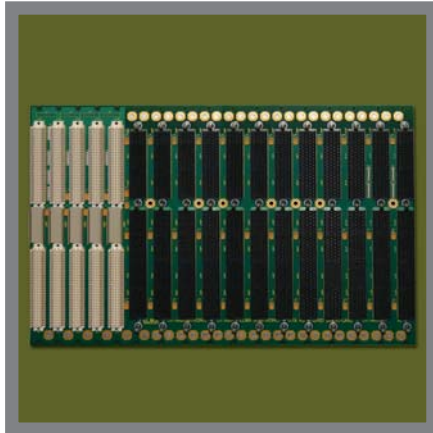




SYSTEM PLATFORMS

BACKPLANES



CABINETS

COMPONENTS



ACCESSORIES

SIMULATION SERVICES

VPX: Products and Services

Elma Electronic

ABOUT ELMA

Founded in 1962, Elma is an industry innovator in the design and manufacture of electronic enclosures and passive electronic components. Elma enjoys a leading position in the VME/VME64x, VXI, VXS, VPX, PXI, cPCI, ATCA, MicroTCA and Rugged COTS packaging markets.

Based in Wetzikon, Switzerland and Fremont, California, Elma is a global leader in electronic enclosures and components. The company has facilities and representatives in over 24 countries. Elma has a broad base of customers in diverse industries such as telecommunications, industrial control, medical electronics, military and defense.

Elma strives to provide products superior in quality, reliability, performance, and consistently presents new, innovative designs to the market. Elma's product line encompasses well over 16,000 parts, including enclosures, cabinets, high quality switches, LED arrays, knobs and much more. Elma also offers design and integration services backed by responsive and knowledgeable technical support. Elma's leading quality level is reached through training of all employees and following of systematic procedures per ISO 9001 standards to which Elma has been registered.

CUSTOM SOLUTIONS

Customization is the standard at Elma Electronic. With an extensive offering of modular products as a foundation, Elma is able to leverage existing solutions and proven design concepts to meet any custom application. This approach ensures that Elma will provide a quality, compliant solution with significantly reduced lead time, cost and risk.

Elma leads the industry in modifying standard VME and VPX backplanes and chassis to meet customer's exact needs.

TECHNICAL CAPABILITIES

- Agency Certification
- Verification Testing
- EMC Testing
- Thermal Testing
- System Integration
- Simulation/Characterization

WHY CHOOSE ELMA

Flexibility

Elma tailors solutions to individual applications to ensure fast and cost-effective results.

Experience

Extensive practical experience in packaging electronic systems is used to minimize the time taken to develop new customized solutions without compromising system performance or reliability.

Compatibility

Because the two key electromechanical components - enclosures and backplanes - are made in-house, Elma guarantees compatibility, consistency and reliability.

Global Resources

With manufacturing in Europe, Asia and the USA, customers benefit from local service backed by global resources.

ELMA PRODUCT DIVISIONS

System Platforms



Backplanes



Cabinets



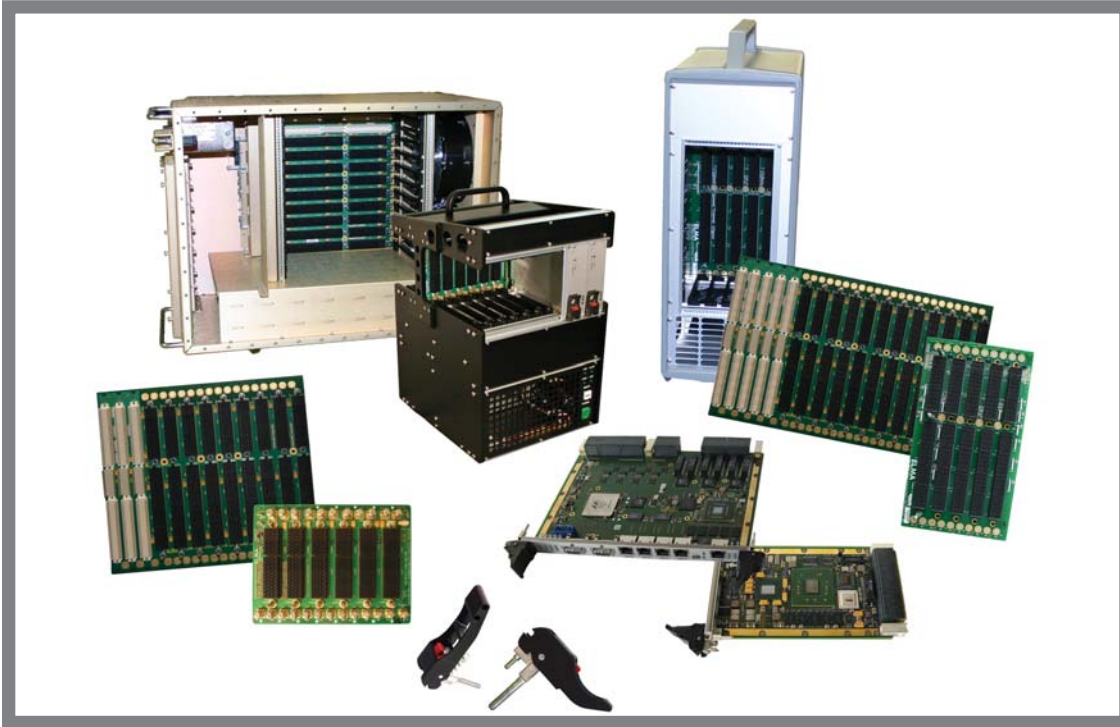
Enclosures & Components



Switches, Knobs & LEDs



VPX Overview



Elma is the leader in VITA 46/48 VPX products. Our experts developed the industry's first VPX backplane and proposed the first VME pinouts to the VITA 46 subcommittee. Since then, Elma has developed a wide range of VPX configurations with and without legacy VME64x slots.

VPX presents design challenges with higher layer-count backplanes, and more demanding power and cooling requirements. Elma tackles these problems with signal integrity analysis, thermal simulation and testing, and nearly 30 years of electronics packaging experience. Elma's creative routing techniques reduce layer counts, preventing long via stubs that hamper signal continuity. To optimize VPX backplane performance, we often use low-dielectric laminate materials like FR408 or Nelco 4000-13SI.

With thermal simulation, Elma finds potential hot spots in the VPX chassis design. Our engineers can then use optimum combination of fans, air intake/exhaust, air baffles, etc. to distribute airflow and maximize cooling efficiency. Elma's modular design allows tremendous flexibility in configurations. With various portable/lab, 19" rackmount, and rugged chassis options, Elma has a VPX system platform solution for you. We also offer VPX SBCs, switches, and controllers. Contact Elma for our embedded subsystem integration services.

VPX uses the high-speed multi-gig connector typically in a mesh topology, vastly increasing the potential bandwidth of the system. The VITA 46 technology brings the following features to reality while maintaining the ability to inter-operate with existing VME boards:

- Vastly increased high-speed serial I/O support for such needs as digital video, mass storage interconnects (e.g. SATA) and FPGA interconnects(e.g. RocketIO).
- Support for high-speed switched serial fabrics with performance up to 10 Gbps.
- Support for cost-reducing two-level maintenance by providing an Electrostatic Discharge (ESD) protection mechanism and board covers.
- Support of distributed switching that eliminates the need for dedicated switch card slots.
- Support for VITA 42 mezzanine sites with high speed I/O.
- Both 3U and 6U x 160mm cards in Eurocard format.
- Optional implementation of VMEbus.

VPX System Platforms



TYPE 32, VPX 4U PORTABLE TOWER

- Portable tower, according to latest VITA 46/48 specifications
- Size 4U wide x 84HP high
- 5 slot VPX mesh backplane standard
- Ideal for prototyping and demonstrations
- Cooling achieved through 1 x 12V DC fan pushing 150 CFM
- Easily converts to open frame chassis for testing/debugging
- Convenient handle makes it ideal for portability
- High EMC shielding
- Assembled and wired
- Customized versions available

ORDER NUMBER:
32P0SPX48Y3VCEO

The VPX Tower offers a carrying handle for easy portability making it ideal for prototyping, demonstrations, and mobile applications. The unit also features advanced EMC shielding, scratch-resistant vinyl clad aluminum covers, and power components. Cooling is achieved with 1 x 12V DC fan pushing 150 CFM in a front-to-rear airflow configuration. Elma has performed thermal simulations to ensure the optimal performance. As VPX offers a wide range of power options, a flexible 800W power supply with various input voltages is included.

Utilizing Elma's modular extrusion-based design, the chassis facilitates a wide range of configurations.



Rugged COTS Enclosures

- 5U, 8U, 9U, 12U and 14U heights
- EMI/RFI integrity via braided gasketing and honeycomb filters
- Chassis shell comprised of aluminum extrusions spot-welded to aluminum plates
- MIL-grade components
- Configurable I/O patch panel on rear
- Tested for shock, vibration, and structural integrity
- 7U, 5U, shock isolated options standard
- 350 - 1400 watt power supplies
- High volume, rear-mounted exhaust fans (470 CFM)



Type 12 Rackmount

- 19" Rackmount, made from aluminum extrusions and sheets, chromated
- 3U, 4U, 7U, 9U, 10U, 12U heights
- IEEE 1101.10/.11 compliant
- Advanced EMC shielding
- Wired platform with backplane, power supply, integrated cooling
- 80mm Rear I/O card mounting
- Covers fold over side plates increasing shielding effectiveness
- Most versatile of chassis family
- Attractive finish



Type 15 Rackmount/Desktop

- 19" Rackmount or desktop
- 3U, 4U, 9U, 10U heights
- IEEE 1101.10/.11 compliant
- Advanced EMC shielding
- Double walled side plates
- Wired platform with backplane, power supply, integrated cooling
- 80mm Rear I/O card mounting
- Powder-coated finish
- Casted aluminum handles
- Attractive, well-rounded edges and finish

VPX Test & Development Platform



FEATURES

- Modular test & development platform
- Versions supporting 3U or 6U cards
- Other architectures include CompactPCI, VME/64x, and VXS
- Front accessible test points and monitoring LEDs for +3.3V, +/-5V, +/- 12V, +/- 24V, and +/- 48VDC
- High performance cooling via 3 x 150 CFM fans
- Speed controlled fans with fan-fail indication
- Optional system monitor with remote monitoring
- Full RTM support and rear A/C power entry module
- Pluggable front and rear module fan trays
- Top handle for ease of portability
- Attractive powder-coated finish is scratch-resistant

ORDER NUMBER:

5-slot, 84HP version: 3AE0SPSXC8Y2VCHX

The E-Frame was designed for the high and flexible power requirements of VPX systems. However, other backplane architectures can be implemented. With a rugged modular aluminum construction, the versatile E-frame tower can support up to 19 slots at .8" or 15 slots at 1" pitch, depending on cabling options. There are front accessible test points and monitoring LEDs for +3.3V, +/-5V, +/-12V, +/- 24V, and +/- 48VDC. The E-frame features high performance cooling with 3 x 150 CFM fans under the card cage. The fans are speed controlled with fan fail indication. A system monitor with remote monitoring via Ethernet capability is optional.

The black coated powder coated finish of the E-frame enhances aesthetics and provides scratch-resistance. Other features include a Rear A/C PEM (Power Entry Module) with fuses, GND stud, front located ESD jacks. The unit also offers full RTM (rear transition module) support.



3U 84HP E-Frame



3U 49HP E-Frame



6U 84HP E-Frame

VPX Backplanes - 6U



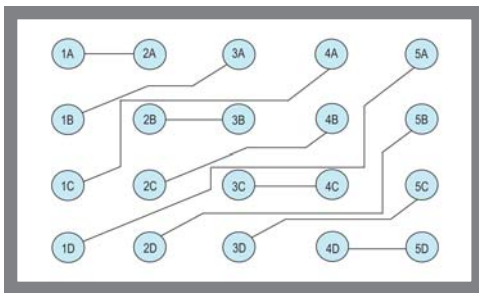
5-SLOT 6U VPX BACKPLANE

- Compliant to the latest VITA 46 Specifications
- High-speed Multi-gig connector in mesh topology
- Rugged Eurocard form factor in 6U height
- High flexibility allowing applications to dictate the necessary fabric mapping
- Provides built in ESD ground protection in every slot
- RoHS compliant versions optional
- 3U versions also available
- 20-layer stripline design in FR-4
- Signal integrity studies available upon request
- FR408 or Nelco high grade laminate material optional
- 5+2 (5 VPX, 2 legacy VME64x) Hybrid VPX backplane is available

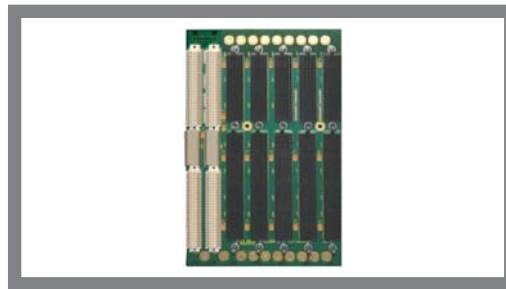
ORDER NUMBER

5 Slot: 69-PS605

5+2 VPX Hybrid Backplane: 69-PS607



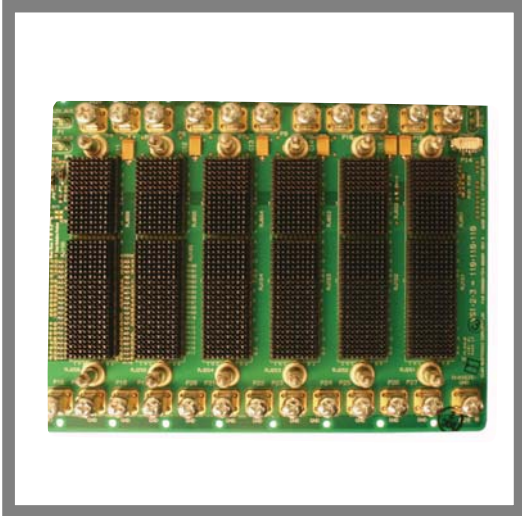
5-Slot Connectivity Chart



5+2 Hybrid VPX Backplane

VPX presents many design challenges and experienced teams like Elma Bustronic's are best suited to take them on. With 480 pins per slot with up to 186 differential pairs, there is an incredible amount of I/O to route through the backplane. Additionally, VPX uses high-speed differential serial signals that can switch well in excess of 3.0 GHz. The VITA 46 spec acknowledges that the backplane may require up to 16 routing layers, and a huge 36-layer overall PCB stackup. The result could be long via stubs which can degrade the signal. To alleviate this, Elma Bustronic performs simulations to optimize the signal quality of the design and minimize the negative stub effects. One key method is to take the performance requirements, which typically would be 3.125 GBps or 6.250 GBps and route the backplane to minimize the layer count, but follow proper design rules. Design rules typically specify how close signals should be to another or to components, avoiding 90 degree bends of the signal, and so on. Reducing the layer count can shorten the stubs, thus reducing the stub effect. In most cases, a high-grade laminate will need to be used even in smaller (fewer slot) backplanes. For example, the five-slot VPX backplane uses an FR-408 low-dielectric material to enhance performance.

VPX Backplanes - 3U



6-SLOT 3U VPX BACKPLANE

- Compliant to the latest VITA 46 Specifications
- High-speed Multi-gig connector
- Uses the rugged 3U-160 Eurocard form factor
- Twisted Ring routing topology
- Switch slot for centralized switching per VITA 46.20
- All slots conform to VITA 46.3 for Serial RapidIO™ with channels A and B arranged as 2 fat pipes (x4) channels configured as a twisted ring extending from slots 1 to 5
- Provides built in ESD ground protection in every slot
- RoHS compliant versions optional
- 6U versions also available

ORDER NUMBER

6 Slot: 69-PS306

BOARD SPECIFICATIONS

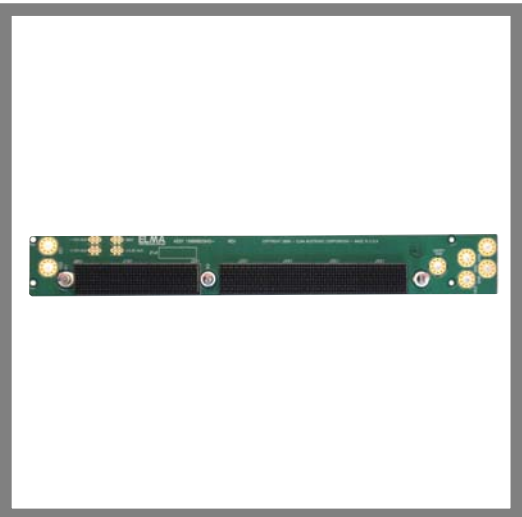
- 12-layer stripline design
- 2 oz. power and ground
- PCB FR-4 or equivalent
- PCB .145" thick

MECHANICAL SPECIFICATIONS

- 3U height
- 6-Slots
- MultiGig RT-2 connectors

In the Bustronic 3U VPX backplane to 46.20 specifications, slot 6 has configurable thin pipe links for distributed Gigabit Ethernet to slot 1 through slot 5 and two fat pipes for rear I/O. In slots 1-5 any or all of the P1 thin pipes (x2 channels) assigned to the 46.20 control channel star can be reconfigured as rear I/O by removing zero ohm SMT shunts. In slots 1-5 all P2 differential pairs are available on the rear side for I/O.

VPX Power and Ground Backplane



FEATURES

- Compliant to latest VITA 46 specifications
- Power and ground only for VPX development purposes
- 3.3V, 5V, and 12V power
- Simple and low-cost development backplane
- P0-P6 pins are user-defined

ORDER NUMBER:

101VPX701P-1X40R

BOARD SPECIFICATIONS

- 10-layer stripline design
- 2 oz. copper power and ground
- PCB UL recognized 94V-0
- PCB FR-4 or equivalent
- PCB .212" thick

MECHANICAL SPECIFICATIONS

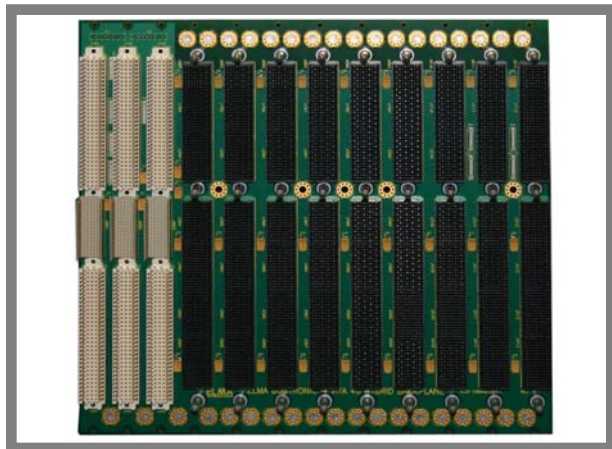
- 3U and 7U heights
- 1 slot

The VPX power and ground development backplane is a simple and cost-effective development tool. All of the pins are user defined. Power for 3.3V, 5V and 12V are included. The 7U version is standard and a 3U version is available upon request. The rear connectors are all fully loaded from RJ0-RJ6.

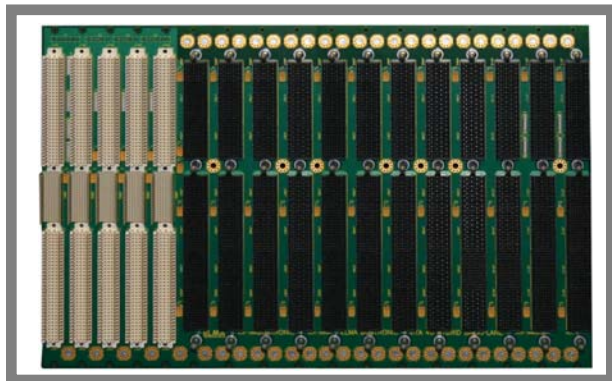
VPX Design Concepts - Hybrid VPX/VME

VPX provides for the development of hybrid backplanes. It is designed to simultaneously support a mix of bus segment sections that can be configured as full mesh, pipeline or single or dual star topologies. VPX even supports having some slots configured as legacy parallel VME. Connector segments J1 to J6 can even be implemented for either differential signals or single ended signals. The architecture offers design flexibility as opposed to a more fixed and defined architecture. This allows a user to use exactly as many pins and connection configurations, etc, as are needed for the specific application. VPX designs a standard card layout and standard mechanics but lets system engineers connect-the-dots between them so as to conform to the exact needs of their requirement.

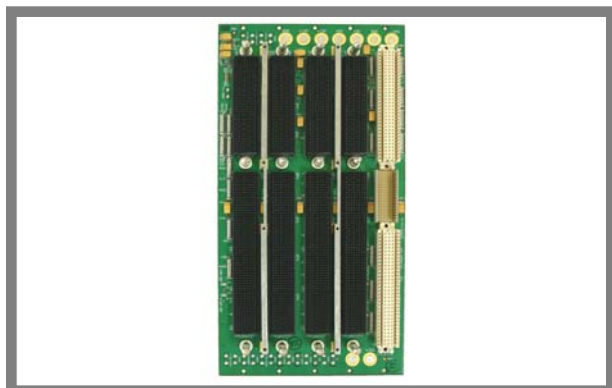
The VPX architecture defines a slot requirement that gives location for every one of the VME64x signals. In addition, enables legacy VME signals to be used on any particular slot, but does not require them to be available on every slot. Part of the challenge in developing a Legacy Hybrid VPX/VME backplane involves proper wiring that ensure that electrical signals are assigned to the VPX slot in a way that meets the constraints of signal routing while keeping sensitive signals away from each other, i.e., ensuring that groups of address lines are placed together, and that clock signals are separated from them.



Custom 12-slot VPX Hybrid Backplane



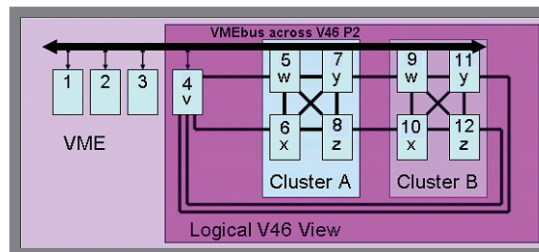
Custom 17-slot VPX Hybrid Backplane



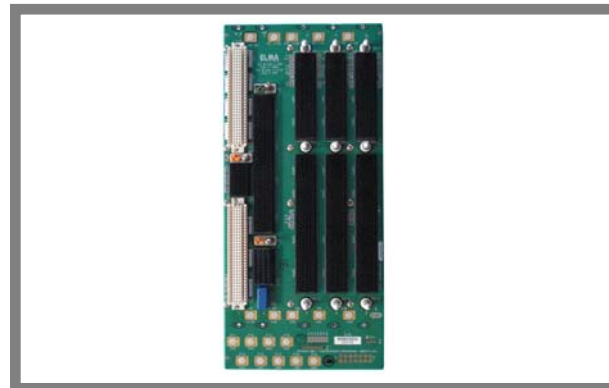
Custom 5-slot VPX Hybrid Backplane

VPX 12 & 17-SLOT CUSTOM BACKPLANE EXAMPLES

- Evolutionary bus architecture that provides very high connectivity while allowing the reuse of existing VME software protocols
- Uses the rugged 6U x 160mm Eurocard form factor
- Offers a highly flexible interconnect scheme that can support either differential or single ended signaling
- Supports redundant meshes, pipeline topologies and cluster computing
- High flexibility allowing applications to dictate the necessary fabric mapping
- Defines the mapping of VME bus signals onto the VITA 46 P2 connector
- Provides built in ESD ground protection in every slot
- Supports both IEEE 1101.10 air cooled enclosures and IEEE 1101.2 conduction cooled enclosures
- Supports PMC and XMC mezzanine modules sockets on the VITA 46 bus segment

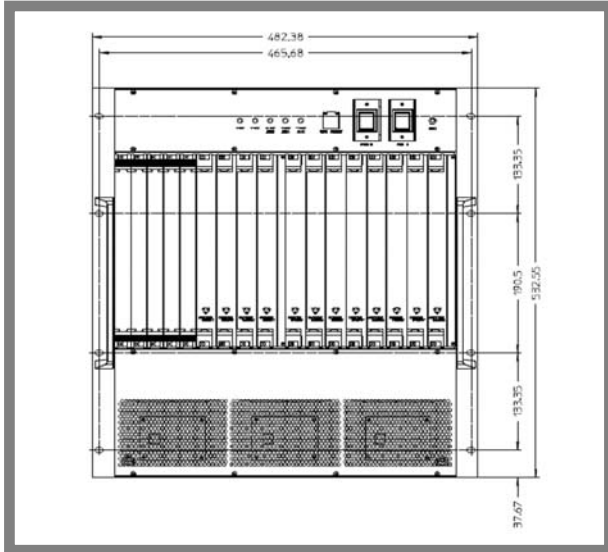


12-Slot Connectivity Chart



5-slot VPX/VXS Hybrid Backplane

VPX Design Concepts - Chassis Configurations



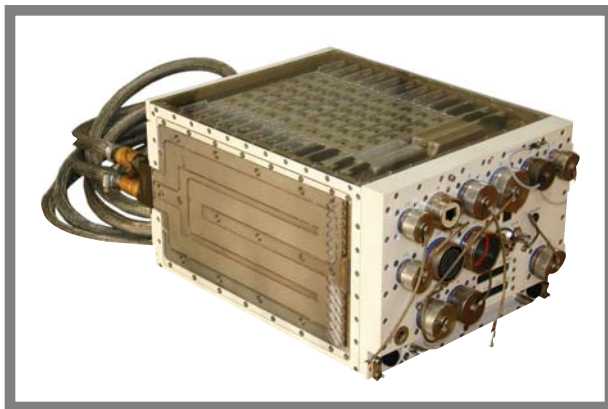
TYPE 12, CUSTOM VPX 17-SLOT VPX RACKMOUNT CHASSIS

- Rugged Type 12 rack mount chassis, 12U High x 20" Deep
- Flush 6U x 160mm card cage per VITA 46.0 requirements
- Rear recessed 6U x 80mm card cage for RTMs
- Hybrid VPX/V64X backplane compliant to VITA 46
- Hybrid backplane will be max 16.4" wide due to 0.4" additional space between VPX cluster A and B needed to accommodate VME64X terminations
- Three high performance Delta 12V DC fans (190 CFM each) mounted below card cage with built in air plenum for even distribution of air
- 4U air intake panel on the front below cards with additional air intake on the left and right sides bottom
- Rear 2U exhaust panel
- Front top 2U panel with dual on/off switch, reset switch and indication LEDs for all VPX voltages
- Dual PFC MegaPAC power supplies on rear bottom behind backplane
- Dual AC inlet and filter (10amps), one for each power supply located on rear bottom 4U panel
- Power supplies baffled for separate air flow
- Fan speed control feature for audible noise management



ATR, CUSTOM VPX 12-SLOT SYSTEM PLATFORM

- 1 ATR
- VITA 46 backplane in 12 slots - 9 V46 slots, 3 VME slots
- Power Supply: 120 VAC or 28 VDC
- Measures 15.38"W x 12"H x 19.6"D
- Bottom patch panel offers access to P2 section of the backplane
- Integral cooling with front-to-rear airflow
- AC input connector, power on/off toggle switch, elapsed time meter and voltage indicators with voltage monitor, status indicator I/O front panel
- Fan fail indicator and reset switch (optional)



ATR, VPX-REDI LIQUID COOLED

- 1 ATR
- Conduction cooled ATR for VME, CPCI, VITA 41 (VXS), VITA 46 (VPX) and custom
- Independent dual liquid cooled side walls
- Modular design, field-proven high integrity frame construction
- Cools in excess of 100 Watts per slot
- In accordance with ARINC 404A
- Can accommodate up to 10 x 6U x 160mm conduction cooled cards
- Up to 1KW input power
- Input Power Mil-Std 704E
- DC 28V / 270V
- 1 and 3 phase 115VAC 400Hz on request
- Custom IO options including Mil-Std wiring and connectors
- Choice of cooling fluids including glycol, kerosene, PAO, salt water, de-ionized water
- Contact sales for specific order information

VPX Single Board Computer (PowerPC Based) - 3U



CPU FEATURES:

- One MPC8640 (Single or Dual-Core) running up to 1.25 GHz with (per Core):
- Up to 16GB of Soldered NAND flash
- L1 cache: 32KB Inst. and 32KB Data
- 1MB of L2 integrated cache with parity
- Two DDRII banks (up to 2 GBytes each) with ECC
- Mirror-Bit Flash (up to 512 MBytes)
- 512 KB of nvSRAM (non-volatile memory)
- Calendar clock with supercap backup; elapsed time counter
- Thermal and power supply monitoring sensors

ORDER NUMBER:

IC-PPC-VPX3a

COMMUNICATION SUBSYSTEM FEATURES:

- 8 lanes available as one PCIe x8 or two PCIe x4 or four PCIe X2 links (hardware setting)
- 4 lanes available as one PCIe x4 or one SRIO x4 link (hardware setting)
- 2*GigE ports available either as 1000BT interfaces on front RJ45 connectors or as 1000KX (or SGMII) interfaces on P2 (automatic detection)
- 2*GigE ports available either as 2*1000BT interfaces or 2*1000KX (or SGMII) interfaces on P1 (factory setting)
- 1* RS232 UART available on a front mini USB connector or on P1
- Eight GPIOs on P2 (3.3V LVTTTL Level - protected)
- I2C bus for management interface (VITA 46.11)
- Status LEDs

ACCESSORIES:

- Engineering kit for debug: JTAG/COP, console, etc.
- 3U rear transition module

This Single Board Computer is a 3U / 4HP (0.8") VPX board compliant with 3U module definitions of the VITA 46.0 standard. It is available in standard, extended, rugged and conduction-cooled grades.

VPX Single Board Computer (Intel Based) - 3U



CPU FEATURES:

- One Intel® Core™2 Duo processor SL9380 (or SU9300)
- Core speed = 1.8GHz (or 1.2GHz)
- FSB speed = 800MHz
- L2 cache = 6MB (3MB)
- Thermal design power = 17W (10W)
- DDRII 400 with ECC (up to 2 GBytes)
- One boot flash memory (up to 16 Mbits)
- Up to 4GB of Soldered NAND flash
- Calendar clock with supercap backup
- Thermal monitoring sensor

ORDER NUMBER:

IC-DC2-VPX3a

COMMUNICATION SUB SYTEM FEATURES:

- 8 lanes available as one PCIe x8 or two PCIe x4 links (hardware setting)
- 2*GigE ports available either as 2*1000BT interfaces or 2*1000KX (or SGMII) interfaces on P1 (factory setting)
- 2* RS232 UART
- 2 * USB2 ports
- 2 * SATA ports
- 8 GPIOs
- I2C bus

ACCESSORIES:

- Engineering kit for debug : JTAG/COP, console, etc.
- 3U Rear Transition Module

This Single Board Computer is a 3U / 4HP (0.8") VPX board compliant with 3U module definitions of the VITA 46.0 standard. It is available in standard, extended, rugged and conduction-cooled grades.

VPX XMC Carrier - 3U

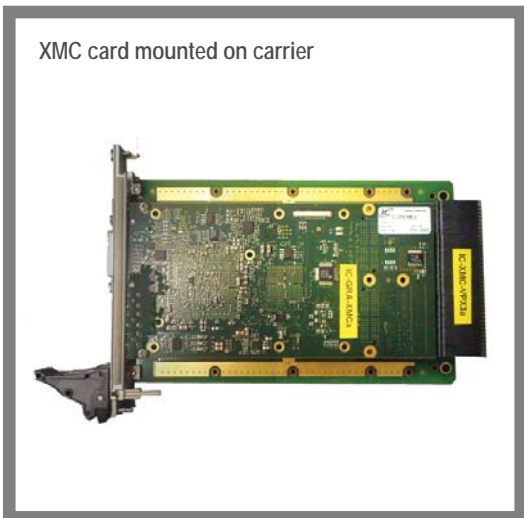


FEATURES:

- Carrier board for XMC module
- Compliant to latest VITA 46 specifications
- Designed to support the XMCs per the VITA 42 specification
- 3U x 160mm, 4HP wide
- Standard, extended, rugged and conduction cooled versions available

ORDER NUMBER:

IC-XMC-VPX3a



The IC-XMC-VPX3a is an XMC carrier which can act as a non system module or, populated with Processor XMC board, as a System Controller.

The following interfaces are available on the VPX backplane:

- Utility Plane : Power supplies, Reset, NVMRO, Reference Clock
- Data Plane : 8 lanes from XMC Jn5 to VPX P1
- Expansion Plane : Rear-IO signals to VPX P2, 20 differential and 24 single-ended from XMC Jn6

The IC-XMC-VPX3a is a VPX 3U / 4HP (0.8") board compliant with 3U module definitions of the VITA 46.0 standard. It is available in standard, extended, rugged and conduction-cooled grades.

XMC (VITA 42) defines an open standard for supporting high-speed, switched interconnect protocols on the popular PMC form factor. It adds connectors for the high-speed interconnects while retaining the main features of the PMC specification, staying within the height. It provides better definition for carrier cards, and allows for optional configuration without PMC connectors using only the high-speed connectors.

VPX Ethernet Switch - 6U



LAYER 2 SWITCHING CAPABILITIES:

- 16K entries forwarding database
- Automatic or controlled learning and aging routing table
- Port and MAC access control
- Flow control and backpressure
- 10 KB Jumbo Frame
- IGMPv3 & MLDv2 snooping
- Rapid Reconfiguration 802.1w
- Link aggregation static or LACP

ORDER NUMBER:

ComEth 4340

BANDWIDTH MANAGEMENT:

- Unicast & Multicast rate limiting
- Egress rate shaping with rate ranging port from 64K to 1Gbps
- Minimal bandwidth guarantee
- Per traffic Class

VLANs SERVICES:

- 4K active VLANs
- 4K Bridge multicast groups
- Flexible VLAN assignment
- 802.1Q port-based, protocol
- Based 802.1v, service VLANs
- 802.1ad, Policy-based VLANs

QUALITY OF SERVICE ENGINE:

- 8 priority queues per port
- Flexible bandwidth management with hierarchical shaping
- Unicast and multicast routing engine
- RIPV2, OSPF V2 Routing proxy-ARP, DHCP relay

IPV6 CAPABLE SECURITY FEATURES:

- 802.1X Port authentication
- Multicast/Broadcast limiting STP/RSTP protocol
- Virtual cable tester On-Line Flexible management tools :
 - Web or CLI management
 - SNMP (Standard & private MIBs)
 - Enhanced port mirroring
 - Easy software updating

ComEth4340a supports full-wire speed L2 bridging and L3 IPV4/V6 Unicast and Multicast routing (full-wire speed capacity of 125 Mpps) with L2-L4 advanced traffic classification, filtering and prioritization:

- Two 10 GKX4 ports available on P1 rear connector
- Two 10 Gigabit ports available on the front panel (XAUI/10GB-CX4)
- Twenty four 1000KX ports routed via rear I/O (P2 & P3)

Alternatively, up to 16 of the 1000KX ports can be configured in 1000BT mode and routed to P5 & P6. In addition, 4 GigE rear ports can be made accessed via the front panel (4 x 1000SX/LX fiber channels or 4 x 1000BT copper ports).

- 24 x 1 GigE & up to 4 x 10 GigE ports with a full-wire speed switching capacity of 125 Mpps
- ComEth4340a supports full-wire speed L2 bridging and L3 IPV4/V6 Unicast and Multicast routing with L2-L4 advanced traffic classification, filtering and prioritization
- ComEth4340a is available in 6U 0.8" pitch form factor, from standard to conduction-cooled grade

DV3200 VPX SerDes Test Blade



- Multilane differential serial fabric test card for VPX
- Lab-on-board eliminates need for acquiring a whole rack of equipment
- Directly evaluate true Gbps serial link BER performance
- Test and characterize entire multi-lane serial fabric with one integrated module
- Achieve lowest cost of test and fastest time to market
- Can be used for testing both line cards and backplanes
- 6U x 160mm form factor

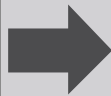
ORDER NUMBERS

Blade with 4 Channels: 69-DVT3200-4

Additional 4 Channel Module: 69-DJ60

The adoption of serial link technology in VPX poses significant debug, characterization, and test challenges. The DV3200 is an ultra low cost multi-lane Gbps serial test module that achieves unprecedented density and performance. With the DV3200, you do not need to purchase equipment such as oscilloscopes, pattern generators, jitter analyzers, BERTs, clock generators, and analog function generators.

DEBUG, CHARACTERIZATION, AND TEST CHALLENGES OF SERIAL TECHNOLOGY

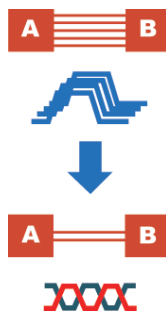


Cost
+
Time
+
Inaccuracy

- **Conventional equipment rack required for serial technology**
- **Capable of validating only a single-lane serial link**
- **Very capital-intensive**

THE NEED

- Shrinking timing/voltage margins
- Physical layer critical to overall system performance
- Existing solutions rely on mathematical models to predict performance inside chassis
- Large lane counts result in an impractical test paradigm

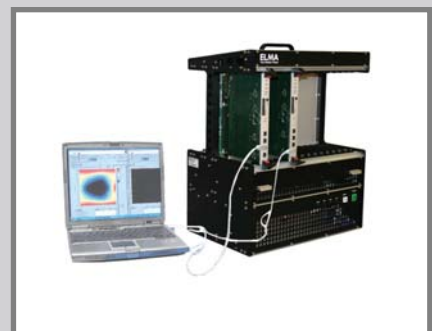


DV3200 BENEFITS

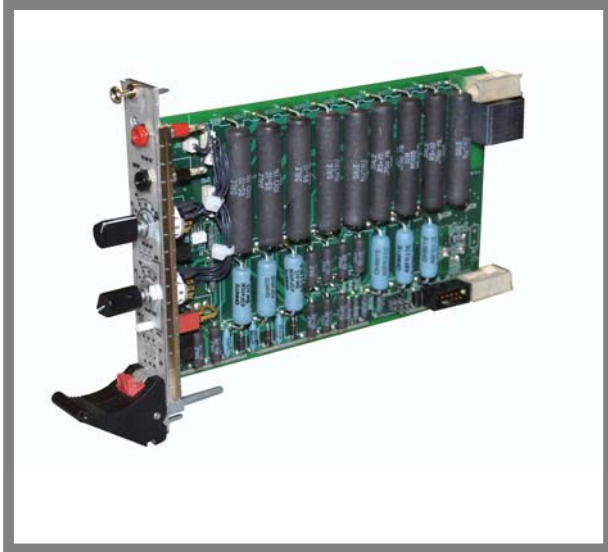
- 6U VPX plug-in module format eliminating the need for 64 SMA connectors and patch cables
- Simplifies characterization of the high speed signals associated with VPX plug-in modules and custom VPX backplanes
- Adapts to evolving protocols

DV3200 IN A VPX CHASSIS FEATURES

- Pattern Generator x16
- Oscilloscope x16
- BERT x16
- Jitter Injector x16
- Jitter Tester x16
- Single 6U VPX Module
- Single PC control
- Ultimate Test Portability



VPX Load Boards



- Load board for VPX systems, meets ANSI/VITA mechanical and electrical connection standards
- Verifies chassis can meet power requirement and specifications for VPX
- Aids in locating hot spots in the chassis
- Go-No-Go indicators for 12V, 3.3V, 5V, +12V_Aux, -12V_Aux & 3.3V_Aux
- Two test point outputs and rotary switch selector for voltage settings, markings for SIG and GND
- Power reset button (to minimum level), SYSRESET signal on the two test point outputs
- Power level LED (1, 2, and 3) and push button (Step UP) indications
- RoHS compliant

ORDER NUMBER:

3U VPX Load Board: 80-316-VPS-XXXX

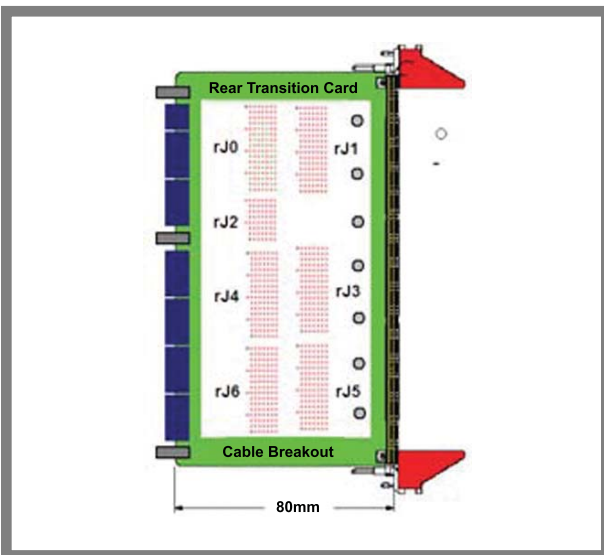
6U VPX Load Board: 80-616-VPS-XXXX

MECHANICAL SPECIFICATIONS

- 3U and 6U heights
- 160mm depth

The load board functions to test a system's cooling capabilities by first applying the load to the power supply for verification and creating the necessary heat to confirm chassis cooling. The 3U and 6U VPX load cards feature a microcontroller-based stepped load control. The rotary switch selects the voltage setting while pushing the ON switch will cycle between different power levels shown on the LED display. The set load power levels are saved in EEPROM.

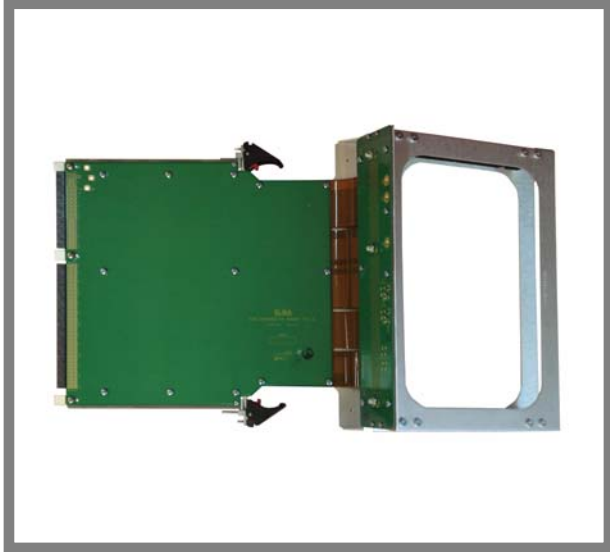
VPX Universal RTM



- 6U x 160 mm RTM format
- 10 layer design
- Breakout for all signals possible depending upon connector configuration
- Typical configuration has connectors installed to bring out J0, J2, J3 and J4 signals
- Front panel and injector/ejector optional, with all necessary holes provided
- Strain relief holes provided directly behind the front panel mounting location for clamping bar or wire-ties

The Universal VPX RTM Breakout Board can allow a test engineer to access I/O signals on custom built VPX boards. The board would not be intended for high-speed signals but would typically be used to bring out single ended TTL signals that might be part of a customer's custom IO board.

VPX Test Extender



- Conforms to VITA 46 VPX specifications
- Controlled impedance rigid-flex-rigid design
- Alignment keying headers provided for extender and plug-in card
- 100 Ohm differential pair routing
- Mechanical frame supports 6U, 160mm plug-in card
- Frame has injector/ejector latches for plug-in card
- Signal rate: 3.125 Gb/sec
- +5V on/off switch
- Current monitor on +5V power
- Frame has injector/ejector latches to hold extender securely to chassis

ORDER NUMBER:
1940000318-0000R

BOARD SPECIFICATIONS

- 10-layer stripline design
- PCB UL listed 94-V0
- PCB .080" thick
- PCB Material: L24 Type GFN

MECHANICAL SPECIFICATIONS

- 6U height
- 240mm
- MultiGig RT-2 connectors

Elma Bustronic used creative engineering to solve a major problem in developing the VPX Extender Board - the lack of a right angle receptacle for VPX in the marketplace. So, the company produced a rigid-flex-rigid PCB design to get around the problem. The solution entails a right angle pin connector that plugs into the backplane, connected to a flex circuit that wires to the straight receptacle to receive the plug-in board.

The VPX extender boards are designed to bring a circuit card completely out of a card cage or enclosure so that it can be tested or debugged. This provides access to both sides of the test board. There are test points for all of the differential pairs on the MultiGig fabric connector for the hub slots.

The VPX Extender boards come in a 10-layer stripline design for the rigid PCB and microstrip design for the flex circuit portion. Also featured is an ammeter, which measures the current and has a digital indicator on the front panel showing the status.

Elma Bustronic also offers extender boards in VXI, VME, AdvancedTCA, AMC and CompactPCI architectures. Other system accessories include load boards, power interface boards, shelf managers, system/voltage monitors, and more.

VPX Handles, Panels and Components

Handles

Handles, Hot Swap, IEEE

Top with ESD pin	81-095
Top without ESD pin	81-095-01
Bottom with ESD pin	81-096
Bottom without ESD pin	81-096-01

Handles, Hot Swap, Telco classic

Top with ESD pin	81-205
Top without ESD pin	81-205-01
Bottom with ESD pin	81-206
Bottom without ESD pin	81-206-01

Handles, Hot Swap, Telco long

Top with ESD pin	81-214
Bottom with ESD pin	81-215

Extrusion

Height	Width	
3U	5HP	66-515-3-VPX
6U	5HP	66-515-6-VPX

Components

Microswitch with	81-088-1
pre-assembled cable	

Panels

Front Panels with Handles

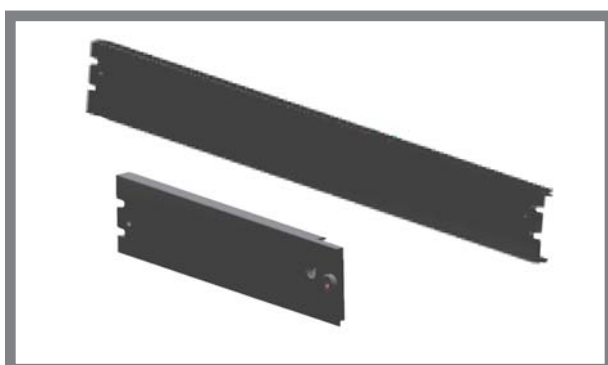
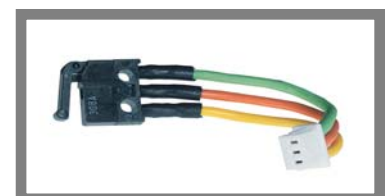
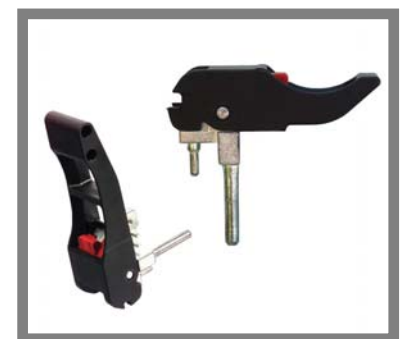
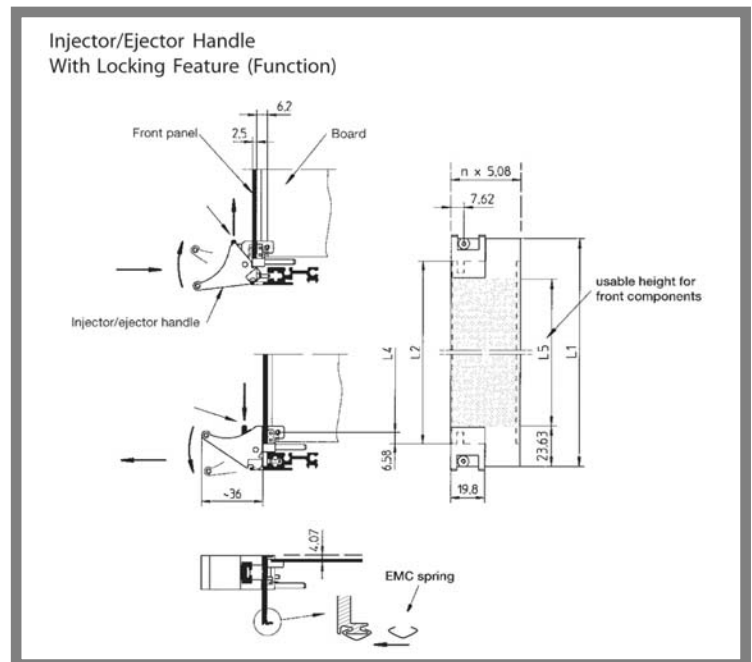
- 6U x 5HP, 6U x 6HP, and 6U x 4HP

Filler Panels

- 6U x 5HP, 6U x 6HP, and 6U x 4HP

Filler Front Panel with Air Baffle

- 6U x 160mm by 5HP



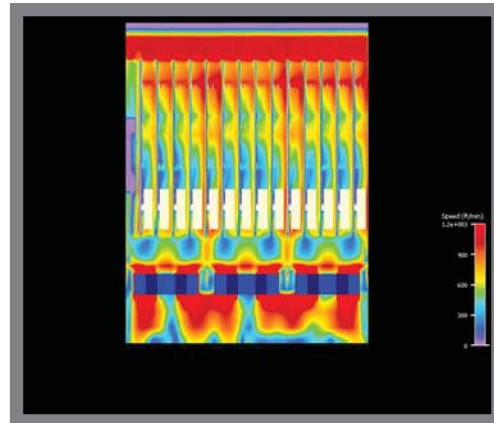
Thermal Simulation

THERMAL SIMULATIONS

Elma has performed extensive thermal simulation studies to optimize the design of its VPX packaging product line.

Using the Computational Fluid Dynamics (CFD) modeling software Flotherm, Elma's engineers optimize air intake and exhaust openings, increase or decrease plenum space, locate baffles to vary slot openings and redirect air flow where required. Locating hot spots in the chassis, the designer can simulate various scenarios to rectify the situation and select the appropriate fans and components. Finally, the designer finds the ideal balance of cooling, EMC, audible noise, power, and other elements to meet or exceed the specifications and keep costs low.

Elma's design philosophy embraces extensive use of thermal simulations that helps to perfect the design and reduce time to market. Our Validation Lab includes thermal, environmental, and EMC chambers and a wind tunnel to verify the results.



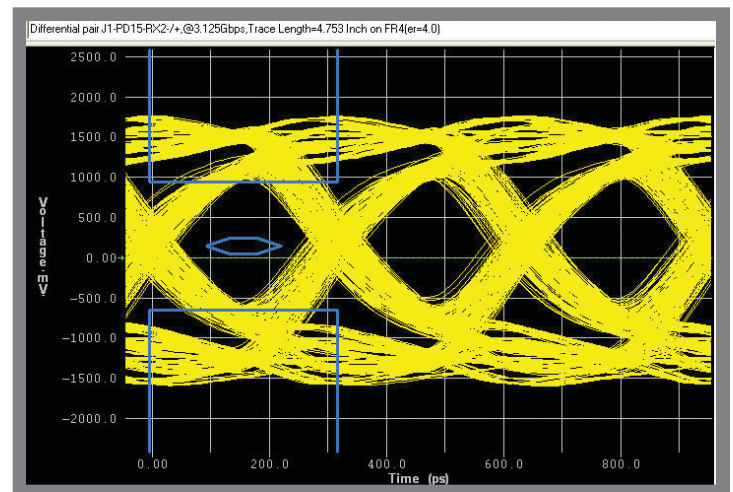
Airflow Speed Inside Chassis

BACKPLANE SIGNAL INTEGRITY STUDIES

Elma Bustronic's signal integrity analysis and simulation services ensure efficient cost-effective design solutions that work superbly the first time, every time. And we continue to expand our technical resources with new high-speed measurement technology, interconnect model extraction, and software to support measurement-driven design. The simulations predict the characteristics of a custom design and eliminate "trial and error," resulting in faster turnaround and guaranteeing that our products meet or exceed your specifications.

Faster PCB designs are by nature more sophisticated and delicate. At higher clock speeds, the PCB demands cleaner signal transmission without compromising the stability of the system. This is where Signal Integrity engineering comes into play. Simply put, signal integrity studies the design of high-speed circuits that can accommodate cleaner signals passing through them.

Elma's creative routing techniques reduce layer counts, preventing long via stubs that hamper signal continuity. To optimize VPX backplane performance, we often use low-dielectric laminate materials like FR408 or Nelco 4000-13SI.



Eye diagram of 5-slot VPX Mesh Backplane

Drvr	Rcvr	Trace Length (inches)	Eye Height			Eye Width			Jitter (pS)
			Total (V)	High level (V)	Low level (V)	Total (pS)	High level (V)	Low level (V)	
Slot5	Slot1	4.753	1.44	1.29	-1.00	181.49	1.29	-1.00	111.93

VPX System Platform Order Key

12V
15V
32V
39V

	1	2	3	4	5	6	7	8	9	10	11	12	13
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1,2) Num. of Slots BP

00-21: Single BP AY-YA: Split
Example: 7 slot = 07
Example: 12 + 9 = LI

3) BP Bare board

- P = VPX, 6U (VITA 46)
- W = VPX, 3U (VITA 46)
- X = No BP installed
- Z = Custom

4) BP Connector Config: J1/J2/P0

- S = RT-2(J0-J6) 6U
- U = RT-2 (J0-J2) 3U
- X = No connectors
- Z = Custom

5) Drives

- 1 = 1 X 3.5"
- 2 = 2 X 3.5"
- 3 = 1 X 5.25" HH
- 4 = 2 X 5.25" HH
- 5 = 4 X 5.25" HH
- 6 = 2 X 3.5", 1 X 5.25"HH
- 7 = 1 X 3.5", 2 X 5.25"HH
- 8 = 2 X 3.5", 2 X 5.25"HH
- 9 = 1 X 3.5", 1 X 5.25"HH
- A = 1 x 2.5", 1 X CDROM (SL)
- B = 2 x 2.5"
- C = 6 x 5.25" HH
- D = 1 x slim line CDROM
- X = Not installed

6) Height

- 2 = 2U
- 3 = 3U
- 4 = 4U
- 6 = 6U
- 7 = 7U
- 8 = 8U
- 9 = 9U
- A = 10U
- C = 12U

7) Width

- 6 = 63T
- 8 = 84T

8) Rear I/O

- N = No
- Y = Yes

9) Depth

- 2 = 200mm - 299mm
- 3 = 300mm - 399mm
- 4 = 400mm - 499mm
- 5 = 500mm - 599mm
- 6 = 600mm - 699mm

10) Card Orientation

- V = Vertical
- H = Horizontal
- T = Top Load

11) PSU Input

- A = 110/220VAC (Plug In)
- C = 90 - 230VAC (Fixed)
- E = 110/220VAC (2 x HS, N+1)
- G = 90 - 230VAC (Plug In)
- N = 24/28VDC (Fixed)
- O = 24/28VDC (2 x HS, N+1)
- P = 90 - 230VAC(2 x HS, N+1)
- X = No PSU

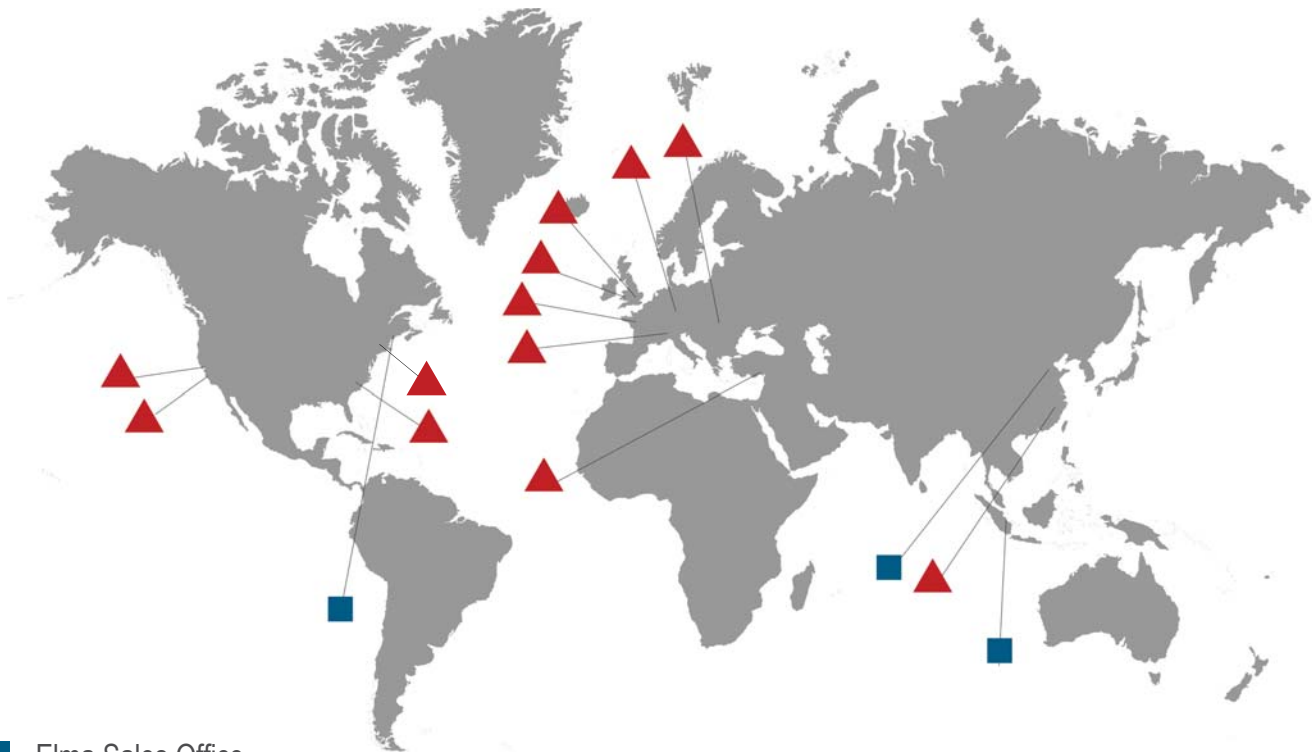
12) PSU Output

(Note: Not all PSU combinations available)

- 2 = 200 - 299 watts (w/o 3.3V)
- 3 = 300 - 399 watts (w/o 3.3V)
- 4 = 400 - 499 watts (w/o 3.3V)
- 5 = 500 - 599 watt (w/o 3.3V)
- 6 = 600 - 699 watt (w/o 3.3V)
- 7 = 700 - 799 watt (w/o 3.3V)
- 8 = 800 - 899 watt (w/o 3.3V)
- 9 = 900 - 999 watt (w/o 3.3V)
- A = 100 - 199 watt (w/ 3.3V)
- B = 200 - 299 watt (w/3.3V)
- C = 300 - 399 watt (w/3.3V)
- D = 400 - 499 watt (w/3.3V)
- E = 500 - 599 watt (w/3.3V)
- F = 600 - 699 watt (w/ 3.3V)
- G = 700 - 799 watt (w/ 3.3V)
- H = 800 - 899 watt (w/3.3V)
- I = 900 - 999 watt (w/3.3V)
- J = 1000 - 1099 watt (w/3.3V)

13) Shielding Level

- 0 = Level 0
- 1 = Level 1
- 2 = Level 2
- X = Not installed



- Elma Sales Office
- ▲ Elma Production/Assembly/Sales

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