

Telemetry-West

AVALON™

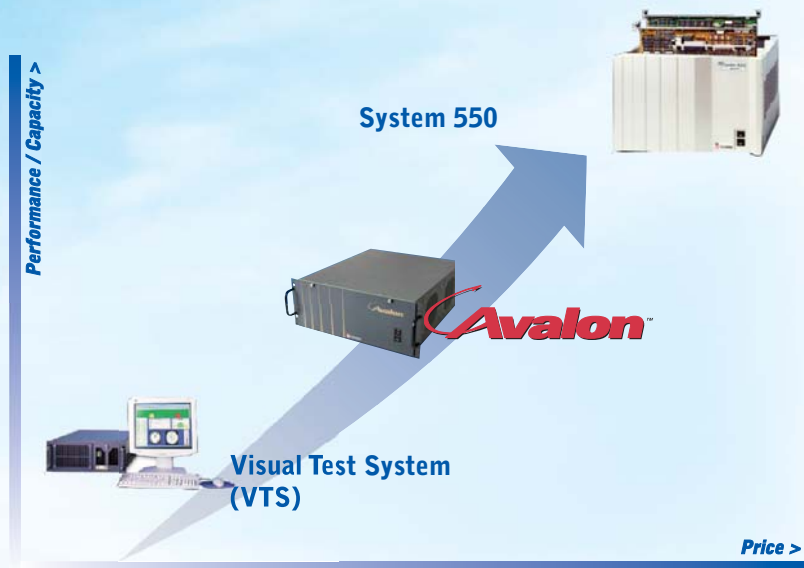


L-3 Telemetry-West is proud to announce its latest high-performance real-time I/O computing platform, Avalon. Based on the widely successful System 550 product family, Avalon offers the performance of an asymmetric multi-processing platform with a broadcast bus for real-time determinism — all while approaching a PC price range. This true real-time system provides automatic data merging as well as low latency, deterministic processing for up to 1 million tags. Avalon runs L-3's Java-based Vista Enterprise Telemetry Software or Unix-based System 500 Applications Software.

KEY FEATURES

- Mid-range, multi-channel, real-time telemetry and avionics platform for up to 1M tags
- Real-time deterministic operating system
- State-of-the-art PMC and carrier architecture
- Up to 20 PMC slots in a slim-profile 4U chassis
- Real-time MUXbus broadcasts data to all modules simultaneously
- Extremely low latency multiple I/O data merging with time correlation
- 4-slot bi-directional carrier includes arbitration
- Runs Java-based Vista Enterprise Telemetry Software
- Architecturally compatible with System 550
- Full range of PMC and VME-based I/O options
- Fits standard 19" rack

The system is completely modular, allowing solutions to be scaled from a single telemetry or avionics input stream to multiple input streams in a single chassis. General functions include telemetry processing, satellite commanding, avionics acquisition, simulation, and processing. Telemetry-West also offers a large tool set with the Avalon system, including a rich library of standard algorithms, custom algorithm development, data storage & playback, real-time alarms, 2-D and 3-D data displays, and Application Programming Interfaces (APIs).



The power and features of the System 550 in a smaller package with a lower price.

Excellence You Can Measure



Avalon™

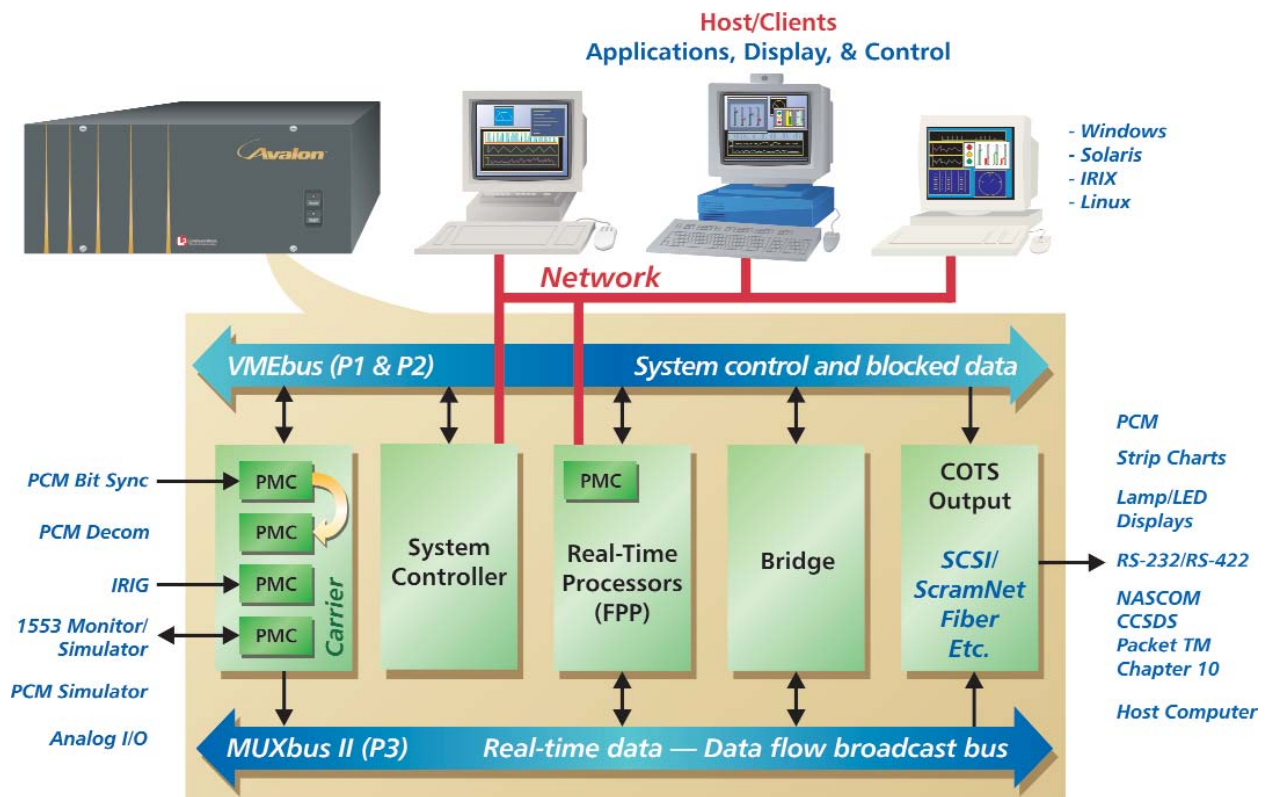
Designed with tomorrow in mind

The Avalon™ is designed for high-speed, high-performance real-time data acquisition and processing. It's portable, rugged and robust for applications from mission control rooms and laboratories to flying test beds and ships. In fact, the Avalon is based on the successful System 550, which is installed at over 800 locations worldwide — no other COTS solution is as fielded or adaptable.

Applications include:

- Flight test telemetry
- Launch vehicle control and monitoring
- Packet communications multiplexing and de-multiplexing
- Direct data acquisition from high-performance sensors
- Avionics equipment test and integration
- Manufacturing test

The open architecture of the Avalon system provides a comprehensive range of data I/O that includes PCM telemetry, IRIG time, MIL-STD-1553, ARINC-429, CCSDS, NTDS, voice, analog, digital, and serial streams. A typical standalone system consists of a front-end chassis with application specific VME and PCI Mezzanine Card (PMC) boards, connected to one or more workstations (UNIX, Linux, and Windows) via a local area network. The workstations interface with the Avalon chassis via the Vista software suite that provides a complete enterprise-level, operating environment for configuring, controlling and monitoring the Avalon system. Systems can be ordered as complete turn-key solutions or as individual chassis and appropriate I/O boards to be embedded and controlled via the Java-based Applications Programming Interface (API).



Example of Avalon Interior Architecture

All the data, all the time . . .

101010110010101011010100101
011010100101010110101010110
101010010101011010000101010
111010101001010101000101010
110010101001001010101000101
010111010101001010101011010
01010101010101010010

The MUXbus™ Advantage

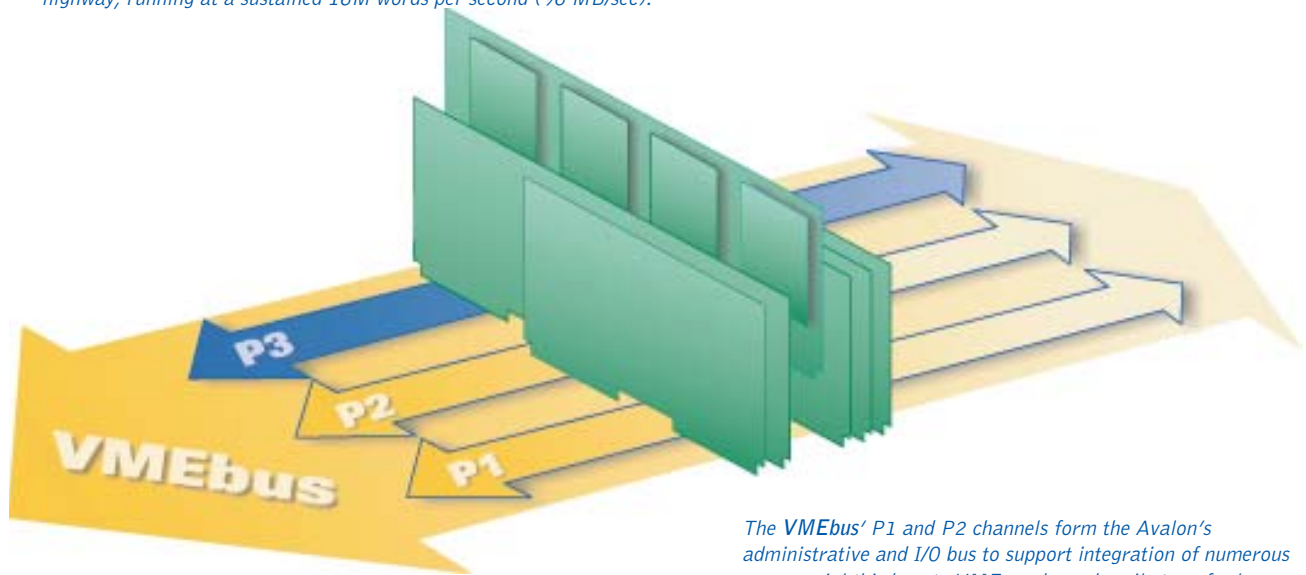
The Avalon is designed to take advantage of industry standards like the VME and PCI buses. This means the Avalon can accommodate industry's full range of state-of-the-art general and application specific modules. But even the best standards have their limitations, so that's why we added the powerful MUXbus™ capability to the Avalon's backplane. This exceptionally high-speed real-time data highway provides the backbone for determinism.



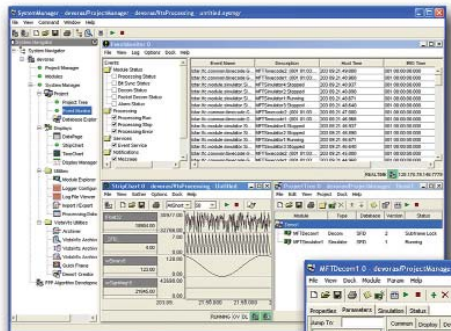
The MUXbus (P3 of the VMEbus) features a broadcast data flow architecture and deterministic arbitration design to ensure that all specified modules within the system receive data simultaneously, at rates up to 16M words/sec and with latencies under one microsecond. This allows unparalleled performance vs. competing systems using only the P1 and P2 implementation of the VMEbus. With the incorporation of the latest PMC Carrier II module, four PMC boards with fully independent functions can occupy the same space as a single MUXbus VME module. The result is performance that ensures:

- Latency under a microsecond
- Data multiplexed and distributed without processor intervention
- Hardware-driven data flow
- Deterministic throughput, independent of data rates and configurations
- A parallel hardware architecture, whereby adding modules linearly increases I/O and processing performance

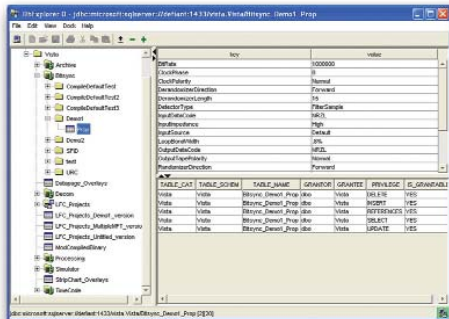
The MUXbus (on P3 of the VMEbus) is the Avalon's real-time data highway, running at a sustained 16M words per second (96 MB/sec).



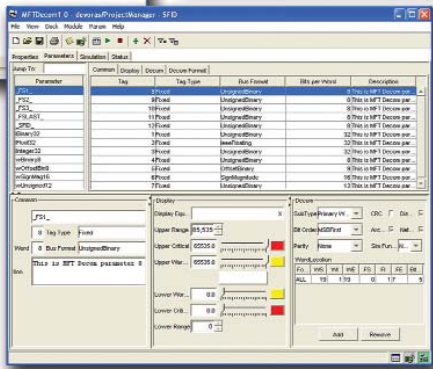
The VMEbus' P1 and P2 channels form the Avalon's administrative and I/O bus to support integration of numerous commercial third-party VME cards, and easily transfer large data blocks between front-end modules.



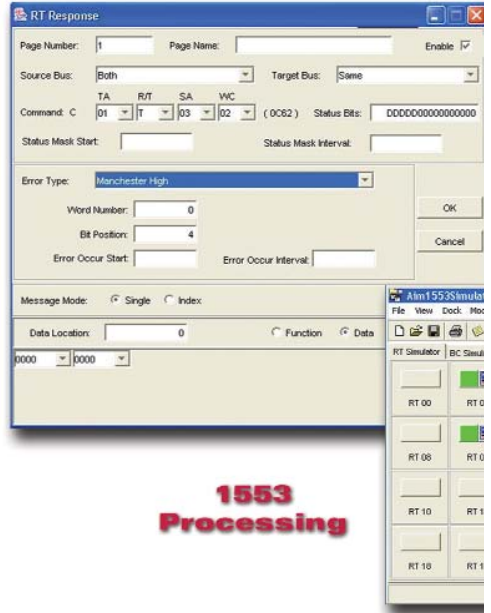
Vista Navigator



Database Tools



Parameter Management



1553 Processing

Acquisition

The Avalon system makes it easy to assemble, modify or merge multiple telemetry, avionics bus, time parallel or serial streams. It's as easy as selecting the appropriate card/module and adding it to an empty slot. The Avalon's powerful data flow architecture lets you easily add new modules or chassis to accommodate additional data streams for increased acquisition capability.

Processing

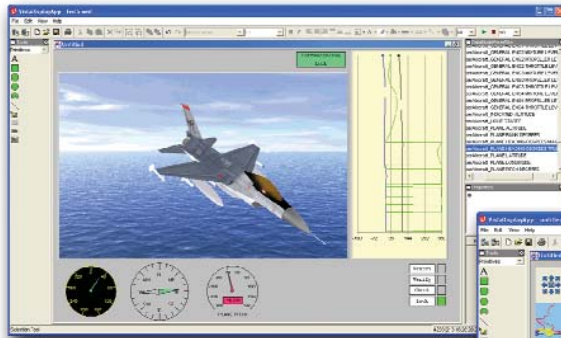
The Avalon's data flow architecture is an excellent platform for embedded real-time processing. It provides a scalable, parallel, data-driven and deterministic computing environment, where adding real-time processors linearly increases throughput. You can often eliminate programming tasks by quickly choosing, linking or chaining algorithms from a large library that includes CCSDS, data compression, statistics, alphanumeric and trigonometric algorithms, as well as those for decommutating large, complex telemetry formats or specialized avionics bus ICDs.

Display

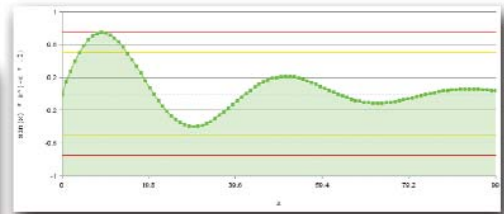
Vista's advanced software suite lets you visualize data, any way you choose. Written Java to be completely platform independent, visualizations can be in 2D graphs and alphanumeric formats, 3D aircraft and weapons models, moving maps with terrain features, or design your own from either a library of display objects or even custom tailored designs. Displays can be initiated by events such as out-of-limit events or timers. You can also update these displays on the fly in real time, or use a "scrolling slider bar" to roll back and review recent past data.

Simulation & Control

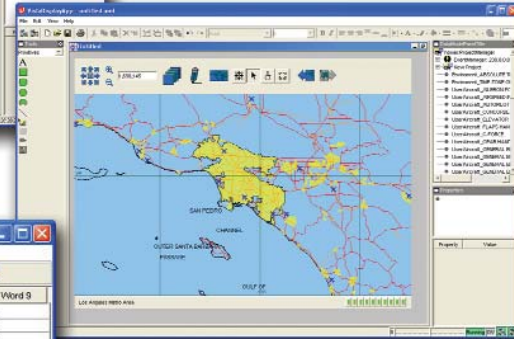
The Avalon is ideal for training and simulation, systems integration, test applications or satellite command and control. The system offers the ability to produce dynamic data for multiple PCM, MIL-STD-1553, analog and digital streams. Additionally, the Avalon can simulate virtually any real-time input stream. These streams can be derived from multiple function generators or dynamically change in response to internal algorithms or external stimuli from high-fidelity simulations.



3D Models



Strip Charts



Moving Map

A	Word 1	Word 2	Word 3	Word 4	Word 5	Word 6	Word 7	Word 8	Word 9
0	00	00	00	50	00	00	89	81	0a
1	00	01	00	52	00	00	72	00	0a
2	00	02	00	54	00	00	10	16	0a
3	00	03	00	56	00	00	c3	b3	0a
4	00	04	00	58	00	00	91	c0	0a
5	00	05	00	5a	00	00	c0	04	0a
6	00	06	00	5c	00	00	b8	30	0a
7	00	07	00	5e	00	00	00	00	0a

Quick Frame



Distribution

With its broadcast data flow architecture, the Avalon simultaneously delivers output to all modules in the same bus cycle — eliminating overhead or time delays to transfer the data to multiple recipients. Data can also be distributed by reflective memory schemes or any commercially available network protocol.

Application Programming Interface

The Avalon's API is a robust Java based direct link between the front-end chassis, servers, workstations and PC's on your network. All features and capabilities accessed through the Vista GUIs can be controlled via this API. Additionally the API supports the integration of other software and hardware with either Vista or Vista supported products, which can easily be embedded into a larger system.

Storage

The Avalon's storage capabilities are matched to any real-time application. Data can be archived to the workstation directly over the LAN or via SCSI or Fiber Channel to JBODs or RAIDs or any other COTS storage device. Sophisticated play back software allows precise control of data playback by time or event and can even be run in a batch mode for post-test processing.

Setup & Control

System setup and control is easy with Vista's Java based navigator, which allows you to quickly maneuver between system functions. All functions utilize a point-and-click interface to visualize the entire system, create displays, define module and project set-ups, choose processing algorithms, select parameter attributes and create telemetry or avionics frame descriptions. Alternately, you can utilize custom developed software for the control and set-up of the Avalon via the Java based API.



CARRIER TECHNOLOGY

PMCs and Carrier

Telemetry-West's movement to the PCI Mezzanine Card (PMC) form factor across its product families was begun as an IR&D technology insertion several years ago capitalizing on all of the speed and interoperability of PCI while adding a high reliability connector system and mezzanine form factor. The result is an I/O mezzanine card system that not only enjoys direct silicon support, but also has the muscle to handle the next generation of I/O technologies.

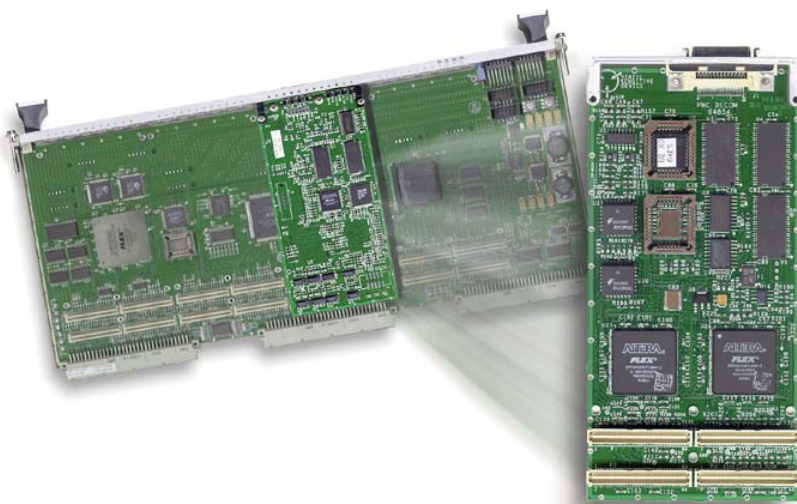
Benefits include:

- Smaller form factor (increasing system I/O density)
- Reduced costs (reducing prices to customers)
- Reduced parts counts with the movement to FPGA based logic (reducing vendor supplied obsolescence issues)
- Cross-platform capabilities (allowing insertion into PC, VME, cPCI & Multibus hardware architectures)
- High availability of COTS processor and networking components (adding value when core competencies are to be found in high volume industries)

This highly successful transition has allowed Telemetry-West to develop a family of PMC I/O cards that service the telemetry, avionics, real-time and data-acquisition communities. These cards form the basis of the I/O capability for the Avalon as well as the System 550 and Vista PC-based product families.

The multifunction VME Mezzanine Carrier (ZCM596) accommodates up to four (4) industry-standard PCI Mezzanine Cards (PMCs), and the VME Mezzanine Carrier with Arbiter (ZCA596) can also perform arbitration for the PMCs. This dramatically increases the functional density of the Avalon chassis more than four-fold, allowing five (5) slots worth of functions to fit into a single VME slot.

PMC modules are defined by the IEEE 1386.1 standard to follow the same electronic design as PCI cards, but in a mezzanine card form factor. One to four 2.9-inch by 5.9-inch (75 by 150 mm) boards attach to the carrier motherboard as daughter cards and occupy a single 9U backplane slot. The carrier functions as a bridge between the standard PCI bus, connecting the PMCs to the real-time MUXbus and the VMEbus at full rates. Data can also move between PMCs on the MCM at full PCI bus rates or with an onboard "electronic patch panel" to move serial data between PMCs.



VME Carrier Features:

- Accepts one to four standard PMCs
- Occupies only a single VME system bus slot, yet accommodates up to 4 diverse functions in addition to MUXbus arbitration
- Sustains full onboard PCI bandwidth
- Bridges data between the PMCs and the real-time system bus at full data rates
- Electronically controlled patch panel moves signal streams between PMCs

AVALON SPECIFICATIONS

Avalon Base System Chassis

Application Modules

Input

Telemetry Receiver/Combiner
PCM Bit Sync
PCM Frame Sync
PCM Decom
MIL-STD-1553
Analog
Digital
Serial
IRIG Time
ARINC 429
Voice
NTDS
Video

Output/Simulation

PCM Simulator
PCM Encoder
MIL-STD-1553
Analog
Digital
Serial
Voice

Mass Storage

SCSI
Fiber Channel

Network

Ethernet
SCRAMNet
Fiber Channel

Hardware Processing

Power PC (FPP)
Network Workstations

Software Processing

CCSDS
IRIG-106 Chapter 8
IRIG-106 Chapter 10
Standard Algorithms (150+)
Custom Algorithms
Application Programming Interfaces

Specifications for Model Avalon-R

Internal Architecture

MUXbus

Function: High-performance real-time data transfer between modules

TypeData flow, synchronous
Bus ModeBroadcast
Transfer Rate16 MHz, 96 MB/sec (62.5 ns cycle time)
Size20-bit tag* (address); 32-bit data
Tag Range1M*
ArbitrationRotating priority
Number of Chassis
 Supported1 to 8 chassis, using PMC Gateway
 Module Set (GWZ533-SET)

VMEbus

Function: Setup and control for all modules; data transfer for selected modules

TypeMulti-master, asynchronous
Bus ModeMaster/slave
Transfer Rate (VME64)10 MHz, 80 MB/sec (theoretical), 55
 MB/sec typical
Size32-bit address (A32); 32-bit data (D32)
VME6432-bit address (A32); 64-bit data (MBLT)
ArbitrationLevel priority

System Controller

Function: Performs network and module setup and control

CPUSee System Controller 5 (SCM595) data
 sheet
Operating SystemWind River VxWorks

* Not available on all modules and software. Contact factory for details.

Chassis Configuration

Chassis Dimensions7" H (4U) x 19" W x 20" D (22.5" D
 with rack slides)
Rear Panel I/O Slots18 available
Rear I/O Connector Panel27 application-unique units, 4.8" x 0.6"
Rack MountingStandard rack-mount kit
Weight (full modules)45 lbs.
Power Consumption350 W (maximum configuration); 160 W
 typical

Operating Environment:

Temperature50°F to 113°F (10°C to 45°C)
Relative Humidity
 (non-condensing)10% to 90%
Altitude (unpressurized)0 to 10,000 ft. (0 to 3,048 m)

Non-Operating Environment:

Temperature-40°F to 140°F (-40°C to 60°C)
Relative Humidity
 (non-condensing)0% to 95%
Altitude0 to 30,000 ft. (0 to 9,144 m)

Input Voltage Range85 VAC - 264 VAC
Input Frequency Range47 Hz - 63 Hz
Approvals PendingCE, FCC-A

Application Module Size

MUXbus (9U)6.80" (160 mm) H x 14.4" (366 mm) W
VMEbus (6U)6.80" (160 mm) H x 9.187" (233 mm)
 W

Compatibility

SWA500 Applications Software
VISTA Software

Ordering Information

AVALON-RAvalon System Chassis, Rackmount, 6
 VME Slots (includes System Controller
 and VME Mezzanine Carrier with Arbiter)
SCM595System Controller 5 Module (Spare Only)

Telemetry & RF Products

Excellence You Can Measure

Excellence You Can Measure

Avalon is part of L-3 Telemetry West's over-50-year heritage of providing performance and value to virtually every major defense and aerospace organization in the World. We're joined in that legacy by over seventy L-3 divisions, each a leader in its area of expertise — from microwave components, antennas and telemetry instrumentation to satellite communications and secure communications systems. Our breadth of capability in the telemetry, avionics integration and data acquisition arenas continues to grow with full spectrum solutions that include ground-based and airborne telemetry components and systems as well as complete systems engineering and integration services.

Turnkey solutions from a single source — delivered on time and with complete after-market support. That's what L-3 Communications is all about. With over 12 billion dollars in revenue and one of the highest ratios of engineering staff to total employees, we have what it takes to give you the competitive edge.

Telemetry-West

9020 Balboa Avenue
San Diego, CA 92123-3507
858.694.7500 800.351.8483
Fax: 858.279.0693
www.L-3Com.com/TW



Telemetry & RF Products