

Technical Bulletin

MiniARMOR-700

Miniature Asynchronous Real-Time Multiplexer & Output Reconstructor
Airborne Data Acquisition Products



FEATURES

- Multiplex High Rate Data Sources
 - PCM
 - Avionics Bus
 - Parallel Digital Data
 - Voice/Time
 - Video
 - Analog
- Reconstruct High Rate Data
 - During Playback or Real Time Record
 - Channel-to-Channel Coherency
- Recorder Capability
 - Aydin ATD-800-II
 - AMPEX DCRsi™*
 - AMPEX DIS™* 120/160
 - Metrum B-VLDS/VLDS-BR
 - Metrum 32/64 HE
 - L-3 S/TAR™**
- Airborne and Ground Versions
 - Plug-In Card Modularity
 - Programmable

APPLICATIONS

- Aircraft Flight Test
- Aircraft Static Test
- Aircraft Fatigue Test
- Ground Vehicle Test
- Wind Tunnel Test
- Surveillance Systems
- UAV Video Recording
- Monitor Heads Up Display
- Monitor Cockpit Display
- Monitor Dynamic Conditions
- Captive Carry Flutter
- Missile Launch
- Target Scoring
- Radar Data
- Satellite Data



communications

SYSTEM DESCRIPTION

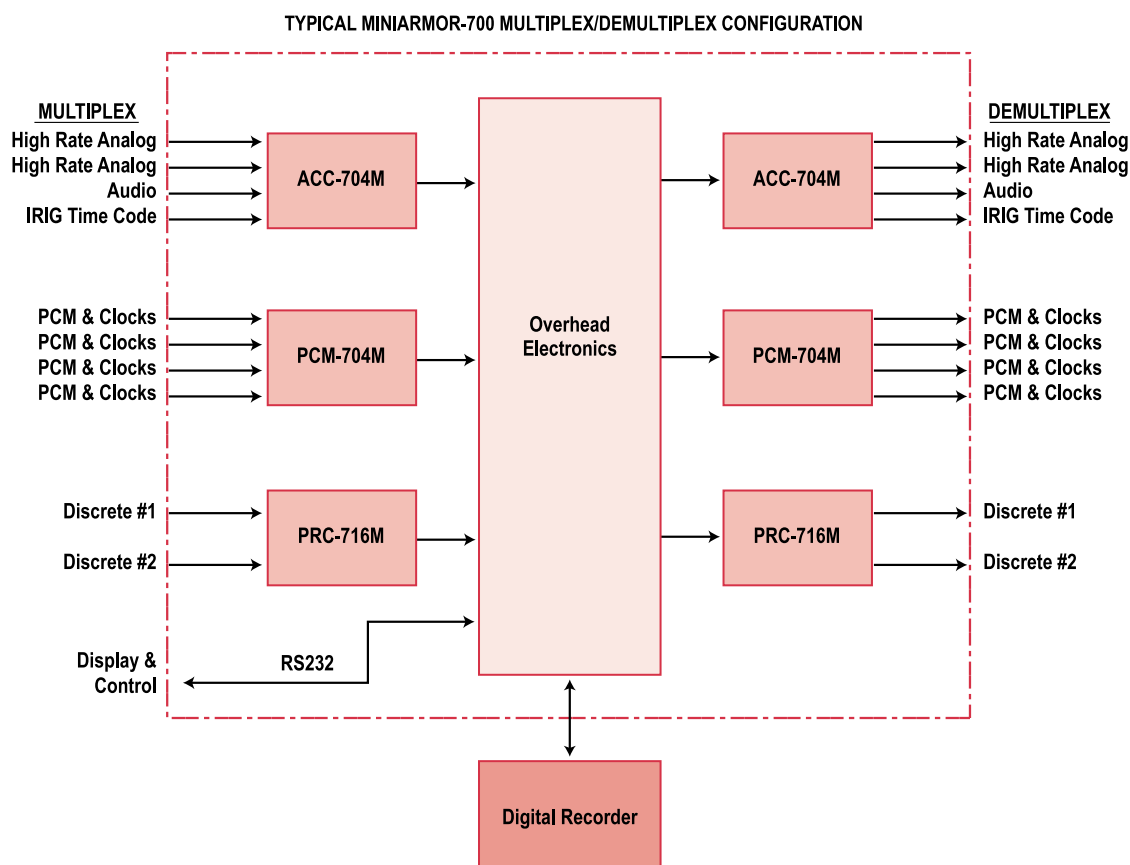
The MiniARMOR-700 is a high speed data multiplexer and reconstructor, capable of interfacing many asynchronous data sources to a high speed digital recorder. The system is capable of operation rates up to 240 Mbits/sec depending on the type of recorder used.

The MiniARMOR-700 architecture provides buffering for each input data source providing totally asynchronous operation among the various input channels. Any mixture of low rate and high rate channels can be accommodated by a single configuration.

The MiniARMOR-700 operates either under the control of host computer, or in a standalone configuration by the use of a control panel. The system is fully programmable and can be hosted by an IBM compatible computer via the built-in RS-232/422 COM port. Windows®*** based setup and configuration software is provided allowing full access to all system control and status by a non-technical operator.

The MiniARMOR-700 chassis is available in 7 slot, 9-slot, and 11-slot sizes depending on the desired number of plug-in cards. Laboratory versions are also available which have 15 and 18 slots (LabARMOR-715/718). All airborne versions contain DC-to-DC power supplies which operate from a 28 volt source. The laboratory version operates from 120/240 VAC, 50-400 Hz.

All of the circuitry within the MiniARMOR-700 family has been designed to be power efficient. Internal self-heating has been minimized to allow complete freedom in the selection and placement of cards within the chassis. The MiniARMOR-700 is housed in a ruggedized, miniaturized chassis which is suitable for application in harsh environments. The LabARMOR-715 and 718 are standard 19" rack assemblies.



APPLICATION NOTES

A series of application notes is available for the MiniARMOR and all related products. These notes are available by contacting L-3 Communications Telemetry-East by phone, FAX or e-mail. These notes cover such topics as:

- MiniARMOR-700 Product Selection Guide
- Interfacing the Aydin Vector Division ATD-800-II
- Interfacing the AMPEX DCRsi™ 107
- Interfacing the AMPEX DCRsi™ 107/240
- Interfacing the AMPEX DCRsi™ 75
- Interfacing the Metrum B-VLDS/VLDS-BR
- Tape Duplication and Dubbing
- Extended Record Configurations (Cascading)
- Diagnostic Test Methods
- Manual Remote Control
- Environmental Guidelines
- Thermal Considerations: MiniARMOR-700

SOFTWARE

MiniARMOR software for Windows® is an icon/toolbar based environment that provides convenient control of the acquisition features of the MiniARMOR-700 system. Programming experience is not necessary.

Hardware configuration can be defined in a matter of seconds. Individual setup and control pages allow tailoring each plug-in card to the particular requirements at hand. The graphical, intuitive approach to programming allows non-programmers to start collecting data within minutes of installation.

Windows®-based MiniARMOR software runs on an IBM PC/AT computer operating in the Windows® 3.1/95 environment or in a Windows® 3.11 NT network configuration. The host computer and MiniARMOR-700 communicate through a standard serial link (RS-232 or RS-422). All configuration information is stored in non-volatile memory within the MiniARMOR.

SYSTEM CONFIGURATION

The MiniARMOR-700 can be configured to meet a wide variety of applications. A customer with specific mission requirements may require a dedicated MiniARMOR-700 configuration which exactly meets a list of needs. However, another user may want a MiniARMOR-700 which has been configured for maximum flexibility. Many users need a system which can be changed rapidly to handle a wide variety of measurement scenarios. The MiniARMOR-700 can easily accommodate this situation through field reconfiguration and reprogramming.

The MiniARMOR-700 can be retrofitted with the latest cards and features available within the product family. As new recorder interfaces and new data source interfaces are developed, the cards for these functions can be retrofitted into existing MiniARMOR-700 applications. In addition, special interface needs can be met using L-3 Communications Telemetry-East's support in the areas of system design, integration and development.

HOW TO CONFIGURE THE MINIARMOR-700

A MiniARMOR-700 configuration can be defined using four simple steps:

Input Definition:

List the various data input types and the quantity of each type. Select the inputs based on the types of cards available for the MiniARMOR-700 system. If a large number of analog or digital channels are required, consider encoding these through a PCM Encoder product prior to multiplexing by the MiniARMOR-700 (see L-3 Communications Telemetry-East Encoder product literature). Typical MiniARMOR-700 input multiplexer cards include:

- | | |
|---------------------------|-------------------|
| ■ PCM | PCM-704M |
| ■ Daughter Boards | |
| □ Bit Synchronizer | BSC-714M |
| □ Video VED-701 | |
| ■ Avionics Bus (1553/PCM) | BRC-704M |
| ■ Parallel Digital Data | PRC-716M/PRC-724M |
| ■ Wideband Analog | ACC-704M/ACC-714M |
| (Voice, Time Code etc.) | |

HOW TO CONFIGURE THE MINIARMOR-700 (continued)

Output Definition:

The MiniARMOR-700 can be used to reconstruct some or all of the original data sources. The original timing, signal level, and inter-channel correlation is fully maintained during this process. Decide what input data must be reconstructed and choose the appropriate reconstructor card(s). Typical output reconstructor cards include:

■ PCM	PCM-704D/PCM-714D
■ Daughter Boards - Video	VED-701
■ Avionics Bus (1553/PCM)	BRC-704D
■ Parallel Digital Data	PRC-716D/PRC-724D
■ Wideband Analog	ACC-704D/ACC-714D
Voice, Time Code etc.)	

Recorder:

The MiniARMOR-700 can be configured to interface with many types of digital recorders. Each type of recorder requires a different MiniARMOR-700 controller card as follows:

■ AMPEX DCRsi™ (107 & 240)	CTL-710
■ AMPEX DIS™ (120/160)	CTL-715
■ L-3 ATD-800-II	CTL-720
■ Metrum VLDS-BR	CTL-730
■ Metrum B-VLDS	CTL-735
■ L-3 S/TAR™	CTL-710S

Some of the criteria used in selecting the recorder include bandwidth, data capacity, cost (acquisition and maintenance), availability, and environment.

Final Configuration:

A MiniARMOR-700 chassis is selected based on the total number of plug-in cards. The basic MiniARMOR-700 chassis must have the following card types:

- MDX-700 Card (overhead - comes with the chassis)
- Controller Card (1 or 2 cards - specify at time of order).

The MiniARMOR-700 chassis may contain any combination of the following card types:

- Input Cards ("M" suffix - specify at time of order)
- Output Cards ("D" suffix - specify at time of order)

There are three chassis sizes for the airborne MiniARMOR-700 configuration, and two chassis size for the laboratory configuration. These vary in their card capacity as follows:

■ MiniARMOR-707	7 Card Slots
■ MiniARMOR-709	9 Card Slots
■ MiniARMOR-711	11 Card Slots
■ LabARMOR-715	15 Card Slots
■ LabARMOR-718	18 Card Slots

Before making the final selection, the size and weight of the MiniARMOR-700 should be checked to insure compatibility with the application.

Example: A MiniARMOR-707 has seven (7) slots available for plug-in cards. The MDX-700 and CTL-7XX cards occupy two (2), leaving five (5) additional slots for various input/output cards.

MINIARMOR-700 SPECIFICATIONS

Configurations

Basic Chassis:

Contains power supply, internal motherboard, and MDX-700 overhead card.

Record Only:

Includes Basic chassis plus one or more controller cards (CTL7XX) based on the type of recorder, and one or more input multiplexer cards (PCM-704M, ACC-704M, etc.).

Playback Only:

Includes Basic chassis plus one or more controller cards (CTL-7XX) based on the type of recorder, and one or more output reconstructor cards (PCM-704D, ACC-704D, etc.). The set of reconstructor cards does not necessarily have to match the configuration used for recording.

Record/Playback:

Includes Basic chassis plus one or more controller cards (CTL-7XX) based on the type of recorder, one or more input multiplexer cards (PCM-704M, ACC-704M, etc.), and one or more output reconstructor cards (PCM-704D, ACC-704D, etc.). The set of reconstructor cards does not necessarily have to match the set of multiplexer cards.

Compatibility

Operating Mode:

The MiniARMOR-700 supports 3 modes of operation; Compatible Mode, Enhanced Compatible Mode, and Enhanced Mode.

Compatible Mode:

Compatible with the Calcuex ARMOR systems providing a maximum system data rate up to 128 Mb/s/sec.

Enhanced Compatible Mode:

Used to retain speed and acquisition data rates compatible with the Calcuex ARMOR systems while allowing some enhanced features to be used (e.g. Time Coding).

Enhanced Mode:

Used to expand the maximum data rates beyond those of the Calcuex ARMOR system and to provide new features such as Time Code. The maximum system data rate is up to 240 Mb/s/sec.

MINIARMOR OVERHEAD FEATURES

Overhead Card:

MDX-700 Multiplexer/Demultiplexer card. Provides internal system clocks necessary for operation, and provides an IRIG-AC/DC time code interface.

Maximum Data Rate:

The MDX-700 Multiplexer/Demultiplexer card supports operation at rates up to 240 Mb/s/sec. The maximum operating rate is based on the Controller card used in the chassis (CTL-7XX) and the type of recorder in use.

Diagnostics:

Provided on individual controller cards by test points on the card, test points on the interface connector, and by way of RS-232 query using the host computer interface. Refer to individual card data sheets for additional information.

Loopback Testing:

A "Loop Mode" is provided which allows the input card data stream to be fed directly to the output data card data stream.

Format Memory:

Format and previous setup parameters are stored in non-volatile memory. This supports identical formats in the Multiplexer and Demultiplexer and thus simplifies operation.

TIME CODE INTERFACE

Function:

The MiniARMOR-700 supports IRIG Time insertion into the data stream in all operating modes except for the "Compatible Mode."

IRIG Time Input:

IRIG-A, IRIG-B, or IRIG-G; AC or DC.

DC Time Monitor:

An IRIG-A, IRIG-B, or IRIG-G, DC output is provided for monitoring or cascading purposes. It is an unmodulated output having the same time format (A, B, or G) as the time input.

Time Output during Playback:

During tape playback, the MDX-700 captures the IRIG time values from tape and place them in hardware status registers which may be accessed by the user. This information can be used to develop a catalog for each recorded tape which correlates the IRIG frame time for each block of data on tape. Alternatively, the contents of these registers can be steered to a parallel output card (PRC-716D) for playback monitoring or data search purposes.

Some users may prefer to acquire IRIG time using one of the ACC-704M channels. The original time signal can be reconstructed using the ACC-704D.

Resolution:

High Time: BCD Days, Hours and Minutes (16 bits)

Low Time: BCD Sec and Tens of Sec (15 bits)

Micro Time: Binary microseconds (14 bits)

ENVIRONMENTAL

Environmental Specifications for the MiniARMOR unless otherwise specified.

Operating Temperature Range:

MiniARMOR: -35°C to +70°C

LabARMOR: 0°C to +50°C

Storage Temperature Range:

MiniARMOR: -55°C to +100°C

LabARMOR: -10°C to +70°C

Random Vibration:

15 to 2,000 Hz; Overall 10 Grms.

Shock:

25 g, half sine, 11 mSec.

Altitude:

+80,000 feet.

Acceleration:

11 g continuous, any axis.

Humidity:

0 to 90% RH, non-condensing.

Bench Handling:

MIL-STD-810, Procedure VI

4 drops per face.

SIZE, WEIGHT AND MECHANICAL

Dimensions:

MiniARMOR-707: 5.35"H x 7.5"D x 7.7"W
 MiniARMOR-709: 5.35"H x 7.5"D x 9.2"W
 MiniARMOR-711: 5.35"H x 7.5"D x 10.7"W

Weight:

MiniARMOR-707: 10.25 pounds
 MiniARMOR-709: 11.90 pounds
 MiniARMOR-711: 13.55 pounds

Connectors:

J1 (Input power): MS27508E8F35P
 J2 (DC Time): DE-9S
 BNC (AC Time): BJ-213

Mating Connectors:

P1 (Input power): MS27484T8F35S
 P2 (DC Time): DEMAM-9P
 BNC (AC Time): BNC Bayonet, 3-lug

Card Slot Allocation:

A complete family of I/O cards and controllers is available for use with the MiniARMOR-700. The MDX-700 must be placed into the last slot of the chassis.

Mounting:

Flange mount using six (6) 0.189" DIA. holes.
 Refer to MiniARMOR-700 Outline Drawing.

Thermal:

The MiniARMOR-700 uses convection and conduction as the primary means for cooling. The installation interface should be a metallic surface with a maximum temperature of +70°C. Convective cooling air should be provided if available.

POWER REQUIREMENTS

Input Voltage:

MiniARMOR-700: +28VDC $\pm$ 4VDC.
 Reverse polarity protection is provided.

Power supply:

All versions of the MiniARMOR-700 use the same type of power supply. The following power is available for the MDX-700 card, the CTL-7XX card(s), and all I/O cards within the system:

+5V @ 10A
 -5V @ 5A
 $\pm$ 12V @ 4.5A
 $\pm$ 15V @ 4A

Power Consumption:

The MiniARMOR-700 power consumption is based on the system configuration. An empty chassis which contains only the MDX-700 card consumes 12 watts from the +28 volt supply. Additional power is required for the other cards within the chassis. Refer to the data sheets for the individual plug in cards for additional power consumption information.

ORDERING INFORMATION

Basic Models

7-slot chassis with MDX-700 and Power Supply

9-slot chassis with MDX-700 and Power Supply

11-slot chassis with MDX-700 and Power Supply

Model No.

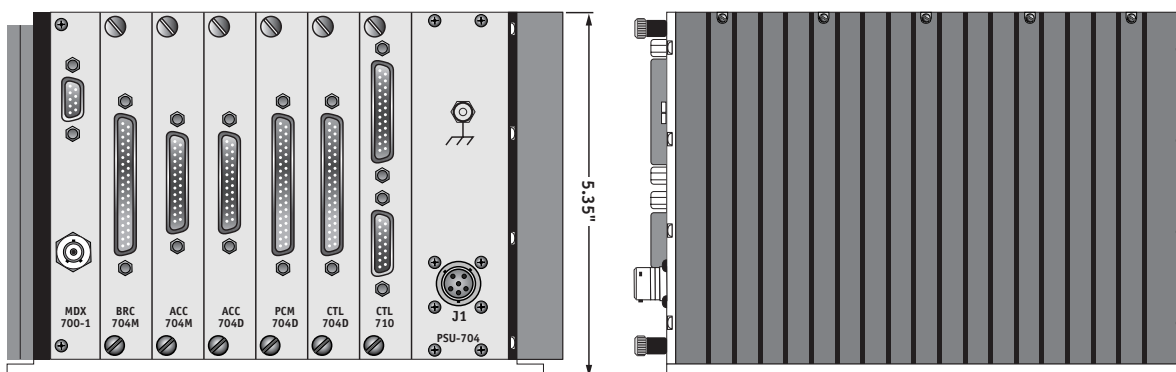
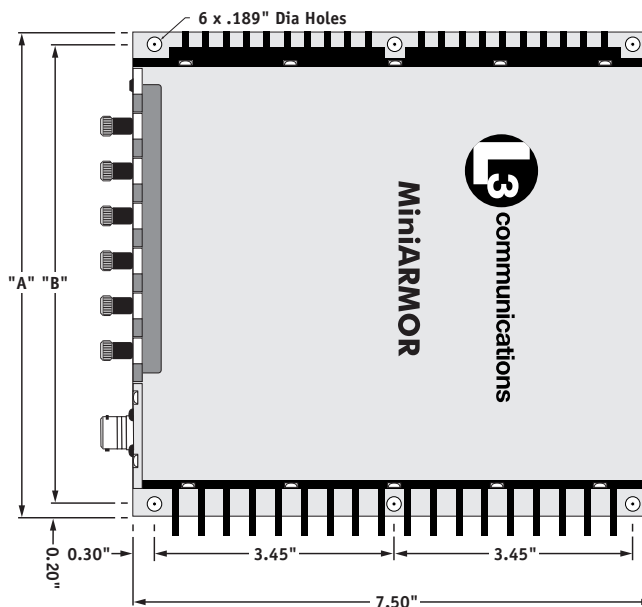
MiniARMOR-707

MiniARMOR-709

MiniARMOR-711

MiniARMOR-700 Outline Drawing

PHYSICAL SPECIFICATION				
Unit Type	Numbers of Slots	Weight (Pounds)	Dim "A"	Dim "B"
707	7	10.25	7.70	7.30
709	9	11.90	9.20	8.80
711	11	13.55	10.70	10.30



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