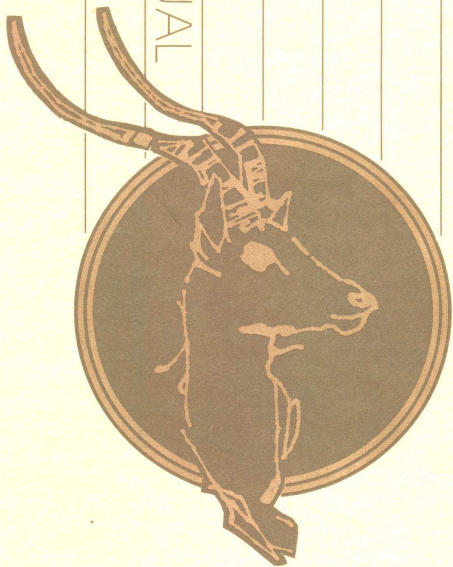


HP Confidential

FIELD TRAINING MANUAL



capricorn
HP-85

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CAPRICORN
January, 1980

WOULDN'T IT BE NICE IF WE HAD A DESKTOP COMPUTER THAT WOULD:

- Stimulate new sales where price/performance has excluded Desktop Computers in the past?
- Complement our present product line, increasing sales of other DCD products as well?
- Reinforce the fact that Desktop Computers are a reliable problem-solving tool?
- Increase our visibility in the scientific, industrial and personal markets?
- Provide a lower cost starting point to HP's line of Powerful BASIC language computers.

WELL NOW WE DO!

capricorn



I. WHAT IS A CAPRICORN?

Here's one way of finding out.

capricious /ke-'prish-es/ *adj.* (usu. *intrans.*) governed or characterized by capriciousness — *capriciously* *adv.* — **capriciousness** *n.*
ant. steadfast — **capriciously** *adv.* — **capriciousness** *n.*
Capricorn /'kap-ri-ko(ə)rn/ *n.* [ME *Capricorne*, fr. L *Capricornus* (gen. *Capricorni*), fr. *caper* goat + *cornu* horn — more at HORN] **1:** a fully integrated BASIC language desktop computer for professional and industrial use **2:** a desktop computer with powerful and versatile interfacing, intrinsic graphics and powerful BASIC language **3:** a low cost, high quality, easy-to-use, professionally reliable desktop mainframe computer
capriciation /'kap-re-fe-'ka-shen/ *n.* [L *caprificatio*-, *caprificatus*, fr. *caprificatus*, pp. of *caprificare* to pollinate by caprification, fr. *caprificus*], artificial pollination of figs that usu. bear only pistillate flowers by hanging male flowering branches of the caprifig in the trees to facilitate pollen transfer by a wasp to the edible figs.
caprifig /'kap-re-'fig/ *n.* [ME *caprifige*, part trans. of L *caprificus*, fr. *capr.*- *caper* goat + *figus* fig — more at FIG]: a wild fig (*Ficus carica sylvestris*) of southern Europe and Asia Minor used for caprification of the edible fig; *also:* its fruit

captain of industry: the head of a great industrial enterprise: ENTREPRENEUR

captain's chair *n.*: an armchair with a low curved back with vertical spindles and a saddle seat

captain's mast *n.*: MAST **3**

captan /'kap-tan/ *n.* [origin unknown]: a fungicide C₈H₈Cl₂NO₂S used on agricultural crops

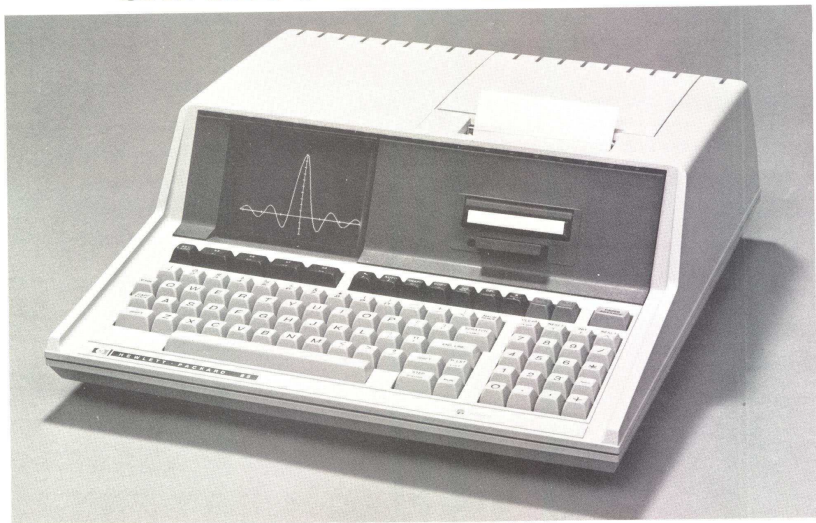
caption /'kap-shen/ *n.* [ME *capcioun*, fr. L *captio*-, *captio* act of taking, fr. *captus*, pp. of *capere* to take — more at HEAVE] **1:** the part of a legal instrument that shows where, when, and by what authority it was taken, found, or executed **2:** the heading esp. of an article or document: **TITLE b:** the explanatory comment or designation accompanying a pictorial illustration **c:** a motion-picture subtitle — **captionless** /-les/ *adj.* **caption vt.** **captioned**; **captioning** /-sh(e)-ning/ : to furnish with a caption : **ENTITLE**

capitious /'kap-shes/ *adj.* [ME *capciosus*, fr. MF or L: MF *captieux* fr. L *captiosus*, fr. *captio* act of taking, deception] **1:** calculated to confuse, entrap, or entangle in argument **2:** marked by an often ill-natured

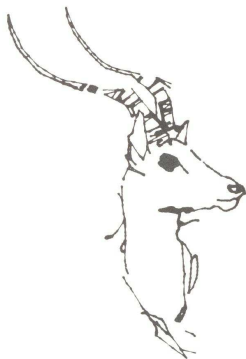
Another way of finding out is to keep reading.



CAPRICORN IS THE HP-85



**HEWLETT-PACKARD'S
PERSONAL COMPUTER FOR INDUSTRY**



capricorn

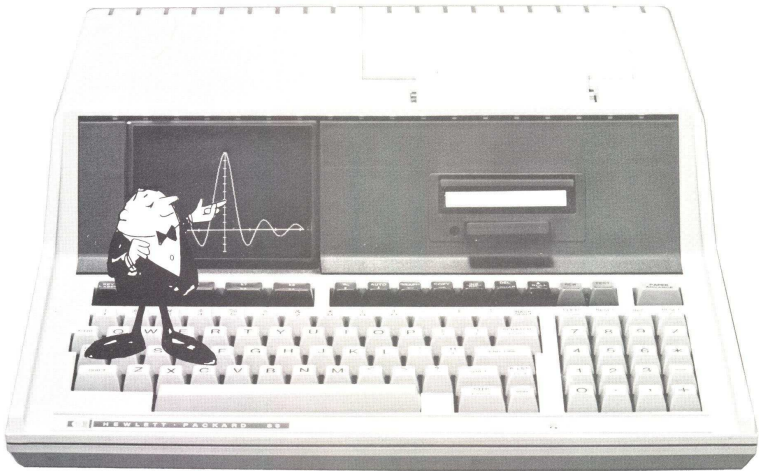
HP-85

In One, High Quality, Integrated Package CAPRICORN Provides:

- Powerful BASIC: ANSI superset, a subset of Systems 35/45 BASIC

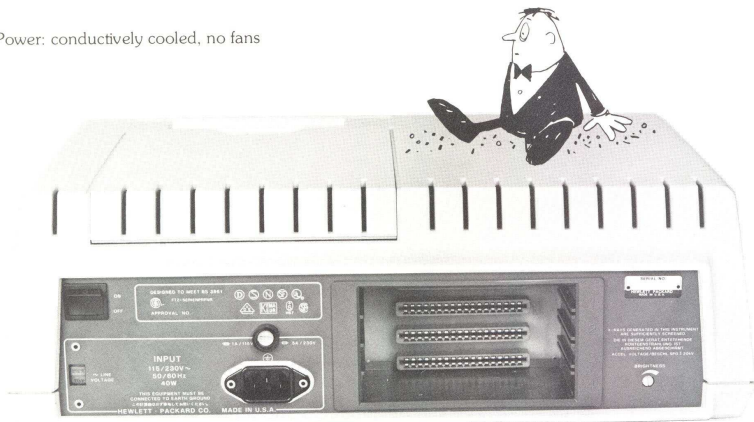


- Alpha-Numeric Keyboard: typewriter keyset, numeric keypad, user-defined soft keys, display and system control keys.



- CRT Display: 5" diagonal, 16 lines of 32 characters, alpha-numeric and graphics capability, medium graphics resolution - 192×256 , standard graphics commands control display.
- Thermal Printer: 32 character lines, speed-120 lines/min., CRT display can be dumped to printer.
- Tape Cartridge: uses 98200A tapes, 210K bytes for data, 190K bytes for programs, file by name up to 42 files, secured files possible.

- Memory: 16K (14.6K user R/W) bytes; **User** expandable to 32K (30.7K user R/W) bytes
- Powerful and Versatile I/O: four slots for ROM Drawer (holds up to six ROMs), interface cards, and the memory expansion card
- Small Size: 16"W × 17"L × 6"H (40.64 cm W × 43.18 cm L × 15.24 cm H)
- Light Weight: 20 lbs. (9.1 kg)
- Low Power: conductively cooled, no fans



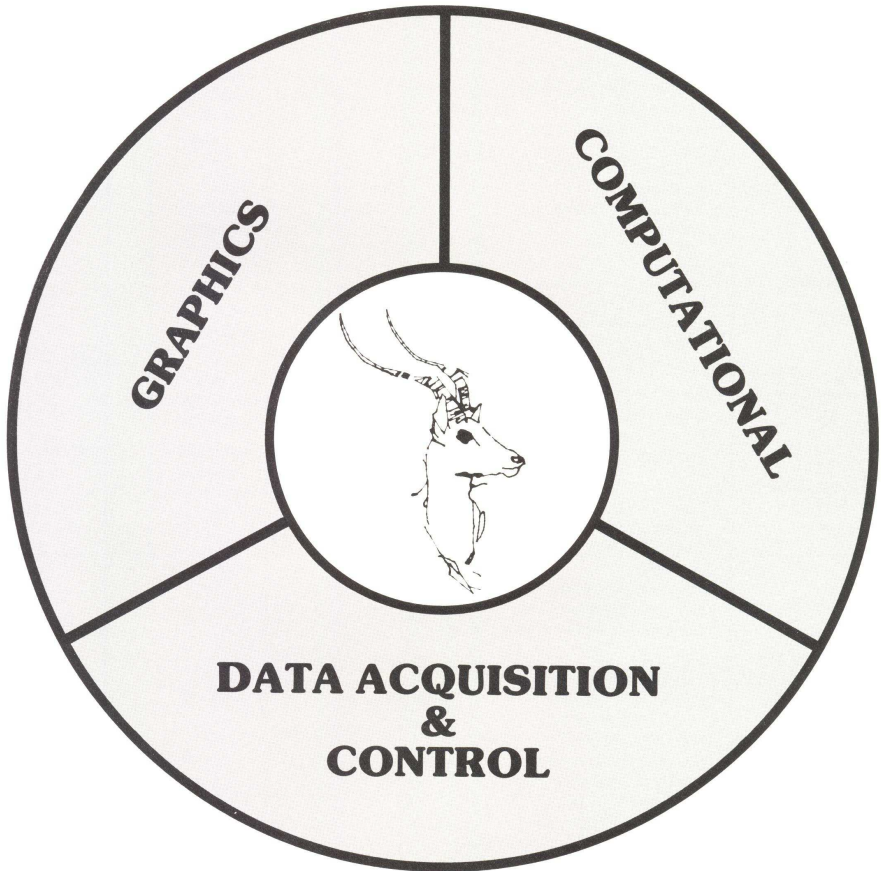
II. FEATURES

Don't limit CAPRICORN's versatility

Its low cost and outstanding features will make it an important part of all our key markets!

In short, CAPRICORN is:

- A Computational Mainframe**
- A Data Acquisition and Control Mainframe**
- A Graphic Mainframe**



Features & Benefits

Features	Benefits	Computational	Application Data Acquisition & Control	Graphics
CRT	<ul style="list-style-type: none"> • Interactive Environment for user Software Development & Editing • Visual Test Data Displays • High Screen Resolution 	X	X X	X X
String/ Numeric Capability	<ul style="list-style-type: none"> • Handles Complex Mathematical Functions • Allows Easy Interpretation of user Formatted I/O 	X		
Powerful BASIC	<ul style="list-style-type: none"> • Low Cost starting point to HP's line of BASIC desktop computers • Industry Standard in our markets • Additional Software already developed • Users already familiar with BASIC 	X X X X	X X	X
Trace Capability	<ul style="list-style-type: none"> • Aids user in Debugging complex problems • Shortens Software Development Time 	X X	X X	
User Definable Soft Keys	<ul style="list-style-type: none"> • No overlay needed, it appears on CRT • Provides operator with software Interrupt Capability 	X X	X X	X X
Expandable Memory	<ul style="list-style-type: none"> • Up to 32K bytes for large programs • Cuts Down cumbersome overlaying • Provides Large Data Buffering, cutting down data massaging to and from tape 	X X	X X X	
Powerful & Versatile I/O*	<ul style="list-style-type: none"> • Provides user with Direct Control over interfaces • Low Cost entry point into HP's line of powerful HP-IB controllers • Variety of Interfacing applications: BCD, RS-232, 16-bit parallel • Normal (Direct Handshake mode) and Buffered (Interrupt and Fast Handshake modes) 		X X X X	

*I/O features not available at introduction

Features	Benefits	Computational	Application Data Acquisition & Control	Graphics
Real Time Clock	<ul style="list-style-type: none"> • Provides 3 programmable timed interrupts • Perfect for Data Logging & Acquisition 		<p style="text-align: center;">X</p> <p style="text-align: center;">X</p>	
Intrinsic Graphics	<ul style="list-style-type: none"> • No extra ROMs, turnkey • Complements user's problem-solving process • Graphics Data Reduction for user 	<p style="text-align: center;">X</p> <p style="text-align: center;">X</p>	<p style="text-align: center;">X</p>	<p style="text-align: center;">X</p> <p style="text-align: center;">X</p> <p style="text-align: center;">X</p>
Bplot Command	<ul style="list-style-type: none"> • User can define any sized graphic characters, symbols, or patterns, i.e. logos 			<p style="text-align: center;">X</p>
Copy to Internal Printer	<ul style="list-style-type: none"> • Hard copy of CRT graphics and alpha- numerics • Don't have to change PRINTER IS to get alpha-numeric output to printer. Cannot do this with Systems 35/45 • A must for good documentation 	<p style="text-align: center;">X</p> <p style="text-align: center;">X</p> <p style="text-align: center;">X</p>	<p style="text-align: center;">X</p> <p style="text-align: center;">X</p> <p style="text-align: center;">X</p>	<p style="text-align: center;">X</p> <p style="text-align: center;">X</p> <p style="text-align: center;">X</p>
Small Size & Weight	<ul style="list-style-type: none"> • Allows processing power to benefit the user where his work resides, not at the DP Center 	<p style="text-align: center;">X</p>	<p style="text-align: center;">X</p>	<p style="text-align: center;">X</p>
Low Price	<ul style="list-style-type: none"> • Makes exceptional price/performance a reality • Low Cost entry point into HP's line of desktop computers 	<p style="text-align: center;">X</p> <p style="text-align: center;">X</p>	<p style="text-align: center;">X</p> <p style="text-align: center;">X</p>	<p style="text-align: center;">X</p> <p style="text-align: center;">X</p>

Be sure to stress to the customer the following features assuring the customer of HP's long-term commitment to Computer Products and CAPRICORN.

- Powerful BASIC
- Powerful and versatile I/O
- Friendly Graphics with hard & soft copy

In Summary:

Hewlett-Packard provides:

- High Quality
- Technical Expertise
- Worldwide/Local Service and Support

Personal Computing provides:

- Computing Power
- An Easy-to-use Mainframe
- Portability

Industry **demands:**

- A Professionally Reliable Product

THAT IS WHY CAPRICORN IS:

HEWLETT - PACKARD'S

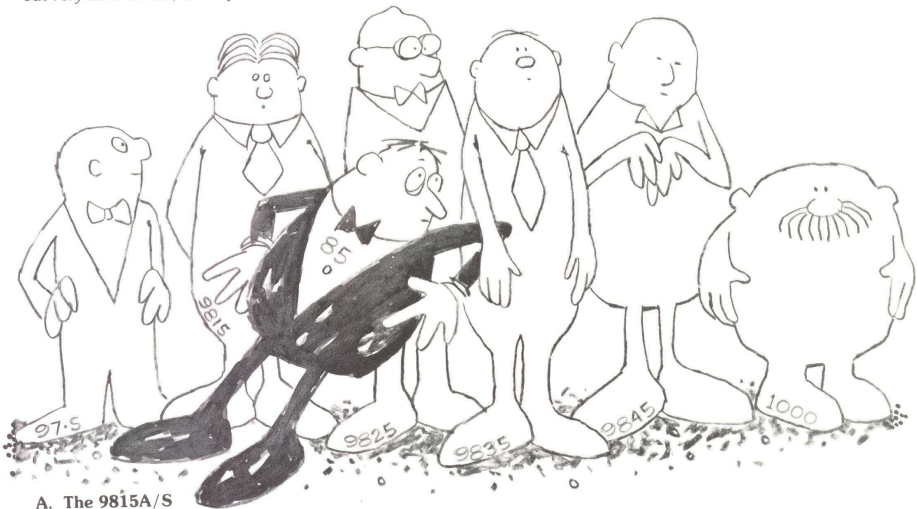
PERSONAL COMPUTER

FOR INDUSTRY

III. MARKETPLACE

CAPRICORN is Hewlett-Packard's newest commitment to the desktop computer user. The versatility of the BASIC language plus the easy editing of the unit allows the user to approach problem solutions on an interactive (i.e. cut and try) basis. This concept combined with the low cost and high portability of the machine yields a highly personal problem-solving tool.

How does the CAPRICORN fit into our product line? Doesn't it compete with the 9815A/S and 9825A/S? Yes, but very little. In fact, it complements our present Desktop Computer product line.



A. The 9815A/S

Most 9815A units are sold to OEM's to be used in dedicated (i.e., one task oriented) applications. The semi-friendliness of the RPN language, though powerful, does not lend itself to interactive reprogramming of the unit. Most end-users do not program the unit at all but instead use it as a turnkey solution. The 9815 has competed very well in applications where a microprocessor was an alternate answer. This is due to two factors. First, even though the 9815 has a semi-friendly language for solving problems in an interactive mode, it is still much more friendly than a microprocessor language. And secondly, the volume of units to be built would not justify, in comparison to the 9815 cost, the microprocessor development costs (both in time and money). For these reasons, the 9815 will compete very handily where a run only, dedicated, non-user programmable, microprocessor-like solution is desired.

B. The CAPRICORN

CAPRICORN is a completely different device, the language is very friendly at the user level. This allows the end user to tailor his solution to problems he has at hand. Therefore, it might be said that CAPRICORN may be used as an Analytical Problem-Solving Tool. That is, the unit will be used to "massage" the data so that the user may reach a conceptual view of his problem solution.

CAPRICORN also has a BASIC language version of the 9825 I/O scheme. Input/Output cards that will be available are HP-IB, 16-bit parallel, BCD, and RS-232 Serial. Though slower in speed than the 9825A, the unit has a great deal of I/O versatility at a much lower cost. For the user who does not require high speed the unit allows monitoring/control of a process, and then massaging of the data as stated before.

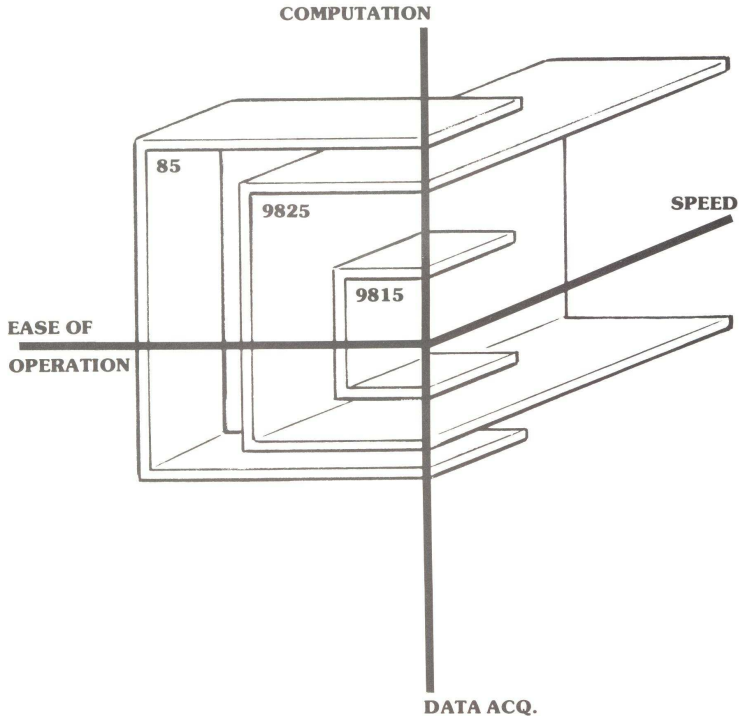
C. The 9825A/S

As the 9815 is our microprocessor-like machine, the 9825 is our desktop minicomputer. With its flexible programming language and high speed, the 9825 lends itself directly to high speed monitor/control applications. In the laboratory the 9825 is easy to set up and adaptable to almost any experiment. In control environments the 9825 is fast enough to detect and react to almost any condition.

Although directed at the monitor/control market the 9825 can also compete within the computational marketplace. Its high speed allows a high throughput of data. Applications include sorting, statistics, and accounting. In all cases, the 9825's claim to fame is speed.

DCD has two other mainframes which do not overlap CAPRICORN but do require mention: the 9835 and the 9845. The 9835 is our BASIC language I/O machine. It also serves as our BASIC language computational mainframe for users who do not require graphics in their work. The 9845 is our top of the line unit. It has BASIC language, I/O, Graphics, and internal 80-column printer. It can be used with equal ease for either I/O or computational applications.

The following graph summarizes the above discussion. There are essentially three axis or application interactions: the computation I/O axis, the versatility axis, and the speed axis. Cost is the limiting factor in all applications. For example, a 9825 could be used in every application that a 9815A can, however, price is the limiting feature.




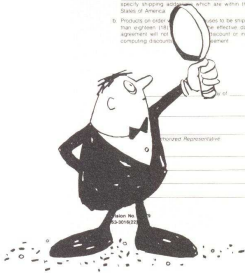
IV. CONTRACT SALES

(OEM's and VEU's)

The key to success in selling CAPRICORN is volume.

The best selling tool available to you to help achieve this volume is one that you already have: **Your old friend the OEM/VEU Contract.** Since your primary emphasis will be selling to existing and targeted OEM/VEU accounts, let's look at what makes CAPRICORN attractive to these special customers and how you can best use the contract as a tool to achieve volume sales of this exciting new product.

	COMPUTER PRODUCTS PURCHASE AGREEMENT
between HP and _____ NO: _____	
<p>The Buyer hereby agrees to purchase Hewlett-Packard (HP) products described in the attached Purchase Order subject to:</p> <ol style="list-style-type: none"> a. the attached HP Terms and Conditions of Sale, HP document 9810-001 Rev. No. _____, which shall govern all non-warranty sales; b. the attached Computer Products Warranty and Installation Terms, HP document 9810-002 Rev. No. _____, except for Desktop Computers (Series A-2 products); and c. the additional terms and conditions stated in this agreement. <p>1. PRICE The price for the products purchased hereunder will be determined in accordance with Exhibit _____.</p> <p>2. DELIVERY</p> <ol style="list-style-type: none"> a. Deliveries under this agreement shall be made by air-shipment. These orders shall be shipped on an expedited (2) month basis after the effective date of this agreement. Orders for all types of products shall be processed by air shipment from the HP factory and delivery time shall be 10 to 14 business delivery days. Each order shall contain a reference to this agreement. Buyer shall incur all international shipping and handling charges. Buyer shall incur all international shipping and handling charges which are within the United States of America. b. Products purchased hereunder shall be shipped via air-shipment unless otherwise specified in the agreement or the purchase order or included in the accompanying purchase order. 	<p>3. EXHIBITS The products listed below are attached to and form a part of this agreement:</p> <p>(1) HP Software Terms Rev. No. _____</p> <p>Products Subject to Discount Exhibit</p> <p>(1) Exhibit A-1 Rev. No. _____ (2) Exhibit A-2 Rev. No. _____ (3) Exhibit A-3 Rev. No. _____ (4) Exhibit A-4 Rev. No. _____ (5) Exhibit A-5 Rev. No. _____ (6) Exhibit A-6 Rev. No. _____ (7) Exhibit A-7 Rev. No. _____ (8) Exhibit A-8 Rev. No. _____ (9) Exhibit A-9 Rev. No. _____ (10) Exhibit A-10 Rev. No. _____</p> <p>Price Classes</p> <p>(1) Exhibit B-1 Rev. No. _____ (2) Exhibit B-2 Rev. No. _____ (3) Exhibit B-3 Rev. No. _____</p> <p>Options Exhibit</p> <p>(1) Exhibit C Rev. No. _____ (2) Exhibit D Rev. No. _____ (3) Exhibit E Rev. No. _____ (4) Exhibit F Rev. No. _____ (5) Exhibit G Rev. No. _____ (6) Exhibit H Rev. No. _____ (7) Exhibit I Rev. No. _____ (8) Exhibit J Rev. No. _____ (9) Exhibit K Rev. No. _____ (10) Exhibit L Rev. No. _____</p> <p>NOTE: Exhibits A-1 through B-3 or B-5 must be checked above and marked in paragraph 1. PRICE. *Signature required.</p>
_____ Buyer Representative	
_____ Authorized Representative	
_____ Title Name	
_____ Title	
_____ Address	



A. The OEM

The single most important thing to an OEM is turning a profit. An OEM does not make a profit by buying our products at a discount and reselling them. The discount he earns from us is just about chewed up in increased marketing and cash flow expense to handle the product.

It's the enhancement that our product provides to his product that results in increased sales and hence, increased profits for him that justifies his purchase. Consequently, the OEM looks for the least expensive solution that will handle his data acquisition problem and still provide the quality that will enhance his system and help him sell more. This is why the 9815 is such a super success as an OEM product. It solves the data acquisition problems of so many measurement instrument manufacturers at a low cost and still offers the quality enhancements of HP service and support.

CAPRICORN continues in the tradition of the 9815 by providing the same quality at the same low cost with the added benefits to the OEM of BASIC language, CRT display and graphics.

Stress these important points when selling CAPRICORN to OEM's:

1. Don't encourage 9815 OEM's to switch to CAPRICORN. They probably don't want to anyway. Make them aware of it for future products.
2. Go back to previous OEM prospects where the 9815 wouldn't sell because of the lack of BASIC, Alpha Display or graphics and difficulty of end user programming.
3. Use CAPRICORN as a door opener to future OEM sales of other DCD mainframes. Many 9825 OEM's today used to be 9815 OEM's.
4. Stress low cost but **above all stress HP quality, worldwide service and support, HP's reputation and long term commitment to the marketplace. This is what he really wants to hear.**

B. The VEU

The 9815 is a super OEM box but has not sold well into VEU's. This means that our lowest cost entry into major accounts has been the 9825 and our lowest cost BASIC language entry has been the 9835. This is where CAPRICORN will really shine. It provides us with our first truly low-cost BASIC language entry-level machine for major accounts. The potential for large volumes of low cost BASIC machines in our traditional major accounts is high. A large national research lab with which we have a VEU contract has purchased over 150 Commodore PET's to date. This is the kind of volume potential that exists and CAPRICORN now offers them an HP solution.

Since the VEU is buying CAPRICORN for a variety of internal applications rather than re-selling it into a specific market there are different aspects of CAPRICORN that should be stressed.

- **HP-IB Capability** - It's a big deal in major accounts. Many of these accounts are buying lots of HP instrumentation and CAPRICORN is an excellent HP-IB controller.
- **BASIC Language** - Since CAPRICORN uses this standard language it's easier for the VEU to justify software investment which is upward compatible to larger desktops and other mainframes.
- **Graphics** - Graphics is being demanded by our customers more each day. Prior to CAPRICORN our only solution was with our top of the line 9845. Now we can offer a graphics solution in the low-end of the product line which provides an excellent opportunity for you to grow a customer through the product line.
- **Versatility** - CAPRICORN is not just a good controller or a good computational machine, but both. It can be used in a variety of applications in a major account and at a low cost. This is especially important to a VEU since it must be kept busy to pay for itself.
- **Portability** - Don't overlook the advantage to the user of the compact, lightweight integrated design of CAPRICORN. With the CRT, tape drive and printer, all built-in, the user doesn't have to worry about collecting various pieces together to use the machine. At 20 lbs., it's also easy to carry from work station to work station. Its quiet operation with silent printer and no cooling fan can also be a big advantage.
- **HP Quality** - Just as with the OEM, quality is very important. Again, stress HP's worldwide service and support and long-term commitment. Most market studies indicate that many of today's personal computer manufacturers may not be around in 5 years.

V. ORDERING INFORMATION

A. Order locations

All CAPRICORNs and its associated peripherals and accessories sold by the SF02 group should be ordered from **Division 40, Product Line 97, Fort Collins, Colorado**. Likewise, all order processing information concerning the SF02 group should be directed to the Division 40, Product Line 97 Order Processing group. CAPRICORN consumables should be ordered from Corporate Parts Center, Mountainview, CA.

B. CAPRICORN Part Numbers

85A / S Mainframe

Part Number	Description
85A	85A Desktop Computer 14576 bytes of Read/Write memory, CRT display, thermal printer, and tape cartridge system

Standard Accessories Included with the 85A

Description	Quantity	Part Number
Owners Manual	1 Ea.	00085-90002
Reference Card	1 Ea.	00085-90039
Pocket Guide	1 Ea.	00085-90040
Standard Pac	1 Ea.	00085-13001
Fuse 1.0 amp	1 Ea.	2110-0001 *
Fuse .5 amp	1 Ea.	2110-0605 *
U.S. Fuse Holder	1 Ea.	2110-0565 *
European Fuse Holder	1 Ea.	2110-0567
Tape Cartridge	1 Ea.	See Below*
Thermal Paper	1 Roll	See Below**
Power Cord	1 Ea.	8120-1378
Registration Card	1 Ea.	00085-90006
Service Card	1 Ea.	00085-90007
Accessory Card	1 Ea.	00085-90004
User's Library Form	1 Ea.	00085-90005
Three-Ring Binder	1 Ea.	82935A

*Tape Cartridges are available only in packages of five each as part number 98200A.

**Thermal Paper is available only in packages of two rolls per package as part number 82931A.

Optional CAPRICORN Accessories

Memory Expansion

82903A

Note: Only one 82903A may be used per system. Maximum memory size is 32K bytes per machine.

85A Accessories and Consumables

98200A

Tape Cartridges (5 each); Note: save cartridge as used with the 9815/25/35/45.

82931A

Thermal Paper (2 rolls)

82932A

Tape Cartridge Binder

82933A

Travel Case

82935A

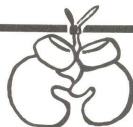
Three Ring Binder

VI. DISTRIBUTION STRATEGY

We expect a very high volume of CAPRICORN's to be sold. To effectively manage this volume CAPRICORN will primarily be sold by two sales forces, SF02 and SF12. Each sales force will sell to their traditional marketplaces. Sales Force 02 will sell to our current and targeted OEM and VEU accounts. Sales Force 12 will sell to dealer accounts and the OEM and VEU accounts not covered by SF02.

Two other sales forces **may sell** CAPRICORN at **some later date**. Sales Force 01 is considering using CAPRICORN in their systems. However, this will not be presented until FY81 at the earliest. Sales Force 07 **may sell** CAPRICORN to the surveying marketplace utilizing software written by the Civil Engineering Division. At this time we do not know when this might occur.

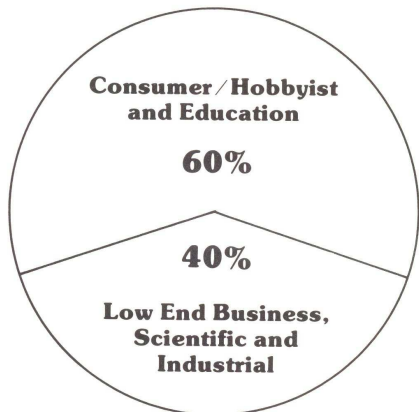
VII. COMPETITION



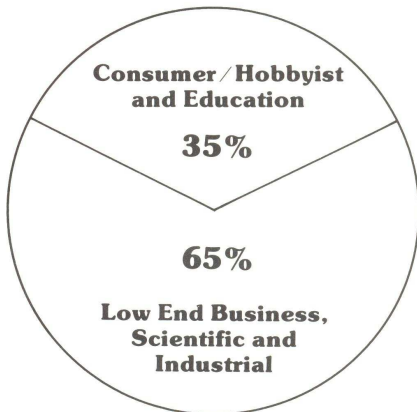
A. Introduction

Because of its price performance ratio CAPRICORN is a significant entry into the low cost computer market. This market grew from practically nothing in 1975 to \$350 million today and is projected to grow to \$3.5 billion worldwide in 1982. Currently, the consumer/hobbyist and education segments represent close to 60% of the low cost computer market while the low end business, scientific and industrial segments make up the remaining 40%. However, in 1982 the low end business, scientific and industrial segments should represent nearly 65% of the total worldwide market. This shift will occur because of the trend toward decentralized systems and higher cost/performance ratios. These two factors will allow people in industry to justify a computer more easily than previously possible.

1979 WORLD MARKET



1982 WORLD MARKET



	Consumer Hobbyist	Education	Business	Scientific Industrial	Total
1979 U.S.	125	12	80	24	241
1979 Worldwide	165	22	105	35	327
1982 U.S.	740	100	1055	465	2360
1982 Worldwide	1110	150	1582	698	3540
Low Cost Computer Market (\$M)					

On all segments of the low cost market, CAPRICORN will be competing with microprocessor systems, microcomputers, small mini's and other desktop computers as well as home/personal computers. In the scientific computation and control markets, CAPRICORN's HP quality, HP support and cost/performance ratio should outclass the typical home/personal computer. However, because of its competitive pricing, many customers may perceive CAPRICORN to be similar in quality and capabilities to the home/personal computers on the market. The following competitive information will help you sell against computers like APPLE II, PET, TRS-80, etc. Information on mini's, micros and other desktops already exists and will remain valid for CAPRICORN.

B. Home/Personal Computers

Currently there are four names which stand out in the home/personal computer market. They are APPLE II, Commodore's PET, Tandy's (Radio Shack) TRS-80 and TI's 99/4. Because these computers are a new area of competition for CAPRICORN, DCD's PL 97 R&D lab purchased an APPLE II, a PET and a TRS-80 system to analyze and compare with CAPRICORN. The following table summarizes the detailed hardware and software study done by the lab. Since a TI-99/4 was not available for the lab study the information given has been summarized primarily from trade journals.



1. System Price Comparisons

The systems compared below include 16K of user memory, a display, a printer, a mass storage device and the necessary interfaces. All of the non-HP systems provide an audio cassette interface in the base system which are compatible with most commercially available units. Since all five systems can operate with either a cassette or mini-floppy, total prices are quoted for both systems.

APPLE II

Base Price	\$1,195
16K User Memory	
Applesoft Integer BASIC	
or	
Apple Basic Plus	
Graphics Software Support	
Audio Cassette Interface	
6 I/O slots	
Tone Generator	
SONY 17" Color Monitor	439*
Monitor Adapter	30
Audio Cassette	50-100**
Mini-Floppy	595
Printer Interface	225
Centronics Impact Printer	695
Clock / Calendar Card	199
<hr/>	
TOTAL Audio Cassette System	\$2,833-2,883
Mini-Floppy System	3,378

*May purchase any SONY monitor (cheapest black/white \$100)

**Any commercially available cassette

PET

Base Price	\$ 975
16K User Memory	
Extended BASIC	
Line Drawing Software	
8" CRT	
3 I/O Slots	
2 Audio Cassette Interface	
Tone Generator	
HP-IB Interface	
Real Time Clock, No Interrupt Capabilities	
Per's Own Cassette	95
Mini-Floppy & Interface	1,295
Impact Printer & Interface	845
<hr/>	
TOTAL Cassette System	\$1,915
Mini-Floppy System	3,115

CAPRICORN*

Base Price	
16K user memory	
Extended BASIC	
5" CRT with Graphics	
32 column Thermal Printer	
dump graphics capability	
3 I/O slots	
DC-100 cartridge	
Capacity 200K Bytes	
8 User Defined Keys	
Tone generator	
System Timers - 3	
Mini-Floppy	
Mass Storage ROM	
HP-IB Interface	
<hr/>	
TOTAL Cartridge System	
Mini-Floppy System	

*Price not finalized at time of printing

TI 99/4

Base Price	\$1,150
16K User Memory	
.25K Scratch Pad RAM	
TI BASIC	
Graphics Software Support	
2 Audio Cassette Interface	
Synthesizer	
Color 13" TV Monitor	
Audio Cassette	50-100**
Mini-Floppy	Currently Unknown
32 Character Thermal Printer	Currently Unknown

TRS-80*

Base Price	\$ 988
16K R/W Memory	
Level II BASIC	
Graphics Software Support	
12" CRT	
1 General Purpose I/O Slot	
1 Printer Interface	
Audio Cassette & Interface	
Real Time Clock	
Printer & Cable	538
Mini-Floppy	499
<hr/>	
TOTAL Audio Cassette System	\$1,526
Mini-Floppy System	\$2,025

*These prices are quoted from January 1, 1979 price list. At the time of printing dealers were giving substantial discounts and hinting at an overall price reduction by Radio Shack.

2. Technical Summary

	CAPRICORN	APPLE II	PET	TI 99/4	TRS-80
Language	BASIC	BASIC Assembly PASCAL*	BASIC Assembly	BASIC	BASIC Assembly
Maximum Read/Write Memory (Basic System)	32K	32K	32K	16K + ¼K scratch pad 56K ROM for application soft- ware written by Mattel	48K
Program Storage Efficiency	Poor	Fair	Fair	?	Fair
Language & OP System Size	32K	12K	12K	26K	12K
Operating System Editing Debug Error Handling	Best Best Best Best	Fair Poor Fair Good	Poor Fair Poor Poor	? ? ? ?	Good Fair Fair Fair
Speed**	1	.91	1.01	?	1.25
Integration	Best	Poor	Good	Fair	Fair
Display	Built-in 5" CRT	Color Monitor or TV	Built-in 8" CRT	Included 13" RCA Monitor	Included B/W 12" Monitor
Graphics Resolution Instruction Set Total Capability	Best Best Good	Fair Good Best***	Poor Poor Poor	? ? ?	Poor Fair Fair
Mass Storage Cassette Mini-Floppy	Built-in DC100 Optional ?K	Optional Audio Optional 116K	Optional Audio Optional 2-170K	Optional Audio Optional ?K	Optional Audio Optional 84K
Keyboard Reliability Typing Quality	Good Good Good	Best Good Best	Fair Fair Good	? ? ?	Good Good Good
Printer Type	Built-in Scanning Thermal Bidirectional	Optional Centronics Impact or any RS-232	Optional Impact	Optional Thermal	Optional Electrostatic
I/O Capabilities plus Documentation	Good	Best	Fair	Poor	Poor
Processor I/O Bus available	No	Yes	Yes	No	Yes
Interfaces	Bit Parallel HP-IB RS-232 BCD	8 Bit HP-IB RS-232 Custom	8 Bit HP-IB RS-232	RS-232 Audio Cassette	RS-232
Peripherals Input	Programmable Clock	Joy Stick Light Pen Paddles Programmable Clock Digitizer	Light Pen Programmable Clock	Voice Synthesizer	Voice Synthesizer

2. Technical Summary

	CAPRICORN	APPLE II	PET	TI 99/4	TRS-80
Output	Plotter	Voice Synthesizer Tone Generator Plotter	Voice Synthesizer Tone Generator	Joy Stick	Programmable Clock
Other	HP-IB RS-232	HP-IB Maybe RS-232	Most HP-IB RS-232	None	RS-232
Product Design	Should Pass	Gross Failure****	Legally Passed	?	Failure
EMC Radiated VDE	Should Pass	Gross Failure****	Failed****	?	Very Marginal
EMC Conducted VDE	Required by HP	No but Should*****	No - it does not have metal case ground	?	Passed With Loop Holes
UL Approved					

3. Miscellaneous Comparisons

	CAPRICORN	APPLE II	PET	TI 99/4	TRS-80
Documentation	HP Quality	Good Quality/ Good Quantity Well Supported I/O	Poor O & P Well Supported I/O	Written for Non- Computer User No I/O Support	Good Quality Good Quantity Poorly Supported I/O
Software Quality Application	HP Standards	Good Scientific Math Business	Poor Education Home Small Business	OK Home Games Education	Poor* Home Games Education
Service Where	Worldwide On-Site or Bench Repair	Dealers Bench Repair Normal On-Site May Be Offered	Dealers and Service Centers Bench Repair Normal On-Site May Be Offered	?	Region Centers Bench Repair Only
Turn-Around Time	2-day	1 Week Typical		?	Advertised 2-4 day
Warranty	90-day Bench	90-day Parts and Labor	90-day Parts and Labor	?	90-day Parts and Labor

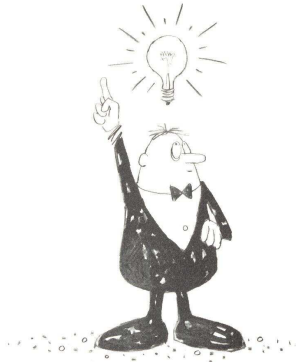
*APPLE II PLUS Only

**Normalized average time of 4 benchmarks (i.e., TRS-80 is slower than CAPRICORN)

***APPLE was rated best here because of its larger CRT and color capabilities even though CAPRICORN has sharper resolution and better instruction set.

****The System the lab purchased failed, however, PET is selling extremely well in Europe which means they are either modifying the systems sold there or used a special machine for the VDE tested.

*****QA has reported that Apple II has now passed VDE (indicating a new hardware system?)



4. Conclusions

After comparing the systems, the first thing you should have noticed was that a personal computer system is much more expensive than the base price which is advertised. Although CAPRICORN will probably* be somewhat more expensive than the other systems, it is still competitive. In keeping with Hewlett-Packard's philosophy, CAPRICORN has five main things to offer over the other personal/home computers:

- 1) **Integration** - Only CAPRICORN offers a totally integrated system containing a display, keyboard, printer and mass storage device;
- 2) **A highly enhanced BASIC language** - CAPRICORN offers the largest set of mathematical and string functions as well as the most complete set of graphics, mass storage and I/O commands;
- 3) **User definable keys** - only PET could offer something vaguely similar by putting the computer into a loop to trap a key code and then branching on the code. Only CAPRICORN allowed a program interrupt "on key";
- 4) **Dump graphics capability** - no other personal computer offered anything close;
- 5) **HP's reputation** - of course, none of the other systems could offer HP's quality (although PET came close), HP service or HP support!

Probably the biggest contribution CAPRICORN has to offer to the low cost market is that familiar term "friendliness"! For example, none of the other systems evaluated offered a complete set of debug tools including line, variable, and array element tracing, single stepping, and error trapping. APPLE and the TRS-80 came closest with line tracing and an "ON ERROR GOTO" command. Finally, CAPRICORN had the best editing capabilities. It was the only personal/home computer to offer syntaxing on store, auto numbering, built-in renumbering capability, clear to end of line key, and a clear screen key. Also, except for PET it was the only computer capable of inserting or deleting characters anywhere on the CRT.

Although CAPRICORN has many features to offer over its personal/home competition, APPLE II and PET do have their strong points. PET's strengths come from its built-in IEEE-488 interface. This interface is not totally compatible with our HP-IB interface and PET is not capable of driving all of Hewlett-Packard's HP-IB peripherals, nor can we talk to all of the PET compatible instruments. APPLE II's main strengths come from its simple and extremely well-supported I/O backplane and APPLE supports custom interfacing by other manufacturers. Another strong contribution APPLE II can make is a low-cost color graphics system.

Another plus for APPLE II, PET and the TRS-80 is the ability to be programmed in assembly language which allows the user to customize his software. This is a particularly big plus for APPLE II since it gives the user total control of the micro-processors I/O bus.

TRS-80 seems to be strictly directed at the home and very small business market and has few features which should make it serious competition for CAPRICORN. The TI 99/4 should not be competition for CAPRICORN since TI's marketing emphasizes pre-programmed ROM pacs rather than aiming the 99/4 at hobbyist and home programmers.

*Final price not set at time of printing.

5. Low-Cost Computer Trends

With a projected growth of almost 1000% by 1982 there will be a lot of activity in the low-cost computer market. However, it is expected that a lot of this activity will be directed at the business market which will represent close to 45% of the total market. This trend is already evident from the replacement computers introduced by APPLE, Commodore, Tandy and TI. It is expected that IBM, Atari, Mattel and possibly DEC will also become active in this market. The following table lists the companies which are currently active and their projected trends.

COMPANY	PRESENT POSITION*	TREND*	EVIDENCE
Mattel	Home/Consumer	Home/Consumer	Canned Software Home Applications
Atari	Home/Consumer	Home/Consumer Professional	Intro. of Model 800 Stated Objectives
TI	Home/Consumer	Home/Consumer Professional Very Small Business	Announcement of 99/7 Stated Objectives
Cromemco	Very Small Business	Very Small Business	Current Software Offering
DEC	Small Business	Small Business Very Small Business	Aggressive Retail Plans Reports of Lower Priced Products
IBM	Small Business	Small Business Very Small Business	Opening 50 Retail Outlets
Wang	Small Business	Small Business	
Commodore	Professional	Professional Very Small Business Industrial	Intro. of CBM HP-IB Interface
Tandy	Professional Home/Consumer	Professional Very Small Business	Intro. of TRS-80 II Creation of Computer Centers Considering on sight service
Apple	Professional	Professional Very Small Business Industrial	Intro. of PASCAL Stated Objectives Intro. of HP-IB Intro. of Software

*In this case Professional also includes the commercial market as well as scientists and engineers.

C. The 9815 and 9825

As stated in the marketplace section CAPRICORN actually complements the desktop product line rather than competes head-on with the 9815 and 9825 by offering a highly interactive, high performance and low costs solution to our customers. However, where the application does not make the choice clear, here is some information which should assist you:

I. Technical Summary *

	CAPRICORN	9815S	9825S
System Price		\$3,950	\$7,700
User Memory (Bytes)	16K	3800 Steps	24K
I/O # Slots Types	Good 3 HP-IB 8 Bit RS-232 BCD	Fair 2 HP-IB 8 Bit RS-232 BCD	Best 3 HP-IB 16 Bit RS-232 BCD DMA
Interrupt I/O Speed**	1 Level Vector 4	N/A 4	2 Level Vector 1
Display	5" CRT With Graphics	Numeric Gas Discharge Singleline	Alpha-Numeric LED Singleline
Mass Storage Built-in Capacity Raw Transfer Rate Ave. Access Time Peripheral	200K Tape .65K Bytes 9.3 Sec Mini-Floppy	96K Tape 1K Bytes 9.3 Sec N/A	220K Tape 2.75K Bytes 6.2 Sec Floppy
Language Storage Efficiency Editing Debug	BASIC Poor Good Good	RPN Best Fair Fair	HPL Good Best Best

*Taken from DCD PL97 lab study and marketing benchmarks.

**Normalized average time for all I/O operations (i.e., 9825 is fastest)

2. Benchmarks

A. Comparison of Mathematical Function Execution Time.

This program fills a 200 element array (200 registers on the 9815) in a FOR-NEXT loop with the results of a complicated function. If the result is negative a count variable is incremented, otherwise a GOSUB is executed. The subroutine consists of another complicated calculation using the negative count.

CAPRICORN	9815	9825	
10 OPTION BASE 1	0000 2	0033 STO I A	0: dim A[200]
20 DIM A(200)	0001 0	0035 IF -	1: deg
30 DEG	0002 1	0036 GOTO 0041	2: 0*X
40 X=9	0003 #REGS	0038 GOSUB 0045	3: for i=1 to
50 FOR I=1 TO 200	0004 DEGS	0040 NEXT A	200
60 A(I)=LOG(1+INT(I/15))+EXP(10-4)*SIN(I)	0005 0	0041 1	4: log(1+int(I/
70 IF A(I)<0 THEN 100	0006 STO J	0042 STO+ J	15)+exp(10-4))*
80 GOSUB 140	0007 1	0043 NEXT A	sin(I)+A[I]
90 GOTO 110	0008 STO A	0044 STOP	5: if A[I]<0;
100 X=X+1	0009 2	0045 RCL J	sto 8
110 NEXT I	0010 0	0046 ENTER↑	6: asb 12
120 BEEP 43 55,1100	0011 0	0047 ENTER↑	7: sto 9
130 END	0012 STO F	0048 ENTER↑	8: X+1+X
140 Y=1/(1+EXP(X))*SIN(X*X)+EXP(X)*SIN(X^3)	0013 FOR A+F	0049 etX	9: next I
150 RETURN	0014 RCL A	0050 STO I	10: beep
160 END	0015 ENTER↑	0051 ROLL↓	11: stp
	0016 SIN	0052 *	12: 1/(1+exp(X))*
	0017 X*Y	0053 ENTER↑	sin(X*X)+exp(X)
	0018 1	0054 SIN	*sin(X^3))+Y
	0019 5	0055 ROLL↓	13: ret
	0020 +	0056 *	14: end
	0021 INT	0057 SIN	*8794
	0022 1	0058 *	
	0023 0	0059 X*Y	
	0024 ENTER↑	0060 RCL I	
	0025 4	0061 *	
	0026 -	0062 +	
	0027 etX	0063 1	
	0028 +	0064 +	
	0029 1	0065 1/X	
	0030 +	0066 STO I	
	0031 LOG	0067 RETURN	
	0032 *	0068 END	

	CAPRICORN	9815	9825
TIME:	33s	79s	8.5s

Results:

The CAPRICORN micro processor has been optimized to execute BCD mathematical functions. The 9815's 6800 micro processor can only execute 8 bit adds and subtracts - functions must be performed in software. The 9825 is fastest because its internal clock is faster than the 9815's or CAPRICORN's.

B. Comparison of Printer Speed.

This program prints one-hundred numbers using a FOR-NEXT loop.

CAPRICORN	9815	9825
10 FOR I=1 TO 100	0000 I	0: for I=1 to
20 PRINT I	0001 STO A	100
30 NEXT I	0002 I	1: prt I
40 END	0003 0	2: next I
	0004 0	3: end
	0005 STO F	*8522
	0006 FOR A→F	
	0007 RCL A	
	0008 PRINT	
	0009 NEXT A	
	0010 END	

	CAPRICORN	9815	9825
TIME	48s	33s	33s

Results:

The 9815 and 9825 printers operate at approximately 2.5 lines/sec. while CAPRICORN's printer operates at approximately 2 lines/sec. at 20 characters/line or less. For a full 32 character line CAPRICORN printer speed is approximately 1.5 lines/sec. Of course, CAPRICORN's 32 character printer will allow more data to be output per line.

C. Comparison of Tape Write Speed.

This program fills an array of 100 elements (100 register on the 9815) with the index value of a FOR-NEXT loop. The array (or registers) are then stored in 10 consecutive files on the tape.

CAPRICORN	9815	9825
10 OPTION BASE 1	0000 1	0: trk 1
20 DIM A(100)	0001 0	1: dim A[100]
30 FOR I=1 TO 100	0002 1	2: for I=1 to
40 A(I)=I	0003 #REGS	100
50 NEXT I	0004 1	3: I>A[I]
60 ASSIGN# 1 TO "TEST"	0005 STO A	4: next I
70 FOR I=1 TO 10	0006 1	5: for I=1 to 10
80 PRINT# 1,I ; A(I)	0007 0	6: rcf I,A[#]
90 NEXT I	0008 0	7: next I
100 ASSIGN# 1 TO *	0009 STO F	8: beep
110 BEEP 43.55,1100	0010 FOR A+F	9: trk 0
120 END	0011 RCL A	10: end
	0012 STO I A	*8064
	0014 NEXT A	
	0015 1	
	0016 STO A	
	0017 1	
	0018 0	
	0019 STO F	
	0020 FOR A+F	
	0021 1	
	0022 0	
	0023 0	
	0024 ENTER↑	
	0025 1	
	0026 RCL A	
	0027 RCDATA	
	0028 NEXT A	
	0029 END	

TIME:	CAPRICORN	9815	9825
	109s	21s	17s

Results:

On the 9815 and 9825 data is written to the tape immediately rather than being buffered into 256 byte blocks as it is on CAPRICORN.

D. Comparison of Data Manipulation.

This program sorts a 200 element array (200 registers on the 9815) using a bubble up sort.

CAPRICORN

9815

```

10 OPTION BASE 1
20 DIM A(100)
30 FOR I=1 TO 100
40 A(I)=101-I
50 NEXT I
60 DISP "PRESS CONT"
70 PAUSE
80 FOR I=1 TO 99
90 FOR J=I+1 TO 100
100 IF A(J)>A(I) THEN 140
110 M=A(I)
120 A(I)=A(J)
130 A(J)=M
140 NEXT J
150 NEXT I
160 BEEP 43.55,1100
170 END
    
```

```

0000 I
0001 0
0002 2
0003 #REGS
0004 1
0005 STO A
0006 1
0007 0
0008 0
0009 STO F
0010 FOR A+F
0011 1
0012 0
0013 1
0014 ENTERT
0015 RCL A
0016 -
0017 STO I A
0018 NEXT A
0019 PRNT@
0020 P
0021 P
0022 E
0023 S
0024 S
0025
0026 R
0027 U
0028 N
0029 7
0030 S
0031 T
0032 0
0033 P
0034 END@
0035 STOP
0036 I
0037 STO A
0038 9
0039 9
0040 STO F
0041 1
0042 +
0043 STO G
0044 FOR A+F
0045 RCL A
    
```

9825

```

0: dim A[100]
1: for I=1 to
  100
2: 101-I+A[I]
3: next I
4: dsp "PRESS
  CONT"
5: stp
6: for I=1 to 99
7: for J=I+1 to
  100
8: if A[J]>A[I];
  sto 12
9: A[I]+M
10: A[J]+A[I]
11: M+A[J]
12: next J
13: next I
14: beep
15: end
*19439
    
```

	CAPRICORN	9815	9825
TIME:	159s	60s	19s

Results:

The 9815's 6800 micro-processor was designed to efficiently handle data manipulations such as store and recall from memory, compares branches, etc., while CAPRICORN's processor is weaker in this area. Again, the 9825 is faster because of its faster internal clock.

3. Conclusions.

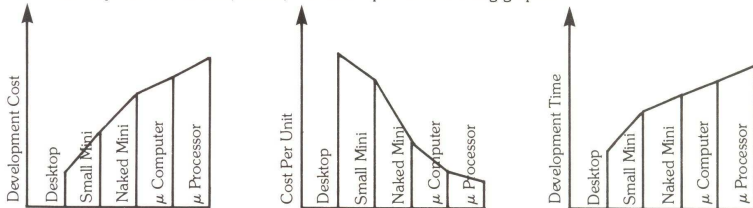
These benchmarks emphasize that CAPRICORN actually complements the desktop product line. As you can see from benchmark "A" and "D", CAPRICORN is best suited for math intensive applications; the 9815 is best suited for applications requiring a great amount of looping, branching and comparing; and finally the 9825 is best suited for applications requiring blazing speed.

In applications requiring both extensive math and great amounts of looping the speeds of CAPRICORN and the 9815 will be comparable. In general if speed is a major factor then the 9825 is the best fit for the application. If not, you must also evaluate how each computer's flexibility and ease of use fits the application. CAPRICORN is best suited for general purpose applications. Its friendly features such as enhanced editing, and debug capabilities, plus a CRT and BASIC language shorten program development time. On the other hand, the 9815's small, streamlined package and concise language is best suited for dedicated applications.

In short the 9815 is our dedicated desktop, CAPRICORN is our personal computer for industry, and the 9825 is our high speed, high performance desktop.

D. Micro's and Mini's

When considering automation, an OEM must carefully analyze three factors — development time, development cost and cost per unit — when deciding whether to use some type of micro, mini or desktop computer in his product. Typically the development cost and development time will be smallest for desktop computers and largest for micro-processor systems while cost per unit will be smallest for micro-processors and higher for desktop computers. These trends are depicted for micro's, mini's, and desktop in the following graphs:



Here are some figures which will help put these graphs into perspective. The parts required for an average-sized micro-processor system, for example, would only cost about \$100-200 dollars but hardware and software development time could take well over a year. Today, naked mini's (i.e., a mini-CPU, power supply and a rack mount with no software) cost about \$1,000-\$2,000 and may still require a year for software development time. Finally desktop computers and small mini's represent a hardware per unit cost of \$5,000-\$20,000 but, the friendly features of a desktop may cut the development time to 3 or 4 months while a mini-computer based system could still require 6 months to a year to develop.

As you can see the OEM selling a very high volume product will be very sensitive to the cost per unit required to automate his product, while another OEM selling a very high cost, low volume system may be more sensitive to development time, particularly if the cost per unit to automate represents only a small percentage of the total system cost. In general our experience with OEM's has indicated that a good "rule of thumb" for deciding, by unit volume, between the different types of computers is as follows:

If an OEM projects a total unit sales of approximately 500 units per year or less than a desktop computer would make the best sense.

Over 1,000 units per year an OEM should strongly consider a micro-processor.

Between 500 and 1,000 units per year an OEM should consider either a naked mini- or micro-computer system.

Of course the OEM's need for service and support will also affect these rule of thumb figures with desktop computers requiring the least amount of service and support and micro-processor systems requiring the most. Although CAPRICORN will lower the entry cost of a BASIC language desktop computer, it will not dramatically affect the rule of thumb numbers given above, but it will make the decision easier for manufacturers considering whether or not to automate their product.

VIII. CAPRICORN SOFTWARE



Standard Applications Pac (P/N 00085-13001):

Moving Average, Annuities and Compound Amounts with Amortization, Polynomial Solutions, Simultaneous Equations, Calculus and Roots of $f(x)$, Curve Fitting, Auto Function Plot, Histogram Generator, Arithmetic Teacher, Calendar Functions, Biorhythms, Timer, Music Composer, and Ski Game.

BASIC Training Pac (P/N 00085-13002):

Provides a valuable learning aid for novice users. Contains a thorough HP-85 BASIC language tutorial. Demonstrates the HP-85's capabilities with graphics emphasis. Includes keyboard learning aid.

General Statistics Pac (P/N 00085-13003):

One Sample Analysis, Paired Sample Analysis, Test Statistics, Distributions, and Multiple Linear Regression.

Math Pac (P/N 00085-13005):

Simultaneous Equations, Solution to $f(x) = 0$ on an Interval, Integration with Equally-Spaced and Unequally-Spaced Data Points, Ordinary Differential Equations, Chebyshev Polynomial, Fourier Series for Equally-Spaced and Unequally-Spaced Points, Fast Fourier Transform, Hyperbolic Functions, Complex Operations, and Triangle Solutions.

Games Pac (P/N 00085-13010):

Blackjack, Slot Machine, Poker, Solitaire, Reversi, Gomoku, Cribbage, War, Sea Skirmish, Blockade, Race Track, Lander, Race, Hangman, Hunt the Wumpus, King, Nimk, Maze Generator, Life, Birthday Plot.

Linear Programming Pac (P/N 00085-13011):

Solves a wide variety of optimization problems using a modified simplex method that incorporates variable bounds. Problem examples include Chemical Blending, Feed Mix, Production Scheduling, Investment Portfolio Selection and Market Media Selection.

Regression Analysis Pac (P/N 00085-13037):

Performs Multiple Linear Regression, Variable Selection Methods Using Stepwise Regression, Polynomial Regression Analysis, and Residual Analysis. Includes Basic Statistics and Data Manipulation.

Basic Statistics and Data Manipulation Pac (P/N 00085-13036):

Provides Comprehensive Summary Statistics as well as routines for entering, editing, naming, recoding, sorting, storing, transforming and listing data for statistical analysis by other programs.

Note: The Standard Applications Pac is included as a standard accessory with every CAPRICORN.

Note: The BASIC Training Pac, also titled **Getting Down to BASICS**, contains a customer training tape and workbook. This pack can be very effective in providing an entry point for the completely inexperienced user into our line of BASIC desktop computers.

IX SALES AIDS

In order to sell CAPRICORN you must make it visible to the marketplaces. What is also important is that you want to make your time as productive as possible. Since CAPRICORN is targeted for the **low cost** and **high volume sales** marketplaces you must conduct the sales process with **many** people at once. There are several tools available to achieve this.

- **The Seminar Selling Concept**
- **Customer Seminar Presentations**
- **Demo Equipment**
- **Demo Software**

A. Seminar Selling

Because of the demand for OEM and VEU account development group presentations will become vital. With seminar selling you want to **identify** prospective buyers. From there, improve their **awareness** of HP's product line of Desktop Computers and the CAPRICORN mainframe. At the same time you want to achieve a **qualification** of the buyers. Investigation and closings can then be performed later in the more traditional manner.

B. Customer Seminar Presentations

A CAPRICORN video tape presentation will be available for use in customer seminars. This futuristics video tape presentation will center upon CAPRICORN and its features and benefits. This video tape will position CAPRICORN as HP's personal computer for professionals. Emphasis will be placed on CAPRICORN's ease-of-use, pointing out that the inexperienced user can acquire genuine computer skills.

The CAPRICORN video tape presentation can key off of the existing **Desktop Computer Applications in Industry** slide show. By presenting both, the slide show **and** the video tape, you get the customer hooked on the **concept** of using desktop computers in industrial applications. From there you can stress how CAPRICORN can meet the low-cost high-performance applications of the professional user in industry.

C. Demo Equipment

The HP 85's small size and weight will be an advantage when scheduling demos; it can go anywhere. Besides the mainframe all you need is the HP 85 Demo Tape. Remember, whatever you demo on the CRT can be dumped to the printer as well.

D. Demo Software

The demo tape consists of 11 different demo segments. The demo is interactive allowing you or the customer to choose which segments are to be run.

Several of the segments included are:

An Introduction to the HP 85: Displays the computer's features and benefits.

HP 85 as a Controller: A typical scenario demonstrates HP 85's ability to act as a controller.

Graphics Power: Demonstrates some of the HP 85's graphics capabilities.

Mortgage: A typical home mortgage is computed and graphically displayed.

Stocks: The price of the 1978 HP stock is graphed with the 1978 Dow Jones Industrial Average.

Family Regression: Statistical curve-fitting technique is used to approximate a set of data points.

Musical Demonstration: The use of the programmable BEEP statement is demonstrated as the HP 85 plays a short selection by C.P.E. Bach.

The variety of segments available will be very effective in demonstrating the HP 85's versatility and features.

In addition, a pre-packaged combination encompassing some of the demo segments is included on the demo cartridge for an easy-to-use overall HP 85 demo. It is not interactive, start it up and let it go.

E. Service

Hewlett-Packard is the only company which offers **worldwide local service** for a CAPRICORN type instrument. A customer can be assured of placing a CAPRICORN anywhere in the world and it can be repaired locally.

The self-test feature of CAPRICORN allow the user to thoroughly test the system anytime he wishes. This results in a lowered service cost to the customer as non-failure service calls can be eliminated. Further, as self-test is built into CAPRICORN, there are no test types to be lost or destroyed.

Service contracts will also be offered for CAPRICORN. These contracts guarantee a twenty-four hour response time. Also service contract customers have priority over regular per call customers. The cost of these services has been set at the same price that per call service customer would spend yearly.

Note: As an incentive, customers who purchase a nine-month service contract during the initial customer order, will have their warranty upgraded from a bench to an on-site type.

X QUESTIONS TO EXPECT

1. Is the CAPRICORN file by name directory resident in memory like the 9835 and 9845?
 - A. Yes. However, it may only hold one half of directory at a time (twenty-one files **names** versus forty-two files for the tape). If the file name to be addressed is already in memory, CAPRICORN immediately accesses it. If not, CAPRICORN loads the other half of the directory, then accesses the file.
2. Since CAPRICORN has dot graphics capability can I "dump graphics" like I can on the 9845B/T?
 - A. Yes, CAPRICORN has a "copy" command. You may copy either the graphics page or the printer page (which can't be done on the 9845 without "reprinting"). However, this command copies to the internal printer only.
3. Does CAPRICORN have "live keyboard"?
 - A. No, but it does have a "poor man's" live keyboard. That is, the program halts whenever a keyswitch is pressed and that key is entered into the display. The operator can then perform his operation and return to program operation by pressing "Continue".
4. Will CAPRICORN customers be invited to join DCD's BASIC User's Club?
 - A. A separate BASIC User's Library is being initiated by Corvallis for CAPRICORN customers.
5. What training courses will be available for CAPRICORN customers?
 - A. CVD is preparing a training package consisting of a training tape cartridge and workbook. They are also preparing a two-day CAPRICORN training course.
6. Will the programs I write on CAPRICORN be compatible with your future desktops?
 - A. Yes, Hewlett-Packard has a definite commitment to the BASIC language. All future machines will speak BASIC. Therefore, the programs you develop on CAPRICORN will operate on future — HP — computers.
Note: Will also work on the 9835/45.
7. What is the shelf life of the CAPRICORN consumables?
 - A. If stored in a normal office environment (temperature and humidity) and if stored out of direct sunlight, the shelf life is indefinite.
8. How do I know HP will support me as an OEM customer.
 - A. Much of HP's sales growth is a direct result of our post sales support of customers. 75 % of our customers later purchase more equipment from us. Likewise, our OEM sales have doubled every year.
9. If my CAPRICORN malfunctions, how do I get it repaired?
 - A. HP has worldwide local sales and service facilities. The service technicians at these facilities can arrange to either repair your unit at the office or travel to your facility and repair the unit there.
10. Can I have more than one 82903A 16K memory in the machine?
 - A. No, 32K bytes is the maximum machine memory size. Extra 82903A's will be ignored.
11. If I have the optional memory how many interface cards may I have?
 - A. Two. The optional Memory and ROMs each occupy a module slot.

APPENDIX A

9835/45 and CAPRICORN Language Comparisons

The 9845B has an extremely powerful and easy-to-use version of the BASIC language. It has become DCD's defacto standard. Because this version is so well-known we thought a comparison between the 9845B and CAPRICORN might prove interesting, even though CAPRICORN is **one-tenth** the price of the 9845B.

CAPRICORN Capabilities as Compared to the 9845B

1. Variable names may only be a single alphacharacter followed by a single numeric (B1, C3, etc.) (total of 286); the 9835/45A can have up to sixteen character variables.
2. No String arrays, the 9835/45 can have string arrays six dimensions deep.
3. Numeric arrays may only be two dimensions deep.
4. CAPRICORN does not have GET and SAVE commands, only LOAD and STORE. therefore, tape programs are not compatible with our other BASIC machines (9835 and 9845).
5. Program chained from tape cannot be located at a particular line number in program memory. All material from the calling routine is overlaid. However, common data is retained.
6. CAPRICORN does not have subprograms.
7. Special function keys cannot be used as typing aids.
8. CAPRICORN program lines may not have labels.
9. CAPRICORN graphics does not have different line types.
10. CAPRICORN graphics does not have a character size statement.
11. CAPRICORN graphics only has vertical and horizontal labeling capability.

APPENDIX B

CAPRICORN Options Not Available at Introduction

This section contains preliminary information on several options and Software Pacs which are planned for CAPRICORN but will not be available at introduction. This information is presented here in order to give you a better overall picture of where CAPRICORN fits into the product line and to give you enough information to be able to recommend the best HP solution for the customer.

As with any preliminary information exact specifications, prices and availability cannot be given. This information should only be used to provide the customer with a broad view of the capabilities of CAPRICORN. No promises or commitments should be made based on this pre-introduction information.

CAPRICORN Hardware Options (Still in Development)

User installable hardware options that will enhance and extend an already powerful BASIC.

ROMs • I/O: Provides an I/O command set similar to that used by the 9825. Includes direct handshake, interrupt, and fast handshake I/O modes. Allows movement of binary and ASCII data. Complete I/O formatting available for ASCII data. Provides BASIC language extensions used to control information between the user-installable interface cards and CAPRICORN.

- **Printer/Plotter:** Provides a subset of BASIC I/O commands for operation of the 2631 Matrix Printer, 7225 Mini-Plotter, 9872 Plotter, and other HP-IB peripherals using the HP-IB interface card.
- **Advanced Programming:** Gives the user extended BASIC commands allowing the use of subprograms and program control flags. Permits programs to be merged and enhances editing.
- **Mass Storage:** Gives the user extended BASIC commands allowing complete control and utilization of a future floppy-disk system.
- **Matrix:** Provides an extended subset of BASIC commands for matrix math functions and matrix manipulations. Performs linear system solutions and simplifies array I/O.
- Handbooks and Quick Reference Cards will be available for each ROM.
- The ROM drawer which can hold up to 6 ROMs plugs into 1 to the 4 I/O slots in the back of CAPRICORN. The ROM drawer has to be ordered separately at a cost to the customer. (Included in the 85S configuration.)

Interface Cards

- **HP-IB:** This interface is Hewlett-Packard's implementation of the IEEE-488 - 1978 interface standard. The interface provides the necessary hardware to connect a maximum of 14 HP-IB compatible devices such as printers, plotters, and all HP-IB compatible instruments. High level BASIC language extensions provided by the I/O ROM allow easy control of both data and commands on the interface. The interface is capable of operating in both SYSTEM CONTROLLER and NON-SYSTEM CONTROLLER modes.
- **General Purpose I/O:** This interface provides 16-bit, half-duplex, general purpose I/O operation for connection to TTL type signal levels. Two independent 16-bit channels are provided; one for input and another for output. Additional control, status and peripheral response signals are provided to synchronize information flow between the interface and the device connected. BASIC language extensions are provided in the I/O ROM to simplify communication between the user program and the device connected.
- **Binary Coded Decimal (BCD):** This interface provides the hardware necessary to connect CAPRICORN to devices having BCD outputs. Both the mantissa and exponent can be assigned. An eight-bit output bus is provided to allow device control. Interface control signals are also available to synchronize data flow between the interface and the device connected. BASIC language extensions are provided in the I/O ROM, to facilitate communication between the user program and the peripheral device.
- **Bit Serial I/O:** This interface provides RS-232-C compatible I/O for peripheral and data-communication interfacing applications. The interface operates in asynchronous mode only and an optional cable is available for connection to such Data Set Equipment (DSE) as modems. BASIC language extensions are provided by the I/O ROM to simplify such serial communication.

85S

Remember that I/O will be a key distinction of CAPRICORN. With this in mind, the 85S will include the following:

- CAPRICORN
- I/O ROM
- ROM Drawer
- HP-IB Interface Card (or by option another Interface Card)

CAPRICORN SOFTWARE PACS

(Still in Development)

Finance Pac:

Compound Interest and Loan Amortization, Discounted Cash Flow Analysis, Depreciation, Simple Interest and Interest Conventions, Bonds, Notes and Breakeven Analysis.

Circuit Analysis Pac:

Determines Steady-State AC behavior of Electrical Networks consisting of Resistors, Capacitors, Inductors, Voltage-Controlled Current Sources and Independent Current Sources.

Statistical Graphics Pac:

Contains routines for plotting Statistical Data, Time Plot, Histogram, Probability Plots, X-Y Scanner Plot, Semi-Log Plot, Log-Log Plot, XYZ Plot, and Andrews Plot; contains Basic Statistics and Data Manipulation.

Graphic Presentations Pac:

Produces Bar Charts, Line Charts, Pie Charts. Featuring 4 Character Fonts, the pack can also create 7-Color Overhead Slides.

Text Editor Pac:

Provides text editing features with character-editing capabilities.

CAPRICORN Peripherals

CAPRICORN will be compatible with the following:

All Hewlett-Packard HP-IB peripherals, for example:

- 9872 Plotter
- 2631 Matrix Printer
- 9876 Thermal Printer
- 7245 Thermal Plotter/Printer
- 7225 Mini-Plotter
- Will require the HP-IB Interface Card, and the Printer/Plotter ROM.
 - All Hewlett-Packard HP-IB Instruments
 - Will require HP-IB Interface Card and the I/O ROM

A Low-cost double-density, single-sided floppy-disk drive (**in development**). Will require HP-IB Interface Card and the Mass Storage ROM

A low-cost plotter (**in development**). Will require HP-IB Interface Card and the Printer/Plotter ROM.

NOTES



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