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ARCX 4000 Series

Ruggedized/Military/Industrial Computer

USER'S MANUAL



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1.0 GENERAL INFORMATION

1.1 Intended Audience

This user's manual was written for technically qualified personnel who will be working with ARCX series devices using the XCOM-6400 COM Express module. It is not intended for a general, non-technical audience that is unfamiliar with computer-on-module (COM) devices and their application.

1.2 Preface

The information contained in this manual is subject to change without notice, and Acromag, Inc. (Acromag) does not guarantee its accuracy. Acromag makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Further, Acromag assumes no responsibility for any errors that may appear in this manual and makes no commitment to update, or keep current, the information contained in this manual. No part of this manual may be copied or reproduced in any form, without the prior written consent of Acromag,

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All rights reserved. Acromag and Xembedded are registered trademarks of Acromag Incorporated. All other trademarks, registered trademarks, trade names, and service marks are the property of their respective owners.

1.2.2 Class A Product Warning

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may find it necessary to take adequate corrective measures.

1.2.3 Environmental Protection Statement

This product has been manufactured to satisfy environmental protection requirements where possible. Many components used (structural parts, circuit boards, connectors, batteries, etc.) are capable of being recycled. Final disposition of this product after its service life must be conducted in accordance with applicable country, state, or local laws or regulations.

1.3 ARCX 4000 Series

The ARCX 4000 Series offers Ruggedized/Military/Industrial Computer for the Acromag Com Express processor modules. There are two basic model types, ARCX-4120 and ARCX-4110. The ARCX-4120 offers two PMC/XMC expansion sites. The ARCX-4110 offers one PMC/XMC expansion site.

The ARCX 4000 series has the following options:

- Expansion size
- Dual Drive Bay
- Power Filter
- Front Panel

1.3.1 Key Features

- Designed to meet requirements of MIL-STD-810F environmental specification.
- Designed to meet IP67 NEMA Rating.
- Optional Power Filter to meet requirements of MIL-STD-704F and MIL-STD-1275E.
- Programmable Power Limits.
- Wide range input power, 10Vdc-36Vdc through a Size #12 38999 Type connector.
- Power indicator and fault/Status LEDs.
- Supports Acromag Type 6 COM CPU modules.
- Provides access to standard computer peripherals of the Type 6 COM Express CPU module through size #23 38999 Type connector.
    - Two HDMI/DVI ports
    - One VGA port
    - Three USB 2.0 Ports
    - Two RS-232/485 Communication ports
    - One SATA port
    - Two Gigabit Ethernet Ports
    - Audio (One Line in and One Line out)
    - Fault/Status LED

- Two mPCIe/mSATA slots are available on the carrier.
- PMC/XMC expansion (Option of one or two sites)
    - PMC/XMC Rear I/O access provided through the front of the ARCX 4000 via MIL-STD #23 38999 type connector.
    - PMC/XMC Front I/O access available through the rear panel of the ARCX 4000.
        - Pocket and PMC/XMC cutout outline indicated on rear panel
        - IP67 rating voided when hole is cut out
- Dual SSD Drive Bay (Option)
    - Two SATA SSD Drive Bays (2.5 inch drive's supported)

CPU Module (XCOM-6400)

Intel Core™ i7 processor (4th generation, codename Haswell)

i7-4700EQ: 2.4GHz, quad core, 6Mb cache, 47W.

Chipset

Intel 8-Series QM87 PCH chipset (codename Lynx Point)

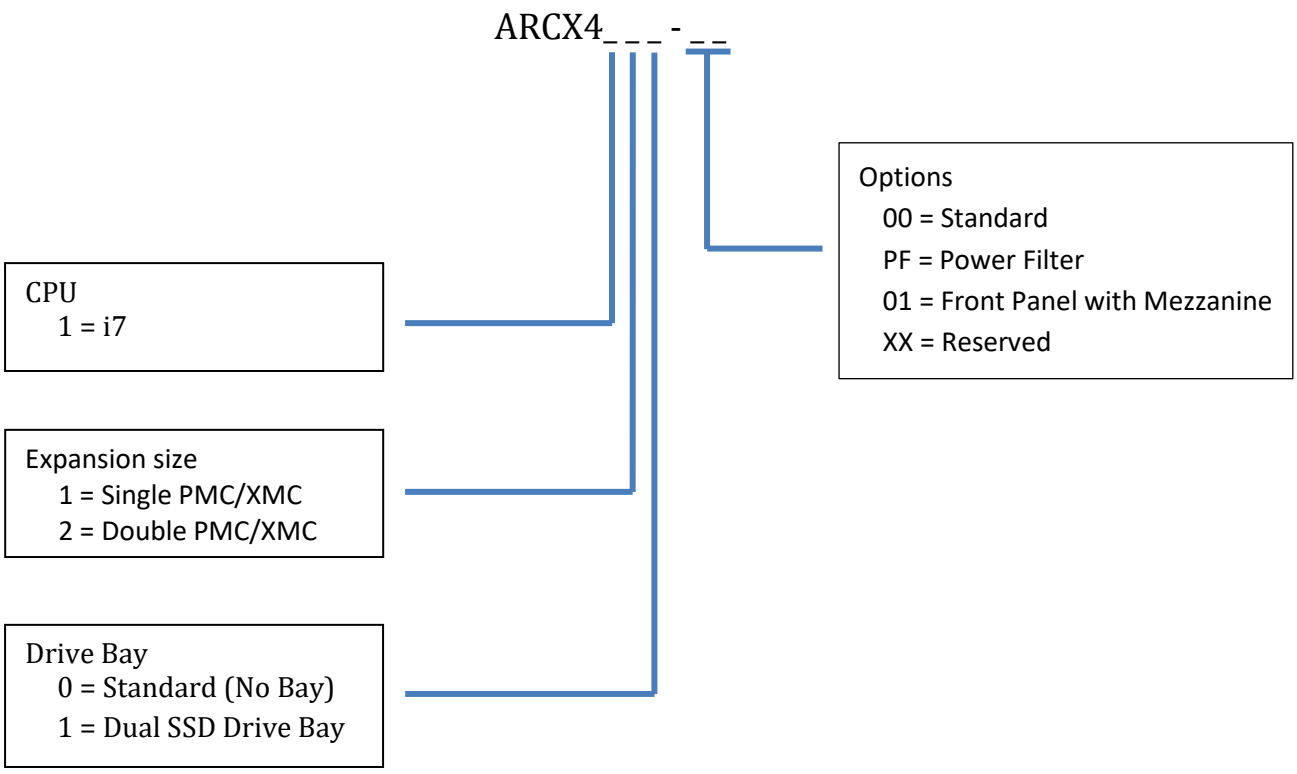
Intel DH82QM87 Platform Controller Hub

Memory

16GB of 1600 DDR3L ECC memory (**see section 6.6 for more information**)

1.4 Ordering Information

Models:



Example:

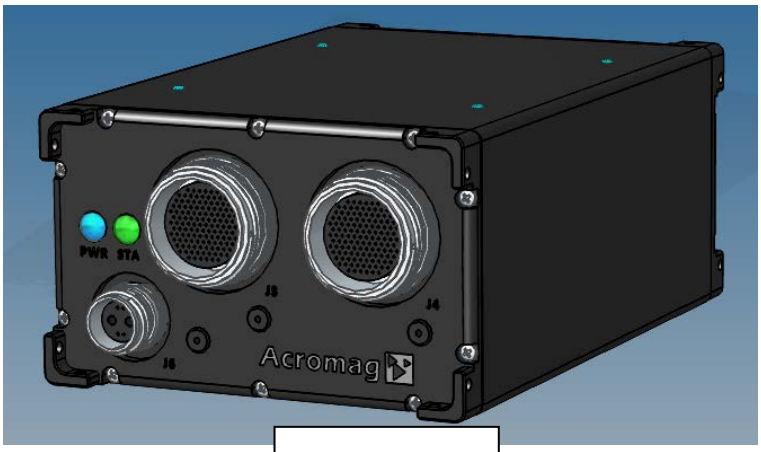
ARCX-4120-PF (i7 CPU, Double PMC/XMC Expansion size, Power Filter)

Only Lead Free models are available.

Note: Customers requiring lead solder electronics in the ARCX box will be handled as a special with appropriate NRE to cover cost of documenting and lead-time to build.



ARCX-4120-00



ARCX-4110-00

1.4.1 Accessories

Accessories (optional)	
ACEX-FP-PF-LF	MIL-STD-704F/MIL-STD-1275E Power Filter
5028-556	38999 #23 size, CPU I/O Peripheral Breakout Cable
5028-557	38999 #12 size, Power Cable
5028-558	38999 #23 size Keyed "A" mating cable connector only
5028-559	38999 #23 size Keyed "C" mating cable connector only
5028-560	38999 #23 size Keyed "B" mating cable connector only
5028-561	38999 #12 size Keyed A mating cable connector only
5028-566	38999 #23 size, PMC/XMC Site 1 Rear I/O Breakout Cable
5028-567	38999 #23 size, PMC/XMC Site 2 Rear I/O Breakout Cable
5028-571	ARCX Dual SSD Drive Tray (Spare Drive Tray for Dual SSD Dive Bay Option)
ATMD-02	Air cooled heatsink
ATMD-03	Cold Plate, 8" x 10" Assembly

Note: The cables/connectors in the table above are for development and are not IP67 rated.

Note: 5028-566 and 5028-567 cables are intended for use with two 5025-288 SCSI-3 termination panels.



5028-556

Customers that need IP67 cables can use the following connectors/boots that are available thru Amphenol or Aero Electric:

Amphenol Part Number	**Connector Description**	**Straight Shrink boot Part number**	**Right Angle Shrink boot Part number**
2M805-002-16ZNU23-130PA	CONN P CIR 130 38999 #23 keyed A PLUG IP67	2M809S060-6H	2M809A060-6H
2M805-002-16ZNU23-130PB	CONN P CIR 130 38999 #23 keyed B PLUG IP67	2M809S060-6H	2M809A060-6H
2M805-002-16ZNU23-130PC	CONN P CIR 130 38999 #23 keyed C PLUG IP67	2M809S060-6H	2M809A060-6H
2M805-002-16ZNU12-201PA	CONN P 6 CIR 38999 #12 Keyed A PLUG IP67	2M809S060-4H	2M809A060-4H
Aero Electric Part Number	**Connector Description**	**Straight Shrink boot Part number**	**Right Angle Shrink boot Part number**
AE96MM-26-Y23-130PA-002	Ultra High Density 38999 III plug, shell size 23, integral rear, normal/A clocking	AE94MM-809S060-6H	AE94MM-809A060-6H
AE96MM-26-Y23-130PB-002	Ultra High Density 38999 III plug, shell size 23, integral rear, alternate/B clocking	AE94MM-809S060-6H	AE94MM-809A060-6H
AE96MM-26-Y23-130PC-002	Ultra High Density 38999 III plug, shell size 23, integral rear, alternate/C clocking	AE94MM-809S060-6H	AE94MM-809A060-6H
AE96MM-26-Y12-201PA-002	Ultra High Density 38999 III plug, shell size 12, integral rear, normal/A clocking	AE94MM-809S060-4H	AE94MM-809A060-4H

1.5 References

The following resources regarding COM Express modules, the XCOM-4600 EDK board, and the Haswell© family of Intel® core processors are available for download on Acromag's website or by contacting your sales representative.

- XCOM-6400 COM Express CPU Module User's Manual
  www.acromag.com
- APTIO™ Core BIOS Manual (for Acromag® Products featuring the Intel® 4th Generation "Haswell" Core Processor Family)
  www.acromag.com
- ACEX-4610/4620 COM Express Carrier Board User's Manual
  www.acromag.com
- ACEX-FP-0X Front Panel Board User's Manual
  ACEX-FP-I0-0X Front Panel Board with Mezzanine User's Manual
  www.acromag.com
- XCOM-4600-EDK Engineering Design Kit Board
  www.acromag.com
- Intel® document No. 328901, "Mobile 4th Generation Intel® Core™ Processor Family Datasheet – Volume 1 of 2", Rev: 002; September, 2013.
  www.intel.com/content/www/us/en/processors/core/CoreTechnicalResources.html
- COM Express Module Base Specification Rev. 2.1
  www.picmg.org

1.6 Operating System Compatibility

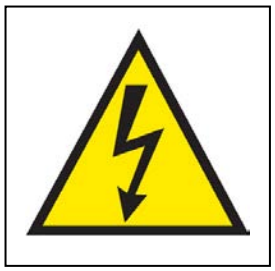
Microsoft Windows 8.1 (32bit & 64bit)

Microsoft Windows 7 (32bit & 64bit)

PMC and XMC modules may require hardware device driver's specific to your operating system to operate properly. Refer to your PMC or XMC manual for more information.

2.0 PREPARATION FOR USE

IMPORTANT PERSONAL AND PRODUCT SAFETY CONSIDERATIONS



It is very important for the user to consider the possible safety implications of power, wiring, component, sensor, or software failures in designing any type of control or monitoring system. This is especially important where personal injury or the loss of economic property or human life is possible. It is important that the user employ satisfactory overall system design. It is understood and agreed by the Buyer and Acromag that this is the Buyer's responsibility.



WARNING: This board utilizes static sensitive components and should only be handled at a static-safe workstation. This product is an electrostatic sensitive device and is packaged accordingly. Do not open or handle this product except at an electrostatic-free workstation. Additionally, do not ship or store this product near strong electrostatic, electromagnetic, magnetic, or radioactive fields unless the device is contained within its original manufacturer's packaging. Be aware that failure to comply with these guidelines will void the Acromag Limited Warranty.

2.1 Unpacking and Inspecting

Upon receipt of this product, inspect the shipping carton for evidence of mishandling during transit. If the shipping carton is badly damaged or water stained, request that the carrier's agent be present when the carton is opened. If the carrier's agent is absent when the carton is opened, and the contents of the carton are damaged, keep the carton and packing material for the agent's inspection.

For repairs to a product damaged in shipment, refer to the Acromag Service Policy to obtain return instructions. It is suggested that salvageable shipping cartons and packing material be saved for future use in the event the product must be shipped.

This product is physically protected with packing material and electrically protected during shipment. However, it is recommended that the product be visually inspected for evidence of mishandling prior to applying power.

3.0 Block Diagrams and Connector Pin out Tables

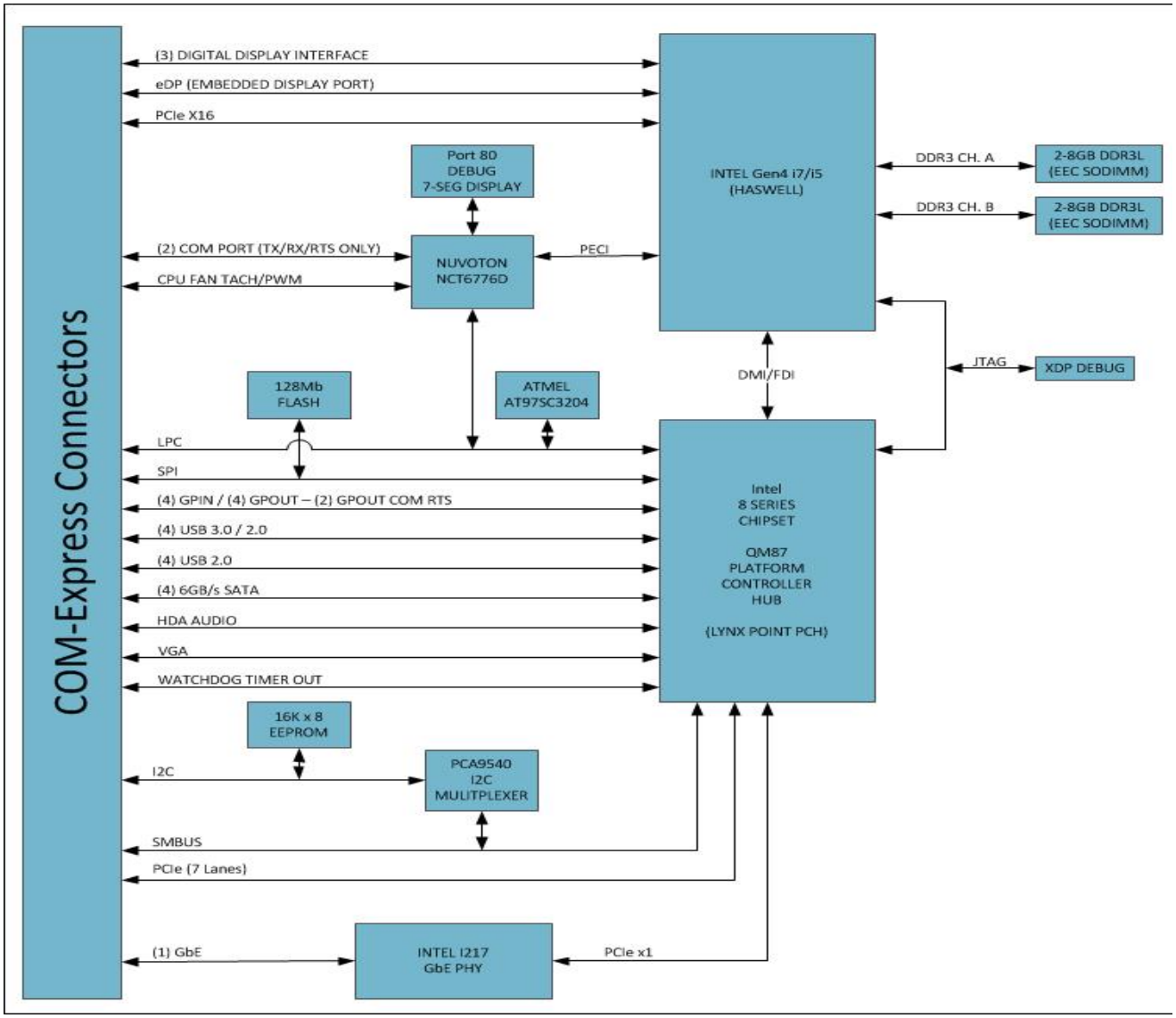
3.1 ARCX-4120 Block Diagrams

The ARCX-4120 is made up from 3 main components

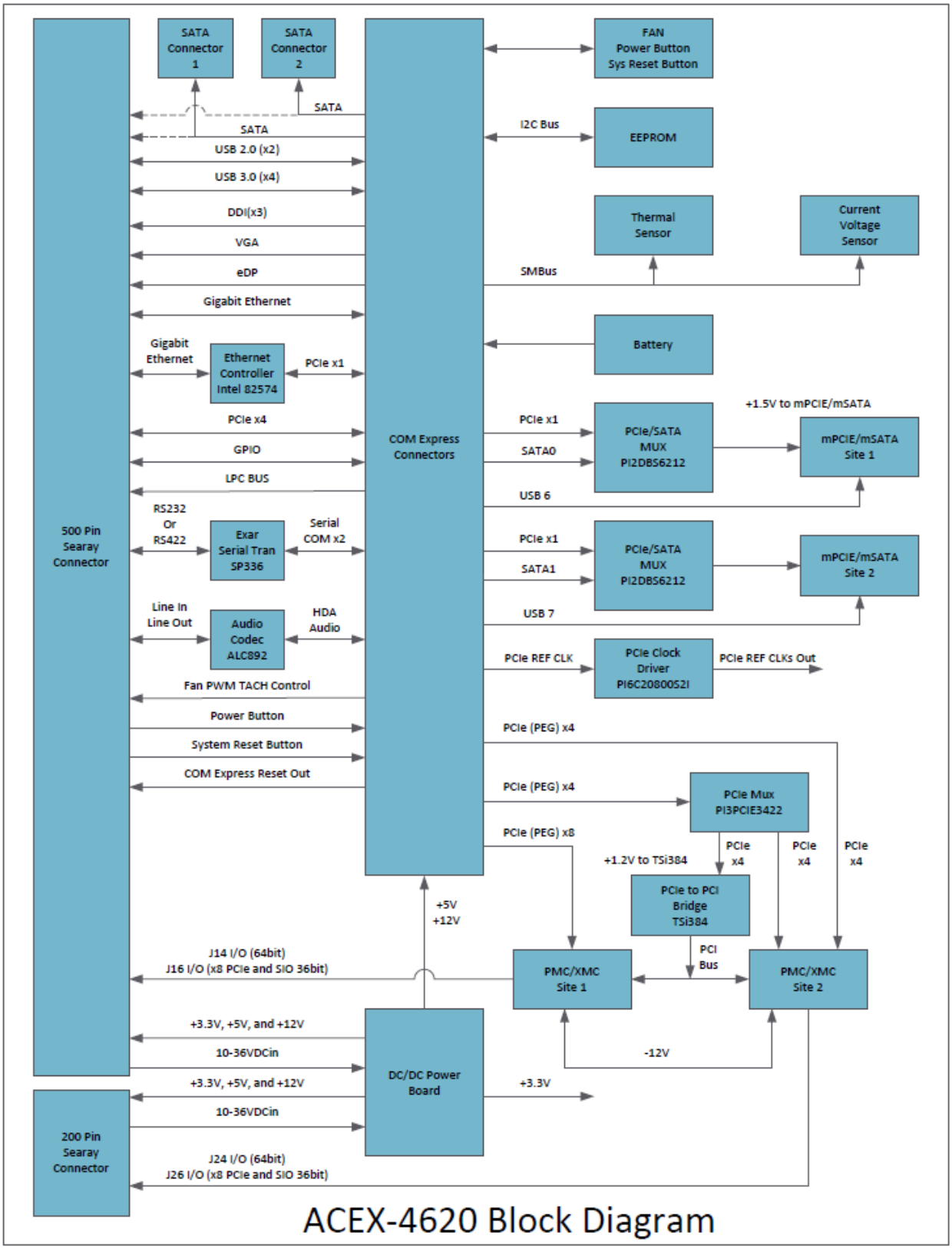
- XCOM-6400 COM Express CPU Module
- ACEX-4620 Carrier Board
- ACEX-FP-02 Front Panel Board (standard)

The block diagrams for each component are shown below in Figs. 3.1.1, 3.1.2, and 3.1.3. These may be a helpful reference as you review the connector pin out tables in this section.

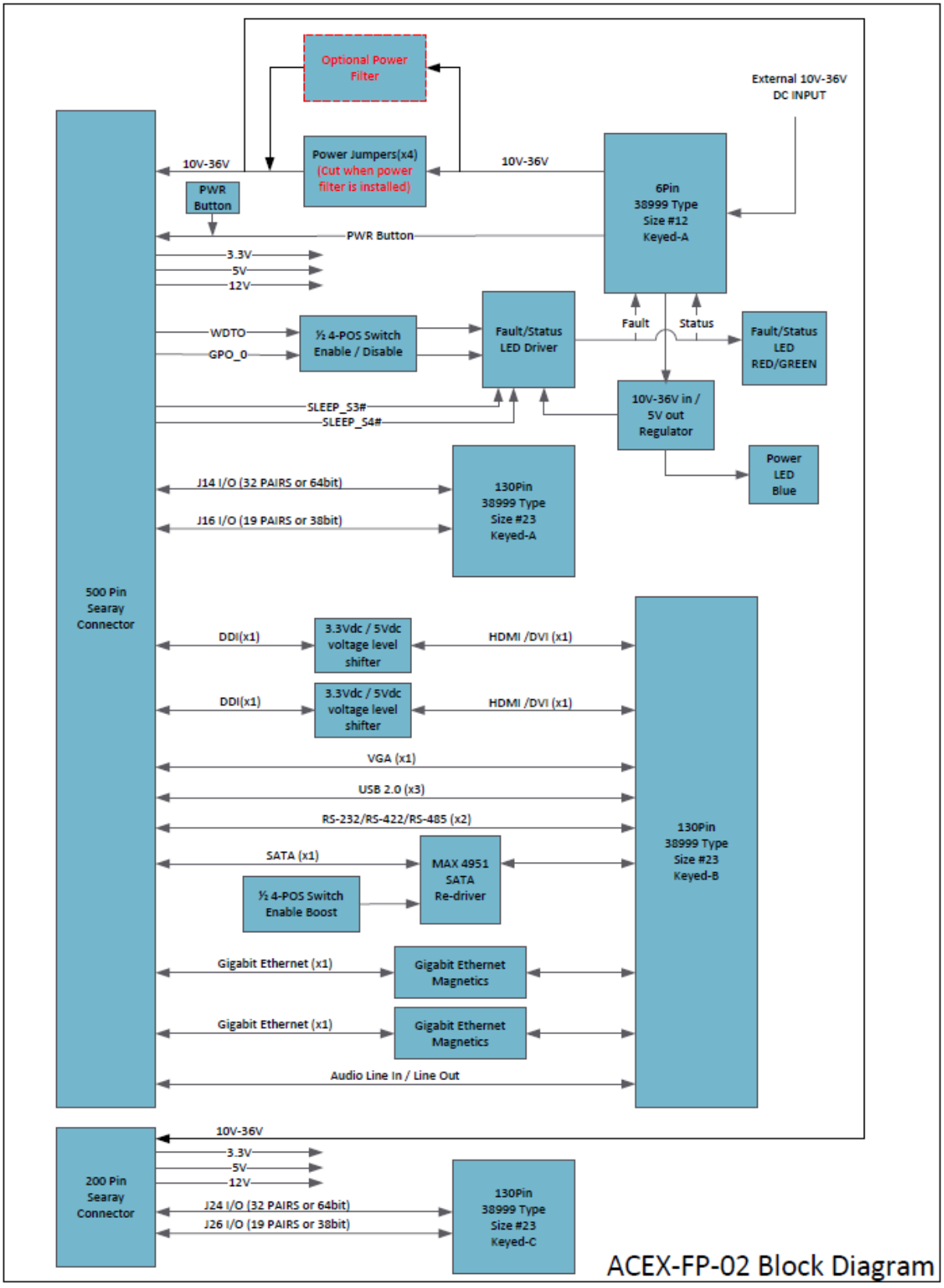
3.1.1 XCOM-6400 COM Express CPU Module Block Diagram



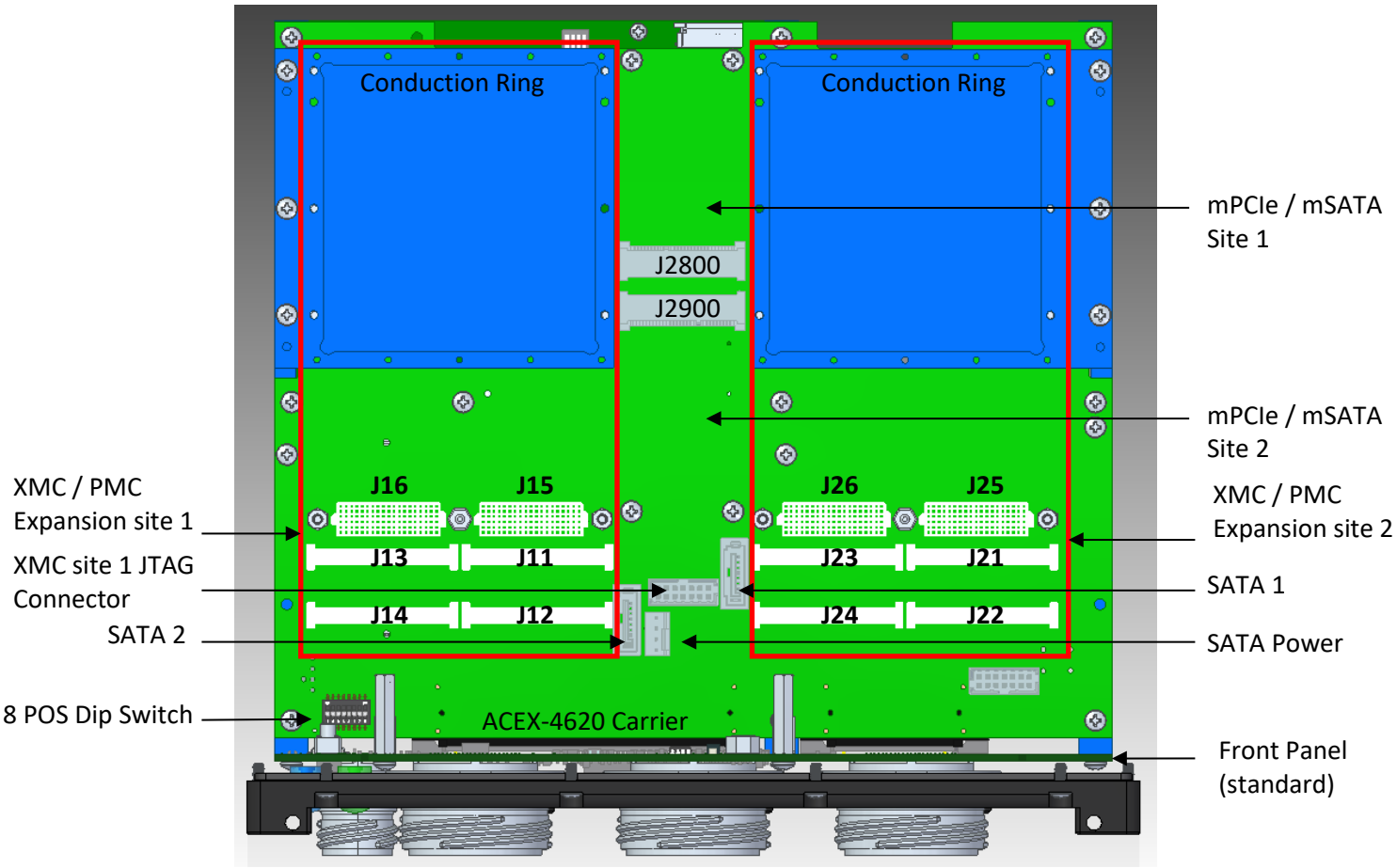
3.1.2 Model ACEX-4620 Carrier Block Diagram

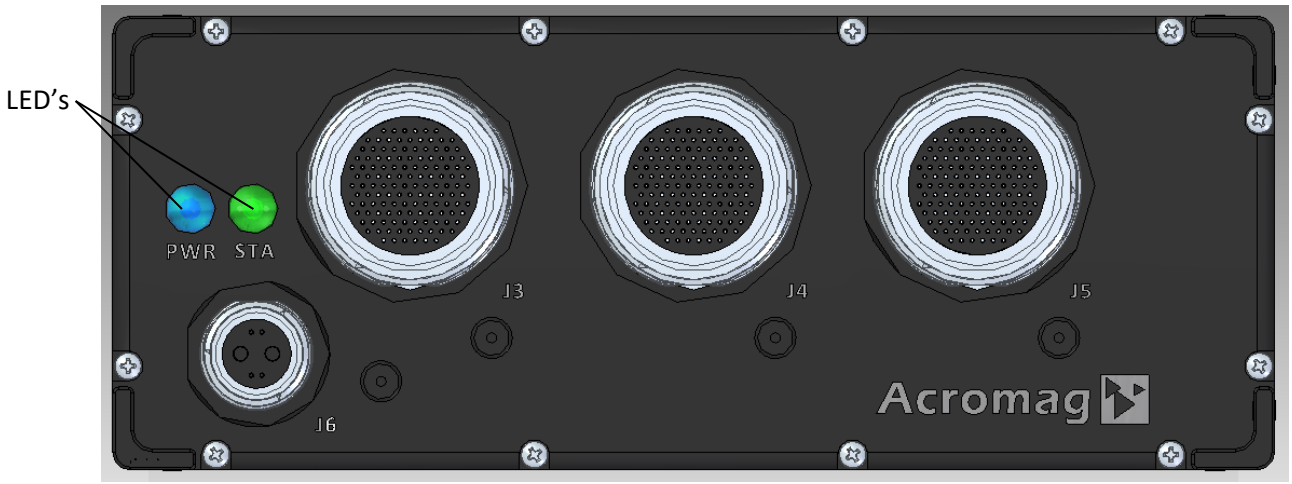


3.1.3 Model ACEX-FP-02 Front Panel (standard) Block Diagram



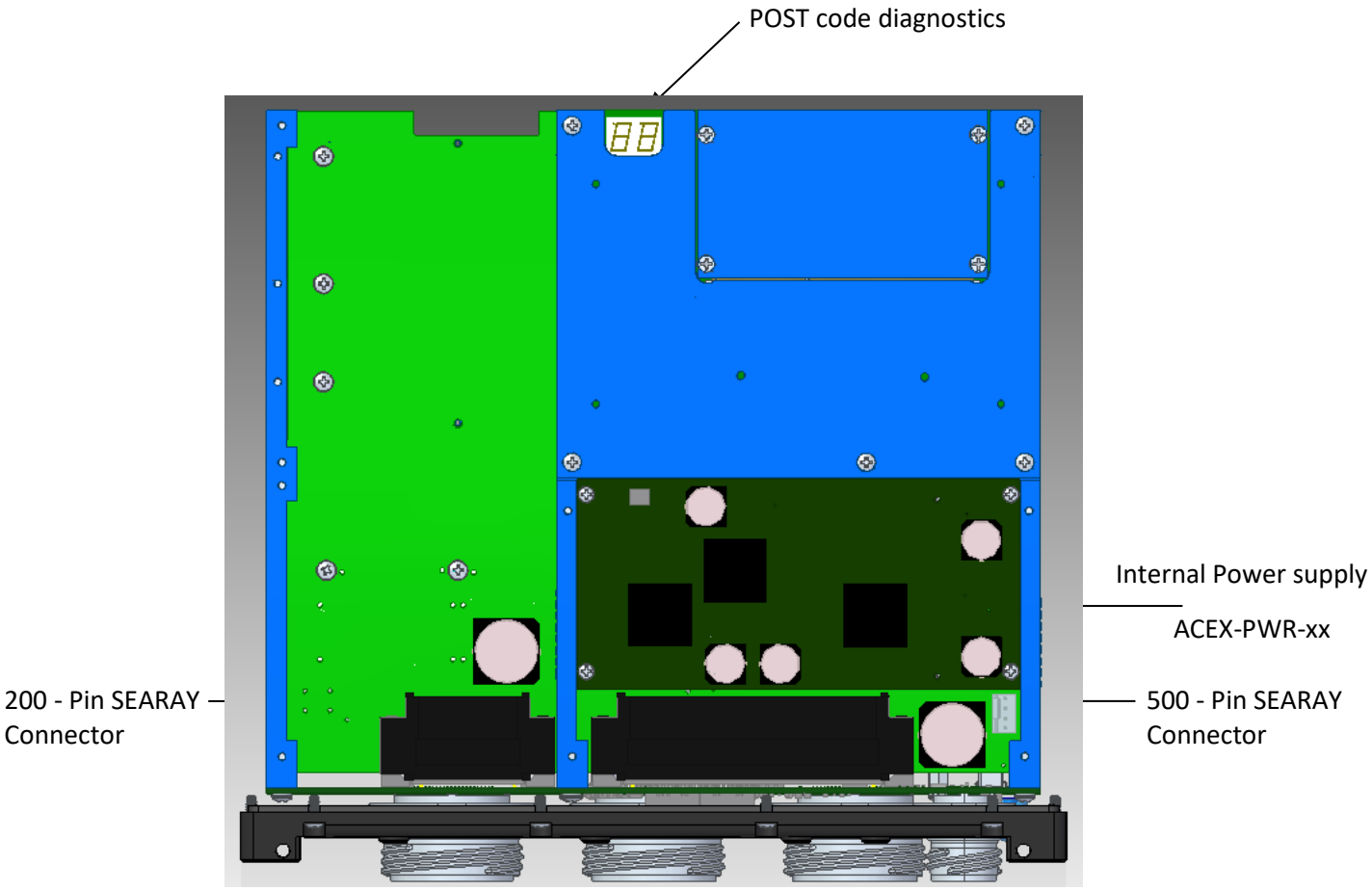
3.1.4 ARCX-4120, Top view





Front Panel (front view)

3.1.5 ARCX-4120, Bottom view



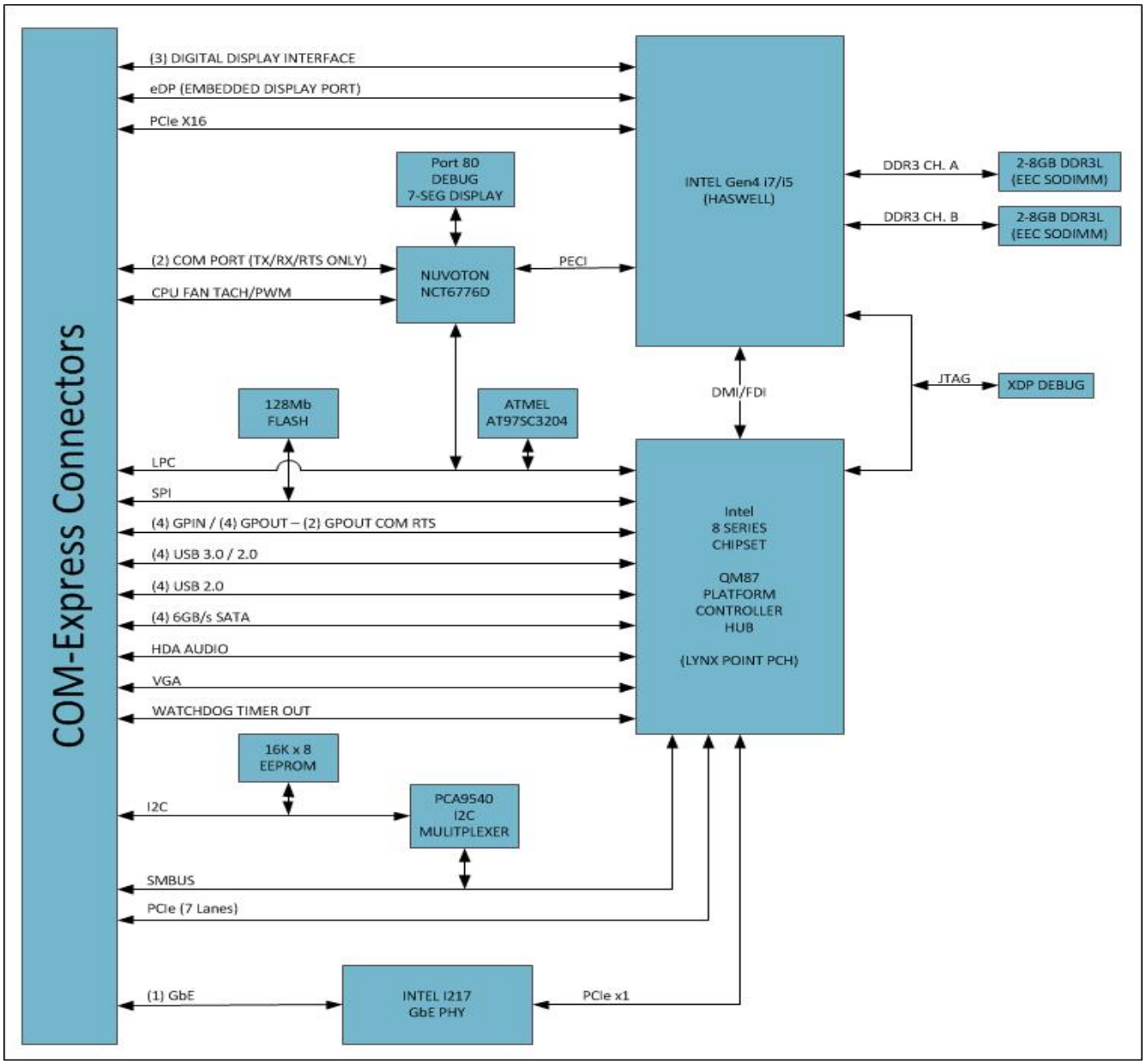
3.2 ARCX-4110 Block Diagrams

The ARCX 4110 is made up from 3 main components

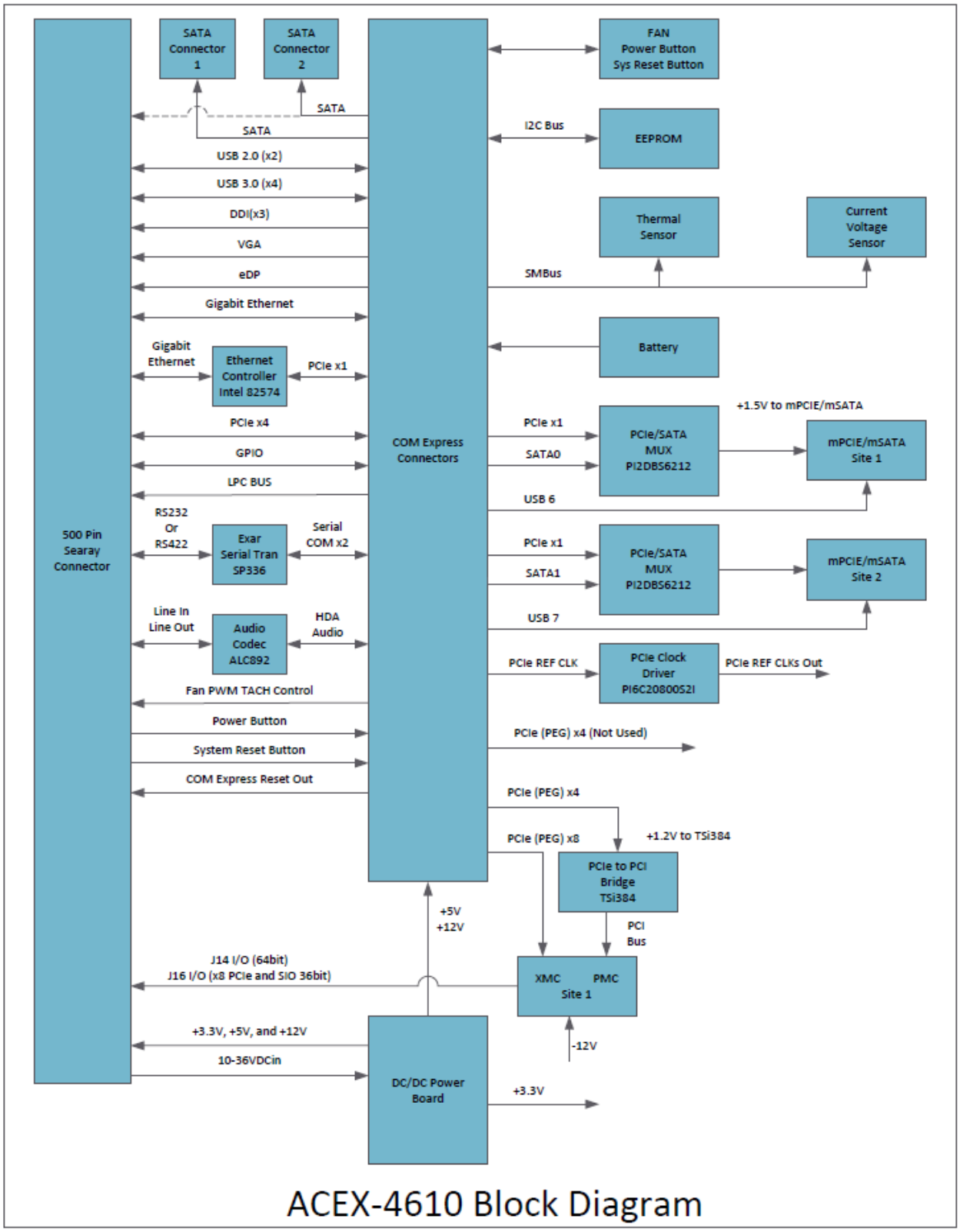
- XCOM-6400 COM Express CPU Module
- ACEX-4610 Carrier Board
- ACEX-FP-01 Front Panel Board (Standard)

The block diagrams for each component are shown below in Figs. 3.2.1, 3.2.2, and 3.2.3. These may be a helpful reference as you review the connector pinout tables in this section.

3.2.1 XCOM-6400 COM Express CPU Module Block Diagram

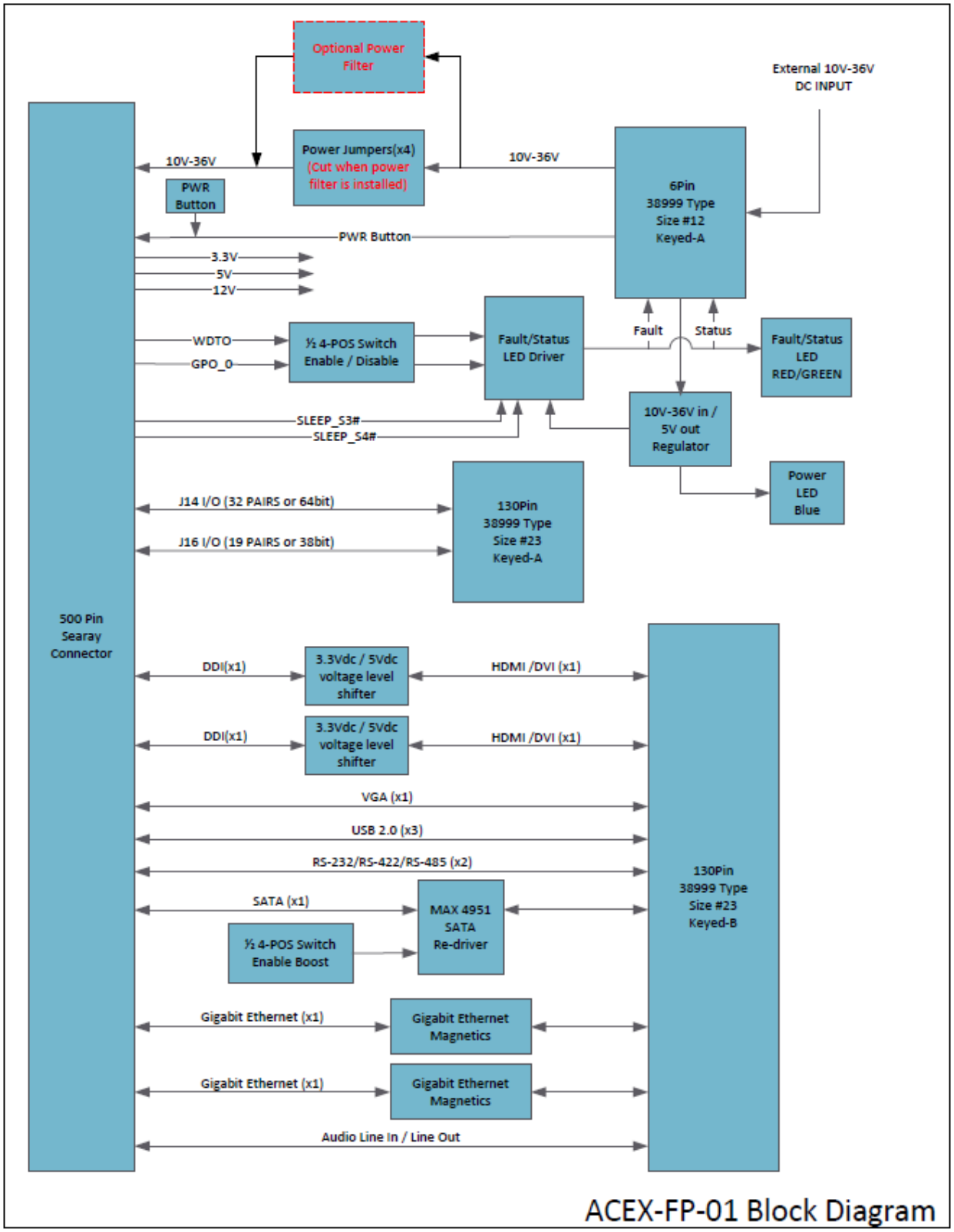


3.2.2 Model ACEX-4610 Carrier Block Diagram

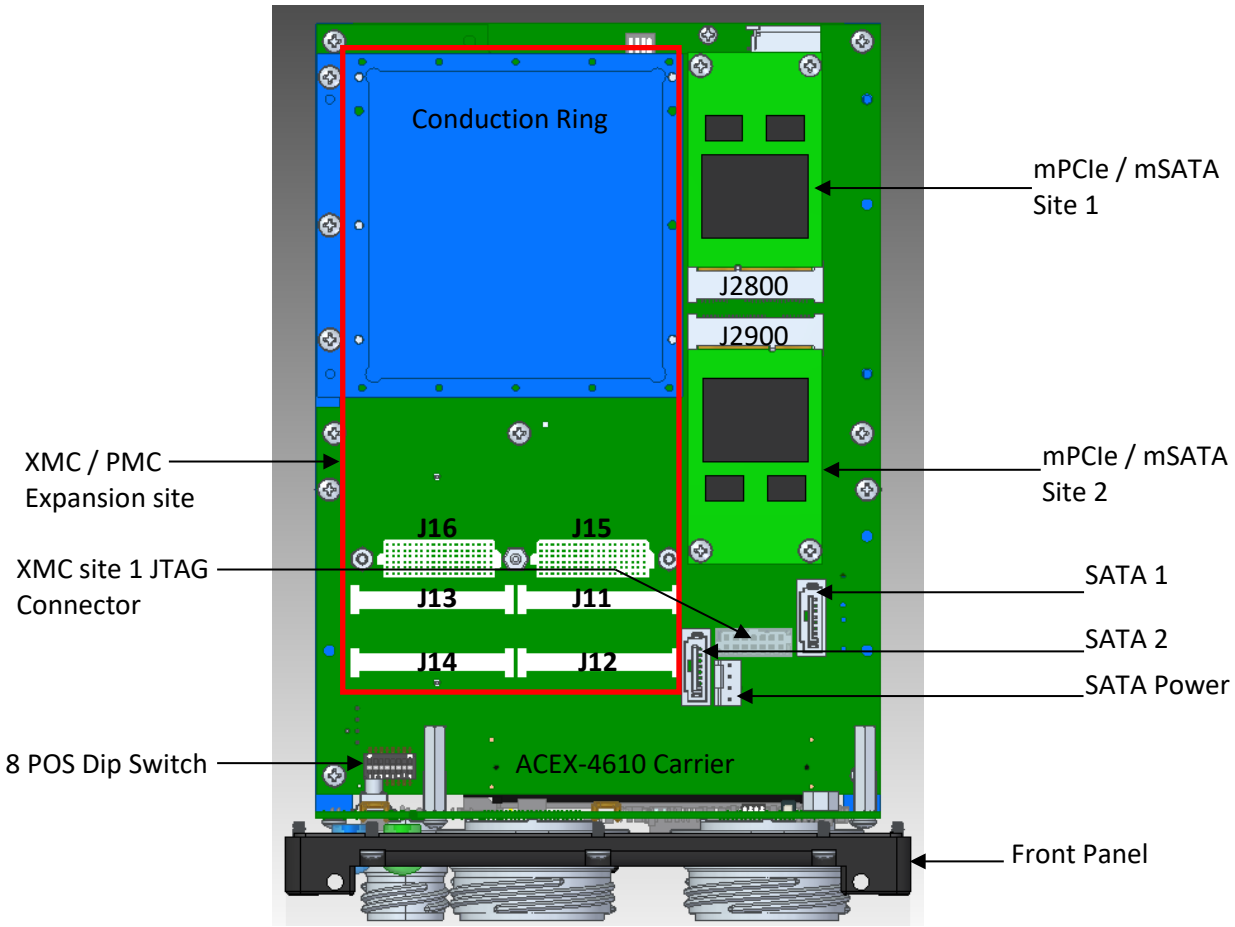


ACEX-4610 Block Diagram

3.2.3 Model ACEX-FP-01 Front Panel (standard) Block Diagram



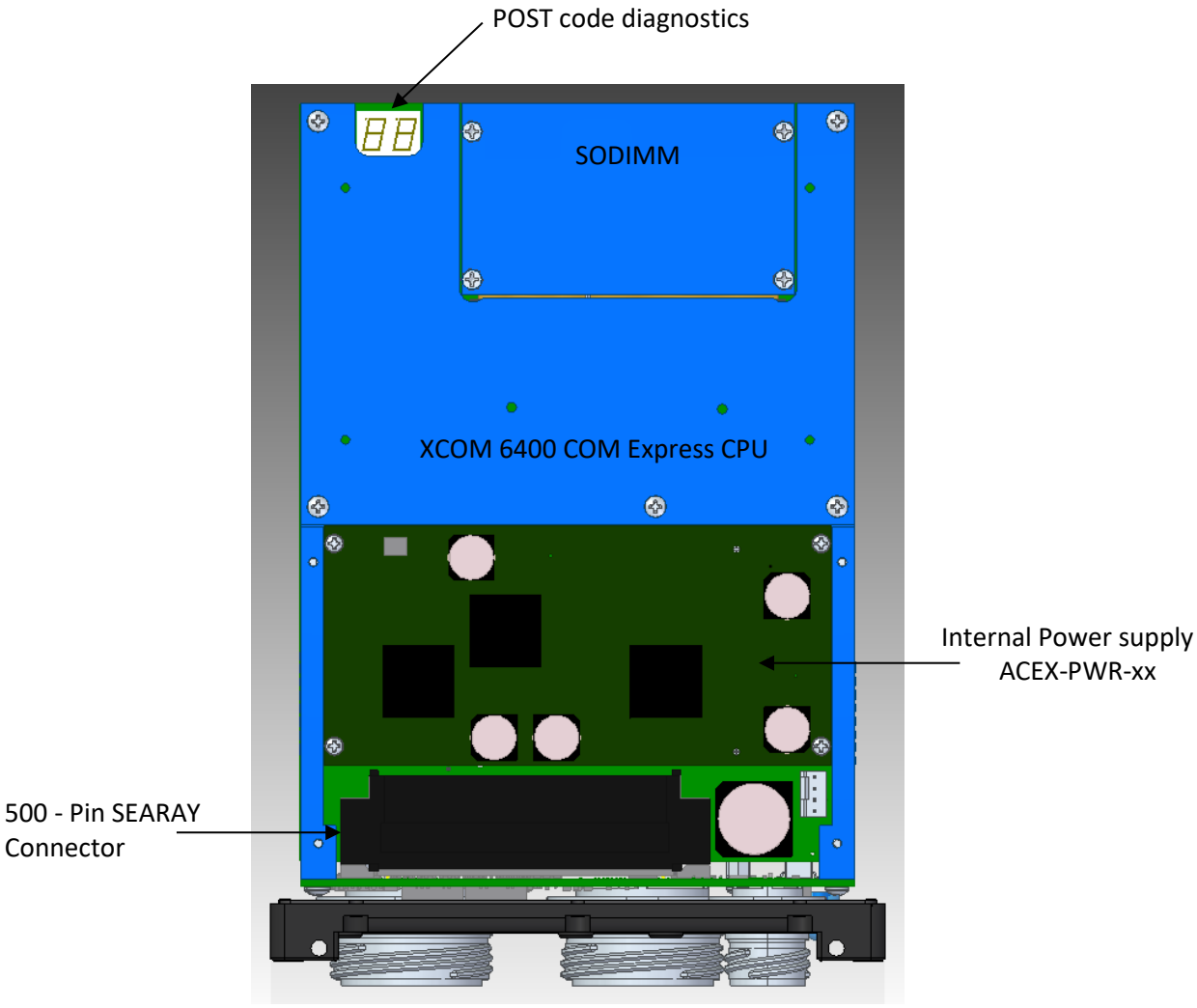
3.2.4 ARCX-4110, Top view





Front Panel (front view)

3.2.5 ARCX-4110, Bottom view



3.3 Connector Pin Outs

J3 is a 130-pin size #23 38999 type connector, keyed – A. This connector provides access to the Rear I/O coming from the PMC/XMC site on the carrier board (ACEX-46xx). If a PMC P4/J4 connector is used/installed in site 1 on the carrier board than all 32 differential Pairs of Rear I/O signals are available thru J3. If an XMC card P15 connector is used/installed in site 1 of the carrier board than the UD (user defined signals) Row C and F of the XMC boards P16 connector as defined in VITA 42.0 signals are available.

J3 - Keyed-A (130-Pin size #23 38999 type Connector)

Pin	*Signal Name*	*Pin*	*Signal Name*	*Pin*	*Signal Name*	*Pin*	*Signal Name*
1	J14_RIO0_P	**34**	J14_RIO14_P	**67**	J14_RIO26_P	**100**	GND
2	J14_RIO0_N	**35**	J14_RIO14_N	**68**	J14_RIO26_N	**101**	J16_SIO7_P
3	J14_RIO1_P	**36**	GND	**69**	GND	**102**	J16_SIO7_N
4	J14_RIO1_N	**37**	J14_RIO15_P	**70**	J14_RIO27_P	**103**	J16_SIO8_P
5	J14_RIO2_P	**38**	J14_RIO15_N	**71**	J14_RIO27_N	**104**	J16_SIO8_N
6	J14_RIO2_N	**39**	GND	**72**	J14_RIO28_P	**105**	GND
7	J14_RIO3_P	**40**	GND	**73**	J14_RIO28_N	**106**	J16_SIO9_P
8	J14_RIO3_N	**41**	J14_RIO16_P	**74**	GND	**107**	J16_SIO9_N
9	GND	**42**	J14_RIO16_N	**75**	J14_RIO29_P	**108**	J16_SIO10_P
10	J14_RIO4_P	**43**	J14_RIO17_P	**76**	J14_RIO29_N	**109**	J16_SIO10_N
11	J14_RIO4_N	**44**	J14_RIO17_N	**77**	GND	**110**	No Connect
12	GND	**45**	GND	**78**	J14_RIO30_P	**111**	J16_SIO11_P
13	J14_RIO5_P	**46**	GND	**79**	J14_RIO30_N	**112**	J16_SIO11_N
14	J14_RIO5_N	**47**	J14_RIO18_P	**80**	GND	**113**	GND
15	GND	**48**	J14_RIO18_N	**81**	J14_RIO31_P	**114**	J16_SIO12_P
16	J14_RIO6_P	**49**	GND	**82**	J14_RIO31_N	**115**	J16_SIO12_N
17	J14_RIO6_N	**50**	J14_RIO19_P	**83**	GND	**116**	GND
18	J14_RIO7_P	**51**	J14_RIO19_N	**84**	J16_SIO0_GCLK_P	**117**	J16_SIO13_P
19	J14_RIO7_N	**52**	J14_RIO20_P	**85**	J16_SIO0_GCLK_N	**118**	J16_SIO13_N
20	J14_RIO8_P	**53**	J14_RIO20_N	**86**	J16_SIO1_P	**119**	GND
21	J14_RIO8_N	**54**	GND	**87**	J16_SIO1_N	**120**	J16_SIO14_P
22	J14_RIO9_P	**55**	J14_RIO21_P	**88**	J16_SIO2_P	**121**	J16_SIO14_N
23	J14_RIO9_N	**56**	J14_RIO21_N	**89**	J16_SIO2_N	**122**	GND
24	J14_RIO10_P	**57**	J14_RIO22_P	**90**	J16_SIO3_P	**123**	J16_SIO15_P
25	J14_RIO10_N	**58**	J14_RIO22_N	**91**	J16_SIO3_N	**124**	J16_SIO15_N
26	GND	**59**	GND	**92**	J16_SIO4_P	**125**	J16_SIO16_P
27	J14_RIO11_P	**60**	J14_RIO23_P	**93**	J16_SIO4_N	**126**	J16_SIO16_N
28	J14_RIO11_N	**61**	J14_RIO23_N	**94**	GND	**127**	J16_SIO17_P
29	J14_RIO12_P	**62**	J14_RIO24_P	**95**	J16_SIO5_P	**128**	J16_SIO17_N
30	J14_RIO12_N	**63**	J14_RIO24_N	**96**	J16_SIO5_N	**129**	J16_SIO18_GCLK_P
31	No Connect	**64**	GND	**97**	GND	**130**	J16_SIO18_GCLK_N
32	J14_RIO13_P	**65**	J14_RIO25_P	**98**	J16_SIO6_P		
33	J14_RIO13_N	**66**	J14_RIO25_N	**99**	J16_SIO6_N		

J4 is a 130-pin size #23 38999 type connector, keyed – B. This connector provides the standard peripheral I/O.

J4 - Keyed-B (130-Pin size #23 38999 type Connector)

Pin	Signal Name	Pin	Signal Name	Pin	Signal	Pin	Signal
1	DPB_DDC_CLOCK	34	DPC_TMDS_CLOCK_SHIE	67	LAN1 DI3 P	100	WDTO
2	DPB_DDC_DATA	35	DPC_TMDS_D2_P	68	GND	101	GND
3	USB0_N	36	DPC_TMDS_D2_N	69	GND	102	GND
4	USB0_P	37	DPB_HPD	70	+12V	103	UART_TX1_
5	DPC_DDC_CLOCK	38	DPB_TMDS_D2_SHIELD	71	+5V (SATA)	104	GND
6	DPC_DDC_DATA	39	DPB_TMDS_CLK_P	72	LAN0 DI0 N	105	+3.3V
7	DPB_TMDS_D1_SHIELD	40	DPB_TMDS_CLK_N	73	LAN0 DI1 N	106	VGA RED
8	DPB_TMDS_D0_P	41	GND	74	LAN0 DI2 N	107	VGA GND
9	DPB_TMDS_D0_N	42	USB2_GND	75	LAN0 DI3 N	108	GND
10	USB0_+5V	43	USB2_+5V	76	LAN1 DI0 N	109	GND
11	USB0_GND	44	GND	77	LAN1 DI1 N	110	GND
12	USB1_GND	45	DPC_TMDS_CLK_P	78	LAN1 DI2 N	111	UART_RX0_
13	DPC_TMDS_D0_P	46	DPC_TMDS_CLK_N	79	LAN1 DI3 N	112	LINE IN R
14	DPC_TMDS_D0_N	47	DPC_TMDS_D2_SHIELD	80	UART_RX1	113	AUDIO GND
15	DPC_TMDS_D0_SHIELD	48	DPC_HPD	81	GND	114	LINE OUT R
16	DPB_TMDS_D1_P	49	No Connect	82	+5V (SATA)	115	+3.3V
17	DPB_TMDS_D1_N	50	No Connect	83	GND	116	VGA GREEN
18	DPB_TMDS_D0_SHIELD	51	No Connect	84	VGA GND	117	VGA PWR
19	GND	52	No Connect	85	GND	118	VGA HSYNC
20	GND	53	No Connect	86	SATA0_TX_	119	VGA VSYNC
21	USB1_N	54	No Connect	87	SATA0_TX	120	UART_TX0
22	USB1_P	55	No Connect	88	GND	121	UART_RX0_
23	DPC_TMDS_D1_SHIELD	56	No Connect	89	GND	122	LINE IN L
24	DPC_TMDS_D1_P	57	GND	90	GND	123	LINE OUT L
25	DPC_TMDS_D1_N	58	GND	91	UART_TX1_	124	AUDIO GND
26	DPB_TMDS_D2_P	59	+12V (SATA)	92	UART_RX1	125	VGA SDATA
27	DPB_TMDS_D2_N	60	LAN0 DI0 P	93	+5V (SATA)	126	VGA
28	DPB_TMDS_CLOCK_SHIE	61	LAN0 DI1 P	94	+3.3V	127	GND
29	DPB_TMDS_PWR	62	LAN0 DI2 P	95	VGA_BLUE	128	UART_TX0_
30	USB2_N	63	LAN0 DI3 P	96	VGA GND	129	GND
31	USB2_P	64	LAN1 DI0 P	97	SATA0_RX	130	No Connect
32	USB1_+5V	65	LAN1 DI1 P	98	SATA0_RX_		
33	DPC_TMDS_PWR	66	LAN1 DI2 P	99	GND		

J5 is a 130-pin size #23 38999 type connector, Keyed – C. This connector provides access to the Rear I/O coming from the PMC/XMC site on the carrier board (ACEX-46xx). If a PMC P4/J4 connector is used/installed in site 2 on the carrier board than all 32 differential Pairs of Rear I/O signals are available thru J3. If an XMC card P15 connector is used/installed in site 2 of the carrier board than the UD (user defined signals) Row C and F of the XMC boards P16 connector as defined in VITA 42.0 signals are available.

J5 - Keyed-C (130-Pin size #23 38999 type Connector)

Pin	*Signal Name*	*Pin*	*Signal Name*	*Pin*	*Signal Name*	*Pin*	*Signal Name*
1	J24_RIO0_P	**34**	J24_RIO14_P	**67**	J24_RIO26_P	**100**	GND
2	J24_RIO0_N	**35**	J24_RIO14_N	**68**	J24_RIO26_N	**101**	J26_SIO7_P
3	J24_RIO1_P	**36**	GND	**69**	GND	**102**	J26_SIO7_N
4	J24_RIO1_N	**37**	J24_RIO15_P	**70**	J24_RIO27_P	**103**	J26_SIO8_P
5	J24_RIO2_P	**38**	J24_RIO15_N	**71**	J24_RIO27_N	**104**	J26_SIO8_N
6	J24_RIO2_N	**39**	GND	**72**	J24_RIO28_P	**105**	GND
7	J24_RIO3_P	**40**	GND	**73**	J24_RIO28_N	**106**	J26_SIO9_P
8	J24_RIO3_N	**41**	J24_RIO16_P	**74**	GND	**107**	J26_SIO9_N
9	GND	**42**	J24_RIO16_N	**75**	J24_RIO29_P	**108**	J26_SIO10_P
10	J24_RIO4_P	**43**	J24_RIO17_P	**76**	J24_RIO29_N	**109**	J26_SIO10_N
11	J24_RIO4_N	**44**	J24_RIO17_N	**77**	GND	**110**	No connect
12	GND	**45**	GND	**78**	J24_RIO30_P	**111**	J26_SIO11_P
13	J24_RIO5_P	**46**	GND	**79**	J24_RIO30_N	**112**	J26_SIO11_N
14	J24_RIO5_N	**47**	J24_RIO18_P	**80**	GND	**113**	GND
15	GND	**48**	J24_RIO18_N	**81**	J24_RIO31_P	**114**	J26_SIO12_P
16	J24_RIO6_P	**49**	GND	**82**	J24_RIO31_N	**115**	J26_SIO12_N
17	J24_RIO6_N	**50**	J24_RIO19_P	**83**	GND	**116**	GND
18	J24_RIO7_P	**51**	J24_RIO19_N	**84**	J26_SIO0_GCLK_P	**117**	J26_SIO13_P
19	J24_RIO7_N	**52**	J24_RIO20_P	**85**	J26_SIO0_GCLK_	**118**	J26_SIO13_N
20	J24_RIO8_P	**53**	J24_RIO20_N	**86**	J26_SIO1_P	**119**	GND
21	J24_RIO8_N	**54**	GND	**87**	J26_SIO1_N	**120**	J26_SIO14_P
22	J24_RIO9_P	**55**	J24_RIO21_P	**88**	J26_SIO2_P	**121**	J26_SIO14_N
23	J24_RIO9_N	**56**	J24_RIO21_N	**89**	J26_SIO2_N	**122**	GND
24	J24_RIO10_P	**57**	J24_RIO22_P	**90**	J26_SIO3_P	**123**	J26_SIO15_P
25	J24_RIO10_N	**58**	J24_RIO22_N	**91**	J26_SIO3_N	**124**	J26_SIO15_N
26	GND	**59**	GND	**92**	J26_SIO4_P	**125**	J26_SIO16_P
27	J24_RIO11_P	**60**	J24_RIO23_P	**93**	J26_SIO4_N	**126**	J26_SIO16_N
28	J24_RIO11_N	**61**	J24_RIO23_N	**94**	GND	**127**	J26_SIO17_P
29	J24_RIO12_P	**62**	J24_RIO24_P	**95**	J26_SIO5_P	**128**	J26_SIO17_N
30	J24_RIO12_N	**63**	J24_RIO24_N	**96**	J26_SIO5_N	**129**	J26_SIO18_GCLK_P
31	No connect	**64**	GND	**97**	GND	**130**	J26_SIO18_GCLK_N
32	J24_RIO13_P	**65**	J24_RIO25_P	**98**	J26_SIO6_P		
33	J24_RIO13_N	**66**	J24_RIO25_N	**99**	J26_SIO6_N		

J6 is a 6-pin size #12 38999 type connector, keyed - A. This connector is used to provide External input power 10V to 36V DC to the Carrier board (ACEX-46xx). This connector has a PWR_BTN line to allow the user use a power switch.

J6 - Keyed-A (6-Pin size #12 38999 type Connector)

Pin	Signal Name
1	PWR_BTN
2	Reserved (DO NOT USE)
3	INPUT_PWR
4	INPUT_GND
5	Reserved (DO NOT USE)
6	GND

4.0 LED Function

4.1 Power LED

The Blue Power LED indicates 10V-36V DC power is applied at the external power input.

4.2 Status LED

The Status LED is used to show the status of the system power state S3 and S4.

4.3 System power state definitions

System power state S3 the "sleep state":

All power is off except memory. If power is removed at this point you will lose your current session.

System power state S4 the "hibernate state":

Safe to remove power, will always resume the current session when power is reapplied.

There are three basic states indicated by the Status LED:

- Status LED steady "Green On" when the system is running.
- Status LED "Blink Green" when the system enters sleep state S3.
- Status LED will turn off when the system enters Sleep state S4 Hibernate.

Signal Activity		Status LED		
Sleep S3#	**Sleep S4#**	Green On	Blink Green	LED Off
0	0			✓
0	1		✓	
1	1	✓		

✓ - Condition of the Status LED
0 - Represents a Low state
1 - Represents a High state

Note:

1. S3# and S4# are active low signals (# indicates active low).
2. *It is ok to remove power from the system when the Status LED is off.*
3. S5 State is not monitored by the LED however the Status LED will go off during a S5 or shutdown condition.

5.0 Switch Configuration

5.1 8-Position Dip switch (located on the Carrier board)

(optional configuration) Bold indicates default setting		
1	ON	J15 JTAG voltage = 2.5Vdc
	OFF	**J15 JTAG voltage = 3.3Vdc**
2	ON	J25 JTAG voltage = 2.5Vdc
	OFF	**J25 JTAG voltage = 3.3Vdc**
3	ON	*J25 MPRESENT#, Signal low , Enable (XMC Site 2)*
	OFF	***J25 MPRESENT# , Signal High, Disable (XMC Site 2)***
4	**ON**	SER_MODE0 (see Serial Port Configuration below)
	OFF	SER_MODE0 (see Serial port configuration below)
5	**ON**	SER_MODE1 (see Serial Port Configuration below)
	OFF	SER_MODE1 (see Serial Port Configuration below)
6	**ON**	**mPCIe/mSATA site 1 = mPCIe enabled**
	OFF	mPCIe/mSATA site 1 = mSATA enabled
7	**ON**	**mPCIe/mSATA site 2 = mPCIe enabled**
	OFF	mPCIe/mSATA site 2 = mSATA enabled
8	ON	PCI_SEL_100 = 25, 50, 100MHz
	OFF	**PCI_SEL_100 = 33, 66, 133MHz**

Serial Port Configuration	***SER_Mode0***	***SER_Mode1***
Dual RS-232	*0*	*0*
COM0: RS-232 / COM1:RS-485	*0*	*1*
Dual RS-485	*1*	*0*
Low Power Shutdown	*1*	*1*

See the ACEX-4610/4620 Carrier user's manual for more information.

SW2 – (located on the Front panel PCB)

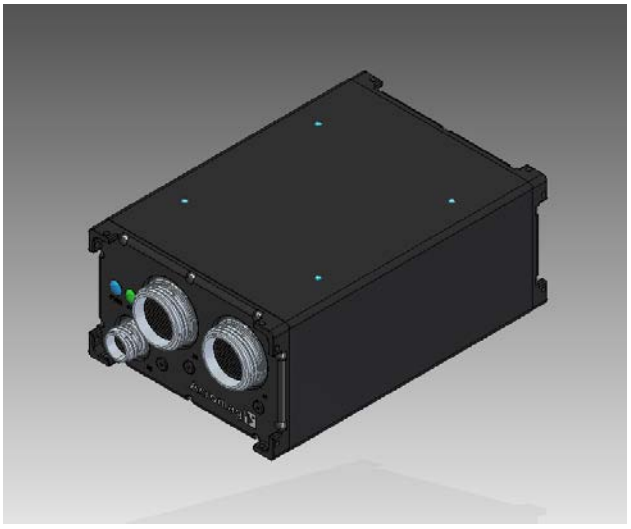
SW2 Reserved for future use.

SW2 - Bold indicates default factory settings		
SW2 - 1	ON	Reserved
	OFF	Normal operation
SW2 - 2	ON	Reserved
	OFF	Normal operation
SW2 - 3	ON	Reserved
	OFF	Normal operation
SW2 - 4	ON	Reserved
	OFF	Normal operation

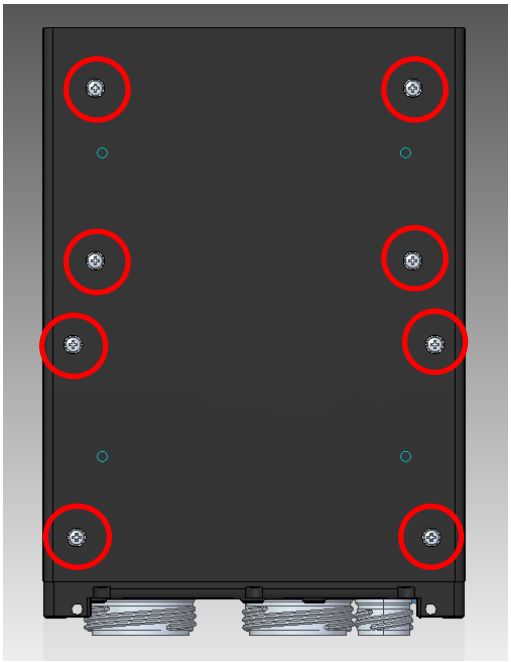
6.0 Installing Expansion Modules, Memory and Battery.

The ARCX 4000 series provides expansion sites for PMC or XMC expansion modules as well as m-SATA or mini PCIe expansion modules. This section describes how to install these modules. Although system memory and battery are low maintenance items this section will also show you how to access these items.

6.1 ARCX-4110, disassembly



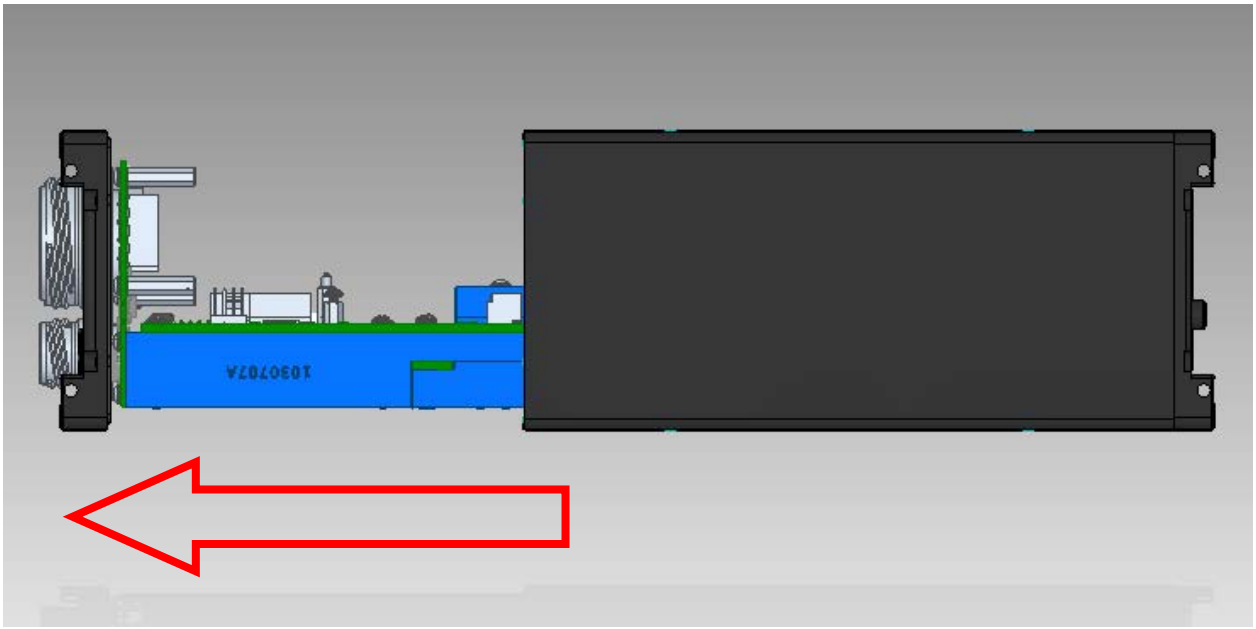
1. Remove 8 screws (M2.5 x 6mm) from the bottom of the unit.



2. Remove the 10 screws (M2.5 x 6mm) that secure the front panel.



3. Carefully pull/slide the assembly out of the enclosure as shown.

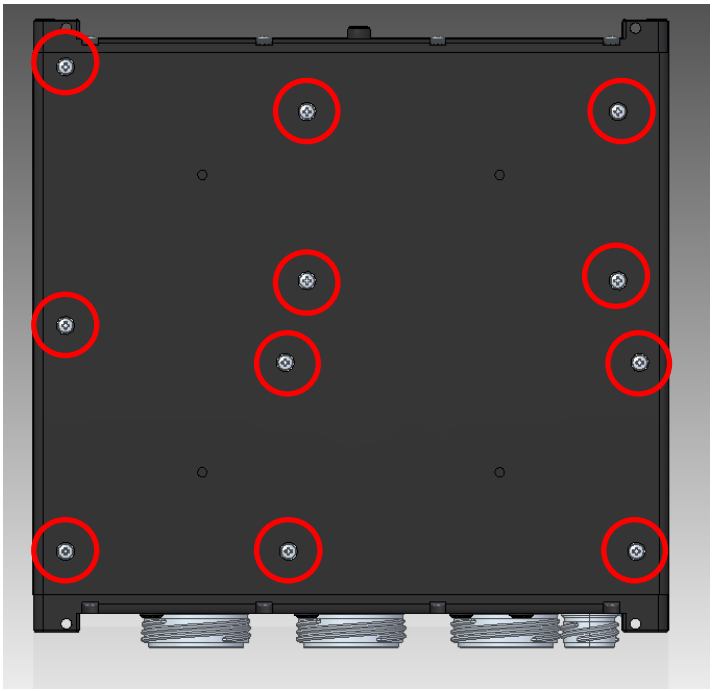


ARCX-4110 Disassembly is complete.

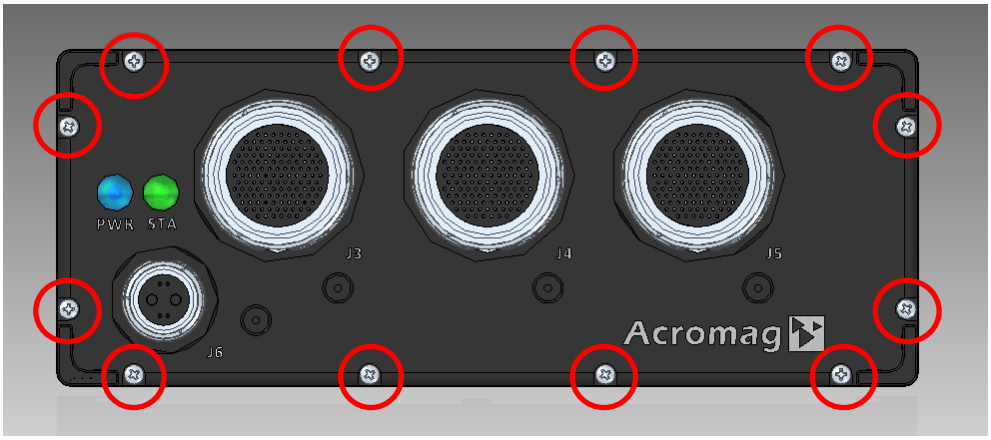
6.2 ARCX-4120, disassembly



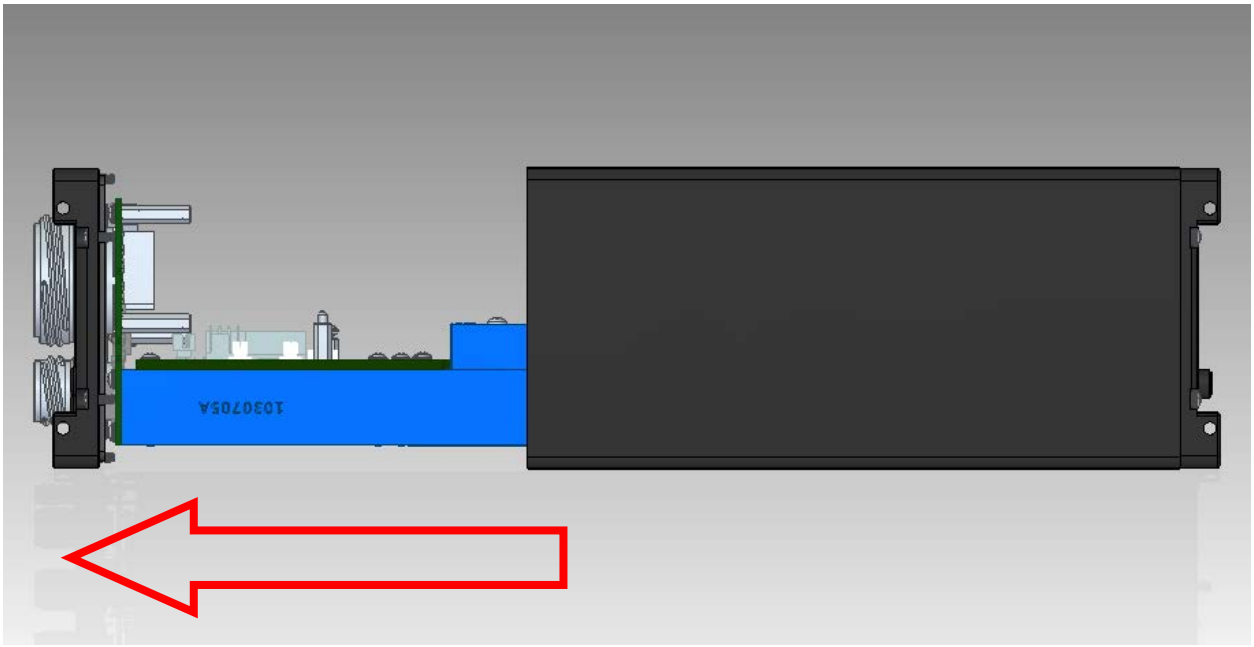
1. Remove 11 screws (M2.5 x 6mm) from the bottom of the unit.



2. Remove the 12 screws (M2.5 x 6mm) that secure the front panel.



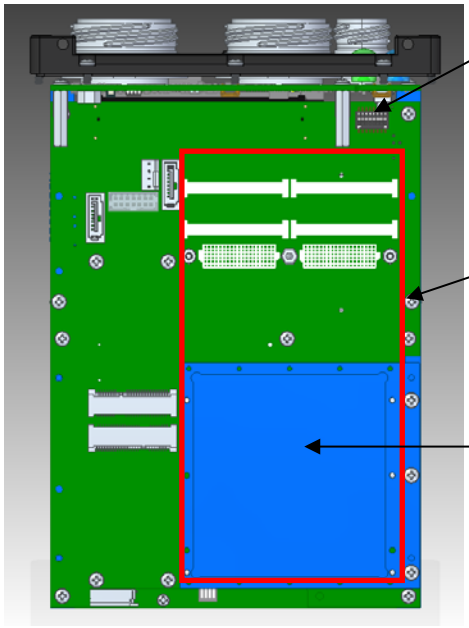
3. Carefully pull/slide the assembly out of the enclosure as shown.



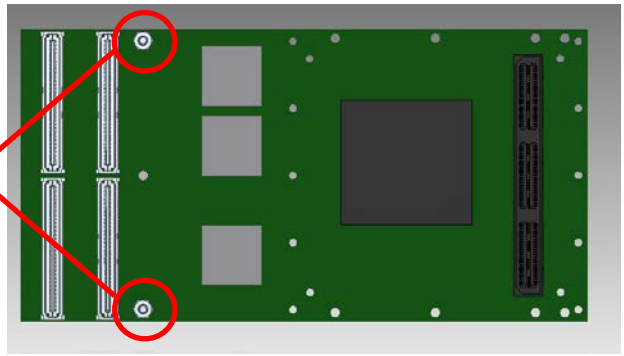
ARCX-4120 Disassembly is complete.

6.3 ARCX-4110, installing a PMC or XMC module

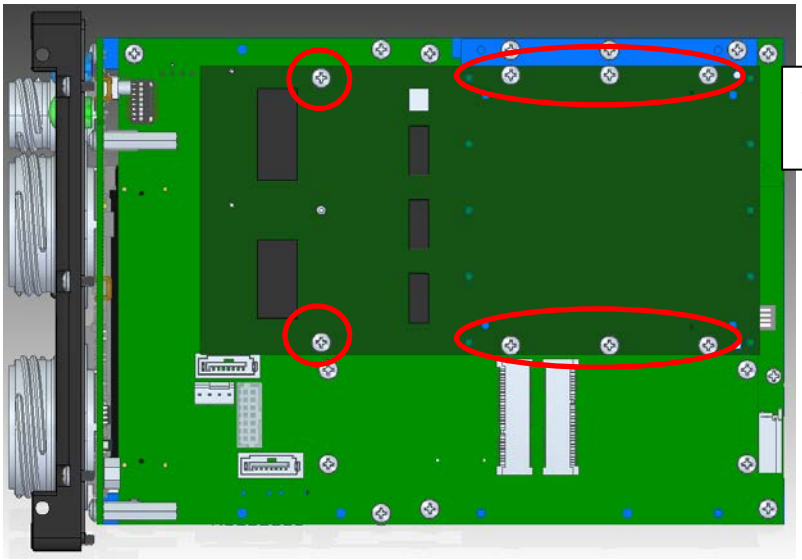
See the disassembly instructions in section 6.1 then proceed to step one.



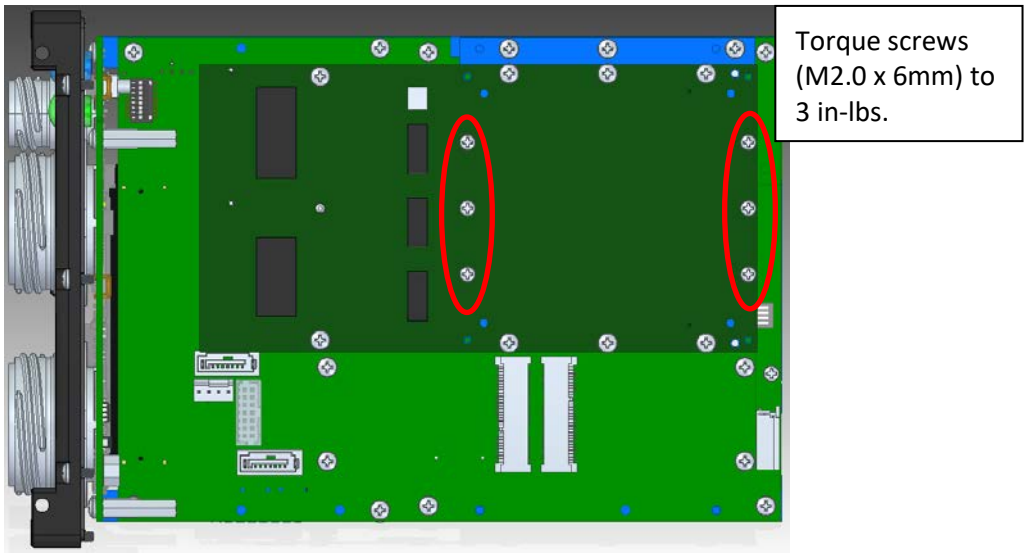
NOTE: Remove these screws and standoffs from your XMC or PMC module if they exist.



1. Plug your module in into the expansion site and secure the module to the conduction ring with a quantity of 8 (M2.5 x 6mm) screws.



2. Install a quantity of 6 (M2.0 x 6mm) screws.

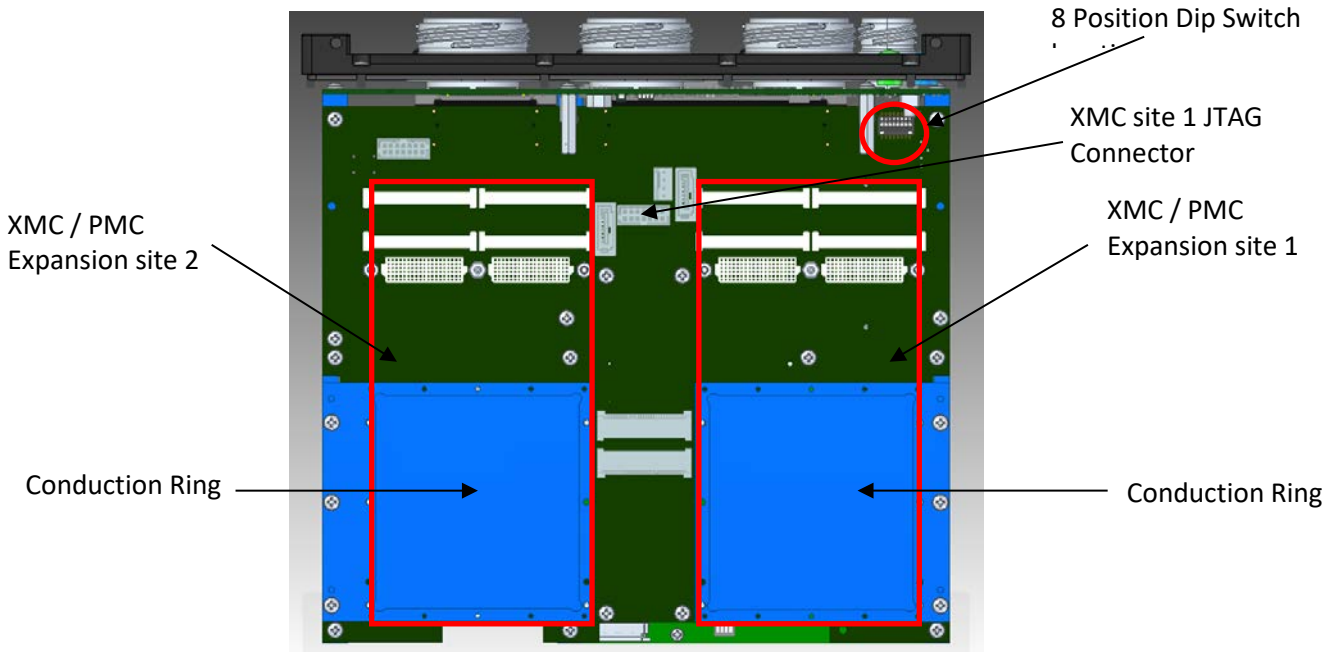


Installation of XMC or PMC module is complete.

Proceed *to section 6.8 (ARCX-4110) to reassemble ARCX box.*

6.4 ARCX-4120, installing a PMC or XMC module

See the disassembly instructions in section 6.2 then proceed to step one.



XMC or PMC configuration:

- A single XMC or PMC module can be used in site 1 or site 2.
- Two XMC modules can be installed in site 1 and site 2 at the same time.
- Two PMC modules can be installed in site 1 and site 2 at the same time.

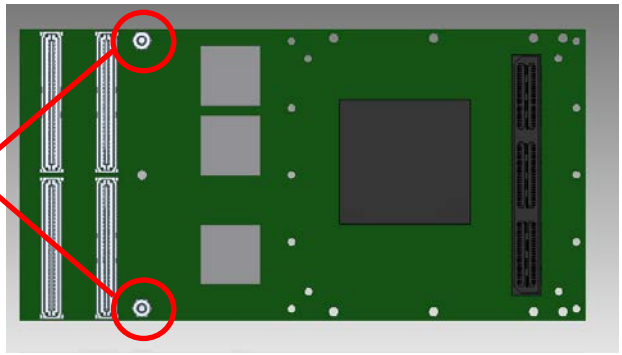
Note:

If an XMC and a PMC module are used together, you must install the XMC card in site 1 and the PMC card in site 2.

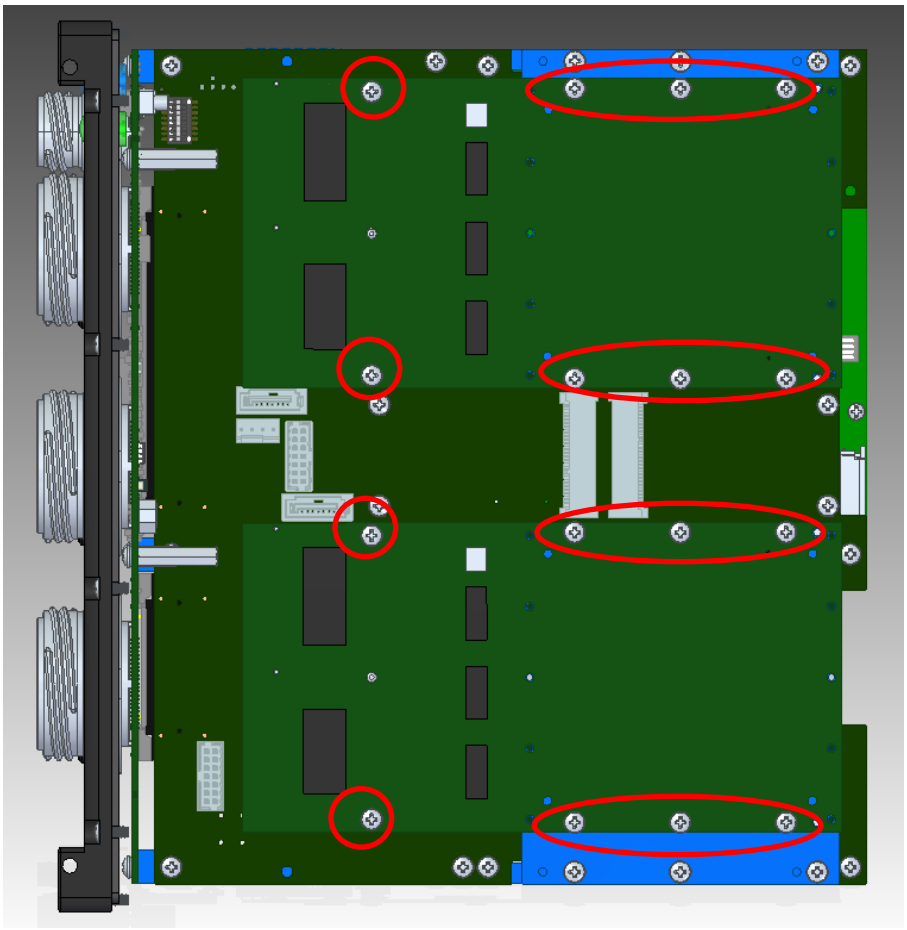
See section **5.0 "Switch Configuration"** for information about J-tag voltage setting and the use of MPRESENT# signal.

Generally the XMC module will drive the MPRESENT# signal low indicating an XMC module is present. If the module you are using does not support this feature then you will need to set SW3 to the "**on**" position to allow the system to detect your XMC module. When a PMC module is installed in site 2 SW3 must set to the "**off**" (default) position.

NOTE: Remove these screws and standoffs from your XMC or PMC module if they exist.

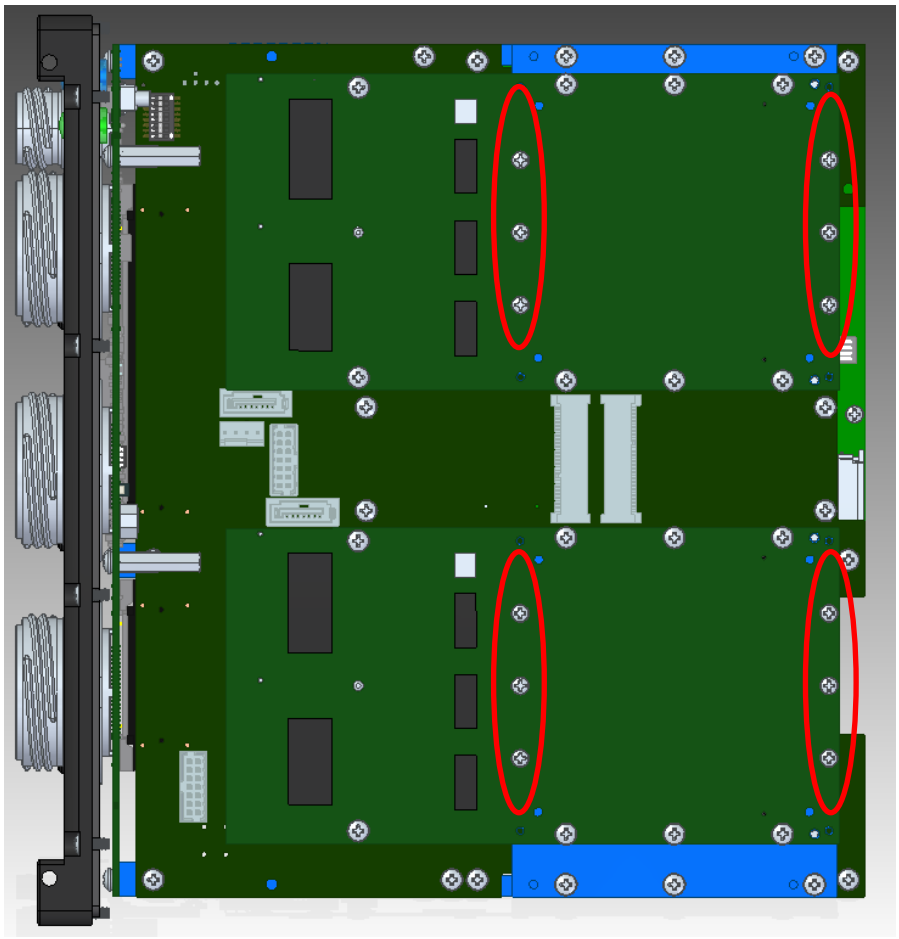


1. Plug your module in into the expansion site and secure the module in each site to the conduction ring with a quantity of 8 (M2.5 x 6mm) screws per site.



Torque screws (M2.5x 6mm) to 5 in-lbs.

2. Install a quantity of 6 (M2.0 x 6mm) screws per site.



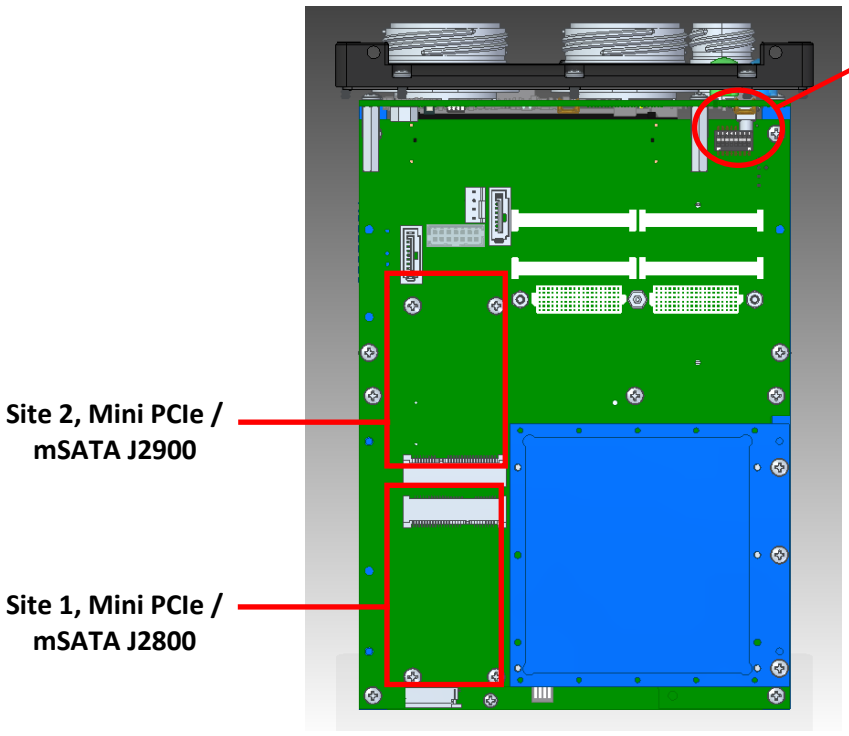
Torque screws (M2.0 x 6mm) to 3 in-lbs.

Installation of XMC or PMC module is complete.

Proceed *to section 6.9 (ARCX-4120) to reassemble ARCX box.*

6.5 ARCX-4110 OR ARCX-4120, installing a Mini PCIe or mSATA module

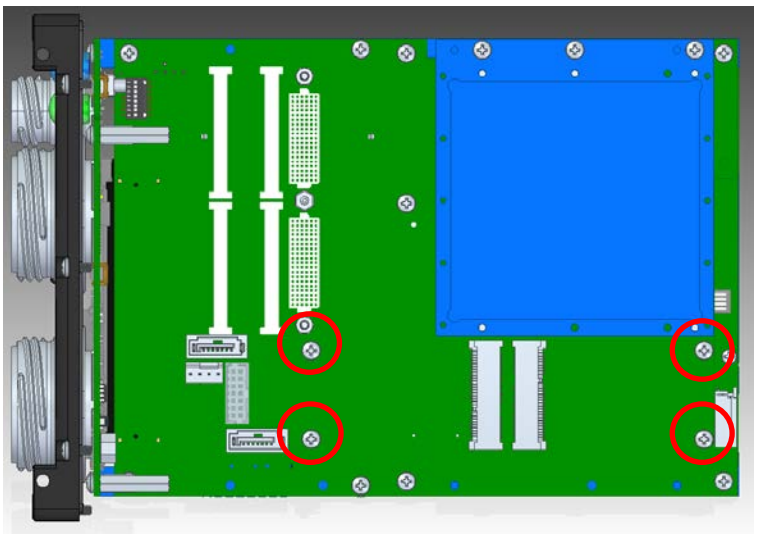
See the disassembly instructions in section 6.1(ARCX-4110) or 6.2 (ARCX-4120) then proceed to step one.



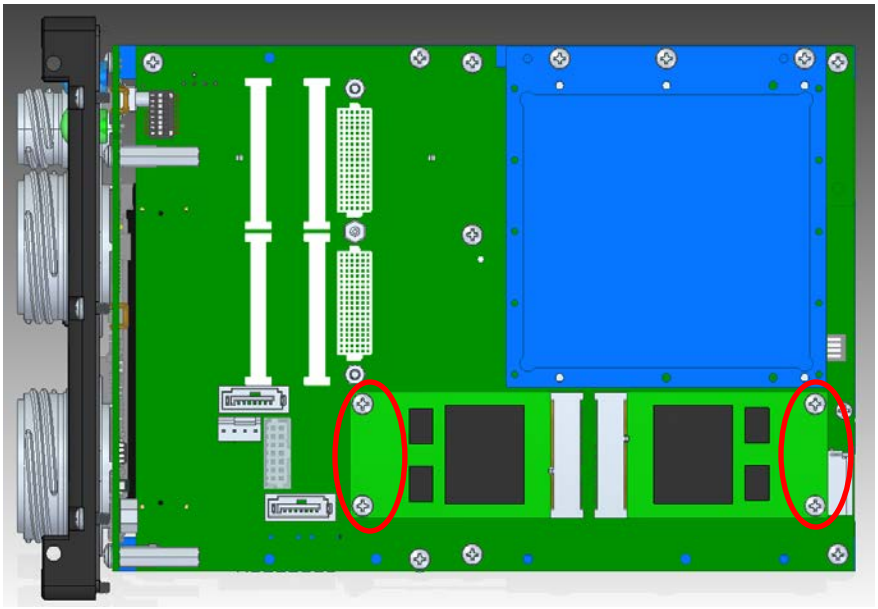
Note:

See section **5.0 "8 Position Dip Switch Configuration"** set switch 6 and/or 7 to the correct setting for your module type.

1. Remove the 2 (M2.5 x 4mm) screws from each expansion site standoff.



2. Install your Mini PCIe or mSATA module and secure with the provided screws (M2.5 x 4mm).



Torque to 5 in-lbs.

Installation for Mini PCIe or mSATA module is complete.

Proceed *to section 6.8 (ARCX-4110) or 6.9 (ARCX-4120) to reassemble ARCX box.*

6.6 ARCX-*4110* or ARCX-4120, memory access

There are two SODIMM sockets located on the XCOM-6400 CPU module. This section describes how to access the memory modules. The ARCX 4000 series supports a maximum of 16GB (2 x 8GB SODIMM) of system memory.

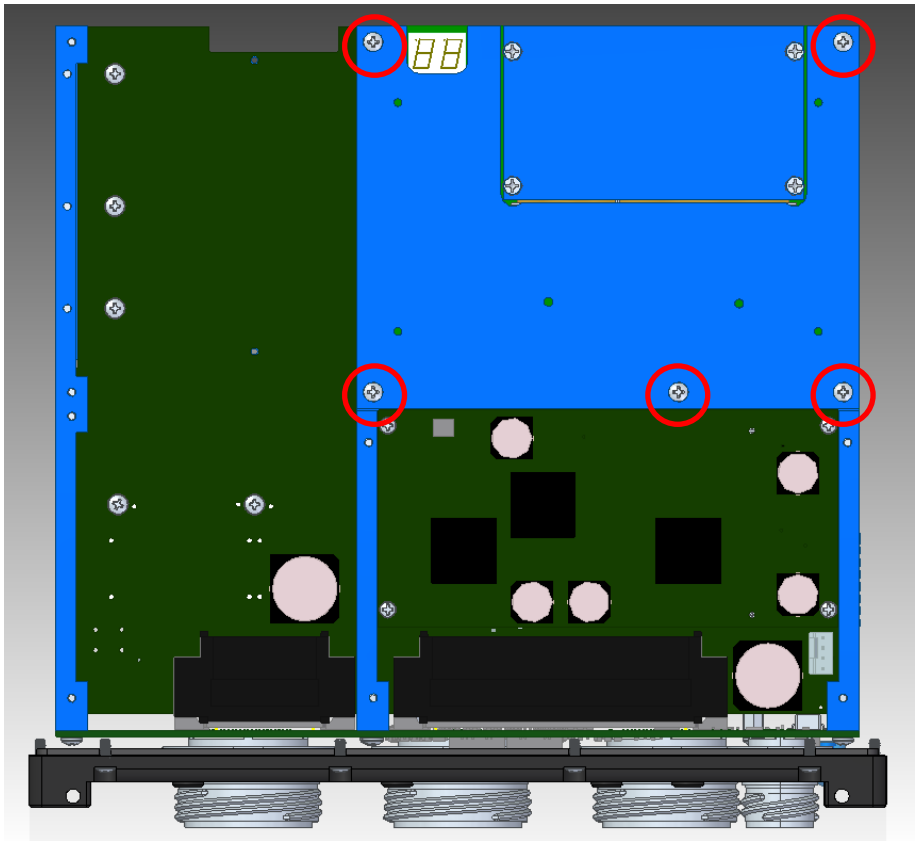
Single or Dual Ranked x8 un-buffered ECC 204-pin SODIMMs using 1Gb, 2Gb, or 4Gb DRAM technologies.

Single/Dual Rank	DIMM Capacity	DRAM Organization	# DRAM Devices	# Row/Col Address Bits	# of Banks Inside DRAM	Page Size
Single	1GB	128M x8	9	14/10	8	8K
Single	2GB	256M x8	9	15/10	8	8K
Single	4GB	512M x8	9	16/10	8	8K
Dual	2GB	128M x8	18	14/10	8	8K
Dual	4GB	256M x8	18	15/10	8	8K
Dual	8GB	512M x8	18	16/10	8	8K

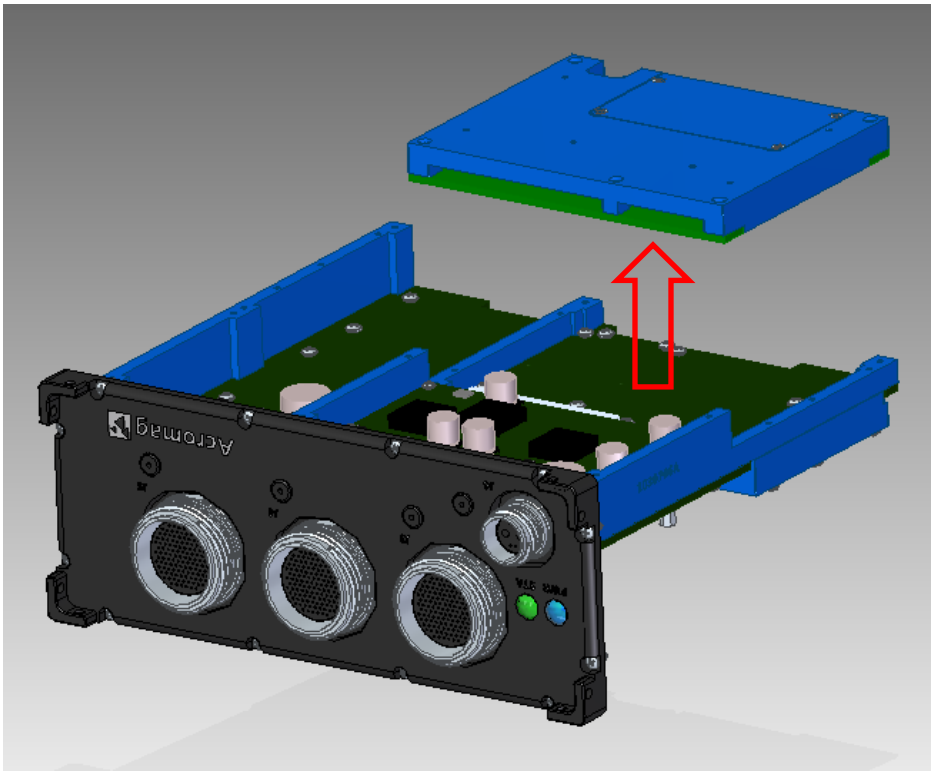
SODIMM Memory Module Removal

See the disassembly instructions in section 6.1(ARCX-4110) or 6.2 (ARCX-4120) then proceed to step one.

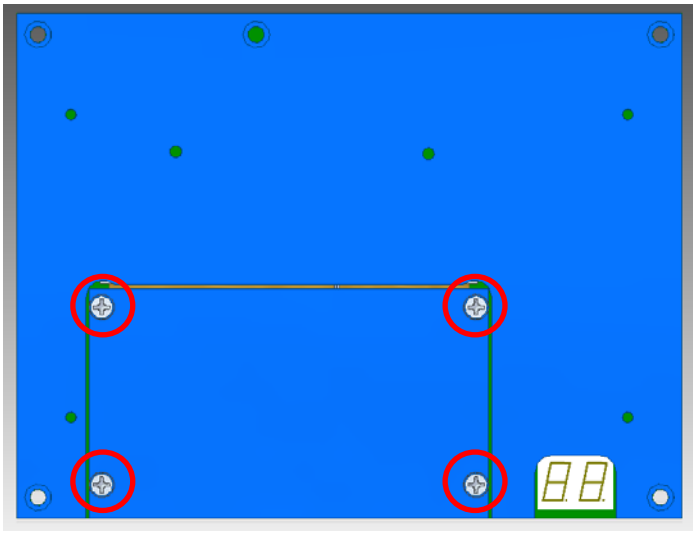
1. Remove the XCOM-6400 CPU Module from the Carrier by removing the 5 (M2.5 x 6mm) screws.



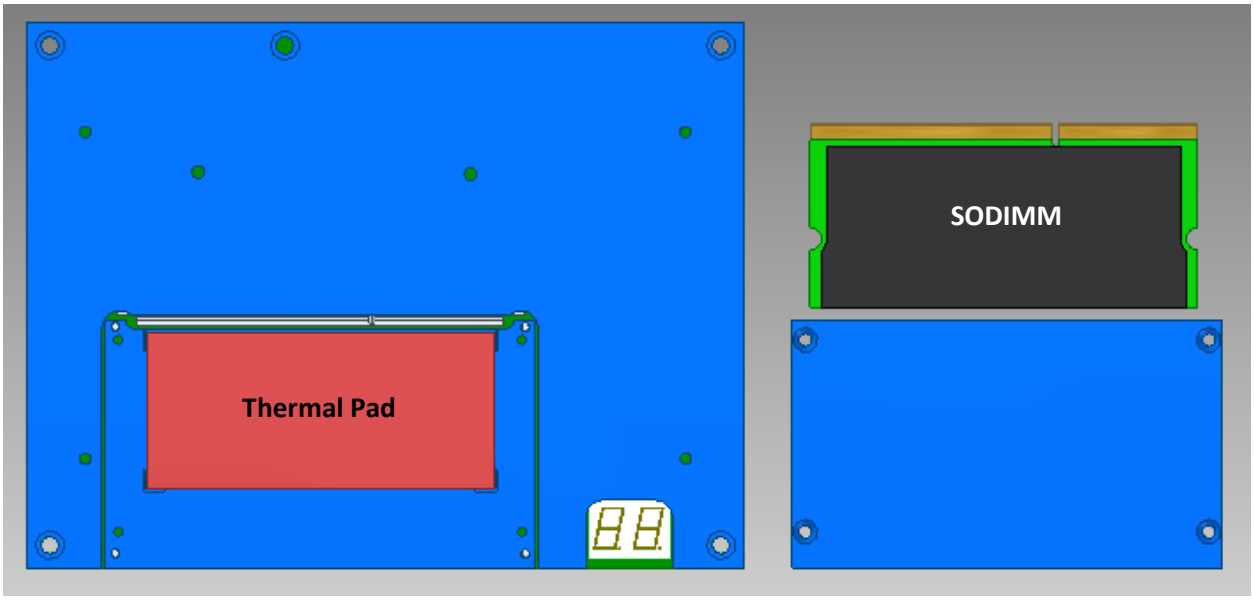
2. Carefully lift the XCOM-6400 CPU module up and away from the carrier (ACEX-46xx) board.



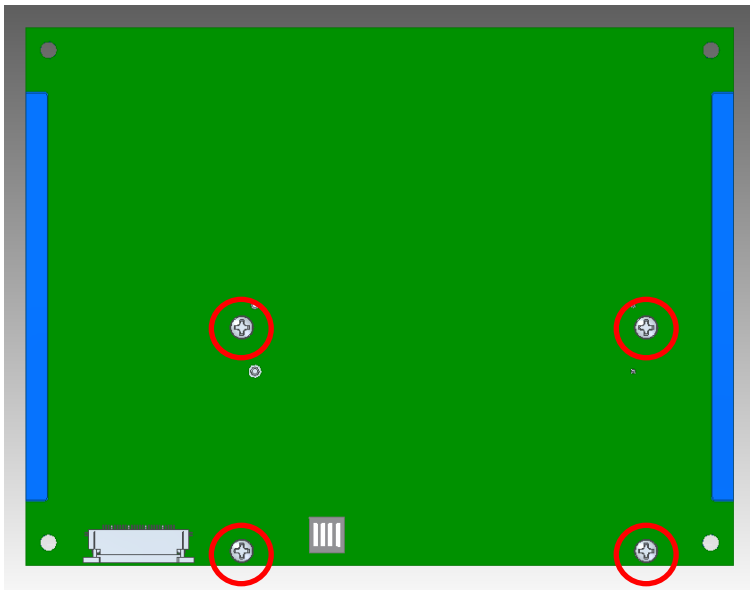
3. Remove the 4 (M2.0 x 8mm) Flat Head screws that secure the top of the memory hold down mechanism (Secure Conduction Memory Latch Technology).



4. Remove the top of the hold down mechanism (top SODIMM site) and the memory module.

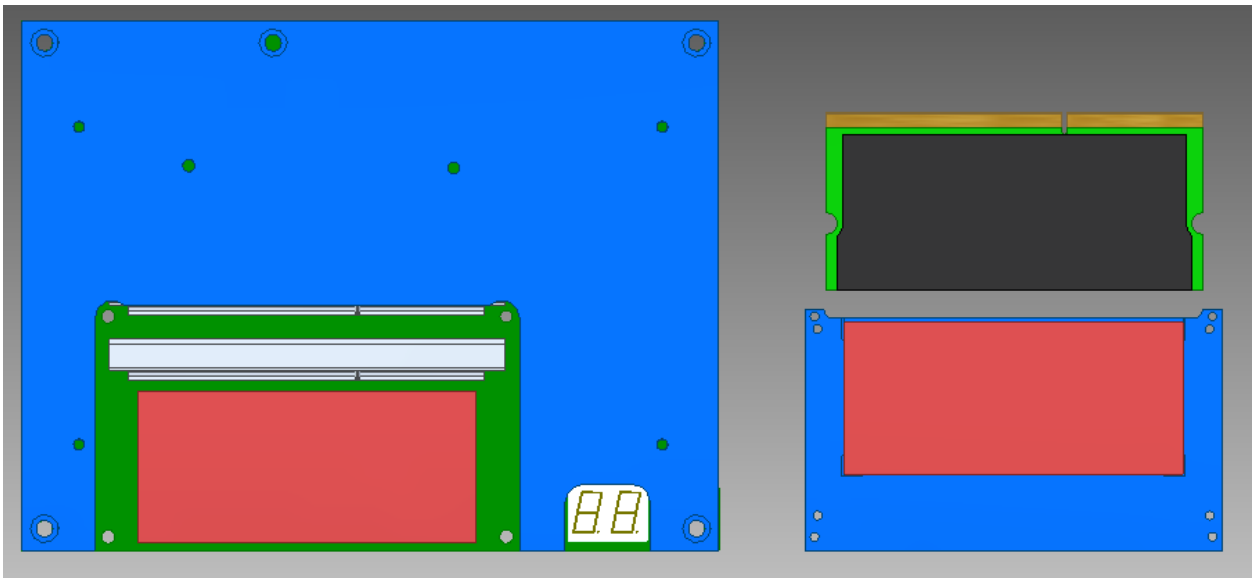


5. Remove the 4 (M2.0 x 6mm) Pan Head screws on the bottom side of the XCOM-6400 CPU module.



Bottom side of the XCOM-6400 CPU module

6. Remove the bottom of the hold down mechanism (bottom SODIMM Site) and the memory module.



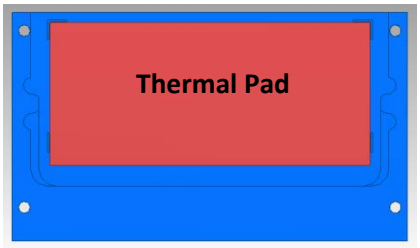
SODIMM Memory Module Removal is complete.



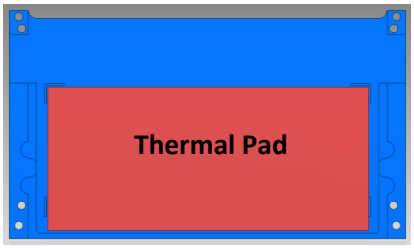
Upper (top view)



Lower (top view)



Upper (bottom view)

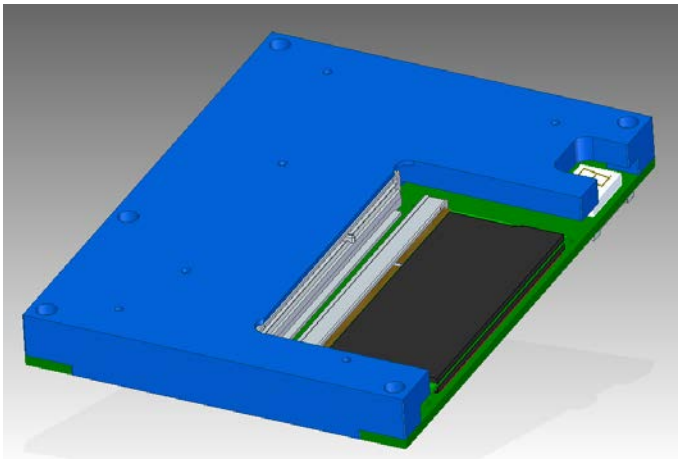


Lower (bottom view)

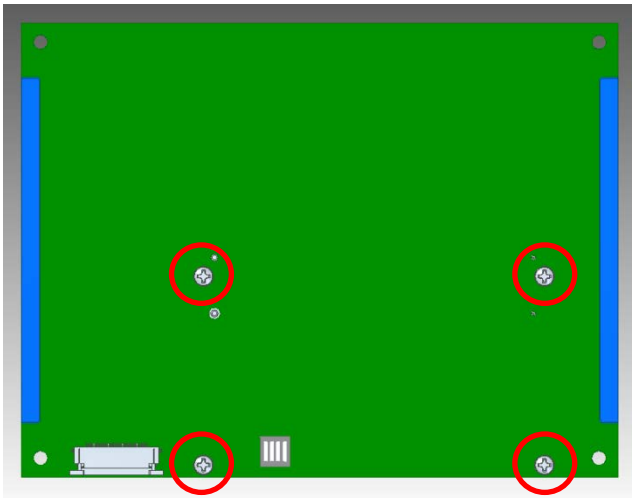
"Secure conduction memory latch technology" hold down mechanism

Installing SODIMM memory and reassembling the "Secure Conduction Memory Latch Technology" hold down mechanism.

1. Install SODIMM into the lower memory socket.



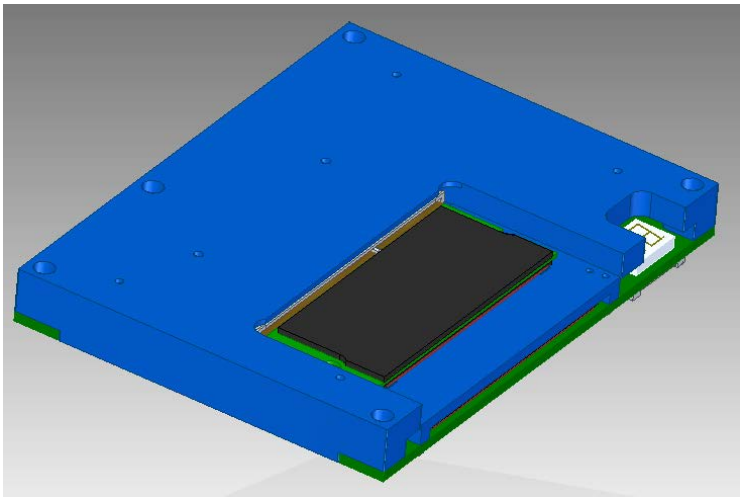
2. Align the notch on the bottom of the lower hold down mechanism with the notch opening on the memory module, hold in place while turning the XCOM-6400 CPU module over and install the 4 (M2.0 x 6mm) Pan Head screws.



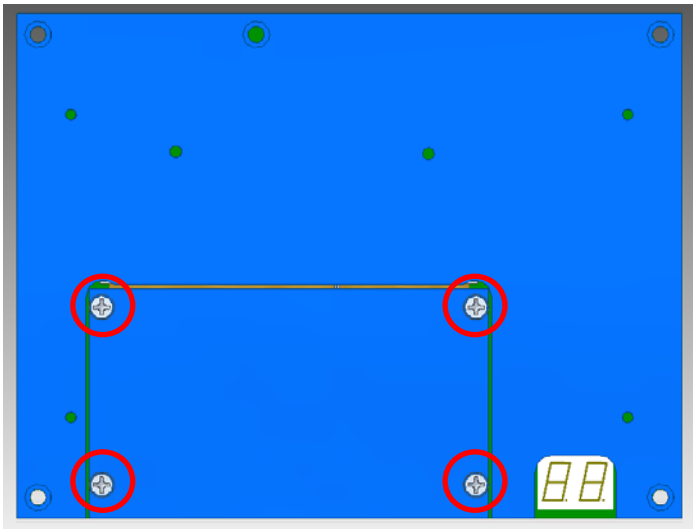
Bottom side of the XCOM-6400 CPU module

Torque screws (M2.0 x 6mm) to 3 in-lbs.

3. Install SODIMM into the Upper memory socket.

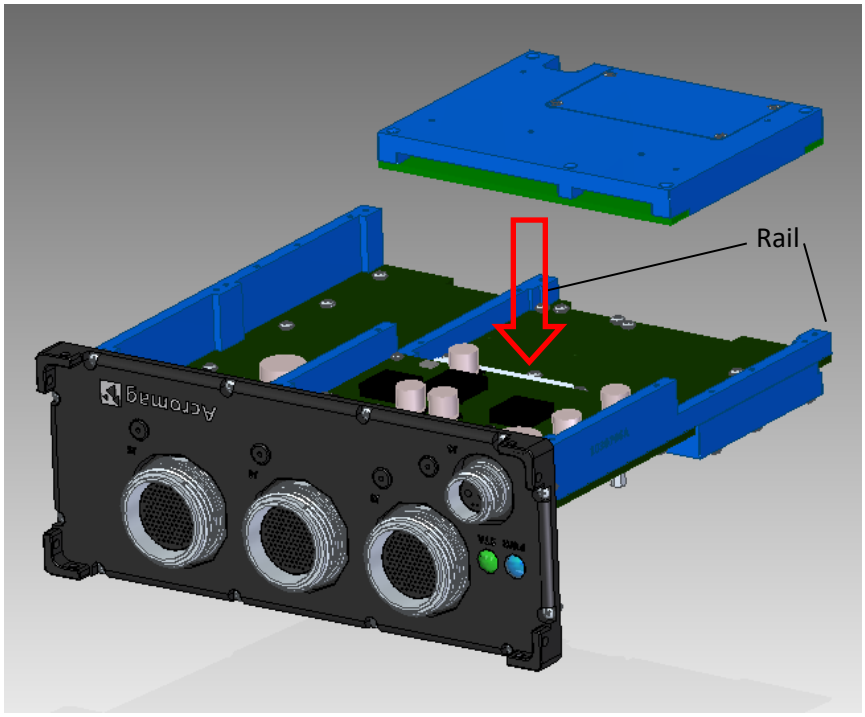


4. Align the notch on the bottom of the upper hold down mechanism with the notch opening on the memory module, hold in place and install the 4 (M2.0 x 8mm) Flat Head screws

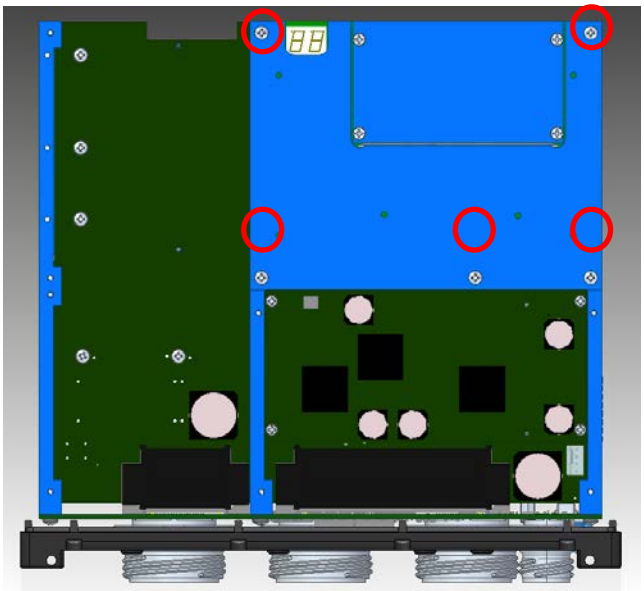


Torque screws (M2.0 x 6mm) to 3 in-lbs.

5. Carefully attach the XCOM-6400 CPU module to the carrier by aligning the XCOM CPU to the Rails on the ACEX carrier and press into place. (This mates the CPU to the carrier via the COM express connector)



6. Install 5 (M2.5 x 8mm) screws to secure the XCOM-6400 CPU module to the Carrier board (ACEX-46xx).



Torque to 5 in-lbs.

SODIMM reassembly is complete.

Proceed *to section 6.8 (ARCX-4110) or 6.9 (ARCX-4120) to reassemble ARCX box.*

6.7 ARCX-4110 or ARCX-4120, battery access

See the disassembly instructions in section 6.1(ARCX-4110) or 6.2 (ARCX-4120) then proceed to step one.

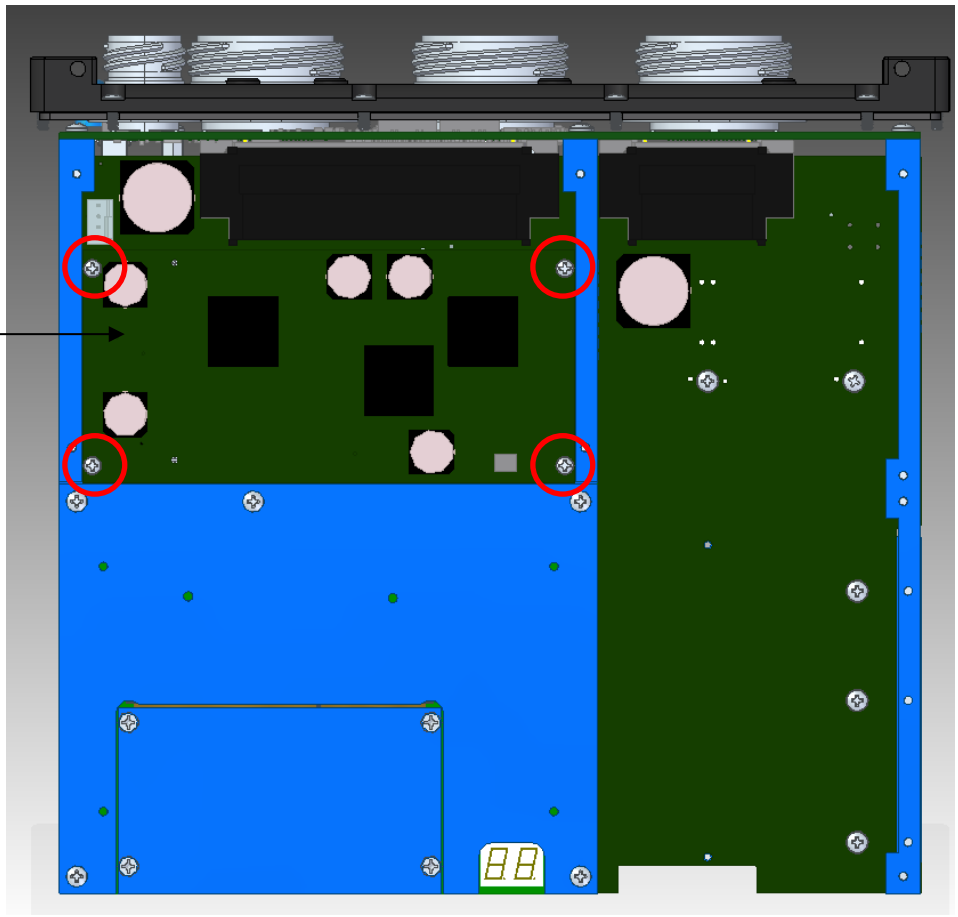
Replacing the battery:

The battery is located on the bottom side of the carrier board (ACEX-46xx) under the ACEX-PWR-xx board.

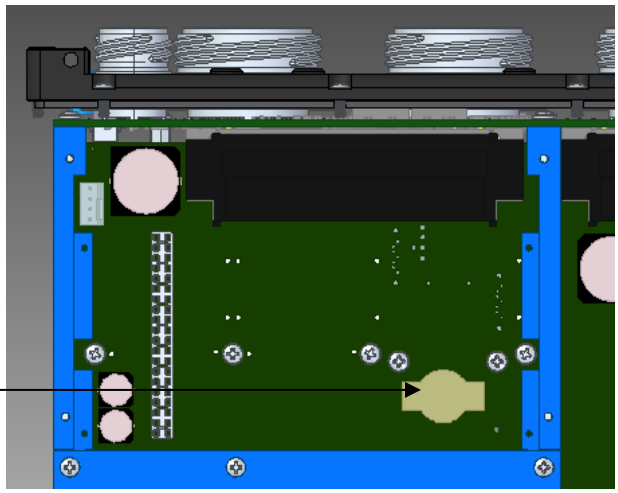
Battery: CR1225

3V Lithium Battery

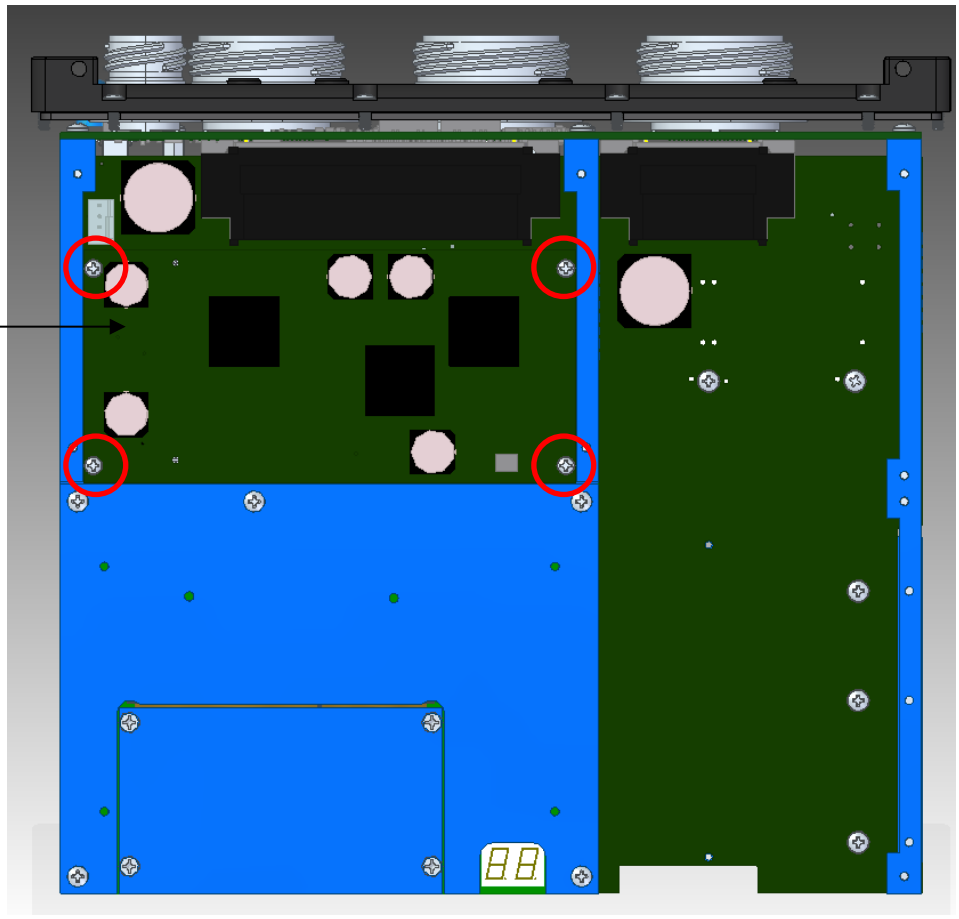
1. Remove the 4 (2M x 6mm) screws from the power board.



2. Remove the power board by lifting straight up.



3. Reinstall the power board and secure with 4 (M2.0 x 6mm) screws.

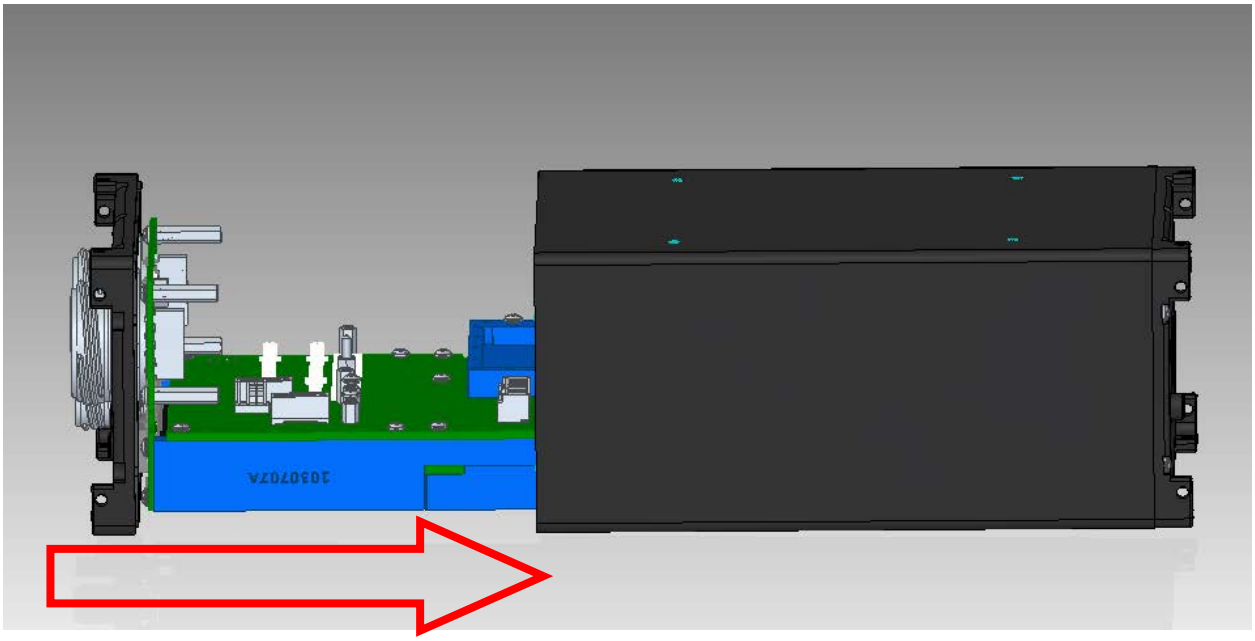


Battery replacement complete

Proceed *to section 6.8 (ARCX-4110) or 6.9 (ARCX-4120) to reassemble ARCX box.*

6.8 ARCX-4110, assembly

1. Carefully slide the ARCX-4110 assembly back into the enclosure



2. Install the 10 screws (M2.5 x 6mm) that secure the front panel only hand tight.



3. Install the 8 screws (M2.5 x 6mm) on the bottom of the unit only hand tight.

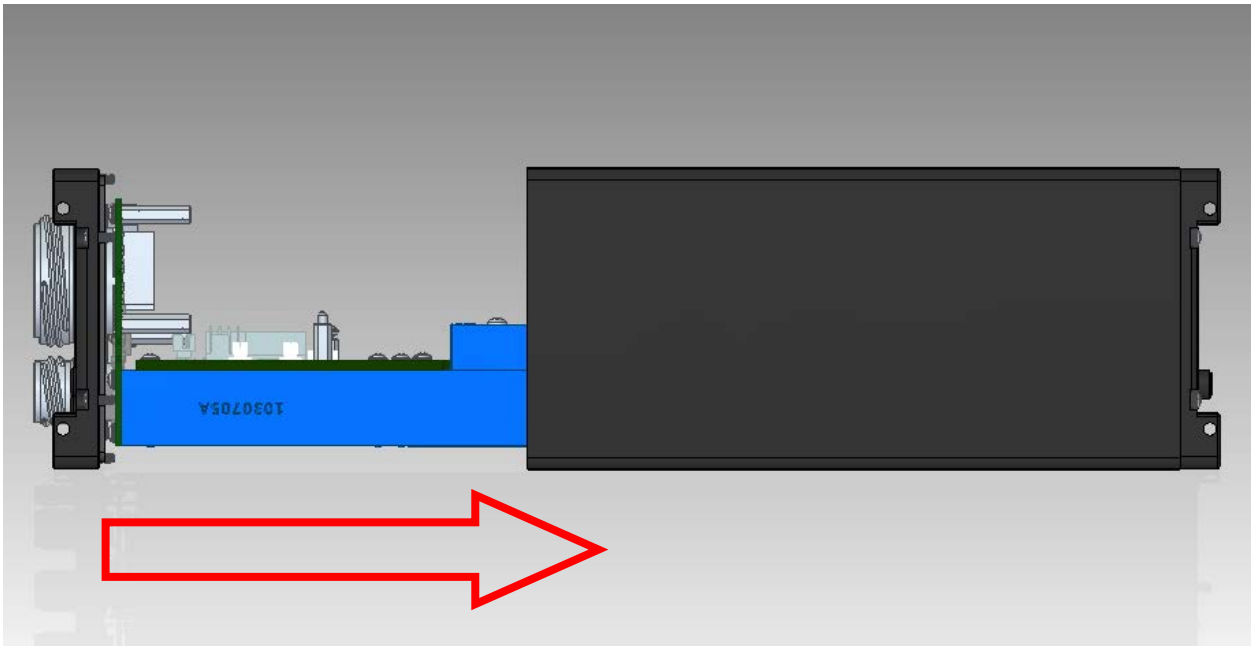


4. Torque the 10 screws that secure the front panel to 5in-lbs.
5. Torque the 8 screws on the bottom of the unit to 6in-lbs.

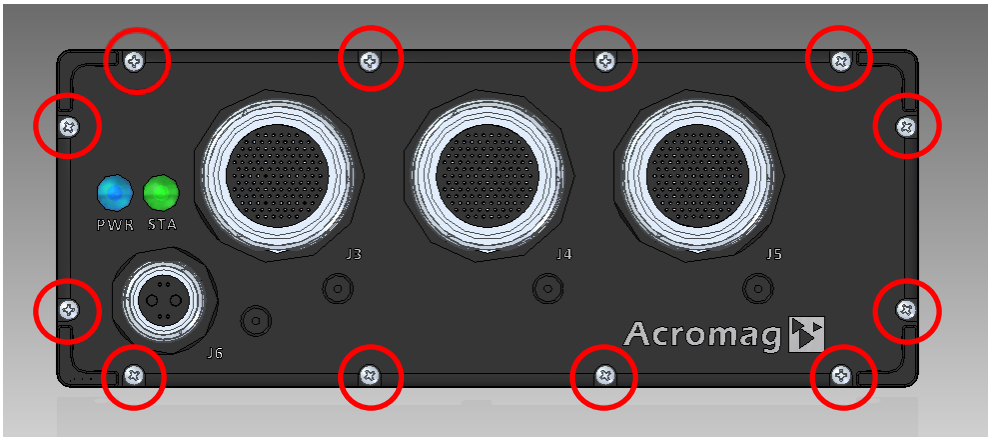
Reassembly of the ARCX-4110 is complete.

6.9 ARCX-4120, assembly

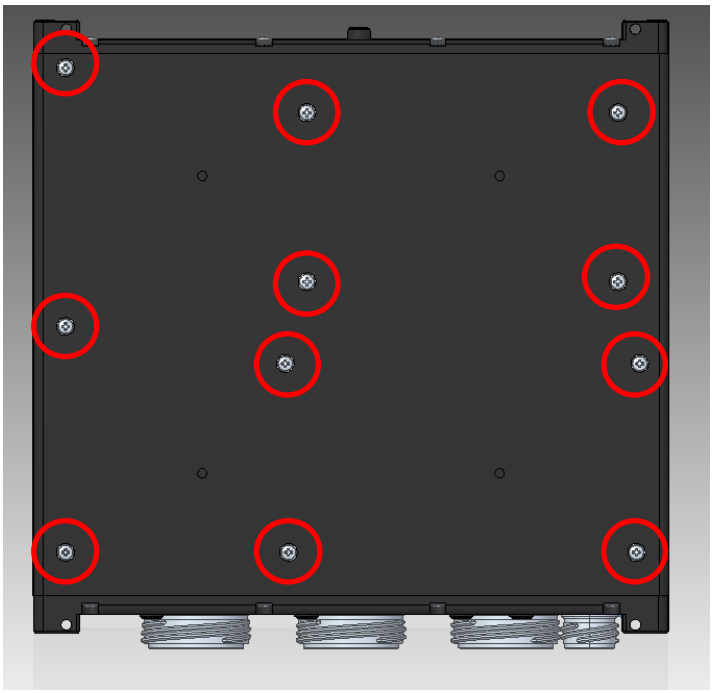
1. Carefully slide the ARCX-4120 assemblies back into the enclosure.



2. Install the 12 screws (M2.5 x 6mm) that secure the front panel only hand tight.



3. Install the 11 screws (M2.5 x 6mm) on the bottom of the unit only hand tight.



4. Torque the 12 screws that secure the front panel to 5in-lbs.
5. Torque the 11 screws on the bottom of the unit to 6in-lbs.

Reassembly of the ARCX-4120 is complete.

7.0 SERVICE AND REPAIR

7.1 Service and Repair Assistance

Acromag has automated diagnostic and test equipment that thoroughly checks the performance of suspect boards. Furthermore, when any repair is made, the board is first tested, then placed in a burn-in room at an elevated temperature, and finally retested before return shipment to the customer.

Please refer to Acromag's Service Policy Bulletin or contact Acromag for complete details on how to obtain parts or return parts for repair.

7.2 Preliminary Service Procedure

CAUTION: POWER MUST BE TURNED OFF BEFORE SERVICING BOARDS

Before beginning repair, be sure that all of the procedures in the "Preparation for Use" section have been followed. Also, refer to the documentation of your carrier board to verify that it is correctly configured. Replacement of the board with one that is known to work correctly is a good technique for isolating a faulty part.

7.3 Where to Get Help

If you continue to have problems, your next step should be to visit the Acromag worldwide web site at www.acromag.com. Our web site contains the most up-to-date product and software information.

Go to the "Support" tab to access:

- Application Notes
- Frequently Asked Questions (FAQ's)
- Product Knowledge Base
- Tutorials
- Software Updates/Drivers

Acromag's application engineers can also be contacted directly for technical assistance via email, telephone, or FAX through the contact information listed below. Note that an email question can also be submitted from within the Knowledge Base or directly from the "Contact Us" tab. When needed, complete repair services are also available.

- Email: solutions@acromag.com
- Phone: 248-624-1541
- Fax: 248-624-9234

8.0 SPECIFICATIONS

8.1 Physical

ARCX-4120-XX:

Height:	3.29 in (83.57 mm)
Width:	8.41 in (213.49 mm)
Depth:	8.34 in (211.71 mm)

ARCX-4121-XX:

Height:	5.19 in (131.70 mm)
Width:	8.41 in (213.49 mm)
Depth:	8.34 in (211.71 mm)

ARCX-4110-XX:

Height:	3.29 in (83.57 mm)
Width:	5.46 in (138.68 mm)
Depth:	8.34 in (211.71 mm)

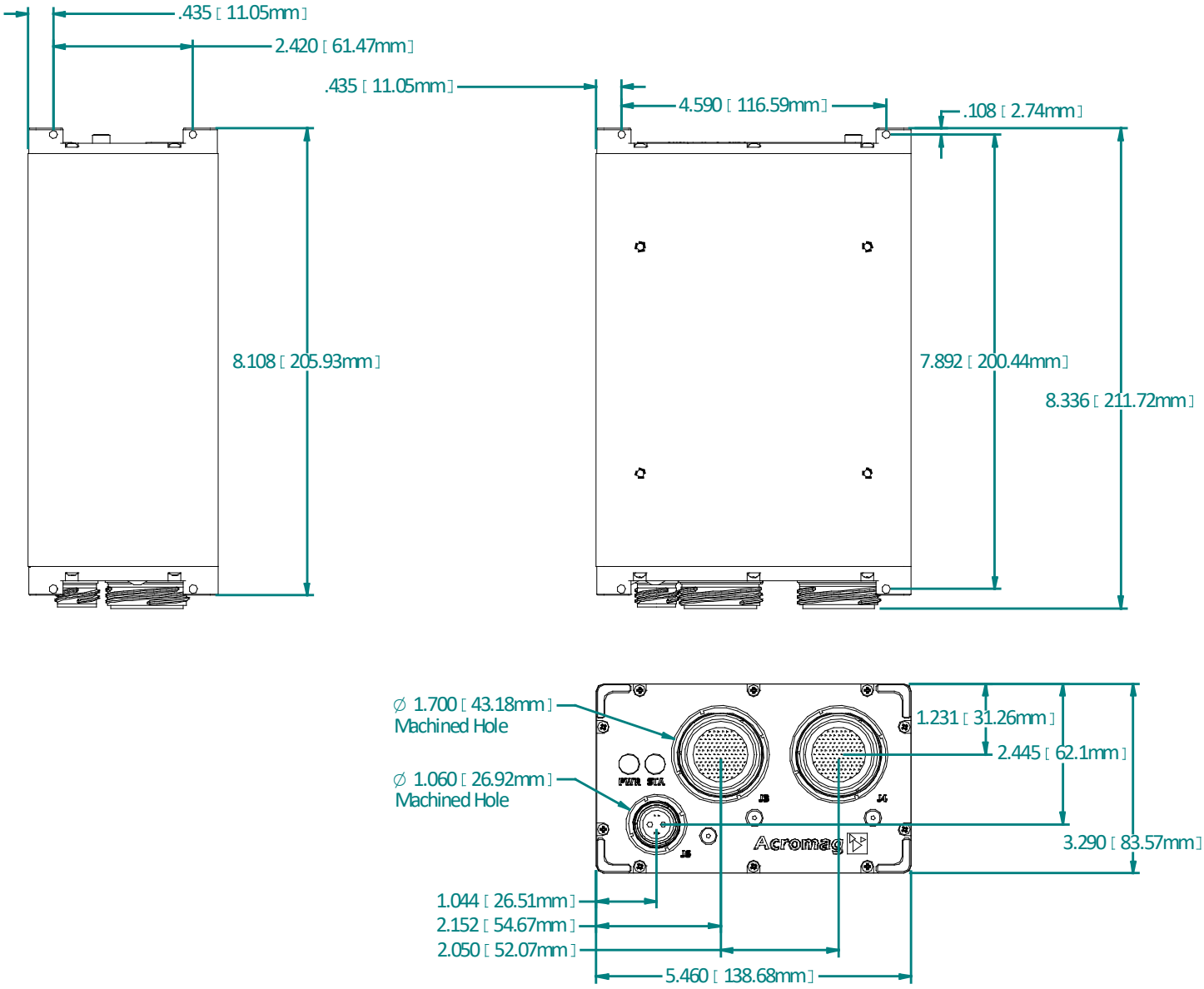
ARCX-4111-XX:

Height:	5.19 in (131.70 mm)
Width:	5.46 in (138.68 mm)
Depth:	8.34 in (211.71 mm)

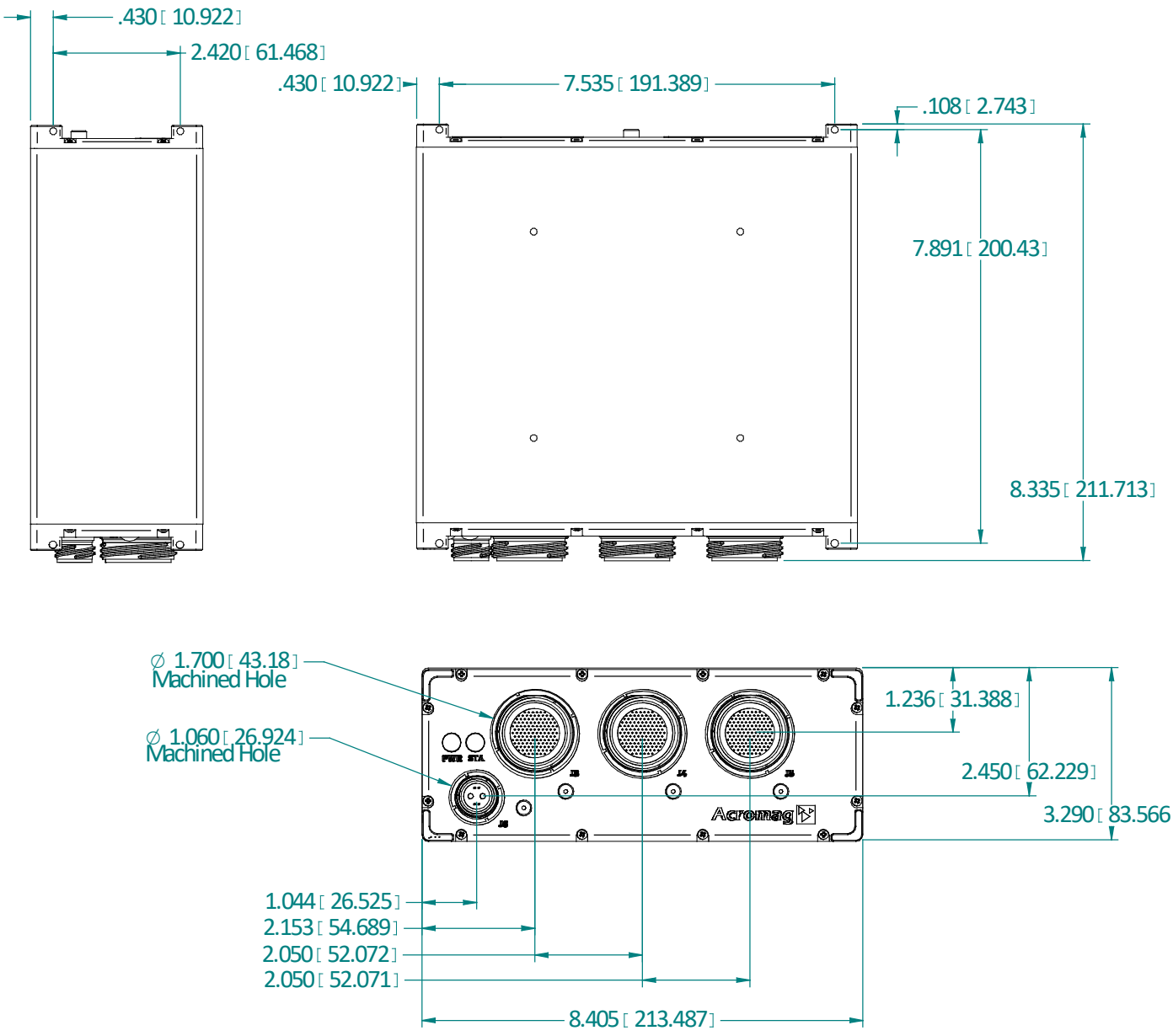
Unit Weight (does not include PMC/XMC modules or shipping material):

- ARCX-4120-XX 7.1 lbs. (3.58 kg)
- ARCX-4121-XX 10.4 lbs. (4.72 kg)
- ARCX-4110-XX 5.6 lbs. (2.54 kg)
- ARCX-4111-XX 8.1 lbs. (3.67 kg)

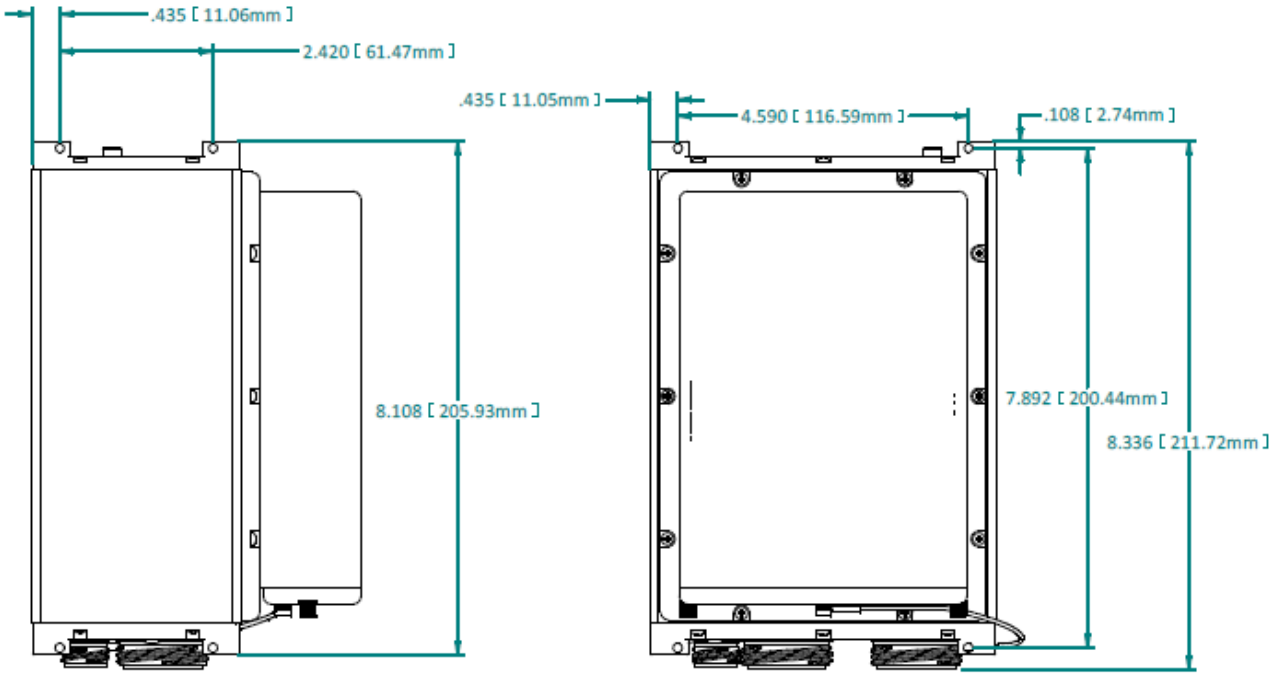
Mechanical Dimensions ARCX-4110-XX

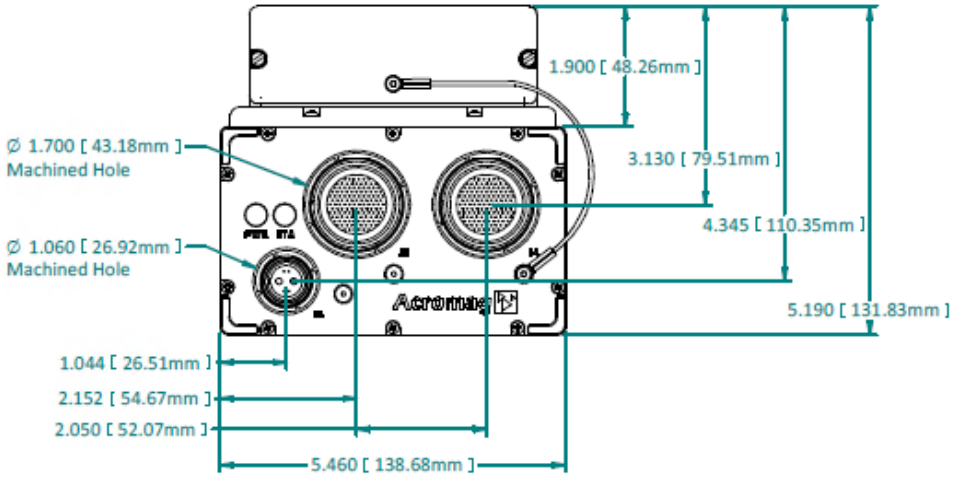


Mechanical Dimensions ARCX-4120-XX

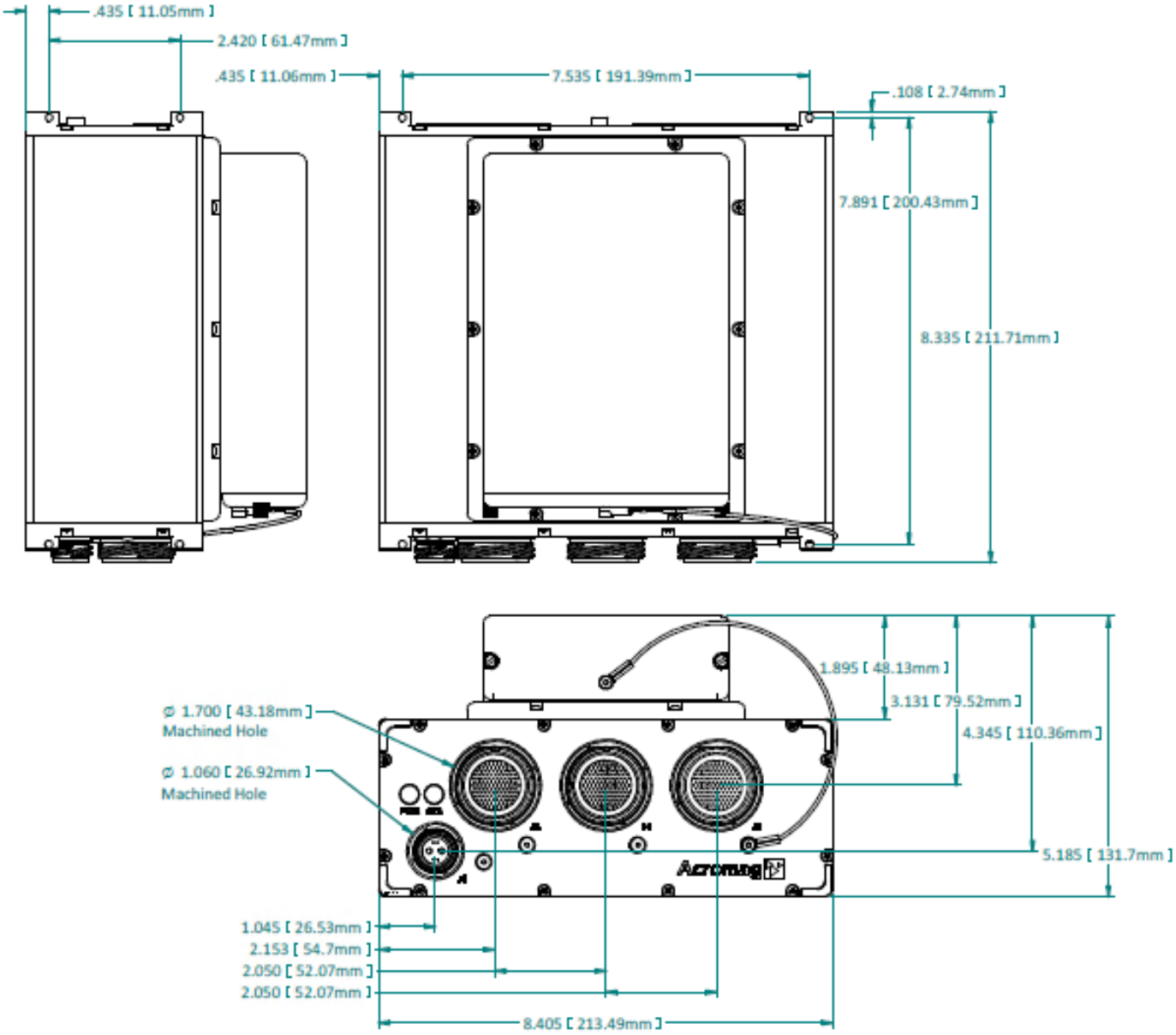


Mechanical Dimensions ARCX-4111-XX





Mechanical Dimensions ARCX-4121-XX



8.2 Environmental Considerations

Summarized below are the operating temperature range, airflow and other environmental requirements and applicable standards for the ARCX 4000 series. ATMD-02 (Air cooled heatsink) and ATMD-03 (Cold Plate 8" x 10") are available accessories. See page 82 for additional details.

8.2.1 Operating Temperature and Airflow Requirements

Below are graphs for the 4110 and 4120 series of products. The graphs indicate the maximum allowable ambient air temperature for air cooled applications and the maximum allowable cold plate temperature for cold plate applications.

HOW TO USE THE GRAPHS

In all cases, it is the area under the curve(s) that is the acceptable operating range for the intended end application.

Example: The end application will have a total of 95W in the ARCX-4110 enclosure with no additional cooling assistance other than 800lfm of air provided by the user via a fan or by some other air flow resource.

See power tables at the end of this document to help estimate power consumption. The total power would include CPU power plus all other PMC/XMC, etc. boards in the enclosure. The power consumption can vary widely depending on the end application. The user should measure the input power with his end application running to get a better estimate

Using the graph labeled "ARCX 4110 AIR COOLED" pick the 95W mark on the horizontal axis (WATTS), draw a line up to the AIR WITHOUT HSK line. From where it intersects that line, draw a line to the left to where it intersects the vertical axis MAX AIR TEMPERATURE. This will indicate that with 95W of power the maximum air temperature allowed is approximately 25C. The user must keep the air at or below 25C for a 95W air cooled application. This application will be limited to "room" temperatures and below. Additional cooling capability must be added if the operating temperature is to be above room temperature.

Disclaimer: These graphs are believed to be conservative. They are believed to indicate typical to worse case customer applications. It is the end user's responsibility to verify the end application power consumption in the ARCX enclosure. Acromag does not take any responsibility for the user applications.

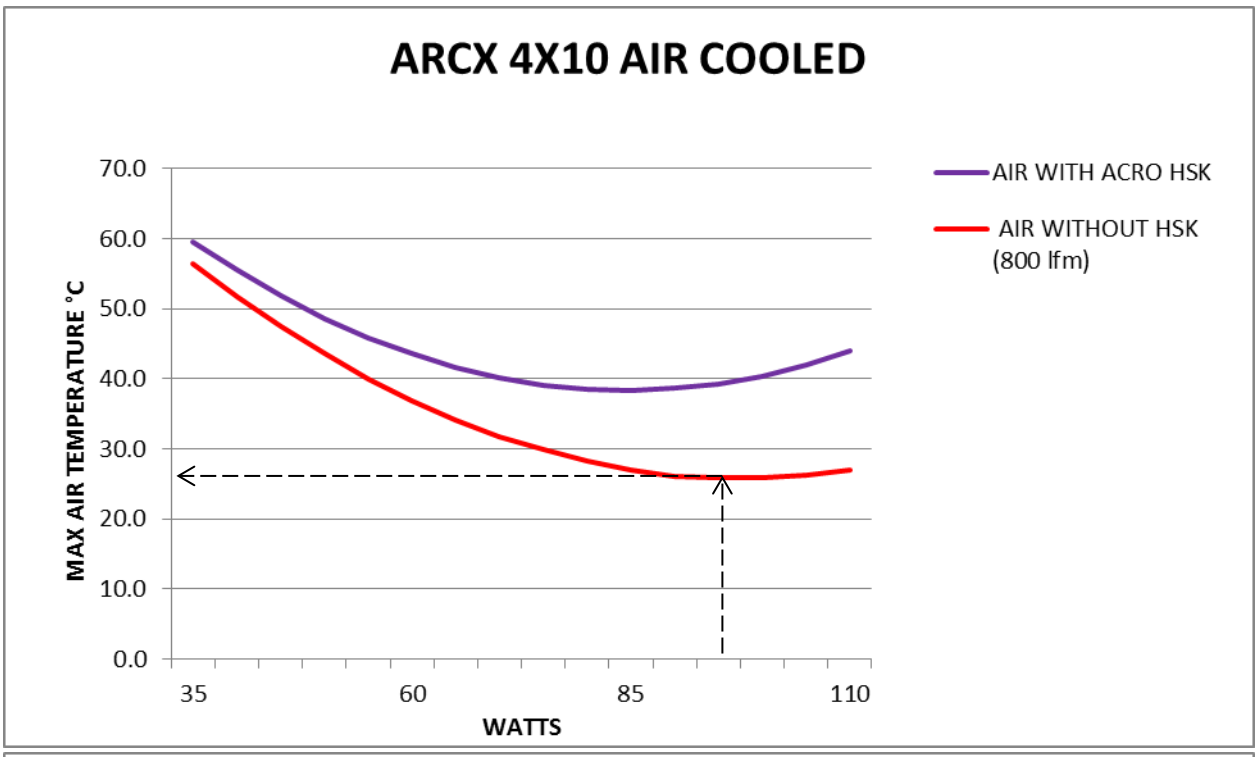
AIR vs COLD PLATE APPLICATIONS

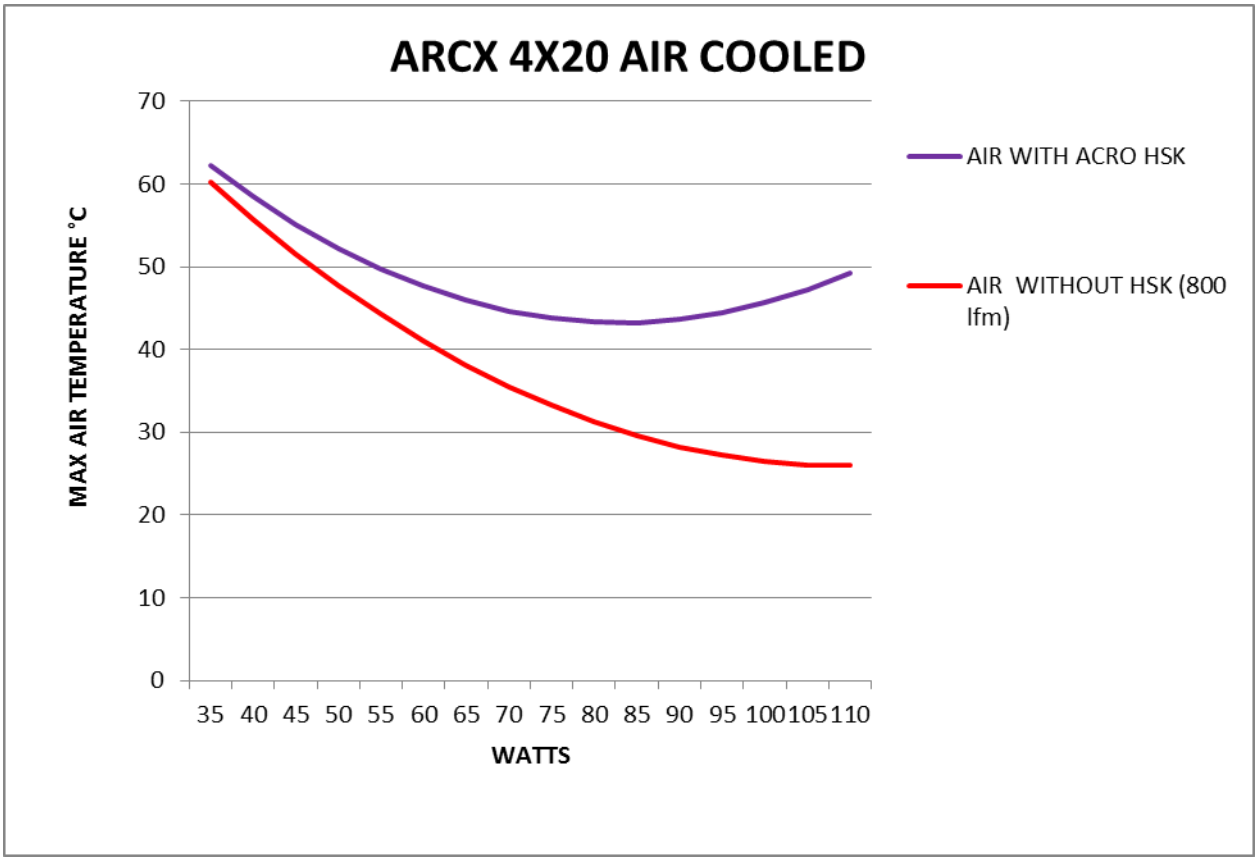
There are two curves that are usable for air applications. It should be understood that the ARCX enclosure was designed to be a conduction cooled enclosure. The performance is limited using air cooling only. There is a forced air heat sink assembly (ATMD-02) available for users that would like to purchase a means to cool the enclosure. Refer to the curves labeled "AIR WITH ACRO HSK" For the previous example; using the Acromag forced air heat sink accessory would widen the allowable "ARCX-4110 Air Cooled" ambient temperature at 95W to approximately 40C. If the environment is relatively cool like a server room, then it is possible that the enclosure will work without any additional cooling assistance. In the end application it will be the user's responsibility to validate whether there is enough cooling capacity for the wattage being drawn.

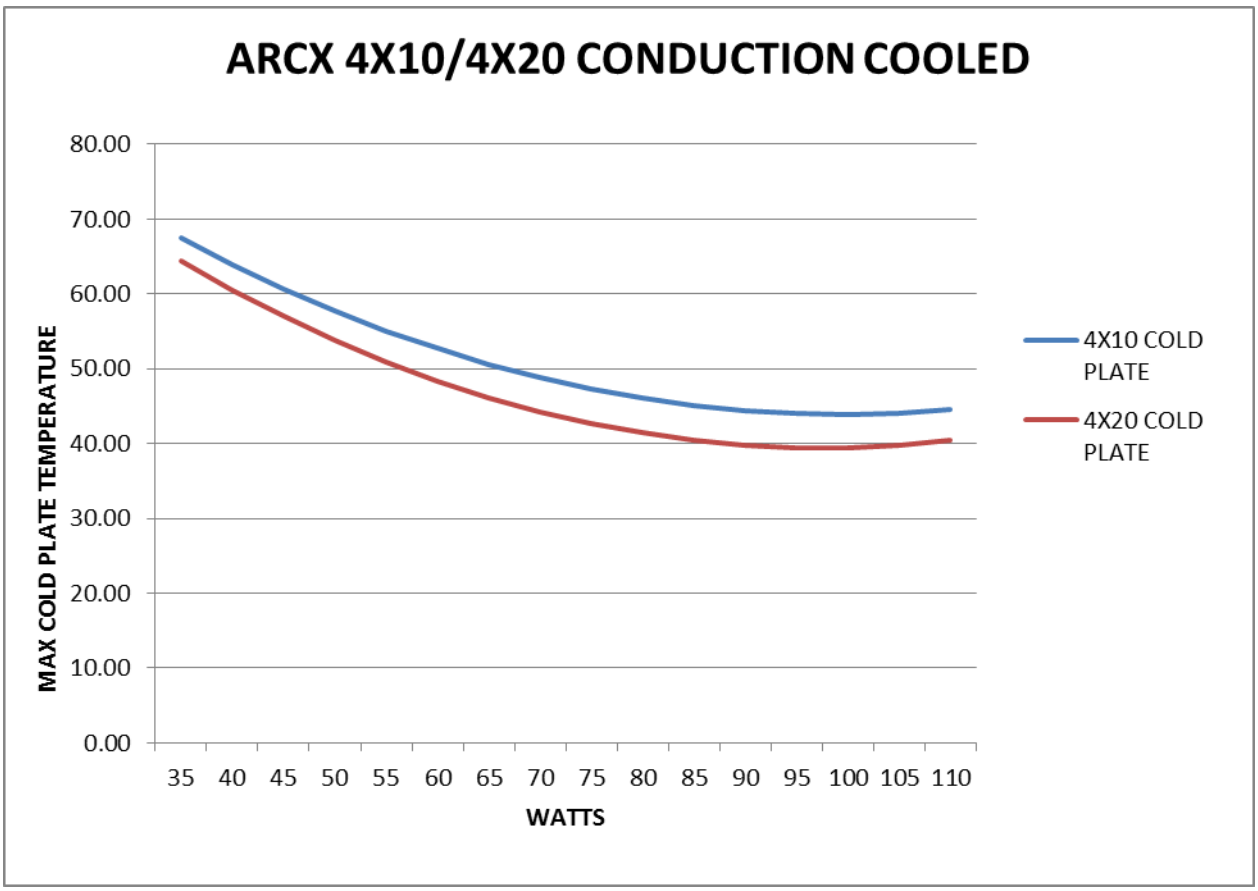
The ARCX was designed to be a conduction cooled enclosure. The user is responsible for mounting the ARCX to a cold plate and maintaining the cold plate temperature. The cold plate can be a water cooled plate like the (ATMD-03) or to any surface that will continuously conduct the heat away from the ARCX enclosure. Controlling the cold plate temperature is essential in keeping the ARCX system within its operating temperature range.

The preferred mounting method is with the bottom of the ARCX enclosure mounted directly to the cold plate. The ARCX is capable of being mounted on the other three sides but it will be the user's responsibility to verify the system is being properly cooled. The enclosure was designed to conduct heat away from any of the four sides. The heat is concentrated on the bottom so that is the preferred mounting surface whenever possible. All the graphs provided are with the bottom of the system mounted to the cooling device.

The graphs are non-linear and should not be misapplied. Only the graph with the intended cooling method should be considered.


ARCX 4X10 AIR COOLED
MAX AIR TEMPERATURE °C
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
35
60
85
110
WATTS
AIR WITH ACRO HSK
AIR WITHOUT HSK (800 lfm)


ARCX 4X20 AIR COOLED
MAX AIR TEMPERATURE °C
70
60
50
40
30
20
10
0
35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110
WATTS
AIR WITH ACRO HSK
AIR WITHOUT HSK (800 lfm)



Note – The ARCX is capable of applications above 110 Watts.

The preferred method above 110W is with the CONDUTION COLD PLATE where the cold plate temperature can be controlled / maintained. Air cooled applications above 110W are also conceivable.

Consult factory for any applications beyond 110 watts.

The graphs **cannot** be used to extrapolate beyond 110W.

8.3 Power Requirements

Minimum input Voltage +10V DC

Maximum input Voltage +36V DC

Note: The Maximum current cannot exceed 15 Amps.

8.31 POWER ESTIMATION TABLES

The following tables can be used to estimate power consumption.

ARCX-4110 Typical Configurations & Their Power Requirements								
Configuration	**i7 CPU Power (Watts)**	**XMC/ PMC (Opt.) (Watts)**	**Ext. Fan Acc. (Opt. (Watts)**	**mSATA or mPCIe #1 (Opt. (Watts)**	**mSATA or mPCIe #2 (Opt. (Watts)**	**Power Conv. Dissip. @85% Eff. (Watts)**	**Total Input Power Req. (Watts)**	**Total Power Dissip. Enclo. (Watts)**
i7 CPU maximum, XMC @ maximum, two mSATA or mPCIe, with fan accessory	47.0	25.0	16.8	5.0	5.0	17.4	116.2	99.4
i7 CPU maximum, XMC @ maximum, two mSATA or mPCIe, no fan accessory	47.0	25.0	0.0	5.0	5.0	14.5	96.5	96.5
i7 CPU maximum, XMC @ maximum, one mSATA or mPCIe, no fan accessory	47.0	25.0	0.0	5.0	0.0	13.6	90.6	90.6
i7 CPU maximum, no XMC, one mSATA or mPCIe, no fan accessory	47.0	0.0	0.0	5.0	0.0	9.2	61.2	61.2
i7 CPU limited @ 25 watts, no XMC, one mSATA or mPCIe, no fan accessory	25.0	0.0	0.0	5.0	0.0	5.3	35.3	35.3

ARCX-4120 Typical Configurations & Their Power Requirements									
Configuration	**i7 CPU Power (Watts)**	**#1 XMC/ PMC (Opt.) (Watts)**	**#2 XMC/ PMC (Opt.) (Watts)**	**Ext. Fan Acc. (Opt.) (Watts)**	**mSATA or mPCIe #1 (Opt.) (Watts)**	**mSATA or mPCIe #2 (Opt.) (Watts)**	**Power Conv. Dissip. @85% Eff. (Watts)**	**Total Input Power Req. (Watts)**	**Total Power Dissip Encl. (Watts)**
i7 CPU maximum, Two XMC's @ maximum, two mSATA or mPCIe, with fan accessory	47.0	25.0	25.0	25.2	5.0	5.0	23.3	155.5	130.3
i7 CPU maximum, Two XMC's @ maximum, two mSATA or mPCIe, no fan accessory	47.0	25.0	25.0	0.0	5.0	5.0	18.9	125.9	125.9
Power (i7 CPU maximum, Two XMC's @ maximum, one mSATA or mPCIe, no fan accessory	47.0	25.0	25.0	0.0	5.0	0.0	18.0	120.0	120.0
i7 CPU maximum, XMC #2 @ maximum, one mSATA or mPCIe, no fan accessory	47.0	0.0	25.0	0.0	5.0	0.0	13.6	90.6	90.6
i7 CPU maximum, no XMC's, one mSATA or mPCIe, no fan accessory	47.0	0.0	0.0	0.0	5.0	0.0	9.2	61.2	61.2
i7 CPU limited @ 25 watts, no XMC's, one mSATA or mPCIe, no fan accessory	25.0	0.0	0.0	0.0	5.0	0.0	5.3	35.3	35.3

8.4 Other Environmental Requirements

8.4.1 Relative Humidity

The range of acceptable relative humidity is 5% to 95% non-condensing.

8.4.2 Storage Temperature

The range of acceptable storage temperatures is –40° C to +85° C.

8.4.3 Vibration (operating and Non-operating)

MIL-STD-810G, Method 514.6

Procedure I (General Vibration)

Category 20 (Ground vehicles/ground mobile)

8-500Hz, Sinusoidal 5Grms X, Y and Z axis. 1hr per axis (15-minute sweep up / 15-minute sweep down)

8.4.4 Mechanical Shock (operating and Non-operating)

MIL-STD-810G, Method 516.6

Procedure I (functional Shock)

50g, 11ms 1/2 sine 3 positive/negative per axis

(18 drops)

8.4.5 Ingress Protection Water/Dust proof

IEC 60529, IP67

6 - Totally protected against dust

7 - Protection against the effect of immersion between 15cm and 1m

8.4.6 CE Marked

EMC Directive 204/108/EC

Immunity per EN 61000-6-2:

Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.
Radiated Field Immunity (RFI), per IEC 61000-4-3.
Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.
Surge Immunity, per IEC 61000-4-5.
Conducted RF Immunity (CRFI), per IEC 61000-4-6.

Emissions per EN 61000-6-4:

Enclosure Port, per CISPR 16.
Low Voltage AC Mains Port, per CISPR 16.
Telecom / Network Port, per CISPR 22.

Note: This is a Class A product, excluding the use of DVI interface.

RoHS Directive 2011/65/EU

In compliance per EN 50581.

8.4.7 FCC US/Canada

FCC Part 15, Class A Digital Device.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This is a Class A product, excluding the use of DVI interface.

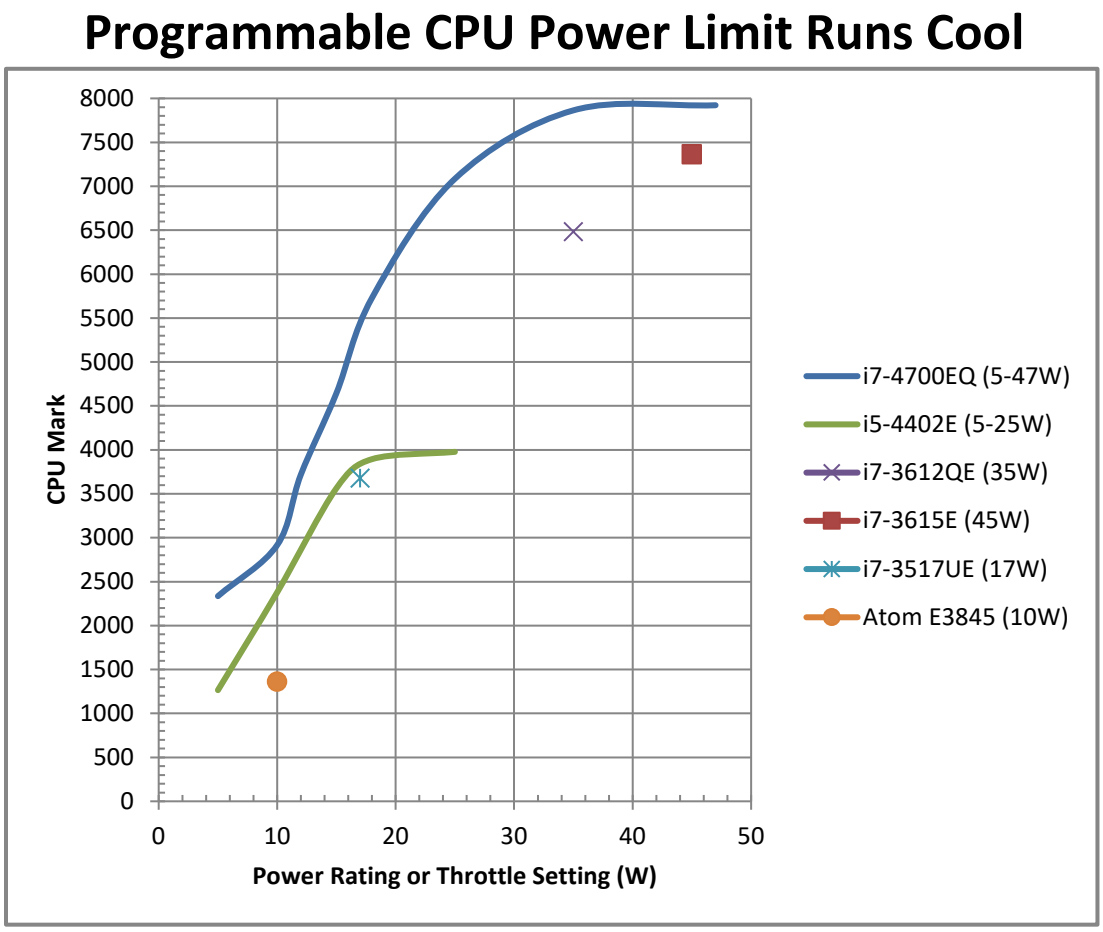
8.5 Reliability Prediction

Mean Time Between Failure…..MTBF = 110,080 hours @ 25C,

Using MIL-HDBK-217F, Notice 2.

Appendix

Programmable Power Limits



Acromag's XCOM-6400, ARCX units feature programmable power limits, allowing the user to 'dial-down' the maximum power consumption of the CPU in systems where power is a concern. The graph above shows that the i7-4700EQ CPU outperforms other available embedded Intel CPU's at every power point from 5W - 47W, even the i5-4402E.

By simply programming a lower power limit in the BIOS setup, the 47W i7-4700EQ CPU can be used in applications where less power is available, or heat removal is an issue. This is accomplished by the CPU automatically under clocking its frequency to maintain a power level at the set limit[1].

Note: that once the minimum frequency of 800MHz is reached that the programmed limit could be exceeded. Extremely large workloads have a realistic minimum power of around 20W. However light to medium workloads can effectively maintain a power limit as low as 5-10W.

There are two programmable CPU limits. These are the long-term average Power Limit 1 (PL1) and the short-term Power Limit 2 (PL2). Depending on a windowed Power Limit 1 Time 'constant' Tau, the CPU can spend a short time above power level PL1 up to a maximum of PL2, allowing a significant performance boost for short workloads. If the CPU power remains above PL1 at the end of this time the power is then limited back to PL1. The power must drop below the PL1 limit before it allowed to increase back to PL2 again. For time spent above PL1 an equivalent amount of time must be spent below PL1 in order for it to rise again to PL2. The maximum time could be as much 2.5x the value of Tau.

The default values for each CPU are as follows:

CPU	PL1	PL2	Tau
I7-4700EQ	47W	59W	28 seconds
I5-4402E	25W	31W	28 seconds

PL1 and PL2 can be programmed in watts to any value below the default. Entering a value above the default will result in the default value being used. Entering 0 also results in the default value being used.

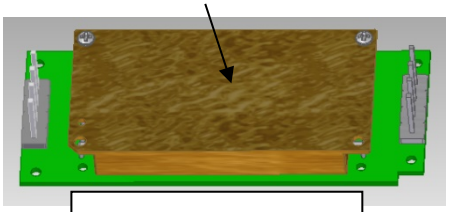
Tau can be programmed to any number of seconds up to 256, however it is recommended by Intel to always use the default value of 28. This value maximizes the effectiveness of the short-term performance boost while ensuring that the life of the part is not jeopardized by spending too much time above PL1.

More details about programming these power limits using the BIOS setup utility are provided in *The Acromag Core BIOS Manual*.

Power Filter (Optional Accessory) installation

This process is the same for ARCX-4110 or ARCX-4120

Synqor
MQME-28-P-U-ES



ACEX-FP-PF
Power Filter module

Features

- 20 amps output current
- Very low DC resistance
- > 80 dB differential-mode attenuation at 500kHz
- > 60 dB common-mode attenuation at 500kHz
- Stabilizing bulk capacitor and damping resistor included
- All capacitors are X7R multi-layer ceramic
- Designed to meet all MIL-STD 461 EMI and most RTCA/ D0-160E Section 22 lightning requirements

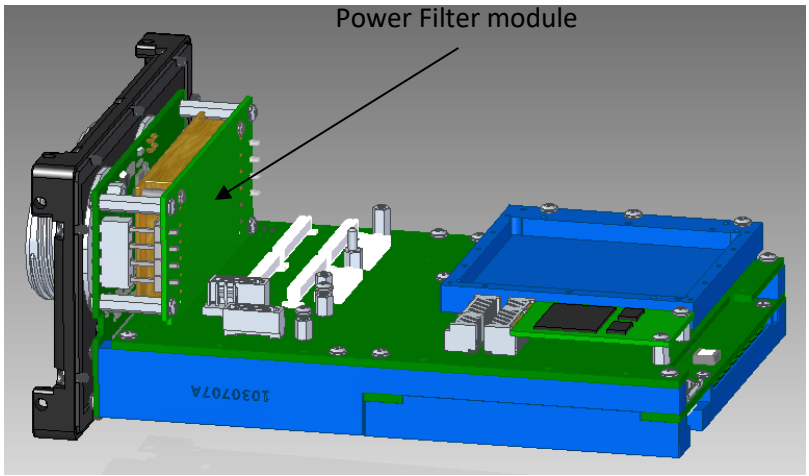
Note: The ARCX 4000 series input current cannot exceed 15 amps

Specification Compliance

MQME series filters (with MQFL converters) are designed to meet:

- MIL-HDBK-704-8 (A through F)
- RTCA/DO-160E Section 16
- MIL-STD-1275B
- DEF-STAN 61-5 (part 6)/5
- MIL-STD-461 (C, D, E)
- RTCA/DO-160E Section 22

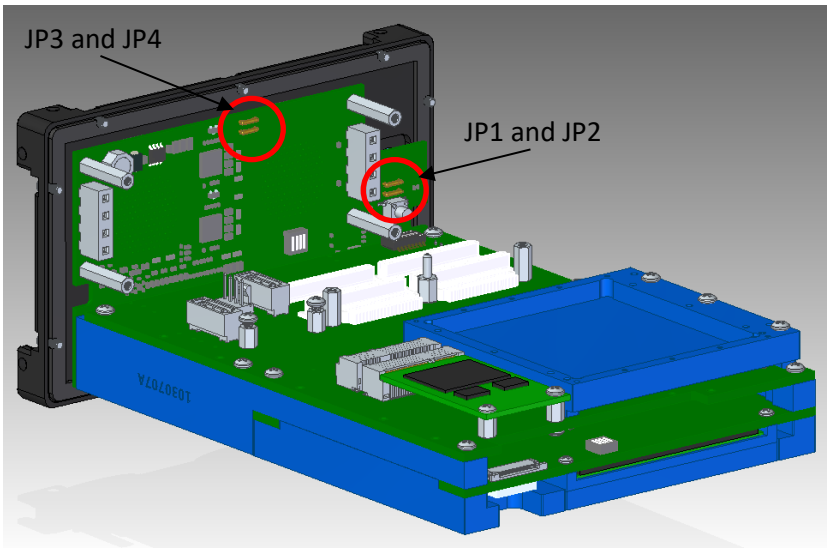
The Power filter component is a SynQor P/N MQME-28-P-U-ES (www.synqor.com)

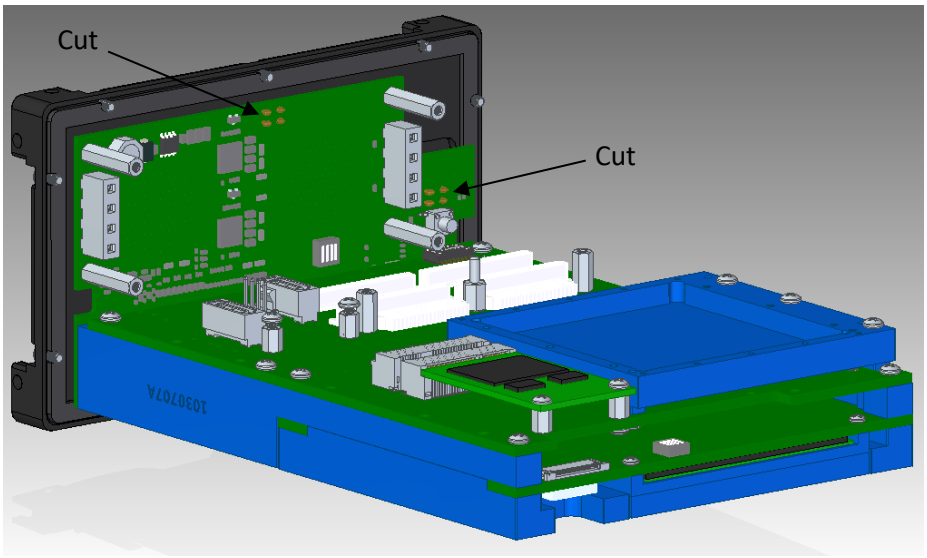


Note: The power filter is not available when using the Front Panel with Mezzanine option. The power Filter is already installed on the ARCX-41XX-PF models. See ordering information.

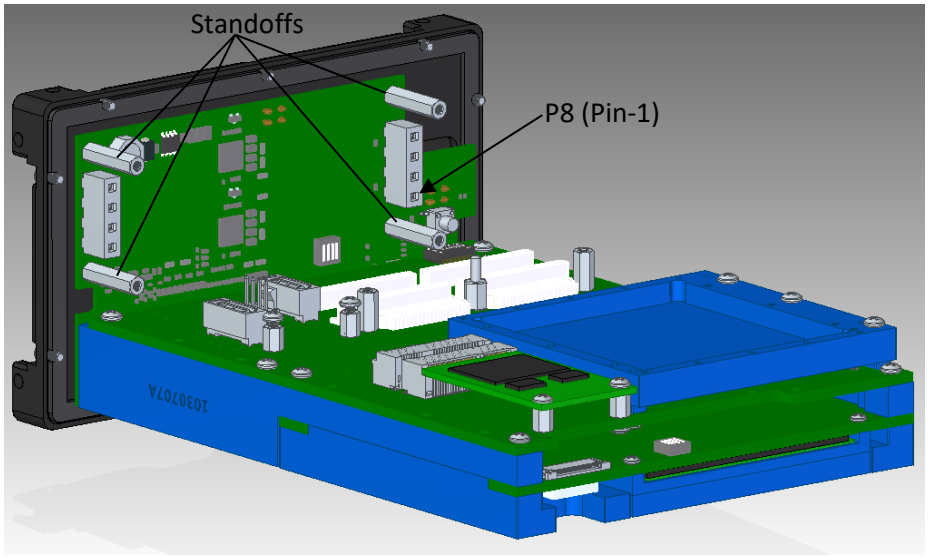
See the disassembly instructions in section 6.1(ARCX-4110) or 6.2 (ARCX-4120) then proceed to step one.

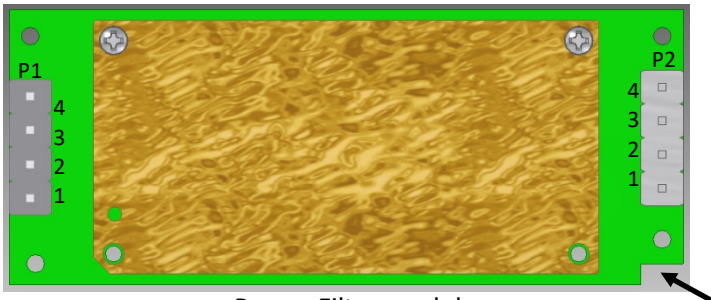
1. Before installing the power filter module the power filter bypass jumpers need to be cut or removed, this allows power to flow through the power filter. Using wire cutters, cut 4 power filter bypass Jumpers JP1, JP2, JP3, JP4 as illustrated below.





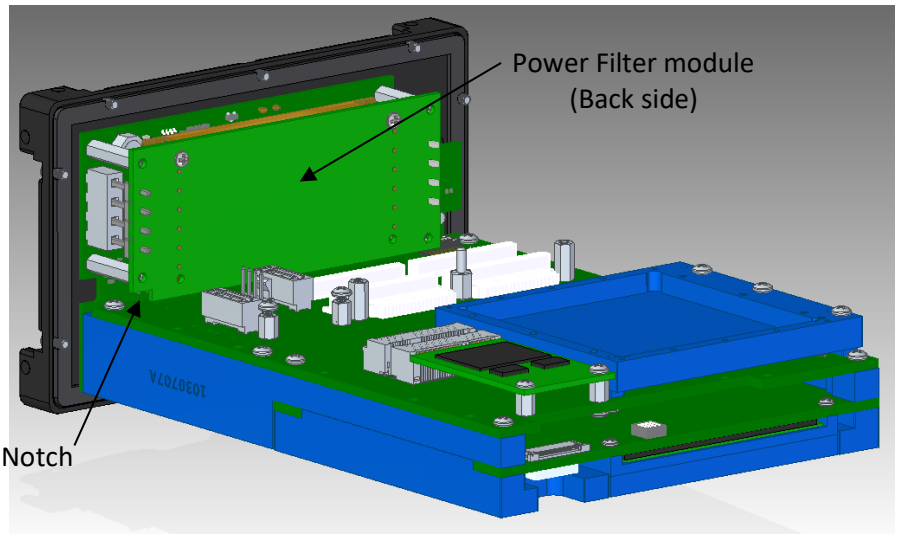
2. Install the power filter board onto the front panel board by aligning Pin 1 of P1 and P2 (located on the power filter board) with Pin 1 of J7 and J8 (located on the front panel board) and press into place until the power filter board is seated on the standoffs on located on the front panel board.





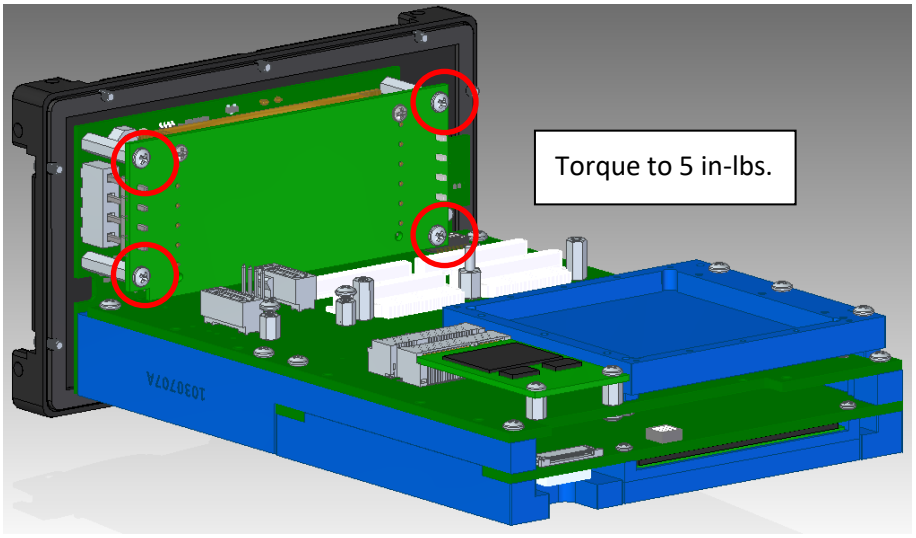
Power Filter module
(front view)

Notch



Note: Notice the location of the notch on the power filter board to ensure correct orientation.

3. Secure with 4 screws (M2.5 x 6mm).



Power Filter installation is complete.

Proceed *to section 6.8 (ARCX-4110) or 6.9 (ARCX-4120) to reassemble ARCX box.*

Front Panel with Mezzanine Option

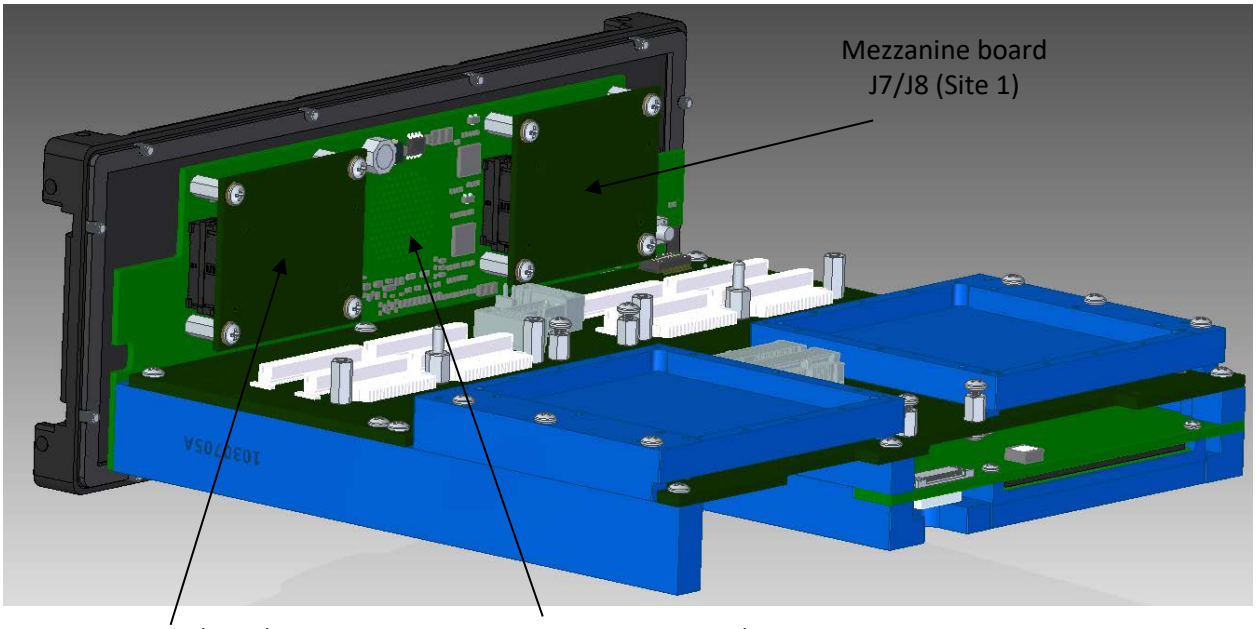
The Front Panel with Mezzanine option provides addition flexibility to the ARCX 4000 Series design. The front panel boards (ACEX-FP-IO-0x) support the use of custom mezzanine modules through the use of ultra-high-density SEARAY connectors. These custom modules interface between the system and XMC/PMC rear I/O 38999 type connectors.

Mezzanine Board Interface

The ACEX-FP-IO-0x boards require the use of a mezzanine board on J7/J8 and J9/J10 in order to provide connections for the signals being routed to the corresponding 38999 connectors J3 and J5, respectively. On standard models, a "pass-through" mezzanine board is included for each of the mezzanine board sites on the ACEX-FP-IO-0x boards. The "pass-through" mezzanine board simply routes the PMC/XMC Rear I/O signals straight through to the 38999 connector. The "pass-through" mezzanine board is designed to be interchangeable between the two mezzanine board sites.

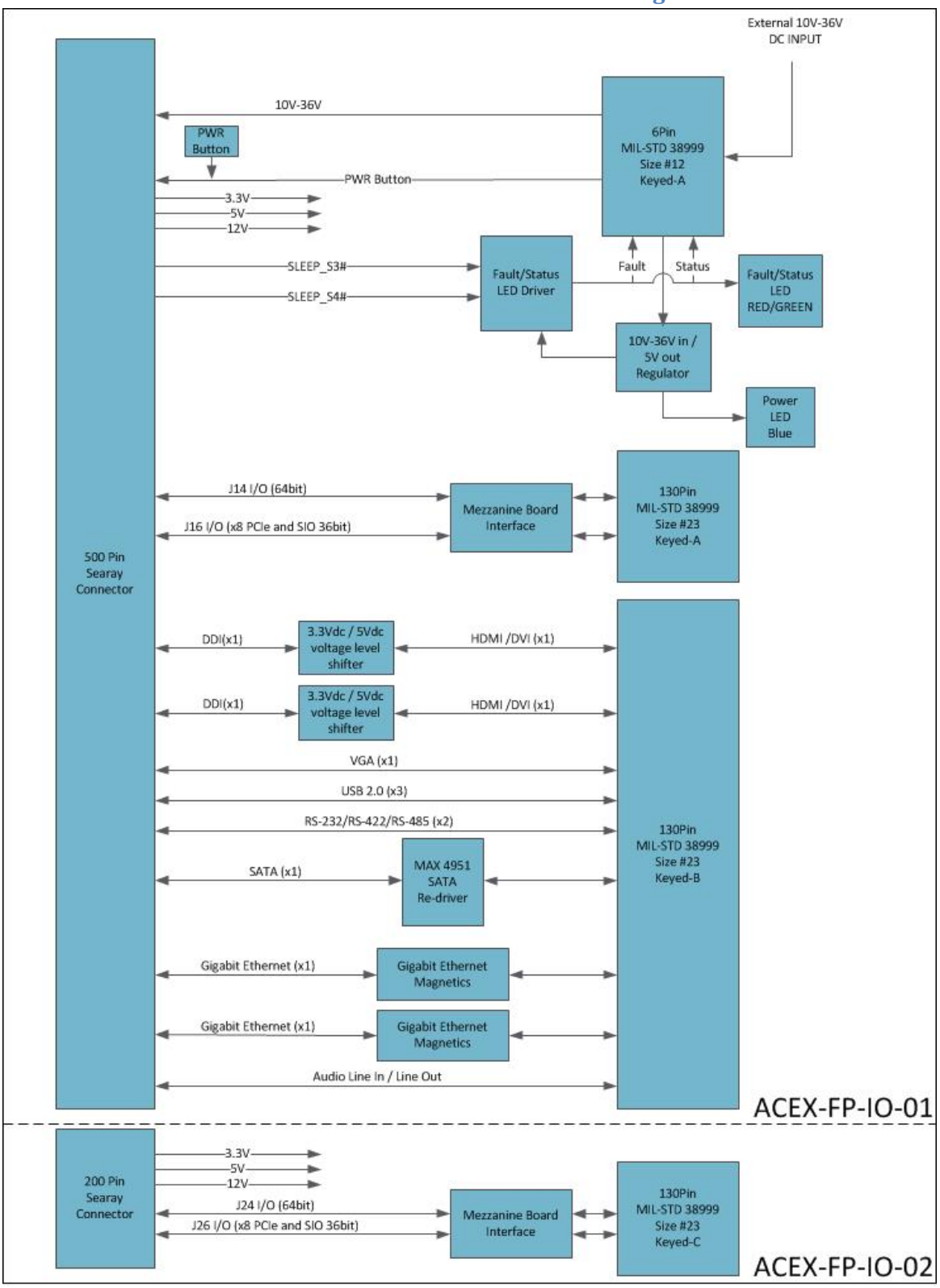
In addition to the core set of PMC/XMC Rear I/O signals that are identical between the two sites, there are a set of signals unique to each of the mezzanine board sites. On the J7/J8 mezzanine board (Site 1) there are a variety of miscellaneous signals are available for use on custom mezzanine boards. These include PCIe lanes, a SATA interface, GPIO signals, and I2C Bus lines. On the J9/J10 mezzanine board (Site 2) the additional pins are used to bring up the rest of the PMC/XMC Rear I/O signals for use on custom mezzanine boards.

See the ACEX-FP-IO-0X Front Panel Manual for more information about custom mezzanine boards.
www.Acromag.com



Note: The internal Power Filter is not available with the Front Panel with Mezzanine option

Model ACEX-FP-IO-0x Front Panel with Mezzanine Block Diagram

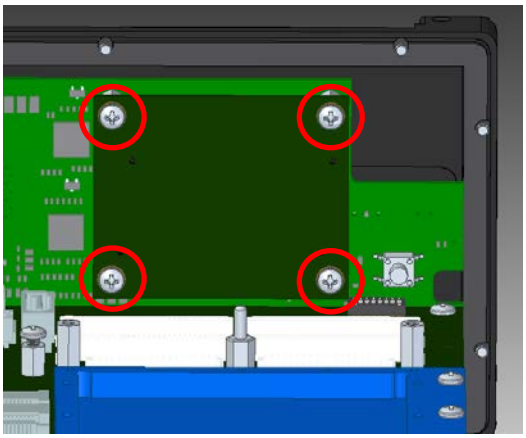


Replacing mezzanine boards

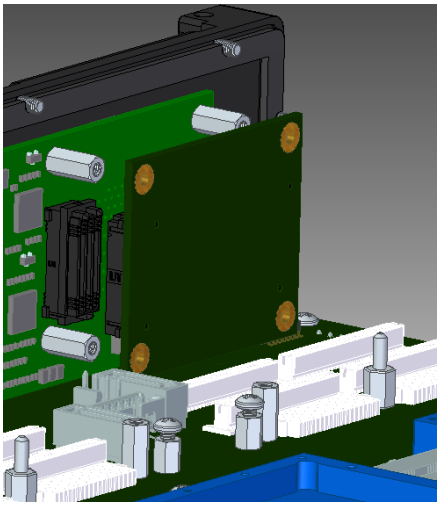
See the disassembly instructions in section 6.1(ARCX-4110) or 6.2 (ARCX-4120) then proceed to step one.

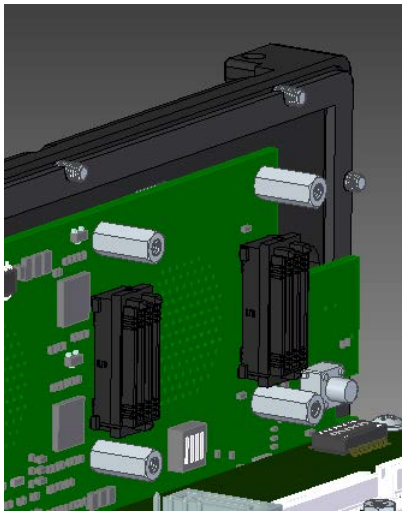
Removing Mezzanine Board:

1. Remove the 4 screws (M2.5 x 6) that secure the Mezzanine board to the front panel board.



2. Carefully unplug and remove the mezzanine board.

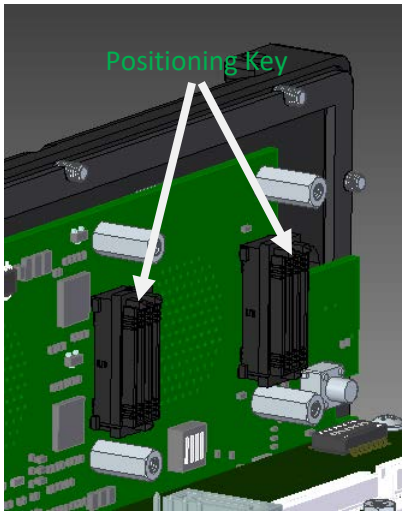


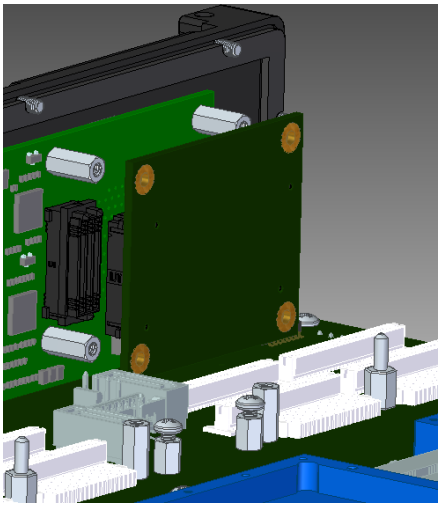


Mezzanine removal is complete.

Installing Mezzanine Board:

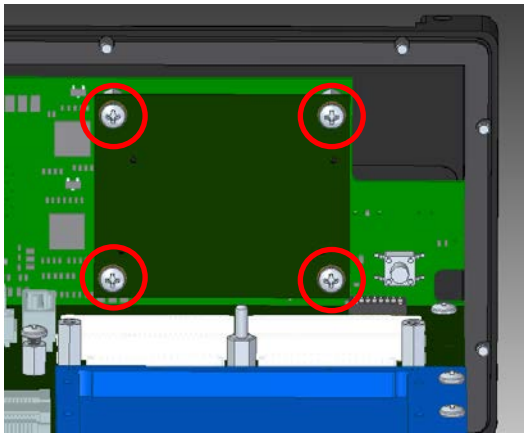
1. Carefully plug in the mezzanine board.





The connectors are keyed to only allow correct positioning

2. Install the 4 screws (M2.5 x 6) that secure the Mezzanine board to the front panel board.



Torque to 5 in-lbs.

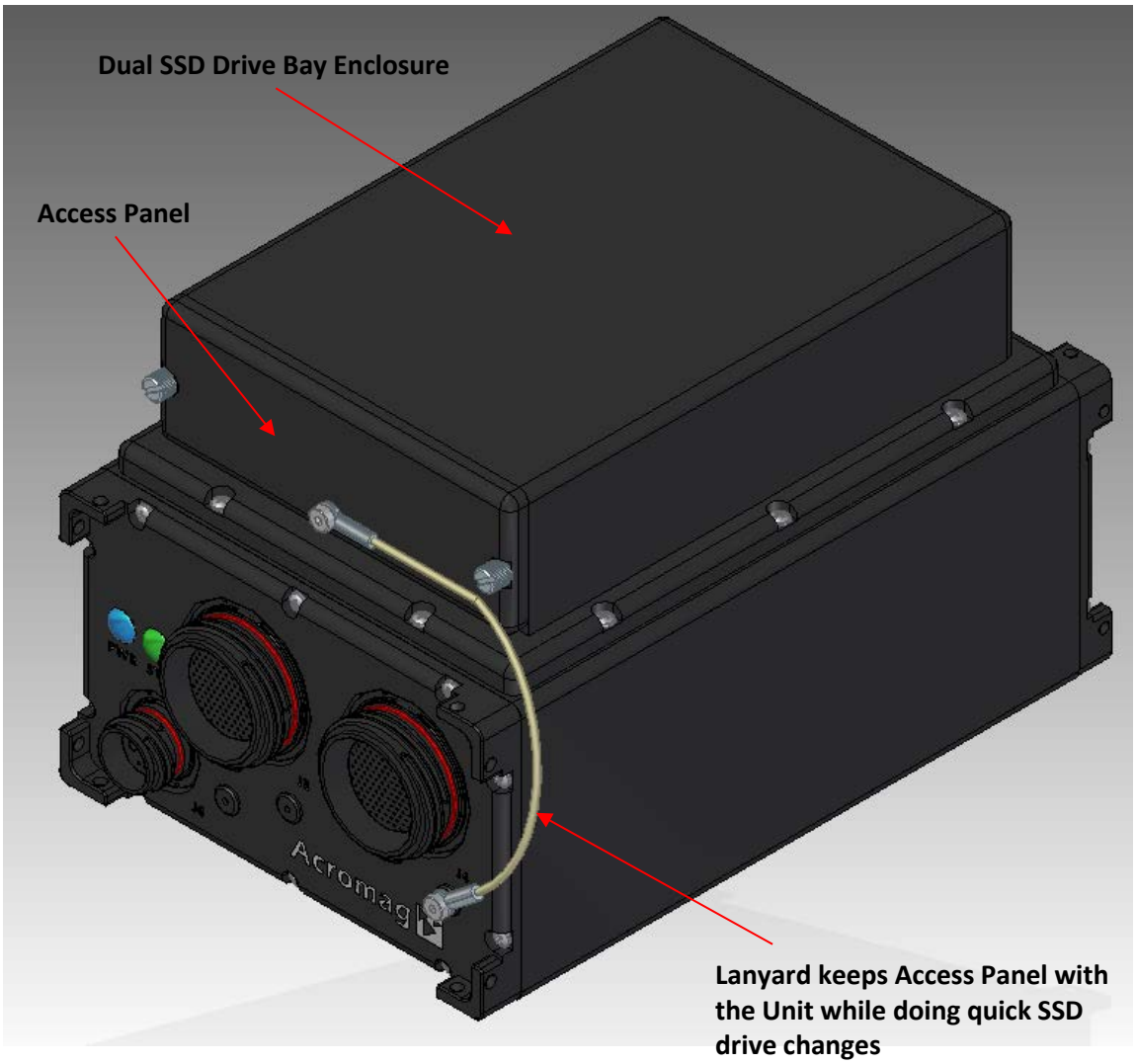
Mezzanine installation is complete.

Proceed *to section 6.8 (ARCX-4110) or 6.9 (ARCX-4120) to reassemble ARCX box.*

Dual SSD Drive Bay Option

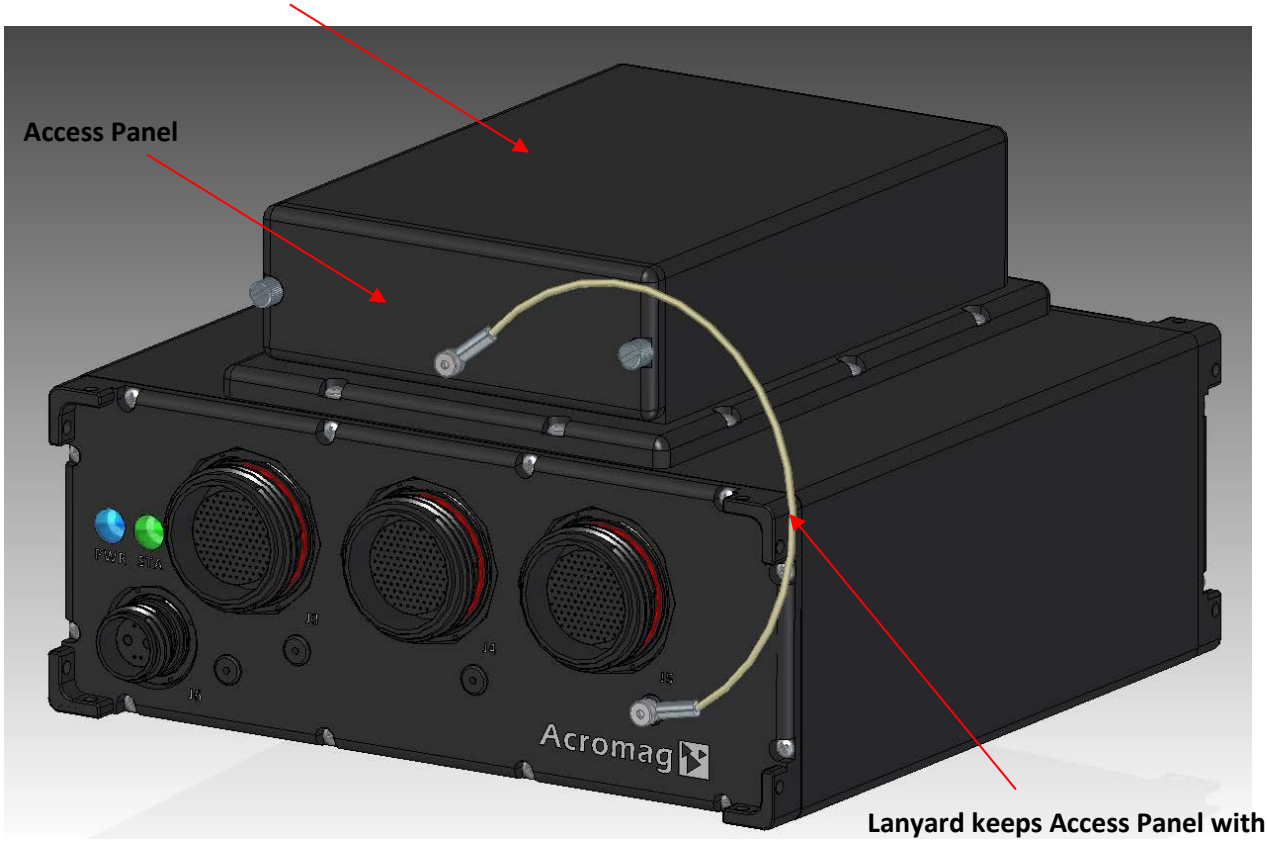
The Dual SSD Drive Bay option provides the ability to use 2 SATA SSD hard disk drives in your ARCX 4000 series unit while maintaining IP67 standard.

The drive bays are housed in a fully sealed enclosure. These Drive Bays can be configured with 2 SATA SSD hard disk drives and setup to use RAID 1 for backups or RAID 0 for powerful personal computing. The DUAL SSD Drive Bays are design for quick and easy removal as well as a LOCK to add extra protection and prevent unwanted SSD removal. Additional Drive Trays (P/N 5028-571 – Dual SSD Drive Tray) are also available for quick drive changes.



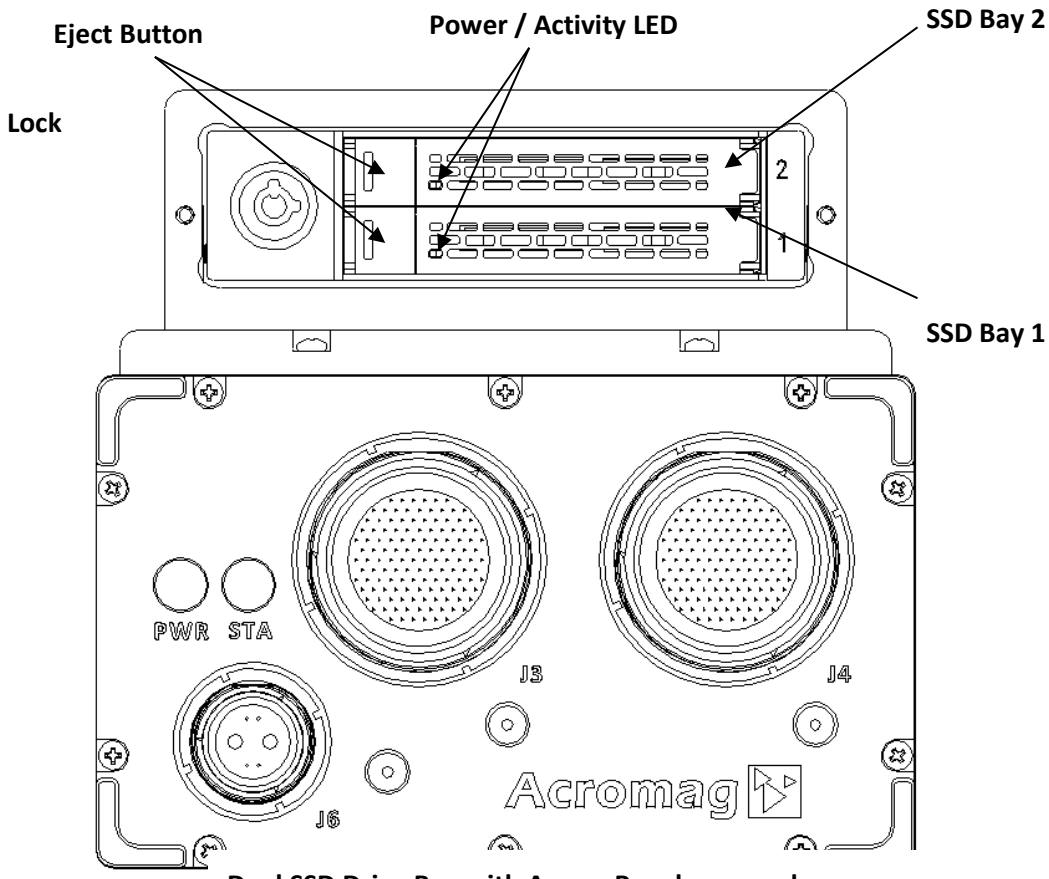
ARCX-4111-XX

Dual SSD Drive Bay Enclosure



Lanyard keeps Access Panel with the Unit while doing quick SSD drive changes

ARCX-4121-XX



Dual SSD Drive Bay with Access Panel removed

SSD Drive Bays - SATA 2.5 inch drives.

LED (Power / Activity)

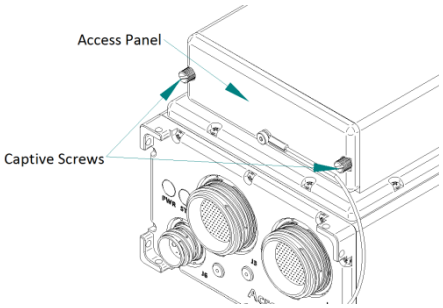
- The LED is Green when power is on.
- The LED will flash yellow showing activity.

Lock - When locked drives cannot be removed. (Does not have to be locked to operate)

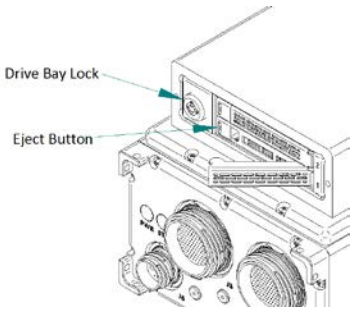
Note: The SSD Drive power is on when the 10V to 36VDC voltage is on.
Turn off all power before adding or removing SSD Drives to prevent Data loss or corruption.

Dual SSD Drive Bay Option - SSD (Solid State Drive) Installation

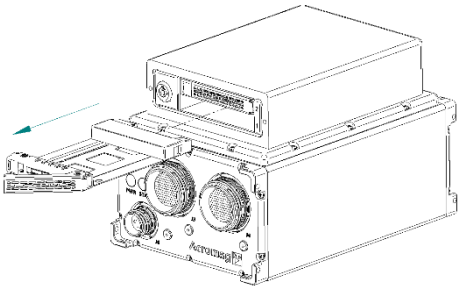
Ensure power is off before starting



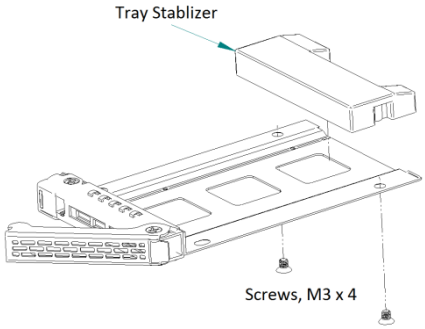
1. Loosen the two captive screws and remove the access panel.



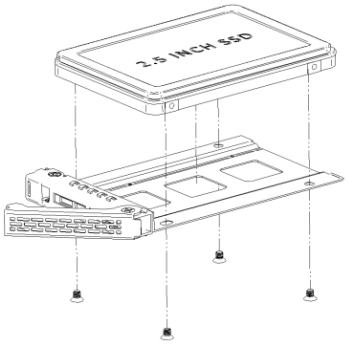
2. Unlock / Press the eject button.



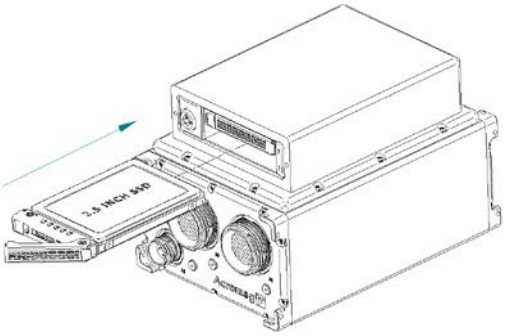
3. Pull the drive tray straight out.



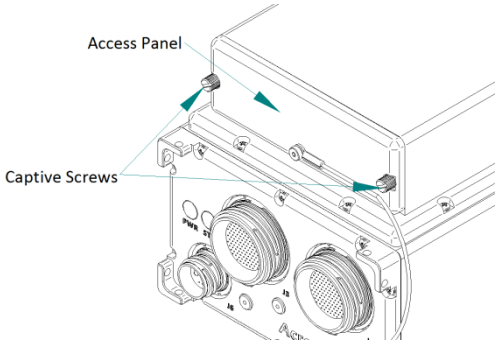
4. Remove the tray stabilizer and discard. (keep the two screws)



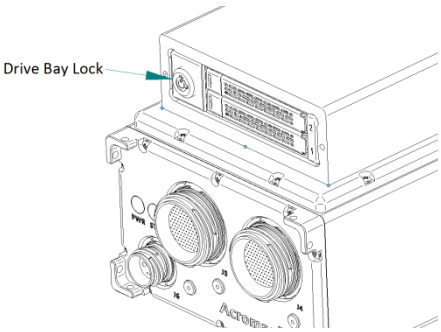
5. Install the SSD and secure with QTY. 4 Screws, M3 x 4.



6. Slide the drive tray back into the drive bay. (Ensure the door latches)



7. Lock the drive bay. (Does not have to be locked for operation)



8. Re-attach the access panel and tighten the captive screws.

SSD Installation is complete.

ATMD-02 Air Cooled Heatsink

The ATMD-02 Heatsink is an optional external device that can be purchased. This will allow for product development in the laboratory for the case when no airflow is not enough to cool the system.



The ATMD-02 Air cooled heatsink assembly comes with the following hardware:

- Heatsink assembly.
- Special 38999 #12 power cable with power cable for the fan (No need to order 5028-557 power cable).
- Quantity 4, M3 x 12MM screws to mount the ARCX 4000 to the heatsink.

The ATMD-02 is designed to accommodate both the single wide or double wide ARCX computer.

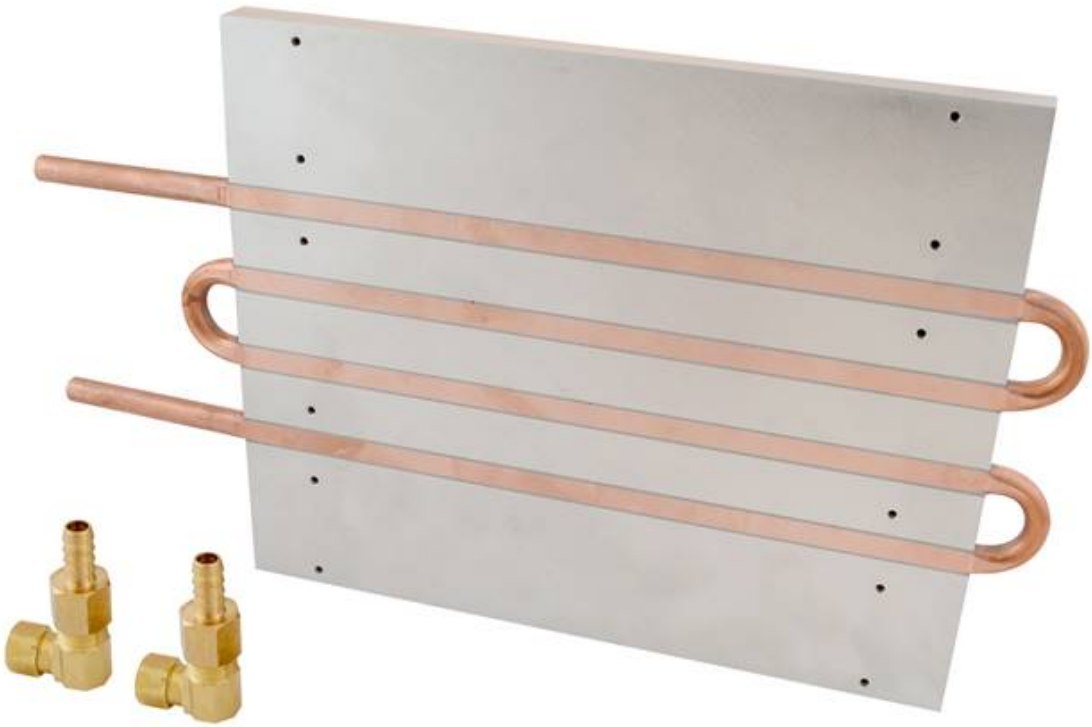
The ARCX box must be revision D or greater. Consult the factory if you have an older version, your system might be upgradable.

Weighs 5.6 lbs.

Approximate dimensions H: 2" x W: 8.2" x D: 9"

ATMD-03 Cold Plate

The ATMD-03 Cold Plate is an optional external device that can be purchased. This will allow for product development in the laboratory for the case when air cooling is not enough.



The ATMD-03 Cold Plate assembly comes with the following hardware:

- Cold Plate 8" x 10"
- A pair of 90 degree compression fittings
- A pair of barbed hose fittings for 3/8" hose to allow for a quick installation.
- Quantity 4, M3 x 12MM screws to mount the ARCX 4000 to the cold plate

The ATMD-03 is designed to accommodate both the single wide or double wide ARCX computer.

The ARCX computer can be mounted with either the front I/O facing the pipe fittings or away from them.

Weights 5.5 lbs.

Certificate of Volatility

Acromag Model ARCX-4xxx-xx	Manufacturer: Acromag, Inc. 30765 Wixom Rd Wixom, MI 48393			
Volatile Memory				
Does this product contain Volatile memory (i.e. Memory of whose contents are lost when power is removed) ■ Yes □ No				
Type (SRAM, SDRAM, etc.) SDRAM **(located on the XCOM-6400-xxxx)**	Size: Up to 16GB (depends on the SODIM modules installed)	User Modifiable ■Yes □ No	Function: Storage of code/data for CPU	Process to Sanitize: Power Down
Type (SRAM, SDRAM, etc.) PCH internal CMOS SRAM **(located on the XCOM-6400-xxxx)**	Size: 256 bytes	User Modifiable ■ Yes □ No	Function: Data storage for system/BIOS	Process to Sanitize: Momentarily close switches SW1-3 and SW1-4
Non-Volatile Memory				
Does this product contain Non-Volatile memory (i.e. Memory of whose contents is retained when power is removed) ■ Yes □ No				
Type (EEPROM, Flash, etc.) Flash **(located on the XCOM-6400-xxxx)**	Size: 16Mbyte	User Modifiable ■ Yes □ No	Function: Storage of code and data for system/bios	Process to Sanitize: Clear Flash memory by erasing all sectors of the Flash
Type (EEPROM, Flash, etc.) EEPROM **(located on the XCOM-6400-xxxx)**	Size: 16Kbyte	User Modifiable ■ Yes □ No	Function: Storage of Module ID and/or User data	Process to Sanitize: Clear EEPROM by erasing all bytes
Type (EEPROM, Flash, etc.) EEPROM **(located on the ACEX-4610/4620)**	Size: 32Kb (4096 x 8)	User Modifiable ■ Yes □ No	Function: Storage of MAC ID and register setting for operation of Ethernet controller	Process to Sanitize: Clear EEPROM memory by erasing all bytes
Type (EEPROM, Flash, etc.) EEPROM **(located on the ACEX-4610/4620)**	Size: 2Kb	User Modifiable ■ Yes □ No	Function: Storage of User data	Process to Sanitize: Clear EEPROM memory by erasing all bytes
Acromag Representative				
Name:	Title: Sales and Marketing	Email: solutions@acromag.com	Office Phone: 248-295-0310	Office Fax: 248-624-9234

Revision History

The following table shows the revision history for this document:

Release Date	Version	EGR/DOC	Description of Revision
03/19/2015	A	PDG/ARP	Initial Acromag release.
04/08/2015	B	PDG/ARP	Added Front Panel with Mezzanine Option.
06/30/2015	C	PDG/ARP	Added Dual SSD Drive Bay Option.
10/8/2015	D	DAG/ARP	Added ATMD-02 option.
04/19/2016	E	DAG/ARP	Cleaned up the confusion about IP67 in section 1.4.1
12 OCT 2018	F	MRT/MJO	Updated dimensioned drawings (pg 57-60) to include connector position.
14 MAR 2019	G	AS/MJO	Corrected Aero Electric and Amphenol Part Numbers on page 11.

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