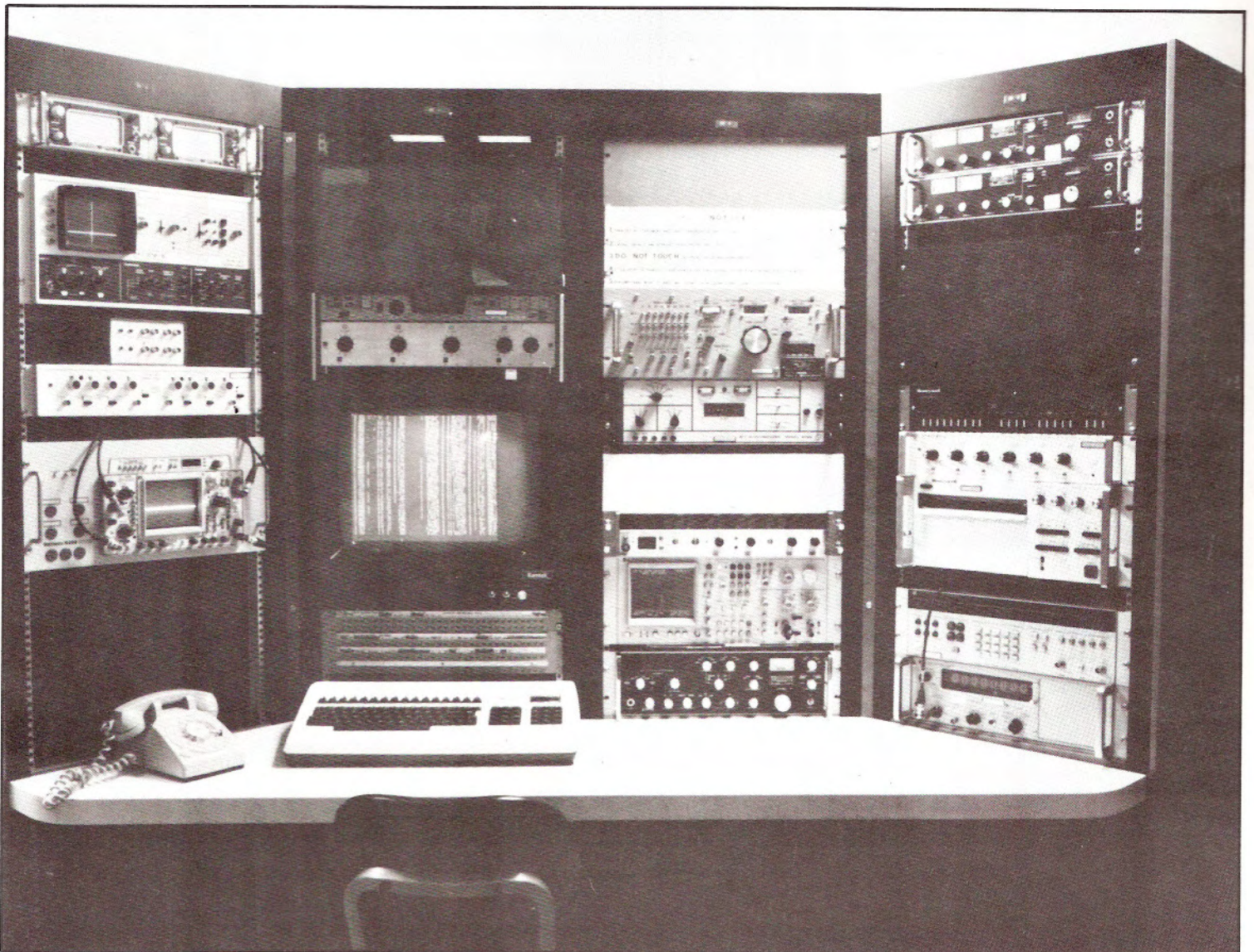




DPS-100 Binary Data Processing System





DPS-100 Data Processing System

General Description

The Signal Science DPS-100 is a laboratory system which permits signal analysts to process and display digital data contained in PCM, PPM, or PDM signals. The DPS-100 hardware employs a VAX-based architecture, and the operating software is menu-driven. The DPS-100 can operate with multiple users.

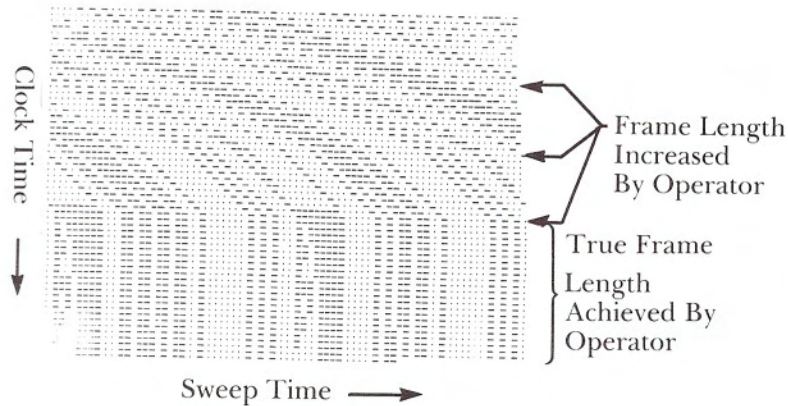
The input data format required by the DPS-100 depends on the specific signal format to be processed. For any PCM signal format, the DPS-100 accepts the output binary waveform from a standard PCM demodulator and bit synchronizer. For PPM or PDM signals, the DPS-100 accepts the pulsed waveform from an AM detector.

The DPS-100 performs these primary functions:

- Digitizing PPM or PDM signals from AM detectors to recover the digital data represented by the pulsed waveform.
- Accepting digital data from PCM demodulators and bit synchronizers.
- Reformatting of input digital data which employ any binary coded waveform such as NRZ-S, NRZ-M, NRZ-L, biphase-space, biphase-mark, split-phase, and RZ to recover the serial bit stream represented by this waveform type.
- Processing of the reformatted bit stream to delete idle or redundant data, to identify and synchronize data frames, to identify and demultiplex the different data fields, and to extract specific data structures.
- Plotting of the processed data by means of software graphics that include special grid labelling and two- or three-dimensional displays in spherical and Cartesian coordinates.

PPM or PDM signals may be burst-digitized at rates up to 100,000 samples per second (20,000 samples per second average rate), and demodulated PCM signals can be accepted at rates up to 500,000 bits per second. The exact bit rate of the data is measured after the signals are accepted, and the data is reformatted as needed to exhibit

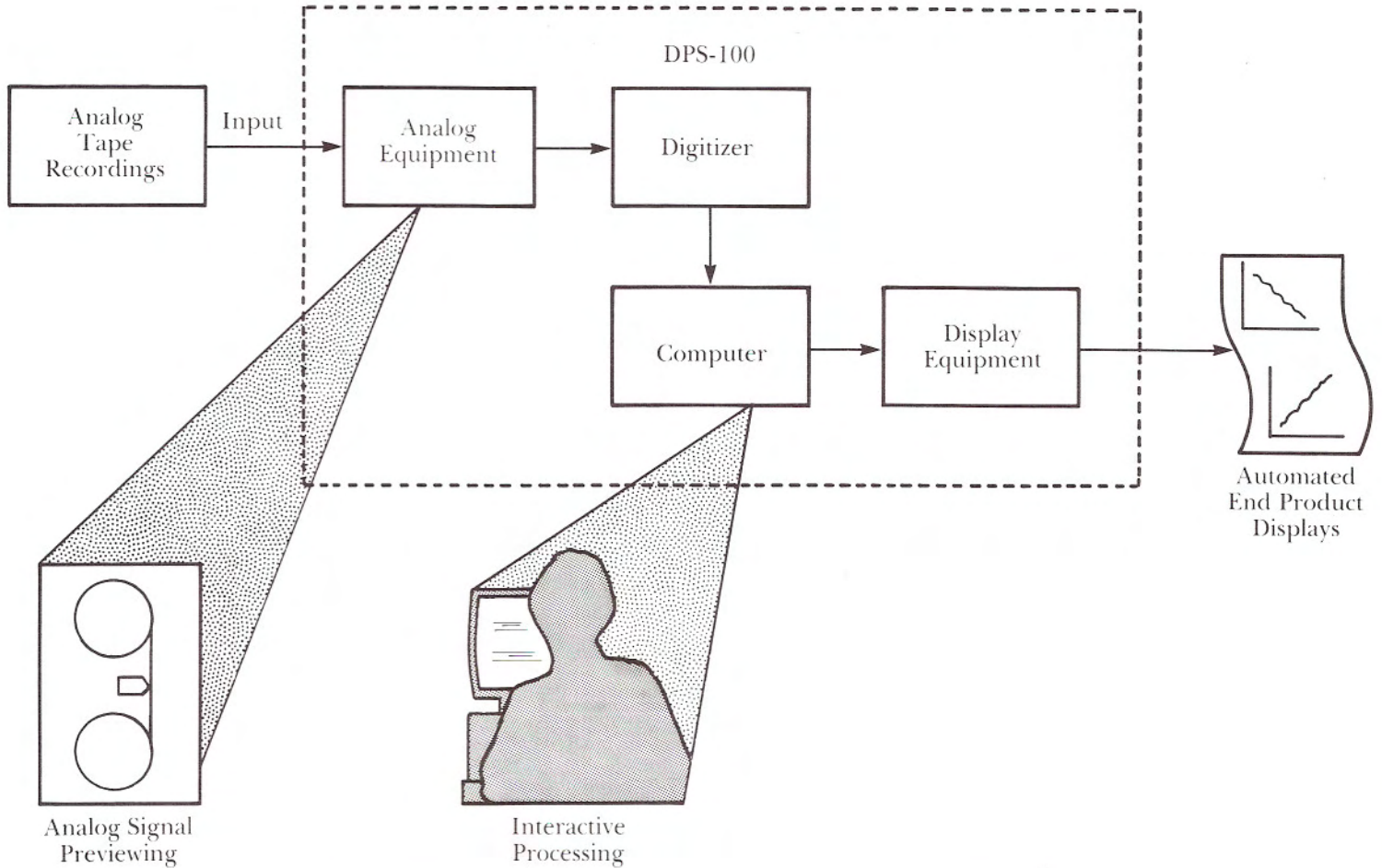
the underlying binary data. Raster displays of the reformatted data are used to identify the data frame structure and measure the true frame length of the specific signal format.



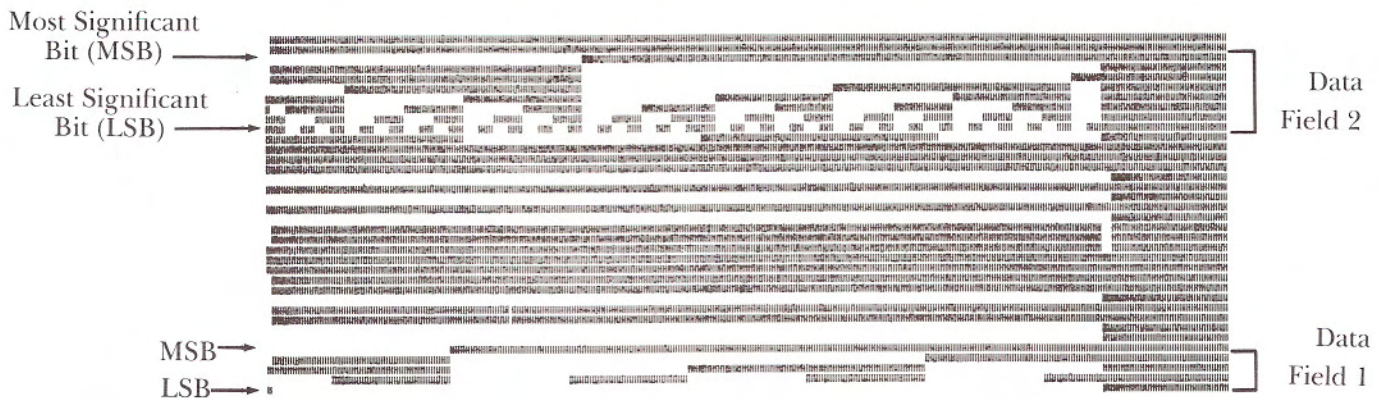
Most of the DPS-100 software was developed by Signal Science engineers for use in their own signal analysis efforts. The experience gained during this work has resulted in many enhancements to the software so that it is now a very mature, user-friendly system.

The DPS-100 software allows the analyst to preview the binary data and identify data parameters. Idle or redundant periods in the data can be removed easily to simplify the identification of frame patterns. Once synchronized, the binary data are processed frame by frame, and each frame may be sorted according to message type, message address, or other criteria. Further processing of the sorted data then yields the information content.

Plotting and display software is versatile and can exhibit the signal structures and information content that are normally encountered in digital data. Two- and three-dimensional graphics are readily accessible in Cartesian or spherical coordinates.



- Frame sync pattern removed
- Other message addresses removed
- Other message subjects removed
- Other message addresses removed
- Other message subjects removed



One message type, one message address, and one message subject deinterleaved from other message types, message addresses, and message subjects

Physical Description

At the heart of the DPS-100 is a mainframe from the VAX family of DEC's mid-sized computers. Input signals are transferred to the computer over high-speed direct-memory-access busses. For PPM or PDM signals, a LeCroy dual channel time-of-arrival digitizer, controlled by an Aeon high-speed interface, converts the analog waveforms to digital form and transfers them to the computer through an IEEE-488 bus. For PCM signals, the binary data stream from the demodulator and bit synchronizer is transferred to the computer through a DRE11 interface unit. Another IEEE-488 bus connects DPS-100 system peripherals, such as the

printer/plotter, workstations, time code reader, spectrum analyzer, and oscilloscope, to the computer.

The DPS-100 normally operates with one digitizing workstation and three analysis workstations. A high-speed, color-graphics Ramtek display allows for data evaluation at the digitizing workstation. The analysis workstations consist of DEC VT241 terminals with color graphics. A printer/plotter produces report-quality graphics for analyst archives.

DPS-100 Specifications

CPU	DEC VAX 11/730, 11/750, 11/780, or MicroVAX-2
Workstations	One RAMTEK digitizing station with color-graphics display; three or more DEC VT241 analysis stations with color graphics displays
Number of Inputs	One input signal channel is the standard configuration; up to eight simultaneous input signal channels are available as a real-time processing option
Signal Paths	PCM input through DRE11 interface; PPM or PDM input through LeCroy digitizer and IEEE-488 DMA bus
Input Rates	PPM/PDM: 100,000 samples per second peak 20,000 samples per second continuous PCM: 500,000 bits per second continuous
Data Encoding	NRZ-S, NRZ-M, NRZ-L, biphase-space, biphase-mark, split phase, and RZ.



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