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**Future Technology Devices International Ltd**

**VPROG-1**

**Vinculum Host Controller Programmer**

**Datasheet**

**Document Reference No.: FT\_000059**

**Version 1.00**

**Issue Date: 2008-07-14**

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## **1 Introduction**

### **1.1 Overview**

The VPROG-1 is used to program individual Vinculum Host Controller devices or it can be used to program Vinculum Host Controller devices used on the VDIP1 and VDIP2 (Vinculum VNC1L-1A evaluation boards). The VPROG-1 programmer requires either a VPROG-1-S-LQFP48 or a VPROG-1-S-ZIF40 adaptor connected to it to allow programming of the Vinculum host controller devices.

The Vinculum host controller device is an embedded USB host controller IC with 64k Byte of embedded Flash ROM program memory. The host controller Flash ROM is blank when supplied and requires to be programmed by the user. The VPROG-1 programmer allows the user to program the Vinculum host controller device Flash ROM via a USB interface.

The VPROG-1-S-LQFP48 is used to program individual Vinculum host controller devices.

The VPROG-1-S-ZIF40 is used to program Vinculum host controller devices used on the VDIP1 and VDIP2 modules.

For further information on the VNC1L-1A go to the Vinculum website <http://www.ftdichip.com/>.

### **1.2 Features**

The VPROG-1 has the following features:

- USB controlled and powered.
- Quick and easy programming of individual Vinculum host controller devices.
- Quick and easy programming of VDIP host controller prototyping modules.
- Quick and easy programming of ganged VPROG-1 (up to 10) programmers.
- Easy to use VNC\_PROG software.
- Visual indication of programming progress and status using LEDs.

## 2 Block Diagram

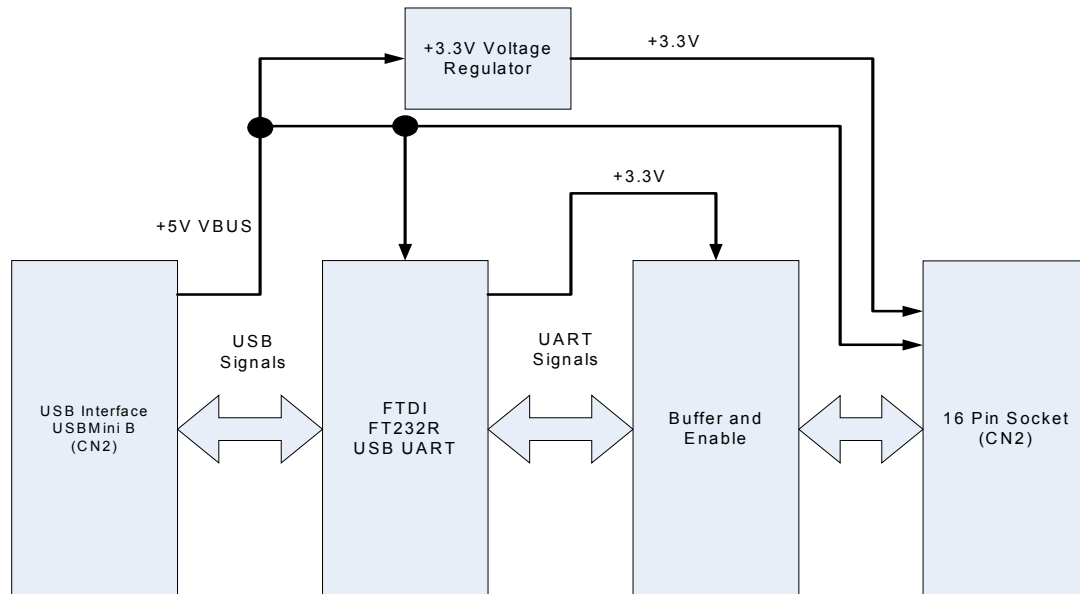


Figure 2.1 VPROG-1 Main Board Diagram

### 2.1 Block Description

The VPROG-1 programmer uses a FTDI FT232R USB UART IC to interface between a PC USB and the Vinculum host controller. The VPROG-1 programmer draws its power from the USB bus (up to a maximum of 45mA). A +3.3V voltage regulator is used to generate a +3.3V supply for the program adaptor – which is also supplied by the +5V VBUS via a power switch. Signals to and from the program adaptor are buffered and enabled before being driven to the program adaptor. Four LEDs indicate the status of the power and give program device pass/fail status after programming is complete. A “Program” button initiates the programming of the Vinculum host controller devices when it is pushed.

### 2.2 VPROG-1 Connections

There are 2 connectors on the VPROG-1 programmer. The USB MINI-B (CN1) connects to PC USB interface. The 16 way socket (CN2) connects to the selected program adaptor (VPROG-1-S-LQFP48 or a VPROG-1-S-ZIF40). The following tables, Table 2.1 and Table 2.2, describe the function of each connector.

Pin Number	Name	Type	Description
1	VBUS	Power Input	+5V from USB bus
2	D-	Input	Data Minus
3	D+	Input	Data Plus
4	No connection	N/A	N/A
5	GND	Power Input	0V

Table 2.1 USB Connector (CN1) Signal Description.

Pin Number	Name	Type	Description
1	VNC_PROG#	Output	Active low program enable for the VNC1L-1A. Used in combination with VNC_RESET# to program the VNC1L-1A.
2	GND	Power Output	0V to the programming adaptor.
3	VNC_RESET#	Output	Active low reset signal to the VNC1L-1A on programming adaptor. Used in combination with VNC_PROG# to program the VNC1L-1A.
4	GND	Power Output	0V to the programming adaptor.
5	VNC_RTS#	Input	Active low Request to Send from the VNC1L-1A on the programming adaptor.
6	GND	Power Output	0V to the programming adaptor.
7	VNC_TXD	Input	Data transmitted from VNC1L-1A on the programming adaptor. (VNC1L-1A transmitted data)
8	GND	Power Output	0V to the programming adaptor.
9	VNC_CTS#	Output	Active low Clear to Send to the VNC1L-1A on the programming adaptor.
10	SW_VCC5V	Power Output	+5V power supply to the programming adaptor.
11	VNC_RXD	Output	Data transmitted to VNC1L-1A on the programming adaptor. (VNC1L-1A received data)
12	SW_VCC3V3	Power Output	+3.3V power supply to the programming adaptor.
13	Not connected	N/A	Not connected
14	LED_SW_VCC	Power Input	+3.3V input from programming adaptor. Used to illuminate MPOWER LED.
15	Not connected	N/A	Not connected
16	GND	Power Input	0V to the programming adaptor.

**Table 2.2 Module Adaptor Connector (CN2) Signal Description.**

### 3 VPROG-1 User Guide

The following diagram, Figure 3.1, shows the VPROG-1 unit. The user interface is described below:



Figure 3.1 VPROG-1 Base Unit

#### 3.1 PC Connection

The VPROG-1 module connects to a PC USB port via the USB Mini-B connector on the VPROG-1. Check that only the POWER LED is illuminated. This indicates that the VPROG-1 has power and is functional.

#### 3.2 VPROG-1 Program Adaptors

The VPROG-1 requires one of two program adaptors. These are shown in the Figure 3.2 and Figure 3.3.

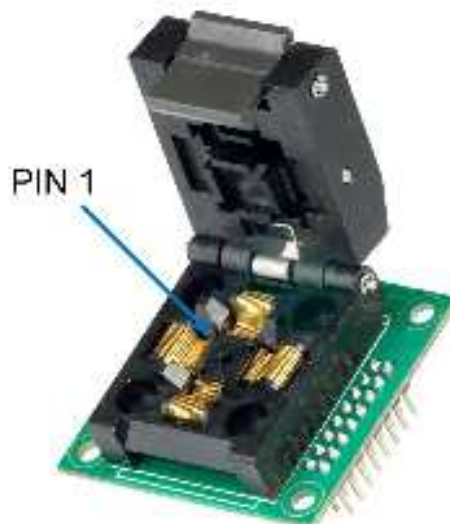


Figure 3.2 VPROG-1-S-LQFP48

The VPROG-1-S-LQFP48 is used to program individual host controller devices. Note the position of PIN1 in the VPROG-1-S-LQFP48 socket.



**Figure 3.3 VPROG-1-S-ZIF40**

The VPROG-1-S-ZIF40 is used to program Vinculum host controller devices used on the VDIP1 or VDIP2 modules. For connection of these modules to the VPROG-1-S-ZIF40 refer to Section 3.6.

### **3.3 VPROG-1 User Software**

The VPROG-1 programmer uses the VNC\_PROG software. This software can be downloaded from the FTDI website ([www.ftdichip.com](http://www.ftdichip.com)) as an executable called "VNC\_PROG.exe".

The software can be run on a PC running Windows operating systems and provides a simple GUI to allow the user to check for the number of FTDI devices attached to the programmer(s), allows the user to browse to select the firmware, programs the VNC1L-1A and then verifies that the Vinculum host controller device has been correctly programmed.

### **3.4 Vinculum VNC1L-1A Firmware**

The VPROG-1 can program the Vinculum host controller with a selection of firmware which is available from Vinculum VNC1L-1A firmware downloads.

The data to be programmed is in a binary format and has a file extension ".rom". For example the Vinculum VNC1L-1A will accept the VDAP firmware. At the time of writing the latest version was VDAPFUL\_V3\_64.ROM.



### 3.5 Programming Individual Vinculum Host Controller Devices

To program an individual Vinculum host controller device, then the VPROG-1-S-LQFP48 adaptor should be fitted to the VPROG-1 module. The Vinculum host controller device to be programmed is placed into the socket (see Figure 3.2 for pin 1 orientation). The user should then follow the following steps:

1. Start the VNC\_PROG by running the "VNC\_PROG.exe" (if not already running). The GUI appears as shown in Figure 3.4:

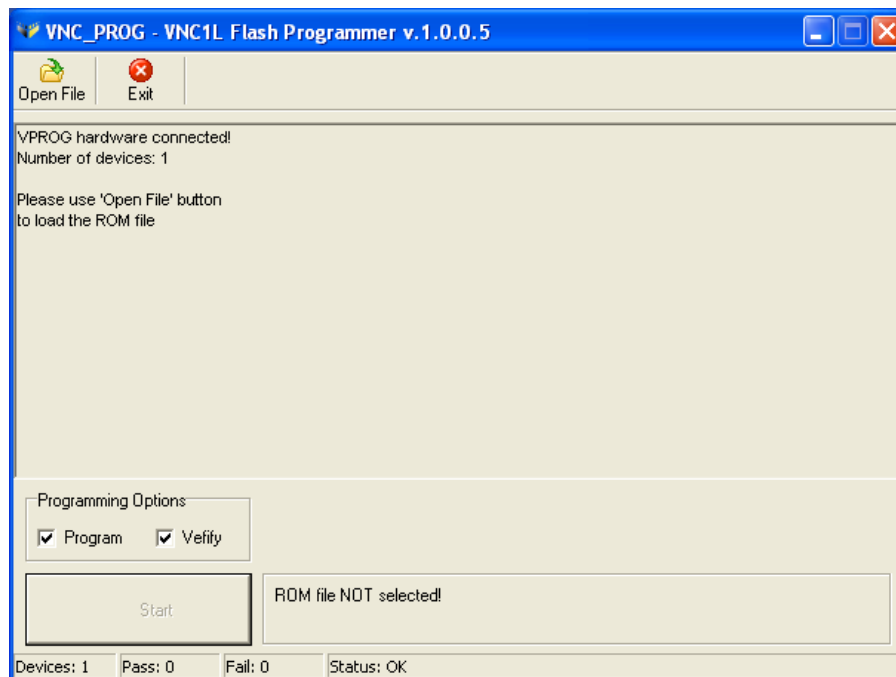


Figure 3.4 VPROG-1 Initial User Interface

2. Select the required firmware by using the "open\_file" menu and browsing to the downloaded <filename.rom> file. When file has been loaded, the display changes as shown by Figure 3.5:

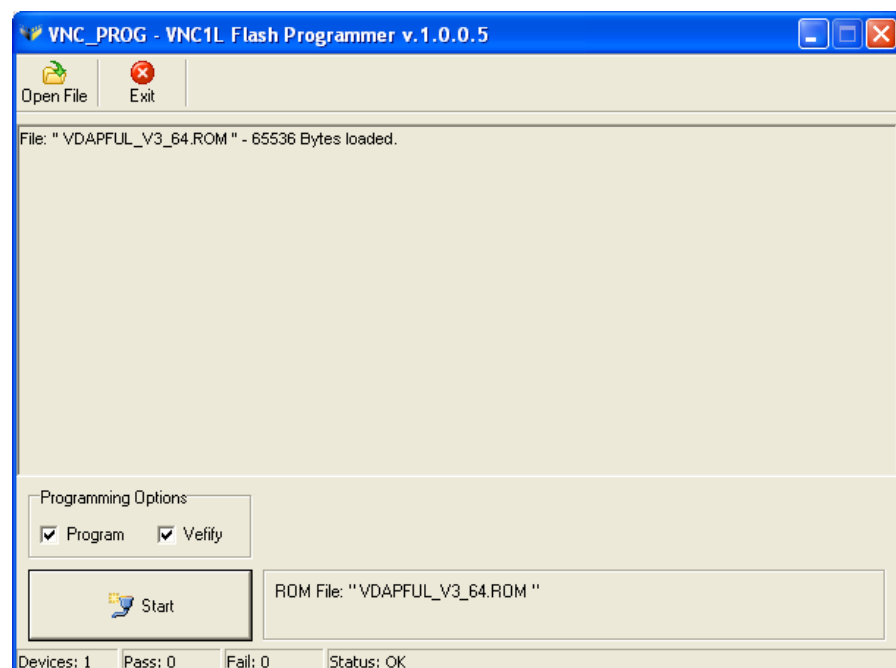
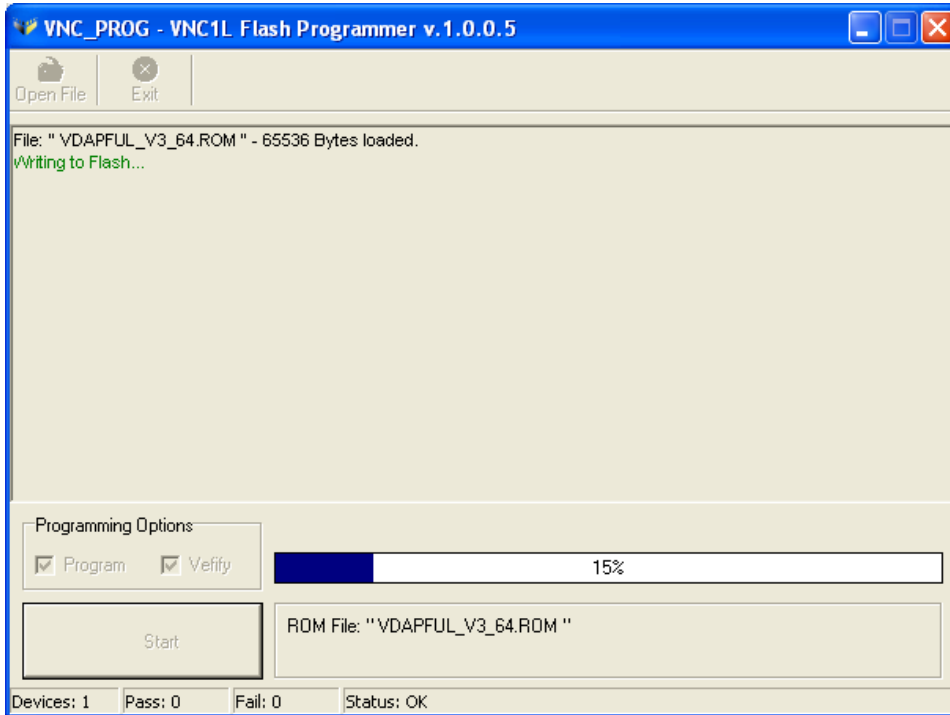


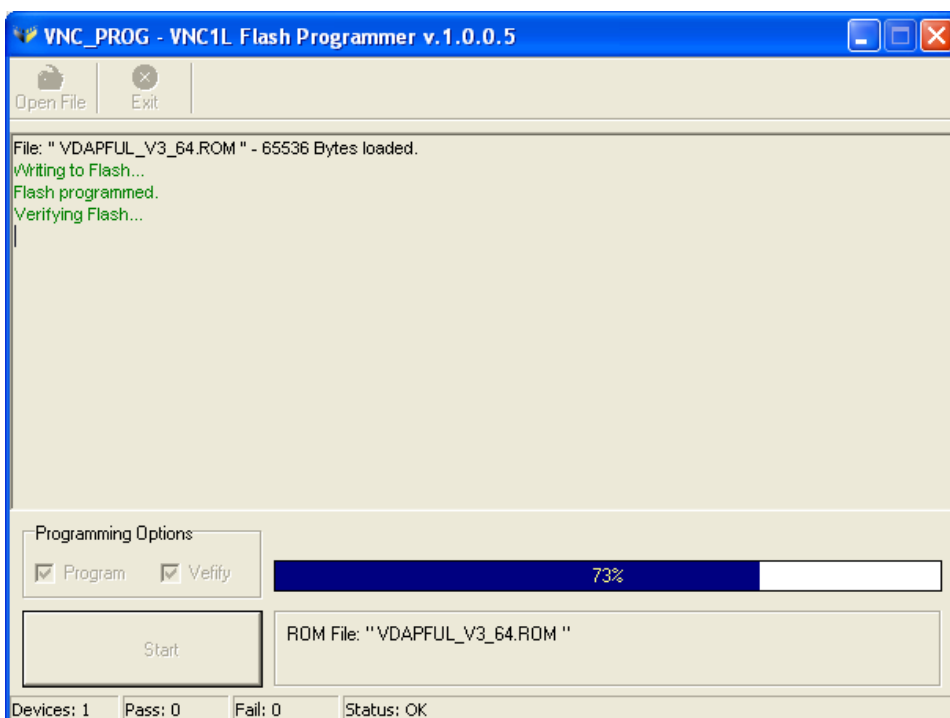
Figure 3.5 VPROG-1 Interface after download of <filename.rom>

3. To begin programming, either press the PROGRAM button on the VPROG-1 module or the "START" button on the PC user interface. The POWER and MPOWER LEDs will illuminate.
4. Check that the MPOWER LED remains ON for approximately 10s during the programming cycle. Check that the user interface appears as shown in Figure 3.6 as the programming progresses.



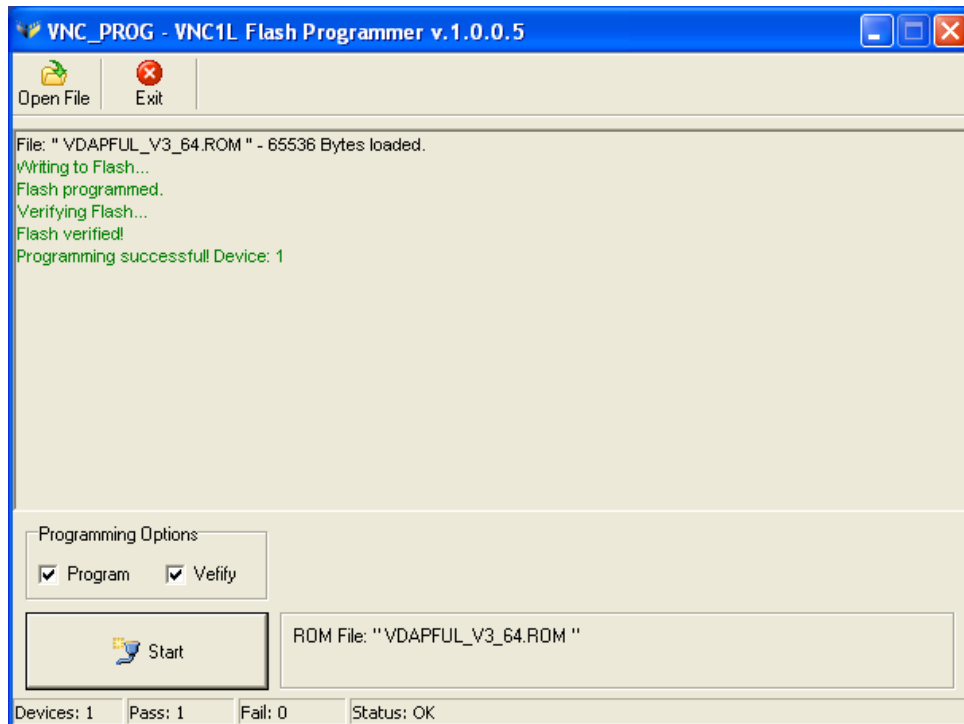
**Figure 3.6 VPROG-1 Progression of Programming VNC1L-1A**

5. The VPROG-1 will then verify that the device has been programmed. The user interface is shown in Figure 3.7.



**Figure 3.7 VPROG-1 Verifying the Programming of VNC1L-1A**

6. When programming is complete, check that the PASS LED is ON. This indicates that programming is complete. The user interface, when complete, is shown in Figure 3.8:



**Figure 3.8 VPROG-1 Completion of Programming VNC1L-1A**

7. To repeat the process, either press the PROGRAM button on the VPROG-1 module or the "START" button on the PC user interface.
8. When complete, the Vinculum host controller device can then be removed from the VPROG-1-S-LQFP48 socket.

### **3.6 Programming VDIP Vinculum VNC1L-1A Evaluation Boards**

The VDIP modules allow users to quickly prototype using the Vinculum host controller device, VNC1L-1A.

The modules provide a Vinculum VNC1L-1A device plus a number of USB host connections. VDIP1 has 1 USB host. VDIP2 has 2 USB hosts. The VDIP1 module is interfaced to via a 24 pin DIP connector. The VDIP2 is interfaced to via a 40 pin DIP connector.

To program a VDIP module, then the VPROG-1-S-ZiF40 adaptor should be fitted. The VDIP1 connects to the VPROG-1-S-ZIF40 as shown in Section 3.6.1. The VDIP2 connects to the VPROG-1-S-ZIF40 as shown in Section 3.6.2.

Programming the modules follows the same steps shown for programming the host controller devices shown in Section 3.5.

#### **3.6.1 Connecting VDIP1 to the VPROG-1-S-ZIF40**

The VDIP1 connects to the VPROG-1 via the VPROG-1-S-ZIF40 adaptor. The VDIP1 has 24 pins and should be connected as shown in the following Figure 3.9

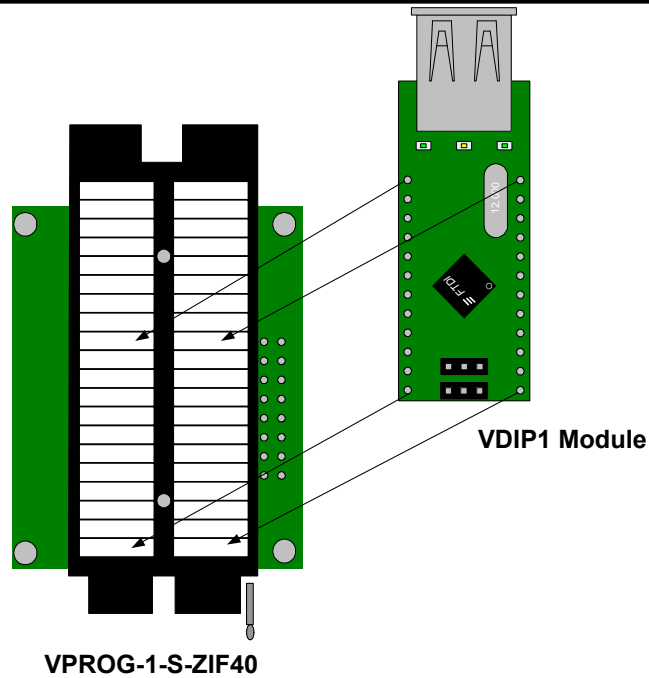


Figure 3.9 VDIP1 Connection to VPROG-1-S-ZIF40

### 3.6.2 Connecting VDIP2 to the VPROG-1-S-ZIF40

The VDIP2 connects to the VPROG-1 via the VPROG-1-S-ZIF40 adaptor. The VDIP2 has 40 pins and should be connected as shown in the following Figure 3.10

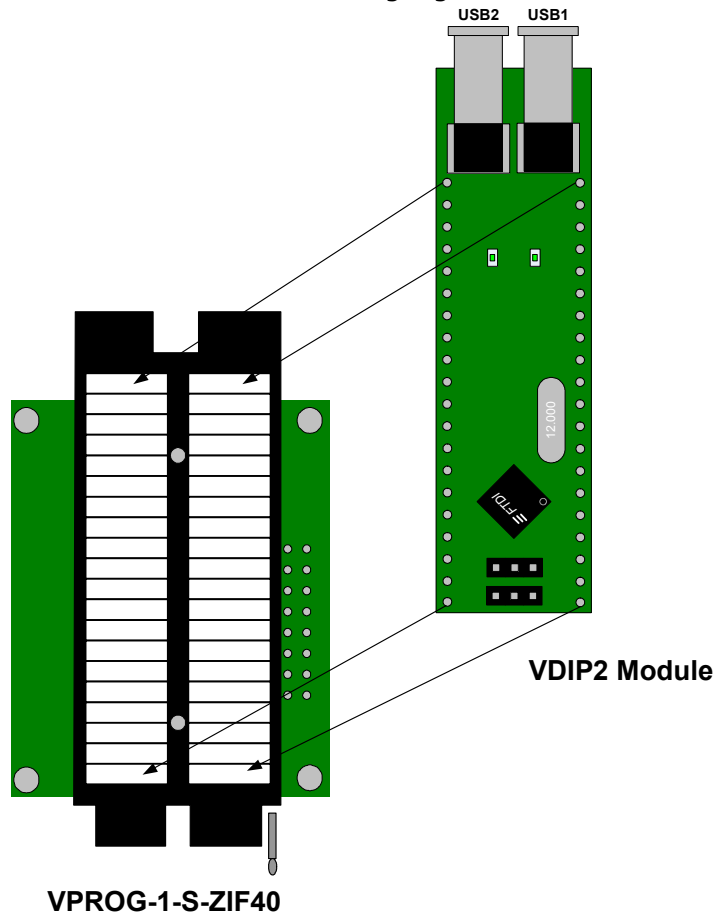


Figure 3.10 VDIP2 Connection to VPROG-1-S-ZIF40

### 3.7 Programming Multiple Vinculum VNC1L-1A Devices

To program multiple Vinculum host controller devices, up to 10 VPROG-1 programmers can be ganged together. An example of this is shown in Figure 3.11

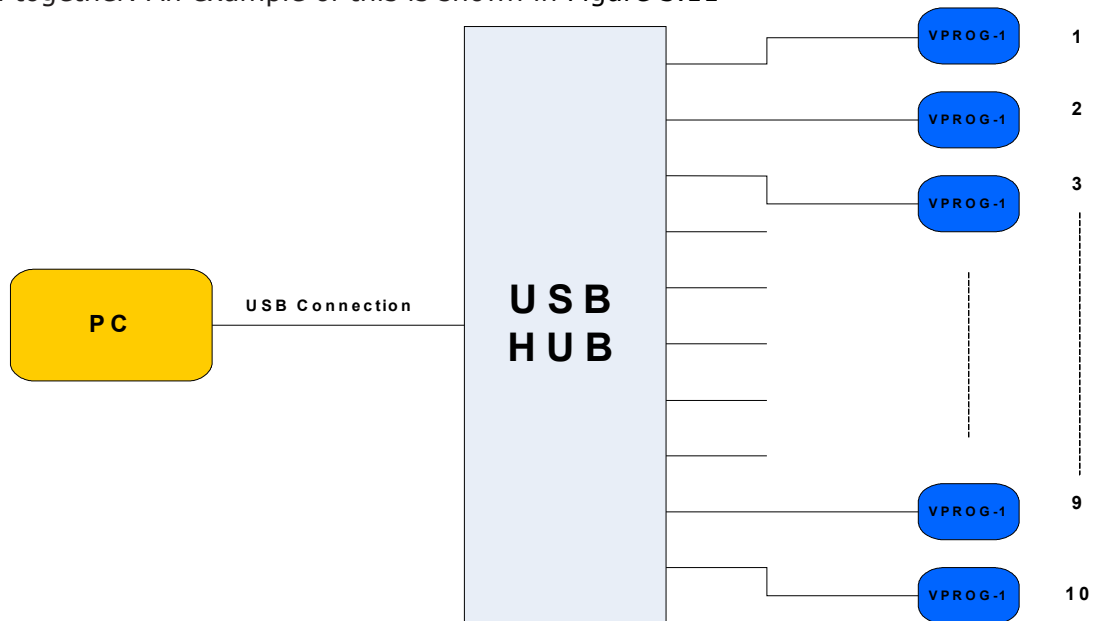


Figure 3.11 Programming VNC1L-1A Using Multiple VPROG-1 Modules

### 3.8 LED Indicators

The VPROG-1 programmer has 4 LEDs. Table 3.1 describes the function of the LEDs.

LED NAME	Colour	LED OFF	LED ON
POWER	Green	The VPROG1 hardware has not been recognised by the host PC.	The VPROG1 hardware has been recognised by the host PC.
MPOWER	Yellow	Module Power: VNC1L-1A is not powered and is not in being programmed.	Module Power: VNC1L-1A currently powered and programming in progress.
PASS	Green	No indication	VNC1L-1A has been programmed successfully.
FAIL	Red	No indication	VNC1L-1A has failed to be programmed correctly.

Table 3.1 VPROG-1 LED Indicators

## 4 Dimensions

The dimensions of the VPROG-1 are shown in Figure 4.1. These dimensions exclude any programming adaptor.

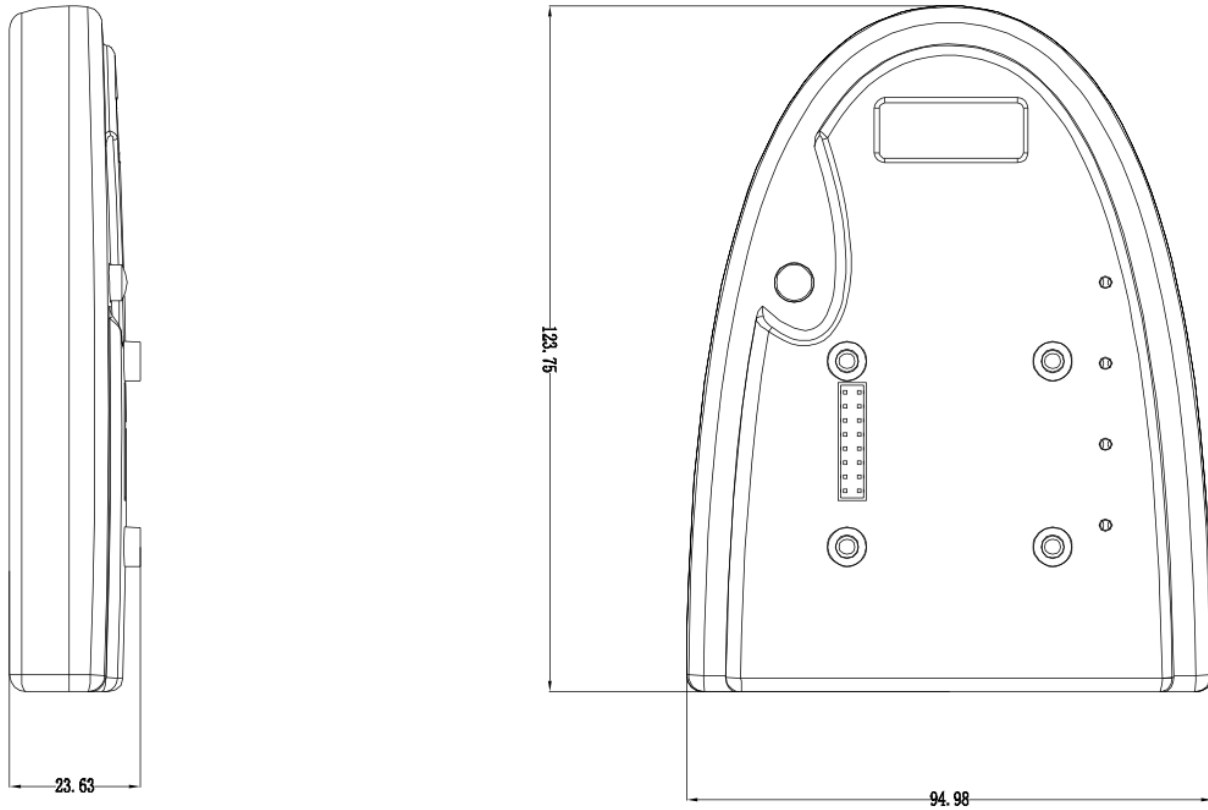


Figure 4.1 VNC1L-1A Programmer Dimensions



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Please visit the Sales Network page of the FTDI Web site for the contact details of our distributor(s) and sales representative(s) in your country.

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## Appendix B - Revision History

**Version 1.00** Full datasheet released

July 2008