# 42-681 Midi Mains Switcher

Introduction

The Midi Mains Switcher is a free standing unit that allows any mains-powered equipment such as signal lights, pyrotechnics, etc to be switched under midi control. Multiple units allow the user to control power up and power down conditions in sequence. Mains switching occurs at the zero-crossing point of the mains cycle, which together with spike suppression components, ensures that interference is virtually eliminated. Mains input and output connectors are IEC 3 pole with a 20mm fuse on the input line. The control input uses a standard 5 pin din female Midi connector. Configuration of the unit is via 16 DIL switches with provision to override the operating mode via Midi Program Change commands and omni on/off status via Midi Channel Mode commands.

Note: *This preliminary version of the manual assumes familiarity with Midi messages, binary conventions and terms describing such.*

Front Panel Description
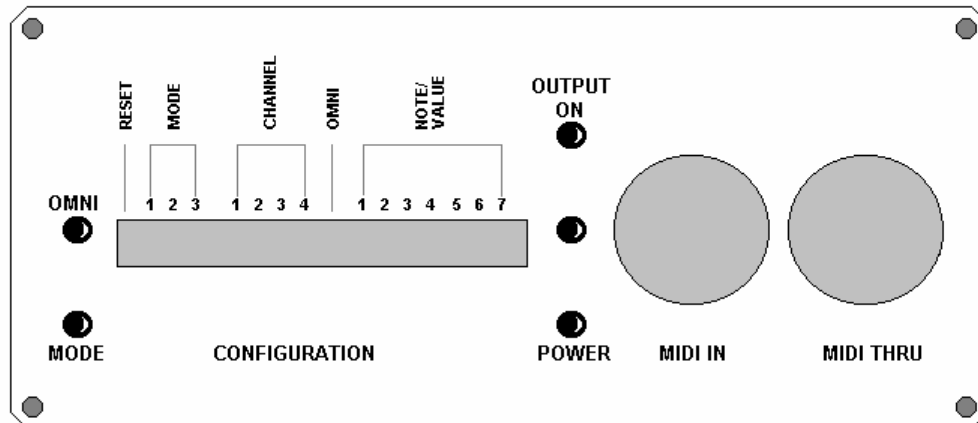
Omni LED: When illuminated indicates that the unit is set to Omni On receive mode, i.e. will be controlled by Midi commands on any of the 16 Midi channels. Omni Off status (LED extinguished), unit will only respond to Midi commands on the Midi channel as set by the user utilising the 'Channel' DIL switches.

Mode LED: Gives a visual indication of which operating mode has been selected as preset by the user using the front panel 'Mode' DIL switches or via remote Midi Program Change commands. Eight operating modes are available, the LED flashes to indicate which mode is currently active, i.e. one flash = mode one, two flashes = mode two, etc.

Configuration Switches:
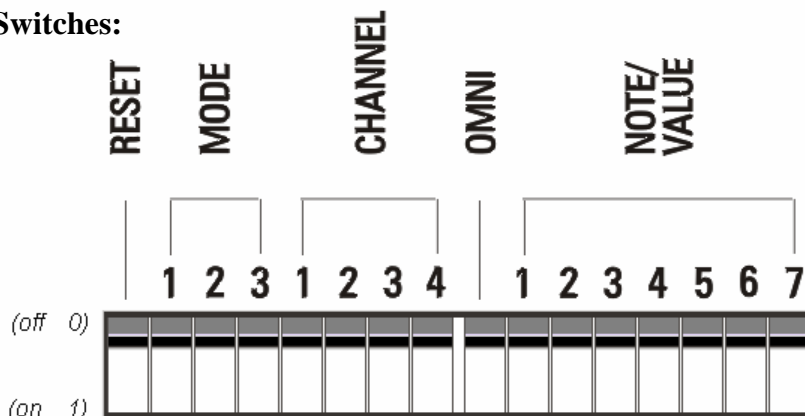
Reset Swt: Flip the DIL switch briefly on (down position) then off to reset Mode and Omni status to front panel switch settings.

Mode Swt: Three DIL switches that select one of the following operation modes:

	MAINS ON	**MAINS OFF**	**COMMENT**
Mode 1 *Note On ~Note Off*	Midi Note On	Midi Note Off	Note as defined by Note/Value DIL switches
Mode 2 *Note On Toggle*	Midi Note On	Next Midi Note On	Note as defined by Note/Value DIL switches
Mode 3 *Note Velocity*	Midi Note Velocity >63	Midi Note Velocity <63	Note as defined by Note/Value DIL switches
Mode 4 *Note Next Adjacent* *Colour*	Midi Note On	Next Adjacent Note On same colour	Note as defined by Note/Value DIL switches **See Appendix C**
Mode 5 *Midi Controller*	Midi Control Value >95	Midi Control Value <32	Controller as defined by Note/Value DIL switches
Mode 6 *Note +1*	Midi Note On	Note On + 1 Note Value	Note as defined by Note/Value DIL switches **See Appendix C**
Mode 7 *Note +2*	Midi Note On	Note On + 2 Note Value	Note as defined by Note/Value DIL switches **See Appendix C**
Mode 8 *Bypass*	~~~~~~~	~~~~~~~	No response to Midi, thru port still active

Mode Swt ......*continued***:**

See **Appendix B** for DIL switch settings to select operating modes.

Note: Front panel setting can be overridden by sending a Midi Program change command from your Midi controller. Mode number corresponds to the program change command that will select.

Channel Swt: Four DIL switches to select one of the sixteen available Midi channels. See **Appendix B** for switch settings.

Note: Front panel setting can be disabled by sending a Channel Mode Message from your Midi controller (Control message 125 Omni On), or via the Omni DIL switch. Reception on selected Midi channel can be re-instated by sending Controller 124 Omni Off from a Midi Controller, de-selecting Omni mode via the Omni DIL (up position) or using the Reset DIL switch which will also re-instate currently selected mode.

Omni Swt: DIL switch to enable/disable Omni On reception mode.
See **Appendix B** for switch settings.

Note: Front panel setting can be overridden by sending a Channel Mode Message from your Midi controller, (Midi Control message 125 Omni On or Control 124 Omni Off).

Note/Value Swt: Seven DIL switches to select Midi Note or Midi Controller that will trigger a 'mains on' condition, See **Appendix B** for switch settings

See also **Appendix C** for information relating to *Special Conditions* in relation to Note 0 (C-2) in Modes 1, 2 & 3 also notes126 (F#8) &127 (G8) in Modes 4, 6 & 7.

Output On LED: Illuminates when a Midi message that satisfies the 'mains on' condition as preset by the user has been received and mains power is passed through the unit.

Midi In LED: Illuminates when any Midi data is received by the unit. Also illuminates when any of the front panel switches are altered to confirm change of status.

Power LED: Illuminates to indicate the switcher is on and power is available to pass through the unit.

Midi In Din:	Standard 5 pin Female Din Midi socket to accept Midi data from your Midi controller.

Midi Thru Din:	Standard 5 pin Female Din Midi socket to pass all Midi data presented to the Midi In socket onto other Midi Mains Switcher's and or other Midi equipment.

Note: All Midi data is passed through the Midi Mains Switcher even when in *Bypass* mode (Mode 8).

Back Panel Description

IEC Mains Inlet:	Standard IEC mains inlet connector providing power to the switcher as well supplying switched mains outlet.

IEC Mains Outlet:	Standard IEC mains outlet connector providing power to connected mains equipment when switched via Midi.

Midi Specification

The Midi Mains Switcher conforms to Midi Standard Version 1.0. See **Appendix D** Midi Implementation Chart to view supported Midi commands.

Technical Specification

Mains input:	230V AC	
Fuse:	20mm 6.3A (T) HRC	(Stock code:42-275)
Max load (resistive):	1.5kW	
Control to mains isolation:	1.5 kV	
Dimensions (w x d x h):	Extruded case;	110 x 170 x 47mm
Weight:	0.8kg	
Mating connectors:	IEC mains input	42-154
	IEC mains output	42-153
	MIDI DIN Plug	43-335

42-681 Midi Mains Switcher : Appendices

Contents

Swt 1	Swt 2	Swt 3	Swt 4	Swt 5	Swt 6	Swt 7	Note	Midi Note/Control	Midi Controller
0	0	0	0	0	0	0	**ANY** (C -2)	0	Program Bank Number MSB
1	0	0	0	0	0	0	C# -2	1	Modulation
0	1	0	0	0	0	0	D -2	2	Breath Control
1	1	0	0	0	0	0	D# -2	3	
0	0	1	0	0	0	0	E -2	4	Foot Controller
1	0	1	0	0	0	0	F -2	5	Portamento Time
0	1	1	0	0	0	0	F# -2	6	Data Entry MSB
1	1	1	0	0	0	0	G -2	7	Channel Volume
0	0	0	1	0	0	0	G# -2	8	Balance (Stereo Volume)
1	0	0	1	0	0	0	A -2	9	
0	1	0	1	0	0	0	A# -2	10	Pan
1	1	0	1	0	0	0	B -2	11	Expression (accent above value of Control 7)
0	0	1	1	0	0	0	C -1	12	Effect Controller 1 MSB
1	0	1	1	0	0	0	C# -1	13	Effect Controller 2 MSB
0	1	1	1	0	0	0	D -1	14	
1	1	1	1	0	0	0	D# -1	15	
0	0	0	0	1	0	0	E -1	16	General 1
1	0	0	0	1	0	0	F -1	17	General 2
0	1	0	0	1	0	0	F# -1	18	General 3
1	1	0	0	1	0	0	G -1	19	General 4
0	0	1	0	1	0	0	G# -1	20	
1	0	1	0	1	0	0	A -1	21	
0	1	1	0	1	0	0	A# -1	22	
1	1	1	0	1	0	0	B -1	23	
0	0	0	1	1	0	0	C	24	
1	0	0	1	1	0	0	C#	25	
0	1	0	1	1	0	0	D	26	
1	1	0	1	1	0	0	D#	27	
0	0	1	1	1	0	0	E	28	
1	0	1	1	1	0	0	F	29	
0	1	1	1	1	0	0	F#	30	
1	1	1	1	1	0	0	G	31	
0	0	0	0	0	1	0	G#	32	Program Bank Number LSB
1	0	0	0	0	1	0	A	33	Controller # 1 LSB
0	1	0	0	0	1	0	A#	34	Controller # 2 LSB
1	1	0	0	0	1	0	B	35	Controller # 3 LSB
0	0	1	0	0	1	0	C 1	36	Controller # 4 LSB
1	0	1	0	0	1	0	C# 1	37	Controller # 5 LSB
0	1	1	0	0	1	0	D 1	38	Controller # 6 LSB
1	1	1	0	0	1	0	D# 1	39	Controller # 7 LSB
0	0	0	1	0	1	0	E 1	40	Controller # 8 LSB
1	0	0	1	0	1	0	F 1	41	Controller # 9 LSB
0	1	0	1	0	1	0	F# 1	42	Controller # 10 LSB
1	1	0	1	0	1	0	G 1	43	Controller # 11 LSB
0	0	1	1	0	1	0	G# 1	44	Controller # 12 LSB
1	0	1	1	0	1	0	A 1	45	Controller # 13 LSB
0	1	1	1	0	1	0	A# 1	46	Controller # 14 LSB
1	1	1	1	0	1	0	B 1	47	Controller # 15 LSB
0	0	0	0	1	1	0	C 2	48	Controller # 16 LSB
1	0	0	0	1	1	0	C# 2	49	Controller # 17 LSB
0	1	0	0	1	1	0	D 2	50	Controller # 18 LSB
1	1	0	0	1	1	0	D# 2	51	Controller # 19 LSB
0	0	1	0	1	1	0	E 2	52	Controller # 20 LSB
1	0	1	0	1	1	0	F 2	53	Controller # 21 LSB
0	1	1	0	1	1	0	F# 2	54	Controller # 22 LSB
1	1	1	0	1	1	0	G 2	55	Controller # 23 LSB
0	0	0	1	1	1	0	G# 2	56	Controller # 24 LSB
1	0	0	1	1	1	0	A 2	57	Controller # 25 LSB
0	1	0	1	1	1	0	A# 2	58	Controller # 26 LSB
1	1	0	1	1	1	0	B 2	59	Controller # 27 LSB

Swt 1	Swt 2	Swt 3	Swt 4	Swt 5	Swt 6	Swt 7	Midi Note	Note/Control Number	Midi Controller
0	0	1	1	1	1	0	C 3	60	Controller # 28 LSB
1	0	1	1	1	1	0	C# 3	61	Controller # 29 LSB
0	1	1	1	1	1	0	D 3	62	Controller # 30 LSB
1	1	1	1	1	1	0	D# 3	63	Controller # 31 LSB
0	0	0	0	0	0	1	E 3	64	Sustain Pedal (On/Off)
1	0	0	0	0	0	1	F 3	65	Portamento On/Off
0	1	0	0	0	0	1	F# 3	66	Sostenuto On/Off
1	1	0	0	0	0	1	G 3	67	Soft Pedal (On/Off)
0	0	1	0	0	0	1	G# 3	68	
1	0	1	0	0	0	1	A 3	69	Hold 2 (Sustain 2 On/Off)
0	1	1	0	0	0	1	A# 3	70	
1	1	1	0	0	0	1	B 3	71	Resonance
0	0	0	1	0	0	1	C 4	72	Release Time
1	0	0	1	0	0	1	C# 4	73	Attack Time
0	1	0	1	0	0	1	D 4	74	Cutoff Frequency
1	1	0	1	0	0	1	D# 4	75	
0	0	1	1	0	0	1	E 4	76	
1	0	1	1	0	0	1	F 4	77	
0	1	1	1	0	0	1	F# 4	78	
1	1	1	1	0	0	1	G 4	79	
0	0	0	0	1	0	1	G# 4	80	General 5
1	0	0	0	1	0	1	A 4	81	General 6
0	1	0	0	1	0	1	A# 4	82	General 7
1	1	0	0	1	0	1	B 4	83	General 8
0	0	1	0	1	0	1	C 5	84	
1	0	1	0	1	0	1	C# 5	85	
0	1	1	0	1	0	1	D 5	86	
1	1	1	0	1	0	1	D# 5	87	
0	0	0	1	1	0	1	E 5	88	
1	0	0	1	1	0	1	F 5	89	
0	1	0	1	1	0	1	F# 5	90	
1	1	0	1	1	0	1	G 5	91	Effect 1 Depth (Reverb)
0	0	1	1	1	0	1	G# 5	92	Effect 2 Depth (Tremolo)
1	0	1	1	1	0	1	A 5	93	Effect 3 Depth (Chorus)
0	1	1	1	1	0	1	A# 5	94	Effect 4 Depth (Detune/Variation)
1	1	1	1	1	0	1	B 5	95	Effect 5 Depth (Phaser)
0	0	0	0	0	1	1	C 6	96	Data Increment (+ going value)
1	0	0	0	0	1	1	C# 6	97	Data Increment (- going value)
0	1	0	0	0	1	1	D 6	98	Non Registered Parameter Number LSB
1	1	0	0	0	1	1	D# 6	99	Non Registered Parameter Number MSB
0	0	1	0	0	1	1	E 6	100	Registered Parameter Number LSB
1	0	1	0	0	1	1	F 6	101	Registered Parameter Number MSB
0	1	1	0	0	1	1	F# 6	102	
1	1	1	0	0	1	1	G 6	103	
0	0	0	1	0	1	1	G# 6	104	
1	0	0	1	0	1	1	A 6	105	
0	1	0	1	0	1	1	A# 6	106	
1	1	0	1	0	1	1	B 6	107	
0	0	1	1	0	1	1	C 7	108	
1	0	1	1	0	1	1	C# 7	109	
0	1	1	1	0	1	1	D 7	110	
1	1	1	1	0	1	1	D# 7	111	
0	0	0	0	1	1	1	E 7	112	
1	0	0	0	1	1	1	F 7	113	
0	1	0	0	1	1	1	F# 7	114	
1	1	0	0	1	1	1	G 7	115	
0	0	1	0	1	1	1	G# 7	116	
1	0	1	0	1	1	1	A 7	117	
0	1	1	0	1	1	1	A# 7	118	
1	1	1	0	1	1	1	B 7	119	
0	0	0	1	1	1	1	C 8	120	
1	0	0	1	1	1	1	C# 8	121	See **Appendix D**
0	1	0	1	1	1	1	D 8	122	
1	1	0	1	1	1	1	D# 8	123	*Channel mode messages reserved.*
0	0	1	1	1	1	1	E 8	124	
1	0	1	1	1	1	1	F 8	125	*Not available for active mains*
0	1	1	1	1	1	1	F# 8	126	*switching.*
1	1	1	1	1	1	1	G 8	127	

42-681 Midi Mains Switcher **Appendix B** *Mode/Channel Settings*

SW 1	SW 2	SW 3	Mode No.	Mode Description		SW 1	SW 2	SW 3	SW 4	Midi Channel
0	0	0	1	Note On ~ Note Off		0	0	0	0	1
1	0	0	2	Note On Toggle		1	0	0	0	2
0	1	0	3	Note Velocity		0	1	0	0	3
1	1	0	4	Note Same Colour		1	1	0	0	4
0	0	1	5	Midi Controller		0	0	1	0	5
1	0	1	6	Note + 1		1	0	1	0	6
0	1	1	7	Note + 2		0	1	1	0	7
1	1	1	8	Bypass		1	1	1	0	8
						0	0	0	1	9
						1	0	0	1	10
						0	1	0	1	11
						1	1	0	1	12
						0	0	1	1	13

Omni	Status	Comment
0	Omni Off	Selected Channel
1	Omni On	Any Channel Valid

SW 1	SW 2	SW 3	SW 4	Midi Channel
1	0	1	1	14
0	1	1	1	15
1	1	1	1	16

Mode 1:   **Note On ~ Note Off**
Example below Note Value Swt preset to Note C3 (Midi Note 60).
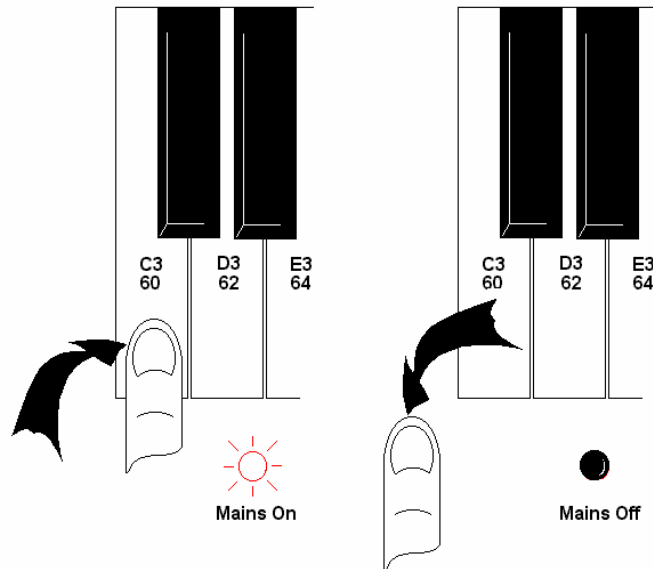
Also see Special Conditions Mode 1.

Mode 2:   **Note On Toggle**
Example below Note Value Swt preset to Note C3 (Midi Note 60).
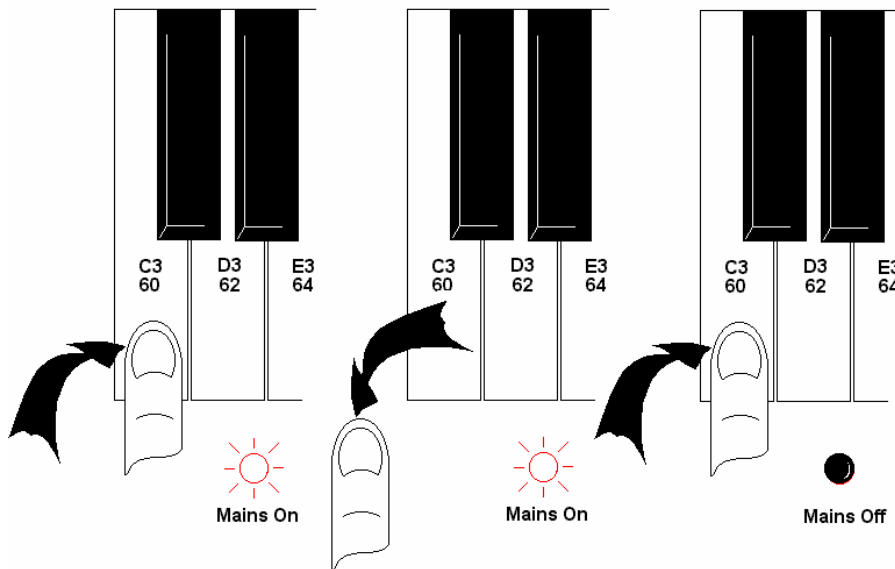
Also see Special Conditions Mode 2.

Mode 3:   Note Velocity
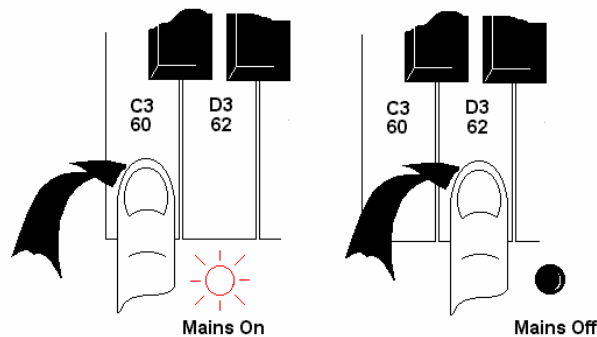Example below Note Value Swt preset to Note C3 (Midi Note 60).
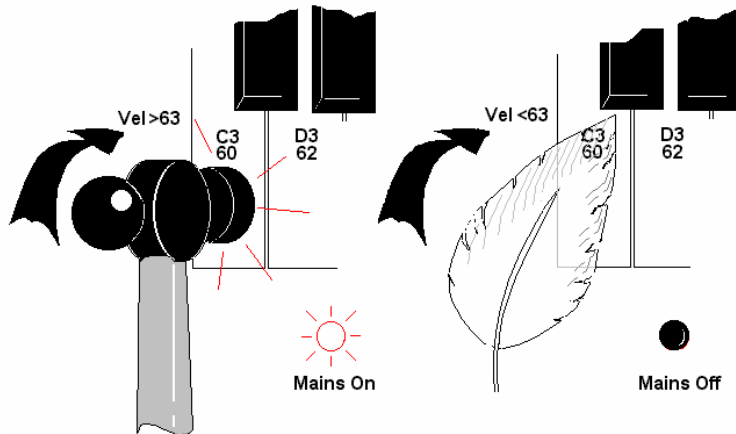
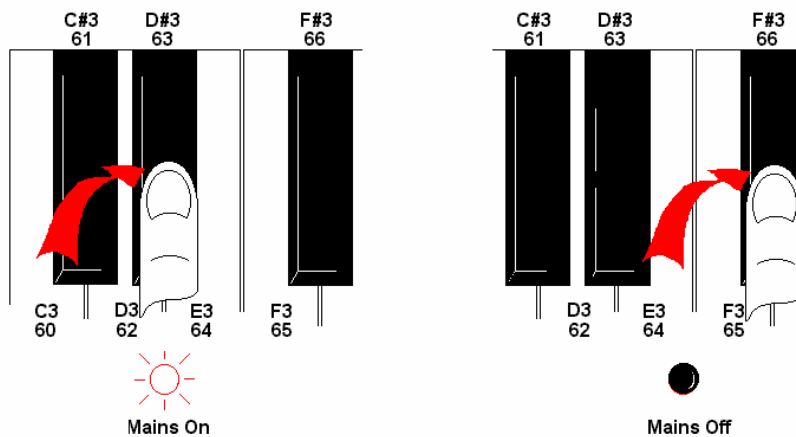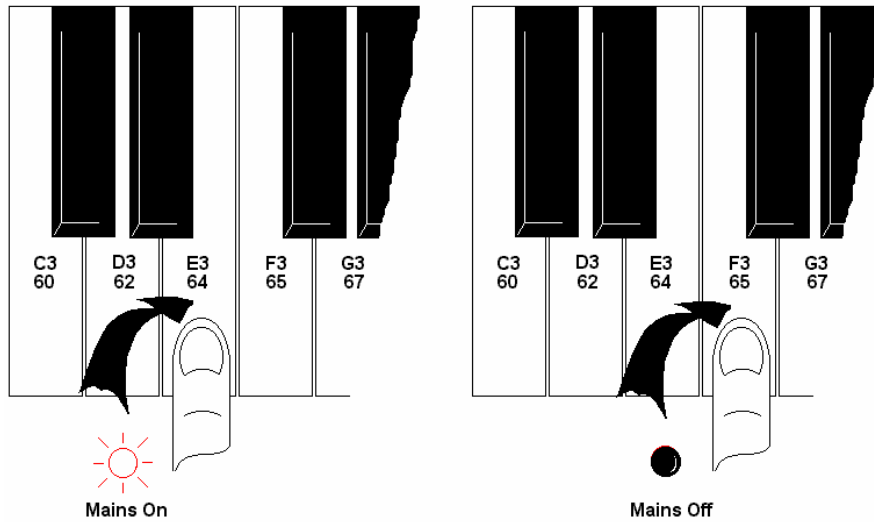*Also see Special Conditions Mode 3.*

Mode 4:   Note Next Adjacent Colour
Example 1   Note Value Swt preset to Note C3 (Midi Note 60).

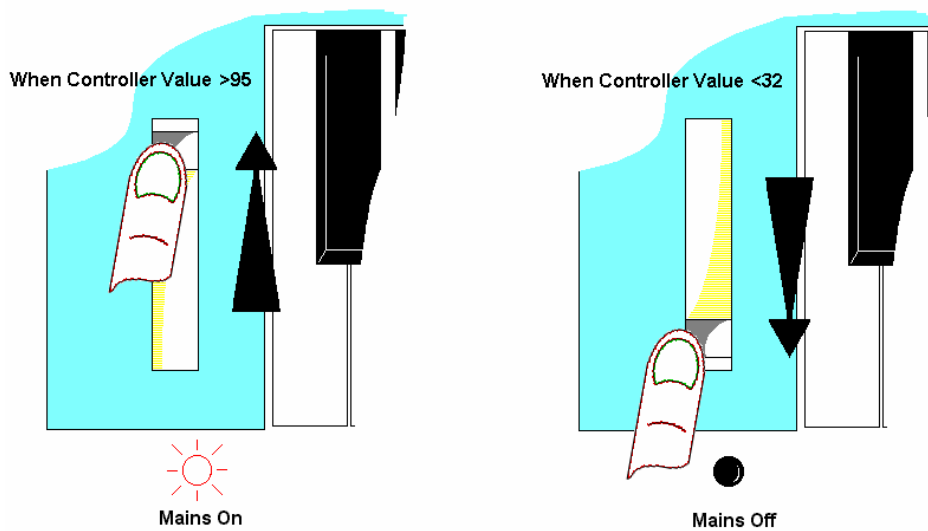*Example 2*   Note Value Swt preset to Note D#3 (Midi Note 63).

Mode 4:   **Note Next Adjacent Colour ....***Continued*

Example 3   Note Value Swt preset to Note E3 (Midi Note 64).

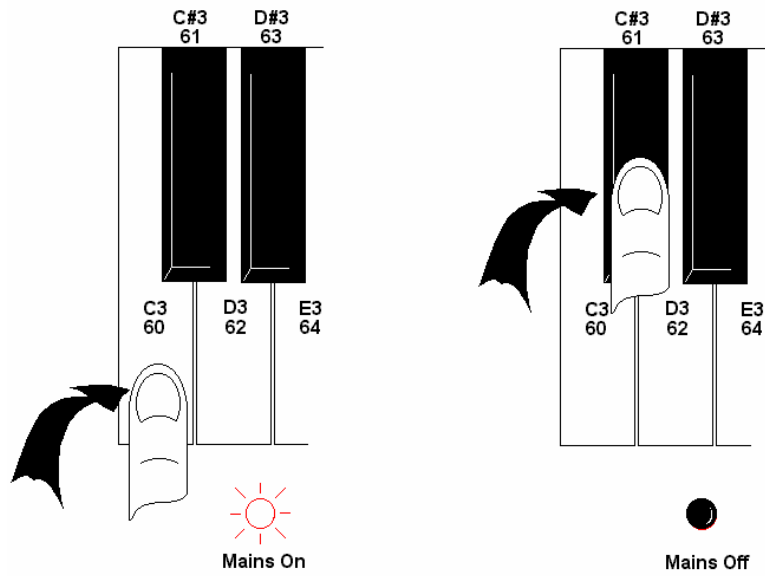*Also see Special Conditions Mode 4.*

Mode 5:   **Midi Controller.**

      Example below Controller 1:- Modulation Wheel.

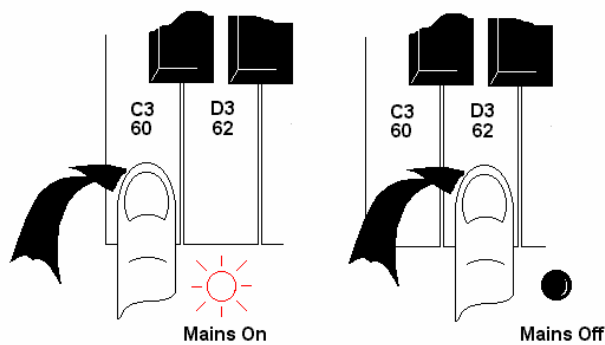**Note:** *Dead-band area between Controller Values 32 ~ 95.*

Mode 6:   **Note +1**
Example below Note Value Swt preset to Note C3 (Midi Note 60).

Also see Special Conditions Mode 6.

Mode 7:   **Note +2**
Example below Note Value Swt preset to Note C3 (Midi Note 60).

Also see Special Conditions Mode 7.

Special Conditions

Note Zero: Mode 1, Mode 2 & Mode 3.

Selecting Note 0 (C-2) on the Note/Value Swt. allows the Midi Mains switcher to ignore the first data byte of any received note command effectively giving the following results:-

Mode 1:	Any Note On	Mains On
Note On ~ Off	Any Note Off	Mains Off
Mode 2:	Any Note On	Mains On
Note On Toggle	Next Note On (any Note)	Mains Off
Mode 3:	Any Note Velocity >63	Mains On
Note Velocity	Any Note Velocity <63	Mains Off

Note Wrap: Mode 4, Mode 6 & Mode 7.

Midi has a note range from Note 0 (C-2) to Note 127 (G8). In operating modes that use the next note same colour, note +1 or note +2 selecting note 127 as your mains on condition would mean there wouldn't be a note value to switch the mains off. With respect to this a 'note wrap' has been implemented in these modes which produces the following:-

Mode 4:	Note 126 (F#8)	Mains On
Note Adj. Colour	Note 1 (C#-2)	Mains Off
	Note 127 (G8)	Mains On
	Note 0 (C-2)	Mains Off
Mode 6:	Note 127 (G8)	Mains On
Note +1	Note 0 (C-2)	Mains Off
Mode 7:	Note 126 (F#8)	Mains On
Note +2	Note 0 (C-2)	Mains Off
	Note 127 (G8)	Mains On
	Note 1 (C#-2)	Mains Off

Summary of Midi Implementation for Opto Switcher

Hardware:

Midi In	5 pin Din
Midi Thru	5 pin Din
Local Reset	1 DIL switch
Mode (Program Change)	3 DIL switches
Channel Selection	4 DIL switches
Omni On/Off	1 DIL switch
Note/Value Selection	7 DIL switches

Software:

Function		Recognized	Remarks
Channel		1 - 16	Set by DIL switch
Mode	Default Messages	Mode 1 & 3 O	Honours 1,2,3, 4
Note Number		0 - 127	Set by DIL switch
Velocity	Note On Note Off	O X	Mode 3 only
Touch		X	
Pitch Bend		X	
Control Change		0 - 120	Mode 5 only
Program Change		O	1 - 8
System Exclusive		X	
System Common		X	
System Real Time		O	System Reset Only
Notes		Channel Mode messages supported: Control 121 All Controllers Off (Mode 5 only) Control 123 All Notes Off (Modes 1, 2, 3, 4, 6 & 7 only) Control 124 Omni Off Control 125 Omni On Real Time Messages supported: System Reset (Mains Switched off, reset to local switch default)	

Mode 1: Omni On, Poly   **Mode 2:** Omni On, Mono   O: Yes
Mode 3: Omni Off, Poly **Mode 4:** Omni Off, Mono   X: No