PORTABLE PROGRAMMER QUICK START GUIDE

IMPORTANT INFORMATION

1) Do not leave the programmer connected to the PC adapter or a target system, as this will drain the battery.

Installing Software

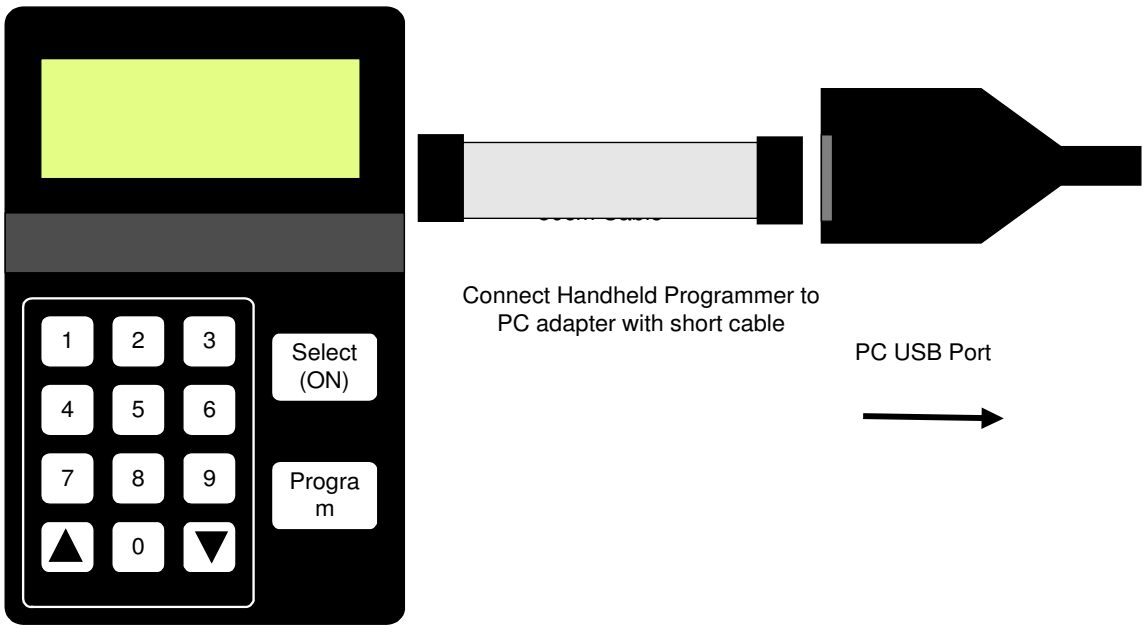
1) Run the executable file on the CD. This will install software and pre-install USB drivers.

2) Plugin PC dongle to a USB port. The drivers should install automatically. If they do not, see Troubleshooting section

LOADING FROM THE PC

1) Connect the PC adapter (dongle) to the PC USB port.

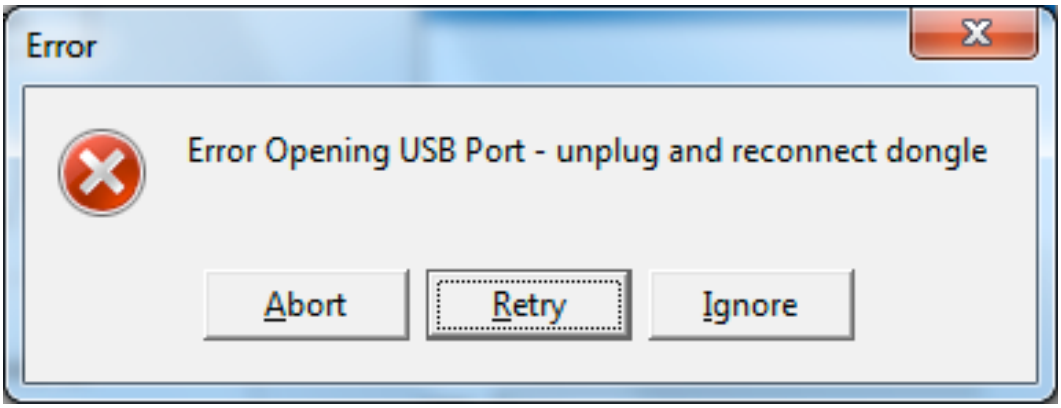
2) Connect the PC adapter directly to the programmer using the short ribbon cable.



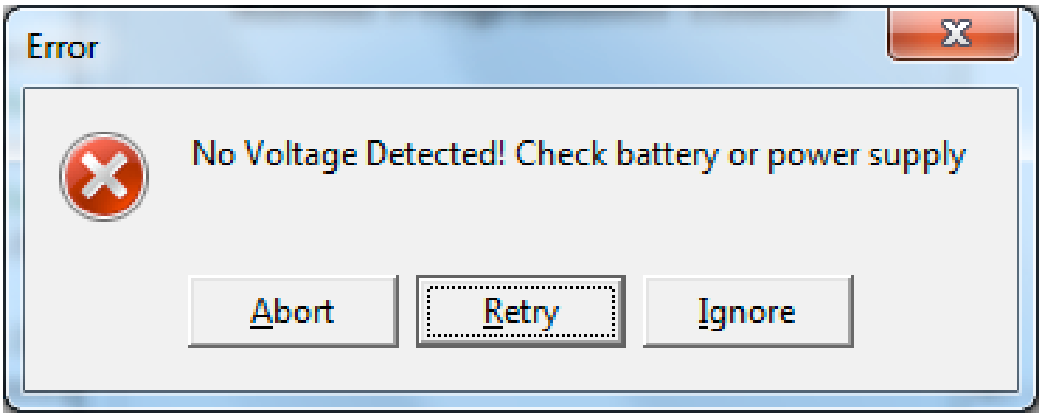
3) To load code, follow the instructions in the software.

Run the Portable Programmer software

a) If USB dongle is not detected, or another Kanda dongle is present, then this error appears. Make sure only one Kanda dongle is plugged in or close other software.

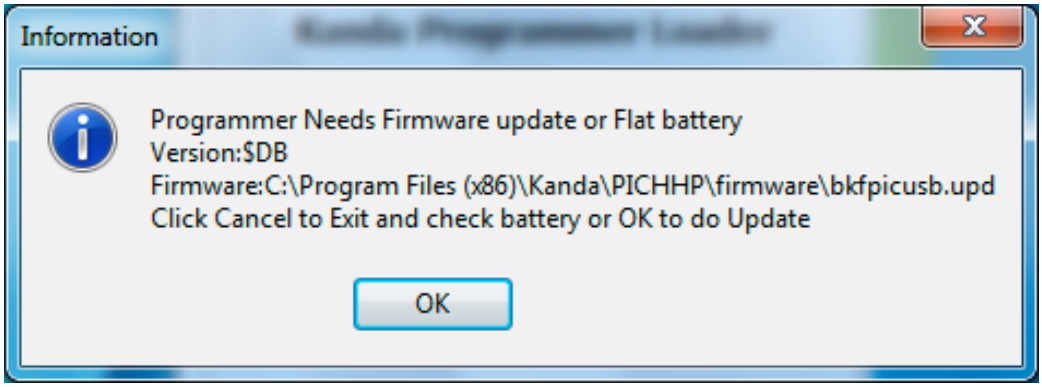


b) If the AVR Portable Programmer is not detected, then this message will appear. Make sure the programmer is connected to the dongle, and the programmer is powered, or battery is Ok.

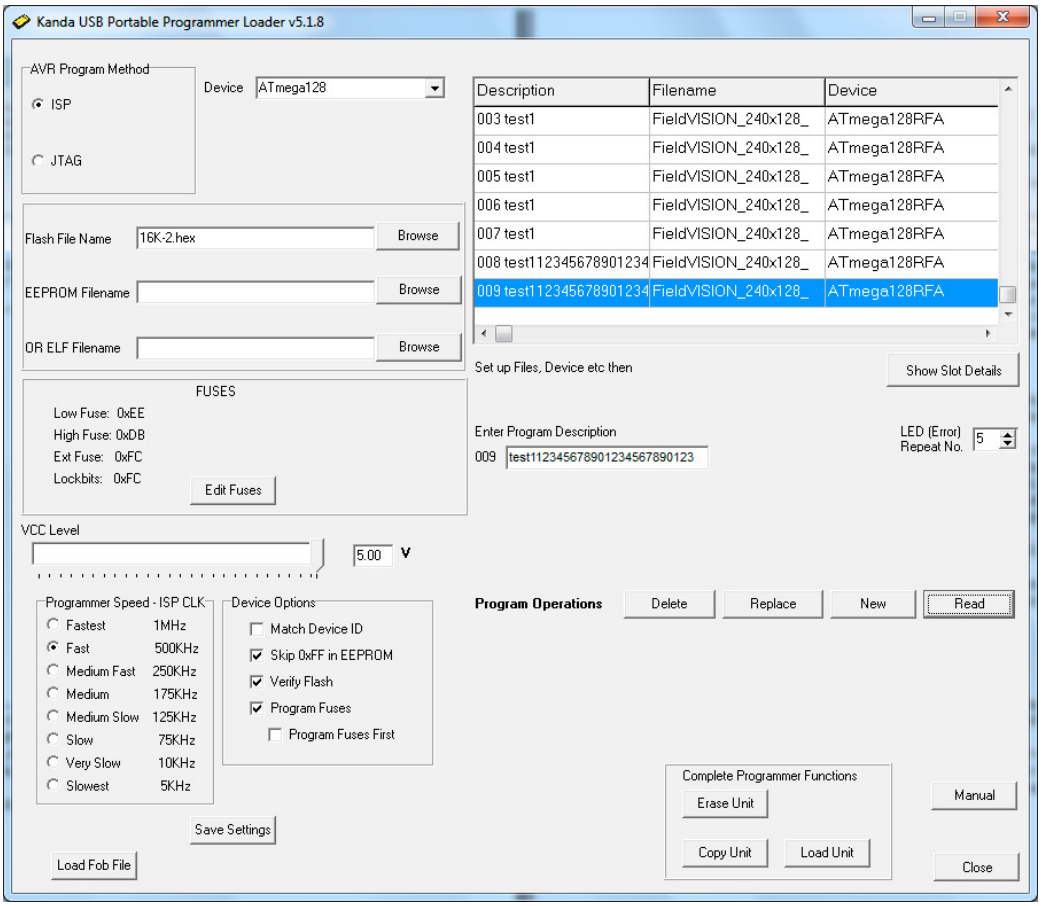


c) To run programmer in Demo mode, Click Ignore. The programmer software will load but you will not be able to Read or Program a programmer until one is connected.

d) If the AVR Programmer requires a firmware update, this message appears. Click OK to carry out firmware update.



Once the programmer is detected and any firmware update necessary has been carried out, the main programmer window will appear.



The right-hand side of the screen shows the Programmer settings, and the left-hand side shows details about the AVR device, filename, programming method and other details that will be used to load the programmer.

The programmer LCD will say "**Loader Connected**" and keypad is ignored.

Programmer and Device Setup

- Select **Program Method** - ISP or JTAG or Xmega PDI
- Select **Device**
- **Flash Filename** box. Enter your flash filename or leave blank if you want to only program EEPROM.
- **EEPROM Filename** box – if AVR device has EEPROM and data is required, then select your EEPROM file
- **ELF filename** box. Load a production ELF file (produced by Atmel Studio 7) *instead* of flash and EEPROM files. This file includes flash, EEPROM, fuses, lockbits and User Row for Xmega.
- **Fuses button** - click to change fuses, see section below.
- **VCC Level** - use slider to select voltage of target circuit
- **Programmer Speed** - Select speed of ISP clock. As a guide, Fastest is for 16MHz target clock, Fast is 8MHz target clock, Medium Fast is 1MHz target clock. Fuse settings on new AVR devices give 1MHz clock by default.
- **Device Options**

    - **Match Device ID**. If checked, programmer checks that target device ID (signature bytes) match device selected. Error code for mismatch is 7 red flashes.
    - **Skip 0xFF in EEPROM**. If checked, locations set to 0xFF in EEPROM file are not programmed. This increases programming speed but old data can be left in EEPROM
    - **Verify Flash**. Check to verify flash memory, which is best practice. If unchecked, flash is not verified, which is faster.
    - **Program Fuses**. Check to program fuses and lock bits, with values set by Fuse button.
    - **Program Fuses First**. Check to program fuses before device is erased. This is useful for setting EESAVE fuse to preserve EEPROM, for example.

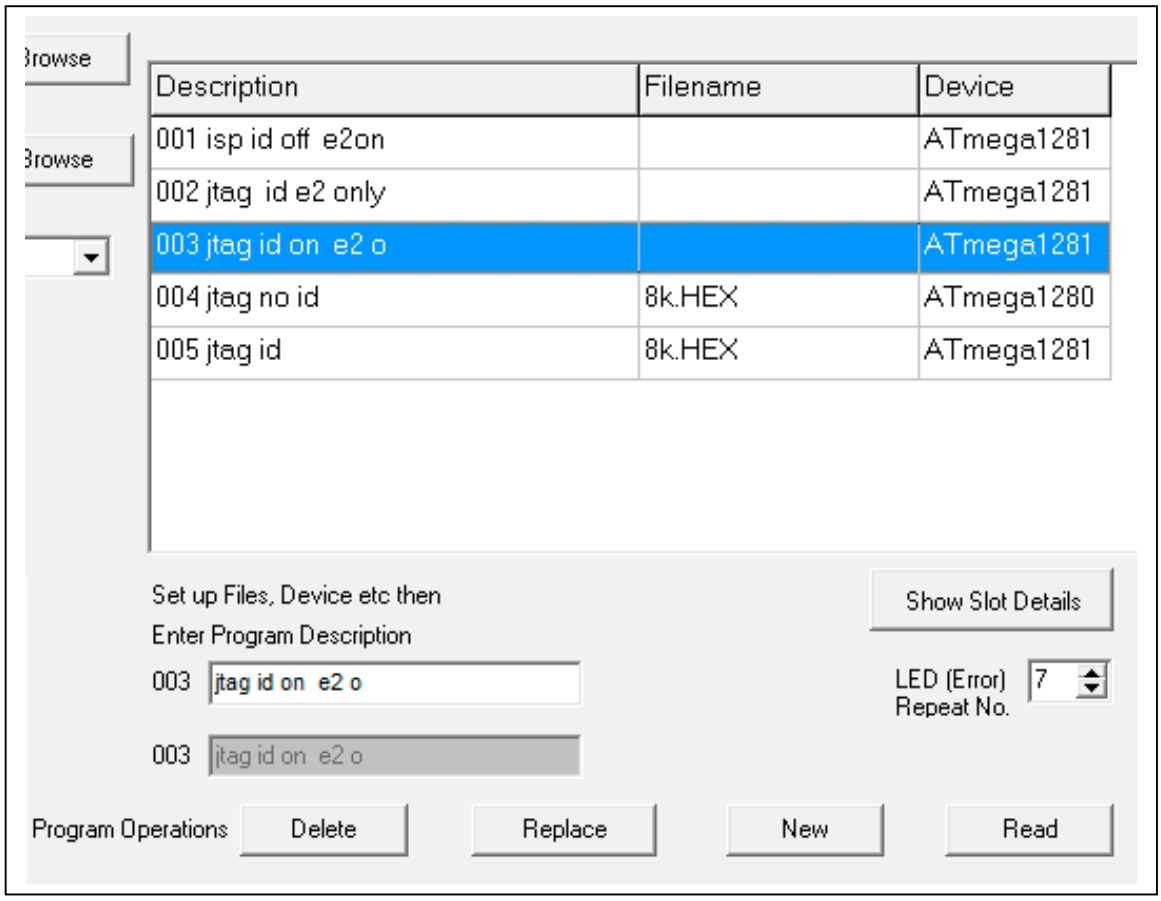
Other Setup Features

- **Program Description**. You must enter a program description of up to 28 characters. This is displayed in pane at top when programmer is read and on LCD.
- **LED (Error) repeat No**. A message will flash on LCD when programming has finished, showing success or reason for failure. This setting will set how many times the message is repeated. Press 0 key to clear message.

Loading the Programmer

Once all these settings have been selected, the programmer can be loaded. The buttons to load the programmer are labelled as **Program Operations**.

The portable programmer has buttons to delete, replace or add new programs. Once the programmer is loaded with 32 programs the New program button is disabled and Programmer Full message shows.



New Button. This will add the program to the next free slot

Replace Button. This will replace the slot selected in the pane above.

Delete Button. This will remove the slot selected in pane above the buttons and set description to Empty.

Read Button. This will read the programmer and display description, filename and AVR device selected in the pane above buttons.

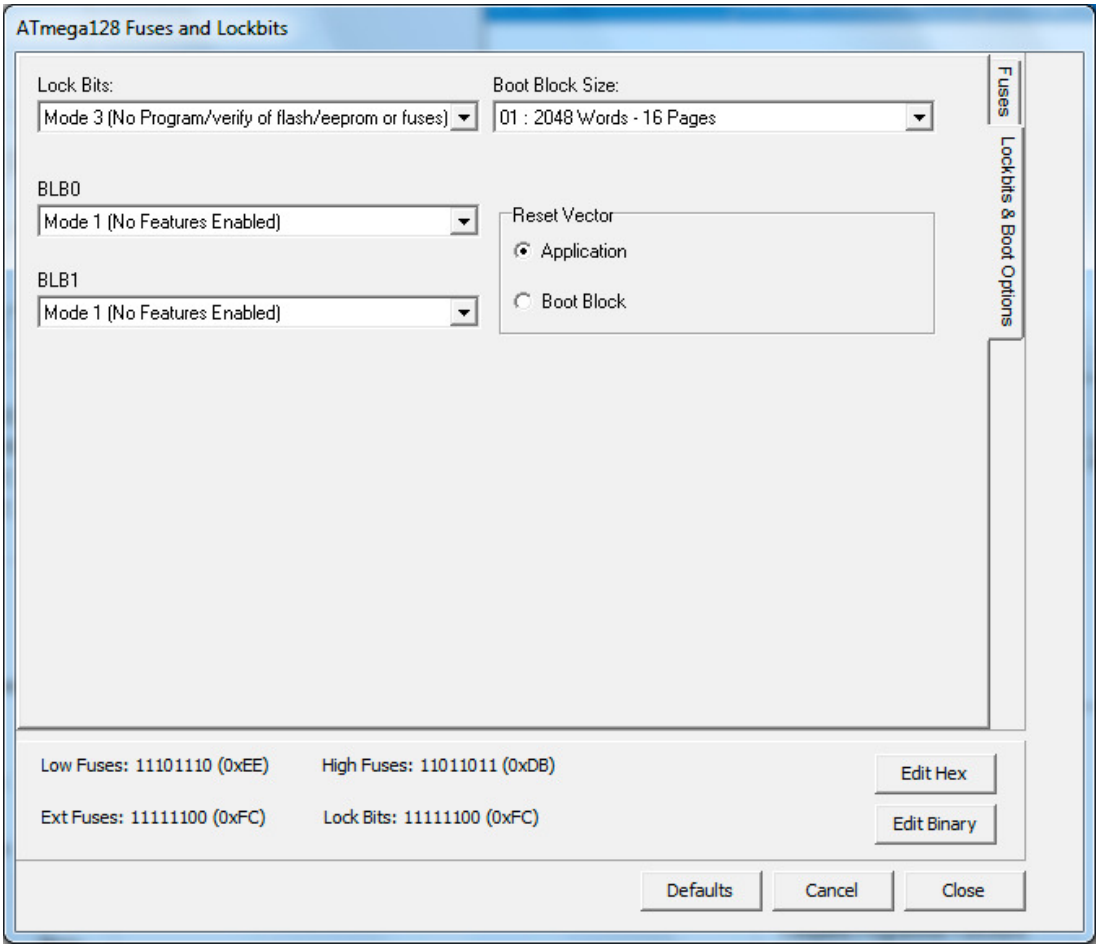
Show Slot Details button. This will show more details, see section below.

Empty Portable Programmer

If the programmer is empty, only New and Read buttons are shown. Clicking on these buttons will load the currently selected slot on the unit. This PC software ignores the programmer keypad.

Fuse Button

Click the Fuse button to edit the Fuses for the currently selected device. If you select a different device, the default fuses will be loaded, other wise the fuse values you select will be saved.



The available fuses and lock bits for the currently selected AVR are displayed. Click on the tab on the right of the screen to **see Lockbits and Boot Block** options.

Enabled AVR fuses (programmed) are actually 0 value. The binary values of each available fuse are displayed at the button of the screen. Click **Edit Binary** button to enter fuse values as binary numbers or **Edit Hex** button to enter hex values..

Default button will load defaults for the AVR device selected

Cancel button will close Fuse box without saving changes

OK button will close Fuse box and save your changes.

Show Slot Details button

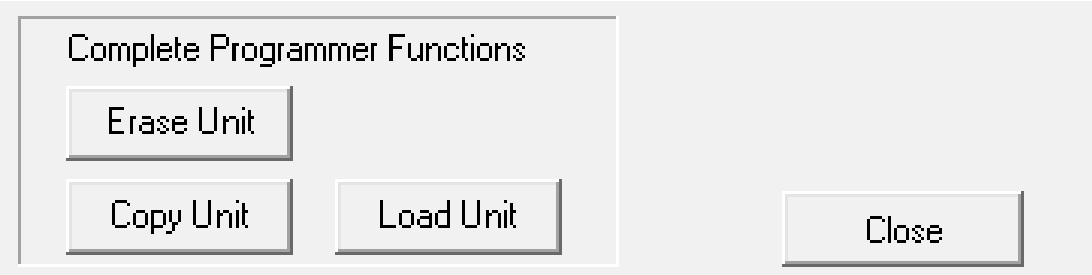
This button (at right hand side below display pane) will give more details of the contents of the programmer.

Clicking on this button will update all the settings to those used in the programmer slot that is currently selected in the display pane, including fuses.

Program Options

The programmer settings are saved to the registry and when software is run again, these settings will be loaded.

Complete Programmer Functions



These are at bottom right of screen.

Erase Unit button. This will erase all programs and settings from the programmer. The programmer will then be empty.

Copy Unit button. This allows the contents of the programmer to be saved to a file (.prg). All the settings and data are saved.

Load Unit button. This allows the settings and data from one programmer previously saved as a PRG file to be loaded into another programmer.

This is the easiest way to load multiple programmers. Load the first one with all the slots you need, then Copy Unit. Use Load Unit to transfer the contents to other programmers.

This is also the simplest way to transfer settings to another user. This replaces the Fob file mechanism used on old AVR handheld and keyfob software.

Load from Command line or Process

The software can be launched from a command line or another process by calling avrHHP.exe with a Load parameter and optional .PRG filename parameter, for example

avrHHP Load

This will open PRG open file dialog box. Select file to load programmer

Call it with a second parameter, a .PRG filename eg

avrHHP.exe Load "C:\Test Files\test1.prg" will load this file

The software will run, load the programmer and then close.

To keep the software open after load add a third parameter called SHOW, for example

avrHHP.exe Load "C:\Test Files\test1.prg" SHOW

Programming Target

POWER OPTIONS

There a three power options with the Handheld Programmer

1) **Programmer powers target**
   Plug into unpowered target. Connector pin 2 (Vcc) must be connected to Vcc on your board and all 4 GND pins must be connected to target ground. Use battery or external PSU.
   There is a 150mA current limit for powering the target.
   In Software, select Vcc needed by target circuit on Target Voltage selector (0-5V)

2) **Target Powered and Vcc connected to ISP Header**
   If target Vcc is connected to ISP header – Pin 2, then *Set voltage in software, on Target Voltage Selector, to 0V (or less than target voltage).*

   All 4 GND pins must be connected and target must be powered.

3) **Target Powered and Vcc NOT connected to ISP header**
   If target Vcc line is NOT connected to Pin 2 – Vcc on ISP header,
   In Software, select Vcc on Target Voltage selector (0-5V) to match target circuit voltage.

   Do connect all four GND pins to target ground.
   Power Target

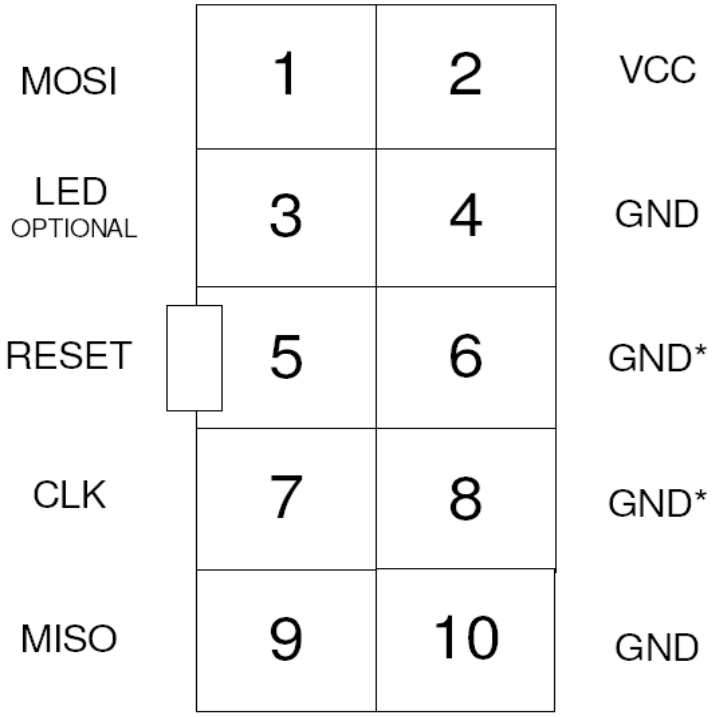
TARGET Connection -ISP

1) Connect the programmer to the target system using the short ribbon cable.

- Target Layout – not end of lead view
- Header is 0.1” (2.54mm) box header in 5 x 2 format, with polarising notch - 10-way IDC header
- See section below for *Six Way adapters*

- GND* These pins must be connected to target ground
- GND One or both must be connected to Target ground

TARGET CONNECTOR FOR AVR PROGRAMMERS

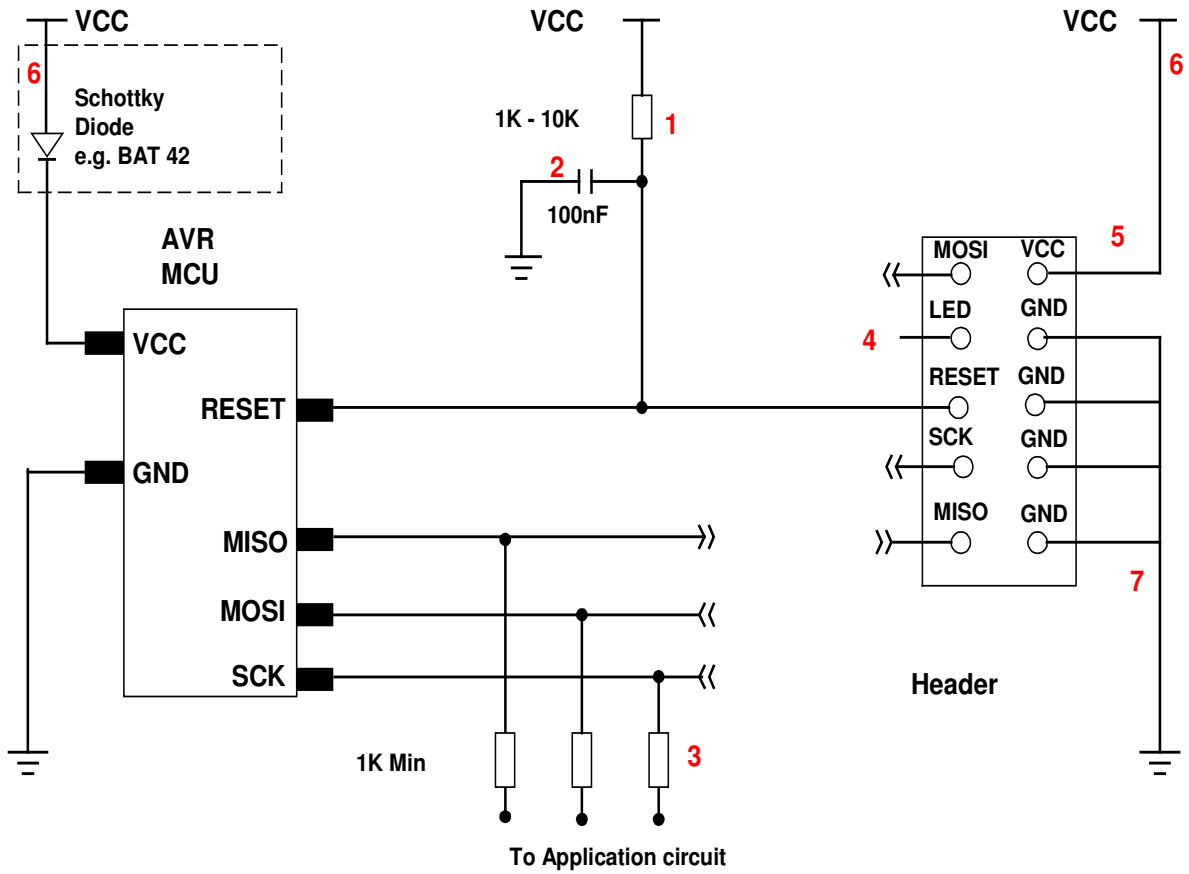


TOP VIEW OF THE CONNECTOR ON THE TARGET SYSTEM

0.1" PITCH 2*5 BOXHEADER WITH POLARISING NOTCH

Recommended ISP Circuit

This diagram shows a typical ISP circuit that will work with the Handheld Programmer. Please read the notes for more detail.



1) This resistor should be fitted. It can larger than 10K if required, but not smaller than 1K

2) Again 100nF is a typical value. We suggest a minimum of 10nF.

3) Programming lines should be isolated from application circuit with series resistors, especially if application circuits force the state of the AVR pins. In exceptional cases, a multiplexer may be needed to isolate these lines. Capacitors on these lines may mean that a slower programming speed should be selected. AVRs that use RX/TX pins for programming eg ATmega128 need at least a 1K resistor for RX line (MISO) if UART is used.

4) Optional LED line. This can be connected to an indicator LED if desired, or used to drive a multiplexer. It is LOW during programming

5) If Vcc is not connected to header, see ***Power Options*** section for programmer setup.

6) If the programmer is powering the target, it is current limited to 150mA. If the rest of your circuit draws too much current, then fit this diode, and connect VCC to header and AVR through it.

7) GND pins. We recommend that all GND pins are connected. If not, then either pin 4 or pin 10 MUST be connected – these are programmer Ground. Pin 6 is connected to programmer battery but can be omitted. Pin 8 MUST be connected as it is the mode pin. The programmer uses this pin to check if it is connected to a PC or a target.

Note: The 10-way lead is not wired Pin 1 to Pin 1, so the connector on the programmer shown here is NOT the same as the end of the 10-way lead.

10-way Connector on Programmer

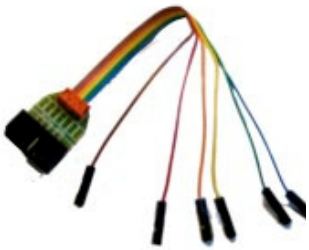
SIX WAY ADAPTERS

Because of the need to connect more than 1 GND pin, the adapter should connect GND pins together. So, the adapter is not as straight forward as it first appears.

Adapters from the 10-way DIL interface to 6-way flying leads, 6-way DIL (Atmel 3 x 2 0.1” pin header), and 6-way Micromatch connectors are available from Kanda. 10-DIL6 is included in this kit.

Order Codes are:

10FLEX6

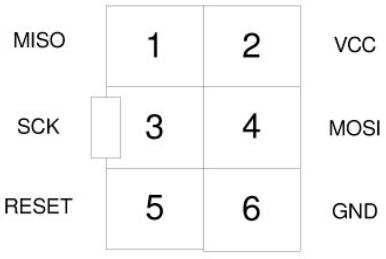


10DIL6

10MICR6

Adapters for smaller pitches, 0.05" (1.27mm) or 2.0mm are also available - https://www.kanda.com/Adapters--Connectors.188.html

TARGET CONNECTOR FOR AVR
PROGRAMMERS (ATMEL 6WAY)



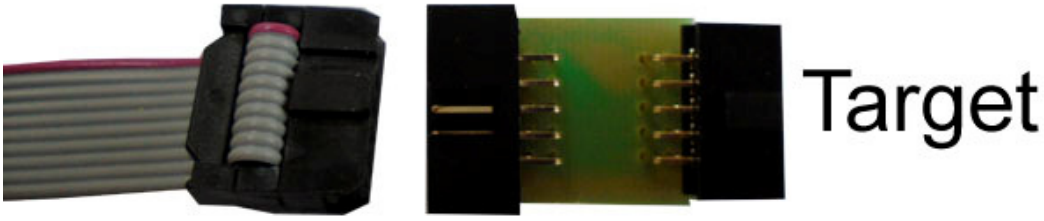
TOP VIEW OF THE CONNECTOR ON
THE TARGET SYSTEM

0.1" PITCH 2*3 BOXHEADER
WITH POLARISING NOTCH

JTAG Programming

Everything is the same for JTAG programming except the programmer needs a JTAG adapter. These are available on our shop (www.kanda.com) but is also included in this kit.

Order Code: AVRHHP-JTAG



If you want to make your own JTAG adapter, the pin outs on the programmer are shown below

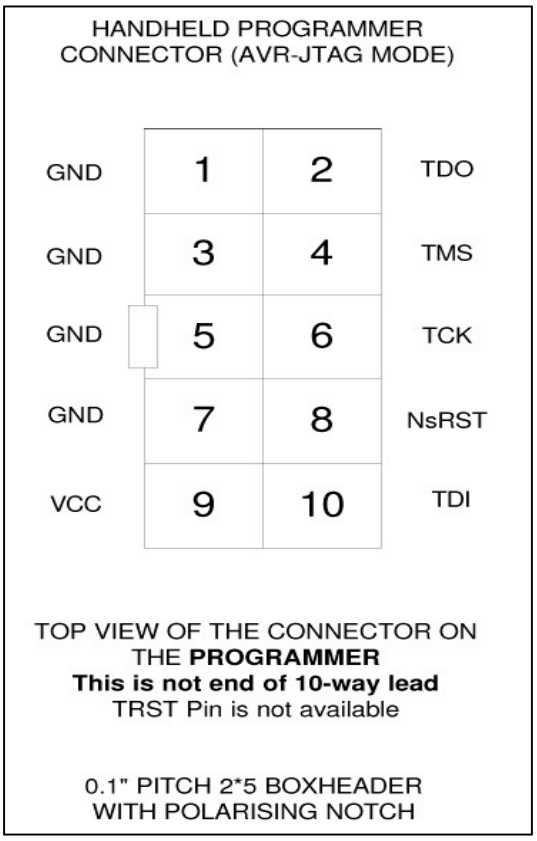
Note: These are NOT the same as the end of the 10-way lead, which is not wired pin 1 to pin 1. We recommend that you make up your own lead and use the 10-way connector on the programmer. All the GND pins on this connector must be wired to ground.

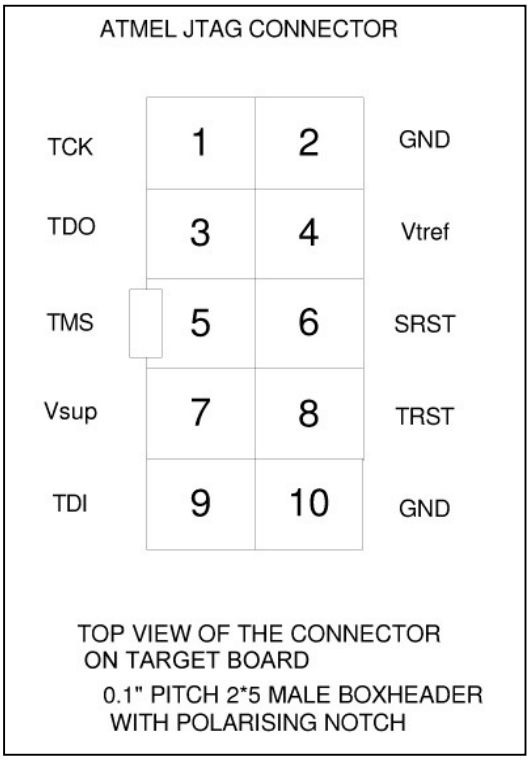
The second diagram is an Atmel JTAG layout usually used on target PCBs.

Atmel JTAG Header	Handheld Programmer
1: TCK	6 : TCK
2: GND	1,3,5,7: GND
3 TDO	2: TD0
4: Vtref	9: VCC
5: TMS	4: TMS
6:SRST	8 : NsRST
7: Vsup	9: VCC
8: TRST	N/C
9: TDI	10: TDI
10: GND	1,3,5,7 : GND

1) TRST is not available
2) VCC pin 9 on programmer needs connecting to both Pin 4 AND Pin 7 on target end
3) All 4 GND pins on programmer must be connected to either Pin 2 or Pin 10 or both, depending on which are connected to Ground on your target.

4) Misconnection (to JTAG without adapter or ISP with adapter) will NOT damage programmer, you will get Over-current message on LCD. It may damage your target.





Errors

During programming, the LCD screen will say **Programming...**

When programming has finished it will say **Programmed OK**

If there is an error, the error cause will be displayed. These are

- **'ISP Entry FAIL**' - check connections
- **'EEPROM verify FAIL**' - check skip FF setting or slow programmer
- **'FLASH verify FAIL**' - slow down programmer
- **'FUSE verify FAIL**' - slow down programmer
- **'Count LIMIT Reached** ' - Number of programs limit reached
- **'Device ID WRONG** ' - check correct AVR selected
- **'Empty Slot** ' - selected slot is empty
- **'VCC Over-Current** ' - current limited exceeded. Power target or isolate extra circuits and check for faulty board
- **'Header Checksum'** - damage to programmer data, reload programmer
- **'Flash Checksum'** - damage to user code, reload programmer

The error or OK message will flash repeatedly, the number of times is set by LED (Error) Repeat No on set up screen. Wait until error message stops or press 0 key to clear message and re-enable programming.

BATTERY AND POWER SUPPLY

The Portable Programmer uses a rechargeable 9V PP3 battery. These are commonly available.

ONLY FIT RECHARGEABLE BATTERY as programmer contains a charging circuit! The programmer must always have a battery in it even if power supply is connected, as power supply just charges battery.
Current output may be limited when battery is charging, approximately 100mA rather than 150mA.

The programmer battery is charged from the external Power Supply Unit included. This power supply is

- 2.1mm barrel connector (coaxial plug), centre positive.
- 15V DC regulated
- 300 mA plus

TROUBLESHOOTING

Windows driver problems

If you get a driver error or FTDIxx.DLL not found, make sure that you have run the install software on CD and then plugged in programmer, NOT the other way round.

The driver should appear as a "USB Serial Converter" in USB section of Device Manager. Windows should do this automatically. If it does not, please follow this procedure.

- Plugin Programmer and ideally remove other USB devices
- Go to Control Panel > System > Hardware screen
- Click on Device Manager button
- Open USB section and select “USB Serial Converter”
- Right click on it, and select Update Driver
- Driver location is (default install path)
  C:\Program Files\Kanda\AVRHHP\driver\driver

Error Message: “Programmer is not responding – check connections and battery power”

1) Check dongle is attached to USB port
2) Check that programmer is connected to PC as shown on Page 1
3) Check battery or power supply to the programmer
4) Make sure you have a Handheld Programmer dongle, not a standard AVRISP-U/STK200 dongle. The unit will say “Dongle2” on it.
5) Disconnect other USB devices that may interfere with port

New Portable Programmer Version

The latest software version, v5.6.0 and above, is not compatible with programmers loaded with older software versions. You will get the message that Programmer MUST be erased. This must be done.

Use the COPY button to save the programmer contents before you upgrade to the new version. Then use LOAD button to reload programmer after the firmware update.

FURTHER INFORMATION

Please contact support@kanda.com for technical support or go to our website support pages for latest software.

See **www.kanda.com/support**

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