

HP 9000 Series 800



Configuration Guide

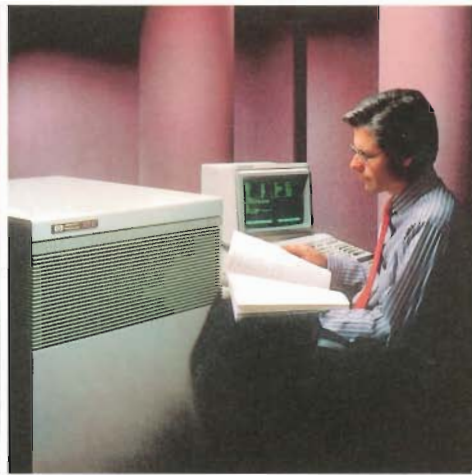


TABLE OF CONTENTS



Title	Section
Introduction	1
Operating System and Application Software	2
Operating System Software	2.1
Application Software	2.2
HP 9000 Model 825S Configuration	3
Hardware Overview	3.1
Product Structure	3.2
Main Memory Configuration	3.3
I/O Configuration	3.4
Model 825S Configuration Summary	3.5
HP 9000 Model 840S Configuration	4
Hardware Overview	4.1
Product Structure	4.2
Main Memory Configuration	4.3
I/O Configuration	4.4
Model 840S Configuration Summary	4.5
HP 9000 Model 850S Configuration	5
Hardware Overview	5.1
Product Structure	5.2
Main Memory Configuration	5.3
I/O Configuration	5.4
Model 850S Configuration Summary	5.5
Supported Peripherals	6
Summary	7
Terminology	Appendix

NOTICE

The information contained in this document is subject to change without notice.

HEWLETT-PACKARD MAKES NO WARRANTY OF ANY KIND WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this material.

Hewlett-Packard assumes no responsibility for the use or reliability of its software on equipment that is not furnished by Hewlett-Packard.

This document contains proprietary information which is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced or translated to another language without the prior written consent of Hewlett-Packard Company.

1. INTRODUCTION

The purpose of this guide is to help you select the appropriate HP 9000 Series 800 configuration.

You should have the following Hewlett-Packard publications available for reference:

- o HP 9000 Series 800 data sheets for Models 825S, 840S and 850S
- o HP 9000 Series 800 Hardware Technical Data
- o HP 9000 Series 800 Computer Systems -- Pricing Information

The publications listed above are included in the HP 9000 Series 800 Systems Reference Guide.

For a description of the terms used here, please see the appendix at the end of this overview.

HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

2. OPERATING SYSTEM AND APPLICATION SOFTWARE

2.1 OPERATING SYSTEM SOFTWARE

Each HP 9000 Series 800 system comes standard with the HP-UX operating system. In addition, customers may upgrade the standard HP-UX license for increased numbers of users. Detailed information for each system and licenses follows and is summarized in Table 1.

92452A 16-User License HP-UX includes:

1. HP-UX, featuring C and the HP-UX Symbolic Debugger. Also includes Assembler, DIL, Real-Time Package, and PORT/HP-UX. Software Media Option AA0 or AA1 must be ordered.
2. 16-User License.
3. HP92453K HP-UX Documentation Package.

Must specify software Media Option AA0 or AA1.

- AA0 Software on 1/4-in. cartridge tape.
- AA1 Software on 1/2-in. 1600 cpi 9-track tape.
- 0B0 Delete 92453K HP-UX Documentation Package.
- 0CC Revision upgrade for user not on support services.

92453A HP-UX as defined above, but with 32-User-license:

- 0A0 Credit for upgrade from 16-user license.

92454A HP-UX as defined above, but with 64-User license:

- 0A1 Credit for upgrade from 16-user license.
- 0A2 Credit for upgrade from 32-user license.

92455A HP-UX as defined above, but with unlimited user license:

- 0A1 Credit for upgrade from 16-user license.
- 0A2 Credit for upgrade from 32-user license.
- 0A3 Credit for upgrade from 64-user license.

92439A Native Language I/O and stick Kanji Font

- AA0 Software on 1/4-in. cartridge tape.
- AA1 Software on 1/2-in. 1600 cpi 9-track tape.

92433A Simplex Kanji Font (requires current version of 92439A Native Language I/O):

- AA0 Software on 1/4-in. cartridge tape.
--AA1 Software on 1/2-in. 1600 cpi 9-track tape.

**Table 1: Summary of HP-UX Operating System Licenses:
HP 9000 Series 800**

	Model 825S	Model 840S	Model 850S
16-user	Included with hardware	Included with hardware	N/A
32-user	92453#0A0	92453#0A0	Included with hardware
64-user	92454#0A1 or 92454#0A2	92454#0A1 or 92454#0A2	92454#0A2
Unlimited user	N/A	92455#0A1 or 92455#0A2 or 92455#0A3	92455#0A2 or 92455#0A3

Multi-User Considerations

The limitations imposed by the multi-user license are:

- o Only the licensed number of users may log in at one time. The number of *login* prompts (*gettys*) outstanding may exceed the licensed limit under some conditions; however, only the licensed number of users can successfully log in.
- o There may be additional *logins* for *uucp*, plus;
- o There may be any number of RS-232C ports used for non-terminal I/O, such as printers and plotters.

Memory and Disc Requirements

Minimum memory: 8 Mbytes

Minimum disc
storage: 125 Mbytes

Media Options

Software distribution/update media types are summarized at the end of this chapter.

HP-UX Operating System

HP-UX is a superset of AT&T's System V Interface Definition (SVID), Issue 2 Volumes 1 & 2, assuring portability of applications developed on other SVID compliant systems. HP-UX incorporates features from AT&T UNIX * System V, Release 2.0 and from U.C. Berkeley's 4.2 BSD.

Additionally, HP-UX includes a selection of enhancements along with many innovations of its own to extend the capabilities of the UNIX system.

The UNIX operating system is a licensed software product. As a licensee of this product, Hewlett-Packard is required to distribute a UNIX System V, Release 2.0 binary license with every HP-UX operating system.

For more specific information about HP-UX and other software products available on HP 9000 Series 800 computer systems, please see the appropriate data sheets containing specifications and characteristics of the Series 800 HP-UX operating system, languages, graphics and data management software, as well as data communications products.

* *UNIX is a registered trademark of AT&T in the U.S. and in other countries.*

Minimum HP-UX System

The minimum hardware configuration for a Series 800 HP-UX system of release 1.1 (or later) is:

- o 27110B HP-IB ** interface, 27140A ** multiplexer interface, cable and supported terminal with a 24-line X 80-column display;
- o 8.0 Mbytes ** or more of total memory;
- o one or more CS/80 winchester discs, one of which has 125 Mbytes total capacity;
- o any supported 1/4-inch or 1/2-inch tape drive, for software installation;
- o one of the following devices from which a HP 9000 Series 800 computer system can be booted:

Discs: 7933H
 7935H
 7936H
 7937H
 7957A *** +
 7958A +

Disc/Tape: 7914CT
 7914P/R
 7914ST

Tapes: 35401A
 7974A
 7978B
 9144A



****** *Included as standard equipment on Series 800.*

******* *This disc has insufficient capacity and/or performance for use as a "system" disc. It may be usable for secondary mounted volumes.*

+ *Supported in HP-UX Release 1.2.*

2.2 APPLICATION SOFTWARE

The following is a summary of the most important software products currently available on HP 9000 Series 800 computer systems. More complete ordering information for each of these products is provided in the Pricing Guide or in the CPL.

Description	Product # for Model 825S	Product # for Model 840S	Product # for Model 850S
Programming languages:			
Assembler	standard*	standard*	standard*
C	standard*	standard*	standard*
Pascal	92444A/R	92431A/R	92462A/R
FORTRAN 77	92443A/R	92430A/R	92461A/R
Application Development Tools:			
COBOL Developer Package	35328A	35326A	35330A
COBOL Run Time Package	35329A	35327A	35331A
4GL:			
HPtoday Developer Pack	35305A	92440A/R	35307A/R
HPtoday Run Time Environment	35306A	92441A	35308A
Data Management:			
ALLBASE	92460A/R	36217A/R	92469A/R
HP Visor	92533A/R	92534A/R	92535A/R
Graphics software:			
Starbase Graphics Library	92445A/R	92436A/R	92463A/R
DGL/AGP Graphics Library	92446A/R	92437A/R	92464A/R
GKS	92521A/R	92525A/R	92529A/R
Display List	92522A/R	92526A/R	**
X Window	92524A/R	**	**

* Included in standard system.

** Not yet available.

Description	Product # for Model 825S	Product # for Model 840S	Product # for Model 850S
Networking software:			
NS/9000	91787A/R	98195A/R	91789A/R
ARPA/BSD Services	50981A/R	50980A/R	50982A/R
LAN/9000	91786A	98194A	91788A
Gateway SNA/3270	36918A/R	36911A/R	36919A/R
NS for DEC VAX	50950A/R	50950A/R	50950A/R
Software packages:			
Development Pack incl. FORTRAN 77, Pascal, Starbase and DGL/AGP Graphics Library	92447A	92438A	92465A
ALLBASE and HPtoday Developer Pack	92459A	92442A	92468A

Software Media Options

Unless the software is supplied only on a single media tape, you must designate the media you want via an Option Number.

Software Product Option	Part Description
AA0	1/4-inch cartridge tape
AA1	1/2-inch 9-track magnetic tape, 1600 cpi
0B0	Delete manuals
0CC	Revision upgrade for user not on support services

For upgrade options, please refer to the Price Guide.

Multiple Copy Discounts on Software

If you have or are purchasing multiple systems, you may be eligible for discounts on multiple copies of certain software packages.

Each additional copy of the software is purchased at a discount by ordering the same software product number but with an "R" suffix (such as 92533R). The "R" product confers the right to reproduce the "A/B" software for use on one other computer, and includes a set of manuals. The "R" product also confers the right to resell or sublicense the software in the normal course of your business. HP software products bundled into systems purchased from HP OEM's do not qualify for the discount.

The following policies are effective immediately and are not retroactive:

A-Copy Prerequisite

Eligibility for purchasing a Right-to-copy (R-Copy) version of any given non-operating system software product for the Series 800 family requires a previous or concurrent purchase of an A-Copy on an equivalent or higher class processor. There are currently three classes of software on the series 800: 825 Class, 840 Class, and 850 Class. An 850-Class A-Copy software product purchase entitles the holder of that software license to purchase an unlimited number of R-Copy licenses on any Series 800 processor. In contrast, an 825-Class A-Copy license precludes the purchase of an R-Copy license on either a Model 840S or Model 850S unless an equivalent or higher class A-Copy purchase is made. (Note: Unlike subsystem software, the HP-UX operating system employs user-based pricing.)

Software Bundles

In some instances two or more A-Copy products are combined together in a bundle at a lower price than the sum of the independent products. This bundle price is typically equivalent to or less than the sum of the combined products at R-Copy prices. Although priced at R-Copy levels, an A-Copy bundle license implies A-Copy licenses for all of the individual component products. Separate pieces of the bundle may later be purchased on equivalent or lower class processors at R-Copy prices. Buying the Development Pack (FORTRAN, Pascal, DGL/AGP, Starbase) on a Model 825S permits a future purchase of FORTRAN, for example, at the R-Copy price on subsequent 825S purchases.

Software Upgrades

The software upgrade program is provided as a companion to the hardware program to offer financial credits when a lower-priced system is returned in exchange for the purchase of a higher-priced system. Software upgrades may also be used to convert a lower-class A-Copy license to a higher-class A-Copy license when no hardware upgrade occurs. In these instances, the A-Copy upgrade must be accompanied by an R-Copy replacement on the lower-class processor from which the original A-Copy software was upgraded. If an 840-Class A-Copy purchase is followed by a Model 850 purchase, that A-Copy license may be transferred to an 850-Class A-Copy license through the use of a software upgrade providing that it is accompanied by an 840-Class R-Copy replacement.

3. HP 9000 MODEL 825S CONFIGURATION

3.2 HARDWARE OVERVIEW

Because the Model 825S processor is implemented in VLSI, it is very compact. The single-chip processor, floating-point co-processor, CIO Channel Adapter, 16 Kb cache for data and instructions and the TLB are all found on two boards in the Model 825S CPU (see Figure 1 for a 825S Block Diagram).

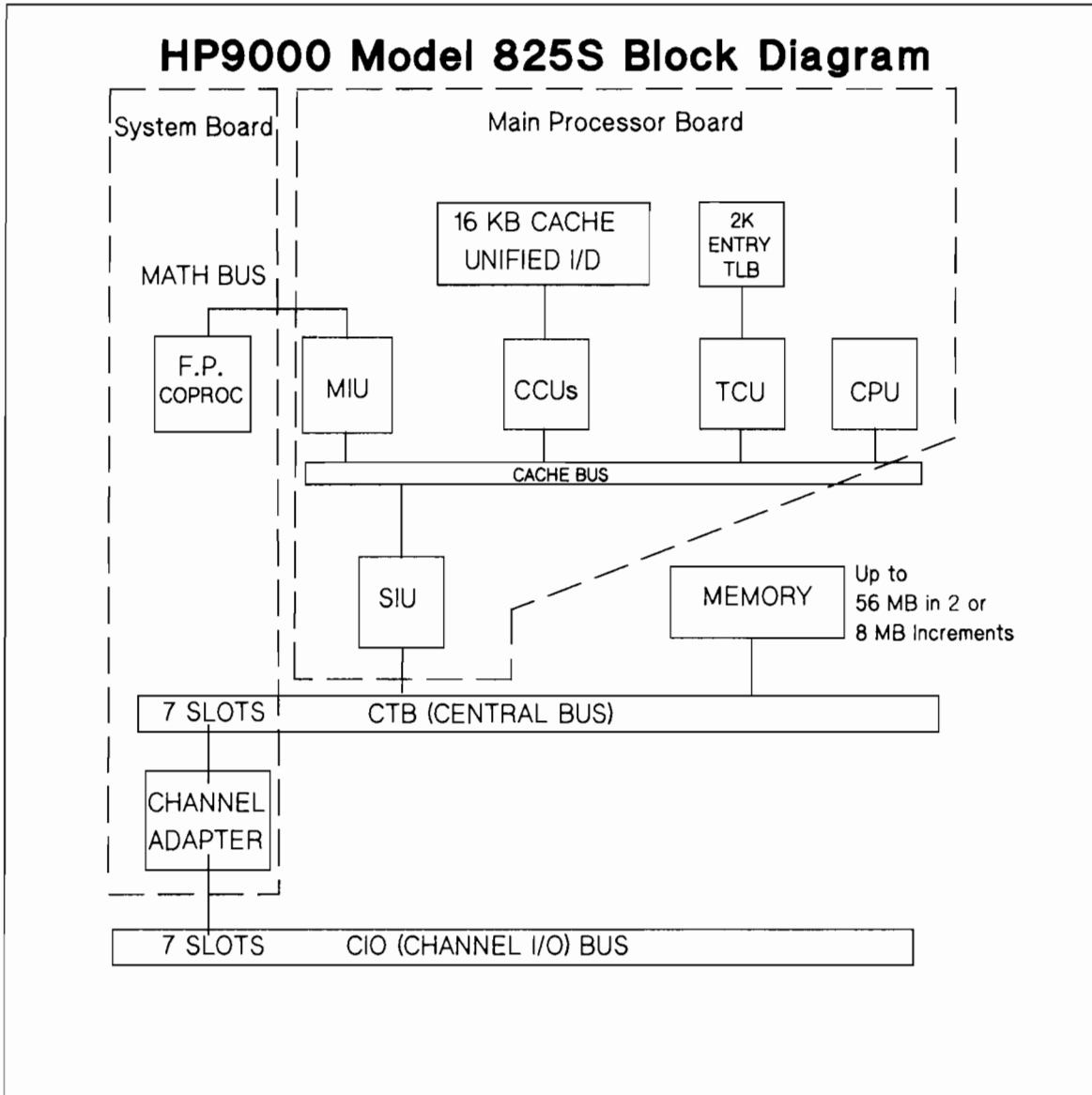


Figure 1

3.2 PRODUCT STRUCTURE

The standard Model 825S SPU (see Figure 2) comes with:

Part No.	Description
A1004A	1 CPU with floating-point co-processor 1 234mm high by 325mm wide by 500mm deep shuttle package 1 power supply 8 Mbytes ECC memory containing memory controller and memory array 1 Central System Bus 1 channel I/O bus 1 CIO Channel Adapter 1 6-channel MUX 1 HP-IB 1 16-user HP-UX license
Opt.AA0	HP-UX software on 1/4-inch cartridge tape
Opt.AA1	HP-UX software on 1/2-inch 1600 cpi tape
	Manuals, installation and 90-day on-site warranty

Add-on options:

Opt.001	Additional 2 Mbyte ECC memory
Opt.002	Additional 8 Mbyte ECC memory
Opt.003	Expander and CIO Channel Adapter
Opt.0E1	Battery backup system

Add-on hardware:

A1009A	2 Mbyte ECC memory
A1010A	8 Mbyte ECC memory
A1013A	Expander and CIO Channel Adapter (adds 7 CIO slots)
A1014A	Battery backup system
A1015A	Access Port
27110B	HP-IB Interface card
27114A	Parallel Asynchronous FIFO Interface
27140A	6-channel MUX
97099A	19-inch rack mount kit for 825S SPU
19500B	19-inch rack mount kit for 825S battery backup unit
91786A	LAN/9000, includes LANIC, ThinMAU, Coax adapter and T-Connector

98720A	Solid Rendering Display System with 4-plane memory overlay
98721A	3-D Solid Graphics Accelerator
A1017A	Display Controller Interface
98723A	Additional Power Supply for 98720A Display System
98722A	8-plane Frame Buffer Memory for SRX
46021A	ITF Keyboard
46060A	HP-HIL 2-button mouse
46081A	Buffer Box with Speaker
46084A	ID Module
98784A	19-in. Color Monitor (1280 X 1024)
98290A	RGB Cables

3.3 MAIN MEMORY CONFIGURATION

The standard Model 825S comes with 8 Mb of ECC main memory. Memory can be expanded by adding 2 Mb or 8 Mb boards, up to a maximum of 56 Mb if no CIO expander is used. Each memory card contains a memory controller and memory array of 256 Kbit or 1 Mbit NMOS dynamic RAM chips.

The central bus (CTB) of the Model 825S has six slots left for adding more memory (see Figure 2) and/or for adding a CIO expander. One CTB slot is initially taken by an 8 Mb memory board.

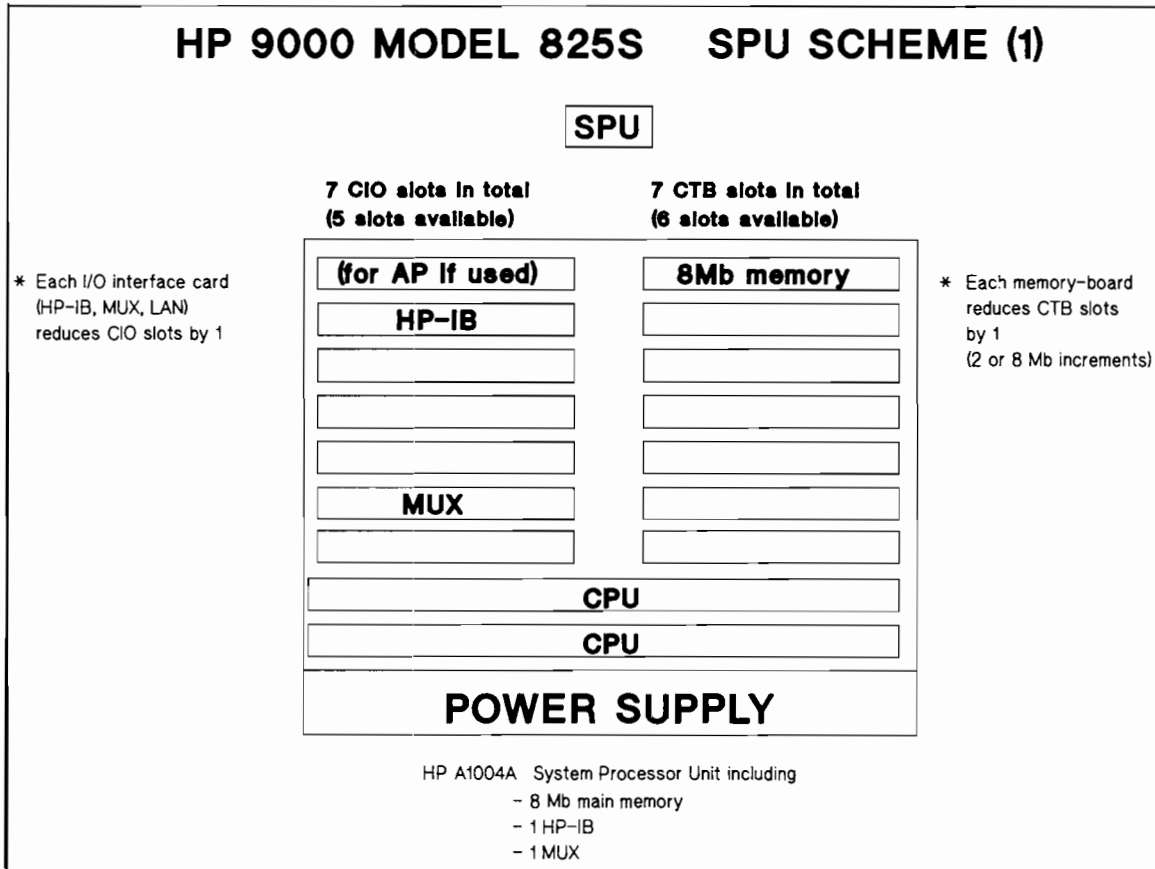


Figure 2

If the CIO expander is connected, one CTB and one CIO slot in the 825S SPU are used (see Figure 3). This decreases the maximum memory size to 48 Mb.

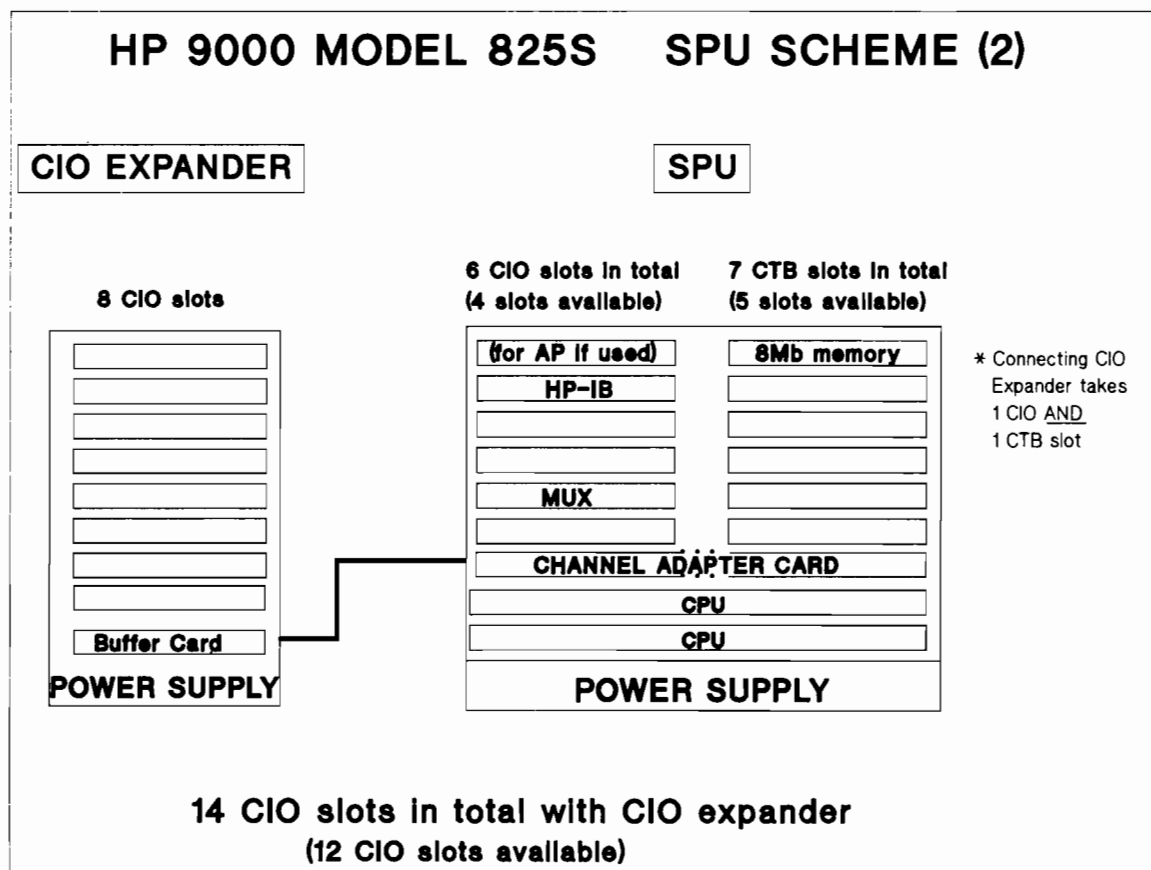


Figure 3

3.4 I/O CONFIGURATION

The 825S has five CIO slots left for adding interface cards such as HP-IB, MUX and LAN, since two CIO slots are initially occupied by one MUX and one HP-IB (Figure 2). Connecting the optional Access Port (AP) for remote diagnostics to the 825S would take another CIO slot.

If the CIO expander with eight additional CIO slots is connected to the 825S SPU, one CIO and one CTB slot are needed, leaving a total of 12 CIO slots available for connecting channel I/O device adapters.

These ports can be used for any supported interface card with the exception that the LAN card must reside in the 825S card cage.

Adding the CIO expander not only increases the number of slots for connecting additional channel I/O device adapters such as HP-IB's or MUX's, but it also has another advantage. Included in the CIO expander is an additional channel I/O bus and a channel adapter, which is the interface between the channel I/O bus and the central system bus. Having two CIO buses working in parallel adds up to 5 Mbytes/second I/O bandwidth, depending on the system configuration.

3.5 MODEL 825S CONFIGURATION SUMMARY

Figure 11 (see Section 7) illustrates the Model 825S configuration.

Memory Configuration Guidelines

Minimum memory: 8 Mbytes (included in standard SPU)

Maximum memory: 56 Mbytes (without CIO expander)

48 Mbytes (with CIO expander connected)

Additional memory: At the time of purchase, order these additional memory options (maximum 56 Mbytes):

Opt.001 2 Mbytes RAM board

Opt.002 8 Mbytes RAM board

To add memory to an existing system, order these (maximum 56 Mbytes):

A1009A 2 Mbytes RAM board

A1010A 8 Mbytes RAM board

I/O Configuration Guidelines

Standard

Channel Adapters: 1

Maximum supported

Channel Adapters: 2

Standard I/O slots: 7 (2 are used for standard MUX and HP-IB, leaving 5 available slots)

Maximum I/O slots: 14 (12 available slots; requires purchase of expander. Expander includes CIO Channel Adapter and buffer card)

Maximum supported

HP-IB cards: 13

Maximum supported

6-channel MUX: 11

Terminal Configuration Guidelines

Maximum supported
terminals: 72 *

Available slots on included

6-channel MUX: 5 (1 dedicated to console);
4 (if optional Access Port is connected)

For additional terminals:

The included MUX has 5 ports available for additional terminal or serial device connections. Additional 6-channel MUX's (P/N 27140A) must be purchased to fill the remaining CIO slots. Once the standard 7 CIO slots are filled with MUX's, HP-IB's, etc., the expander including the second CIO Channel Adapter (Opt.003 or P/N A1013A) must be purchased; this adds 7 CIO slots.

Disc Configuration Guidelines

Maximum supported HP-IB
Discs (spindles): 12 (up to 4 discs/HP-IB card)

Maximum disc storage with
HP-IB discs: 6.85 Gbytes **

The standard SPU comes with 1 HP-IB card included for system discs. Additional HP-IB cards can be purchased separately (P/N 27110B).

Note: High speed devices (disc drives) and low speed devices (tape drives, plotters, printers) should use separate HP-IB cards. This is because the effective bus speed will be determined by the speed of the slowest device.

Other System Peripherals Configuration Guidelines

Maximum supported
tape drives: 8 (up to 4 tapes/HP-IB card)

Maximum supported
HP-IB printers: 8 (up to 4 printers/HP-IB card)

* *Maximum HP-UX license for the 825S is 64.*

** *9.14 Gbytes will be available in future.*

Maximum supported
HP-IB plotters: 8 (up to 4 plotters/HP-IB card)

Maximum supported terminals and/or
serial devices: 72

Maximum supported
HP-IB instruments: 52

Note: High speed devices (disc drives) and low speed devices (tape drives, plotters and printers) should use separate HP-IB cards. Low speed devices can be intermixed on one card, e.g., one HP-IB card can support two tape drives, one system printer and one system plotter.

Other CIO Card Configuration Guidelines

Maximum supported
LAN cards: 1 (must reside in SPU box)

Maximum access
port cards: 1 (must reside in slot 0 in SPU box)

Maximum supported
parallel cards: 4

4. HP 9000 MODEL 840S CONFIGURATION

4.1 HARDWARE OVERVIEW

The Model 840S CPU consists of five processor boards (see Figure 4) and is implemented in TTL technology. The cache size is 128 Kb and is divided into an instruction cache and data cache, each 64 Kb large.

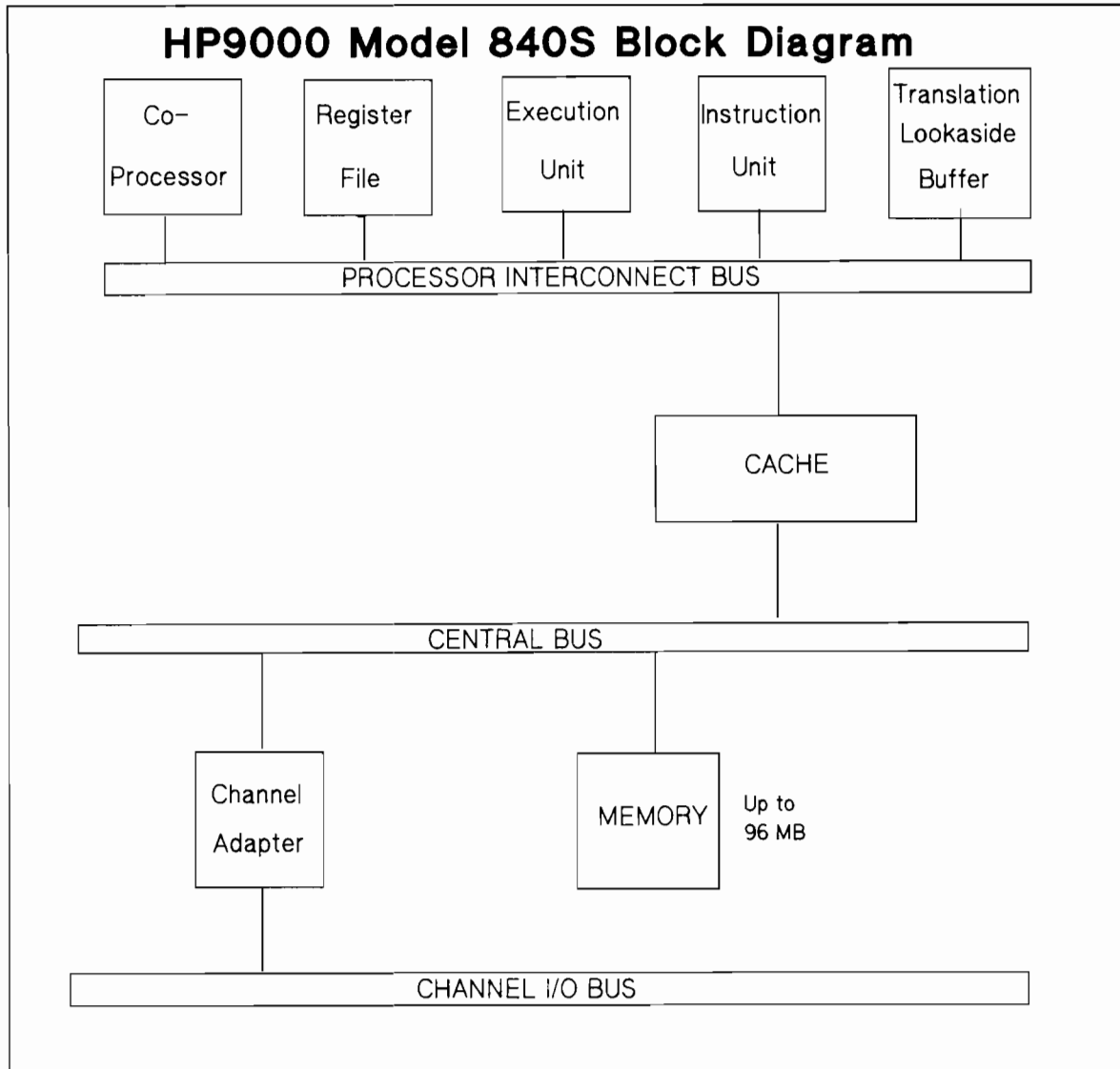


Figure 4

Figure 5 shows the front and rear view of the Model 840S.

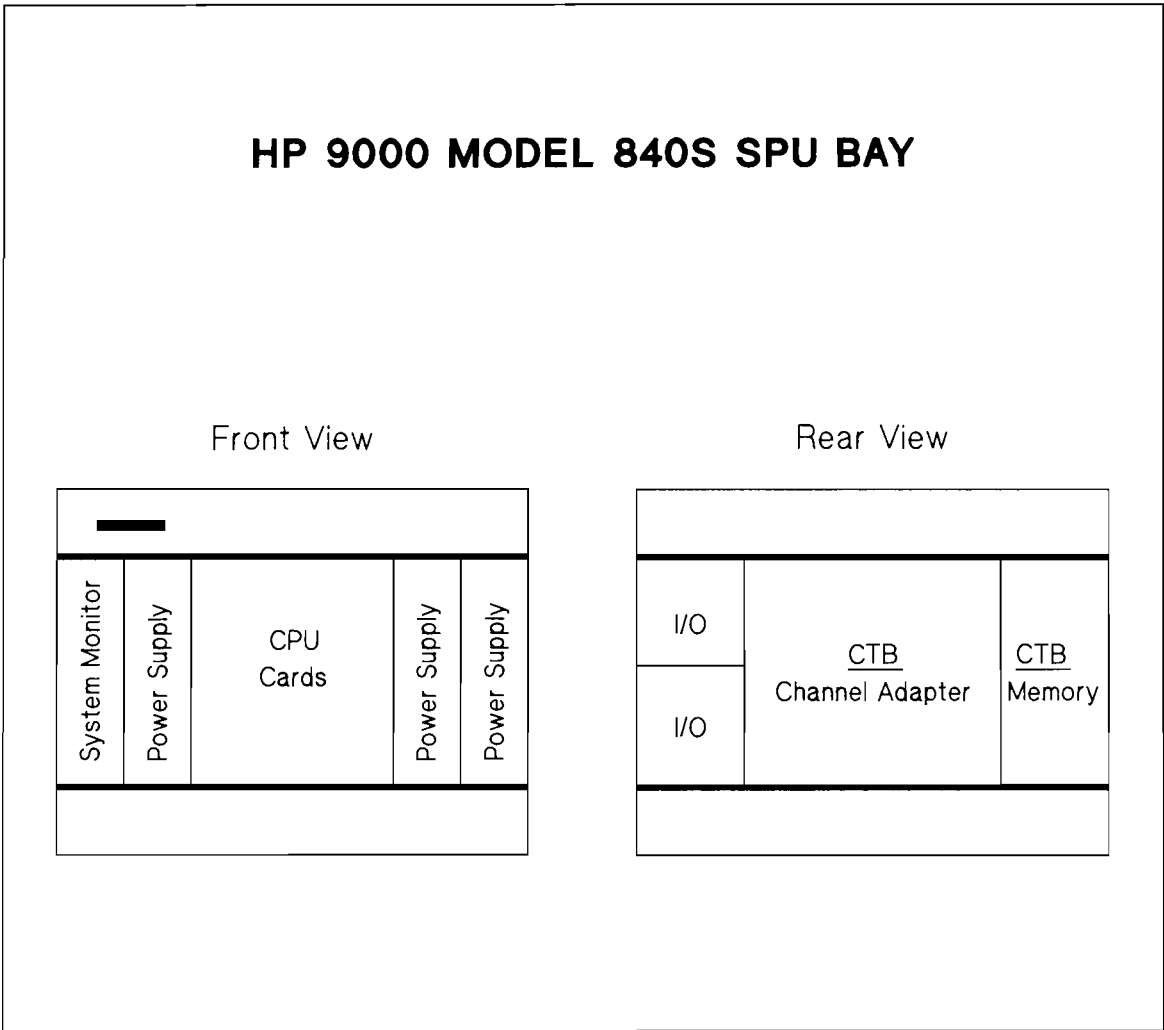


Figure 5

4.2 PRODUCT STRUCTURE

The standard Model 840S SPU (see Figure 4) comes with:

Part No.	Description
9741A	1 CPU with floating-point co-processor 1 cabinet 1 power supply 1 8 Mbyte ECC memory 1 Central System Bus 1 channel I/O bus 1 CIO Channel Adapter 1 Battery Backup Unit 1 access port card 1 6-channel MUX 1 HP-IB card 1 16-user HP-UX license
Opt.AA0	HP-UX software on 1/4-inch cartridge tape
Opt.AA1	HP-UP software on 1/2-inch 1600 cpi tape
	Manuals, installation and 90-day on-site warranty



Add-on options:

Opt.508	8 Mbytes additional ECC memory
Opt.531	Replace standard 8 Mbytes with 32 Mbytes ECC memory (2 card set)
Opt.532	32 Mbytes ECC additional memory (2 card set)
Opt.601	Expander including cabinet and CIO Channel Adapter

Add-on hardware:

19748A	8 Mbytes ECC memory
19733A	32 Mbytes ECC memory (2 card set)
19746B	Expander including cabinet and CIO Channel Adapter (adds 16 CIO slots)
19744A	Channel Adapter
27110B	HP-IB interface card
27114A	Parallel Asynchronous FIFO Interface
27140A	6-channel MUX
19749A	Cable Management system with Console Table
98194A	LAN/9000 includes LANIC, ThinMAU, Coax adapter and T-Connector

4.3 MAIN MEMORY CONFIGURATION

The Model 840S includes 8 Mbytes of ECC main memory. Memory can be expanded by adding 8 Mbytes or 32 Mbytes, up to a maximum of 96 Mbytes.

The original 8 Mbytes set, a 3 Mbytes controller and a 5 Mbytes array, utilizes 256 Kbit NMOS dynamic RAM chips. The new 32 Mbytes set uses 1 Mbit dynamic RAMs and consists of a 12 Mbytes controller and a 20 Mbytes array. These two memory board sets can be mixed in a single 840S.

The CTB of Model 840S has a total of 13 slots (see Figure 6). Six of these are reserved exclusively for memory. The remaining seven CTB slots are used for connecting one or more channel adapters (two-board sets).

For proper system function, an 8 Mbytes memory board set must sit behind any 32 Mbytes memory board in the card cage (see Figure 7).

Memory configurations on the 840S are as follows:

8 Mb	48 Mb
16 Mb	64 Mb
24 Mb	72 Mb
32 Mb	96 Mb
40 Mb	

(Current plans call for support of a single card 8 Mbytes memory set on the 840S in 1988. At that time, all 8 Mbytes memory increments between 8 and 96 will be supported.)

4.4 I/O CONFIGURATION

The CIO bus contains 14 slots for CIO cards. Four of those are used for the CIO buffer card, the access port for remote console capabilities, the MUX and HP-IB. The remaining ten slots are open for I/O interface cards (Figure 6).

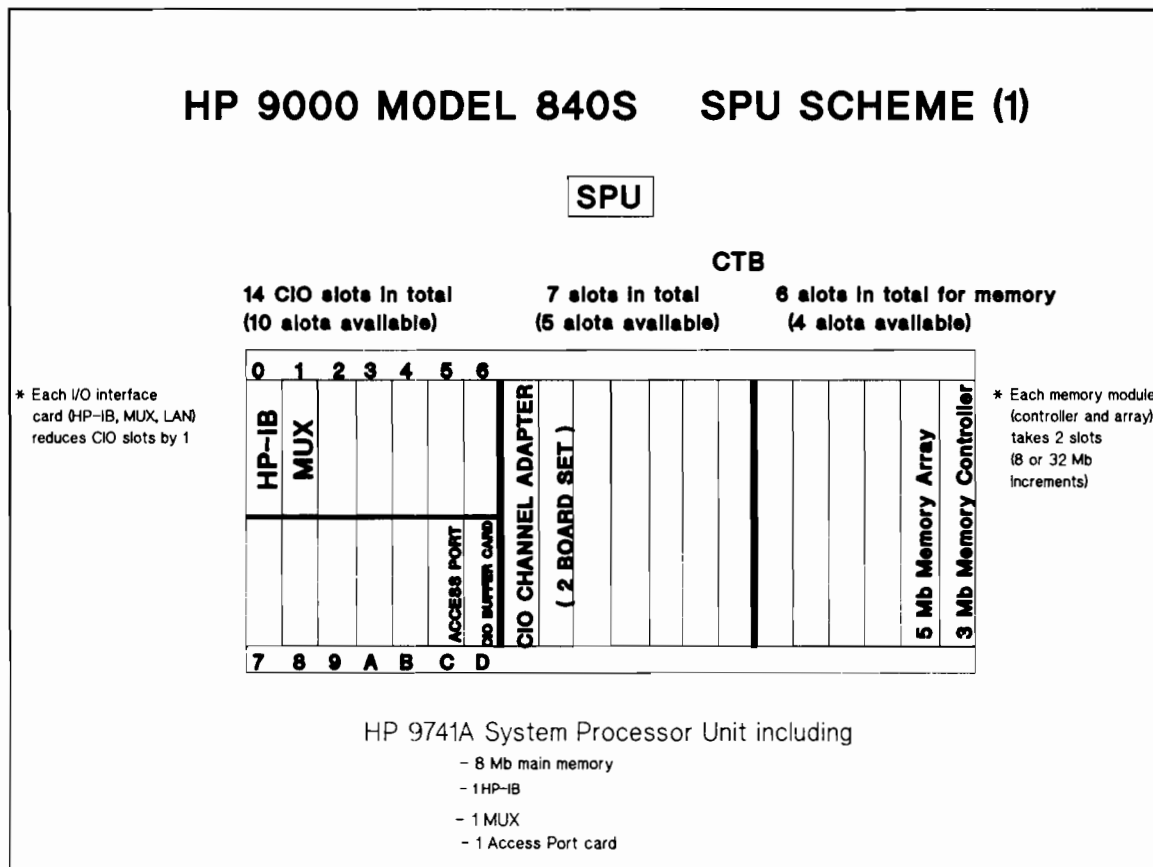


Figure 6

Recommendations for using CIO slots:

The following slot assignments are recommended: HP-IB in slot 0, and the MUX in slot 1. Place the CIO buffer card in slot D and the access port in slot C.

With the I/O expander, the 840S has a total of 26 CIO ports, excluding the standard HP-IB and MUX (see Figure 7), which can be used for any supported CIO card with the exception that the LAN card must reside in the 840S card cage. Since the I/O expander adds an additional channel I/O bus to the 840S, two CIO buses are working in parallel. This adds up to 5 Mbytes/second I/O bandwidth to the system, depending on the whole configuration.

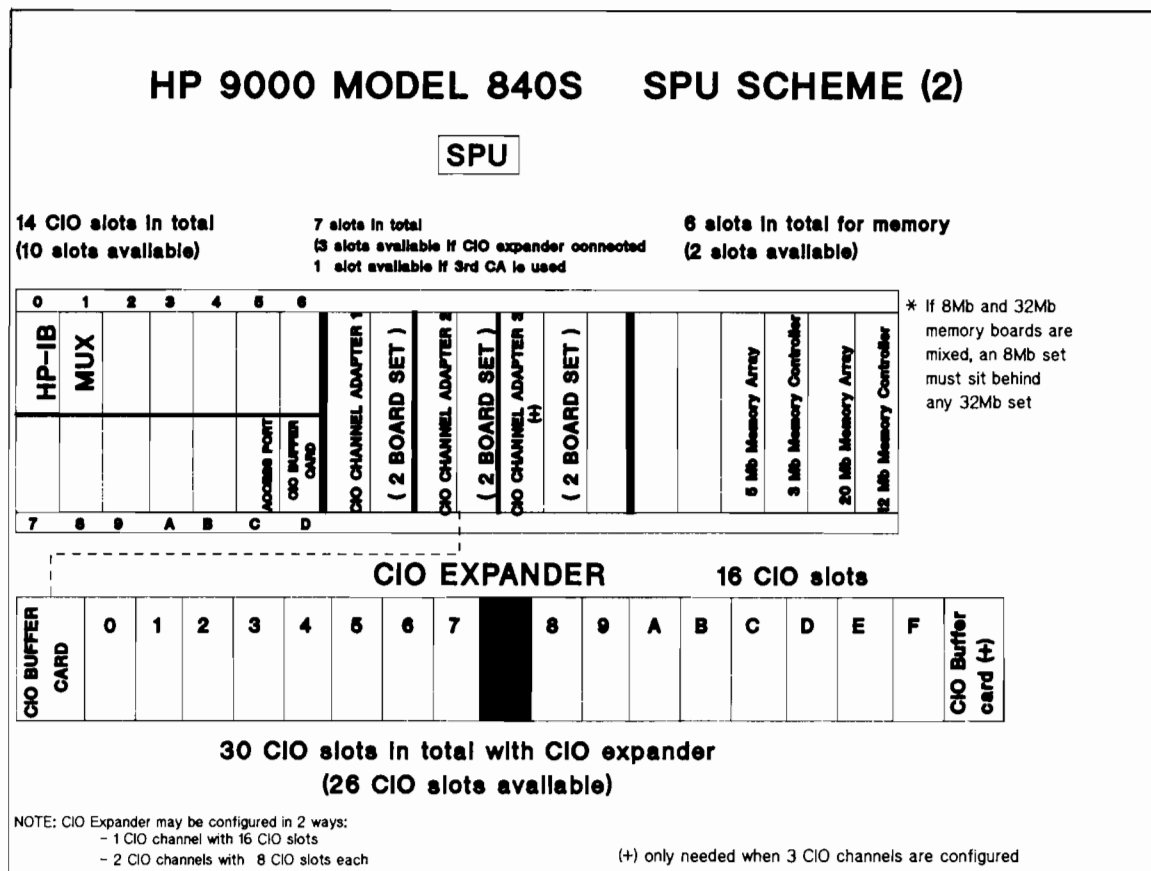


Figure 7

With the addition of a third CIO Channel Adapter, the additional 16-slot expansion module can be separated into two units of eight slots each. With that configuration, the 840S has three channel I/O buses working in parallel.

4.5 MODEL 840S CONFIGURATION SUMMARY

Figure 11 (see Section 7) illustrates the Model 840S configuration.

Memory Configuration Guidelines

Minimum memory: 8 Mbytes (included in standard SPU)

Maximum memory: 96 Mbytes

Additional memory: At the time of purchase, order these additional memory options (maximum 96 Mbytes):

Opt.508 8 Mbytes memory

Opt.531 Delete standard 8-Mbytes memory;
add 32 Mbytes memory

Opt.532 Add 32 Mbytes memory

To add memory to an existing system, order these (maximum 96 Mbytes):

19748A 8 Mbytes memory

19733A 32 Mbytes memory

I/O Configuration Guidelines

Standard Channel

Adapters: 1

Maximum supported

Channel Adapters: 3

Standard I/O slots: 14 (4 are used for included MUX, HP-IB, access port
and CIO buffer, leaving 10 available slots)

Maximum I/O slots: 30 (26 available slots; requires purchase of
expander including CIO Channel Adapter)

Maximum supported

HP-IB cards: 27

Maximum supported

6-channel MUX: 22

Terminal Configuration Guidelines

Maximum supported
terminals: 128

Available slots on included
6-channel MUX: 4 (2 dedicated to console and access port)

For additional terminals:

The included MUX has 4 ports available for terminal connections. Additional 6-channel MUX's (P/N 27140A) must be purchased to fill the remaining CIO slots if additional terminals are needed. Once the standard 14 CIO slots are filled with MUX's, HP-IB's, etc., the expander (Opt.601 or P/N 19746B) must be purchased; this adds 16 CIO slots. A third CIO Channel Adapter (P/N 19744A) can be purchased to improve the I/O bandwidth by another 5 Mbytes/second. This would then separate the 16-slot expander into two units of 8 slots each.

Disc Configuration Guidelines

Maximum supported HP-IB
Discs (spindles): 12 (up to 4 discs/HP-IB card)

Maximum disc storage
with HP-IB discs: 6.85 Gbytes*

The standard SPU comes with 1 HP-IB card included for system discs. Additional HP-IB cards can be purchased separately (P/N 27110B).

Note: High speed devices, i.e., disc drives, should use a separate HP-IB card from low speed devices, such as tape drives, printers and plotters. This is because the effective bus speed will be determined by the speed of the slowest device.

**9.14 Gbytes will be supported in future.*

Other System Peripherals Configuration Guidelines

Maximum supported
tape drives: 8 (up to 4 tapes/HP-IB card)

Maximum supported
HP-IB printers: 8 (up to 4 printers/HP-IB card)

Maximum supported
HP-IB plotters: 8 (up to 4 plotters/HP-IB card)

Maximum supported terminals and/or
serial devices: 128

Maximum supported
HP-IB instruments: 108

Note: High speed devices, (disc drives) should use a separate HP-IB card that that used for low speed devices such as tape drives, printers and plotters. Low speed devices can be intermixed on one card, e.g., one HP-IB card can support two tape drives, one system printer and one system plotter.

Other CIO Card Configuration Guidelines

Maximum supported
LAN cards: 1 (must reside in SPU box)

Maximum access
port cards: 1 (included in standard SPU)

Maximum supported
parallel cards: 8

5. HP 9000 MODEL 850S CONFIGURATION

5.1 HARDWARE OVERVIEW

The Model 850S is implemented in NMOS III VLSI technology. The single-chip CPU, TLB (128 Kb for data and instructions) and the floating-point co-processor are all found on one board in the 850S SPU.

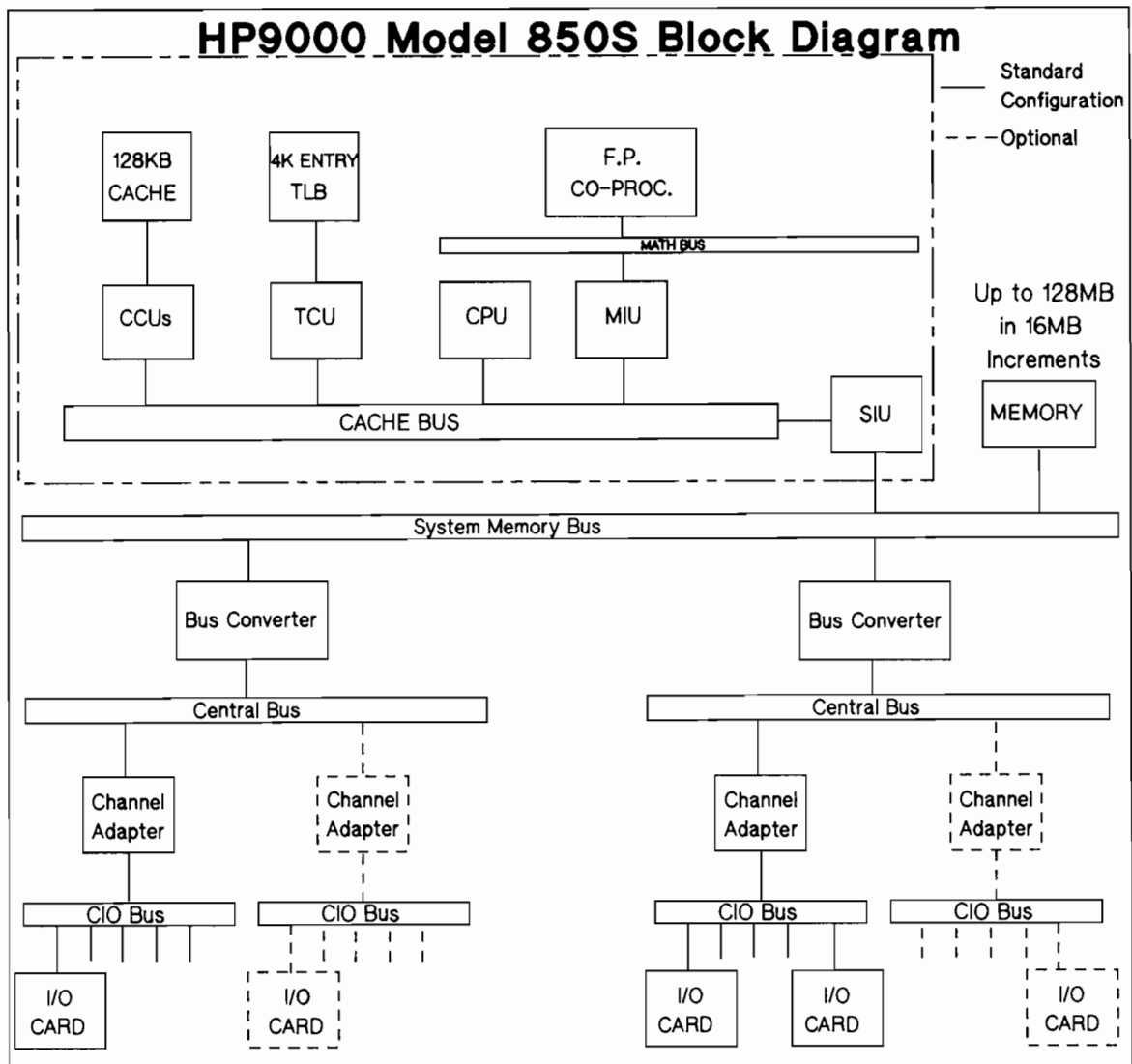


Figure 8

5.2 PRODUCT STRUCTURE

The standard Model 850S SPU (see Figure 9) comes with:

Part No.	Description
9742A	1 processor board with floating-point co-processor 1 two-bay, 1m Rosebud cabinet 1 power supply 1 memory controller (controls up to 8 16-Mbyte boards) 1 16-Mbyte ECC memory board 2 bus converters (connect central system bus to the system memory bus) 2 Central System Buses 2 Channel Adapters (connect CIO bus to a central system bus) 2 CIO buses 1 Battery Backup Unit 1 access port card 1 6-channel MUX 1 HP-IB card 1 32-user HP-UX license
Opt.AA0	HP-UX software on 1/4-inch cartridge tape
Opt.AA1	HP-UX software on 1/2-inch 1600 cpi tape
	Manuals, installation and 90-day on-site warranty

Add-on option:

Opt.516	16 Mbytes additional ECC memory
---------	---------------------------------

Add-on hardware:

A1101A	Channel adapter
A1104A	16 Mbyte ECC memory
27110B	HP-IB Interface card
27114A	Parallel Asynchronous FIFO Interface
27140A	6-channel MUX
19749A	Cable Management system with Console Table
91788A	LAN/9000 includes LANIC, ThinMAU, Coax adapter and T-Connector

5.3 MAIN MEMORY CONFIGURATION

The Model 850S memory subsystem consists of one memory controller board (MCB) that can support up to eight memory array boards (Figure 9). Each memory board uses 1 Mbit dynamic RAM chips and has a storage capacity of 16 Mbytes. The 850S includes one MCB with one 16 Mbytes memory array board and can be configured to a maximum of 128 Mbytes (8 16-Mbyte boards).

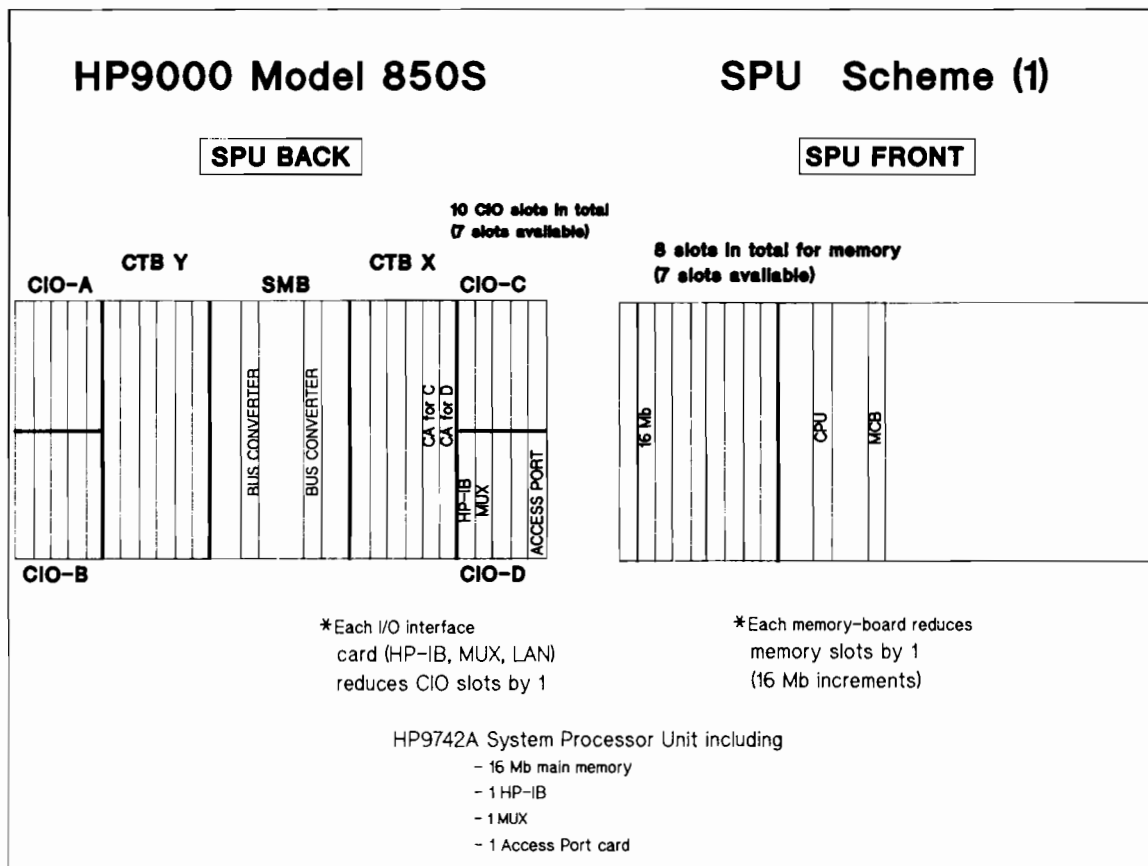


Figure 9

5.4 I/O CONFIGURATION

The I/O subsystem for the 850S is similar to that of the Models 825S and 840S. In the base system, two Channel Adapters (CA) are included. Each CA has the hardware capability to support eight device adapters (interface cards), although at present only five device adapters are implemented per CA, giving a total of ten CIO slots. Two of these are used for the HP-IB and MUX and one is for the access port included with the base system; seven CIO slots are available.

The Central System Bus (CTB) can support two CA's (see Figure 8). Since there are two CTB's in the Model 850S, four CA's can be utilized, increasing available CIO slots to 17 (see Figure 10).

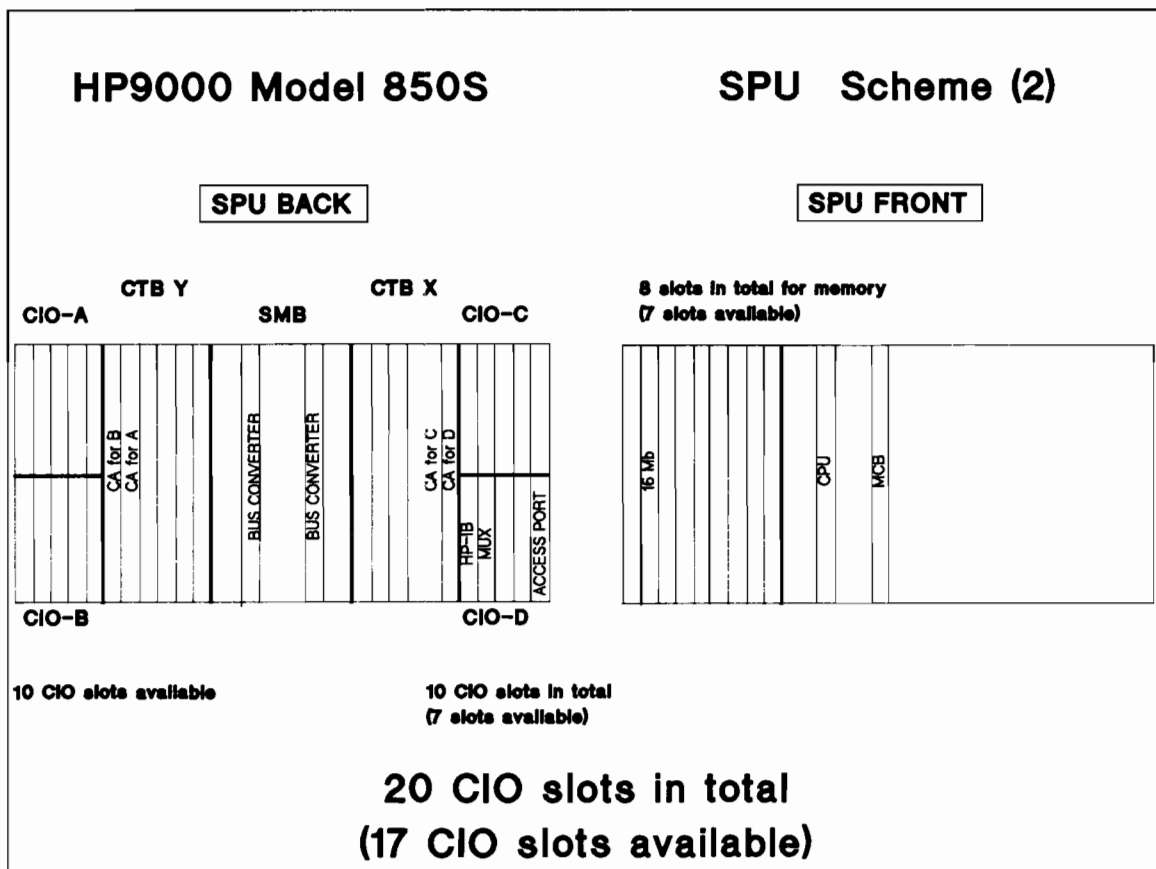


Figure 10

Greater CIO connectivity is planned for the future.

5.5 MODEL 850S CONFIGURATION SUMMARY

Figure 11 (See Section 7) illustrates the Model 850S configuration.

Memory Configuration Guidelines

Minimum memory: 16 Mbytes (included in standard SPU)

Maximum memory: 128 Mbytes

Additional memory: At the time of purchase, order the additional memory option:

Opt.516 16 Mbytes memory

To add memory to an existing system, order:

A1104A 16 Mbytes memory

I/O CONFIGURATION GUIDELINES

Standard Channel

Adapters: 2 (5 I/O slots per CA)

Maximum supported

Channel Adapters: 4

Standard I/O slots: 10 (3 are used for included MUX, HP-IB and access port, leaving 7 available slots)

Maximum I/O slots: 20 (17 available slots; requires purchase of 2 additional CA's)

Maximum supported

HP-IB cards: 18

Maximum supported

6-channel MUX: 17

Terminal Configuration Guidelines

Maximum supported

terminals: 102

Available slots on included

6-channel MUX: 4 (2 dedicated to console and access port)

For additional terminals:

The included MUX has 4 ports available for terminal connections. If additional terminals are needed, additional 6-channel MUX's (P/N 27140A) must be purchased to fill the remaining CIO slots. Once the standard 10 CIO slots are filled with MUX's, HP-IB's, etc., an additional CA (P/N A1101A) must be purchased; this adds 5 I/O slots. Up to two additional CA's can be purchased, for a maximum of 20 slots.

Disc Configuration Guidelines

Maximum supported HP-IB
Discs (spindles): 12 (up to 4 discs/HP-IB card)

Maximum disc storage with
HP-IB discs: 6.85 Gbytes*

The standard SPU comes with 1 HP-IB card included for system discs. Additional HP-IB cards can be purchased separately (P/N 27110B).

Note: High speed devices (disc drives) and low speed devices (tape drives, plotter, printers) should use separate HP-IB cards. This is because the effective bus speed will be determined by the speed of the slowest device.

Other System Peripherals Configuration Guidelines

Maximum supported
tape drives: 8 (up to 4 tapes/HP-IB card)

Maximum supported
HP-IB printers: 8 (up to 4 printers/HP-IB card)

Maximum supported
HP-IB plotters: 8 (up to 4 plotters/HP-IB card)

Maximum supported terminals and/or
serial devices: 102

Maximum supported HP-IB
instruments: 72

**18.27 Gbytes will be supported in future.*

Note: High speed devices, i.e., disc drives should use a separate HP-IB card from that used for low speed devices such as tape drives, printers and plotters. Low speed devices can be intermixed on one card, e.g., one HP-IB card can support two tape drives, one system printer and one system plotter.

Other CIO Card Configuration Guidelines

Maximum supported

LAN cards: 1

Maximum access

port cards: 1 (included in standard SPU)

Maximum supported

parallel cards: 8

6. SUPPORTED PERIPHERALS

All peripherals listed below are supported in HP-UX Release 1.1 unless otherwise specified.

Discs	System Disc	Description	Interface
7907A 7914CT	Y	20 Mb fixed/20 Mb removable disc/tape drive: 132 Mb winchester and 9144A 1/4-in. tape cartridge	HP-IB HP-IB (1)
ST	Y	disk/tape drive: 132 Mb winchester and 7974A 1/2-in. tape	HP-IB (1)
P/R	Y	disk/tape drive: 132 Mb winchester and 9140 1/4-in. tape cartridge	HP-IB (1)
7933H	Y	404 Mb fixed media	HP-IB
7935H	Y	404 Mb removable media	HP-IB
7936H	Y	307 Mb Eaglett, 8 in.	HP-IB
7937H	Y	571 Mb Eagle, 8 in.	HP-IB
7957A	Y	81 Mb Falstaff, 5.25-in. OEM	HP-IB (2)
7958A		130 Mb Falstaff, 5.25-in. OEM	HP-IB (2)
9122D		3 1/2 in. microfloppy, dual	HP-IB (2)
		dual disc drive	
9122S		3 1/2 in. microfloppy, single drive	HP-IB (2)
9127A		5 1/4 in. floppy, single drive	HP-IB (2)

Tapes	Description	Interface
7974A	1/2-in. start/stop/streaming; 1600cpi(PE)/800cpi(NRZI)	HP-IB (1)
7978B	1/2-in. start/stop/streaming; 6250cpi(GCR)/1600cpi(PE)	HP-IB (1)
7979A	1/2-in. start/stop/streaming; 1600cpi(PE)/800cpi(NRZI)	HP-IB (2)
7980A	1/2-in. start/stop/streaming; 6250cpi(GCR)/1600cpi(PE)	HP-IB (2)
9144A	1/4-in. tape cartridge; 67 Mb capacity	HP-IB
35401A	1/4-in. tape cartridge autochanger; 537 Mb capacity	HP-IB

(1) Will be obsolete.

(2) Supported in HP-UX Release 1.2.

Printers	Description	Interface
2225D	thinkjet	RS232
2227A	quietjet+ workstation plus	RS232
2228A	quietjet+ workstation plus	RS232
2235B/D	480 cps draft/240 cps letter quality	RS232, Amigo HP-IB (2)
2563B	300 lpm	HP-IB/CIPER
2564B	600 lpm line-matrix	HP-IB/CIPER
2565A	600 lpm line-matrix (obsolete)	HP-IB/CIPER
2566B	900 lpm line-matrix	HP-IB/CIPER
2567B	1200 lpm line-matrix	HP-IB/CIPER
2684A	laser jet 2000, 20ppm	RS232
2686A	laser jet, 8ppm	RS232
2686A+	laser jet plus	RS232
2932A	dot matrix, 200 cps	RS232, dumb HP-IB, Amigo HP-IB
2934A	near letter quality/dot matrix, 200cps	RS232, dumb HP-IB, Amigo HP-IB
3630A	PAINTJET: 180 DPI Color Inkjet	RS232
41063A	NLS printer - OEM Epson LQ1000	RS232 (2)

Terminals	Description	Interface	System Console
C1003A	Wyse 30, Televideo 905, Hazeltine 1500...compatible	RS232 (2)	Y
C1001A	HP2392A compatible	RS232 (2)	
C1002A	HP2394A compatible; input forms, 16 page display memory	RS232 (2)	
C1004A	VT220/100/52 compatible	RS232 /RS422 (2)	
2392A	alphanumeric, block mode, ANSI compatible	RS232	
2393A	monochrome vector graphics	RS232	
2394A	Data entry local forms	RS232	
2397A	color raster display with vector graphics	RS232	
Emulators	150, 110+, 300, IPC, Vectra	RS232	
45945	Asian PC with Japanese, Korean or Chinese language support	RS232	
SRX Display	Solids Rendering Display System (supported as system console on 825S only)	LGB	Y

(1) Will be obsolete.

(2) Supported in HP-UX Release 1.2.

Graphics Devices	Description	Interface
2393A	monochrome, vector graphics terminal	RS232
2397A	color raster display terminal with vector graphics	RS232
7440A	color plotter, 8 pen, A4/A size	HP-IB/RS232
7475A	color plotter, 6 pen, A3/B size	HP-IB/RS232
7550	color plotter, 8 pen, A4/A and A3/B size, roll feeder	HP-IB/RS232
7586B	drafting plotter, 8 pen, A thru E size, roll feeder	HP-IB/RS232
7595A	Draftmaster I plotter, 8 pen, A4/A thru AO/E	HP-IB,RS232/422
7596A	Draftmaster II plotter, A4 thru AO rollfeed	HP-IB,RS232/422
SRX Display	Solids Rendering Display System (supported on 825S and 840S only)	LGB

Datacomm Devices	Description	Interface
2334A	multimux, 4-port modem control interface	RS232
37212A	300/1200 baud, 212/v22, auto dial/answer	RS232
92205A	Hayes 1200 Smart modem	RS232
	Racal-Milgo (dial-in)	RS232
U.S. Robotics	2400 dialer	RS232
Bell 212A	Dial-in modem	

7. SUMMARY

Figure 11 gives a summary of minimum and maximum configuration possibilities for the HP 9000 Series 800.

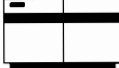
HP 9000 SERIES 800 PRODUCT LINE				
				
MODEL		825S	840S	850S
CONFIGURATIONS				
MEMORY (Mb)	Min/Abs.MAX	8 / 56	8 / 96	16 / 128
Increments (Mb)		2 , 8	8 , 32	16
MID-BUS (CTB):				
CIO CA	Min/Abs.MAX	1 / 2	1 / 3	2 / 4
CIO Expander	Min/Abs.MAX	- / 1	- / 1	- / 0
avall. CIO slots	Min/Abs.MAX	5 / 12	10 / 26	7 / 17
CIO DEVICE ADAPTERS:				
HP-IB	Min/Abs.MAX	1 / 13	1 / 27	1 / 18
MUX	Min/Abs.MAX	1 / 11	1 / 22	1 / 17
LAN	Min/Abs.MAX	- / 1	- / 1	- / 1
ACCESS PORT	Min/Abs.MAX	- / 1	1 / 1	1 / 1
PERIPHERALS:				
HP-IB DISCS	Min/Abs.MAX	1 / 12	1 / 12	1 / 12
Maximum Disc Capacity (Gb)		6.85 (*)	6.85 (*)	6.85 (**)
TAPE DRIVES	Min/Abs.MAX	1 / 8	1 / 8	1 / 8
PRINTERS	Min/Abs.MAX	- / 8	- / 8	- / 8
TERMINALS	Min/Abs.MAX	1 / 64	1 / 128	1 / 102
Note: MINIMUM - The minimum operational configuration Abs. MAXIMUM - for each individual category As a whole this configuration is non-operational			(*) 9.14 Gbytes will be supported in the future (**) 18.27 Gbytes will be supported in the future	

Figure 11

APPENDIX: Terminology

Access Port

The access port (AP) allows for diagnostics, monitoring and management of the system. It comes standard with Models 840S and 850S and must be ordered separately on the Model 825S.

The access port card resides in a dedicated CIO slot and contains self-test firmware, access port firmware and a connection to the 6-channel MUX, where two ports are used for the local system console and a remote console. Port zero on the MUX is the default for the local system console, but control can be transferred to other ports, including the remote port. As the remote console, both local and remote terminals display the same information.

Bus Hierarchy

The Series 800 is based on a two-tier I/O bus structure (825S, 840S: CTB-CIO) or a three-tier I/O bus structure (850S: SMB-CTB-CIO).

The buses on the various levels are used for different purposes requiring different bus speeds. For example, on the 825S the Central System Bus (CTB), used for data transfer between CPU and memory, requires a higher speed than the Channel I/O Bus (CIO), which is used for connecting peripheral devices.

For the connection of buses with different speeds, interfaces for timing and bus protocols are needed. The interface between CTB and CIO is called CIO Channel Adapter (CA), and the interface between System Memory Bus (SMB) and CTB is called Bus Converter (850S only).

Channel Adapter

The Channel Adapter provides the interface between the central system bus (CTB) and the channel I/O bus (CIO bus). It synchronizes the different speeds and bandwidths of the CTB and CIO bus. The CA also manages DMA transfers between CIO interfaces of their associated peripherals and main memory. Thus, large blocks of data can be transferred to and from main memory with minimal CPU intervention, reducing CPU overhead.

Channel I/O Buffer Card

The CIO buffer card drives CIO signals from the Channel Adapter and the CIO backplane. The Channel Adapter and the CIO buffer card should be considered as one functional unit.

The buffer card is capable of fanning out CIO bus signals from the Channel Adapter to a maximum of 16 interface cards (on VLSI CA only eight slots are supported). There is one CIO buffer card for each Channel Adapter.

Channel I/O Bus

The Series 800 utilizes a common, general-purpose channel I/O bus. This 16-bit I/O is used to connect peripheral devices and data communication cards. The typical maximum transfer rate through the CIO Channel Adapter is 5 Mb/second.

Channel I/O Device Adapters (Interface Cards)

Device adapters, also known as interface cards, provide an interface between peripheral devices (for example, terminals, disc drives, printers) and the CIO bus.

Central Bus

The central bus (CTB) is the communication path between the CPU, the main memory modules, and the channel I/O adapter. The CTB provides a 32-bit wide data path.

ECC Main Memory

Each Series 800 computer includes a minimum of either 8 Mbytes or 16 Mbytes of ECC memory, expandable in different increment options. The memory subsystem uses either 256 Kbit or 1 Mbit dynamic RAMs (ECC: single-bit error correction, multi-bit error detection). Main memory is backed up such that if power is lost and restored within 15 minutes, the operating system is automatically restarted and processing can resume without data loss (battery backup optional on Model 825S).

HP-IB Interface

The Hewlett-Packard Interface Bus (HP-IB) is HP's implementation of IEEE Standard 488-1978 and identical ANSI standard MC1.1. The term "HP-IB" is also used to identify HP instruments conforming to this standard.

This interface is used to connect HP-IB devices like discs, printers, plotters and magnetic tape devices to HP 9000 Series 800 systems.

Multiplexer

The Multiplexer provides six asynchronous ports with full duplex control capability for connection of terminals or other RS-232-C devices to HP 9000 Series 800 systems. The MUX supports direct or remote connection of terminals, printers, plotters and other asynchronous devices.

Parallel Card

The Parallel Asynchronous FIFO Interface is designed to provide multipurpose 8- or 16-bit parallel communication capabilities between external instruments and HP 9000 Series 800 systems.



