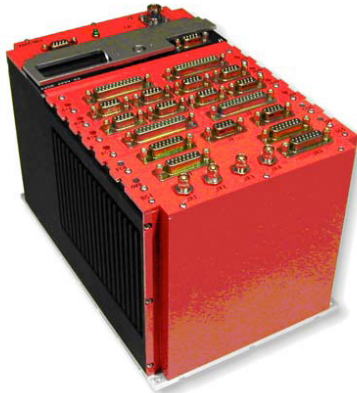


# AIM-2004, 2005R, 2006 & Cards

IRIG 106 Chapter 10 Multiplexer/Recorder

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## Overview

The AIM-2004/2005R/2006 units support external recorders and are designed to accept up to four, five or six data acquisition cards that provide various interfaces.

Each unit includes an overhead (OVH-3X0) processor card, a Time/CAIS Bus Mezzanine (RCI-305) card, and the AIM-2005R has optional removable solid-state memory. Input data is multiplexed into a single high-speed data transport to the external or internal media.

The AIM units accept IRIG B AC or DC time to support IRIG Chapter 4 for selected data through the CAIS bus. IRIG Chapter 10 is supported for recorded data timestamping.

These AIM units can also operate as CAIS remote data acquisition units. This capability allows specific data from incoming data sources (including PCM, 1553, IEEE 1394b and Fibre Channel) to be captured and also allows card, unit and recorder status to be communicated to a CAIS controller for flight safety data transmission.

## Key Features

- Airborne data multiplexer and recorder that accepts a variety of cards hosting high and low speed communications interfaces
- Several chassis sizes are available:
  - + AIM-2004: 4 I/O module capacity
  - + AIM-2005R: 5 I/O module capacity with a solid state recorder cartridge
  - + AIM-2006: 6 I/O module capacity
- Compatible with the following I/O cards:
  - + 2-channel 1.0625 Gbps optical Fibre Channel receiver card
  - + 4-channel 400 Mbps IEEE 1394b FireWire card
  - + 4 or 8 channel 20 Mbps PCM card
  - + 4 or 8 channel MIL-STD-1553 card
  - + 2-channel 1.0625 Gbps electrical Fibre Channel card
  - + 4-channel audio/video MPEG-2 card
  - + 2-channel 100/1000BASE-T Ethernet card
  - + 18-bit general-purpose I/O card
  - + 2-channel 400 Mbps optical FOTR receiver card
  - + 2-channel 10/100 Optical Ethernet and one 1000BASE-T Ethernet card
- Built-in solid state recorder (AIM-2005R only)
  - + 16 to 128 GB data storage
  - + Sustained record rate up to 50 MBps (media-dependent)
- Compatible with off-the-shelf media including FC/1394/Ethernet drives FC JBOD and FC RAID
- Accepts IRIG B AC or DC time
- Includes a CAIS bus interface
  - + Single-point programming through CAIS or RS-232/422
  - + Operates as a CAIS DAU remote unit
  - + Provides recorder and unit status to the CAIS
- The AIM family of products support selected data from interface cards for flight safety data transmission to the CAIS bus controller.

## Applications

- Flight test instrumentation system
- Vehicle development

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# Specifications

## Electrical Specifications

- Supply:  $+28_{VDC} \pm 4_{VDC}$
- Total approximate power consumption: 53 W
- Temperature:
  - + Operating temperature:  $-40^{\circ}F$  to  $+185^{\circ}F$  ( $-40^{\circ}C$  to  $+85^{\circ}C$ )
  - + RMM-3XXX operating temperature:  $-40^{\circ}F$  to  $159.8^{\circ}F$  ( $-40^{\circ}C$  to  $+71^{\circ}C$ )
  - + Storage temperature:  $-67^{\circ}F$  to  $+257^{\circ}F$  ( $-55^{\circ}C$  to  $+125^{\circ}C$ )

## Dimensions and Mechanical

- Approximate weight: 15 lbs
- AIM-2004 dimensions (WxHxD): 6.3 x 6.0 x 6.6"
- AIM-2005R dimensions (WxHxD): 6.3 x 6.0 x 9.3"
- AIM-2006 dimensions (WxHxD): 6.3 x 6.0 x 8.2"

## Data Throughput

The AIM-2005R and AIM-2006 units are structured with internal 64-bit, 33 MHz compact PCI-like buses capable of peak data rates of 264 MBps.

The AIM-2004 (4 I/O slots) uses a 64-bit, 66 MHz compact PCI-like bus with a peak data rate of 528 MBps. The system processor utilizes 256 MB of memory with a peak data rate of 2.1 GBps. This allows a sustained data throughput between the electrical Fibre Channel card and the recorder of up to 50 Mbps for the 5 or 6 I/O slot unit, and 100 MBps for the 4 I/O slot unit.

If aggregate input data exceeds the maximum sustained data rate of the unit or of the recorder, the setup software allows the user to decimate incoming data by a factor of 2 to 127. Data decimation can be done on a major frame basis for PCM, on an ASM basis for Fibre Channel and IEEE 1394b, and on a channel basis for IEEE 1394b.

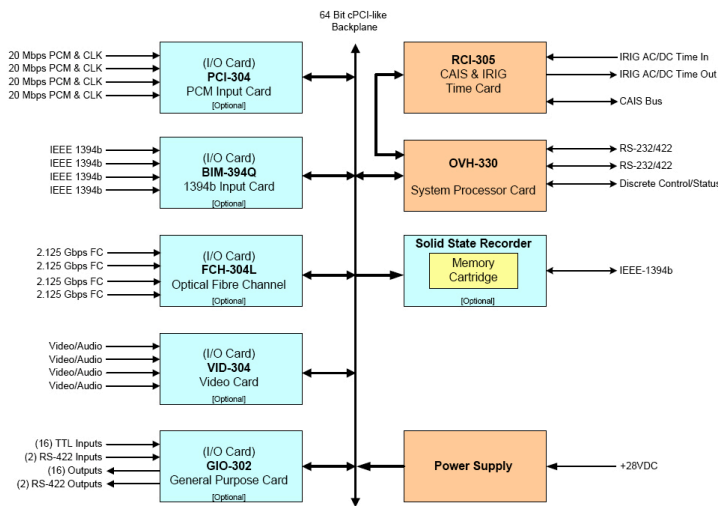
## Expansion

When additional I/O cards are required, AIM units operate with additional slave units in a distributed multiplexer configuration using an electrical Fibre Channel bus at 1.0625 Gbps between units. The slave units are HS-AVDAU (High Speed Avionics Data Acquisition Unit)-2004 (4 I/O slots), or HS-AVDAU-2006 (6 I/O slots), and they accept AIM I/O cards. Slave units do not interface with a recorder; they communicate aggregate data to the AIM unit. The slave units have an internal overhead processor, an IRIG time reader and a CAIS bus interface.

## Recorder Data Format

The recorded data is compatible with IRIG 106 Chapter 10 format. All incoming data is packetized and timestamped for cross-channel correlation prior to recording. The unit's internal Compact PCI-like bus supports Chapter 10 timing requirements.

AIM-2005R Block Diagram



AIM-2005R block diagram

## Specifications

This section describes cards that are available for use in AIM-2004, AIM- 2005R and AIM-2006 multiplexer/recorder units including their function, capacity, and other characteristics. The model number for the card is listed in parenthesis next to its name.

### 100/1000BASE-T Ethernet (ETN-302G)

- Function: Standard IEEE 802.3 Ethernet card
- Input: 2 channels, each supporting 100/1000BASE-T
- Physical characteristics:
  - + All channels are transformer-coupled
  - + External connections use DB-9 receptacles
  - + Maximum cable run is 100 meters
  - + Up to 1000 Mbps line speed

### CAIS/IRIG Interface Card (RCI-305)

- Function: Mezzanine card supported by the OVH-3X0. Communicates with other equipment for data setup and capture.
- Features: Accepts IRIG B AC/DC time
- Compatibility: 5 Mbps CAIS bus interface

### Ethernet Switch Card (ESW-303)

- Function: Optical and electrical Ethernet switch and bus monitor card
- Input: 2 channels, each supporting 100BASE-FX; One channel supporting 10/100/1000BASE-T

### Fibre Optic Receiver (FOR-302L)

- Function: Two-channel 400 Mbps fiber optic receiver card that interfaces with the FOTR bus

### Optical Fibre Channel Receiver (FCR-302L)

- Function: Two optical Fibre Channels inbound-only data receiver
- Interface: Dual 1.0625 Gbps Fibre Channel electrical interfaces
- Standards: Adheres to ANSI and Fibre Channel Industry Association Standards. Received data frames are timestamped per IRIG 106 Chapter 10.

### IEEE 1394b (BIM-394Q)

- Function: Standard IEEE 1394b physical signaling interface with custom connectors
- Input: Provides four 400 Mbps independent 1394b nodes (leaf only)
- Physical characteristics:
  - + External connections use DB-9 receptacles
  - + Line transceivers transformer coupled to interface connector
  - + Maximum cable run is 12 meters
  - + Up to 400 Mbps line speed

### Electrical Fibre Channel Interface (FCH-302E)

- Function: Processes multiplexed data from electrical Fibre Channel interfaces or interfaces with a solid-state recorder and GSE for recorder data download
- Interface: Dual 1.0625 Gbps Fibre Channel electrical interfaces
- Standards: Adheres to ANSI and Fibre Channel Industry Association standards
- Physical characteristics:
  - + External connections use two DB-9 receptacles
  - + Line transceivers transformer coupled to interface connector
  - + Rate of 1.0625 Gbps
  - + Maximum cable distance of 100 ft

## Specifications

### MIL-STD 1553 Interface (BIM-553Q, BIM-553F, BIM-553)

- Function: MIL-STD-1553 bus interface card
  - + BIM-553Q: 4-channel card
  - + BIM-553F: 4-channel card with message filter capability
  - + BIM-553: 8-channel card that supports IRIG 106 Chapter 8
- Coupling: Direct or transformer-coupled (programmable)
- Protocol: Bus monitor per 1553A or B
- Time: Incoming messages are timestamped per IRIG Chapter 10
- Features:
  - + Programmable per channel
  - + Direct or transformer coupler
  - + MIL-STD-1553A or B
  - + Sub-address 31 Mode CMD (1553B) or normal sub-address (1553A)
  - + Response time from 4 usec to 25 usec in increments of 0.1 usec

### Optical Fibre Channel Card (FCH-304L)

- Function: Captures data from up to 4 optical Fibre Channel interfaces at 2.125 Gbps
- Standards: Adheres to ANSI and Fibre Channel Industry Association standards
- Physical characteristics:
  - + Fibre link uses 50/125 micron graded index multimode optical fiber
  - + Laser wavelength of 830 to 860 nm (850 nominal)
  - + Line rate of 2.125 Gbps
  - + Faceplate-mounted D Subminiature receptacle with optical terminals

### Overhead Card (OVH-300A, OVH-330A, OVH-350)

- Function: Main processor card
  - + OVH-300A: Used in the AIM-2004
  - + OVH-330A: Used in the AIM-2006 and AIM-2005R
  - + OVH-350: Used in the AIM-2004
- OVH-300A and OVH-330A:
  - + CPU performance: ~932 Dhrystone 2.1 MIPS @ 466 MHz
  - + Memory: 128 MB DDR SDRAM, 2.1 GBps peak bandwidth
  - + Storage I/O: 32 MB non-volatile flash memory
  - + Connectors: Two serial RS-232/422 ports
- OVH-350:
  - + CPU performance: ~1600 Dhrystone 2.1 MIPS @ 800 MHz
  - + Memory: 256 MB DDR SDRAM, 2.1 GBps peak bandwidth
  - + Storage I/O: 64 MB non-volatile flash memory
  - + Two Gigabit and one Fast Ethernet port
  - + Connectors: Two serial RS-232/422 ports

## Specifications

### PCM Interface (PCI-304, PCI-304B, PCI-308)

- Function: PCM/clock input interface card
  - + PCI-304: 4-channel card
  - + PCI-304B: 4-channel card with dual bit sync
  - + PCI-308: 8-channel card
- Signal I/F: Accepts RS-422 differential inputs (serial NRZ-L data and zero-phase bit clock) or single-ended data and clock inputs
- Capability: Frame sync correlator per channel
- Data rate: Standard rates up to 20 Mbps on a per-channel basis
- Features: Programmable on a per-channel basis for all decom settings
- Time: IRIG timestamp on every incoming frame
- Bandwidth: Aggregate data rate for the module is 80 Mbps
- Optional: 2-channel bit sync operating at up to 20 Mbps per channel. Full code conversion is supported

### General Purpose I/O (GIO-302)

- Function: General-purpose input/output card
- Output: 16 general-purpose, opto-isolated outputs, 2 RS-422 compliant differential outputs
- Input: 16 general-purpose LVTTTL inputs, 2-RS-422 compliant differential inputs

### PCM Output (ARM-301A, ARM-301B)

- Function: Specific PCM data output card
  - + ARM-301A: RMOR-compatible for transmission of user-selectable input channels
  - + ARM-301B: IRIG 106 Chapter 4 PCM output of user-selectable parameters from input channels

### Solid State Recorder Cartridge (RMM-3XXX)

(AIM-2005R only)

- Function: Built-in Flash storage media
- Capacity: 16 GB to 128 GB
- Data rate: Up to 50 MBps
- Data retrieval
  - + In-chassis – Data available over a DB-9 connector supporting standard IEEE 1394b signaling
  - + Out-of-chassis – When powered by an external power supply, data is available over a standard IEEE 1394b bilingual connector

### Video/Audio Interface (VID-304)

- Function: 4 channels of 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 resolutions
- Audio interface
  - + High-level (up to 40 V<sub>p-p</sub>) or low-level (up to 4 V<sub>p-p</sub>) input per channel
  - + One stereo input per channel
  - + 1V<sub>p-p</sub> nominal into 10 Kohms
  - + Audio channels 1-4 are multiplexed with video channels 1-4
- Compression: Per MPEG-2 profile MP@ML
- Time: All incoming frames are timestamped per IRIG Chapter 10

Note: The AIM-200X(R) will support up to 12 channels of video maximum.

## Ordering Information

Contact [Curtiss-Wright](http://Curtiss-Wright) for ordering information.