Eμ SYSTEMS

3046 SCOTT BOULEVARD

SANTA CLARA, CALIFORNIA 95050

PHONE (408) 241-0788

NOTES FOR USERS OF E-MU SYSTEMS SSM CHIP DEMO BOARD

The enclosed documentation includes a complete parts list for the voice demo board, including a manufacturer's part number for each item. Except those items supplied by E-mu, most items can be substituted readily with only slight effect on circuit performance. In particular:

The 1% resistors can be substituted for near-valued 5% units with some loss in temperature stability.

The TL082 op-amps can be substituted by 1458's with some loss of bandwidth and oscillator stability with temperature.

The trimmers specified can be freely substituted, but cermet varieties will maintain best tempco.

Don't forget E-mu is a professional system manufacturer, not a parts distributor. We are set up to ship out voice demo kits, but can't sell miscellaneous parts. Don't ask.

We sell this board as a service to hobbyists, but have no facilities to answer questions, do simple design mods, etc. If you cannot get the circuit to work, it's up to you to debug it, unless you purchased the board pre-assembled and tested. The board has been checked and is error free; the SSM chips are first run and fully tested and guaranteed.

The typical front panel schematic is a suggestion only, to show how the board can be connected. Infinite variations exist.

Have Fun! -- E-mu

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PARTS LIST - E-mu Systems SSM Chip Voice Demo Board

QTY	PART	MFR'S PART NUMBER
1	Circuit Board	Available from E-mu - $50 by itself
1	Edge Conn.	TEKA TP5-W01-50 or any S-100 type.

The following parts are required for the on-board power supply. None are required if +/- 15V are supplied to the board externally. The user must supply fused 110VAC to the board's power connector.

1	Power Conn.	MOLEX 09-65-1031
1	Mating Conn.	MOLEX 09-50-3031 with 3 08-50-0106 pins
1	Transformer	SIGNAL TRANSFORMER ST 4-36
2	200uF 40V Cap	SPRAGUE 500D208G050FF7
4	1N4002 Diode	MOTOROLA
2	2N4923	MOTOROLA
2	Heatsinks	THERMALLOY 6073
2	Hdwe for above	2 ea. 4-40x1/2" screw, nut, lockwasher
1	741 opamp	NATIONAL LM741CN
1	723 requlator	NATIONAL LM723CN
1	2N3904	MOTOROLA
4	3.01K 1% Res	DALE RN55D
1	3.32K 1% Res	DALE RN55D
1	9.09K 1% Res	DALE RN55D
2	3.9 ohm Res	Any 1/4 watt 5%
1	200 ohm	"
1	470 pF Cap	SPRAGUE 5GA-T47

The following parts are required depending on filter option:

LOWPASS:

4	1000 pF Cap	SPRAGUE 5GA-D10
5	10K Res	Any 1/4 watt 5%

HIGHPASS:

4	2000 pF Cap	SPRAGUE 5GA-D20

ALLPASS (Phase-shifter):

4	2000 pF Cap	SPRAGUE 5GA-D10
5	10K Res	Any 1/4 watt 5%

The remaining parts are required for stuffing the board as per schematics:

QTY	PART	MFR'S PART NUMBER
1	741 opamp	NATIONAL LM741CN
4	1458 dl opamp	NATIONAL LM1458CN
4	TL082 dl opamp	TEXAS INSTRUMENTS TL082CP
1	SSM2020	Custom IC, available from E-mu for $7.50 ea.
2	SSM2030	Custom IC, available from E-mu for $10.00 ea.
1	SSM2040	Custom IC, available from E-mu for $10.00 ea.
2	SSM2050	Custom IC, available from E-mu for $7.50 ea.
8	1N914 Diode	FAIRCHILD or any 1N914 or 1N4148
2	10K Trimmer	BECKMAN 91BR10K
2	20K Trimmer	SPECTROL 64Y203
1	20K Trimmer	BECKMAN 91BR20K
4	100k Trimmer	BECKMAN 91BR100K
2	121 ohm 1% R	DALE RN55D
2	54.9K 1% Res	DALE RN55D
2	90.9K 1% Res	DALE RN55D
2	100K 1% Res	DALE RN55D
2	267K 1% Res	DALE RN55D
3	1.0K Tempco R	TEL LABS Q-81, available from E-mu for $3.50 ea.
3	5 pF Cap	SPRAGUE 10TSV33
3	22 pF Cap	SPRAGUE 10TSQ22
4	100 pF Cap	SPRAGUE 10TST10
4	1000 pF Cap	SPRAGUE 5GAD10
2	1000 pF PolyS	MALLORY SXM110, available from E-mu for $0.45 ea.
2	0.01 uF Cap	SPRAGUE TG-S10
14	0.1 uF Cap	SPRAGUE 3CZU104D8050C5
2	10 uF Tant Cap	SPRAGUE 196D106X0035PE4
4	200 ohm Res	All following are any 1/4 watt 5%
11	1.0K	
6	2.2K	
2	7.5K	
10	10K	
4	15K	
4	20K	
4	22K	
2	27K	
8	47K	
1	56K	
1	91K	
29	100K	
2	150K	
5	270K	
6	330K	
2	470K	
2	1.5M	
2	2.2M	
2	2.7M	
2	10M	

Except parts so specified above, E-mu will not sell listed parts separately.
Add $1.50 for handling on all orders for parts alone.

The following kit prices include handling charge:

E-mu Voice Evaluation Kit: Includes circuit board, the 6 SSM IC's, 3 Tempco resistors, and 2 Polystyrene caps. -- $100.00 postpaid

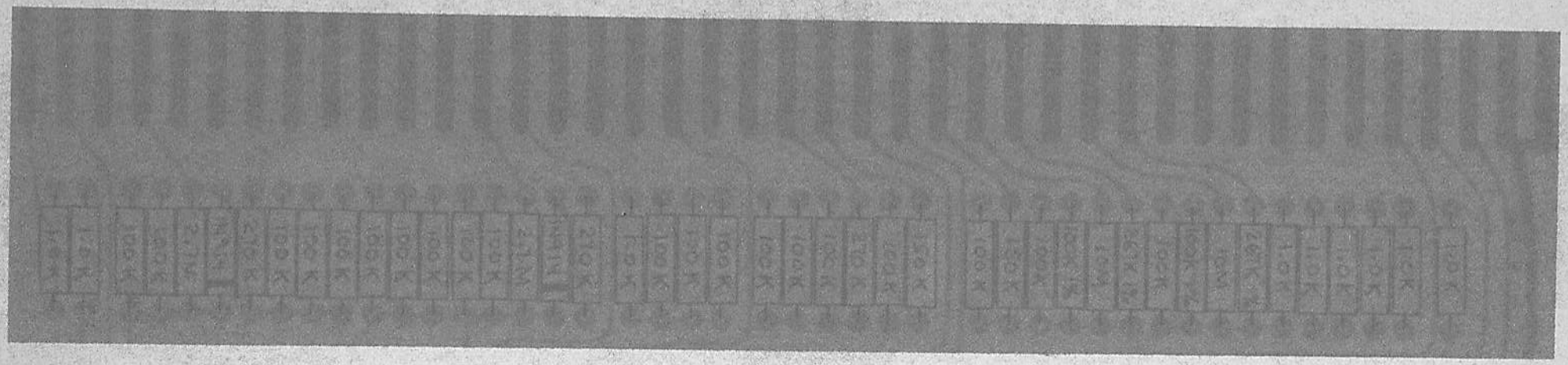
E-mu Voice Kit (complete parts): Includes all parts listed above. If you have trouble obtainig parts, you should order this. -- $250.00 postpaid

E-mu Voice (assembled and tested): Complete board, assembled & tested. -- $450 postpaid

CALIFORNIA RESIDENTS - ADD SALES TAX!

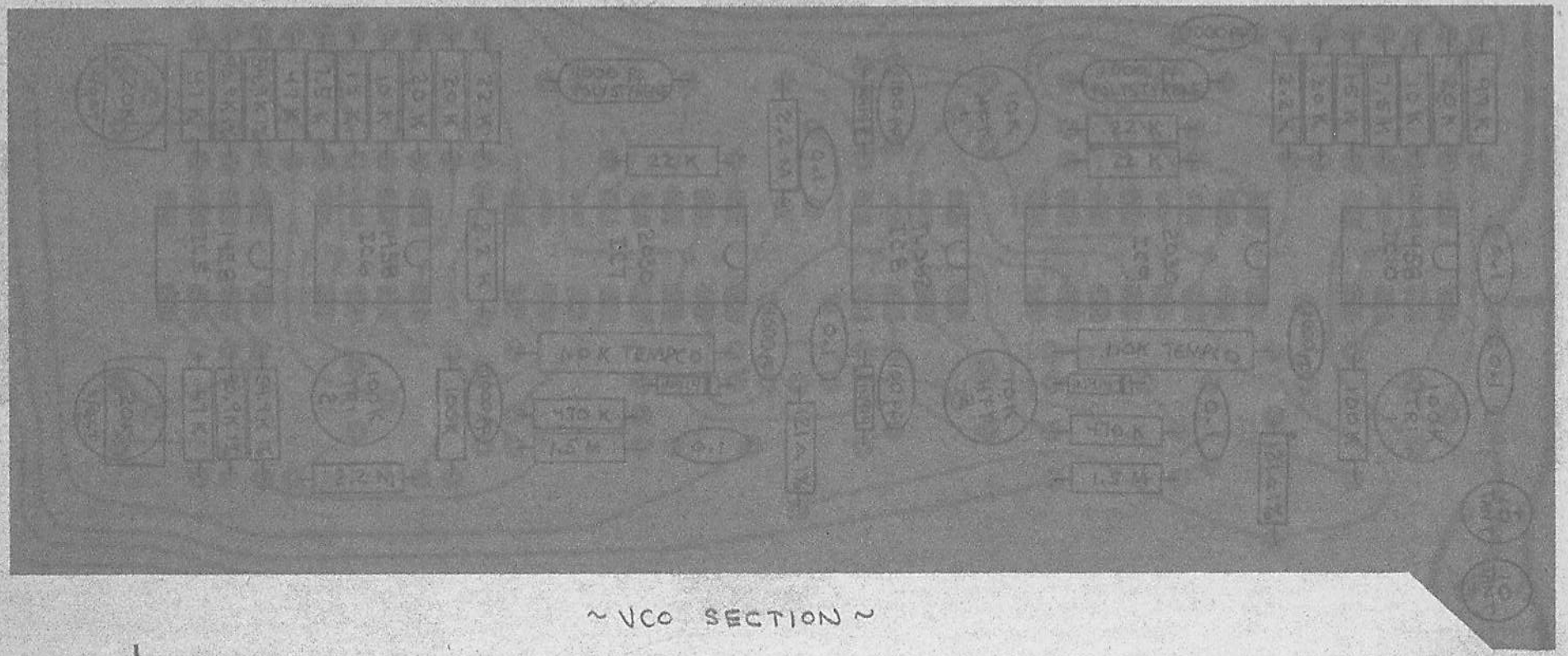
E-mu Systems Voice Demo Board - Pinouts

Pin #	Signal Name	Typical Connection
1-4	Ground	Panel Ground
5	TG1 Attack Input	TG1 Attack Pot
6	TG1 Gate Input	TG1 Gate Input Jack
7	TG1 Init Decay Input	TG1 Initial Decay Pot
8	TG2 Gate Input	TG2 Gate Input Jack
9	TG1 Final Decay Input	TG1 Final Decay Pot
10	TG2 Attack Input	TG2 Attack Pot
11	TG1 Trigger Input	TG1 Trigger Input Jack
12	TG2 Init Decay Input	TG2 Initial Decay Pot
13	TG2 Trigger Input	TG2 Trigger Input Jack
14	TG2 Final Decay Input	TG2 Final Decay Pot
15	Ground	Panel Ground
16	+15V	Panel +15 for Pots
17	Ground	Panel Ground
18	-15V	Panel -15V for Pots
19	TG2 Output	TG2 Output Jack
20	TG2 Sustain V Input	TG2 Sustain Voltage Pot
21	TG1 Output	TG1 Output Jack
22	TG1 Sustain V Input	TG1 Sustain Voltage Pot
23	VCO1 Sync Input	VCO1 Sync Input Jack
24	VCO1 Triangle Output	VCO1 Triangle Output Jack
26	VCO1 Sawtooth Output	VCO1 Sawtooth Output Jack
28	VCO1 Pulse Output	VCO1 Pulse Output Jack
30	VCO2 Pulse Output	VCO2 Pulse Output Jack
32	VCO2 Sawtooth Output	VCO2 Sawtooth Output Jack
34	VCO2 Triangle Output	VCO2 Triangle Output Jack
37	VCO1 Init Freq Coarse	VCO1 Initial Freq Coarse Pot
38	VCO1 Keyboard Input	VCO1 Keyboard Input Jack
39	VCO1 Init Freq Fine	VCO1 Initial Freq Fine Pot
40	VCO1 Freq Mod Input	VCO1 Frequency Modulation Input Attenator
43	VCO2 Init Freq Coarse	VCO2 Initial Freq Coarse Pot
44	VCO2 Keyboard Input	VCO2 Keyboard Input Jack
45	VCO2 Init Freq Fine	VCO2 Initial Freq Fine Pot
46	VCO2 Freq Mod Input	VCO2 Frequency Modulation Input Attenuator
47	VCO2 Pulse Width Cntl	VCO2 Pulse Width Pot
48	VCO2 Pulse Width Input	VCO2 Pulse Width Mod Input Attenuator
49	VCO2 Linear FM Input	VCO2 Linear FM Input Attenuator
51	VCO1 Linear FM Input	VCO1 Linear FM Input Attenuator
52	VCO2 Sync Input	VCO2 Sync Input Jack
53	VCO1 Pulse Width Cntl	VCO2 Pulse Width Pot
54	VCO1 Pulse Width Input	VCO1 Pulse Width Mod Input Attenuator
55	VCF Initial Freq Input	VCF Initial Frequency Pot
56,58,60	VCF Freq Cntl Inputs	VCF Freq Cntl Input Attenuators
61	VCF Resonance Input	VCF Resonance Control
62,64,66	VCF Signal Inputs	VCF Signal Input Attenuators
69	VCA1 Exp'l Cntl Input	VCA1 Exp'l Gain Cntl Input Attenuator
70	VCA1 Output	VCA1 Output Jack
71	VCA1 Init Gain Input	VCA1 Initial Gain Pot
72,74	VCA1 Gain Cntl Inputs	VCA1 Gain Control Input Attenuators
76,78,80	VCA1 Signal Inputs	VCA1 Signal Input Attenuators
82,84,86	VCA2 Signal Inputs	VCA2 Signal Input Attenuators
89	VCA2 Init Gain Input	VCA2 Initial Gain Pot
90,92	VCA2 Gain Cntl Inputs	VCA2 Gain Control Input Attenuators
93	VCA2 Exp'l Cntl Input	VCA2 Exp'l Gain Cntl Input Attenuator
94	VCA2 Output	VCA2 Output Jack
95	VCF Resonance Output	VCF Resonance Control
96	VCF Output	VCF Output Jack
97-100	Ground	Panel Ground



~ INPUT SECTION ~

Em SYSTEMS	15 MAY 78
DWN: (EM	CK:
DOC Nº 1600-011-001	
ASSEMBLY DIAGRAM ~ Em VOICE DEMO: INPUT	

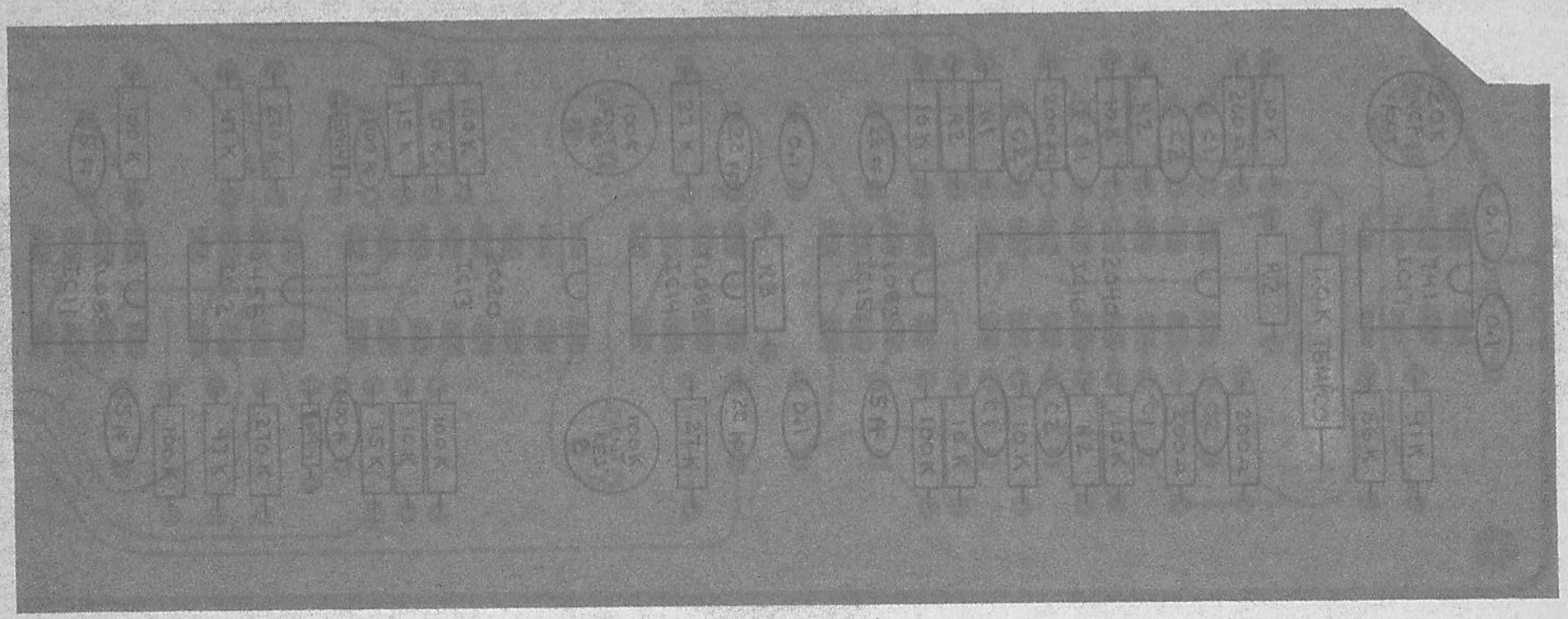


~ VCO SECTION ~

ROUND TRIMMER: BECKMAN 91BR20K (SINGLE TURN)
RECTANGULAR TRIMMER: SPECTROL 64Y203 (25 TURN)

ALL CAPACITANCES ARE IN μf UNLESS OTHERWISE NOTED.

E♪ SYSTEMS	15 MAY 78
DWN: (SD)	CK:
DOC № 1600-011-001	
ASSEMBLY DIAGRAM ~ E♪ VOICE DEMO: VCO's	

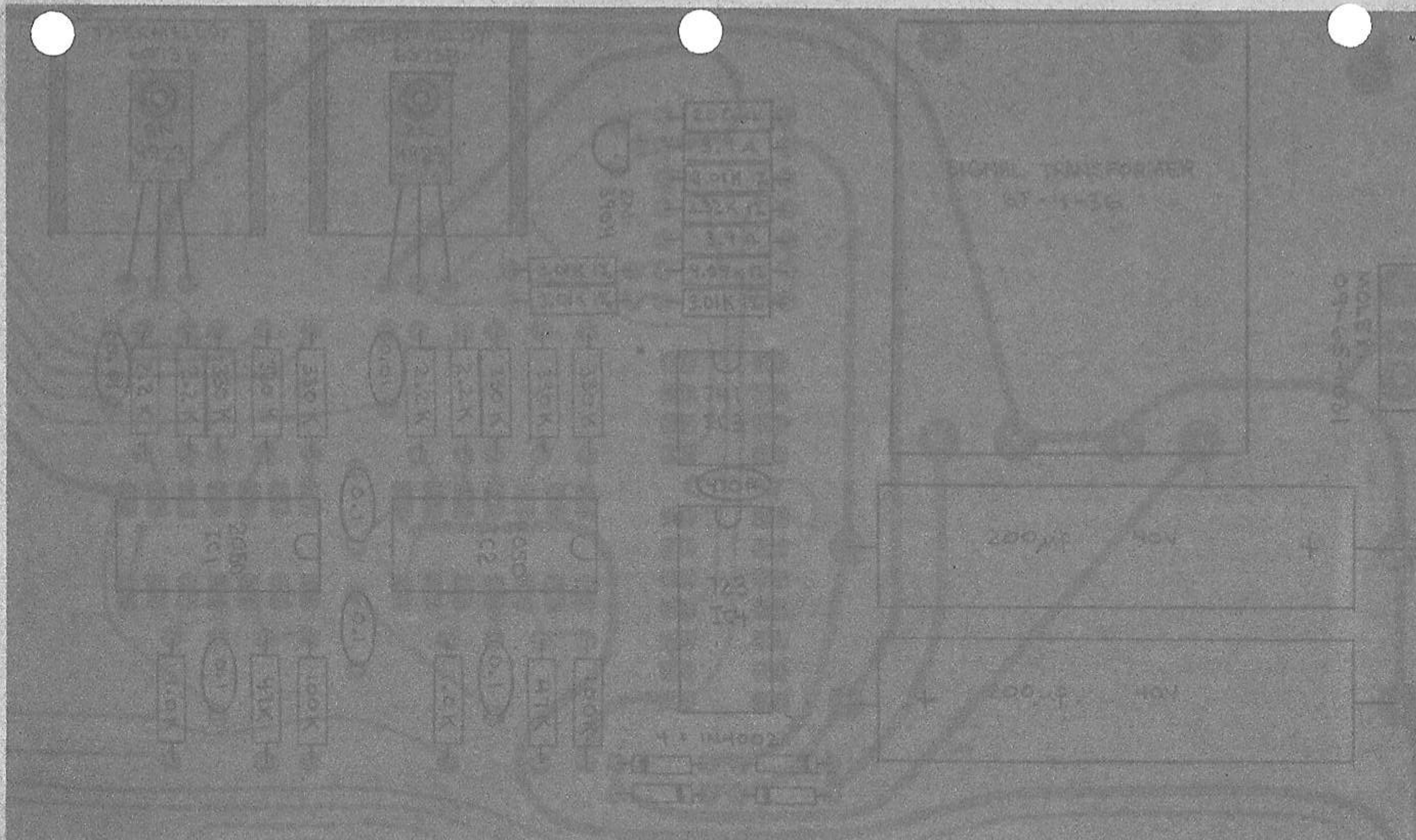


~VCF-VCA SECTION~

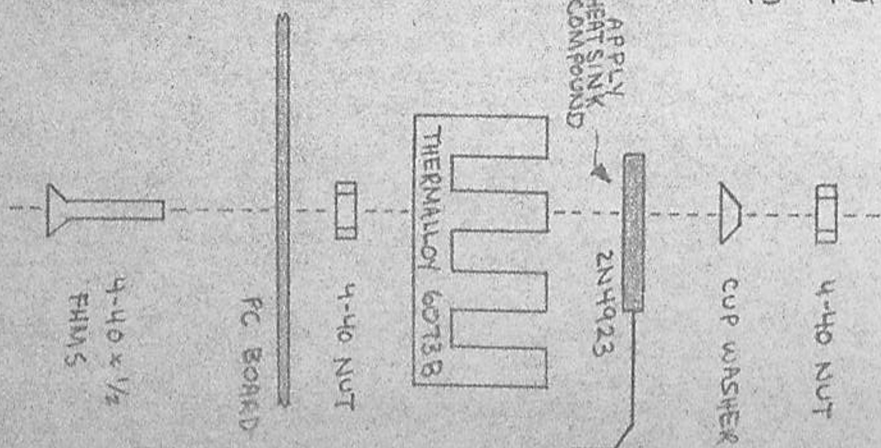
FUNCTION:	C1:	C2:	R1:	R2:	R3:
VCLPF	1000 pf	OMIT	10K	10K	OMIT
VCHPF	OMIT	2000 pf	OMIT	OMIT	OMIT
ALL PASS (PHASE SHIFT)	OMIT	2000 pf	OMIT	10K	10K

ALL CAPACITANCES ARE IN μf UNLESS OTHERWISE NOTED.

Em SYSTEMS	15 MAY 78
DWN: GP	CK:
DOC Nº 1600-011-001	
ASSEMBLY DIAGRAM~ Em VOICE DEMO: VCF-VCA	



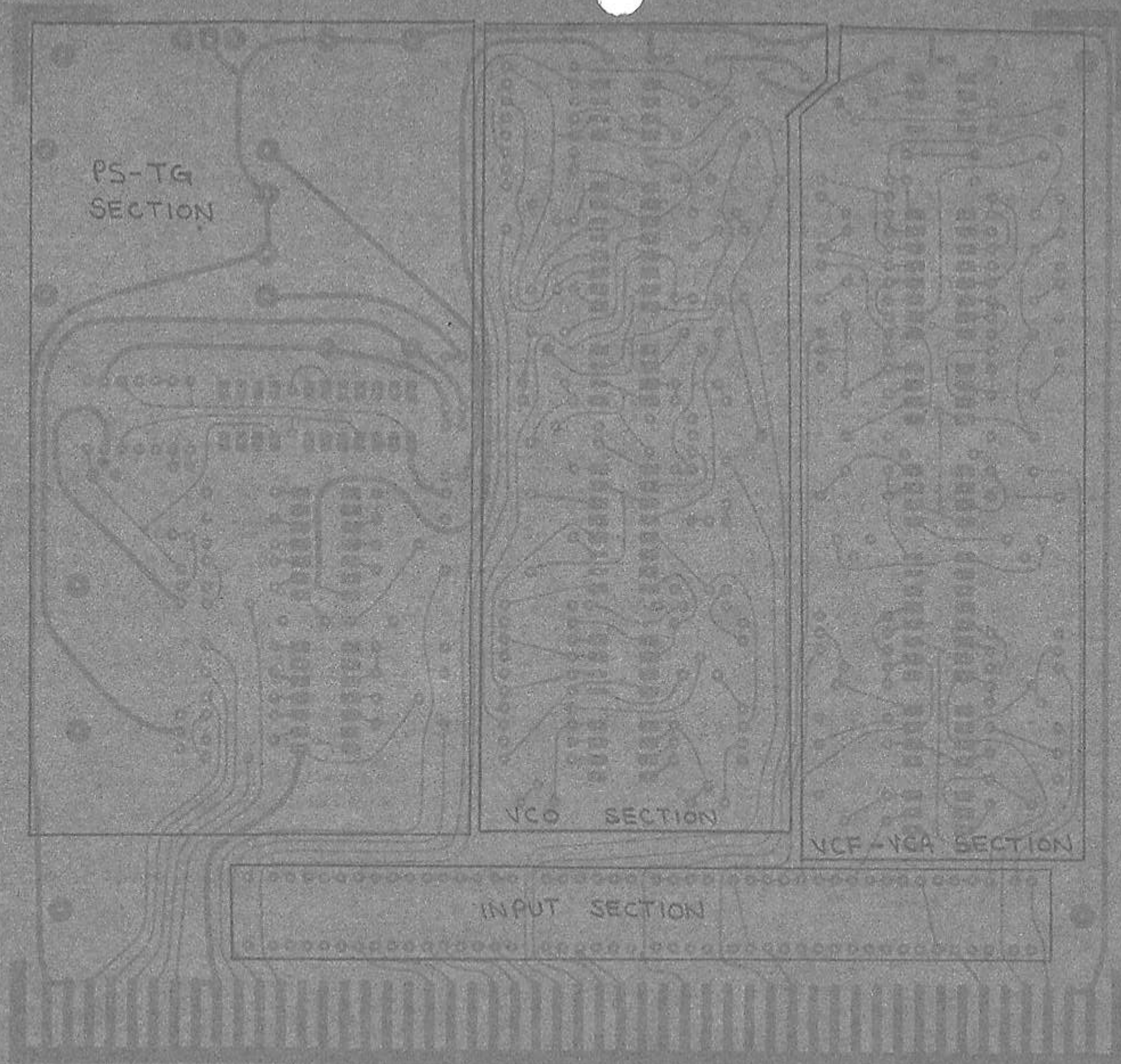
~ PS-TG SECTION ~



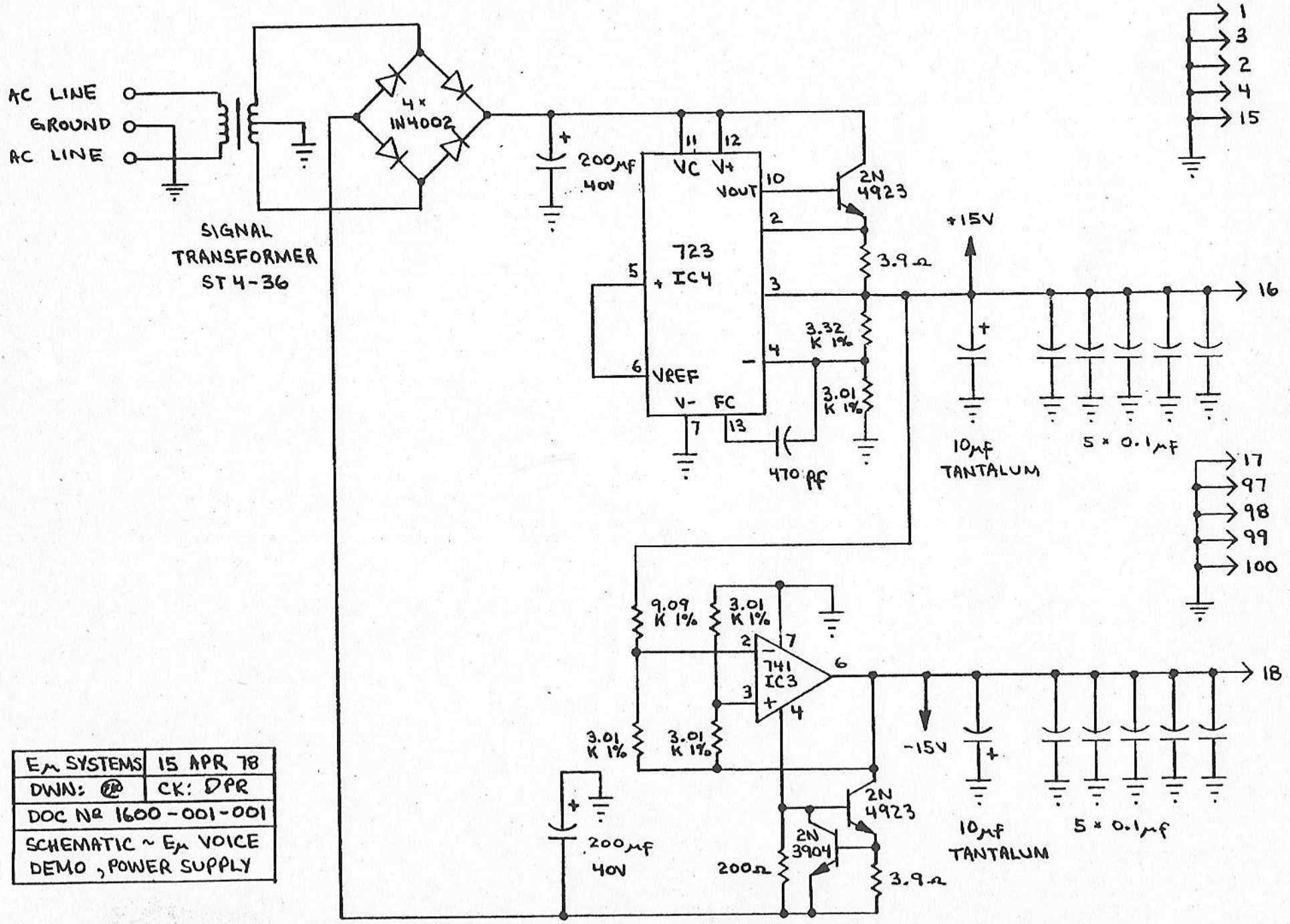
~ HEATSINK ASSEMBLY ~

ALL CAPACITANCES ARE IN µf UNLESS OTHERWISE NOTED.

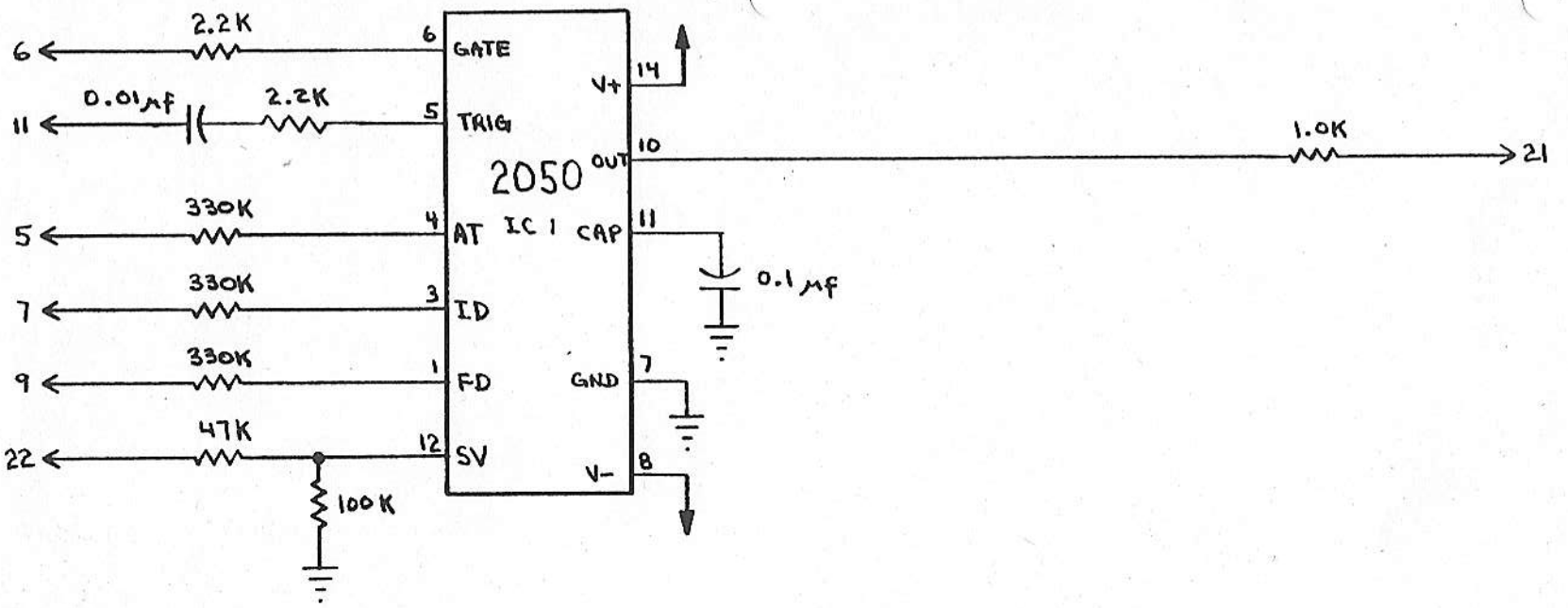
Eµ SYSTEMS	15 MAY 78
DWN: (EW)	CK: M
DOC Nº 1600-611-001	
ASSEMBLY DIAGRAM ~ Eµ VOICE DEMO: PS-TG	

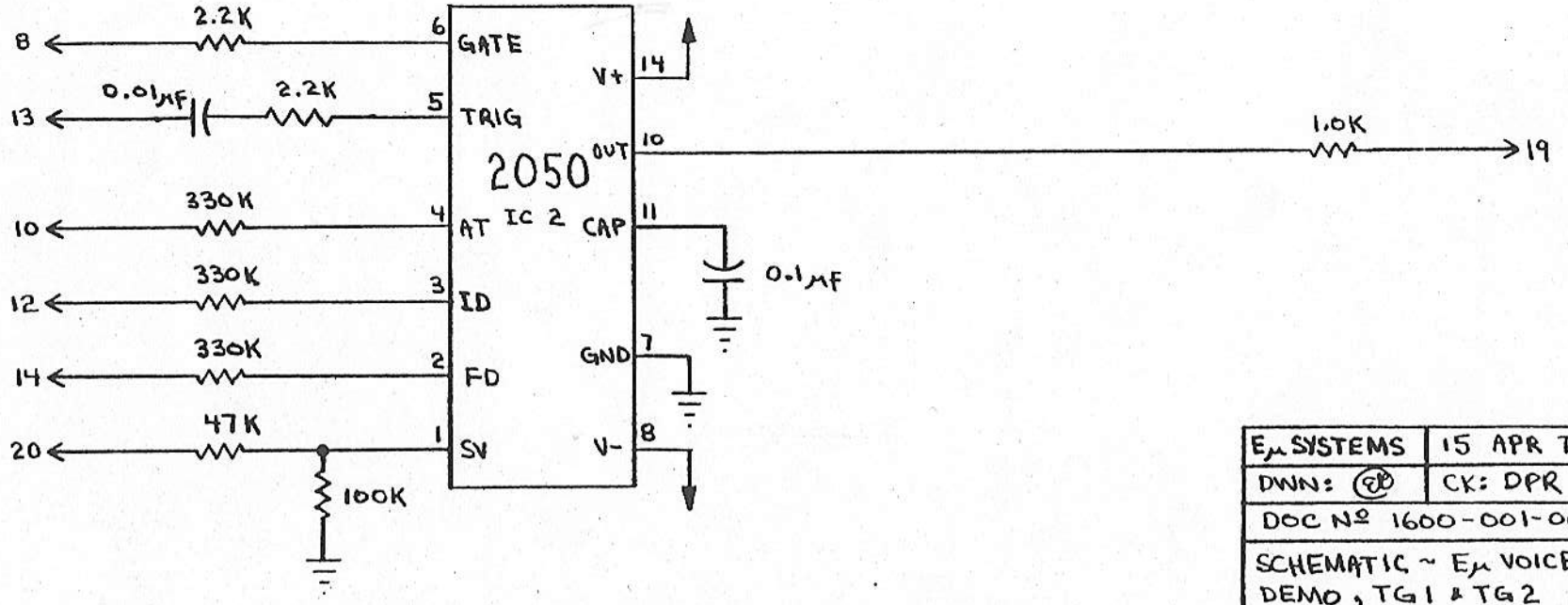


E-mu SYSTEMS	15 MAY 78
DWN: [initials]	CK: [initials]
DOC Nº 1600-011-001	
ASSEMBLY DIAGRAM E-mu VOICE DEMO: REF.	

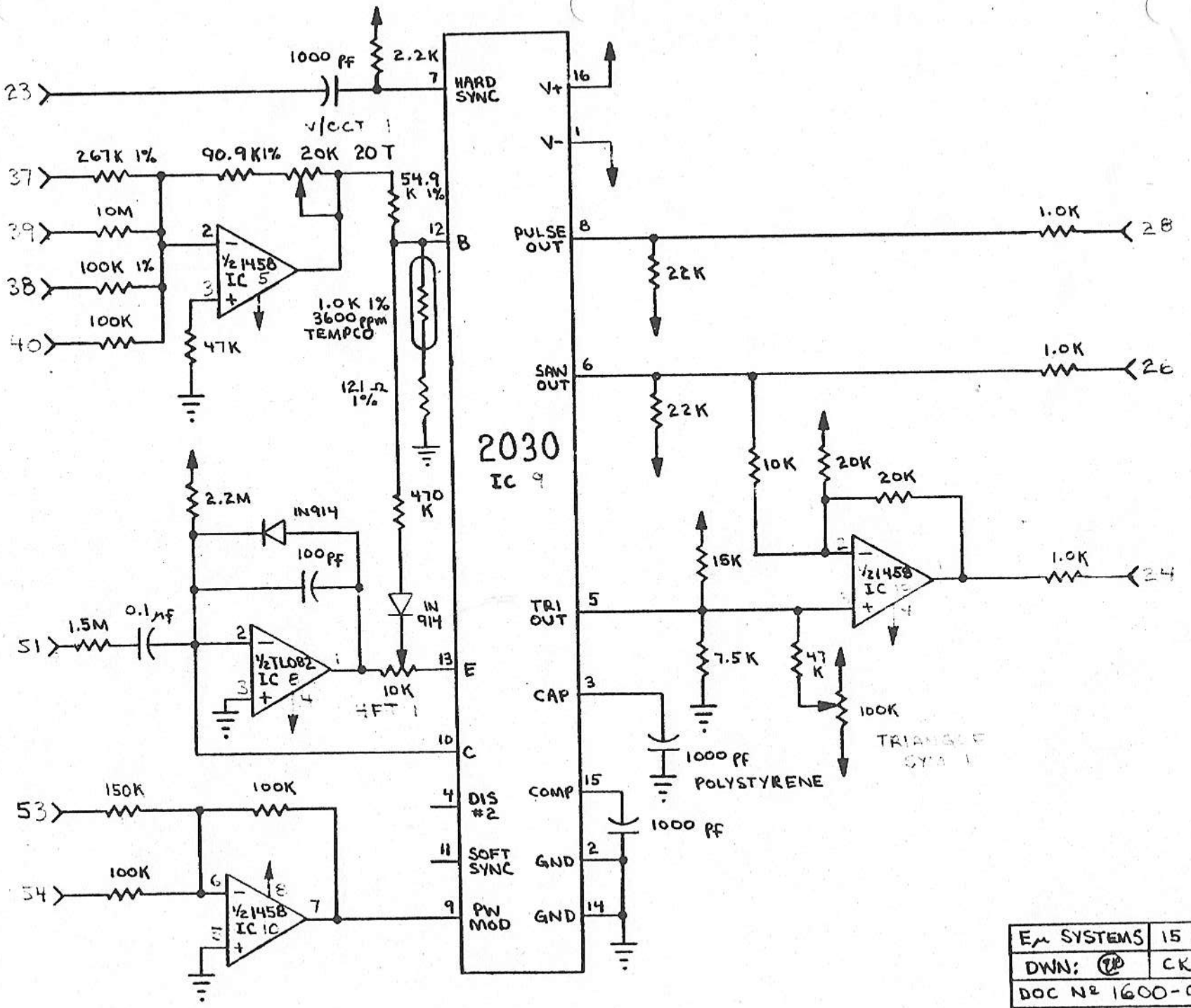


Em SYSTEMS	15 APR 78
DWN: DPR	CK: DPR
DOC NR 1600-001-001	
SCHEMATIC ~ Em VOICE DEMO, POWER SUPPLY	

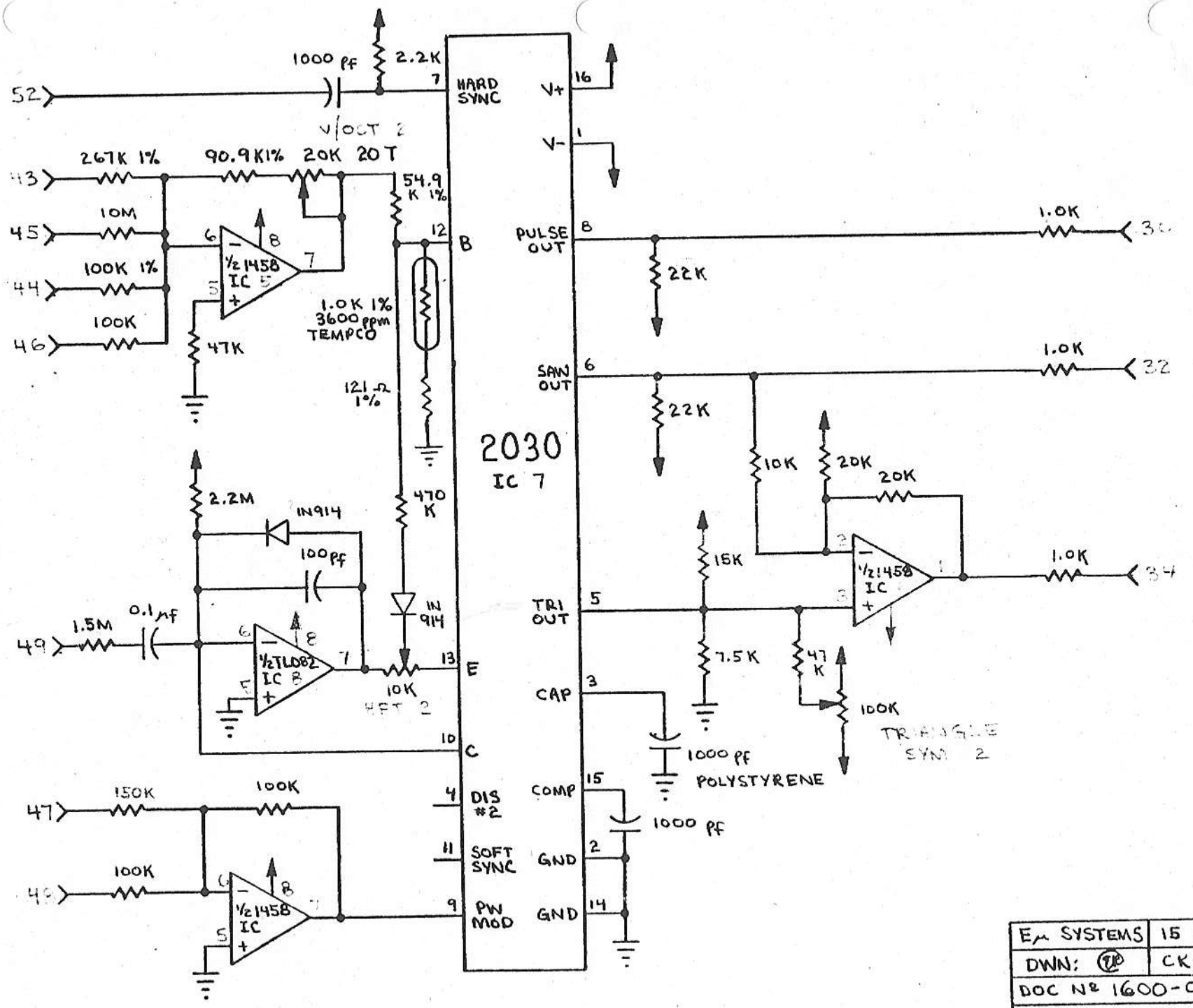




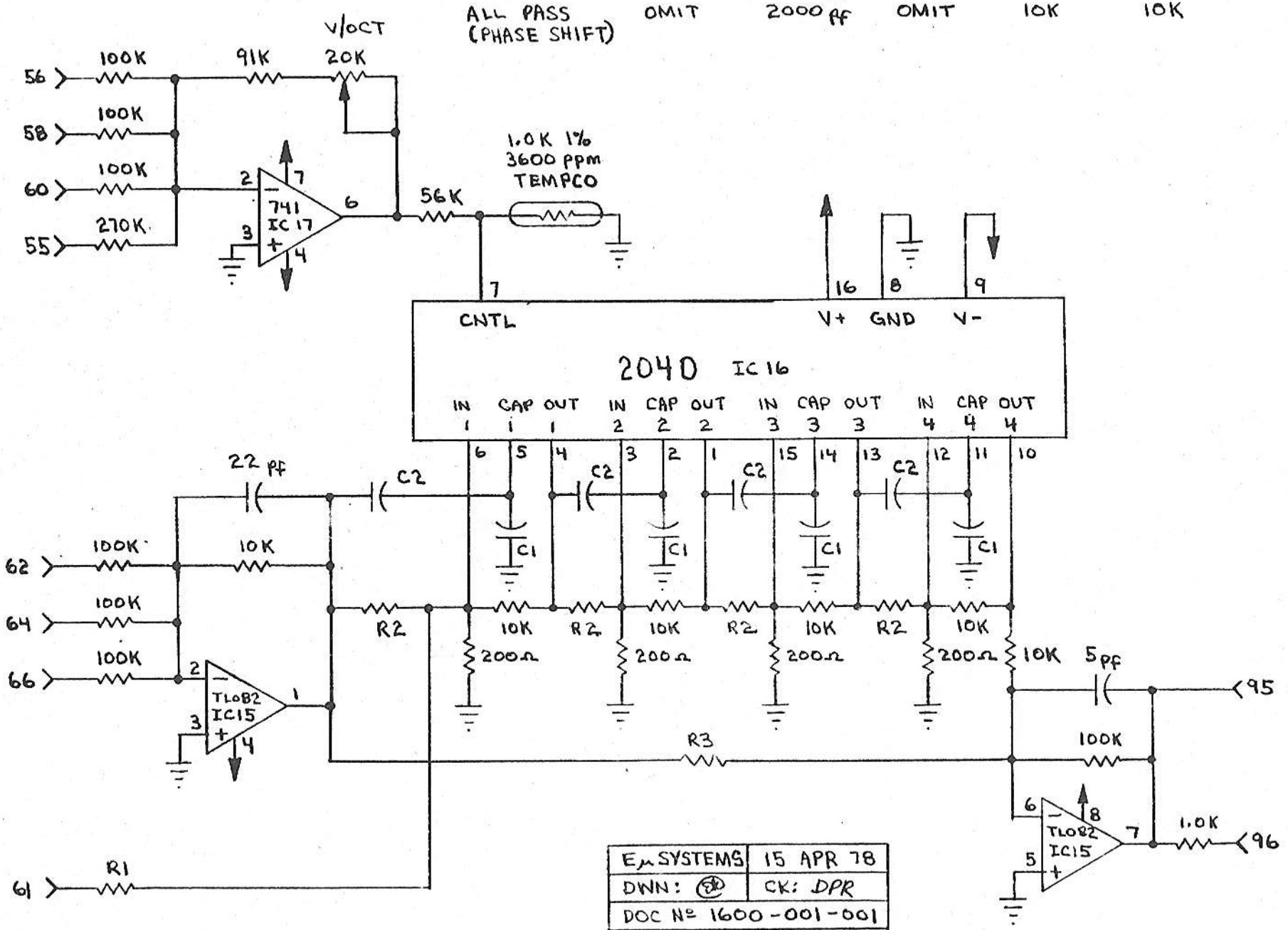
Eμ SYSTEMS	15 APR 78
DWN: (RP)	CK: DPR
DOC Nº 1600-001-001	
SCHEMATIC ~ Eμ VOICE DEMO, TG1 & TG2	



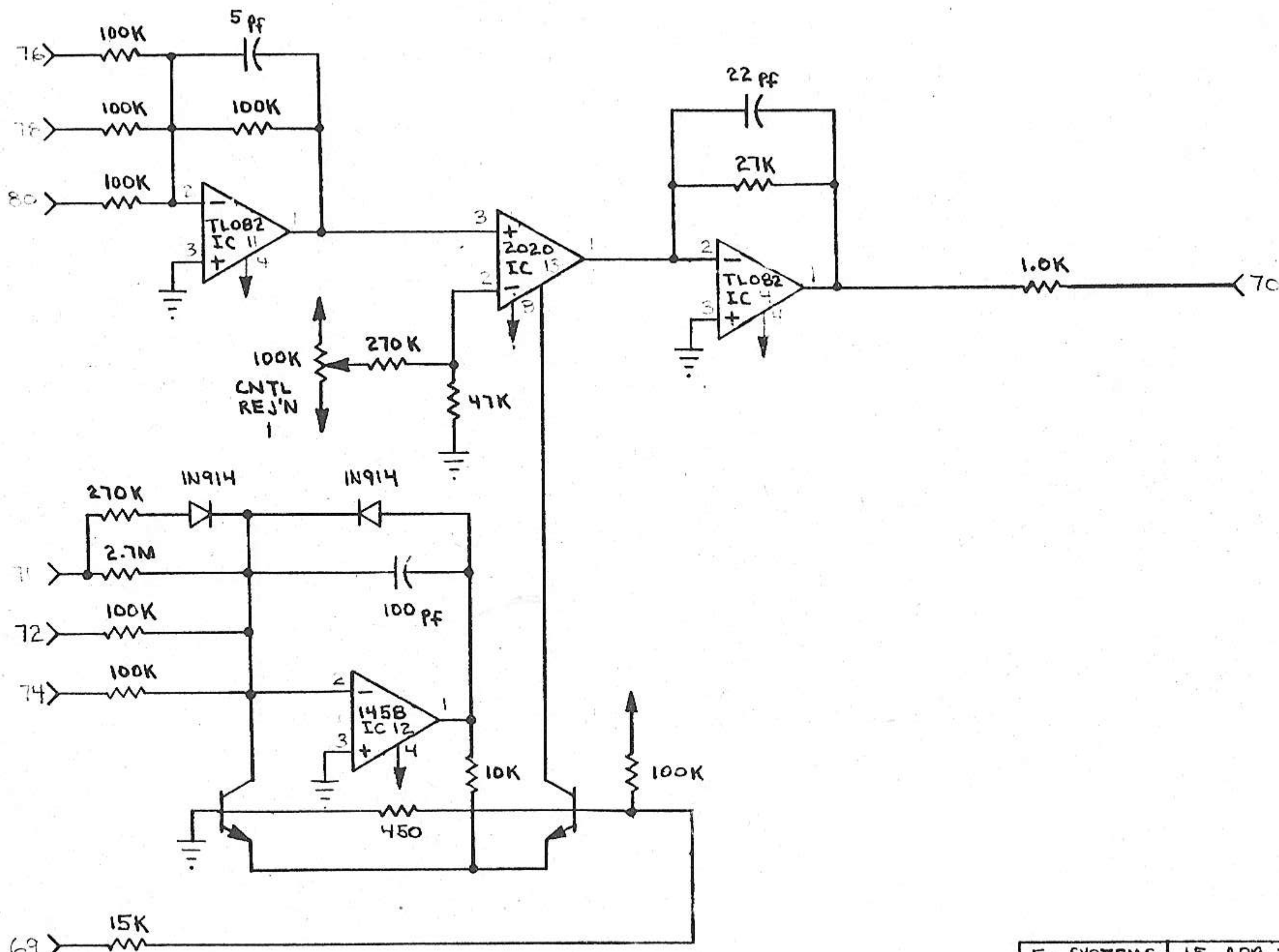
E SYSTEMS	15 APR 78
DWN: [illegible]	CK: DPR
DOC Nº 1600-001-001	
SCHEMATIC ~ E VOICE DEMO, VCO 1	


1000 pf
2.2K
52
V/OCT 2
HARD SYNC
V+
V-
267K 1%
90.9K 1%
20K 20T
43
45
44
46
10M
100K 1%
100K
47K
½ 1458 IC 5
54.9 K 1%
1.0K 1% 3600 ppm TEMPCO
121 Ω 1%
B
PULSE OUT
1.0K
22K
SAW OUT
2030 IC 7
2.2M
IN914
100pf
470 K
IN 914
1.5M
0.1 mf
49
½ TL082 IC 8
10K SET 2
E
C
TRI OUT
15K
10K
20K
20K
½ 1458 IC
7.5K
47 K
100K
TRIANGLE SYM 2
CAP
1000 pf POLYSTYRENE
COMP
1000 pf
DIS #2
SOFT SYNC
GND
PW MOD
GND
150K
100K
47
48
½ 1458 IC
E SYSTEMS
15 APR 78
DWN:
CK: DPR
DOC Nº 1600-001-001
SCHEMATIC ~ E VOICE DEMO, VCO 2

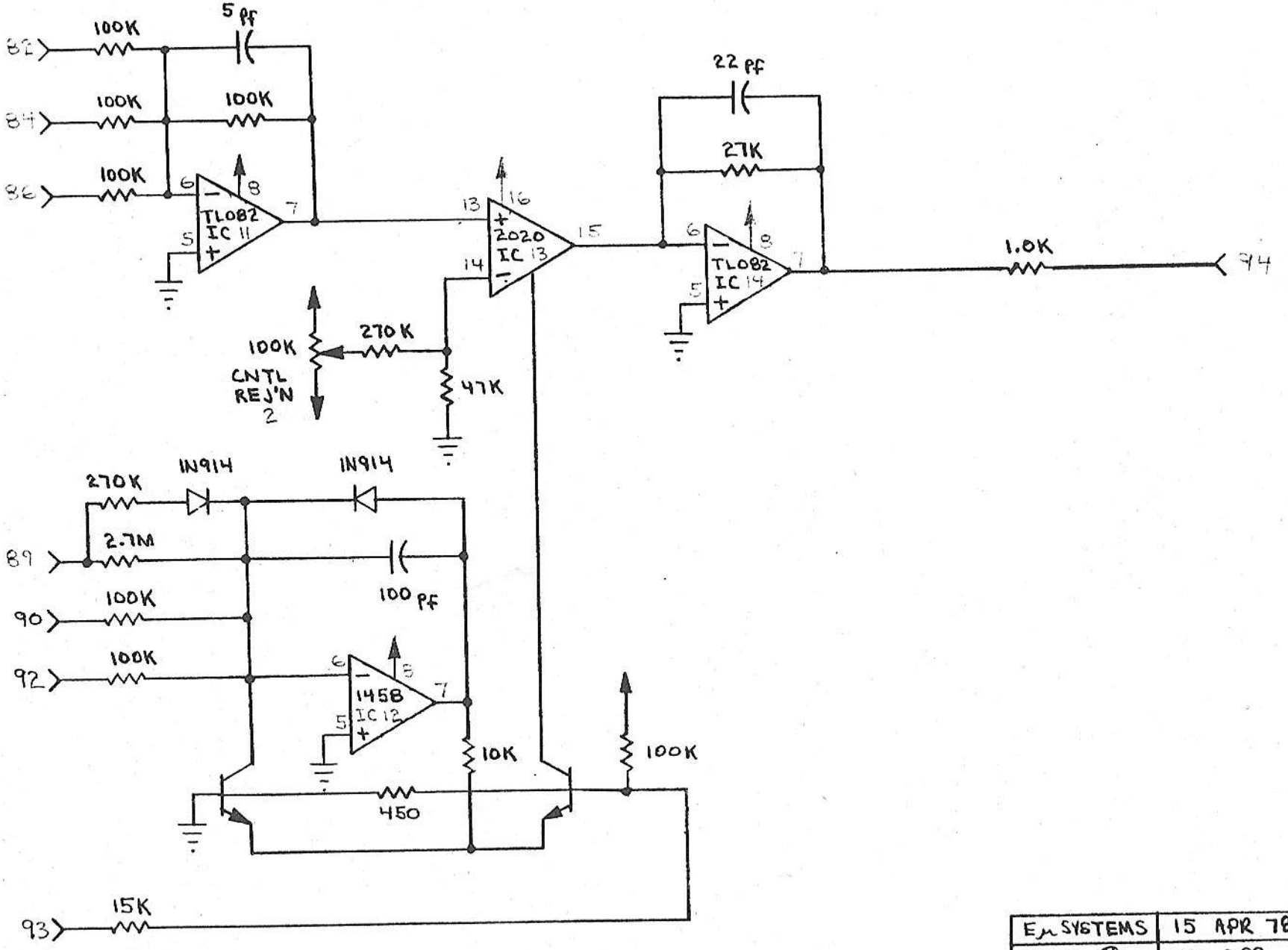
FUNCTION	C1:	C2:	R1:	R2:	R3
VCLPF	1000 pf	OMIT	10K	10K	OMIT
VCHPF	OMIT	2000 pf	OMIT	OMIT	OMIT
ALL PASS (PHASE SHIFT)	OMIT	2000 pf	OMIT	10K	10K



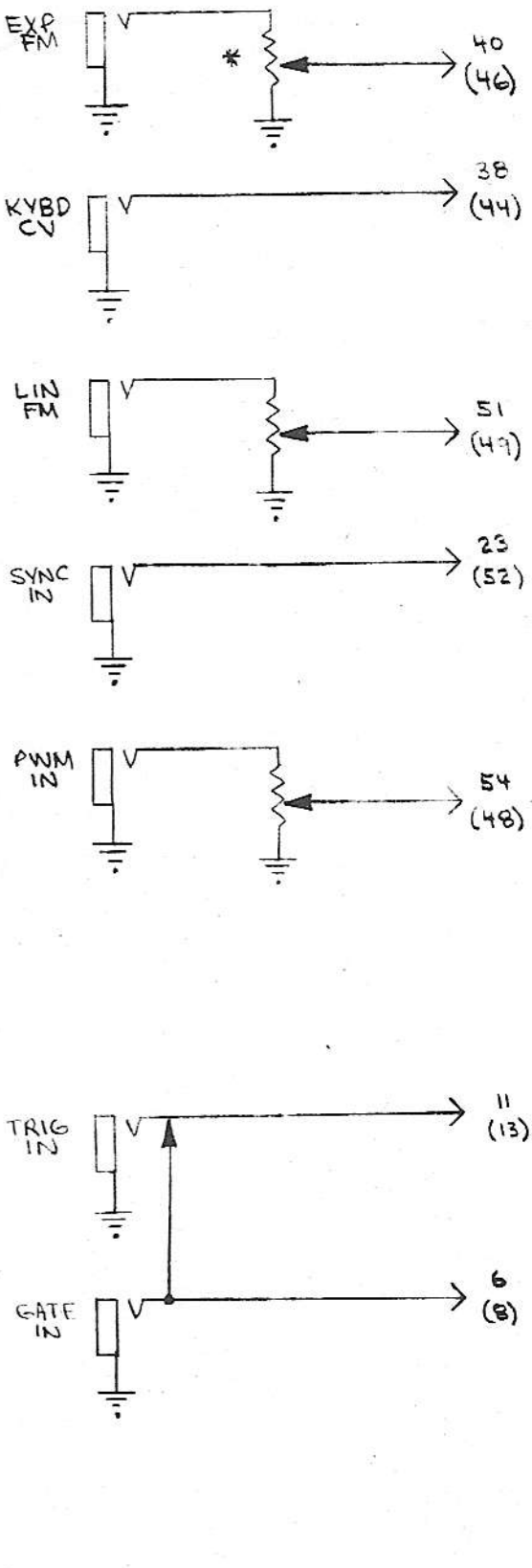
Eμ SYSTEMS	15 APR 78
DWN: BK	CK: DPR
DOC Nº 1600-001-001	
SCHEMATIC ~ Eμ VOICE DEMO, VCLP/HP FILTER	

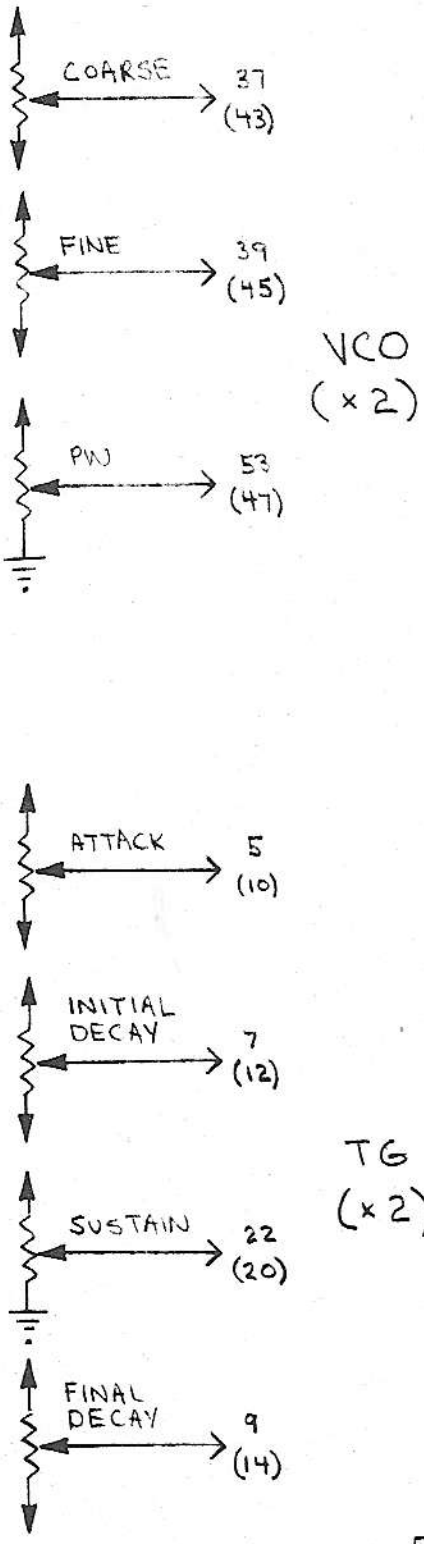


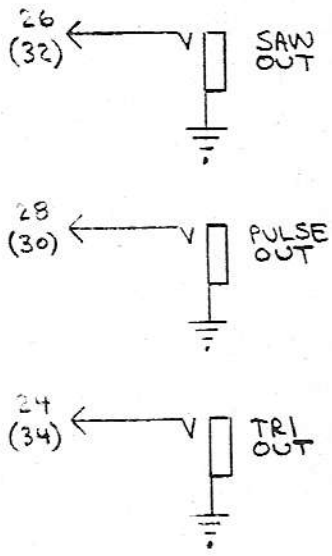
Eμ SYSTEMS	15 APR 78
DWN: (EA)	CK: DPR
DOC Nº 1600-001-001	
SCHEMATIC ~ Eμ VOICE DEMO, VCA 1	



E_μ SYSTEMS	15 APR 78
DWN: ⓓ	CK: DPR
DOC Nº 1600-001-001	
SCHEMATIC ~ E_μ VOICE DEMO, VCA 2	

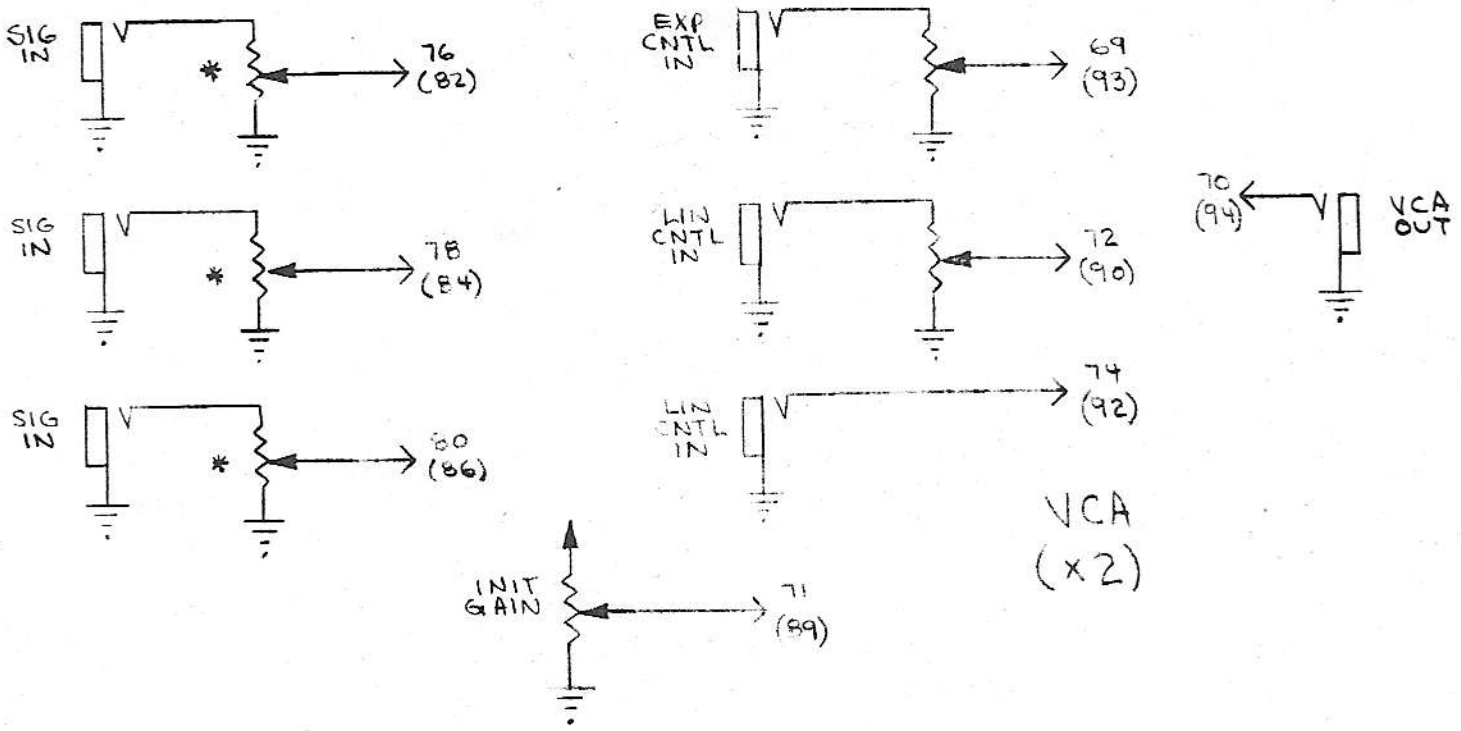


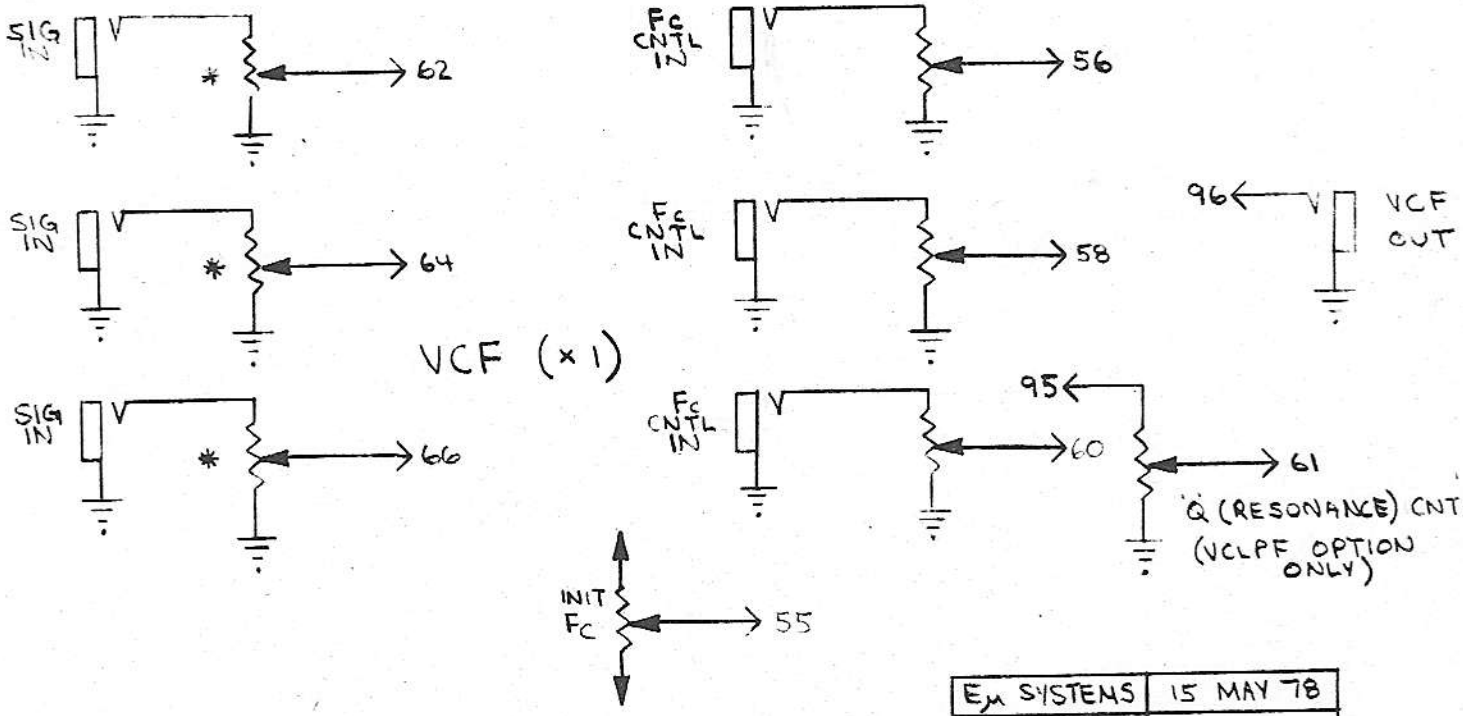




ALL POTS 100K
LINEAR ALWAYS OK
* = LOG PREFERRED
(n) = 2nd SECTION REF.

Eμ SYSTEMS	15 MAY 78
DWN: ⓔ	CK: M
DOC Nº 1600 - 001 - 001	
SCHEMATIC ~ Eμ VOICE DEMO: TYP. FRONT PANEL	





ALL POTS 100K
LINEAR ALWAYS OK
* = LOG PREFERRED
(n) = 2nd SECTION REF.

E$_\mu$ SYSTEMS	15 MAY 78
DWN: EM	CK:
DOC N= 1600-001-001	
SCHEMATIC ~ E$_\mu$ VOICE DEMO: TYP. FRONT PANEL	