ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

**Artisan Technology Group**
(217) 352-9330 | sales@artisantg.com | artisantg.com

**Full-service, independent repair center**
with experienced engineers and technicians on staff.

**We buy your excess, underutilized, and idle equipment**
along with credit for buybacks and trade-ins.

**Custom engineering**
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

**Expert team | Trust guarantee | 100% satisfaction**

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

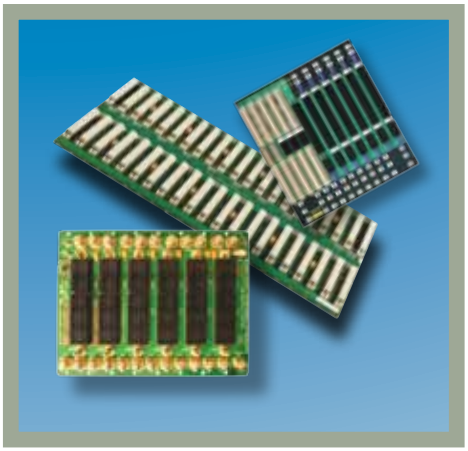
Find the *Elma 11V-68409-R12J12-C* at our website: *Click HERE*













# TYPE 11

BACKPLANES

ACCESSORIES

SYSTEM COMPONENTS

INTEGRATION SERVICES

TEST & VALIDATION SERVICES

# VITA-Based System Platforms

## VME, VME64x, VPX, VXS, VXI, and more

**ELMA**
Your Solution Partner

**Elma Electronic ● www.elma.com**

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

# Elma Electronic Inc.

## WHO IS ELMA ELECTRONIC

Founded in 1962, Elma is a leading global manufacturer and supplier of products used in integrated embedded platforms for military/aerospace, communications, medical imaging, and industrial applications. Based in Fremont, California and Wetzikon, Switzerland, the company has facilities and representatives in over 24 countries. Elma has a broad base of customers in diverse industries such as military and defense, telecommunications, industrial control, and medical electronics.

The Elma group of companies' products and services range from electromechanical components, to boards, to complete standard or custom system platforms. Elma constantly strives to provide products designed to be superior in quality, reliability, performance, and innovation. The focus is to leverage proven technology based on VITA (VME, VPX, and VXS), PICMG standard architectures (CPCI, ATCA and MicroTCA) and rugged COTS based solutions.

The company offers fast, flexible response to customer needs and extensive practical knowledge in tailoring solutions to specific applications. The combined Elma Team has the knowledge and resources critical to address the increasing complexity and interplay between backplane, packaging, board level and software aspects of a successfully integrated System Solution. The addition of the ACT/Technico brand of products and services strengthens Elma's position as a vertically integrated supplier for Embedded Computing customers, while the Bustronic division provides unsurpassed high end backplane design expertise.

Elma's product line encompasses well over 16,000 parts, including system packaging and boards, enclosures, backplanes, cabinets, and other electro-mechanical components. Elma's quality level is reached through training of all employees and following of systematic procedures per ISO 9001 standards, to which Elma has been certified.

## 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

**Systems**



**Embedded Computing Products**



**Backplanes**



**Enclosures & Components**



**Cabinets**



**Switches, Knobs & LEDs**





Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

## HOW ELMA DOES IT - CORE CAPABILITIES

The company supplies a first class offering of products for standard and rugged COTS electronics packaging and sub-systems integration: boards, chassis, backplanes, mechanical components, cabinets, and LED/switches for a wide variety of applications worldwide. The ACT/Technico branded products and services enable Elma to be a leading supplier of integrated embedded boards and sub-systems built on open standards platforms, including Single Board Computers, mass storage and RAID products, I/O and networking solutions, RTOS, Linux or Windows, and device drivers.

System architecture, hardware, and software design services are offered to quickly deliver complete solutions and expedite time to market. We take true COTS products, such as single board computers and PMCs, then enhance and qualify them to meet your rugged requirements.

This extensive range of products and services gives Elma Electronic Inc. a unique ability to complete entire projects from initial system architecture through specification, design, manufacturing and test.

Elma has a professional sales team committed to the value added sale. Our sales staff and application engineers are able to match requirements to the application and recommend semi or full custom solutions when appropriate. Our staff of experienced electrical, software, mechanical and system engineers combine to provide state of the art solutions designed to meet our customers' specifications. We support those products long after shipment with warranty coverage and complete documentation packages.

In house manufacturing capability rounds out our ability to integrate the products and designs into a complete, shippable solution. Our Quality department rigorously maintains our corporate commitment to ship products that are built with quality workmanship.

Elma is capable of quickly turning projects from initial system architecture through to specification, design, manufacturing and test. We also work with you to manage the entire project including EOL issues, spares inventory and lifecycle management.

## TECHNICAL CAPABILITIES

- Standard and rugged COTS integration and test expertise
- System platform architecture design and development
- Hardware and software selection
- Chassis platform design and selection
- Embedded and COTS system integration
- High performance cable assemblies
- Manufacturing
- Run rates from 10s to low 1000s
- Project management
- Full support for the project, single point of contact
- Software installation
- Bootable device drivers included as needed
- Device driver development
- Functionally tested in hardware matching target system
- Testing
- Factory test software
- System level/payload testing
  SBCs, I/O, storage, operating system
- Unit level environmental testing
  ESS, NEBS, MIL-STDs 167, 810, 901D
- Regulatory compliance testing CE, UL, FCC

## 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 VITA based backplanes and chassis to meet customers' exact needs.



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

# VITA (VMEbus International Trade Association)



## VMEbus Products:

- System Platforms
- Backplanes
- Extender Boards
- Jumper Boards
- Form Factor Adapters
- Power Supplies
- Voltage & Systems Monitors
- Load Cards

Elma has been involved with the VITA standards since its inception and is committed to bringing the best technical expertise and products to the VITA community. This background information will provide a brief overview of the evolution of standard VME to the latest fabric architectures of VXS and VPX™.

### VMEbus

The VME (Versa Module Eurocard) defines an electrical interface system used to interconnect data processing, storage, and other peripheral control devices in a closely coupled hardware configuration. Our goal is to ensure that every VME or VITA-based product we manufacture fulfills or exceeds the standards. Elma's specification, innovations, market-driven product line, and services are guaranteed for their consistency and excellence.

The VMEbus evolved from Motorola's VERSAbus. VERSAbus was a bus structure originally designed to allow the interconnection of various printed-circuit cards. Designed to fit the Eurocard form factor, the VERSAbus quickly became a standard in Europe. In 1981, Motorola, in collaboration with Mostek, Signetics/Philips, and Thompson CSF of France, announced the new VMEbus as a nonproprietary standard in the public domain.

The VMEbus mechanical assembly specifications are based on DIN 41 495, Part 5 and IEC 297-3. VMEbus boards come in two sizes - 100 x 160mm (3U) Eurocard or 233.35 x 160mm (6U) Double Eurocard. The depth of each is 160mm; their heights are 3U and 6U. The backplane pitch is 0.8".

The VMEbus specification describes the 6U subrack divided into two parts. The upper portion is designated as J1/P1 and the lower portion, J2/P2. The initial J1 system bus backplane was designed, using a 96-pin DIN connector, as a complete 16-bit system, where all 96 pins are allocated. The J2 backplane in the lower part of the subrack expanded the system to 32-bits, where only the middle row pins were allocaated, leaving room for User I/O expansion.

The VMEbus has successfully evolved over the years to meet industry and market expectations. The VME64x standard (VITA 1.1-1997) added even more capabilities such as:

- 160 pin connector family
- 95 pin P0/J0 connector
- +3.3V power supply pins
- More +5 VDC power pins
- Geographical addressing
- Higher bandwidth cycles (up to 160 MB/sec)
- 141 more user defined pins
- IEEE 1101.11 compliant rear plug-in units (Transition modules)
- Live insertion/Hot Swap capability

- Injector/Ejector locking handles (IEEE 1101.10)
- EMC front panels (IEEE 1101.10)
- ESD features (IEEE 1101.10)

This specification laid the groundwork for High Availability and Live Insertion (Hot Swap) VME standards, then on to increased bandwidths up to 320MB/sec. All old legacy boards that comply with IEEE-1014-1987 are considered to be VME64 compliant and are identified as VME64 compatible. All these new boards work in conjunction with the old legacy boards providing a smooth upgrade path for system integrators. Thus the VMEbus continues to grow and support diverse applications such as industrial automation and controls, defense, telecom, medical and instrumentation.

## VXIbus

The VXIbus specification was created in 1987 specifically for instrumentation systems. The main sizes for VXI are "C" (6U x 340mm) and "D" (9U x 340mm) and the backplane pitch is 1.2mm.

## VXS

In 2004, the VITA 41 architecture was created. VXS (VITA 41.x) adds a high-speed MultiGig connector over P0 of a VME64x backplane for serial data traffic. The same style of connector is also used for switch slots, driving the centralized fabric signals. VXS is backwards-compatible to VME. Designers have the flexibility of plugging in standard VME64x cards for parallel bus only, integrate the payload and switch cards for parallel bus and switch fabric transport, or switch fabric transport only. The VXS specification allows for four differential serial pairs per direction link over P0, and supports up to two such ports on each VMEbus card. The result is theoretical slot-to-slot bandwidth of 3 Gb/s.

## VPX, OpenVPX, and VPX REDI

VPX (VITA 46/48), ratified in 2006, uses the same connector as the P0 on VXS but along the entire board. The specification allows for the use of VME however does not require it. 6U VPX utilizes a mesh topology for high connectivity and performance. Hybrid VPX backplanes can incorporate the VMEbus signals for slots going to legacy VME64x slots. 3U VPX typically has a twisted pair routing topology to accommodate User I/O. The VPX Gigabit Ethernet Control Plane per VITA 46.20 provides a separate star or dual star network for out-of-band communication. VPX in the mesh format offers a theoretical slot-to-slot bandwidth of 5 GB/s.

The OpenVPX (VITA 65) System specification was created to bring versatile system architectural solutions to the VPX market. Based on the extremely flexible VPX family of standards, the OpenVPX standard uses module mechanical, connectors, thermal, communications protocols, utility, and power definitions provided by specific VPX standards and then describes a series of standard profiles that define slots, backplanes, modules, and Standard Development Chassis.

VPX REDI (VITA 48), was created to define a set of thermal cooling schemes for the VPX family of products. It also introduces a new 2-level maintenance definition for VPX systems.

In keeping with our commitment to provide reliable and consistent products, Elma is proud to offer an extensive line of VITA-based products and services. We invite you to explore this catalog and contact us for more information.


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

# VITA System 11 Overview

ELMA
Your Solution Partner



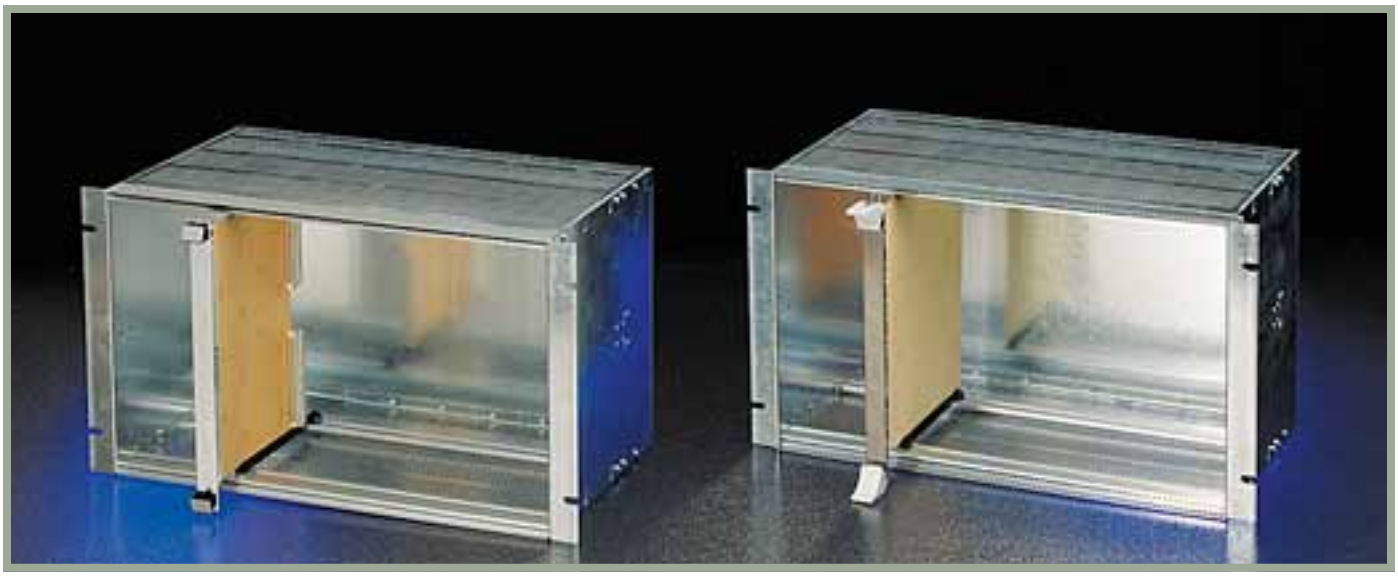
## FEATURES:

- 19" Rackmount, sheet steel, pre-galvanized enclosure
- Dimensions according to IEEE 1101.10/.11
- Sizes 3U to 9U high
- 3 to 21 slot backplanes
- Advanced EMC shielding without gaskets, standard
- Vibration resistant
- Designed to meet UL, CE and FCC requirements
- Mounting for 3U or 6U VITA-Based System Platforms (VME, VME64x, VPX, VXS, VXI), horizontal or vertical
- Rear I/O optional
- Wide range of EMC shield peripheral modules and panels
- AC or DC input
- System Monitoring optional
- 100 watt - 1000 watt power supplies

Elma Type 11 family of enclosures provides a high quality, cost effective platform for packaging rackmount VITA System applications. Designed to IEEE 1101.10/.11 standards, Type 11 enclosures give advanced EMC shielding protection and are available with a wide range of options. Based on a modular packaging approach, the system can be configured by selecting the backplane, PSU, device modules and the number of slots. Engineered for superior cooling the Type 11 is available with either front to rear or bottom to top airflow. Standard heights are 3U-9U with custom sizes possible. The Type 11 will accept 3U or 6U cards mounted vertically or horizontally. Systems can be configured with or without rear I/O card cage.


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

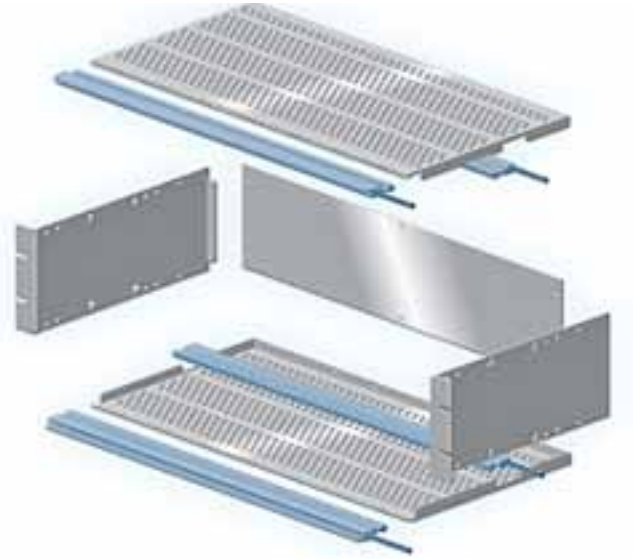
# VITA System 11 Overview



Rear panel (has to be ordered separately)

## PRODUCT INFORMATION

- Advanced EMC shielding is standard
- Dimensions according to IEC 60297
- Rapid assembly
- Top and bottom covers fully perforated



## MATERIAL

- Aluminum extrusions, electrically conducting
- Side plates, top and bottom covers of pre-galvanized sheet steel

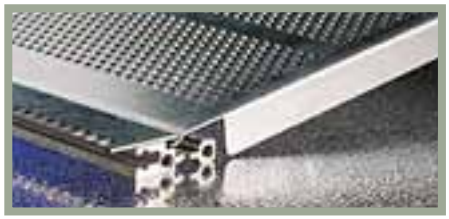
## SCOPE OF DELIVERY

- Complete sub-rack including M 2.5 tapped strips

Front extrusions meet IEEE 1101.10 and Compact PCI Standard, specially designed for plug-in units with high insert/extract forces.

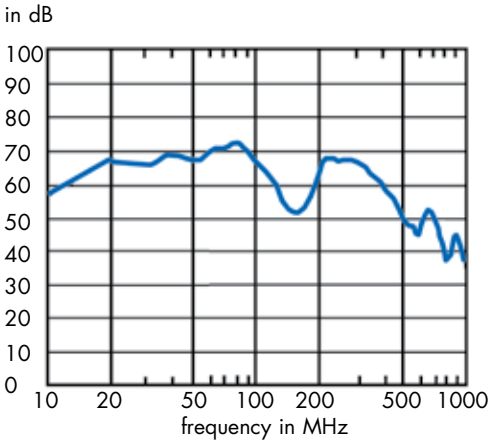


By means of standard snap-fit and screw connections also suitable for demanding applications.





### Typical attenuation for Type 11C






Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

# VITA System 11 Horizontal Enclosure (3U)

ELMA
Your Solution Partner



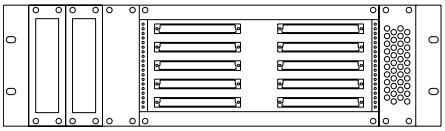
## FEATURES:

- 19" Rackmount fully compliant to IEEE 1101.10/.11
- 3U x 84HP x 290mm (H x W x D)
- 6U Horizontal card mounting
- Optional 80mm Rear I/O
- 5 slot VITA-Based System Platforms (VME, VME64x, VPX, VXS, VXI)
- Advanced EMC shielding to meet CE and FCC
- Cooling front to rear
- Wide range of PSU inputs (90 - 264 VAC, 48 VDC)
- Fixed-mount or front pluggable PSUs with redundant hot swap options
- System monitoring for DC voltages, fan fail and over temp (optional)
- Connector options: 3 Row (96 PIN), 5 Row (160 PIN), 5 Row + P0
- Ready to run - turnkey solution

## SCOPE OF SUPPLY

High quality 19" rackmount chassis platform consisting of pre-galvanized steel enclosures, high performance VITA System backplane, power supply, cooling system and AC/DC power components. Assembled, wired and tested prior to shipment.

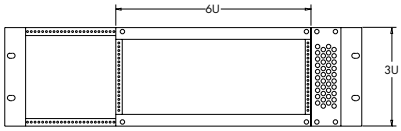
## ORDERING INFORMATION



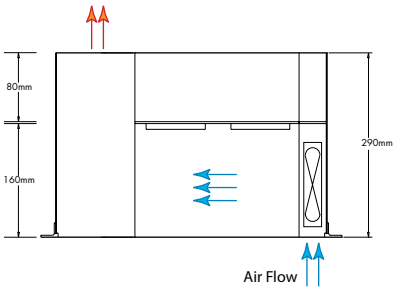
| Description | Order Number |
|---|---|
| ■ 3U(H) x 17"(W) x 290mm(D)<br>■ Holds 5, 6U x 160mm Cards<br>■ 5 Slot VME Backplane<br>■ 2 x 3.5" HH Devices<br>■ 1 x 50 CFM Fan<br>■ 150W: +5V/15A; +12V/5A; -12V/1A | 11V05MM238N2HC11<br>**VME** |


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

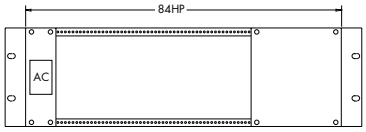
## LINE DRAWINGS




Front View




Top View




Rear View

## ENVIRONMENTAL

| | Operating | Storage / Transit |
|---|---|---|
| **Temperature:** | 0°C to +50°C | -20°C to +70°C |
| **Altitude:** | 6000 ft. (1,829m) | 50,000 ft. (15,240m) |
| **Humidity:** | 5% to 95% Non condensing | 5% to 95% Non condensing |
| **Shock:** | 10 Gs @ 11ms | 10 Gs @ 11ms (per ASTM 0775) |
| **Vibration:** | 1.0 Gs @ 10 to 330 Hz | 1.2 Gs @ 5 to 330 Hz |
| **Agencies:** | Designed to meet UL 60950, FCC, A, B, CE | |
| **Weight:** | Approx:17lbs | |

## CUSTOM CONFIGURATIONS

11 V ❑ ❑ ❑ ❑ ❑ 3 8 N ❑ H ❑ ❑ ❑

❑❑ NUMBER OF SLOTS
00-21: Single BP; AY-YA: Split
Example 7 slot = 07
Example 12 + 9 = LI

❑ BP BARE BOARD
A = oVPX, 6U, 1" (VITA 65)
B = oVPX, 3U, 1" (VITA 65)
C = oVPX, 6U, .8" (VITA 65)
D = oVPX, 3U, .8" (VITA 65)
H = oVPX, 6U, 1" + .8" (VITA 65)
I = oVPX, 3U, 1"+ .8 (VITA 65)
L = VXS Dual Star
M = V64, J12 mono, 3 row
N = VME64x, 6U
O = VME64x, 7U
P = VPX, 6U (VITA 46)
W = VPX, 3U (VITA 46)
S = VXS Star
T = VXS (Mesh)
X = No BP Installed
Z = Custom

❑ BP CONNECTOR
(CONFIGURATION J1/J2/PO)
L = 5 row, RT-2 PO & SW
M = 3 row, J1 flush, J2 13mm
N = 3 row, J1/J2, 17mm
O = 5 row, w/o PO
P = 5 row, w/ PO
S = RT-2 (J0-J6) 6U
U = RT-2 (J0-J2) 3U
V = RT-2(J0-J6) 6U, RTM
W = RT-2 (J0-J2) 3U, RTM
X = No Connectors
Y = Hybrid
Z = Custom

❑ DRIVES
1 = 1 x 3.5"
2 = 2 x 3.5"
D = 1 x slim line CDROM
X = No Mounting

❑ HEIGHT
3 = 3U

❑ WIDTH
8 = 84 T

❑ REAR I/O
N = No

❑ DEPTH
2 = 200mm - 299mm
3 = 300mm - 399mm

❑ CARD ORIENTATION
H = Horizontal

❑ PSU INPUT
A = 110/220VAC (Plug-in)
C = 90-230VAC (Fixed)
E = 110/220VAC (2 x HS, N + 1)
G = 90-230VAC (Plug-in)
H = 48VDC (Plug-in)
K = 48VDC (Fixed)
M = 48VDC (2 x HS, N + 1)
N = 28VDC (Fixed)
O = 28VDC (2 x HS, N+1)
P = 90-230VAC (2 x HS, N + 1)
X = No PSU

❑ PSU OUTPUT
(NOT ALL PSU COMBINATIONS AVAILABLE)
1 = 100 - 199 watts (w/o 3.3V)
2 = 200 - 299 watts (w/o 3.3V)
3 = 300 - 399 watts (w/o 3.3V)
A = 100 - 199 watts (w 3.3V)
B = 200 - 299 watts (w 3.3V)
C = 300 - 399 watts (w 3.3V)
X = Not Installed

❑ SHIELDING LEVEL
0 = Level 0
1 = Level 1
2 = Level 2
X = Not Installed

# VITA System 11 Horizontal Enclosure (4U)

ELMA
Your Solution Partner



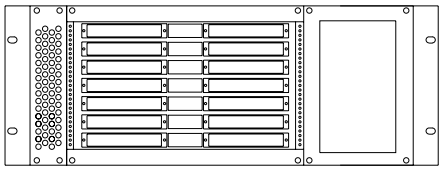
## FEATURES:

- 19" Rackmount fully compliant to IEEE 1101.10/.11
- 4U x 84HP x 290mm (H x W x D)
- 6U Horizontal card mounting
- Optional 80mm Rear I/O
- 7 slot VITA-Based System Platforms (VME, VME64x, VPX, VXS, VXI)
- Advanced EMC shielding to meet CE and FCC
- Cooling front to rear
- Wide range of PSU inputs (90 - 264 VAC, 48 VDC)
- Fixed-mount or front pluggable PSUs with redundant hot swap options
- System monitoring for DC voltages, fan fail and over temp (optional)
- Connector options: 3 Row (96 PIN), 5 Row (160 PIN), 5 Row + P0, RT-2
- Ready to run - turnkey solution

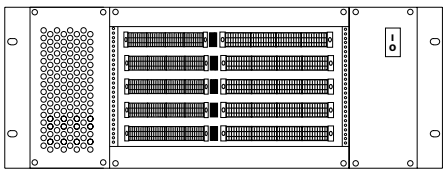
## SCOPE OF SUPPLY

High quality 19" rackmount chassis platform consisting of pre-galvanized steel enclosures, high performance VITA System backplane, power supply, cooling system and AC/DC power components. Assembled, wired and tested prior to shipment.

## ORDERING INFORMATION



| Description | Order Number |
|---|---|
| ■ 4U(H) x 17"(W) x 290mm(D)<br>■ Holds 7, 6U x 160mm Cards<br>■ 7 Slot VME or VME 64x Backplane<br>■ 2 x 5.25" HH Devices<br>■ 1 x 114 CFM Fans<br>■ 250W: +5V/40A; +12V/6A; -12V/6A; 3.3V/20A | 11V07OP448N2HCB1<br>**64X** |

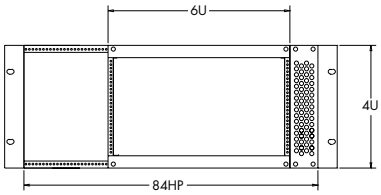


| Description | Order Number |
|---|---|
| ■ 4U(H) x 17"(W) x 290mm(D)<br>■ Holds 5, 6U x 160mm Cards (1")<br>■ Holds 5, 6U x 80mm RTMs<br>■ 5 Slot VPX Backplane (K2p-N1)*<br>■ 1 x 114 CFM Fan<br>■ 250W: +5V/40A; +12V/6A; -12V/6A; 3.3V/20A | 11V05AVX48Y2HCB1<br>**VPX** |

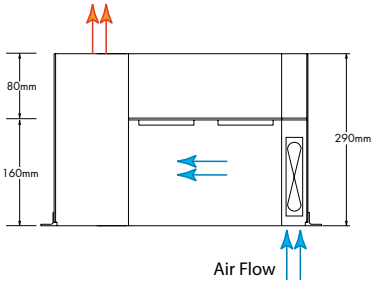
** see Topology Graph page 108 for details*


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

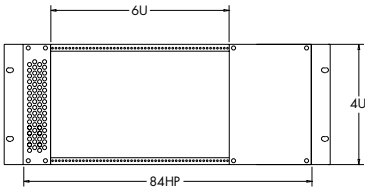
## LINE DRAWINGS




**Front View**




**Top View**




**Rear View**

## ENVIRONMENTAL

| | Operating | Storage / Transit |
|---|---|---|
| **Temperature:** | 0°C to +50°C | -20°C to +70°C |
| **Altitude:** | 6000 ft. (1,829m) | 50,000 ft. (15,240m) |
| **Humidity:** | 5% to 95% Non condensing | 5% to 95% Non condensing |
| **Shock:** | 10 Gs @ 11ms | 15 Gs @ 11ms (per ASTM 0775) |
| **Vibration:** | 1.0 Gs @ 10 to 330 Hz | 1.2 Gs @ 5 to 330 Hz |
| **Agencies:** | Designed to meet UL 60950, FCC, A, B, CE | |
| **Weight**: | Approx: 19lbs | |

## CUSTOM CONFIGURATIONS

**11 V ❑ ❑ ❑ ❑ ❑ 4 8 ❑ ❑ H ❑ ❑ ❑**

❑❑ NUMBER OF SLOTS
00-21: Single BP; AY-YA: Split
Example 7 slot = 07
Example 12 + 9 = LI

❑ BP BARE BOARD
A = oVPX, 6U, 1" (VITA 65)
B = oVPX, 3U, 1" (VITA 65)
C = oVPX, 6U, .8" (VITA 65)
D = oVPX, 3U, .8" (VITA 65)
H = oVPX, 6U, 1" + .8" (VITA 65)
I = oVPX, 3U, 1"+ .8 (VITA 65)
L = VXS Dual Star
M = V64, J12 mono, 3 row
N = VME64x, 6U
O = VME64x, 7U
P = VPX, 6U (VITA 46)
W = VPX, 3U (VITA 46)
S = VXS Star
T = VXS (Mesh)
X = No BP Installed
Z = Custom

❑ BP CONNECTOR
(CONFIGURATION J1/J2/PO)
L = 5 row, RT-2 PO & SW
M = 3 row, J1 flush, J2 13mm
O = 5 row, w/o PO
P = 5 row, w/ PO
S = RT-2 (J0-J6) 6U
U = RT-2 (J0-J2) 3U
V = RT-2(J0-J6) 6U, RTM
W = RT-2 (J0-J2) 3U, RTM
X = No Connectors
Y = Hybrid
Z = Custom

❑ DRIVES
1 = 1 x 3.5"
2 = 2 x 3.5"
3 = 1 x 5.25" HH
4 = 2 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 CDR (SL)
B = 2 x 2.5"
D = 1 x slim line CDROM
X = No Mounting

❑ HEIGHT
4 = 4U

❑ WIDTH
8 = 84 T

❑ REAR I/O
N = No
Y = Yes

❑ DEPTH
2 = 200mm - 299mm
3 = 300mm - 399mm

❑ CARD ORIENTATION
H = Horizontal

❑ PSU INPUT
A = 110/220VAC (Plug-in)
C = 90-230VAC (Fixed)
E = 110/220VAC (2 x HS, N + 1)
G = 90-230VAC (Plug-in)
H = 48VDC (Plug-in)
K = 48VDC (Fixed)
M = 48VDC (2 x HS, N + 1)
N = 28VDC (Fixed)
O = 28VDC (2 x HS, N+1)
P = 90-230VAC (2 x HS, N + 1)
X = No PSU

❑ PSU OUTPUT
(NOT ALL PSU COMBINATIONS AVAILABLE)
2 = 200 - 299 watts (w/o 3.3V)
3 = 300 - 399 watts (w/o 3.3V)
B = 200 - 299 watts (w 3.3V)
C = 300 - 399 watts (w 3.3V)
X = Not Installed

❑ SHIELDING LEVEL
0 = Level 0
1 = Level 1
2 = Level 2
X = Not Installed

# VITA System 11 Vertical Enclosure (7U)

ELMA
Your Solution Partner



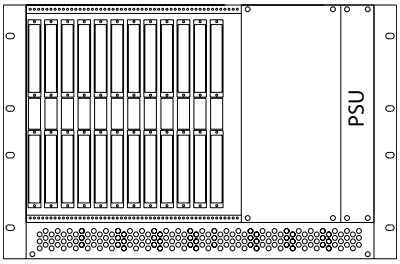
## FEATURES:

- 19" Rackmount fully compliant to IEEE 1101.10/.11
- 7U x 84HP x 290mm (H x W x D)
- 6U Vertical card mounting
- Rear 6U x 80mm I/O card cage
- Optional 80mm Rear I/O
- 3 to12 slot VITA-Based System Platforms (VME, VME64x, VPX, VXS, VXI) backplane options
- Advanced EMC shielding to meet CE and FCC
- Cooling bottom to top
- Wide range of PSU inputs (90 - 264 VAC, 48 VDC)
- Fixed-mount or front pluggable PSUs with redundant hot swap options
- System monitoring for DC voltages, fan fail and over temp (optional)
- Connector options: 3 Row (96 PIN), 5 Row (160 PIN), 5 Row + P0
- Ready to run - turnkey solution

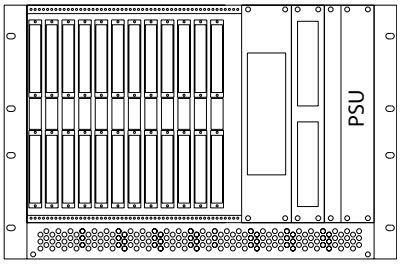
## SCOPE OF SUPPLY

High quality 19" rackmount chassis platform consisting of pre-galvanized steel enclosures, high performance VITA System backplane, power supply, cooling system and AC/DC power components. Assembled, wired and tested prior to shipment.

## ORDERING INFORMATION



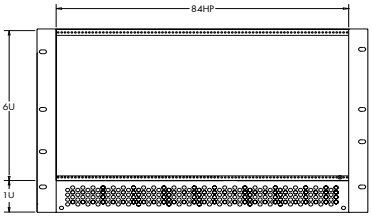

| Description | Order Number |
|---|---|
| ■ 7U(H) x 17"(W) x 290mm(D)<br>■ Holds 12, 6U x 160mm Card<br>■ 12 Slot VME64x Backplane<br>■ No Device Mounting<br>■ 3 x 114 CFM Fans<br>■ 500 watt Plug-in PSU: 5V/60A; +12V/12A;12V/4A; 3.3V/60A | 11V12OPX78Y2VGE1<br>**64X** |



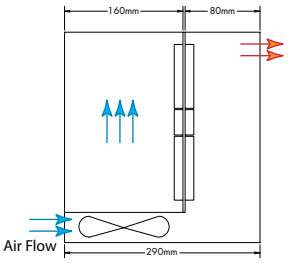

| Description | Order Number |
|---|---|
| ■ 7U(H) x 17" (W) x 290mm(D)<br>■ Holds 12, 6U x 160mm Card<br>■ 12 Slot VME64x Backplane<br>■ 1 x 5.25" & 2 x 3.5" Devices<br>■ 3 x 114 CFM Fans<br>■ 500 watt Plug-in PSU: 5V/60A; +12V/12A; -12V/4A; 3.3V/60A | 11V12OP678Y2VGE1<br>**64X** |


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

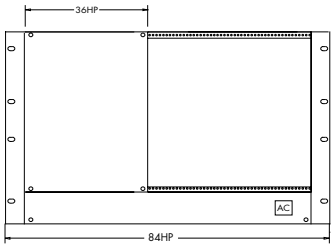
## LINE DRAWINGS




**Front View**




**Right Side View**




**Rear View**

## ENVIRONMENTAL

| | Operating | Storage / Transit |
|---|---|---|
| **Temperature:** | 0°C to +50°C | -20°C to +70°C |
| **Altitude:** | 6000 ft. (1,829m) | 50,000 ft. (15,240m) |
| **Humidity:** | 5% to 95% Non condensing | 5% to 95% Non condensing |
| **Shock:** | 10 Gs @ 11ms | 10 Gs @ 11ms (per ASTM 0775) |
| **Vibration:** | 1.0 Gs @ 10 to 330 Hz | 1.2 Gs @ 5 to 330 Hz |
| **Agencies:** | Designed to meet UL 60950, FCC, A, B, CE | |
| **Weight:** | Approx: 24lbs | |

## CUSTOM CONFIGURATIONS

11 V ❑ ❑ ❑ ❑ ❑ 7 8 ❑ ❑ V ❑ ❑ ❑

❑❑ NUMBER OF SLOTS
00-21: Single BP; AY-YA: Split
Example 7 slot = 07
Example 12 + 9 = LI

❑ BP BARE BOARD
A = oVPX, 6U, 1" (VITA 65)
B = oVPX, 3U, 1" (VITA 65)
C = oVPX, 6U, .8" (VITA 65)
D = oVPX, 3U, .8" (VITA 65)
H = oVPX, 6U, 1" + .8" (VITA 65)
I = oVPX, 3U, 1"+ .8 (VITA 65)
L = VXS Dual Star
M = V64, J12 mono, 3 row
N = VME64x, 6U
O = VME64x, 7U
P = VPX, 6U (VITA 46)
W = VPX, 3U (VITA 46)
S = VXS Star
T = VXS (Mesh)
X = No BP Installed
Z = Custom

❑ BP CONNECTOR
(CONFIGURATION J1/J2/PO)
L = 5 row, RT-2 PO & SW
M = 3 row, J1 flush, J2 13mm
O = 5 row, w/o PO
P = 5 row, w/ PO
S = RT-2 (J0-J6) 6U
U = RT-2 (J0-J2) 3U
V = RT-2(J0-J6) 6U, RTM
W = RT-2 (J0-J2) 3U, RTM
X = No Connectors
Y = Hybrid
Z = Custom

❑ 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 CDR (SL)
B = 2 x 2.5"
D = 1 x slim line CDROM
X = No Mounting

❑ HEIGHT
7 =- 7U

❑ WIDTH
8 = 84 T

❑ REAR I/O
N = No
Y = Yes

❑ DEPTH
2 = 200mm - 299mm
3 = 300mm - 399mm

❑ CARD ORIENTATION
V = Vertical

❑ PSU INPUT
A = 110/220VAC (Plug-in)
C = 90-230VAC (Fixed)
E = 110/220VAC (2 x HS, N + 1)
G = 90-230VAC (Plug-in)
H = 48VDC (Plug-in)
K = 48VDC (Fixed)
M = 48VDC (2 x HS, N + 1)
N = 28VDC (Fixed)
O = 28VDC (2 x HS, N+1)
P = 90-230VAC (2 x HS, N + 1)
X = No PSU

❑ PSU OUTPUT
(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 watts (w/o 3.3V)
6 = 600 - 699 watts (w/o 3.3V)
A = 100 - 199 watts (w 3.3V)
B = 200 - 299 watts (w 3.3V)
C = 300 - 399 watts (w 3.3V)
D = 400 - 499 watts (w 3.3V)
E = 500 - 599 watts (w 3.3V)
F = 600 - 699 watts (w 3.3V)
X = Not Installed

❑ SHIELDING LEVEL
0 = Level 0
1 = Level 1
2 = Level 2
X = Not Installed



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

# VITA System 11 Vertical Enclosure (9U)

ELMA
Your Solution Partner



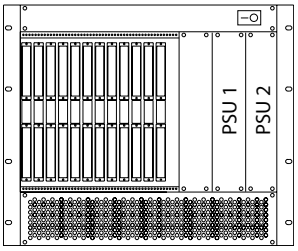
## FEATURES:

- 19" Rackmount fully compliant to IEEE 1101.10/.11
- 9U x 84HP x 290mm (H x W x D)
- 6U Vertical card mounting
- Rear 6U x 80mm I/O card cage
- 3 to 21 slot VITA-Based System Platforms (VME, VME64x, VPX, VXS, VXI) backplane options
- Advanced EMC shielding to meet CE and FCC
- Cooling front to rear
- Wide range of PSU inputs (90 - 264 VAC, 48 VDC)
- Fixed-mount or front pluggable PSUs with redundant hot swap options
- System monitoring for DC voltages, fan fail, and over temp (optional)
- Connector options: 3 Row (96 PIN), 5 Row (160 PIN), 5 Row + P0
- Ready to run - turnkey solution

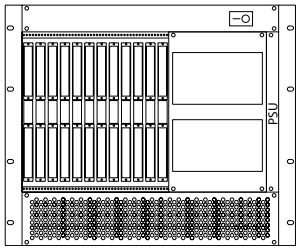
## SCOPE OF SUPPLY

High quality 19" rackmount chassis platform consisting of pre-galvanized steel enclosures, high performance VITA System backplane, power supply, cooling system and AC/DC power components. Assembled, wired and tested prior to shipment.

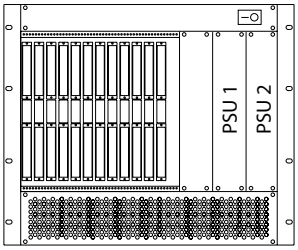
## ORDERING INFORMATION




| Description | Order Number |
|---|---|
| ■ 9U(H) x 17"(W) x 290mm(D)<br>■ Holds 12, 6U x 160mm Cards, front<br>■ 12 Slot VME64x Backplane<br>■ No Device Mounting<br>■ 3 x 114 CFM Fans<br>■ 2 X 500 watt Plug-in PSU: 5V/60A; +12V/12A; -12V/4A; 3.3V/60A<br>■ Rear I/O | 11V12OPX98Y2VPE1<br>**64X** |




| Description | Order Number |
|---|---|
| ■ 9U(H) x 17"(W) x 290mm(D)<br>■ Holds 12, 6U x 160mm Cards<br>■ 12 Slot VME64x Backplane<br>■ 4 x 5.25" HH Devices<br>■ 3 x 114 CFM Fans<br>■ 1 X 500 watt PSU: 5V/60A; +12V/12A; -12V/4A; ; 3.3V/60A<br>■ Rear I/O | 11V12OP598Y2VCE1<br>**64X** |

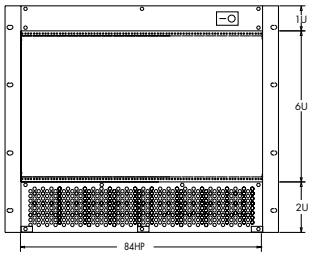



| Description | Order Number |
|---|---|
| ■ 9U(H) x 17"(W) x 290mm(D)<br>■ Holds 12, 6U x 160mm Cards<br>■ 12 Slot VXS Backplane<br>■ No Device Mounting<br>■ 3 x 114 CFM Fans<br>■ 2 x 500 watt Plug-in PSU: 5V/60A; +12V/12A; 12V/4A; 3.3V/60A<br>■ Rear I/O | 11V12LLX98Y2VPE1<br>**VXS** |

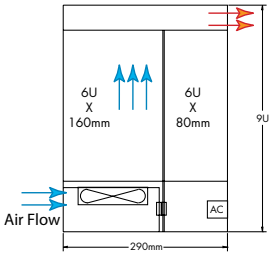


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

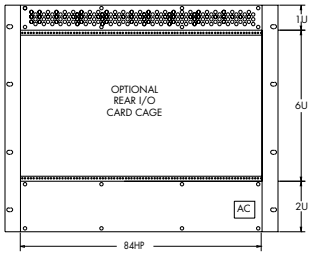
## LINE DRAWINGS




**Front View**




**Right Side View**




**Rear View**

## ENVIRONMENTAL

| | Operating | Storage / Transit |
|---|---|---|
| **Temperature:** | 0°C to +50°C | -20°C to +70°C |
| **Altitude:** | 6000 ft. (1,829m) | 50,000 ft. (15,240m) |
| **Humidity:** | 5% to 95% Non condensing | 5% to 95% Non condensing |
| **Shock:** | 10 Gs @ 11ms | 10 Gs @ 11ms (per ASTM 0775) |
| **Vibration:** | 1.0 Gs @ 10 to 330 Hz | 1.2 Gs @ 5 to 330 Hz |
| **Agencies:** | Designed to meet UL 60950, FCC, A, B, CE | |
| **Weight**: | Approx: 26lbs | |

## CUSTOM CONFIGURATIONS

**11 V ❑ ❑ ❑ ❑ ❑ 9 8 ❑ ❑ V ❑ ❑ ❑**

❑❑ NUMBER OF SLOTS
00-21: Single BP; AY-YA: Split
Example 7 slot = 07
Example 12 + 9 = LI

❑ BP BARE BOARD
A = oVPX, 6U, 1" (VITA 65)
B = oVPX, 3U, 1" (VITA 65)
C = oVPX, 6U, .8" (VITA 65)
D = oVPX, 3U, .8" (VITA 65)
H = oVPX, 6U, 1" + .8" (VITA 65)
I = oVPX, 3U, 1"+ .8 (VITA 65)
L = VXS Dual Star
M = V64, J12 mono, 3 row
N = VME64x, 6U
O = VME64x, 7U
P = VPX, 6U (VITA 46)
W = VPX, 3U (VITA 46)
S = VXS Star
T = VXS (Mesh)
X = No BP Installed
Z = Custom

❑ BP CONNECTOR
(CONFIGURATION J1/J2/PO)
L = 5 row, RT-2 PO & SW
M = 3 row, J1 flush, J2 13mm
O = 5 row, w/o PO
P = 5 row, w/ PO
S = RT-2 (J0-J6) 6U
U = RT-2 (J0-J2) 3U
V = RT-2(J0-J6) 6U, RTM
W = RT-2 (J0-J2) 3U, RTM
X = No Connectors
Y = Hybrid
Z = Custom

❑ 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 CDR (SL)
B = 2 x 2.5"
D = 1 x slim line CDROM
X = No Mounting

❑ HEIGHT
9 = 9U

❑ WIDTH
8 = 84 T

❑ REAR I/O
N = No
Y = Yes

❑ DEPTH
2 = 200mm - 299mm
3 = 300mm - 399mm

❑ CARD ORIENTATION
V = Vertical

❑ PSU INPUT
A = 110/220VAC (Plug-in)
C = 90-230VAC (Fixed)
E = 110/220VAC (2 x HS, N + 1)
G = 90-230VAC (Plug-in)
H = 48VDC (Plug-in)
K = 48VDC (Fixed)
M = 48VDC (2 x HS, N + 1)
N = 28VDC (Fixed)
O = 28VDC (2 x HS, N+1)
P = 90-230VAC (2 x HS, N + 1)
X = No PSU

❑ PSU OUTPUT
(NOT ALL PSU COMBINATIONS AVAILABLE)
1 = 100 - 199 watts (w/o 3.3V)
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 watts (w/o 3.3V)
6 = 600 - 699 watts (w/o 3.3V)
7 = 700 - 799 watts (w/o 3.3V)
8 = 800 - 899 watts (w/o 3.3V)
9 = 900 - 999 watts (w/o 3.3V)
A = 100 - 199 watts (w 3.3V)
B = 200 - 299 watts (w 3.3V)
C = 300 - 399 watts (w 3.3V)
D = 400 - 499 watts (w 3.3V)
E = 500 - 599 watts (w 3.3V)
F = 600 - 699 watts (w 3.3V)
G = 700 - 799 watts (w 3.3V)
H = 800 - 899 watts (w 3.3V)
I = 900 - 999 watts (w 3.3V)
J = 1000 - 1099 watts (w 3.3V)
K = 1100 - 1199 watts (w 3.3V)
L = 1200 - 1299 watts (w 3.3V)
M = 1300 - 1399 watts (w 3.3V)
N = 1400 - 1499 watts (w 3.3V)
X = Not Installed

❑ SHIELDING LEVEL
0 = Level 0
1 = Level 1
2 = Level 2
X = Not Installed



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

# ECP - Embedded Computing Products

ELMA
Your Solution Partner

ACT TECHNICO
Embedded Computing Solutions by Elma

Elma's Embedded Computing Products, designed and marketed under the ACT/Technico brand, provides innovative solutions with best in class partner products, our own line of storage and I/O products, and over 100 man-years of system integration experience. We also provide ruggedized solutions to meet the most demanding environmental requirements. Certified to ISO 9001, the company supplies integrated embedded systems to companies in defense/aerospace, homeland security, semiconductor equipment, communications, energy, and transportation industries.

Elma Electronic is the premier electronic packaging expert and offers best in class embedded board level products and services. Experience enables us to provide you with the right embedded system platform for your program needs. To support this effort, we have a first-class offering of standards based products – single board computers, mass storage, networking, device drivers, and more. We take true COTS products, such as single board computers and PMCs, then enhance and qualify them to meet project requirements.

The next several pages offer a brief overview of the product categories and services available. Please visit our website or contact your sales representative for complete listings and further details.



## Storage

### Innovative Embedded Mass Storage Solutions

- Direct Attached Storage (DAS)
- Network Attached Storage (NAS) / RAID 0 - 5
- Removable drives / Hot Swap & FRU
- Data Security Solutions:
  - Secure-Erase
  - Write-Protect

**Drive Form Factors:** 1.8", 2.5" & 3.5" & CF

- Rotating
- Solid state flash
- Optical (CD/DVD)
- Tape drives

**Board Form Factors:**

- PMC/XMC
- 6U VME, VXS
- 3U & 6U VPX and OpenVPX


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



## Single Board Computers & Blades

From legacy to latest technologies

### Processors Supported:

- PowerPC
- PowerQUICC
- Intel architectures
- Single and multicore processors

### Form Factors:

- PMC, XMC
- 6U VME, VXS
- 3U & 6U VPX and OpenVPX

- COTS Ruggedization Program: Enhanced and/or modified standard products
- Extending board temperature ranges
- Conduction cooled



## Networking

Full range of Ethernet solutions

### Switches and controllers:

- Fast (10/100), Gigabit and 10 Gigabit Ethernet
- Up to 26 ports in a single slot
- Copper / Fiber (Optical)
- Layer 2 and full wire speed Layer 3
- IPv4 & IPv6
- Multicast / Unicast
- Standard, extended temp and conduction cooled versions

### Board Form Factors:

- PMC/XMC
- 6U VME, VITA 31.1, VXS
- 3U & 6U VPX and OpenVPX



## I/O Products

Wide range of available solutions

### Functions:

- Audio and video
- Serial, parallel, binary
- Network Interface Controller (NICs)
- SCSI / ATA
- A/D and D/A channel converters
- 1553, ARINC
- Motion control, CANbus
- FPGA based

### Form Factors:

- PMC, XMC, AMC
- 3U & 6U VPX and OpenVPX



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

# ECP - Embedded Computing Products



## AppliPaks SBC and I/O "Brick"

Level Application Development Systems

The Elma AppliPak is a bundled, single procurement source. When you need to ensure that the Single Board Computer you order from us works with specific mezzanines, we can provide the SBC and the modules in a "brick" assembly. We'll bundle the boards under a single model number, qualify and test the assembly before shipment. A typical bundle includes a PowerPC or Intel SBC; Windows, Linux or VxWorks; boot file and drivers; choice of mass storage on PMC or 6U boards, and I/O options such as SCSI, Ethernet, digital I/O and audio. An AppliPak may also include Rear Transition Modules or Breakout Boards. The bricks are available in standard and rugged versions.

Elma can extend the environmental capabilities of your AppliPak with mechanical enhancements, temperature screening, and conformal coating. Each unit is fully tested and a full documentation package is available, including qualifications, manufacturing and test data.



## SystemPaks

Application Development System Platforms

This takes the AppliPak to the sub-system platform level by bundling the board set into a fully integrated and tested subsystem assembly, ready for application development. Available for all standard bus architectures, it is configured, tested and shipped in a chassis suitable for the environment in which it will be used.



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

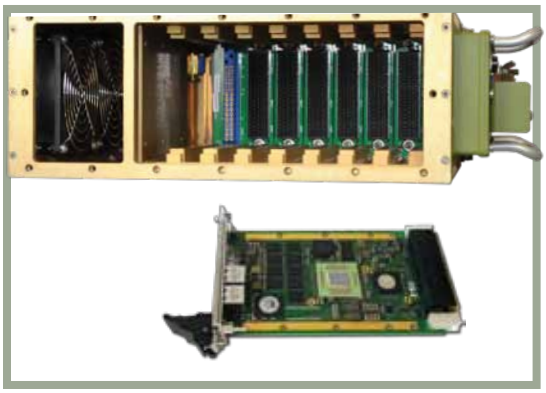


## Subsystems

Integrated Sub-Systems

Our embedded sub-system solutions bring the bundle concept one step further, by providing the full range embedded package.
They are designed to provide a complete platform upon which our customers build their integrated systems.

Typical systems might include powered chassis with SBC(s), mass storage, rear transition modules, audio and video modules, Ethernet or fabric switch(es), the operating system and any necessary drivers. We work with you to manage the project through it's entire life cycle.



## Rugged Products

Standard COTS products enhanced for rugged environments

We can take true COTS products, such as single board computers and PMCs, then enhance and qualify them to meet project requirements. We offer a growing supply of conduction cooled boards as well as conformal coating for salt spray environments.
We qualify boards and systems to the environmental standards of MIL STDs 810F, 901D and 167, and 461. We also design and prepare these products for barge testing.

We offer conformal coating per MIL STD I-46508 where required, and can extend the temperature range of COTS boards when needed.



## Services

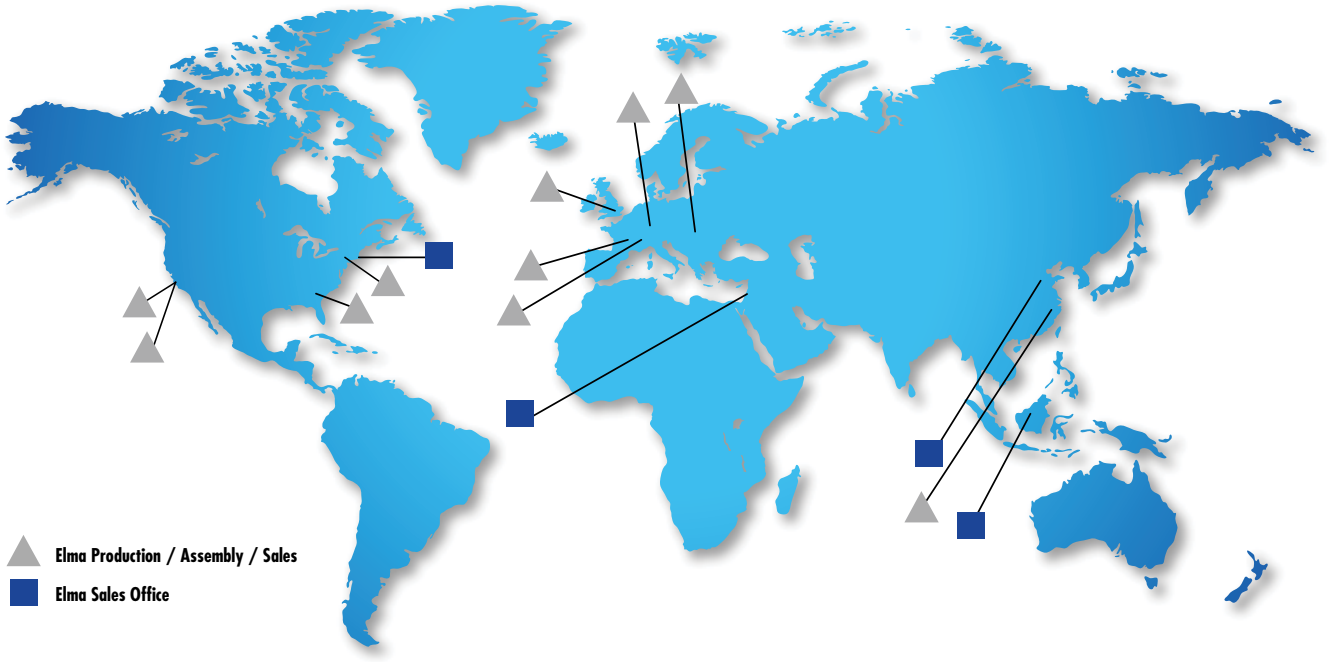
Designed to fully support the total embedded solution

To support our efforts in providing you with the level of embedded solutions you require, we offer a full complement of services.
A platform solution might include any or all of the following: design & build plans, procurement, full product documentation, test services and plans, manufacturing, software installation, project management such as inventory & spares maintenance.
We can do pcb and mechanical design, full doc package support, and testing services. We also offer OS configuration and install along with device drivers.



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

# Locations




### ELMA ELECTRONIC/OPTIMA

Elma Electronic/Optima EPS
1775 MacLeod Drive
Lawrenceville, GA 30043
Phone: (770) 496-4000
Fax: (770) 496-4041
sales@optimaeps.com
www.optimaeps.com, & www.elma.com

### UNITED STATES, ELMA ELECTRONIC

Elma Electronic US Headquarters
44350 Grimmer Blvd.
Fremont, CA 94538
Phone: (510) 656-3400
Fax: (510) 656-3783
sales@elma.com
www.elma.com

Elma Electronic Inc.
760 Veterans Circle
Warminster, PA 18974
Phone: 215-956-1200
Fax: 215-956-1201
sales@elma.com
www.elmasystems.com

### ELMA BUSTRONIC

Elma Bustronic Headquarters
44350 Grimmer Blvd.
Fremont, CA 94538
Phone: (510) 490-7388
Fax: (510) 490-1853
sales@elmabustronic.com
www.elmabustronic.com

### SWITZERLAND

Elma Electronic AG
Hofstrasse 93, Postfach
8620 Wetzikon
Phone: +41 44 933 41 11
Fax CH:+41 44 933 42 15
Fax Inter: +41 44 932 38 12
sales@elma.ch
www.elma.com

### CHINA

Elma Electronic China
8F, 355 Fu Te Road (West1)
Wai Gao Qiao Free Trade Zone
Pudong District, Shanghai 200131
Phone: +86 21 5866 5908
Fax: +86 21 5866 5918
sales@elmachina.com
www.elma.com

### ASIA PACIFIC

Elma Asia Pacific Pte. Ltd
115-A Commonwealth Drive
#03-14 Tanglin Halt Industrial Estate
Singapore 149596
Phone: +65 6479 8552
Fax: +65 6479 8662
sales.elmaap@elma.com
www.elma.com

### GERMANY

Elma Trenew Electronic GmbH
Stuttgarter Strasse 11
D-75179 Pforzheim
Phone: +49 7231 97 340
Fax: +49 7231 97 3497
info@elma.de
www.elma.com

### UNITED KINGDOM

Elma Electronic UK Ltd
Solutions House, Fraser Road
Priory Business Park
Bedford MK44 3BF
Phone: +44 (0)1234 838822
Fax: +44 (0)1234 836650
sales@elma-uk.com
www.elma.com

### ISRAEL

Elma Electronic Israel Ltd.
34, Modi'in St.
IL.Z. Sgula
Petach-Tikva 49271
Phone: +972 3 930 50 25
Fax: +972 3 931 31 34
sales@elma.co.il
www.elma.com

### FRANCE

Elma Electronic France SASU
ZA du Buisson Rond
F-38460 Villemoirieu
Phone: +33 4 37 06 21 10
Fax: +33 4 37 06 21 19
sales@elma-electronic.fr
www.elma.com

### ROMANIA

Elma Electronic SRL
Maltopol Nr.16 Street, sector 1
RO-011048 Bucuresti
Phone +4021 310 7998
Fax +4021 310 7992
info@elma.ro
www.elma.com



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

**Artisan Technology Group** is an independent supplier of quality pre-owned equipment

## Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

## We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

## Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP