the MCB shunt trip connection. A double pole push switch, also on flyleads, provides for the "Test" function, on both module channels simultaneously. The test current passes through a second winding on the CT bobbin.

An important point to note is that the shunt trip coil takes the place of the current coil on the 2nd (neutral) pole of the MCB. Obviously this prevents overcurrent protection on the neutral pole. While not a problem on star (Y) connected supplies RCD modules **must not** be fitted to installations connected to delta (Δ) connected mains supplies.

The RCD is selected for "may trip" 22mA "must trip" 30mA. Trip time at 30mA is 150millSec (5x) and 30milliSec at 150mA. This is in compliance with Euro standards for RCD devices except that within the Euro standard the "may trip" threshold is 15mA.

6.3.4.1 Diagram 11 (RCD PCB)



6.3.5 Circuit description –and operation notes- (Fluorescent module)

The fluorescent module comprises of a Non-Dim contactor on one channel and a hard fired thyristor dimmer on the other. While both channels have their control inputs separate (Non Dim Ch A, dimmer Ch B) the Dimmer processor “knows” to drive both simultaneously when a fluorescent module is detected.

Control is effected from the even (2, 4, 6, etc) logical dimmer number.

The default law is linear. This may be subsequently changed to one of the fluorescent laws and appropriate values set for bottom cut off & max output. Reference should be made to instructions provided by the ballast manufacturers in this respect as incorrect settings may damage both tubes & ballast’s. The only difference between Electronic & Magnetic laws is that the electronic law provides an transient output surge when fading up from an off state. Some ballast’s require this to ensure the tubes are correctly struck.

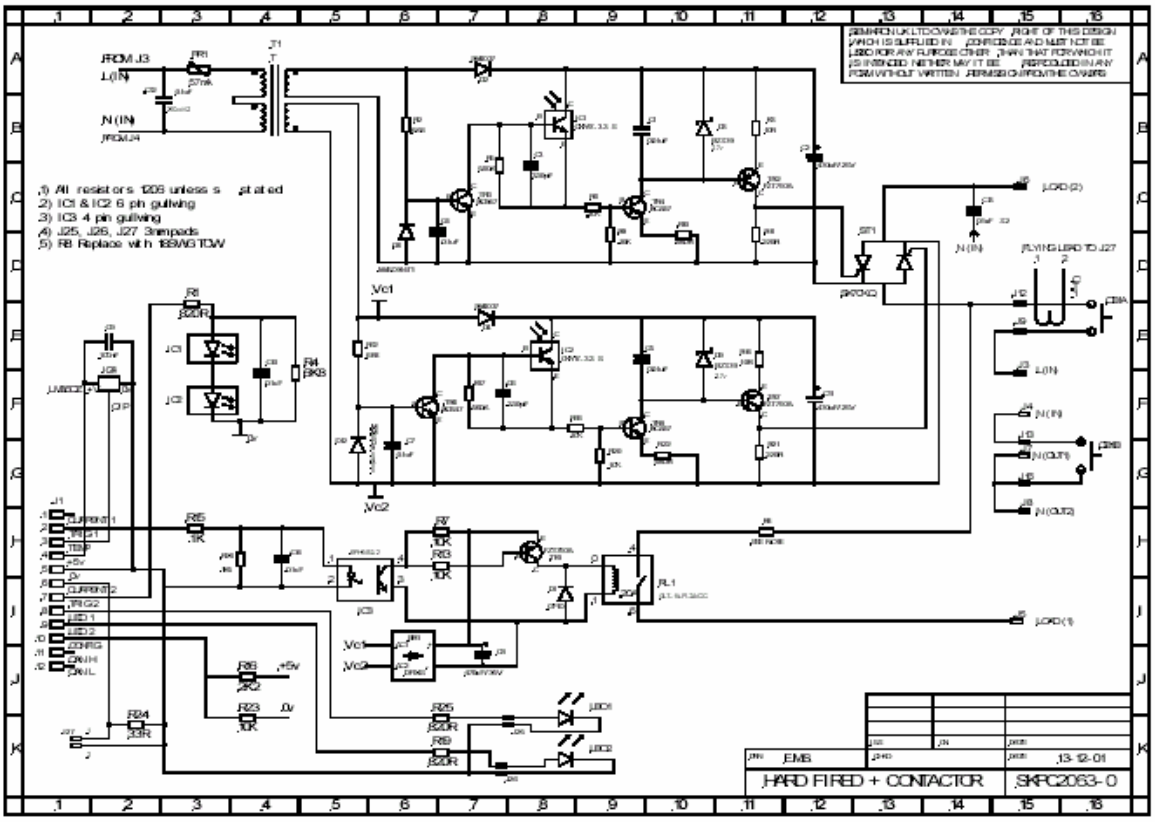
Patch data may be entered in the Ch A (1, 3, 5, 7 etc) position and will be used should a regular dual dimmer be inserted. Do not make any change to the profile (law) for this position with the fluorescent module in place. (the law may be set as desired with a dual module inserted). Respective setting for both module types is saved and will be automatically re-instated for each module type upon insertion.

The hard firing circuit also steers the gate drive so that drive is only applied to the thyristor in forward bias. This aids stability on loads that present a leading power factor (some electronic ballast’s).

Transformer T1 provides power for each gate circuit. C2 & C11 are charged on the ½ cycle prior to the conduction of their associated thyristor. They have to be first suspects if problem are encountered that suggest poor gate drive.
R16 & R23 set the voltage defining module type.

There is just a single MCB (10 amps) protecting the Non-Dim and dimmed outputs. RCD protection can be added. A modification supplied to some customers is to remove & link out the Contactor and remove R23. This results in a conventional dimmer module with Ch A permanently live from the MCB to provide a maintained feed, as required for emergency lighting circuits.

6.3.5.1 **Diagram 12** (Fluorescent module schematic)



7. Spare parts

The list below is all spare parts for SLD that can be ordered from customer service. Other items (some mentioned in the text) are available and can be obtained on application to myself. It is hoped to give these items formal part numbers in the future, which will make them available via customer service.

The final item in the list is a “Rack spares kit” This contains all the items listed in the 4th column.

Part Number.	Different for C rack	Description	Quantity included in 75600/A2
D type will fit		Power supply module (C Rack)	
75600/1	**Yes**	Power supply module (D Rack)	**1**
242/B057		Power supply unit 12 volt 100 watt	
280/B162		Fan (C rack)	
280/B164	**Yes**	Fan (D rack)	
161/B090		PCB (dual module)	
161/B091		PCB (50 amp module)	
161/B092		PCB (contactor module)	
258/B122		MCB 15A SP	
258/B126		MCB 15A DP	
258/B123		MCB 20A SP	
258/B127		MCB 20A DP	
258/B124		MCB 25A SP	
258/B125		MCB 50A SP	
258/B129		MCB 50A DP	
258/B136		MCB 15A DP shunt trip (for RCD module)	
258/B137		MCB 25A DP shunt trip (for RCD module)	
161/B067		RCD sense / amplifier PCB	
modify D rack item	**Yes**	PCB CIC card (C rack)	
RB/REF2120		PCB CIC card (D rack)	**1**
RB/REF2121		PCB dimmer backplane	**12**
D rack item fits		Rack processor module (C rack)	
75692	**Yes**	Rack processor module	**1**
		Electronics module (C Rack)	
75690xx	**Yes**	Electronics module (D Rack)	
75600/3		Termination repair kit	
D type can be used		SBUS cable loom	
PL/1C62824	**Yes**	SBUS cable loom	
280/B163		Fan filter	
235/B164		800 amp rack fuse	**3**
235/B163		4 amp processor fuse	**3**
250/B163		Load terminal clamp	
250/B???		Load terminal (50 / 100 amp link)	
75600/A2		Rack spares kit	

8. ReporterPro

These are only brief notes on a complex application. They intended just to get you up & running. As you gain experience with the application you should find more & more things slip into place.

The software is in 2 parts, A communications server and a client. This is intended for large multi-user environments, principally for the Parknet application of which ReporterPro is a subset. Multi client operation is not discussed further here. Further information on the topic may be found in readme.htm located in the root directory of the installation CD

8.1 System requirements

PC with 350Mhz (minimum) Pentium processor, 256Mb RAM (96Mb for NT4), 1024 x 768 display, NIC with TCP/IP protocol installed CD-ROM drive (or a network connection to a location containing the installation archive, UK or US keyboard. English language Windows XP or NT4 (sp6) operating system.

8.2 Installation

The ReporterPro software utilises a database hosted by Access 2000. The runtime components for this are included on the CD but they will not co-exist with earlier versions of Access. To avoid stability problems earlier versions of Microsoft Access must be un-installed before installing ReporterPro. Later versions of Access do not present a stability problem but all Microsoft Access file associations will migrate to the runtime version.

It is strongly recommended that ReporterPro is not installed on a machine that has any variant of Microsoft Access installed unless you have considerable PC experience. Further discussion is beyond the scope of this document.

Several modules within ReporterPro are written in visual basic. This brings a problem with string variables when a non English host OS is in use. For example e & é are not the same.
A problem also arises with the use of a keyboard that provides for emulant bearing characters (é). Certain components in the applications data entry fields are influenced by keyboard mapping tables. The character mapping of non English keyboards results in incorrect data being passed between internal data tables with disastrous results.

If the CD does not autorun browse to the root directory & double click autorun.exe to launch the installer. It is recommended that you do not change any of the installation default values other then (if desired) the program group to place under on the start menu.

As is usual when installing programs all other applications on the PC should be shut down.

If Access 2000 is not installed on your system click the button to install the Access 2000 runtime before attempting installation of ReporterPro.

During the install process several data access components are installed via a command script. Do not yourself close the command window that appears.

8.3 Configuration

If you have not already done so configure the machine for a static IP address (to suit the shownet network) when the installation completes. Then reboot. This is not strictly necessary with Windows XP but avoids any possible problems, particularly after installation of the data access components.
Note:- *Do not use the "alternate IP address" (for when a DHCP server is not detected) feature in Windows XP. You must place a static IP address in the traditional place.*

It is not possible to route the connection between the ReporterPro PC & the SN nodes.

Ensure that the SN node(s) & rack(s) are correctly interconnected, with the nodes "Reporter" port correctly defined within the node configuration. Connect the node, PC and any other devices to the network and run IOFTP32 on the PC. Use the who command to verify all connected shownet devices are on line. If any shownet devices have duplicate or inappropriate IP addresses you will receive error messages. If there are any problems correct them before proceeding further.

To run IOFTP32 on a PC copy the files ioftp32.exe & 220node.cfg (from a console) into a directory on the PC. Edit 220node.cfg to reflect the IP address & machine name of the PC. If the name of the PC exceeds 8 characters or contains a space just include the first 8 characters, or up to the space, for the name entered in 220node.cfg. You should consider changing the name of your PC to one of max 8 characters and no spaces. To run IOFTP simply double click ioftp32.exe
Caution:- *If your PC also connects to an NT network do not yourself change the name of your PC. Should you do so you will be unable to re-connect to the NT network without assistance from your NT network administrator.*

Close down IOFTP32 (ReporterPro will not connect if IOFTP32 is running).

Start ReporterPro. When started for the first time a licence agreement will be displayed. Click OK to accept. A login screen will appear. The default login name is Administrator the password is administrator. Both are case sensitive.

Most data entry fields described below are live. Values entered take immediate effect. If a mistake is made you may not be able to back out & correct it. Close the window, saying OK to discard the DB record, and start afresh. Take care when in the data fields to ensure the cursor is fully to the left before typing anything.

On Administer select Configurations. Press Duplicate and confirm. Name must not contain a space and not exceed 8 characters. Description is “free text” Fill in with meaningful data.
Enter the IP address of the computer into Host IP address. If you are using other then 255.255.255.000 for IP mask please ensure you know exactly whet you are doing. The Gateway field should not be left blank. 192.168.000.001 is a suitable value. You cannot route the IP traffic, unless you have split the client & server components of ReporterPro..
When complete ensure the line is selected & press the Activate button
The octets of the IP values must be complete. IE 123. Single characters will not be correctly parsed. This includes 0. A 1 - 2 digit value must be given leading zeros. The periods separating the octets are already in place. Do not type them. Take care to ensure your values do not inadvertently straddle a period.

Right click All Zones in the Main Control window. Choose Add Zone & type an appropriate name. Right click the (new) zone & choose Add Rack. Enter an appropriate number, select SLD for Product & choose Fixed for Case & select appropriate height. Do not check Special wiring. Click OK and a dimmer map will be generated –all will be blank at this stage. Close the window & repeat the process for each rack in the system.

Under Net select Nodes. In Node enter the node name, select the appropriate type and enter the IP address. Close the window and then re-open.

Click the (blank) box to the left of the node name –the Node port data appears. Select the appropriate port usage under Port Type. (DMX From Net = DMX out, Supervisory = Reporter). From Net select Supervisory Ports. Select the node by clicking the (blank) box to the left of the name. The Port field (not editable) should contain the supervisory port number. If not you have made a mistake in a previous window. Go back and correct.
In Port Rack select the rack number that is to connect to that port. An error will occur if you try and connect a rack to more then one port.

Under Status select Node status & Rack Status. All (physically) connected Nodes / Racks should now be on line. If not close down ReporterPro (File –Exit all) & restart (ensure IOFTP32 is not running) If devices are still not on line a mistake has been made somewhere. Go back through all the steps and carefully check your work.

8.4 Operation

8.4.1 Rack configuration

This is very brief –just to get you doing basic things. Once you start using the program and become proficient with the tasks below other operational modes will start to fall naturally in place. The help system is very comprehensive –but was originally written for Parknet –of which ReporterPro is a subset. There are links to some items that do not feature in ReporterPro.

Go to the Main Control window locate a rack (seen to be on line) & double click it. Press Get Data from Racks. Highlight Configuration and press OK –the rack configuration data will be downloaded.

The following tasks can be carried out off line to prepare data for later uploading to a rack.

Select a rack press the Module Map button and select from the drop down boxes the module types manually. Once this is done the following parameters may be edited, by first pressing the appropriate button

Patch:- DMX CID and Outlook patch data is entered here. The Rack drop down list (top left) can be used to select alternate racks. Do not worry about duplicate CID until all racks have been patched. When complete only 0 should be listed for duplicate CID

Circuits:-. On this screen parameters like Max output volts, Law (profile) Fault Reporting (on / off) can be defined along with various other parameters.
Unlike the patch screen this window must be closed to transfer modified values into the database.

Pressing Send Data to Rack on the Rack configuration window opens a window where you specify what parts of the configuration database to send. The selection Configuration is everything. There are some instances where this may not be appropriate. User selection allows you to choose all configuration groups individually.
This may be required in the following circumstances.

When the dimmer rack software is upgraded to fix a bug this may have involved a rearrangement of data types within the DB structure. If such rearrangement has been made uploading a configuration saved from the previous structure can cause problems. If after a data upload, following a software upgrade
things don’t work out as they should carefully review the information in release.txt (from the software archive) to see what changes have been made. If for example a bug relating to dimmer profiles (laws) has been fixed and problems arose following restoration of the original configuration then it is worth trying uploading just the basic patch data (which is what is most tedious to re-input manually).

Note:- *If anything has occurred to render the database suspect it is essential to first re-birth the processor before attempting another upload.*

To upload only patch data perform the following steps
From the selection window highlight User Selection and press OK. Choose Mux Patch and press OK. Repeat and this time choose Circuit patch (to upload the CIDs)

Then configure profiles & other items manually at the rack processor(s). Do not use ReporterPro to do this. After checking all is OK the new rack configuration in it's entirety can be downloaded into ReporterPro.

From Rack Configuration window press Get data from rack. Highlight Configuration & press OK

8.4.2 Dimmer fault reporting.

For this to work fault reporting must first be enabled. If you have part populated racks you will only be able to enable fault reporting on dimmers that are actually present. If you have any form of custom rack, that has less then it's usual complement of dimmer processors (REF2121) PCBs you must ensure fault reporting is disabled on dimmer numbers associated with the missing processors. Streams of fault data will flood the system if this is not done.

Press Circuit faults in Main Control. A window opens that displays live actual circuit faults. Faults dissapear from this window when cleared. Note that a load fault becomes clear as soon as the circuit is faded to zero. Pressing Log in the Active Circuit faults window displays a log of all faults stored in the rack(s) database. Pressing Flush clears the faults from the window -not the database. New faults arising will be displayed. Pressing Restore will refresh the window from the rack(s) database

Filter permits either fault types and / or specific circuits from being displayed. The button Filter appears on both ate Active & Log windows but changes made in one reflect in the other. Circuits to hide are selected from a drop down list –where all circuits that have fault reporting enabled are displayed. An error will occur if you attempt to list the same circuit twice. At present a bug prevents a circuit selection filter once made from being cleared. A workaround is to simply overtype the unwanted entry with a non existent CID. Don't forget you can only use each CID number once.

8.5 Administration

An event schedule is generated every 24 hours. If prompted to Up-date click OK.

The Reporter Pro Clean Start shortcut can be used to start ReporterPro to empty ReporterPro of expired data, generate the schedule and to repair and compact the ReporterPro Data Database.

ReporterPro Repair+ Compact shortcut is used to repair and compact the ReporterPro code database should a problem occurs during operation that leaves the ReporterPro Code Database (RepPro.mdb) in an invalid state.

You can create more appropriate user names from Administer - User Accounts. Users added can be given restricted permissions –preventing them altering rack configuration details for example.

Warning if you change the Administrator password and forget it you will have to re-install ReporterPro. Re-installation will wipe out the database. If you have previously backed up the database you could restore it – unfortunately the system will then require the (forgotten) password to log in.

The database may be backed up by copying all of the .mdb & .ldb files from the installation directory to a CD-ROM or other backup media.
These files are specific to the actual release version of ReporterPro. Do not use them to restore data to a later (or earlier) release as grief will certainly ensue.
The only sure way of transferring data onto a later release is to upload it from the dimmer racks