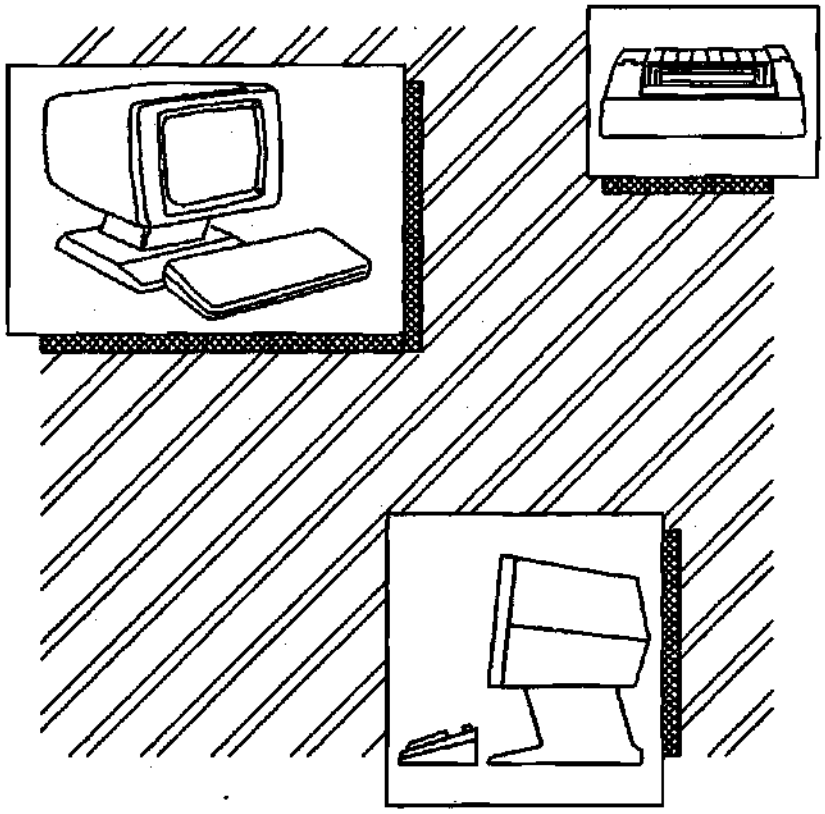
North American Response Centers

HP 3000 APPLICATION NOTE

TERMINAL TYPES

for HP 3000 HPIB computers



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Terminal Type 4

This terminal type is supported with device type 16 only on MPE IV and MPE V/P ADCC and ATC ports. It is used for HP2600A or Datapoint 3300 keyboard display terminals at (10,15,30,60,120,240 cps).

Flow Control:	XON/XOFF with timer disabled
Block Mode:	not supported
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	Initial echo on, linefeed accepted during input data, linefeed character replaces formfeed in output data, system response to a backspace is an end-of-marker character, 7 databits recognized.
Printer Control:	None.
Considerations:	This terminal type is rarely seen as the devices requiring it are quite archaic. If used on MPE V/E or above there is a delay protocol that has been added which will cause the display output to pause for .3 seconds at every linefeed.

Terminal Type 6

This terminal type is supported with device type 16 on MPE IV and MPE V ATC, ADCC and ATP ports. It is used for HP2762 A/B (General Electric terminet 300 or 1200), or Data Communications terminal model B at (10,15,30,120 cps) with paper tape reader/punch, option 2. Note: this terminal must be equipped for echoplex.

Flow Control:	XON/XOFF with timer disabled. On MPE V/E and above there is a delay protocol of .3 seconds for line feeds and form feeds.
Block Mode:	not supported.
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	Initial echo on, linefeed accepted during input data, form feed allowed in output data, system response to a backspace is a linefeed character. 7 databits recognized. A DC3 character is output after each linefeed.
Printer Control:	none.
Considerations:	Watch out for delay protocol for this termtype. On termtype 6 the ADCC actually outputs 45 NUL's after a carriage return or linefeed at 240 cps.

Terminal Type 9

This terminal type is supported with device type 16 on mpe IV and MPE V ATC, ADCC and ATP ports. It is used for the old HP2615 Beehive Mini Bee. It is also widely used for foreign terminals which do not use enq/ack flow control or block mode.

Flow Control:	XON/XOFF with timer disabled. On MPE V/E and above there is a delay protocol of .3 seconds for linefeeds and formfeeds.
Block Mode:	not supported
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	Initial echo on, line feed accepted as input data, formfeed allowed in output data, no system response to a backspace, 7 databits recognized.
Printer Control:	none
Considerations:	Because of the delay protocol used with V/E and above operating systems this terminal type is infeasible for foreign terminals. The symptoms are a very sluggish terminal (.3 seconds line feed delay). Terminal type 18 does not use this delay protocol and is generally recommended for foreign terminal applications.

Terminal Type 10

This terminal type is supported with device type 16 on all versions of MPE for any asynchronous port. It is used for HP terminals and devices including the 264x,262x and 239x families of terminals as well as the HP 150. This terminal type is also used on foreign terminals which emulate HP's enq/ack protocol and block mode data transmission. These include the Direct 825 and 1025.

Flow Control:	ENQ/ACK with time out transmission after 10 seconds. XON/XOFF with timer disabled.
Block Mode:	Enabled for line and page block mode. Alert character is a DC2, trigger character is a DC1.
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard Control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	initial echo on, linefeed accepted as input data, no system response to backspace, 7 databits recognized.
Printer Control:	none
Considerations:	If a non HP terminal is configured with termtype 10 the computer will send an ENQ character but the terminal will not respond so only 80 characters are printed every 10 seconds.

Terminal Type TT10NOEC

This terminal type is supported with device type 16 starting with MPE T-DELTA 4 (G.01.04) and U-MIT (G.A2.00). It is used for HP terminals and devices including the 264X, 262X, and 239X families of terminals.

This terminal type fixes problems with ADCC ports in regards to "ESC" character processing and echo. Some full screen applications, such as HPSLATE, which read a lot of escape sequences, can display garbage on the screen. With TT10NOEC, the escape character is not treated as a special character by the ADCC software. Character echo will be done by software instead of ADCC hardware. Since the escape character is no longer recognized by ADCC software, the "ESC;" and "ESC:" commands to turn echo off and on will no longer work. Two programs are supplied to perform these functions: ECHOON.PUB.SYS and ECHOOFF.PUB.SYS.

This terminal type must not be used with ATP ports.

Flow Control:	ENQ/ACK with time out transmission after 10 seconds. XON/XOFF with timer disabled.
Block Mode:	Enabled for line and page block mode. Alert character is a DC2, trigger character is a DC1.
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard Control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	initial echo on, linefeed accepted as input data, no system response to backspace, 7 databits recognized.
Printer Control:	none
Considerations:	If a non HP terminal is configured with termtype TT10NOEC the computer will send an ENQ character but the terminal will not respond so only 80 characters are printed every 10 seconds.

Terminal Type 12

This terminal type is supported with device type 16 on all versions of MPE for any asynchronous port. It is used for native language extended characters sets on HP terminals over ATC ports and for the HP2645 Katakana/Roman data terminal. The only difference between this terminal type and termtype 10 is that termtype 12 expects 8 data bits where termtype 10 expects 7.

Flow Control:	ENQ/ACK with time out retransmission after 10 seconds. XON/XOFF with timer disabled.
Block Mode:	enabled for line and page block mode. alert character is a DC2. Trigger character is a DC1.
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	initial echo on, linefeed accepted as input data, formfeed allowed in output data, no system response to backspace, 8 data bits with no parity.
Considerations:	HP terminals on ATP ports or ADCC ports must be configured for parity=none, chk parity=no and data bits=8 when used for NLS/3000 on termtype 10.

Terminal Type 13

This terminal type is supported with device type 16 on all versions of MPE for any asynchronous port. It is used for message switching networks or communication with other computers where echo is not desired. It is also common on a 2601A printer although termtype 18 is recommended.

Flow Control:	XON/XOFF with timer disabled
Block Mode:	line and page block mode with alert character DC2 and trigger character DC1
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	initial echo off, linefeed accepted as input data, formfeed allowed in output data, no system response to a backspace, 7 data bits , none or zeros parity
Printer Control:	none
Considerations:	HP2601A and 2602B printers frequently use this termtype however the block mode and echo are not needed and termtype 18 will work fine. This terminal type is often used over Telenet and Tymnet networks where the user would be charged for those echoed characters.

Terminal Type 14

This terminal type is used by HP MTS terminals which use synchronous data transmission over an INP. It will not work over any asynchronous controller although it does have the same characteristics as termtype 10.

Flow Control:	ENQ/ACK with time out transmission after 10 seconds. XON/XOFF with timer disabled.
Block Mode:	enabled for line and page block mode. alert character is a DC2, trigger character DC1
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	none
Considerations:	Terminals running on MTS are the only devices using this terminal type. MTS terminals connected to a 2333a cluster controller will use termtype 10 however.

Terminal Types 15 & 16

These terminal types are supported on MPE IV and MPE V over any asynchronous controller. They are grouped together because they are both used for the same single device, the 2635 printing terminal. The difference being that terminal type 15 is used for 8 bit data transmission needed for NLS/3000 or other extended character sets.

Flow Control:	ENQ/ACK, XON/XOFF with timer disabled.
Block Mode:	not supported
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	initial echo on, linefeed accepted during input data, linefeed replaces formfeed in output data, system response to a backspace is an line feed character, 7 data bits bits for termtype 16 and 8 data bits for terminal type 15.
Considerations:	As of MPE V/E Block Mode has been removed from termtype 15 and 16. Terminals configured with this termtype that use block mode must be reconfigured to a supported block mode termtype like 10 or 12.

Terminal Type 18

This terminal type is supported with device types 16 & 32 on all versions of MPE for any asynchronous port. It is used for all foreign terminals that do not use ENQ/ACK and printers with less intelligent controllers. It is not supported spooled.

Flow Control:	XON/XOFF with timer disabled.
Block Mode:	not supported.
Read Trigger:	NUL
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	initial echo on, linefeed accepted during input data, formfeed allowed in output data, no system response to a backspace, 7 data bits recognized.
Printer Control:	none
Considerations:	This terminal type is considered the "plain vanilla" terminal type used with foreign devices and some HP devices. Terminal type 18 is not supported for spooled printers because no status checking is done for possible printer problems. Status checking is the printer control HP uses to stop and save an active spoolfile when a condition such as "paper out" occurs. Status checking will also print a message at the console indicating what the problem may be. Printers requiring this terminal type do not have the firmware to respond to status checking.

Terminal Type TTPCL18

This terminal type is supported with device type 32 on MPE V/E ,T-MIT and above operating systems which allow user defined terminal types created with the workstation configurator. It is shipped on MPE V T-MIT and above installation tapes. It has been designed to provide enhanced control for printers that do not use termtype 19 or 21. It also can be used for extended character printing or used over a multiplexer.

Flow Control:	XON/XOFF with 60 second timer enabled upon receipt of each XOFF. If an XON is not received in 60 seconds a message is displayed on the console and the CPU continues to wait for the XON.
Block Mode:	not supported
Read Trigger:	NUL
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	initial echo on, formfeed allowed in output data, linefeed accepted as input data, no system response to backspace, 8 data bits no parity.
Printer Control:	Printer initialization to hard reset, disable display functions mode and turn on auto perf-skip.
Considerations:	Because of the 60 second timer and the added printer initialization this should be a desired terminal type for HP printers currently on termtype 18. This terminal type is also recommended for HP printers over a multiplexer when higher throughput is desired. Increased throughput is achieved by the elimination of printer status checking.

Terminal Type TT18NOEC

This terminal type is supported with device type 16 starting with MPE T-DELTA 4 (G.01.04) and U-MIT (G.A2.00). It is used for HP terminals and devices including the 264X, 262X, and 239X families of terminals.

This terminal type fixes problems with ADCC ports in regards to "ESC" character processing and echo. Some full screen applications, such as HPSLATE, which read a lot of escape sequences, can display garbage on the screen. With TT18NOEC, the escape character is not treated as a special character by the ADCC software. Character echo will be done by software instead of ADCC hardware. Since the escape character is no longer recognized by ADCC software, the "ESC;" and "ESC:" commands to turn echo off and on will no longer work. Two programs are supplied to perform these functions: ECHOON.PUB.SYS and ECHOOFF.PUB.SYS.

This terminal type must not be used with ATP ports.

Flow Control:	XON/XOFF with timer disabled.
Block Mode:	not supported.
Read Trigger:	NUL
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	initial echo on, linefeed accepted during input data, formfeed allowed in output data, no system response to a backspace, 7 data bits recognized.
Printer Control:	none
Considerations:	This terminal type is considered the "plain vanilla" terminal type used with foreign devices and some HP devices. Terminal type 18 is not supported for spooled printers because no status checking is done for possible printer problems. Status checking is the printer control HP uses to stop and save an active spoolfile when a condition such as "paper out" occurs. Status checking will also print a message at the console indicating what the problem may be. Printers requiring this terminal type do not have the firmware to respond to status checking.

Terminal Type TT18PLUS

This terminal is supported with device type 32 beginning with TDELTA 4 (G.01.04) and U-MIT (G.A2.00). It was not released with MPE but is available with an ATP/ADCC patch.

This terminal type fixes a problem with ATP firmware XON/XOFF processing with terminal type 18. If a XON follows a XOFF too closely, the ATP firmware may miss the XON which will cause the port to hang. This senario can happen with printers connected to the 3000 via multiplexers. TT18PLUS will cause the XON/XOFF handshake to be done in software instead of ATP firmware.

This terminal must not be used with ADCC ports.

Flow Control:	XON/XOFF with timer disabled.
Block Mode:	not supported.
Read Trigger:	NUL
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	initial echo on, linefeed accepted during input data, formfeed allowed in output data, no system response to a backspace, 7 data bits recognized.
Printer Control:	none
Considerations:	This terminal type is considered the "plain vanilla" terminal type used with foreign devices and some HP devices. Terminal type TT18PLUS is not supported for spooled printers because no status checking is done for possible printer problems. Status checking is the printer control HP uses to stop and save an active spoolfile when a condition such as "paper out" occurs. Status checking will also print a message at the console indicating what the problem may be. Printers requiring this terminal type do not have the firmware to respond to status checking.

Terminal Type 19

This terminal type is supported with device type 32 on all versions of MPE for any asynchronous port. It is used for HP spooled printers that have more intelligent controllers including the 256X, 263X and 293X printer families.

Flow Control:	XON/XOFF with timer disabled
Block Mode:	not supported
Read Trigger:	DC1 character (XON character)
Special Characters:	standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL
Terminal Control:	initial echo on, formfeed allowed in output data, linefeed accepted in input data, no system response to a backspace, 7 data bits odd parity.
Printer Control:	Printer initialization to disable display functions, enable HP terminal mode, turn off underlining, set ROM1 to second character set, set ROM2 to primary character set, set pitch at 10.0, set line spacing at 6 lines per inch, clear horizontal tabs, set right margin, set left margin, slew 1 line at line feed, turn on auto perf-skip, disable char set selection control.
Considerations:	Termtype 19 sends a status request to the printer when the printer is opened, at the end of every line and when the port receives an XOFF character. This status request checks for printer online, paper and transmission errors. If the printer does not reply within 10 seconds a spoolee I/O error is encountered and the printer will stop spooling. If the printer is remote and a multiplexor is used, the status request may not always return within 10 seconds. Termtype 21 does not generate a status request at the receipt of an XOFF. Instead a 60 second timer is started and if an XON is not received in that time a "device not ready" message is displayed and the spooler will continue to wait for the XON.

Terminal Type TTPCL19

This terminal type is supported with device type 32 on MPE V/E , T-MIT and above operating systems which allow user defined terminal types created with the workstation configurator. It is shipped on MPE V T-MIT and above installation tapes. It is used for HP direct connect and remote spooled printers such as the 256X and 293X printers. The difference between this termtype and termtype 19 is that this one contains less printer initialization. This makes it simpler for the user or programmer to select desired printer settings.

Flow Control:	XON/XOFF with timer disabled
Block Mode:	not supported
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL
Terminal Control:	initial echo on, formfeed allowed in output data, linefeed accepted in input data, no system response to a backspace, 7 data bits odd parity
Printer Control:	Printer initialization to hard reset, disable display functions mode, enable auto perf-skip
Considerations:	TTPCL19 contains the same status checks as termtype 19. Because there are no control sequences to tell the printer what column to start in, what line spacing to use, what slew should be used, what pitch or character set the printer should have, the printer can be set directly thus giving users more flexibility and control.

Terminal Type 20

This terminal type is supported with device type 32 on MPE V/E , T-MIT and above operating systems using ADCC or ATP controllers. It is used for HP printers such as the 256X, 263X and 293X series printers where 8 data bits are required. It is not supported as a remote printer termtype.

Flow Control:	XON/XOFF with timer disabled
Block Mode:	not supported
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF if handshake disabled, subsystem break if disabled, NUL, DEL.
Terminal Control:	initial echo on, form feed allowed in output data, linefeed accepted in input data, no system response to a backspace, 8 data bits no parity.
Printer Control:	Printer Initialization to disable display functions mode, enable HP terminal mode, turn off underlining, set ROM1 to secondary character set, set ROM2 to primary character set, set pitch to 10.0, set line spacing to 6 lines per inch, clear horizontal tabs, set right margin, set left margin, hard reset, slew 1 line at line feed, turn on auto perf-skip, enable char set selection control.
Considerations:	Termtype 20 is used primarily for NLS/3000 where 8 databits are required. Other than this it is the same as termtype 19 with status requests sent after each line feed and XOFF.

Terminal Type 21

This terminal type is supported with device type 32 on MPE V/E, T-MIT and above operating systems using ADCC or ATP controllers. It is used for HP printers such as the 256X, 263X and 293X series spooled printers. Its primary use is to allow the use of embedded printer control escape sequences in the data which may cause errors with termtype 19 because of status checks after each XOFF.

Flow Control:	XON/XOFF with 60 second timer upon receipt of each XOFF. If XON is not received in 60 seconds a message is displayed at the console and the CPU continues to wait for a XON
Block Mode:	not supported
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL
Terminal Control:	initial echo on, formfeed allowed in input data, linefeed accepted in input data, no system response to a backspace, 7 data bits odd parity
Printer Control:	Printer initialization to hard reset, disable display functions mode, enable HP terminal mode, turn off underlining, set ROM1 to secondary character set, set ROM2 to Primary character set, set print pitch to 10.0, set line spacing at 6 lines per inch, clear horizontal tabs, set right margin, set left margin, slew 1 line at line feed, turn on auto perf-skip, disable character set selection control.
Considerations:	This terminal type enables you to insert printer control escape sequences into data. If this is done using terminal type 19 a printer error may occur if a status request, as a result of an XOFF, is sent in the middle of the embedded escape sequence. Terminal type 21 is also useful in remote applications where a status request may not be answered in less than 10 seconds which causes a spoolee I/O error. This is typically seen when the printer is remote and passes through a statistical multiplexor. Termtype 21 does not send status requests after XOFF's.

Terminal Type 22

This terminal type is supported with device type 32 on MPE V/E, T-MIT and above operating systems using ADCC or ATP controllers. It is used for HP direct connect printers such as the 256X, 263X and 293X series spooled printers where 8 data bits are required. It also allows embedded printer control escape sequences as it does not do status checks after each XOFF. It is not supported remotely.

Flow Control:	XON/XOFF with 60 second timer enabled upon receipt of each XOFF. If an XON is not received in 60 seconds a message is displayed on the console and the CPU continues to wait for the XON.
Block Mode:	not supported
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL
Terminal Control:	initial echo on, formfeed allowed in input data, no system response to a backspace, 8 data bits no parity.
Printer Control:	Printer initialization to disable display functions mode, enable HP terminal mode, turn off underlining, set ROM1 to secondary character set, set ROM2 to primary character set, set pitch to 10.0, set line spacing to 6 lines per inch, clear horizontal tabs, set right margin, set left margin, slew 1 line at line feed, turn on auto perf-skip, enable char set selection control.
Considerations:	This terminal type is used for NLS/3000 or extended character sets where embedded printer control will be used. It is also highly recommended for 2631B or 293x printers over a statistical multiplexer.

Terminal Type TTPCL22

This terminal type is supported with device type 32 on MPE V/E, T-MIT and above operating systems which allow user defined terminal types created with the workstation configurator. It is shipped on MPE V T-MIT and above installation tapes. It is used for HP direct connect printers that need termtype 20 or 22 but without any undesirable printer initialization.

Flow Control:	XON/XOFF with 60 second timer enabled upon receipt of each XOFF. If an XON is not received in 60 seconds a message is displayed on the console and the CPU continues to wait for the XON.
Block Mode:	not supported
Read Trigger:	DC1 character (XON character)
Special Characters:	Standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL
Terminal Control:	initial echo on, form feed allowed in output data, linefeed accepted as input data, no system response to a backspace, 8 data bits no parity.
Printer Control:	Printer initialization to hard reset, disable display functions mode, enable auto perf-skip
Considerations:	TTPCL22 contains the same characteristics as termtype 22 except for printer initialization. The printer control on TTPCL22 allows users to set characteristics directly thus allowing more flexibility and control.

Terminal Type 24

This terminal type is used for X.25 PAD (Packet Assembler/Disassembler) access on versions of X.25 software beginning with B.01.00. It is used for VPLUS applications with 2622A, 2623A, 2624B (with the proper ROM versions), 2625A, 2627A, 2628A, 239X, and 150 terminals.

Flow Control:	Both the X.25 PAD and the HP terminal should be set to XON/XOFF flow control.
Block Mode:	VPLUS applications only. There is NO DC2 alert or DC1 trigger.
Read Trigger:	none
Special Characters:	Standard control characters for backspace, cancel, end-of-record, and subsystem break. Note that these characters may have significance to the X.25 PAD.
Terminal Control:	Is controlled by the X.25 PAD. Echo is done by the PAD and initially set on by X.25 software.
Printer Control:	none
Considerations:	Terminal type 24 is recognized only by the IOPADO driver for X.25 PAD access.

Terminal Type 31

This terminal type is supported with device type 16 on all versions of MPE for ADCC and ATP controllers. This is the default terminal type that is used if the I/O configuration contains an invalid terminal type name or file. It is the same as termtype 18 except for system response to a backspace which is a slash character.

Flow Contol:	XON/XOFF with timer disabled
Block Mode:	not supported
Read Trigger:	NUL
Special Characters:	standard control characters for HP terminals are used. These include control sequences for console attention, backspace, cancel, end-of-record and subsystem break.
Stripped Characters:	XON/XOFF characters if handshake disabled, subsystem break if disabled, NUL, DEL
Terminal Control:	initial echo on, linefeed accepted during input data, formfeed allowed in output data, system response to a backspace is a slash character, 7 data bits recognized
Printer Control:	none
Considerations:	If users ever complain of a backslash appearing every time they hit the backspace key remember that you probably have an invalid terminal type name or file.

User Defined Terminal Types

User defined terminal types are supported on MPE V/E, T-MIT and above operating systems on ADCC and ATP terminal controllers. They are created by a local area office or buy purchasing the workstation configurator, (ttutil.pub.sys). This product is used to create any desired terminal type characteristic. This can be flow control, block mode support, read trigger, special characters etc... . The most useful advantage however is probably vertical forms control. Different VFC files can be set up to initialize printers in different ways.

With the workstation configurator different VFC files can be used with any given output file using the ENV parameter of the file equation. This enables users to send any valid escape sequence to the device at spoolfile initialization. These escape sequences can posistion the cursor, define the character set, set up line spacing, pitch, slew etc... It also allows the same port to be used in a number of different ways without reconfiguring.

With different devices coming out, the workstation configurator will allow users to easily modify termtype characteristics suited to a particular device. In the past new devices were introduced with options that were not available because of the terminal type needed to make the device work. The workstation configurator has been helpful in instantly creating a terminal type that will allow all device characteristics to be used.

Considerations:

Workstation Configurator termtype files will show up with 2 question marks in the assigned termtype field of a sysdump listing. Make sure a record of the current termtype exists.

Problems may occur with Workstation Configurator files used with terminals running applications such as Deskmanager or Slate. These products do a fcontrol to find out the terminal type and are returned a 0 because a Workstation Configurator terminal type file is not expected. Because a 0 is returned, Slate and Desk think they are being run on a dumb terminal and may not work if the application is block mode.

Glossary

Backspace Response:

When a backspace is entered the previous character is deleted from the input stream. Different devices expect slightly different codes to perform this action and cause the desired effect. Most commonly, the system response to a backspace is nothing. With the workstation configurator you may also erase the character you backspace to.

Some devices require the end of medium character to move the display cursor back. Hard copy terminals generally require a line feed to move the print head one space down so data is not overprinted. For devices which can not physically move the print head backward an option is available in which the driver responds to each backspace by sending a slash character followed by the character deleted which will then give the user some idea of how many characters have been deleted.

Block Mode:

Block Mode is a method of transferring data from the terminal to the computer. Instead of sending each character as it is typed, the terminal buffers a line or more of data and sends the entire block when the user has pressed ENTER. With the Workstation Configurator you have the ability to specify the type of block mode supported along with defining the alert and block trigger characters.

Delay Protocol:

The delay protocol is a method of control intended for printers where the print head has to physically return when a line feed or form feed is encountered. The extra time required for this physical movement of the print head may result in data overrun or overprinting unless the delay protocol is added. With the workstation configurator the delay flow control and delay time variable are optional.

Echo:

When the terminal is in remote mode, in character mode, and local mode is disabled, characters typed on the keyboard are not placed in the display by the terminal. The computer must echo (or send back to the terminal) each character as it is received. When it is desired that the characters typed not be displayed , such as when entering a password, echo may be disabled.

Enquiry/Acknowledge:

The ENQ/ACK protocol is a flow control method that is controlled by the driver. When writing data to the terminal, the driver breaks the data into blocks. After each block has been written, the driver sends an enquiry character to the device and waits for an acknowledge character to come back to the computer. When the device sees the enquiry character it responds with the acknowledge character if it can accept the next full block of data. If not, the device waits until it can accept the next block with an acknowledge. With the Workstation Configurator the device can be configured so the CPU will send another block

or another enquiry if no acknowledge is received within the 10 second time out.

Flow Control:

Flow Control is the method by which the flow of data between the computer and the terminal device may be controlled so as to avoid sending data faster than the receiver can handle it. ENQ/ACK, XON/XOFF, delay, read trigger and block mode reads are various methods of handling flow control on a HP 3000 asynchronous port.

Form Feed in Output:

Some devices do not recognize and act upon the formfeed character in a useful manner. One of the terminal type characteristics available specifies that each form feed character in the outgoing data stream may be replaced with a different character. Usually this is the line feed character.

Line Feed in Input:

Some devices do not provide an automatic wraparound when typing characters beyond the end of a display line. Without the wraparound, typing at the end of the line places each character upon all previously typed characters in the last position of the display line. To resolve this problem the linefeed character may be selected as a special character. Receipt of the linefeed character causes the HP 3000 to echo the line feed, write a carriage return character to the terminal and remove the line feed character from the input data.

Parity:

Parity is a means of verifying that data is transmitted between the terminal and computer without error. These bits may all be used for the character code (with 256 possible character codes available), or seven bits used for the character code (allowing 128 characters) and the eighth bit used as a parity bit.

If seven data bits are used there are 4 possible parity settings: force to 0 where the parity bit is always 0, force to 1, odd or even parity where the parity bit is set to either 0 or 1 so that the total number of 1 bits in the eight bit character is either even or odd depending on the parity type enabled.

Printer Control:

When a printer is shared among users each user may want to use the printer in a different way and consequently alter the settings on the printer by direct changes or escape sequences. The user may change characteristics such as margins, tabs, print density and pitch thus affecting the next user who does not neccesarily want those choices of characteristics.

To prevent 1 user from affecting the next user, the printer must be initialized to a default known state before printing the next job. When the device open occurs on a type 32 device, the port controller software writes an initialization character string to the device. This string is determined by the currently active terminal type.

Read Trigger:

The read trigger is used to tell the terminal device when it should start to send characters to the HP 3000. In other words, it is a method of preventing a device from sending input characters before the HP 3000 is ready to accept them. Once the HP 3000 sends the read trigger character, input can proceed.

Special Characters:

There are several characters which have special significance to the terminal driver. These characters cause the driver to take special actions. With the Workstation Configurator, you are able to define the characters that cause each of the following special actions: console attention, backspace, cancel, end-of-record and subystem break.

Stripped Characters:

With the Workstation Configurator, you are able to define a set of characters which have no special function other than to be removed from the input data. When these characters are typed, they are ignored and do not show up in the data read. For example, if the XON/XOFF flow control is not enabled, then one of the terminal type options allow you to specify that XON and XOFF be stripped from input. if a subsystem break character is entered when subsystem breaks are not enabled, the character may be removed from the input stream. If the console attention character is entered from a terminal which is not the console, it may be ignored or treated as a data character.

Terminal Control:

There are several characteristics which allow you to have some control over the terminal. With the Workstation Configurator you are able to control each of the following terminal type characteristics: Echo, Line feed during input, Formfeed during output, backspace response and parity.

Vertical Formats:

Many printers allow the use of Vertical Format Control (VFC). VFC allows a programmer to instruct a printer to skip to predetermined lines on page with certain carriage control directives instead of counting and outputting a number of blank lines.

With the Workstation Configurator, each VFC character sequence (up to a maximum of 16 characters each) may be defined. When one of the VFC carriage controls is used (%300 to %317), the driver generates the character sequence necessary to move the printer carriage to the proper channel. For further information on Vertical Format Control, refer to the "MPE V System Operation and Resource Management Manual".

XON/XOFF Protocol:

In contrast to the other methods, this is controlled by the terminal device. The driver sends data to the device in a continuous stream. If the device can no longer accept data (because of being put offline, filling its buffer, running out of paper, etc.), it sends the XOFF character to the driver. The driver then stops sending data to the device. When the device is able to accept data again, it sends the XON character to the driver and the driver resumes data transmission to the device.

With the Workstation Configurator, you can specify if a timer should be started when the XOFF character is received. If a timer is started and the timer expires before the XON character is received, a message is printed on the console stating that the device is offline. The timer duration can be specified from one to 255 seconds.