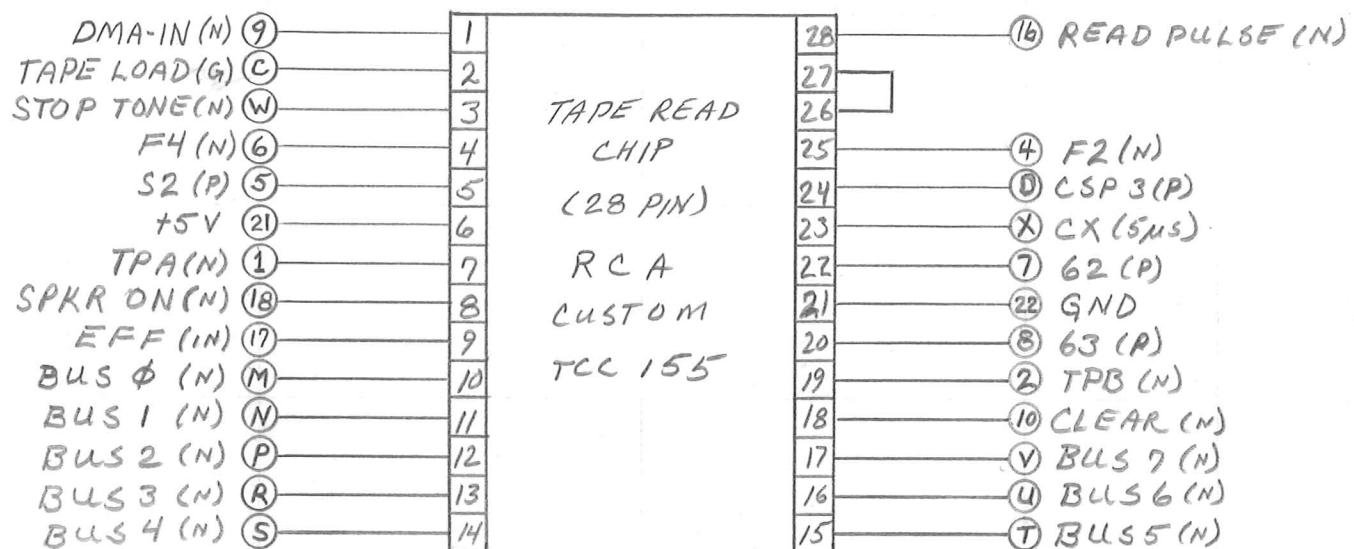


FRED 1.05 CARD A7

TAPE READ

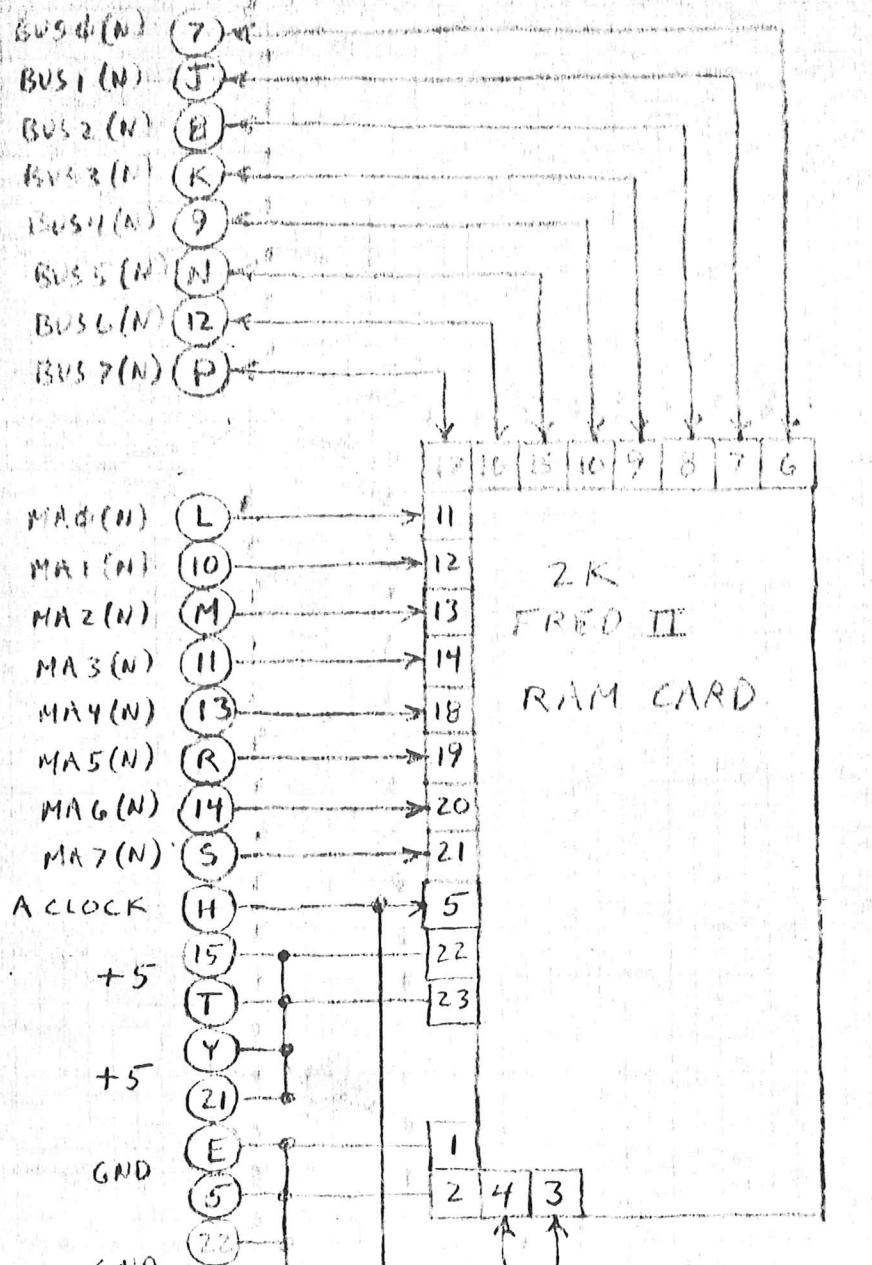


9-22-75

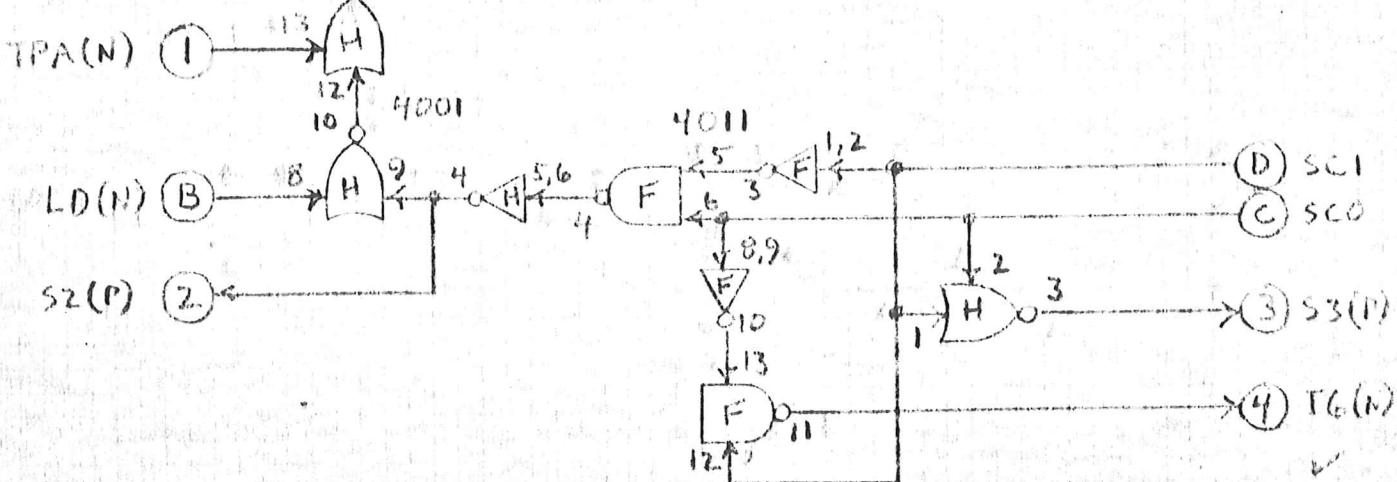
B.J.C.

CARD A12 - RAM

L.O.M.

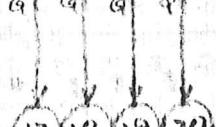
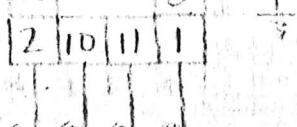
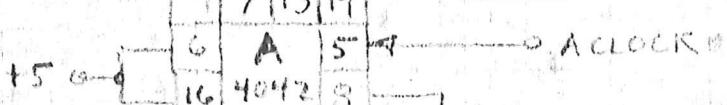
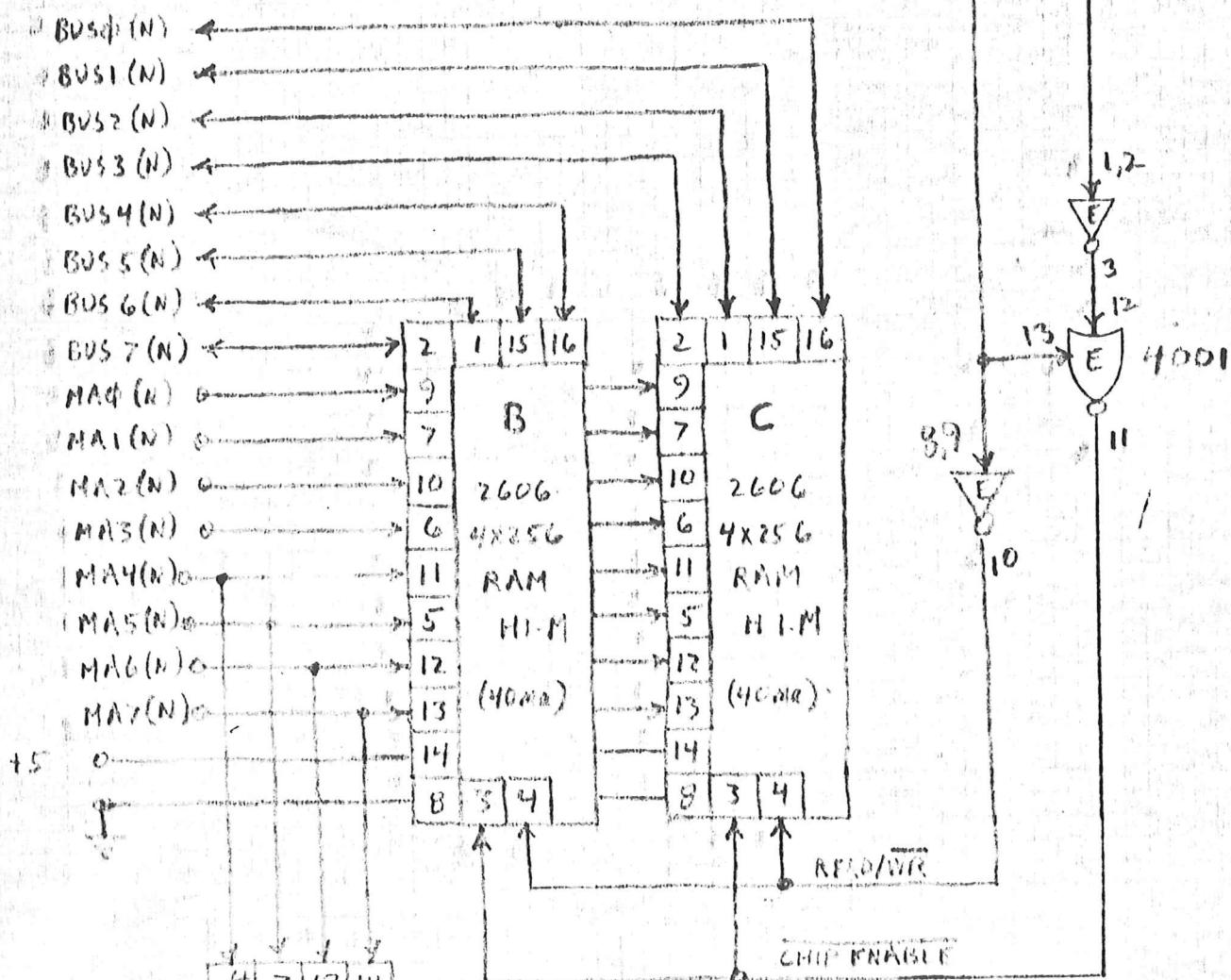
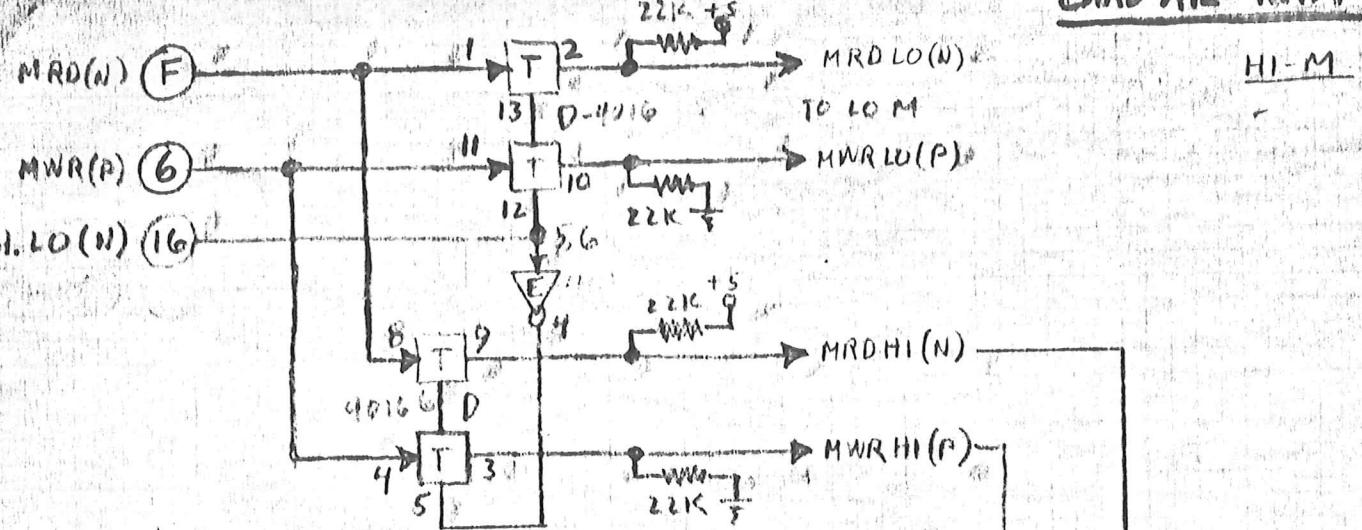


	A	I	TPA(N)
LD(N)	B	2	S2(P)
SC0	C	3	S3(F)
SC1	D	4	TG(N)
GND	E	5	GND
MRD(N)	F	6	MWR(P)
A CLOCK	G	7	BUS 1(N)
BUS 1(N)	H	8	BUS 2(N)
BUS 2(N)	I	9	BUS 3(N)
MA1(N)	J	10	HAL1(D)
MA2(N)	K	11	HAL2(N)
MA3(N)	L	12	BUS 4(N)
MA4(N)	M	13	BUS 5(N)
MA5(N)	N	14	BUS 6(N)
MA6(N)	O	15	HAL3(N)
MA7(N)	P	16	HAL4(N)
	Q	17	AM (IN)
	R	18	AS (IN)
	S	19	AG (IN)
	T	20	AT (IN)
	U	21	+5 (IN)
	V	22	GND
	W	23	GND



JAW 11-1-74

CARD A12-RAM



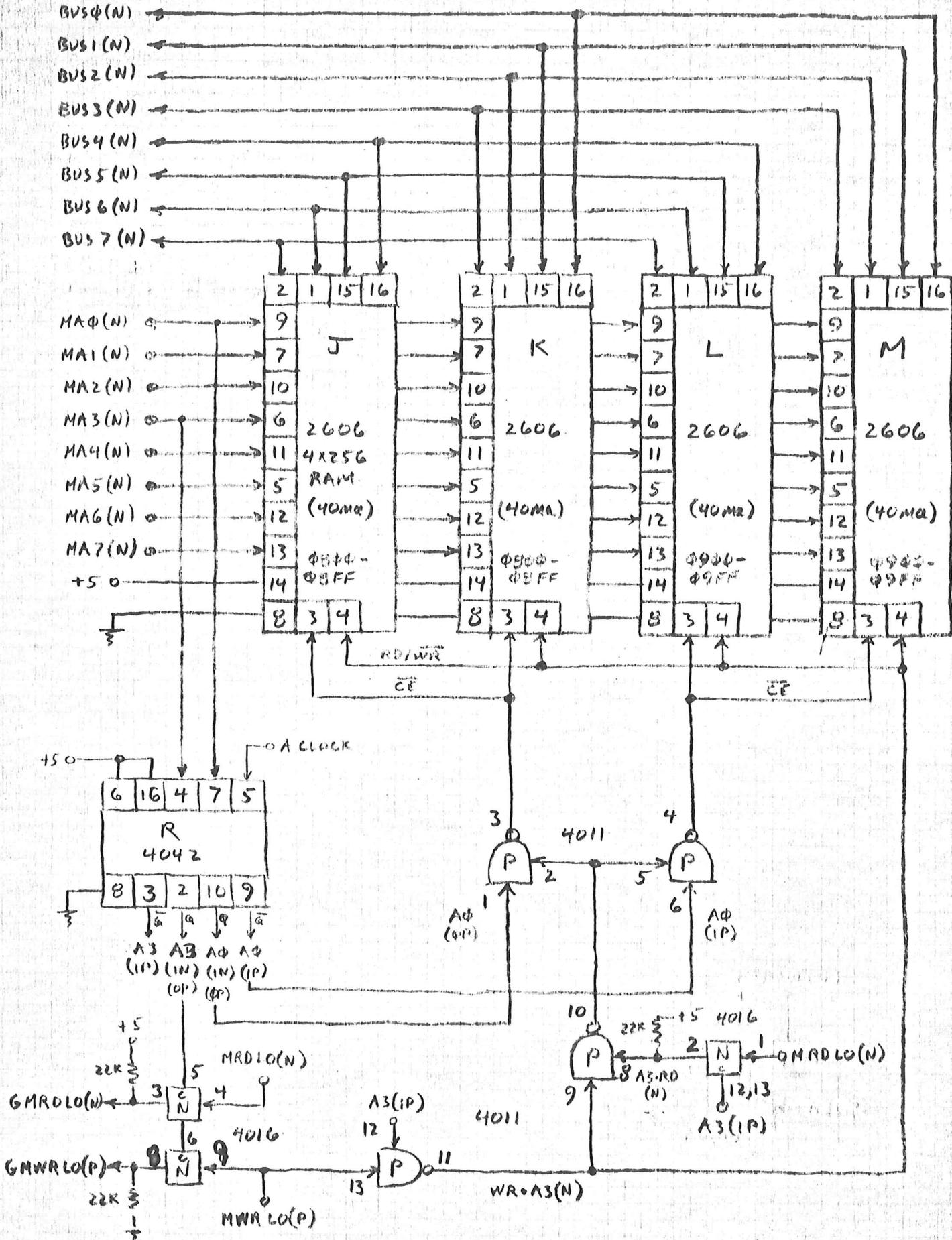
B3

JAW 11-1-74



CARD A12-RAM

512 BYTES @  $\Phi B C O \rightarrow \Phi 9 F F$

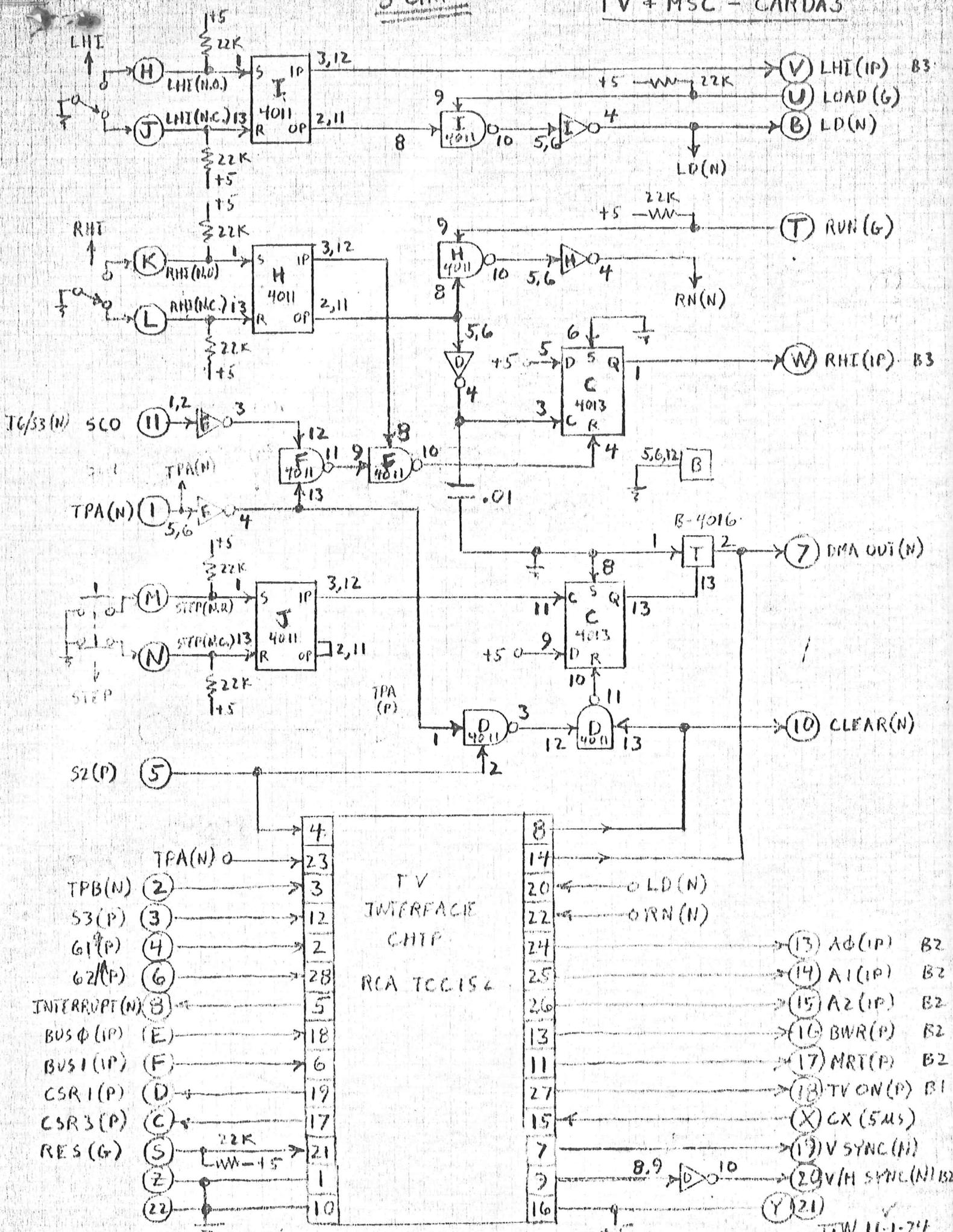


CARD A12 - COMPONENT SIDE.

1		H	F 4011	R 4012
		4001	(4)	
				N 4016 P 4011
				L 2606 M 2606
				J 2606 K 2606
21		(4)		(4)
22.	A 4042	B 2606	C 2606	D 4016 E 4001

8 CMPS

TV + MSC - CARD A3

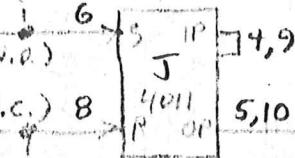


TV & MSC - CARD A3

A	I	TRA(N)
L.D(N)	2	TPB(N)
CSPR×3(P)	3	S3(P)
GSR-1(P)	4	6119(P)
BUSΦ(M)	5	S2(P)
BUS1(IP)	6	G2IA(P)
LHD N.C.	7	OMA, OVT(N)
LHT N.C.	8	THTER(N)
AMT N.C.	9	
AMT N.C.	10	CLEAR(1)
STEP N.O.	11	SCD
STEP N.C.	12	S2(18)
SX N.O.	13	A0(1)
SX N.C.	14	A1(1)
RES(6)	15	A2(1P)
KVS(6)	16	BW6(P)
LOAD(6)	17	MRI(P)
LHT(P)	18	TVOM(P)
RHI(1)	19	V3FLC(N)
CX	20	V/H SYNC(N)
TS	21	TS
GND	22	GND

4.5

2220



2220

5

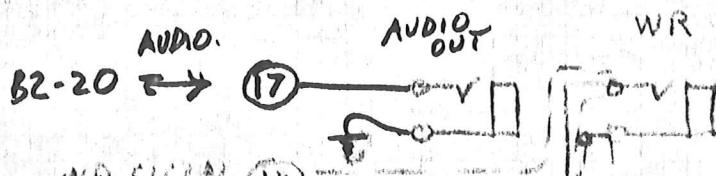
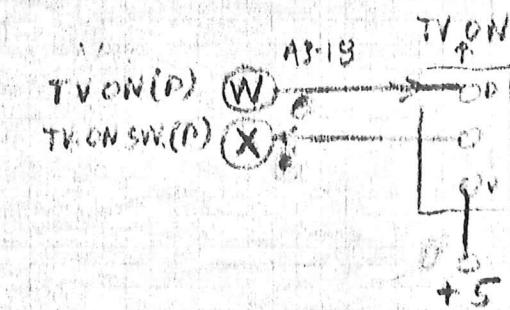
SX

(12) SX (AN)

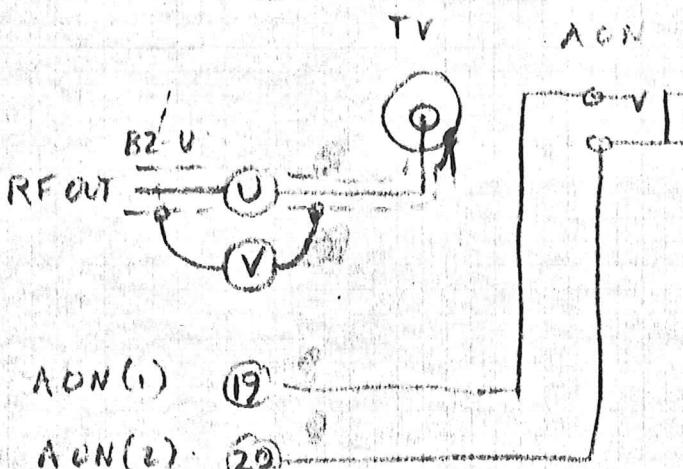
1

J/O PANEL - CARD (B)

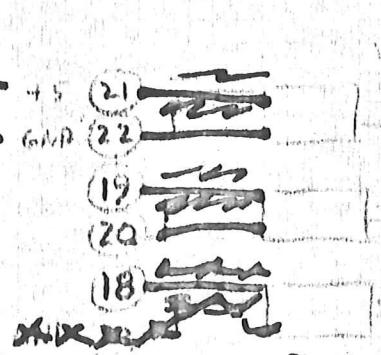
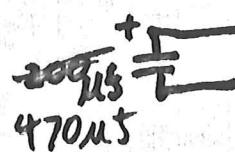
$\text{IV}(M(P)) \rightarrow \text{IV}^{\text{con}}(M(P))$



WR. SIGMA  
CVT



B5Φ(1N)	A	1	FSI(N)
1	B	2	2
2	C	3	3
3	D	4	4
4	E	5	P5Φ(1N)
5	F	6	1
6	G	7	2
7	H	8	3
8	J	9	
EXT. IN(P)	K	9	
SPKR SW(1)	L	10	
SPKR(N)	M	11	
WR PULSE	N	12	
	P	13	
X	R	14	
SCOPTONE(1N)	S	15	) WR. SIGNAL
SCOPTONE SW(N)	T	16	OUT
TV RF	U	17	
	V	18	
TV ON (P)	W	19	SR. (N.O.)
TV ON SW (P)	X	20	'A ON(1)
+5	Y	21	'A ON(2)
(GND)	Z	22	+5



(13) 270K  
(14) 270K

SPKR (GEN  
= U.C.)  
SPECIAL  
PLUG  
FOR  
BUILT  
IN UNIT  
ONLY

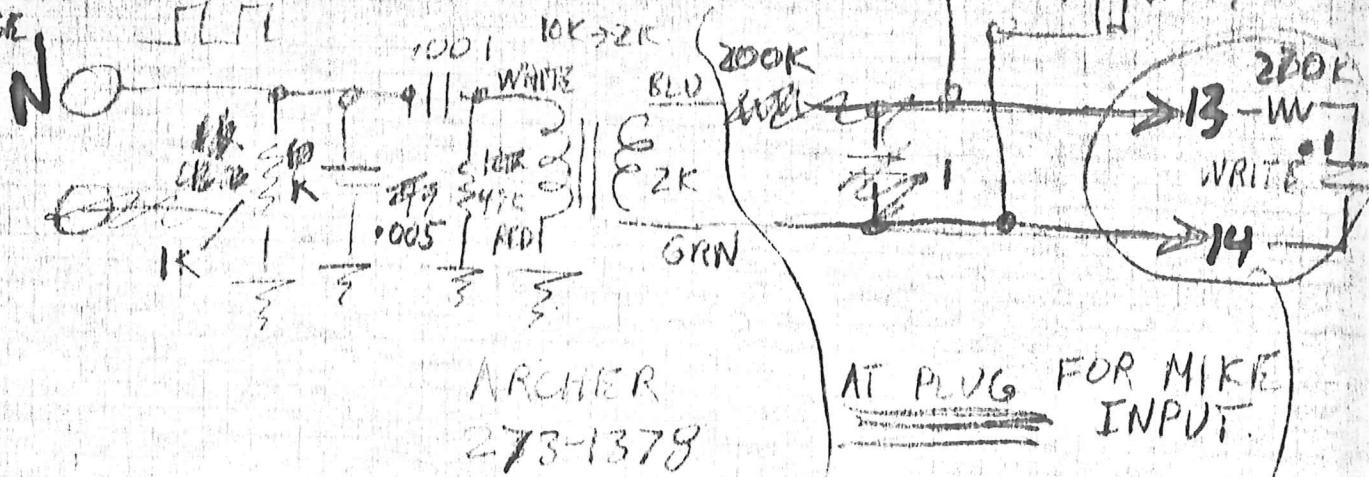
MISS 8

FOLIO 10

KUNMING.

JAN 11-1-74

WRITE PULSE  
FROM B3

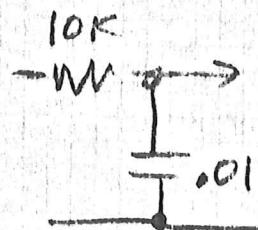


CARD  
B1

ARCHER  
273-1378

AT PLUG FOR MIKE  
INPUT.

PANASONIC WITH ALL



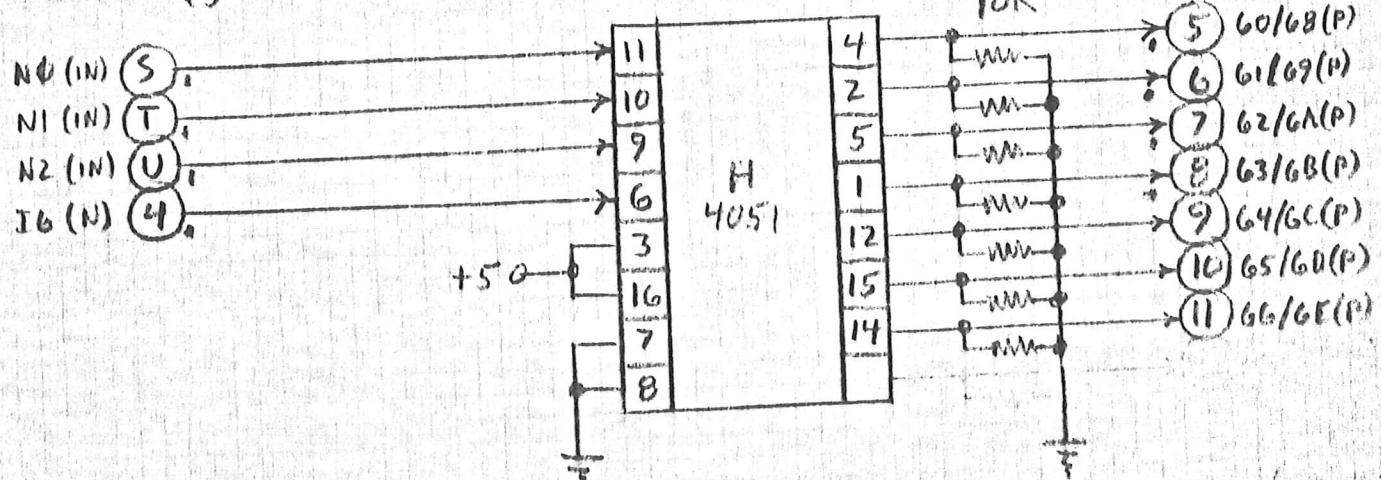
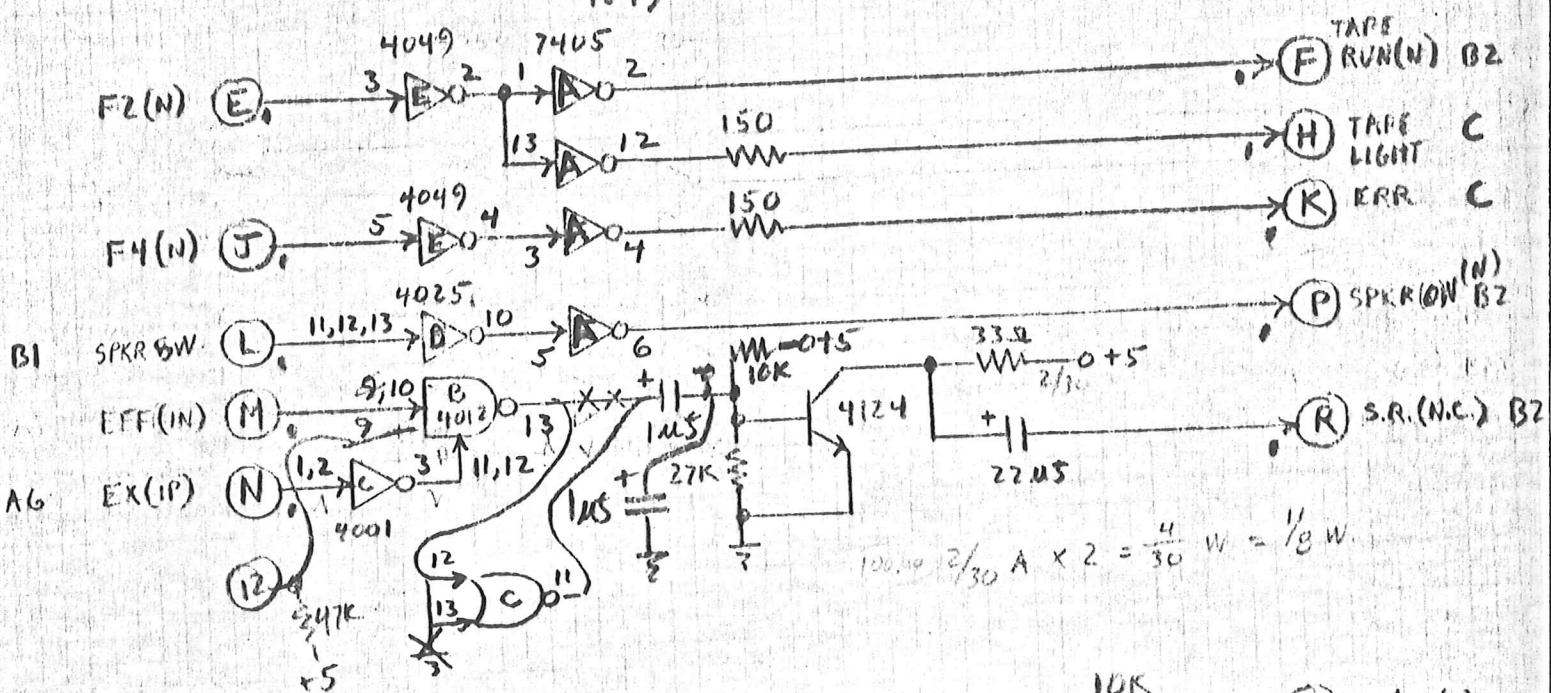
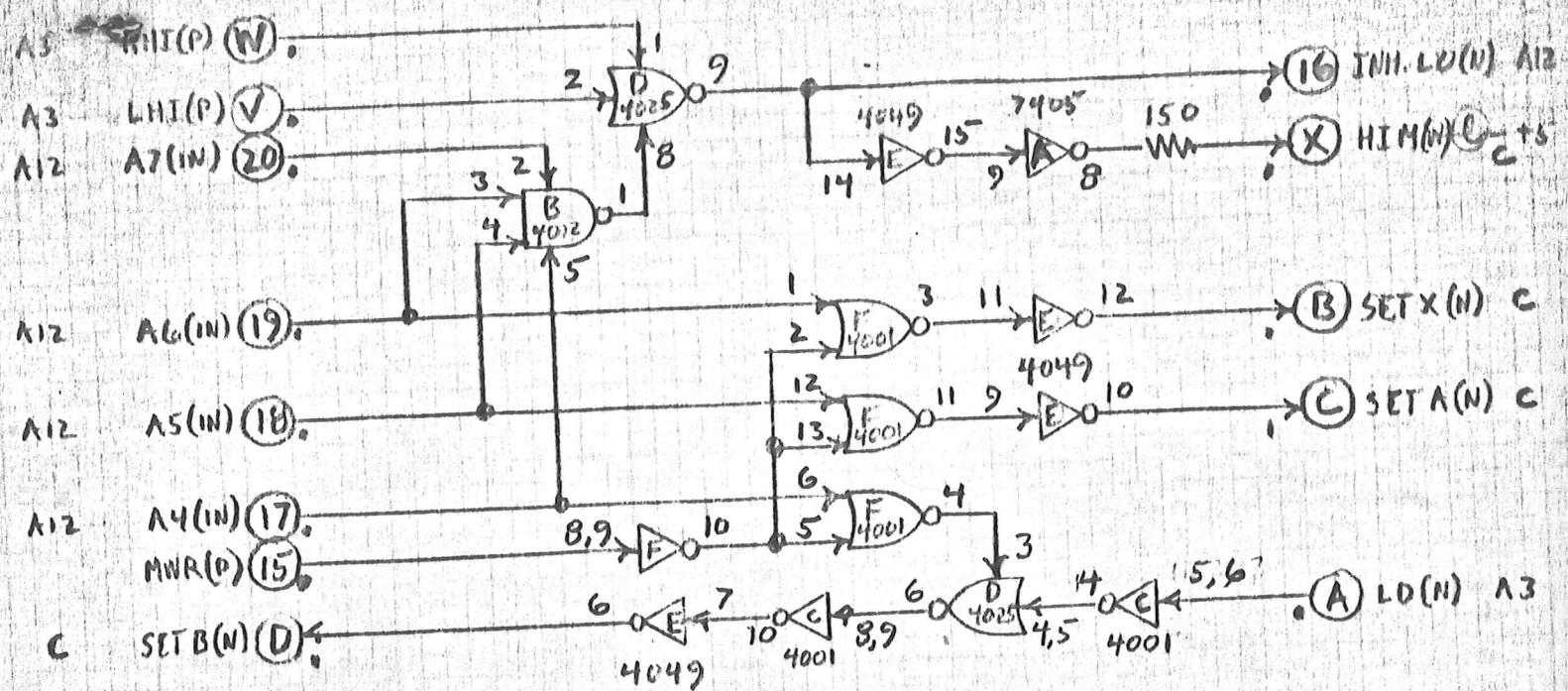
RCA AUX INPUT  
ALL OFF

CHANGING

NO. BS-12 TO BI-N  
CHARGE AT-W TO BD-S (WIRE R. PULSE)  
ADD B3E3 TO BI-C (WIRE TO BD)  
S 14 STOP INP. ON ONE

## MSC, P.C. CHANGES

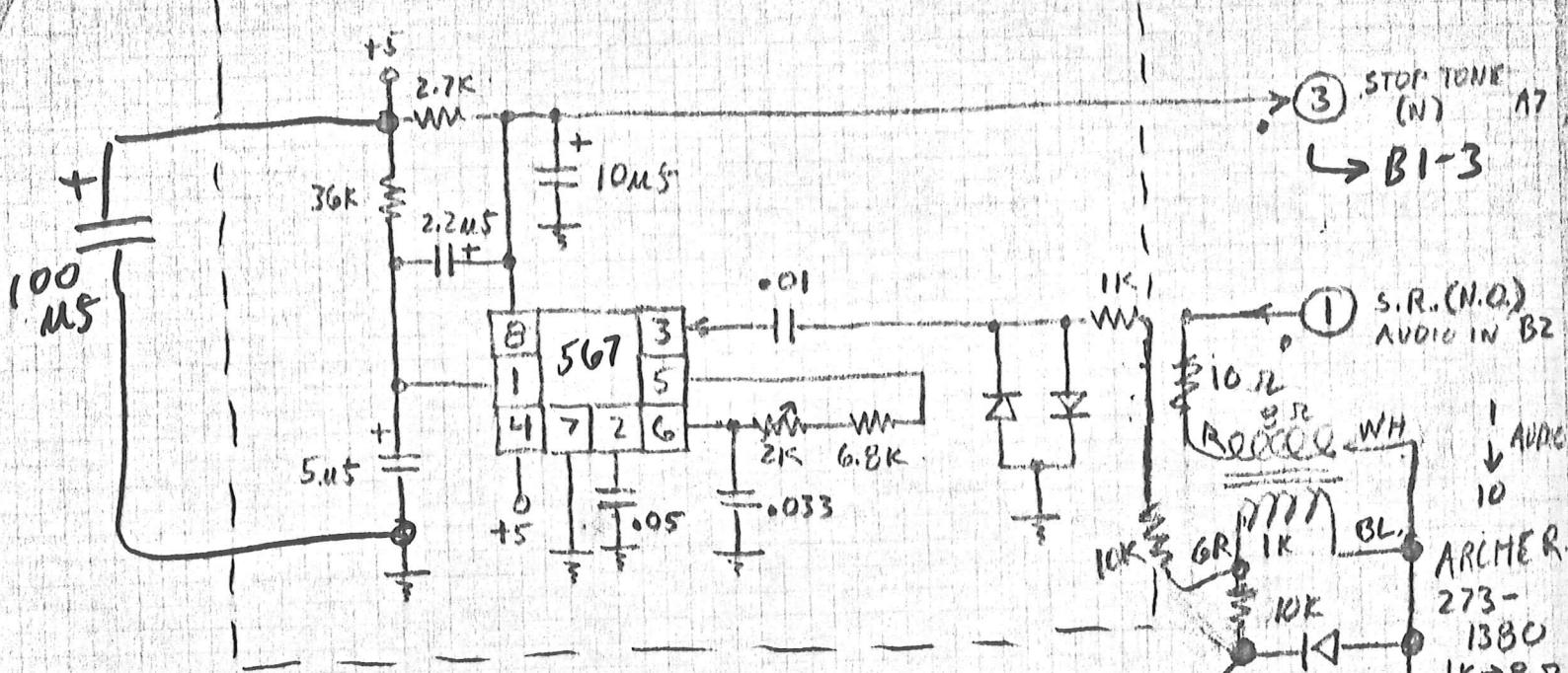
CUT ~~MEB~~ CLEAR LINE ON TV BUFFER P.C. CARD  
ADD JUMPER ON HEX DECODE & DEBOUNCE P.C.CARD



35 PINS

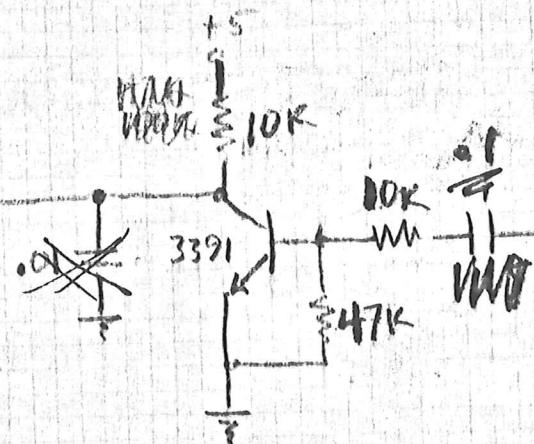
JAW 11-1-74

# TONE CARD



LD(N)	A	1	S.R. (N.O.)
SETX(N)	B	2	READ PULSE
SETA(N)	C	3	AUDIO IN
SETB(N)	D	4	JG(N)
F2(N)	E	5	64/1024(P)
RUN(N)	F	6	64/1024(I)
TAPELIGHT	H	7	62/16B(P)
F4(IN)	J	8	63/16B(P)
ERRLIGHT	K	9	64/16C(P)
SIRR SW	L	10	65/16D(P)
PTT(IN)	M	11	60/16E(P)
EX(P)	N	12	TAPE WR PULSE
SPPRCM(N)	P	13	) WRITE SIG.
S.R. (N.O.)	R	14	OUT
HD (N)	S	15	MWA (P)
NT (N)	T	16	TNH LD(W)
NR (N)	U	17	A4 (IN)
LHT (P)	V	18	A5 (IN)
RHT (P)	W	19	A6 (IN)
MMLIGHT	X	20	A7 (IN)
+5	Y	21	+5
GND	Z	22	GND

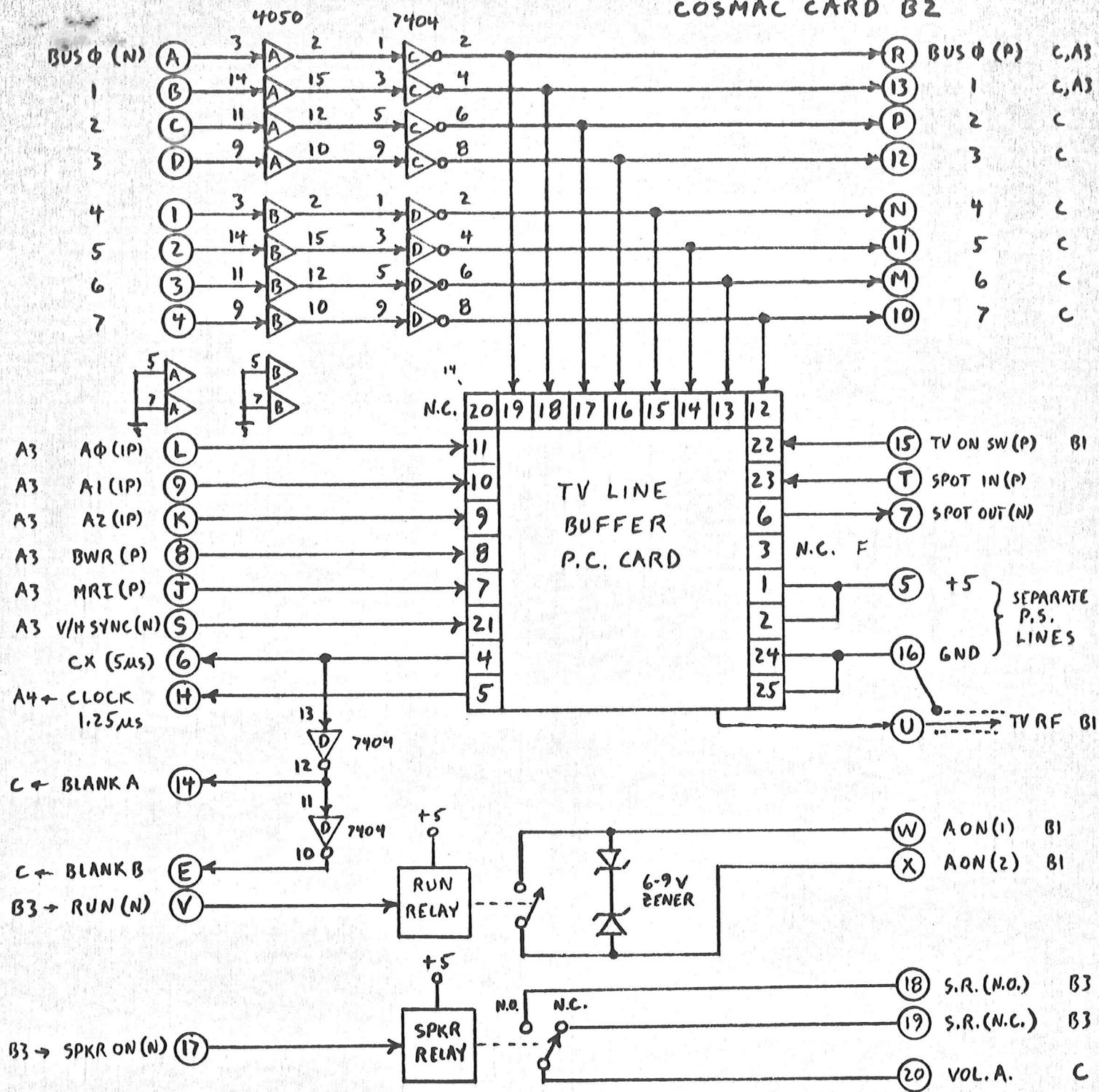
A7 READ PULSE (N) ②



*TAPE WRITE CIRCUIT*

JAN 11-1-74 V

TV BUFFER & TAPE RELAYS  
COSMAC CARD B2



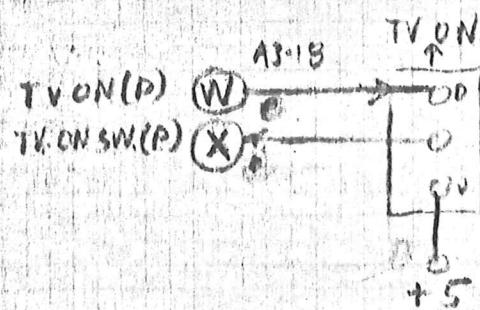
BUS <sub>0</sub> (N)	A 1	BUS <sub>4</sub> (N)
1	B 2	5
2	C 3	6
3	D 4	7
BLANK B	E 5	+5
	F 6	CX
CLOCK	H 7	SPOT OUT (N)
MRI (P)	J 8	BWR (P)
A2 (P)	K 9	A1 (P)
A0 (P)	L 10	B7 (P)
B6 (P)	M 11	B5 (P)

B4 (P)	N 12	B3 (P)
B2 (P)	P 13	B1 (P)
BO (P)	R 14	BLANK A
V/H SYNC (N)	S 15	TV ON SW (P)
SPOT IN (P)	T 16	GND
TV RF	U 17	SPKR (N)
RUN (N)	V 18	S.R. (N.O.)
AON (1)	W 19	S.R. (N.C.)
AON (2)	X 20	VOL. A.
+5	Y 21	+5
GND	Z 22	GND

JAW 11-20-74

# I/O PANEL - CARD B1

+5 → TV ON SW(P) B2-15

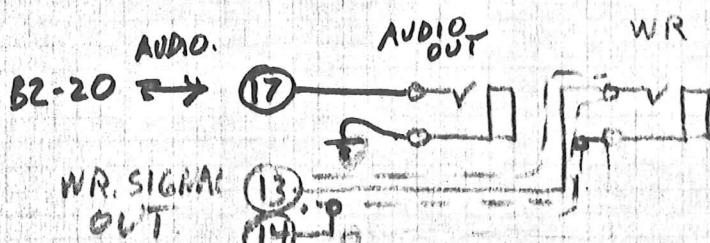


SPKR ON

A7-1B  
M SPKR(N)  
L SPKR SW(N)

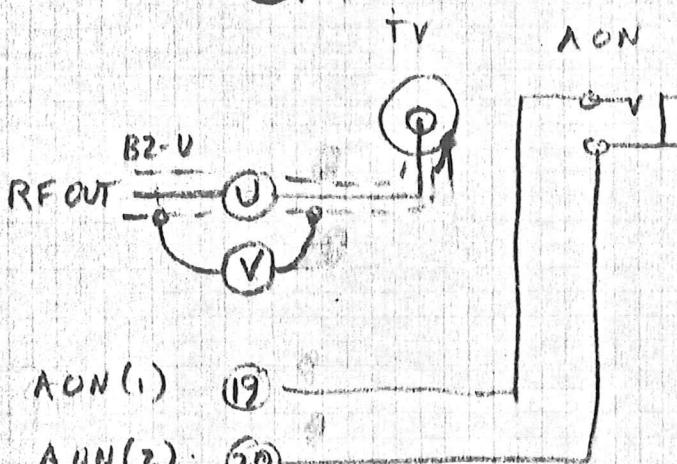
B3-L → B3-3

S STOP TONE(S)  
T STOP TONE(M)  
A7-W.



WR

FFF



AON

A1N

(18) S.R. (N.O.)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
BSΦ(IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
EXT. IN(P)																											
SPKR SW(N)																											
SPKR(N)																											
WA PULSE	X																										
STOP TONE IN(S)																											
STOP TONE SW(N)																											
TV RF																											
TV ON (P)																											
TV ON SW(P)																											
+5																											
GND																											

) WR. SIGNAL OUT

200μS +  
470μS

5V GND

OUTSIDE +

POWER

19 20 R.E.M.

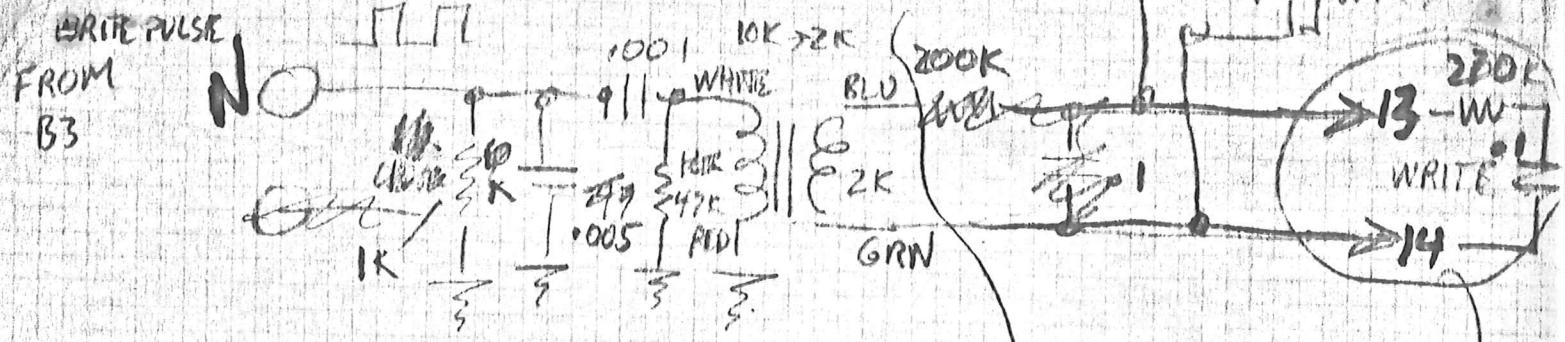
18 SPKR (GND)

200μS  
SPECIAL  
BLDG  
FOR  
BUILT  
IN UNIT  
ONLY

270K 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

MIKE

JAW 11-1-74

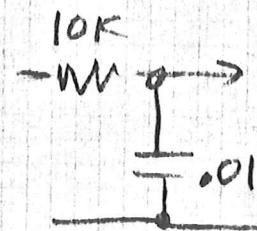


ARCHER  
273-1378

AT PLUG FOR MIKE INPUT.

CARD  
B1

PANASONIC WITH ALC



RCA AUX INPUT  
ALC OFF

CHANGES  
ADD B3-12 TO B1-N (TYPE WR. PULSE)  
CHANGE A-W TO B3-B TO B1-C TO B1D ADD STOP ZONE  
ADD B3-3 TO B1-C ADD INI. SW.

MSC. P.C. CHANGES

CUT CLEAR LINE ON TV BUFFER P.C. CARD

ADD JUMPER

ON HEX DECODE + DEBOUNCE P.C. CARD.

$\rightarrow +5 \rightarrow 15, T$   
 $\rightarrow 64 \rightarrow E, S$

- 15 -

\* 45 → 5 3 SEPARATE  
\* 6ND → 16 3 RUN

SIGNAL	A12	A3	A45	A6	A7	A8	A9	A11			B1	B2	B3	C
	P.AM	TV+MSC	COSMAC	HEX IN	TAPE RD	TAPE WR	COIN GAME CRTS				I/O JCLS	TV.GFR +MSC	JAPCCTS +MSC	CONF PAGE
BUS φ (N)	• 7	—	• M	• M	• M	• M	• M	• M	.	.				
1	• J	—	• N	• N	• N	• N	• N	• N	.	.				
2	• 8	—	• P	• P	• P	• P	• P	• P	.	.				
3	• K	—	• R	• R	• R	• R	• R	• R	.	.				
4	• 9	—	• S	• S	• S	• S	• S	• S	.	.				
5	• N	—	• T	• T	• T	• T	• T	• T	.	.				
6	• 12	—	• U	• U	• U	• U	• U	• U	.	.				
7	• P	—	• V	• V	• V	• V	• V	• V	.	.				
MAD (N)	• L	—	• G	—	—	—	—	—	.	.				
1	• 10	—	• D	—	—	—	—	—	.	.				
2	• M	—	• E	—	—	—	—	—	.	.				
3	• 11	—	• F	—	—	—	—	—	.	.				
4	• 13	—	• H	—	—	—	—	—	.	.				
5	• R	—	• J	—	—	—	—	—	.	.				
6	• 14	—	• K	—	—	—	—	—	.	.				
7	• S	—	• L	—	—	—	—	—	.	.				
A CLOCK	H	—	—	—	—	—	—	—	.	.				
TPA(N)	• 1	• 1	• 1	• 1	• 1	• 1	• 1	• 1	.	.				
TPB(N)	—	• 2	• 2	• 2	• 2	• 2	• 2	• 2	.	.				
LD(N) LOAD	• B	• B	• B	—	—	—	—	—	.	.				
S2(P)	• 2	• 5	—	• 5	• 5	• 5	• 5	• 5	.	.				
S3(P)	• 3	• 3	—	—	—	—	—	—	.	.				
IG(N)	• 4	—	—	—	—	—	—	—	.	.				
SCO	• C	• 11	• 11	—	—	—	—	—	.	.				
SCI	• D	—	• 12	—	—	—	—	—	.	.				
WRD(N)	• F	—	• 20	—	—	—	—	—	.	.				
MWR(P)	• G	—	• 19	—	—	—	—	—	.	.				

SIGNAL	A12	A3	A45	AG	A7	A8	A9	A11		B1	B2	B3	C
	RAM	TVO MSC	COSMAC	HSX IN	TAPE RD	TAPE WR				TVO STTRS	TV BFR + MSC	TAPE CTS + MSC	CONTIN PAGE
INH. LO (N)	*16	—	—	—	—	—				—	*16	—	—
A4 (IN)	*17	—	—	—	—	—				—	*17	—	—
A5 (IN)	*18	—	—	—	—	—				—	*18	GRY	—
A6 (IN)	*19	—	—	—	—	—				—	*19	VIO	—
A7 (IN)	*20	—	—	—	—	—				—	*20	BLU	—
DMA-IN (N)	—	—	.9	.9	.9	—	.9	—		—	—	—	—
DMA-OUT (N)	—	.7	.7	—	—	.7	.7	—		—	—	—	—
INTERRUPT(N)	—	.8	.8	—	—	—	.8	—		—	—	—	—
CLOCK	—	—	W	—	—	—	—	—		*H	—	—	—
CLEAR(N)	—	*10	*10	*10	*10	*10	*10	—		—	—	*8	—
EF1 (N)	—	—	.3	.3	—	—	—	—		—	—	—	—
EF2 (N)	—	—	.4	—	.4	—	—	—		—	—	*E	—
EF3 (N)	—	—	.5	—	—	—	—	—		—	—	—	—
EF4 (N)	—	—	.6	.6	.6	—	—	—		—	—	*J	—
NΦ (N)	—	—	*18	—	—	—	—	—		—	*S	GRN	—
N1 (N)	—	—	*17	—	—	—	—	—		—	*T	YEL	—
N2 (N)	—	—	*16	—	—	—	—	—		—	*U	ORANGE	—
N3 (N)	—	—	15	—	—	—	—	—		—	—	—	—
G2/A (P)	—	*6	—	.7	.7	*6	—	—		—	*7	—	—
G3/B (P)	—	—	—	—	—	*8	—	—		—	*8	—	—
GΦ/8 (P)	—	—	—	.8	—	—	—	—		—	*5	—	—
CSR=1 (P)	—	*D	—	*D	—	—	—	—		—	—	—	—
CSR=3 (P)	—	*C	—	—	*D	*D	—	—		—	—	—	—
G1/9 (P)	—	*4	—	—	—	—	—	—		—	*6	—	—
LHI (IP)	—	*V	—	—	—	—	—	—		—	*V	—	—
RHI (IP)	—	*W	—	—	—	—	—	—		—	*W	—	—
SX (IN)	—	*12	—	—	—	*12	—	—		—	—	—	—

SIGNAL	A12	A3	A45	A6	A7	A8	A9	A11		B1	B2	B3	C
	RAM	TV+MSC	CUSMAC	HEX IN	TAPE RD	TAPE WR.				I/O JACCS	TV,BTR. +MSC	TAPE CTS +MSC	CDR PWR
H0(IP)	—	—	—	11	—	—				—	—	—	—
H1(IP)	—	—	—	12	—	—				—	—	—	—
H2(IP)	—	—	—	13	—	—				—	—	—	—
H3(IP)	—	—	—	14	—	—				—	—	—	—
H4(P)	—	—	—	15	—	—				—	—	—	—
EX(IP)	—	—	—	L	—	—				—	N	—	—
CO(IP)	—	—	—	16	—	—				—	—	—	—
C1(IP)	—	—	—	17	—	—				—	—	—	—
C2(IP)	—	—	—	18	—	—				—	—	—	—
C3(IP)	—	—	—	19	—	—				—	—	—	—
CP(IP)	—	—	—	20	—	—				—	—	—	—
CIN(N)	—	—	—	W	—	—				—	—	—	—
C(N)	—	—	—	X	—	—				—	—	—	—
BYTE MODE(N)	—	—	—	J	—	—				—	—	—	—
CARD IN(P)	—	—	—	K	—	—				—	—	—	—
HEX LOAD(N)	—	—	—	C	—	—				—	—	—	—
CA(IN)	—	—	—	A	—	—				—	—	—	—
CB(IN)	—	—	—	B	—	—				—	—	—	—
TAPE LOAD(N)	—	—	—	C	—	—				—	—	—	—
EFF(IN)	—	—	—	•17	•17	—				—	—	M	—
SPKR(N)	—	—	—	•18	—	—				—	M	—	—
STOP TONE <sup>SW</sup> (N)	—	—	—	•W	—	—				T	—	—	—
CX(SUS)	—	X	—	•X	•X	•X				—	6	—	—
READ PULSE(N)	—	—	—	•16	—	—				—	—	2	—
TAPE WRITE PULSE	—	—	—	—	•20	—				—	N	—	—
S.R.(NO.) AUDIO IN	—	—	—	—	—	—				—	18	18	1
WR SIG. OUT. (CD-KX)	—	—	—	—	—	—				—	13	13	14
				—	—	—					—	—	14

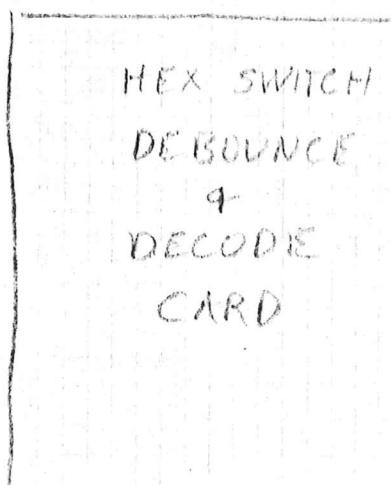
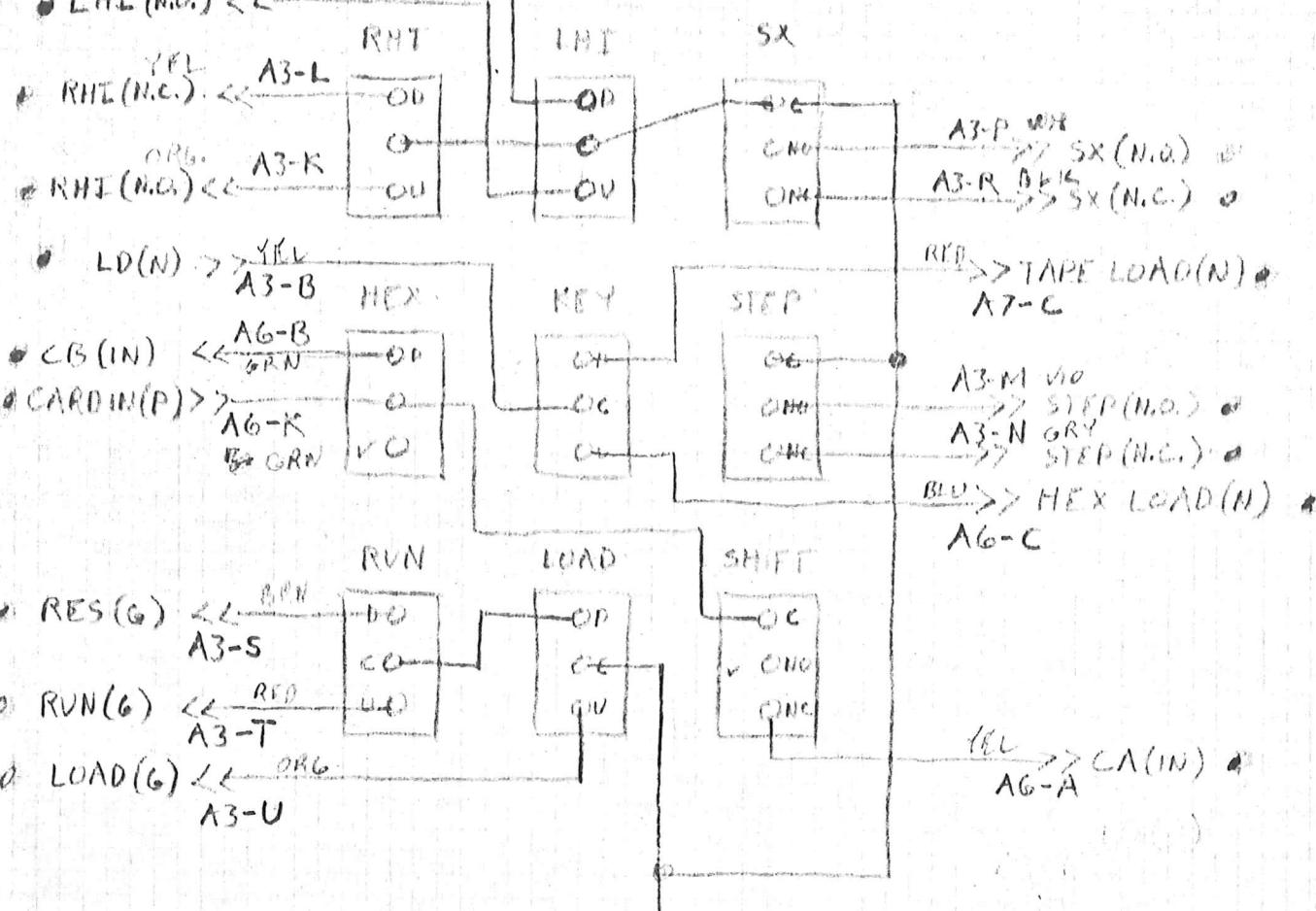
SIGNAL.	A12	A3	A45	A6	A7	A8	A9	A11		B1	B2	B3.	C
	RAM	TV+MCZ	COSMAC	HEX IN	TAPE RD	TAPE WR							
A0 (IP)	—	• 13	—	—	—	—							
A1 (IP)	—	• 14	—	—	—	—							
A2 (IP)	—	• 15	—	—	—	—							
BWR (P)	—	• 16	—	—	—	—							
MRI (P)	—	• 17	—	—	—	—							
TV ON (P)	—	• 18	—	—	—	—							
V SYNC (N)	—	19	—	—	—	—							
V/H SYNC (N)	—	• 20	—	—	—	—							
BUSΦ (IP) TTL	—	• E	—	—	—	—							
1	—	—	—	—	—	—							
2	—	—	—	—	—	—							
3	—	—	—	—	—	—							
4	—	—	—	—	—	—							
5	—	—	—	—	—	—							
6	—	—	—	—	—	—							
7	—	—	—	—	—	—							
LHI (N.O.)	—	—	H	—	—	—							
LHI (N.C.)	—	—	J	—	—	—							
RHI (N.O.)	—	—	K	—	—	—							
RHI (N.C.)	—	—	L	—	—	—							
STEP (N.O.)	—	—	M	—	—	—							
STEP (N.C.)	—	—	N	—	—	—							
SX (N.O.)	—	—	P	—	—	—							
SX (N.C.)	—	—	R	—	—	—							
RES (G)	—	—	S	—	—	—							
RUN (G)	—	—	T	—	—	—							
LOAD (G)	—	—	U	—	—	—							



# CONTROL PANEL - C

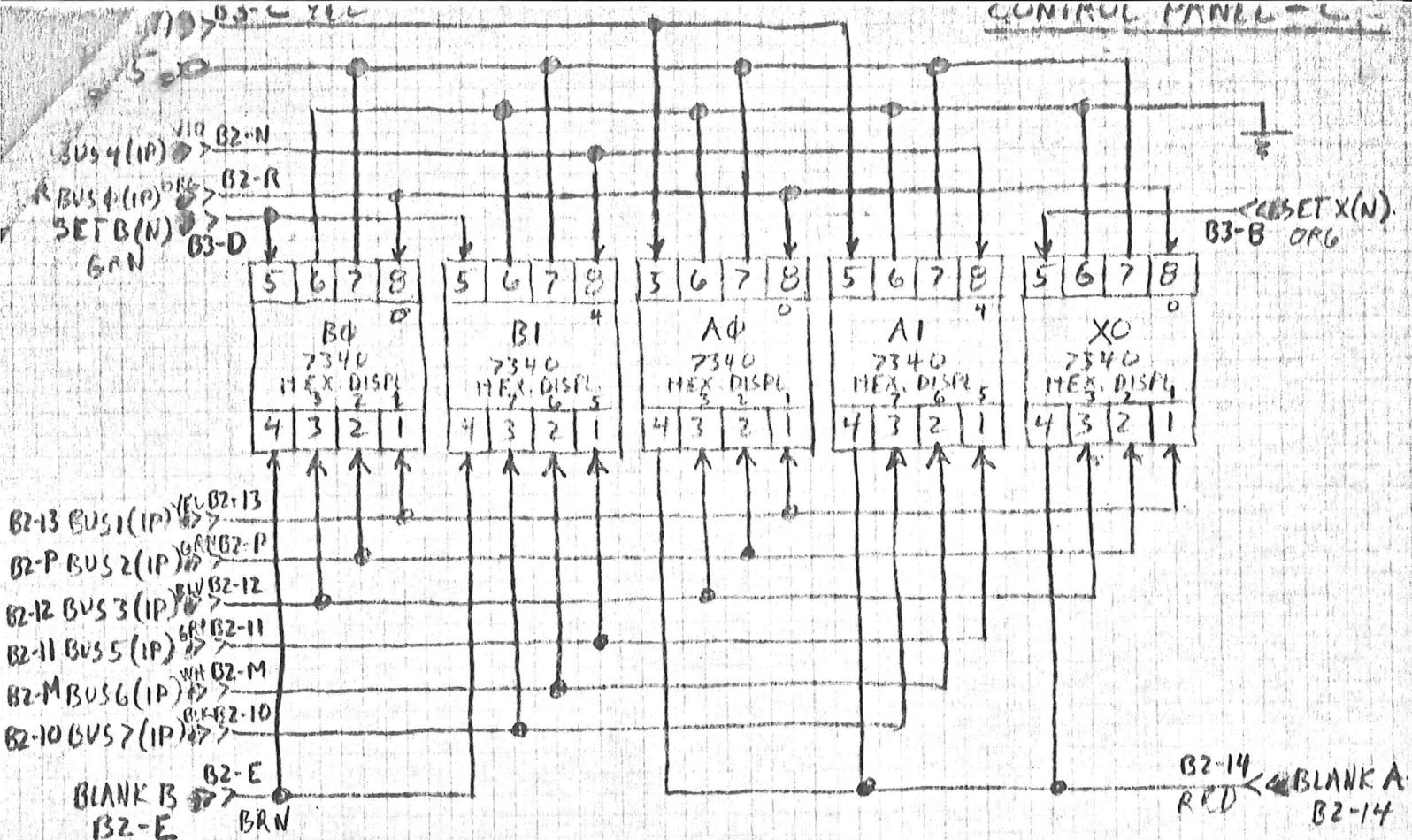
TOP

- LHI (N.C.) << A3-T REP
- LHI (N.O.) << A3-H PRT

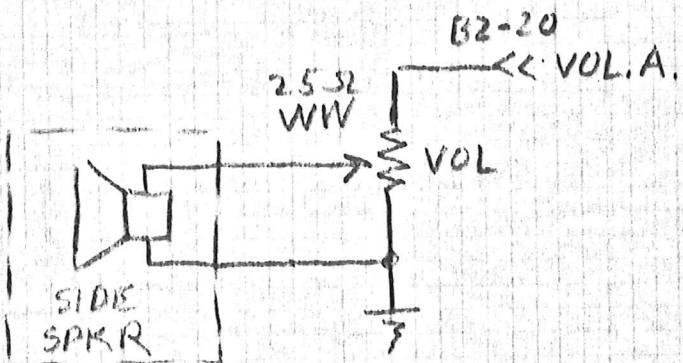
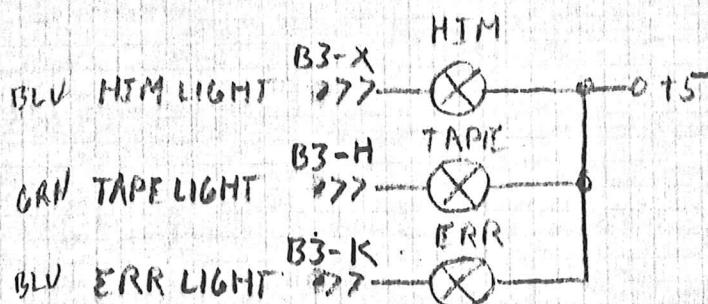


WHT	A6-11	>> HD (IP)
GRY	A6-12	>> HI (IP)
VIO	A6-13	>> H2 (IP)
BLU	A6-14	>> H3 (IP)
REP	A6-15	>> HC (P)
GRN	A6-10	<< CLEAR (N)
YEL	A6-1	<< TPA (N)
ORG	A6-2	<< TPB (N)
BRN	0+5	
BLK		

JAW 11-1-74  
42

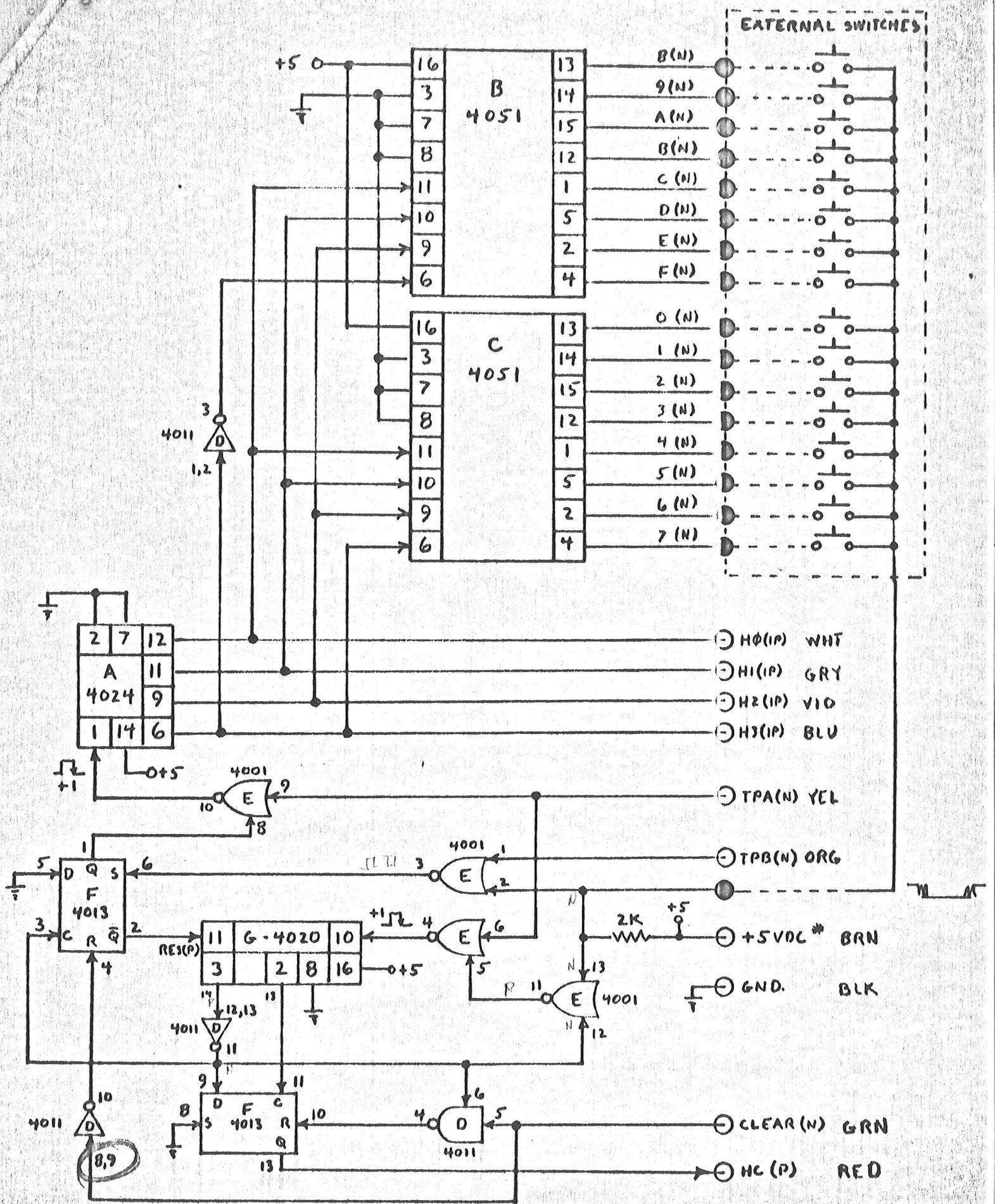


HEX UTILITY DISPLAY - REAR VIEW

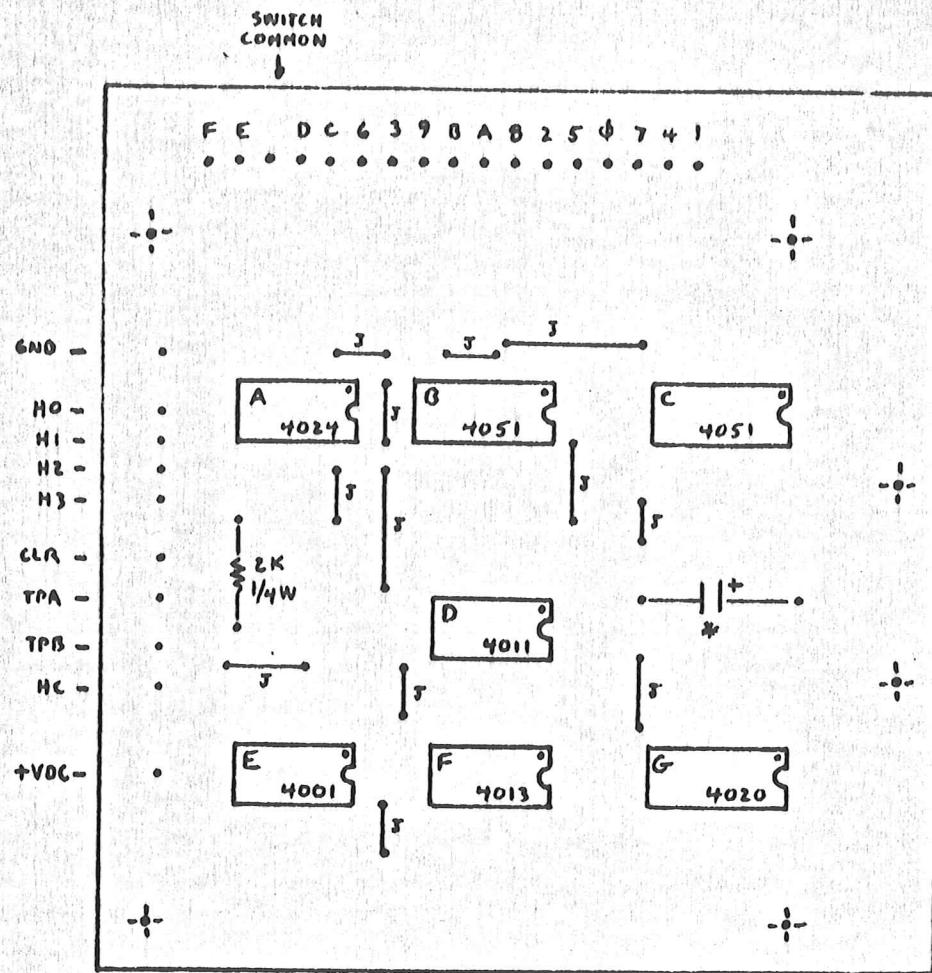


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# FRED-II HEX SWITCH DECODE & DEBOUNCE CARD



JAW B-1-74



HEX KEYBOARD DECODE AND DEBOUNCE  
COMPONENT SIDE  
\* OPTIONAL FILTER CAP.

JAN 19 8-1-74