



ProtoDev | PIC Development PCB Series

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Introduction

The ProtoDev PIC Development PCB series is a highly extensible development system. The series of PCBs are designed to facilitate quick and simple project development.

Scope

This version of the manual covers the following items:

- ProtoDev DX V1.3
- ProtoDev – 20 V1.0

Manual version	VA.01
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Availability

All ProtoDev PCBs can be obtained through our distribution network.

Product Support

The ProtoDev Series of PCBs support can be obtained directly from ZarDynamix by emailing the following address support@zardynamix.com

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Date: April 2010

ProtoDev

The ProtoDev DX series of PCBs are designed using a modular architectural approach. The PCBs also therefore share a number of development features which are standardized features across the PCB range.

This release of the manual covers the following PCBs

- ProtoDev – DX
- ProtoDev – 20

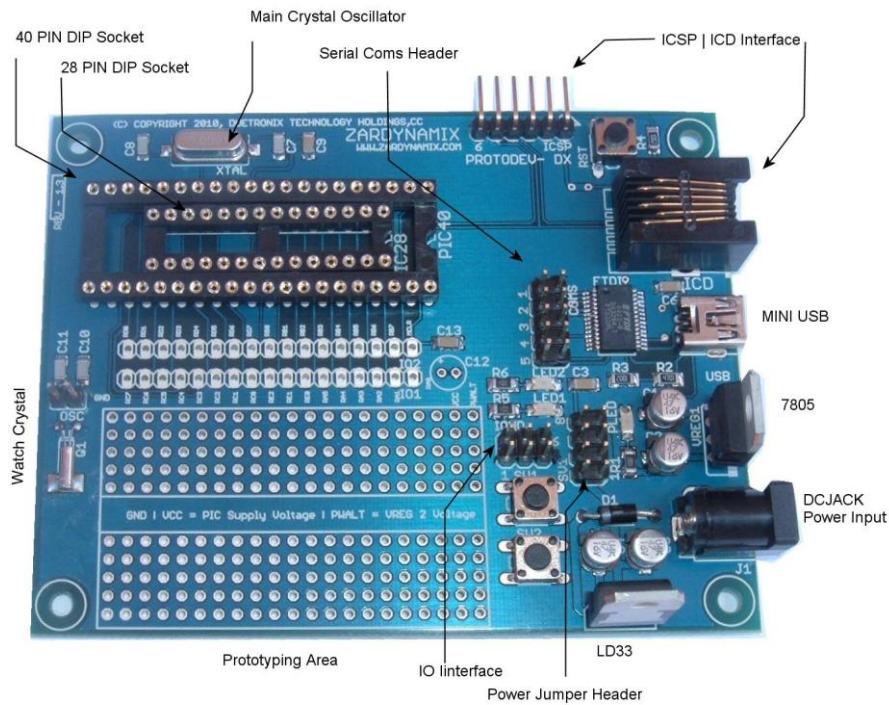
Feature set

The following features apply to the two PIC development PCBs of the ProtoDev family. For all PCBs in the family, all PIC I/O are tracked to headers for ease of use. The prototyping area has the power and ground connections tracked to the prototyping area.

	ProtoDev DX	ProtoDev - 20
PIC Support	16Fxx 18 FXX & J Types	16Fxx 18 FXX
DIP Packages	28 40	8 14 20
Power Supply	3v3 5v	3v3 5v
Serial Communications	USB (FTDI Emulator)	USB (FTDI Emulator)
Programming	PICKIT 2 & 3 and ICD	PICKIT 2 & 3 and ICD
IO	2 LEDs 2 Push buttons	2 LEDs 2 Push buttons
Reset Switch	Yes	Yes

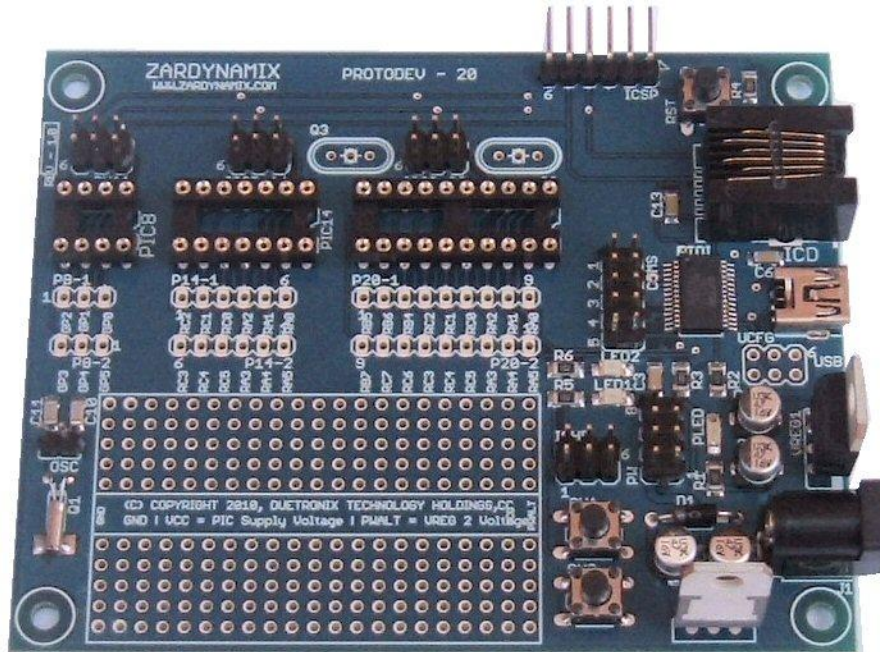
ProtoDev – DX

Shown below is the layout for the ProtoDev DX, which in many ways is similar to the other members of the ProtoDev family.



ProtoDev – 20

The ProtoDev – 20 is very similar in layout and configuration as the ProtoDev – DX. The main difference is that the ProtoDev – 20 carries three IC holders for three different PIC types. The PCB also does not have a primary crystal, since many of the devices it supports have internal oscillators. If a specific crystal frequency is required, a ceramic resonator can be included.



Power Up

The ProtoDev series have a dual power supply using an LD33V and an LM7805. This enables the PCB to support both the Fxxx and Jxxx PIC devices. Although standard F type devices can be supplied with a lower supply than the maximum 5.5 Vdc, J type devices require a 3v3 voltage supply and a higher supply voltage can damage your PIC.

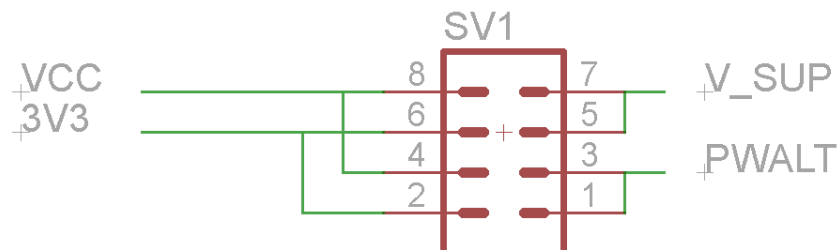
The jumper block SV1 enables the power supply to be configured to 1) supply both the PIC and the prototyping area with the same voltage 2) supply the PIC and the prototyping area with different voltages.

To power up the PCB, do the following

1. Configure the power supply jumper SV1, short the pins as indicated by the table below:

	Supply to PIC	Supply to Prototyping area	Notes
7 8	5 VDC		To power a standard F type at 5Vdc, enable 7 8.
6 5	*	5Vdc to PIC	
4 3	3v3		To power a J Type enable 4 3.
2 1	*	3v3 to PIC	
* If 7 8 is enabled then 4 3 must be disabled and vice versa			

The circuit snippet below will assist in identifying where the supply voltages originate from and where they can be configured to link to.



2. Connect the power supply to the PCB using the DC jack called J1. The power level should be set to 7 Vdc if 5 volts is required or 4.5 – 5 Vdc if 3v3 is required to power the PCB
3. The power LED will illuminate
4. If a PIC was inserted, and correctly programmed the PIC will start up and run the onboard firmware

Powering the Prototyping Area

The prototyping area is powered from the same onboard power supply, and depending on the configuration the area will receive either one of the on hand supply voltages, or both. See the table above for the jumper configuration.

The pads are connected horizontally, left to right. This configuration enables the user to solder in additional components in the same as you would using strip board.

Inputs and Outputs

All I / O is tracked to I01 and I02. Mostly the I/O pins are connected directly to the PIC, certain lines are connected to other points on the PCB.

PIC I/O with Multiple Connection Points		
MCLR	ICD ICSP RST Switch	MCLR for programming
RB7	PGD	Data For Programming
RB6	PGC	Clock Signal for programming
RC7	RX	Receive for USART
RC6	TX	Transmit for USART

Push Buttons

The PCB has three push buttons. RST, which is hardwired to the PIC and is used to reset the device at any time to restart its operations.

SW1 and SW2 are connected to the header IOHD. They have been implemented in such a way that the switches can be used in any configuration.



LEDs

The PCB has three leds, PLED and LED1 and LED2. PLED is wired as an indicator LED for the power supply. If the LED does not illuminate when the power supply is connected, this means a) the LED is not functioning or 2) the power supply is reversed.

Note: If the power supply is reversed, the diode D1 will protect the PIC.

Programming Interfaces

The ProtoDev has 2 programming interfaces and the interface used depends on the type of programmer that you have available. If you have an ICD 2 or ICD 3 programmer the 6 Way RJ12 can be used. If you have a PICKIT 2 or PICKIT 3 then the 6 way ICD header would be used.

Programming your PIC

The arrow located on the right hand side of the header strip indicates orientation. Simply connect the PICKIT 2 or PICKIT 3 with the labeling facing upwards and visible.

When a programming cycle is started, ensure that the power supply to the ProtoDev PCB has been disconnected, as the PICKIT programmer will supply its own programming voltage which conflicts with any external source.

Programming the ProtoDev – 20

The ProtoDev – 20 supports 3 different DIP types of PICs, namely the 8, 14 and 20 PIN. The 3 IC holders have been configured in such away so that the programming interface for each of the three devices is mechanically isolated from each other.

To program any one of the three devices, the ICSP header pins need to be jumpered.

ICSP Header Configurations		
ICSP 20	All 3 pins	All three pins of each individual header must be jumpered to enable the PICKIT ICD programmer to program the device in socket. Only 1 device can be programmed at any time.
ICSP 14	All 3 pins	
SV11	All 3 pins	

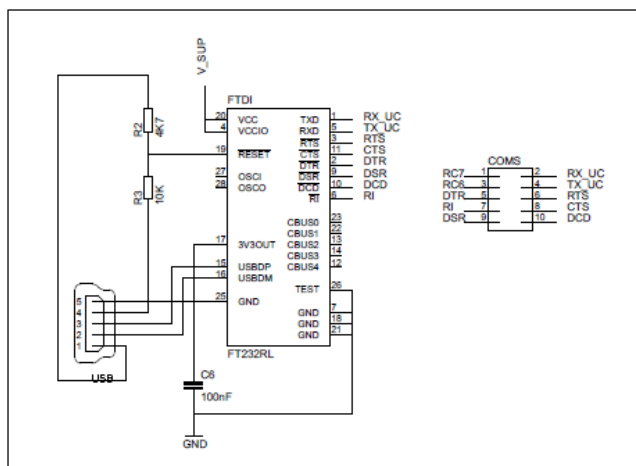
USB Communications

Communication with the PCB for PC to PIC communications is via the FTDI USB to RS232 emulation device. The FTDI device has been configured to run at the VSUP voltage level which may be 3v3 or 5vdc.

Windows 7 fully supports the FTDI device with no need to install and device drivers. To establish a connection with the PCB, simply connect the PC to the PCB with the PCB powered up. Windows 7 will auto detect the device, install a driver and emulate the USB device as a standard COM port.

Previous versions of Windows may require the user to install a device driver which can be downloaded from the manufacture’s website.

Connections



The connections required to interface the RX | TX lines with the FTDI device have been tracked in. To use the connections simply jumper the connections as described in the image.

Jumper 1 and then 2 as per the PCB, and this will interface the PIC to the FTDI device. Jumper 1 | 2 and 3 | 4 as per the circuit diagram below for the same result which interfaces the PIC with the FTDI device.

For the FTDI device to be used as the communications interface, the PIC requires code to run the internal USART to send receive data.

References

Useful Links

PIC devices: www.microchip.com

FTDI: www.ftdichip.com

Home site for product information

www.zardynamix.com

Compilers

MikroElektronika: www.mikroe.com