



DATA TERMINALS AND COMMUNICATIONS

DTC-300 USERS MANUAL



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SECTION 1

1.0 DESCRIPTION

The DTC-300 Data Terminal is designed to provide the remote computer user with a truly "universal" data terminal. By incorporating a micro-processor (miniature computer) and the Diablo HyType I print mechanism, the unit produces variable width (4 to 14-7/8 inches), typewriter quality output at 10, 15, or 30 characters per second. The user may choose from a variety of print styles in character or plot mode. The micro-processor also allows selection of ASCII, BCD, Correspondence, or Baudot (Telex) line codes by simply turning the CODE SELECT switch. Along with these features, the DTC-300 provides reliability unsurpassed in the data terminal field today.

Conceptually, the micro-processor used in the DTC-300 is similar to any computer. It is controlled by a program which is stored in ROM (read only memory). This program may be reconfigured to meet special requirements. A working storage area is provided for buffering and data manipulation.

Plotting is an additional capability of the DTC-300 that may easily be utilized by the operator. Control codes are used to move the print head bi-directionally with a resolution of 1/60 inch. The friction or pin feed platen moves the paper forward or reverse in increments of 1/48 inch.

Although reliability is an inherent characteristic of the DTC-300, serviceability and ease of maintenance are prime considerations in its design. The unit consists of four discrete modules - keyboard, printer, micro-processor, and power supply. By using this modular approach, service can be performed quickly "on-site" by simply exchanging the failing module. Therefore, costly downtime is minimized and maintenance cost is reduced significantly. After removal, the failing module can be repaired at depot or shop level with no inconvenience to the terminal user.

1.1 Module Description

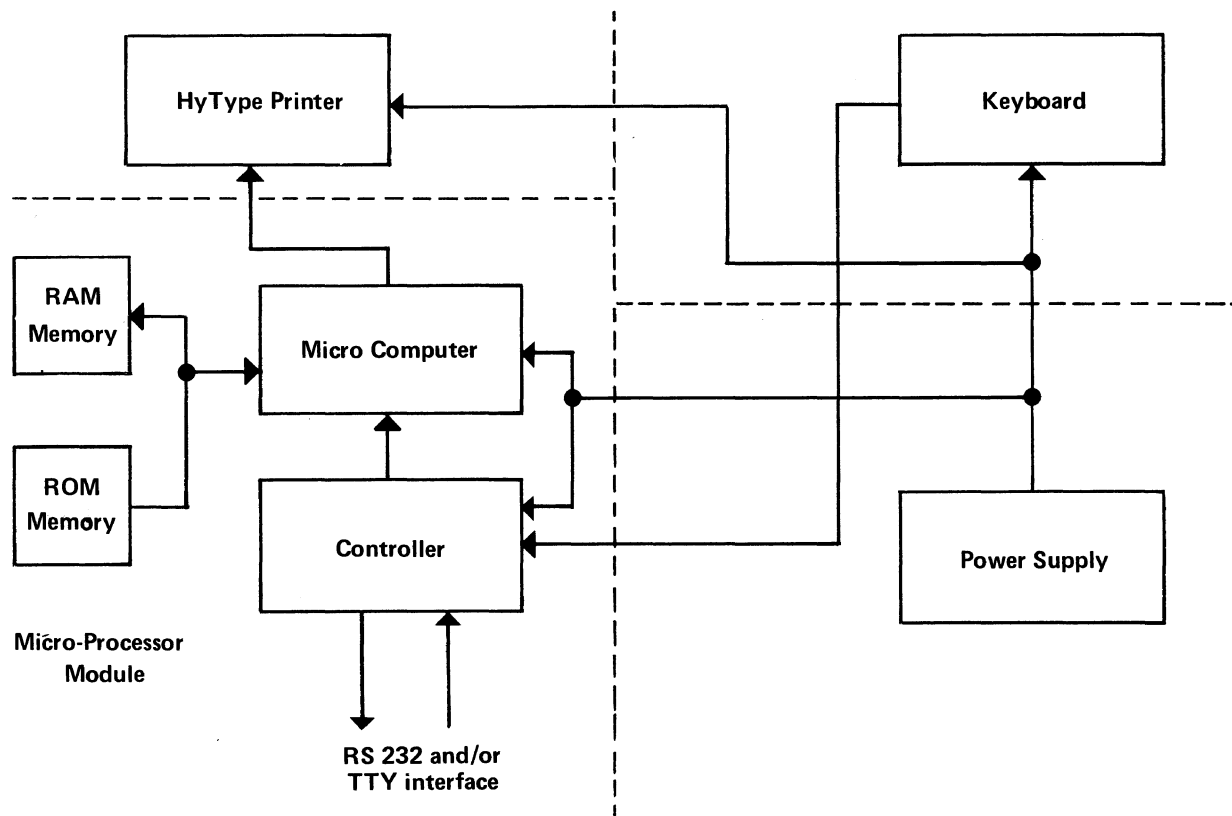
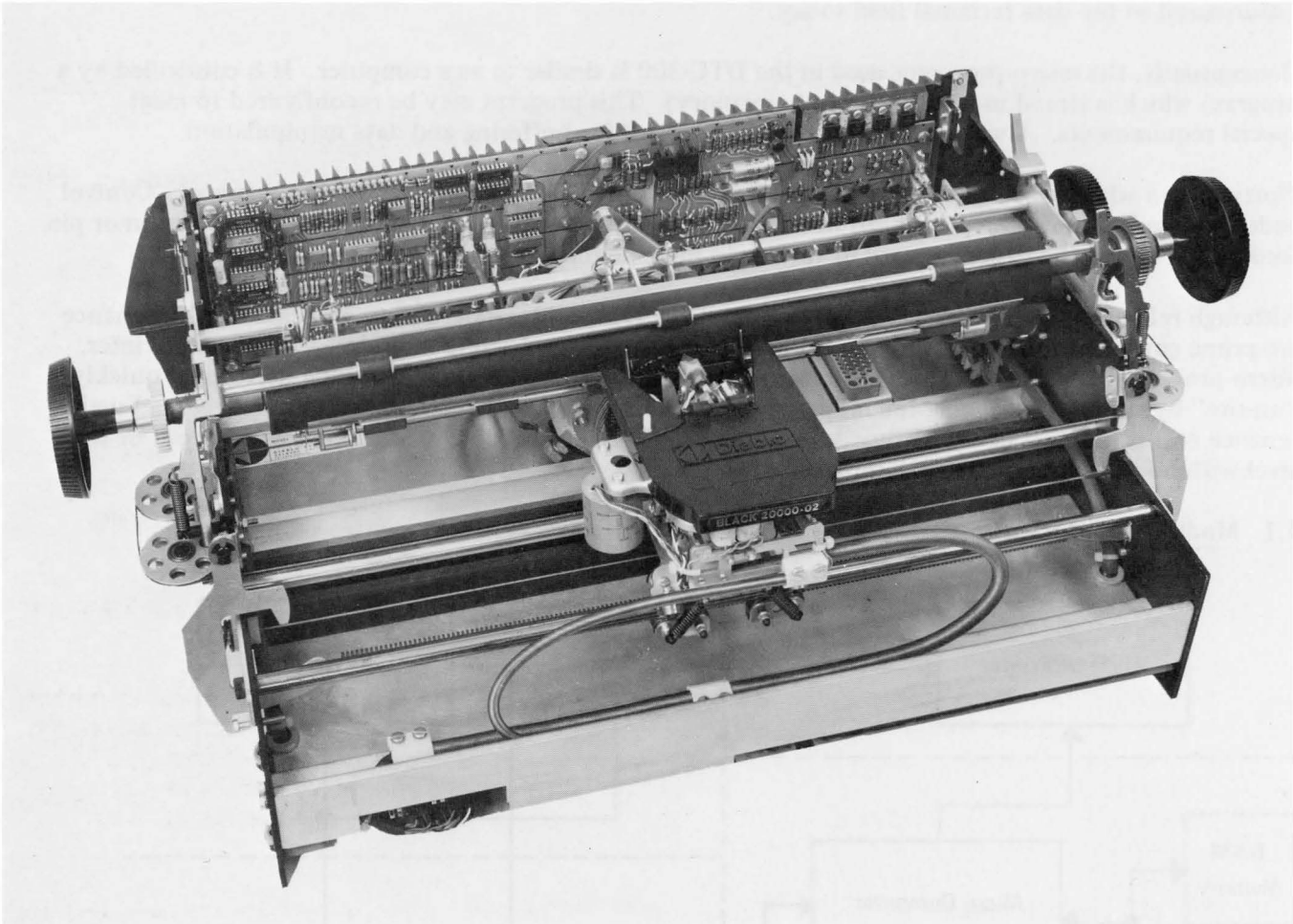


Fig. 1-A DTC-300 MODULAR LAYOUT

The DTC-300 is of modular design as illustrated in Figure 1-A. The following is a description of each of the four modules:

- 1.1.1 Keyboard - The DTC-300 keyboard incorporates reed switch contacts with solid state electronics to provide long life and trouble-free operation. A 10-key numeric pad is a standard feature on the DTC-300.
- 1.1.2 Printer - The Diablo HyType I printer is used in the DTC-300. This highly reliable, compact unit is especially suited for applications where wide carriage, multiple copy, low noise level, and high print quality are desired.

DIABLO HY TYPE I



Printing and carriage movement are accomplished by unique electronic control techniques that eliminate 80 per cent of the moving parts found in conventional printers. It can print up to 158 characters per line (12 pitch) at speeds up to 30 characters per second. The character set may be easily changed by snapping in one of several "daisy" print wheels available. (Foreign language wheels are also available.) Ribbons may be either fabric or carbon contained in a snap-in cartridge.

The carriage, platen, and print wheel are positioned by servo motors. Because of the inherent accuracy of the servo motors and transducer control, the carriage may be positioned in increments as small as 1/60 inch. Platen movement provides for a resolution of 1/48 inch vertically. Either a pin or friction feed platen is available along with a variable width forms tractor.

- 1.1.3 Micro-Processor - The Intel micro-processor is used to control the operation of the DTC-300. The PROM's (programmable read only memory) and integrated circuit chips of the micro-

processor are socket mounted to facilitate easy repair and special firmware changes.

The buffering technique used in the DTC-300 allows for 128 characters to be buffered and analyzed by the micro-processor. In the event of multiple spaces or line feed codes, the micro-processor provides the print mechanism with a command to skip the next print position or print line rather than move incrementally for each space or line. No timing considerations are necessary for carriage return, line feed, and tabbing in program applications.

- 1.1.4 Power Supply - The power supply is an integrated, solid state unit that provides the DTC-300 with the necessary voltage and current requirements. The single module unit is situated to facilitate easy removal and replacement if required.

1.2 Applications

The DTC-300 data terminal's high versatility allows it to be used in a broad range of terminal applications. In the LOCAL mode the DTC-300 may be interfaced with stand-alone storage devices (cassette, paper tape, floppy disc, etc.) to perform off-line editing or data entry for batch applications. With the high print quality available, the DTC-300 may also be used for many word processing applications.

In the LINE mode, the DTC-300 may be used to communicate serially in full or half duplex with a remote or "on-site" computer. Interactive timesharing applications are easily handled as no timing considerations are necessary for carriage return or line feed operation. The 128 character buffer and micro-processor handle the timing considerations internally.

Since the DTC-300 with the optional code selection is IBM 2741 compatible (Correspondence and BCD code), file inquiry and maintenance on database systems such as IBM's IMS (Integrated Management System) and Cincoms TOTAL is possible. The DTC-300 is also ideally suited for text processing applications such as ATS (Administrative Terminal Service) or comparable text processing programs.

The DTC-300 may be used with APL (A Programming Language) systems as an APL print wheel and APL key tabs are available.

For plotting applications the incremental spacing capabilities of the Diablo HyType I printer are used to accomplish high resolution plotting. In the plot mode the DTC-300 prints a character and waits for a carriage movement or paper feed command. These commands move the print carriage 1/60 inch horizontally or rotate the platen roller 1/48 inch vertically. The micro-processor also analyzes these movement commands to optimize carriage and platen positioning in the plot mode. For further details on the DTC-300 plot capabilities see section 4.4.

The plot mode is entered by receipt of a control "F" (F^C) from either the keyboard or communication line. A subsequent control "F" (F^C) or "G" (G^C) puts the DTC-300 back into the character mode. Control "G" (G^C) forces an unconditional exit from plot mode. This code structure is compatible with most timeshare services but in the case of special code requirements, the micro-processor PROM's may be reprogrammed upon request. Please contact DTC for further details.

1.3 Features

The DTC-300 features a full 96 character keyboard with a 10-key numeric pad. A hidden control panel houses the following controls:

- 1) Parity - odd, even, all, none
- 2) Code - ASCII (standard), BCD, Correspondence, Baudot
- 3) Duplex - full or half
- 4) 110, 150, 300 Baud (ASCII only)
- 5) Pitch - 10 (pica) or 12 (elite)
- 6) Reset - homes print mechanism, resets micro-processor controls, and tab stops.



DTC-300 KEYBOARD AND CONTROL PANEL

The DTC-300 features two standard line connectors.

RS 232 The EIA Standard RS 232 connector (female) is compatible with Series 113 and 103 Dataphones and equivalent units. External modems, acoustic coupler, and EIA RS 232 compatible storage devices may also be interfaced using this connector.

TTY A standard 4 wire (20 to 60 ma) current loop interface is provided. A Molex connector is used.

An optional TTL/T²L interface is available with the DTC-300. This interface uses the same line disciplines that the RS 232 port has and offers users the ability to tie directly to their computer data bus. Please contact DTC for more information on this feature.

SECTION 2

2.0 OPTIONS

- 2.1 Code Select Option - The DTC-300 may be equipped with the code select option which allows the operator to switch between ASCII, BCD, Correspondence, or Baudot code by simply turning a switch. The micro-processor handles all code conversion internally. Following is a brief description of the four code positions.

ASCII - Standard code provided with the DTC-300. Operates at 110, 150, or 300 baud rates in either full or half duplex.

Correspondence and BCD - In either of these positions the DTC-300 is IBM 2741 compatible. Both attention and reverse break signals are provided and either dial-up or leased line facilities may be used. A detailed flowchart of 2741 operation is located in section 6.

Baudot (Telex) - This code provides 5 level Baudot operation at 50 Baud (66 words per minute).

- 2.2 APL Option - An APL compatible keyboard and print wheel are available with the DTC-300. When equipped with this option, the DTC-300 operates as an APL terminal at 10, 15, or 30 characters per second.

- 2.3 Answerback Option - A predetermined message (30 character maximum) can be transmitted by pressing the HERE IS key or on receipt of an ENQ code.

- 2.4 Edit Buffer - An 8 or 16K (8,192 or 16,384) character buffer can be provided with the DTC-300. The buffer may be used to store and edit data offline. This data can then be transmitted at speeds up to 1200 Baud.

- 2.5 Acoustic Coupler - An external acoustic coupler pad with the standard DTC 103/113 integral modem can be ordered with the DTC-300. The modem can operate in any of the following modes:

Originate Only - terminal to remote computer.

Manual Answer/Originate - attended terminal or remote computer to terminal communication.

Auto Answer/Manual Originate - unattended operation. Remote computer to terminal or attended terminal to terminal communication.

CARRIER SPECIFICATIONS

Characteristics	Answer Mode		Originate Mode		Units
Line Frequency	Transmit	Receive	Transmit	Receive	
Mark	2225	1270	1270	2225	Hz
Space	2025	1070	1070	2025	Hz

Fig. 2-A CARRIER SPECIFICATIONS (answer/originate)

- 2.6 Data Access Arrangement (DAA) - The DTC-300 can be equipped with internal modems allowing ~~for~~ for direct connection to data access arrangements provided by the Telephone Company.
- 2.7 IBM Compatible Line Adapters - The DTC-300 can be equipped with integral IBM compatible line adapters for use in 2741 modes of operation. These adapters may be used in either two or four wire configurations.

Limited distance adapter for use in applications where the communication line is less than eight (8) wire miles.

Model 1 - Speeds of up to 150 Baud (15 CPS) over a maximum of four wire miles.

Model 2 - Speeds of up to 600 Baud (60 CPS) over a maximum of eight wire miles.

Leased line adapter for applications that require speeds of up to 600 Baud (60 CPS) over an unlimited distance.

Shared Line Adapters (SLA) are available for shared line applications. Each of the four sub-channels may operate at speeds of up to 300 Baud (30 CPS). The DTC-300 data terminals used in such applications may be located at the same point on the line or multi-dropped over the length of the line.

CARRIER SPECIFICATIONS

Characteristics	Limited Distance		Leased Line	Shared Line				Units
	Type 1	Type 2		1	2	3	4	
Line Frequency								
Mark	1170	1000	1400	820	1230	1640	2050	Hz
Space	1830	2200	2000	990	1400	1810	2220	Hz

Fig. 2-B CARRIER SPECIFICATIONS (leased/shared line adapters)

2.8 Paper Handling Accessories

- 2.8.1 Forms Stand - A stand that is positioned on the back of the DTC-300 to store and dispense the fan-fold type of forms.
- 2.8.2 Roll Handler - Bracket which holds the roll feed or teletype roll paper.
- 2.8.3 Pin Feed Platen - Platen designed to feed standard 14-7/8 inch computer paper with positive pin feed. Recommended for applications where multi-part paper or plotting are major considerations.

- 2.8.4 Forms Tractor - Adjustable mechanism used to feed variable width paper (4 to 14-7/8 inches) positive control of sprocket drive.

FORMS TRACTOR ASSEMBLY





SECTION 3

3.0 KEYBOARD CONTROLS

The keyboard controls on the DTC-300 are explained below. The CONTROL and ESCAPE functions for the standard DTC-300 are listed in Figure 3-A.

HERE IS	When installed, this option initiates the transmission of a pre-programmed answerback message of up to 30 characters in length.
RETURN	Returns the print element to the leftmost position on the carriage.
UPPER CASE ALPHA	Places the DTC-300 in a model 33 teletype compatible mode. Transmits upper case alpha and numeric characters when in this mode.
BREAK	Generates a greater than 200 ms. spacing signal which interrupts the computer.
BACKSPACE	Moves the print element to the left: a) 1/12 inch in 12 pitch (one elite character). b) 1/10 inch in 10 pitch (one pica character). c) 1/60 inch in plot mode (one increment).
REPEAT	When pressed, this key will cause the repetition of any depressed character or function key until either is released.
SHIFT	Places printer in upper case as long as SHIFT is depressed.
SHIFT LOCK	Same function as SHIFT except it must be cancelled by depression and release of SHIFT key.
LINE FEED	Moves platen up: a) 1/8 inch in 12 pitch. b) 1/6 inch in 10 pitch. c) 1/48 inch in plot mode.
CONTROL	Suppresses printing of simultaneously pressed characters and adds control bit to character. Special control functions are detailed in Figure 3-A.
ESCAPE	Is used in conjunction with other codes to cause functions detailed in Figure 3-A. (Same as ALT Mode.)
POWER/FAULT	Power switch. Fault light flashes on parity error and steadily illuminates on system error. Light and condition may be cleared by RESET or selecting NONE parity.
LINE/LOCAL	LOCAL - Allows off-line operation as standard office typewriter while holding communications line in a marking state. LINE - DTC-300 is connected to communications line.

3.1 CONTROL and ESCAPE Functions

When using ESCAPE functions, first press and release the ESCAPE key followed by pressing numeric key desired. The control functions are used by pressing the control key and alpha key simultaneously. All escape and control key functions may be initiated from the communication line. All functions are programmable at the plant and may be changed upon request for a nominal one-time charge.

CONTROL and ESCAPE Functions			
CONTROL	ESCAPE	Function	Description
	1	Tab set (electronic)	Sets horizontal tab stop in present location of print element.
	2	Tab clear (electronic)	Clears horizontal tab stop in present location of print element.
	5	Double LF	Initiates or cancels double line feeding.
E		ENQ	Requests answerback.
F		PLOT	Enter or exit plot mode.
G		BEL	Audible alarm.
G		EXIT PLOT	Unconditional exit of plot mode.
H		BS	Backspace.
I		HT	Moves carriage to next tab stop.
J		LF	Moves platen forward 1/48 inch when in plot mode or one line in character mode.
K		REV LF	Spaces carriage down in the same increments as defined for Line Feed.
L		FF	Moves carriage up until head-of-form is encountered.
Q		DC1	Used to control auxiliary devices.
R		DC2	Used to control auxiliary devices.
S		DC3	Used to control auxiliary devices.
T		DC4	Used to control auxiliary devices.

Fig. 3-A CONTROL AND ESCAPE FUNCTIONS

3.2 Control Panel

The DTC-300 control panel is located behind the front cover of the printer. Lift up on the cover to expose the control switches.



CONTROL PANEL LAYOUT

3.2.1 Parity Switch - This four position rotary switch is used to set the parity checking circuitry for both transmission and reception of data. The setting is as follows: (FAULT light when error is detected):

ODD	Checks for odd parity on reception and generates odd parity on transmission.
EVEN	Checks for even parity on reception and generates even parity on transmission.
NONE	Performs no checking and generates a space parity bit for every character.
ALL	Performs no checking and generates a mark parity bit for every character.

3.2.2 Duplex Switch - This two position switch sets the line mode of operation.

HALF	Causes character from the keyboard to print at the time it is sent on line.
FULL	Causes character input from the keyboard to be sent without being printed. Computer may reflect same character back or send back different data.

3.2.3 Code Select Switch - This optional four position rotary switch selects the following:

ASCII (Standard Code)	Compatible with teletype and other ASCII terminals. The baud switch may be set at 110, 150, or 300 baud (standard code).
CORRESPONDENCE	Compatible with Correspondence-coded 2741 line disciplines. The speed of the DTC-300 is automatically set at 134.8 baud. Break key is used as Attention key.
BCD	Compatible with BCD and EBCDIC line disciplines. The speed of the DTC-300 is automatically set at 134.8 baud. Break key is used as Attention key.
BAUDOT (Telex)	Compatible with model 28 or 32 teletypes (Baudot 5 level coded). The speed of the DTC-300 is automatically set at 50 baud.

3.2.4 Baud Rate Switch - This three position switch is used to set the print and communication speed of the DTC-300 when the CODE switch is set for ASCII or in LOCAL operations. The settings are as follows:

110	Sets the DTC-300 to operate at 110 baud (10 characters per second).
150	Sets the DTC-300 to operate at 150 baud (15 characters per second).
300	Sets the DTC-300 to operate at 300 baud (30 characters per second).

3.2.5 Pitch Select Switch - This two position switch sets both vertical and horizontal alignment as follows:

10	Sets printer to: 10 characters per inch (pica) - horizontal 6 lines per inch - vertical
12	Sets printer to: 12 characters per inch (elite) - horizontal 8 lines per inch - vertical

3.2.6 Reset Button - The RESET button clears the DTC-300 circuitry of any error condition. It also returns the print element to the leftmost position and clears all tab stops.

The control circuits are reset and the DTC-300 may be used immediately after the carriage has returned to the left.

SECTION 4

4.0 OPERATING PROCEDURES

Operation of the DTC-300 is very similar to that of other interactive data terminals. Controls the operator may exercise from the keyboard are listed in Figure 3-A. Programming considerations and both LOCAL and LINE operations are described in this section.

4.1 Programming Considerations

The programming considerations necessary for use of the DTC-300 are minimal. As the terminal is fully buffered and the micro-processor optimizes movement of the printer, no timing considerations are necessary for carriage return, line feed, and tabbing operations. Should a buffer overflow condition occur, the fault lamp will light and may be cleared by pressing RESET.

Parity generated and/or checked by the DTC-300 is determined by the setting of the parity switch. It may either be odd, even, mark (all bits on), or none. The DTC-300 may be set to lock the keyboard and/or transmit a break if a parity error is detected. This setting must be performed by a service representative or set at the plant.

Auto Line Feed on receipt of a Carriage Return may be provided if specified on order or set by a service representative.

4.2 Off-Line Operation

The DTC-300 can be used in LOCAL as a standard office typewriter. When connected to an off-line storage device such as digital cassette, paper tape, or floppy disc, the user may prepare and edit data for batch entry. Word-processing applications may also be handled on the DTC-300 using the off-line storage devices or high speed edit buffer.

Local or Off-Line Operation

To use the DTC-300 in LOCAL or for off-line applications:

1. Press POWER switch. POWER lamp will light with no fault indication.
2. Press LINE switch to LOCAL or LINE as required.
3. Set pitch to desired setting. (Pica - 10 pitch or 10 characters per inch; Elite - 12 pitch or 12 characters per inch.)
4. Tab stops and Single or Double line space may be set as described in Figure 3-A.
5. Keyboard operation is similar to that of a normal office typewriter.

When using off-line storage devices, they must be located between the DTC-300 and the modem or acoustic coupler on the RS 232 line connector. The DTC-300 must be in LINE mode to communicate with such devices. The off-line operations (i.e., start read/write, stop read/write) may be initiated from the DTC-300 keyboard using the CONTROL or ESCAPE functions as required by the storage device.

4.3 On-Line Operation

For on-line operation certain prerequisites must be met prior to signing on the system. The user must know the line speed, line discipline (full or half duplex), and line code (ASCII, Correspondence, BCD, etc.) to perform the necessary switch settings on the DTC-300.

To configure the DTC-300 for on-line operation:

1. Press POWER switch. POWER lamp will light with no fault indication.
2. Open front cover and insure control switch settings are set to conform with system requirements.
3. Set tab stops and line spacing as described in Figure 3-A.
4. Press LINE/LOCAL switch to insure the DTC-300 is in LINE position.
- 5a. Attended operation - dial desired number and when high pitched tone is heard:

Acoustic coupler - place hand set in coupler cradle.

Integrated modem (DAA) - pull up right switch hook on the phone.

Dataphone - push in the DATA button.

- 5b. Unattended operation - set up for unattended operation (auto answer):

Dataphone - push DATA button: Dataphone will auto answer.

Integral Modem (DAA) - no special preparation other than DTC-300 switch settings.

4.4 Plotting Operations

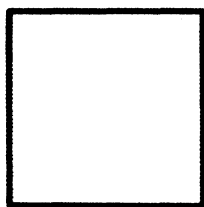
The DTC-300 provides high resolution plotting as a standard feature. The plot mode may be initiated either by the keyboard command or via the communication line by a remote computer. Following is a description of plot operation:

1. Enter the plot mode by issuing a CONTROL "F".
2. Select the desired character or graphic symbol to be printed and press corresponding key on the DTC-300 keyboard.
3. The DTC-300 will then wait for a movement command.

Space - Move print element 1/60 inch to the right.
Backspace (H^c) - Move print element 1/60 inch to the left.
Line Feed (J^c) - Move platen 1/48 inch up or forward.
Reverse Line Feed (K^c) - Move platen 1/48 inch down or reverse.
4. The character or symbol may be printed.
5. To exit PLOT mode, either another CONTROL "F" or a CONTROL "G" (unconditional exit) must be received.

The most efficient method of using the plot mode is through the use of simple subroutines to control the entry/exit of plot and carriage or platen movement. The subroutines can be called in by various drivers or a main program. A sample of a basic plot subroutine and the output is shown in Figure 4-A.

RUN



DONE
LIST

```
0010 REM      THIS PROGRAM WILL PLOT A 1" BY 1" SQUARE
0020 PRINT "          ";
0030 PRINT "";
0040 REM      THE ABOVE STATEMENT PUTS THE TERMINAL IN PLOT MODE
0050 REM      BY SENDING A NON-PRINTING CONTROL 'F' CHARACTER
0060   FOR X=1 TO 60
0070     PRINT " .";
0080   NEXT X
0090 REM 60 THRU 80 PRINTS THE TOP OF THE SQUARE
0100   FOR Y=1 TO 48
0110     PRINT " .";
0120   NEXT Y
0130 REM 110 PRINTS A LINE FEED THEN A .
0140   FOR X=1 TO 60
0150     PRINT ":";
0160   NEXT X
0170 REM 150 PRINTS A BACK SPACE THEN A . FOR THE BOTTOM OF THE SQUARE
0180   FOR Y=1 TO 48
0190     PRINT " .";
0200   NEXT Y
0210 REM 190 PRINTS A REVERSE LINE FEED (CTL K) AND A .
0220 PRINT "";
0230 REM 220 SENDS A CONTROL 'F' TO TAKE THE TERMINAL OUT OF PLOT MODE
0240 END
```

Fig. 4-A SAMPLE PLOT AND GENERATING PROGRAM

4.5 Auxiliary Storage Operation

Add-on or auxiliary storage devices can be interfaced with the DTC-300 utilizing the RS 232 port. The TTY port may also be used to communicate with auxiliary storage devices if they will operate in the current loop (20-60 ma) mode. The CONTROL or ESCAPE codes necessary to initiate different operations can be issued through the DTC-300 keyboard. These codes are usually specified in the auxiliary devices' operator manual.



SECTION 5

5.0 OPERATOR MAINTENANCE AND CARE

The DTC-300 is designed so that it requires minimum operator maintenance and the care it does require is very easily performed. The different areas that the operator may become involved in are:

- Changing the ribbon
- Changing the print wheel
- Loading paper
- Cleaning the platen

With reasonable care, the DTC-300 will provide high quality output and afford extremely high reliability for many years.

C A U T I O N

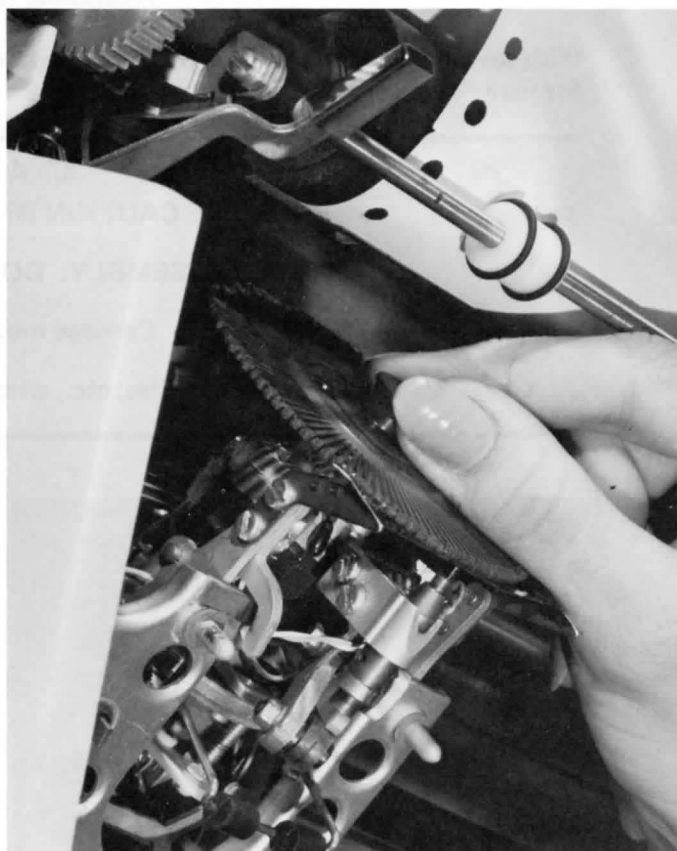
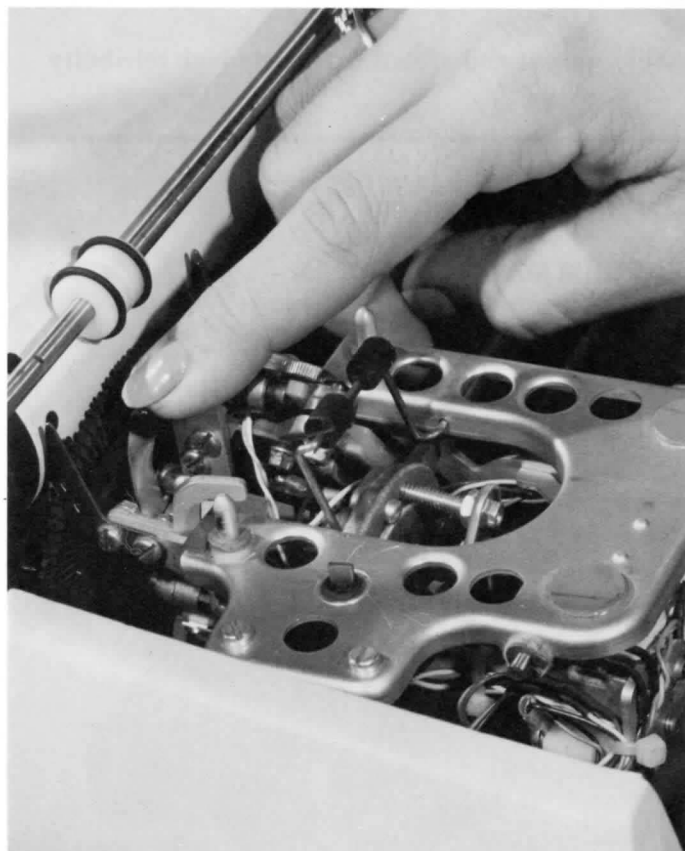
EXERCISE CAUTION WHEN CHANGING PRINT WHEEL OR RIBBON ASSEMBLY. DO NOT PERFORM MAINTENANCE IN LINE MODE. Carriage movement will inflict considerable hurt to fingers, hair, neckties, etc., when inadvertently caught in carriage assembly!!!



RIBBON REPLACEMENT

5.1 Ribbon Replacement

1. Press either RESET or RETURN to position carriage assembly to leftmost position. This will allow easy access to both ribbon and print wheel.
2. Lift front cover and push rubber roller that holds ribbon cartridge down forward. (See photograph.)
3. Lift ribbon cartridge off.
4. Replace ribbon insuring ribbon is in front of guides and print wheel. Pull rubber roller back on ribbon cartridge.



PRINT WHEEL REPLACEMENT

5.2 Print Wheel Replacement

1. Press either RESET or RETURN to position carriage assembly to leftmost position.
2. Remove ribbon as described in Section 5.1 - Ribbon Replacement.
3. Push carriage lock lever left and rotate assembly back. (See photograph.)
4. Remove print wheel by pulling on center knob.
5. Replace print wheel and insure drive key is in slot on the print wheel. Push back firmly.

6. Rotate assembly forward and push lock lever right to lock assembly forward.
7. Replace ribbon as described in Section 5.1 - Ribbon Replacement.

5.3 Paper Loading

Paper is fed around the platen in the same manner as for an office typewriter. The lever on the left rear portion of the cover (see Figure 7.1 , Appendix) engages the friction feed when pushed to the rear. If either the pin feed or forms tractor is used, the lever should be positioned forward to release the friction drive.

If the forms tractor is used, the paper may vary from 4 to 14-7/8 inches in width. Both the left and right tractor are adjustable and may be positioned as required.

5.4 Platen Care

Care should be exercised to avoid printing on the platen with no paper. This will cause smudges on the paper and cause the platen to harden. Do not use alcohol to clean the platen. Clean the platen with "Fedron" platen cleaner or suitable equivalent.



SECTION 6

6.0 PRINCIPLES OF OPERATION

6.1 Firmware

The firmware (hardware implemented software) controls the various internal operations of the DTC-300. These various functions are:

- Keyboard input/output
- Communication protocol
- Serial-to-parallel code conversion
- Printer optimization subroutines
- Plot control
- Buffer analysis and optimization

The DTC-300 firmware can be altered at the plant to implement custom code features or engineering changes.

6.2 ASCII Operation

The ASCII communication subroutines are programmed to operate at 110, 150, and 300 baud. At 110 baud the transmission code is one start bit, seven data bits, one parity bit, and two stop bits. At 150 and 300 baud, the code structure is the same as at 110 baud except that one stop bit follows the parity bit. (See Figures 6-A and 6-B.)

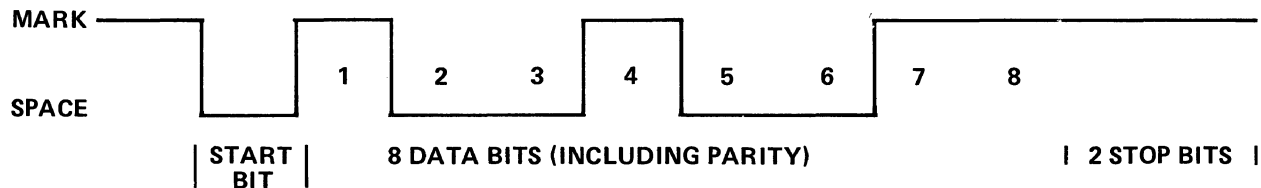


Fig. 6-A ASCII AT 110 BAUD (11 Bits/Characters)

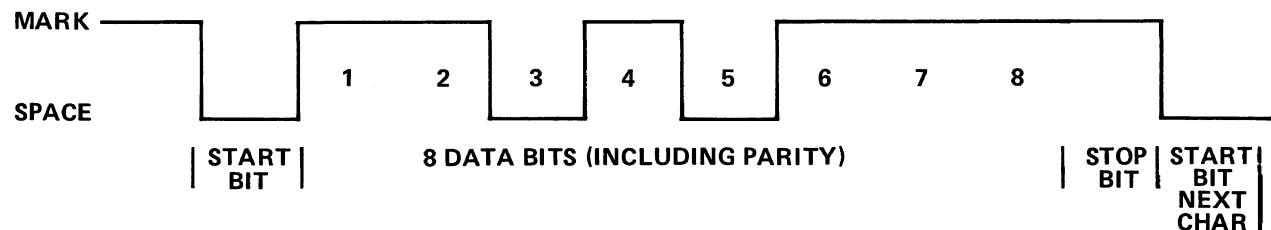


Fig. 6-B ASCII AT 150 and 300 BAUD (10 Bits/Characters)

6.3 Correspondence and BCD Operation

The DTC-300 may operate in either Correspondence or BCD (EBCDIC) if the Code Select option is on the terminal. The necessary code conversion between ASCII and Correspondence or BCD is performed by the micro-processor as the printer and keyboard are ASCII code devices.

Figure 6-C consists of a detailed flowchart of the communication protocol that the DTC-300 must follow in communicating with Correspondence or BCD (EBCDIC) supported systems. The DTC-300 provides for ATTN and reverse break by using alternate keys and key caps for the selected keys.

Transmission code structure is one start bit, six data bits, one parity bit, and one stop bit. Transmission in Correspondence or BCD is automatically set at 134.8 baud.

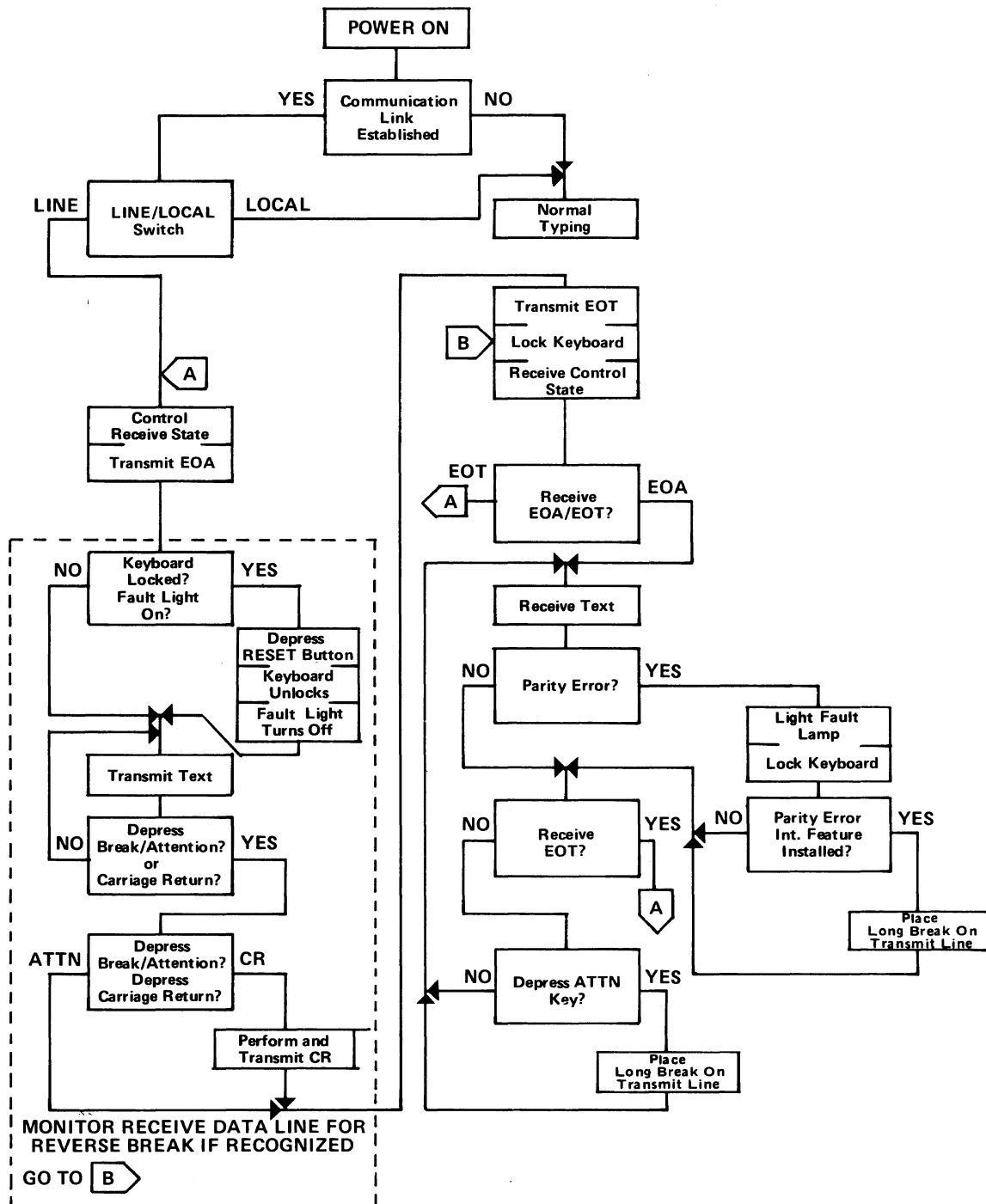


Fig. 6-C BCD/CORRESPONDENCE FLOWCHART

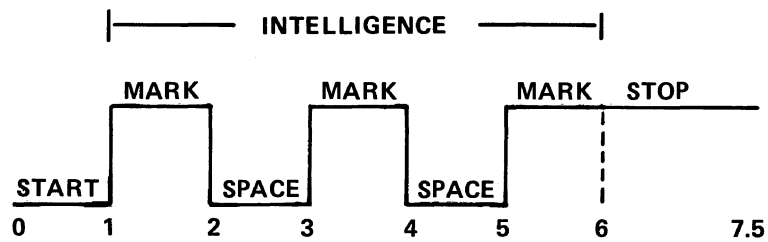
6.4 Baudot (Telex) Operation

The DTC-300 equipped with the Code Select option and operating in Baudot code is compatible with the TELEX service. Line speed is set at 50 baud (66 words per minute).

The transmission code structure is one start bit, five data bits.

FIGURES	-	?	:	&	3	!	&	#	8	i	(	)	.	,	9	0	1	4	Bell	5	7	;	2	/	6	"	Blank	Letters	Figures	Space	Carriage Return	Line Feed
LETTERS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Blank	Letters	Figures	Space	Carriage Return	Line Feed
	1	1		1	1	1				1	1					1		1		1		1	1	1	1		1	1				
	2		2				2		2	2	2	2				2	2	2			2	2	2				2	2			2	
			3			3		3	3		3		3	3		3	3		3		3	3		3	3		3		3			
		4	4	4		4	4			4	4		4	4	4			4				4		4			4	4		4		
		5					5	5				5	5		5	5	5			5		5	5	5	5	5		5	5			

FIVE CHANNEL BAUDOT COMMUNICATIONS CODE



FIVE-BIT BAUDOT CHARACTER

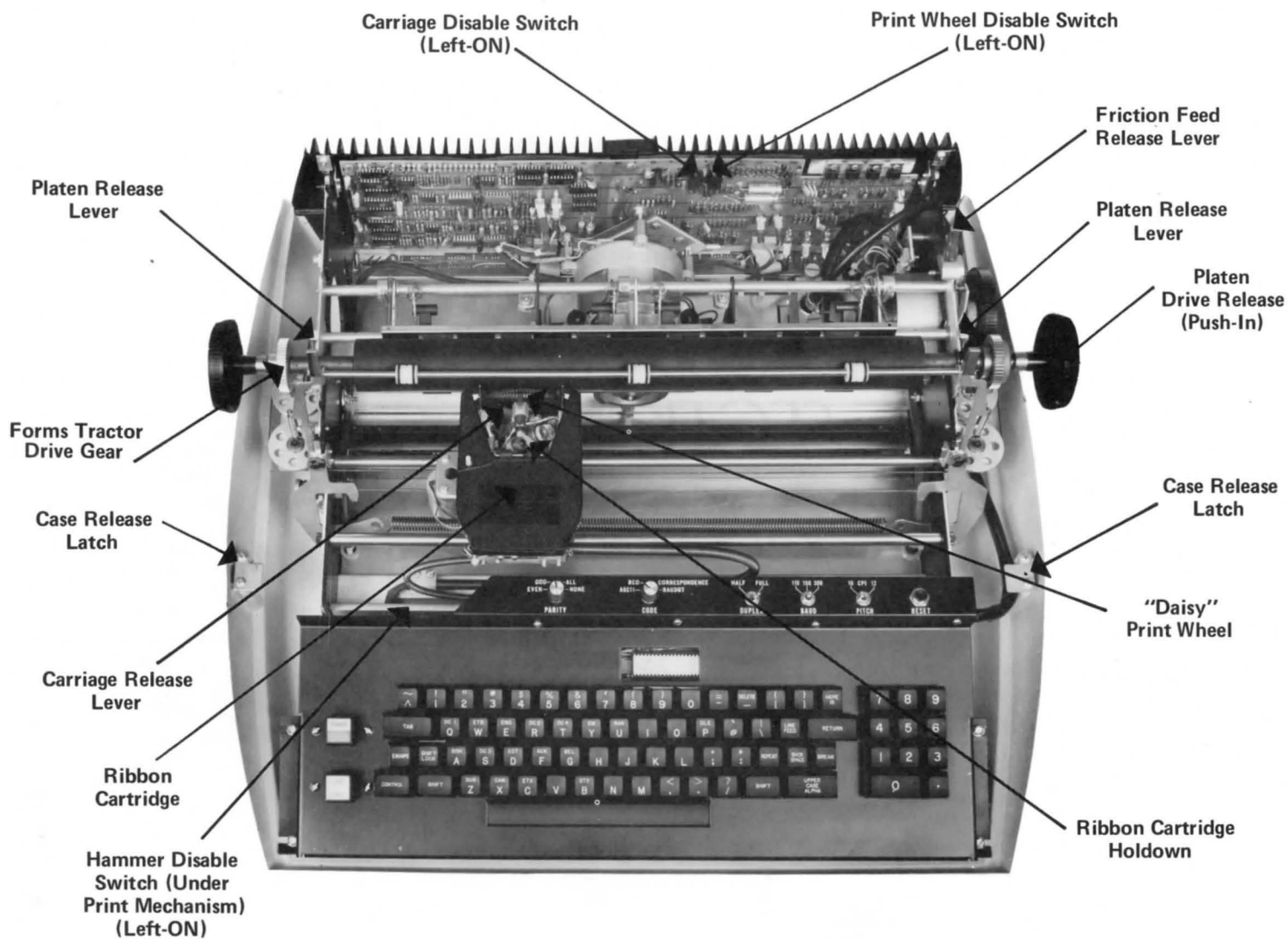
Fig. 6-D BAUDOT CHART



SECTION 7

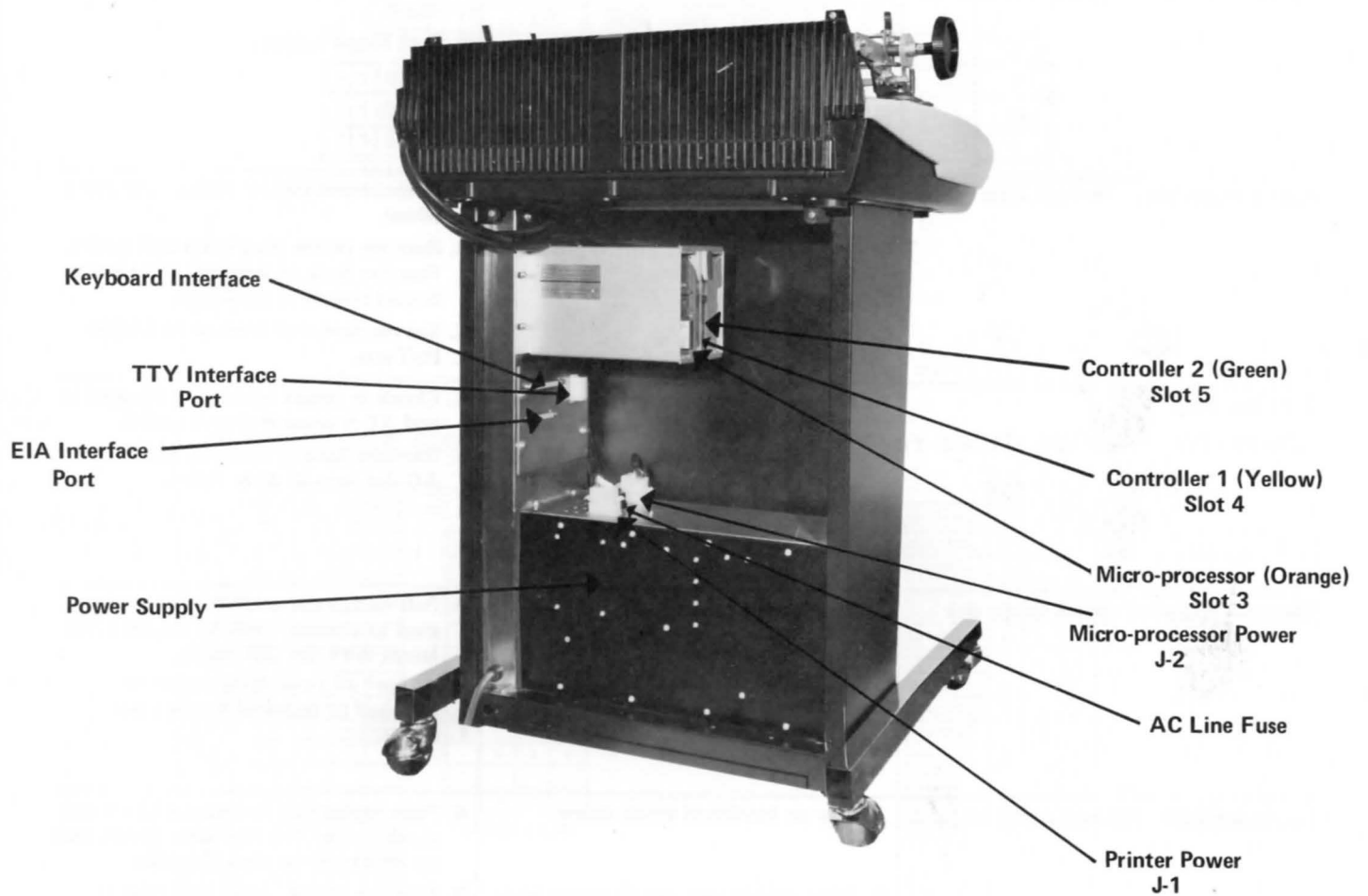
APPENDIX

TOP VIEW



7.1 LOCATION CHARTS

REAR VIEW



INDICATION	POSSIBLE CAUSE	FIX
Steady Fault light - printer inoperative	A. Carriage movement inhibited B. Improper data commands received C. Printer failure	A. Check printer area for objects that may obstruct movement (i.e., pencils, ribbons, etc.) B. Push Reset C. Call service if trouble persists.
Flashing Fault light	A. Buffer overflow B. Print wheel or ribbon jammed C. Incorrect parity received	A. Push Reset button. B. Remove and replace ribbon and print wheel. C. Select proper parity and push Reset.
Flashing Fault light - printer inoperative	A. Print wheel or ribbon jammed B. Parity error (BCD or Corres. Mode)	A. Remove and replace ribbon and print wheel. B. Push Reset button.
Printer inoperative - no fault light	A. Print wheel or ribbon jammed B. Loose circuit board (micro-processor) C. Faulty printer	A. Remove and replace ribbon and print wheel. B. Remove power plug from wall outlet. Remove back of terminal and reseal circuit boards in card cage. C. See maintenance manual on Diablo HyType.
Terminal Dead	A. AC power not present	A. Check to insure terminal is plugged in and AC is present at wall outlet. B. Remove back of terminal and check AC line fuse (8 Amp Fuse).
Terminal operative - panel lamps out	A. Panel lamps burned out	A. Pull switch out and unscrew center stud to separate switch. Replace bad lamps with No. 381 lamps. *Caution* all panel lamps must be installed or terminal damage can result.
Keyboard dead - Fan and lamps on	A. Key on keyboard stuck down B. Print inhibit switches in wrong position	A. Push repeat key to insure a key is not stuck down. If a character prints, pull up on key of printed character. B. Remove platen. Push case release levers forward to remove case. Insure carriage and print wheel disable switches are pushed to left.
Ribbon stuck - print quality poor	A. Ribbon jammed B. Expended carbon ribbon	A. Remove ribbon and pull out approximately 6" length of ribbon. Wind ribbon back and replace. B. Replace ribbon.

7.2 TROUBLE LOCATION CHART

USASCII CODE

÷ - delete
(^) - 140B

b₇ b₆ b₅ b₄ b₃ b₂ b₁ Column Row					0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
					0	1	2	3	4	5	6	7
0 0 0 0					0	NUL	DLE	SP	0 0 0	@ ←	P *	↵ →
0 0 0 1					1	SOH	DC1	! " #	A %	Q ?	a A	q Q
0 0 1 0					2	STX	DC2	) " -	B L	R P	b R	r R
0 0 1 1					3	ETX	DC3	< # <	C A	S T	c c	s S
0 1 0 0					4	EOT	DC4	≤ \$ ≤	D L	T ~	d D	t T
0 1 0 1					5	ENQ	NAK	= % =	E e	U ↓	e E	u U
0 1 1 0					6	ACK	SYN	> & ≥	F _	V v	f F	v V
0 1 1 1					7	BEL	ETB	] ' >	G V	W w	g G	w W
1 0 0 0					8	BS	CAN	v (≠	H 0	X >	h H	x X
1 0 0 1					9	HT	EM	^) v	I ?	Y A	i E	y Y
1 0 1 0					10	LF	SUB	# *)	J °	Z <	j S	z Z
1 0 1 1					11	VT	ESC	÷ + (	K ' [	{	k K	{
1 1 0 0					12	FF	FS	[, ,	L □	\ b s	l L	F
1 1 0 1					13	CR	GS	- + =	M / }	} }	m M	} }
1 1 1 0					14	SO	RS	. . >	N T	≥ ^	n U	\$ ~
1 1 1 1					15	SI	US	/ / ?	O 0	- X	o 0	DEL

CORRESPONDENCE CODE

BIT POSITION BIT VALUE →				1 2 1 2 1 2 1 2	← BIT POSITION	← BIT VALUE			
				8 4 2 1					
0 0 0 0				SP	t	!	½	j	
0 0 0 1				!	1	x	m	g	
0 0 1 0				2	n	.	=		
0 0 1 1				3	u	v	f		
0 1 0 0				5	e	!	p		
0 1 0 1				7	d	r	.		
0 1 1 0				6	k	i	q		
0 1 1 1				8	c	a	,		
1 0 0 0				4	l	o	/		
1 0 0 1				0	h	s	y		
1 0 1 0				Z					
1 0 1 1				EOA	b	w	-		
1 1 0 0				RCD	PRNT	RST	READ		
1 1 0 1					INDEX	CR/LF	TAB		
1 1 1 0				UC SHIFT		BKSP	LC SHIFT		
1 1 1 1				EOT	PREFIX	IDLE	CD		

LOWER CASE

SP	T	°	¼	J
[±	X	M	G	
@	N	.	+	
#	U	V	F	
%	E	"	P	
&	D	R	:	
ˆ	K	I	Q	
*	C	A	,	
\$	L	O	?	
)	H	S	Y	
Z				
(	B	W	-	

UPPER CASE

BINARY CODED DECIMAL (BCD) CODE

BIT POSITION BIT VALUE →				1 2 1 2 1 2 1 2	← BIT POSITION BIT VALUE			
				8 4 2 1				
0 0 0 0				0 0 0 1	0 0 0 1			
0 0 0 1				0 0 1 0	0 0 1 0			
0 0 1 0				0 0 1 1	0 0 1 1			
0 0 1 1				0 1 0 0	0 1 0 0			
0 1 0 0				0 1 0 1	0 1 0 1			
0 1 0 1				0 1 1 0	0 1 1 0			
0 1 1 0				0 1 1 1	0 1 1 1			
1 0 0 0				1 0 0 1	1 0 0 1			
1 0 0 1				1 0 1 0	1 0 1 0			
1 0 1 0				1 0 1 1	1 0 1 1			
1 0 1 1				1 1 0 0	1 1 0 0			
1 1 0 0				1 1 0 1	1 1 0 1			
1 1 0 1				1 1 1 0	1 1 1 0			
1 1 1 0				1 1 1 1	1 1 1 1			
1 1 1 1								

SP	°	\	<
>	?	J	A
)	S	K	B
:	T	L	C
*	U	M	D
(	V	N	E
:	W	O	F
"	X	P	G
*	Y	Q	H
[	Z	R	I
]			
##	,	!	

UPPER CASE

RCD	PRNT	RST	READ
	INDEX	CR/LF	TAB
UC SHIFT		BKSP	LC SHIFT
EOT	PREFIX	IDLE	CD

LOWER CASE

APL CHARACTER ASSIGNMENTS

b₇ b₆ b₅ b₄ b₃ b₂ b₁ Column Row					0 0	0 0 ₁	0 1 ₀	0 1 ₁	1 0 ₀	1 0 ₁	1 1 ₀	1 1 ₁
					0	1	2	3	4	5	6	7
0	0	0	0	0	0	NUL	DLE	SP	0	◇→	P	— *
0	0	0	1	1	1	SOH	DC1	..''	1	A	Q	α ?
0	0	1	0	2	2	STX	DC2	)—	2	B	R	⊥ ρ
0	0	1	1	3	3	ETX	DC3	<<	3	C	S	⌈ ⌊
0	1	0	0	4	4	EOT	DC4	≤ ≤	4	D	T	⌊ ~
0	1	0	1	5	5	ENQ	NAK	= =	5	E	U	ε ↓
0	1	1	0	6	6	ACK	SYN	> ≥	6	F	V	— U
0	1	1	1	7	7	BEL	ETB	] >	7	G	W	∇ ω
1	0	0	0	8	8	BS	CAN	∇ ≠	8	H	X	Δ ∘
1	0	0	1	9	9	HT	EM	^ ∇	9	I	Y	⌊ ↑
1	0	1	0	10	10	LF	SUB	≠ }	(	J	Z	° ∘
1	0	1	1	11	11	VT	ESC	÷ (	[	K	{ ⌈	! ← {
1	1	0	0	12	12	FF	FS	, ;	L	⌈	□	⌈
1	1	0	1	13	13	CR	GS	+ × -	M	} →	⌊	→ }
1	1	1	0	14	14	SO	RS	. :	N	\$	T	≥
1	1	1	1	15	15	SI	US	/ \	O	DEL	O	-X

\$f	..''	)—	<<	≤ ≤	= =	> ≥	] >	∇ ≠	^ ∇	^	× -	÷	{ ⌈	} ↑
≥ 0	1 ⌊	2 2	3 3	4 4	5 5	6 6	7 7	8 8	9 9	0 0	+ ⌈	- X	← {	→ }
	?	Q	ω	ε	ρ	~	↑	↓	⌊	0	*	◇→	⌈	
			W	E	R	T	Y	U	I	O	P	- ←	⌈	
			α	⌊	L	—	∇	Δ	°	!	□	÷ (	≠)	
			A	S	D	F	G	H	J	K	L	[[	(]	
				∘	∘	⌈	U	⊥	T	⌊	;	:	\	
				Z	X	C	V	B	N	M	,	.	/	

EIA RS 232 B OR C PIN ASSIGNMENTS		
Pin No.	Inter-Change Circuit	DESCRIPTION
1	AA	Protective Ground
2	BA	Transmit Data
3	BB	Receive Data
4	CA	Request to Send
5	CB	Clear to Send
6	CC	Data Set Ready
7	AB	Signal Ground
8	CF	Receive Line Signal Detector
9	+P	For Testing Only
10	-P	For Testing Only
11	CY	Originate Mode
12	CX	Local Mode
13 - 19		Unassigned
20	CD	Data Terminal Ready
21		Unassigned
22	CE	Ring Indicator
23 & 24		Unassigned
25	CN	Terminal Busy

THE DTC-300 USES THE FOLLOWING PINS:

1	AA	Protective Ground
2	BA	Transmit Data
3	BB	Receive Data
7	AB	Signal Ground
20	CD	Data Terminal Ready

EIA INTERFACE PORT

PIN	SIGNAL
2	Transmit Data
3	Receive Data
7	Signal Ground
20	Data Terminal Ready

TTY INTERFACE PORT

PIN	SIGNAL
5	Negative Transmit
6	Positive Transmit
7	Negative Receive
8	Positive Receive

NOTE: The DTC-300 acts as a passive device in the TTY environment.

7.5 TTY AND RS 232 SIGNALS

