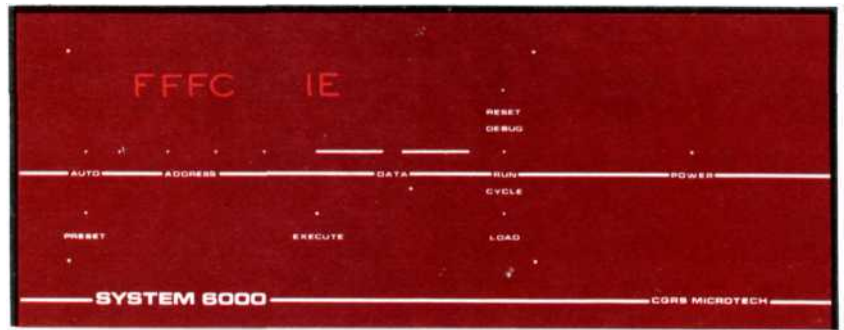


C G R S presents



# SYSTEM 6000

... a new concept in microcomputers.

This concept begins with a simple tutorial computer that can be expanded to the most complex level — in a neat clean package — without cables, clutter and kluge. The SYSTEM 6000 concept includes a select combination of features that offer versatility, economical computing power, and easy repair and maintenance.

## ❖ VERSATILITY

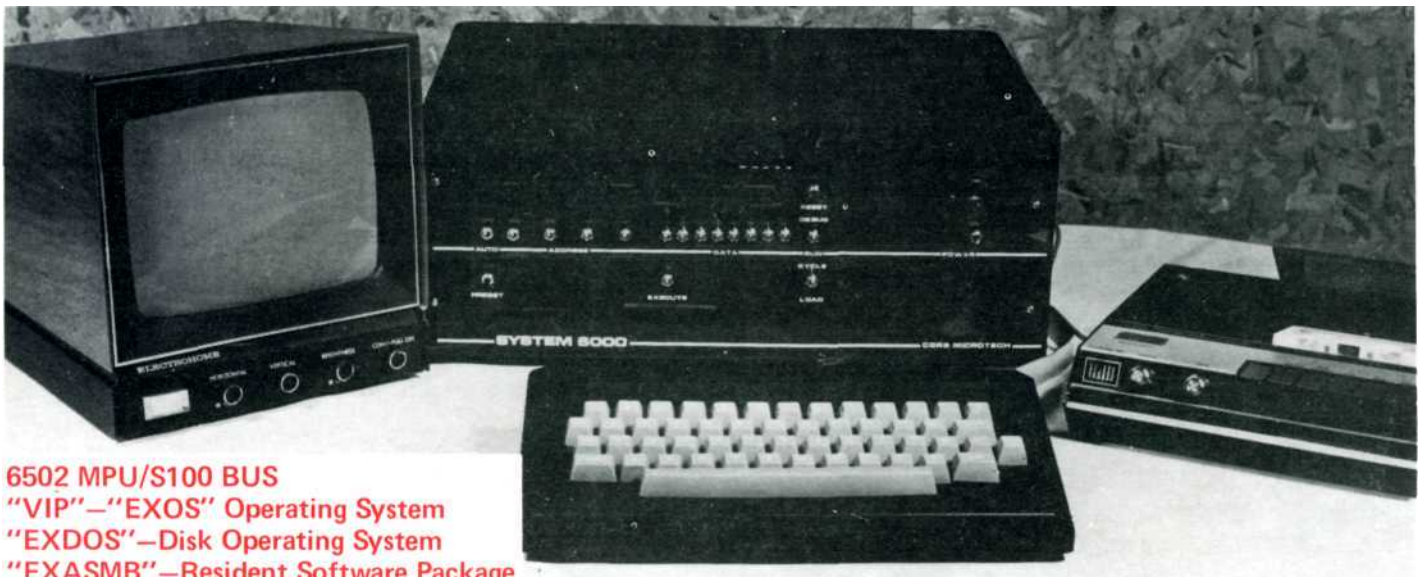
All CGRS systems are multi-level expandable and standard S100 compatible. No matter what the requirement, the multi-board S100 computer can match it. The variety and availability of S100 peripherals and accessories is *unparalleled*. If your requirements change, your computer can change.

## ❖ ECONOMICAL COMPUTING POWER

CGRS offers computers any way you want them; Kits, Boards, and Complete Systems. Because the CGRS systems are upward compatible, you pay only for your present requirements. Expand later when the need arises, S100 expansion — the most competitive and inexpensive.

## ❖ DIAGNOSTICS

The CGRS system has a unique diagnostic control panel that can be used for checking and testing of the microcomputer system. A Direct Memory Access type device, the CGRS control panel offers an optional method for easy repair and maintenance.



6502 MPU/S100 BUS  
"VIP"—"EXOS" Operating System  
"EXDOS"—Disk Operating System  
"EXASMB"—Resident Software Package

# THE SYSTEMS.....

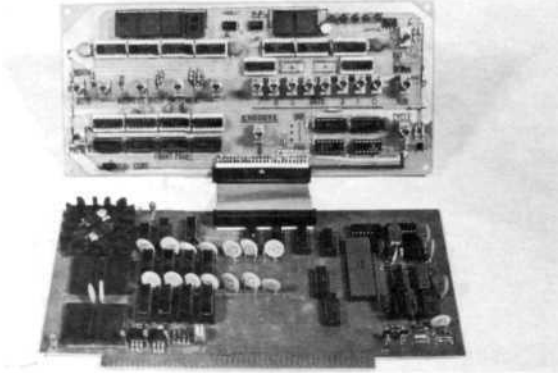
MULTI-LEVEL MICROCOMPUTER SYSTEMS  
FOR THE EXPERIMENTER, STUDENT, AND HOBBYIST:

## ❖ LEVEL I: TUTORIAL COMPUTER SYSTEM

- \*6502 MPU with 256 bytes of Ram
- \*Direct Memory Access control panel
- \*S100 bus expandable

The CGRS Tutorial Computer is a simple microcomputer system that offers the beginner an easy way to learn microcomputer operation. The memory can be loaded and read from the panel. Microprocessor programs can be run and controlled from the control panel, allowing the operator to understand and learn microprocessor operation.

## ❖ LEVEL II: INTRODUCTORY COMPUTER SYSTEM



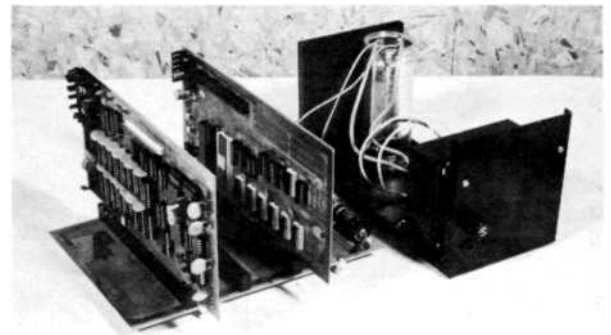
- \*6502 MPU with 1024 bytes of Ram
- \*Direct Memory Access control panel
- \*TTL support logic and S100 interface

The CGRS Introductory Computer provides all elements of a microcomputer base. In addition to the features of Level I, the Introductory Computer provides all the TTL logic and support required to implement a powerful computer system.

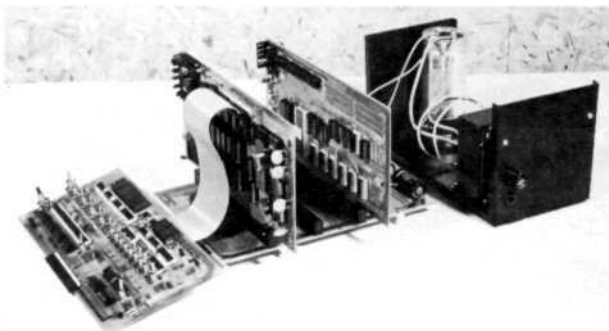
## ❖ LEVEL III: STANDARD COMPUTER SYSTEM

- \*6502 MPU with 1024 bytes of Ram
- \*T.I.M.II I/O Board
- \*S100 Motherboard
- \*S100 Power Supply - 8V@10A,  $\pm 16V@1A$

The CGRS Standard Computer System is a simple yet complete microcomputer with MPU, Ram, Rom, and I/O. This system is ready-to-go with the "Terminal Interface Monitor" program — connect to any standard computer terminal and operate. The S100 Power Supply and Motherboard leave room for future expansion .



## ❖ LEVEL IV: ADVANCED COMPUTER SYSTEM



- \*6502 MPU with 2048 bytes of Ram
- \*T.I.M.II I/O Board
- \*S100 Motherboard
- \*S100 Power Supply-8V@10A, $\pm 16V@1A$
- \*Direct Memory Access control panel

The CGRS Advanced Computer System offers a complete bare bones computer along with the diagnostic D.M.A. control panel. This combination provides both type of advanced tools, hardware and software diagnostic capability, in a ready-to-go system.

FOR THE ENGINEER, EDUCATOR, AND PROFESSIONAL:

## LEVEL V: PROFESSIONAL COMPUTER SYSTEM

- \*6502 MPU with 2048 bytes of Ram
- \*T.I.M.II I/O Board
- \*S100 Motherboard
- \*S100 Cabinet with Power Supply - 8V@10A,±16V@1 A
- \*Direct Memory Access control panel
- \*"EXOS"-extended operating system firmware package

The CGRS Professional Computer System is a microcomputer development lab. The package includes "EXOS", extended operating system, resident software for advanced microcomputer work. The Professional Computer System is complete, ready to connect to any standard computer terminal. The S100 Cabinet and Power Supply leave ample room for expansion to any level of sophistication, allowing the user to add microcomputer development tools as required.

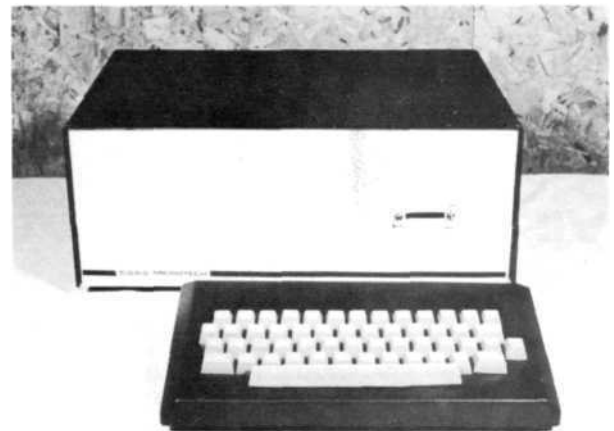


\*OPTIONAL 2.0 MHZ. Operation

## LEVEL X: TURNKEY COMPUTER PACKAGE

- \*6502 MPU with 1024 bytes of Ram
- \*T.I.M. II I/O Board
- "Cabinet, Power Supply - 8V@10A,±16V@1 A
- \*S100 Motherboard
- \*VB1B Video Board and Keyboard
- \*"VIP" Operating System Firmware

The CGRS Turn-key Computer package is a general purpose microcomputer complete with keyboard and video output. The microcomputer features the "VIP" operating system, a special program that controls the video screen, providing a "built-in" computer terminal. The system is, of course, S100 expandable to any powerful level, making it particularly suitable for business and general computing applications.



## LEVEL XI: PORTABLE COMPUTER PACKAGE

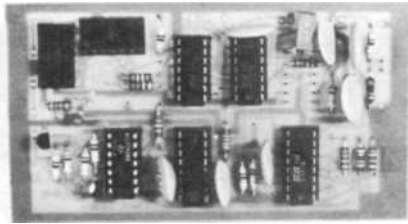
- \*6502 MPU with 1024 bytes of Ram
- \*T.I.M. II I/O Board
- \*Portable Briefcase with Power Supply - 8V@6A,±16V@1 A
- \*S100 Motherboard
- \*VB1B Video Board and Keyboard
- \*"VIP" Operating System Firmware

The CGRS Portable Computer offers the CGRS system in a convenient portable case. This package comes complete with video output, keyboard and "VIP" operating system. The portable case has room for additional S100 accessory cards allowing for further expansion if extra computing power is ever required.



# SYSTEM OPTIONS.....HARDWARE

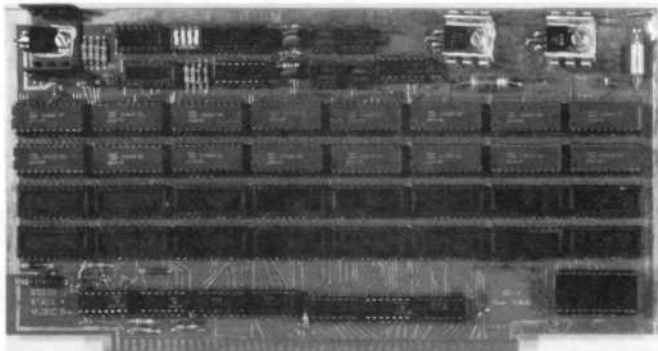
## AUDIO INTERFACE



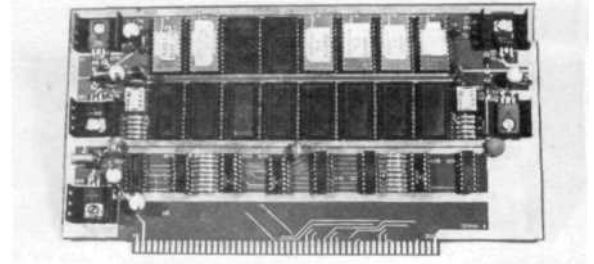
The CGRS Audio Interface provides inexpensive mass storage for a microcomputer using an ordinary audio cassette recorder. This card connects between any computer terminal output and the audio recorder and can be used to record and read either standard "Kansas City" or "Bi-Sync (Tarbell)" type tapes. The unit can be connected in series with any RS232 terminal or used by itself as a separate I/O device.

## 16K ROM CARD

The 16K Rom Card provides space for "resident" software. Programs can be stored in "2708" read-only memories and will instantly be available to the computer. CGRS software, such as "EXOS", "DATE", "EXDOS", "VIP", and "TINY BASIC" are provided on "2708" PROM and could be used in this card.

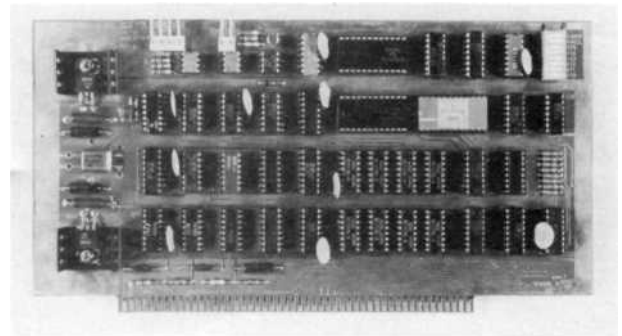


- \*Fully static
- \*Addressable on any 4K memory boundary
- \*16 Kilobytes of read-write memory on a single card that provides sufficient Ram for a moderately complex microcomputer system.
- \*S100 compatible and can be used to expand any CGRS system.



## VIDEO OUTPUT CARD

The VB1B Video Output Card will drive any video monitor to display computer controlled text messages and pictures on the screen. Text is displayed as 16 lines of up to 64 characters and graphics can simultaneously be displayed as a 128x48 block grid. The Video Output Card is controlled by the computer as a memory-mapped device that occupies 1K of space.



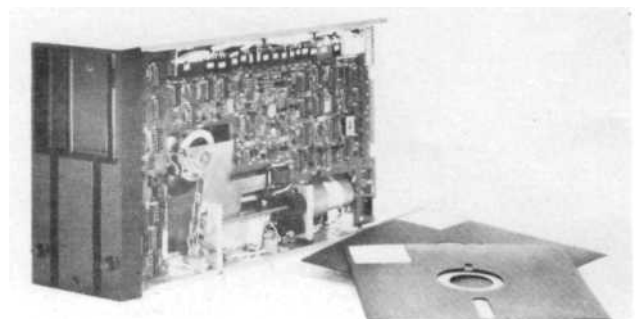
## PRINTER

110 characters/second maximum print rate  
8 $\frac{1}{2}$ " wide standard paper  
A high speed impact printer to connect to your microcomputer for hard copy output. The CGRS printer comes complete with power supply, matching enclosure, and parallel interface suitable to connect to any parallel I/O card such as the T.I.M.II I/O.

## ADVANCED FLOPPY DISK SYSTEM

**PERSCI 277 DUAL 8" DRIVE**  
**1070 CONTROLLER CARD**  
**CGRS S100 ADAPTOR CARD**

The Persci 277 disk drive is the fastest, most advanced full size disk available. The CGRS disk system with S100 adapter card and "EXDOS" disk operating system software gives high speed disk power to the SYSTEM 6000. This allows the computer to read and write records or data very quickly to memory. A disk system is almost imperative in data intensive applications such as small business computers and data management systems. The CGRS disk system is the fastest and most reliable available.



# .....SOFTWARE

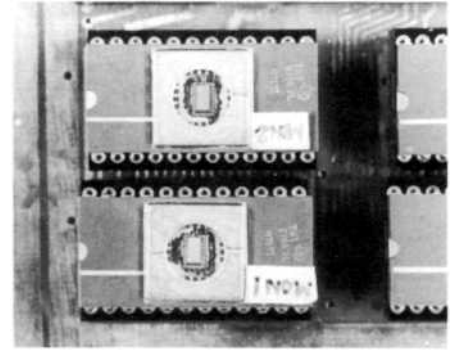
## 'VIP' VIDEO INTERFACE PARALLEL

"VIP" is a special immediate operating system for the CGRS Computer.

It provides I/O routines for a parallel keyboard and the video board. As an operating system, the "VIP" will initialize all I/O components and accept command inputs. Additional software routines provide the following:

1. Examine and Load any memory location
2. Execute a program from any memory location
3. Load T.I.M. format tapes
4. Punch (Dump) T.I.M. format tapes
5. Go to higher level operating system

The "VIP" is available complete on "2708" PROM.



## 'EXOS' EXTENDED OPERATING SYSTEM

"EXOS", Extended Operating System, is a powerful professional style microcomputer operating system. It has an extensive repertoire of commands:

DISP -- Display memory HEX with Ascii	DISC -- go to EXDOS	USER -- go to user defined address
ENTER --Enter into memory	SAVE -- a program in "Basic" (warm)	UTIL -- go to "Utility" program
FILL -- a block of memory with BYTE	TEST-- the memory non-destructively	EXEC -- from a specified address
EDIT -- go to "DATE" editor	LOAD -- a T.I.M. format tape w/offset	COMP -- compare memory & print differences
ASMB -- go to "DATE" assembler	DUMP -- a T.I.M. format tape	FIND -- a specified string or data in memory
LIST -- go to "DATE" disassembler	NULL -- set number of terminal nulls	BASIC -- go to "Basic" interpreter (cold)
MOVE -- a specified block of memory	MATH -- hex/decimal, relative calculations	TAPE -- dump edit file for assembly
TRACE --go to "DATE" trace routine	XREF -- print asmb symbol table	ASCII -- Toggle Ascii display

The "EXOS" operating system provides professional level software for microcomputer development work. This package is available on 4K of 2708 type PROM. (4 pieces)

## 'DATE' RESIDENT SOFTWARE DEVELOPMENT PACKAGE

**DISASSEMBLER  
ASSEMBLER  
TRACE and DEBUG  
EDITOR**

"DATE" provides the essential resident software for assembly language programming. *Disassembler* will decode machine language programs from memory and display the assembly language instructions. The *Assembler* is an extremely compact one-pass assembler that accepts standard MOS Technology Assembly Language statements and loads machine code into the memory while providing a documentation listing. The "one-pass" assembler is an interactive program and will accept source code directly from the system keyboard.

The *Trace* routine allows the user to trace through a program one instruction at a time, displaying the instruction op codes and the MPU registers after each instruction.

The *Editor* allows text, especially assembly language source, to be entered and edited in a line format. The program automatically generates line numbers and any line can be called by number for editing.

## 'EXDOS' DISK OPERATING SYSTEM

"EXDOS", the Disk Operating System for SYSTEM 6000, provides an extension of the resident software system to include the powerful commands supported by a high speed disk drive. These commands include:

COPY - disk to disk, file to file on same disk	RENAME - any file
REINITIALIZE — with optional interleave	Search — for any file — 100 files
DELETE — any file and repack disk	Read/Write to any sector
SAVE — any memory space to 64K!	Read/Write to multiple sectors
LOAD — and execute a file	Hex or Decimal disk parameters
ASMB — a file from disk	List Directory information
EDIT — a file form disk	Kill — the disk (with protection)
	TEST — diagnostic routine

This software along with either of the CGRS Disk Systems will elevate the SYSTEM 6000 microcomputer to the highest level of microcomputer power available anywhere.

## 'TINY BASIC'

LET	RETURN
IF...THEN	END
INPUT	REM
PRINT	CLEAR
GO TO	LIST
GO SUB	RUN

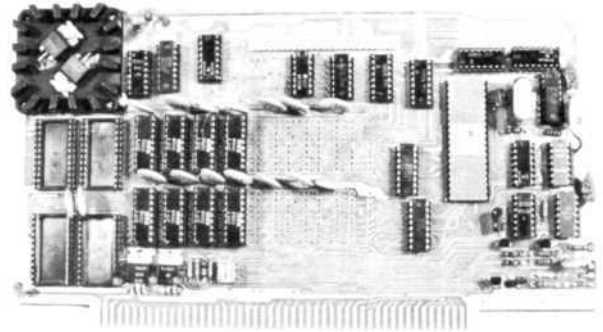
The famous "TINY BASIC" by Tom Pittman is available on 2708 PROM from CGRS. This version of "TINY BASIC" is available for either the "VIP" or the "TIM" monitor programs. "TINY BASIC" is a subset of Dartmouth basic that provides integer arithmetic and the "USR" command, a machine language subroutine call.

# THE PARTS.....

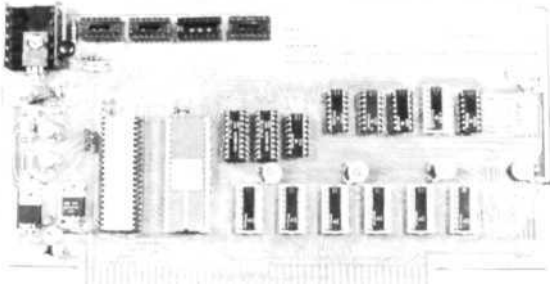
FOR THE SYSTEM BUILDER:

## ❖ 6502 MPU BOARD

- \*6502 Microprocessor with 1.0 MHZ crystal clock
- \*2K bytes of 2111 Ram
- \*4K bytes of 2708 EPROM
- \*On-card Voltage Regulator
- \*Power-up Restart circuitry
- \*50 Pin Front Panel Connector
- \*Slow Memory Interface logic
- \*S100 Interface Logic



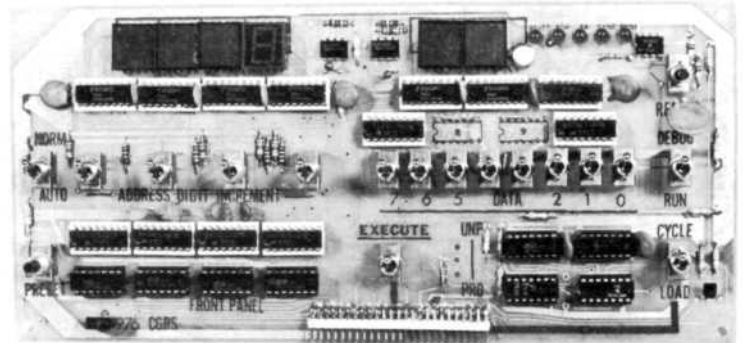
## ❖ TIM II I/O BOARD



- \*6530-004 "T.I.M." I/O circuit
- \*6820 P.I.A. I/O circuit
- \*Fully-decoded memory-mapped I/O
  - 3 parallel ports
  - 1 serial port
- \*320 bytes of on-board Ram
- \*1024 bytes of Rom with "T.I.M." monitor program
- \* Breadboard area for custom I/O interface

## ❖ D.M.A. FRONT CONTROL PANEL

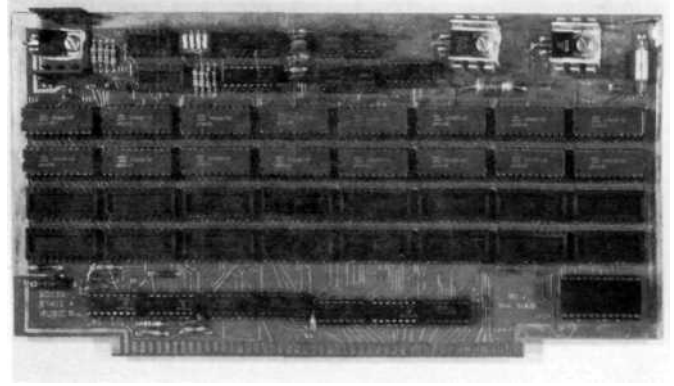
- \*Direct Memory Access to read or write memory
- \*Seven-Segment Hexadecimal displays
- \*High quality miniature toggle switches
- \*Single-cycle/Full speed program control
- \*50 wire ribbon cable connector to MPU board
- \*L.E.D. status lights on control bus



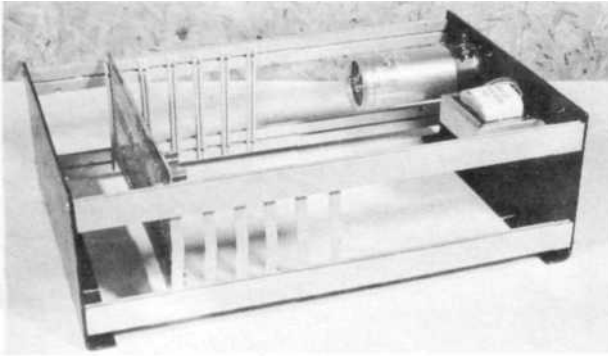
## \* FLOPPY DISK I/O CARD

- \*Persci 1070 disk controller card adapter
- \*4 parallel Input/Output ports
- \*Dual 16 bit counter/timer
- \*2 serial Input/Output ports
- \*4K bytes of PROM space (2708)

This multiple I/O card provides an assortment of I/O to connect to the various peripheral devices required in powerful microcomputer systems. The Persci 1070 disk controller adapter provides the fastest, most powerful disk available. In addition, the floppy I/O card provides space for 4K bytes of 2708-type EPROM for use in advanced microcomputer systems.

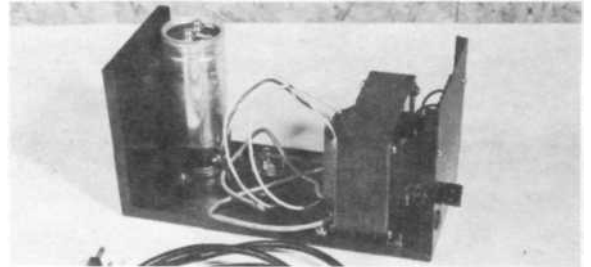


## \* CARD RACK



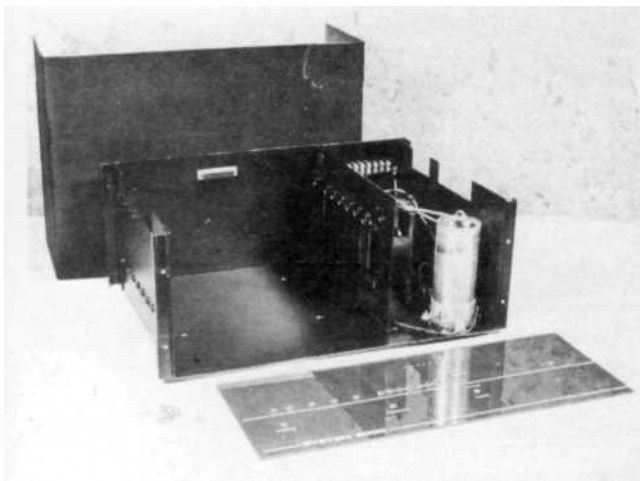
An S100 card rack with plenty of room for a big motherboard and S100 power supply. The CGRS card rack kit comes with end plates, side rails, card guides and mounting hardware, and can be used as either a rack mount or a table top computer frame.

## \* POWER SUPPLY



S100 Power Supply  
+8 Volts@10 Amps  
+16 Volts@1 Amp  
-16 Volts@1 Amp

## \* CABINET



CGRS offers the S100 Cabinet for custom S100 computer systems. The cabinet has room for 11 S100 boards and a front panel board. A power supply compartment provides room for power supply components and a 4<sup>1</sup>/<sub>2</sub>" fan. Specially designed for cross-flow ventilation and easy access to cards, the CGRS S100 cabinet comes with either blank metal or silk-screened plexiglass front panel.

**\*OPTIONAL Smoke Grey LEXAN Cover**

# SYSTEM 6000 PHILOSOPHY:

**MULTI-LEVEL CONSTRUCTION:** We believe the microcomputer buyer should be able to get a microcomputer with the features that are required and not have to worry about future expansion. The simplest, cheapest computer should be expandable to the most complex level without dangling cables and boards, without rewiring, without repackaging, and without having to junk the original equipment.

**STANDARD S100 EXPANSION:** The S100 bus has unquestionably become the defacto standard among microcomputers. Over 100 companies now manufacture the greatest variety of computer peripherals available anywhere. S100 cards are generally available from multiple sources with good prices and quick delivery. Repair and maintenance is easier with widespread availability of test equipment and diagnostic devices made especially for S100 computers.

**CLEAN, SIMPLE PACKAGE:** We believe in a clean multi-board package as opposed to a collection of p.c. boards strewn across a desk or a big p.c. board of solid Integrated Circuits. The multi-board computer is easier to fix, easier to change, and easier to expand.

**System 6000** is a microcomputer system designed for the beginner as well as the advanced. More importantly, it is designed for the beginner who will become the advanced.

**System 6000** is a microcomputer system designed to grow with the user. It is the only microcomputer with multi-level construction, standard S100 bus, an optional diagnostic panel, and complete software support.

## **CGRS MICROTECH**

**P.O. BOX 368**

**SOUTHAMPTON, PA. 18966**

**(215) 757-0284**