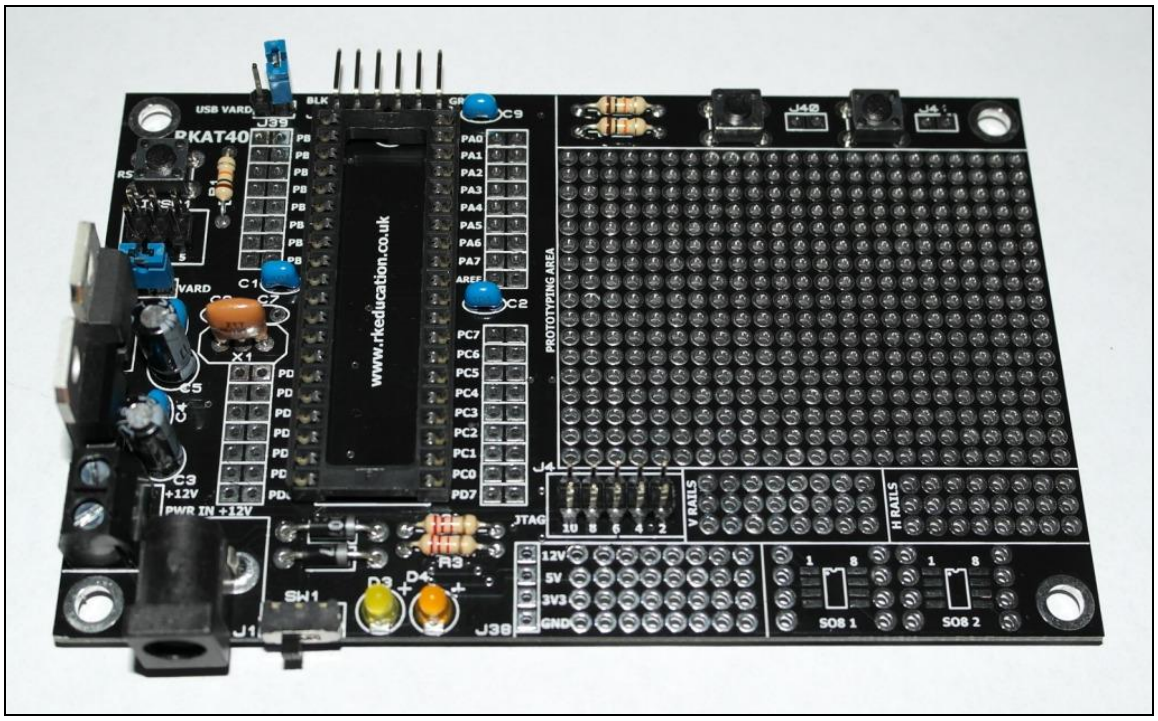
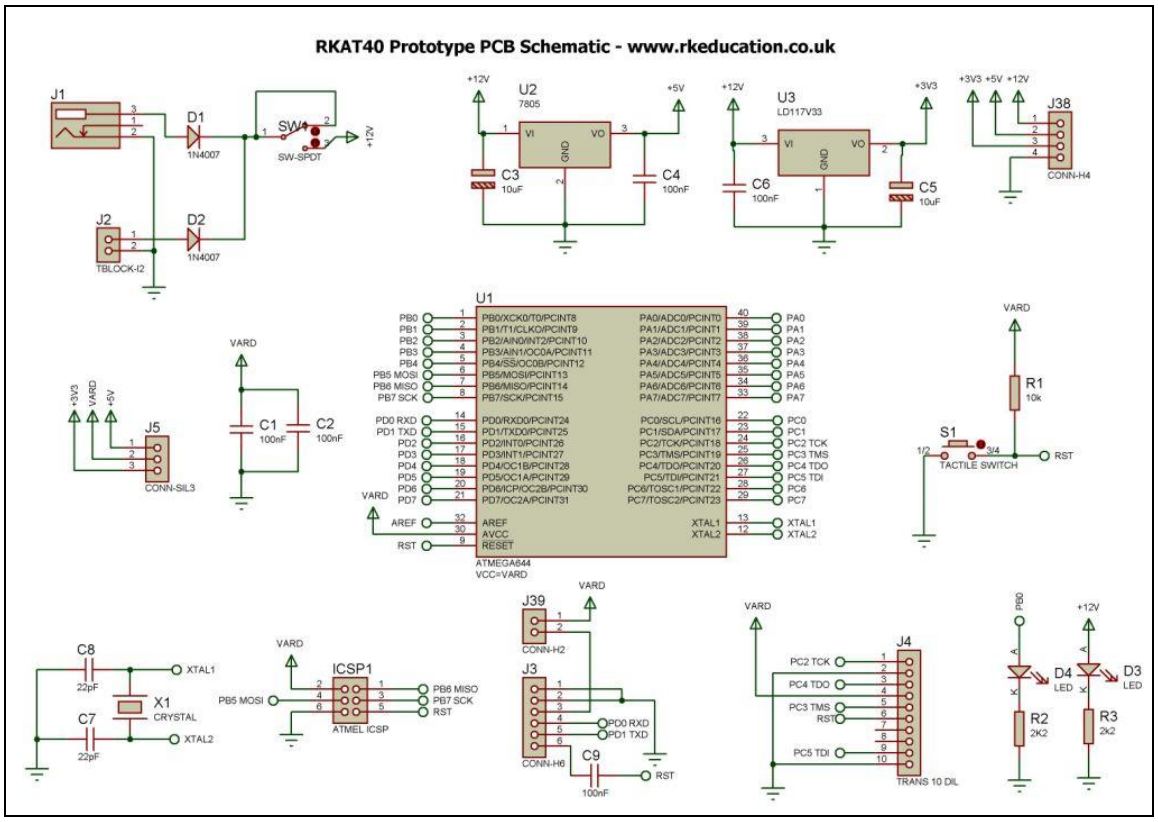
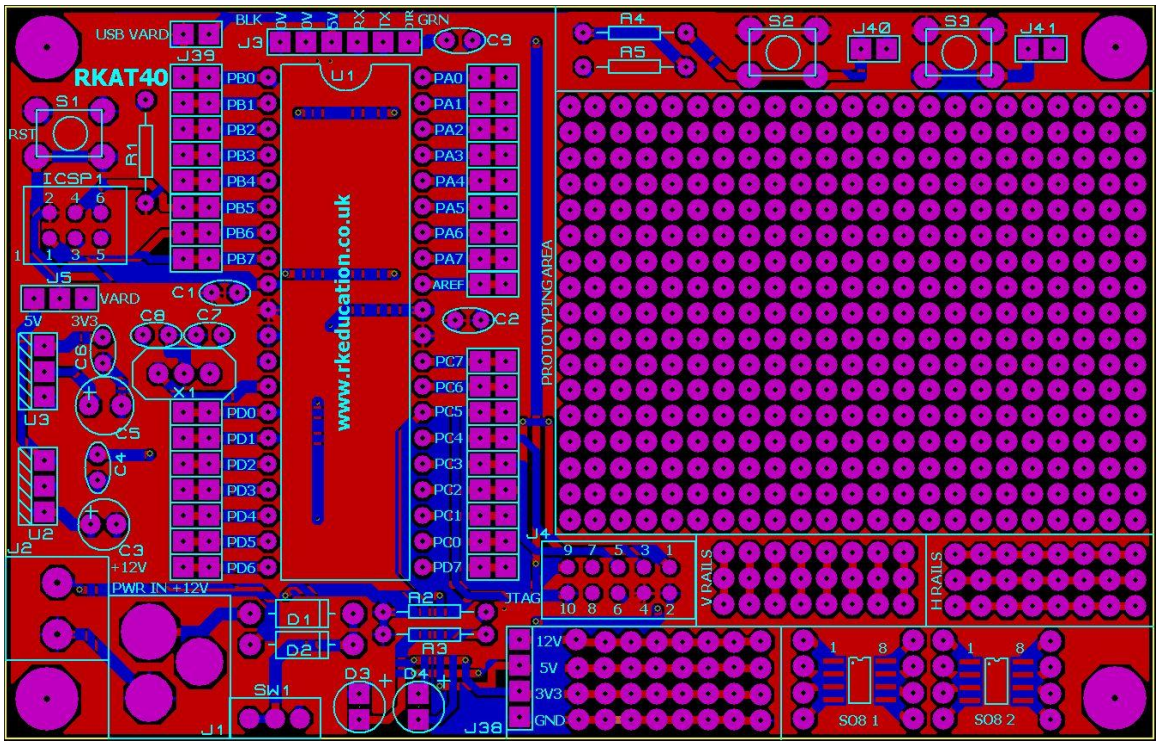
RKAT40 Component List and Instructions



Constructed PCB



Schematic



PCB layout

Description

The RKAT40 prototype project PCB has been designed to use Atmel and Sanguino microcontrollers

- Designed for use with 40 pin Atmel and Sanguino MCUs
- E.g. ATMega1284p ATMega644p ATMega324p
- Software is downloaded from a PC into the microcontroller via an ICSP header or via an FTDI cable
- Hardware reset switch included
- The clock reference can be either a ceramic resonator or crystal oscillator
- All input and output pins have a PTH
- A large prototyping area with power rails
- 2x SO8 footprints with breakout pins
- Power rails on the prototyping area
- Powered by a terminal block or DC power socket
- +12VDC input and +5VDC and +3.3VDC regulated outputs
- 3 LEDs used to indicate power – +12V, +5V and +3.3V
- Power switch and LED power indicators
- High quality, double sided black PCB

Component List

J1 – 2.1mm DC socket
J2 – 2 way 5mm pitch terminal block
J3 - 6 way header for FT232 cable
J4 - 10way dual row header 2x 5way
J5 - 3 way header with header tab
J39 - 2 way header
C1, C2, C4, C6, C9 – 100nF multilayer ceramic capacitor
C3, C5 – 10uF electrolytic capacitor 16VDC
C7, C8 - 22pF capacitor (do not use when using ceramic resonator)
D1, D2 – 1N4007
D3, D4 – 3mm LEDs
ICSP1 - 3x2 header for ICSP
R3, R4 – 2k2 ¼ watt resistor (red red red)
R1, R4, R5 – 10k ¼ watt resistor (brown black orange)
S1, S2, S3 – 6mm tactile switch
SW1 - Ultra miniature slide switch for power switch
U1 – 40 way DIP socket with microcontroller e.g. ATMega1284p
U2 – 7805 voltage regulator TO220 package
U3 –LD1117V33 3V3 voltage regulator TO220 package
X1 – ceramic resonator or crystal oscillator

When constructing always start with the components that have the lowest profile and work high, for example start with the resistors and end on the voltage regulators.

Instructions

The PCB has been designed to use ATMEL and Sanguino microcontrollers.

Connecting Power

The power is connected to the terminal block marked PWR IN, the 0V input, usually black is put in the lower terminal and the +VE, usually red, is put in the upper terminal, power can also be supplied via the 2.1mm DC socket, a regulated 12VDC 1Amp power supply should be used. The circuit incorporates a 7805 and LD1117V33 voltage regulator, a heat sink may need to be added to the voltage regulators if a high current is required as they will become hot, particularly if higher currents are demanded from the regulators.

Downloading software

Once the software has been written using the Programming Editor it can be downloaded into the Sanguino (or equivalent). This is downloaded using a download cable that connects either to your PC's USB port. Insert the download plug into the download socket and activate the program function in your Programming Editor. If all goes well it will tell you the program download was successful.

A great deal of useful information is available on websites such as the Arduino forum.

Using the prototype area

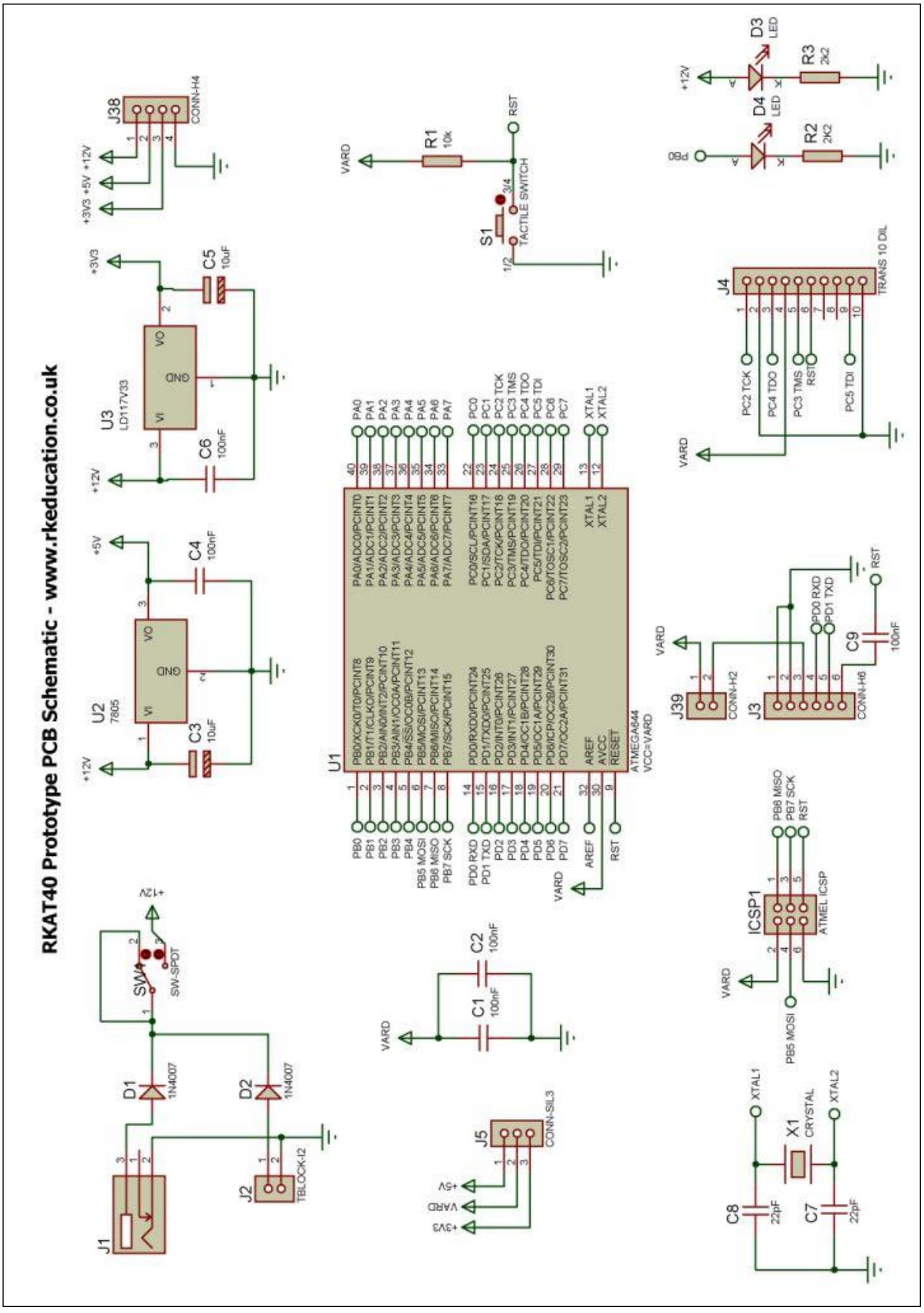
Using the prototype area is simple and how it is used is dependent on what is being done. Access to all of the pins of U1 is gained by through holes near the pins of U1, simply connect using jumper wires. There are power rails at the bottom of the prototyping area and they are clearly labelled. There are 2 SO8 surface mount footprints with breakout pins to allow easy interfacing. There are 2 further sets of rails above and below the prototyping area.

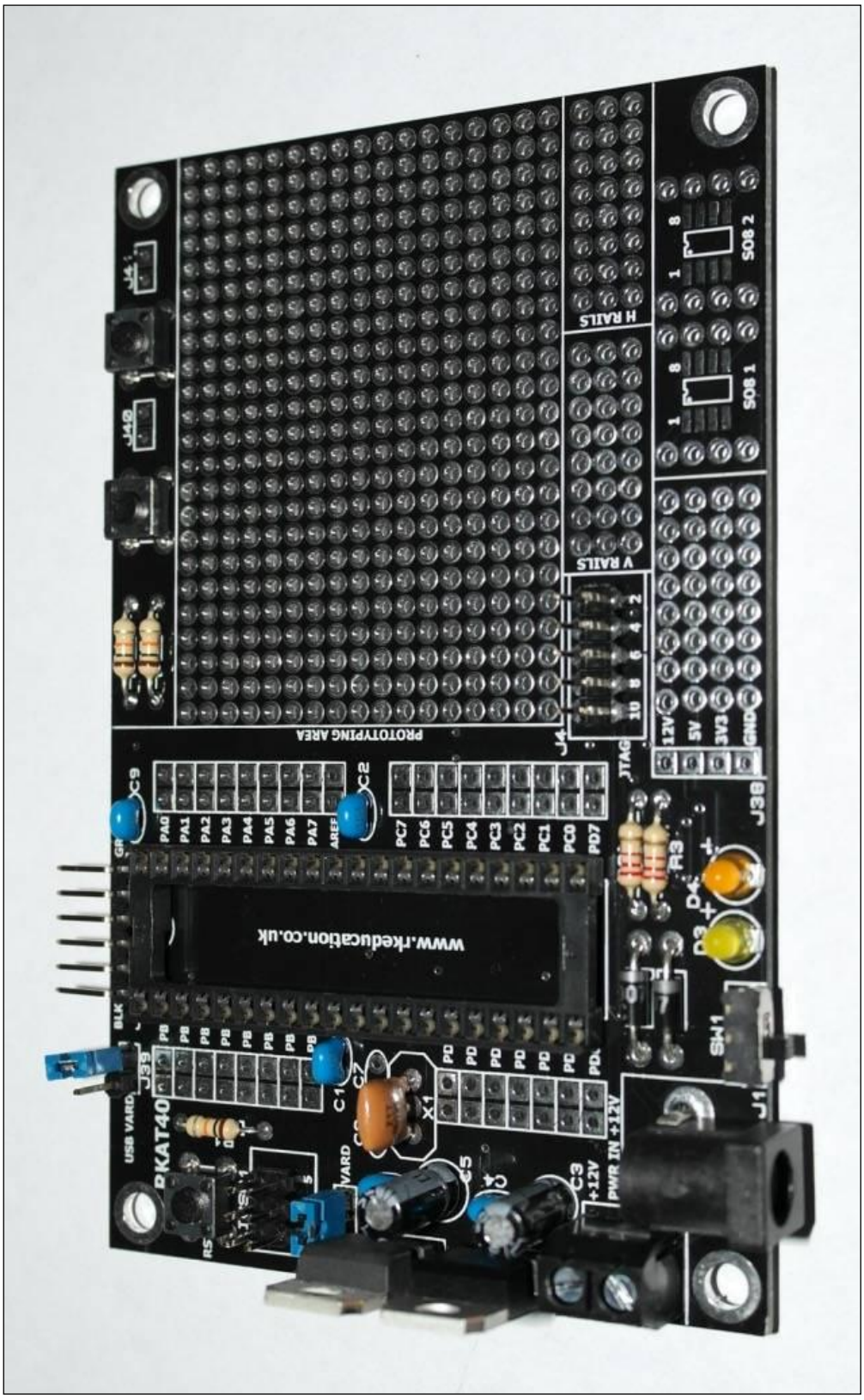
Please visit our website

www.rkeducation.co.uk

If you have any comments or queries please email us at

technical@rkeducation.co.uk


RKAT40 Prototype PCB Schematic - www.rkeducation.co.uk
U1
ATMEGA644
VCC=VARD
U2
7805
U3
LD1117V33
J1
J2
TBLOCK-I2
J3
CONN-H6
J4
TRANS 10 DIL
J5
CONN-SIL3
J38
CONN-H4
J39
CONN-H2
ICSP1
ATMEL ICSP
X1
CRYSTAL
S1
TACTILE SWITCH
SW1
SW-SPDT
D1
1N4007
D2
1N4007
D3
LED
D4
LED
R1
10k
R2
2K2
R3
2K2
C1
100nF
C2
100nF
C3
10uF
C4
100nF
C5
10uF
C6
100nF
C7
22pF
C8
22pF
C9
100nF
VARD
+12V
+5V
+3V3
RST
XTAL1
XTAL2
PB5 MOSI
PB6 MISO
PB7 SCK
PD0 RXD
PD1 TXD
PC2 TCK
PC4 TDO
PC3 TMS
PC5 TDI


PROTOTYPING AREA
H RAILS
V RAILS
SOS 2
SOS 1
JTAG
12V
5V
3V3
GND
www.rkeducation.co.uk
RKAT40
PWR IN +12V