C-300/C-301 Terminal Service Manual

CADO Systems Corporation 2055 West 190th Street P.O. Box 3759 Torrance, California 90510 U.S.A.

CONTEL CADO - Company Confidential

In accordance with the FCC ruling on Class A computing devices manufactured after January 1, 1981, we are including the following notification:

WARNING

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residental area is likely to cause interference, in which case the user at his own expense will be required to correct the interference.

COPYRIGHT © 1983, 1984, 1985 CADO SYSTEMS CORPORATION ALL RIGHTS RESERVED

This documentation and its associated programs are copyrighted by CADO Systems Corporation or its distributors as indicated by the notices appearing thereon. You may not use, copy, modify, or transfer the documentation or programs, or any copy, modification, or merged portion of the documentation or programs in any manner not expressly authorized in writing. Unauthorized reproduction or publication of any material herein by any person is a direct violation of copyright laws.

Doc. No. 110579-1B Changed July 1985

PREFACE

This manual describes the equipment servicing procedures to be used by service engineers and technicians in maintaining the operational integrity of the C-300/C-301 Video Display Terminals (VDTs).

RELATED PUBLICATIONS

<u>Title</u>	Number
Sam Woo Operation and Service Manual	110600
C-300/C-301 Terminal Installation Manual	110525-1C

REVISION HISTORY

This page lists any change page(s) which have been issued for insertion into this document and/or any complete revisions(s) of this document which have been published since the first issue.

A revision incorporates any change pages issued before the revision date. Each successive change or revision gets a new set of change bars on the affected pages.

	Change Pag	es		Revisions	<u> </u>
Change <u>Letter</u>		Pages	<u>Date</u>		Revision No.
			November	1983	1
A	November 1984	v i 2-6a			
В	July 1985	i, iii, iv 1-9, 2-4, 2-4a, 2-4b, 2-5, 2-6, 2-8 2-8a, 2-8b	1		

TABLE OF CONTENTS

		<u>Page</u>
1	OVERVIEW, C-300/C-301 VIDEO DATA TERMINALS	
		1 - 1 1 - 6
2	OPERATION AND ADJUSTMENTS	
		2 - 1 2 - 3
	2.2.1 Setting Baud Rate, C-300 2.2.2 Setting Baud Rate, C-301 2.2.3 DIP Switch 1D Settings, C-300 2.2.4 Jumper Settings, C-300 2.2.5 Jumper Settings, C-301 2.2.6 Setting Software Flow Control, C-300 2.2.7 Setting Software Flow Control, C-301	2-3 2-5 2-7 2-7 2-8 2-8 2-8a
2.3	Terminal Operation	2-9
	2.3.1 Terminal Start Up	2-9
	2.3.1.1 C-300 Status Line 2.3.1.2 C-301 Status Line	2 - 9 2 - 11
	2.3.2 Adjusting Display Brightness and Contrast	2-14
2.4	Mode Selection and Keyboard Controls	2-16
	2.4.1 C-300/C-301 Special Attributes 2.4.2 Keyboard Mode Selection 2.4.3 Graphic and Special Characters 2.4.4 Cursor Controls 2.4.5 Tab Controls 2.4.6 Clear Controls 2.4.7 Insert/Delete Controls 2.4.8 Other Control Functions	2-16 2-19 2-20 2-21 2-23 2-21 2-25 2-26
	1.1 1.2 2 2.1 2.2	1.1 General Description and Features 1.2 C-300/C-301 Specifications 2 OPERATION AND ADJUSTMENTS 2.1 Terminal Connections 2.2 Pre-Power Adjustments 2.2.1 Setting Baud Rate, C-300 2.2.2 Setting Baud Rate, C-301 2.2.3 DIP Switch 1D Settings, C-300 2.2.4 Jumper Settings, C-301 2.2.6 Setting Software Flow Control, C-300 2.2.7 Setting Software Flow Control, C-301 2.3 Terminal Operation 2.3.1 Terminal Start Up 2.3.1.1 C-300 Status Line 2.3.1.2 C-301 Status Line 2.3.2 Adjusting Display Brightness and Contrast 2.4 Mode Selection and Keyboard Controls 2.4.1 C-300/C-301 Special Attributes 2.4.2 Keyboard Mode Selection 2.4.3 Graphic and Special Characters 2.4.4 Cursor Controls 2.4.5 Tab Controls 2.4.5 Tab Controls 2.4.6 Clear Controls 2.4.7 Insert/Delete Controls

				Page
SECTION :	3	C-300/C-	-301 HARDWARE DESCRIPTION	
:	3.1	Display	Assembly	3-2
		3.1.2 3.1.3	Power Supply, C-300/C-301 Controller PCBA, C-300 Video Driver PCBA, C-300/C-301 Video Alignment Procedures	3-4 3-6 3-8 3-9
:	3.2	Keyboard	i, C-300/C-301	3-10
		3.2.2	General Description Keyboard Tilt Adjustment Keyboard/Display Connections	3-10 3-11 3-11
APPENDIX	A	C-300/C-	-301 SCHEMATICS	

LIST OF FIGURES

<u>Figure</u>		Page
1-1	C-300/C-301 Video Data Terminal (VDT)	1-1
1-2	C-300/C-301 Display Screen	1-2
1-3	Display Assembly Rotated to the Left	1-3
1-4	Screen Light Shield	1-3
1-5	Screen Tilted Up 15	1-4
1-6	C-300/C-301 Keyboard	1-5
2-1	C-300/C-301 Terminal Connectors	2-1
2-2	Removing C-300/C-301 Rear Cover	2-2
2-3	Controller PCBA Location, C-300/C-301	2-3
2-4	C-300 Baud Rate Switches	2-5
2-5	Status Line Setup Mode Displays	2-5
2-6	Status Line Display, C-300	2-9
2-7	C-301 Status Line	2-11
2–8	CRT Brightness and Contrast Controls	2-14
3-1	Base Section of C-300/C-301 VDT	3-1
3-2	Removing C-300/C-301 Cover	3-2
3-3	C-300/C-301 Display Assembly with Cover Removed, Lower View	3-3
3-4	Rear of Display Assembly with Cover Removed	3-3
3-5	DC Power Supply PCBA	3-4
3-6	Controller PCBA, C-300/C-301	3-6
3-7	Video Driver PCBA	3-8
3-8	C-300/C-301 VDT Keyboard	3-10
3-9	C-300/C-301 Keyboard Tilt Adjustment	3-11
3-10	Keyboard/Display Cable Connections	3-11

TABLES

<u>Table</u>		Page
1-1	C-300/C-301 Graphic Characters and their ASCII Selection Codes	1-5
1-2	C-300/C-301 Specifications	1-6
2-1	C-300/C-301 Interface Cables	2-2
2-2	C-300 Main Baud Rate Settings (SW1D)	2-4
2-2A	C-300 Auxiliary Baud Rate Settings (SW1D) (Firmware Revisions 1 through 6)	2 - 4a
2 - 2B	C-300 Auxiliary Baud Rate Settings (SW1D) (Firmware Revision 7 or Later)	2 - 4a
2-3	C-301 Baud Rate Settings	2-6
2-3a	C-301 Setup Commands	2 - 6a
2-4	Other DIP-Switch 1D Settings	2-7
2-5	Jumper Settings, C-300	2-7
2-6	C-301 Jumper Connections	2-8
2-7	Status Line Displays, C-300	2-10
2-8	Status Line Displays, C-301	2-12
2-9	C-300/C-301 Attributes, Non-Protected	2-17
2-10	Attribute Coding	2-18
2-11	C-300/C-301 Keyboard Mode Selection	2-19
2-12	Graphic Characters and their ASCII Selection Code	2-20
2-13	Cursor Control Functions	2-21
2-14	Cursor Addressing Code	2-22
2-15	Tab Controls	2-23
2-16	Clear Control Functions	2-24
2-17	Insert/Delete Control Functions	2-25
2-18	Other Control Functions	2-26
2-19	Control Code Symbols, Monitor Mode Display	2-27
2-20	Summary of ESC Sequences	2-28
3-1	Part Numbers, Display Assembly Major Components	3-4
3-2	Major ICs. C-300/C-301 Controller PCBAs	3-7

1.1 GENERAL DESCRIPTION AND FEATURES

The C-300/C-301 terminals are intelligent 8085A microprocessor controlled VDTs designed for use with CADO Processing Systems, providing the user with a number of advanced VDT functions and capabilities.

The C-300 and the C-301 are identical in external appearance, and each provides data-entry and word processing capability. The C-300 supports CADO Word Processing II. The C-301 supports CADO Word Processing II and III.

Figure 1-1 is a view of the C-300/C-301, showing the terminals' two basic components: (1) the 14-in. CRT display assembly, and (2) the ANSI compatible, detached keyboard.

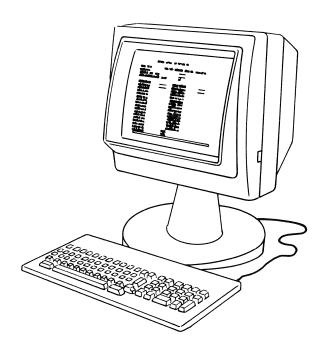


Figure 1-1 C-300/C-301 Video Data Terminal (VDT)

The display assembly is designed around a 14-in. cathode ray tube (CRT) video monitor, providing a 13-in. diagonal viewing screen for display of text, data, and graphics information. The full screen displays up to 1,920 characters, 24 lines of 80 characters each. A 25th line, the status line, located at the lower edge of the screen, provides a display of the current operating mode and status of the terminal, along with the current time-of-day.

The standard CRT screen uses a P31 green-phosphor, normally displaying green characters on a black background. An amber phosphor display screen is optionally available. C-300/C-301 software controlled attribute selection permits the operator to select black characters on a green (or amber) background, blinking characters, and/or half-brightness character displays.

Controls for screen brightness and contrast are located at the lower left-hand corner of the display assembly (Figure 1-2).

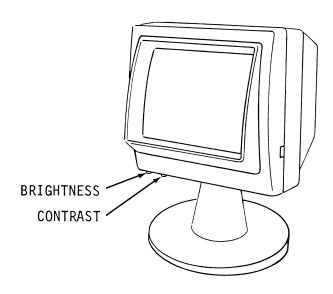


Figure 1-2 C-300/C-301 Display Screen

The display assembly is mounted on a forward-sloping base-plate via a tapered supporting column which permits the screen to swivel up to 45° to the right or to the left of the center forward position. This arrangement, along with the detached keyboard feature, permits the user to place the terminal display assembly and keyboard at the most convenient location on the desk or work-station, and to adjust the display screen and keyboard for maximum operator convenience. Figure 1-3 shows the display assembly rotated to the full left position.

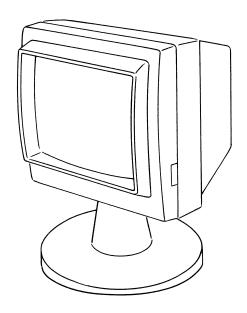


Figure 1-3 Display Assembly Rotated to the Left

The periphery of the screen is shielded from ambient light along four edges, top, bottom, left, and right (see Figure 1-4), and the screen may be tilted as much as $\pm 15^{\circ}$ from the true vertical position to eliminate screen reflections from possible forward and side light sources (see Figure 1-5).

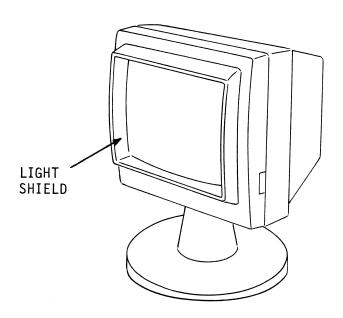


Figure 1-4 Screen Light Shield

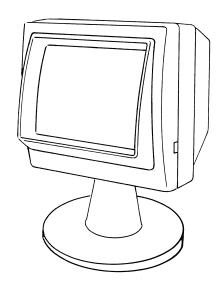


Figure 1-5 Screen Tilted Up 150

The C-300/C-301 VDT generates and displays 128 ASCII characters, with vertical descenders on lower case characters when required. In addition, these VDTs provide 11 graphic symbols (see Table 1-1) for generating line-drawings, charts, and tables directly from the VDT keyboard or the host processor. Each character is formed by a 9 x 13 dot matrix, and is approximately 0.2 inch high and 0.1 inch wide. An alternate character set is switch-selectable with the C-300, and keyboard selectable on the C-301.

Special attributes of the C-300/C-301 terminals include blinking character displays, reversed video polarity for displaying black characters on a green (or amber) background, half-intensity character displays, and protected display/memory areas which permit the host system or the operator to restrict selected areas from operator modification. In addition, a security attribute allows the operator to set up selected screen/memory areas for character entry and withhold this information from screen display.

A non-destructive, non-blinking, block format cursor is used to index character entries. The cursor normally increments to the right, along the currently selected line to the next character position as entries are made. It may also be incremented up, down, left, or right, or sent to the home position, via keyboard control. In addition, it may be moved to any desired position within the screen memory by inputting a coded pair of x,y coordinates from the keyboard or from the host processor.

Table 1-1 C-300/C-301 Graphic Characters and their ASCII Selection Codes

Character	Selecti	lon Co	ode
_	(space)	6	k
ı	1	A	a
+	Ħ	В	b
	#	С	c
一 一	\$	D	d
L	%	E	e
	&	F	f
٦ -	t	G	g
	(H	h
-)	I	i
-	•	J	j
space	:	Z	z

Figure 1-6 shows the DIN Standard Keyboard which connects to the display pedestal via a seven-conductor, shielded cable. The keyboard provides seventy-four (74) standard keys for alphanumeric data and graphic symbols entry, and for terminal control.

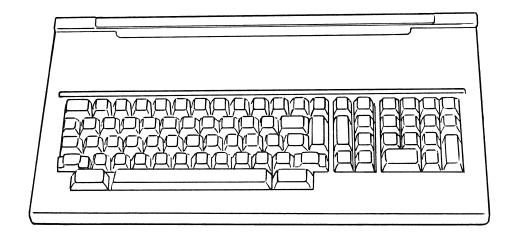


Figure 1-6 C-300/C-301 Keyboard

1.2 C-300/C-301 SPECIFICATIONS

This page and the four following pages present the specifications of the C-300/C-301 terminals.

Table 1-2 C-300/C-301 Specifications (1 of 5)

FEATURE	DESCRIPTION
Screen	
Capacity	1920 characters (24 lines, 80 characters each).
Status Line	25th line.
Size	14-in. (diagonally) CRT.
Color	Green background with black characters or black background with green characters (P31 Phosphor). Amber screen available as an option.
Visual Attributes	Normal, inverse, blink, half-intensity, protected, and security fields.
Displayable Characters	128 ASCII characters (with descenders on lower case characters) plus 11 graphic symbols and 32 monitor mode symbols.
Character Size	Approximately 0.2 inch high by 0.1 inch wide (9 by 13 dot matrix).
Tab	Automatic tabbing past attribute characters and protected fields. The cursor will stop at the next tab or one character past the next unprotected field.
Scroll	Lines scroll upward as data is entered.
Cursor	Non-destructive, non-blinking block.
Cursor Control	Up, down, left, right, home, carriage return, and line feed.
Cursor Addressing	Direct x,y cursor positioning by line and column, host or keyboard.
Alternate Character Set	Switch (C-300) or keyboard (C-301) selectable; replaces standard character set.

FEATURE	DESCRIPTION
Keyboard	
Layout	62-key ANSI-compatible teletypewriter/ type-writer-compatible keyboard plus 10-key numeric pad.
Character Code	Positional this allows interchange of character sets.
Key Rollover	N-key rollover (full, accurate response to rapid multiple key closures) is a standard feature of the keyboard.
Auto Repeat	Auto repeat of all character codes is a standard feature of the keyboard. The repeat rate is a nominal 10 characters per second. Auto repeat occurs for all characters, shifted or unshifted.
	Auto repeat begins after a continuous key depression of .7 seconds, and continues until key is released.
Signal Output	The keyboard outputs a serial 10-bit asynchronous code consisting of one start bit, eight data bits and one stop bit. The data rate is 10 bytes per second. Signal sense is negative true logic at the interface. Signal is at "Marking" Condition (0 volts) when quiescent.
Signal Levels	Input and output signal levels are TTL compatible. The output signal is capable of driving one standard TTL load over a distance of six feet.
Power	The keyboard is powered from the terminal controller with $+5.0 \pm 5\%$ volts DC.

Table 1-2 C-300/301 Specifications (3 of 5)

FEATURE	DESCRIPTION
Terminal Control	
Character Generation	C-300 4K EPROM C-301 4K EPROM
Control Code	C-300 4K EPROM, 256 bytes RAM C-301 8K EPROM, 64K RAM
Screen Memory	C-300 2K Static RAM C-301 included in 64K RAM above
Bell	An audible alarm upon receipt of BEL (CTRL + G on keyboard) or as cursor passes through 72nd character location in LOCAL mode.
Self Test	Initiated either through CPU control, by keying in a sequence of control keys, upon power up, or upon depression of the boot switch.
Operating Modes	
Conversational	Character-by-character transmission.
Local	Off-line display data entry.
Line Monitor	Display of all ESC codes and control code sequences.
Programmers Mode	Display of attribute characters as control characters by the C-301, or as special programmers mode symbols by the C-300.

Table 1-2 C-300/301 Specifications (4 of 5)

FEATURE	DESCRIPTION
Communications	
Interface	Serial RS-423 (RS-232C compatible).
Modem Control	103 modem (standard).
Modes	Full-duplex asynchronous.
Transmission Rates, Main Port	<pre>C-300: 300, 1,200, 9,600 or 19,200 baud (switch selectable)</pre>
	<pre>C-301: 300, 1,200, 9,600 or 19,200 baud (keyboard selectable)</pre>
Auxiliary Port	A serial bidirectional interface with a character buffer on both send and receive lines.
	C-300: Sixteen or eight baud rates (switch selectable), from 50 or 110 to 19,200 baud, respectively, depending upon the firmware revision level.
	<u>C-301</u> : Sixteen baud rates (keyboard selectable) from 50 to 19,200 baud.
<u>Environmental</u>	
Temperature Humidity	41°F - 118°F (5°C - 48°C) 5% to 95%, non-condensing
AC Power Input	
Voltage Frequency Current Power Consumption Heat dissipation	100V, 115V, 200V, 230V, ± 10% 50/60 Hz @ 115V AC - 0.52 Amps 60 Watts 205 BTU/hr.
DC Voltages	(Internally supplied, regulated)
+5V @ 2.5 Amps max. +12V @ 1.5 Amps max. -12V @ 0.25 Amps max.	

Table 1-2 C-300/301 Specifications (5 of 5)

FEATURE	DESCRIPTION
<u>Dimensions</u>	
Display Assembly	15-3/4 in. (40 cm) D x 15 in. (38.1 cm) W x 19.5 in. (49.3 cm) H
Keyboard	8-3/16 in. (20.8 cm) D x 17-7/8 in. (42.9 cm) W x 1-7/8 in. (4.75 cm) H
Weight	
Display Assembly	49 lbs. (22.2 Kg); packed, with Keyboard
Keyboard	4 lbs. (1.82 Kg)

2.1 TERMINAL CONNECTIONS

All connectors for interfacing the C-300/C-301 to AC power, to the host processor, and to other system elements are located on the rear of the C-300/C-301 pedestal base, as shown in Figure 2-1.

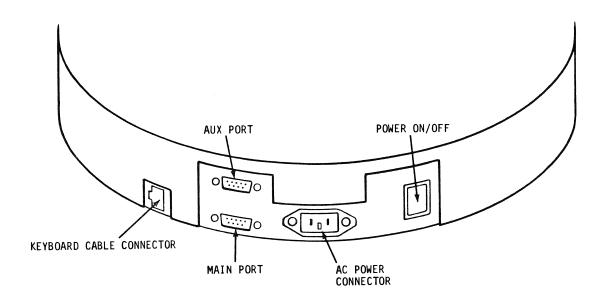


Figure 2-1 C-300/C-301 Terminal Connectors

The connector on the extreme left of Figure 2-1 is the keyboard connector. To the right of this are two 9-pin port connectors; the lower one is the main port, going to the host processor, and the upper one is the auxiliary port, used to output data and text to a printer. The two remaining items shown are the AC power input connector and the C-300/C-301 power ON/OFF switch. In both the C-300 and the C-301, a single fuse is located in the power supply PCBA.

Table 2-1 lists the part numbers of the various cables that are used to connect the C-300/C-301 to various systems.

Table 2-1 C-300/C-301 Interface Cables

C-300/C-301 Port	Cable Port No.	Interconnects With
Main	350164	TIGER ATS 64, ATS 32, C.A.T. III
Main	350163	C.A.T. I, II
Main	350163	20/22, 24, 28
Aux	350125	P152-9, P811-9, P300/301, P600/601
Aux	350126	P1001-9
Aux	350166	P1004-9
Aux	350178	P3404
Keyboard Port	510042	Keyboard

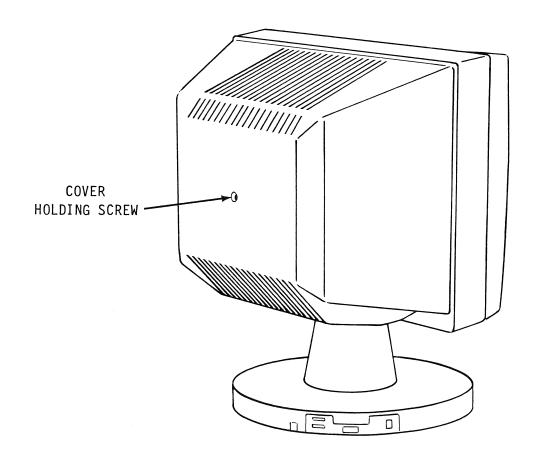


Figure 2-2 Removing C-300/C-301 Rear Cover

2.2 PRE-POWER ADJUSTMENTS

2.2.1 SETTING BAUD RATE, C-300

The C-300 baud rate is set via switches 7 and 8 of DIP Switch 1D. This switch is located within the C-300 display housing on the Controller PCBA. To access this switch, first remove the single screw that holds the rear cover to the display assembly (see Figure 2-2). Next, remove the housing, and locate the Controller PCBA on the right side of the metal framework of the display chassis, as viewed from the rear (Figure 2-3). DIP Switch 1D is located at the bottom edge of the Controller PC board, as shown in Figure 2-4.

The baud rate switches are read only during a power-up sequence or when a VDT reset is performed. The VDT may be reset from the keyboard by the following entry: CTL + .. (use dot on 10-key pad only).

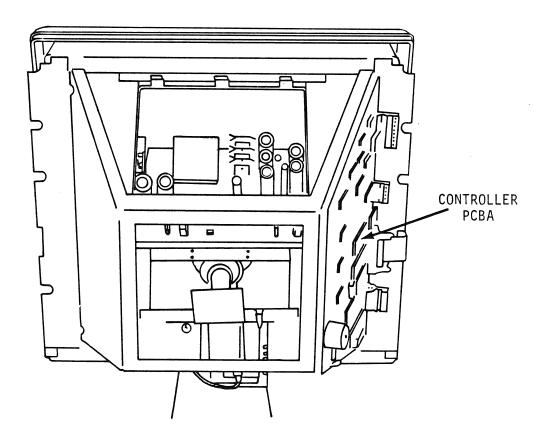


Figure 2-3 Controller PCBA Location, C-300/C-301

Set the baud rate for the desired value, as indicated in Table 2-2.

Table 2-2 C-300 Main Baud Rate Settings (SW1D)

Main Port Baud Rate	SW7	SW8
19,200	OFF	OFF
9600	OFF	ON
1200	ON	OFF
300	ON	ON

Setting the baud rate for the auxiliary port depends upon the revision level of the firmware installed on the terminal. To find the revision level, check the part number on IC No. 8E, on the terminal controller board.

- If IC No. 8E is from Revisions 1 through 6 (CADO Part Nos. 250079-01 through 250079-06), set the auxiliary port baud rate via positions 1 through 4 of DIP switch SW1D. Table 2-2A shows the baud rate settings using this firmware.
- If IC No. **8E** is from Revision 7 or later (CADO Part No. 250079-07 or a later revision level), set the auxiliary port baud rate via positions 1 through 3 of DIP switch SW1D. Table 2-2B shows the baud rate settings using this firmware.

Replace the display assembly cover and holding screw.

Table 2-2A C-300 Auxiliary Baud Rate Settings (SW1D) (Firmware Revisions 1 through 6)

Aux Port Baud Rate	SW1	SW2	SW3	SW4
19,200	OFF	OFF	OFF	OFF
9600	OFF	OFF	OFF	ON
7200	OFF	OFF	ON	OFF
4800	OFF	OFF	ON	ON
3600	OFF	ON	OFF	OFF
2400	OFF	ON	OFF	ON
2000	OFF	ON	ON	OFF
1800	OFF	ON	ON	ON
1200	ON	OFF	OFF	OFF
600	ON	OFF	OFF	ON
300	ON	OFF	ON	OFF
150	ON	OFF	ON	ON
134.5	ON	ON	OFF	OFF
110	ON	ON	OFF	ON
75	ON	ON	ON	OFF
50	ON	ON	ON	ON

Table 2-2B C-300 Auxiliary Baud Rate Settings (SW1D) (Firmware Revision 7 or Later)

Aux Port Baud Rate	SW1	SW2	SW3	
19,200 9600 4800 2400 1200 300 150	OFF OFF OFF ON ON ON	OFF OFF ON ON OFF OFF	OFF ON OFF ON OFF ON OFF	

This page left blank intentionally.

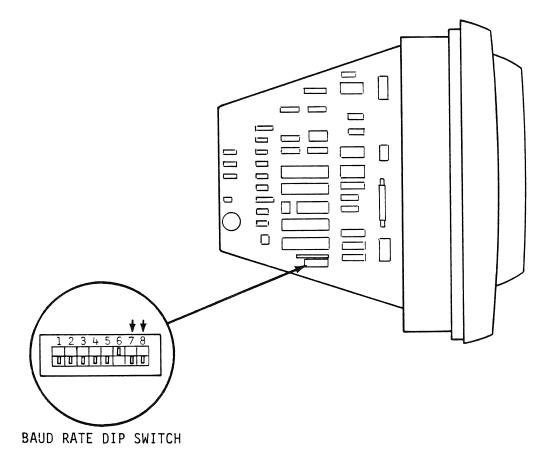


Figure 2-4 C-300 Baud Rate Switches

2.2.2 SETTING BAUD RATE, C-301

The C-301 baud rate is set from the keyboard, after the terminal is brought up, when the terminal is in LOCAL and SETUP modes. To set the C-301 baud rate, use the following procedure:

- 1. Turn AC power ON. To set the terminal to LOCAL mode, hold the CTRL and SHIFT keys down, and momentarily press the ESC key. Release the CTRL and SHIFT keys.
- 2. To select SETUP mode, hold the CTRL and SHIFT keys down, momentarily press the RETURN key (10 key numeric pad RETURN only), and then release the CTRL and SHIFT keys. The status line will display the terminal setup parameters in one of two formats, as shown below:

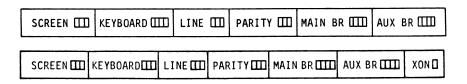


Figure 2-5 Status Line Setup Mode Displays

NOTE: The display is dependent on the revision level of the firmware installed. The differences between the two displays do not affect this procedure.

3. Move the cursor to the MAIN BR parameter block and enter the correct bits for the desired baud rate, as shown in the baud rate codes below. To toggle bits between Ø and 1, hold down SHIFT key while momentarily pressing T. The baud rate codes are shown in Table 2-3, below.

Table 2-3 C-301 Baud Rate Settings

Main Port Baud Rate	Code
19,200	1111
9600	1110
1200	0111
300	0101

Aux Port Baud Rate	Code
19,200	1111
9600	1110
7200	1101
4800	1100
3600	1011
2400	1010
2000	1001
1800	1000
1200	0111
600	0110
300	0101
150	0100
134.5	0011
110	0010
75	0001
50	0000

- 4. After entering the 4-digit code for the desired baud rate, lock the setting: Hold down the SHIFT key and momentarily press the S key. Release SHIFT. Move the cursor to the AUX BR parameter, and follow the same procedure for setting the AUX port baud rate.
- 5. To release SETUP mode, hold down the CTRL and SHIFT keys and momentarily press the RETURN key. This action returns the terminal to LOCAL mode.

To return to ONLINE mode, hold down the CTRL and SHIFT keys and momentarily press the ESC key.

6. Table 2-3a, C-301 Setup Commands, summarizes the commands in SETUP mode.

Table 2-3a C-301 Setup Commands

CTRL+SHIFT+RETURN#	Enter/exit SETUP mode.
TAB	Forward tab to next field. When the TAB is pressed and the cursor is in the last field, the cursor "wraps around" to the first field.
SPACE BAR	Move cursor one position to the right. When the SPACE BAR is pressed and the cursor is in the last position of the line, the cursor wraps around to the first position of the line.
BACKSPACE	Move cursor one position to the left. When the BACKSPACE is pressed and the cursor is in the first position of the line, the cursor wraps around to the last position of the line.
SHIFT+T	Toggle bit at current cursor position.
SHIFT+S	Store bits currently displayed.
SHIFT+R	Display stored bits.

^{*} CTRL+SHIFT+RETURN means hold CTRL and SHIFT down and press the RETURN key (next to the 10-key pad). The CTRL and SHIFT keys on this keyboard act like the SHIFT key on a conventional typewriter. To get a special character the key must be held down while the character is typed.

2.2.3 DIP SWITCH 1D SETTINGS, C-300

As described in Section 2.2.1, switches 1 through 4 of DIP-switch 1D are used to set the C-300 auxiliary port baud rate, and switches 7 and 8 of this DIP-switch determine the C-300 main port baud rate. Table 2-2 shows the required settings for given baud rates. Table 2-4, below, lists the functions of switches 5 and 6 on Switch-pack 1D.

Table 2-4 Other Dip-Switch 1D Settings

Switch No.	Function	Setting
5	Alternate Character Set	OFF
5	Normal Character Set	ON
6	60Hz Video	ON
6	50Hz Video	OFF

2.2.4 JUMPER SETTINGS, C-300

Two sets of jumpers are provided in the C-300, jumper sets E3/E4 and E7/E8. Table 2-5, below, lists the functions of these jumper sets.

Table 2-5 Jumper Settings, C-300

Function	Jumper Used
CD# Not Inverted CD# Inverted	E3 E4
CRT Controller (2C) Synertek SY6545-1	E7
CRT Controller (2C) Hitachi 68A45SP	E8

^{*} The CD signal is a printer on modem output which indicates the device (printer or modem) is ready to accept data.

2.2.5 JUMPER SETTINGS, C-301

Two sets of jumpers are provided on the C-301, as shown in Table 2-6.

Table 2-6 C-301 Jumper Settings

Function	Jumper Connection
CD# Not Inverted CD# Inverted	E6 E7
Permits keyboard selection of main versus alternate character set via escape sequence.	E3
Not used with CADO software.	E4
Selects main character set only.	E5
* The CD signal is	a printer or modem output which

^{*} The CD signal is a printer or modem output which indicates the device (printer or modem) is ready to accept data.

2.2.6 SETTING SOFTWARE FLOW CONTROL, C-300

C-300 firmware from Revision 7 or later revisions includes a software flow control capability used by TIGER ATS operating systems running System Software Release 5.0 and later releases. The software flow control is set via position 4 of the DIP switch SW1D, as follows:

Software Flow	Switch Setting
Enabled	ON
Disabled	OFF

If the terminal is connected to a TIGER ATS running System Software Release 5.0 or a later release, the software flow control can be either enabled or disabled. If the terminal is connected to any other system, disable the software flow control.

CAUTION: Before setting this switch, be sure that the terminal is equipped with firmware from Revision 7 or a later revision. Check that the part number on IC No. 8E is 250079-07, or a later revision level. If this IC is from an earlier revision level (that is, part numbers 250079-01 through 250079-06), do not change this setting: it is used to set the auxiliary port baud rate (refer to Subsection 2.2.1 for details).

2.2.7 SETTING SOFTWARE FLOW CONTROL, C-301

C-301 firmware from Revision 7 and later revisions includes a software flow control capability used by TIGER ATS operating systems running System Software Release 5.0 and later releases. The software flow control is set via the Setup mode:

- 1. Place the terminal offline by pressing CTRL/SHIFT/ESC, together. LOCAL should display on the status line.
- 2. Enter Setup mode by pressing CTRL/SHIFT/RETURN, together. Use the RETURN key next to the 10 key numeric pad. The status line displays the Setup mode parameters in the following format:

SCREEN III KEYBOARD III LINE III PARITY III MAIN BR IIII AUX BR IIII XON 🛭

NOTE: If XON is not displayed as the last field on the right of the status line, the firmware installed is from before Revision 7, and cannot accommodate software flow control.

3. Press TAB to move the cursor to the XON parameter. Press SHIFT/T, together, to toggle bits between 0 and 1 and enable or disable the software flow control, as follows:

XON [Software Flow
1	Enabled
0	Disabled

If the terminal is connected to a TIGER ATS running System Software Release 5.0 or a later release, the software flow control can be either enabled or disabled. If the terminal is connected to any other system, disable the software flow control.

4. Press SHIFT/S, together, to make changes permanent. Return to the Normal status line format by pressing CTRL/SHIFT/ RETURN, together. Place the terminal online to the main processor by pressing CTRL/SHIFT/ESC, together. ONLINE should display on the status line.

This page left blank intentionally.

2.3 TERMINAL OPERATION

2.3.1 TERMINAL START UP

- 1. Connect the terminal to the host processing system.
- 2. Connect the terminal to the AC voltage source and turn power ON. Unit beeps once.
- 3. Adjust CRT brightness and contrast for a reasonable presentation of status line display at bottom edge of screen. Final adjustment will be made later.

2.3.1.1 <u>C-300 Status Line</u>

The C-300 status line is composed of five display fields, A, B, C, D, and E. Fields A through D indicate the current status or selected modes of the terminal. Field E may be used to display time-of-day. When the terminal first comes up, the display will be as shown in Figure 2-6; that is, the terminal will be ONLINE with the host, the system will be ready (SYSTEM READY) if all bootstrap self-tests were passed, and the terminal will be in ALPHA LOCK mode (numbers and upper case letters). Table 2-7 shows the various C-300 displays that may be presented in each status field, depending on the VDT operating mode selected.

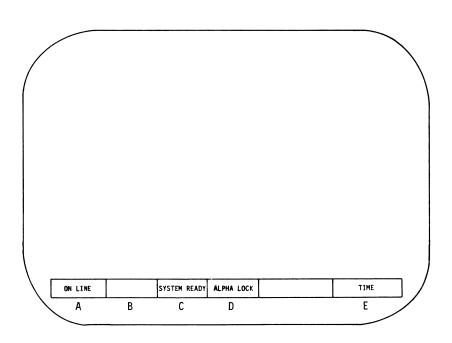


Figure 2-6 Status Line Display, C-300

Table 2-7 Status Line Displays, C-300

FIELD	DISPLAY	INDICATION
A	ONLINE	Terminal is actively online with host system.
	LOCAL	Terminal is logically detached from the host system.
	NO DISPLAY	Terminal operation is normal.
В	MONITOR	When the monitor mode is enabled, selected Control and Escape codes may be displayed but are not implemented. New Line is enabled and scroll is disabled, irrespective of the settings of the local control keys. Table 2-18 shows the symbols used to represent each control code.
	GRAPHICS	Terminal is in GRAPHICS mode.
	PRINT "N"	System Printing
		N=1: Terminate N=2: Print screen (Local only) N=5: Simulprint (with display)
С	SYSTEM READY	Indicates that system is ready for use. Displayed when valid power-up self test is completed.
	ERROR CHECK	Indicates self test has failed.
	KEYBOARD LOCKED	Indicates that keyboard has been disabled by CPU or by keyboard entry.
D	ALPHA LOCK	Locks alphabet in upper-case mode.
E	TIME-OF-DAY	Displays hours, minutes and seconds when enabled by ESC routine.

The C-301 status line is shown in Figure 2-7 below. The C-301 status line is composed of eight display fields, A, B, C, D, E, F, G, and H. Fields A through G indicate the current status or selected modes of the terminal. Field H may be used to display time-of-day. When the terminal first comes up, the status line will be as follows: Field A displays ONLINE, indicating that the terminal is online with the host; Field B is blank; Field C displays DSR, indicating that the terminal is ready to send and receive data; Field D is blank; Field E displays SYSTEM RDY if the terminal self-test has completed without error; Field F displays ALPHA LOCK; Field G is blank; and Field H is blank. Table 2-8 shows the various C-301 displays that may be presented in each status line, depending on the VDT operating mode selected.

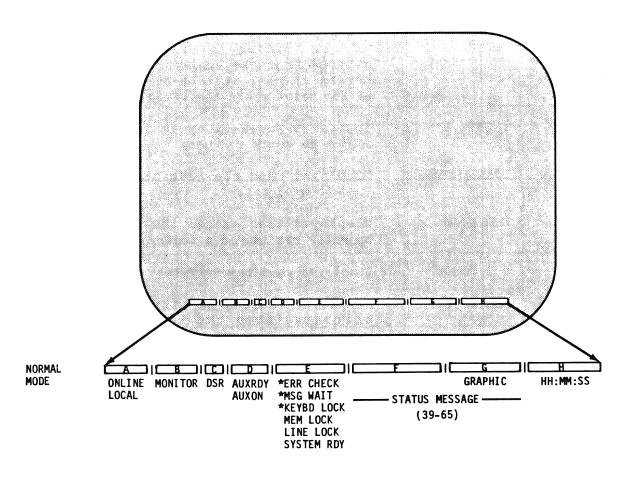


Figure 2-7 C-301 Status Line

Table 2-8, below, shows the various C-301 displays which may be presented on the status line.

Table 2-8 Status Line Displays, C-301 (1 of 2)

FIELD	DISPLAY	INDICATION
A	ONLINE	Terminal is actively online with host system.
	LOCAL	Terminal is logically detached from the host system.
В	MONITOR	Indicates line monitor mode has been entered. Control Escape codes are displayed but not acted upon; otherwise this field is blank.
С	DSR	DSR is displayed when the terminal is connected to the host database and is ready to send/receive data.
D	AUXRDY	When a printer is attached to the Aux port, the screen is ready to be printed.
	AUXON	If the printer is ready and CTRL + - is entered from the keyboard (10 Key Pad), the screen display will be printed. At the end of the print cycle the field goes blank.
E	SYSTEM RDY	Indicates power-up cycle is completed and system is ready for use.
	LINE LOCK	Displayed when the host has initiated the line-lock signal.
	MEM LOCK	Displayed when either the host CPU or the operator has issued a memory lock signal.
	ERR CHECK	Displayed when the self-test fails.
	MSG WAIT	Displayed (half-intensity, reversed video, blinking) when the host processor has completed a message sequence to the VDT message buffer.
	KEYBD LOCK	Displayed when the keyboard has been disabled by the host.

Table 2-8 Status Line Displays, C-301 (2 of 2)

FIELD	DISPLAY	INDICATION
F	ALPHA LOCK	Indicates the VDT is in the ALPHA LOCK mode.
	SHIFT LOCK	Indicates the VDT is in the SHIFT LOCK mode, otherwise this field is blank.
G	GRAPHICS	Used to display GRAPHICS status. When GRAPHICS is displayed in this field, only graphics characters can be entered.
н	HH:MM:SS	Displays time of day when the operator enters the command CTRL + ESC, e, #### (#### is any sequence of four digits).
	,	
·		

2.3.2 ADJUSTING DISPLAY BRIGHTNESS AND CONTRAST

NOTE: The C-300/C-301 should be completely warmed up before making final brightness and contrast settings. Allow approximately 3 minutes warm-up before making these final adjustments.

The locations of the brightness and contrast controls are shown in Figure 2-8. These controls should be adjusted to present the most convenient, readable information screen to the terminal operator. When data characters are present on the screen, clarity of the presentation may be maximized by considering the following:

1. Brightness:

Be sure that the room lights and other ambient lights are set for the normal condition of the area. Also, from the operating position, look for and eliminate any stray light reflections from the screen surface. This may be accomplished by setting the swivel angle of the display stand, and/or by adjusting the screen-tilt mechanism.

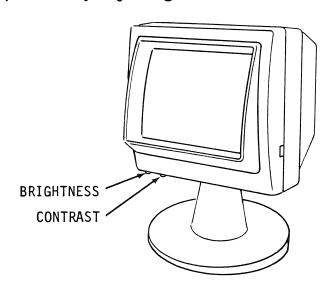


Figure 2-8 CRT Brightness and Contrast Controls

2. Contrast:

The contrast control determines the intensity or highlight brightness of the display characters, and should be set for the lowest possible setting (least contrast) consistent with effortless viewing of the information on the display screen. Proper contrast produces two positive results: (1) Character focus tends to be sharper and clearer at the lower contrast settings, as scanning beam-size is smaller at these intensities, and (2) the likelihood of producing operator eyestrain is less at the lower contrast levels.

3. Adjustment:

Correct procedures for setting CRT brightness and contrast parameters are as follows: (1) Set brightness for a "just-visible" background on the screen, faint retrace lines visible, and then reduce the brightness control until the background and retrace lines just disappear. (2) Reduce the contrast control until the characters become weak, and nearly disappear; then increase character contrast to a comfortable level, one that may be sustained over a long period of time.

NOTE: When setting the brightness and contrast controls, be sure that you set them from a normal operating position. Check this with your hands in the typing position on the keyboard while you are viewing the screen from the normal operating position.

2.4 MODE SELECTION AND KEYBOARD CONTROLS

This section describes the use of the C-300/C-301 keyboard for terminal operation. These functions are available to the operator when the terminal is in LOCAL mode only.

NOTE: At times, several keys or groups of keys are used in various combinations to enter control commands to the terminal. These commands are typically represented by statements such as the following:

1. CTRL + SHIFT + ESC

or

2. CTRL + P, CTRL + B

Statement 1 is implemented by simultaneously holding down the CTRL key and the SHIFT key and momentarily pressing the ESC key before releasing the CTRL and SHIFT keys.

Statement 2 is implemented by the following steps:

- a. Hold down CTRL key and momentarily press P key.
- b. Release CTRL.
- c. Hold down CTRL key and momentarily press B key.
- d. Release CTRL.

In general, the + sign following a key designation indicates that the key is held down while the next action is taken. The two + signs in statement 1 indicate that both keys are held down (CTRL + SHIFT +) while the ESC key is pressed.

The comma in statement 2 indicates that all previous keys are released before moving to the next sequence.

2.4.1 C-300/C-301 SPECIAL ATTRIBUTES

In addition to displaying characters in normal brightness, contrast and intensity, the C-300/C-301 VDT may also be set to display characters with the attributes listed in Table 2-9 below. These attribute displays may be selected from the keyboard when the terminal is in LOCAL mode, or from the host system when the C-300/C-301 is in ONLINE mode. As shown in Table 2-9, the visual effects of these attributes include blinking, half- intensity, and video polarity inversion, and combinations of these three effects. Video polarity inversion interchanges the brightness intensity of the display background and its characters, i.e., changes the display from the normal green characters on a black background to black characters on a green background.

The attribute commands also permit the operator to establish protected display and non-display fields. Protected display fields are selected areas of the screen and screen memory that are not cleared from the display when the initial CLEAR DISPLAY or CLEAR LINE commands are issued. The non-display feature of the C-300/C-301 permits the operator (LOCAL mode) or the host system (ONLINE mode) to store characters in selected areas of screen memory, without displaying these characters on the screen. Table 2-9 shows the commands for entering the various attributes.

Table 2-9 C-300/C-301 Attributes, Non-Protected

Attributes	Control Sequence
To exit any selected attribute mode.	CTRL + ESC, ! CTRL + a
BLINKING DISPLAYS Full intensity, no inversion Half intensity, no inversion Full intensity, inversion Half intensity, inversion	CTRL + ESC, ! @ CTRL + ESC, ! d CTRL + ESC, ! h CTRL + ESC, ! 1
BLINKING, PROTECTED FIELD Full intensity, no inversion Half intensity, no inversion Full intensity, inversion	CTRL + ESC, ! b CTRL + ESC, ! f CTRL + ESC, ! j CTRL + ESC, ! n
NON-BLINKING DISPLAYS Full intensity, normal Half intensity, normal Full intensity, inverse Half intensity, inverse	CTRL + ESC, !, CTRL+0 CTRL + ESC, !, CTRL+d CTRL + ESC, !, CTRL+h CTRL + ESC, !, CTRL+1
NON-BLINKING, PROTECTED Full intensity, normal Half intensity, normal Full intensity, inversed Half intensity, inversed	CTRL + ESC, !, CTRL+b CTRL + ESC, !, CTRL+f CTRL + ESC, !, CTRL+j CTRL + ESC, !, CTRL+n
NON-DISPLAY MODE	CTRL + ESC, !, CTRL+p

Attributes may be called up from the keyboard when the terminal is in LOCAL mode, or they may be implemented by the host processing system when the VDT is in ONLINE mode. In both cases, an attribute character defines the beginning point of the selected attribute field. Attribute display characteristics are coded into an attribute selection character, as indicated in Table 2-10, below:

Table 2-10 Attribute Coding

BIT NO.	FUNCTION
7	RESERVED (for internal use)
6	Ø = normal field 1 = blinking
5	RESERVED (for internal use)
4	<pre>Ø = display field 1 = non-display field (security)</pre>
3	Ø = normal video 1 = inverse video
2	<pre>Ø = normal intensity 1 = low intensity</pre>
1	Ø = unprotected 1 = protected
Ø	RESERVED (for internal use)

ESC SEQUENCE

The ESC sequence for entering a field attribute is:

ESC ! <attribute character>

2.4.2 KEYBOARD MODE SELECTION

The C-300/C-301 keyboard may be used to select certain operating modes when the VDT is in LOCAL mode. These modes, along with their selection commands, are listed in Table 2-11.

Table 2-11 C-300/C-301 Keyboard Mode Selection

FUNCTION	COMMAND	COMMENTS
ONLINE/LOCAL	CTRL + SHIFT + ESC LOCAL mode allows keyboard control of terminal. ONLINE mode allows host control.	Terminal toggles between ONLINE and LOCAL each time command is entered.
and numbers wit keyboard (usefu NORMAL gives lo	CTRL + LOCK es upper-case letters thout shifting the ul for data entry). ower-case letters ithout shifting.	Terminal toggles between NORMAL and ALPHA LOCK on each command entry.
GRAPHICS NORMAL	CTRL + N CTRL + O	Enter GRAPHICS mode. Exit GRAPHICS mode.
MONITOR/NORMAL	CTRL + P, CTRL + B CTRL + P, CTRL + C In MONITOR mode, CTRL and ESC codes are dis- played, but not acted upon.	Enter MONITOR mode. Exit MONITOR mode.
LOCK KEYBOARD UNLOCK KEYBOARD	CTRL + ESC, (To clear: CTRL + . + . NOTE: On 10- key pad.	Locks keyboard. Unlocks keyboard.
CLEAR: From cursor to end of screen.	CTRL + . (on 10- key pad.	Clears non-protected areas.

2.4.3 GRAPHIC AND SPECIAL CHARACTERS

In addition to the normally available alpha-numeric characters, the C-300/C-301 may be set to generate and display images from a set of 11 graphic character elements. These include horizontal and vertical line segments, two dimensional corners, and other graphic elements. This facility allows the operator to generate a variety of high-quality charts, graphs, and tables, directly from the keyboard. Table 2-12 lists the available graphic characters, along with their corresponding ASCII selection codes. Any one of the ASCII characters shown in the selection code column may be used to generate the corresponding graphics when the keyboard is in GRAPHICS mode.

To select GRAPICS mode: Enter CTRL + N. To cancel GRAPHICS mode: Enter CTRL + O.

Table 2-12 Graphic Characters and their ASCII Selection Code

Graphic Character	Select	ion Co	ode
ı	1	A	а
+	99	В	ь
	#	С	c
Τ	\$	D	đ
L	7,	E	е
Г	&	F	f
_ ¬	ŧ	G	g
	(H	h
-)	I	i
-	#	J	j
_	space	e	k
space	:	Z	Z

2.4.4 CURSOR CONTROLS

The cursor normally increments to the right, along the currently selected line to the next character position as entries are made. It may also be incremented up, down, left, or right, or sent to the home position, via keyboard control. In addition, it may be moved to any desired position within the screen memory by inputting a coded pair of x,y coordinates from the keyboard or from the host processor. Table 2-13 lists the incrementing controls. All numeric values in these commands must be input via the 10-key pad. Table 2-14 lists the ASCII codes used to reposition the cursor to new x,y coordinates.

Table 2-13 Cursor Control Functions

Thun at 1 am	Command	Comments
Function	Command	Commerces
Cursor UP	CTRL + 8 or CTRL + ESC, A	Moves cursor up 1 line.
Cursor DOWN	CTRL + 2 or CTRL + ESC, B	Moves cursor down 1 line.
Cursor RIGHT	CTRL + 6 or CTRL + ESC, C	Moves cursor to right 1 space.
Cursor LEFT	CTRL + 4 or CTRL + ESC, D	Moves cursor to left 1 space.
Cursor to HOME	CTRL + 5 or CTRL + ESC, H	Moves cursor to HOME position, upper left corner.
Read Cursor Address	CTRL + ESC, Z	Terminal transmits cursor position (line and space coordinates) to host.
Postion Cursor Vertically	CTRL + ESC X (code)	Positions cursor to selected line, as determined by code (see Table 2-13 for code)
Position Cursor Horizontally	CTRL + ESC Y (code)	Positions cursor to horizontal coordinate, as determined by code (see Table 2-13 for code).

Table 2-14 Cursor Addressing Code

	I		İ
ASCII	LINE or	ASCII	LINE or
CHARACTER	COLUMN	CHARACTER	COLUMN
	_		. .
(space)	1	H	41
!	2	I	42
**	3 4	J	43
#	4 -	K	44
\$	5 6	L	45
%		M	46
& (anostrophe)	7	N	47
' (apostrophe)	8	0	48
	9	P	49
1 2	10	Q	50
Ī.	11	R	51
, (comma)	12	S T	52 53
	13	U U	53
- (hyphen)	14 15	V	54 55
,	16	W	56
0	17	X	57
1	18	Y	58
2	19	Z	59
3	20	[60
4	21	\	61
5	22	j	62
6	23	*	63
7	24	_ (underline)	64
8	25	' (grave accent)	65
9	26	a	66
:	27	b	67
	28	c	68
; <	29	đ	69
=	30	e	70
>	31	f	71
?	32	g	72
e	33	h	73
A	34	i	74
В	35	j k	7 5
B C	36	k	76
D	37	1	77
E	38	m	78
D E F G	39	n	79
G	40	0	80

Example: To move cursor to column 50, line 5: Enter CTRL + ESC Y Q, CTRL + ESC X \$.

2.4.5 TAB CONTROLS

C-300/C-301 tab control commands are listed in Table 2-15.

Table 2-15 Tab Controls

Function	Command	Comments
Set Tab	CTRL + ESC, 1	Sets tab stop at cursor position, for all lines.
Clear Tab	CTRL + ESC, 2	Clears all single tab columns at the cursor position.
Clear all tabs	CTRL + ESC, 3	Clears all tabs.
Move to tab	Tab Key	Moves cursor to next upcoming tab, from left to right, each time tab key is pressed.
	·	

2.4.6 CLEAR CONTROLS

Table 2-16 lists the controls for clearing screen and screen-memory information.

Table 2-16 Clear Control Functions

Function	Command	Comments
Clear Screen	CTRL + . (. on 10 key pad)	Enter . once to clear screen.
Clear Everything	CTRL + (. on 10 key pad) or CTRL + ESC, a	Enter . twice to clear screen and memory, send cursor home, initialize all interfaces, read communications options, and boot terminal.
Clear to End of Line	CTRL + ESC I	Clears from cursor position to end of line.
Clear All	CTRL + ESC K	Clears screen, display memory, tabs, attri-butes. Moves cursor to home.
Clear Unprotected Fields	CTRL + ESC J	Clears all unprotected fields beyond cursor position.

2.4.7 INSERT/DELETE CONTROLS

Table 2-17 lists C-300/C-301 input commands which are used for deleting existing data and inserting new material.

Table 2-17 Insert/Delete Control Functions

Function	Command	Comments
Insert Line	CTRL + ESC L	Beginning with the cursor line, all lines are shifted down one space, freeing the cursor line for new entries. Data shifted beyond the bottom line or into a protected area will be lost.
Insert Character	CTRL + ESC N	This function shifts all data downstream from the cursor position one place to the right, opening one space for a new character each time the CTRL + ESC N entry is made. Character scrolling will continue until a null or a character preceding an attribute is replaced.
Delete Line	CTRL + ESC M	This command deletes the line marked by the cursor. Data downstream from the deleted line is retroceded into the cleared line space. Protected area data will not be moved, however.
Delete Character	CTRL + ESC O	Deletes character marked by cursor. All characters downstream from deleted character retrocede one space each, filling the deleted character's space.

Table 2-18 Other Control Functions

Function: Read status when ready Command: ESC % (from host only)

Comments: All commands from host, including this one, are

stored in a buffer and serviced in turn.

Status Bit Format:

Bit	Code	Function
7	1	Odd parity
6	0	0
5	0	0
4	0	0
3	1	Printer busy = 1
2	1	Keyboard locked = 1
1	0	0
0	0	0

Function: Transmit line or page

Command: ESC =

Comments: This sequence is followed by ESC plus a character

(send block parameter). The character in this sequence determines the type of transmission to be

initiated by the ESC = sequence, that is:

1 (hex 31) = Send page (24 lines by 80 columns)

2 (hex 32) = Send line (cursor line by 80 columns)

Protected and non-protected data will be sent to the main communications port. End of line transmissions will be marked by CR, LF (Hex OD, OA). Graphic fields will be preceded by an SO (OE) code and followed by a SI (OF) code. Attribute characters on the screen will be transmitted in a two character sequence (ESC! char) where the second character is the field attribute as shown in Table 2-10, bit 1.

Function: Programmers Mode ON

Command: CTRL + ESC f

Comments: In this mode, field attributes are displayed as

control character symbols, but are not executed.

Table 2-19 lists control character symbols.

Table 2-19 Control Code Symbols, Monitor Mode Display

HEX VALUE	CONTROL CODE	SYMBOL
0	NUL	
1	SOH	♦
2	STX	Sχ
3	ETX	Eχ
Ħ	EOT	E _T
5	ENQ	A
6	ACK	♦
7	BEL	В∟
8	BS	B _S
9	HT	H _T
A	LF	L _F
В	VT	•
С	FF	74
D	CR	4
E	S0	*
F	S1	+
10	DLE	Ų_
11	DC1	M ₁
12	DC2	M ₂
13	DC3	м3
14	DC4	Мц
15	NAK	
16	SYN	×
17	ETB	3-
18	CAN	c _N
19	EM	3-
1 A	SUB	*
1B	ESC	E _C
1C	FS	
1D	GS	
1E	RS	•
1F	US	-

2.4.9 SUMMARY OF ESCAPE SEQUENCES

Table 2-20 summarizes the C-300/C-301 Escape commands. Each character shown is preceded with the CTRL + ESC sequence.

Table 2-20 Summary of ESC Sequences

Key Function	Key	Function
Set Attribute Read Status When Ready Lock Keyboard Unlock Keyboard Set Tab Clear Tab Clear All Tabs Main Character Set Alternate Character Set Send Key Override Cursor Up Cursor Down Cursor Right Cursor Left	H I J K L M N O X Y Z d e f	Home Cursor Clear to End of Line Clear Unprotected RESET Insert Line Delete Line Insert Character Delete Character Set Cursor-Line Set Cursor-Column Read Cursor Position CPU Message Status Line Clock Programmers Mode ON Programmers Mode OFF

Hardware elements of the C-300/C-301 display unit are concentrated in two areas of the VDT system: In the CRT compartment of the display assembly, as shown in Figure 3-3, and in the base section of the display assembly, as shown in Figure 3-1, below.

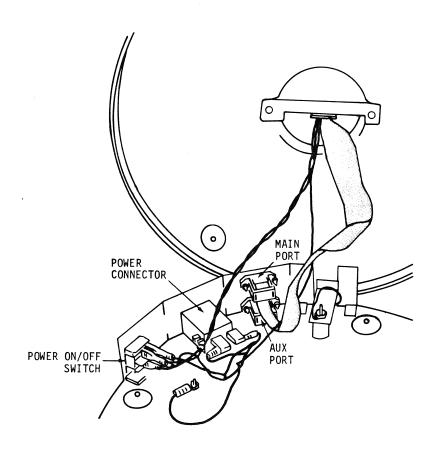


Figure 3-1 Base Section of C-300/C-301 VDT

3.1 DISPLAY ASSEMBLY

To gain access to the components within the display assembly, locate the single screw at the center of the rear section of the assembly, and remove this screw while holding the cover to prevent it from falling. When the screw is free of the assembly, remove the plastic cover from the unit (see Figure 3-2).

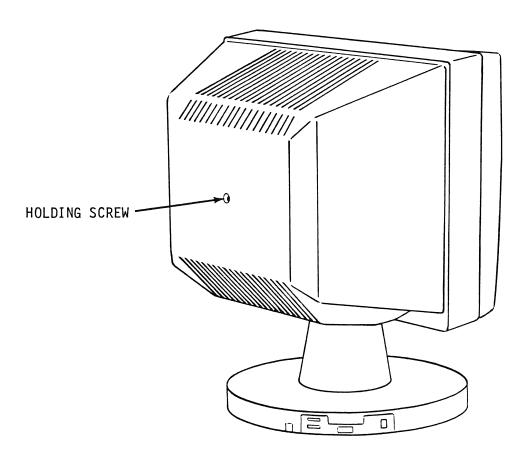


Figure 3-2 Removing C-300/C-301 Cover

Figure 3-3 is a rear view of the C-300/C-301 display assembly, with the cover removed, showing the locations of the various subassemblies within the unit. In this figure, the Video Driver PCBA may be seen in the lower section of the assembly, the terminal Controller is shown on the right side, and the Power Supply, while not visible in the figure, is located on the upper-side of the assembly frame. The end-plate of the frame may be taken off by removing the four corner screws which hold the plate to the frame.

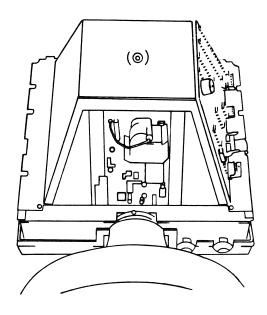


Figure 3-3 C-300/C-301 Display Assembly with Cover Removed, Lower View

Figure 3-4 is a different view of the display assembly, showing the location of the power supply. With the exception of the different types of controller PCBAs, the C-300 and C-301 display assemblies are identical. The C-300 and C-301 Controller boards are not interchangeable; the power supply and video driver boards are.

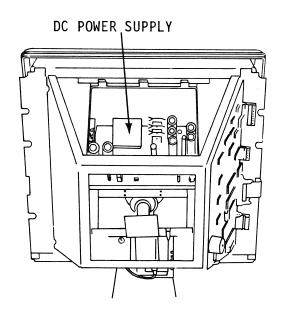


Figure 3-4 Rear of Display Assembly with Cover Removed

Table 3-1 lists the CADO part numbers for the major units in the display assembly.

Table 3-1 Part Numbers, Display Assembly Major Components

Part Number	Component
260183	C-300 Controller
260180	C-301 Controller
360037	DC Power Supply
350181	Monitor Assembly (Green)
350186	Monitor Assembly (Amber)

3.1.1 POWER SUPPLY, C-300/C-301

The DC power supply, providing +5V, +12V and -12V to all VDT components, is located within the C-300/C-301 display assembly, and is made accessible by removing the plastic housing which covers the display chassis. Figure 3-4 shows the location of this assembly. This supply operates at input voltages of either 115VAC or 230VAC, as determined by the setting of the line voltage jumper shown in Figure 3-5.

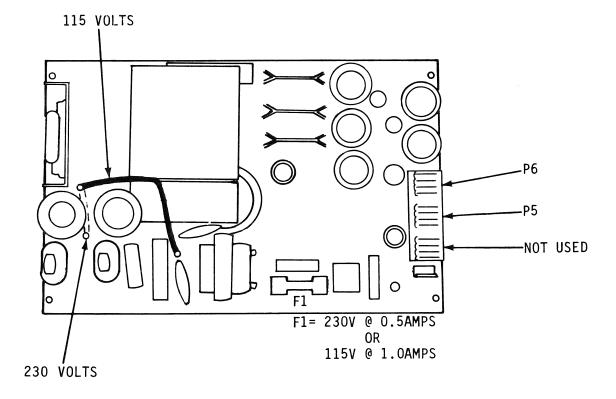


Figure 3-5 DC Power Supply PCBA

Figure 3-5 also shows the location of major elements of the DC power supply, including the AC input line fuse and two parallel output connectors P5 and P6. J4, J5 and J6 are connected in parallel, and carry the same voltages to the formatter. J6 is not used. The AC line input to the supply, a spade-type connector, is shown at the lower-right corner of the PCBA.

This supply provides the following DC voltage for the terminal:

Output	Load		Voltage
Voltage	Min	Max	Tolerance
+5VDC	0.45A	2.5A	±5%
+12VDC	0.3A	2.0A	±5%
-12VDC	0	0.1A	<u>+</u> 10%

NOTE: The output tolerance refers to the nominal voltage and includes line regulation, load regulation, temperature drift and set-up tolerance.

Individual maximum ratings:

+ 5VDC: 5 amps if no load on + 12V output, or 2.5 amps if load draws 2.5 amps on + 12V output.

+ 12VDC: 2.5 amps if +5V output load draws 1.5 amps or less.

- 12VDC: 0.5 amps

NOTE: The maximum continuous output power shall not exceed 40 Watts.

Mechanical Characteristics, Power Supply

Size (Overall): length: 6.3 in. (160 mm) width 3.9 in. (100 mm)

height 2.0 in. maximum (51.4 mm)

15.17 oz (0.43 kg) Weight:

Mating connectors: 3021 Molex P/N 09-50-3031 Molex P/N 22-01-1043 AC Input: DC Output:

Figure 3-6 is a sketch of the C-300 Controller PCBA, located on the right side of the display assembly frame, as seen from the rear of the unit. Four connectors are located on the front edge of this board:

J1 - DC Power input

J2 - Keyboard connector

J3 - Port connectors

J4 - Video driver connectors

DIP Switch 1D is shown near the center of the bottom edge of the board and is described in detail in Subsections 2.2.1 and 2.2.3.

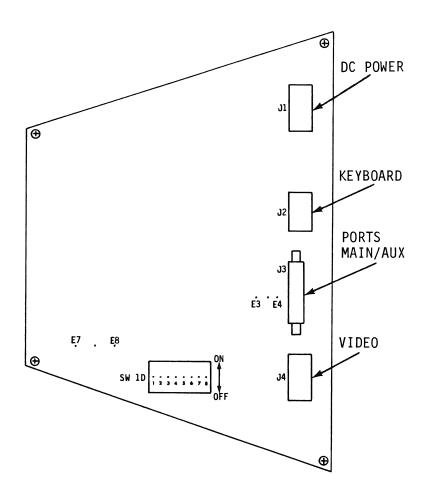


Figure 3-6 Controller PCBA, C-300/C-301

Table 3-2 Major ICs, C-300/C-301 Controller PCBAs

	C-300 Controller P	CBA (P/N 260183)
IC No.	IC Type	<u>Description/Function</u>
7C	8085	Microprocessor
2C	8155	RAM, TIMER, I/O
5D	8251A	Port USART
4C	1863	Keyboard UART
8E	2732A	EPROM 4K Bytes (pgm code)
8c	6845	CRT Controller
10E	MK4802-3	Screen Memory, 2K Bytes
11D	SY2159	Row Buffer
13E	2732A	EPROM, Char. Gen. 4K Bytes
11C	748288	PROM, Address Translator

C-301 Controller PCBA (P/N 260180)

IC No.	Type	<u>Description/Function</u>
U 36	8085A-2	Microprocessor
U41	2764	Control Code 8K Bytes
U26	2732A	Character Generator 4K Bytes
U29,U35,U39,	2164-20	64K Dynamic RAM
U40,U45,U49,		
U54,U60		
U37 ·	8275	CRT Controller
U 50	8237A	DMA Controller
บ13	8255A	Programmable Peripheral
		Interface
บ19	1863	Keyboard UART
U 64	8251A	Main Port USART
U 55	8251A	Auxiliary USART
U 9	81 16	Baud Rate Generator

The C-300 and the C-301 use the same video driver PCBA, and on both units this board is mounted on a metal plate located immediately below the rear section of the display CRT. Figure 3-7 is a sketch of this PCBA, showing the locations of C-300/C-301 video display internal alignment controls. Video alignment procedures are described in the next subsection.

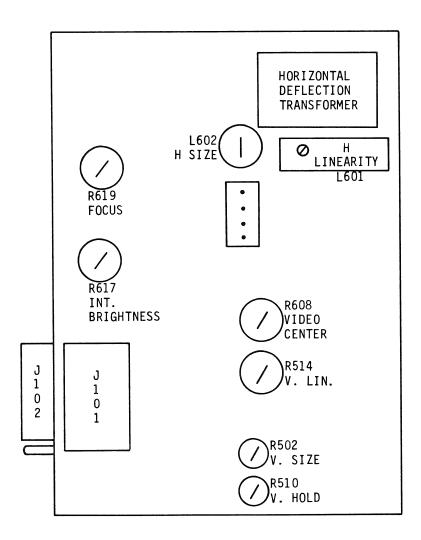


Figure 3-7 Video Driver PCBA

3.1.4 VIDEO ALIGNMENT PROCEDURES

The display brightness and contrast controls are described in Subsection 2.3.2 of this manual. Figure 3-7 shows the additional video controls, located on the Video PCBA.

1. Internal Brightness. This control is used to adjust display brightness when the front-panel brightness control does not provide sufficient range to reach optimum display brightness.

To adjust this control, set the front-panel control to the mid-position of its range and adjust the internal brightness control for the desired background intensity. The front-panel control may be used to "trim" display brightness to its final value.

- 2. Center Focus. Set this control for best overall display resolution and sharpness (focus), with a full screen of characters displayed.
- 3. Vertical Hold. Set the vertical hold control to eliminate vertical roll in the display.
- 4. Vertical Size and Linearity. Set the vertical size control so that the display just fills the display screen, with the status line at the lower edge of the screen, and line number one at the top edge. The vertical linearity control is adjusted to establish a consistency in the size of displayed characters over the vertical dimension of the screen. Since some interaction exists between these two controls, it is usually necessary to alternate several times from size to linearity adjustments, in this order.
- 5. Video Center. Set the video center control for equal margins, left to right.
- 6. Horizontal Size. Adjust the horizontal size control for desired display margin on the right and left sides of the display.

3.2.1 GENERAL DESCRIPTION

The C-300/C-301 keyboard is shown in Figure 3-8 below. The keyboard is not physically attached to the CRT display and connects to this unit via a single 7-conductor cable, permitting the operator to locate and orient the keyboard on the terminal, console, or other work-surface at his or her personal convenience. Two rotatable "feet" located on the rear edge of the keyboard, one at each rear corner, provide a means of changing the tilt-angle of the keyboard, in accordance with operator preference (Figure 3-9).

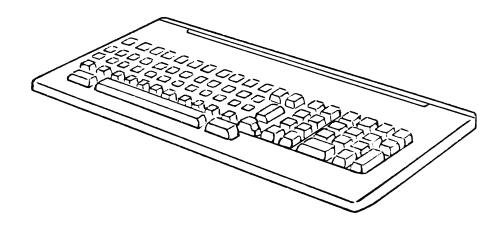


Figure 3-8 C-300/C-301 VDT Keyboard

The keyboard is designed and manufactured to DIN (German Institute for Standardization) standards and provides 62 ANSII-compatible alphanumeric input keys, plus a 10-key numeric data entry pad with return. The keyboard is both typewriter and teletypewriter compatible.

Standard features include N-Key Rollover, insuring full response to multiple key closures in proper sequence, and Auto-Repeat for all character codes, shifted or unshifted, at a nominal rate of 10 characters per second. Positional key-coding is used to support the use of alternate character sets.

Overall dimensions of the keyboard are 16-11/16 in. L x 8-11/16 in. W x 1-5/8 in. High, with the tilt feet retracted. The front edge of the assembly is 5/8 in., discounting keys. The 1-5/8 in. height at the rear edge of the keyboard is extended to 2-3/8 in. When the rear feet are set for maximal tilt.

3.2.2 KEYBOARD TILT ADJUSTMENT

Figure 3-9 shows the "rotating-feet" which may be used to adjust the keyboard tilt angle.

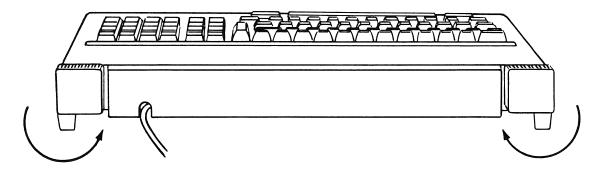


Figure 3-9 C-300/C-301 Keyboard Tilt Adjustment

3.2.3 KEYBOARD/DISPLAY CONNECTIONS

Figure 3-10 lists the pin assignments for the keyboard/display interconnecting cable.

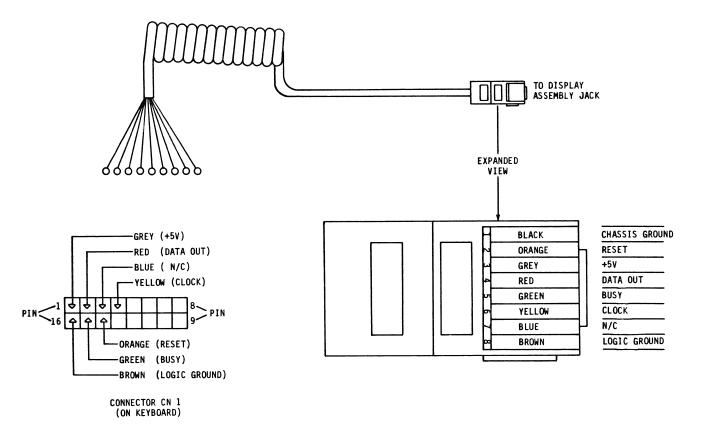


Figure 3-10 Keyboard/Display Cable Connections

APPENDIX A C-300/C-301 SCHEMATICS

Drawing No.					Page
120131	Power	and Signal	Diagram,	C-300/C-301	A-3
120153	C-300	Controller	PCBA		A- 5
120151	C-301	Controller	PCBA		A-9

