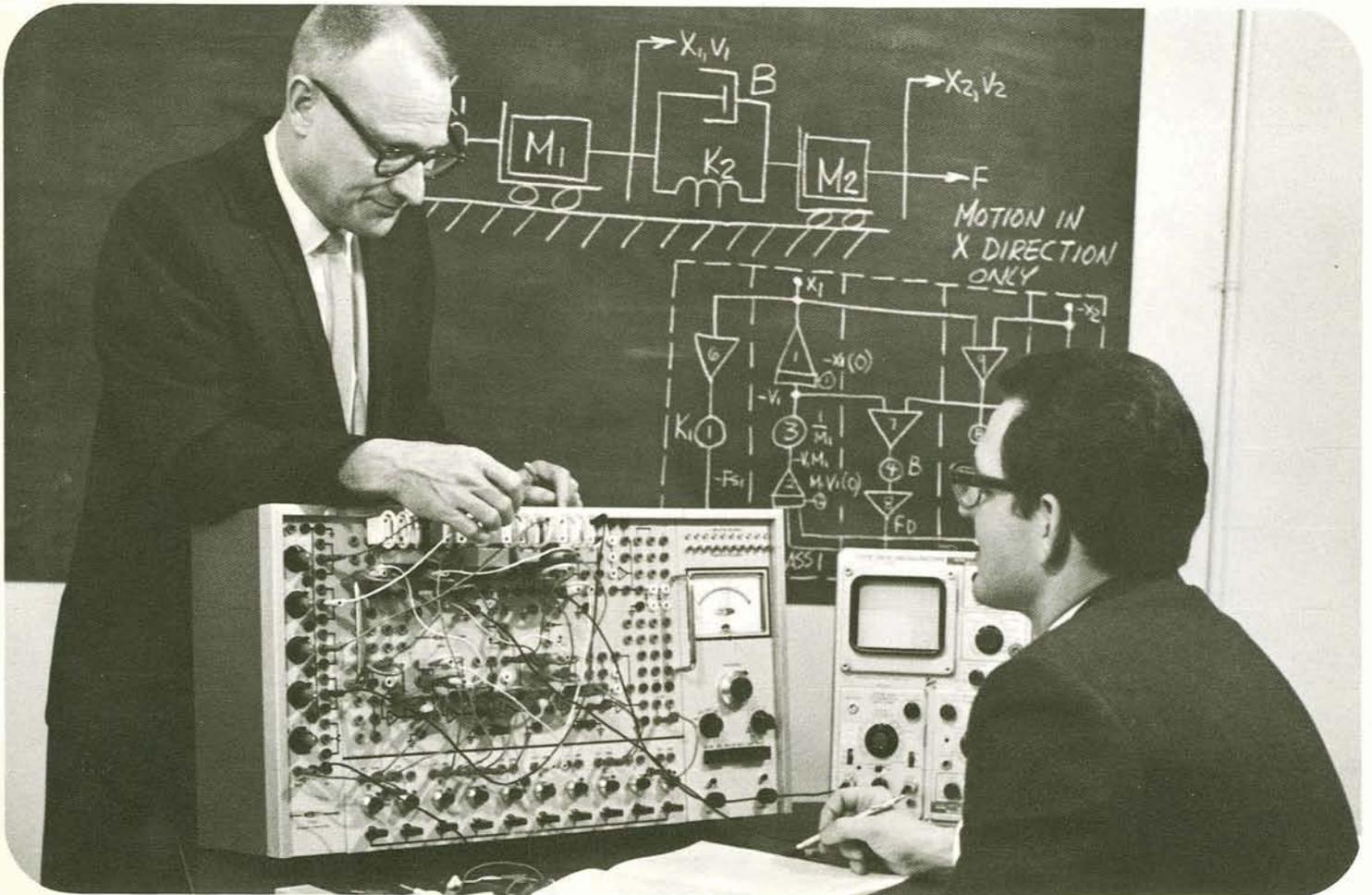


FEB 11 1969

MODEL

33000

EDUCATIONAL
ANALOG COMPUTER



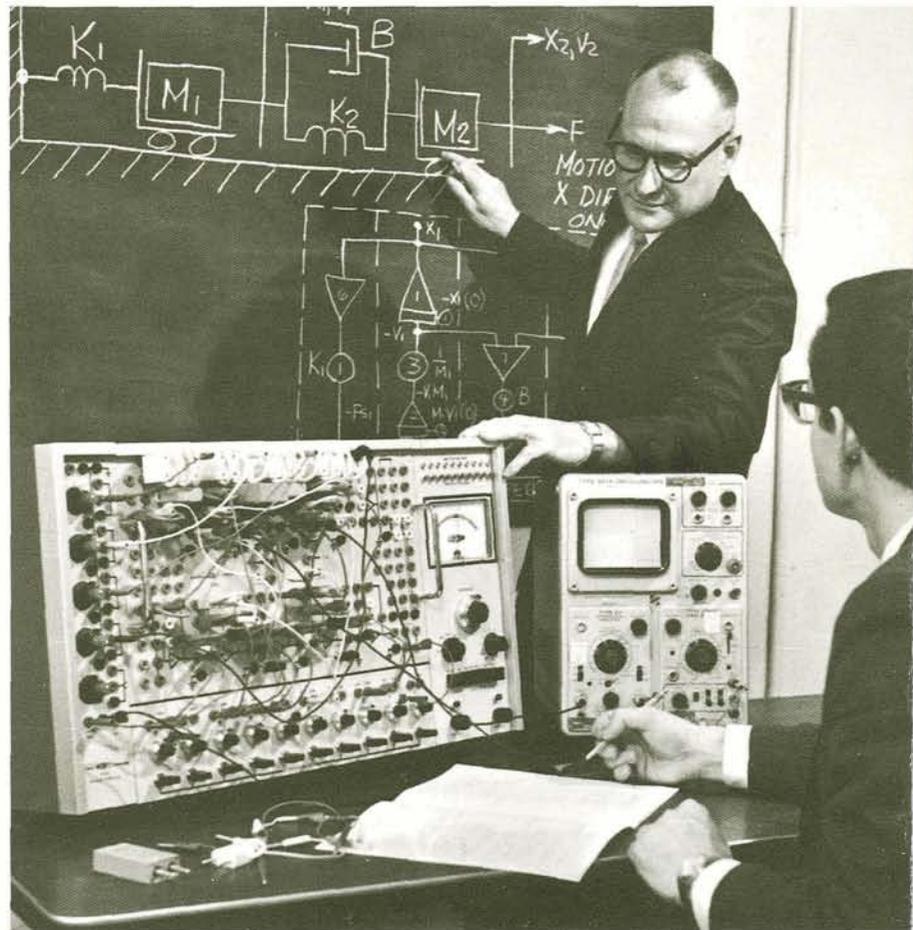
The SD 3300...the classroom Analog Computer specifically designed for student use. Demonstrate physical problems and complex mathematical solutions the easy way...with this modern, low cost classroom computer.

1 **Problem Diagram and Computer Program** are illustrated by instructor on blackboard. Student need only understand basic relationship of physical variables and constants.

2 **Computer** performs solution to the program that describes the system under study.

3 **Results** can be visually observed on the built-in voltmeter, an oscilloscope, or an XY recorder.

Student immediately captures the "feel" for seeking an optimum solution by being able to vary problem parameters on the computer and observe corresponding changes.



FOR INSTRUCTION....

The SD 3300 uses a problem board designed especially to solve problems peculiar to classroom instruction. Possession of several problem boards permits additional student groups to set up boards away from the computer and to store their programmed boards between classes for subsequent use.

To program a problem, students merely plug molded resistors, capacitors, and patch cords into terminals on the board. The amplifier designation on the problem board surface corresponds directly to the symbolism the students use in drawing computer diagrams. Thus, students capture a "feel" for computer programming by directly duplicating the programming instructions.

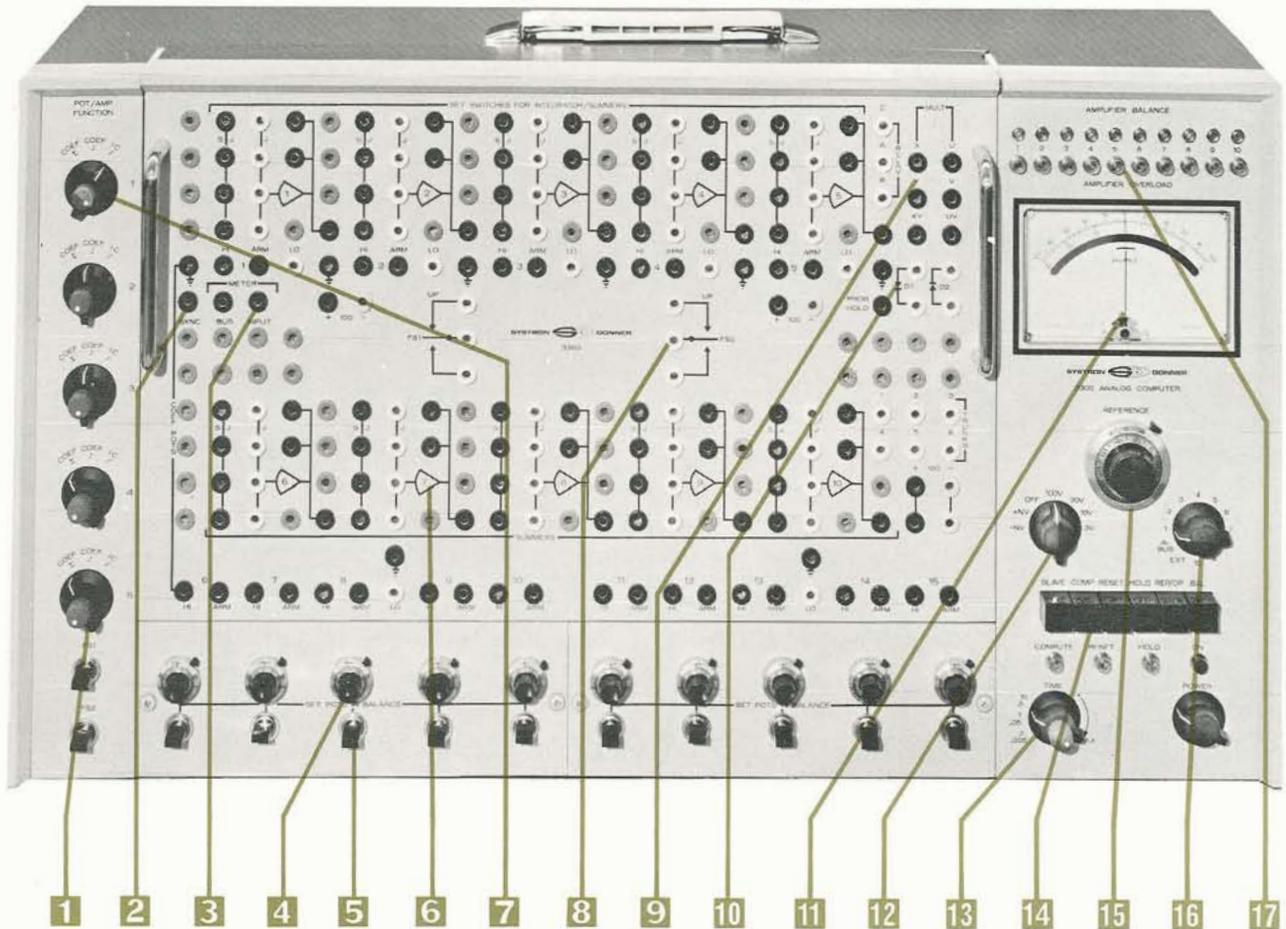
Using drift stabilized amplifiers, precision computing components, and ten-turn coefficient potentiometers, the 3300 meets all requirements for analog data handling systems with precision and versatility. All integrators may be controlled in the Compute, Reset, and Hold modes of operation either at the Computer's Control Panel or through remotely located contact closures. Thus, the 3300 may be left unattended and automatically controlled by external timing devices.

Equally compact and versatile non-linear accessories extend the data handling capabilities to include multiplication and function generation.

Big Computer Features

- * All solid state construction
- * ± 100 volt computing range
- * Removable problem board
- * Repetitive operation
- * 10 amplifier capacity
- * Null reference system
- * Visual computer circuits
- * Current limited protection

Modern Design – Simplicity in Operation



- 1** *COEFFICIENT POT STRIP*: 5 Single-turn potentiometers for use as IC or coefficient pots.
- 2** *SYNC OUTPUT*: Supplies a sync pulse to allow easy monitoring by an oscilloscope during Repetitive Operation.
- 3** *EXTERNAL* input to the Panel Meter allows meter to be used to measure voltages not available on the address switch.
- 4** *TEN-TURN, WIRE-WOUND POTENTIOMETERS* are available as an option in groups of five, with either counting dials or plain knobs.
- 5** *MOMENTARY CONTACT SWITCH*: When depressed, allows panel meter to read arm of respective potentiometer.
- 6** *STANDARD COMPUTER CIRCUIT SYMBOLS*: Student can compare to standard text books and visually follow his patching.
- 7** *IC NETWORKS*: Amplifiers 1 through 5 are supplied with initial condition networks which utilize reed relays giving compatible integrator switching times to allow slaving to an SD 10/20.
- 8** *FUNCTION SWITCHES* allow quick changing of coefficients and other problem parameters.

- 9** *PROBLEM BOARD TERMINATIONS* for use of existing 3700 Series Multipliers.
- 10** *FREE DIODES* for setting up comparator networks, dead zone and backlash circuits, etc.
- 11** *LARGE, EASILY READ PANEL METER* with mirror scale for elimination of parallax. 3, 10, 30 and 100 v ranges, \pm NULL and External.
- 12** *METER FUNCTION AND RANGE SWITCH*.
- 13** *REP-OP CONTROL*: Varies compute time and rate of repetition when computer is in Rep-Op.
- 14** *MODE CONTROL SWITCHES*: Compute, Reset, Rep-Op, Hold, Slave, and Balance.
- 15** *NULL REFERENCE POTENTIOMETER*: A precision 10-turn, wire-wound potentiometer featuring a large counting dial and 0.1% linearity.
- 16** *METER ADDRESS SELECTOR*: Amplifiers 1 to 10, Potentiometer Arm Bus, and External.
- 17** *OVERLOAD LAMPS*: Individual lamps for each amplifier indicate when summing junction deviates from zero.

A complete SD 3300 ready to use includes:

- 6 Operational Amplifiers, Model 3310—identical high performance “op amp” used in bigger SD 10/20 and 40/80 series.
- 5 Initial Condition Networks
- 5 Initial Condition or Coefficient Potentiometers
- 1 Removable Problem Board
- 1 ± 100 volt Reference System
- 1 Null Meter System
- 1 Starter Set of Patch Cords and Plug-in Components

At any time later, SD 3300 can be expanded to its maximum capacity of:

- 10 Operational Amplifiers
- 15 Coefficient Potentiometers

Big Computer Specifications

Operational Amplifiers

- Output range: ± 100 volts at 25 milliamps
- Gain: 10^7
- Electronic Chopper Stabilized
- Junction drift per 8 hours: < 100 microvolts
- Noise: < 10 millivolts peak-to-peak
- Individual overload indicators and individual balance adjustments provided.

Reference Supply

- ± 100 volt system, regulated to 0.01%. All supplies are current limited.

Initial Conditions

- 5 initial condition networks utilizing reed relays.
- 5 initial condition coefficient potentiometers settable

to better than 0.1% (useable as coefficient potentiometers).

Null Reference System

- Direct Meter Ranges: ± 100 v, ± 30 v, ± 10 v, ± 3 v full scale.
- Null reference potentiometer has better than 0.1% linearity.

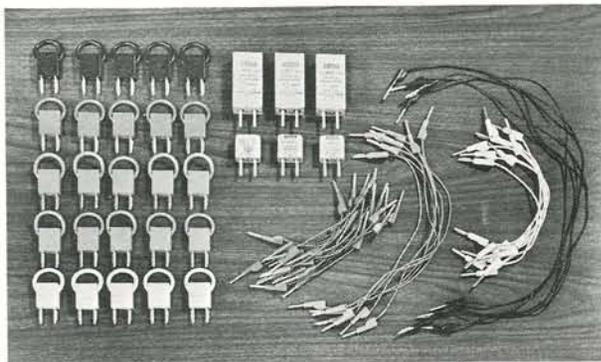
Integrator Networks

- 1 msec reed relays in integrator networks.
- Power Requirement: 115 or 230 v; 50-60 Hz.
- Power Consumption: 100 watts nominal.
- Dimensions: 27 $\frac{1}{4}$ " W. x 14 $\frac{3}{4}$ " H. x 8 $\frac{1}{2}$ " D.
- Weight: 75 lbs.

Versatile Accessories

Component Group Selections

(Selection "A" shown in picture)



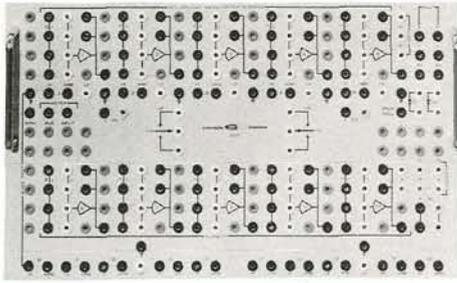
Selection A: 36 patch cords, 25 resistors (1%), and 6 integrating capacitors (0.1% polystyrene).

Selection B: A versatile assortment based on 1% resistors. 60 patch cords, 40 resistors (1%), and 8 capacitors (0.1% polystyrene).

Selection C: Precision components group. 60 patch cords, 25 resistors (0.1%), 6 high-ohm resistors (1%), and 13 capacitors (0.1% polystyrene).

Selection D: Largest assortment of precision components. 75 patch cords, 35 resistors (0.1%), 15 high-ohm resistors (1%), and 13 capacitors (0.1% polystyrene).

3360 Problem Board

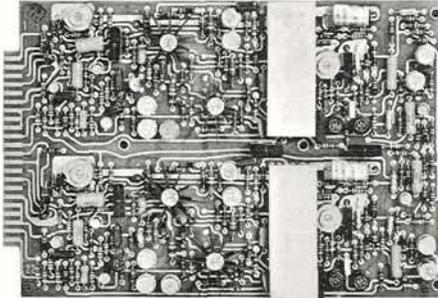


Featuring

- * Visual Computer Circuits
- * Multiple Input and Output Terminals
- * Free Diodes

The 3360 is economical and compact. The use of several Problem Boards with one computer adds appreciably to the versatility of the computer. It permits one group of students to patch a problem, while another solves a problem on the computer.

3310 Dual Operational Amplifier

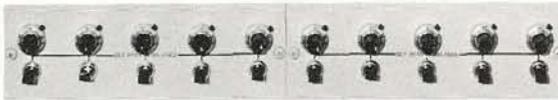


Featuring

- * ± 100 volts
- * Electronic Chopper
- * Current Limited Output

This is the same reliable, field proven amplifier used in the large SD 80 and SD 10/20 series computers. A fully expanded 3300 computer contains five 3310 Dual Operational Amplifier plug-in cards.

Potentiometer Panels

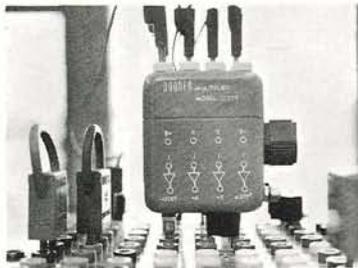


Ten 10-turn, wire-wound potentiometers with counting dials or plain locking knobs may be added in groups of five. Resolution is 0.013%.

Available are: Model 3375 Pot Group—five 10-turn, wire-wound pots with lockable counting dials.

Model 3376 Pot Group—five 10-turn, wire-wound pots with plain locking knobs.

3732P Quarter Square Electronic Multiplier

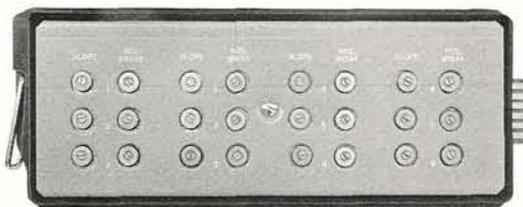


Input: ± 100 volts
Output: $0.01 XY (\pm 100 v)$
Accuracy: 0.25%
Bandwidth: 15 kHz
Phase Shift: 1° at 1 kHz

Mounts directly on Problem Board. Rotary switch automatically programs for multiplication, division, or square root.

Requires 2 to 3 operational amplifiers.

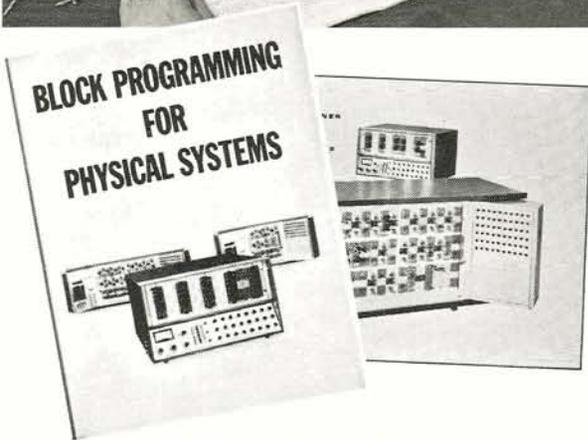
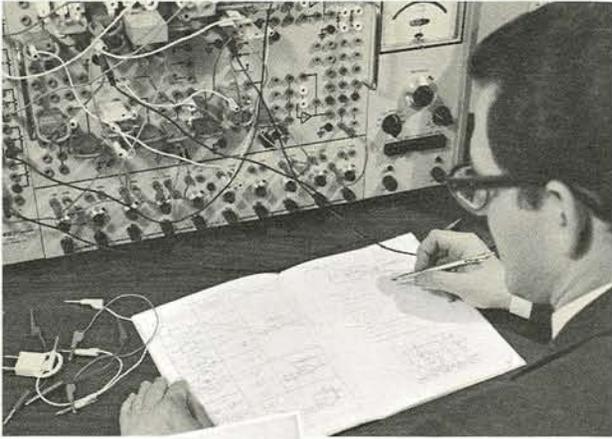
3351 Variable Diode Function Generator



12 segments: 6 positive, 6 negative
Variable breakpoint and variable slope
Input: ± 100 volts
Output: ± 100 volts
Frequency Response: 1 kHz

Requires 2 operational amplifiers. A high resolution DFG, Model 3352 is also available for use with the 3300 computer.

Helpful Training Aids in Analog Computation



The Computer Operations Group at Systron-Donner has developed a series of useful applications bulletins and computer programming guides. Most of these user-oriented publications are specifically designed to help the student and researcher gain a better understanding of how to use a portable, desk top analog computer.

The following topics are described in literature offered free of charge:

- "How to Use and Program Analog Computers"
- "How to Simulate a Non-Linear Control System with an Analog Computer"
- "Block Programming for Physical Systems"

Available to all S-D Computer customers is a new Analog Computer Handbook. This publication, offered free of charge with every 3300 Analog Computer, is a hard-bound, 22-chapter book that covers most thoroughly all important computer "software" aspects, including digital logic control.

The Most Experienced in Desk Top Computers

More than 13 years of experience stand behind Systron-Donner's present computer developments. Systron-Donner manufactures analog computers that range in size from the small 3300 computer to the large SD 80 which can be expanded to well over 100 operational amplifiers.

Fields of application, where SD computers are used, include electrical, mechanical, industrial, agricultural, chemical, aeronautical, petroleum, nuclear, and civil engineering; physics, psychology, medicine, mathematics, astronomy, geophysics, and economics.

Technical Sales Assistance



Address of nearest S-D Engineering Representative

Systron-Donner's Total Computer Program is geared to offer complete service. Computer demonstrations, applications assistance, and close personal handling of customer requests are offered by the factory as well as your nearest S-D engineering sales office.

SYSTRON  DONNER

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