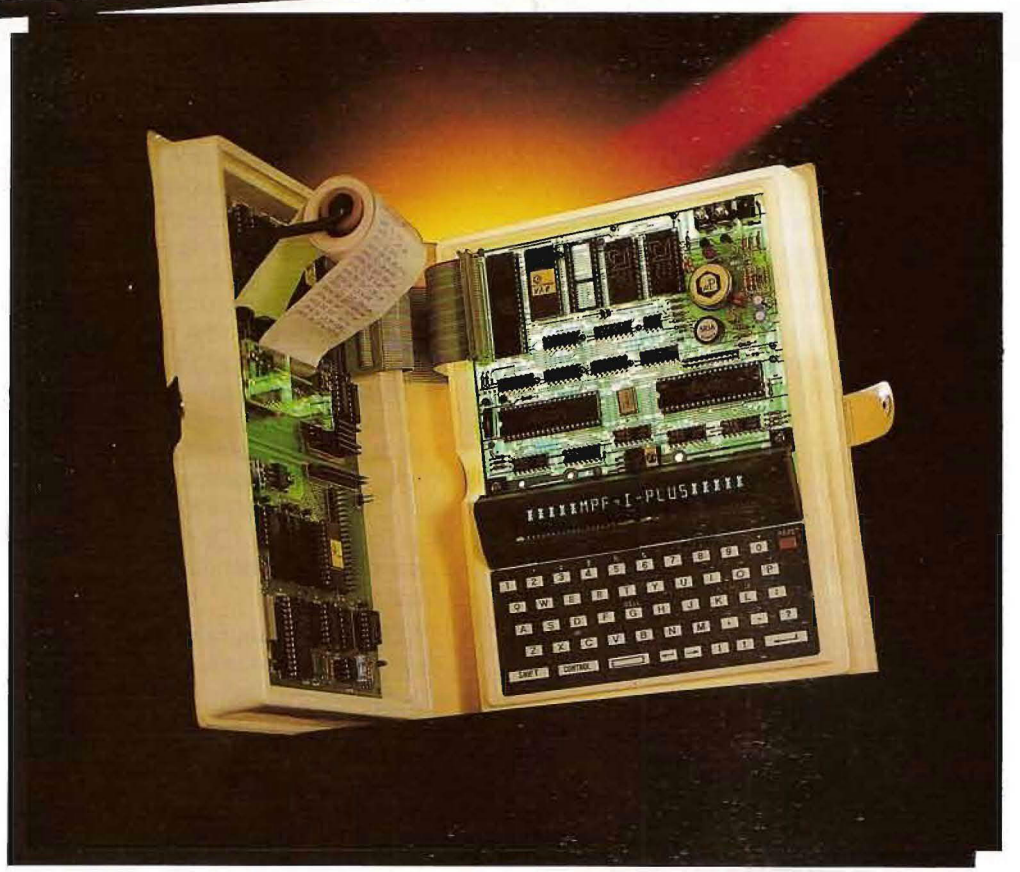
UNLOCK YOUR FUTURE

SEP 1 2 1983

Learn Computing...

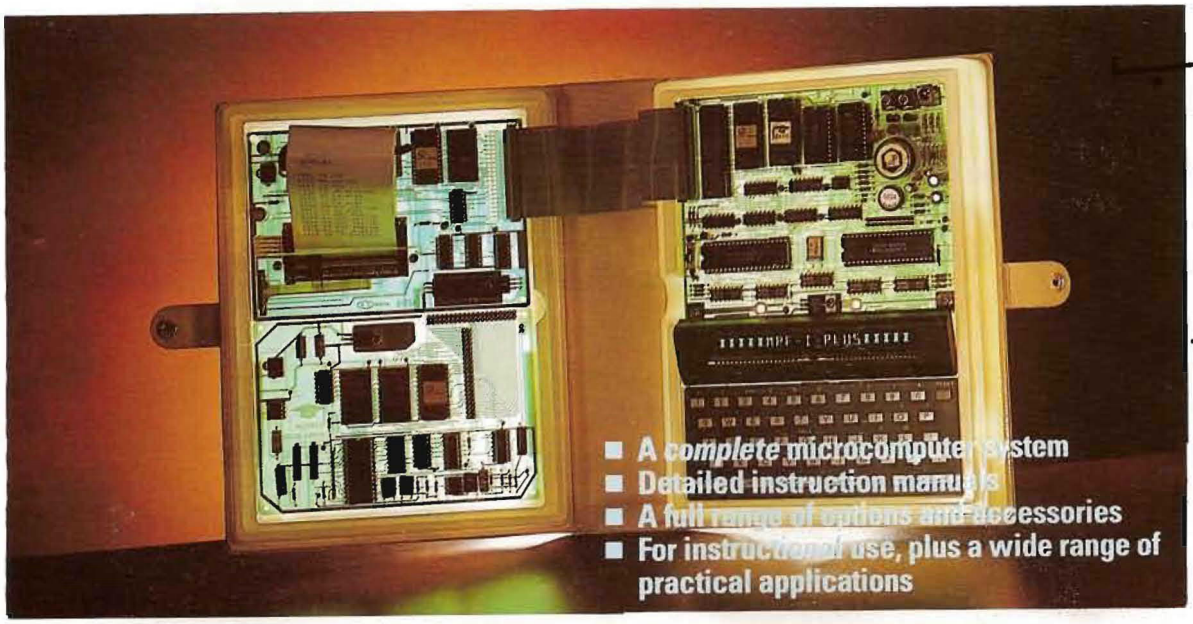
- At Your Own Speed
- On Your Own Time
- In Your Own Environment

with the MICRO-PROFESSOR



THE MICRO-PROFESSOR

EVERYTHING YOU NEED TO LEARN COMPUTER BASICS IN ONE ECONOMICAL PACKAGE.



By 1990, if you don't know computer basics you may not have a job. Computing is becoming as essential as reading and writing. But you know that—you already have basic knowledge of how microcomputers work, and a thirst for full understanding.

Now add the Micro-Professor to your basic grasp of microcomputing. Result: you get computer 'literacy.' You'll be much more effective. Your earnings potential will go 'way up.' Your new skills can be put to immediate, practical use.

Who needs the Micro-Professor? You do! If you're a high school or college student, you want it. If you're an engineer or technician working in any technical discipline, you need it. If you're employed in a technical company in any job, you can benefit from it. If you're one of the millions who want to become part of our future world where computers will be more and more important, your Micro-Professor will be the best investment you've ever made—an investment in yourself.

The Micro-Professor gives you all you need to join the growing world of microcomputing. It's a complete, fully developed, tested and proven system that gives you step-by-step, start-to-finish, hands-on instruction. It covers all key aspects of understanding and using the popular Z-80 microprocessor. It includes interactive Monitor, Line Assembler, Two Pass Assembler, Text Editor and Disassembler. Optional languages include BASIC and FORTH. Battery back up circuits provided for the users to keep the contents of the RAMs.

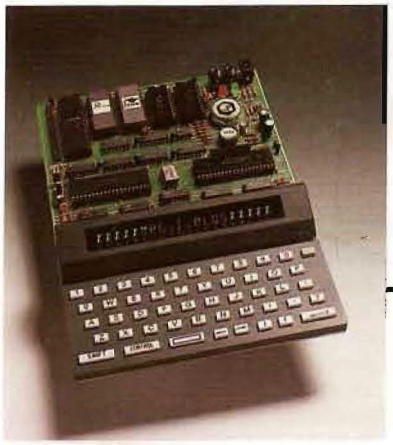
In addition to its instructional power, the Micro-Professor shows you how to 'breadboard' and prototype your own microprocessor-based hardware. It lets you create the software you need to make the hardware work in your specific application.

What do you get? Your Micro-Professor includes the complete microprocessor system with all the instructional manuals you need (see manual illustrations on page five). The system includes its own AC power supply. Extra options put you in the forefront of computing:

- EPROM to store your programs on IC permanently;
- Speech synthesizer to add the latest dimension of voice;
- Printer to let you record and list your working results;
- Sound generation, to permit musical composition;
- I/O and Memory board to provide serial/parallel ports and memory expansion.
- TV interface board to permit you to list program/data on TV.
- An experiment/expansion accessory kit choice

Let the Micro-Professor unlock your future!

PRODUCTS

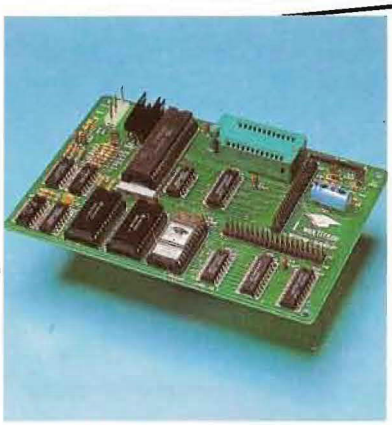


The MPF-IP Micro-Professor: the total teacher.

Everything you need to become proficient in microcomputing is included with your basic Micro-Professor. You get the Z-80 processor chip with on-board 4K-byte RAM and 8K-byte ROM, accessed by high-quality, 49-key keyboard, with its own internal power supply.

There's much more: The built-in speaker, the interface for program storage/reading to and from cassette, 20-digit, 14-segment alpha-numerical green tube display, 48 input/output lines, Battery back up circuits for the RAM contents, bus-expandable Z-80 architecture as a standard feature, and three essential user manuals.

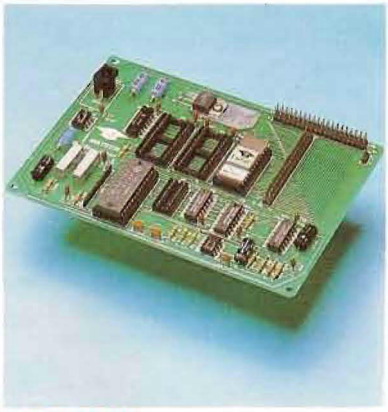
Z-80 is a registered trademark of Zilog Inc.



EPB-MPF-IP
EPROM Memory Option: extra processing power.

The optional EPROM programmer board adds power and flexibility to your Micro-Professor. It's a single, plug-in card with its own connector that can accept currently available 1K, 2K, 4K and 8K EPROM devices operating on + 5V power.

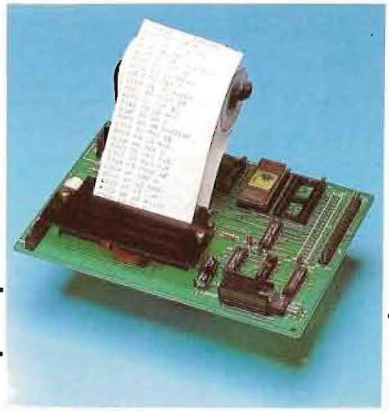
The EPROM board lets you read data from EPROM memory onto the RAM buffer, then verify, display, list or modify the data. You can write data from RAM to EPROM memory as required by your program, and delet/insert at will using both memory capabilities.



SSB-MPF-IP
Speech Synthesizer Option: adding the voice dimension.

The optional Speech Synthesizer board lets you create voice output from your Micro-Professor. The board—complete and ready to plug in—uses the reliable, fully developed speech-synthesis microcircuit produced by Texas Instruments. You get a 20-word vocabulary plus time-clock program on the board, from the existing 1,200-word TI word 'library.' Additional EPROM sockets on the board allow you to add words selectively as you need them.

You enter commands through the Micro-Professor keyboard and hear the words through the on-board audio speaker standard with your MPF-IP



PRT-MPF-IP

Printer Option:
read and store your data.

The optional printer gives you a permanent, written alphanumeric record of data and programs from your Micro-Professor. The compact thermal print mechanism forms clear, easily read letters and numbers at almost one line per second on a 20-character width, like this:

```
010 LET A=0
020 INPUT C
030 IF C>7 THEN 70
040 GOSUB 200
050 PRINT A
060 STOP
070 GOSUB 100
080 PRINT A
090 STOP
100 FOR B=1 TO C
110 LET A=A+B
120 NEXT B
2000 AF XOR A
2001 21 LD HL,1800
2004 77 LD (HL),A
2005 11 LD DE,1801
2008 01 LD BC,07AC
200B ED LDIR
200D 2F CPL
200E 21 LD HL,18E7
```

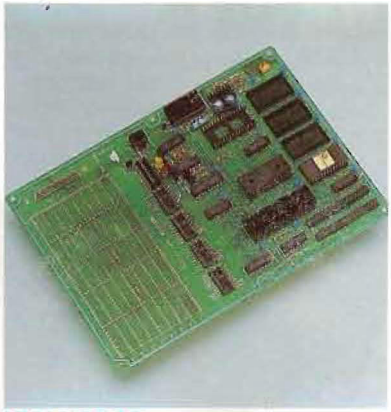
The printer board incorporates several useful features, such as Memory Dump Utility and Z-80 disassembler-listing Utility.
printer Driver utility.

SGB-MPF-IP

Sound Generation Option:
add musical composition.

The optional Sound Generation board converts your Micro-Professor into a system for producing music and other sounds—a three-octave electronic organ with replay and 'rhythm' available, as well as a melody or sound generator. A built-in audio speaker on the board provides high-quality sound output. Your sound 'programs' are entered through the keyboard.

The rapid growth of synthesized music by computer, and the wide use of electronic sound generation in many fields of music, provides the basis for a valuable learning experience with your Micro-Professor.



IOM-MPF-IP

Input/Output and Memory Board:
Expand the Memory and I/O ports

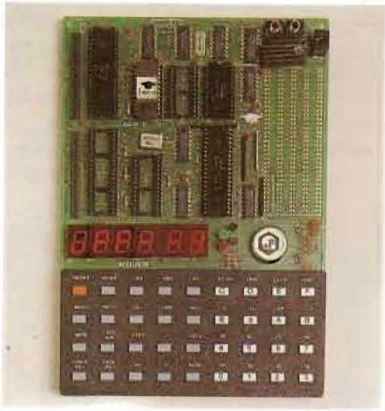
The Input/Output and Memory Board provides you the Counter/Timer chip (Z80-CTC), Communication Interface Chip (USART 8251) and Parallel-I/O chip (Z80-PIO) kits to increase the MPF-IP I/O capacity to interface with the outside environment. So that MPF-IP is the starting choice of professionals for microcomputer design and product applications.
It also provides extra 6K-bytes RAM and 4K-bytes ROM to expanse the memory space of MPF-IP.

MPF-I

ACC-MPF
Accessory Options:
increasing your capabilities.

Optional experiment/expansion kit provides the means for a broad range of working/learning experiments with your Micro-Professor:

- 40-wire flexible ribbon connector to wire-wrap board
- IC/resistor/capacitor workboard for component insertion
- counter/time and parallel-I/O chip kits
- reusable experimental breadboard
- RAM expansion to 4K bytes
- blank 4K-byte EPROM for program storage.



MPF-I Micro-Professor

Z80 CPU high performance microprocessor with 158 instructions.
2K RAM expandable to 4K.
2K ROM, sophisticated monitor expandable to 8K.
24 I/O system lines.
2K of sophisticated monitor, including system initialization, keyboard scan, display scan, and tape write and read.
6 digit, 0.5" red LED display.
Audio cassette interface: 165 bit/sec. average rate for data transfer between memory and cassette tape.
Extension connectors: All CPU buses, CTC channel signals and I/O port bus usable for expansion.
Counter timer circuit provided.
Parallel I/O circuit socket provided.
2.5" diameter speaker.
Driver circuits
3.5" x 1.36" wire wrapping area for expansion.
9V, 0.6A adaptor provided.
Three complete self-learning textbooks with experiments and applications.
Keyboard: 36 keys including 19 function keys, 16 hex-digit keys and 1 user defined key.
Tiny BASIC interpreter with two special features. Allows user to call subroutines written in machine code residing in memory. Allows user to write variable values into desired memory address or read the value of variables from a specific memory address.

EPB-MPF EPROM Programmer Board

For all +5V 1K/2K/4K EPROMs.
MFP-1 compatible, using 40 pin flat ribbon cable and connector.
Single +5V 2K EPROM, 2516 x 1. Monitor EPROM address: 9000-97FF.
Static 4K RAM, 6116 x 2. Basic RAM address: 8000-8FFF.
Programmable I/O port, 8255 x 1.24 parallel I/O lines. I/O address: CC-CF.
Main power input: 30V/75mA and 9V/400mA adaptors provided.
24-pin, zero insertion force socket textool.

SSB-MPF Speech Synthesizer Board

High reliability TI TMS 5220/5200.
Two EPROM sockets for expanding vocabulary.
Share Z80 CPU of MPF-1 as host controller.
MPF-1 keyboard and speaker used for input/output.
Adjustable voice pitch and volume.
9V, 0.5A adaptor provided

PRT-MPF Thermal Printer

5 x 7 matrix characters.
Built-in alphanumeric character patterns.
Built-in MPF-1 memory dump utility.
Built-in MPF-1 BASIC program listing utility.
Built-in Z80-disassembler listing utility.
20 characters, 138 dots per line.
9V, 1A adaptor provided

SGB-MPF Sound Generation Board

High-reliability GI-AY-3-8910 programmable sound generation chip.
4K EPROM for storing sound generation programs and data.
One EPROM socket for expanding sound data.
Shares Z80 CPU as host controller and 2K RAM of MPF-1 as memory for sound data.
Built-in amplifier circuit and high quality speaker.

ACC-MPF Experiment/Expansion Kit

Mini-breadboard for insertion of ICs, resistors and capacitors for experiments.
Z80-CTC (counter and time chip) and parallel I/O chip to expand MPF capability.
Flexible ribbon, 40-wire wrap connector connects MPF to breadboard.
Reusable breadboard.
2K RAM to expand to 4K static memory.
Blank 4K EPROM for permanent program storage.

SOFTWARE

MPF-IP Monitor Commands

RESET Enter and Initialize Monitor
CTRL Q Re-enter Monitor
CTRL E Initialize Text Buffer and Enter Text Editor
CTRL R Re-enter Text Editor
CTRL A Enter Two Pass Assembler
CTRL L Enter Line Assembler
CTRL D Enter Disassembler
CTRL B Initialize and Enter BASIC interpreter
CTRL C Re-enter BASIC interpreter
CTRL P Printer Control

Display/Alter Registers

R Display Register Contents
↓ Display contents of Next register set
↑ Display contents of Previous register set
: Alter Contents of register

Display/Alter Memory

M Display selected Memory contents
↓ Display Next four bytes of memory contents
↑ Display previous four bytes of memory contents
: Alter current memory contents
. Dump a block of memory contents
/ Move a block of memory contents
F Fill RAM buffer with data
J Relative address calculation
I Insert a block of data into memory
D Delete one byte of data from memory

Execution/Trace

G Execution of program
S Single step execution

Break point Manipulation

B Set/Clear Breakpoints

Load/Dump Memory

L Load memory contents from the tape recorder
W Store memory contents to the tape recorder

Advanced Interactive Monitor

MPF-IP software resides as firmware in 8K bytes ROM on the single-board computer. This monitor responds to a comprehensive set of self-prompting, single-key commands. The monitor include powerful Line Assembler, Disassembler, Text Editor and Two Pass Assembler. It also provides the interface to the optional BASIC and FORTH interpreters.

Line Assembler

The Line Assembler allow to keyin program by mnemonic codes. Each line will be store in memory in machine code. The memory space could be reduced.

Disassembler

The Disassembler allows you to list the Z80 machine codes on the green tube display and optional printer in mnemonic form with symbolic labels.

Text Editor

The Text Editor allows you to add, change or delete instructions anywhere in a program without affecting any other portion. It uses sample commands, which may be displayed or listed to the printer or display. The source code in the edit buffer is translated into machine code by the Two Pass Assembler.

Two Pass Assembler

The Two Pass Assembler allows the user to write exceptionally efficient programs for applications in which execution speed is critical-real-time process control, for example. The Two Pass Assembler shortens the development and documentation time for complex programs by allowing the user to assign labels to instructions, subroutines and data locations.

BASIC interpreter

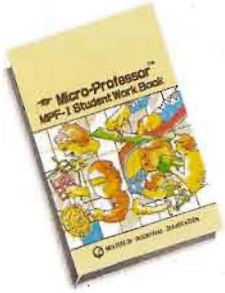
An easy-to-learn language, BASIC is the most widely used programming tool for general computational tasks. The MPF-IP BASIC interpreter contained on 8K bytes ROM which includes floating point arithmetics. The MPF-IP BASIC interpreter can slove business, engineering and scientific problems, assist with decision-making, teach, even entertain.

FORTH Language

FORTH gives MPF-IP users an expandable, structured, stack-oriented language which is programmed in Reverse Polish Notation, the same as that used in popular, programmable scientific calculations. Relative to other language, FORTH is so simple to use for control applications that even non-programmers can use it successfully. FORTH is contained 8K bytes ROM., plugged directly into the MPF-IP single-board computer.

MICRO-PROFESSOR MANUALS AND WORKBOOK: ALL THE INSTRUCTION YOU NEED.

Included with the Micro-Professor



Optional $14.95

User's Manual

Standard with your Micro-Professor, this basic manual provides you with a full understanding of all the features and capabilities of your system. Contents include:

- Hardware/software specifications and physical configuration
- General description and operation introduction
- Detailed hardware/software descriptions
- Monitor subroutines
- Memory check data
- Appendices and references
- Text Editor
- Assembler and Disassembler
- Memory Mapping

Experimental Manual

Furnished with your Micro-Professor, this manual covers all facets of learning with and using your system and exercising its complete capabilities. Material covered comprehensively includes:

- Designing microcomputer programs
- Data transfer experiments
- Complete mathematical/logical functions (nine experiments)
- System applications (eight experiments)
- Display function and operation

Monitor Program Source Listing Manual

Also part of the basic Micro-Professor package, this manual gives you the complete source-code listings of the **MPF-IP monitor, providing the** user with a detailed insight into all the capabilities and functions of the complete system from the programming standpoint.

Student Workbook (optional at extra cost)

Available optionally for your Micro-Professor, the Student Workbook is a 100-page, step-by-step instructional 'system' to bring you from initial unpacking and turnon of your MPF-IP to full working familiarity. Written in easy-to-understand tutorial form, the Workbook provides effective, explanation-exercise-answer formats on all key operations, applications and functions. The eight chapters include keyboard familiarization, avoidance of programming problems, introduction to the hardware and software, an explanation of the monitor and its useful routines, and data on how to read and understand the hardware schematic. Appendices provide detailed, helpful references, an explanation of keyboard capabilities and full definitions of all registers used in the system.

Although optional, the Student Workbook is an essential reference tool for serious students of the Micro-Professor.

SPECIFICATIONS

MPF-IP Micro-Professor

Z80 CPU high performance microprocessor with 158 instructions.
4K RAM, Battery Back-up circuits provided for the users to keep the contents of the RAMs.
8K ROM, sophisticated monitor expandable to 16K.
8K of sophisticated moitor, including text editor, two pass assembler, line assembler, break point, system initialization, keyboard scan, display scan, type write and tape read, register and memory modification, insert, delete, move relation, fill and step execution.
20 digits, 14-segment green tube display.
49-key alphanumeric keyboard including editing and functional keys.
Audio cassette interface: 165 bit/sec. average rate for data transfer between memory and cassette tape.
Extension connectors: all CPU buses usable for expansion.
2.25" diameter speaker.
9V, 0.6A adaptor provided.
Three complete self-learning textbooks with experiments and applications.

EPROM Programmer Board

For all + 5V 1K/2K/4K/8K EPROMs.
MFP-IP compatible, using 40 pin flat ribbon cable and connector.
Single + 5V 4K EPROM, 2732 x 1
Monitor EPROM address: 9000-9FFF.
Static 2K RAM, 6116 x 3 Basic RAM address: D800-EFFF
Programmable I/O port, 8255 x 1.24 parallel I/O lines. I/O address: 78-7F
Main power input: 9V/500mA adaptors provided.
28-pin, zero insertion force socket textool.

Speech Synthesizer Board

High reliability TI TMS 5220/5200.
Two EPROM sockets for expanding vocabulary.
Share Z80 CPU of MPF-IP as host controller.
MPF-IP keyboard and speaker used for input/output.
Adjustable voice pitch and volume.
9V, 0.5A adaptor provided.

Thermal Printer

5 x 7 matrix characters.
Built-in alphanumeric character patterns.
Built-in MPF-IP memory dump utility.
20 characters, 138 dots per line.
9V, 1A adaptor provided.

Sound Generation Board

High-reliability GI-AY-3-8910 programmable sound generation chip.
4K EPROM for storing sound generation programs and data.
One EPROM socket for expanding sound data.
Shares Z80 CPU as host controller and 4K RAM of MPF-IP as memory for sound data.
Built-in amplifier circuit and high quality speaker.

Experiment/Expansion Kit

Mini-breadboard for insertion of ICs, resistors and capacitors for experiments.
Z80-CTC (counter and time chip) and parallel I/O chip to expand MPF capability.
Flexible ribbon, 40-wire wrap connector connects MPF to breadboard.
Reusable breadboard.
2K RAM to expand to 4K static memory.
Blank 4K EPROM for permenent program storage.

Input/Output and Memory Board

Z80-CTC (Counter and Timmer chip), Z80-PIO (Parallel I/O chip) and 8251 (USART Communication Interface chip). Static 6K RAM, 6116 (or equivalent) X 3 and 4K EPROM for memory expansion.

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MULTITECH INDUSTRIAL CORPORATION

FACTORY: 5, TECHNOLOGY ROAD III
HSINCHU SCIENCE-BASED INDUSTRIAL PARK.
HSINCHU, TAIWAN, 300, R.O.C.

MARKETING DIVISION:
977, MIN SHEN E. ROAD, TAIPEI, 105, TAIWAN, R.O.C.
TEL: (02)769-1225(10 LINES) TLX: 19162 MULTIIC
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* Specifications subject to change without prior notice.

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