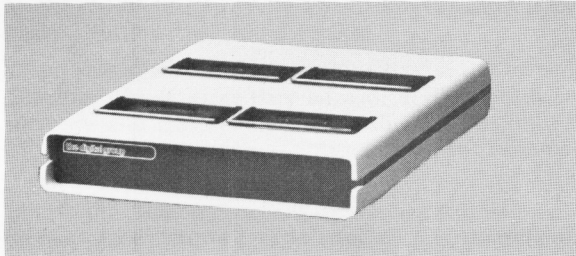
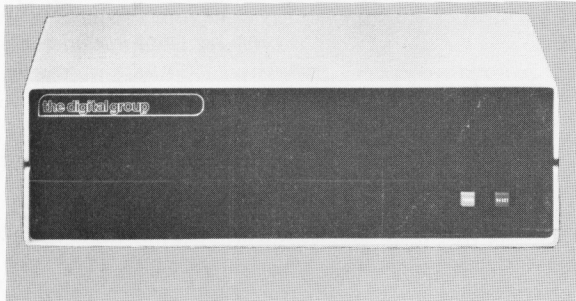


the digital group INC flyer

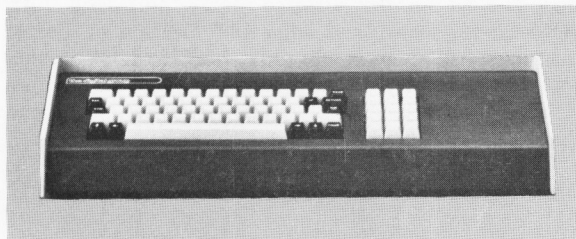
numbers 1-9 consolidated



THIS FLYER IS INTENDED TO GIVE YOU AN OVERVIEW OF THE SYSTEMS AND PRODUCTS WE NOW HAVE AVAILABLE. WE ALSO HOPE TO GIVE YOU AN IDEA OF WHAT WE CONSIDER IMPORTANT IN DESIGNING EFFECTIVE COMPUTER SYSTEMS.



WE'VE BROKEN THIS FLYER INTO SEPARATE SECTIONS FOR YOUR CONVENIENCE. HOPEFULLY, YOU WON'T HAVE TO WADE THROUGH PARTS IN WHICH YOU HAVE LITTLE INTEREST IN ORDER TO GET THE INFORMATION YOU'RE AFTER.



THIS FLYER CONTAINS ALL PERTINENT INFORMATION FROM FLYERS 1 THROUGH 9. YOU WILL AUTOMATICALLY RECEIVE NEW FLYERS AS THEY BECOME AVAILABLE.

AS ALWAYS, THANK YOU FOR YOUR SUPPORT AND ENCOURAGEMENT.

THE DIGITAL GROUP

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philosophy

SYSTEM PHILOSOPHY

or — Why we are doing what we're doing

We feel that the Digital Group Systems represent by far and away the most significant systems for computer hobbyists available today. We would like to discuss why our systems offer major advantages to the serious hobbyist.

CHANGE

If there is one constant that is already evident in this field, it is constant change. You are about to invest (or have already invested) a significant amount of money in a micro-computer system. That system should be able to easily adapt itself to new microprocessors by different manufacturerers and take advantage of new technologies with levels of integration. Otherwise, no sooner do you make your investment than another faster, cheaper, better, or enhanced micro chip comes out and you have to start over — or live locked-in to an obsolete design. That can be very frustrating.

The Digital Group Systems are designed specifically to easily adapt to change. The designs are also tailored for maximum flexibility in user support. We hope to demonstrate by specific area why the Digital Group Systems are the best choice for the hobbyist with the following discussions.

INVESTMENT

Most manufacturers continually emphasize their CPU's cost and features. However, the major portion of your investment is not spent on the CPU and CPU support circuitry. The major portion of investment is spent on memory, interfaces, software, and peripherals. This ratio will continue to swing even more heavily away from the CPU as CPU chip prices continue their rapid decline.

What does that mean? If you purchase a CPU that quickly becomes obsolete (as they all will) and you fully invest in memory and peripherals specifically tailored only for that CPU, you risk having your entire investment become totally obsolete.

The Digital Group Systems are designed to be independent of the manufacturer's CPU chip design. Complete system compatibility is maintained at the CPU card level. All memory, input/output, and peripherals are completely independent of the CPU selected. With the Digital Group Systems, you may now select different CPU architectures from four manufacturers. We are offering:

- Zilog/Mostek Z80
- Intel/AMD 8080A
- Motorola 6800
- MOS Technology 6501/6502

With the Digital Group Systems, you can change from a Z80 to a 6800 by literally unplugging the Z80 card and plugging in the 6800 card. Switch on power, read in the 6800 operating system cassette and you have changed your system to a 6800. The same is also true for the MOS Technology 6502 or 8080. Your major investment in memory and peripherals has been protected at a minimal additional cost and effort.

Each of the CPU's is completely interchangeable at the CPU

card level with any other. Other CPU's will be made available from us as the technology advances. Each CPU chip has specific strengths and weaknesses. Your selection of a CPU will, of course, depend upon your application's requirements. As your requirements change, alternative CPU's may prove more attractive. The beauty of the Digital Group Systems is that you can change your mind.

As an added bonus, the user is also able to take advantage of nifty applications written on another manufacturer's machine with minimal software conversion (mostly I/O device reassignments). Total software conversion can be avoided. This approach will continue to become attractive as CPU costs drop.

SYSTEM ORIENTATION

Another fact that has surfaced in this field is that there is a phenomenal variety of OEM's, businessmen and hobbyists out there with vastly different abilities and resources available to them. Having a single option of being allowed only to purchase an assembled system or an empty box with a single power supply does not fully address many users' needs.

The Digital Group has always believed that, as an option, the purchaser should be able to purchase only the parts of a system he needs. This allows the advanced experimenter, engineer, or end-user to take advantage of:

1. Using what he already has on hand. Allowing conversion from other CPU systems without repurchasing every component.
2. Getting use out of a manufacturer's evaluation chip set.
3. Unbundling the power supply and cabinet for custom designs.
4. Different TV screen sizes and keyboard layouts.
5. Different cabinet preferences.

Many partial system prices are available in our price list or on request by letter or over the phone. We are not able to offer completely bare board systems but are usually more than willing to meet you halfway. Naturally, any item announced as a bare board (I/O, Memory) will continue to be available as a bare board for those that desire it.

QUALITY

Why is quality so important? The Digital Group insists on the highest quality in all of its products. Manufacturers will shave corners to keep costs down. With the average electronics kit product, that approach is usually acceptable to the purchaser. However, we feel that the corner shaving approach is totally unacceptable for the Microcomputer system user. What you are building is a real honest-to-God computer system. There are literally thousands of parts and interconnections in the system — any single failure can bring the system down. If quality shortcuts have been made, reliability is reduced. The experimenter may end up spending most of his time debugging and fixing his computer rather than using it to develop and run applications.

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The Digital Group's level of quality is reflected in what we supply in all our products:

PC BOARDS —

FR-4 heat-resistant epoxy base material (superior to G-10)

Double-sided boards with plated through holes

Gold plated connector fingers

All circuits solder-fused (a special plating process which enhances solderability and reliability)

CONNECTORS —

Wire-wrap only — gold plated

INTEGRATED CIRCUITS —

Distributor or Factory prime IC's

PARTS —

Resistors are 5% or better

Capacitors are 10% or better

Bypass capacitors are distributor/factory prime

Trim pots are sealed type

SOCKETS —

Every IC is socketed

MAINTENANCE

Every computer system will eventually go down. It is at that point that the maintenance design features become very important. The Digital Group Systems are specifically designed for ease of maintenance.

PLUGGABLE BOARDS: Every Digital Group System board is a plug-in board. The board plugs into a connector on one side. Bolt-together boards are very inconvenient to maintain. Ribbon cables and dip plugs going every which-way from all sides of each PC board also contribute to maintenance problems.

IC SOCKETS: Every Digital Group kit contains a socket for each IC — not just the expensive ones. Even though the socket may be almost as expensive as the IC, when you need to replace a 7400 gate you don't want to risk destroying a double-sided PC board trying to unsolder the IC.

STANDARD PARTS: Standard parts and common IC's are used throughout. Custom IC's "selected" IC's, or single-source parts have been avoided wherever possible to avoid part replacement availability problems and to maintain compatibility.

hardware

HARDWARE APPROACHES

The way we view it.

CPU VARIATIONS

Each microprocessor CPU that the Digital Group offers has various strengths and weaknesses. All can accomplish any given application. However, there is no single microprocessor that is "best" for everything. The differences occur in the amount of storage used, the time required to produce a given result, and various system features. Proper CPU selection is solely dependent on application requirements.

Z-80: The Z-80 is the newest and, in our opinion, the most powerful microprocessor available today. The Z-80 offers all the major advantages of the 6500, 6800 and 8080. It excels at input/output, direct bit manipulations and memory manipulation. The Z-80 is software compatible with the 8080 and, therefore, can utilize the largest application support base that is available for microprocessors today.

8080A: The 8080A is a register-oriented general purpose microprocessor. It is the most popular microprocessor on the market today and, therefore, enjoys the highest level of currently available support. If the application can be processed mostly within its internal registers, it is very fast.

6800: The 6800 is a memory-oriented general purpose microprocessor. Almost all operations involve transfers to and from memory. It has a sophisticated bus-oriented architecture. The instruction set is very comprehensive — similar to a PDP-11. Support from many sources is available. It is difficult to interface a full-function front panel.

6502: The 6502 from MOS Technology has an architecture very similar to the 6800 with a slightly smaller instruction set. The 6500 excels at data handling applications. It uses the 6800's bus structure and adds a front panel capability for single-stepping.

Obviously, the foregoing comments are only intended to give the briefest highlights. For further comparisons, we

would recommend the series on Microprocessor Benchmarking in EDN magazine which began in the April 20, 1975 issue. EDN is usually available at large public libraries or college engineering libraries and has carried an extensive series of articles on microprocessors.

SYSTEM BASE COMPARISONS

There have been a number of approaches to microprocessor system design. Each has something to recommend it. We are presenting our analysis of four basic system bases.

There are, of course, variations among systems, but we still feel the comments are valid.

Toggle Switches and LED Bit Lamps: The first microprocessor system designs were based on toggle switch input and LED bit lamp readouts. Programs were small or took hours to enter and were lost when power was switched off.

Numeric Keyboard and 7-Segment Readout: This system base represents the first level of improvement. Each byte entered requires 2-3 key depressions rather than 8 toggle switch flips. The 7-segment readout eliminates the requirement for the user to interpret pure binary. However, only one character and address at a time is displayed — the coding interrelationships are available only byte-by-byte. Operator effort for analysis is proportionally high.

Teletype: Teletype based systems represent the next level of improvement and offer some significant advantages. They usually have some form of monitor in ROM (ex-Motorola MIKBUG, etc.) which allows the operator to type in code and helps isolate him from errors. The total program is printed out in hard copy. In addition, paper tape is usually available to provide an economical media for program storage and exchange.

There are some trade-offs, however. New teletypes cost \$1000 and up. Teletypes are electro-mechanical devices which require significant maintenance — used surplus teletypes are the worst offenders. The input/output speed is

usually around 10 characters per second — a dump of 1K bytes in octal can take almost 7 minutes. And creates a great deal of irritating noise. In addition, paper tape is a damage-prone and bulky media.

Video and Cassette: The latest improvement has been the movement to using a TV set as an output display, a full alphanumeric keyboard for input, and an audio cassette for program storage and exchange. Video-based systems provide full user to system interaction at minimal cost. The speed of system response is practically instantaneous. Operations may be performed in almost complete silence. Reliability is enhanced as electro-mechanical mechanisms are limited to the keyboard and cassette recorder. Data media storage density is much higher — you can store over 2000 feet of paper tape on one side of a single C-90 audio cassette.

The cost/performance trade-offs with The Digital Group's video-based systems represent what we feel is the best performance at the most reasonable cost. Even a commercial system with a new commercial monitor, high quality cassette recorder, and a new keyboard could be assembled for less than \$400 in additional cost. If the purchaser supplies a modified TV set as the monitor (ref BYTE No. 2), a moderate quality cassette recorder, and a like-new surplus keyboard, he should be able to get going for around \$150 in additional cost. All interfaces and operating system software are supplied as standard with each Digital Group system.

FRONT PANELS

Front panels have offered three major features to users — allowed forced loading or changing of memory to get going, limited display of information, and the ability to single step through instructions.

The Digital Group System does not require a front panel. All instructions needed to "get going" are contained in an EROM Bootstrap loader. Loading or changing of memory is supported by two major TV-oriented functions — Keyboard Program and Storage Dump. Each may be accessed or called from the other interactively. Addresses may be set or reset to allow operations or visibility at any time. Instructions are keyed in through the keyboard with the preceding 10 addresses and contents visible in a pushup stack. Storage Dump displays 96 bytes of storage and addresses in Octal or Hexadecimal (system dependent) on the screen at a time. Pages are directly selectable or may be advanced serially by depressing the space bar on the keyboard. A full screen update occurs in less than 1/30th of a second.

In addition, a storage dump trap may be inserted in the instructions to catch and display all registers, flags, and storage contents at any specific point in a program's execution. This has proven to be a very powerful debugging tool for software development.

However, the bus structure of the Digital Group Systems will support a plug-in front panel as an option for those who feel that their needs require one. A schematic for a basic front panel which will plug into any available memory space is included in the Digital Group's system manual.

DIGITAL GROUP VIDEO-BASED SYSTEM OPERATION

Initiating operation on a basic Digital Group System consists of four steps:

1. Place a system cassette or saved program cassette in the audio cassette recorder and depress play.
2. Turn system power on.

3. After the cassette is read in, select an application code from the list displayed on the TV monitor.
4. Enter the code on the keyboard and the application begins operation.

DIGITAL GROUP VIDEO-BASED OPERATING SYSTEM

Each Digital Group System is supplied with a standard operating system on cassette for video-based operations. The functions supplied are:

1. Read Cassette
2. Write Cassette
3. Program from Keyboard*
4. Dump Storage*
5. TV Monitor Functional Support Routines

*These functions may be supplied in either Octal/Hexadecimal or both depending on system selected.

The storage requirement for the Operating System is 1.5K.

In addition, system maintenance routines will be included or made available. The first of these is a memory checker routine which will test all possible single bit patterns and display any failing memory IC's board location on the monitor. This routine is designed to keep running until interrupted. After all the possible single bit combinations have been tested without error, an alpha symbol is displayed and execution continues. Therefore, memory may be tested for extended periods of time and the number of successful tests is indicated by the number of alphas on the monitor.

INDIVIDUAL CARDS

CENTRAL PROCESSING UNITS

(CPU's the computer part of your computer).

We are currently offering 4 CPU's but we're a little biased at the moment. The Digital Group considers the Z-80 to be the major microprocessor and it outsells all others and has become the leader..

We have never before been able to recommend any of our processors (6500, 6800, 8080A) without some qualifications as to their suitability for certain applications. The Z-80 has ended that.

Why? The Z-80 offers all the major advantages of the 6500, 6800, 8080 and even IBM 360-like instructions. Zilog added 80 new major instructions to the 8080's instruction set which increases the power of the system dramatically.

Control operations are vastly simplified with direct bit manipulation. Data handling has also been significantly improved with block memory moves and block I/O.

But the final touch is that the Z-80 is completely software compatible with the 8080A. Excluding timing loops, all of our 8080-based software runs without change! That means you can take advantage of the Z-80 and immediately utilize all the 8080 support that is already out there.

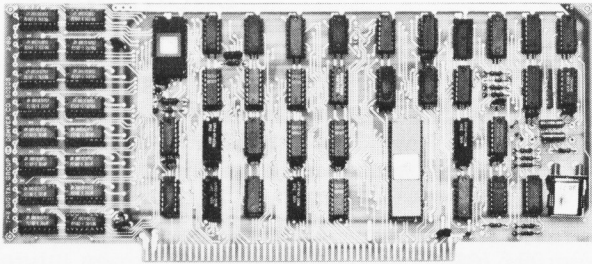
What else? Plenty. With a Digital Group System's video-based operation, software approach, and the Z-80 you are quickly at the state of the art with a full system. As always,

the digital group

the Z-80 CPU card is completely system compatible and merely requires exchanging CPU cards to change processors. But the best part of all is that you can get a Digital Group System with a Z-80 processor for only \$50 more than our already reasonable price.

Z-80 FEATURES

- Complete compatibility with 8080 object code
- 80 new instructions for a total of 158
- 696 Op codes
- Extensive 16-bit arithmetic
- 3 Interrupt modes (incl. 8080), mode 2 provides 128 interrupt vectors
- Built-in automatic dynamic memory refresh
- Eleven addressing modes including:
 - Immediate
 - Immediate extended
 - Page zero
 - Relative
 - Extended
 - Indexed
 - Register
 - Implied
 - Register indirect
 - Bit
 - Combination of above
- New Instructions (highlights):
 - Block move up to 64K bytes memory to memory
 - Block I/O up to 256 bytes to/from memory directly
 - Input/Output from any register
 - String Search
 - Direct bit manipulation
- 22 Registers – 16 general purpose
- 1, 4, 8 and 16 bit operations



Z-80 CPU CARD

DIGITAL GROUP Z-80 CPU CARD

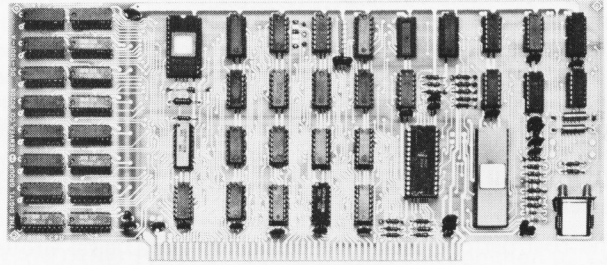
- 2K bytes 500ns static RAM
- 256 bytes EPROM bootstrap loader (1702A)
- 2 Direct Memory Access (DMA) channels
- Hardware Interrupt controller
 - Supports all 3 modes of interrupt
 - Mode 2 supports 128 interrupt vectors
- Data and Address bus lines drive 30 TTL loads
- Z-80 runs at maximum rated speed – 400 ns cycle
- Single step or single instruction step
- EPROM de-selectable for full 64K RAM availability (programs may start at location 0)
- Complete interchange with Digital Group 8080A, 6800, and 6500 CPU's
- Order Code = Z80-CPU

8080A CPU

(intel, AMD and Others)

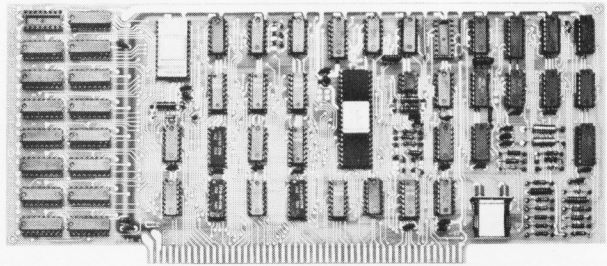
- The 8080A CPU Board features:
 - 2K of RAM onboard

- Single stepping
- 1702A EPROM programmed for bootstrap load
- DMA capability
- 8-level hardware vectored interrupt
- Data bus lines drive 30 TTL loads
- Crystal controlled clock (2 MHz)
- Order Code = 8080-CPU



8080A CPU CARD

6502 CPU CARD

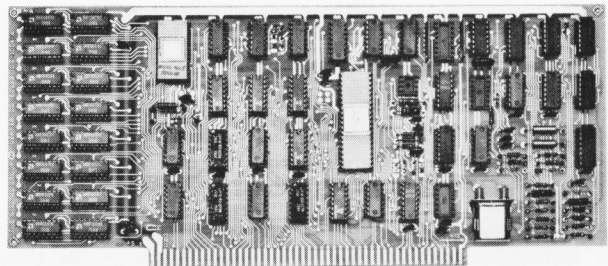


6502 CPU

(MOS Technology)

- The 6502 CPU Board features:
 - 2K of RAM onboard
 - Single stepping
 - 1702A EPROM programmed for bootstrap load
 - DMA capability
 - 11-level software vectored interrupt
 - Data bus lines drive 30 TTL loads
 - Crystal controlled clock (1 MHz)
 - Order Code = 6502-CPU

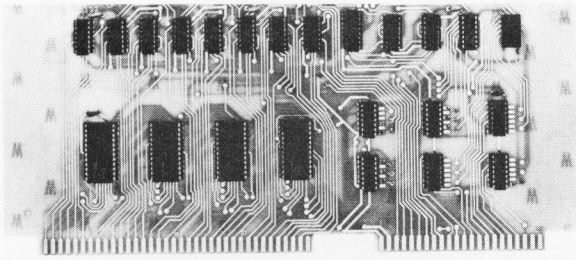
6800 CPU CARD



6800 CPU

(Motorola/AMI)

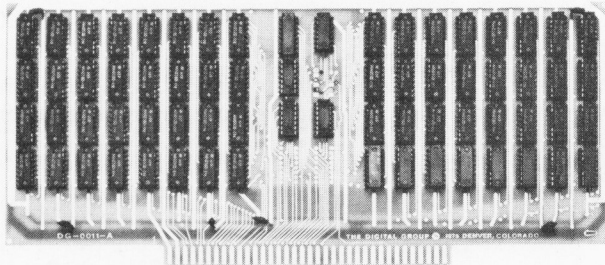
- The 6800 CPU Board features:
 - 2K of RAM onboard
 - Single stepping
 - 1702A EPROM programmed for bootstrap load
 - DMA capability
 - 11-level software vectored interrupt
 - Data bus lines drive 30 TTL loads
 - Crystal controlled clock (1 MHz)
 - Order Code = 6800-CPU



INPUT/OUTPUT

INPUT/OUTPUT

Four 8-bit Input Ports
 Four 8-bit latching Output Ports
 Full 16-bit port addressing — supports memory oriented I/O structures (68/6500) and Z80/8080 approaches
 Signals are standard TTL level
Order Code = IO-F



8K MEMORY

8K STATIC RAM MEMORY

500ns 21-2's

No wait states required for any Digital Group CPU
 Static RAM used for ease of maintenance
 Buffered address lines
 Applies only 1/20 TTL load to bus lines
 Address decoding covers full 64K range in 8K boundaries
 Power consumption = 1.6A of 5V per 8K
Order Code = MEM-8

8K FAST, LOW-POWER STATIC RAM MEMORY

250ns 2102LHPC
 Same features as MEM-8
 Power consumption: 1.2A Amp per 8 K
 Uses 250ns 2102LHPC chips for best combination of speed and power consumption
Order Code = MEM-8C

TV READOUT & AUDIO CASSETTE INTERFACE

TV Readout — Cursor under software control
 512 characters
 16 lines by 32 characters
 7 x 9 character matrix — shifted (effective 7 by 12)
 Full 128 character ASCII
 Upper and Lower case alphabet
 Math Symbols
 Special Symbols
 Greek Alphabet
 Direct Video Output to standard monitor or modified TV set
 Single 8-bit parallel port interfaces

Cassette Interface — Uses standard unmodified audio cassette recorder

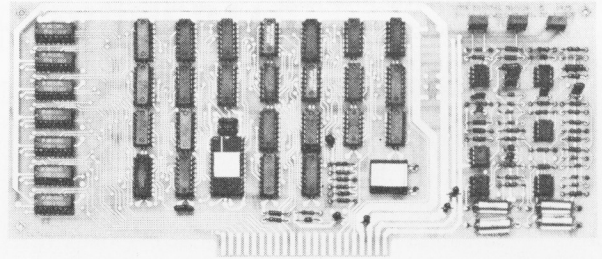
Extremely reliable FSK recording
 Standard wide-shift teletype frequencies 2125 HZ and 2975 HZ

Operates at 1100 baud or 100 characters per second — 1K loads in 11 seconds

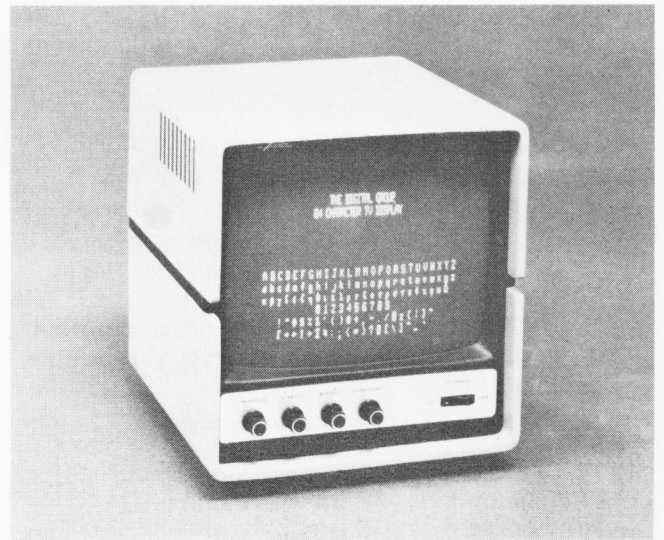
Single bit TTL interface (1 in and 1 out)

Uses crystal-controlled software UART for serialization/deserialization

Order Code = TVC-F



TV READOUT and AUDIO CASSETTE INTERFACE



DIGITAL GROUP 64 CHARACTER TV DISPLAY

We are pleased to announce our new TV readout with a 64-character line. It will give your system a great deal more capability.

Here are the specifics on the Digital Group TV Readout and Audio Cassette Interface:

1024 Character TV Readout

64 characters horizontal by 16 lines

7x9 character matrix (effectively 7x12 due to character shifting)

1K on-board RAM for buffer storage — requires no main memory — completely independent

128 character ASCII

Upper case alpha

Lower case alpha with base line extenders (g, j, p, y)

Numbers and extended math symbols

Greek alphabet

Software driven cursor — forward and backward

the digital group

Compatible with most microprocessors; Interfaces with one 8-bit parallel output port
 Timebase may be driven with an external timebase (may be synchronized to TV camera, TV set, etc.)
 Readout timebase available at connector (can be used for graphic driver, etc.)
 White characters on black, and/or black on white; software selectable
 Plugs into standard dual 22-pin TVC connector on Digital Group Systems

Improved Audio Cassette Interface:

Reliable FSK recording technique
 Uses standard unmodified audio cassette recorder
 Write cassette system uses a digitally synthesized frequency shift system, derived from TV system's master crystal oscillator
 Read cassette system easily aligned using the write system as an alignment aid
 Runs at 1100 baud (100 characters/second) – loads 16K in 3 minutes

General Information:

Power: +5 volts, ±12 volts
 Size: 5" high by 12" wide (not incl. connector)
 Kit includes:
 52 IC's and low-profile sockets
 Capacitors, resistors, potentiometers and diodes
 11.980 MHz crystal and socket
 Dual 22-pin wire-wrap connector
 PC board – FR-4 (heat-resistant) epoxy, double sided, plated through holes, gold-plated fingers, fused solder plating
 Documentation: Theory of operation, construction, and debugging aids

Compatibility:

1024 character TVC plugs into same socket as 512 character version
 Existing 512 character TVC software will drive the 1024 TVC, but will require line width constant modifications
 1024 character TVC version software packages available from DGSS as well as some conversion services

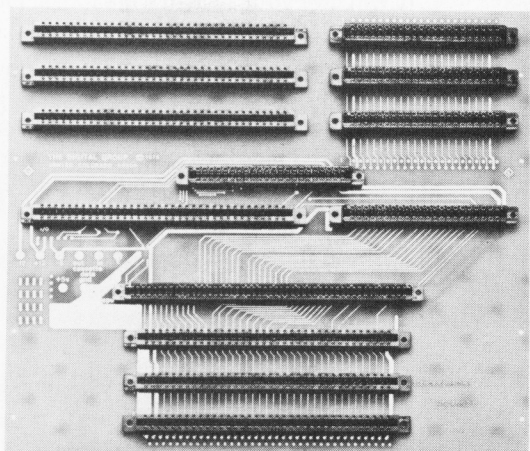


Photo above is of a Standard Mother Board with connectors installed in every available slot. Mother boards come without connectors. Each system board you buy has the connectors it requires to plug into the mother board. The Standard Mother will support up to 26K of memory and 16 input ports and 16 output ports. In addition, it will support a TVC and a CPU of your choice (Z80, 8080, 6500, 6800.)

512 TVC TO 1024 TVC UPGRADE KIT

As always, when the Digital Group extends the capabilities of our systems, it doesn't mean obsolescence for any products. We are offering an upgrade kit for present Digital Group system owners who wish to go to the longer line length. This kit uses most of the IC's from our TVC-F readout. No unsoldering is required; all new sockets, capacitors, resistors, PC board and other necessary parts are supplied.

PLEASE NOTE: The new 64-character TV Readout requires higher bandwidth than is normally available with a converted home TV set as a monitor. Though they will be legible, the characters will appear smaller and fuzzier than what you may have become accustomed to with our 32-character TV Readout. For this reason we will continue to offer and support our 32 by 16 TVC. Our 9" Javelin monitors handle the 64-character readout nicely.

Order code	Description	Prices	
		Kit	Assembled
TVC-64	Full 64-character TV Readout and Audio Cassette Interface	140.00	205.00
TVC-64UPG	Upgrade kit ffrom TVC-F	65.00	na
SYSOPT-64	Substitute 64-character TV Readout	10.00	10.00

We are also making a new system option available for those who are purchasing full systems from us and wish to have the 64-character line.

MOTHER BOARDS

Standard Mother – Each standard mother provides space for:

- 1 CPU card with 2K RAM
- 1 TV Readout and Cassette Interface
- 4 Input/Output cards or Peripheral Interfaces
- 3 Memory cards or 2 Memory cards and 1 Front Panel (24K additional RAM)

Size: 10-3/8" deep by 12" wide

Power: A fully populated Standard Mother will require about 10-1/2 Amps from the +5V supply with standard devices. Other currents are minimal. Total current requirements will depend on peripheral interface requirements.

Order Code = MB-2

MINI-MOTHER

Each Mini-Mother provides space for:

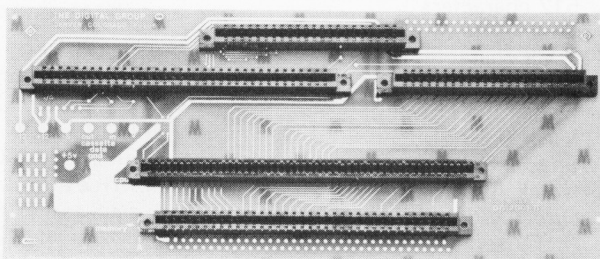
- 1 CPU card with 2K RAM
- 1 Input/Output Card
- 1 TV Readout and Cassette Interface
- 1 8K RAM Board

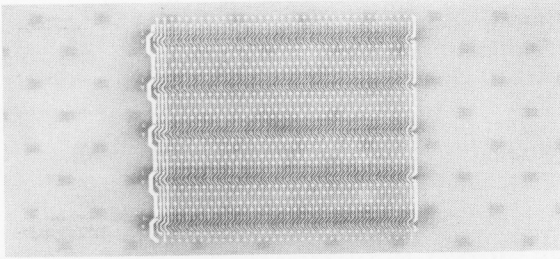
Size: 5-3/8" deep by 12" wide

Power: A fully populated Mini-Mother (w/10K) will require about 4.5 Amps from the +5V supply with standard devices. Other currents are minimal.

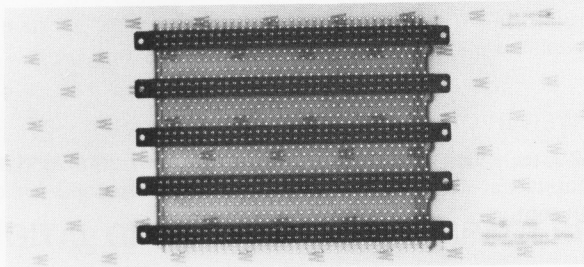
Order Code = MB-1

MINI-MOTHER





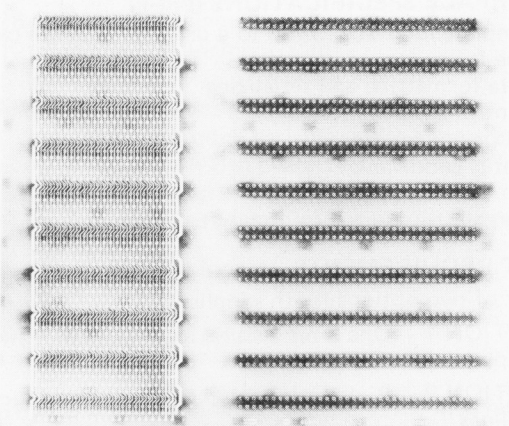
MEMORY EXPANSION WITHOUT CONNECTORS



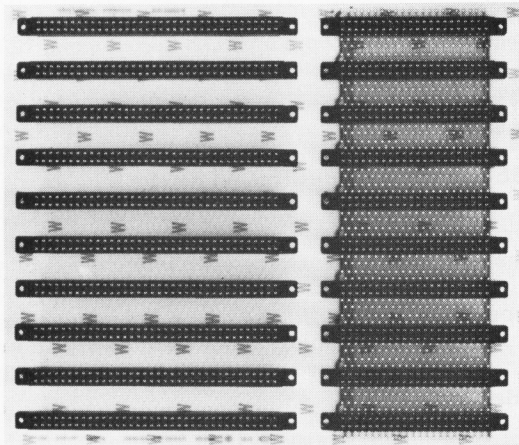
MEMORY EXPANSION WITH CONNECTORS

MEMORY EXPANSION MOTHER BOARD

The Memory Expansion card attaches to either the Mini-Mother or the Standard Mother. It provides space for 5 more Memory cards (40K RAM) or 4 more Memory cards (32K RAM) and a front panel. 5-1/2" deep by 12" wide.
Order Code = MB-3



INPUT/OUTPUT EXPANSION WITHOUT CONNECTORS

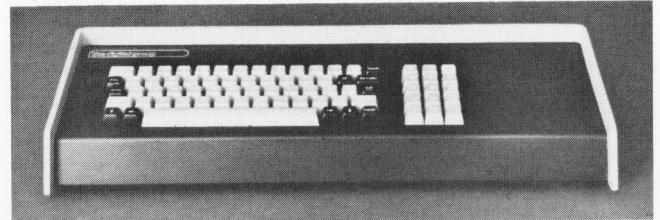


INPUT/OUTPUT EXPANSION WITH CONNECTORS

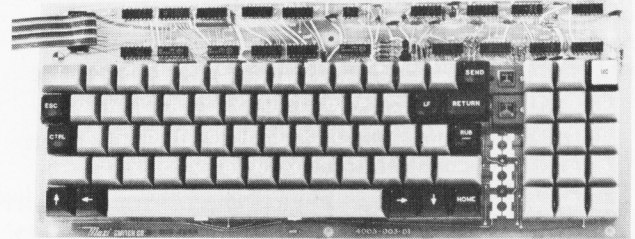
INPUT/OUTPUT EXPANSION MOTHER BOARD

The Input/output Expansion card attaches to either the Mini-Mother or the Standard Mother. It provides space for 10 more Input/Output or Peripheral Interface cards. 10-3/8" deep by 12" wide.
Order Code = MB-4

PERIPHERALS



DIGITAL GROUP KEYBOARD



DIGITAL GROUP KEYBOARD

Features:

- 128 character ASCII
- Numeric Pad
- 76 Keys
- Cursor controls
- Lighted Upper-Case Key
- Good Tactile Feedback (2 level)

Specifications:

- Technology: Capacitance (solid state)
- Power: +5V only
- Output level: Fully TTL compatible
- Rollover: 2 Key
- Keyforce: 2 oz. nominal
- Pre-Travel: .100 inch
- Total-travel: .165 inch
- Over-travel: .065 inch
- Keyswitch life: In excess of 100 million operations
- Order Code = KEY 1

CASSETTE STORAGE SYSTEM

The Digital Group Cassette Storage System gives you total magnetic tape data storage and retrieval for your microprocessor, capable of operating 1 to 4 computer-controlled Phi-Deck cassette transports. Within seconds (20 at most), your system zips to any of over one-quarter million 8-bit bytes per drive. And that really puts it all on-line!

The Digital Group Cassette Storage System is ideal for:

- Large data files — names, accounts, etc.
- Indexed computer-controlled program files
- Sorts
- Inexpensive mass storage
- Work files
- Indexed random retrieval
- Multi-pass compilers
- System residence

In addition, with a Digital Group System and a Phi-Deck transport, your total load procedure is reduced to a single action — turning on power. Everything else is automatic! Your Digital Group System is completely ready for use in a very few seconds. And you avoid a large investment in single-use PROM memory.

MAJOR STORAGE SYSTEM COMPONENTS

1. Controlling and Formatting Interface — single card for 1 to 4 drives
2. Software Operating System
3. Computer-controlled Cassette Drive(s)

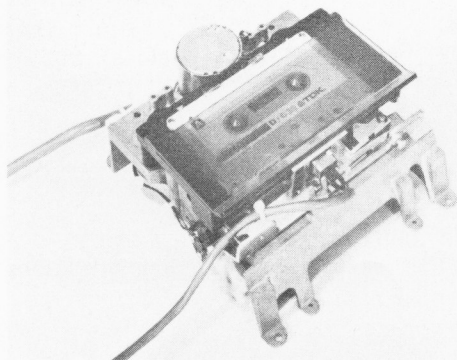
Selected Specifications:

- Data Rate: 800 bytes per second, 8K loads in 10 seconds
- Media: High-quality standard audio cassettes
- Search Speed: 100 inches per second
- Tape Speed: 5 inches per second
- Power Requirements: +12V to +20V at .7A peak and +5V at 1A plus 60ma per drive
- Port Requirements: One 8-bit parallel input port plus two 8-bit parallel output ports
- Cassette Drive is an enhanced Phi-Deck with a digital head, cast head bar, stronger capstan, and four-footing cabling.

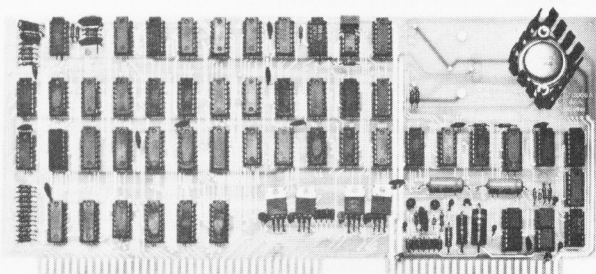
SOFTWARE OPERATING SYSTEM

- Z80/8080 Based 650 bytes
- Error Detection: CRC
- Retries after soft errors
- Automatically bypasses hard errors
- Block size = 1 to 256 bytes or multiple of 256 bytes

PHI-I DIGITAL CASSETTE DRIVE



PHI-F INTERFACE



Software Functions supplied:

- Record multiple blocks
- Record 1 block
- Read 1 block
- CRC check
- Fast reverse
- Fast forward
- Search for block

THE DIGITAL GROUP CASSETTE STORAGE SYSTEM

- Recording Density: 1600 FCPI (Flux Changes per Inch)
- Interblock gap: 1/8"
- Error Rate: Virtually zero when using software package supplied with deck and high-quality cassettes.

POWER REQUIREMENTS:

+12V to +20V at .4 Amps average, .7 Amps peak and +5V regulated at 1 Amp plus 60 ma per drive attached for capstan motor.

DATA CAPACITY

8-bit bytes

No. of Drives	Media		
	C-30	C-60	C-90
1	254,000	508,000	762,000
2	508,000	1,016,000	1,524,000
3	762,000	1,524,000	2,286,000
4	1,016,000	2,032,000	3,048,000

INTERFACE SPECIFICATIONS (PHI-F)

A complete interface for up to 4 drives on a single card supplies the following:

- Data formatting and serializing
- Control signals
- All power for 4 drives
- Status conditions
- Jam sensing
- Manual stop switch (switch not supplied)

PORT REQUIREMENTS (up to 4 drives)

Either of two options (both supplied):

- OPTION 1 — One 8-bit parallel Input port plus two parallel Output ports
- OPTION 2 — Bi-directional I/O data bus plus four strobe lines

Ports are TTL-level signals.

MISCELLANEOUS

- Card size = 5" high by 12" wide
- Connectors are dual 22-pin and dual 36-pin along 12" edge on .156" centers. Connectors are supplied in kit with w/w posts (.025).

Order Code = PHI-F

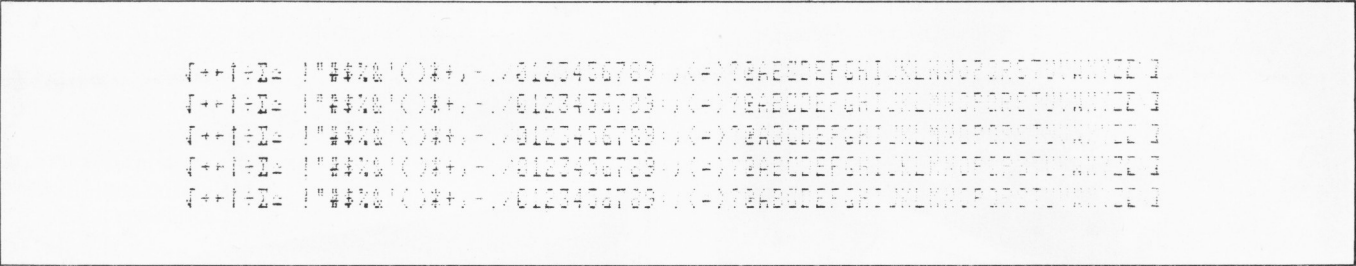
CASSETTE DRIVE SPECIFICATIONS

Digital Group Phi-Deck — Included Enhancements:

- High speed — 5 ips
- Digital Head — Enhanced cassette interchangeability
- Cast Head Bar — better tape alignments
- Stronger Capstan shaft
- 4-foot cables with Molex connectors for easy connecting
- Motor power lines have been reoriented for best control

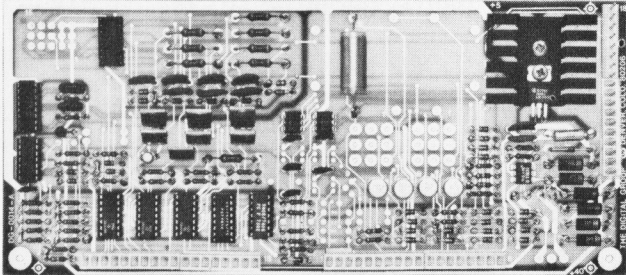
Order Code = PHI-1

NOTE: A complete storage system includes 1 interface kit and 1 to 4 drives.



PRINTER OUTPUT SAMPLES (actual size)

13 CHAR/INCH : !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`
 12 CHAR/INCH : !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`
 10 CHAR/INCH : !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`



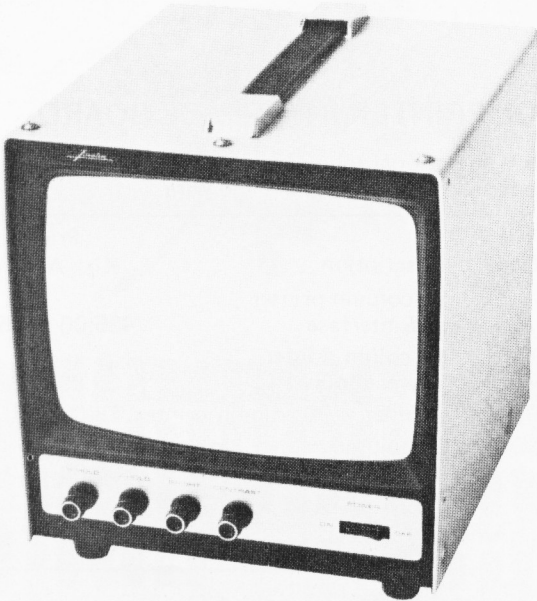
96-COLUMN PRINTER INTERFACE BOARD

JAVELIN B&W 9" MONITOR

The Digital Group has tested a significant number of monitors of many different sizes (5" through 19") from Sony, Sanyo, Panasonic, Javelin, Conrac and JVC. We feel that this monitor represents the best value. The display is very crisp with no "hot spots" in the letters. The DC Restoration is excellent. Viewing size is large enough to be easily seen while the monitor itself is of a size and weight that is truly portable. It was obviously designed as a high-resolution professional monitor — not an adapted TV set from the manufacturer's consumer line. We are obviously pretty fond of the little beasts. We think you'll like them too.

Order Code = MON-9J

9-INCH JAVELIN MONITOR



SYSTEMS WITHOUT CABINETS

The Digital group has always believed in offering a wide range of purchase options for its products. In order to provide a low-cost entry, we offer our systems without requiring the purchaser to buy our cabinets or power supply. This approach increases flexibility for custom mounting as well as keeping your total investment to a minimum. As can be seen in the pictures, each system is free-standing and requires only four long bolts or feet for bottom clearance.

3-BOARD SYSTEM

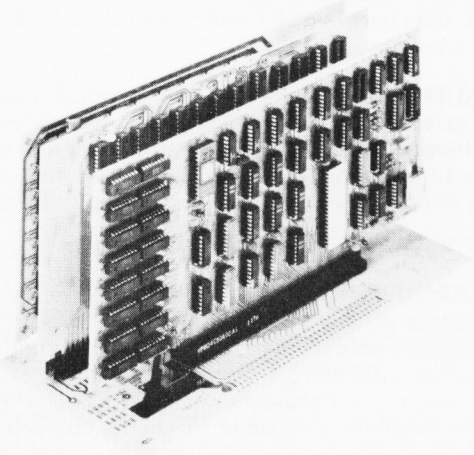
(with Mini-Mother)

The Digital Group System's basic configuration for any CPU consists of:

- 1 CPU card with 2K RAM
- 1 Input/Output card with 4 ports in and 4 ports out
- 1 TV Readout and Cassette Interface
- 1 Mini-Mother card

This is referred to as the 3-board System. The Mini-Mother has one additional space which can hold an additional 8K Memory card or a Front Panel. NOTE: The TV Readout requires an outport port, a keyboard will require an input port, and the Cassette Interface requires the Least Significant Bit on an input and an output port. This leaves 2-7/8 input and output ports uncommitted. No interconnecting wiring is required for the TV Readout or Cassette Interface.

MINI-MOTHER WITH Z-80 CPU

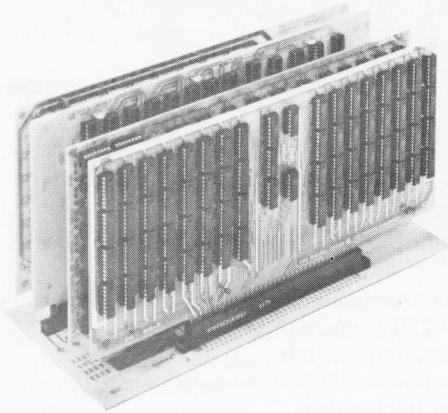


The front card in this photo is a Z-80 CPU card. Behind it is an I/O board and behind the I/O board is a TVC card. This particular configuration is a 3-board system.

4-BOARD SYSTEM

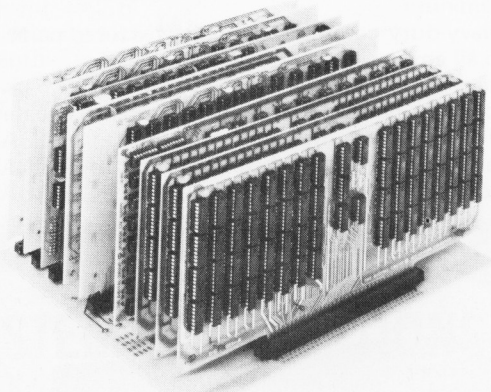
(with Mini-Mother)

The 3-Board configuration may also be supplied with the additional 8K Memory (for a total of 10K of RAM) which is referred to as the 4-Board System.



4-BOARD SYSTEM FULLY POPULATED

2. ASCII Keyboard (full 128 character ASCII recommended)
3. Audio Cassette Recorder
4. Video Monitor or modified TV set
5. Miscellaneous hardware and cables



STANDARD MOTHER FULLY POPULATED

ADDITIONAL REQUIREMENTS

To make a Digital Group System fully operational, you need only add the following items:

1. Power supply (+5V, -5V, +12V, -12V recommended)

The picture above is of a fully populated Standard Mother.
Note: For a \$15 charge the Standard Mother may be substituted in any system package. Order code = MB2-SVB



SYSTEM CABINETS

Many of you have already had a chance to look over the Digital Group cabinets at various conventions, and we're delighted to report that your reactions have been very enthusiastic to our approach. We also listened to all your suggestions for improvements — most of which have been incorporated.

As is our policy when we enter an area, we like to give you the reasoning behind what we're doing. And so —

DIGITAL GROUP CABINET DESIGN PHILOSOPHY

1. Separate components for maximum flexibility. If your computer system is in a single box it is difficult

- to upgrade or make additions without starting over.
2. Unified system appearance. Ideally, all components in your system should look like they belong together rather than cabled together at random.
3. Highest quality
4. Custom design at pre-built prices.
5. Ease of construction and use have high priority.

We believe your system should look like a system rather than an assortment of products. You should be proud to display the results of your investments in labor and money. And, as always, that investment should be as adaptable as possible against the inevitable onslaught of technological change.

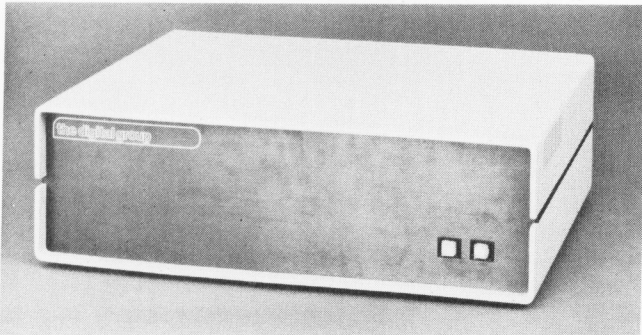
the digital group

We feel our current system line embodies our philosophy quite well. We hope that you will agree.

GENERAL INFORMATION

All cabinets have the following characteristics:

1. Heavy-duty aluminum is used throughout
2. Front panels and side rails are dark brown anodized aluminum
- 3; Heavy-duty commercial quality textured paint is used on all covers — color is tan
4. Logo is in white
5. Non-marring feet are supplied with each cabinet
6. All assembly hardware is included
7. Cabinets are prepunched for standard Digital Group products unless otherwise specified



STANDARD CPU CABINET

STANDARD CPU CABINET

The CPU cabinet is designed to contain a standard motherboard based Digital Group System plus power supply. It is pre-punched to accept all necessary hardware as detailed below.

POWER SUPPLY

The power supply mounting plate is set up for the 6-Amp PWR-6 or 12-Amp PWR-12 with PWR-Ø supplies. The 18-Amp PWR-18 and PWR-Ø can also be supported internally, if desired (option No. PWR-18SUB).

EXPANSION CAPABILITY

There is expansion capability for about 5 additional cards (beyond the standard motherboard) depending on the size and placement of the power supply. If the power supply is mounted externally, there is space for an additional 10 cards or 24 total. The card rack runs the entire length of the cabinet.

In addition, various mixes of power supplies, I/O, and memory may be used by varying positions of supplies, motherboards, and expansion cards. We have tried to maintain as much flexibility as possible. A few possible configurations are listed

MB Position	Maximum Memory	Maximum I/O in and out
with 12A P/S in Cabinet:		
1	26K	36 ports
2	42K	32 ports
3	66K	16 ports
with 18A P/S in cabinet:		
1	26K	24 ports
2	42K	20 ports
3	not possible w/18A	
with Power Supplies out of cabinet:		
1	26K	68 ports
2	82K	44 ports
3	130K	16 ports

Note: to obtain maximum numbers shown, it may be necessary for customer to drill a few small holes and trim excess materials off MB-2 and expansion cards.

BACK PANEL CONNECTORS

Back panel connection is provided via optional industry standard 22-pin dual readout edge connectors (.156" spacing) and mating paddle cards. We believe this approach to be very reliable, economical, and readily available.

ITEMS INCLUDED WITH CPU CABINET (CB-CPU)

Qty.	Description
1	Standard 5" box fan (quiet type)
1	Lighted power switch — red w/legend
1	Lighted reset switch — blue w/legend
1	Card rack for standard motherboard (rails extend entire length of cabinet)

Back-panel hardware:

1	SO-239 Video connector
1	Fan on-off switch
1	Grounded HD 3-wire power cord
1	Fan finger guard
1	Power cord strain relief
2	Miniature audio jacks
1	Fuseholder
1	Slo-blo fuse
1	Set assembly hardware — misc. screws, bolts, grommets, etc.
4	Rubber feet
1	Wiring harness for hardware and power
1	22-pin dual readout w/w conn. (44 lines)
1	22-pin dual-sided paddle card (44 lines)
1	Digital Group 3-ring Systems binder

SPECIFICATIONS

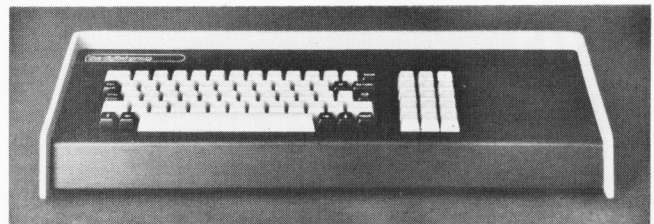
Height = 7.5"
Width = 24"
Depth = 16.75"
Weight = approximately 15 pounds with hardware, w/o power supply or system

Order code	Description
CB-CPU	Standard CPU cabinet
CB-CPU-OP1	Subst. 18A P/S mounting plate

KEYBOARD CABINET

Keyboard cabinets are supplied in a similar design theme as the rest of the system. There are 2 options:

- Option 1 — Insert punched for KEY1
- Option 2 — Blank insert for custom keyboard mounting

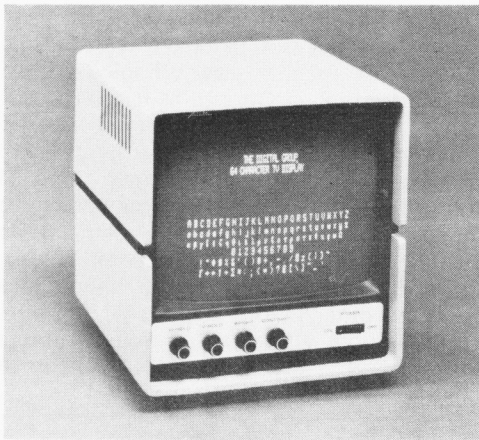


KEYBOARD CABINET WITH KEY1

SPECIFICATIONS

Insert:	Overall		
Height (front) = 1.85"	Height	=	4.275"
Height (rear) = 3.25"	Width	=	21"
Width = 20.8"	Depth	=	7.843"
Depth = 7.25"			

Order Code	Description
CB-KEY1	Cabinet for KEY1
CB-KEYØ	Cabinet w/blank insert



9-INCH MONITOR CABINET

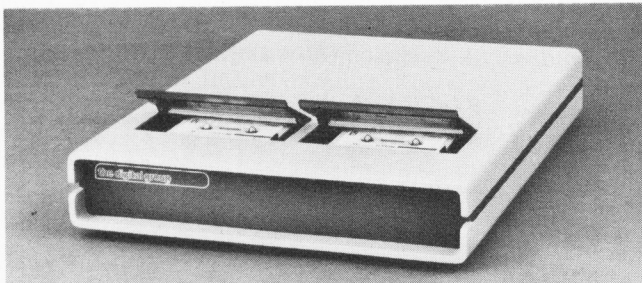
9" MONITOR CABINET

The monitor cabinet is designed to contain our 9" Javelin or Sanyo monitor. It replaces the original cabinet and is strictly a very nice dress option.

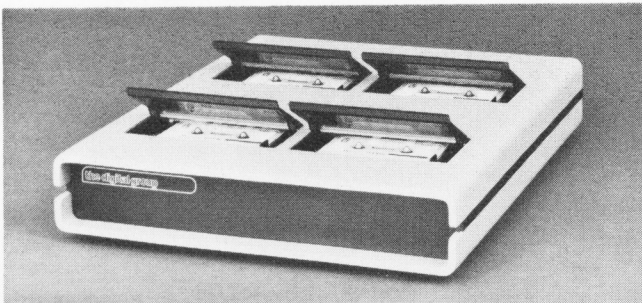
9" MONITOR CABINET SPECIFICATIONS

Height = 10"
Width = 9"
Depth = 10.25"

Order Code = CB-MON9



CB-CAS2



CB-CAS4

CASSETTE STORAGE SYSTEM CABINETS

The CB-CAS2 cabinet for the cassette drives is designed to contain 2 drives and, optionally, the PHI-F interface card. The CB-CAS4 cabinet for the cassette drives is designed to contain 4 drives only.

As you can see, the difference is the cabinet tops. Cabinet tops will also be available separately should your requirements change.

DIGITAL GROUP RECOMMENDATIONS

CB-CAS2 cabinet is suitable for:

Any 2-drive system with or without interface card mounted inside.

"Non-DG" systems (4-drive "non-DG" configuration will require 2 cabinets or external interfacing.)

CB-CAS4 cabinet (4-drive is suitable primarily for Digital Group systems which can accommodate the PHI-F card on the motherboard.

SPECIFICATIONS

Height = 2.5"
Width = 13.5"
Depth = 16"

Order Code	Description
CB-CAS2	Cabinet for 2 drives
CB-CAS4	Cabinet for 4 drives
CB-CAB-T2	2-drive spare top
CB-CAB-T4	4-drive spare top

SYSTEM COMBINATIONS

We couldn't resist packaging up various combinations of our equipment in standard configurations and giving you a better price as an incentive to buy the whole system at once.

SYSTEM 1

The System 1 is a complete 4-board Z80 System in a cabinet which includes the following items:

- Z80 CPU with 2K memory (Z80-CPU)
- Input/Output card (IO-F)
- TV Readout and Audio Cassette Interface (TVC-F)
- Additional 8K Memory (Mem-8)
- Standard Motherboard (MB-2)
- 12 Amp power supply (PWR-12)
- Standard CPU Cabinet (CB-CPU)

Order Code = Z80-SYS1

SYSTEM 2

The System 2 is a complete System 1 with an additional 8K Memory (MEM-8) for a total of 18K.

Order Code = Z80-SYS2

SYSTEM 3

The System 3 is a complete System 2 with 18K plus the following peripherals:

- Keyboard and Cabinet (KEY&CB)
- 9" Monitor and Cabinet (MON9&CB)
- Cassette Drive Interface (PHI-F)
- 4 Digital Cassette Drives and Cabinet (CAS&CB4)
- Plus all interconnecting cables

Order Code = Z80-SYS3

SYSTEM 4

With the addition of our new 96-column printer to our line, we can now offer a complete system package including high-speed impact hardcopy. Our new System 4 is a System 3 with the addition of PT-96-COMP, and an additional I/O card. The resulting configuration contains:

- Z80 CPU
- 32 Character TV Readout and Audio Cassette Interface (TVC-F)
- 2 Input/Output Card (2-IO-F)
- 18K 500ns Static RAM (2-MEM-8 + 2K on CPU)

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Cassette Drive Interface (PHI-F)
 Standard Motherboard (MB-2)
 12 Amp Power Supply (PWR-12)
 Standard CPU Cabinet (CB-CPU)
 9" Monitor and Cabinet (MON9 + CB)
 4 Digital Cassette Drives and Cabinet (CAS + CB4)
 Capacitance Keyboard and Cabinet (KEY1 + CB)
 96-Column Printer and Cabinet (PT96-COMP)
 Plus all interconnecting cables

Order Code = Z80-SYS4

SYSTEM NOTE:

Please note that there are several options for more memory, 64-character TV Readouts, different CPU's, etc. contained in the System Options section of the price list.

ADDITIONAL EQUIPMENT

1702A EPROM MEMORY BOARD

Features:

Holds 4K of 1702A's
 ROM and a portion of RAM may overlap with ROM taking precedence.
 Jumperable to any 4K boundary

Parts List:

16 – 1702A	1 – LM320/5
2 – 74125	3 – 7430
1 – 74154	1 – 7502
2 – 7408	1 – 7404

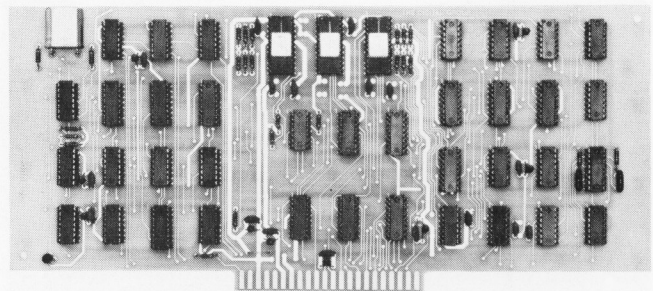
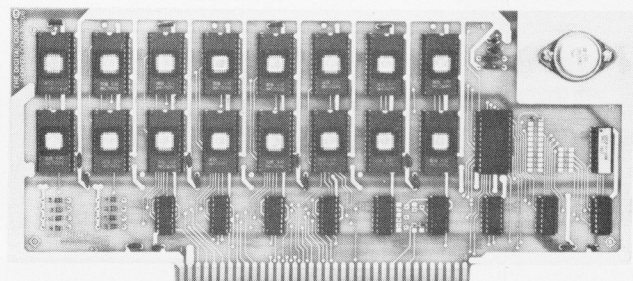
Misc. bypass caps, IC socket, 36-pin dual connector

Order Code = 1702-F Full kit with 4K 1702A's (unprog.)
 1702-0 Full kit without 1702A's
 1702-PCC PC Board and Connector

4096 PICTURE-ELEMENT COLOR GRAPHICS

64x64 Picture Element Display
 Three 4K Dynamic memories (for red, blue, green) result in 8 different hues at each of the 4K points.
 Computer main memory is not required for picture refresh – full on-board buffering
 Crystal-controlled time base generator provides all read logic, as well as composite video
 Driven by two 8-bit parallel TTL ports from most microprocessors or minicomputers.
 Ideal for low-cost simultaneous graphical analysis or microprocessor controlled games or displays
 Z-80 assembler listings for typical graphic software drivers for Z-80 or 8080 included. Software listing for the 6502 available.

1702A EPROM MEMORY BOARD



4096 PICTURE ELEMENT

Plugs into a standard dual 22-pin connector.

General Information:

Power: +5 volts, +12 volts
 Size: 5" high by 12" wide (not including connector)
 Kit includes: 40 IC's and low-profile sockets, all capacitors, resistors, potentiometers, and diodes, 11.232 MHz crystal and socket, PC board, 22-pin connector, etc.
 Documentation: Theory of Operation, Construction, and Debugging aids

Sample Z80 color graphics software for erasing, setting screen hue, drawing colored dots and lines.

Interfacing to a color TV set:

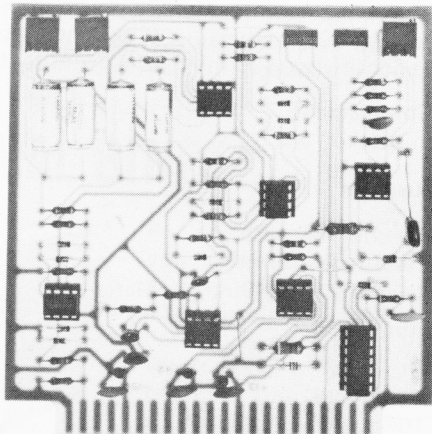
This kit was designed as a minimum cost system — connection to a home color set requires internal modification to the tv set itself. The composite Sync system from the 4K color graphics board is directly attached to the sets sync separator. The output from the three color memories is then attached to the 3 color gun drivers in the tv set. These modifications should be done only by someone familiar with color tv systems. Also note: The board cannot be plugged directly into the DG motherboard, but requires an externally mounted dual 22-pin connector (supplied).

Order Code	Description	Kit	Assembled
GRAPH-64	64 by 64 color graphics interface	175.00	225.00

STANDALONE AUDIO CASSETTE INTERFACE

We are now offering a slightly improved standalone version of the audio cassette interface that we include on our TV Readout (TVC). This is Dr. Suding's latest audio cassette interface as described in the July '76 issue of BYTE. It is designed to operate with any audio cassette recorder of some quality (\$50 and up).

The kit consists of all parts, a small single-sided PC Board (4.75" by 4.825") which plugs into a 22-pin connector. The connector supplied is single readout with solder eyelets. This interface is not plug-in compatible with any bus structure we know of (including ours). Therefore, you will be required to hook up 3 power lines and 4 data lines — 2 to ports. Driving software is included with the kit and in the BYTE article.



STANDALONE AUDIO CASSETTE INTERFACE

In addition to its primary function as an audio cassette interface at 1100 baud, this cassette interface will also support the proposed BYTE "Kansas City" 300 baud standard, amateur radio radioteletype, standalone radioteletype terminal, and audio frequency shift keying unit in general. Various component value changes to support these applications are covered in the BYTE article but are not supplied with the kit.

Basic Specifications:

Date Rate: 1100 baud (100 characters/second)

Power: +5V, +12V all with nominal current regs.

Recording method: FSK with full-wave active filters, standard wide-shift RTTY frequencies.

Order Code = CAS-STD

POWER SUPPLIES

Digital Group System Power supplies are modular 4-voltage supplies contained in two units. You may select either 6, 12, or 18 amps on the +5V line and the 3-line voltage supply. Should your system outgrow its power supply, increasing its capability is usually a matter of upgrading the +5V supply only, not purchasing a whole new 4-voltage supply. The +5V supplies are available as assembled units only.

3-VOLTAGE POWER SUPPLY

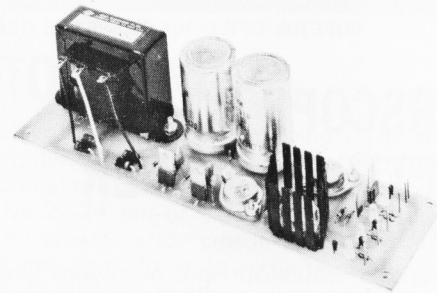
(PWR-0)

Provides: +12V at 1 Amp
-12V at 1 Amp
-5V at 1 Amp

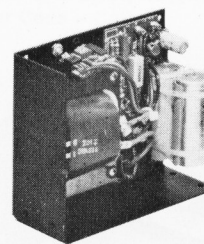
All over-voltage, over-current and over-temperature protected.

Power Supply Ordering Information

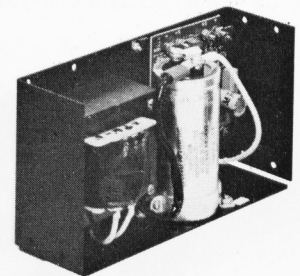
Order Code	Consists of:
PWR-6	5V 6A and PWR-0
PWR-12	5V 12A and PWR-0
PWR-18	5V 18A and PWR-0
PWR-0	-5V @ 1A, -12V @ 1A, +12V @ 1A



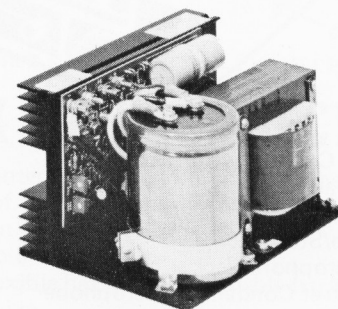
3-VOLTAGE POWER SUPPLY



+5V - 6 AMP



+5V - 12 AMP



+5V - 18 AMP

the digital group

accessories

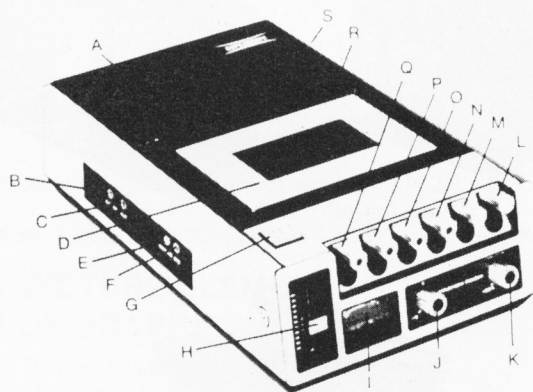
A number of our customers may have been interested in an appropriately featured cassette recorder. The following device represents what The Digital Group feels is the best value in today's market.



SUPERSCOPE C-104 CASSETTE RECORDER

SUPERSCOPE C-104 CASSETTE RECORDER WITH VARI-SPEED

For the musician, businessperson, or anyone who expects maximum performance we proudly introduce the Superscope C-104. It has features never before found on a portable recorder to provide more versatility for your recording needs... which set this recorder apart from all others. The C-104 is backed by a one-year warranty on parts and labor.



- A. 3-Digit Tape Counter with Reset
- B. External Speaker Jack
- C. Cassette Compartment
- E. Remote Stop/Start Jack
- F. External Microphone Jack
- G. Built-in Electret Condenser Microphone
- H. Straight-Line Playback Volume Control
- I. Record Level Battery Strength Indicator
- J. Playback Tone Control
- K. Vari-Speed Pitch Control
- L. Locking Pause Control
- M. Stop/Eject Button

- N. Cue/Fast Forward Button
- O. Play Button
- P. Review/Rewind Button
- Q. Record Button
- R. AC Input Jack
- S. 6V DC Input Jack

Additional Features

1. Automatic Record Level
2. Dual Flywheel Mechanism
3. Automatic Total Mechanism Shut-off (TMS)
4. Built-in Recharging Circuitry
5. Optional Ni-Cad Battery Pack
6. Unique Lever Action Controls
7. Vari-Speed Pitch Control (for adjusting speed plus or minus 20%)

Specifications:

Power Requirements:

- AC 120 Volts AC, 6 Watts 50/60 Hz
- DC 6 Volts
- Battery size and quantity: 4
- Size "C" batteries
- Battery life: 6 hrs. continuous

Tape Speed:

1-7/8

Rewind and Fast Forward Time:

100 seconds/C-60

Reel Size:

Cassette

Frequency Response:

Standard Tape:
60 Hz to 10kHz @ 1-7/8 ips

Recording System:

Half-track Mono

Signal-to-noise Ratio:

Low Noise Tape: 48dB

Inputs:

- 1 Auxiliary: (one)
Plug type: Mini
Impedance: 100 K Ohms
Input Sensitivity: 100 mV
- 1 Microphone: (one)
Plug type: mini
Impedance: Low
Input sensitivity: -72 mV

Speaker Complement:

Built-in speaker, 3 3/4"

Bias Frequency:

65 kHz

Type of Level Indication:

Record Level Battery Strength Meter

Power Output:

1.4 Watts Max. @ 1 kHz

Head Configuration:

- 1 half track erase
- 1 half track record/playback

Wow and Flutter:

NAB 0.25% RMS @ 1-7/8 ips

Number and Type of Motor:

1 DC Servo - Vari-Speed $\pm 20\%$

Number of Semi-conductors:

- 10 Transistors
- 1 Field Effect Transistors (FET)
- 6 Diodes

Outputs:

- 1 Extension speakers: (one)
Plug type: Mini
Impedance: 8 Ohms

Unit Dimensions: 6" W x 2 1/2" H x 11" D

Unit Weight: 3 lbs., 0 ozs.

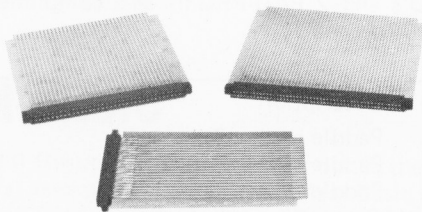
FEATURES THAT WE CONSIDER SIGNIFICANT REGARDING THE CASSETTE RECORDER

- Variable speed (Vari-Speed) for matching cassettes which may have been recorded off-speed. Varies $\pm 20\%$
- Index Counter
- Cue/Fast Forward control and Rewind control: Aid in audibly searching tape for selecting program.

In addition, it's a pretty nifty general purpose cassette recorder.

Each C-104 we provide will have been checked by The Digital Group for speed accuracy. In addition, we will modify the recorder by partially defeating the monitor jack cutoff switch so that you can hear the data (at reduced volume) while cable-connected to your computer. This modification consists of a single resistor and does not invalidate the warranty in any way.

Order Code = CAS-1



EXTENDER CARDS

EXTENDER CARD SET

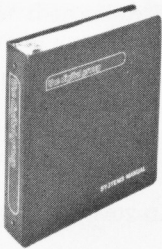
Each 3-Card Extender Card set provides the following:

- 1 - 22-pin extender card and connector on .156" centers
- 1 - 36-pin extender card and connector on .156" centers
- 1 - 50-pin extender card and connector on .156" centers

All cards are double-sided dual position extenders. Each card is also available separately. Overall card height with connector mounted is 7-1/8". Fingers are gold plated.

Order Code = EXT-3

MANUAL BINDER



For those of you who wish to keep your system documentation together in a three-ring binder, we now offer an attractive 1-1/2 inch binder in dark brown with 2-page lifters which is identical to the one provided with each of our cabinet-extender systems.

Order Code = Sys-Bind

MANUALS

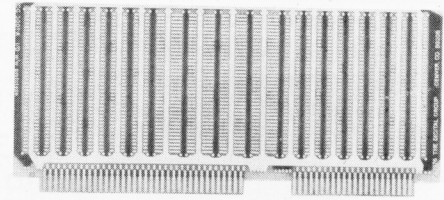
Digital Group now provides separate availability for most of our system manuals. These manuals are available on a standalone basis only. A credit will not be allowed towards later product purchase.

Order Code	Description
DOC-Z80CPU	Complete Z80 CPU Documentation including bus structure and OP System.
DOC-ZILOG	Zilog's Z80 technical manual.
DOC-Z80SYS	Complete Z80 System documentation (Z80CPU, Zilog, TVC, I/O, MEM, PWRØ)

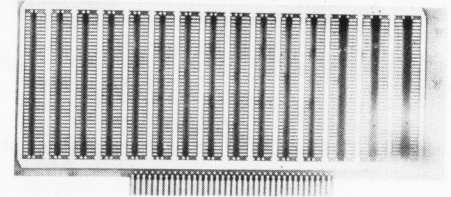
DOC-I/O
DOC-MEM
DOC-TVC

DOC-PWRØ
DOC-CASSTD
DOC-PHI

Input/Output documentation
8K Memory documentation
TV Readout and Audio Cassette documentation
3 Voltage Power Supply documentation
Standalone Cassette Documentation
Cassette Storage System Documentation



I/O w/w PROTOTYPING

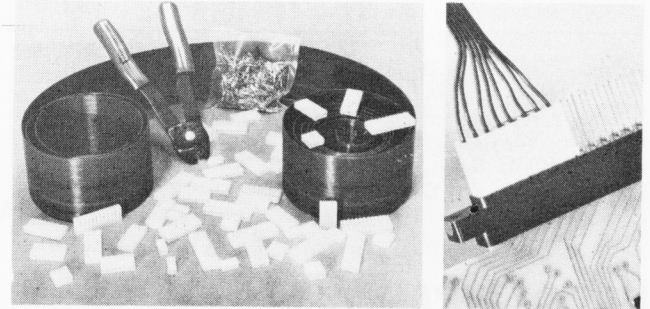


MEMORY w/w PROTOTYPING

PROTOTYPING

Two types of wire-wrap prototyping cards are available. The first is designed for custom input/output/peripheral devices. It contains space for up to sixty-five 14- or 16-pin dips plus twelve 22-24 pin or eight 40-pin IC's plus some discretes. The second is for custom memory/front panel devices and may contain up to sixty 14- or 16-pin devices or thirty-six 22-pin (.4" width) devices plus an additional 3 columns for IC's of .4" through .6" width devices - nine 24-pin or six 40-pin. Power and ground planes are provided and are connected to IC sockets via w/w or stick-on jumpers.

Order Code = CAB-1



CAB-1 CABLING KIT

EXAMPLE OF MOLEX USE

MOLEX INTERCONNECTION KIT

- Each Molex interconnection kit contains the following:
- 10 each of the following female bodies: 2, 4, 8, 10, 12 position
 - 400 Crimp-on type pins
 - 10 feet flexible heavy-duty flat cable (stranded wire) - 62 wires wide
 - Molex crimp tool

Order Code = Cab-1

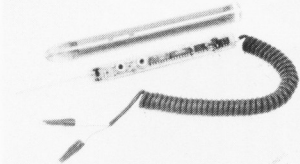
the digital group

DATA CASSETTES

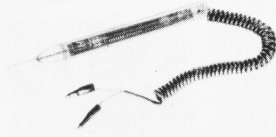


For those of you who wish greater reliability in a cassette, certified data cassettes from Maxell and others. Certified at 800 BPI.

Order Code	Description	Price
C-DATA	Certified Data Cassette	7.00
C-DATA5	5 Certified Data Cassettes	32.50/5
C-DATA10	10 Certified Data Cassettes	60.00/10



TTL LOGIC DETECTOR



TTL LOGIC INJECTOR

LOGIC PROBES

A pair of logic probes to help those among you who like to experiment with (or debug) hardware.

THE TTL LOGIC DETECTOR

Can detect 4 states which it displays on its internal 7-segment readout.

H = Logic High ("1") O = Open or invalid level
L = Logic Low ("0") P = Pulse

The **TTL LOGIC INJECTOR** (shown outside case) can inject highs, lows, or pulse trains.

When used together, these 2 probes provide a very powerful testing combination at a reasonable price.

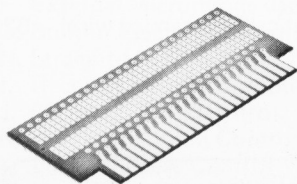
Order Code	Description	Kit	Assm.
PROBE-DET	TTL Logic Detector Probe	18.95	24.95
PROBE-INJ	TTL Logic Injector Probe	18.95	24.95
PROBE-PAIR	Both Injector and Detector Probes	37.00	49.00

PADDLE CARDS

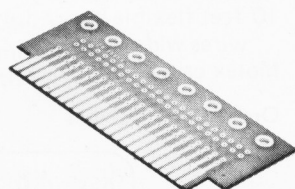
Paddle cards and cables are used to provide interconnection between system components.

This initial release of 4 basic types of paddle cards can extend the capabilities of your system as well as making interconnection more convenient.

PAD-PROT



PAD-STD



STANDARD PADDLE CARD:

The basic paddle card — double-sided with 2 holes/finger for wire termination. Large holes provide strain relief.

DIP PROTOTYPING PADDLE CARD:

Similar to the standard but with a dip-type prototyping area.

20 MA CURRENT LOOP PADDLE CARD:

A special paddle card which allows a parallel port to communicate to a 20MA current loop device.

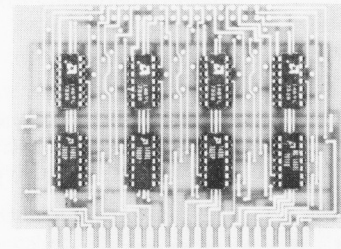
RS-232 PADDLE CARD:

Another special paddle card which allows your system to communicate with RS-232 type interfaces. Available with up to 32 (16 input, 16 output) RS-232 lines.

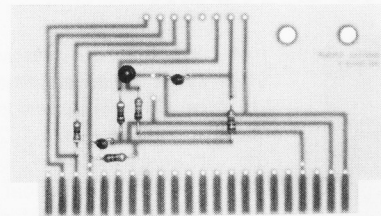
CONNECTORS WITH PADDLE CARDS:

In addition to individual paddle cards we are offering a combination of 5 22-pin w/w connectors plus 3 PAD-STD's and 2 PAD-PROT's as a complimentary kit for your CPU cabinet.

Order Code	Description	Kit Price
PAD-STD	Paddle card — Standard	5.95
PAD-PROT	Paddle card — Dip Proto	5.95
PAD-20MA	Paddle card — 20MA Current Loop (w/parts)	7.95
PAD-232-1	Paddle card w/8RS-232 Lines	30.00
PAD-232-4	Paddle card w/32 RS-232 Lines	75.00
CONN-22-5	5 22-pin Dual, 3 PAD-STD's, 2 PAD-PROT	45.00



PAD-RS232



PAD-20MA

CABLES

Several pre-assembled cables are now available as options for those who do not wish to build their own. (Note: these cables are included in a system 3 or 4).

Order Code	Description	Assm. Price
CBL-VID	4' Video Cable w/UHF connector at each end	6.95
CBL-PHI	6' Phi-Deck Cable for up to 4 drives. 22-pin paddle card, 36-pin dual w/w connector and hardware	29.95
CBL-PT96	6' Printer Cable — 22-pin paddle cards at each end	24.95

D.G. software systems

Digital Group Software Systems was created as a separate corporation for the development and distribution of software for Digital Group Systems. They have also been providing support for the software side of the operation. DGSS is headed up by Chuck and Dianne Howerton.

What is DGSS Software? — DGSS Software is specifically tailored to execute on a Digital Group System unless otherwise specified. Most packages are provided on audio cassette (Suding Format — 1100 baud) with directions-for-use documentation. Source listings are not provided. (Tiny Basic programs are self-listing.) If you purchase our packages for any machine other than The Digital Group's, you are on your own (good luck!). This is not meant to prohibit use on other equipment, just a statement that DGSS cannot support your efforts at this time.

MAXI-BASIC

The Digital Group is delighted to announce the availability of the first version of Digital Group Maxi-Basic for Z80 and 8080 based Digital Group systems. This BASIC is a powerful extended BASIC with many features not contained in standard BASICs.

Major Features:

- Fast BCD Floating Point Arithmetic
- Formatted Output
- Multiple Statements per line
- Multiple Line Functions — User Defined with multiple variables
- Available Memory Size Determined Automatically
- Statement Renumbering
- String Manipulation
- N-Dimensioned Arrays
- Most Source Statements are stored as single bytes

Due to the high interest in this product, we've decided to include as much information as possible on the statements and commands. While this approach will probably be a little dryer than normal, it should help provide many of the answers to your questions about Maxi-BASIC's capabilities.

First, some notes on abbreviations:

- () = optional
- LN = line number
- exp = expression

GENERAL

- Line number range = 0 through 65,535
- Multiple statement per line separator = colon
- Blanks are ignored anywhere in statements
- Control-C = halts execution whenever entered

COMMANDS

- RUN (LN)
- LIST (LN), (LN)
- SCR = Scratch program
- REN (beg LN) (increment) = Renumber
- CLEAR = Clear all variables
- CONT = Continue

CONSTANT RANGE

.6E-63 through .99999999 E+63

OPERATORS

↓ '*' '/' '-' '+'

RELATIONAL

=, <, >, <>, >=, =>, <=, =<

BOOLEAN

AND, OR, NOT

STATEMENTS

LET (optional)
IF ... THEN ... ELSE ...
FOR ... STEP multiply nested
NEXT
GOTO
ON ... GOTO
EXIT

STOP
END
REM
READ
DATA
RESTORE (LN)

INPUT ("literal prompt")
INPUTL

GOSUB
RETURN
PRINT
FILL

OUT

COMMENTS

same as GOTO, but terminates active FOR loops

LN specifies the line the READ pointer is to be restored to.

Same as INPUT but inhibits Carriage Return at end of user input

Fill a byte in memory with an expression value
Executes a Z80/8080 OUT instruction. Ex: OUT 5,3 will perform an OUT 5 instruction with 3 in the Accumulator

ARRAYS

Any number of dimensions
Any size, to the limits of memory

STRINGS

A string of 8-bit characters may be dimensioned to any size, limited only by available memory. Exs:
100 DIMZ\$(1), Z1\$(10000)

Substrings A\$(N,M) = substring of characters N through M
Concatenation: The string concatenation character is a plus sign

USER DEFINED FUNCTIONS

Either String or Numeric type
Any number of numeric arguments

Single line
Multiple line

MACHINE LANGUAGE SUBROUTINE INTERFACING

CALL (expl, optional exp2)
expl = address of machine language subroutine
exp2 = value passed to machine language subroutine

FUNCTIONS

FREE (0) Number of bytes remaining in free storage
ABS (exp) Absolute value of expression
SGN (exp) Determines the sign of expression
INT (exp) Integer value of the expression
LEN (str name) Returns the length of the string
CHR\$ (expr) Returns a string with the specific character
VAL (str exp) Returns the numeric value of the string
STR\$ (str exp) Returns a string with the specified
 numeric value
ASC (str name) Returns ASCII code of first character in
 string
SIN (exp) SINE of expression
COS (exp) COSINE of expression
RND (exp) Returns a random number between 0 and 1
LOG (exp) Returns natural log of expression
EXP (exp) Returns the value of e raised to the
 specified power
SORT (exp) Returns the positive square root of
 expression
CALL (exp, opt. exp) See Machine Language Interfacing
EXAM (exp) Returns the contents of addressed
 memory byte

FORMATTED OUTPUT

PRINT %\$10F3,J

Digital Group Maxi-BASIC uses Format Strings anywhere in the PRINT statement. A Format String consists of optional format characters followed optionally by a format specification.

The Format characters are:

C = place commas to the left of decimal point as needed
\$ = place a dollar sign to the left of value
Z = suppress trailing zeroes
= make this format string the default specification

Format Specifications (similar to FORTRAN) are:

nFm = Value printed in n-char field, right justified,
 m digits to right of decimal
nI = Value printed in n-char field, right justified
nEm = Value printed in scientific notation

All printed values are rounded if necessary.

TAB (N) = Advances printer to a specified output position

STORAGE REQUIREMENTS

Maxi-BASIC V.1.0. requires 8K and loads from 4K through 12K. The minimum Digital Group recommended configuration is 18K.

Distribution Package includes:

User Documentation — Knowledge of BASIC in general is presumed
Object code on Sudio audio cassette (1100 baud)

Price: \$15.00

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MAXI-BASIC GAMES

(see following note)

Each MAXI-BASIC Game Set Tape comes with a listing of each program on the tape as well as operating instructions. The cost of each MAXI-BASIC Game Set Tape is \$7.50.

- **MAXI-BASIC Game Set 1** — \$7.50 @ cassette tape with source listings and instructions).

MAGIC-SQUARE: Computer vs. human in an attempt to complete a MAGIC-SQUARE while block the opponent.

DEPTH-CHARGE: Sink the submarine before he sinks you; a three-dimensional search game.

REVERSE: A MAXI version of this popular solitaire game of number manipulation.

BAGELS: Try to guess the computer's number based on clues such as PICO FERMI and BAGELS.

BIRTHDAY: Learn some interesting and important facts about what has transpired since your natal day.

- **MAXI-BASIC Game Set 2** — (\$7.50 @ cassette tape with source listings and instructions).

"WORD": A word guessing game which includes 102 five-letter words.

GUNNERY: A really challenging artillery game which includes windage and shot variations.

WOMBAT: A grid-search game to find the WOMBAT. You get ten tries and then . . .

SUNSIGN: Given certain factors which are different for every individual, this program produces unique designs.

COMPOUND-INTEREST: Let's see . . . If I put \$10 out of each paycheck in the bank at 6%, how much would I have in 10 years?

- **MAXI-BASIC Game Set 3** — (\$7.50 @ cassette tape with source listings and instructions).

AWARI: An ancient African game of skill and strategy . . . you against the computer.

TARGET: Space war in three dimensions using circular coordinants.

BULCOW: A number guessing game with clues as to the relationship of your guess to the number.

LOAN-PAYMENTS: This program computes the payment schedule for a loan.

BUTTON: A guessing game where you try to guess which one of 7 "people" has the button; they give you clues.

- **MAXI-BASIC Game Set 4** — (\$7.50 @ cassette tape with source listings and instructions).

HURKLE: Find the shy Hurkle in the grid using computer supplied clues.

ICBM: You are the controller for an anti-missile base . . . get the ICBM before it gets you.

CHANGE: Computes change in bills and coins given the price and amount tendered.

RADIZ ARITH: In the DODECIMAL (Base 12), how much is 3A+B???

LETTER: Guess a letter given clues relative to your last guess.

NUMBER: Find the secret number in the minimum number of tries.

- **MAXI-BASIC Game Set 5** — (\$7.50 @ cassette tape with source listings and instructions).

FIFPOP: Change a row of X's to O's with a new set of rules for each game.

NIM: An ancient Chinese game . . . you against the computer . . . either goes first . . . just don't take the LAST!!

HANGMAN: Beautiful graphics make this word guessing game great fun to play.

TAXMAN: Learn factoring while trying to outfox the Taxman.

CHECKBOOK: This program can help you to balance your checkbook!!

- **MAXI-BASIC Game Set 6** — (\$7.50 @ cassette tape with source listings and instructions).

LUNAR LANDING: A somewhat out-of-the-ordinary LUNAR LANDER which can be beaten.

23 MATCHES: Develop a strategy so that you don't have to take the last match!!

RADIX CONV: Converts any number up to 262143 Decimal to Octal and vice-versa.

PIZZA: A "Screwball" game where you have to figure out where the pizzas go!!

BIO RYTHM: A very comprehensive version of BIO RYTHM which flags "critical" days and computes the composite.

- **MAXI-BASIC Game Set 7** — \$7.50 @ cassette tape with source listings and instructions).

BRIDGE-DEALER: Generates and deals bridge hands all sorted and arranged.

"WAR"-Cards: This popular card game pits you against the computer for control of the deck.

ACEY-DUCY: A game designed to drive sane people nuts when they match the pot on a King-Three!!

HORSERACE: They're off and running at 'Wherever Racetrack' . . . good odds, several horses and unlimited bets.

BLACKJACK: A casino-level version of this game; plays by Vegas rules for a dealer.

- **MAXI-BASIC Games ***SPECIAL*** = \$50.00!!**
Obtain all seven MAXI-BASIC Game Set Tapes for \$50.00 . . . a savings of \$2.50. Includes all source listings and operating instructions for each game on each tape.

****NOTE:** All MAXI-BASIC Games are read in after bootstrapping MAXI-BASIC into the system. Games are read in one at a time. List will come up with Options 1 through 7. Type 7. Type RUN(cr) and you're in business!!

PHIMON

PHIMON is the long awaited Digital Group Cassette Storage Operating System . . . Available NOW!!!

The PHIMON EXECUTIVE Program requires only 2K of memory for its resident routines and the system overlay area. The DIRECTORY requires an additional 1K area at

the high end of lower memory (7 to 8K in a 10K system or 23 to 24K in a 26K system) and an additional 1K for the Debugging tools (Octal and Hexadecimal supplied) when they are in use.

PHIMON is easy to implement and easy to use. A jumper-wire change to the CPU board is required to move the 2K of memory on the CPU board to addresses 56K to 58K (340000 to 347377 Octal or E000 to E7FF Hexidecimal). The PHIMON EXECUTIVE Program resides in this memory space well out of the way of user programs. Then, replace the CPU board EROM with the one provided with PHIMON, insert the PHIMON cassette in cassette storage deck No. 0 and turn on the power.

When PHIMON begins execution after being bootstrapped in, the first thing you will see will be the HELP list which shows all of the commands available. Read the accompanying documentaiton and you are in business.

PHIMON SYSTEM COMMAND SUMMARY

The following commands are available when PHIMON is in the command mode. Only the first two letters of the command are required (which is why they are shown here as caps), the remaining ones are optional.

Command	Description
HElP	Displays systems command on monitor.
DIrectory	Displays the names, types, and size of all files catalogued on a specified device.
LOad	Loads a specified program file into memory.
RUUn	Loads a specified program into memory and starts it executing.
SAve	Saves a specified program file onto cassette storage and catalogues it in the DIRECTORY.
STart	Starts a program, which is in memory, executing.
ZERo	Zeroes the DIRECTORY of either a systems cassette or a nonsystem cassette.
DElete	Deletes specified files from the DIRECTORY.
DTO	Loads the Debugging Tool Octal into memory and turns execution control over to it.
DTH	Loads the Debugging Tool Hexadecimal into memory and turns execution control over to it.
ALter	Causes a specified system overlay to be loaded into memory so that it can be altered using DTO or DTH.
INsert	Writes a specified overlay onto the system cassette.
BUild	Copys the PHIMON operating system and its overlays onto another cassette.
REad	Reads in a SUDING format audio cassette into memory.
WRite	Writes out a SUDING format audio cassette from memory.

In addition, PHIMON permits user programs to use any of its DIRECTORY handling and cassette storage handling routines, providing easy access to files and file creation. Among these routines are LOOKUP (searches DIRECTORY for file name), ENTER (searches DIRECTORY for available space), and CLOSE (adds a user program's file to the DIRECTORY). Also available are all of the standard cassette storage system control routines (READ, WRITE, REWIND, STOP, etc.)

The PHIMON Cassette Storage Operating System Release Package contains the following:

1. A Cassette Storage System mode recorded version of PHIMON.
2. An audio cassette recorded version of PHIMON recorded at the Digital Group standard of 1100 BAUD in Suding format.
3. A replacement ROM for use with PHIMON which contains a Load-and-Go Bootstrap-loader and the basic TV routines.
4. Approximately 100 pages of documentation, including:
 - a. A complete PHIMON users guide describing the operation of PHIMON and all supplied system overlays; and
 - b. A source listing of the PHIMON EXECUTIVE program and all system overlays.

PRICE: \$30.00 per package.

OTHER SOFTWARE SYSTEMS

Z-80/8080 MINI-BASIC

An adaptation of DGSS TINY BASIC. Copyrighted by Dr. Mark Yoseloff, E. Brunswick, New Jersey. Incorporates String Manipulation and Handling. Provides all command level inputs within the BASIC itself. MINI-BASIC is self-adapting to memory size and will run in any 6K or larger Z-80/8080 Digital Group system. It will execute any previous TINY BASIC program/game. Available only in TV-output form.

MINI-BASIC GAMES Set 1

A comprehensive set of "Casino Games" including BLACK-JACK, CRAPS, ROULETTE and SLOT-MACHINE. The screen graphics must be seen to be believed!!

COST: MINI-BASIC and MINI-BASIC GAMES Set 1 = \$10.00 including 2 cassettes and 23 pages of documentation.

CODE PRACTICE PROGRAM

Written by Alex Vdolek of Seattle, WA. Permits using The Digital Group, Inc. (DGI) micro-processor for CW code practice. Allows user to select speed of 256 randomly generated CW characters. System will either display each character on TV screen as it is sent or will display all 256 CW characters after last character has been sent. Runs in less than 2K of memory.

COST: \$5.00 @ cassette tape with operating instructions.

THREE-PART MEMORY TEST ROUTINES

Written by Dr. Robert Suding. This memory test routines tape allows the user to initially or periodically test memory chips in his system. First routine checks system memory printing out extent of contiguous groups of memory. Second routine generates randomized pattern throughout memory and reads back, comparing for identical data to test for bad IC's, unsoldered pins and shorted address lines. Third routine checks for slow memory by writing a short subroutine through memory and then executing the subroutine. Excellent preventative maintenance tool.

NEW DIGITAL GROUP OP/SYSTEM WITH CURSOR FOR Z-80 SYSTEM

Written by Dr. Robert Suding. This cursor Op/System for

Z-80 is the new format of TV Storage Dump and Keyboard Program with new wording at Options 3 and 4. This new OP/Sys is currently utilized in the Z-80 Assembler, DisAssembler, Text/Editor and MAXI-BASIC programs. Complete with source listing and one-page of operating instructions.

SUPER CLOCK

Written by Charles Howerton. This Z-80 program allows you to turn your Digital Group, Inc., micro-computer into the world's most expensive digital clock! Can be set as a 24-hour or 12-hour clock. Gives hours, minutes and seconds. Includes source listing and operating instructions.

COST: THREE-PART MEMORY CHECK FOR Z-80 SYSTEM, NEW DIGITAL GROUP OP/SYSTEM WITH CURSOR FOR Z-80 and SUPER CLOCK (All on 1 tape) = \$7.50 @ cassette tape with source listings and operating instructions.

TINY BASIC EXTENDED-TV CASSETTE OPERATED SYSTEM (TBX TVCOS), Version 2

Created by Dick Whipple and John Arnold of Tyler, Texas — Based upon design criteria published in September 1975 issue of PCC and interfaced for The Digital Group, Inc. (DGI) 8080/Z-80 microcomputer by Dr. Robert Suding. A superset of TINY BASIC as originally proposed. A limited/modified subset of full BASIC language. Has 26 possible simple/dimensioned variables; 4 immediate commands; contains RN (Random Number) generator. TBX, Version 2, is self-adapting to memory size and will run in any DGI 8080/ Z-80 system which is larger than 6K. In addition, TBX, Version 2, comes complete (in cassette format) in a TV only version, Baudot teletype version and ASCII teletype version.

COST: \$7.50 @ cassette tape with operating instructions.

TINY BASIC GAMES, DGSS Set 1

Contains games of CHOMP, CHECKERS, TIC-TAC-TOE, DIGI-GUESS and BRAINTEASER.

COST: \$5.00 @ cassette tape with operating instructions.

NOTE: ALL TINY BASIC GAMES are read in after bootstrapping TBX-TV COS into the system. The games are read in one at a time. List will come up with Options 1 through 6. Type 6. Type RUN(cr) and you're in business!

TINY BASIC GAMES, DGSS Set 2

Contains games of ARTILLERY, DR. THERAPY, REVERSE, BIORHYTHM and GOLF.

COST: \$5.00 @ cassette tape with operating instructions.

TINY BASIC GAMES, DGSS Set 3

Contains games of TAXMAN, SNARK, TRAP, NUMBER, SQUARE ROOT and CLOCK.

COST: \$5.00 @ cassette tape with operating instructions.

TINY BASIC GAMES, DGSS Set 4

Contains games of HAMURABI, STARS, 23-MATCHES, 20-QUESTIONS, BLACKJACK, FACTOR and BATUM.

COST: \$5.00 @ cassette tape with operating instructions.

TINY BASIC GAMES, DGSS Set 5

Contains games of BOMBER, LUNAR LANDER, SPACE BATTLE, MATADOR and DICE.

COST: \$5.00 @ cassette tape with operating instructions.

TINY BASIC GAMES, DGSS Set 6

Contains educational programs of CHIEF, MR. QUIZZER, ADDITION, SUBTRACTION, and MULTIPLICATION.

COST: \$5.00 @ cassette tape with operating instructions.

warranties

WARRANTY/SERVICE POLICY

The Digital Group has now formalized its limited warranty and service policy. We are trying to accomplish two things — we want Digital Group kit purchasers to be satisfied and we want to help if you get in trouble.

Debugging a computer and/or its peripherals and components is a time-consuming task — especially if you are unfamiliar with the circuit. The kit supplier should be much more familiar with the circuit and be able to debug it much more effectively.

However, before we detail our limited warranties, a few terms should be defined:

Service Charge: Fix-it fee usually established at announcement. Covers all labor involved tracking down problems and correcting them. Applies to out-of-warranty kits. Also applies to units if the unit goes down and the purchaser wishes us to fix the problem. Service charges (fix-it-fee) should be sent with the kit for repair.

Parts Charges: Any user parts found to be defective and replaced. Also applies to parts out-of-warranty.

Postage: You pay the postage back to us, we pay the postage back to you.

The Digital Group reserves the right to change any warranty policy or term and also the right to send hopeless basket-cases back to the purchaser (returning the service charges).

DIGITAL GROUP LIMITED WARRANTY

Digital Group assembled and tested units — all parts and labor are warranted for 90 days after receipt of unit. Warranty not valid for user-caused problems — parts and service charges will apply.

Full parts kits — All Digital Group supplied parts are warranted for 90 days on an exchange basis. Service charge for labor will apply if the entire kit is sent back for repair. User-caused problems are chargeable for both parts and service.

Partial kits or parts — All Digital Group supplied parts are warranted for 90 days on an exchange basis. Full service charge will apply if kit sent back for repair. User caused problems are chargeable for both parts and services.

Modified Kits — Warranty applies only to unmodified portions and those portions unaffected by any modifications.

FLAT FIX-IT FEE SCHEDULE

Board	Fee	Tune	Both
TVC	\$20.00	\$20.00	\$30.00
I/O	10.00		
MEM	20.00		
CPU's (all)	40.00		
PHI-DECK	35.00		
CAS-STD	20.00		
TVR	20.00		
MB-2	10.00		

dealers

DIGITAL GROUP DEALERS

ALABAMA

ICP, COMPUTERLAND
Bob Johnson
1507 Chambliss Lane
Birmingham, AL 35226

THE COMPUTER CENTER
Terry Woodward
303B Poplar Place
Birmingham, AL 35209
(205) 870-7199

ARIZONA

ARIZONA MICRO SYSTEMS
Otto P. Weeden
3240 W. Larkspur
Phoenix, AZ 85029
(602) 942-8405

BITS AND BYTES
COMPUTER SHOP
Robert H. Kruse
6819-C N. 21st Avenue
Phoenix, AZ 85015
(517) 835-8472

CALIFORNIA

BITS N BYTES
MICROCOMPUTER SYSTEMS
John L. Mock
679D S. State College Blvd.
Fullerton, CA 92631
(714) 879-8386

BYTE SHOP
Michael Sannes
3139 E. McKinley Avenue
Fresno, CA 93703
(209) 485-2417

BYTE SHOP
COMPUTER STORE
Don Anderson
509B Francisco Blvd.
San Rafael, CA 94901
(415) 457-9311

COMPUTER STORE
OF SAN FRANCISCO
Al Cherin 1093 Mission Street
San Francisco, CA 94103
(415) 431-0640

CREATIVE COMPUTER CO.
Robert Cohen
10357 Wilshire Blvd. No. 20
Los Angeles, CA 90024
(213) 475-3239

MICROBYTE
Bob Barthelow
584 Rio Lindo Avenue
Suite 4
Chico, CA 95926
(916) 891-1300

MICROCOMPUTERS
David Hollister
18120 Brookhurst Street
Fountain Valley, CA 92708
(714) 963-5551

PEOPLE'S COMPUTER SHOP
W. K. Lin
13452 Ventura Blvd.
Sherman Oaks, CA 91423
(213) 789-7514

PLATE SOLID STATE
ELECTRONICS
Larry Plate
735 State Street
Balboa Building, Suite 301
Santa Barbara, CA 93101
(805) 962-1990

RAINBOW COMPUTING, INC.
Gene Sproule
10723 White Oak Avenue
Granada Hills, CA 91344
(213) 360-2171

SUNSHINE COMPUTER CO.
Richard Travis
20710 So. Leapwood Avenue
Carson, CA 09746
(213) 830-8965

the digital group

THE COMPUTER CENTER
David Thalimer
8205 Ronson Road
San Diego, CA 92111
(714) 292-5302

THE COMPUTER ROOM
BYTE SHOP OF SAN JOSE
Lawrence Grijalva
155 Blossom Hill Road
San Jose, CA 05123
(408) 226-8383

UPLAND COMPUTER LABS
Rupert Penner
Don Phillips
75 East Ninth Street
Upland, CA 01786
(714) 981-1503

COLORADO

ASPEN COMPUTER SERVICES
Don A. Voltmer
Patio Bldg., 630 E. Hyman
Aspen, CO 81611
(303) 925-5544

BITRONICS-GREAT PLAINS
COMMUNICATIONS
Rick Fletcher
108 South Fifth Street
Lamar, CO 80152
(303) 336-7956

MITI MINI COMPUTER STORE
John Harris
621 South Broadway
Denver, CO 80209
(303) 778-6230

THE AUDIO LIBRARY
Bob Hyde
502 S. Tejon
Colorado Springs, CO 80903
(303) 636-5297

CONNECTICUT

NATIONAL COMMUNICATION
INDUSTRIES COMPANY
Michael Cooney
Peter Buswell
One River Road
Cos Cob, CT 06807
(203) 661-2800

DELEWARE

ELECTRONIC EQUIPMENT
COMPANY, INC.
William Steif
53 Marrows Road
Newark, DE 19713
(302) 453-1975

FLORIDA

BYTE SHOP
John Dalton
Gerald Langston
1325 N. Atlantic Avenue
Cocoa Beach, FL 32931
(305) 784-1881

COMP SHOP
Dean Wentworth
121 E. Fifth Avenue
P.O. Box 5993
Tallahassee, FL 32301
(904) 878-4402

MICRO COMPUTE SYSTEM
SALES & SERVICE
Lee Hinman
1633 South State Road
N. Lauderdale, FL 33068
(305) 972-6093

GEORGIA

THE COMPUTER
SYSTEMCENTER
Richard Stafford
3330 Piedmont Road NE
Atlanta, GA 30305
(404) 231-1691

HAWAII

CAPACITY INC.
Steve Rose
P.O. Box A
Haiku, Maui
Hawaii 96708
(808) 575-2930

SMALL COMPUTER SYSTEMS
Jeremy Jones
3140 Waiialae Avenue
Honolulu, HI 96816
(808) 732-1471

IDAHO

ERA COMMTRONICS
Ernest R. Anderson, Jr.
9275 Malad Street
Boise, ID 83605
(208) 375-8246

ILLINOIS

BITS AND BYTES
Charles Anderson
2376 Washington Road
Washington, IL 61571
(309) 745-5113

BITS AND BYTES
COMPUTER STORE
Roy Emerson
2928 W. 147th Street
Posen, IL 60469
(312) 389-7112

ITTY BITTY MACHINE CO.
Robert Goekel
1316 Chicago Avenue
Evanston, IL 60201
(312) 328-6800

INDIANA

DATA DOMAIN
Ray Borill
406 So. College Avenue
Bloomington, IN 47401
(812) 334-3607

QUANTUM
COMPUTER WORKS
David Kominiaik
6637 Kennedy Avenue
Hammond, IN 46323
(219) 989-9828

IOWA

IOWA MICROCOMPUTER
STORE
Darrrell Browning
328 Grand Avenue
West Des Moines, IA 50265
(515) 277-8084

THE SYSTEMS GROUP
John H. Jebens
1327 W. 29th Street
Davenport, IA 52804
(319) 391-8652

KANSAS

Larry T. Walker
10 Fifth Artillery Road
Fort Leavenworth, KS 66027
(913) 684-2138

KENTUCKY

DICOMM, INC.
Larry Waldron
506½ Euclid Avenue
Lexington, KY 40502
(606) 233-3346

LOUISIANA

EXECUTIVE MICRO-
COMPUTER DIVISION
Jan R. Wilson
6969 Titian Avenue
Baton Rouge, LA 70808
(504) 927-7660

MARYLAND

THE COMPUTER WORKSHOP,
INCORPORATED
Raymond N. Brown
11308 Hounds Way
Rockville, MD 20852
(301) 468-0455

MASSACHUSETTS

COMPUTER MART, INC.
Charles Dunning
1097 Lexington Street
Waltham, MA 02154
(617) 899-4540

MICHIGAN

COMPUMART, INC.
John Johnson
1250 N. Main Street
Ann Arbor, MI 48104
(313) 994-3200

COMPUTER MART
Joseph Inatome
1800 West Fourteen Mile Rd.
Royal Oak, MI 48073
(313) 576-0900

FGF COMMUNICATIONS
Robert Fox
4307 Bluebird Drive
Midland, MI 48640
(517) 835-8472

UNITED MICROSYSTEMS
CORP.
Jor-Chin Ho
2601 S. State Road
Ann Arbor, MI 48104
(313) 668-6806

MINNESOTA

THE COMPUTER DEPOT
Craig Stout
Bob Miller
801 Nicollet Mall Suite 1716
Minneapolis, MN 55402
(612) 338-6714

MISSOURI

MICRO COM, INC.
Dr. Morton Jacobs
6314 Brookside Plaza, Suite 202
Kansas City, MO 64113
(816) 363-5131

NEW HAMPSHIRE

COMPUTER MART
OF NEW HAMPSHIRE
Ron Cordova
170 Main
Nashua, NH 03060
(603) 889-0691

NEW JERSEY

THE COMPUTER MART
OF NEW JERSEY
Larry Stein
501 Rt. 27
Iselin, NJ 08830
(201) 283-0600

NEW YORK

COMPUTER MART
OF NEW YORK
Stanley Veit
118 Madison Avenue
New York, NY 10001
(212) 279-1048

CO-OP ELECTRONICS
Paul R. VanSickle
9148 Main Street
Clarence, NY 14031
(716) 634-2193

ITHACA AUDIO
Steven Edelman
410 College Avenue No. 147
Ithaca, NY 14850
(607) 273-3271

MICRO COMPUTER
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Joel Heckman
234 Tennyson Terrace
Williamsville, NY 14221
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RICHARD S. BRANNIN
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East Williston, NY 11596
(516) 746-1079

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Dennis Buckley
Room 512 487 Broadway
New York, NY 10013
(212) 226-2038

NORTH CAROLINA

TECHNICAL VIDEO
SYSTEMS, INC.
James E. Holladay
245 Olson Street
Winston-Salem, NC 27103
(919) 768-9536

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Gary Shell
3014 Miami Road Suite 205
Cincinnati, OH 45227
(513) 561-7315

OKLAHOMA

BITS, BYTES & MICROS
"the computer store"
Charles Gibson
1186 N. MacArthur Blvd.
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(405) 947-5646

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Charles Weddington
1020 W. Wilshire Blvd.
Oklahoma City, OK 73116
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THE MICRO WORKS CO.
Joe Stewart
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1605 N. Dogwood
Owasso, OK 74055
(918) 481-1137

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COMPUTER COMPANY
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205 West Tenth
Eugene, OR 97401
(503) 484-1040

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(803) 771-7824

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(803) 744-8858

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Oak Ridge, TN 37830
(615) 482-1091

SURYA CORP.
Dave McLennan
5755 Nolensville Road
Nashville, TN 37211
(615) 834-5638

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AUSTIN MICRO PRODUCTS
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Dan Drummond
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Austin, TX 78765
(512) 472-3808/446-2248

COMPUTER MART OF TEXAS
Tom Chrane
4622 28th Street
Lubbock, TX 79410
(806) 797-7550

ELECTRONIC SPECIALTY CO.
Don R. Jarvis
4032 Bellaire Blvd.
Houston, TX 77025
(713) 665-0477

KA ELECTRONIC SALES
Byron Kirkwood
1220 Majesty Drive
Dallas, TX 75247
(214) 634-7870

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1011 Devonport
Seabrook, TX 77586
(713) 474-2923

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Kenneth A. Bennett
4618 Summit Drive
Wichita Falls, TX 76310
(817) 692-8027

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Bruce Carlyle
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Houston, TX 77036
(713) 977-0110

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John Howland
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San Antonio, TX 78216
(512) 828-0553

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Dee Justesen
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Salt Lake City, UT 84105
(801) 466-7911

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RMS TECHNOLOGY
Harold Fischgrund
706 Industry Drive
Hampton, VA 23661
(804) 838-2458

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INLAND MICROSYSTEMS
Mark Waller
Box 982
Spokane, WA 99210
(509) 924-4789

KBC COMPUTER SHOP
Bernie Brunson
2735 152nd Avenue NE
Redmond, WA 98052
(206) 883-3050

RETAIL COMPUTER STORE
Susanne Broom
410 NE 72nd
Seattle, WA 98115
(206) 524-4102

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COMPUTER STORE
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Madison, WI 52711
(608) 225-5552

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COMPUTER RADIO
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120 El Dorado Ct.
Cheyenne, WY 82001
(307) 634-3225

CANADA

COMPUTER MART LTD.
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T. Blankenfeldt
1543 Bayview Avenue
Toronto, Ontario
Canada M1K 4K4
(416) 484-9708

THE COMPUTER STORE
Austin Hook
Gary Haggins
3515 18th Street SW
Calgary, ALTA.
Canada T2T 4T9
(403) 243-0301

TJB MICROSYSTEMS LTD.
John Atwood
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Edmonton, Alberta
Canada T6E 5G7
(403) 433-0565

TRINTRONICS
Steve Pumple
Murray Desnoyer
186 Queen Street W
Toronto, Ontario
Canada M5V 1Z1
(416) 598-0262

FRANCE

SIGMATRONICS
Andrew Seligman
89 Rue St. Du Faubourg
St. Honore
Paris 75008 France

SOUTH AMERICA

ROBERT LEGGE
Box 30, 069
Av. Alvaro Ramos 1.142
Sao Paulo, Brasil 01.000

price list

DIGITAL GROUP PRICE LIST

Description	Order Code	Prices	
		Kit	Assembled
SYSTEMS			
3-board system with Z80-CPU, IO-F, TVC-F and MB-1 (2K total memory)	Z80-3BD	\$475.00	\$695.00
4-board system with Z80-CPU, IO-F, TVC-F, MEM-8 and MB-1 (10K total memory)	Z80-4BD	\$675.00	\$945.00
SYSTEM OPTIONS			
Substitute 8080 CPU — deduct	8080-SUB	(50.00)	(50.00)
Substitute 6800 CPU — deduct	6800-SUB	(50.00)	(50.00)
Substitute 6502 CPU — deduct	6500-SUB	(100.00)	(100.00)
Substitute Standard Motherboard	MB2-SUB	15.00	45.00
SYSTEM PACKAGES			
Complete 4-board Z-80 system including: 10K memory, 12 Amp power supply (PWR-12), Standard Motherboard (MB-2), and Standard CPU Cabinet (CB-CPU)	Z80-SYS1	\$895.00	\$1295.00
Complete as above, with 18K.	Z80-SYS2	\$1095.00	\$1545.00
Complete Z80-SYS2 plus Key 1&CB, Mon9&CB, CAS&CB4 and all cables	Z80-SYS3	\$2045.00	\$2545.00
Complete Z80-SYS2 plus 1 additional I/O Card, Key1&CB, MON9&CB, PHI-F, CAS&CB4, PT-96-COMP and all cables	Z80-SYS4	\$2675.00	\$3255.00
SYSTEM PACKAGE OPTIONS			
Additional 8K Memory boards when purchased with SYS1, 2, 3 or 4 — each	SYS-MEM8	\$200.00	\$270.00
Additional 8K 300ns low-power Memory boards when purchased with either SYS1, 2, 3 or 4	SYS-MEM8C	\$250.00	\$320.00
Substitute 300ns low-power memory in SYS1	91L02C-10S	\$62.50	\$62.50
Substitute 300ns low-power memory in SYS2, 3, or 4	91L02C-18S	\$112.50	\$112.50
Substitute 18 Amp power supply (includes CB-CPU-OP1)	PWR-18SUB	\$40.00	\$40.00
Substitute 64-character TV Readout	SYSOPT-64	\$10.00	\$10.00
Delete 2 PHI-I's from SYS3 or SYS4.	SYS-PHI2	(200.00)	(200.00)
Note: also any other of our CPU's may be supplied in place of the Z80 by selecting 8080-SUB, 6800-SUB, or 6500-SUB from the System Options and deducting the appropriate amount.			
INDIVIDUAL ITEMS			
MEMORIES			
8K 500 nanosecond 2102-1's	MEM-8	\$225.00	\$295.00
8K 300 nanosecond low-power 2102LHPC	MEM-8C	\$275.00	\$345.00
8K memory board as above without memory IC's	MEM-Ø	\$50.00	na
1702A 4K EPROM board with 4K 1702A's (unprog'd)	1702-F	\$299.00	\$345.00
1702A 4K EPROM board without 1702A's	1702-Ø	\$75.00	\$105.00
1702A PC board & Connector	1702-PCC	\$35.00	na
PERIPHERALS			
Complete I/O card — Four 8-bit Input ports and four 8-bit Output ports	IO-F	\$65.00	\$95.00
TV Readout and Audio Cassette Interface	TVC-F	\$130.00	\$195.00
Full 64-character TV Readout and Audio Cassette Interface	TVC-64	\$140.00	\$205.00
Upgrade Kit from TVC-F	TVC-64UPG	\$65.00	na
64 by 64 Color Graphics Interface	GRAPH-64	\$175.00	\$225.00
Digital Cassette Storage Interface for 4 drives	PHI-F	\$135.00	\$195.00
Digital Cassette Storage Drive	PHI-I	na	\$115.00
2 Digital Cassette Storage Drives and cabinet	CAS&CB2	\$270.00	\$295.00
4 Digital Cassette Storage Drives and cabinet	CAS&CB4	\$480.00	\$505.00
Capacitance Keyboard with numeric pad and cursor control keys and interface cable	KEY1	na	\$150.00

Description	Order Code	Kit	Assembled
Capacitance Keyboard as above and cabinet	KEY1&CB	\$180.00	\$205.00
9" Javelin monitor.	MON-9J	na	\$175.00
9" Javelin monitor with Digital Group cabinet	MON9&CB	\$199.50	\$215.00
96-Column Printer and Interface	PT-96	\$495.00	\$595.00*
Power Supply for 96-Column Printer	PT96-PS	\$30.00	na
Cabinet — 96-Column Printer.	CB-PT96	\$75.00	\$85.00
96-Column Printer, Power Supply, Cabinet and Cable	PT96-COMP	\$595.00	\$675.00

*Includes Power Supply

POWER SUPPLIES

5V at 6 Amps and PWR-Ø	PWR-6	\$95.00	\$125.00
5V at 12 Amps and PWR-Ø	PWR-12	\$135.00	\$165.00
5V at 18 Amps and PWR-Ø	PWR-18	\$175.00	\$205.00
-5V at 1 Amp, -12V at 1 Amp, +12V at 1 Amp	PWR-Ø	\$45.00	\$60.00

CABINETS

Standard CPU cabinet w/6/12 Amp power supply plate	CB-CPU	\$145.00	na
Substitute 18 Amp power supply mounting plate	CB-CPU-OP1	N/C	na
9" monitor cabinet	CB-MON9	\$35.00	na
Dual Cassette Storage System cabinet	CB-CAS2	\$45.00	na
Quad Cassette Storage System cabinet.	CB-CAS4	\$45.00	na
Dual drive — spare top	CB-CAB-T2	\$20.00	na
Quad drive — spare top.	CB-CAB-T4	\$20.00	na
Keyboard cabinet for Key 1	CB-KEY1	\$35.00	na
Keyboard cabinet w/blank insert	CB-KEYØ	\$35.00	na

ACCESSORIES

Prototyping w/w card for I/O bus w/connectors	PROT-IOC	na	\$38.00
Prototyping w/w card for Memory bus w/connector.	PROT-MEMC	na	\$35.00
3-card Extender card set.	EXT-3	\$55.00	\$75.00
Superscope C-104 Audio Cassette Recorder	CAS-1	na	\$119.50
Manual Binder	SYS BIND	na	\$6.00
Cabling kit and crimp tool.	CAB-1	\$43.95	na
Certified Data Cassette.	C-DATA	na	\$7.00
5 Certified Data Cassettes	C-DATA5	na	\$32.50
10 Certified Data Cassettes	C-DATA10	na	\$60.00
TTL Logic Detector Probe	PROBE-DET	\$18.95	\$24.95
TTL Logic Injector Probe	PROBE-INJ	\$18.95	\$24.95
Both Probes	PROBE-PAIR	\$37.00	\$49.00
Paddle Card — Standard	PAD-STD	\$5.95	na
Paddle Card — Dip Proto	PAD-PROT	\$5.95	na
Paddle Card — 20ma Current Loop (w/parts)	PAD-20MA	\$7.95	na
Paddle Card w/8 RS-232 Lines.	PAD-232-1	\$30.00	na
Paddle Card w/32 RS-232 Lines	PAD-232-4	\$75.00	na
Five 22-pin Dual, 3 PAD-STD's, 2 PAD-PROT	CONN-22-5	\$45.00	na
4-foot Video Cable	CBL-VID	na	\$6.95
6-foot Phi-Deck Cable for up to 4 Drives and 36-pin dual w/w connector	CBL-PHI	na	\$29.95
6-foot Printer Cable.	CBL-PT96	na	\$24.95

DOCUMENTATION

Complete Z80 CPU doc. Incl. bus structure and Operating System	DOC-Z80CPU	—	\$7.50
Zilog's Z80 technical manual	DOC-ZILOG	—	\$7.50
Complete Z80 System Documentation (DOC-Z80CPU, DOC-ZILOG, DOC-TVC, DOC-I/O, DOC-MEM, DOC-PWRØ)	DOC-Z80SYS	—	\$15.00
Input/Output documentation	DOC-I/O	—	\$1.00
8K Memory documentation.	DOC-MEM	—	\$1.00
TV Readout and Audio Cassette Interface	DOC-TVC	—	\$1.00
3 Voltage Power Supply	DOC-PWRØ	—	\$1.00
Standalone Cassette	DOC-CASSTD	—	\$1.00
Cassette Storage System	DOC-PHI	—	\$7.50
1702A EPROM Memory.	DOC-1702A	—	\$1.00

ORDERING INFORMATION

There are a number of ways to order from the Digital Group.

PAYMENT WITH ORDER

Either a personal check or money order. The Digital Group reserves the right to hold shipment on an order until personal checks clear.

C.O.D.

minimum COD order is \$50.00

There will be a 5% COD surcharge added to the order (up to a maximum surcharge of \$10.00) for the special handling COD's require.

CHARGE ORDERS

Minimum charge order is \$50.00

The Digital Group accepts both Mastercharge and BankAmericard, either by phone or mail. Charge orders are treated exactly the same as prepaid orders. Upon receipt of the order, the charge is authorized with the charge card company. Our sequential delivery number is assigned and the charge is submitted to the charge card company. If the charge is rejected by the charge card company, the sequential order number is not assigned until authorization occurs.

PURCHASE ORDERS

Purchase orders will usually be accepted from the following only:

1. Governmental Institutions
2. Educational Institutions

All other orders will require payment with order or be COD. Purchase Order terms: 5% 10 net 30

SOFTWARE ORDERS

For quickest handling, all software orders should be sent directly to:

Digital Group Software Systems
P.O. Box 1086
Arvada, Colorado 80001
(303) 422-4566

Any software orders submitted to the Digital Group will be acknowledged and transmitted to DGSS.

ORDER POLICY

Sequential order delivery will be maintained at all times — including orders from dealers.

FOREIGN ORDERS

All foreign orders must be prepaid. The air freight charges incurred will be shipped collect.

the digital group_{INC.}

box 6528 denver, colorado 80206 (303) 777-7133