

-80A

_R'S MANUAL

JERMAN MICROPROCESSORS
EQUIPMENT & SUPPLY CORP.
At The Chicagoland Airport
P.O. BOX 515
Prairie View, Illinois 60069
Phone: (312) 634-0076

PARTS LIST

✓ OP-80A-IC1-IC9	NE555*	\$1.50ea
✓ IC10	SN7474	.95
✓ IC11	SN7437	.95
✓ C1, C2	.1mf 10v disc capacitors	.35
✓ R1	25-50K In-line Resistor Network	2.25
✓ R2-R5	220 ohm, 1/4 watt	.20
✓ I1-I4	Red LED*	1.25
✓ S1	Precision Sensor Array*	32.00
✓ WW1	16 Pin Wire Wrap Socket	1.25
WG1	1.647" Precision Wire Guide	.45
WG2	1.000" Precision Wire Guide	.45
24"	Fine Solder	.35
✓ PC1	OP-80A Printed Circuit Card	12.00
✓ IM	OP-80A Instruction Manual	5.00
✓ B1	Anodized Extruded Aluminum Box	7.50
✓ DIP48	DIP Connector w/ 48" Cable	5.00

OPTIONS

OP-80A-L1	Lamp Kit (Mounts to OP-80A Card) Requires approx. 500ma. For use with opaque paper tape.	19.95
TR1	OP-80A Tape Transport	TBD

Include \$2.50 shipping/handling and 6% California sales tax.

*These items are selected and matched devices,
Do Not order seperately.

OP-80A OPERATING INSTRUCTIONS

Operation of the OP-80A Paper Tape Reader is straight forward. The paper tape to be read is inserted between the guides and pulled from left to right. Note the position of the OAE arrow ">" and the small sprocket arrow pointing to the fourth sensor from the bottom for proper tape orientation.

In order to read light weight paper tape (semi-opaque) an LED indicator has been provided to facilitate proper alignment of the light source. (Note...A great deal of feedback is utilized in the sensor design to reject the 60 cycle AC component emitted by the light source, however, fluorescent light is not recommended as a source.) To align the reader, place a low wattage incandescent lamp¹ (15 to 60 watts recommended) over the reader and lower until the SP (Sprocket) LED comes on. The OP-80A is now ready for use.

To test the reader, load a simple bootstrap loader into the computer.² The program should run in a loop waiting for the RDA line to go high (or $\overline{\text{RDA}}$ to go low). When the line goes high, the data should be input through the port. If an acknowledge signal is generated by the input port, it should be sent out over ACK (or $\overline{\text{ACK}}$). If no such signal

is available, the program must generate one. This may be output through the same port that supplies data to S1 and S2. The program will now return to the initial loop and wait for the next RDA change.

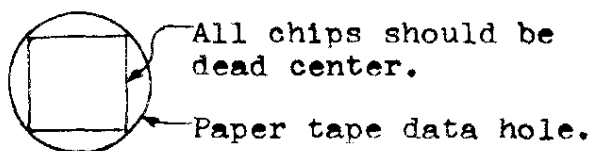
¹A high intensity lamp with a 12v auto lamp is an excellent light source. ie., Tensor Model 6500 with bulb #1156.

²Refer to OP-80A SUPPORT SOFTWARE later in this manual.

ASSEMBLY

I. INSTALL WIRE GUIDES, SENSOR ARRAY

- A. Mount the long horizontal guides $5/32''$ above the card. A drill makes an excellent stand-off for this operation. The horizontal guides must be mounted first!
- B. Install the short vertical guides. Use 4 to 6 layers of paper tape between the horizontal and vertical guides for proper spacing.
- C. Drop the sensor on to the card. Watch the placement of pin 1. Thread some paper tape on to the reader. Solder pin 1. With the tape pulled taut, reheat pin 1 and align the sensor as shown below.



- D. Solder all sensor leads. If the paper tape is still not properly centered over the sensor array, adjust the guides with a small pair of pliers.

ASSEMBLY (cont.)

II. MOUNT THE FOLLOWING PARTS IN THE ORDER LISTED

- A. Mount all the resistors. Refer to the parts placement diagram at the end of this manual.
- 7.* B. Install J1. *Yule!*
- C. If you plan to mount the optional light source, (OP-80A-L1), install J2.
- D. If your data input port generates a negative going data acknowledge signal ($\overline{\text{ACK}}$) jumper point A to $\overline{\text{ACK}}$. If the acknowledge signal is positive going, jump A to ACK.
- E. Mount all ICs. Watch the placement of pin 1.
- F. Mount the wire wrap socket. Do not cut the pins. They may be needed if additional option cards are purchased.
- G. Mount all the LEDs. Watch the placement of the cathode lead. (The LED chip is mounted to the cathode lead.)
- H. Mount the disc capacitors.
- I. This completes the assembly of the printed circuit card. INSPECT YOUR WORK CAREFULLY. It is suggested you proceed to the cable assembly and interface instructions before assembling the box.

INTERFACE INSTRUCTIONS

Refer to the I/O SOCKET diagram in this manual.

Using the diagram, connect the reader to a parallel port in the computer. If you wish to connect the reader to a port with a serial interface already installed, refer to the OP-80A UART INTERFACE BULLETIN.

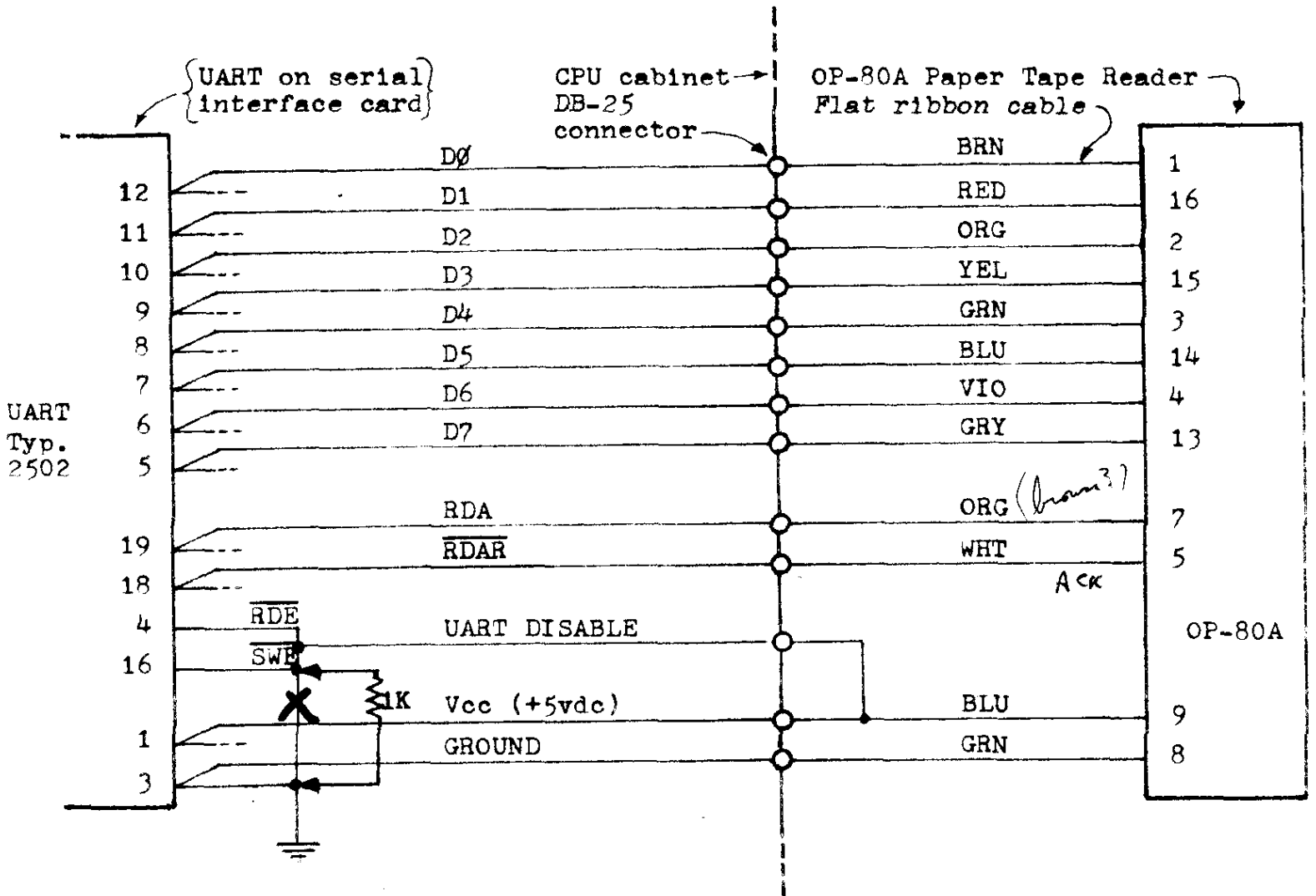
The parallel interface is very straight forward. The data lines D₀ thru D₇ are connected to the input port. When data is available, RDA goes HIGH and $\overline{\text{RDA}}$ goes LOW. Either signal may be used to flag the computer through a second input port. After the computer has input the data, it should reset the RDA latch. This is done with a positive or negative pulse (ACK or $\overline{\text{ACK}}$) from a computer output port. This same port may also control the buffered LEDS, S1 and S2.

If you do not want to use an output port to reset the RDA latch, you may obtain an ACK (or $\overline{\text{ACK}}$) signal from the computer input port. This signal is usually the product of a CPU generated "IN" signal, the decoded port address, and a clock timing signal. Refer to your microprocessor manual for details.

OP-80A UART INTERFACE

BULLETIN

By using the circuit shown below, the OP-80A can be connected directly to the terminal I/O (Input/Output) port in your computer - thus allowing you to load paper tapes at high speed without software modifications.



OP-80A

I/O S O C K E T

DØ	1	●	BRN	RED	●	16	D1
D2	2	●	ORG	YEL	●	15	D3
D4	3	●	GRN	BLU	●	14	D5
D6	4	●	VIO	GRY	●	13	D7
ACK or $\overline{\text{ACK}}$	5	●	WHT	BLK	●	12	SPARE
$\overline{\text{RDA}}$	6	●	BRN	RED	●	11	S2
RDA	7	●	ORG	YEL	●	10	S1
GROUND	8	●	GRN	BLU	●	9	+5vdc

DØ thru D7 = DATA OUTPUT BYTE

S1 and S2 = STATUS LEDES

RDA = READER DATA AVAILABLE (\uparrow)

$\overline{\text{RDA}}$ = READER DATA AVAILABLE (\downarrow)

ACK or $\overline{\text{ACK}}$ = ACKNOWLEDGE (Resets RDA and $\overline{\text{RDA}}$) (\uparrow) or (\downarrow)*

POWER = +5vdc @ 175ma MAXIMUM

OP-80A

* Items matched for sensitivity and uniform response.

OP-80A
High Speed
Paper Tape
Reader

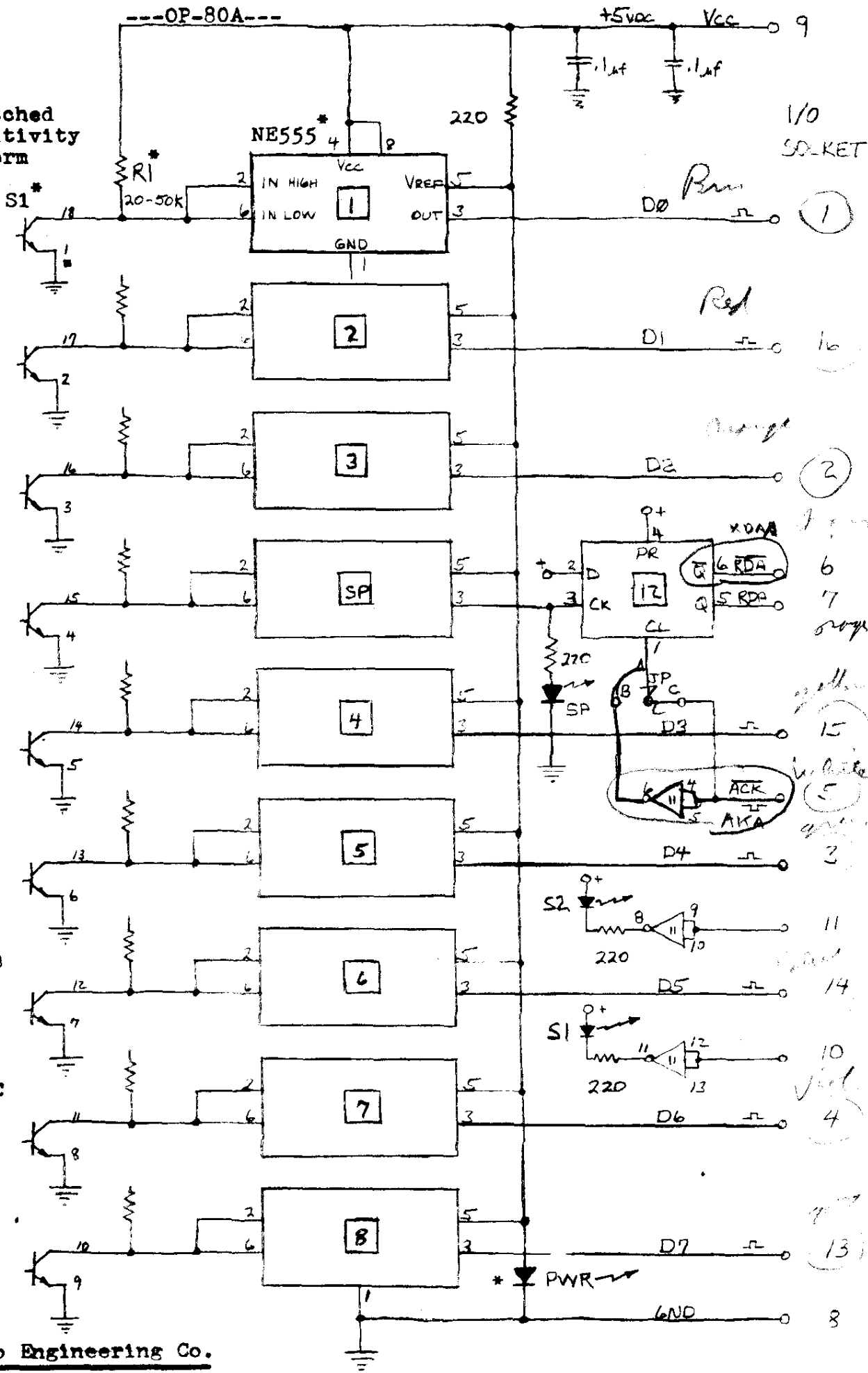
© 1976
all rights
reserved

Preliminary
Schematic

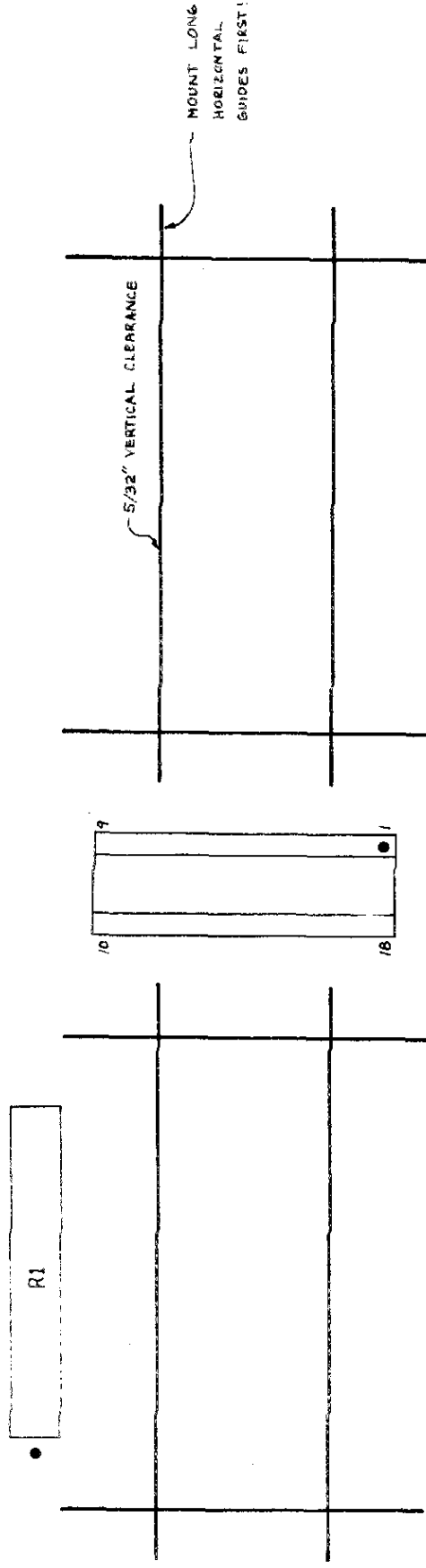
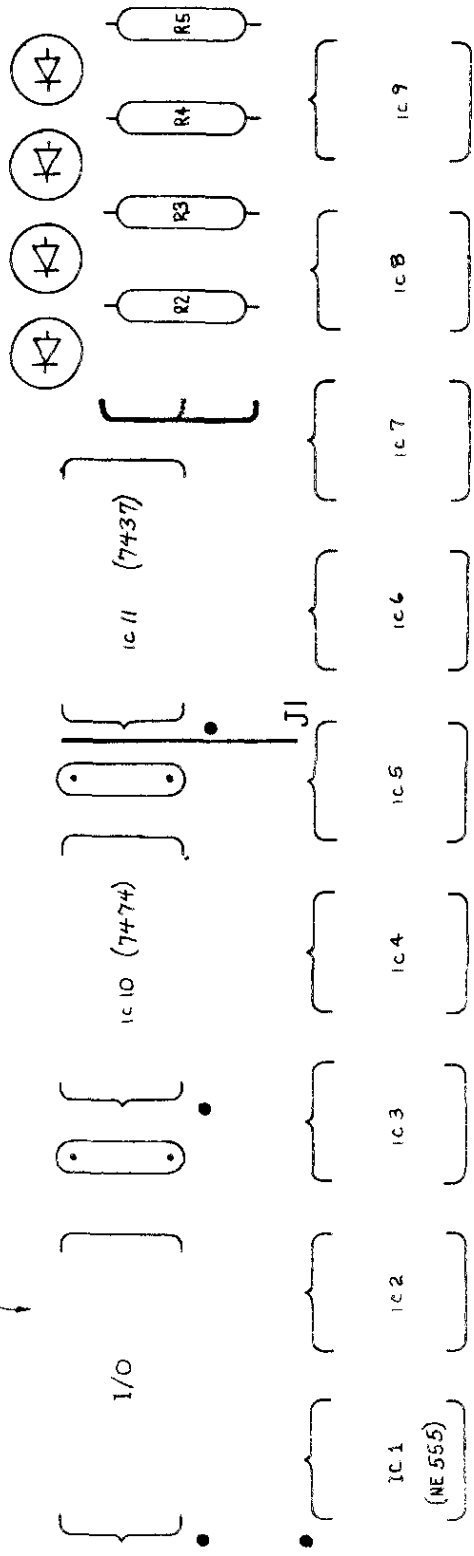
Jumper A to B
for ACK (JL)

or

✓ Jumper A to C
for $\overline{\text{ACK}}$ (LF)



DO NOT CUT GUIDES
ON I/O SOCKET!



© 1976 OAE

3-1-76 REV 1

```

0000
0000
0000
0000
0000
0000
0000
0000
0000 31 00 D4
0003 CD 06 00
0006 CD 45 00
0009 FE 3A
000B C2 06 00
000E CD 2A 00
0011 57
0012 C8
0013 CD 2A 00
0016 67
0017 CD 2A 00
001A 6F
001B CD 2A 00
001E CD 2A 00
0021 77
0022 23
0023 15
0024 C2 1E 00
0027 C3 06 00
002A
002A
002A CD 45 00
002D CD 3D 00
0030 07
0031 17
0032 17
0033 17
0034 5F
0035 CD 45 00
0038 CD 3D 00
003B 83
003C C9
003D
003D
003D D6 30
003F FE 0A
0041 D8
0042 D6 07
0044 C9
0045
0045
0045 DB 00
0047 E6 40
0049 CA 45 00
004C DB 01
004E D3 01
0050 E6 7F
0052 C9

```

```

0000 * << PAPER TAPE LOADER >>
0001 *
0002 * USE THIS PROGRAM TO LOAD SOFTWARE
0003 * PACKAGE #1
0004 *
0005 ORG 0000
0006 SP EQU 6
0007 * INTEL TAPE LOADER
0009 LXI SP,0D400H
0010 CALL READ
0020 READ CALL TTYIN
0025 CPI ':'
0030 JNZ READ
0035 CALL CHAR
0040 MOV D,A
0045 RZ
0050 CALL CHAR
0055 MOV H,A
0060 CALL CHAR
0065 MOV L,A
0066 CALL CHAR
0070 LOOP CALL CHAR
0075 MOV M,A
0080 INX H
0085 DCR D
0090 JNZ LOOP
0095 JMP READ
0100 *
0105 *
0110 CHAR CALL TTYIN
0115 CALL HEX
0120 RLC
0125 RAL
0130 RAL
0135 RAL
0140 MOV E,A
0145 CALL TTYIN
0150 CALL HEX
0155 ADD E
0160 RET
0165 *
0166 *
0170 HEX SUI 48
0175 CPI 10
0180 RC
0185 SUI 7
0190 RET
0195 *
0200 *
0205 TTYIN IN 0
0206 ANI 64
0207 JZ TTYIN
0210 IN 1
0215 OUT 1
0216 ANI 127
0220 RET

```

DUMP 0000 0052

```

0000 31 00 D4 CD 06 00 CD 45 00 FE 3A C2 06 00 CD 2A
0010 00 57 C8 CD 2A 00 67 CD 2A 00 6F CD 2A 00 CD 2A
0020 00 77 23 15 C2 1E 00 C3 06 00 CD 45 00 CD 3D 00
0030 07 17 17 17 5F CD 45 00 CD 3D 00 83 C9 D6 30 FE
0040 0A D8 D6 07 C9 DB 00 E6 40 CA 45 00 DB 01 D3 01
0050 7F C9

```