



**DIRECT INTERFACE TO:**

- Orbis 76/77
- Shugart 800
- Calcomp 140
- Pertec 400/500 571
- Innovex 210
- GSI 110
- CDC 9404

**FEATURES**

- Low cost—\$460 in quantity 100.
- Single (8.5" x 15.7") hex PC board.
- Up to 4 drives with overlapped head seek.
- IBM 3740 format compatible (256,256 bytes/diskette). Optional high capacity data format (315,392 bytes/diskette)
- High data throughput via PDP-11 DMA requiring no CPU intervention during data transfer.
- Up to 64 K bytes may be transferred in a single operation.
- One-tenth Unibus utilization compared to DEC RX-11.
- Automatic head unload after 4 seconds if no disk activity.
- Error retry of 10 times during data transfer requests.
- Bootstrap mode automatically loads and starts PDP-11 program from disk.
- Jumper selectable device interface address and Unibus priority levels.
- Jumper selectable or software specified interrupt vector address.
- Utilizes LSI bipolar microprocessor.
- Requires only +5 volt power supply (may be powered from PDP-11).

**Description**

The SMS FD1100 is a complete PDP-11 Unibus compatible floppy disk drive controller. It is packaged on a single hex PC board for controlling up to 4 daisy chained floppy disk drives. High data rates are sustained through use of PDP-11 DMA data transfer. Large data files may be read or written in a single operation without PDP-11 CPU intervention. Data is transferred continuously across disk track boundaries and successive sectors to reduce the complexity of user written PDP-11 software driver.

An "intelligent" DMA channel technique is used to perform disk functions such as SEEK, READ, WRITE, COMPARE, and FORMAT. A disk operation is specified by loading parameters of the operation into a

3-6 word I/O Request Packet (IORP) area in PDP-11 memory. Parameters specified may include disk request function, disk track and sector address, PDP-11 data buffer address, PDP-11 data buffer length, interrupt vector address, next IORP Address, etc. The disk operation is then initiated by setting control bits in a PDP-11 device interface register and in the IORP. The FD1100 then utilizes the IORP information to complete the disk request, return status and possibly interrupt the PDP-11. The PDP-11 driver software is simplified since no CPU intervention is required during data transfer, and all status and error conditions are automatically updated in the IORP by the FD1100.



## Floppy Disk Drive Interface

A 50 pin 3M connector on the FD1100 PC board provides all logic signals required for direct connection to most floppy disk drives. The FD1100 supports from 1 to 4 drives connected in a daisy chain configuration. Floppy disk drive power and ground connections must be provided separately.

## Disk Format

The FD1100 performs all formatting and control functions required to read and write data according to IBM 3740 specifications. The IBM 3740 format provides 256,256 bytes of storage per diskette (26 sectors/track, 77 tracks/diskette).

~~For higher storage capacity, the FD1100-1 accommodates diskettes with 315,392 bytes of storage. It utilizes an IBM soft sectored format (256 bytes/sector, 16 sectors/track, 77 tracks/diskette).~~

## PDP-11 Hardware Interface

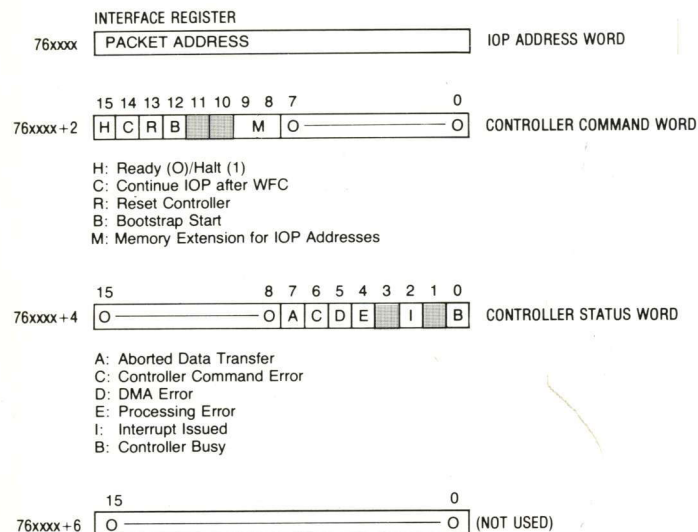
The FD1100 is a single DEC hex PC board which plugs directly into the PDP-11 Unibus. The Unibus interface includes logic for driving and receiving Unibus signals, controlling master/slave operations (including DMA), generating interrupts and selecting 4 device interface registers. A four word block address for the device interface registers is jumper selectable between 76000<sub>8</sub> to 77770<sub>8</sub>. The interrupt vector address is jumper selectable between 00000<sub>8</sub> to 000774<sub>8</sub>.

## PDP-11 Software Interface

All disk operations are initiated by setting appropriate bits in the device interface registers and in the IORP. The disk operation is specified in an I/O Request Packet (IORP) stored in PDP-11 memory. The beginning address of the IORP memory block is specified in a device interface register. Basic controller error status is also reflected in the device interface registers. A sequence of IORP's is called an I/O Program (IOP).

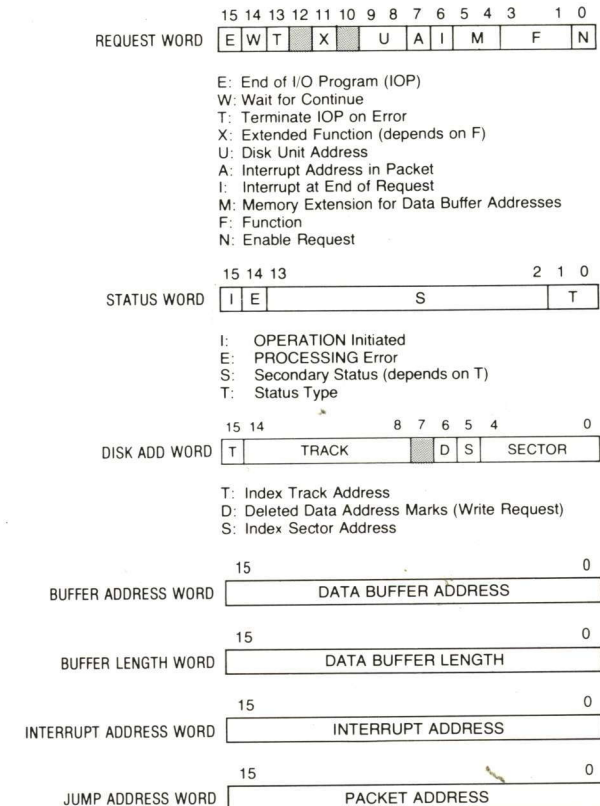
## Device-Interface Registers

The assignment of device interface register addresses and their bit significance is shown below.



## I/O Request Packet (IORP)

The IORP specifies all parameters of the disk operation. The PDP-11 software driver loads these parameters into the IORP memory block and then initiates the disk request by setting bits in the IORP and device interface registers. The bit assignment of the IORP words follows:



## Disk Functions

The 8 disk functions, specified in the F field of the IORP Request Word are;

FUNCTION	DESCRIPTION
STATUS (F = 0)	Returns status to the S field of the IORP Status Word.
SEEK (F = 1)	Steps head to specified track.
READ (F = 2)	Reads a block of data from disk into PDP-11 memory.
COMPARE (F = 3)	Reads a block of data from the disk and compares it with the contents of PDP-11 memory.
READID (F = 4)	Reads next disk sector ID information.
WRITE (F = 5)	Writes a block of data from PDP-11 memory to the disk.
FORMAT (F = 6)	Initialize track to IBM soft sectored format.
JUMP (F = 7)	Jump to next IORP specified in IORP Jump Address Word.

## Specifications

Mechanical	Single 8.5" x 15.7" DEC hex PC board. Plug and electrically compatible with PDP-11 Unibus. Disk Drive Interface: One 50 pin 3M connector (3425-0000).
Power	6.0 amps (nominal) @ +5 volts.
Environment	0° - 50°C system ambient operating temperature. 10% to 90 % relative humidity.