ESV Workstation

Fiber Link User's Manual

ESV, ESV Series, ESV Series Workstations, ES/os, ES/Dnet, ES/PEX, ES/PHIGS, ES/PSX, Clean-Line, Fiber Link, Local Server, CDRS, and Shadowfax are trademarks of Evans & Sutherland Computer Corporation.

LAT Host Services, DEPICT, and PCONFIG are trademarks of Ki Research.

AVS is a trademark of Stardent Computer, Inc.

VAX, VMS, and DECnet are trademarks of Digital Equipment Corporation.

UNIX is a registered trademark of AT&T.

Ethernet is a registered trademark of Xerox Corporation.

Motif is a trademark of the Open Software Foundation, Inc.

SunPHIGS is a registered trademark of Sun Microsystems, Inc.

Part Number: 517941-401 AA
April

Table of Contents

1. Overview

The Evans & Sutherland Fiber Link card implements the *Fiber Distributed Data Interface (FDDI) Network Interface Standard*. The card has the following components:

- Node processor,
- Packet memory,
- AMD FDDI chip set,
- Optic transceivers, and
- DMA controller.

The node processor is a 68020 with 128 Kbytes of RAM and 64 Kbytes of PROM. The node processor program resides in RAM after boot up from PROM. The node processor is responsible for the overall operation of the card.

The card has 256 Kbytes of packet memory. This memory is used to store data between the VMEbus and the AMD FDDI chip set. This memory can also be accessed by the node processor.

The AMD FDDI chip set transmits data from packet memory to the optical transceivers and receives data from the optical transceivers and stores it in packet memory. The chip set consists of the following:

- RAM Buffer Controller (RBC),
- Data Path Controller (DPC),
- Fiber Optic Ring Media Access Controller (FORMAC), and
- Encoder Decoder (ENDEC) chips.

These chips implement the FDDI protocol and manage the packet memory.

The optic transceivers transmit data to and receive data from the optic fiber. The card supports a dual ring configuration. The card has a DMA controller to transfer data between the VMEbus and packet memory. The transfer can be either in master or slave mode.

Network Software and Station Management Support

The Fiber Link card will support the full *Internet Protocol Suite*. Currently, ES/Dnet and LAT Host Services are not supported.

The current version of the FDDI Station Management is *Draft Revision 5.1*, except for the following optional messages:

- SIF Configuration Request
- SIF Operation Request
- Extended Service Frames

LED Indicators

There are eight LED indicators on the card. LED0 is at the bottom and LED7 is at the top. The LEDs indicate the following:

LED#	Description
LED0	On – active CMT connection on the A-keyed FDDI cable
LED1	On – active CMT connection on the B-keyed FDDI cable
LED2	On – the ring is cabled correctly to the ESV Workstation
LED3	Not currently used
LED4	DMA activity
LED5	Not currently used
LED6	Flashes on/off at a 2 second interval – the card is operational
LED7	Error code being displayed

Fiber Link LED Error Codes

There are two type of error codes that are displayed in the LEDs:

- Hardware (LEDs always on)
- Software (LEDs flashing)

Hardware Errors

LED Code (in hex)	Error
82	Bus Error
83	Address Error
84	Illegal Instruction
85	Zero Divide
86	Chk Instruction
87	Trapv Instruction
88	Privilege Instruction
89	Trace Instruction
8A	Line 1010 Emulator
8B	Line 1111 Emulator
8E	Format Error
8F	Uninitialized Interrupt
98	Spurious Interrupt

Software Errors

LED Code (in hex)	Error
81	Unexpected Host Command
82	Invalid Receive Interrupt From Host
83	Invalid Send Interrupt From Host
84	Host Send Message Too Big
85	No More Transmit Slots
86	S-Frame Pointer or Descriptor Coding Error
87	A-Frame Pointer or Descriptor Coding Error
88	DMA Did Not Complete
89	DMA Timeout
8A	Unexpected DMA Interrupt

2. Installation Instructions

Software Installation

1) Obtain the *FDDI Internet Node Address* for your ESV Workstation from your network manager. This will be different from your *Ethernet Internet Address*. The FDDI network must have a different network or subnetwork address from the Ethernet network or subnetwork address.

2) Install your FDDI Internet Node Address in the **/etc/hosts** file with an alias name for your node. For example, if your node name is **keyhole**, your alias might be **keyfddi**.

3) Make a new file called **/etc/local_fddi_hostname**. On the first line enter the alias name. On the second line, enter the network mask and broadcast address. For example,

```
keyfddi
netmask 0xffffff00 broadcast 220.123.045.0
```

4) If you need to set the FDDI Ring Parameters, obtain the values from your network manager. Make a new file called **/usr/etc/fddi/new_fddi_params**. On line 1, enter the bid time; on line 2, the Tmax time; on line 3, the Tmin time; and on line 4, the Tvx Default time. All times are in milliseconds. For example,

   9.0   Bid Time

   165.0 Tmax

   4.0   Tmin

   2.5   Tvx Default

5) Reboot your ESV Workstation.

6) To access another node on your FDDI network, use the FDDI Node Alias Name of that node. Remember that the Ethernet network has a different node name from the FDDI network node name.

Increasing TCP Performance

To take advantage of the speed of the Fiber Link card, the send and receive socket buffer sizes should be increased to about 32,000 bytes. The following code fragment is used to set the buffer sizes.

```
      int i, sn, socket_size;
      socket_size = 32000;
/*
      Open socket.
*/
      sn = socket(AF_INET,SOCK_STREAM,0);
/*
      Set send and receive socket size.
*/
      i = setsockopt( sn, SOL_SOCKET, SO_SNDBUF, &socket_size,
                  sizeof( socket_size ) );
      if( i<0 )
      {
         printf("%d",errno);
         perror("Cannot set send socket size");
         exit(0);
      }
      i = setsockopt( sn, SOL_SOCKET, SO_RCVBUF, &socket_size,
                  sizeof( socket_size ) );
      if( i<0 )
      {
         printf("%d",errno);
         perror("Cannot set receive socket size");
         exit(0);
      }
```

Make sure that the send and socket buffer sizes are both the same size and that the socket buffer sizes on both ends of the connection are the same size.