VXI Data Disk, DAT & SCSI-2 Interface Module HP E1562D, E1562E, E1562F

Product Overview

Fast Data Recording Modules for VXI Applications

HP E1562D
DAT and Disk SCSI-2 Module

HP E1562E
Dual Disk SCSI-2 Module

HP E1562F
Dual Data Disk

This VXI module is a high-speed dual SCSI-2 interface used for on-line recording of digital data to disk. It is ideal in a variety of data capture applications, including both dynamic and static signal acquisition. It finds applications in transient signal analysis, in acoustic and mechanical measurements, as well as electronic surveillance.

The HP E1562D/E/F module is available in three configurations to meet your most demanding data capture needs.

HP E1562D is a two slot, C-size module consisting of a dual SCSI-2 interface with a 4.3 Gbyte internal disc and a 4 Gbyte internal DAT tape for data backup or throughput. Option 1CD deletes the DAT tape drive.

HP E1562E module is a two slot, C-size module consisting of a dual SCSI-2 interface and dual 4.3 Gbyte disks. For applications using external SCSI-2 storage devices, option 1BD deletes both internal disk drives.

HP E1562F is a two slot, C-size module with two 4.3 Gbyte disks without the SCSI-2 or throughput controllers. It is used with either the HP E1562D or HP E1562E to increase throughput performance (disk striping) or increase throughput storage depth.

Sustained data throughput to internal disks at >10 Mbytes/sec for more than 800 Sec!

There is no need to accept gaps or missing samples in your high speed transient digital data capture applications. Using HP's VXI Local Bus, data can be transferred from VXI ADC modules to the dual disk HP E1562E at a real time, sustained rate of more than 10 Mbytes/sec without losing a single byte of data. With over 8 Gbytes of disc storage, data can be written to the disc at this 10 Mbyte/sec rate for over 800 seconds. With the single disk HP E1562D data can be written at more than 5 Mbytes/sec, also for more than 800 seconds.

Simultaneously monitor data while recording to disk

In cases where it is also necessary to monitor the local bus data as it is being written to disk, some (or all) of the data can be transferred to the VXI bus for monitoring by the host computer. The effect of monitoring the data on the overall local bus transfer rate is very small, however, there is a 2 Mbyte/sec limit on the data rate of the monitored data (using D16 transfers to shared memory). Consequently, if the monitoring data rate doesn't exceed the shared memory rate, then the effect of data monitoring on the data recording rate to disk is not significant.

The amount of data that can be monitored is dependent upon the amount of shared memory available.

Disk striping offers fastest data recording at >20 Mbytes/sec

Use two HP E1562 modules (one HP E1562E and one HP E1562F) to transfer data via the Local Bus at a combined real time rate of >20 Mbytes/sec using all four internal disks. A simple block diagram of this configuration is shown in figure 2. An example of this arises using the 23 bit HP E1430A (10 Msa/s Analog to Digital Converter) which produces data at a 20 Mbyte/sec rate.

Figure 1:
HP E1562E block diagram

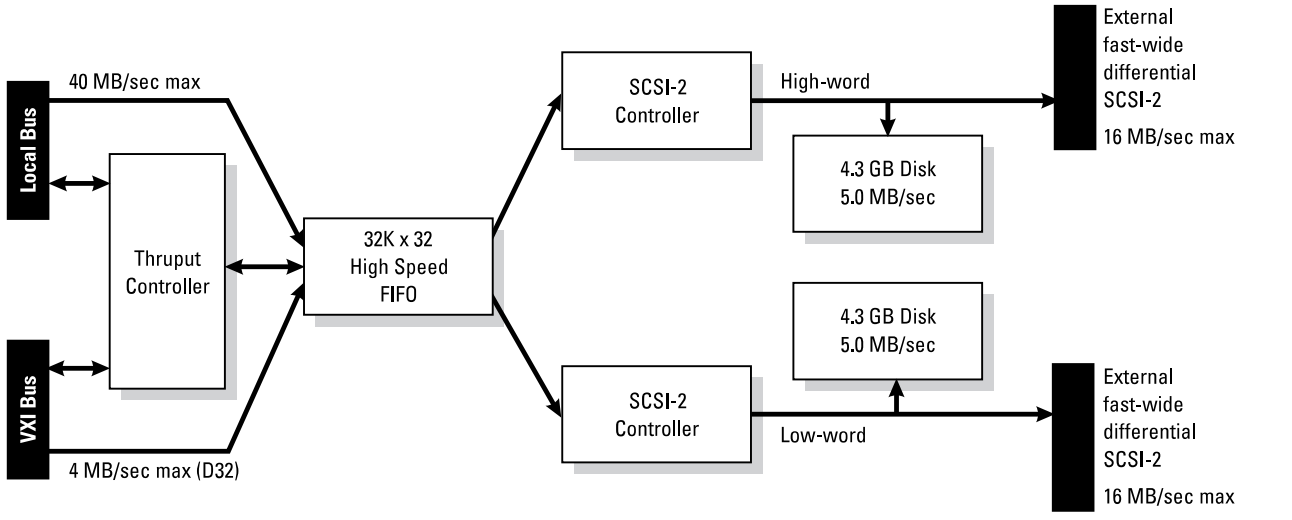
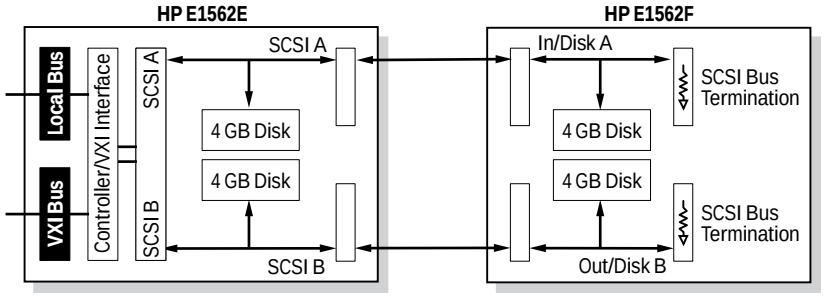


Figure 2 :
Configuration using striping for >20 MBytes/sec



Instead of using two HP E1562 modules as outlined above, the same performance (assuming similar disk drives) can be obtained using one HP E1562E Data Disk and two, fast wide differential external SCSI-2 disks (connected to the front panel connectors of theHP E1562E).

Use external SCSI-2 devices connected to the HP E1562 for fast data export

In other applications, data can also be transferred from ADC modules via the Local Bus to external fast wide differential SCSI-2 devices at the rate of 16 Mbytes/sec on each of the two SCSI interfaces, simultaneously.

Using the single-ended SCSI-2 port on the HP E1562D , data can be transfered to a Metrum Buffered VLDS tape recorder at a 4 Mbyte/sec rate.

Backup disk data to DAT

The DAT drive in the HP E1562D can be used to backup the data stored on the HP E1562D disk. This backup operation is done by the HP E1562D without host intervention.

In the HP E1562E dual disk module, on-line data can be written to one disc using one SCSI-2 interface while the host computer is simultaneously backing up the second disk using the second SCSI-2 interface (requires a cable connection between the host SCSI interface and the HP E1562E front panel connector).

If the HP E1562E module is not busy writing on-line data then its data can also be backed up using the host computer by transferring the data via the VXI bus.

Use DAT tape for slower throughput applications

The DAT drive in the HP E1562D can also be used for data throughput to tape in applications where the data rate is much slower, approximately 0.5 Mbytes/sec (see technical data sheet for specification).

Use either local bus or VXI Bus data transfers

If you use VXI input modules without Local Bus support, data can be transferred to the SCSI module over the VXI backplane. These transfers can take place at a maximum rate of 5 Mbytes/sec (D32). For example, nine HP E1413C 64-Channel modules can be simultaneously writing data to the HP E1562 providing 576 channels scanned every 1 ms, without losing any samples.

One can also monitor data while recording it to the HP E1562 disk when Local Bus transfers are not involved. In this case the data is being transferred via the VXI bus to both the disk and shared memory. If the amount of data monitored is small compared to the overall amount of data being written to disk, then the throughput rate to disk is not significantly compromised. If all of the data is being monitored then the overall effect of monitoring while recording is a factor of two in performance. This factor of two in performance arises because the same bus is being used to transfer the data to disk as well as sending the data to shared memory for monitoring by the host.

Use both local bus and VXI bus data transfers simultaneously

The HP E1562D/E module can also simultaneously acquire data from both Local Bus modules and interleave this data stream with modules that only use the VXI bus for data transfers. An example would include a measurement situation where several HP E1413C (64 Ch, Scanning ADC) modules producing data on the VXI bus which are mixed with several HP E1432A (16 Ch, 51.2 kSa/s) modules sending their data over the Local Bus.

Data monitoring can also take place in these mixed Local Bus / VXI bus data recording sessions.

Replace analog tape recorders in many applications

Analog tape recorders have traditionally been used to record signals so that different data analysis processes can be performed off-line, on the same data or simply to archive raw data for some future use.

Writing digitized data to disk provides more dynamic range than that available on analog tape recorders. Tape recorders (both analog and digital) are serial devices which requires the tape to be rewound each time the data is to be reused. Recording the data on the HP E1562 VXI Data Disk provides rapid, random access to any segment of the data. The data can also be backed up to DAT tape (internal or external) for long term archival storage.

Recording times using HP E1432A 16 channel, 51.2 kSa/s/ch modules

Table 1 shows the real time recording times using a single disk HP E1562D and the HP E1432A 16 Ch, 51.2 kSa/s module for various channel counts and ADC sampling rates. Using a dual disk HP E1562E we could double these times. By taking advantage of the disk striping feature, these recording duration times could be multiplied by the number of disks being striped.

Recording Times using HP E1433A 8 channel, 196 kSa/s/ch modules

Table 2 shows the real time recording times using a single disk HP 1562D and the HP E1433A 8 Ch, 196 kSa/s/ch module for various channel counts and ADC sampling rates. Using a dual disk HP E1562E we could double these times. By taking advantage of the disk striping feature, these recording duration times could be multiplied by the number of disks being striped.

Recording times using HP E1430A 10MSa/s ADC modules

Table 3 shows the real time recording times using two HP E1562 modules and the HP E1430A 10 Msa/s, 23 bit ADC module for various channel counts and ADC sampling rates. Note that in this two HP E1562 configuration one of the modules needs to be a HP E1562E and the other is a HP E1562F module.

Table 1 - Real time recording duration times using HP E1562D data disk with HP E1432A 16 channel modules (time in hours)

SPAN Hz	Sampling Rate Sa/S/Ch (b)	Number of Active Channels 1	8	16	32	40	48	56	64	72	80	96
20000	51200	11.393	1.424	0.712	0.356	0.285	0.237	***0.203*** (a)	***0.178*** (a)	***0.158*** (a)	***0.142*** (a)	***0.119*** (a)
18750	48000	12.153	1.519	0.760	0.380	0.304	0.253	***0.217*** (a)	***0.190*** (a)	***0.169*** (a)	***0.152*** (a)	***0.127*** (a)
16000	40960	14.242	1.780	0.890	0.445	0.356	0.297	0.254	***0.223*** (a)	***0.198*** (a)	***0.178*** (a)	***0.148*** (a)
5000	12800	45.573	5.697	2.848	1.424	1.139	0.949	0.814	0.712	0.633	0.570	0.475
4000	10240	56.966	7.121	3.560	1.780	1.424	1.187	1.017	0.890	0.791	0.712	0.593
312.5	800	729.167	91.146	45.573	22.786	18.229	15.191	13.021	11.393	10.127	9.115	7.595
250	640	911.458	113.932	56.966	28.483	22.786	18.989	16.276	14.242	12.659	11.393	9.494
200	512	1139.323	142.415	71.208	35.604	28.483	23.736	20.345	17.802	15.824	14.242	11.868

a. The table entries in bold italic type require the dual disk HP E1562E because of the data rates.

b. Sample rates shown for the HP E1432A are the maximum rates (51.2 kSa/s/ch) and a small subset of the other available rates.

Table 2 - Real time recording duration times using HP E1562D data disk with HP E1433A 8-channel modules (time in hours)

SPAN Hz	Sampling Rate Sa/S/Ch (c)	Number of Active Channels 1	8	16	24	32	40	48	56	64	72	80
76800	196608	2.967	0.371	***0.185*** (a)	***0.124*** (a)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
40000	102400	5.697	0.712	0.356	0.237	***0.178*** (a)	***0.142*** (a)	***0.119*** (a)	(b)	(b)	(b)	(b)
20000	51200	11.393	1.424	0.712	0.475	0.356	0.285	0.237	***0.203*** (a)	***0.178*** (a)	***0.158*** (a)	***0.142*** (a)
18750	48000	12.153	1.519	0.760	0.506	0.380	0.304	0.253	***0.217*** (a)	***0.190*** (a)	***0.169*** (a)	***0.152*** (a)
16000	40960	14.242	1.780	0.890	0.593	0.445	0.356	0.297	0.254	***0.223*** (a)	***0.198*** (a)	***0.178*** (a)
5000	12800	45.573	5.697	2.848	1.899	1.424	1.139	0.949	0.814	0.712	0.633	0.570
4000	10240	56.966	7.121	3.560	2.374	1.780	1.424	1.187	1.017	0.890	0.791	0.712
250	640	911.458	113.932	56.966	37.977	28.483	22.786	18.989	16.276	14.242	12.659	11.393
200	512	1139.323	142.415	71.208	47.472	35.604	28.483	23.736	20.345	17.802	15.824	14.242

a. The table entries in bold italic type require the dual disk HP E1562E because of the data rates.
b. Not available because the HP E1433A local bus is limited to a maximum of 10 Mbytes/s.
c. Sample rates shown for the HP E1433A are the maximum rate (196608 Sa/s/ch) and a small subset for the other available rates.

Table 3 - Real time recording duration times using two HP E1562 data disks with HP E1430A 10 M/sa/s ADC modules (time in minutes)
This configuration requires one HP E1562E and one HP E1562F module.

SPAN Hz	Sampling Rate Sa/S/Ch	Number of Active Channels 1	2	3	4
4,000,000	10,240,000	***13.672***	(a)	(a)	(a)
2,000,000	5,120,000	***27.344***	***13.672***	(a)	(a)
1,000,000	2,560,000	***54.688***	***27.344***	***18.229***	***13.672***
500,000	1,280,000	***109.375***	***54.688***	***36.458***	***27.344***
250,000	640,000	***218.750***	***109.375***	***72.917***	***54.688***
125,000	320,000	***437.500***	***218.750***	***145.833***	***109.375***
62,500	160,000	***875.000***	***437.500***	***291.667***	***218.750***

a. Due to the write rate limit for the HP E1562E module, these entries are not applicable.

Comprehensive software support

This SCSI interface module is a message based VXI module with a SCPI interpreter. This allows software packages like HP VEE (HP E2120D & E2111D) an easy way to setup a HP E1562 data disk module.

This module's command set allows the user a relatively simple, straight forward interface for programming the module. The complexity of managing the data flow from multiple VXI input modules to multiple disks has been reduced to typically less than a dozen SCPI commands with parameters. This programming command set manages the data transfer for applications needing only the single disk HP E1562D. The module also handles all the transactions associated with the high performance dual disk application (high word to disk A / low word to disk B) and also manages the multiple disk (disk striping) case.

Additional software support

The module is also supported by a set of C examples programs for use by an embedded VXI host computer (HP-UX or Microsoft® Windows), a host computer connection via the MXI interface, or the HP E1485 Signal processor (via Programmers Toolkit HP 35635T).

For applications needing to manage reading and writing of multiple files on the disk(s), a LIF file system software package is available. Two versions of the LIF file system are available, one a shared library for HP-UX and one for MS Windows in the form of a DLL (dynamic link library).

Using HP E1562D/E as system disk not recommended

For applications needing a 4 Gbyte embedded system disk, the HP E3249B is recommended. The HP E3249B module has a single ended SCSI-2 interface compatible with the HP V743 VXI controller.

The HP E1562D/E could conceptually be used as a HP-UX system disk provided the computer had a wide differential SCSI-2 interface, but this is not recommended since it would be possible to write to the HP-UX system disk with VXI backplane commands to the HP E1562 data disk controller. It is possible to use the DAT drive in the HP E1562D module as a device to load software to the host disk. The host computer, however, must have a single ended SCSI-2 interface and external cable (typically daisy-chained from the host system disk to the front panel of the HP E1562D).

Accessories available

The HP E1562D/E module when used without any external SCSI-2 devices doesn't require SCSI terminators connected to the front panel. When connecting external SCSI-2 devices the following cables and terminators are available.

Single-Ended port A on HP E1562D:

HP C2908A	Cable, 1- Meter
HP C2904A	Active Terminator

Wide-Differential HP E1562E port A and B and port B on HP E1562D:

HP C2911A	Cable, 0.9 Meter
HP C2924A	Cable, 2.5 Meter
HP C2905A	Active Terminator

Note that the HP E1562F includes one active terminator. The HP E1562E and the HP E1562F are delivered with one each 0.5 meter Wide Differential SCSI-2 cable.

Summary specifications

See Technical Data Sheet (Pub. 5965-6938E) for complete list of specifications.

Ordering information

HP E1562D Disk & DAT, SCSI-2 I/F

Opt 1CD	Delete DAT drive
Opt 0B0	Delete manual
Opt 0B1	Add manual

HP E1562E Dual Disk, SCSI-2 I/F

Opt 1BD	Deletes internal disks
Opt 0B0	Delete manual
Opt 0B1	Add manual

HP E1562F Dual Data Disk

Opt 0B0	Delete manual
Opt 0B1	Add manual

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