THE KANDA PIC BOARD

Introduction

Here we will discuss the features of the Kanda PIC hardware, and how to use them.

Device Support

Here is a list of all the PIC devices that were in production at the time of development(Dec 2011). Many other PIC devices will work too – provided that their pin-out is suitable – see socket diagrams in section 7, and compare with your datasheet

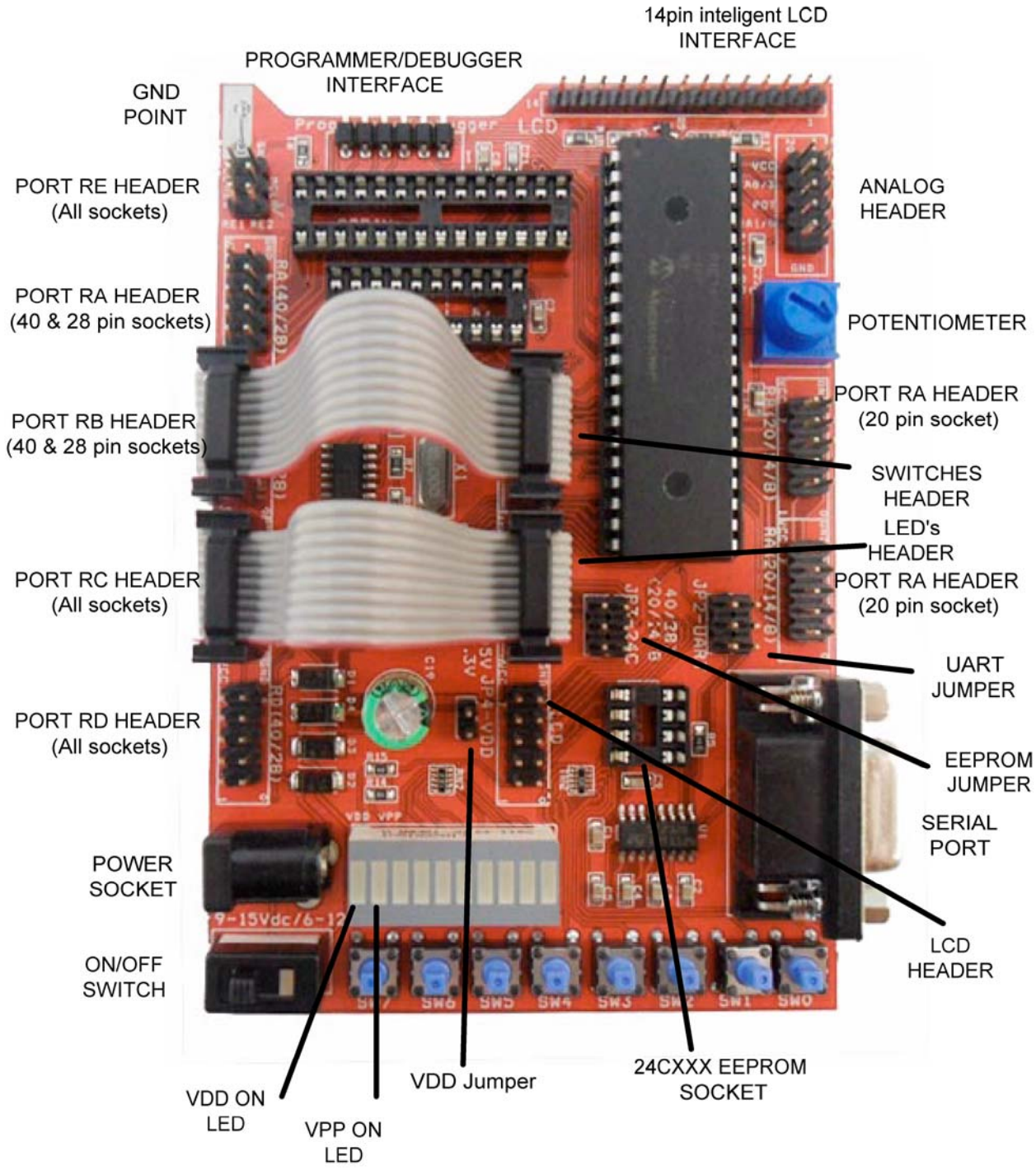
8 PIN DEVICES
PIC12F683 PIC12F508 PIC12F509 PIC12F635 PIC12F510 PIC12F615
PIC12F609 PIC12F519 PIC12F629 PIC12F675

14 PIN DEVICES
PIC16F610 PIC16F676 PIC16F630 PIC16F688 PIC16F684 PIC16F636
PIC16F616 PIC16F505 PIC16F526 PIC16F506

20 PIN DEVICES
PIC16F785 PIC16F677 PIC16F631 PIC16F685 PIC16F687 PIC16F689
PIC16F690 PIC18F14K50 PIC18F13K50

28 PIN DEVICES
PIC16F72 PIC16F722 PIC16F723 PIC16F726 PIC16F73 PIC16F737
PIC16F76 PIC16F767 PIC16F870 PIC16F872 PIC16F873A PIC16F876A
PIC16F882 PIC16F883 PIC16F886 PIC16F913 PIC16F916 PIC18F2220
PIC18F2221 PIC18F2320 PIC18F2321 PIC18F2331 PIC18F2410 PIC18F2420
PIC18F2423 PIC18F2431 PIC18F2450 PIC18F2455 PIC18F2458 PIC18F2480
PIC18F24J10 PIC18F24K20 PIC18F2510 PIC18F2515 PIC18F2520 PIC18F2523
PIC18F2525 PIC18F2550 PIC18F2553 PIC18F2580 PIC18F2585 PIC18F25J10
PIC18F25K20 PIC18F2610 PIC18F2620 PIC18F2680 PIC18F2682 PIC18F2685
PIC18F26K20

40 PIN DEVICES
PIC16F724 PIC16F727 PIC16F74 PIC16F747 PIC16F77 PIC16F777
PIC16F871 PIC16F874A PIC16F877A PIC16F884 PIC16F887 PIC16F914
PIC16F917 PIC18F4220 PIC18F4221 PIC18F4320 PIC18F4321 PIC18F4331
PIC18F4410 PIC18F4420 PIC18F4423 PIC18F4431 PIC18F4450 PIC18F4455
PIC18F4458 PIC18F4480 PIC18F44J10 PIC18F44K20 PIC18F4510 PIC18F4515
PIC18F4520 PIC18F4523 PIC18F4525 PIC18F4550 PIC18F4553 PIC18F4580
PIC18F4585 PIC18F45J10 PIC18F45K20 PIC18F4610 PIC18F4620
PIC18F4680 PIC18F4682 PIC18F4685 PIC18F46K20


14pin inteligent LCD INTERFACE
PROGRAMMER/DEBUGGER INTERFACE
GND POINT
PORT RE HEADER (All sockets)
PORT RA HEADER (40 & 28 pin sockets)
PORT RB HEADER (40 & 28 pin sockets)
PORT RC HEADER (All sockets)
PORT RD HEADER (All sockets)
POWER SOCKET
ON/OFF SWITCH
ANALOG HEADER
POTENTIOMETER
PORT RA HEADER (20 pin socket)
SWITCHES HEADER
LED's HEADER
PORT RA HEADER (20 pin socket)
UART JUMPER
EEPROM JUMPER
SERIAL PORT
LCD HEADER
VDD ON LED
VPP ON LED
VDD Jumper
24CXXX EEPROM SOCKET

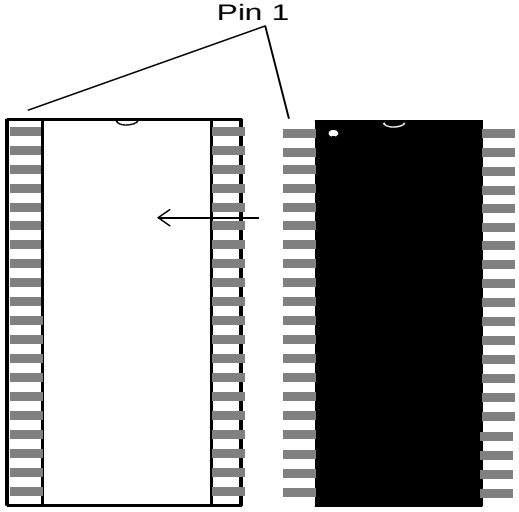
Power and Programmer Connection

Push the programmer onto the "programmer/debugger" header that sits in the recess on the side of the board.

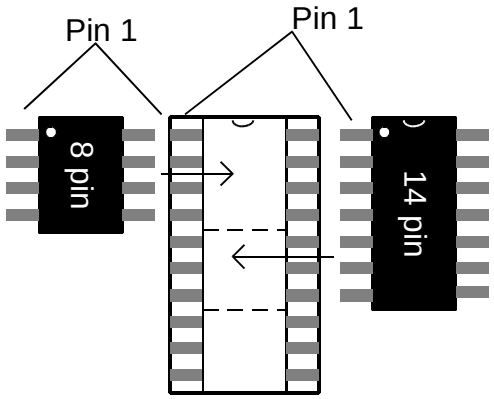
The power supply, 9-15V DC or 6-12V AC, is plugged into the power socket (5.5/2.1mm Barrel, either center +ve or -ve). The “Power On/Off” switch is located next to the power connector. Insert the device before switching the power on. The Vcc LED (The segment of the bar LED closest to the power socket) should light when the power is correctly applied. Your hardware is now ready for programming.

Device orientation

Before programming a device using the programmer, the device must be inserted correctly into the programming unit. At the end of the device you will notice a notch cut-out. There is a notch cut-out on the device socket as well. The notch on the device must correspond with the notch in the socket.



The 20pin socket can also be used with 14pin and 8pin PIC devices. In this case the devices should be fitted at the top of the socket



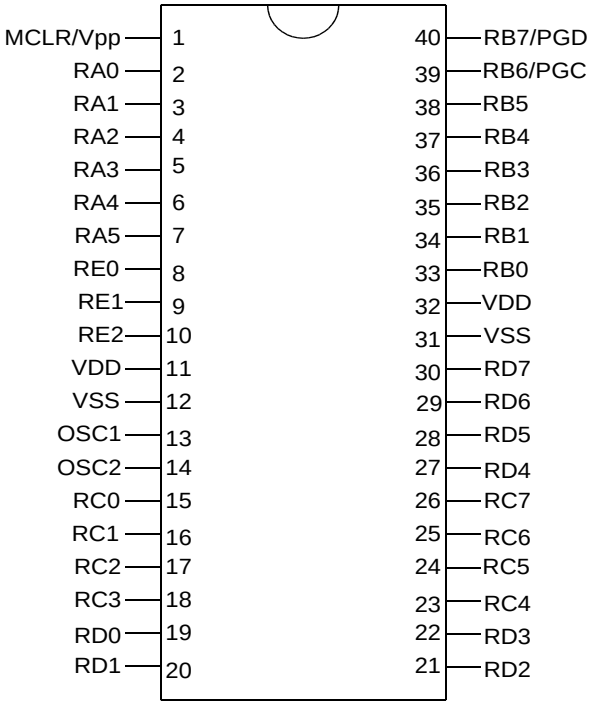
Warning: The orientation of the device is vitally important. If you put it in the wrong way then you may damage the device. Do not plug a device in with the power switched on or you may damage it. Never remove the device with the power on. Do NOT insert devices in more than one socket at a time otherwise programming errors will occur.

Clock Circuit

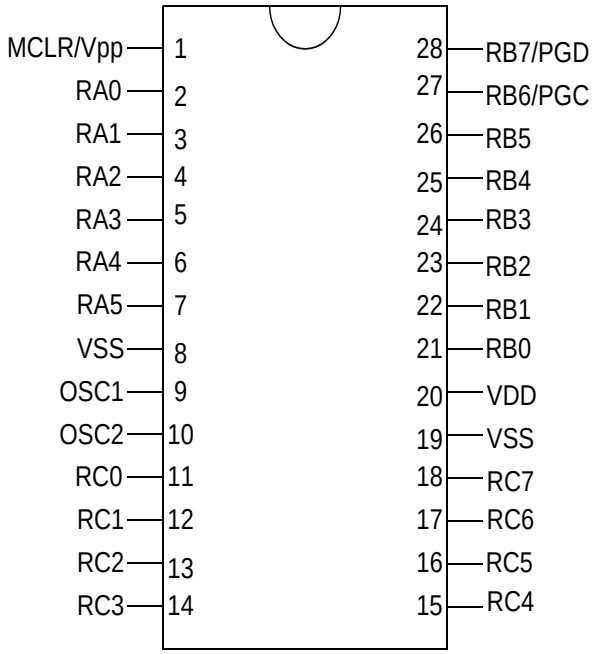
The board is fitted with an external clock circuit which connects to the PIC's OSC1 pin. As standard it runs at 10Mhz crystal. PIC devices should be configured for a "HS" clock source.

Device Sockets

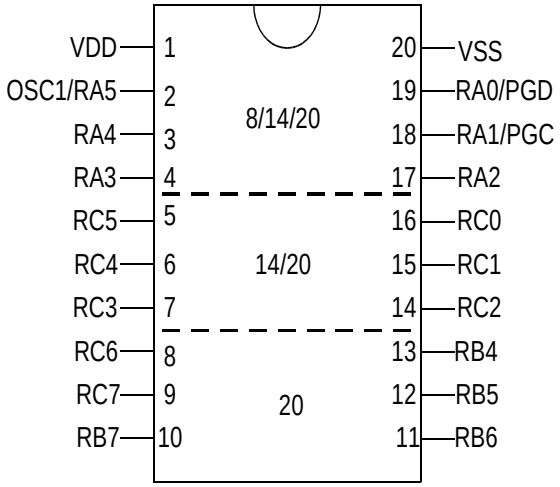
40-pin Digital socket – labelled 40pin. RA, RB, RC, RD and RE are connected to headers RA(40/28) RB(40/28) RC, RD and RE accordingly.



28-pin socket – labelled 28pin. RA, RB and RC are connected to headers RA(40/28), RB(40/28) and RC accordingly.



20-pin socket - labelled 20pin. RA, RB and RC are connected to headers marked RA(20), RB(20) and RC.



Jumpers and their functions

JP1 Clock

This jumper only effects devices in the 20/14/8 pin devices. It determines whether the PIC's OSC1 pin is connected to the clock signal, or to the RA(20) header. Connection to the RA(20) requires the PIC to be configured to run from its internal clock.

JP2 UART

This jumper determines if the UART circuit connects the TX/RX pins of a 40/28 pin device or a 20 pin device. This is a double jumper - one link for TX, and one for RX.

JP3 24C

This jumper determines if the 24C eeprom socket connects to the SDA/SCL pins of a 40/28 pin device or a 20 pin device. This is a double jumper - one link for SDA, and one for SCL.

JP4 Voltage Selection

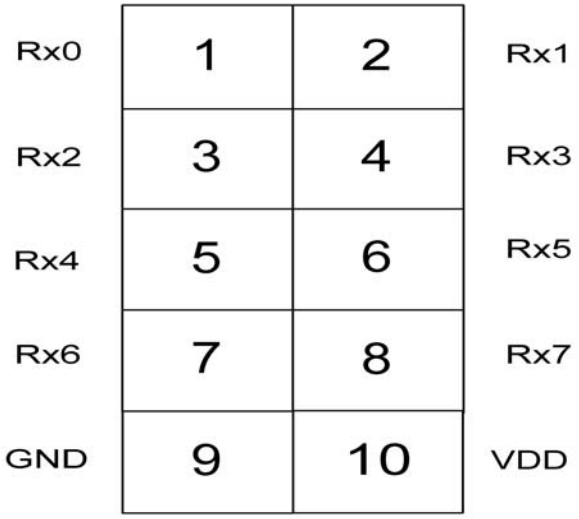
Jumper JP4 is used to select either 3.3V or 5V board Vcc. For VCC = 5V, close jumper JP4 – For VCC = 3.3V, remove JP1

Jumper	Function	Open/Set to	Closed/Set to	Default
JP1	CLOCK or I/O	CLK	RA5	CLK
JP2	UART	40/28 - Connects to RC6/RC7 for use with 28/40 pin devices	20/14/8 - Connects to RB5/RB7 on the 20pin socket for use with 20 pin devices	40/28
JP3	24C	40/28 - Connects to RC3/RC4 for use with 28/40 pin devices	20/14/8 - Connects to RB4/RB6 on the 20pin socket for use with 20 pin devices	40/28
JP4	VCC	5V	3.3V	Open

Board Headers

All PIC ports are brought out to headers along the board edge. Each header has up to 8 I/O pins as well as Vcc and Ground pin for power supply to external circuits. The Vcc voltage is determined by the setting of JP4.

LED's, switches and the LCD interface are all connected to headers in the centre of the board. They can be connected to the PIC port of your choice by using one of the 10way ribbon jumper cables.



Header descriptions

Port headers, RC, RD and RE, are connected to all sockets that have these ports available. But two sets of port headers are used for ports RA and RB. One set for 40/28 pin sockets and one for the 20/14/8 pin socket.

Port RA(20) Use this when the PIC is in the 20 pin socket. Only 6 bits are implemented on this port – RC6 and RA7 are not used.

Port RA(40/28) Use this when the PIC is in the 40 or 28 pin socket. Only 6 bits are implemented on this port – RC6 and RA7 are not used.

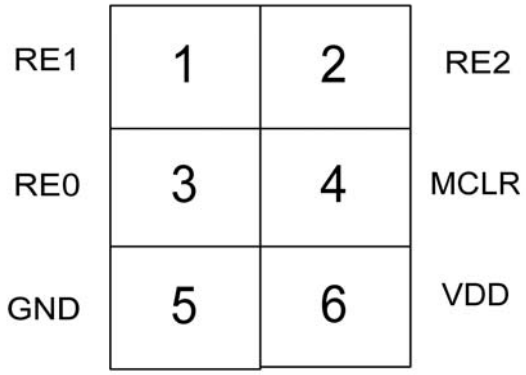
Port RB(20) Use this when the PIC is in the 20 pin socket. Only 4 bits are implemented on smaller PIC's on this port – RB0, RB1, RB2, RB3 are not used.

Port RB(40/28) Use this when the PIC is in the 40 or 28 pin socket.- this is a full 8bit port.

Port RC Use this with any socket.- this is a full 8bit port.

Port RD This port is only implemented on 40pin PIC's .- this is a full 8bit port.

Port RE This port is only implemented on 40pin PIC's .- Only 3 bits are implemented. RE0, RE1, RE2. MCLR is also available on this header



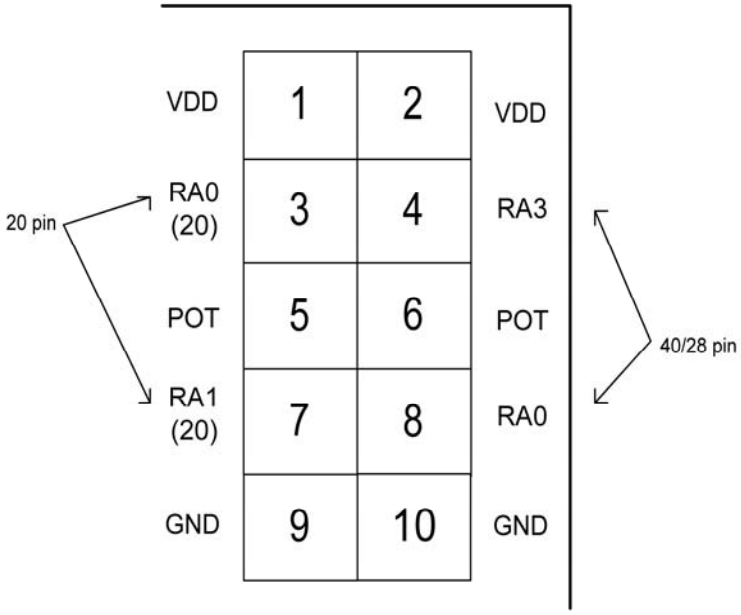
Using the Analog Header

The Analog header comprises GND, VCC, Potentiometer output, and a choice of two ADC port pins on the PIC device.

Use the outer row when using 40 or 28pin PIC's. RA0 and RA3 are available.

Use the inner row when using 20/14/8 pin PIC's. RA0 and RA1 are available

In typical use, one of the PIC's ADC pins can easily be connected to the output of the potentiometer using a jumper.



BOARD PHERIPHERALS

Switches and LEDS

The LEDs are connected through a 1K resistor network to the LED header. A 10-way lead connects to a Port header, by default RC or RA(20). The switches are connected to the Switches header. A 10-way lead connects to a Port header, by default RB. The switches and LEDs can be disconnected, if required. To use them, ensure that the leads are connected. The board is also marked with the port pin connection for each switch and LED.

24C EEPROM socket

This socket is for use with a 24CXXX eeprom. It can be connected to the correct pins on the PIC for the I2C module. This varies between 40/28pin PIC's and 20pin ones. So you need to set the the JP2 jumpers to the correct socket

When using a 40pin or 28pin device; Select the 40/28pin position for JP2. SDA=RB4, SCL=RB3

When using a 20/14/8pin device Select the 20pin position for JP2. SDA=RB4,

SCL=RB6

RS232

A 9-way female D-type, as used on data terminal equipment, is available for serial port communication.

When connecting to a PC or other Data Terminal Equipment, a “straight through” lead is required - not a null-modem cable. There is a RS232 driver chip (Max202 type) to provide the necessary level shifting.

The correct pins for the PIC UART varies between 40/28pin PIC's and 20pin ones. So you need to set JP3 jumpers to the correct socket.

When using a 40pin or 28pin device, select the 40/28pin position for JP2. TX=RC6,
RX=RC7

When using a 20/14/8pin device, select the 20pin position for JP3. TX=RB5, RX=RB7

LCD connector

The 14pin header along the edge of the board, marked **LCD,** is for a standard 2 x 16 intelligent LCD, such as those based Hitachi HD487780 IC. The full LCD datasheet is in the LCD Sample Code folder. It is wired for 4bit mode - Pin function is shown in the following table.

Connection Name	Function
1 - GND	Ground
2 - VCC	5V Vcc
3 - CON	Contrast
4 - RS	Register Select
5 - R/W	Not Write
6 - E	Enable
7	NC
8	NC
9	NC
10	NC
11	Data Bit 4
12	Data Bit 5
13	Data Bit 6
14	Data Bit 7

The 10pin LCD header next the the LED's can be used to connect any 8bit port with the LCD, by connecting a jumper cable between it and desired port header. By default it is connected to RD, for use with 40pin PIC's. Port RC can be used for smaller PIC's.

The Contrast of the display is set by the voltage on pin 3. This is set by a potential devider formed by R16 and R17 resistor to provide a default contrast voltage of 0.6 Volts. To increase this voltage, increase the value of R16 from 820R.

This board is not designed for use with back lit LCD modules, so the extra connections needed are not included and the power supply will not supply the current required.

ACCESSORIES

LCD

KEYPAD

7 SEGEMENT LED