Visible Signals

RGB Matrix – Output

DIY Video Synthesizer module for eurorack

Manual V0.3a

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 Output module provides summed outputs for each of the Red, Green and Blue colour mixes on the A and B busses.

All Visible Signals manuals include a version number, which corresponds to the version number printed on the PCBs, plus a revision letter. Please make sure the manual you use has the same version number as your PCBs! Contact info@visiblesignals.net if you can't find the right manual.

Suggested Build Order

RESISTORS

	Part	Value		Part	Value
☐	R7	1K	☐	R4	20K
☐	R8	1K	☐	R5	20K
☐	R9	1K	☐	R6	20K
☐	R10	1K	☐	R13	499R
☐	R11	1K	☐	R14	499R
☐	R12	1K	☐	R15	499R
☐	R1	20K	☐	R16	499R
☐	R2	20K	☐	R17	499R
☐	R3	20K	☐	R18	499R

DIODES & FERRITES

Make sure the diodes are in the right way.

	Part	Value		Part	Value
☐	L1	Ferrite Bead	☐	D1	IN400x
☐	L2	Ferrite Bead	☐	D2	IN400x

ICs

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	☐	IC4	LM6172
☐	IC2	LM6172	☐	IC5	LM6172
☐	IC3	LM6172	☐	IC6	LM6172

MLCC CAPACITORS

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

	Part	Value		Part	Value
☐	C3	100n	☐	C9	100n
☐	C4	100n	☐	C10	100n
☐	C5	100n	☐	C11	100n
☐	C6	100n	☐	C12	100n
☐	C7	100n	☐	C13	100n
☐	C8	100n	☐	C14	100n

SOCKETS

Make sure the sockets fit into the front panel as you solder them.

	Part	Value		Part	Value
☐	A_BLUE	PJ302M	☐	B_BLUE	PJ302M
☐	A_GREEN	PJ302M	☐	B_GREEN	PJ302M
☐	A_RED	PJ302M	☐	B_RED	PJ302M

ELECTROLYTIC CAPACITORS

Make sure the long legs go in the hole marked with a '+'.

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

HEADERS

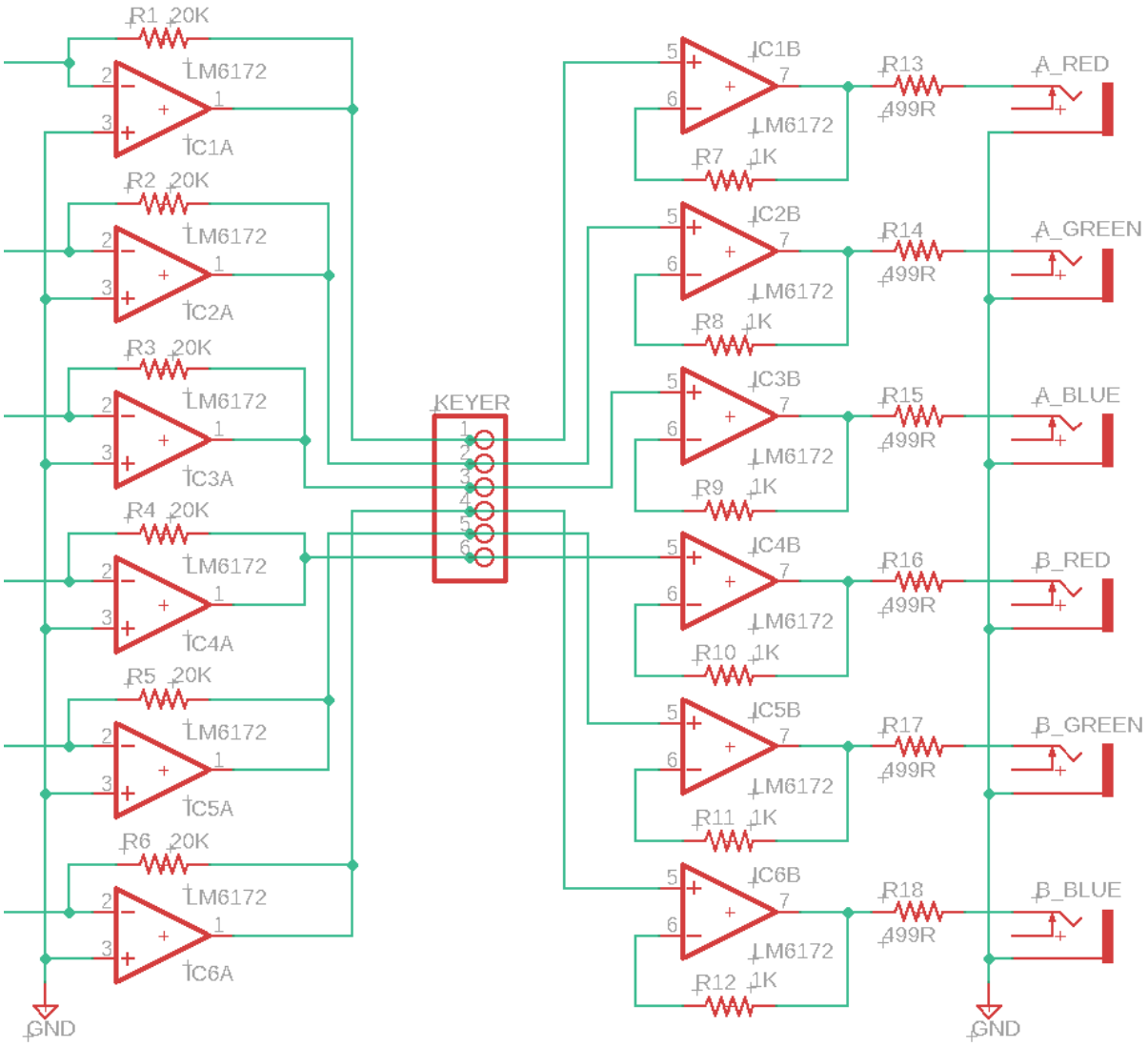
Before you solder the KEYER and PWR headers in place it's best if you build the Keyer PCB and then come back to do the headers and sockets that connect the two PCBs at the same time. If you have the Combo panel then attach the PCBs to it in order to line up the Output and Keyer PCBs with each other perfectly. Otherwise screw the panels into your Eurorack frame backwards (i.e. with the component PCBs protruding), or else clamp the two panels together somehow to make sure they're correctly lined up.

	Part	Value		Part	Value
☐	POWER	Pin Header 2x5 Shrouded	☐	INPUTS	Pin Header 2x7 Right angle
☐	KEYER	Pin Header 6x1	☐	PWR	Pin Header 4x1

Circuit Details

The RGB Matrix Output module mixes the six colour signals (Red, Green and Blue for each of bus A and B) together using inverting summing op-amps, and then buffers them for the output sockets. It also feeds the mixed signals to the Keyer module.

The summing op-amps use 20K resistors in their feedback path, which are twice the value of the 10K resistors used by the Input and Direct In modules, so the effective outcome is that all input signals are doubled when unattenuated (i.e. control pots set to fully clockwise), or at unity gain when set to the 12 o'clock position.



Bill of Materials

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

Type	Value/Description	Qty	Vendor	Part Number	*	Notes
Resistor	1K	6	Mouser	603-MFR-25FBF52-1K	*	
Resistor	20K	6	Mouser	603-MFR-25FBF52-20K		
Resistor	499R	6	Mouser	603-MFR-25FBF52-499R	*	
Ferrite bead	Ferrite bead	2	Mouser	623-2743001111	*	
Diode	IN400x	2	Mouser	750-1N4001-G	*	
IC	LM6172	6	Mouser	926-LM6172IN/NOPB	*	
Capacitor	100n	12	Mouser	594-K104K15X7RF53K2	*	
Pin Header	Pin Header 2x5	1	Mouser	710-61201021621	*	Shrouded
Pin Header	Pin Header 2x7 right angle	1	Mouser	649-1012938291402BLF		Or get a 40x2 and snap off what you need
Pin Header	Pin Headers 4x1	1	Mouser	649-1012937890401BLF		Or get a 40x1 and snap off what you need
Pin Header	Pin Headers 6x1	1	Mouser	649-1012937890601BLF		Or get a 40x1 and snap off what you need
Socket	PJ302M	6	Thonk	PJ302M	*	
Electro Capacitor	10uF	2	Mouser	80-ESL106M050AC3AA	*	
PCB	RGB Matrix Starter Pack PCB set	1	Visible Signals	MM-SP		
Panel	RGB Matrix Starter Pack PCB set	1	Visible Signals	MM-SP		