Configuration Guide
HP Series 200 Computers

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How to Use This Document

The following Configuration Guide was designed to make the process of configuring a Series 200 computer as simple and expeditious as possible. It contains a wealth of technical information, but if followed carefully, reduces that information to a set of relatively straightforward choices. It is for use primarily by the Hewlett-Packard technical salesperson or the technically knowledgeable end user.

The only requirement to meet before using it is to *know the application*; i.e., you should be able to answer such questions as: How much memor? is required? Is graphics necessary? What about a printer? A plotter? etc. With that information, this document can be used as a kind of "shopping list" to make the appropriate choices. It does not cover all contingencies (Shared Resource Management, excessive memory requirements, etc.), but is a general guide to configuring for most normal applications. Situations beyond the scope of this Guide should be referred to the appropriate HP technical expert or documentation.

It is important to follow this document sequentially — you should begin at "The Computer" and go straight through to "The 9888A Bus Expander" (or to the point at which you determine the Bus Expander will not be needed). It is laid out as a worksheet — a series of steps which can be easily followed and which contain all information necessary to make a particular choice, plus a Summary Sheet at the beginning to record your choices. It is important to note that earlier choices often become the basis for later ones, and earlier choices may occasionally have to be changed in the light of later ones. For this reason, no sections should be skipped.

You will need a Series 200 Price List to fill out the "Price" column of the Summary Sheet. A Desktop Computer Sales Handbook may also be helpful for certain technical questions. For information on Shared Resource Management, please consult the Shared Resource Management Technical Supplement.

A brief mention of warranty and service contracts will be found at the end of this guide.

Summary Sheet

1. THE COMPUTER

Computer	Product No.	Opt. No.	Price

2. THE LANGUAGE SYSTEM

Product No.	Media Opt.	Description	Price

3. MEMORY

Qty.	Product No.	Description	Price
	98256A	256K RAM Memory Board	

4. PERIPHERALS

Product No./Opt. No.	Description	Price

5. INTERFACES/BACKPLANE ACCESSORIES

Product No.	Opt. No.	Description	Price

6. CABLES

Qty.	Part No.*	Description	Price

* If option no., place under "Interfaces" above.

7. THE SERIES 200 BACKPLANE (Reference only)

8. THE 9888A BUS EXPANDER

Qty.	Part No.	Description	Price
	9888A	Series 200 Bus Expander	

1. The Computer

Step 1: Look over the following table of Series 200 mainframes. It contains important configuration information, the backplane slots available and the maximum number of I/O cards which can be used. Additional product information will be found in the Series 200 Price List.

Step 2: From your knowledge of the application, choose one or more mainframes. Insert your choice(s) on the Summary Sheet.

Mainframes

Computer/Product No.	Standard RAM	Backplane Slots Available	Max. I/O
Model 16A Computer 9816A ● Built-in HP-IB (w/2-meter cable) ● Built-in RS-232C ● 2-slot card cage for interfaces, language systems and memory expansion ● Delete graphics option available ● No powerfail support available ● 9-in. diagonal CRT (80 characters wide) ● Boots only from external 3½-in. and 5¼-in. flexible disc drives	128K bytes*	2	1
Model 16S Computer 9816S ● RAM BASIC 2.0 ● 512K byte RAM (256K on processor board plus one additional 256K board) ● Built-in HP-IB (w/2-meter cable) ● Built-in RS-232 ● 2-slot card cage for interfaces, language systems and memory expansion ● No powerfail support available ● 9-in. diagonal CRT ● Boots from all supported mass storage devices, including SRM	512K bytes	1	1
Model 26A Computer 9826A ● Built-in HP-IB (w/2-meter cable) ● 8-slot card cage for interfaces, language systems and memory expansion ● 7-in. diagonal CRT (50 characters wide) ● Powerfail support available ● Boots from all supported mass storage devices, including SRM	128K bytes*	8	4
Model 26S Computer 9826S ● RAM BASIC 2.0 ● BASIC Extensions 2.1 ● RAM Pascal 2.1 ● 640K byte RAM (128K on processor board plus two additional 256K boards) ● Built-in HP-IB (w/2-meter cable) ● 8-slot card cage for interfaces, language systems and memory expansion ● 7-in. diagonal CRT (50 characters wide) ● Powerfail support available ● Boots from all supported mass storage devices, including SRM	640K bytes	6	4
Model 36A Computer 9836A ● Built-in HP-IB (w/2-meter cable) ● 8-slot card cage for interfaces, language systems and memory expansion ● 12-in. diagonal CRT (80 characters wide) ● Powerfail support available ● Boots from all supported mass storage devices, including SRM	128K bytes*	8	4
Model 36S Computer 9836S ● RAM BASIC 2.0 ● BASIC Extensions 2.1 ● RAM Pascal 2.1 ● 640K byte RAM (128K on processor board plus two additional 256K boards) ● Built-in HP-IB (w/2-meter cable) ● 8-slot card cage for interfaces, language systems and memory expansion ● 12-in. diagonal CRT (80 characters wide) ● Powerfail support available ● Boots from all supported mass storage devices, including SRM	640K bytes	6	4
Model 36C Color Computer 9836C ● Built-in HP-IB (w/2-meter cable) ● 8-slot card cage for interfaces, language systems and memory expansion ● 12-in. diagonal CRT (80 characters wide) ● Powerfail support available[†] ● Boots from all supported mass storage devices, including SRM	128K bytes*	8	4

* On the processor board.

† Powerfail on the Model 36C retains all information, but the display cannot be powered.

Computer/Product No.	Standard RAM	Backplane Slots Available	Max. I/O
Model 36CS 9836CS • RAM BASIC 2.0 • BASIC Extensions 2.1 • RAM Pascal 2.1 • 640K byte RAM (128K on processor board plus two additional 256K boards) • Built-in HP-IB (w/2-meter cable) • 8-slot card cage for interfaces, language systems and memory expansion • 12-in. diagonal CRT (80 characters wide) • Powerfail support available† • Boots from all supported mass storage devices, including SRM	640K bytes	6	4
Model 20A Box Computer 9920A • Built-in HP-IB • Built-in Keyboard Interface • 15-slot card cage for interfaces, language systems and memory expansion • Boots from all supported mass storage devices, including SRM • No beeper available • No powerfail support available	128K bytes*	15	7
Model 20S Development System 9920S • RAM BASIC 2.0 • BASIC Extensions 2.1 • RAM Pascal 2.1 • Built-in HP-IB (w/2-meter cable) • Built-in Keyboard Interface • 98203A Keyboard (w/3-meter keyboard extension cord; can be ordered separately as P/N 09920-61601) • 98204A Composite Video Card Set • 640K bytes RAM (128K on processor board plus two additional 256K boards) • 15-slot card cage for interfaces, language systems and memory expansion • Rack Mount Kit • Boots from all supported mass storage devices, including SRM • No beeper available • No powerfail support available	640K bytes	11	6

* On the processor board.

† Powerfail on the Model 36CS retains all information, but the display cannot be powered.

Mainframe Options

Step 3:
Below are listed the Series 200 mainframe options. Choose which, if any, you desire and enter your choice on the Summary Sheet.

Computer	Opt. No.	Description
Model 16A	090	Delete graphics

Model 26A
    26S
    36A
    36S
    36C
    36CS
	050	Powerfail protection

Model 36A
    36S
    36C
    36CS
	801	Jumper for 50 Hz refresh rate on CRT

Model 20A	908	Rack Mount Kit (included with the Model 20S; can also be ordered separately as P/N 5061-0078)
All Models	810 820 830 840 850	French keyboard/character set Spanish keyboard/character set German keyboard/character set Katakana keyboard/character set Swedish/Finnish keyboard/character set

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2. The Language System

Step 1: Below are listed all language systems for the Series 200. If one is not included in your mainframe selection (i.e., the "A" or "C" models) or you desire an additional one, please choose now; enter your choice on the Summary Sheet. If you already have what you need in your mainframe selection, proceed directly to Step 2.

Languages

Product No.	Description	Approximate Read/Write Memory Required by Language System
98601A	BASIC 2.0	
98601A	ROM	21K
98611A	RAM	277K
98611R	Right-to-Reproduce*	277K
	BASIC Extensions 2.1†	
98612A	RAM	328K
98612R	Right-to-Reproduce*	328K
	HPL 2.0‡	
98604A	ROM	14K
98614A	RAM	122K
98614R	Right-to-Reproduce*	122K
	Pascal 2.1	
98615A	RAM	512K†
98615R	Right-to-Reproduce*	512K†
98615E	Right-to-Execute**	130K††

* Confers the right to make one additional copy of the language for use on another computer. A certificate and manual are supplied.
† Requires BASIC 2.0 to run. BASIC Extensions 2.1 consists of six separate modules. The following amount of memory is required by the individual modules:

Advanced Programming	176K
Graphics	48K
Shared Resource Management	53K
Shared Resource Management Programming	35K
HP-IL/BCD	12K
XREF	7K

‡ HPL is not supported on the Models 20A, 20S, 36C or 36CS.
** Confers the right to duplicate only the operating system for the purpose of executing application software. None of the program development subsystems (editor, compiler, etc.) may be reproduced. A certificate is supplied, but no manuals.
†† Minimum recommended execution environment.

Step 2: The media options for Series 200 language systems are given below. These options are required for both RAM and ROM systems — RAM for providing language and utilities, ROM for providing utilities only.

If you have chosen a Model 16 or 20 (no internal mass storage), please specify either Opt. 630 or 650, depending on which external mass storage device will be used. Be sure to change this option later if you change your choice (see Section 4).

If you have chosen a Model 26A, 36A or 36C and have added a language in this section, order Opt. 655.

If you have chosen a Model 26S, 36S or 36CS (language included), you may proceed to the next section — Opt. 655 will automatically be shipped.

Media Options

Opt. No.	Description
630	3½-in external flexible disc
650*	5¼-in external flexible disc
655	5¼-in internal flexible disc

* The difference between option 650 and 655 has to do with interleave. Since internal disc drives on the Series 200 are faster than the external 5¼-in. drives, interleave 1 is used. External drives use an interleave of 3 or 4. Although either option will work, a disc with the correct interleave will load as much as 16 times faster.

3. Memory

All operating systems and application software require read/write memory (RAM). While it is beyond the scope of this Guide to determine the optimum amount of memory for your system, this section will help you determine the *minimum* amount neded to run your language.

Step 1: Under "The Computer," find the amount of RAM supplied in your choice of mainframes and enter under "A" below.

Step 2: Under "The Language System," find the column "Approximate Read/Write Memory Required By Language System" and determine the amount of memory required for your language system; enter under "B" below. If you ordered more than one language system, use the largest value of RAM for "B". If you plan to use BASIC Extensions 2.1, enter its value under "C".

Step 3: Subtract as shown to determine net RAM, "D".
If the value is negative, there is a net RAM deficit and you must order additional RAM for the language system. As RAM is available only in 256K increments, divide this value by 256 and round up to the next whole number to obtain the amount of 256K RAM boards (98256A) that need to be ordered. Enter this number in the Summary Sheet. If the value is positive, no additional RAM boards are needed for the language system.

Note: While these calculations will help determine the amount of RAM you need, you should also keep the following in mind:

All application software requires RAM. Most also require a language system, indicating that you will need enough memory for both language system *and* software; a few, such as VisiCalc®*, will run without a language.

You will also need RAM for user-written programs in addition to the requirements of the language system.

* VisiCalc® is a registered trademark of VisiCorp.

A. RAM standard with Series 200 mainframe	_____	K
B. RAM required by language system	_____	K
C. RAM required by Extensions (if any)	_____	K
D. A − (B + C)	_____	K

4. Peripherals

Step 1: Below is the complete list of supported peripherals for Series 200 computers, together with information on language support. Read over the list, selecting the items you think the application requires. Enter your choice(s) on the Summary Sheet.

Note: Not all peripherals are supported on all languages! If you plan to use the same peripherals under multiple languages, be sure each language supports each peripheral. (Language systems listed are the earliest versions to provide support; subsequent versions automatically provide support.)

Also, be sure to see the footnotes for special cases and exceptions.

Product No. (Opt. Included)	Description	Language Support		
		BASIC	HPL	Pascal
Printers				
2601A Opt. 826*	Letter Quality Daisy Wheel Printer	1.0	1.0	2.1
2602A Opt. 046	Letter Quality Daisy Wheel Printer	1.0	1.0	2.0
2631B/G	Serial Impact Graphics Printer	1.0	1.0	1.0
2671B/G†	Serial Thermal Graphics Printer	1.0	1.0	1.0
2673G†	Intelligent Serial Thermal Graphics Printer	1.0	1.0	1.0
9876A	Thermal Graphics Printer	1.0	1.0	1.0
82905A/B Opt.002†§	Serial Impact Printer	1.0	1.0	1.0
Plotters‡				
9872C	Eight-pen Plotter	1.0	1.0	1.0
9872T	Eight-pen Plotter	1.0	1.0	1.0
7470A Opt. 002	Two-pen Graphics Plotter	1.0	1.0	1.0
7580A	Eight-pen D/A1-size Drafting Plotter	1.0	1.0	1.0
7585B	Eight-pen E/A0-size Drafting Plotter	1.0	1.0	2.0
Tablet‡				
9111A**	Graphics Tablet	2.0	—	1.0
Mass Storage				
9885M*	8-in. Flexible Disc Drive (Master)	2.0††	1.0	1.0
9885S*	8-in. Flexible Disc Drive (Slave)	2.0††	1.0	1.0
9895A	8-in. Dual Flexible Disc Drive (2.4M byte)	2.0‡‡	1.0	1.0
82901M	5¼-in. Dual Flexible Disc Drive (Master) (540K byte)	2.0‡‡	1.0	2.0
82902M	5¼-in. Flexible Disc Drive (Master) (240K byte)	2.0‡‡	1.0	2.0
9121S	3½-in. Single Flexible Disc Drive (270K byte)	2.0‡‡	1.0	2.0
9121D	3½-in. Dual Flexible Disk Drive (540K byte)	2.0‡‡	1.0	2.0
9133A	Combination 3½-in. Flexible Disc (270K byte) and 5¼-in. Winchester Disc Drive (4.6M byte)	2.0‡‡	1.0	2.0
Opt. 010	4.8M byte Winchester	2.0‡‡	—	2.0
9133B	Combination 3½-in. Flexible Disc (270K byte) and 5¼-in. Winchester Disc Drive (9.7M byte)	2.0††	—	2.0
9134A	5¼-in. Winchester Drive (4.6M byte)	2.0‡‡	1.0	1.0
Opt. 010	4.8M byte Winchester	2.0††	—	2.0
9134B	5¼-in. Winchester Drive (9.7M byte)	2.0††	—	2.0
9135A	Combination 5¼-in. Flexible Disc (270K byte) and 5¼-in. Winchester Drive (4.6M byte)	2.0‡‡	1.0	2.0
Opt. 010	4.8M byte Winchester	2.0††	—	2.0
7908P	16.5M byte Fixed Disc	2.0††	—	2.0
7911P	28.1M byte Fixed Disc	2.0††	—	2.0
7912P	65.6M byte Fixed Disc	2.0††	—	2.0
External Monitors (Model 20 only)				
82913A	12-in. (305mm) CRT Display	N/A	N/A	N/A
Opt. 001	230V (Europe)			
Opt. 002	100V (Japan)			
82912A	9-in. (229mm) CRT Display	N/A	N/A	N/A
Opt. 001	230V (Europe)			
Miscellaneous				
1360S	Graphics Display System*	N/A	N/A	N/A

* Not supported on the Model 16 or Model 20.
† Not supported in a Pascal development environment.
‡ Specify Opt. 026 when ordering Model 16 or 26 and Opt. 036 when ordering Model 36.
§ Graphics not supported.

** Needs a dedicated HP-IB device to optimize cursor tracking. Also, when running BASIC, requires BASIC Extensions 2.1.
†† Requires BASIC Extensions 2.1.
‡‡ Although BASIC 2.0 is recommended, BASIC 1.0 customers can use the peripheral with the BASIC Enhancements Binary (BEB) present. However, this is not recommended, as BASIC 2.0 contains all BASIC 1.0 and BEB capabilites and more, and BEB is no longer a supported product.

5. Interfaces/Backplane Accessories

Step 1: Every peripheral requires an interface (also called an I/O card). Write the peripheral(s) you have chosen in the chart under "Interfaces Needed" below. Then, from the "Series 200 Interfaces" table below, determine which interface(s) you will need and write it in the chart also.

Note: All peripherals are HP-IB except those noted under "Exceptions" below.

Exceptions

Peripheral	Interface	Product No.
2601A, Opt. 826	RS-232	98626A Opt. 002 for Model 26/36
9885M	GPIO	98622A Opt. 002 and 98620 DMA Controller
7908P	For BASIC: HP-IB and DMA Card	98624A HP-IB (or built-in) and 98620A DMA Controller when operating in BASIC
	For Pascal: HP-IB or Disc Interface	98624A HP-IB (or built-in) or 98625A Disc Interface when operating in Pascal. 98620A DMA recommended
7911P	(Same as 7908P)	
7912P	(Same as 7908P)	
External Color Monitor	Color Output	98627A Color Video Interface

Interfaces Needed

Peripheral	Interface
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Step 2: Inspect the table below to make sure that the interface(s) you have chosen is supported on your language system — if not, you may have to change an earlier choice. Languages given are the earliest versions to provide support; later versions automatically provide it. Also, see the footnotes for exceptions and special cases.

Series 200 Interfaces*

Product No.	Description	Language Support BASIC	HPL	Pascal
98624A	HP-IB[1]	1.0	1.0	1.0
98622A	GPIO	1.0	1.0	1.0
98623A	BCD	2.0[2]	1.0	—
98626A	RS-232 (Serial)	1.0	1.0	2.0
98625A	Disc	—	—	2.0
98627A	Color Video	2.0[3]	2.0	1.0
98634A	HP-IL	2.0[2]	—	—
98628A[4]	Datacomm	1.0[5]	—	1.0
98691A[6]	Programmable Datacomm	2.0[7]	—	1.0[7]
Model 20 only				
98201A	Custom Keypad Interface	2.0	—	2.0
98204A	Composite Video Cards (2)	2.0	—	2.0
Opt. 090[8]	Delete Graphics Card	2.0	—	2.0

* Excludes the interface for Shared Resource Management (SRM), which is not covered in this publication.

[1] The built-in HP-IB interface for the Model 20 will not work on other Series 200 mainframes and must be present on the Model 20A to run BASIC or Pascal.

[2] Requires BASIC 2.0 *plus* BASIC Extensions 2.1. In this case, the HP-IL/BCD binary is used, requiring 12K of RAM *in addition to* the requirements of the language system.

[3] Requires BASIC 2.0 *plus* BASIC Extensions 2.1.

[4] The 98628A Datacomm Interface requires a personality module option. (This is *not* necessary for the Programmable Datacomm Interface.) The only option available at this time is Opt. 100. Please enter this number with each Datacomm Interface ordered.

[5] Requires the BASIC Enhancements Binary (BEB) if BASIC 1.0 is used. It is not recommended that BEB be sold, even to BASIC 1.0 customers, as all capabilities are contained in BASIC 2.0 and it is no longer a supported product.

[6] The Programmable Datacomm Interface is not legal for connection to public lines, but requires a dedicated (i.e., private) line.

[7] Or user-written driver.

[8] The 98204A cannot be upgraded later to include graphics if this option is specified.

Step 3:
For **GPIO, BCD, Color Video, HP-IL, Datacomm, Programmable Datacomm, Custom Keypad** or **Composite Video Card** interfaces, do the following:

Count up the total number of interfaces of each type. Look up the product no. in the table that corresponds to the interface. Enter both on the Summary Sheet.

Step 4:
For **RS-232** interfaces:

If you are *not* ordering a Model 16 computer, count up the total number of RS-232 entries and enter this figure on the Summary Sheet, along with the product no.

If you are ordering a Model 16 computer, count up the total number of RS-232 entries and subtract 1 (the Model 16 has one RS-232 interface built-in). Enter this number on the Summary Sheet, along with the product no.

Step 5:
For **HP-IB** interfaces:

Determine whether you want all of the peripherals daisy-chained from one HP-IB interface or split among several HP-IB interfaces.

Note: The maximum number of devices which can share an HP-IB interface is 15, including the controller. The optimum hook-up of instrumentation to a mainframe is outside the scope of this Guide; for help in this area, consult an HP instrument salesperson.

If you have decided to share the HP-IB interface among all of the peripherals and instrumentation, you will not need to order an HP-IB interface (each Series 200 mainframe has one HP-IB built-in).

If you have decided to have more than one HP-IB interface, count up the total number of HP-IB devices desired and subtract 1. Enter this figure on the Summary Sheet, along with the product no.

Step 6:
Several other Series 200 accessories, like interfaces, plug into the backplane. Choose any, if needed, from the list below and enter your choice(s) on the Summary Sheet.

Note: Like interfaces, these accessories must be considered when accessing backplane slots available (Section 7).

Series 200 Backplane Accessories

Product No.	Description	Language Support		
		BASIC	HPL	Pascal
98620A	DMA Controller (2-channel)	2.0*	1.0	1.0
98630A Opt. 001	Breadboard Card Backplane Extender Card			
98255A	EPROM Card	2.0*	—	—
98253A	EPROM Development Kit (2 cards)	2.0*	—	—
98259A	128K Byte Magnetic Bubble Memory Card	2.0*	—	—

* Requires BASIC 2.0 *plus* BASIC Extensions 2.1. In this case, the Advanced Programming Binary of BASIC Extensions 2.1 is used, requiring 176K of RAM *in addition to* the requirements of the language system.

6. Cables

Every interface requires some kind of cable to connect it to a peripheral. Some cables come standard with a peripheral and thus do not need to be ordered. Others are ordered as options to the interfaces. All cables can be ordered separately under their own part numbers. None of the backplane accessories requires a cable.

Step 1:
If you have ordered a **GPIO, BCD, RS-232, Datacomm** or **Programmable Datacomm** interface: Consult the chart below and next to the interface type select the appropriate cable. Note the following special cases:

For the **Datacomm** or **Programmble Datacomm** interface:
If you plan to order a Data Link Adaptor or 300 Baud Modem, you do not need to order a datacomm cable, so you should specify Opt. 099 (no cable).

For the **RS-232** Interface:
If you plan to order a 300 Baud modem, you do not need to order a datacomm cable, so you should specify Opt. 099 for the Model 26/36. The Model 16 is shipped standard without a cable.

If you desire an RS-232 cable for the Model 16, order either P/N 5061-4215 (male) or 5061-4216 (female).

Transfer your choices to the Summary Sheet.

HP Cable Options

Interface	Prod. No./ Opt. No.	Description	Part No.
HP-IB	98624A	1 M (3.3 ft.) HP-IB cable 2 M (6.6 ft.) HP-IB cable 4 M (13.2 ft.) HP-IB cable 0.5 M (1.6 ft.) HP-IB cable	10833A 10833B 10833C 10833D
GPIO	98622A (Opt. 001) (Opt. 002) (Opt. 003) (Opt. 004)	 4.6 M (15 ft.) unterminated cable 0.8 M (2.5 ft.) unterminated cable for 9885M Flexible Disc Drive 4.6 M (15 ft.) terminated cable for 6940A/B Multiprogrammer 2.5 M (8.3 ft.) terminated cable for 9866A/B Thermal Printer	 5061-4209 5061-4211 5061-4210 5061-4212
BCD	98623A (Opt. 001)	 4.6 M (15 ft.) unterminated cable	 5061-4217
RS-232 (Serial)	98626A (Opt. 001) (Opt. 002) (Opt. 099)	 4.9 M (16 ft.) RS-232 cable with DTE (male) connector 4.9 M (16 ft.) RS-232 cable with DCE (female) connector No cable 300 Baud Modem	 5061-4215 5061-4216 13265A
Disc*	98625A	1M (3.3 ft.) HP-IB cable 2M (6.6 ft.) HP-IB cable 4M (13.2 ft.) HP-IB cable 0.5M (1.6 ft.) HP-IB cable	10833A 10833B 10833C 10833D
Color Video	98627A	(Four 15 M (5 ft.) coaxial cables with BNC connectors included)	
HP-IL	98634A	(1 M (3 ft.) HP-IL cable included)	
Datacomm	98628A (Opt. 001) (Opt. 002) (Opt. 003) (Opt. 099) (Opt. 100)	 4.9 M (16 ft.) RS-232-C DTE (male) cable with test connector 4.9 M (16 ft.) RS-232-C DCE (female) cable with test connector 4.9 M (16 ft.) RS-449/423 DTE (male) cable with test connector No cable Async and Data Link Personality Module Data Link Adaptor 300 Baud Modem	 5061-4215 5061-4216 5061-4250 13264A 13265A
Programmable Datacomm	98691A (Opt. 001) (Opt. 002) (Opt. 003) (Opt. 099)	 4.9 M (16 ft.) RS-232-C DTE (male) cable with test connector 4.9 M (16 ft.) RS-232-C DCE (female) cable with test connector 4.9 M (16 ft.) RS-449/423 DTE (male) cable with test connector No cable	 5061-4215 5061-4216 5061-4250
Custom Keypad	98201A	(Connector supplied for user-supplied wires)	
Composite Video Card	98204A	(Cable supplied)	

* If a 98625A Disc Interface is used to connect a 7908/11/12, the disc is provided with the proper cable. Up to four 2908/11/12 disc drives may be connected to a Series 200 computer.

Step 2: If you ordered an **HP-IB** or **Disc** interface, keep the following considerations in mind:

One 2-meter HP-IB cable is shipped standard with every Series 200 mainframe.

One 2-meter HP-IB cable is shipped standard with every 7908 and a 1-meter HP-IB cable with 7911 and 7912. Since up to four 7908/11/12 disc drives can be connected to a Series 200 computer, the total cable length maximum is 10 meters.

With HP-IB you need one cable for *every peripheral*, not one cable for every interface.

Maximum HP-IB cable length may not exceed 2 meters per device. Thus, if you have 3 devices (such as a controller, a printer, and a plotter), you may not exceed a total of 6 meters of cable.

The *total* cable length in any HP-IB system may not exceed 20 meters regardless of the number of devices.

For additional information on cabling, please consult your local HP systems engineer.

Transfer your choices to the Summary Sheet.

Step 3: If you ordered an **HP-IL** interface, note that a 1 M (3 ft.) HP-IL cable is supplied. Additional cables can be ordered through HP's Computer Supplies Organization (CSO).

Step 4: Finally, if you ordered a **Color Video** or a **Composite Video Card** interface (Model 20), note that cables are automatically supplied. The **Custom Keypad** interface comes with a connector for user-supplied wires that attach to a custom keypad or switch assembly.

7. The Series 200 Backplane

You have now made all the basic choices in configuring your Series 200 computer system — mainframe, language, memory, peripherals, interfaces, backplane accessories and cables. One very important matter remains — summing up the effect of these choices on the Series 200 backplane.

Critical to understanding this effect is the physical configuration of each interface or backplane accessory. Please note the following:

All Series 200 **interfaces** (I/O cards) have a metal connector plate which covers two slots in the backplane, leaving one slot for use by a simple plug-in card (see Figure 1).

The **98204A Composite Video Card** interface also contains a separate graphics card which requires an adjacent slot (Opt. 090 removes this card).

The following **backplane accessories** (plus **ROM language** and **memory boards**) are simple plug-in cards without metal connector plates (see Figure 1):
* 98255A EPROM Card
* 98620A DMA Controller
* 98256A 256K RAM Memory Board
* 98259A 128K RAM Magnetic Bubble Memory Board
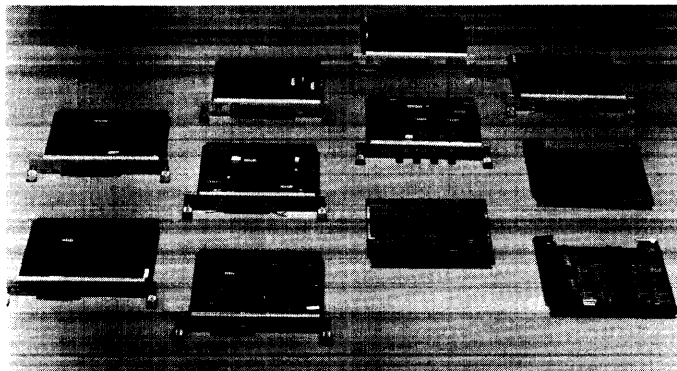* 98601A BASIC 2.0 ROM Board
* 98604A HPL 2.0 ROM Board

Figure 1   Series 200 Interfaces and Plug-In Cards

Please consult the appropriate section(s) below.

Model 26/36 Backplane

The Model 26/36 backplane (see Figure 2) can accomodate a total of up to 8 plug-in ROM, RAM, DMA, interface and backplane accessory cards. In the diagram, there is room for 8 entries, each representing one slot location.

Step 1: Consult your filled-in Summary Sheet. For each card you have ordered, write in the appropriate product no. in the slots, i.e.:

If you ordered a Model 26S, 36S or 36CS, write "98256A" in two slots.

For each 98256A 256K RAM Memory Board ordered above those which come with the mainframe, write "98256A" in a slot.

If a ROM-based language system was ordered, write the corresponding product number in one of the slots.

For each interface or backplane accessory card ordered, write in its corresponding product number in an available slot.
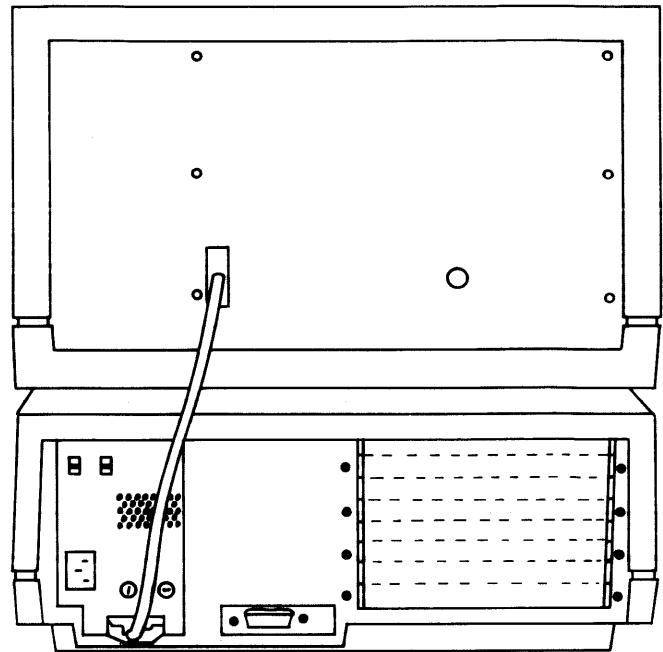

Figure 2   Model 26/36 Backplane

Step 2: Count the total number of entries you have made. If you have exceeded 8, you will need to consider either purchasing a 9888A Bus Expander (next section) or reducing the total number of cards used.

If you have slots left over, you may want to consider increasing the amount of memory by ordering more 98256A Memory Boards, or you may want to leave them empty for later use.

Step 3: In addition to making sure you physically have room, you should also note the following:

Because of the metal connector plates, no more than *four* interface cards may be used in the Model 26/36 backplane.

Only *one* DMA controller card may be used in the backplane.

Use of more than *two* Magnetic Bubble Memory Cards in a Model 26/36 backplane may exceed power supply limitations.

If you have no need for additional slots in your Model 26/36, you need not proceed to the next section and may consider your configuration complete.

Model 16 Backplane

The Model 16 backplane (see Figure 3) can accomodate up a total of 2 plug-in ROM, RAM, DMA, interface and backplane accessory cards. In the diagram, there is room to make two entries, each representing one slot location.
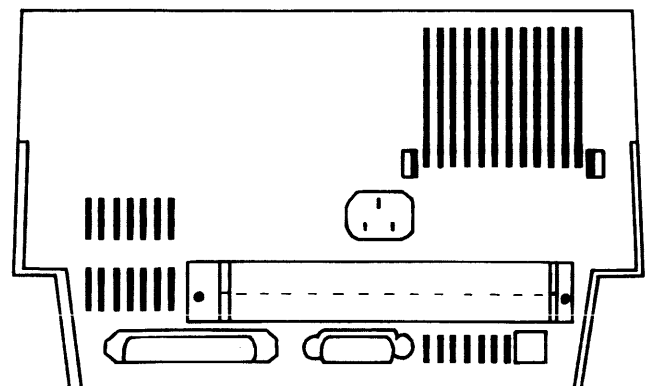

Figure 3   Model 16 Backplane

Step 1:
Consult your filled-in Summary Sheet. For each card you have ordered, write in the corresponding part no. in the slots, i.e.:

If you ordered a Model 16S, write in "98256A" in one slot.

For each 98256A 256K RAM Memory Board ordered above those which come with the mainframe, write "98256A" in a slot.

If a ROM-based language system was ordered write its part number in one of the slots.

For each interface card or backplane accessory ordered, write in its corresponding part number in an available slot.

Step 2:
Count the total number of entries you have made. If you have exceeded 2, you should consider 1) purchasing a Model 26/36, each of which has 8 backplane slots, 2) purchasing a 9888A Bus Expander (next section) or 3) reducing the total number of cards used.

If you have slots left over, you may want to consider increasing the amount of memory by ordering more 98256A Memory Boards, or you may want to leave them empty for later use.

Step 3:
In addition to making sure you physically have room, please note the following:

Because of the metal connector plate, no more than *one* interface card will fit in the Model 16 backplane.

No more than *one* DMA controller may be used in the backplane.

Use of more than *one* Magnetic Bubble Memory Card in a Model 16 backplane may exceed power supply limitations.

If you have no need for additional slots in your Model 16, you need not proceed to the next section and may consider your configuration complete.

Model 20 Backplane

The Model 20 backplane (see Figure 4) can accommodate up to a total of 15 plug-in ROM, RAM, DMA, interface and backplane accessory cards. In the diagram, there is room for 15 entries, each representing one slot location.

Step 1:
Consult your filled-in Summary Sheet. For each card you have ordered, write in the corresponding part number in the slots, i.e.:

If you ordered a Model 20S, write "98256A" in two slots and "98204A" in two slots.

For each 98256A 256K RAM Memory Board ordered above those which come with the mainframe, write "98256A" in one slot.

If a ROM-based language system was ordered, write its part number in one of the slots.

For each interface or backplane accessory ordered, write its part number in an available slot.
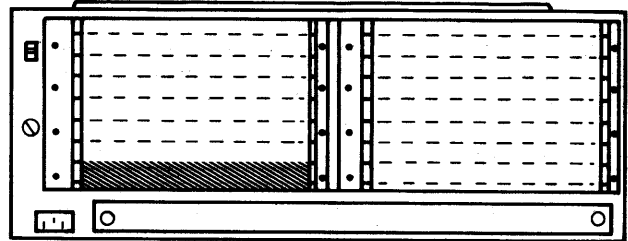

Figure 4   Model 20 Backplane

Step 2:
Count the total number of entries you have made. If you have exceeded 15, you should consider 1) purchasing a 9888A Bus Expander (next section) or 2) reducing the total number of cards used.

If you have slots left over, you may want to consider increasing the amount of memory by ordering more 98256A Memory Boards, or you may want to leave them empty for later use.

Step 3:
In addition to making sure you physically have room, please note the following:

Because of the metal connector plates, no more than *seven* interface cards may be used in the Model 20 backplane.

No more than *one* DMA Controller may be used in the backplane.

Use of more than *four* Magnetic Bubble Memory Cards in a Model 20 backplane may exceed power supply limitations.

If you have no need for additional slots in your Model 20, you need not proceed to the next section and may consider your configuration complete.

8. The 9888A Bus Expander

The 9888A Bus Expander (also called a Backplane Expander) is *not* a Series 200 mainframe, but a means to increase the number of backplane slots available to Series 200 computers. By now, you should have decided whether you need to order the 9888A.

Configuring the 9888A is similar to configuring the backplane of the Series 200 computers, especially the Model 20. Each backplane expander contains 16 backplane slots, of which a maximum of eight may be used for interface cards. The greatest difference in configuring the two is that there are more limitations in the use of the bus expander. Some of these are:

The following backplane accessories are *not* supported on the 9888A, but must reside in the Series 200 backplane.
- ROM Language System Boards
- 98620A DMA Controller
- 98255A EPROM Card

When the 9888A is used, powerfail protection is not operable on the Series 200 mainframe.

Memory access time is up to 20% slower in the 9888A than in the computer's internal bus.

If a combination of 98256A RAM boards *and* 98254A RAM boards (out-of-production 64K byte RAM boards) are to be used, please refer to the 9888A Bus Expander Data Sheet for limitations, as this subject is outside the scope of this publication. There is no difficulty in using only 98256A boards.

A maximum of four bus expanders may be used with the Model 26/36 and Model 20 and one with the Model 16 (each requires the use of one slot in the Series 200 backplane.) The maximum amount of memory obtainable with a Model 26/36 is 7.3M bytes, with a Model 16, 4.6M bytes, and with a Model 20, 7.3M bytes.

Step 1:
Refer to the diagram below (Figure 5), where there is room to make 16 entries, each representing one slot location.

For each 98256A Memory Board used in the expander write "98256A" in a slot.

For each interface card or backplane accessory used in the expander write its corresponding part number in an available slot.
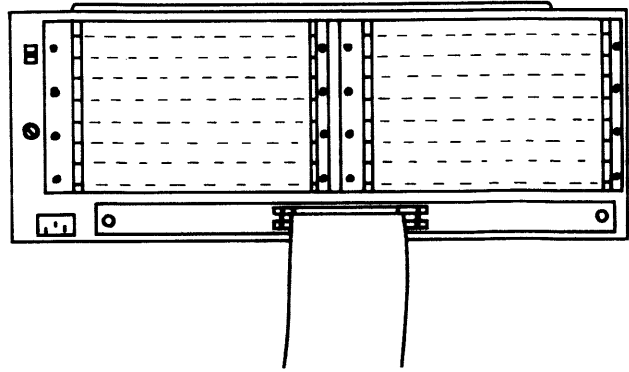

Figure 5   9888A Bus Expander Slots

Step 2:
Count up the total number of entries.

If you have exceeded 16, you need to consider purchasing an *additional* 9888A Bus Expander (in the case of the Model 26, 36 or 20) or reducing the number of memory or interface cards used in the 9888A.

If you have slots left over, you may wish to to increase the amount of memory by ordering additional 98256A Memory Boards, or you can leave them for use later.

Step 3:
In addition to making sure you have room, please refer to the limitations above to insure that none have been violated. Enter your order of bus expander(s) on the Summary Sheet.

Step 4:
If you plan to use your 9888A in a rack-mount configuration, you should also order the Rack Mount Kit, Opt. 908. It is also orderable separately as P/N 5061-0078. Enter your choice on the Summary Sheet.

You have now finished the process of configuring your Series 200 computer. A reminder — for prices consult the Series 200 Price List and refer any advanced technical questions to the appropriate HP technical expert or document.

A Word About Warranty and Service

Before leaving hardware configuration, it is important to mention warranty and service contracts — it makes little sense to have a fully configured system if you have no protection for it in the future.

Warranty

All HP desktop computers come with a 90-Day warranty which provides free repair and maintenance. The Model 16A/S, the Model 20 and the 9888 Backplane Expander have a Return-to-HP warranty which requires you to *ship the unit back to HP* at your cost, while all other other HP desktops feature On-Site Warranty in which HP will repair the unit *at your location*.

Service Contracts

To extend your protection beyond 90 days, you should purchase a service contract. Two major choices of service contracts are available — Field Monthly Maintenance Charge (FMMC) and Product Monthly Maintenance Charge (PMMC). FMMC, like Return-to-HP, allows you to return a failed unit to HP freight prepaid, whereupon HP will repair and return the unit at no cost. With PMMC, as with On-Site, HP will travel to your site and repair the unit. Both FMMC and PMMC contracts are available for 12-month periods. The PMMC, while more expensive, provides a higher degree of service inasmuch as it allows your unit to remain at your location while being repaired.

If you purchase a computer with Return-to-HP Warranty and a one-year PMMC, your warranty will be upgraded to On-site. Thus you will have 15 months of on-site protection rather than 12.

When you buy peripherals with a mainframe, the peripheral warranty will be upgraded to level of the computer warranty, but the converse is not true. Thus it is possible to have a Return-to-HP Warranty on a mainframe and On-Site Warranty on a peripheral. You should avoid this situation if possible, since a suspected problem in the peripheral could turn out to be in the mainframe. To avoid this, you can purchase a PMMC on the mainframe; you will receive full On-Site protection for both peripheral and mainframe. You will get an additional 90 days on the mainframe as well.

A Final Word

Consider your application — if any "downtime" is detrimental to your productivity, you should strongly consider PMMC. If you have many of the same products and do not use any of them to their full capacity, FMMC will probably suffice.

Service contracts are a good investment. They protect you from possible high repair costs and allow you to budget repair into your monthly cash flow. Please give them careful consideration.

To order, or to obtain additional information on HP service contracts, call the HP Support Services Telemarketing Center at (800) 835-4747.