PERKIN-ELMER

Reliance Terminals

DMA I/O SUBSYSTEM (DIOS)

PRODUCT DESCRIPTION

The DMA I/O Subsystem (DIOS) is a high-performance, intelligent communications controller for Perkin-Elmer's family of 32-bit computer systems. The DIOS provides Direct Memory Access (DMA) facilities between main memory and multiple I/O devices, thus allowing data transfers to take place with no processor intervention. System throughput is therefore dramatically improved.

Part of Perkin-Elmer's array of advanced data communications products, the DIOS is an intelligent controller supporting up to 63 two-wire or 31 four-wire data communications devices. For asynchronous devices, the DIOS supports both the 2-line and 8-line communications multiplexors as well as Perkin-Elmer's earlier PALS and PASLA equipment. For character-synchronous or bit-synchronous devices, the DIOS supports the Single Line Synchronous Adapter, the Quad Synchronous Adapter, and the 201/301 Data Set Adapter (character synchronous only).

The DIOS is available in two versions:

M47-014

Accommodates asynchronous protocols as used by Perkin-Elmer terminals in a high-volume, transaction processing Reliance software environment.

M47-015

Accommodates asynchronous, character synchronous and the bit-oriented protocols such as SDLC, HDLC and ADCCP which require zero bit insertion/deletion. Automatic flag insertion/deletion is also provided.

FEATURES

- Supports up to 63 two-wire or 31 four-wire devices
- Peak throughput of 100,000 characters per second
- Data rates up to 56 Kilobaud per line
- Fully supported under Perkin-Elmer's 32-bit operating system OS/32 (R05.1 or higher)
- Compatible with all Perkin-Elmer 32-bit processors
- Hardware Cyclic Redundancy Check (CRC) generation and checking (M47-015 only)
- Built-in comprehensive diagnostic testing hardware.

OPERATIONAL CHARACTERISTICS

In the operational environment, the DIOS interfaces to both the system multiplexor bus and the memory bus. The DIOS generates its own private bus, referred to as the DIOS bus, upon which all DIOS-supported device controllers reside. This bus is electrically identical to the system multiplexor bus and operates with all current I/O bus extensions, including bus buffers and I/O bus switches. None of the delays introduced by these devices adversely affect the performance of the DIOS.

Functionally, the DIOS provides an outboard extension of the existing 32-bit microcoded Auto Driver Channel, with which it is compatible. All Auto Driver Channel features are supported by the DIOS, including: dual buffers, translation and error check character generation using Longitudinal Redundancy Check (LRC), CRC-16, or CRC-SDLC.

Whenever the processor issues a command to start a data transfer (this command is issued over the system multiplexor bus to the DIOS), the DIOS obtains all relevant information for the transfer from memory and initiates the transfer. When the transfer terminates, the DIOS notifies the processor via an interrupt. The data transfer takes place with no processor intervention required, allowing dramatically improved system throughput with minimal processor degradation.

SPECIAL PROTOCOL SUPPORT

The DIOS microcode contains special routines to support selected communications protocols.

- **For asynchronous devices:**

  The DIOS microcode routines enable an entire terminal screen (maximum of 1,920 characters) in a RELIANCE software environment to be transferred between the terminal and the processor. Processor intervention is required only to initiate and terminate the transfer. During the transfer, the processor is free to service other transaction requests, providing better overall user response.

- **For synchronous devices:**

  The DIOS microcode routines fully support the popular BISYNC protocol. Special character handling routines process the many control characters of the BISYNC protocol in a manner fully compatible with the OS/32 BISYNC line driver. This enables higher level software, such as 2780/3780 Emulation, HASP/32, and the 3270 Emulation and Support packages, to use DIOS hardware without modification.

- **For bit-synchronous devices:**

  The DIOS microcode routines provide full support for the continuous frame transfer capabilities of the zero bit insertion/deletion versions of the Quad Synchronous Adapter and Single Line Synchronous Adapter. Using OS/32's chained or queued buffer techniques, processor intervention is required only once per frame or buffer. The DIOS handles all device status checking. Frame check sequence generation/validation are also handled by the DIOS. When used in conjunction with Perkin-Elmer's ZDLC Channel Terminal Manager software package, the DIOS provides the most comprehensive high-throughput support package available for all three industry standard bit-oriented protocols: SDLC, HDLC, and ADCCP.

PERFORMANCE LIMITS

The limits for the maximum number of devices and corresponding line speeds vary with the type of device as follows:

Asynchronous Devices

4 wire, HDX	31 lines @ 19.2K baud
2 wire, HDX	63 lines @ 9.6K baud

Character Synchronous (BISYNC) Devices

4 wire, HDX	4 lines @ 56 K baud, or
	31 lines @ 19.2K baud
2 wire, HDX	63 lines @ 9.6K baud

Bit-Synchronous (SDLC, HDLC, ADCCP) Devices

Two-Way Simultaneous	8 lines @ 56 K baud
Two-Way Alternate	16 lines @ 56K baud
Two-Way Simultaneous	24 lines @ 19.2K baud
Two-Way Alternate (2-wire)	48 lines @ 19.2K baud
Two-Way Simultaneous	31 lines @ 9.6K baud
Two-Way Alternate (2-wire)	63 lines @ 9.6K baud

The DIOS imposes no restriction on device mix, i.e., a single DIOS will concurrently support asynchronous, character synchronous and bit-synchronous devices.

CONFIGURATION REQUIREMENTS

The asynchronous version of the DIOS (M47-014) occupies two adjacent I/O chassis slots, which must contain an EDMA bus. The character synchronous/bit-synchronous version of the DIOS (M47-015) occupies two and a half adjacent I/O chassis slots. Field installation of a DIOS in an existing system may require some reconfiguration; consult your local Perkin-Elmer Sales/Service representative.

PRODUCT NUMBERS

M47-014   DMA I/O Subsystem (DIOS), asynchronous support only.

M47-015   DMA I/O Subsystem (DIOS), asynchronous, character synchronous and bit-synchronous support.

RELATED DOCUMENTATION

29-725   DIOS Programming Manual

29-724   DIOS Maintenance Manual (includes Installation Manual).

SPECIFICATIONS

Model	M47-014	M47-015
Weight	2.4 kg. (5.3 lbs)	2.7 kg. (6.0 lbs)
Dimensions	2 ea. 381mm x 381mm (15 inches x 15 inches)	2 ea. 381mm x 381mm (15 in. x 15 in.) 1 ea. 178mm x 381mm (7 inches x 15 inches)
Power Requirements	14.0 amperes @ +5 volts DC	15.5 amperes @ +5 volts DC
Operating Environment	0 to 50°C 10-90% relative humidity (no condensation)	0 to 50°C 10-90% relative humidity (no condensation)

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