Zeli Systems
SATPAK-VME-FORCE22

PRELIMINARY

Precise Position Service (PPS) GPS Solution for the VME Bus

Features:
- The SATPAK-VME-FORCE22 is a 6U form factor carrier board that provides a VME interface for the Precise Position Service (PPS) military Trimble FORCE 22 GPS receiver.
- The SATPAK-VME-FORCE22 provides access to all the FORCE 22 capabilities including: 12 Channel, GRAM compliant, L1/L2, DS-102/DS-101 key loading, SAASM, 1PPS/10PPS/UTC/Time Mark, Have Quick interface, optional SINCGARS interface, PVT Output, navigation capability, ICD-GPS-153 interface, Differential GPS interface, NMEA interface, Trimble Diagnostic interface, and 3 serial communication channels.
- Primary FORCE 22 power is +5 VDC provided by the VME Bus power pins.
- Backup power for the FORCE 22 provided by an onboard rechargeable lithium battery. Backup power is used to preserve cryptovariables, maintain the low-power time source, and maintain non-volatile RAM.
- Fused +5V to GPS receiver.
- Employs a PC16554 Quad Universal Asynchronous Receiver Transmitter (QUART) to communicate with the GPS receiver.
- QUART can be bypassed to provide RS-232 or RS-422 signal levels at front panel for RDT/IP, HCI, and HCI communication channels of the FORCE22 via DB9S connectors J1, J2, and J3.
- Meets VME A24:D08(O) requirements to access on-board QUART (PC16554) and interrupt control/vector registers.
- VME ROAK interrupter can handle four interrupt sources. Typically only three are used by the SATPAK-VME-FORCE22.
- Dual antenna inputs (main and auxiliary) via front panel SMA connectors.
- Front panel SMA connector input for external timing interface (11.68 or 12.8 MHz).
- The Trimble FORCE 22 incorporates Selective Availability Anti-Spoofing Module (SAASM) technology.
- Custom cable assemblies available for Have Quick, SINCGARS, Differential GPS interface, and KYX-13, KOI-18, AN/CYZ-10 key loading devic

SATPAK-VME-FORCE22 Function: The SATPAK-VME-FORCE22 is a 6U form factor carrier board that is specifically tailored to accommodate the Trimble FORCE 22 GPS receiver

module. The FORCE 22 is a military Precise Position Service (PPS) GPS receiver that provides 12 channel tracking, GRAM compliance,

L1/L2, DS-102/DS-101 key loading, SAASM, 1PPS/10PPS/UTC/Time Mark, Have Quick interface, optional SINCGARS interface, PVT output, navigation capability, ICD-GPS-153 interface, Differential GPS interface, NMEA interface, Trimble Diagnostic interface, dual antenna input, external timing input, and 3 serial communication channels.

Power: The SATPAK-VME operates from single +5 VDC power. The GPS receiver +5 volt power is fused using a resettable fuse that is thermally activated. Once the fault condition has been removed, the fuse will automatically reset after cooling. Backup power for the FORCE22 is provided by an onboard rechargeable lithium battery.

VME Interface to FORCE22: The FORCE 22 utilizes three (3) independent serial interfaces. The RS-232 and RS-422 signal levels for the three FORCE22 serial interfaces are converted to CMOS and then transmitted and received over the VME bus using an industry standard PC16554 quad universal asynchronous receiver transmitter (QUART). The QUART is initialized and accessed via a VME A24:D08(O) data transfers. The fourth unused port of the QUART can be dedicated to any user-defined function. Four interrupt sources can be programmed for interrupt level and priority via an interrupt control register for each source. A separate interrupt vector register allows programmable 8-bit vectors. Push-on jumpers allow selection of the SATPAK-VME base address. The SATPAK-VME supports address modifiers 39, 3D, 29 and 2D as per the VME-Bus specification. All of the critical FORCE22 signals are routed to the user-defined VME P2 connector pins for secondary access via the VME backplane.

VME Front Panel Communication with the FORCE22:

Each of the three FORCE22 serial communication channels can also be accessed using front panel DB9 connectors J1, J2, and J3. A front-panel DB25 connector (J4) is used for DS 102/101 and KDP key loading, HAVEQUICK output, External on/off control, Time Maintenance Power, Mode Control, optional SINCGARS interface, 1PPS/10PPS output, and 1PPS input. Cable assemblies are available.

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SPECIFICATIONS
**(Block Diagram not shown in ".pdf" version
of datasheet)**

Mechanical, Environmental, Power:

Physical Dimensions:	160mm X 233m (VME 6U)
Operating Temp:	-40°C to 80° C
Humidity:	0 to 99% (non-condensing)
Power:	+5V +/- 5%, 0.3 A
Fabrication:	1.68mm ± 0.2mm, FR4

Connectors:

GPS TX/RCV (CHA):	J1
Conn:	RDT/IP GPS TX/RCV (RS232)
Type:	DB9S
GPS TX/RCV (CHB):	J2
Conn:	HCI GPS TX/RCV (RS422)
Type:	DB9S
GPS TX/RCV (CHC):	J3
Conn:	HCI GPS TX/RCV (RS232)
Type:	DB9S

Note: J1, J2, and J3 only used when QUART is bypassed

DS-101/102/KDP:	J4
Conn:	Key Load/FORCE22 critical signals
Type:	DB25S
GPS Antenna: J5	
Conn:	SMA (BNC optional)
Type:	Bulkhead Female
1PPS/10PPS Output:	J6
Conn:	SMA (BNC optional)
Type:	Right-Angle PCB mount
Ext Osc Input: J7	
Conn:	SMA (BNC optional)
Type:	Right-Angle PCB mount

VME-Bus Interface:

Data Type:	D08(O) slave
Addressing Type:	A24 standard supervisory, standard non-privileged address)
Addressing Base:	A8 to A24 configurable by push-on jumpers

Offset 1	QUART RDT Base Add	(R/W)
Offset 3	QUART RDT Int Enable	(R/W)
Offset 5	QUART RDT Int Ident	(R)
Offset 5	QUART RDT FIFO Cntr	(W)
Offset 7	QUART RDT Line Cntr	(R/W)
Offset 9	QUART RDT Modem Cntr	(R/W)
Offset B	QUART RDT Line Status	(R/W)
Offset D	QUART RDT Modem Stat	(R/W)
Offset F	QUART RDT Scratch Reg	(R/W)
Offset 11	QUART HCI Base Add	(R/W)
Offset 13	QUART HCI Int Enable	(R/W)
Offset 15	QUART HCI Int Ident	(R)
Offset 15	QUART HCI FIFO Cntr	(W)
Offset 17	QUART HCI Line Cntr	(R/W)
Offset 19	QUART HCI Modem Ctr	(R/W)
Offset 1B	QUART HCI Line Stat	(R/W)
Offset 1D	QUART HCI Modem St	(R/W)
Offset 1F	QUART HCI Scratch Rg	(R/W)
Offset 21	QUART REPRG Base Add	(R/W)
Offset 23	QUART REPRG Int Enable	(R/W)
Offset 25	QUART REPRG Int Ident	(R)
Offset 25	QUART REPRG FIFO Cntr	(W)
Offset 27	QUART REPRG Line Cntr	(R/W)
Offset 29	QUART REPRG Modem Ctr	(R/W)
Offset 2B	QUART REPRG Line Stat	(R/W)
Offset 2D	QUART REPRG Modem St	(R/W)
Offset 2F	QUART REPRG Scratch Rg	(R/W)
Offset 31	VME Interrupt Cntr Reg A	(W)
Offset 33	VME Interrupt Cntr Reg B	(W)
Offset 35	VME Interrupt Cntr Reg C	(W)
Offset 37	VME Interrupt Cntr Reg D	(W)
Offset 39	VME Interrupt Vec Reg	(R/W)