

# MDD 500

## Multi-Standard Digital Decoder

# Operator's Manual

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# Safety Warnings

Always ensure that the unit is properly earthed and power connections correctly made.

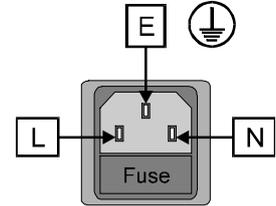
This equipment shall be supplied from a power system providing a **PROTECTIVE EARTH**  connection and having a neutral connection which can be reliably identified.

The power terminals of the IEC mains input connector on the rear panel are identified as shown below:

E = Protective Earth Conductor

N = Neutral Conductor

L = Live Conductor



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## Power cable supplied for countries other than the USA

The equipment is normally shipped with a power cable with a standard IEC moulded free socket on one end and a standard IEC moulded plug on the other. If you are required to remove the moulded mains supply plug, dispose of the plug immediately in a safe manner. The colour code for the lead is as follows:

GREEN/YELLOW lead connected to E (Protective Earth Conductor)

BLUE lead connected to N (Neutral Conductor)

BROWN lead connected to L (Live Conductor)

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## Power cable supplied for the USA

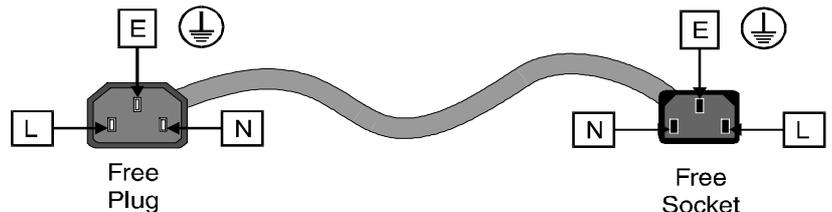
The equipment is shipped with a power cord with a standard IEC moulded free socket on one end and a standard 3-pin plug on the other. If you are required to remove the moulded mains supply plug, dispose of the plug immediately in a safe manner. The colour code for the lead is as follows:

GREEN lead connected to E (Protective Earth Conductor)

WHITE lead connected to N (Neutral Conductor)

BLACK lead connected to L (Live Conductor)

The terminals of the IEC mains supply lead are identified as shown opposite:



*Note that for equipment that is not fitted with a mains power switch, to comply with BS60950 Clauses 1.7.2 and 2.6.9, the power outlet supplying power to the unit should be close to the unit and easily accessible.*



### Warnings

Voltages within this unit can be lethal under certain circumstances. Where power is required to be connected to the unit during servicing great care must be taken to avoid contact with these voltages.

Maintenance should only be carried out by suitably qualified personnel.

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## EMC Standards



This unit has been designed to conform to the following standards:

### Electromagnetic Compatibility-Generic Immunity Standard BS EN 50082-1:1992

*The European Standard EN 50082-1:1992 has the status of a British Standard and is related to European Council Directive 89/336/EEC dated 3rd May 1989.*

### Electromagnetic Compatibility-Generic Emission Standard BS EN 50081-1:1992

*The European Standard EN 50081-1:1992 has the status of a British Standard and is related to European Council Directive 89/336/EEC dated 3rd May 1989.*

## EMC Performance of Cables and Connectors

Snell & Wilcox products are designed to meet or exceed the requirements of the appropriate European EMC standards. In order to achieve this performance in real installations it is essential to use cables and connectors with good EMC characteristics.

All signal connections (including remote control connections) shall be made with screened cables terminated in connectors having a metal shell. The cable screen shall have a large-area contact with the metal shell.

### COAXIAL CABLES

Coaxial cables connections (particularly serial digital video connections) shall be made with high-quality double-screened coaxial cables such as Belden 8281 or BBC type PSF1/2M.

### D-TYPE CONNECTORS

D-type connectors shall have metal shells making good RF contact with the cable screen. Connectors having "dimples" which improve the contact between the plug and socket shells, are recommended.

## Packing List

The unit is supplied in a dedicated packing carton provided by the manufacturer and should not be accepted if delivered in inferior or unauthorised materials. Carefully unpack the carton and check for any shipping damage or shortages.

Any shortages or damage should be reported to the supplier immediately.

Enclosures:

- MDD 500
- Power cable
- Operator's Handbook

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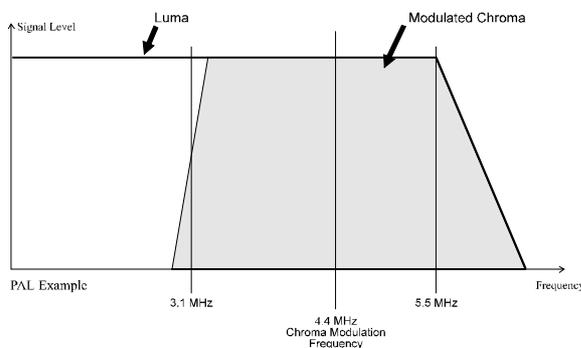


## Description

Congratulations for buying one of the highest quality, cost effective digital decoders available on the market today. By combining sophisticated design and manufacturing techniques with a high, performance to price ratio, we offer competitive, high quality, digital processing that can be relied upon.

The MDD500 is a Multit-Standard broadcast quality digital decoder. Incorporating a non-complementary, adaptive field based digital comb filter, the MDD is capable of generating very high quality digital component output from an analogue composite source. The module utilises techniques derived from work pioneered by the BBC Research department, and ensures exceptional stability, excellent subcarrier rejection and repeatable results.

Decoding of a composite signal is carried out by separating the luminance and chrominance signals and then decoding the chrominance. The problem is that the signal actually consists of a 5MHz luminance signal with a modulated chrominance signal of 2MHz bandwidth superimposed at 4.43MHz. A simple decoder just filters the chrominance away from the luminance but this leaves remnants of the chrominance on the luminance and visa versa.



The relationship between the subcarrier and the line frequency reveals another approach to separating these two signals. The composite video signal which has horizontal, vertical and temporal components produces a complex energy spectrum of interleaving luminance and chrominance sidebands. In the luminance the peaks appear at multiples of the line frequency, and the chrominance peaks interleave with these due to the PAL quarter line offset in the subcarrier frequency with respect to the line frequency. Thus it is possible to separate chrominance from luminance with a filter that has nulls at frequencies close to the multiple of the line frequency. This technique is called COMB FILTERING.

By careful product design it is possible to arrange for the filter to operate over several lines in a number of

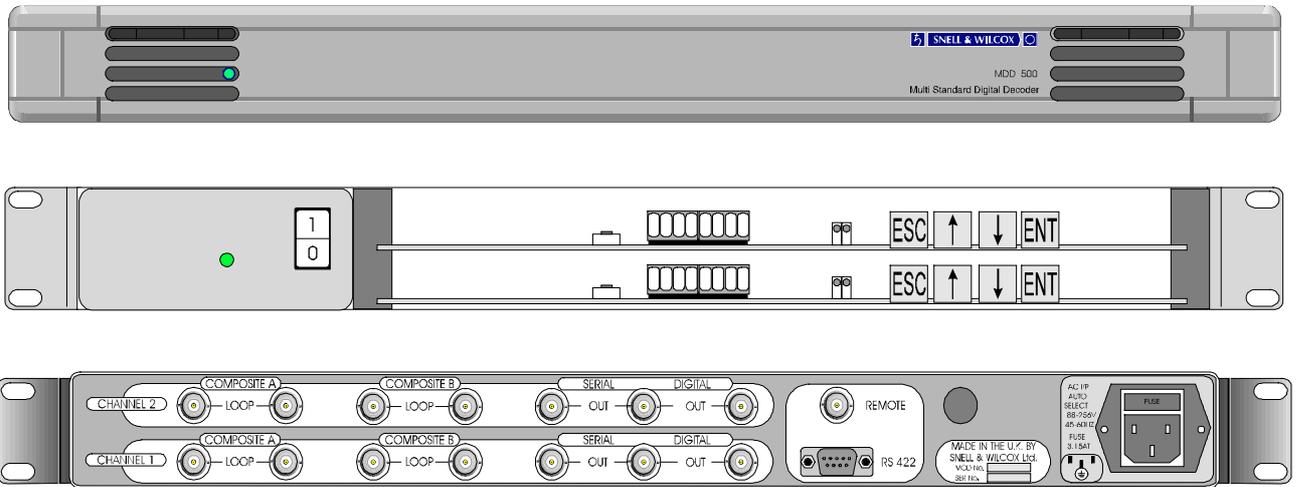
fields. This produces excellent results on static images and only slight degradation on a moving image.

The main processor cards are housed in a compact 1U 19 inch rack which also contains the switched mode power supply, axial cooling fan and connectors. One of two analogue composite video signals can be selected for decoding to 10 bit digital 4:2:2 CCIR 656 format. In order to extract the best performance the relevant mathematical relationship between the colour sub-carrier frequency and the horizontal line frequency should be maintained.

All processing is carried out digitally with ten bit accuracy throughout. Picture black level is processor stabilised for full compliance with CCIR 601-2. Behind the hinged front panel is a status display and menu control system. VITS, VITC, IDS and teletext signals present on the composite source can be selected for transparent analogue to digital conversion under user control. Video gain, black level, horizontal picture position and video delay adjustments are offered for ease of system installation. An internally generated test signal locked to the incoming video can be produced which can be used to test for serial clock recovery and cable equalisation.

The MDD is available in two versions - a single and a dual channel. The single channel contains one processor card in the lower slot whereas the dual channel version has cards in both slots. The cards operate completely independently.

## Features

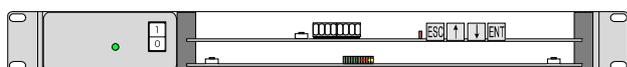


- Multi Standard - PAL I,M,N, & NTSC
- 10-bit processing throughout the system.
- Adaptive Field Comb Filtering.
- Minimum Delay Modes - Ideal for editing environments
- Adaptive Vertical Filter
- Chroma Gain
- Comprehensive VITS processing
- 3 Serial Digital Outputs
- Internal test patterns
- Full remote control facility using Snell & Wilcox proprietary serial BNC system - 'RollCall'
- 2 Channels in one box

## Installation

The MDD500 is supplied in a dedicated carton provided by the manufacturer and should not be accepted if delivered in inferior or unauthorised material. Carefully unpack the unit and check for any shipping damage or shortages. If you encounter any problems please report them to the supplier immediately.

**IMPORTANT NOTE :** In cases of complaint the packing material should be retained for inspection by the carrier.



The unit is designed for mounting in a 1U high slot in a 19" racking system.

The chassis is equipped with a pair of mounting ears attached to the side plates and suitable screws should be inserted through the holes in these flanges to secure the chassis to the racking system. Ensure that the rack is correctly configured to accept the 1U unit with chassis runners positioned to support the unit.

*Under no circumstances should the unit be hung from its rack ears alone as this will result in irreparable damage to the case.*

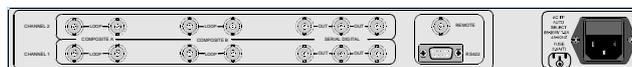
Whilst mounting the unit please try to ensure that there is adequate air flow to the sides of the unit.

If an MDD is to be mounted in a rack together with convection cooled equipment, e.g. Analogue distribution amplifiers ensure that it is not located above or interspersed with these units. The equipment should be operated in an environment having a temperature between 0°C and +40°C and a relative humidity of less than non-condensing.



The front panel is opened by pulling the two catches forwards. We have found that the easiest way of doing this is with your thumbs ! The internal hinge mechanism has been designed so that the panel can slide forwards and drop down to leave unrestricted access to the boards.

## Electrical Connection



The power supply accepts AC mains in the range 88 to 256 Volts AC @ 45Hz to 60Hz and will auto switch to these standards. The main power connection, located at the rear of the unit, is made via a fused IEC320 inlet socket (fuse 2.5 AT) with the middle pin as earth conductor. This electrical connection should be located as close to the unit as possible to facilitate easy isolation.



Earth  
Connection

## Power Indicator

The ON / OFF switch is located behind the front panel. The power LED is visible with the front panel open or closed. The power indicator will glow GREEN under normal conditions but switch to RED if the cooling fan has failed or an internal error has occurred.

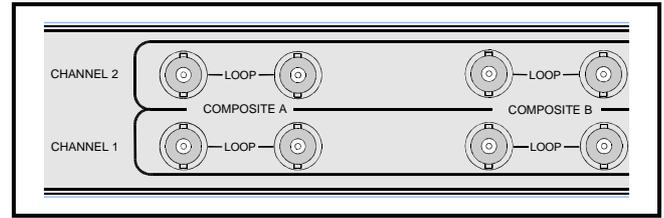
## Signal Connections

### Composite Inputs

The two loop-through Composite inputs are labelled Channel 1 and Channel 2

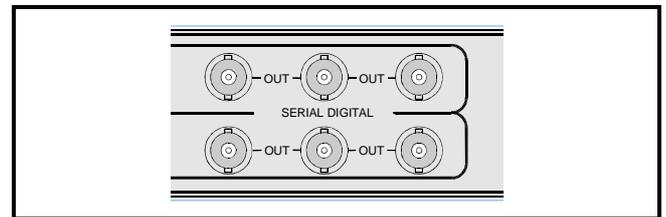
The relevant input is selected from the menu system (See section "The Menu System")

Nominal input level is 1V peak to peak and a termination must be fitted if the loop through facility is not used.



### Serial Outputs

All digital outputs can be used simultaneously. To aid compliance with EMC/RFI regulations, we recommend the use of high quality co-axial cable type BBCPSF1/2 or equivalent.

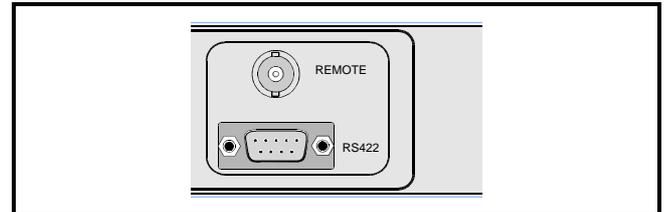


### Remote Control

Interface to the "Roll Call" communications network is via the single REMOTE BNC connector. Connections should be made by means of a 'T' piece ( $Z_0=75$  Ohms) to a 75 Ohm cable system with both extremities terminated in 75 Ohms.

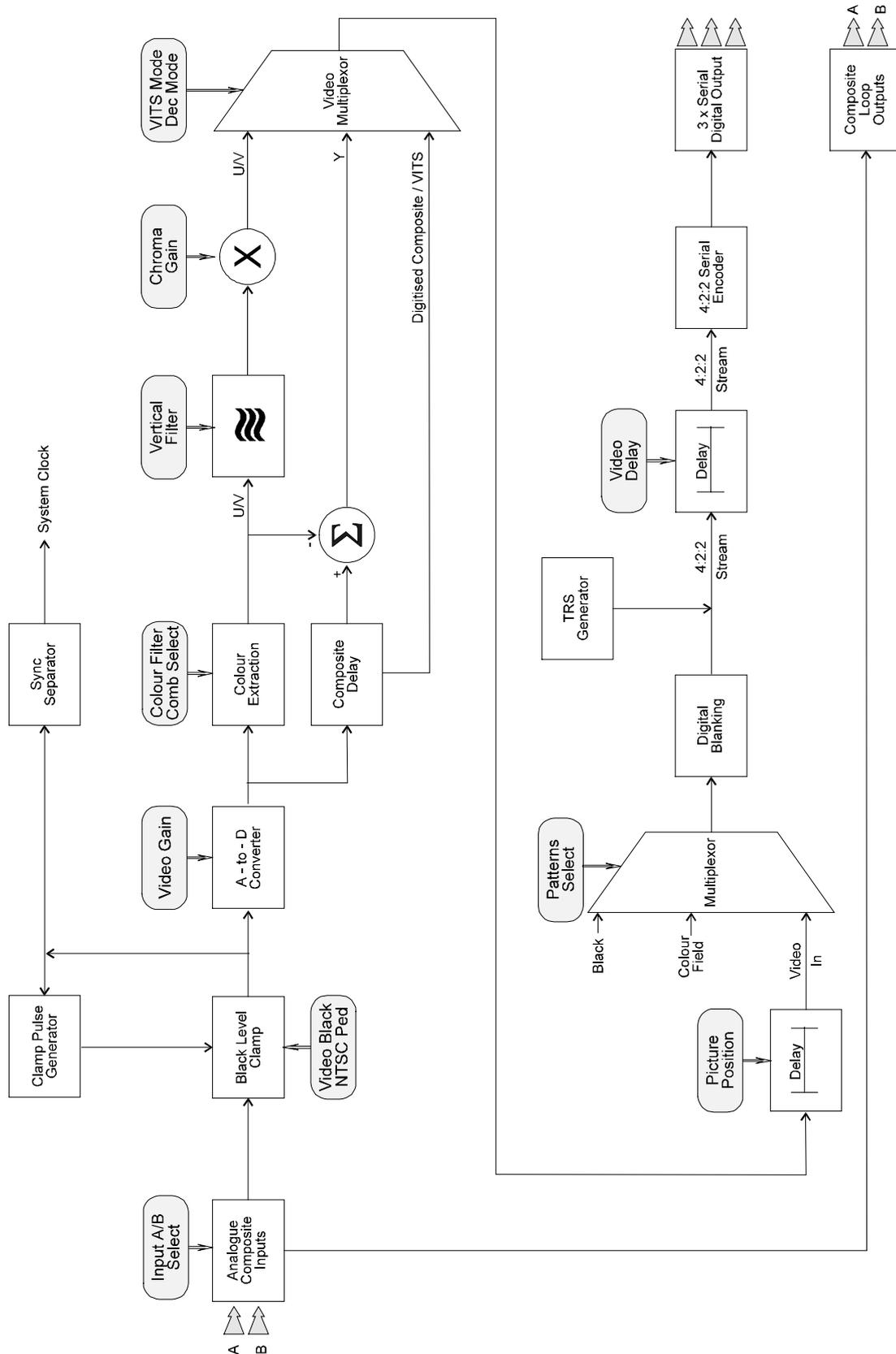
Under no circumstances should the "Roll Call" network be directly connected to any other communications network such as a computer "Ethernet" system.

Provision is made for RS 422 remote control interfacing via the 9-pin female 'D' connector



# Block Diagram

Simple Block Diagram, including Adjustable Parameter.



## Getting Started

Connect up the unit so that there is a Analogue Composite video signal applied to input A. REMEMBER to fit a termination if the video loop through is not used. Any one of the 3 serial outputs can be used from the same channel.

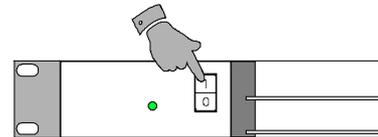


The front panel is opened by using the two black catches at either end of the panel. We have found the best way of opening the panel is to use your thumbs to release the catches and then ease the panel sufficiently forward to take hold of it. Carefully slide the assembly forward and allow the panel to hinge down.

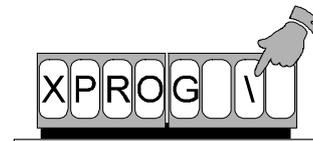


Turn the unit on. The LED will glow GREEN.

If an internal error occurs, or the cooling fan was to fail then this LED would turn RED.

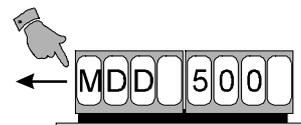


The display will indicate that the Xilinx devices are being configured. The bar at the end of the message will rotate during this process.



A scrolling message will then display the units name and the configuration status.

The initialisation sequence is now complete and the output should be the decoded input.



### Factory Configuration

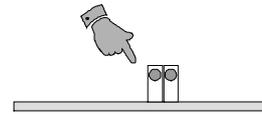
- Auto standards mode
- Normal Comb Mode
- Composite Input A
- Colour mode
- Black Track Enabled
- Pedestal On
- Medium Colour Filter
- Adaptive Vertical Filtering
- Fail to Black
- All VITS lines enabled

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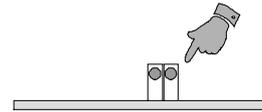
## Card Edge Features

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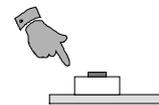
The left LED will illuminate if there is an error with the D1 output serial encoder PLL



The right LED will illuminate if there is a loss of input sync's



If for any reason the menu system should fail the CPU can be restarted with the CPU RESET switch.



## Operation

There are four modes of YC separation using different combing architectures. Each mode has been optimised for different applications.

### Adaptive mode

This mode uses a field comb to separate the Y & C. Traditional comb failure artefacts are suppressed by a tailored algorithm. The delay through the unit is 1 frame  $\pm 1$  user adjustable line. This mode should be used if failure artefacts become obtrusive or if minimum chroma smear on shot changes is required.

### Normal mode

This mode uses a non-adaptive field comb to separate the Y & C. The delay through the unit is 1 frame  $\pm 1$  user adjustable line. This mode gives the best possible YC separation giving a high Luminance bandwidth and significantly reduced cross colour. However, some comb failure artefacts will be noticed on saturated vertical transitions.

### Min Delay mode

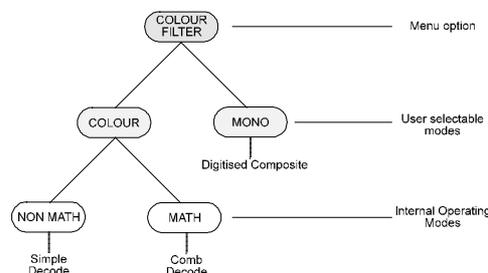
The Minimum Delay mode utilises a non-adaptive field comb, however the delay through the unit has been reduced to 2 lines  $\pm 1$  user adjustable line. This mode is ideal for editing environments where the least possible video delay is required but with the sharpest possible pictures.

### Adaptive Min Dly

The Adaptive Minimum Delay mode utilises the same field combing structure as the non-adaptive mode, however comb failure artefacts are suppressed by a tailored adaptive algorithm. The delay through the unit is still 2 lines  $\pm 1$  user adjustable line. Adaptive Minimum Delay produces excellent multi-generation performance even though the resolution is slightly lower on scenes with little or no movement.

*Important Note : Both Minimum Delay modes are disabled in PAL M.*

There are 2 further modes of operation, COLOUR and MONO. These modes are selected from the menu system option COLOUR MONO (See next section).



### Colour Mode

In COLOUR mode the decoder will automatically switch between simple and comb decoding depending upon the mathematical relationship between horizontal line frequency and subcarrier.

#### Comb decode

This mode will be automatically selected if the incoming PAL or NTSC signal has the required mathematical relationship. The Field Comb algorithm preserves the luminance bandwidth.

#### Simple decode

This mode will be automatically selected if the mathematical relationships are invalid. In this mode the chrominance is effectively removed from the luminance by a notch filter.

### Mono Mode

Any input that contains no burst will be automatically detected as monochrome and the decoder will switch to MONO mode, clearing the U and V channels and passing the digitised input directly to the output, thus preserving quality. MONO mode can also be manually selected from the menu and should be used if for some reason a burst is present on a mono signal.

## Colour Filter

Another important option in the menu system is the COLOUR FILTER. By altering the response of the chrominance filter, prior to remodulation and subtraction from the composite, the effective area of the spectrum that is combed can be controlled.

On static scenes the luminance and the chrominance will be separated by the comb structure. However, with movement the comb will fail and the luminance resolution will be degraded. Therefore a wider chroma bandwidth will produce slightly lower luminance resolution with moving scenes. In general the filter choice will depend upon the type of material that is being decoded.

This is shown in the table below.

<i>Filter</i>	<i>Movement</i>
<b>WIDE</b>	Little
<b>MEDIUM</b>	Medium (default)
<b>NARROW</b>	Fast moving

## Adaptive Vertical Filter

An adaptive vertical filter has been included which cancels out small chroma phase errors thus suppressing Hannover bars.

The filter also offers a further reduction in cross colour and reduced chroma smearing on vertical transitions. The adaption algorithm can be switched on or off from the "VERT ADP" option in the menu.

The operation will generally depend upon the type of material being decoded. Some guidelines as to which settings should be used are given below,

On

Filter will adapt to vertical transitions. This is optimised for the sharpest pictures.

This has the maximum vertical resolution & Hannover bar suppression

Off

Picture content has a lot of high frequency diagonal luminance

eg. Small graphics, captions, scrolling titles, chequered patterning etc.....

## Menu System

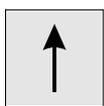
The MDD has an interactive user interface, consisting of a high contrast 8 character display and a bank of four push button switches, both of which are accessed by opening the front panel.



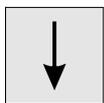
Long messages are scrolled across the display so that more information can be displayed.



Cancels the current action and reverts to the previous level.



Steps to the next menu level or causes a relevant value to increase.



Steps to the previous menu level or causes a relevant value to decrease.



Branches to a sub-menu or causes a parameter to be accepted with a transition to the previous menu level.

### Operation

The decoder configuration can be programmed via the control buttons adjacent to the display. These buttons give access to a number of menus which have been arranged so that progressively selecting the relevant item on any given menu will eventually lead to the parameter requiring modification.

Some of the parameter modifications take effect immediately allowing the change to be previewed before accepting it by pressing the [ENT] button. Pressing the [ESC] Button will cancel the change and move the menu up one level.

Once the decoder has been configured the menu should be returned to the top level by pressing [ESC] [ESC] [ESC]. In this way any status or error messages can be scrolled across the display.

SW Vn	=	X.yy (software version).
TV Mode	=	PAL I / NTSC / PAL M / PAL N / Auto
Input	=	Composite A / B
c/m (colour mode)	=	Comp / Decoded
C. Filter	=	Wide / Medium / Narrow
On Fail	=	Black / Colour Field / Input

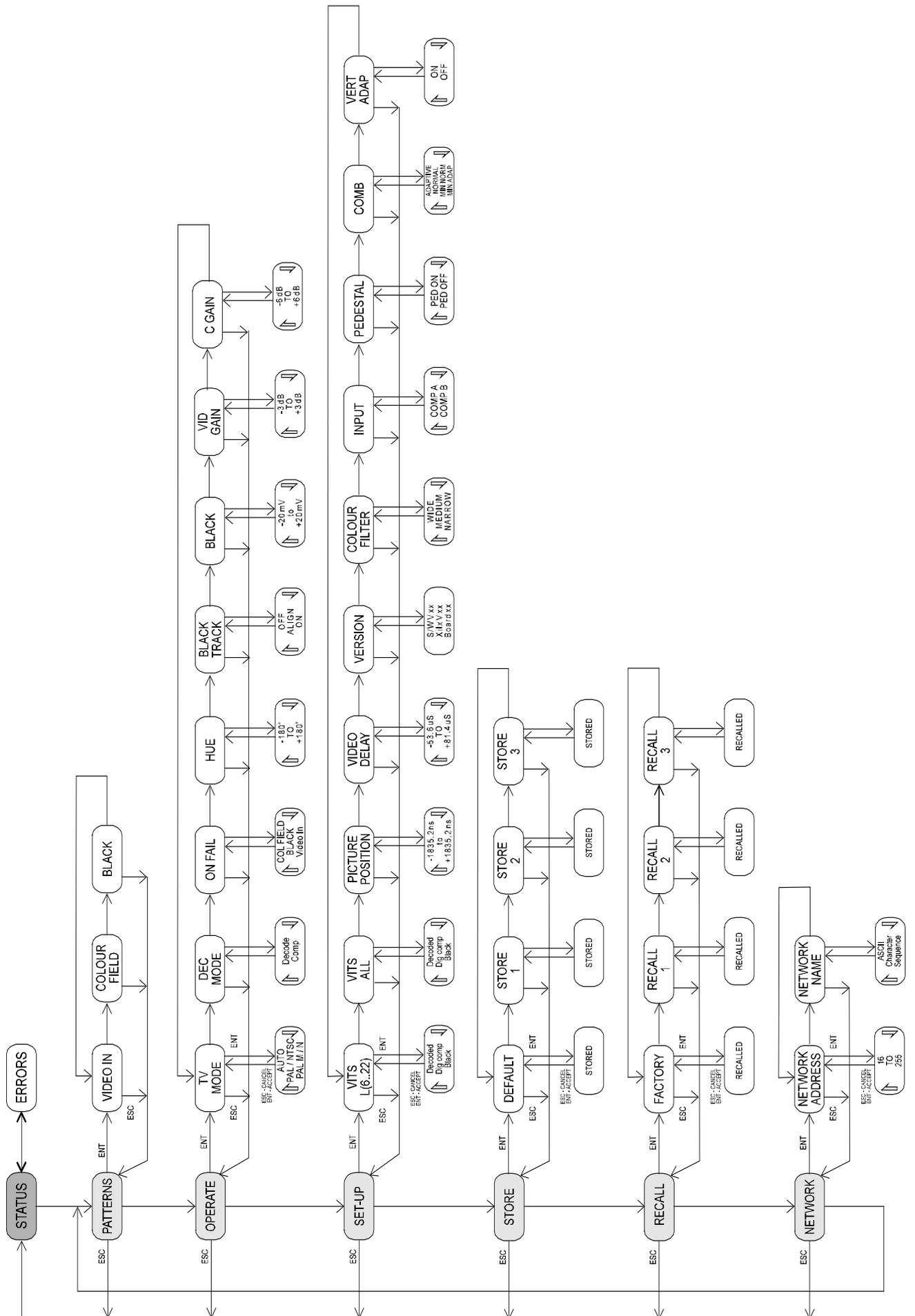
### Error Messages

No composite signal.	Missing input or wrong input selected
Wrong Input standard.	Unrecognised input standard or incorrect standard for selected output
Signal Level Invalid.	Signal level outside the Automatic Black trackin window - Unable to track.

### Default Settings

The menu system is factory configured so that each option has a default setting, which are listed with the description of each menu item. The Factory defaults can be recalled at any time from the FACTORY option in the STORE menu.

Any change made to the menu set up will be automatically stored in DEFAULTS options after the unit has been left idle for more than 2 minutes. These defaults will then be loaded the next time the unit is powered up. The FACTORY settings can be recalled from the STORE menu at any time.



At the top level of the menu system are 6 options;

PATTERNS	selects video source to output.
OPERATE	regularly changed parameters. Changing these options will not effect the picture output.
SET-UP	decoder set-up parameters. There may be some picture disturbance on the output whilst changing these parameters.
STORE	stores decoder configurations in internal memory
RECALL	recalls decoder configurations in internal memory
NETWORK	sets the remote control network address for the card

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## Patterns

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Video In	sets the output to the Video In Signal
Colour Field	sets the output to the SDI two colour test signal
Black	sets the output to black

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## Operate

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TV Mode	selects the mode for the input.
Auto	input standard is automatically detected
PAL I	configures the unit for a PAL I input
NTSC	configures the unit for a NTSC input
PAL M	configures the unit for a PAL M input
PAL N	configures the unit for a PAL N input
Default	Auto
Dec Mode	specifies whether the input is colour or mono
Decoded	colour input will be decoded
Comp	output is non-decoded digitised composite to preserve quality
Default	Decoded
On Fail	selects the output that will be displayed should the input fail
Colour Field	displays the colour field pattern
Black	sets the output to a single black field
Input	passes the failed input
Default	Black
Hue	allows adjustment of the NTSC hue control
Range	-180° to +180° in 0.5 degree steps
Default	0°
Black Track	disables or enables the Automatic Black stabilisation
Off	No stabilisation
Align	Used for card alignment
On	Auto black stabilised
Default	On
Black	sets the offset of the ADC ie. Black level
Range	-20 mV to +20 mV in 0.2 mV steps
Default	0 mV
Vid Gain	sets the sensitivity of the ADC. ie. Gain
Range	-3.00 dB to +3.00 dB in 0.2 dB steps
Default	0 dB
C Gain	sets the chroma gain
Range	-6.00 dB to +6.00 dB in 0.05 dB steps
Default	0 dB.

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**Set-up**


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Vits Lxxx	select the format for the VITS line pair	Colour Filter	selects the type of filter used to filter the chrominance prior to it being re-modulated for subtraction from the composite.
Range	PAL I / PAL N : lines 6 to 22 paired with 319 to 335 NTSC / PAL M : lines 10 to 20 paired with 272 to 282	Wde	filtering with a wide bandwidth
Black	All VBIS lines will be blanked	Medium	filtering with a medium bandwidth
Dig Comp	All VBIS lines will be passed unchanged through the Luminance channel. The U & V channels will be blanked	Narrow	filtering with a narrow bandwidth
Decoded	Decodes the VBIS line as normal video, ie Y & C separated	Default	Medium
Default	Dig Comp	Input	selects the composite input
Vits All	initiate global VITS lines mode set-up, applies to all the VITS lines	Comp A	input A
Black	All VBIS lines will be blanked	Comp B	input B
Dig Comp	All VBIS lines will be passed unchanged through the Luminance channel. The U & V channels will be blanked	Default	Comp A
Decoded	Decodes the VBIS line as normal video, ie Y & C separated	Pedestal	determines whether the input pedestal is removed or passed
Default setting	Dig Comp	Ped On	the input has a pedestal
<i>Note :</i>	<i>When setting up a number of VBIS lines it may be easier to first configure all the VITS lines using VITS ALL, then configure individual lines using the VITS Lxxx option</i>	Ped Off	the input has no pedestal
Picture Position	Allows delay adjustment of output video in relation to the TRS codes	Default	Ped On
Range	$\pm 1835.2$ nsec adjustable in 7.4 nsec steps	Comb	selects the style of Combing and adaptive algorithms
Default	0 nsec.	Adaptive	Adaptive Field comb (1 Frame delay)
Video Delay	Allows adjustment of output video in relation to the input video.	Normal	Non-Adaptive Field comb (1 Frame delay)
Range	-53.6 $\mu$ sec to +81.4 $\mu$ sec in 37 nsec steps	Min Norm	Minimum delay Non-Adaptive Field comb (2 Line delay)
Default	0 nsec.	Min Adap	Adaptive Minimum delay Field comb (2 Line delay)
Version	returns the software and xilinx version numbers	Default	Normal
		<i>Note :</i>	<i>Both Minimum Delay modes are disabled in PAL M</i>
		Vert Adap	disables or enables the Adaptive algorithm for the vertical filter.
		On	Adaptive filtering
		Off	Vertical filtering ie. No Adaption
		Default	On

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## Store

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Default	Stores current set-up that is recalled automatically on power up.
Store 1,2,3	Store current set-up in Store 1, 2 or 3

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## Recall

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Factory	Recall the factory configuration and default settings.
Recall 1,2,3	Recall configuration stored in Store 1, 2 or 3

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## Network

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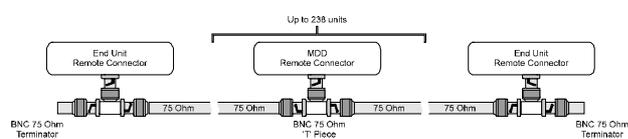
Address	Sets the remote control network address for the card
Range	16 to 255 in steps of 1
Default	Address 16 for the Lower slot, 17 for the Upper slot
Network Name	Sets the network name for the card.
Range	ASCII character sequence. The "UP" and "DOWN" arrow keys sequence through the character set. The "ENTER" key accepts the current letter and moves on to the next character space At the end of the line the "ENTER" key will accept the whole line and return to the previous menu level.
Default	Card serial number eg 25-09-06

	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
_	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n

## Remote Control

The MDD has provision to be remotely controlled via two different interfaces, either S&W RollCall, or RS422.

Interface to the "RollCall" communications network is via the single BNC connector. Connections should be made by means of a 'T' piece ( $Z_0=75$  Ohms) to a 75 Ohm cable system as shown below. It should be noted that both extremities of the cable system must be terminated in 75 Ohms and the maximum number of units limited to 240 on one single cable run.



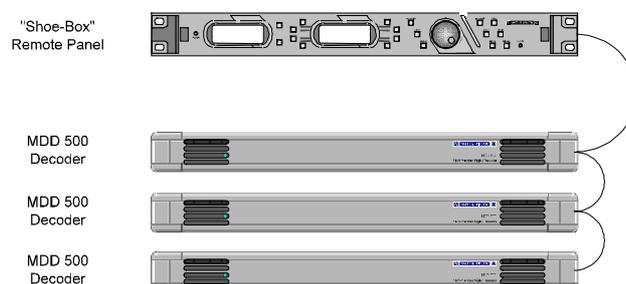
The communications network is a specially designed remote control network system and many more units can be accommodated by using a "Network Bridge". Remote control can come from either a dedicated front panel or "shoe-box" or a standard IBM compatible PC. Full protocol documentation and more detailed information is available on request from the supplier.

The RS 422 remote control interface is via the 9-pin female 'D' connector. Protocol information is also available on request from the supplier.

### Basic RollCall Operation

All the features from the menu system are available remotely with the same options structure. This maintains compatibility and facilitates easy operation for users familiar with the unit.

The most common MDD500 remote configuration is shown below where many decoders are connected to the network for remote control by one remote panel or "shoe-box".



### Typical Set-up

The network address for each card is set via the menu system option "NETWORK". The lower card defaults to address 16 whilst the upper card, if fitted, will default to address 17. When installing a network it is recommended that a table similar to the one at the end of the manual be kept up-to-date to allow fast and accurate allocation of new unit addresses.

The card edge menu system is disabled when the unit is being remotely controlled. Any attempt to change parameters will be blocked and an error message "REMOTE ACCESS - Hold down all keys to disconnect" will be displayed. By holding all 4 menu keys together the remote user will be disconnected from the MDD unit and control will be returned to the local card edge keys.

Parameter changes are reflected both locally and remotely. For example, if the output is changed to the colour field test pattern by a remote unit then any further access from the card edge to the PATTERNS option will indicate this change. Similarly, if the card edge changes a parameter then this will be reflected on the display panel of the remote unit.

For more detailed information about the operation of the remote panel or PC software please consult their relevant manuals.

## Specifications

### Signal Inputs

Composite Video 2 Analogue balanced loop-through

### Signal Outputs

Digital Component 3 Serial Digital to SMPTE 259M - C

### Main Processing

Digital Processing Full 10 bit processing throughout  
 Field comb Symmetric and Asymmetric adaptive field combs  
 Filters Adaptive vertical filter  
 Test Pattern Serial link pathological test, green field / pink field

### Controls

Input select COMP-A , COMP-B,  
 Format select PAL-I, PAL-N, PAL-M, NTSC, Auto  
 Action on Input Loss On Fail - Video in, Colour field, Black  
 Output Video In, Colour field, Black  
 Video gain  $\pm 3$  dB  
 Chroma gain  $\pm 6$  dB  
 Black level  $\pm 20$  mV Processor stabilised On / Off  
 Colour filters Wide / medium / narrow  
 Horz. picture position  $\pm 1835.2$  nsecs adjustable in 7.4 nsec steps  
 NTSC / PAL-M pedestal Remove / pass  
 NTSC hue  $\pm 180^\circ$   
 VBIS Individual line controls or Group control for  
 blanking / passing of VBIS lines.  
 625 composite standard : 6 to 22 & 319 to 335  
 525 composite standard: 9 to 20 & 271 to 282  
 Status LEDs Serial Encoder PLL error LED  
 Sync Separator input loss  
 Bi- Coloured Power LED GREEN for POWER ON, RED for board error

### Performance

Standards 525 or 625 line standards, PAL-I, PAL-N, PAL-M, NTSC  
 Video ADC Sampling 10 bits at 27 MHz  
 Data Paths Full 10 bit  
 Hannover Bar suppression YES  
 BLO operating range  $\pm 100$  Hz  
 Analogue Input Video @ 1V pk -pk into 75 Ohms  
 Analogue Input Return Loss Better than 40 dB at 4.43 MHz  
 Digital Output Return Loss Better than 17 dB at 270 MHz  
 Video delay  
     Adaptive / Normal 1 Frame +81.4  $\mu$ sec -53.6  $\mu$ sec  
     Min Delay : Adaptive / Normal 2 Lines +81.4  $\mu$ sec -53.6  $\mu$ sec  
     All adjustable in 37 nsec steps

**Communications**

RollCall™ BNC	Proprietary Snell & Wilcox interface multi-drop via BNC network.
RollCall™ RS485	Proprietary Snell & Wilcox protocol mutli-drop via single 9-way ribbon cable

**Power**

Input Voltage Range	88 V to 256 V 45/60 Hz
PSU	Auto Switching
Consumption	40VA maximum - Single channel unit 80VA maximum - Dual channel unit
Mains Fuse Rating	IEC320 fused inlet - fuse rating 2.5 AT
Power ON/OFF	Switch located behind front panel
Mains Plug	Fit 7A Fast to any Fused plug

**Mechanical**

Temperature Range	0 to 40° C operating
Cooling	Filtered cooling system processor monitored fan fail
Case Type	1U Rack Mounting
Dimensions	483 mm x 495 mm x 45 mm (w,d,h)
Weight	10kg

Company policy is one of continuous product improvement. Specification is subject to change without notice

## Maintenance

In the unlikely event of this unit failing to operate correctly no attempt should be made to repair the unit unless all the necessary test equipment, service manuals and technical expertise is available and permission has been granted in writing by SNELL and WILCOX Ltd. or their official agents, for such repairs to be attempted. Failure to comply with these conditions will void the warranty.

First line maintenance should be confined to the replacement of the plug-in cards, the power supply module, the cooling fan, the air filter and the mains inlet fuse.

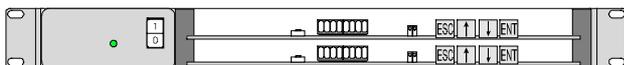
### Cleaning

It is important that the ventilation slots in the front and bottom of the front panel and the slots in the side of the unit do not become obstructed or blocked in any way including the build-up of dust etc. as this will interfere with the ventilation and cooling of the unit. A reduction of air flow through the unit may result in overheating and the power supply over-temperature cut-out may operate and shut down the unit.

The front panel slots, side panel slots and the cooling fan should be regularly inspected and cleaned if necessary.

### Removing the PCB Card

The front panel should be pulled forward and down using the two plastic levers A & B to reveal the two circuit cards which may then be safely removed by means of the card ejectors.



#### IMPORTANT NOTE

*The circuit cards must be replaced in their correct locations. Failure to observe this procedure will render the unit non-operational and may result in damage to the electronics.*

### Removing the Power Supply

Disconnect power to the unit by removing the IEC power connector

Allow two minutes for capacitors to discharge

Remove the top cover of the unit (14 screws)

Pull off the white plug-in connectors (2 items)

Remove the two M3 countersunk screws on the underside of the case securing the module

Withdraw the module The replacement module is Snell & Wilcox part No. RMY5 UPP100

### Removing the Mains inlet fuse

The unit has a 2.5AT fuse located in the small pull-out tray of the IEC mains inlet assembly fitted to the rear panel. A spare fuse will also be found in this tray.

The replacement fuse is Snell & Wilcox part No. RMF5 2.5AT

### Removing the Cooling fan

Remove the top cover of the unit (14 screws)

Remove the two circuit cards using the card ejectors

Remove the cable retaining screws from the top of the fan (2 M3 screws)

Remove the card-guide-to-frame retaining screws (6 screws) and remove card guide

Remove the nut and washer from the stud in front of the fan (M3 nut)

Remove countersunk fan retaining screw from underside of case (M3 screw)

The fan and its mounting may now be moved into the card space area

Remove the fan electrical connections from the front PCB

Cut the wires at the connector end to allow removal from the protective sleeving

The fan assembly may now be removed from the unit. The replacement fan is Snell & Wilcox part No. RM F907 (specify either PAPST or Comair type) and has a new connector fitted to the wires which should be retained along the case wall.

### Replacing / Cleaning the air filter

The front panel should be pulled forward and down using the two plastic levers

Remove the two M3 nuts and washers securing the metal mesh

Remove the filter material

The filter may be washed in soap and water and replaced when completely dry

The filter may be replaced with Snell & Wilcox part No. RMF 806

