

AXE027 PICAXE USB CABLE

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1.0) Introduction

The PICAXE USB download cable is used to download PICAXE programs into PICAXE chips. It can be used with any PICAXE chip or project board. The cable is compatible with any software application that supports programming of PICAXE chips.

The PICAXE USB download cable connects via the computer's USB port. However the cable contains a tiny circuit board, molded into the compact USB connector. This circuit contains a USB to serial convertor chip, and so the actual data transfer to the PICAXE chip is via a 5V logic level serial connection.

2.0) General tips for using the AXE027 USB cable

Always plug in the USB cable *before* starting the software application.

Always use the USB cable in the same USB port on your computer.

Most operating systems regard each individual USB port as a unique location. Therefore if you plug your cable into a different USB port on the computer you may be prompted to reinstall the driver files for this new location.

The USB cable's internal circuit board is powered by the computer's USB port. Therefore remove the cable from the PICAXE project when the USB end of the cable is not inserted into a computer, as the cable will not then be powered.



3.0) Windows 10 and Windows 11 Installation

Pre-installation Notes:

- a) Kindly note that you cannot install the driver from within the Windows 'Settings' app (gear icon). You **must** install the driver via 'Control Panel' instead.
- b) The AXE027 driver is pre-installed as part of the PICAXE Editor installation. If you do not have the PICAXE Editor already installed you should download: <https://picaxe.com/downloads/axe027.zip> and then unzip the contents into a suitable temporary folder on your desktop e.g. \AXE027

3.1) Installing the AXE027 PICAXE USB Cable Driver

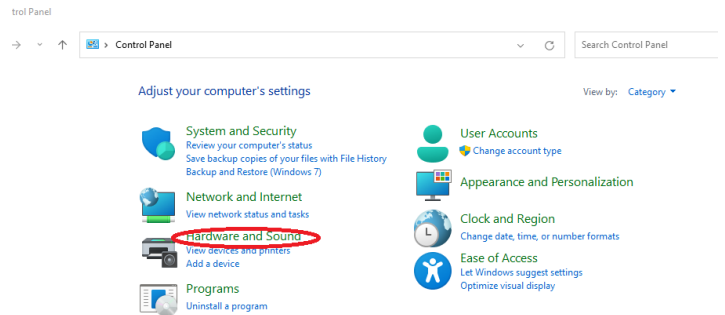
The screenshots below show Windows 11, however the process is identical for Windows 10.

- 1) Insert the AXE027 cable into a spare USB socket. Remember this socket, so that the cable is always used here in the future.

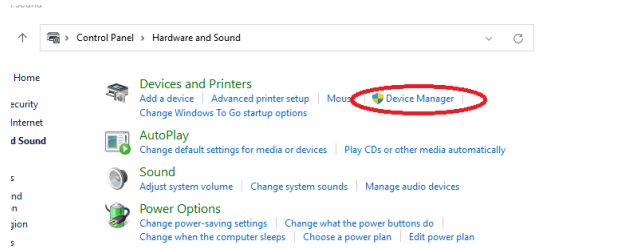
- 2) Tap the Windows key (or Start button) and type in 'Control Panel'

- 3) Click on the 'Control Panel' app to run it

- 4) Click on the 'Hardware and Sound' title

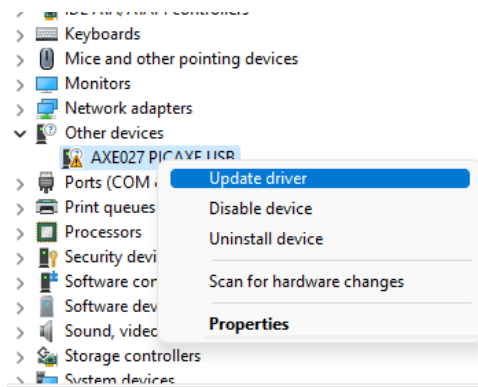


- 5) Within 'Devices & Printers' click on 'Device Manager'

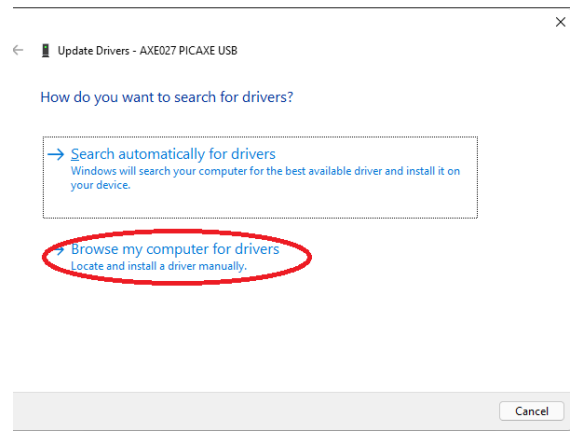


- 6) Find the 'AXE027 PICAXE USB' entry within the 'Other devices' section

- 7) Right click over 'AXE027 PICAXE USB' and select 'Update driver'



8) Select 'Browse my computer for drivers'

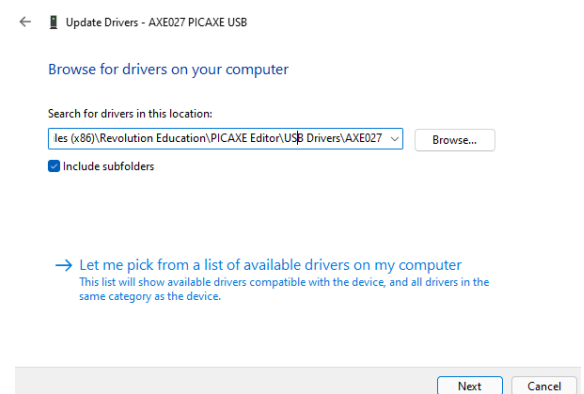


9) Click the 'Browse...' button and then either

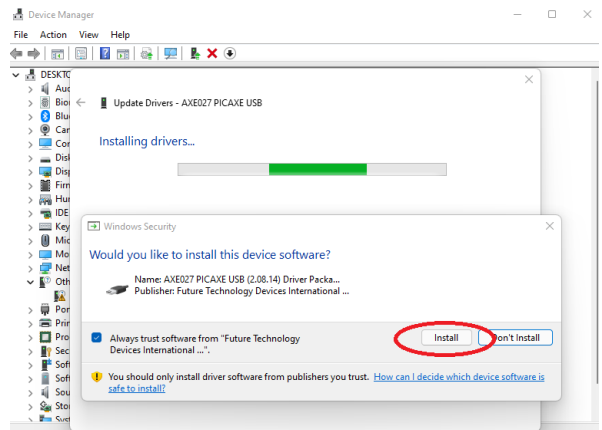
a) browse to C:\Program Files (x86)\Revolution Education\PICAXE Editor\USB Drivers\AXE027

or

b) browse to the \AXE027 drivers folder that you created on your desktop from the zip file



10) Click Next and then 'Install' and wait for the driver to install. **You MUST now also install the 'USB Serial Port' driver as well (steps 11-15).**



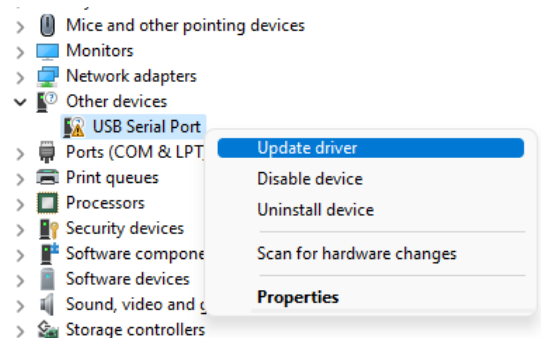
11) Find the 'USB Serial Port' entry within the 'Other devices' section

12) Right click over 'USB Serial Port' and select 'Update driver'

13) Select 'Browse my computer for drivers'

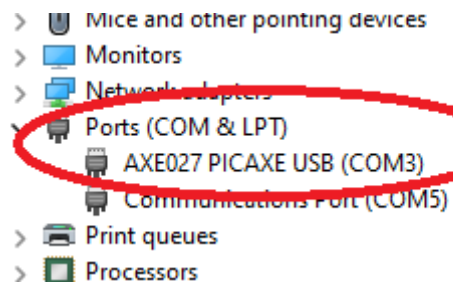
14) The correct folder should already be shown (same as step 9)

15) Click Next and 'Install' and wait for the driver to install.



16) The AXE027 setting should now be shown with a valid COM port number in the 'Ports (COM & LPT)' section. Your installation is fully complete once the computer has been restarted.

The COM port that is allocated will not change as long as you always use the cable in the same physical USB socket on the computer.



4.0) Linux Installation

The AXE027 cable contains an internal electronic circuit, based upon an FTDI USB<->serial converter chip. This chip is already supported by the default Linux installation, via the kernel driver named 'ftdi_sio' (kernel 2.4.20 and later).



Therefore no driver download is required.

However, as many different products from many different companies all use the same FTDI chip, each product is given a unique 'product id' number for identification purposes. This unique product id is programmed into the chip inside the cable, so that when the cable is connected to the computer it can be uniquely identified.

The unique product id for the AXE027 USB cable is 0xbd90. The vendor id is 0x0403.

However the default driver ftdi_sio, as installed by most Linux distributions, only recognizes a few product ids for the FTDI chip (e.g. 0x6001). Therefore it is required to 'patch' the driver so that it correctly supports the AXE027's 0xbd90 product id.

Make sure your user name is a member of the ports group to enable permissions to use the AXE027 USB cable at /dev/ttyUSB0. The group is normally called dialout, but in some Linux builds such as Arch may be called uucp

```
sudo usermod -a -G dialout username
```

(At this point you **must** reboot the computer)

Option A) Either temporarily modify the FTDI driver to use the AXE027 PID (until next reboot)

```
sudo modprobe ftdi_sio
sudo chmod 777 /sys/bus/usb-serial/drivers/ftdi_sio/new_id
sudo echo "0403 bd90" > /sys/bus/usb-serial/drivers/ftdi_sio/new_id
```

(Now insert AXE027 Cable and the port /dev/ttyUSB0 should appear)

Option B) Or add a rule to permanently modify FTDI driver to AXE027 PID

Create a new rule file using your favourite text editor with this filename:
/etc/udev/rules.d/99-ftdi.rules

Enter this text all on one line and save the file

```
ACTION=="add", ATTRS{idVendor}=="0403", ATTRS{idProduct}=="bd90",
RUN+="/sbin/modprobe ftdi_sio" RUN+="/bin/sh -c 'echo 0403 bd90 >
/sys/bus/usb-serial/drivers/ftdi_sio/new_id'"
```

Reload the rules (or simply reboot computer again)

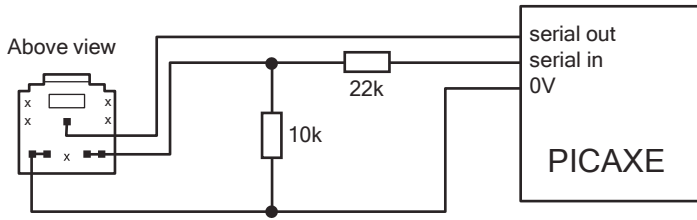
```
sudo udevadm control --reload
```

(Now insert AXE027 Cable and the port `/dev/ttyUSB0` should appear)

If the software such as LinAXEpad is having permissions issue accessing the port try running the software as sudo from the command line rather than clicking the icon e.g.

```
sudo ./LinAXEpad
```

5.0) PICAXE Download Circuit



The standard PICAXE download socket (part CON039) and 10k/22k download circuit is unchanged for use with the AXE027 USB cable (ie the same circuit is used for both the AXE026 serial cable and the AXE027 USB cable).

As the AXE027 interfacing voltage is at true logic levels (5V, rather than RS232 voltage levels) it is theoretically permissible to reduce the value of the 22k resistor (e.g. to 1k), but only **if** a AXE026 serial cable is **never** to be used. However for maximum versatility it is recommended to leave the circuit unchanged.

There is no advantage to using the 'enhanced' download circuit (see main PICAXE manual) with the AXE027 USB cable, as the enhancements in this circuit are to compensate for negative variations in RS232 voltages (which do not apply when using the 5V logic level AXE027 USB cable). However, if already built into a project board, it is acceptable to continue to use the enhanced circuit.

The AXE027 USB cable may also be used to transmit/receive serial data from the PICAXE input/output pins (via serin and serout commands).

6.0) AXE027 Circuit Diagram

The miniature USB to serial circuit is built into the plastic molding of the USB plug on the AXE027 cable. The circuit diagram is shown below.

