PCM / PAM SIMULATOR
MODEL 236

40 Mbps PCM/PAM Simulator

Features

- *1 Bps to 40 Mbps operation with 1 Hz resolution*

- *Internal Frequency Synthesizer*

- *Frame and Subframe capacity*

- *Bipolar output option*

- *Virtual Instrument Software for remote control*

- *All IRIG PCM Codes and RNRZ-L*

- *Selectable RNRZ-L patterns, forward and reverse (2^N-1; N=7, 9, 11, 15,17, 20, 23)*

- *Convolutional Encoder (R=1/2, K=7)*

- *Local and Remote Control*

- *Non-Volatile Format Storage*

- *8192 unique frame data words*

- *8192 unique subframe datawords*

- *Dynamic data changes during simulation*

- *TTL, RS-422 and RS-232 outputs*

General Description

The GDP Space Systems Model 236 PCM/PAM Simulator addresses the need to perform cost effective PCM or PAM clock and data simulations. The unit facilitates widespread use of PCM by combining the most desired application features users into one unit. The Model 236 is ideal for PCM users who do not have the time or the inclination to become simulator programmers. The Model 236 allows users to directly describe a telemetry format in response to plain language prompts using the front panel keyboard and high-contrast vacuum fluorescent display.

The format consists of a frame filled with a background pattern over which unique data words may be superimposed. A subframe may also be added to the format and unique words placed anywhere within the frame/subframe matrix. The unique words may also be distributed throughout the frame and/or subframes in a super commutated manner. The Model 236 generates PCM data at rates up to 40 Mbps. Output data rate is determined by an external clock source, or by an internal frequency synthesizer. The internal synthesizer may be programmed for the desired data rate by direct entry from the front panel or via the Remote Control interface. The Remote Control interface can be used for all format, data rate and code selections.

Applications

Data Processing System Test
The flexibility and performance of the Model 236 PCM/PAM simulator make it an excellent simulation tool for evaluating and testing PCM Data Reduction and Processing Systems. A unique, table driven architecture enables the user to specify complex PCM formats and unique data values on a word-by-word or frame-by-frame basis. The Model 236 generates all of the standard IRIG STD PCM codes (NRZ-L/M/S,RNRZ, BiØ-L/M/S, and DM-M/S). The data output may also be convolutionally encoded. The user can test the performance of a processing system under known conditions with fixed or varying data values.

Satellite Receive Station Test
The Model 236 is capable of generating complex PCM formats similar to those produced by many of the remote sensing satellites, and the TT&C links on various communications satellites. Using a data stream produced by the Model 236 "GO/NO GO" quick-tests of a receive station and ground station maintenance and troubleshooting may be supported. The Model 236 PCM/PAM simulator is compatible with practically all of standard modulators and up converters. Therefore, it should be capable of supporting end-to-end (antenna to computer) testing of a receive station.

Systems Integration Support
Local operation via the front panel display and keyboard, and Remote operation via RS232 or optionally IEEE-488, enable the Model 236 PCM/PAM simulator to support the systems designer through all phases of systems integration. Supporting hardware component test to operational software evaluation, the Model 236 can supply a "known" source of PCM or PAM data that can assist the integrator performing tests beginning at the subsystem level and progressing through the operation of the entire system.

SPECIFICATIONS

DATA FORMAT
4-16 Bits/word
1-8192 frames/subframe
1-8192 words/frame

DATA SOURCES
ID counter, 12 bits
General Data Word
Frame: 16 Bits x 8192 Unique Words
Subframe: 16 Bits x 8192 Unique Words

SYNCHRONIZATION TYPES

Frame:	**Subframe:**
Normal	SF Sync Complement
Alternating FS	Recycle Pattern
1-64 bit sync pattern	ID counter up/down

BIT RATE
1 bps through 40 Mbps NRZ-L

OUTPUTS
TTL: 50 Ohm. BNC Connectors.
   NRZ-L, TTL Data
   CODE, TTL Coded Data
      NRZ-L,M,S
      RNRZ (2^N-1; N=7, 9, 11, 15,17, 20, 23)
      BIO-L,M,S
      DM-M/S
      Convolution Encoder: R=1/2, K=7
   0° & **180°** degree clock

PAM: Pulse Amplitude Modulation (Optional). BNC
BIP: Bipolar Data Output (Optional). BNC

RS232: DB25S connector.
     Coded data
     NRZ-L data
     0 & 180 degree clock
RS422: DC37S connector
     Coded data
     NRZ-L data
     0 & 180 degree clock

REMOTE CONTROL
RS232 Serial Interface: DE9S connector
   Asynchronous start-stop serial data link
   Baud rate (300-9600), parity, and stop bits.
IEEE-488 Interface (Option) : Standard IEEE connector.

LOCAL FRONT PANEL CONTROL
VF Display and Keypad
   Bright, high contrast Vacuum Fluorescent (VF)
      2-line by 40-character display format
   Twenty (20) position keypad

LED Indicators
   RUN (Green); **HALT** (Red)

Test Point Outputs: BNC Connectors
   NRZ-L data
   CLK, 0 degree clock
   CODE, Coded data
   FRM, Frame Pulse
   PAM, Pulse Amplitude Modulated (Optional)

MISCELLANEOUS
   Power: 108/240VAC, $\pm$10% 47-63 Hz
   Temperature: 10° to 50° C operating
   Humidity: 15 to 95%
   Size: 19"W x 3 ½"H x 20"D
   Weight: 20 lbs.

PAM OUTPUT OPTION
   Channel rate: up to 320 K Samples/sec
   Resolution: 1 part in 256 (8 bits)
   Output Range: 0 to +5 volts into 75 ohm load
   Linearity: $\pm$½ LSB
   Accuracy: $\pm$½ LSB
   Stability: $\pm$20 ppm/degree C over 10 to 50 C

BIPOLAR OUTPUT OPTION
   Amplitude: 50mV to 10Vp-p (open circuit)
   Offset: 0 to $\pm$5 Volts (open circuit)
   Offset plus peak signal is limited to $\pm$10V

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Ordering Information

Part Number	Description	Part Number	Description
MD236-00	**Basic Unit**	OP236-13	20 ppm Frequency Synthesizer
OP236-11	PAM Output	OP236-21	IEEE-488 Remote Control (RS232 STD)
OP236-12	Bipolar Output	OP236-89	Chassis Slides