TAB-1   MODULAR SUPPORT TABLE
        (27"h x 24"w x 27"d)

        This table covers the display and mini-computer housing
        assembly and is supported in the front by two legs. It
        is an attractive as well as functional support for the
        monitor and keyboard assembly.

TAB-2   EXTENDED MODULAR SUPPORT TABLE
        (27" h x 48" w x 27" d)

        This table is twice as long as TAB-1, providing the
        PDS-1 operator with additional work area and space for
        a console or other device.

HRC-1   HIGH CONTRAST, HIGH RESOLUTION CRT

        This tube has a contrast ratio of 20:1 which is twice that
        of the standard tube. Spot diameter is nominally 12 mils
        rather than 20 mils as with the standard tube. Brightness
        is 50 foot lamberts.

HOZ-1   HORIZONTAL CRT

        This option consists of a horizontally mounted 14" CRT,
        which allows the display of up to 128 characters per line.
        Character size and number of character/line are determined
        by both analog and software adjustments.

SLM-1   SLAVE DISPLAY MONITOR (14")

        The standard slave is a 14" CRT monitor; other sizes are
        available on request. There is no practical hardware limit to the
        number of slaves one PDS-1 can drive.

DSK-1   ADDITIONAL DISPLAY MONITOR AND KEYBOARD

        In situations where multiple keyboard-monitor terminals
        driven by one PDS-1 are justified economically, it is
        possible for an applications programmer to develop
        software that treats each display and keyboard independently
        so that each keyboard operator thinks he has his own display
        terminal.

        This option provides the interface and switching logic to
        allow such programs to be written. The monitor and keyboard
        are included and are identical in construction and appear-
        ance to the basic display head.

CAB-1 8' CABLE FOR MODEM OR ACOUSTIC COUPLER

This 8 foot cable is used to connect the PDS-1 serial
interface to modems equipped with EIA (RS232 standards)
connectors.

CAB-2 8 KEYBOARD PATCH CABLE

CAB-3 8' CRT PATCH CABLE

These cables increase the versatility of the basic PDS-1
by permitting the independent relocation of the monitor
and keyboard remote from the mini-computer and display
processor assembly.

ROM   READ ONLY MEMORY BOOTSTRAP

When either a Programmer/Maintenance Control Panel (CON-1)
or Reload Cassette (REL-1) is not ordered, a Read Only
Memory Bootstrap must be used to get the PDS-1 "on the
air". This short program (40_8 instructions) allows the
user to read in the block loader program. The block loader
generally precedes the main program on paper tape or other
input medium and is read into a transient area of the oper-
ating program in order to conserve core.

Read Only Memories must be ordered for a specific input
device (teletype,photoelectric tape reader, or on-line
computer). Special ROM bootstraps for reading input from
other devices are available on request providing they do
not exceed 40_8 instructions.

CON-1 PROGRAMMER/MAINTENANCE CONTROL PANEL

The price for this option includes additional software
consisting of an assembler, debugger, and various diag-
nostic tests and loaders.

The console comprises data and address switches, memory
buffer, accumulator, program counter, and memory address
register content lights. Additional function lights and
switches allow the user to observe and control the state
PDS-1. The user is able to step through a program cycle
by cycle or instruction by instruction and manually read
or write any location in memory.

LVH-1 LONG VECTOR HARDWARE

The LVH-1 allows the programmer to draw solid, dotted, or
invisible lines from the present cursor position to any
other location on the screen using only three instructions,
resulting in a considerable savings in core memory. Each
display accumulator (LSB & MSB) acts as a continuous binary
accumulator rather than as a dual independent unit. Because
vectors generated with LVH-1 are drawn at the same rate

as those generated in increment mode and core memory need be referenced only three times, the number of memory cycles stolen by the display processor is substantially reduced. This gives the mini-computer more time for data processing I/O transfers, etc.

SGR-1 SUPPRESSED GRID FEATURE

SGR-1 consists of hardware which, when coupled with appropriate subroutines, permits the rapid drawing of horizontal and vertical lines at reduced beam intensity. For example: a 20 line x 20 line reference grid, covering the entire screen can be drawn in under 2.5 ms, thus consuming less than 10% of available display time. The high contrast between the grid lines and displayed data and characters makes this feature very useful in data display and analysis applications.

MDS-1 8 LEVEL DISPLAY SUBROUTINE FEATURE

MDS-1 provides the Display Processor with an 8 level nested subroutine capability which may be utilized to conserve core in applications where one or more image subroutines are used extensively as the basic components of more complex pictures.

For example, a subroutine could be generated which would construct a benzene ring from six short vector subroutines stored in core. The benzene ring could in turn be called to construct a variety of more complex chemical molecules, etc. For each sub-picture so generated, an additional level of nested subrouting is required.

Thus, a wide variety of composite pictures may be constructed and each called for display with a single instruction.

ACI-1 ADDRESSABLE CLOCK WITH INTERRUPT

This real-time digital clock option is 16 bits long and may be preset to any desired value via an I/O instruction. The resolution of the clock is 1 millisecond, derived from counting PDS-1 memory cycles. Hence, the clock will not continue to count when the machine is stopped. When the 16 bit register overflows, an interrupt will occur if the interrupt function is enabled. An I/O instruction is also available to read the clock at any time. Other counting speeds are available.

ACI-2 ADDRESSABLE CLOCK WITH INTERRUPT

Same as ACI-1,except IEI-1 is not required.

HDC-1 HALF DUPLEX COMMUNICATIONS LOGIC

HDC-1 provides the logic necessary to take care of the

turn-around (sometimes referred to as "reverse channel")
condition required on Bell 202C or equivalent modems.
This option is not required for synchronous modems or for
those meeting the Bell 103 standards.

DFI-1   END OF DISPLAY FRAME INTERRUPT

When enabled, this option will generate an interrupt when-
ever the display refresh sync flip-flop is set. This
feature eliminates the need for the less efficient skip/
wait routine usually employed by the mini-computer to
determine when to restart the Display Processor.

SIT-1   ADDITIONAL ASYNCHRONOUS SERIAL INTERFACE
        (CARD ONLY, NOT INSTALLED)

An additional serial card which is plug replaceable with
either the standard serial interface card or TKA card.
This allows the user to have additional rates for either
the standard serial I/O or TKA interfaces.

DSA-1   DUAL SPEED ASYNCHRONOUS SERIAL INTERFACE
        (WITH SELECTOR SWITCH) INCREMENTAL

The price for this option is the incremental cost for
obtaining a second speed (manually selectable) with either
the TKA or standard serial I/O interfaces. The switch is
physically located on the rear connector panel.

TTS-1   SERIAL I/O SELECTOR SWITCH

This option provides the operator with manual switch
control of any serial interface in order to eliminate
problems caused by simultaneous transmission of data by
two devices. For example, when two peripherals are
interfaced with a PDS-1, and the switch option is employed,
the operator can communicate with either device without
manually changing the cables. This assumes, of course,
that both devices communicate with the PDS-1 at the same
speed. If these devices operate at different speeds
through the same serial interface, the DSA-1 option must
also be employed.

IEI-1   INTERFACE EXPANSION, AND EXTERNAL INTERRUPT

With this option a data or status word of 16 bits may be
parallel transferred to or from an external device. All
such transfers are under IOT program control via the PDS-1
accumulator. All input/output, interrupt, and I/O skip
lines are presented at 2 connectors on the back panel of
the PDS-1.

SEO-1   ADDITIONAL SERIAL OUTPUT (FORMERLY TTYR)

This output interface, which is under I/O program control and is completely independent of the standard serial communications interface, supplies output to asynchronous, EIA compatible peripherals, or asynchronous, current mode devices. Speeds up to 9600 baud and code levels are specifiable up to 30 days prior to delivery.

SEO-2   ADDITIONAL SERIAL OUTPUT

Same as SEO-1 except IEI-1 is not required.

TKA-1   ADDITIONAL KSR, ASR INTERFACE

This additional serial interface is independent of the standard serial interface and is under IOT program control via the IEI-1 option. This interface board is plug replaceable as is SIT-1, with speeds and codes to order.

TKA-2   ADDITIONAL KSR, ASR INTERFACE

Same as TKA-1, except IEI-1 is not required

SYN-1   SYNCHRONOUS INTERFACE

SYN-1 is provided to users who order a synchronous interface in lieu of the standard, asynchronous, I/O interface. The additional hardware includes input/output character buffers, and line sync control circuitry. It is capable of operating at any rate up to 50,000 bits per second.

SYN-2   ADDITIONAL SYNCHRONOUS INTERFACE

This interface is identical to SYN-1 except that is is provided in addition to either SYN-1 or the standard serial interface. It requires the IEI-1 option.

SYN-3   ADDITIONAL SYNCHRONOUS INTERFACE

SYN-3 is identical to SYN-2 except that the IEI-1 option is not required.

PTR-1   PHOTOELECTRIC TAPE READER INTERFACE

The 8 bit high speed Photoelectric Tape Reader interface is compatible with most tape readers of the 300 character per second category. IMLAC uses a Digitronics tape reader which provides a relatively high input speed (equivalent to 2400 baud) for programs stored on paper tape. The necessary documentation on pin connections and functions is furnished so that other makes of readers may be interfaced.

PTP-1 PAPL 'APE PUNCH INTERFACE

This interface may be used to drive a high-speed paper
tape punch unit such as the Mohawk Data Sciences 2110S
(TPH-1) and is under program control via the IEI-1 option.

PTP-2 PAPER TAPE PUNCH INTERFACE

Same as PTP-1 except IEI-1 is not required.

PLO-1 PL R INTERFACE

This interface is designed for use with a digital incremental
plotter. (Calcomp 565 or equivalent) An interpretive soft-
ware routine is supplied by IMLAC to drive plotters of this
design.

PLO-2 LOTTE NTERFACE

Same as PLO-1 except IEI-1 is not required.

STI-1 ;TORAGE TUBE INTERFACE

STI-1 comprises the buffers and control logic necessary
for screen erase, view, etc. which are necessary to drive
a Tektronix 611 (or equivalent). The combination of storage
tube and refreshed display is useful in certain CAD appli-
cations for volatile data plotting.

GSI-1 GENERAL 16-BIT INTERFACE CARD

A fully buffered, 16 bit, interface card complete with
IOT decoding, skip, and interrupt logic. This card is
intended for use by designers who are interfacing peri-
pheral equipment to the PDS via the IEI-1 option.

;MENTAL COST 'OR 8K PDS-1

The price for MEM-1 is the incremental cost for each addi-
tional 4K of core memory, memory electronics, and software
over the basic PDS-1 price.

MEM-2 CHASSIS PREWIRED FOR ADDITIONAL 4K OF MEMORY

MEM-2 includes the wiring only for an additional 4K of
memory and provides the user with the option of building
his machine up to 8K of memory in the future by simply
adding the core stack and plugging in the additional cards.

MEM-3 ADDITIONAL 4K MEMORY

MEM-3 is the additional core stack and memory electronics
boards to be used in conjunction with MEM-2.

LPA-1   LIGHT PEN

A light pen is available to PDS-1 users for specific
graphics or text interactive modes of operation where
it is desirable to augment the input capability of the
machine.

The light pen option includes a light pen, a light pen
register (LPR), and appropriate I/O commands. When a
light pen "strike" occurs, the mini-computer is interrupted
and jumps to an interrupt service routine which identifies
it as a light pen interrupt. The hardware interface for
the light pen stores the contents of the Display Program
Counter (DPC) in the LPR, unless the display program is in
the process of executing a display processor subroutine.
In this case it waits until completion of the subroutine
and returns to the main display list before storing the
contents of DPC in the LPR and causing the interrupt.

Upon receiving the light pen interrupt, the user program
can now identify where in the display list is was interrupted
and functionally determine what to do next.

LPA-2   LIGHT PEN

Same as LPA-1 except IEI-1 is not required.

XYR-1   X, Y, BEAM POSITION REGISTERS

The hardware for XYR-1 comprises additional registers
which are loaded with the X, Y, beam position (from the
X and Y display AC's) coincidentally with a light pen
"strike." Their contents may then be read into the
accumulator (AC) under program control via an **IOT** command.

REL-1   RELOAD CASSETTE INCLUDING ROM

For PDS-1's utilized in environments without access to
input peripherals or where on-line remote loading is incon-
venient or too slow, the load feature is an economical
method for loading programs. This package combines a
special ROM card, a control card, and cassette player which
allows the user to load programs at about 1,000 baud.
REL-1 includes its own interface to the PDS-1.

CBS-1   CASSETTE BULK STORE

CBS-1 incorporates all features of REL-1 in addition to
permitting the writing of information on the tape at about
1000 baud. This write function, under program control,
allows cassette tape storage of the screen display or spec-
ified core locations. It is also possible to start and
stop the cassette recorder under program control.

LMD-1 ACOUSTIC COUPLER WITH TAPE CASSETTE
                (300 BAUD MAX.)

       LMD-1 packages an acoustic coupler and tape cassette
       player/recorder, into a neat, off-line mass storage
       device for inputting and outputting programs, data
       files, etc. This option provides an economical method
       for loading the PDS-1 either locally or remotely via
       the acoustic coupler. LMD-1 is interfaced to the PDS-1
       through the standard serial interface or the TKA option,
       and operates at 300 baud.

TRD-1 PAPER TAPE READER (300 CHAR/SEC.)

       IMLAC presently supplies a Digitronics photoelectric
       tape reader, Model 2540 EP. This reader has proven to
       be a reliable, high speed (300 char/sec.) input device
       for the paper tape storage medium. The PTR-1 interface
       is a prerequisite for the TRD-1.

TPH-1 PAPER TAPE PUNCH   30 CHAR/SEC.)

       The high speed punch, when interfaced to the PDS-1,
       allows the rapid rate reproduction of programs stored in
       core (using block punch program) or the outputting of
       display and data files, etc., on punched paper tape. The
       PTP-1, 2 interface is a prerequisite for this option.

STO-1 STORAGE TUBE

       This storage tube monitor system with appropriate function
       controls is interfaced to the PDS-1 via the STI-1 option.
       The storage tube may be used to augment the standard,
       display, refresh tube in applications where the simple
       volatile plotting of large quantities of data, in addition
       to the selective editing of portions of that data, is
       required.

HCY-1 HARD COPY DEVICE

       The hard copy option provides the user with a permanent and
       exact copy of the PDS-1's screen content. The copy itself
       will not deteriorate upon exposure to heat or light. The
       paper may be marked on with pen, pencil, or felt tip marker