# TYPICAL AD/FIVE CONFIGURATION

## ANALOG COMPUTING COMPONENTS

- Integrator/Sums .......................... 36
- Summer/High Gain .......................... 24
- Summer/Inverters .......................... 36
- Summer/Dual Electronic Switches (associated with non-linear equipment) .......................... 36
- Inverters (committed to non-linear equipment) ..................................................... 192
- Hand Set Potentiometers ......................... 12
- Servo Set Potentiometers .............. 108
- Multipliers (quarter square) .............. 24
- Sine/Cosine DFG .............................. 6
- Logarithmic DFG ...................... 6
- Arbitrary Function Generator .......... 23
- Dual Digital to Analog Switches .......... 24
- DPDQ Relays .................................. 12
- Function Switches ............................ 12
- Hard Limiters .................................. 12
- Comparators .................................. 16
- Track/Store Networks ...................... 4
- Analog Trunks ................................ 110

(The above counts are typical and may be modified to fit the users' requirements.)

## TYPICAL PERFORMANCE CHARACTERISTICS

### AMPLIFIER

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Range</td>
<td>±13 V</td>
</tr>
<tr>
<td>Output Current (at ±10 volts)</td>
<td>45 ma</td>
</tr>
<tr>
<td>Output Protection</td>
<td>Short circuit proof to any voltage in the range ±15 volts</td>
</tr>
<tr>
<td>Open Loop D.C. Gain</td>
<td>2 x 10³</td>
</tr>
<tr>
<td>Velocity Limit</td>
<td>50 V/sec</td>
</tr>
<tr>
<td>Bandwidth (10K/10K)</td>
<td>1.5 MHz</td>
</tr>
<tr>
<td>Peaking</td>
<td>1.0 db</td>
</tr>
<tr>
<td>Noise peak-to-peak (0-800 KHz)</td>
<td>0.5 mV</td>
</tr>
<tr>
<td>Offset at Summing Junction</td>
<td>± 20 μV</td>
</tr>
<tr>
<td>Phase Shift at 1.0 KHz</td>
<td>0.02°</td>
</tr>
<tr>
<td>T.I.D.E. at 1.0 KHz</td>
<td>0.04%</td>
</tr>
<tr>
<td>T.I.D.E. at 10 KHz</td>
<td>0.4%</td>
</tr>
<tr>
<td>Overload Recovery from either voltage or current overload condition</td>
<td>0.6 msc</td>
</tr>
</tbody>
</table>

### INTEGRATOR

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Scales</td>
<td>x1, x10, x100, x1000</td>
</tr>
<tr>
<td>Inputs</td>
<td>3 Gates of 1, and 3 Gates</td>
</tr>
<tr>
<td>Mode Control</td>
<td>Electronic Switching for IC, OP, HOLD</td>
</tr>
<tr>
<td>Switching Time Between any Two Modes</td>
<td>900 nanoseconds</td>
</tr>
<tr>
<td>Drift in Hold (x1 or x10 time scale)</td>
<td>50 μV/sec</td>
</tr>
</tbody>
</table>

### POTENTIOMETERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance</td>
<td>5 Kohms</td>
</tr>
<tr>
<td>Setting Time</td>
<td>1.5 sec</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.02%</td>
</tr>
<tr>
<td>Phase Shift Range at 1.0 KHz for settings greater than 0.1</td>
<td>± 0.1°</td>
</tr>
</tbody>
</table>

### MULTIPLIERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Error (</td>
<td>x</td>
</tr>
<tr>
<td>Zero Error (i.e., x + y</td>
<td>0)</td>
</tr>
<tr>
<td>Bandwidth (x = 10 V, y</td>
<td>20 V)</td>
</tr>
<tr>
<td>Phase Shift at 1.0 KHz</td>
<td>0.03°</td>
</tr>
<tr>
<td>Phase Shift at 10 KHz</td>
<td>0.3°</td>
</tr>
<tr>
<td>T.I.D.E. at 1.0 KHz</td>
<td>0.06%</td>
</tr>
<tr>
<td>T.I.D.E. at 10 KHz</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

### LIMITERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limit Range—Plus Limit</td>
<td>–10 V to ±10 V</td>
</tr>
<tr>
<td>Limit Range—Minus Limit</td>
<td>–10 V to ±10 V</td>
</tr>
<tr>
<td>Slope after Limit</td>
<td>1.0 mv/V</td>
</tr>
</tbody>
</table>

### LOGIC ELEMENTS

- Flip Flops .................................. 16
- OR/NOR Gates ................................ 60
- Two Input Gates ................................ 36
- Four Input Gates ................................ 16
- Six Input Gates ................................ 8
- Multiple Carry-Out Two-Decade BCD Counters ............. 4
- Variable Carry-Out Two-Decade BCD Counters .......... 4
- Logic Switches (3 position) ................... 6
- Function Switches (2 position) .............. 6
- Logic Trunks .................................. 20

### HYBRID ELEMENTS

- Analog to Digital Converter Channels ............. 16
- Digital to Analog Converter Channels .......... 16
- Digital Sense Lines ................................ 16
- Digital Control Lines ................................ 16
- Digital Interrupt Lines ......................... 8

### ADDRESSING SYSTEM

- Circuitry and Switches All solid state |
- Readout System Input Impedance 10 ohms |
- Multiplex Rate for Hybrid Operation 5,000 points/sec |

### INTERVAL TIMER (REP-OP TIMER)

- Number of Pre-settable Periods | 3 |
- Circuitry | BCD Counter |
- Counter Input | Derived from 1.0 MHz Logical Clock |

### DIGITAL-TO-ANALOG CONVERTER

- Configuration | 14 bits plus sign, double buffered |
- Track/Store | Optional |
- Phase Shift at 1.0 KHz | 0.00 |
- Bandwidth | 500 KHz |
- Settling Time to ±0.02% | 7 μsec |
- Accuracy | ±0.025% |

### ANALOG-TO-DIGITAL CONVERTER

- Configuration | 14 bits plus sign |
- Hold Amplifiers | Optional |
- Throughput Rate | 100 KHz |
- Throughput Accuracy | ±0.025% |

### DIMENSIONS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>62.5 in</td>
</tr>
<tr>
<td>Length</td>
<td>62.5 in</td>
</tr>
<tr>
<td>Depth with Work Shelf</td>
<td>46 in</td>
</tr>
<tr>
<td>Depth without Work Shelf</td>
<td>29.5 in</td>
</tr>
</tbody>
</table>

### POWER REQUIREMENTS—ANALOG COMPUTER

- Voltage | 105-125 v ±, 50-60 Hz |
- Current | 15 amp. max. |
AD/FIVE gives you more than hybrid computation speed and accuracy.

You expect speed and accuracy from any computer. You get both, plus major advances in analog/hybrid computer design in the AD/FIVE. Measure these advances in terms of configuration, control convenience, design, patchload termination, saving, man-machine ease of communication and hybrid interfacing. You won't be disappointed. You will be impressed. By the unique interface and control structure which gives you equally efficient manual or digital processor control. By the small amount of digital programming required to accomplish hybrid control. By the way the AD/FIVE handles hybrid and interactive analog computation quickly and precisely. Drift free, virtually spikeless switching performance is easy for the AD/FIVE, assuring you of computational accuracy in your computer laboratory.

Total system "up-time" is due both to the conservative circuit design that has become a trademark of Applied Dynamics products and to the balanced design for static and dynamic performance of the components that make up the AD/FIVE. Most-wanted features of the AD/FIVE include:

• All solid-state addressing system.
• Modular design easily expanded to complete hybrid system.
• Performs in normal ambient conditions without special air-conditioning requirements.
• Operates on 115v a-c, 15 amp, 1 phase supply.
• Completely mobile and easily moved through standard 30" doorways.
• Basic clock is 1 megahertz crystal with accuracy to ten parts per million.

The AD/FIVE interface system design makes optimum use of the control and operational features of both the AD/FIVE and the PDP-11 family of digital computers.

The PDP-11 from Digital Equipment Corporation is a 16-bit, parallel-logic machine using two's complement arithmetic. The computer may be equipped with up to 128 K words of addressable core memory. All computer system components and peripherals communicate with one another on a single high-speed data bus known as the Unibus™. The Unibus concept is the key to the many strengths of the PDP-11 and one of the reasons this machine was chosen by Applied Dynamics for the digital subsystem. Devices on the Unibus are addressed in the same manner as core memory locations and special I/O instructions are not needed. The PDP-11 may be equipped with disk, magnetic tape, paper tape and punched card memory systems. An optional Extended Arithmetic Unit provides high-speed hardware, multiply and divide capability. The AD/FIVE and PDP-11 are joined by interface hardware to allow digital computer control of the analog and logic modes, repetitive operation, address and data registers, time scale, autohold, problem verify, setting and reading coefficient devices, interval timer, digital ratiometer, analog-to-digital conversion, digital-to-analog conversion, sense lines, control lines, and interrupt lines. The interface can also become master of the PDP-11 Unibus, allowing full use of the priority bus request and non-processor request features. These permit direct memory access (DMA) and cycle steal (CS) modes of operation.

The analog-to-digital converter system in the interface is a 100-KHz, 14-bit plus sign, 10-volt unit. Eight multiplexer channels are supplied with the basic converter. An additional eight channels may be readily added, at extra cost. The A-to-D converter features random access or sequential modes of operation under computer control.

The digital-to-analog converter system includes double-buffered, 14-bit plus sign multiplying D-to-A converters.

The sixteen control lines, sixteen sense lines and eight interrupt lines are terminated in the logic section of the patch panel. The control lines are set and the sense lines read by the digital computer through the interface system. Alternately, an operator may manually set the control lines or read the sense lines through appropriate commands from the optional digital access panel (DAP).

Compatibility, mobility and hybrid computer versatility.
Central Overload Panel alerts you to overload conditions by illuminating indicators for the programmable operational amplifiers and to the fixed and variable diode function generators. Overload panel layout corresponds to the patch panel and includes indicators for "plus" reference, "minus" reference and the address selector unloading amplifier. Six unassigned indicators can be used to accommodate future expansion.

Digital Access Panel permits monitoring of the interface operation and manual access to the interface system. It is used to simplify both programming and maintenance.

Logic Control and Indicator Panel takes a compact, orderly approach to the arrangement of the logic state indicators, analog and logic function switches, comparator override control switches, flip-flop load switches and the binary-coded decimal counter thumbwheel switches.

Control Panel contains the in-line readout display for the address selector system, the digital ratiometer, the coefficient device data register, and controls for the interval timer, the address selector system, the analog and logic modes, the time scale, the analog voltmeter and other miscellaneous controls.

Patch Panel terminates both analog and logic components. The same type of patch cord is used for analog and logic patching. Patch panel motor drives assure uniform patch panel movement between the patchcord tips and the patchbay springs no matter how the patchbay frame is loaded. Configuration is easily modified by changing circuit cards and patchpanel modules. A reversible patch panel may be used with up to a half-full AD/FIVE making it possible for two problems to be patched on the same patch panel for a 50% reduction in patch panel costs.

The upper third of the patch panel is for patchable logic components and controls; the bottom two thirds for terminating analog components. Each third is divided into twelve vertical sections.

The panel contains 36 modules, each with 96 holes. Modules are put into the patch panel in the order and location needed by the user. Patch cords may be inserted or removed with the patch panel engaged and with the power on or off.
THE ADDRESS SYSTEM

The all solid-state, serial-entry type address system uses field effect transistors, rather than relays, for speed and reliability. It is possible to address up to 721 points in the AD/FIVE from momentary-contact push buttons located in the center of the control panel. The system may be used as a 300-readings-per-second multiplexer with the digital ratiometer in hybrid operation, and as a 5,000-readings-per-second multiplexer when used with an analog-to-digital converter. The six addressable classes of components in the system are:

1. Amplifiers
2. Potentiometers
3. Trunks
4. D-to-A converters
5. Non-linear
6. Miscellaneous

The address called for and its corresponding digital ratiometer value appear on the in-line display windows. A CLEAR button permits the operator to reset the address register at any time during the selection sequence. The address system provides digital computer access through optional hybrid interface expansion modules.

SETTING THE SERVO-POTENTIOMETER

To set the servo-potentiometer, the operator addresses the pot, depresses the DATA ENTRY push button and enters the five-digit value on the serial-entry keyboard. Then he depresses the SET COEF button. In less than 1.5 seconds, the addressed pot sets itself to the desired value. At the completion of the setting operation the control state returns to ADDRESS. If the operator wishes to control the servo pot manually, he uses the buttons labeled UP and DOWN. The pot setting control rate is regulated by a knob on the control panel.

ANALOG MODE CONTROL

The mode of the AD/FIVE integrators is controlled by the push buttons IC (Initial Condition), OP (Operate), and H (Hold). Solid-state "FET" switching circuits switch all three modes in less than 900 nanoseconds. All integrators are controlled by the analog mode control push buttons, unless the programmer chooses to control individual integrators from the patch panel logic section.

LOGIC MODE CONTROL

Logic mode control push buttons are directly below those for analog mode control. In the Load mode, all logic components are set to their initial states or cleared when appropriate. In the Run mode, clocking signals are applied to all patched elements. The Stop mode interrupts the clocking signals, freezing the logic. The logic Step push button allows the operator to advance the logic program manually.

LOGIC EXECUTIVE

The LOGIC EXEC push button transfers the console analog mode control from the control panel push buttons to control by the interval timer. This lets the operator control the interval timer from the LOAD, RUN, STOP logic control push buttons and activates the Repetitive Operation mode without any patching.

INTERVAL TIMER CONTROL and TIME SCALE CONTROL

Three two-digit thumbwheel switches, A, B and C, let the operator select three sequential timing intervals for cyclic control of all three analog modes. The three push buttons located below the thumbwheel switches are the basic clock increment selectors for the interval timer. The time scale controls are the x10 and x100 push buttons.

Interval = \((\text{thumbwheel setting}) \times (\text{basic clock increment})\)

(time scale)

Intervals from 10 microseconds to 99 seconds are available by using the push buttons and thumbwheel switch controls.

The patch panel gives additional local control. The AD/FIVE interval timer counts clock signals derived from the one-megahertz, crystal-controlled basic clock. It exhibits timing precision far better than analog techniques. In hybrid operation, the interval timer may be controlled from the digital computer, a valuable optional feature.

As for time scale control, it's easily achieved by using the x10 and x100 push buttons. Time scales include x1, x10, x100 and x1000. Local time scale control is available at the patch panel.

OTHER CONTROLS

SLAVE ON BUTTON allows the AD/FIVE to be slaved to another AD/FIVE.

HYBRID ON BUTTON transfers control of the AD/FIVE to the digital computer or the optional Digital Access Panel.

PROBLEM VERIFY push button controls relays that disable certain patch panel reference terminals and activate others. This action allows test initial conditions to be applied to integrators for problem verification.

TEST BUTTON activates the integrator test mode, determining the derivative current present at the summing junction of an addressed integrator in the IC mode.

AUTO HOLD BUTTON places all the integrators in the Hold mode automatically when any amplifier or non-linear device goes into an overload condition. If the LOGIC EXEC push button is activated, all logic elements in the AD/FIVE will also freeze, a useful feature when running a hybrid problem.

ANALOG VOLTMETER CONTROLS allow the operator to select voltage range, and to monitor address selector outputs and the power supply outputs.
AD/FIVE
COMPUTING COMPONENTS

Printed circuit cards
with plated-through holes
and gold plated contacts are typical
of the reliability features found in
AD/FIVE components. TTL integrated
circuits are used where appropriate for logic and
control circuits throughout the computer.

STABILIZED OPERATIONAL AMPLIFIERS
are solid-state throughout, including the chopper. Frequency
response is excellent and the amplifiers can withstand a
sustained short circuit, either to ground or to any voltage
at the patch panel, without amplifier damage. High-
speed recovery from either a voltage or current overload
condition is a key requirement for all types of analog and
hybrid computations.

SUMMER/INTEGRATOR is configured as an integrator
by the use of a bottle plug. The high-speed, electronic
mode control switching circuitry is normally controlled
by the console Operate and Hold busses. For iterative
and hybrid applications, this circuitry may be controlled
from the logic section of the patch panel. Time scale
control is also available from the patch panel. Each
integrator network has three gain-one inputs, three gain-
ten inputs, two initial-condition inputs and three outputs.

SUMMER/HIGH GAIN AMPLIFIERS have three gain-
one inputs, three gain-ten inputs, three outputs and two
output diodes which may be patched to limit the output
of the summer to either positive or negative voltages,
or to generate simple non-linear functions.

SWITCH/SUMMER AMPLIFIERS have two electroni-
cally-switched inputs and one unity-gain input. The
high-speed input switches are normally closed, con-
f iguring the switch/summer as a three-input summer.
Control of the 900-nanosecond switches is available on
the logic section of the patch panel.

TRACK-STORE NETWORKS may be used with the
summer/high gain amplifiers, summer/integrator ampli-
fiers or the inverter amplifiers. There are two track
inputs and an initial-condition input available on the
patch panel. Track and IC control lines terminate in the
logic section of the patch panel. Network switching time
is less than 900 nanoseconds.

SERVO-SET POTentiOMETER SYSTEM is built for
accuracy, speed and reliability. Each potentiometer has
a d-c servo motor and a motor pulley connected to the
potentiometer shaft by a rubber belt drive. There are no
gears or clutches to wear out, or to cause backlash. A
non-linear resistor (a lamp in series with the wiper arm)
provides potentiometer arm protection. The potentiom-
eters are precision wire-wound, ten-turn devices.

QUARTER-SQUARE MULTIPLIERS are of two types.
First is a regular multiplier with two input inverters and
one output amplifier. Second is the convertible multi-
plier, which converts to a dual-square unit to perform
square or square root operations. It has two input in-
verters and two terminating amplifiers, one of which is
available as an inverter when in the multiply or divide
m odes. Both multipliers have high accuracy and high
bandwidth characteristics with total error at 1 KHz of less
than .09%. Sine/cosine generators and log function
generators are also available.

DUAL VARIABLE DIODE FUNCTION GENERATOR
may operate as two independent, ten-segment, fixed-
breakpoint DFG’s or a single, ten-segment DFG with
variable breakpoints. Each DFG has an input inverter and
a terminating amplifier. When neither function generator
in the pair is used, the terminating amplifiers may be used
as inverters elsewhere in the program. A three-position
switch labeled F (fixed), V (variable) and I (inverters)
selects the desired mode. Function generator set-up is
simple using an optional VDFG calibrator unit.

MASTER/SLAVE CLOCK SYSTEM eliminates the prob-
slems of logic systems that operate on leading and trailing
edge clock pulses. The AD/FIVE two-phase clocked
logic system prevents propagation delay errors, race
conditions and erroneous state changes. It is ideal when
two consoles are slaved together.

OR/NOR LOGIC GATES have 2, 4 or 6 inputs and both
normal and complemented outputs. AND/NAND func-
tions need no further equipment. Each gate has state
indicators on the logic control and indicator panel. The
dual flip-flops may be used independently or as cells in
binary counters, or shift registers. Each flip-flop pair has
common Enable and Load inputs. Each flip-flop of the
pair has individual Trigger, Set, Clear and Load Set
inputs and both normal and complemented outputs.
AD-FIVE/PDP-11 SOFTWARE OPERATING SYSTEMS

PAPER TAPE SOFTWARE SYSTEM
(for PDP-11's not equipped with magnetic tape or disk)

P-11 RELOCATABLE ASSEMBLER
The Relocatable Assembler translates your assembly language program into a relocatable object module. This two-or-three-pass assembler can be used on small systems. It will run with 8K words of core memory and an ASR-33 Teletype.

P-11A ABSOLUTE ASSEMBLER
Available in both 4K and 8K versions, P-11A lets you define a source program with letters, numbers or symbols and then assemble an object program in absolute binary so that it will be meaningful and usable by the PDP-11. Position-independent code can be assembled with P-11A.

ABSOLUTE LOADER
This is used to load programs punched in absolute binary format into core memory.

PAPER TAPE EDITOR (ED-11)
The Editor lets you enter portions of a source program from a teletypewriter or paper tape and make corrections or additions to text.

ODT-11 ON-LINE DEBUGGING TECHNIQUE
Paper tape debugging programs are similar to ODT-11R (described below) except they do not work in a relocatable environment. Two versions are available, one being a subset of the other.

10X INPUT/OUTPUT
UTILITY PERIPHERAL DRIVER
10X is a service routine that allows single-or-double-buffered I/O processing on an ASR-33 Teletype or with a paper tape. These routines let you make simple assembly language calls in a device-independent manner.

FLOATING POINT AND MATH PACKAGE (FPP-11)
A number of commonly used subroutines are available to perform arithmetic operations. These routines are reentrant and position independent to provide maximum flexibility.

HYBRID COMMUNICATION ROUTINES (HCR's)
The HCR's are Fortran callable subroutines written in Assembly language. The extensive HCR LIBRARY includes a wide variety of functions used to control and communicate with the AD/FIVE Analog/Hybrid System.

AD/FIVE HYBRID BASIC (HYBASIC/PT)
HYBASIC is an extension of Dartmouth BASIC to include all of the HYBRID COMMUNICATION ROUTINE (HCR) functions in an interactive environment. It operates in a minimum of 8K core.

PDP-11 LINKER (LINK-11)
LINK-11, like its disk counterpart, combines relocatable object modules into absolute modules, suitable for loading into core.

DISK OPERATING SOFTWARE SYSTEM
(for PDP-11's equipped with magnetic tape and disk)

EDIT-11 TEXT EDITOR (DOS)
EDIT-11 is a text editing program for use with the Disk Operating System. Operated by user commands from the keyboard, EDIT-11 will read ASCII files from any device, make direct changes and write on any device. In addition to basic editing functions EDIT-11 provides for command macros and multiple input and output files. Utility commands such as SAVE, UNSAVE, EXECUTE MACRO, EDIT OPEN, END FILE and EXIT are part of the EDIT-11 package.

MACRO ASSEMBLER (MACRO-11)
MACRO-11 translates symbolic assembly language programs, which may include macro definitions, into relocatable binary object modules.

PDP-11 LINK (LINK-11)
LINK-11 combines the outputs of several assemblies and/or Fortran compilations into one load module. It is a powerful tool when constructing large software systems.

FORTRAN IV
ANSI FORTRAN IV (DOS) is available for preparation of hybrid programs where this standardized mathematical language is more beneficial.

HYBRID COMMUNICATION ROUTINES (HCR's)
As described in column 1 on this page.

HYBASIC (DOS)
HYBASIC (DOS) is an extension of Dartmouth BASIC which includes all of the HYBRID COMMUNICATION ROUTINE functions in an interactive environment. In addition, HYBASIC (DOS) features a powerful file handling capability when used with the Disk Operating System.

PERIPHERAL INTERCHANGE PROGRAM (PIP)
PIP is a general utility program which is used to transfer a file from one system device or peripheral to another. Also included are routines for file and directory maintenance.

ON-LINE DEBUGGING TECHNIQUE (ODT-11R)
This is a core-resident program, operating in a relocatable environment, that lets you debug your binary programs at the console by running them in specific segments and checking for expected results at various points.

TRACE UTILITY
TRACE allows you to trace operations of your program with listing on the output medium.

DIAGNOSTIC PROGRAMS

MAINDEC
MAINDEC is a complete set of comprehensive tests for the PDP-11 hardware such as the CPU test, memory test and peripheral tests.

LINKAGE DIAGNOSTICS (LKD)
LKD is a main line program consisting of thirteen independent subroutines designed to completely check out the hybrid interface system and the AD/FIVE control registers and servo-set potentiometer system. The DAC system, ADC and DRM systems, sense and control system are readily tested by the operator.

The Assembly language version of LKD will operate in the 8K version of the PDP-11 paper tape system whereas the Fortran LKD version is available for PDP-11's equipped with the Disk Operating System.

PROGRAM LIBRARIES

FORTRAN IV LIBRARY—EAEILIB
For use with PDP-11's equipped with the Extended Arithmetic element, the library includes such functions as exponential, truncation, logarithm, square root, sine, cosine, plus many more.

FLOATING POINT AND MATH PACKAGE (FPP-11)
A number of commonly used subroutines is available to perform arithmetic operations. These routines are reentrant and position independent providing maximum flexibility.

As new programs and routines are developed they will become available to PDP-11 users through the PDP-11 program library or from DECUS, the Digital Equipment Users Society. DECUS is a voluntary, non-profit users group whose objective is to serve as an exchange center among users for ideas and information. DECUS maintains an extensive software library, publishes a newsletter and conducts technical symposia twice a year in the U.S. and annually in Europe and Canada.

PERIPHERAL EQUIPMENT
A complete line of analog readout and display equipment is available for the AD/FIVE Analog/Hybrid System. X-Y Recorders, Multi-channel Strip Chart Recorders, Multi-channel High Speed Repetitive Operation Scopes, Storage Oscilloscopes and the Dynamics Terminal System may be added to the AD/FIVE to satisfy the user's requirements.