

PicSignalDetection – mounting instructions

Thanks for buying this PicSignalDetection pcb or kit! Now the fun of mounting starts. Make sure you read the complete instructions before you start mounting. Assembling can be done by an experienced hobbyist in about one hour.

List of components

Please check if all is complete. The kit should have the following components, if you bought the pcb, these components are suggested (but you can of course adapt it to your needs):

Qty	Value	Device	Parts
1	G2RE	12V relay	K1
1	3-pin	Con-KK	SIGNAL
2	7.5mm	2-pin PTR	X1, X2
1	PIC-ICSP-MINI	2x3 pinheader	ICSP
1	4-pin	Con-KK	DC (not included)
1	PIC12F675P	8pin DIP + uC	IC1
3	BC550	BJT	Q1, Q2, Q3
1	22p	C-cer-2.5	C5
2	10u	C-el-2.5/6	C2, C7
1	47uF/35V	C-el-2.5/6	C3
1	330uF/25V	C-el-3.5/10	C1
1	220nF/250VAC	C-mkt-15	C11 (not included)
2	100nF	C-mkt-5	C6, C10
3	100nF	C-multi-2.5	C4, C8, C9
4	1N4148	Diode	D1, D3, D4, D5
1	1N4007	Diode	D2
1	100mA	Fuse, holder + cap	F2
2		LED3MM	CMPLED, OUTLED
1	10k	Potmeter	R11
2	100	R-0.25W	R15, R17
8	100k	R-0.25W	R2, R4, R5, R6, R7, R13, R14, R16
2	2k2	R-0.25W	R3, R8
2	1k	R-0.25W	R9, R10
2	47	R-0.5W	R1, R12
1		Rectifier	B1
1	2VA/7.5V	transformer EI30	TR2
1	7805	Vreg	IC2

Tools

- ✓ Soldering iron and solder
- ✓ Multi-meter (voltage and resistance)
- ✓ Side-cutting pliers

General instructions

Note that C11 is not included, but may be added to prevent any effect of high-frequency content from the power supply. If you use one, please make sure that a capacitor suitable for 250VAC is used to guarantee correct long term operation.

There are several ways to connect the input signal, depending on your application:

- Connect mono single-ended signal to SIGNAL-1 (gnd) and SIGNAL-3 (signal)
- Connect stereo single-ended signal to SIGNAL-1 (gnd), SIGNAL-2 (left signal), SIGNAL-3 (right signal)
- Connect mono balanced signal to SIGNAL-2 (cold signal), SIGNAL-3 (hot signal), depending on your application also SIGNAL-1 (gnd) can be used

Optionally, the circuit can be used to switch the output relay of a power amplifier. The output relay switches about 4s after the power relay has switched on to prevent the switch-on transient on your loudspeakers. A flyback diode in parallel with the relay coil is recommended. One side of the coil of the output relay must be connected to DC-2, the other side can be connected in several ways:

- Use the +12V on DC-1 and use a 12V relay
- Ommit R12 and use an external positive voltage (and corresponding relay)

Optionally, the DC detection circuit can be used to switch off the output relay, when a DC offset on the power amplifier output is detected. The output relay can be used without the DC detection, in that case it will just switch on the output relay about 4s after switching on the power relay and switch off the output relay immediately after switching off the power relay.

- Connect the power amplifier outputs to DC-3 (gnd) and DC-4 (output)
- If DC detection is not used, components R14, C2, D1, D3, D4, D5 and Q3 can be omitted. Note that R13 is still needed to pull input pin 4 of the uC high.

Mounting

The easiest way of mounting is by starting with the components with the lowest height and build up the PCB in steps, where components of the same height are fitted and soldered in each step. So, solder in this order: resistors, diodes, multilayer capacitors, connectors, transistors, regulators, electrolytic capacitors.

Hint: The LEDs can be wire to a front panel to provide visual feedback.

Always double check all components before you solder them (especially the ones that are polarity dependent, diodes, electrolytic capacitors, etc), as it is difficult to remove them after soldering, much more time consuming and may break components or PCB.

Testing

NOTE: Double check the high voltage part, before connecting the mains supply!

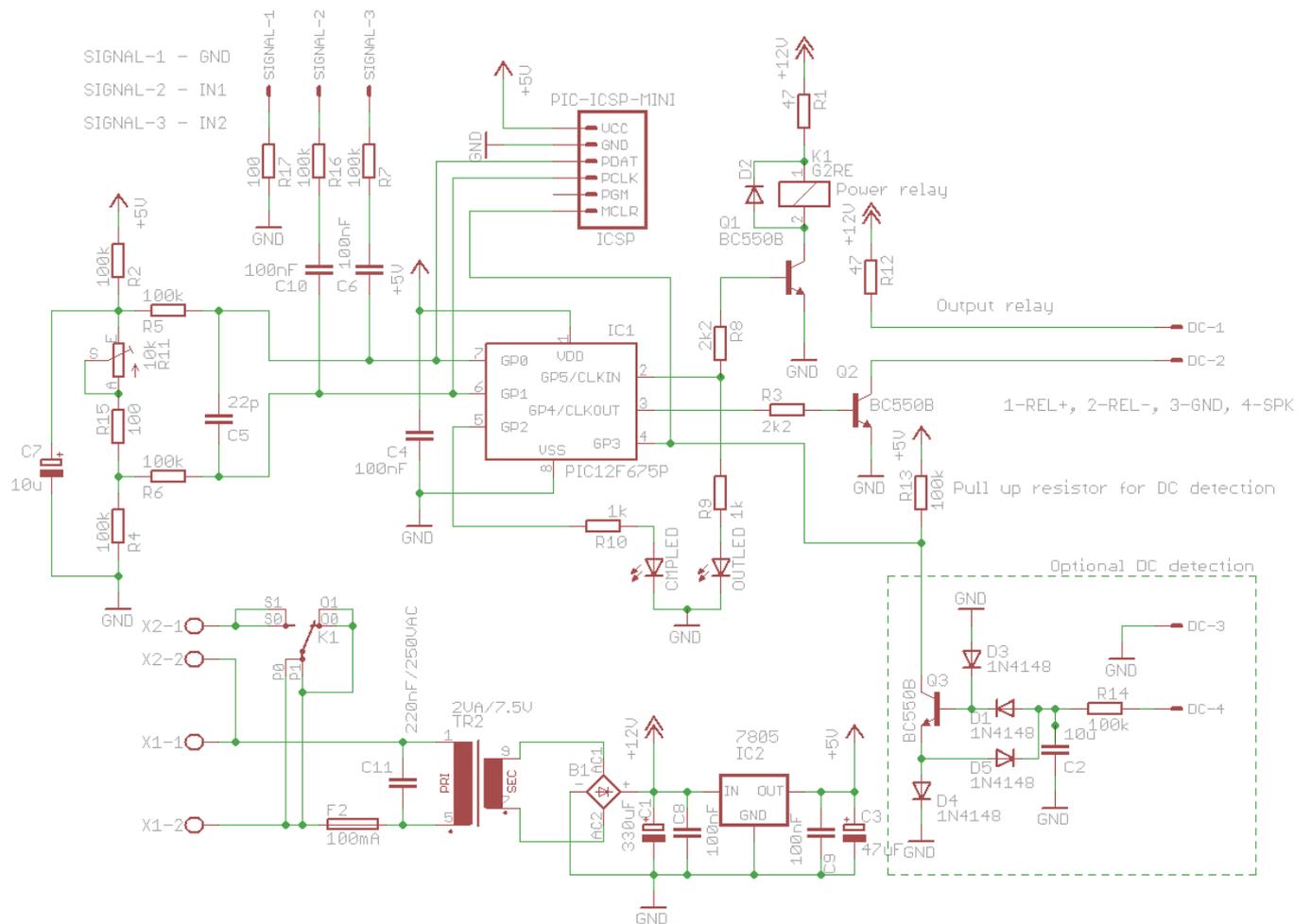
Do not mount the PIC12F675 and connect mains. Check if the unregulated +12V is somewhere between 11-16V (varies with load). Check that the regulated 5V supply is between 4.9-5.1V. If all is ok, remove mains and connect the microcontroller.

After poweron, the comparator led will first blink for about 4s. After a few seconds of stabilising time, the circuit is operational.

Using potmeter R11, the sensitivity can be adjusted between about 5mV to 500mV. Start with potmeter full anti-clockwise. Sensitivity can be set by using a small input signal on the IN connector and moving R11 clockwise until comparator led will show detected signal.

Immediately after signal is first detected, the output led and output relay should switch on.

Schematic



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