WinSystems®
An Employee-Owned Company

SYS-405 User Manual

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Introduction

The SYS-405 is a high-performance, industrial, small form factor (SFF) system capable of operating at very high temperatures without a fan or heat-pipe. The processor is an Intel E3800 Atom series, integrated into the SYS-405 using a COM Express Type 6 module. The 5052 aluminum alloy enclosure is ideal for applications in extreme environments, and the sturdy base plate provides a thermal solution that protects the PCB assembly. For additional flexibility and ease of system integration, the SYS-405 accepts a wide input power range from +10 to +50VDC. Software and drivers are available at www.winsystems.com.

If additional information is required, call WinSystems Technical Support at (817) 274-7553 and speak with one of our Application Engineers; they are available M-F, 8 AM to 5 PM, Central Daylight Time (CDT) for assistance with all of your product requirements.

Specifications

Feature	SYS-405S	SYS-405D	SYS-405Q
Processor	**Intel® Atom™ E3815**	**Intel® Atom™ E3827**	**Intel® Atom™ E3845**
- Core Speed	1.46 GHz	1.75 GHz	1.91 Hz
- Number of Cores	1	2	4
- L2 Cache	512 KB	1 MB	2 MB
Graphics	**Intel® Gen 7 Graphics Engine**		
- Graphics Frequency	400 MHz	542/792 MHz (Turbo)	
- Virtualization	Hardware based Intel® VT-x		
Operating Systems	**Linux, Windows, DOS, and other x86 compatible**		
Video Interfaces	**Up to 2 Active Displays** **VGA up to 2560x1536 at 24bpp** **DisplayPort 1.1** **LVDS 18 or 24 Bpp**		
Memory (RAM)	**2, 4, or 8 GB DDR3L SDRAM**		
BIOS	**Phoenix**		
Ethernet	**2 Intel® I210 GbE controllers**		
- Speed	Auto-negotiation for 10/100/1000 Mb/s		
- Advanced Features	IEEE1588 and IEEE 802.1AS time stamping IEEE802.Qav Audio-Video Bridging (AVB) Advanced Power Management (APM) Support Remote boot		
Storage (Bootable)	**1 SATA (2.0) channel** **1 CFAST socket (on back of the board)** **1 mSATA socket (MiniPCIe socket)**		
Serial I/O	**2 serial ports (RS-232/422/485)**		
Bus Expansion	**2x MiniPCIe (One supports mSATA, One supports USB 2.0)** **IO60 (SPI, I^2C, PWM, UART)**		
USB	**1 USB 3.0 port, 3 USB 2.0 ports, and 1 USB interface @ J14**		
Watchdog Timer	**Adjustable from 1 second to 255 minute reset**		
Audio	**HD Audio supported**		
- Audio Interfaces	DisplayPort 1.1 Line Out, Line In, Mic to 3.5 mm 7.1 Surround		
Power[1]	**+10 to 50VDC input** **(7W typical/ 9 W Max)**	**+10 to +50VDC input** **(7.5W typical/ 10W Max)**	**+10 to +50VDC input** **(8.75W typical/ 12W Max)**
Mechanical	**Dimensions: 5 x 8 x 2.5 inches (127 x 203 x 63.5 mm)**		
Weight	**Weight: 2.65 lbs. (1.2Kg)**		
Operating Temperature Range	**-40°C to +85°C (-40°F to +185°F)**		
Storage Temperature	-50°C to +95°C (-58°F to +203°F)		
Humidity Range	0 - 90% Relative Humidity (RH), Non-Condensing		

[1] Power consumption estimates are for the SYS-405 only and exclude any external devices.

1.0 Before You Begin

This User Manual provides instructions for optimal performance and prevention of injury and/or damage to the product. You may VOID the warranty and/or cause damage by neglecting the Best Practices as outlined in Appendix - A.

1.1 Removing the Enclosure Top Cover

Use a #2 Phillips head screwdriver to remove the nine (6-32 x 1.4 inch) flat head screws that secure the enclosure top cover to the SYS-405 frame, as depicted in **Figure 1.1-1**. Once all screws are out, lift the cover and set aside.
**CFAST cover uses identical screws as the enclosure top cover.*

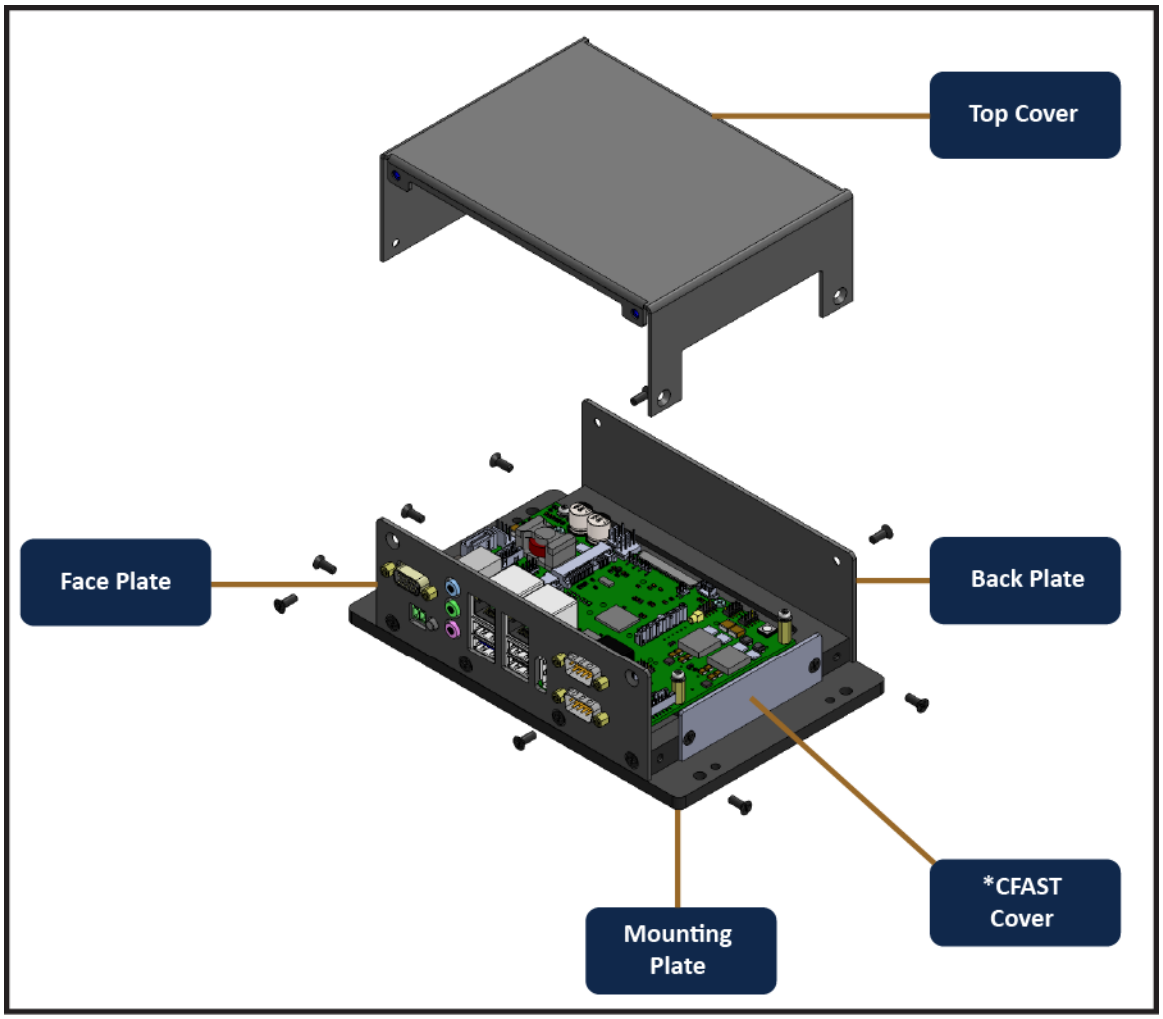


Figure 1.1-1. Removing the Enclosure Top Cover.

1.2 Positioning the Board and Mounting Plate for Reference

To ensure your view is consistent with the illustrations on the pages that follow, position the mounting plate and board with the component side facing you as depicted in **Figures 1.2-1** and **1.3-1.** These illustrations provide locations of connectors and jumpers, and other information critical to setup and configuration.

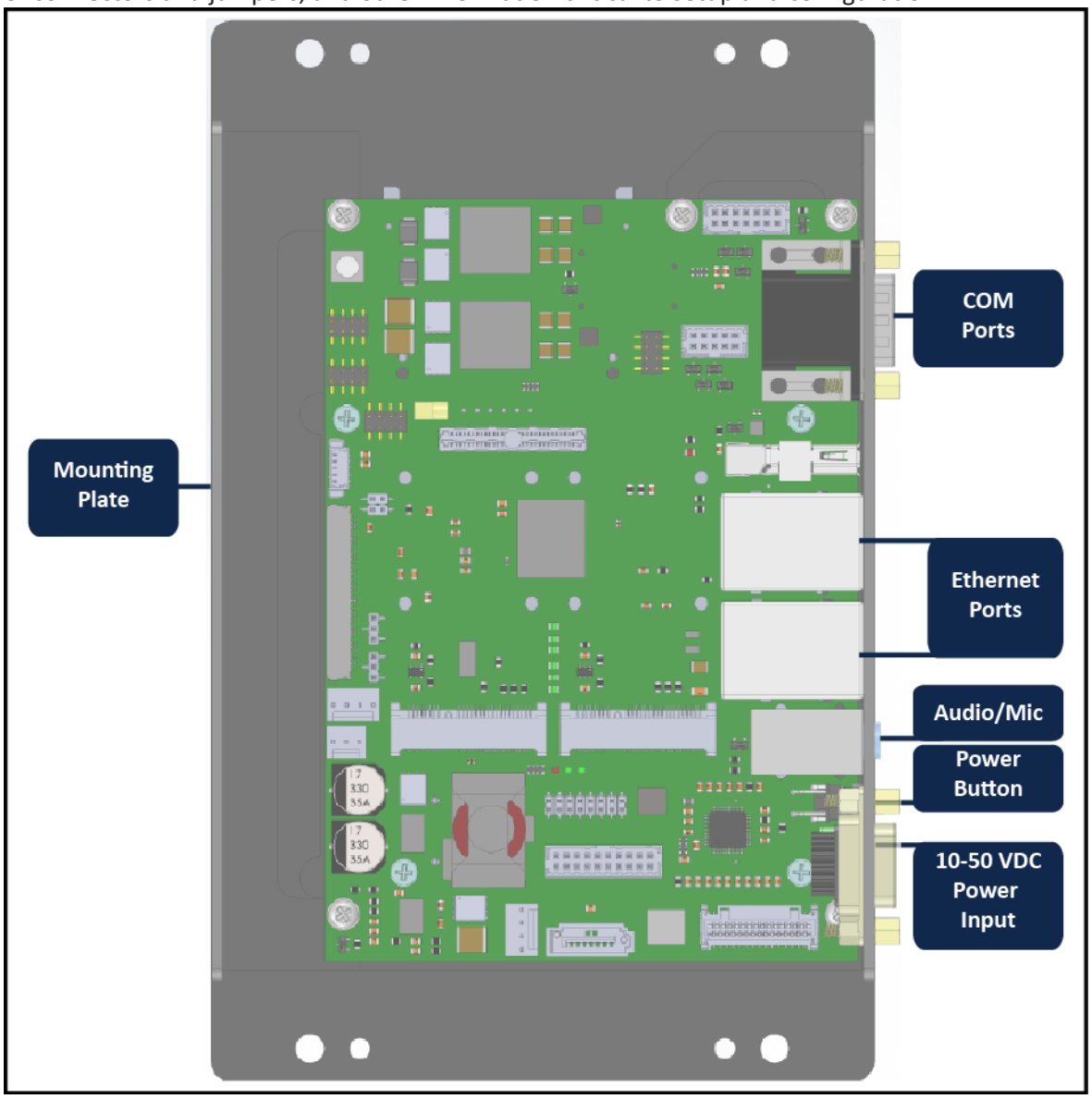


Figure 1.2-1. Positioning the Board and Mounting Plate for Reference.

1.3 Locating Connectors and Jumpers

The topside of the board contains both connectors and jumper blocks; jumper blocks are used to configure the SYS-405 across a wide range of requirements and modes of operation. **Figure 1.3-1** provides locations of all jumpers and connectors for the SYS-405 board. This figure does not include the mounting board due to space constraints.

IMPORTANT! This product ships with a heat sink; removing the heat sink VOIDS the warranty.

NOTE: To view information on a connector, switch, or jumper, click on its descriptor box. You'll be taken to another page within the manual with more information. Once there, click on the destination image or text to go back, if desired.

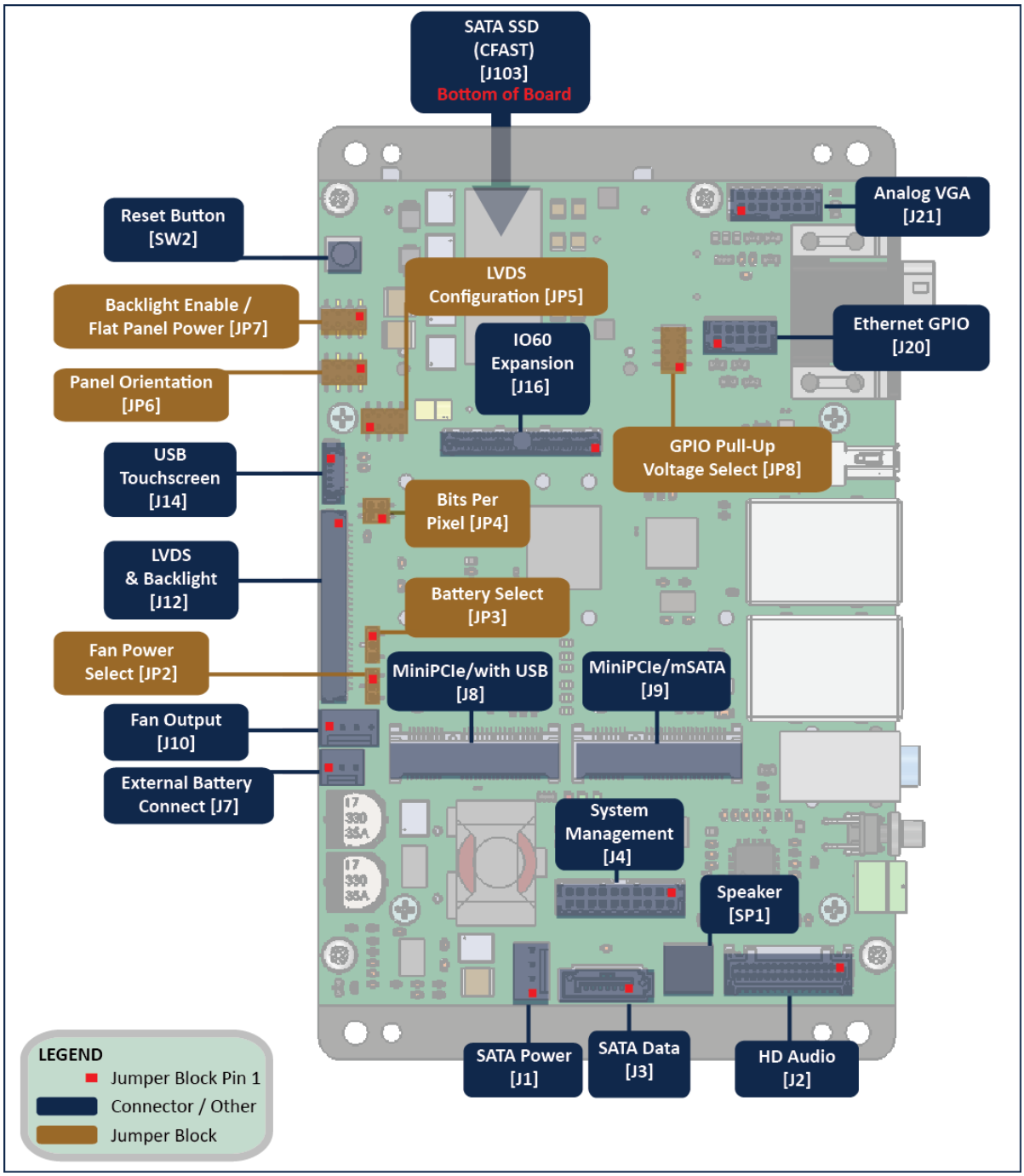


Figure 1.3-1. Connectors and Jumpers.

1.4 External Connectors, Ports, and Inputs

All external connectors, ports, and inputs are on the SYS-405 faceplate.

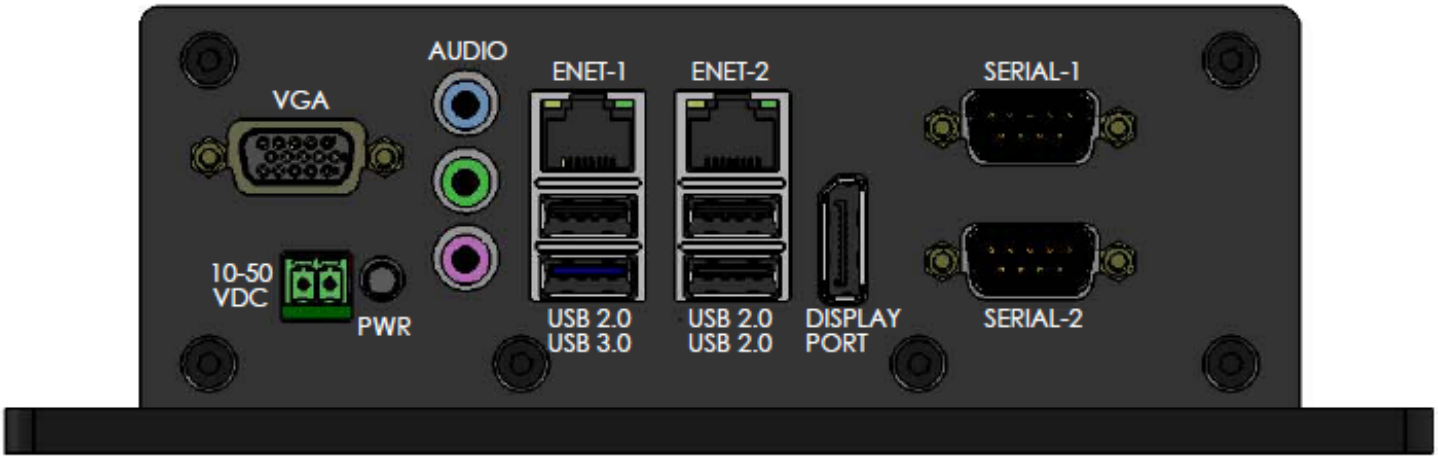
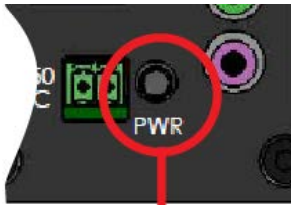
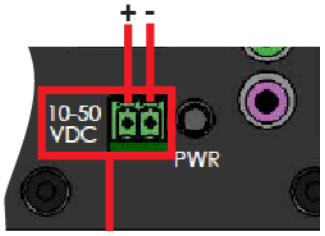


Figure 1.4-1. External Connectors, Ports, and Inputs on the SYS-405 Faceplate.

2.0 Connectors, Jumpers, and I/O

The following sections contain important information about various elements on the SYS-405 board, such as jumpers and connectors that are crucial in configuring the SYS-405 for operation. Use these tables along with the figures in **sections 1.2** through **1.4** to set up the SYS-405.

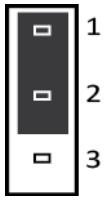
2.1 Power

POWER		
Name	**Layout**	**Additional Information**
PWR (Power) Button **[SW1]**		The **PWR** button (**SW1**), located on the lower left front of the faceplate between the microphone input and the power input, controls power to the SYS-405 board. Upon initial hookup of power to **J5** (the 10-50VDC green input connector), the **PWR** button is bypassed and the board powers up without further action from the user. However, after initial power up: • A brief press of the **PWR** button initiates a soft on or off, depending on the present state • If the unit becomes unresponsive, press and hold the **PWR** button for four (4) seconds, then release, to perform a hard restart
+10 - +50 VDC Power Input **[J5]**	 	The SYS-405 can operate from +10 to +50 VDC (+/-5%). The green power input connector (**J5**) is located next to the **PWR** button on the lower left of the faceplate. **WARNING!** Connect voltage as depicted, or you may damage the board and void the warranty. Connector Reference / MFR/Part Number / WinSystems Part Number PCB Connector / Phoenix/1803277 / G201-0002-500 Mating Connector / Phoenix/1803578 / G201-0002-550 Crimp Connector / Connection Method: Screw / N/A

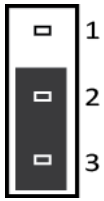
POWER

Fan Voltage Output [JP2]

Default Setting



For 5VDC @ J10

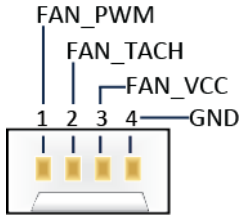


For 12V DC @ J10

This jumper setting provides either a +5 or +12 VDC output at pin 3 (FAN_VCC) of connector **J10**, External Fan Connect. Select the appropriate voltage output based on fan requirements. The default setting is no jumper.

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Samtec/TMM-103-01-L-S-SM-P-TR	G650-2003-0E0
Jumper	Samtec/2SN-BK-G	G201-0002-005
Jumper Kit, 2MM	N/A	KIT-JMP-G-200

External Fan Connect [J10]

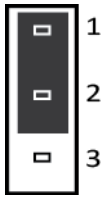


The fan voltage output of this connector is determined by the jumper configuration on **JP2**.

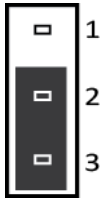
Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Molex/22-11-2042	G201-0004-003
Mating Connector	Molex/22-01-2045	N/A
Crimp Connector	Molex/2759, 4809 KK® Crimp terminal	N/A

Battery Backup Select [JP3]

No battery backup



External battery backup

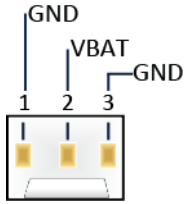


Internal battery backup

This jumper selects whether back up for the real time clock, CMOS and optional GPS are performed by an internal (optional) or external battery. To use an external battery (connected at **J7**), jumper pins 1 & 2 (his is default). For using the optional internal battery, jumper pins 2 & 3. However, note there is no internal battery shipped with the SYS-405.

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Header	Samtec/TMM-103-01-L-S-SM-P-TR	G650-2003-0E0
Jumper	Samtec/2SN-BK-G	G201-0002-005
Jumper Kit, 2MM	N/A	KIT-JMP-G-200

External Battery Connect [J7]

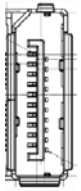


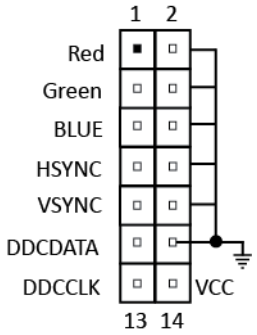
Supplies the SYS-405 board with external standby power for the real-time clock, CMOS, and optional GPS. An extended temperature lithium battery is available from WinSystems, part # BAT-LTC-E-36-16-1 or BAT-LTC-E-36-27-1. For OEM applications, an on-board battery can be integrated into the motherboard. Please contact a WinSystems' Application Engineer for more information.

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Molex/ 22-11-2032	G201-0003-001
Mating Connector	Molex/22-01-2035	N/A
Crimp Connector	Molex/ 2759, 4809 KK® Crimp terminal	N/A

2.2 Video

<table>
<tr><th colspan="3">VIDEO</th></tr>
<tr><th>Name</th><th>Layout</th><th>Additional Information</th></tr>
<tr><td>DisplayPort 1.1

[J15]</td><td>  </td><td>DisplayPort 1.1 is situated between the USB and Serial ports. Aside from video, it also delivers bandwidth capable of high definition (HD) audio. See section 2.3 Audio for more information.</td></tr>
<tr><td>Analog VGA

[J21]</td><td> 
</td><td>The SYS-405 supports analog VGA and delivers video to the SYS-405 faceplate VGA connector.

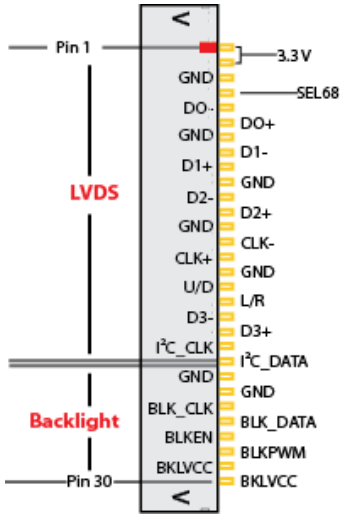
<table>
<tr><th>Connector Reference</th><th>MFR/Part Number</th><th>WinSystems Part Number</th></tr>
<tr><td>PCB Connector</td><td>Molex/87832-1420</td><td>G650-2014-0H0</td></tr>
<tr><td>Mating Connector</td><td>Molex/087568-1443</td><td>N/A</td></tr>
<tr><td>Crimp Connector</td><td>Molex/50394-8051</td><td>N/A</td></tr>
</table></td></tr>
<tr><td>VGA</td><td> 

VGA (supplied by J21)</td><td>The VGA video output is located above the 10-50VDC power input connector on the SYS-405 faceplate.</td></tr>
</table>

VIDEO

Name	Layout	Additional Information

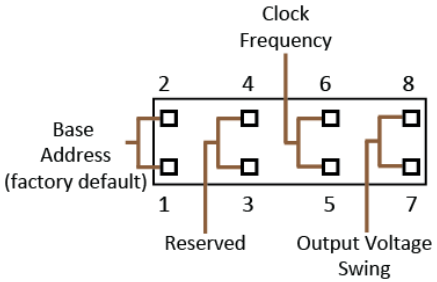
LVDS & Backlight [J12]



Flat panel displays connect to the SYS-405 motherboard at **J12**. The board supports LVDS resolutions up to 1920x1200 at 24 bits per pixel (Bpp). A USB Touchscreen interface connection is located at **J14.** Panel color mode selection for 6-or 8-bits per pixel is configured at **JP4**. All resolutions are panel hardware dependent.

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	HIRose/DF19G-30P-1H(54)	G650-3030-0F0
Mating Connector	HIRose DF19G -30S-1C(05)	N/A
Crimp Connector	DF19A Series	N/A

LVDS Configuration [JP5]



LVDS Configuration Jumpers

Configuration for LVDS, LVDS output swing, and clock frequency for I²C is made at **JP5** using the selection options depicted in the layout illustration to the left and configuration table below.

LVDS Configuration	Type	Jumper Pins 1-2	3-4	5-6	7-8
Base Address	I²C 0xC0				
	I²C 0x40*	*			
Rate	18 bpp				
	24 bpp		■		
Clock Frequency	0.5% Spread				
	0% Spread			■	
Output Voltage Swing	300 mV out				
	400 mV out				■

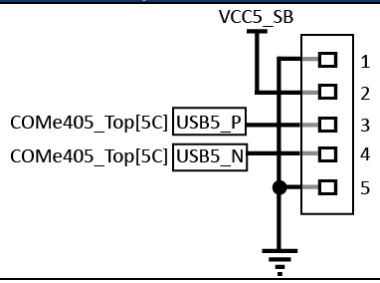
Legend: No Jumper / Jumper

*** Factory default. If moved, panel will not work.**

Connector Reference	MFG/Part Number	WinSystems Part Number
PCB Connector	Samtec/ TMM-104-01-G-D-SM-P-TR	G650-2008-0G0
Jumper	Samtec/2SN-BK-G	G201-0002-005
Jumper Kit, 2MM	N/A	KIT-JMP-G-200

VIDEO

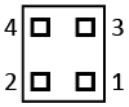
USB Touchscreen [J14]



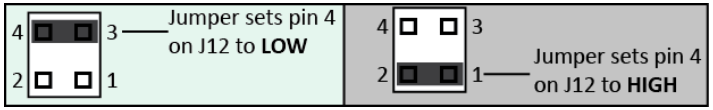
J14 (USB 5) provides Plug-and-Play support for a USB Touchscreen. Aside from a simpler and faster interface, it also provides power within the USB cable, eliminating the need for a separate, dedicated cable to power the touchscreen.

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Molex/53398-0571	G650-2005-000
Mating Connector	Molex/51021-0500	N/A
Crimp Connector	Molex/50394-8051	N/A

Bits Per Pixel (Bpp) [JP4]



Flat Panel Controller. **JP4** is panel dependent and controls 6 or 8-bits per pixel where supported.



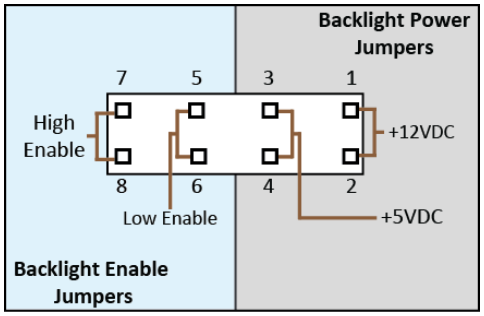
WARNING! Jumpering more than one set of pins on **JP4** at a time will damage the board.

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Samtec/ASP-67231-02	G650-2004-0G0
Jumper	Samtec/2SN-BK-G	G201-0002-005
Jumper Kit, 2MM	N/A	KIT-JMP-G-200

VIDEO

Name	Layout	Additional Information

Backlight Power [JP7]



Use the layout graphic on the left and/or the configuration table below to select the appropriate jumper for backlight power and backlight enable at **JP7**.

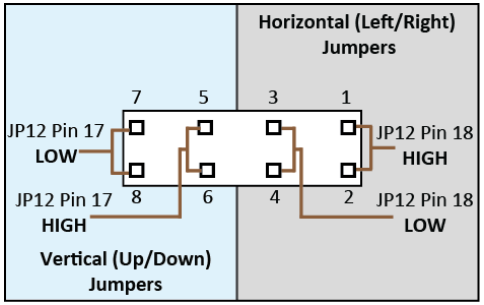
Backlight	Option	Jumper Pins 1-2	3-4	5-6	7-8
Backlight Enable	High Enable				■
	Low Enable			■	
Backlight Power	+5VDC		■		
	+12VDC	■			

Legend: No Jumper / Jumper

WARNING! JP7 supports one jumper for backlight enable settings and one jumper for backlight power settings (two total). However, jumpering more than one set of pins (for backlight enable) and one set of pins (for backlight power) **will** damage the board.

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Samtec/TMM-104-01-G-D-SM-P-TR	G650-2008-0G0
Jumper	Samtec/25N-BK-G	G201-0002-005
Jumper Kit, 2MM	N/A	KIT-JMP-G-200

Panel Orientation [JP6]



Use the layout graphic on the left and/or the configuration table below to select the appropriate jumper for panel orientation.

Panel Orientation	Option	Jumper Pins 1-2	3-4	5-6	7-8
Horizontal (Left/Right)	J12 Pin 18 - High	■			
	J12 Pin 18 - Low		■		
Vertical (Up/Down)	J12 Pin 17 - High			■	
	J12 Pin 17 - Low				■

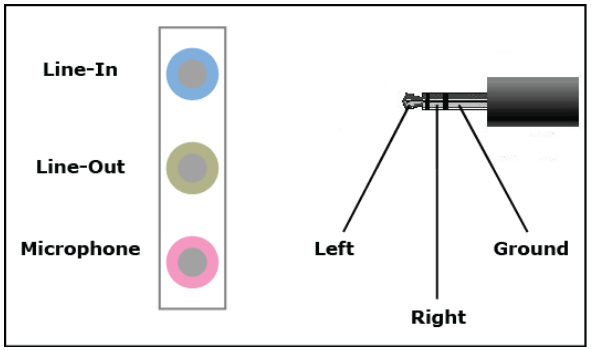
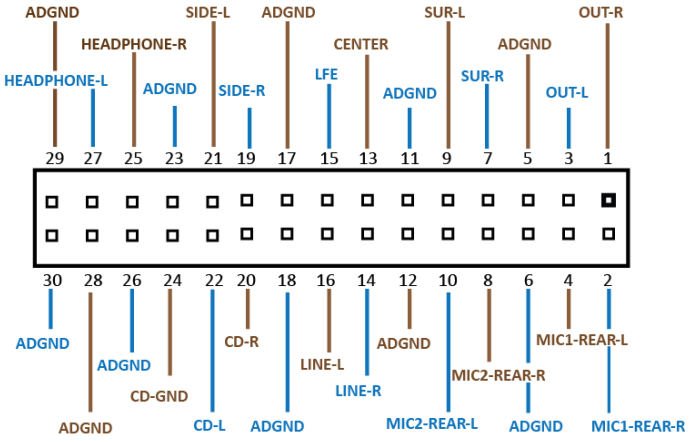
Legend: No Jumper / Jumper

WARNING! JP6 supports one jumper for horizontal panel orientation and one jumper for vertical panel orientation (two total). However, jumpering more than one set of pins (for vertical) and one set of pins (for horizontal) **will** damage the board.

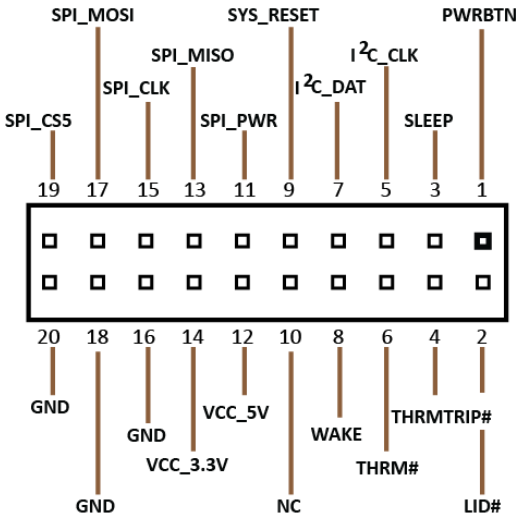
Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Samtec/TMM-104-01-G-D-SM-P-TR	G650-2008-0G0
Jumper	Samtec/25N-BK-G	G201-0002-005
Jumper Kit, 2MM	N/A	KIT-JMP-G-200

2.3 Audio

The SYS-405 uses the Realtek ALC888S-VD codec controller which provides both Digital and Analog channels. The controller has three jack detection pins and a built-in beep generator. The SYS-405 supports three audio interfaces - one digital (DisplayPort 1.1), two analog (Stereo Audio [Line-In/Line-Out/Microphone], and one HD Audio (7.1 Surround). The DisplayPort 1.1 interface located at **J15** also delivers video capability; see more information about this interface in the Video section of this user manual.

AUDIO		
Name	**Layout**	**Additional Information**
Stereo Audio (Line-In, Line-Out, & Mic) **[J6]**		The SYS-405 uses 3.5-mm stereo line-out, line-in, and microphone jacks at **J6**. The diagram to the left depicts the line-in, line-out, and microphone-in ports that are on the faceplate.
HD Audio 7.1 Surround **[J2]**		**HD Audio connection**. WinSystems cable CBL-AUDIO7-102-12, delivers 7.1 (surround sound) audio from this connector. CBL-AUDIO5-102-12 delivers 5.1 audio, and CBL-AUDIO3-102-12 delivers stereo audio. **Connector Reference** / **MFR/Part Number** / **WinSystems Part Number** PCB Connector — Molex/501931-3070 — G650-2030-0HC Mating Connector — Molex/503110 — N/A Crimp Connector — Molex/501930 — N/A

2.4 System Management

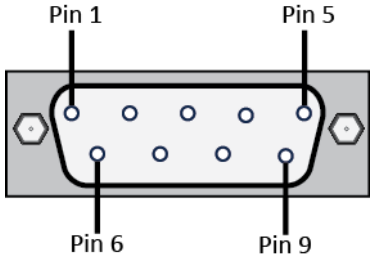
SYSTEM MANAGEMENT		
Name	**Layout**	**Additional Information**
System Management **[J4]**		**J4** supports many system features. The primary uses are to provide a security feature to manage system intrusion and provide notification on thermal status. Pin 2 (LID#) signifies whether the system is on/off or opened/closed and can be used for an intruder alert. If this particular bit is set, the user can wire it to their system to initiate a system shut down. Pin 4 provides thermal trip status, action (e.g., system shut down) is taken in response to the system overheating, and the user can be notified of a thermal trip. More information regarding thermal protection signaling is provided in the table below. Additionally, you can tie **J4** to a sleep mode via Pin 3.

Thermal Protection Signaling

Thermal Protection	Pin	Power Rail	Description
THRM#	1	3.3V/3.3V	Input from off-Module temp sensor indicating an over-temp situation
THRMTRIP#	0	3.3V/3.3V	Active low output indicating that the CPU has entered thermal

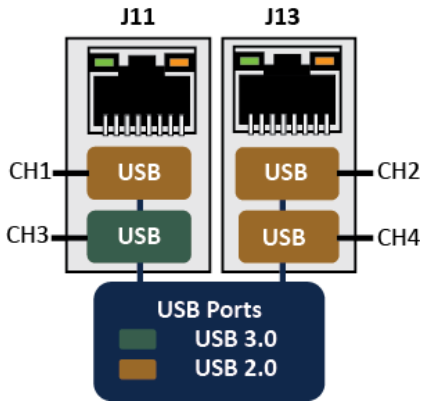
Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Molex/87832-2020	G650-2020-0H0
Mating Connector	Molex/51110-2050	N/A
Crimp Connector	Molex/50394-8051	N/A

2.5 Serial

SERIAL		
Name	**Layout**	**Additional Information**
Serial I/O **[J19A]** Serial I/O **[J19B]**		The SYS-405 is equipped with two on-board serial ports (RS-232/422/485) at **J19**. Both serial channels use the advanced EXAR SP339E multiprotocol transceiver. Both ports are configured in the BIOS and include options for 120-ohm receiver termination, slew rate, and protocol.

Pin	RS-232	RS-422	RS-485
1	DCD	N/A	N/A
2	RX	TX+	TX/RX+
3	TX	RX+	N/A
4	DTR	N/A	N/A
5	GND	GND	GND
6	DSR	TX-	TX/RX-
7	RTS	RX-	N/A
8	CTR	N/A	N/A
9	RI	N/A	N/A

2.6 USB

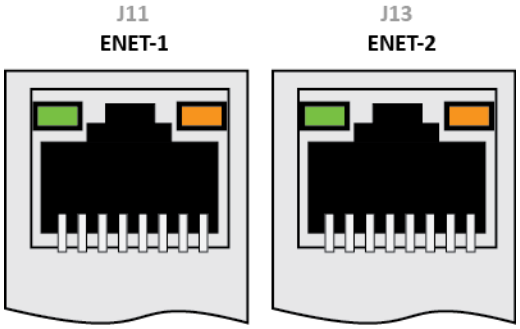
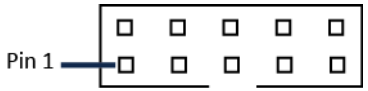
USB		
Name	**Layout**	**Additional Information**
USB 2.0 / 3.0 (Channels 1 & 3) **[J11]** USB 2.0 (Channels 2 & 4) **[J13]**		**J11** provides USB 3.0 on the bottom port (CH3) and USB 2.0 on the top port (CH1). **J13** provide USB 2.0 on both ports (CH2 & CH4).

Pin	USB 3.0	USB 2.0
1	USBVCC	
2	D-	
3	D+	
4	GND	
5	RX-	Not Present
6	RX+	
7	GND	
8	TX-	
9	TX+	

2.7 Ethernet

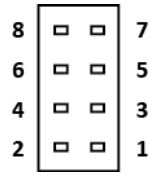
The two Ethernet ports are labeled **ENET-1** and **ENET-2** (due to space constraints on the faceplate), but the term **Ethernet** is used in this Manual.

ETHERNET

Name	Layout	Additional Information
Ethernet **[J11, J13]**		Two Intel I210 Gigabit Ethernet controllers provide standard IEEE 1588 and 802.1AS protocol time-stamping. Each Ethernet interface includes 10/100/1000 MB multi-speed, full, and half-duplex operation. **Pin / Function / Description / Cable Color** 1 / TX_D1+ / Tranceive Data+ / white/green 2 / TX_D1- / Tranceive Data- / green 3 / RX_D2+ / Receive Data+ / white/orange 4 / BI_D3+ / Bi-directional Data+ / blue 5 / BI_D3- / Bi-directional Data- / white/blue 6 / RX_D2- / Receive Data- / orange 7 / BI_D4+ / Bi-directional Data+ / white/brown 8 / BI_D4- / Bi-directional Data- / brown
Ethernet (GPIO) Controller **[J20]**		The SYS-405 is equipped with an Ethernet GPIO connector at **J20**, which is associated with **ENET-2** at **J13**. Reference power to **J20** is controlled by jumper settings on **JP8** (next page). **Pin / Function** 1 / GPIO0 2 / GND 3 / GPIO1 4 / GND 5 / GPIO2 6 / GND 7 / GPIO3 8 / GND 9 / VDD IO 10 / GND **Connector Reference / MFR/Part Number / WinSystems Part Number** PCB Connector / Molex/87832-1020 / G650-2010-0H0 Mating Connector / Molex/51110-1050 / N/A Crimp Connector / Molex/50394-8051 / N/A

ETHERNET

Ethernet GPIO Reference Voltage Selection [JP8]



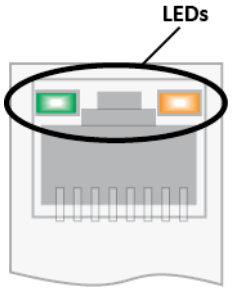
The table below provides jumpers for voltage settings on **JP8**. The board supports voltages of 3.3V, 5V, and 12V.

Voltage	Jumper Pins
3.3V	1 - 2
5.0V	3 - 4
12.0V	5 - 6

WARNING! Jumpering more than one set of pins at a time will damage the board.

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Samtec/TMM-104-01-G-D-SM-P-TR	G650-2008-0G0
Jumper	Samtec/25N-BK-G	G201-0002-005
Jumper Kit, 2MM	N/A	KIT-JMP-G-200

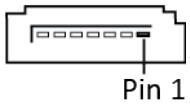
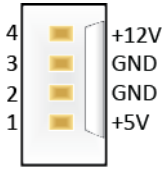
Ethernet LEDs



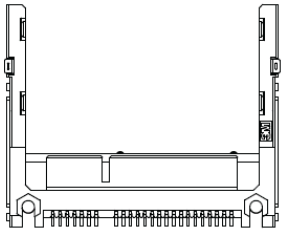
On-board Ethernet activity LEDs are built into the **ENET** connectors at **J11 & J13**. There is one green LED (left) and one bi-color green/yellow LED (right). Activity signals for these lights are defined in the table below.

LED	Activity	Ethernet Status
Left	Off	No Link
	Flashing	Linked
Right	Off	No Link
	Off	Linked @ 10 MB
	On	Linked @ 100 MB
	On	Linked @ 1 GB

2.8 Serial ATA (SATA)

SERIAL ATA (SATA)		
Name	**Layout**	**Additional Information**
Serial ATA **[J3]**		The bootable SATA (2.0) interface is located at **J3**. WinSystems offers CBL-SATA-701-20 for this connector. **NOTE**: **J3** cannot be used as SATA when **J9** mSATA is present. **Pin / Function** 1 GND 2 RX1+ 3 RX1- 4 GND 5 TX1- 6 TX1+ 7 GND **Connector Reference / MFR/Part Number / WinSystems Part Number** PCB Connector — Molex/67800-5003 — G650-3007-000 Mating Connector — Molex: W/Cable: 68561-0014 — CBL-SATA-701-20
SATA Power **[J1]**		Power is supplied to the SATA device via the connector at **J1**. WinSystems offers **CBL-PWR-117-12** for this connector. **Connector Reference / MFR/Part Number / WinSystems Part Number** PCB Connector — Molex/22-11-2042 — G201-0004-003 Mating Connector — Molex/22-01-2045 — N/A Crimp Connector — Molex/2759, 4809 KK® Crimp terminal — N/A

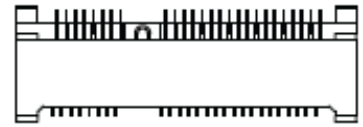
SERIAL ATA (SATA)

Name	Layout	Additional Information
SATA SSD (CFAST) **[J103]** On back of the board		The SYS-405 supports CFAST storage at **J103** **located on the back of the board**. Pin definitions are provided in the table below.

Pin	CFAST	Description	Pin	CFAST	Description
S1	SGND	Signal Ground	PC5	NC	No Connect
S2	A+	SATA PAIR A	PC6	NC	No Connect
S3	A-		PC7	GND	Ground
S4	SGND	Digital GND	PC8	LED1	LED Output
S5	B-	SATA PAIR B	PC9	LED2	LED Output
S6	B+		PC10	IO1	Reserved
S7	SGND	Signal Ground	PC11	IO2	Reserved
Key			PC12	IO3	Reserved
Key			PC13	3.3V	Power
PC1	CDI	Card Detect In	PC14	3.3V	Power
PC2	GND	Ground	PC15	GND	Ground
PC3	NC	No Connect	PC16	GND	Ground
PC4	NC	No Connect	PC17	GND	Card Detect Out

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Molex/0679105700	G650-2024-3K0
Mating Connector	No Mating Connector/CFAST Card	N/A

2.9 MiniPCIe

MINIPCIe (J8, J9)		
Name	**Layout**	**Additional Information**
MiniPCIe with USB **[J8]**	 Pin 1	The SYS-405 includes a MiniPCIe socket at **J8**. Pin definitions are provided in the table below.

Pin	Name	Pin	Name
1	WAKE#	2	3.3Vaux
3	NC	4	GND
5	NC	6	1.5V
7	CLKREQ#	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
Mechanical Key			
17	NC	18	GND
19	NC	20	W_DISABLE#
21	GND	22	PERST#
23	PERn0	24	+3.3Vaux
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3Vaux	40	GND
41	+3.3Vaux	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	NC	46	LED_WPAN#
47	NC	48	+1.5V
49	NC	50	GND
51	NC	52	+3.3Vaux

NC - Not Connected

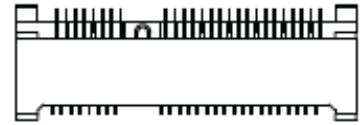
Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Molex/0679105700	G650-0052-0K0
Mating Connector	No Mating Connector/MiniPCIe with USB Card	N/A

MINIPCIe (J8, J9)

Name	Layout	Additional Information

MiniPCIe (PCIe) & (PCIe & mSATA)

[J9]



The SYS-405 includes a MiniPCIe socket at **J9**. The socket auto detects mSATA, providing a bootable media and storage interface. Pin definitions are provided in the table below.

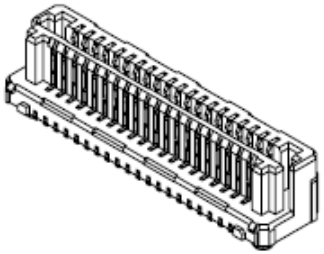
NOTE: **J9** cannot be used as mSATA when **J3** SATA is present.

Pin	Name	Pin	Name
1	WAKE#	2	3.3Vaux
3	NC	4	GND
5	NC	6	1.5V
7	CLKREQ#	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
Mechanical Key			
17	NC	18	GND
19	NC	20	W_DISABLE#
21	GND	22	PERST#
23	PERn0	24	+3.3Vaux
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	NC
37	GND	38	NC
39	+3.3Vaux	40	GND
41	+3.3Vaux	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	NC	46	LED_WPAN#
47	NC	48	+1.5V
49	NC	50	GND
51	mSATA_DET	52	+3.3Vaux

NC - Not Connected

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Molex/0679105700	G650-0052-0K0
Mating Connector	No Mating Connector/MiniPCIe with USB Card	N/A

2.10 IO60 Expansion Bus

IO60 Expansion Bus (J16)		
Name	**Layout**	**Additional Information**
IO60 Expansion Bus **[J16]**		The IO60 expansion bus allows the attachment of mezzanine cards to provide additional functionality.

Pin	Name	Pin	Name
1	VCC5	2	VCC5
3	VCC5	4	VCC5
5	UART_TX	6	UART_RX
7	UART_RTS	8	UART_CTS
9	GND	10	UART_MUX_CTL
11	SP13_CLK	12	SP13_MISO
13	SP13_SS0	14	SP13_MOSI
15	SP13_1	16	SP13_SS2
17	SP13_3	18	SP13_RDY
19	GND	20	GND
21	I2C3_SCL	22	I2C3_SDA
23	GND	24	GND
25	PWM3	26	EPIT1
27	GND	28	GND
29	EXP_RST_N	30	EXP_INT
31	GPIO7_0	32	GPIO7_1
33	GPIO7_2	34	GPIO7_3
35	GPIO7_6	36	GPIO7_7
37	GPIO7_8	38	GPIO7_11
39	GND	40	GND
41	TP22	42	TP16
43	TP21	44	TP15
45	GND	46	GND
47	TP20	48	TP14
49	TP19	50	TP13
51	GND	52	GND
53	TP18	54	TP12
55	TP17	56	TP11
57	VCC3.3	58	VCC3.3
59	VCC3.3	60	VCC3.3

Connector Reference	MFR/Part Number	WinSystems Part Number
PCB Connector	Samtec/LSEM-130-06.0-L-DV-A-N-K-TR	G650-0060-070
Mating Connector	Samtec/LSEM-130-06.0-L-DV-A-N-K-TR	G650-0060-070

3.0 Setup

The Figures provided in **Sections 1.2 through 1.4** assist in locating and identifying the connectors outlined in the following steps.

3.1 Installation/Hookup

1. Connect a compatible monitor to the VGA connector or DisplayPort on the faceplate of the SYS-405.
2. Connect a USB keyboard to any one of the four USB ports.
3. Connect a USB mouse to any one of the three remaining USB ports.
4. Plug in the boot media of your preference. Options are:
   - CFAST (**J103** – on back of the board)
   - SATA (J3) OR MiniPCI with mSATA (J9) – never connect both simultaneously
   - USB 2.0 or USB 3.0
   - Ethernet [ENET-1 or ENET-2] for boot media over Ethernet
5. Connect an Ethernet cable to either ENET-1 or ENET-2.

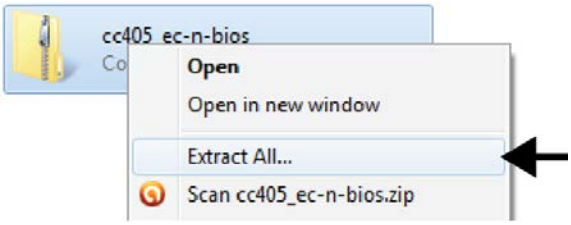
3.2 Power Up

Plug in the compatible mating connector that carries a +10 to +50 VDC power source to the input connector at **J5**. The first time the board is plugged in, the SYS-405 powers up automatically; there is no need to press the **PWR** button.

4.0 BIOS Updates

The latest BIOS updates are located at www.winsystems.com in the Software/BIOS section of each product website. Download the zip file from our product website to your local hard disk or USB drive, then extract the files to the root directory of the USB drive and use them to update the SYS-405 BIOS following the instructions below.

1. Right click on the recently downloaded zipped BIOS update file, and select **Extract All…** from the drop down list.



2. You are prompted to select a destination. Click **Browse** and choose the root directory of the USB drive that you will use for the update.
3. Click **OK**, and at the next prompt click **Extract** to extract and copy the files to the root directory of your USB drive. Once the files are extracted, you'll see two folders, named **bios** and **ec**, indicating the process was successful.
4. Make sure the SYS-405 is powered down, and all USB ports are empty with the exception of the single port that is occupied by the keyboard cable.
5. Insert the USB drive containing the BIOS update into any one of the three available SYS-405 USB ports and power up the system.
6. When the WinSystems logo appears in the display (after a beep), immediately press **F5**. The **Boot Menu** and **App Menu** appear in the display, with **Boot Menu** highlighted.
7. Use the up/down arrow keys on the keyboard to highlight **Internal Shell**, then press **Enter**. After a few seconds, you will exit the **Boot Menu** to the prompt, **Shell>**.
8. Type in the name of the drive assigned to the USB you are using for the update. The drive will be prefaced with "fs." For example "fs0:, fs1:, fs2:, etc." If there are no other USB drives plugged in to the SYS-405, the drive containing the BIOS update will be fs0.
9. Go to the drive by typing in "**fs0:**" at the **Shell>** prompt.
   fs0:\> appears in the display.
10. Type "**cd bios**"
    fs0:\bios> appears in the display.
11. Type "**update**" and the update procedure begins. Wait a few moments for the process to complete.
12. Once "**FPT Operation Passed**" appears in the display, type "**cd .. \ec**" (make sure there is a space after "cd" and the first period).
    fs0:\ec> appears in the display.
13. Type "**update**" at the **fs0:\ec>** prompt. The update process resumes. This update only takes about 10 seconds to complete before you will hear a beep and the system reboots.

    The BIOS update procedure is complete.

5.0 BIOS Settings

NOTE: BIOS information is only valid for the current version of BIOS; older versions of the BIOS may not appear and function in the same manner.

5.1 Boot Up and the Main Menu

Press **F2** when prompted to bring up System Utilities in the BIOS.

The **BIOS Settings** menu appears in the display. See upcoming sections for BIOS specific settings.
After following the Power Up settings in **Section 5.2**, use the keyboard as directed by the options provided at the bottom of the display to navigate the menus (as follows).

The BIOS Setup screen appears in the display with the **Main** menu highlighted.

5.1.1 Main Menu Items and Submenus

The **Main** menu contains the following items and/or submenus.

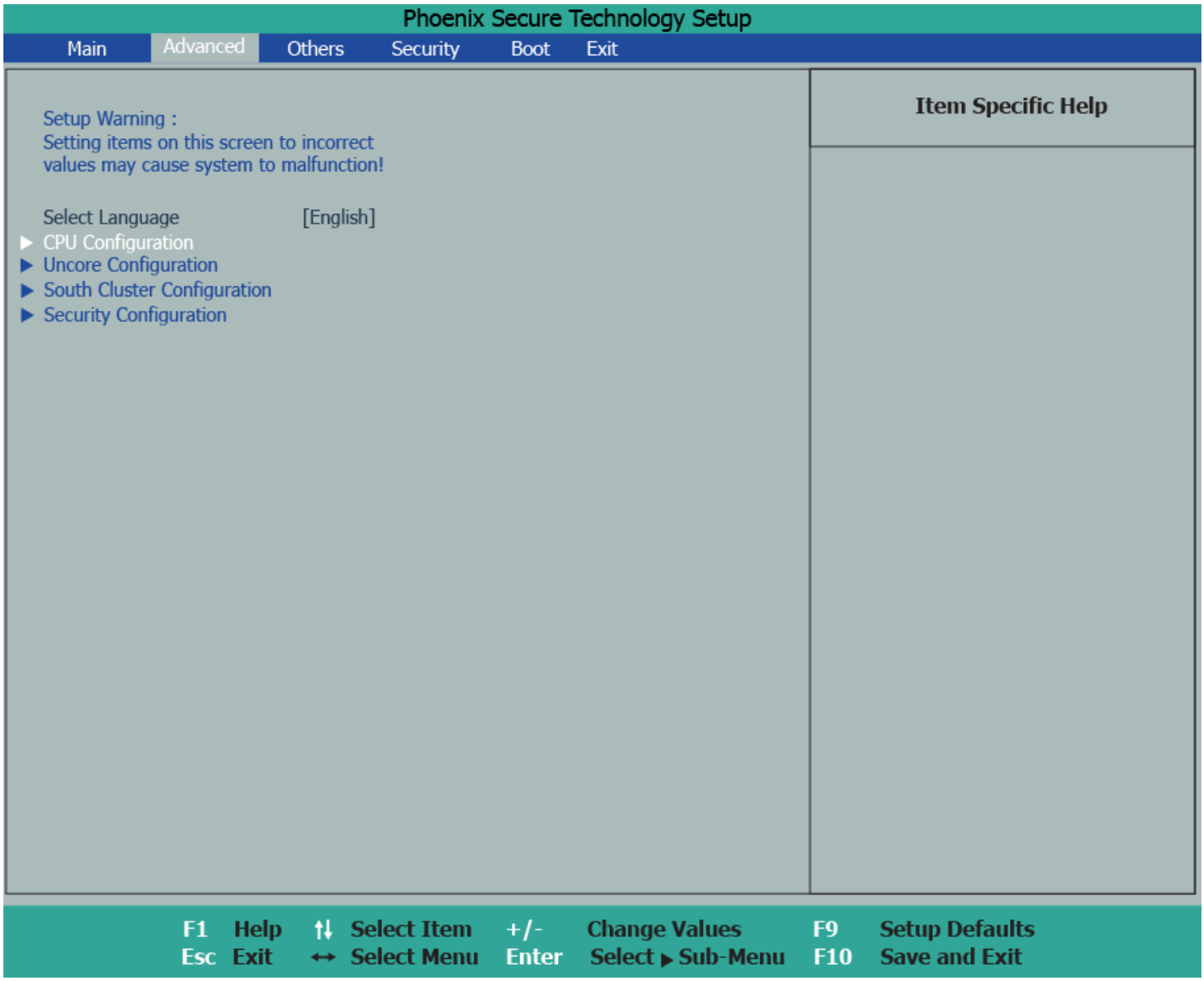
MAIN MENU ITEMS & SUBMENUS		
Item / Submenu	**Default Setting / Value**	**Function / Definition**
System Date	N/A	Displays the current date in MM/DD/YYYY format. To set or change the date, highlight the row using the up/down arrow keys, then highlight the month, day, or year by pressing the Enter key until the desired value is highlighted with a square block (■). Use the +/- keys to change the highlighted value.
System Time	N/A	Displays the current time in HH/MM/SS format. To set or change the time, highlight the row using the up/down arrow keys, then highlight the hour, minute, or second by pressing the Enter key until the desired value is highlighted with a square block (■). Use the +/- keys to change the highlighted value.
System Information (Read Only)		
BIOS Version	CC405yymmdd	BIOS Version
BIOS Build Date	mm/dd/yyyy	BIOS Build Date
EC Version	ymmddTXX	EC Version
EC Build Date	mm/dd/yyyy	EC Build Date
Processor Type	Intel (R) Atom™ CPU E3800 series	Processor Type
System Memory Speed	1066 MHz or 1333 MHz	System Memory Speed
L2 Cache RAM	512 KB per Core	L2 Cache RAM
Total Memory	Up to 8192 MB	Total Memory
[1]	SODIMM Information	
MAC Address (Module)	00:90:FB:XX:XX:XX	MAC Address (Module)
MAC Address (Carrier)	00:01:45:XX:XX:XX	MAC Address (Carrier)
Boot Features		
NumLock	[On}	Selects the default state for NumLock during power up
Timeout	[2]	Number of seconds that Power On Self Test (POST) will wait for user input before booting
CSM Support	[Yes]	Compatibility Support Module that provides backward compatibility services for legacy BIOS devices, such as int10/int13, dependent OS.
Quick Boot	[Disable]	Enables/disables quick boot
Diagnostic Splash Screen	[Disable]	Enables/disables the diagnostic splash screen during boot.
Diagnostic Summary Screen	[Disable]	Displays the Diagnostic Summary screen during boot.
BIOS Level USB	[Enable]	Enables/disables all BIOS support for the USB to reduce boot time. Note: This will prevent using a USB keyboard in Setup or a USB biometric scanner such as a finger print reader to control access to setup, but does not prevent the operating system from supporting such hardware.
Console Redirection	[Disable]	Enables/Disables Universal Console Redirection
Allow Hotkey in S4 resume	[Enable]	Enables or disables hotkey detection when the system resumes from the Hibernate state.
UEFI Boot	[Enable]	Enables the Unified Extensible Firmware Interface (UEFI). The UEFI interfaces between the OS and firmware.
Legacy Boot	[Enable]	Enables Legacy boot (USB floppy emulation)
Boot in Legacy Video Mode	[Disable]	Enable forces display adapter to switch from video mode to Text Mode 3 at the end of BIOS POST for non-UEFI boot mode (legacy boot). Some legacy software, such as DUET, requires BIOS to enter text video mode on boot.

MAIN MENU ITEMS & SUBMENUS		
Item / Submenu	**Default Setting / Value**	**Function / Definition**
Load OPROM	[On Demand]	Load all OPROMs or on demand, according to the boot device.

5.2 Advanced Menu

The **Advanced** menu contains a variety of complex Items and Submenus for CPU and other types of configuration.

WARNING! Assigning incorrect values to items on the following screen menus may cause system malfunction.



5.2.1 Advanced Menu Items and Submenus

ADVANCED MENU ITEMS & SUBMENUS		
Item/Submenu	**Default Setting**	**Function**
CPU Configuration		
Active Processor Cores	[All]	Number of cores to enable in each processor package.
Execute Disable Bit	[Enable]	Prevents certain classes of malicious buffer overflow attacks when combined with a supporting Operating System (OS).
Limit CPUI Maximum	[Disable]	Disabled for Windows XP.
Bi-directional PROCHOT#	[Enable]	When a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor.
VTX-2	[Enable]	Enables or disables the VTX-2 Mode support.
TM1	[Enable]	Enables or disables TM1, which is a thermal monitor based on clock throttling.
DTS	[Enable]	Enables or disables the digital thermal sensor, which protects the sensor from overheating.
CPU Power Management: This subset of the CPU Configuration Submenu provides options for CPU power management		
Intel ®SpeedStep ™	[Enable]	Enables or disables processor performance states (P-States)
Boot Performance Mode	[Max Performance]	Selects the performance state that the BIOS will set before OS handoff.
Intel ® Turbo Boost Technology	[Enable]	Enable to allow processor cores to run faster than the base operating frequency if it is operating below power, current, and temperature specification limits.
C-States	[Disable]	Enables or disables C-States
Uncore Configuration		
GOP Driver	[Enable]	Enable or disable the GOP Driver. Enabling will unload VBIOS; Disabling will load VBIOS.
IGD Configuration		
Integrated Graphics Device	[Enable]	Enables or disables the Integrated Graphics Device (IGD).
Primary Display	[Auto]	Selects which of the IGD/PCI Graphics devices should be the primary display, or select SG for Switchable/Hybrid GFX.
RC6 (Render Standby)	[Enable]	Enables or disables render standby support.
PAVC	[Lite Mode]	Enables or disables protected audio/video control.
GTT Size	[2MB]	Selects the GTT size.
Aperture Size	[256 MB]	Selects the aperture size.
DVMT Pre-Allocated	[64 MB]	Selects the DVMT 5.0 pre-allocated (Fixed) graphics memory size used by the internal graphics device.
IGD Turbo	[Auto]	Selects the IGD Turbo feature, if Auto is selected. IGD Turbo will only be enabled when SOC stepping is 80 or above.
Spread Spectrum Clock	[Disable]	Enables the clock chip spread spectrum feature.
Force Lid Status	[ON]	For test: forces lid status to on or off.
BIA	[Auto]	>>Auto: GMCH Use VBIOS Default >>Level n: Enabled with Selected Aggressiveness Level.
IGD Boot Type	[eDP]	Selects preference for Integrated Graphics Device (IGD) display interface used upon system boot up.
Panel Scaling	[Auto]	Select the LCD panel scaling option used by the internal graphics device.
LCD Panel Type	[1024 x 768 NXP Generic]	Select LCD Panel Type
Bpp Select	[24 Bpp]	Select Bpp Type
South Cluster Configuration		
PCI Express Configuration: This subset of the South Cluster Configuration submenu provides options for PCI Express configuration		
PCIe 0 Speed	[Auto]	Configures PCIe 0 speed.
PCIe 1 Speed	[Auto]	Configures PCIe 1 speed.
PCIe 2 Speed	[Auto]	Configures PCIe 2 speed.
PCIe 3 Speed	[Auto]	Configures PCIe 3 speed.
PCI Express Root Port 1	[Enable]	Controls the PCI Express Root Port 1 (MiniPCIe)
PCI Express Root Port 2	[Enable]	Controls the PCI Express Root Port 2 (MiniPCIe)

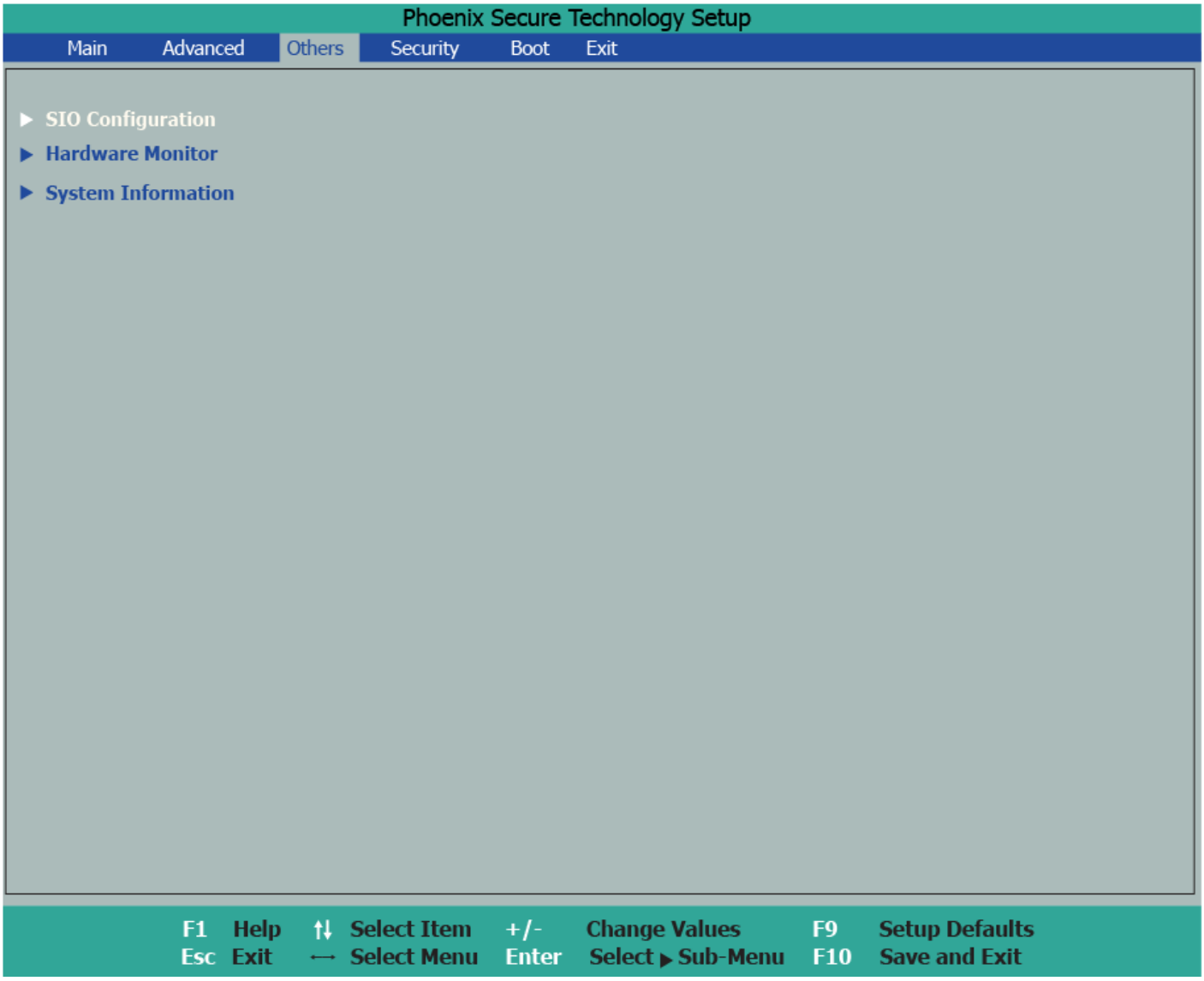
ADVANCED MENU ITEMS & SUBMENUS		
Item/Submenu	**Default Setting**	**Function**
PCI Express Root Port 3	[Enable]	Controls the PCI Express Root Port 3 (Ethernet, Carrier)
PCI Express Root Port 4	[Enable]	Controls the PCI Express Root Port 4 (Ethernet, Carrier)
USB Configuration: This subset of the South Cluster configuration submenu provides options for USB configuration		
XHCI Mode (Read Only)	[Disable]	
XHCI Link Power Management	[Enable]	Enables or disables XHCI link power management (USB 3.0)
EHCI Controller	[Enable]	Controls the USB EHCI 9USB 2.0) functions. One EHCI controller must always be enabled.
USB Per-Port Control	[Enable]	Controls each of the USB ports (0~3) disabling
USB Port #0	[Enable]	Enables or disables the USB port
USB Port #1	[Enable]	Enables or disables the USB port
USB Port #2	[Enable]	Enables or disables the USB port
USB Port #3	[Enable]	Enables or disables the USB port
Audio Configuration: This subset of the South Cluster Configuration Submenu provides options for audio configuration		
LPE Audio Support	[Disable]	Selects LPE Audio ACPI mode or PCI mode.
Audio Controller	[Enable]	Controls detection of the Azalia device. **Disabled**: Azalia will be unconditionally disabled. **Enabled**: Azalia will be unconditionally enabled.
SATA Drives: This subset of the South Cluster Configuration submenu provides options for SATA drives		
Chipset SATA	[Enable]	Enables or disables the chipset SATA controller. The chipset SATA controller supports both internal SATA ports (up to 3Gb/s supported per channel)
SATA Test Mode	[Disable]	Enables or disables test mode.
Chipset SATA Mode	[AHCI]	IDE: Compatibility mode disables AHCI. **AHCI**: Supports advanced SATA features such as Native Command Queuing. **Warning**: OS may not boot if this setting is changed after OS install.
LAN Configuration: This subset of the South Cluster configuration Submenu provides options for LAN configuration		
PXE ROM	[Disable]	Enables or disables PXE Option ROM execution for onboard LAN
LPSS & SCC Configuration		
LPSS & SCC Devices Mode	[PCI Mode]	LPSS & SCC Devices Mode Settings
SCC SD Card Support	[Enable]	SCC SD Card Support Enable/Disable
Miscellaneous Configuration: This subset of the South Cluster Configuration submenu provides options for miscellaneous configuration		
State After G3	[SO State]	Specifies in which state to begin when power is re-applied after a power failure (G3 state).
SMM Lock	[Enable]	Enables or disables the SMM Lock feature. This locks the SMRAM and disables the SMM driver.
PCI MMIO Size	[GB]	Sets the PCIO MMIO size.

5.2.2 Security Configuration Items and Submenus

SECURITY CONFIGURATION ITEMS & SUBMENUS		
Item/Submenu	**Default Setting**	**Function/Definition**
TXE Configuration		
TXE FW Version (Read Only)	1.0.2.1067	Example Only
TXE FW Capabilities (Read Only)	A0001040	Example Only
TXE FW Features (Read Only)	A0001040	Example Only
TXE FW OEM Tag (Read Only)	00000000	Example Only

SECURITY CONFIGURATION ITEMS & SUBMENUS		
Item/Submenu	**Default Setting**	**Function/Definition**
TXE Firmware Mode (Read Only)	Normal	Example Only
TXE File System Integrity Value	0	Example Only
TXE	[Enable]	
TXE HMRFPO	[Disable]	
TXE Firmware Update	[Enable]	
TXE EOP Message	[Enable]	
TXE Unconfiguration Perform		Reverts TXE settings to factory defaults

5.3 Others Menu



5.3.1 SIO Configuration Items and Submenus

SIO CONFIGURATION ITEMS & SUBMENUS			
Item/Submenu		**Default Setting**	**Function**
Serial 1			
I/O Address		[3F8]	Modifies the input serial 1 I/O address range from 0x100 to 0xFFF8
IRQ		[4]	Modifies the input serial 1 IRQ range from 1 to 15
OPTIONS	**[RS232]**	RS232	Selects the serial 1 mode
	SLEW	[not Limited]	Selects the serial 1 SLEW
	BRG	[Normal]	Select Serial 1 BRG High=33.333 MHz Normal=1.8432MHz
	[RS422]	N/A	Selects the serial 1 mode
	Transmitter	[Auto]	Selects Serial 1 Transmitter
	Termination	[No Termination]	Selects transceiver termination
	SLEW	[not Limited]	Selects the serial 1 SLEW
	BRG	[Normal]	Select Serial 1 BRG High=33.333 MHz Normal=1.8432MHz
	[RS485]	N/A	Selects the serial 1 mode
	Transmitter	[Auto]	Selects Serial 1 Transmitter
	Termination	[No Termination]	Selects transceiver termination
	SLEW	[not Limited]	Selects the serial 1 SLEW
	BRG	[Normal]	Select Serial 1 BRG High=33.333 MHz Normal=1.8432MHz
	[Loopback]	N/A	Selects the serial 1 mode
	Transmitter	[Auto]	Selects Serial 1 Transmitter
	Termination	[No Termination]	Selects transceiver termination
	SLEW	[not Limited]	Selects the serial 1 SLEW
	[BRG]	[Normal]	Select Serial 1 BRG High=33.333 MHz Normal=1.8432MHz
Serial 2			
I/O Address		[2F8]	Modifies the input serial 2 I/O address range from 0x100 to 0xFFF8
IRQ		[3]	Modifies the input serial 2 IRQ range from 1 to 15
OPTIONS	**[RS232]**	RS232	Selects the serial 2 mode
	SLEW	[not Limited]	Selects the serial 2 SLEW
	BRG	[Normal]	Select Serial 2 BRG High=33.333 MHz Normal=1.8432MHz
	[RS422]	N/A	Selects the serial 2 mode
	Termination	[No Termination]	Selects transceiver termination
	SLEW	[not Limited]	Selects the serial 2 SLEW
	BRG	[Normal]	Select Serial 2 BRG High=33.333 MHz Normal=1.8432MHz
	[RS485]	N/A	Selects the serial 2 mode
	Termination	[No Termination]	Selects transceiver termination
	SLEW	[not Limited]	Selects the serial 2 SLEW
	BRG	[Normal]	Select Serial 2 BRG High=33.333 MHz Normal=1.8432MHz
	[Loopback]	N/A	Selects the serial 2 mode
	Termination	[No Termination]	Selects transceiver termination
	SLEW	[not Limited]	Selects the serial 2 SLEW
	BRG	[Normal]	Select Serial 2 BRG

SIO CONFIGURATION ITEMS & SUBMENUS		
Item/Submenu	**Default Setting**	**Function**
		High=33.333 MHz Normal=1.8432MHz
IO60		
I/O Address	[3E8]	Modifies the input serial 3 I/O address range from 0x100 to 0xFFF8
IRQ	[6]	Modifies the input serial 3 IRQ range from 1 to 15
GPS		
I/O Address	[2E8]	Modifies the input serial 4 I/O address range from 0x100 to 0xFFF8
IRQ	[7]	Modifies the input serial 4 IRQ range from 1 to 15
Watch Dog Timer		
Watch Dog Timer	[**Disable**/Enable]	Enables or disables the watch dog timer
Timer Unit	[**Second**/Minute]	If Watch Dog Timer is Enabled, choose between Second and Minute
Timer Value	255	Set Watch Dog Timer values (for both Second and Minute) between 20 and 255

5.3.2 Hardware Monitor Items and Submenus

HARDWARE MONITOR ITEMS & SUBMENUS (Read Only)		
Item/Submenu	**Default Setting**	**Function**
CPU Temp	N/A	Displays the temperature of the CPU in Celsius
CPU Fan	N/A]	N/A if no external fan is connected
VCORE	N/A	Displays the voltage for this selection
3.3 V	N/A	Displays the voltage for this selection
5.0V	N/A	Displays the voltage for this selection
12.0V	N/A	Displays the voltage for this selection
1.35V	N/A	Displays the voltage for this selection

5.3.3 APM Configuration Items and Submenus

APM CONFIGURATION ITEMS & SUBMENUS		
Item/Submenu	**Default Setting**	**Function**
Power On By RTC Alarm	[Disable]	If enabled, allows the SYS-405 to be powered on by an RTC alarm.
Wake on Lan1	[Enable]	If enabled, allows the SYS-405 to be wakened by the Ethernet (ENET-1)

5.4 Security Menu

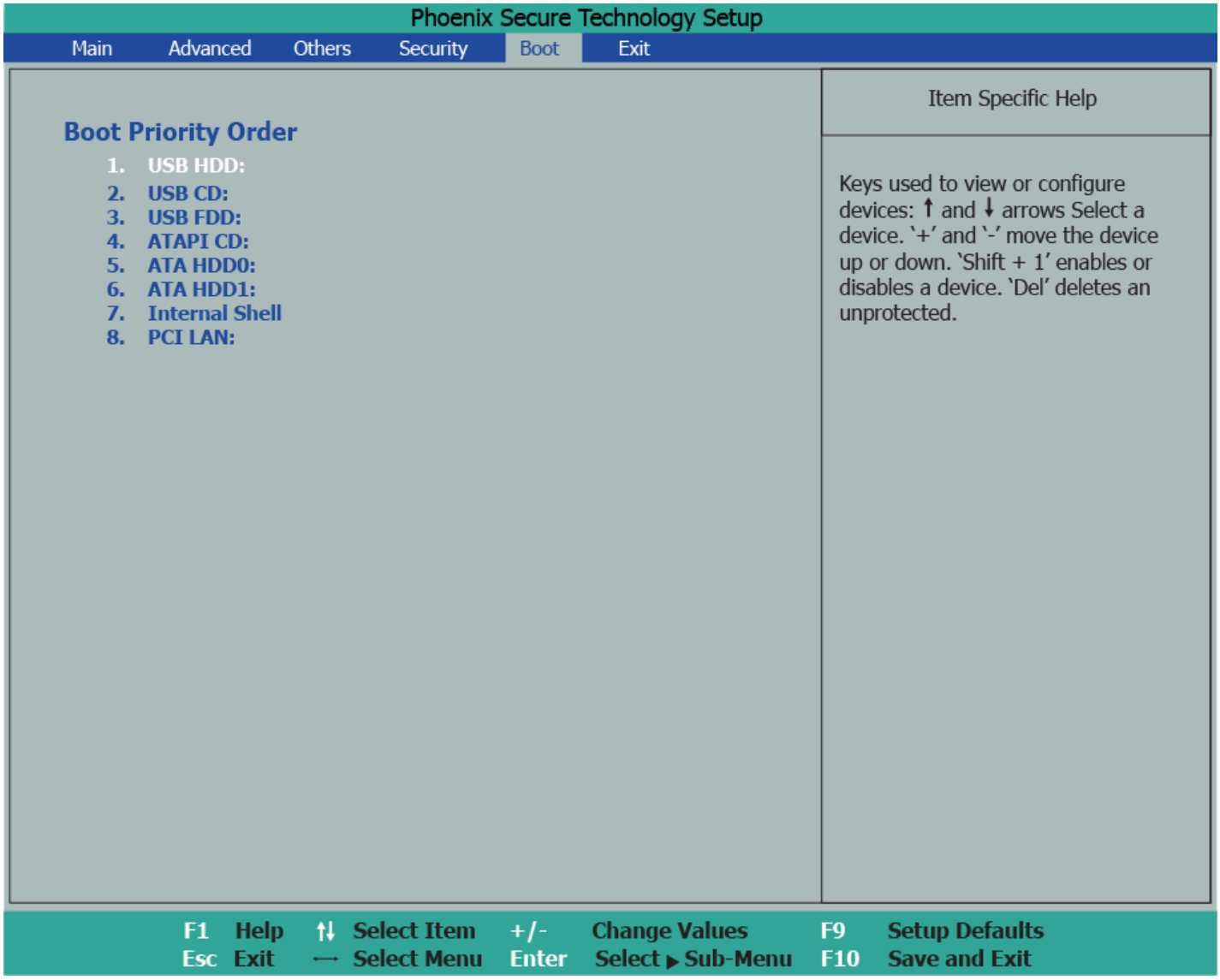
The menu options as depicted below are prior to changes by the user. Once the user sets a Supervisor password, some of the menu items will no longer appear as grey text.

5.4.1 Security Menu Items and Submenus

SECURITY ITEM MENUS & SUBMENUS		
Item/Submenu	**Default Setting**	**Function**
Supervisor Password is:	Cleared	Read only.
User Password is:	Cleared	Read only.
Set Supervisor Password	[Enter]	Press **Enter** to set or clear the supervisor account's password. Press **Esc** to exit without making changes.
Supervisor Hint String	[ ]	Press **Enter** to type a hint for the Supervisor password. If you forget your password, the answer to your hint will help you recover the password.
Set User Password	[Enter]	Press **Enter** to set or clear the user password. Press **Esc** to exit without making changes
User Hint String	[ ]	Press **Enter** to type a hint for the User password. If you forget your password, the answer to your hint will help you recover the password.
Min. password length	[1]	Sets the minimum number of characters for your password (1-20).
Authenticate User on Boot	[Disable]	Enables or disables user authentication prompt on boot.

SECURITY ITEM MENUS & SUBMENUS		
Item/Submenu	**Default Setting**	**Function**
HDD Security Status		If no hard disk drive is detected, this is blank.
No HDD detected		This is the display when no hard disk drive is detected.
Trusted Platform Module (TPM)		
TPM not detected		

5.5 Boot Menu



5.5.1 Boot Menu Items and Submenus

BOOT MENU ITEMS & SUBMENUS		
Item/Submenu	**Default Setting**	**Function**
Boot Priority Order		
USB HDD:	N/A	Once selected, use the + or – key to change the order in which the selected device boots. Keys used to view or configure devices: Up and down arrows select a device. '+' and '-' move the device up or down. 'Shift + 1' enables or disables a device. 'Del' deletes an unprotected device.
USB CD:		
USB FDD:	N/A	
ATAPI CD:	N/A	
ATA HDDO:	N/A	
ATA HDD1:	N/A	
Internal Shell	N/A	
PCI LAN:	N/A	

5.6 Exit Menu

5.6.1 Exit Menu Items and Submenus

EXIT MENU ITEMS & SUBMENUS		
Item/Submenu	**Default Setting**	**Function**
Exit Saving Changes	N/A	Saves all changes, and then exits setup.
Exit Discarding Changes	N/A	Exits setup without changes.
Load Setup Defaults	N/A	Equal to F9. Loads standard default values.
Discard Changes	N/A	Load the original value of this boot time, not the default Setup value.
Save Changes	N/A	Save all changes of all menus, but do not restart the system.

6.0 Cables and Drivers

Go to www.winsystems.com for cable and driver information.

7.0 Mechanical Drawings

7.1 Top Side Mounting Board with Dimensions

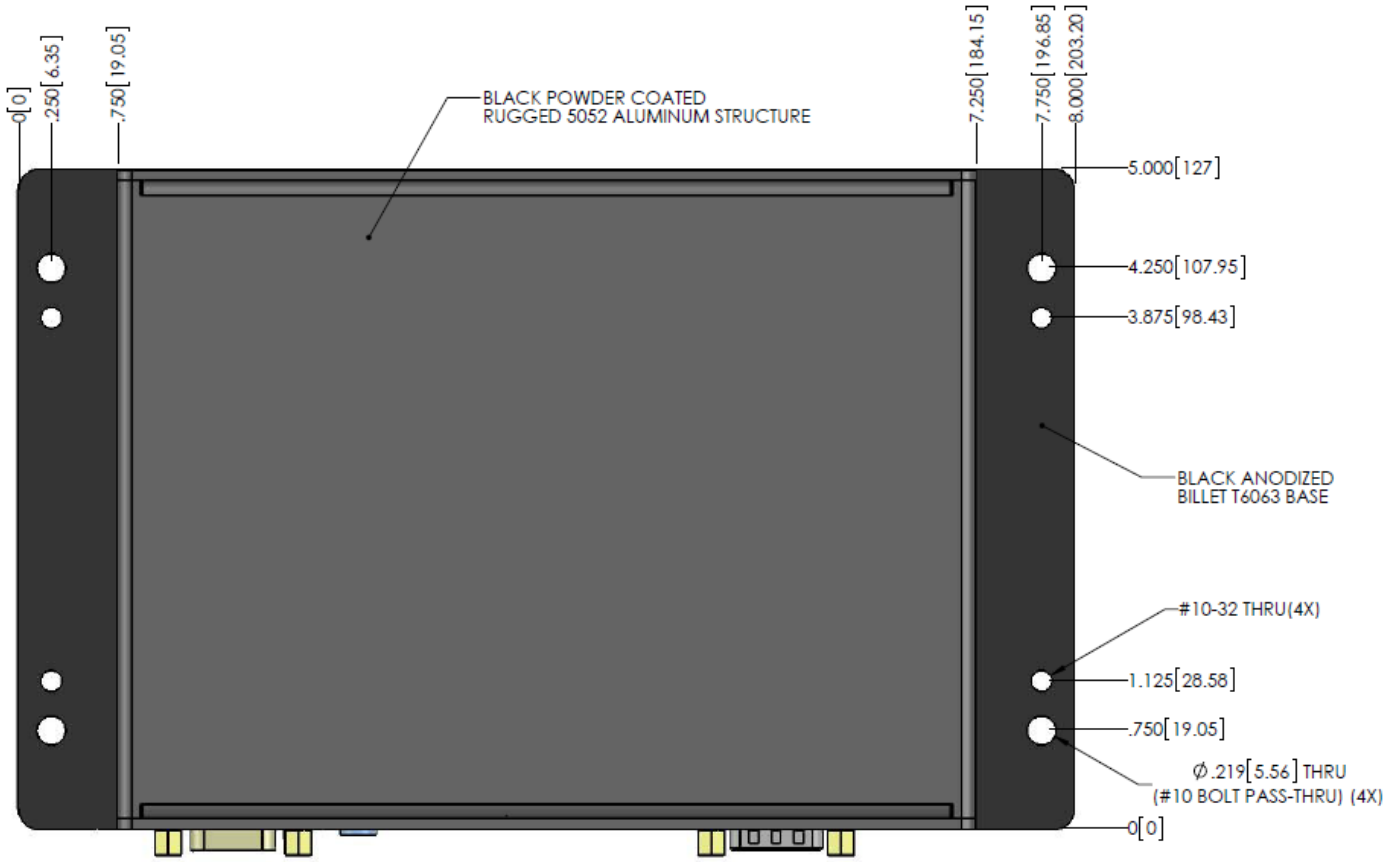


Figure 7.1-1. Top Side Mounting Board with Dimensions.

7.2 Side and Faceplate View with Dimensions

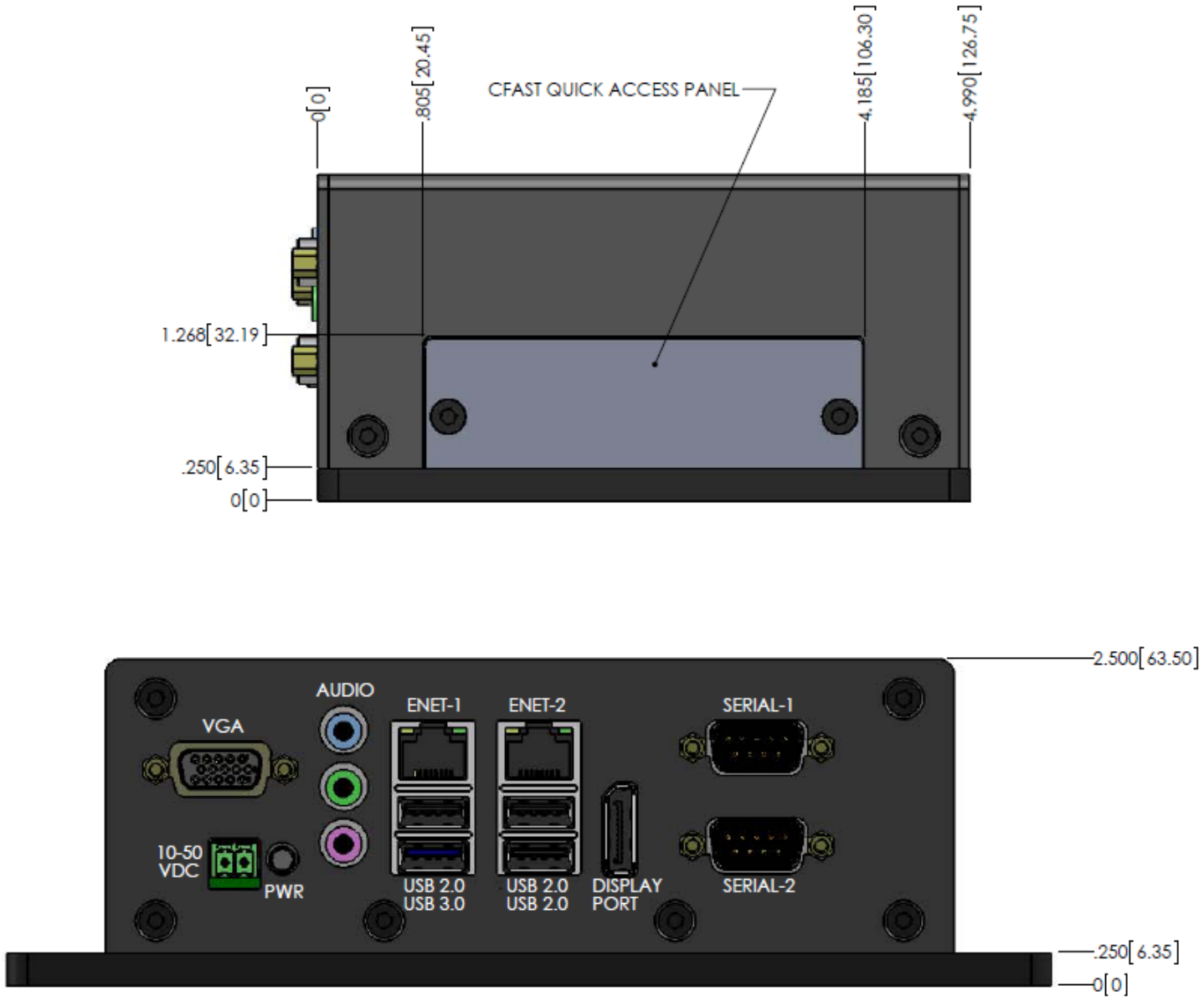


Figure 7.2-1. Side and Faceplate View with Dimensions.

Appendix A – Best Practices

A.1 Power Supply

Power Supply	
	**Avoid Electrostatic Discharge (ESD).** Only handle the SYS-405 and other bare electronics when electrostatic discharge (ESD) protection is in place. Having a wrist strap and a fully grounded workstation is the minimum ESD protection required before the ESD seal on the product bag is broken.
	Power Supply Budget. Evaluate your power supply budget. It is usually good practice to budget 2X the typical power requirement for all of your devices.
	**Zero-Load Power Supply**. Use a zero-load power supply whenever possible. A zero-load power supply does not require a minimum power load to regulate. If a zero-load power supply is not appropriate for your application, then verify that the SYS-405's typical load is no lower than the power supply's minimum load. If the SYS-405 does not draw enough power to meet the power supply's minimum load, the power supply will not regulate properly and can cause damage to the SYS-405.
	Use Proper Power Connections (Voltage). When verifying the voltage, you should always measure it at the power connector on the SYS-405. Measuring at the power supply does not account for voltage drop through the wire and connectors. The SYS-405 requires +10 to +50VDC to operate. Verify the power connections. Incorrect voltages can cause catastrophic damage.
	Power Harness. Minimize the length of the power harness. This will reduce the amount of voltage drop between the power supply and the SYS-405.
	Gauge Wire. Use the largest gauge wire that you can. Most connector manufacturers have a maximum gauge wire they recommend for their pins.

A.3 Conformal Coating

Applying conformal coating to a WinSystems product will not in itself void the product warranty, if it is properly removed prior to return. Coating may change thermal characteristics and impedes our ability to test, diagnose, and repair products. Any coated product sent to WinSystems for repair will be returned at customer expense and no service will be performed.

A.4 Operations/Product Manuals

Every board computer has an Operations manual or Product manual.

Operations/Product Manuals	
	**Manual Updates**. Operations/Product manuals are updated often. Periodically check the WinSystems website (www.winsystems.com) for revisions.
	Always check the pin out and connector locations in the manual before plugging in a cable. Many products have identical headers for different functions and plugging a cable into the wrong header can have disastrous results.
	Contact an Applications Engineer with questions. If a diagram or chart in a manual does not seem to match your board, or if you have additional questions, contact your Applications Engineer.

Warranty Information

http://www.winsystems.com/warranty.cfm

WinSystems warrants to Customer that for a period of two (2) years from the date of shipment any Products and Software purchased or licensed hereunder which have been developed or manufactured by WinSystems shall be free of any material defects and shall perform substantially in accordance with WinSystems' specifications therefore. With respect to any Products or Software purchased or licensed hereunder which have been developed or manufactured by others, WinSystems shall transfer and assign to Customer any warranty of such manufacturer or developer held by WinSystems, provided that the warranty, if any, may be assigned. Notwithstanding anything herein to the contrary, this warranty granted by WinSystems to the Customer shall be for the sole benefit of the Customer, and may not be assigned, transferred or conveyed to any third party. The sole obligation of WinSystems for any breach of warranty contained herein shall be, at its option, either (i) to repair or replace at its expense any materially defective Products or Software, or (ii) to take back such Products and Software and refund the Customer the purchase price and any license fees paid for the same. Customer shall pay all freight, duty, broker fees, and insurance charges for the return of any Products or Software to WinSystems under this warranty. WinSystems shall pay freight and insurance charges for any repaired or replaced Products or Software thereafter delivered to Customer within the United States. All fees and costs for shipment outside of the United States shall be paid by Customer. The foregoing warranty shall not apply to any Products of Software, which have been subject to abuse, misuse, vandalism, accidents, alteration, neglect, unauthorized repair or improper installations.

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1. To obtain service under this warranty, obtain a return authorization number. In the United States, contact the WinSystems' Service Center for a return authorization number. Outside the United States, contact your local sales agent for a return authorization number.

2. You must send the product postage prepaid and insured. You must enclose the products in an anti-static bag to protect from damage by static electricity. WinSystems is not responsible for damage to the product due to static electricity.