Visible Signals

RGB Matrix – Keyer

DIY Video Synthesizer module for eurorack

Manual V0.4b

The RGB Matrix is an expandable three channel, dual-bus video-rate matrix mixer for colourising and mixing pattern and video sources in full colour RGB, allowing manipulations previously only possible through the combination of a large number of other separate modules. It also includes three-channel RGB crossfader/keying functionality, for complex image compositing and effects.

The RGB Matrix Keyer module crossfades between the A and B busses, based on the luma (brightness) of either bus or an external CV input. The threshold and sharpness of the crossfade are adjustable via panel controls.

Suggested Build Order

RESISTORS

	Part	Value		Part	Value
☐	R6	1.4K	☐	R40	1M
☐	R28	100K	☐	R41	1M
☐	R15	10K	☐	R42	1M
☐	R19	10K	☐	R1	2K
☐	R5	12K	☐	R13	2K
☐	R10	1K	☐	R8	4.7K
☐	R12	1K	☐	R11	4.99K
☐	R16	1K	☐	R14	4.99K
☐	R17	1K	☐	R20	4.99K
☐	R18	1K	☐	R22	499R
☐	R21	1K	☐	R23	499R
☐	R4	1K	☐	R24	499R
☐	R7	1K	☐	R25	499R
☐	R9	1K	☐	R26	499R
☐	R31	1K5	☐	R27	499R
☐	R32	1K5	☐	R29	499R
☐	R33	1K5	☐	R37	499R
☐	R34	1K5	☐	R38	499R
☐	R35	1K5	☐	R39	499R
☐	R36	1K5	☐	R2	51K
☐	R30	2.49K	☐	R3	51K

INTEGRATED CIRCUITS

Make sure the ICs are in the right way, with the notch (or the left side relative to the writing on top of the chip) lined up with the silkscreen.

	Part	Value		Part	Value
☐	IC1	LM6172	☐	IC3	TL072
☐	IC2	LM6172	☐	IC6	LT1251
☐	IC4	LM6172	☐	IC7	LT1251
☐	IC5	LM6172	☐	IC8	LT1251

MLCC CAPACITORS

All unlabelled capacitors on the PCB silkscreen are 100nF MLCC types.

	Part	Value		Part	Value
☐	C4	100n	☐	C14	100n
☐	C5	100n	☐	C15	100n
☐	C6	100n	☐	C16	100n
☐	C7	100n	☐	C17	100n
☐	C8	100n	☐	C18	100n
☐	C10	100n	☐	C19	100n
☐	C11	100n	☐	C20	100n
☐	C13	100n	☐	C21	100n

VOLTAGE REFERENCE

Make sure the flat side of the TL431 voltage reference is oriented the same way as shown on the silkscreen. Bend the middle pin out slightly so it goes the correct hole.

	Part	Value
☐	REG1	TL431

SOCKETS & POTS

Make sure the socket and pots fit into the front panel as you solder them.

	Part	Value		Part	Value
☐	EXT_IN	PJ302M	☐	RED_OUT	PJ302M
☐	BLUE_OUT	PJ302M	☐	VR1	10K
☐	GREEN_OUT	PJ302M	☐	VR2	10K

SWITCH SHIM PCB

*Make sure the switch shim PCB has the **Bottom** side facing out (away from the switch) or else it will work backwards. Solder the shim PCB to the main PCB first, slide the switch into the switch PCB and then fit the front panel. Put the socket and pot nuts on to hold the panel in place and finally solder the switches to the shim PCBs.*

	Part	Value
☐	PCB1	3PDT

HEADERS

The Stackable Headers are soldered on the opposite side of the PCB to all the other components. ***Build the Output module first and fit both modules to the Combo panel to help line up the stackable headers for soldering to make sure they are soldered in the right position.***

	Part	Value		Part	Value
☐	OUTPUT	Stackable Header	☐	PWR	Stackable Header

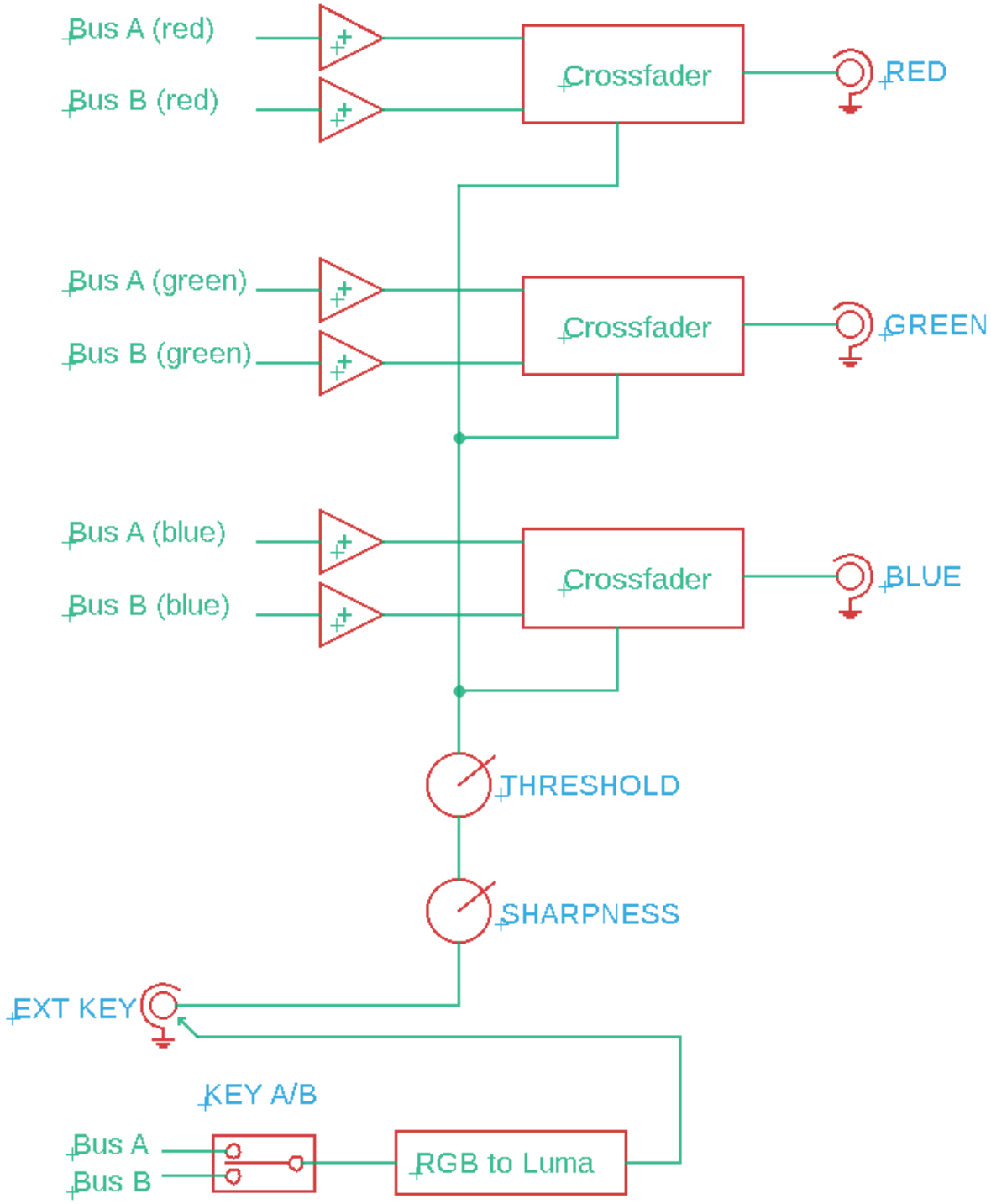
ELECTROLYTIC CAPACITORS

The long legs of C1 and C1 go in the hole marked '+'.

	Part	Value		Part	Value
☐	C1	10uF	☐	C2	10uF

Description

The Keyer module first mixes the three colour components of either the bus A or B colour channels to calculate a luma level. This is used to control the crossfade between the two buses, unless overridden by a CV in the EXT KEY socket. Two controls then allow for the crossfade point (threshold) and transition width (sharpness) to be adjusted. The final crossfade CV signal is then used to control three crossfaders, one for each colour channel.



Bill of Materials

Parts marked with an asterisk are frequently used in Visible Signals modules, so consider stocking up if there is a quantity discount available.

Type	Value/Description	Qty	Vendor	Part Number	*	Notes
Resistor	1.4K	1	Mouser	603-MFR-25FBF52-1K4		
Resistor	100K	1	Mouser	603-MFR-25FBF52-100K	*	
Resistor	10K	2	Mouser	603-MFR-25FBF52-10K	*	
Resistor	12K	1	Mouser	603-MFR-25FBF52-12K		
Resistor	1K	9	Mouser	603-MFR-25FBF52-1K	*	
Resistor	1K5	6	Mouser	603-MFR-25FBF52-1K5		
Resistor	1M	3	Mouser	603-MFR-25FBF52-1M		
Resistor	2.49K	1	Mouser	603-MFR-25FBF52-2K49		
Resistor	2K	2	Mouser	603-MFR-25FBF52-2K		
Resistor	4.7K	1	Mouser	603-MFR-25FBF52-4K7		
Resistor	4.99K	3	Mouser	603-MFR-25FBF52-4K99		
Resistor	499R	10	Mouser	603-MFR-25FBF52-499R	*	
Resistor	51K	2	Mouser	603-MFR-25FBF52-51K		
IC	LM6172	4	Mouser	926-LM6172IN/NOPB	*	
IC	TL072	1	Mouser	595-TL072IP	*	
IC	LT1251	3	Mouser	584-LT1251CN#PBF		
MLCC Capacitor	100n	16	Mouser	594-K104K15X7RF53K2	*	
Socket	PJ302M	4	Thonk	PJ302M	*	
Stackable Header	Stackable Header 6x1	1	Mouser	200-SSQ10404TS		Or 474-PRT-09280
Stackable Header	Stackable Header 4x1	1	Mouser	200-SSQ10604TS		Or 474-PRT-09280 and remove two pins
Voltage Reg IC	TL431	1	Mouser	511-TL431CZT	*	
Switch	3PDT	1	Mouser	108-0006-EVX or 7303SYZQE		
Electro Capacitor	10uF	2	Mouser	80-ESL106M050AC3AA	*	
Knobs	Davies 1900H	2	Thonk	1900H	*	T18 or rounded shaft to match Pots
Potentiometer	10K Linear	2	Thonk	Alpha 9mm VERTICAL	*	T18 or rounded shaft to match Knobs
PCB	RGB Matrix Keyer	1	Visible Signals	MM-SP		
Panel	RGB Matrix Keyer	1	Visible Signals	MM-SP		