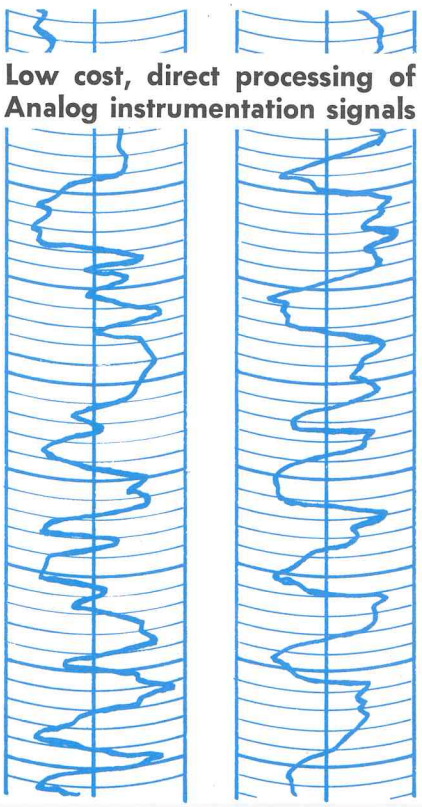
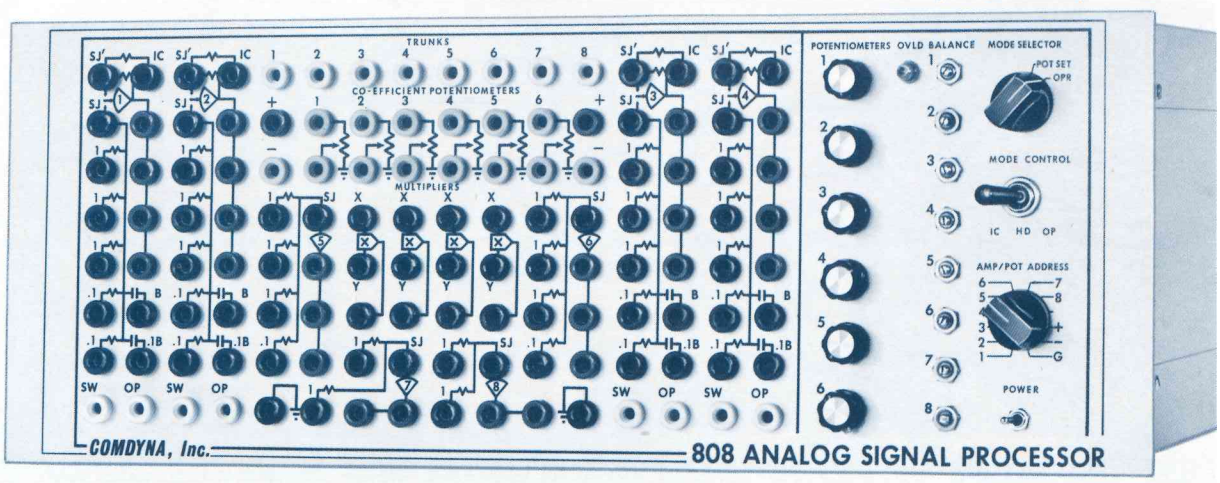
808

ANALOG SIGNAL PROCESSOR



Low cost, direct processing of Analog instrumentation signals

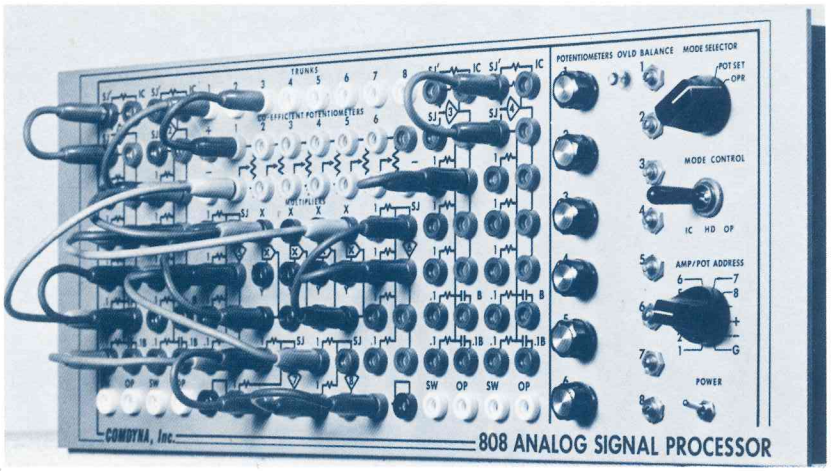


COMDYNA, Inc.

COMPUTERS FOR DYNAMIC ANALYSIS

THE COMDYNA 808 ANALOG SIGNAL PROCESSOR

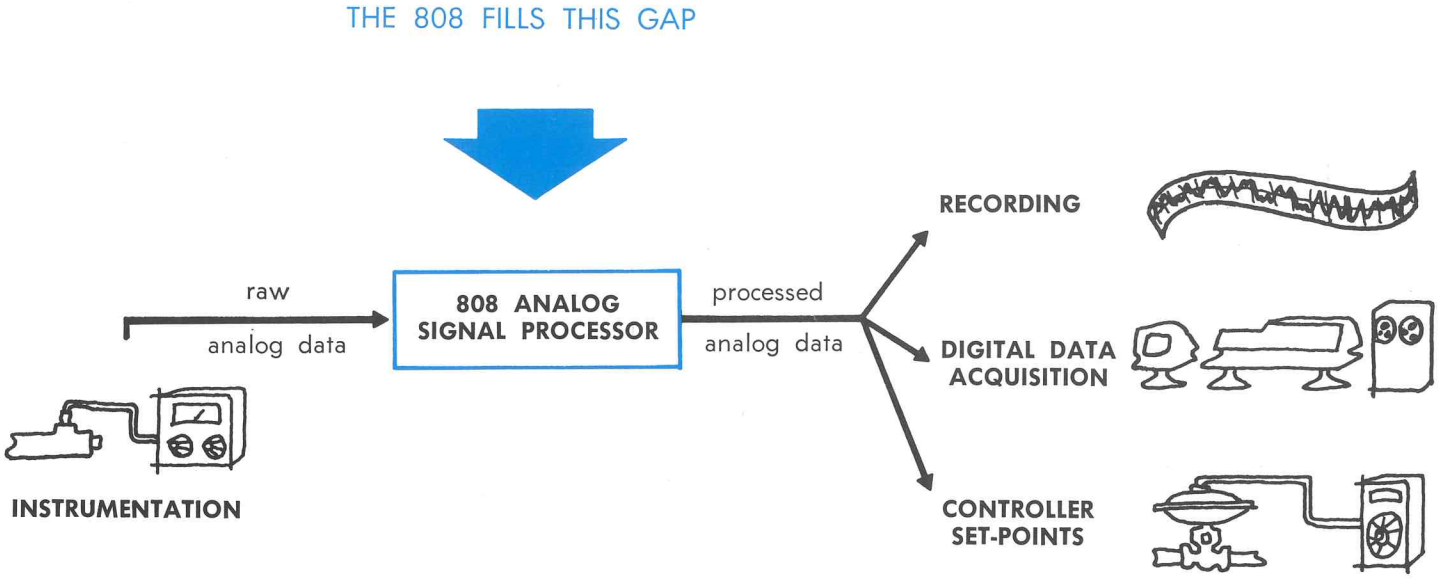
is a versatile, low cost analog computer designed specifically for handling measurement data. It enables instrumentation signals to be processed while still in an analog form. Results are instantaneous and may be displayed, recorded or used in parallel with raw source data.



THE 808 ROUNDS OUT A DATA ACQUISITION SYSTEM

The 808 Analog Signal Processor increases the efficiency, flexibility and expands the usefulness of data acquisition systems. It rounds out an instrumentation system by performing operations that are best handled in an analog form.

In a typical data acquisition system . . .



OUTPUTS FROM THE 808 ANALOG SIGNAL PROCESSOR:

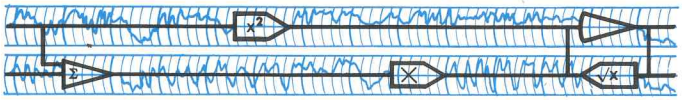
May be recorded or displayed in analog form for direct analysis.

Provide preprocessed inputs to a digital data acquisition unit for digital computer analysis.

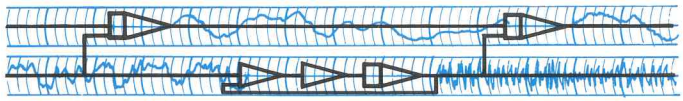
May be used as controller set-points, where processed variables are the desired control functions.

4 GENERAL OPERATIONS

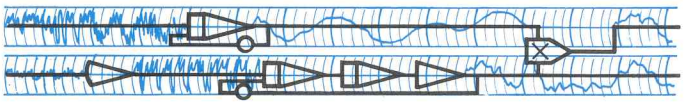
provide the versatility to meet a variety of instrumentation needs. All four are readily programmed on the 808 Analog Signal Processor. And, they likely will cost a fraction of alternate methods . . . such as manual calculations, digital computer run time or special designed equipment.



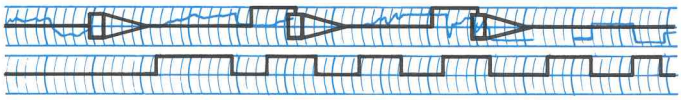
Arithmetic Calculations . . . Practically every conceivable arithmetic operation can be handled with the wide assortment of operational elements. Program linear operations with integrators, summers, sign inverters and potentiometers. Add non-linear functions with multipliers, dividers, squaring, logarithm or other arithmetic function generators. And, even include empirical functions with the Comdyna 701 Variable Diode Function Generator. One versatile system performs all the arithmetic calculations likely to be encountered.



Time Variant Functions . . . For time-dependent functions, such as integrations and differentiations, the 808 is perfect for the job. Connect an instrumentation variable to an integrator input. . . . On command, the continuous, exact integral is obtained. Derivatives, and other time variant functions, are handled in a similar manner.



Signal Conditioning . . . A wide assortment of operational elements are available to aid the conditioning of raw analog data. The 808 system has free amplifiers, potentiometers, a precision plus and minus ten volt reference, a fifteen volt power supply, summing resistor networks, integrating capacitors, and multiplying networks. These can be easily used for special filters, summers, integrators, sign inverters, special scaling and balancing circuits or numerous other operations that aid signal conditioning.



Digitally-controlled Operations . . . The 808 control functions are compatible with digital logic systems. Analog/Digital or Digital/Analog operations, therefore, can be combined to serve many data handling needs. High speed electronic switching is the standard integrator mode control. Electronic switching may also be used to create analog memory, change scale factors, or apply functions based on logic decision making.

TYPICAL APPLICATIONS

The four general operations listed above are often used in the following application categories. Under these categories, the 808 range of specific applications is practically unlimited.

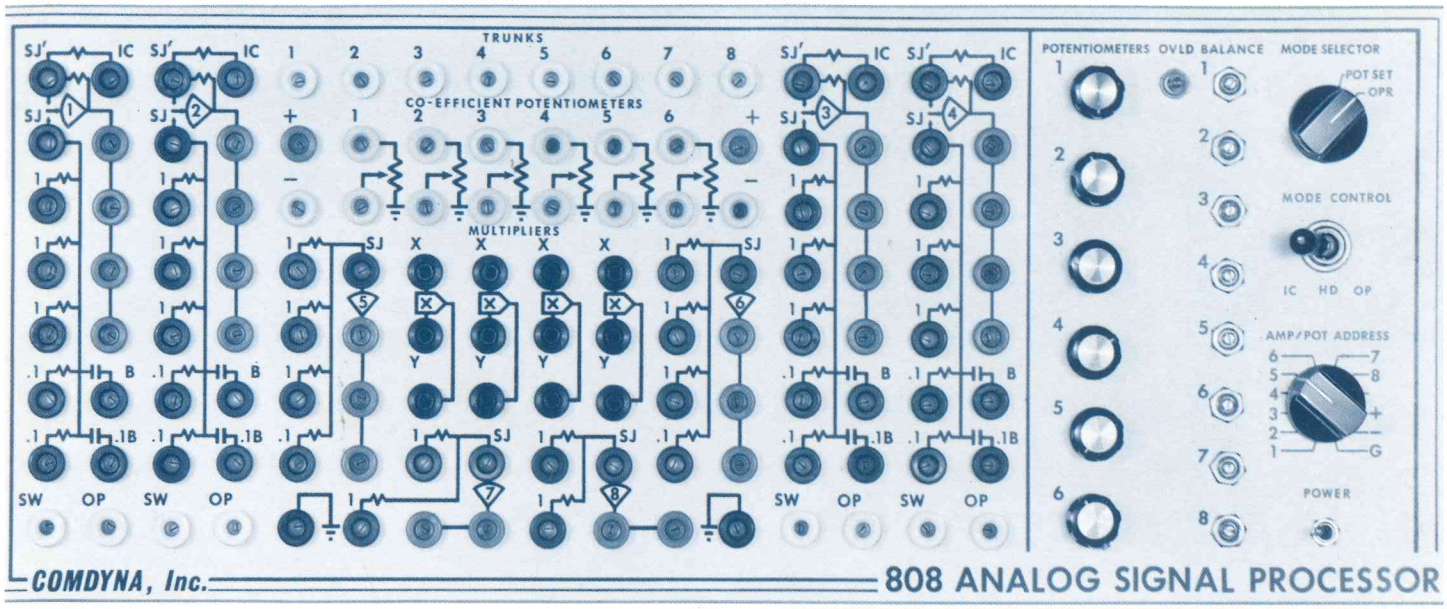
Implicit Measurement . . . Instrumentation variables that cannot be directly measured often can be obtained through indirect calculation. For example, mechanical power is frequently the product of shaft speed times torque. Both speed and torque are obtained through direct measurement, but power is not. Implicit power measurement, however, can be obtained by using the Comdyna 808 to multiply speed and torque. Power, obtained through analog multiplication, is but one example of implicit measurement. Others include . . . efficiency, co-efficient of friction, work, enthalpy, rosette stress, directional vector, and many more. In each case, the implicit measurement appears as an analog signal, and is handled like any direct measurement.

Process Control . . . Analog operations serve a variety of production or prototype control applications. Implicit measurements are desirable set-points where control functions are more influenced by calculated than measured variables. In addition to providing calculated set-points, various control techniques can readily be patched on the 808, and then tried with a minimum of difficulty. There are standard programs for one, two or three mode controllers, lead and lag circuits, etc. Special approaches, such as optimization schemes, also can be programmed. The Analog Signal Processor is adaptable to a wide range of process control designs, modifications and applications.

Data Reduction . . . Reduction of analog data to usable form is handled accurately, easily and efficiently. Reductions can be performed either on-line during a test, or off-line from recorded analog tape. Either way, inputs and outputs are in analog form, and can be handled in an identical manner.

Preprocessing Digital Computer Inputs . . . Preprocessing inputs to digital acquisition systems often simplifies both data acquisition and digital computer data analysis programs. Some mathematical operations, such as integration, are better handled with analog techniques. Arithmetic calculations requiring large, time-consuming digital routines are often handled with only a few inexpensive analog elements. Where high frequency signals occur, continuous analog calculations can eliminate the need for storing large amounts of digital data. By preprocessing inputs the 808 Analog Signal Processor can greatly increase the potential of digital data acquisition systems . . . and reduce costly digital computer run time.

808 FUNCTIONAL COMPONENTS



Straightforward programming and good operator features are a major design criteria. Some of the primary system features and computing capabilities are shown above and described in the following . . .

Patch Panel . . . Programming is performed with color coded patch cords and banana jacks. Clearly marked symbols make patching easy for the operator. ¾" hole spacing is standard.

Operational Amplifiers . . . Eight high gain operational amplifiers offer stable performance over a wide frequency range. Four amplifiers (nos. 1 through 4) are furnished with high-speed electronic switches that can be independently controlled with external logic commands.

Summation . . . Each operational amplifier has an associated precision summing network for accurate summation of analog variables.

Integration . . . Amplifiers with electronic switching also have provisions for integrating capacitors. Values for these precision capacitors can be selected by the user, based on the need for specific integration time constants. Individual integrator modes is controlled either from the control panel mode control switch, or with external logic commands.

Multiplication by Constants . . . Six co-efficient potentiometers are provided for entering constants into a program. A Pot Set mode and Pot Address switch are used with an external voltmeter for accurate setting of co-efficients.

Multiplication of Variables . . . Four multiplying networks can be used with any of the eight operational amplifiers for multiplication division, squaring and square foot functions.

Trunks . . . Eight input/output trunks, brought from a rear trunk connector, terminate at the patch panel. These trunks allow for convenient input/output of raw and processed data.

Precision Reference . . . A precise, positive and negative 10 volt reference supply is terminated at the patch panel. The reference can be used internally or with external instrumentation.

Overload Indicator . . . A lamp overload indicator shows when any of the eight amplifiers exceeds 10 volt system reference.

Control and Address Features . . . The Amp/Pot Address switch provides address of the eight operational amplifiers and the six co-efficient potentiometers. Outputs of the address switch is placed on an amplifier address and potentiometer address bus, found in the rear trunk connector.

Mode Selector Switch . . . The Mode Selector switch either places the unit in an operate or a pot set mode. During the pot set mode, all six co-efficient potentiometers receive the 10 volt reference as inputs for accurate setting of co-efficients.

Mode Control Switch . . . The Mode Control switch manually provides a logic command for placing integrators into the initial condition, hold or operate mode.

ACCESSORY COMPONENTS

Digital Voltmeter . . . A 3½ place digital voltmeter, with auto polarity feature, is available for digital readout of 808 variables. The unit is furnished in a standard rack mounted chassis.

Null Meter . . . Economical readout of analog variables is available with a null meter and 3 place precision null potentiometer. The unit is furnished on a rack mounted panel.

Comdyna 701 VDFG . . . Arbitrary variable functions or co-efficients are available with addition of the 701 Variable Diode Function Generator. The unit is panel or chassis mounted, and patched to the 808 for operation.

Special Input Amplifiers . . . Special amplifiers for instrumentation signal amplification are available upon request, and can be mounted within the 808 unit.

THE 808 OFFERS COST AND OPERATING BENEFITS

CONSIDER THE SAVINGS . . .

Elimination of Data Processing Time

Analog computing is instantaneous. The Comdyna 808 performs operations in virtually zero time. There is no faster way to process analog data.

Low Cost Analysis

Cost of individual operations is a fraction of any alternate method — whether by manual calculation or digital computer run time. Initial equipment is low, and the total cost of operation is negligible . . . just 25 watts of power.

AND THESE BENEFITS . . .

Improved Presentation of Measured Variables

Instant results make calculated variables available for immediate readout. Calculated variables can be displayed or recorded in place of/or along with measured variables. Total information from instrumentation is presented in a better, more useful form.

Increased Efficiency of Test Runs and Process Control

The 808 gives immediate access to calculated variables as variations occur during a process or test run. With better information, processes and tests are more effectively controlled and evaluated. Analysis can be performed at the test or process location.

Improved Data Reduction

The better and more complete presentation of instrumentation variables helps to reduce the recording and processing of superfluous information. More meaningful recorded data helps simplify and improve off-line data reduction.

PLUS OTHER IMPORTANT FACTORS . . .

Ease of Installation

As analog data signals and 808 operations are compatible, there is virtually no interface requirements. The 808 is easily installed in any instrumentation system.

Ease of Operation

Programming is straightforward and easily learned. Operation requires no special training.

Excellent Accuracy Over a Wide Frequency Range

Accurate operation covers both static and dynamic conditions. Performance meets static needs and excels in processing high frequency data.

Adds System Flexibility

The wide selection of operations and ease of program changes lets the 808 Analog Signal processor meet a variety of needs. This one unit can greatly increase the flexibility and power of your instrumentation system.