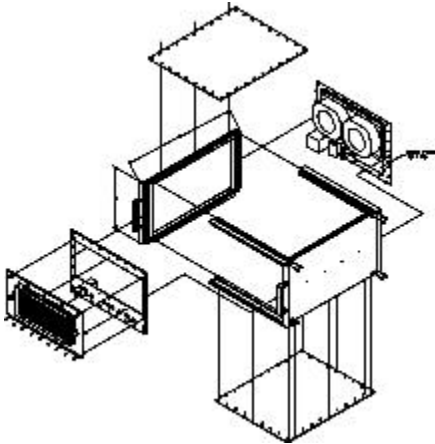


COTS: External Shells



Size	Part Number	A (MM)	B (MM)	Wp (MM)	Hp (MM)
3U	12R2-32ZZZZZZZZZZ	132.45	558.8	*	*
	12R2-35ZZZZZZZZZZ		635		
4U	12R2-42ZZZZZZZZZZ	176.9	558.8	*	*
	12R2-45ZZZZZZZZZZ		635		
5U	12R2-52ZZZZZZZZZZ	221.35	558.8	150	75
	12R2-55ZZZZZZZZZZ		635		
6U	12R2-62ZZZZZZZZZZ	265.8	558.8	*	*
	12R2-65ZZZZZZZZZZ		635		
7U	12R2-72ZZZZZZZZZZ	310.25	558.8	175	61.1
	12R2-75ZZZZZZZZZZ		635		
8U	12R2-82ZZZZZZZZZZ	354.7	558.8	*	*
	12R2-85ZZZZZZZZZZ		635		
9U	12R2-92ZZZZZZZZZZ	399.15	558.8	250	150
	12R2-95ZZZZZZZZZZ		635		
10U	12R2-02ZZZZZZZZZZ	443.6	558.8	*	*
	12R2-05ZZZZZZZZZZ		635		

12U	12R2- 22ZZZZZZZZZZ	532.5	558.8	350	150
	12R2- 25ZZZZZZZZZZ		635		

*Please contact your local salesman

COTS: Design Features



The COTS 12R2 is a high quality and cost-efficient rugged package for all VME/VME64x and compact PCI applications. The rugged product line includes 5U, 7U, 9U and 12U models for both 6U and 9U cards. Shock-isolation is optional.

Intended to withstand the demands of a military environment, the 12R2 is designed to meet the benchmark military standards. The 12R2 uses honeycomb filters, braided gasketing, and metal impregnated gasket sheets to seal off every external seam to ensure compliance to MIL-STD-461D. To verify that the chassis will more than meet your shock and vibration requirements, the 12R2 has been tested for shock, vibration, and structural integrity per MIL-STD-810E and MIL-STD-167. Test reports and performance specifications are available upon request. The 12R2 integrates standard off-the-shelf parts including aluminum flat frames and covers, ruggedized side plates, cross-functional extruded profiles, and standard electrical components and wire harnesses to reduce lead time. The 12R2 has MIL-grade components and system monitoring LEDs. The 12R2 holds up to 20 boards and has a powerful, efficient cooling system. In addition, fixed-mounted shock-resistant or shock-isolated 5.25" drive options are available.

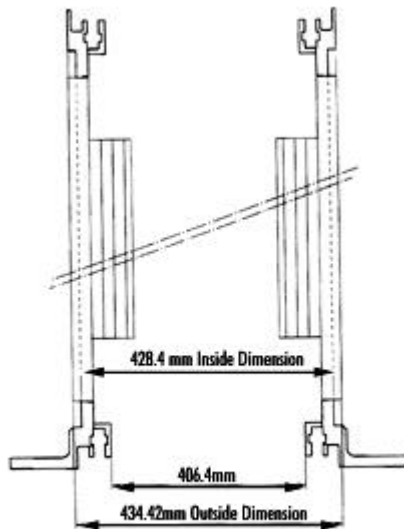
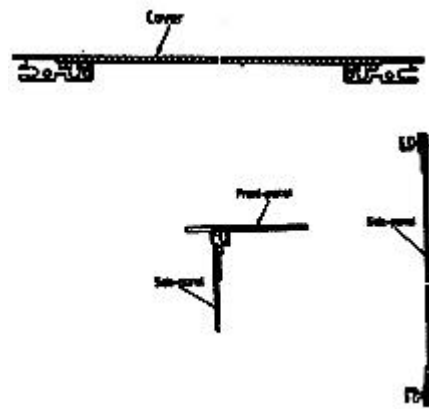
Product Highlights

- Rugged COTS enclosure
- VME/VME64x and compact PCI
- 9U and 12U units, standard and stocked
- 7U, 5U, shock-isolated options available
- Complete EMI/RFI integrity via braided gasketing and honeycomb filters
- Rugged chassis shell made of aluminum frames and extruded profiles
- 350 - 1000 Watt power supplies

- 90 - 220 VAC, 47-500Hz, 28 /48 VDC inputs
- Wide range of backplane options - 2 - 20 slots
- MIL-grade components
- Configurable I/O patch panel on rear
- High volume, rear-mounted exhaust fans (470 CFM)
- Standard voltage and system monitoring LEDs
- Wide range of 6U and 9U card cages available
- Tested for shock, vibration, and structural integrity
- Designed to meet MIL-STD-167
- Designed to meet MIL-STD-810E
- Designed to meet MIL-STD-461D

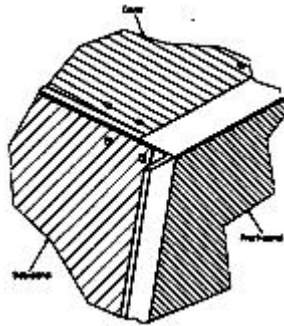
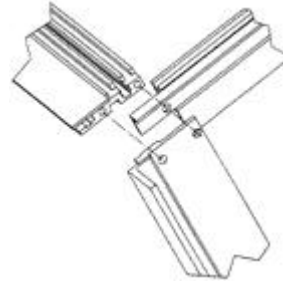
12R2 Design Features

The 12R2 rugged COTS design combines extruded profiles and the rugged benefits of standard aluminum frames and captive hardware. This innovative design bases the entire chassis around the custom ruggedized side plate. Spot-welded to a 3mm thick aluminum plate are front, rear, top and bottom extruded aluminum profiles. The flexibility of the extrusions allows the entire chassis with standard, off-the-shelf aluminum frames, ensuring quick delivery and minimal engineering effort. The final product is a shell that can and has easily passed MIL-STD-810E and MIL-STD-167 shock and vibration tests.

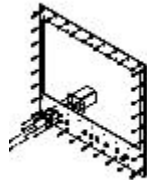


Each cover frame is 3mm thick and has custom self-tapping, stainless steel, captive screws installed. Each mating extrusion has an EMC gasket channel and a T-channel that accommodates the rugged stainless steel tapped strip. The rear frame (4mm thick) is designed to give maximum available I/O space for each size; each chassis comes with a standard 1.5mm thick blank, patch panel. For corrosion resistance, every aluminum part in the 12R2 chassis has a protective gold alodine coating.

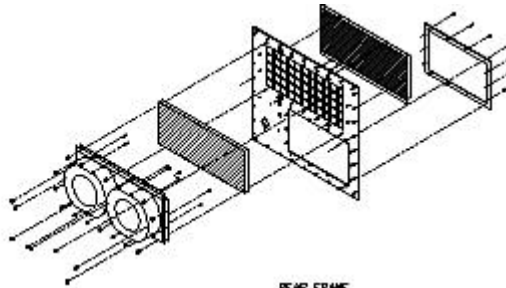
The 12R2 offers a superior EMC package. Designed to meet EMI requirements per MIL-STD-461D, the 12R2 uses honeycomb filters, braided gasketing, and metal impregnated gasket sheets to seal off every external seam.



The 12R2 integrates COTS MIL-grade components and a standard wire harness to ensure a high quality, rugged electrical turnkey system without the associated engineering and delivery problems common in today's COTS market. The harnesses and components have been designed and selected to maximize the system options from standard configurations.



FRONT FRAME



REAR FRAME

COTS: MIL-STD Testing



MIL-STD-167, Shipboard Vibration

MIL-STD-167 (MS167) tests a unit in each axis over the range of 4-50Hz. The range has been specified by the MS167 as normal frequency range of shipboard applications. A unit under test (EUT) is fixed-mounted to a slip table (in the transverse side-to-side axis and longitudinal front-to-back axis) or mounted directly



to a plate on top of the shaker (in the vertical axis--bottom to top). The input at each frequency is defined by a table displacement tabulation in MS167.

There are three parts to MS167: exploratory sweep (15s and each 1Hz interval between 4-50Hz), variable dwell (5min and each 1Hz interval between 4-50Hz), endurance dwell (2hr dwell at resonant frequency).

In addition to the above procedures, a continuous 5 or 15 minute sweep is usually performed across the entire 5-50Hz range before the MS167 exploratory sweep. This continuous sweep is much more useful than any of the MS167 tests in identifying the true resonant frequencies of a system. In general, this sweep is the basis for choosing the endurance dwell frequency.

MIL-STD-810E, Shock

MIL-STD-810E tests the response of a unit to an individual shock pulse. In each axis, 3 positive and 3 negative (1/2 sine) pulses are applied to the EUT. The duration of the shock pulse is defined by MIL-STD-810E (MS810E) for each input level.

MIL-STD-810E, Structural Integrity Vibration

MIL-STD-810E structural integrity tests the response of a unit, in each axis, to a random vibration input over the frequency range of 5-2000 Hz.

The purpose of the structural integrity test is to see if the EUT will survive mechanically after being submitted to the random vibration profile for 1 hour in each axis. Although the test does not measure acceleration or transmissibility levels, it does plot the power spectral density profile of the system over the frequency range.

12R2 Development

During the development of the 12R2 product line, ELMA's engineering R&D department conducted multiple tests to ensure that the 12R2 design passed the shock, vibration, and structural integrity specifications outlined in MIL-STD-167 and MIL-STD-810E.

During the initial tests, the 9U x 22" prototypes went through MIL-STD-167 vibration and MIL-STD-810E shock from 15G to a maximum of 35G. The 12U x 25" prototypes went through MIL-STD-810E shock from 25G-30G and MIL-STD-810E random structural integrity vibration.

Based on the exceptional results of the base design during the first run of tests (complete and abbreviated test reports are available), the second round of testing focussed on the effect of shock and vibration on critical items within the chassis. Accelerometers positioned in the chassis during the first round of testing determined the transmitted input to these components. Based on these inputs, tests performed on various power supplies, drives and isolation assemblies helped determine the optimal configurations and best components for the 12R2 product line. Complete test reports available on request.

COTS: Figure Tables

Code X		
A=02	G=08	P=14
B=03	H=09	Q=15
C=04	J=10	R=16
D=05	K=11	S=17
E=06	M=12	T=18
F=07	N=13	

Figure 1a

Code Y		
A=02	G=08	P=14
B=03	H=09	Q=15
C=04	J=10	R=15
D=05	K=11	S=17
E=06	M=12	T=18
F=07	N=13	

Figure 1b

CODE	DESCRIPTION
A	cPCI, 6U, Rev. 2.0 compliant
B	VME standard, 96 pin only w/ jumper pin holes
C	VME64x, 96 pin
D	VME64x, 96 pin & J0
E	VME 64x, 160 pin
F	VME 64x, 160 pin & J0

Figure 2a

CODE		Description VME		Description cPCI	
J1 or P1-P2	J2 or P3-P5	J1	J2	P1-P2	P3-P5
Δ	Δ	1st & last slot 13mm,		P1 & P2 short	P3 P4 P5 long

		5.5mm all others			
B	B	1st & last slot 17mm, 5.5mm all others		P1 short, P2 long tails	P1, P2, P4 short P3, P5 long
C	C	1st & last slot 13mm, w/locking shrouds			
D	D	1st & last slot 17mm, w/locking shrouds			
E	E	All slots 13mm	All slots 13mm		
F	F	All slots 17mm	All slots 17mm		
G	G	All slots 13mm, w/locking shrouds	All slots 13mm, w/locking shrouds		
H	H	All slots 17mm, w/locking shrouds	All slots 17mm, w/locking shrouds		
Z	Z	No connectors installed	No connectors installed	P1 & P2 not installed	P3, P4, P5 not installed

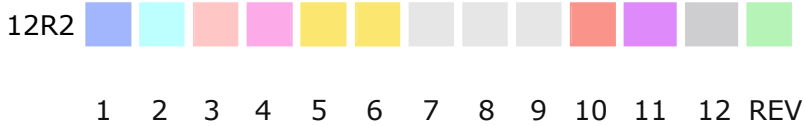
Figure 2b

Physical		Electrical		Environmental (Operating)	
Depth	22", 25"	Frequency	47-500MHz	Cooling	Two 235 CFM
Height	5U, 7U, 9U	Voltage	85-264V	Operating	0 degrees C to 85 degrees C
Width	17"	Power	350W - 1000W	Storage	-20 degrees C to 25 degrees C
				Humidity	0 to 95, non-condensing
				Altitude	-1200 to 18,000 Ft.

	70 lb. Typ. (7U) 80 lb. Typ (9U) 100 lb. Typ (12U)	+/-12V	Altitude	-1200 to 18,000 Ft.
Boards	6U x 160mm 6U x 220mm 9U x 160mm 9U x 220mm		Shock	25G's 11ms
Backplane	VME, VME64x, cPCI		Vibration	4.0 G's RMS 15 to 2000Hz
			Acceleration	4.5 G' s w/o disk
			Sand and Dust	blowing
			Salt/Fog	limited
			Fungus	limited
			MIL-STD Specs	MIL-STD-167
				MIL-STD-810E
				MIL-STD-461D
				MIL-STD-704
				MIL-STD-901

12R2 Environmental Specifications

COTS: Order Info



Height 5=5U 7=7U 9=9U 2=12U	Depth 2=22" 5=25"	CardCage A=Eurocard B=IEEE.10 C=Eurocard Shock-isolated D=IEEE.10 Shock-isolated	Card Size R=6U x 160mm S=6U x 220mm T=9U x 160mm V=9U x 220mm	Backplane Size 02-20(single) Split Backplane See figure 1a, 1b	Backplane Configuration See figure 2a, 2b
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PSU Output						
#	Watts	+5V	+12V	-12V	+3.3V	+5.2V
1	800	80A	16.7A	16.7A		
2	1000	120A	16.7A	16.7A		
3	1200	120A	16.7A	16.7A		38.5A
4	750	40A	16.7A	16.7A	40A	
5	950	80A	16.7A	16.7A	40A	

6	875	40A	16.7A	16.7A	80A	
7	350	50A	8A	4A		2A
8	800	80A	16.7A	16.7A	Low Profile PSU	
9	300	Hot Swap				
Z	No PSU					

<p>Chassis Input R=85-220VAC, 400Hz S=28VDC* T=48VDC Z=No PSU</p>	<p>Drives A=4x 5.25" HH, Horizontal B=2x 5.25" HH, Vertical C=2x 5.25" HH, Vertical Shock-isolated (fixed-mounted cage only) D=2x 5.25" HH, Horizontal E=4x 5.25" HH, (2x isolated) F=6x 5.25" HH G=1x 5.25"HH, 1 x 3.5", Horizontal Z=no drives</p>	<p>Revision Level to be assigned by Elma</p>
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*Please contact your local salesman