Announcing.....

"MCOS"

MACHINE CODE OPERATING SYSTEM
in a 4 k-byte EPROM (2732) for your MC-10X board.

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This EPROM opens up TWO exciting new worlds of programming for you to explore:

1 6803 Machine Code

Powerful, professional, 6803 monitor lets you easily enter, modify, execute, save, load, debug and even print machine code programs.

2 CHIP8 Interpreter

Popular "tiny" language, extended for the MC-10, lets you create your own animated video games with the minimum of effort. Much, much faster than BASIC and more memory-efficient than machine code! With only minor changes, dozens of programs already written for the "DREAM-6800", "ETI-660" and RCA "Cosmac VIP", will run on the MC-10. Utilizes the 128x96x4 colour graphics mode, bringing out the best in the MC-10's display chip. Say goodbye to sluggish, coarse 64x32 format. (Keep BASIC for numeric computation and text handling.)

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6803 Monitor Commands

[B] Branch offset calculator (for PC relative addressing).
[C] Continue from breakpoint, or, run CHIP8 program.
[D] Dump tape file; uses Tandy standard "CSAVEM" format.
[E] Examine memory in hex format (screen dump).
[F] Fill RAM block with constant byte.
[G] Go; run m/c program.
[H] Help; lists commands available.
[L] Load tape file; also lists header info.
[M] Memory modify; for entering and changing RAM data.
[P] Printer setup; allows use of serial port.
[R] Register display; de-bugging feature.
[S] Checksum calculator; for verification of RAM data.
[U] User mode; sets single or double byte display (E & M).

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Cassette tape file handling

MCOS lets you save machine code programs and binary data from anywhere in memory, for later reloading using either BASIC's 'CLOADM' command or MCOS's [L] command. The [L] command can also be used to examine a tape to see what's on it simply by entering a "dummy" file name (e.g. "******"). This will give you a list of file names, plus file type, loading addr (m/c), program length (BASIC) and EXEC address (m/c), etc, for each file on the tape.

Printer support

The [P] command sets up the printer port (RS-232 serial) so that all info displayed on the screen is also directed to the printer port. This command also lets you change the Baud rate for use with a variety of printers. This facility can be turned off if not required.

De-bugging facilities

Two features of MCOS assist in de-bugging mach. code programs. The first is the use of breakpoints, otherwise known as software interrupts. By placing 'SWI' instructions at strategic points in your code, you can force execution to be interrupted and a display of the 6803 registers and status will ensue, telling you what the machine was doing. A second feature uses the 'NMI' interrupt line.

Monitor Calls

The monitor and CHIP8 interpreter contain a great many routines which are useful in other programs. So, rather than write your own, you can call up these monitor subroutines, thus simplifying the program. Of particular interest will be the routines which deal with keyboard input (character, byte, hex numbers, etc), display output (character output, graphics screen), printer output, etc.

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MCOS is supplied in a 2732 EPROM (4k), with User Guide. Price is just $30 (incl. post). An annotated assembly listing is available at an additional cost of $5. From...

M. J. Bauer
PO Box 221
Ivanhoe, Vic. 3079

Orders are being taken now. Delivery is expected to commence late October or early November.

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Announcing the 'MC-10X'.....

RAM-ROM-I/O EXPANSION BOARD for the TANDY MC-10 micro color computer

..... from the creator of the 'DREAM-6800'

********** Features **********

+ Add up to 36K memory (20K RAM) using a mixture of RAM and EPROM device types; (see parts layout diagram).

+ Ability to switch between internal BASIC ROM and external EPROM (with alternative operating system).

+ Parallel input/output interface (20 lines via 6821 PIA). (Accessible from BASIC or machine code.)

+ Low power consumption so that no additional power supply is needed.

The expanded MC-10 is an ideal starter system for hobbyists or second system for a dedicated task.

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-- Price list --

MC-10X Expansion Board;
(Bare PCB with circuit and construction hints) $30

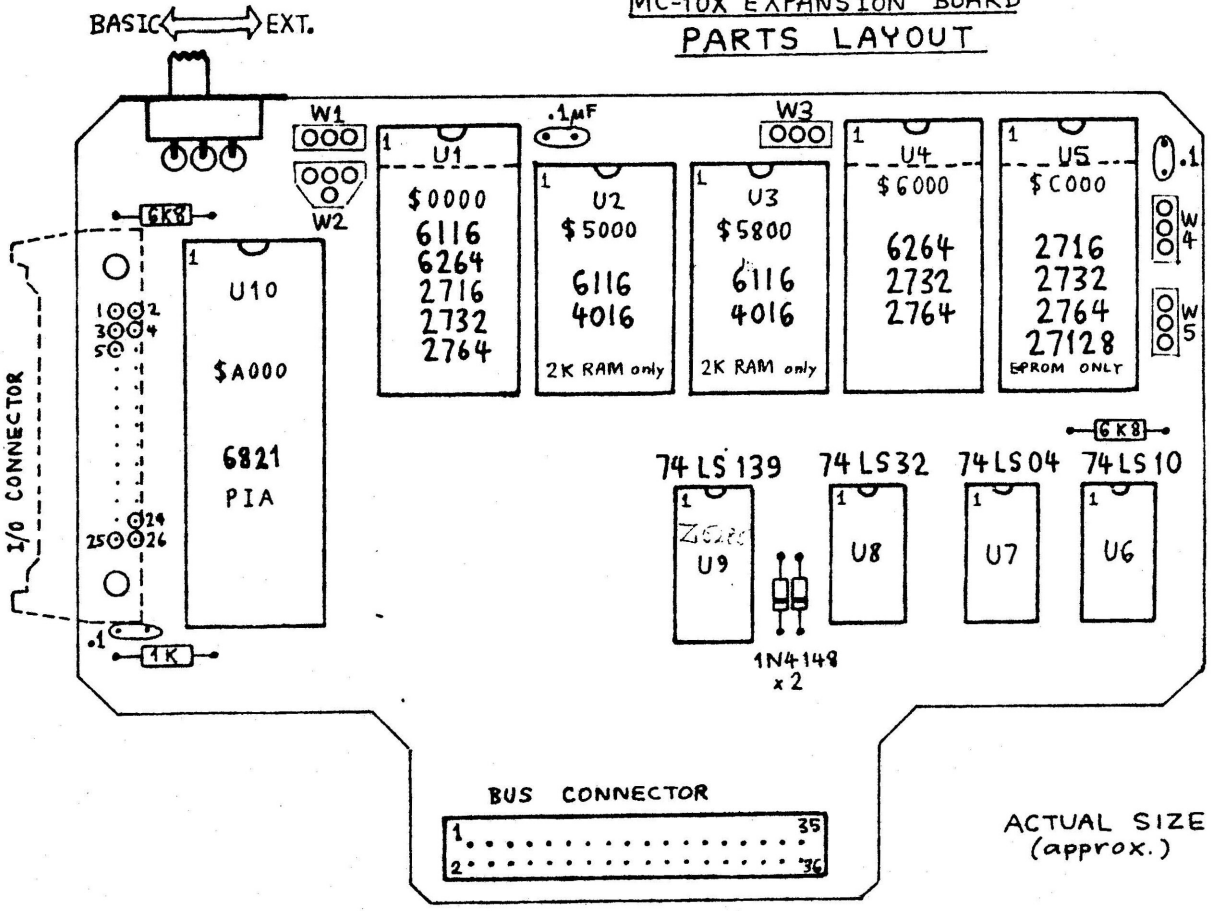
Machine Code Monitor and CHIP8 Language:
MCOS/CHIP8 EPROM (incl. User Guide) $30
MCOS annotated assembly listing ..... $ 5

Send orders, and make cheques payable to:

M. J. Bauer
PO Box 221
Ivanhoe, Vic. 3079

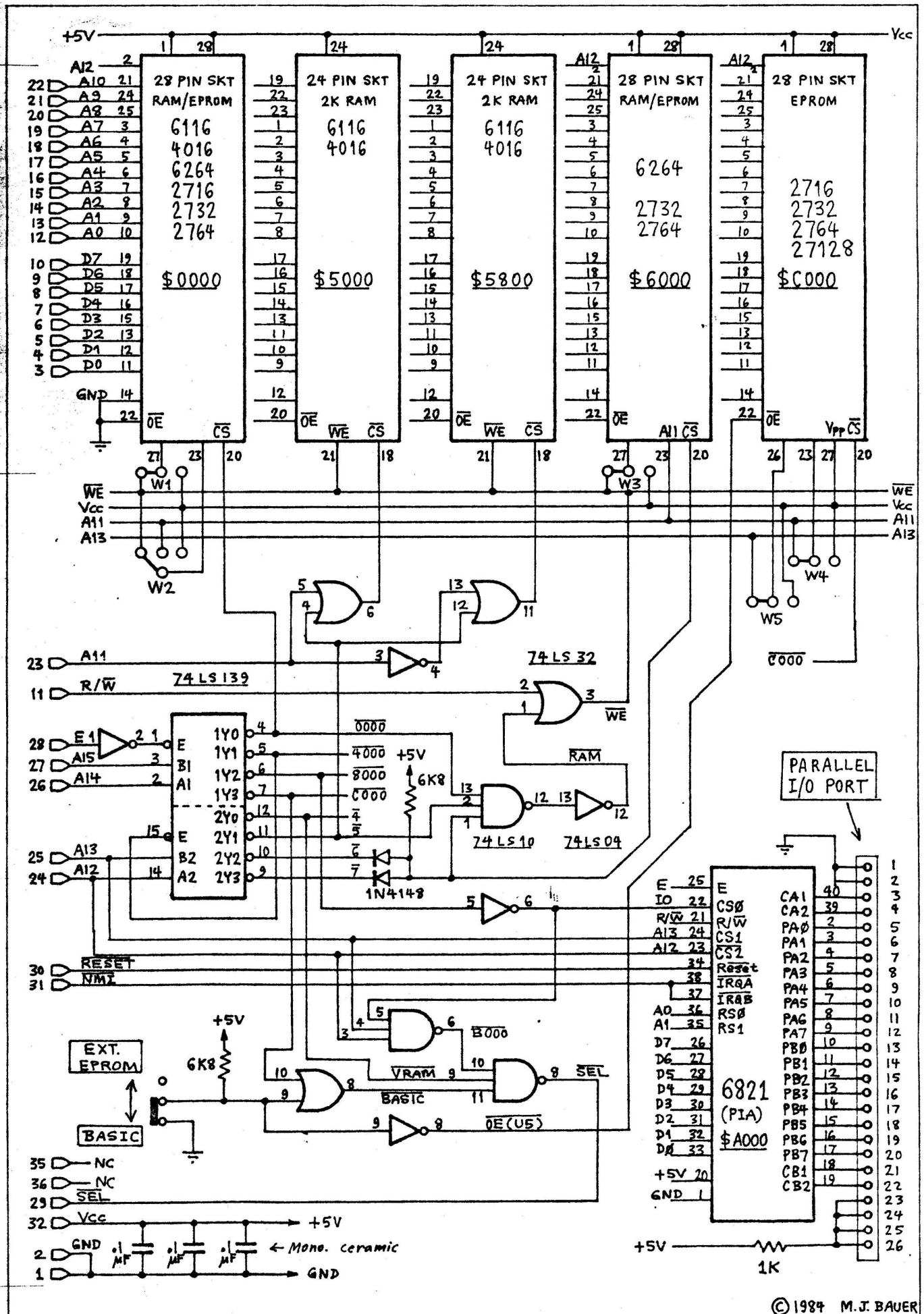
The MC-10X board is recommended only for experienced electronics constructors with technical know-how.

MC-10X EXPANSION BOARD
PARTS LAYOUT



ACTUAL SIZE
(approx.)

MC-10 EXPANSION BOARD ••• CIRCUIT DIAGRAM



RAM-ROM-I/O EXPANSION BOARD for the TANDY MC-10

Construction Hints

(1) You will need a good quality low wattage or temperature controlled soldering tool with a very fine tip (e.g. 1mm). Do not attempt the job with an inferior iron.

(2) Before soldering anything to the board, inspect for signs of shorted or broken tracks. Scrape between shorted tracks with a sharp instrument. If the board is going to be plugged directly into the back of the MC-10, sitting up vertically, then cut the board to the shape outlined using a hacksaw.

(3) Begin with the feedthrus; the board is not plated through. Take a length of 22 guage (approx) tinned copper wire and weave it in and out of the feedthru holes. Solder both sides of each feedthru, taking care not to use excess solder. Then snip off the wires as close to the joints as possible, keeping in mind that IC sockets have to sit on top of some of the feedthrus. The feedthru pads are identifiable as the smallest diameter pads on the board. Refer to the parts layout to identify locations of pads intended for components and jumper links.

(4) Next solder in the IC sockets, resistors, capacitors and diodes. Use sockets for U1, U2, U3, U4, U5 and U10 at least. The TTL (74 LS XXX) ICs may be soldered in directly. Note: It is necessary to solder the top (component) side pads of the R's, C's and diodes, but not the ICs.

(5) Choice of connector for the I/O port (PIA) is arbitrary, but a right-angle strip header (male) is recommended. This is designed to accept a (female) ribbon cable crimp connector. You could use a cheaper straight pin header if the budget is tight.

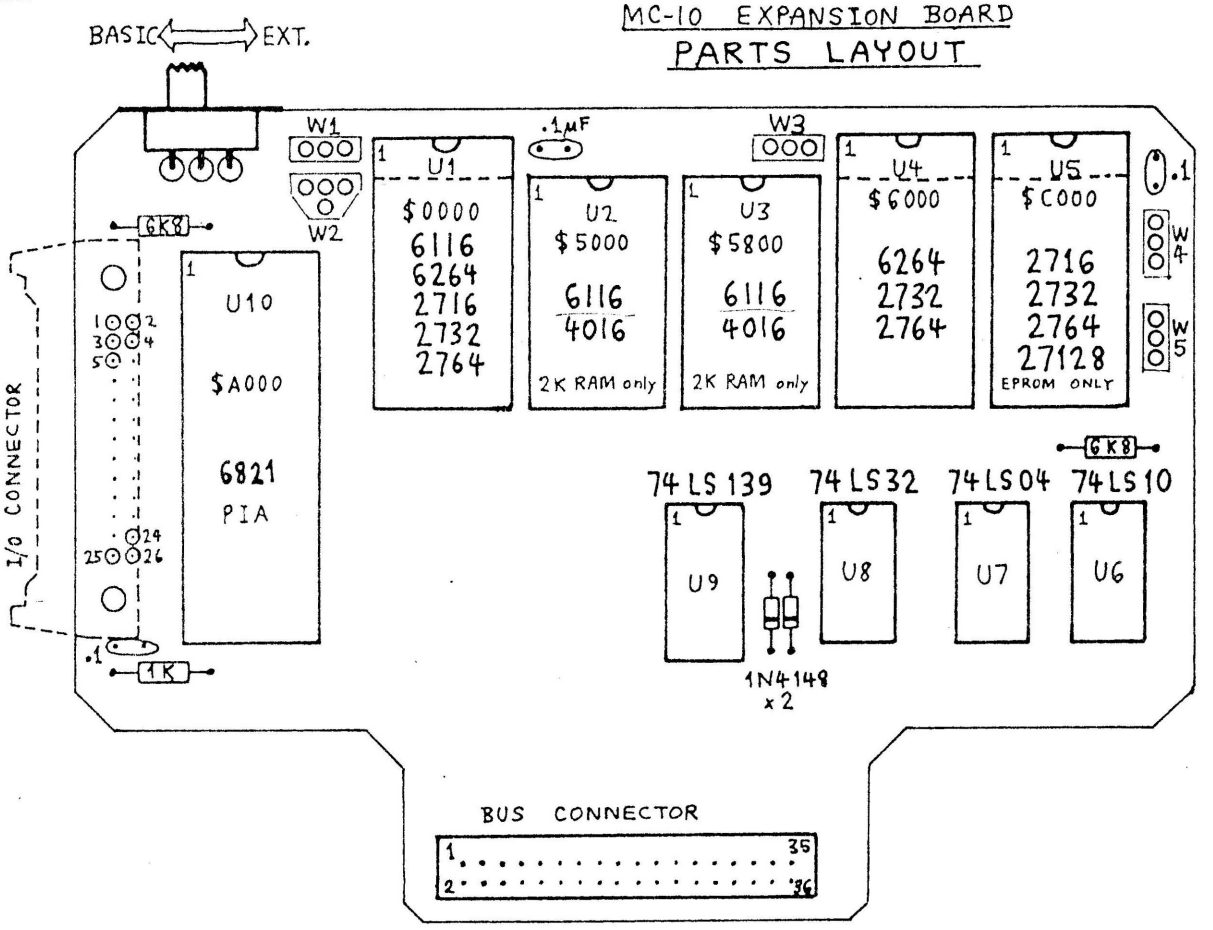
(6) The MC-10 bus connector is a 36 contact (2 x 18) double-sided edge connector, preferably with long wire-wrap pins (as opposed to solder tails). Example: Amtron Tyree type 225A-18219-WW-100. (Try Magrath's in A'Beckett St, Melbourne.) If you can't obtain exactly the right connector, it might be easier to use a "cut-to-length" variety, which seem to be more readily available, and put up with open ends, or glue bits of plastic onto the ends if you feel thus inclined. If it doesn't have wire-wrap pins, you will have to solder wires to the solder tags, in which case you might also decide to connect the board to the computer via a length of cable instead of mounting the connector directly on the board. If so, keep the cable short (e.g. less than a foot). Then the expansion hardware could be mounted in a box. If you have the right connector, do not push it flat to the board, but leave it standing 1 cm off the board so that the pins/wires can be soldered on the top side. THE CONNECTOR IS BOTH MOUNTED AND SOLDERED ON THE TOP (COMPONENT) SIDE.

(7) Next, solder a suitable switch to the board. The body of the switch may be Araldited to the board for rigidity.

(8) Now you are ready to jumper the board to suit the type of memory chips you intend to use. For starters, it is recommended to use three 6116 type RAM devices (2k bytes each); one down at $0000 (U1), and one each at $5000 and $5800 (U2 and U3). This will give you 4k extra RAM for BASIC, contiguous with the internal 4k RAM, plus 2k for machine-code subroutines out of the way of BASIC's area. This combination requires only a single jumper at 'W2' (see column 1 of the Jumper Wiring table).

Note: When plugging 24-pin devices into 28-pin sockets, the IC is put in the bottom end of the socket (i.e. the GAP is near pin 1).

MC-10 EXPANSION BOARD
PARTS LAYOUT



JUMPER WIRING FOR VARIOUS DEVICES:

	6116/4016 2K x 8 RAM	6264 8K x 8 RAM	2716 2K x 8 EPROM	2732 4K x 8 EPROM	2764 8K x 8 EPROM	27128 16K x 8 EPROM
U1 @ $0000	W1 ○○○ W2 ●○○ *	W1 ●●○ W2 ○●○	W1 ○○○ W2 ○○●	W1 ○○○ W2 ○●○	W1 ○●● W2 ○●○	X
U4 @ $6000	X	W3 ●●○ *	X	W3 ○○○ (Don't care)	W3 ○●●	X
U5 @ $C000	X	X	W4 ● W5 ● ○	W4 ○ W5 ● ○ *	W4 ○ W5 ● ○ *	W4 ○ W5 ○ ●