MSD

What You See is What You Get!

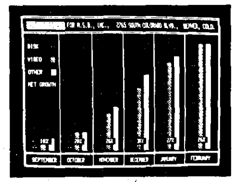
Now, A Video System You Can Afford!

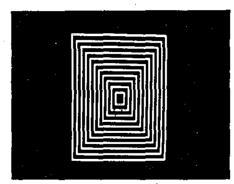
MSDV-100 Video Display System:

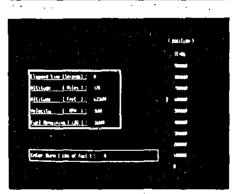
The Video Display System is a high quality 80 character, 24 line video output device for the S-100 bus. Many advanced features have been incorporated which are not normally found on units costing many times the price.

The character set includes upper and lower case characters as well as full punctuation. Any character can be underlined, a feature useful in word processing. A character can also be made to blink at a user selectable rate, often used for alarm or warning situations. Additionally a character can appear in reverse field (black on white) or, if composite video is used, individual characters can be intensified.

Also included in the MSDV-100 is the ability to generate high quality continuous forms overlays. Charts, graphs, or order entry forms are easy to produce on the video screen.







A third significant feature of the Video Display System is the ability to display grey scale elements in any of nine levels in any of 1920 positions on the screen. This is especially useful for bar graphs and for grey scale graphics or animations.

Internally, the MSDV-100 is a two-board S-100 based system which occupies 2K of RAM address space and two I/O ports, user selectable. The microcomputer can write to the screen directly with horizontal retrace synchronization if desired for a flicker free, very high speed display.

Software support for the MSDV-100 is complete with both machine language code, including fully commented source listings, and a comprehensive Basic software package implementing all MSDV-100 features. Assembly language drivers allow the sophisticated user to easily customize the system for specilized applications.

Programs are provided that permit the user to link the video system to high level programming languages such as Basic. A link program, provided in Basic, permits the user with no knowledge of assembly language programming to immediately obtain video output. The link fully implements the forms capability of the MSDV-100, including direct cursor addressing, as well as the other advanced features of the Video Display System.

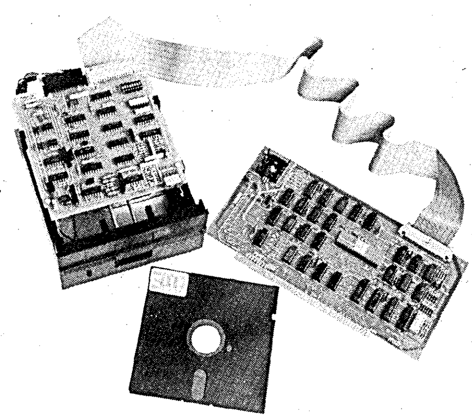
MSDD-100 Floppy Disc System:

The MSDD-100 Floppy Disc System is a significant advance in low cost, high density mass storage systems. Using the industry standard Shugart SA400 minifloppy™ drive and a highly reliable LSI controller, the single card MSDD-100 Floppy Disc System represents a major cost/performance breakthrough for the hobbyist and businessman.

Many features not provided on larger disc systems are standard on the MSDD-100 Disc system. The controller will support up to three drives and provides all of the disc timing functions, therefore no software timing loops are required. A very flexible onboard vectored interrupt structure is provided, a valuable feature for use in modern multi-tasking applications.

The disc controller design is totally synchronous, requiring no "one shots". Ease of maintenance is evidenced by the fact that there are no adjustments required for operation.

Circle 71 on inquiry card.



The Altair/S100 compatible disc controller is a single board design, and features very low power consumption.

Included free with each MSDD-100 Floppy Disc System is a software package, provided on diskette, for formatting, certifying, and copying discs, as well as programs for creating fully customized memory-to-disc and disc-to-memory routines which may be put in read-only memory. In addition, assembly language I/O driver listings are provided to facilitate custom applications programming.

Also included are disc driver routines for Altair Basic, which allow program and data storeage on disc, and permit sector level I/O through Basic. Many programs and files may be kept on a single disc, and cassette I/O is retained. These drivers work with 8K, 3.2, 8K 4.0, Extended 3.2 and 4.1 versions of Basic.

MICRO SYSTEMS DEVELOPMENT — MSD

2765 So. Colorado Blvd. Suite 110 Denver, CO 80222 (303) 758-7411

Sanyo Monitor (VM4209)	$150
Micro-Floppy Disc System	$499*
(Assembled)	$599*
Video Display System	$285
(Assembled)	$385
Additional Drivers	$350 ea.
Diskettes	$4.25 ea.

*Power Supply not included.

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sense organs, and the design and execution of movements in space, lend themselves perfectly to parallel processing in small subunits. Here the brain can vastly outperform our typical current computers which have only one, or at most a few, processing units capable of simultaneous operation. For example, all of the data in the visual field is available simultaneously on the surface of the retina. Rather than dealing with it point by point, the brain sucks it all in at once in one enormous byte and sets to work on the analysis of many small areas of the visual field simultaneously. (We shall examine its algorithms in detail later.)

Even with the small cheap processors available to us now, we could obviously never afford to match the brain in quantity. However, we don't have to go to the other extreme and try to do it point by point serially with a single very fast processor as has been typically attempted. The job is just too large for even the fastest machine to do this way, and there are certain advantages as well in terms of the feature extraction process to having a basically parallel system. On the other hand, we do have a speed advantage and it certainly should be possible to simulate the operation of a number of the brain's processors with only one of ours in the same time frame. (There will be some increase in complexity where the results of neighboring units are interactive.) Just how to optimize this sort of tradeoff is, of course, a matter for much study. A first step which we shall take here will be to examine some of the tricks and shortcuts in the feature extraction process that the brain itself uses to save time.

The third system characteristic which results from the brain's hierarchical organization is high survival value. We will learn nothing about Asimov's first two "laws" of robotics (the protection of human beings) by studying the brain. The third law, ensuring the survival of the robot, has always been a major concern of brain architecture. It is annoying, but not usually fatal when the big machine in the computer center develops a fault. When it happens to a brain, or in the situations we will send them into, a robot, the whole device may be destroyed. The redundancy inherent in the brain's basic structure is, of course, valuable in this regard, but there is more to it than that. Recall two facts about the brain: There is an evolutionary order of development to its structure, and the major functions have representation at all levels. These two facts are related. Whereas our computers have never been expected to incorporate pieces of earlier models, the brain in the present form contains most of the parts of its earlier forms. The simplest early brains obviously had to be capable, in their own inelegant way, of getting the organism around in the environment and surviving. During the course of evolution, more complex structures capable of more sophisticated handling of the same basic functions became available. Rather than eliminating the older structures and duplicating their functions, the newer ones simply took control of the older and used them as subprocessors. A fairly general principle of organization evolved in which the higher level structures control the lower not by turning them on when needed, but by inhibiting their actions except as desired. The beauty of this system is that if a higher center is suddenly damaged, the older, more primitive units which it normally holds in inhibition are released to function on their own. Thus, damage tends not to eliminate vital functions, but only to downgrade the complexity with which the job can be performed. This is especially true of functions such as defense. The typical result of damage to higher brain centers is a "nasty" animal, ie: one which can adequately fight, but which fails to make fine discriminations about the appropriate stimulus conditions for doing so, and which defaults in the safe direction by attacking any strong stimulus source. Of course this kind of thing has its limits, and this is particularly true of the most highly developed brains where some of this type of organization is sacrificed in order to give the highest centers direct access to the lowest for feedforward in the control of complex operations.

In the case of damage to lower centers, the multitude of processing elements available allows some of the higher levels to be reprogrammed to take over the functions of lower level systems by simulating their operation. The process takes a little time to organize, but it can be quite effective if the organism can survive for a few weeks while reorganization takes place.

While it is apparent that it is not possible to give a definite answer to the question of where a function of any complexity is performed in the brain, it may be useful (for orientation to the device) to identify some of the anatomical divisions of the brain shown in figures 3 and 4 with some of the functions which have important representation at those levels.

The lowest level of the central nervous system, the spinal cord, is a major route of input and output to the rest of the brain. With the exception of a few special cases, most of the sensory input from the body and most of the output to the muscles passes through this structure. Although it contains