VITA RF
PRODUCT PORTFOLIO
ENABLING AN OPEN VPX WORLD
VITA 67.3 OVERVIEW

The VITA 67.3 specification draws on the solutions provided in 67.1 and 67.2 but is unique as it doesn’t define the locations of the ports like its predecessors. Additionally, floating contacts have been moved to the Backplane side (vs the Plug-In side in 67.1 and 67.2). These two changes were implemented to allow Plug-In Module designers the freedom to implement direct RF connector PCB launches on the carrier and/or any mezzanine card, eliminating the requirement for RF cable assemblies on the Plug-In Module. However cable options are available and still permitted.

Chassis and card-manufactures work toward developing an interoperable solution satisfying their immediate density and performance related challenges. In order to assure the most robust solutions, it is advisable to use modules and contacts from the same manufacturers. However, fully populated Plug-In Modules utilizing V67.3 hardware from two different OEMs qualified to the VPX standard can plug-in to the same Backplane slot.

VITA 67.3 Connector Modules C, D and E were developed to take advantage of the 1” pitch between adjacent Plug-In Modules. SV Microwave has created a variety of Backplane Connector modules fitting the Module C envelope. While we can customize these to accommodate any application, the most widely adopted options have been the 10 and 14 port configurations that are now available in our global distribution channel.
SV Microwave’s VITA 67.3 SMPM series electrical and mechanical performance meet and exceed the standards specified in ANSI/VITA67.3-2017, listed below for reference.

### SPECIFICATIONS – VITA 67.3 SMPM (MATED PAIR)

<table>
<thead>
<tr>
<th>ELECTRICAL</th>
<th>MECHANICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSWR</td>
<td>Axial Travel</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>Radial Float</td>
</tr>
</tbody>
</table>

#### Electrical Specifications

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Requirement</th>
<th>Cross Talk Requirement (dB MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MHz to 40 GHz</td>
<td>1.5:1 Max</td>
<td>3 MHz to 30 MHz: ≥ 140 dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 MHz to 3 GHz: ≥ 120 dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 GHz to 27 GHz: ≥ 100 dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27 GHz to 40 GHz: ≥ 90 dB</td>
</tr>
<tr>
<td>3 MHz to 30 MHz</td>
<td>30 dBm</td>
<td>Engage Force: 3.5 lbs (typ)</td>
</tr>
<tr>
<td>30 MHz to 3 GHz</td>
<td>20 dBm</td>
<td>Disengage Force: 3.5 lbs (typ)</td>
</tr>
<tr>
<td>3 GHz to 40 GHz</td>
<td>20 dBm</td>
<td>Min Pitch (.047”): ≥ 120 dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Min Pitch (.086”): ≥ 90 dB</td>
</tr>
</tbody>
</table>

#### Mechanical Specifications

<table>
<thead>
<tr>
<th>Power Handling</th>
<th>Spring Force (Full Deflection)</th>
<th>Vibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 MHz to 30 MHz</td>
<td>30 dBm</td>
<td>MIL-STD-810</td>
</tr>
<tr>
<td>30 MHz to 3 GHz</td>
<td>20 dBm</td>
<td></td>
</tr>
<tr>
<td>3 GHz to 40 GHz</td>
<td>20 dBm</td>
<td></td>
</tr>
</tbody>
</table>

### VITA 67.3 SMPM BACKPLANE CONNECTOR MODULES

- **VITA 67.3 SMPM 10-Port Backplane Connector Module**
  - SV PN: SF9321-60059

- **VITA 67.3 SMPM 14-Port Backplane Connector Module**
  - SV PN: SF9321-60086

- **VITA 67.3 SMPM Backplane Contact For Ø.086” Cable**
  - SV PN: 3221-40066

- **VITA 67.3 SMPM Backplane Contact For Ø.047” Cable**
  - SV PN: 3221-40071

- **VITA 67.3 SMPM Bullet Insertion/Removal Tool**
  - SV PN: 500-32-007

- **VITA 67.3 SMPM Contact Removal Tool**
  - SV PN: 500-32-015
VITA 67.3 SMPM PLUG-IN CONNECTOR MODULES

Plug-In Connector Modules are manufactured by a variety of embedded systems technology companies with the common goal of interfacing to the Backplane. SV offers a variety of SMPM Plug-In Connector Modules and contact options as COTS parts.

SV’s VITA 67.3 product line has been extended to include SMPM fixed length cable assembly configurations. These standard items are stocking with SV’s distribution partners for quick turn prototyping. Once functionality is verified, contact SV directly for customized cable solutions – whether you are looking for low loss, phase stability or phase/delay matched sets, SV can build a custom cable to meet your needs.
Mated pair testing of Backplane and Plug-In Connector Modules confirms specification data. Positioning of gate flags is important since the specification references mated pair performance; SV can provide a full signal path solution that includes almost any standard RF interface. The aluminum block shown in Figure 4 holds the male and female contacts in the proper alignment position during testing, replicating the geometry of the end application.
VITA 67.3 SMPS MODULES

In order to support design flexibility, increased data rates and high density requirements of VPX platforms, SV Microwave has designed VITA 67.3 modules with our smallest high performance interface - the SMPS series. The SMPS series has been an industry standard for over 10 years and is used extensively in some of the most demanding US MIL-AERO programs. The SMPS interface is currently being adopted as a DLA Standard under the name SMP3. SV’s SMPS contacts are compatible with the DLA open standard.

### SPECIFICATIONS – VITA 67.3 SMPS (MATED PAIR)

<table>
<thead>
<tr>
<th>ELECTRICAL</th>
<th>MECHANICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VSWR</strong></td>
<td>Axial Travel</td>
</tr>
<tr>
<td>2 MHz to 67 GHz</td>
<td>1.5:1 Max (1.35:1 (typ))</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>Radial Float</td>
</tr>
<tr>
<td>2 MHz to 67 GHz</td>
<td>.12 * (\sqrt{f(GHz)})</td>
</tr>
<tr>
<td><strong>Cross Talk Requirement (dB MIN)</strong></td>
<td>Engage/Disengage Force</td>
</tr>
<tr>
<td>3 MHz to 30 MHz</td>
<td>≥ 140 dB</td>
</tr>
<tr>
<td>30 MHz to 3 GHz</td>
<td>≥ 120 dB</td>
</tr>
<tr>
<td>3 GHz to 27 GHz</td>
<td>≥ 100 dB</td>
</tr>
<tr>
<td>27 GHz to 40 GHz</td>
<td>≥ 90 dB</td>
</tr>
<tr>
<td><strong>Power Handling</strong></td>
<td>Nominal Mated Condition</td>
</tr>
<tr>
<td>3 MHz to 30 MHz</td>
<td>30 dBm</td>
</tr>
<tr>
<td>30 MHz to 3 GHz</td>
<td>20 dBm</td>
</tr>
<tr>
<td>3 GHz to 40 GHz</td>
<td>20 dBm</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### VITA 67.3 SMPS BACKPLANE CONNECTOR MODULES

- **VITA 67.3 SMPS 19-Port Backplane Connector Module**
  - SV PN: SF9321-60093
  - only for Ø.047” cable
- **VITA 67.3 SMPS 12-Port Backplane Connector Module**
  - SV PN: SF9321-60084
  - only for Ø.047” cable
- **VITA 67.3 SMPS Backplane Contact**
  - For Ø.086” Cable
  - SV PN: 3821-40024
- **VITA 67.3 SMPS Backplane Contact**
  - For Ø.047” Cable
  - SV PN: 3821-40023
- **VITA 67.3 SMPS Bullet Insertion/Removal Tool**
  - SV PN: 500-38-004
- **VITA 67.3 SMPS Contact Removal Tool**
  - SV PN: 500-38-006
VITA 67.3 SMPS Plug-In Connector Modules slightly differ from their SMPM predecessor. These contacts have either snap-in or flange mounted features which are tightly pitched and stay aligned via precision holes in the Plug-In Connector Module.

SV’s VITA 67.3 product line has been extended to include SMPS fixed length cable assembly configurations. These standard items are stocking with SV’s distribution partners for quick turn prototyping. Once functionality is verified, contact SV directly for customized cable solutions – whether you are looking for low loss, phase stability or phase/delay matched sets, SV can build a custom cable to meet your needs.
Mated pair testing of Backplane and Plug-In Connector Modules confirms specification data. Below you will see our test configuration and data.

Figure 3
Test Setup for Mated Pair VITA 67.3 SMPS

Figure 3.1
Gate flag position for SMPS Mated Pair Measurement

Figure 3.2
Gated VSWR Plot (typical)

Figure 3.3
Electrical Isolation Plot (Mated Pair)
VITA 67.1 AND 67.2 OVERVIEW

The VITA 67.1 and 67.2 Open VPX standards have enjoyed growing popularity in recent years as they are adopted by an increasing number of DOD programs. SV Microwave, as a leader in the development of 67.1 and 67.2, continues to support these important products both directly and through a wide product offering in our distribution channel. Key features include:

- Populated Plug-In Connector Modules inter-mate with Backplane Connector Modules across multiple qualified manufacturers
- Plug-In Connector Modules must be populated by that manufacturer’s Plug-In Contact

**VITA 67.1 SMPM**
- 4-Port (1/2 width) Backplane Connector Module
  - SV PN: SF1132-6037

**VITA 67.2 SMPM**
- 8-Port (full width) Backplane Connector Module
  - SV PN: SF1132-6036

**VITA 67.1 SMPM**
- 4-Port (1/2 width) Plug-In Connector Module
  - SV PN: SF9321-60015

**VITA 67.2 SMPM**
- 8-Port (full width) Plug-In Connector Module
  - SV PN: SF9321-60013

**VITA 67.1/67.2 SMPM**
- Plug-In Contact
  - For Ø.047” Cable
    - SV PN: 3221-40019

**VITA 67.1/67.2 SMPM**
- Contact Removal Tool
  - SV PN: 500-32-022

**VITA 67.1/67.2 SMPM**
- Plug-In Contact
  - For Ø.085” Cable
    - SV PN: 3221-40022

**SMPM Female VITA 67.1/67.2 to SMA Male Cable Assembly**
- For Ø.085” Cable
  - SV PN: 7032-6729-060 (6”)
  - SV PN: 7032-6729-120 (12”)

**SMPM Female VITA 67.1/67.2 to SMA Male Cable Assembly**
- For Ø.047” Cable
  - SV PN: 7032-6728-060 (6”)
  - SV PN: 7032-6728-120 (12”)

SV can also terminate your VITA backplane cables to a variety of multiport I/O panel solutions. Rather than cabling to individual I/O connectors, it is often advantageous to use a multiport I/O connector such as a D38999 circular or rectangular multiport for increased density and ruggedization. Below are just a few examples of the many solutions that SV has for these applications.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>INTERFACE</th>
<th>CABLE</th>
<th>TYPE</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>BMA</td>
<td>Ø.086&quot;</td>
<td>Socket</td>
<td>SF9411-6000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pin</td>
<td>SF9421-6000</td>
</tr>
<tr>
<td>12</td>
<td>SMPM</td>
<td>Ø.047&quot;</td>
<td>Socket</td>
<td>SF3251-60004</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pin</td>
<td>3241-40004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ø.086&quot;</td>
<td>Socket</td>
<td>SF3211-6004</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pin</td>
<td>3221-4002</td>
</tr>
<tr>
<td>16</td>
<td>SMPS</td>
<td>Ø.047&quot;</td>
<td>Socket</td>
<td>SF9911-60001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pin</td>
<td>9921-40001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ø.086&quot;</td>
<td>Socket</td>
<td>9351-40029</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pin</td>
<td>9341-40043</td>
</tr>
</tbody>
</table>
SV Microwave also manufactures a variety of hybrid VITA modules. These modules contain both VITA compliant coaxial cavities and Multi-Mode MT Ferrules in compliance with the VITA 66 standard. Our catalog of hybrid modules is highly customizable and constantly expanding. A few examples are shown below. Check our website www.svmicrowave.com for a full list of the latest VITA and SOSA-aligned module offerings.
SV Microwave’s Rapid Response Cable Builder offers VITA 67.1, 67.2 and 67.3 cable assemblies online. These cables are custom made and ship within 5-10 business days. For more information, please visit our website at http://svmicrowave.com/products/rf-cable-builder
VITA 67.3 SMPM contacts have a unique ‘contact + adapter’ configuration that enables them to be easily assembled and removed from the Backplane Connector Module and provide excellent radial captivation on the multiport block.

**Figure 9**
Contact Installation to Connector Module (by hand)

**Figure 9.1**
Bullet Installation to Contact. Uses Tool PN 500-32-007.

**Figure 9.2**
Bullet Fully Seated in Contact

**Figure 9.3**
Final Assembly. Connector Module + Contact + Bullet.

**Figure 9.4**
Bullet Removed From Contact. Uses Tool PN 500-32-007.

**Figure 9.5**
Bullet Removed From Contact

**Figure 9.6**
Contact Removed. Uses Tool PN 500-32-015.

**Figure 9.7**
Contact Removed from Block

**APPENDIX I**
INSTALLATION INSTRUCTIONS: VITA 67.3 SMPM

To remove the contacts (once adapters are extracted), removal tool PN 500-32-015 is used to compress the clip and plunge the contact from the housing. SV Microwave has also developed an extended length removal tool (not shown, PN 500-32-042) for deep chassis applications.

**Figure 9.4**
Bullet Removed From Contact. Uses Tool PN 500-32-007.

**Figure 9.5**
Bullet Removed From Contact

**Figure 9.6**
Contact Removed. Uses Tool PN 500-32-015.

**Figure 9.7**
Contact Removed from Block
APPENDIX II

INSTALLATION INSTRUCTIONS: VITA 67.3 SMPS

VITA 67.3 SMPS contacts have a similar ‘contact + adapter’ configuration to the SMPM series. However, in the SMPS series the Female-Female bullet is replaced by a Female-Male adapter. This feature enables quick installation, removal, and centering of the contact relative to the connector module.

To remove the contacts (once the adapters are extracted), removal tool PN 500-38-006 is used to compress the clip and plunge the contact from the housing.
APPENDIX III
CABLE AND CONNECTOR ROUTING OPTIONS

This Appendix has been included to illustrate some pictorial examples showing routing options for terminating backplane and Plug-In modules.

Stacking circuit boards can achieve the highest signal density. Cards can be stacked and aligned with the connector rows. In this example with a 14-Port VITA 67.2 SMPS Plug-In Module, there are four rows for stacked circuit boards.

In this Plug-In Module, adapter contacts (SF1138-6020) are used with SMPS adapters (“bullets”, PN 1138-4001) and SMPS Edge Launch connectors (3285-6001) to launch the signal directly from the module to the PCB.

In this mated set of VITA 67.3 SMPM modules, the modules are cabled on both sides. The Backplane Module uses a standard SMPM contact (3221-40066). The top two Plug-In Modules are using snap-in SMPM cable contacts (3211-60350) terminated to Ø.086” flex cable.