

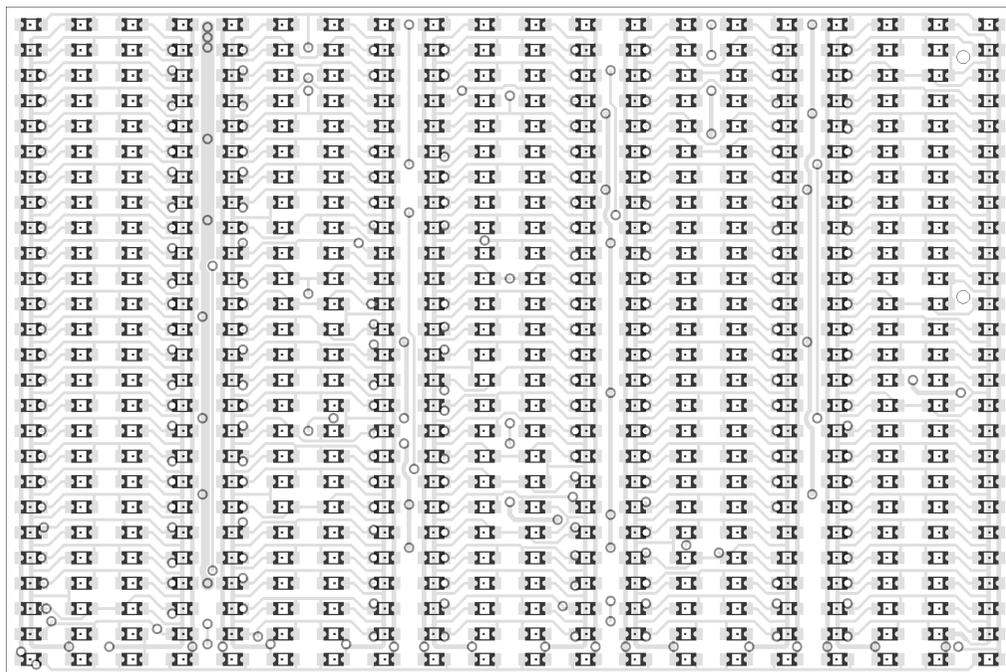
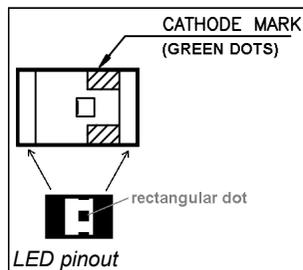
ArcadeMicro (Aμ) Construction Kit

Contents:

- | | |
|---|---|
| 1 Power Supply 5V/2A | 20 MOSFET IRLML6244 |
| 1 PCB "ArcadeMicro Rev.1" | 26 Transistor BC858C |
| 1 3-wire cable, 1m | 2 Diode 1N4148 (SMD) |
| 530 LEDs 0805 (10 LEDs are spares) | 5 Resistor Array 4x 22Ω (1206) |
| 1 SD-Card Slot | 26 Resistor 68Ω (0805) |
| 1 D-SUB 9-pin female connector | 1 Resistor Array 4x 1kΩ (1206) |
| 1 D-SUB housing for 9-pin connector | 8 Resistor Array 4x 2.2kΩ (1206) |
| 1 Controller ATmega162 (TQFP) | 2 Capacitor 33pF (0805) |
| 1 RS232 Driver MAX232 (SO16, narrow) | 5 Capacitor 100nF (0805) |
| 3 Shift Register 74HC164 (SO14, narrow) | 5 Tantalum Electrolytic Cap., 1μF (size A) |
| 1 Crystal, 14.7456 MHz (SMD) | 1 Low-ESR Electrolytic Cap., 470μF (size G) |

SMD Soldering Advice

To solder the SMD components, tin only one of the pads, then grab the component with tweezers, re-heat the tinned pad and slide the component in sideways. When the component is aligned properly, remove the soldering iron, let the solder joint cool down and solder the rest of the pins. It is recommended to solder the components in the order listed below.



PCB top component placement

LEDs: The orientation is important for the LEDs, there are two green dots on one side (the same side the arrow on the bottom of the LEDs is pointing to). This side must face in the direction of the rectangular dot for that particular LED in the component placement image (see LED pinout image). Please note that the orientation changes after every two rows (since the image is sideways, the rows are top-to-bottom there). If you don't want to solder all LEDs at first, you should at least complete the first row and the first column (which is enough to see if the circuit is working) and add a single LED in the remaining corner (to make the board lie flat when populating the other side).



Resistors: The orientation of the resistors doesn't matter.

Name	R1 ~ R5	R6 ~ R12, R40	R13 ~ R38	R39
Value	4x 22 Ω	4x 2,2 kΩ	68 Ω	4x 1,0 kΩ
Marking	220	222	680 or 68R0	102



Transistors:

Name	T1 ~ T20	T21 ~ T46
Type	IRLML6244	BC858C
Marking	S...	3L



Integrated Circuits: The controller (IC1) has a dent in one corner to indicate the correct orientation. ICs 2 to 5 have either a notch on one end or a chamfered long edge. The chamfered edge is indicated on the silkscreen with a line. If you can't find the notch or chamfered edge, you can also find the correct orientation using the text on the ICs: if you hold the IC so the text is readable, the notch is on the left side. IC2 is MAX232 (RS232 driver) and ICs 3, 4 and 5 are 74HC164 (shift register).

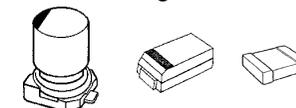


Diodes (D1, D2): The black ring on the diodes corresponds to the thick line on the silkscreen.



Capacitors: Only the electrolytic capacitors (1 μF and 470 μF) have a specific orientation. The 1 μF ones have a bar printed near one of the pins indicating the positive side which has to face toward the little '+' sign on the silkscreen. The 470 μF one has two chamfered corners on the positive side which must match the silkscreen outline; there is also a black bar printed on top of the capacitor on the negative side.

Name	C1	C2 ~ C6	C7 ~ C11	C12, C13
Value	470 μF	1 μF	100 nF	33 pF
Marking	470	A6E or 105	none	none



Quartz Crystal (Q1): The orientation of the quartz crystal doesn't matter.

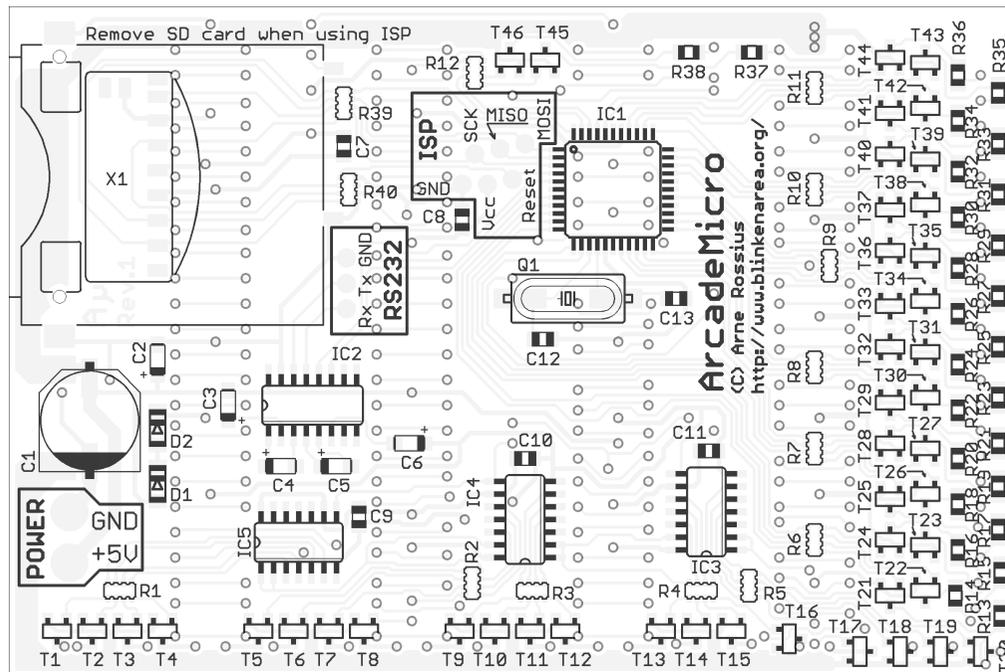


SD Card Slot (X1): Remove the SD card dummy from the slot and make sure the two plastic pins are properly latched in the holes before soldering. Make sure the solder joints inside the slot are flat enough for the SD card to fit over them.

RS232 Connection: Solder the three wires of the cable to the RS232 solder pads on the PCB. Connect the other side to the female D-SUB connector, then mount the housing on the connector. The pin numbers are indicated on the D-SUB connector.

Solder pad	Tx	Rx	GND
D-SUB connector pin	2 (RxD)	3 (TxD)	5 (GND)

Power Adapter: Cut off the plug on the end of the power adapter's cable (if any) and solder the wires to the two large solder pads labeled "POWER". Make sure to get the polarity right, your kit might be destroyed if connected backwards. Use a multimeter to check the power adapter's polarity if you're not sure. If you don't want to use the included power adapter, you can also use any other power supply with 5V (regulated) and at least 1 A maximum current.



PCB bottom component placement

Programming the Controller

The kit comes with a pre-programmed controller. If you want to update the firmware or use your own, you can use the solder pads in the "ISP" section to connect an AVR ISP programmer. The most recent firmware is available for download from the project page in the BlinkenArea wiki (see below for URL).

Using the ArcadeMicro

After powering on, the ArcadeMicro should display the A_{μ} logo followed by a "Chaosknoten". You can now send an MCUF stream via RS232 (115200 Baud) or insert an SD card.

MMC, SD and SDHC cards are supported with a FAT16 or FAT32 filesystem. Very small MMC and SD cards (up to 32 MB) use FAT12 and must be reformatted to FAT16 before they can be used with this kit. If there are several partitions on the card, the first primary partition with a FAT16 or FAT32 partition ID (0x04, 0x06, 0x0B, 0x0C) will be used. Some SD cards come with no partition at all, in which case a partition must be created and formatted. If your SD card isn't compatible with the ArcadeMicro, an error message will scroll across the LEDs.

Files on the SD card must be stored in a directory with the name ARCADE. The files in that directory will be played in the order listed in the FAT (usually the order in which they were copied onto the SD card). If there is no ARCADE directory, an error message will be displayed. The supported file formats are:

File extension	Format
BIN	modified BlinkströmAdvanced file (binary, 8 grayscales)
BLM	BlinkenLights Movie (simple ASCII format, no grayscale support)
BML	Blinkenlights Markup Language (XML-based, 2 to 256 grayscales, but only 8 grayscales displayed by the ArcadeMicro)

More information about the file formats is available in the BlinkenArea Wiki.

Questions? Problems? Comments?

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Project webpage

<http://wiki.blinkenarea.org/index.php/ArcadeMicro>

<http://wiki.blinkenarea.org/index.php/ArcadeMicroEnglish>