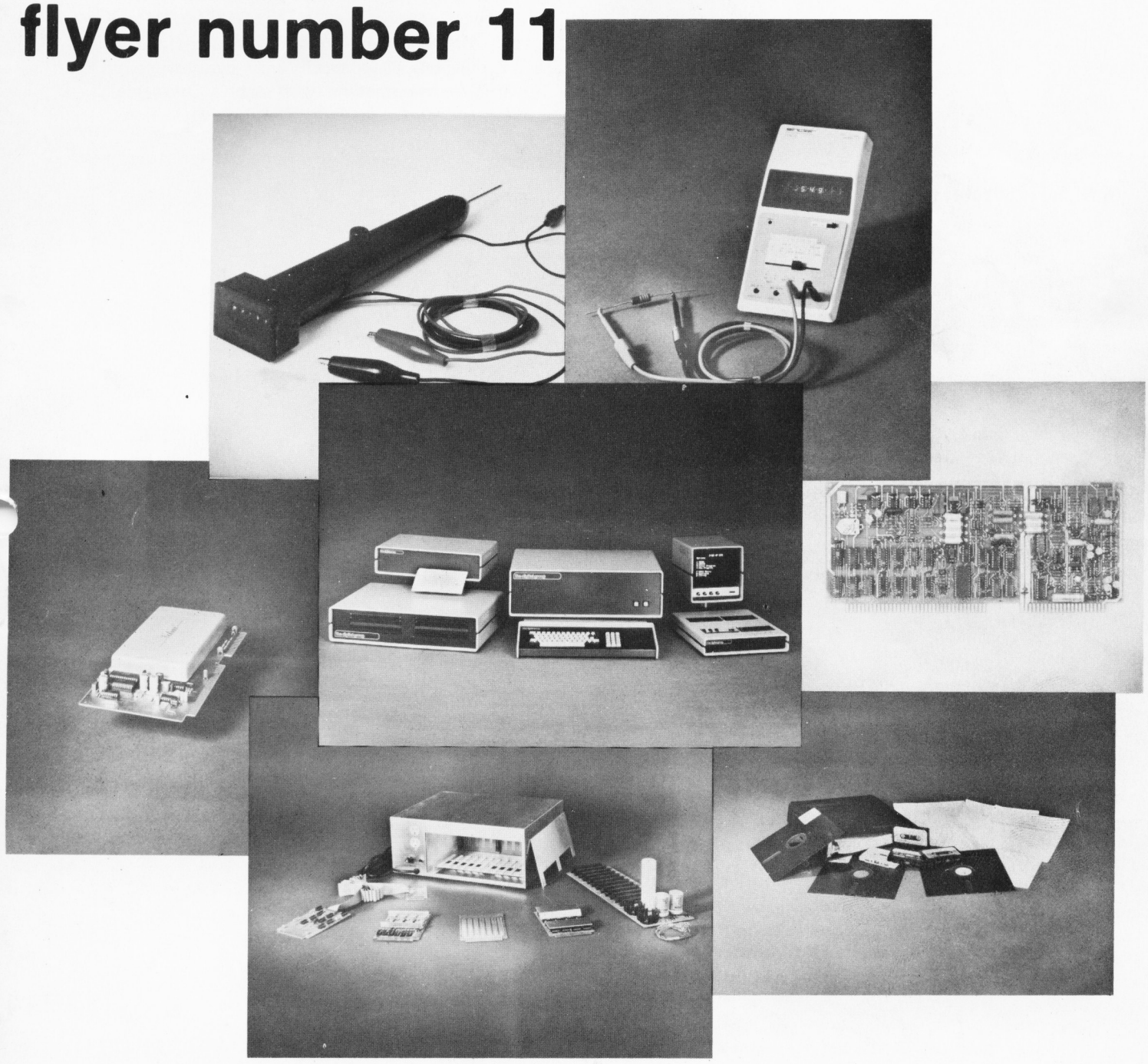
the digital group INC.

flyer number 11



- contents -

- assembler two • opus I & II • business basic • voice synthesizer • digital voltmeter • ham board
- convers • word processing • real world interface • george risk keyboard • frequency counter probe

REAL-WORLD INTERFACE

In our continuing effort to expand the capabilities of your system, we are introducing the Real-World Interface. This system component is actually a system in itself. It is specifically designed to help you get your computer to actually control all those things you know it can control so well.

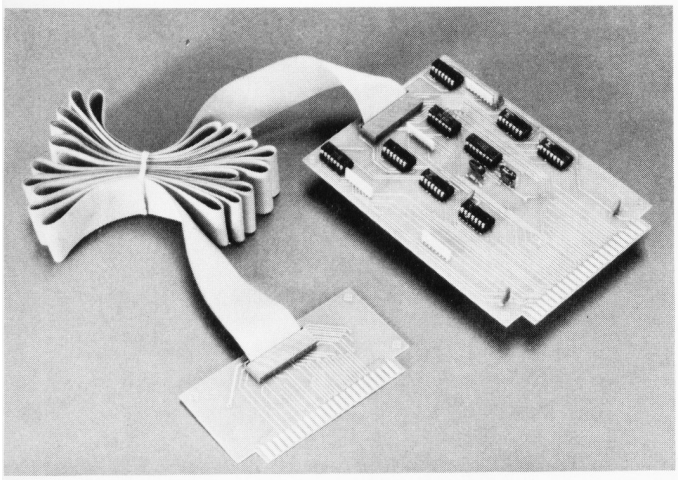
At initial announcement we have the following basic components:

- Motherboard and power supply
- Parallel CPU interface
- Cabinet

Plus three types of plug-ins:

- AC controller
- DC controller
- Prototyping card

The recommended software packages are Convers, Assembler, or MAXI-Basic, in that order.



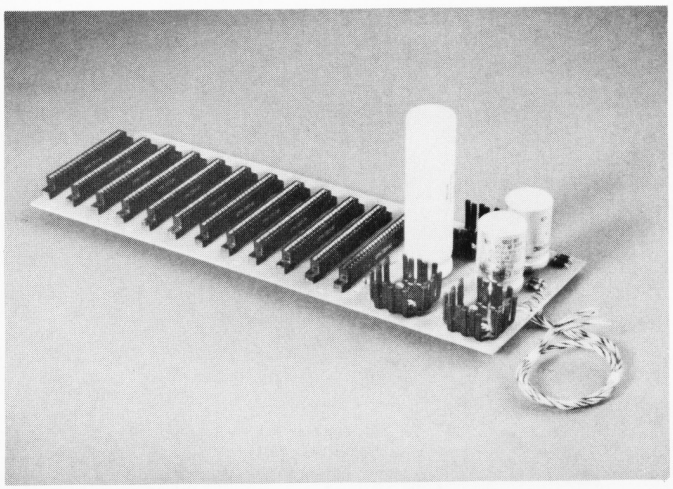
Parallel CPU Interface

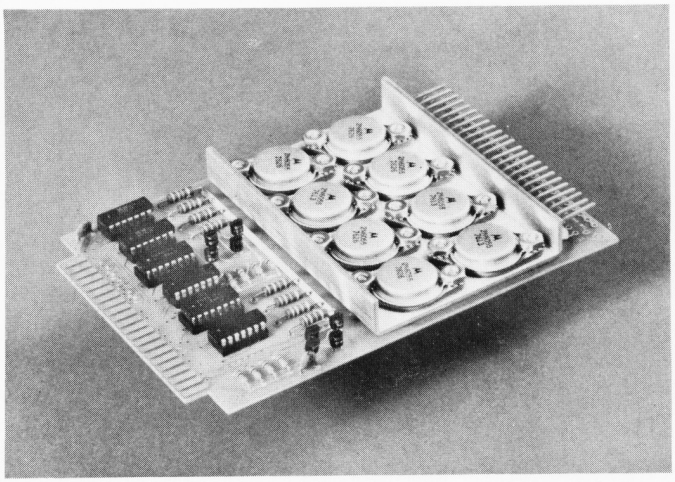
- All buffering for Data Out (25 TTL loads), Address (25 TTL loads) and Data In (10 TTL loads)
- Power required — +5V DC ±5% @ 350 mA required
- Includes cable and paddlecard for connection to dual 22 on Digital Group CPU back panel. Two 22-pin edge connectors included
- Generates strobe for enabling control cards
- Requires two output ports and one input port
- 8′ cable included
- One required for Real-World Interface System

Specifications:

Motherboard & Power Supply

- 12 slots — 11 control cards, one for the interface card
- +5V DC ±5% @ 1A, +12V DC ±5% @ 1A, -12V DC ±5% @ 1A contained on board
- Parallel bus — 44 lines
- May be free-standing (with care)



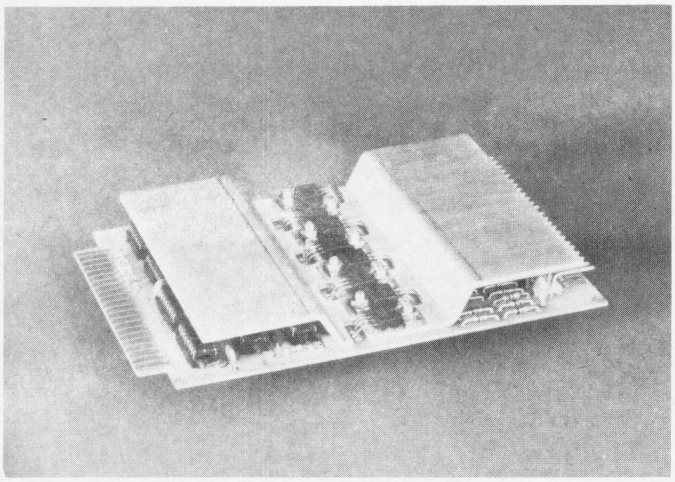


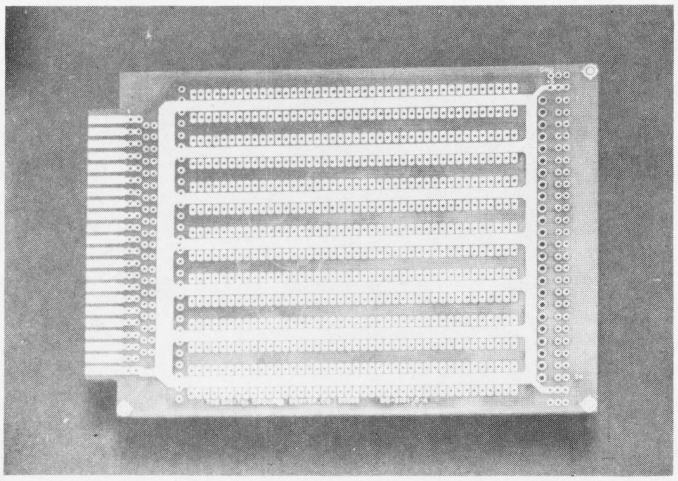
DC Controller

- Eight output devices (2N6055) each output up to 50V and up to 5A
- Power required — +5V DC ±5% @ 200mA, +12V DC @ 300 mA
- Control DC motors, switches, solenoids, etc.
- May use internal +12V DC for load or external DC up to 50V DC

AC Controller

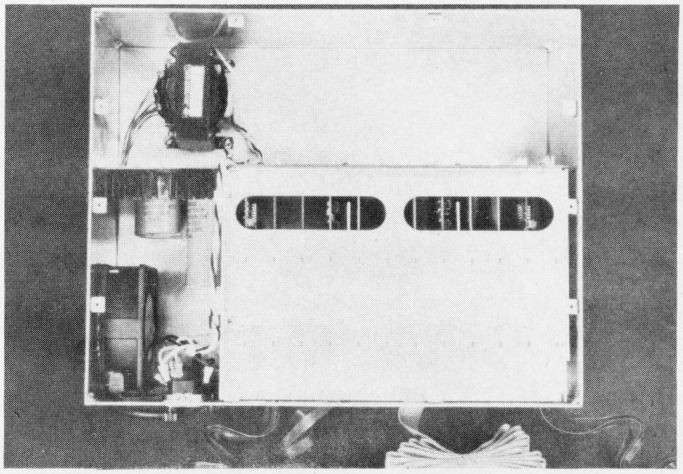
- Eight output devices (2N6342A/2N6343A, -12 amp Triacs)
  Each output 240V AC max, 12A max RM5
- Power Required — +5V DC ±5% @ 350mA
- Control AC motors, lamps, switches, etc.
- Opto-isolated (MCS-2400 or equivalent)





Prototyping Board

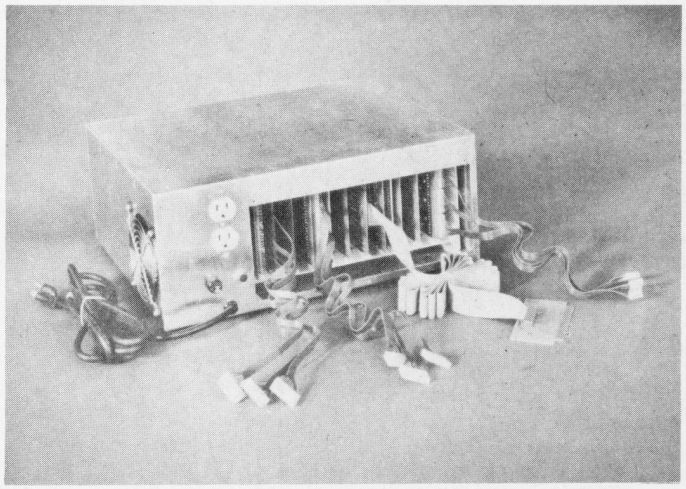
- Edge connector pin-out compatible with system bus
- Build own circuits to be used in Real-World Interface



Cabinet

- Rack mountable
- Space for additional power supply, etc.
- Card rack to which motherboard mounts — holds cards in place
- Air flow restricted for movement over system boards for most efficient cooling
- Compact — 17"w x 7"h x 14"d
- Fan, fuse, AC unswitched utility outlet

This is just the beginning of the Real-World Interface System. Many more types of plug-ins and applications will be along soon.



Order Code	Description	Kit	Assem.
RW-MBPS	Motherboard and power supply	$95.00	$115.00
RW-PARCPU	Parallel CPU interface	70.00	85.00
RW-CABINET	Cabinet	49.95	74.95
RW-BASE	Above three items complete	199.50	260.00
RW-MB-PC	Motherboard PC board only	45.00	N/A
RW-AC8	AC controller, complete	125.00	150.00
RW-AC8-0	AC controller w/o eight 2N6342/3A's and w/o eight MCS-2400's	49.95	N/A
RW-DC8	DC controller, complete	65.00	79.50
RW-DC8-0	DC controller w/o eight 2N6055's	40.00	N/A
RW-PROT1	Prototyping card, complete	24.95	N/A
RW-PROTPC	Prototyping PC board	19.95	N/A

HAM INTERFACE BOARD

The Ham Board allows the amateur radio operator to use his microprocessor to send and receive telegraph code, send and receive teletype code, send microprocessor-generated slow scan television pictures, and receive slow scan television pictures into microprocessor memory and onto a TV.

The Ham Board provides the needed interface between the speaker output of the amateur receiver, and the microphone input of the transmitter. The Ham Board is connected to the Digital Group microprocessor via three output ports and two input ports. The microprocessor is then programmed to perform the desired operation.

Minimum Recommended System

The initial software supplied with the Ham Board assumes the following system:

- Digital Group Z-80 system with standard motherboard
- Minimum of 18K of memory
- 1024 character TV readout and cassette interface board
- Supplemental I/O board
- Digital Group keyboard
- Ham interface board

Additional requirements

- TV monitor
- Cassette recorder
- Ham rig

A special "SysHam" package is available to supply everything you need:

- Z-80 CPU
- Two I/O boards
- 1024 TV readout & cassette interface board
- Ham interface board
- Two 8K memory boards (or 16K of 32K board)
- Standard motherboard
- CPU cabinet
- 12A +5V DC power supply
- Digital Group keyboard and cabinet

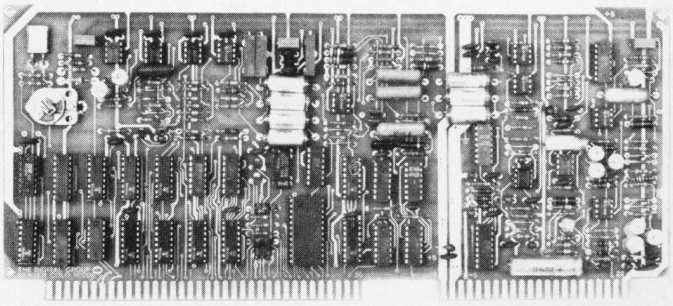
Included Software

- Ham Software I
- Maxi-BASIC
- Assembler II

For the experimenter — the Ham Board can be used with almost any computer. Software supplied by the Digital Group is intended for use on Z80 based Digital Group systems. Software needed to run on other computers would have to be developed by the user.

Many Advantages

- The same unit can perform many functions. This means fewer ham peripherals and lower cost.
- New features are added by programming, not rebuilding. An extensive engineering application can be implemented as easily as loading a new cassette.
- The "HAM microprocessor" becomes a device usable by the rest of the family. Reprogram it for math practice for the kids.
- The microprocessor may be used as a "Ham Calculator" . . .
  - Calculate Oscar orbits
  - Calculate electronic or antenna design problems
  - Handle logging procedures in contests and pileups
- Designed *by* active Hams (WØLMD & WØPMY) *for* Hams. Tested on the air for months while constantly adding and improving new features.



Order Code	Description	Kit	Assem.
HAM-1	Ham board	$195.00	$295.00
Z80-SYSHAM	Complete Ham system	1545.00	2045.00

DIGITAL GROUP/VOTRAX VOICE SYNTHESIZER

Now, you can vocally command your computer . . . it will listen . . . and it will talk back to you. How? With the introduction of the exciting new Digital Group/Votrax Voice Synthesizer.

All this is possible because the Digital Group/Votrax Voice Synthesizer has an unlimited vocabulary, with 64 "human sounds" that can be combined and re-combined to form words and languages. Imagine your own computer glibly spouting English, Latin, Spanish, Russian, Japanese and Yiddish. And 100 average English words require only 1200 bytes of memory!

Programming the Digital Group/Votrax

The Digital Group/Votrax Voice Synthesizer kit is supplied with demonstration and diagnostic software which will permit preliminary testing. Assembler listings of the code involved are included.

We have additional software available at nominal cost:

- "Talking Basic" — $10. Maxi-BASIC output and programs converted to English.
- "Talking CW" — $10. For impressing your Ham buddies. Requires the forthcoming Ham interface card.
- "Latin and Spanish Talking" — $10. Hear the computer repeat letters and words typed in Latin or Spanish.
- "Voice Input Software" — $15. The typical software required to program your Digital Group microprocessor to understand your voice. Projected availabilty date: early December.
- Demonstration Tape — $5. A sample voice output audio tape and further explanation of the system.

Bonus: A basic voice input circuit is included that may be programmed to understand a small vocabulary of voice commands. A simple, low-cost circuit is used.

External Hardware Requirements:

- One 8-bit output port and one 8-bit input port
- +5V at 400 mA +12V at 1 amp
- 8 ohm speaker
- High impedance microphone (if voice input desired)

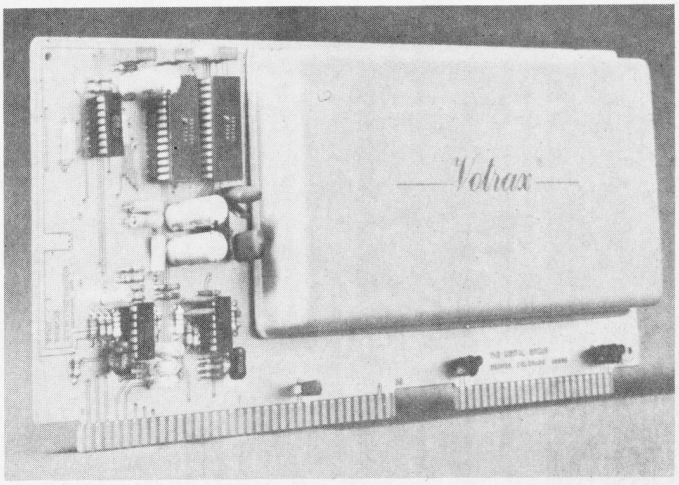
The Digital Group/Votrax Synthesizer board is designed to plug into one I/O slot of a Digital Group system. The software supplied assumes a Digital Group Z-80 system with at least 18K of memory, the 1024 character TV cassette board, and the synthesizer attached to port 3. Other configurations and computers would work, but will require some degree of hardware and programming effort by the user. The Digital Group/Votrax Voice Synthesizer requires one 8-bit output port and one 8-bit input port of your computer, +5V DC at 400 mA and +12V at 1 amp. For voice input and output, a high impedance microphone and an external 8-ohm speaker are needed.

Order Code	Description	Kit	Assem.
VOTRAX1	Digital Group/Votrax Voice Synthesizer	$495.00	$595.00
VOT1	Talking Basic	N/A	10.00
VOT2	Talking CW	N/A	10.00

Unlimited Applications

Consider these possibilities:

- Home applications — voice control of AC and DC devices
- An aid for the blind, with the Voice Synthesizer supplementing a CRT display
- Astronomy — voice input and output of celestial coordinates where light would spoil "night vision"
- Robotics
- Games
- Student terminals
- Ham radio repeater telemetry systems
- Student language pronunciation learning



Specifications:

- Built-in audio amplifier
- Low processor time overhead
  - 80 phoneme buffer (FIFO memories) allows burst mode buffer loading
  - Continuous speech possible with a small memory disk system
  - Multilevel programming possible with continuous speech
- Low cost synthesizer design
  - Phoneme sounds based on the Votrax VS-6 model, only without inflection for lower cost and easier programming.

Let's Talk Price

Actually, we should be shouting this one. The Digital Group/Votrax Voice Synthesizer, with all its capabilities, is only $495 kit or $595 assembled and tested. That's language anybody can understand.

Order Code	Description	Kit	Assem.
VOT3	Latin and Spanish	N/A	10.00
VOT4	Voice input software (available December)	N/A	15.00
VDEMO1	Sample demonstration tape	N/A	5.00

THE SINCLAIR PDM 35 PERSONAL DIGITAL MULTIMETER

Now everybody can afford to have a personal digital multimeter.

Everybody who makes electrical measurements knows the advantages of using a digital meter — quick clear readings, high accuracy and resolution, high input impedance, etc. But a digital multimeter used to mean a bulky box to carry around and a lot of money to pay out — The Sinclair PDM 35 changes that — it's got all the functions and features you need in a digital multimeter but packed into a case small and light enough to go where you go, and at a Digital Group price that's less than you'd expect to pay for an analog meter.

Features

- 3½ digit resolution
- Clear bright LED display
- Automatic polarity selection
- Resolution of 1mV and 0.1A
- Resistance measurement up to 20M ohm
- Accuracy 1% of reading
- Operates on battery or AC adaptor
- Industry standard 10M ohm input impedance
- Genuine pocket format
- Full multimeter facilities

The Sinclair PDM 35 is the ideal instrument for anyone who needs to make rapid, accurate measurement. Development engineers, laboratory technicians, computer specialists, test engineers will all find the PDM 35 the perfect answer for their needs. Its rugged construction and battery operation make it ideal for hand work in the field, while it's angled LED display and optional AC power facility mean that it's just as useful on the bench.

Compare the PDM 35 with a Typical Analog Meter

Accuracy

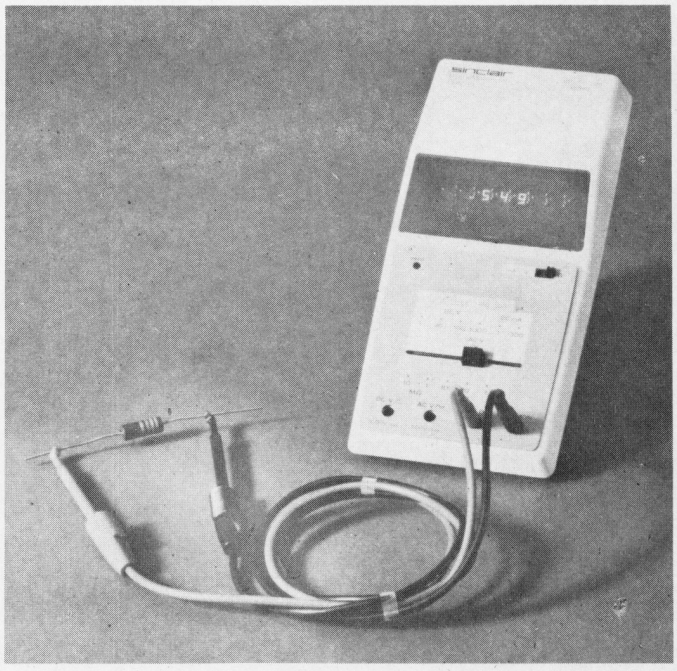
The PDM's 1% of reading compares with 3% of full scale for a comparable analog meter, that makes it about five times more accurate on the average.

Resolution

The PDM will resolve 1mV versus 10mV for a comparable analog meter and resolution on current is over 1000 times greater.

Input Impedance

The PDM's DC input impedance of 10M ohm is 50 times higher than a 20K ohm/volt analog on the 10V range.



Convenience

The PDM's precise digital readout means the end of trying to interpret ambiguous scales, the end of parallax errors, the end of reversing leads for negative readings. You can read the display at any angle and there's no delicate meter movement to damage. You can resolve current as low as 0.1nA and measure transistor and diode junctions over five decades of current.

Specifications

	Range	Accuracy (of reading)	Comments
DC Volts (4 ranges)	1mV to 1000V	1.0% + 1 count	10 M ohm input Impedance
AC Volts (40Hz - 5KHz)	1V to 500V	1.0% + 2 count	Mean Reading R.M.S.
DC Current (6 ranges)	1 nA to 200 mA	1.0% + 1 count	Max. Resolution 0.1 nA
Resistance (5 ranges)	1 ohm to 20 M ohm	1.5% + 1 count	Also provides 5 junction-test ranges

Size	6" x 3" x 1½"
Weight	Under 8 oz. including battery
Power Requirement	Throwaway 9V radio battery
Sockets	Standard 4 mm for resilient plugs
Options	AC adaptor for 117V 60 Hz or 220/240V 50 Hz power Deluxe padded carrying case

Order Code	Description	Kit	Assem.
DVM-S	Sinclair Digital Voltmeter	N/A	$59.50

DIGITAL GROUP FREQUENCY COUNTER

The Digital Group Frequency Counter is the first counter designed to fit in your hand. How many times have your probes accidentally slipped from the point under test only to short to the supply? Besides being hard on circuit elements, it becomes a bit frustrating. With the Digital Group Frequency Counter you don't have to turn away from your work. The display is in-line with the probe tip and only a shift of your eye is required to see both the probe tip and display. Murphy (of Murphy's Law fame) may hate you for it, but who likes him anyway?

The frequency counter requires only a 5 volt supply (a TTL supply works fine) for operation and draws only 125 mA. A grounding wire is supplied with an alligator clip that plugs into the side of the impact-resistant, clear plastic case.

The frequency counter operates in two ranges; 10 Hz - 1MHz, and 1 KHz - 30 MHz guaranteed, with 6-digit accuracy. A switch on the case is used to select the appropriate range. In addition, a decimal point automatically switches from KHz to MHz when going between ranges.

Specifications

Frequency Range:
10 Hz - 30 MHz guaranteed (40 MHz typical) in two ranges: 10 Hz - 1 MHz, gate time 1 sec; 1 KHz - 30 MHz gate time .1 sec.

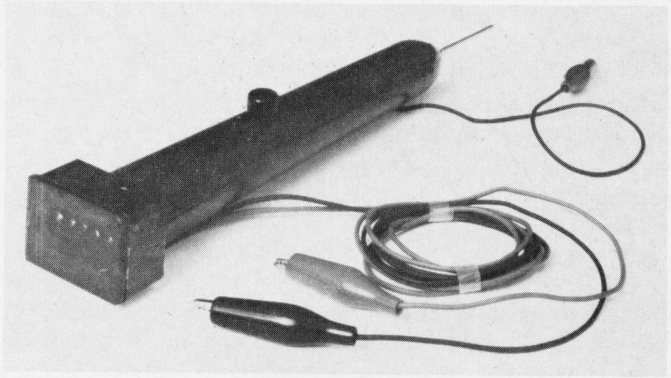
Input Characteristics:
Maximum input 50 volt P-P; AC coupling.

Input Impedance:
5.6 M ohm shunted by 20 pfd.

Sensitivity:
100 mV, 10 Hz - 1 MHz (using high range above 100 KHz); 200 mV, above 1 MHz.

Time Base:
5.24288 MHz crystal oscillator.

Temperature Stability:
20 ppm/°C over -10 °C to + 60°C.



Accuracy:
+ 1% count plus time base error.

Setability:
+ 2 ppm at 25 °C.

Display:
6 digit LED display with .11" high digits. Decimal point designates KHz on low range and MHz on high range.

Power Requirements:
+5 volt DC and ground. A TTL supply works fine. Current requirements — less than 125 mA.

Physical Information:
Size—7½" case length. The probe is 3/4" diameter at the probe end and 1-1/16" diameter at the rear. The display box is 1.5" x 1-1/16" x .6" at the rear of the case. The probe tip extends 1-3/8" out the front. Weight 4 oz. Case material — high impact plastic, transparent red.

Accessories:
Grounding wire with clip, 1' length. Extra jack for custom ground wire.

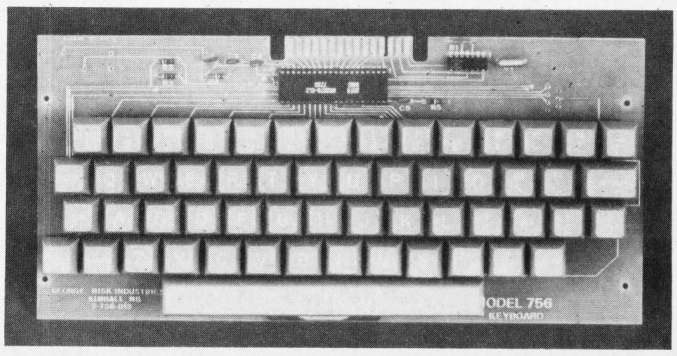
Order Code	Description	Price
FREQ-CTR	Frequency counter in a probe	$99.50

INEXPENSIVE KEYBOARD

Many of you have requested a keyboard that is less expensive than our Key-1. We've found a keyboard that does meet our requirements with somewhat fewer extra features but that does get the job done, quite nicely.

Features:

56 Keys
Full 128 character ASCII output
Shift-lock key with mechanical latch
Supplied assembled and tested only
5 foot cable included with preassembled connector on keyboard end
Mechanical key switches - individually replaceable +5V only



Order Code	Description	Price
KEY 2	56-Key Keyboard	$79.50

SOFTWARE — GENERAL

The Digital Group has acquired Digital Group Software Systems and has formed a new division in its place — Digital Group Software. All current orders with DGSS will be filled by The Digital Group with, we hope, as little confusion as possible. All current contractual arrangements between DGSS and its contributors will, of course, remain intact. **New orders for software should be placed through The Digital Group**.

As Digital Group Software products gain in number and sophistication, we expect to provide a new level of support through Digital Group's software division. For the first step, we have established a separate new phone number with 2 lines specifically for software questions: (303) 778-1725.

We would like to take this opportunity to thank Chuck and Diane Howerton for a job well done and we wish them well in their new endeavors.

Note: Several of our major softeware products are of a much greater capability and complexity than any previous products. It may not be transparently obvious from this flyer whether the product will suit your needs. Should that be the case, we would recommend first purchasing the documentation for a more detailed analysis. The prices and order codes for the package manuals that are available are contained in the price list. You will also receive a card entitling you to a full credit for the manual should you subsequently purchase the package.

CONVERS

CONVERS is a new type of language for microprocessors. It is what is known in the Data Processing community as a "threaded" language.

CONVERS was written at the University of Arizona by Scott B. Tilden and M. Donner Denton specifically for microprocessor based computers. It was adapted for a Digital Group Z-80 Based System by Peter L. Collins.

Features:

- Ideal for control-oriented applications
- Application Vocabulary is user defined
- Vocabulary words may be re-defined at anytime in or out of a program
- Links easily to machine code or assembler routines
- Generates very efficient code
- Compiles each line of code as it is entered
- Executes each line directly if desired
- Total software transportability between different types of CPU's is possible

Why CONVERS?

CONVERS is an unusual approach to computer programming and not just another computer language. The justification of this statement can be supported by comparing CONVERS to other commonly used computer languages available to mini's and micro's. BASIC and FORTRAN, the most widely used scientific computer language are languages; i.e., a definite syntax must be followed to properly execute programs. Users are limited to the routines available in their particular software package Upgrading the language itself cannot be done easily. The CONVERS system due to its unique structure allows constant expanding and/or remodeling to suit immediate or future needs. Such changes are not restricted to just adding "library" programs, expansion of the language itself is easily accomplished. CONVERS also allows the syntax to be modified in any way the user may wish, i.e., the DO-LOOP structure can be readily modified to execute in virtually any way desired, in fact it might not even loop at all. Other common software systems used today do not allow the system itself to be easily modified at will. From this aspect CONVERS can best be thought of as a language to write customized computer languages for whatever specific task is at hand.

CONVERS, while being a high-level "language", also allows routines to be defined at any time in assembly and machine code. In fact, programming can be done at several levels simultaneously. Thus, one is able to develop I/O control routines "on-line" as well as verify and debug these routines while remaining seated at the computer. These routines are added automatically to the system and become part of it. FORTRAN and BASIC do not allow this type of flexibility, in fact FORTRAN is not an interactive language to begin with.

Additionally CONVERS, as a result of its unique structure, encourages the user to program in small "modules" of code due to the ease with which routines are linked together. This has the effect of making programs more efficient and significantly decreasing the time required for development of new programs since code can be readily shared.

Structure of CONVERS

The entire base for a CONVERS system resides in kernel, requiring approximately 1k. Everything else is constructed based upon the kernel. Therefore, total software transportability between different CPU's can be obtained by a single reconstruction of the kernel for each new machine.

Above the kernel resides a dictionary with pre-defined basic (not BASIC) functions which may be used to construct definitions of more powerful words.

Overview

Since CONVERS is basically an interpretive "language", instant communication with the user is established once the system has been loaded into memory. CONVERS is analogous to BASIC in this respect. As is the case with BASIC, the interpreter is initially waiting for the user to type in a "command" which can be any number of characters followed by a space or a series of commands followed by a carriage return. In CONVERS if the command is recognized it is executed immediately. This Execution Mode is very different from BASIC which actually stores the program as a string of ASCII characters in a buffer and then interpretes (compiles) and executes each step of the program separately. In CONVERS, the interpreter is executing entries as they are being typed on the terminal. The entry being executed is the entire "program" which has been previously compiled. Thus CONVERS is an interpretive language with two modes, COMPILE and EXECUTE, which are separated in time. This separation of modes is very important in terms of execution speed. As new definitions ("programs") are being compiled using previous definitions, the addresses of all the previous

entries required to define the new definition's function are incorporated within it. This new entry then becomes a "program" which remains permanently as part of the CONVERS system. When this entry name is typed on the terminal, the interpreter simply calls and immediately executes the entry since all required compilation was already accomplished when the entry was originally defined.

CONVERS is also novel in both the types of commands available to the user as well as the way the commands are stored in memory. CONVERS stores routines in a "dictionary" format; each routine (dictionary entry) has a name followed by the executable machine code. The CONVERS interpreter is itself a series of dictionary entries.

The entries in the dictionary are of many types including terminal I/O routines, looping and conditional testing routines, arithmetic routines, etc., they all can be immediately executed by typing the entry name on the terminal. However, it is the ability to link these entries themselves that make CONVERS so useful. Since some entries must be defined using totally new code, (due to the fact that previous entries cannot always be "put together" in such a way as to execute the required function the user desires) CONVERS also allows new entries to be defined using assembly or machine code.

Summary

Through incorporation of a variety of software concepts a unique highly flexible package has evolved for programming microprocessors.

CONVERS offers a combination of easy programming, high memory efficiency, and fast operating speed which is ideally suited for many types of applications. A complete operating system in the final system is estimated to occupy less than 8K bytes and provide the capabilities of a resident assembler, compiler, editor, I/O communications, stack operations, and a variety of other useful routines.

As a result of separating the compile and execute states, both the advantages associated with an interactive interpreter language are provided while retaining the speed associated with assembler/compiler approaches.

The modular threaded code nature used by the system coupled with the ease with which various levels of language can be mixed, greatly improve the overall flexibility.

The potential capabilities of this type of lanuage are almost breathtaking. We are just beginning to explore the full potential of CONVERS ourselves and are climbing up our own learning curve. The more we learn, the better we like it. For the first time a programmer can code almost as fast as he can think. Applications written in CONVERS should be extremely easy to use and change. However, because CONVERS gives you so much power and because it is different in approach from other languages, from coming up to speed with it initially can present some obstacles and we definitely do not recommend it for the novice. The documentation is quite extensive and well-done, but it is not an instructional tutorial for the novice. Familiarity with computers is assumed.

Release Information

CONVERS is being offered in a preliminary release version for the more advanced software experimenter. There will be a more fully polished version at a later date. However, **updating will not be automatic and is not included in this offering.**

The preliminary version we are offering has been well tested and all known errors have been corrected. What remains to be done in the next version is to re-assemble the kernel. All languages you build, or work that you do, in the present version of CONVERS should be compatible with the next version. The total function of the language itself has been fully implemented and documented.

Release Dictionary of supplied operators

Kernel Operators

UPDICT
INTTY
OUTTTY
PUSH
POP
TTYOUT
OOO
STKDE
@
1@
DUP
DE-STK
BC-STK
SWAP
HERE
HEAD
1+
OVER
DROP
SEARCH
CRLF
SPACE
ZERO?
OCTCVRT
NUMBER
!
,
ENTER
LINK
1,
LITERAL
COMPILE
EXECUTE

Basic Operators

CONSTANT
INTEGER
XCHG
IZOP
IMPOP
INZOP
RZ
STATE
DAD
COMPLEMENT
MINUS
0PUSH

O
PRECEDENCE
STK-DICT
IF, ELSE, THEN
=
BELL
DO, LOOP
DADSP
IC
I
I
K
AND
DP
, CODE
REMEMBER
2*
2/

SWITCH
SP
UNDER
MAX
MIN
1!
1 WORD
WORDS
CURT
IO
IOCURT
DECIMAL
OSTAL
DATAOUT
PORTOUT
OUTDEVICE
INDATA
SPECIAL
BEGIN-HERE
BEGIN
END
CLR
|
|
UNPRECEDENCE
KEYBOARD
CR
DECK
REWIND
PHIMON
PRR

AA
ABORT
CURRENT
OBLOCK
ERASE-CORE
UPDATE
FLUSH
GAG
DEVICE
DEV
BLOCK
LOAD
;S
LIST
BEGIN
END
EDITOR
BLK
EDIT
-
D
IN
R
T
TT
SHOW
BLOCKS
BBCOPY
CLEAR

Preliminary Release Package Contents:

Release tape for PHI-MON based systems
- Contents:
  - Kernel
  - Basic Dictionary
  - Editor
  - Minimum Z80 Assembler

Digital Group Systems CONVERS User Guide (approximately 100 pages)
- Contents:
  - Introduction and Overview
  - User's Manual
  - Kernel
  - Dictionary through basic
  - Other aids

Recommended configuration for preliminary release:

- 26K Z80 DG System
- Monitor
- Keyboard
- PHIMON
- 2 Digital Cassette Drives

Pricing:

(Phimon is a prerequisite)

CONVERS (includes Doc-CONVERS)	$25.00
Doc-CONVERS/Manual only*	$10.00

*creditable toward later CONVERS purchase only

BUSINESS-BASIC

Microworks, in Cincinnati, has taken the standard Digital Group Maxi-BASIC and, by adding a significant number of extensions, created Business-BASIC. We think these enhancements make Digital Group Business-BASIC an extremely productive and powerful language for microcomputer system users.

Enhanced Routines:

Character Input and Output Routines

Upper and lower case characters are supported. All characters are converted to upper case, unless they are within quotes or entered during execution of an input statement. (Example: 10 PRINT 'UPPER & lower').

Scroll Routine

The scroll routine has reduced 'flashing' and increased speed since the entire screen is not rewritten during each character output.

Line Length Routines

The line length routine for input assumes that the maximum input length equals the maximum output length. (Previously the maximum input length was always 72).

Direct Statement Execution Routine

All statements can be typed for immediate execution. Also multiple statements per line during direct execution is allowed.

Output Interruption Routine

Upon receiving a Control 'C' BASIC will finish execution of any PRINT statement and then return to the command mode.

RND function has been improved to give a more even distribution of values.

New Routines:

CURSR Statement

This statement is followed by one or two parameters. If one parameter is given (Example: 10 CURSR X) the cursor is moved to the xth position on the screen. If two parameters are given (Example: 10 CURSR N,M) the cursor is moved to the Mth column of row N on the screen.

(For one parameter, X is in the range of 1 to 1023; for two, N is in the range of 1 to 15 and M is 0 to 63.)

UNDIM Statement

This statement allows the programmer to release the memory allocated to a string variable or an array. (Example: 10 UNDIM A$,X$,B,C)

PRINTUSING

An extensive PRINTUSING capability for more precise report formatting. Print elements in the PRINTUSING statements are editied into the print line as directed by the IMAGE statement.

IMAGE

This statement provides an image line for formatting output generated by literals and variables in a corresponding PRINTUSING statement.

Selected features:

#	Replacement character
,	Floating comma
+	Floating plus sign
-	Floating minus sign
$	Floating dollar sign

Example: $##,###.##

PACK/UNPACK

The PACK/UNPACK statements pack or unpack numeric values into an alphanumeric variable or array reducing the storage requirements for large amounts of numeric data where only a few significant digits are required.

CONVERT

Converts from string to numeric and from numeric to string under formatted control

KEYIN

KEYIN allows the programmer to check keyboard input character-by-character rather than field-by field as in INPUT.

PRINT HEX

Outputs values in hexidecimal codes

HEX (hh) — function

Allows direct hexadecimal manipulations, with hexadecimal literal strings.

DELY Command

This command causes a delay to be generated between characters on output. The delay generated is N times 10.4 microseconds, where N is 0 to 255. (Example: DELY N)

AUTO Command

Automatic line numbering of BASIC statements is accomplished by the use of this command. Two parameters are used (both are optional). The first is the starting statement number, the second is the increment. (Example: AUTO 300,5). Exit from the AUTO mode is accomplished by typing on EOT (Control D).

Cursor Control Characters

The following table lists the control characters which provide special output functions. These output functions are suppressed during LIST.

Ctrl G	Bell (on TTY only, suppressed on screen during RUN-time.)
Ctrl H	Move cursor left
Ctrl I	Move cursor right
Ctrl K	Home cursor
Ctrl L	Clear screen
Ctrl N	CR/LF
Ctrl Q	Move cursor down
Ctrl R	Move cursor up

During LIST and RUN-times a Ctrl M will generate a CR/LF.

Future Statement Expansion

The user may add new statements as needed. The table of new statement strings is located at 33F9 hex. Statement string format is 'Bn' followed by any number of ASCII characters without parity.

File Statements

Full PHI-DECK access capabilities are implemented in BASIC. Up to ten files may be open at one time, and may be accessed sequentially or randomly. All records are referenced by logical block id's, freeing the user from concern about actual hardware block id's. (Block id's are relative to the file.) Files may be input, output or input/output (records may be read or written on the same file).

Statements currently implemented are

OPEN
GET
PUT
CLOSE
REWIND
PURGE

Order Code	Description	Price
BUS-1	Business-BASIC	$20.00

WOPROC —
A Word Processing System By Jerry Nix

Professional word processing capability has arrived at last for the Digital Group System user! The micro-computer can now excel in another area which is ideally suited for it.

What WOPROC Can Do For You

Prepare and print

1) Letters
2) Business documents
3) Homework
4) Legal forms
5) Recipes
6) Documentation
7) Books and articles
8) Term papers

And anything else which could be prepared with a typewriter.

Just What is Word Processing?

Many think that it is just fancy text-editing. Certainly it is, but, oh, so much more! WOPROC gives greater flexibility and power by automatically taking care of the menial tasks of typing such as line length, justification, paragraphing, and centering. Correction of errors, insertion, and deletions are easily done. Simple, easily remembered keystroke commands control the entire editing process. Material is printed exactly as desired, with minimal effort on the part of the user. In short, a word processor doesn't stop at merely editing text; it also processes this text in a variety of ways.

WOPROC Features Include

- User-oriented — easily learned by almost anyone
- Responsive operation — all operations are performed immediately upon entry
- Screen display fully formatted — screen display and printed copy are virtually identical
- Interactive justification — as characters are typed, words are automatically put on the next line when they exceed the right margin.
- Tape storage of edited files
- Automatic buffer writeout — single files can be any size, and when using Phi-decks, editing is possible in the forward or backward direction on the tape
- A rich variety of editing and formatting operations including:
  - Automatic text insertion (when you type the letters!)
  - Cursor movement through the text by character, word, line, sentence, paragraph, and page
  - Forward and reverse searches for specified phrases, and replacement with alternate phrases if desired
  - Deletion of characters, words, and sentences
  - Margin controls throughout the text include paragraph indentation, centering, tab stops, and left and right margins
  - Imbedded communication to the printer includes pitch, lines per page, headings, and type of justification (flush or ragged), all of which can also be set interactively before printing
- Fully documented with a comprehensive user's manual

Hardware Configuration

- 18K or more Digital Group Z-80 System
- 64 character TV and cassette interface board
- Two or more Phi-decks with PHIMON operating system, or audio cassette player and ZE-ROM.
  Note: Some functions are not supported under audio cassette.
- Digital Group printer or other hard copy unit. The user's manual contains information necessary for modifying non-Digital Group printer handlers to work under WOPROC . (Comes with D.G. printer handler.)

WOPROC Release Package

- WOPROC User's Manual.
- PHIMON based WOPROC system and an audio cassette-based system on a 1100-baud Suding cassette.

Order Code	Description	Price
WOPROC-1	Word Processor	$27.50

OPUS/ONE and /TWO – SOFTWARE PACKAGE

OPUS/ONE and OPUS/TWO are major extensions of BASIC-type languages by Administrative Systems, Inc., in Denver, Colorado. The language's major emphasis has been to maximize function and capability. It is particularly well-suited to personal/business type applications. OPUS is well documented and has been tested in many installations. We can only give you a brief glimpse of the power of OPUS here; for more complete information, we would recommend purchase of the manual which will be credited on your subsequent order of OPUS.

OPUS/ONE

Features

- Syntax similar to disk BASIC's
- Up to 55 digits of precision
- Alphanumeric variables up to 127 characters
- Branching to descriptive labels rather than line numbers
- Variables may interchangeably be numeric, string or array
- Arrays may have n-dimensions
- Array sizes are limited only by available memory space
- Arrays may be re-dimensioned at any time
- Full data record file support — user-oriented file storage
- A number of different device drivers may be used
- Editing — by line number as in BASIC
- Renumbering — whole programs or any section of a program
- Programs may be appended to each other in memory

Minimum Digital Group System Configuration

- 26K Memory (includes 6K user memory)
- Phi-decks or floppy disks
- 64 character TV readout and cassette interface
- I/O board
- Z80 CPU

System software will also support:

- Floppy disks and tape operating in one system
- Digital Group printer or similar hardcopy devices
- Digital Group keyboard

Logic Statements

IF . . . ELSE . . .
ON . . . GOTO . . .
GOSUB
GOTO
LOOP . . . NEXT
WHILE . . . CONT

LIST expr 1: expr 2, expr 3, expr 4
expr 1 = output DEVICE
expr 2 = beginning LINE NO
expr 3 = ending LINE NO
expr 4 = number of lines per page

File Input/Output Statement Example

READ expr 1, expr 2: variable list
expr 1 = required file number
expr 2 = logical record to be read

READ 1, 37: A, B, FRED, CHECKNO, DATE

Note: A, B, . . . may be strings, variables or entire arrays.

Formatted Print (selected options)

Bn — n blanks
Ln — left-justify in a field on n characters
Ln.m — left-justify
Rn - right justify
Rn.m
n(. . .) — format symbols enclosed in parentheses will be executed n times

Commands/Statements

ASSIGN	Assign a file number to a disk file
BRK	Break
BYE	Terminate OPUS
COM	Compile
CONT	Continue
CSAVE	Compiled save
DEL	Delete
DIM	Dimension
DISC	Enable a disk
FILE	End of file
ELSE	Conditional block execution
END	Terminate program
GET	Load source program
GOSUB	Execute a no-parameter subroutine
GOTO	Unconditional jump
IF	Conditional block execution
IN	Declare input device
INPUT	Request data (with prompt)
KILL	Purge file
LIB	List library of files or programs
LIN	Generate line feeds
LIST	List program
LOAD	Load an object program
LOOP	Execute a section of code a specified number of times
NEW	Clear program area
NEXT	End of loop
ON	Execute a specific block of code

OPEN	Create a data file on disk
OUT	Declare output device
PF	Print formatted
PRINT	Output data
PURGE	Delete all data in a file logical record
READ	Read data from a file
REN	Renumber
RETURN	Exit from subroutine
RUN	Start execution of an object program
SAVE	Save a source program
SCAN	Read data contained in the program
SPA	Generate spaces to the output device
STUFF	Write a byte into a memory location
THEN	Specify arguments
TO	Maximum number of loops in a loop operation
WHILE	Execute a section of code while a condition is true
WRITE	Write data on a file

Functions:

ABS	Absolute value
ASC	ASCII character of number
ATN	Arctangent
COS	Cosine
DATE	Day, month, year
EOF	End of file on disk or tape
EXP	Value of e
FETCH	Returns the contents of a memory byte
FILE	Returns the specifications of a disk file
LEN	Length of a variable
LOG	Natural log
NONE	Returns a value specifying if data was entered in last *input* statement
NOT	Logic negative
NUM	Convert to numeric form
RND	Random number
SGN	Sign
SIN	Sine
SQR	Square root
STR	String format
TAN	Tangent
TRU	Truncate to integer

Operators

+	Addition
-	Subtract or negation
/	Divide
*	Multiply
<	Less than
< =	Less than or equal
=	Assign a value to a variable
> =	Greater than or equal
>	Greater than
#	Determine if two expressions are equal
&	Concatenate two strings
AND	Logical "and" of true/false condition
IS	Determine if two expressions are equivalent
MAX	Maximum
MIN	Minimum
OR	Logical "or" of true/false condition
↑	Raise one number to the power of another
(	Expression/substring/matrix left delimiter
)	Expression/substring/matrix right delimiter
,	List or operation delimiter
:	List delimiter within an operation
;	Statement delimiter
REM	Remark
[	Left hand delimiter of a block of code
]	Right hand delimiter of a block of code
\	Delimits block of code

OPUS/TWO

(Upwards compatible from OPUS/ONE)

Extended Capabilities

ASCII program files (from a text editor) are supported as input

Machine code relocatable files are supported

Dimensioned files are supported — similar to embedded key files

ERR	Trap errors in program
EXT	Extended subroutine call
GLOBAL	Similar to common
CALL	Call a subroutine
@	Define a function
SUB	External subroutine declaration (may reside on disk/tape)
SEEK	Search for matching substring within a string

Extended File Commands

SEQ	Get next logical record number
ESEQ	Get next empty record
REC	Get next logical record
TAG	File label processing
SWAP	Swap data file media
MCALL	Call machine code subroutine
OLAY	Sets up overlay area
DATA	Stores executable data directly into a matrix
POP	Causes program execution to abnormally leave a block

Order Code	Description	Price
OPUS-1	OPUS/ONE	$65.00
OPUS-2	OPUS/TWO	110.00
DOC-OPUS	OPUS/ONE and TWO manual	12.50

Z80 ASSEMBLER II

Z80 Assembler II is an updated version of Z80 Assembler I. Its full capabilities are shown in the following tables:

Order Code	Description	Price
Assembler II	Z80 Assembler II	$15.00

Executive Commands:

LIST	List all source statements
LIST X	List Line X
LIST X Y	List from Line X to Line Y
ASSM	Assemble source statments
ASSME	Assemble, but list only statements with errors
ASSML	Assemble, keeping in label table any label containing a period
ASSMLE	Same as ASSML, but listing only errors
NEWF	Clear existing file
DELT X	Delete Line X
DELT X Y	Delete from Line X to Line Y
RSEQ	Resequence source with starting Line 100, 10 steps between lines
RSEQ X	Resequence source with starting Line X, 10 steps between lines
RSEQ X Y	Resequence source with starting Line X, Y steps between lines
HEX	Display all output in Hexadecimal mode
OCT	Display all output in split Octal mode
SAVES	Save source code on cassette
SAVEO	Save object code on cassette
LOADS	Load source code from cassette
EXEC	Execute object code - assumes no "org" or "st" statement used
EXEC X	Execute object code - x=address in Hex (4digits) or Oct (6 digits) - neither with a "H" or "Q" suffix
LTABL	Print label table
MERGE	Merges existing file to file coming in from cassette similar to loads, but merges with existing file by line number
ZERO	Zero all memory above source file

Variables:

123345	Split Octal
1234H	Hexadecimal
0FFCH	Hexadecimal
123456O	True Octal
123446D	Decimal
'A'	ASCII value of A, MSB=0
"A"	ASCII value of A, MSB=1
$	Value of first byte on line where $ exists - changes for every line
LABEL	Value of label
<LABEL	Least significant byte of label
>LABEL	Most significant byte of label
+ or -	All expressions may have as many + or - as buffer allows (64 Chrs/Line)

Pseudo ops

ST X	Assemble code for address X, but do not put code there
ORG X	Assemble code for address X, and put code there
DC	Data constant (8 bit value)
DB	Same as DC - DB or DC arguments are separated by commas. Strings of ASCII characters may be quoted with "or".
DW	Data word (16 bit value) may be separated by commas
DS	Data storage. leaves argument value of bytes unchanged
EAN	Stops assembly at this point, not necessary if complete assembly desired

NEW SOFTWARE PRODUCTS

ASSMEDIT — Copyright, 1977, by Edwin Anderson.

DGI's Assembler I Source File Editor. Permits insertion, deletion, and addition of material in a line of source code without retyping the whole line. Also locate and change all (some) occurrences of a tag, etc. **Z-80 only.**

SUPER EDITOR-FORMATTER — Copyright, 1977, by Fred J. Greeb.

Z-80 only. A complete rewrite of the original "Classy Text Editor" by Fred Greeb including more editing commands and a whole new set of formatting commands which can be used for "word processing" type of operations.

Z-80 RELOCATER — Copyright, 1977, by Joseph E. Willis & Helen W. Gottschalk, Harshaw Chemical Co.

Object-code relocation program. Will relocate a running program from one area of memory to another. This can be useful for adapting programs written for non-Digital Group systems.

BUSINESS 100 — Copyright, 1977, by Dave Musselman.

A point-of-occurrence data collection and processing tool for business use. Has features found only on 10 kilobuck registers. Can title and change your products, services, employee names. Self-configuring to your system. Displays 32/64 TVC and runs in 8K. Cash register section collects data, bookkeeping section posts per sale and accounting section displays results in daily, weekly and monthly reports (current updates). Records are stored on audio-cassette tapes.

MICRO-CHESS — Copyright, 1977, by Peter Jennings.

Fantastic game program which, we are told, plays at a very advanced level. It can be set to play "blitz" chess with 10-second moves and it IS beatable!! Given no limit for playtime . . . and it plays a ROUGH game!! **Z-80 only.**

MAXI-BASIC GAME SET 8

ROAD RACE — Copyright, 1977, by Jeff Kearns. A real-time driving game where the player is graded according to "driving" ability.
QUBIC — 3-D "Tic-Tac-Toe". An adaptation of the HP version by Holden Caine.
FIENDS & SINNERS — A strategy game of you against the computer to force opponent to make desired moves. Adapted by Holden Caine.

Z-80 LUNAR LANDER — Copyright, 1977, by Clark Calkins.

A real-time simulation of a lunar landing complete with all instrumentation and controls.

MAXI-BASIC GAME SET 9

HANGMATH — Numeric cryptograms with multiplication problems by Gary Gagno.
OTHELLO — The toughest board game we have seen of you-against-the-computer for control of the board, written in Maxi-BASIC. Adapted by Holden Caine.
A,E,I,O,U AND SOMETIMES Y — A guessing game of words without vowels by Jim Felando.

Announcement

As of November 1, 1977, no tapes for re-recording purposes (32 to 64 TVC) will be accepted by The Digital Group. All future 64 TVC tape requirements will have to be ordered as *new* tapes. All tapes currently at DGSS for re-recording will be honored and sent within the 30-day period as listed in Flyer #1 - 9 Consolidated.

Order Code	Description	Price
ASSMEDIT		$7.50
ED-FORM1	Editor-Formatter, Cassette and User's Manual	10.00
ED-FORM2	Editor-Formatter Technical Manual and 8080 Source Listing	7.50
ED-FORM3	Editor-Formatter Cassette, User and Technical Manual	15.00
Z80-RELO		10.00
BUS-100		15.00
MICRO-CH		15.00
Z80-LUNAR		7.50
MB-GS8		7.50
MB-GS9		7.50

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. A 10% COD deposit is required with all COD orders.

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.

ORDER POLICY

Sequential order delivery will be maintained at all times.

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.

FOREIGN ORDERS

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

RETURNED GOODS

Should you return merchandise for any reason, please include your name and address and your order number inside the package.

DELIVERY LEAD-TIMES

Unless otherwise specified, expected delivery lead-times are less than 30 days after receipt of order. However, The Digital Group is many times dependent on its suppliers for timely delivery and unexpected delays can occur from time to time. Should such a delay occur on your order, you will be notified.

order form

THE DIGITAL GROUP ORDER FORM

Name _____ Date _____

Address _____

City _____ State _____ Zip _____

Quantity	Order Code	Description	Price Each	Amount Extended

Total	
Sales Tax (Colorado residents)	
Total	

Amount Enclosed _____

BankAmericard or Mastercharge number:

Expiration Date: _____

Interbank number: (M/C only)

Signature: _____

the digital group™

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

DIGITAL GROUP PRICE LIST

(Effective November 1, 1977)

Code	Description	Kit	Assem.
Systems			
Z80-3BD	3-board system with Z80-CPU, IO-F, TVC-F and MB-1 (2K total memory)	$475.00	$695.00
Z80-4BD	4-board system with Z80-CPU, IO-F, TVC-F, MEM-8 and MB-1 (10K total memory)	675.00	945.00
System Options			
8080-SUB	Substitute 8080 CPU — deduct	(50.00)	(50.00)
6800-SUB	Substitute 6800 CPU — deduct	(50.00)	(50.00)
6500-SUB	Substitute 6502 CPU — deduct	(100.00)	(100.00)
MB2-SUB	Substitute Standard Motherboard	15.00	45.00
System Packages			
Z80-SYS1	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)	895.00	1295.00
Z80-SYS2	Complete as above, with 18K	1095.00	1545.00
Z80-SYS3	Complete Z80-SYS2 plus Key1-COMP, Mon9-COMP, PHI4-COMP	2045.00	2545.00
Z80-SYS4	Complete Z80-SYS2 plus KEY1-COMP, MON9-COMP, PHI4-COMP, PT96-COMP	2675.00	3255.00
Z80-SYS5	Complete Z80-SYS2 plus KEY1-COMP, MON9-COMP, DSS-COMP2, PT96-COMP	3445.00	3995.00
Z80-SYS6	Complete Z80-SYS2 plus KEY1-COMP, MON9-COMP, DSS-COMP1, PHI4-COMP, PT96-COMP	3545.00	4195.00
Z80-SYS7	Complete Z80-SYS2 plus KEY1-COMP, MON9-COMP, DSS-COMP2, PHI4-COMP, PT96-COMP	3995.00	4695.00
Z80-SYSHAM	Complete Ham System	1545.00	2045.00
System Package Options			
SYS-MEM8	Additional 8K memory boards when purchased with SYS1, 2, 3 or 4	ea. 200.00	ea. 270.00
SYS-MEM8C	Additional 8K 300 ns low-power memory boards when purchased with either SYS1, 2, 3 or 4	250.00	320.00
91LO2C-10S	Substitute 300 ns low-power memory in SYS1	62.50	62.50
91LO2C-18S	Substitute 300 ns low-power memory in SYS2, 3 or 4	112.50	112.50
SYSOPT-32A	Substitute 32K board in system 2 thru 7	375.00	425.00
SYSOPT-32B	Add 16K to SYS5, 6 or 7	375.00	425.00
SYSOPT-16A	Substitute 16K board in system 2 thru 7	N/C	N/C
SYS-MEM32	Add 1 full 32K board to a system order	795.00	895.00
SYS-MEM16	Add 1 full 16K board to a system order	425.00	N/A
PWR-18SUB	Substitute 18 amp power supply (includes CB-CPU-OP1)	40.00	40.00
SYSOPT-64	Substitute 64-character TV readout	10.00	10.00
SYS-PHI2	Delete 2 PHI-1's from SYS3 or SYS4 deduct	(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.

Memories			
MEM-8	8K memory boards, 500 ns 2102-1's	225.00	295.00
MEM-8C	8K memory boards, 300 ns low-power 2102LHPC	275.00	345.00
MEM-0	8K memory board as above without memory IC's	50.00	N/A
1702-F	1702-A 4K EPROM board with 4K 1702A's (unprogrammed)	299.00	345.00
1702-0	1702A 4K EPROM board without 1702A's	75.00	105.00
1702-PCC	1702A PC board & connector	35.00	N/A
MEM-32	32K memory board	845.00	945.00
MEM-16	16K memory board	445.00	N/A
MEM16-32	16K to 32K upgrade	425.00	N/A
Peripherals			
COMM-1	Communications interface with parts for one I/O channel	95.00	N/A
COMM-4	Communications interface with four I/O channels	145.00	195.00
HAM1	Ham interface board	195.00	295.00
IO-F	Complete I/O card — four 8-bit input ports and four 8-bit output ports	65.00	95.00
KEY-1	Capacitance keyboard with numeric pad and cursor control keys and interface cable	N/A	150.00
KEY1-COMP	Capacitance keyboard as above, cabinet and cable	180.00	205.00
KEY2	Mechanical keyboard	N/A	79.50
MON-9	9" monitor	N/A	175.00
MON9-COMP	9" monitor with Digital Group cabinet and cable	199.50	215.00
PT96-COMP	96-column printer, power supply, cables and cabinet	595.00	675.00
CB-PT96	Cabinet — 96-column printer	75.00	85.00
PT96-COMP2	96-column printer, power supply, and cable	535.00	595.00
TVC-F	TV readout and audio cassette interface	130.00	195.00
TVC-64	Full 64-character TV readout and audio cassette interface	140.00	205.00
TVC-64UPG	Upgrade kit from TVC-F	65.00	N/A

VOTRAX1	Votrax Voice Synthesizer board	495.00	595.00

Storage Devices

PHI-F	Digital cassette storage interface for four drives	135.00	195.00
PHI-1	Digital cassette storage drive	N/A	115.00
PHI2-COMP	Two digital cassette storage drives, PHI-F, cabinet, cables	435.00	520.00
PHI4-COMP	Four digital cassette storage drives, PHI-F, cabinet, cables	645.00	730.00

Standard Disk Subsystem Components

DSS-INT1	Interface card	195.00	245.00
DSS-DRIN1	Standard 8" floppy drive (Innovex)	N/A	550.00
DSS-DRSH1	Standard 8" floppy drive (Shugart)	N/A	550.00
DSS-DRPT1	Standard 8" floppy drive (Pertec)	N/A	550.00
DSS-PWR2	Power supply for two standard drives	65.00	85.00
DSS-CB1	Single drive cabinet	85.00	N/A
DSS-CB2	Dual drive cabinet	105.00	N/A
DSS-CBLPK1	Complete cables for single drive	N/A	60.00
DSS-CBLPK2	Complete cables for 2-drive	N/A	80.00
DSS-CBLPK3	Complete cables for 3-drive	N/A	100.00
DSS-CBLPK4	Complete cables for 4-drive	N/A	120.00

Complete Disk Subsystems

(including interface, power supply, cabinet, cables as appropriate)

DSS-COMP1	Single drive	895.00	995.00
DSS-COMP2	Dual drive	1395.00	1545.00
DSS-COMP3	Three-drive (two cabinets)	1995.00	2195.00
DSS-COMP4	Four-drive	2495.00	2695.00

Mini-Disk Subsystems

DSM-INT1	Interface card	195.00	245.00
DSM-DRSH1	Mini-floppy (5") drive (Shugart)	N/A	345.00
DSM-PWR2	Power supply for two mini-floppies	65.00	85.00
DSM-CB1	Single mini-drive cabinet	65.00	N/A
DSM-CB2	Dual mini-drive cabinet	85.00	N/A
DSM-CBLPK1	Complete cables for single mini-drive	N/A	60.00
DSM-CBLPK2	Complete cables for 2-mini-drives	N/A	80.00
DSM-CBLPK3	Complete cables for 3-mini-drives	N/A	100.00
DSM-CBLPK4	Complete cables for 4-mini-drives	N/A	120.00

Complete Mini-Disk Subsystems

DSM-COMP1	Single drive	675.00	725.00
DSM-COMP2	Dual drive	995.00	1145.00
DSM-COMP3	Three drives — two cabinets	1495.00	1695.00
DSM-COMP4	Four drives	1820.00	2045.00

Floppy Subsystems Accessories

DSS-F1H	One 8" hard sectored floppy	N/A	7.00
DSS-F5H	Five 8" hard sectored floppies	N/A	30.00
DSS-F10H	Ten 8" hard sectored floppies	N/A	50.00
DSS-F1S	One 8" soft sectored floppy	N/A	7.00
DSS-F5S	Five 8" soft sectored floppies	N/A	30.00
DSS-F10S	Ten 8" soft sectored floppies	N/A	50.00

Real-World Interface

RW-MBPS	Motherboard and power supply	95.00	115.00
RW-PARCPU	Parallel CPU interface	70.00	85.00
RW-CABINET	Cabinet	49.95	74.95
RW-BASE	Above three items complete	199.50	260.00
RW-MB-PC	Motherboard PC board only	45.00	N/A
RW-AC8	AC controller, complete	125.00	150.00
RW-AC8-0	AC controller w/o eight 2N6342/3A's and eight MCS-2's	49.95	N/A
RW-DC8	DC controller, complete	65.00	79.50
RW-DC8-0	DC controller w/o eight 2N6055's	40.00	N/A
RW-PROT1	Prototyping card, complete	24.95	N/A
RW-PROTPC	Prototyping PC board	19.95	N/A

Power Supplies

PWR-6	5V at 6 amps and PWR-0	95.00	125.00
PWR-12	5V at 12 amps and PWR-0	135.00	165.00
PWR-18	5V at 18 amps and PWR-0	175.00	205.00
PWR-0	-5V at 1 amp, -12V at 1 amp, +12V at 1 amp	45.00	60.00

Cabinets

CB-CPU	Standard CPU cabinet w/6 or 12 amp power supply plate	145.00	N/A
CB-CPU-OP1	Substitute 18 amp power supply mounting plate	N/C	N/A
CB-MON9	9" monitor cabinet	35.00	N/A
CB-CAS2	Dual cassette storage system cabinet	45.00	N/A
CB-CAS4	Quad cassette storage system cabinet	45.00	N/A
CB-CAB-T2	Dual drive — spare top	20.00	N/A
CB-CAB-T4	Quad drive — spare top	20.00	N/A
CB-KEY1	Keyboard cabinet for KEY1	35.00	N/A
CB-KEY0	Keyboard cabinet w/blank insert	35.00	N/A
BB-STD	Standard Basic Box	45.00	N/A
BB-COMP	Complete Basic Box	95.00	N/A
PP-1	Peripheral Plate	19.50	N/A

Accessories

PROT-IOC	Prototyping w/w card for I/O bus w/connectors	N/A	38.00
PROT-MEMC	Prototyping w/w card for memory bus w/connector	N/A	35.00
EXT-3	Three card extender card set	55.00	75.00
CAS-1	Superscope C-104 audio cassette recorder	N/A	119.50
SYS-BIND	Manual binder	N/A	6.00
CAB-1	Cabling kit and crimp tool	43.95	N/A
C-DATA	Certified data cassette	N/A	7.00
C-DATA5	Five certified data cassettes	N/A	32.50
C-DATA10	Ten certified data cassettes	N/A	60.00
PAD-STD	Paddlecard — standard	5.95	N/A

PAD-PROT	Paddlecard — dip proto	5.95	N/A
PAD-20MA	Paddlecard — 20 mA current loop (w/parts)	7.95	N/A
PAD-232-1	Paddlecard w/8 RS-232 lines	30.00	N/A
PAD-232-4	Paddlecard w/32 RS-232 lines	75.00	N/A
CONN-22-5	Five 22-pin dual, three PAD-STD's, two PAD-PROT	45.00	N/A
CBL-VID	6' video cable	N/A	6.95
CBL-PHI	6' Phi-deck cable for up to four drives and 36-pin dual w/w connector	N/A	29.95
CBL-PT96	4' printer cable	N/A	24.95

Test Equipment

PROBE-DET	TTL Logic Detector Probe	18.95	24.95
PROBE-INJ	TTL Logic Injector Probe	18.95	24.95
PROBE-PAIR	Both probes	37.00	49.00
PROBE-FREQ	Frequency Counter in a probe	N/A	99.50
DVM-S	Digital Voltmeter	N/A	59.50

Documentation — Hardware

DOC-Z80CPU	Complete Z80 CPU documentation including bus structure and operating system	N/A	7.50
DOC-ZILOG	Zilog's Z80 technical manual	N/A	7.50
DOC-Z80SYS	Complete Z80 system documentation (DOC-Z80CPU, DOC-ZILOG, DOC-TVC, DOC-I/O, DOC-MEM, DOC-PWR0)	N/A	15.00
DOC-BB&PP	Basic Box and Peripheral Plate	N/A	1.00
DOC-CASSTD	Standalone cassette interface	N/A	1.00
DOC-COMM	Communications interface	N/A	2.00
DOC-DSM	Mini-disk subsystem	N/A	5.00
DOC-DSS	Standard disk subsystem	N/A	5.00
DOC-HAM1	Ham interface	N/A	3.00
DOC-I/O	I/O documentation	N/A	1.00
DOC-MEM8	8K memory board documentation	N/A	1.00
DOC-MEM32	32K memory board	N/A	1.00
DOC-PHI	Cassette storage system	N/A	7.50
DOC-PT96	96-column printer	N/A	5.00
DOC-PWR0	3 voltage supply	N/A	1.00
DOC-TVC	TV readout and audio cassette interface	N/A	1.00
DOC-TVC64	64-character TVC	N/A	1.00
DOC-VOTRAX	Speech synthesizer	N/A	10.00
DOC-1702A	1702A EPROM memory board	N/A	1.00

Software: (Documentation is included with all packages)

ASSM II	Assembler II	15.00
BUS-1	Business BASIC	20.00
DOC-BUS1	Business BASIC documentation	5.00
CONVERS	CONVERS	25.00
DOC-CONVERS	CONVERS documentation	12.50
OPUS-1	OPUS/ONE	65.00
OPUS-2	OPUS/TWO	110.00
DOC-OPUS	OPUS/ONE and TWO documentation	12.50
WOPROC	Digital Group Word Processor	27.50
DOC-WOPROC	Word Processing documentation	10.00
VDEMO1	Speech Synthesizer sample audio demonstration tape	5.00
VOT1	Speech Synthesizer Talking BASIC	10.00
VOT2	Speech Synthesizer Talking CW	10.00
VOT3	Speech Synthesizer Latin & Spanish	10.00
VOT4	Speech Synthesizer voice input software (available December)	15.00
ASSMEDIT	Editor for Assembler I	7.50
BUS-100	Business-100	15.00
ED-FORM1	Editor-Formatter cassette and user's manual	10.00
ED-FORM2	Editor-Formatter technical manual & 8080 source listing	7.50
ED-FORM3	Editor-Formatter cassette, user & technical manual	15.00
MB-GS8	Maxi-BASIC Games Set 8	7.50
MB-GS9	Maxi-BASIC Games Set 9	7.50
MICRO-CH	Micro-Chess	15.00
Z80-LUNAR	Z80 Lunar Landing	7.50
Z80-RELO	Z80 Relocator	10.00

frequency counter probe
digital group - votrax
real world interface
digital voltmeter
ham board

Super Software

convers
opus I & II
assembler two
business basic
word processing

The Digital Group
P.O. Box 6528
Denver, Co. 80206
(303) 777-7133

first class mail
u.s. postage
paid
permit no. 845
DENVER, CO.

first class

the digital group