

GIMIX

State-of-the-art 6809
microcomputer systems



The GMX 6809 CPU III

The GIMIX 6809 CPU III board is an advanced design, specifically intended for use with multi-user, multi-tasking operating systems.

Built on a multi-layer circuit board and utilizing high-speed, high-density logic, the GMX CPU III enhances the performance of the 2MHz, 6809 by providing such features as 1 byte/micro-second DMA block transfers from memory to memory or between memory and I/O devices, and advanced memory management with 2K segments and segment attributes. The board automatically arbitrates DMA contention between the on board DMA and external DMA devices such as disk controllers. The 2K memory segments allow more efficient memory usage. The segment attributes allow the trapping of out-of-range memory references, write protection, and a hardware single step function for software debugging.

The board prevents the execution of certain illegal instructions from crashing the system by monitoring interrupts to the 6809 and its response to them. If the processor does not respond to an interrupt within 128 clock cycles the board resets the 6809 and asserts a special reset vector. The system can then close down the offending task and resume normal operation. This also limits the length of time that interrupts can remain masked by a user, preventing users from keeping the system from task switching and servicing other users.

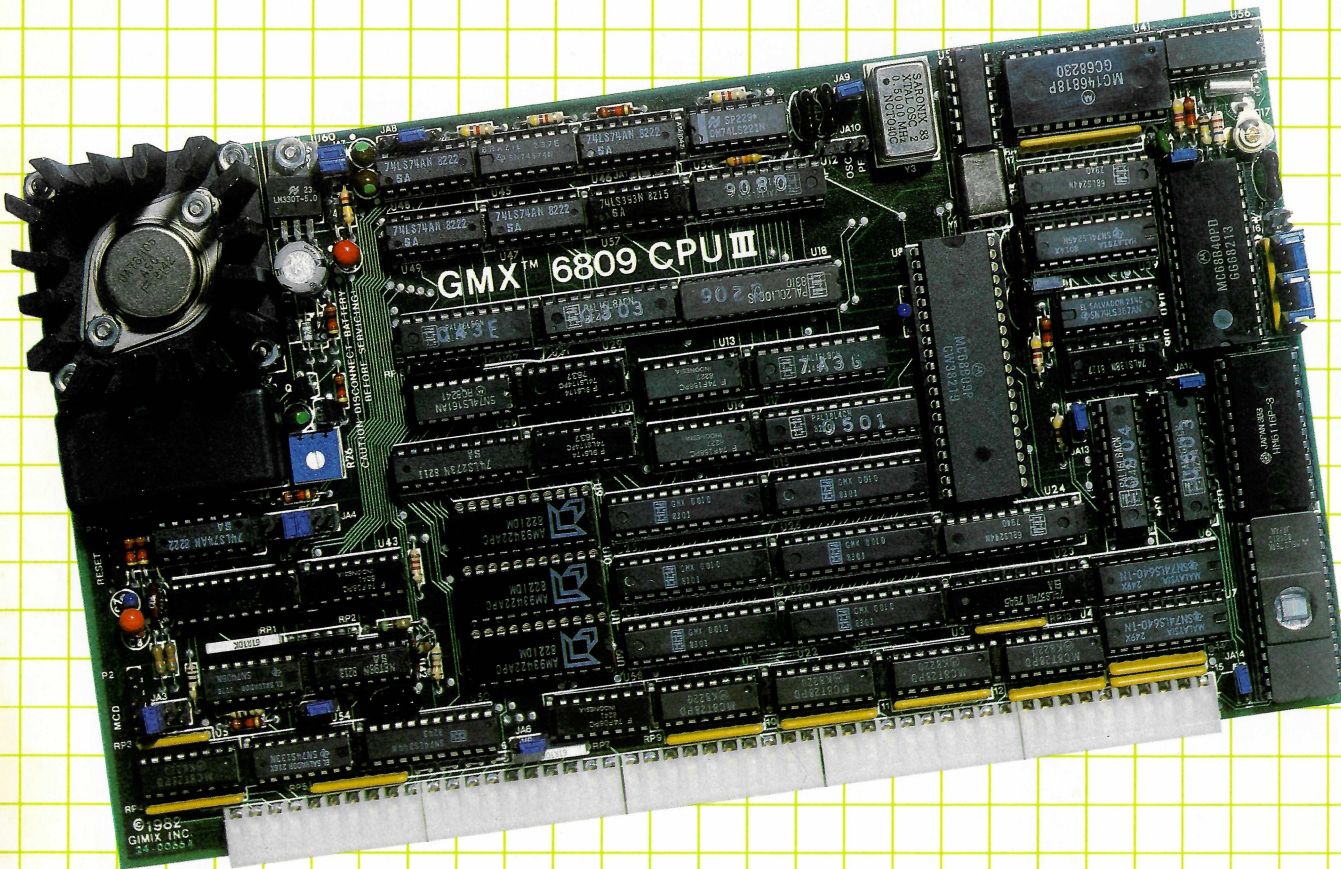
To further protect the system, the CPU board supports separate user and system "states" with automatic switching to the system state in response to interrupts and system (SWI) calls. Certain functions and memory areas can only be accessed in the system state, preventing unauthorized accesses.

The GMX CPU III also includes a full function time-of-day clock with year and automatic leap year/daylight savings time correction, and a 2K scratchpad RAM; both with battery back-up. To provide precision timing functions, a 6840 PTM with a separate 500 KHz. precision (.0025%) time base oscillator is included. The oscillator is easily user replaceable to provide other time base frequencies (750 KHz. maximum). The single EPROM socket will accept 2K, 4K or 8K EPROMS, with a maximum of 4K mapped into the system address space at any one time. Software switching is implemented by selecting the upper or lower half of an 8K EPROM under hardware or software control.

OS-9 GMX III Operating System

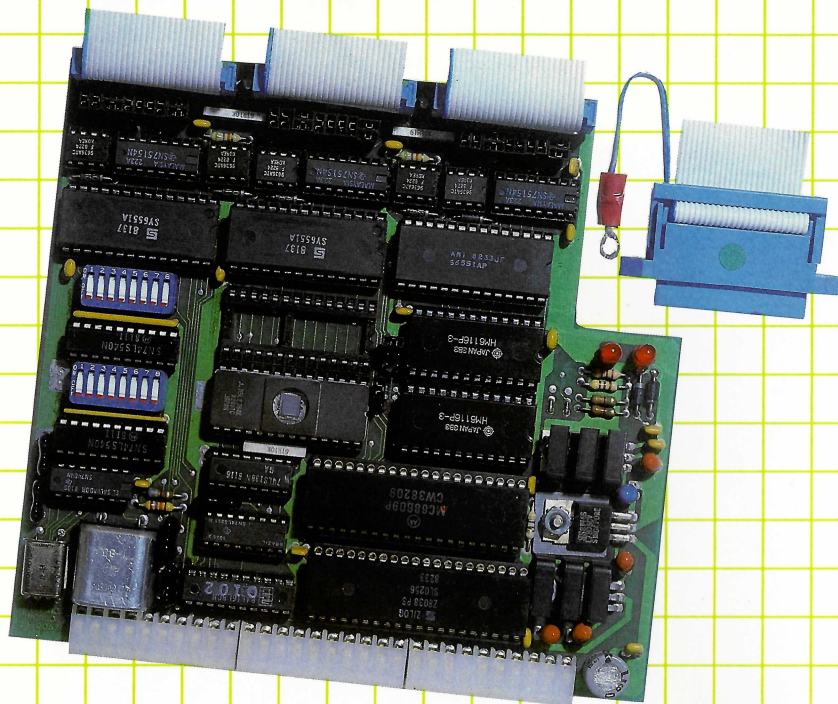
OS-9 GMX III is an enhanced OS-9 Level II that takes full advantage of the features of the GMX CPU III. As a result, the system is faster, more memory efficient, and a more secure multi-user, multi-tasking operating system than the original OS-9 GIMIX II, while retaining complete software compatibility. Throughput is enhanced by the memory to memory DMA and the automatic task switching, while the memory attributes and illegal instruction trapping protect the system and individual users from each other. Sharable system modules in RAM are write protected to prevent tampering. Memory mapping in 2K segments and the ability to load modules in non-contiguous RAM provide more efficient memory utilization. Each task can be allocated a full 64K of RAM, with no operating system overhead in the tasks address space.

UniFLEX for the GMX 6809 CPU III and Intelligent I/O boards is in development.



Intelligent Serial I/O Processor Board #11

(for the 30 pin bus)



The **GIMIX Intelligent Three-port RS-232C Serial Interface** can significantly increase the throughput of a multi-user system. By buffering data transfers between users and the system, and preprocessing the data, it reduces the number of interrupts to the host CPU, allowing the host more time for other processing tasks.

Features:

- Independent on-board 2MHz 68B09 CPU
 - Up to 20K of on-board memory (EPROM and RAM)
 - Buffered data transfer between host and on-board CPUs using a Z8038 FIO with 128 byte bi-directional FIFO buffer and mailbox message capabilities.
 - Three RS-232C serial I/O ports (6551As) with software selectable baud rates, word length, stop bits, and parity.
 - Each port has five "handshake" lines for modem control applications.
 - The on-board 6809 can be reset by the host processor.
 - Compatible with memory-to-memory DMA transfers to/from the GMX 6809 CPU III.
 - Sense switches and status LEDs that can be used to select software options and indicate board status.
 - Separate 26-pin cable connections for each port.
- Appropriate on-board firmware and operating system drivers are required. Uses up to three #95 cable sets (DB-25S connectors).

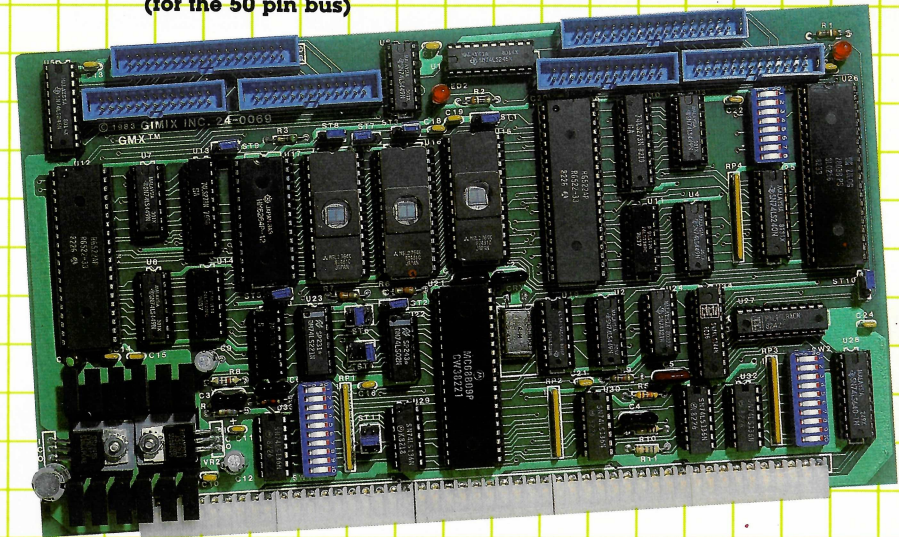
Also available — **Intelligent five-port serial interface #13** version for the 50 pin bus.

OS-9 firmware and drivers for the Intelligent 3-port Serial Interface

The OS-9 firmware and drivers enhance the performance of multi-user systems, while providing functions (including single character I/O) equivalent to the standard ACIA type drivers normally used for terminals and serial printers. Input line editing functions (backspace, echo, line dup and repeat, etc.) are handled by the I/O board, rather than the host, allowing the host more time for other processing tasks. The host is only interrupted when a complete input line (terminated by a "CR") is entered, or certain special characters are received. Input and output data are buffered on the I/O board so that the host can perform other tasks while serial data is being transmitted or received. When used with the GMX CPU III, block data transfers between the I/O board and the host use the CPU's memory-to-memory DMA to further enhance throughput. In addition to performance enhancements, features such as software selectable baud rates and transmission characteristics (number of data bits, stop bits, parity, etc.) are provided. The board also transmits "messages" to any or all I/O ports to indicate that the I/O Interface is ready and "waiting for the host", and that the host is "on-line" and has opened a path to the port. Messages to individual ports can be disabled.

Intelligent Parallel I/O Processor Board #12

(for the 50 pin bus)



The **Intelligent Four-port Parallel Interface** can be used to improve system performance by buffering data transfers to parallel peripherals such as printers and/or by buffering and pre-processing parallel input data from keyboards, sensors, etc.

Features:

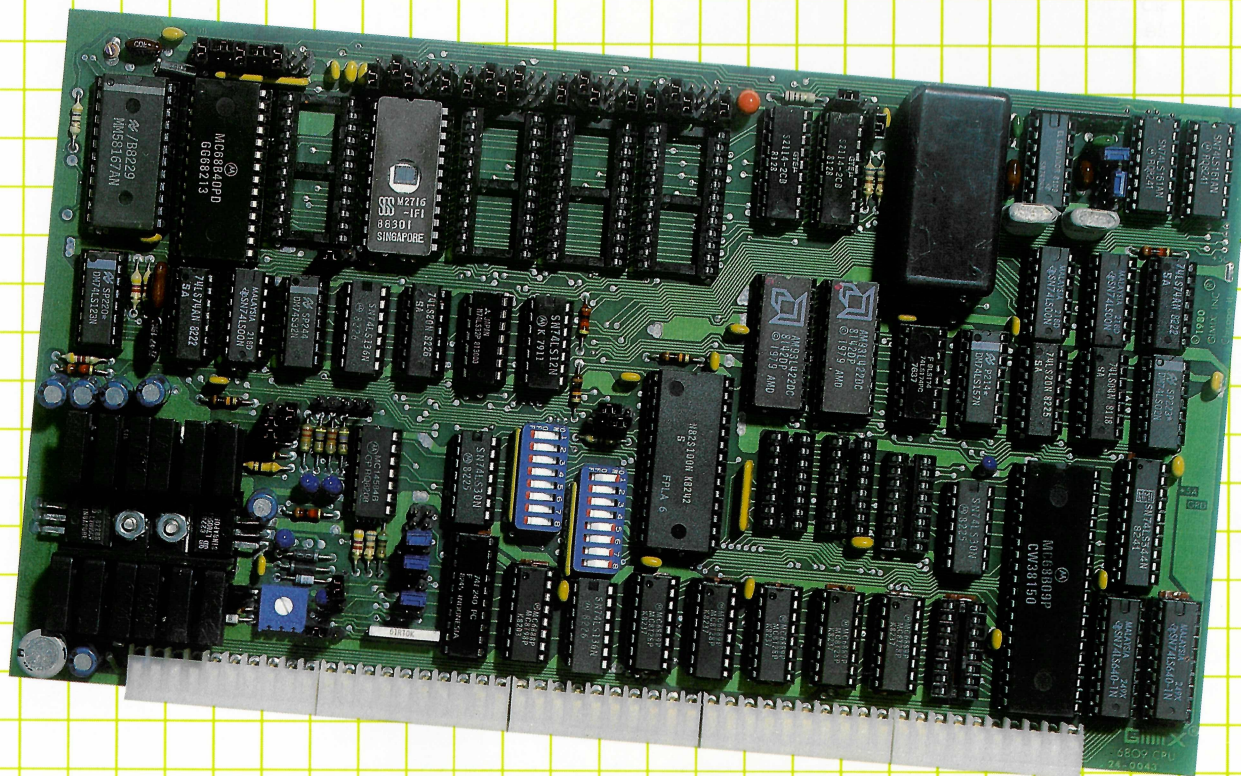
- Independent on-board 2MHz 68B09 CPU
- Up to 32K of on-board memory (EPROM and RAM)
- Buffered data transfer between host and on-board CPUs using a Z8038 FIO with 128 byte bi-directional FIFO buffer and mailbox message capabilities.
- Four fully buffered 8-bit parallel ports with handshaking and input/output latches (two 6522 VIAs). Each 6522 also has two 16-bit counter/timers and a shift register for serial data transfers.
- Software programmable direction for each bit on two of the four ports (1 per VIA), the other 2 ports can be individually programmed as 8 in or 8 out. The bi-directional handshake lines can be programmed as inputs or outputs.
- The on-board 6809 can be reset by the host processor.
- Full 20-bit address decoding; it can be addressed on any 4 byte boundary in 1M byte of address space.
- Compatible with memory-to-memory DMA transfers to/from the GMX 6809 CPU III.
- Sense switch and status LEDs that can be used to select software options and indicate board status.
- Separate 26-pin cable connections for each port plus two 36-pin, Centronics pinout compatible, connectors. Each 36 pin connector uses 2 ports to allow full implementation of the Centronics printer interface.

Appropriate on-board firmware and operating system drivers are required. Uses up to four #95 cable sets (DB-25P connectors) or two 36-pin cable sets with Centronics compatible connectors. Centronics compatible cable sets include a back panel connector plate for the Classy Chassis. Back panel to printer cables are also available.

GIMIX 6809 CPU PLUS Board #05 for use with FLEX, OS-9 GMX I, UniFLEX, and OS-9 GMX II

The GIMIX 6809 PLUS CPU is an extremely versatile board that offers the user a great many features and options which make it an ideal choice for a variety of systems and applications.

- Any one of 3 memory management techniques can be used: Straight Bank Select, GIMIX Enhanced DAT w/software write protect (optional), SWTPC compatible DAT (required for SBUG-E) (optional)
- Software write protect in 4K blocks, of the entire address space (when GIMIX enhanced DAT is installed)
- Jumper selectable processor clock speeds (1, 1.5, 2 MHz.)
- Separate buffers for the 6809 and the on card devices
- 4 PROM/ROM/RAM sockets for monitors and user software (up to 32K)
- PROM/ROM/RAM sockets individually jumper selectable for single or multiple supply voltage and 1, 2, 4 or 8K byte devices (Some FPLAs do not support 8K devices.)
- 1K bytes of scratchpad RAM
- 6840 programmable timer with provisions for external clock, gate and output connections
- Time of Day Clock (58167) w/Battery backup
- 9511A or 9512 Arithmetic Processor w/Jumper selectable 2, 3, or 4 MHz. clock speeds (optional)
- FPLA address decoding for the 8 on card devices 4 PROM/ROM/RAM sockets, 58167, 9511A/9512, 6840, 1K scratchpad RAM
- Software switching of address configurations for the 8 on card devices (allows software switching between on board PROM/ROM/RAM resident system monitors)
- All FPLA decoded devices can be individually enabled/disabled
- FPLA decoded devices are available for DMA access
- Extended addressing for the FPLA decoded devices (can be disabled)
- Software switching between on and off board system monitors using extended addressing
- Jumper selectable interrupts for the 6840, 58167, and 9511A/9512
- NMI input can be jumpered to the bus or to an external connector
- BA & BS jumper selectable for independent or gated operation
- User defined latch output
- Gold Molex connectors for trouble free contact
- SS-50 and SS-50C compatible
- Full DMA capabilities (works with any of the 6809 DMA methods)
- Full Slow memory capabilities
- Fully assembled, tested and burned in



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Serial Interface Boards

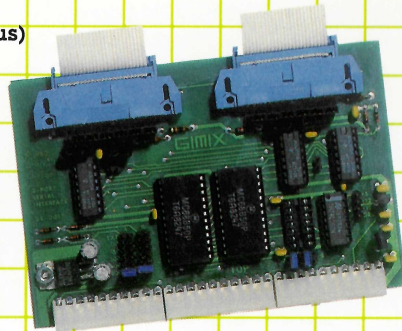
SERIAL INTERFACE boards use the versatile 68B50 programmable ACIA that provides software control over: number of data bits, parity, stop bits, and interrupts. They all feature RS-232 compatible input/output with RTS, CTS, and DCD handshake signals.

All serial boards have gold plated, header type connectors for corrosion resistance and reliable operation.

2 Port Serial Interface #43

Solderless jumpers provide easy selection and changing of options.

(for the 30 pin bus)



Features:

- 2 separate RS-232 ports (with handshake) on a single board
- Jumper programmable connector pinouts for easier connection to external devices. (Connector can be programmed as DCE or DTE)
- Provides direct plug-in of standard RS-232 connectors when used with optional GIMIX cable sets.
- Individual baud rate and interrupt select jumpers for each port.
- Selectable for use with 4, 8 or 16 addresses per slot. Uses 1 or 2 #95 cable sets.

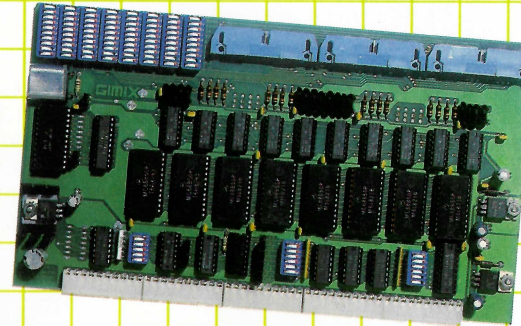
#95 Cable Sets For I/O Boards

Cable sets include: Ribbon cable with a matching connector for the I/O board, a 25 pin "D" type data connector for back panel mounting, and mounting hardware. *Please specify which board when ordering cable sets.*

8 Port Serial Board #46

The GIMIX 8 PORT SERIAL INTERFACE has 3 header type connectors for external connections. The center connector provides Transmit Data, Receive Data, and signal ground for all 8 ports. The outer 2 connectors each provide TX, RX, and signal ground as well as the 3 handshake lines RTS, DCD, and CTS for 4 ports.

(for the 50 pin bus)

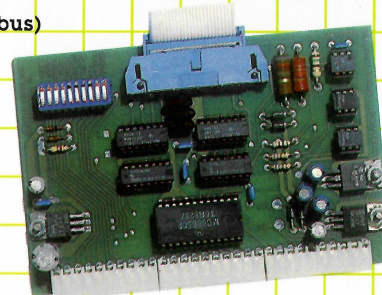


Features:

- 8 separate RS-232 ports (with handshake) on a single 50 pin board
 - Extended address decoding for the SS50C bus
 - Occupies only 16 bytes of address space
 - DIP-switch addressable to any 16 byte boundary
 - Individual DIP-switch selectable baud rates and interrupts for each port
 - On board baud rate generator for baud rates from 75 to 38.4K baud
- Uses 1 or 2 #95 cable sets.

Single Port Serial Interface #41

(for the 30 pin bus)



DIP-switches provide full control over I/O and handshaking configuration — easily accessible, no soldering necessary for:

- RS-232 or 20 Ma. Current Loop select
- One of five baud rates or an external clock
- Optional connection to the Interrupt Request line
- Override of the DCD and CTS modem control signals

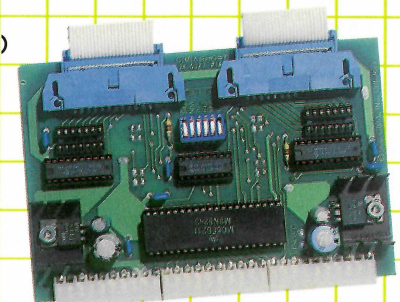
On-card regulators for +5, +12, and -12 volts provide power at the connector for modems, cassette interfaces, etc. Uses 1 or 2 #95 cable sets.

Parallel Interface Boards

Parallel boards use the 68B21 PIA for compatibility and versatility. Each 6821 provides two 8 bit ports with a variety of handshake and interrupt generation modes.

Two Port Parallel Interface Card #42

(for the 30 pin bus)

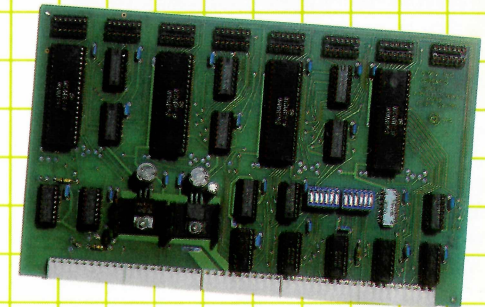


Each Port Has:

- Eight data I/O lines — fully **buffered**, with Schmidt-trigger inputs for high noise immunity
 - DIP-switch selection, of either **input** or **output**
 - One **buffered** input handshaking line
 - One **buffered** output handshaking line that is strappable for input.
 - DIP-switches for connecting to the interrupt Request or the Non-Maskable Interrupt lines.
 - A gold-plated header connector
 - Gold Bus Connectors
 - A DIP-socket for connecting to boards that need an external 8-bit or output port such as the GIMIX Opto board.
 - On-card regulators for +5 and -12 volts provide power at the connectors for keyboards, tape readers, etc.
- Uses 1 or 2 #95 cable sets.

8 Port Parallel Interface Board #45

(for the 50 pin bus)



- Eight 8 bit parallel ports on a single board
 - Four 6821 PIAs
 - 3 ports buffered for output
 - 5 ports bi-directional (not buffered)
 - Built in interrupt generator outputs 1 second or 1 minute interrupts
 - Occupies 16 bytes of address space
 - DIP-switch addressable to any 16 byte boundary
 - Does NOT have extended address decoding
- Uses 1 to 8 #95 cable sets.

All GIMIX boards have Gold Bus Connectors and are fully socketed, assembled, burned in, and tested.

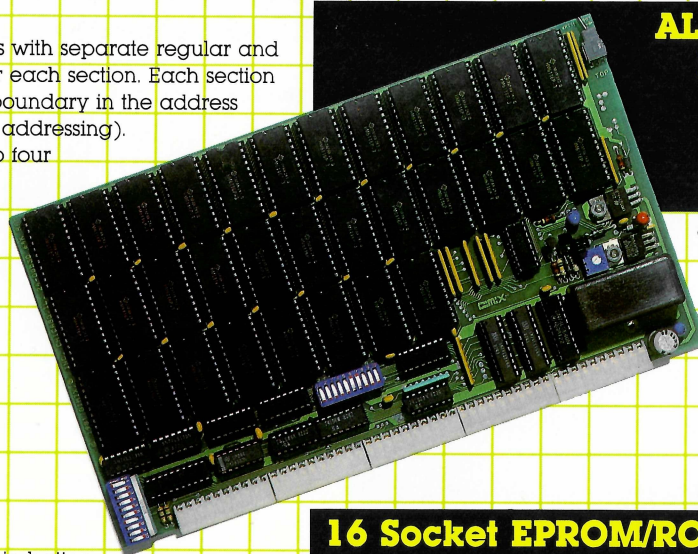
Features:

- Addressable in two 32K sections with separate regular and extended address decoding for each section. Each section can be addressed to any 32K boundary in the address range (1M byte with extended addressing). Each 32K section is divided into four 8K blocks that can be individually enabled or disabled. Disabled sections do not occupy address space.
- Fully Static Memory does not require complicated refresh timing or clocks for data retention. Compatible with any of the 6800/6809 DMA techniques.
- Guaranteed 2Mhz. Operation uses high speed (150 Ns.) memory with no wait states or clock stretching required.
- Non-Volatile Memory with built in battery back-up. Retains data even with system power removed. With the battery fully charged, data remains intact for a minimum of 21 days.
- Ultra-Low Power CMOS RAM requires less than 1/4 AMP (250 Ma.) typical at 8V.
- Low Bus Voltage Detection inhibits memory access during power up and power down to prevent false writes to the memory.

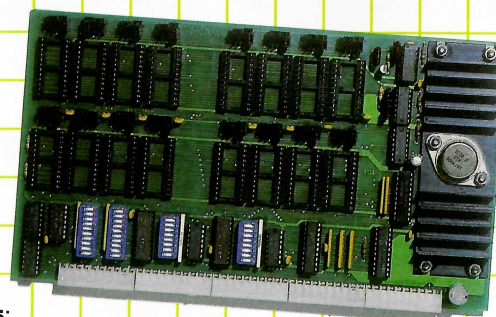
Windrush EPROM Programmer

- Probably the most versatile EPROM Programmer available. Interface & software to EXORcisor - II (fully addressable) and S-50 bus systems.
- Programs and verifies 2508/2708, 2516/2716 (single and tri-volt types) 2532, 2732, 2732A, 2564, 2764 — without additional 'personality' modules.
- Programmer extends out to your work area via 5' of twisted pair cable.
- Extensive commands menu...move data, read, program, verify EPROMs, examine/change buffer, formatted dump of buffer, fill buffer.
- Fully documented user's manual w/schematics & theory of operation. Professionally finished PCBs w/solder resist & component overlay.
- Software available for FLEX 2/9, SSB, OS-9 (LVL 1 now, LVL 2 later) and MDOS...All source files supplied. One version is supplied FREE. Specify disk size please!

- Write Protect Switch permits the entire board to be write protected for PROM/ROM emulation and software debugging.



16 Socket EPROM/ROM/RAM Board #32



Features:

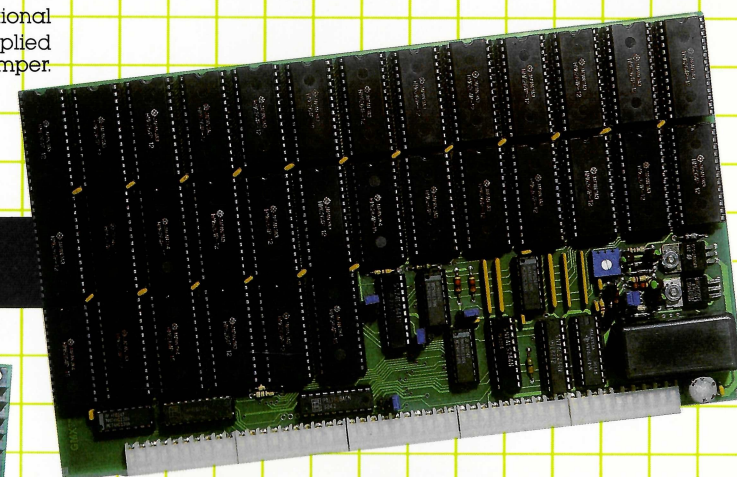
- Up to 128K on a single board (using 8K devices). Can be used with 2, 4, and 8K 24 pin, 2716/2516 pinout, single supply voltage EPROMs and most pin-compatible ROMs and static RAMs.
- Device sizes and types can be mixed on the same board
 - 2 separate 8 socket sections
 - DIP-switch selection of base address for each section
 - Individual address decoders for each section, including extended address decoding
 - Bi-polar PROMs for address decoding allow mixing of device sizes within a section
 - Separate slow memory generation for each section. (6809 only)
 - Each socket is jumper programmable for device size and type (2, 4 or 8K PROM/ROM/RAM)

ALSO AVAILABLE NMOS Version Without Battery Backup #67

- Low Power NMOS RAM requires less than 1/2 AMP (500 Ma.) typical at 8V.
- Write Protect optional with customer supplied switch or jumper.

Features:

- Addressable in configurations to suit a variety of applications. Full 20 bit address decoding for 1M byte systems. Addressing compatible with OS-9 GMX II and III, UnifLEX, and FLEX with GIMIX-VDISK.
- Fully Static Memory does not require complicated refresh timing or clocks for data retention. Compatible with any DMA technique.
- Guaranteed 2 Mhz. Operation uses high speed (150ns), 8Kx8 static RAMs with no wait states or clock stretching required.
- Low Power RAM requires less than 350 ma. typical at 8V, for 256K Bytes. A Megabyte (4 boards) requires less than 1.5 Amps.



256K Byte Non-Volatile, Battery Backup Version (as pictured) #72

With the same features as the above...PLUS

- NiCad Battery Backup for power-off data retention up to 300 Hrs. with a fully charged battery.
- Low Bus Voltage Detection inhibits memory access during power-up and power-down to prevent false writes to the memory.
- Write-Protectable for PROM/ROM simulation and software debugging.

8" Disk Cabinet and Power Supply

The cabinet features the same quality, styling, and finish as the GIMIX MAINFRAME and mounts two standard size 8" floppy and/or winchester disk drives. It will also hold 4 thinline 8" floppys or a combination of 2 thinline floppys and an 8" winchester.

To provide an easy means of controlling the power to an entire system from one switch, three accessory outlets, one for the computer and two for peripherals (terminals, printer, etc.), are provided. The back panel mounted power switch selects either OFF ON, or the AUTO mode. In the AUTO mode, the power supply and two of the accessory outlets are controlled by the computer (or other device), connected to the third



accessory outlet. When the computer is turned on or off, the cabinet senses the presence or absence of current flow to the computer and turns itself and the other accessory outlets on or off. Circuitry is also provided to turn AC drive motors ON and OFF under computer control. A built in fan with a washable air filter provides cooling for the power supply and drives. The back panel is punched for 4 connectors (two 50 and two 20 pin) for connections between the cabinet and the computer.

The power supply uses a constant voltage Ferro-resonant transformer for reliability and protection against brownouts and power line noise. It provides +5 Volts at 6 Amps, +24 Volts at 6 Amps, and -5 Volts at 750 Ma. continuously; with ample surge capacity for drives that require higher starting currents. The supply has two separate 24 V. outputs that can be sequenced to delay starting of the second drive until the first is up to speed.

All units are fully assembled, burned in, and tested.

Winchester Systems

Winchester packages are available for upgrading current GIMIX 6809 systems equipped with #68 DMA controllers and at least one floppy disk drive. The packages include one or two Winchester drives, DMA Hard Disk Interface, and the appropriate software drivers. The Interface can handle two Winchester Drives and provides Automatic Data Error Detection and Correction: up to 22 bit burst error detection and 11 bit burst error correction.

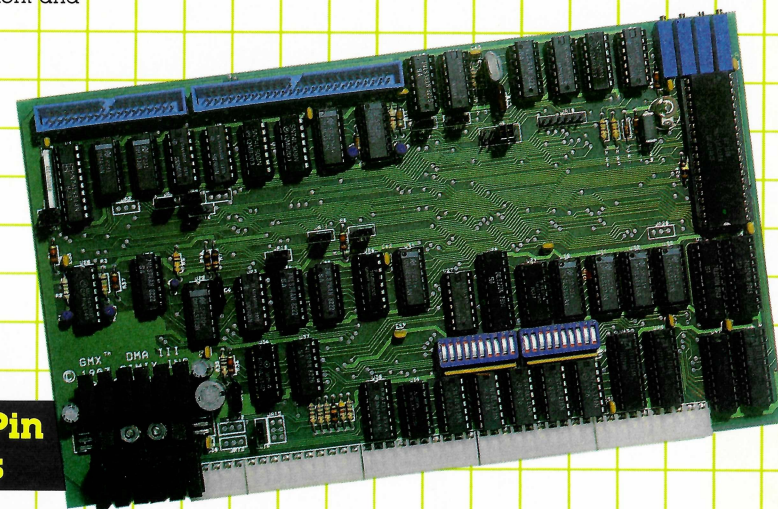
Dual drives can be used together to increase on line storage — or use one for back-up of the other. (More convenient and reliable than tape backup systems.)

GIMIX DMA Double Density Disk Controller #68

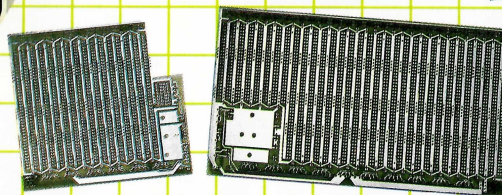
The GIMIX DMA (Direct Memory Access) DISK CONTROLLER has the capabilities needed to realize the full potential of today's sophisticated multi-user/multi-tasking operating systems such as OS-9™ and UniFLEX™.

High speed using bi-polar logic DMA circuitry for guaranteed operation at 2MHz. DMA transfers take place at full bus speed using 6809 cycle steal DMA. Interrupts can be generated to indicate the completion of the transfer.

3 ms. stepping is supported on 5¼" as well as 8" drives.



GIMIX 30 and 50 Pin Prototyping Boards



- Double sided with plated thru holes and gridded power and ground lines.
- The entire top edge has pads for .100 x .100 header (ribbon) connectors.
- Provisions for decoupling caps distributed throughout the array.
- Can be used with wire wrap, wiring pencil, solder wiring, etc.
- With gold bus connectors and heat sinks — unassembled.

GIMIX 50 Pin Prototyping Board #66

- 16 rows of pads on .100 x .300 centers; up to 72 fourteen pin ICs.
- Accepts standard 6, 8, 14, 16, 20, 24, 28, and 40 pin DIP devices.
- Accepts 4 TO-220 regulators; 2 on the +8V & 1 ea. on the +/- 16V lines.

GIMIX 30 Pin Prototyping Board #33

- 8 rows of pads on .100 x .300 centers; up to 41 fourteen pin ICs.
- Accepts standard 6, 8, 14, 16, 20, 24, and 40 pin DIP devices.
- Accepts 3 TO-220 regulators, 1 on the +8V & 1 ea. on the +/- 16V lines.

Single and Double Density data storage on any combination of 5¼" and 8" floppy disk drives; single and double headed, single and double track density, up to 4 drives total.

Low Error Rates are insured by a data recovery circuit (data separator) and adjustable write precompensation circuitry for drives that require precomp. Separate precomp adjustments are provided for 5¼" and 8" drives.

Addressable to any 8 byte boundary in the address space (1M byte when extended address decoding is used). The board occupies only 8 bytes of address space.

Extended Addressing control using the SS-50C extended address lines. Control of the extended address lines allows the board to perform DMA transfers to and from any address in the 1M byte address space.

Fully Buffered with separate 5¼" and 8" output buffers and schmidt trigger input buffers for the disk drive signals.

The DMA controller leaves the processor free to perform other tasks once the transfer is initiated, unlike programmed I/O disk controllers which require full time use of the processor during data transfers to and from disk.

This is extremely important in a multi-user/multi-tasking environment as the processor can perform other tasks such as console I/O while a disk transfer is in progress.

The GIMIX CLASSY CHASSIS 6800/6809 SS-50 Bus Mainframe

The CLASSY CHASSIS includes:

A heavyweight, aluminum cabinet (18" wide x 21" deep x 7" high) painted in a putty colored, durable baked enamel finish. The cabinet holds our 6800/6809 mother board, CV Ferro-resonant power supply, and has provisions for mounting one or two 5 1/4" Floppy or Winchester disk drives. The back panel is punched for 15 "D" type data connectors (25 pin) and has provisions for two removable connector plates that are available in a variety of connector configurations. Cabinets are normally supplied with two blank plates unless other types are required or specified. The cabinet includes a fan and ventilation slots which direct cooling air over the boards and power supply. The front panel has a 3 position, key locking, power switch that permits the reset switch to be locked out, preventing accidental system reset, and a three position Reset/Abort switch. Optional filler plates are available for systems that do not use the 5 1/4" drive openings.

The 6800/6809 SS-50/C Motherboard

This highly versatile motherboard is easily reconfigured for a variety of 6800 and 6809, SS-50 and SS-50C bus configurations.

Gold Plated connectors are used throughout to insure long lasting electrical contact and protection against corrosion.

It has fifteen 50 pin slots, 8 DIP-switch addressable 30 pin I/O slots, and a special 10 pin slot for the baud rate generator board. The fully buffered I/O block can be configured for 4, 8, or 16 decoded addresses per slot, and is DIP-switch addressable to any 32, 64, or 128 byte boundary. Extended address decoding (SS-50C) allows the I/O block to be addressed anywhere in the 1M byte address space.

The baud rate generator board provides 11 standard (16X) baud rates, from 75 to 38.4K, in 2 groups. Programming jumpers allow easy selection of up to five baud rates. The five baud rate lines on the 50 pin bus are easily disconnected from the 30 pin bus for use with SS-50C extended addressing or as user defined lines. A slow I/O circuit, for the 6809 CPU, can be used to generate an MRDY signal whenever an I/O slot is accessed (this allows, for example, using PIO Disk Controllers with a 2MHz. 6809 CPU).

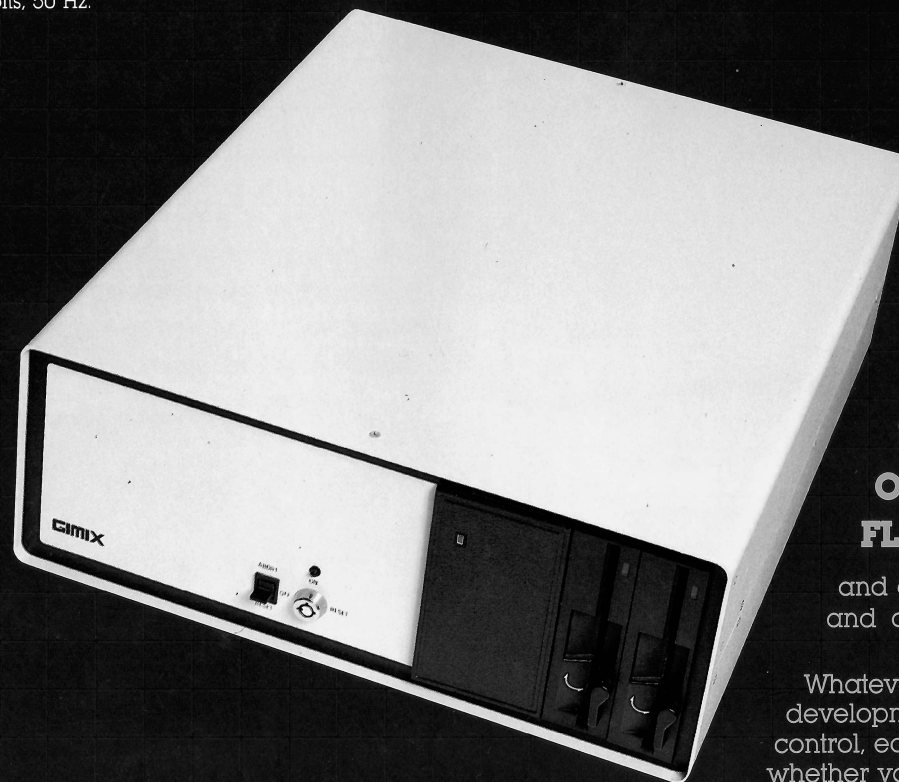
All data, address, and control lines are fully terminated and separated by noise reducing ground lines on the bottom of the board.

The .090" thick, double sided PC. board has a full ground plane Faraday Shield on the top side to further reduce noise.

Industrial Quality Power Supply

Features:

A Constant Voltage, Ferro-resonant, Faraday shielded, transformer, custom designed for GIMIX, for brown-out and overvoltage protection and for proper system operation, even under adverse AC power input conditions. It includes an AC line filter, 3 DC filter capacitors, and a filter assembly board with clamping terminal block for easy wiring. The power supply provides +8 Volts at 30 Amps, +16 Volts at 5 Amps, and -16 Volts at 5 Amps; enough to power a fully loaded system plus the 5 1/4" disk drives (floppy and/or Winchester) that can be installed in the cabinet. All outputs are filtered and individually fused. The standard version operates over an AC input range of 90 to 140 Volts, 60 Hz. Export versions are available for inputs of 95 to 130 or 190 to 260 volts, 50 Hz.



GIMIX 6809 systems support five predominant operating systems:

**OS-9 GMX III,
OS-9 GMX II,
UniFLEX,
OS-9 GMX I,
FLEX**

and a wide variety of languages and development software.

Whatever your application: software development, instrumentation, process control, educational, scientific or business; whether you need single or multi-user capabilities, GIMIX has hardware and the operating systems to get the job done reliably.

Please phone or write if you need further information.



GIMIX inc.

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