



Connect Tech Inc.
Embedded Computing Experts

www.connecttech.com

USERS GUIDE

COM Express[®] + GPU Embedded System (VXG/DXG)



VXG Series



DXG Series

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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: <http://connecttech.com/support/resource-center/>. See the contact information section below for more information on how to contact us directly. Our technical support is always free.

Contact Information

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Note:

Please go to the [Connect Tech Resource Center](#) for product manuals, installation guides, device driver software and technical tips. Submit your [technical support](#) questions to our support engineers.

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)

One Year Limited Warranty

Connect Tech Inc. provides a 1-Year Warranty for this product. 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. 1-Year 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 1-Year 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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ESD Warning



Electronic components and circuits are sensitive to Electro Static Discharge (ESD). When handling any circuit board assemblies including Connect Tech VXG/DXG System, it is recommended that ESD safety precautions be observed. ESD safe best practices include, but are not limited to:

- Leaving circuit boards in their antistatic packaging until they are ready to be installed.
- Using a grounded wrist strap when handling circuit boards, at a minimum you should touch a grounded metal object to dissipate any static charge that may be present on you.
- Only handling circuit boards in ESD safe areas, which may include ESD floor and table mats, wrist strap stations and ESD safe lab coats.
- Avoiding handling circuit boards in carpeted areas.
- Try to handle the board by the edges, avoiding contact with components.

Revision History

Revision	Date	Changes
0.00	2014-03-13	Original
0.01	2014-09-18	Updated for PCB Version REV C
0.02	2015-01-28	Corrected warranty information
0.03	2015-03-04	Correct Cable Drawing, Added Standoff Details, Corrected GBE LED Connector Pinout
0.04	2015-03-23	Added reference to serial driver and updated 2D mechanical drawing, corrected CBG117 cable drawing
0.05	2015-11-23	Modified Introduction, Updated Product Features, Updated Block Diagram, Added VGA Default Display Details, Added COM Express BIOS Details, Changed GPU Summary Details, Updated CBG145 Drawing
0.06	2016-12-15	Modified format. Moved jumper description into appropriate feature section. Added RTC battery information. Reordered sections for to improve readability
0.07	2017-08-09	Added cable drawing links, removed drawings from doc; Updated part numbers and GPU options
0.08	2017-09-07	Added new part numbers
0.09	2017-11-02	Updated block diagram
0.10	2018-01-04	Added new DXG PN's, Revised cable information
0.11	2018-01-24	Updated images; Updated GPU module specs
0.12	2018-04-10	Updated GPU Module Fan table, GPU Options table, Input Power
0.13	2022-12-02	Updated address and Audio connector information



Introduction

Connect Tech's COM Express® + GPU Embedded System from Connect Tech combines the latest generation x86 processors with high-end Graphics Processing Units (GPU) all into a ruggedized small form factor embedded system. Choose from [Intel® Xeon® E3-1515M/1505L](#) options and from NVIDIA® Quadro®, Tesla®, and GeForce® GPUs for applications that require access to [CUDA Cores](#) and the ability to process complex mathematics in parallel of the on-board x86 CPU.

This embedded system exposes all of the latest generation interconnect including: Gigabit Ethernet, USB 3.0 and 2.0, DisplayPort++, VGA, LVDS, SATA III, GPIO, I2C, mSATA, miniPCIe, PCIe/104 and SD Card Expansion. This embedded system uses all locking ruggedized positive latching connectors.

VXG part numbers have Passive Heat Spreaders that are to be installed into a Customer Designed End Thermal Solution. DXGs part numbers have an Active Cooling Solution with Integrated Support Frame.

Product Features and Specifications

Specifications	
COM Express CPU Options	Intel® Xeon® E3-1505M V6 ("Kaby Lake" 7th Gen, 4 x 3.0 / 4.0 GHz, 8MB cache, 45 W) Intel® Xeon™ E3-1505L V6 ("Kaby Lake" 7th Gen, 4 x 2.2 / 3.0 GHz, 8MB cache, 25 W) Intel® Xeon® E3-1515M V5 ("Skylake" 6th Gen, 4 x 2.8 / 3.7 GHz, 8MB cache, 35 W) Intel® Xeon™ E3-1505L V5 ("Skylake" 6th Gen, 4 x 2.0 / 2.8 GHz, 8MB cache, 25 W) * Ext Temp
GPU Module Options	NVIDIA® Quadro® P5000 – (Pascal, 2048 CUDA Cores, 100W) NVIDIA® Quadro® P3000 – (Pascal, 1280 CUDA Cores, 75W) NVIDIA® Quadro® M5000 SE – (Maxwell, 2048 CUDA Cores, 150W) NVIDIA® Quadro® M3000 SE – (Maxwell, 1024 CUDA Cores, 75W) NVIDIA® Tesla® M6 – (Pascal, 1536 CUDA Cores, 100W) NVIDIA® GeForce™ GTX 1080 – (Pascal, 2560 CUDA Cores, 150W) NVIDIA® GeForce™ GTX 1050Ti – (Pascal, 768 CUDA Cores, 60W)
COM Express Compatibility	COM Express® Type-6 (PCIMG COM Express® COM.0 R2.1)
MiniPCIe Expansion	2 Slots (With PCIe, USB and SATA Connections)
PCIe/104 Expansion	4 x PCIe x1 lanes 2 x SATA III (on PCIe/104 Type-2 Pins)
DisplayPort/HDMI/DVI	6 Total - 2 Outputs from COM Express, 4 Outputs from GPU
VGA Video	1 Analog CRT VGA Port
LVDS Video	Dual Channel 18/24-bit LVDS
Gigabit Ethernet	2 x 10/100/1000 Ethernet Ports
USB 2.0	6 USB 2.0 Ports (4 Integrated into USB 3.0 Connector)
USB 3.0	4 USB 3.0 Ports
HD Audio	1 Stereo Input, 1 Stereo Output
RS-232	3 Total - 2 from PCIe UART, 1 from COM Express Console Port
RS-485	2 Ports
GPIO	8 -bits (Buffered 4in/4out, +3.3V or +5V Selectable)
Ext SATA	2 External SATA Connectors (Capable of SATA III)
mSATA	2 mSATA Slots (Capable of SATA III)
SD Card	1 microSD Card Slot (From USB Host Controller, with Bootable Option)
System Interfaces	I2C, SMBus, S3 Power Level Output, Reset Output
I/O Connector Type	Rugged Locking Positive Latching 2mm Pitch Connectors
Input Power	Single Wide Input Range: +16V to +48V DC **
Power Consumption	Varies per VXG/DXG SKU with different CPU and GPU models
RTC Battery	On-board 3V 48mAh (BR1125A) Option to connect external RTC battery.
Dimensions	See 3D Models
Operating Temperature Range	(0°C to +55°C), and (-40°C to +85°C) Options Available
Standoffs	4x PCIe/104 Female to Female Standoffs

** +12V DC input supported in some applications

Part Number and Ordering Information

Below is a list of standard CPU / GPU combinations. Other combinations are available; please contact sales@connecttech.com to request a specific processor.

Part Number	CPU	GPU	Operating Temperature	Thermal/Mounting Solution
VXG101	Intel® Xeon® E3-1505L V5, 32GB DDR4	NVIDIA® GeForce™ GTX 1050Ti	-40°C to +85°C (-40°F to +185°F)	Passive Heat Spreaders (Customer Designed End Thermal Solution)
VXG102	Intel® Xeon® E3-1515M V5, 32GB DDR4	NVIDIA® GeForce™ GTX 1080	0°C to +55°C (+32°F to +131°F)	
VXG201	Intel® Xeon® E3-1505M V6, 32GB DDR4	NVIDIA® Quadro® P5000	0°C to +55°C (+32°F to +131°F)	
VXG202	Intel® Xeon® E3-1505L V6, 32GB DDR4	NVIDIA® Quadro® P3000	0°C to +55°C (+32°F to +131°F)	
VXG203	Intel® Xeon® E3-1515M V5, 32GB DDR4	NVIDIA® Quadro® P5000	0°C to +55°C (+32°F to +131°F)	
VXG204	Intel® Xeon® E3-1505L V5, 32GB DDR4	NVIDIA® Quadro® P3000	0°C to +55°C (+32°F to +131°F)	
VXG205	Intel® Xeon® E3-1515M V5, 32GB DDR4	NVIDIA® Quadro® M5000 SE	0°C to +55°C (+32°F to +131°F)	
VXG206	Intel® Xeon® E3-1505L V6, 32GB DDR4	NVIDIA® Quadro® M3000 SE	0°C to +55°C (+32°F to +131°F)	
VXG301	Intel® Xeon® E3-1505M V6, 32GB DDR4	NVIDIA® Tesla® M6	0°C to +55°C (+32°F to +131°F)	
VXG302	Intel® Xeon® E3-1515M V5, 32GB DDR4	NVIDIA® Tesla® M6	0°C to +55°C (+32°F to +131°F)	
DXG101	Intel® Xeon® E3-1505L V5, 32GB DDR4	NVIDIA® GeForce™ GTX 1050Ti	0°C to +55°C (+32°F to +131°F)	Active Cooling Solution (with Integrated Support Frame)
DXG102	Intel® Xeon® E3-1515M V5, 32GB DDR4	NVIDIA® GeForce™ GTX 1080	0°C to +55°C (+32°F to +131°F)	
DXG201	Intel® Xeon® E3-1505M V6, 32GB DDR4	NVIDIA® Quadro® P5000	0°C to +55°C (+32°F to +131°F)	
DXG202	Intel® Xeon® E3-1505L V6, 32GB DDR4	NVIDIA® Quadro® P3000	0°C to +55°C (+32°F to +131°F)	
DXG203	Intel® Xeon® E3-1515M V5, 32GB DDR4	NVIDIA® Quadro® P5000	0°C to +55°C (+32°F to +131°F)	
DXG204	Intel® Xeon® E3-1505L V5, 32GB DDR4	NVIDIA® Quadro® P3000	0°C to +55°C (+32°F to +131°F)	
DXG205	Intel® Xeon® E3-1515M V5, 32GB DDR4	NVIDIA® Quadro® M5000 SE	0°C to +55°C (+32°F to +131°F)	
DXG206	Intel® Xeon® E3-1505L V6, 32GB DDR4	NVIDIA® Quadro® M3000 SE	0°C to +55°C (+32°F to +131°F)	
DXG301	Intel® Xeon® E3-1505M V6, 32GB DDR4	NVIDIA® Tesla® M6	0°C to +55°C (+32°F to +131°F)	
DXG302	Intel® Xeon® E3-1515M V5, 32GB DDR4	NVIDIA® Tesla® M6	0°C to +55°C (+32°F to +131°F)	



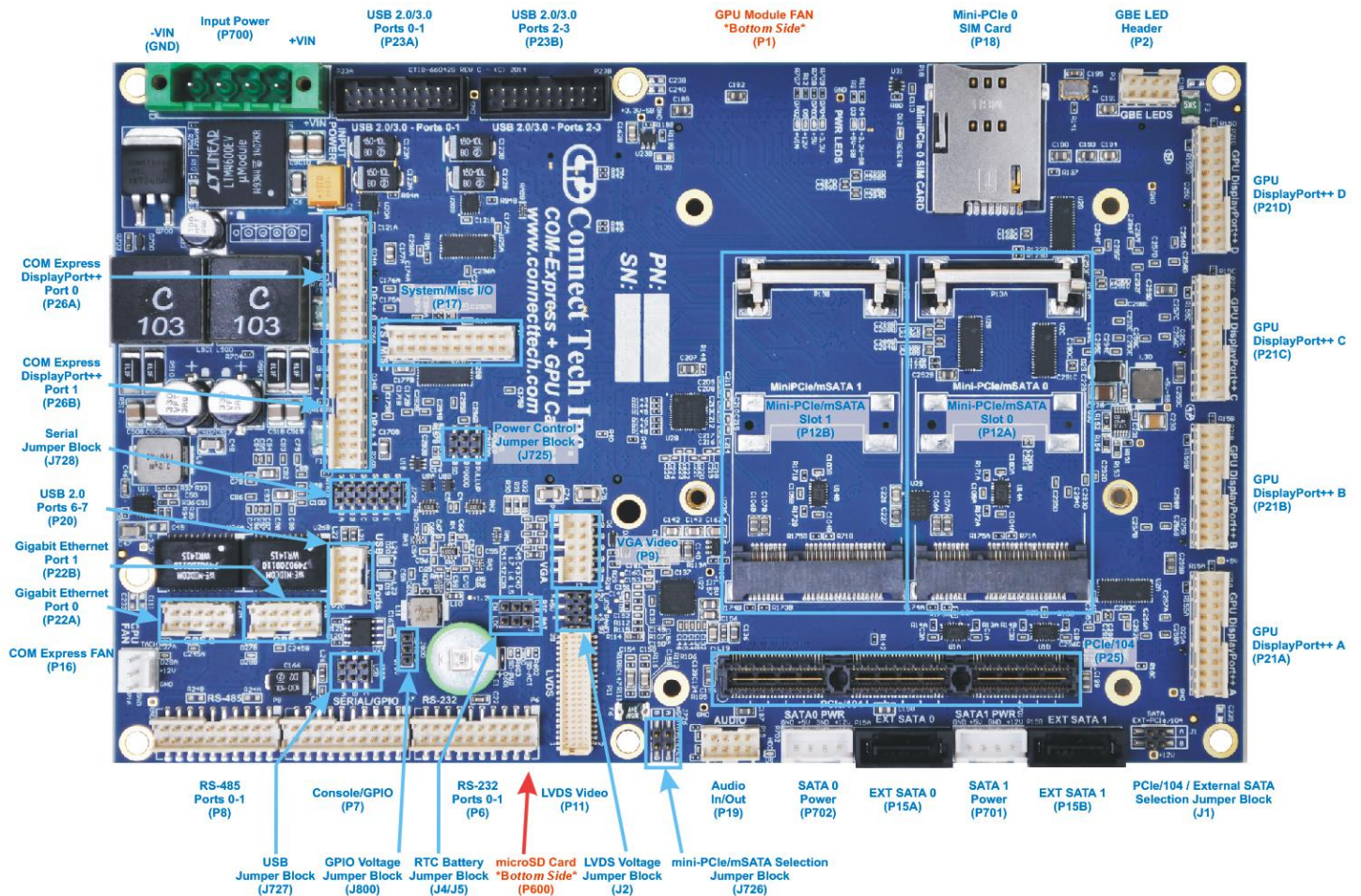
End of Life Information

Please note that the NVIDIA GeForce GTX 970, 950, 745M GPUs have reached EOL Status. As a result, various Part Numbers have been removed from the Part Number and SKU Information Table above. The remainder of the Manual includes information on the NVIDIA GeForce GTX 970, 950, 745M for Reference ONLY.

For additional information and inquiries please contact Connect Tech Inc.



Connector Locations



Note: PCIe/104 Standoffs not Shown

Connector Summary

Designator	Connector	Description
P1	GPU Module FAN	Fan for GPU Modules
P2	GBE Led	Link and Act LED Signals for GBE 0 and GBE 1
P6	RS-232	Exar UART RS-232 Serial Ports A and B
P7	SERIAL/GPIO	COM Express RS-232 Serial Port with GPIO
P8	RS-485	Exar UART RS-485 Serial Ports A and B
P9	VGA	COM Express VGA Display Connector (Default Video Display)
P10	COM Express	COM Express Type-6 Connector
P11	LVDS	COM Express LVDS Display Connector
P12A	Mini-PCle/mSATA 0	Mini-PCle/mSATA Slot 0
P12B	Mini-PCle/mSATA 1	Mini-PCle/mSATA Slot 1
P15A	EXT SATA 0	External SATA Plug 0
P15B	EXT SATA 1	External SATA Plug 1
P16	CPU FAN	CPU Fan Connector
P17	SYSTEM/MISC	System Header Connector
P18	SIM CARD	SIM Card Connector
P19	AUDIO	HD Audio Connector
P20	USB PORT 6-7	USB 2.0 Ports 6 and 7
P21A	GPU DisplayPort++ A	GPU DisplayPort++ A
P21B	GPU DisplayPort++ B	GPU DisplayPort++ B
P21C	GPU DisplayPort++ C	GPU DisplayPort++ C
P21D	GPU DisplayPort++ D	GPU DisplayPort++ D
P22A	GBE 0	Gigabit Ethernet 0
P22B	GBE 1	Gigabit Ethernet 0
P23A	USB2.0/3.0 Ports 0-1	USB 2.0 and USB 3.0 Ports 0 and 1
P23B	USB2.0/3.0 Ports 2-3	USB 2.0 and USB 3.0 Ports 2 and 3
P24	GPU CARD	Edge Card Connector for GPU Card
P25	PCIe/104	PCIe/104 Top Connector
P26A	DP++ 0	COM Express DisplayPort++ 0
P26B	DP++ 1	COM Express DisplayPort++ 1
P600	SD CARD	microSD Card Connector
P700	PWR	Vertical Screw Terminal Power Connector

Jumper Summary

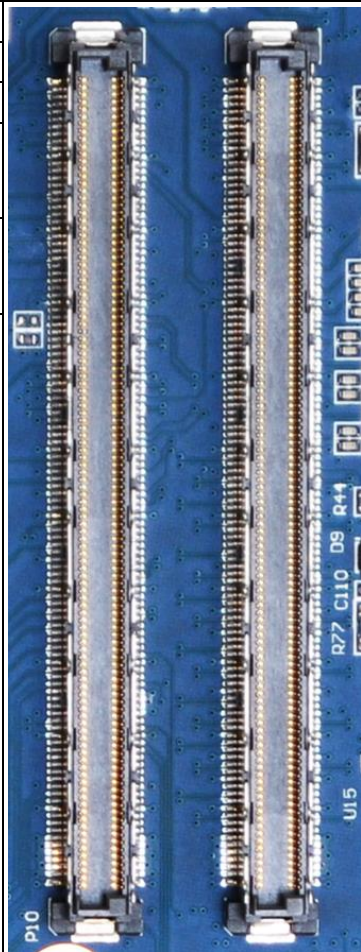
Designator	Jumper	Description
J1	SATA EXT-PCIe/104	Jumper selection for SATA Ports 0 and 1 to connect to External SATA Plugs or the PCIe/104 Type 2 Stack
J2	LVDS PANEL	Jumper selection for the LVDS PANEL VCC (Can be +3.3V, +5V or +12V)
J4	EXT BAT	Jumper selection for on-board RTC battery or external RTC battery
J5	RTC CLR	Jumper selection to Enable RTC battery or Clear
J725	Power Control	Jumper selection for disabling COM Express shutdown functionality, Power Good signal, or +3.3V Stand By override
J726	mSATA/miniPCIe	Jumper selection for either Mini-PCIe or mSATA
J727	USB	Jumper selection for USB 2.0 Port 6. Used to select USB or SD Card.
J728	SERIAL	Jumper selection for PCIe UART (EEPROM, Auto RS-485 Mode) and for RS-485 TX/RX Control
J800	GPIO-V	Jumper selection for the GPIO VCC (Can be +3.3V or +5V)

Detailed Feature Descriptions

CPU & Chipset

The processor and chipset are implemented on the VXG/DXG Systems COM Express Type-6 Module, which connects to the VXG/DXG System Carrier Board via a Tyco fine pitch stacking connector.

COM Express Module Connector

Function	COM Express interface	
Location	P10	
Type	TE Connectivity Board to Board Connector	
Carrier Connector P/N	3-6318491-6 Manufacturer: TE Connectivity	
Mating Connector P/N	3-1827231-6 Manufacturer: TE Connectivity	
Pinout	Refer to COM Express R2.0 specification, Type-6	

CPU Fan

Function	CPU Fan	
Location	P16	
Type	Molex Solid Header with Friction Lock	
P/N	22232031	
Mating	22012035 (Or Equivalent)	
Cable	N/A	
Pinout	Pin	Description
	1	TACH
	2	+VCC
	3	GND



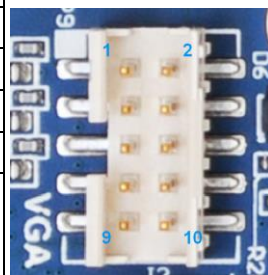
Video/Display outputs

The VXG/DXG System combines the video output ability of a COM Express Type-6 Module with that of a GPU. There are 8 possible outputs sources, depending on the COM Express module and GPU configuration

VGA Video (COM Express Output)

To allow for greater flexibility, the VXG/DXG System provides a VGA Video Output. Routed directly from the COM Express Type-6 Module, this provides additional video output formats for operation.

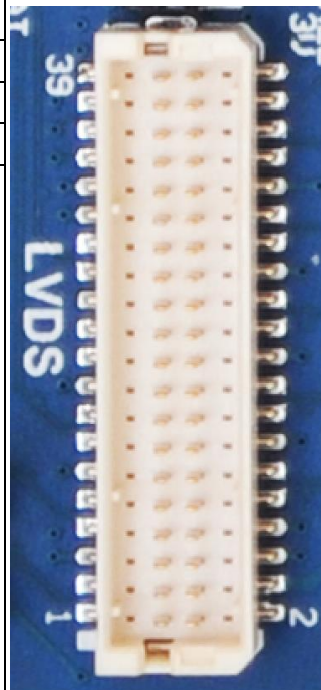
Function	VGA Video			
Location	P9			
Type	FCI Minitek Double Row 5 x 2			
P/N	98424-G52-10LF			
Mating	10073599-010LF			
Cable	CBG120			
Pinout	Pin	Description	Pin	Description
	1	DAC RED	2	GND
	3	DAC GREEN	4	-
	5	DAC BLUE	6	SC DDC
	7	HSYNC	8	SD DDC
	9	VSYNC	10	GND



LVDS Video (COM Express Output)

The VXG/DXG System provides dual 18-bit or 24-bit LVDS Display Channels via P9, which are connected directly from the COM Express Type-6 Module.

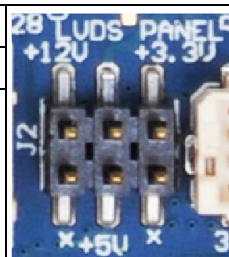
Function	LVDS Video			
Location	P11			
Type	Hirose Low Profile Board to Cable Connector			
P/N	DF20G-40DP-1V(56)			
Mating	DF20A-40DS			
Cable	CBG125			
Pinout	Pin	Description	Pin	Description
	1	LVDS B0-	2	PANEL VCC ^[1]
	3	LVDS B0+	4	PANEL VCC ^[1]
	5	GND	6	GND
	7	LVDS B1-	8	GND
	9	LVDS B1+	10	LVDS A0-
	11	GND	12	LVDS A0+
	13	LVDS B2-	14	GND
	15	LVDS B+	16	LVDS A1-
	17	GND	18	LVDS A1+
	19	LVDS B CLK-	20	GND
	21	LVDS B CLK+	22	LVDS A2-
	23	GND	24	LVDS A+
	25	LVDS B3-	26	GND
	27	LVDS B3+	28	LVDS A CLK-
	29	GND	30	LVDS A CLK+
	31	GND	32	GND
	33	LVDS PPEN	34	LVDS A3-
	35	-	36	LVDS A3+
	37	LVDS BLT CTRL	38	LVDS BLC CLK
	39	LVDS BLEN	40	LVDS BLC DAT



Note [1]: This voltage can be selected from Jumper J2 to be +3.3V, +5V, or +12V

Jumper – LVDS Panel Power (J2)

Function	LVDS PANEL Power	
Location	J2	
Modes	Position	Description
	+12V	LVDS PANEL Power +12V
	+5V	LVDS PANEL Power +5V
	+3.3V	LVDS PANEL Power +3.3V



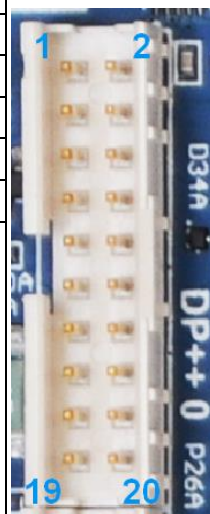
DisplayPort Connector (GPU & COM Express Output)

With the addition of on-board DisplayPort-HDMI/DVI switching circuitry, the VXG/DXG can interface with most monitors available. Please see the DisplayPort-HDMI/DVI switching description for details.

Two DisplayPort++ connections from the COM Express module are available and can be configured to output DisplayPort, or HDMI/DVI through the use of the appropriate cable. The configuration of each interface is setup via the COM Express module's BIOS settings. Refer to the COM Express module's documentation for more details.

Up to an additional four DisplayPort++ from the GPU are also available and can be configured to output DisplayPort, or HDMI/DVI through the use of the appropriate cable. Please refer to the GPU Summary for more details on GPU Outputs.

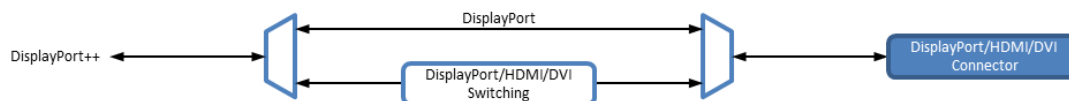
Function	DisplayPort Connector (DisplayPort Output)			
Location	P21A, P21B, P21C, P21D, P26A, P26B			
Type	FCI Minitek Double Row 10 x 2			
P/N	98414-G06-20LF			
Mating	10073599-020LF			
Cable	CBG113			
Pinout	Pin	Description	Pin	Description
	1	DP0+	2	DP3+
	3	DP0-	4	DP3-
	5	GND	6	GND
	7	DP1+	8	DPAUX-
	9	DP1-	10	DPAUX+
	11	GND	12	GND
	13	DP2+	14	Hot Plug Detect
	15	DP2-	16	GND
	17	GND	18	GND
	19	+3.3V	20	DP/TMDS SEL ^[4]



Note [4]: Cable assembly must tie low (GND) for DisplayPort output

DisplayPort-HDMI/DVI Switching

The VXG/DXG Systems DisplayPort++ connectors can be used to display outputs other than DisplayPort. On-board switching circuitry to enable HDMI or DVI has been included. The VXG/DXG COM Express DisplayPort Connectors may require a change to the COM Express BIOS to swap output formats. However the GPU DisplayPort Connectors are Hot Swappable and require only a cable change.



DisplayPort-HDMI/DVI Switching Diagram

Default Display Device

Please note that the VGA from the COM Express Type-6 Module will be configured to be the Primary Display Device on all VXG/DXG Systems. This will over-ride any other Display Device from the COM Express or GPU Module until changed. This setting can be modified in the COM Express Module BIOS upon initial startup of the VXG/DXG.

MXM GPU Module Drivers/Software:

Software drivers for the NVIDIA GPUs can be found at the following website:

NVIDIA: <http://www.nvidia.com/Download/index.aspx>

System Type: **GeForce**

Product Family: **GeForce 10 Series (Notebook)**

Product: **GeForce 1080** or **GeForce 1050Ti**

System Type: **Quadro**

Product Family: **Quadro Series (Notebook)**

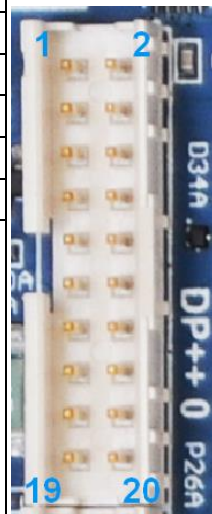
Product: **Quadro P5000** or **Quadro P3000** or **Quadro M5000 SE** or **Quadro M3000 SE**

System Type: **Tesla**

Product Family: **M-Class**

Product: **M6**

Function	DisplayPort Connector (HDMI/DVI Output)			
Location	P21A, P21B, P21C, P21D, P26A, P26B			
Type	FCI Minitek Double Row 10 x 2			
P/N	98414-G06-20LF			
Mating	10073599-020LF			
Cable	CBG145			
Pinout	Pin	Description	Pin	Description
	1	TMDS2+	2	TMDS CLK+
	3	TMDS2-	4	TMDS CLK-
	5	GND	6	GND
	7	TMDS1+	8	DDC DATA
	9	TMDS1-	10	DDC CLK
	11	GND	12	GND
	13	TMDS0+	14	Hot Plug Detect
	15	TMDS-	16	GND
	17	GND	18	GND
	19	+3.3V	20	DP/TMDS SEL ^[5]



Note [5]: Cable assembly must tie high (+3.3V) for HDMI/DVI output

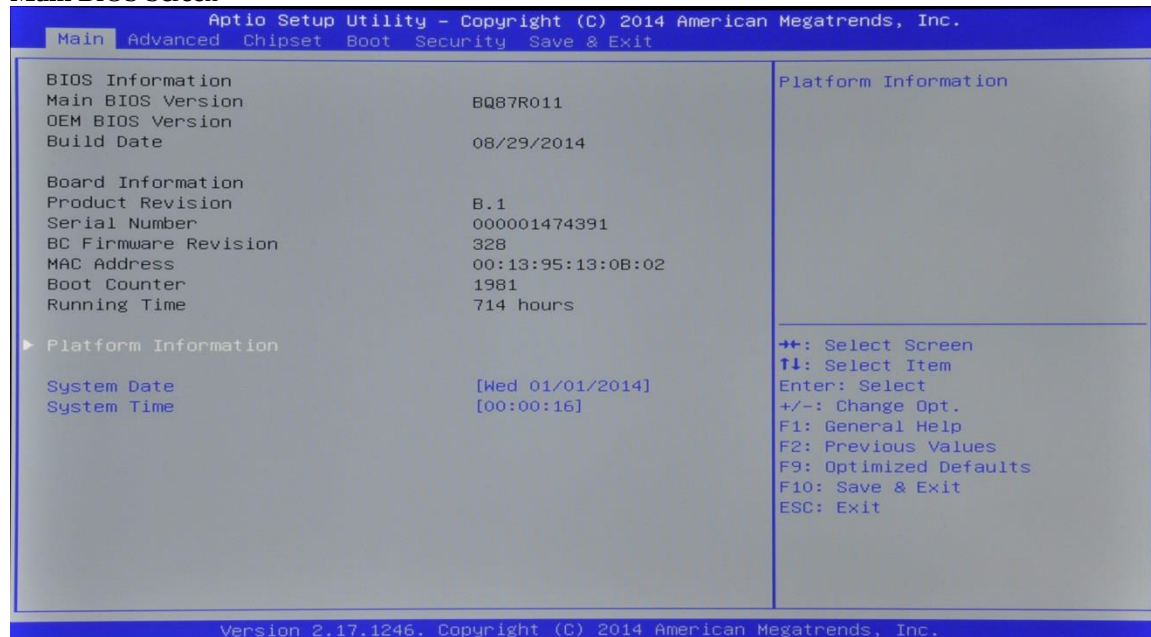


COM Express BIOS VGA Display

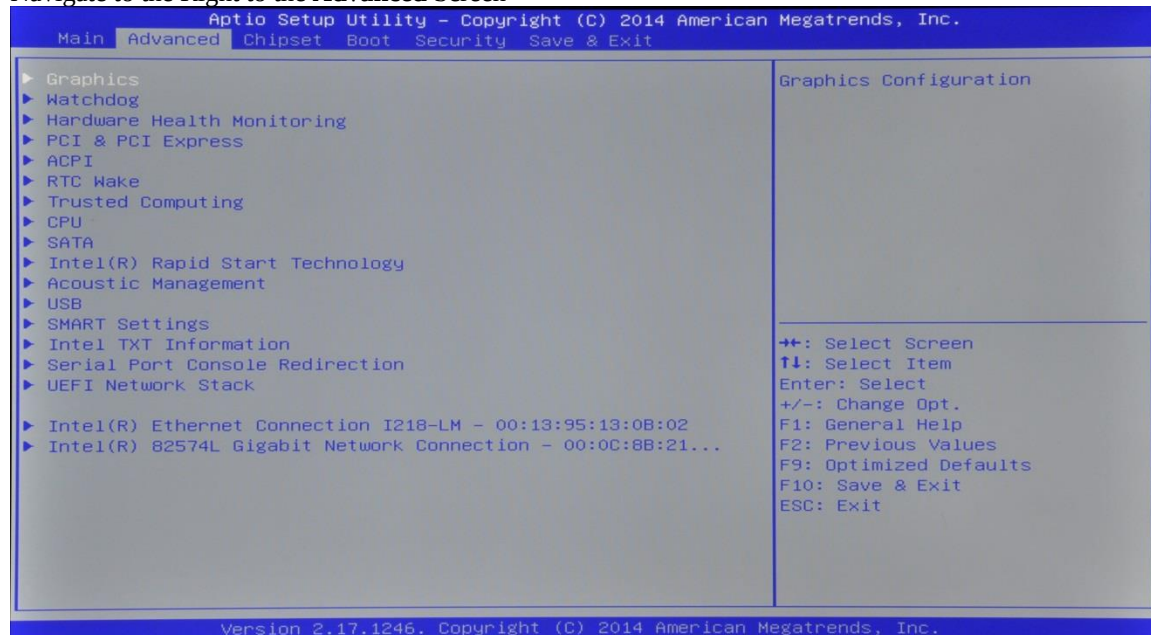
The following are instructions on how to change the Default Display Device on the Congatec conga-TS87 and GE bCOM6 L1400 COM Express Modules.

Congatec conga-TS87

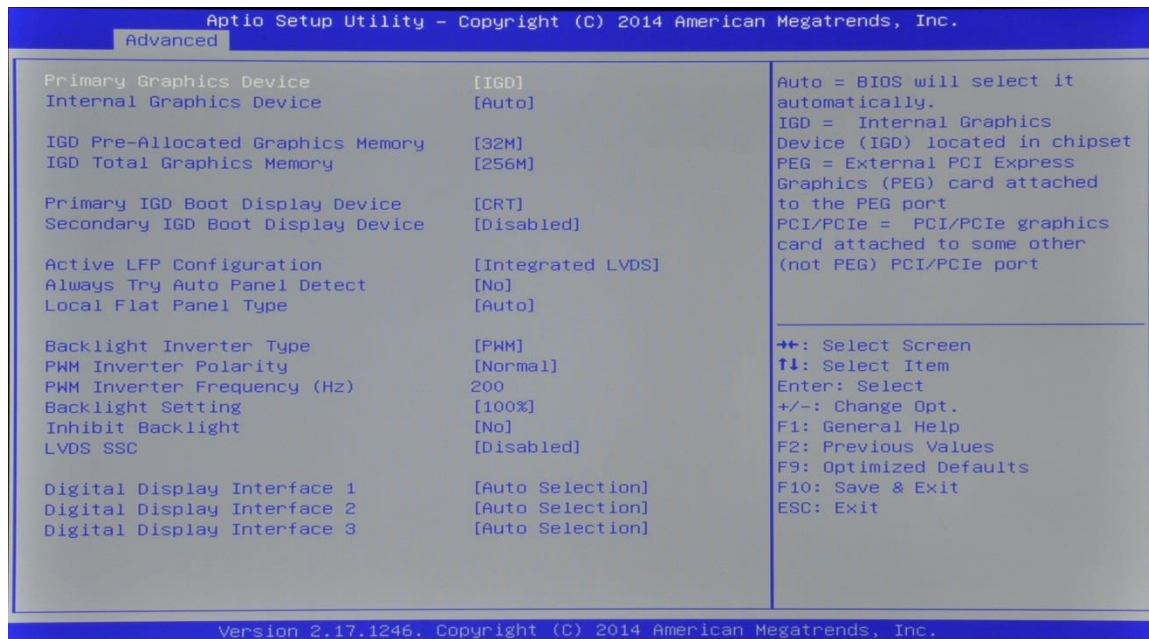
Main BIOS Screen



Navigate to the Right to the **Advanced** Screen



Navigate to the **Graphics** Screen



The **Graphics** Screen has the following BIOS Options:

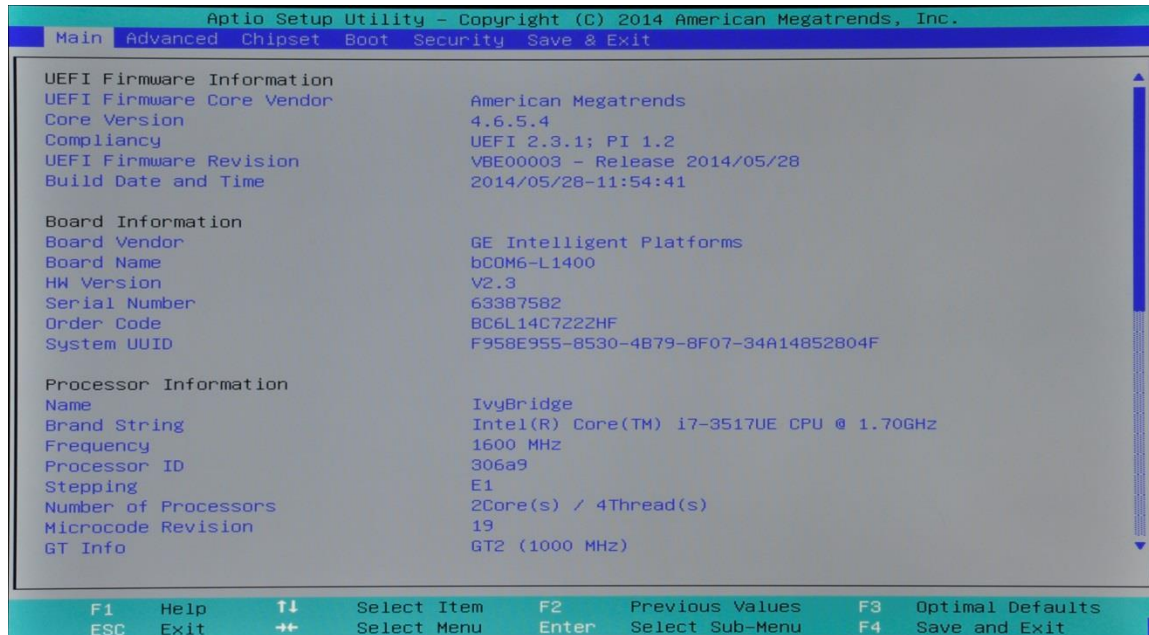
Primary Graphics Device – This sets the COM Express to be the Primary Graphics Device.

Primary IGD Boot Display Device – This sets the VGA on the COM Express to be the Primary Display Device

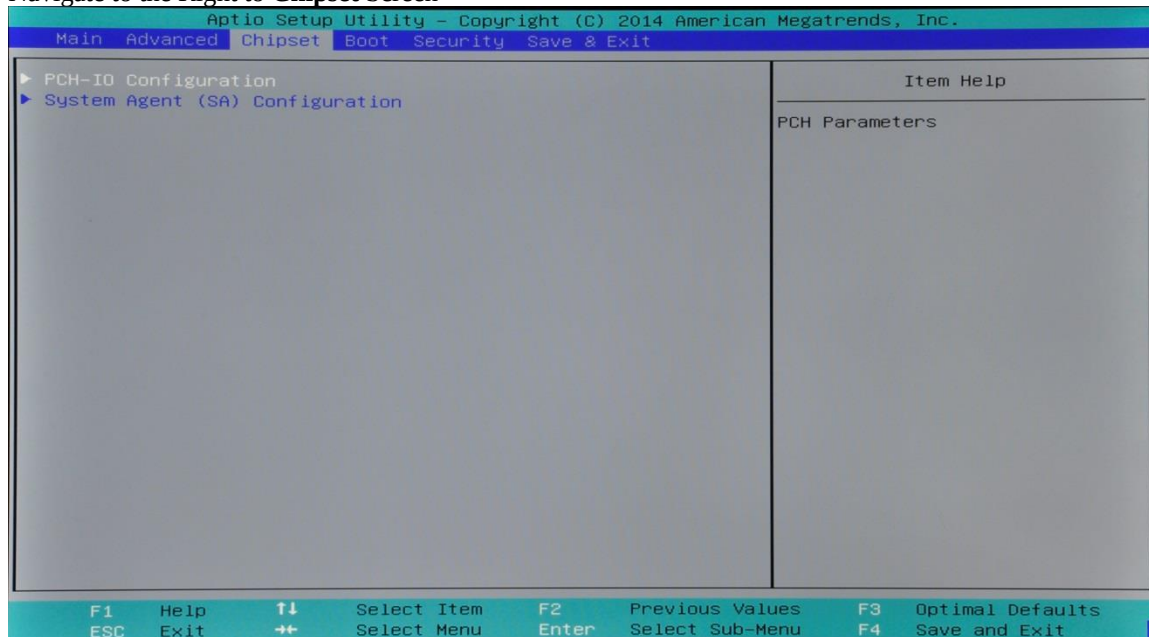


GE bCOM6 L1400

Main BIOS Screen

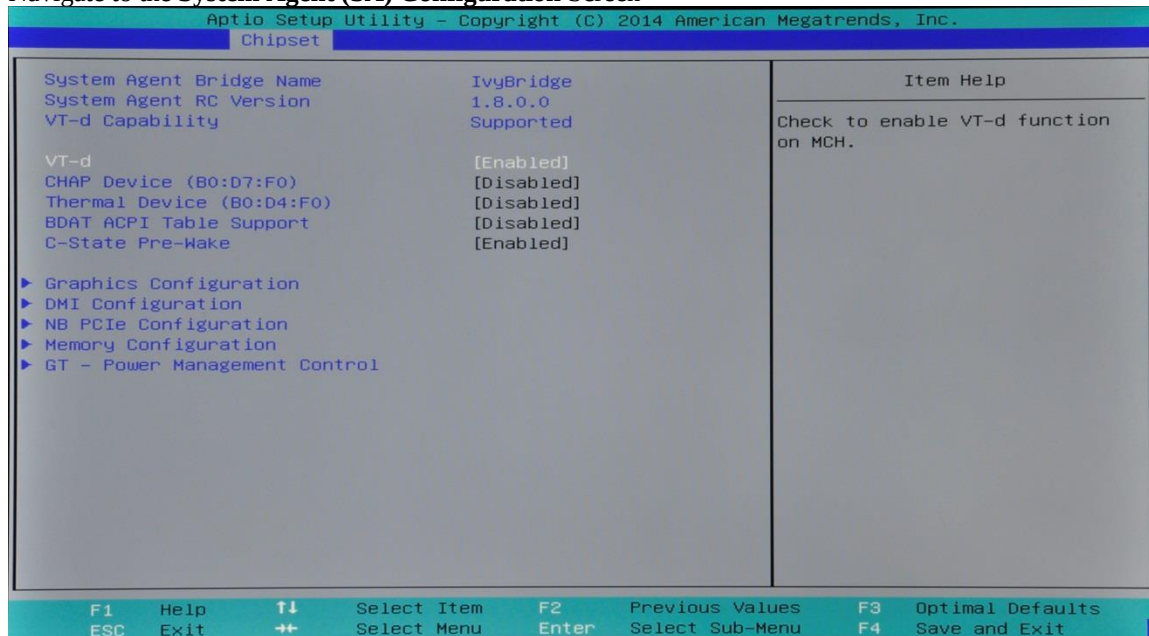


Navigate to the Right to **Chipset** Screen

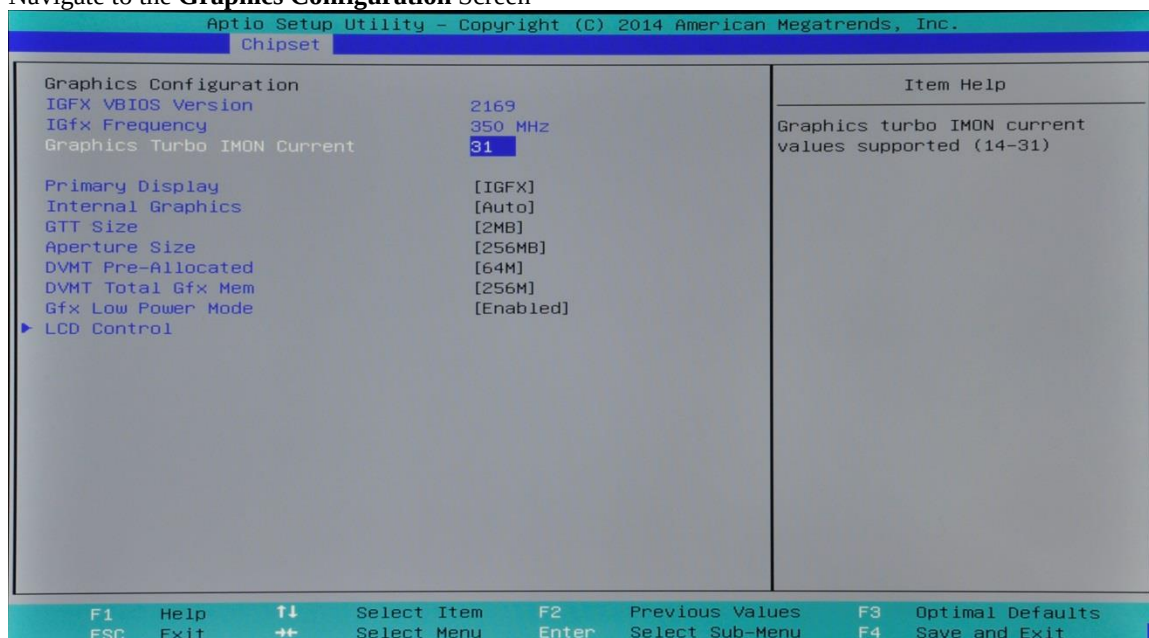




Navigate to the **System Agent (SA) Configuration** Screen



Navigate to the **Graphics Configuration** Screen



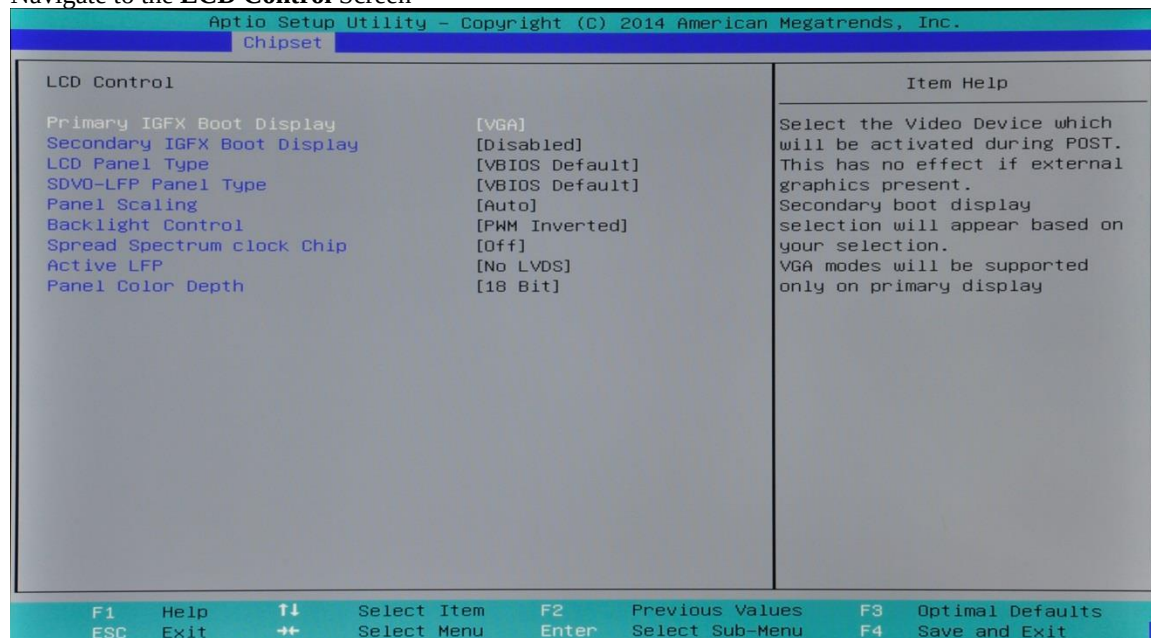
The **Graphics Configuration** Screen has the following control:

Primary Display - This sets the COM Express to be the Primary Graphics Device.

However to change the Primary Display Device you will need to Navigate to the **LCD Control** Screen



Navigate to the **LCD Control** Screen



The **LCD Control** Screen has the following control:

Primary IGFX Boot Display - This sets the VGA on the COM Express to be the Primary Display Device

Graphics Processing Unit (GPU)

The VXG/DXG System provides the ability to link a GPU to the COM Express Module via a PCIe x16 connection, capable of PCIe Gen 3.0. All VXG/DXG Systems will have the GPU Module pre-installed. Please refer to the GPU Summary for more details.

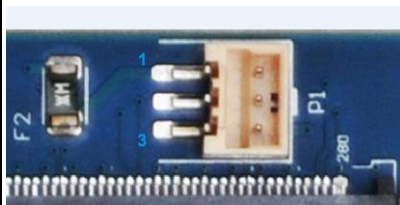
GPU Connector

Function	GPU Module Connector	
Location	P24	
Type	JAE Electronics Fine Pitch MXM 3.0 Connector 3mm Stack Height.	
P/N	MM70-314-310B1-2-R300	
Pinout	Refer to MXM Graphics Module Mobile PCI Express Module Electromechanical Specification Version 3.1, Rev 1.0	

GPU Module FAN

The VXG/DXG System provides two external Fan connections. One of these is on the bottom side of the PCB near the GPU Module.

Function	GPU Module Fan	
Location	P1	
Type	Molex Pico-SPOX	
P/N	087437-0343	
Mating	Pin Housing: 087439-0300 Terminals: 087421-0000	
Cable	N/A	
Pinout	Pin	Description
	1	+12V
	2	-
	3	GND



GPU Options

The VXG/DXG has multiple GPUs available. These have different specifications and operating conditions, as detailed below. Please note that not all available GPUs are listed; please contact sales@connecttech.com for more GPU options.

NVIDIA Quadro® & Tesla®

	Quadro P3000	Quadro P5000	Quadro M5000 SE	Quadro M3000SE	Tesla M6
NVIDIA® CUDA™ Cores	1280	2048	2048	1024	1536
Processor Clock	1088/1210 (Boost)	1278/1513 (Boost)	861/1038 (Boost)	540	950/1051 (Boost)
Memory Size	6GB	16GB	8GB	4GB	8GB
Memory Type	GDDR5	GDDR5	GDDR5	GDDR5	GDDR5 ECC
Memory Clock	14 Gbps	12 Gbps	17 Gbps	13 Gbps	6.6 Gbps
Memory Interface	192-bit	256-bit	256-bit	256-bit	256-bit
Memory Bandwidth	168.3 GB/s	192.3 GB/s	160 GB/sec	160 GB/sec	147.2 GB/s
Output Channels	4	4	4	4	0
Power Draw	75W	100W	150W	75W	100W
Single Precision Compute Power	3.9 TFLOPS	6.4 TFLOPS	3.2 TFLOPS	1.9 TFLOPS	2.2 TFLOPS
Open CL	1.2	1.2	1.2	1.2	1.2
Open GL	4.5	4.5	4.5	4.6	
DirectX	12	12	12	12	
Shader Model	5.1	5.1	5.0	5.0	
PCI Express Gen	3.0	3.0	3.0	3.0	3.0
PCI Express Link Width	x16	x16	x16	x16	x16
Operational Temperature Range	0°C ~ 55°C	0°C ~ 55°C	0°C ~ 55°C	0°C ~ 55°C	0°C ~ 55°C

NVIDIA GeForce™

	GTX 1050Ti	GTX 1080
NVIDIA® CUDA™ Cores	768	2560
Processor Clock	1392 MHz	1733 MHz
Memory Size	4 GB	8 GB
Memory Type	GDDR5	GDDR5X
Memory Clock	7 Gbps	10 Gbps
Memory Interface	128-Bit	256-Bit
Memory Bandwidth	112 GB/s	320 GB/s
Output Channels	4	4
Power Draw	60W	150W
Single Precision Compute Power	2.29 TFLOPS	7.96 TFLOPS
Open CL	1.1	1.2

Open GL	4.5	4.5
DirectX	12	12
Shader Model	5.0	5.0
PCI Express Gen	3.0	3.0
PCI Express Link Width	x16	x16
Operational Temperature Range	0°C ~ 55°C -20°C ~ 70°C -40°C ~ 85°C	0°C ~ 55°C

HD Audio

The VXG/DXG System features HD Audio capabilities with the assistance of the Cirrus Logic CS4207 Codec device. From the codec, 1 Microphone Input and 1 Headphone Output are available.

Function	HD Audio			
Location	P10			
Type	FCI Minitek Double Row 4 x 2			
P/N	98414-G06-08LF			
Mating	10073599-008LF			
Cable	CBG118			
Pinout	Pin	Description	Pin	Description
	1	-	2	-
	3	MIC IN R	4	MIC IN L
	5	GND	6	GND
	7	HP OUT R	8	HP OUT L



Software Support for the CS4207

Additional drivers will be needed to properly operate audio on the VXG/DXG System. Some downloadable links can be found below.

Windows XP Driver: http://www.cirrus.com/en/pubs/software/CS4207_WinXP_1-0-0-38.zip

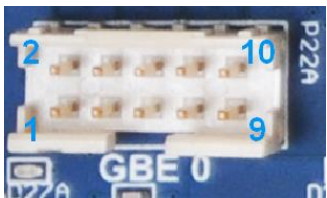
Windows 7/Vista Driver: http://www.cirrus.com/en/pubs/software/CS4207_WinVista_Win7_32-64-bit_6-6001-1-30.zip

Linux Driver: Included in kernels 2.6.30 and up.

10/100/1000 Ethernet (GBE)

The VXG/DXG System features dual 10/100/1000 Ethernet Ports. GBE 0 is sourced from the COM Express Module. Meanwhile, GBE 1 is sourced from an Intel 82574 PCIe PHY Controller located on the VXG/DXG System Carrier Board, connected via PCIe x1 to the COM Express Module.

Function	Gigabit Ethernet Connector			
Location	P22A, P22B			
Type	FCI Minitek Double Row 5 x 2			
P/N	98414-G06-10LF			
Mating	10073599-010LF			
Cable	CBG117			
Pinout	Pin	Description	Pin	Description
	1	MX0-	2	MX0+
	3	MX1-	4	MX1+
	5	SHELL	6	SHELL
	7	MX2-	8	MX2+
	9	MX3-	10	MX3+



GBE LED

The VXG/DXG System provides two GBE Ports. Both of the GBE Ports however do not have the GBE LED Indicators. This GBE LED Connector has on-board in-line 470 Ohm before each of the LED Pins.

Function	GBE LED			
Location	P2			
Type	FCI Minitek Double Row 4 x 2			
P/N	98414-G06-08LF			
Mating	10073599-008LF			
Cable	N/A			
Pinout	Pin	Description	Pin	Description
	1	GBE 1 – ACT#	2	+3.3V
	3	GBE 1 – LINK	4	+3.3V
	5	GBE 0 – ACT#	6	+3.3V
	7	GBE 0 – LINK	8	+3.3V

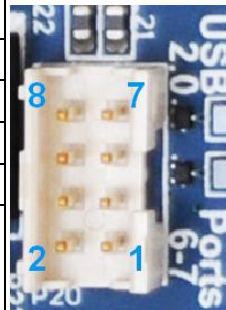


USB & MicroSD

USB 2.0 Connector

The VXG/DXG System has multiple USB Ports. USB 2.0 Port 7 is sourced directly from the COM Express Module. USB 2.0 Port 6 however has multiple functionality options. Using Jumper J727, Port 6 can either be a Client USB, or it can be used to connect the SD Card to the COM Express Module.

Function	USB 2.0 Ports 6 and 7			
Location	P20			
Type	FCI Minitek Double Row 4 x 2			
P/N	98414-G06-08LF			
Mating	10073599-008LF			
Cable	CBG104			
Pinout	Pin	Description	Pin	Description
	1	PORT 6 – VBUS ^[2]	2	PORT 7 – VBUS
	3	PORT 6 – D– ^[3]	4	PORT 7 – D–
	5	PORT 6 – D+ ^[3]	6	PORT 7 – D+
	7	PORT 6 – GND	8	PORT 7 – GND



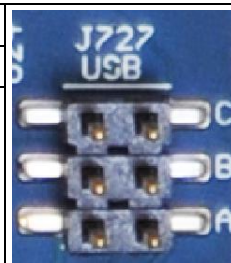
Note [2]: USB 2.0 Port 6 can be optionally be used as client USB. Simply remove the Jumper from J727A to enable

Note [3]: USB 2.0 Port 6 can be optionally be used to enable the SD Card. Simply remove the Jumper from J727C to enable

Jumper – USB Port 6 Switching (J727)

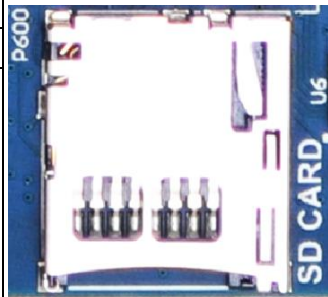
The following jumper selection only impacts USB 2.0 Port 6. USB 2.0 Port 7 is directly routed to P20, and the jumper settings on J727 will not impact it.

Function	USB 2.0 Port 6 Switching		
Location	J727		
Modes	Position	Jumper ON	Jumper OFF
	A	VBUS Power ON	VBUS Power OFF
	B	No Function	No Function
	C	USB 2.0 on Connector	SD Card Controller



microSD CARD Connector

The VXG/DXG System provides a microSD Card Slot. This microSD can be accessed by the COM Express Module over USB 2.0 Port 6^[10].

Function	microSD Card ^[10]		
Location	P600		
Type	Molex microSD Memory Card Connector		
P/N	5025700893		
Pinout	Pin	Description	
	1	SD_D2	
	2	SD_D3	
	3	SD_CMD	
	4	SD_VDD	
	5	SD_CLK	
	6	GND	
	7	SD_D0	
	8	SD_D1	
	9	GND	
	10	SD_CD#	

Note [10]: USB 2.0 Port 6 can be optionally be used to enable the SD Card. Simply remove the Jumper from J727C to enable

USB 3.0/2.0 Connector

The VXG/DXG System provides up to a maximum of four USB 3.0 Ports. The USB 3.0 signals are sourced directly from the COM Express Type-6 Module, and run through a Pericom Semiconductor PI3EQX7502AIZDE re-driver. Over current protection, power supply filtering and ESD protection is provided.

Function	USB 3.0			
Location	P23A, P23B			
Type	Lotes Co. Ltd Double Row 10 x 2			
P/N	ABA-USB-152-K01			
Cable	CBG131			
Pinout	Pin	Description	Pin	Description
	1	Port A - VBUS	20	-
	2	Port A - SSRX-	19	Port B - VBUS
	3	Port A - SSRX+	18	Port B - SSRX-
	4	GND	17	Port B - SSRX+
	5	Port A - SSTX-	16	GND
	6	Port A - SSTX+	15	Port B - SSTX-
	7	GND	14	Port B - SSTX+
	8	Port A - D-	13	GND
	9	Port A - D+	12	Port B - D-
	10	-	11	Port B - D+

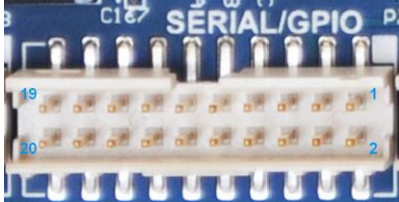


Serial

Serial/GPIO Connector

The VXG/DXG System allows access to the COM Express Modules GPIO by routing them out to a GPIO header. The GPIO voltage is configurable via jumpers. Also present is a RS-232 Console Port that connects to the COM Express Module's UART.

Function	RS-232 Serial and GPIO			
Location	P7			
Type	FCI Minitek Double Row 10 x 2			
P/N	98424-G52-20LF			
Mating	10073599-020LF			
Cable	CBG121			
Pinout	Pin	Description	Pin	Description
	1	GPI0	2	GPO3
	3	GPI1	4	GPO2
	5	GPI2	6	GPO1
	7	GPI3	8	GPO0
	9	GND	10	-
	11	-	12	-
	13	RS-232 RX	14	-
	15	RS-232 TX	16	-
	17	-	18	-
	19	GND	20	-



Note: GPIO is not available on Intel® Core™ i7-3517 COM Express Module

Jumper – GPIO Power Selection (J800)

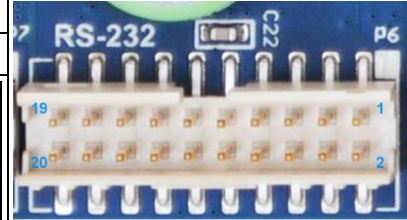
Function	GPIO Power	
Location	J800	
Modes	Position	Description
	+5V	GPIO +5V
	+3.3V	GPIO +3.3V



RS-232 Serial Connector

The VXG/DXG System provides two RS-232 Serial ports. Each of these ports are derived directly from the COM Express Type-6 using a single PCIe x1 link connection, and an EXAR XR17V354 (Shared with RS-485).

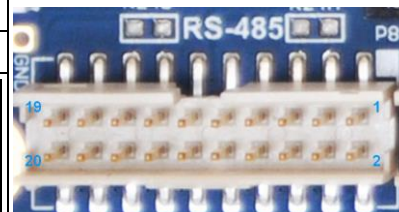
Function	RS-232 Serial			
Location	P6			
Type	FCI Minitek Double Row 10 x 2			
P/N	98424-G52-20LF			
Mating	10073599-020LF			
Cable	CBG121			
Pinout	Pin	Description	Pin	Description
	1	Port A – DCD	2	Port A – DSR
	3	Port A – RXD	4	Port A – RTS
	5	Port A – TXD	6	Port A – CTS
	7	Port A – DTR	8	Port A – RI
	9	GND	10	GND
	11	Port B – DCD	12	Port B – DSR
	13	Port B – RXD	14	Port B – RTS
	15	Port B – TXD	16	Port B – CTS
	17	Port B – DTR	18	Port B – RI
	19	GND	20	GND



RS-485 Connector

The VXG/DXG System provides two RS-485 Serial ports. Each of these ports are derived directly from the COM Express Type-6 using a single PCIe x1 link connection, and an EXAR XR17V354 (Shared with RS-232).

Function	RS-485 Serial			
Location	P8			
Type	FCI Minitek Double Row 10 x 2			
P/N	98424-G52-20LF			
Mating	10073599-020LF			
Cable	CBG121			
Pinout	Pin	Description	Pin	Description
	1	Port A – RXD+	2	-
	3	Port A – TXD+	4	-
	5	Port A – TXD-	6	-
	7	Port A – RXD-	8	-
	9	GND	10	-
	11	Port B – RXD+	12	-
	13	Port B – TXD+	14	-
	15	Port B – TXD-	16	-
	17	Port B – RXD-	18	-
	19	GND	20	-

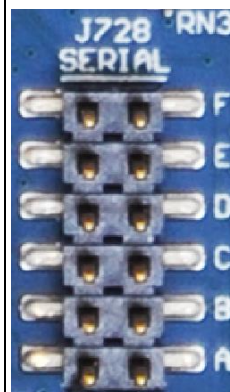


Software Support for the Exar 17V354

Additional drivers will be needed to properly operate the 4 additional serial ports on the COM Express carrier. Drivers for this functionality can be found on the product page here:
<http://connecttech.com/product/com-express-gpu-embedded-system/>

Jumper – Serial UART and RS-485 Control (J728)

Function	Serial UART and RS-485 Control			
Location	J728			
Modes	Position	Description	Jumper In	Jumper Off
	A	EEPROM	Enable PCIe UART EEPROM	Disable PCIe UART EEPROM
	B	PCIe UART - TRI State Enable	Enable TRI-State control for PCIe UART	Disable TRI-State control for PCIe UART
	C	PCIe UART - 485 Port 0 - RTS-TX Control	Enable RS-485 Port-0 RTS-TX Control	Disable RS-485 Port-0 RTS-TX Control
	D	PCIe UART - 485 Port 0 - RTS-RX Control	Enable RS-485 Port-0 RTS-RX Control	Disable RS-485 Port-0 RTS-RX Control
	E	PCIe UART - 485 Port 1 - RTS-TX Control	Enable RS-485 Port-1 RTS-TX Control	Disable RS-485 Port-1 RTS-TX Control
	F	PCIe UART - 485 Port 1 - RTS-RX Control	Enable RS-485 Port-1 RTS-RX Control	Disable RS-485 Port-1 RTS-RX Control

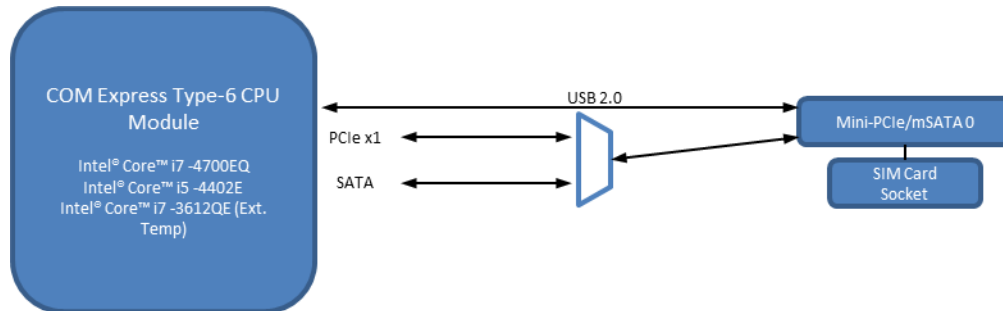


Mini-PCIe/mSATA Slots

Dual Function Mini-PCIe/mSATA Slots

The VXG/DXG System has two dual purpose functional Mini-PCIe/mSATA Slots. Each of these slots can accept either a Mini-PCIe module or an mSATA SSD module. These slots have special circuitry that allows for the selection between connecting PCIe lanes or SATA lanes.

Each of these slots are also provided with a USB 2.0 in addition to the PCIe as per the Mini-PCIe specification, see below for a block diagram of the slots functionality.



Mini-PCIe/mSATA Dual Functionality Diagram*

*Please note, a SIM card is only available on Mini-PCIe/mSATA slot 0

Jumper - mSATA/miniPCIe selection (J726)

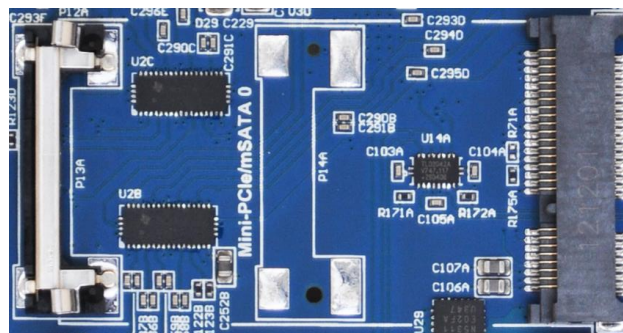
Function	Mini-PCIe/mSATA Switching ^[12]		
Location	J726		
Modes	Position	Jumper ON	Jumper OFF
	A	Slot 0 Mini-PCIe	Slot 0 mSATA
	B	Slot 1 Mini-PCIe	Slot 1 mSATA



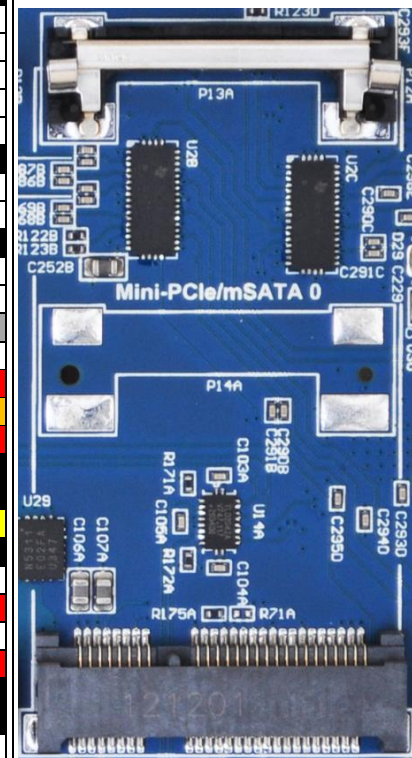
Note [12]: See Mini-PCIe/mSATA Slots for detailed description of functionality

Half and Full Length Mini-PCIe/mSATA Module Installation

The VXG/DXG System comes with dual mounting solutions to allow for the population of a half and a full length module. If you would prefer to have a single slot or both slots populated with half-length hardware at the time of your production order please contact sales@connecttech.com for further details.

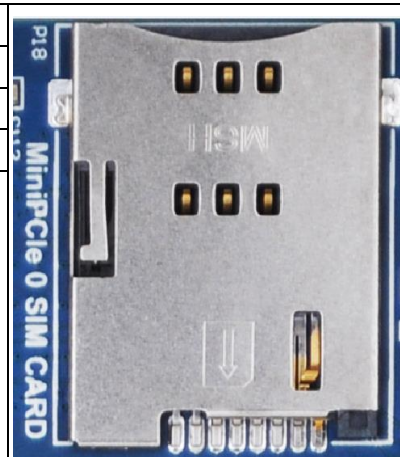


Function	Mini-PCIe/mSATA Slots		
Location	P12A, P12B		
Type	Molex Edge Card Connector		
P/N	0679105700		
Pinout	Pin	Mini-PCIe Description	mSATA Description
	1	-	-
	2	+3.3V	+3.3V
	3	-	-
	4	GND	GND
	5	-	-
	6	+1.5V	+1.5V
	7	CLKREQ#	-
	8	UIM_PWR	-
	9	GND	GND
	10	UIM_DATA	-
	11	PCle CLK+	-
	12	UIM_CLK	-
	13	PCle CLK-	-
	14	UIM_RESET	-
	15	GND	GND
	16	UIM_VPP	-
	17	-	-
	18	GND	GND
	19	-	-
	20	W_DISABLE#	-
	21	RESV	RESV
	22	-	-
	23	PCle RX+	SATA TX+
	24	+3.3V	+3.3V
	25	PCle RX-	SATA TX-
	26	GND	GND
	27	GND	GND
	28	+1.5V	+1.5V
	29	GND	GND
	30	SMB_CLK	-
	31	PCle TX-	SATA RX-
	32	SMB_DATA	-
	33	PCle TX+	SATA RX+
	34	GND	GND
	35	GND	GND
	36	USB D-	-
	37	GND	GND
	38	USB D+	-
	39	+3.3V	+3.3V
	40	GND	GND
	41	+3.3V	+3.3V
	42	-	-
	43	RESV	RESV
	44	-	-
	45	-	-
	46	-	-
	47	-	-
	48	+1.5V	+1.5V
	49	-	-
	50	GND	GND
	51	-	-
52	+3.3V	+3.3V	



SIM Socket

Function	SIM Socket	
Location	P18	
Type	Molex Push-Push SIM Card Connector	
P/N	0475530001	
Pinout	Pin	Description
	1	UIM_PWR
	2	UIM_RST
	3	UIM_CLK
	4	-
	5	GND
	6	UIM_VPP
	7	UIM_DATA
	8	SHELL
	9	SHELL



External SATA

The VXG/DXG System provides two SATA plugs that are SATA-PCIe/104 switched. Please see SATA-PCIe/104 Switching description for additional details.

Function	SATA	
Location	P15A, P15B	
Type	Molex Vertical Serial ATA Plug	
P/N	0471554001	
Cable	CBG090	
Pinout	Pin	Description
	1	GND
	2	TX+
	3	TX-
	4	GND
	5	RX-
	6	RX+
	7	GND



SATA Power Connector

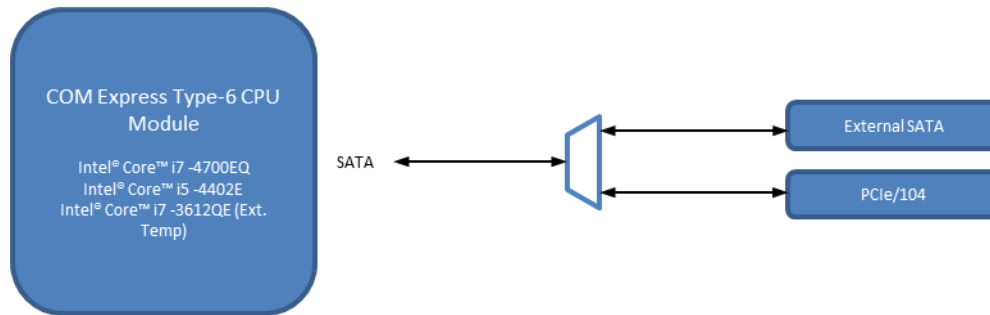
The VXG/DXG System also provides power for external SATA Hard Drives. The power connectors can be found next the External SATA connectors.

Function	SATA Power	
Location	P701, P702	
Type	XH Low Profile Crimp Connector	
P/N	B4B-XH-AM(LF)(SN)(P)	
Mating	XHP-4	
Cable	CBG090	
Pinout	Pin	Description
	1	GND
	2	+5V
	3	GND
	4	+12V



SATA-PCIe/104 Switching

The VXG/DXG System has multiple SATA connections sourced from the COM Express Module. Each of these can connect to SATA HDD, SSD, or mSATA. To allow for greater flexibility and customization, switching circuitry allowing for the selection of connecting to an external SATA plug or to the PCIe/104 Type 2 Connector has been added.



SATA-PCIe/104 Switching Diagram

Jumper - SATA EXT-PCIe/104 Switching (J1)

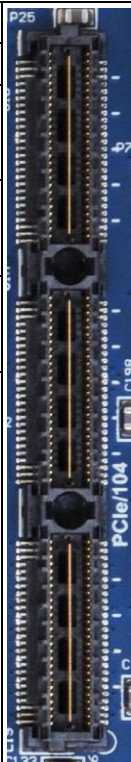
Function	SATA External Plug – PCIe/104 Switching ^[11]			
Location	J1			
Modes				
	Location	Jumper ON	Jumper OFF	
	A	External SATA 0	PCIe/104 Type 2 Conn SATA 0	
	B	External SATA 1	PCIe/104 Type 2 Conn SATA 1	

Note [11]: See SATA-PCIe/104 Switching for detailed description of functionality

PCIe/104 Expansion

The VXG/DXG System provides the addition of PCIe/104 Type 2 Stack ability. This enables up to Four PCIe/104 cards to be added atop of the VXG/DXG System. PCIe/104 Female to Female standoffs ship with all VXG/DXG products to allow for PCIe/104 Card integration.

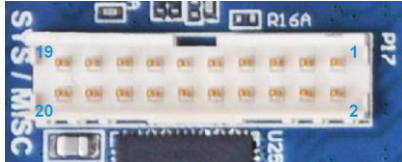
The VXG/DXG PCIe/104 Connector is a PCIe/104 Type 2. This means that it connects only Four PCIe x1 Links in Bank 1; and has x2 SATA Links with one in Bank 2 and the other in Bank 3. There are no PCIe x4, or x8, or x16 provided to this connector.

Function	PCIe/104 Stack Interface	
Location	P25	
Type	Samtec Fine Pitch Stacking Connector 15mm Stack Height	
Carrier Connector P/N	ASP-129637-03	
Mating Connector P/N	ASP-129646-03	
Pinout	Refer to PCI/104-Express & PCIe/104 Specification, Rev 2.01 NOTE: PCIe/104 Type 2 (SATA in Banks 2/3, No PCIe x16 Link)	

System and Miscellaneous Connector

The System header can be used to connect the power button, reset button, and LEDs required to monitor the module performance or state.

Function	System Controls			
Location	P17			
Type	FCI Minitek Double Row 10 x 2			
P/N	98414-G06-20LF			
Mating	10073599-020LF			
Cable	CBG116			
Pinout	Pin	Description	Pin	Description
	1	+5V	2	SPEAKER-
	3	-	4	+5V SB
	5	RTC BAT EXT	6	GND
	7	SYS RESET#	8	GND
	9	PWRBTN#	10	GND
	11	BATLOW#	12	GND
	13	EXT S3#	14	SMB DAT
	15	I2C CLK	16	CMB CLK
	17	I2C DAT	18	SMB ALERT#
	19	+5V	20	GND



Input Power and Control

The VXG/DXG System accepts a single power input to power all on-board devices. The VXG/DXG System accepts a wide input range of +12V to +48V for operation.

Function	Power	
Location	P700	
Type	FCI Pluggable Terminal Block	
P/N	20020108-G041A01LF	
Mating	20020003-G041B01LF (Or Equivalent)	
Pinout	Pin	Description
	1	VIN
	2	VIN
	3	GND
	4	GND



Jumper – Power Control (J725)

Function	Power Control		
Location	J725		
Modes	Position	Description	
	PULLUP	+3.3V Stand By Connected to PWR_OK	
	PGOOD	PGOOD Connected to PWR_OK	
	SD	Enable/Disable COM Express Shutdown Functionality	

Power Control Option 1 – ATX Style Power Control

J725 Position	Jumper ON/OFF
PULLUP	OFF
PGOOD	ON
SD	ON

When the Power Control Jumpers are setup to enable “ATX Style Power Control” it will exhibit the following behaviour:

- When power is applied to the Input Power Connector (P700), the system will ONLY turn on its “Always On” voltages (or standby rails).
- The system power and COM Express CPU is then controlled by the PWRBTN# signal. The PWRBTN# is meant to be connected to GND via a Mom-Off switch. When the PWRBTN# signal is pulsed low the COM Express CPU and all of the main on-board voltage rails will power ON.
- This mode allows the system to go into suspend and sleep modes.
- Since the SD jumper is install when the system is triggered to power down from the PWRBTN# or the host operating system all of the main on-board voltage rails will turn OFF. However the always on (or standby rails) will remain on.

Power Control Option 2 – AT Style Power Control

J725 Position	Jumper ON/OFF
PULLUP	ON
PGOOD	OFF
SD	OFF

When the Power Control Jumpers are setup to enable “AT Style Power Control” it will exhibit the following behaviour:

- When power is applied to the Input Power Connector (P700), the system will turn on all of its on-board power rails.
- This mode is useful if you intend the system to be powered on whenever power is applied, without the need for a power button.
- To turn OFF all power to the system, the input power must be turned OFF

RTC Battery

This carrier has a Panasonic BR1225A/FA Lithium battery providing 3V@ 48mAh to VBAT. VBAT is the supply for the RTC Clock of the COM Express module.

If the BR1225A is not sufficient for the application, an external battery can be connected to P17 with J4 selection jumper set appropriately.

For further information about RTC battery selection and life time estimation, see Application Note 00009 CTIN-00009 <http://connecttech.com/pdf/CTIN-00009.pdf>

Note: the battery ships with a non-conductive label to prevent accidental discharge. It can be removed before installation.

Jumper – RTC Battery Selection (J4)

Function	RTC Battery Selection		
Location	J4		
Modes	Position	Description	
	EXT	External RTC Battery	
	LOC	On-Board RTC Battery	

Jumper – RTC Battery Clear/Enable (J5)

Function	RTC Battery Clear/Enable		
Location	J5		
Modes	Position	Description	
	CLR	Clear RTC	
	EN	Enable RTC	

Typical Hardware Installation Procedure

1. Ensure all external system power supplies are OFF.
2. Install the necessary cables for the application. At a minimum, this would include:
 - a) Power cable to the input power connector
 - b) Connect a video display cable
 - c) Keyboard and mouse via USB
 - d) SATA or mSATA hard drive

For additional information on the relevant cables, please see the Cables and Interconnects section of this manual.

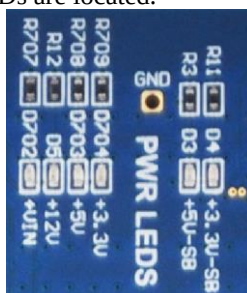
3. Connect the power cable to power supply
4. Ensure your power supply is in the range of +12V to +48V DC
5. Switch ON the power supply. DO NOT power up your system by plugging in live power.

On-board Indicator LEDs

The VXG/DXG System has 10 on-board indicator LEDs.

LED	Description
D1	+1.5V
D2	+1.8V
D3	+5V-SB
D4	+3.3V-SB
D5	+12V
D8	HDD ACT
D12	RESET#
D600	SD-ACT
D601	SD-PWR
D702	+VIN
D703	+5V
D704	+3.3V

See below for a diagram of where these LEDs are located.



Power Consumption

Current Consumption

Below are the maximum ratings of the VXG/DXG System.

Maximums	Amps	Watts
Theoretical absolute maximum total draw of all functionality on the board. Based on what theoretical maximum numbers from COM Express and MXM GPU ratings.	16	192

Below are measurements taken with the VXG/DXG System running in various Modes and/or Configurations. Some values will change depending on what COM Express Module, and what GPU Module are installed. Please refer to the Module manufacturer's manual for full details on the current consumption of the particular Module you are using.

Actual Measurements	Amps	Watts
VXG001 - Booted to BIOS, System Idle	1.5	36.0
VXG001 - Booted to Linux Ubuntu , single DisplayPort video output, USB keyboard with system running CPU stress test	2.6	38.4
VXG001 - Booted to Windows 7, single DisplayPort video output, USB keyboard with system running CPU & GPU Stress Test	4.1	98.4
VXG001 - Booted to Windows 7, Quad DisplayPort video outputs, USB keyboard with system running CPU & GPU Stress Test	4.9	117

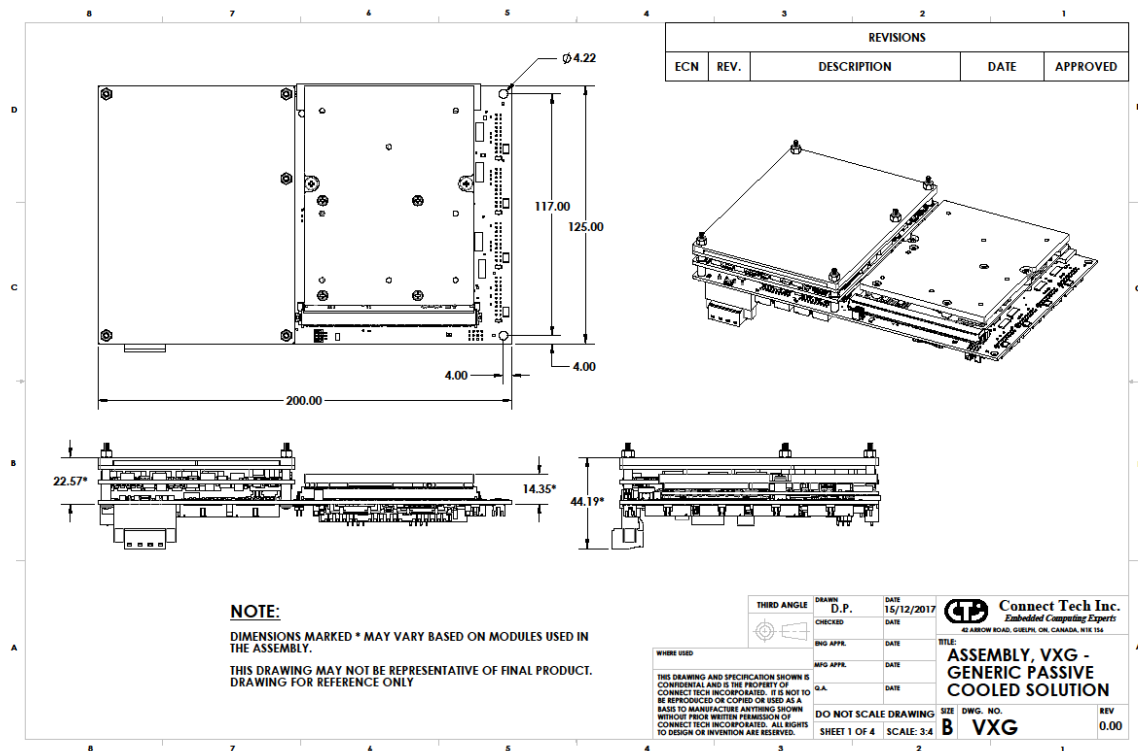


Mechanical Drawings and Models

A complete **3D STEP Model** file of VXG/DXG assembly can be downloaded here:

http://www.connecttech.com/ftp/3d_models/VXG_DXG_3D_MODEL.zip

VXG 2D Mechanical Dimensioned Plan View Drawing – All dimensions are shown in (mm)



DXG 2D Mechanical Dimensioned Plan View Drawing – TBD

Cables and Cable Kit Information

Cable Kits

The following tables summarize the VXG/DXG System's available cable kits from Connect Tech.

CKG053 – “Full” Cable Kit

Description	Part Number	QTY	Drawing No.
SATA HDD Signal and Power Cable	CBG090	2	CTIC-00347
VGA to 10-Pin Minitex Cable	CBG120	1	CTIC-00379
Dual DB-9 to 20-Pin Minitex Cable	CBG121	3	CTIC-00380
Dual USB 2.0 to 8-Pin Minitex Cable	CBG104	1	CTIC-00429
DisplayPort to 20-Pin Minitex Cable	CBG113	6	CTIC-00432
RJ-45 to 10-Pin Minitex Cable	CBG117	2	CTIC-00433
Dual Audio to 8-Pin Minitex Cable	CBG118	1	CTIC-00434
20-Pin Minitex System Cable	CBG116	1	CTIC-00435
2x RA USB3.0 Cable Panel Mount: Right Angle Inner Exit	CBG160	2	N/A
2x RA USB3.0 Cable Panel Mount: Right Angle Outer Exit	CBG287	2	N/A
2x RA USB3.0 Cable Panel Mount: Vertical Exit	CBG288	2	N/A

CKG021 – “Starter” Cable Kit

Description	Part Number	QTY	Drawing No.
SATA HDD Signal and Power Cable	CBG090	1	CTIC-00347
VGA to 10-Pin Minitex Cable	CBG120	1	CTIC-00379
Dual USB 2.0 to 8-Pin Minitex Cable	CBG104	1	CTIC-00429
RJ-45 to 10-Pin Minitex Cable	CBG117	1	CTIC-00433

Additional Available Cables

Description	Part Number	Drawing No.
HDMI Female to 20-Pin Minitex Cable	CBG145	CTIC-00461
Dual USB 2.0 to 20-Pin Minitex Cable	CBG130	CTIC-00488
LVDS (DF20A-40DS) to Un-Terminated Wires	CBG125	OEM

Plenum Rated Cables are available upon request.