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EDITOR'S NOTE

This issue contains a number of articles that will give you better understanding of, and increased efficiency with, your HP 3000 System. There are no software updates.

The HP 30032 Asynchronous Terminal Controller provides Electronic Industries Association (EIA) standard RS232 interfacing of terminal devices and modems to the HP 3000/Series II computer. The lead article describes how eight operational subtypes can be configured on the HP 30032.

Some questions from customers appear with more frequency than others. We state some of the more common questions asked about COBOL and EDITOR (we also provide answers).

In answer to requests, we are stating the HP position on the use of non-HP media products (packs and cartridges) on HP drive products.

An important part of a System Manager's job is selecting system parameters. An article describes these parameters, and gives guidelines for standard systems along with memory requirements.

Finally, Auerbach Publishers recently did a study of the support policies of a number of minicomputer vendors, including Hewlett-Packard. We are pleased to give you our answers to their questionnaire on sales and support policies.

Address your subscription and distribution correspondence to:

SUBSCRIPTION SUPERVISOR
COMPUTER SYSTEMS - COMMUNICATOR 3000
HP Computer Services Division
974 East Argues Avenue
Sunnyvale, CA 94086

Address your editorial correspondence to:

EDITOR
COMPUTER SYSTEMS - COMMUNICATOR 3000
HP General Systems Division
5303 Stevens Creek Boulevard
Santa Clara, CA 95050

HP 3000 SERIES II ASYNCHRONOUS TERMINAL CONTROLLER SPECICATIONS

Don Van Pernis
HP General Systems Division

ABSTRACT

This article describes how eight operational subtypes can be configured on the HP 30032 Asynchronous Terminal Controller, which interfaces devices/modems to the HP 3000 Series II. These subtypes specify various operating characteristics for the devices/modems that can be attached to the HP 30032. This is accomplished by different I/O sequences from the driver to the interface, changing the control signals between the interface and the user device/modem.

GENERAL

The HP 30032 Asynchronous Terminal Controller provides RS232 interfacing of terminal devices and modems to the HP 3000/Series II computer. For terminal devices directly connected to the 30062 panel of the 30032 or to extension cables 30062-60006 (7.5 meter), 30062-60009 (15 meter) or 30062-60012 (30 meter) which are in turn connected to the panel, the 30032 mimics a data set by providing data for the terminal device on pin 3 and accepting data from the terminal device on pin 2 of the 25-pin interface. For directly connected terminal devices, no control signals are implemented and no states of control signals should be assumed. Terminal devices should only interface to pins 2, 3, and 7. They must in all cases avoid connecting to pins 9, 13, 14, 15, 16, and 18 of the jacks on the panel. Any terminal device providing signals on these pins may affect the performance of the system. A terminal receiving signals on any of these pins may perform erratically.

When the HP 3000/II is connected to a data set (modem) through the 30062-60020 (7.5 meter) or 30062-60021 (15 meter) cable it appears as an RS232 terminal. All signals presented to the data set conform electrically to RS232C and CCITT V.28. All data and control signals implemented conform to RS232C and CCITT V.24 except for the DATA TERMINAL READY/DATA SET READY handshake as described below.

The respective 25-pin jacks on the panel of the 30032 are configured as "ports". With the HP 3000/II operating system and terminal handler program IOTERM0, these ports may be configured for eight different subtypes of operation, as shown in the following table.

Subtype	Operation
0	For directly connected terminals requiring speed sensing.
1	For asynchronous full duplex modems, such as Bell 103's and CCITT V.21 modems requiring speed sensing.
2	For asynchronous half duplex modems with reverse channels, such as Bell 202S and CCITT V.23 modems. Automatic speed sensing is implemented and DATA RATE SELECT (RS232, CH; CCITT, 111) is set ON.
3	Identical to Subtype 2 except that DATA RATE SELECT is set OFF.
4	Identical to Subtype 0 except that automatic speed sensing is disabled. This subtype is intended for operation with leased-line full duplex modems which can be configured to operate without control signals.
5	Identical to Subtype 1 except that automatic speed sensing is disabled.
6	Identical to Subtype 2 except that automatic speed sensing is disabled.
7	Identical to Subtype 3 except that automatic speed sensing is disabled.

Signals implemented through modem cables 30062-60020 (7.5 meters) and 30062-60021 (15 meters).

Pin	RS232	V.24	Name	Notes
SUBTYPES 0 and 4				
2	BA	103	TRANSMITTED DATA	*
3	BB	104	RECEIVED DATA	*
7	AB	102	SIGNAL GROUND	*
SUBTYPES 1 and 5				
2	BA	103	TRANSMITTED DATA	
3	BB	104	RECEIVED DATA	Local copy OK.
4	CA	105	REQUEST TO SEND	Always ON.
6	CC	107	DATA SET READY	Must be ON to operate.
7	AB	102	SIGNAL GROUND	*
8	CF	109	DATA CARRIER DETECT	*
20	CD	108.2	DATA TERMINAL READY	**
SUBTYPES 2, 3, 6, and 7				
2	BA	103	TRANSMITTED DATA	*
3	BB	104	RECEIVED DATA	Local copy OK.
4	CA	105	REQUEST TO SEND	*
5	CB	106	CLEAR TO SEND	*
6	CC	107	DATA SET READY	Must be ON to operate.
7	AB	102	SIGNAL GROUND	*
8	CF	109	DATA CARRIER DETECT	Local copy OK.
12	SCF	122	SECONDARY CARRIER DETECT	Local copy OK.
19	SCA	120	SECONDARY REQUEST TO SEND	*
20	CD	108.2	DATA TERMINAL READY	**
23	CH	111	DATA RATE SELECT	Always ON for Subtypes 2 and 6. Always OFF for Subtypes 3 and 7.

*Fully conform to RS232C and CCITT V.24/V.28

**Normally ON. OFF for five seconds to disconnect modem from telephone line.

SUBTYPE 0

Hardware required --

- HP 3000/II including 30032:

  30032-60001 Terminal Data Interface
  30062A Connector Panel
  30062-60006, 60004, 60012 cables optional

- Asynchronous RS232 terminal up to 2400 bits/second.

Subtype 0 uses only TRANSMITTED DATA and RECEIVED DATA. It does not use any control signals. If Terminal Control Interface (TCI) boards are installed in the system, their output signals will be set OFF. If signals are presented to control inputs they will be ignored. If no TCI boards are installed, the control outputs will be grounded.

If a spacing condition occurs for more than one character time on the input data line, the driver software will treat this condition as a BREAK.

If no sessions are active on a port configured Subtype 0, nothing can happen until carriage return (CR) has been input from the attached terminal. Upon receipt of CR, the terminal handler perceives the bit rate, configures the port, and a log-on timer starts.

The user must complete a valid HELLO within the log-on timeout period (usually 2 minutes) or the terminal will have to transmit another CR to begin another log-on sequence. Upon completion of a valid log-on sequence, the only way that the session can be terminated is by:

1. User saying BYE.

2. System manager closing the session.

3. System crash.

Subtype 0 provides automatic speed detection for rates of 110, 150, 300, 600, 1200 and 2400 bits/second.

SUBTYPE 1

Hardware required --

- HP 3000/II including 30032:

  30032-60001 Terminal Data Interface
  30061-60001 Terminal Control Interface
  30062A Connector Panel
  30062-60020, 60021 cable

- Asynchronous full duplex modems (BELL 103, Vadic 3400, CCITT V.21, etc)

- Asynchronous RS232 terminal up to 2400 bits/second.

Subtype 1 uses TRANSMITTED DATA, RECEIVED DATA, DATA TERMINAL READY, DATA SET READY, DATA CARRIER DETECT and REQUEST TO SEND. REQUEST TO SEND is always ON. The normal condition of DATA TERMINAL READY is ON. When the modem answers an incoming call, it sets DATA SET READY to ON. The terminal handler program IOTERM0 starts the log-on timeout when DATA SET READY goes ON.

If a successful log-on has not occurred within the allowed time (normally two minutes) the terminal handler will drop DATA TERMINAL READY for five seconds to disconnect the modem from the phone line. Note that this operation does not strictly conform to CCITT V.24 and RS232 requirements since the terminal handler does not require that DATA SET READY go to the OFF state before setting DATA TERMINAL READY to ON again. This is necessitated by a variety of leased-line modems and limited distance line adapters that present a constant ON signal for DATA SET READY.

Thirty seconds after DATA SET READY goes on, if DATA CARRIER DETECT does not go ON, DATA TERMINAL READY will be set OFF for five seconds to cause the modem to disconnect from the telephone line. Any ON to OFF transition of DATA CARRIER DETECT while in the receive state will cause a Read Error to be reported. A Read Error in MPE will terminate the session. A Read Error in the Editor subsystem will cause a prompt for retransmission of the previous input. Read Errors reported to other subsystems may be treated as a BREAK, may prompt for retransmission, or may terminate the session.

Any ON to OFF transition of DATA CARRIER DETECT while in the transmit state will be interpreted as a BREAK.

Any carrier loss for 30 seconds or more will end the session and disconnect the modem from the telephone line by setting DATA TERMINAL READY to OFF for five seconds.

In addition to the 30-second carrier-fail timeout there is a carrier-fail counter that will close a session and disconnect the modem if 50 consecutive carrier failures occur within the receive state. Successful completion of the receive state will reset the counter and a Read Error will be reported to the system.

Any ON to OFF transistion of DATA SET READY will close the session and cause DATA TERMINAL READY to be set OFF for five seconds.

Subtype 1 provides automatic speed detection for rates of 100, 150, 300, 600, 1200 and 2400 bits/second.

SUBTYPE 2

Hardware required --

- HP 3000/II including 30032:

  30032-60001 Terminal Data Interface
  30061-60001 Terminal Control Interface (2)
  30062A Connector Panel
  30062-60019 or 60020 cable.

- Asynchronous half duplex modems (Bell 202S, CCITT V.23, etc) with reverse channel

- Asynchronous RS232 terminals up to 2400 bits/second that support reverse channel signaling.

Subtype 2 uses TRANSMITTED DATA, RECEIVED DATA, REQUEST TO SEND, CLEAR TO SEND, DATA CARRIER DETECT, SECONDARY CARRIER DETECT, SECONDARY REQUEST TO SEND and DATA RATE SELECT. The normal condition of DATA TERMINAL READY is ON. When the modem answers an incoming call, it sets DATA SET READY to ON. The terminal handler program IOTERM0 starts the log-on timeout when DATA SET READY goes ON. DATA RATE SELECT is always ON.

If a successful log-on has not occurred within the allowed time (normally two minutes), the terminal handler will set DATA TERMINAL READY to OFF for five seconds to disconnect the modem from the telephone line. Note that this operation does not strictly conform to CCITT V.24 and RS232 requirements since the terminal handler program IOTERM0 does not require that DATA SET READY go to the OFF state before setting DATA TERMINAL READY to ON again. This is necessitated by a variety of leased-line modems and limited distance line adapters that present a constant ON signal for DATA SET READY.

Thirty seconds after DATA SET READY goes ON, if DATA CARRIER DETECT does not go ON, DATA TERMINAL READY will be set OFF for five seconds to cause the modem to disconnect from the telephone line.

Three states of communications are recognized by the terminal handler program IOTERM0. These states are:

1. Computer transmitting data

2. Computer receiving data

3. Line turnaround in progress

The HP 3000/II ignores the condition of DATA CARRIER DETECT during the time that it is in the transmitting state. Thus it is independent of whether or not the modem provides local copy of its control signals. The HP 3000/II must see DATA CARRIER DETECT ON during the receiving state. If DATA CARRIER DETECT goes from ON to OFF during a time that the HP 3000/II is receiving data, a 30-second carrier-fail timeout will be activated. If DATA CARRIER DETECT does return to ON within the 30 seconds, the session will be closed and DATA TERMINAL READY will be set OFF for 5 seconds to cause the modem to disconnect from the telephone line. If DATA CARRIER DETECT goes ON again before the 30 second timeout expires, the timer will be reset and a Read Error will be reported to the system. A Read Error in MPE will terminate the session. A Read Error in in the Editor subsystem will cause a prompt for retransmission of the previous input. Read Errors reported to other subsystems may be treated as a BREAK, may prompt for retransmission, or may terminate the session.

In addition to the 30-second carrier-fail timeout there is a carrier-fail counter that will close a session and disconnect the modem if 50 carrier failures occur within the receive state. Successful completion of the receive state before a count of 50 will reset the counter and a Read Error will be reported to the system.

The HP 3000/II requires CLEAR TO SEND and SECONDARY CARRIER DETECT to both be ON before it enters the transmitting state. Failure to see CLEAR TO SEND and SECONDARY CARRIER DETECT both ON within five seconds after the beginning of a line turnaround will cause the HP 3000/II to try to cause another turnaround. It does this by setting REQUEST TO SEND to OFF and SECONDARY REQUEST TO SEND to ON for two seconds. At the end of this two-second period it tests to see if DATA CARRIER DETECT is ON, indicating the presence of the remote terminal still on-line. If DATA CARRIER DETECT is OFF, the HP 3000/II assumes a failure of the communication link, closes the session and disconnects the modem from the telephone line by setting DATA TERMINAL READY to OFF for five seconds. If DATA CARRIER DETECT is ON at the end of the two seconds, the HP 3000/II assumes that the remote terminal is still on-line and continues to try to turnaround the remote terminal. This continues indefinitely until the terminal turns around or the line is disconnected.

CLEAR TO SEND going OFF after the HP 3000/II has entered the transmitting state will cause the HP 3000/II to try another turnaround. This will continue indefinitely until CLEAR TO SEND goes ON again.

While in the transmitting state, any ON to OFF transition of SECONDARY CARRIER DETECT will be perceived as a BREAK. This will cause the HP 3000/II to cease transmitting and go to the line turnaround state. Failure to complete a turnaround within 30 seconds will terminate the session and disconnect the modem from the telephone line. If the turnaround completes successfully, the HP 3000/II will be in the receiving state and will wait indefinitely for input from the remote terminal.

The HP 3000/II uses the reverse channel of asynchronous half duplex modems to cause remote terminals to perform line turnarounds. While in the receiving state the HP 3000/II has SECONDARY REQUEST TO SEND to ON. To force the remote terminal to turnaround the line, HP 3000/II sets SECONDARY REQUEST TO SEND to OFF and waits for DATA CARRIER DETECT to go from ON to OFF. It then sets REQUEST TO SEND to ON and waits to see CLEAR TO SEND and SECONDARY CARRIER DETECT both ON before entering the transmitting state. Failure to see SECONDARY CARRIER DETECT ON within 30 seconds will terminate the session and cause the modem to be disconnected from the telephone line. If DATA CARRIER DETECT does not go OFF within five seconds, the HP 3000/II will set SECONDARY REQUEST TO SEND to ON for two seconds and then OFF again to try to force the remote terminal to turnaround the line. This retry procedure will continue indefinitely.

SUBTYPE 3

Subtype 3 is identical in every respect to Subtype 2 except that DATA RATE SELECT (CH, 111, pin 23) is always OFF.

SUBTYPE 4

Subtype 4 is identical in every respect to Subtype 0 except that automatic speed detection is disabled and log-ons must occur at a preconfigured bit rate. After log-on, the MPE SPEED command may be used to change to other rates. Termination of a session with BYE resets the speed to the preconfigured value.

Subtype 4 is intended to replace Subtype 0 for use with leased-line full duplex modems where a failure of the link, modem, or remote terminal might affect speed detection of other ports.

SUBTYPE 5

Subtype 5 is identical to Subtype 1 except that the speed must be configured as in Subtype 4.

SUBTYPE 6

Subtype 6 is identical to Subtype 2 except that the speed must be configured as in Subtype 4.

SUBTYPE 7

Subtype 7 is identical to Subtype 3 except that the speed must be configured as in subtype 4.

GENERAL FEATURES OF SUBTYPES 2, 3, AND 7

DATE RATE SELECT is supported. It is ON for Subtypes 2 and 6 and OFF for Subtypes 3 and 7.

Automatic speed detection is provided in Subtypes 2 and 3. Detected rates are 110, 150, 300, 600, 1200 and 2400 bits/second. Note that

most asynchronous half duplex modems work at rates less than 2400 bits/second. For Bell 202S modems the maximum rate supported by HP 3000/II is 1200 bits/seconds. For CCITT V.23 modems the maximum rate is 1200 bits per second if DATA RATE SELECT is ON and 600 bits/second if it is OFF. (Most CCITT V.23 modems have some provision to override the DATA RATE SELECT signal at the 25-pin interface. The modems at both ends of the link must have equivalent configuration with regards to DATA RATE SELECT.

Subtypes 6 and 7 require that the log-on speed be preconfigured. Configured rates of 10, 15, 30, 60, and 120 characters per second are usable with Subtype 6. Rates of 10, 15, 30 and 60 characters per second are usable with Subtype 7. After log-on, the MPE SPEED command can be used to change to any of the other usable rates.

CCITT V.23 modems are prone to present a spurious character as received data at the time that DATA CARRIER is switched OFF. In conjunction with terminal types TERM=10 and TERM=11, Subtypes 2, 3, 6 and 7 will transmit an ETX before setting REQUEST TO SEND to OFF to switch carrier OFF. Terminals such as the HP 2630A, HP 2631A, HP 2635A, HP 2640B, HP 2640N, HP 2641A, and HP 2645A understand ETX as the last valid character and ignore any additional characters that may accompany line turnaround.

A potential problem exists with the ETX protocol at low bit rates of 110 and 150 bits per second. The 2640 series terminals append ETX and two RUB OUTS after transmitting CR. At low rates the terminal may still be outputting to its modem after the HP 3000/II has received CR and has initiated the turnaround. This may cause the terminal to get locked-up in its line turnaround. For this reason rates of 110 or 150 bits/second are not to be used with 2640 series terminals through asynchronous half duplex modems.

Although RS232 and V.24 recommend against it, some modems provide local copy of TRANSMITTED DATA on RECEIVED DATA, DATA CARRIER DETECT is ON while REQUEST TO SEND is ON and SECONDARY REQUEST TO SEND is ON. The HP 3000/II recommends no local copy but will perform as described with or without local copy of data and control signals.

DISCONNECT FEATURES OF SUBTYPES 2, 3, 6 AND 7

1. BYE - Normal end of session.

   The session is terminated and the modem is disconnected from the telephone line.

2. Automatic termination of session if DATA SET READY goes OFF due to loss of power in the modem or an open subscriber loop in the telephone system.

NOTE

This is the normal mechanism for terminating sessions that have been interrupted by a disconnection in Bell and Bell-like telephone systems.

3. Automatic disconnection of WRONG-NUMBER calls due to:

   a. Failure to see DATA CARRIER DETECT go ON within thirty seconds after DATA SET READY goes ON

   or

   b. Failure to complete a successful log-on within two minutes (or whatever length of time is configured for the log-on timeout)

   or

   c. DATA SET READY going OFF due the subscriber loop going open.

   Note that in no case can the HP 3000/II remain connected to the telephone line through the modem for more than the configured log-on time.

4. Automatic termination of sessions in the event of a disconnection of any part of the communication link to the remote terminal. If the HP 3000/II is in the transmitting state when a disconnect occurs, it will see SECONDARY CARRIER DETECT go OFF. This will be perceived as a BREAK and will cause the HP 3000/II to turnaround the line and attempt to enter the receive state. Failure to see DATA CARRIER DETECT go ON within 30 seconds will terminate the session and cause the modem to disconnect from the phone line.

5. Telephone systems such as the Bundespost in the Federal Republic of Germany present pulsating tones at the time of disconnection. These tones are seen by the modems as carrier and are presented to the HP 3000/II as DATA CARRIER DETECT going OFF and ON. The 50 carrier-fail counter will terminate the session and disconnect the modem from the telephone line.

SIGNAL CONDITIONS - SUBTYPES 2, 3, 6 AND 7

Pin	RS232	V.24	Name	Condition
TRANSMITTING STATE				
2	BA	103	TRANSMITTED DATA	Data
3	BA	104	RECEIVED DATA	Clamped to MARK if no local copy.
4	CA	105	REQUEST TO SEND	ON
5	CB	106	CLEAR TO SEND	ON
6	CC	107	DATA SET READY	ON
7	AB	102	SIGNAL GROUND	-
8	CF	109	DATA CARRIER DETECT	OFF if no local copy.
12	SCF	121	SECONDARY CARRIER DETECT	ON
19	SCA	120	SECONDARY REQUEST TO SEND	OFF
20	CD	108.2	DATA TERMINAL READY	ON
23	CH	111	DATA RATE SELECT	ON Subtypes 2 and 6. OFF Subtypes 3 and 7.
RECEIVING STATE				
2	BA	103	TRANSMITTED DATA	MARK
3	BB	104	RECEIVED DATA	Data
4	CA	105	REQUEST TO SEND	OFF
5	CB	106	CLEAR TO SEND	OFF
6	CC	107	DATA SET READY	ON
7	AB	102	SIGNAL GROUND	-
8	CF	109	DATA CARRIER DETECT	ON
12	SCF	121	SECONDARY CARRIER DETECT	OFF if no local copy.
19	SCA	120	SECONDARY REQUEST TO SEND	ON
20	CD	108.2	DATA TERMINAL READY	ON
23	CH	111	DATA RATE SELECT	ON Subtypes 2 and 6. OFF Subtypes 3 and 7.

SIGNALS AT "DATA SET" END OF CABLE 30062-60020 (25 FEET) or 30062-60021 (50 FEET) ALL PORTS

Pin	RS232*	V.24*	Name	I/O	Notes**
1					U
2	BA	103	TRANSMITTED DATA	Output	
3	BB	104	RECEIVED DATA	Input	
4	CA	105	REQUEST TO SEND	Output	C,E
5	CB	106	CLEAR TO SEND	Input	A,B
6	CC	107	DATA SET READY	Input	A
7	AB	102	SIGNAL GROUND		
8	CF	109	DTA CARRIER DETECT	Input	A
9					U
10					U
11					U
12	SCF	121	SECONDARY CARRIER DETECT	Input	A,B
13					U
14					U
15					U
16					U
17					U
18					U
19	SCA	120	SECONDARY REQUEST TO SEND	Output	C,D,E,F
20	CD	108.2	DATA TERMINAL READY	Output	C,E
21					U
22					U
23	CH	111	DATA RATE SELECT	Output	C,D,E,F,G
24					U
25					U

*RS232 and V.24 designations refer to operation of the HP 3000/II as a data terminal equipment (DTE).

**See last page of this article.

SIGNALS AT BACK PANEL 30062 J1 THROUGH J15 ODD NUMBERED

Pin	RS232*	V.24*	Name	I/O	Notes**
1				Input	
2	BB	104	RECEIVED DATA	Input	
3	BA	103	TRANSMITTED DATA	Output	
4	CF	109	CARRIER DETECT	Input	A
5	Connected to Pin 4.				
6	CD	108.2	DATA TERMINAL READY	Output	C,E
7	AB	102	SIGNAL GROUND		
8	CA	105	REQUEST TO SEND	Output	C,E
9	Test		+15V	Output	X
10					U
11	SCF	121	SECONDARY CARRIER DETECT	Input	A,B
12	SCA	120	SECONDARY REQUEST TO SEND	Output	C,D,E,F
13					U,X
14					U,X
15					U,X
16					U,X
17	Test		-15V	Output	X
18					U,X
19					U
20	CC	107	DATA SET READY	Input	A
22	CB	106	CLEAR TO SEND	Input	A,B
23	CH	111	DATA RATE SELECT	Output	C,D,E,F,G
24					U
25					U

*RS232 and V.24 designations refer to operation of the HP 3000/II as a data terminal equipment (DTE).

**See last page of this article.

SIGNALS AT BACK PANEL 30062 J0 THROUGH J14 EVEN NUMBERED

Pin	RS232*	V.24*	Name	I/O	Notes**
1					U
2	BB	104	RECEIVED DATA	Input	
3	BA	103	TRANSMITTED DATA	Output	
4	CF	109	CARRIER DETECT	Input	A
5	Connected to pin 4.				
6	CD	108.2	DATA TERMINAL READY	Output	C,E
7	AB	102	SIGNAL GROUND		
8	CA	105	REQUEST TO SEND	Output	C,E
9	Test		+15	Output	X
10					U
11	SCF	121	SECONDARY CARRIER DETECT	Input	A,B
12	SCA	120	SECONDARY REQUEST TO SEND		C,D,E,F
13			(CARRIER DETECT -J+1)	(Input)	A,B,X
14			(DATA SET READY-J+1)	(Input)	A,B,X
15			(REQUEST TO SEND-J+1)	(Output)	C,X
16			(SECONDARY REQUEST TO SEND-J+1)	(Output)	C,D,X
17	Test		-15	Output	X
18			(CLEAR TO SEND-J+1)	(Input)	A,X
19					U
20	CC	107	DATA SET READY	Input	A
21					U
22	CB	106	CLEAR TO SEND	Input	A,B
23	CH	111	DATA RATE SELECT	Output	C,D,E,F,G
24					U
25					U

*RS232 and V.24 designations refer to operation to the HP 3000/II as a data terminal equipment (DTE)

**See last page of this article.

Notes:

A. Not interpreted by Subtype 0 or Subtype 4.

B. Not interpreted by Subtype 1 or Subtype 5.

C. Grounded if no TCI boards (30061-60001).

D. Grounded if only one TCI board (30061-60001).

E. Normal state: OFF for Subtype 0 or Subtype 4.

F. Normal state: OFF for Subtype 1 or Subtype 5.

G. Normal state: OFF for Subtype 2 or Subtype 6.

Normal state: OFF for Subtype 3 or Subtype 7.

U. Unused-electrically open.

X. Terminal devices must not connect to these pins.

COBOL CAPABILITIES

John Pavone
HP General Systems Division

Following are some questions asked by customers about the HP 3000 Series I and II COBOL capabilities.

1. Q. When using a subscript on a qualified data item, does the subscript follow the item or the qualifier?

   EXAMPLES:

   a. MOVE FLD1 to FLD2 (SUB) IN AREA-1.
   b. MOVE FLD1 to FLD2 IN AREA-1 (SUB).

   A. The subscript follows the qualifier; therefore, example b is correct.

2. Q. When a FORTRAN program calls a COBOL Subprogram can the subprogram open and close files?

   A. Yes, however the files are only known within the subprogram. No communication is possible to the FORTRAN program.

3. Q. I have a FORTRAN program which calls a COBOL Subprogram named FEECARD. Using the segmenter I placed the FEECARD segment into an RL. When I try to run my program I get an "UNRESOLVED EXTERNAL REFERENCE FEECARD'" message. A segmenter listing of the RL shows FEECARD' as an external. What is my problem?

   A. Remember that all COBOL main and subprograms generate, as a minimum, two segment RBM's, one for the initialization segment and the other for the code segment. When placing a subprogram into an RL, both the initialization and code segments must be entered.

4. Q. How does the COBOL compiler format variable length record files?

   A. Formatting of variable length record files is handled by the File System, not COBOL. The structure of the file is as follows:

      a. Each record includes a one word byte count, the value of which indicates the number of bytes within the record.

b. Each block includes an end of block marker which is a word containing a -1 (octal 177777).

Refer to MPE Intrinsics Manual, Section III, for more details on the File Management System.

5. Q. Is it possible to issue a CALL statement from a COBOL main program, which opens a file, to an SPL subroutine and pass the file number to the subroutine?

   A. Yes. The COBOL program can pass the file number to an SPL subroutine via the USING clause of the CALL statement. By passing the COBOL filename, defined in the File Section ("FD filename") as a parameter, the compiler passes the MPE file number assigned when the file was opened. Within the SPL routine this parameter must be declared as Integer or Logical by.value.

6. Q. The COBOL manual, in its description of the CALL statement, states that subprograms are not recursive. Since code and data are separated on the HP 3000 why is this a limitation in COBOL?

   A. The COBOL ANSI standards do not require that COBOL subprograms be recursive. You are correct in assuming that by the nature of the HP 3000 architecture code can be recursive; however, tests to validate this capability have not been extensively evaluated. You could attempt to try a recursive CALL and it may work; however, if it fails, we do not support that it should work as per the ASA standard.

7. Q. Are COBOL data declarations in the Working Storage Section named FILLER initialized to SPACES when the program initialization module is executed?

   A. No. Initialization of FILLER is not automatic. To obtain initialization you must use the VALUE clause. Page 6-41 of the manual states "If the programmer omits the VALUE clause, the content of the items are unpredictable when the program is loaded."

8. Q. When copying a routine from a COPY LIBRARY the compiler also selects any succeeding lines with spaces in columns 73-80. Is this a bug?

   A. No. The manual page 8-11 states "Each COPYLIB source line must contain an identification field in columns 73-80." The compiler will, however, accept any lines containing spaces in those columns. The manual will be updated to reflect this condition. Possible ways to avoid this problem is to uniquely label all COPYLIB lines or use a KSAM file for the COPYLIB.

9. Q. Can you clarify the limits of numeric/non-numeric literals and input to an ACCEPT statement?

   A.
   - Numeric literals are 18 digits.
   - Non-numeric literals are 120 characters.
   - ACCEPT statement input is 200 characters.

   NOTE: To terminate input to an ACCEPT statement, when the input string is less than the size specified in the picture clause for the data item, requires the user to press the (CR) key twice. This is normal for the compiler as it is the mechanism the compiler uses to distinguish between end of input and continuation of terminal end of line conditions. When the ACCEPT logic detects a carriage return character, and the size of character input is less than field size, the compiler issues another READ to the terminal. If the first character is also a carriage return the compiler completes the formation of the data item, otherwise it continues to process input data.

10. Q. How does COBOL implement LOCK/UNLOCK at FOPEN? Files that specify LOCKING are opened with EXCLUSIVE ACCESS.

    A. COBOL implements LOCK/UNLOCK taking all file defaults when FOPEN is issued. To allow file sharing, by other processes, include a FILE EQUATION at run time. A recommendation has been suggested to the MPE lab that the default for files which are to use locking be changed to SHARED ACCESS from the present default of EXCLUSIVE.

11. Q. How does the compiler handle four-word integer quantities?

    A. The compiler converts any integer quantity greater than double to packed decimal for arithmetic operations.

12. Q. Timings of benchmarks using large COPYLIBS indicate excessive overhead in searching through the library. Is there any method that will improve this problem and can we expect any improvement with COBOL 74?

    A. COBOL compiles show measureable improvement when the COPYLIB is transferred to a KSAM file. The method for processing a COPYLIB in COBOL 74 will not significantly differ from the current technique.

13. Q. Is there a way to declare and open an output file in a COBOL main program and later on write to the file in a COBOL subprogram?

    A. No. COBOL files must be opened/closed within each main or subprogram that references them; however, by declaring the files "SHARED" with "APPEND" access both the main and subprogram can write to a common file.

14. Q. When a calling program and a called subprogram are "PREP'D" together, how are DB-relative addresses for the subprogram's Working-Storage offset to allow for main Working-Storage?

    A. All data for COBOL main programs (outer block) and non-dynamic subprograms are passed to the Segmenter as secondary DB blocks. The Segmenter allocates these blocks consecutively starting at DB+0. The outer block is always compiled into the first segment in the USL and must remain as the first RBM module which allocates secondary DB storage. For any subprogram the word address of the start of its data area is placed into Q + 2 when the subprogram is called.

EDITOR CAPABILITIES

John Pavone
HP General Systems Division

Following are some questions asked by customers about the HP 3000 Series II EDITOR capabilities:

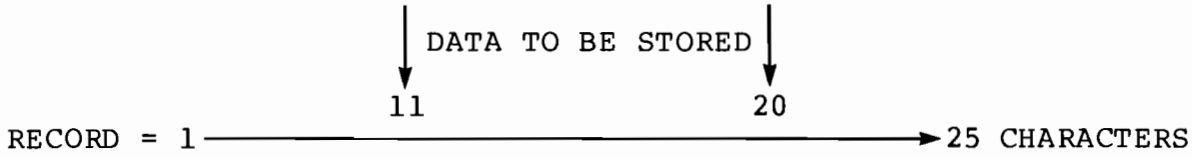
1. Q. When attempting to text in a file from magnetic tape, which contains 2200 records, and a SET SIZE = 2500 is used, the Editor gives an error 31 - "Scratch File Write Error" along with a tombstone error code of 0 = End of File. If a SET SIZE = 3000 is used the text operation is performed successfully. How can I predetermine the minimum value to use for SET SIZE in order to avoid this problem?

   A. The Editor workfile SIZE calculation is discussed in the manual under the SET command - SIZE option. Pre-calculation of size requirements for non-disc resident files is, at best, a rough estimate. To ensure adequacy of initial disc space use a value of (# of records + 25%) i.e., for a 2200 record tape file you should use a SIZE = 2750. Since the KEEP function only stores the # of actual records contained in the file, to an appropriately-sized disc file, no disc space is wasted for the final file. Subsequent TEXT commands would thereafter conform to the rules, specified in the manual, for source disc file settings of SIZE.

2. Q. When using SET LEFT and SET RIGHT margins, execution of a KEEP command stores the entire record - not just the data between the margin boundaries. True/False?

   A. True. The SET LEFT and SET RIGHT operations are only intended to establish margin boundaries for data display; not data storage. The SET LENGTH command determines the size of records stored. To accomplish storage of data within a LEFT and RIGHT margin boundary requires the use of the CHANGE and SET LENGTH commands.

   The CHANGE command can be used to perform left truncation while the SET LENGTH command performs right truncation. Given the following example:



a. /CQ 1/10, "", ALL (Char. 11 becomes char. 1.)

b. /S RIGHT = 10 (Sets right margin to char. 10.)

c. /S LENGTH = 10 (Record length becomes 10 chars.)

d. /K filename (10 char. data record stored.)

3. Q. When JOINing an unnumbered file, 8 bytes on the right are truncated. True/False?

   A. True. As initially implemented the JOIN command did not allow a capability to specify the joined file as being unnumbered; therefore, the 8 right-most bytes were truncated, as though they represented the 8 sequence number bytes appended by a KEEP command.
   Note: SET FORMAT=DEFAULT was in effect.

   A design change has been implemented in release 4.03 that allows the JOIN command to include the UNN option. The command JOIN filename, UNN will now join an unnumbered file to the workfile without truncating any characters from the text.

4. Q. When using the HOLDQ command, in session mode, is there any way to suppress the hold file message "HOLD FILE LENGTH IS n RECORDS"?

   A. This message cannot be suppressed as currently implemented.

5. Q. Is there a way by which I can search a text file for all lines containing either of two strings and list those lines?

   A. Yes. The following two examples were developed by Madeline Lombaerde, HP General Systems Division.

EXAMPLE 1

```
S SHORT
S TIMES=100
FQ FIRST
W
   FQ*
   BEGINQ
     BEGINQ
       FQ "TEST LINE 25"/*(RIGHT)
       OR
       BEGINQ
         FQ*(LEFT)
         FQ "TEST LINE 30"/*(RIGHT)
         END
       L*
       END
     OR
     FQ*+1
   END
```

EXAMPLE 2

```
S SHORT
S TIMES=100
FQ FIRST
W
   BEGINQ
    BEGINQ
      FQ"TEST LINE 25"/*(RIGHT)
      OR
      BEGINQ
        FQ*(LEFT)
        FQ"TEST LINE 30"/*(RIGHT)
        END
      L*
      END
    OR
    FQ*+1
    END
  FQ*
```

Notes:

a. Both example procedures should be run in session mode. If they are run in batch mode numerous error 8 and 21 messages are given for each line searched during execution of the WHILE block.

b. Example 1 exits the procedure based upon a time-out of the WHILE block. Upon exit the flag is FALSE and must be set to TRUE (via the YES command) before the Editor will accept further commands.

c. Example 2 exits the procedure upon reaching end-of-file. The FLAG is TRUE enabling further Editor commands to be entered.

d. Example 2 executes faster than example 1.

6. Q. How can I use the Editor to convert a COBOL Source program in 80 column format with page and line numbers in columns 1-6 to an Editor COBOL formatted file, Editor line numbers in columns 1-6, file code of 1052 and length of 80 bytes.

A. After loading the 80 column card file onto the disc, perform the following Editor functions:

```
/T Source, UNN  (V LENGTH = 80)

/C 1/6, "", ALL (Removes columns 1-6 and shifts data left 6
                 byte positions)

/S FORMAT = COBOL (Sets RIGHT and LENGTH values to 74 and
                   sets file code = 1052)

/K Newfile   :LISTF Newfile, 2 (= LENGTH of 80 bytes and a
                                  filecode of 1052)
```

HP MEDIA PRODUCTS

Bob Hoke
HP Disc Memory Division

There have been several requests for an explanation of HP Disc Memory Division's position on the use of non-HP media products (packs and cartridges) on HP drive products. The following are the reasons why we strongly specify that our users use only the HP supplied media product.

First, the distinction must be made between media and other supplies-type products such as mag-tape and line printer paper. In the case of media, HP's disc drive reliability and performance is intimately dependent upon the quality and performance of the pack or cartridge.

Specifications, such as data integrity, interchangability, and error-rate performance must be specified in conjunction with a media that meets stringent HP tolerances. Yet as important as these specs are, they are not as important as some critical mechanical balance and surface flatness criteria. The mechanical tolerances, although extremely difficult to specify, are factors that can cause major catastrophic damage to HP disc products.

Our experience shows that media from the outside (even from our own vendors) do not reliably meet the above criteria. HP has invested around $200K worth of unique electronic measurement and testing equipment for testing and verifying each and every pack or cartridge product. The high rate of rejection, considering these products were built to HP specs, is the reason why we feel we must continue to carefully control the quality of the media products installed in HP drives. The main reason for rejection turns out not to be the error rate performance but failure to meet the mechanical tolerances.

The user must understand that HP is not supplying the same product as available from an outside vendor. The HP product is selected, uniquely and individually tested, and certified to meet HP's rigid requirements for total drive performance. This added value does make our product cost somewhat more but the added costs are necessary to achieve a high level of customer satisfaction.

WHERE AN OUTSIDE PACK IS USED AND DAMAGE OCCURS AS A RESULT, HP WILL NOT PAY FOR THE REPAIR OF THAT DAMAGE UNDER WARRANTY OR UNDER THE SERVICE CONTRACT.

The media area is under careful study at HP Disc Memory Division and everything possible is being done to bring our customers the best possible value in both drive and media products.

SERIES II CONFIGURATION GUIDELINES FOR SYSTEM MANAGERS

Thomas M. Root
HP General Systems Division

Choosing an appropriate set of configuration parameters is an important part of tuning an HP 3000/II. In general, the various parameters should be as small as possible while still providing sufficient resources to process the required work load. The following guidelines are offered to help the System Manager make an intelligent choice of parameters for his or her particular system.

STANDARD CAPABILITIES

The guidelines presented here assume that users are using only the standard capabilities; sites using the process handling or extra data segment capabilities should make additional allowances for the extra resources required. The table at the end of the parameter descriptions gives suggested values for a 16-user system. It also indicates the memory requirements for each table, whether it is permanently resident, and whether the configured value is automatically changed when the memory size is changed.

TERMS

The following terms will be used:

- Jobs: The maximum number of jobs that will be run at any given time.
- Sessions: The maximum number of sessions that will be run at any given time.
- Users: The maximum number of jobs or sessions that will be run at any given time.

  Note that users, as defined here, may be less than the sum of jobs plus sessions. For example, during the day the System Manager allows 1 job and 16 sessions, in the evening 3 jobs and 10 sessions, and at night 6 jobs and 5 sessions. Thus,

  ```
  Jobs = the maximum jobs = 6
  Sessions = the maximum sessions = 16
  Users = the maximum at any one time = 17
  ```

- Terminals: The maximum number of configured terminals.

PARAMETER DESCRIPTIONS

1. MAX # OF OPEN SPOOLFILES

   This is the maximum number of spool files that may be in the OPENED state at any one time; it does not affect spool files in the ACTIVE or READY states. When a spool file is opened, MPE creates a "virtual device" of the required type by filling in an unused logical device entry with the appropriate values. In essence, this parameter tells MPE how many logical device numbers to reserve for spooling.

   A spooled or streamed job requires at least two opened spoolfiles, one for $STDIN and one for $STDLIST. In addition, each user requires an open spoolfile for each access to a spooled device.

2. CST

   This portion of the Code Segment Table is used for all permanently allocated code segments (those listed in LOADMAP), plus all code segments that come from any segmented library.

3. EXTENDED CST

   This portion of the CST is used for all code segments that come from program files (including RL segments). It must be large enough to hold all the segments that will be allocated at any given time, whether they are allocated permanently via the ALLOCATE command or dynamically via the RUN command.

4. DST

   The Data Segment Table is used for all data segments, whether they be MPE tables, user data stacks, file system segments, etc. Allow approximately 64 + 8 * Users -- add more if user extra data segments are to be used.

5. PCB

   The Process Control Block is used to contain the status of each process on the system. Allow approximately 14 + 1 * Spoolers + 2 * Users -- add more if process handling is to be used.

6. I/O QUEUE

   The I/O Queue is used to hold all I/O requests. Allow approximately 16 + 16 * Spooled Output Device + 2 * Users.

7. TERMINAL BUFFERS

   Terminal Buffers are used for all terminal I/O. Allow approximately 3 * Terminals -- add more if page mode terminals are to be used.

8. SYSTEM BUFFERS

Set this parameter to 8.

9. MEMORY MANAGEMENT TABLE

This table contains the various queues required by the memory manager. Use the values in Appendix C of the System Manager Manual.

10. ICS

The Interrupt Control Stack is used to process all interrupt requests. Allow 512 words.

11. UCOP REQUEST QUEUE

This is the request queue for the User COntroller Process. UCOP is responsible for deleting processes, changing priorities, and expanding or contracting stacks. Allow approximately 2 * Users -- add more if process handling is used.

12. TIMER REQUEST LIST

The Timer Request List is used for calls to PAUSE, timed terminal I/O, and various other timings such as modem turnaround. Allow approximately 1 * Terminals + 1 * Users.

13. BREAKPOINT TABLE

The Breakpoint Table is used to hold the information needed for DEBUG breakpoints. Allow at least 16 entries to aid in trouble shooting by HP SE's or Product Specialists and add more if DEBUG is used extensively.

14. # OF RINS

This parameter is the total number of Resource Identification numbers available to the system. It includes global rins, local rins, and file rins which are used whenever dynamic file locking is requested. The number of rins needed depends on the users' applications but there should be at least one per user to allow for the dynamic file locking used by subsystems such as the SEGMENTER.

15. # OF GLOBAL RINS

This parameter is used to allocate the space needed to save the user names, account names, and passwords associated with global rins. Since this parameter can only be changed on a reload, it is a good idea to allow a few more than are expected to be needed.

16. # OF SECONDS TO LOGON

Whenever a terminal is speed sensed to begin a logon, MPE starts a logon timeout. If the time expires before the logon is complete, the port is reset to its initial state. This is particularly important with modems to prevent a wrong number from hanging a port indefinitely. The time should be as short as possible so that improper logons can be reset promptly, but it must be long enough so that the slowest typist can logon successfully. Sixty seconds is usually adequate.

17. MAX # OF CONCURRENT RUNNING SESSIONS

and

18. MAX # OF CONCURRENT RUNNING JOBS

Individually, these parameters specify the limits that will be in effect when the system is initialized. Their sum is the maximum number of users that can be logged on at any given time. Normally the number of jobs should be set to the desired default job limit and the number of sessions set to users - the number of jobs.

19. DEFAULT JOB CPU TIME LIMIT

This parameter may be used to establish a default limit on the number of CPU seconds that a job may use. This default will be used whenever the TIME=cpusecs parameter is omitted from a JOB statement. If this parameter is 0, no default limit will be imposed.

20. LOG FILE RECORD SIZE (SECTORS)

and

21. LOG FILE SIZE (RECORDS)

These parameters specify how log files are to be built. The values given in the System Manager manual are suitable for all systems.

22. VIRTUAL MEMORY

This parameter specifies the number of sectors of the system disc (logical device 1) that are to be set aside for virtual memory. This area is used only for data segments since code segments are read directly from the program file or segmented library. When virtual memory space is allocated, enough space is reserved to hold the largest size allowed for the data segment. In the case of a processes' data stack, this is the value of MAXDATA that was specified when the program was PREP'ed. The amount of virtual memory required is highly dependant on the users' applications as

well as the number of users. Values of 4K to 8K are usually sufficient but large numbers of data segments or large data segment sizes may require more space. This parameter can only be changed on a reload so it's advisable to err on the generous side.

23. DIRECTORY

Appendix E of the System Manager Manual provides a formula for estimating the amount of directory space required. Like virtual memory, the directory size can only be changed on a reload so it's advisable to err on the generous side.

24. MAX # OF SPOOLFILE KILOSECTORS

This parameter allows a system manager to specify the maximum amount of disc space that may be used by the spoolers. If this amount of space is exceeded, all spooling queues will be shut until they are opened by the operator. Many sites may choose to set this value large enough so that the effective limit on disc space is the amount of free space in the device class SPOOL.

25. # OF SECTORS PER SPOOLFILE EXTENT

This parameter specifies the quantum that will be used for allocating spool file disc space. Since a spool file may have only 32 extents, it also specifies the maximum size of any single spool file. If large spool files are required, such as for year end reports, this value may be made quite large; there is a potential problem, though, since the system may be unable to find a large enough contiguous area of disc space to allocate an extent if the disc space is highly fragmented. This would make it impossible to do any spooling. An alternative to generating large output spool files, is to periodically close the output file and open a new one. A large report program might start a new output file every 200 pages. While this would require gathering several files for the complete report, it has the advantage of allowing the first portion of the report to begin printing while the program is still running. Spool files use a special type of variable length records with trailing blanks stripped. An extent size of 384 sectors will allow an output file of approximately 25000 print lines.

26. TIME QUANTUM

This parameter specifies the time quantum allowed for processes in the CS, DS, and ES subqueues. Generally, long quanta favor batch processes while short quanta favor interactive processes. A value of 500 usually provides good overall response but system managers should experiment with other values to find the best one for their particular system. Small changes in the quantum will probably not be noticable, so changes on the order of a factor of 2 are suggested for an initial trial.

27. TERMINAL PRIORITY

and

28. CS PRIORITY LIMIT

and

29. DS PRIORITY LIMIT

These parameters establish the relative priority of the CS, DS, and ES subqueues. Their operation is described in section 6 of the System Manager Manual beginning on page 79. Values of 152, 160, and 180, respectively are normally used but the specific requirements of a given system may dictate some other values.

30. MAX # OF CONCURRENT RUNNING PROGRAMS

This parameter is used by the memory manager to control the size of its working set table. Allow as many concurrent programs as users -- add more if process handling is used.

31. MAX CODE SEGEMENT

and

32. MAX # CODE SEGMENTS PER PROCESS

and

33. MAX STACK SIZE

and

34. MAX EXTRA DATA SEGMENT SIZE

and

35. MAX # OF EXTRA DATA SEGMENTS PER PROCESS

These parameters are used to limit the amount of resources that can be used by any given process. If the system's users are conscientious about using the minimum resources required for a given task, these parameters may be set to the maximum allowed, thereby giving the users the maximum freedom. Otherwise, limits may be imposed. It is important to note, however, that these are system-wide limits that apply to all users.

36. STANDARD STACK SIZE

This is the default stack size used if the STACK= parameter is not included in the PREP command. Since the amount of stack space needed is highly application dependant, users should be encouraged to adjust their applications and use an explicit STACK declaration instead of relying on a default value.

SUGGESTED VALUES FOR A 16-USER SYSTEM

Parameter	Suggested Value for 16 Users	Entry Size in Words	Memory Resident	Memory Size Dependant
1. MAX # OF OPEN SPOOLFILES	20-32	8	Yes	No
2. CST	192	4	Yes	Yes
3. EXTENDED CST	576	4	Yes	Yes
4. DST	256	4	Yes	Yes
5. PCB	64	16	Yes	Yes
6. I/O QUEUE	64	11	Yes	Yes
7. TERMINAL BUFFERS	64	16	Yes	Yes
8. SYSTEM BUFFERS	8	129	Yes	Yes
9. MEMORY MANAGEMENT TABLE	384	5	Yes	Yes
10. ICS	512	1	Yes	Yes
11. UCOP REQUEST QUEUE	32	2	No	Yes
12. TIMER REQUEST LIST	32	4	Yes	Yes
13. BREAKPOINT TABLE	64	4	Yes	Yes
14. # OF RINS	48	2	No	Yes
15. # OF GLOBAL RINS	16	12	No	Yes
16. # OF SECONDS TO LOGON	60			No
17. MAX # OF CONCURRENT SESSIONS	16	1	Yes	Yes
18. MAX # OF CONCURRENT JOBS	2	1	Yes	Yes
19. DEFAULT JOB CPU TIME LIMIT	0			No
20. LOG FILE RECORD SIZE	2			No
21. LOG FILE SIZE	1023			No
22. VIRTUAL MEMORY	8192			Yes
23. DIRECTORY	1024			Yes
24. MAX # OF SPOOLFILE KILOSECTORS	128			No
25. # OF SECTORS PER SPOOLFILE EXTENT	384			No
26. TIME QUANTUM	500			No
27. TERMINAL PRIORITY	152			No
28. CS PRIORITY LIMIT	160			No
29. DS PRIORITY LIMIT	180			No
30. MAX # OF CONCURRENT RUNNING PROG	24	20	Yes	Yes
31. MAX CODE SEGMENT SIZE	8192			Yes
32. MAX # OF CODE SEG/PROCESS	63			Yes
33. MAX STACK SIZE	31232			Yes
34. MAX EXTRA DATA SEGMENT SIZE	31232			Yes
35. MAX # OF EXTRA DATA SEG/PROCESS	4			Yes
36. STANDARD STACK SIZE	800			No

A RANGE OF SUPPORT SERVICES TO ASSURE YOUR SUCCESS

Hewlett-Packard places the same emphasis on long-term, responsive customer support as it does on the superior design and manufacture of computer products.

Because of this philosophy, as a user of an HP 3000 Computer System you can rely on complete support to maintain your system at the peak of efficiency. Your system is backed by multiple resources, including field service representatives, manufacturing facilities at the General Systems Division, and Hewlett-Packard's Computer Service Division -- a worldwide organization.

The following questions* were developed by Auerbach Publishers, Inc. (Pennsauken, N.J.) as part of a study of the support policies of minicomputer vendors. Hewlett-Packard is pleased to present the answers to these questions as they pertain to the HP 3000 Computer Systems -- a powerful management tool for today's business data processing.

*These questions are reprinted by permission of AUERBACH Publishers and are abstracted from their publication titled MINICOMPUTER VENDOR PRACTICES SURVEY.

Hardware sales

1. Q. **Do you rent, lease, or sell your equipment?**

   A. HP 3000 systems are available for purchase or lease.

2. Q. **If you provide a lease, is it a) Monthly, with a 90-day cancellation; b) 1-year lease; c) 2- to 4-year lease; d) Full payout lease; e) Lease/other terms?**

   A. b), c), d), and e).

3. Q. **Do you offer quantity discounts to end users on your equipment?**

   A. Yes. Hardware discounts range from 5 to 20%; software discounts range from 20 to 70%.

4. Q. **Do you offer quantity discounts to Third-Party Participants (TTP)?**

   A. Yes. HP 3000 System OEM discounts range from 10 to 25% on hardware and 20 to 70% on software.

5. Q. **Do you use the same discount schedule for end users and TTP's?**

   A. Hardware, no. Software, yes.

6. Q. **What is the range of your discounts for the following quantities? [5 or less . . . 100 plus.]**

   A.

# SYSTEMS	HARDWARE				SOFTWARE
	HP 3000 SERIES I		HP 3000 SERIES II		HP 3000 SERIES I & II
	VEU*	OEM**	VEU	OEM	VEU & OEM
1	0%	10%	0%	10%	0%
2	0	10	5	10	20
3	0	10	8	13	20
4	5	10	10	15	30
5	8	13	12	17	30
6	8	13	12	17	40
7	8	13	14	19	40
8	10	15	14	19	40
9	10	15	15	20	40
10	12	17	15	20	40
11	12	17	15	20	50
12	12	17	15	20	50
13	14	19	17	22	50
14	14	19	17	22	50
15	14	19	18	23	50
16	14	19	18	23	60
17	14	19	18	23	60
18	15	20	18	23	60
19	15	20	18	23	60
20	15	20	19	24	60
21	15	20	19	24	65
22	15	20	19	24	65
23	15	20	19	24	65
24	15	20	19	24	65
25	17	22	20	25	65
26	17	22	20	25	70
Max	20	25	20	25	70

* Volume End User
** Original Equipment Manufacturer

7. Q. **Is the discount based on revenue, CPU units, or another variable? Specify:**

   A. HP 3000 Systems hardware discount is based upon CPU units contracted for in current contract: 2 functional units per Series I, 4 functional units per Series II system. The software discount for all HP 3000 Systems is based upon the total number of HP 3000 Systems purchased plus contracted for in current year's contract.

8. Q. **Do you charge separately for: a) Hardware; b) Installation; c) Maintenance; d) Documentation; e) Program support; f) Education?**

   A. The purchase price of HP 3000 Systems includes pre-sale consulting to plan the selection and training of the operating staff, help in site preparation, and installation of the system by an HP Customer Engineer. Complete operating system and software documentation is provided in addition to the system user's documentation. Software consulting for additional fees is available from the HP Systems Engineer. A variety of training courses in the use of the HP 3000 System are available on a tuition basis at an HP Technical Center or on-site. After the 90-day warranty (hardware and software), maintenance is available through a Customer Maintenance Agreement for hardware and the operating system. The purchase of software includes full software support services; these services may be continued after the initial 48-month period by renewal (additional fee).

9. Q. **Do you or does the buyer pay for the shipping costs?**

   A. The buyer.

9a. Q. **What are your specified delivery times?**

   A. Varies with HP 3000 availability schedule. During August 1977, shipment was approximately 12 weeks after receipt of order.

10. Q. **Do you accept trade-in of old equipment on new?**

   A. Hewlett-Packard offers a product for pre-Series II system owners to upgrade to an HP 3000 Series II. A trade-in allowance for returned parts is available which is applied against the purchase of an HP 30409B – Upgrade to HP 3000 Series II for HP 3000, HP 3000CX, and HP 3000 Series I systems.

10a. Q. **If yes, what is your allowance structure? Specify:**

   A. See No. 10.

10b. Q. **Will you sell used and/or reconditioned hardware?**

   A. No, except that parts returned in an HP 30409B upgrade are integrated with new hardware in the production of HP 3000 Series I systems.

10c. Q. **If yes, how is it discounted? Specify:**

   A. See No. 6.

11. Q. **Will you sell OEM-designated equipment to an end user?**

   A. Yes.

11a. Q. **Is the OEM equipment normally sold under your name or that of the OEM? Specify:**

   A. Under Hewlett-Packard's name.

11b. Q. **Do you sell OEM equipment at the price you paid, or at a higher price? If higher specify the range of markup:**

   A. The sale price of OEM equipment is higher reflecting the modifications, stringent quality testing and a 90-day warranty added by Hewlett-Packard.

11c. Q. **Are there any special charges associated with attached OEM equipment? Specify:**

   A. No.

Hardware installation

12. Q. Is installation included in the hardware price?

A. Yes.

13. Q. What services are included as part of the installation? a) Physical planning; b) Facility preparation; c) Machine replacement; d) Machine checkout; e) Software system generation.

A. a), d), and e).

13a. Q. Who performs the physical planning?

A. The HP Customer Engineer visits the customer site and helps the customer plan the environment for the system.

13b. Q. What services are included as part of physical planning?

A. On-site visit and consultation by HP Customer Engineer, SITE PREPARATION MANUAL, HP COMPUTER SYSTEM SITE PLANNING WORKBOOK. These materials provide an appropriate and effective guide to the buyer in coordinating the additional facilities consultants and contractors who may be required.

14. Q. Do your installation charges include travel or is travel an additional charge?

A. Travel is included up to 100 miles from the HP Service Office.

15. Q. In machine checkout, do you use your operating system and a sample program or do you use diagnostics only?

A. Diagnostics on subsystems and then a complete checkout with the MPE operating system.

16. Q. Do you install and check out OEM equipment connected to your system?

A. Yes, if sold by Hewlett-Packard.

16a. Q. If yes, how do you bill for the installation?

A. No additional charge; it is included in the purchase price.

Hardware warranty

17. Q. Do you warrant your hardware?

A. Yes.

17a. Q. If yes, parts only, or parts and labor?

A. Parts and labor.

17b. Q. If yes, for what length of time?

A. 90 days.

18. Q. When does the warranty begin? a) Date of shipment; b) Date of receipt; c) Date of installation; d) Other - specify:

A. c).

19. Q. Does customer installation affect the warranty?

A. Not applicable.

20. Q. Do you provide warranty service outside of normal working hours?

A. Yes.

20a. Q. If yes, is it billable or nonbillable?

A. Billable.

20b. Q. Is there an extra charge for weekend repairs?

A. Yes.

20c. Q. Do you bill extra for travel?

A. No.

21. Q. Do you charge for situations in which no defect is found?

A. No.

22. Q. Do you warrant parts?

A. Yes.

22a. Q. If yes, for how long?

A. 90 days.

23. Q. Do you repair parts?

A. Yes.

23a. Q. If yes, what is the response time? Specify:

A. Not applicable because defective parts are exchanged.

24. Q. Do you loan parts?

A. No; parts are exchanged.

25. Q. Do you accept trade-in parts?

A. No, but defective parts are exchanged on-site.

26. Q. How is attached OEM equipment warranted? Specify:

A. All equipment sold by Hewlett-Packard for HP 3000 Systems is included in the 90-day warranty. Hewlett-Packard does not warrant or support foreign devices attached to HP 3000 Systems.

Hardware maintenance

27. Q. Do you offer maintenance at the customer's location on: a) A contractural basis; b) An hourly basis.

A. Both.

27a. Q. If yes, do you charge extra for: a) Weekends; b) Nights; c) Travel time; d) Cases in which no trouble is found; e) Operator errors; f) Phone line trouble; g) User errors; h) OEM errors; i) Other. Specify:

A. Contractual basis: a), b), e), f), g), h), and i) — on-site visit for problem determined to be attributable to user/operator misuse of system. Hourly: extra charge for all.

28. Q. Is a minimum configuration a prerequisite for maintenance?

A. Yes.

28a. Q. If yes, explain:

A. Each HP 3000 System must include an HP disc, magnetic tape, standard MPE operating system, standard memory configuration and all foreign devices removed for HP service.

29. Q. Do you charge to correct a design defect?

A. No.

30. Q. **Does your maintenance agreement provide problem determination responsibility?**

A. Yes.

31. Q. **Under your maintenance agreement, do you offer a rebate for extended periods of downtime?**

A. No.

32. Q. **Do you offer expedited service for a premium?**

A. No; however, extended maintenance coverage is available.

33. Q. **Will you offer a maintenance agreement on an OEM device?**

A. Yes, if sold by HP.

33a. Q. **If yes, explain:**

A. All equipment sold by Hewlett-Packard is serviced by Hewlett-Packard Customer Engineers.

34. Q. **Will you offer assistance to troubleshoot an OEM device?**

A. No, if it is a foreign device (not sold by HP).

35. Q. **Do you offer maintenance education?**

A. Yes.

35a. Q. **If yes, is it: a) Billable and/or nonbillable; b) Available at the customer's location; c) Available at multiple locations. At how many?**

A. a) Billable; b) No; c) Not at customer's location, but at GSD factory in Santa Clara, California.

Software products

36. Q. **Is your firm's software copyrighted?**

A. Yes.

37. Q. **Do you sell or license your software?**

A. Sell.

38. Q. **Is there a license fee?**

A. No; however, there is a required monthly software fee that must be paid for forty-eight (48) months.

39. Q. **What type of licenses are available to your customers – both end users and TTP's?**

A. HP 3000 software (object code) is purchased. It may be copied for archival purposes and backup only.

40. Q. **If an operating system is sysgened on a different system than it is executed on, to which system must it be licensed? a) Sysgen system; b) Execute system; c) Both.**

A. Each HP 3000 System includes the MPE operating system; thus the question is not applicable.

41. Q. **If a compiler is licensed and an application program is prepared on one system but executed on another, to which system must the compiler be licensed? a) Prepare; b) Execute; c) Both.**

A. HP 3000 software is purchased, not licensed. In the above scenario only one copy of the compiler needs to be purchased – for the "Prepare" HP 3000 system.

42. Q. **Is there a fee to execute licensed software on a backup CPU/system?**

A. Purchased HP 3000 software may be copied for archival or backup purposes only. In the above scenario, a buyer may run software on computer "A" and transfer it to computer "B" if and when computer "B" is run to replace computer "A" in a backup capacity. Note that the buyer may not buy one copy of, for example, a compiler to run on both systems. Hewlett-Packard offers software discounts to buyers of multiple systems.

43. Q. Do you offer software discounts if a customer upgrades from one licensed product to another.

A. Not applicable; HP 3000 software is purchased. Hewlett-Packard continually provides owners of HP 3000 Systems with both design error corrections and product enhancements as part of the HP 3000 software support services.

44. Q. Is software under development ever made available to users?

A. No, except for a limited number of test sites immediately prior to introduction.

Software distribution

45. Q. On what media does your firm distribute software? a) Paper tape; b) Cards; c) Cassettes; d) Mini reels; e) Tape cartridges; f) Mag tape (7/9 track); g) Diskettes; h) Disk cartridges (single); i) Disk packs (multi-platter); j) Tele-processing (communications link); k) Other. Specify:

A. f) 9 track magnetic tape.

46. Q. How is your operating system software delivered? a) Executable; b) Object; c) Source.

A. a) Executable.

47. Q. How many copies of related software publications are provided free with the software?

A. One complete set is delivered with the system and updates are sent to the System Manager as part of the software support services.

Initial software installation

48. Q. Is on-site software installation service available?

A. Yes.

48a. Q. If yes, under what arrangement? a) Free or part of license agreement; b) Cost.

A. All HP 3000 software is installed as part of the purchase.

49. Q. Who in your firm performs the software installation? a) Salesman; b) Hardware customer engineer; c) Software engineer; d) Other. Specify:

A. b) Hardware customer engineer.

50. Q. What services are performed during software installation? a) Unpacking; b) Sysgen; c) Backup; d) Education; e) Sample program execution; f) Applications design assistance; g) Application installation; h) Product problem fixing; i) Other. Specify:

A. a), b), c), d), e), g), h), i) — operator and equipment usage training.

51. Q. How many days per month is installation service provided?

A. During all normal working days.

52. Q. Does the software arrive with all known fixes?

A. Yes.

52a. Q. If yes, is it a) Preapplied; b) Ready to apply; c) Separately obtained.

A. a).

53. Q. Is the software warranted?

A.

	W/O Installation Service	W/ Installation
a. Yes/no		yes
b. For how long?	NOT	90 days
c. Starting	APPLICABLE	at installation
d. What service?		full s/w support services

54. Q. What predelivery services are available? What are the associated charges? a) Applications design; b) Data center; c) Applications programming; d) Supervisor modification; e) Other. Specify:

A. a) Systems Engineering Consulting - fee; b) Data Center - limited time at no charge; e) Consulting on numerous topics by HP System Engineers [see HP CUSTOMER SUPPORT FOR HP 3000 SYSTEMS, brochure number 5953-0514, for details] — fee.

Software maintenance

55. Q. **Is software maintenance available?**

    A. Yes.

55a. Q. **If yes, is it included in the software price?**

    A. It is included in the purchase price, but paid monthly.

56. Q. **Is a hardware maintenance contract a prerequisite for software maintenance?**

    A. No.

57. Q. **How many types/levels of software maintenance are available? Describe each.**

    A. The purchase of all HP 3000 software includes full software support services for four years (unless purchased under the prepaid purchase option - includes one year's full support services). At the expiration of the initial support period two levels of support are offered: full support services or the lesser Software Subscription Service. The Software Subscription Service includes: software status bulletins, software updates (installed), and reference manual updates. The full software support service includes those same items plus phone-in consulting for any problems relating to misinterpretation of HP documentation, user application programs, or HP software design errors. It also includes on-site software assistance for resolution of problems associated with HP software, if the problem cannot be resolved over the telephone.

58. Q. **When a user sends in a trouble report, by what means is a fix returned? a) Letter; b) Newsletter; c) Phone; d) On-site aid; e) Other. Specify:**

    A. Hewlett-Packard uses the most expedient method for resolving customer software problems; the methods employed range from a) through d). Typically, the fix is incorporated in the latest version of the software and is installed on all systems by HP Customer Engineers.

59. Q. **From a user's viewpoint, what is the average trouble report turnaround time?**

    A. For MPE (operating system): 6-9 weeks from report to worldwide installation of the fix. Software subsystems: Typical telephone assistance response time is four hours; if on-site assistance is required, the typical response time is 8 working hours. The entire fix turnaround time is 6-9 weeks from report to worldwide installation of the fix.

60. Q. **How many months' lapse is there for: a) Maintenance release; b) New functional version.**

    A. a) 12 weeks (3 months); b) Variable.

61. Q. **Does the user pay for software functional upgrades?**

    A. No.

62. Q. **While supported by a maintenance agreement for a typical operating system, what does a user automatically receive from the firm? Specify:**

    A. The user will receive the full support services outlined in question **57.**

63. Q. **What must a user do to receive a new version or release of a product to which he is licensed?**

    A. Hewlett-Packard sells software for the HP 3000; all HP 3000 customers covered under software support services automatically receive all design error corrections and enhancements.

64. Q. **For how many months may a user be covered by a maintenance contract after a new release/version is available if he does not upgrade?**

    A. Hewlett-Packard supports all software products for five years after a product is removed from active sales.

65. Q. **What types of on-site assistance/maintenance area available?**

    A. A Hewlett-Packard Systems Engineer will assist the System Manager in verifying, isolating, and resolving any problems associated with the HP software purchased for the site.

66. Q. **Who would perform this on-site software service? a) Salesman; b) Hardware customer engineer; c) Software engineer; d) Other. Specify:**

A. c) HP Systems Engineer. The HP Customer Engineer will be involved if system is halting or running intermittently.

67. Q. **What is the fastest way for a user who has a software bug to find out if a fix is available? Specify:**

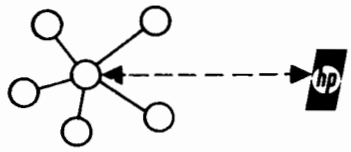
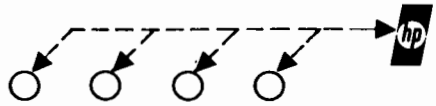
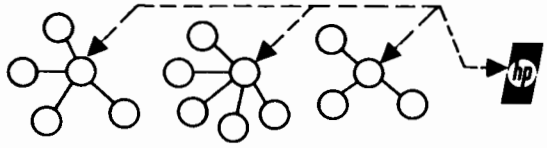
A. All customers receive semi-monthly copies of the Software Status Bulletin. If the design error is not documented the customer can call the local Systems Engineer Organization for phone-in consulting assistance as part of his full software support services.

68. Q. **If an on-site software maintenance contract is offered, what are the contractual response times (hours/days)?**

A. The typical on-site response time is within 8 working hours for the investigation, verification, and reporting of HP software design errors after phone-in consulting did not resolve the problem.

69. Q. **If a user has multiple licenses for the same software product, which of the following are available? a) Maintenance price discount for each department; b) A central maintenance plan whereby the user maintains a single vendor liaison.**

A. a); b), and a combination of the two (Note: HP 3000 software is purchased, not licensed):

SOFTWARE SUPPORT CONTACTS	DESCRIPTION
SINGLE	
MULTIPLE	
COMBINATION	

Legend: ◯ = Customer HP3000 System hp = HP SE Support

Software education

70. Q. **Does your firm offer software education?**

A. Yes.

70a. Q. **If yes, how is it paid (fee, credit with license, etc.)?**

A. Hewlett-Packard offers a variety of training courses which are available on a tuition basis and may be ordered from an HP Sales Representative. In addition to courses offered at the HP Training Centers, trained Hewlett-Packard instructors can provide classes at a customer's site.

70b. Q. If yes, at how many locations, how frequently, and at what level of detail?

A. HP 3000 training courses are taught at Training Centers in Santa Clara, California; Rockville, Maryland; and several locations overseas, as well as at a customer's site. For course availability, consult your local HP Sales Representative. Courses are designed for personnel ranging from neophytes to the HP 3000 to sophisticated OEM system programmers.

User groups

71. Q. Do your customers have a user group?

A. Yes, the HP 3000 Users Group.

72. Q. Is there a membership fee?

A. Yes - either for an HP 3000 site or an individual.

73. Q. Does your user group hold regular meetings?

A. Yes; they are documented in the JOURNAL OF THE HP 3000 USERS GROUP.

73a. Q. If yes, how many per year? a) National; b) Regional; c) Local.

A. a) One international meeting (several days) per year; b) and c) - several, depending upon the location.

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HEWLETT-PACKARD
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5951-6111	COMMUNICATOR 1000	_____	$48.00	_____	
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	TOTAL DOLLARS for 5951-6111				_____
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	TOTAL DOLLARS for 5951-6112				_____
5951-6113	COMMUNICATOR 3000	_____	48.00	_____	
	(if quantity is greater than 1 discount is 40%)			_____	
	TOTAL DOLLARS for 5951-6113				_____

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		_____	_____	10.00	_____	
		_____	_____	10.00	_____	
	TOTAL DOLLARS					_____
5951-6112	COMMUNICATOR 2000	_____	_____	$ 5.00	_____	
		_____	_____	5.00	_____	
		_____	_____	5.00	_____	
	TOTAL DOLLARS					_____
5951-6113	COMMUNICATOR 3000	_____	_____	$10.00	_____	
		_____	_____	10.00	_____	
		_____	_____	10.00	_____	
	TOTAL DOLLARS					_____
TOTAL ORDER DOLLAR AMOUNT						_____

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The following instructions are for customers who do not have Software Service Contracts.

1. Complete name and address portion of order form.
2. For new direct subscriptions (see sample below):
   a. Indicate which COMMUNICATOR publication(s) you wish to receive.
   b. Enter number of copies per issue under Qty column.
   c. Extend dollars (quantity x list price) in Extended Dollars column.
   d. Enter discount dollars on line under Extended Dollars. (If quantity is greater than 1 you are entitled to a 40% discount.*)
   e. Enter Total Dollars (subtract discount dollars from Extended List Price dollars).

   **To qualify for discount all copies of publications must be mailed to same name and address and ordered at the same time.*

SAMPLE

☒ **DIRECT SUBSCRIPTION**

Part No.	Description	Qty	List Price	Extended Dollars	Total Dollars
5951-6111	COMMUNICATOR 1000	3	$48.00	$144.00	
	(if quantity is greater than 1 discount is 40%)			57.60	
	TOTAL DOLLARS for 5951-6111				$86.40

3. To order back issues (see sample below):
   a. Indicate which publication you are ordering.
   b. Indicate which issue number you want.
   c. Enter number of copies per issue.
   d. Extend dollars for each issue.
   e. Enter total dollars for back issues ordered.

   All orders for back issues of the COMMUNICATORS are cash only orders (U.S. dollars only) and are subject to availability.

SAMPLE

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(subject to availability)

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		XX	2	10.00	20.00	
				10.00		
	TOTAL DOLLARS					$30.00

4. Domestic Customers: Mail the order form with your U.S. Company Purchase Order or check (payable to Hewlett-Packard Co.) to:

   HEWLETT-PACKARD COMPANY
   Computer Systems COMMUNICATOR
   P.O. Box 61809
   Sunnyvale, CA 94088
   U.S.A.

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