Introduction:

The KPIC-0820P is a prototyping PCB designed to be used with 8, 14, 18 and 20 Pin Microchip PIC Micro-controllers. It includes areas for a basic power regulator, reset circuit, crystal, resonator and RC oscillator, ICD-2 port, serial interface and prototyping.

It is provided as a bare PCB and you only add the components you need.

Features:

- Single Sided PCB with solder mask and top overlay.
- Sockets for 8, 14, 18 or 20 Pin Microchip PIC Micro-controllers.
- All I/O Pins from Micro-controller are available to use.
- Simple regulator circuit layout.
- Serial I/O layout.
- RC, resonator or crystal oscillator circuit layouts.
- ICD-2 Port for in-circuit programming or in-circuit debugging using the MPLAB-ICD2 from Microchip.
- Carefully designed prototyping area with supply rails and space for IC's
- Pb free version available on request
  (Minimum order quantity applies)

Technology:

- 1.6mm FR4 Glass Epoxy with 35um (1oz) finish copper.
- Solder tinned HASL
- Green solder mask on bottom layer
- White silk screened top overlay

Photo:

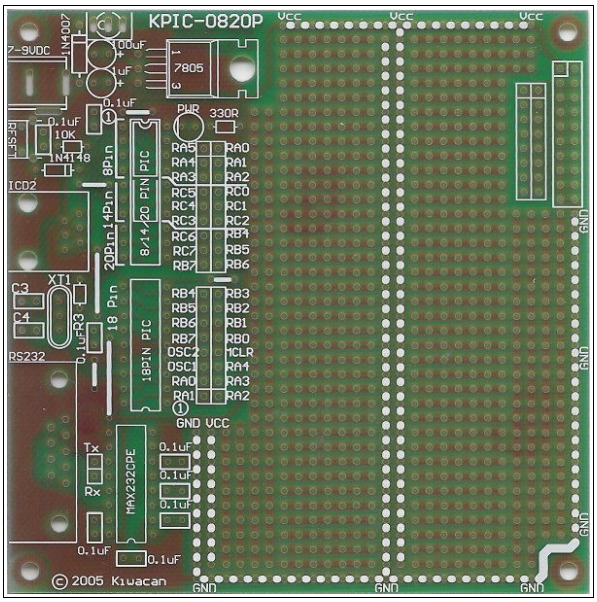

Figure 0.0: Photo of KPIC-0820P

TABLE OF CONTENTS

1.0 SCHEMATIC DIAGRAM

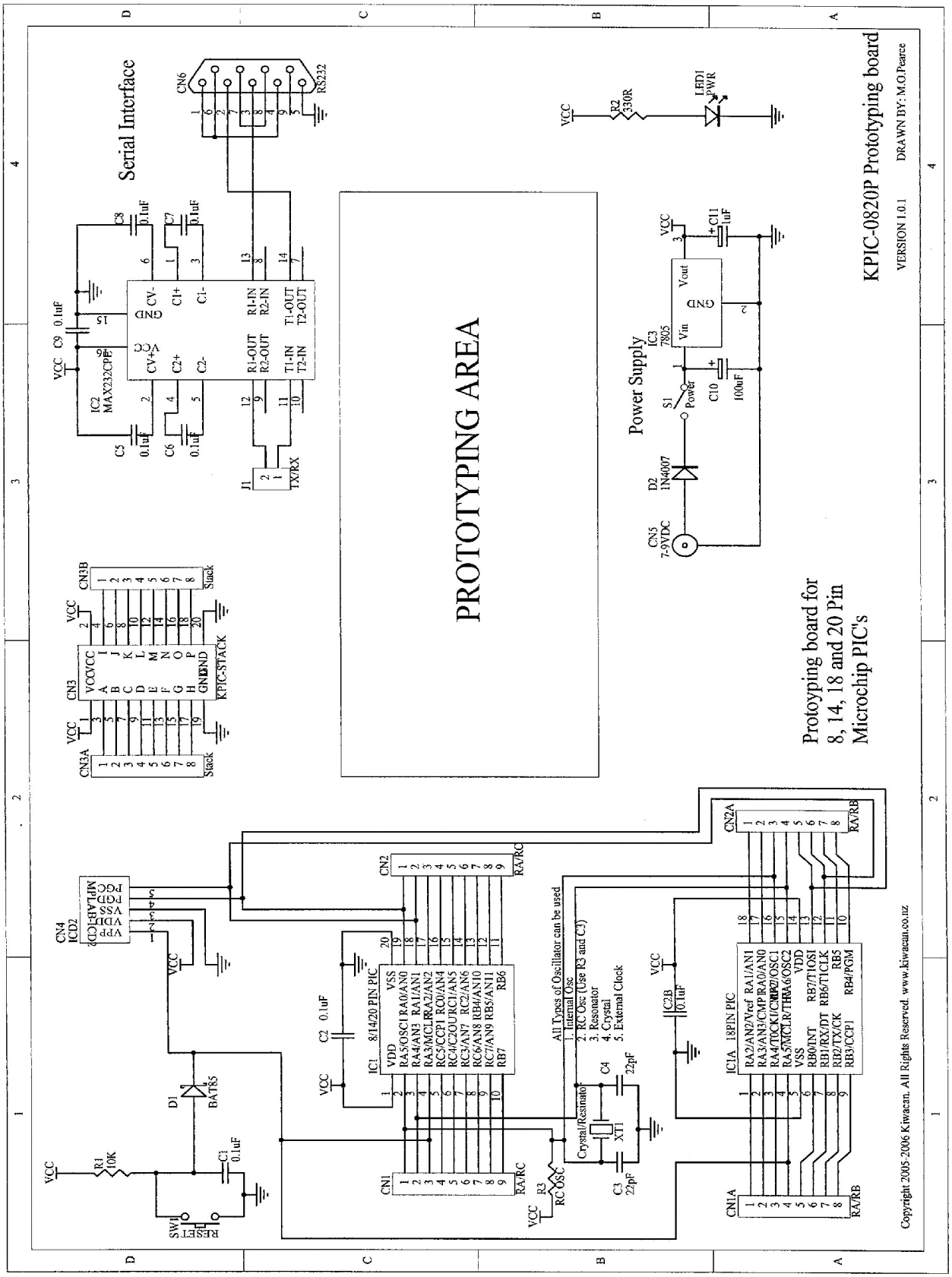

Figure 2: Schematic Diagram

2.0 BOARD AREAS

The following descriptions explain the individual areas of the KPIC-0820P prototyping board.

If an area of the board is not required then no components need to be added.

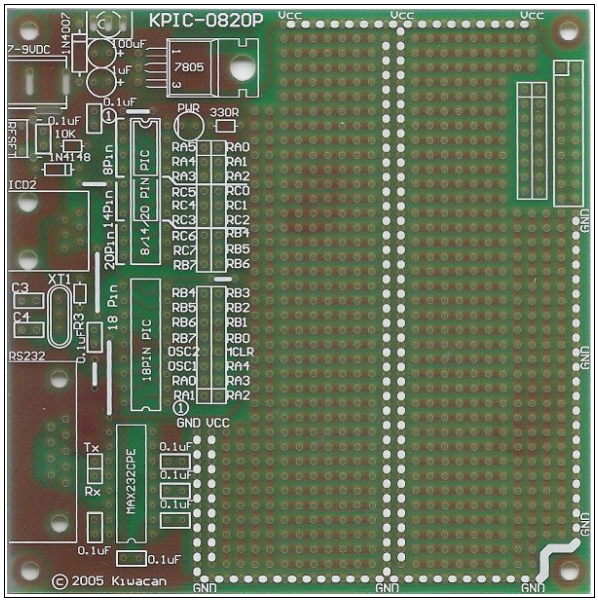

Figure 2.0: PCB Overview

Figure 2.0 shows the total board layout, the following pictures are separated from this so that a more detailed description can be given.

2.1 Links

Figure 2.1 shows the links, it is recommended that these be installed for all circuit designs as some links complete power and ground circuits. These links should be inserted and soldered first.

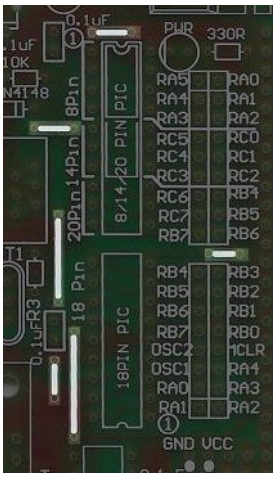

Figure 2.1 Links

2.2 Power Supply

Figure 2.2 is the voltage regulator section. Using a standard 3.3V or 5.0V voltage regulator, two filter capacitors a diode for polarity protection, a power switch and a DC power socket, this section forms a simple power supply. For specific part numbers please see the bill of materials in Section 3.

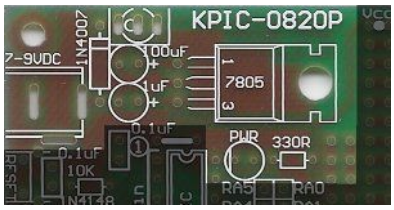

Figure 2.2: Power Supply

2.3 Reset

Figure 2.3 shows the basic reset area that has been implemented. This uses a 10K ohm pull up resistor, 0.1uF capacitor, and switch as the Reset circuitry and a BAT85 diode for isolation from the ICD2 or external circuitry used. If you are using the internal MCLR function of a specific micro-controller then this circuitry is not needed.

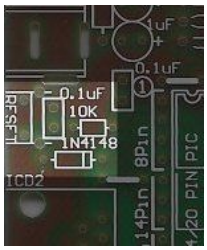

Figure 2.3: Reset Block

2.4 ICD2

The ICD2 connector shown in Figure 2.4 can be used for in-circuit programming or in-circuit debugging if you have a Microchip MPLAB-ICD2 development tool. An adapter cable can be made so that other programmers can be used but are not covered by this data sheet.

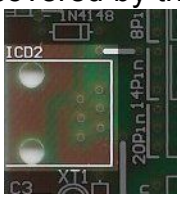

Figure 2.4: ICD2 Connector

2.5 Oscillator

Figure 2.5 shows the oscillator section. This section can be configured as one of the following:

1. RC Oscillator
2. Ceramic Resonator
3. Crystal Oscillator
4. Not Used

Figure 2.5: Oscillator Block

2.5.1 RC Oscillator

To configure as an RC Oscillator use C3 and R3 component locations. For calculating the component values required refer to the data sheet for the micro-controller you are using.

2.5.2 Ceramic Resonator

To configure for use with a ceramic resonator the configuration depends on the ceramic resonator you are using.

If you use a resonator with internal capacitors then the location XT1 is all that needs to be used as the center pin is grounded for this purpose.

If you are using a resonator without internal capacitors the the resonator should be inserted into location XT1 and appropriate capacitors into C3 and C4 positions. Please refer to resonator and micro-controller data sheets for appropriate values.

2.5.3 Crystal Oscillator

The Crystal oscillator configuration uses XT1 position for the crystal and C3, C4 for the capacitors. For correct capacitor values please refer to the crystals data sheet.

Note: A value of 18pF for C3 and C4 is common.

2.5.4 Not Used

If an internal oscillator, or external TTL clock is used then none of these components need to be used.

2.6 Serial Port

Figure 2.6 shows the component positions for a simple two wire serial port configuration. It uses a D9 right angle Socket, a MAX232 or pin compatible level shifter, 4 x 0.1uf/10uF capacitors and one 0.1uF decoupling capacitor (Left of I.C).

The PCB is wired as a null modem with loop back on CS and DTR with Rx and Tx pins configured so that it can directly connect to a PC with a straight through cable.

The two holes marked Tx and Rx can be wired to any pin on the micro-controller, or to the UART specific pins as specified by the micro-controllers data sheet.

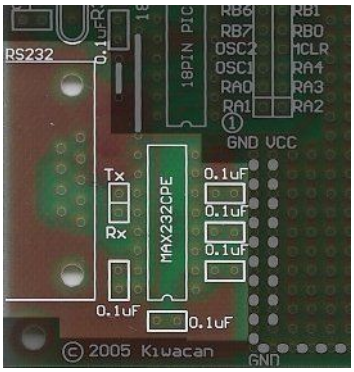

Figure 2.6: RS232 Block

2.7 Socket for 8,14,20 Pin micro-controller

Figure 2.7 shows the IC socket for 8, 14 and 20 pin PIC micro-controllers and the output connections to be used for connecting to the prototyping area.

Please note that the common port designations have been used from the PIC12F and PIC16F range, PIC18 ,PIC24, dsPIC and some PIC12/16 device pin outs may vary from what is shown on the overlay so please check each micro-controllers data sheets.

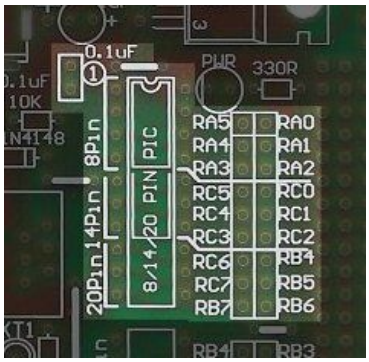

Figure 2.7: 8,14,20 Pin Sockets

Please note the location of pin 1 indicated by the 1 inside the circle. For all of the 8,14,and 20 pin devices, pin 1 must be at the top left.

2.8 The 18 Pin socket

Figure 2.8 shows the socket used for 18 pin devices such as the very commonly used PIC16x84 and its descendants.

The connections for the prototyping area have been labeled according to the 16F84 outputs but note that MCLR, OSC1 and OSC2 have alternative functions on many newer devices so please refer to your micro-controllers data sheet for details.

Please take special note that pin 1 is at the bottom right for this configuration.

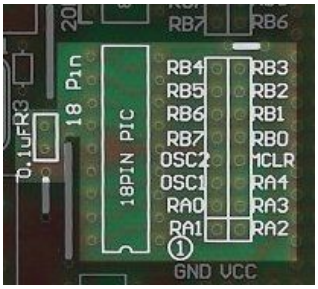

Figure 2.8: 18 Pin Socket

2.9 Prototyping Area

Figure 2.9 illustrates the prototyping area and how the tracks are laid on the underside of the PCB. This layout is similar to that of some plug in prototyping boards, but with power and ground running through the middle. With the power accessible in the center and at the edge of the board it simplifies the power wiring.

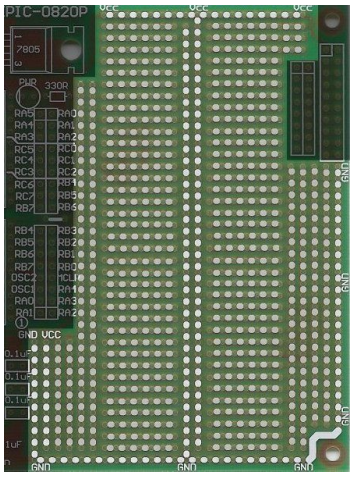

Figure 2.9: Prototyping Area

Note that some older versions of the PCB are missing the overlay as shown above but the track layout is identical.

2.10 Expansion Connector

The Expansion connector is designed so that additional KPIC series boards can be stacked on top of each and share power as well as pass up to 16 lines of digital or analog signals.

Connecting boards can be done in two ways.

1. By using a 2x10 way socket on the bottom board and a 2x10 way pin header on the top board. This allows two boards to be connected together.
2. Using a 2x10 way stack through socket which has long pins on a socket. This allows multiple boards to be stacked on top of each other. Kiwacan part number KPIC-STACK-KIT is a kit to do this, including spacers for the PCB's.

3.0 BILL OF MATERIALS

This bill of materials is broken down into sections as shown in section 2. These are for a generic configuration and actual requirements will vary depending on your project design.

Part numbers for Farnell In One and SICOM are given. Other component suppliers should have equivalents.

Kiwacan cannot guarantee the availability or correctness of these part numbers so please check actual part types and suitability before ordering.

3.1 Power Supply BOM

Ref	Description	Farnell In One	Sicom
CN5	2.5mm DC Socket	224960	CNP10223
D2	1N4007 Diode	9565051	1N4007
S1	Switch	9473084	SW070B
C10	100uF 16V Electrolytic	3017590	C16R100
C11	1uF 16V Electrolytic	9452524	C16R1M
IC3	LM7805 Regulator	412776	7805
R2	330ohm ¼ Watt 5mm	9343032	RA330
LED1	5mm RED LED	3599322	5141RD

3.2 Reset Circuitry

Ref	Description	Farnell In One	Sicom
R1	10Kohm 1/4w 5mm	9342419	RA10K
C1	0.1uF capacitor 0.1”	750992	CCM.1
D1	BAT85 Schottky diode	1097299	BAT18
SW1	R/A PB Switch	959716	SW0606

3.3 ICD2

Ref	Description	Farnell In One	Sicom
CN4	RJ 6/6 RA Connector	4430890	CNWE7

3.4 Oscillator

Ref	Description	Farnell In One	Sicom
C3	18pf Ceramic Capacitor	236950	CC22 (22pF)
C4	18pf Ceramic Capacitor	236950	CC22 (22pF)
XT1	16MHz Crystal	9713700	CSX16.00

3.5 Serial Port

Ref	Description	Farnell In One	Sicom
C5	0.1uF	750992	CCM.1
C6	0.1uF	750992	CCM.1
C7	0.1uF	750992	CCM.1
C8	0.1uF	750992	CCM.1
C9	0.1uF	750992	CCM.1
IC2	MAX232CPE (or Equiv)	3025020	ST232CN
CN5	D9 PCB Socket R/A	8391360	CNDR09S

3.6 IC Sockets

Ref	Description	Farnell In One	Sicom
IC1	8/14/20 Pin Socket	4285608	CNICM20
IC1A	18 Pin Socket	4285591	CNICM18

3.7 Stack Through (Single Board)

Ref	Description	Farnell In One	Sicom
CN3	Bottom Board – Socket	7992025	CNHFPD20
CN3	Top Board - Pins	1022241	CNM20HDS

3.7.1 Stack Through (Multi board)

Kiwacan has a special connector for stacking multiple boards that is not available from general distributors.

Connector only:
Kiwacan KPIC-STACK

Connector and spacer kit:
Kiwacan KPIC-STACK-KIT

4.0 ORDERING INFORMATION

The KPIC series are currently available from the following distributors.

- Farnell In One
  www.farnellinone.com
- South Island Component center
  www.sicom.co.nz
- Kiwacan Direct (Starting mid 2006)
  www.kiwacan.co.nz

Kiwacan part numbers as follows:

Standard: KPIC-0820P

Pb Free: KPIC-0820P-PBF

Note: Pb Free boards are done as special orders and have MOQ and specific pack sizes.

5.0 CONTACT INFORMATION

For more information please visit our web site:

http://www.kiwacan.co.nz/

For sales inquiries please email:

sales@kiwacan.co.nz