



Connect Tech Inc.
Embedded Computing Experts

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USERS GUIDE

GraphiteVPX/CPU TX1



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Preface

Disclaimer

The information contained within this user's guide, including but not limited to any product specification, is subject to change without notice.

Connect Tech assumes no liability for any damages incurred directly or indirectly from any technical or typographical errors or omissions contained herein or for discrepancies between the product and the user's guide.

Customer Support Overview

If you experience difficulties after reading the manual and/or using the product, contact the Connect Tech reseller from which you purchased the product. In most cases the reseller can help you with product installation and difficulties.

In the event that the reseller is unable to resolve your problem, our highly qualified support staff can assist you. Our support section is available 24 hours a day, 7 days a week on our website at: www.connecttech.com/sub/support/support.asp. See the contact information section below for more information on how to contact us directly. Our technical support is always free.

Contact Information

Mail/Courier

Connect Tech Inc.
Technical Support
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Note:

Please go to the [Download Zone](#) or the [Knowledge Database](#) in the [Support Center](#) on the Connect Tech website for product manuals, installation guides, device driver software and technical tips. Submit your technical support questions to our customer support engineers via the [Support Center](#) on the Connect Tech website.

Telephone/Facsimile

Technical Support representatives are ready to answer your call Monday through Friday, from 8:30 a.m. to 5:00 p.m. Eastern Standard Time. Our numbers for calls are:

Toll Free: 800-426-8979 (North America only)

Telephone: 519-836-1291 (Live assistance available 8:30 a.m. to 5:00 p.m. EST, Monday to Friday)

Facsimile: 519-836-4878 (on-line 24 hours)

Limited Product Warranty

Connect Tech Inc. provides a one year Warranty for the VPG003 GraphiteVPX/CPU. Should this product, in Connect Tech Inc.'s opinion, fail to be in good working order during the warranty period, Connect Tech Inc. will, at its option, repair or replace this product at no charge, provided that the product has not been subjected to abuse, misuse, accident, disaster or non-Connect Tech Inc. authorized modification or repair.

You may obtain warranty service by delivering this product to an authorized Connect Tech Inc. business partner or to Connect Tech Inc. along with proof of purchase. Product returned to Connect Tech Inc. must be pre-authorized by Connect Tech Inc. with an RMA (Return Material Authorization) number marked on the outside of the package and sent prepaid, insured and packaged for safe shipment. Connect Tech Inc. will return this product by prepaid ground shipment service.

The Connect Tech Inc. Limited Warranty is only valid over the serviceable life of the product. This is defined as the period during which all components are available. Should the product prove to be irreparable, Connect Tech Inc. reserves the right to substitute an equivalent product if available or to retract the Warranty if no replacement is available.

The above warranty is the only warranty authorized by Connect Tech Inc. Under no circumstances will Connect Tech Inc. be liable in any way for any damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, such product.

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Revision History

Revision	Date	Changes
0.00	2016/09/18	Initial Release
0.01	2016/09/30	Naming Change Embedded System to GraphiteVPX/CPU
0.02	2016/10/27	Update to some photos, added weight.

Introduction

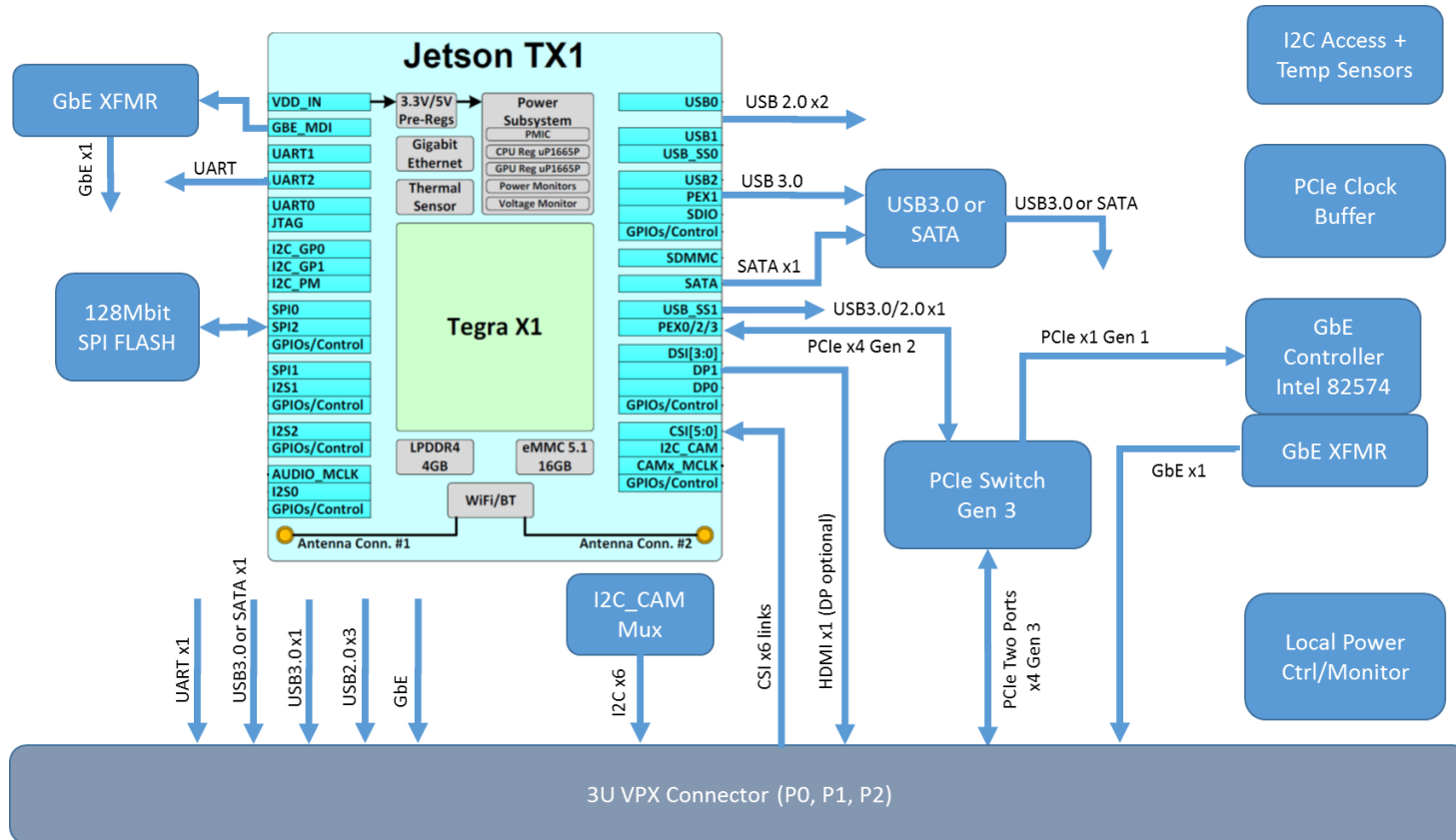
Connect Tech's GraphiteVPX/CPU-TX1 is a VITA 65 compliant 3U VPX single board computer that brings the NVIDIA® Jetson™ TX1 embedded computing platform to the VPX form factor.

This complete host solution delivers over 1 TeraFLOPs of performance, with multiple USB 3.0 and 2.0 ports, multiple GbE channels, and 6 CSI camera interfaces to round out the VPG003 GraphiteVPX/CPU.

Product Features and Specifications

Feature	VPG003 GraphiteVPX/CPU
Processor	NVIDIA Jetson TX1, 1 TFLOP/s, 256-CUDA Cores with a Quad core 64-bit ARM A57
Memory	4GB LPDDR4
On Board Storage	16GB eMMC
Display	1x HDMI Link
Ethernet	2x Gigabit Ethernet (10/100/1000) Links
USB	1x USB 2.0 (OTG) / 2x USB 3.0/2.0 ports
Serial	1x RS-232 (TX1 debug)
Video Input	6x CSI-2/MIPI Camera Sensor Inputs
Power Requirement	12V (VS1), 5V (VS3), 3V3_AUX (VS2 is not used)
Operating Temperature	-40°C to +70°C - Conduction Cooled edge temperatures.
Dimensions	Standard 3U VPX VITA 65 – 1” pitch.
Weight	450g
Accessories	RTG004 – RTM for the VPG003 CPU board.
Warranty and Support	1 Year Warranty and Free Support

Product Overview



Detailed Feature Description

The VPG003 GraphiteVPX/CPU is a Ruggedized NVIDIA Jetson TX1 System. The VPG003 comes with the standard NVIDIA Jetson TX1 Ubuntu Jetpack Image.

OpenVPX Payload Profile: MOD3-PAY-2F-16.2.7-2

Power Input

The VPG003 GraphiteVPX/CPU accepts a standard VPX VITA 46 power input set. VS1 = 12V, VS2 = 3.3V (not used), VS3 = 5V and 3V3_AUX.

Console

The VPG003 GraphiteVPX/CPU has a console port to allow for remote or headless use of the System. With an RS-232 Link, the Console allows for additional debug of the VPG003 GraphiteVPX/CPU.

10/100/1000 Ethernet (GbE)

Two ports of GbE are available, one interface comes from the TX1 onboard Ethernet controller. The second is on the PCIe bus and comes from the Intel 82574 Ethernet Controller. Both with distinct MAC Id's.

Software Support for the Intel 82574

Additional drivers may be required to properly operate the GBE Port 1 of the System.

These drivers can be downloaded directly from Intel's website from the link below:

<http://downloadcenter.intel.com/SearchResult.aspx?lang=eng&ProductFamily=Ethernet+Components&ProductLine=Ethernet+Controllers&Product=Intel%C2%AE+82574+Gigabit+Ethernet+Controller>

Display (HDMI only)

One HDMI video output is available for display up to 4k.

MIPI CSI 2.0 Camera inputs

There are 6 independent CSI 2.0 camera inputs available to the user.

USB 3.0/2.0 and OTG

The VPG003 has two ports capable of USB 3.0 or 2.0 (USB A and USB B) and an extra USB 2.0 port used as either a host or client port selected through the USB ID pin state. Client mode is used to update the TX1's base software load. Host mode acts as a standard host USB 2.0 port. The USB B port and the SATA port are mutually exclusive and are selected via the J2 header block.



SATA 2.0

One SATA Gen 2 port is available direct from the TX1 for additional storage capability. The SATA port and the USB B port are mutually exclusive and are selected via the J2 header block.

PCIe Switch Description

The VPG003 GraphiteVPX/CPU has a PEX8718 Gen 3 capable PCIe Switch that has 2 x4 ports connected to the backplane using the DATAPLANE. This switch currently runs Gen 2 only due to the host TX1 having a maximum speed of 5.0 Gbps Gen 2 PCIe.

System LED's

The VPG003 GraphiteVPX/CPU has 7 System LEDs on the front face:

LED	Description	LED Colour
PB_OK	Backplane Power OK	Blue
FAIL	System in Reset	Red
PCIe0	PCIe Link Status to TX1	Blue
PCIe1	PCIe Link Status Intel GbE	Blue
PCIe2	PCIe Link Status Backplane Port 2	Blue
PCIe3	PCIe Link Status Backplane Port 1	Blue
PERR	Fatal PCIe Error Detected	Red

Current Consumption Details

Below are the maximum ratings of the VPG003 GraphiteVPX/CPU with 12V (VS1) and 5V (VS3) combined totals.

Theoretical Maximum	Watts
Maximum	30W
Typical	20W

Below are measurements taken with the VPG003 GraphiteVPX/CPU running in various configurations. Please refer to the NVIDIA Jetson TX1 manual for full details on the current consumption and operational details.

Actual Measurements	Amps	Watts
System standalone, powered OFF, with no loads	TBD	TBD
System standalone, powered ON, no operating system, with no loads	TBD	TBD
HDMI video output, USB keyboard, system sitting in Ubuntu Console	TBD	TBD
HDMI video output, USB keyboard/mouse, 2x GBE running, system sitting in Ubuntu Desktop (GUI), running NVIDIA Smoke Render Test	TBD	TBD



NVIDIA Jetson TX1 Software

The VPG003 comes pre-flashed with an L4T (Linux for Tegra) R24.2 environment, which includes support for many common APIs, and is supported by NVIDIA's complete development tool chain.

Please refer to NVIDIA's official L4T webpage link for full details:

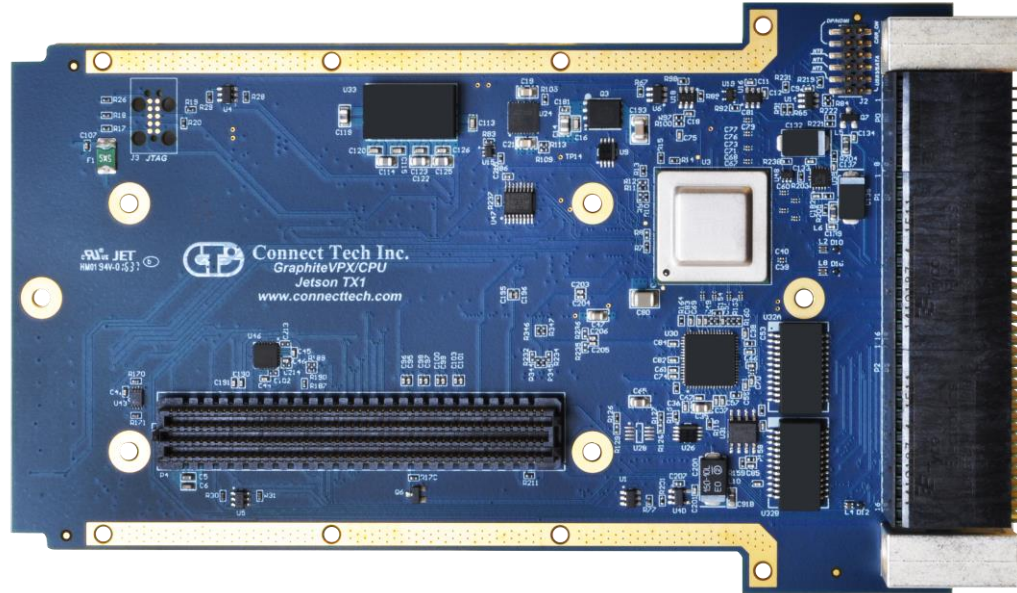
<https://developer.nvidia.com/embedded/linux-tegra>

Mechanical Details

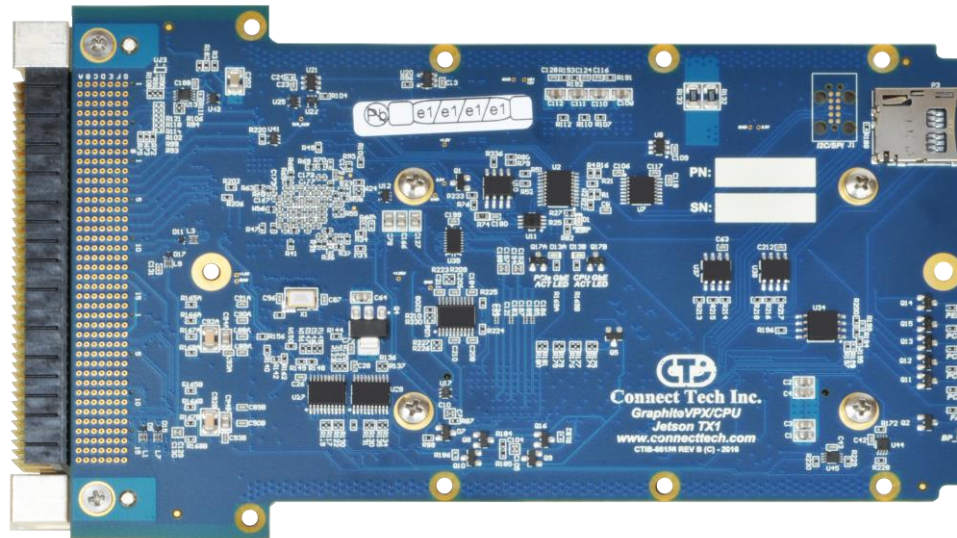
A complete **3D STEP Model** file of VPG003 GraphiteVPX/CPU can be requested from Sales@connecttech.com.

VPG003 GraphiteVPX/CPU – Top Side





VPG003 GraphiteVPX/CPU – Bottom Side



RTG004 Details

RTM for Development

