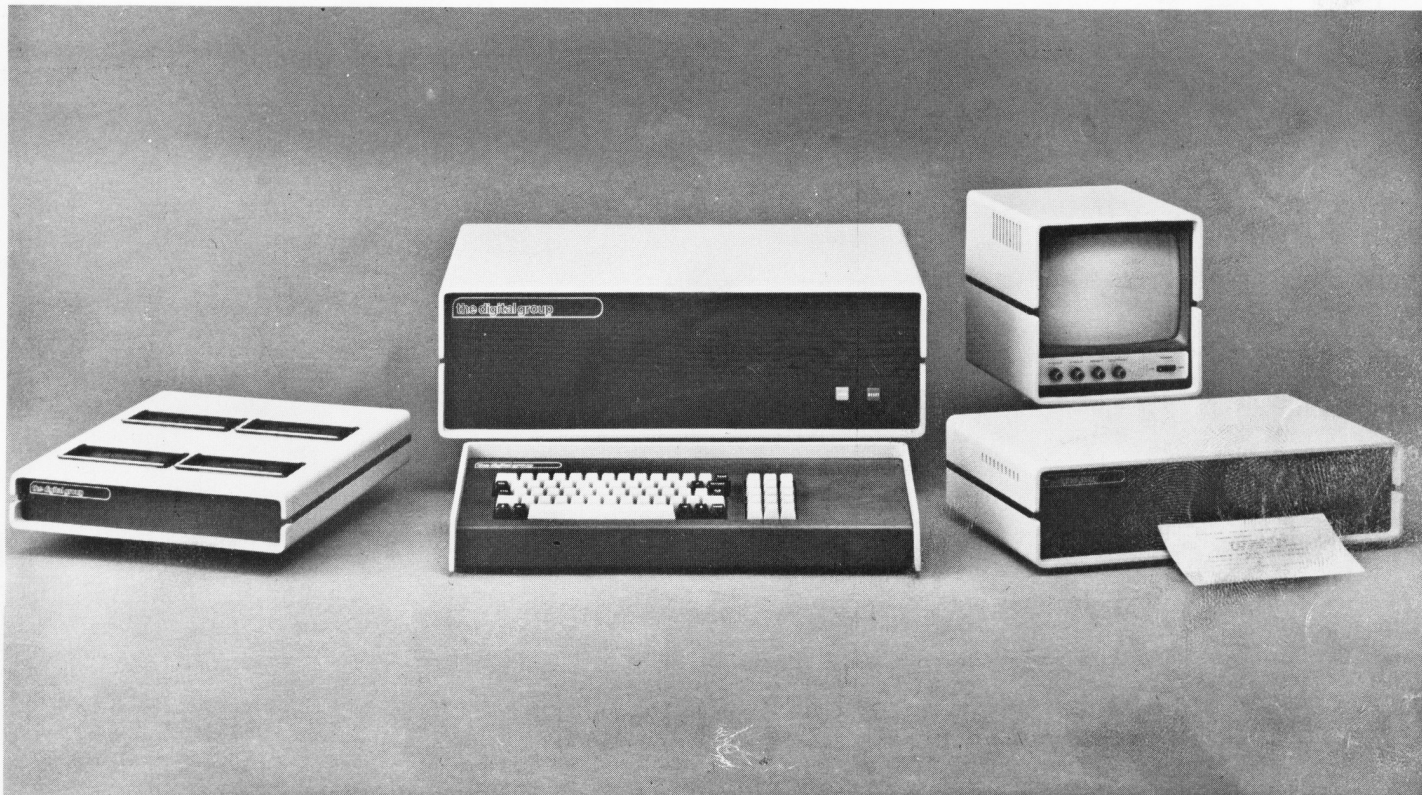# the digital group INC.

flyer number 9

SYSTEM 4

Greetings!

We've packed this newest flyer with our latest series of major announcements . . . . and we hope you'll find all the new products we're offering as exciting as we believe them to be.

The Digital Group will be on the road quite a bit this spring and summer, and we're looking forward to meeting a good many of you in person at one of the computer conventions. In the meantime, we hope this flyer (and all the upcoming ones) will answer any questions you have about our products.

We enjoy doing business with you.

Happy Spring.

CONTENTS:

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)

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	Description	Kit	Assembled
Z80-SYS4	Z80 System 4	$2675.00	$3255.00

DIGITAL GROUP 96-COLUMN IMPACT PRINTER

DIGITAL GROUP 96-COLUMN IMPACT PRINTER

Now, that small computer system you own or have been considering for personal or business use suddenly becomes a lot more usable — with the addition of a full-size impact printer from the Digital Group. A printer designed for small computers that need big output (like yours).

With the Digital Group printer, you can print your heart out . . . and it won't cost an arm and a leg. The Digital Group printer is available for less than $500. That's right — $500.

Just look at these specifications:

Fast — 120 characters per second
96 characters per line
12 characters per inch horizontal
6 lines per inch
Makes up to 4 copies simultaneously
Character set and pitch variable under software control — double width characters, etc.

5 x 7 character matrix
Ribbon has built-in re-inkers for a life of 10,000,000 characters
Paper can be either a standard 8½-inch roll, fanfold or cut page
Interfaces to 8-bit parallel ports

INTERFACE — Using Molex connectors, the interface card may be connected to existing I/O ports (1 parallel, 8 bit, 5v TTL data port in and 1 out). Interface is independent of any given bus structure.

POWER SUPPLY — Transformer and filter cap mount exterior to the card. Everything else is on the interface card, thereby requiring no power from the host system. A +40v supply runs the printer head while the 5v supply powers the card.

*Power supply circuit is on interface card.

2

PRINTER OUTPUT SAMPLES (actual size)

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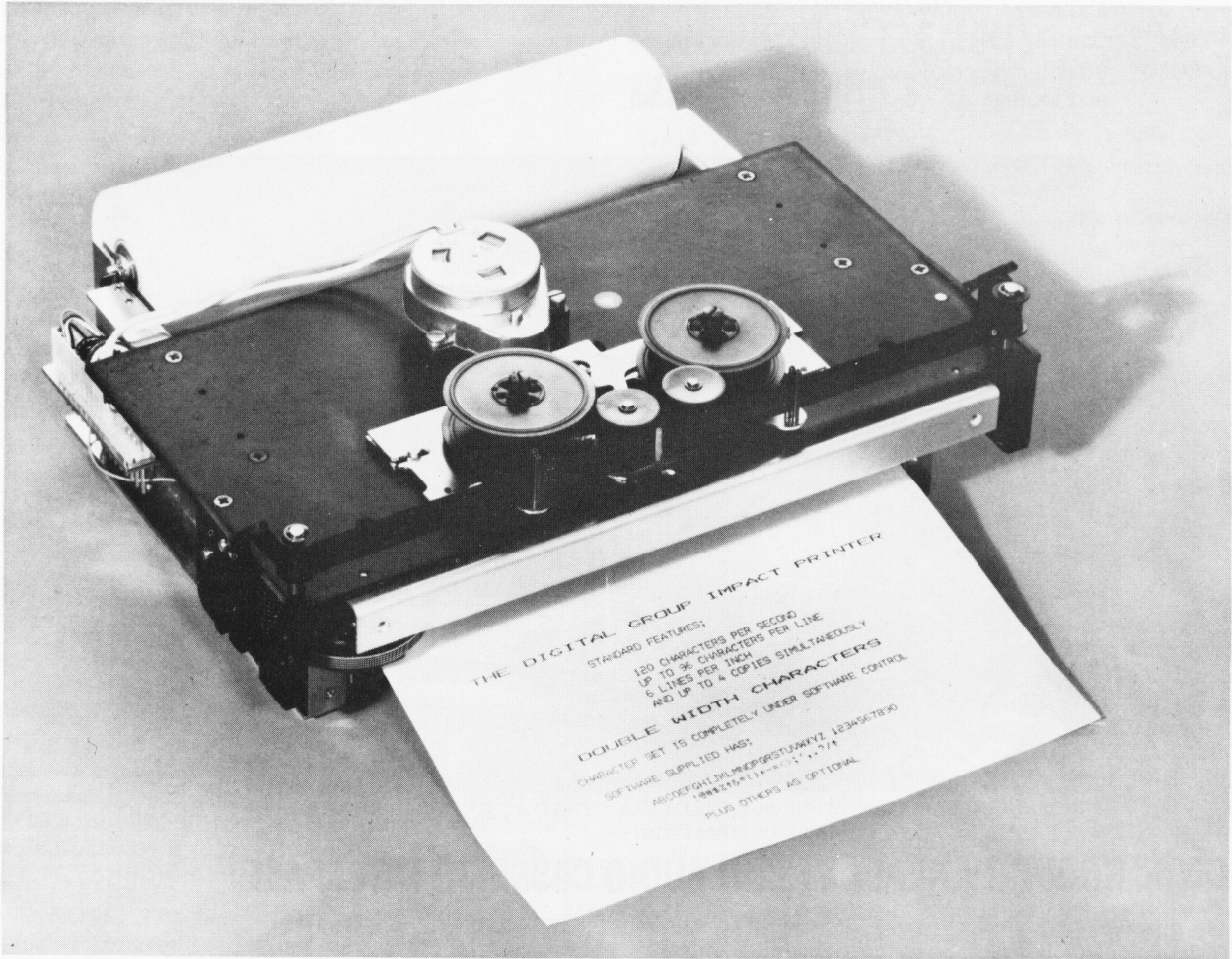

DIGITAL GROUP 96-COLUMN IMPACT PRINTER (without cabinet)

```
TEST
TEST
TEST
TEST
TEST
TEST
TEST
TEST
TEST
TEST
TEST
TEST
TEST
TEST
```

SOFTWARE SUPPORT — The printer is software driven. All interface software located in RAM of the CPU. Lower case ASCII converted to upper case letters under software control, therefore enabling use of upper case only. Printer uses a 5 x 7 character matrix. Character fonts located in RAM. It is possible to change character set if desired.

PAPER ADVANCE — Advancing paper is accomplished through the use of an independently controlled solenoid.

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LINE OPERATION — As the Printer's character set is completely under software control, you may select output either with the top line printing first (which appears to be coming out of the printer upside-down) or bottom line first (which appears to be coming out of the printer right-side up) by re-loading the print-character buffer.

96-COL PRINTER INTERFACE BOARD

Mounts in optional cabinet
Includes all parts, connectors and wire
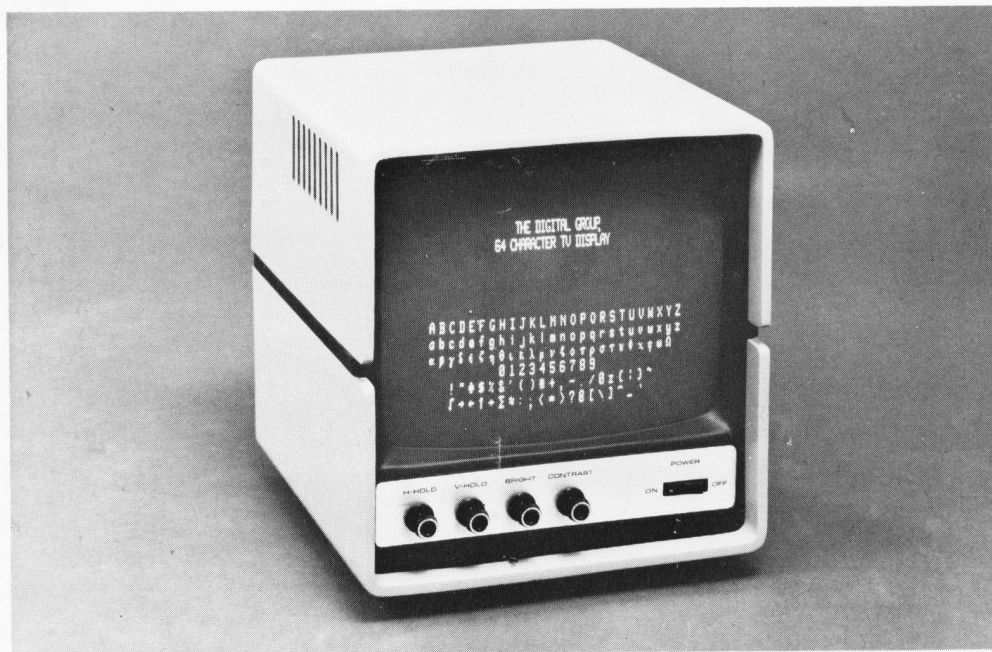
96-COLUMN PRINTER INTERFACE BOARD

Order Code	Description	Prices Kit	Assembled
PT96	96 column printer and interface	495.00	545.00
PT96-PS	96 column printer and power supply	30.00	na
CB-PT96	Cabinet — 96 column printer	75.00	85.00
PT96-COMP	96 column printer, power supply and cabinet	595.00	675.00
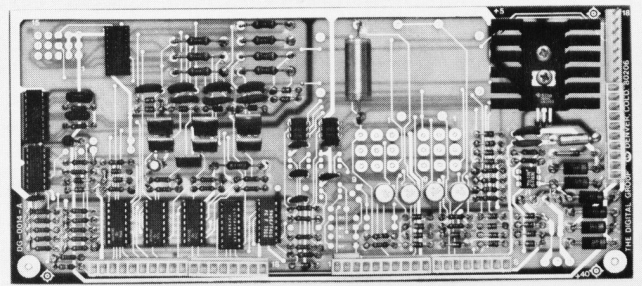
DIGITAL GROUP 64 CHARACTER TV DISPLAY

DIGITAL GROUP TV READOUT AND AUDIO CASSETTE INTERFACE

We are please 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:
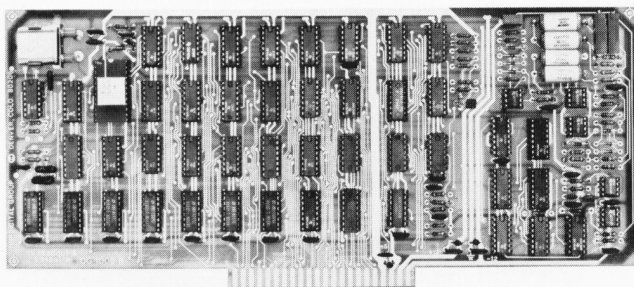
1024 Character TV Readout

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

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.)

4

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, potentionmeters 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

Compatability:

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

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

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.

		Prices	
SYSOPT-64	Substitute 64-character TV Readout	10.00	10.00
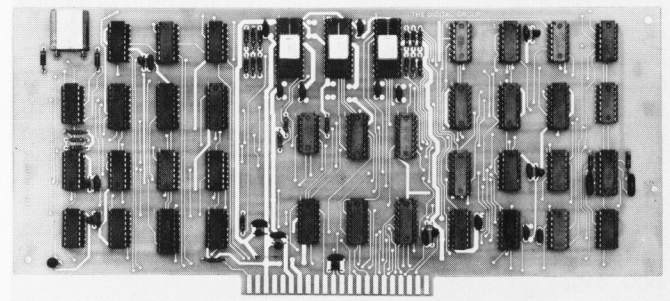
4096 PICTURE-ELEMENT COLOR GRAPHICS

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.

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, potentionmeters, 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	Prices Kit	Assembled
GRAPH-64	64 by 64 color graphics interface	175.00	225.00

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ACCESSORIES

In response to your requests, The Digital Group is adding a line of accessories which we hope will help make your computing more enjoyable.

DATA CASSETTES

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

CASSETTE TAPES

Order Code	Description	Price
C-DATA	Certified Data Cassette	7.00
C-DATA5	5 Certified Data Cassettes	35.50/5
C-DATA10	10 Certified Data Cassettes	60.00/10
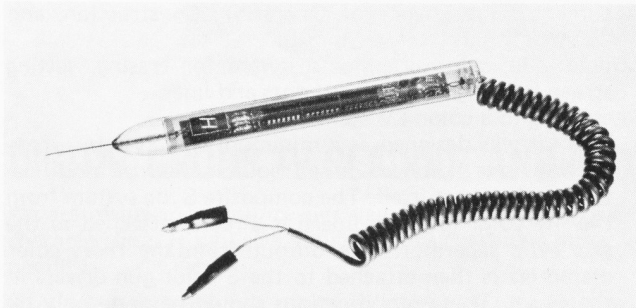
TTL LOGIC DETECTOR
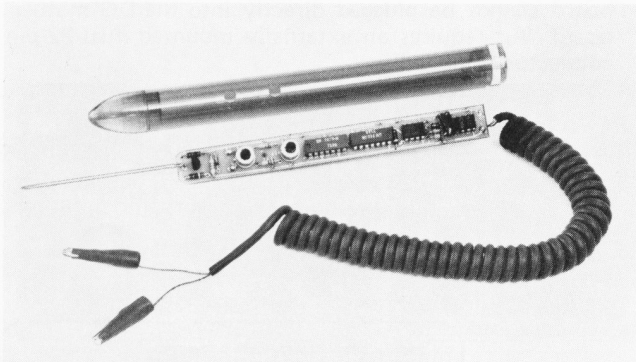
TTL LOGIC INJECTOR

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.

		Prices	
Order Code	Description	Kit	Assembled
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.

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	Palle 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

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	Assembled 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

FLYER NEWS

What is contained in an assembled system? Why do they cost more than each assembled component separately?

The reason a System 3 (or 4) costs more than "the sum of their parts" is very simple — you are getting more. All cables and interconnections are included. In addition, an extensive testing and burn-in procedure with all system components operating together is performed to help assure that your assembled system will operate reliably by merely "plugging it in".

CLEARINGHOUSE CONVERSION

All subscribers to our original clearinghouse publication are being converted over to a full 1-year subscription to JUDGE at no charge.

DEMAND

The Digital Group's products are becoming well known and accepted in the marketplace. However, the demand for our products is increasing faster than we have been able to increase either our production (or that of our suppliers). Our current lead times (as of April 15, 1977) are approximately as follows: Naked Systems = 4-6 weeks, Peripherals = 8-10 weeks, Complete Systems with Cabinets = 8-10 weeks.

A few manufacturers are now leaving the personal market having picked up the "easy money". The Digital Group has been and is fully committed to the personal computer market.

We have continually rejected the "charge-what-the-market-will-bear" approach and felt it was more appropriate to try and live with the supply problems.

We continue to order ever-larger quantities of parts and products, expand our facilities, add people and phone lines, parallel development efforts, upgrade our products and on and on. We honestly believe that our systems offer by far the best value available today. However, due to our "conservative" approach you may have to wait a little longer to obtain our products. We think you'll find the wait more than worthwhile. In the meantime, we appreciate your patience and support.

APPLICATION NEWS

From time to time we have requests from magazine editors about actual uses and applications about how our machines are utilized. If you have a unique, or even not so unique, application for your Digital Group equipment, please drop a line to the marketing department at the D.G. In turn we shall pass them on to the appropriate magazine editors.

PAD-20MA
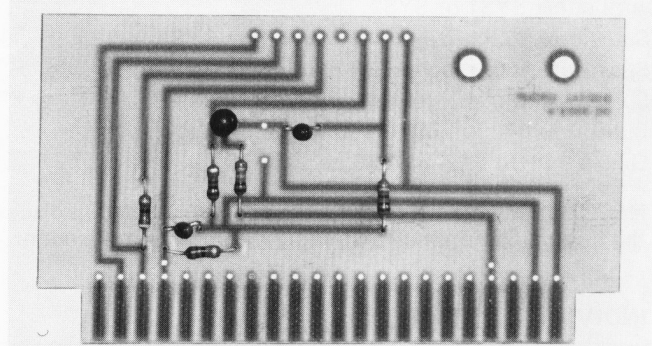
PAD-PROT and PAD-STD

PAD-RS232

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price list

effective 4/15/77

Description	Order code	Prices Kit	Prices 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 either SYS1 or SYS2 — each.	SYS-MEM8	$200.00	$270.00
Additional 8K 300ns low-power Memory boards when purchased with either SYS1 or SYS2.	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.	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:

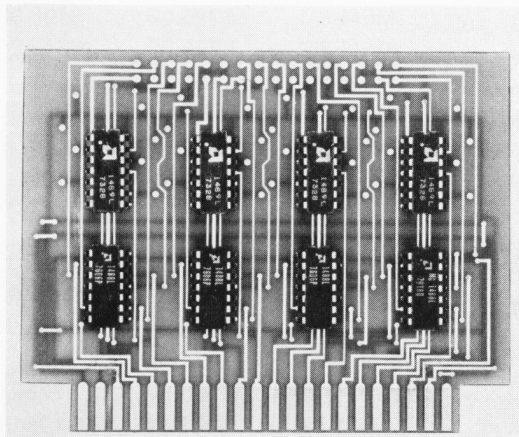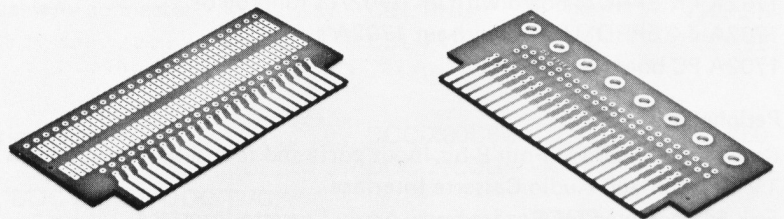| Description	Order code	Kit	Assembled
Memories:			
8K 500 nanosecond 2102-1's	MEM-8	$225.00	$295.00
8K 300 nanosecond low-power 91L02c's	MEM-8C	$275.00	$345.00
8K memory board as above without memory IC's	MEM-0	$50.00	na
1702A 4K EPROM board with 4K 1702A's (unprog'd).	1702-F	$299.00	$345.00
1702A 4K EPROM board without 1702A's	1702-0	$75.00	$105.00
1702A PC board & Connector	1702-PCC	$35.00	na
Peripherals & I/O			
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	$545.00
96-Column Printer Printer Power Supply 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

Power Supplies:

Description	Order code	Kit	Assembled
5V at 6 Amps and PWR-∅ PWR-6	$95.00	$125.00
5V at 12 Amps and PWR-∅ PWR-12	$135.00	$165.00
5V at 18 Amps and PWR-∅ PWR-18	$175.00	$205.00
-5V at 1 Amp, -12V at 1 Amp, +12V at 1 Amp . . . . .PWR-∅	$45.00	$60.00

Cabinets:

Description	Order code	Kit	Assembled
Standard CPU cabinet . . . . .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-KEY∅	$35.00	na

Accessories:

Description	Order code	Kit	Assembled
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-IOC	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
Pabble Card — Dip Proto. . . . . .PAD-PROT	$5.95	na
Paddle Card — 20ma Current Loop (w/parts) PAD-20MA	$7.96	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:

Description	Order code	Kit	Assembled
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-PWR∅ 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-PWR∅	—	$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 although this is not usually necessary.

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 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 purchase 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 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 inc

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

THE DIGITAL GROUP SOFTWARE SYSTEMS INC.

ANNOUNCING 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. Ø 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.
RUn	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 60 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.

SOFTWARE SYSTEMS

ADDITIONAL NEW SOFTWARE FROM DGSS

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.

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 coordinates.

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+B7??

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).

FIPFOP: 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 cource 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!!

BIORYTHM: A very comprehensive version of BIORYTHM 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!!

SOFTWARE SYSTEMS

Recap of previously published programs, some with version changes, some with additional information, is listed here for your benefit . . . complete with price for each.

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

Created by Dick Whipple and John Arnold of Tyler, Texas — Based upon design criterial 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.

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NOTE: ALL TINY BASIC GAMES are read in after bootstrapping TBX-TVCOS 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!

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TINY BASIC GAMES, DGSS Set 2

Contains games of ARTILLERY, DR. THERAPY, REVERSE, BIORYTHM 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.

KINGDOM-LIFE 1 & 2 (For 8080 or Z-80)

KINGDOM lets you be "King" of land/bushels/acres and population of your "KINGDOM". Object is to accumulate 1 million acres and/or bushels which can only be done by buying and selling land. A great test of your abilities.

LIFE 1 is standard LIFE which takes a pattern and with simple LIFE rules, iterates until a stable situation is reached.

LIFE 2 is bi-symetrical pattern generator but without a stable situation ever reached. Will continue to run and never repeat pattern for approximately 10^{31} years!

COST: $5.00 @ cassette tape with operating instructions.

"GALAXY" — Copyright SCELBI Computer Consulting, Inc., 1976 (For 8080 or Z-80)

A true "Star Trek" game complete in every respect. Your mission: to destroy some number of Klingons in a specified number of star dates. Seven commands permit 3 levels of scanning, movement in 16 different directions at 64 different speeds. Phasors and Photon Torpedoes as weapons and energy transfers to the shields in battle. Star Bases are available for reprovisioning between battles.

COST: $7.50 @ cassette tape with operating instructions.

AMATEUR RADIO HAM CASSETTE (For 8080 or Z-80)

Amateur Radio (CW) Send and Receive. RTTY (Baudot) Send and Receive. CW Receive adjusts automatically to any CW speed sen. CW

Send has eight 100-character memories that may be called individually. CW Send features 256 character software FIFO buffer.

RTTY Receive can select 60, 66 and 100 WPM with upper or lower case output to TV. RTTY SEND can do so at 60, 66 or 100 WPM.

COST: $5.00 @ cassette tape with operating instructions.

EDUCATOR 8080

Designed to assist micro-computer user in understanding effect that execution of various instructions has on status and operation of 8080 computer. Version 2 as appeared in July 1976 BYTE Magazine.

COST: $10.00 @ cassette tape with operating instructions and 8080 instruction set.

EDUCATOR Z-80

A completely new EDUCATOR for the Z-80 micro-computer system which implements over 400 of the Z-80 commands and variants. Displays seven working registers and the flags. A great help in understanding the effect that execution of various instructions has on status and operations of the Z-80 computer.

COST: $10.00 @ cassette tape with operating instructions and Z-80 reference card.

ASSEMBLER* (Z-80 only)

*See following footnote.

A two-pass memory-resident symbolic assembler with the capacity for over 96 symbolic tags which stores all source code in a space-compressed form; thus, facilitating maximum utilization of available memory. Requires 12K plus working storage — Minimum recommended system = 18K.

COST: $15.00 @ cassette tape with operating instructions.

DISASSEMBLER (For Z-80* or 8080**)

See footnote following this section.

The disassembler will take any program and alternately display it in nmemonic/OP code form (Z-80 nmemonics in the Z-80 version/ 8080 nmemonics in the 8080 version) or dump form in either hex or octal or in ASCII character form. This tool is extremely useful for documenting your hand-coded machine language programs.

COST: $10.00 @ cassette tape with operating instructions.

TEXT-EDITOR (For Z-80* or 8080**)

The Text-Editor is a DGSS implementation of the "Classy Text-Editor" by Fred Greeg, Denver, CO, as published in DR. DOBB'S JOURNAL . . . et al, August, 1976. A very versatile piece of software for minipulation of textual material.

COST: $7.50 @ cassette tape with operating instructions.

MAXI-BASIC (For Z-80* or 8080**)

MAXI-BASIC is a powerful extended BASIC with many features not contained in standard BASICs.

Major Features are:
   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
   Twenty Functions including —
      Direct I/O and Machine Language Subroutines

MAXI-BASIC requires 8K and loads from 4K through 12K. Minimum Digital Group recommended configuration is 18K.

COST: Ver. 1.0 with no update, for Z80 and 8080 systems = $15.00 @ cassette tape and operating instructions.

COST: For Z-80 ONLY: Ver. 1.0 now and automatic update of Ver. 2.0* = $20.00 @ cassette tape and operating instructions.

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*We are working hard on the Ver. 2.0 but have no information at this time as to Ver. 2.0 capabilities or availability. To receive this automatic update, you must forward payment of $20.00 at the time you order Z-80 MAXI-BASIC Ver. 1.0. You may not obtain Ver. 2.0 for just an additional $5.00 if you have ordered only Z-80 MAXI-BASIC Ver. 1.0. with no update option. The Ver. 2.0 will then be an additional $15.00 to you.

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All DGSS, Inc. software is available for either 32 character/TVC or the new 64 character/TVC.

Digital Group System owners who are upgrading their TVC boards from 32 characters to 64 characters may have their software upgraded as follows:

   The ORIGINAL DGSS tape(s) may be returned to DGSS along

with a postage and handling fee of $2.50 per tape. DGSS will copy a 64 character version of the software onto the tape and mail it back to you. Please allow 30 days for processing, copying and delivery.

Software eligible for this offer is as follows:

MAXI-BASIC (Z-80/8080)   TBX-TVCOS (Video ONLY)
Assembler   "Galaxy"
DisAssembler   Educator
Text/Editor (Z-80/8080)   Ham-1

NOTE: There will be NO exceptions to the copying procedure (i.e., the Assembler will only be copied unto an original Assembler cassette tape as supplied by DGSS, Inc.). The $2.50 fee covers only the

cost of postage, handling and copying and does NOT include any documentation of any kind.

The 64 character versions will be functionally identical to the 32 character versions.

* The Z-80 Assembler, DisAssembler, Text Editor and MAXI-BASIC come with three frontend processors: 1) 60/WPM Baudot TTY; 2) 110 Baud ASCII TTY; and 3) IBM Selectric for Itel 1051 model.

** The 8080 DisAssembler, Text Editor and MAXI-BASIC come with two front-end processors: 1) 60/WPM Baudot TTY; and 2) 110 Baud ASCII TTY.

Announcing the formation of

J oint
U sers of
D igital
G roup
E quipment

JUDGE is an organization designed to promote the interests of Digital Group Micro-computer owners and users. Under the co-sponsorship of The Digital Group, Inc. (DGI) and Digital Group Software Systems, Inc. (DGSS), JUDGE will, hopefully, become the vehicle for communications between users and between the users and the companies.

The media for exchange will be a newsletter to be published monthly beginning in May, 1977. The newsletter will contain helpful hints in both the hardware and software areas, software bug "fixes", and short programs of general interest. In addition, there will be a problems column wherein users with specific problems will be able to solicit assistance from other users. There will be, additionally, a column where users who have interfaced non-product-line hardware and/or software to their systems can share their efforts with others. Also, there will be a "Want Ads" section for those who wish to buy, sell or trade their goodies.

Until such time as the JUDGE membership directs otherwise, Dianne W. Howerton, VP, Operations, DGSS, Inc., will be acting secretary for JUDGE and acting Editor of the newsletter. Once things get rolling along well and the membership in JUDGE grows to the point where it becomes representative of the true-user population, there will be a general election of officers; once they take office, whatever functions they wish to assume will be turned over to them.

Voting membership in JUDGE will be limited to owners of DGI Micro-computer systems to insure that it is being operated solely in their interest. The newsletter will, of course, be available to anyone who wishes to subscribe. Membership will be automatic for all DGI equipment owners of record; however, a subscription to the newsletter will be $12.00 per year for ALL subscribers.

Please write and let us know your feelings about JUDGE as soon as possible.

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send to: JUDGE Editor, c/o DGSS, Inc., P.O. Box 1086, Arvada, Colorado 80001

☐ I am ☐ am not a Digital Group, Inc., micro-computer system owner.

☐ I wish to subscriber to the JUDGE newsletter at the rate of $12.00 per year (USA)
($15.00 U.S. Funds for Foreign Subscribers.

Name _____

(Company and Title, if applicable) _____

Address _____

City _____ State _____ Zip _____

☐ Check enclosed   (NO billing accepted).

Charge my BAC/VISA or Master Charge Account No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Expiration Date _____ Master Charge Interbank No. ☐☐☐☐

Signature _____

DIGITAL GROUP SOFTWARE SYSTEMS, INC. ORDER FORM

IMPORTANT!! Please fill in following information before forwarding Order Form to DGSS:

TYPE OF MICRO-SYSTEM (Brand Name)_____

☐ 8080 ☐ Z-80 ☐ Memory Size (K) TVC: ☐ 32 Char. ☐ 64 Char.

PLEASE NOTE: DGSS, Inc. software and programs are designed and written to run on The Digital Group, Inc. (DGI) Micro-Computer. Owners of other than DGI equipment order and accept DGSS, Inc. software and programs AT THEIR OWN RISK.

Quantity	Description of Software Program	Price Each	Amount Extended
1	PHI MON PACKAGE	30	
1	NEW OP SYS/superclock/ mem checker	7.50	
	modify my 6 casettes to 64 ch display	15.00	

	TOTAL:	
Sales Tax for Colorado residents only @ .035%		
	NET TOTAL:	

Amount Enclosed: _____

BankAmericard/VISA or Mastercharge number:

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Mastercharge Interbank Number: ☐☐☐☐

Expiration Date:_____ Signature:_____

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SEND THIS FORM TO:

digital group software systems inc.
po box 1086, arvada, colorado 80001
Phone (303) 422-4566

DGSS Office Use Only: Mailed:_____ Via:_____ Batch No._____