Technical Bulletin

MPC-800 Series II

Miniature Programmable Signal Conditioning and Encoder

Airborne Data Acquisition Products

FEATURES

- CAIS and 10WIF Compatible
- Modular Design with Integral Signal Conditioning
- Small Size, Light Weight, Low Cost
- Fully Programmable
- Missile and Fighter Aircraft Applications
- Operation to 5 or 10 Mbps
- Resolution to 12 Bpw
- Accuracy ± 0.5% Standard - Over Complete Environments (Optional Accuracies Available)
- System Programming via ADASWARE or VistaTEC
- Military Screening and Parts Levels Available
- Standalone or Master/Slave Operation including integration with PCU-800 or MMSC-800

GENERAL FEATURES

The MPC-800 is a data acquisition system component providing all the signal conditioning and encoding functions, where size, performance, and cost are critical and the environmental conditions are severe. Based on over 35 years of Signal Conditioning, PCM Encoding and Data Acquisition experience, L-3 Communications Telemetry-East has designed the MPC-800 to combine all of the most commonly required functions in a very small modular package. The unit is constructed from stackable conditioning and overhead modules which contain discrete, thick-film hybrid, and custom ASIC circuit technologies, The design approach minimizes size and weight, improves survivability in extremely hostile environments, and minimizes cost.

L3 communications

GENERAL FEATURES

PCM Encoder

The design philosophy of the MPC-800 is based on the extremely successful MMSC-800 product line with a unique packaging approach to make the unit more cost effective. The functional building blocks of the MMSC-800 have been re-partitioned and repackaged in the MPC-800 to meet the most commonly encountered requirements for experimental, tactical, and operational aircraft and missiles. Utilizing modular architecture, the MPC-800 can be configured to meet the exact needs of any flight test program and still allows the user the ability to reconfigure the unit in the field to adapt to changing mission requirements. Full programmability of gains, offsets, filter cutoffs, and channel sampling rates is offered with a software package that offers a friendly Graphical User Interface (GUI).

The MPC-800 and its library of data input modules is the functional building block of a Distributed Data Acquisition System operating as a Standalone Encoder or in Master/Slave configurations. In addition to configurations implemented using the MPC-800 alone, the MPC-800 may be integrated with the L-3 T-E PCU-800 in large system configurations allowing for installation of slave encoders in closer proximity to the sensors to be monitored which provides enhanced performance as well as reduced cabling requirements.

Signal Conditioning

The MPC-800 meets the challenge of today's marketplace by offering a complete family of signal conditioning modules to accept inputs from sensors and subsystems. Some of these modules are described in this data sheet. The types and features of these conditioners are continuously expanding as new modules are developed. Please consult the factory for a complete list of the currently available modules.

Custom modules can be created for unique measurement requirements.

Both analog and digital signal conditioning modules are available for virtually any sensor. Analog sensors include the following:

- Bridges and bridge type devices
- AC and DC voltage inputs
- Potentiometers
- Accelerometers
- Resistive Temperature Devices
- Thermocouples

A wide range of analog signal conditioning features are available depending on the type of sensor to be monitored and therefore the type of signal conditioning module selected. Modules are available with the following features:

- Excitation
  Constant Voltage
  Constant Current
  Multiplexed Constant Current
- Programmable Gain and Offset
- Pre-sample filtering
  Fixed frequency cutoff
  Programmable frequency cutoff
- Calibration
- Simultaneous Sampling
- Input attenuation or filtering
- Bridge completion

A wide variety of digital input data can be accommodated through the selection of the appropriate signal conditioning modules. The following types of digital modules are available.

- Synchro/Resolver Inputs
- Discrete (single ended or differential)
- Isolated Discrete
- Serial Digital
- Frequency or Period
- Timed Event
- ARINC 429 Bus Monitor
- 1553 Bus Monitor

MPC Programming Software

The MPC-800, as in the initial design, is user program-mable via ADASware Programming Software, a Windows®-based software package providing the user the flexibility of a file based soft-ware package which allows all MPC operational parameters to be stored as desired under a file name defined by the user.

In addition to ADASware, MPC-800 programming and system configuration management is available though the use of Vista TEC the latest software development of L-3 Communications Telemetry-East.

VistaTec provides the following programmable functions:

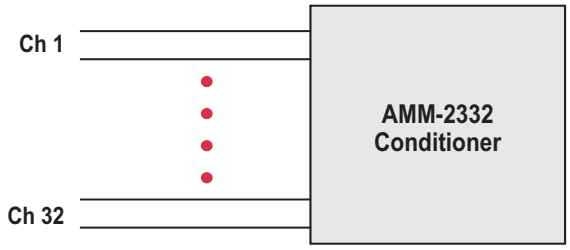
- Measurement Definition Management
- End-to-End Calibration
- Automatic Telemetry Frame Format Population
- Relational Database
- Airborne Hardware Setup
- Ground Hardware setup and Control - Ground Systems and Telemetry Receivers
- Project Manager
- Alarm Detection and Event Reporting and Logging
- Real-Time Data Archiving
- Real-Time Algorithm Processing
- Software Packet and Frame Decommutator
- Real-Time Data Displays - DataScope/DataViews/ SL-GMS/GLG
- Data Distribution
- Avionics Bus Management and Analysis
- Applications Programming Interface (API / SDK)
- Post-Processing Application (e.g., Matlab) Interface

Vista is implemented on Microsoft Windows NT or UNIX platforms. In addition the Vista TEC plug-in is downward scalable for operation on the current Windows operating systems: 95, 98, ME 2000 and XP.

ANALOG CONDITIONING MODULES

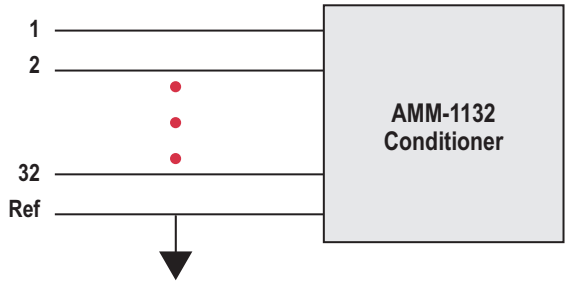
AMM-2332 Analog Multiplexer

This module provides thirty-two channels of analog multiplexing with twenty -four gains and adjustable offset for each channel.



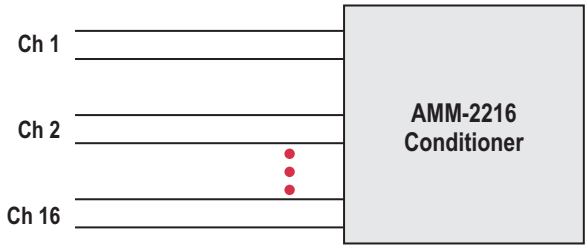
AMM-1132 - Single- Ended Analog Multiplexer

Up to 32 single ended analog inputs are accepted using this module. The maximum input is set via factory installed resistors. Specify input requirements at time of order. Additionally, software programmability of secondary gain and offset are provided on a channel by channel basis.



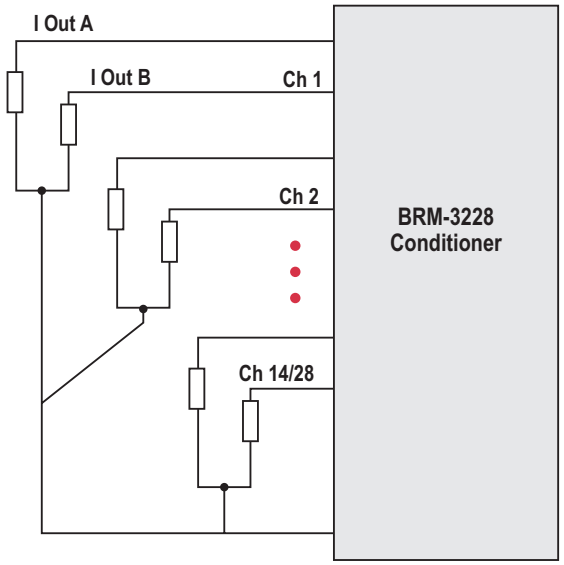
AMM-2216 Differential Analog Multiplexer

Up to 16 differential analog inputs are accepted using this module. The maximum input is set via factory installed resistors. Specify input requirements at time of order. Additionally, software programmability of secondary gain offset are provided on a channel by channel basis.



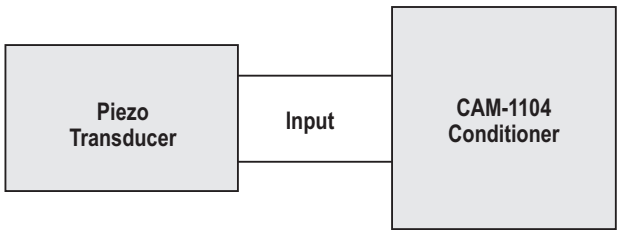
BRM 3228 - RTD Conditioner and Multiplexer

This module provides conditioning and multiplexing for up to 28 Resistive Temperature Devices or Potentiometers. A precision, dual-tracking, multiplexed, constant-current source is used to provide an extremely high accuracy measurement with no self heating errors. The constant current value is selectable for 1.25, 2.5, 3.75, or 5.0 mA per module which allows complete flexibility for various sensor resistances. Four user selectable gains are offered in addition to software programmability of secondary gain and offset on a channel by channel basis.



CAM-1104 - Piezoelectric Accelerometer Conditioner

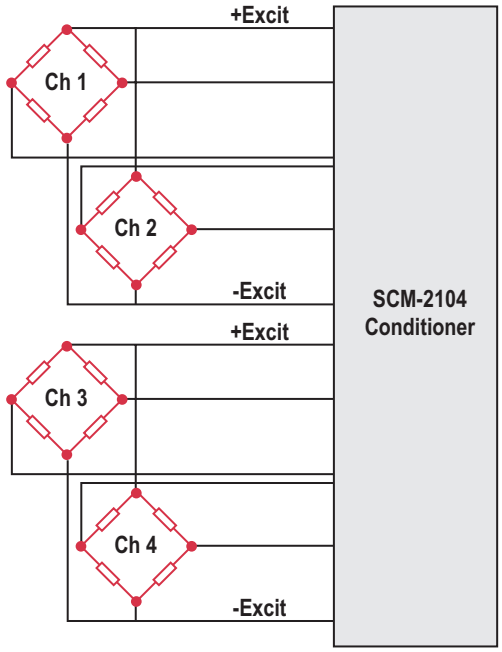
This module accepts inputs signal directly from up to 4 Piezoelectric Accelerometers and performs software programmable charge conversion and six pole pre-sample filtering. Additionally, software programmability of secondary gain and offset are provided on a channel by channel basis.



ANALOG CONDITIONING MODULES

SCM-2104 Bridge Conditioner

This module provides a 4 channel bridge conditioner. Each channel has 8 programmable gains, programmable offset, and 6-pole Butterworth filter. There is a ±5 Volt 40 mA maximum, constant voltage source per 2 channels when used with the EPM-802 module. Zero calibration is provided.



SCM-2204 Bridge Conditioner with S/H

The same features as the above SCM-2104 except each channel has its own software programmable sample/hold amplifier for simultaneous sampling.

SCM-2204A Bridge Conditioner with S/H

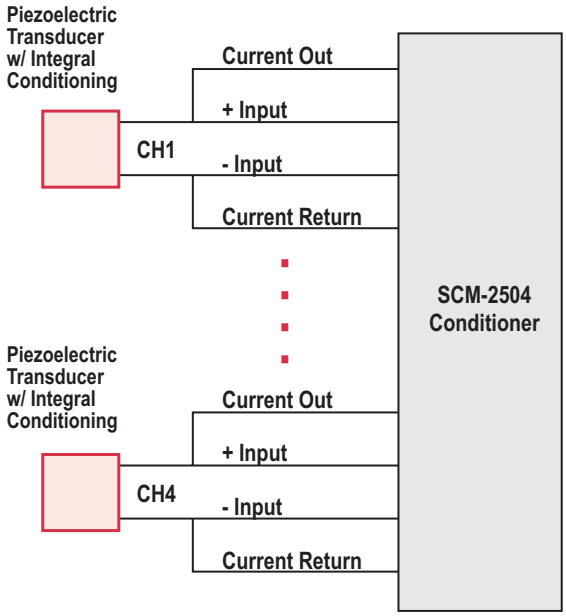
The same features as the above SCM-2104 except each channel has it's own externally controlled sample/hold amplifier for simultaneous sampling.

SCM-2204B AC Coupling Modules

This module works in conjunction with the SCM-2104, SCM-2204 or SCM-2204A to provide an AC coupled input with a 1 pole passive high pass filter.

SCM-2504 Accelerometer Conditioner

This module will condition up to 4 piezoelectric accelerometers with integral conditioning (low impedance devices). The module provides constant current excitation, 8 programmable gains and offset, and a factory set 6-pole low pass filter. Additionally, software programmability of secondary gain and offset are provided on a channel by channel basis. AC coupling with active offset correction is also provided.



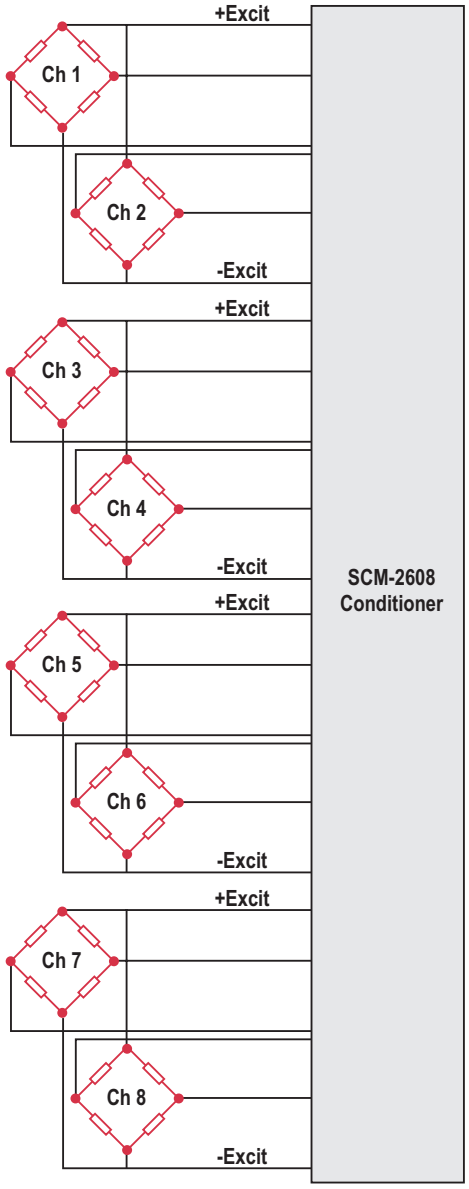
SCM-2804 Accelerometer Conditioner

The same features as the above SCM-2204 except inputs are DC coupled.

ANALOG CONDITIONING MODULES

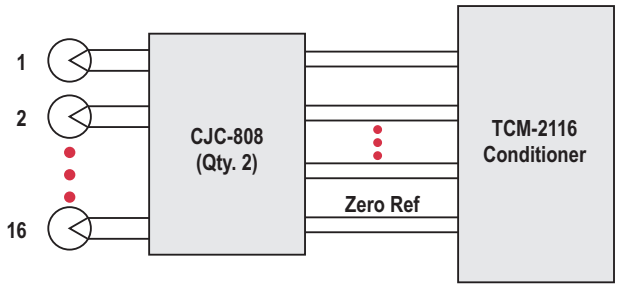
SCM-2608 Channel Bridge Conditioner

This module provides an 8 channel bridge conditioner. Each channel has 4 programmable gains, programmable offset, and a factory set 2-pole Butterworth filter. There is a ± 5 Volt 40 mA maximum constant voltage source per 4 channels when used with the EPM-802 module. Zero calibration is provided.



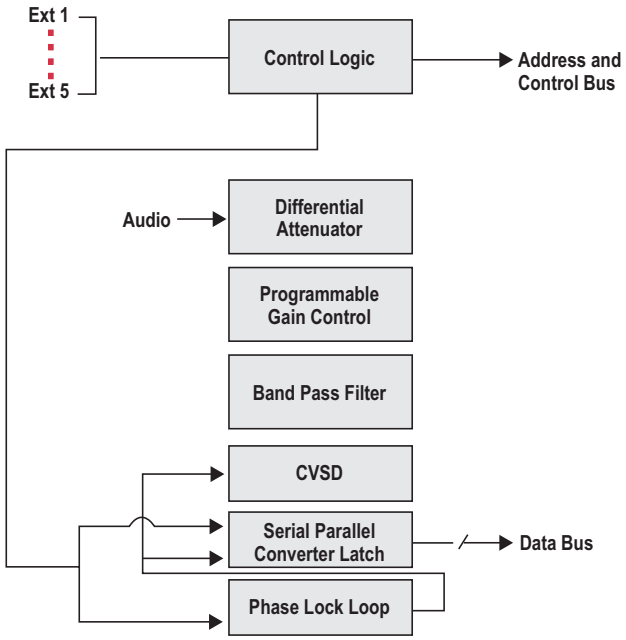
TCM-2116 Thermocouple Conditioner

This module provides conditioning for up to 16 thermocouple signals. Two external Aydin Vector CJC-808 Isothermal Reference Junction blocks are provided to convert from thermocouple material to copper wire. The conditioning module monitors the temperature of the reference junction block, multiplexes the copper inputs, and corrects for the temperature of the reference block. Secondary programmable gain and offset are provided for individual thermocouple scaling.



VCM-2102 Voice Conditioner

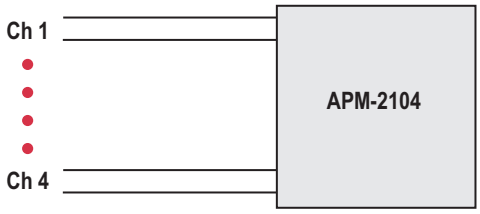
This module is a two channel voice conditioner which acquires analog voice and digitizes it using the Continuous Variable Slope Delta (CVSD) modulation technique. It has four user-selectable input ranges, an input band pass filter, and operates between 10 and 40 Kbps.



DIGITAL CONDITIONING MODULES

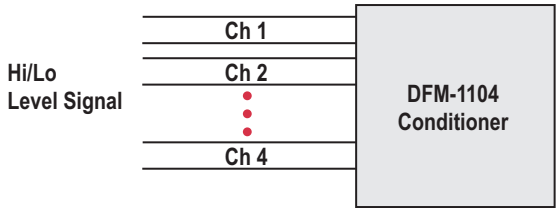
APM-2104 Frequency/Period Counter

This module has four input channels, each providing a 16 bit counter that can be read as 1-3 words in the PCM stream. Each channel operating mode can be individually programmed to perform as a period counter, a frequency counter, or as a totalizer.



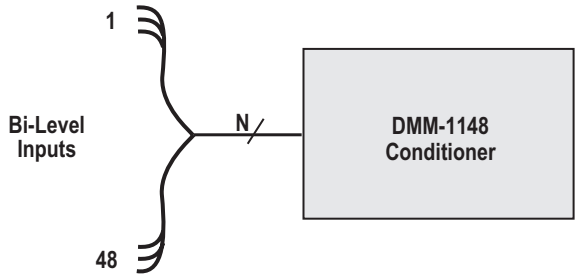
DFM-1104 Digital Frequency Module

This module contains four frequency counters with up to 12 bit resolution (4095). It accepts low level inputs directly such as frequencies, pulse inputs, fuel-flow and RPM. Operation is user selectable for reset on “read”’ “accumulate”, or “external command”. Channels can be cascaded in groups of two for operation with two channels having a resolution of up to 24 bits.



DMM-1148 Digital Bi-Level

This Bi-Level multiplexer accepts up to 48 discrete (one bit) inputs. The module provides threshold detection for these inputs. The data is passed to the interface modules as four words of up to 12 bits each, dependent on the system word length. Bit 1 is the MSB and the first bit transmitted in the PCM data stream.

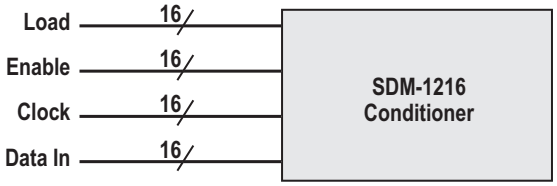


DMM-1148A Digital Bi-Level

The same features as the above DMM-1148 except that each word (12 bits) is jumper selectable to pull up or down configuration.

SDM-1216 Serial Digital Multiplexer Module

Provides 16 channels of serial data multiplexing with five software programmable transfer modes. Synchronous transfer of up to 16 channels operating at 8 to 16 bits per word. External interface connections are HC/TTL compatible.



SDM-2202A Serial Digital Multiplexer Module

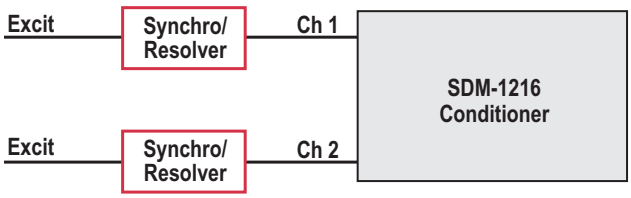
The same features as the SDM-1216 except the SDM-2202A accepts 1 channel of RS-422 compatible serial data.

SDM-2404B Serial Digital Multiplexer Module

The same as the above SDM-2202A except 4 channels of RS-422 compatible serial input are provided.

SRM-2102 2 Channel Synchro/Resolver Converter Module

This module accepts up to 2 Synchro or Resolver input signals and performs a direct-to-digital conversion. The module contains an electronic “Scott T” which converts from synchro to resolver, and a high performance tracking resolver to digital converter.



COMBINATION DATA MODULES

DFB-3126 Frequency Counter (Bi-Level Multiplexer)

This module provides two frequency counter channels with the features of the DFM-1104 module, along with two 12 bit words of bi-level multiplexing as found in the DMM-1148.

OVERHEAD MODULES

EPM-802 Excitation Supply Module

Provides excitation power for bridge conditioning. Used in conjunction with SCM-2104, SCM-2204, SCM-2204A, SCM-2504, SCM-2608 and SCM-2804 when bridge excitation is required.

CONDITIONER/ENCODER SPECIFICATIONS

PCM Overhead

Bit Rate:	5.0 Mbps, Standard 10.0 Mbps, Optional
Resolution:	8-16 BPW, Programmable
Words/Major Frame:	16,000 Max. Programmable
Subframe Depth:	256 Max. Programmable
Synch/SFID:	Fully Programmable
Output Data:	NRZ-L, BiØL, RNRZ-L
Premodulation Filter:	6-pole Bessel, 2 jumper selectable output voltage levels.

Input Power (MIL-STD-704)

Voltage:	28 ± 6 Vdc
Current:	Depends on input modules
Over Voltage:	+40 volts; indefinitely
Reverse Polarity:	-40 volts; indefinitely
Low Voltage:	+22 volts; without damage

Environmental Conditions (MIL-STD-810D)

Temperature Operating:	-35°C to +85°C (Std) -55°C to +85°C (Opt)
Non Operating:	-55°C to +100°C (Opt)
Vibration Sine:	30g; 10 Hz to 2,000 Hz
Random:	30g; 10 Hz to 2,000 Hz
Shock:	50g; 110 msec, half sine
Acceleration:	100g; steady state
Humidity:	to 95% non-condensing
EMI:	MIL-STD-461, 462

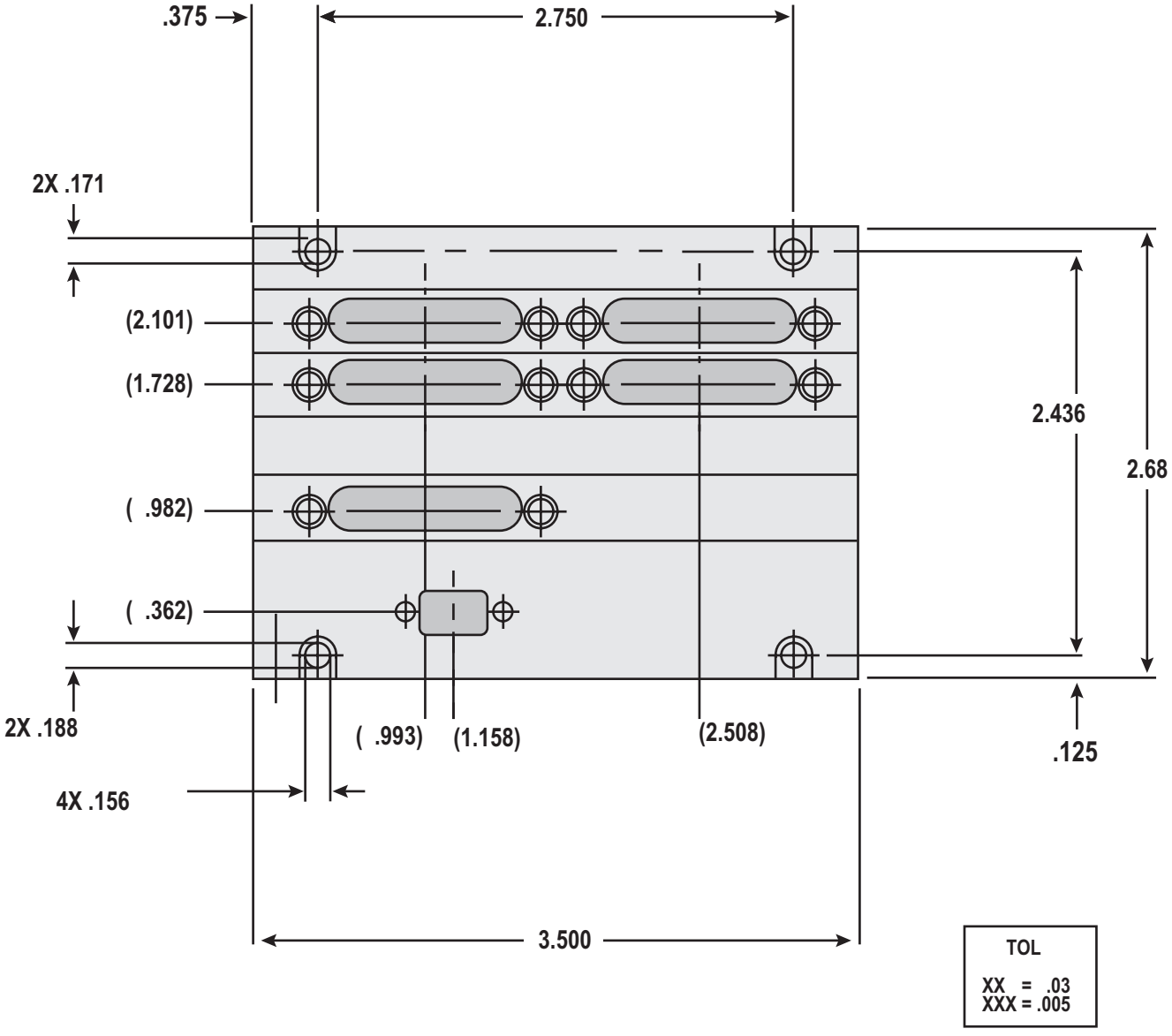
QUALITY CONTROL AND PRODUCT ASSURANCE

L-3 Communications Telemetry-East manufactures under strict Quality Control procedures in accordance with the requirements of ISO 9001 and MIL-Q-9858A. L-3 Communications Telemetry-East has its foundation in strong customer support. We can supply custom designs to meet specific needs. Let us help to solve your particular measurement requirement.

ORDERING INFORMATION

When ordering, refer to the model number given in the module description section. For a list of current versions, special applications or additional information, contact the L-3 Communications Telemetry-East sales office in Bristol, PA, or the nearest L-3 Communications Telemetry-East sales representative.

MPC-800 Outline Drawing



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