Application Note

AN_203

Loading VNC2 ROM files Using V2PROG Utility

Version 1.1

Issue Date: 2012-02-21

This application note explains how to program Vinculum-II (VNC2) using a free FTDI utility, V2PROG, to load precompiled ROM files into VNC2 devices over the VNC2 Debugger/Programmer interface.

Use of FTDI devices in life support and/or safety applications is entirely at the user’s risk, and the user agrees to defend, indemnify and hold harmless FTDI from any and all damages, claims, suits or expense resulting from such use.
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1 Introduction

FTDI have introduced a new suite of simplified “bridging” ROM files to allow for fast interconnect between differing interfaces. These ROM images (and sample code) are targeted at those users who would like to implement VNC2 into a design without creating their own firmware.

To further simplify the use of this precompiled code, FTDI have also provided a new programming utility called V2PROG which enables pre-compiled ROM files to be loaded into the VNC2 device over the debugger/programmer interface without needing to use the IDE or FT_PROG. This may also be of benefit in a mass production environment where the full IDE is not required.

1.1 Overview

VNC2 is the second of FTDI’s Vinculum family of embedded dual USB host controller devices. The VNC2 device provides USB Host interfacing capability for a variety of different USB device classes including support for BOMS (bulk only mass storage), Printer and HID (human interface devices). For mass storage devices such as USB Flash drives, VNC2 transparently handles the FAT file structure.

Communication with non USB devices, such as a low cost microcontroller, is accomplished via UART, SPI or parallel FIFO interfaces. VNC2 provides a new, cost effective solution for providing USB Host capability into products that previously did not have the hardware resources available.

VNC2 allows customers to develop their own firmware using the Vinculum-II software development tool suite. These development tools provide compiler, assembler, linker and debugger tools complete within an integrated development environment (IDE).

The Vinculum-II VNC2 family of devices are available in Pb-free (RoHS compliant) 32-lead LQFP, 32-lead QFN, 48-lead LQFP, 48-lead QFN, 64-Lead LQFP and 64-lead QFN packages. For more information on the ICs refer to http://www.ftdichip.com/Products/ICs/VNC2.htm.
2 Connecting the hardware

![Diagram of hardware connection]

Using a separate VNC2 Debugger/Programmer module requires interconnect as per figure 2.1.

![Debugger/Programmer module]

Figure 2.2 Debugger/Programmer module

To allow for the VNC2 chip to be programmed it must be powered. The 5V supply from the debugger module (if used) must be converted to 3V3/1V8 to supply the VNC2 chip via a regulator on the VNC2 PCB. Alternatively a user may provide their own power supply.

The VNC2 pinout is:

<table>
<thead>
<tr>
<th>Signal</th>
<th>32-pin pkg</th>
<th>48-pin pkg</th>
<th>64-pin pkg</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND</td>
<td>1, 16, 19, 27</td>
<td>1, 24, 27, 39</td>
<td>1, 30, 35, 53</td>
<td>Device ground supply pins</td>
</tr>
<tr>
<td>3V3 VREGIN</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>+3.3VDC supply to the regulator</td>
</tr>
<tr>
<td>1V8 VCC PLL IN</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>+1.8VDC supply to internal clock multiplier</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Requires 100nF decoupling capacitor close to pin</td>
</tr>
<tr>
<td>GND PLL</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>Device analog ground supply for internal clock multiplier</td>
</tr>
<tr>
<td>VREG OUT</td>
<td>7</td>
<td>7*</td>
<td>7</td>
<td>+1.8VDC output from regulator to device core</td>
</tr>
<tr>
<td>Signal</td>
<td>32-pin pkg</td>
<td>48-pin pkg</td>
<td>64-pin pkg</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>VCCIO</td>
<td>13, 22, 28</td>
<td>17, 30, 40</td>
<td>21, 38, 54</td>
<td>+3.3VDC supply to I/O interface pins (IOBUS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VCCIO must be connected for proper operation</td>
</tr>
<tr>
<td>RESET#</td>
<td>10</td>
<td>9</td>
<td>9</td>
<td>Can be used by an external device to reset VNC2</td>
</tr>
<tr>
<td>PROG#</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>Asserting PROG# enables program mode</td>
</tr>
<tr>
<td>DEBUGGER I/F</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>I/O for programming and in-circuit debugging</td>
</tr>
</tbody>
</table>

*Not used on 48-pin LQFP package

Table 2.1 VNC2 Pin-Out
3 Installing the Debugger/Programmer Module driver

To allow a PC to communicate with the debugger/programming module it is necessary to load a driver for this module.

Installation of the Debugger/Programmer driver is a simple case of plugging the device in and allowing the Windows Installation Wizard to go online, find and load the driver. For more details on driver loading for different versions of Windows OS please refer to the Driver Installation Guides.

Note: these drivers are also required by the V2PROG utility.
4 Installing V2PROG

V2PROG is downloadable from the FTDI website at (http://www.ftdichip.com/Support/Utilities/V2PROG_Installer.zip)

The zip file should be downloaded and extracted onto the PC. This can be done with free utilities such as Winzip by right clicking on the zip file and selecting "Extract files..." from the pop-up menu.

The extracted file V2PROG Installer.exe will now be placed in the folder of your choosing. Double click on the file to run the exe and follow the on-screen prompts.

![Image](image_url)

**Figure 4.1 Welcome screen**

Accept the licence to allow the installation to continue.

![Image](image_url)

**Figure 4.2 Licence screen**
Select "Next" to install the executable and a desktop icon. (Untick the desktop icon option if you do not want a shortcut on your desktop).

![Component installation screen](image)

**Figure 4.3 Component installation screen**

Select the folder where you want the file installed. The default is `C:\Program Files\FTDI\Vinculum II Utilities\V2PROG`. Then press "Install".

![Installation path screen](image)

**Figure 4.4 Installation path screen**
On the final screen select "Finish" to complete the installation.

The executable file (V2Prog.exe) is now ready for use.
5 Running V2PROG

Double click on the V2PROG.exe file to open the application.

This should give a GUI with two boxes and a Program button.

The ROM path is the location that the Rom file is stored on the PC. In the figure below the file is called FT232Uart.ROM and is located at C:\FTDI DATA.

The VNC2 device that was found is "VNC2 Debugger Module". This is the default string returned from the VNC2 debugger/programmer module. Simply ensure you select the device you want to program.

Figure 5.1 V2Prog Screenshot

Press the Program button to load the file. The utility will show Status: Flash write done when it has completed.

On completion of programming the device the utility will reset the VNC2 allowing for the application ROM to start running.
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Appendix A – References

Document References
Application and Technical Notes available at
VNC2 Datasheet
V2-EVAL datasheet
V2Debugger/Programmer Module Datasheet
Vinculum II Toolchain
AN_151 Vinculum II User Guide
AN_159_Vinculum_II_Firmware_Flash_Programming.pdf
Driver Install Guides

Precompiled ROM files
V2PROG

Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Terms</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HID</td>
<td>Human Interface Device</td>
</tr>
<tr>
<td>ROM</td>
<td>Read Only Memory</td>
</tr>
<tr>
<td>SPI</td>
<td>Serial Peripheral Interface</td>
</tr>
<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
</tr>
<tr>
<td>USB-IF</td>
<td>USB Implementers Forum</td>
</tr>
</tbody>
</table>

NOTE – put terms in alphabetical order.
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<table>
<thead>
<tr>
<th>Revision</th>
<th>Changes</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Initial Release</td>
<td>2012-01-27</td>
</tr>
<tr>
<td>1.1</td>
<td>Corrected hyperlinks to V2PROG</td>
<td>2012-02-21</td>
</tr>
</tbody>
</table>