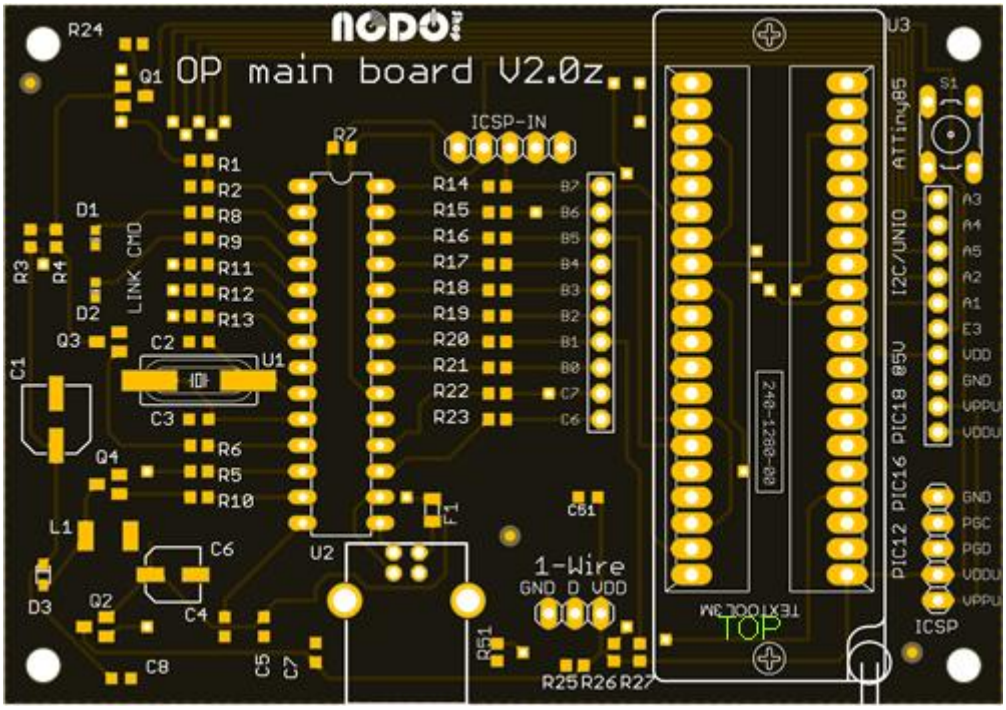
Assembly and Operation
Nodo Open Programmer
V2.0



This kit is based on http://openprog.altervista.org/ which handles PICs up to 20 pin and EEproms and can program additional devices using plug in extension boards (not supplied). Surface mount components have been used to ease assembly and reduce costs, as well as a ZIF socket for long life and convenient operation. This manual should be read together with the website which gives a lot more information on the design.

Some other devices can be programmed depending on version: v2.0z can program ATTiny85 and can be expanded with adapter boards for programming further types of device such as 3.3V PICs; V2.0s can program PIC devices up to 40 pin but is not intended to work with adapter boards.

v2.0s is based on http://www.purchiaroni.com/progetti/UsbPicProg/UsbPicProg_ENG.html.

Contents

Assembly

The board can be assembled even by those not very experienced in soldering.

If you need a bit of practice, visit this site: https://www.makerspaces.com/how-to-solder/

Tools required for assembly:

- Soldering iron (with narrow tip) for electronics, preferably temperature controlled
- Solder for electronics, preferably 60/40 leaded solder with rosin flux core

Components:

The kit contains the following components:

- 1 x Open Programmer main board (already fitted with SMD components)
- 1 x PIC (already programmed)
- 1 x IC socket
- 1 x ZIF socket
- 1 x pin header strip (optional)
- 2 x socket header strips (optional) (for expansion boards)
- 1 x USB B connector
- 1 x Push button SPST tactile switch (optional)

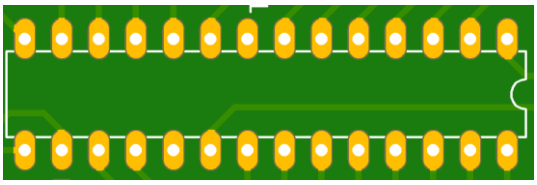
Connections:

Most of the components are already fitted to the board.

Read the instructions carefully before attempting each step of the assembly process.

Sockets

- **Take care to position the 28 pin PIC socket in the proper direction!** On one end you will see a semicircular notch. This needs to be aligned with the marking on the board.
- Hold the socket down with one finger and turn the board over. Now solder two of the corner pins to hold the socket.
- Check position then solder remaining pins.



Proceed as above for the 40 pin ZIF socket. **Make sure the socket is the right way round!**

Position the USB socket on the board (can only fit one way) and solder 4 pins to the board. Fill the mounting holes with solder so the socket is firmly attached.

Pin headers (optional)

Cut the pin header strip into two sections of 5 pins each. Position one header on the board where you see a row of holes marked ICSP. Solder one pin, check the header is vertical, then solder remaining pins. Repeat for ICSP-IN.

Switch (optional)

A push button switch is included in the kit, solder this at S1.

Expansion headers (optional)

Position one socket header on the top side of the board. Hold it vertical, turn the board over, and solder 2 of the pins. Check if the header is vertical on the board, adjust if needed, and solder all pins. Repeat with the other socket header.

Cleaning

Inspect and clean your soldering with isopropyl alcohol and a small brush to remove flux.

PIC installation

Make sure the board is not connected then carefully insert the pre-programmed PIC into the IC socket, aligning the small semicircular mark on the chip with the semicircular cutout in the socket.

Testing

Requires a Windows PC and the *opgui* Windows software which you can download from the website.

Connect the programmer to a Windows PC with a high quality USB lead. This should produce the usual USB device connection sound. The LED marked LINK should be blinking slowly.

Obtain a multimeter and set it to voltage range. Touch the black probe to the USB connector shield and the red probe to F1 near the USB connector, the meter should read greater than 4.75 V. If not replace the USB cable.

Run *opgui* and check that you see this:

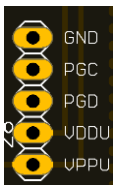
```
Programmer detected
VID=0x1209 PID=0x5432

Firmware version 0.11.x
Hardware ID: 0.0.1 (18F2550)
```

If you see `Programmer not detected` check the connection with the PC.

Click on the Options tab and press the Hardware Test button. You will be reminded to remove any device from the programmer, click OK, then asked to check as follows:

```
Verify on the programmer the value of the following voltages:
 VDDU=5V
 VPPU=13V
 PGD(RB5)=0V
 PGC(RB6)=0V
 PGM(RB7)=0V
```

Use the multimeter to probe the pads in bottom right of the board. Black lead to GND, red lead to the pads mentioned. PGM is B7 located near the ICSP-IN pads. There may be a difference of up to 1V.



If these voltages are correct then press OK and check voltages again. Continue checking voltages and pressing OK until the test procedure is finished.

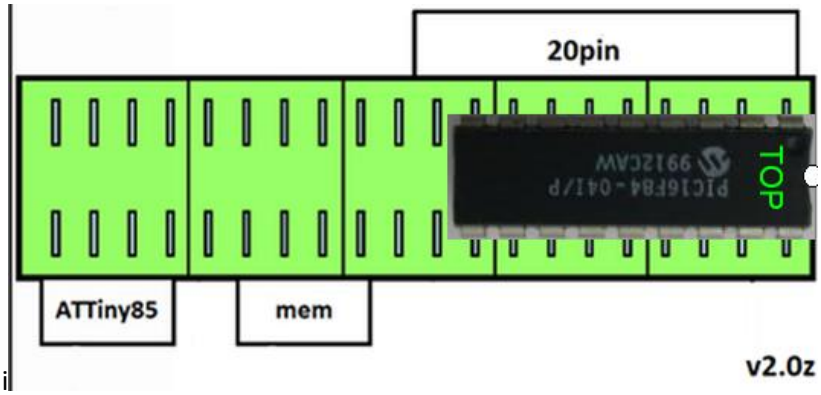
Operation

Connect the programmer to a PC using a standard USB A-B cable. You should hear a beep from the PC and see a green LED blinking fast, then more slowly, on the board.

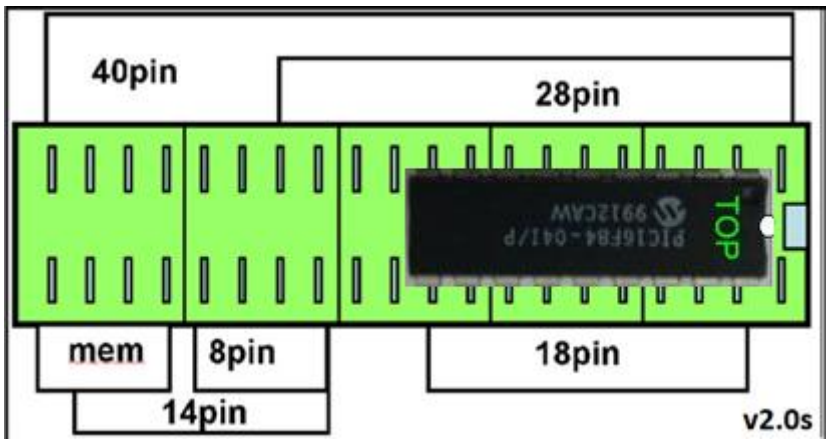
Note: TOP of the ZIF socket (near the operating lever) is at the <u>bottom right</u> of the board as shown:

All versions of the programmer can program a wide range of devices using extension boards that plug in to the main board. The original v2.0 board can program PICs up to 20 pin and EEprom devices in a separate 8 pin socket.

v2.0z uses a ZIF socket for all chips. It can program PICs up to 20 pin, EEprom **and ATTiny85** devices. The diagram shows how chips should be placed, in this example an 18 pin PIC device. The notch at the top of the chip should always face TOP.



V2.0s is an alternative design which can program PICs **up to 40 pin** and EEprom devices.



The notch on the device should always points towards TOP (handle of the ZIF socket).
There are marks on the board to assist you with placing devices correctly in the socket.