

**NEEDS ASSESSMENT STUDY**  
**FOR**  
**A PROPOSED PROGRAM IN**  
**ELECTRONIC COMPUTER MICROPROCESSORS TECHNOLOGY**

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PART I

PROGRAM DESCRIPTION

Mission Statement  
Design Criteria  
Performance Goals

## PROGRAM DESCRIPTION

### Mission Statement:

This two year Associate Degree in Applied Arts and Science is designed to develop skills and knowledge essential for employment in the field of Electronic Computer Microprocessors Technology. The student will gain technical experience utilizing microprocessing technology in designing electro-mechanical and electronic control systems, processes, and equipment. This program will specify equipment by introducing him to typical products in the market and by in depth study of the most used equipment. He will be introduced to machine language and assembly language, programing of various commercially available microprocessor systems, and will write programs to apply these systems to practical applications. Interfacing the microprocessor and the outside world will be studied by actual applications.

### DESIGN CRITERIA I

The Electronic Computer Microprocessor Technology Program will provide the student with technical experience to acquire an understanding of the application of microprocessor technology in the design of mechanical, electro-mechanical and control systems.

### Performance Goals:

- P. G. I The student will be able to demonstrate the use of Microprocessors Technology hardware such as ~~buss structures, the MPV Organization,~~ and philosophy utilizing the 8080 and 6800 units. *80286 other processors ? ?*
- P. G. II The student will be able to demonstrate the use of peripheral sources: the clock generator, Asynchronous Communications Interface Adapter (ACIA), Synchronous Serial Data Adapter (SSDA), Peripheral Interface Adapter (PIA), Random Access Memory (RAM), and Read Only Memory (ROM).
- P. G. III The student will be able to demonstrate the Microcomputer Organization, including the MPU Signals, Memory Addressing, Device Select Pulses, and the Memory Mapped and Accumulator I/O.
- P. G. IV The student will develop an understanding of the use and function of the software which includes the 8080 Instruction Set, Simple Micro-computer Programs, RS232 and 20MA Loop Structure, and Basic Peripheral Devices. Basic Peripheral Devices includes the teletypewriter and keyboards, CRT Terminal, printer, paper tape punch and reader, magnetic tape, and the floppy disc.

### DESIGN CRITERIA II

The Electronic Computer Microprocessors Technology Program will provide the necessary technical experience to maintain and repair mechanical, electro-mechanical and control systems utilizing microprocessor technology.

## DESIGN CRITERIA II

### Performance Goals:

- P. G. I The student will be able to demonstrate the use of advanced micro-processor programming which interrupts, subroutines, and control routines (Proportional control, Liner control, etc.).
- P. G. II The student will demonstrate the use of digital to analog and analog to digital convertors.
- P. G. III The student will demonstrate the use of probes and sensors which includes pressure sensors, temperature sensors, and strain guages.
- P. G. IV The student will demonstrate the use of servos which includes the solenoids and linear servos and motors and rotary servos.
- P. G. V The student will be able to demonstrate the function and the use of data loggers.
- P. G. VI The student will be able to demonstrate the use of data manipulation and storage.

## DESIGN CRITERIA III

The Electronic Computer Microprocessor Technology Program will provide the necessary technical experiences related to the understanding of the functions of the current Electronic Computer Microprocessor equipment used in business, industry, and the medical field.

### Performance Goals:

- P. G. I The student will research a microcomputer based system which will control, monitor an industrial process machine, business machine, automotive function or a medical application.
- P. G. II Utilizing the research information, the student will design a microcomputer based system.
- P. G. III The student will construct a microcomputer based system from the design.
- P. G. IV The student will test and refine the microcomputer based system.
- P. G. V The student will demonstrate the microcomputer based system.

PART II

SURVEY RESULTS OF NEEDS - STUDY

## ELECTRONIC COMPUTER MICROPROCESSORS TECHNOLOGY

### I. Introduction

In September, 1979, the Department of Engineering Related Technology and the Office of Career Education conducted a survey to ascertain the interest for an Associate Degree Program in Electronic Computer Microprocessors Technology.

### II. Methodology

Preliminary questionnaires were developed in conjunction with the Engineering Related Technology Department and members of the Electronic Computer Microprocessors Technology Program Advisory Committee, consisting of eleven persons from the Electronic Computer Microprocessors and education fields.

The questionnaires were titled and described as follows:

#### Survey No. 1

Student Survey (see Attachments A, B, C, D) A survey of current high school and community college students as to their interest in the proposed Electronic Computer Microprocessors Technology Program (Attachments A & B).

#### Survey No. 2

Survey of current literature that illustrates the growth and potential of the Microprocessors field (Attachment E).

#### Survey No. 3

Survey of the literature that illustrates the potential employment opportunities (Attachment F).

#### Survey No. 4

Letters of support for the need for an Electronic Computer Microprocessors Technology Program.

MICROPROCESSOR TECHNOLOGY

STUDENT SURVEY COMMENTS

OAKLAND COMMUNITY COLLEGE

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1. After taking an automotive course, if I could take a course like this would really be helpful, in working on the new cars with computer readouts.
2. What about bio-medical?
3. As long as it relates to auto servicing.
4. Autos will be using these types of computers more extensively in the coming years and auto and diesel mechs. will need more knowledge in this field.
5. Develop a computer that would make registration easier!
6. Somebody's got to program the computers of the future!!!
7. There should be two or three levels.
8. I'm just finishing the apprentice electrical curriculum and would be interested.
9. Sounds like an interesting course.
10. Great idea.
11. Need to see course descriptions first.
12. I would like to see plans for this program.
13. A good choice.
14. It would be an opening opportunity for alot of people.
15. At this time I am not interested but feel that it would be a good course for OCC.
16. Computer chips are going to be utilized much more in the future, so it would be a good idea to offer classes in them.
17. There probably is a need for some students.
18. I am against additional electronic equipment being installed in the modern car. Mechanics are not able to troubleshoot without replacing complete unit and I understand electronic equipment is not suitable for heat ranges involved. Too much sophistication.



19. Not interested in such a program.
20. Microprocessing equipment will become less valuable as more and more people gain the intelligence and knowledge offered through the many MCC Associate Degree Programs.
21. I am looking for a construction estimating course.
22. I feel a tech. school or vocational school would be better equipped to teach this field.
23. I'm practically color blind; Would it make a difference??
24. Like the idea.
25. Personally don't believe in computers, but there is a definite need.
26. A college has to keep up with the time or it will become outdated.
27. In order to expand such a field, a program has to be set up.
28. Interesting but I am in an electrical program.
29. My wife would be interested.
30. Not a full program, but some classes to start them.
31. At this time, I would not be using something in this field, If I was into this field I would take the course if it was offered.

MICROPROCESSOR TECHNOLOGY

STUDENT SURVEY

*Describe the 520 students?*

Microprocessor technology is a rapidly growing area of today's electronics field. The tiny components of computer chips assist in the development of readouts in cars such as miles per gallon, miles until empty, etc.; in the making of personal hand-held computers; and in numerous other areas of our increasingly technological world.

Oakland Community College is in the process of developing a Microprocessor Technology program. We would appreciate if you would take the time to respond to the following in order to assist us.

Thank you.

*Who? Where? Classroom? Random? Mail?*

Total 520

Please check the appropriate spaces.

26.35% 137 I feel there is a need for such a program at Oakland Community College.

9.23% 48 I would be interested in taking some courses in Microprocessor Technology.

0.00% 0 I would pursue an Associate Degree or Certificate of Achievement in Microprocessor Technology.

37.12% 193 I am not interested.

Comments:

Using the above answers in numerical sequence, combined answers were:

12.69% - 66 - 1 & 2

0.38% - 2 - 1 & 3

5.77% - 30 - 1 & 4

0.19% - 1 - 2 & 3

7.31% - 38 - 1, 2, & 3

0.19% - 1 - 1, 3, & 4

0.77% - 4 - 1, 2, 3, & 4

FAVORABLE - 61.92%  
UNFAVORABLE - 37.12%  
NON-VALID - .96%

MICROPROCESSOR TECHNOLOGY

STUDENT SURVEY

Microprocessor technology is a rapidly growing area of today's electronics field. The tiny components of computer chips assist in the development of readouts in cars such as miles per gallon, miles until empty, etc.; in the making of personal hand-held computers; and in numerous other areas of our increasingly technological world.

Oakland Community College is in the process of developing a Microprocessor Technology program. We would appreciate if you would take the time to respond to the following in order to assist us.

Thank you.

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 Total 237

Please check the appropriate spaces.

33.33% 79 I feel there is a need for such a program at Oakland Community College.

6.75% 16 I would be interested in taking some courses in Microprocessor Technology.

3.38% 8 I would pursue an Associate Degree or Certificate of Achievement in Microprocessor Technology.

30.80% 73 I am not interested.

Comments:

Using the above answers in numerical sequence, combined answers were:

8.43% - 20 - 1 & 2 1.27% - 3 - 1 & 3

5.91% - 14 - 1 & 4 1.68% - 4 - 2 & 3

6.75% - 16 - 1, 2, & 3 0.85% - 2 - 1, 3, & 4

0.85% - 2 - 1, 2, 3, & 4

FAVORABLE - 67.50%

UNFAVORABLE - 30.80%

NON-VALID - 1.70% - 9 -

MICROPROCESSOR TECHNOLOGY

STUDENT SURVEY COMMENTS

NORTHEAST AND SOUTHWEST OAKLAND  
VOCATIONAL EDUCATION CENTERS

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1. A program as such, would give more students an opportunity to advance their knowledge in parts of the computer field. Program like this would put students a step closer to the future.
2. I'm extremely interested in the computer field and feel it should be expanded.
3. I totally feel there is a need for this type of class, thank you.
4. It sounds very interesting.
5. It's cool.
6. Good idea.
7. It's a good thing for people who want to go into this field.
8. It is just a lot of pinko propoganda.
9. The only way this course will help is if you are going to teach it. A waste of money and time.
10. Most of that stuff is made by computer so what's the need??
11. I'm not going to college.
12. I'm waiting for the course.
13. Interest in electronics.
14. It sounds like a fairly new field and something new to pursue as a career. The employment would probably be good.
15. I think microprocessor technology sounds pretty interesting.
16. It sounds like it could be an asset in developing the mind to adapt to the future ways of America.
17. It's an interesting occupation.
18. This would increase the amount of computer technology and would make the world advance.
19. Sounds like a cool class.

20. I don't know what microprocessor is but it sounds good.
21. So the field of opportunity will be widened.
22. I have another career in mind, but I think this would be a good course for someone else.

MICRO-PROCESSING SUPPORT INFORMATION

Gottheimer, Debra, "More Power to the Calculator," Administrative Management, July, 1978, pp. 35-44.

p. 35 "Now that microprocessors are smaller, cheaper, and stronger than ever, the hand-held computer may soon be a reality."

Gottheimer, Debra, "Computer Graphics: 'One Image is Worth 10,000 Printouts,'" Administrative Management, July, 1978, pp. 57-63+.

p. 57 "Microprocessor technology has opened a dynamic potential for incorporating visual capabilities into computer systems."

"New Equipment," Administrative Management, July, 1978, p. 75.

p. 75 The Network is a microprocessor-based dictation system from Sony accessible by telephone or phone-style dictating station. Dictaphone also produces microprocessor based dictation equipment.

"Memo--Computer Growth," Administrative Management, March, 1979, p. 14.

The computer industry sales, which totaled approximately \$500 million in 1978, is expected to hit more than \$2.4 billion by 1982, according to a report by Dataquest's Minicomputer Industry Service.

The report states that the key to the dramatic growth will result from improved manufacturers' distribution methods."

"Memo--New Computer Market," Administrative Management, July, 1979, p. 10.

"The under \$10,000 computer systems market, which only began in 1975, is expected to jump to \$658-million in 1979, up nearly \$400-million from 1978, according to a study conducted by Marketing Development, Concord, Mass. a market research consulting firm.

The widespread availability of high density, low-cost microprocessor and microcomputer chips is aiding the growth of this market. There are two distinct categories within the market--the under \$10,000 computer systems and the under \$2,000 computer systems. Both are expected to show major growth over the next several years, though the development of these markets will vary based on the number of major end-users for each category.

"New Equipment," Administrative Management, July, 1979, p. 71.

"Automated filing and retrieval of microfilmed documents are available with 3M's new maicrapoint system.

The standalone retrieval system makes use of microprocessor technology to file and find information on microfilm. It indexes documents, storing descriptors of the microfilmed lines, together with their film addresses, on magnetic diskettes."

MICRO-PROCESSING SUPPORT INFORMATION

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Gottheimer, Debra, "More Power to the Calculator," Administrative Management, July, 1978, pp. 35-44.

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p. 35 "Now that microprocessors are smaller, cheaper, and stronger ever, the hand-held computer may soon be a reality."

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Gottheimer, Debra, "Computer Graphics: 'One Image is Worth 10,000 Printouts,'" Administrative Management, July, 1978, pp. 57-63

p. 57 "Microprocessor technology has opened a dynamic potential for incorporating visual capabilities into computer systems."

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"New Equipment," Administrative Management, July, 1978, p. 75.

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p. 75 The Network is a microprocessor-based dictation system from S accessible by telephone or phone-style dictating station. Dictapho produces microprocessor based dictation equipment.

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"Memo--Computer Growth," Administrative Management, March, 1979, p.

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"Memo--New Computer Market," Administrative Management, July, 1979, p.

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"New Equipment," Administrative Management, July, 1979, p. 71.

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The standalone retrieval system makes use of microprocessor technology to file and find information on microfilm. It indexes documents, stores descriptors of the microfilmed lines, together with their film addresses on magnetic diskettes."

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MICRO-PROCESSING SUPPORT INFORMATION

Free, John, "Computerized Cars On-board Microprocessors Spark a Revolution in Automobile Engineering," Popular Science, August 1979, p.54.

p. 54 "'By 1981,' says GM president E.M. Estes, 'we expect virtually all GM gasoline-powered passenger cars sold in this country will be equipped with an on-board computer as standard equipment.'"

p. 55 "...in addition to emission and engine-control tasks, micro-computers are taking over a surprising variety of functions in some 1980 model cars: keyless door locks, climate regulation, digital-readout dash displays, and radios."

p. 55 Says Henry Ford II, "' By 1985, we estimate that some 12 percent of the car's value will be in electronics - in engine and vehicle controls, driver conveniences, information displays, and entertainment and communication systems."

p. 56 "Ford's EEC (Electronic Engine Control) systems use sensors to monitor various parameters - crank-shaft, throttle, and exhaust-gas-valve positions, collant and inlet - air temperatures, manifold absolute pressure, barometric pressure, exhaust oxygen and mor. The sensors send signals to the EEC so that it can compute how the best performance can be achieved and pipe signals to actuators (valves, ignition, etc.) As you drive, this so-called closed loop (sensors--EEC--Actuators) fine tunes the engine 30 times a second."

p. 57 Micro-processors are used for digital readout of time, date, speed, fuel, etc. They may also serve as a message center with actual printed messages such as miles per gallon, miles to empty, etc. when more sophisticated micro-processors are used. (paraphrase)

p.58 "Advanced designs on the way could involve microcomputers distributed throughout the car 'talking' to each other over a single common wire (multiplexing) and sharing computing responsibilities."

Snyder, David P., "Welcome to the Information Age," Voc Ed, April 1979, pp. 28-32.

p. 28 "...it has been estimated (by Marc Uri Porat of Stanford, among others) that more than 55 percent of America's GNP is related to the gathering, storing, transcribing, retrieving, analyzing, packaging and distribution of information."

P. 29 "Scenes from 1990...More than two-thirds of all American houses will be linked to an electronic network that will send and receive messages, monitor utility consumption, provide fire and intruder protection and afford access to health care, shopping and education/research resources."



# Wear a computer chip in your bra

THOSE computer chips that are rapidly beginning to change your life may start turning up in brassieres, of all places.

Let's take this one slowly. Variations in breast temperature are related to the time of ovulation and, theoretically, a microprocessor (chip) the size of a postage stamp could determine that variation. Thus, a woman could know, with

exactness, whether she was fertile.

Such a chip is being developed at an electronic lab in Scotland for use in fertility clinics. The scientists think they could hook it to a numerical display unit (like those in electronic calculators) whose reading would answer the question: "safe" or "unsafe"? Or, someone has suggested, the chip could trigger a red or green light.



IF YOU'RE upset by the sight of scrapped tires thrown carelessly on roadsides, here's an optimistic note: The old tires may yet re-emerge as sheets of "new" rubber. Scientists have come up with a process that involves granu-

lating the scrap, then using a microwave oven to devulcanize it (thereby breaking its chemical bonds). They say this microwave system will enable them to re-use rubber that doesn't respond to other reclaiming systems.

SOME of the mozzarella in many frozen pizzas really isn't cheese — it's a substitute made from vegetable oil and milk proteins (mostly casein).

Pizza makers blend it with the real cheese as a means of keeping down the price of the finished product. That gives you an idea of what's ahead. One firm, for example, is working on chemical flavors so that it can offer "substitute" Romano and Parmesan. Mozzarella, by contrast, doesn't have any real flavor. In pizza, its function is to bind the ingredients to the crust.

—ED ORLOFF.

MICRO-PROCESSING SUPPORT INFORMATIONEmployment Outlook

Employment of computer technicians is expected to grow much faster than the average for all occupations through the mid-1980's. As the Nation's economy expands, more computer equipment will be used and more technicians will be needed to install and maintain it. Business, government, and other organizations will buy, lease, or rent additional equipment to manage vast amounts of information, control manufacturing processes, and aid in scientific research. The development of new uses for computers in fields such as education, medicine, and traffic control also will spur demand.

Because most technicians are young, relatively few openings will stem from deaths and retirements. Most job openings will result from rising demand for the services of computer service technicians. Most openings will occur in metropolitan areas.

The rising demand for computer technicians is related to the growing number of computers in operation and the geographic distribution of these computers. Continued reductions in the size and cost of computer hardware will bring the computer within the reach of a rapidly increasing number of small organizations. As more and more of these small systems are installed, the amount of time technicians must spend travelling between clients also will increase.

Downturns in the economy will tend to have a less negative effect on job openings for computer service technicians than for most occupations because even when business is declining firms will continue to use computers for accounting and other data-processing.

Earnings and Working Conditions

Average weekly earning of computer service technician trainees ranged from about \$180 to \$200 a week in 1976, according to a private survey of firms engaged in computer maintenance. Experienced workers earned about \$235 a week. While senior technicians, those with 8-10 years' experience, earned between \$250 and \$285. Highly skilled specialists averaged from \$310 to \$340 a week.

Because computer installations generally run around the clock, working time lost during a computer breakdown can be very expensive. For this reason, technicians must be available to make emergency repairs at any time, day or night. Although the normal workweek is 40 hours, overtime is standard. The method of assigning overtime varies by employer. Some technicians are on call 24 hours a day. Others work rotating shifts—days 1 week, nights the next. However it is implemented, computer technicians can expect substantial amounts of overtime; in many cases, annual overtime pay can be as much as 20 percent of base salary. For most technicians, travel is local and they usually are not away from home overnight. Employers pay for travel, including reimbursement for job-related uses of the technician's car, as well as work-related education expenses.

Although some bending and lifting is necessary, the computer technician's job is not strenuous. Work hazards are limited mainly to burns and electrical shock, and can be avoided if safety practices are followed.

Occupational Outlook Handbook, 1978-79 Edition  
Computer Technician

## ELECTRONIC COMPUTER MICROPROCESSORS TECHNOLOGY

### Summary

The community surveys have revealed that the Electronic Computer Microprocessors field is the fastest growing field in business and manufacturing in the entire country. Also, the surveys indicated that persons at the high school, community college, and in the business and industrial community are very interested in the development of an Electronic Computer Processors Program at the community college level. Further, the survey results reveal that the development and refinement of the microprocessors are having a tremendous impact on our daily lives at home, business, and industry.

Even though the Engineering Related Technology Department has collected ample evidence from community surveys and specific research materials to justify the need for Oakland Community College to develop and implement a two-year Associate Degree Program in Electronic Computer Microprocessors Technology, plentiful evidence of support for this program will be collected in the next few weeks to further illustrate the need for developing this program.

PART III  
ADVISORY COMMITTEE

ELECTRONIC COMPUTER MICROPROCESSORS TECHNOLOGY

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651-8810

ELECTRONIC COMPUTER MICROPROCESSORS TECHNOLOGY

SUGGESTED CURRICULUM

			<u>Cr.</u>
* DRT 114	Electronics Drafting		3
* ELT 121	Basic Electricity		3
* ELT 122	Basic Electronics	Prerequisite ELT 121	3
* ELT 202	Digital Logic	Prerequisite ELT 121	3
* ELT 207	Advanced Logic Circuits	Prerequisite ELT 202	3
* # ELT 208	Introduction to Microprocessors	Prerequisite ELT 207	
# ELT 209	Microprocessor Programming	Prerequisite ELT 208	
# ELT 210	Programming Lab (must be taken concurrently with ELT 209)		
# ELT 211	Interfacing Microprocessors	Prerequisite ELT 209	
# ELT 212	Interfacing Lab (must be taken concurrently with ELT 211)		

\*Courses marked \* are currently being offered. Prerequisites are mandatory exceptions will be by consent of instructor.

For the Degree Program, the above courses plus the currently required Electronics Technology. Total credit for an Associate Degree in Micro Technology would be 76 credits.

#Specialized Electronic Computer Microprocessors Technology courses with a #.

Joe  
As.  
Man  
Pla.  
Pont  
857-

Joe Lo  
Manager  
GMC Truck  
Division  
Pontiac,  
857-3748

Niel Perke  
Associate D  
Burroughs Co  
Internationa  
Detroit, Mich  
1-972-9369

Michael Folkert  
Computer Analys  
Computer Periphe  
Rochester, Michi  
651-8810

## ELECTRONIC COMPUTER MICROPROCESSORS TECHNOLOGY

### ELT 209 MICROPROCESSOR PROGRAMMING

Microprocessor Programming is a course designed to develop in the student a confidence in his ability to create software for the various microprocessor families. It will prepare him to apply microprocessors to various engineering and control problems.

#### Program Goals:

- P. G. I     The student will exhibit his knowledge of the basic 8080 instructions by writing short programs utilizing these basic instructions and running them on the computer. Basic instructions from the fine instruction groups will be explored and the student will explain the function of each. Programs must run correctly for this goal to be successful.
- P. G. II    The student will exhibit his knowledge of subroutines by writing programs utilizing subroutines, conditional and unconditional jumps and conditional and unconditional calls. This goal is attained when all programs run successfully.



PART V

PROPOSED EQUIPMENT LIST

ELECTRONIC COMPUTER MICROPROCESSORS TECHNOLOGY

SUGGESTED EQUIPMENT LIST

Four Heath H-8 Computer Systems consisting of the following:

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
1	H-8 Computer	\$ 495.00	\$ 495.00
4	WH-8 8K Memory	265.00	1,060.00
1	H8-2 Parallel	160.00	160.00
1	WH8-4 4 Port Serial Interface	250.00	250.00
4	WH8-41 Cable	15.00	60.00
1	WH8-5 Serial I/O and Cassette I/O	160.00	160.00
2	WH8-51 Adapter Cable	15.00	30.00
1	WH 17 Single Disk Drive	695.00	695.00
1	H17-1 Second Drive	315.00	315.00
1	Paper Tape Reader/Punch	500.00	500.00
1	H9 CRT Video Terminal	750.00	750.00
1	Line Printer	895.00	895.00
1	Cassette Recorder-Player	60.00	60.00
1	Operating System Software	250.00	250.00
	Total		<u>\$5,680.00</u>

Four Heath H11A 16 Bit Computer Systems consisting of the following:

1	WH11A Mainframe	\$1,850.00	\$1,850.00
1	WH11-32 32K Memory	2,100.00	2,100.00
1	WH11-2 Parallel I/O	160.00	160.00
2	WH11-5 Serial I/O	160.00	320.00
2	WH11-51 Cable	30.00	60.00
1	H11-6 Math Chip	165.00	165.00
1	WH27 Dual Drive Floppy Disk	2,495.00	2,495.00
1	H-10 Paper Tape Reader/Punch	500.00	500.00
1	WH-9 CRT Terminal	750.00	750.00
1	WH-14 Line Printer	895.00	895.00
1	Operating System with	600.00	600.00
	Total		<u>\$9,895.00</u>

4	H-8 System	\$5,680.00	\$22,720.00
4	H-11 System	9,895.00	<u>39,580.00</u>
	Total		62,300.00
	Miscellaneous parts, tools, test equipment		<u>50,000.00</u>

Grand Total \$112,300.00

PART VI

SUPPORT LETTERS



Tektronix, Inc.  
P.O. Box 500  
Beaverton, Oregon 97077

Phone: (503) 644-0161  
TWX: 910-467-8708

September 21, 1979

Ms. Yvonne Nielsen  
Oakland Community College  
2900 Featherstone Road  
Auburn Heights, MI., 48057

Dear Yvonne,

Thanks for your letter asking about microprocessor information. I am currently the Product Manager for Tektronix' Microprocessor Labs, so I may be able to give you some useful information. There are three items I can offer you - a text on microprocessor designing, some subjective comments about career opportunities and a local contact with our company.

First, enclosed you'll find an evaluation copy of a text we have recently developed. It focuses on our area of interest - designing microprocessor-based products. This text is very comprehensive in its coverage of the various products used in microprocessor design and how and when to apply them. It is intended, in part, to be a text for classroom instruction. You or your instructors may find it useful in your efforts. Additional copies are available for about \$20.00 each from Tektronix. I would appreciate any comments you or your people might have on the usefulness of the text.

Second, regarding career opportunities, I can only say that they appear to be growing in leaps and bounds. As you are no doubt aware, microprocessors are invading all aspects of American industry, both in industrial products and in consumer products. We serve people who design microprocessor-based products. We expect that their need for equipment alone will grow by a factor of five over the next five years. This does not address the equipment needs of people who service or manufacture these products.

Career opportunities exist in all phases of the microprocessor industry. Today a heavy emphasis is placed on people who can design and manufacture microprocessor-based products. As more and more of these products arrive in customers' hands, the need for service personnel will grow at phenomenal rates. Of course, there are opportunities in sales, marketing and management as well. The essential ingredient for success for an individual is a good working knowledge of microprocessor technology, its use and

Ms. Yvonne Nielsen  
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application. We have a difficult time finding people with this knowledge. They command very good salaries when we do find them. The opportunity exists and will continue to exist for at least ten more years.

Our sales representative in the area is:

Byron Lunz  
Tektronix, Inc.  
501 Progress Road  
Dayton, Ohio, 45449

Phone: (513) 859-3681

Please feel free to contact either Byron or myself if you have any additional questions.

Sincerely,

*Roger B. Hokanson*  
Roger B. Hokanson  
LDP Marketing  
Tektronix, Inc.  
Beaverton, Oregon

RBH/1h

Enc.

OAKLAND SCHOOLS, VOCATIONAL EDUCATION DIVISION  
ELECTRICAL-ELECTRONIC TEACHERS ASSOCIATION OF MICHIGAN  
EASTERN MICHIGAN UNIVERSITY

Present a hands-on workshop intended for electronics teachers and administrators in schools that have not yet introduced microprocessors into their electronics programs.

Introduction to the Need

The keynote address will be given by Dr. Lansing B. Evans, Staff Engineer, Bendix Research Laboratories. He will describe the revolution in electronics that has resulted from the introduction of microprocessors and emphasize the need for including this device in high school and community college electronic programs.

SUPPORT INFORMATION

Hands-On Sessions for Teachers

Mr. Robert F. Renner, Specialist in Microprocessors, RETS Electronic Schools, will describe the 6800 microprocessor to establish a minimum foundation for the programming activities that will take place. A large number of Motorola D2's (a 6800 microprocessor based trainers) will be available, and instructors and advanced students from RETS will assist with individual and small-group instruction.

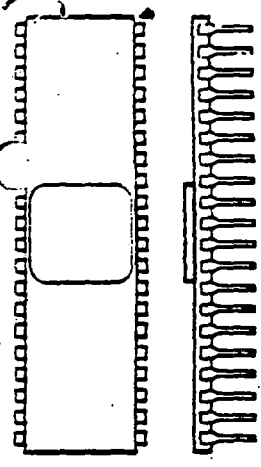
Special Session for Administrators

A panel discussion (with audience participation) will take place concurrently with the hands-on session. It will emphasize administrative problems associated with the introduction of this device. Costs, upgrading of instructors, and the need for prompt action if electronic instruction is to keep abreast of industry will be considered. Panel members will include: Dr. James Hannamann, Director, Industrial Education, Oakland Schools, Prof. William Streib, Eastern Michigan University, and Dr. Lansing B. Evans, Staff Engineer, Bendix Research Laboratories.

~~EXPERT ON MICRO. DETROIT~~

Microprocessor  
Workshop

Saturday, October 6, 1979, 8:30 until 3:30, Oakland Schools,  
2100 Pontiac Lake Road, Pontiac, Michigan



Please return to Robert Younker, 15900 Merriman, Livonia, MI 48154 by October 1, 1979. Enclose \$8.00 for each person. Lunch is included.

Name \_\_\_\_\_ ( ) Teacher, ( ) Adm.

I plan to bring ( ) guests.

Names of guests: \_\_\_\_\_ ( ) Teacher, ( ) Adm.

\_\_\_\_\_ ( ) Teacher, ( ) Adm.

Please use the other side of this sheet for address correction or to add names and addresses to the EETAM mailing list.