OpenVPX™ Trends and Updates

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14 January 2020

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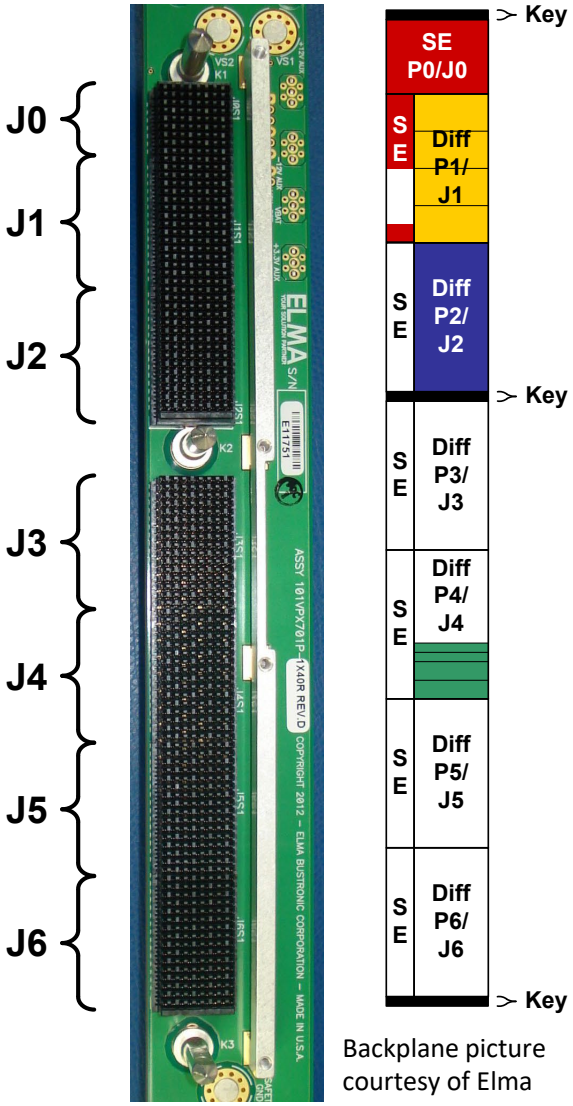
This work is sponsored by the Department of the Air Force under Air Force Contract #FA8702-15-D-0001. Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the United States Government.

Outline

- **OpenVPX and associated standards**
- **Relationship of OpenVPX with other standardization efforts**
- **OpenVPX plans and trends**
- **Improving interoperability by reducing number of voltages used**
  - Slot Profiles added by ANSI/VITA 65.0-2019 only use 12 VDC, 3.3V_AUX, and VBAT
- **Improving interoperability by minimizing User Defined pins**
  - Of the five 6U and six 3U Slot Profiles added by ANSI/VITA 65.0-2019, only one 6U and one 3U has User Defined pins



Backplane picture courtesy of Elma

Some of these slides were taken from the OpenVPX Tutorial. The full Tutorial as well as some others is available at: http://www.vita.com/Tutorials

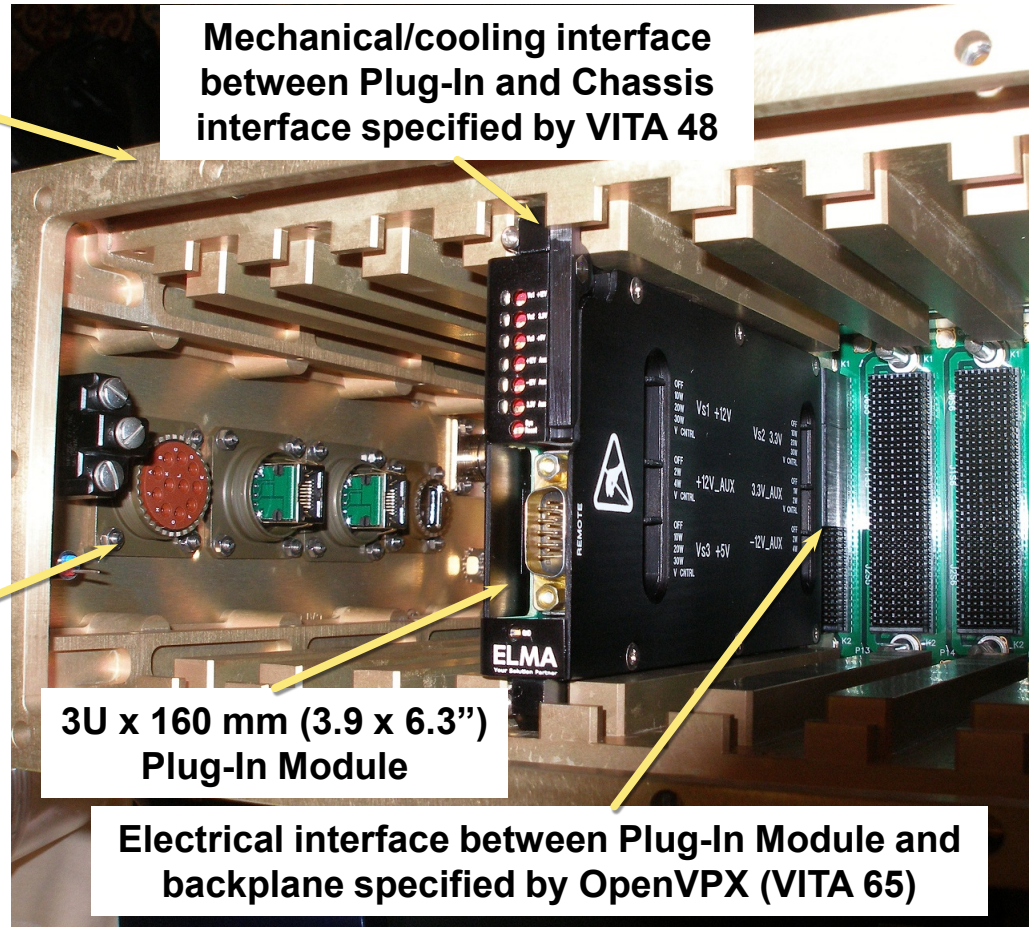
OpenVPX and Associated Standards

Conduction cooled chassis

Channels for cooling air

Chassis front panel

Pictures courtesy of Elma



Mechanical/cooling interface between Plug-In and Chassis interface specified by VITA 48

3U x 160 mm (3.9 x 6.3”) Plug-In Module

Electrical interface between Plug-In Module and backplane specified by OpenVPX (VITA 65)

- These standards define interfaces between Plug-In Modules and chassis for products intended to be deployed in harsh environments

Relationship of OpenVPX to Other Standardization Efforts

- **For what goes into OpenVPX, continuing to get input from:**
  - SOSA (Sensor Open Systems Architecture) Hardware Working Group
  - HOST (Hardware Open Systems Technology) community of both those working on it and those using it
  - Army C5ISR Center's CMOSS (C4ISR/EW Modular Open Suite of Standards) Community thru their influence of SOSA
- **Also taking input from VITA 65 Working Group back to SOSA**
  - Several of us participate in both VITA and SOSA
- **In SOSA we have discussions, which are ITAR controlled, to come up with best solutions in relation to target applications**
  - The VITA Standards Organization is international, so we cannot have discussions involving ITAR controlled and other sensitive information
- **Working to align SOSA, HOST, CMOSS and OpenVPX**
  - In terms of Slot and Module Profiles, expect SOSA, HOST, and CMOSS to continue to point at a subset of OpenVPX

OpenVPX Plans and Trends

- **New version of OpenVPX™ Published November 2019**
  - ANSI/VITA 65.0-2019, OpenVPX™ System Standard; November 2019
  - ANSI/VITA 65.1-2019, OpenVPX™ System Standard – Profile Tables; November 2019
- **Working to further improve interoperability**
  - Moving ecosystem toward Plug-In Modules only using 12 VDC, 3.3V_AUX and VBAT
  - Most of the new Slot Profiles have no UD (User Defined) pins
    - Of the five 6U and six 3U Slot Profiles added by ANSI/VITA 65.0-2019, only one 6U and one 3U has UD pins
  - Intended that where User Defined pins needed, restrict them to a few specific slots
- **The VITA 65 Working Group is working on the next version, expect:**
  - To add higher density optical and coax blind mate (backplane) connector
  - Additional Module Profiles using 100 Gbit Ethernet (both optical and copper)
    - ANSI/VITA 65.1-2019 only has a few using 100 Gbit Ethernet over optical and none over copper
  - Continue trend of avoiding User Defined pins with most new Slot Profiles
  - To be published in 2020 or early 2021

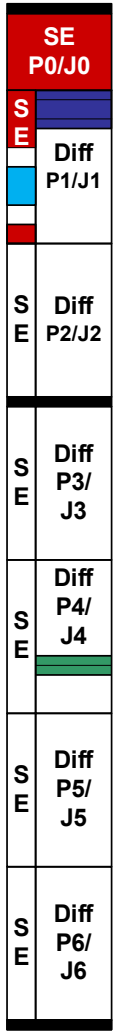
Recommend 12 VDC Only for Plug-In Module Power

6U Plug-In Module Power Supplies		
Pin name	2017 usage	Recommended starting in 2019
VS1	+12 VDC	+12 VDC
VS2		
VS3	+5 VDC	Not used
+12V_AUX	+12 VDC	Not used
-12V_AUX	-12 VDC	Not used
3.3V_AUX	+3.3 VDC	+3.3 VDC
VBAT	+3 VDC	+3 VDC

3U Plug-In Module Power Supplies		
Pin name	2017 usage	Recommended starting in 2019
VS1	+12 VDC	+12 VDC
VS2	+3.3 VDC	Not used
VS3	+5 VDC	Not used
+12V_AUX	+12 VDC	Not used
-12V_AUX	-12 VDC	Not used
3.3V_AUX	+3.3 VDC	+3.3 VDC
VBAT	+3 VDC	+3 VDC

- **Plug-In Modules using multiple supplies makes it more difficult to interchange boards**
  - If have chassis full of Plug-In Modules using primarily 5 VDC and then change to ones using primarily 12 VDC, will probably need to change power supply also.
- **With ANSI/VITA 65.0-2019 have Recommendations for Plug-In Modules to only use 12 VDC, 3.3V_AUX, and VBAT**
  - In ANSI/VITA 65.0-2019 see Sections 3.2.1 and Section 8.8
- **Backplanes still required to have distribution busses for all supplies**
  - Up to system integrators as to how much power to make available on each buss
- **Slot Profiles added to ANSI/VITA 65.0-2019 decide on a Slot Profile by Slot Profile basis whether a given Slot Profile's Module Profiles will be 12 VDC, 3.3V_AUX, and VBAT only**
  - All the ones added only use 12 VDC, 3.3V_AUX, and VBAT
- **Intent of recommendations is to gradually migrate the ecosystem to 12 VDC, 3.3V_AUX, and VBAT only**
  - Some end customers might require this for all Slot Profiles used in their system.

6U Slot Profiles Added by ANSI/VITA 65.0-2019



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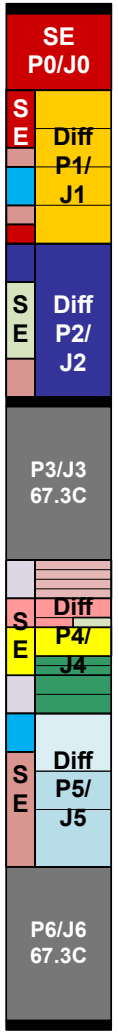

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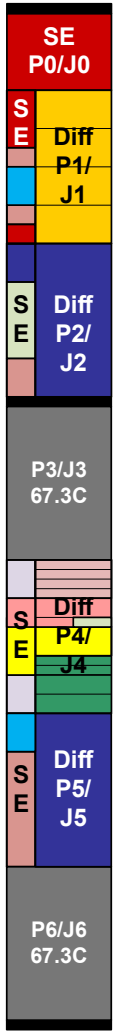

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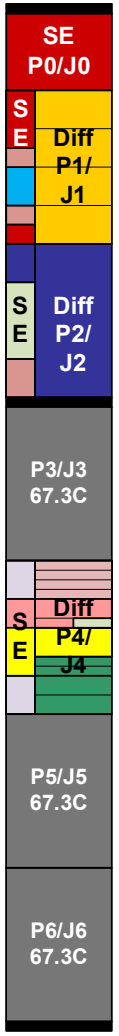

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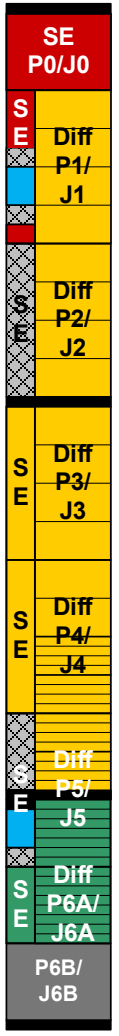
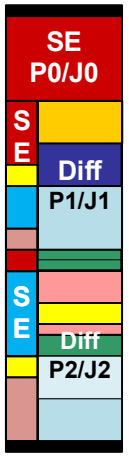


SLT6-SWH-. . .-10.8.1

- **Module Profiles for these Slot Profiles only use the following for power from the backplane:**
  - 12 VDC (VS1 and VS2)
  - 3.3V_AUX
  - VBAT
- **SLT6-PAY-4U2U-10.2.8 is the only one of these with UD (User Defined) pins**

3U Slot Profiles Added by ANSI/VITA 65.0-2019



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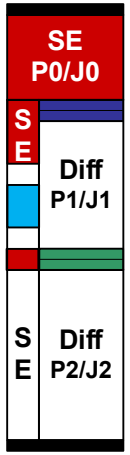

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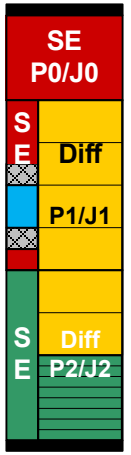
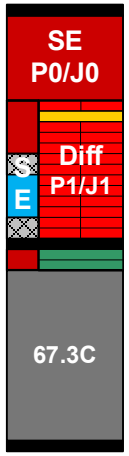


SLT3-SWH-6F8U-14.4.15

SLT3-PAY-. . .-14.6.13

SLT3-PAY-. . .-14.6.14

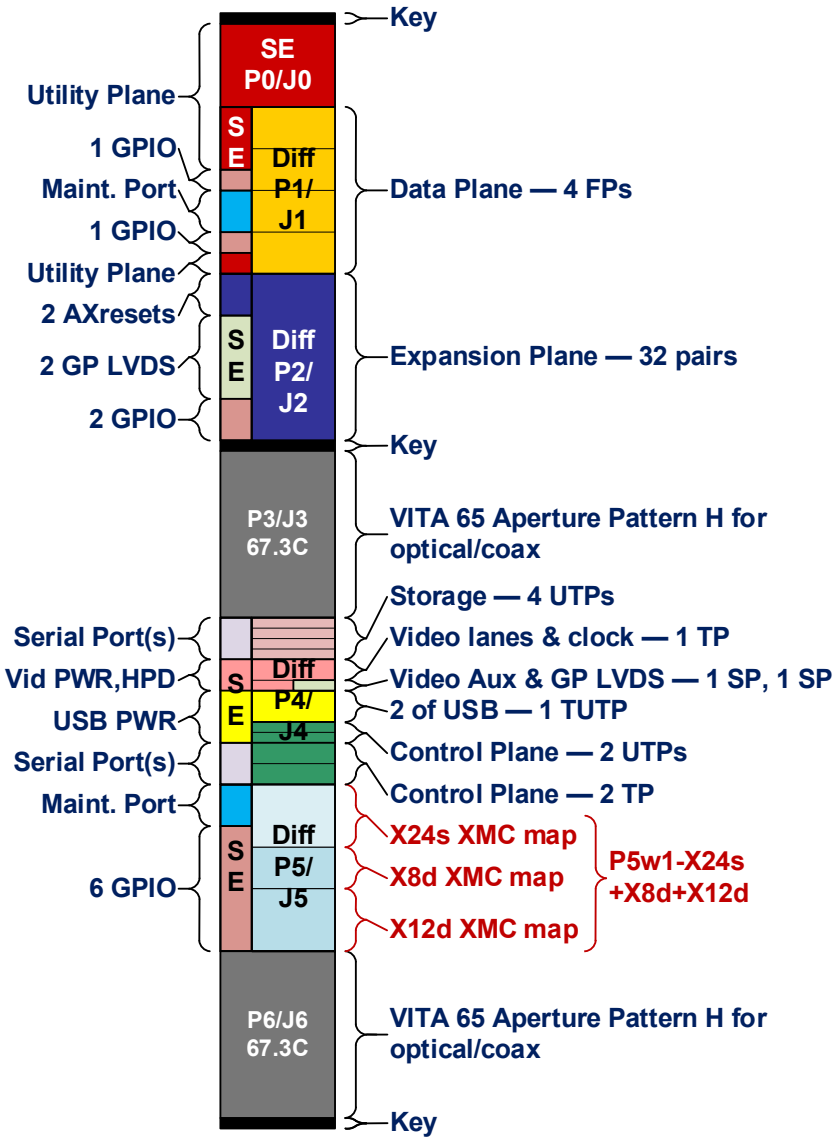


SLT3-PAY-. . .-14.9.2

- **Module Profiles for these Slot Profiles only use the following for power from the backplane:**
  - 12 VDC (VS1)
  - 3.3V_AUX
  - VBAT
- **SLT3-PAY-2U2U-14.2.17 is the only one of these with UD (User Defined) pins**

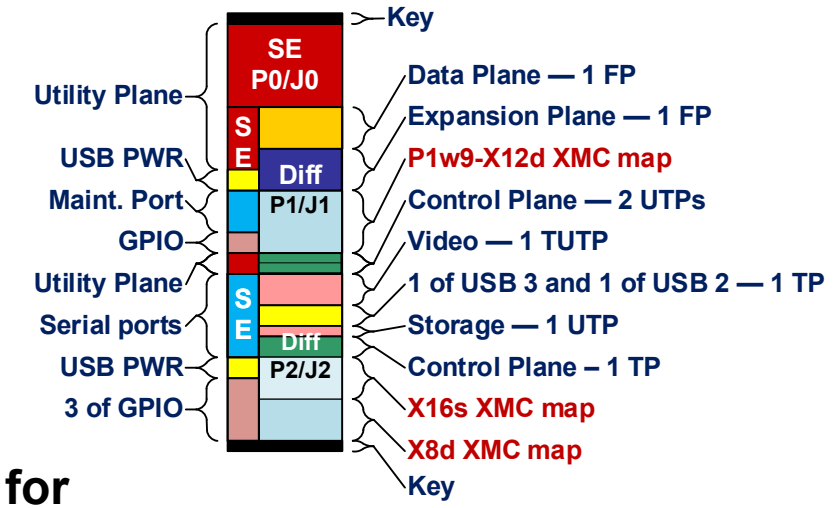
Isolating User Defined Pins to a Small Number of Slots

SLT6-PAY-4F1Q1H4U1T1S1S1TU2U2T1H-10.6.3-n



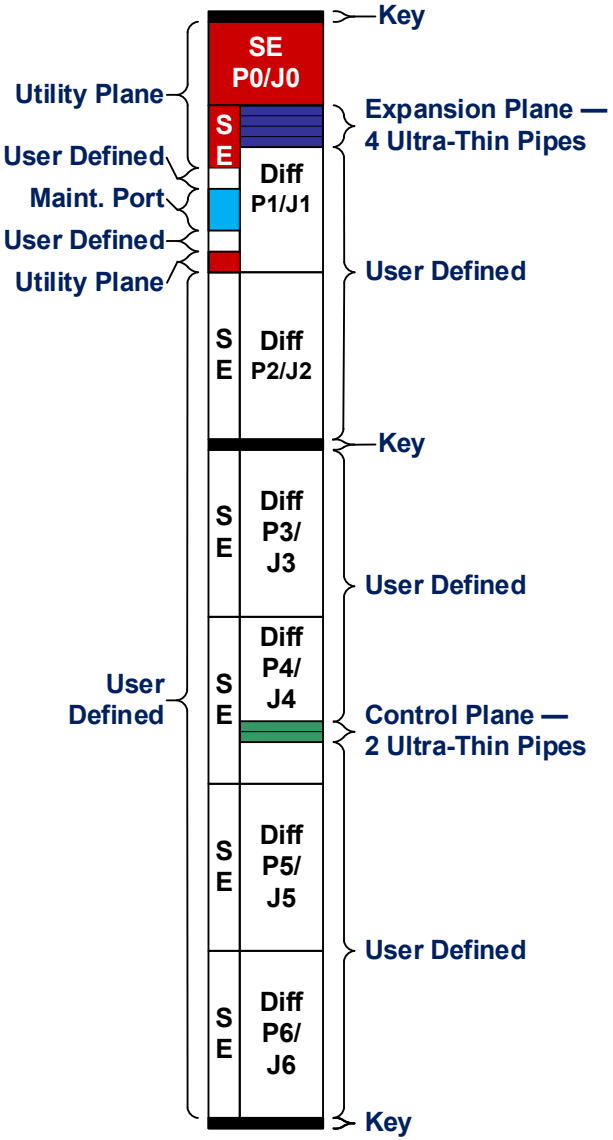
- **Use network interfaces for control when practical**
  - Avoid using discretes (individual signals) as much as practical
- **Many applications will require use of discretes**
- **These Slot Profiles are intended for SBCs (Single Board Computers) with XMC sites**
  - 6U also intended for other applications such as RF input/output
- **Drive system specific pins, such as discretes, using XMC**
  - XMC can be system specific and stay with the platform as SBC upgraded
  - Use XMC for driving legacy signals
- **If all the needed system specific pins do not fit available XMC sites use Slot Profiles with lots of UD pins**

SLT3-PAY-1F1F2U1TU1T1U1T-14.2.16



Slot Profiles with Lots of User Defined Pins

SLT6-PAY-4U2U-10.2.8



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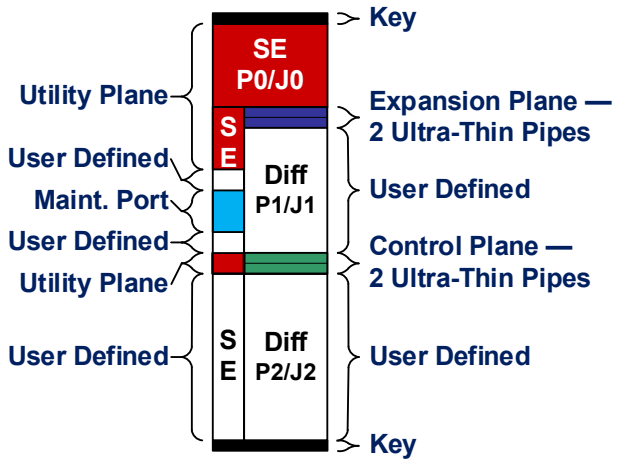
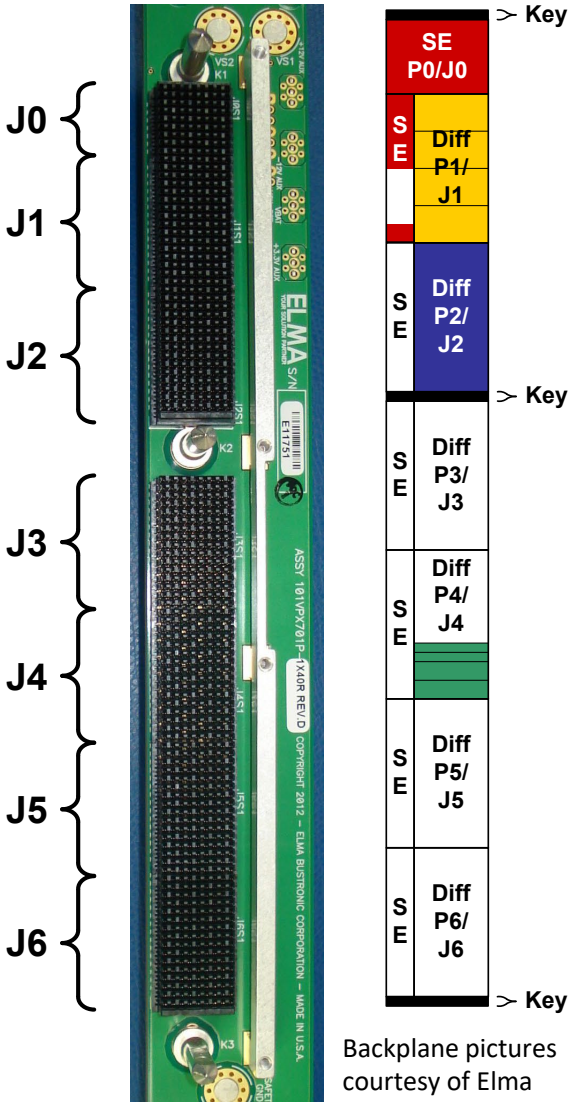


- **If cannot fit the required system specific pins on XMCs use these Slot Profiles**
  - SOSA refers to these Slot Profiles as being for system specific interfaces
- **Get all the User Defined pins driven by a few slots**
- **Intended for one of two use models:**
  1. Subservient to other Plug-In Module(s) via Expansion Plane
  2. Able to receive commands from many Plug-In Modules via Control Plane

Summary

- **ANSI/VITA 65.0-2019 and 65.1-2019 were published November 2017**
  - All the new Slot Profile have Module Profiles requiring only 12 VDC, 3.3V_AUX, and VBAT be used
- **User Defined pins can inhibit interoperability**
  - Most of the new Slot Profiles have no User Defined pins
- **SOSA, HOST, and CMOSS communities being used to get input for next revision of OpenVPX standards**
- **The VITA 65 Working Group is working on the next version**



Backplane pictures courtesy of Elma