TRS-80® DT-1

Owner's Manual

Radio Shack®

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Introduction

What is a data terminal?

Terminus: Lat. Boundary or End.

A data terminal is the connection between you and a computer. It is not a computer. It is a connection to a computer and transfers information from human form (e.g., letters, numbers, etc.) to a format computers understand (e.g., electrical pulses).

There are three parts to a Terminal:

- The Keyboard, where you enter data.
- The Video Screen, where the Computer outputs data in visible form.
- The Input/Output Channels, where the Terminal communicates with the Computer.

When you connect a Data Terminal to a power source and turn the switch ON, nothing really happens unless the Terminal is connected to a "Host" computer. A Host is the controlling computer in a multiple-computer system. Consequently, the operation and capabilities of your Data Terminal are limited only by the limitations of the Host computer -- your Terminal can only do what the Host can do and no more!

For instance, your Data Terminal cannot store programs or data itself, but it can access information stored by the Host System.

Note that different Host Systems operate in different ways. In fact, they may even recognize different keyboards. If you press a key on the Terminal when it is connected to one Host, the reaction may be totally different than when you press the same Terminal key when it is connected to a different Host!

In other words, **the specific operation of your Data Terminal depends upon the Host that is in control.**

Consequently, good Data Terminals (like the DT-1) must be designed to operate with a variety of different Hosts.

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Where is the Host computer?

The Host computer may be located near the DT-1 (directly connected), or it may be hundreds of miles away and connected to your Terminal via modems and telephone lines.

Can a DT-1 communicate with another DT-1?

Yes, two DT-1's can communicate (e.g., you and another DT-1 user can "talk" by typing on the keyboard) but that's all they can do. They can't process or store any information unless they're connected to a Host.

Other special features of the DT-1 include:

- A 7Ø-key console keyboard that includes a 12-key numeric pad and conforms to standard Data Terminal keyboard format.
- A 12-inch Screen to display information.
- Both Serial and Parallel Printer Interface for hard-copy output of data (requires a separate printer, optional/extra).
- RS-232-C Interface for quick and efficient information transmission between the Data Terminal and the Host System.
- Software selectable "switches" to establish Input/Output parameters, such as Reverse Video, Baud Rate, Automatic Line Feed, and more.

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1/ Description of the DT-1

Before you begin using the DT-1, it's important that you become familiar with it. This section will describe the Terminal, particularly some of the keys which you may not be familiar with. Remember though, the description of a particular key (e.g., what it does) may differ from Host to Host.

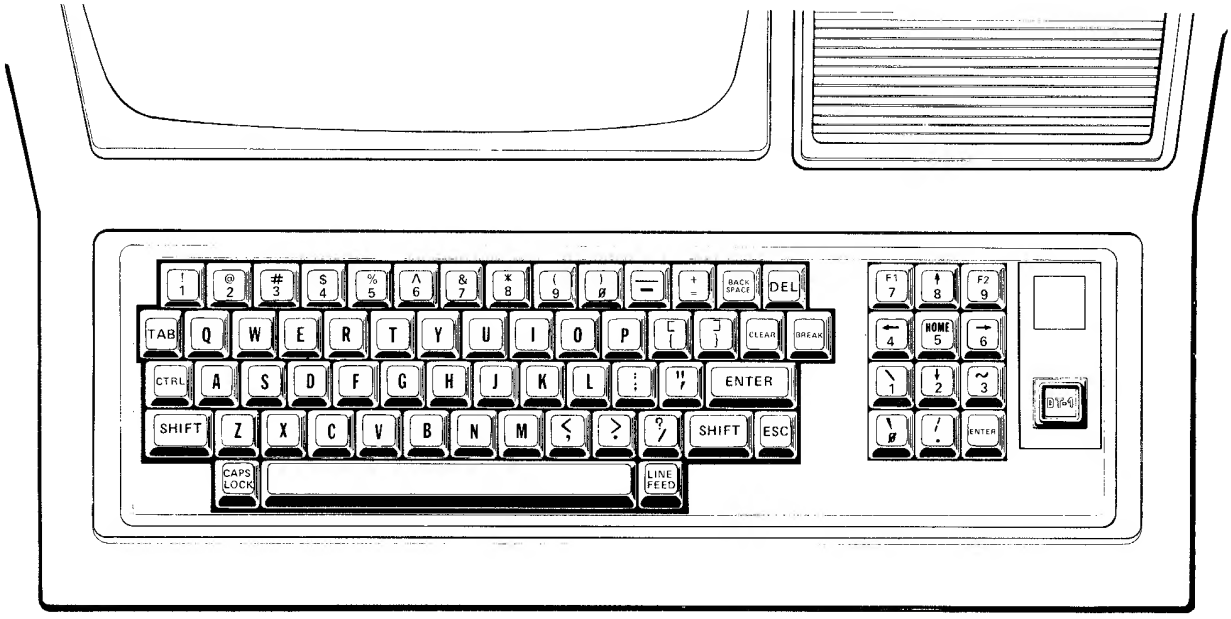

Figure 1. The DT-1 Keyboard Console

There are two parts of the DT-1 keyboard. On the left is the standard, typewriter-style keyboard with a few additional keys. On the right is a standard 12-key numeric pad that also has special functions.

To right of the numeric pad is the red, "power-on light." Whenever the DT-1 is on, this light will illuminate.

Around the edges of the standard typewriter keys are some keys that most typewriters do not have.

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Note that if you press a key-combination (such as <CTRL> <A>), the ASCII code sent to the Host is different from pressing <A> by itself. For a complete description of the ASCII codes sent by the DT-1, see **Appendix C.**

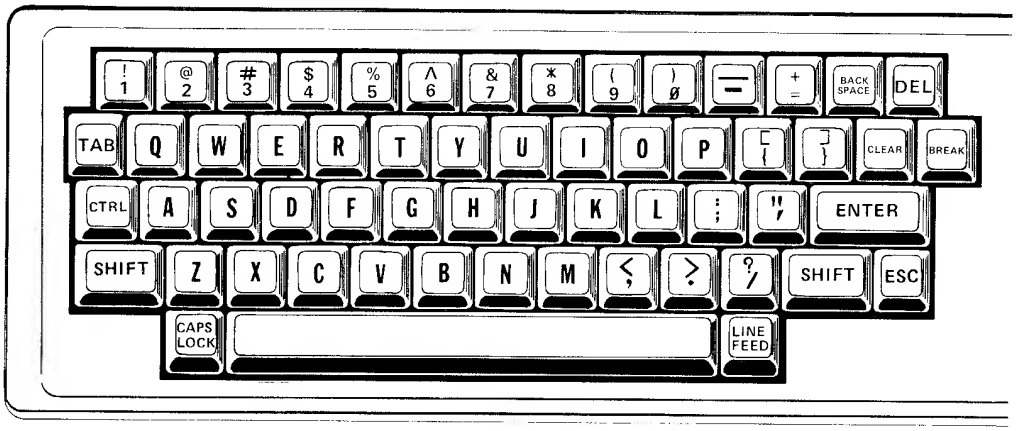

Figure 2. DT-1 Keyboard

CAPS LOCK

Press this key once and the DT-1 will use uppercase letters (all capitals) only. Press again and the DT-1 will use upper/lowercase letters (you'll have to press <SHIFT> before uppercase letters are displayed).

CTRL

The "control" key. Holding <CTRL> down while pressing any other key will send a second meaning of the key to the Host. For example, CONTROL G is the "Bell." To ring the bell (sound the buzzer), press <CTRL> and <G> at the same time.

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BACK SPACE

Backspace the Cursor. This key moves the Cursor one space to the left so that a character may be re-typed.

DEL

Delete key. When you position the Cursor on a character and press this key, the character will be deleted ("erased").

CLEAR

Clear key. In most emulations, this key clears the Screen and "homes" the Cursor. (It usually positions the Cursor to the upper-left corner of the Screen.)

BREAK

Break key. This key generally means "interrupt". Pressing this key sends a space of 3/4-second duration to the Host.

ENTER

Enter key. This key is similar to the typewriter's carriage return and tells the Host to accept the data typed since the last carriage return. (Note that the numeric pad also has an <ENTER> key.)

ESC

Escape key. After you press <ESC>, the next key you press will have a second meaning. This enables the keyboard to be used as a bank of switches to operate the Host system, turning printers off and on and performing many other control functions. The list of "switches" is in Appendix C. There is one list for each terminal emulated by the DT-1.

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LINE FEED

This usually causes the Host to move the Cursor down one line without returning it to the left margin.

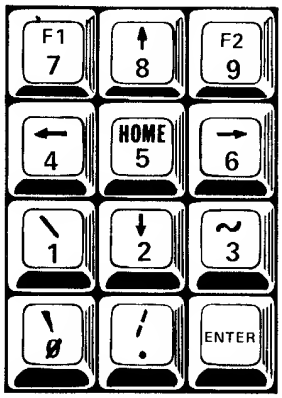

Figure 3. DT-1 Keypad

The numbers on the DT-1 Keypad are exactly the same as the numbers on the top row of keys but include a decimal point and an <ENTER> key conveniently located for efficient data entry.

Pressing <SHIFT> and a number on the Keypad is not the same as pressing <SHIFT> and a number on the top row of the Keyboard. For example, <SHIFT> <0> on the top row of keys sends ASCII Code 00 to the Host. <SHIFT> <0> on the Keypad, however, sends ASCII Code 60 to the Host.

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The Keypad is also used to move the Cursor. The "arrow" keys will move the Cursor left, right, up, and down as indicated. To use the cursor-positioning arrow keys, press <SHIFT> then the appropriate arrow key.



Special Function

This character is sometimes used as carriage return.



Special Function



and


Special Function

<F1> sends the code 01 to the Host; <F2> sends 02. The effect of sending these codes depends on the Host.



Clears the Screen and puts the Cursor on its "home" position. This is usually the upper left corner but may be the lower left corner.

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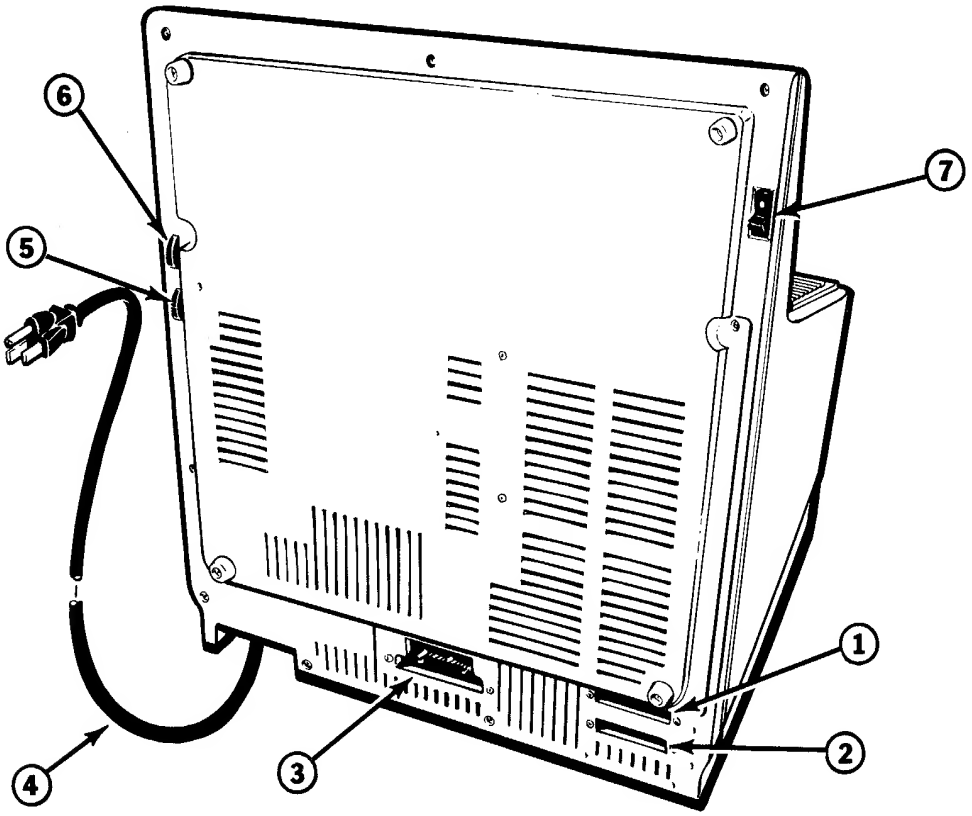

Figure 4. DT-1 Connections and Controls

(1) RS-232 Connection Jack to connect the DT-1 to a Host computer, a modem, or a system network connector.

(2) Serial Printer Connection Jack

(3) Parallel Printer Connection Jack

(4) AC Power Cord

(5) Video Brightness Control

(6) Video Contrast Control

(7) On/Off Switch.

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2/ Setting Up the DT-1

Before connecting the DT-1 to an AC power source, be sure the Terminal and all peripherals are OFF.

The AC Power Cord exits from the rear of the Terminal. Connect it and all peripherals to an appropriate power source. (Although not required, a device such as the Automatic Power Controller (Radio Shack Catalog Number 26-1429) could prove to be both helpful and convenient.) Power requirements for all Radio Shack products are specified on the units and in the owner's manuals (see Specifications).

You can connect the DT-1 to a Host Computer System directly (via a cable), or through the telephone lines (via a modem).

Connecting the DT-1 to a TRS-8Ø

The TRS-8Ø DT-1 can communicate with a variety of Host computers, including the TRS-8Ø Model 16, Model II, Model I, and Model III.

To use a TRS-8Ø Computer as a Host computer, you'll need the proper connection cable. Table 1 describes the cables Radio Shack provides which can be used to connect a TRS-8Ø to the DT-1.

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Cat. No.	Cables and Accessories
26-14Ø8	DB-25 to DB-25 (5' male-to-male). Use this cable to connect the DT-1 to the Modem I, Modem II, or a mini-computer designed to be used with the Terminal.
26-149Ø	Molded RS-232 Cable (1Ø' male-to-male). (The connector of this cable will not fit through the Model III or DT-1 cases.)
26-1491	Same as above but 25' long.
26-1492	Same as above but 5Ø' long.
26-1493	Same as above but 1ØØ' long.
It is recommended that you use these cables when the DT-1 is some distance away from the Host.	
26-1495	RS-232 Cable Extender (2" female-to-female). Use this adapter to connect two male terminated cables together. (This adapter will not fit through the DT-1 or Model III cases.)
26-1496	Null Modem Adapter (2" female-to-male). Use this adapter to "swap" pins so a DT-1 can communicate with another TRS-8Ø. (This adapter will not fit through the DT-1 or Model III cases.)
26-1497	Model III RS-232 Extender (8" female-to-male). Use this cable to "extend" the connector. Connect this adapter to a DT-1 or Model III, then connect the adapter to one of the cables.

Table 1

Note that the DT-1 uses RS-232-C Pin #2 to transmit data, and Pin #3 to receive data. All TRS-8Ø Computers use this same configuration. Therefore, before connecting the DT-1 to a TRS-8Ø, you must be sure the Host computer is configured to transmit data via Pin #3 and receive data via Pin #2 (opposite the DT-1).

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The easiest way to do this is to include a Null Modem Adapter (26-1496) between the DT-1 and the Host computer.

Note that the RS-232-C Interface must be as described in Table 2.

Signal	Function	DT-1 Pin#	TRS-8Ø Pin#
GP	Ground Protective	1	1
TD	Transmit Data	2	3
RD	Receive Data	3	2
RTS	Receive to Send	4	5
CTS	Clear to Send	5	4
DSR	Data Set Ready	6	6
SG	Signal Ground	7	7
CD	Carrier Detect	8	2Ø & 6
DTR	Data Terminal Ready	2Ø & 6	8

Table 2

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Refer to the following instructions when connecting the DT-1 directly to a TRS-8Ø Host computer. Alternatives are offered where possible to use cables you may already have. All of the variations will produce exactly the same results.

DT-1 to Model II/16

1. Connect one end of a DB-25 to DB-25 Cable (26-44Ø3) to the DT-1 RS-232 Jack.

2. Connect the other end of the above Cable to the female plug of a Null Modem Adapter (26-1496).

3. Connect the male plug of the Adapter to the Model II/16 (Serial Channel A/B).

4. Insert a Terminator Plug into any unused Serial Channel.

or

1. Connect the male plug of the Model III RS-232 Extender (26-1497) to the RS-232 Jack of the DT-1.

2. Connect the female plug of the above to the male plug of a Molded RS-232 Cable (26-149Ø/1/2/3).

3. Connect the female plug of a Null Modem Adapter (26-1496) to the above cable you're using.

4. Connect the male plug of the Adapter to the Model II/16 (Serial Channel A/B).

5. Insert a Terminator Plug into any unused Serial Channel.

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DT-1 to Model III

1. Connect one end of the DB-25 to DB-25 Cable (26-14Ø8) to the RS-232 Jack of the DT-1.

2. Connect the other end of the above Cable to the female plug of a Null Modem Adapter (26-1496).

3. Connect the male plug of the Adapter to the female plug of a Model III RS-232 Extender (26-1497).

4. Connect the male plug of the Extender to the Model III.

or

1. Connect the male plug of a Model III RS-232 Extender (26-1497) to the RS-232 Jack of the DT-1.

2. Connect the female plug of the above Cable to the male plug of a Molded RS-232 Cable (26-149Ø/1/2/3).

3. Connect the male plug of the above Cable you're using to the female plug of a Null Modem Adapter (26-1496).

4. Connect the male plug of the above Adapter to the RS-232 Jack of the Model III.

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DT-1 to Model I

1. Connect the male plug of the RS-232 Cable (supplied with 26-1145) to the RS-232 Jack of the DT-1.
2. Connect the other end (Card Edge) of the above Cable to the RS-232 Jack on the Model I Expansion Interface.
3. Set the COMM/TERM Switch to COMM.

or

1. Connect the male plug of the Model III RS-232 Extender (26-1497) to the RS-232 Jack of the DT-1.
2. Connect the female plug of the above Extender to the male plug of a Null Modem Adapter (26-1496).
3. Connect the female plug of the Adapter to the male plug of the RS-232 Cable (supplied with 26-1145).
4. Connect the other end (Card Edge) of the above Cable to the RS-232 Jack on the Model I Expansion Interface.
5. Set the COMM/TERM Switch to TERM.

or

1. Connect the male plug of the Model III RS-232 Extender (26-1497) to the RS-232 Jack of the DT-1.
2. Connect the female plug of the above Extender to one end of a Molded RS-232 Cable (26-149Ø/1/2/3).
3. Connect the other end of the Molded Cable to an RS-232 Cable Extender (26-1495).
4. Connect the other end of the above Extender to the male plug of a Null Modem Adapter (26-1496).
5. Connect the female plug of the above Adapter to the male plug of the Model I RS-232 Cable (supplied with 26-1145).
6. Connect the other end (Card Edge) of the above Cable to the RS-232 Jack on the Model I Expansion Interface.
7. Set the COMM/TERM Switch to TERM.

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Connecting the DT-1 to a Modem

Connection through the telephone lines requires a modem such as the TRS-8Ø Modem I (26-1172) or Modem II (26-1173).

DT-1 to Modem I/II

1. Connect one end of a DB-25 to DB-25 Cable (26-14Ø8) to the DT-1 RS-232 Jack.

2. Connect the other end of the above Cable to the RS-232 Jack on the Modem I/II.

or (Modem II only)

1. Connect the male plug of the Model III RS-232 Extender (26-1497) to the RS-232 Jack of the DT-1.

2. Connect the female plug of the above Cable to the male plug of a Molded RS-232 Cable (26-149Ø/1/2/3).

3. Connect the other end of the Molded Cable to the Modem II.

For specific details on connecting the Modem to a telephone line, see your Modem's Operation Manual.

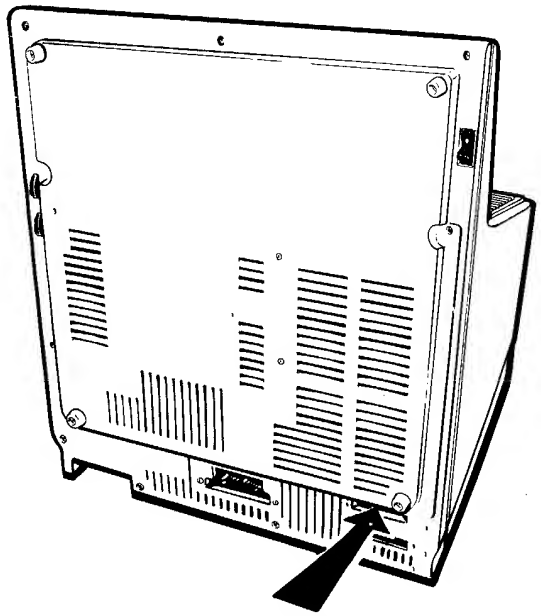

Figure 5. Terminal-to-Modem Connection

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Connecting the DT-1 to a Printer

If you are using a parallel printer, connect the Terminal-to-Printer Cable (26-44Ø1) to the Parallel Printer Jack. See your Printer's owner's manual for details on Printer connection and use.

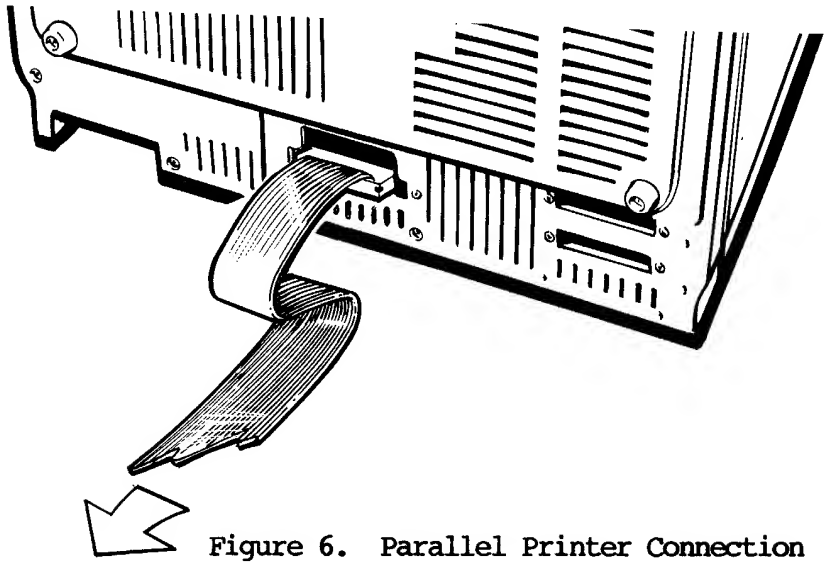

Figure 6. Parallel Printer Connection

If you are using a serial printer, connect the Terminal-to-Printer Cable (26-3Ø14) to the Serial Printer Jack. See your Printer's owner's manual for details on Printer connection and use.

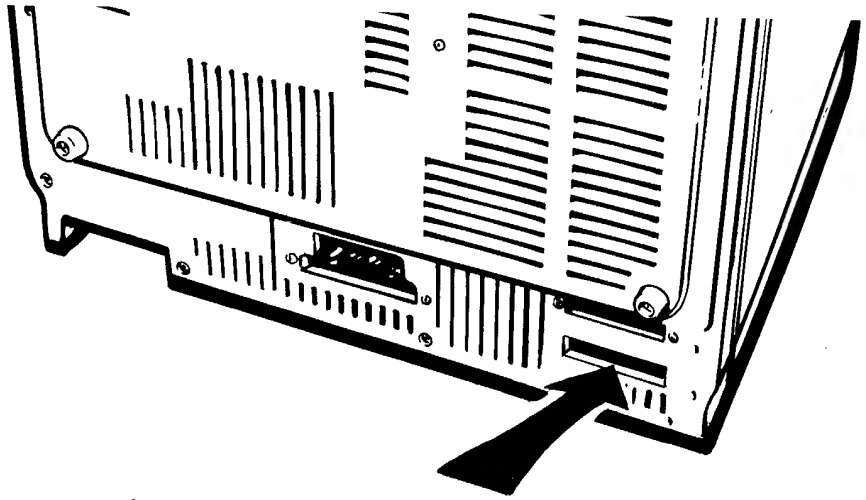

Figure 7. Serial Printer Connection

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3/ Using the DT-1

Press the On/Off Switch to turn the DT-1 ON. The red Power On light (to the right of the Keypad) will then illuminate.

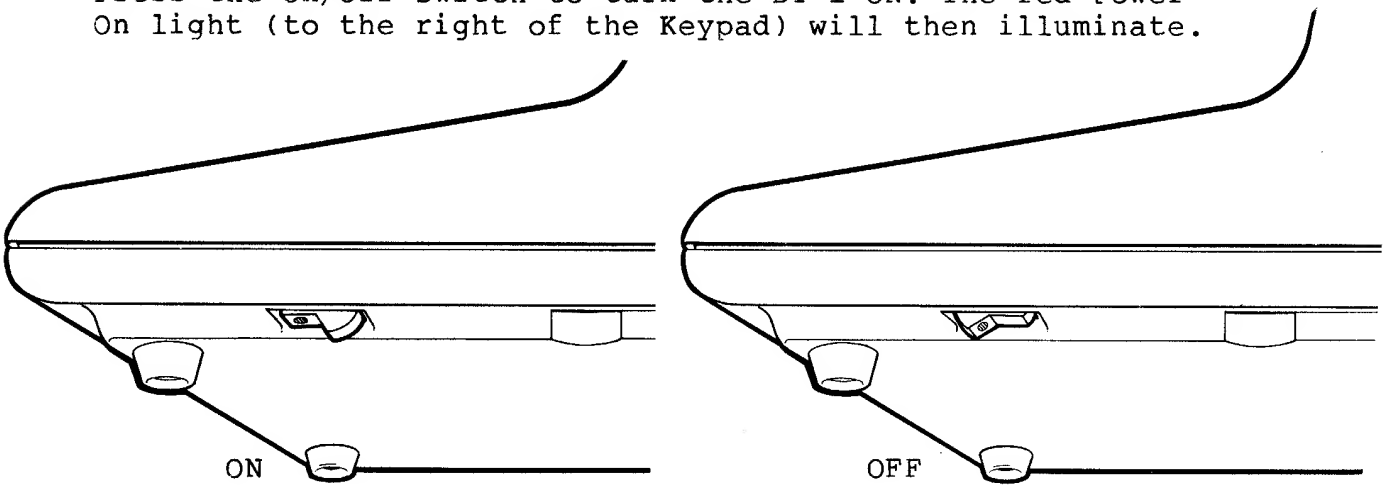

Figure 8. DT-1 On/Off Switch

If the DT-1 isn't connected to and communicating with a Host when you turn the power on, a Cursor will appear in the upper left corner of the Screen after a few seconds. The cursor may be a small white rectangle instead of the underline shown, and may be flashing on and off.

If the Terminal is connected to and communicating with a Host System, what appears on the Screen on power-up will depend on the Host system.

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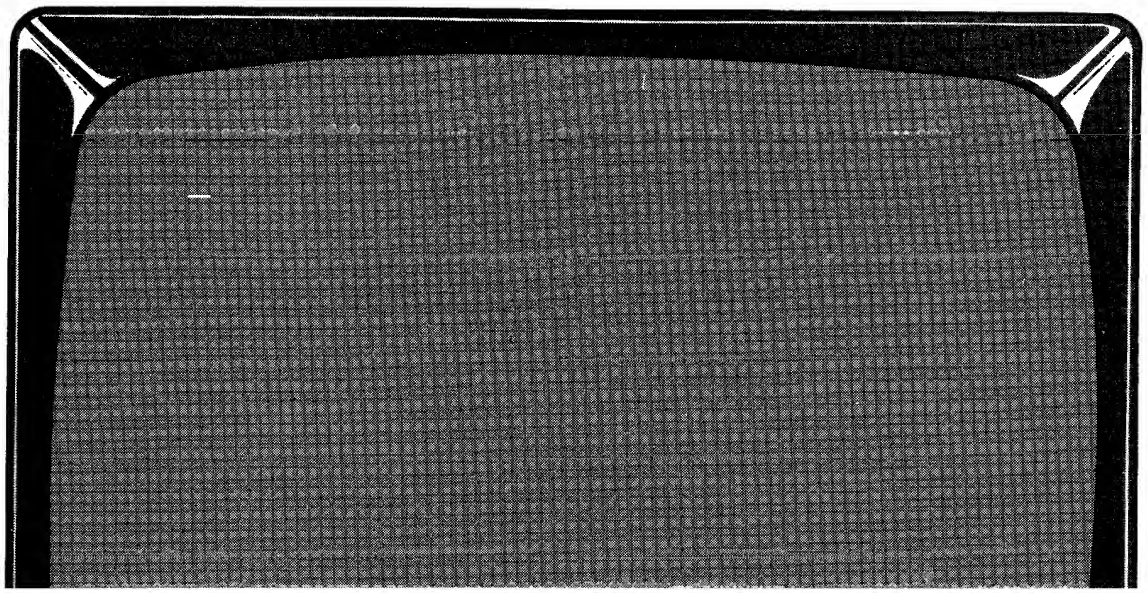

Figure 9. DT-1 Cursor (Initial Power-up)

If you don't see anything, adjust the Video Brightness and Contrast Controls.

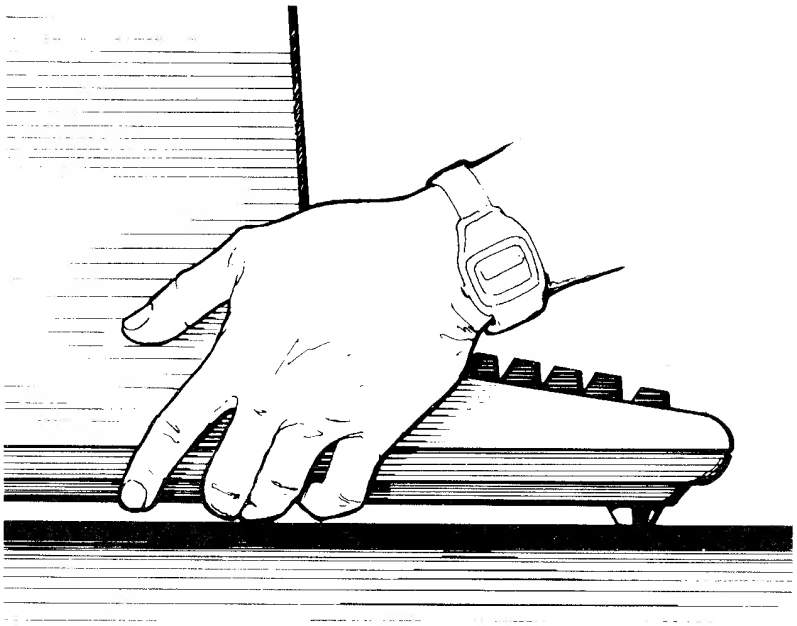

Figure 1Ø. DT-1 Video Control Adjustment

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Establishing DT-1 Input/Output Parameters ("Set-Up")

Before using the DT-1 with a Host System and related peripherals (such as a Printer), you'll have to be sure the Terminal is using the appropriate Input/Output (I/O) parameters.

For instance, before the DT-1 can begin communicating with a Host, you must be sure the Terminal and Host baud rates are the same. Or, you may want to use the DT-1's Reverse Video feature where black letters are displayed on a white Screen instead of the typical white on black.

Unlike many other Terminals which have mechanical DIP switches which you must set, the DT-1 uses software-selectable "switches" which are more convenient and more efficient than mechanical switches.

The DT-1 software switches allow you to manipulate the:

- Terminating Character.
- Emulation Mode.
- Reverse Video.
- Data Terminal Ready.
- Data Set Ready.
- Data Carrier Detect.
- Odd or Even Parity.
- Parity Select.
- Word Length.
- Baud Rate.
- Automatic Line Feed.
- Automatic Wrap-Around.
- Full- or Half-Duplex.
- Cursor Select.

To set the I/O parameters (or to see what the current settings are), press the key-combination of:

<CTRL> <SHIFT> <ENTER>

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The DT-1 will then produce a display similiar to Figure 12.

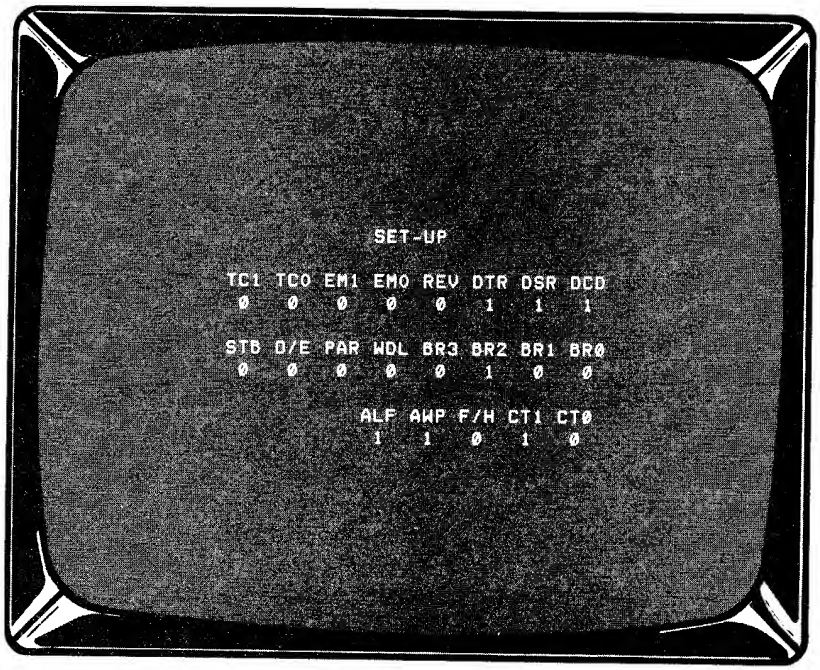

Figure 11. DT-1 I/O Parameter Menu

Note that when the Menu first appears, the Cursor is positioned below TC1.

To move the Cursor to the right, press the right arrow key (e.g., press <6>).

To move the Cursor to the left, press the left arrow key (press <4>).

To move the Cursor down a line, press the down arrow key (press <8>); to go up a line, press up arrow (<2>). (Or you can press <SPACEBAR> and the Cursor will move down a line but jump to the first line position. When it reaches the bottom line, it automatically moves to the first position of the top line.

Each item in the Menu is a switch with two positions -- 0 or 1.

To set the switch, simply position the Cursor over the appropriate 0 or 1 (below the function you wish to manipulate) and press either <0> or <1>.

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The DT-1 will not respond to any other keyboard input unless it is a number which has a directional arrow as the second meaning (e.g., pressing <2> both on the top row of the Keyboard and on the Keypad will move the Cursor down).

The following section will explain what each Menu function is and how Ø or 1 manipulates that function.

TC1 TCØ
Terminating Character Control Select

Ø	Ø	Carriage Return
Ø	1	Carriage Return/Line Feed
1	Ø	End of Text
1	1	End of Transmission

These two switches define the terminating character which follows a number-key command. If you will be using these sequences, find out what your Host Computer requires and set the switches accordingly.

EM1 EMØ
Emulation Mode Select

Ø	Ø	Televideo 91Ø
Ø	1	Lear Siegler ADM-5
1	Ø	ADDS 25
1	1	Hazeltine 141Ø

The DT-1 can emulate four different terminals -- the Televideo 91Ø, Lear Siegler ADM-5, ADDS 25, and Hazeltine 141Ø. Set the switches to the settings for the terminal you wish to emulate.

REV
Reverse Video Select

Ø = Normal
1 = Reverse

Reverse video means black characters on a white background. Normal video means white characters on a black background.

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DTR
Data Terminal Ready

Ø = Disconnected
1 = Connected

This sets a status signal from the DT-1 to the Host computer. When DTR is not asserted, the DT-1 is not ready for operation. When it is asserted, the DT-1 is ready to communicate with the Host computer.

If Ø is selected, the DT-1 will send this signal to the Host; if 1 is selected, the DT-1 will not send this signal.

DSR
Data Set Ready

Ø = Disconnected
1 = Connected

This is a signal that indicates whether the Host is ready for data.

If Ø is selected, the DT-1 will respond to this signal and stop sending data to the Host when the DSR line is not asserted.

When Disconnected (Ø is selected), the DT-1 considers the DSR line to be asserted all the time and will not respond to Host signals to stop sending data.

See the information supplied with your Host Computer for details.

DCD
Data Carrier Detect Select

Ø = Disconnected
1 = Connected

This is a signal from a Host (usually a modem). When asserted, communications can proceed.

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If this switch is Connected, the DT-1 will insist on the DCD line being asserted before communication can take place.

When Disconnected, the DCD line is assumed to be asserted and the DT-1 will ignore that signal from the Host.

STB
Stop Bit Select

Ø = 1 Stop Bit
1 = 2 Stop Bits

This switch will select one or two stop bits. The Host computer may respond to only one stop bit. Try one stop bit; if garbled data results, use two stop bits.

O/E
Odd or Even Parity Select

Ø = Odd Parity
1 = Even Parity

If the Parity Select (see PAR below) is set to 1, this switch controls whether odd or even parity is used.

PAR
Parity Select

Ø = No parity
1 = Send parity

This switch determines whether or not the DT-1 will send a parity bit with the transmitted word. It also activates parity checking when the DT-1 is receiving characters.

If parity is set (either even or odd), then received characters which fail the parity test will be displayed as @.

WDL
Word Length Select

Ø = 8-Bit Word
1 = 7-Bit Word

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If you want the DT-1 to send and receive an 8-bit word length, set this switch to Ø. If you want a 7-bit word length, set it to 1.

BR
Baud Rate Select

BR3	BR2	BR1	BRØ	
Ø	Ø	Ø	1	75
Ø	Ø	1	Ø	11Ø
Ø	Ø	1	1	15Ø
Ø	1	Ø	Ø	3ØØ
Ø	1	Ø	1	6ØØ
Ø	1	1	Ø	12ØØ
Ø	1	1	1	24ØØ
1	Ø	Ø	Ø	48ØØ
1	Ø	Ø	1	96ØØ
1	Ø	1	1	96ØØ
1	1	Ø	Ø	96ØØ
1	1	Ø	1	96ØØ
1	1	1	Ø	96ØØ
1	1	1	1	96ØØ
Ø	Ø	Ø	Ø	96ØØ
1	Ø	1	Ø	192ØØ

One of ten baud rates may be selected. Set each bit to produce the baud rate you need.

Example

BR3	BR2	BR1	BRØ
Ø	1	Ø	Ø

The baud rate is set at 3ØØ baud, correct for most modems.

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ALF
Automatic Line Feed Select

Ø = CR
1 = CR/LF

This switch selects the code(s) supplied by the DT-1 when <ENTER> is pressed. When set to Ø, pressing <ENTER> sends only a carriage return to the Host. When set to 1, both a carriage return and a line feed are sent when you press <ENTER>. Use the setting your Host requires.

AWP
Automatic Wrap-Around Select

Ø = No Wrap
1 = Wrap

If this switch is set to 1, the Cursor will move to the next line when the end of a line is reached on the Screen. If set to Ø, the Cursor will not move down and back to the left until <ENTER> is pressed.

F/H
Full- or Half-Duplex Select

Ø = Full
1 = Half

Set this switch to Ø (Full-Duplex) if the Host echos characters typed on the DT-1.

If this switch is set to 1 (Half-Duplex), characters typed on the DT-1 are displayed on the DT-1's Screen.

If you set the DT-1 to half-duplex and the Host is echoing the character, you will see two of each character on the Screen; one character will be from the DT-1 and the other echoed from the Host.

If this happens and you want to see only one character, simply set the switch for full-duplex operation.

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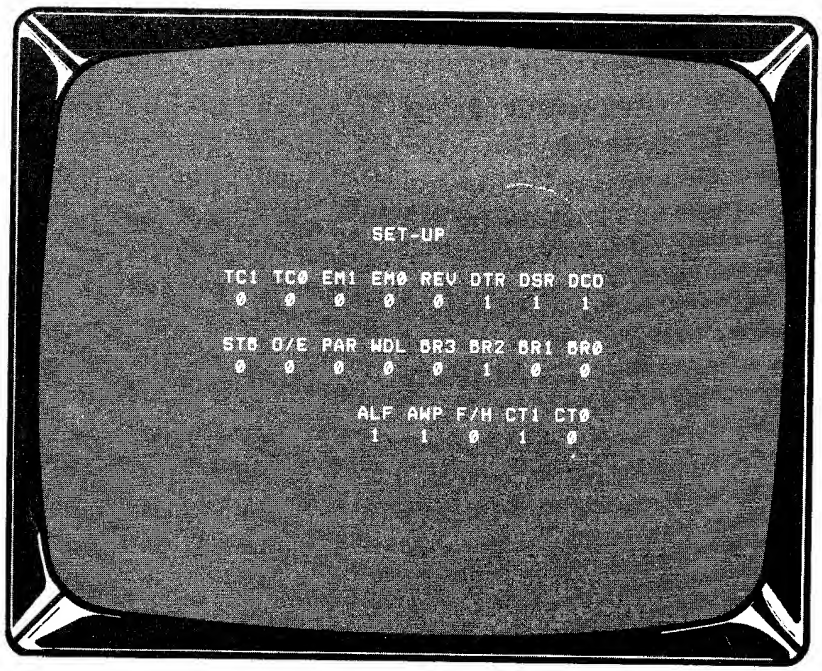
CT1 CTØ
Cursor Select

Ø	Ø = Blinking Block
Ø	1 = Blinking Underline
1	Ø = Steady Block
1	1 = Steady Underline

You can select the type of Cursor you want to use regardless of the Host. Cursor selection depends solely on the DT-1.

Sample I/O Parameter Display



The settings above indicate the DT-1 is emulating a Televideo 91Ø terminal with a carriage return following a control sequence. Normal video is being used and DTR, DSR, and DCD are connected. 1 stop bit, no parity, 8-bit word length, and 3ØØ baud are also in effect. Automatic line feed and line wrap-around, full-duplex, and a steady block Cursor are also set.

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Storing I/O Parameters

When you've set up the I/O parameters you need, you can either store them "permanently" or "temporarily".

- "Permanent" storage means that the DT-1 will store these parameters in memory. These same parameters will be used the next time you turn the Terminal on.
- "Temporary" storage means that the DT-1 will use the parameters only while the Terminal is on; any new parameters will be lost when the Terminal is turned off. When the DT-1 is turned on again, the Terminal will use whatever "permanent" parameters are in the Terminal's memory.

To store I/O parameters permanently:

1. When you've established the parameters you need, press <ENTER>.
2. The DT-1 will ask if you want to store the parameters permanently. Press <Y> (yes).
3. The DT-1 will display the message SET-UP STORED.
4. Press the key-combination of <CTRL> <SHIFT> <ENTER> to leave the Set-Up mode.

   As soon as you press <CTRL> <SHIFT> <ENTER>, the Menu will disappear, the buzzer will sound, and the Cursor will return to the Home position.

To store I/O parameters temporarily:

1. When you've established the parameters you need, press <ENTER>.
2. The DT-1 will ask if you want to store the parameters permanently. If you do not want to, press any key except <Y>.
3. The DT-1 will display the message SET-UP NOT STORED.
4. Press the key-combination of <CTRL> <SHIFT> <ENTER> to leave the Set-Up mode.

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As soon as you press <CTRL> <SHIFT> <ENTER>, the Menu will disappear, the buzzer will sound, and the Cursor will return to the Home position.

Printer Operation

The DT-1 has two printer interfaces -- one interface is for serial printers, the other is for parallel printers.

You can have both a serial and a parallel printer connected to the DT-1. If two printers are connected to the Terminal, both must be configured to print, or the non-printing unit must be de-selected in such a manner that a BUSY signal is not generated by this Printer.

To connect a Printer to the DT-1, see Setting Up the DT-1 earlier in this manual.

To use a Printer once it is connected to the DT-1, follow the instructions for the terminal you are emulating (see **Appendix** D).

Technical Information

Data from the DT-1 is handled by the printers in different forms but in like manner. For example, the serial printer must be set up to accept data at the same baud rate that the Terminal is using. The parallel printer will be accepting data on an "as available" basis when a word has been assembled from the serial format.

Both printers use BUSY hand-shaking. That is, if one of the printers is busy, both printers are busy.

When the DT-1 receives a BUSY status from either of the Printers, the terminal will transmit a CONTROL S (XOFF) to the Host System in an attempt to stop further data from being received. If the Host system does not stop sending data, the Printer may lose characters. The DT-1 does not buffer characters for the Printer.

There are some Host Systems that use CONTROL S as a terminating character somewhat like other systems use Carriage Return. This type of Host System will not operate correctly on a parallel printer and may not operate correctly on a serial printer if the baud rate is too fast.

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When the Printer goes not BUSY, the DT-1 will transmit a CONTROL Q (XON), which signals the Host to continue data transmission.

When the DT-1 is used with most parallel printers, the input data to the Terminal will be passed to the Printer on a character by character basis. The Printer will store these characters into its memory until one of two conditions occur:

- The Printer receives a carriage return, or
- The Printer's buffer is full.

At either of these two points, most printers will activate the busy line, and the Printer will print that line or the buffer contents. At the point where the Printer went BUSY, the DT-1 will transmit a CONTROL S, which should stop the Host from sending more data. The effect you see on the Screen will be a transmission pause at the end of each line. The Printer will allow the DT-1 to tell the Host to continue when that line has been printed.

If a parallel printer sets the BUSY line after each character and it is BUSY for longer than one character time (determined by baud rate), the DT-1 may detect the BUSY signal after each character is sent to the Printer. In such a case, the DT-1 may transmit CONTROL S and CONTROL Q's upon each character. The Line Printer III (26-1156) is the only Radio Shack printer which will exhibit this characteristic. The effect on the Screen will be an apparent decrease in received baud rate.

Local Mode Commands

While most DT-1 operations are controlled by the Host System, there are times when you need to perform special operations "locally". For instance, suppose you want the Printer to start printing but, when you transmit the codes to start the Printer, the Host does not echo the code. You need to give the command in Local Mode.

In Local Mode Operation, codes that control special functions are not sent to the Host but are acted upon just as if they were received from the Host.

There are two Local Mode sequences -- Escape Codes and Control Codes. For a description of Escape and Control Codes available with your DT-1, see Appendix D.

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Escape Codes.

To get into Escape Code Sequences/Local Mode, use the key-combination of:

<SHIFT><ESC>

For instance, the normal command to turn the printer (91Ø mode) on is:

<ESC> <@>

Some Host Systems will not allow the ESC code (1B) to be echoed. In this case, the only way to turn the Printer on is to use the special Local Mode. In order to do this, press:

<SHIFT> <ESC> <@>

The ESC @ would not be transmitted. It would be detected by the DT-1 and the Printer channel would be enabled.

In some cases, more than one letter is operated on, but not transmitted in the Local Mode. For example, if we wanted to move the Cursor using the ESC = xy sequence, we would press:

<SHIFT> <ESC> = 15

This moves the Cursor to the 18th line and the 22nd character on that line. None of these characters are transmitted to the Host. The DT-1 recognizes that the ESC = sequence needs two more alpha-codes to complete the sequence. (For details on Cursor Positioning Codes, see **Appendix F.**)

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Control Codes.

To get into Control Code Sequences/Local Mode, use the key-combination of:

<SHIFT> <CTRL> <ESC>

All three keys must be held down at the same time, and then released; then press the <CTRL> key. For example, to ring the bell, press:

<SHIFT> <CTRL> <ESC> <CTRL> <G>

Special Functions

<ESC> <b>
Reverse Video

The reverse of the Set-Up Parameters will be used. For example, if you chose Normal (White on Black) Video in the Set-Up Parameters, then <ESC> <b> will reverse that setting and you will see black letters on a white screen.

If you chose Reverse (Black on White) Video in the Set-Up Parameters, then <ESC> <b> will cause Normal Video (White on Black) to be used.

<ESC> <d>
Normal Video

Use the Set-Up Parameters for Video Display (used after <ESC> <b> above).

<SHIFT> <BREAK>
Software Restart

This key-combination causes a software reset (also called a "warm restart"). DT-1 Input/Output parameters are reset to the permanent settings, and a CONTROL Q is sent to the Host so that it can continue.

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<CTRL> <SHIFT> <ENTER>
Enter or exit I/O parameter set-up mode.

You can change DT-1 I/O parameters in this mode. A CONTROL S is sent to the Host System telling it to halt.

<SHIFT> <ESC>
Escape Code Sequence

Followed by one or more keys, this sequence sends the Escape Code indicated to the DT-1 for local use.

<SHIFT> <CTRL> <ESC>
Control Code Sequence

Followed by a letter, this key-combination sends a Control Code to the DT-1 for local use.

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4/ Troubleshooting and Maintenance

Your DT-1 is a very reliable device which should provide you with years of trouble-free service.

Self-Test Mode

The DT-1 has a Self-Test which is turned on when you press the key-combination of:

<ESC> <V>

If you are emulating the Hazeltine 141Ø, the keys are <CTRL><ESC><V>. When you press <ESC> <V>, you should see every possible character the DT-1 can produce. If all possible characters do not appear, you may have a problem with the character generator ROM or with the Video RAM. If you suspect this is a problem, check with your local Radio Shack Computer Center.

To turn the Self-Test off, press <O>. Then press <CLEAR> or <SHIFT><CLEAR> to clear the Screen.

In Case of Trouble...

The first thing to do in case of trouble is to see if the trouble is in the DT-1 or in the System.

Data leaving the DT-1 goes out on pin #2 and is received on pin #3 of the RS-232 channel. If pins #2 and #3 are connected, the DT-1 will receive its own output. If characters you type on the Keyboard are displayed on the Screen, the DT-1 is very likely operating correctly and you may look for problems somewhere else in the System.

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Hints and Tips...

- Be sure the I/O parameters are correct for your System.
- Be sure to use the correct baud rate for your modem.
- Be sure the computer you are using for a host has its RS-232 channel properly configured (i.e. Baud Rate, Word Length, Parity, Stop Bits).
- Be sure SETCOM has been set.

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5/ Specifications

AC Power Supply	
Power Requirements	105-130 VAC, 60 Hz
Power Consumption	20 Watts
Temperature Range	55 to 110 F (13 to 43)
Humidity Range	10% to 80% relative, non-condensing
Size	18.5" x 12" x 21" (17cm x 31 cm x 53cm)
Weight	23.4 lbs (10.5kg)

Note that the RS-232-C Interface must be as described in Table 3.

Signal	Function	DT-1 Pin# to	TRS-80 Pin#
GP	Ground Protective	1	1
TD	Transmit Data	2	3
RD	Receive Data	3	2
RTS	Receive to Send	4	5
CTS	Clear to Send	5	4
DSR	Data Set Ready	6	8
SG	Signal Ground	7	7
CD	Carrier Detect	8	20 & 6
DTR	Data Terminal Ready	20 & 6	8

Table 3

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Signal	Function	Pin #
Strobe	1.5 microsecond pulse to clock the data from the processor to the printer	
Data Ø	Bit Ø LSB of output data byte	3
Data 1	Bit 1 of output data byte	5
Data 2	Bit 2 of output data byte	7
Data 3	Bit 3 of output data byte	9
Data 4	Bit 4 of output data byte	11
Data 5	Bit 5 of output data byte	13
Data 6	Bit 6 of output data byte	15
Data 7	Bit 7 of output data byte (MSB)	17
BUSY	Input to Terminal from Printer High indicates busy	21

Table 4. Parallel Printer Interface

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Appendix A/ The ASCII Character Set

The DT-1 will output and receive all 128 ASCII codes. The following is a list of these codes and the keys used to produce them.

Dec	Hex	Oct	Key	Dec	Hex	Oct	Key
Ø	ØØ	ØØØ	CTRL 3-9,Ø	64	4Ø	1ØØ	@
1	Ø1	ØØ1	CTRL A	65	41	1Ø1	A
2	Ø2	ØØ2	CTRL B	66	42	1Ø2	B
3	Ø3	ØØ3	CTRL C	67	43	1Ø3	C
4	Ø4	ØØ4	CTRL D	68	44	1Ø4	D
5	Ø5	ØØ5	CTRL E	69	45	1Ø5	E
6	Ø6	ØØ6	CTRL F	7Ø	46	1Ø6	F
7	Ø7	ØØ7	CTRL G	71	47	1Ø7	G
8	Ø8	Ø1Ø	CTRL H	72	48	11Ø	H
9	Ø9	Ø11	CTRL I	73	49	111	I
1Ø	ØA	Ø12	LINE FEED	74	4A	112	J
11	ØB	Ø13	CTRL K	75	4B	113	K
12	ØC	Ø14	CTRL L	76	4C	114	L
13	ØD	Ø15	RETURN	77	4D	115	M
14	ØE	Ø16	CTRL N	78	4E	116	N
15	ØF	Ø17	CTRL O	79	4F	117	O
16	1Ø	Ø2Ø	CTRL P	8Ø	5Ø	12Ø	P
17	11	Ø21	CTRL Q	81	51	121	Q
18	12	Ø22	CTRL R	82	52	122	R
19	13	Ø23	CTRL S	83	53	123	S
2Ø	14	Ø24	CTRL T	84	54	124	T
21	15	Ø25	CTRL U	85	55	125	U
22	16	Ø26	CTRL V	86	56	126	V
23	17	Ø27	CTRL W	87	57	127	W
24	18	Ø3Ø	CTRL X	88	58	13Ø	X
25	19	Ø31	CTRL Y	89	59	131	Y
26	1A	Ø32	CTRL Z	9Ø	5A	132	Z
27	1B	Ø33	ESCAPE	91	5B	133	[
28	1C	Ø34	CTRL :	92	5C	134	CTRL /
29	1D	Ø35	CTRL]	93	5D	135	]
3Ø	1E	Ø36	HOME	94	5E	136	^
31	1F	Ø37	CTRL _	95	5F	137	_
32	2Ø	Ø4Ø	SPACE	96	6Ø	14Ø	CTRL '

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Dec	Hex	Oct	Key	Dec	Hex	Oct	Key
33	21	Ø41	!	97	61	141	a
34	21	Ø42	"	98	62	142	b
35	22	Ø43	#	99	63	143	c
36	23	Ø44	$	1ØØ	64	144	d
37	24	Ø45	%	1Ø1	65	145	e
38	25	Ø46	&	1Ø2	66	146	f
39	26	Ø47	'	1Ø3	67	147	g
4Ø	27	Ø5Ø	(	1Ø4	68	15Ø	h
41	28	Ø51	)	1Ø5	69	151	i
42	29	Ø52	*	1Ø6	6A	152	j
43	2A	Ø53	+	1Ø7	6B	153	k
44	2B	Ø54	,	1Ø8	6C	154	l
45	2C	Ø55	-	1Ø9	6D	155	m
46	2E	Ø56	.	11Ø	6E	156	n
47	2F	Ø57	/	111	6F	157	o
48	3Ø	Ø6Ø	Ø	112	7Ø	16Ø	p
49	31	Ø61	1	113	71	161	q
5Ø	32	Ø62	2	114	72	162	r
51	33	Ø63	3	115	73	163	s
52	34	Ø64	4	116	74	164	t
53	35	Ø65	5	117	75	165	u
54	36	Ø66	6	118	76	166	v
55	37	Ø67	7	119	77	167	w
56	38	Ø7Ø	8	12Ø	78	17Ø	x
57	39	Ø71	9	121	79	171	y
58	3A	Ø72	:	122	7A	172	z
59	3B	Ø73	;	123	7B	173	CTRL [
6Ø	3C	Ø74	<	124	7C	174	CTRL -
61	3D	Ø75	=	125	7D	175	}
62	3E	Ø76	>	126	7E	176	~
63	3F	Ø77	?	127	7F	177	<DEL>

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Appendix B/ Table of Keyboard Codes

The table below gives the ASCII Code produced when the key-combinations indicated are pressed. Multiple keys must be held down together to produce the indicated code. Remember CAPS LOCK means the Alphabet will be uppercase with or without <SHIFT>, and keys with two symbols on them will produce the top symbol only when <SHIFT> is pressed.

Key	Lower Case	<CTRL>Key	<SHIFT>key	<CTRL><SHIFT>Key
,	2C	ØØ	3C	ØØ
-	2D	7C	5F	1F
.	2E	ØØ	3E	ØØ
/	2F	5C	3F	ØØ
Ø	3Ø	ØØØ	2Ø	ØØ
1	31	(3)	21	ØØ
2	32	(3)	4Ø	ØØ
3	33	ØØ	23	ØØ
4	34	ØØ	24	ØØ
5	35	ØØ	25	ØØ
6	36	ØØ	26	ØØ
7	37	ØØ	27	ØØ
8	38	ØØ	28	ØØ
9	39	ØØ	29	ØØ
A	61	Ø1	41	Ø1
B	62	Ø2	42	Ø2
C	63	Ø3	43	Ø3
D	64	Ø4	44	Ø4
E	65	Ø5	45	Ø5
F	66	Ø6	46	Ø6
G	67	Ø7	47	Ø7
H	68	Ø8	48	Ø8
I	69	Ø9	49	Ø9
J	6A	ØA	4A	ØA
K	6B	ØB	4B	ØB
L	6C	ØC	4C	ØC

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M	6D	ØD	4D	ØD
N	6E	ØE	4E	ØE
O	6F	ØF	4F	ØF
P	7Ø	1Ø	5Ø	1Ø
Q	71	11	51	11
R	72	12	52	12
S	73	13	53	13
T	74	14	54	14
U	75	15	55	15
V	76	16	56	16
W	77	17	57	17
X	78	18	58	18
Y	79	19	59	19
Z	7A	1A	5A	1A
<BACK SPACE>	Ø8	Ø8	Ø8	Ø8
DEL	7F	7F	7F	7F
{	7B	ØØ	5B	1B
}	7D	1D	5D	1D
<SPACE BAR>	2Ø	2Ø	2Ø	2Ø
<LINE FEED>	ØA	ØA	ØA	ØA
<CLEAR>	1A	1A	1B2A	1B2A
<BREAK>	(1)	ØØ		
<ENTER>	ØD	ØD	ØD	(2)
<ESC>	1B	1B		

Table of ASCII by Keypress

Notes:

1. This key causes the DT-1 to send a "space" of .75 seconds.

2. <CTRL><SHIFT><ENTER> puts the DT-1 into its I/O parameter set-up mode. It transmits a <CTRL> <S> to the Host to stop input.

3. This key shifts the DT-1 into and out of Monitor Mode. No code is generated with this key.

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Keypad Keys

Key	Lower	<CTRL>Key	<SHIFT>key	<CTRL><SHIFT>Key
Ø	3Ø	Ø123(2)	6Ø	ØØ
1	31	Ø141(2)	5C	1C
2	32	Ø142(2)	ØA	ØA
3	33	Ø143(2)	7E	ØØ
4	34	Ø144(2)	Ø8	Ø8
5	35	Ø145(2)	1E	1E
6	36	Ø146(2)	Ø1	ØC
7	37	Ø147(2)	Ø1	ØØ
8	38	Ø148(2)	ØB	ØB
9	39	Ø149(2)	Ø2	ØØ
.	2E	ØØ	7C	ØØ
<ENTER>	ØD	ØD	ØD	(1)

Key-sequence (2) is a standard ASCII sequence which many Hosts interpret as a special function sequence. The sequence in the table is followed by a terminating character from the TC table in the Set-Up procedure.

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Appendix C/ Keyboard Equivalents for Common Terminals

The following pages are a quick reference guide to four of the more common terminals in use. Use the guide for the Terminal you are emulating.

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Televideo 91Ø Keyboard Equivalents

Function	ØØ	Key
Cursor Commands		
Home		<HOME> or <CTRL> ^
New Line		<CTRL> _
Carriage Return		<ENTER> or <CTRL> M
Cursor Down		<downarrow> or <CTRL> J
Cursor Up		<uparrow> or <CTRL> K
Cursor Left		<leftarrow> or <CTRL> H
Cursor Right		<rightarrow> or <CTRL> L
Tab Controls		
Move to Tab		<TAB> or <CTRL> I
Set Column Tab		ESC 1
Clear Column Tab		ESC 2
Clear All Tabs		ESC 3
Back Tab		<SHIFT><TAB> or <ESC> I
Edit Commands		
Erase to End of Line		<ESC> T
Erase to End of Page		<ESC> Y
Clear Screen to Spaces		<CLEAR> or<ESC> + or <CTRL> Z
Clear Screen to Nulls		<SHIFT><CLEAR> or <ESC> *
Bell		<CTRL> G
Visual Controls		
Normal Video		<ESC> G Ø
Invisible Video		<ESC> G 1
Blink Video		<ESC> G 2
Invisible Blink		<ESC> G 3
Reverse Video		<ESC> G 4
Invisible Reverse		<ESC> G 5
Reverse Blink		<ESC> G 6
Reverse Invisible Blink		<ESC> G 7
Underline		<ESC> G 8
Invisible Underline		<ESC> G 9
Blink Underline		<ESC> G :
Invisible Blink Underline		<ESC> G ;
Reverse Underline		<ESC> G <
Invisible Reverse Underline		<ESC> G =
Reverse Blink Underline		<ESC> G >

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Invisible Reverse Blink Underline	<ESC> G ?
Half Intensity On	<ESC>)
Half Intensity Off	<ESC> (
Cursor Visible/Invisible Toggle	<ESC> .
Display a Single Control Character	<ESC> F <character>
Display Normal to Reverse	<ESC> b
Display Reverse to Normal	<ESC> d

Test Modes

Self Test On	<ESC> V
Self Test Off	O

Cursor Screen Locations

Load Cursor (Row)	<ESC> [r
Load Cursor (Column)	<ESC>] c
Load Cursor (Row and Column)	<ESC> = r c
Read Cursor (Row and Column)	<ESC> ?

Device Controls

Enable Keyboard	<ESC> "
Disable Keyboard	<ESC> #
Enable Printer Port	<ESC> @
Disable Printer Port	<ESC> A
Enable Transparent Print	<CTRL> R
Disable Transparent Print	<CTRL> T
Auto Scroll ON/OFF Toggle	<ESC> H

Monitor Controls

Monitor On	<ESC> U
Monitor Off	<ESC> u
Monitor On (local)	<CTRL> 1
Monitor Off (local)	<CTRL> 2

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ADDS 25 Keyboard Equivalences

Function	1Ø Key
Cursor Control	
Home	<HOME> or <CTRL> A
New Line	<CTRL> _
Carriage Return	<ENTER> or <CTRL> M
Cursor Down	<downarrow> or <CTRL> J
Cursor Up	<uparrow> or <CTRL> Z
Cursor Left	<leftarrow> or <CTRL> H or <CTRL> U
Cursor Right	<rightarrow> or <CTRL> F
Tab Controls	
Move to Tab	<TAB> or <CTRL> I
Set Column Tab	<ESC> 1
Clear Column Tab	<ESC> 2
Back Tab	<SHIFT><TAB> or <ESC> I
Edit Controls	
Erase to End of Line	<ESC> K
Erase to End of Page	<ESC> k
Clear Screen (Nulls)	<SHIFT><CLEAR> or <ESC> *
Clear Screen (Spaces)	<CTRL> L
Bell	<CTRL> G
Visual Controls	
Normal Video	<ESC> G Ø
Invisible Video	<ESC> G 1
Blink Video	<ESC> G 2
Invisible Blink	<ESC> G 3
Reverse Video	<ESC> G 4
Invisible Reverse	<ESC> G 5
Reverse Blink	<ESC> G 6
Reverse Invisible Blink	<ESC> G 7
Underline	<ESC> G 8
Invisible Underline	<ESC> G 9
Blink Underline	<ESC> G :
Invisible Blink Underline	<ESC> G ;
Reverse Underline	<ESC> G <
Invisible Reverse Underline	<ESC> G =
Reverse Blink Underline	<ESC> G >
Invisible Reverse Blink Underline	<ESC> G ?
Half Intensity On	<ESC>)

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Half Intensity Off	<ESC> (
Cursor Visible/Invisible Toggle	<ESC> .
Display a Single Control Character	<ESC> F <character>

Test Mode

Self Test On	<ESC> V
Self Test Off	O

Cursor Screen Locations

Load Cursor (Row)	<CTRL> K r
Load Cursor (Column)	<CTRL> P c
Load Cursor (Row and Column)	<ESC> Y rc
Read Cursor (Row and Column)	<ESC> ?

Device Controls

Enable Keyboard	<ESC> 6
Disable Keyboard	<ESC> 5
Enable Printer Port	<CTRL> R
Disable Printer Port	<CTRL> T
Enable Transparent Print	<ESC> 3
Disable Transparent Print	<ESC> 4
Auto Scroll ON/OFF Toggle	<ESC> H

Monitor

Monitor On (local)	<CTRL> 1
Monitor Off (local)	<CTRL> 2

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Lear Siegler ADM-5 Keyboard Equivalents

Function	Ø1	Key
Cursor Controls		
Home		<HOME>
New Line		<CTRL> _
Carriage Return		<ENTER> or <CTRL> M
Cursor Down		<downarrow> or <CTRL> J
Cursor Up		<uparrow> or <CTRL> K
Cursor Left		<leftarrow> or <CTRL> H
Cursor Right		<rightarrow> or <CTRL> L
Tab Controls		
Move to Tab		<TAB> or <CTRL> I
Set Column Tab		<ESC> 1
Clear Column Tab		<ESC> 2
Clear All Tabs		<ESC> 3
Back Tab		<SHIFT><TAB> or <ESC> I
Edit Commands		
Erase to End of Line		<ESC> T
Erase to End of Page		<ESC> Y
Clear Screen to Nulls		<SHIFT><CLEAR> or <ESC> *
Clear Screen to Spaces		<CTRL> Z
Bell		<CTRL> G
Visual Attributes		
Half Intensity On		<ESC>)
Half Intensity Off		<ESC> (
Display Normal to Reverse		<ESC> G or <ESC> b
Display Reverse to Normal		<ESC> d
Cursor Visible/Invisible Toggle		<ESC> .
Display a Single Control Character		<ESC> F <character>
Test Mode		
Self Test On		<ESC> V
Self Test Off		O
Cursor Screen Locations		
Load Cursor (Row)		<ESC> [r
Load Cursor (Column)		<ESC>] c

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Load Cursor (Row and Column)	<ESC> = rc
Read Cursor (Row and Column)	<ESC> ?

Controls

Enable Keyboard	<ESC> "
Disable Keyboard	<ESC> #
Enable Printer Port	<CTRL> N
Disable Printer Port	<CTRL> O
Enable Transparent Print	<ESC> @
Disable Transparent Print	<ESC> A
Auto Scroll ON/OFF Toggle	<ESC> H

Monitor

Monitor On	<ESC> U
Monitor Off	<ESC> u or <ESC> X
Monitor On (local)	<CTRL> 1
Monitor Off (local)	<CTRL> 2

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Hazeltine 141Ø Keyboard Equivalents

Function	Key
Cursor Control	
Home	<HOME>
Carriage Return	<ENTER> or <CTRL> M
Cursor Down	<downarrow> or <CTRL> J
Cursor Up	<uparrow> or <ESC><CTRL> L
Cursor Left	<leftarrow> or <CTRL> H
Cursor Right	<rightarrow> or <CTRL> P
Tab Controls	
Move to Tab	<TAB> or <CTRL> I
Set Column Tab	<ESC> 1
Clear Column Tab	<ESC> 2
Clear All Tabs	<ESC> 3
Back Tab	<SHIFT><TAB> or <ESC> I
Edit Commands	
Erase to End of Line	<ESC><CTRL> O
Erase to End of Page	<ESC><CTRL> X
Clear Screen (Spaces)	<CLEAR>
Clear Screen (Nulls)	<SHIFT><CLEAR> or <CTRL> :
Bell	<CTRL> G
Visual Commands	
Normal Video	<ESC><CTRL> G Ø
Invisible Video	<ESC><CTRL> G 1
Blink Video	<ESC><CTRL> G 2
Invisible Blink	<ESC><CTRL> G 3
Reverse Video	<ESC><CTRL> G 4
Invisible Reverse	<ESC><CTRL> G 5
Reverse Blink	<ESC><CTRL> G 6
Reverse Invisible Blink	<ESC><CTRL> G 7
Underline	<ESC><CTRL> G 8
Invisible Underline	<ESC><CTRL> G 9
Blink Underline	<ESC><CTRL> G :
Invisible Blink Underline	<ESC><CTRL> G ;
Reverse Underline	<ESC><CTRL> G <
Invisible Reverse Underline	<ESC><CTRL> G =
Reverse Blink Underline	<ESC><CTRL> G >
Invisible Reverse Blink Underline	<ESC><CTRL> G ?
Display Normal to Reverse	<ESC> b
Display Reverse to Normal	<ESC> d

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Half Intensity On	<ESC><CTRL> Y
Half Intensity Off	<ESC> (

Test Controls

Self Test On	<ESC> V <ESC><CTRL> S
Self Test Off	O

Cursor Screen Locations

Load Cursor (Column and Row)	<ESC><CTRL> Q rc
Read Cursor (Column and Row)	<ESC><CTRL> E

Device Controls

Enable Keyboard	<ESC><CTRL> F
Disable Keyboard	<ESC><CTRL> u
Enable Printer Port	<ESC> /
Disable Printer Port	<ESC> ?
Enable Transparent Print	<ESC> *
Disable Transparent Print	<ESC> /

Monitor Mode Controls

Local Monitor On	<CTRL> 1
Local Monitor Off	<CTRL> 2

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Appendix D/ Glossary

ASCII -- American Standard Code for Information Interchange.

Asserted -- Turned on but not in a logical, binary, or electrical sense. The YES state.

Back Tab -- Moves Cursor to previous tab position. If there is no previous tab set, the Cursor will move to column one of that line.

Baud Rate -- Rate data is being sent between a Terminal and a Host. Approximately equal to "Bits per second".

Bell -- The buzzer in the DT-1.

Blink -- Characters following a Blink command will flash at a periodic rate.

Busy -- A signal sent to a Host by a printer telling the Host that the printer is "busy" and not to send more data.

Carriage Return -- Returns the Cursor to column one of the same line.

Clear All Tabs -- Removes all tabs on the Screen (Tab key will not function after this command).

Clear Screen (Spaces) -- Clears entire Screen of characters, replacing each position with a space (HEX code 2Ø).

Clear Tab -- Removes typewriter-type tab for entire Screen vertically (at the Cursor position).

Clear Screen (Nulls) -- Clears entire screen of characters, replacing each position with a null (Hex code ØØ).

Column -- Horizontal spaces. The DT-1 displays 8Ø columns.

Cursor Down -- Moves the Cursor down one line.

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Cursor Left -- Moves the Cursor left one character position.

Cursor Right -- Moves the Cursor right one character position.

Cursor Up -- Moves the Cursor up one line.

Cursor Visible/Invisible -- A toggle that allows the Cursor to be displayed or to be suppressed.

Default -- The value a switch or parameter takes on if you do not specify a value.

De-select -- Turn off. When the Printer is deselected, data from the Host will no longer be printed on the Printer.

Display Normal/Reverse -- A toggle that changes the Screen to normal or reverse video display.

Echo -- The Host immediately sends the character it just received back to the DT-1. The returned character may or may not be displayed on the Screen.

Emulate -- To copy or duplicate exactly. If you are emulating the Televideo 91Ø, then every key pressed on the DT-1 will function exactly as if it were pressed on the Televideo 91Ø.

Enabled -- Turned on. Permitted to function.

Even Parity. -- The number of bits in a character is counted. If the result is odd, the parity bit is set. Then the number of bits set will be even - hence, even parity. On the receive end, the number of bits in the word is counted. The result is compared with the parity bit and, if the result is odd and the parity bit is not set, then the computer knows that an error has occurred.

Full-Duplex -- Used when characters typed on the DT-1 are echoed by the Host System.

Half-Duplex -- Used when characters typed on the DT-1 are not echoed by the Host System. Usually the Terminal will display characters in this mode.

Half Intensity Off -- Characters input following this command are displayed at full white level.

Half Intensity On -- Characters input following this command are displayed at a less than white (gray) intensity.

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Home -- Moves the Cursor to column one, row 1, which is usually the upper-left corner of the Screen.

Invisible Video -- Characters are output, but not shown on the Screen, the Cursor increments, and spaces are printed. (See Transparent Video.)

Line Feed -- Moves the Cursor down one line without returning it to the left margin.

Move to Tab -- Moves the Cursor to the next tab position on that line. If tabs have been cleared, or they are not set, the Cursor will not move.

New Line -- Moves the Cursor to column one of the next line.

Normal Video -- Video displayed on the Screen as specified upon power-on with REV Switch set to Ø.

Odd Parity -- Each time a character is sent, a parity bit is sent too. If the number of bits set in the character is even, then the parity bit is set, resulting in an odd number - hence odd parity. When received, the number of bits set in the character is again counted and, if an even number results, then the parity bit must be set. If the parity bit is not set and the number of characters is even, the computer knows that an error in transmission has occurred.

Parallel -- The character is present all at once, using 7 or 8 wires with a unique combination of voltages on them. (See Serial.)

Parity -- An error-checking system.

Reverse Video -- Characters are displayed opposite of power-on condition (white on black or black on white).

Row -- The number of lines on a page. The DT-1 displays 24 rows.

Scroll -- When the Cursor reaches the last line of the screen and a carriage return is received, all the lines are moved up one line, the top line disappears, and the new line is the last line (at the bottom of the Screen).

Select -- Turn on. Selecting a Printer means that output from the Host will be sent to the Printer.

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Serial -- Data arrives one bit at a time through a single wire and 7 or 8 bits set in a unique combination of voltage levels defines a character. (See Parallel.)

Set Column Tab -- Sets a typewriter-type tab for the entire Screen vertically (at the Cursor position).

Transparent Video -- Characters typed on the Keyboard are sent to the Host, echoed to the Terminal, but NOT displayed on the Screen. The Cursor does not advance as characters are typed. Used to prevent passwords being displayed as they are typed.

Underline -- Characters input following this command are underlined.

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Appendix E/ Cursor Position Coordinates

When the Cursor is positioned by the Host System, the command codes will use ASCII characters that represent the line and column number where the Cursor is to be placed.

Some emulation modes allow the Cursor position to be interrogated by a command function. The DT-1 will transmit ASCII codes based on the current position. The following list shows the line and column positions and their ASCII codes.

Line Number	Column Number	Code	Line Number	Column Number	Code
1	1	space	*	27	:
2	2	!	*	28	;
3	3	"	*	29	<
4	4	#	*	3Ø	=
5	5	$	*	31	>
6	6	%	*	32	?
7	7	&	*	33	@
8	8	'	*	34	A
9	9	(	*	35	B
1Ø	1Ø	)	*	36	C
11	11	*	*	37	D
12	12	+	*	38	E
13	13	,	*	39	F
14	14	-	*	4Ø	G
15	15	.	*	41	H
16	16	/	*	42	I
17	17	Ø	*	43	J
18	18	1	*	44	K
19	19	2	*	45	L
2Ø	2Ø	3	*	46	M
21	21	4	*	47	N
22	22	5	*	48	O
23	23	6	*	49	P
24	24	7	*	5Ø	Q
*	25	8	*	51	R
*	26	9	*	52	S

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Line Number	Column Number	Code	Line Number	Column Number	Code
*	53	T	*	67	b
*	54	U	*	68	c
*	55	V	*	69	d
*	56	W	*	7Ø	e
*	57	X	*	71	f
*	58	Y	*	72	g
*	59	Z	*	73	h
*	6Ø	[	*	74	i
*	61	/	*	75	j
*	62	]	*	76	k
*	63	^	*	77	l
*	64		*	78	m
*	65	←	*	79	n
*	66	a	*	8Ø	o
			*	*	DEL

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Appendix F/ Control Codes for Video Display

Control Codes are displayed in the Monitor Mode. The following table gives the Mnemonic abbreviation and ASCII code for each.

Character	Mnemonic	Code	Key
	NUL	ØØ	<CTRL> Ø
S_H	SOH	Ø1	<CTRL> A
S_X	STX	Ø2	<CTRL> B
E_X	ETX	Ø3	<CTRL> C
E_T	EOT	Ø4	<CTRL> D
E_Q	ENQ	Ø5	<CTRL> E
A_K	ACK	Ø6	<CTRL> F
B_L	BEL	Ø7	<CTRL> G
B_S	BS	Ø8	<CTRL> H
H_T	HT	Ø9	<CTRL> I
L_F	LF	ØA	<CTRL> J
V_T	VT	ØB	<CTRL> K
F_F	FF	ØC	<CTRL> L
C_R	CR	ØD	<CTRL> M
S_O	SO	ØE	<CTRL> N
S_I	SI	ØF	<CTRL> O
D_L	DLE	1Ø	<CTRL> P
D_1	DC1	11	<CTRL> Q

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D_2	DC2	12	<CTRL> R
D_3	DC3	13	<CTRL> S
D_4	DC4	14	<CTRL> T
N_K	NAK	15	<CTRL> U
S_Y	SYN	16	<CTRL> V
E_B	ETB	17	<CTRL> W
C_N	CAN	18	<CTRL> X
E_M	EM	19	<CTRL> Y
S_B	SUB	1A	<CTRL> Z
E_C	ESC	1B	<ESC>
F_S	FS	1C	<leftarrow>
G_S	GS	1D	<rightarrow>
R_S	RS	1E	<uparrow>
U_S	US	1F	<downarrow>

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