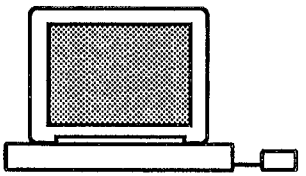
Hardware

ID-02-0388

Basic hardware components

There are certain hardware components which are basic to the operation of the Direct-to-Disk system. Many of these can be optionally expanded for greater system capacity and flexibility.



Terminal with mouse

Computer terminal and mouse

The **computer terminal** consists of a cathode ray tube (CRT) screen for visual display, a typing keyboard and a mouse. The terminal acts as a communication link with the New England Digital ABLE computer, located in the signal processor.

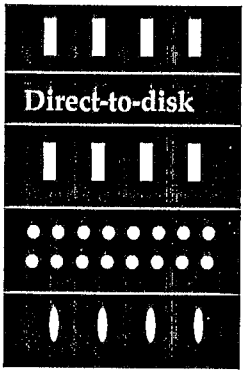
The Pericom MG600 raster graphics terminal features a 15-inch monitor with 1024 x 768 pixel display resolution. Characters are displayed in green phosphor. There are contrast and brilliance controls on the side of the unit.

The terminal keyboard has 121 keys, 8 visual indicator lights and an audio tone generator. In addition to the standard typewriter keyboard, there are **function keys (F1, F2,** etc.) and **programmable function keys (PF1, PF2,** etc.) for special uses. The terminal keyboard is connected to the computer terminal by a cable. The terminal itself is connected to the signal processor and to a power source.

The **mouse** is a small hand-operated device with three buttons. The movement of the mouse on a flat surface controls the cursor on the terminal screen. Pressing one of the buttons or pressing and holding a button while moving the mouse selects and places items on the terminal screen.

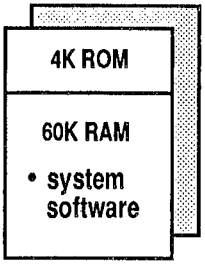
The computer

The New England Digital **ABLE computer** is located near the bottom of the Direct-to-Disk signal processor. It contains a 16-bit reduced instruction set computer (RISC) consisting of a CPU built on two printed circuit boards. It interfaces with other boards for arithmetic functions, memory, synchronization and all input, output and storage devices. The computer is programmed in scientific XPL, a high-level language similar to PL/I.

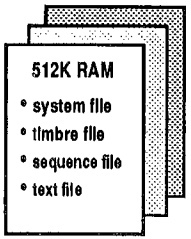


Computer in signal processor

Basic hardware components (con't)



internal memory



external memory

Memory and voices

The computer's **internal memory** M64K board has a total capacity of 64,000 16-bit words. Four kilobytes are read only memory (ROM) for fixed programs such as the loading software and the character set on the terminal, and 60 kilobytes are random access memory (RAM) which holds the system software.

Several **external memory** M512K boards, each capable of holding 512,000 words of RAM, contain additional system software plus sequences. The more external memory in the system, the larger and more complex the sequence that can be stored.

For each track installed in the Direct-to-Disk system, you have one **voice**. Each voice contains two 16-bit digital-to-analog (DAC) converters, which translate the digital signal into audio. Only one sound can play off of a Direct-to-Disk track at a time.

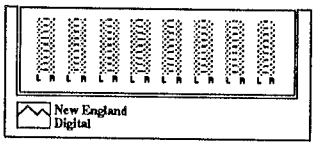
Inputs and outputs

Audio **inputs** to the Direct-to-Disk are controlled by the Sample-to-Memory module. Each of these modules provides four balanced, high impedance line level inputs labeled A, B, C and D. All inputs are sampled simultaneously. All four inputs are available when recording at sampling rates of 50 kHz or less; only two inputs, A and B, are available when recording at sampling rates above 50 kHz.

Four Sample-to-Memory modules can be installed to provide up to sixteen 50 kHz inputs or eight 100 kHz inputs. Each module has a lighted display numbered 1, 2, 3 or 4. For each module installed in your system, up to four tracks can be recorded on simultaneously.

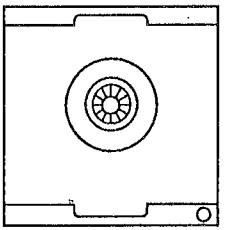
At the **output** stage, each track is routed to a stereo voice, which provides a left and right direct output for each track. Thus, a single track can be placed (panned) within a stereo image. A composite stereo output of all tracks in your system is also available.

The **meter bridge** is a remote unit with an LED display and columns of 18-segment peak program meters (PPM). The meter bridge indicates each track's recording mode as well as signal level. The maximum signal sensed is +19 dBm.



meter bridge

floppy disk



tape cartridges

Storage devices

Sounds and sequences can be stored on a 5 1/4-inch **floppy disk drive**, a **hard disk drive** or a **tape drive.** A Direct-to-Disk system must have at least one floppy drive and one Winchester drive to operate. In addition, up to eight internal Wren hard drives can be installed.

Up to 1.2 megabytes of data can be stored on each high density (HD) **floppy disk** inserted into a floppy drive.

Signals recorded on Direct-to-Disk tracks are stored on hard disk drives mounted in groups of four in the Direct-to-Disk signal processor. Each hard drive stores sound from two Direct-to-Disk tracks.

These hard disk drives store sounds recorded with the Sample-to-Memory unit. Up to eight hard drives, storing sound for 16 tracks, may be installed.

High-speed tape drives using tape cartridges can be installed in the Direct-to-Disk signal processor for permanent data storage. Each drive provides backup for two tracks. Up to eight backup drives can be installed.

The recording capacity of the Wren internal hard disk drives is as follows:

Number of hard disks	Number of tracks	Sampling frequency	Recording time per track
4	8	50 kHz	26 minutes
8	16	50 kHz	26 minutes
8	8	50 kHz	52 minutes
8	8	100 kHz	26 minutes

MIDI interface

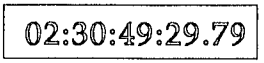
MIDI makes it possible to place the Direct-to-Disk into a network of synthesizers, sequencers, rhythm machines and other audio processing equipment.

MIDI's universal hardware and software specifications allow you to integrate the Memory Recorder into a system made up of your favorite keyboard and a variety of instruments to perform or record sound.

A MIDI module consists of four **MIDI OUTPUTS**, one **MIDI INPUT** and one **MIDI THRU** connection, expandable to 32 outputs. With an 8-output configuration, you can select an auxiliary input for receiving MIDI sync signals. Each MIDI OUT port can carry messages on any or all of 16 channels. The transmission rate is more than 3000 10-bit MIDI messages per second.

The system can also send and receive MIDI **program change** signals and **song position pointers**.

Optional hardware components



SMPTE time code

Synchronization devices

SMPTE* time code provides a means of reading a synchronized signal on tape that includes a 24-hour clock with elapsed time information. Using SMPTE, you can synchronize music, dialog or sound effects to video or film by matching the time code of the picture with that of the sound.

The Direct-to-Disk can read 24, 25 and 30 frames per second and Drop Frame time code formats. Each frame has an eight-digit number that locates the frame in time (hours:minutes:seconds:frames). Each frame is further divided into 80 bits, making SMPTE accurate to 1/80th of a frame.

SMPTE hardware consists of a SMPTE reader/interface board installed in the signal processing unit and SMPTE input/output connectors.

The **Clock Interface Module (CIM-1)** allows you to synchronize to clock pulses when synchronizing the Direct-to-Disk to tape recorders and other systems.

It does this by translating audio signals or clock pulses into FSK signals and FSK signals into clock pulses, by making clock impulses compatible with the Direct-to-Disk and by converting audio signals into pulses.

The CIM-1 also counts clock pulses received at the DIV IN jack and sends a smaller number of pulses to each of the divider outputs.

Sampling hardware

The **Sample-to-Memory** hardware consists of a sample rate generator, phase accumulators, an amplitude computer, formatter and buffer memory cards, located in the Direct-to-Disk near the bottom of its signal processor.

The buffer memory cards hold the sounds temporarily until they are stored on hard disk. The number of tracks you have in your system determines the amount of buffer memory required.