Visible Signals

1IF InterFace

DIY Video Synthesizer module for eurorack

Manual V0.3b

1IF InterFace is a 6HP 1U tile for buffered interfacing between RCA connected 75-ohm video and standard eurorack 1V video signals. Converters for both directions are provided: from RCA to eurorack, and from eurorack to RCA.

Recommended Build Order

Start with the rear board: inner-most components for easier soldering, first the IC.

	Part	Value		Part	Value
☐	IC1	LM6172	☐	L1	Ferrite bead
☐	R5	1K			

Then the rest of the resistors, diodes, ferrite beads and smaller (unlabelled) capacitors. Make sure the diodes are the right way around.

	Part	Value		Part	Value
☐	R7	75R	☐	R1	100K
☐	R3	1K	☐	L2	Ferrite bead
☐	R8	1.1K	☐	C3	100n
☐	R2	2.32K	☐	C4	100n
☐	R6	2.49K	☐	D1	1N400x
☐	R4	30K	☐	D2	1N400x

Next, solder the power header. See below for a note about the Pulp power connector.

	Part	Value
☐	J1	5x2 or 3x1

Then the electrolytic capacitors. Make sure they are the right way around.

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

Leave the interconnect pin headers for now and move to the front board instead.

	Part	Value		Part	Value
☐	R9	100K	☐	R10	499R
☐	R11	75R	☐	R12	499R

Next up, sockets. Make sure the RCAs (with the bigger holes) are the right way around or they won't line up with the panel. For the 3.5mm PJ301M sockets, bend the ground pin out slightly away from the PCB and leave it unsoldered for now.

	Part	Value		Part	Value
☐	S1	RCJ-054	☐	S3	PJ301M
☐	S2	RCJ-054	☐	S4	PJ301M

Next up plug the two interconnect header/sockets pairs together and fit them into the boards as you solder them in. Make sure the silkscreen text 'THIS EDGE GOES UP!' on the two boards faces inwards and is lined up on the same side.

	Part	Value		Part	Value
☐	J1	4x1	☐	H1	4x1
☐	J2	4x1	☐	H2	4x1

The final step is to snip the two PJ301M ground pins a bit shorter and solder them to either (or both) of the middle pins of the corresponding sockets/headers.

Module Use

There are a couple of common uses for this module. My favourite is as a simple luma-to-CV converter to input a black and white video image into a eurorack modular system. For composite input the chroma (colour signal) is still present in the CV, but RGB CV-to-composite modules seem to filter it out when converting anyway and I've never seen a problem.

The other main use for this module is to convert a composite signal into eurorack 0-1V levels for manipulation and then subsequent re-convert it back to composite levels and 75-ohm termination. On the eurorack side the composite sync pulses are present as voltages less than 0V, and ideally any manipulation should leave those signals as unaffected as possible (unless glitching is the goal). Depending on the CV manipulations on the eurorack side the output composite signal can be corrupted to a greater or lesser degree, so outputting to a good TBC or a CRT will usually give the best results.

Circuit Details

The circuit for the 1IF is a pair of non-inverting op-amps, with some scaling and a DC offset mixed in to adjust the black level to approximately 0V. R4 sets the offset for the 3.5mm-to-RCA converter and R8 sets the offset for the RCA-to-3.5mm converter. R2 and R6 set the boost for the 3.5mm-to-RCA and RCA-to-3.5mm converters, respectively.

Dirty Secret

Because this module is so tiny it does have one small, sordid secret… the two inputs are correctly terminated to ground (75 ohms for the RCA and 100K for the 3.5mm) but they also each have a DC offset directly summed in via resistors. While not exactly 100% kosher, this has worked just fine with all the gear I've checked. But if you do find it causes you problems then you can omit R4 and R8 and adjust the DC offset some other way (e.g. using a 1VR and a 1MX/1MI).

Pulp Power Connector

Oops… the three power pins for the Pulp power connector (a "Futaba J" type) are in the wrong order on the version 0.3 1IF rear PCB. Sorry about that – I didn't have access to a Pulp case for testing ☹ Please use the standard eurorack 5x2 power cable instead. This will be fixed on a future board revision.

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
Capacitor	100n	2	Mouser	594-K104K15X7RF53H5	*	
Diode	1N400x	2	Mouser	750-1N4001-G	*	Any part like 1N4001, 1N4004, etc is fine
Electro Capacitor	10uF	2	Mouser	80-ESL106M050AC3AA	*	
Ferrite bead	Ferrite bead	2	Mouser	623-2743001111	*	
IC	LM6172	1	Mouser	926-LM6172IN/NOPB	*	
PCB	1IF PCB set	1	Visible Signals	1IF		
Pin Header	Pin header 5x2	1	Mouser	855-M22-2020546	*	Not Shrouded (won't fit!) or a Pulp "Futaba J" connector
Pin Header	Pin header 4x1	2	Mouser	523-G800W304018EU		Or get a single 40x1 and snap off just what you need
Pin Socket	Pin socket 4x1	2	Mouser	200-SSQ10404TS		These are much, much cheaper from Tayda!
Resistor	1K	2	Mouser	603-MFR-25FBF52-1K	*	
Resistor	499R	2	Mouser	594-5063JD499R0F	*	
Resistor	75R	2	Mouser	603-MFR-25FBF52-75R	*	
Resistor	1.1K	1	Mouser	603-MFR-25FBF52-1K1		
Resistor	2.32K	1	Mouser	603-MFR-25FBF52-2K32		
Resistor	2.49K	1	Mouser	603-MFR-25FBF52-2K49		
Resistor	30K	1	Mouser	603-MFR-25FBF52-30K		
Resistor	100K	2	Mouser	603-MFR-25FBF52-100K	*	
RCA Socket	RCJ-054	2	Mouser	490-RCJ-054		Choose your own colours :)
3.5mm socket	PJ301M	2	Thonk	PJ301M	*	Vertical mount