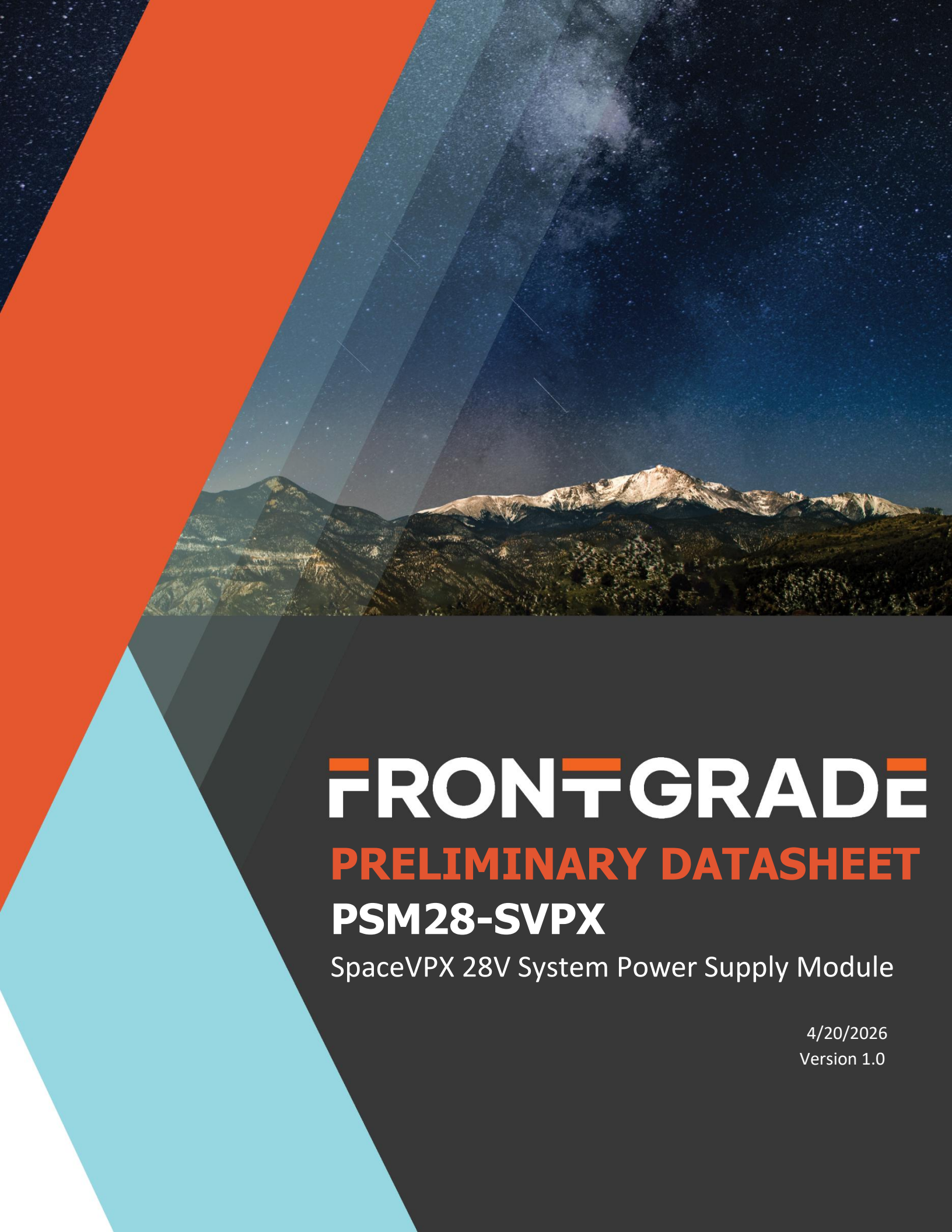




FRONTGRADE

PRELIMINARY DATASHEET

PSM28-SVPX

SpaceVPX 28V System Power Supply Module

4/20/2026
Version 1.0



Introduction

The Frontgrade™ PSM28-SVPX is a compact 3U SpaceVPX power supply designed with MAMBA architecture and GaN technology for high-efficiency DC-DC conversion. It delivers regulated 12V power from unregulated 28V input with 20A peak output and $\pm 5\%$ tolerance, ensuring stable performance for deep space and low-Earth orbit missions.

Optimized for SpaceVPX (VITA 78.0) systems, the PSM28-SVPX maintains SWaP efficiency while distributing reliable power across payloads. Its modular design provides one primary unswitched 12V rail and up to six switched 12V rails, each capable of 100W continuous output, reducing system complexity and saving valuable backplane space.

The embedded UT32M0R500 ARM Cortex-M0+ microcontroller adds intelligent power management through switching control, health monitoring, diagnostics, and thermal regulation, improving reliability and mission sustainability.

Seamlessly integrating with Frontgrade's reconfigurable processing platforms, the PSM28-SVPX supports plug-and-play scalability. Parallel operation with current sharing allows designers to expand power delivery without redesigning system architecture, enhancing redundancy and flexibility.

Whether used independently or in multi-module configurations, the PSM28-SVPX provides dependable, intelligent power distribution tailored to critical space applications.

Applications

- Satellites & Deep Space Missions
- Scientific Instruments & Payloads
- Space-Based Communication Systems
- Supports high-efficiency operation in both LEO (low-Earth orbit) constellations and deep-space exploration missions.
- Powers flight computers, command and data handling units, and reconfigurable processing system

Why it Matters

The PSM28-SVPX power supply matters because it delivers **reliable, efficient, and scalable power** in the **extreme and harsh environments**, where failure is not an option. By combining high-efficiency DC-DC conversion, radiation tolerance, and intelligent power management, it ensures stable operation for mission critical systems like flight computers, payloads, and communication equipment. Its modular, SpaceVPX-aligned design reduces system complexity while enabling flexibility and redundancy through parallel operation, making it easier to scale power as mission demands grow. Ultimately, this capability supports longer mission lifespans, improved reliability, and more adaptable system architectures.

Ordering Information

Ordering PN	Product Grade	Target Mission Class / Environment
PSM28-SVPX-OP-EDU	EM (Room Temp only)	Lab / Development Use Cases
PSM28-SVPX -OP-FM4	COTS Parts Grade (-10°C to +50°C)	Target Mission Class D
PSM28-SVPX -OP-FM3	Level 3 Parts Grade (-10°C to +50°C)	Target Mission Class C

Note: Frontgrade makes best effort to fit equivalent parts grading to build corresponding FM# level, but exceptions should be expected, particularly where Level 1 or Level 2 parts grades are not achievable/practical for standard hardware builds.

Features

Primary Input Power

- 24Vdc to 36Vdc Input range, 28V Nominal
- 42Vdc for 2 seconds Survival Limit
- 150uF Max Input Capacitance
- Isolated from secondary > 1 Meg ohm at 50V
- MIL-STD-461 Revision G capable
- 15 pin D-sub–Input Voltage Connector

Secondary Output Power

- 12V at 240W (peak), 100W Nominal continuous power
- 12V at 100W per switched output
- Seven 12V outputs
 - Total power sharable between outputs
 - Six Switchable 12Vdc outputs
 - One non-switchable – “always on” 12Vdc output
 - 8A max per output

Telemetry

- 3.3V Local Voltage
- 12V Output Voltage
- 28V Input Bus Current
- Unswitched 12Vdc VS1 Output Current
- Switched 12Vd VS1 Output Current/Switch
- Local Board Temperature
- Accessible through IPMI commands

Operational Life / Reliability and Performance

- System reliability over 0.98
- System SEU rate: No more than one ground intervention per year for typical LEO Missions
- TID: Up to 25 krad (Si)
- NASA PEM-INST-001 Level-2 parts pedigree available
- Operational Temperature: -10°C to 50°C
- Storage Temperature: -40°C to 105°C

VITA 78 Backplane Profile

- SLT3-PSS-6S3V3A1B-14.8.2

Mass / Volume / Thermal

- Mass: less than 600 grams (estimated),
- Standard 3U 160mm SpaceVPX form factor
- Maximum operating temperature mounted on a regulated thermal interface: 50°C

Block Diagram

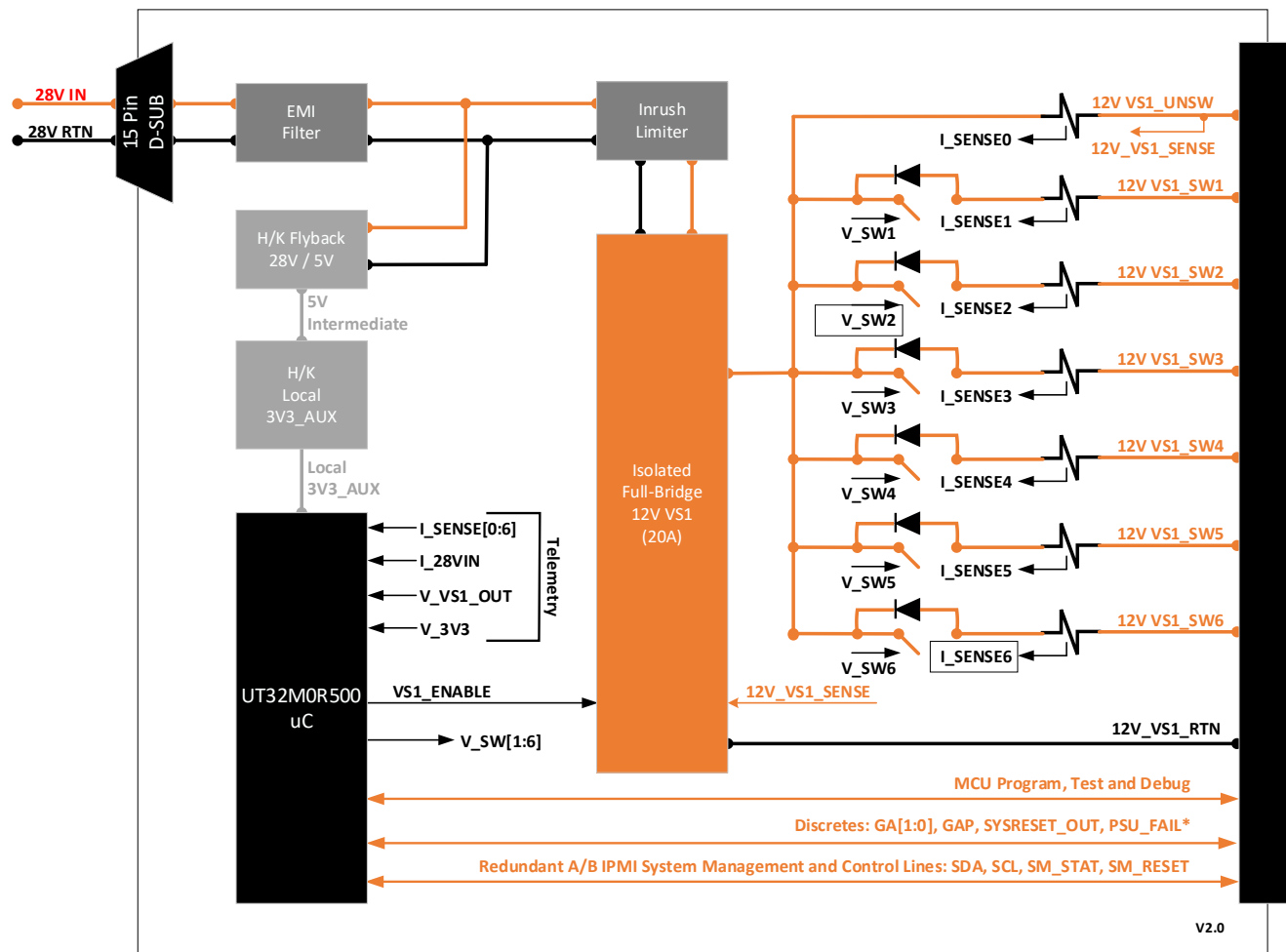


Figure 1. PSM28-SVPX Block Diagram

Backplane Slot Profile and Connection Tables

The PSM28-SVPX is a 3U VPX card that measures 100 mm x 160mm and is based off the VITA 78.0 standard. The backplane interface is based on the VITA 78.0 Payload Slot Profile: SLT3-PSS-6S3V3A1B-14.8.2. Only P0 follows the standard VITA 78 Profile. P1 and P2 are custom slot profiles using the differential connector.

For reference, the slot profile for VITA 78.0 is shown below.

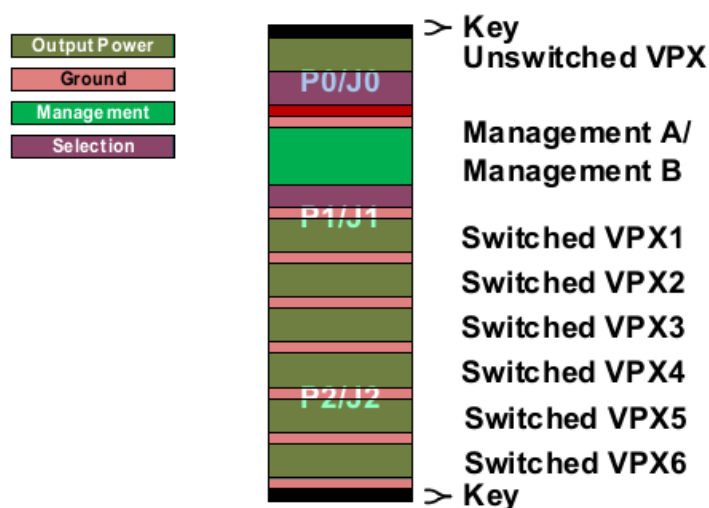


Figure 4. Backplane Slot Profile, SLT3-PSS-6S3V3A1B-14.8.2

Within the SLT3-PSS-6S3V3A1B-14.8.2 slot profile, P0 represents plug (male) connector on the module/card and J0 represents the jack (female) connector on the backplane. They carry the same signals (power and utility). P1 and P2 use custom profiles and follow the same guidance for the connector type.

P0 Backplane Connector Signal/Pin Mapping

The PSM28-SVPX is a 3U VPX card that measures 100 mm x 160mm and is based off the VITA 78.0 standard. The backplane interface is based on the VITA 78.0 Payload Slot Profile: SLT3-PSS-6S3V3A1B-14.8.2. The P0 and J0 connectors are depicted below. P1 and P2 follow a custom profile and are described in the following sections.

P0/J0 Backplane Connector Signal/Pin Mapping

Connector Manufacturer: Smiths Interconnect

Manufacturer Part Number: KX1HCP02C1TBH

Mates with Backplane Connector Part Number: KX2HCU01C1TAH

	Row G	Row F	Row E	Row D	Row C	Row B	Row A
1	OC_Vs1	OC_Vs1	OC_Vs1	No Pad*	OC_Vs2	OC_Vs2	OC_Vs2
2	OC_Vs1	OC_Vs1	OC_Vs1	No Pad*	OC_Vs2	OC_Vs2	OC_Vs2
3	OC_Vs3	OC_Vs3	OC_Vs3	No Pad*	OC_Vs3	OC_Vs3	OC_Vs3
4	GND	OC_SYSRESET*	GND	OC_-12V_Aux	GND	OC_FAIL*	GND
5	POWER_SEL2	GND	GND	OC_-3.3V_Aux	GND	GND	POWER_SEL5
6	POWER_SEL1	POWER_SEL0	GND	OC_+12V_Aux	GND	POWER_SEL4	POWER_SEL3
7	TCK	GND	TDI	TDO	GND	TMS	TRST*
8	GND	A_SYS_CON*	A_SYS_CONP*	GND	B_SYS_CON*	B_SYS_CONP*	GND

* See [VITA 46.0] Table 4-4, for the definition of no pad.

Table 2: SLT3-PSS-6S3V3A1B-14.8.2 – P0

	Row i	Row h	Row g	Row f	Row e	Row d	Row c	Row b	Row a
1	OC_Vs1	OC_Vs1	OC_Vs1	OC_Vs1	No Pad*	OC_Vs2	OC_Vs2	OC_Vs2	OC_Vs2
2	OC_Vs1	OC_Vs1	OC_Vs1	OC_Vs1	No Pad*	OC_Vs2	OC_Vs2	OC_Vs2	OC_Vs2
3	OC_Vs3	OC_Vs3	OC_Vs3	OC_Vs3	No Pad*	OC_Vs3	OC_Vs3	OC_Vs3	OC_Vs3
4	GND	GND	OC_SYSRESET*	GND	OC_-12V_Aux	GND	OC_FAIL*	GND	GND
5	GND	POWER_SEL2	GND	GND	OC_-3.3V_Aux	GND	GND	POWER_SEL5	GND
6	GND	POWER_SEL1	POWER_SEL0	GND	OC_+12V_Aux	GND	POWER_SEL4	POWER_SEL3	GND
7	TCK	GND	GND	TDI	TDO	GND	GND	TMS	TRST*
8	GND	A_SYS_CON*	A_SYS_CONP*	GND	GND	B_SYS_CON*	B_SYS_CONP*	GND	GND

* See [VITA 46.0] Table 4-4, for the definition of no pad.

Table 3: SLT3-PSS-6S3V3A1B-14.8.2 – J0

P0 Connector Pin Location	P0 Connector VITA78 Name	PSM28 Signal Name	Signal Type
RowG1	OC_Vs1	+12V VS1 (Unswitched)	
RowG2	OC_Vs1	+12V VS1 (Unswitched)	
RowG3	OC_Vs3	N/C	
RowG4	GND	GND	
RowG5	POWER_SEL2	PS2_IN	
RowG6	POWER_SEL1	PS1_IN	
RowG7	TCK	UART_TX	
RowG8	GND	GND	
RowF1	OC_Vs1	+12V VS1 (Unswitched)	
RowF2	OC_Vs1	+12V VS1 (Unswitched)	
RowF3	OC_Vs3	N/C	
RowF4	OC_SYSRESET*	Sys_Reset_Out	
RowF5	GND	GND	
RowF6	POWER_SELO	PS0_IN	
RowF7	GND	GND	
RowF8	A_SYS_CON*	A_SYS_CON_IN	
RowE1	OC_Vs1	+12V VS1 (Unswitched)	
RowE2	OC_Vs1	+12V VS1 (Unswitched)	
RowE3	OC_Vs3	N/C	
RowE4	GND	GND	
RowE5	GND	GND	
RowE6	GND	GND	
RowE7	TDI	UART_RX	
RowE8	A_SYS_CONP*	A_SYS_CONP_IN	
RowD1	No Pad*	N/C	
RowD2	No Pad*	N/C	
RowD3	No Pad*	N/C	
RowD4	OC_-12V_Aux	N/C	
RowD5	OC_3.3V_Aux	N/C	
RowD6	OC_+12V_Aux	N/C	
RowD7	TDO	uC Reset	
RowD8	GND	GND	
RowC1	OC_Vs2	N/C	
RowC2	OC_Vs2	N/C	
RowC3	OC_Vs3	N/C	
RowC4	GND	GND	
RowC5	GND	GND	
RowC6	GND	GND	
RowC7	GND	GND	
RowC8	B_SYS_CON*	B_SYS_CON_IN	
RowB1	OC_Vs2	N/C	
RowB2	OC_Vs2	N/C	

P0 Connector Pin Location	P0 Connector VITA78 Name	PSM28 Signal Name	Signal Type
RowB3	OC_Vs3	N/C	
RowB4	OC_FAIL*	OC_FAIL_Out	
RowB5	GND	GND	
RowB6	POWER_SEL4	PS4_IN	
RowB7	TMS	uC Program	
RowB8	B_SYS_CONP*	B_SYS_CONP_IN	
RowA1	OC_Vs2	N/C	
RowA2	OC_Vs2	N/C	
RowA3	OC_Vs3	N/C	
RowA4	GND	GND	
RowA5	POWER_SEL5	PS5_IN	
RowA6	POWER_SEL3	PS3_IN	
RowA7	TRST*	N/C	
RowA8	GND	GND	

P1/J1 Backplane Connector Signal/Pin Mapping

Connector Manufacturer: Smiths Interconnect

Manufacturer Part Number: KX1FCD02C1TBH

Mates with Backplane Connector Part Number: KX2FCU01C1TAH

Table 4: Custom profile based on differential connector, P1

P1 Connector Pin Location	P1 Connector VITA78 Name	PSM28 Signal Name	Signal Type
RowA1	UD	N/C	
RowA10	GND	GND	
RowA11	UD	+12V Output 0	
RowA12	GND	GND	
RowA13	CPtp02-DA+	+12V Output 1	
RowA14	GND	GND	
RowA15	CPtp01-DA+	+12V Output 1	
RowA16	GND	GND	
RowA2	GND	GND	
RowA3	UD	N/C	
RowA4	GND	GND	
RowA5	UD	SCS_3_IN	
RowA6	GND	GND	
RowA7	UD	N/C	
RowA8	GND	GND	
RowA9	UD	+12V Output 0	
RowB1	UD	N/C	
RowB10	UD	+12V Output 0	
RowB11	UD	+12V Output 0	
RowB12	UD	+12V Output 0	
RowB13	UD	+12V Output 1	
RowB14	UD	+12V Output 1	
RowB15	CPtp02-DA-	+12V Output 1	
RowB16	CPtp01-DA-	+12V Output 1	
RowB2	UD	N/C	
RowB3	UD	N/C	
RowB4	UD	N/C	
RowB5	UD	SCS_5_IN	
RowB6	UD	B_SYSRESET_IN	
RowB7	CPtp02-DC+	N/C	

P1 Connector Pin Location	P1 Connector VITA78 Name	PSM28 Signal Name	Signal Type
RowB8	CPTp01-DC+	SM_STAT_OUT_B	
RowB9	UD	+12V Output 0	
RowC1	GND	GND	
RowC10	UD	+12V Output 0	
RowC11	GND	GND	
RowC12	UD	+12V Output 0	
RowC13	GND	GND	
RowC14	CPTp02-DC-	+12V Output 1	
RowC15	GND	GND	
RowC16	CPTp01-DC-	+12V Output 1	
RowC2	UD	N/C	
RowC3	GND	GND	
RowC4	UD	N/C	
RowC5	GND	GND	
RowC6	UD	SCS_4_IN	
RowC7	GND	GND	
RowC8	UD	B_GA0	
RowC9	GND	GND	
RowD1	UD	N/C	
RowD10	GND	GND	
RowD11	UD	+12V Output 0	
RowD12	GND	GND	
RowD13	CPTp02-DB+	+12V Output 1	
RowD14	GND	GND	
RowD15	CPTp01-DB+	+12V Output 1	
RowD16	GND	GND	
RowD2	GND	GND	
RowD3	UD	N/C	
RowD4	GND	GND	
RowD5	UD	SM_RESET_IN_B	
RowD6	GND	GND	
RowD7	UD	IPMB_SCL_B	
RowD8	GND	GND	
RowD9	UD	+12V Output 0	
RowE1	UD	N/C	
RowE10	UD	+12V Output 0	
RowE11	UD	+12V Output 0	
RowE12	UD	+12V Output 0	

P1 Connector Pin Location	P1 Connector VITA78 Name	PSM28 Signal Name	Signal Type
RowE13	UD	+12V Output 1	
RowE14	UD	+12V Output 1	
RowE15	CPtp02-DB-	+12V Output 1	
RowE16	CPtp01-DB-	+12V Output 1	
RowE2	UD	N/C	
RowE3	UD	N/C	
RowE4	UD	N/C	
RowE5	UD	B_GAP	
RowE6	UD	SCS_0_IN	
RowE7	CPtp02-DD+	IPMB_SDA_B	
RowE8	CPtp01-DD+	B_GA1	
RowE9	UD	+12V Output 0	
RowF1	GND	GND	
RowF10	UD	+12V Output 0	
RowF11	GND	GND	
RowF12	UD	+12V Output 0	
RowF13	GND	GND	
RowF14	CPtp02-DD-	+12V Output 1	
RowF15	GND	GND	
RowF16	CPtp01-DD-	+12V Output 1	
RowF2	UD	N/C	
RowF3	GND	GND	
RowF4	UD	N/C	
RowF5	GND	GND	
RowF6	UD	SCS_2_IN	
RowF7	GND	GND	
RowF8	UD	SCS_1_IN	
RowF9	GND	GND	
RowG1	SYS_CONP*	IPMB_SCL_A	
RowG10	GND	GND	
RowG11	REF_CLK2-	A_GA0	
RowG12	GND	GND	
RowG13	REF_CLK2+	A_GAP	
RowG14	GND	GND	
RowG15	Maskable Reset*	IPMB_SDA_A	
RowG16	GND	GND	
RowG2	GND	GND	
RowG3	VBAT	SM_RESET_IN_A	

P1 Connector Pin Location	P1 Connector VITA78 Name	PSM28 Signal Name	Signal Type
RowG4	GND	GND	
RowG5	SYS_CON*	SM_STAT_OUT_A	
RowG6	GND	GND	
RowG7	REF_CLK1-	A_SYSRESET_IN	
RowG8	GND	GND	
RowG9	REF_CLK1+	A_GA1	

P2/J2 Backplane Connector Signal/Pin Mapping

Connector Manufacturer: Smiths Interconnect

Manufacturer Part Number: KX1FED02C1TBH-SL1

Mates with Backplane Connector Part Number: KX2FCU01C1TAH-SL1

Plug-In Module P2	Row G	Row F	Row E		Row D	Row C	Row B		Row A
Backplane J2	Row i	Row h	Even	Odd	Row e	Row d	Even	Odd	Row a
1	UD	GND	GND-J2	EP00-TD-	EP00-TD+	GND	GND-J2	EP00-RD-	EP00-RD+
2	GND	EP01-TD-	EP01-TD+	GND-J2	GND	EP01-RD-	EP01-RD+	GND-J2	GND
3	UD	GND	GND-J2	EP02-TD-	EP02-TD+	GND	GND-J2	EP02-RD-	EP02-RD+
4	GND	EP03-TD-	EP03-TD+	GND-J2	GND	EP03-RD-	EP03-RD+	GND-J2	GND
5	UD	GND	GND-J2	EP04-T-	EP04-T+	GND	GND-J2	EP04-R-	EP04-R+
6	GND	EP05-T-	EP05-T+	GND-J2	GND	EP05-R-	EP05-R+	GND-J2	GND
7	UD	GND	GND-J2	EP06-T-	EP06-T+	GND	GND-J2	EP06-R-	EP06-R+
8	GND	EP07-T-	EP07-T+	GND-J2	GND	EP07-R-	EP07-R+	GND-J2	GND
9	UD	GND	GND-J2	EP08-T-	EP08-T+	GND	GND-J2	EP08-R-	EP08-R+
10	GND	EP09-T-	EP09-T+	GND-J2	GND	EP09-R-	EP09-R+	GND-J2	GND
11	UD	GND	GND-J2	EP10-T-	EP10-T+	GND	GND-J2	EP10-R-	EP10-R+
12	GND	EP11-T-	EP11-T+	GND-J2	GND	EP11-R-	EP11-R+	GND-J2	GND
13	UD	GND	GND-J2	EP12-T-	EP12-T+	GND	GND-J2	EP12-R-	EP12-R+
14	GND	EP13-T-	EP13-T+	GND-J2	GND	EP13-R-	EP13-R+	GND-J2	GND
15	UD	GND	GND-J2	EP14-T-	EP14-T+	GND	GND-J2	EP14-R-	EP14-R+
16	GND	EP15-T-	EP15-T+	GND-J2	GND	EP15-R-	EP15-R+	GND-J2	GND

Table 5: Custom Profile based on differential connector, P2

P2 Connector Pin Location	P2 Connector VITA78 Name	PSM28 Signal Name	Signal Type
RowG1	UD	N/C	
RowG2	GND	GND	
RowG3	UD	N/C	
RowG4	GND	GND	
RowG5	UD	N/C	
RowG6	GND	GND	
RowG7	UD	N/C	
RowG8	GND	GND	
RowG9	UD	N/C	
RowG10	GND	GND	
RowG11	UD	N/C	
RowG12	GND	GND	
RowG13	UD	N/C	
RowG14	GND	GND	
RowG15	UD	N/C	
RowG16	GND	GND	
RowF1	GND	GND	
RowF2	EP01-TD-	+12V Output 2	
RowF3	GND	GND	

P2 Connector Pin Location	P2 Connector VITA78 Name	PSM28 Signal Name	Signal Type
RowF4	EP03-TD-	+12V Output 2	
RowF5	GND	GND	
RowF6	EP05-T-	+12V Output 3	
RowF7	GND	GND	
RowF8	EP07-T-	+12V Output 3	
RowF9	GND	GND	
RowF10	EP09-T-	+12V Output 4	
RowF11	GND	GND	
RowF12	EP11-T-	+12V Output 4	
RowF13	GND	GND	
RowF14	EP13-T-	+12V Output 5	
RowF15	GND	GND	
RowF16	EP15-T-	+12V Output 5	
RowE1	EP01-TD+	+12V Output 2	
RowE2	EP03-TD+	+12V Output 2	
RowE3	EP05-T+	+12V Output 3	
RowE4	EP07-T+	+12V Output 3	
RowE5	EP09-T+	+12V Output 4	
RowE6	EP11-T+	+12V Output 4	
RowE7	EP13-T+	+12V Output 5	
RowE8	EP15-T+	+12V Output 5	
RowE9	EP00-TD-	+12V Output 2	
RowE10	EP02-TD-	+12V Output 2	
RowE11	EP04-T-	+12V Output 3	
RowE12	EP06-T-	+12V Output 3	
RowE13	EP08-T-	+12V Output 4	
RowE14	EP10-T-	+12V Output 4	
RowE15	EP12-T-	+12V Output 5	
RowE16	EP14-T-	+12V Output 5	
RowD1	EP00-TD+	+12V Output 2	
RowD2	GND	GND	
RowD3	EP02-TD+	+12V Output 2	
RowD4	GND	GND	
RowD5	EP04-T+	+12V Output 3	
RowD6	GND	GND	
RowD7	EP06-T+	+12V Output 3	
RowD8	GND	GND	
RowD9	EP08-T+	+12V Output 4	

P2 Connector Pin Location	P2 Connector VITA78 Name	PSM28 Signal Name	Signal Type
RowD10	GND	GND	
RowD11	EP10-T+	+12V Output 4	
RowD12	GND	GND	
RowD13	EP12-T+	+12V Output 5	
RowD14	GND	GND	
RowD15	EP14-T+	+12V Output 5	
RowD16	GND	GND	
RowC1	GND	GND	
RowC2	EP01-RD-	+12V Output 2	
RowC3	GND	GND	
RowC4	EP03-RD-	+12V Output 2	
RowC5	GND	GND	
RowC6	EP05-R-	+12V Output 3	
RowC7	GND	GND	
RowC8	EP07-R-	+12V Output 3	
RowC9	GND	GND	
RowC10	EP09-R-	+12V Output 4	
RowC11	GND	GND	
RowC12	EP11-R-	+12V Output 4	
RowC13	GND	GND	
RowC14	EP13-R-	+12V Output 5	
RowC15	GND	GND	
RowC16	EP15-R-	+12V Output 5	
RowB1	EP01-RD+	+12V Output 2	
RowB2	EP03-RD+	+12V Output 2	
RowB3	EP05-R+	+12V Output 3	
RowB4	EP07-R+	+12V Output 3	
RowB5	EP09-R+	+12V Output 4	
RowB6	EP11-R+	+12V Output 4	
RowB7	EP13-R+	+12V Output 5	
RowB8	EP15-R+	+12V Output 5	
RowB9	EP00-RD-	+12V Output 2	
RowB10	EP02-RD-	+12V Output 2	
RowB11	EP04-R-	+12V Output 3	
RowB12	EP06-R-	+12V Output 3	
RowB13	EP08-R-	+12V Output 4	
RowB14	EP10-R-	+12V Output 4	
RowB15	EP12-R-	+12V Output 5	

P2 Connector Pin Location	P2 Connector VITA78 Name	PSM28 Signal Name	Signal Type
RowB16	EP14-R-	+12V Output 5	
RowA1	EP00-RD+	+12V Output 2	
RowA2	GND	GND	
RowA3	EP02-RD+	+12V Output 2	
RowA4	GND	GND	
RowA5	EP04-R+	+12V Output 3	
RowA6	GND	GND	
RowA7	EP06-R+	+12V Output 3	
RowA8	GND	GND	
RowA9	EP08-R+	+12V Output 4	
RowA10	GND	GND	
RowA11	EP10-R+	+12V Output 4	
RowA12	GND	GND	
RowA13	EP12-R+	+12V Output 5	
RowA14	GND	GND	
RowA15	EP14-R+	+12V Output 5	
RowA16	GND	GND	

Operating Environment

Maximum Ratings

Parameter	Description/Comments	Min	Max	Units
Vin	28Vdc Bus Input	24	36	Vdc
Vout (Unswitched)	12Vdc Voltage Output	11.4	12.5	Vdc
Vout (Switched)	12Vdc Voltage Output	11.4	12.5	Vdc
Iout	Max current per output		8	A
Pout	Total Power Output		240 Peak	W
Cin	Max Input Capacitance		150	uF
Riso_secondary_50V	Isolated from Secondary		1	MOhm
Vin_survival	42V Survival Voltage		2	S
Storage Temp		-40	+105	°C
Operating Temp	Measured at wedge lock	-10	+50	°C
Mass			0.65 TBC	kg

Radiation Performance

Parameter	Description/Comments	Limit	Units
Unshielded TID	Total ionizing dose	25	krad(Si)
SEL Immunity		37	MeV-cm ² /mg
Total Single Event Rate Requiring External or Ground Intervention	Total System Level	1.80e-04	per year

Reliability & Quality

Parameter	Description/Comments	Limit	Units
MTBF	@Ta = 30 °C	3,868,620	hours
Reliability (R) @ 30°C / 100% Active	5 Years	0.946	

Acceptance Testing (FM3 Class C and FM4 Class D)

Temp Cycling	-10°C to +50°C (per SMC-S-016 – 6.3.8)	4	Cycles
Random Vibration (Unbiased)	3-axis / 1 min per axis (20Hz to 2kHz) (per SMC-S-016 – 6.3.5)	7.1	GRMS
Electrical Testing	Functional and Performance	Pass/Fail	

Qualification Testing

Thermal Vacuum	-20°C to +60°C (per SMC-S-016 – 6.3.9)	10	Cycles
Random Vibration (Unbiased)	3-axis / 2 min per axis (20Hz to 2kHz) (per SMC-S-016 – 6.3.5)	14.1	GRMS
Mechanical Shock	3-axis / 1 per axis (per SMC-S-016 – 6.3.4)	MPE + 6dB	
Electrical Testing	Functional and Performance	Pass/Fail	

Functional Description

The **PSM28-SVPX** power supply is designed to convert an input bus voltage into a regulated 12 V output while supporting the power distribution needs of a modular avionics system. It is nominally rated at 100 watts, a limit driven primarily by thermal constraints within the system enclosure rather than the absolute electrical capability of the hardware. While the unit may be capable of handling higher total power under certain conditions, the 100 W specification ensures reliable operation within the intended thermal environment and provides a clear guideline for system-level power budgeting.

A key feature of the **PSM28-SVPX** is its distribution architecture, which includes six switchable output channels and one unswitched output. The unswitched output is typically used to power critical system components, such as the main processor module, ensuring they are always powered when input voltage is applied. The switchable outputs provide flexibility for controlling power to individual payloads or subsystem cards, enabling operators to selectively power cycle components in orbit. This capability is particularly useful for mitigating radiation-induced faults by resetting affected hardware without disrupting the entire system.

Each output channel is designed to support up to approximately 8 amps; a value derived from the total system power limit and the 12 V output. This ensures that even in a worst-case configuration—where a single channel carries most of the load, the system remains within safe operating limits. The total available power is shared across all outputs, meaning that higher consumption on one channel reduces the available capacity on others. This shared power architecture requires careful allocation of loads across channels to maintain overall system performance and reliability.

The **PSM28-SVPX** incorporates an integrated input EMI filter on the same card as the power conversion circuitry, which is a distinguishing feature compared to many traditional power supply designs. In typical systems, EMI filtering is handled by a separate front-end module; however, in this design, the filter is embedded directly into the power supply. This approach reduces system complexity and saves space but also consumes valuable board area, limiting the inclusion of additional features such as reverse polarity or short-circuit protection. The integrated filter is responsible for minimizing electromagnetic emissions and ensuring compatibility with the spacecraft power bus.

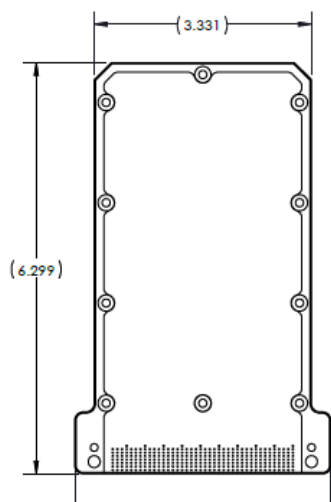
From an input perspective, the power supply is designed to operate over an asymmetric voltage range, with a lower bound of 24 V and an upper bound extending to approximately 36 V.

Overall, the **PSM28-SVPX** power supply balances performance, flexibility, and integration within a constrained form factor. Its combination of switchable outputs, integrated filtering, and carefully managed power limits makes it well-suited for modular system architectures use in harsh and mission critical applications.

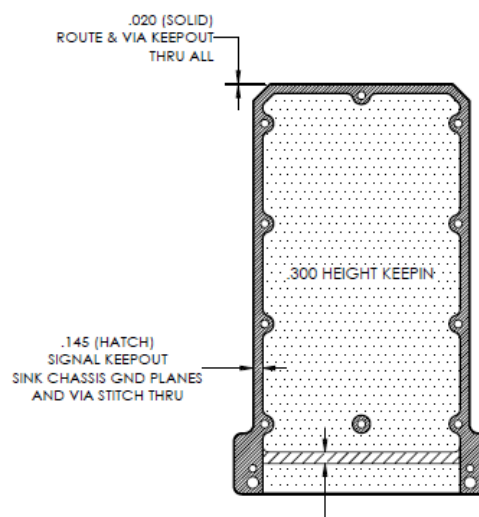
Mechanical Drawing

Placeholder (needs updated with latest information)

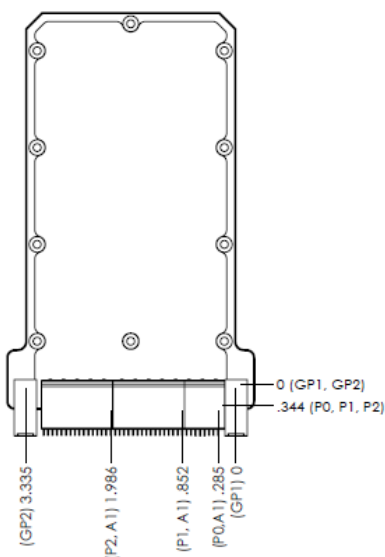
OVERALL



KEEPOUTS



Need Proper Mechanical outline drawings for finished module



Revision History

Date	Revision #	Author	Change Description	Page #
4/28/2026	1.0	DPA	Initial release of Preliminary Datasheet	All

Datasheet Definitions

	Definition
Advanced Datasheet	Frontgrade reserves the right to make changes to any products and services described herein at any time without notice. The product is still in the development stage and the datasheet is subject to change . Specifications can be TBD and the part package and pinout are not final .
Preliminary Datasheet	Frontgrade reserves the right to make changes to any products and services described herein at any time without notice. The product is in the characterization stage and prototypes are available.
Datasheet	Product is in production and any changes to the product and services described herein will follow a formal customer notification process for form, fit or function changes.

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