JOLT

WCCF 79

USERS NEWSLETTER

THE JOLT USERS NEWSLETTER EXPLAINED, OR SOFTWARE IN A MILLION FLAVORS

There are about as many programs for microcomputers as there are stars in the sky, it seems. How many versions are there of STAR TREK, for instance? And yet not one of these is useful to you unless it is written in 6502 machine language for the JOLT hardware or in Tom Pittman's JOLT TINY BASIC (which you should have a copy). The end result is that you have a feeling that everyone else is having all the fun, but that programming is a struggle for you.

Solutions? First, realize that everyone feels the same! Software is very necessary, very powerful, but does not come into existence without effort. The owner of every microcomputer comes into contact with scads of software that won't run on his system.

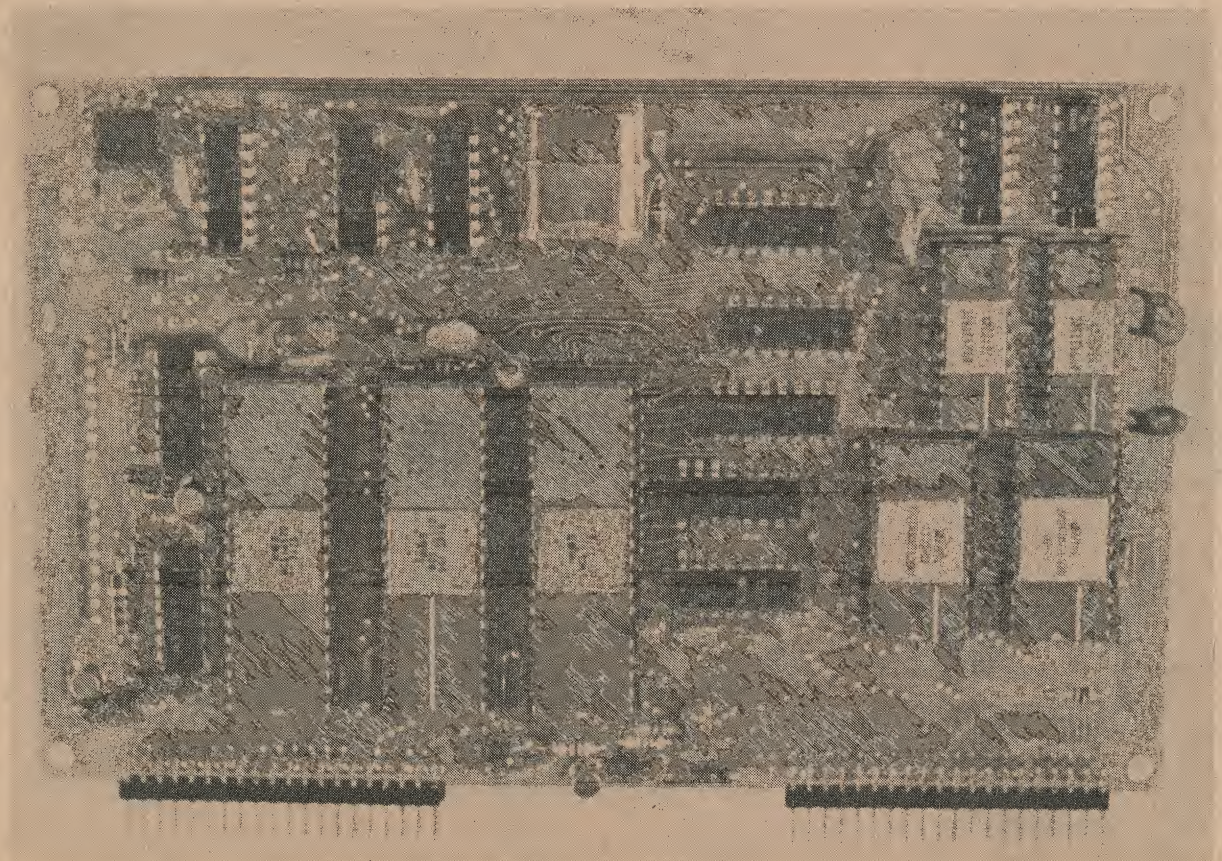
(cont'd on page 2)

SUPER JOLT

A SUPER COMPACT SINGLE BOARD COMPUTER FEATURING OVER 5000 BYTES OF RESIDENT SYSTEM SOFTWARE.

Microcomputer Associates Inc. has not only announced the SUPER JOLT, but has begun shipments of their hotest addition to the JOLT family of microcomputer card modules. SUPER JOLT, the most compact single board computer available, measures a mere 4 1/4" by 7" and contains the 8-bit 6502 microprocessor, 1,024 bytes of static RAM, 32 bidirectional and programmable I/O lines, a 1 megahertz crystal controlled clock, an interval timer, 4 interrupts including a timer interrupt and a non-maskable interrupt, three serial interfaces: 20 mA current loop, RS 232 and TTL, as well as 5,120 bytes of resident ROM program memory that includes a complete single pass Resident Assembler Program, called

(cont'd on page 2)



SUPER JOLT - A SUPER COMPACT SINGLE BOARD COMPUTER FEATURING OVER 5000 BYTES OF RESIDENT SYSTEM SOFTWARE.

JOLT TINY BLACKJACK RUNNING INSTRUCTIONS

1. Power up JOLT and transfer control to TINY BASIC. TINY BASIC should output a ":" character indicating it is ready to input statements.

2. Hit Line Feed on the teletype. This prepares TINY BASIC to read paper tape.

3. Start teletype reader. The JOLT TINY BLACKJACK source tape will be read in. The last statement is

   ```
   810 END
   ```

4. Stop reader.

5. Using teletype keyboard enter "RUN".

6. The TINY BLACKJACK Program will begin by typing a title, then proceed to "deal" two hands, one for the player and one for the dealer.

7. The program will prompt for "hits", (i.e. taking another card) by typing "HIT?". Indicate yes by typing a one "1" and no by typing a "0".

8. If either the player or the dealer exceeds a count of 21, the program types "BUSTED".

9. The program will automatically restart after each hand is played.

10. NOTE: For purposes of calculating hand values, aces are treated as equal to a value of <u>one</u> only, not <u>eleven</u> as optionally done in real Blackjack

JOLT TINY BASIC

BLACKJACK

```
5 REM JOLT TINY BASIC
6 REM RESPOND "1" FOR YES, "0" FOR NO
7 REM   TO "HIT?" PROMPT MESSEGE.
20 PRINT "TINY BLACKJACK"
30 PRINT "PLAYER HOLDS  ",
40 GOSUB 500
50 C=B
60 GOSUB 500
70 C=B+C
80 PRINT "FOR   ", C
90 PRINT "DEALER SHOWS ",
100 LET M=RND(13)
120 GOSUB 500
130 D=B
140 PRINT " "
150 X=C
160 PRINT "PLAYER ";
170 GOSUB 700
190 PRINT "DEALER'S DOWN CARD IS ",
191 A=M
192 GOSUB 510
193 D=B+D
194 PRINT "FOR ",D
196 IF D>17 GOTO 206
198 PRINT "DEALER HIT = ",
200 GOSUB 500
202 D=B+D
204 GOTO 194
206 IF D>21 PRINT "DEALER BUSTS, PLAYER WINS"
208 IF D<21 PRINT "DEALER STAYS ON  ";D
210 GOTO 020
500 LET A=RND (13)
510 B=A+1
520 IF B>10 THEN B=10
530 IF A>0 GOTO 560
540 PRINT "A",
550 RETURN
560 IF A<10 THEN PRINT (A+1),
570 IF A=10 THEN PRINT "J",
580 IF A=11 THEN PRINT "Q",
590 IF A=12 THEN PRINT "K",
620 RETURN
700 PRINT "HIT  ";
710 INPUT N
720 IF N<>1 GOTO 800
730 PRINT "HIT=  ";
740 GOSUB 500
750 X=X+B
760 PRINT "FOR  ", X
770 IF X<22 GOTO 700
780 PRINT "<<<BUSTED>>>"
800 RETURN
810 END
```

RELATIVE JSR

Frequently you will want to write relocatable machine language programs or subroutines. So you carefully use branches instead of jumps but find the program still isn't relocatable because it uses JSR's to it's own subroutines and the JSR's have absolute addresses. Well, here's the fix.

-Write one subroutine that stays fixed (say at FFCO) and is the destination of all JSR's (maybe some mfgr will even put it in their ROM)
-Rewrite your program with a BCC to your subroutine following each JSR.
-The program itself can now be completely relocatable!

Here's an example.

You are writing a program called FOXES which calculates the fox population on the Green Acres Bunny Farm, given bunny population, the previous year fox population, the number of hired fox hunters, and the number of foxlets (OK, pups) per annual litter. You hope to find the fewest number of hunters that will still protect the farms profitability. The output will be a graph of the fox population for the next 50 years for each set of input data. The finished program (and it ran OK the first time, right?) and subroutines reside as shown. The program FOXES with GRAPH in it can be moved anywhere you want and will still run.

Let's trace what happens.

-You start the program at 1000
-It fools around getting inputs and initializing
-It calculates the propulations for the next 50 years
-Now it is ready to graph the data, the JSR at 107B is executed and the program control is transferred to FFCO and the address 107D is pushed onto the stack
-Now we are in the subroutine RELSUB
RELSUB increments the address 107D on the stack to 107E, that address is then transferred to NEWPCL and NEWPCH which the JMP (I) uses
RELSUB then increments the address 107E on the stack to 107F so that when the RTS at 10BA is executed program control will be transferred to 1080 in the mainline FOXES
RELSUB clears carry then executes the JMP (I) at FFE4
-Program control is transferred to the BCC at 107E with the stack set up for a return from subroutine to 1080
-The BCC transfer control to GRAPH to do the subroutine
-When the RTS at 10BA is encountered and executed, the 107F on the stack is popped into the PC, incremented and used as the address of the next instruction
-The mainline, FOXES, has been reentered at 1080

If the identical program, FOXES, were loaded at 1900 thru 19BA it would run the same with 197D being pushed on the stack instead of 107D. And notice that RELSUB never changes and can be used by all you programs wherever they are located.

HARDWARE DESIGN PROBLEM

Interest in using microcomputers to ease our energy problems is growing. But problems still abound. For instance, if you wanted to measure your 120V usage, how would you do it? That's the design project.

Design an interface to a 120V main that puts out 0 to 2V for 0 to 200 Amps with a 0 to 20 Amp option. The transducer might be 10 turns or so around the current carrying conductor, or a transformer core flux link. Here are the specs.

SPECIFICATIONS

1. Interface and transducer provide 2500 VAC or greater electrical isolation.
2. Interface runs off +5V and ground only, less than 50 ma.
3. Less than .1Watt of power may be extracted from the primary conductor.
4. An Existing primary does not have to be cut or broken to install transducer.
5. 1% of full scale accurate over temp range 0 to 70°C, supply voltage range 4.25V to 5.5V.
6. Output: 0 to 2V for 0 to 200 Amps with a 0 to 20V option.
7. Output impedance less than 10K.

In the next issue we'll present a method of inputting the 0 to 2V with an ADC.

WOULDN'T IT BE NEAT.....

If this magazine consisted of 50 pages of program listings. It can be more than just an idea. Mail your paper creation to JOLT USERS NEWSLETTER c/o NELSON EDWARDS, WALLA WALLA (WHO) COLLEGE, COLLEGE PLACE, WA 99324.

SYSTEM CLOCK SPEED

The JOLT CPU card comes with instructions to set the clock rate at 750KHz. But every card, CPU and RAM, has been shipped with memory so fast that the clock can be speeded up to 1 MHz. While that's no major selling point, it's nice to know the folks at MAI are doing what they can to keep the JOLT the best little system around!

8.25 on the Richter Scale! That's the SUPER JOLT! It's the same size as the JOLT CPU card but has room for TINY BASIC and RESIDENT ASSEMBLER on it! You have to see it to believe it. Send $395 and we'll let you see it. For keeps.

POWER-ON RESET

In a few JOLT systems we have experienced the situation where the 6502 and 6530 do not properly reset. This condition occurs due to a slow rising reset signal and presents itself mostly by not properly resetting the JOLT during a power-up situation.

A simple way to clear up this problem wou would be to remove capacitor C1 and connect a momentary switch to ground. This would allow manual resetting after power-up. In order to get a good clean power-on reset (automatic reset when power is turned on) install the simple external circuit as shown in figure 1 of your JOLT CPU hardware manual.

Another method of clearing this problem is to add a capacitor/resistor circuit to pin 16 (*RESET) of the 6530 (U9) DEMON chip. Simply cut the trace leading into the chip (leave enough room to add a capacitor) and mount a .01 uf capacitor in series with pin 16 and the *RESET line. Also connect a 3.3K ohm pull-up resistor from the capacitor and pin 16 connection to +5Volts. Finally, change R13 from 4.7K ohms to 3.3K ohms.

CROW TO TAKE CHARGE OF JOLT CUSTOMERS

Darrell Crow, Editor of MICROCOMPUTER DIGEST AND INDUSTRY REPORT, will also be assuming the duties of Customer service for all of MICROCOMPUTER ASSOCIATES' JOLT CUSTOMERS.

Crow's background includes three years as editor of the magazine, five years as a senior engineering technician at American Microsystem's Inc.'s Microprocessor Department. Electronic education was received at the University of Nevada and West Valley College. Journalism education was at San Jose State College.

As head of JOLT Customer Service, Crow will be responsible for the production of the JOLT User's Newsletter, implementing a JOLT software library exchange, and helping customers solve problems with their systems.

So be sure to contact Darrell with any repairs and/or warranty servicing. Customer Service hours are 1:30 to 4:30 Monday thru Thursday.

6502 RAP/TINY BASIC ROMS FROM MAI

Microcomputer Associates Inc. has announced shipment of their 6502 Resident Assembler (RAP) Program and TINY BASIC interpretive program on ROM chips. Two 2K x 8 ROMs comprise the software ROM package housing the 1.75K RAP and the 2.2K TINY BASIC programs.

Formerly contained in seven 1702A PROMs, RAP is the only single pass Resident 6502 assembler available anywhere today. Statements are entered either from paper tape or directly from a terminal keyboard. RAP generates a listing and places object code into RAM for immediate execution. A minimum of 4K x 8 RAM memory is needed with the users' 6502 microcomputer. RAP allows a 6502 microcomputer to function economically as a microcomputer development system. Following assembly the programs can be debugged using the debugging facilities of DEMON, Microcomputer Associates' DEbug MONitor program housed in the 1K ROM section of a 6530 ROM/RAM- I/O-Interval timer circuit. A text editor is included.

For those microcomputer users who prefer to use a higher level language, TINY BASIC, a subset of Dartmouth BASIC, permits immediate entry and execution of TINY BASIC language programs. Statements include: LET, IF..., THEN, INPUT, PRINT, GO TO, GO SUB, RETURN, END REM, CLEAR, LIST, RUN, and functions RND (Random Number Generator) and USR (User SubRoutine) that allows branching, with arguments to assembly language subroutines. ROM software has been designed so that most any I/O devices can be used.

The ROMs are totally compatible with 2708 type PROMS.

The RAP/TINY BASIC ROM package (SW101) is priced at $200 and includes full documentation with deliveries from stock to 30 days ARO.

RAP is also available on a set of seven 1702A PROMs (SW200) for $295. TINY BASIC is available either in paper tape format (SW300) for $25 or on a set of nine 1702A PROMs (SW201) for $275. All software is fully documented with deliveries from stock to 30 days ARO.

JOLT BIOTHYTHM RUNNING INSTRUCTIONS

1. Power up JOLT and transfer control to TINY BASIC. TINY BASIC should output a ":" character indicating it is ready to input statements.

2. Hit LINE FEED on the teletypewriter. This prepares TINY BASIC to ready paper tape.

3. Start teletypewriter reader. The JOLT TINY BIORHYTHM source tape will be read in. The last statement is:

   990 END

4. Stop reader.

5. Using teletypewriter keyboard enter "RUN".

6. The TINY BIORHYTHM program will begin by typeing "BIRTHDATE" followed on the next line with a "?". Proceed to enter your birthdate: month, day and then year. Next your biorhythm date will be asked for (i.e. the date on which you want to know how your biorhythm parameters are treating you). After a carriage return your complete biorhythm is printed out indicating high and low cycles for physical, emotional, intellectual, compassion, aesthetic, self awareness and spiritual feelings.

BIORHYTHM PROGRAM LISTING

```
 10 PRINT "BIRTHDATE"
 20 INPUT A,B,C
 30 PRINT "BIORHYTHM DATE"
 40 INPUT X,Y,Z
 50 D=((11-A+X)*61)/2+(Z-C-1)*365+(Z-C+2)/4+31-B+Y
 60 IF A<3 GOSUB 500
 70 IF X>2 GOSUB 500
 80 PRINT "P,E,I,C,A,SA,S"
 90 V=23
100 GOSUB 700
110 V=V+5
120 IF V<54 GOTO 100
122 PRINT " "
124 PRINT " "
130 GOTO 10
500 D=D-2
510 IF C=C/4*4 THEN D=D+1
520 RETURN
700 P=(D-D/V*V)
705 PRINT P;"/";V,
710 H=(V+1)/2
720 M=0
730 IF M=P PRINT "↑";
735 IF M=P THEN M=M+1
740 IF M<H PRINT "+";
750 IF M>=H PRINT "-";
770 M=M+1
780 IF M<V GOTO 730
785 PRINT " "
790 RETURN
990 END
```

EXAMPLE

```
:RUN
BIRTHDATE
? 1,30,39
BIORHYTHM DATE
? 12,31,99
P,E,I,C,A,SA,S
8/23    ++++++++↑+++---------- (PHYSICAL)
17/28   ++++++++++++++---↑---------- (EMOTIONAL)
7/33    +++++++↑++++++++--------------- (INTELLECTUAL)
19/38   ++++++++++++++++++↑---------- (COMPASSIONATE)
18/43   ++++++++++++++++++↑+++---------- (AESTHETIC)
25/48   ++++++++++++++++++++++-↑---------- (SELF AWARENESS)
42/53   ++++++++++++++++++++++++++++---------↑---------- (SPIRITUAL)
```

PRODUCT CATALOG

Microcomputer Associates will be publishing their latest microcomputer product catalog hopefully in time for the Computer Faire in San Francisco, CA on April 15. To obtain your copy stop by the MAI booth or simply send in your request via normal mail channels.

MAI has added product model numbers to their offerings as well as several new additions to the JOLT family.

New offerings include:

- o CP110 SUPER JOLT - OEM Central Processor Card containing 6502 MPU, crystal clock, 28 bi-directional I/O lines, RS 232, 20 mA & TTL serial interfaces, timer, 1K x 8 ROM DEMON DEbugger/MONitor program, 1K x 8 static RAM memory, two sockets for 2708 EPROM, buffered CPU address & data lines. Optional RAP and TINY BASIC ROMs fit into available EPROM sockets.
- o CP200 8080 CPU - OEM Central Processor Card containing 8080 MPU, crystal clock, 24 bidirectional I/O lines, serial USART interface controlled from an external clock, 1K x 8 static RAM memory, two sockets for 2708 PEROMs, buffered CPU address and data lines. $375 Available now.
- o MM200 2K PROM CARD - Accepts eight 1702A type EPROM memories. Fully decoded and buffered. Fully compatible with CP100 (JOLT) CP110 (SUPER JOLT) and CP200 (8080) CPU Cards. $149. Available now.
- o MM210 4K/8K PROM CARD - Accepts eight 2704 (512 x 4) or eight 2708 (1K x 8) type EPROM memories. Fully decoded and buffered. 600 ns speed. Fully compatible with CP100/CP110/CP200 CPU Cards. Available 2Q77.
- o PD101 AUDIO CASSETTE - Interfaces to three audio casette units. Software drivers provided for HIT, BYTE and high speed recording standards. Provided with on-board audio jacks for easy interfacing to standard cassette recorders. Fully compatible with CP100/CP110/CP200 CPU Cards. $175. Available now.
- o PD102 2704/2708 PROM PROGRAMMER CARD - Programs up to two 2704s or two 2708s from system memory. Software driver program provided. No price established. Fully compatible with CP100/CP110/CP200 CPU Cards. Available 2Q77.
- o PD107 KEYBOARD INTERFACE - Converts an 88-position keyboard to ASCII characters Connects directly to system bus, strappable bus, strappable address. Interrupts CPU when key is hit. Two key roll over. Fully compatible with CP100/CP110 CP200 CPU Cards. No price established yet. Available 2Q77.
- o PD110 TRIAC OUTPUT - Switches 240 VAC at 2 Amps. Connects directly to system bus, strappable address. Screwdriver lug cable attachment. Dual output, separately controlled. No price established yet. Available 2Q77.
- o AS100 CARD CAGE - Provides support and PC Card interconnection (J1) for up to five cards. Power connectors included for each slot. Fan housing included. Bus expandable to additional card cages. Fully compatible with CP100/CP110/CP200 CPU cards as well as the full line of JOLT support cards. $195. Available.
- o AS101 MOTHER BOARD - The same PC card used in the card cage. Includes five J1 connectors and is fully compatible with CP100/CP110/CP200 CPU cards.. $99. Available now.
- o AS102 CARD EXTENDER - Used to extend MAI cards out of the card cage. Simplifies system checkout and troubleshooting. No price established yet. Available 2Q.
- o SW101 TINY BASIC/RESIDENT ASSEMBLER ROMs Two proprietary 2K x 8 mask ROMs (4K x 8) containing the 6502 Resident Assembler Program and JOLT TINY BASIC. Designed for immediate use on the CP110 SUPER JOLT CARD. $200. Available now.
- o SM1000 MICROCOMPUTER CONTROLLER - SUPER JOLT (CP110) system completely packaged in a low-profile 19" rack-mountable chassis. Front panel includes turnkey power switch and reset button. Rear panel includes 40 screwdriver lug cable attachments for I/O lines and 4 EIA connectors for terminal and peripheral interfacing. PC card space is provided for custom interfacing to the external world. Programmable to suit most any need. Ideal for OEM applications requiring a powerful dedicated processor. Line filter and power supply included. $895. Available 2Q77.

This should wrap up the new offerings from MAI. We'll keep you posted on availability, price changes and new product announcements.

GENERAL I/O WITH RAP AND TINY BASIC

The ROM Resident Assembler Program (RAP) and TINY BASIC (TB) were both written to use general I/O subroutines as defined by your system. RAM locations 0, 3, and 6 are used for storing jumps to read, write and Break* (TB ONLY) routines resp. The following examples illustrates its use:

USER I/O

LOC		
00	4Cxxxx	Jump to user Read routine
03	4Cxxxx	Jump to user Write routine
06	4Cxxxx	Jump to user Break routine

DEMON I/O

LOC		
00	4CE972	Jump to DEMON Read (RDT)
03	4CC672	Jump to DEMON Write (WRT)
06	4CZZZZ	Jump to Break Text*

DEMON I/O With High Speed Reader Input Option For TINY BASIC

LOC		
00	4C0600	Jump to User Read
03	4CC672	Jump to DEMON Write (WRT)
06	A6E8	
08	86E7	
0A	4Ce972	Now Jump to DEMON Read

*The Break Test is a feature of TINY BASIC only allowing the Break key to be recognized while output information is being sent.

Well, we've just started the ball rolling. C'mon and send us your general I/O routines so we can print them in the next issue.

SOFTWARE & CUSTOM PROTOTYPING

Do you own a JOLT or some other microcomputer system? Are you having trouble getting things to work? Is your software killing your schedule? Need some help? Call Microcomputer Associates (408) 247-8940. Besides producing the JOLT series of microcomputers, MAI has designed, prototyped or programmed over 130 custom microcomputer related tasks. They know your problems and have the solutions. Give them a call now.

THE TREE OF SPACE--OR HOW I GOT A BLANK 16 PAGE USERS MANUAL.

Below this article is a blank column. It has been carefully designed to motivate you into sharing with JOLT comrades the fruit of your labors. This magazine could be your magazine. Or it can be nothing. To make it everything, we need to work together. So let's all write, list, mail, publish.

The rest of this magazine has been donated to MAI's price list and order form. We hope you'll find the JOLT USERS NEWSLETTER a valuable tool in the use of microcomputing. We would also like your ideas on departments.

What do I mean?

Well, what would you all say to a USER's COUNTRY CORNER. A kind of let's swap, buy or sell column. There's a lot we can do with JUN, but we need you.

Send all contributions, comments, suggestions, contest entries, and other remarks to JOLT USERS NEWSLETTER c/o NELSON EDWARDS, WALLA WALLA COLLEGE, COLLEGE PLACE, WA 99324.

SPACE - THE FINAL FRONTIER

Effective May 1, 1977

MICROCOMPUTER ASSOCIATES PRODUCT AND PRICE LIST

	PRODUCT	PRICE
CPU CARDS		
CP100	JOLT CPU kit	$175
	assembled	$249
CP110	SUPER JOLT CPU kit	NE*
	assembled	$375
CP200	8080 CPU kit	NE*
	assembled	$375
MEMORY CARDS		
MM100	4K RAM Card kit	$199
	assembled	$247
MM200	2K PROM Card assembled	$149
PERIPHERAL CARDS		
PD100	I/O Card kit	$ 99
	assembled	$149
PD101	Audio Cassette assembled	$175
PD110	TRIAC Output assembled	NE*
POWER SUPPLY CARDS		
PS100	Power Supply Card kit	$ 99
	assembled	$149
PS101	Power Supply Card kit	$124
	assembled	$168
ACCESSORIES		
AS100	Card Cage assembled	$195
AS101	MOTHER Board assembled	$ 99
AS200	Universal Card	$ 35
AS300	Accessory Bag	$ 50
SOFTWARE		
SW100	DEMON	$ 40
SW101	TINY BASIC/RESIDENT ASSEMBLER ROMS	$200
SW200	Resident Assembler Program on PROMs	$275
SW201	TINY BASIC program on PROMs	$275
SW300	TINY BASIC program on paper tape	$ 25
SW301	Paper tape Line editor	$ 25
BOOKS		
JD100	JOLT Documentation	$ 50

NOTE: Prices subject to change without notice.
*Price not established at time of publication.

Microcomputer Associates Inc.
2589 Scott Blvd., Santa Clara, CA 95050

NAME_____ DATE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

QUANTITY	MODEL	DESCRIPTION	UNIT PRICE	ITEM TOTAL

SUB TOTAL	
TAX (CA ONLY)	
SHIP/HANDLING	$6.86
TOTAL	

BANKAMERICARD/MASTERCHARGE NO._____

_____

Exp. Date_____INTERBANK #_____

GENERAL ORDERING INFORMATION: Either personal check or money order. MAI reserves the right to hold shipment on an order until a personal check clears although this is not usually necessary. MAI accepts both Mastercharge and BANKAMERICARD, either by phone or mail. Charge accounts must be arranged prior to ordering. All orders under $100 will be shipped COD with a 5% COD surcharge ad added to the order up to a maximum surcharge of $10 for the s special handling COD"s require. Corporate POs will be accepted according to the terms and conditions of MAI.

MAI was founded in April 1974. Since its inception, MAI has become the most diversified and versatile microcomputer company today. In its second year of operation, MAI has proven its capabilities in areas such as hardware and software design, manufacturing of standard and custom products, component and literature distribution, educational workshops and seminars, and publishers of the only total microcomputer news source, the MICROCOMPUTER DIGEST.

MANUFACTURING

MAI is dedicated to producing high quality, functional microcomputer boards and systems. These include special and custom designs as well as MAI's own standard products. MAI specializes in delivering tested, ready to use microcomputer systems, including all software.

DISTRIBUTION

In support of its manufacturing activities, MAI buys in large volumes and passes this savings on to its customers. MAI stocks or can acquire most microprocessor and microprocessor-related components. MAI also carries literature from participating major microprocessor manufacturers as well as most related books and material.

SOFTWARE

MAI is skilled in programming all major microprocessors. Its technical staff has performed application tasks from data acquisition and special monitor programs to development software and higher level languages. The ability to tradeoff software and hardware into a cost effective system is MAI's speciality.

HARDWARE

MAI designs hardware relating to all aspects of a microcomputer system, from CPU and memory cards to special I/O interfaces related to your application.

WORKSHOPS AND SEMINARS

MAI has conducted over 150 public and inhouse microcomputer courses including 4004, 8008, 8080 and PL/M workshops for the Intel Corp., as well as world-wide courses as faculty members of Integrated Computer Systems International. MAI has also presented many customized, on-site workshops and seminars that have spanned from a general introduction to microprocessors to presenting specific inhouse designs. MAI will be pleased to work with you to identify a suitable course outline.

MICROCOMPUTER DIGEST

In addition to providing the above technical microcomputer design and manufacturing services, Microcomputer Associates publishes monthly the MICROCOMPUTER DIGEST. This publication summarizes all activities in the microcomputer area, including foreign and domestic microcomputer developments, applications, main frame and peripheral product announcements, hardware and software design techniques, industry trends and predictions, literature reviews and interviews with notable personalities in the microcomputer industry.

Each quarter a supplementary REFERENCE INDEX is also mailed to Microcomputer Digest subscribers. This index includes a complete bibliography of all microcomputer related material during that quarter that has appeared in print, as well as a listing of microcomputer manufacturers and service organizations.

Once a year, the ANNUAL INDEX classifies and lists all articles printed in the Digest over the previous twelve month period.

Microcomputer Digest is distributed worldwide.

LATE PAYMENT PENALTY

All invoices not paid within 45 days of the invoice date are considered "overdue." The following penalties automatically occur on an overdue account.

1. All discounts on that invoice are voided. A new invoice for the amount of the discounts will be issued. The original invoice remains due and payable in full.
2. The amount of an overdue invoice shall not be included in any later computation of "Accumulated Dollar Schedule."
3. Future orders from the customer will be accepted only on a C.O.D. or cash with order basis until credit is reestablished to MAI's satisfaction.

TERMS

1. 2% 10 Days, Net 30 Days, FOB Santa Clara, CA 95050.
2. All orders subject to credit verification.
3. Discounts voided on invoices not paid in 45 days.
4. International orders must be prepaid or preceded by an irrevocable letter of credit. Minimum international order: $300.
5. All pricing, including volume, OEM and discounts, is established by Microcomputer Associates Inc. and is subject to change without notice.

VOLUME AND OEM PRICING

Microcomputer Associates Inc. quotes quantity orders for its products on the basis of customer product configuration, total quantities and delivery schedule. These quotations provide firm prices for up to 18 months. To qualify for factory quoted volume or OEM pricing an order must be for at least 50 units of one microprocessor system over a 12 month period or have a total list price value exceeding $25,000. Orders not meeting one of these qualifications will be priced according to the latest published price list and the dollar volume discount schedule.

BASE PRICE

The price basis for an order made under this policy is the published Price List in effect at the time a particular order is placed.

Microcomputer Associates Inc.
2589 Scott Blvd. Santa Clara, CA 95050

NAME _____ DATE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

QUANTITY	MODEL	DESCRIPTION	UNIT PRICE	ITEM TOTAL

BankAmericard/Master charge No.

_____

Exp. Date _____ Interbank # _____

Signature _____

SUB TOAAL	
TAX (CA ONLY)	
SHIP/HANDLING	$6.86
TOTAL	

GENERAL ORDERING INFORMATION: Either personal check or money order. MAI reserves the right to hold shipment on an order until a personal check clears although this is not usually necessary. MAI accepts both MASTERCHARGE AND BANKAMERICARD, either by phone or mail. Charge accounts must be arranged prior to ordering. All orders under $100 will be shipped COD with a 5% COD surcharge added to the order up to a maximum surcharge of $10 for the special handling COD's require. Corporate Purchase Orders will be accepted according to the terms and conditions of MAI. INTERNATIONAL ORDERS: Prepayment should be cabled to Account#00417-06355, Bank of America, 215 So. Murphy Ave. Sunnyvale, CA 94086 U.S.A.

MAI was founded in April 1974. Since its inception, MAI has become the most diversified and versatile microcomputer company today. In its second year of operation, MAI has proven its capabilities in areas such as hardware and software design, manufacturing of standard and custom products, component and literature distribution, educational workshops and seminars, and publishers of the only total microcomputer news source, the MICROCOMPUTER DIGEST.

MANUFACTURING

MAI is dedicated to producing high quality, functional microcomputer boards and systems. These include special and custom designs as well as MAI's own standard products. MAI specializes in delivering tested, ready to use microcomputer systems, including all software.

DISTRIBUTION

In support of its manufacturing activities, MAI buys in large volumes and passes this savings on to its customers. MAI stocks or can acquire most microprocessor and microprocessor-related components. MAI also carries literature from participating major microprocessor manufacturers as well as most related books and material.

SOFTWARE

MAI is skilled in programming all major microprocessors. Its technical staff has performed application tasks from data acquisition and special monitor programs to development software and higher level languages. The ability to tradeoff software and hardware into a cost effective system is MAI's speciality.

HARDWARE

MAI designs hardware relating to all aspects of a microcomputer system, from CPU and memory cards to special I/O interfaces related to your application.

WORKSHOPS AND SEMINARS

MAI has conducted over 150 public and inhouse microcomputer courses including 4004, 8008, 8080 and PL/M workshops for the Intel Corp., as well as world-wide courses as faculty members of Integrated Computer Systems International. MAI has also presented many customized, on-site workshops and seminars that have spanned from a general introduction to microprocessors to presenting specific inhouse designs. MAI will be pleased to work with you to identify a suitable course outline.

MICROCOMPUTER DIGEST

In addition to providing the above technical microcomputer design and manufacturing services, Microcomputer Associates publishes monthly the MICROCOMPUTER DIGEST. This publication summarizes all activities in the microcomputer area, including foreign and domestic microcomputer developments, applications, main frame and peripheral product announcements, hardware and software design techniques, industry trends and predictions, literature reviews and interviews with notable personalities in the microcomputer industry.

Each quarter a supplementary REFERENCE INDEX is also mailed to Microcomputer Digest subscribers. This index includes a complete bibliography of all microcomputer related material during that quarter that has appeared in print, as well as a listing of microcomputer manufacturers and service organizations.

Once a year, the ANNUAL INDEX classifies and lists all articles printed in the Digest over the previous twelve month period.

Microcomputer Digest is distributed worldwide.

LATE PAYMENT PENALTY

All invoices not paid within 45 days of the invoice date are considered "overdue." The following penalties automatically occur on an overdue account.

1. All discounts on that invoice are voided. A new invoice for the amount of the discounts will be issued. The original invoice remains due and payable in full.
2. The amount of an overdue invoice shall not be included in any later computation of "Accumulated Dollar Schedule."
3. Future orders from the customer will be accepted only on a C.O.D. or cash with order basis until credit is reestablished to MAI's satisfaction.

TERMS

1. 2% 10 Days, Net 30 Days, FOB Santa Clara, CA 95050.
2. All orders subject to credit verification.
3. Discounts voided on invoices not paid in 45 days.
4. International orders must be prepaid or preceded by an irrevocable letter of credit. Minimum international order: $300.
5. All pricing, including volume, OEM and discounts, is established by Microcomputer Associates Inc. and is subject to change without notice.

VOLUME AND OEM PRICING

Microcomputer Associates Inc. quotes quantity orders for its products on the basis of customer product configuration, total quantities and delivery schedule. These quotations provide firm prices for up to 18 months. To qualify for factory quoted volume or OEM pricing an order must be for at least 50 units of one microprocessor system over a 12 month period or have a total list price value exceeding $25,000. Orders not meeting one of these qualifications will be priced according to the latest published price list and the dollar volume discount schedule.

BASE PRICE

The price basis for an order made under this policy is the published Price List in effect at the time a particular order is placed.

WCCF 77

Microcomputer Associates Inc.

Manny R. Lemas
President

Ray M. Holt
Vice-President

NEWS

SUPER JOLT - A SUPER COMPACT SINGLE BOARD COMPUTER FEATURING OVER 5000 BYTES OF RESIDENT SYSTEM SOFTWARE.

Santa Clara, CA.....Microcomputer Associates Inc. has begun shipments of the SUPER JOLT card, the latest addition to their JOLT family of microcomputer card modules. SUPER JOLT, the most compact single board computer available, measures a mere 4¼" by 7" and contains the 8 bit 6502 microprocessor, 1,024 bytes static RAM, 32 bidirectional and programmable I/O lines, a 1 megahertz crystal controlled clock, an interval timer, 4 interrupts including a timer interrupt and a non-maskable interrupt, three serial interfaces: 20 ma current loop, RS 232 and TTL, as well as 5,120 bytes of resident ROM program memory that includes a complete single pass Resident Assembler Program called RAP, a resident TINY BASIC interpretive language designed especially for JOLT systems and the 1,024 byte DEMON DEbug MONitor program.

The incredibly compact SUPER JOLT with its Resident Assembler Program can function as a single card development system permitting assemblies to be made with only a single pass of a source program from a terminal or via a TTY paper tape reader. Following assembly, the programs can be debugged using the debugging facilities of the DEMON DEbug MONitor program.

For those who prefer to use a higher level language, a subset of Dartmouth BASIC called TINY BASIC is available on board, which permits immediate entry and execution of TINY BASIC language programs. The ROM software has been designed so that most any I/O devices can be used.

By removing the RAP and TINY BASIC ROMs, the SUPER JOLT card becomes a compact general purpose microcomputer card suitable for any dedicated application. The vacated ROM sockets may be used for the user's programmed ROMs or for the user's programmed 2708 type PROMs.

Ray M. Holt, Executive Vice President of Microcomputer Associates and designer of the JOLT line of microcomputer products,

states that "SUPER JOLT is certainly our best product to date. The card is intended principally for the industrial market, but will also attract the growing computer hobbiest market by providing a resident user oriented language in the form of TINY BASIC. Buffering for all address and data lines provides easy expansion to additional card modules."

Manny R. Lemas, MAI President added "With SUPER JOLT we've succeeded once again in providing the maximum amount of usable microcomputer product in the least amount of space. The most important feature of any microcomputer product is how easy is it to use. SUPER JOLT features over 5K of resident system software including debugger, symbolic assembler and standard higher level language. Its a development system, prototyping system, a dedicated applications card, and a computer hobbiest's delight all rolled into one. It's, well in a word, it's SUPER."

SUPER JOLT is further supported by a complete family of existing JOLT card modules including 4K RAM, 2K 1702A PROM, Input/Output, Power supply and Universal Card. A five slot card cage and an 8080 CPU card module substitute are also available. Soon to be announced are the A/D, D/A card and the cassette interface card.

Single unit pricing for the SUPER JOLT card, fully assembled and tested is $375 without RAP and TINY BASIC ROMs, and $575 with the ROMs. Quantity discounts are also available. Prices of other JOLT cards, in kit form begin as low as $96.

In the U.S. and Canada, JOLT products are available directly from Microcomputer Associates Inc. as well as participating computer stores and James Electronics. JOLT products are also distributed off shore in Japan, Australia, Taiwan, Great Britain, Spain, France, West Germany and the Netherlands.

For further information contact:

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