

## Dual High-Speed Multiplexer With Gigabit Ethernet Output



### Description

The AIM (Airborne Instrumentation Multiplexer)-4004-1 performs high-speed data multiplexing. It has a single backplane PCB (Printed Circuit Board) that has two separate bus segments. This allows an OVH-350-1 overhead module, an RCI-305-2 or -3 CAIS interface and an additional Input/Output (IO) board to be installed on each of two backplane segments.

Each bus segment supports 64-bit PCI at 66.67 MHz (533 MBps peak bandwidth) and accepts an I/O board for data multiplexing and recording.

Each backplane bus segment is independent, which allows the AIM-4004 to act as two multiplexers in one physical chassis.

The AIM-4004-1 accepts IRIG-B AC or DC time to support IRIG Chapter 4 for selected data over the CAIS bus.

Each segment of the AIM-4004-1 can also operate as a CAIS remote data acquisition unit. This allows selected data from I/O boards, unit status and recorder status to be provided to the CAIS controller as flight safety data.

### Features

- Dual airborne data multiplexer within a single unit
- Each multiplexer section includes:
  - RCI-305-X remote CAIS and IRIG interface board
  - OVH-350-1 overhead board with two 1-Gb Ethernet outputs
  - One available slot for a user-selectable I/O board
- Accepts the following AIM-200X/AIM-400X I/O boards:
  - 2-channel Radar IQ data LVDS interface board (RDR-302-1)
  - 2-channel Fibre Channel receiver board (FCR-302L-1)
  - 4-channel 2.125 Gbps optical Fibre Channel board (FCH-304L-1)
  - 4-channel 400 Mbps IEEE-1394b FireWire board (BIM-394Q-1)
  - 4-channel 20 Mbps PCM/Clock interface board (PCI-304-1)
  - 8-channel 20 Mbps PCM/Clock interface board (PCI-308-1)
  - 4- or 8-channel MIL-STD 1553 bus interface board (BIM-553Q-1, BIM-553F-1 and BIM-553-1)
  - 2 channel 1.0625 Gbps electrical Fibre Channel board (FCH-302E-1)
  - 4 channel audio / video MPEG-2 board (VID-304-1)
  - 4 channel 10/100 Base-T Ethernet board (ETN-304-1)
- The RCI-305-X accepts IRIG-B AC or DC time
- The RCI-305-X includes a CAIS bus interface:
  - Single-point programming using CAIS or RS-232/422
  - Operates as a CAIS DAU remote unit
  - Provides recorder and unit status to the CAIS controller
  - Supports selected data and status over the CAIS bus
- The OVH-350-1 overhead module provides the following interfaces:
  - Two 1 Gb Ethernet ports for data recording and download
  - One 10/100 BaseT Ethernet management port
  - Two RS-232/422 ports
  - Four GPIO ports

### Applications

- Flight test instrumentation
- Air vehicle test, certification, and development
- Ethernet-based network data acquisition
- System safety monitoring

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### AIM-4004-1 Datasheet

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# AIM-4004-1 – Dual High-Speed Multiplexer With Gigabit Ethernet Output

## Technical Specifications

### Electrical Specifications

Supply: +28VDC ±4VDC

Total Estimated Power Consumption: 53W

Operating temperature: -40°C to +85°C

Storage temperature: -55°C to +125°C

### Dimensions and Mechanical

Weight: 15 lbs.

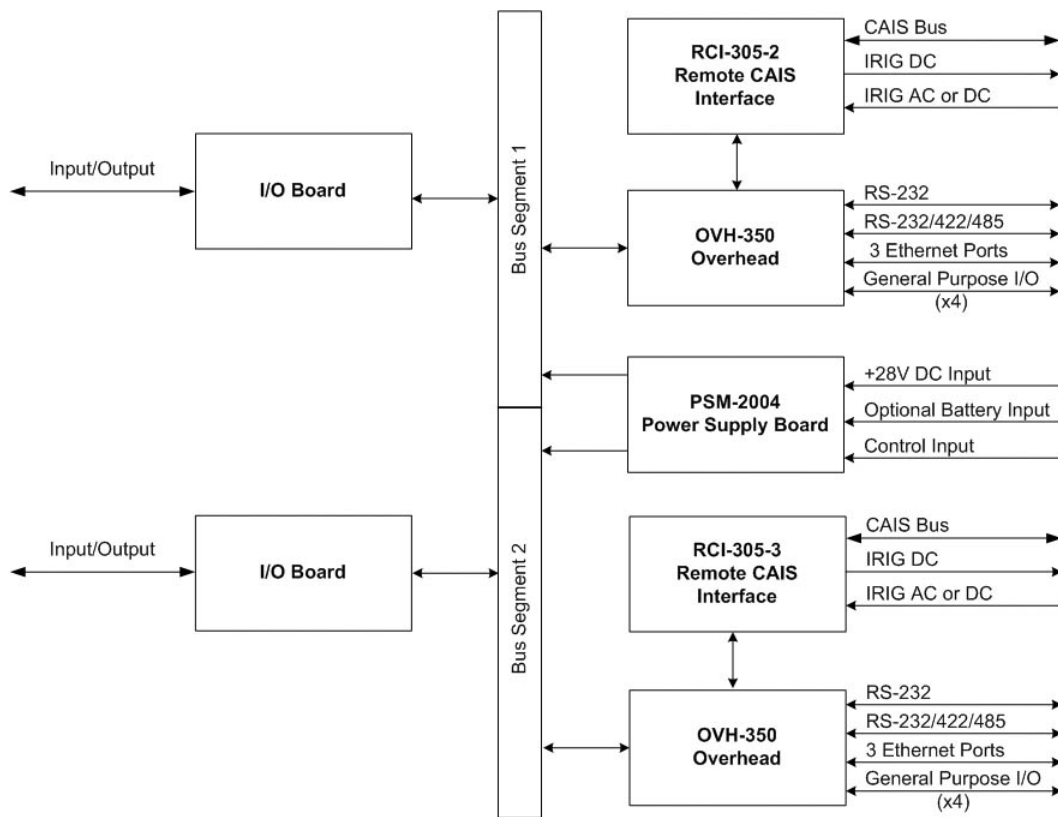
Dimensions: 6.3" W x 6.0" H x 6.6" D

### Data Throughput

The AIM-4004-1 unit has two internal 64-bit, 33MHz Compact PCI-like buses capable of peak data rates of 533 MBps per segment.

**AIM-4004-1 Block Diagram**

The following diagram depicts an AIM-4004-1 with an I/O board installed for each bus segment:



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# AIM-4004-1 – Dual High-Speed Multiplexer With Gigabit Ethernet Output

## Available Input/Output and Overhead Boards

### Input/Output and Overhead Boards

This section describes modules that are compatible with the AIM-4004-1. One I/O module can be used on each half of the backplane.

#### 4 Channel IEEE-1394b Board (BIM-39Q)

**Function:** Standard IEEE 1394b physical signaling interface with custom connectors.

**Interfaces:** Four 400 Mbps (max) independent 1394b nodes (leaf only).

**Standards:** IEEE-1394b

**Details:**

- External connections use two DB-9 receptacles
- Line transceivers' transformer is coupled to interface connector
- Maximum cable run is 12 meters

#### 2 Channel LVDS Interface Board (RDR-302-)

**Function:** LVDS data receiver

**Interfaces:** Two LVDS channels

**Standards:** ANSI/ASQC Q9001-1994, EIA RS-422-A

**Details:** Total receive data rate of 120 MBps; Receive LVDS signal rate of 462 MHz

#### 2-Channel Optical Fibre Channel Receiver Board (FCR-302L-1)

**Function:** Inbound-only data receiver.

**Interfaces:** Two 1.0625 Gbps Fibre Channel electrical interfaces.

**Standards:** Adheres to ANSI and Fibre Channel Industry Association standards. Inbound frames are time-tagged per IRIG-106 Chapter 10.

#### 4 Channel Optical Fibre Channel Board (FCH-304L)

**Function:** Data capture

**Interfaces:** Up to 4 optical Fibre Channel interfaces at 2.125 Gbps

**Standards:** Adheres to ANSI and Fibre Channel Industry Association standards.

**Details:**

- Fibre link uses 50/125 micron graded index multimode optical fiber.
- Laser wavelength of 830 to 860 nm (850 nominal).
- Faceplate-mounted D-subminiature receptacle with optical terminals.

#### 4 or 8 Channel PCM Acquisition Board (PCI-304(B)-1 or PCI-308-1)

**Function:** 4-channel PCM/clock input interface with dual bit sync. Frame sync correlator per channel.

**Interfaces:** 4 or 8 channels that accept RS-422 serial NRZ-L data and zero-phase bit clock or single-ended data and clock inputs.

**Standards:** IRIG-106

**Details:**

- IRIG time tag on every incoming frame
- Aggregate data rate is 80 Mbps
- Programmable per channel frame correlator or throughput mode
- Programmable on a per-channel basis for all decom settings including bits per word, bits per minor frame, minor frame per major frame, sync pattern, bit error before lock is dropped, bit slip window, bad frames to drop lock, sync mask, frames per major frame and frame ID word location.
- Optional 2-channel bit sync operation (for the 4-channel board) at up to 20 Mbps per channel. Supports full code conversion.

#### 4 or 8 Channel MIL-STD 1553 Acquisition Board (BIM-553Q-1, BIM-553F-1, BIM-553-1)

**Function**

- The BIM-553Q-1 is a 4-channel board.
- The BIM-553F-1 is a 4-channel board with selective message filtering.
- The BIM-553-1 is an 8-channel board.

**Interfaces:** 4- or 8- channel bus monitor, A or B direct or transformer-coupled (programmable)

**Standards:** MIL-STD-1553 A or B, inbound messages are time-tagged per IRIG chapter 10

**Details:**

- Programmable per channel.
- Sub-address 31 mode CMD (1553B) or normal sub-address (1553A)
- Response time is from 4 usec to 2.5 usec in increments of 0.1 usec.

#### 2 Channel Electrical Fibre Channel Interface Board (FCH-302E-1)

**Function:** Data capture

**Interfaces:** Two electrical Fibre Channel interfaces

**Standards:** Adheres to ANSI and Fibre Channel Industry Association standards.

**Details:**

- External connections use two DB-9 receptacles
- Line transceivers' transformer is coupled to interface connector
- Rate of 1.0625 Gbps
- Maximum cable distance of 100 ft

#### 4 Channel 10/100 Base-T Ethernet Board (ETN-304-1)

**Function:** 4- channel IEEE 802.3 Ethernet board

**Interfaces:** Differential pair, 802.3 compliant Ethernet

**Standards:** IEEE 802.3

**Details:**

- All channels are transformer-coupled
- External connections use DB-9 receptacles
- Maximum cable run is up to 100 meters
- Up to 100 Mbps line speed

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## Available Input/Output and Overhead Boards

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### 4 Channel Video/Audio Interface Board (VID-304-1)

**Function:** 4- channel MPEG-2 video and audio input

**Video Interface:**

- EIA-RS-170 color or black and white
- Support for NTSC or PAL format
- Composite, S-Video, or component RGB + sync signals
- Programmable bit rates and resolution

**Audio Interface:**

- High-level (up to 40 Vp-p) or low-level (up to 4 Vp-p) input per channel
- One stereo input per channel
- 1 Vp-p nominal into 10 Kohms
- Audio channels 1 - 4 are multiplexed with video channels 1 - 4.

**Details:**

- Compression compliant with MPEG-2 profile MP@ML
- Every incoming frame is time-tagged per IRIG Chapter 10.

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