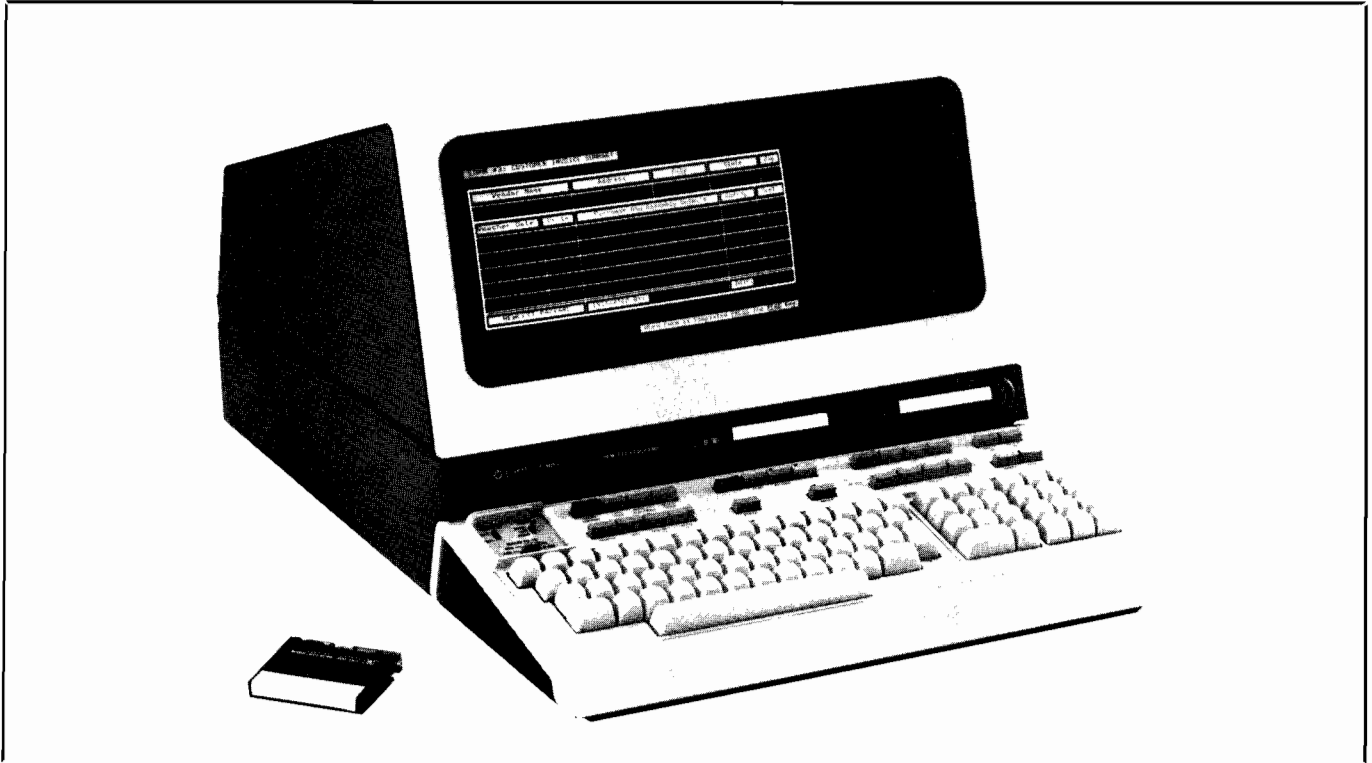




2645A Display Station System Considerations

Application Note

NOTE: This information is for reference only. For 2645A operation on HP systems consult your local Sales Representative.



The 2645A Display Station has features and data communications capabilities designed to be compatible with a variety of systems. The operating modes of the 2645A break down into two groups:

| | |
|--|------------|
| CHARACTER MODE/ TELETYPE COMPATIBLE | BLOCK MODE |
|--|------------|

The purpose of this note is to show the character mode/teletype compatible user how to take advantage of the 2645A Display Station with a minimum of software modifications.

First, a brief description of the 2645A's data communications capabilities.

CHARACTER MODE/TELETYPE COMPATIBLE OR BLOCK MODE

CODE: ASCII

TRANSMISSION: Serial, Asynchronous, RS232C
(optional 20ma current loop)

MODEM SUPPORT: Full Duplex – 103A

Half Duplex – 202C, S, T

Main Channel: <STX> data <ETX>
data <ETX>
data <EOT>

Secondary Channel

BAUD RATE: 9600 baud maximum

PARITY: Vertical Redundancy Check – EVEN, ODD, or NONE

CHARACTER MODE/TELETYPE COMPATIBILITY

The user of character mode/teletype compatible terminals is probably interested in which 2645A features can be used without system software modifications. These are usually related to speed, display storage, or cartridge storage and can often be demonstrated on a first time hook-up. Some of these features (such as off-screen storage) are completely transparent to the user and the system, and others (such as cartridge data capture) are available to the user via the GREEN and GOLD keys.

Table 1 lists these features, their use, cautions, solutions to potential problems, and escape codes for use under computer control. Additional features such as video enhancements can be generated from the system by including the appropriate codes in a PRINT statement (or its equivalent). For example:

```
10 PRINT "EcHEcJEc&a12r40CEc&dB2645A"
20 END
```

will clear the screen, and display 2645A in inverse video in row 12 beginning in column 40.

Table 1. Character Mode/Teletype Compatible

| FEATURE | HOW TO USE | CAUTIONS | SOLUTIONS | ESCAPE CODES |
|--|---|--|--|---|
| 9600 BAUD | SET BAUD RATE SWITCH TO 9600. MAKE SURE SYSTEM IS SET TO RUN AT 9600 BAUD. | 2645A MAY NEED DELAYS AFTER CONTROL CODES OR ESCAPE SEQUENCES. | <ul style="list-style-type: none"> • LOWER BAUD RATE • FILL CHARACTERS • SOFTWARE HANDSHAKE (ENQ, ACK) • HARDWARE HANDSHAKE (13260B) | -- |
| OFF-SCREEN STORAGE | ROLL UP/DOWN NEXT/PREV PAGE HOME UP/DOWN | -- | -- | ESC S/ESC T ESC U/ESC V ESC H/ESC F |
| ENTER KEY | POSITION CURSOR TO SELECTED LINE. ENTER TRANSMITS CONTENTS OF LINE (WITH NO PROTOCOL REQUIREMENTS). | SYSTEM MAY NOT BE DESIGNED TO ACCEPT BLOCKS OF CHARACTERS. | <ul style="list-style-type: none"> • USE SLOWER BAUD RATE. (MOST SYSTEMS CAN HANDLE 1 LINE TRANSMITTED AS A BLOCK). | ESC d |
| RECORDING DATA FROM SYSTEM ON MINI CARTRIDGE | SELECT CARTRIDGE AS DESTINATION USING GOLD KEY. TYPE SYSTEM OUTPUT COMMAND, PRESS RECORD, AND PRESS RETURN. | SYSTEM MAY OUTPUT DATA FASTER THAN 2645A CAN COPY TO MINI CARTRIDGE. | <ul style="list-style-type: none"> • LOWER BAUD RATE • FILL CHARACTERS • SOFTWARE HANDSHAKE (ENQ, ACK) • HARDWARE HANDSHAKE (13260B) | data ESC&pW L _f |
| READING DATA FROM MINI CARTRIDGE TO SYSTEM | SET CARTRIDGE AS SOURCE USING GOLD KEY. PRESS READ ^c . | SYSTEM MAY NOT BE ABLE TO ACCEPT MULTIPLE LINES OF DATA. | <ul style="list-style-type: none"> • USE SLOWER BAUD RATE. • SYSTEMS WHICH ISSUE X-ON CAN USE READ (INSTEAD READ^c) FOR LINE AT A TIME TRANSFER. | ESC&pOR |
| DATA LOGGING | SET CARTRIDGE AS DESTINATION AND TURN ON EDIT MODE. | SYSTEM MAY OUTPUT DATA FASTER THAN 2645A CAN COPY TO MINI CARTRIDGE. | <ul style="list-style-type: none"> • LOWER BAUD RATE • FILL CHARACTERS • SOFTWARE HANDSHAKE (ENQ, ACK) • HARDWARE HANDSHAKE (13260B) | -- |
| SOFT KEYS | (NEXT PAGE) ^c , TYPE DESIRED CODES, (NEXT PAGE) ^c . | SYSTEM MAY NOT BE ABLE TO ACCEPT BLOCKS OF CHARACTERS. | <ul style="list-style-type: none"> • PROGRAM NULLS BETWEEN CHARACTERS. • USE SLOWER BAUD RATE. | ESC j <code> ESC k |

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BLOCK MODE

There will be two types of interest in the 2645A Display Station's block mode operation

- The user who will probably use the 2645A in character mode but wants to know how much work is required to change to block mode operation.
- The user who intends to use the 2645A in block mode and is interested in what features are available.

There is usually no simple way to convert a character-at-a-

time application to block mode. However, the 2645A is flexible enough to accommodate most situations. The 2645A's block mode capabilities break down into two categories:

BURST – blocks of data are transferred with no protocol requirements

MANAGED – lines or blocks of data are transferred at the request and control of the system

Table 2 describes the general operation of these types of transfers.



TABLE 2. BLOCK MODE TRANSFERS

| CATEGORY | OPERATION | STRAPS | SYSTEM REQUIREMENTS |
|----------|--|-------------------------|--|
| BURST | AFTER ENTERING AND EDITING DATA, OPERATOR PRESSES ENTER. ALL DATA IS TRANSFERRED TO SYSTEM. (UNPROTECTED DATA IN FORMAT MODE). | D, G, H OPEN | <ul style="list-style-type: none"> • NO ECHO • NO ERROR MESSAGES UNTIL END OF TRANSFER • ABILITY TO ACCEPT BLOCKS OF DATA WITHOUT OVERRUNS. |
| MANAGED | OPERATOR DEPRESSES ENTER. SYSTEM ENQUIRES WITH DC1, TERMINAL ISSUES DC2, SYSTEM POSITIONS CURSOR, ISSUES DC1 AND GETS DATA. | D, G, OPTIONAL H CLOSED | <ul style="list-style-type: none"> • SYSTEM IS IN CONTROL OF ALL ASPECTS OF TRANSFER. |

GLOSSARY

X-ON COMPATIBILITY – The paper tape reader and punch found on automatic-send-receive (ASR) teletypes are turned on with an X-ON (DC1) and turned off with an X-OFF (DC3). With a 2645A Display Station in remote, pressing the READ key transfers one record to the computer. The next record in the file will be sent when the 2645A receives an X-ON (DC1), and this process can continue until end of file.

SOFTWARE HANDSHAKE – It is possible to send data and commands to the 2645A faster than they can be processed. One way of preventing such overruns is to transfer data to the 2645A in blocks of 80

characters or less. If the computer sends an ENQ code after each block, the 2645A will return an ACK code when it is able to accept the next data block. The HP 3000 implements this feature automatically under terminal type 10.

HARDWARE HANDSHAKE – Another way to prevent data overruns is to use the hardware handshake available in 2645As equipped with the 13260B General Purpose Data Communications accessory. The 2645A indicates a busy condition by lowering the Data Terminal Ready control line. Also, the system can stop the 2645A from transmitting data by turning off the Clear to Send control line.

BLOCK MODE DEMONSTRATION

Files 60 through 63 of the 2645A Demo Cartridge contain a BASIC program that will demonstrate block mode. Complete instructions are given in file 60. The program retrieves a form from cartridge, the operator enters data, and entered data is transmitted to the computer.

```
10 DIM A$(200),B$(1),C$(50),F$(200),J$(200)
15 REM SET THE BLOCK MODE AND AUTO LF KEYS DOWN
20 PRINT "27"&k1a1B"
25 REM POSITION LEFT CARTRIDGE ON FILE 62
30 PRINT "27"&p1u62p2C"
35 REM WAIT FOR COMPLETION
40 INPUT C$
45 REM IF SUCCESSFUL, GO AHEAD. OTHERWISE RETRY
50 IF C$<>"S" THEN 30
55 REM COPY FILE FROM L. TAPE TO DISPLAY
60 PRINT "27"&p1s3dF"
65 REM WAIT FOR COMPLETION
70 INPUT D$
75 REM IF SUCCESSFUL, GO AHEAD. OTHERWISE RETRY
80 IF D$<>"S" THEN 30
85 REM HOME CURSOR
90 PRINT "27"H"
95 REM WAIT FOR OPERATOR TO FINISH AND PRESS ENTER
100 INPUT E$
105 REM HOME CURSOR
110 PRINT "27"H"
*111 REM PRESS THE ENTER KEY
112 PRINT "27"d"
115 REM INPUT THE FIRST FIELD
120 INPUT F$
125 REM PRESS THE ENTER KEY
130 PRINT "27"d"
135 REM INPUT THE SECOND FIELD
140 INPUT J$
145 REM PRESS THE ENTER KEY
150 PRINT "27"d"
155 REM INPUT THE THIRD FIELD
160 INPUT A$
165 REM CLEAR THE DISPLAY AND PRINT DATA
170 PRINT "27"x""27"H""27"J""27"&k0a0B";F$,J$,A$
175 REM READ ONE RECORD FROM TAPE TO TURN ECHO ON
180 PRINT "27"&p1s0R"
190 INPUT C$
200 END
210 REM
220 REM.....TO RUN, PRESS F1.....
```

*Current edition of 2645A Demo cartridge does not include lines 111 and 112.
To run above program update Demo cartridge by adding these statements.

SAMPLE PROGRAM

Block Mode Operation

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SAMPLE FORM