

DATA ACQUISITION & PCM ENCODING

MODEL PCM880



SUPPLYING HIGH PERFORMANCE FLIGHT INSTRUMENTATION, RF/MICROWAVE ASSEMBLIES, POWER AMPLIFIERS, IFF AND DATA ACQUISITION SYSTEMS FOR SEVERE ENVIRONMENTS.

DESCRIPTION

The Ultra Electronics Herley PCM880 System is used for instrumenting missiles, airborne vehicles, and other platforms requiring a small volume ruggedized PCM encoder. The PCM880 is the premier system for acquiring, signal conditioning, and encoding all types of signals. Versatility, flexibility, and ease-of-use are paramount in this system's hardware and software design.

The PCM880 System microprocessor scans the installed hardware, compares it to the user format, and reports discrepancies through the system software. The PCM880 System housings are designed to provide maximum accuracy of test results in the most severe environments. All housings are environmentally sealed with EMI/RFI shielding and gasketing and meet MIL-STD-810E requirements. To minimize noise and crosstalk, all modules are individually shielded in the system.

The PCM880 System is designed to work as a stand-alone encoder or in a Master/Slave configuration.

FEATURES

- Fully Programmable Master/Slave Operation to 25Mbps
- Variable word lengths of 4 to 16 BPW
- Tracking Pre-Modulation Filtered and Selected Word Output
- 8 Selectable Stored Formats
- Embedded Encryption with 8 Selectable Stored Formats
- Real-Time Data Monitor
- Fully Programmable Signal Conditioning of Analog, Digital and Avionics Bus Data
- Standard +/- 1.0% Accuracy



PCM SYSTEM MODULES & COMPONENTS

Through its Windows-based software, the PCM880 System can be controlled by a remote terminal or host computer. System configuration and hardware configuration information is downloaded directly to the microprocessor. A portable laptop computer can be used in the field during system installation for downloading PCM formats and monitoring system operation.

The PCM880 System includes a wide assortment of Signal Conditioners, Bus Monitors, and other special function cards that can be installed in any combination. Signal conditioning is completely programmable from excitation through PCM output. All operational parameters are programmed at the system, card, and frame level using easy to follow menus and familiar Windows commands. Once an PCM880 System is installed, you never have to access the system again, except to change the programming parameters or run a calibration mode. Real-time data is monitored without the use of a decommutator.

STANDARD PCM880 SYSTEM MODULES

- 8 Channel Universal Signal Conditioner Module
- 2 Channel RS-232/422 Serial Interface Module
- 64 Channel Bilevel Discrete Multiplexer Module
- 64 Analog Single Ended Channel Multiplexer Module
- 32 Analog Differential Channel Multiplexer Module
- MIL-STD-1553 Interface Module
- Embedded Encryption Module
- 32 Channel Thermocouple Module
- Voltage Excitation Module
- Re-entry Time Delay Module

OPTIONAL (GROWTH) PCM880 SYSTEM MODULES

- 2 Channel ARINC 429 Interface Module
- 4 Channel Tachometric Signal Conditioner Module
- Time Code Reader Module
- Asynchronous PCM Merge Module
- Dual Pulse Measuring Module
- GPS Receiver Module
- 2 Channel SDLC RS-422/RS-485 Interface Module

PCM880 SYSTEM COMPONENTS

PCM880 System Housings can be configured as Master or Slave encoders. System components may be ordered as spare parts.

Master Encoder Systems include the following:

- DC to DC Power Converters
- Microprocessor
- PCM State Machine Engine
- Master to Slave Interface
- Pre-Modulation Conditioned PCM Output Driver

Slave Encoder Systems include the following:

- DC to DC Power Converters
- Microprocessor
- Slave to Master Interface

PCM SYSTEM SOFTWARE FEATURES

The Windows-based software of the PCM880 System is compatible with Windows NT, and Windows 95/98. The system can be controlled by a remote terminal or host computer. System configuration and hardware configuration information is downloaded directly to the microprocessor. A portable laptop computer can be used in the field during system installation for downloading PCM formats and monitoring system operation. Software includes menu selections for file maintenance, calibration and on-line help.

SYSTEM CONFIGURATION

Configuring the system starts with the Housing Screen (*Figure 1*). Here, the number and type of housings employed by the system are defined. Housings are selected as Master or Slave.

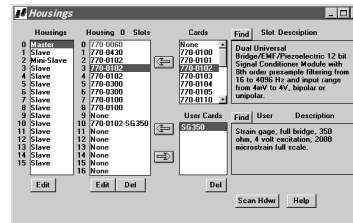


FIGURE 1 - HOUSING SCREEN

Within each housing, cards are selected and assigned to a housing slot. Cards may be selected from a list of standard cards or from a list of cards the user has pre-programmed for specific sensors and applications.

The PCM880 System offers a large selection of plug-in cards. Signal Conditioner cards are available in dual, quad and octal configurations for measuring strain, voltage, acceleration, charge, vibration, position, pressure, power, rate, rotation, speed or temperature.

CARD SET-UP

Cards assigned to a housing slot are programmed through specific card configuration screens. *Figure 2* shows the set-up for a Dual Universal Signal Conditioner card. From this screen, a user can select the port, set the excitation voltage, pre-sample filter, gain, and offset.

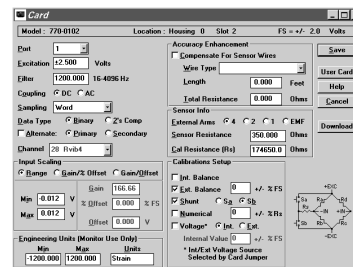


FIGURE 2 - SIGNAL CONDITIONER CARD SCREEN

Each port is assigned to a channel selected from a list of available channels, or a new channel can be

created. Once the user has defined the card set-up, it is saved to the system database. For detailed specifications and capabilities consult individual data sheets or contact the factory.

CHANNEL SET-UP

The Channel set-up screen provides a tabular representation of the PCM frame map and includes card assignments. Information is arranged in columns by channel number and name, word size, frame location, and hardware location. It is easy to add, sort, edit, or delete channels.

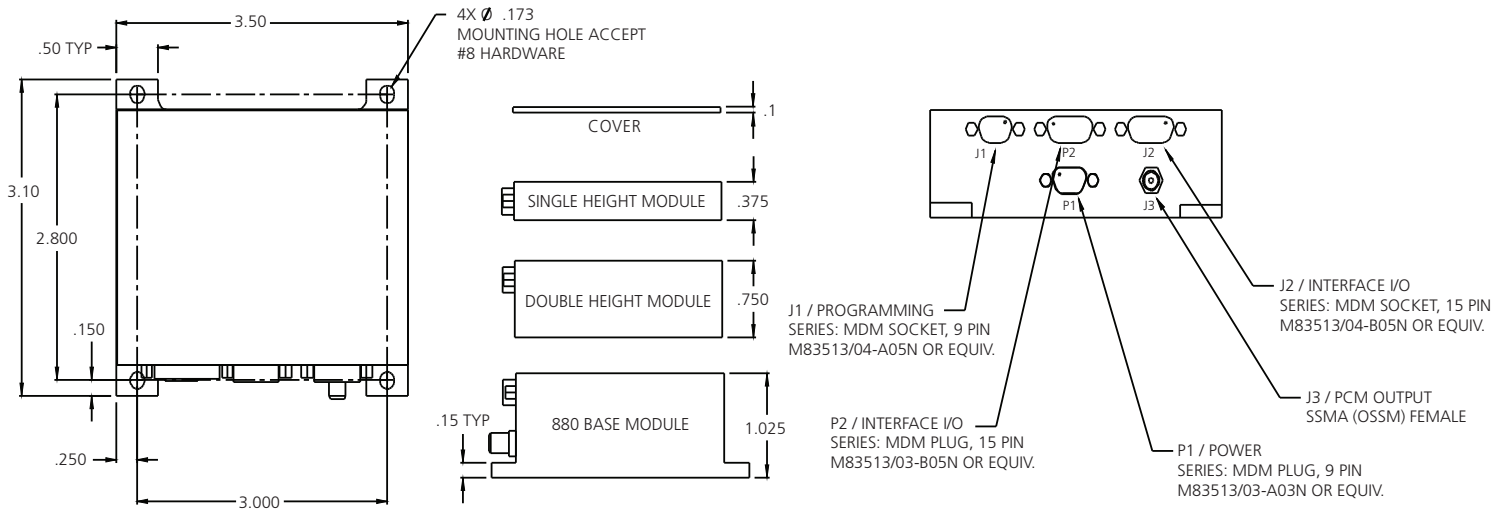
Each channel can be programmed for normal, super, sub, or random commutation. (Random allows any words in the frame to be linked together as a single data channel.)

Channels may be automatically created using the Channel Wizard. Assign a Pre-Label such as VIB, and the Channel Wizard will automatically append a number to create a sequence of channel names such as VIB1, VIB2, VIB3. The Channel Wizard also allows you to select the word and frame numbers you wish to assign to channels in the frame map.

FRAME CONFIGURATION

Two independent frame formats, or master frames, with up to 65,536 words per format, can be stored and selected for use at any time. Frames may be designed with up to 4,096 words per minor frame and 256 minor frames per major frame. Data encoding supports frames with variable word lengths, from 4 to 16 bits including an optional parity bit for data words.

Minor frame synchronization is programmable from 16 to 33 bits (*Figure 3*), with values entered and displayed in hexadecimal, octal, or binary format. The PCM880 System performs subframe synchronization by frame code complement or subframe ID using one or two subframe ID counters.



Each subframe ID counter has an individually programmable count sequence.

meter and Digital lists data values in decimal, hex, or binary format.

subframe counters

• Altitude: Unlimited

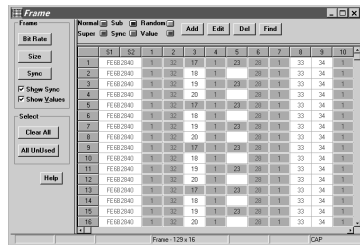


FIGURE 3 - FRAME CONFIGURATION SCREEN

CHANNEL MONITOR MODE

View real-time data through the PC880 System Monitor feature. The system software asynchronously captures two channels of real-time data for viewing and comparison. Figure 4 shows Channel 1 being monitored in Gauge view and Channel 32 is displayed in Waveform view.

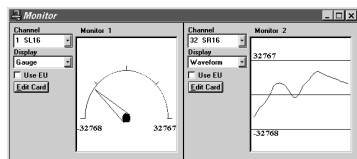


FIGURE 4 - CHANNEL MONITOR SCREEN

The Monitor feature offers several display options. The Engineering Units option converts raw data to conventional measurements such as degrees, strain, and volts. Waveform shows the data points in scrolling oscillographic format. Gauge provides an easy to read panel

PC880 SYSTEM SPECIFICATIONS

- Configuration: Base Module with up to 10 Data Modules per Master or Slave system.
- Set-up and Control: Programmed and controlled via RS-232 serial link to a computer with Windows-based software
- PCM Bit Rate: Programmable selection of internal or external clock. Internal clock is programmable from 1 kbps to 25 Mbps for NRZ-L and RNRZ-L codes (1 kbps to 5 Mbps for other codes).
- PCM Frame Size: Minor frames of up to 4096 words. Major frames with up to 256 minor frames, or up to 65,536 total words.
- PCM Word Size: Individually programmable word lengths from 4 to 16 bits (including optional parity bit)
- PCM Word Order: Programmable for MSB or LSB first
- PCM Word Types: Individually programmable for normal, super, sub, or random commutation
- PCM Word Parity: Programmable as odd, even, or off
- PCM Frame Synchronization: Programmable from 16 to 33 bits
- PCM Minor Frame Synchronization: Programmable for frame code complement or subframe ID using one or two programmable

- PCM Conditioned Output: PCM output is pre-modulation conditioned to reduce harmonics and is programmable from 0.3 to 3.0 Vpp into a 50 ohm load, or 0.6 to 6.0 Vpp into load of 1,000 ohms or more. PCM output is 50 ohm driven.
- PCM Output Codes: Conditioned and TTL outputs are independently programmable to the following PCM codes:
Non-return to zero - NRZ-L
Randomized NRZ - RNRZ-L
Bi-phase - BiØ-L, BiØ-M, BiØ-S
Differential bi-phase - DBiØ-M, DBiØ-S
Delay modulation - DM-M, DM-S
- PCM TTL Output: TTL driven PCM output with Bit Clock for direct input to a decommutator frame synchronizer
- Operating Temperature Range:
Standard: -30°C to +70°C
Extended: -40°C to +85°C
Qualification: -54°C to +85°C
- Vibration:
MIL-STD-810E: Method 514.4
Random: 10 to 2000 Hz at 34.4 g's RMS
Sine: 5 to 2000 Hz at 10 g's RMS
Three orthogonal axes, 20 seconds per axis
- Shock: MIL-STD-810E; Method 516.4, Procedure I - Functional Shock Test for Flight Test Equipment. 1200 g's peak 10 to 5000 Hz Three shocks in each direction of three orthogonal axes both positive and negative for a total of 18 shocks

- Salt Fog: MIL-STD-810E; Method 509.3. Expose 48 hours at 35°C
- Humidity: MIL-STD-810E; Method 507.1. Procedure I Expose 240 hours at 85% minimum humidity from +30°C to +65°C
- Power: MIL-STD-704E; Paragraph 5.3. (40 V DC max. input)
- Power Requirements: DC to DC converter power supplies are available in two input voltage ranges. Standard Range: 22 to 36 volts DC
Optional Wide Range: 12 to 36 volts DC
- EMI/RFI: MIL-STD-461C; Requirements CE03, CE07, CS06, RS02 MIL-STD-461E; Requirements CS101, CS114
- Acceleration: MIL-STD-810D; Method 513.3, Procedure II 225 g's, 5 minutes



making a difference

Ultra Electronics
HERLEY
3061 Industry Drive
Lancaster, PA USA 17603
Tel: +1 717 397 2777
www.ultra-herley.com
www.ultra-electronics.com

Ultra Electronics reserves the right to vary these specifications without notice.
© Ultra Electronics Limited 2015.
Printed in USA
August 2015