

PreampController – mounting instructions

Thanks for buying this Preampcontroller kit! Now the fun of mounting starts. Make sure you read the complete instructions before you start mounting. Complete assembly can be done by an experienced hobbyist in about one hour. This circuit was designed to be used in a preamplifier project. More information can be found on the project page:

<http://www.djuke.nl/en/projects/10-pre-amplifiers/34-preamplifierv2>

List of components

The kit consists of the following components (but you can of course adapt it to your needs).

SMD components

| Qty | Value | Device | Parts |
|-----|------------|----------|--|
| 2 | 100n | C-1206 | C5, C6 |
| 2 | 22p | C-1206 | C1, C2 |
| 2 | | LED-1206 | POWER(green), STANDBY(yellow) |
| 4 | BSS138 | nFET | Q3, Q4, Q5, Q6 |
| 1 | 0R | R-1206 | R20 (only for display with reset) |
| 12 | 10k | R-1206 | R4, R5, R7, R8, R12, R13, R14, R15, R16, R17, R18, R19 |
| 5 | 1k | R-1206 | R1, R2, R3, R10, R11 |
| 1 | 22k | R-1206 | R9 |
| 1 | 2k2 | R-1206 | R6 |
| 1 | PIC18F4620 | TQFP-44 | IC1 |

Through-hole components

| Qty | Value | Device | Parts |
|-----|---------------|---------------|---------------------------------------|
| 1 | BC560 | BJT | Q2 |
| 1 | 100uF | C-elec-2.5-6 | C3 |
| 2 | 47uF | C-elec-2.5-6 | C4, C7 |
| 4 | 4.8mm | Con-faston | X1, X2, X3, X4 |
| 1 | 3-pin | Con-kk | IR |
| 2 | 4-pin | Con-kk | ENC, UART |
| 1 | 5-pin | Con-kk | DAC |
| 1 | PIC-ICSP-MINI | Con-ICSP-MINI | ICSP |
| 1 | 1x4 | Con-pinheader | JP2 (not included) |
| 1 | 1x6 | Con-pinheader | JP3 (not included) |
| 1 | 1x8 | Con-pinheader | JP1 (not included) |
| 1 | AK500/2 | Con-ptr | SUPPLY |
| 2 | ML10 | Con-ribbon | BUTTONS, VOLUME |
| 1 | ML16 | Con-ribbon | DISPLAY |
| 2 | ML6 | Con-ribbon | INPUT, POWER-CTRL |
| 1 | 10Mhz | Crystal | Q1 |
| 1 | 1N4007 | Diode | D1 |
| 1 | 22R | R-0207 | R22 (only for display with backlight) |
| 1 | 10k | R-potmeter | R21 (only for LCD contrast setting) |
| 1 | G2RE-5V | Relay | K2 |

Tools

Required:

- ✓ Soldering iron, flux and solder (0.5mm)
- ✓ Multi-meter (voltage and resistance)
- ✓ Side-cutting pliers, tweezers

Recommended:

- ✓ Adjustable power supply
- ✓ Oscilloscope
- ✓

Mounting

Note that this kit contains (small) SMD components, which have been premounted for convenience. Also some through-hole components are pre-mounted to program the microcontroller and do basic tests.

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 the through-hole components in this order: resistors, diodes, small connectors, electrolytic capacitor, relay, large connectors.

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

Hints:

- For displays without a backlight, a 14-pin ribbon connector can be used (instead of 16-pin)
- Can be used in combination with many standard 2x20 LCD/OLED/VFD character displays. Please refer to the schematic which components to use/omit for each particular display.

Interfacing

This circuit is the heart of a preamplifier or DAC, it connects to many other boards and components:

- StereoInputSelection using the INPUT connector
- CS3318VolumeControl using the VOLUME connector
- Power button and standby/power LEDs using the POWER-CTRL connector
- Other buttons (menu/left/right/select) using the BUTTONS connector
- Character display using the DISPLAY connector
- Infrared receiver on the IR connector
- Encoder on the ENC connector
- CS4398DAC using the DAC connector
- USB-serial converter or RaspberryPi using the UART connector

Testing

Double-check all soldering connections to make sure no shorts are present.

- Connect a 5V power source to the SUPPLY connector
- The Standby LED should light up
- A startup message will appear for a few seconds on the display (if connected)
- A startup message will appear on the UART connection (see next section)

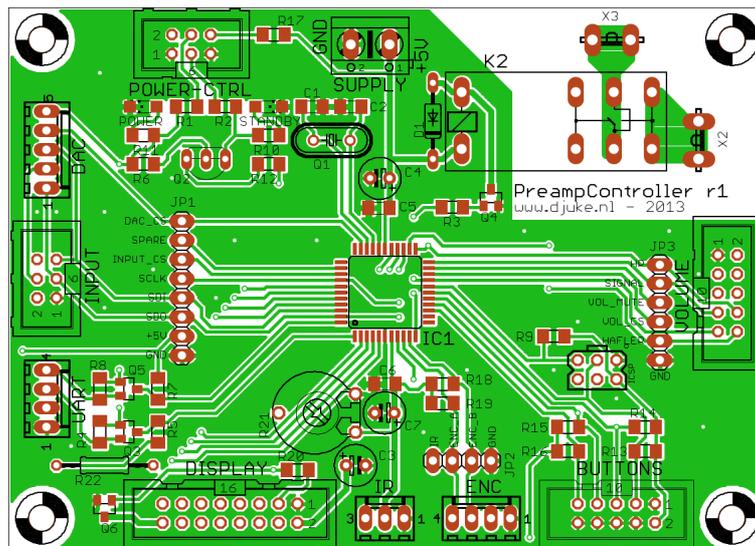
Terminal connection

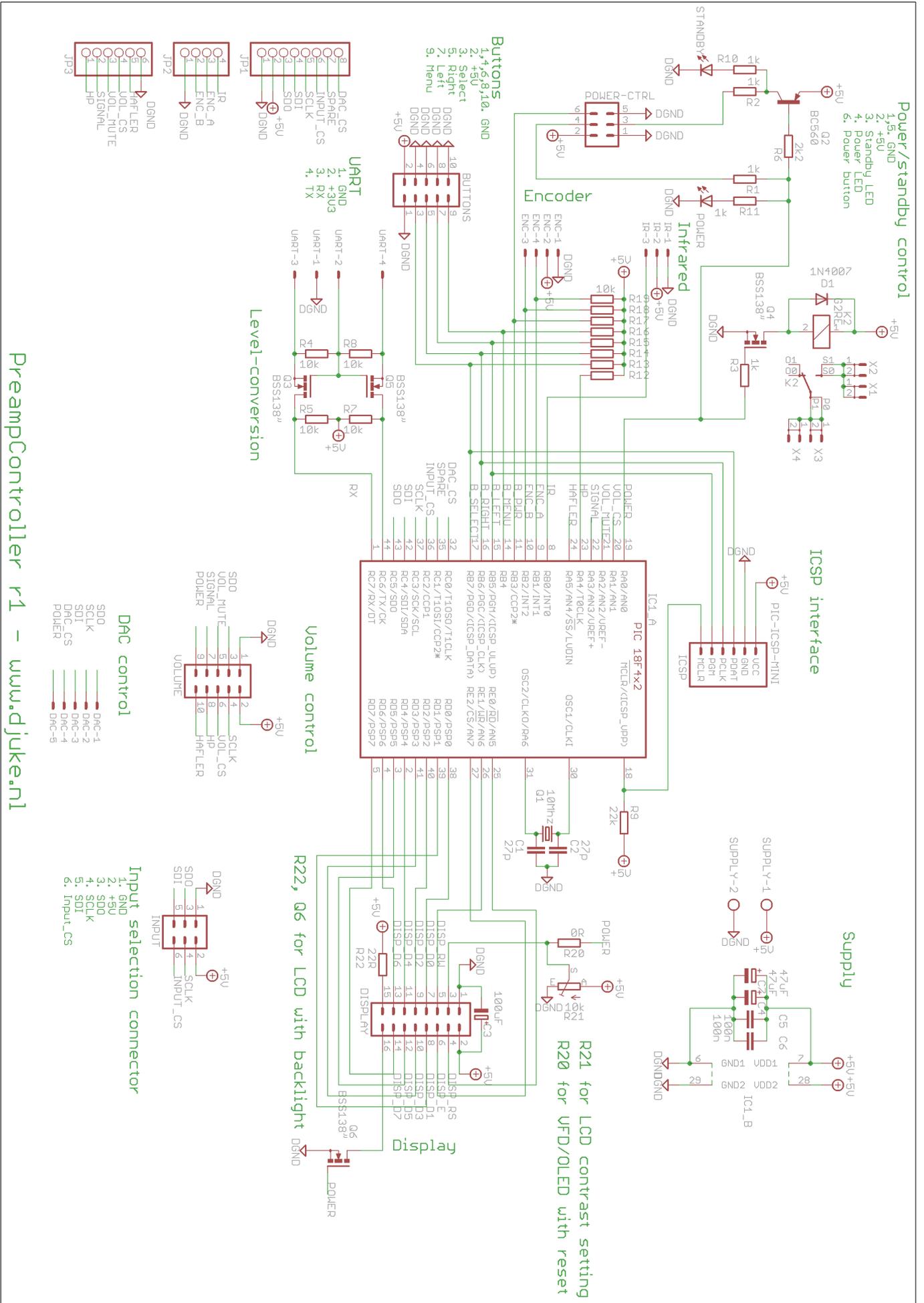
The UART connection can be used to control the preamp from an external source (like a Raspberry Pi). Also it is very useful for troubleshooting. The UART connection has an integrated level conversion, which needs 3V3 on the UART connector. Connection settings: baudrate 115k2, 8N1.

The microcontroller contains a bootloader and the software can be updated from the UART connector. Please refer to the Preamplifier software page for detailed instructions:

<http://www.djuke.nl/en/support/15-preamplifier/36-preamplifierv2software>

Schematic and top silkscreen





PreampController v1 - www.djuke.nl