DATAMATICS

RCSL : 44-RT 172
pages
September 1970

RCLM 400
DESCRIPTION FOR
LPE 200

ABSTRACT : This paper contains information on Logic Elements and Printed Circuit Boards used in the LPE 200

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DATA SHEETS

PCBA CIRCUIT DIAGRAMS, VARIANT SPEC. AND PCB ASSEMBLY DRAWINGS

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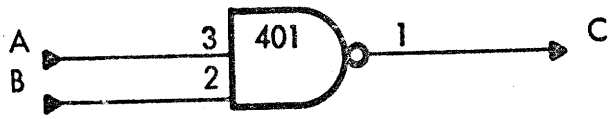
AC401



CIRCUIT DESCRIPTION

The AC401 is a 2-input NAND-element

C = -, (A & B)

SPECIFICATIONS

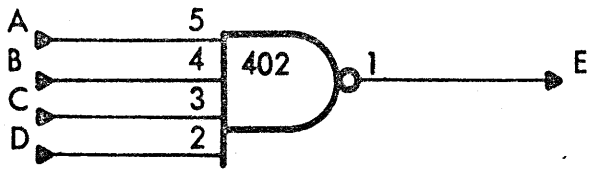
ELECTRICAL CHARACTERISTICS

Input Loading		1 unit load (each input)
Fan-Out		10 unit loads

SWITCHING CHARACTERISTICS

Propagation Time	td(1)	Typ. 18 nS; Max. 29 nS
	td(0)	Typ. 8 nS; Max. 15 nS

AC402



CIRCUIT DESCRIPTION

The AC402 is a 4-input NAND-element.

E = -, (A & B & C & D)

SPECIFICATIONS

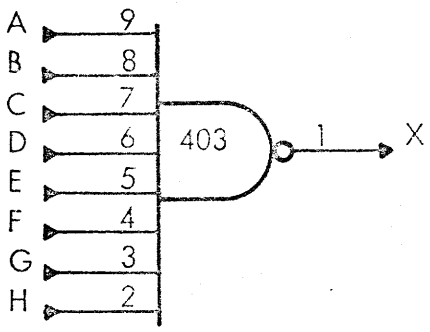
ELECTRICAL CHARACTERISTICS

Input Loading	1 unit load (each input)
Fan-Out	10 unit loads

SWITCHING CHARACTERISTICS

Propagation Time	td(1)	Typ. 18 nS; Max. 29 nS
	td(0)	Typ. 8 nS; Max. 15 nS

AC403



CIRCUIT DESCRIPTION

The AC403 is an 8-input NAND element. The logical operation of the element is:

$$X = -,(A \wedge B \wedge C \wedge D \wedge E \wedge F \wedge G \wedge H)$$

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Loading		1 unit load (each input)
Fan-Out		10 unit loads

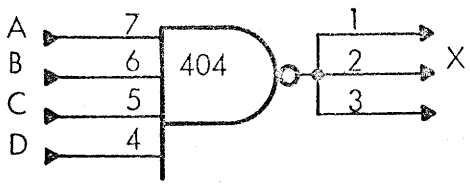
SWITCHING CHARACTERISTICS

Propagation Delay:	td1	Min. 8 ns; Typ. 18 ns; Max. 29 ns	1)
	td0	Min. 4 ns; Typ. 8 ns; Max. 15 ns	1)

NOTE

1) The indicated values for minimum propagation delay are estimated values for which the manufacturer of the circuits does not guarantee.

AC404



CIRCUIT DESCRIPTION

The AC404 is a 4-input NAND power element. The element has 3 parallel coupled output terminals, and if possible, the load should be divided equally on the 3 output terminals. The logical operation of the element is:

$$X = -,(A \wedge B \wedge C \wedge D)$$

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Loading	1 unit load (each input)
Fan-Out	30 unit loads

SWITCHING CHARACTERISTICS

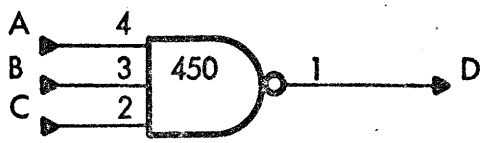
Propagation Delay:	td1	Min. 8 ns; Typ. 18 ns; Max. 29 ns 1)
	td0	Min. 4 ns; Typ. 8 ns; Max. 15 ns 1)

NOTE

1) The indicated values for minimum propagation delay are estimated values for which the manufacturer of the circuits does not guarantee.

RCSL: 52-AA55
pp. 1:1
Dec. 1968

AC450



CIRCUIT DESCRIPTION

The AC450 is a 3-input NAND-element.

C= -,(A & B & C).

SPECIFICATIONS

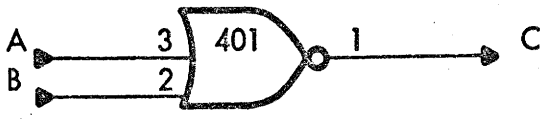
ELECTRICAL CHARACTERISTICS

Input loading	1 unit load (each input)
Fan-out	10 unit loads

SWITCHING CHARACTERISTICS

Propagation Time	td(1)	Typ. 18 ns; Max. 29 ns
	td(0)	Typ. 8 ns; Max. 15 ns

AD401



CIRCUIT DESCRIPTION

The AD401 is a 2-input NORelement

C = -,(A!B)

SPECIFICATIONS

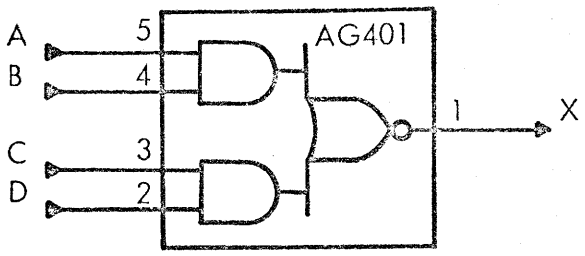
ELECTRICAL CHARACTERISTICS

Input Loading		1 unit load (each input)
Fan-Out		10 unit loads

SWITCHING CHARACTERISTICS

Propagation Time	td(1)	Typ. 18 nS; Max. 29 nS
	td(0)	Typ. 8 nS; Max. 15 nS

AG401



CIRCUIT DESCRIPTION

The AG401 is a 2×2-input AND-NOR element. The logical operation of the element is:

$$X = \neg(A \wedge B \vee C \wedge D)$$

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Loading	1 unit load (each input)
Fan-Out	10 unit loads

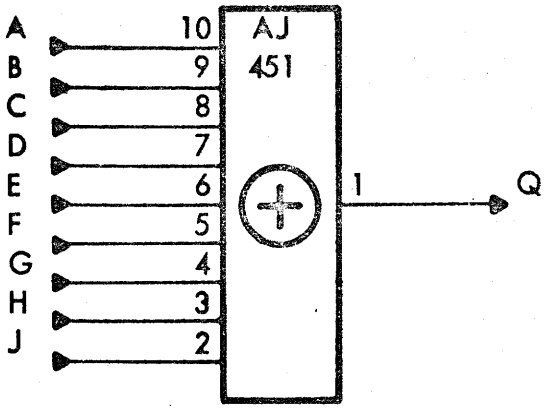
SWITCHING CHARACTERISTICS

Propagation Delay:	td1	Min. 8 ns; Typ. 18 ns; Max. 29 ns 1)
	td0	Min. 4 ns; Typ. 18 ns; Max. 15 ns 1)

NOTE

1) The indicated values for minimum propagation delay are estimated values for which the manufacturer of the circuits does not guarantee.

AJ451



CIRCUIT DESCRIPTION

The AJ451 is a 9 input parity generator or parity checker.

The output is determined by

$$Q = A \oplus B \oplus C \oplus D \oplus E \oplus F \oplus G \oplus H \oplus J$$

giving a high level at the output if an odd number of inputs are high.

SPECIFICATIONS

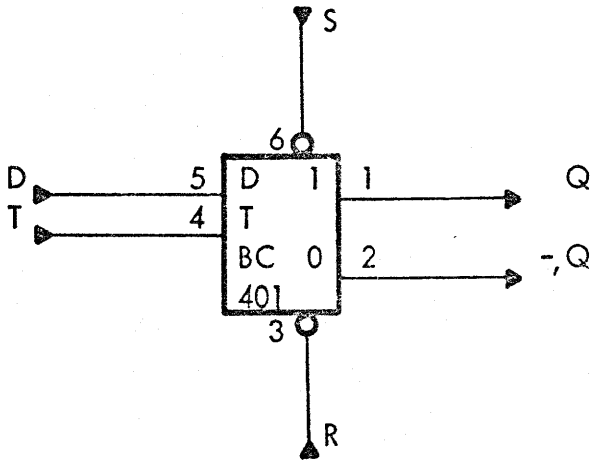
ELECTRICAL CHARACTERISTICS

Input levels	RCLM400 standard levels
Input Load	1 unit load (each input)
Fan Out	10 unit loads

SWITCHING CHARACTERISTICS

Transition to Logical 0	
from input A-B-C-D-E-F-G-H	max. 42 nS, min. 22 nS
from input J	max. 16 nS, min. 13 nS
Transition to Logical 1	
from input A-B-C-D-E-F-G-H	max. 48 nS, min. 28 nS
from input J	max. 30 nS, min. 27 nS

BC401



CIRCUIT DESCRIPTION

The BC401 is a bistable element of the D-type with a data-input, a trigger-input, a reset-input, and a set-input.

S- and R-inputs are superior to other inputs and control the outputs Q and -,Q as described below:

S	R	Q	-,Q
0	0	1	1
0	1	1	0
1	0	0	1
1	1	Not under control by S- and R-inputs.	

Any change of Q, when controlled by D- and T-inputs, is initiated at a voltage level of T, when T changes from logical 0 to logical 1, and is not related to the transition time.

The function is described below:

S	R	D	↑Q
1	1	0	0
1	1	1	1

↑Q is the output after the transition of T from 0 to 1

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Loading	
D, S	1 unit load (each input)
T, R	2 unit loads (each input)
Fan-Out	10 unit loads (each output)

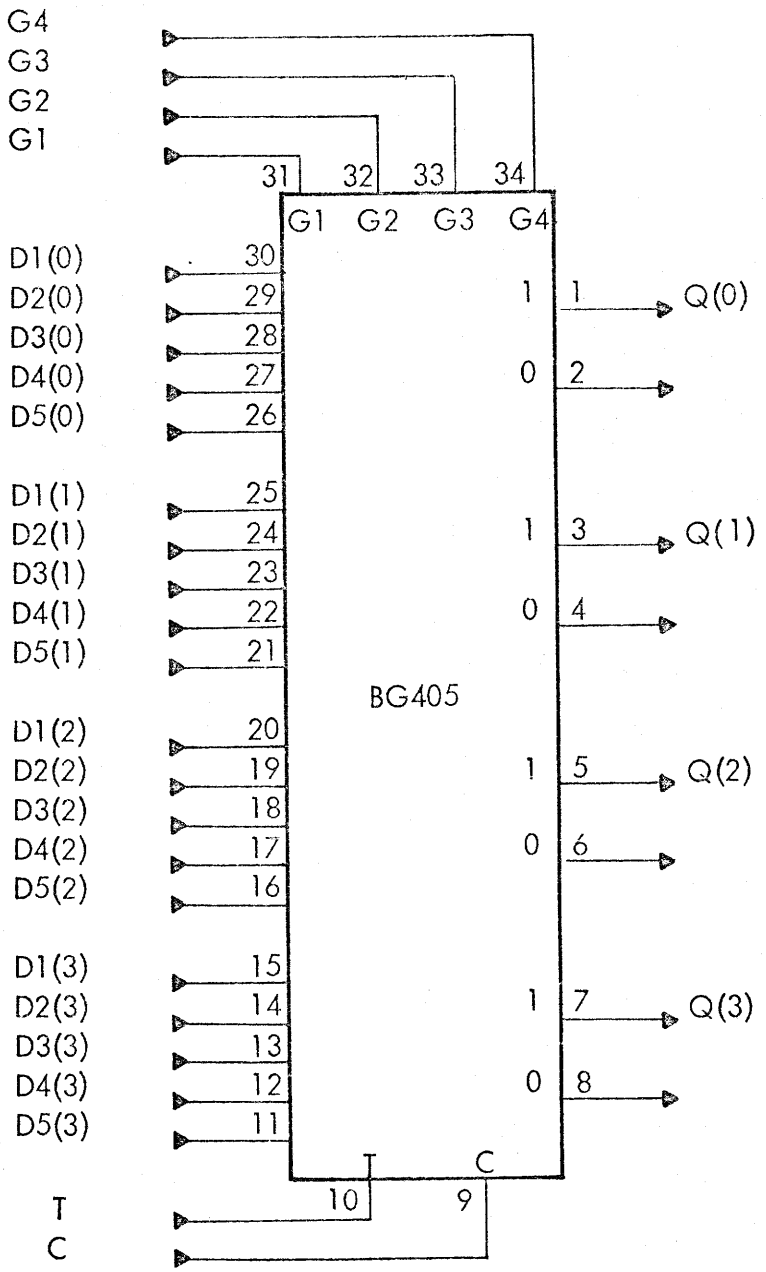
SWITCHING CHARACTERISTICS

Min. Set-Time 1)		20 nS
Min. Hold-Time 2)		5 nS
Min. trigger pulse width		30 nS
Max. toggle frequency		15 MHz
Propagation Time.		
From trigger to output	td(1)	Min. 10 nS; Typ. 20 nS; Max. 35 nS
	td(0)	Min. 10 nS; Typ. 28 nS; Max. 50 nS
From S- and R-inputs		
to output	td(1)	Max. 25 nS
	td(0)	Max. 40 nS

1) To ensure correct storage of data, D-input should be set up for a time $\geq$ Min. Set-Time. During this time D-input should remain stable.

2) To ensure correct storage of data, D-input should remain stable for a time, $\geq$ Min. Hold-Time, after T has passed the threshold value as T changes from logical 0 to logical 1.

BG405



CIRCUIT DESCRIPTION

The BG405 is a 4-bit parallel-in, parallel-out register element which is equipped with 4 inputs D1, D2, D3, and D4 for synchronous data entry and 1 input D5 for asynchronous data entry.

Synchronous Data Entry:

Data inputs D1(0:3), D2(0:3), D3(0:3), and D4(0:3), are controlled by control inputs G1, G2, G3, G4, and the clock input T. Data are stored on the transition from 0 to 1 of the clock.

$$X(n) = G1 \wedge D1(n) \vee G2 \wedge D2(n) \vee G3 \wedge D3(n) \vee G4 \wedge D4(n)$$

X(n)	↑ Q(n)
0	0
1	1

↑ Q(n) = Output after the transition from 0 to 1 of the clock.

Control input C must be 0 during this mode of operation.

Asynchronous Data Entry:

Data inputs D5(0:3) are controlled by the control input C. Asynchronous data entry is independent of the state of the clock input T.

C	D5(n)	↑ Q(n)
0	0	Q(n)
0	1	Q(n)
1	0	0
1	1	1

Q(n) = Output before the transition from 0 to 1 of C.

↑ Q(n) = Output after the transition from 1 to 0 of C.

When control input C = 1, the output Q(n) will follow the data input D5(n), Qn = D5(n). The logic value of D5(n) is stored when C changes from 1 to 0.

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Loading

D inputs	1 unit load
G1, G2, G3, G4	4 unit loads
C, T	8 unit loads
Fan-Out	10 unit loads

SWITCHING CHARACTERISTICS

Synchronous Data Entry:

Min. Width of Clock Pulse		30 ns
Max. Clock Frequency		15 Mc/s
Min. Input Set-Up Time G1, G2, G3, G4, D1(0:3), D2(0:3), D3(0:3), D4(0:3)	1)	50 ns
Min. Input Hold Time G1, G2, G3, G4, D1(0:3), D2(0:3), D3(0:3), D4(0:3)	2)	1 ns
Delay from T to Output Q(n) or -,Q(n), td1		Min. 10 ns; Typ. 20 ns; Max. 35 ns
td0		Min. 10 ns; Typ. 28 ns; Max. 50 ns

Asynchronous Data Entry:

Min. Set-Time	3)	75 ns
Delay from D5(n) to Q(n) or -,Q(n), td1		Max. 70 ns
td0		Max. 85 ns

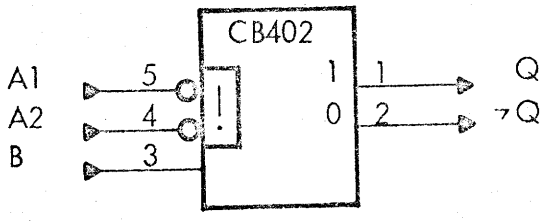
NOTES

1) Set-up time is the time for which the inputs must be steady before the transition from 0 to 1 of the clock.

2) Hold time is the time for which the inputs must be steady after the transition from 0 to 1 of the clock.

3) Set-time is the time for which the C input must be 1 to ensure correct storage of data. During this time the data inputs D5(0:3) should remain stable.

CB402



CIRCUIT DESCRIPTION

The CB402 is a monostable multivibrator with triggering on positive or negative going inputs. The output pulse width is independent of the input pulse width.

The CB402 is triggered when the input function $F = (\neg A1 \vee \neg A2) \wedge B$ changes from 0 to 1. Input B is a schmitt-trigger input which allows triggering on input signals with transition times up to 1 volt/second.

The output pulse width is continuous variable in a ratio 6:1 by means of a screwdriver adjustment. Coarse adjustment is obtained by replacement of the timing capacitor C (refer to the PCBA circuit diagram).

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Loading: A1, A2	1 unit load
B	2 unit loads
Fan-Out	10 unit loads

SWITCHING CHARACTERISTICS

Min. Input Pulse Width	50 ns
Max. Input Rise and Fall Time:	
A1, A2	1 volt/us
B	1 volt/s
Threshold Levels for Input B	
at 25 deg. C: Upper	Typ. 1.55 volt
Lower	Typ. 1.35 volt
Typ. Output Pulse Width	0.69×R×C [ns, kohm, pF]
	Rmin. = 2 kohms
	Rmax. = 12 kohms
Min. Output Pulse Width	50 ns; C = 0, R = 2 kohms
Min. Recovery Time 1)	2.8×C [ns,pF]
Delay from A1, A2 to Q: td1	Min. 25 ns; Typ. 45 ns; Max. 70 ns
Delay from B to Q: td1	Min. 15 ns; Typ. 35 ns; Max. 55 ns
Delay from A1, A2 to -,Q: td0	Min. 30 ns; Typ. 50 ns; Max. 80 ns
Delay from B to -,Q: td0	Min. 20 ns; Typ. 40 ns; Max. 65 ns
Variation of Pulse Width for ±5 per cent Power Supply Variation	Typ. ±0.2 per cent
Variation of Pulse Width with Temperature (0:70 deg. C) 2)	Typ. ±0.2 per cent

NOTES

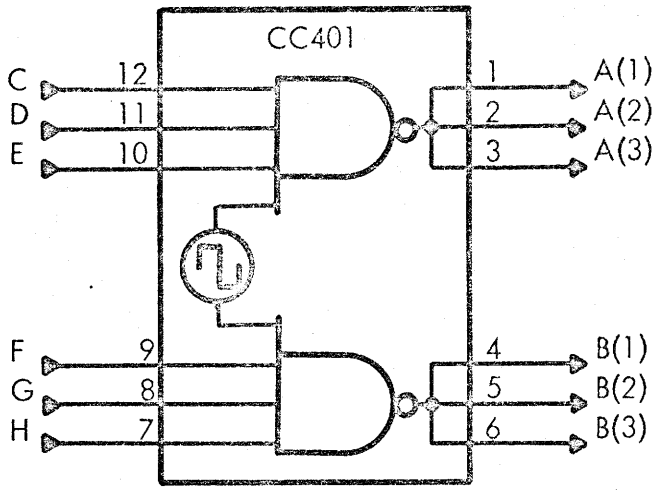
1) Shorter recovery time is possible if a certain amount of output pulse width reduction is allowed. Some approximate values for output pulse with reduction, delta T versus recovery time Tr, is given below.

   Delta T = 1 per cent for Tr = 2.5 ×C [ns,pF]
   Delta T = 5 per cent for Tr = 1.3 ×C [ns,pF]
   Delta T = 10 per cent for Tr = 0.71×C [ns,pF]

2) Variation of the timing capacitor C is not included.

RCSL: 51-VB384
pp. 1:2
April 1969

CC401



CIRCUIT DESCRIPTION

The CC401 is a free-running multivibrator with a frequency range up to 10 Mc/s. The frequency is continuous variable in a ratio 1:4.7 by means of a screwdriver adjustment. The frequency range is selected by replacing the timing capacitors C1, C2, C3, and C4 (refer to the PCBA circuit diagram) on the p.c. board.

The two outputs, A and B, are approximately 180 deg. out of phase. The outputs A and B may be controlled by inputs C, D, E, and F, G, H respectively.

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Loading	1 unit load (each input)
Fan-Out, A(1) + A(2) + A(3), 1)	30 unit loads
B(1) + B(2) + B(3), 1)	30 unit loads

SWITCHING CHARACTERISTICS

Frequency Adjustment, fmax/fmin	4.7
Center Frequency, (fmax+fmin)/2 2)	1.3/(C1+C2+C3+C4), [Mc/s,nF] (C1+C2) = (C3+C4)
Max. Frequency	10 Mc/s
Min. Frequency	Only limited by the mechanical size of C1, C2, C3, and C4. (8x22 mm each).
Output Duty Cycle	Approximately 50 per cent
Frequency Variation vs. Power Supply Variations, (±5 per cent)	< 1 per cent
Frequency Variation vs. Temperature variations (0-70 deg. C)	< 1 per cent; variation of C1, C2, C3, and C4 not incl.

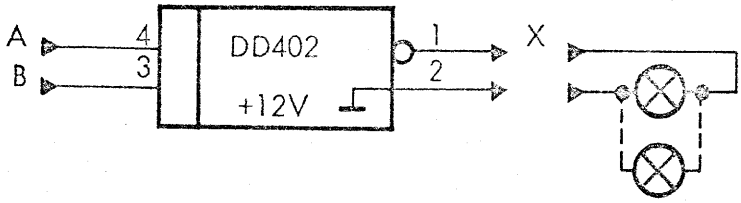
NOTE

1) If possible the load should be equally distributed on the 3 output terminals.

2) Frequency Range vs. C1,C2,C3,C4.

Frequency Range	(C1+C2) = (C3+C4)
10 c/s - 47 c/s	22 µF
47 c/s - 220 c/s	4.7 µF
220 c/s - 1 kc/s	1 µF
1 kc/s - 4.7 kc/s	220 nF
4.7 kc/s - 22 kc/s	47 nF
22 kc/s - 100 kc/s	10 nF
100 kc/s - 2.2 Mc/s	470 pF
2.2 Mc/s - 10 Mc/s	100 pF

DD402



CIRCUIT DESCRIPTION

The DD402 is a lamp driver for incandescent lamps, type CM330, 14 V, 80 mA or equivalent.

The logical operation of the circuit is: $X = \neg(A \wedge B)$. I.e. the lamp will be lit when A and B are 1.

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Loading	1 unit load
Output Drive Capability	Max. two CM330, 14 V, 80 mA or equivalent connected in parallel.
Max. Output Load Current	150 mA

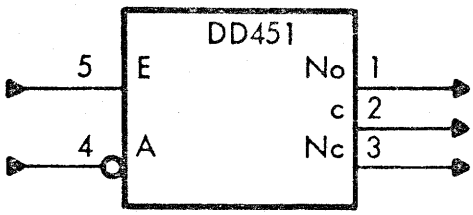
SWITCHING CHARACTERISTICS

Min. Duration of On-Time	1)	10 us
Min. Duration of Off-Time		40 us

NOTE

1) On-time is the time the output is 0.

DD451



CIRCUIT DESCRIPTION

The DD450 is a gated relay driver with relay.

The relay is activated when the E input is high and the A input has been low for more than app. 2 sec. The E input is disabled as soon as the relay is activated, and the realy is then solely controlled by the A input.

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input levels		
E logical 1	open or $V \geq +4,3V$	Vmax.= +5,7V
logical 0	$V \leq 3,5V$	Vmin.= -10V
A logical 1	$V \leq +0,5V$	Vmin.= -4V
logical 0	$V \geq +1,6V$	Vmax.= 10V

Input loading	
E logical 1	max. -0,7 mA
logical 0	max. -5 mA
A logical 1	max. -30 uA
logcial 0	max. +10 mA

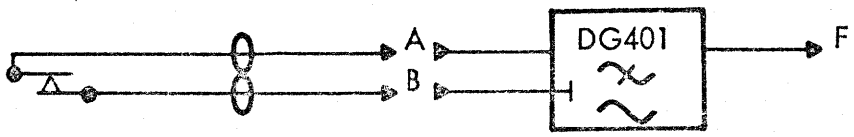
The sign is positive when current flows towards the circuit.

Output current	max. 2A at 30 VDC

SWITCHING CHARACTERISTICS

Delay for operation	max. 5 mS
delay for release	max. 4 mS
Bounching	max. 2 mS

DG401



CIRCUIT DESCRIPTION

The DG401 is a low-pass filter intended to be used as an interface element between mechanical switches and RCLM400 modules. The switch is connected to the DG401 with a twisted pair as shown above.

Output F is 0 when the switch is closed (A and B shorted) and 1 when the switch is open.

The maximum cable length between the switch and the DG401 is determined by the maximum resistance between A and B which will ensure a 0 at the output of the DG401.

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Max. Input Current in A when shorted to B	$-(2.9 + N \times 1.6)$mA N is the fan-out. 1)
Voltage at A with open Input	Min. +3.5 V; Max. +4.3 V The voltage is measured relative to B.
Max. Resistance between A and B for a 0	64 ohms for fan-out = 1 27 ohms for fan-out = 2 9 ohms for fan-out = 3

Min. Resistance between A and B for a 1	4.1 kohms for fan-out = 1 4.4 kohms for fan-out = 2 4.7 kohms for fan-out = 3

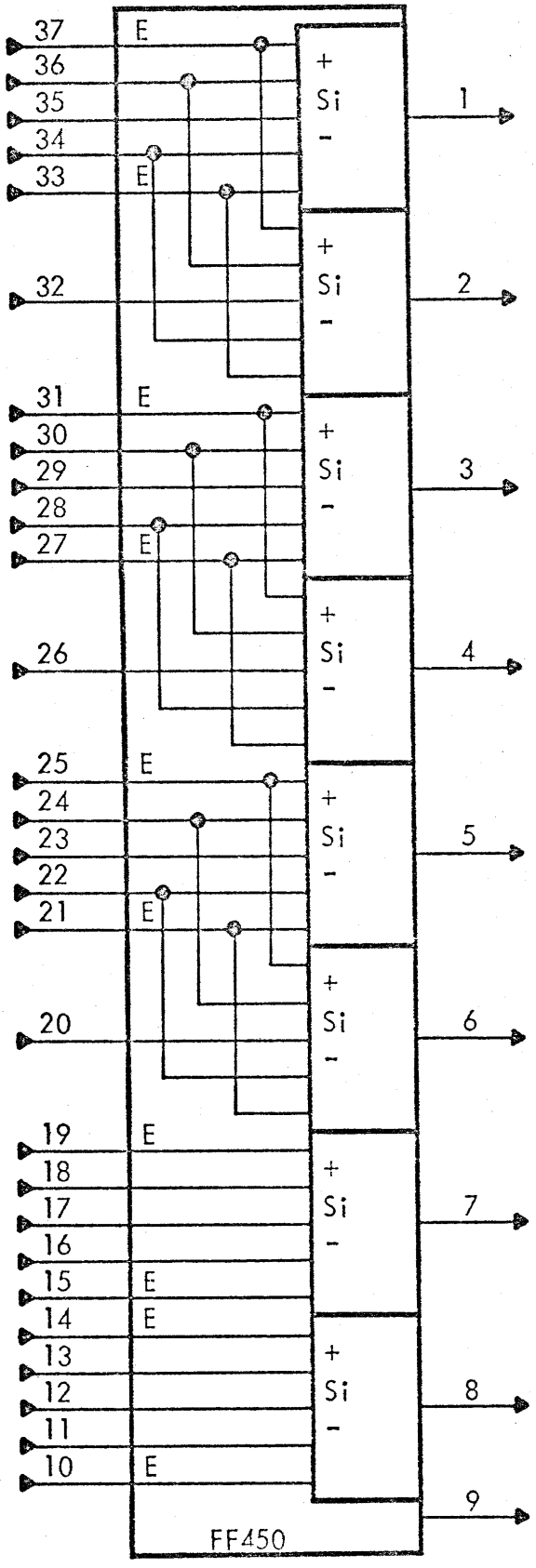
SWITCHING CHARACTERISTICS

Time Constant for pos. Slope	Approximately 36 µs
Time Constant for neg. Slope	Approximately 1.5 µs

NOTE

1) The sign is positive when the current flows towards the circuit.

FF450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FF450

CIRCUIT DESCRIPTION

The FF450 is 8 comparison circuits designed to work as a voltage supervision circuit able to check upper and lower limits for 8 voltages.

Each circuit has one or two of each of the following inputs:

Sense inputs (si) to which the supervised voltage shall be connected. An internal voltage divider will reduce a nominal input voltage to 3,00 V before it is compared with the reference voltages.

Reference inputs (+and-) which connected to the reference voltages will give the more positive (+) and the more negative (-) limit.
Supervising a negative voltage for an accuracy of $\pm$ 5 % will then require -2,85 V at the (+) input and -3,15 V at the (-) input.

Enable inputs (E). A logical 0 at one of these inputs will disable the supervision of either the upper or lower voltage limit in the circuits connected to it. This feature may be used where the circuit shall supervise one of the limits only, e.g. during the switch-on period of the supervised voltage.

The eight outputs (1 to 8) will generate a logical one if the related circuit senses an error.
The common output (9) will generate a logical one if one or more of the circuits sense an error.

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input loads	
si input 12, 17, 20, 23, 26, 29, 32, 35	max. 4 mA/input
reference input 11, 13, 16, 18	max. 0,150 mA/input
reference input 22, 24, 28, 39, 34, 36	max. 0,300 mA/input
enable input 10, 14, 15, 19	
Logical one	max. -0,950 mA/input
Logical zero	max. -1,6 mA/input

enable input 21, 25, 27, 31, 33, 37	
Logical one	max. -1,900 mA/input
Logical zero	max. -3,200 mA/input
Output 1-8 1)	
Logical one level	min. 2,5V; typ. 4V; max. 5V
Logical zero level	min. -1V; typ. 0,5V; max. 0V
Sink current	min. 0,5 mA; typ. 0,8 mA
Output resistance	typ. 200 ohm

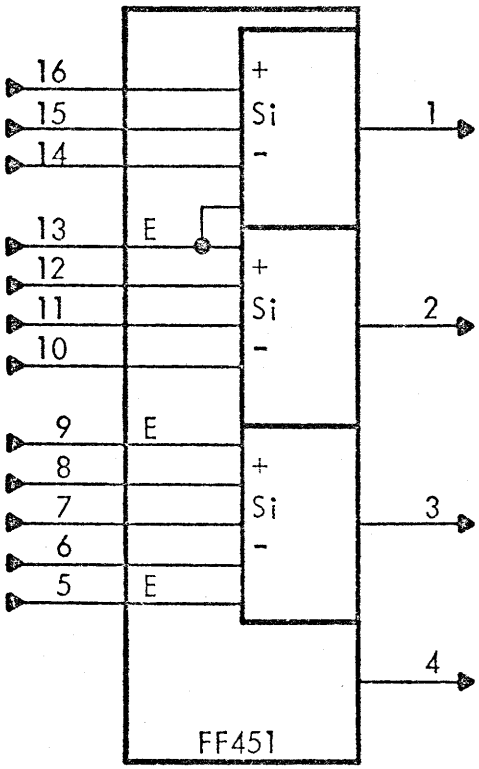
Output 9 is the cathode of 8 1N914 diodes connected to output 1-8.

SWITCHING CHARACTERISTICS

Response time (V in = 100 mV)	typ. 40 ns
Enable release time	typ. 12 ns

NOTE 1) The values are valid only when output 9 is left floating.

FF451



CIRCUIT DESCRIPTION

The FF451 is 3 comparison circuits designed to work as a voltage supervision circuit able to check upper an lower limits for 3 voltages.

Each circuit has one or two of each of the following inputs:

Sense inputs (si) to which the supervised voltage shall be connected. An internal voltage divider will reduce a nominal input voltage to 3,00V before it is compared with the reference voltages.

Reference inputs (+and-) which connected to the reference voltages will give the more positive (+) and the more negative (-) limit.
Supervising a negative voltage for an accuracy of $\pm$ 5 % will then require -2,85V at the (+) input and -3,15V at the (-) input.

Enable inputs (E). A logical 0 at one of these inputs will disable the supervision of either the upper or lower voltage limit in the circuits connected to it. This feature may be used where the circuit shall supervise one of the limits only, e.g. during the switch-on period of the supervised voltage.

The three outputs (1 to 3) will generate a logical one if the related circuit senses an error.
The common output (4) will generate a logical one if one or more of the circuits sense an error.

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input loads		max. 4 mA
Reference inputs		max. 0,150 mA
Enable inputs 1)	logical one	max. -0,95 mA
	logical zero	max. -1,6 mA

Output 1 to 3 2)	
Logical 1 level	min. 2,5V; typ. 4V; max. 5V
Logical 0 level	min. -1V; typ. -0,5V; max. 0V
Sink current	min. 0,5mA; typ. 0,8 mA
Output resistence	typ. 200 ohm

Output 4 is the cathodes of 4 1N914 diodes connected to output 1 to 3.

SWITCHING CHARACTERISTICS

Response time (V in = 100 mV)	typ. 40 ns
Enable release time	typ. 12 ns

NOTES

1) Input 13 is connected to 2 circuits and will therefore take 2 times the specified load.
2) The values are valid only when output 4 is left floating.

RCSL: 52-AA79
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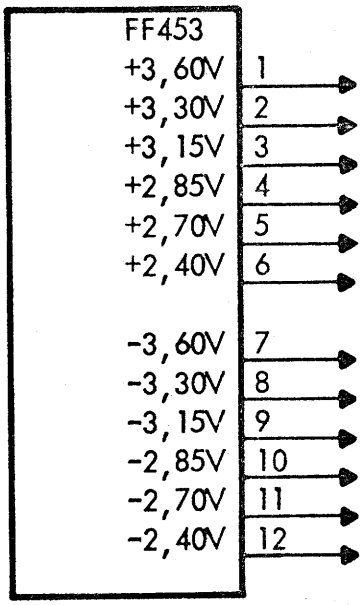
Dec. 1969

FF453



CIRCUIT DESCRIPTION

The FF453 is a voltage generator producing 12 voltages with an accuracy better than 1 0/0.
The 12 voltages are intended to be used as reference levels for voltage supervision circuits.

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Output impedance

Outputs: 1, 7	0 ohm
- 2, 8	9 ohm
- 3, 9	13 ohm
- 4, 10	20 ohm
- 5, 11	22,5 ohm
- 6, 12	27 ohm

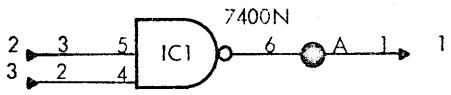
Maximum permissible output currents

outputs 1 to 6	+ 5 mA > I out > -25 mA
outputs 7 to 12	+25 mA > I out > -50 mA

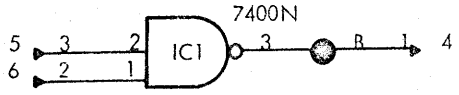
Adjustment:

The potentiometer shall be set so that the most negative reference output (7) is -3,60 Volts $\pm$ 0,01 Volt.

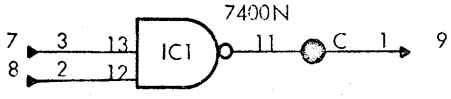
Circuit A



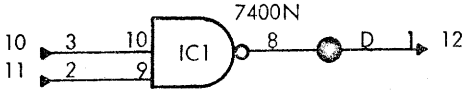
Circuit B



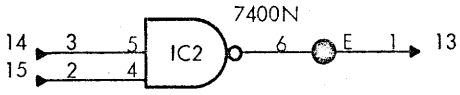
Circuit C



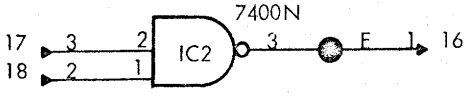
Circuit D



Circuit E



Circuit F



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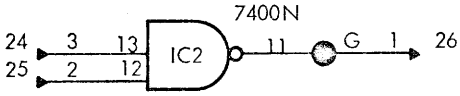

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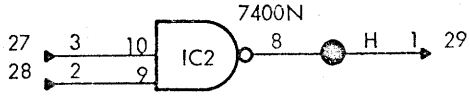
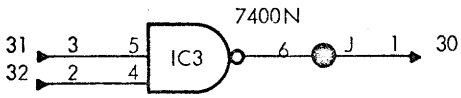
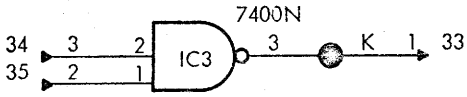


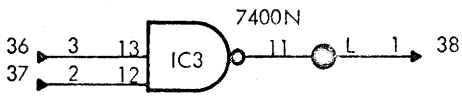
Circuit J



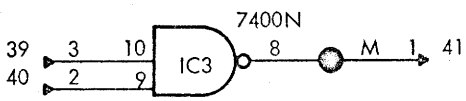
Circuit K



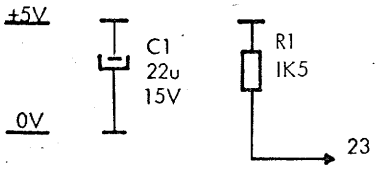
Circuit L



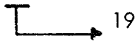
Circuit M



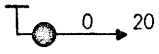
Circuit N



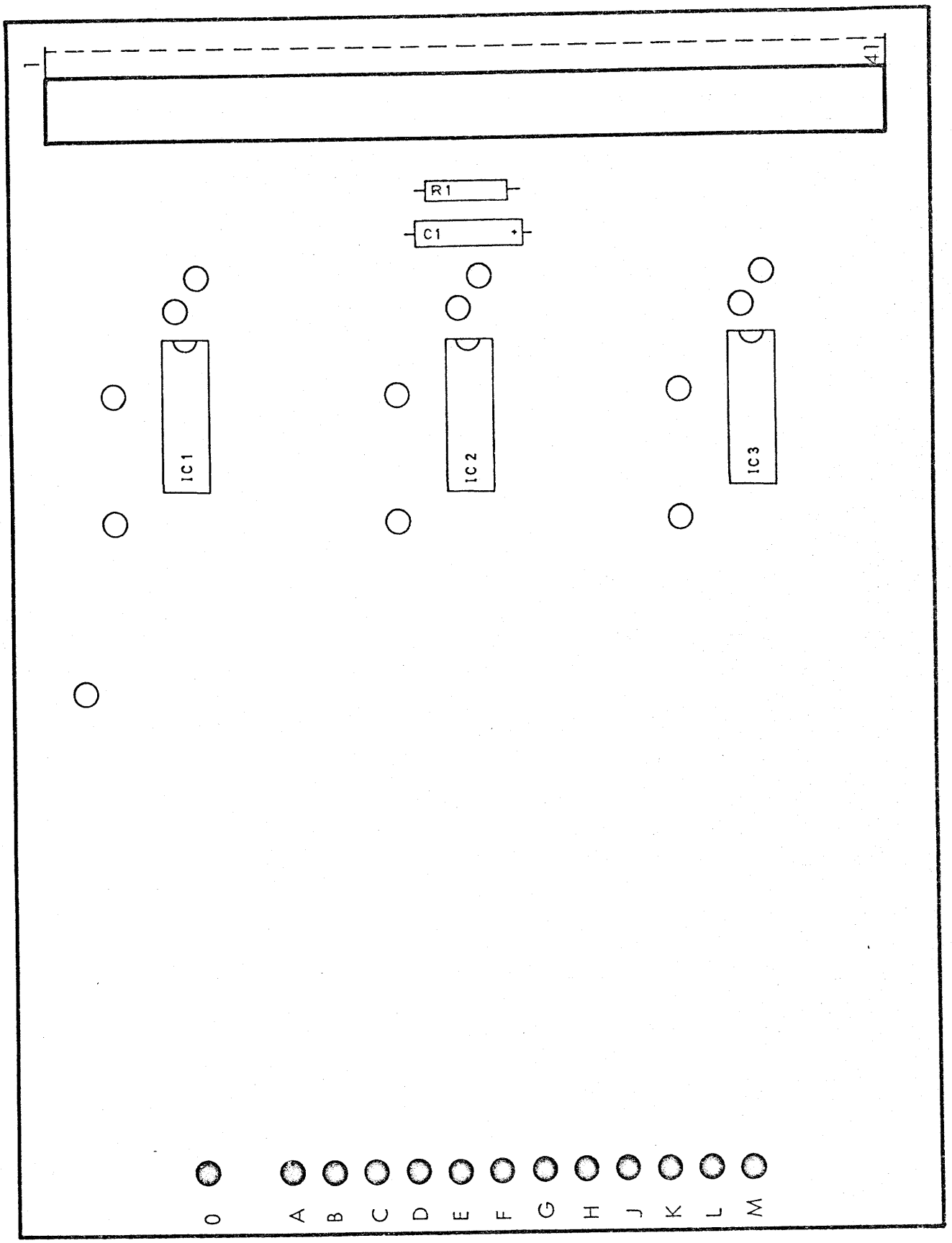
Circuit P



Circuit R

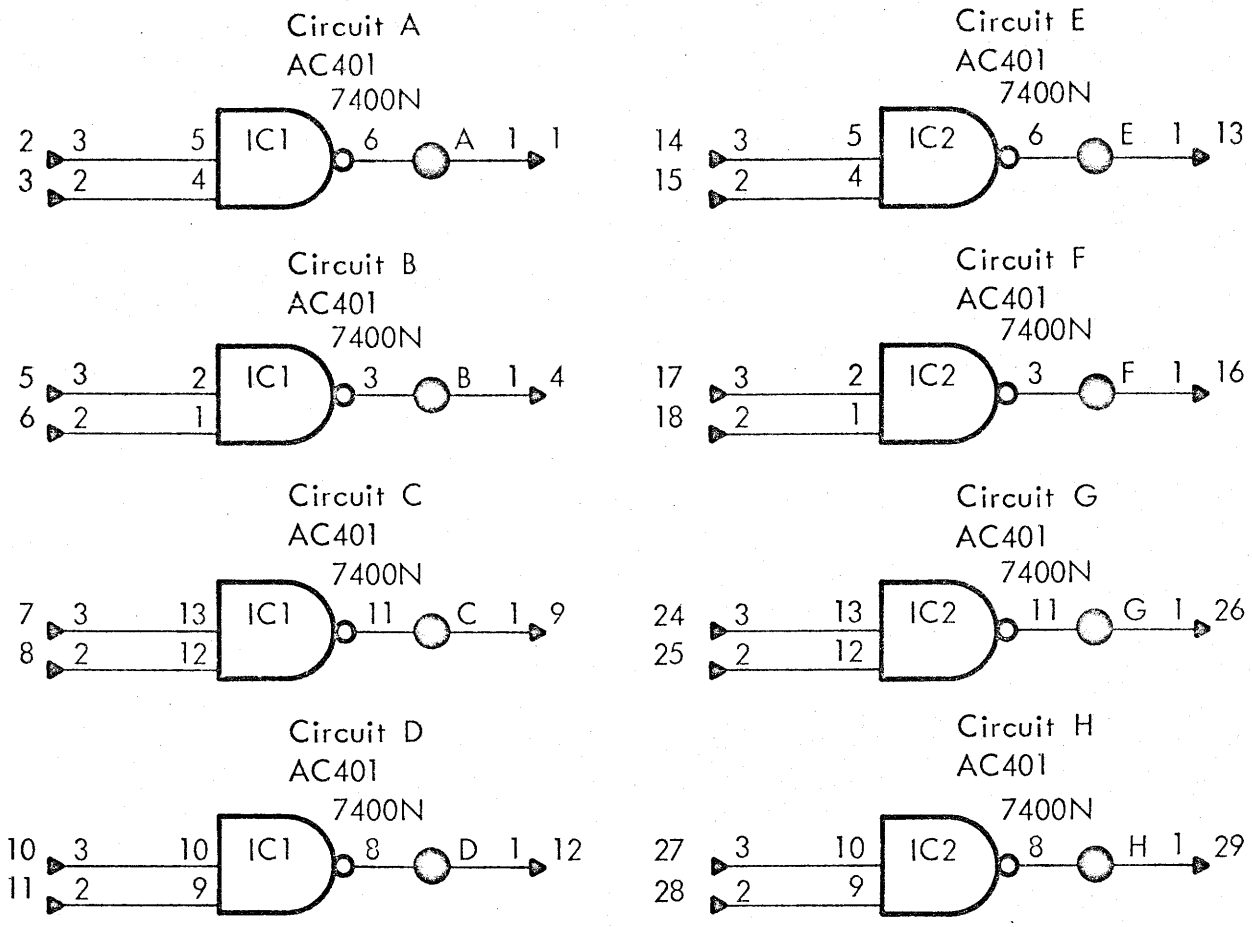


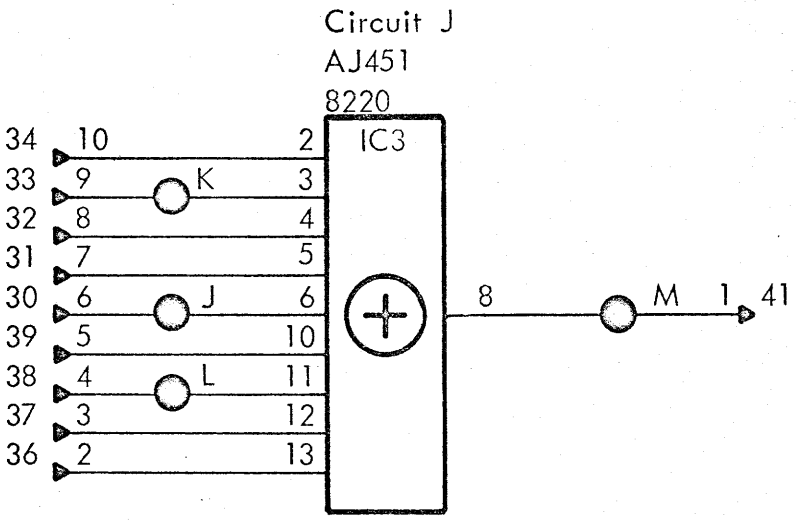
POWER REQUIREMENTS		
+5 V	PIN. 22	40 mA
0 V	PIN. 21	
POWER DISSIPATION: 210 mW		

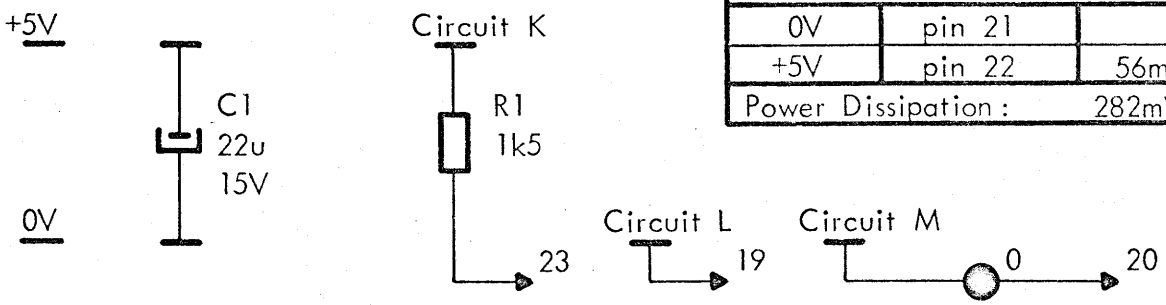


RCLM400 12 AC401 RC0834-1

A20416 PCB Assembly Drawing



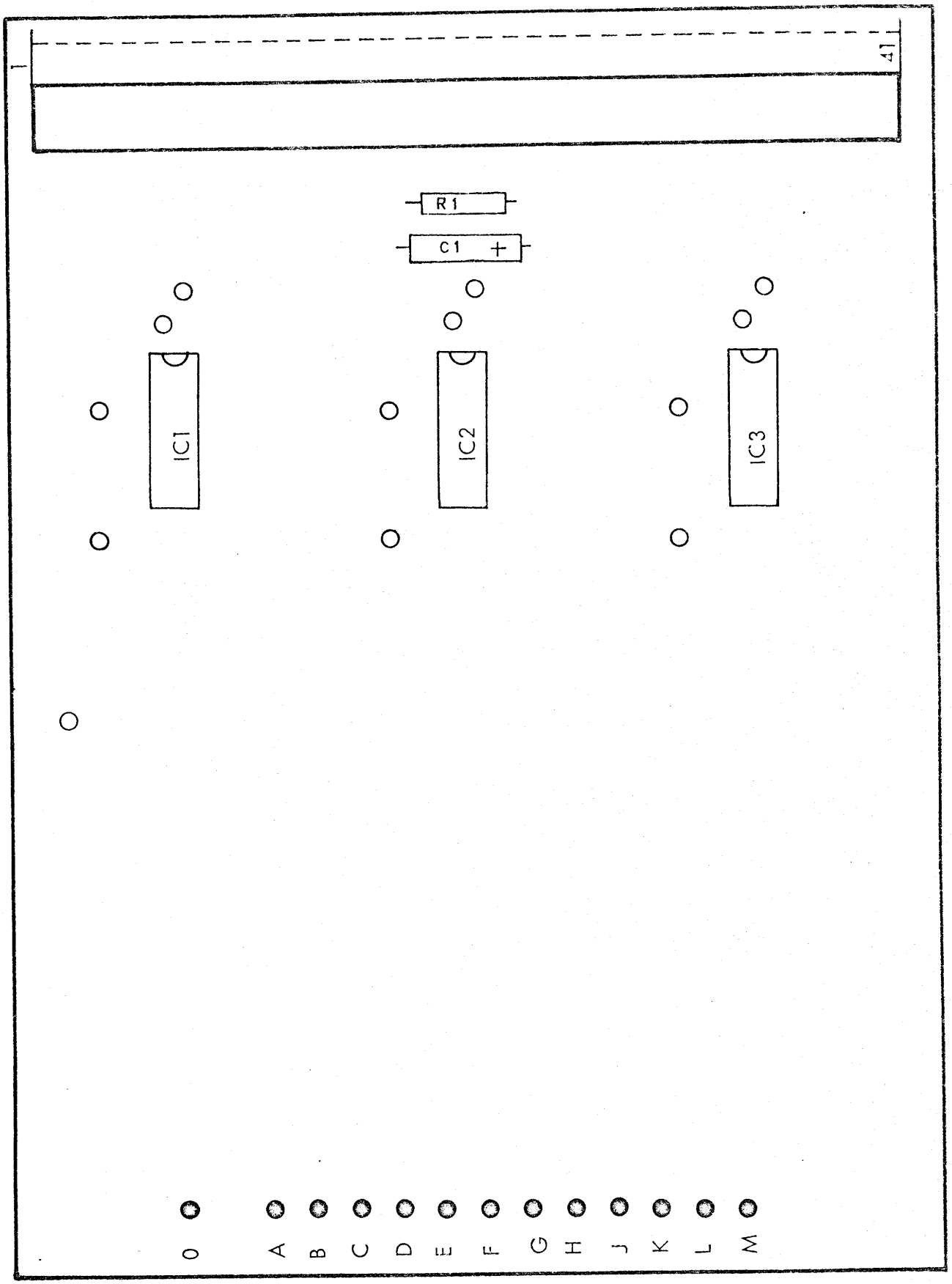




POWER REQUIREMENTS		
0V	pin 21	
+5V	pin 22	56mA
Power Dissipation :		282mW

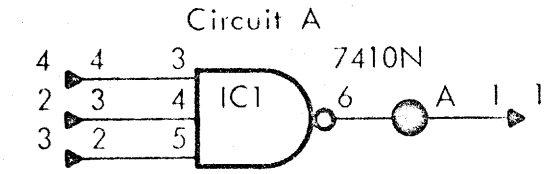
RCLM400 1 AJ451, 8 AC401 RC0834-44

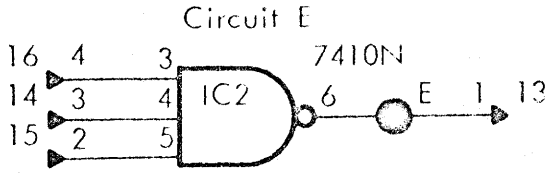
A20 173 PCBA Circuit Diagram

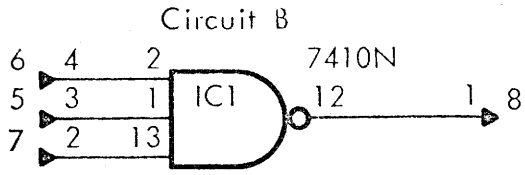


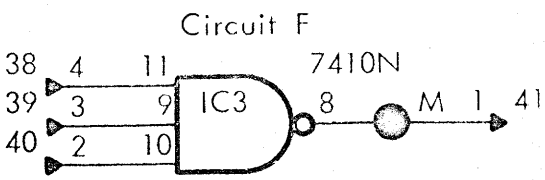
RCLM400 1 AJ451 , 8 AC401 RC0834-44

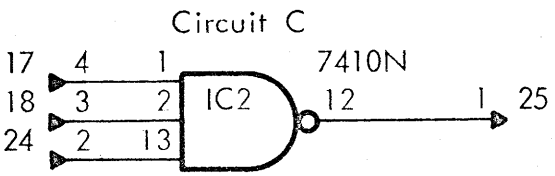
A20199 PCB Assembly Drawing

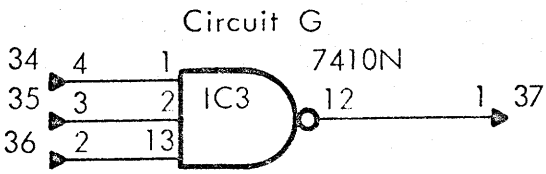


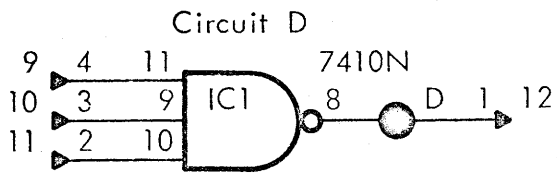


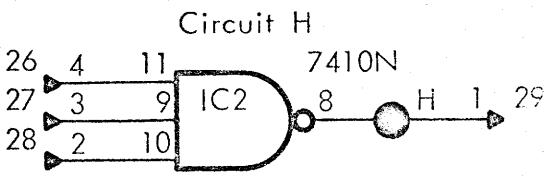


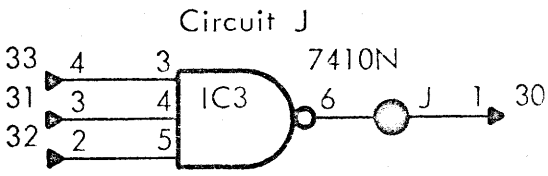


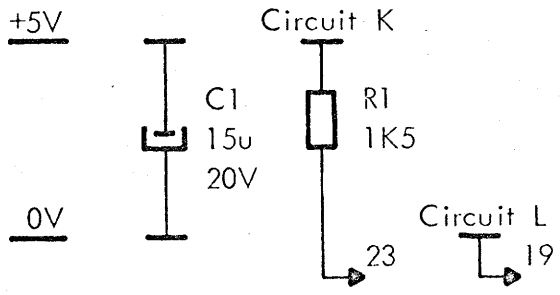




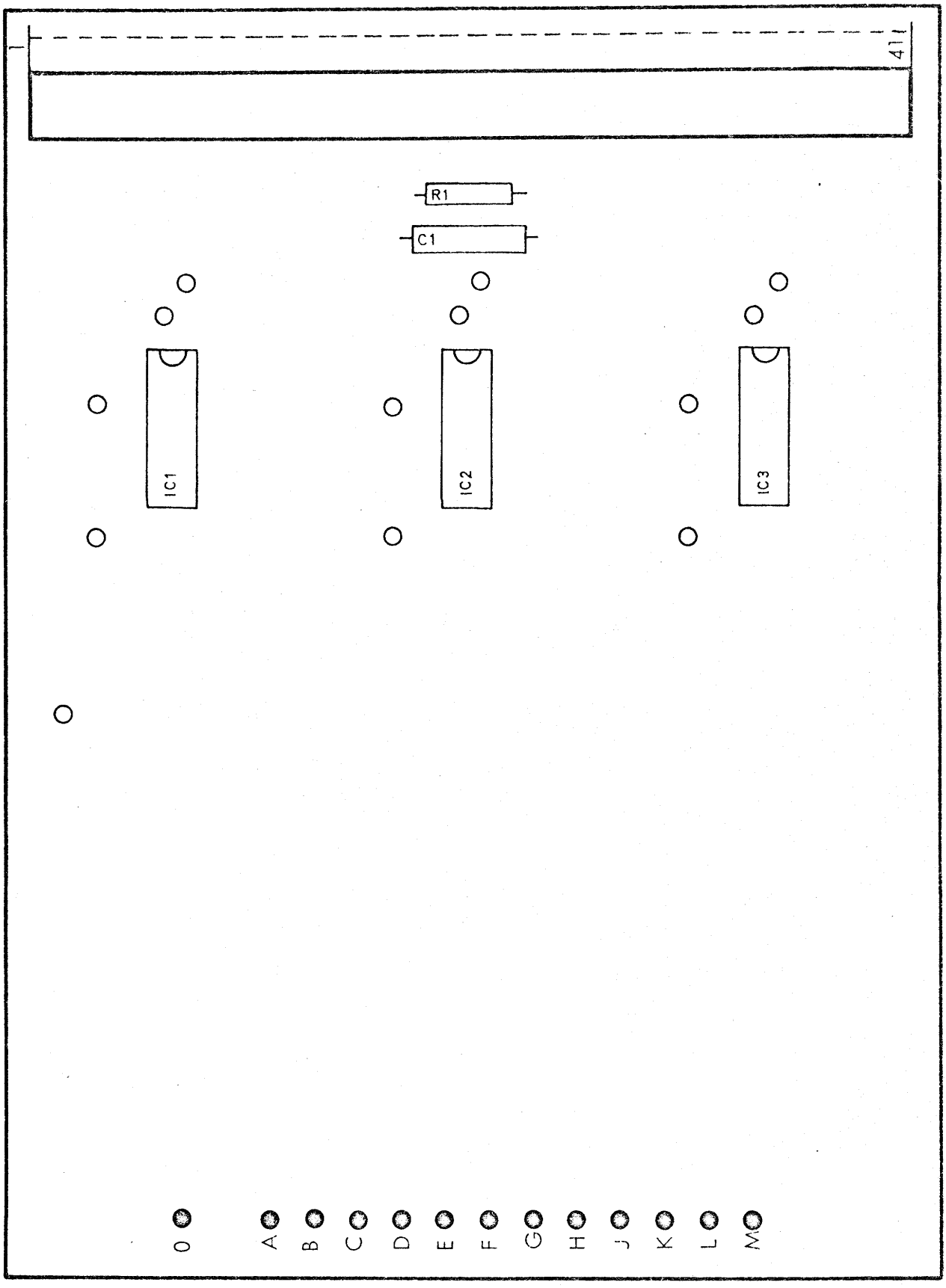


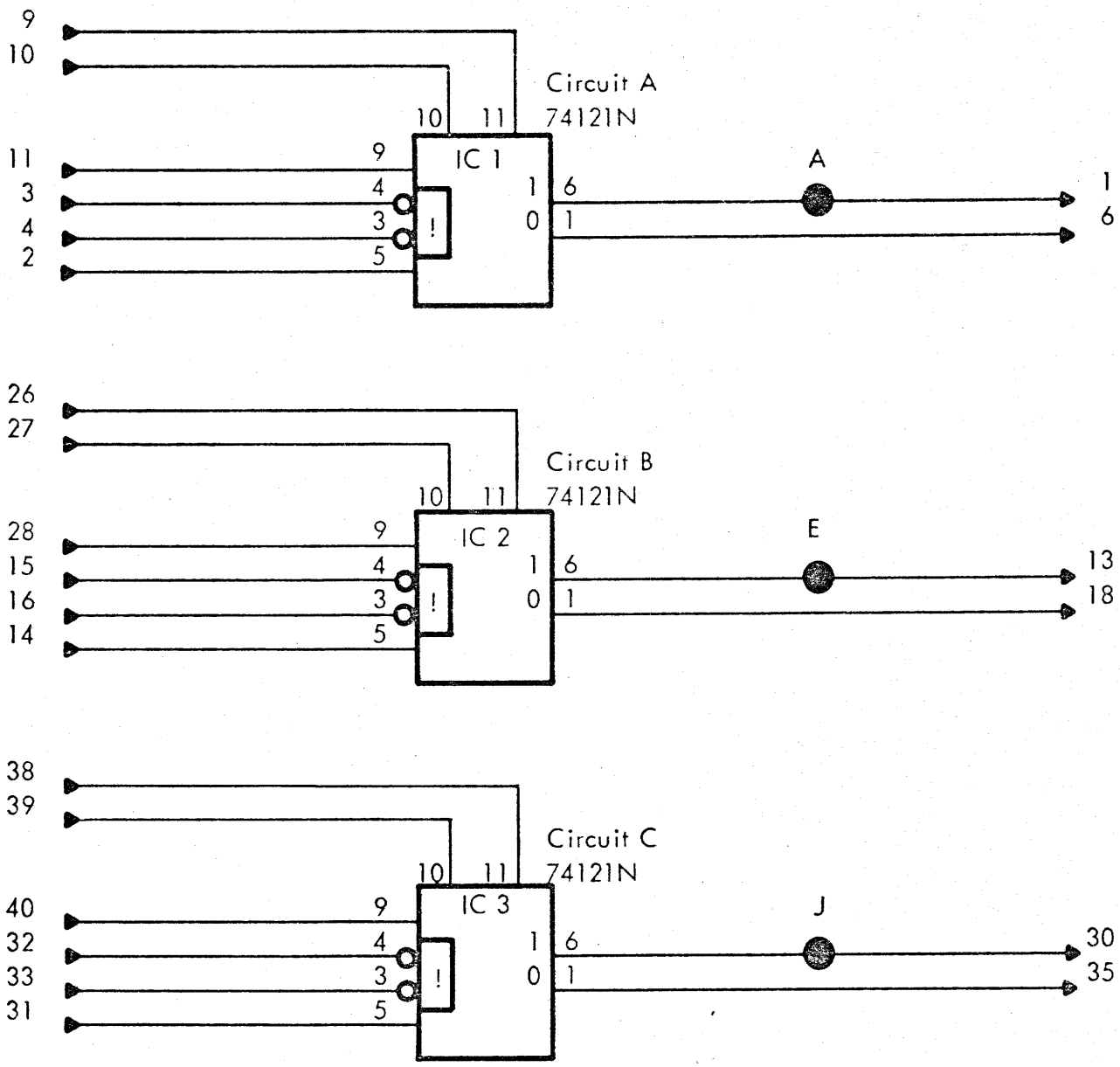




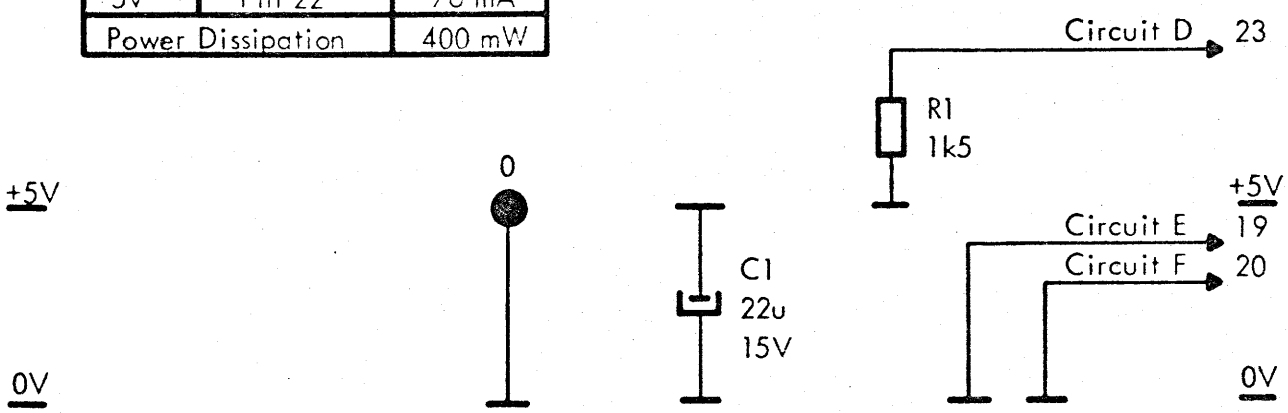


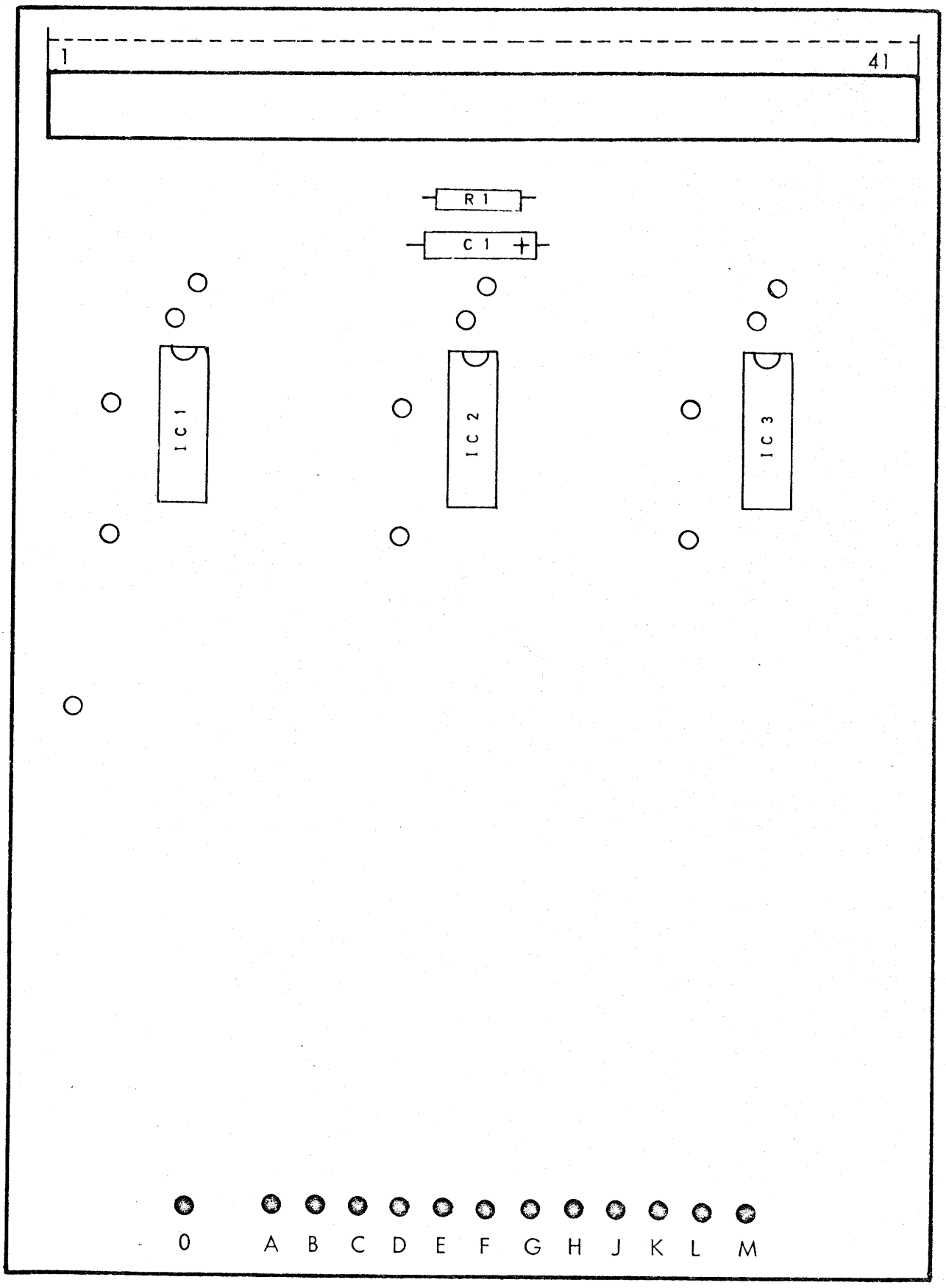
POWER REQUIREMENTS		
0V	pin 21	
+5V	pin 22	30 mA
Power Dissipation		166 mW

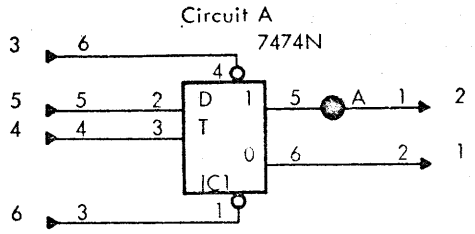

41
R1
C1
IC1
IC2
IC3
0
A
B
C
D
E
F
G
H
J
K
L
M

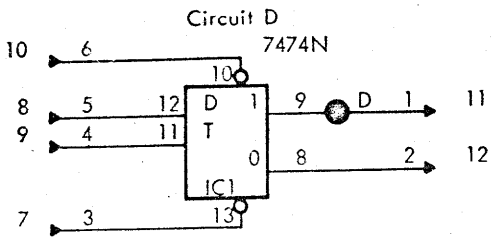


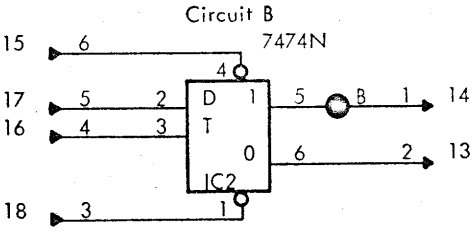
POWER REQUIREMENTS :		
0V	Pin 21	
+5V	Pin 22	76 mA
Power Dissipation		400 mW

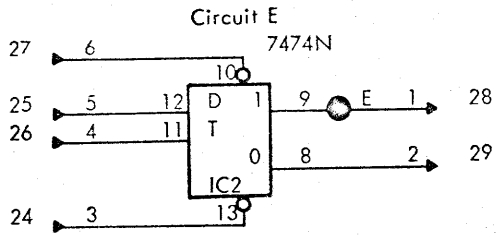


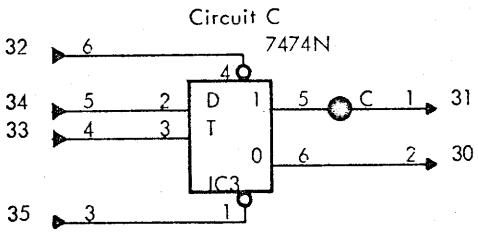

1
41
R 1
C 1
IC 1
IC 2
IC 3
0
A B C D E F G H J K L M

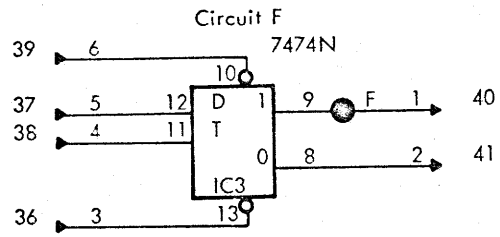


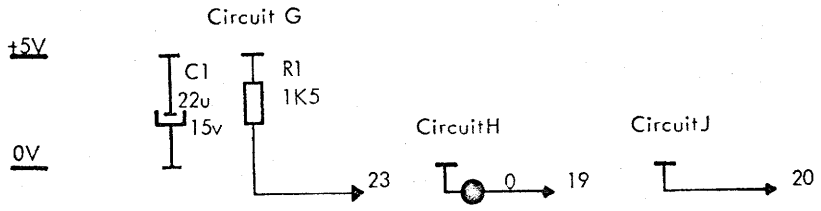




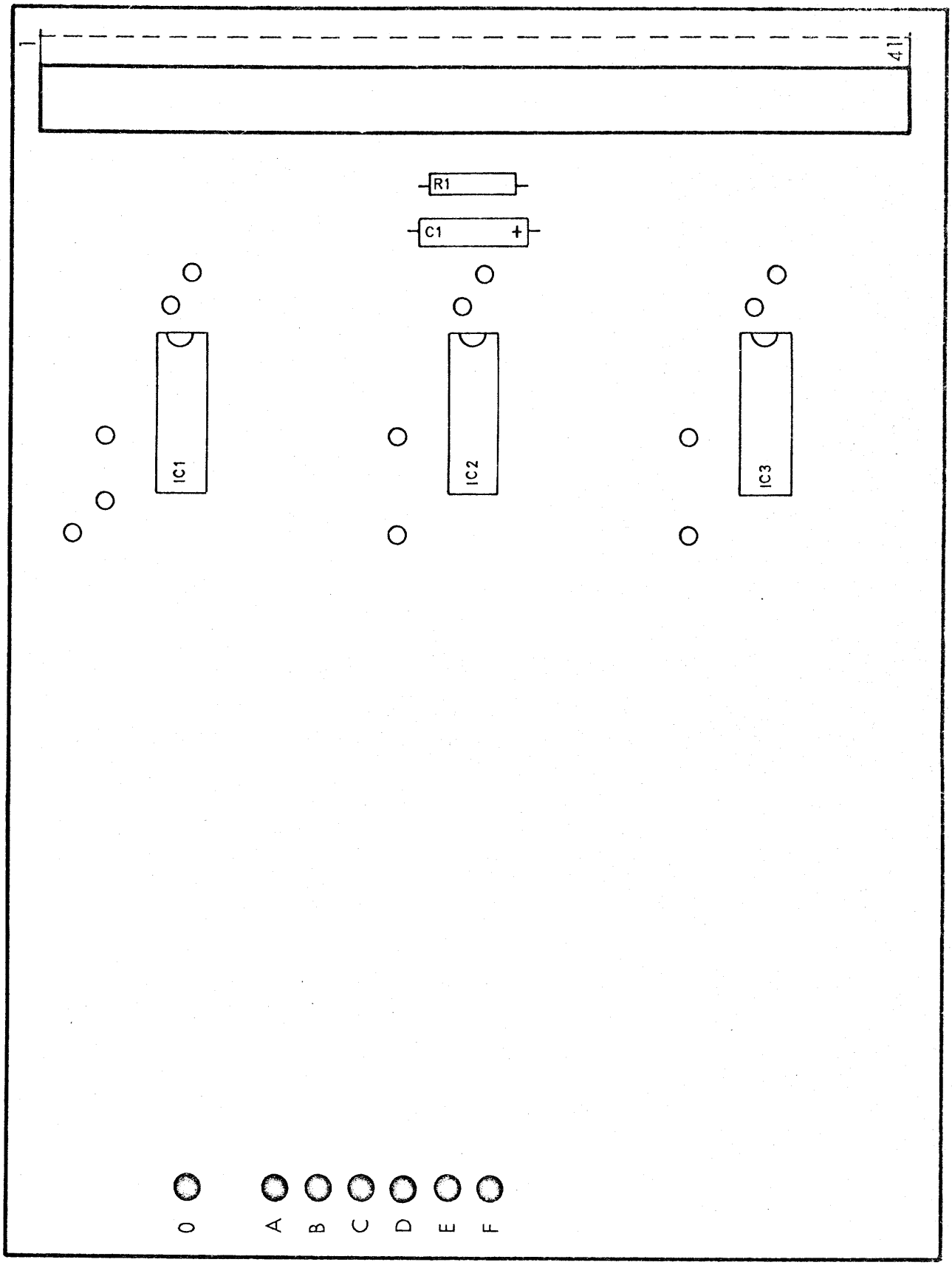






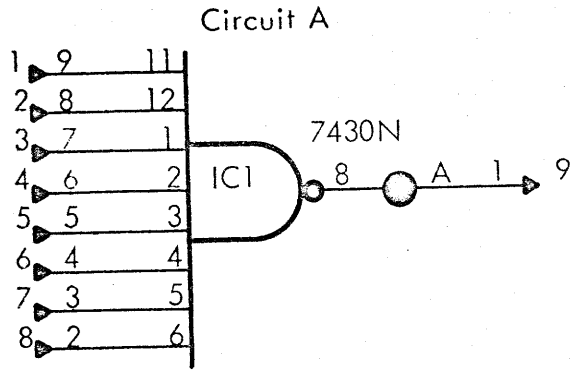


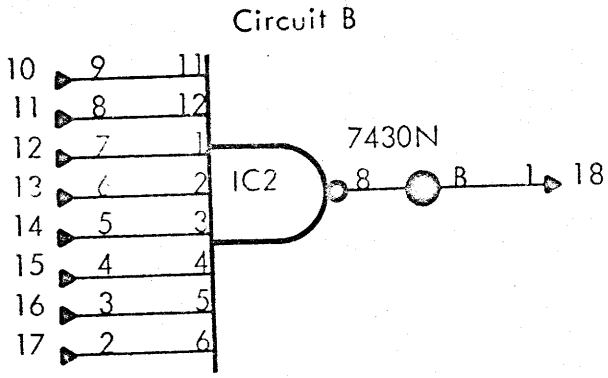
POWER REQUIREMENTS		
+5 V	PIN. 22	57 mA
0 V	PIN. 21	
POWER DISSIPATION: 295 mW		

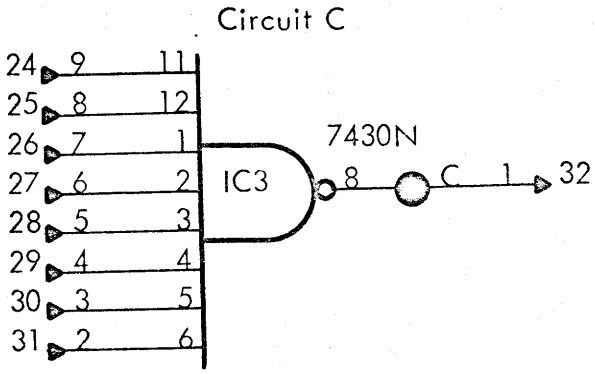


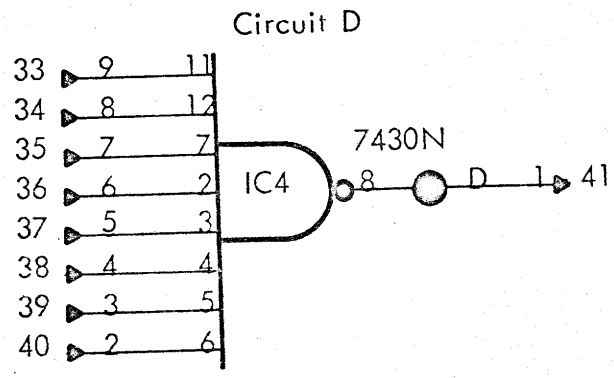
RCLM400 6 BC401 RC0835-1

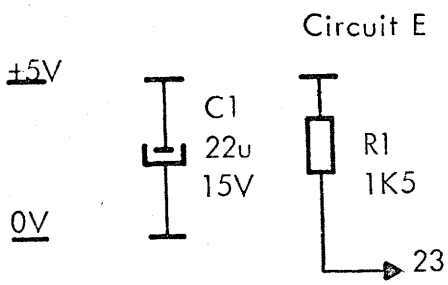
A20 417 PCB Assembly Drawing

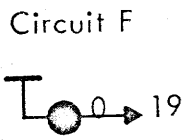


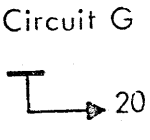






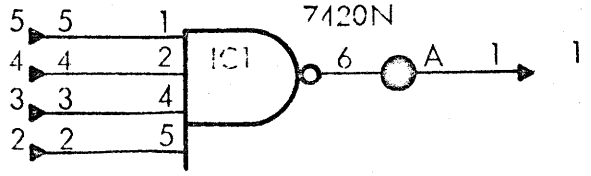




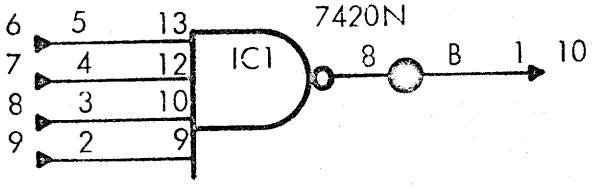


POWER REQUIREMENTS		
+5V	PIN 22	14 mA
0V	PIN 21	
POWER DISSIPATION 70 mW		

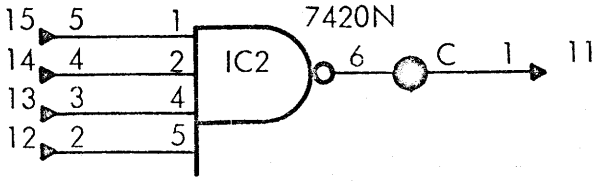
Circuit A



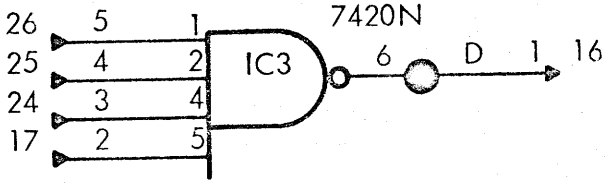
Circuit B



Circuit C



Circuit D



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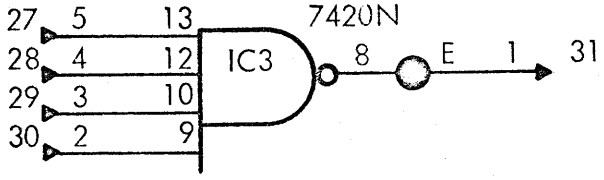
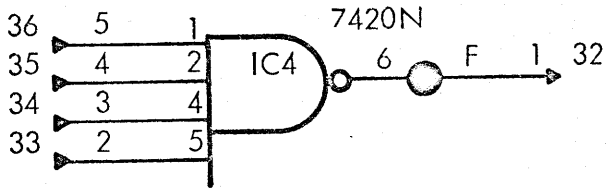
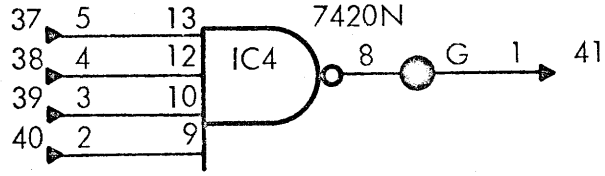


Circuit F

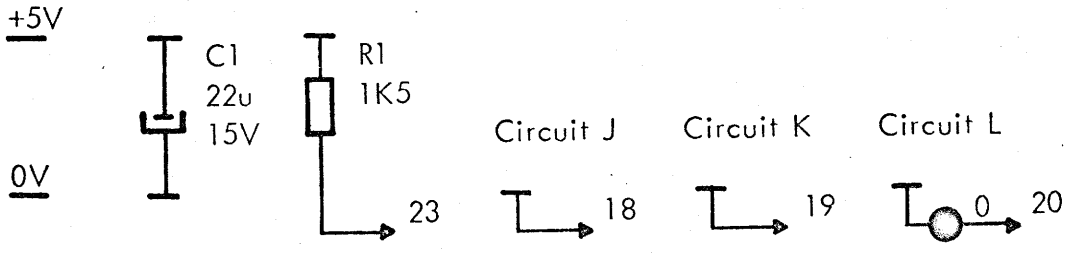


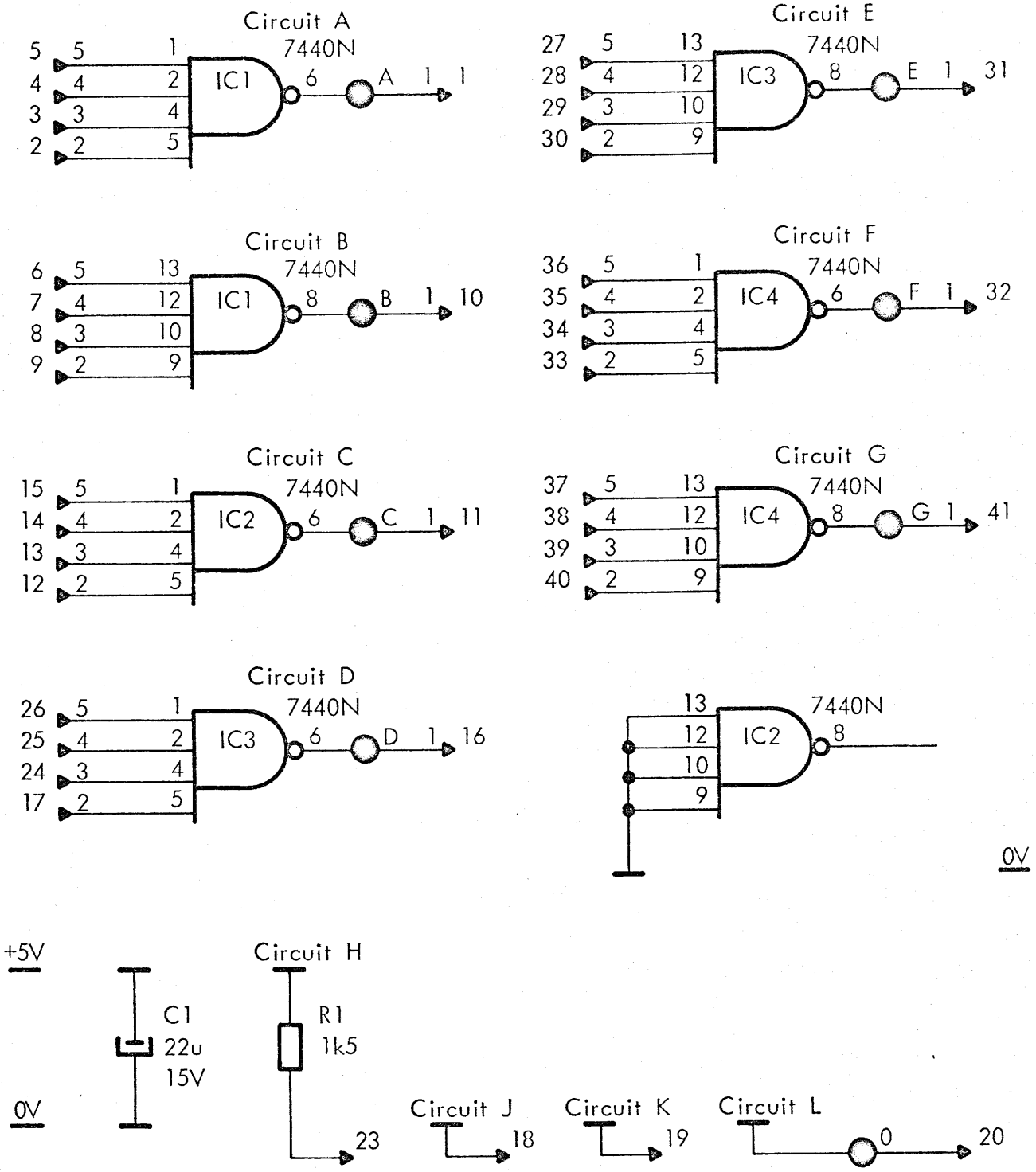
Circuit G



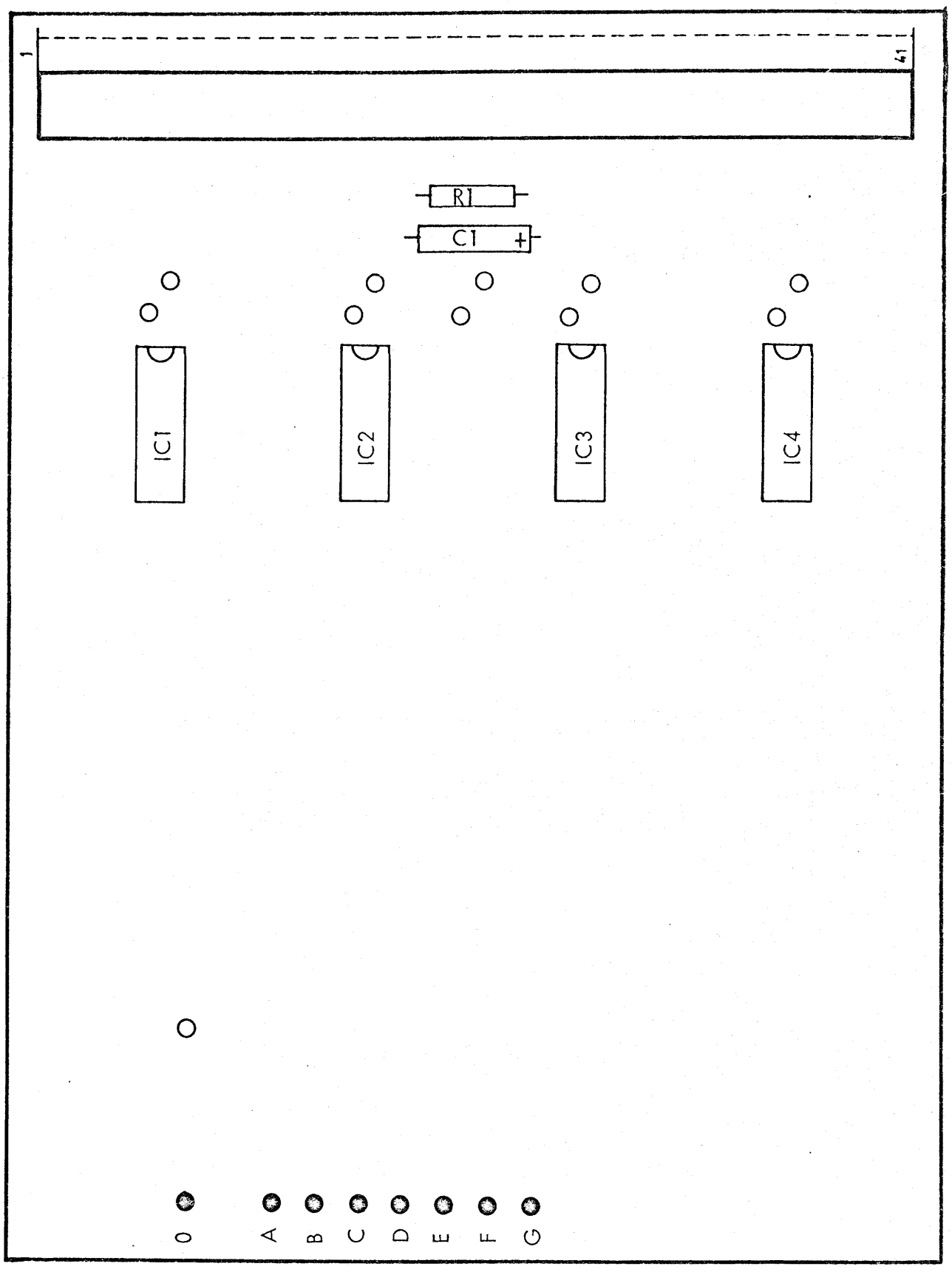
POWER REQUIREMENTS		
+5 V	PIN 22	25 mA
0 V	PIN 21	
POWER DISSIPATION 130 mW		

Circuit H



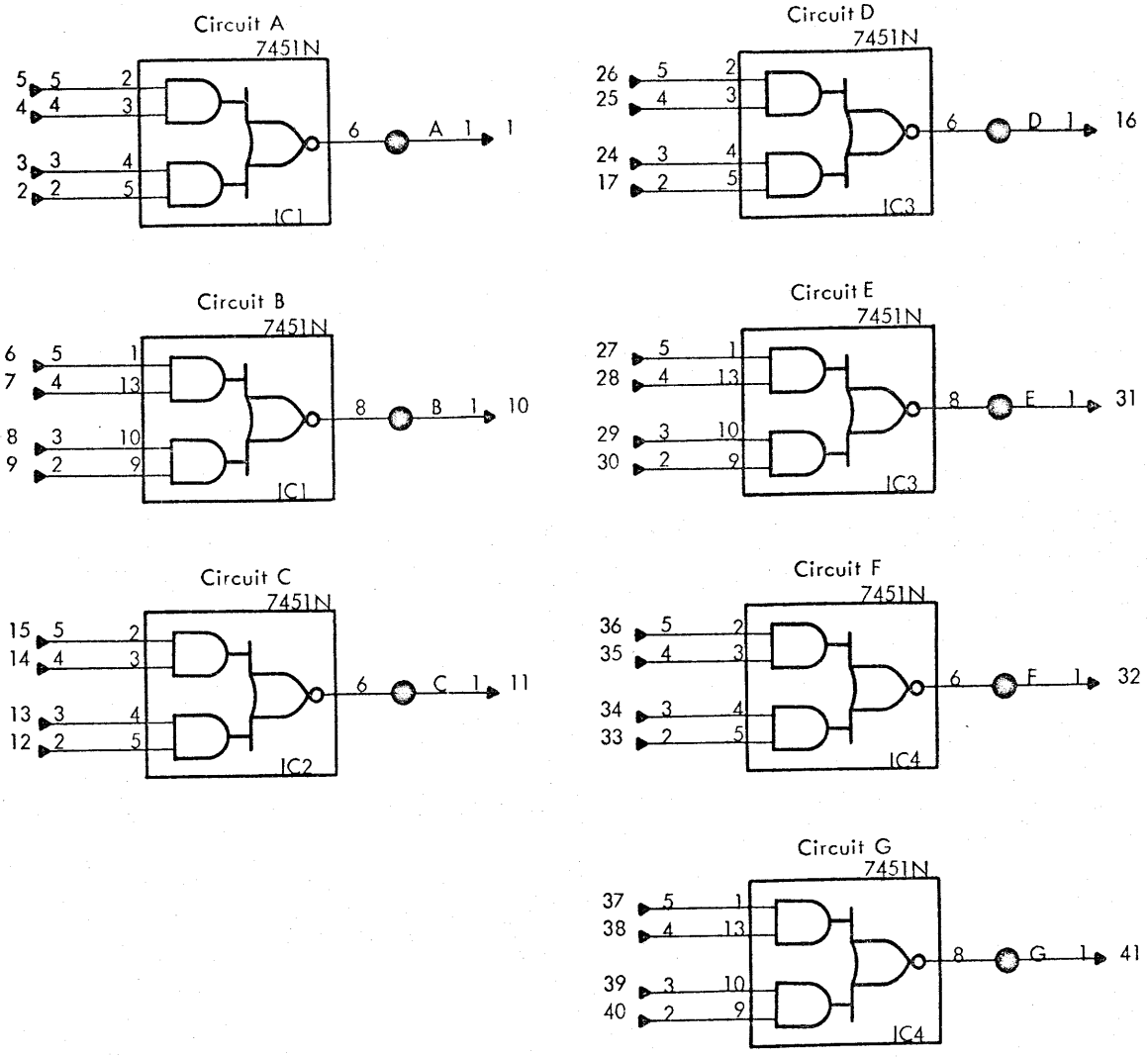


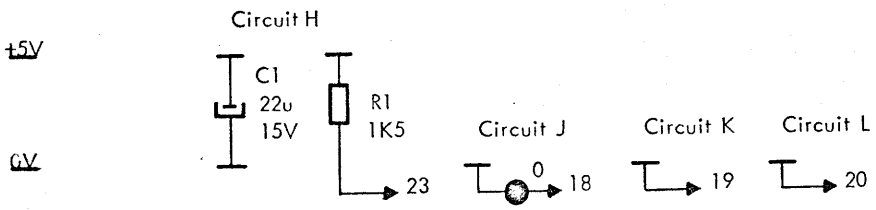
POWER REQUIREMENTS		
0V	pin 21	
+5V	pin 22	77mA
Power Dissipation :		390mW



RCLM400 7 AC404 RC0839-40

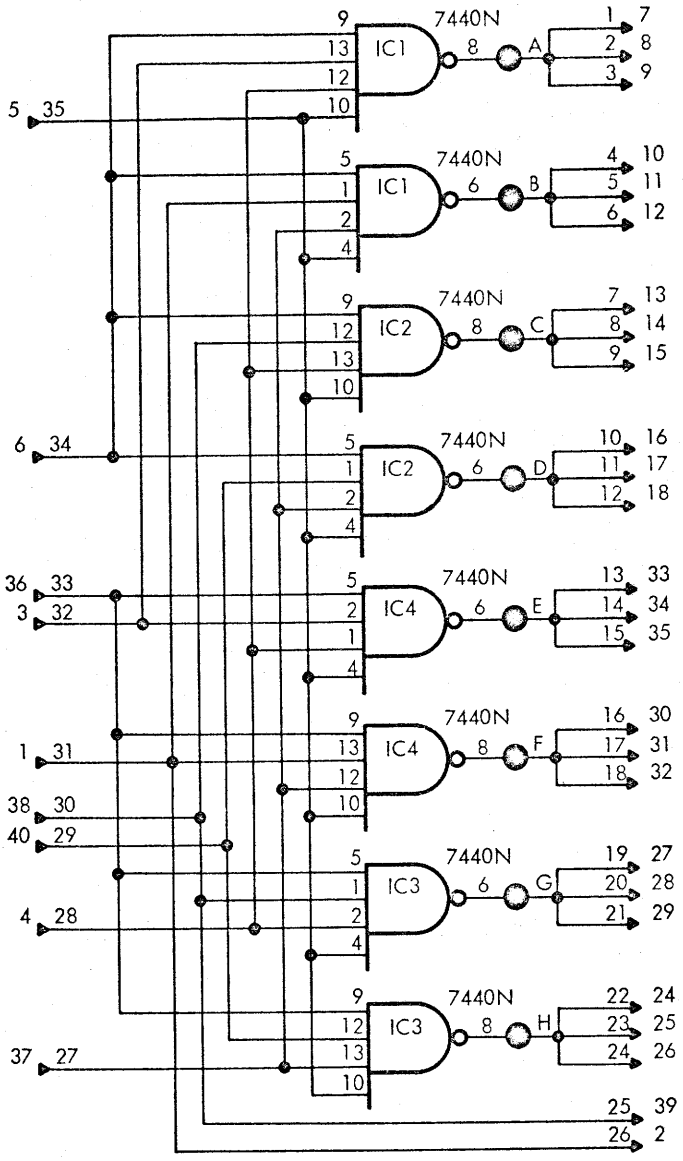
A20224 PCB Assembly Drawing



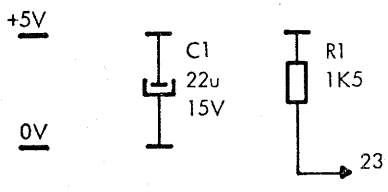


POWER REQUIREMENTS		
+5V	PIN 22	31 mA
0V	PIN 21	
POWER DISSIPATION 165 mW		

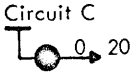
Circuit A



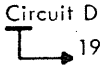
Circuit B



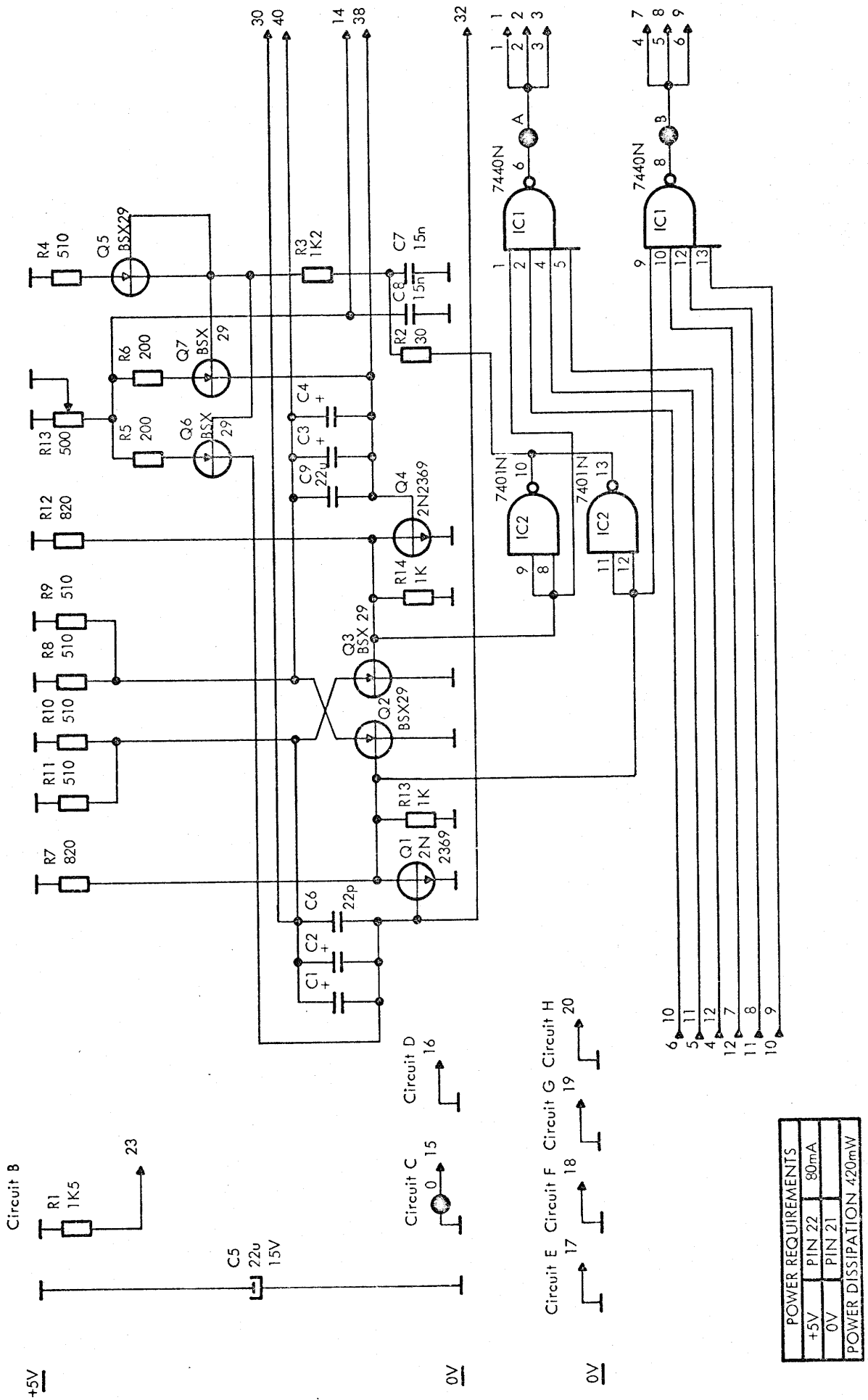
Circuit C



Circuit D



POWER REQUIREMENTS		
+5V	PIN 22	25 mA
0V	PIN 21	
POWER DISSIPATION 135 mW		

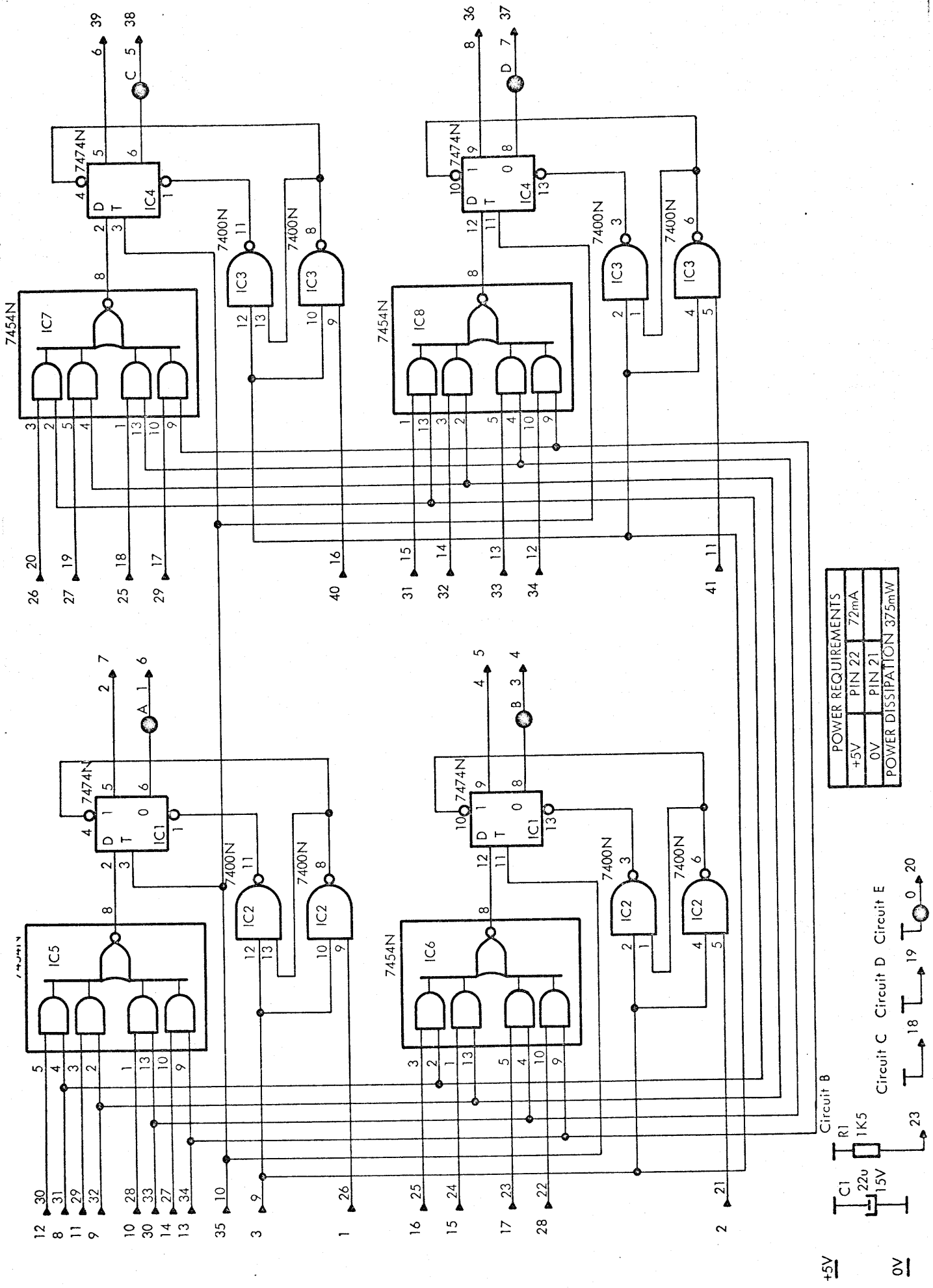


RCLM400 1CC401 RC0851-1

V11780 PCBA Circuit Diagram

C1	C2	C3	C4	CHARACTERISTICS
*	100p	*	100p	5 Mhz

* Not mounted

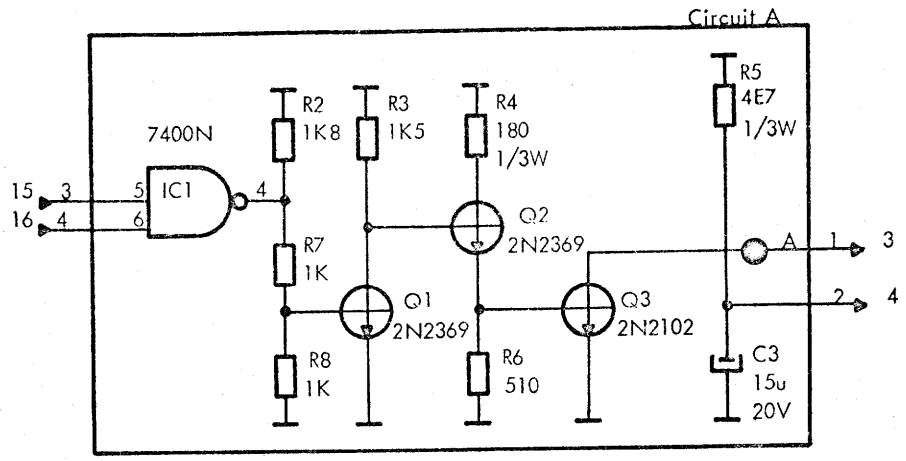


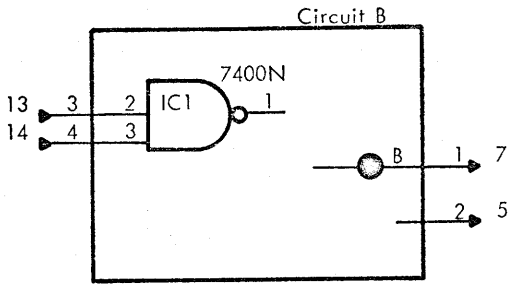
RCLM400 BG405 RC0859-1

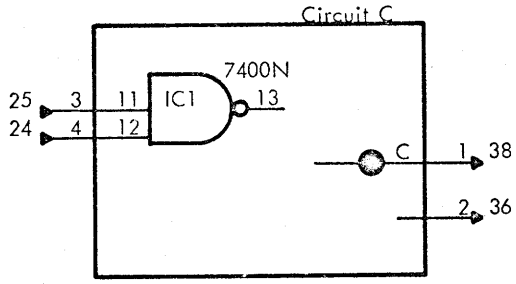
V11564 PCBA Circuit Diagram

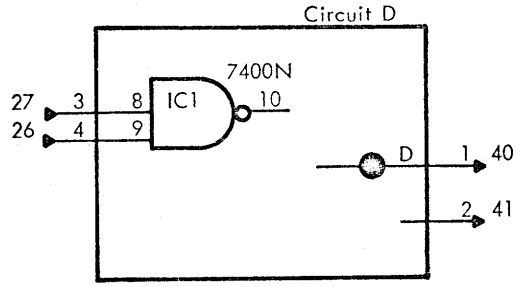
+12V
+5V

0V



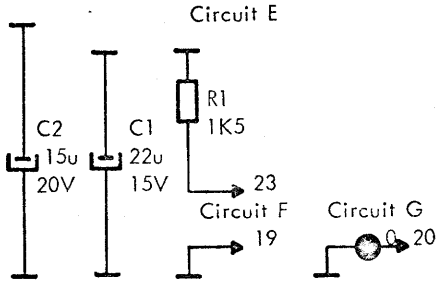






+12V
+5V

0V

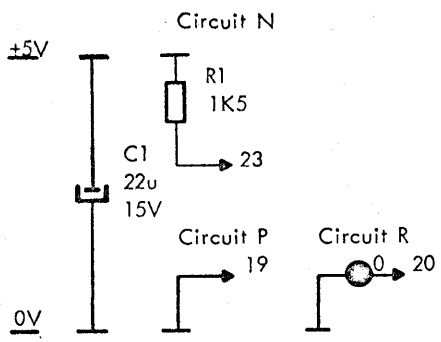


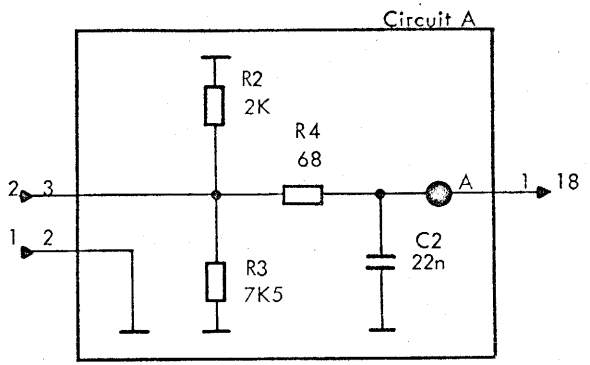
+12V
+5V

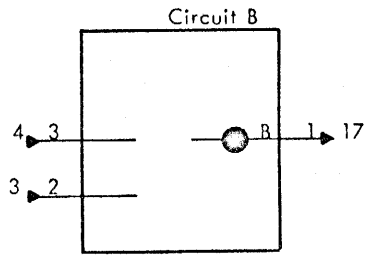
POWER REQUIREMENTS		
+12V	PIN 1	65mA / LAMP
+ 5V	PIN 22	132mA
0V	PIN 21	
POWER DISSIPATION 695mW		

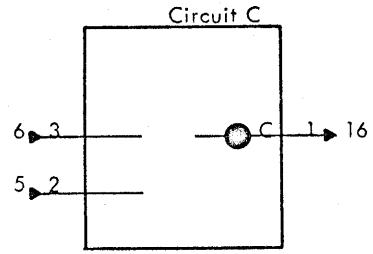
Lamp type: CM 330, 14V/80 mA or equivalent

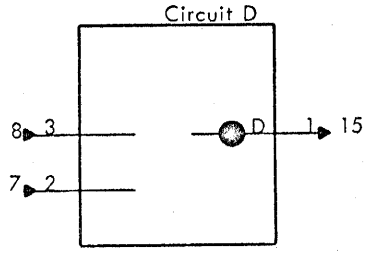
V11100 RCLM400 12DG401 PCBA Circuit Diagram RC0861-1

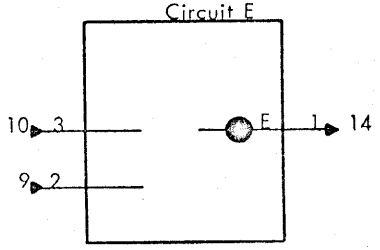


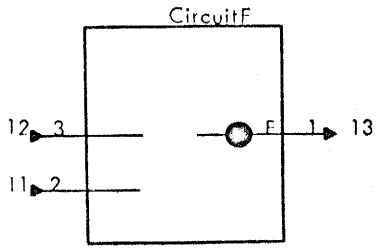


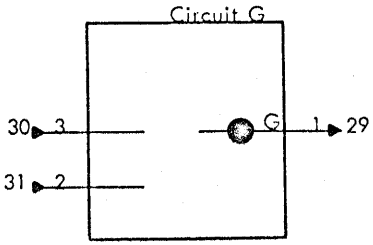


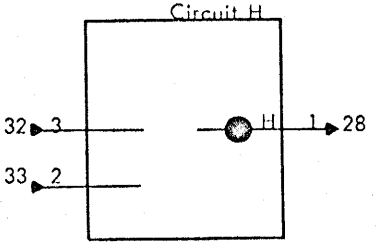


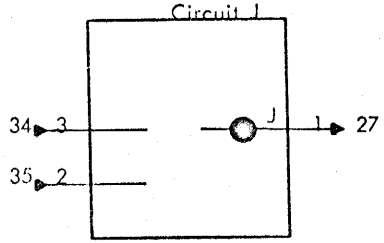


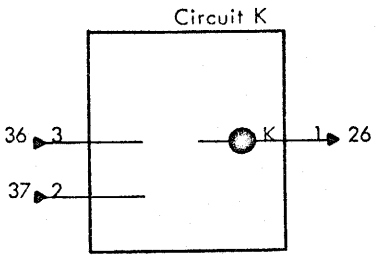


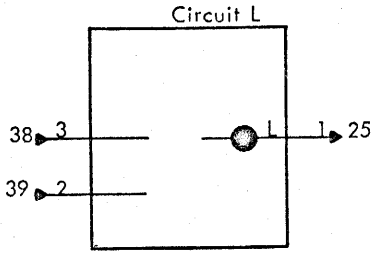


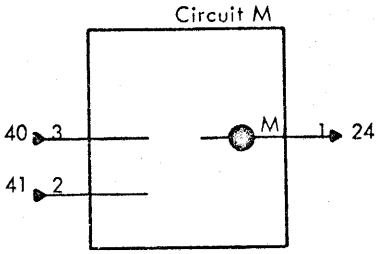












POWER REQUIREMENTS		
+ 5V	PIN 22	32 mA
0V	PIN 21	
POWER DISSIPATION 170 mW		

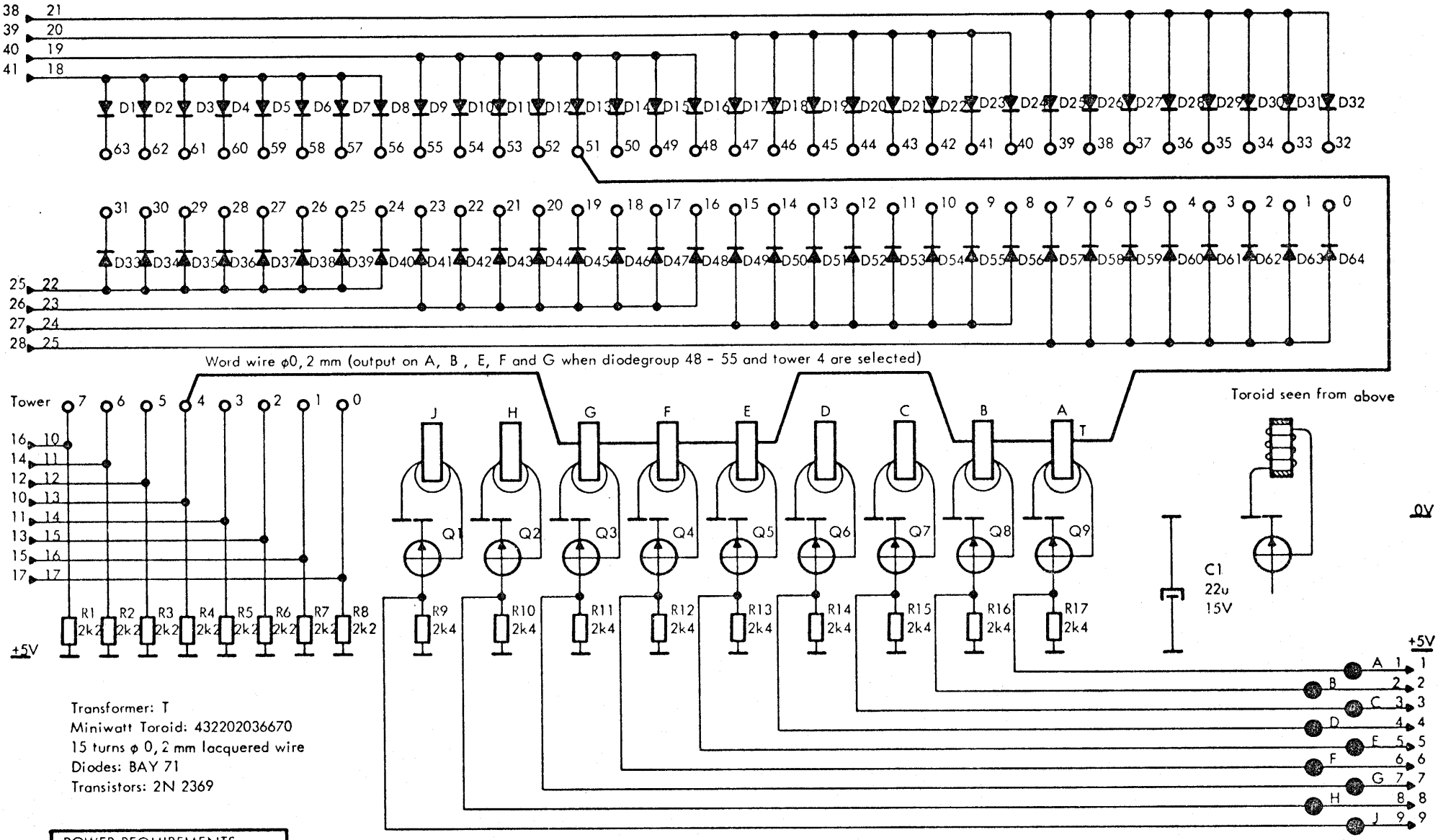
RCLM400

V12010

PCBA Circuit Diagram

1SA401

RC0878 - 1



Transformer: T
Miniwatt Toroid: 432202036670
15 turns φ 0, 2 mm lacquered wire
Diodes: BAY 71
Transistors: 2N 2369

POWER REQUIREMENTS		
+5V	PIN 22	30mA
0V	PIN 21	
POWER DISSIPATION		150mW

X = Through core

Diode	A	B	C	D	E	F	G	H	J	Tower
0										0
8										
16	X	X	X	X	X		X			
24	X	X		X	X	X	X	X	X	
32										
40	X	X	X	X			X	X		
48										
56	X	X	X	X			X	X		
1										1
9										
17	X	X				X	X	X	X	
25		X		X	X	X	X	X		
33							X	X		
41					X		X	X	X	
49							X	X		
57					X		X	X	X	
2										2
10										
18	X					X	X	X		
26	X			X	X	X	X	X		
34	X						X	X	X	
42	X				X		X	X		
50	X						X	X	X	
58	X				X		X	X		
3										3
11										
19										
27				X	X	X	X	X	X	
35		X					X	X	X	
43		X			X		X	X		
51		X					X	X	X	
59		X			X		X	X		

Diode	A	B	C	D	E	F	G	H	J	Tower
4										4
12										
20										
28	X	X	X		X	X	X	X	X	
36	X	X					X	X		
44	X	X			X		X	X	X	
52	X	X					X	X		
60	X	X			X		X	X	X	
5										5
13										
21		X	X			X	X	X	X	
29		X	X		X	X	X	X		
37			X				X	X	X	
45			X		X		X	X		
53			X				X	X	X	
61			X		X		X	X		
6										6
14										
22	X		X			X	X	X	X	
30	X		X		X	X	X	X		
38	X		X				X	X		
46	X		X		X		X	X	X	
54	X		X				X	X		
62	X		X		X		X	X	X	
7										7
15										
23		X				X	X	X		
31			X		X	X	X	X	X	
39		X	X				X	X		
47		X	X		X		X	X	X	
55		X	X				X	X		
63		X	X		X		X	X	X	

X = Through core

Diode	A	B	C	D	E	F	G	H	J	Tower
0										0
8	X	X	X			X	X		X	
16	X	X	X	X		X	X	X	X	
24	X	X			X	X	X	X		
32	X	X	X				X	X	X	
40		X		X	X		X	X	X	
48	X	X	X				X	X	X	
56		X		X	X		X	X	X	
1		X	X		X	X	X		X	1
9										
17		X	X	X		X	X	X		
25		X			X	X	X	X	X	
33				X			X	X	X	
41	X	X		X	X		X	X		
49				X			X	X	X	
57	X	X		X	X		X	X		
2	X		X		X	X	X		X	2
10										
18			X			X	X	X		
26	X		X	X	X	X	X	X	X	
34	X			X			X	X		
42			X	X	X		X	X	X	
50	X			X			X	X		
58			X	X	X		X	X	X	
3			X		X	X	X			3
11			X			X	X		X	
19	X				X	X	X	X	X	
27			X	X	X	X	X	X		
35		X		X			X	X		
43	X	X	X		X		X	X		
51		X		X			X	X		
59	X	X	X		X		X	X		

Diode	A	B	C	D	E	F	G	H	J	Tower
4	X	X			X	X	X		X	4
12										
20		X	X	X	X	X	X	X	X	
28		X		X		X	X	X	X	
36	X	X		X			X	X	X	
44				X	X		X	X		
52	X	X		X			X	X	X	
60				X	X		X	X		
5		X			X	X	X			5
13										
21					X	X	X	X		
29	X	X		X		X	X	X		
37			X	X			X	X		
45	X			X	X		X	X	X	
53			X	X			X	X		
61	X			X	X		X	X	X	
6	X				X	X	X			6
14										
22	X	X	X	X	X	X	X	X		
30	X			X		X	X	X	X	
38	X		X	X			X	X	X	
46										
54	X		X	X			X	X	X	
62										
7					X	X	X		X	7
15										
23				X		X	X	X		
31						X	X	X	X	
39		X	X	X			X	X	X	
47	X	X	X			X	X	X		
55		X	X	X			X	X	X	
63										

RCLM400 1 SA 401 RC0878-1/402

A20792 PCB Variant Specification

X = Through core

Diode	A	B	C	D	E	F	G	H	J	Tower
0										0
8										
16	X	X	X	X	X		X			
24	X	X		X	X	X	X	X	X	
32										
40										
48										
56										
1										1
9										
17	X		X	X	X		X	X		
25		X		X	X	X	X	X		
33										
41										
49										
57										
2										2
10										
18		X	X	X	X		X	X		
26	X			X	X	X	X	X		
34										
42										
50										
58										
3										3
11										
19	X	X	X	X	X		X	X	X	
27				X	X	X	X	X	X	
35										
43										
51										
59										

Diode	A	B	C	D	E	F	G	H	J	Tower
4										4
12										
20										
28	X	X	X		X	X	X	X	X	
36										
44										
52										
60										
5										5
13										
21	X		X	X		X	X	X		
29		X	X		X	X	X	X		
37										
45										
53										
61										
6										6
14										
22										
30	X		X		X	X	X	X		
38										
46										
54										
62										
7										7
15										
23	X	X	X		X		X	X		
31			X		X	X	X	X	X	
39										
47										
55										
63										

X = Through core

Diode	A	B	C	D	E	F	G	H	J	Tower
0										0
8	X	X	X			X	X		X	
16				X	X		X	X		
24	X	X			X	X	X	X		
32										
40										
48										
56										
1		X	X		X	X	X		X	1
9										
17	X			X	X		X	X	X	
25		X			X	X	X	X	X	
33										
41										
49										
57										
2	X		X		X	X	X		X	2
10										
18	X		X	X	X		X	X		
26			X	X		X	X	X	X	
34										
42										
50										
58										
3			X		X	X	X			3
11			X			X	X		X	
19		X	X	X	X		X	X		
27										
35										
43										
51										
59										

Diode	A	B	C	D	E	F	G	H	J	Tower
4	X	X			X	X	X		X	4
12										
20	X	X	X	X	X		X	X	X	
28										
36										
44										
52										
60										
5		X			X	X	X			5
13										
21	X	X	X		X		X	X		
29										
37										
45										
53										
61										
6	X				X	X	X			6
14										
22				X	X		X	X		
30										
38										
46										
54										
62										
7					X	X	X		X	7
15										
23	X			X	X		X	X	X	
31										
39										
47										
55										
63										

X = Through core

Diode	A	B	C	D	E	F	G	H	J	Tower
0										0
8										
16	X	X	X	X	X		X			
24	X	X		X	X	X	X	X	X	
32										
40	X	X	X	X			X	X		
48										
56	X	X	X	X		X		X		
1										1
9										
17	X	X				X	X	X	X	
25		X		X	X	X	X	X		
33							X	X		
41					X		X	X	X	
49						X		X		
57					X	X		X	X	
2										2
10										
18	X					X	X	X		
26	X			X	X	X	X	X		
34	X						X	X	X	
42	X				X		X	X		
50	X					X		X	X	
58	X				X	X		X		
3										3
11										
19										
27				X	X	X	X	X	X	
35		X					X	X	X	
43		X			X		X	X		
51		X				X		X	X	
59		X			X	X		X		

Diode	A	B	C	D	E	F	G	H	J	Tower
4										4
12										
20										
28	X	X	X		X	X	X	X	X	
36	X	X					X	X		
44	X	X			X		X	X	X	
52	X	X				X		X		
60	X	X			X	X		X	X	
5										5
13										
21		X	X			X	X	X	X	
29		X	X		X	X	X	X		
37			X				X	X	X	
45			X		X		X	X		
53			X			X		X	X	
61			X		X	X		X		
6										6
14										
22	X		X			X	X	X	X	
30	X		X		X	X	X	X		
38	X		X				X	X		
46	X		X		X		X	X	X	
54	X		X			X		X		
62	X		X		X	X		X	X	
7										7
15										
23		X				X	X	X		
31			X		X	X	X	X	X	
39		X	X				X	X		
47		X	X		X		X	X	X	
55		X	X			X		X		
63		X	X		X	X		X	X	

RCLM400 1 SA 401 RC0878-1/405

A20794 PCB Variant Specification

X = Through core

Diode	A	B	C	D	E	F	G	H	J	Tower
0										0
8	X	X	X			X	X		X	
16	X	X	X	X		X	X	X	X	
24	X	X			X	X	X	X		
32	X	X	X				X	X	X	
40		X		X	X		X	X	X	
48	X	X	X			X		X	X	
56		X		X	X	X		X	X	
1		X	X		X	X	X		X	1
9										
17		X	X	X		X	X	X		
25		X			X	X	X	X	X	
33				X			X	X	X	
41	X	X		X	X		X	X		
49				X		X		X	X	
57	X	X		X	X	X		X		
2	X		X		X	X	X		X	2
10										
18			X			X	X	X		
26	X		X	X	X	X	X	X	X	
34	X			X			X	X		
42			X	X	X		X	X	X	
50	X			X		X		X		
58			X	X	X	X		X	X	
3			X		X	X	X			3
11			X			X	X		X	
19	X				X	X	X	X	X	
27			X	X	X	X	X	X		
35		X		X			X	X		
43	X	X	X		X		X	X		
51		X		X		X		X		
59	X	X	X		X	X		X		

Diode	A	B	C	D	E	F	G	H	J	Tower
4	X	X			X	X	X		X	4
12										
20		X	X	X	X	X	X	X	X	
28		X		X		X	X	X	X	
36	X	X		X			X	X	X	
44				X	X		X	X		
52	X	X		X		X		X	X	
60				X	X	X		X		
5		X			X	X	X			5
13										
21					X	X	X	X		
29	X	X		X		X	X	X		
37			X	X			X	X		
45	X			X	X		X	X	X	
53			X	X		X		X		
61	X			X	X	X		X	X	
6	X				X	X	X			6
14										
22	X	X	X	X	X	X	X	X		
30	X			X		X	X	X	X	
38	X		X	X			X	X	X	
46										
54	X		X	X		X		X	X	
62										
7					X	X	X		X	7
15										
23				X		X	X	X		
31						X	X	X	X	
39		X	X	X			X	X	X	
47	X	X	X			X	X	X		
55		X	X	X		X		X	X	
63										

RCLM400 1 SA 401 RC0878-1/406

A20795 PCB Variant Specification

X = Through core

Diode	A	B	C	D	E	F	G	H	J	Tower
0										0
8	X	X	X			X	X		X	
16				X	X		X	X		
24	X	X			X	X	X	X		
32										
40										
48										
56										
1		X	X		X	X	X		X	1
9										
17	X			X	X		X	X	X	
25		X			X	X	X	X	X	
33										
41										
49										
57										
2	X		X		X	X	X		X	2
10										
18	X		X	X	X	X		X		
26			X	X		X	X	X	X	
34										
42										
50										
58										
3			X		X	X	X			3
11			X			X	X		X	
19		X	X	X	X	X		X		
27										
35										
43										
51										
59										

Diode	A	B	C	D	E	F	G	H	J	Tower
4	X	X			X	X	X		X	4
12										
20	X	X	X	X	X	X		X	X	
28										
36										
44										
52										
60										
5		X			X	X	X			5
13										
21	X	X	X		X	X		X		
29										
37										
45										
53										
61										
6	X				X	X	X			6
14										
22				X	X	X		X		
30										
38										
46										
54										
62										
7					X	X	X		X	7
15										
23	X			X	X	X		X	X	
31										
39										
47										
55										
63										

RCLM400 1 SA 401 RC0878-1/407

A20796 PCB Variant Specification

X = Through core

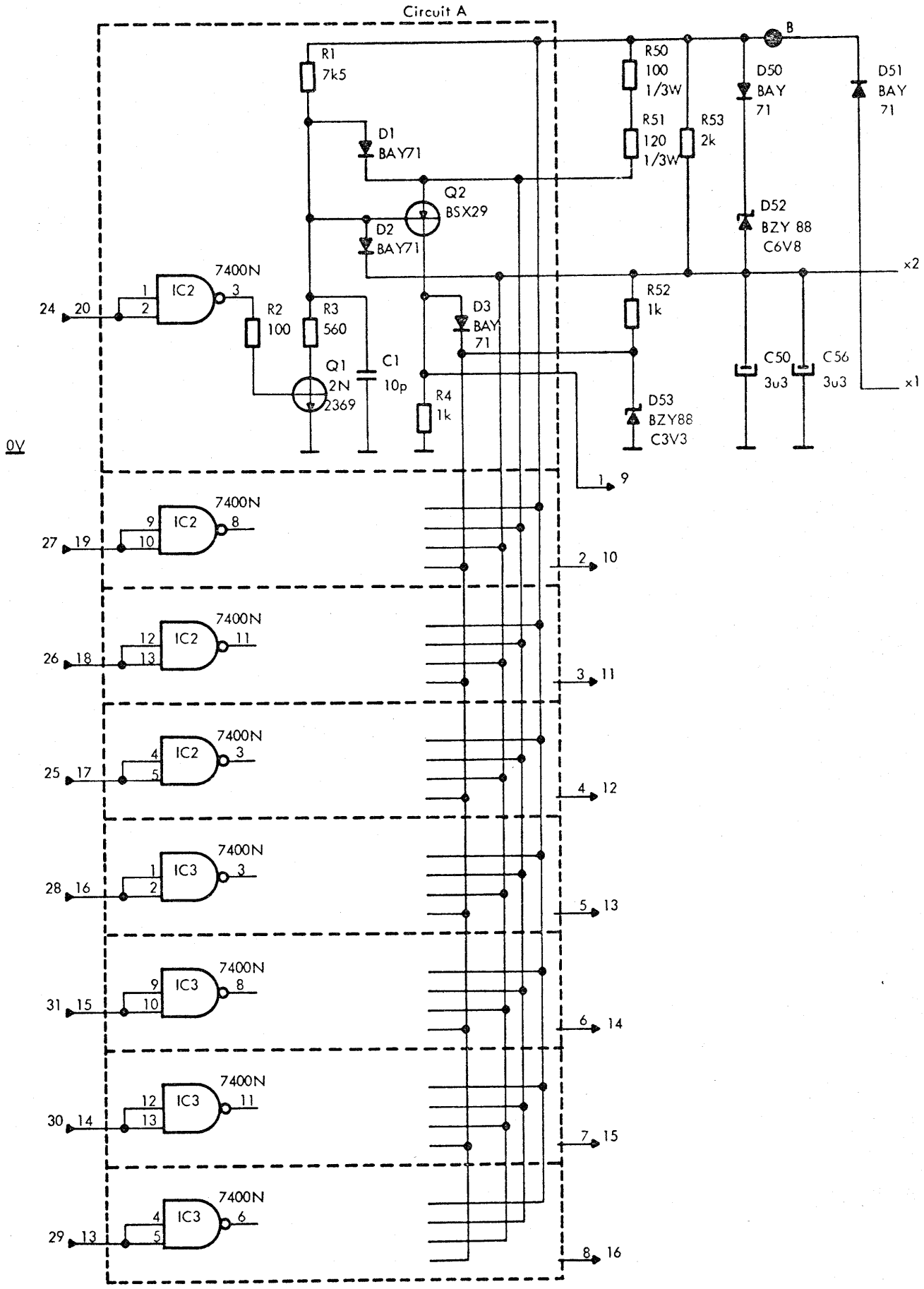
Diode	A	B	C	D	E	F	G	H	J	Tower
0										0
8										
16	X	X	X	X		X	X	X	X	
24	X	X			X	X	X	X		
32	X	X	X				X	X	X	
40		X		X	X		X	X	X	
48	X	X	X				X	X	X	
56		X		X	X		X	X	X	
1										1
9										
17		X	X	X		X	X	X		
25		X			X	X	X	X	X	
33				X			X	X	X	
41	X	X		X	X		X	X		
49				X			X	X	X	
57	X	X		X	X		X	X		
2	X		X		X	X	X		X	2
10										
18			X			X	X	X		
26	X		X	X	X	X	X	X	X	
34	X			X			X	X		
42			X	X	X		X	X	X	
50	X			X			X	X		
58			X	X	X		X	X	X	
3			X		X	X	X			3
11										
19	X				X	X	X	X	X	
27			X	X	X	X	X	X		
35		X		X			X	X		
43	X	X	X		X		X	X		
51		X		X			X	X		
59	X	X	X		X		X	X		

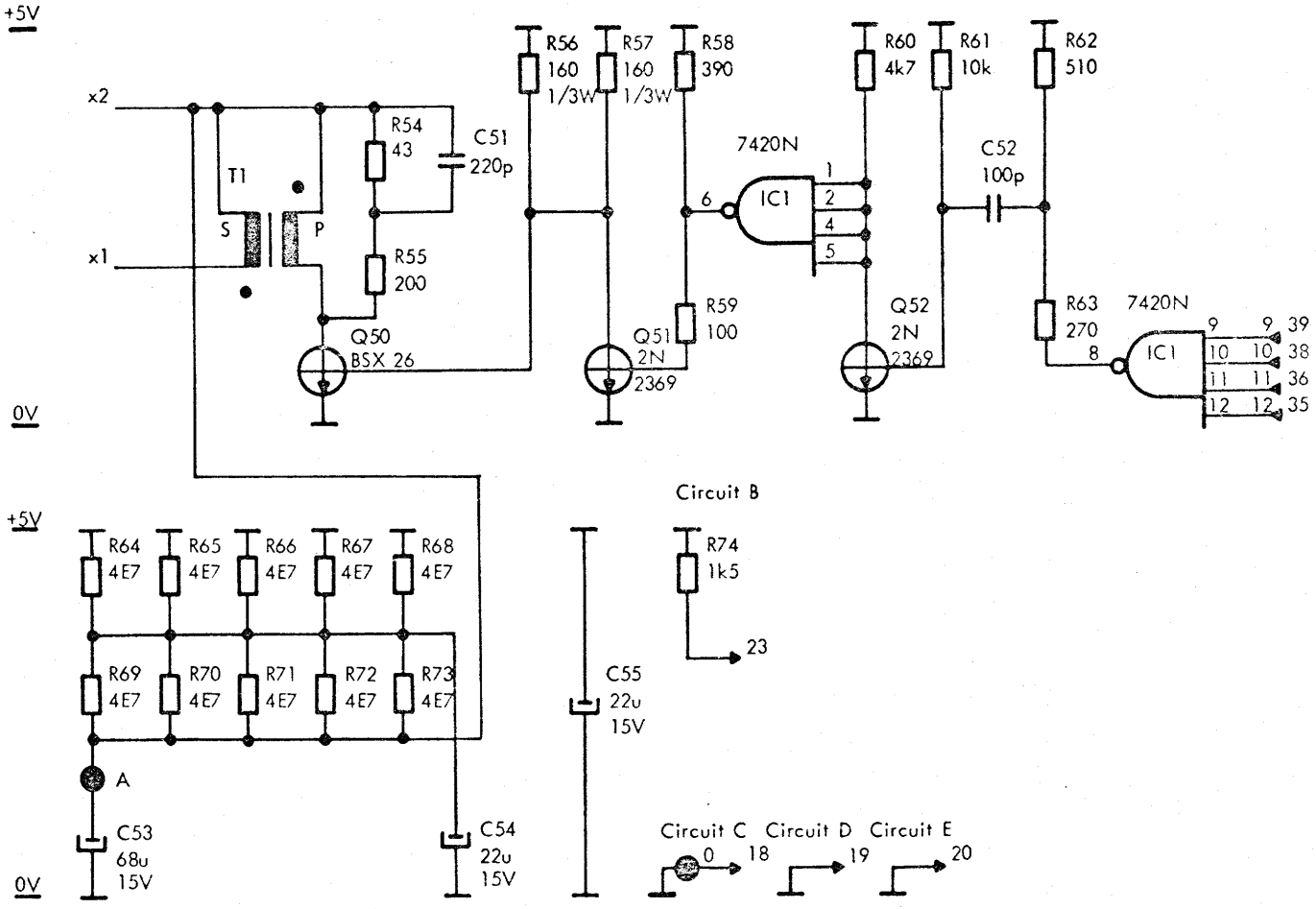
Diode	A	B	C	D	E	F	G	H	J	Tower
4	X	X			X	X	X		X	4
12										
20		X	X	X	X	X	X	X	X	
28		X		X		X	X	X	X	
36	X	X		X			X	X	X	
44				X	X		X	X		
52	X	X		X			X	X	X	
60				X	X		X	X		
5		X			X	X	X			5
13										
21					X	X	X	X		
29	X	X		X		X	X	X		
37			X	X			X	X		
45	X			X	X		X	X	X	
53			X	X			X	X		
61	X			X	X		X	X	X	
6										6
14										
22	X	X	X	X	X	X	X	X		
30	X			X		X	X	X	X	
38	X		X	X			X	X	X	
46										
54	X		X	X			X	X	X	
62										
7										7
15										
23				X		X	X	X		
31						X	X	X	X	
39		X	X	X			X	X	X	
47	X	X	X			X	X	X		
55		X	X	X			X	X	X	
63										

X = Through core

Diode	A	B	C	D	E	F	G	H	J	Tower
0										0
8										
16	X	X	X	X		X	X	X	X	
24	X	X			X	X	X	X		
32	X	X	X				X	X	X	
40		X		X	X		X	X	X	
48	X	X	X			X		X	X	
56		X		X	X	X		X	X	
1										1
9										
17		X	X	X		X	X	X		
25		X			X	X	X	X	X	
33				X			X	X	X	
41	X	X		X	X		X	X		
49				X		X		X	X	
57	X	X		X	X	X		X		
2	X		X		X	X	X		X	2
10										
18			X			X	X	X		
26	X		X	X	X	X	X	X	X	
34	X			X			X	X		
42			X	X	X		X	X	X	
50	X			X		X		X		
58			X	X	X	X		X	X	
3			X		X	X	X			3
11										
19	X				X	X	X	X	X	
27			X	X	X	X	X	X		
35		X		X			X	X		
43	X	X	X		X		X	X		
51		X		X		X		X		
59	X	X	X		X	X		X		

Diode	A	B	C	D	E	F	G	H	J	Tower
4	X	X			X	X	X		X	4
12										
20		X	X	X	X	X	X	X	X	
28		X		X		X	X	X	X	
36	X	X		X			X	X	X	
44				X	X		X	X		
52	X	X		X		X		X	X	
60				X	X	X		X		
5		X			X	X	X			5
13										
21					X	X	X	X		
29	X	X		X		X	X	X		
37			X	X			X	X		
45	X			X	X		X	X	X	
53			X	X		X		X		
61	X			X	X	X		X	X	
6										6
14										
22	X	X	X	X	X	X	X	X		
30	X			X		X	X	X	X	
38	X		X	X			X	X	X	
46										
54	X		X	X		X		X	X	
62										
7										7
15										
23				X		X	X	X		
31						X	X	X	X	
39		X	X	X			X	X	X	
47	X	X	X			X	X	X		
55		X	X	X		X		X	X	
63										


Circuit A
R1
7k5
D1
BAY71
Q2
BSX29
D2
BAY71
R50
100
1/3W
R51
120
1/3W
R53
2k
B
D50
BAY
71
D51
BAY
71
D52
BZY 88
C6V8
x2
x1
R52
1k
D53
BZY88
C3V3
C50
3u3
C56
3u3
D3
BAY
71
R2
100
R3
560
Q1
2N
2369
C1
10p
R4
1k
0V
7400N
IC2
IC3
24
20
27
19
26
18
25
17
28
16
31
15
30
14
29
13
1
9
2
10
3
11
4
12
5
13
6
14
7
15
8
16



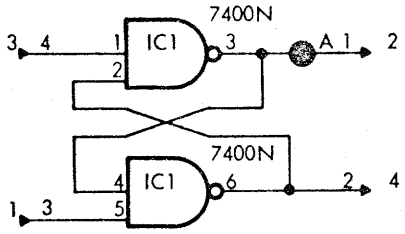
POWER REQUIREMENTS		
+5V	PIN 22	250mA
0V	PIN 21	
POWER DISSIPATION 1250mW		

T1: Miniwat
4322-020-36660

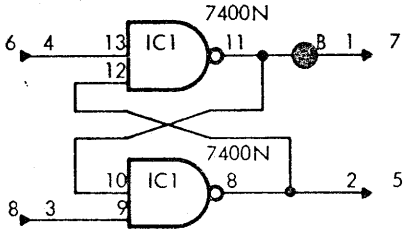
P : 10 wdg ϕ 0,28 mm

S : 30 wdg ϕ 0,20 mm

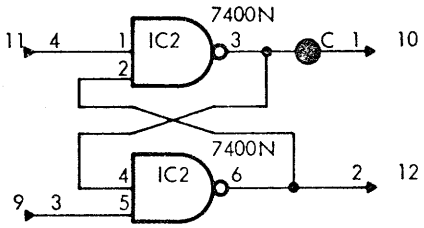
Circuit A
BA403



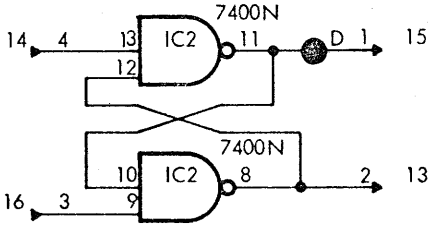
Circuit B
BA403



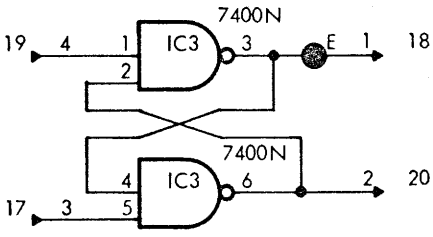
Circuit C
BA403



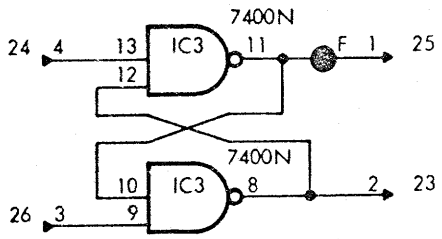
Circuit D
BA403



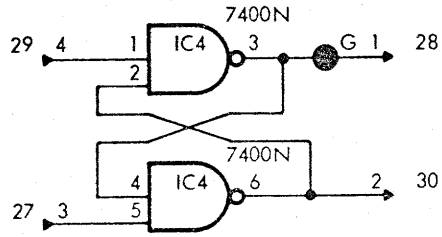
Circuit E
BA403



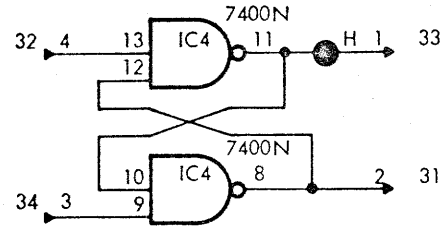
Circuit F
BA403



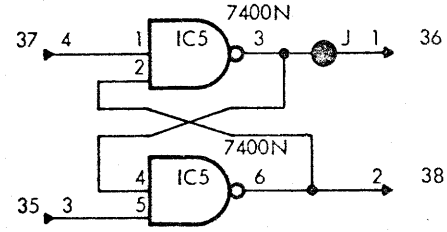
Circuit G
BA403



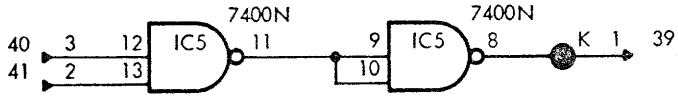
Circuit H
BA403

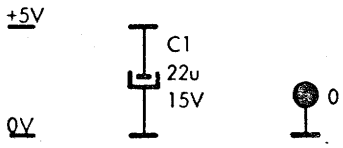


Circuit J
BA403

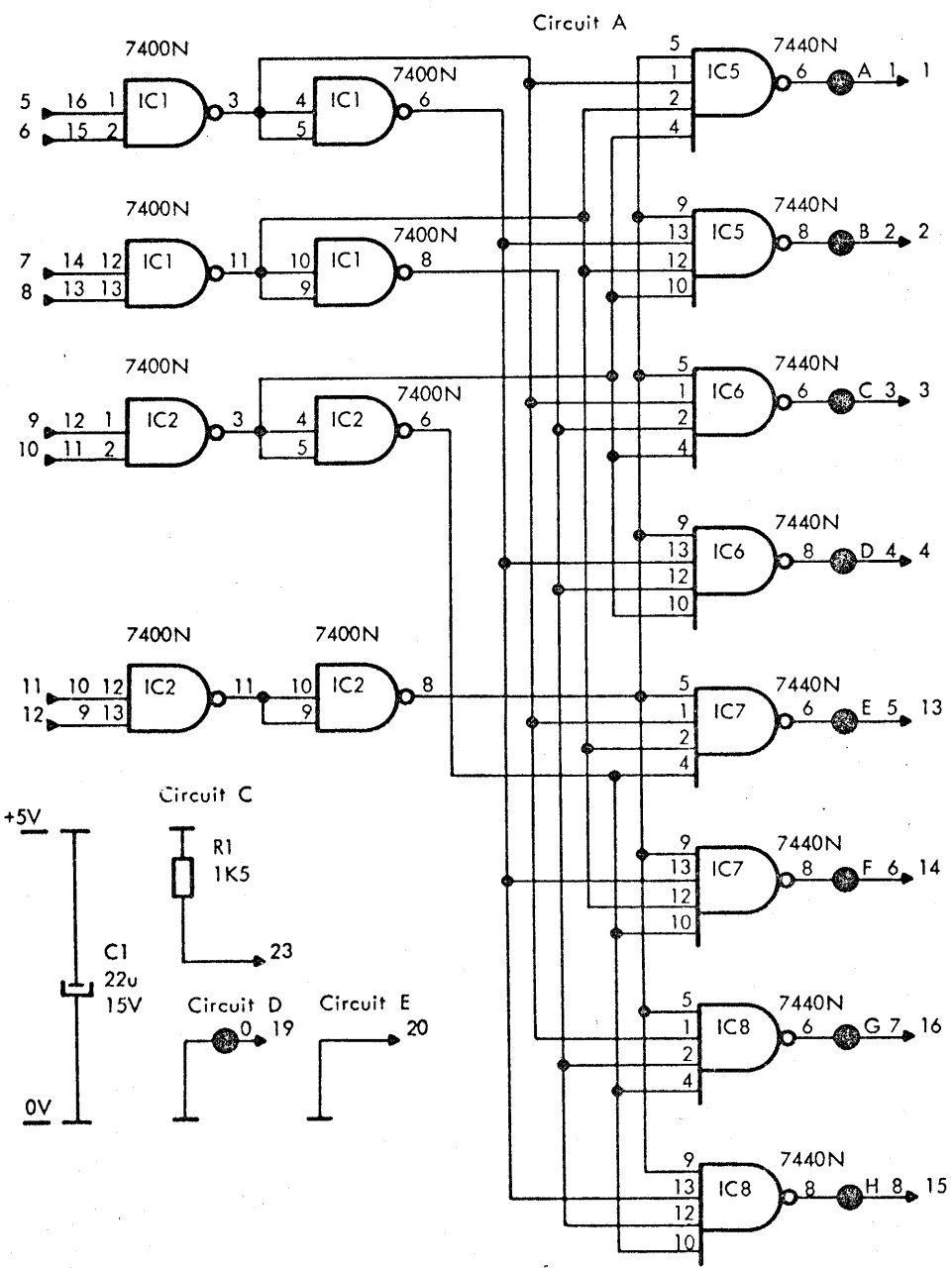


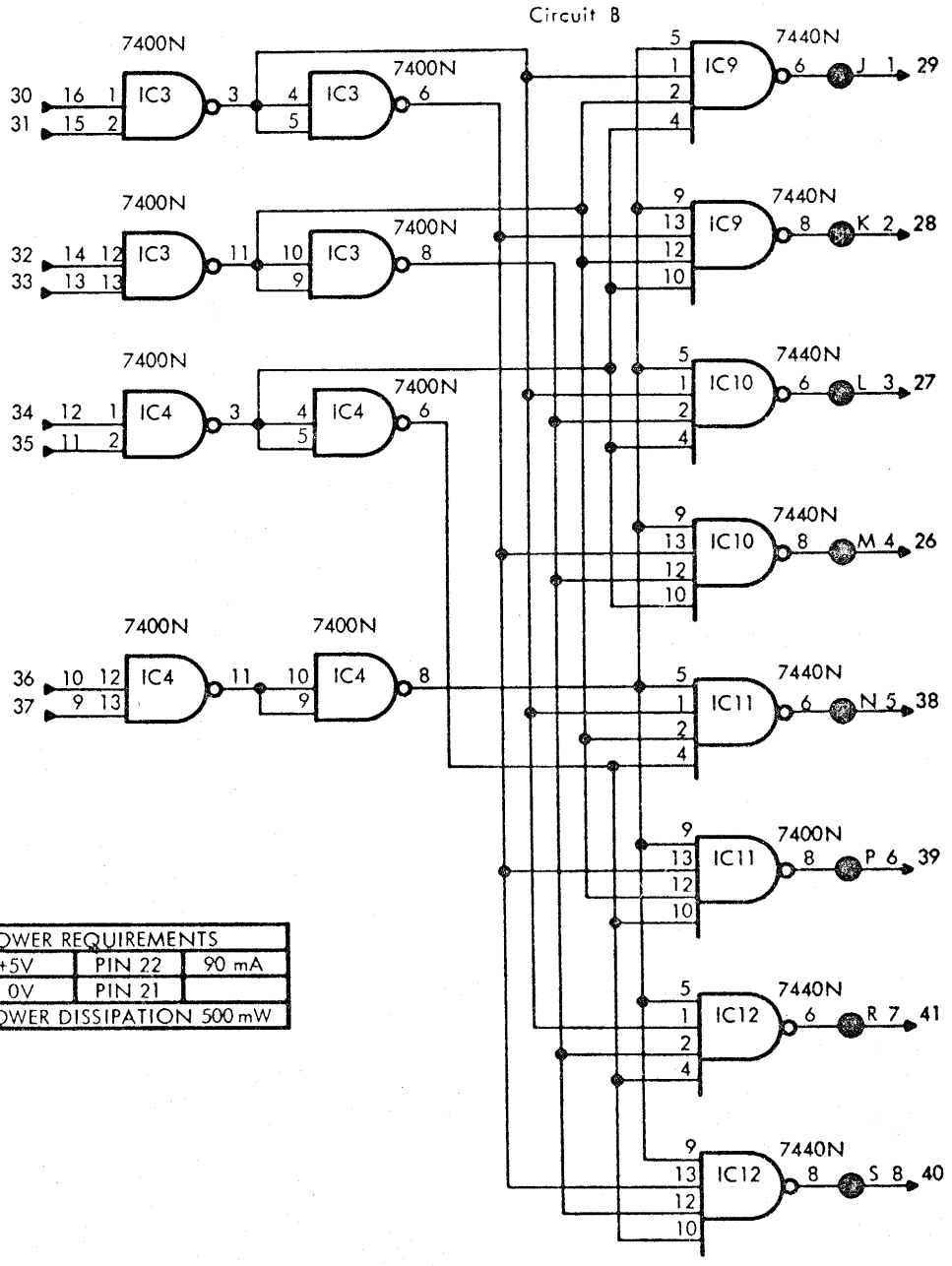
Circuit K
AA405



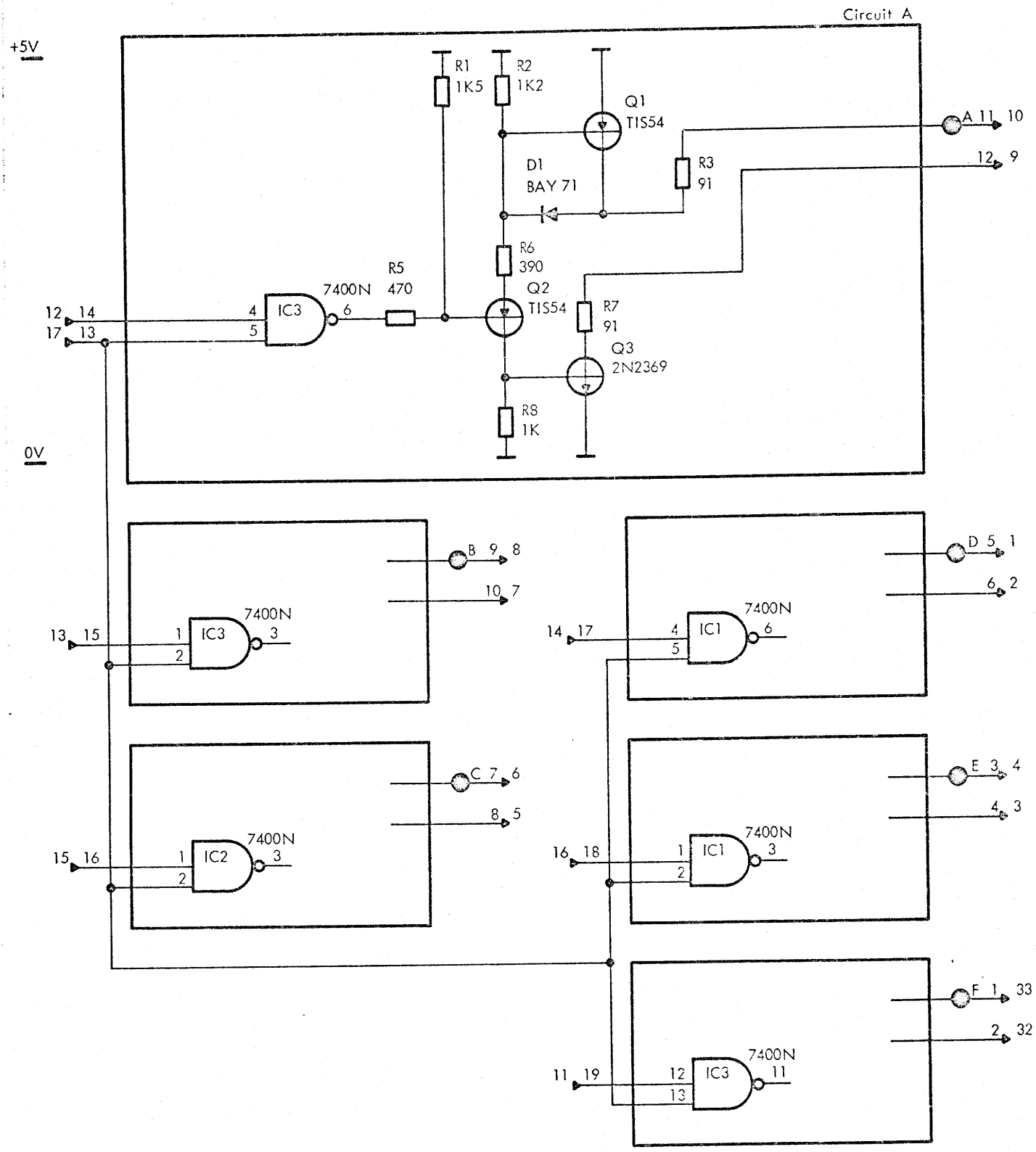


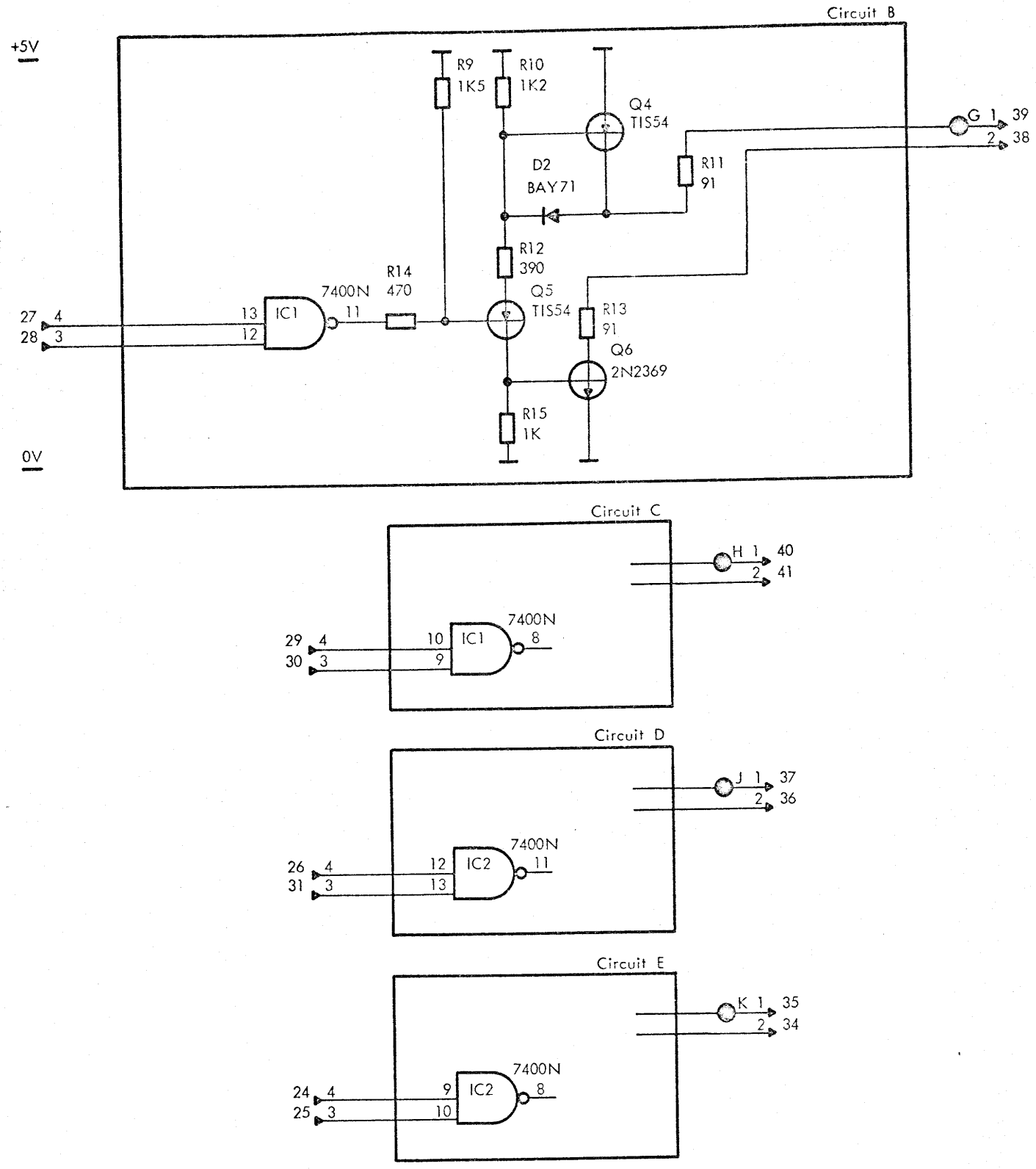
POWER REQUIREMENTS		
+5 V	PIN 22	44mA
0 V	PIN 21	
POWER DISSIPATION 235mW		



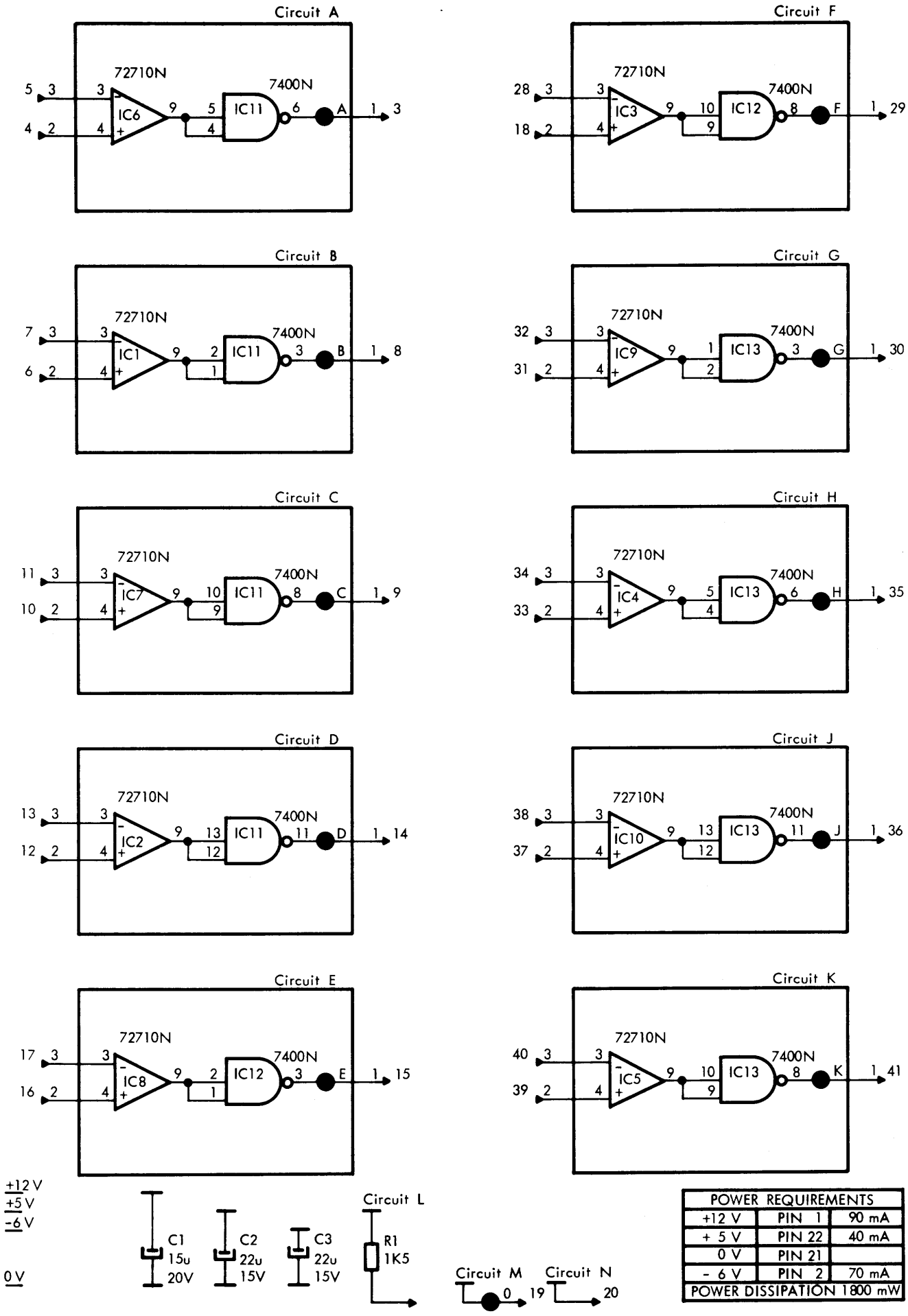


POWER REQUIREMENTS		
+5V	PIN 22	90 mA
0V	PIN 21	
POWER DISSIPATION 500 mW		

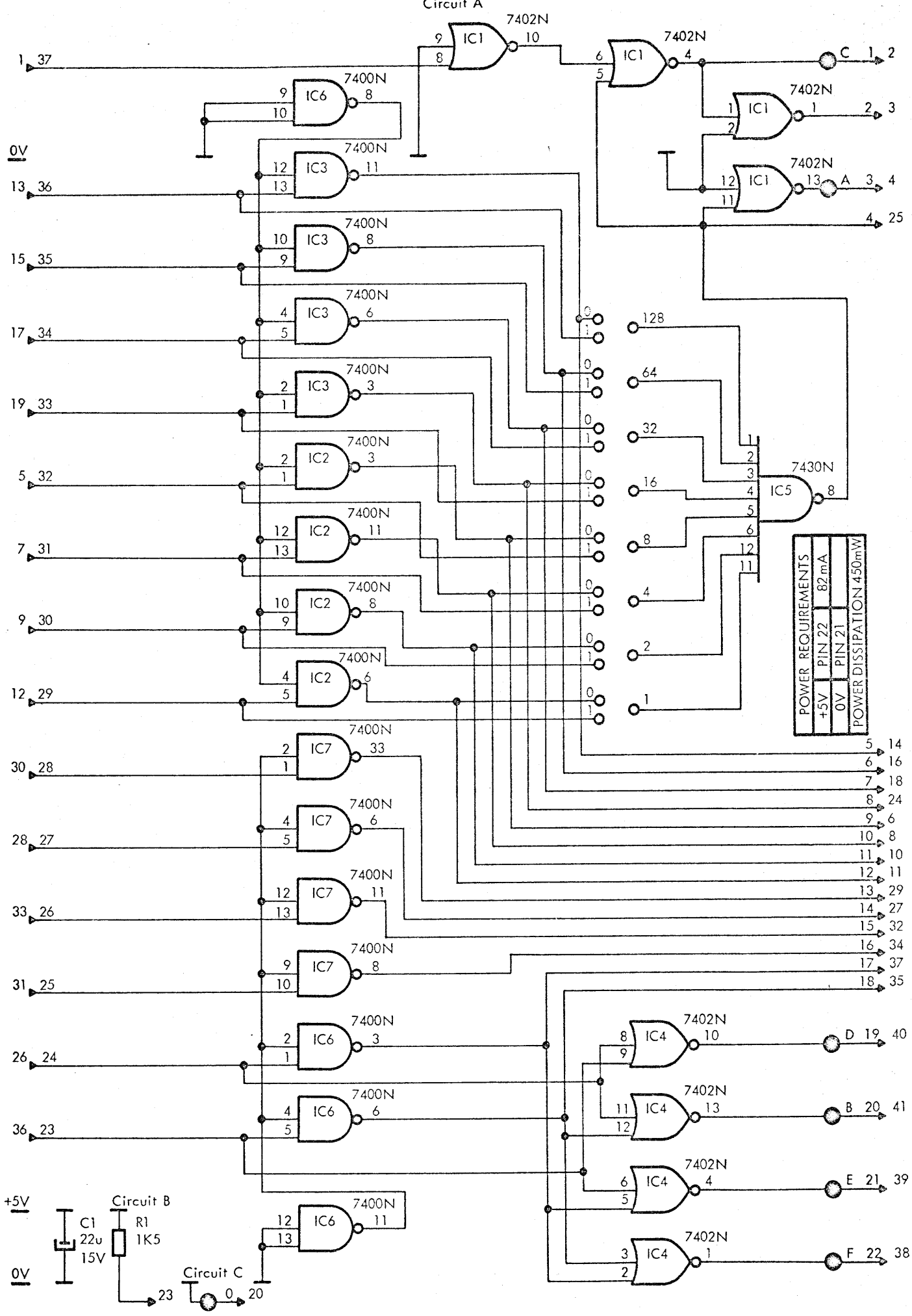

Circuit A
+5V
0V
R1
1K5
R2
1K2
Q1
TIS54
D1
BAY 71
R3
91
R6
390
R5
470
7400N
IC3
Q2
TIS54
R7
91
Q3
2N2369
R8
1K
A 11 10
12 9
12 14
17 13
4
5
6
B 9 8
10 7
13 15
1
2
3
D 5 1
6 2
14 17
IC1
C 7 6
8 5
15 16
IC2
E 3 4
4 3
16 18
F 1 33
2 32
11 19
12
13
11



POWER REQUIREMENTS		
+5V	PIN 22	269 mA
0V	PIN 21	
POWER DISSIPATION 1420 mW		



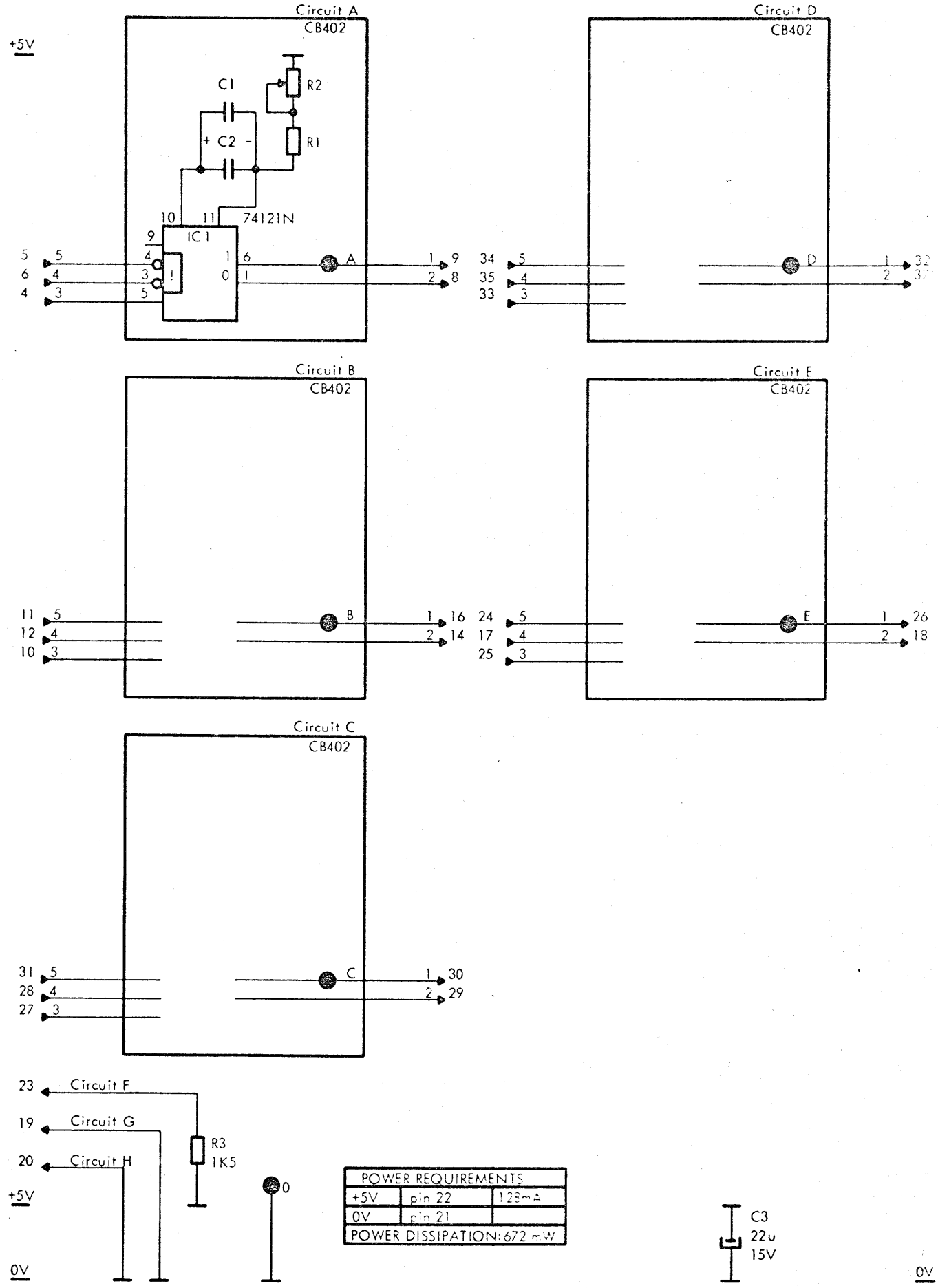
POWER REQUIREMENTS		
+12 V	PIN 1	90 mA
+ 5 V	PIN 22	40 mA
0 V	PIN 21	
- 6 V	PIN 2	70 mA
POWER DISSIPATION 1800 mW		



RCLM400 1AJ408 RC0901-1

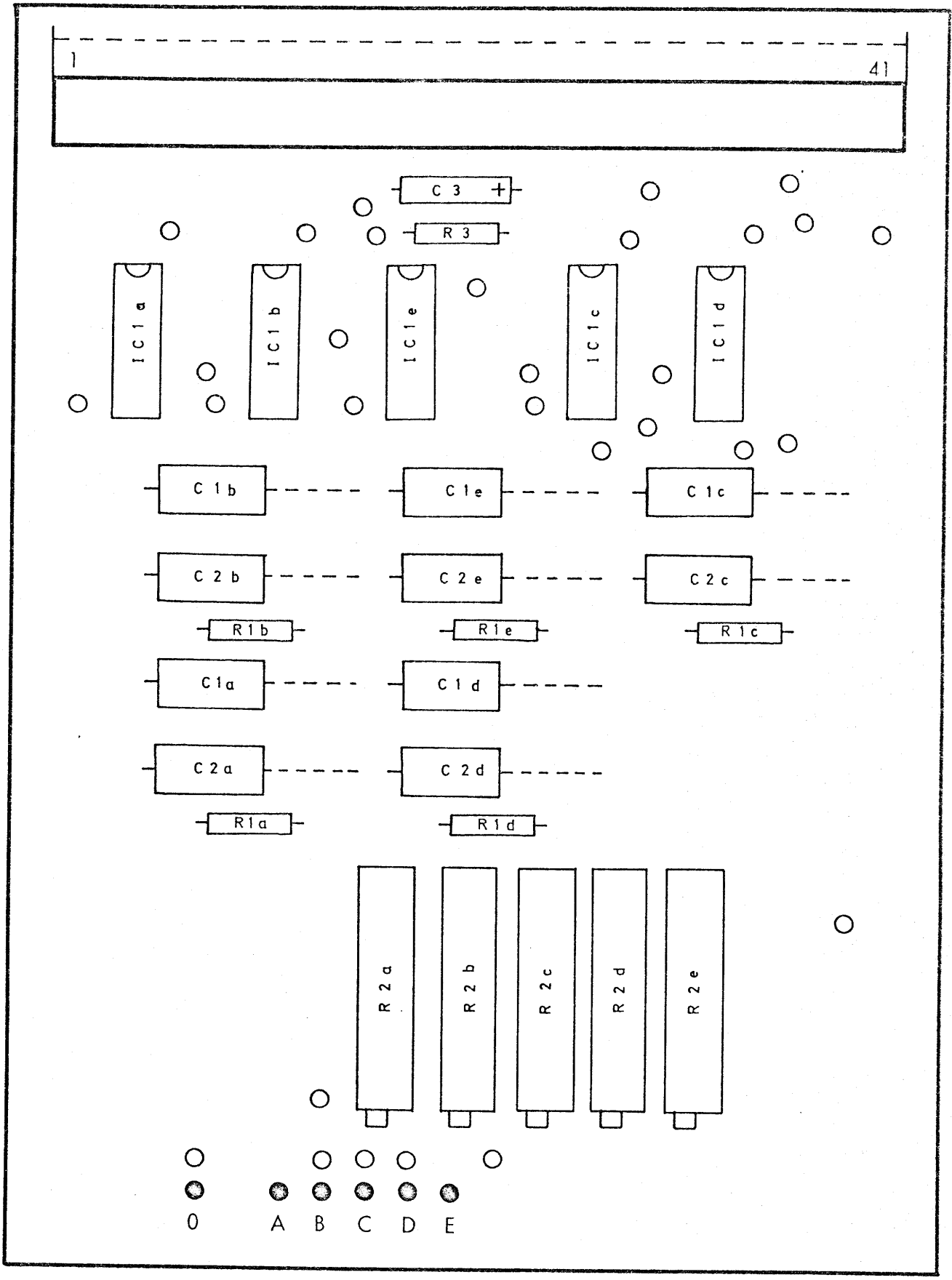
V10927 PCBA Circuit Diagram

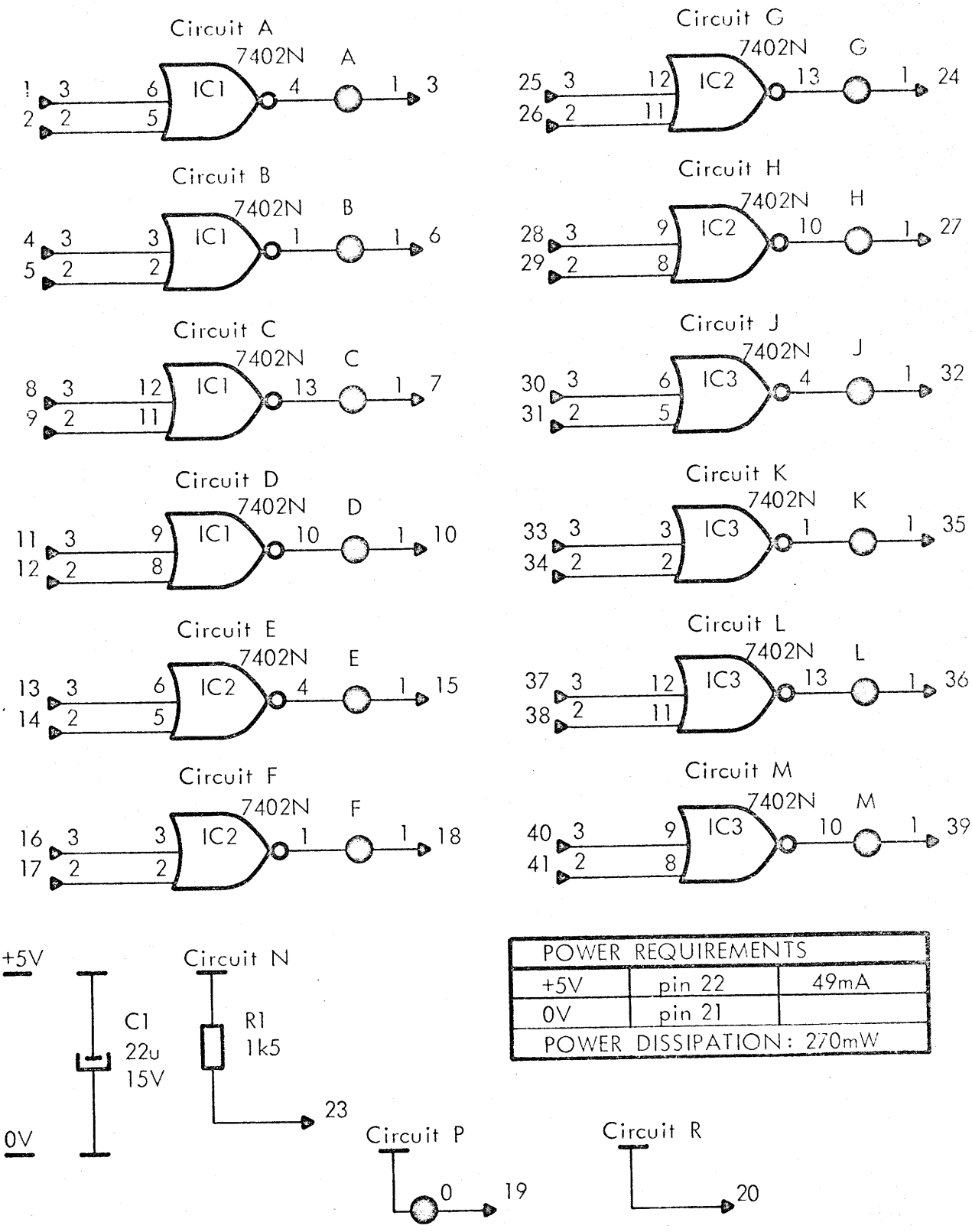
DEVICE NUMBER = 14


Circuit A
CB402
+5V
C1
R2
+ C2 -
R1
10
11
74121N
9
IC1
5
6
4
4
3
5
1
0
6
1
A
1
2
9
8
Circuit D
CB402
34
35
33
D
1
2
32
37
Circuit B
CB402
11
12
10
B
1
2
16
14
Circuit E
CB402
24
17
25
E
1
2
26
18
Circuit C
CB402
31
28
27
C
1
2
30
29
23
Circuit F
19
Circuit G
20
Circuit H
R3
1K5
+5V
0V
0
POWER REQUIREMENTS
+5V
pin 22
128mA
0V
pin 21
POWER DISSIPATION: 672 mW
C3
22u
15V
0V

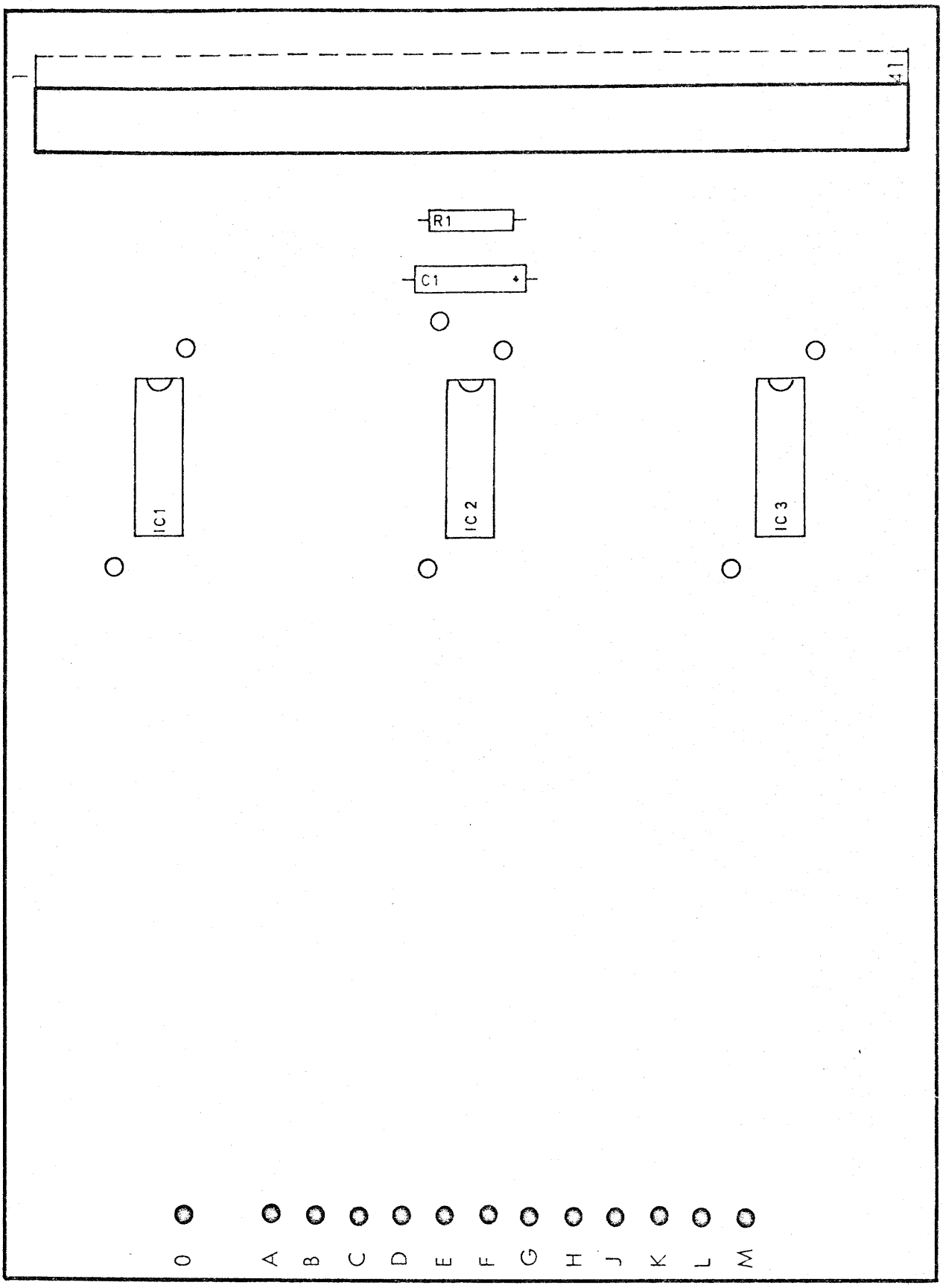
CIRCUIT	R1	R2	C1	C2	CHARACTERISTICS
A	3K6	10K	68p	*	200ns - 600ns
B	8K2	10K	100p	*	0,6us- 1,2us
C	2K	20K	33n	*	50us - 450us
D	6K2	5K	33p	*	150ns - 250ns
E	10K	10K	150p	*	1us - 2us

* Not mounted


1
41
C 3 +
R 3
IC1a
IC1b
IC1e
IC1c
IC1d
C1b
C1e
C1c
C2b
C2e
C2c
R1b
R1e
R1c
C1a
C1d
C2a
C2d
R1a
R1d
R2a
R2b
R2c
R2d
R2e
0
A
B
C
D
E



POWER REQUIREMENTS		
+5V	pin 22	49mA
0V	pin 21	
POWER DISSIPATION: 270mW		



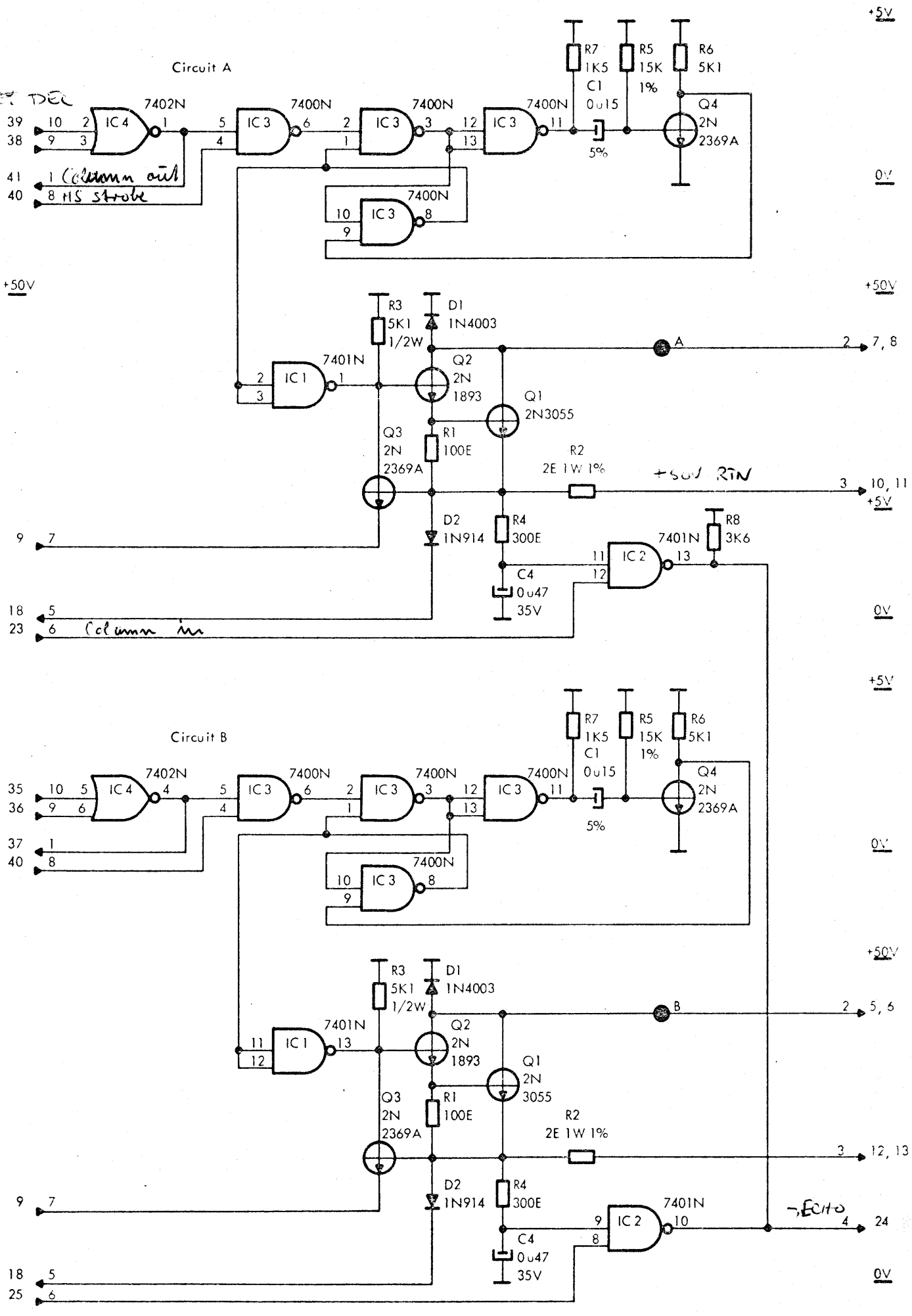
RCLM400

12 AD401

RC3032-1

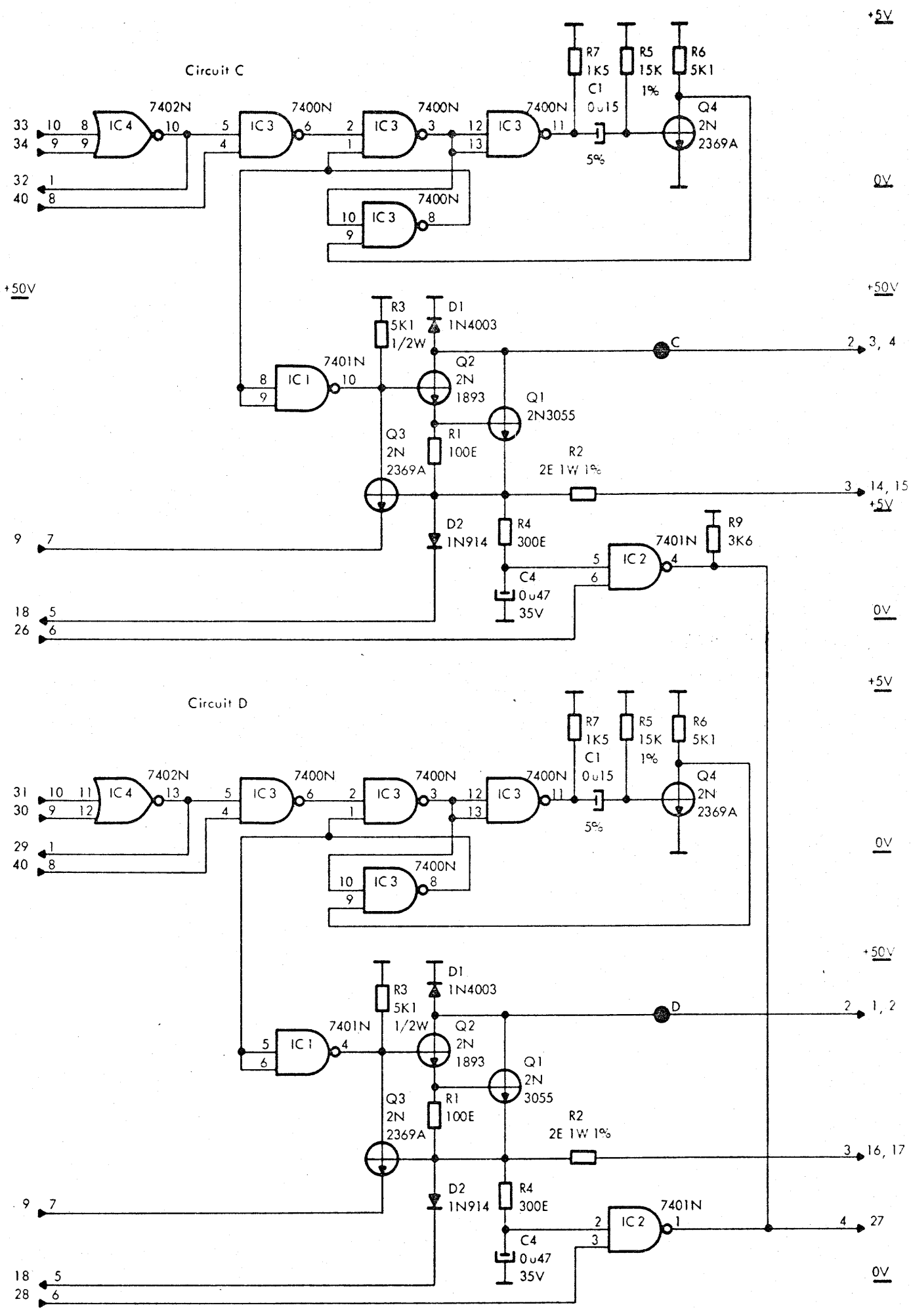
A20326

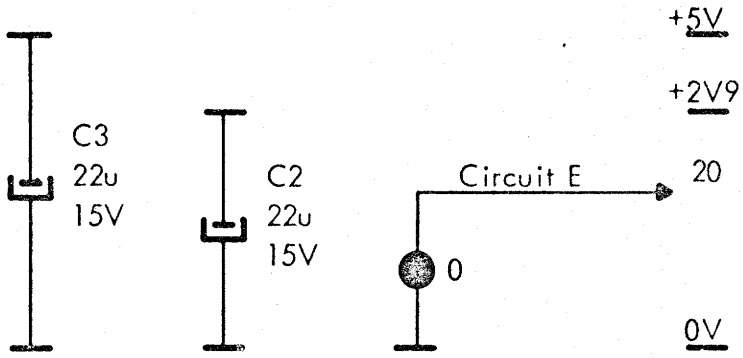
PCB Assembly Drawing



RCLM400 4 DD450 RC3036-1
P 1 of 3

A10517 PCBA Circuit Diagram


Circuit C
+5V
0V
+50V
7402N
7400N
IC4
IC3
IC1
IC2
R7 1K5
R5 15K 1%
R6 5K1
C1 0u15 5%
Q4 2N 2369A
R3 5K1 1/2W
D1 1N4003
7401N
Q2 2N 1893
Q1 2N3055
Q3 2N 2369A
R1 100E
R2 2E 1W 1%
D2 1N914
R4 300E
C4 0u47 35V
R9 3K6
C
D
Circuit D
33
34
32
40
31
30
29
18
26
28
9
7
2
3, 4
14, 15
16, 17
1, 2
27



POWER REQUIREMENTS		
+50V	Pin 19	40 mA
+5V	Pin 22	94 mA
+2V9	Pin 9 *	
0V	Pin 21	
POWER DISSIPATION :		

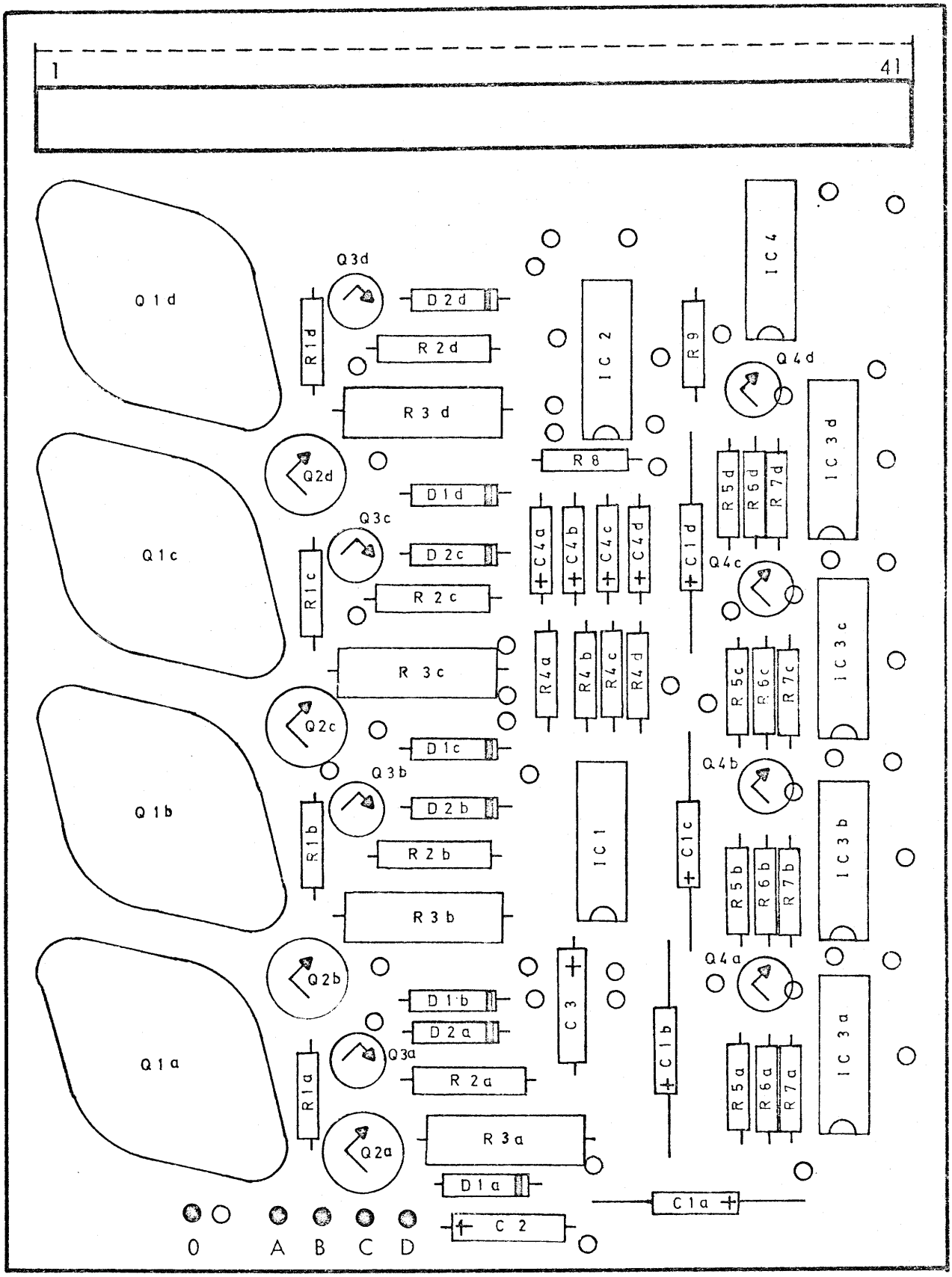
* This voltage is HAMMER CURRENT REF voltage

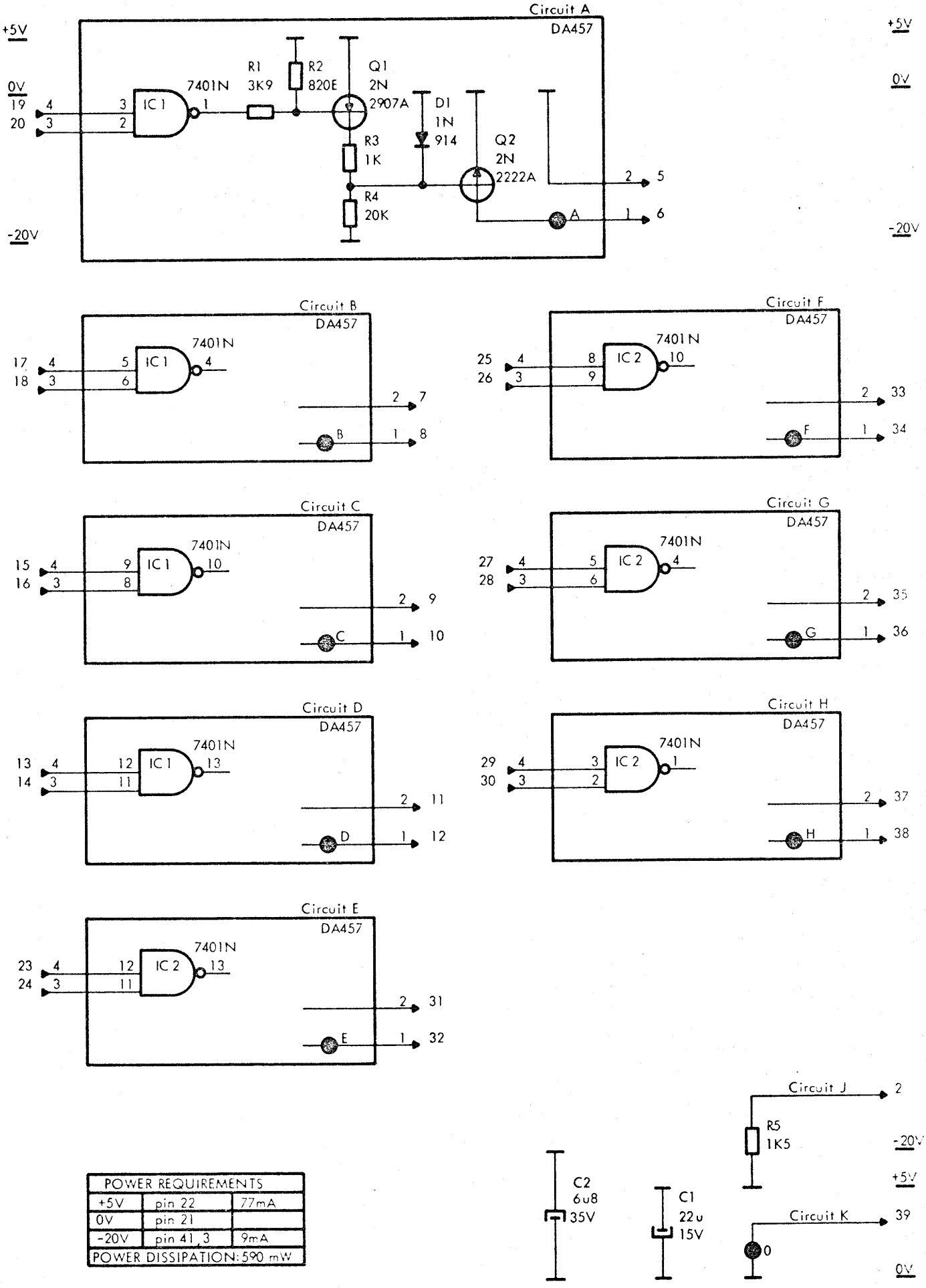
POWER DISSIPATION :

+5V POWER	517 mW	
+50V POWER	2200 mW	
	2717 mW	2717 mW

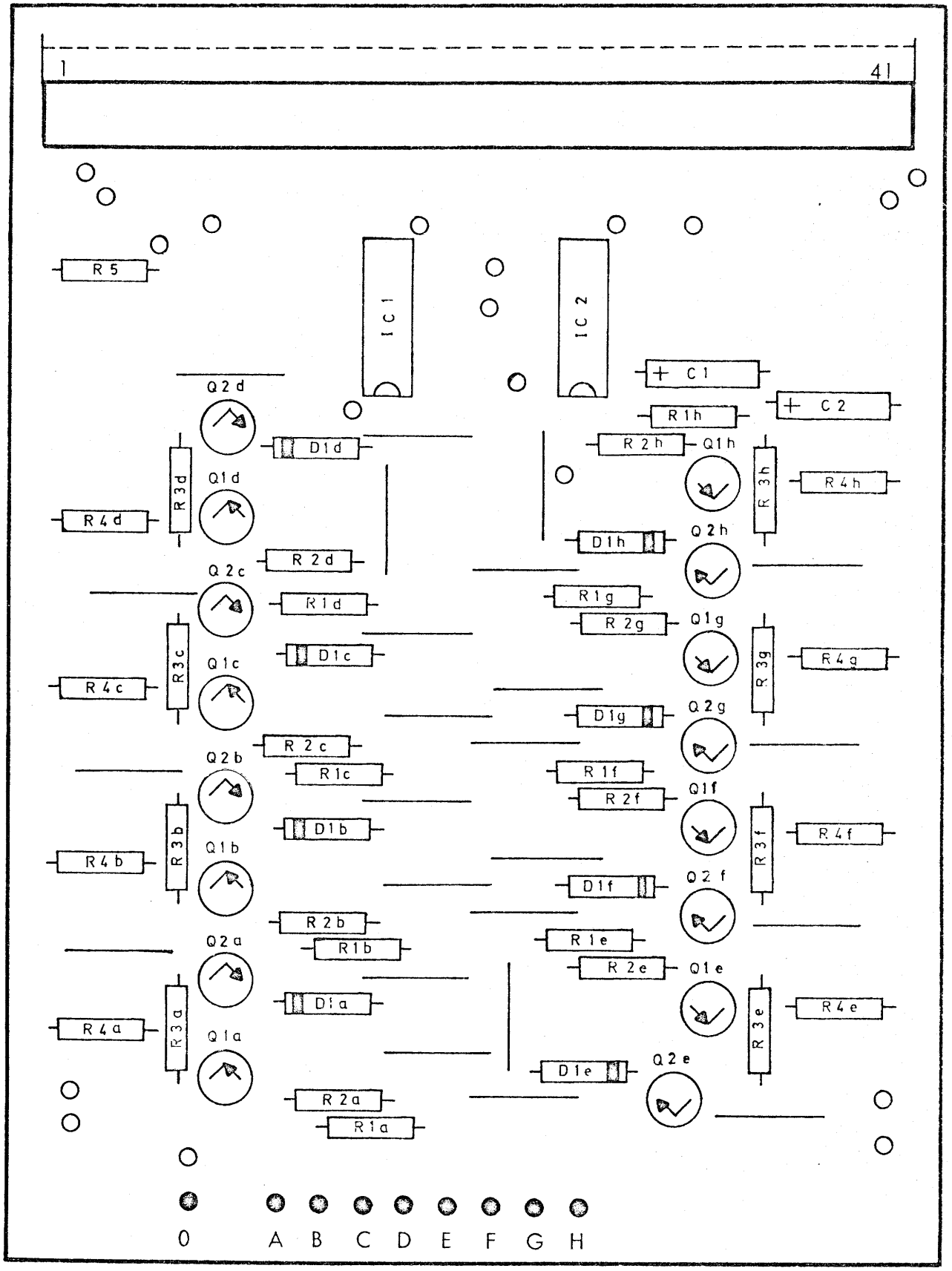
POWER DISSIPATION in

R2a,b,c,d with all hammers fired at 2000 printings/ min	1730 mW
TOTAL	4447 mW


1
41
Q1d
Q1c
Q1b
Q1a
Q3d
Q2d
Q3c
Q2c
Q3b
Q2b
Q3a
Q2a
D2d
R2d
R3d
D1d
D2c
R2c
R3c
D1c
D2b
R2b
R3b
D1b
D2a
R2a
R3a
D1a
R1d
R1c
R1b
R1a
IC2
IC1
C3
C2
R8
R9
IC4
Q4d
Q4c
Q4b
Q4a
IC3d
IC3c
IC3b
IC3a
R5d
R6d
R7d
R5c
R6c
R7c
R5b
R6b
R7b
R5a
R6a
R7a
C4a
C4b
C4c
C4d
R4a
R4b
R4c
R4d
C1d
C1c
C1b
C1a
0
A
B
C
D



POWER REQUIREMENTS		
+5V	pin 22	77mA
0V	pin 21	
-20V	pin 41, 3	9mA
POWER DISSIPATION: 590 mW		



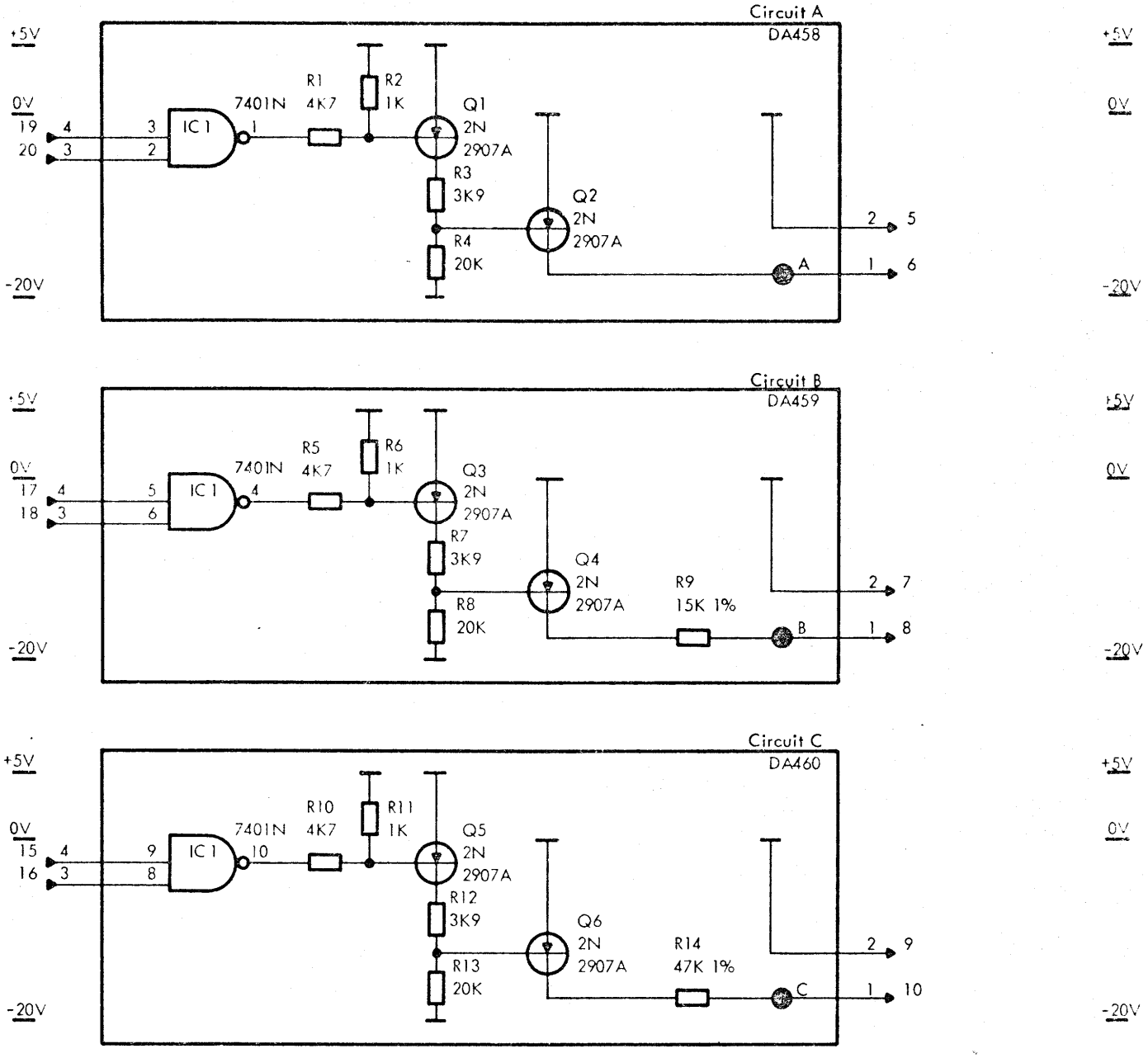
RCLM400

8 DA457

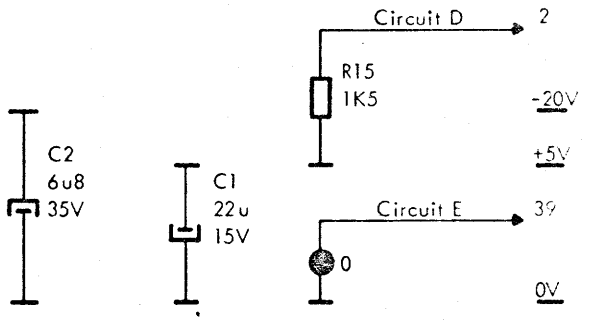
RC3037-3

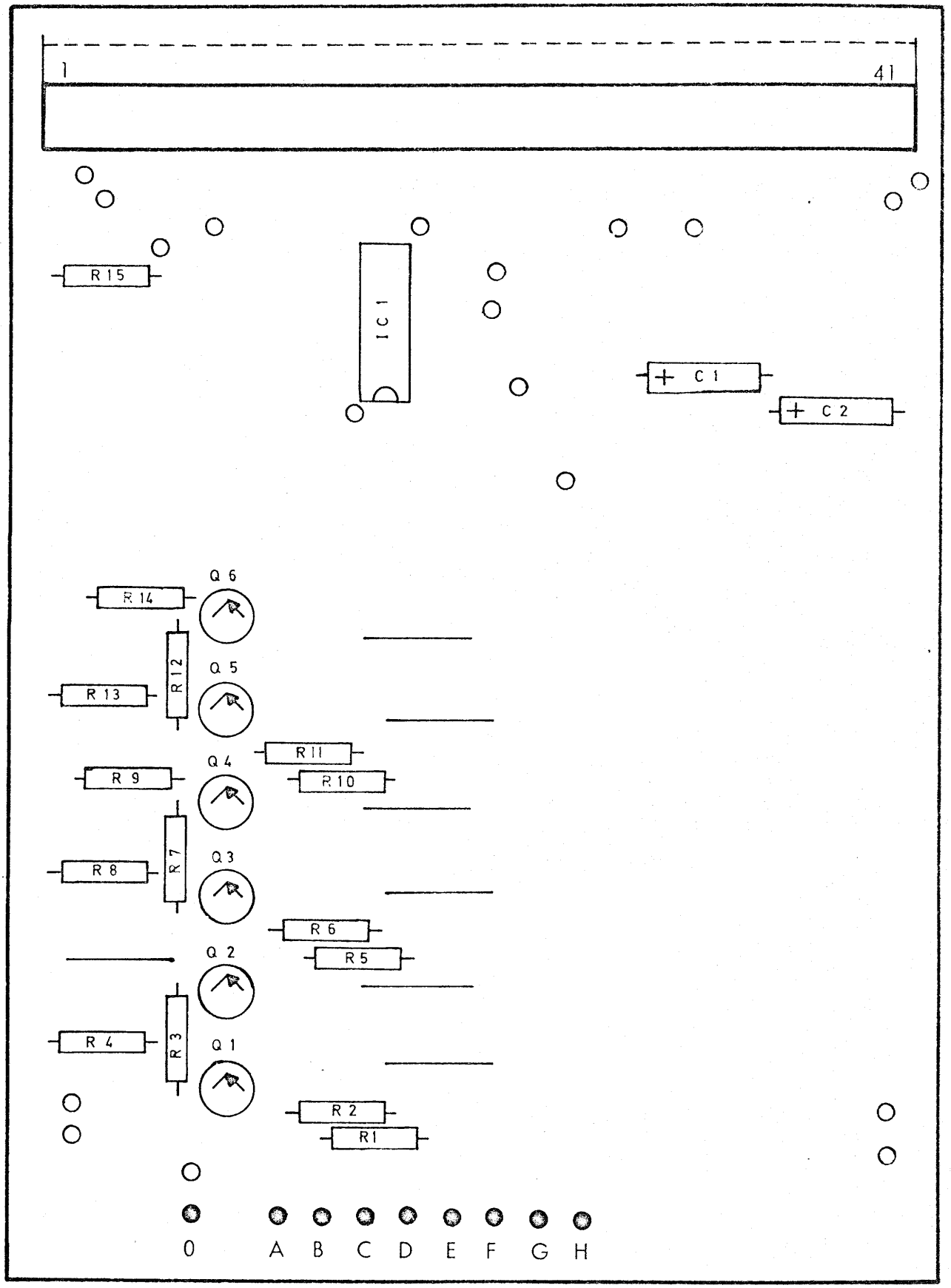
A20524

PCB Assembly Drawing

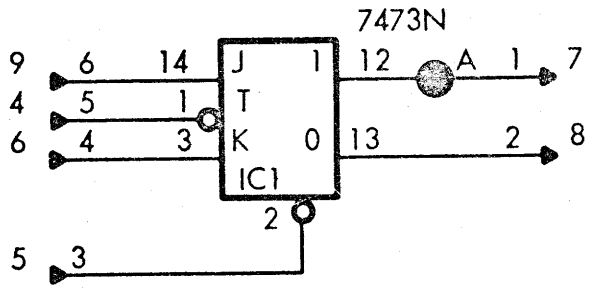


POWER REQUIREMENTS		
+5V	pin 22	20 mA
0V	pin 21	
-20V	pin 41, 3	3mA
POWER DISSIPATION: 165 mW		

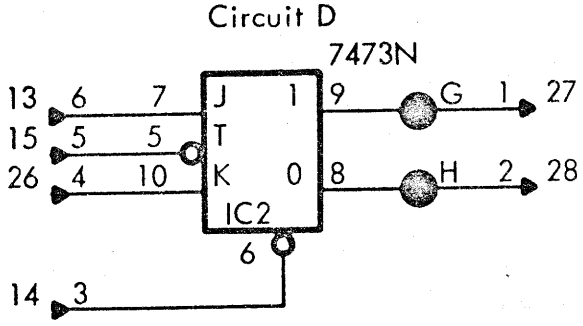



1
41
R 15
IC 1
C 1
C 2
Q 6
R 14
R 12
Q 5
R 13
R 11
R 10
Q 4
R 9
R 7
Q 3
R 8
R 6
R 5
Q 2
R 3
R 4
Q 1
R 2
R 1
0
A
B
C
D
E
F
G
H

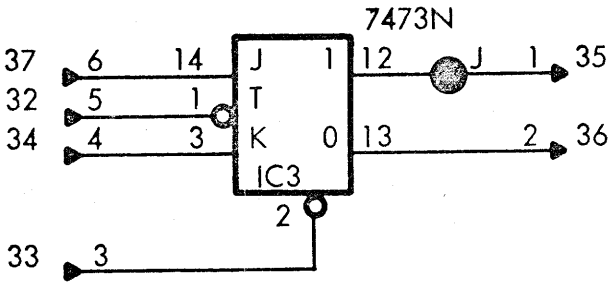
Circuit A



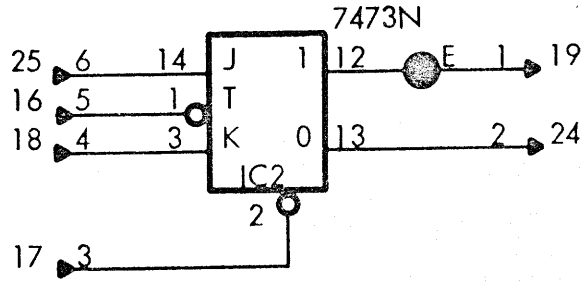
Circuit D



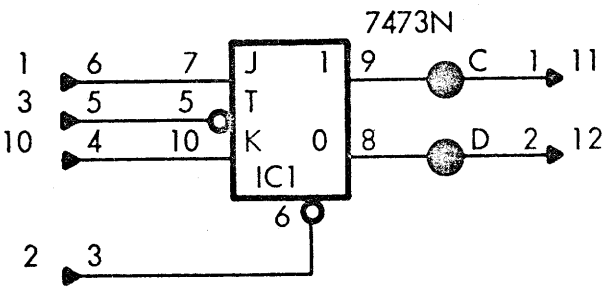
Circuit B



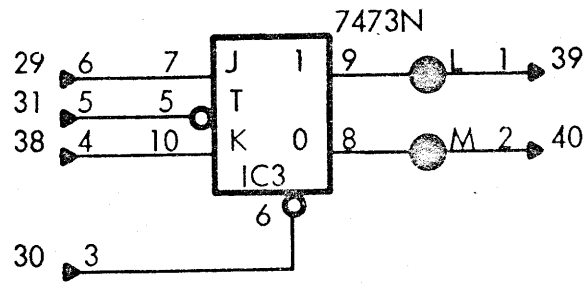
Circuit E



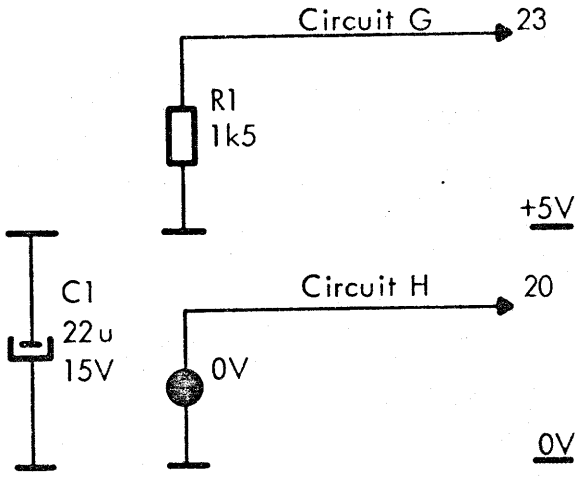
Circuit C



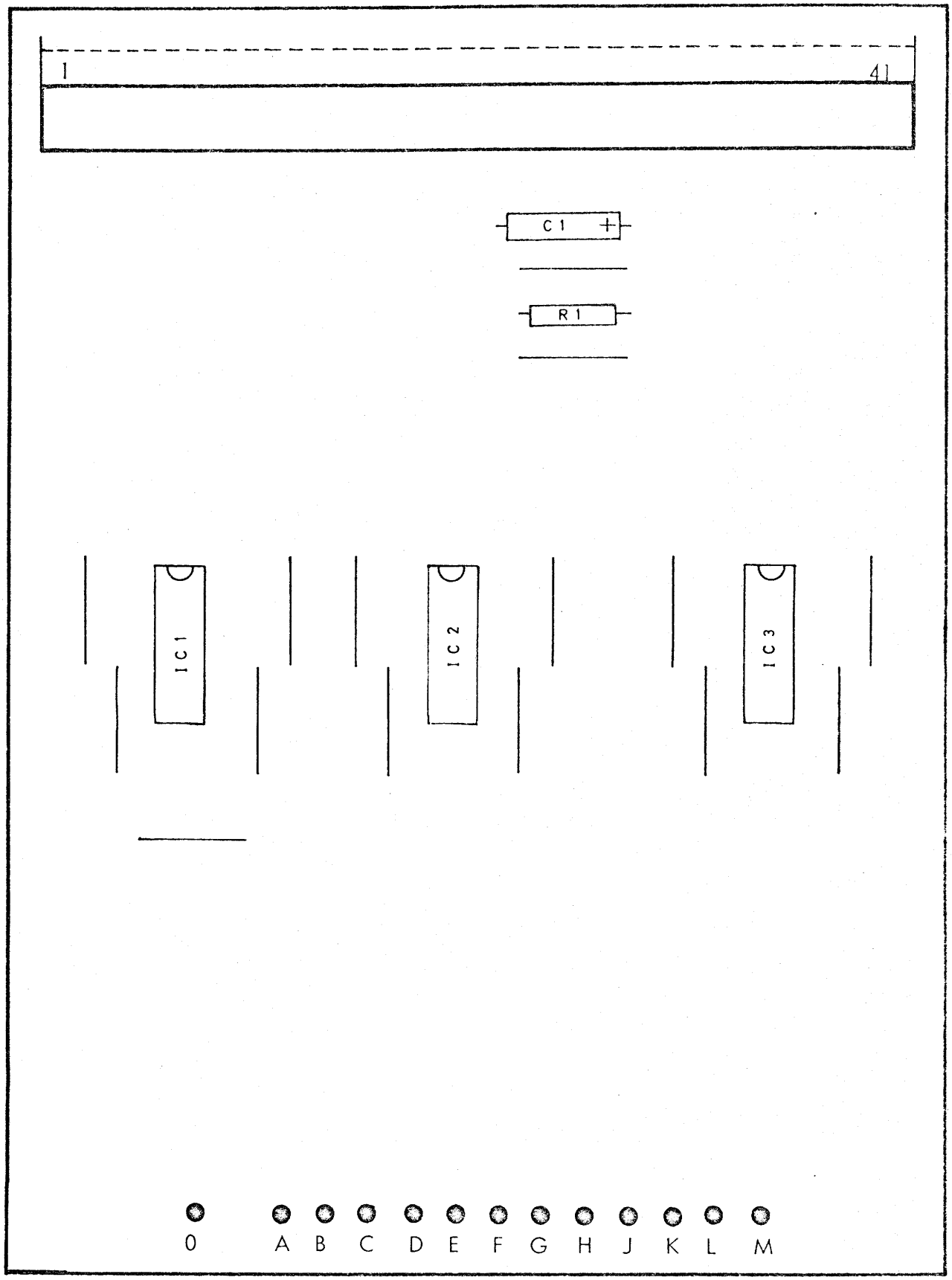
Circuit F



Circuit G



POWER REQUIREMENTS		
+5V	pin 22	53 mA
0V	pin 21	
POWER DISSIPATION: 292 mW		



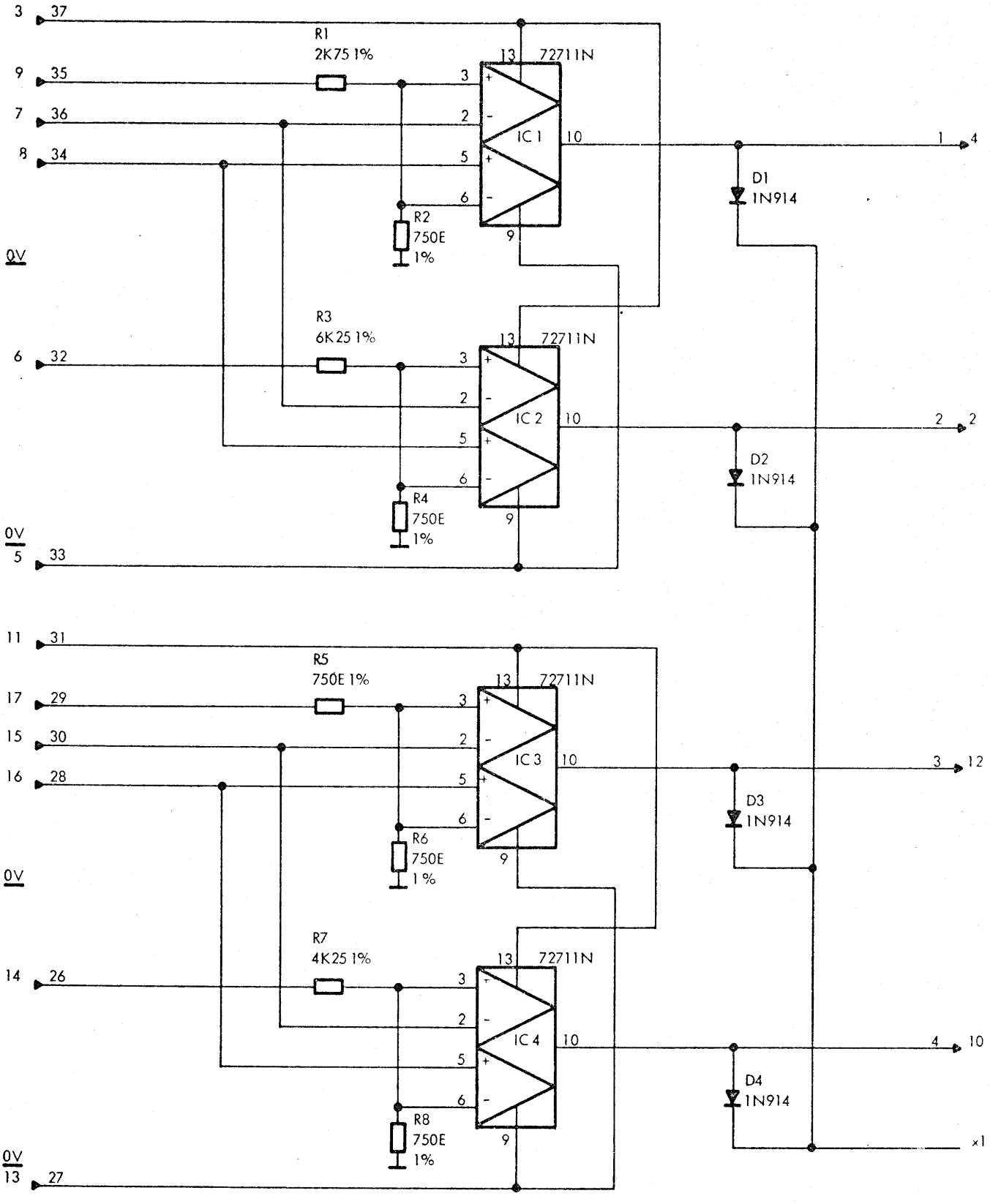
RCLM400

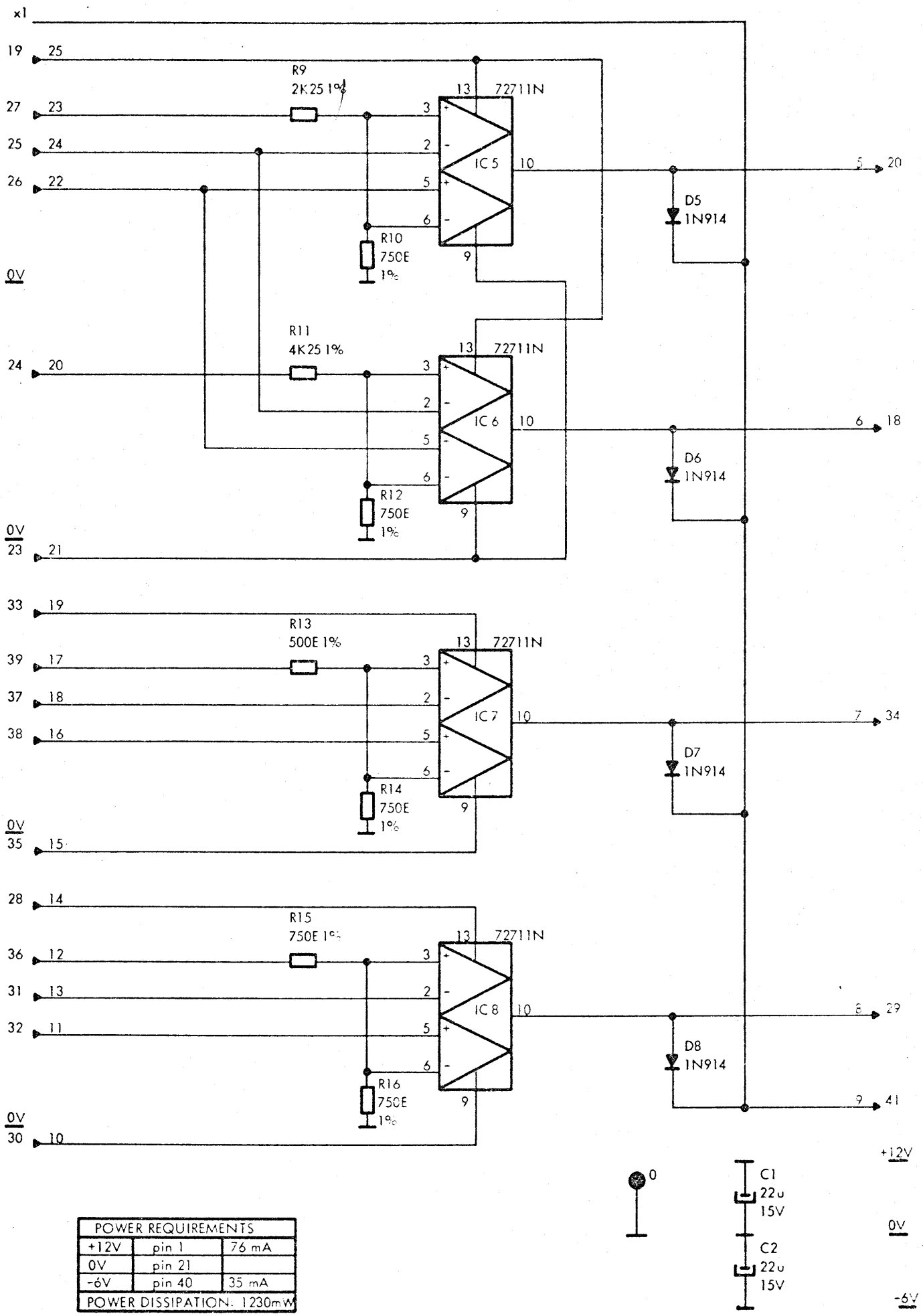
6 BB450

RC3043-2

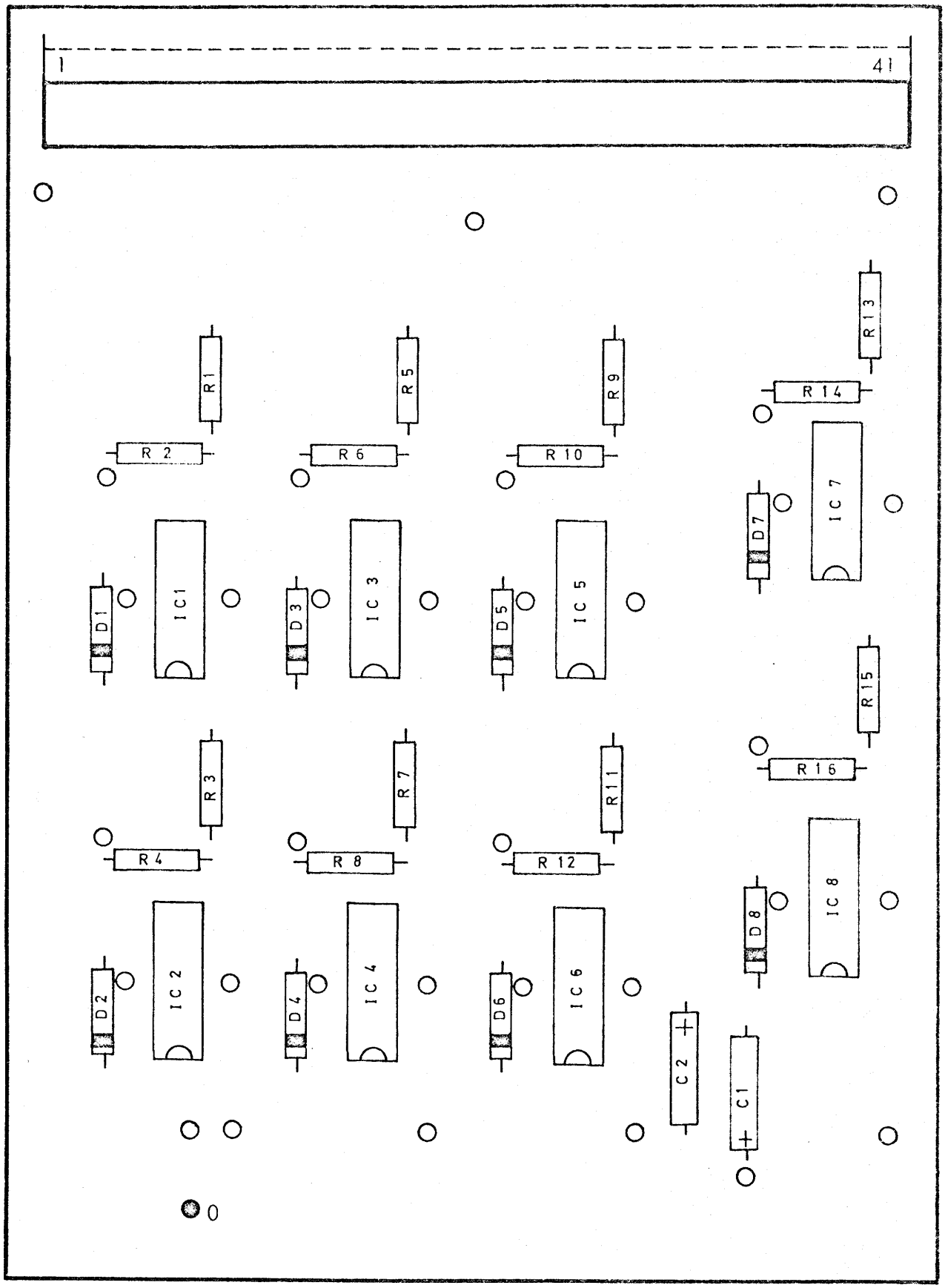
A20514

PCB Assembly Drawing


3
37
R1
2K75 1%
13
72711N
9
35
3
7
36
2
IC 1
8
34
5
10
6
1
4
R2
750E
1%
D1
1N914
9
0V
R3
6K25 1%
13
72711N
6
32
3
2
IC 2
10
2
2
5
6
R4
750E
1%
D2
1N914
9
0V
5
33
11
31
R5
750E 1%
13
72711N
17
29
3
15
30
2
IC 3
10
3
12
16
28
5
6
R6
750E
1%
D3
1N914
9
0V
R7
4K25 1%
13
72711N
14
26
3
2
IC 4
10
4
10
5
6
R8
750E
1%
D4
1N914
9
x1
0V
13
27



POWER REQUIREMENTS		
+12V	pin 1	76 mA
0V	pin 21	
-6V	pin 40	35 mA
POWER DISSIPATION: 1230mW		

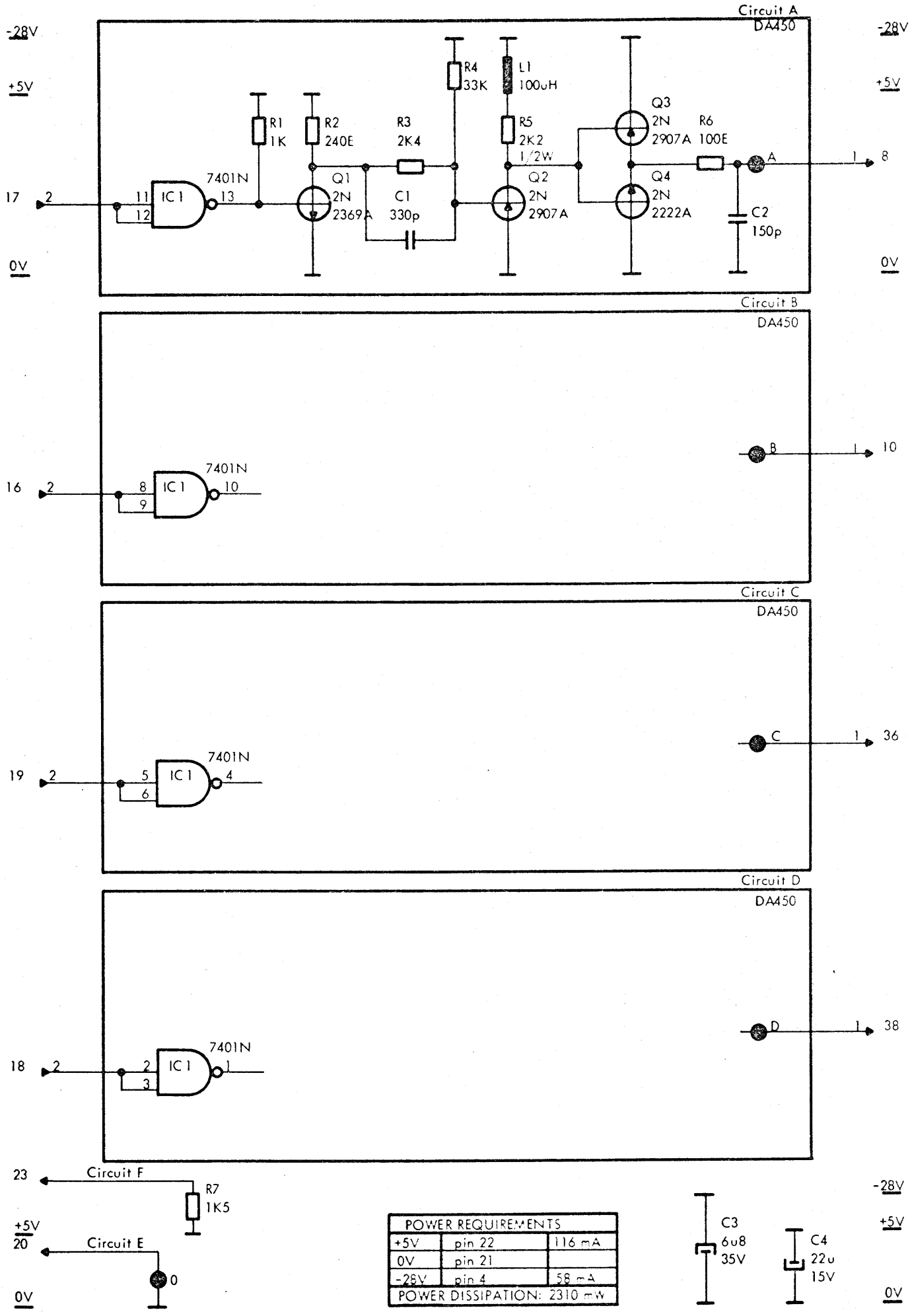


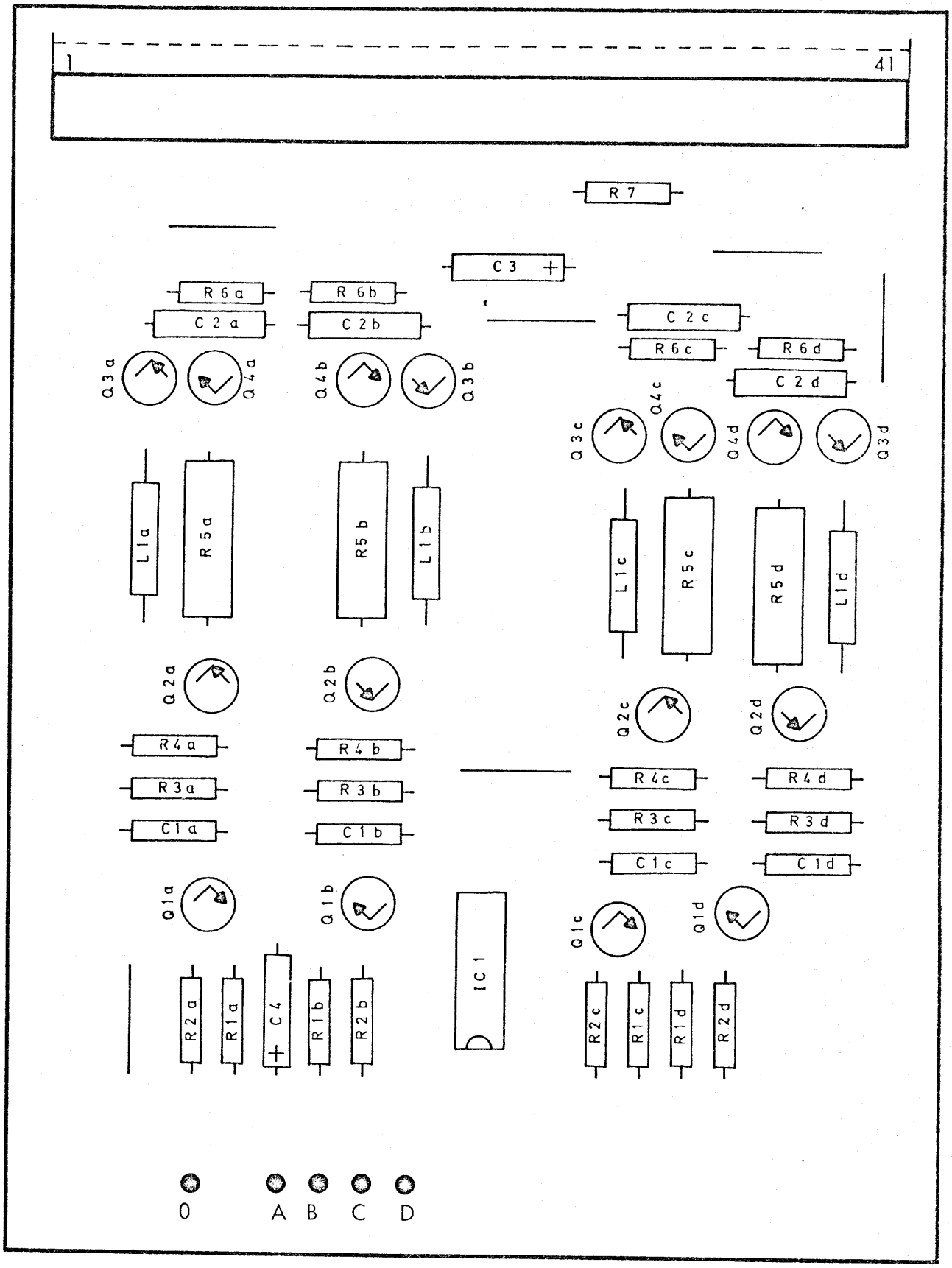
RCLM400

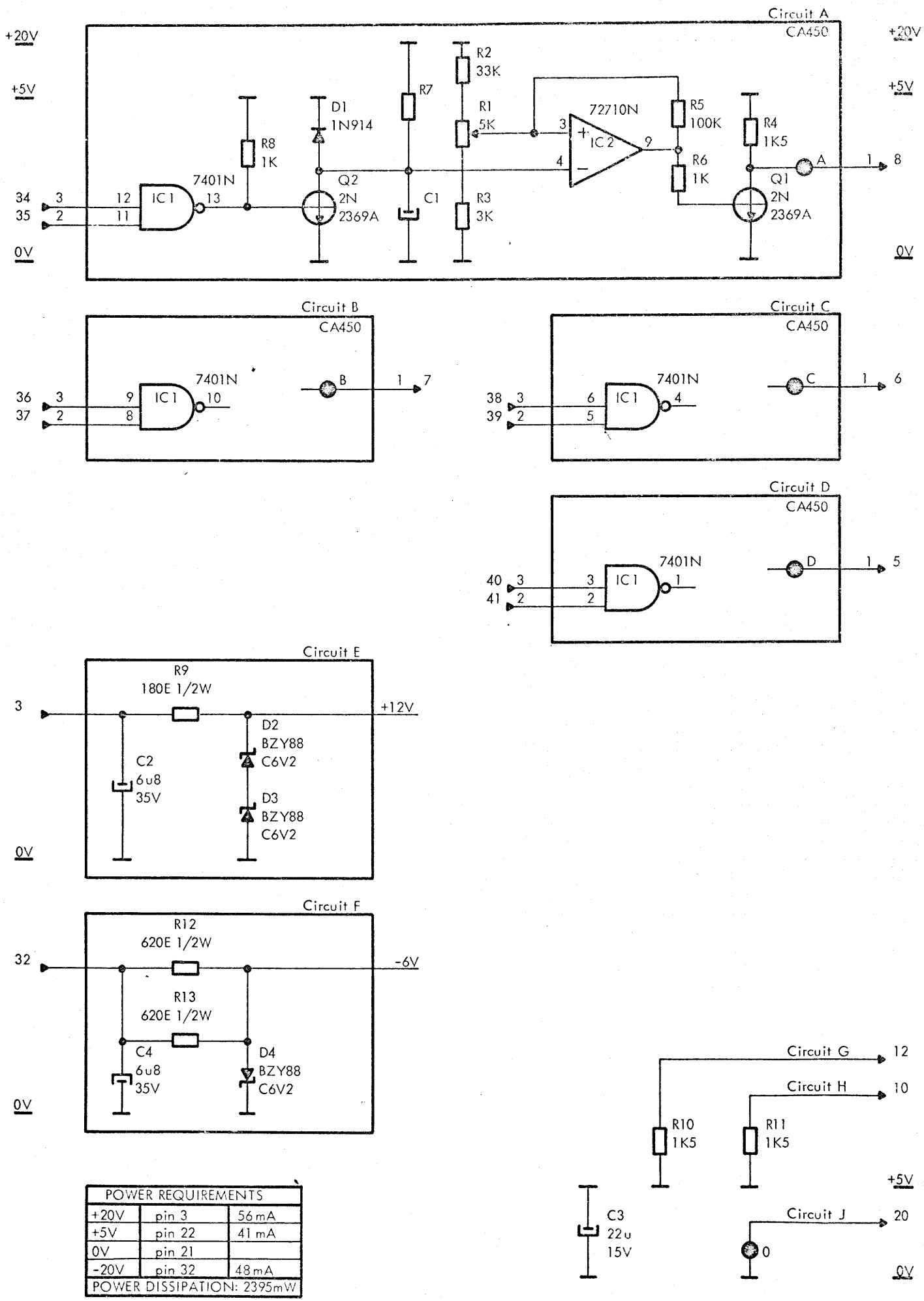
RC3048-1

A20507

PCB Assembly Drawing

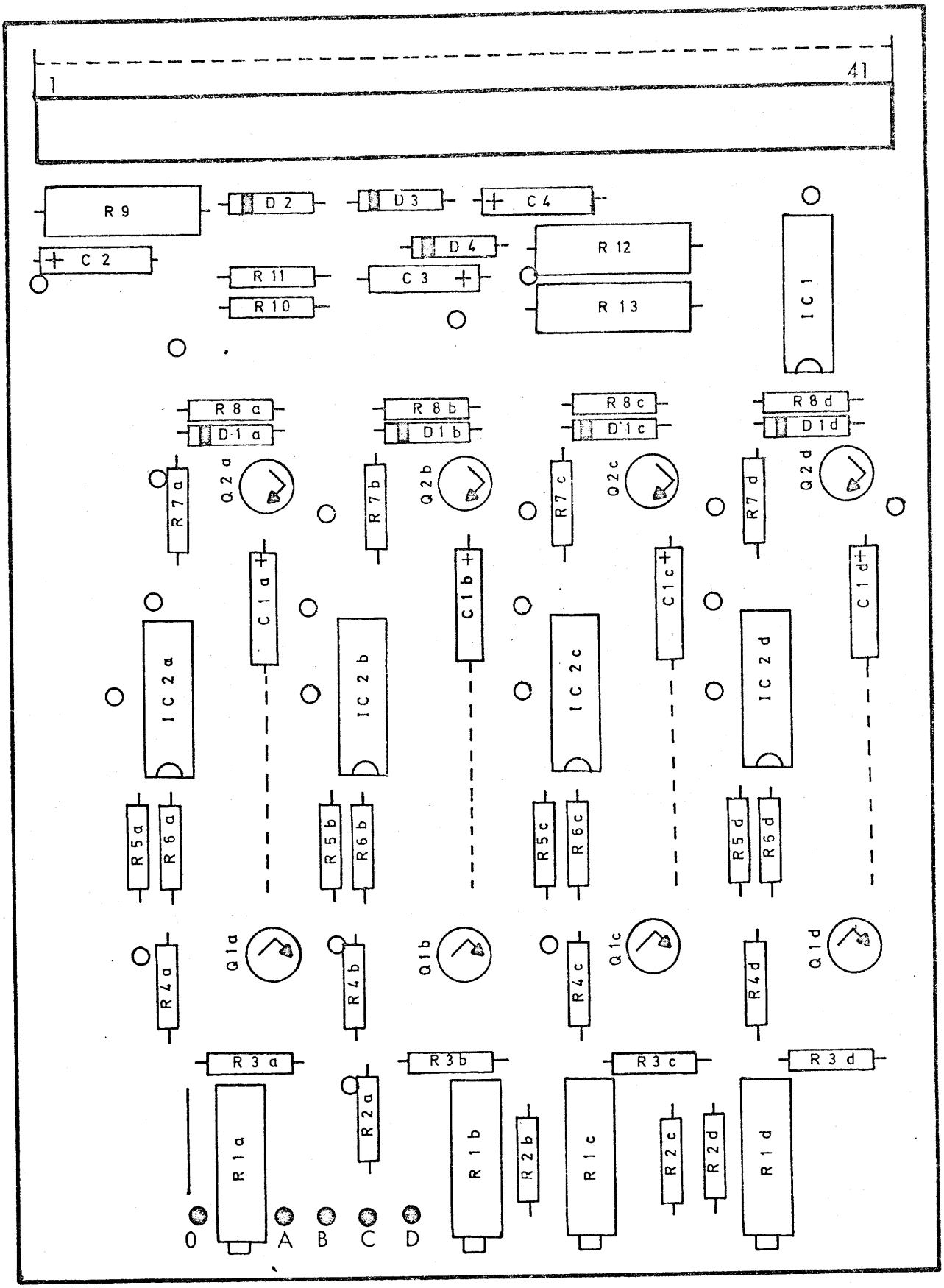

Circuit A
DA450
-28V
+5V
0V
R1 1K
R2 240E
R3 2K4
R4 33K
L1 100uH
R5 2K2 1/2W
R6 100E
Q1 2N 2369A
Q2 2N 2907A
Q3 2N 2907A
Q4 2N 2222A
C1 330p
C2 150p
7401N
IC1
17
16
19
18
A
B
C
D
Circuit B
Circuit C
Circuit D
Circuit E
Circuit F
R7 1K5
20
23
0
POWER REQUIREMENTS
+5V pin 22 116 mA
0V pin 21
-28V pin 4 58 mA
POWER DISSIPATION: 2310 mW
C3 6u8 35V
C4 22u 15V

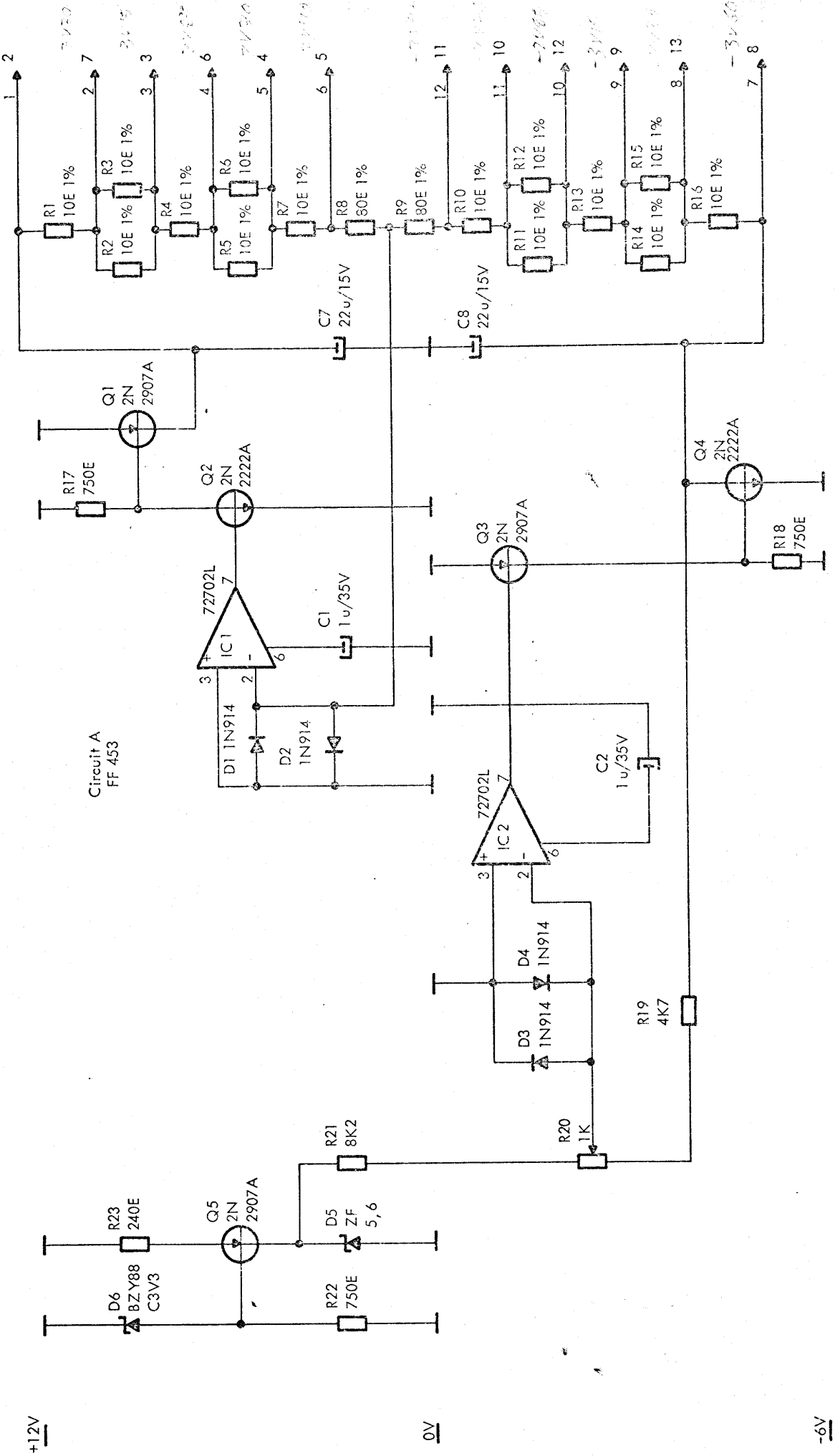

1
41
R 7
C 3
R 6a
R 6b
C 2a
C 2b
C 2c
R 6c
R 6d
C 2d
Q3a
Q4a
Q4b
Q3b
Q3c
Q4c
Q4d
Q3d
L1a
R5a
R5b
L1b
L1c
R5c
R5d
L1d
Q2a
Q2b
Q2c
Q2d
R4a
R3a
C1a
R4b
R3b
C1b
R4c
R3c
C1c
R4d
R3d
C1d
Q1a
Q1b
Q1c
Q1d
IC1
R2a
R1a
C4
R1b
R2b
R2c
R1c
R1d
R2d
0
A
B
C
D



POWER REQUIREMENTS		
+20V	pin 3	56 mA
+5V	pin 22	41 mA
0V	pin 21	
-20V	pin 32	48 mA
POWER DISSIPATION: 2395mW		

CIRCUIT	R7		C1		CHARACTERISTICS
A	68K		10u		100ms
B	33K		1u		5ms
C	68K		10u		100 ms
D	68K		0u1		1ms


41
1
R 9
D 2
D 3
C 4
C 2
D 4
R 12
R 11
C 3
R 10
R 13
I C 1
R 8 a
R 8 b
R 8 c
R 8 d
D 1 a
D 1 b
D 1 c
D 1 d
Q 2 a
Q 2 b
Q 2 c
Q 2 d
R 7 a
R 7 b
R 7 c
R 7 d
C 1 a
C 1 b
C 1 c
C 1 d
I C 2 a
I C 2 b
I C 2 c
I C 2 d
R 5 a
R 6 a
R 5 b
R 6 b
R 5 c
R 6 c
R 5 d
R 6 d
Q 1 a
Q 1 b
Q 1 c
Q 1 d
R 4 a
R 4 b
R 4 c
R 4 d
R 3 a
R 3 b
R 3 c
R 3 d
R 1 a
R 2 a
R 1 b
R 2 b
R 1 c
R 2 c
R 2 d
R 1 d
0
A
B
C
D


R1 10E 1%
R2 10E 1%
R3 10E 1%
R4 10E 1%
R5 10E 1%
R5 10E 1%
R7 10E 1%
R8 60E 1%
R9 80E 1%
R10 10E 1%
R11 10E 1%
R12 10E 1%
R13 10E 1%
R14 10E 1%
R15 10E 1%
R16 10E 1%
C7 22u/15V
C8 22u/15V
Q1 2N 2907A
Q2 2N 2222A
Q3 2N 2907A
Q4 2N 2222A
R17 750E
R18 750E
IC1 72702L
IC 2 72702L
C1 1u/35V
C2 1u/35V
D1 1N914
D2 1N914
D3 1N914
D4 1N914
R19 4K7
R20 1K
R21 8K2
R22 750E
R23 240E
Q5 2N 2907A
D5 ZF 5,6
D6 BZY88 C3V3
Circuit A
FF 453
+12V
0V
-6V

RCLM 400

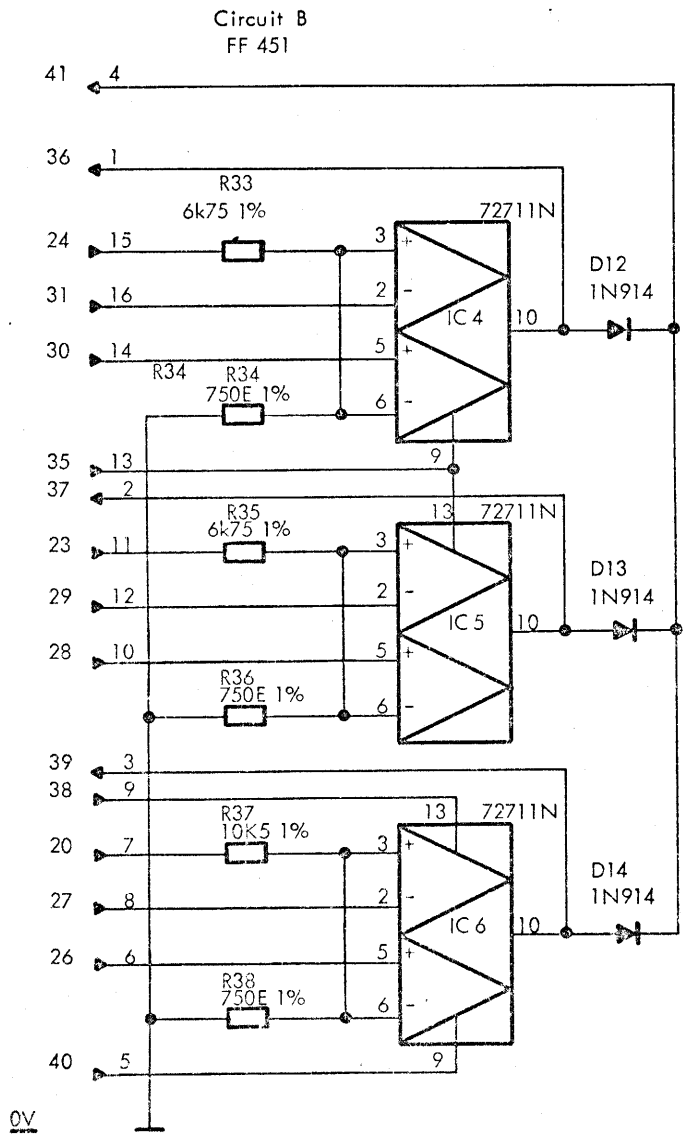
R 10087

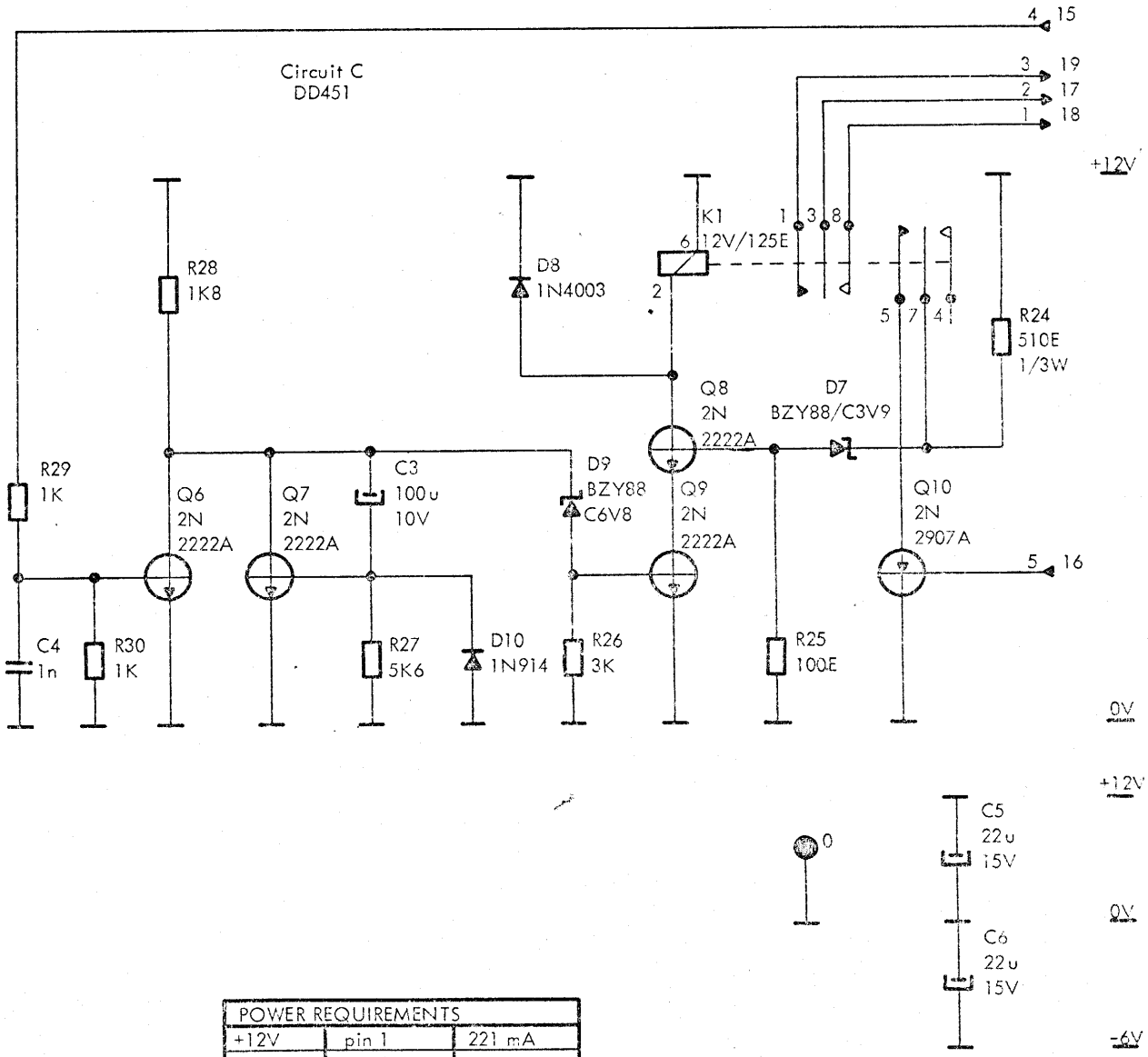
1 DD451,1 FF451,1 FF453

PCBA Circuit Diagram

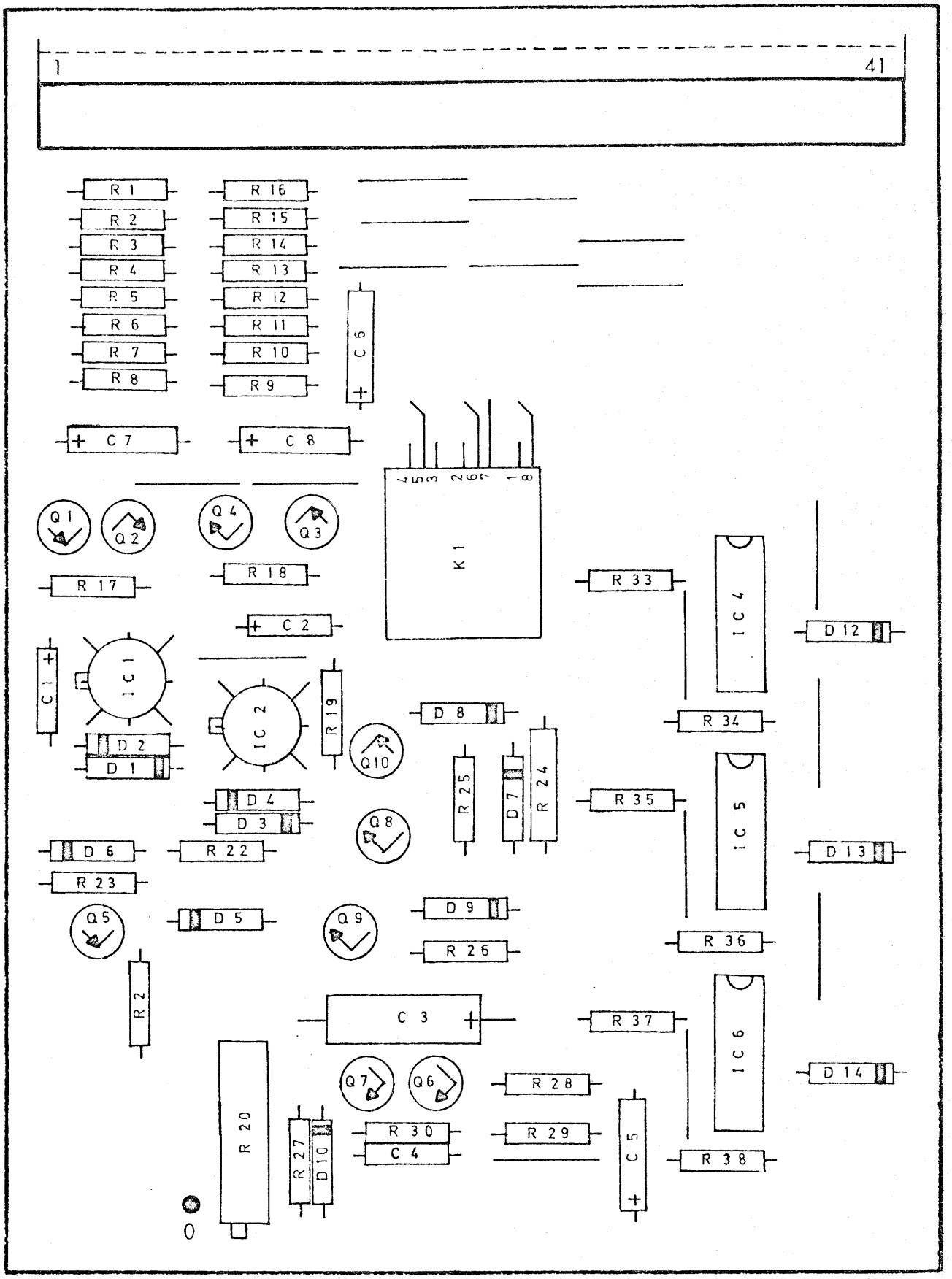
RC3066-1

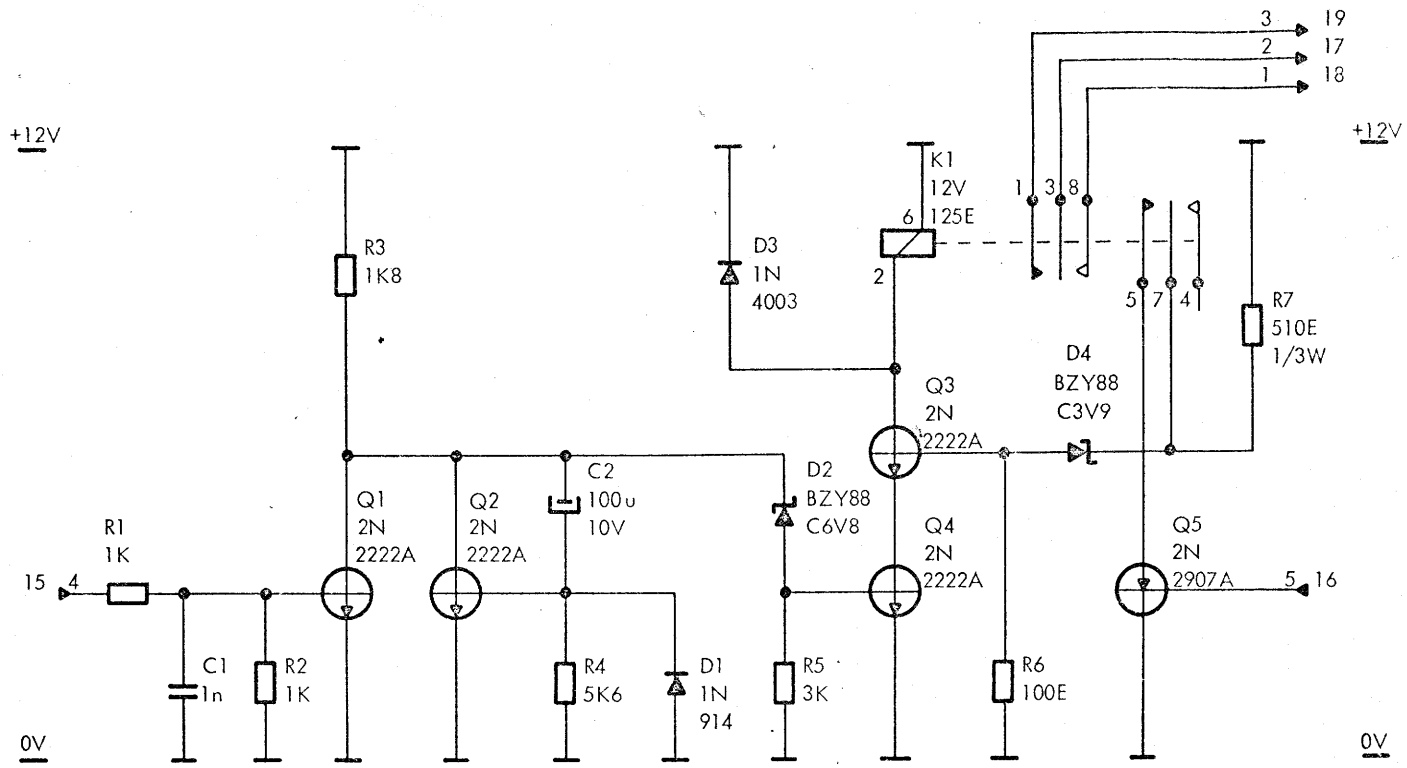
P 2 of 2



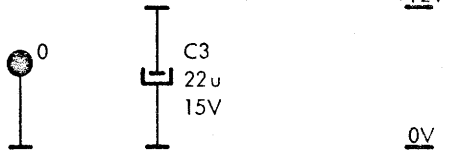


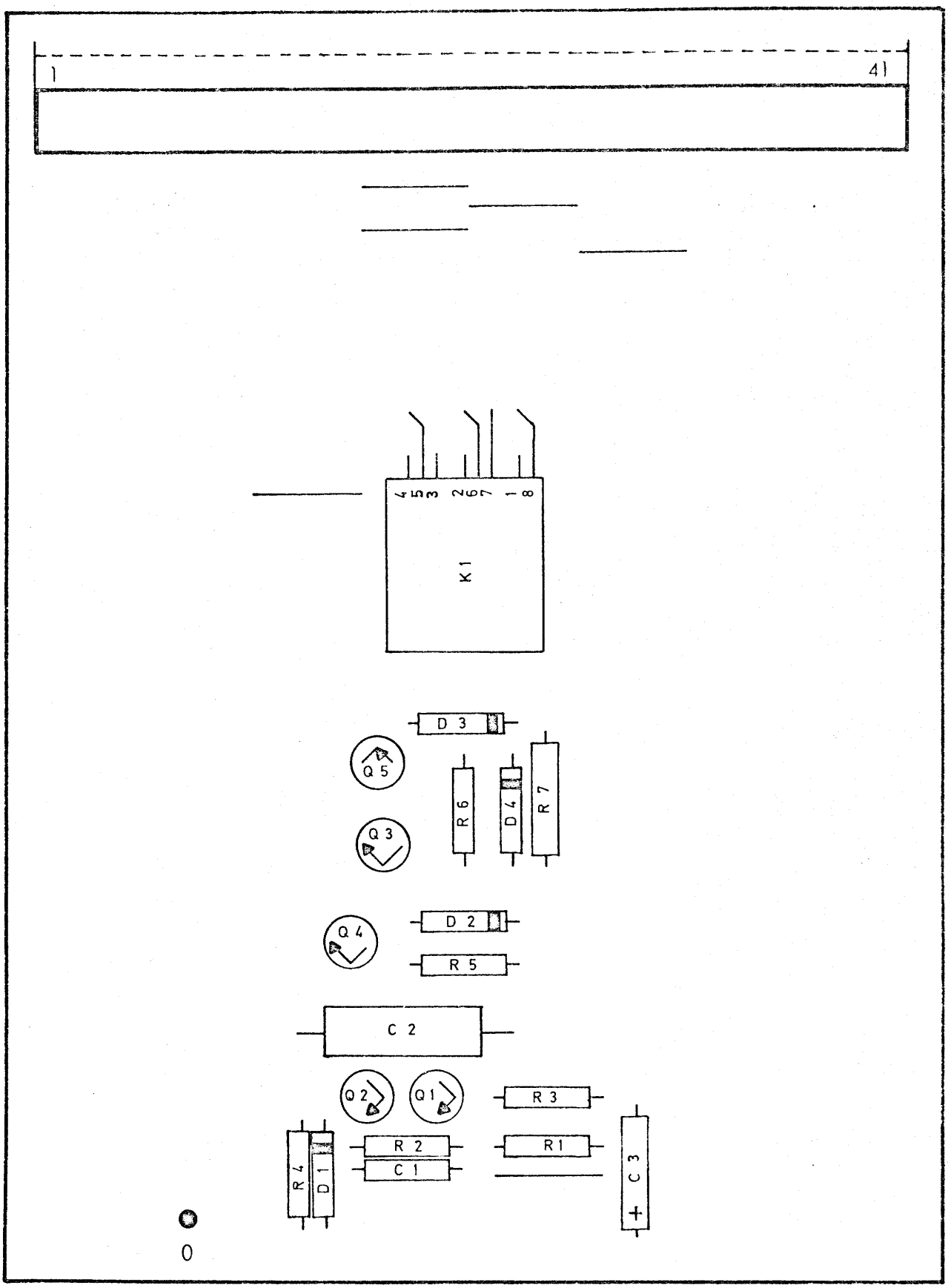
POWER REQUIREMENTS		
+12V	pin 1	221 mA
0V	pin 21	
-6V	pin 14	54 mA
POWER DISSIPATION: 3275 mW		

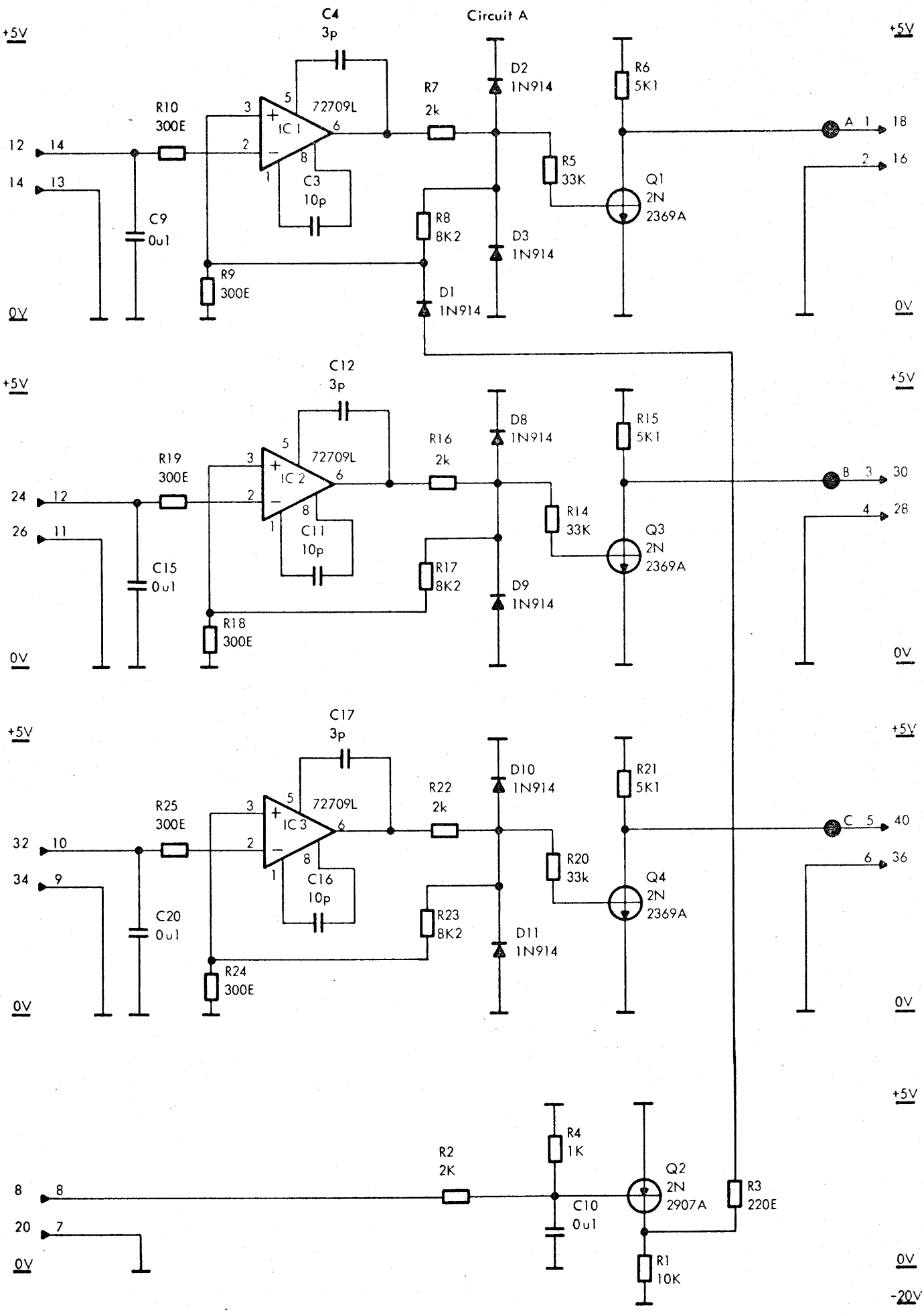

1
41
R 1
R 2
R 3
R 4
R 5
R 6
R 7
R 8
R 16
R 15
R 14
R 13
R 12
R 11
R 10
R 9
C 6
C 7
C 8
K 1
Q 1
Q 2
Q 4
Q 3
R 17
R 18
C 2
C 1
IC 1
IC 2
R 19
D 2
D 1
D 4
D 3
D 6
R 22
R 23
Q 5
D 5
Q 9
D 9
R 26
R 2
C 3
R 20
Q 7
Q 6
R 28
R 30
C 4
R 29
R 27
D 10
C 5
0
D 8
R 25
D 7
R 24
Q 10
Q 8
R 33
IC 4
D 12
R 34
R 35
IC 5
D 13
R 36
R 37
IC 6
D 14
R 38

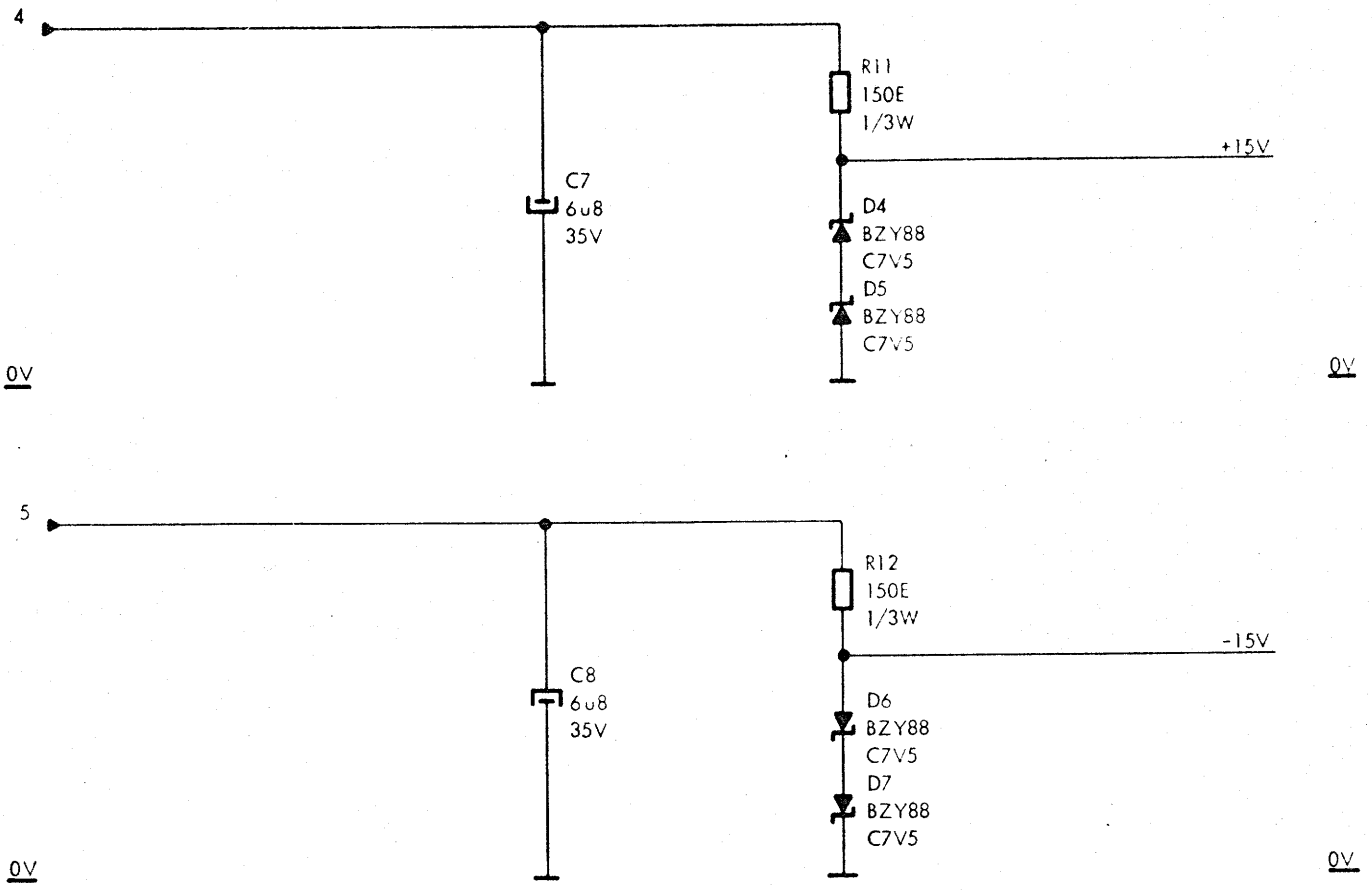


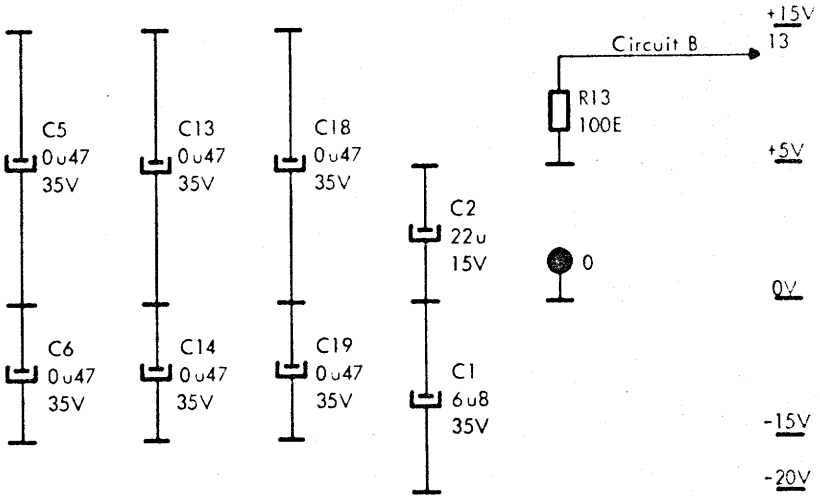
POWER REQUIREMENTS		
+12V	pin 1	127 mA
0V	pin 21	
POWER DISSIPATION: 1700mW		



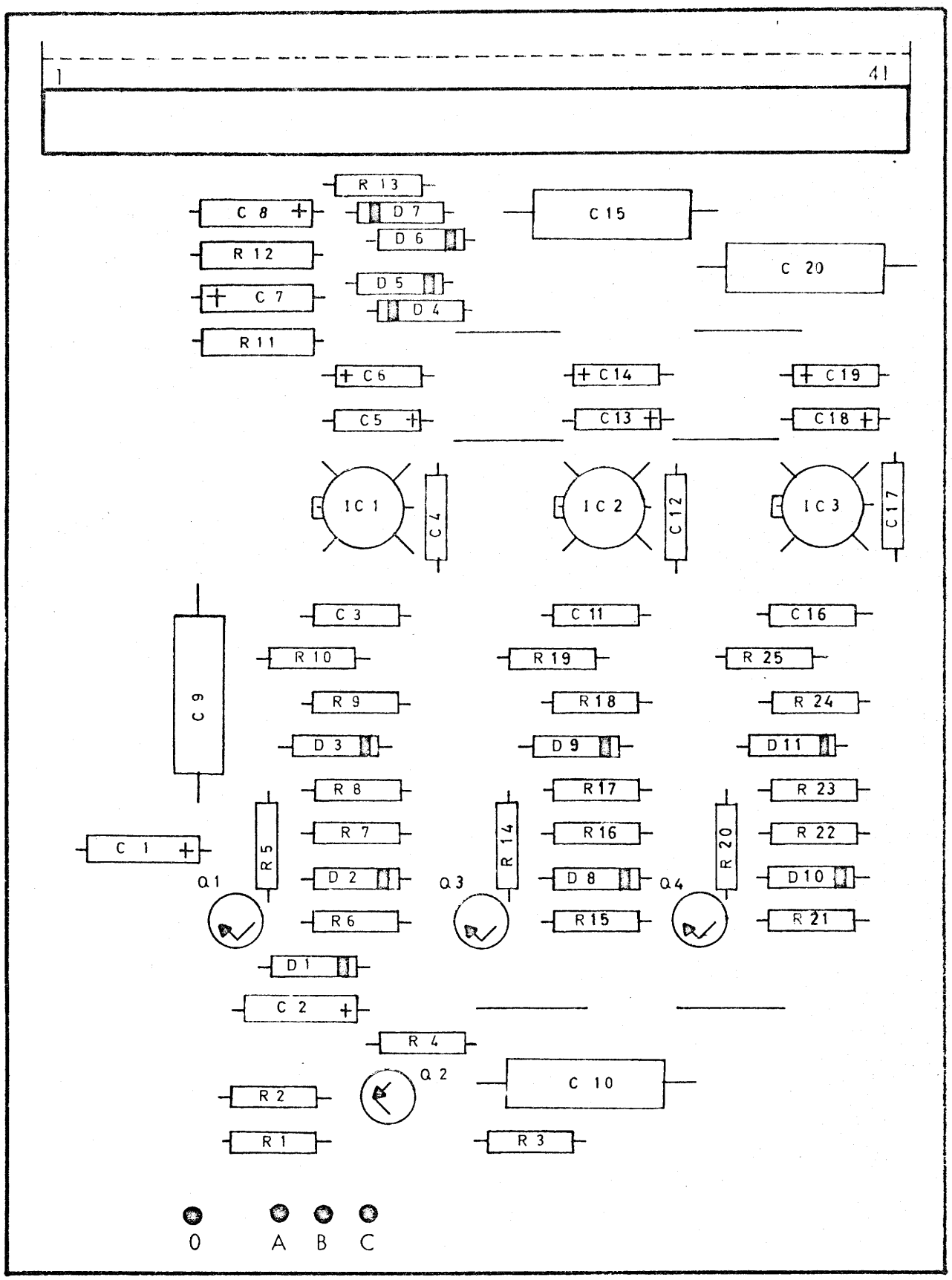

1
41
4 5 3 2 6 7 1 8
K1
D 3
Q 5
R 6
D 4
R 7
Q 3
Q 4
D 2
R 5
C 2
Q 2
Q 1
R 3
R 2
R 1
C 1
R 4
D 1
C 3
0

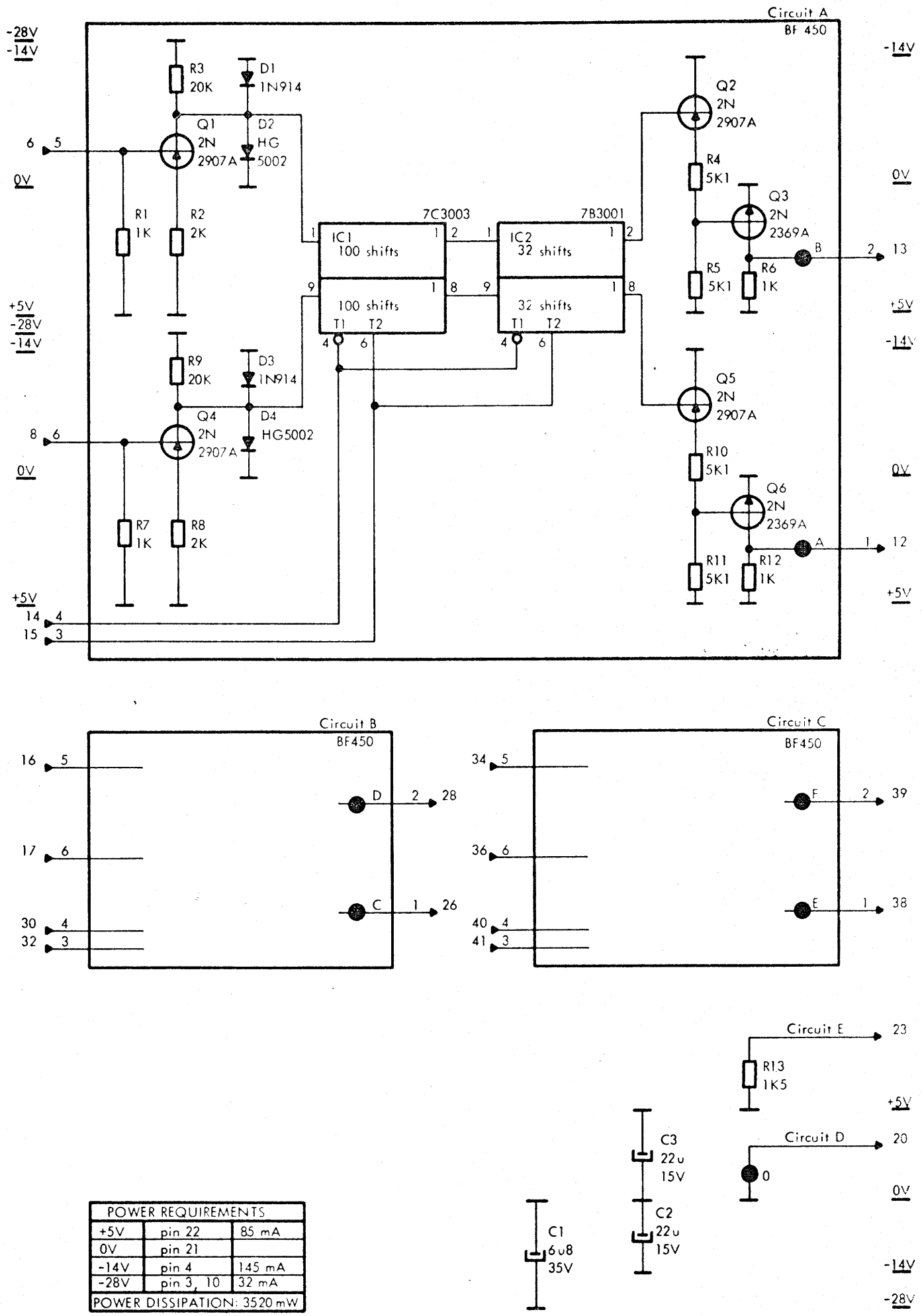

Circuit A
C4
3p
+5V
R10
300E
12
14
14
13
C9
0u1
0V
R9
300E
IC 1
72709L
C3
10p
R7
2k
D2
1N914
R6
5K1
R5
33K
Q1
2N
2369A
R8
8K2
D3
1N914
D1
1N914
A 1
18
2
16
C12
3p
R19
300E
24
12
26
11
C15
0u1
R18
300E
IC 2
72709L
C11
10p
R16
2k
D8
1N914
R15
5K1
R14
33K
Q3
2N
2369A
R17
8K2
D9
1N914
B 3
30
4
28
C17
3p
R25
300E
32
10
34
9
C20
0u1
R24
300E
IC 3
72709L
C16
10p
R22
2k
D10
1N914
R21
5K1
R20
33k
Q4
2N
2369A
R23
8K2
D11
1N914
C 5
40
6
36
R2
2K
8
8
20
7
R4
1K
C10
0u1
Q2
2N
2907A
R3
220E
R1
10K
-20V



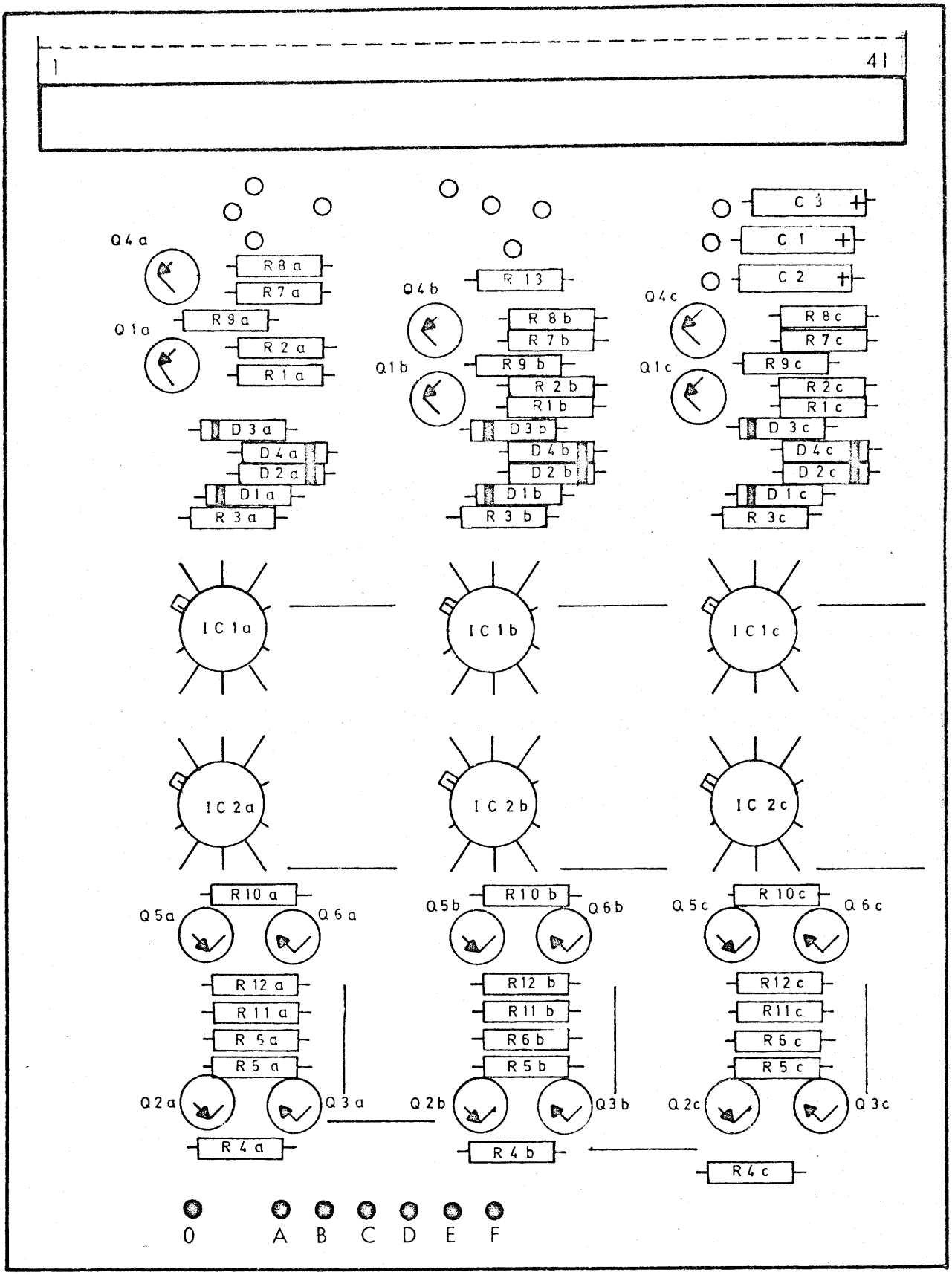


POWER REQUIREMENTS		
+20V	pin 4	40 mA
+5V	pin 22	46 mA
0V	pin 21	
-20V	pin 3, 5	43 mA
POWER DISSIPATION: 2240mW		


1
41
R 13
C 8
D 7
C 15
D 6
R 12
C 20
D 5
C 7
D 4
R 11
C 6
C 14
C 19
C 5
C 13
C 18
IC 1
C 4
IC 2
C 12
IC 3
C 17
C 3
C 11
C 16
C 9
R 10
R 19
R 25
R 9
R 18
R 24
D 3
D 9
D 11
R 8
R 17
R 23
C 1
R 5
R 7
R 16
R 14
R 22
R 20
Q 1
D 2
Q 3
D 8
Q 4
D 10
R 6
R 15
R 21
D 1
C 2
R 4
Q 2
C 10
R 2
R 3
R 1
0
A
B
C



POWER REQUIREMENTS		
+5V	pin 22	85 mA
0V	pin 21	
-14V	pin 4	145 mA
-28V	pin 3, 10	32 mA
POWER DISSIPATION: 3520 mW		


1
41
Q4a
R8a
R7a
Q1a
R9a
R2a
R1a
D3a
D4a
D2a
D1a
R3a
R13
Q4b
R8b
R7b
Q1b
R9b
R2b
R1b
D3b
D4b
D2b
D1b
R3b
C3
C1
C2
Q4c
R8c
R7c
Q1c
R9c
R2c
R1c
D3c
D4c
D2c
D1c
R3c
IC1a
IC1b
IC1c
IC2a
IC2b
IC2c
R10a
Q5a
Q6a
R12a
R11a
R5a
R5a
Q2a
Q3a
R4a
R10b
Q5b
Q6b
R12b
R11b
R6b
R5b
Q2b
Q3b
R4b
R10c
Q5c
Q6c
R12c
R11c
R6c
R5c
Q2c
Q3c
R4c
0
A
B
C
D
E
F