IQ 120

**SPECIFICATIONS
AND
OPERATING PROCEDURE**

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DISPLAY FORMAT

Standard—1920 characters arranged in 24 horizontal lines, 80 characters per line.

SCREEN

Rectangular CRT, 12 inches diagonal, P4 phosphor

DISPLAY MEMORY

1920—character (8-bit) MOS RAM memory

CHARACTER SET

96 alphanumeric ASCII characters

DISPLAY REFRESH RATE

50 or 60 Hz

CURSOR

Forespace, backspace, upline, downline, new line, return, home, tab, and absolute cursor addressing.

FIELD PROTECTION

Any part of the display can be designated as protected to prevent inadvertent overtyping. Protected fields are displayed at reduced intensity.

TRANSMISSION MODES

Conversation mode (full or half-duplex)—characters transmitted as they are typed. Block mode—unprotected, transmit line or page.

KEYBOARD

73-Keys including numeric pad

EDITING FEATURES

Standard—Clear screen, type-over, and absolute cursor addressing. Erase to end of page, erase to end of line/field

REPEAT

15 cps auto repeat

PARITY GENERATION

Switch selectable odd, even

INTERFACE

RS 232-C Point to Point

DATA RATES

Switch selectable: 75, 110, 150, 300, 600, 1000, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, and 19200.

DIMENSIONS

12.5″ high, 18″ wide, 21″ deep

WEIGHT

45 Pounds

POWER REQUIREMENTS

115 Vac, 60 Hz, 130 watts

OPERATING ENVIRONMENT

5 to 40°C, 5 to 95% relative humidity (without condensation)

SELECTABLE TRANSMISSION RATES

To meet the varied transmission rate requirements of a variety of computer interfaces, telephone data lines, and modems, the IQ 120 can operate at data rates of 75, 110, 150, 300, 600, 1000, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600 or 19200 baud. The operator can select any speed at a switch on the rear of the IQ 120.

MODES OF OPERATION

Conversation Mode, Half-Duplex. In this mode, the IQ 120 can send and receive information to and from the remote computer, but in only one direction at a time. Characters are displayed and simultaneously transmitted one character at a time as they are typed at the keyboard. Received characters are displayed as they are received.

Conversation Mode, Full-Duplex. Characters are transmitted as they are typed but are displayed only on reception. Display of characters typed in full-duplex is usually accomplished by the remote computer or the modem echoing the characters back to the IQ 120.
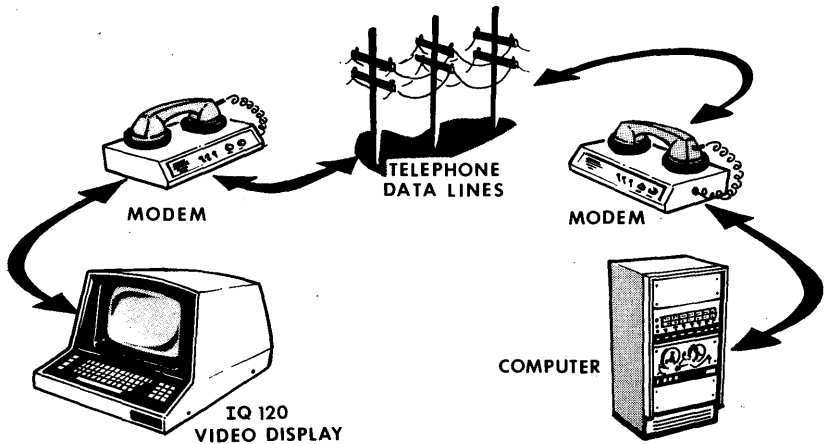

FIG. 1

Roll Mode. IQ 120 is in the roll mode while in full or half-duplex operation with the display unprotected. Executing a line advance function from the bottom line of the screen causes the entire display to move up one line, leaving a new blank line at the bottom. The top line is lost.

Block Mode. In the block mode, information is transmitted and received as complete messages or blocks of data (as opposed to the character-by-character operation in the conversation modes). The operator enters the complete message, up to a full screen in length. The characters are stored and displayed but are not automatically transmitted. After entering the message, the operator can edit the information and then type a special control code which causes all or part of the message to be transmitted.

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In addition to the edit capability, the block mode provides faster transmission of large blocks of data than does the conversation mode. It also permits more efficient utilization of the remote computer and data transmission lines for many applications.

MODE SELECTION

A switch on the rear of the IQ 120 allows the operator to change between full-duplex, half-duplex, and block modes.

THE CURSOR

The cursor is a bright rectangular marker on the IQ 120 screen which indicates the entry point for the next character typed. As characters are entered, the cursor moves from left to right across the display. When the cursor is positioned over a character already displayed on the screen, the character appears as a reverse image in the cursor. Cursor positioning can be controlled from the keyboard or the remote computer.

Incremental Cursor Control.   The cursor can be moved up, down, left or right incrementally by the keyboard or the remote computer.

Absolute Cursor Addressing.   The cursor can be positioned using an absolute address which contains the X and Y co-ordinate location.

EDIT CAPABILITIES

The standard IQ 120 allows the following capabilities for information editing:
Character Type-over
Clear Unprotected Positions to Nulls
Clear Entire Screen to Nulls
Erase to end of Line/Field
Erase to end of Page

FIELD PROTECTION

Areas on the IQ 120 display can be designated by the operator or the remote computer as protected fields. These fields appear at a lower brightness level than the rest of the display and have several useful characteristics:

Protected areas cannot be typed over unless the terminal is first removed from the protected mode. This prevents inadvertent over-typing.

Protected areas are not transmitted by IQ 120.

Protected areas cannot be overwritten by the remote computer unless the IQ 120 is first removed from the protected mode.

HOME KEY

This key causes the cursor to return immediately to the first character position of the first line (called home position). If the IQ 120 is in the protected mode and the home position is a protected character, the cursor will be positioned to the first unprotected position on the screen.

RETURN KEY

This key causes the cursor to move to the first character position of the present line, or to the first unprotected position of the present line if the IQ 120 is in the protected mode.

ALPHA KEY

This alternate action key, when locked down, shifts the 26 alphabetic keys in the upper case mode. All other keys are unaffected.

➜ ⬅ KEYS

These keys move the cursor one character position in the direction of the arrow. If the IQ 120 is in the protected mode and the adjacent position in the direction of the arrow is protected, the cursor will skip the entire protected field and stop at the first unprotected position. The forespace and backspace operations may also be accomplished with the CTRL/L and CTRL/H functions.

⬆ KEYS

This key moves the cursor straight up one line. If the IQ 120 is in the protected mode and the position directly above the cursor is protected, the cursor will move up and then to the left from that position to the first unprotected position. This function may also be accomplished with the CTRL/K keys.

⬇ KEYS

This key is identical in function to the LINE FEED key. This function may also be accomplished using the CTRL/J keys.

TAB KEY

In the protected mode, this key causes the cursor to move to the first unprotected character position following the next protected field. If there are no protected fields between the cursor and the end of the screen, the cursor goes to home or to the first unprotected position. This function may also be accomplished using the CTRL/I keys.

RUB KEY

This key transmits an OCTAL 177 code (RUB OUT) when unshifted and an OCTAL 137 code (underline) in the SHIFTED mode.

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SPACE BAR

Pressing the space bar causes an ASCII space code to be stored in the display memory and a blank space to appear on the screen.

SHIFT KEY

This key is depressed to type the character marked in the upper portion of the typing key.

CLR KEY

This key clears the display and stores null codes in the display memory.

CTRL KEY

This key, when held down while typing another key which generates a transmittable code, causes the bit pattern of the character code to be modified. The control character is transmitted in conversation mode.

New Line. (CTRL/Underline). Positions the cursor to the first character position of the next line (the first unprotected position if in the protected mode).

Beep (CTRL/G). Sounds the audible beep in the IQ 120.

ESC KEY

When the escape key is operated with the shift key in full duplex mode an ASCII escape code is transmitted to the line. When the escape key is operated along with shift code in half duplex an ASCII escape code is sent to the line and causes the next character to be interpreted as the second code in one of the escape sequences described below.

When the escape key is operated when the terminal is in block mode no character is sent to the line but the next character typed is interpreted as the second code in an escape sequence.

Set Protect Mode (ESC &). Sets the IQ 120 into the protected mode, preventing the cursor from entering any position containing a character previously designated as protected. When an (ESC &) is issued to the IQ 120 the cursor is set to the home position. If the home position is protected the cursor is moved to the first unprotected position after the home position.

Reset Protect Mode (ESC '). Set the IQ 120 into the unprotected mode allowing the cursor to enter and overtype protected areas. The protectable status of previously protected characters is maintained; such characters will again become protected when the display is returned to the protected mode.

Start Write Protect (ESC)). Sets the IQ 120 into the Write Protect mode and designates all characters typed thereafter as protectable.

End Write Protect (ESC ( ). Removes the IQ 120 from the Write Protect mode so all characters typed thereafter are unprotected.

(Block Message Transmission)   (Optional)

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Send Page Unprotected (ESC 4). The unprotected character positions from the beginning of the current line through the cursor position is transmitted to the remote computer. The last character position transmitted is followed by transmission of a RETURN code.

Send Page Unprotected (ESC 5). The unprotected character positions from the beginning of the page through the cursor is transmitted to the remote computer. The last character position transmitted is followed by transmission of a RETURN code.

Transmission of null codes to the remote computer is always suppressed by the IQ 120.

Disable Keyboard (ESC #). Disables the keyboard functions.

Enable Keyboard (ESC "). Enables the keyboard functions, when issued by the remote computer, locally only the CLEAR key can remove the keyboard from a disabled condition.

Load Cursor (ESC =). The next two characters following the ESC = sequence represent the absolute cursor row and column coordinates respectively. The cursor coordinate ASCII codes are listed on page 13.

Auxiliary Port on (ESC @). Enable data received on the communications interface to be transmitted through the auxiliary port.

Auxiliary Port off (ESC A). Disables transmission over the auxiliary port.

Clear Display of Nulls (ESC *). Clears entire display to unprotected null codes, and sets unprotected mode.

Clear Unprotected Display to Nulls (ESC +). Stores unprotected nulls in all unprotected locations on the screen. Does not change protect mode. If unprotected mode was set, clear the entire screen to spaces.

Erase Page (ESC Y). Clears the unprotected positions of the display, storing unprotected nulls in memory from the cursor to the end of page. (Fig. 2)
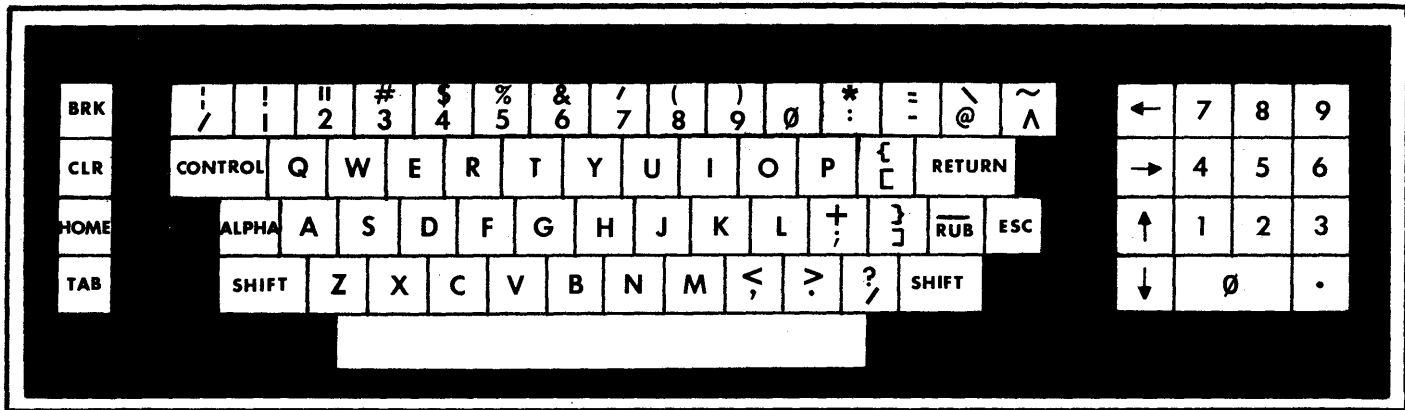
IQ 120
KEYBOARD

FIG. 2

IQ 120 CONTROLS

Besides the keyboard, the only manual controls are located on the rear of the IQ 120. These controls are described as follows: (Fig. 3)

ON/OFF SWITCH

This two-position switch controls the AC power to the unit and certain power-up and power-down sequences. Setting the switch to the ON position resets the circuitry within the IQ 120 positions the cursor to home, and clears the display memory to unprotected nulls.

BRIGHTNESS CONTROL

This potentiometer controls the overall brightness of the CRT display. Brightness is usually adjusted so the display raster (background) is barely visible or just below the point of visibility.

CONTRAST CONTROL

This potentiometer controls the character brightness relative to the background. Contrast is usually adjusted after the brightness control.

BLOCK/FULL/HALF SWITCH

This three-position switch selects the mode of operation. The BLOCK position sets the block mode. The FULL and HALF positions select the appropriate full or half-duplex conversation mode.

BAUD RATE SWITCH

This switch selects any one of the 15 baud rates available in the IQ 120. The switch positions and their associated baud rates are listed on the following page.

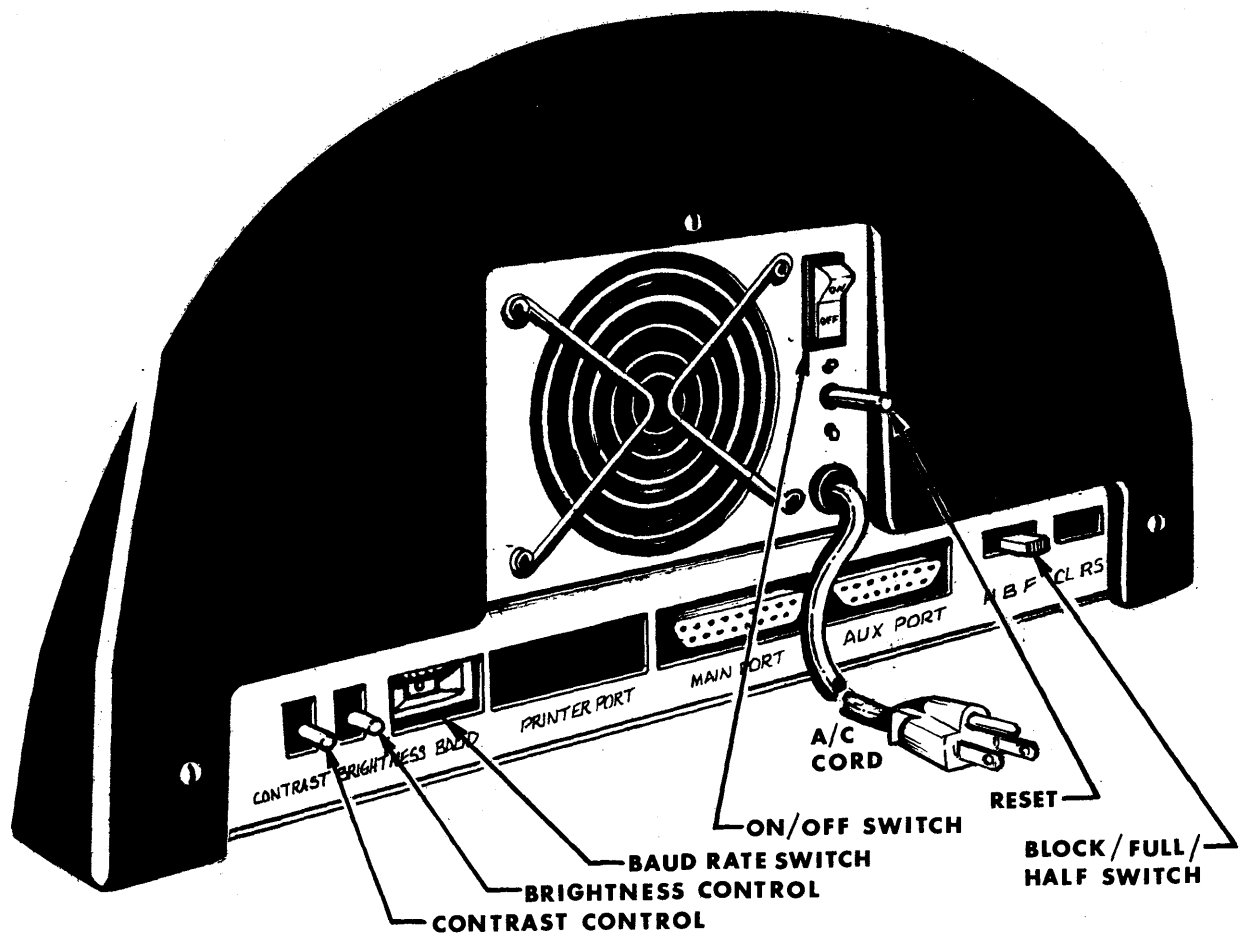| SWITCH POSITION	BAUD RATE
0	75
1	110
2	150
3	300
4	600
5	1000
6	1200
7	1800
8	2000
9	2400
10	3600
11	4800
12	7200
13	9600
14	19200
15	19200

IQ 120 TURN ON PROCEDURE

1. Ensure the IQ 120 power cord is plugged into a grounded 115 Vac outlet.

2. Set the ON/OFF switch on the rear of the IQ 120 to the ON position.

3. Wait approximately 20 seconds for the IQ 120 to warm up. The cursor should then appear at the home position with the rest of the screen clear.

   NOTE: Turning the power switch on clears the display memory. Therefore, if the display contains information which should be saved, the information should be transmitted to the remote computer or otherwise saved before turning the terminal OFF.

4. If the cursor does not appear after the warm-up period, type the CLEAR key. If this fails to produce the cursor, it is possible the brightness and/or contrast controls are misadjusted. They are adjusted as follows:

   a. Set the contrast control to the middle of its range.

   b. Turn the brightness control clockwise until the screen is bright, then reduce brightness slowly until the background is barely visible. The cursor should be present.

   c. Adjust brightness and contrast for desired presentation.

   d. If the cursor does not appear, contact an authorized service representative.

REAR VIEW IQ 120
FIG. 3

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CONTRAST BRIGHTNESS BAUD

PRINTER PORT

MAIN PORT

AUX PORT

H B F CL RS

A/C
CORD

ON/OFF SWITCH

BAUD RATE SWITCH

BRIGHTNESS CONTROL

CONTRAST CONTROL

RESET

BLOCK / FULL /
HALF SWITCH

SECTION FOUR
PROGRAMMING THE REMOTE COMPUTER

The remote computer has full control over the IQ 120. All controls functions which are possible from the keyboard can also be executed from the remote computer.

The computer controls the IQ 120 by transferring the appropriate ASCII codes over the RS 232 interface. The IQ 120 interprets these codes as if they originated from the keyboard.

CTRL FUNCTIONS

When executing from the remote computer a control function that would involve the CTRL key when executed at the keyboard, the following rule applies:

Complement bit 7 of the code for the character which is typed while holding the CTRL key. This generates the same code produced by striking the character key while holding down the CTRL key.

ESC FUNCTIONS

When executing an escape sequence function from the remote computer, transmit the ASCII ESC character code followed by the character code.

ADDITIONAL REMOTE FUNCTIONS

In addition to the keyboard controls described in Section 3, the remote computer can perform the following functions:

Disable Keyboard (ESC #). Disables all keyboard functions.

Enable Keyboard (ESC "). Restores keyboard control.

Load Cursor (ESC =). The next two characters following the ESC = key represent the absolute Y and X coordinates which are used to position the cursor. See the operator's Quick Reference in the back of this handbook for character representation of the coordinates values. If the cursor is set to a protected location it will be advanced to the first unprotected location.

The operator's Quick Reference Table in the back of this manual shows the codes generated by the keyboard. The same codes are used for remote control of the IQ 120.

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SECTION FIVE
INSTALLATION AND INTERCONNECTION

ENVIRONMENT AND MOUNTING

The IQ 120 is completely self-contained, designed for desk or tabletop mounting in a normal office environment.

INTERCONNECTION

1. With the power switch off, plug the IQ 120 power cord into a standard 115 Vac grounded outlet.

2. Connect the RS 232 Cable from the remote computer or modem to the interface connector on the rear of the IQ 120.

Below is a signal/pin list for the RS 232 interface connector.

PIN NO.	SIGNAL NAME	BELL SYSTEM CODE
1	Frame Ground	AA
2	Transmit Data	BA
3	Receive Data	BB
4	Request to Send	CA
5	Clear to Send	CB
7	Signal Ground	AB

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ABSOLUTE
CURSOR POSITIONING

X OR Y	ASCII CODE	X OR Y	ASCII CODE	X OR Y	ASCII CODE
1	Space	28	;	55	V
2	!	29	<	56	W
3	"	30	=	57	X
4	#	31	>	58	Y
5	$	32	?	59	Z
6	%	33	@	60	[
7	&	34	A	61	\
8	'	35	B	62	]
9	(	36	C	63	^
10	)	37	D	64	—
11	*	38	E	65	\
12	+	39	F	66	a
13	'	40	G	67	b
14	—	41	H	68	c
15	.	42	I	69	d
16	/	43	J	70	e
17	0	44	K	71	f
18	1	45	L	72	g
19	2	46	M	73	h
20	3	47	N	74	i
21	4	48	O	75	j
22	5	49	P	76	k
23	6	50	Q	77	l
24	7	51	R	78	m
25	8	52	S	79	n
26	9	53	T	80	o
27	:	54	U		

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OPERATOR'S QUICK REFERENCE TABLE
IQ 120 CONTROL CODES & ESCAPE SEQUENCES

STANDARD FUNCTION	SEQUENCE
Backspace	CTRL H
Down Line	CTRL J
Up Line	CTRL K
Forespace	CTRL L
Home	CTRL ^
New Line	CTRL Underline
Protect On	ESC &
Protect Off	ESC '
Start Write Protect	ESC)
End Write Protect	ESC (
Clear Unprotected to Nulls	ESC +
Clear All to Nulls	ESC *
Load Cursor	ESC =
Line Erase	ESC T
Page Erase	ESC Y
KB Disable	ESC #
KB Enable	ESC "
Skip	CTRL I

OPTIONAL FUNCTIONS	
Send Line	ESC 4
Send Page	ESC 5
Print	ESC P

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SWITCH CONTROL
(C13 ON LOGIC BOARD)

ON = 0 (Low)
OFF = 1 (High)

POSITION

1   Printer use only
     This switch selects the number of Stop Bits in the Printer word structure.
        ON = 1 Stop Bit
        OFF = 2 Stop Bits

2   Printer use only
     This selects Parity or No Parity.
        ON = Parity
        OFF = No. Parity

3   Printer use only
     This switch selects Even Parity or Odd Parity.
        ON = Odd Parity
        OFF = Even Parity

4   Main Port use only
     This switch selects the number of Stop Bits in the Main Port word structure.
        ON = 1 Stop Bit
        OFF = 2 Stop Bits

5   Main Port use only
     This switch selects Parity or No Parity.
        ON = Parity
        OFF = No Parity

6   Main Port use only
     This switch selects Main Port word Length.
        ON = 7 Bit Word
        OFF = 8 Bit Word

7   Main Port use only
     This selects Even or Odd Parity.
        ON = Odd Parity
        OFF = Even Parity

8   Main Port use only
     This switch is for Bit Eight (8) Control.
        ON = Bit 8 Always "0" (Low)
        OFF = Bit Always "1" (High)