

Elkhart Lake Platform Connection to Intel[®] Automated Power Switch (Intel[®] APS) Version 3

OEM - Specific Customization Guide

March 2020

Revision 0.5

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Revision History

Revision Number	Description	Revision Date
0.5	<ul style="list-style-type: none">Initial release.	March 2020

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1 Introduction

1.1 Overview

Intel® Automated Power Switch (Intel® APS) enables innovative and wide power state transition testing on platforms. The Intel® APS programmatic interface provides a simple and easy way to use it.

Intel® APS is designed to switch between different types of power sources and it effectively reduces the manual testing overhead and enables the exploration of multi-step power and system state flows.

1.2 Intel® APS Front Panel

Figure 1-1. Intel® APS Front Panel

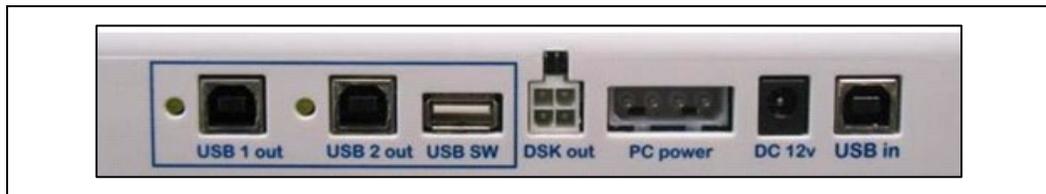




Legend: Front Panel
Input signal voltage – Enables detection of 1.1V or 3V signals
Main – Main connections flat cable connector
EX1 – Extended connections flat cable connector
EX2 – Reserved for future use
MB in – Mobile: DC input from power brick - Molex_A-42404-04xx
MB out – Mobile: DC power output to motherboard - Molex_A-42404-04xx
Battery in - from battery, Molex_26-60-4080
Battery out - to platform battery connector, Molex_09-50-3071
Reset button for Intel® APS Rev 3
LED panel – Signals and Intel APS status LEDs
J1 (Under the flip panel) – Extended capabilities flat cable connector
J2 (Under the flip panel) – connector for connecting the feature cable
J4 (Under the flip panel) – Extended capabilities flat cable connector

1.3 Intel® APS Rear Panel

Figure 1-2. Intel® APS Rear Panel



Legend: Back Panel
USB IN – Connects the Intel® APS to the management computer
DC 12V - Supplies Power IN DC to Intel APS from PSU
PC Power - Do Not Use
DSK out – Connects to the Intel APS DSK unit to control AC power control on/off
USB SW – USB SW controlled device
USB1/2 out – connects the Intel APS USB SW to 2 computers



1.4 Intel® APS LED Indicators

The Intel® APS includes twelve LED indicators. Six of the indicators allow the detection of the power state of the system under test.

The following figure shows the LEDs for each power state:

Figure 1-3. Intel® APS3 LED Indicators Diagram

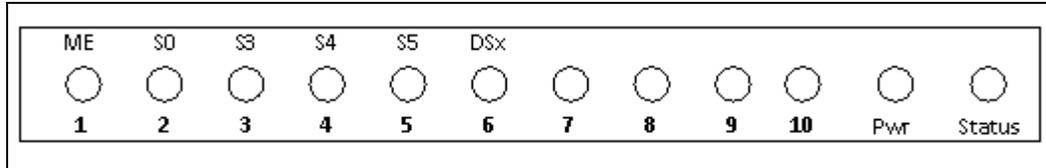


Table 1-1. Intel® APS3 LED Indicators List

LED	Indicates Status of this Signal
LED 1	ME
LED 2	S0
LED 3	S3
LED 4	S4
LED 5	S5
LED 6	INEX1(Deep S4/5)
LED 7	INEX2 (Deep S3)
LED 8	INEX3
LED 9	INEX4
LED 10	INEX5
PWR	APS powered on and ready
Status	Red – APS not initialized by software or reset button is pressed Green – APS powered on and ready

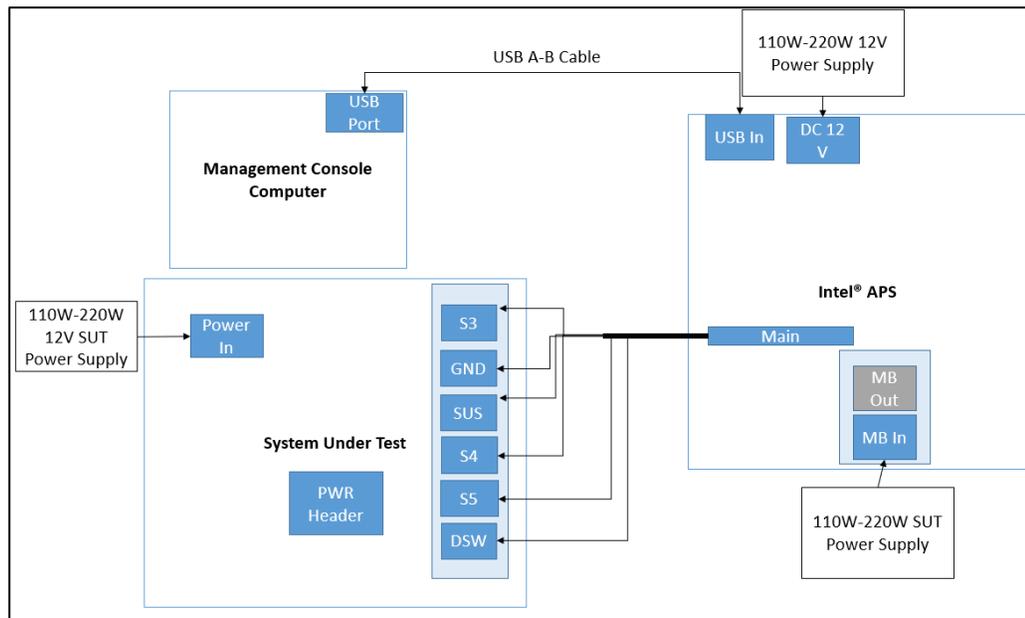
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2 Connection Instructions

This section provides a quick guide for connecting Intel® APS to Elkhart Lake platform. The figure below shows a high-level overview of the required connection between Intel® APS, the management console computer and the System under Test.

For help with locating components on the Intel® APS. For more details on connection and setup, refer the subsequent sections of this guide.

Figure 2-1. High Level Connection Diagram



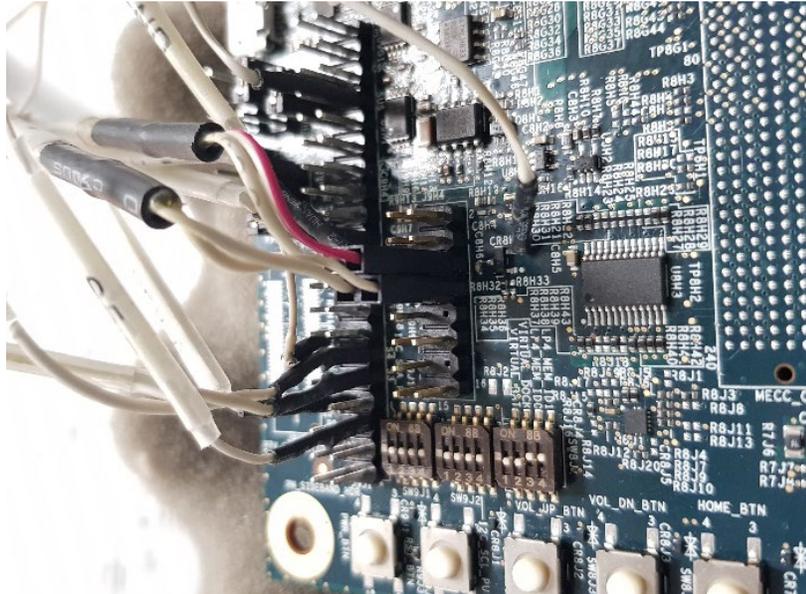
1. Connect the USB cable (A) to the management computers USB port.
2. Connect the other end of the USB cable (B) to the **USB in** connector on the Intel® APS (refer Figure 1-2).
3. Connect one end of the 12V APS power supply to the **DC 12v** socket on the rear panel. Plug the other end into an AC power source.
4. Connect the platform adapter board (refer Figure 3-7) to the MB in socket on the Intel® APS front panel.
5. Connect the SUT power brick to the platform adapter board.
6. Connect the platform power cable to the SUT power in jack.
7. Connect the main Intel® APS cable to the Intel APS Main socket. Connect the individual PWR wire to the correct header on the SUT's board. Refer to below section for more details.
8. Connect the signal cables to the relevant locations on the SUT's board.
9. Use the Intel® APS Software to verify that the Intel® APS is connected properly. For details, refer to the Intel® APS Software Installation and User's Guide.



2.1 Connecting the APS Cables to EHL RVP Platform

Connect the Intel® APS PWR B and RST B cables to the platform’s front panel below connector J9J1 as shown in **Figure 2-2**

Figure 2-2. Power, CMOS and Reset cable connections on the EHL RVP



The table below describes where to connect Intel® APS3 Sampling wires and how to interpret the signals. Refer to **Figure 2-2** for locating the pins on Elkhart Lake board.

Table 2-1. Elkhart Lake Platform Connector J9J1 Pin-out Connection

Pin #	Intel® APS3 Sampling Wire Label	Signal Name
5	S5	PM_SLP_S5_N
8	INEX2	+V.3A
9	S3	PM_SLP_S3_N
11	S4	PM_SLP_S4_N
16	GND	GND
21	INEX1	+V3.3A_DSW
33	SUS	PM_SLP_SUS_N



2.2 Connecting the APS Cables to EHL CRB Platform

For the CRB EHL a hardware rework needs to be done, the pins for the APS feedback signals should be soldered as shown below:

Figure 2-3. Elkhart Lake CRB Platform after soldering as stated in table

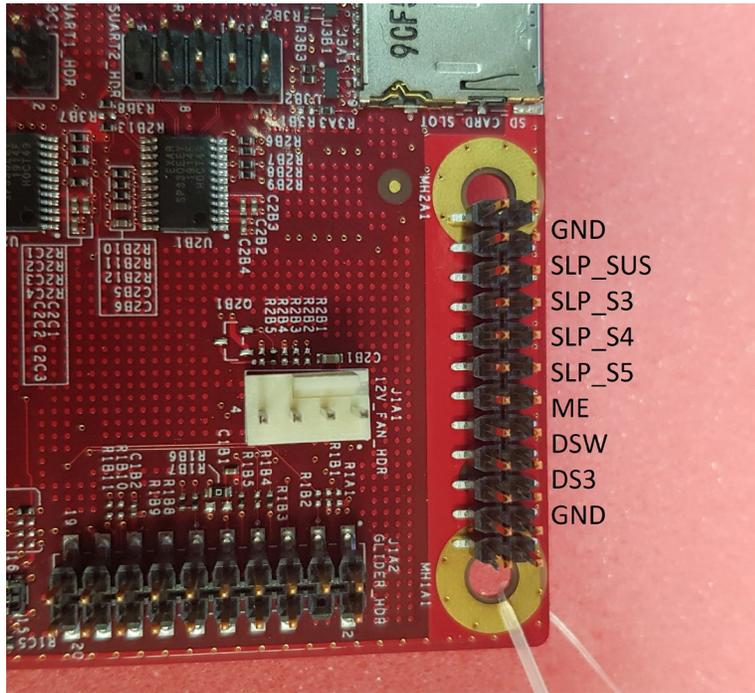


Table 2-2. Elkhart Lake CRB Platform Connections

Customers are required to solder Intel® APS sampling wires to the destination specified in the table below. Refer to pictures between [Figure 2-4](#) and [Figure 2-9](#)

Destination	Intel® APS3 Sampling Wire Label	Signal Name
R4D2.1	SLP_S5	PM_SLP_S5_N
J3M1-4	DSW/INEX2	+V.3A
J4T1-10	SLP_S3	PM_SLP_S3_N
J4T1-8	SLP_S4	PM_SLP_S4_N
J3M1-2	DS3/INEX1	+V3.3A_DSW
J2L1-4	SLP_SUS	PM_SLP_SUS_N

The figures below show the exact location of the destination:

Figure 2-4. Destination R4D2.1 exact location (Top)

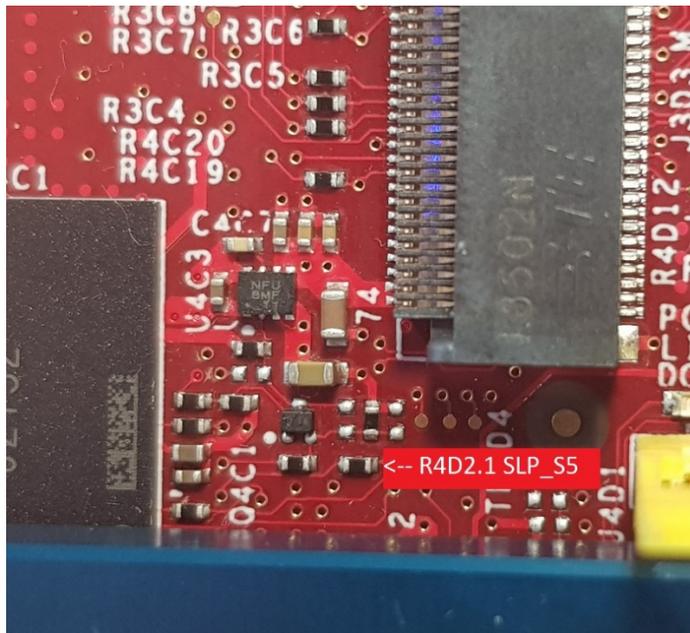


Figure 2-5. Destination J2L1-4 SLP_SUS exact location (Bottom)





Figure 2-6. Destination J2L1-4 exact location (Bottom)

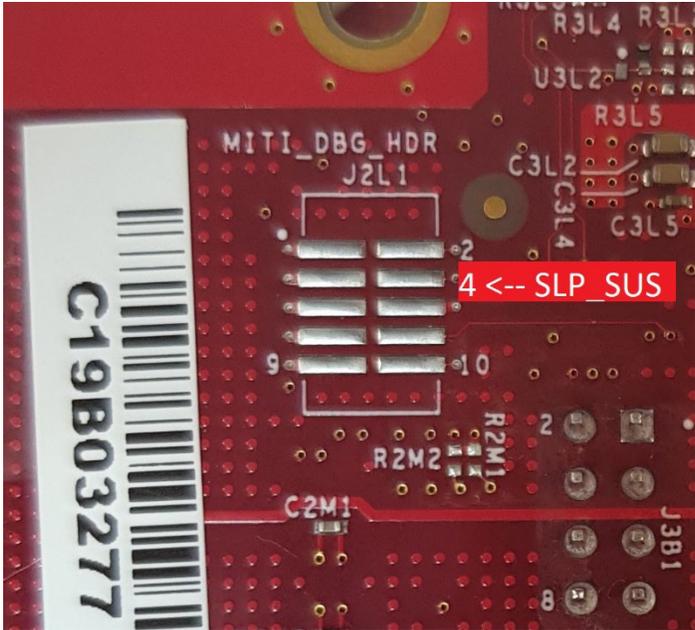


Figure 2-7. Destinations J4T1-8, J4T1-10 exact locations (Bottom)

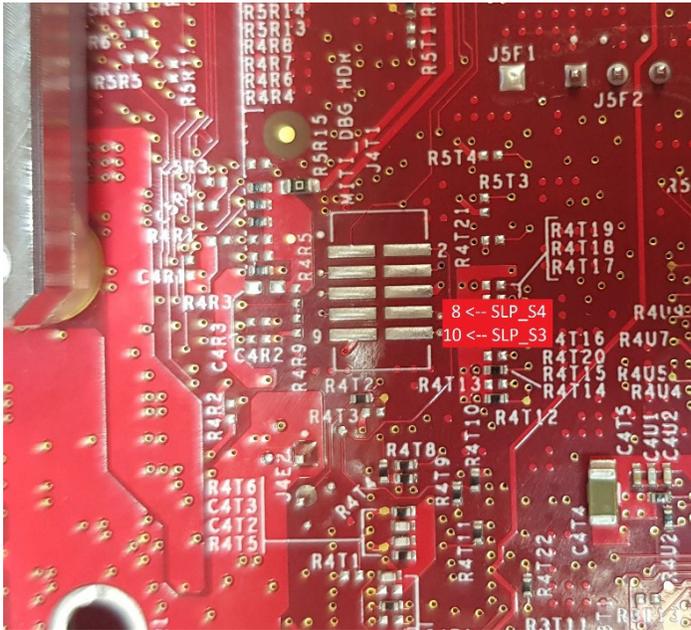


Figure 2-8. Destinations J3M1-2, J3M1-4 exact locations (Bottom)

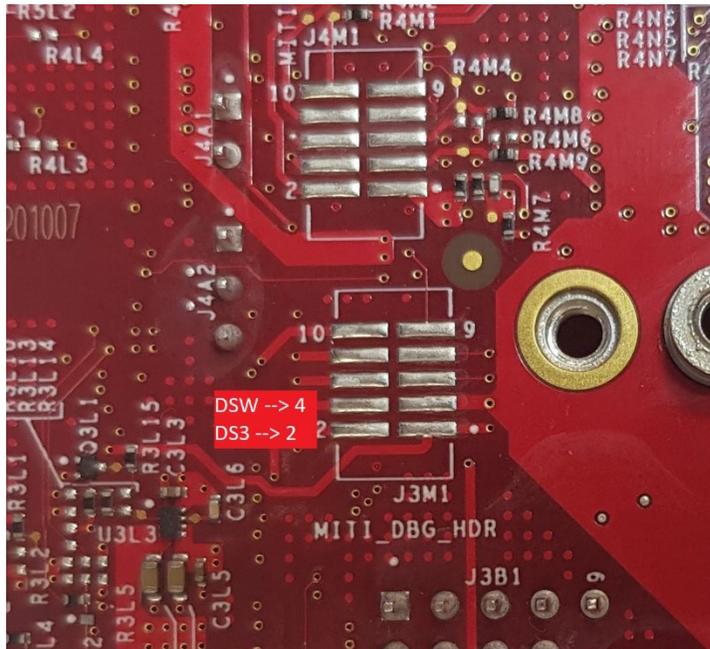
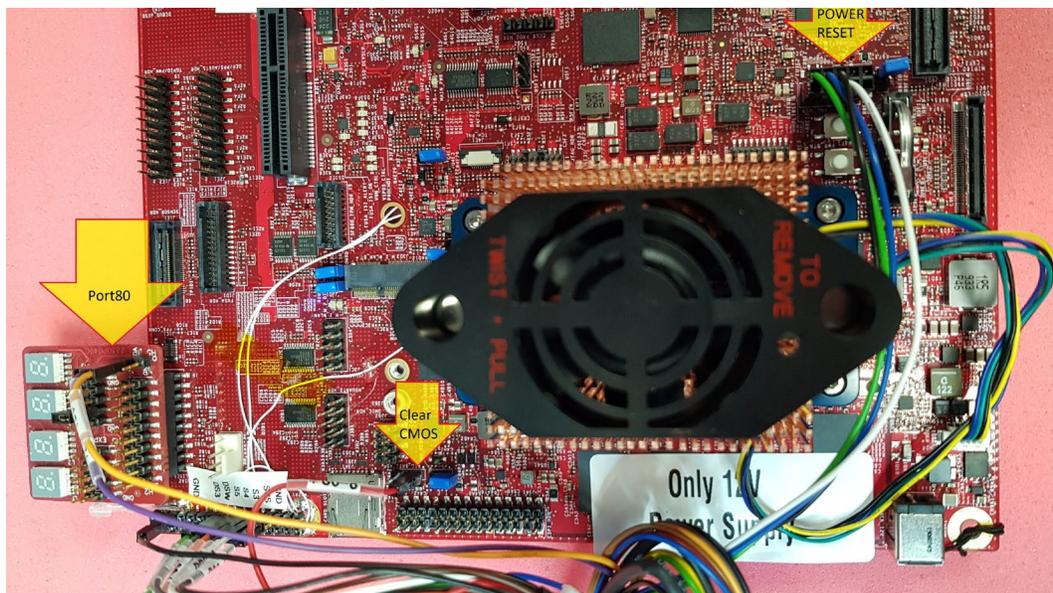


Figure 2-9. Power, CMOS and Reset cable connections on the EHL CRB



3 USB Switch

The Intel® APS includes the option to switch control of a USB device between 2 computers. This enables actions such as file transfer via USB key, USB Provisioning testing, etc.

The switching is performed via the Intel® APS Software.

3.1 Connecting the USB Switch

You set up the USB switching functionality by connecting a USB device and 2 computers to the USB sockets on the rear panel of the Intel® APS (refer Figure 1-2).

To set up USB switching functionality:

1. Connect the USB device to the Intel® APS **USB SW** socket.
2. Connect the first computer to the **USB 1 out** socket.
3. Connect the second computer to the **USB2 out** socket.

Figure 3-1. USB Disk on Key and two Computers Connected to Rear Panel



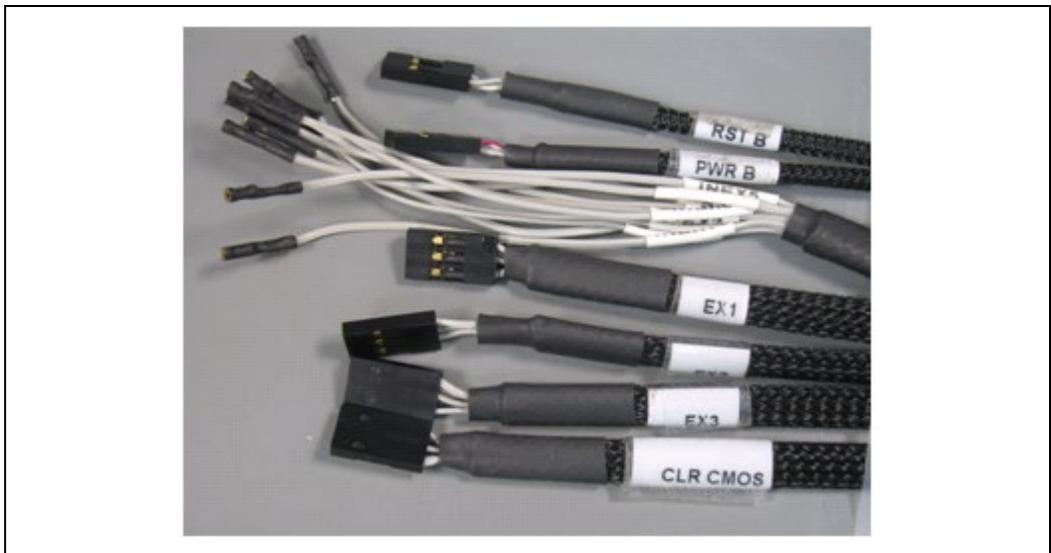
Appendix A Control Cables

A.1 Main Cable

Figure A-1. Main Cable Picture 1



Figure A-2. Main Cable Picture 2



A.2 EX1 Cable

Figure A-3. EX1 Cable Picture 1

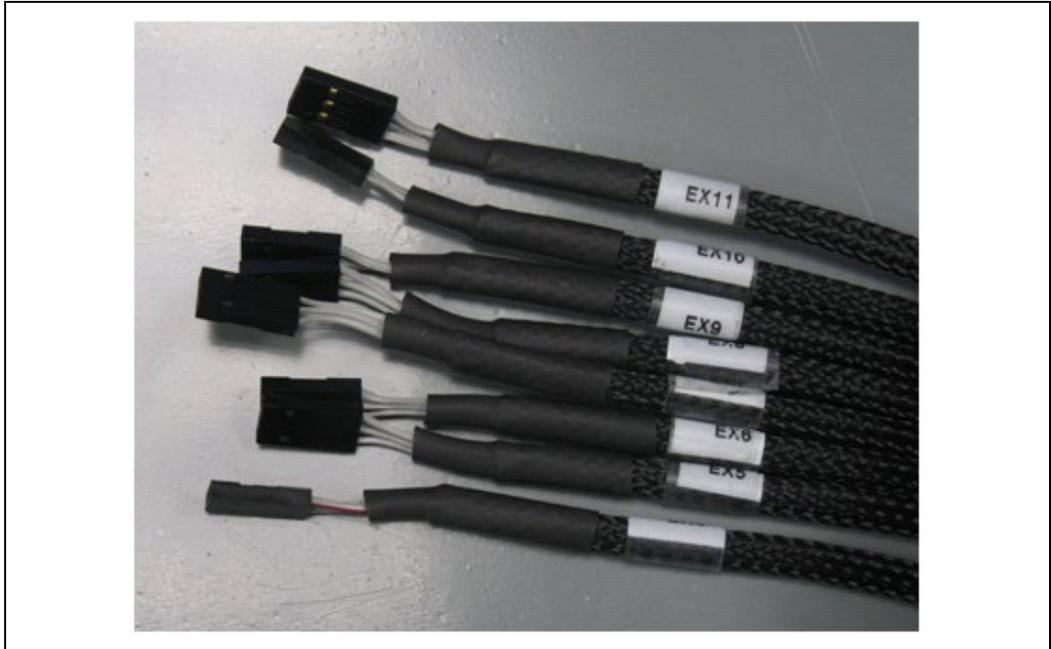


Figure A-4. EX1 Cable Picture 2





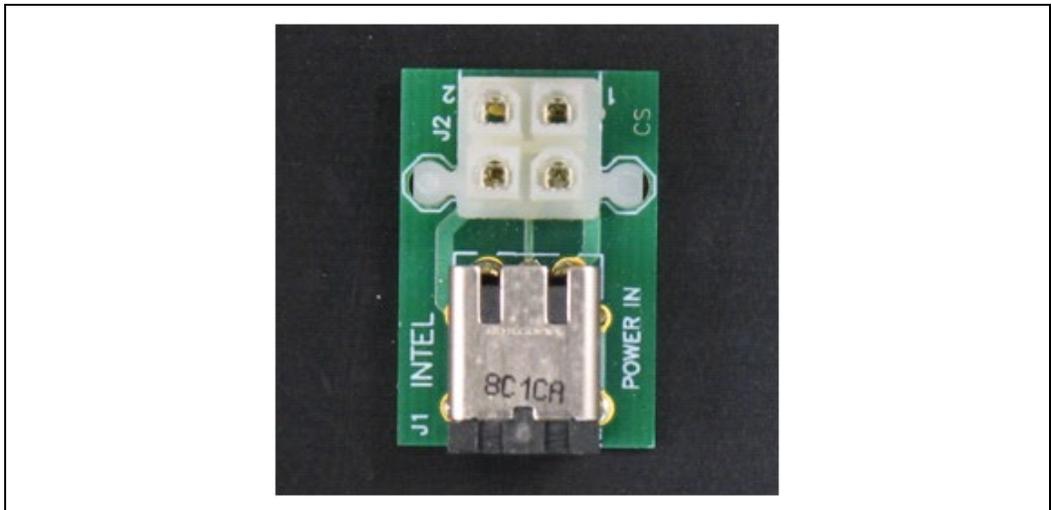
A.3 USB Data Cable

Figure A-5. USB A-B (Data Cable)



A.4 Mobile Platform Adapter Board

Figure A-6. Mobile Platform Adapter Board



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Appendix B Verifying Intel® APS Operation

After you have connected the Intel® APS, you should use the Intel® Automated Power Switch Software (Intel® APS Software) application to test its connectivity and functionality. For details, refer to the Intel® Automated Power Switch Software Installation User Guide.

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Appendix C Important Safety and Regulatory Information

C.1 Do Not Discard Document Must Remain With Product



This symbol on the DSK indicates that the user refers to the documentation for important information regarding potential hazards and actions to be taken.

Mains (AC power), DSK input and output: 100-240 V~ 50/60Hz 5A maximum.

Mains installation (overvoltage) category II (1500 V impulse).

Voltage fluctuation of +/- 10% maximum.

C.2 General Operating Conditions

Indoor Use only, commercial or industrial locations

Ambient temperature: 5°C to 40°C

Relative Humidity: 80% up to 31°C, decreasing linearly to 50% at 40°C

Altitude 0 to 2000m

Pollution Degree 2 (normally only non-conductive pollution occurs (dust, moisture) however temporary conductivity may occur).

To ensure safety connect APS3 Input/output ports ONLY to devices which are Listed, Approved, or Certified as required for use in your region.

Mains Power Input/Output: Some types of Desk Top Systems (the system under Test, SUT) may require more than 5 Amps. Prior to connecting the DSK to a SUT verify that the input current required is less than 5A at the mains voltage that is used.

C.3 Safety Warnings



This above symbol indicates risk of electric shock.



Risk of electric shock 

No user serviceable parts inside. AC mains voltages are present within the power supply and the DSK assembly.

	WARNING	
	RISK OF ELECTRIC SHOCK	
When the DSK is in use disconnect 2 input supply sources prior to servicing.		

Power Connect and Disconnect: The mains (AC power) cords (APS3 Power Supply and DSK) are the primary disconnect device from mains (AC power) and to remove all DC power from the ASP 3 and SUT. The socket outlets are installed near the equipment and is readily accessible.

	WARNING	
	RISK OF ELECTRIC SHOCK	
Connect only to a properly earth grounded outlet. Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk.		

System Earthing (Grounding): To avoid shock, ensure that the power cords are connected to properly wired and earth grounded socket outlets. Ensure that any equipment to which this product is attached is also connected to properly wired and earth grounded socket outlets.

	WARNING	
	RISK OF ELECTRIC SHOCK	
Do not attempt to modify or use the supplied AC power cord if it is not the exact type and rating required.		

Power Cord Requirements: The connector that plugs into the socket outlet must be a grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency in your region. The connectors that plug into the Appliance Inlets (AC receptacle) on the Intel® APS 3 must be an IEC 320, sheet C13, female connector. If the power cord supplied with the system does not meet requirements for use in your region discard the cord, do not use with adapters.



Lightning/Electrical Storm: Do not connect or disconnect any cables or perform installation or maintenance of this product during an electrical storm.

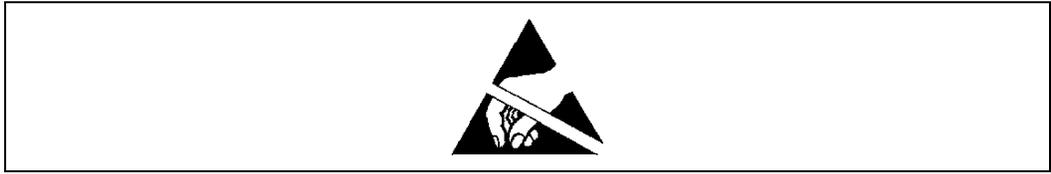


Risk of Fire: Cooling Requirements, Maintain a minimum clearance area of 5 centimeters (2 inches) around the side, front, and back of the product for cooling purposes; do not block ventilation openings in the front and rear panels.

C.4 FCC Statement

This equipment complies with FCC regulations by exemption as Industrial, Commercial or Medical test equipment (47 CFR 15.103) it is not intended for use in a residential location. This equipment generates uses and can radiate radio frequency energy which may result in harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is required to take measures to eliminate the interference.

C.5 Electrostatic Discharge Warning



A properly grounded ESD wrist strap must be worn during installation of the system, connection of cables to the SUT. Failure to do so may damage components within APS or the SUT.



Lithium Battery: Risk of explosion if the lithium battery is replaced by an incorrect type. Observe proper polarity when replacing battery. Dispose of used batteries according to local regulations.

Perchlorate Material: Lithium Battery contains perchlorate material, special handling may apply. Refer www.dtsc.ca.gov/hazardouswaste/perchlorate. This notice is required by California Code of Regulations, Title 22, Division 4.5, and Chapter 33: Best Management Practices for Perchlorate Materials. This product includes a battery which contains perchlorate material.