ELECTRONICS WAREHOUSE INC.
1603 AVIATION BLVD.
REDONDO BEACH, CALIF. 90278
(213) 376-8005

ASCII ENCODED KEYBOARD MODEL EW-100

This 63 key keyboard and its accompanying logic circuitry occupy a 17 3/16" by 5" circuit board. The full ASCII set is produced; all of the control functions, upper-case and lower-case alpha-numeric characters are available. A red LED appears on when the keyboard is in upper-case mode.

All inputs and outputs are TTL compatible. All inputs are one TTL unit load and all outputs have a TTL fan-out of 10. A "1" data output is a TTL "HIGH" level (PLUS 2.4 VDC) and a "0" data output is a TTL "LOW" level (LESS THAN 0.6 VDC). Data is available as parallel data, seven (or eight if parity is used) bits wide. Serial data is optionally available, MSB first prior to the first rising edge at the SERIAL CLOCK input, the successive lower-order bits appearing after each rising edge presented at the SERIAL CLOCK input.

When a key is depressed, the STROBE output goes LOW, for approximately 500 nanoseconds. STROBE output is approximately 500 nanoseconds pulse. Load output is approximately 60 milliseconds pulse, and can also be used as 'STROBE' pulse.

All logic elements used are TTL, hence only a single TTL 5 Volt supply, at a nominal load current of 300 MA, is necessary. The absence of MOS devices eliminates the need for a negative supply, and relieves the user from the necessity of taking precautions to protect delicate MOS devices.

Several features, such as the serial data out, and the parity bit, are available as options to be activated by the user. Spaces have been provided for two IC's which generate the parity bit. If the chips are left out, the MSB output connection on the output connector remains uncommitted and may be hard-wired to either logic level.

For those applications requiring serial data out, a single IC is inserted in the space provided on the circuit board. The user supplies a TTL clock to the SERIAL CLOCK input; the SERIAL OUTPUT changes state on the rising edges of the clock. After LOAD goes LOW, the LOAD input must again go HIGH before the first LOW to HIGH transition of the SERIAL CLOCK.

Once a key is depressed, all other keys are locked out and no further STROBE active LOW states will occur until that key has been released.

ASSEMBLY INSTRUCTIONS

1. Check the contents of the parts bag supplied in the kit against the parts list supplied with the kit to see if it is correct. At the same time, familiarize yourself with the physical appearance of all the parts.

2. Inspect the 63 key keyboard to see that none of the key switches are defective and that all of the contacts are sticking straight up out of the bottom of the keyboard. Straighten any bent contacts. Insertion of the keyboard into the printed circuit board will be next to impossible if this step is not carefully followed.

3. Locate the side of the P.C. board on which the symbols R14 and R15 are printed. There are also four diode symbols visible. Insert and solder R14 and R15 and the four diodes (polarity as shown) from that side of the board. All other components and the keyboard are inserted from the other side of the board.

4. Turn the P.C. board over. Insert and solder the remainder of the components according to the symbols printed on the P.C. board and using the parts list to identify the parts' location. I.C. sockets are recommended (observe Pin 1). The LED should be mounted where the letter R is. There are 2 holes just next to it into which another LED could be inserted, which will appear on when control key is pressed.
   NOTE: All beveled pads are the (-) end of the polarized capacitors.

5. Align the keyboard with the holes in the P.C. board, and starting at one end, carefully insert the contacts into the holes in the P.C. board. As you are doing this, inspect the bottom of the circuit board to make sure that all of the contacts are coming through the holes. Once you

have soldered these connections, it will be impossible to correct any contacts which did not make it through the holes. Once the keyboard appears to be mounted on the circuit board, check to see that all of the holes in the board have contacts through them. A small-bladed screwdriver or a tongue-depresser may be used to push any misaligned contacts through the board.

Carefully solder all of the keyboard connections to the P.C. board. Apply enough heat and enough solder to fill each plate-through hole in the P.C. board, but remember that too much solder is as bad or worse than not enough solder.

6. On edge connector, connect LOAD to S/ACK with a jumper.

7. On underside of P.C. board (where the 2 resistors and 4 diodes are mounted) you will find letters from A to I. Those are jumpers that should be soldered in, going from A to A, B to B, etc.

8. Check your work to make sure all pins are soldered and that there are no shorts between adjacent pins due to excess solder.

KEYBOARD ASSEMBLY IS NOW COMPLETE.

TEST PROCEDURES

NOTE: A 5 volts regulated power supply is required for operation. Average power consumption of the keyboard is 300 MA.

1. Depress the SHIFT LOCK key. The red LED should light, indicating that you are in upper case. Depress SHIFT LOCK key again - the red LED should

go out, indicating lower case. If it does not function, check to see that the LED's and the IC Z6 are inserted and soldered into the board correctly. When either one of the two SHIFT keys is depressed, the red LED should light as long as the key is depressed.

2. If the unit is functioning correctly, the four least significant bits, along with the most significant bit, should be oscillating. If LED's are used to monitor the output, the ones corresponding to the above bits should appear "on" all of the time without any keys depressed. When any key is depressed, the output at the edge connectors should read the true ASCII code for the depressed key.

3. Pin 8 of Z4 should be low until any printing key is depressed (i.e., not the keys CTRL, CTRL RELEASE, SHIFT LOCK, SHIFT, CLEAR, BREAK) at which time it should go high. Pin 1 of Z3 will be oscillating until any key is depressed, at which time it stops until the key is released. If any problems, check Z2, Z3, R1, R2, C2, C3 for wiring problems.

4. If there are any code errors, but the rest of the unit seems to be functioning, check Z4, Z5, Z6, Z7, Z8, Z9 for wiring errors.

NOTE: Load pulse is approximately 60 milliseconds in duration with R12 and C7 as chosen. To alter this pulse width, consult 74121 data sheets for alternate R12 and C7 values. With present values, the keyboard can accept input rates of up to about 10 keystrokes per second. Note that at some point, a low value of pulse width may cause bounce problems.

INSTRUCTIONS FOR USING OPTIONS

1. Parity Bit: Insert and solder Z12 into its socket.

2. Serial Output: Insert and solder Z14 IC into its socket. GROUND PIN 15.

PARTS LIST

IC'S

Z1	74154
Z2	74193
Z3, Z15	74121
Z4	7420
Z5	7410
Z6, Z7	7400
Z8, Z16	7402
Z9	7404
Z10	74132
Z11	7474
Z13	7486
Z14	74165 (OPTIONAL)
Z12	7486 (OPTIONAL)

RESISTORS (¼W 5 - 10%)

R1, R2	330 OHM
R3 THRU R9 AND R13 THRU R15	3.3 KOHM
R10 THRU R12	39 KOHM

CAPACITORS (ALL 10V)

C1, C3	1μF TANT.
C2, C4	.1μF TANT.
C5, C8	.2μF CERAMIC
C6	.1μF CERAMIC
C7	2.2μF TANT.

OTHER PARTS

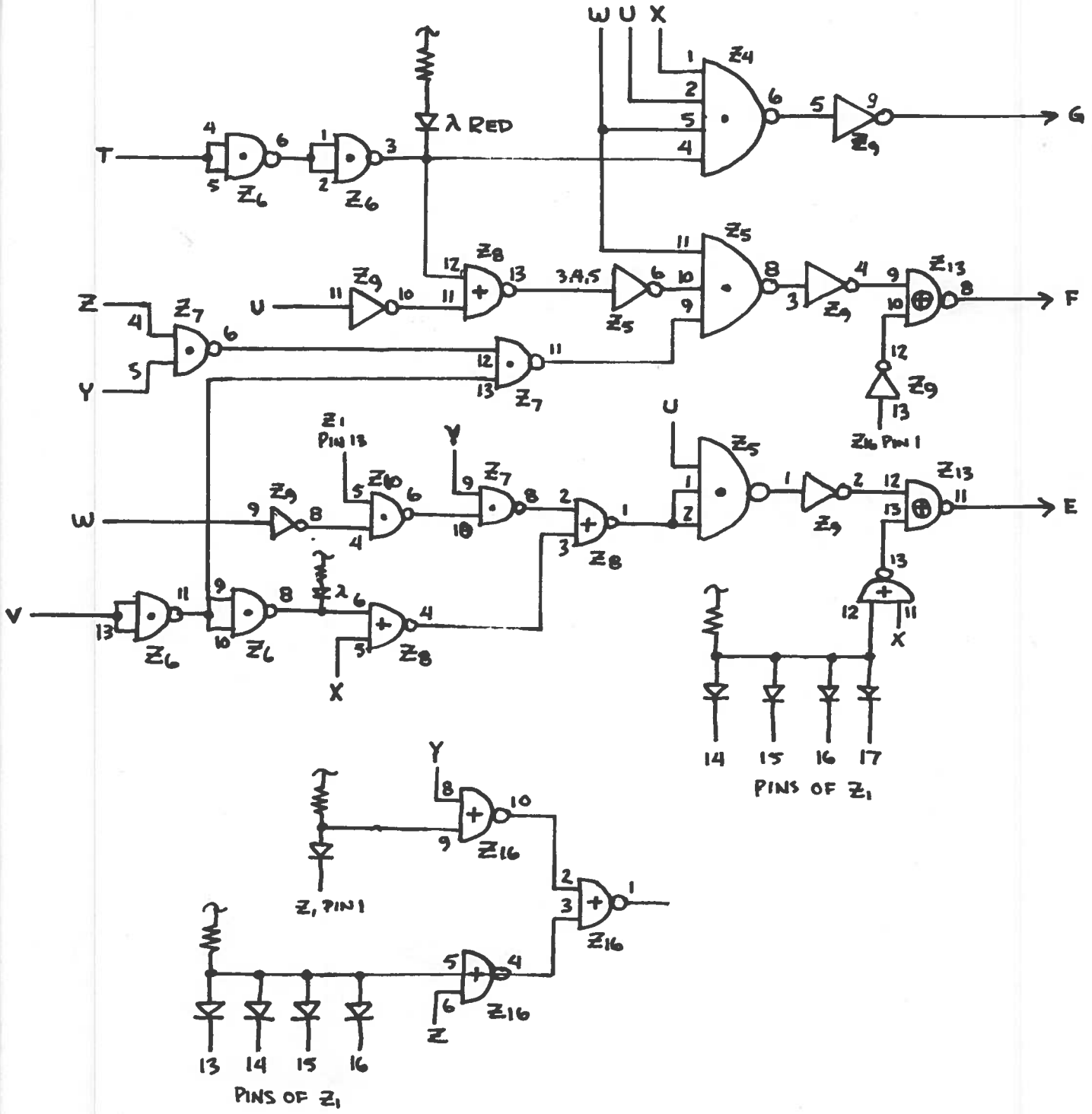
9 DIODES 1N914 OR EQUIVALENT

1 RED LED

1 KEYBOARD

1 P.C. BOARD

ASCII KEYBOARD
EW-100A



TUVWXYZ
ALL HAVE 3.3K Ω
PULLUP.

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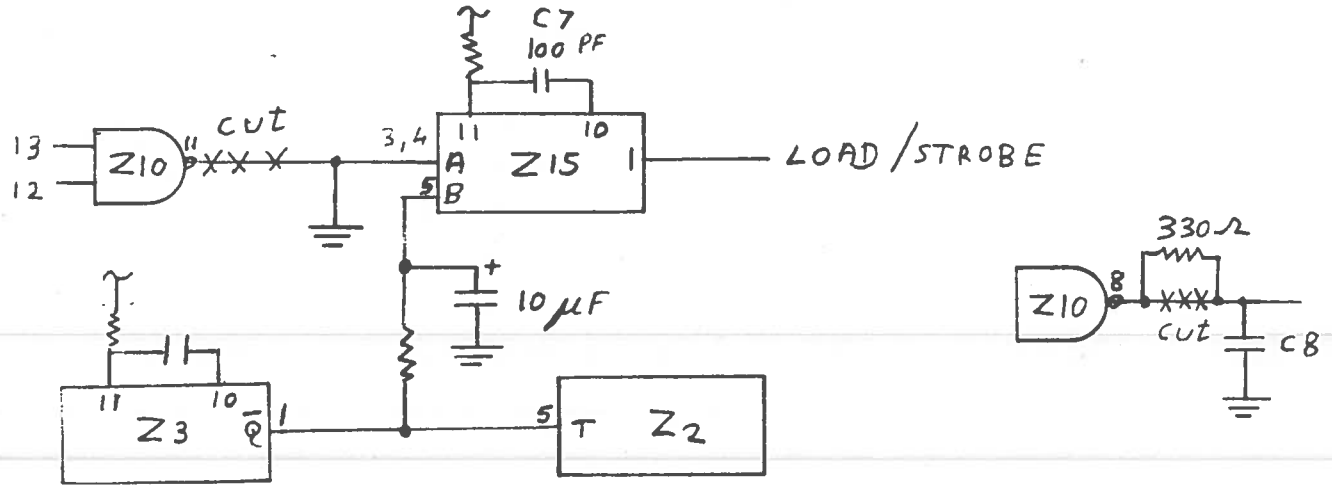
EW-100A ADDITIONAL DEBOUNCE CIRCUIT
ASCII KEYBOARD (To be used in case of occasional bounce).

The following should be done on back side of P.C. board.

1. Cut the foil going from the positive side of C8 to Z10 pin 8. Insert a 300-330 OHM resistor between those 2 points. (use pin 1 of Z10 for the capacitor side).
2. Change C7 capacitor from 2.2MFD to 100PF.
3. Disconnect pins 3,4 of Z15 from pin 11 of z10 by cutting the foil.
4. Connect a 300-330 OHM resistor between Z3 pin 1 ($\bar{Q}$) and Z15 pin 5.
5. Add a 10MFD capacitor between Z15 pin 5 and ground.
6. Ground Z15 pins 3,4.
7. If necessary (in most cases it won't be) lengthen the low to high ratio of Z3 by increasing its time constant capacitor or resistor.

Use "LOAD" finger on edge connector for "STROBE".

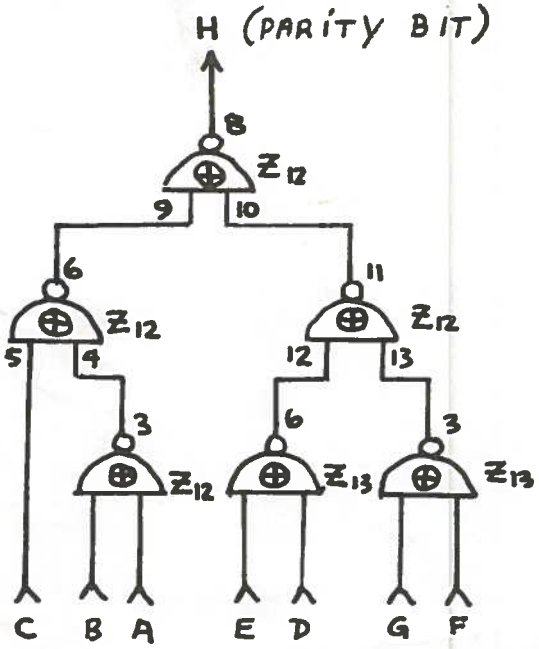


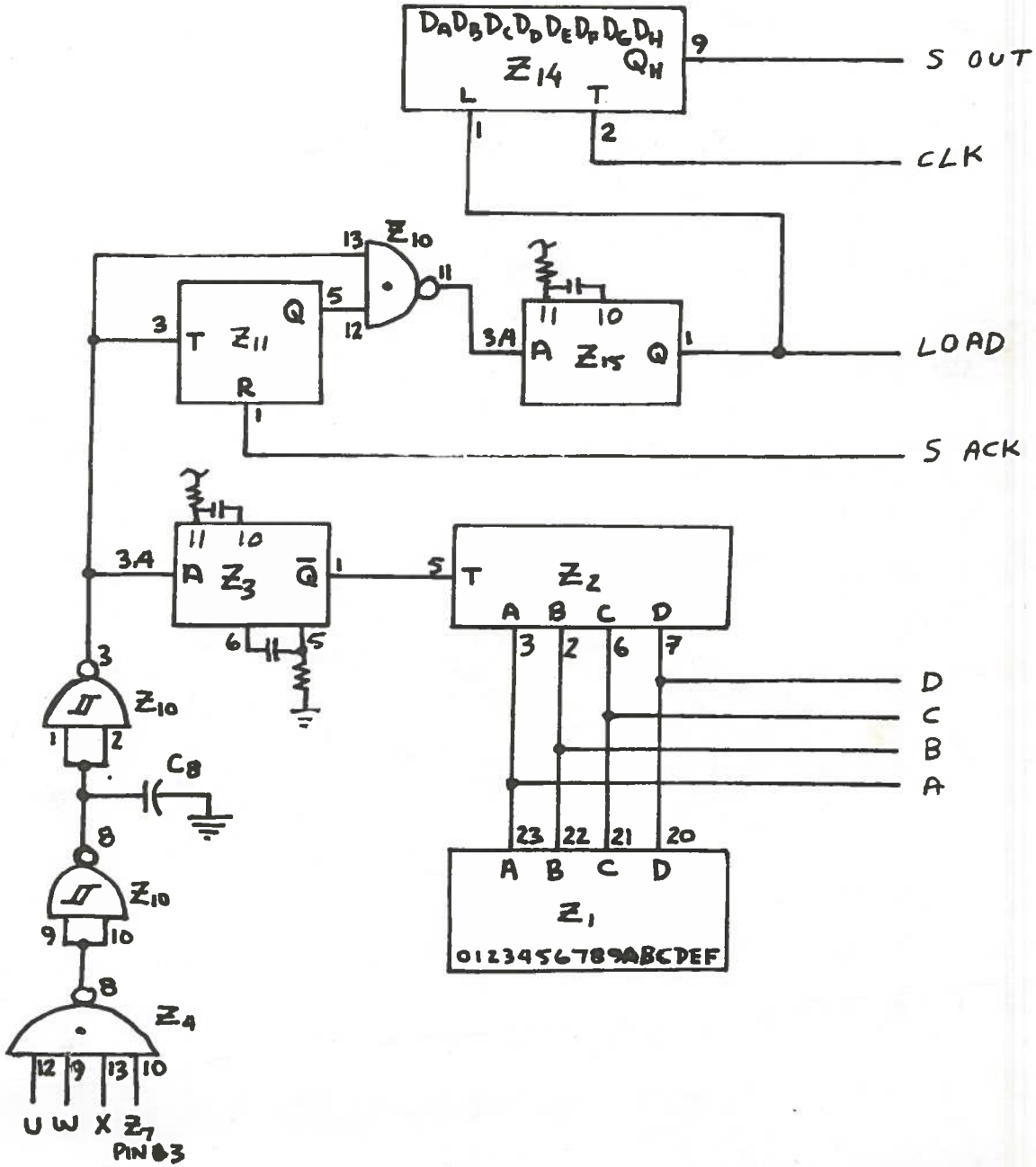
11 300-330 Ω
1 100 pf
10 μf

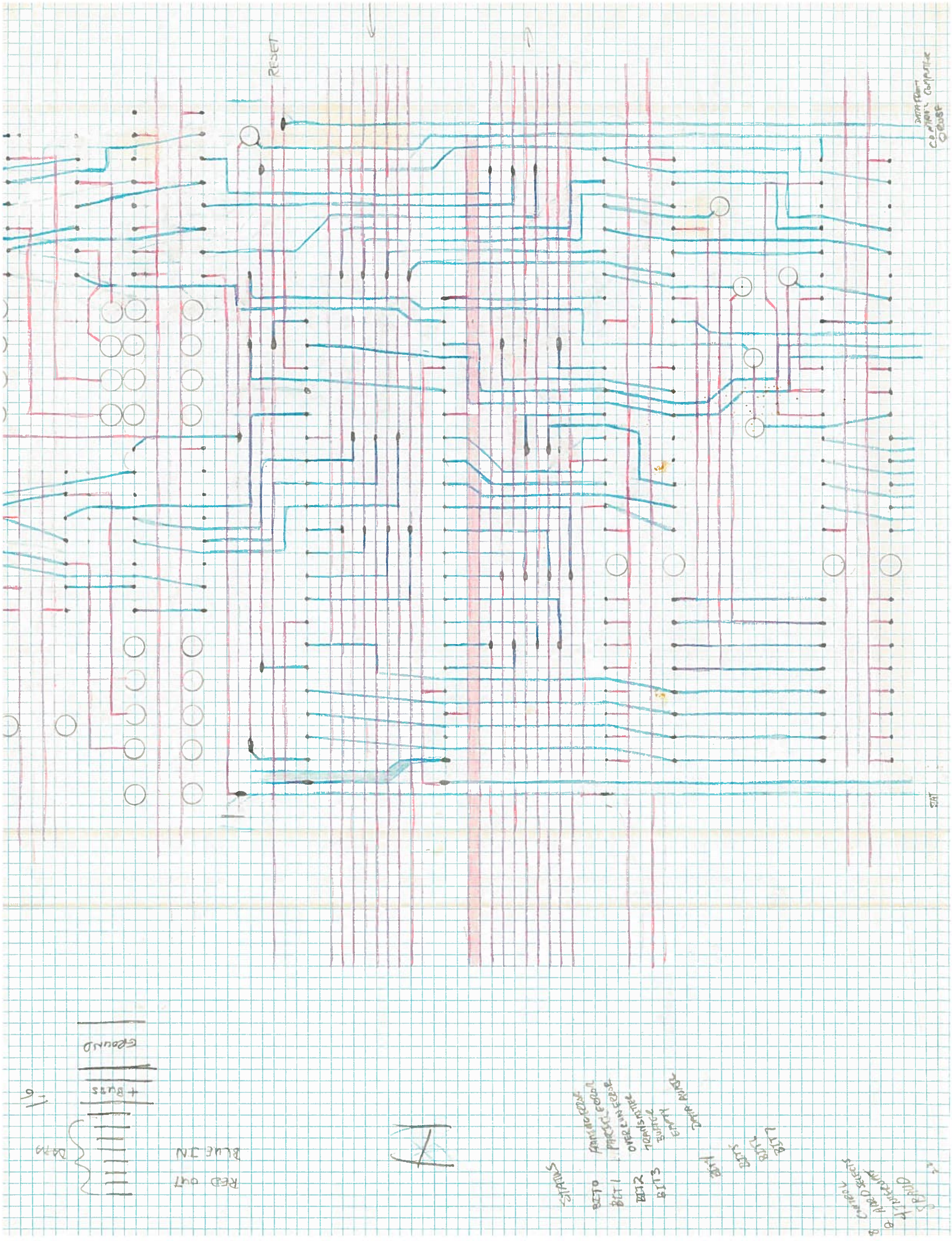
	CHARACTER MODE		CONTROL MODE	
KEY	LOWER CASE	UPPER CASE	LOWER CASE	UPPER CASE
ESC	ESC	ESC	ESC	ESC
BACK SPACE	BS	BS	BS	BS
BREAK	NO FUNCTION ASSIGNED			
TAB	HT	HT	HT	HT
LINE FEED	LF	LF	LF	LF
DELETE	DEL		US	US
CTRL	PLACES KEYBOARD IN CONTROL MODE			
SHIFT LOCK	PLACES KEYBOARD IN UPPER CASE			
SHIFT	PLACES KEYBOARD IN UPPER CASE			
CLEAR	CR	CR	CR	CR
HERE IS	NO FUNCTION ASSIGNED			
REPEAT	NO FUNCTION ASSIGNED			
A	a	A	SOH	SOH
B	b	B	STX	STX
C	c	C	ETX	ETX
D	d	D	EOT	EOT
E	e	E	ENQ	ENQ
F	f	F	ACK	ACK
G	g	G	BELL	BELL
H	h	H	BS	BS
I	i	I	HT	HT
J	j	J	LF	LF
K	k	K	VT	VT
L	l	L	FF	FF
M	m	M	CR	CR
N	n	N	SO	SO
O	o	O	SI	SI
P	p	P	DLE	DLE
Q	q	Q	DC1	DC1
R	r	R	DC2	DC2
S	s	S	DC3	DC3
T	t	T	DC4	DC4
U	u	U	NAK	NAK
V	v	V	SYN	SYN
W	w	W	ETB	ETB
X	x	X	CAN	CAN
Y	y	Y	EM	EM
Z	z	Z	SUB	SUB
[	[	{	NO CONTROL FUNCTION	
\	\	|	NO CONTROL FUNCTION	
]	]	}	NO CONTROL FUNCTION	
^	^	~	NO CONTROL FUNCTION	
1	1	!	DC1	SOH
2	2	"	DC2	STX
3	3	#	DC3	ETX
4	4	$	DC4	EOT
5	5	%	NAK	ENQ
6	6	&	SYN	ACK
7	7	'	ETB	BELL
8	8	(	CAN	BS
9	9	)	EM	HT
0	0	SPACE	DLE	NULL
SPACE	SPACE	SPACE	SPACE	SPACE
@	@	`	SPACE	SPACE
MINUS	MINUS	EQUALS	CR	GS
:	:	*	SUB	LF
;	;	PLUS	ESC	VT
,	,	LESSER	FF	FS
.	.	GREATER	SO	RS
/	/	?	SI	US

SHIFT BOTTOM
CONTROL TOP

= COMP
• SHIFT






RESET
DATA FROM CONTROL COMPUTER
GROUND
+ BUSS
RED OUT
BLUE IN
STATUS
BIT 0
BIT 1
BIT 2
BIT 3