

Overview

Tekmos now offers microcontroller programmers for use with its products. This instruction guide presents a short explanation of the differences between programming Tekmos parts and the earlier microcontrollers they replace. It is followed by a detailed guide to using the programmer.

Use this guide for programming these Tekmos parts:

TK68HC705B32	TK68HC711KS2
TK68HC711D3	TK68HC705C9A
TK68HC711E9	

Tekmos makes replacements for many different types of microcontrollers. Some of the original version microcontrollers used EPROM technology,

which is One Time Programmable (OTP). This EPROM technology used an obsolete process which is no longer available.

Tekmos replaced the EPROM in these devices with an internal 5 volt flash memory. The devices behave identically in the application, but are programmed differently. The Tekmos parts are 5 volt parts, including the programming.

NOTE: Existing Freescale, NXP or Intel programmers cannot be used to program the Tekmos parts. The EPROM technology typically required applying 15 volts to program a part. Since the Tekmos parts are 5 volt parts, the application of 15 volts to the Tekmos parts will severely damage them.



Technical Details

The Tekmos IC Programmer is built on a standard Raspberry Pi computer system. There is a large amount of documentation available on the Internet because Raspberry Pi is so popular. All of it applies to the Tekmos Programmer. If the system needs to be modified in a unique way, such as changing to a fixed IP address, we recommend using the web documentation.

Here are the login details for the Tekmos programmer:

Network name: `raspberrypi`

Operating System: `Raspbian (Debian Wheezy)`

Username: `pi`

Password: `raspberry`

Admin Username: `root`

Admin Password: `root`

Setup

The Programmer can be used in either a headless or standalone mode. If a network and PC is available, the headless mode is probably the easiest to use. There are only two connections that need to be made, the power brick has a micro USB connector that plugs into the side, and a standard Ethernet cable is needed for networking. The system does not have an on-off switch, it should boot up as soon as power is connected.

Putty

The PC that will be communicating with the Programmer will need an installation of the Putty communications program. Download a copy at the Putty website and place it in any directory (it comes as a simple executable that does not need installation).

The Putty homepage is:

<http://www.chiark.greenend.org.uk/~sgtatham/putty/>

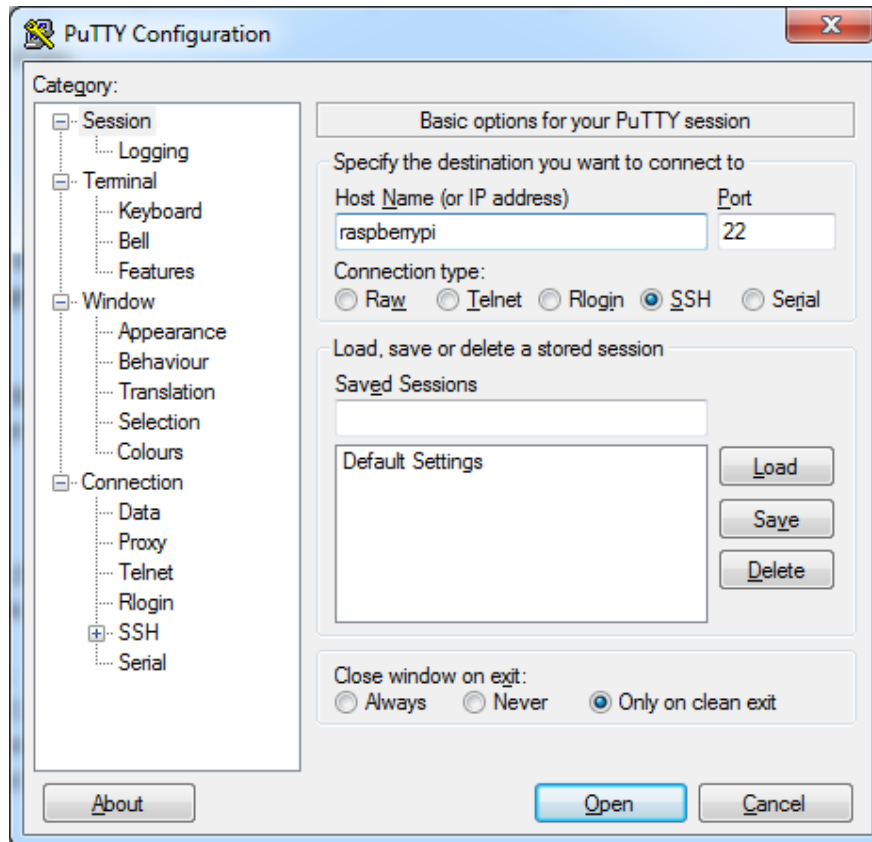
The Putty download page has many different file options. The only file needed is:

`putty.exe`

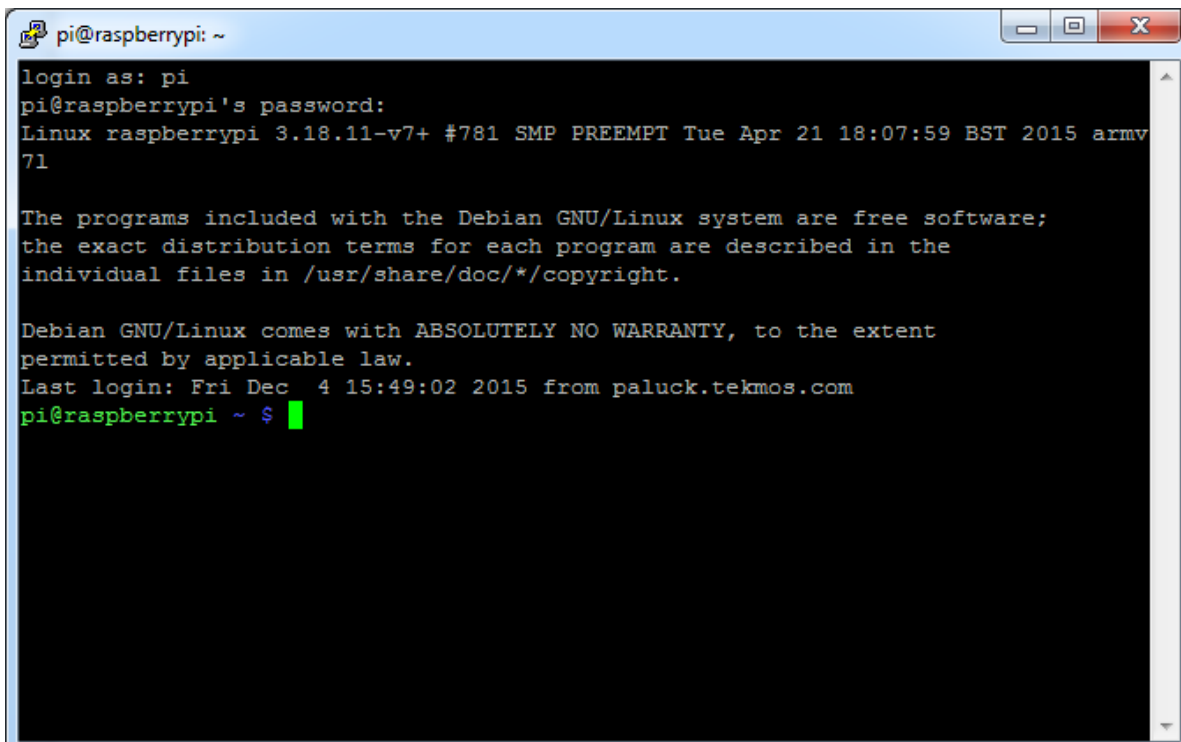
Start Putty and change the hostname to `raspberrypi`. All other settings should be left with their default values.

Press the "Open" button and the program will connect to Raspberry Pi. Enter the regular Username/Password from above. You should enter a shell ready to program devices.

Putty command prompt:



Here is the shell window after login:



```
pi@raspberrypi: ~
login as: pi
pi@raspberrypi's password:
Linux raspberrypi 3.18.11-v7+ #781 SMP PREEMPT Tue Apr 21 18:07:59 BST 2015 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

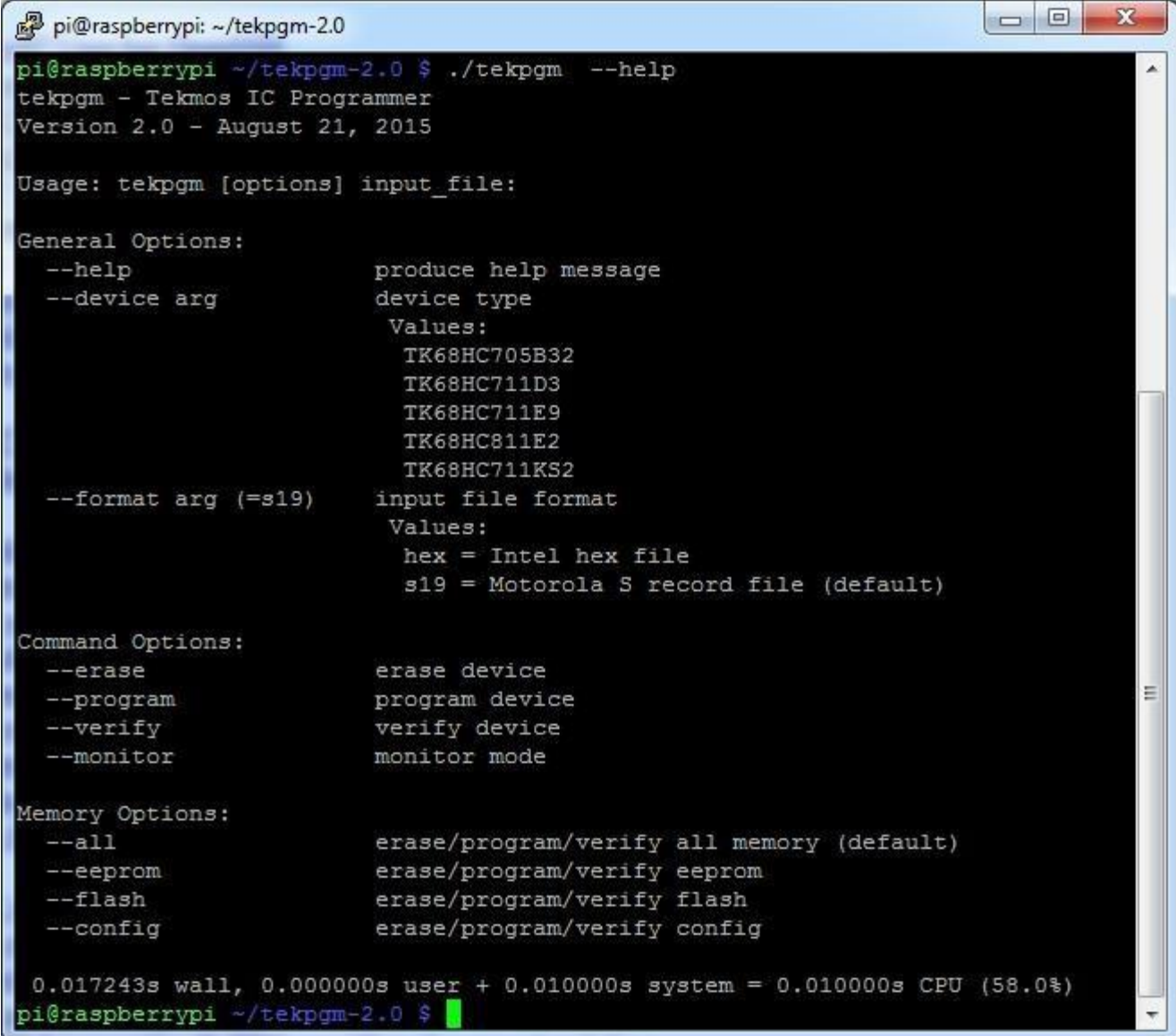
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri Dec 4 15:49:02 2015 from paluck.tekmos.com
pi@raspberrypi ~ $
```

Help

You can ask for the command line help documentation by entering the following command:

```
tekgpm --help
```

Here is a screen capture of the help screen:



```
pi@raspberrypi: ~/tekgpm-2.0
pi@raspberrypirpi ~/tekgpm-2.0 $ ./tekgpm --help
tekgpm - Tekmos IC Programmer
Version 2.0 - August 21, 2015

Usage: tekgpm [options] input_file:

General Options:
  --help                produce help message
  --device arg          device type
                       Values:
                       TK68HC705B32
                       TK68HC711D3
                       TK68HC711E9
                       TK68HC811E2
                       TK68HC711KS2
  --format arg (=s19)  input file format
                       Values:
                       hex = Intel hex file
                       s19 = Motorola S record file (default)

Command Options:
  --erase                erase device
  --program              program device
  --verify               verify device
  --monitor              monitor mode

Memory Options:
  --all                  erase/program/verify all memory (default)
  --eeprom               erase/program/verify eeprom
  --flash                erase/program/verify flash
  --config               erase/program/verify config

0.017243s wall, 0.000000s user + 0.010000s system = 0.010000s CPU (58.0%)
pi@raspberrypirpi ~/tekgpm-2.0 $
```

Programming Devices

The tekgpm program has three operating modes: Erase, Program, or Verify. Within these modes there are also three memories that can be operated on: Flash, EEPROM, or Config. If a memory is not selected then the program assumes all three memories should be operated on. The desired memory configuration is passed as a single S-Record file with an image of the entire 68HC7xx address space.

The default for the programming data is Motorola S19. If the data is in Intel HEX format, than the `--format` option needs to be used.

Erase

To erase an entire device, use the command:

```
tekpgm --erase
```

The device argument should be the correct device family. The supported families are listed in the help command.

Program

To program an entire device, enter the command:

```
tekpgm --program program.s19
```

The programmer will perform three separate operations to program the Flash, EEPROM, and Config. The file name `Program.s19` should be replaced with the S-Record file containing your program.

Verify

To verify an entire device, enter the command:

```
tekpgm --verify program.s19
```

The device will not be changed by this operation, but all three memories will be extracted and compared against the reference S-Record file. `Program.s19` should be replaced with the S-Record file containing your program.

Special Situations:

TK68HC705B32

The `tekpgm` program uses the serial load mode of the TK68HC705B32 to first load a small driver program that is then responsible for actually programming the memory. The Security bit (SEC) in the Options register controls access to serial load mode. If the Security bit is programmed to zero the device will stop responding to attempts to access the serial mode. This is exactly the same way a Freescale device works. If the device is in this mode then use the erase device command shown above to erase the entire device and re-establish access to serial load mode.

Part Ordering Information:

Manufacturing Part Number	Tekmos Programmer Number	Package
TK68HC711D	TK7804	PLCC44
TK68HC711E	TK7803	PLCC 52
TK68HC711K	TK7806	PLCC 84
TK68HC711KS2	TK7801	PLCC 68
TK68HC705B	TK7802	PLCC52
TK68HC705C	TK7807	PLCC44
		PDIP40

Contact Information

TK68HC7xx Device Programmers may be ordered directly from Tekmos:

Tekmos, Inc.
14121 Highway 290 West
Bldg 15
Austin, TX 78737

512-342-9871 phone
Sales@Tekmos.com
www.Tekmos.com

Revision History

Date	Revision	Description
12/13/2015	1.0	Initial release
3/23/2016	1.1	Remove "Preliminary"
7/08/2016	1.2	Fix minor Typographical Error
07/05/2018	1.3	Added Part Ordering Information
06/13/2022	1.4	Updated programmer picture on Page 1. Minor updates on command prompts.

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