Model 556
Acquisition Interface Module

556-USR
4/97

User's Manual

ISO 9001
SYSTEM CERTIFIED

CE

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The information in this manual describes the product as accurately as possible, but is subject to change without notice.

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1. Introduction

The Canberra Model 556 Acquisition Interface Module (AIM) is a single width NIM with a built-in Ethernet (LAN) interface conforming to IEEE 802.2/802.3 communication standards. The AIM has been designed with two high speed ADC ports and an Instrument Control BUS (ICB) for programmable front end NIM. Residing on an Ethernet network, the AIM allows data acquisition from any computer on the network.

The module is a multi-processor design. Overall control is managed by an 80188 16-bit microprocessor. The data acquisition functions are handled by a high speed processor micro-programmed using bit-slice building blocks. An Ethernet co-processor is responsible for the communication between the module and Host computer.

The 556 AIM can acquire data in PHA, Loss-Free PHA or LIST mode from either ADC port independently. The AIM contains 64K, 32-bit channels of local acquisition memory and can acquire data from both ADCs at an aggregate rate of 1 MHz (650 kHz for a single input). Preset and elapsed times are maintained within the module with centisecond resolution. The AIM will automatically terminate acquisition upon reaching the preset live or real time or a preset total counts in a region.

The 556 AIM serves as a link between a host computer and signal processing NIM. This NIM can be configured with manual and/or programmable versions of Canberra's ADC, AMP, HVPS, AMX building blocks to tailor the system to the needs of any application. A single AIM in conjunction with a Genie family workstation can control a whole Bin of programmable NIM for total computer front end configuration and control. Choose from the growing Canberra family of ICB NIM for programmable signal processing.

Use Multi-drop AIMs with appropriate signal processing local to the detectors and select one or more Genie workstations to configure a network. Genie workstations are available on both OS/2 and VMS platforms.

2. Controls and Connectors

This is a brief description of the 556's controls and connectors. For more detailed information, refer to Appendix A, Specifications.

2.1. Front Panel

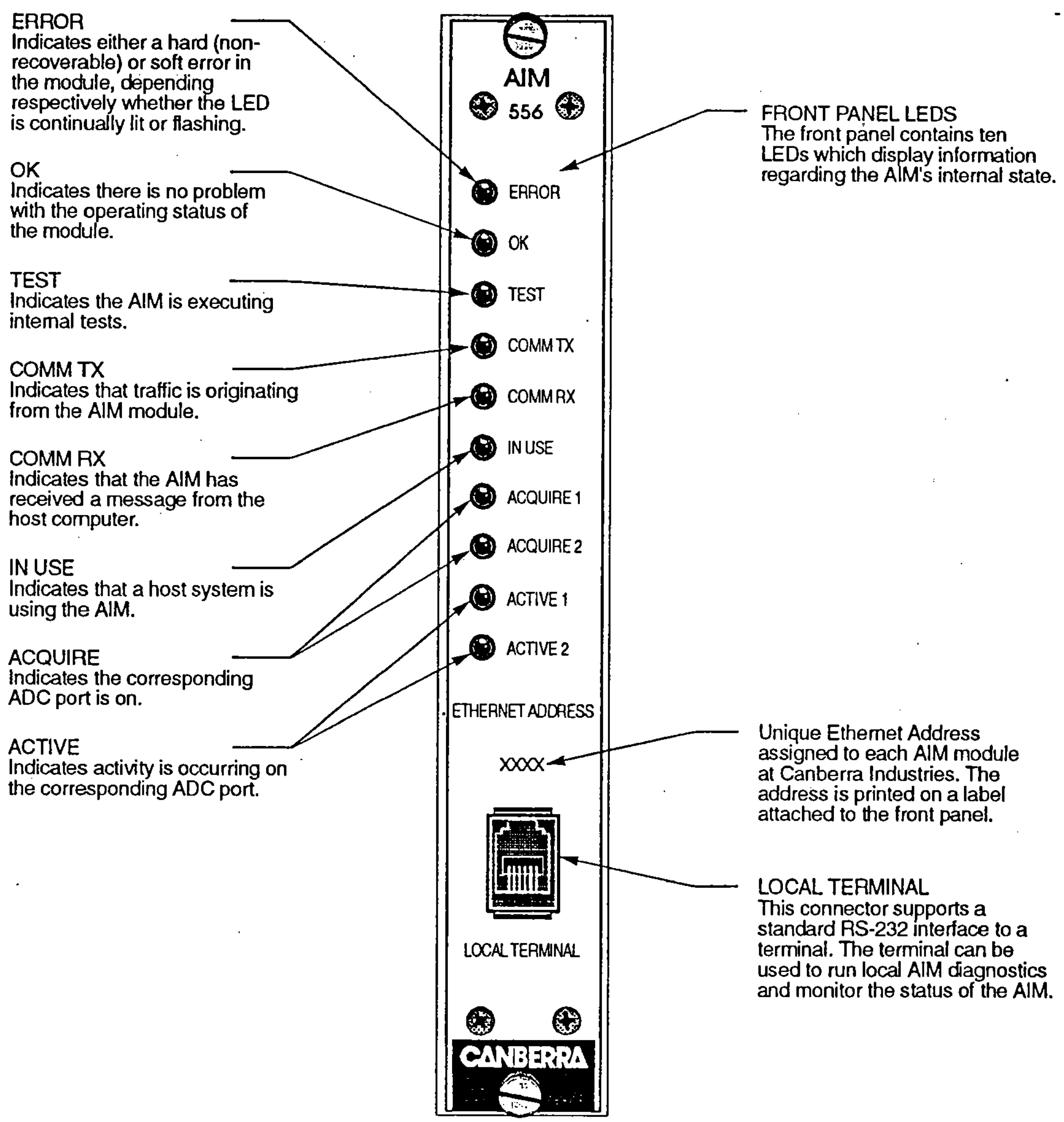


Figure 2.1 Front Panel Indicators and Connector

2.2. Rear Panel

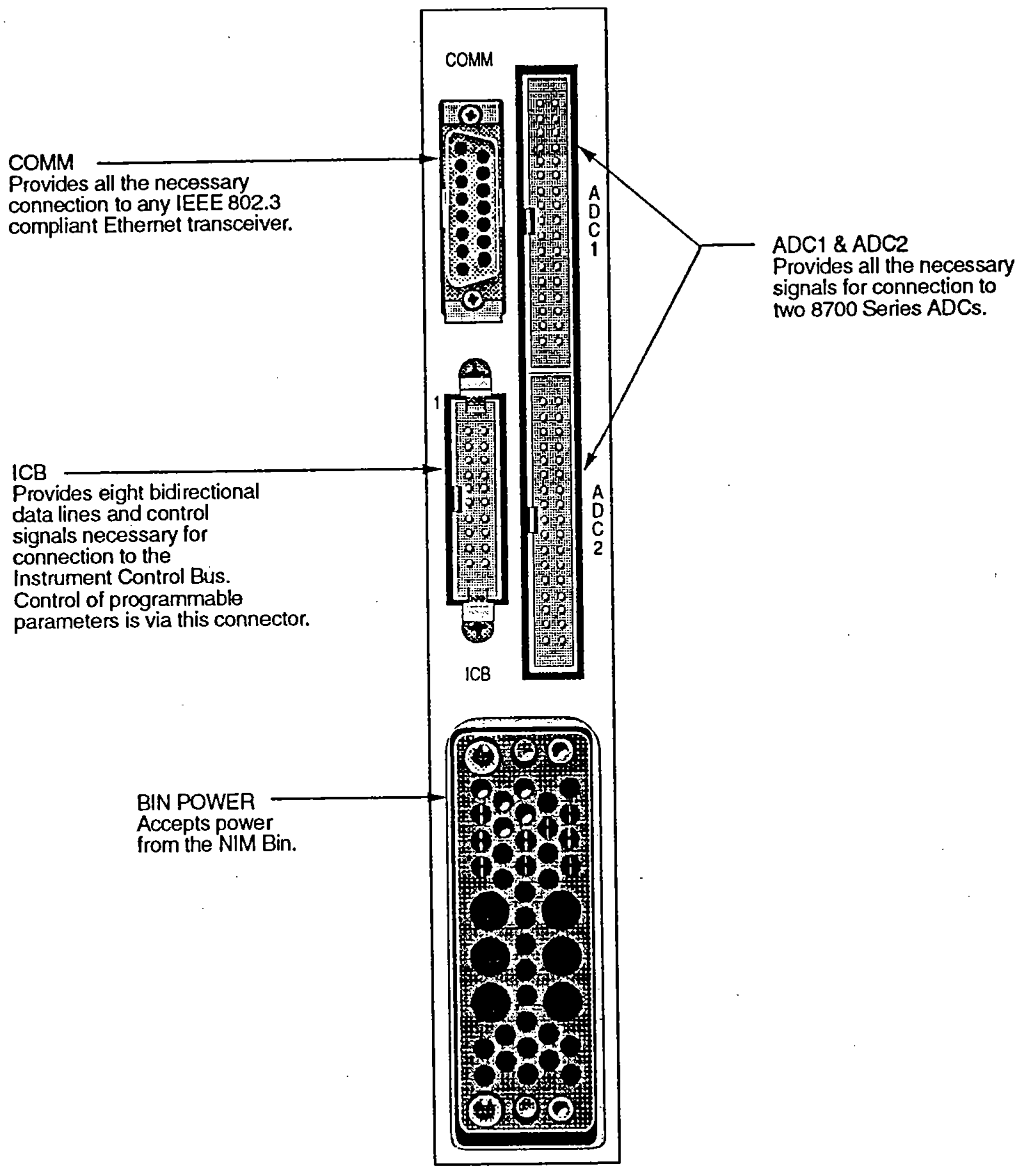


Figure 2.2 Rear Panel Connectors

2.3. Internal Controls

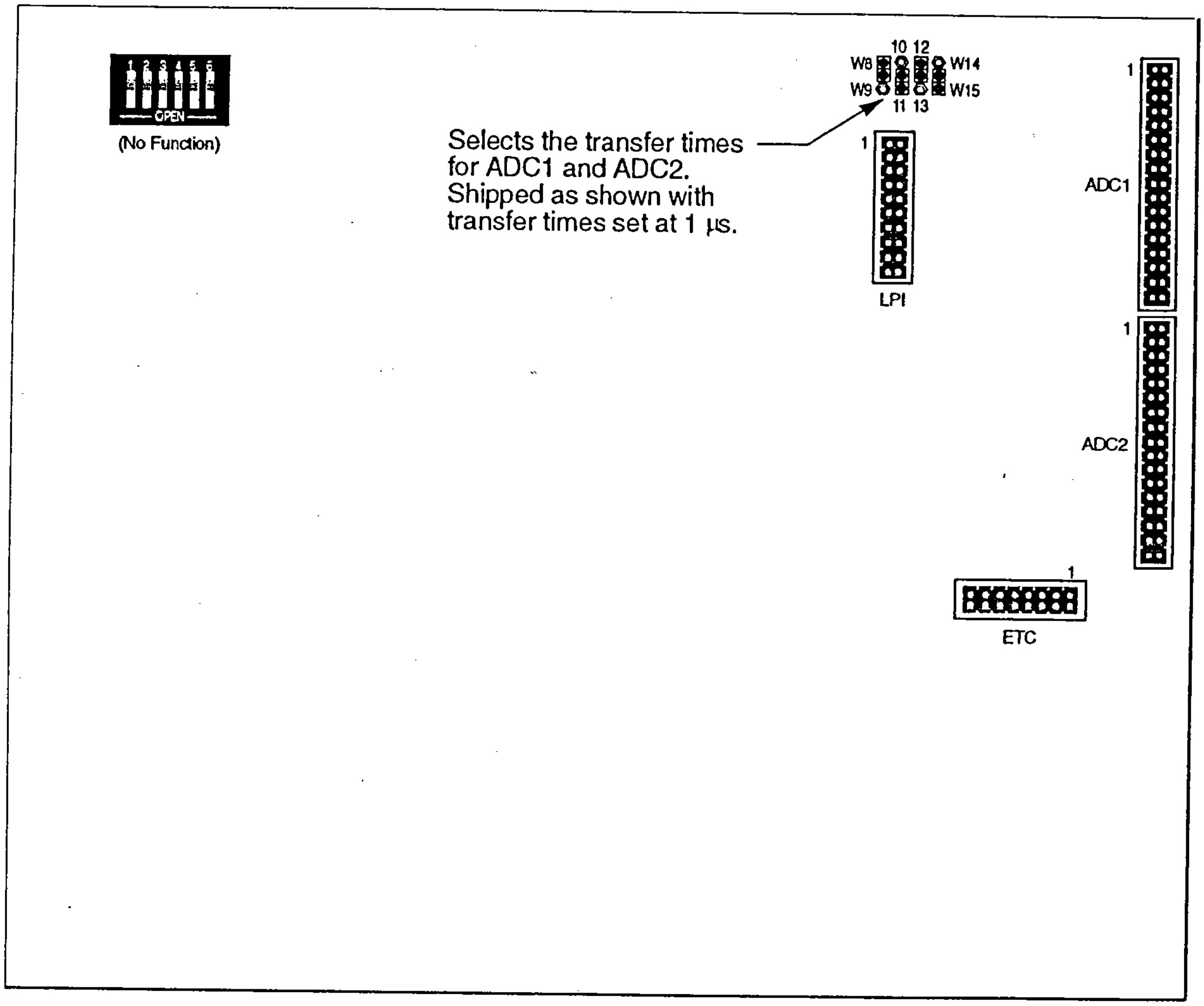


Figure 2.3 Internal Controls

3. Operation

Refer to the Model 9600 AIM/ICB System Setup Manual for a typical ICB installation and technical information.

3.1. Installation

The following procedure describes the installation of an Model 556 AIM module for remote acquisition in an existing system.

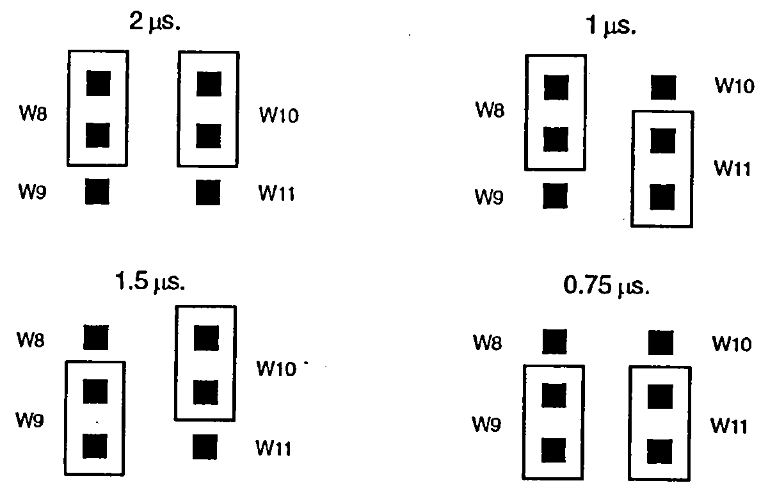
System Requirements

This procedure assumes that the following equipment is available:

- Host: (VMS) VAX or AXP Server or Workstation
  or
  (PC) IBM-compatible personal computer.
- System Software: (VMS) VMS Version 5.2 or later, S600 VMS Spectroscopy Applications Software and S617 VMS Genie Display and Acquisition Software
  or
  (PC) OS/2 Version 2.0 or later, S400 or S402 Genie-PC Basic Spectroscopy Software and S410 Genie-PC AIM SFT Driver.
- Communications: DEC-supported Ethernet interface.
- A NIM Bin which can supply sufficient power (see Appendix A.10, Power Requirements).
- Installed Ethernet Transceiver and transceiver cable. (See Ethernet Transceiver manual for installation procedure.)
- An optional VT100 or compatible terminal set for 9600 baud, 8 data bits, no parity and 1 stop bit (required only for diagnostics).
- One 556 AIM module and local terminal cable.

Carefully unpack the unit, verifying that you have received the Model 556 AIM module, two ADC cables, a 12-headed ICB cable, and the local terminal cable. Thoroughly inspect all equipment for damage that may have occurred during transit. If there are no problems with the equipment, proceed with the following steps:

1. When the AIM is shipped from the factory, the transfer times for both ADCs are set at 1 µs. This will allow a maximum cable length of 4.5 m (15 ft). If these are the desired settings, go to step two. If you'd like to change the transfer time settings, remove the right side-panel from the 556. Referring to Figures 2.3 and 3.1, change the appropriate jumpers on the board.



The jumper positions above show the allowed transfer times for ADC1. The same positions can be used for ADC2 if W12 is substituded for W8, W13 for W9, W14 for W10 and W15 for W11.
Factory setting is 1µs.

Figure 3.1 Transfer Times vs Jumper Settings for ADC1

Use the following guidelines to select the transfer rate: If the cables between the AIM and the ADCs are short, (i.e., less than 2 m (6 ft)), the fastest transfer rate can be selected. If the cables are long (i.e., more than 4.5 m (15 ft)), the slowest rate should be selected.

Note: Only jumpers W8 through W15 should be changed. Moving any other jumpers will affect the internal operation of the AIM. After the desired transfer rate has been selected, replace the right side-panel.

2. Turn off the NIM Bin's power, then install the 556 in the NIM Bin.

3. While the NIM bin power is off, connect the Ethernet transceiver cable between the rear of the AIM module and the Ethernet transceiver box. Be sure to lock the cables in place at both ends (the AIM module and the Ethernet transceiver). The AIM connects to any IEEE 802.3 compliant transceiver, such as DEC DESTA and H4000. Each AIM has a unique network address in the form 00-00-AF-nn-nn-nn. The last six digits (nn-nn-nn) are assigned to the AIM at the factory and are printed on a label on the module's front panel. You will need this address to specify which AIM you want to access. The AIM will operate in any legal Ethernet configuration. However, use caution if you run the AIM through an Ethernet bridge due to the large amount of traffic generated by the AIM. Bridges can be set up to ignore any message with the AIM address prefix "00-00-AF".

4. If you are using a local terminal, connect its cable to the 556's front panel Local Terminal connector. Note that the local terminal is used for troubleshooting; it is not required for normal operation.

5. Orient the cable from the ADC or AMX (see Figures C.1, C.2 or C.3) so that its pin one indicator (an arrow on the connector itself or a highlighted colored cable) is up

and connect it to one of the keyed 34-pin ADC connectors on the AIM's rear panel. See Figure 2.2 for location of the connectors.

6. Turn the NIM bin on. The AIM's TEST LED (only) should turn on within two seconds of power up, indicating that the AIM is executing its internal power-on diagnostics. These diagnostics take approximately 20 seconds to complete. When testing is complete, the TEST LED turns off and the OK LED turns on. If the ERROR LED flashes while the TEST LED is lit, check to ensure that the Ethernet transceiver and Ethernet transceiver cable are properly connected and try the power-on sequence again. See "Error Checks" on page 15 for information about hard and soft errors.

7. The AIM is now in the Acquisition Command Monitor Mode awaiting commands via the Ethernet network.

If you have a Genie-VMS system, read "Genie-VMS Installation" in Section 3.2. If you have a Genie-PC system with Canberra's Genie-PC software package installed, read "Genie-PC Installation" in Section 3.3.

3.2. Genie-VMS Installation

This section tells you how to install and verify the operation of the 556 AIM on a Genie-VMS system with Integrated MCA Control Software package (48-0258).

1. Log on to a host VMS system. Enter the following command:

```
CONFIGURATION/DEVICES
```

A report which shows the status of all AIMs on the network is generated. The new AIM should be included in the report, as shown in the following example. (The report is updated every 20 seconds.)

		Memory	Input Usage				
Address	Status	Allocation	1	2	3	4	Owned by
00-00-01	Reachable	80000001	Used	Free	N/A	N/A	BENGAL
00-00-02	Reachable						TIGER

2. Set up acquisition for the first ADC connected to the AIM with the command:

```
MCA CREATE TEMP NInnnn:1/CHANNELS=2K
```

Where *nnnn* are the least significant digits of the AIM's address. Omit the dashes and the leading zeros. For example, module address 00-02-B1 would be written as "NI2B1".

After you enter this command, the AIM's "In-Use" LED will turn on.

Maximum Collisions counts the number of times that the AIM attempted to send a single message 16 times without success. A large count here indicates network or AIM problems.

TX Traffic Deferred counts the number of times that the Ethernet controller had to wait to send an outgoing message. "TX Traffic Deferred" is a better gauge of network use than the collision counter. If the network is heavily loaded this can be a relatively large number.

Ethernet Line Monitor Commands

Several commands can be used while in the Ethernet Line Monitor:

L will update the screen. Due to performance issues the counters do not have live updates.

Z will zero the counters.

Q will exit the Ethernet Line Monitor and return to the ACM.

3.6. Circuit Description

The 556 AIM Block Diagram is shown in Figure 3.2. The microprocessor is central to the operation of the AIM module, as it is responsible for controlling all other functions within the module. These functions include the local terminal port, host interface, front panel LEDs and acquisition processing unit (APU).

The microprocessor is an Intel 80188 which contains not only the CPU, but all timing logic required to maintain the live and real time clocks for both ADC ports. The microprocessor accesses both RAM and ROM for program and data.

The function of the Acquisition Processing Unit (APU) is to process data collected from either of the ADC ports, completely independent of the microprocessor's operation. To facilitate this, the APU has its own spectral memory independent of that accessed by the microprocessor. Communication between the microprocessor and the APU is provided by the APU Interface.

The Serial Communications Controller which functions as a serial-to-parallel, parallel-to-serial converter/controller is used to connect a local terminal to the AIM for setup and diagnostic purposes.

The host interface connects the AIM module to a controlling computer. The 556 AIM with Ethernet functions as an acquisition server that can be attached to an Ethernet network. A block diagram of the Host Interface for the 556 AIM is shown in Figure 3.3. The Ethernet co-processor is responsible for the communication between a host computer and the module. Messages sent to the AIM module's individual address are received by the Ethernet co-processor and sent to the microprocessor for interpretation. The microprocessor then assembles a response which is sent back to the host via the Ethernet co-processor. Encoding and decoding of data, as well as the electrical interface, is provided by the Ethernet interface, which connects to a 15-pin connector on the rear of the AIM.

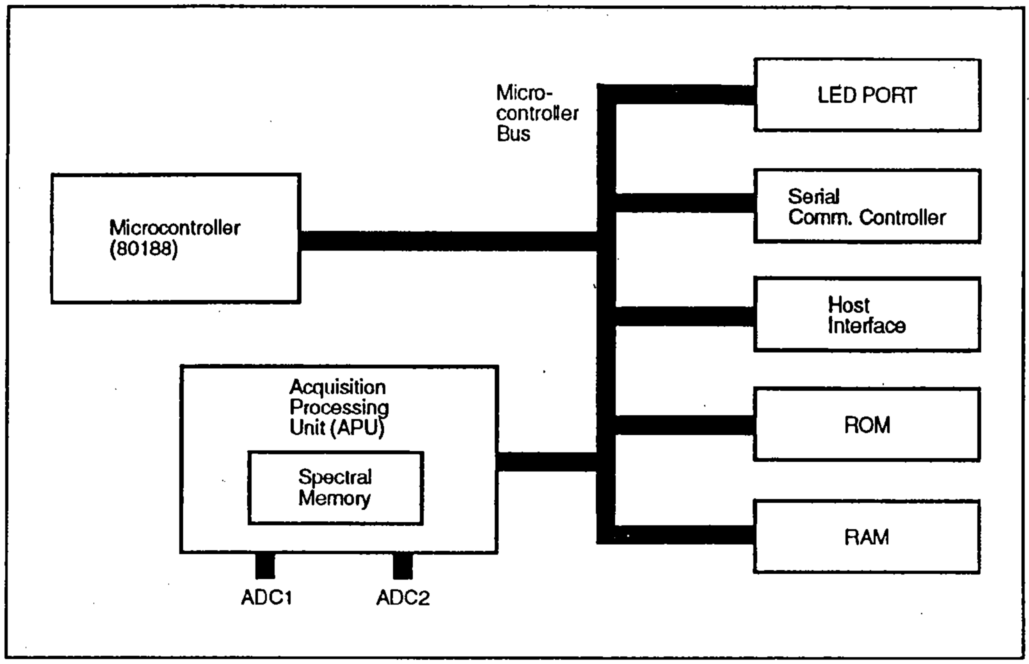


Figure 3.2 AIM Block Diagram

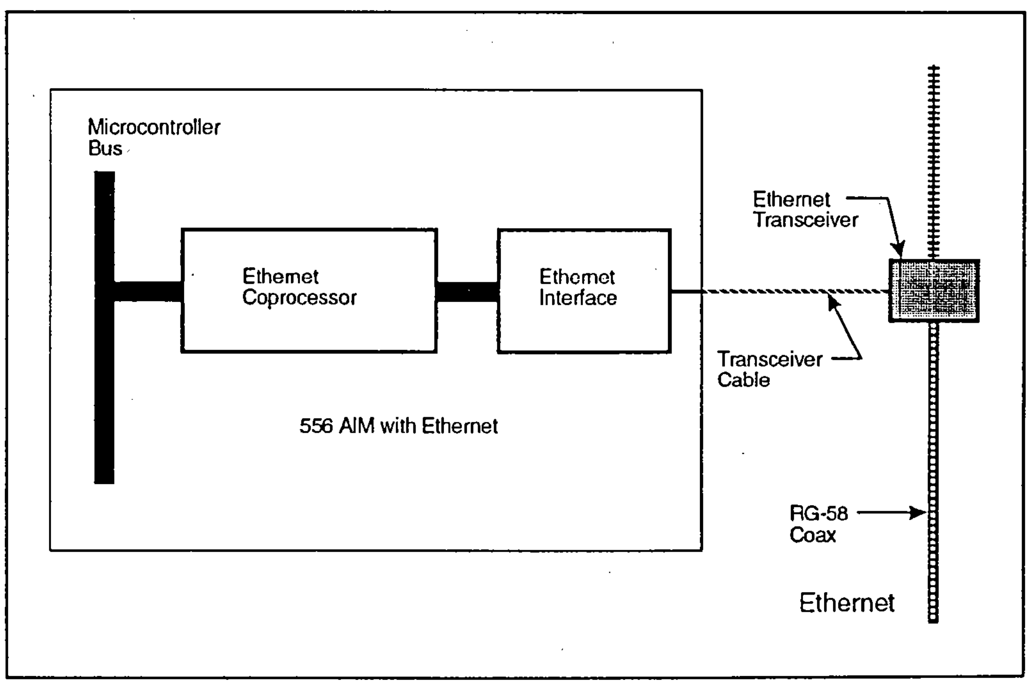


Figure 3.3 AIM Host Interface Block Diagram

3.7. AIM Diagnostics

This chapter provides information on the AIM'S on-board diagnostic capabilities. The diagnostic functions are divided into two types: those that are run during the AIM module's power-on sequence and those that are run by the user using the AIM's Diagnostic Monitor software. The following section assumes that you have read and understand the information presented in "Circuit Description" starting on page 13.

The TEST LED on the front panel of the AIM module is illuminated when either type of diagnostic is being performed. The remainder of this section assumes that a VT100 terminal is connected to the AIM's local terminal port, as described in "Installation" on page 5.

3.7.1 Power-On Diagnostics Sequence

A series of tests are performed by the AIM module to determine the initial internal state of the module when a power-on sequence is initiated. These tests are executed in the following order with outcomes as described.

A Micro-controller RAM test is performed to determine the state of the internal RAM which is accessed by the micro-controller. Failure of this test prevents the AIM from executing any other operations. Failure is indicated by the flashing of the COMM TX, COMM RX and IN USE LEDs while the ERROR LED is on. If this test fails, contact your Canberra Field Service representative for further assistance.

If the Micro-controller RAM test passes, the Serial Communication Controller (SCC) is initialized. There are no diagnostics currently performed on the SCC.

From this point on, the local terminal displays the power-on diagnostics sequence. Each diagnostic being performed is displayed on a different line, with its outcome displayed at the end of the line. Passage of a test is indicated by an "OK". Errors are indicated by a "FAIL" (a beep will sound) and are of two types. The first type is a hard or non-recoverable error which will prevent further operation of the AIM. The second type is a soft error which will be reported but will not prevent further operations.

3.7.2 Error Checks

The Acquisition Processing Unit (APU) is initialized, followed by diagnostics that test both the APU interface and APU memory. Failure of the APU interface test results in a hard error. Failure of the APU memory test results in a soft error.

The Host Interface of the AIM is initialized and tested next. The Ethernet Controller is initialized followed by setup of the AIM module's individual Ethernet address and the AIM module multicast address. A diagnostic test internal to the Ethernet Controller is then run. Failure of any of these tests results in a hard error.

Next a Time Domain Reflectometer (TDR) test is performed. In order for this test to pass, the Ethernet transceiver cable must be connected to the AIM module and the Ethernet network must be configured properly. Failure of this test results in a soft error.

Once these tests are complete, the AIM enters the Acquisition Command Monitor. All messages received from host systems are displayed on the local terminal.

Hard Errors

The AIM indicates hard errors by turning off the TEST LED and turning on the ERROR LED at the end of the power-on sequence.

Soft Errors

Soft errors are indicated by the illumination of the ERROR and TEST LEDs and the display of a soft error code, which are a combination of the COMM TX, COMM RX and IN USE LEDs as shown in Table 3.2. The soft error code is displayed for several seconds, after which the code, TEST and ERROR LEDs are turned off and the OK LED is turned on.

Table 3.2 Soft Error Codes

COMM TX LED	COMM RX LED	IN USE LED	Interpretation
Off	Off	On	APU
Off	On	Off	TDR

3.7.3 User-Run Diagnostics

The user-run diagnostics are run by you, the user, from the local terminal while the AIM is in the Diagnostic Monitor. To enter the Diagnostic Monitor from the Acquisition Command Monitor, type "CTRL D" on the local terminal keyboard.

The remainder of this section describes how to use the various user-run diagnostics and how to interpret their results.

The Diagnostic Monitor is divided into two viewports. The upper viewport contains the diagnostic option window and the command entry line. To the left of a diagnostic option is a single uppercase letter used to run a specific test. To run a specific diagnostic, type the letter representing the desired test and type RETURN or ENTER.

Since the AIM offers more diagnostic options than can fit at any one time in the upper viewport, you are able to scroll through the possible diagnostic options by typing "N" followed by RETURN or ENTER. (However, a diagnostic option need not be present in the diagnostic option window to be run.)

The lower viewport contains the diagnostic "type" being run along with a pass number and test results. Most tests can be run a specified number of times. This enables the AIM to repeatedly execute a function testing for intermittent operation. The pass number displays the number of consecutive times a diagnostic was run.

Below is a description of each diagnostic, specifying how it is used and how to interpret the possible results.

3.7.4 Test APU Interface

This test exercises the interface between the APU and the microcontroller. After this test is selected, you are asked to supply the number of times this test is to be run. This test must pass repeatedly for valid micro-controller to APU communication (thus acquisition) to take place.

3.7.5 Test APU Memory

The APU Interface test must pass before the APU memory test can be run. In this test, the APU memory is tested with a variety of memory diagnostics. After this test is selected you are asked to supply the number of times the diagnostics are to be run. This test must pass repeatedly in order for spectral memory to be valid.

3.7.6 Test Ethernet Communication

The Host to AIM communication path is tested extensively. This test verifies that the Ethernet Controller and Ethernet Interface, internal to the AIM, and the Ethernet transceiver connecting the AIM to the Ethernet LAN, are working properly.

In this test, the AIM sends a TEST message to a node which supports the IEEE 802.2 Type I Ethernet communication protocol. This node responds to the test message by returning the message to the AIM. The AIM then verifies the data sent.

After selecting this test, you are asked to supply the Ethernet address for the target host or AIM module. A valid Ethernet address consists of six pairs of hexadecimal digits; the digits may be separated by dashes (–) or spaces.

Note: If the host system supports DECnet, its Ethernet address can be found with the NCP command SHOW EXEC CHAR. If you type a RETURN or ENTER without typing any characters when asked for the address, the Ethernet communication test is terminated. After entering a valid Ethernet address, you can specify the number of times the test is to be run.

This test must pass in order for the Host to AIM communication to take place.

3.7.7 Test Timers

The real and live timers associated with both ADCs are tested. For this test to run properly, the ADCs connected to each ADC port on the AIM must be disconnected. View the front panel of the AIM while this diagnostic is being run. Notice that the ACQ LED for each ADC is illuminated for several seconds.

The real timer and at least one of the live timers must pass the test in order for acquisition to take place in that ADC. For example, if live timer for ADC1 fails, acquisition could take place in ADC2, provided all other necessary units within the AIM are fully functional.

3.7.8 Print Module's Individual Ethernet Address

The module's individual Ethernet address is displayed within the lower viewport. No diagnostic is actually performed.

3.7.9 Quit Diagnostics

To exit the Diagnostic Monitor, type "Q" followed by RETURN or ENTER. The AIM leaves the Diagnostic Monitor and returns to the Acquisition Command Monitor Mode.

3.7.10 Diagnostic Help

A Help feature is integrated as part of the Diagnostic Monitor. It gives you a brief introduction to a specific diagnostic routine's function, how the diagnostic is to be run and how the results should be interpreted. To obtain help with a specific diagnostic, type "F" followed by RETURN or ENTER. The AIM prompts for the specific letter corresponding to the diagnostic in question. After the appropriate letter is entered, the AIM displays the help information in the lower viewport.

3.8. Preventative Maintenance

Preventative maintenance is not required for this unit.

When needed, the front panel of the unit may be cleaned. Remove power from the unit before cleaning. Use only a soft cloth dampened with warm water and make sure the unit is fully dry before restoring power. Because of access holes in the NIM wrap, DO NOT use any liquids to clean the wrap, side or rear panels.

A. Specifications

A.1 Inputs/Outputs

ADC1 and ADC2 (Data acquisition) - 34 pin ADC standard.

Ethernet - Host I/Os: Provides connection to Ethernet transceiver; IEEE 802.2 and 802.3 compliant.

ICB (Instrument Control Bus) - Provides Host access to ICB Bus.

RS-232 - Terminal I/O for diagnostic functions.

A.2 Manual Controls

ADC Transfer Time - Internal jumper plugs to select transfer times compatible with cable length to each ADC. Factory set for 1 µs (≤4.6 m). Other selections are: 0.75 µs, 1.5 µs, 2 µs. Can be set independently for ADC1 and ADC2.

A.3 Front Panel Indicators

ERROR - LED indicates a hard, non-recoverable error (continuously lit) or soft error (blinking) in the module.

OK - LED; indicates module is operational.

TEST - LED; indicates module is in internal test mode.

COMM TX - LED; indicates module is sending data to host.

COMM RX - LED; indicates module is receiving message from host. During Power-On Self Test it indicates Ethernet network error.

IN USE - LED; indicates host has put module on-line. During Power-On Self Test it indicates memory error.

ACQUIRE - LEDs for ADC ports 1 and 2; indicates corresponding port is ON.

ACTIVE - LEDs for ADC ports 1 and 2; indicates activity on corresponding ADC port.

A.4 Performance[1]

ETHERNET INTERFACE

AIMS/NETWORK - Unlimited.

Communication Standard - IEEE 802.2 and 802.3.

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1. Software packages that support the AIM may not allow full use of the module's capability.

Network Address - 00-00-AF-nn-nn-nn, where nn-nn-nn is a unique address factory set for each Model 556.

A.5 ADC Interface Port

Number of Ports - 2.

Total Memory in AIM module - 64K channels.

Memory per Port - 0 to 64K Channels.

Counts per Channel - 2^{31} - 1 (>2 x 10^9).

Groups per Port - 1 to 128.

Channels per Group - 0 to 32K in one channel increments.

A.6 Acquisition Modes

PHA - Read, +1, Write.

PHA/LFC - Read, +N, Write.

LIST - Write.

A.7 Acquisition Cycle Time

Jumper set for Standard Transfer time.

PHA - 2 μs.

PHA/LFC - 4 μs.

LIST - 2 μs

A.8 PHA Preset

Control - Live and/or true time; counts in an ROI; overflow in any channel.

Time Resolution - 0.01 s.

Time Range - 0.01 to >21 x 10^6 s.

Count Range - 1 to 2^{31}-1 counts

Operating Temperature Range - 0 to 40 °C, ambient.

A.9 Connectors

ADC1 and ADC2 - 34-pin male ribbon headers; rear panel.

Ethernet - 15-pin female D-connector with slide locks; rear panel.

ICB - 20-pin male ribbon header; rear panel.

Local Terminal - RJ11C; front panel.

A.10 Power Requirements

+24 V dc – 2 mA	+12 V dc – 21 mA
–24 V dc – 0 mA	–12 V dc – 21 mA
+6 V – 1.8 A	

(Ethernet transceiver power is not included.)

A.11 Physical

SIZE - Standard single-width NIM module 3.43 x 22.12 cm (1.35 x 8.71 in.) per DOE/ER-0457T.

NET WEIGHT - 0.9 kg (1.91 lb).

SHIPPING WEIGHT - 1.8 kg (4 lb).

A.12 Accessories

C1560 - 12-unit ICB connecting cable.

C1703-2 - Two 60 cm (2 ft) AIM to ADC/AMX cables.

75-9619 - Local terminal cable (RJ-11).

45810019 - Adapter, 25-pin EIA to 6-pin RJ-11.

B. Signal Connectors

This section describes signals and pinouts for the 556's front panel (Local Terminal) and rear panel (Data Interface, ICB Interface, Ethernet Interface and NIM Power) connectors.

B.1 Local Terminal Connector

The front panel Local Terminal RJ11C connector supports a standard RS-232 interface to a terminal, which can be used to run local AIM diagnostics and monitor the status of the module. All input and output signal levels are RS-423 compatible; Output is > +5 V space and < –5 V mark. Input is +0.4 V to +15 V space and –0.4 V to –15 V mark.

Pin Number			
RJ11C	25-pin EIA Adapter	Signal	Description
1,5,6	1,5,6,8-19 21-25	NC	No connection.
2	7	GND	Signal ground.
3	3	TXDB+	Transmitted data to terminal.
4	2	RXDB+	Received data from terminal.
N/A	4-20	RTS/DTR	Request To Send and Data Terminal Ready are connected together in the 25-pin EIA Adapter.

Communications Parameters

The local terminal connector's serial character protocol is fixed at:

9600 baud
8 data bits
No parity
1 stop bit

B.2 Data Interface Connnectors

These two rear panel 34-pin ribbon conectors (ADC1 and ADC2) provide all the necessary signals for connection to the ADC. Negative true signals are shown with a trailing asterisk (ACEPT*); all other signals are positive true.

Pin	Signal	Pin	Signal
1	GND	2	ACEPT*
3	GND	4	ENDATA*
5	GND	6	CDT* or CDT
7	GND	8	ENC* or ENC
9	GND	10	READY*
11	GND	12	INB* (INV*)
13	NC	14	ADC00*
15	ADC07*	16	ADC01*
17	ADC08*	18	ADC02*
19	ADC09*	20	ADC03*
21	ADC10*	22	ADC04*
23	ADC11*	24	ADC05*
25	ADC12*	26	ADC06*
27	ADC14*	28	ADC15*
29	NC	30	NC
31	NC	32	NC
33	NC	34	ADC13X*

Data Interface Signal Functions

This section describes the function of each data interface signal in detail. All input and output signals are TTL compatible with 2.2 kΩ resistors to +5 V. Unless otherwise noted, the input signal levels are:

Low = 0 to 0.8 volts
High = 2.0 to 5.0 volts

And the output signal levels are:

Low = 0 to 0.5 volts
High = 3.0 to 5.0 volts

Signal	Pin	Description
ADC00*	14	INPUT: Binary data 2^0 (LSB).
ADC01*	16	INPUT: Binary data 2^1.

ADC02*	18	INPUT: Binary data 2^2.
ADC03*	20	INPUT: Binary data 2^3.
ADC04*	22	INPUT: Binary data 2^4.
ADC05*	24	INPUT: Binary data 2^5.
ADC06*	26	INPUT: Binary data 2^6.
ADC07*	15	INPUT: Binary data 2^7.
ADC08*	17	INPUT: Binary data 2^8.
ADC09*	19	INPUT: Binary data 2^9.
ADC10*	21	INPUT: Binary data 2^{10}.
ADC11*	23	INPUT: Binary data 2^{11}.
ADC12*	25	INPUT: Binary data 2^{12}.
ADC13X*	34	INPUT: Binary data 2^{13}.
ADC14*	27	INPUT: Binary data 2^{14}.
ADC15*	28	INPUT: Binary data 2^{15} (MSB).
ENDATA*	4	OUTPUT (Enable Data): Used to enable the tri-state buffers driving the 16-bits of data onto the lines ADC00* through ADC15*.
READY*	10	INPUT (Data Ready): Indicates that data is available for transfer from the ADC. High level > 3.5 V.
ACEPT*	2	OUTPUT (Data Accepted): Signals the ADC that the data has been accepted.
INB*	12	INPUT (Inhibit): In non-LFC mode or State 2 of the LFC transfer cycle, this signal indicates that the data available for transfer from the ADC is to be discarded. In LFC mode, this signal indicates that the number transferred during State 1 is the LFC increment (1 → 255). High level > 3.5 V.
ENC*	8	OUTPUT (Enable Converter): This signal enables or disables the ADC module. ENC* = logic 0 enables ADC operation.
CDT*	6	INPUT (Composite Dead Time): This signal indicates the time when the ADC or connected amplifier is busy and cannot accept another input event. It is used to gate the live time clock circuit in the MCA. High level > 3.5 V.
NC	13	No connection.
NC	29	No connection.
NC	33	No connection.
NC	31	No connection.
NC	32	No connection.
NC	30	No connection.
GND	1,3,5,7,9,11	DC common for all interface signals.

B.3 ICB Interface Connector

This rear panel 20-pin ribbon connector (ICB) provides all the necessary signals for connecting the 556 to the Instrument Control Bus (ICB). Negative true signals are shown with a trailing asterisk (LWE*); all other signals are positive true.

Pin	Signal	Pin	Signal
1	GND	2	LD0
3	LD1	4	GND
5	LD2	6	LD3
7	GND	8	LD4
9	LD5	10	GND
11	LD6	12	LD7
13	GND	14	LWE*
15	GND	16	LDS*
17	GND	18	LAS*
19	GND	20	LSRQ*

ICB Interface Signal Functions

This section describes the function of each ICB interface signal in detail. All input and output signals are TTL compatible with a 2.2 kΩ resistor to +5 V. Unless otherwise noted, the input signal levels are:

Low = 0 to 0.8 volts
High = 2.0 to 5.0 volts

And the output signal levels are:

Low = 0 to 0.5 volts
High = 3.0 to 5.0 volts

SIGNAL	PIN	DESCRIPTION
LD0	2	INPUT/OUTPUT: Address/Data line 0 (LSB).
LD1	3	INPUT/OUTPUT: Address/Data line 1.
LD2	5	INPUT/OUTPUT: Address/Data line 2.
LD3	6	INPUT/OUTPUT: Address/Data line 3.
LD4	8	INPUT/OUTPUT: Address/Data line 4.
LD5	9	INPUT/OUTPUT: Address/Data line 5.
LD6	11	INPUT/OUTPUT: Address/Data line 6.
LD7	12	INPUT/OUTPUT: Address/Data line 7. (MSB)

LWE*	14	OUTPUT (Write Enable): This signal is active when the AIM is writing to the ICB.
LDS*	16	OUTPUT (Data Strobe): Used to latch the data into a slave during a write cycle or gate the data onto the bus during a read cycle.
LAS*	18	OUTPUT (Address Strobe): Used to latch the address which the AIM is accessing from the slave unit.
LSRQ*	20	INPUT (System Request): This signal is set when the slave requires service from the AIM. High level > 3.5 V.
GND	1, 4, 7, 10, 13, 15, 17, 19	DC common for all interface signals.

B.4 Ethernet Interface Connector

The AIM, which is capable of operating with any IEEE 802.3-compliant Ethernet transceiver, uses this 15-pin connector for the electrical interface to the Ethernet transceiver cable (AUI).

Pin	Signal	Function
1, 4, 6, 11, 14	GND	Common dc line for all interface signals.
2 9	ECLN+ ECLN–	COLLISION PAIR: A differentially driven input pair tied to the collision-presence pair of the Ethernet transceiver cable. The collision-presence signal is a 10-MHz square wave.
3 10	ETRMT+ ETRMT–	TRANSMIT PAIR: A differential output driver pair that drives the transmit pair of the transceiver cable.
5 12	ERCV+ ERCV–	RECEIVE PAIR: A differentially driven input pair which is tied to the receive pair of the Ethernet transceiver cable.
13	E12V	+12 volt output supplying power to the Ethernet Transceiver.
7, 8, 15	NC	No connection.

B.5 NIM Power Connector

+24 V . . . . pin 28
+12 V . . . . pin 16
–12 V . . . . pin 17
+6 V . . . . pin 10
Power return to ground . pin 34

C. Setup Diagrams

These diagrams, which include several of the more common systems, are provided to help you set up a system using the 556 AIM.

C.1 Typical ICB Bus Installation

Figure C.1 shows a single-input system with a Model 556 AIM controlling the Models 9635, 9615 and 9645.

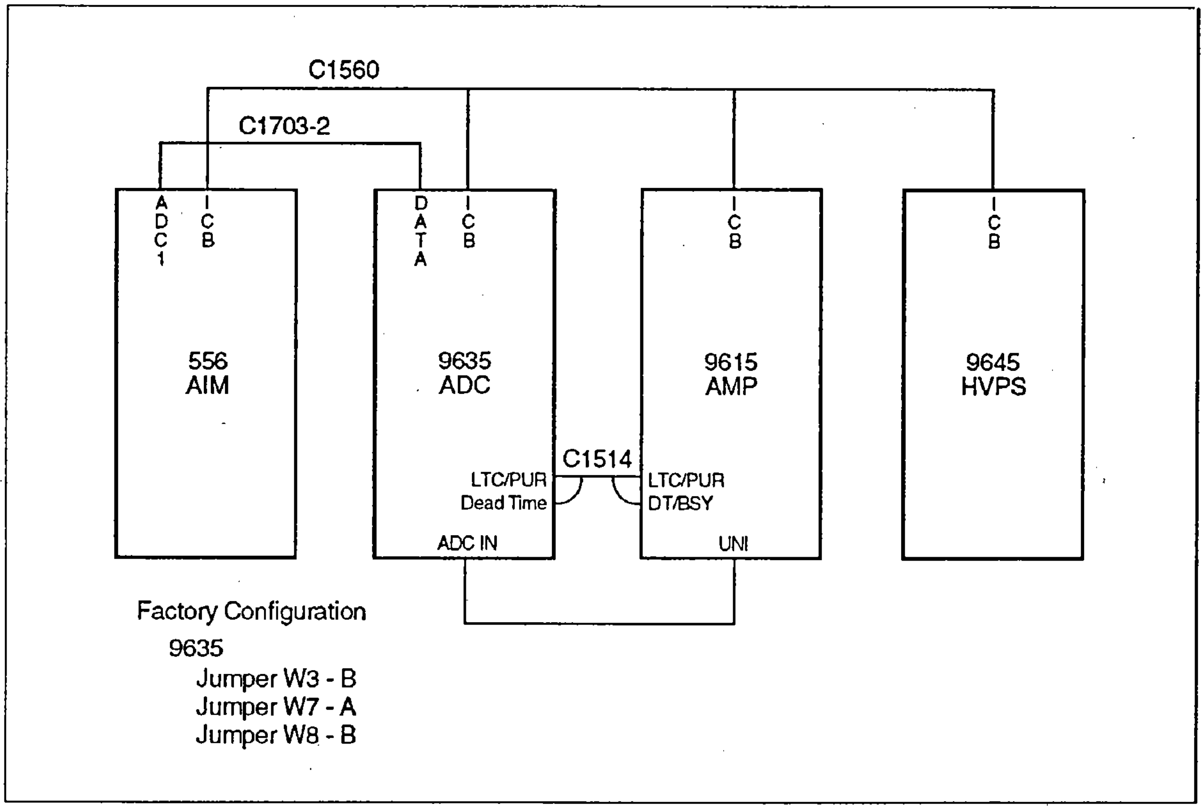


Figure C.1 Typical ICB Bus Installation

C.2 Multiple 556 AIMs in a Network

Figure C.2 shows a system employing several AIM modules in a network, each controlling more than one ICB ADC.

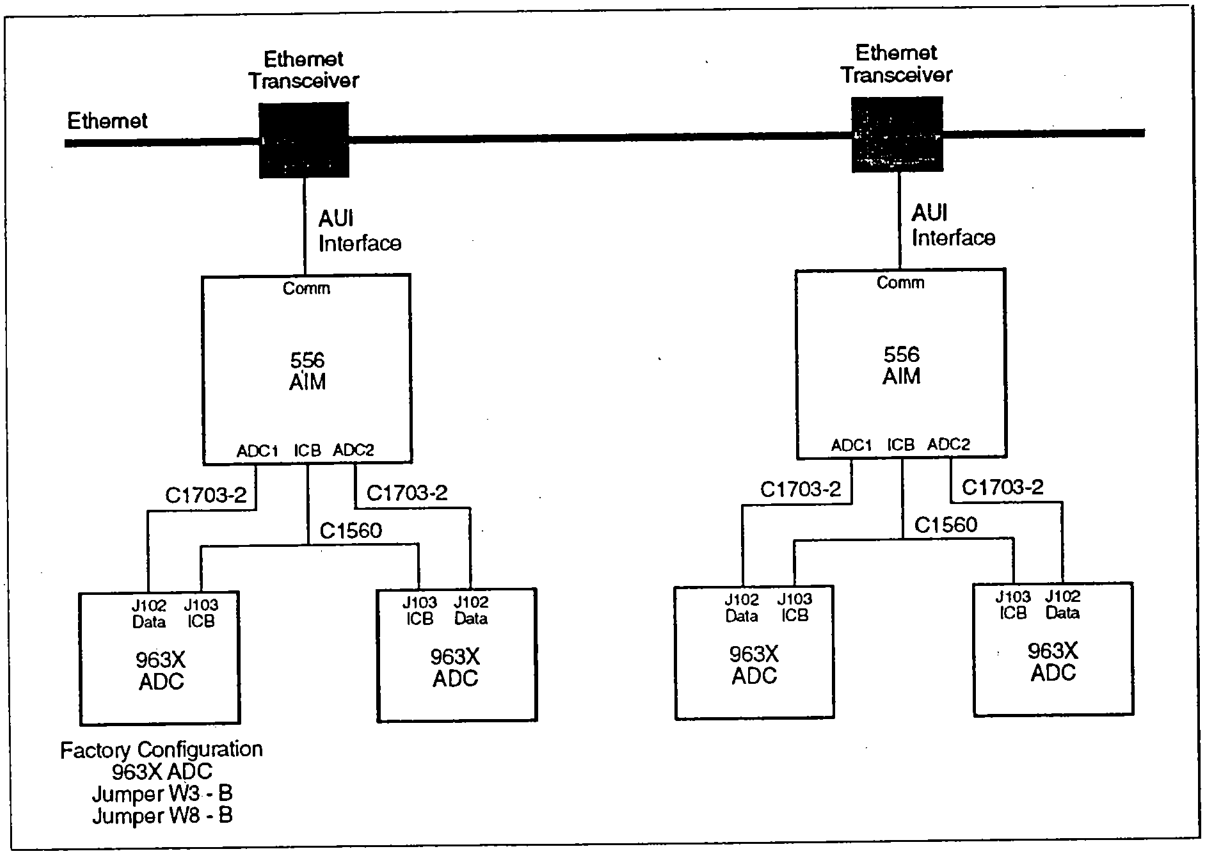
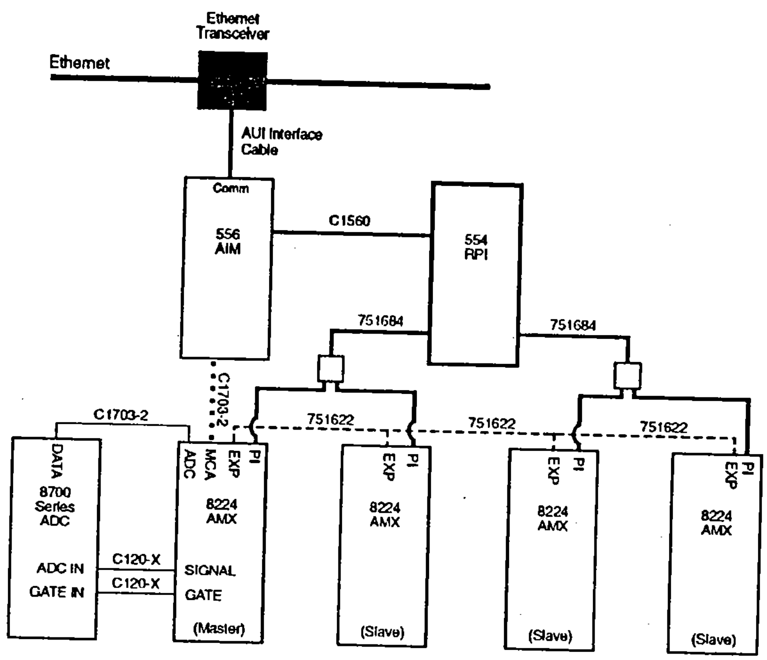


Figure C.2 Multiple 556 AIMs in a Network

C.3 556 AIM with 554 RPI and AMX Modules

Figure C.3 shows a multi-input system implemented with a 556 AIM module and 554 RPI and AMX modules.



••••• **AIM-AMX Connection**
Each AIM is supplied with two C1703-2 Interface Cables.

——— **ADC-AMX Connections**
Each 8224 AMX is supplied with one C1703-2 Interface Cable.

The C120-X Coax Cables for the Signal and Gate connections must be purchased separately.

----- **AMX Master-Slave Connection**
Each slave requires a 751622 Expansion Cable, which must be purchased separately.

——— **Independent Start/Stop for the 8224 AMXs**
This option requires the purchase of a Model 554 Remote Parallel Interface (RPI) and at least one 751684 cable assembly. Each 751684 Cable Assembly supports two 8224s and each RPI supports 2 such cable assemblies. If independent start/stop is not required, 8223 AMXs may be substituted.

Note: The number and type of AMX modules supported is limited by the software platform being used. Please refer to the appropriate manual for information.

Internal Jumpers

8223
W1 - Installed
W2 - B
Internal Switches set for Group Size, Number of Inputs, etc. Refer to 8223 Manual.

8224
J1 - ENC*
W1 - Removed
W2 - Installed
Internal Switches set for Group Size, Number of Inputs, etc. Refer to 8224 Manual.

8701
J1 - ENC*
J3 - NEG
J8 - B
PHA/SVA - SVA
AUTO/DELAYED - Delayed
COINC/ANTI - Coinc
ADJ - Full CCW

8706
J4 - B
J5 - ENC*
J9 - NEG
PHA/SVA - SVA
AUTO/DELAYED - Delayed
COINC/ANTI - Coinc
ADJ - Full CCW

8713/8715/9633/9635
W3 - B
W8 - B
PHA/SVA - SVA
AUTO/DELAYED - Delayed
COINC/ANTI - Coinc
ADJ - Full CCW

96XX ADC can be Substituted with the Addition of the ICB Cable C1560 Connection.

Figure C.3 556 AIM Setup with 554 RPI

Warranty

This warranty covers Canberra hardware and software shipped to customers within the United States. For hardware and software shipped outside the United States, a similar warranty is provided by Canberra's local representative.

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