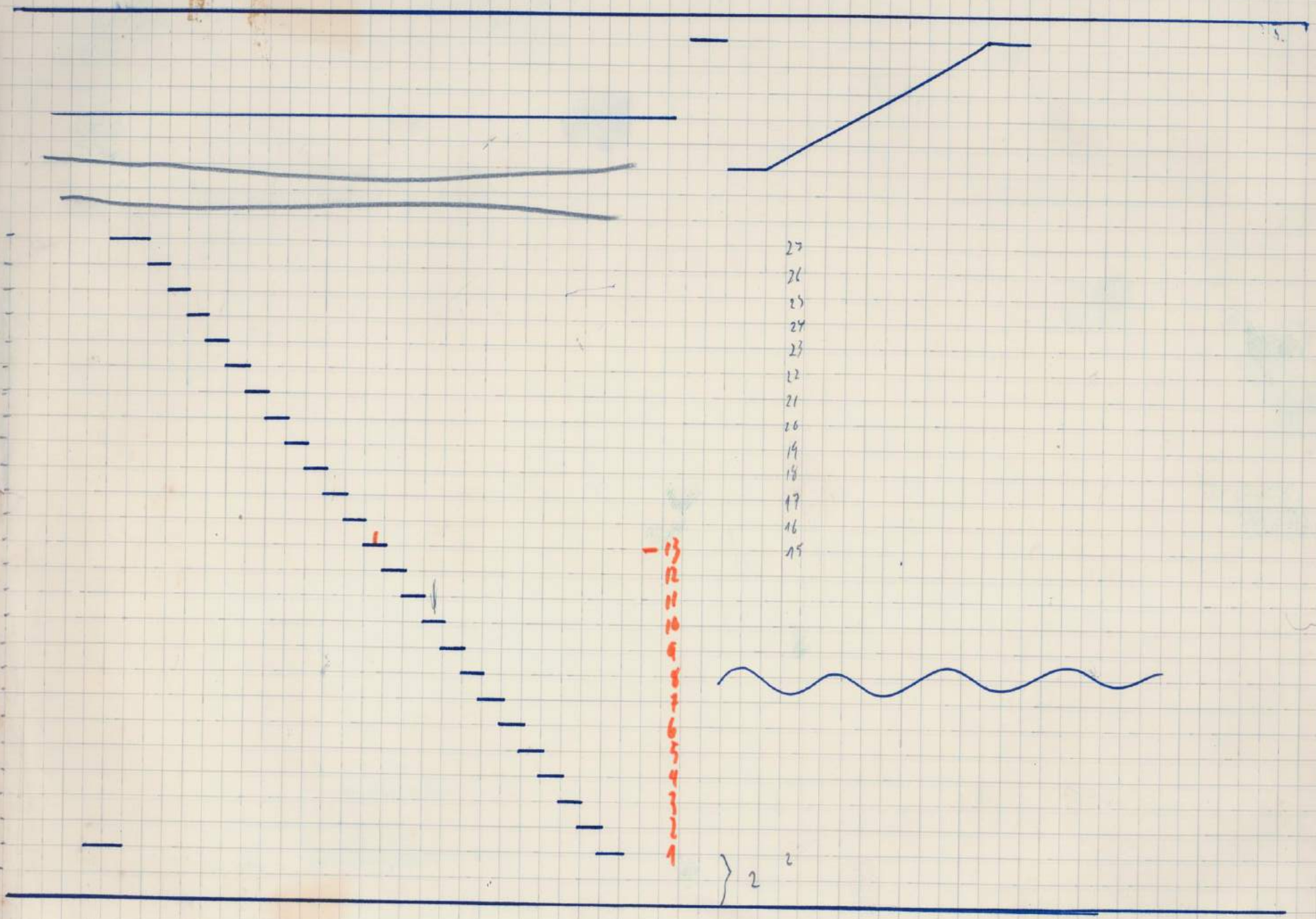
AFINACION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2
1
2

+1	130,8	130					8,2
+2	138,6	132			137		
x	146,8	141		136			8 2
+3	155,6	150		142			9
+6	168,8	160		154			
-1	174,6	170		162			
+1	185	182		173			
-1	196	189		184			
-+2	207,6	199		195			
-2	220	210		202			
+3	233,1	223		218			
x	246,9	238		229			
+1	261,6	249		246			
+1	277,2	267		258			
-2	293,7	285		274			
+2	311,1	297	297				
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+3	349,2	334		323			
+8	370	352		344			
+7	392	371		360			
+8	415.3	393	383				
+9	440	415	402		486	408	
461 +5	466.2	445	430		430		
+1	495,9	475	455	466			
525-2	523,2	504	486	496			
		523			534		

400 ~

128

134

143

525] 32

493

130

46I] 32

43~~I~~-I]

261

~~4I2~~ 407

523

385

~~367~~ 362

346

324

309

29I

278

260

246

230

2I8

205

I95

I86

I75

I62

I52

I46- I43

I36 - I34

I29

130
138,6
146,8
155,6
168,8
174,6
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207,6
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233,1
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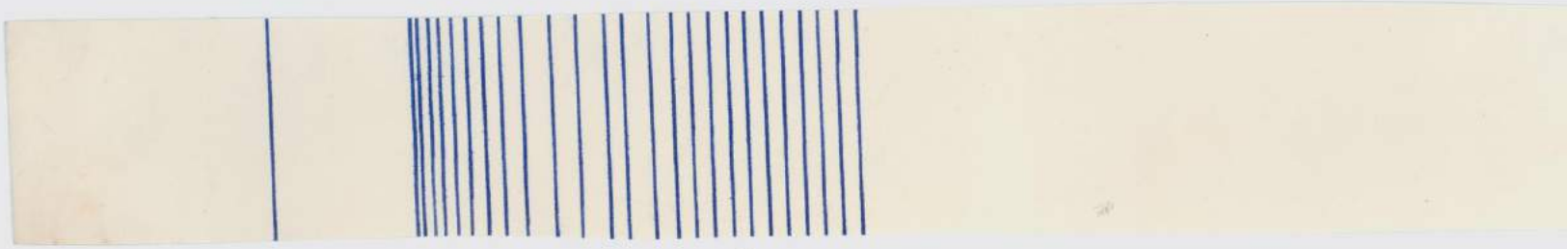
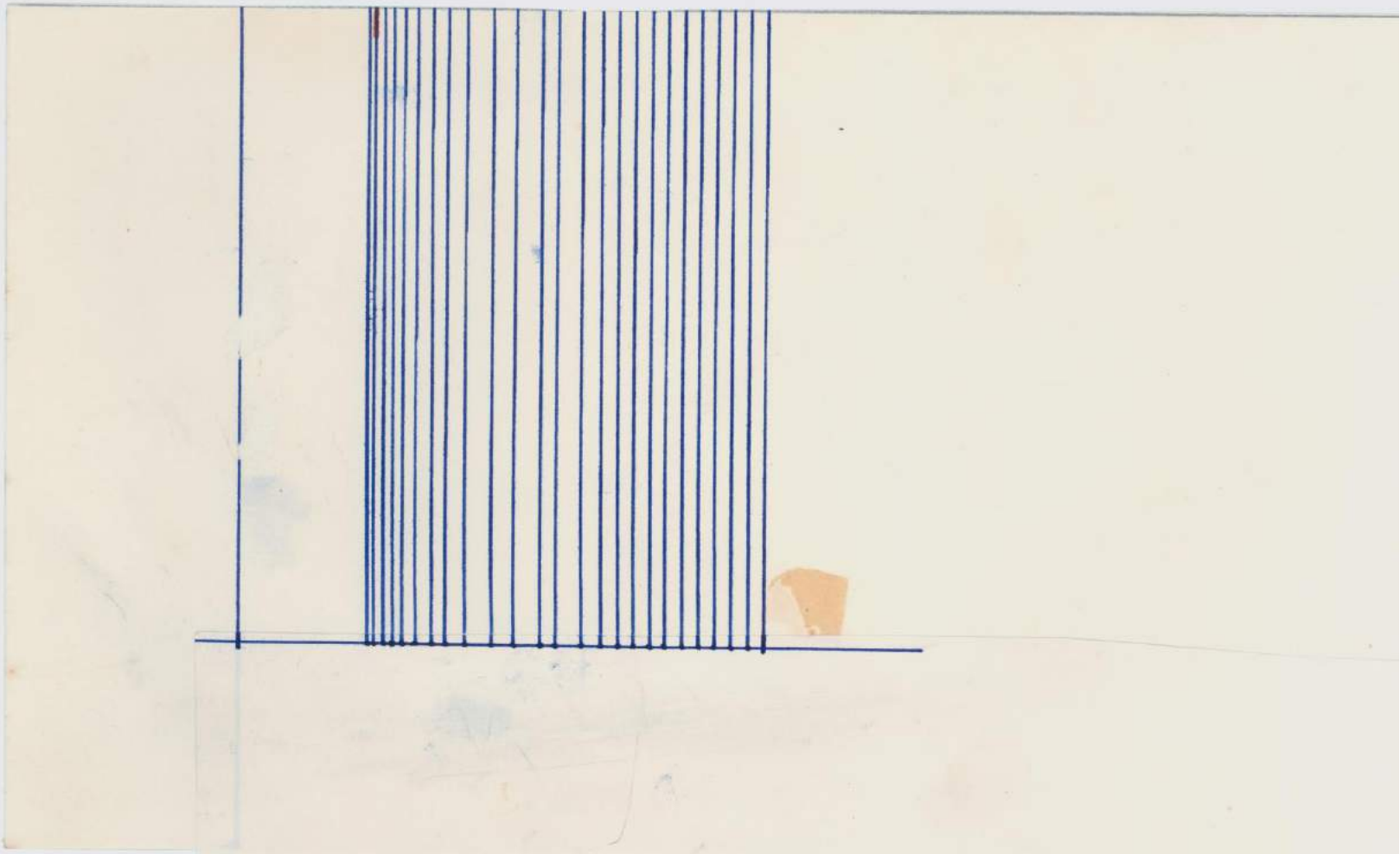
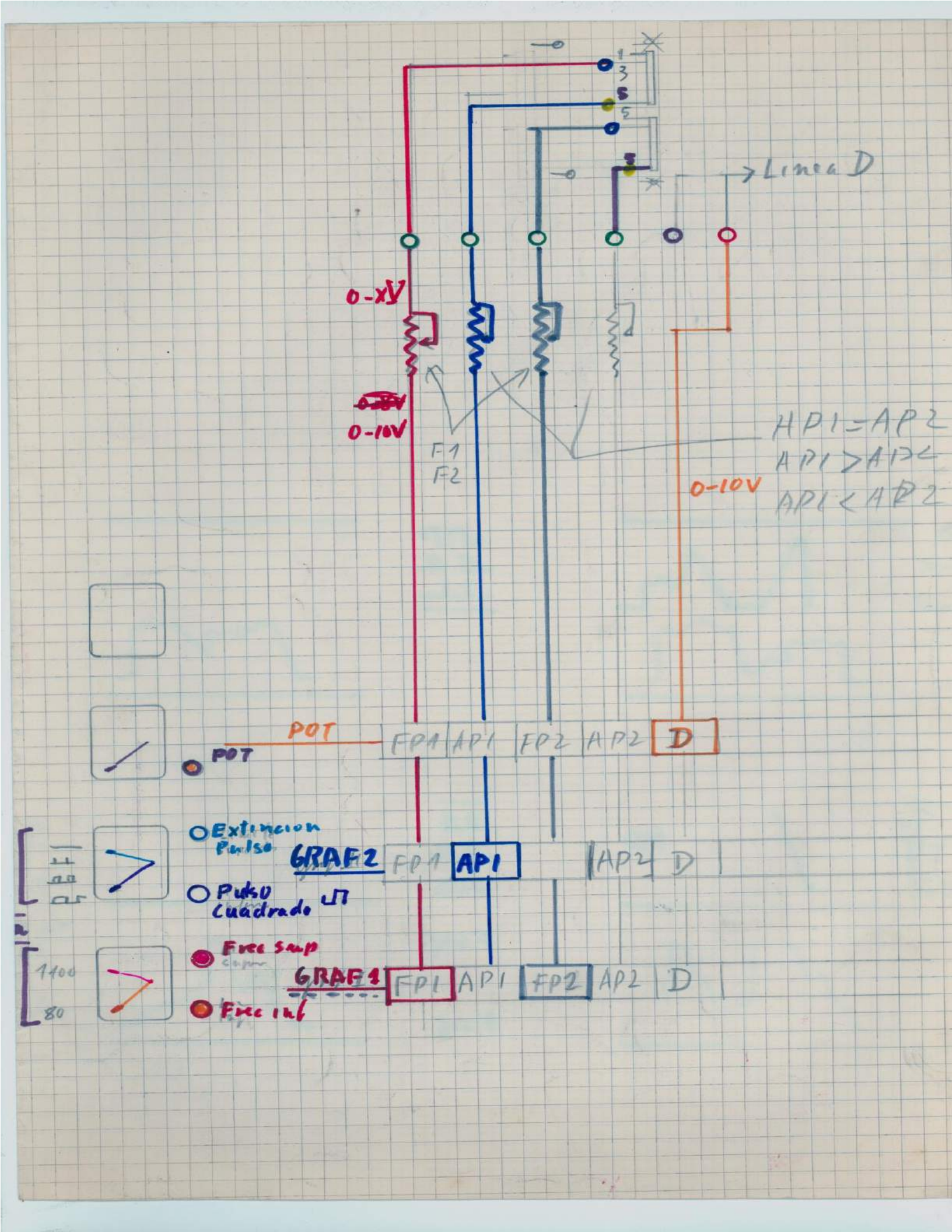
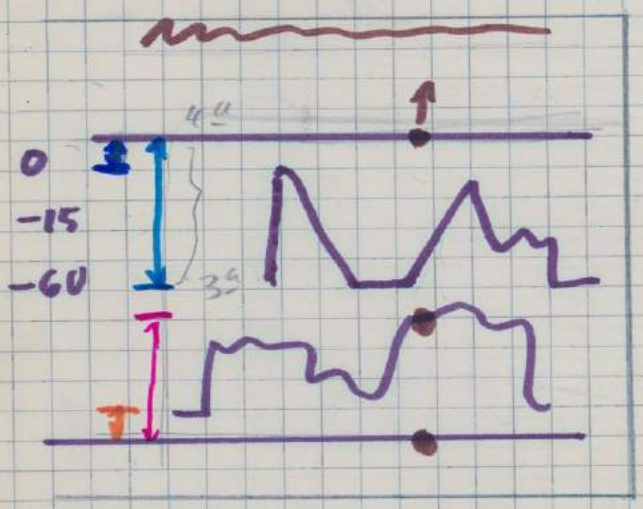
130,8

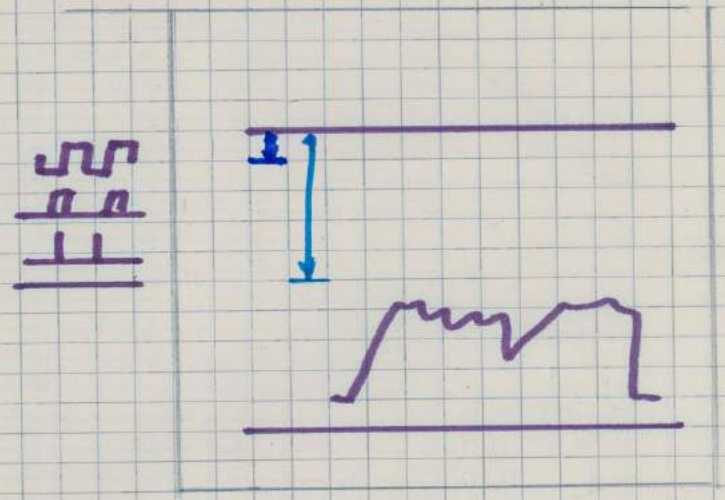


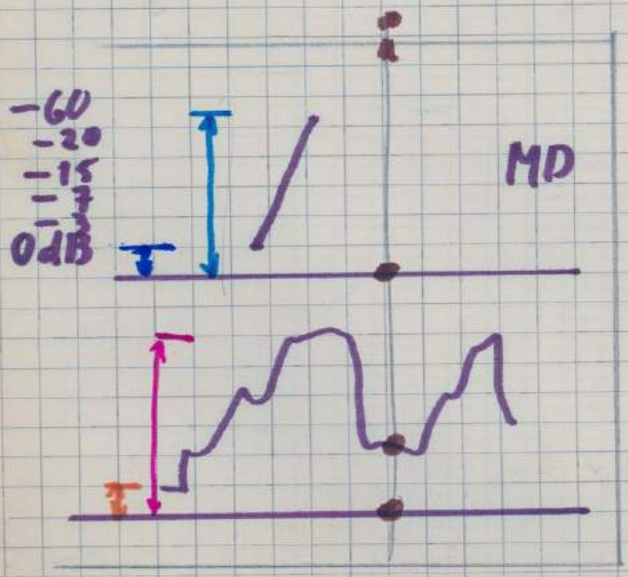


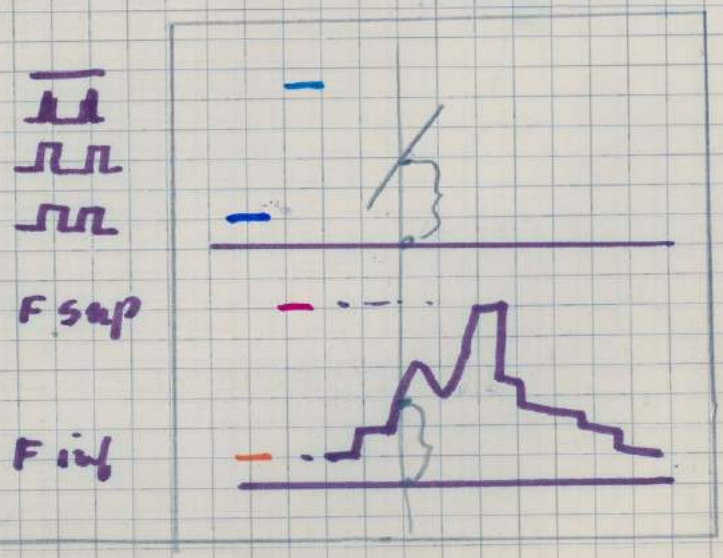
Actual

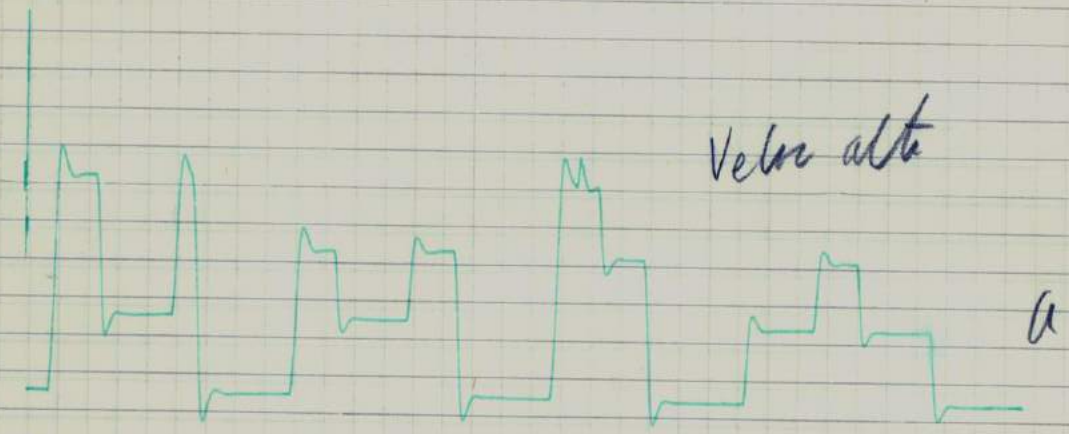

1
3
5
5
5
→ Linea D
0-xV
0-10V
F1
F2
HP1=AP2
AP1>AP2
AP1<AP2
0-10V
POT
FP1
AP1
FP2
AP2
D
POT
Extincion Pulso
GRAF2
FP1
AP1
AP2
D
Pulso Cuadrado
Free sup
GRAF1
FP1
AP1
FP2
AP2
D
1100
80
Free inf


0
-15
-60

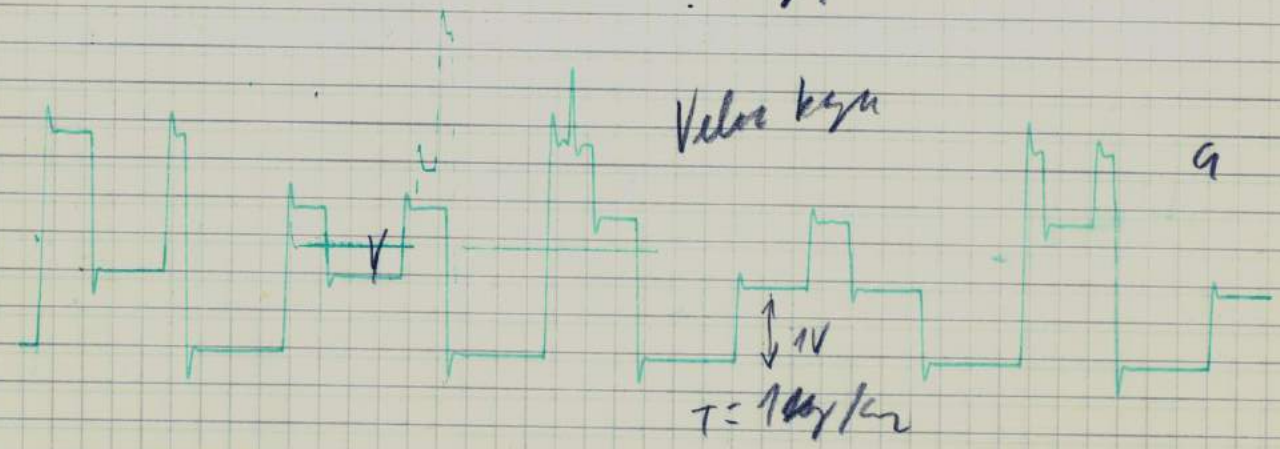


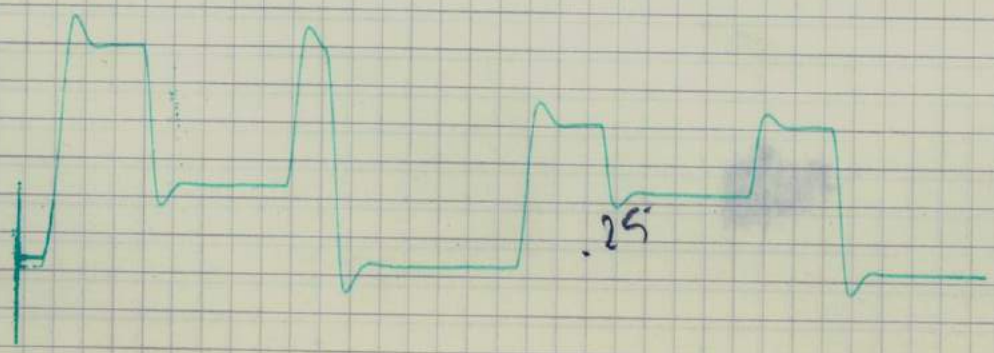

-60
-20
-15
0dB
MD

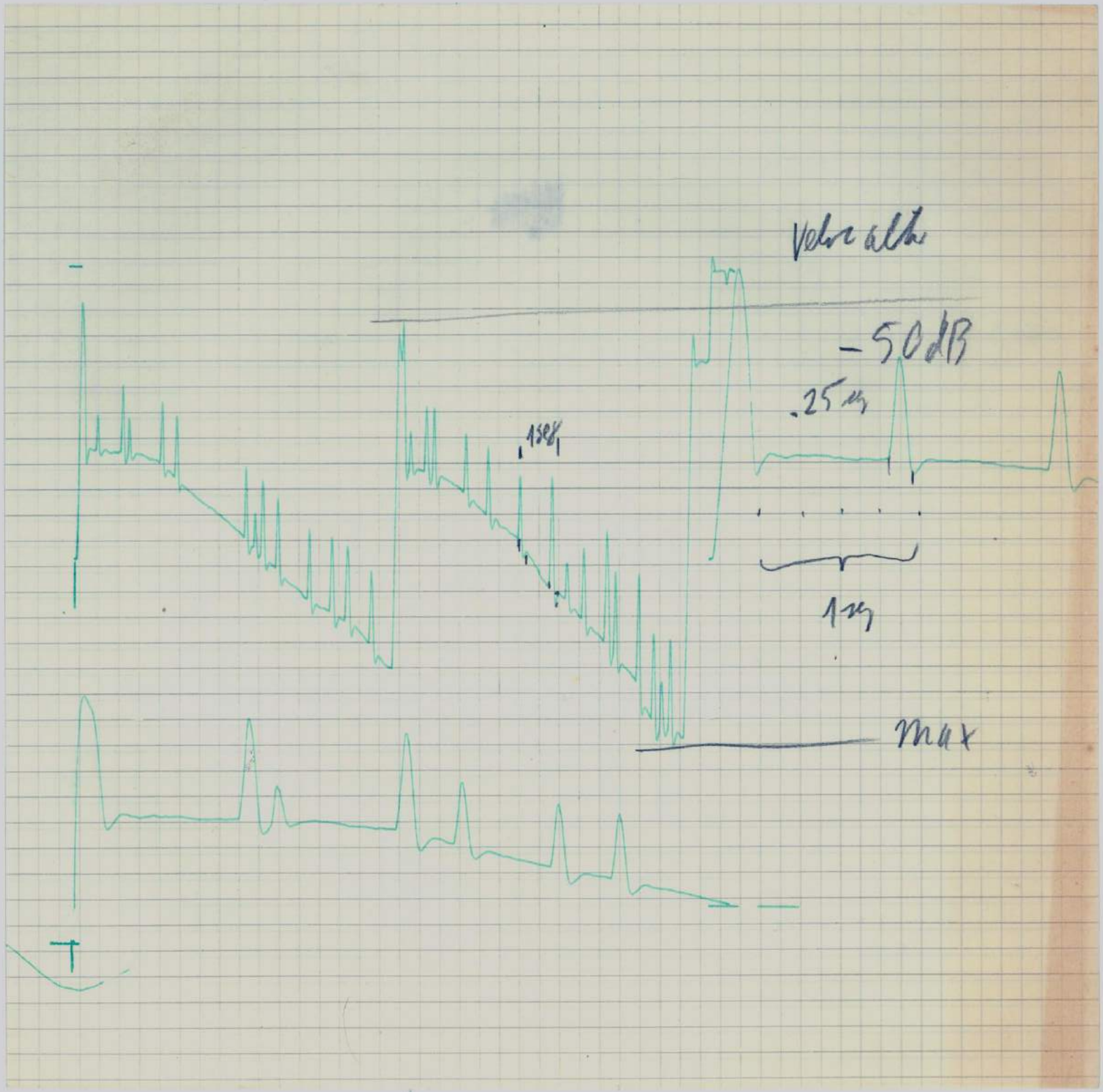

F sup
F inf



5 seg/cm



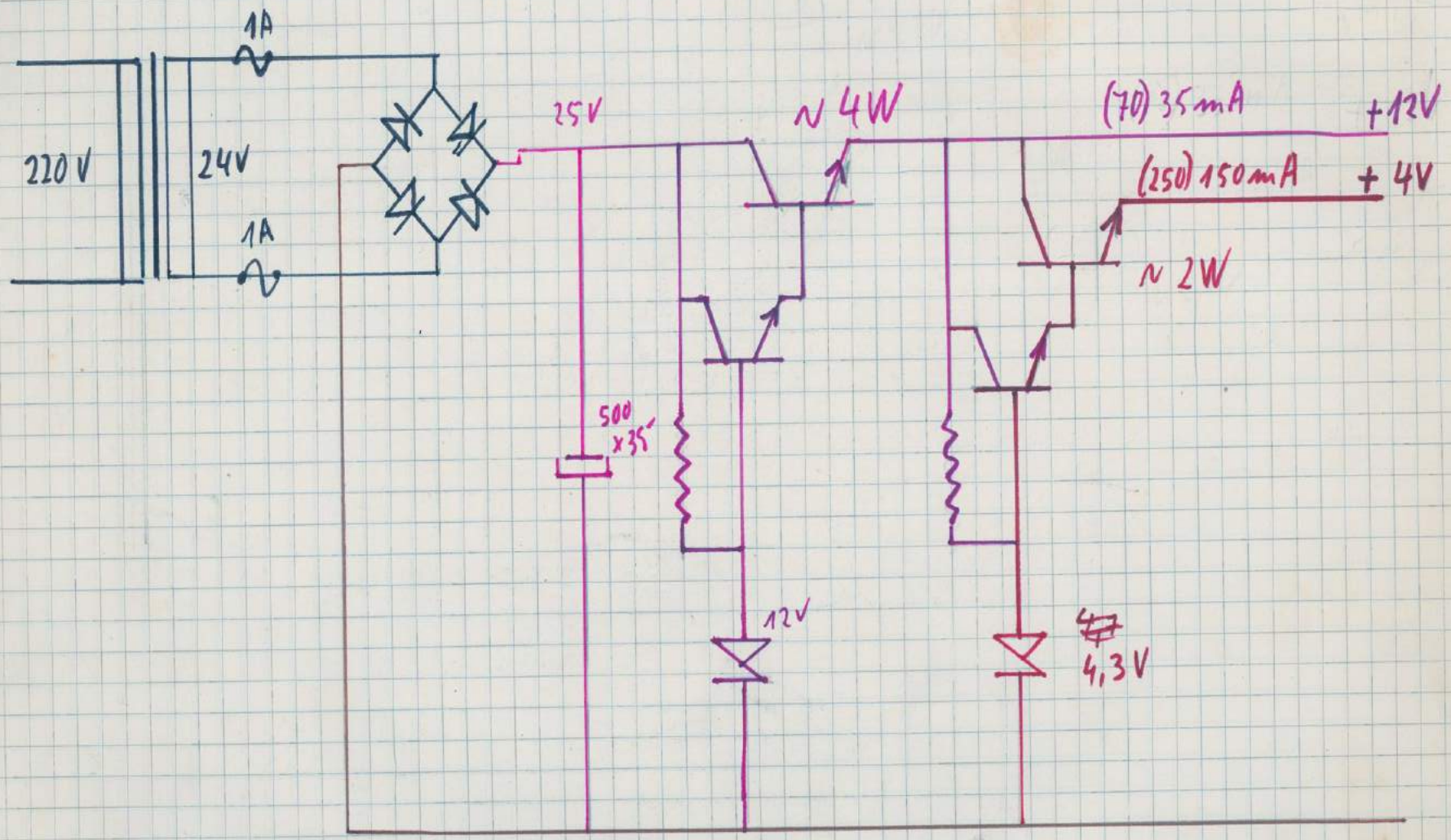



Velocità
-50dB
.25 μs
1 μs
max

V 4 cm = 1 v

4

Fuente regulada +12 +4V



No construido → costo

Ucu = 1 V Velocità

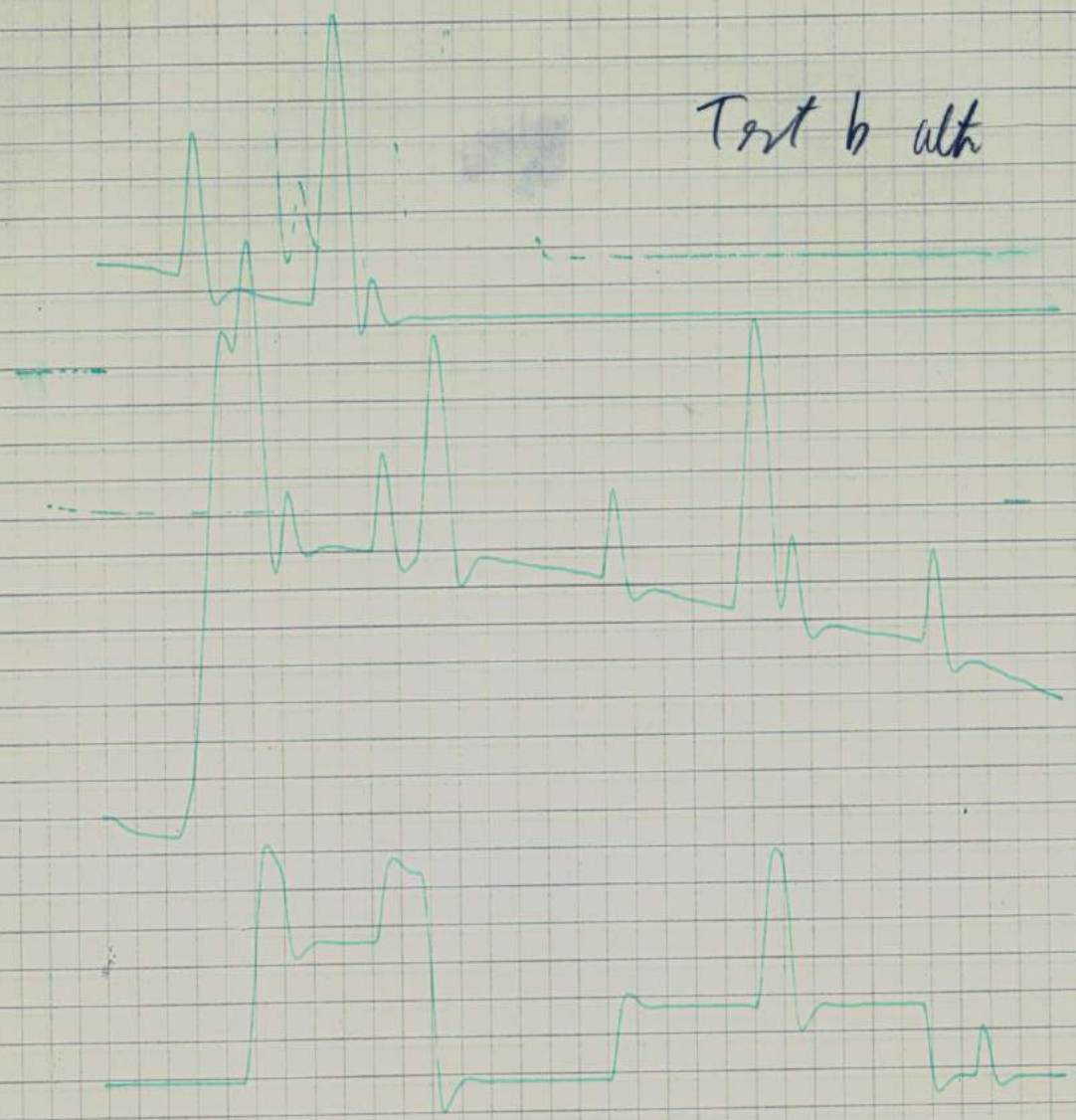
II a

I a

Zinn 11,5

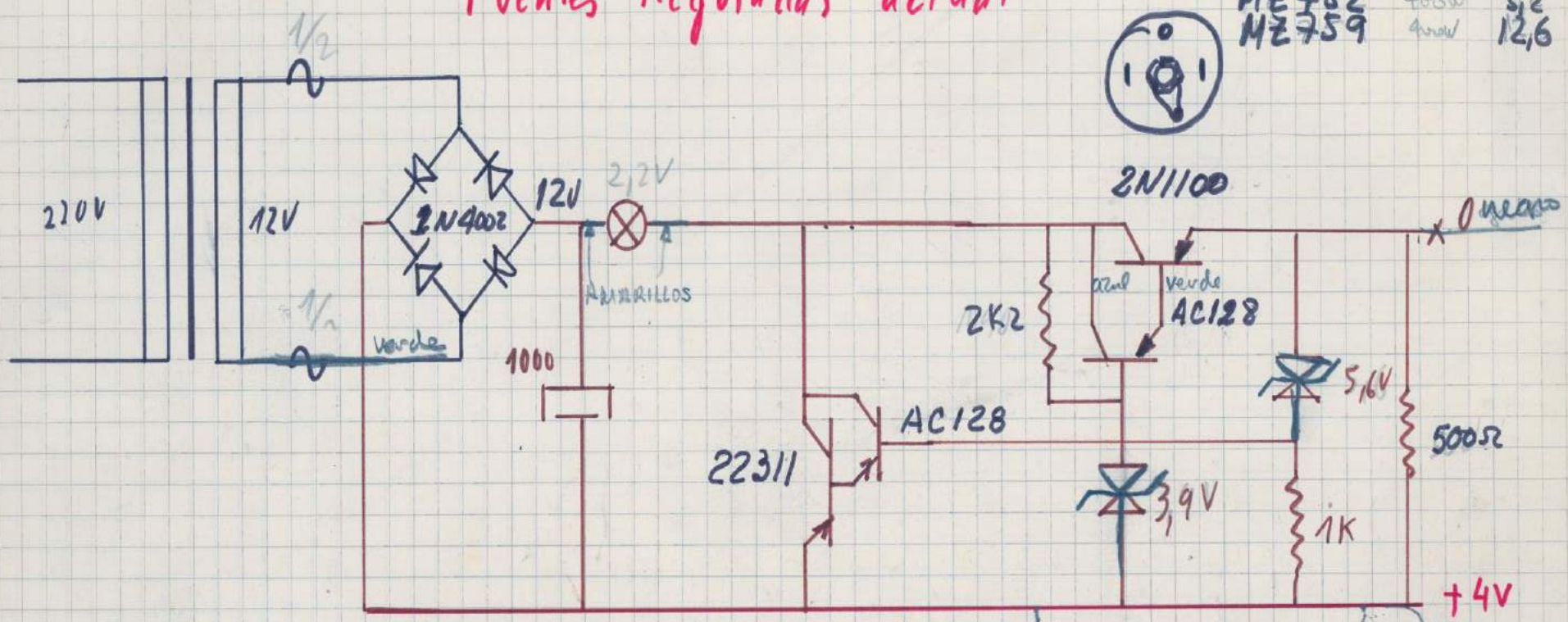
Sol 11,2

Test b alt

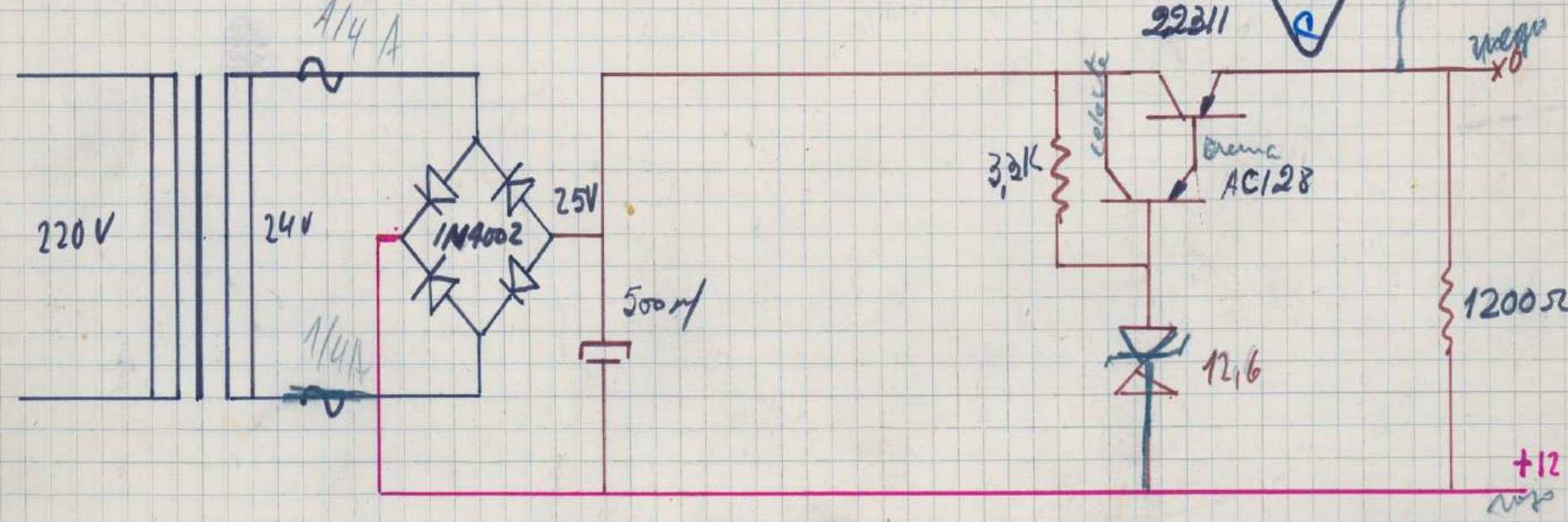


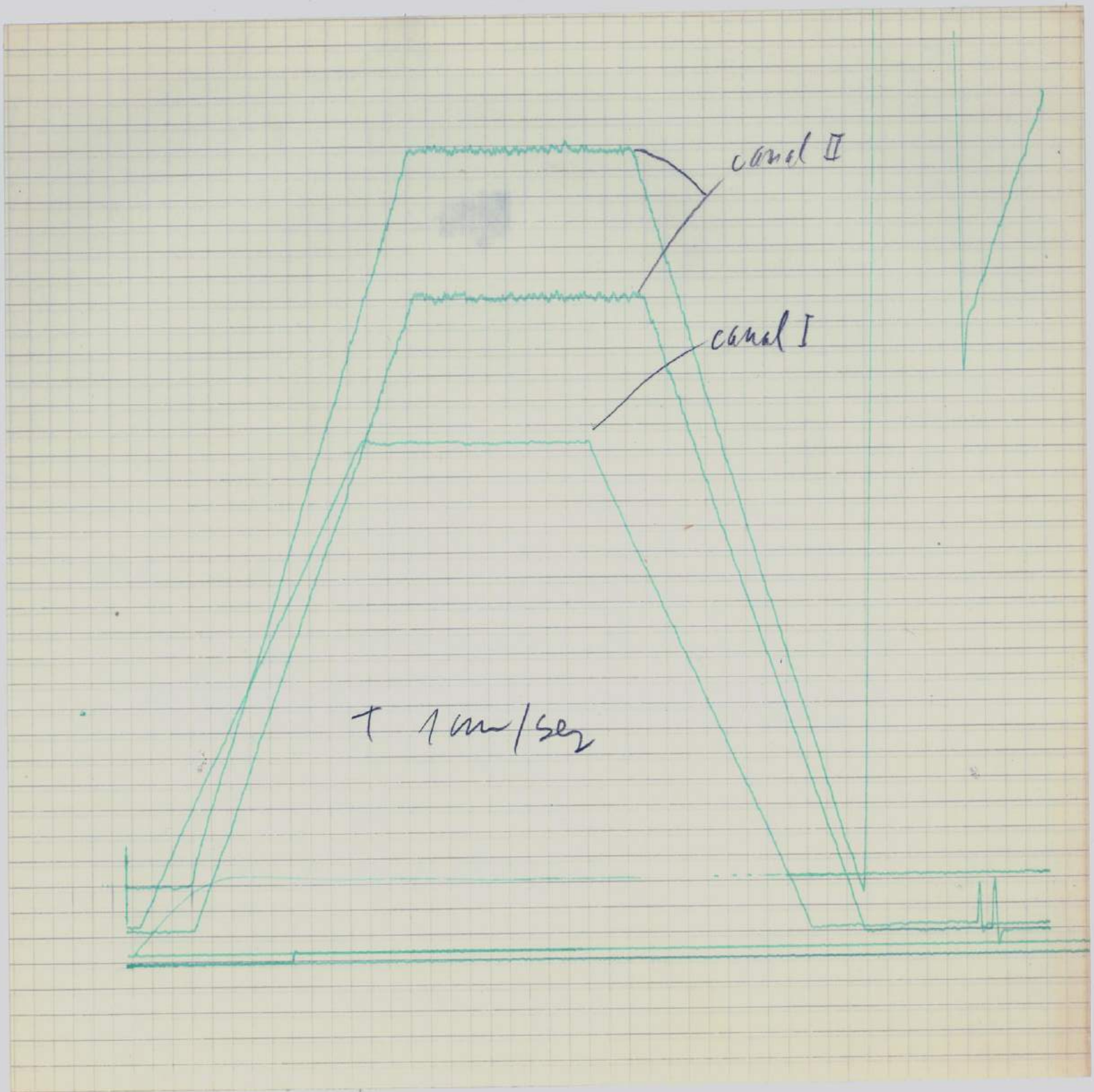
Fuentes Reguladas actual

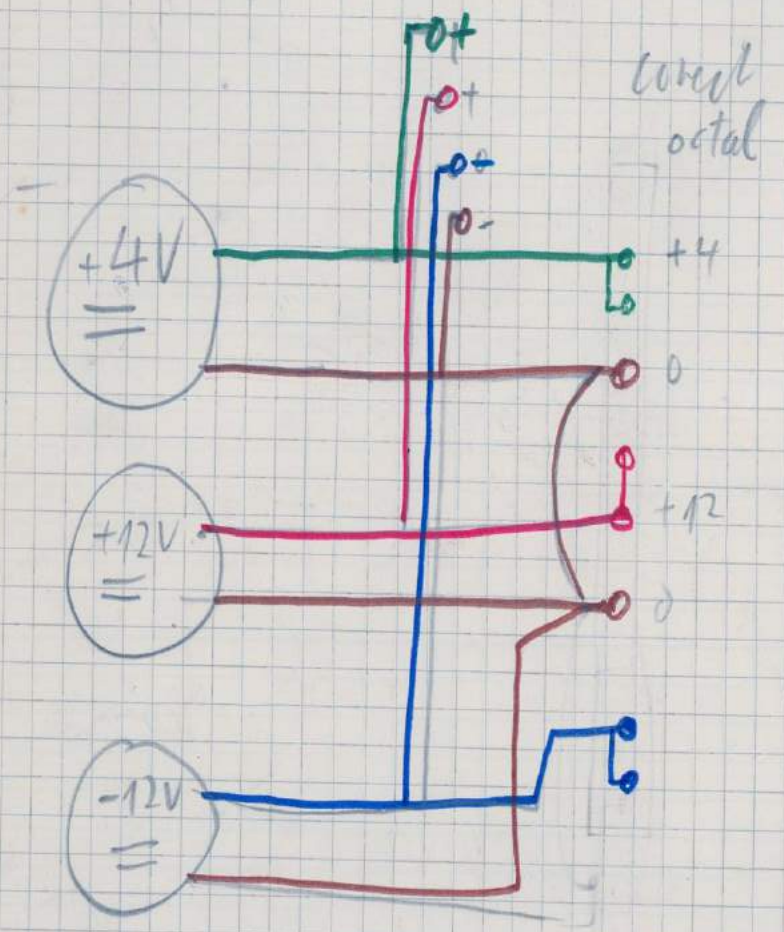
MZ 746	400W	3,9
MZ 748	400W	3,9
MZ 752	400W	5,2
MZ 759	400W	12,6

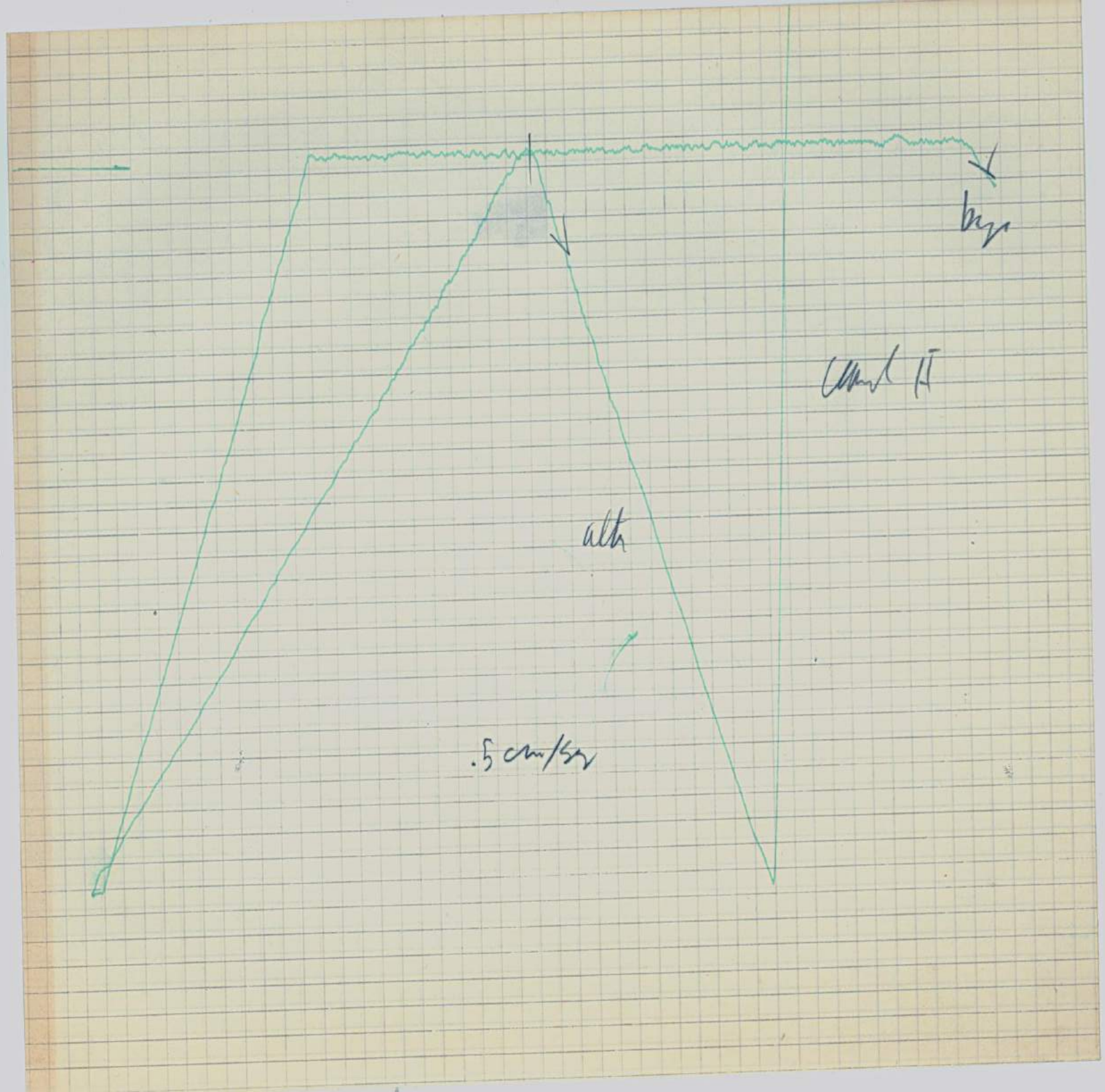


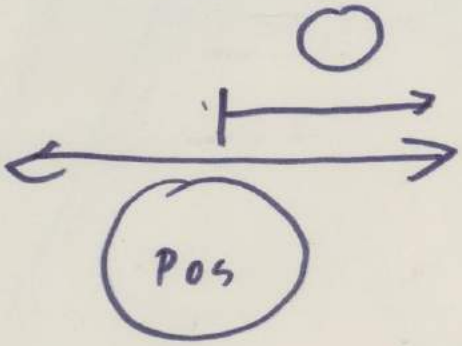
Las masas con alambre grueso aislado y conectar a chassis con 5Ω

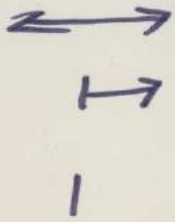



canal II
canal I
T 1 cm/seg

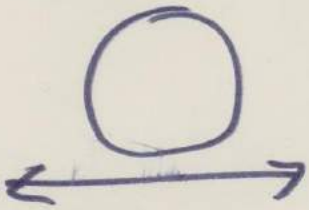

+4V
=
+12V
=
-12V
=
+
+
-
-
+4
0
+12
0
conect
octal

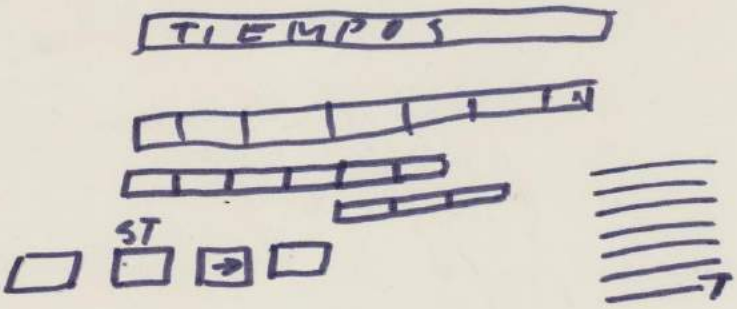

bg
alta
.5 cm/sg

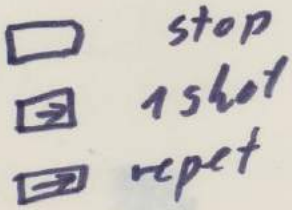




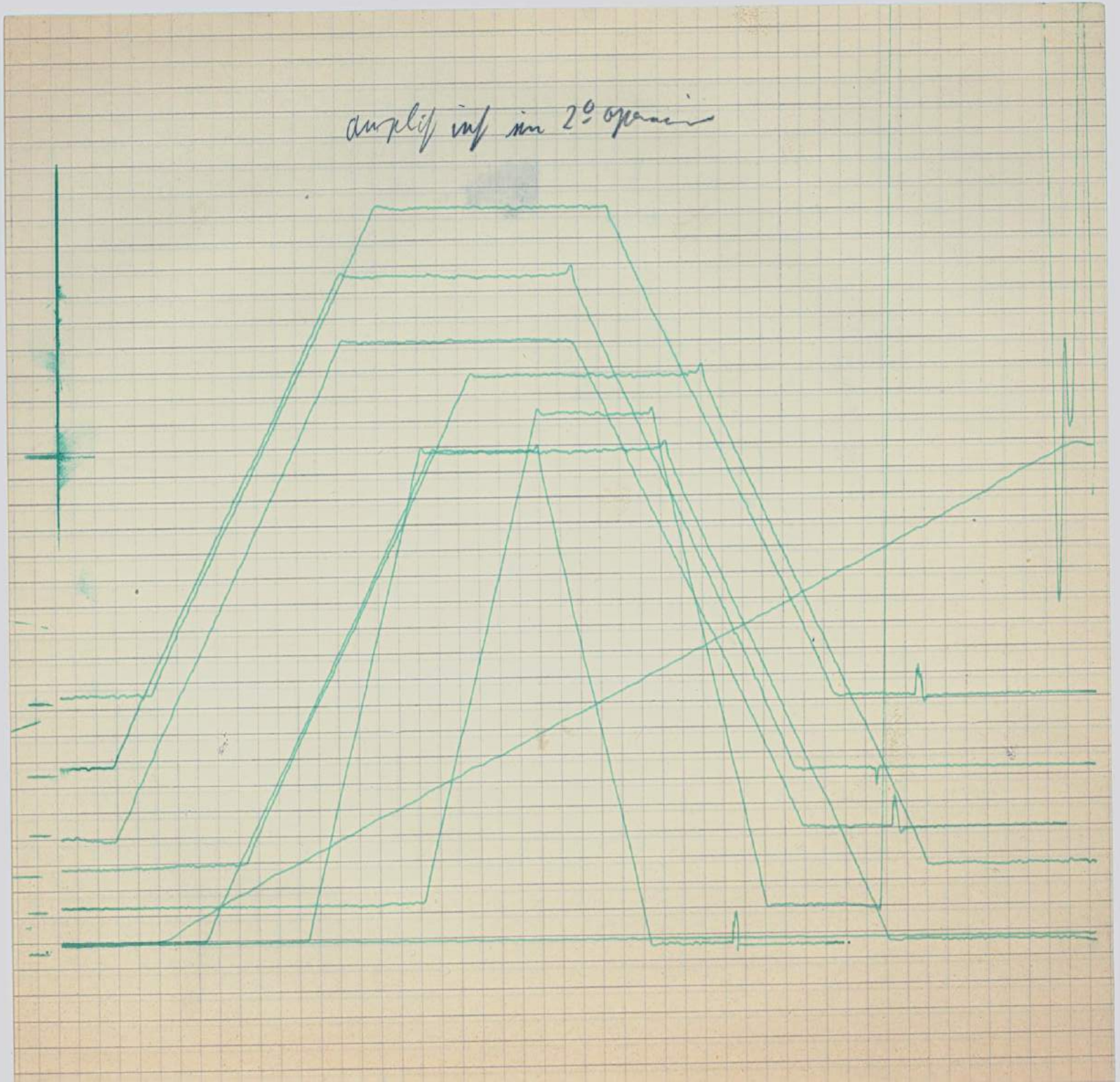
6 → destinos



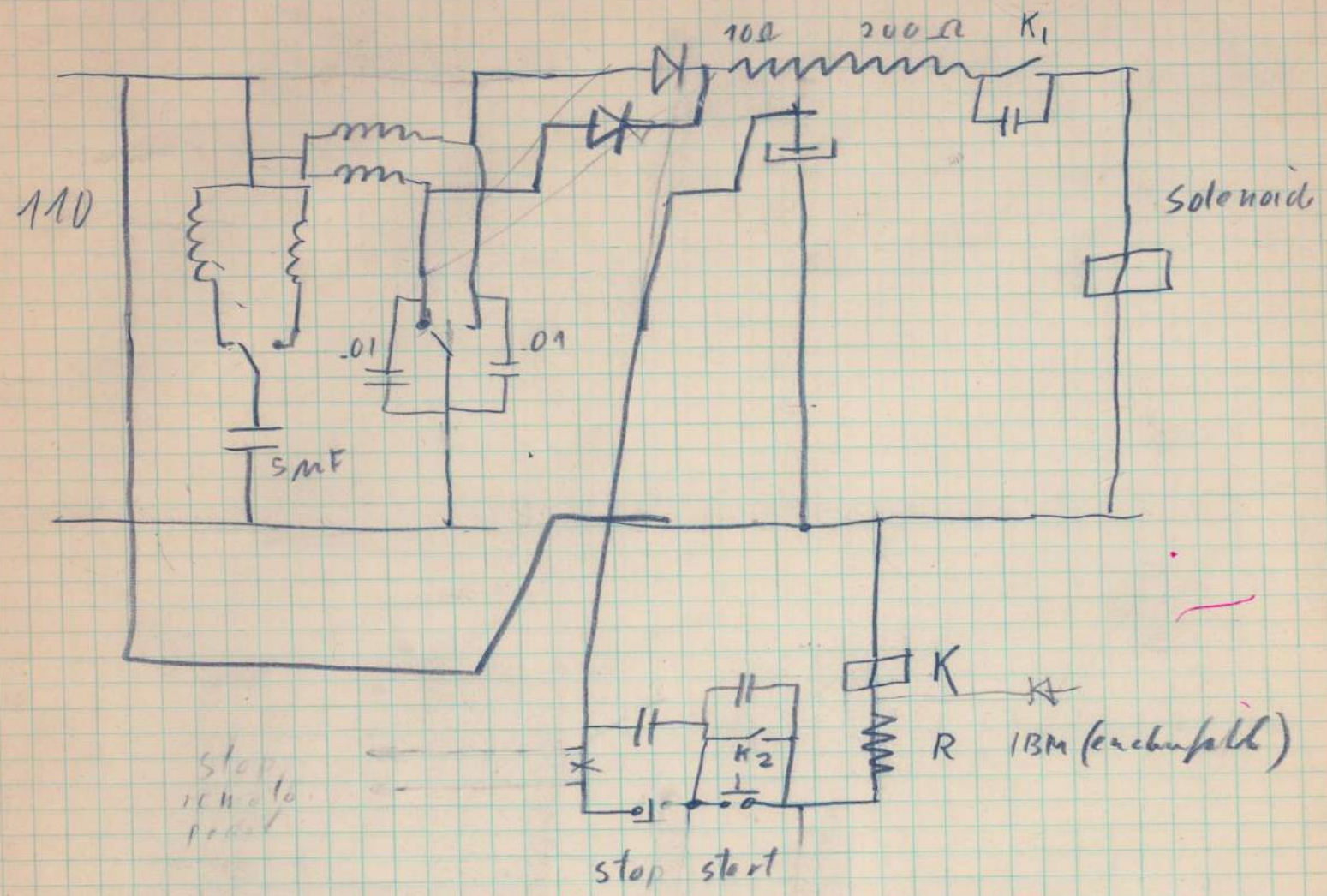


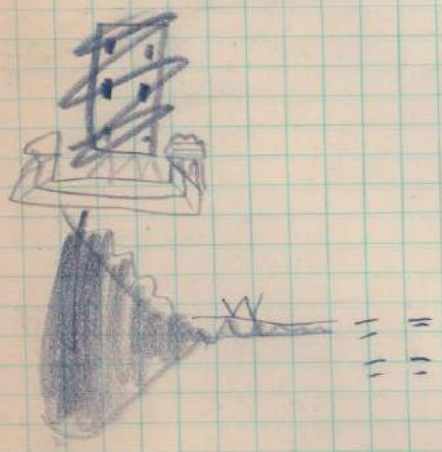


amplif inf in 2º operac



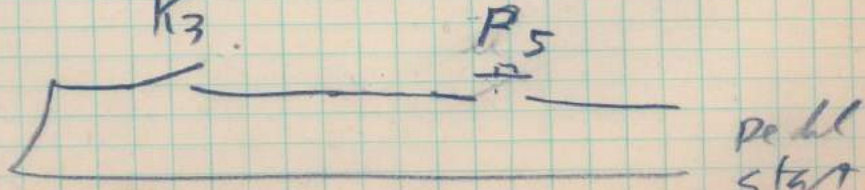
CAÏN
TEL
ON





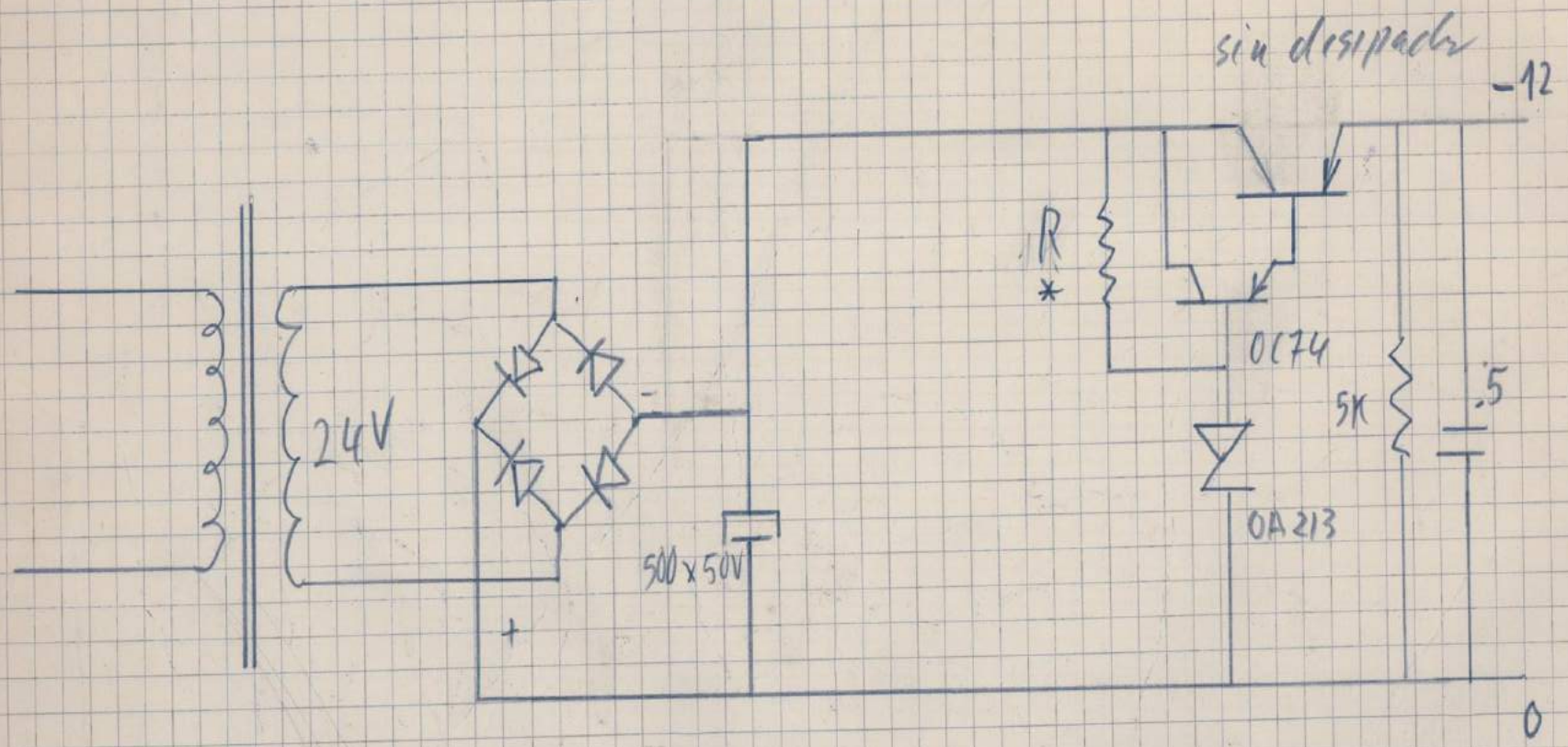
start pedal

K3 → pedal

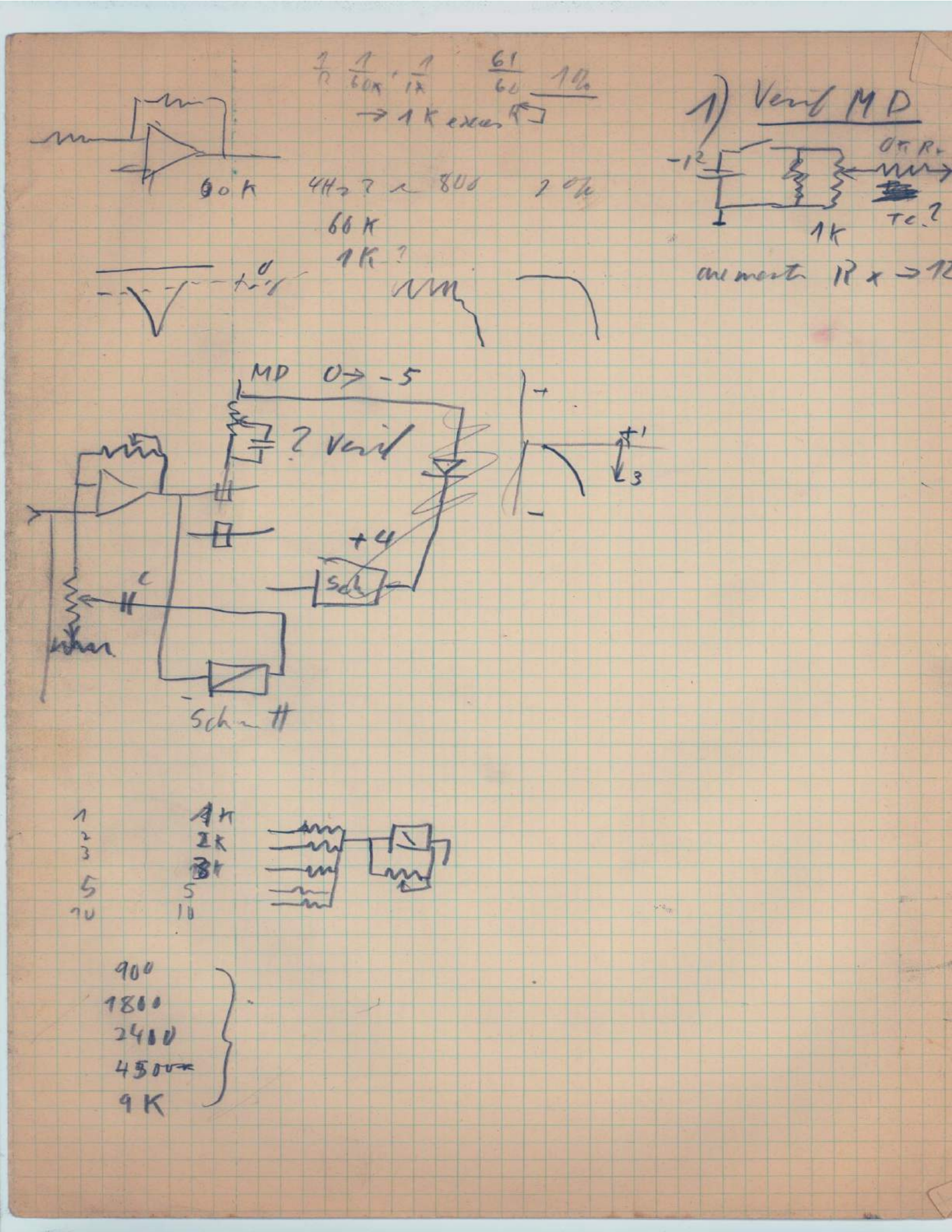


Fuente alimentación -12V

0,1
10V



R aprox 1K ajuste para ≃ 15mA


1) Verif MD
-12
1K
Tc ?
MD 0 → -5
? Verif
+4
Schr
Schritt
1
2
3
5
10
1K
2K
3K
5
10
900
1800
2400
4500
9K

Traccion PAPEL

tentativa 2 cm/s

	60 Hz	50 Hz
Motor	38 cm/s	≈ 31 cm/s
	19 cm/s	≈ 16 cm/s

eje 6 cm 3,14 D. 31/1,9 = 16,5 rps

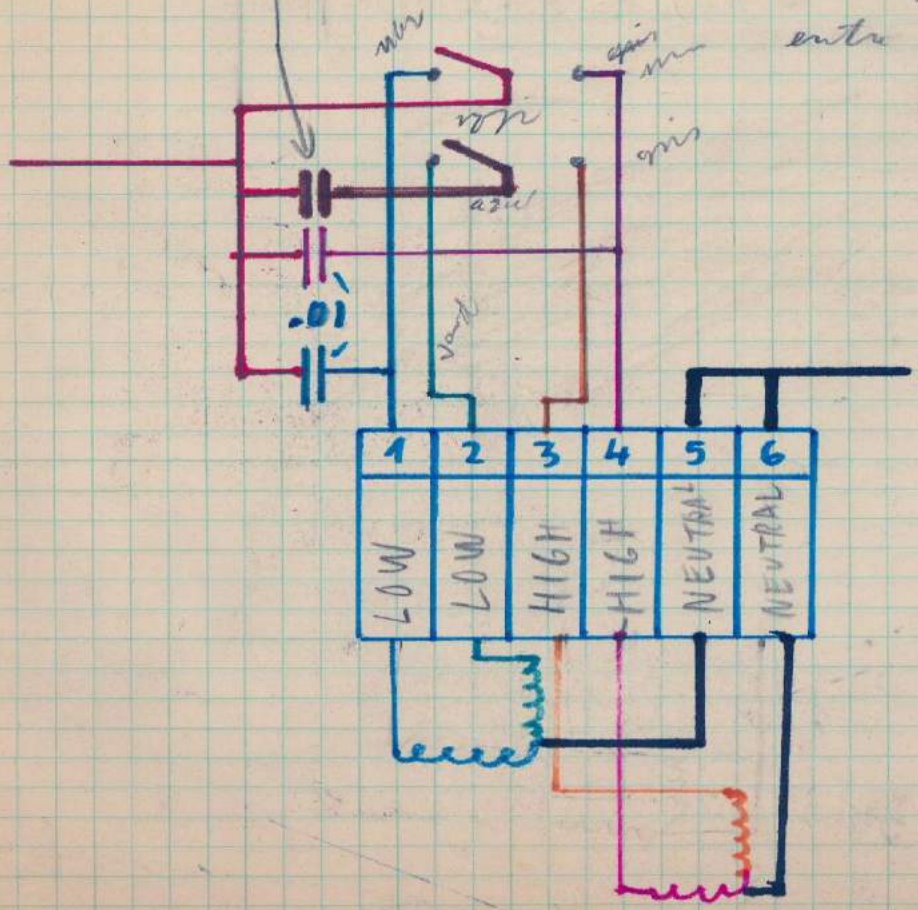
cinta = 19 cm 16/1,9 = 8,4 rps

% 10 para 60 cm ?

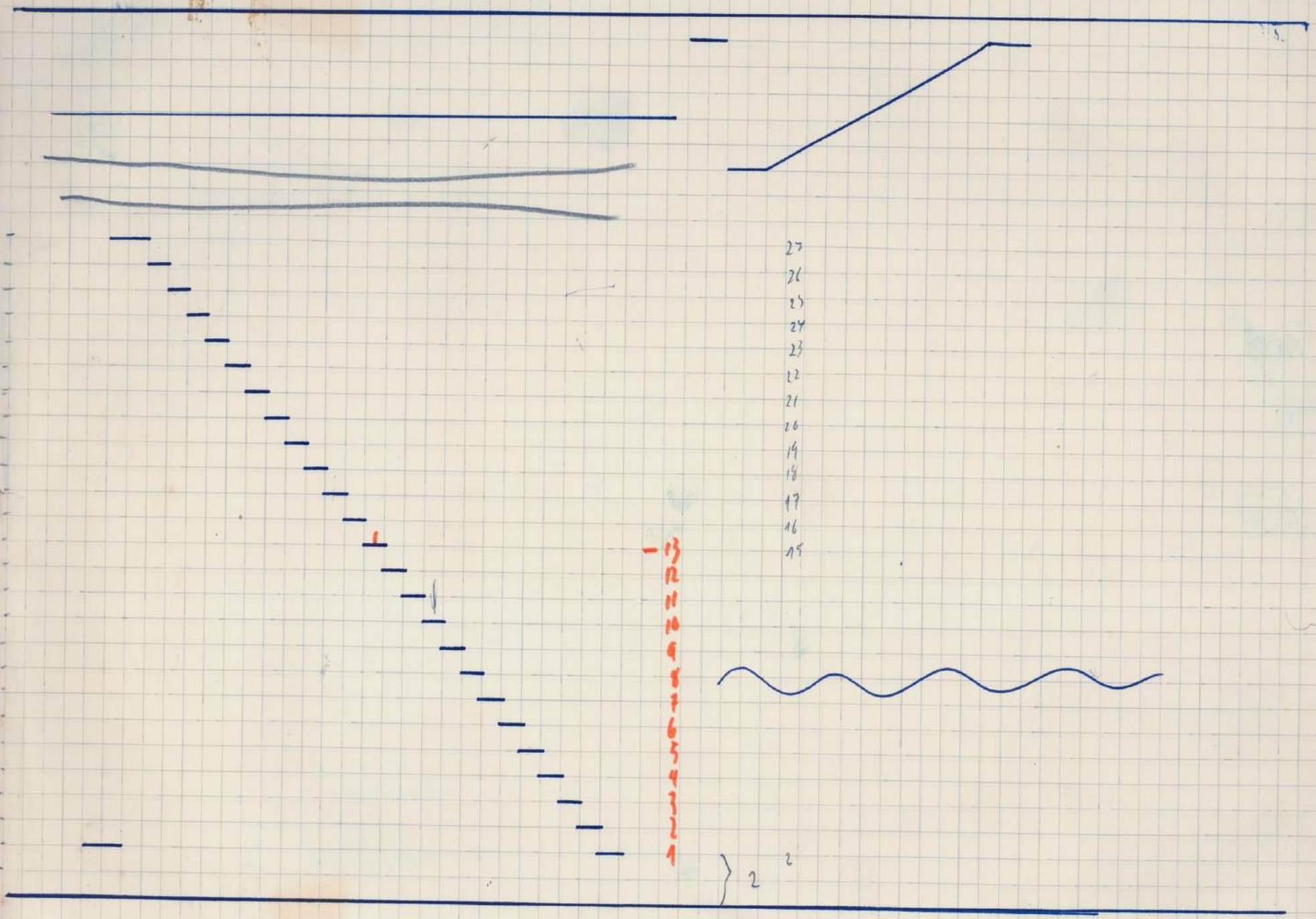
Valor Fac 1 y 3 cm/s

valor a observar o medir

desenchufar motor y medir entre llave



AFINACION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3
2
1
2

+1	130,8	130					8,2
+2	138,6	132			137		
x	146,8	141		136			8 2
+3	155,6	150		142			9
+6	168,8	160		154			
-1	174,6	170		162			
+1	185	182		173			
-1	196	189		184			
-+2	207,6	199		195			
-2	220	210		202			
+3	233,1	223		218			
x	246,9	238		229			
+1	261,6	249		246			
+1	277,2	267		258			
-2	293,7	285		274			
+2	311,1	297	297				
+5	329,6	313		305			
+3	349,2	334		323			
+8	370	352		344			
+7	392	371		360			
+8	415.3	393	383				
+9	440	415	402		486	408	
461 +5	466.2	445	430		430		
+1	495,9	475	455	466			
525-2	523,2	504	486	496			
		523			534		

400 ~

128

134

143

525] 32

493

130

46I] 32

43~~I~~-I]

261

~~4I2~~ 407

523

385

~~367~~ 362

346

324

309

29I

278

260

246

230

2I8

205

I95

I86

I75

I62

I52

I46- I43

I36 - I34

I29

130
138,6
146,8
155,6
168,8
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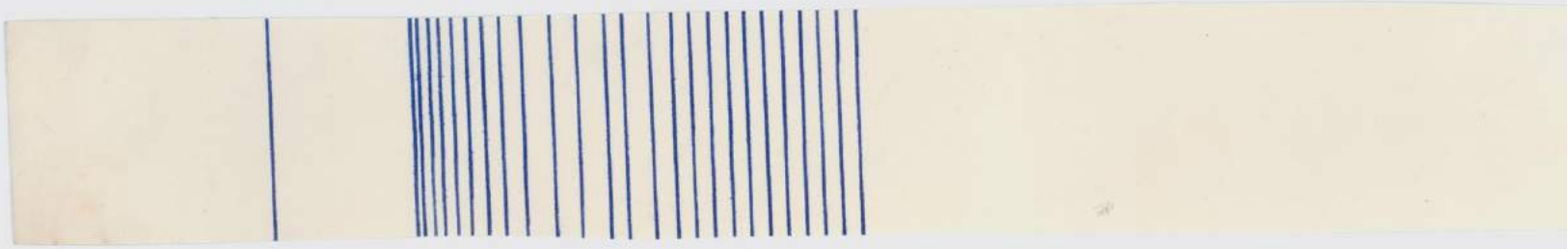
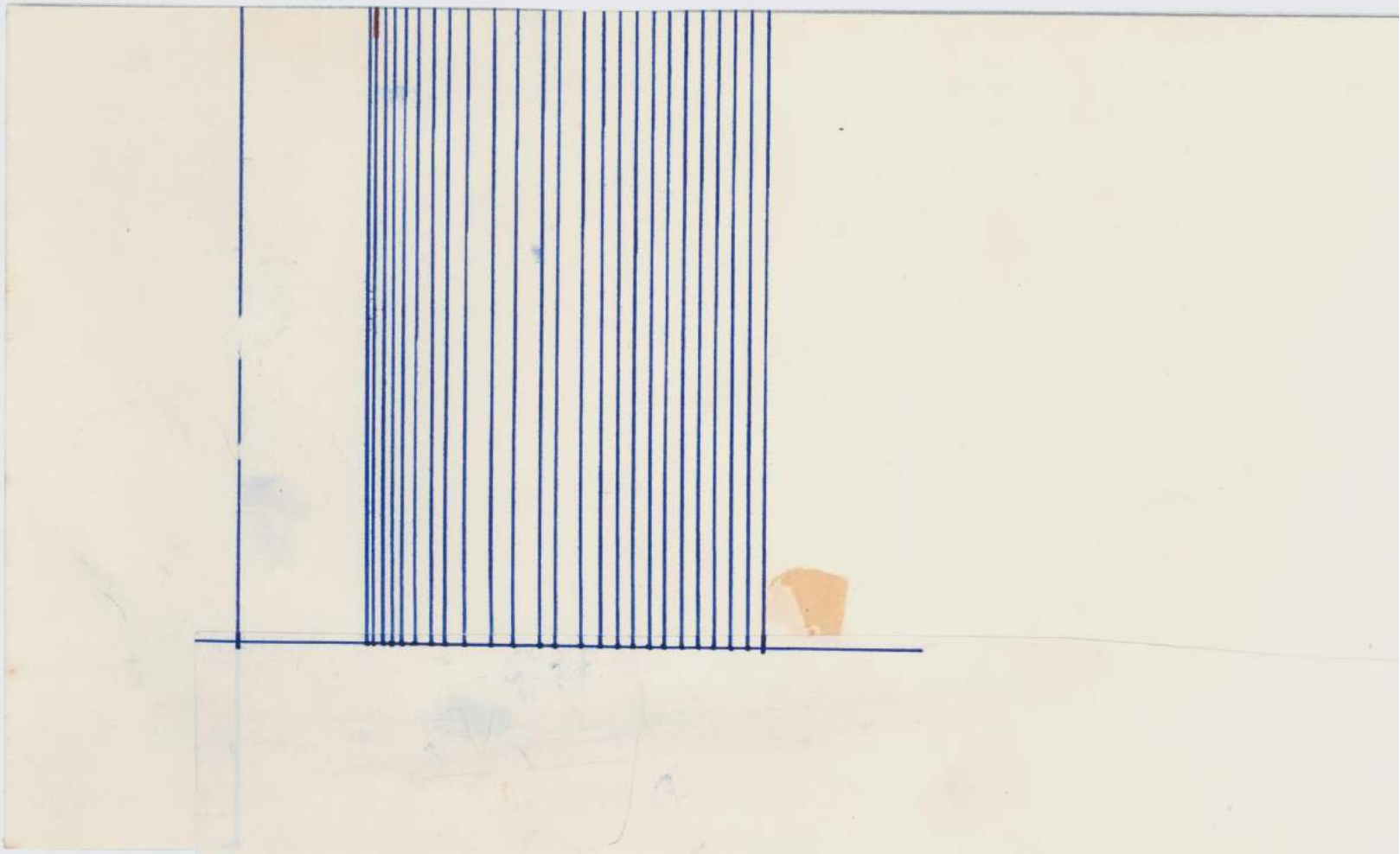
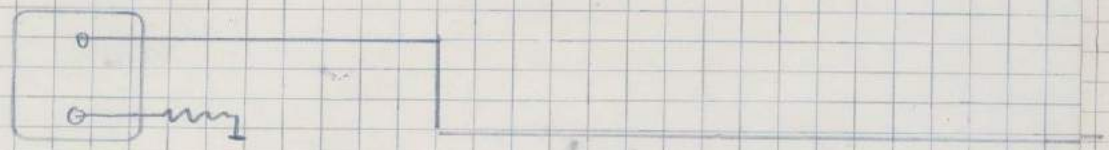
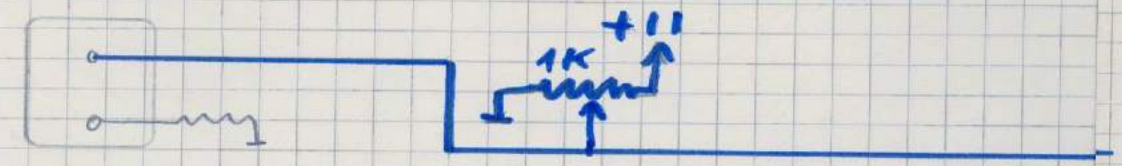
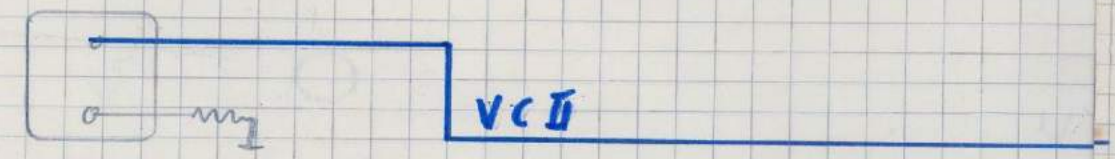
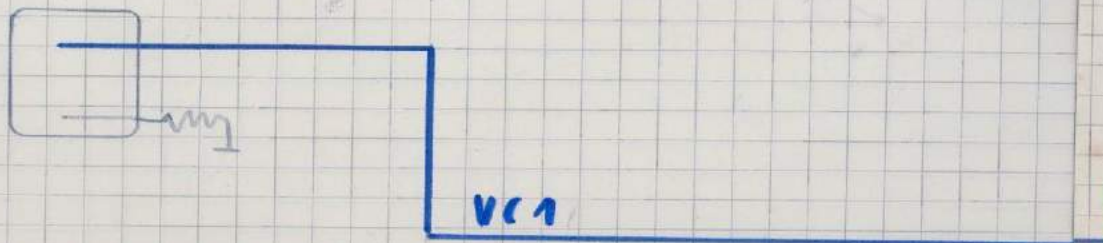


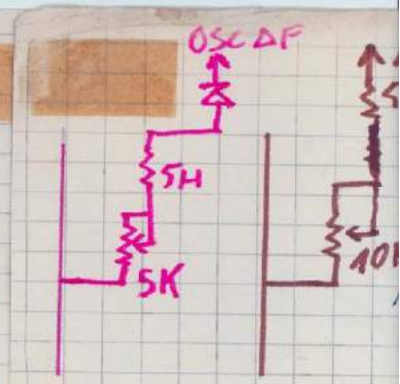


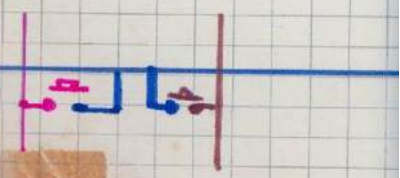


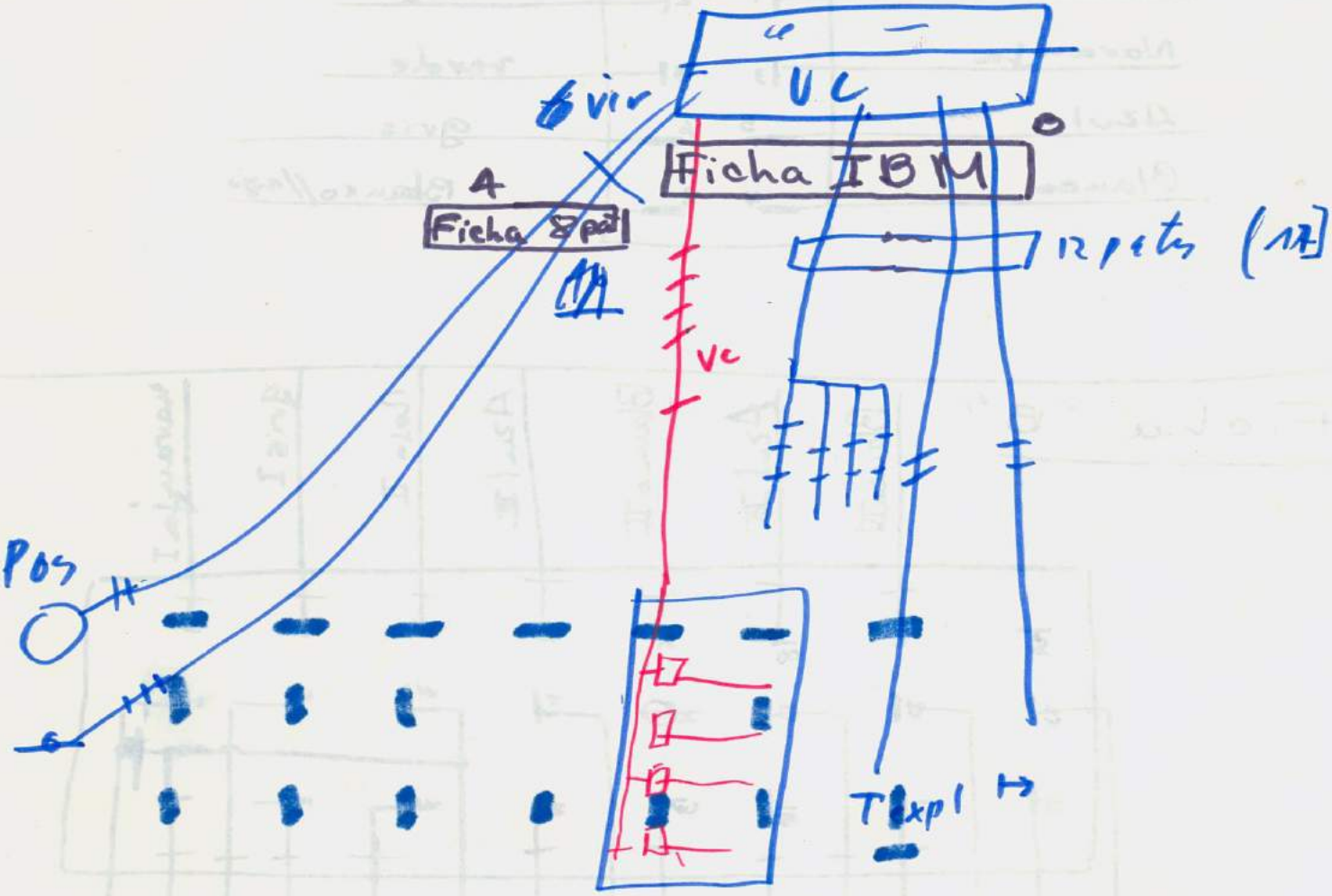

1K
+11


VCII


VC1

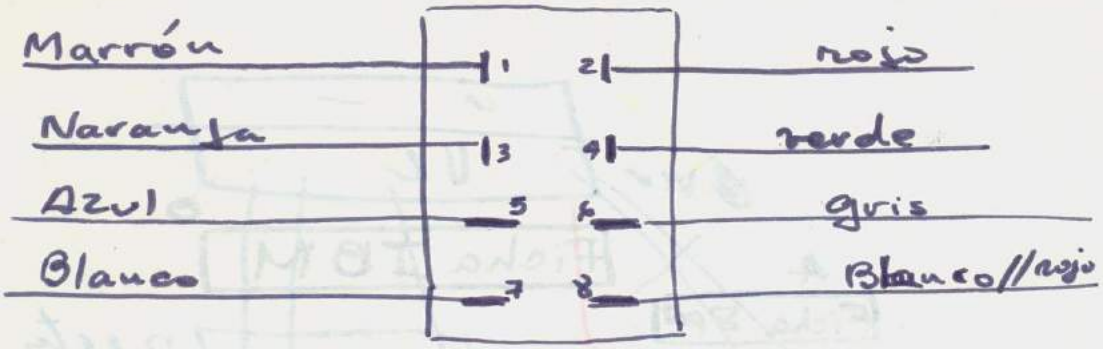

OSC ΔF
5H
5K



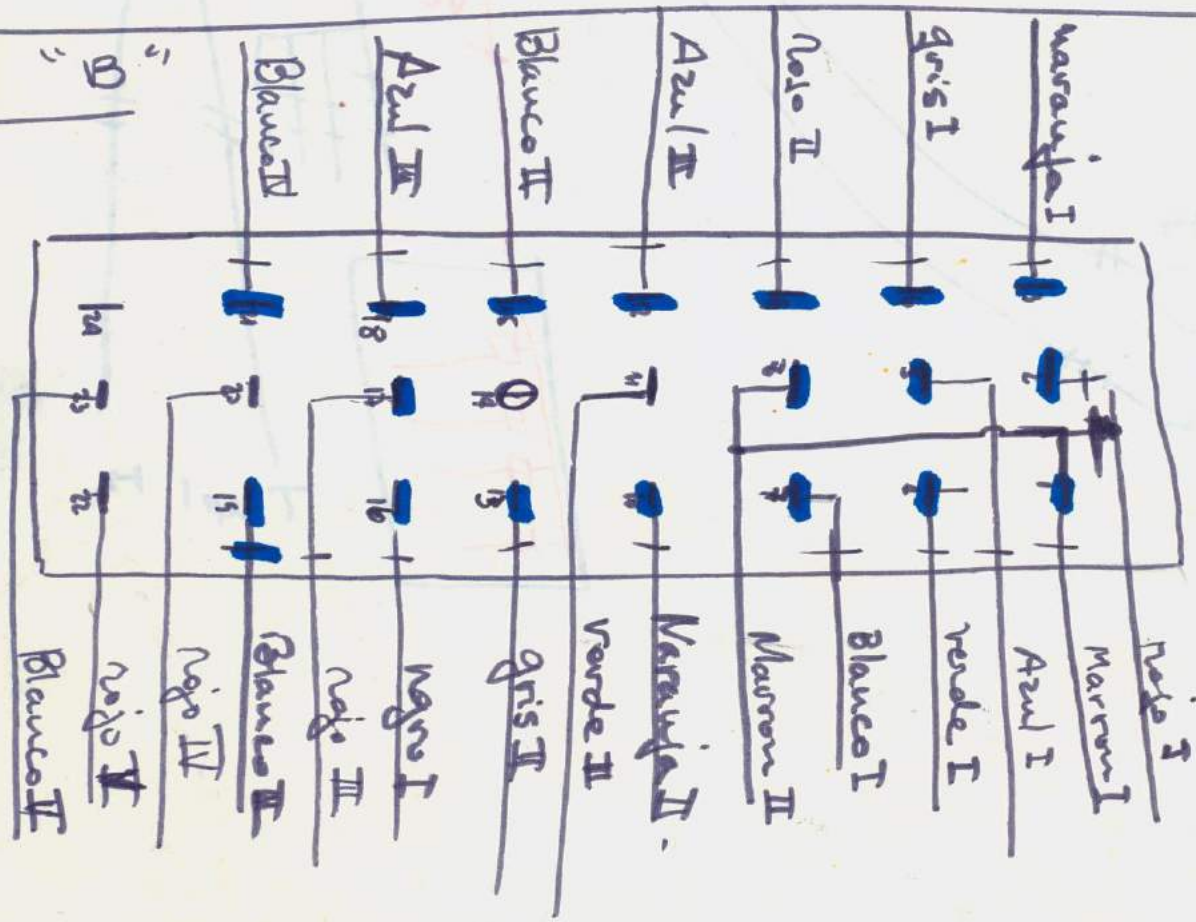

UC
Ficha IBM
Ficha 8pol
12 pts (12)
Pos
Texp

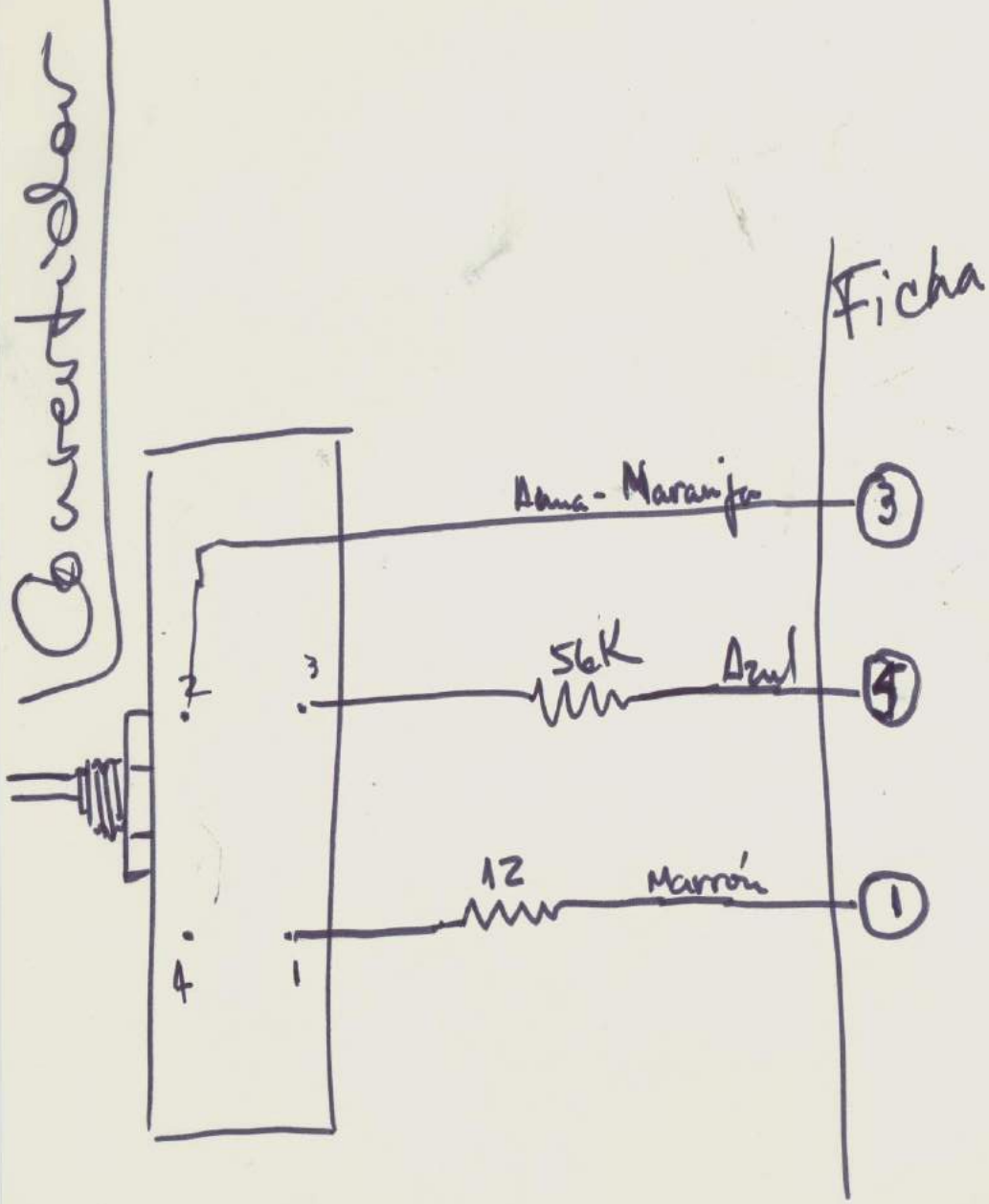
Convertidor

Ficha "A"

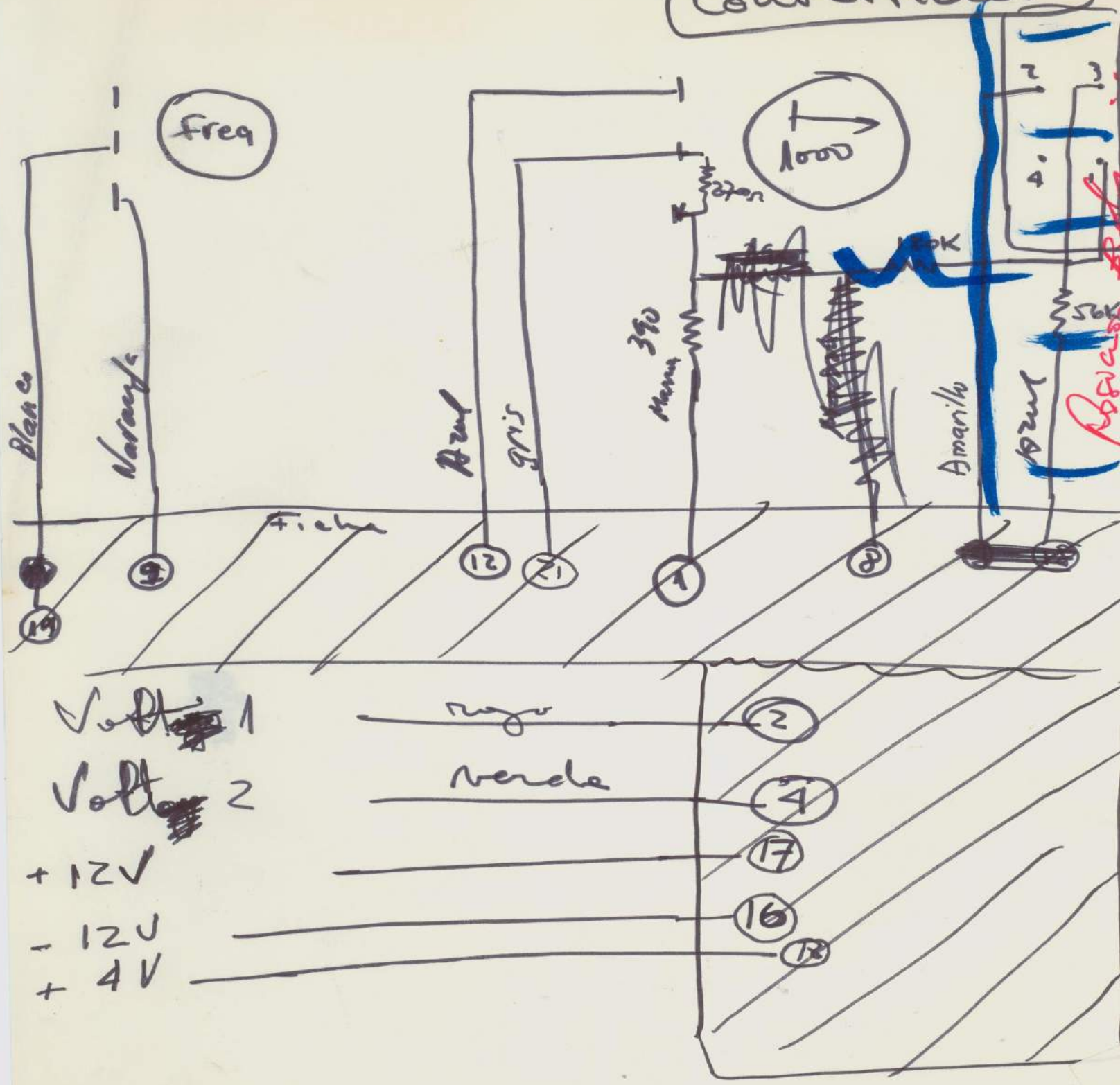


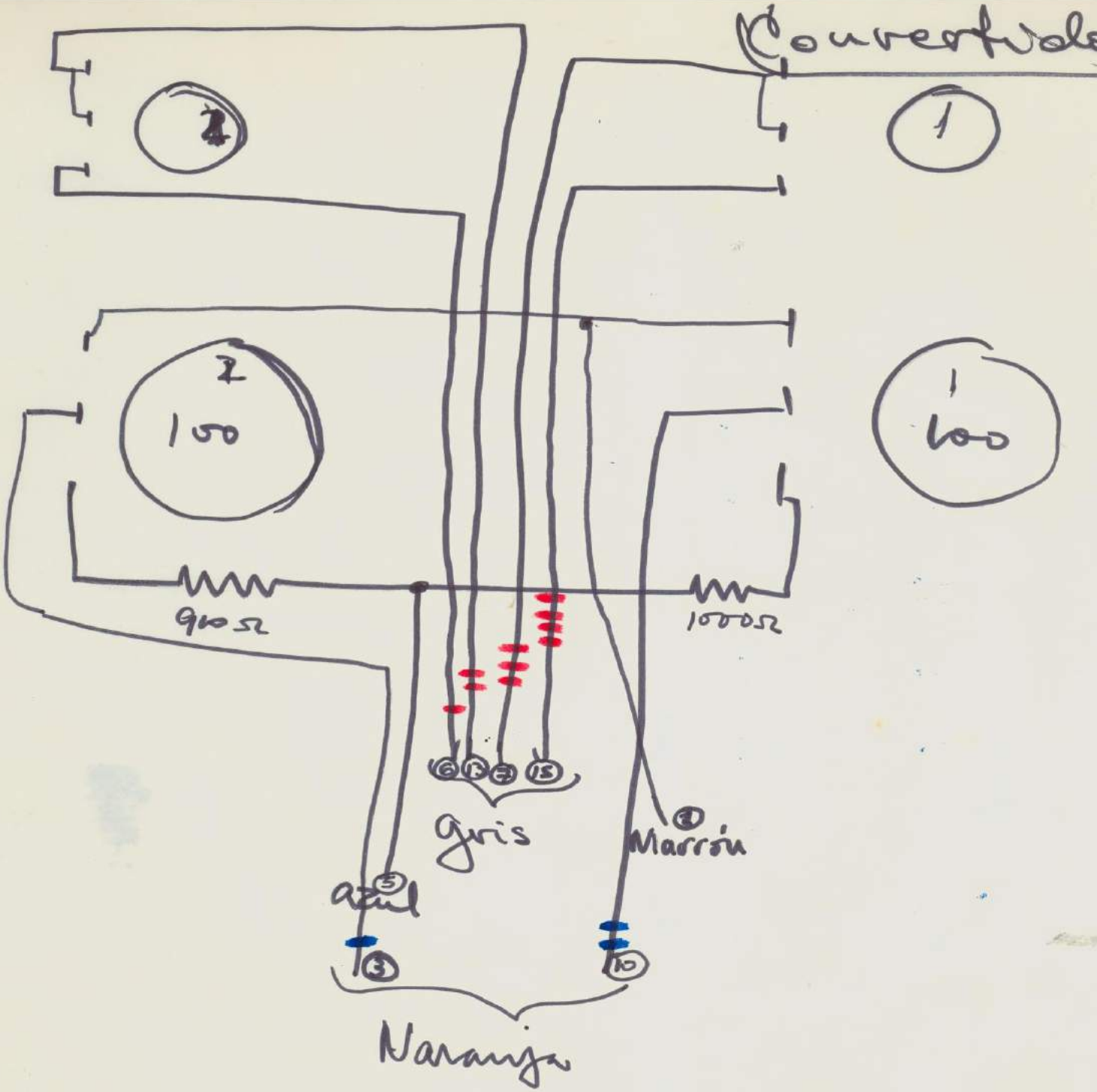
Ficha "B"




Controlador
Ficha
Rosa - Naranja
3
56K
Azul
4
12
Marrón
1
2
3
4
1

(Convertidor)




Convertible
1
2
2
100
1
100
90Ω
1000Ω
6
7
8
15
gris
1
Marrón
5
azul
3
10
Naranja

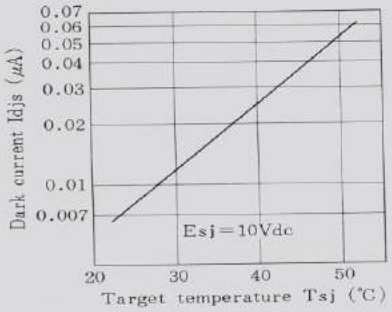
Inhibición

Ring Quartz
ajustable

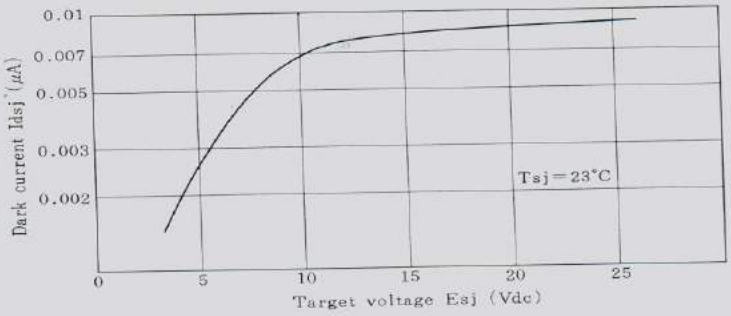
bloques pasan arriba
[illegible]

CHARACTERISTIC CURUVES

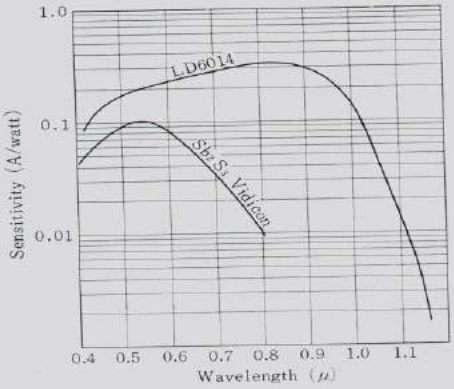
Dark current vs. temperature characteristics



Dark current vs. target voltage characteristics



Photosensitivity characteristics



Typical persistence characteristics

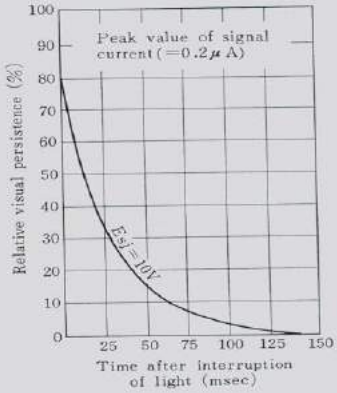
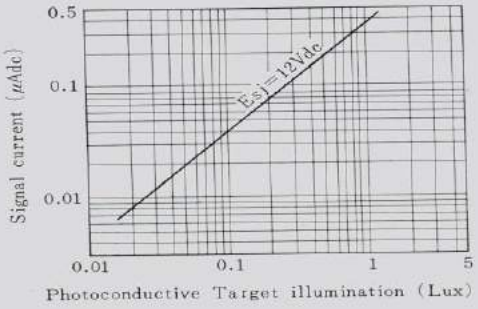
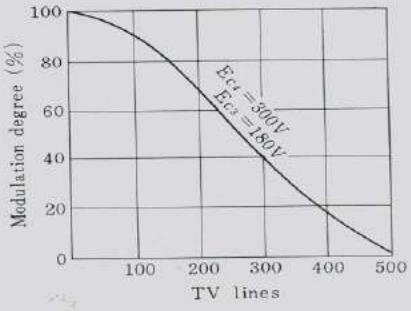


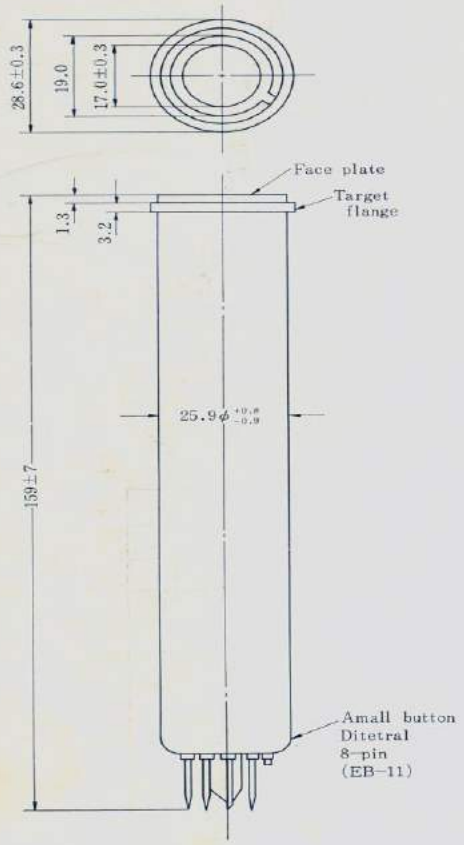
Photo-electric Transfer characteristics

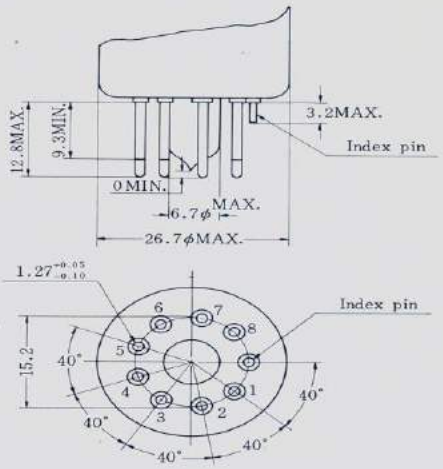


Resolution characteristics



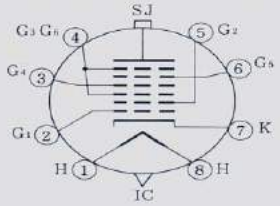
OUTLINE DRAWING (Unit in mm)





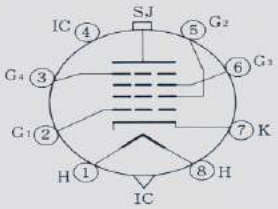
Connection diagram (Bottom view)

LD 6001



Index pin

LD 6014

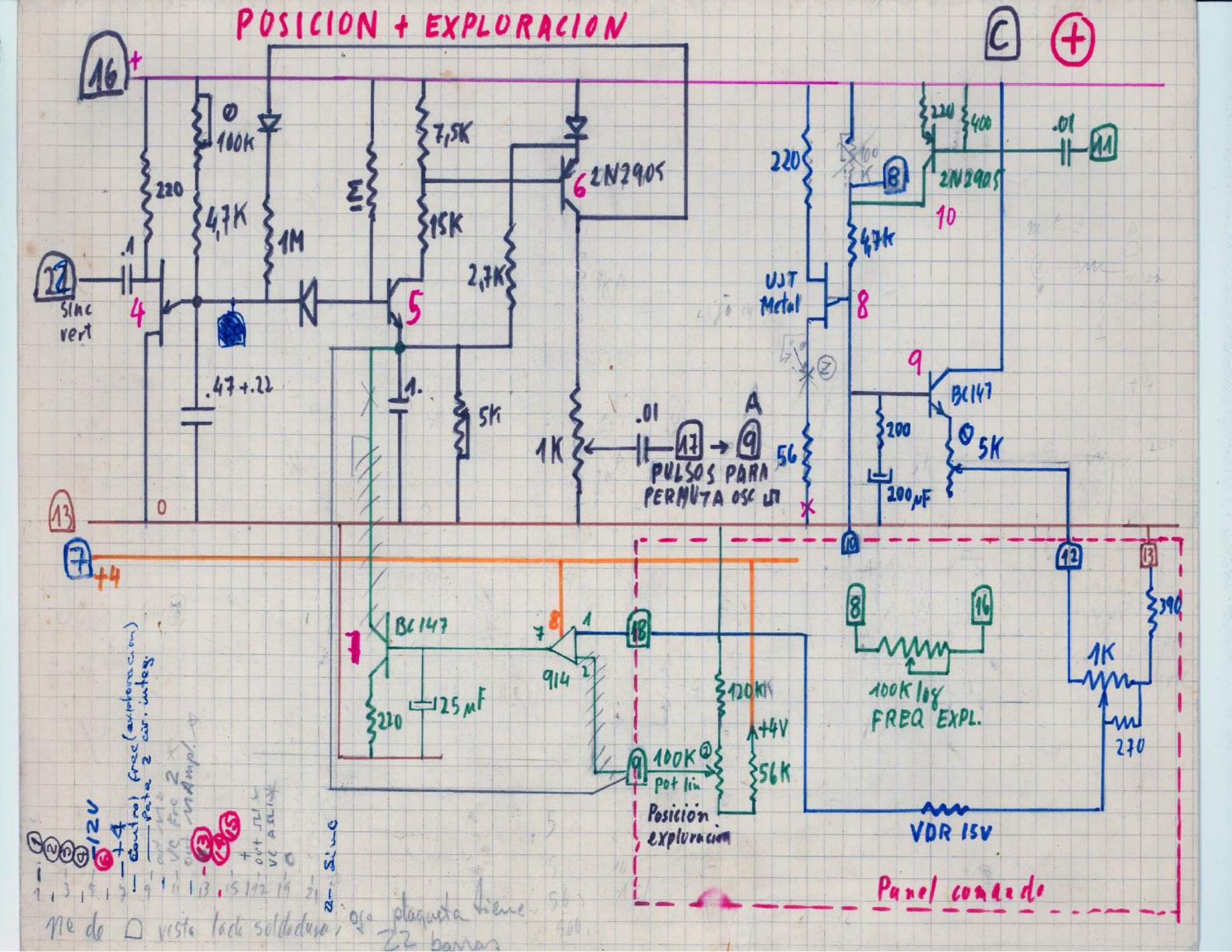


Index pin

Nippon Electric Company, Limited

7-15, Shiba Gochome, Minato-ku, Tokyo, Japan
Tel: Tokyo 452-1111
Cable Address: "MICROPHONE TOKYO"
Telex Address: NECTOK A J22686

7203-1000-M
Printed in Japan


POSICION + EXPLORACION
16
+
C
+
100K
220
4,7K
1M
7,5K
15K
2,7K
2N2905
6
.1
22
Sinc vert
4
5
.47+.22
1.
5K
1K
.01
17
A
9
PULSOS PARA PERMUTA OSC
220
400
.01
11
2N2905
10
8
4,7K
UJT Metal
8
9
BC147
200
200µF
5K
56
13
0
7
+4
BC147
7
8
1
914
2
18
220
25µF
120K
+4V
56K
100K
pot lin
Posición exploración
8
16
100K log
FREQ EXPL.
12
13
390
1K
270
VDR 15V
Panel comando
12V
+4
Sinc
Pata 2 cir. integ.
Amp.
VC Exc 2
VC ALIM
nº de ☐ vista lado soldadura, ojo placuela tiene 22 barras

FOTOS Convertidor A

1 sync

2 ⏚

3 1V pos cc NC

4 H ~~pos~~ 1V

5 " " 2V

6 "

7 +4V

8 NC

9 vert

10 variable timing

11 NC pos sync -2V

12 ~~Horz~~ vert pos

13 " neg

pos a mon

14 MON OUT

15

16 ⏚

17 0

vert

18 ~~-12~~ 0

5V -12 vert

19 0

-12 vert

0,5V

20 Horz 0

video normal

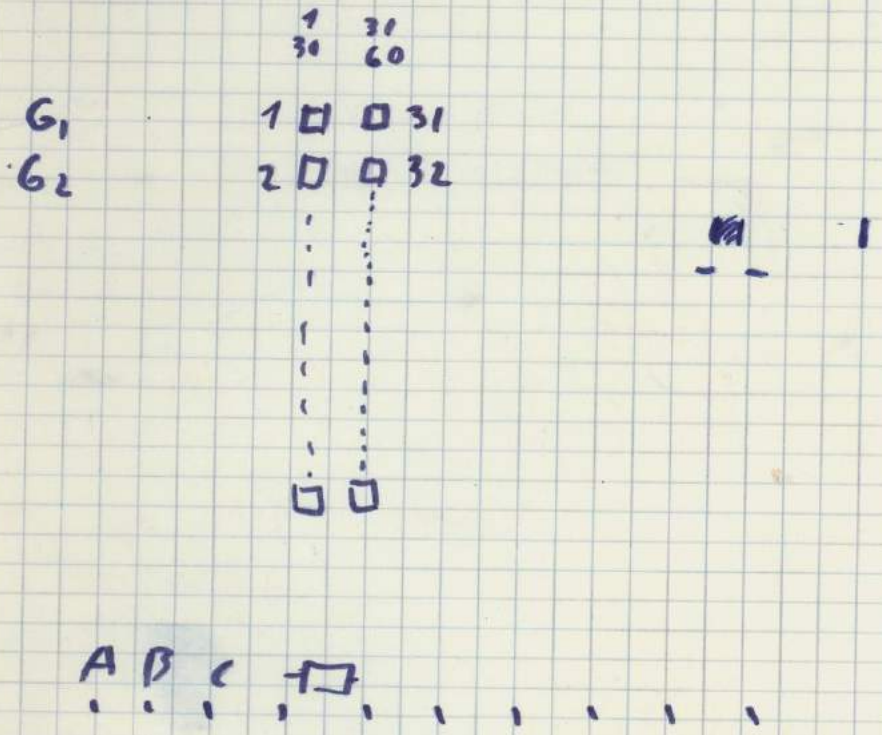
polarity control ⊘ blanco

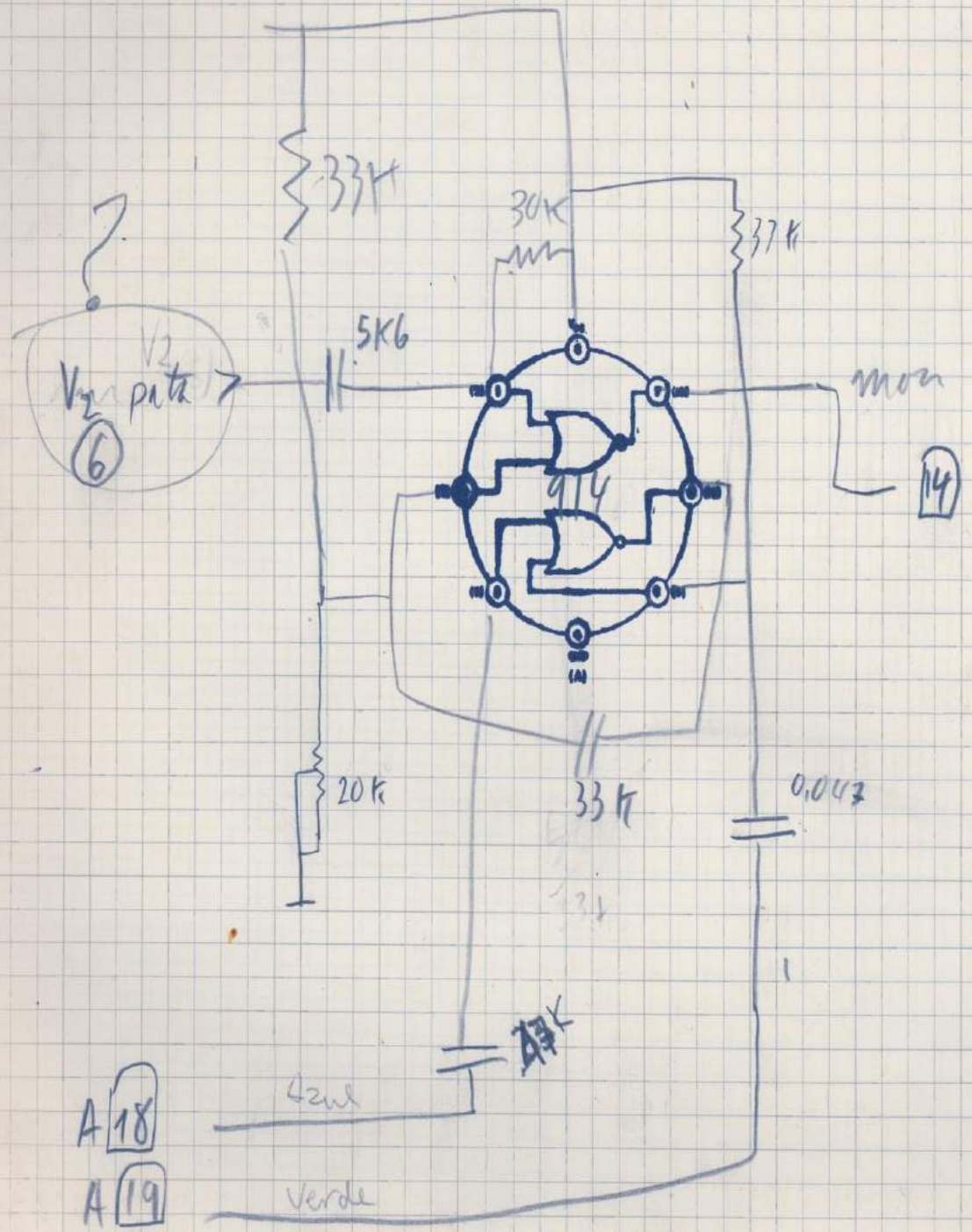
21 +4V

22 ~~vert~~ horz 1,2V

stopper Bung

~~30 x 5 vias~~ 60 x 5 vias





A

A vacantes → 3 8 ~~11~~ 14

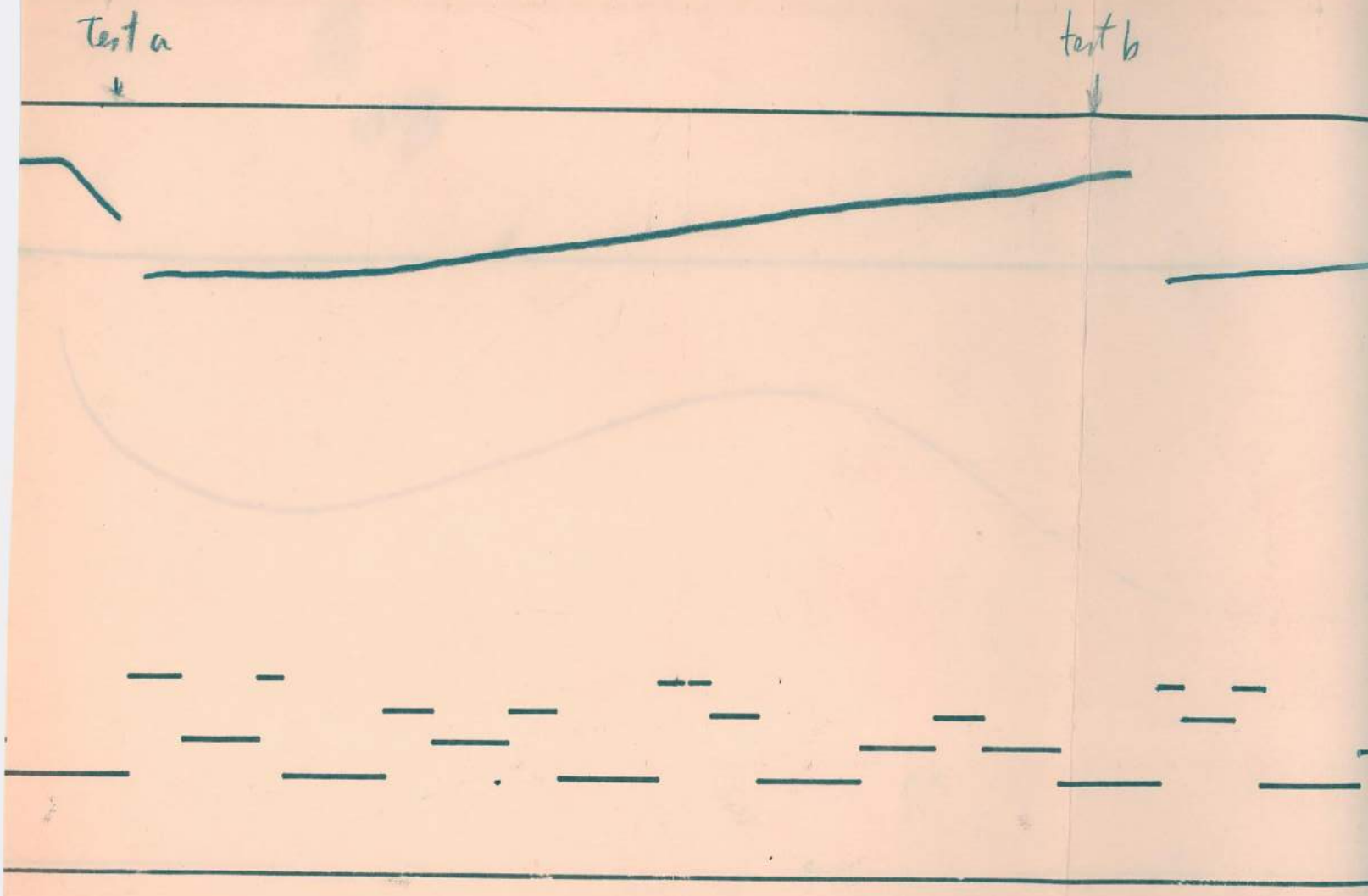
18 ~~19~~

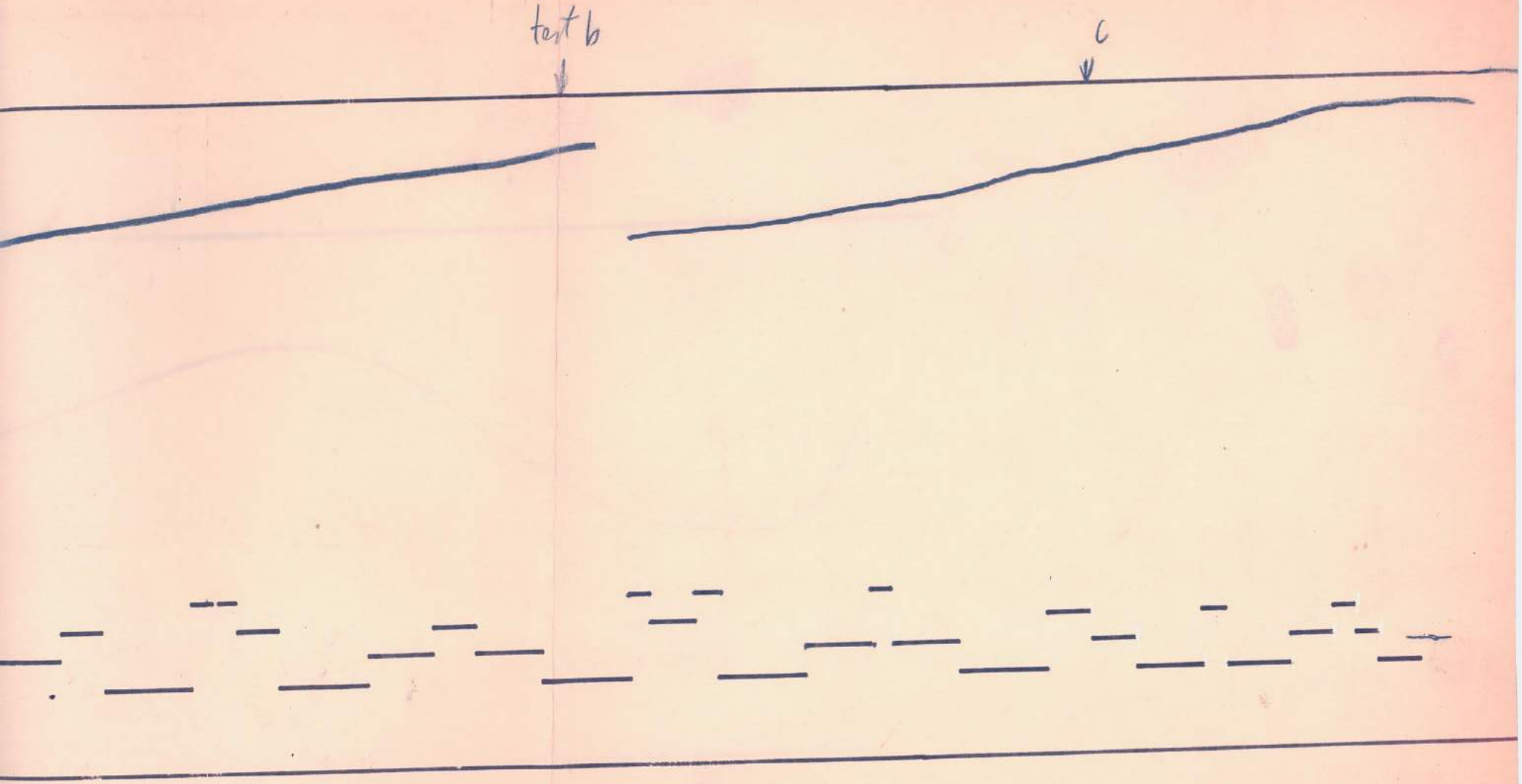
B vacantes 1 4 ~~5 8 9 10~~ 11

~~12 13 14 15~~

17 18 19

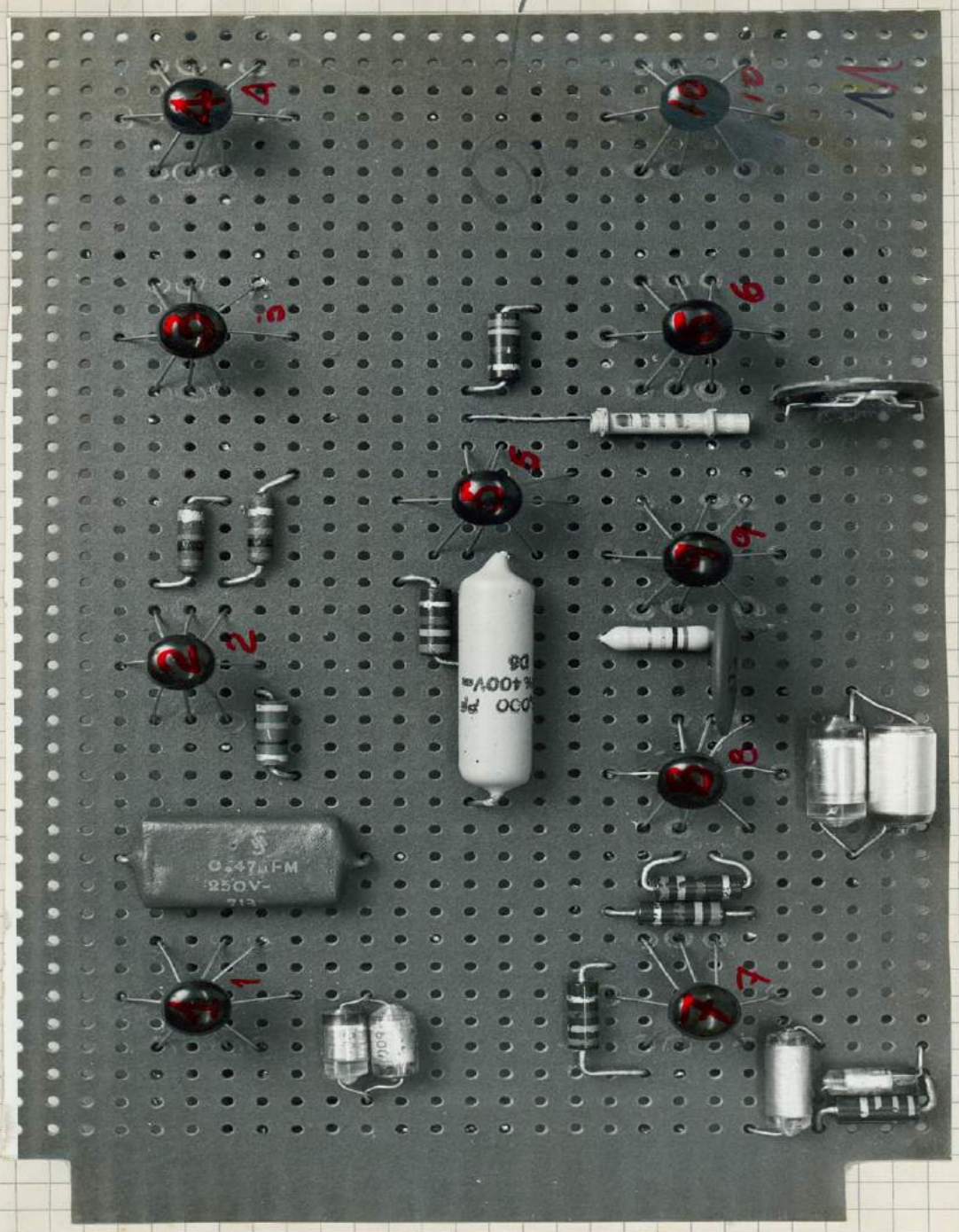
~~20 22~~


Test a
test b

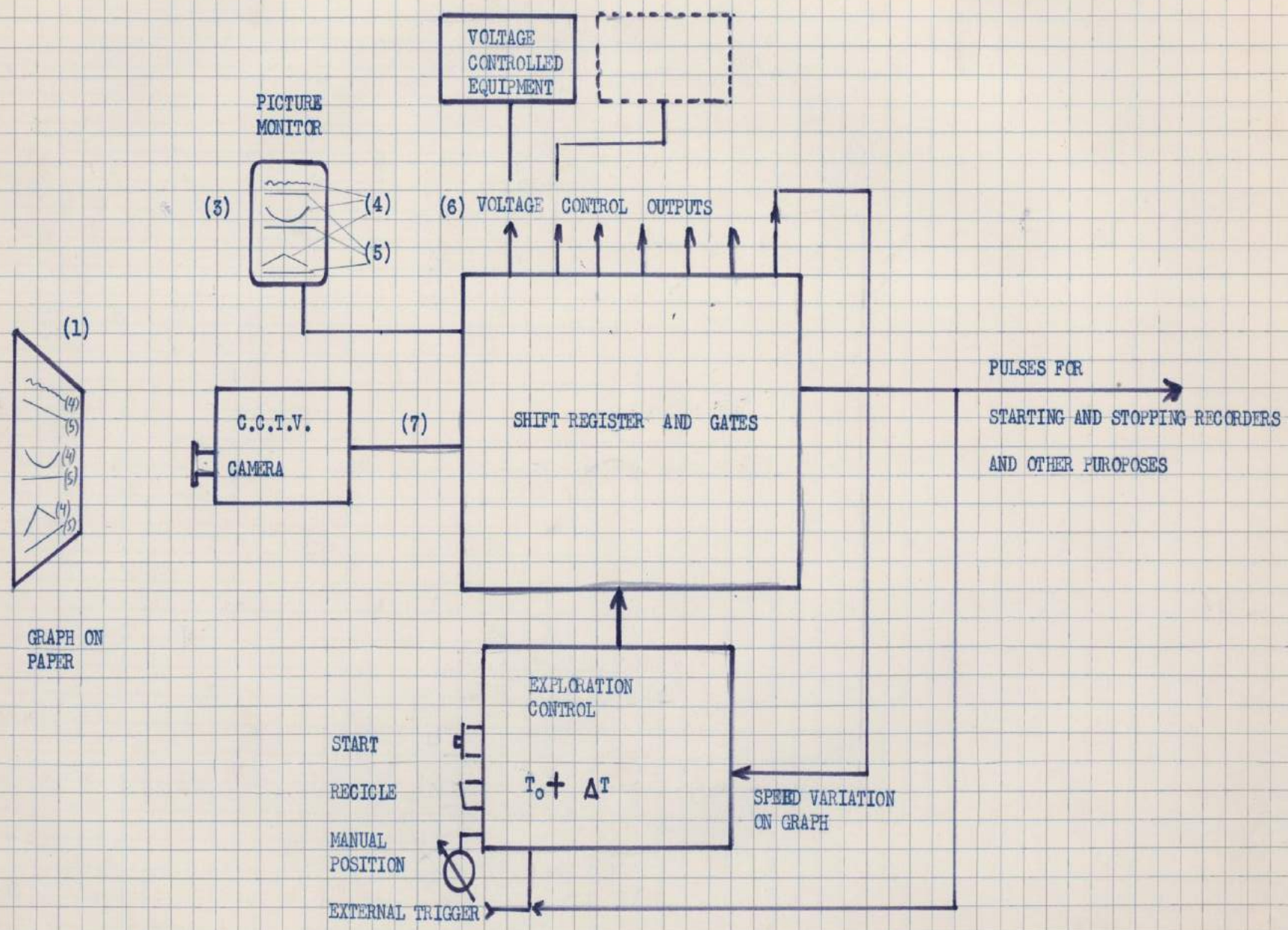

test b
c

A

914 display digital

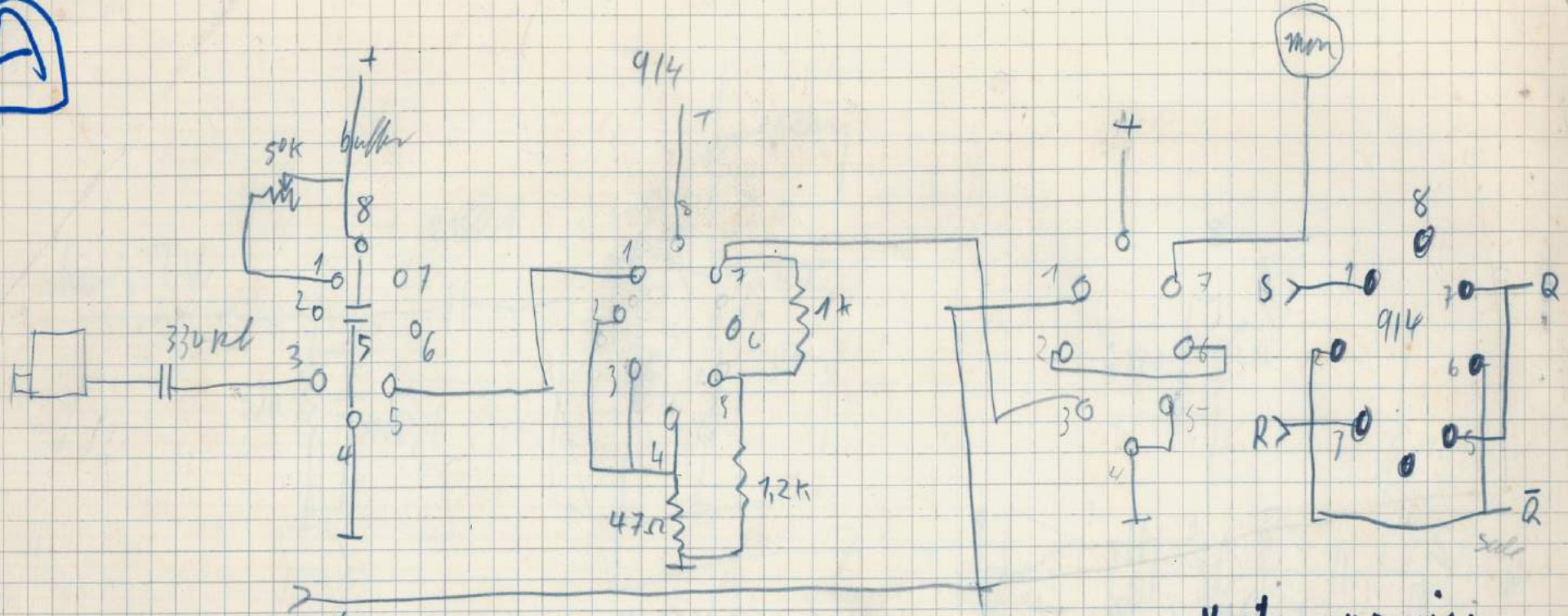


A

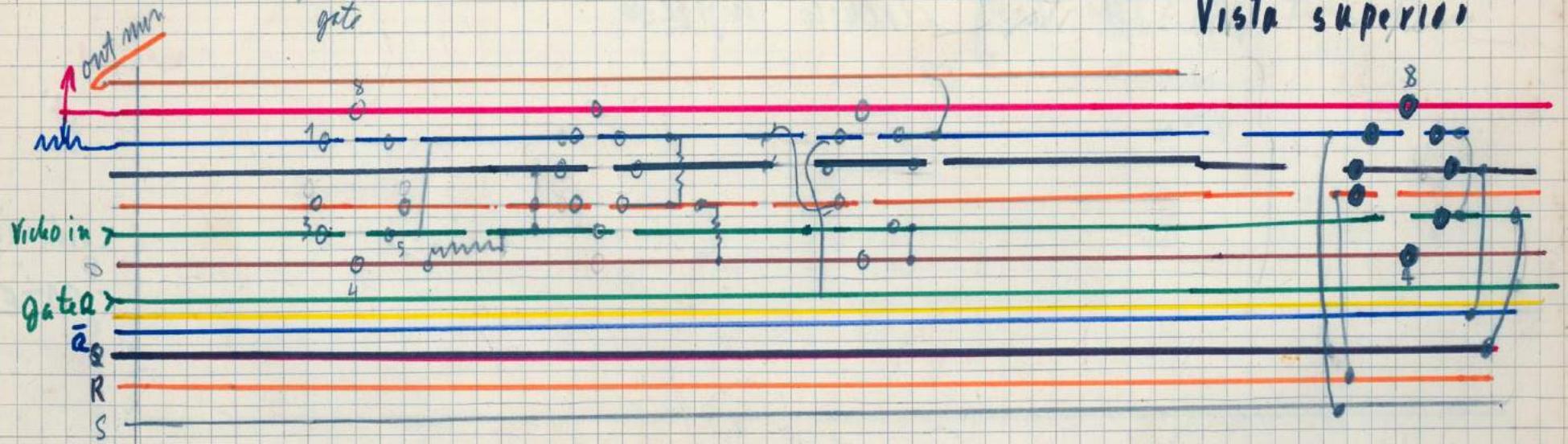

VOLTAGE CONTROLLED EQUIPMENT
PICTURE MONITOR
(3)
(4)
(5)
(6) VOLTAGE CONTROL OUTPUTS
(1)
(4)
(5)
C.C.T.V. CAMERA
(7)
SHIFT REGISTER AND GATES
PULSES FOR
STARTING AND STOPPING RECORDERS
AND OTHER PUROPOSES
GRAPH ON PAPER
EXPLORATION CONTROL
START
RECICLE
$T_o + \Delta T$
SPEED VARIATION ON GRAPH
MANUAL POSITION
EXTERNAL TRIGGER

15

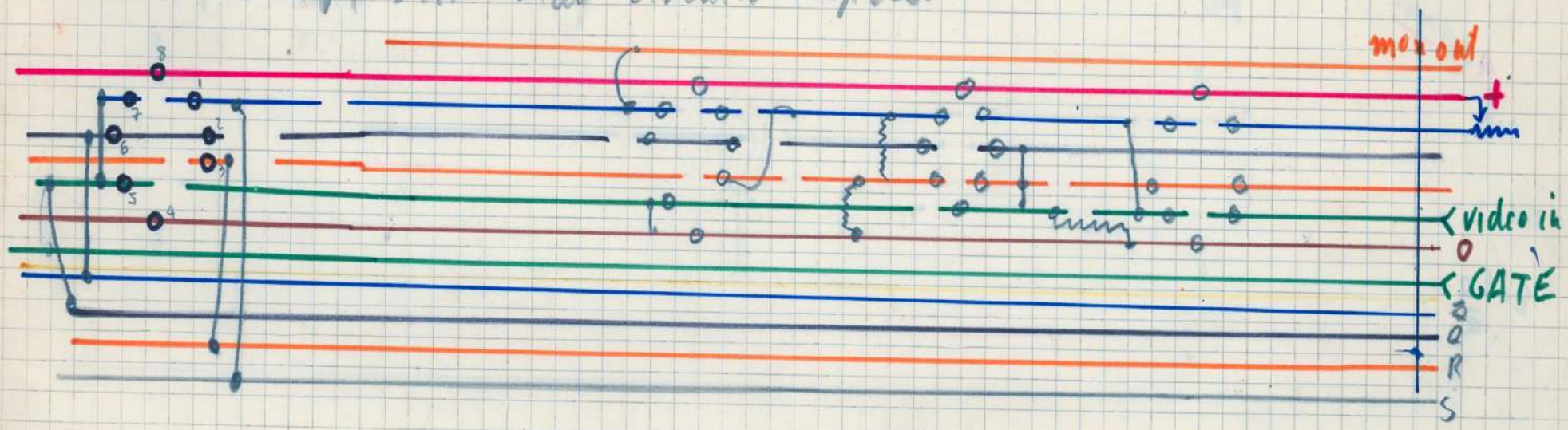
A

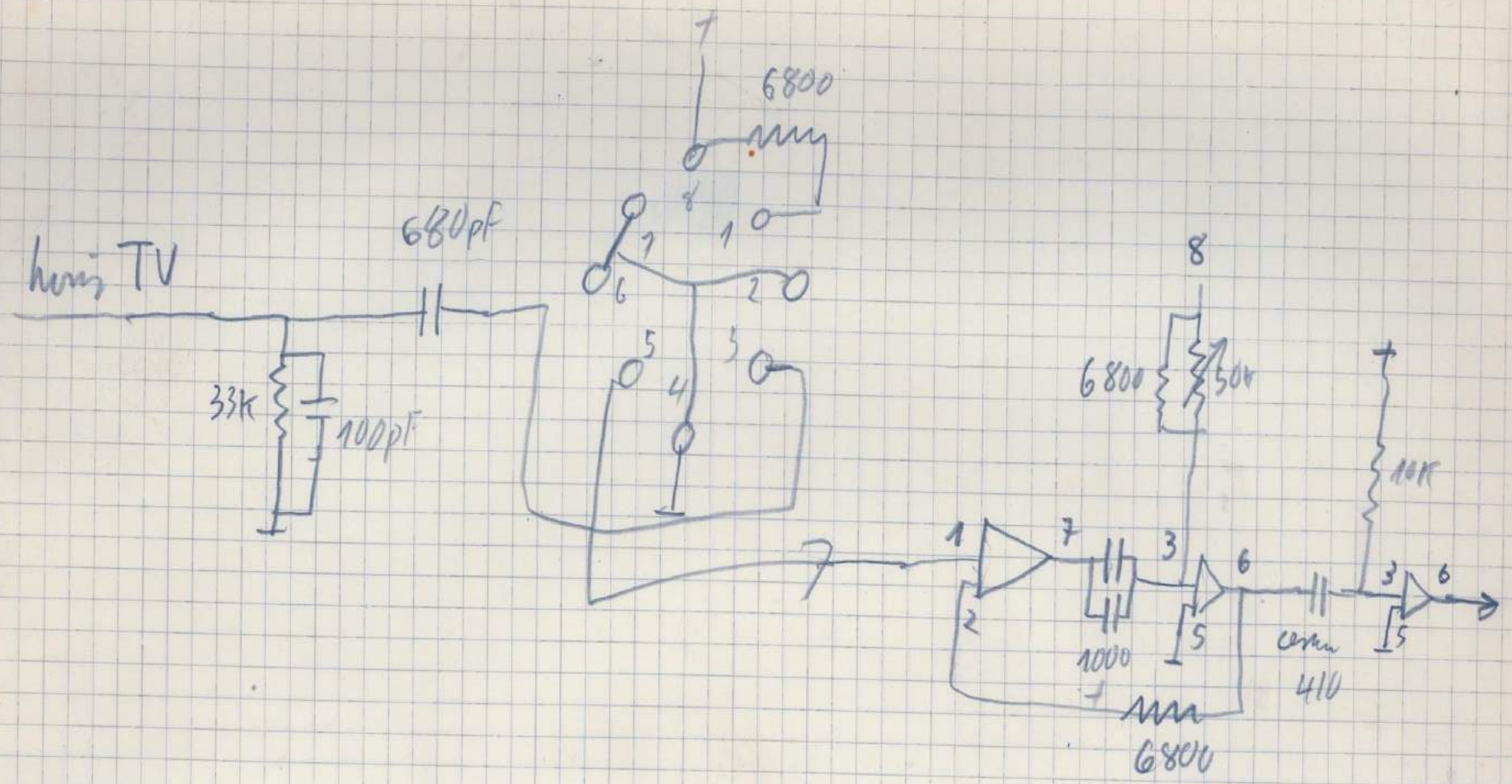


Vista superioi



VISTA lado circuito impreso

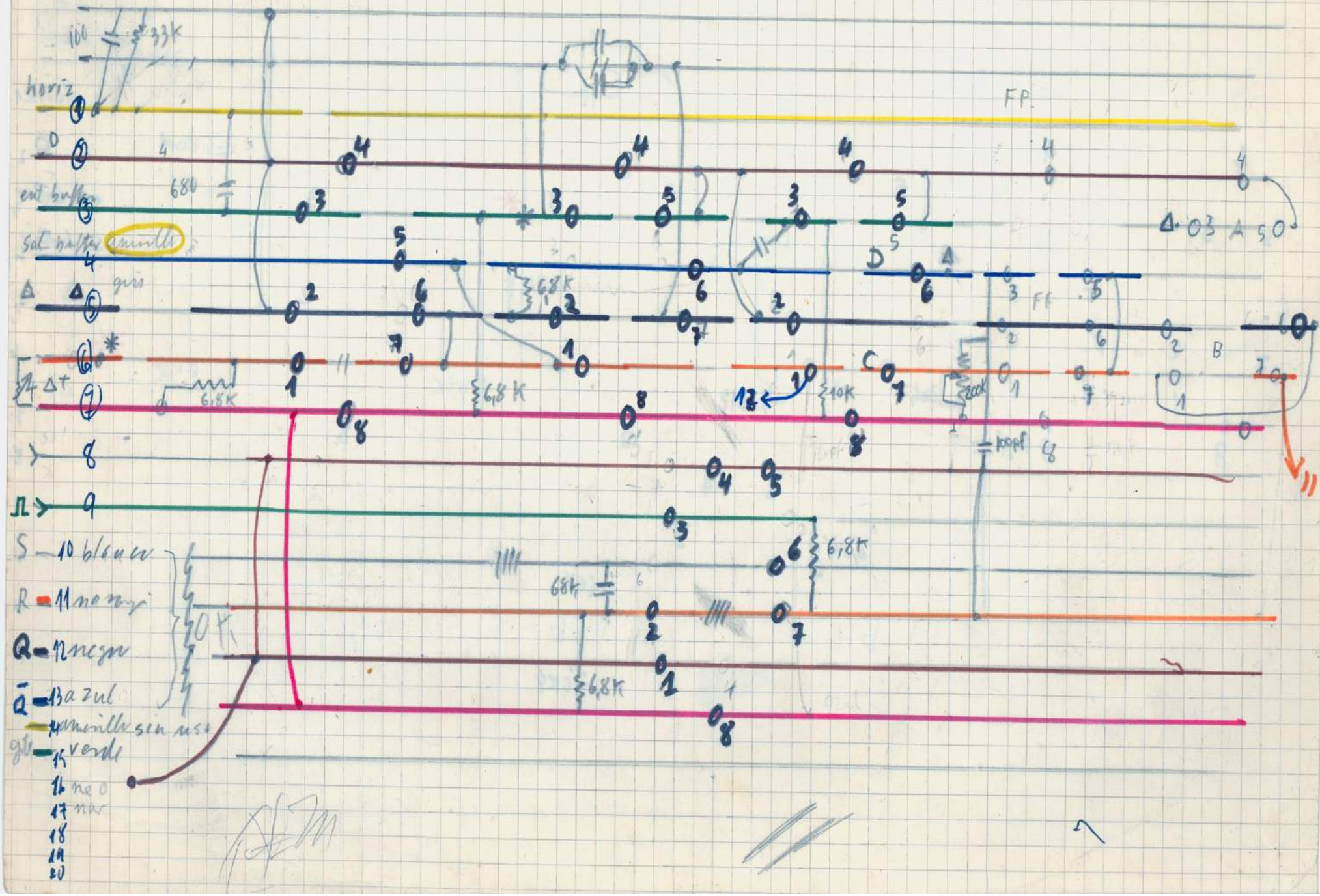


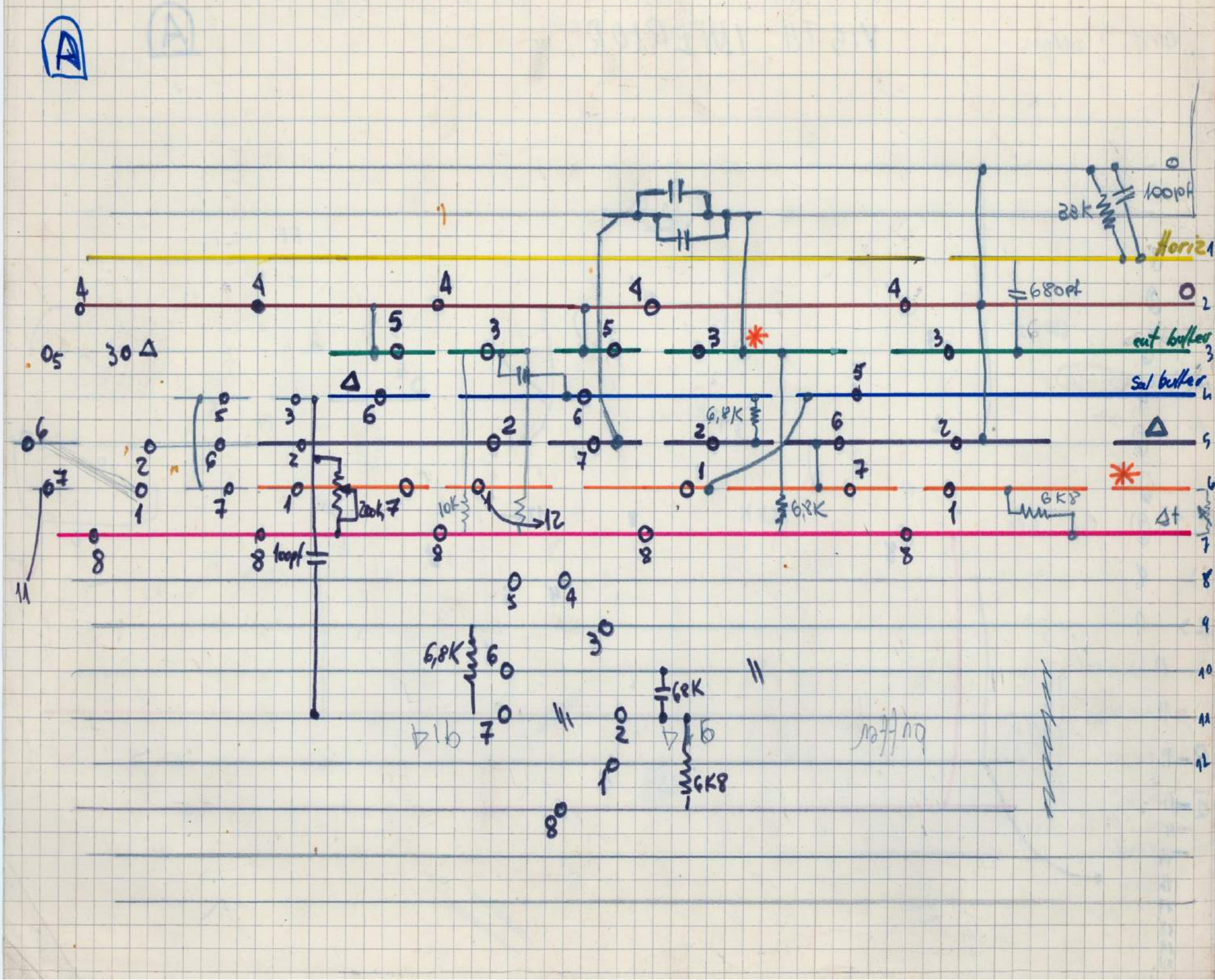

horiz TV
680pF
33K
100pF
6800
8
6800
50K
1000
6800
10K
410

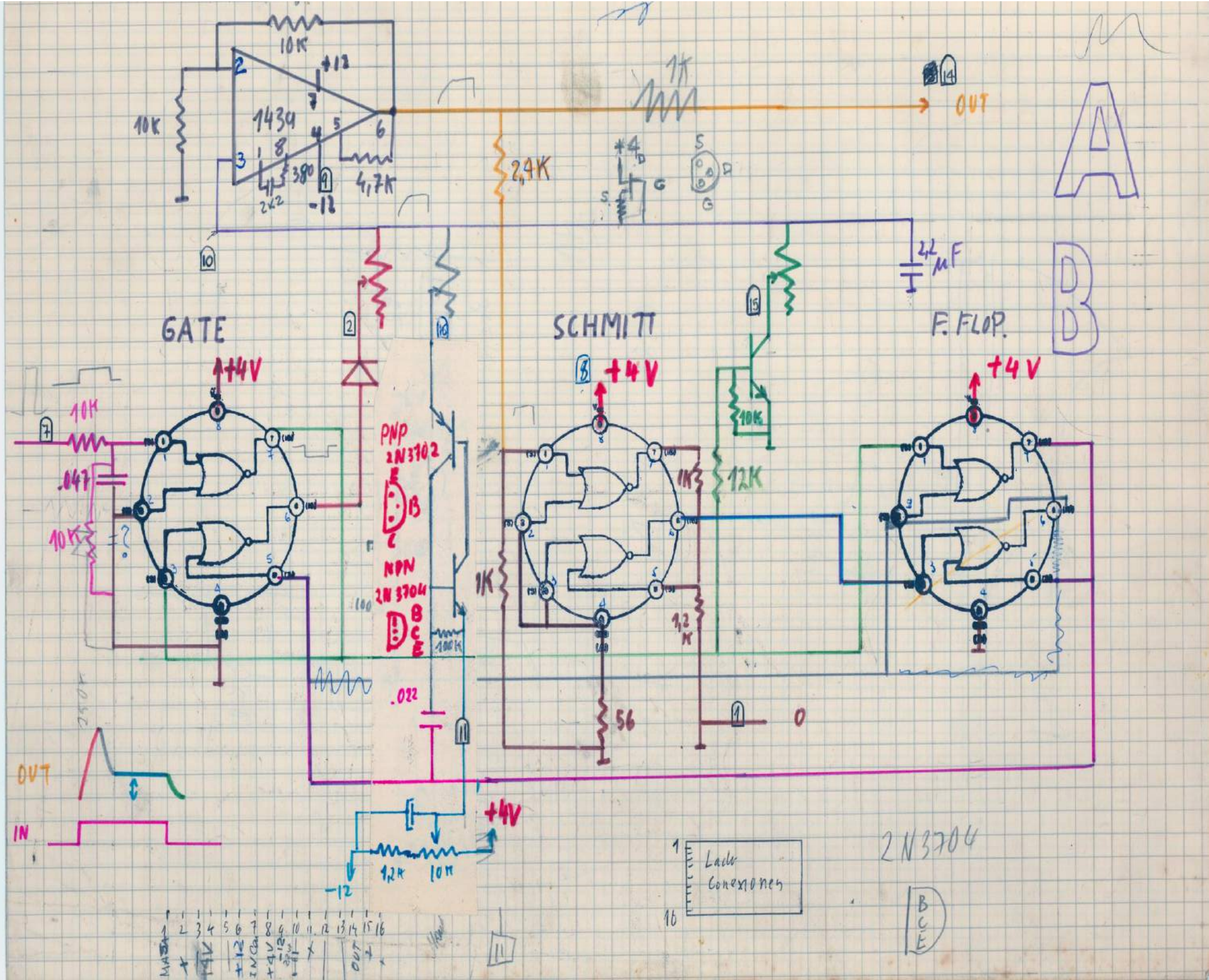
9 + 3 cign

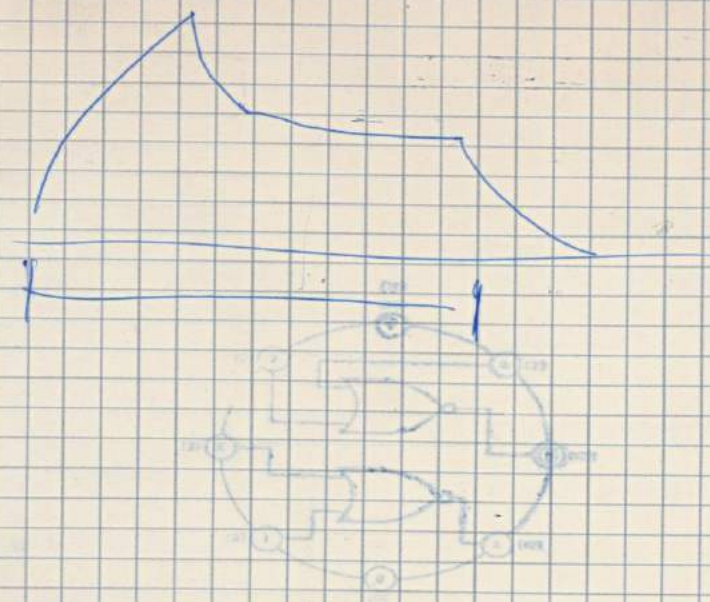
VISTA INFERIOR

A

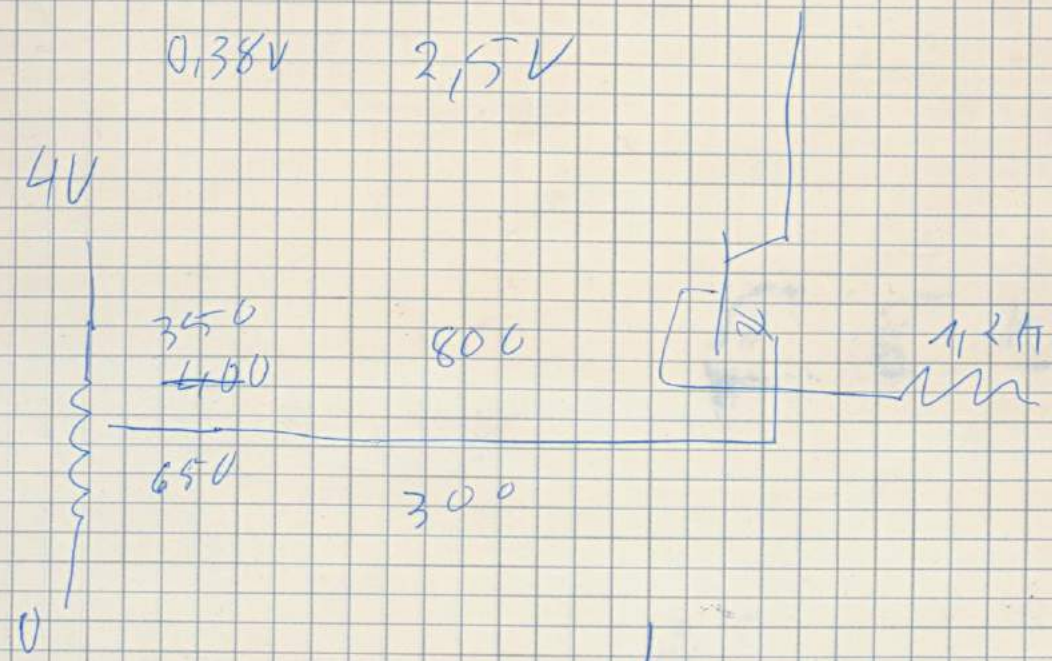


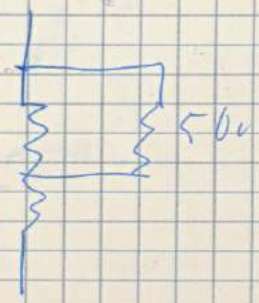

A
Horiz
out buffer
Sal buffer
100pf
28k
680pf
6,8K
10K
12
6K8
100pf
6,8K
6K8
6,8K
6K8

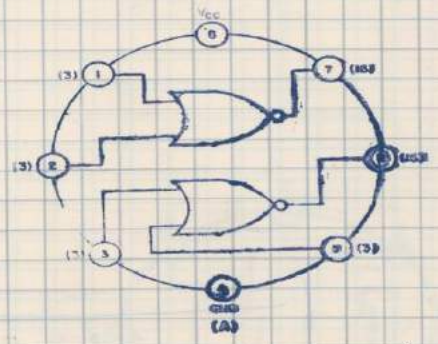

10K
+12
1434
10K
380
242
-12
4,7K
2,4K
1K
OUT
A
2,2 µF
B
GATE
SCHMITT
F. FLOP.
+4V
10K
.047
10K
PNP
2N3702
NPN
2N3704
100K
.022
1K
12K
10K
1K
1,2 K
56
0
OUT
IN
+4V
-12
1,2K
10K
2N3704
Lado Conexiones
1
16
B
C
E

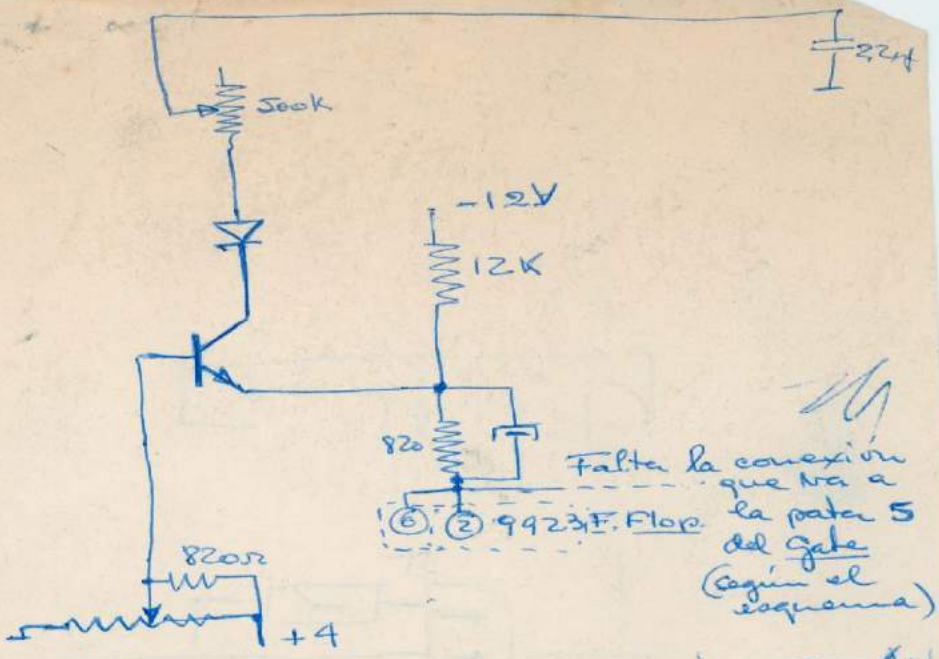


0,38V 2,5V

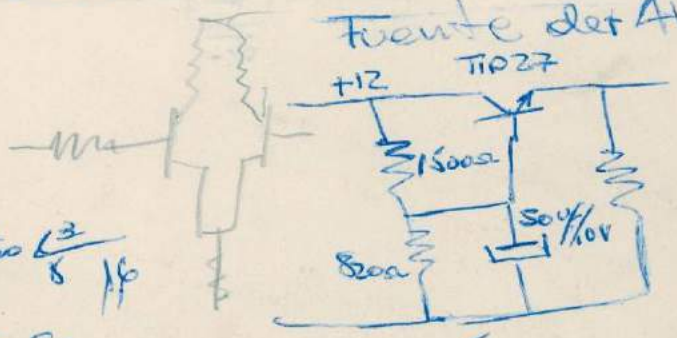




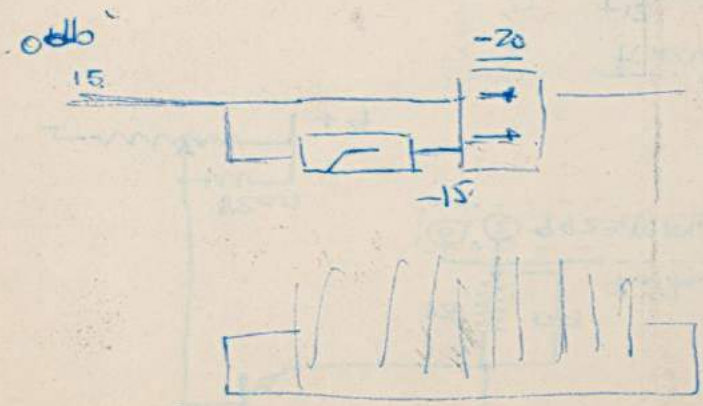

Vcc
6
(3) 1
7 (10)
(3) 2
8 (10)
(3) 3
9 (3)
5
GND
(A)



Fuente del AV

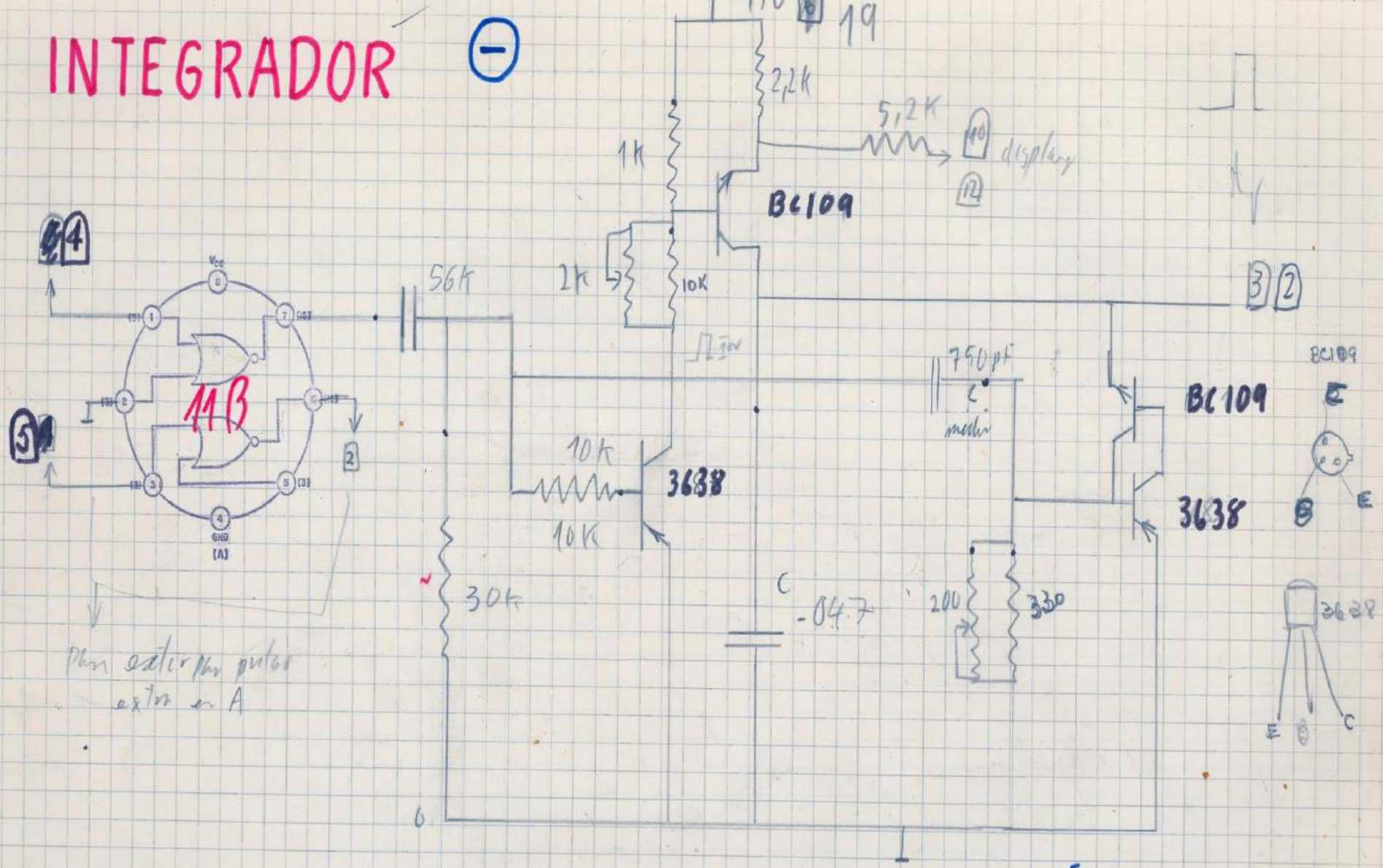


falta +12V

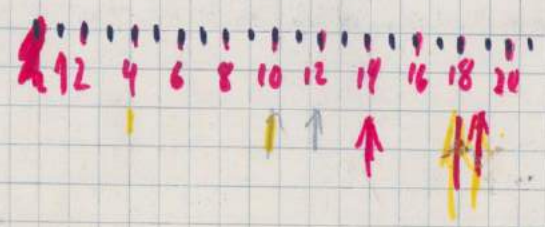

15
-20
-15

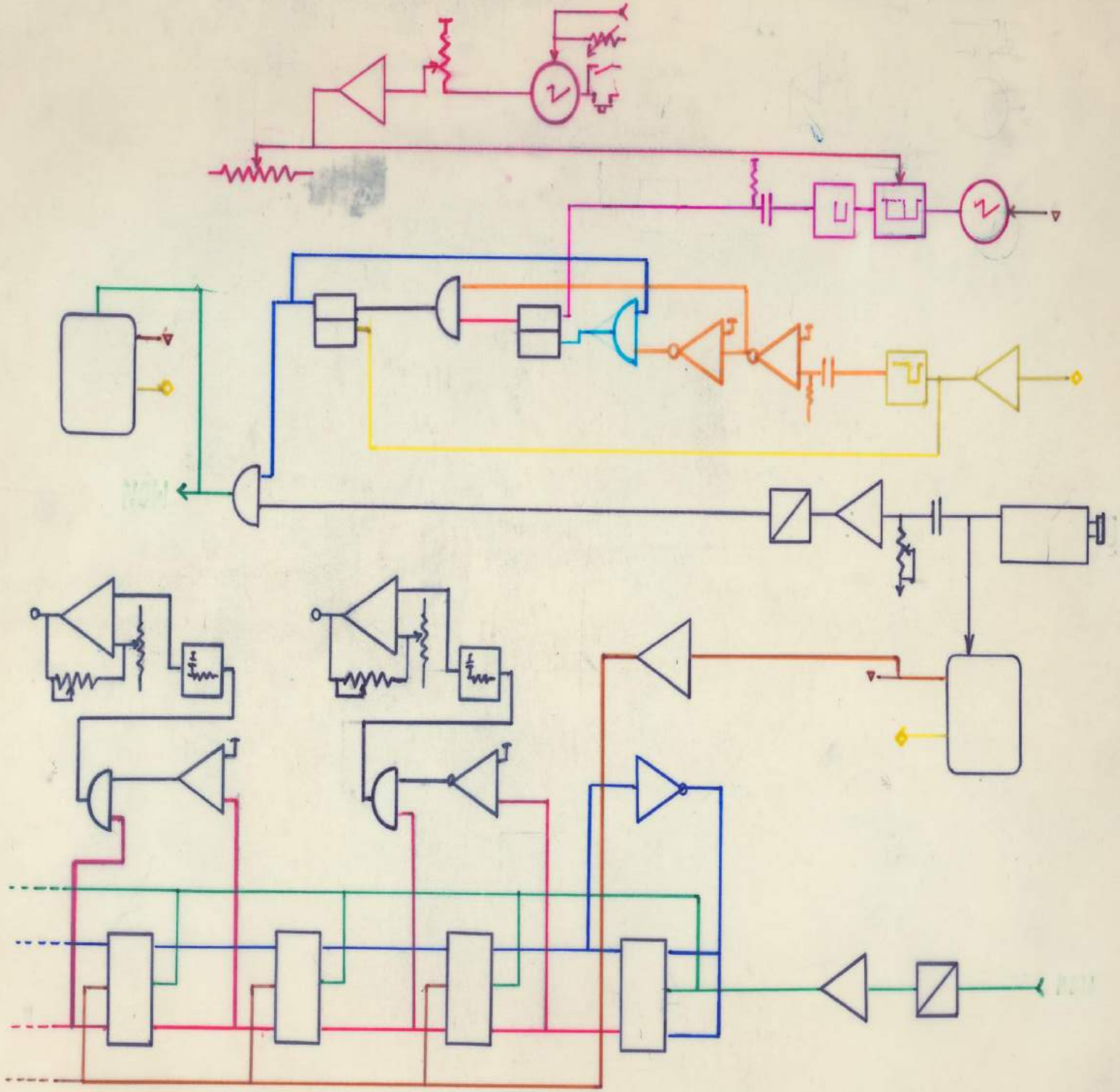
FOTOS Convertidor B

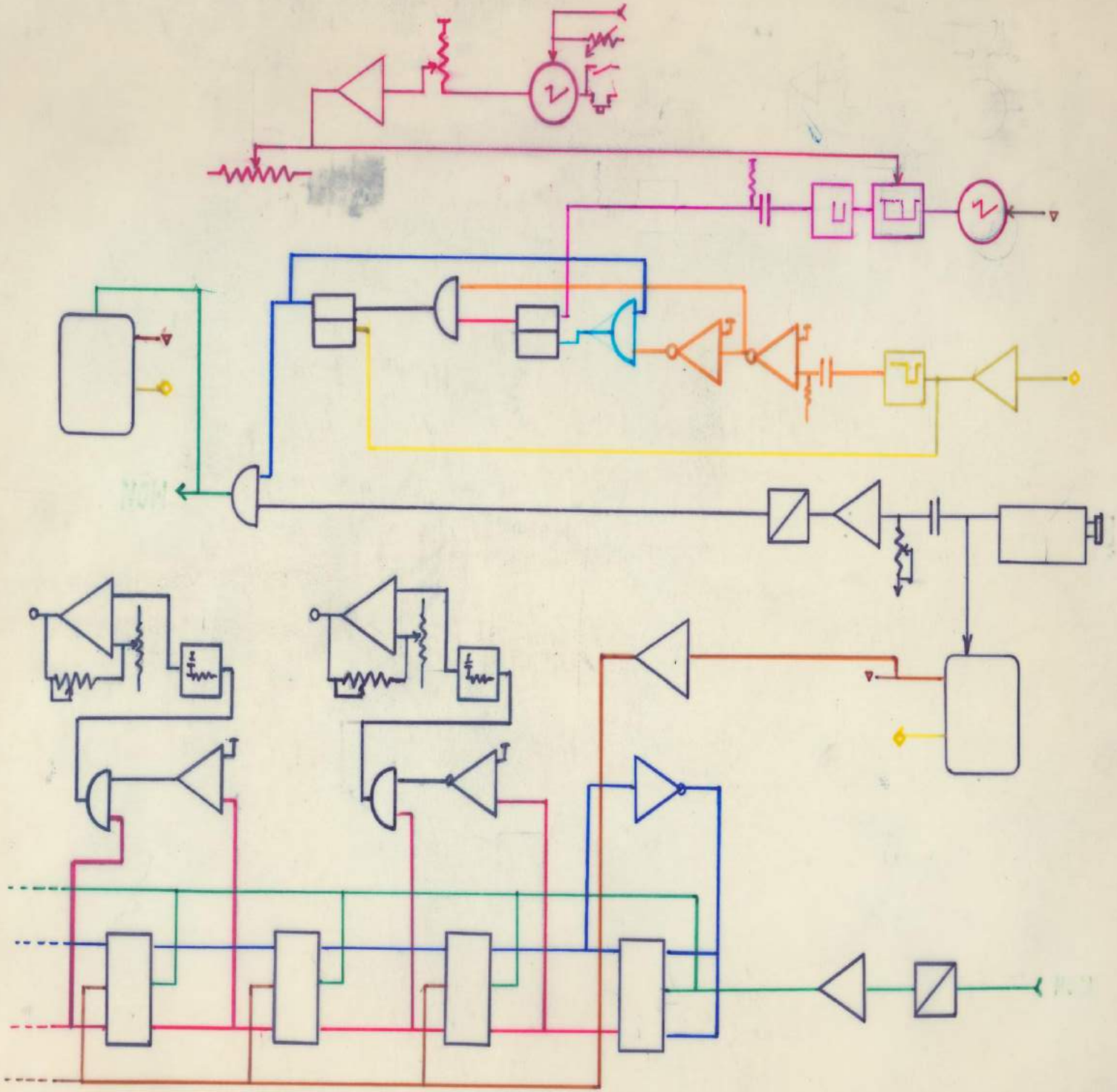
INTEGRADOR ⊖



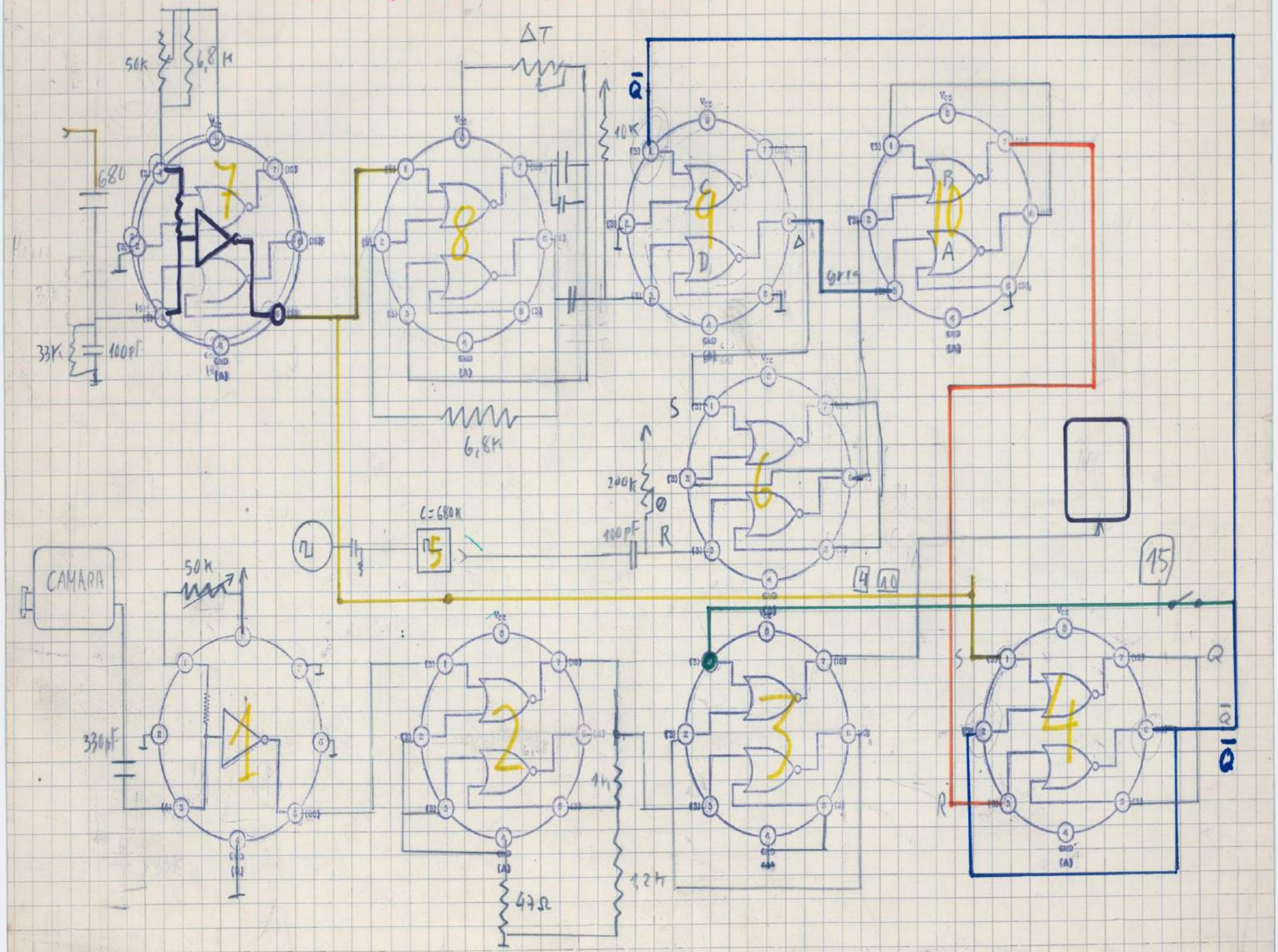
A 250pF
B821



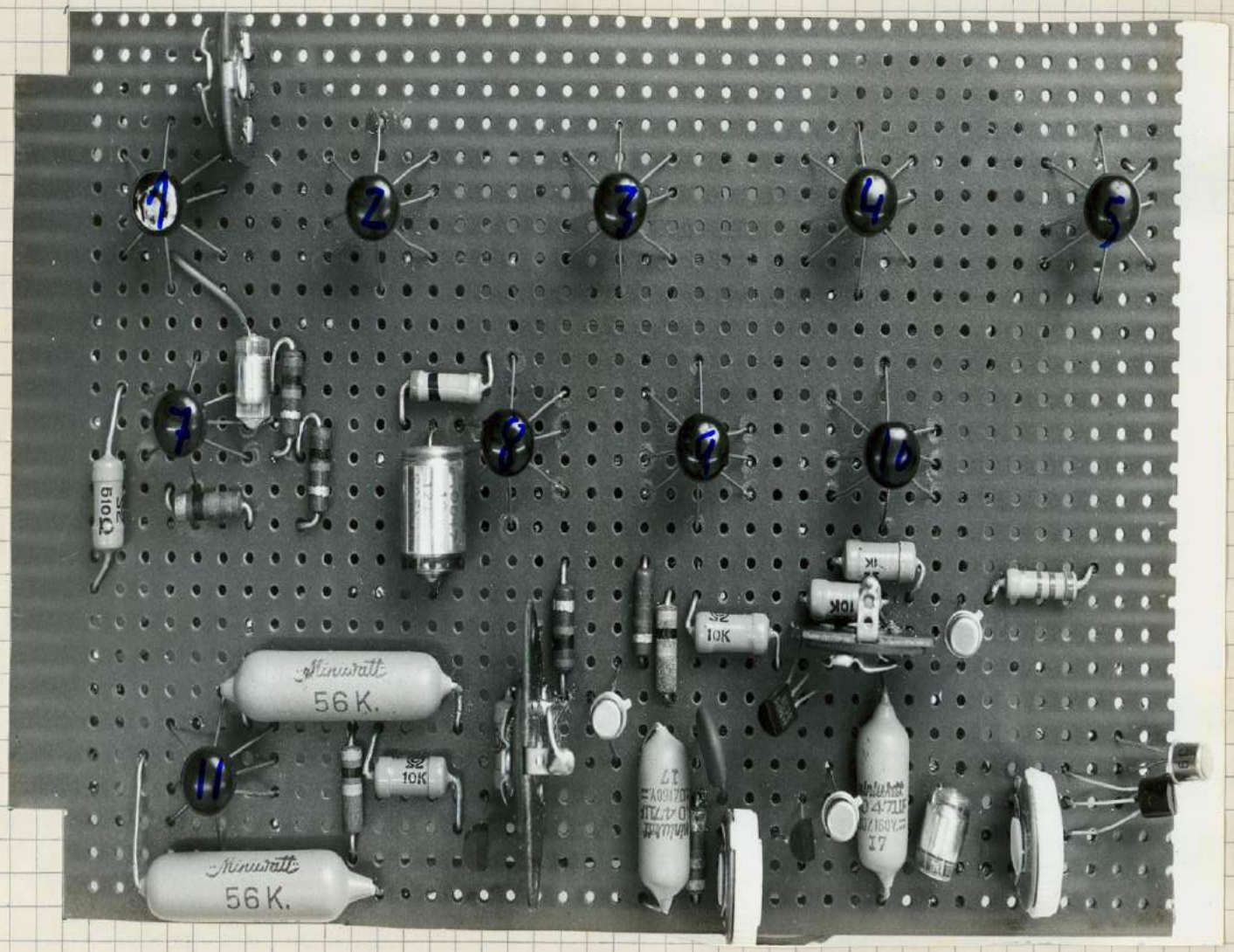




CAMARA → COMPUERTAS



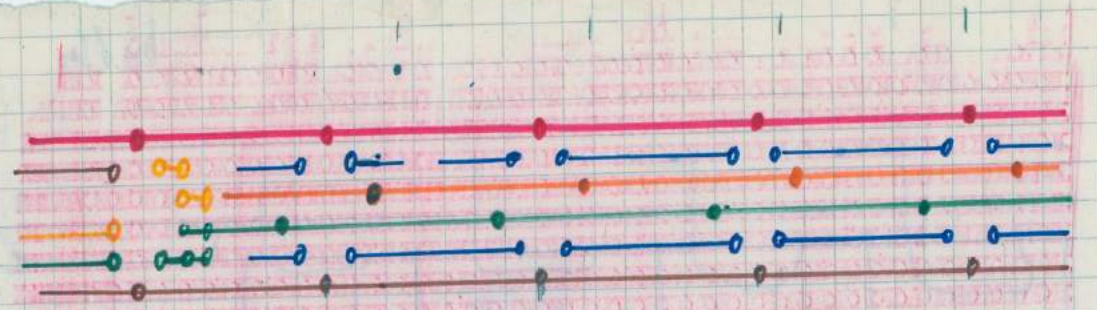
B

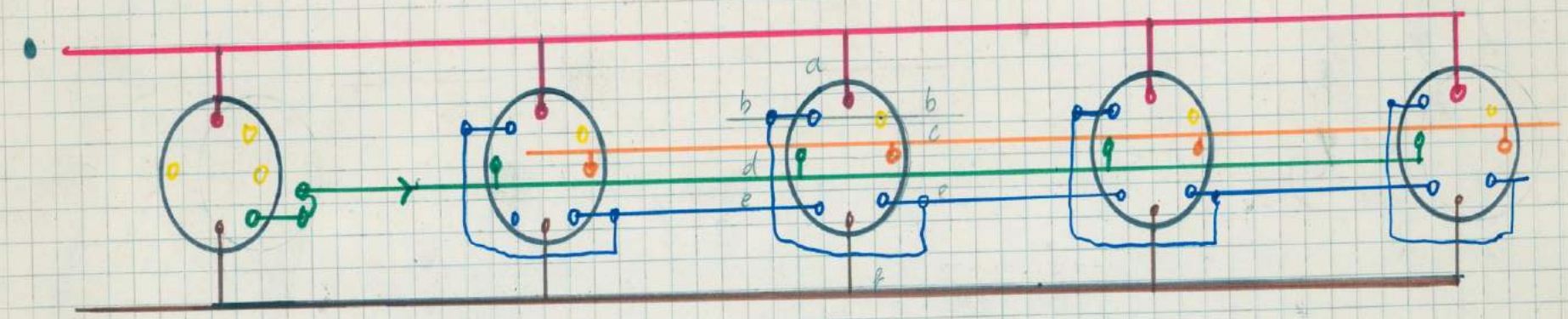


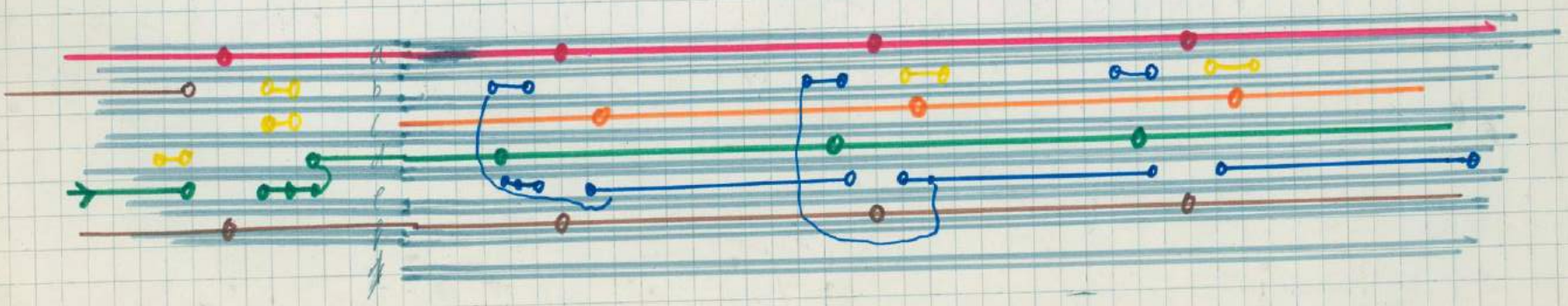
Card B

Card B

Lado posterior y l'c's

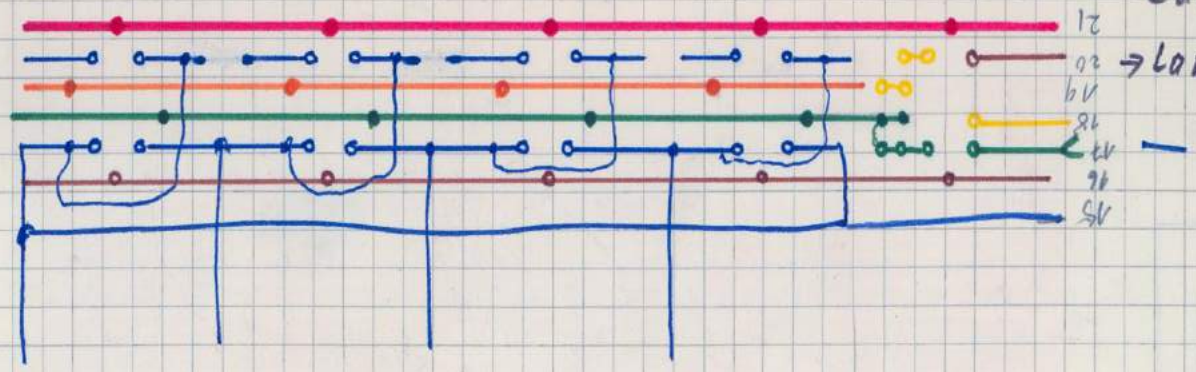






butter

Lady conex

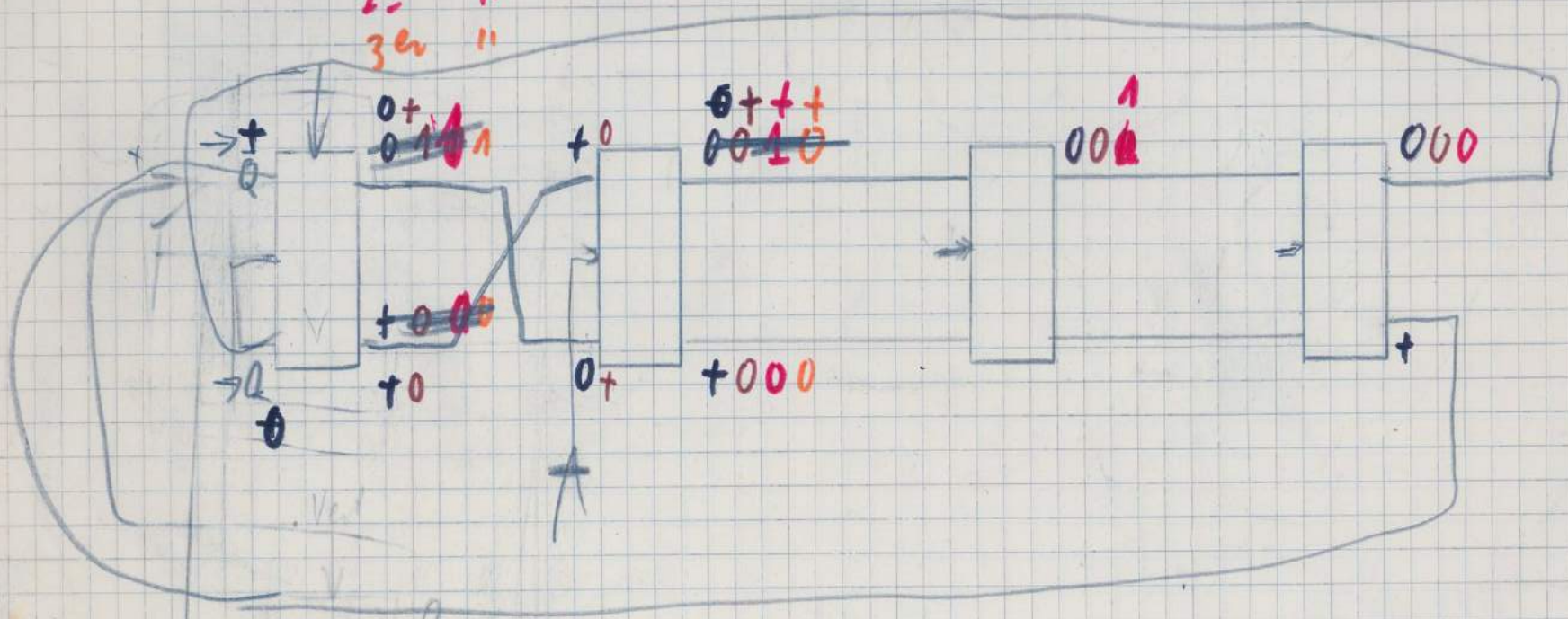


1 Estado inicial

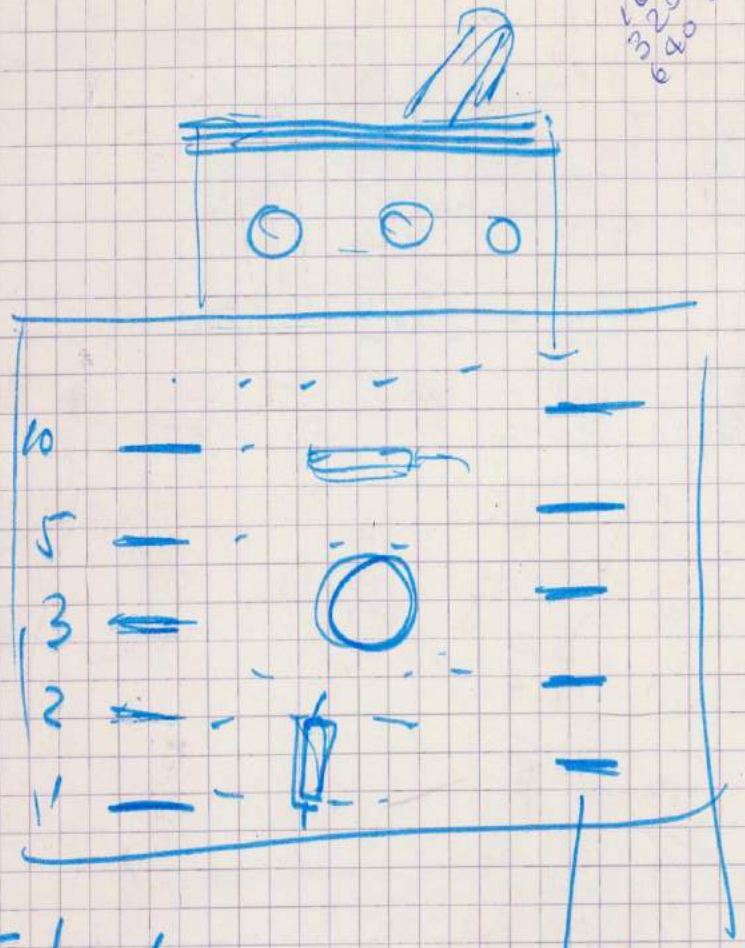
1er pulso

2º "

3er "



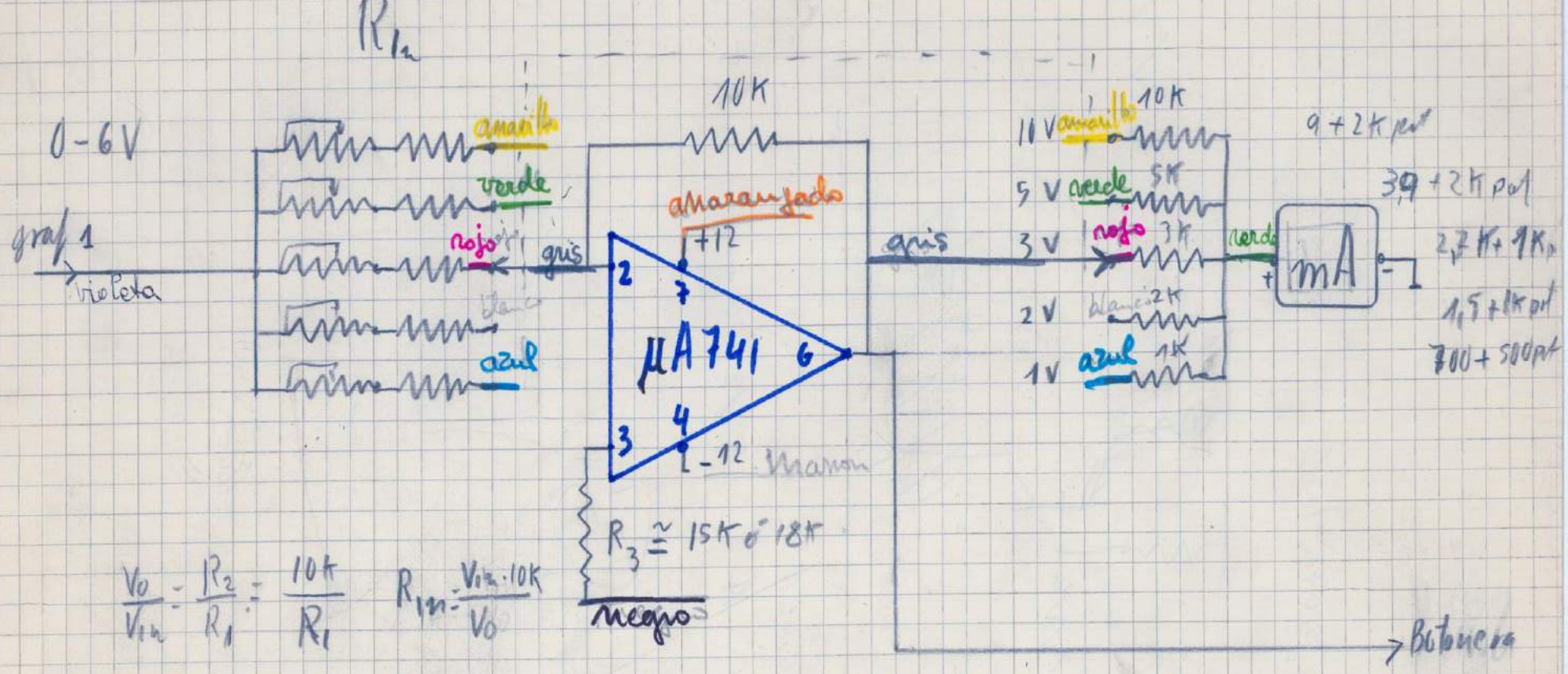
1 2 3 5 10



V. Entrada

inst.

	1	2	3	5
60				
120				
240				
960				



$$\frac{V_0}{V_{1n}} = \frac{R_2}{R_1} = \frac{10K}{R_1} \qquad R_{1n} = \frac{V_{1n} \cdot 10K}{V_0}$$

10V $R_1 = \frac{60}{10} = 6K = 5K + 2K$ pot

5V $R_1 = \frac{60}{5} = 12K = 10K + 1K + 2K$ pot

3V $= \frac{60}{3} = 20K = 18K + 4K$ pot

2V $\frac{60}{2} = 30K = 27K + 10K$ pot

1V $\frac{60}{1} = 60K = 50K + 20K$ pot

$$R_3 \cong \frac{R_1 \cdot R_2}{R_1 + R_2}$$

Cura actual 500 Ω

$R \frac{E}{I}$

$I = \frac{E}{R_{VOR} + R}$

1000 3500

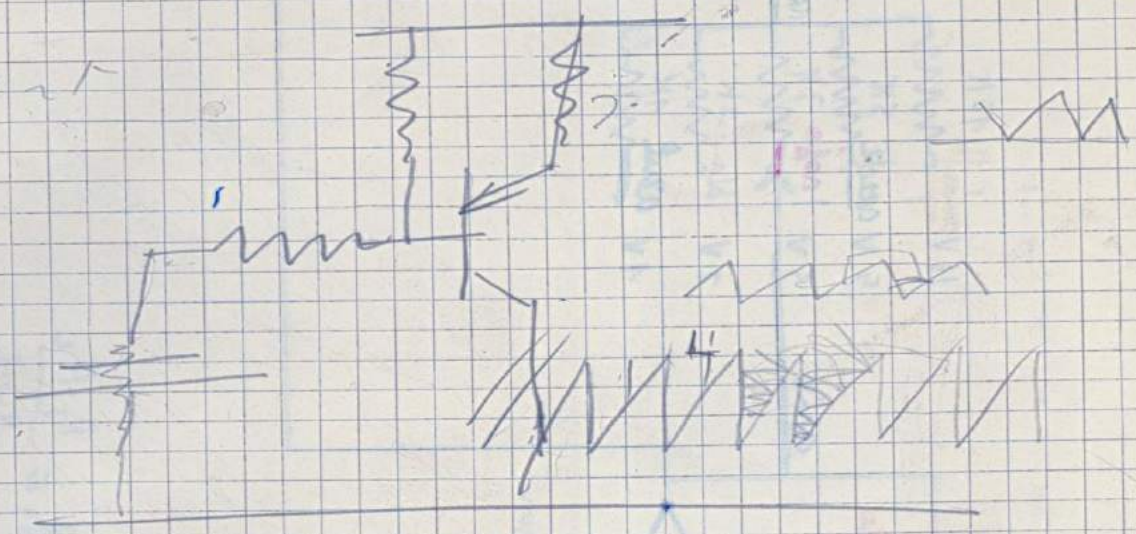
2000 7000

$I = \frac{5}{500} = 0{,}010\ A$

$R \frac{E}{I}$

$\frac{250}{2500} = 0{,}100\ A$

25V



500 Ω mA

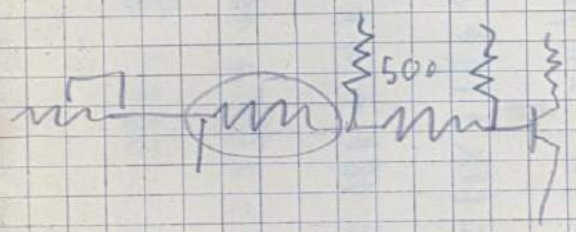
I

$E = I \times R = 500 \cdot 0{,}001$

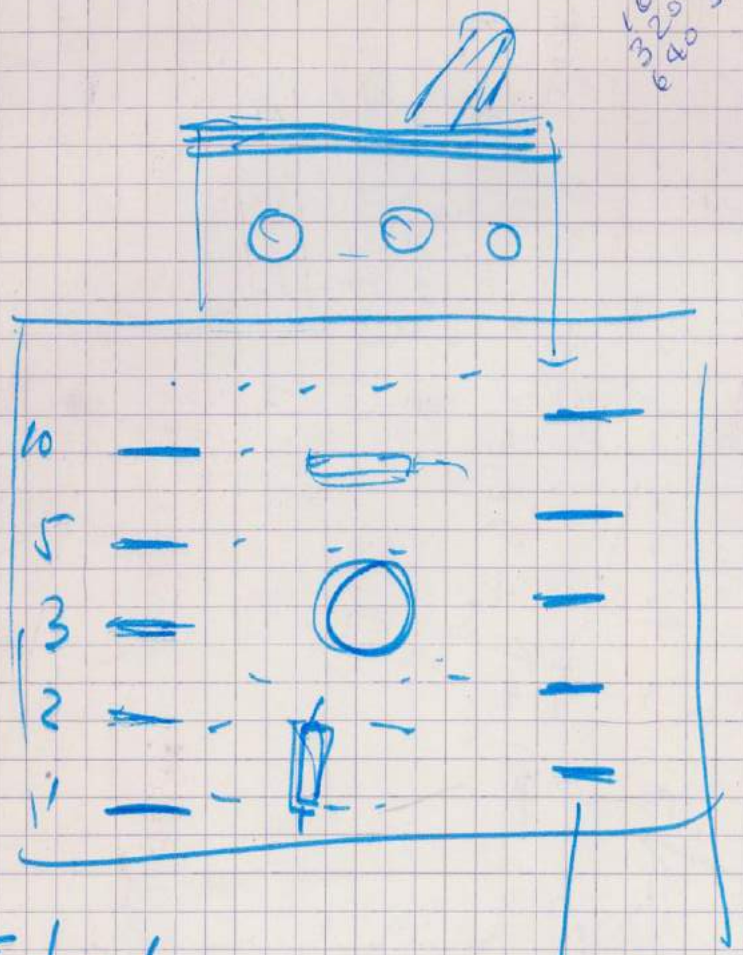
0,5 V = 1 mA 5 V = 10 mA

+ 3V

3,5V = 1mA



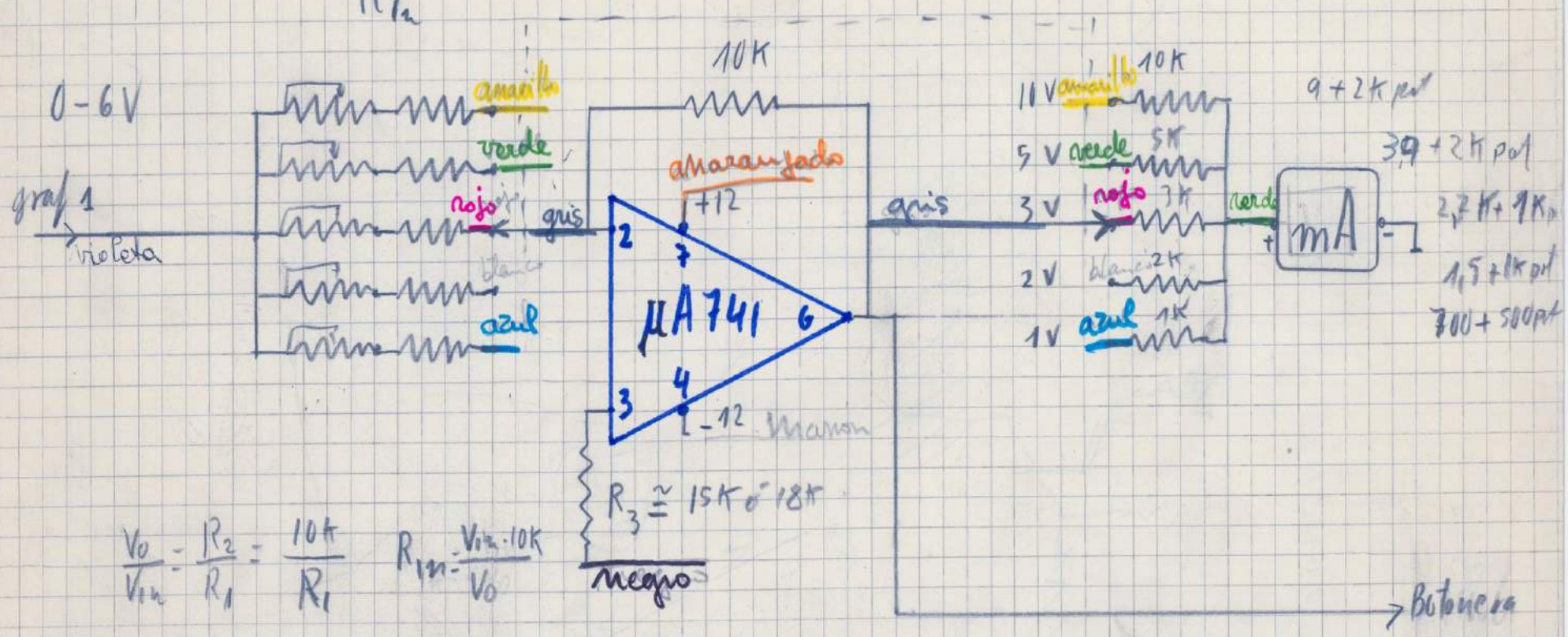
1 2 3 5 10



V. Entrada

inst.

60	1
120	2
240	3
960	5



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10V $R_1 = \frac{60}{10} = 6K = 5K + 2K$ pot

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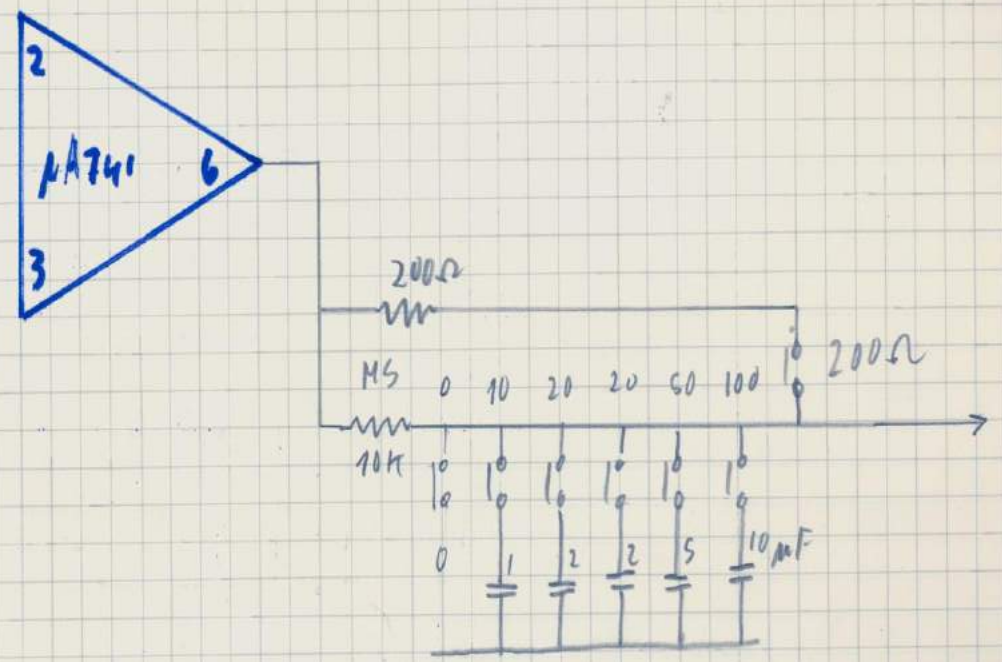
3V $= \frac{60}{3} = 20K = 18K + 4K$ pot

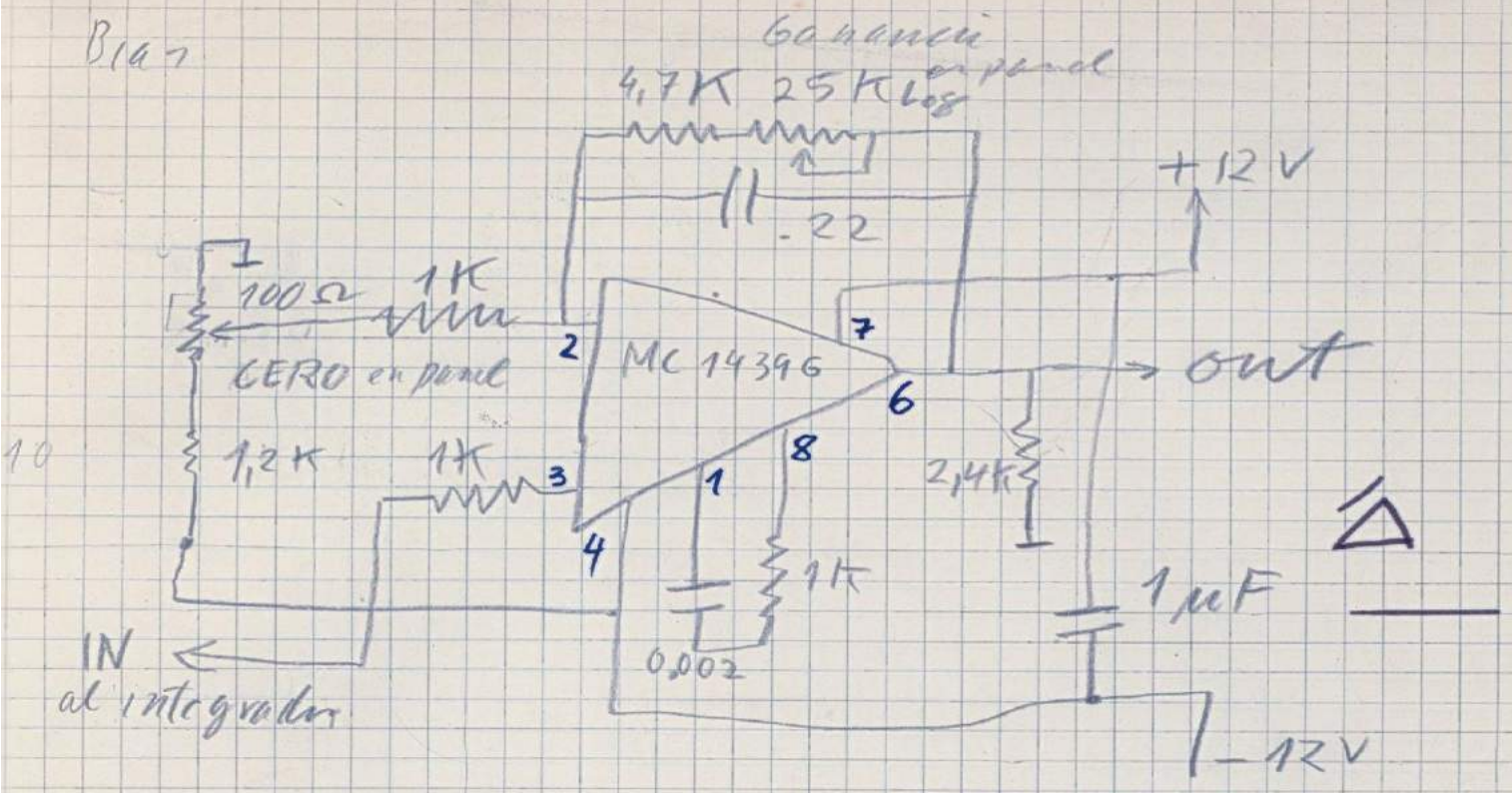
2V $\frac{60}{2} = 30K = 27K + 10K$ pot

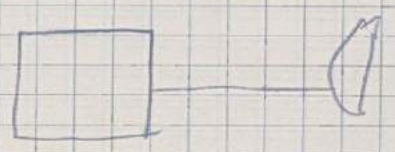
1V $\frac{60}{1} = 60K = 50K + 20K$ pot

$$R_3 = \frac{R_1 \cdot R_2}{R_1 + R_2}$$


2
μA741
6
3
200Ω
MS
10K
0
10
20
20
60
100
200Ω
0
1
2
2
5
10 μF

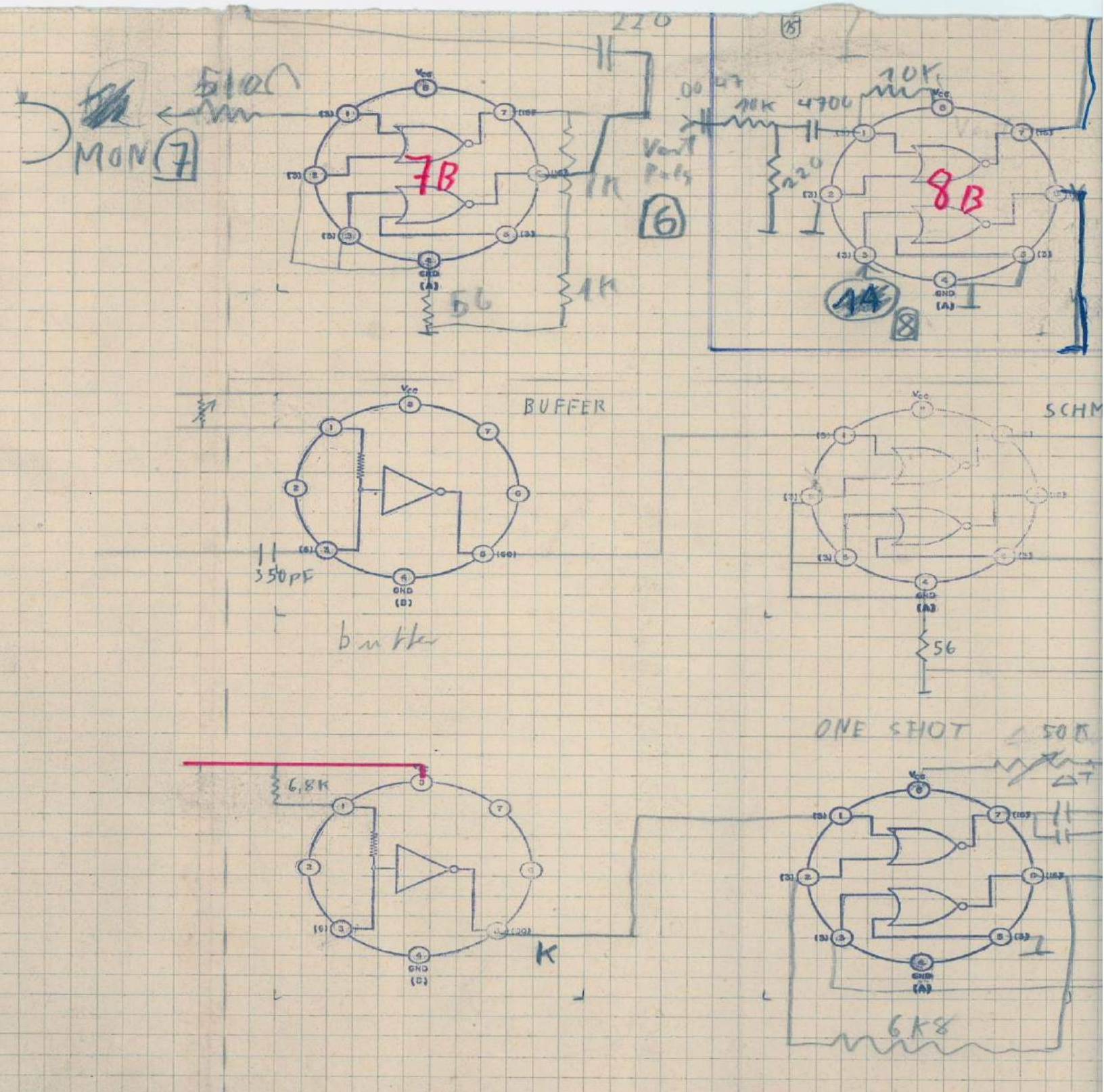
Bia 1

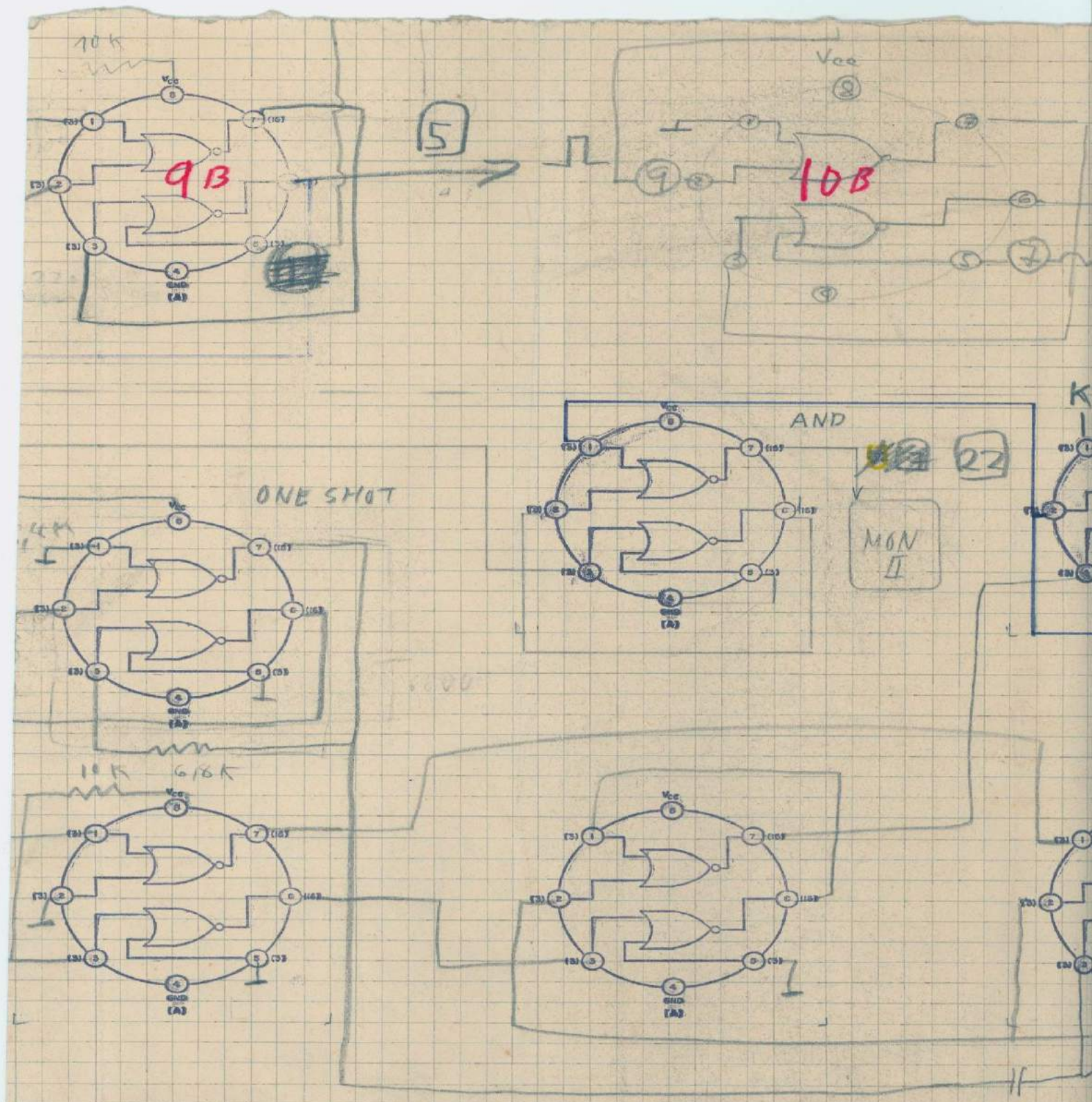

Ganancia en panel
4,7K
25K log
.22
+12V
100Ω
1K
CERO en panel
MC 14396
2
7
6
out
1,2K
1K
3
1
8
2,4K
4
1K
0,002
1μF
IN
al integrador
-12V

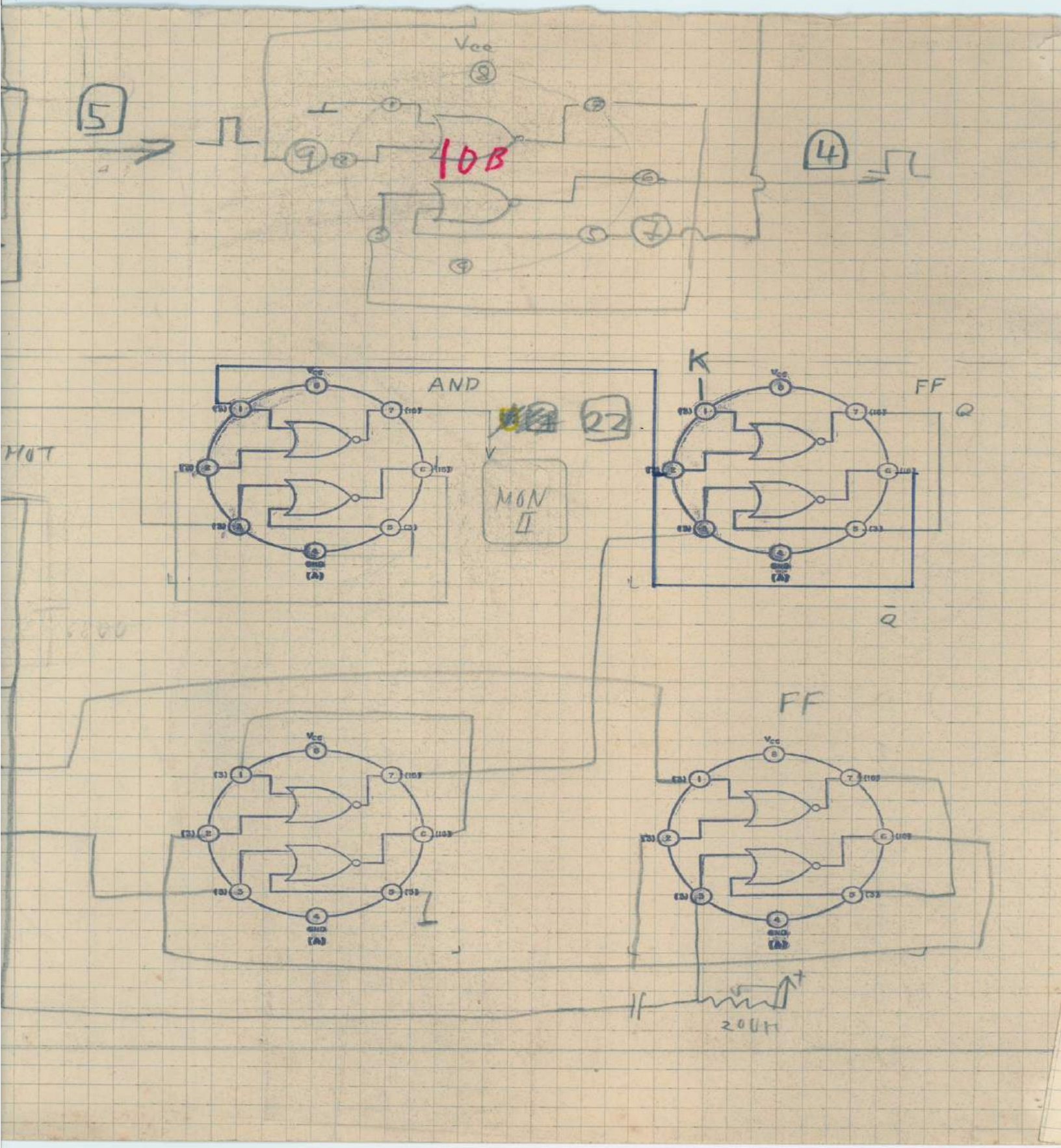


1 = 00K

PK


MON 7
510Ω
220
7B
56
1K
6
10K
4700
8B
14
8
BUFFER
350pF
buffer
SCHM
56
ONE SHOT
50K
6,8K
K
6K8


10K
9B
5
10B
AND
22
MON
II
ONE SHOT
10K
6/6K

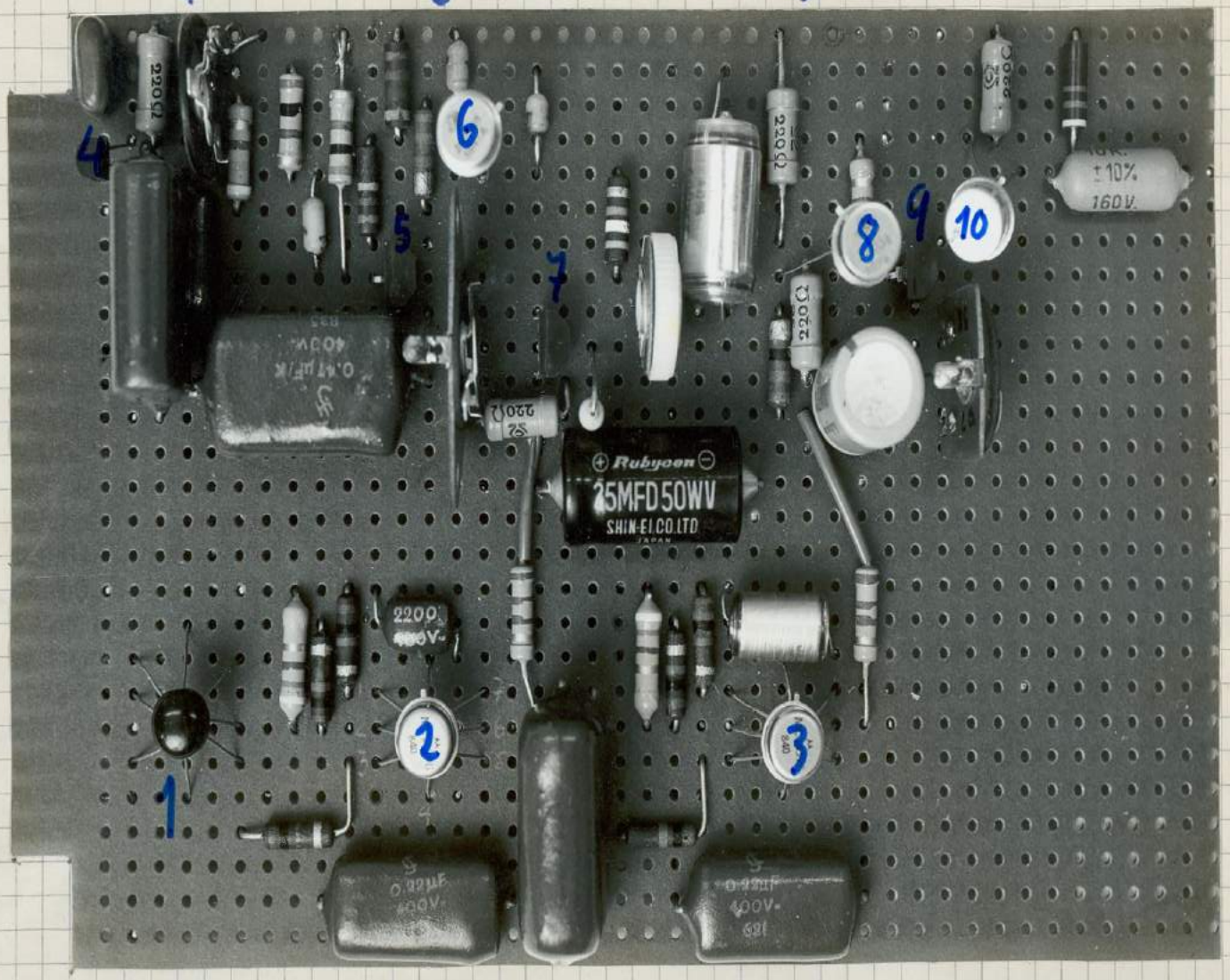

5
Vcc
8
9
10B
4
AND
22
MON
II
K
FF
Q
$\bar{Q}$
MOT
FF
20kΩ

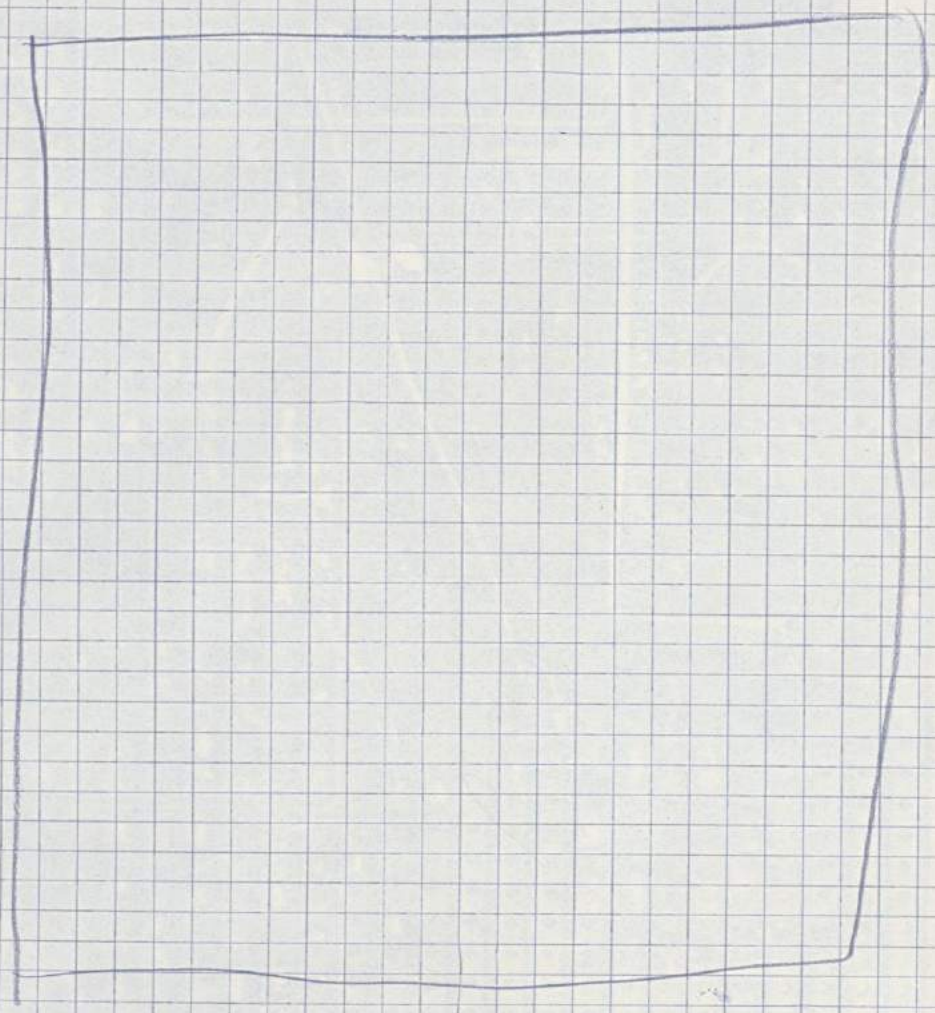
FOTOS Convertidor C

2-5 V

100K
50 c/s

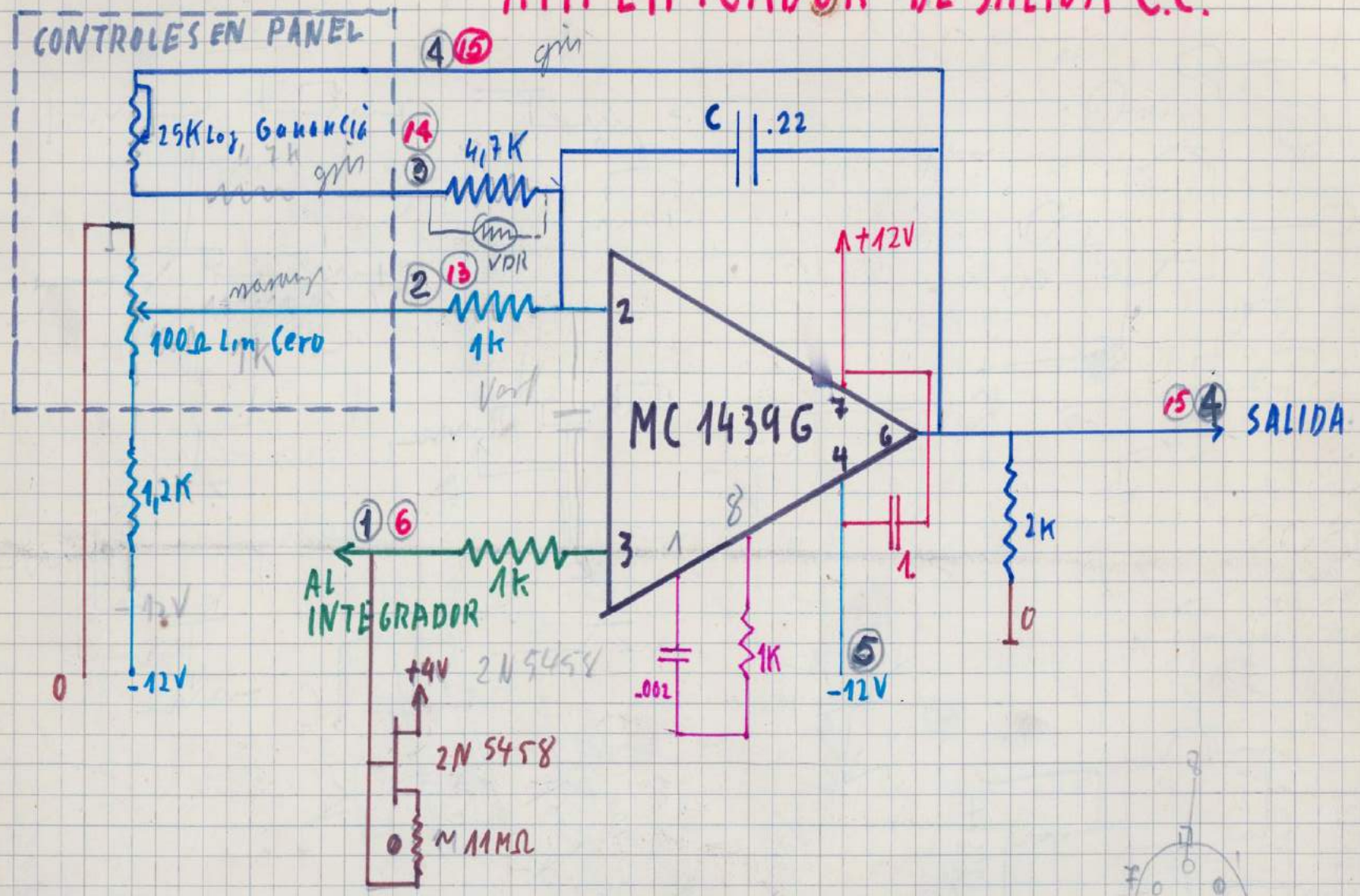
5K
pos

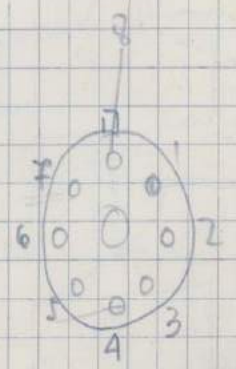




AMPLIFICADOR DE SALIDA C.C.

C





Nota: Los números en negro indican las barras a las que están conectadas las salidas del amplificador "A" y los que están en rojo al las del amplificador "B"

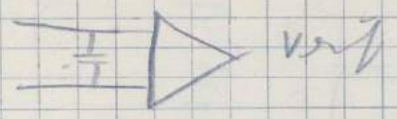
Verif 907 Fairchild

Supprim ripple:

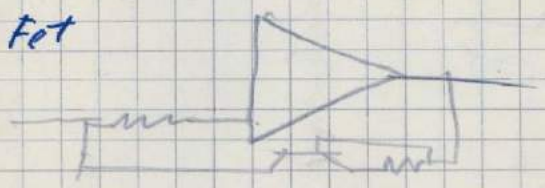
1º compensación entrada Z lin

2º integración C(t) grande respuesta transitoria

1º a) Realim positiva



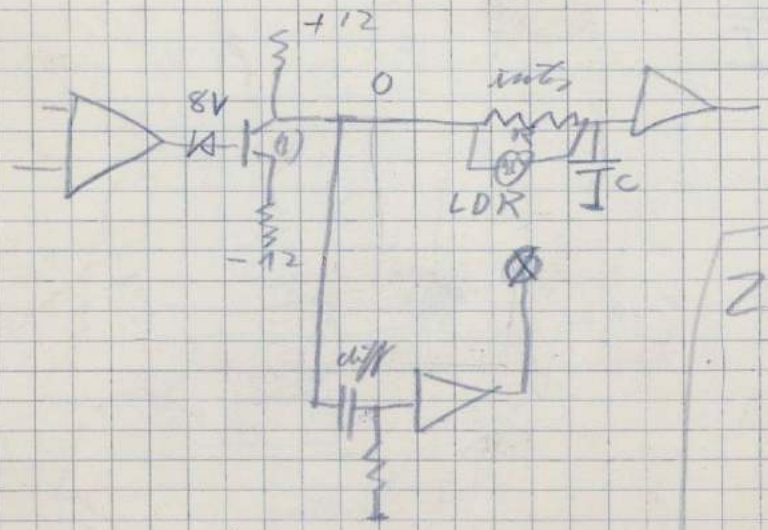
b) Fet

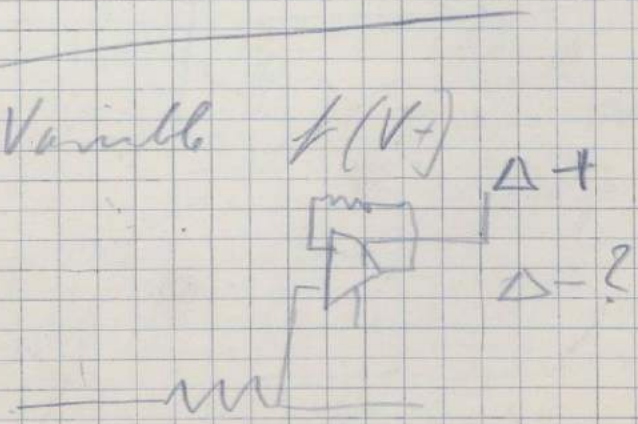


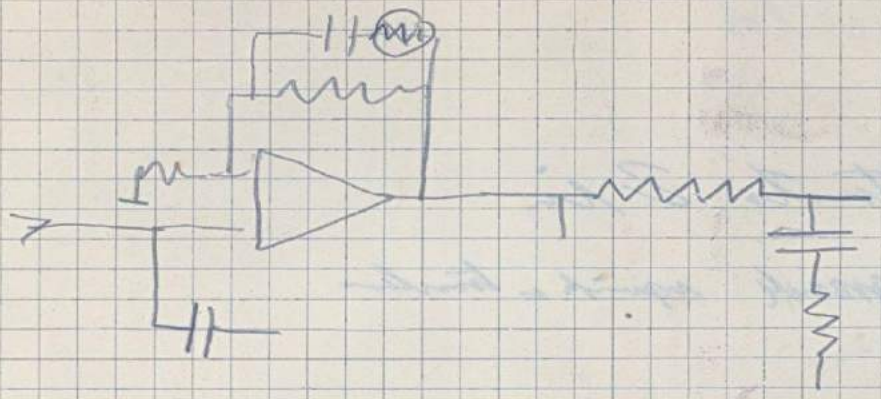
−10 3mΩ

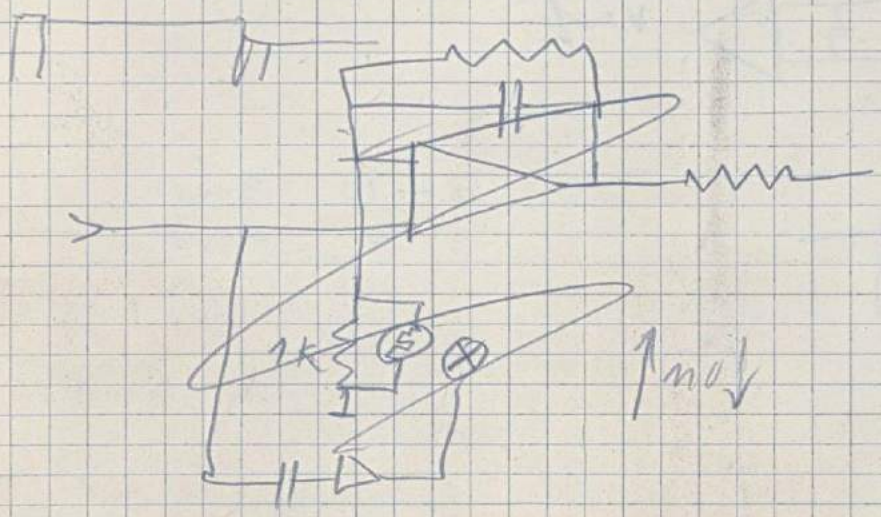
0 2mΩ

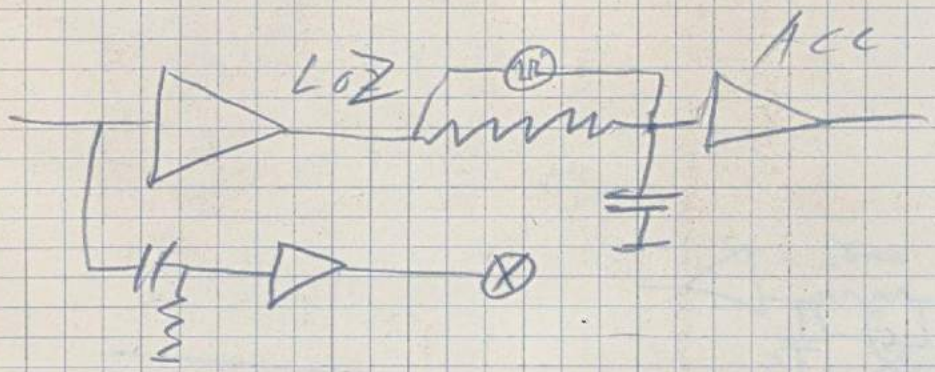
2º



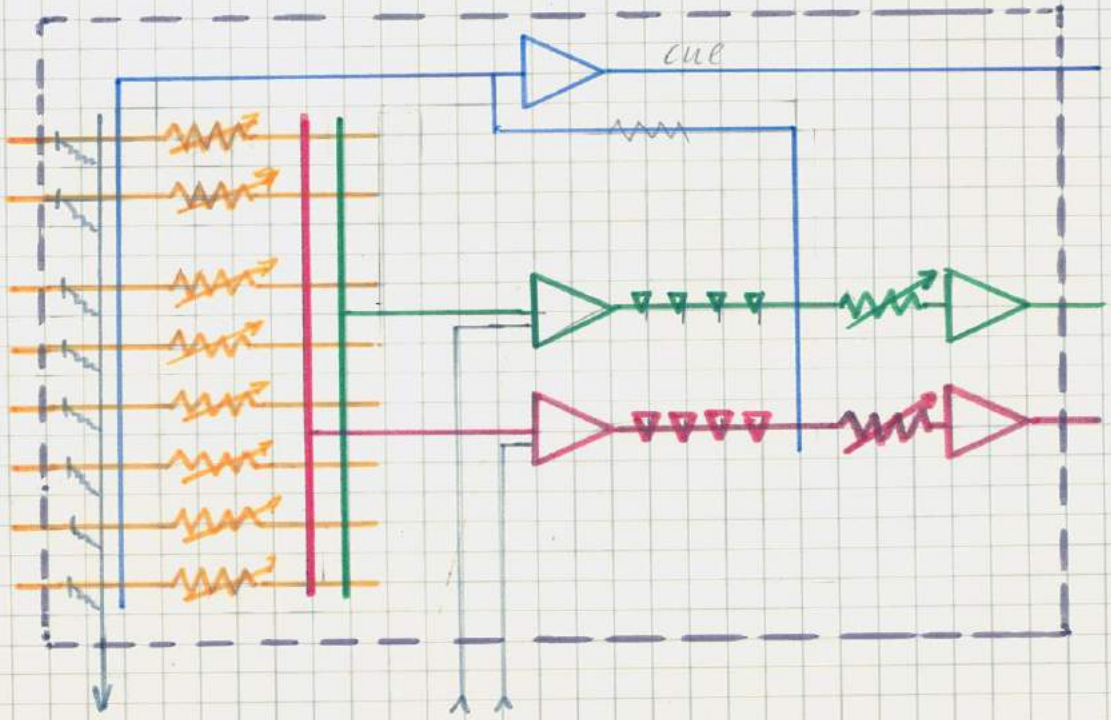


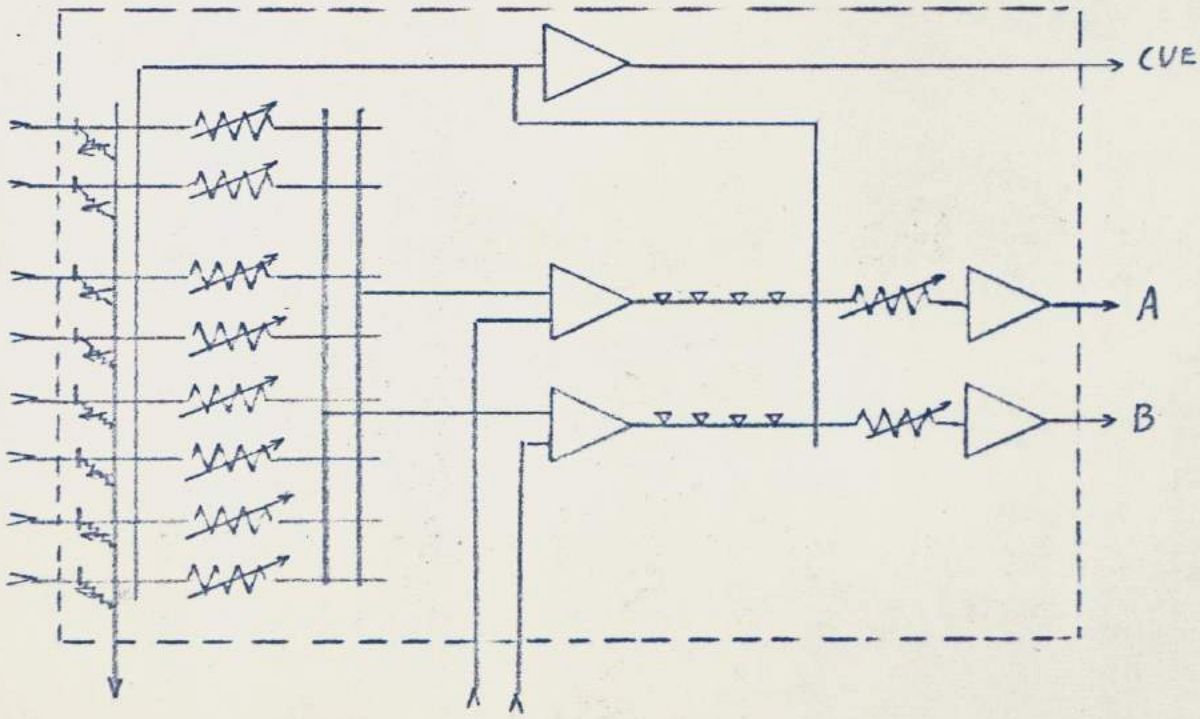


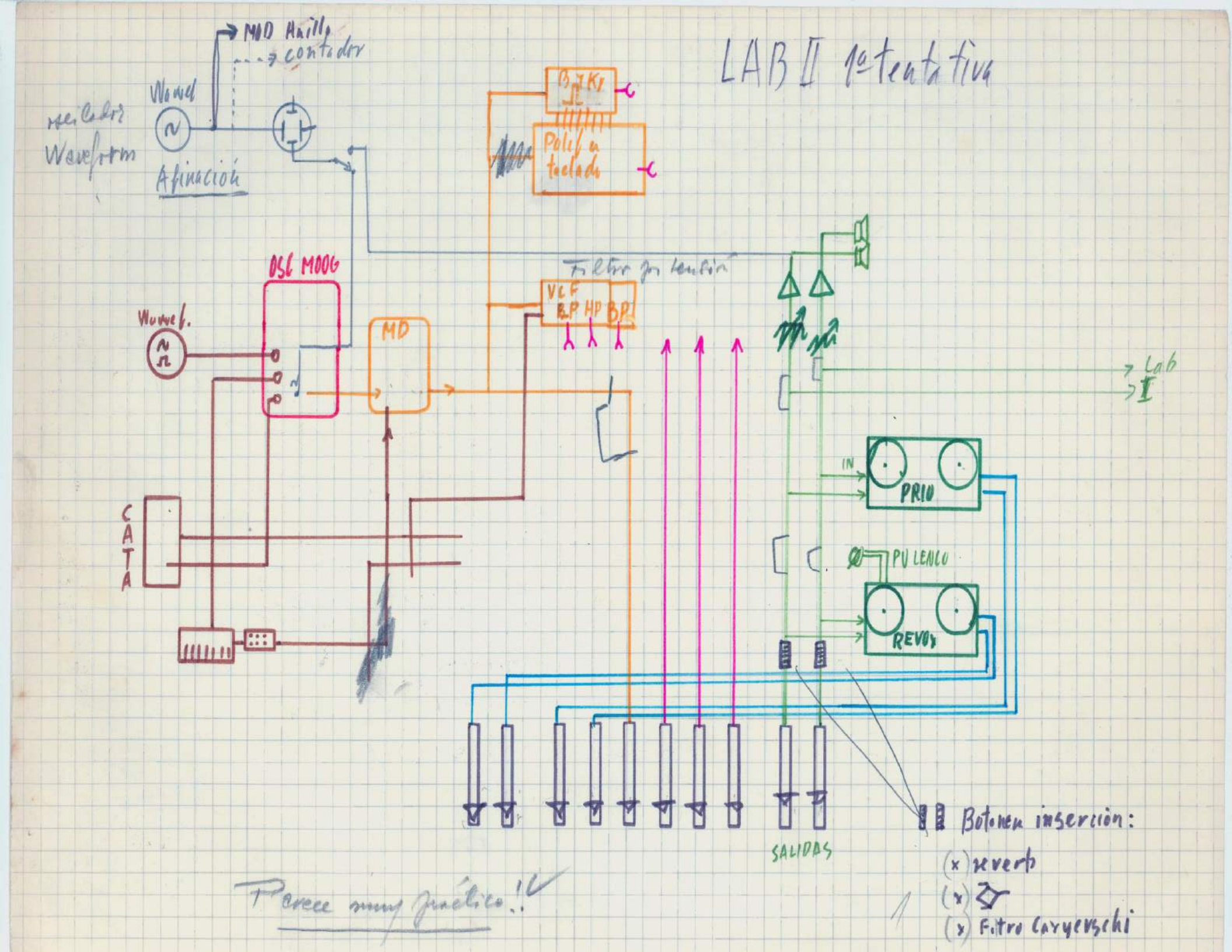

2K
mod

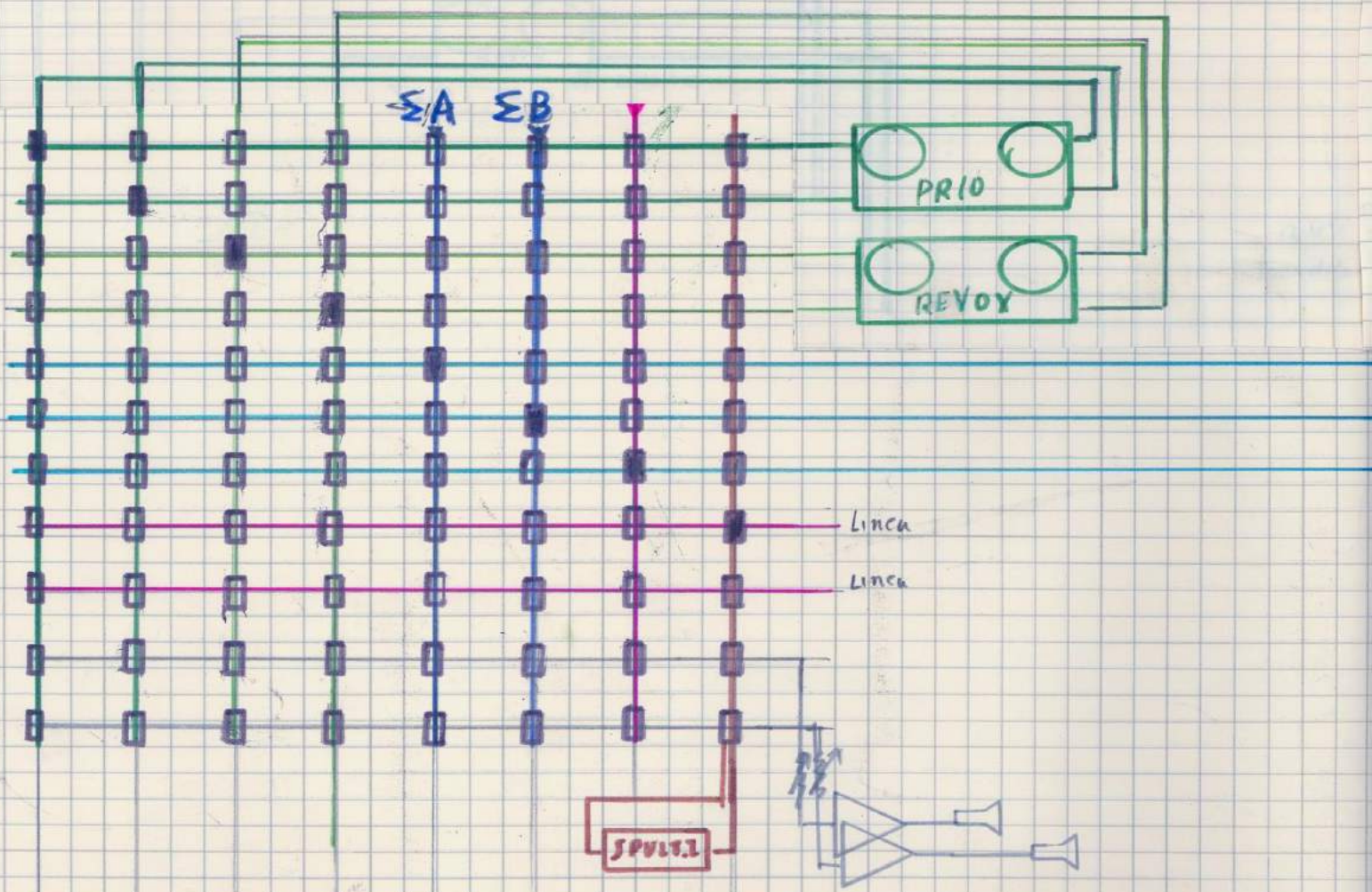

LOZ
Acc

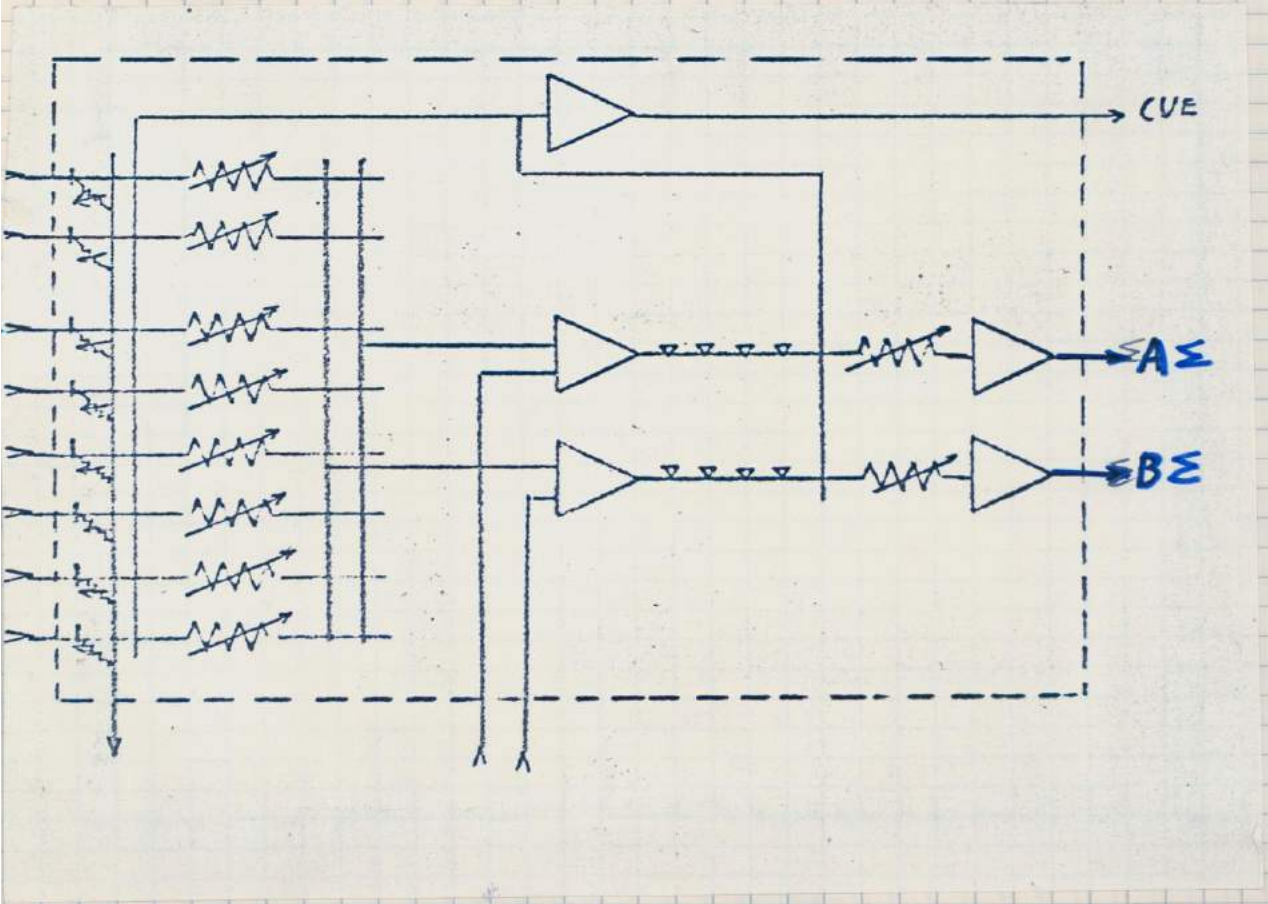
LAB II


cue

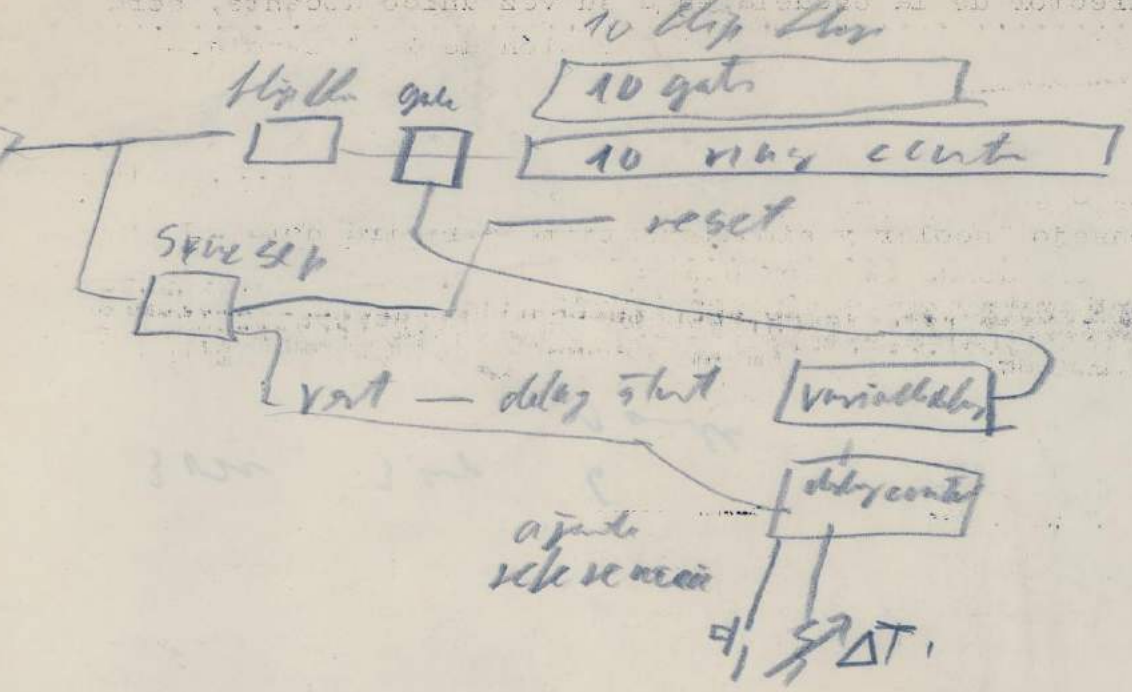

CUE
A
B

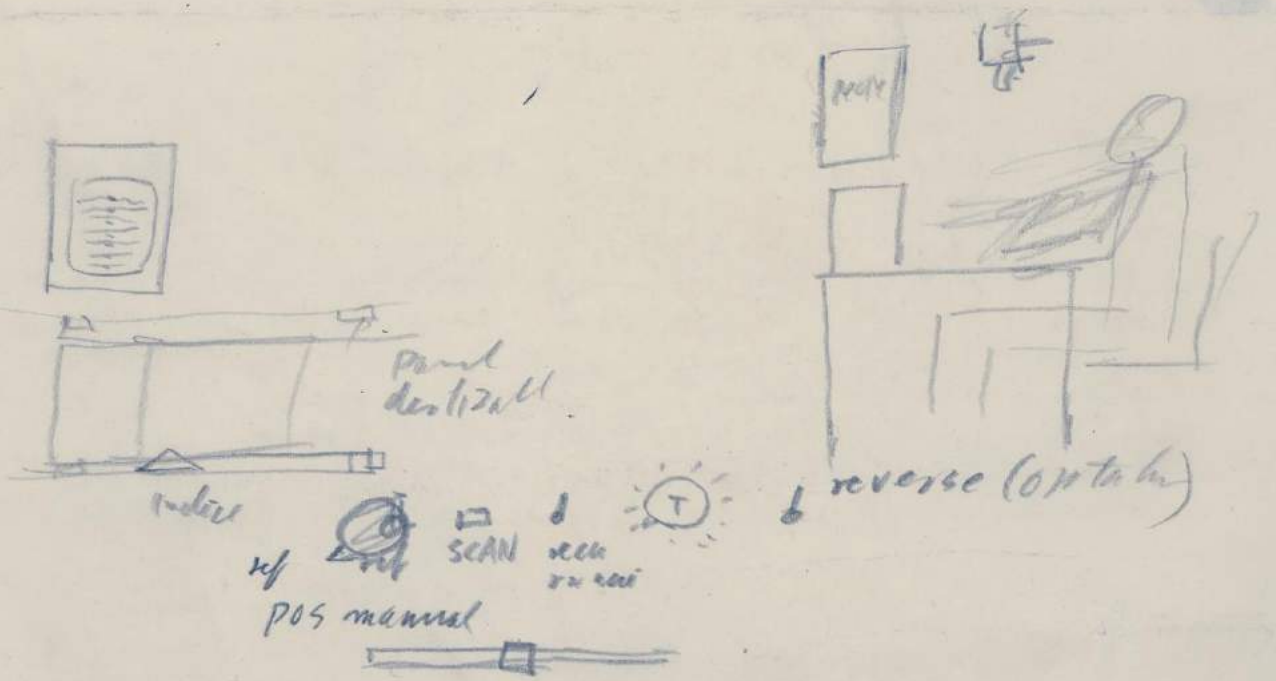

LAB II 1ª tentativa
MID Hall
contador
Wave
seleccionar Waveform
Afinación
Polif a teclado
OSC MOOG
Wave
MD
Filtro por tensión
VCF
LP HP BP
CATA
PRIO
IN
PU LENTO
REVOX
Lab
I
SALIDAS
Botones inserción:
(x) reverb
(x)
(x) Filtro Cavyerschi
Parece muy gráfico!!


ΣA
ΣB
PR10
REVOY
Linea
Linea
SPULT.1

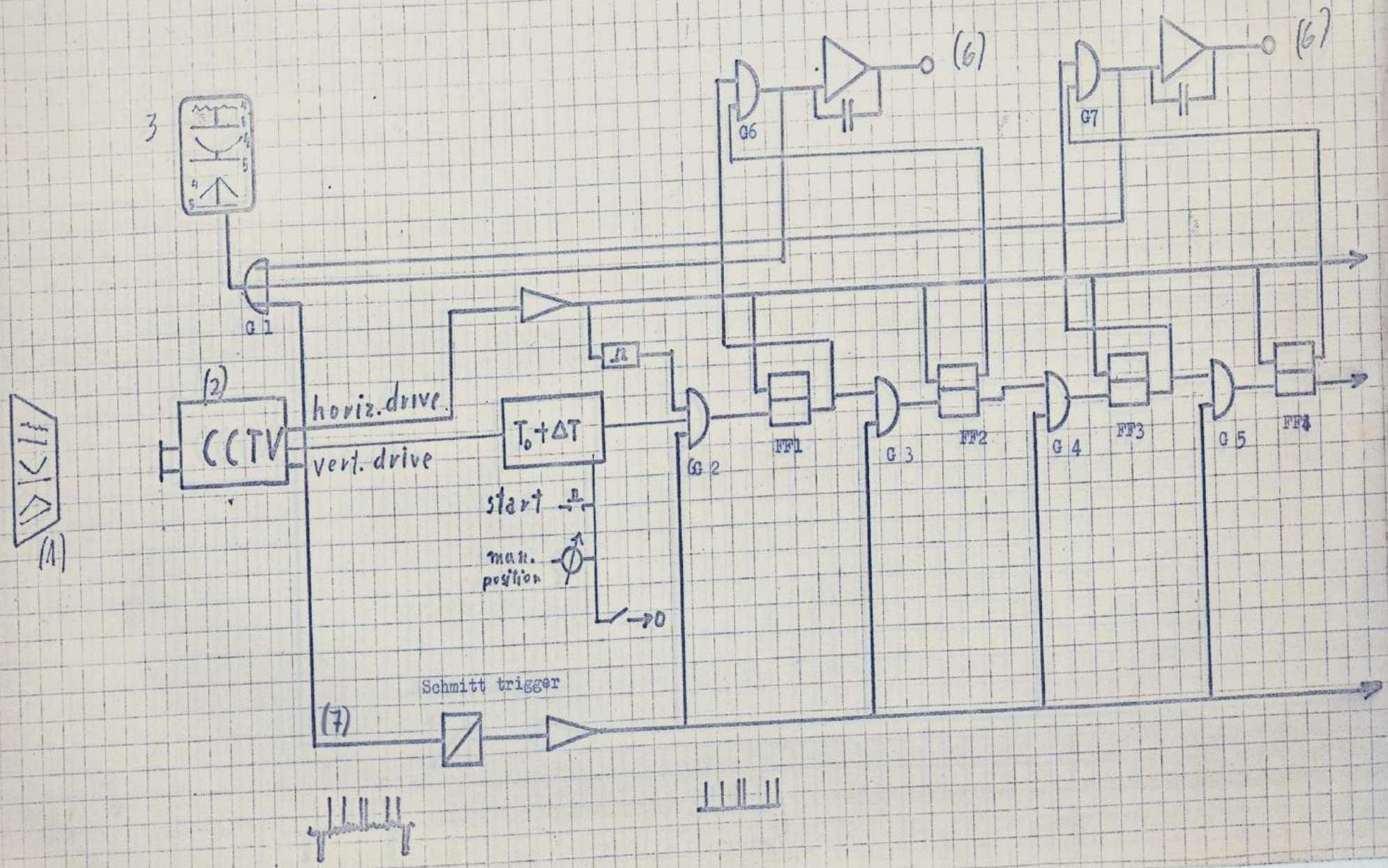

CUE
AΣ
BΣ

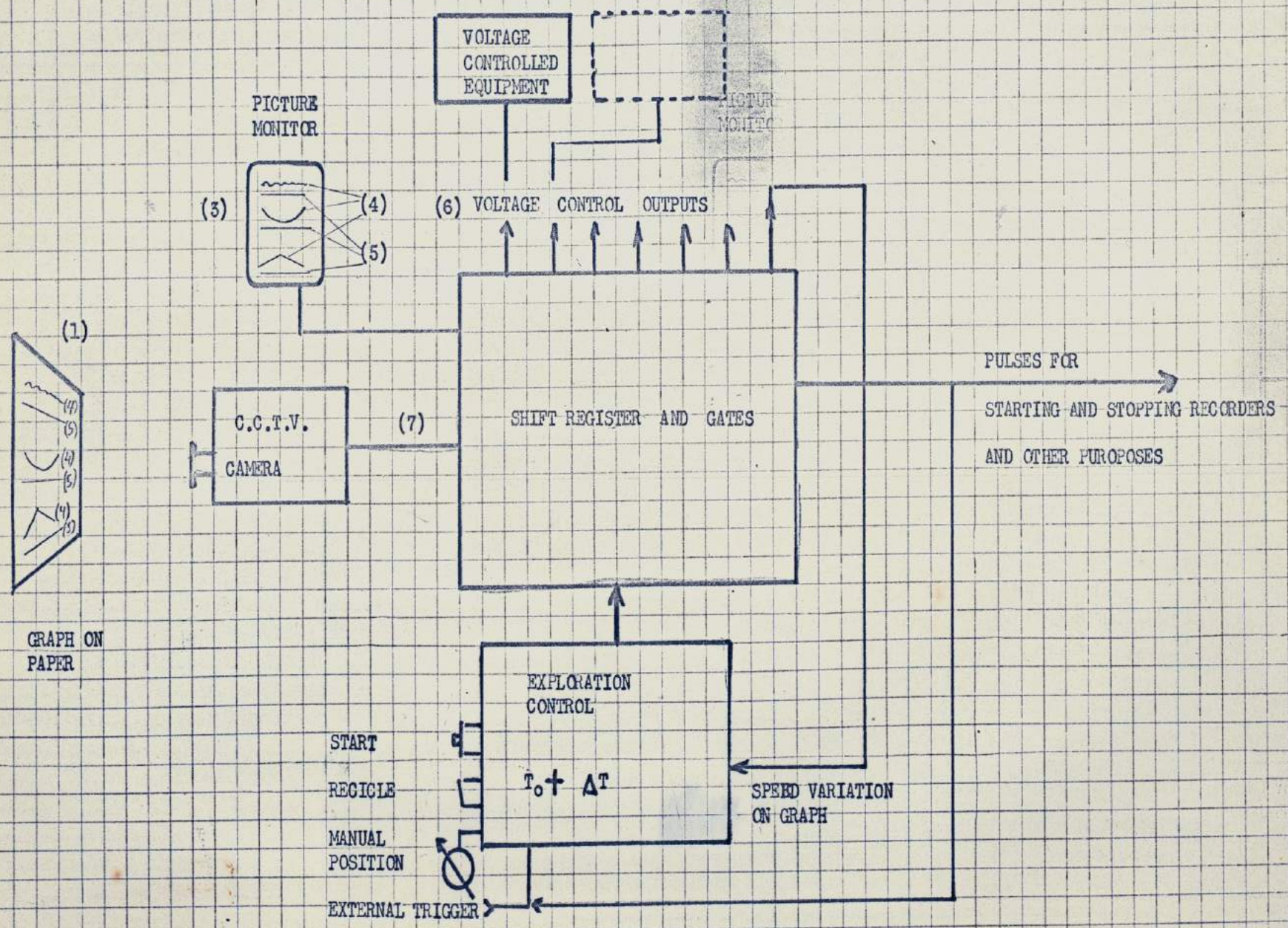
Proy Conversación a revisa

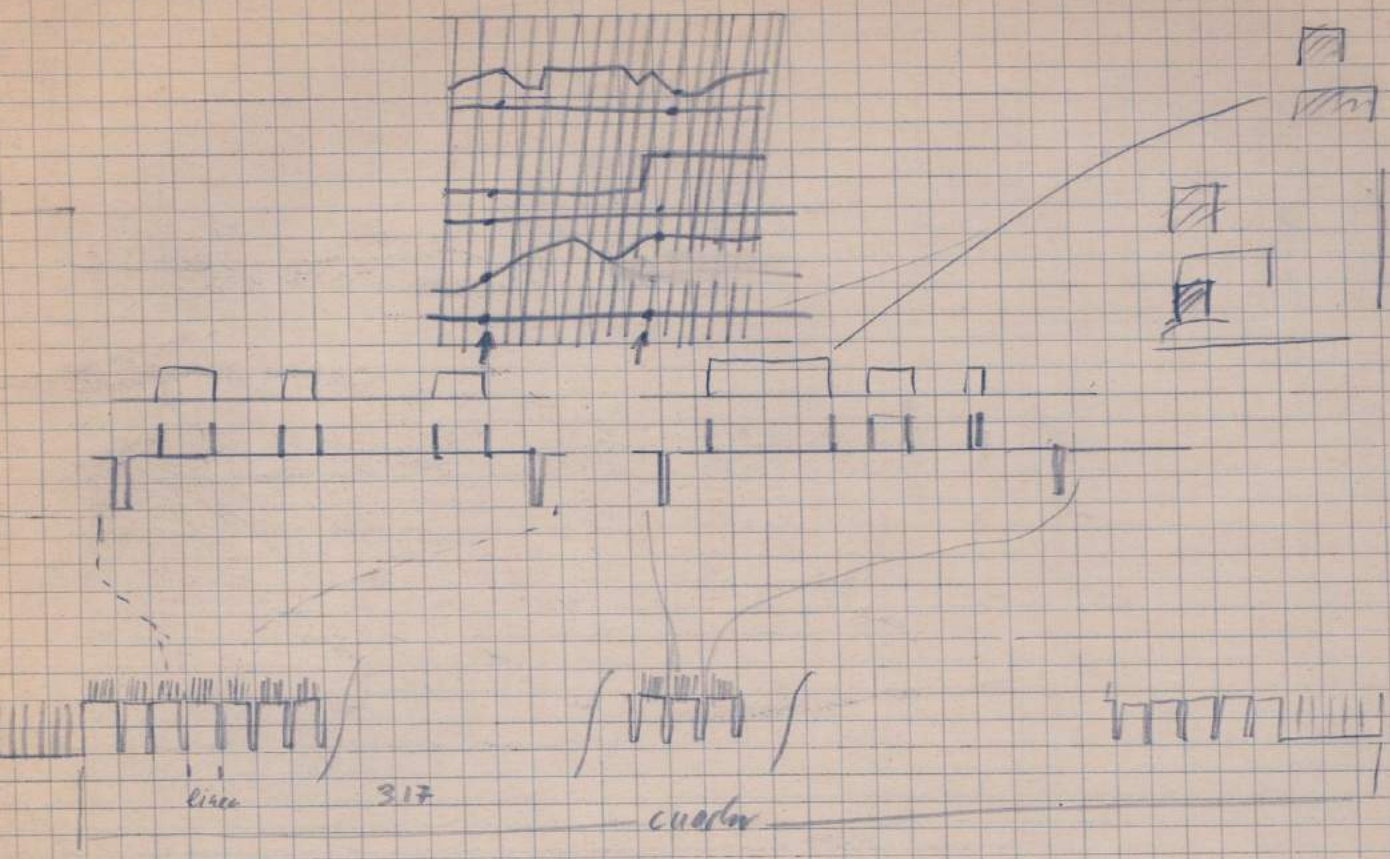

10 flip flop
10 gate
10 ring counter
reset
start stop
start — delay start
variable delay
delay counter
ajuste
referencia
ΔT


panel destizable
indice
ref
SCAN
POS manual
reverse (ortoh)

```
10 REM SIMULDISCADO TELEFONICO
20 INPUT"INGRESE UN NUMERO TELEFONICO";A$

30 L=LEN(A$)
40 FOR I=1 TO L

50 Z$=MID$(A$,I,1)
60 A(I)=VAL(Z$)

70 NEXT I
80 GOSUB 3000

90 PRINT"TERMINO"
100 END
3000 FOR K=1 TO L

3010 FOR J=1 TO A(L)
3020 PRINT CHR$(7)
3030 NEXT J
3040 FOR T=1 TO 200:NEXT T
3050 NEXT K
3060 RETURN
```


3
(1)
(2)
CCTV
horiz. drive
vert. drive
G 1
$T_0 + \Delta T$
start
max. position
Schmitt trigger
(7)
G 2
FF1
G 3
FF2
G 4
FF3
G 5
FF4
G6
G7
(6)
(6)


VOLTAGE CONTROLLED EQUIPMENT
PICTURE MONITOR
(3)
(4)
(5)
(6) VOLTAGE CONTROL OUTPUTS
(1)
(4)
(5)
(4)
(5)
(4)
(5)
C.C.T.V. CAMERA
(7)
SHIFT REGISTER AND GATES
PULSES FOR STARTING AND STOPPING RECORDERS AND OTHER PUROPOSES
GRAPH ON PAPER
EXPLORATION CONTROL
START
RECICLE
$T_o + \Delta T$
MANUAL POSITION
EXTERNAL TRIGGER
SPEED VARIATION ON GRAPH


linea
3.17
cuadro

FUENTE +40 -40V LABORATORIO

plied to the N++ gallium arsenide layers.

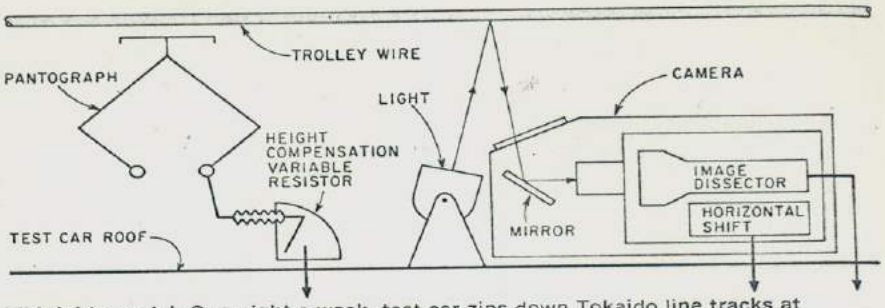
In operation. Researchers at Nippon Electric last year showed that by injecting a small sinusoidal voltage they could synchronize the frequency of the spiky Gunn oscillations in such devices and change fundamental frequency over a range of about two to one. Ability to synchronize the frequency is important when the device is used as a generator of clock pulses—an oscillator operating in stable cavity can be used to set system frequency. Oscillations are in the order of 1 gigahertz, with pulse widths of 0.2 nanoseconds.

The pulse generator is biased in the negative resistance region. Pulse repetition frequency depends on domain transit time, while pulse width depends slightly on carrier density. As the domain being transported reaches anode and is extinguished, a new domain is nucleated and the process repeats.

For operation as a pulse regenerator, the device is biased just below the threshold. When a small trigger pulse is applied, a high-field domain is nucleated and current through the device falls. Current returns to the original quiescent value after the domain transits the device and is extinguished. Pulse width in this mode is reciprocal of free-running repetition frequency, and is in the range of 0.5 to 2 nanoseconds.

Problems. There are still a number of bugs to be ironed out. For one, there is an insensitive region just above the threshold in some of the diodes in which noisy, incoherent oscillations are produced. This diode type still can be used as a pulse generator, but not for pulse regenerators, where operation extends into the noisy region.

Another problem is fabricating devices with desired impedance level. With voltage at about 30 volts, power dissipation must be kept at moderate levels—and devices have been fabricated with impedance levels of about 1,000 ohms. However, this provides power matching to the 75-ohm circuit generally used in high-speed pulse equipment such as pcm but further work is needed.



Midnight special. One night a week, test car zips down Tokaido line tracks at 125 mph while image-dissection tv camera checks overhead electrical wire wear.

Wire-sleuthing

Rejecting such modern developments as lasers in favor of a 35-year old superannuated device, Japanese National Railways has come up with a method of measuring wear in railroad overhead electric wires—at 125 miles per hour. What's more, readings are taken every 11 inches, compared with every 82 feet under an earlier method, which also required a four-man team.

Developed jointly with the Hamamatsu TV Co., the system uses an image-dissection television tube, invented in 1934. Even with electron multiplier assemblies, the image dissector is not used in television pickup systems because other tubes, notably the image orthicon, offer higher sensitivity. Where the latter tube scans an image on a charged plate in the tube by an electron beam, the image dissector moves the image, in the form of an electron bundle, across a pickup head.

A flat spot develops and gets progressively wider as the initially round electric wire used in feeding power to railroad trains wears away. When the wire is worn to about 70% of its original area it must be replaced because it is no longer thick enough to withstand the high pull—up to one metric ton—that dampens vibration.

Man-days. Normally, teams of four workers measure wear manually with micrometers. One man does the measuring, the second man holds the ladder, the third writes down data, and the fourth looks out for approaching trains. Measurements usually are made opposite support poles, which are 165 feet apart, and halfway between poles. This accounts for 20% of all the man-days required for maintenance of power feeding wires—including replacing wires and insulators, and periodic cleaning of insulators.

On standard train lines, with 1,500-volt d-c electrification, measurements can be made under operating conditions because a bamboo ladder provides sufficient insulation. But on the new Tokaido line, with 25,000-volt a-c electrification, power must be turned off before taking measurements; thus they have to be made during early morning hours before the start of the day's service.

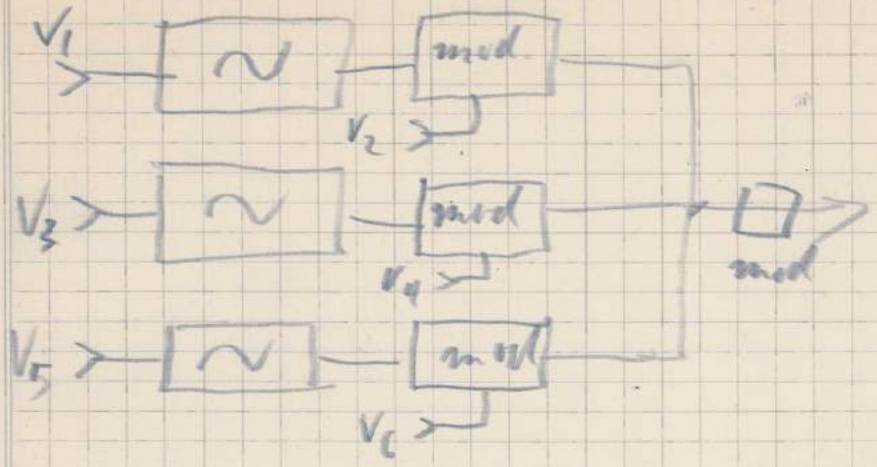
The new system is designed to measure at 125 mph. One night a week a test car is driven down the tracks on the Tokaido line at this speed. Because of the new equipment in this car, wear data can be gathered with little labor, except that which is needed to analyze the records after the run has been completed.

The pantograph collector shoe keeps the flat area shiny while the remainder of the wire becomes coated with corrosion products. Since the test car is run at night, the wire can be illuminated from below with a strong return of light from the flat part and almost no reflection from the remainder of wire and surrounding space, providing there is good differentiation (high contrast) between the flat area and remainder of the wire.

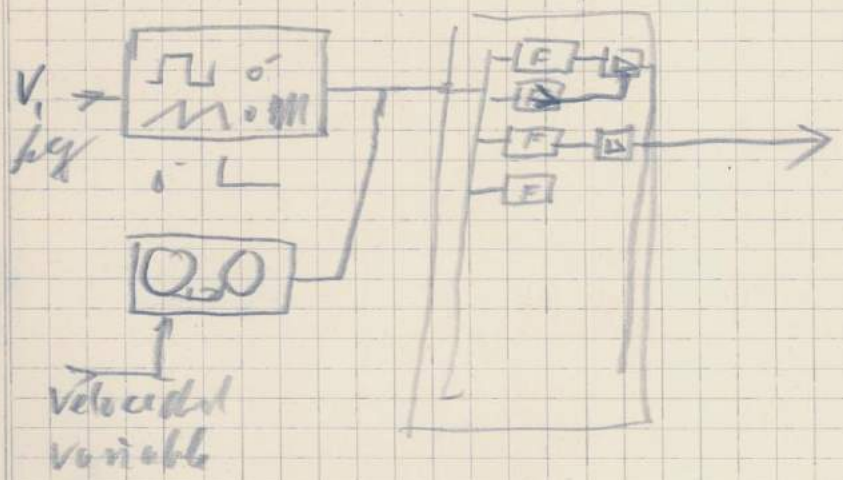
Blurring. In initial experiments the image of wire was picked up

Ampere entrinsecos de cinta

Síntesis aditiva



Síntesis sustractiva



Problemas: ~~varias~~ (1) ΔF ΔL al mayor menor de componente posible

~~Dos~~ + Sumar varios mayor ΔF ΔL en adicionante.

Asignatura _____ Comisión _____

Nombre y apellido _____

Nº. de Registro _____ Fecha _____ Firma _____

Editorial Macchi
CORDOBA 2015 — BUENOS AIRES

PROYECTO LABORATORIO ACCIONADO POR CAMARA DE TV

Sistema de conversion directa de valores numéricos, graficados sobre papel, en tensiones electricas para programar procesos controlados por voltaje.

Utiliza una cámara de television tipo circuito cerrado sin modificar.

Un circuito digital extrae la información de la señal compuesta de video que entrega la cámara.

~~Pueden programarse varios parámetros simultáneamente.~~

La representacion gráfica es explorada punto por punto, o con avance uniforme o con variacion de velocidad de exploracion dada en una de las curvas dibujadas. Puede analizarse cada gráfico en forma repetitiva o no, pudiendo asimismo incluirse marcas de calibracion para reajuste automático de las condiciones iniciales.

Pueden programarse varios parámetros simultáneamente.

Pueden incluirse trazos en la parte superior del gráfico para indicar el ~~destino~~ conexionado y o destino a que se remite la informacion de la curva que sigue.

Descripción del sistema:

El gráfico a explorar se coloca frente a una cámara de televisión girado 90 grados, de modo que el eje de las abcisas quede vertical. Para observar correctamente la imágen en un monitor, este debe pararse de costado.

Con esta disposición se logra que la exploracion horizontal (15.625 Hz) corte las curvas, explorando el gráfico paralelamente al eje de las ordenadas.

Cada curva es precedida por una recta horizontal o trazo de refenencia.

El voltaje obtenible a la salida del sistema es proporcional a la distancia entre ~~[illegible]~~ trazo de referencia y curva.

La ćamara explora normalmente todo el gráfico a razon de 50 cuadros por segundo (entrelazado free running). ~~[illegible]~~

Un sistema de compuerta elige en cada cuadro una línea de entre las 315 exploradas.

La señal de video extraida de esta linea contiene un pulso por c ada trazo de referencia y otro por cada curva que atraviesa.

El tiempo transcurrido entre ambos pulsos (microsegundos), determina el ancho del pulso de extracción. A Partir de este se obtiene un voltaje proporcional a la

Ing. E. Oteiza

Sr. Julio Llinás
Gerente Depto. Publicidad

Julio 31, 1968

Sra. Celia Wainberg
Sr. Mario Marzana
Ing. F. von Reichenbach
Prof. F. Kröpfl

He sentido algunas ondas de choque relacionadas con lo que me comentabas los otros días en Kromos. Por el momento las he ignorado, manteniendo la posición de que si perdemos independencia y la posibilidad de trabajar en el frente creativo, el Instituto perdería totalmente sentido. Efectivamente, tuve la impresión de que la presión no es fuerte y que está causada por cuestiones de tipo circunstancial.

Paso a otro tema de tipo totalmente pragmático, o sea, tengo que hacer un pechazo. En este momento estamos completando el laboratorio de música electrónica con un sistema de control analógico para el cual nos sería de extremada utilidad poder disponer de dos de los cuatro televisores que nos prestaron para el Año 2000. Estos dos televisores, ligeramente modificados por Reichenbach, nos servirían uno como osciloscopio de demostración en clase y otro como monitor de cámara para el sistema en cuestión. Dejo el asunto en tus manos en la esperanza de que nos puedas dar una idem.

SISTEMA DE PROGRAMACION MEDIANTE CAMARA DE TELEVISION

Sistema de conversión directa de valores numéricos, graficados sobre papel, en tensiones eléctricas, para programar procesos controlados por voltaje.
Utiliza una cámara de televisión tipo circuito cerrado sin modificar. De la señal de video que entrega la cámara, un circuito digital extrae la información, convirtiéndola directamente en señales de control.
La representación gráfica es explorada punto por punto, con avance uniforme o con variación de velocidad dada en una de las curvas dibujadas. Puede analizarse cada gráfico en forma repetitiva o no, pudiendo asimismo incluirse marcas de calibración para reajuste automático de las condiciones iniciales.
Pueden programarse varios parámetros simultáneamente.
Pueden incluirse trazos en la parte superior del gráfico para indicar el conexionado y/o destino al que se remite la información de la curva siguiente.

Descripción del sistema

El gráfico (1) a explorar se coloca frente a la cámara (2) de televisión, girando 90 grados, de modo que el eje de las abcisas quede vertical. Con esta disposición se logra que la exploración horizontal corte a las curvas, explorando el gráfico paralelamente al eje de las ordenadas. Para observar correctamente la imagen en un televisor monitor (3), éste debe pararse de costado.
Cada curva (4) es precedida por una recta horizontal (5) o trazo de referencia.
El voltaje (6) obtenido a la salida del sistema es proporcional a la distancia entre trazo de referencia y curva.
La cámara explora normalmente todo el gráfico a razón de 50 (cincuenta) cuadros por segundo. Un sistema de compuerta elige en cada cuadro una línea de entre el total.
La señal de video (7) extraída de esta línea contiene un pulso por cada trazo de referencia y otro por cada curva que atraviesa.
El tiempo transcurrido entre ambos pulsos determina el ancho del pulso de extracción (8). A partir de éste se obtiene un voltaje proporcional a la separación entre trazo de referencia y curva.
La línea seleccionada para obtener el pulso de extracción puede ser la misma o ir cambiando de cuadro en cuadro. Esto último implica que se está explorando el cuadro. En la pantalla del monitor (3) se observa el cuadro entero tal como lo toma la cámara. Los puntos explorados aparecen más brillantes. (9). Puede seguirse visualmente el proceso de exploración y observar dónde deben hacerse correc-

ciones (c9n goma y lápiz).
Una perilla permite explorar maualmente. La posición automática suministra exploración con velocidad uniforme y tiempo ajustable. Su puesta en marcha puede provenir de un impulso externo o ser repetitiva.
La constante de tiempo de exploración puede ser regulada por una de las curvas pudiendo lograrse variación de la misma (10) (de la velocidad de exploración) de acuerdo con cada zona del gráfico explorada.

Utilización del sistema en el laboratorio de música

Los laboratorios nuevos tipo Moog y Buchla son accionados por voltaje. Nuestro generador de diente de sierra y pulsos fue contruído bajo ese principio. El funcionamiento de estos instrumentos con el sistema descripto más arriba es el siguiente:
Generadores: Una curva controla frecuencia y otra amplitud de la señal, pudiendo accionarse varios generadores al mismo tiempo. Ejemplo: una línea horizontal recta produce una frecuencia fija cuya altura depende de la distancia al trazo de referencia. Una inclinación de glissando. Si la línea es trazada a mano levantada se introducen fluctuaciones aleatorias con un cierto grado de control, similares a las que produce el ejecutante de un instrusento tradicional.
Filtros: en forma similar se controla la forma y ancho del espectro (síntesis sustractiva) y su variación en función del tiempo. Ejemplo: trémolos y vibratos de banda pasante en forma controlada y perfecto sincronismo con otras voces.
Modulación: Permite controlar envolventes, producir ataques y extinciones muy complejas con sincronismo exacto. El poder expandir parcialmente la escala del tiempo (curva que determina velocidad de exploración) reduce enormemente la longitud de la hoja o rollo programa. Esta se parecerá mucho a la partitura electrónica de Stokhausen llevando además las indicaciones necesarias para el conexionado automático del circuito necesario en cada caso.
Asimismo puede lograrse el control de arranque y parada exacta de grabadores.
Como meta no demasiado lejana se puede tender a suprimir toda manipulación que no sea dibujar.

United States Patent [19]

von Reichenbach

[11] **3,719,777**

[45] **March 6, 1973**

[54] **PROCESS AND APPARATUS FOR CONVERTING IMAGE ELEMENTS TO ELECTRIC IMPULSES**

[75] Inventor: **Fernando von Reichenbach,** City Bell, Argentina

[73] Assignee: **Instituto Torcuato di Tella,** Capital Federal, Argentina

[22] Filed: **April 19, 1971**

[21] Appl. No.: **135,006**

[30] **Foreign Application Priority Data**

April 17, 1970 Argentina.....228168

[52] **U.S. Cl.**.....**178/6.8,** 178/DIG. 1, 178/DIG. 22, 178/DIG. 36, 235/61.6 A, 235/61.6 B

[51] **Int. Cl.**.....**G06k 9/12,** G06k 11/02, H04n 7/18

[58] **Field of Search**.....178/DIG. 1, DIG. 4, DIG. 22, 178/DIG. 36; 235/61.6 A, 61.6 B

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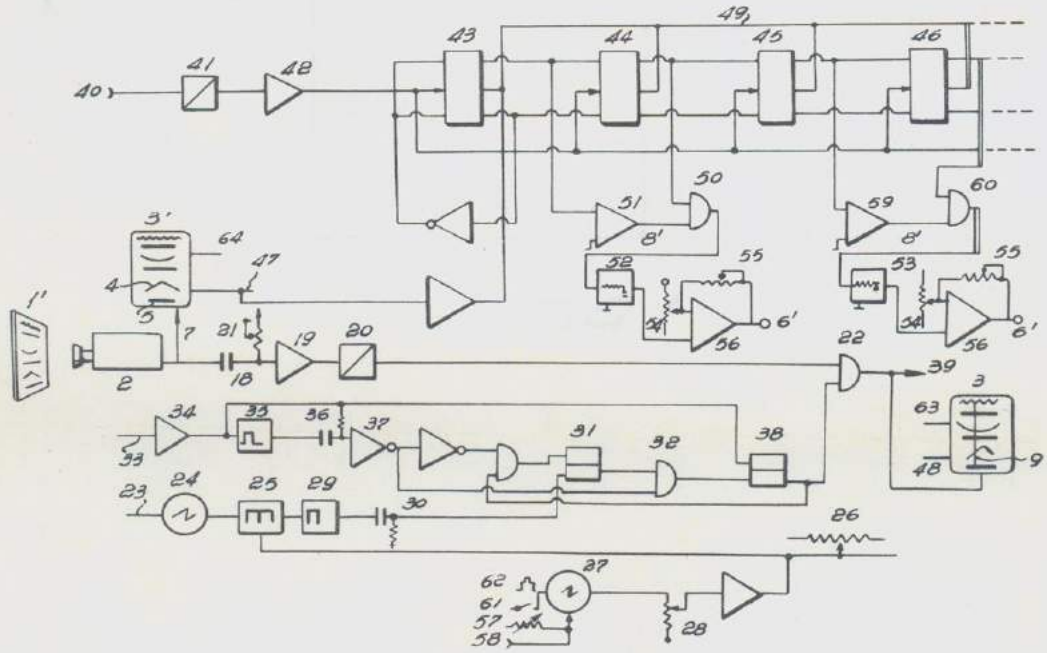
Primary Examiner—Howard W. Britton
Attorney—Tab T. Thein

[57] **ABSTRACT**

Process and apparatus by which numerical values or image elements represented in graph form on paper or other similar material are converted into electric impulses. In a preliminary stage, the graphic numerical values can be successively analyzed and modified, readjusting them to the requirements of the case, in relation to the electric impulses they generate. The graphic numerical values are converted into variable electrical voltages in order to program processes controlled by voltage or intensity, but they can also be utilized in the programming of processes controlled by pulses of variable duration or by counting the pulses.

2 Claims, 2 Drawing Figures



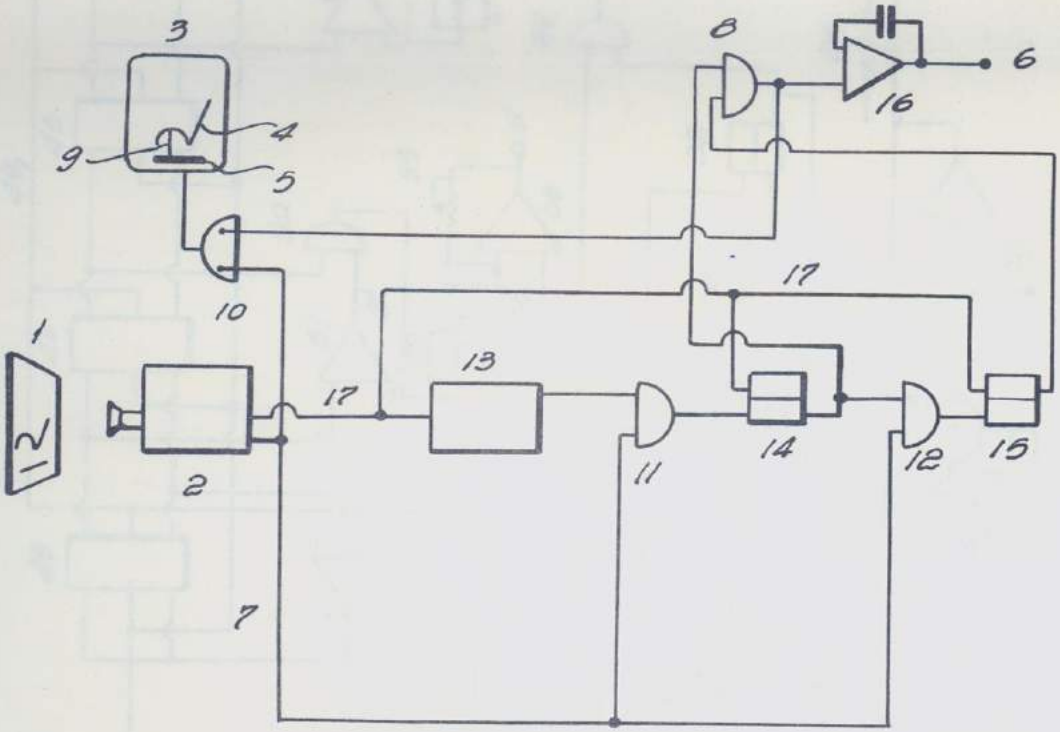


FIG. 1

INVENTOR

BY Fernando von Reichenbach

Agent

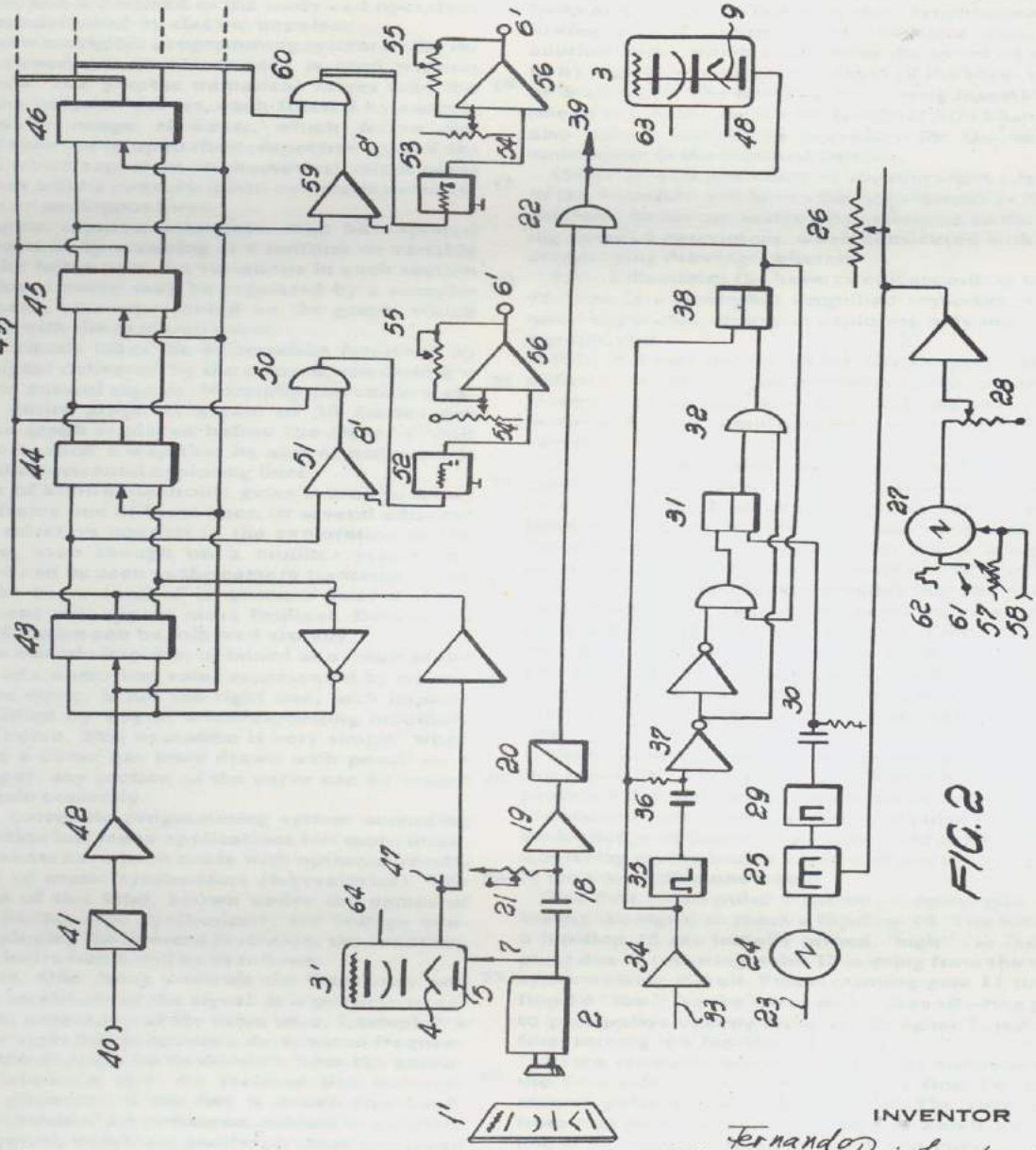


FIG. 2

INVENTOR

BY Fernando von Reichenbach

Agent

PROCESS AND APPARATUS FOR CONVERTING IMAGE ELEMENTS TO ELECTRIC IMPULSES

The invention relates to a programming system, embodied in a process and two exemplary embodiments of an apparatus, corrigible through a closed-circuit television camera, and is destined to the study and operation of processes controlled by electric impulses.

For the new corrigible programming system of the invention a closed-circuit TV camera is used without modifications. The graphic numerical values take the shape of one or more curves, each formed by successive points or image elements, which follow the distance of each curve up to their respective axes of abscissae and which represent the numerical values point by point, that will be converted into correlating electric impulses in an analogous form.

The graphic representation can then be explored point by point or by scanning at a uniform or variable speed. In the latter case the variations in each section of the explored curve may be regulated by a complementary curve, also represented on the graph, which corresponds with the explored curve.

A digital circuit takes the information furnished by the video signal delivered by the camera, converting it directly into control signals. Normally the camera explores the entire graph at a rate of 50 frames per second. The graph is placed before the closed-circuit TV camera in such a way that its axis of ordinates is parallel to the horizontal exploring lines.

A system of known electronic gates is used to select from each frame one of these lines, or several adjacent lines. This selection consists in the exploration of the graph since, even though on a monitor screen the whole frame can be seen as the camera transmits it, the points of the curve (and of its abscissa axis) that are being explored will appear more brilliant. Because of this the exploration can be followed visually.

When the electric impulse, obtained as a result of the conversion of a numerical value represented by a given point on the curve, is not the right one, such impulse can be modified by way of a corresponding modification of the curve. This operation is very simple; when for example a curve has been drawn with pencil on a piece of paper, any section of the curve can be erased or drawn again correctly.

The new corrigible programming system according to the invention has many applications but more intensive experiments have been made with optimum results in the field of music synthesizers (laboratories). The new devices of this kind, known under the names of Moog and Buchla-type synthesizers, are voltage controlled. Employing the present invention, the functioning of these instruments will be as follows:

Generators: One curve controls the frequency and another the amplitude of the signal. It is possible to activate several generators at the same time. Examples: a horizontal straight line produces a determined frequency whose pitch depends on its distance from the abscissa axis or reference line. An inclined line however produces a glissando. If the line is drawn free-hand, aleatoric fluctuations are produced, subject to a certain degree of control, which are similar to those produced by a performer on a traditional instrument, e.g., a violin.

Filters: Similarly, the form and width of the spectrum (substractive synthesis) are controlled and also the variation in relation to time. For example: band-pass tremolos and vibratos in controlled form and in perfect synchronization with the other voices.

Modulation: The invention allows the control of dynamic envelopes, the production of very complex attacks and decays, all this with exact synchronism. By allowing partial expansion of the time scale (using another curve which determines the speed of exploration) it greatly reduces the length of the sheet of paper or draft score. The latter bears a strong resemblance to one of the electronic music scores of Stockhausen and also carries indications necessary for the automatic connection of the required circuits.

Other objects and many of the attendant advantages of the invention will be readily appreciated as the same becomes better understood by reference to the following detailed description, when considered with the accompanying drawings, wherein

FIG. 1 illustrates the basic circuit according to the invention, in a somewhat simplified embodiment of the novel apparatus, aiming at exploring only one curve of a graph; and

FIG. 2 shows the electronic circuit, partly in a simplified form, of a second exemplary embodiment of the inventive apparatus, also for practising the inventive method, for the simultaneous exploration of several curves.

In relation with the circuit illustrated in FIG. 1, a graph 1 to be explored is placed in front of a closed-circuit TV camera 2 which is preferably set on one of its sides, i.e., turned 90° about its horizontal axis so that the abscissa axis becomes vertical, that is in a position parallel with respect to the ordinate axis of graph 1.

This arrangement makes possible that the horizontal exploration of the camera intercepts the curve, thus exploring the graph parallel to the axis of ordinates. A TV monitor 3, similarly supported on one side, can also give the correct picture. A curve 4 to be explored as to its image points is accompanied by a straight horizontal reference line 5 forming its abscissa axis or reference line.

Video pulses or signals 7 from camera 2 reach one of the inputs of AND gates 11, 12 which let them pass provided that their other inputs are activated. A signal is obtained from a vertical restoring pulse 17, i.e., from each change of frame which is delayed in a circuit, e.g., a delaying multivibrator 13, so that is is always included in the time within one frame.

The first video pulse 7 therefore opens gate 11, allowing the signal to reach a flip-flop 14. The latter, and a flip-flop 15 are initially turned "high" (to the upper part) due to restoring pulse 17 coming from the vertical synchronizing circuit. Pulses crossing gate 11 turn flip-flop 14 "low" (to the lower part), thus allowing gate 12 to pass pulses coming from video signal 7 and, therefore, turning low flip-flop 15.

At the moment determined by delay multivibrator 13 the first video pulse 7 actuates flip-flop 14, and the second pulse actuates flip-flop 15. The time elapsed from one pulse to another is that in which a scanning line 9 intercepts reference line 5 and curve 4. As this line 9 has been selected for the purpose of extracting the visual information provided by the score, which later will have to be transformed into voltages, it shall be referred to hereinafter as the reading scanning line.

This is of course one of the about 500 or 600 or so horizontal lines in a regular TV camera (monitor, receiver and the like, the number depending on the system being applied). Because of the 90° rotation or turning of the inventive system, as explained before, the reading scanning line appears vertically.

When flip-flop **14** turns low, it activates a gate **8** which is also open since its other input is connected to flip-flop **15** which is high. When the second video pulse **7** arrives, flip-flop **15** turns low and gate **8** interrupts.

Therefore, at the output of gate **8** a one to ten microsecond wide pulse is obtained which, rectified and integrated by an operational amplifier **16**, gives at output point **6** a direct-current voltage proportional in its magnitude to the width of the video pulse **7**, and therefore, proportional to the distance between reference line **5** and curve **4**.

In monitor **3** the location of reading scanning line **9** is shown directly through an OR gate **10**. This allows access, through its lower input, as illustrated, to video signal **7** while its upper input conducts the output signal from gate **8**. The location of line **9** (or bundle of adjacent lines) is determined by the time lag introduced by multivibrator **13**, starting from vertical restoring pulse **17**.

Line **9** can explore graph **1**, either by modifying gradually the time lag of multivibrator circuit **13** or by keeping this lag constant (and therefore line **9**) but gradually moving graph **1** in a horizontal direction by conventional means. In case graph **1** has been drawn on a long strip of paper, this is a recommended procedure.

While the arrangement shown in FIG. **1**, as a matter of example, aims at exploring a single curve of a graph, the second embodiment to be described hereunder (and its non-illustrated modification to be described later) are adapted simultaneously to explore several curves, as has been mentioned before.

With regards to the circuit of FIG. **2**, a score **1'** is reproduced on the screen of one or two monitors, such as illustrated at 3 and 3'. The latter is the regular monitor of the closed-circuit TV chain, and in this apparatus it is used only for framing and focusing purposes. Monitor **3** is a slave monitor connected in this system through AND gate **10** in such a way that image **1'** is seen without a gray scale, so that only heavy black lines can be seen. The reading scanning line **9** is also visible on the screen of monitor **3**, superposed over the section of the image of score **1'** that in that moment is being processed. AND gate **10** operates as explained for FIG. **1**. It should be understood that elements **2, 3, 4, 5** and **7** are similar to those described for the first embodiment of the inventive apparatus, and will not be re-introduced for the second embodiment. The video signal is differentiated now in a circuit **18** and amplified by a follower amplifier **19** and then transformed by a Schmitt trigger **20**. The threshold of the latter is controlled by a volume control or variable resistor **21**. Thus the signal is free from any interference other than the pulses to be analyzed, which pass through an AND gate **22**.

In order that pulses corresponding to only one scanning line cross gate **22** the following chain is established: a saw-tooth generator **24** which is synchronized by vertical synchronization **23** connects to a variable-width pulse shaper **25**. The pulse width of shaper **25** is voltage controlled by the chain of electronic components: saw-tooth generator **27**, adjustable resistor or potentiometer **28**, buffer amplifier **63**, and a variable resistor **26** or the like, as is described hereinafter in more detail. The use of resistor **26** makes it possible to determine manually a departing position of the exploring line, while generator **27** permits a slow movement of said line. This scanning range of the generator is controlled by an adjustable resistor or control **28**.

The pulse already delayed by shaper **25** is shaped into a sharp pulse by a circuit **29** and differentiated by circuit elements **30**. This pulse turns low a flip-flop **31**, and it will progress through a gate **32** when a pulse arrives, indicating that an entire line has started. In order to obtain this, a horizontal synchronization pulse **33** is amplified by a unit **34**, delayed by a circuit **35**, differentiated by elements **36**, inverted by a unit **37** and transferred to gate **32**. The output of the latter turns a flip-flop **38** down. The latter is raised again by the next horizontal synchronizing pulse in order to avoid that the following line, or part of it, goes through its lower part.

Video signal **7** can go to monitor **3** only when a convenient pulse has turned flip-flop **38** down at gate **22**. Through connections **39, 40** video signal **7** reaches a Schmitt trigger **41** which equalizes the amplitude of the signal. By means of a follower amplifier **42** the signal is fed to the input of a number of JK-type flip-flops **43, 44, 45, 46** which form a well known shift register. As a matter of example, four are shown but it will be understood that there may be more or less.

As a result of this, the first pulse **7** progresses through flip-flop **43**, the second actuates unit **44**, the third, unit **45**, and so on. At each change of frame of the camera, all flip-flops are reset by a line **49** which is fed by a vertical synchronization pulse **47**, amplified by buffer amplifier **63**.

The time elapsed between the operation of units **43, 44** is equal to the time necessary for the TV camera to scan the distance between reference line **5** and the first curve drawn on the score. The time lag between the output of units **45, 46** is equal to the time lag between the following reference line and the next curve, and so on. We can thus read more than one curve, and separate the curves without interaction, through a sequential system resembling pulse-width modulation. The pulses coming from flip-flops **43, 44** go to one input of a gate **50** where an inverter amplifier **51** is connected to the second input.

Integrating stages **52, 53**, etc. allow to obtain direct-current voltages **6'** which should be connected at appropriate control inputs of electronic music synthesizers; these voltages are proportional to each pulse width. In FIG. **2**, as a matter of example, two such circuits are only shown, with substantially similar circuit elements. A variable control **54** adjusts zero in each of them, and a control **55** adjusts the gain of an operational amplifier **56**, thus adjusting the maximum amplitude. Earlier-described control **26** allows to position the reading line and to scan the graph manually. The graph may be explored either once or repeatedly by means of saw-tooth generator **27** connected through control **28**. The amplitude of the saw tooth is controlled by the latter. The frequency of the generator is

manually controlled by a variable resistor **57**, and it is externally voltage controlled through its input **58**. This input could be connected to output **6'** of control **56** (again in both integrating stages **52, 53**). The scanning speed obtained through this connection is proportional to the drawn curve being read.

Additional marks can be included on the upper part of the graph to indicate the connection and/or route the destination to which the information of the following curve is sent.

After the first curve it is possible to omit the next reference line if the amplifiers and gates of the integrating stages are reconnected so that inputs of gate **50** and of an amplifier **59** are tied to the output of flip-flop **44**, and the other input of a gate **60** is tied to the output of flip-flop **45**, and so on.

In this way, the system is used with a maximum of efficiency, but programming becomes more complex; since each curve uses the former curve as a reference line, they must be measured point by point while drawing. A single scan is obtained by pushing a button **62** while repetitive scan is obtained through a switch **61**, both being associated with generator **27**.

Since Schmitt trigger **20** clips off the horizontal and vertical synchronizing pulses of video signal **7**, these pulses are obtained from the standard monitor **3'** in order to avoid building a synchronization circuit to obtain the synchronization pulses from composite video signal **7'**. Horizontal synchronization **64**, obtained from monitor **3'**, is fed to the monitor **3** through line **63**, and also to pulse input **33**. Similarly, vertical synchronization **47** goes an to input **48** and to vertical pulse input **23**.

The process and apparatus according to the invention may also be applied by using a flying-spot scanner instead of a closed-circuit TV camera. This demands only minor modifications and is not illustrated herein but will be readily understood by those skilled in the art. As it is well known, the flying-spot scanner consists of a cathode-ray projection or display tube which, by means of projection optics, casts a non-modulated picture onto a sheet of paper. This image consists of normal scanning lines. The light which is reflected by or goes through the paper is then received by a photomultiplier tube from which, after being amplified, a video signal is obtained (similar to the video pulses of signals **7** described for both exemplary embodiments). The signal of change of frame or vertical restoring signal (such as pulse or signal **17** described before) is obtained from the vertical synchronization on the projection tube.

The advantage of a flying-spot scanner system lies in the possibility of transferring the graph at a higher speed, avoiding troubles caused by the retention time of vidicon or orthicon-type camera tubes. The disadvantage of having possibly to work in a darkened room may be overcome by using a laser beam with a suitable deflection system instead of the normal cathode-ray type projection tube.

It should be understood of course that the foregoing disclosure relates only to preferred embodiments of the invention and that it is intended to cover all changes and modifications of the examples described, and of the inventive method, which do not constitute departures from the spirit and scope of the invention.

What I claim is:

1. A process for converting multi-channel analog graphs into DC voltages, and also for translating analog drawn scores into electronically generated sound, by the aid of an integrated system, a closed TV circuit, and an electronic music synthesizer operated by voltage control, the process comprising the steps of providing a TV camera and a TV monitor, and rotating the same about 90°, placing a graph, containing at least one variable in at least one curve, before said camera, so that the horizontal deflection of the latter crosses said graph from its bottom to its top, converting said variables into video signals in said camera, so that said signals contain one pulse for each intersection with said graph, including differentiating, gating and subsequently shaping and then counting said pulses, and producing from successive pulses, that represent successive intersections on said graph, output pulses directly proportional to the distance of said variables on said graph, rectifying and integrating said output pulses into DC voltages proportional to each magnitude for a desired coincidence point of different curves on said graph, selecting thus at least one adjacent line, and selecting said lines in each frame, optionally positioning said lines along said frames, by controlling the pulse width of a variable multivibrator, said pulse width determining what position said lines will have on said monitor, directly converting said video signals into electric control signals, including adjusting a low-frequency saw-tooth generator so as to scan slowly at least a part of the whole image field, determining which line one after the other is being selected, synchronizing horizontal and vertical pulses, determining that only said one line is selected at a given time for each frame, displaying said lines on said monitor, superimposing said lines onto an image which shows the outlines of said graph, visually following the entire process of taking voltages from said variables of the curves in real time, aurally following said output pulses, and making corrections in said variables until the desired effect is obtained.

2. An apparatus for converting multi-channel analog graphs into DC voltages, and also for translating analog drawn scores into electronically generated sound, including an integrated system, a closed TV circuit, and an electronic music synthesizer operated by voltage control, comprising, in combination, a TV camera and a TV monitor, both being rotated about 90°, a graph being placed before said camera, said graph containing at least one variable in at least one curve, so that the horizontal deflection of said camera crosses said graph from its bottom to its top, electronic means for converting said variables into video signals in said camera, so that said signals contain one pulse for each intersection with said graph, means for differentiating and gating said pulses, means for shaping and counting the same, means for producing from successive pulses, that represent successive intersections on said graph, output pulses directly proportional to the distance of said variables on said graph, means for rectifying and integrating said output pulses into DC voltages proportional to each magnitude for a desired coincidence point of different curves on said graph, means for selecting at least one adjacent line in each frame, electronic means for directly converting said video signals into electric control signals, means for synchronizing horizontal and vertical pulses, means for selecting only said one line at a given time for each frame, means for displaying said

lines on said monitor, and means for superimposing said lines onto an image which shows the outlines of said graph.

* * * * *

PROYECTO LABORATORIO ACCIONADO POR CAMARA DE TV

Resumen

Sistema de opnversion directa de valores numéricos, graficados sobre papel, en tensiones electricas para programar procesos controlados por voltaje.

Utiliza una cámara de television tipo circuito cerrado sin modificar.

Un circuito digital extrae la información de la señal ~~compuesta~~ de video que entrega la cámara.

~~Pueden programarse varios parámetros simultáneamente.~~

La representacion gráfica es explorada punto por punto, con avance uniforme o con variacion de velocidad de exploracion dada en una de las curvas dibujadas. Puede analizarse cada gráfico en forma repetitiva o no, pudiendo asimismo incluirse marcas de calibracion para reajuste automático de las condiciones iniciales.

Pueden programarse varios parámetros simultáneamente.

Pueden incluirse trazos en la parte superior del gráfico para indicar el ~~destino~~ conexionado y/o destino a que se remite la información de la curva que sigue.

Descripción del sistema;

El gráfico a explorar se coloca frente a una cámara de televisión girado 90 grados, de modo que el eje de las abcisas quede vertical. (Para observar correctamente la imágen en un monitor de televisión, este debe pararse de costado.)

Con esta disposición se logra que la exploracion horizontal (15.625 Hz) corte las curvas, explorando el gráfico paralelamente al eje de las ordenadas.

Cada curva es precedida por una recta horizontal o trazo de refenencia.

El voltaje obtenible a la salida del sistema es proporcional a la distancia entre ~~línea de~~ trazo de referencia y curva.

La cámara explora normalmente todo el gráfico a razon de 50 cuadros por segundo (entrelazado free running). ~~Mediante un compuerta~~

Un sistema de compuerta elige en cada cuadro una línea de entre las 315 exploradas.

La señal de video extraida de esta linea contiene un pulso por c ada trazo de referencia y otro por cada curva que atraviesa.

El tiempo transcurrido entre ambos pulsos (microsegundos), determina el ancho del pulso de extracción. A Partir de este se obtiene un voltaje proporcional a la separacion entre trazo de referencia y curva.

La línea seleccionada para obtener el pulso de extracción puede ser siempre la misma o ir cambiando de cuadro en cuadro. Esto último implica que se esta explorando el cuadro, ~~tal como se puede apreciar en la pantalla del monitor~~

En la pantalla del monitor se puede observar el gráfico entero tal como lo toma la cámara. Los puntos de la curva ~~que son~~ explorados se observan como puntos de inter-

sección mas brillantes. Puede seguirse así visualmente el proceso de exploradion y observar donde deben hacerse correcciones (con goma de borrar y lápiz).

Una perilla permite explorar manualmente.

La posicion automatica suministra exploracion con velocidad uniforme y tiempos ajustables. Su puesta en marcha puede provenir de un impulso externo o ser repetitiva.

La constante de tiempo deexploracion puede puede ser regulada por una de las curvas pudiendo lograrse exploracion con distintas velocidades de acuerdo con la zona del gráfico explorada.

CAMARA TV LABORATORIO

Circuitos integrados Fairchild ———————————— 80 ≃ 100
Motorola Ing Coriat ?

Camara Japonesa
Inglesa EMI Ayerza Somefin Somisa ? 650

Unidades Moog

oscilador controlado por voltaje Moog 901 275.-
" " " " Hewlett Packard (570.-) ?

Filtro controlado por voltaje Moog 904 575.-

amplificador controlado por voltaje Moog 902 140.-
~~1560.-~~ U$ 990 ~

Conversion filtro polifónico B y Kj aprox 100.000.-

1740.-

Mano de obra: depende elementos a conseguir
armado fuera ITDT?

590000.—

Elementos auxiliares:

2 TV SIAM uno monitor otro osciloscopio

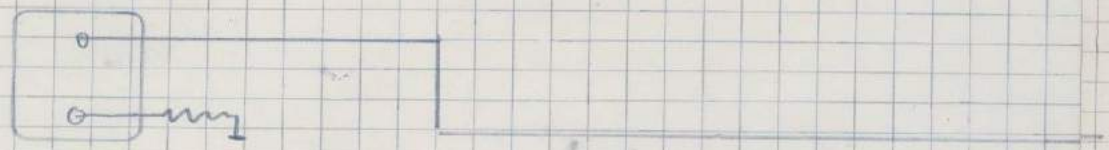
1 osciloscopio Textronix banda ancha doble haz persistencia larga ?

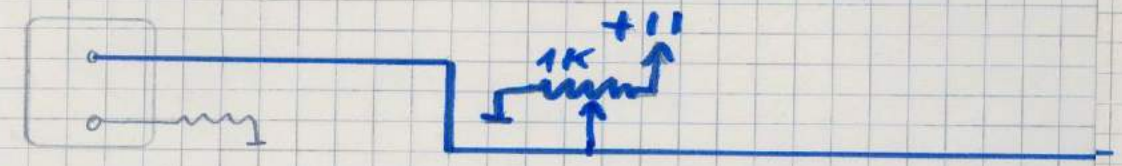
Hoja tipica

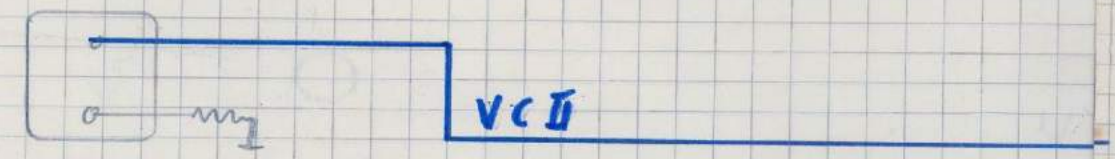
Montaje sistema

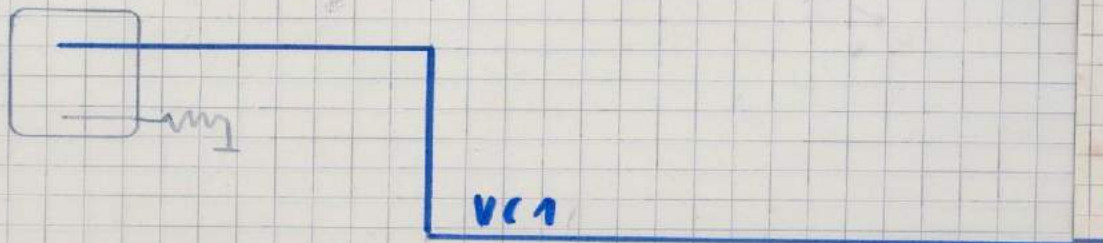
Interconexionado nuevo sistema integrar al antiguo?

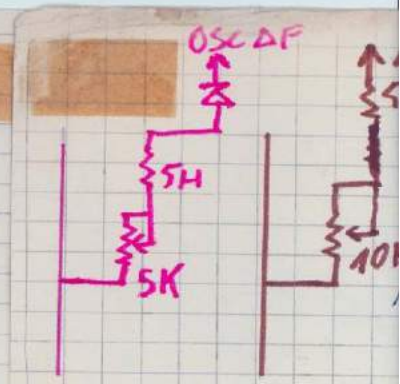
~~conversión osciloscopio a TV~~

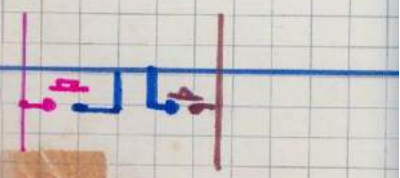


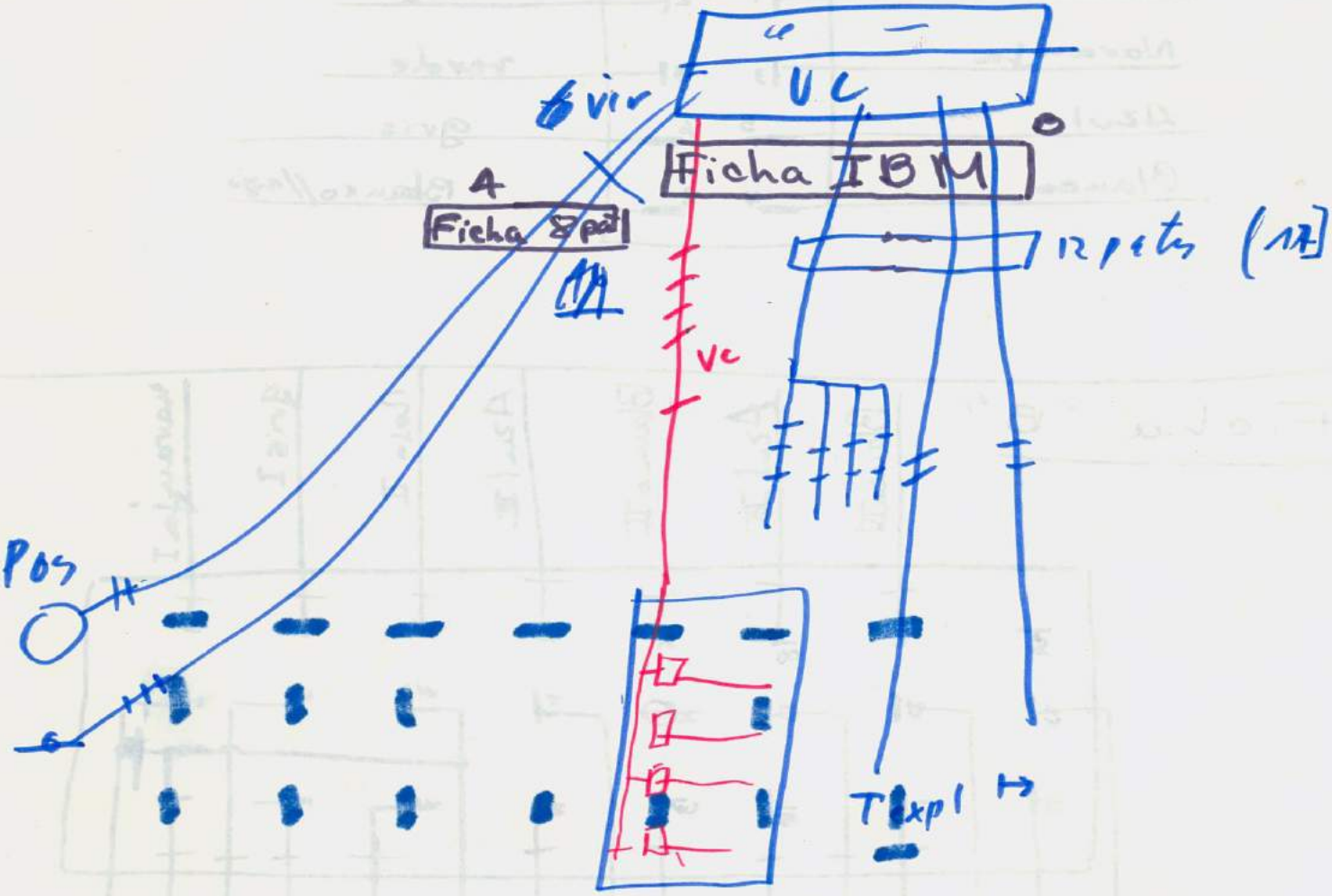

1K
+11


VCII


VC1

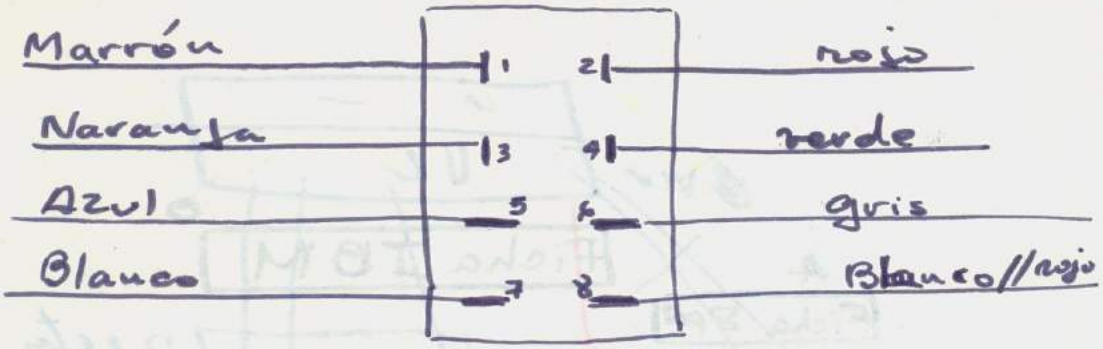

OSC ΔF
5H
5K



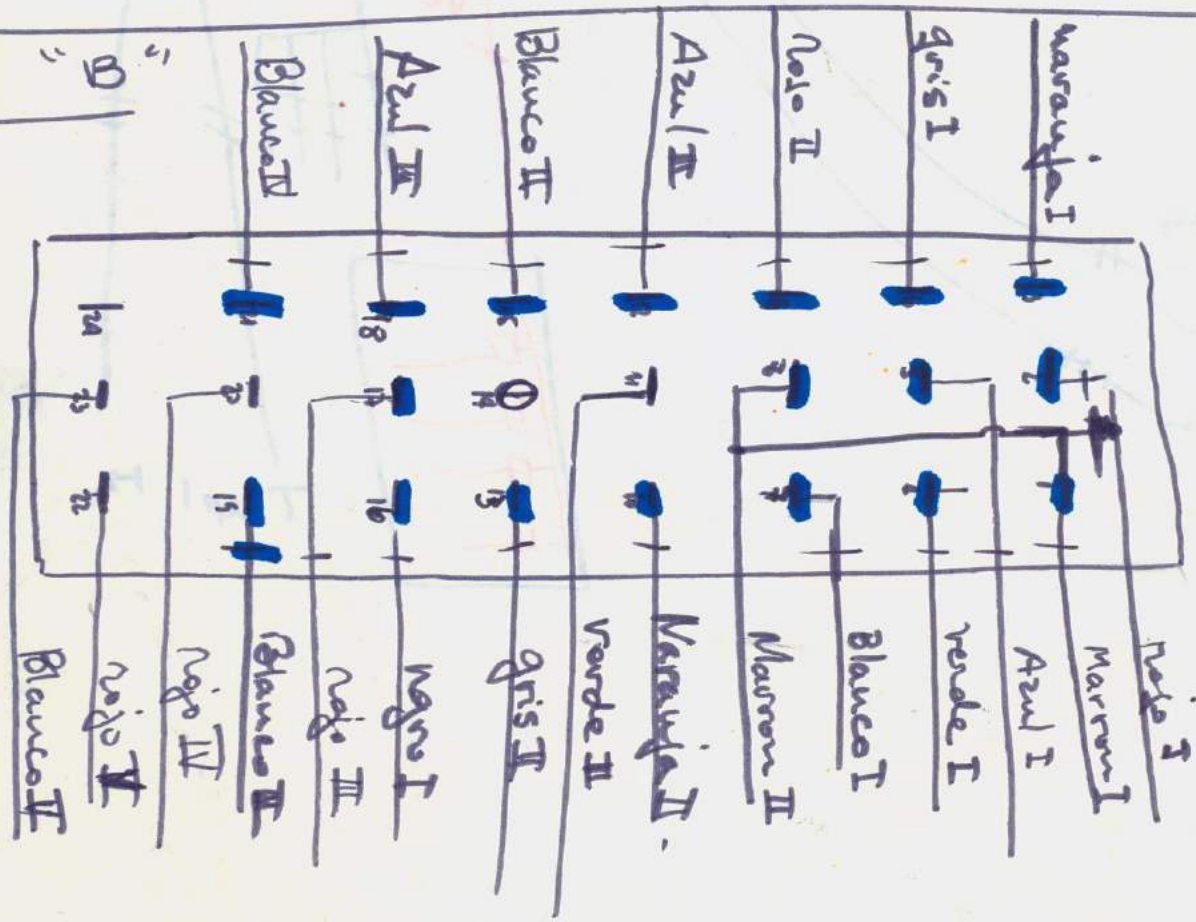

UC
Ficha IBM
Ficha 8pol
12 pts (12)
Pos
Texp

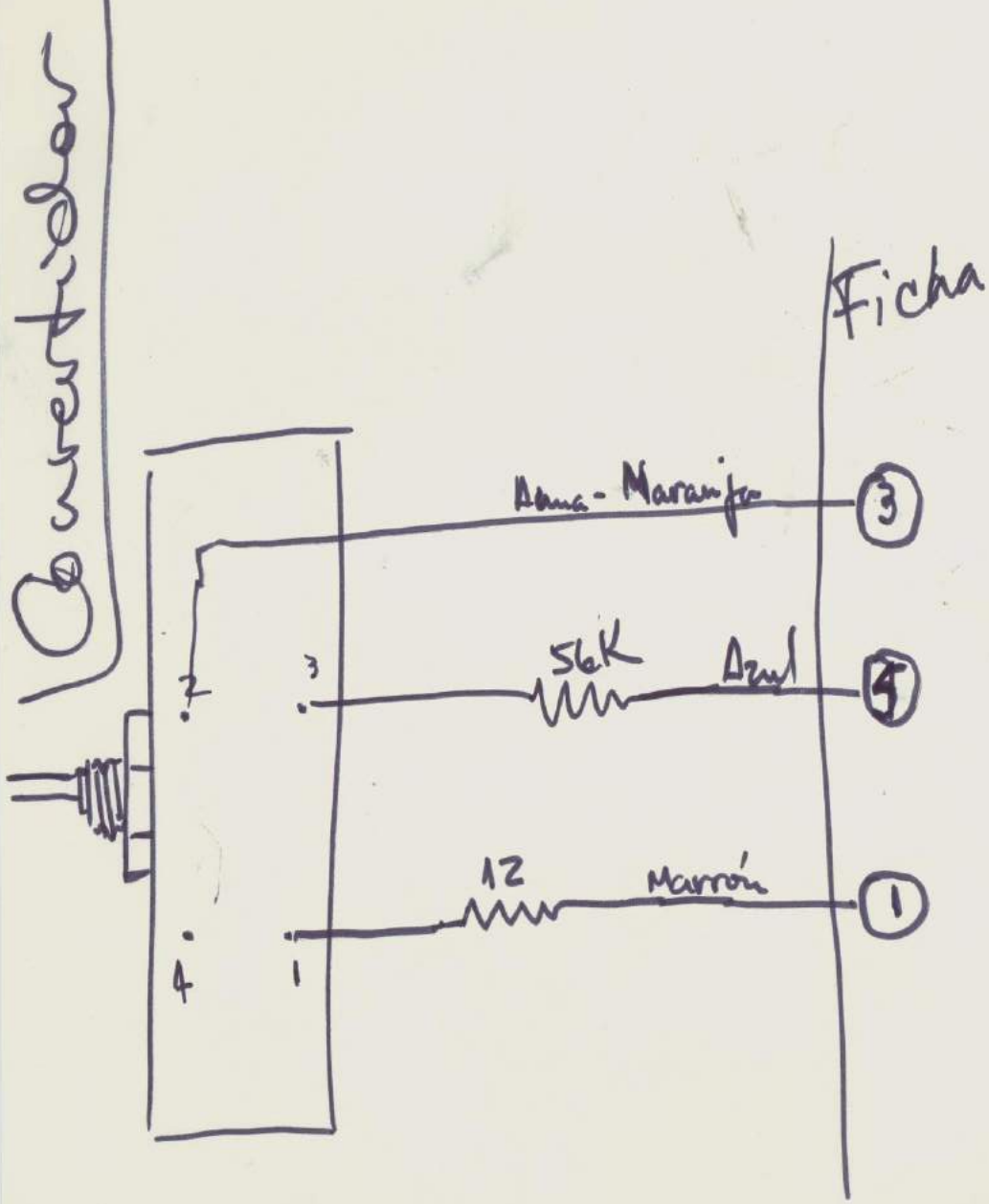
Convertidor

Ficha "A"

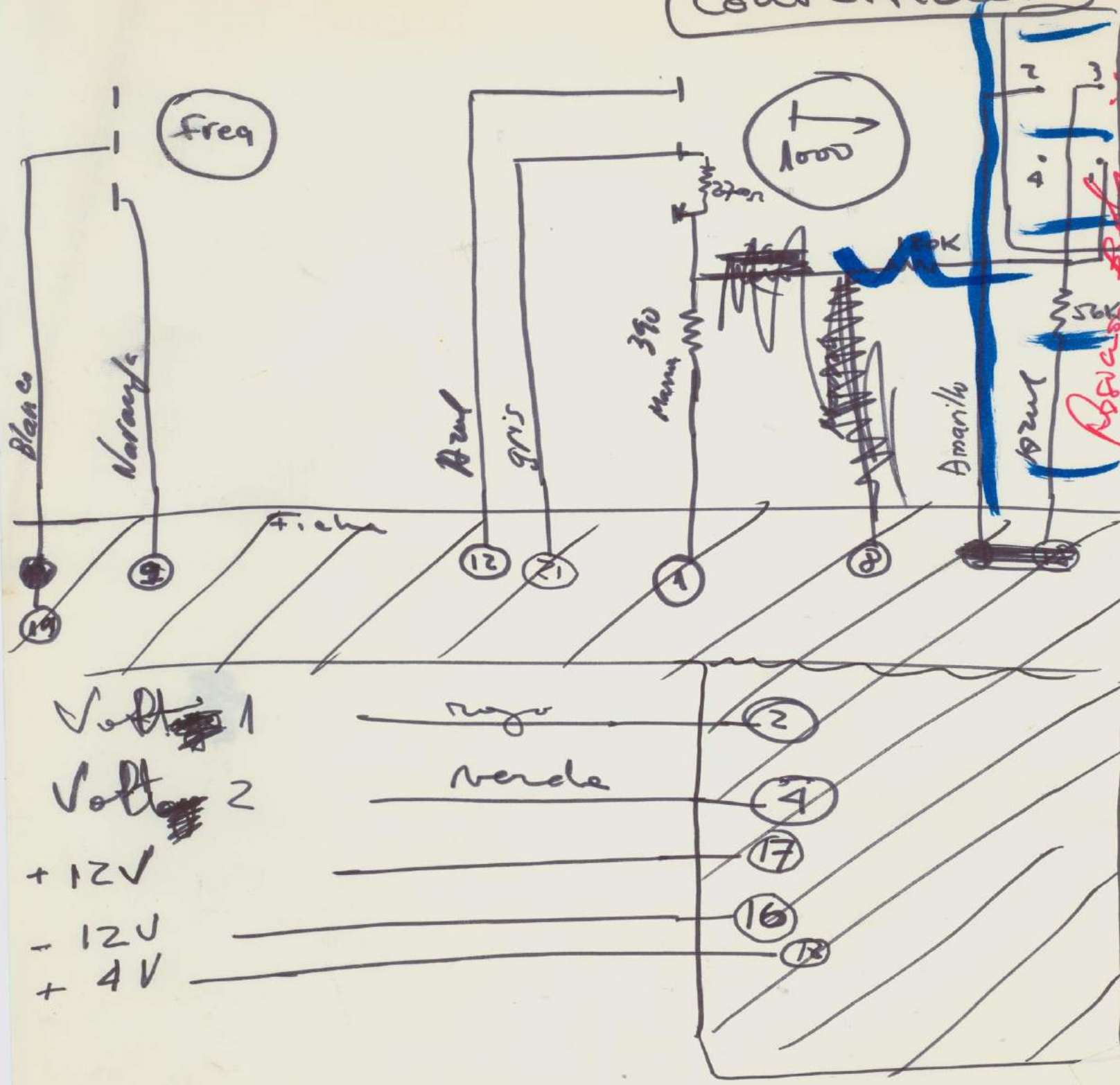


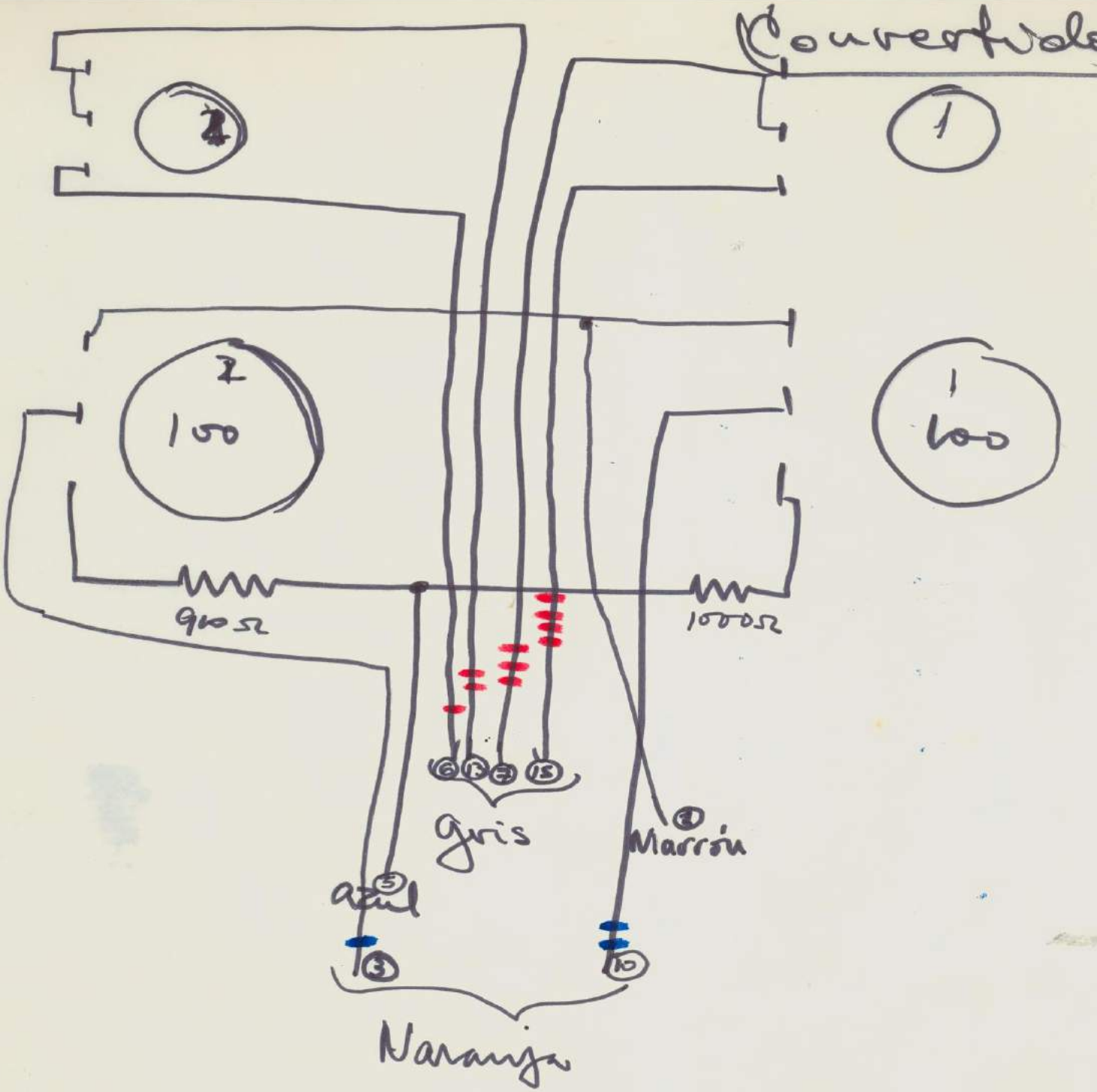
Ficha "B"




Controlador
Ficha
Rosa - Naranja
3
56K
Azul
4
12
Marrón
1
2
3
4
1

(Convertidor)




Convertible
1
2
2
100
1
100
90Ω
1000Ω
6
7
8
15
gris
1
Marrón
5
azul
3
10
Naranja

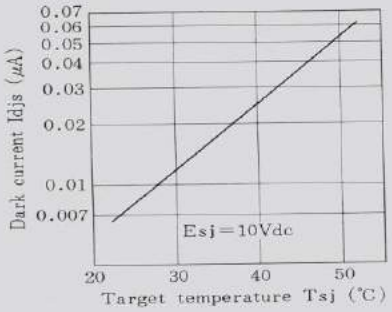
Inhibición

Ring Quartz
ajustable

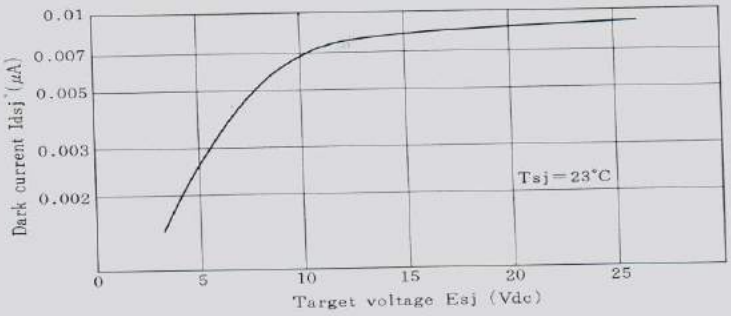
bloques pasan arriba
[illegible]

CHARACTERISTIC CURUVES

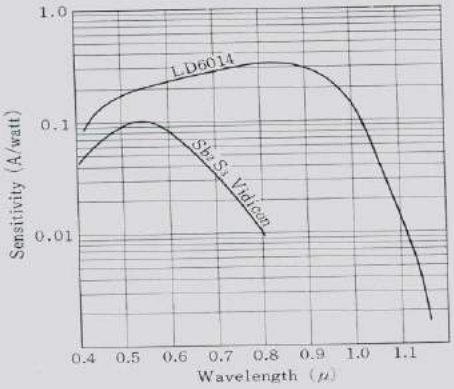
Dark current vs. temperature characteristics



Dark current vs. target voltage characteristics



Photosensitivity characteristics



Typical persistence characteristics

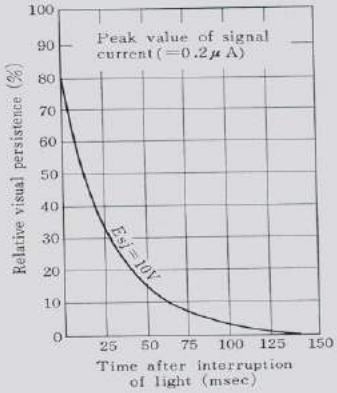
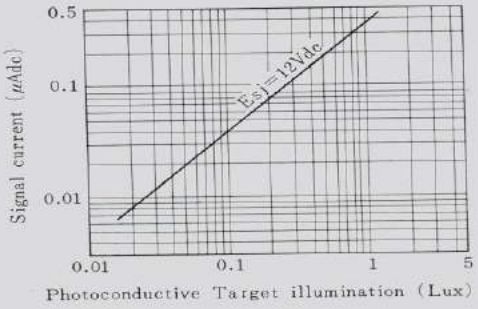
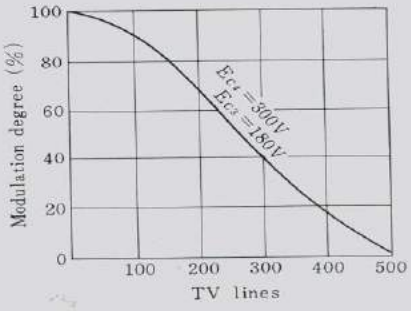


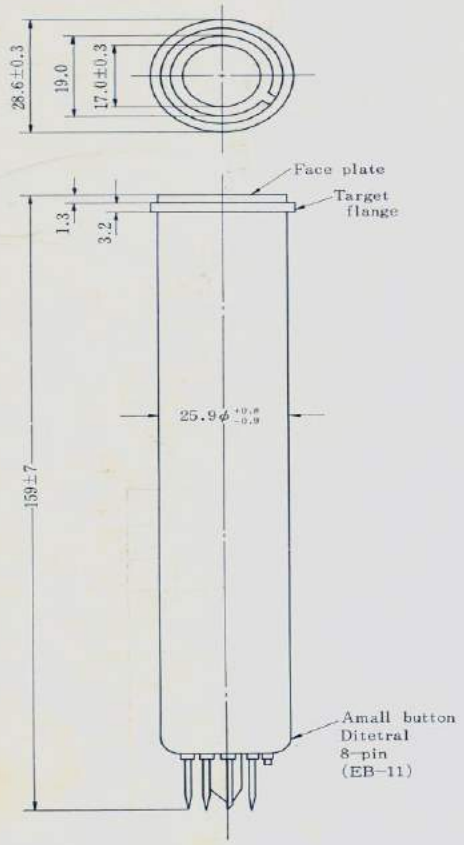
Photo-electric Transfer characteristics

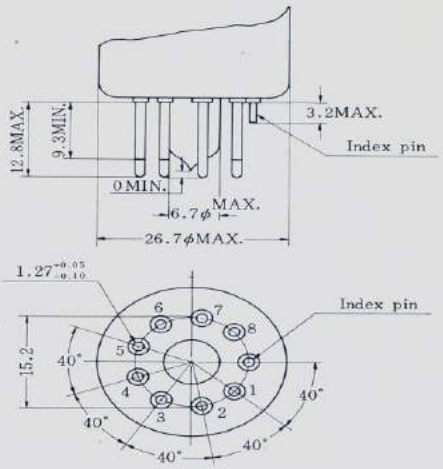


Resolution characteristics



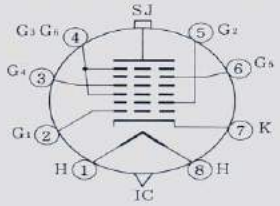
OUTLINE DRAWING (Unit in mm)





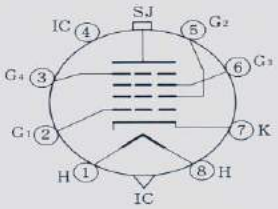
Connection diagram (Bottom view)

LD 6001



Index pin

LD 6014

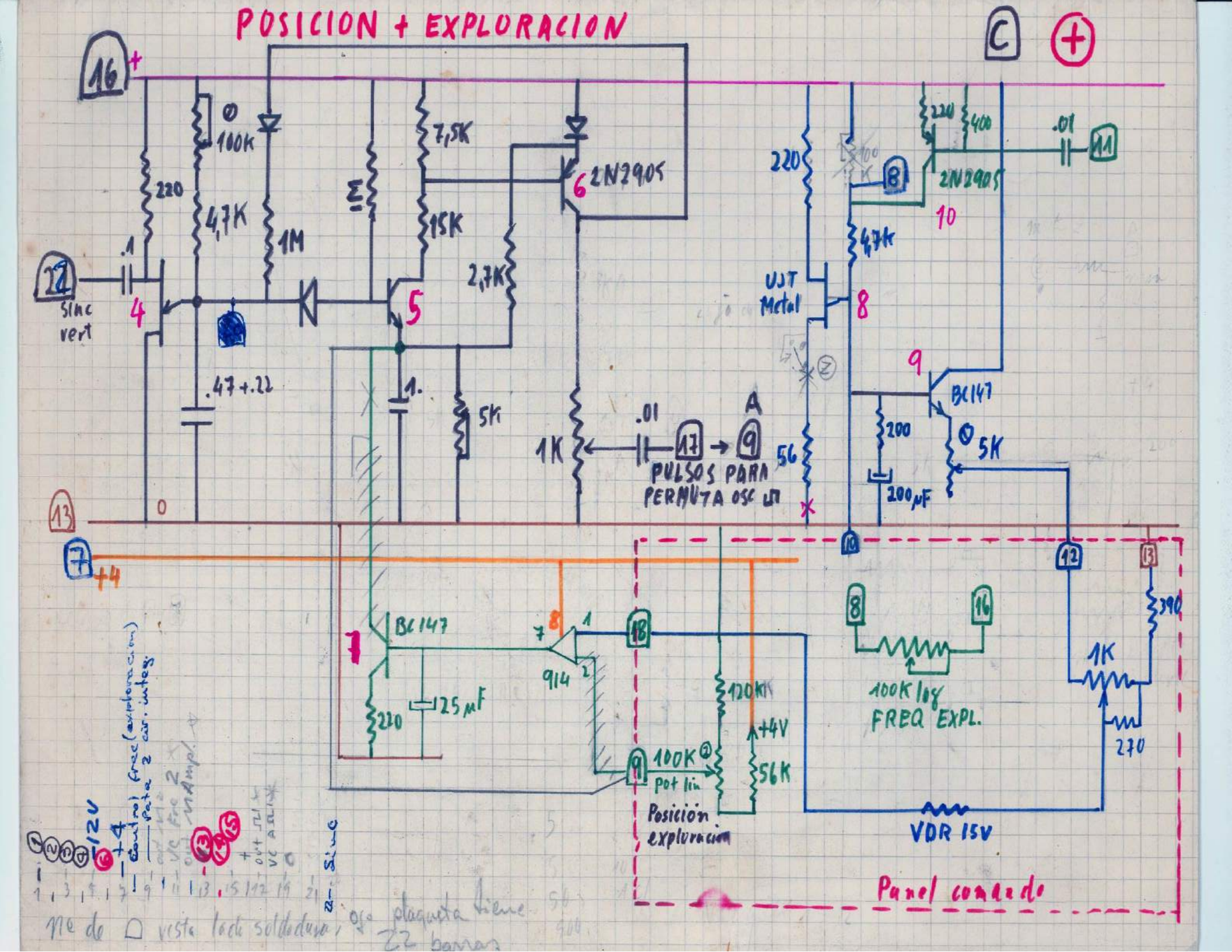


Index pin

Nippon Electric Company, Limited

7-15, Shiba Gochome, Minato-ku, Tokyo, Japan
Tel: Tokyo 452-1111
Cable Address: "MICROPHONE TOKYO"
Telex Address: NECTOK A J22686

7203-1000-M
Printed in Japan


POSICION + EXPLORACION
16
+
C
+
100K
220
4,7K
1M
7,5K
15K
2,7K
2N2905
6
.1
22
Sinc vert
4
5
.47+.22
1.
5K
1K
.01
17
A
9
PULSOS PARA PERMUTA OSC
220
400
.01
11
2N2905
10
8
4,7K
UJT Metal
8
9
BC147
200
200µF
5K
56
13
0
7
+4
BC147
7
8
1
914
2
18
220
25µF
120K
+4V
56K
100K
pot lin
Posición exploración
8
16
100K log
FREQ EXPL.
12
13
390
1K
270
VDR 15V
Panel comando
12V
+4
Sinc
Pata 2 cir. integ.
Amp.
VC Exc 2
VC ALIM
nº de ☐ vista lado soldadura, ojo placuela tiene 22 barras

FOTOS Convertidor A

1 sync

2 ⏚

3 1V pos cc NC

4 H ~~pos~~ 1V

5 " " 2V

6 "

7 +4V

8 NC

9 vert

10 variable timing

11 NC pos sync -2V

12 ~~Horz~~ vert pos

13 " neg

pos a mon

14 MON OUT

15

16 ⏚

17 0

vert

18 ~~-12~~ 0

5V -12 vert

19 0

-12 vert

0,5V

20 Horz 0

video normal

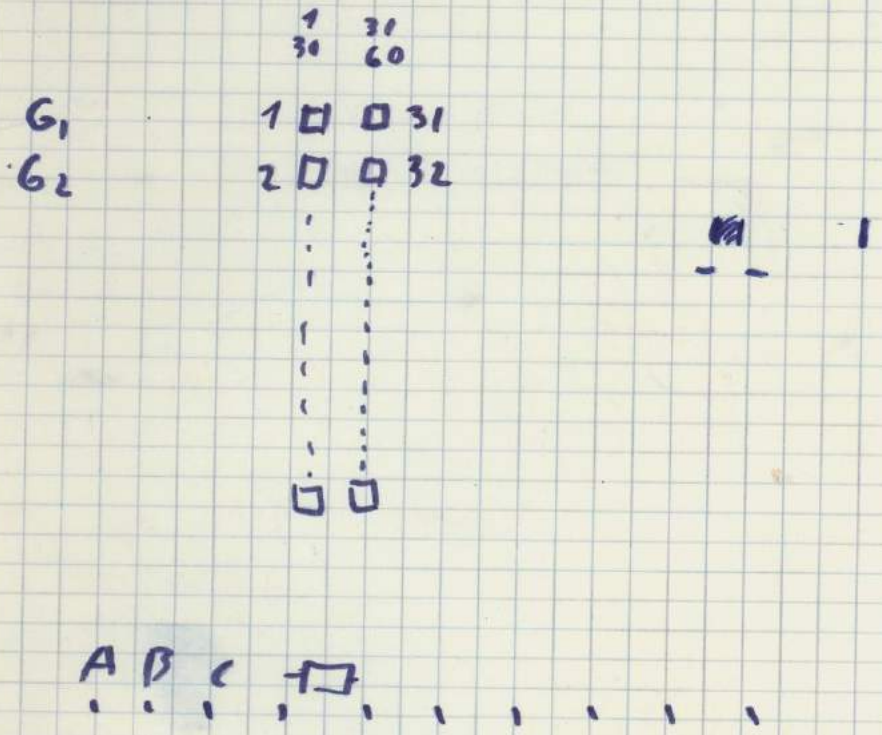
polarity control ⊘ blanco

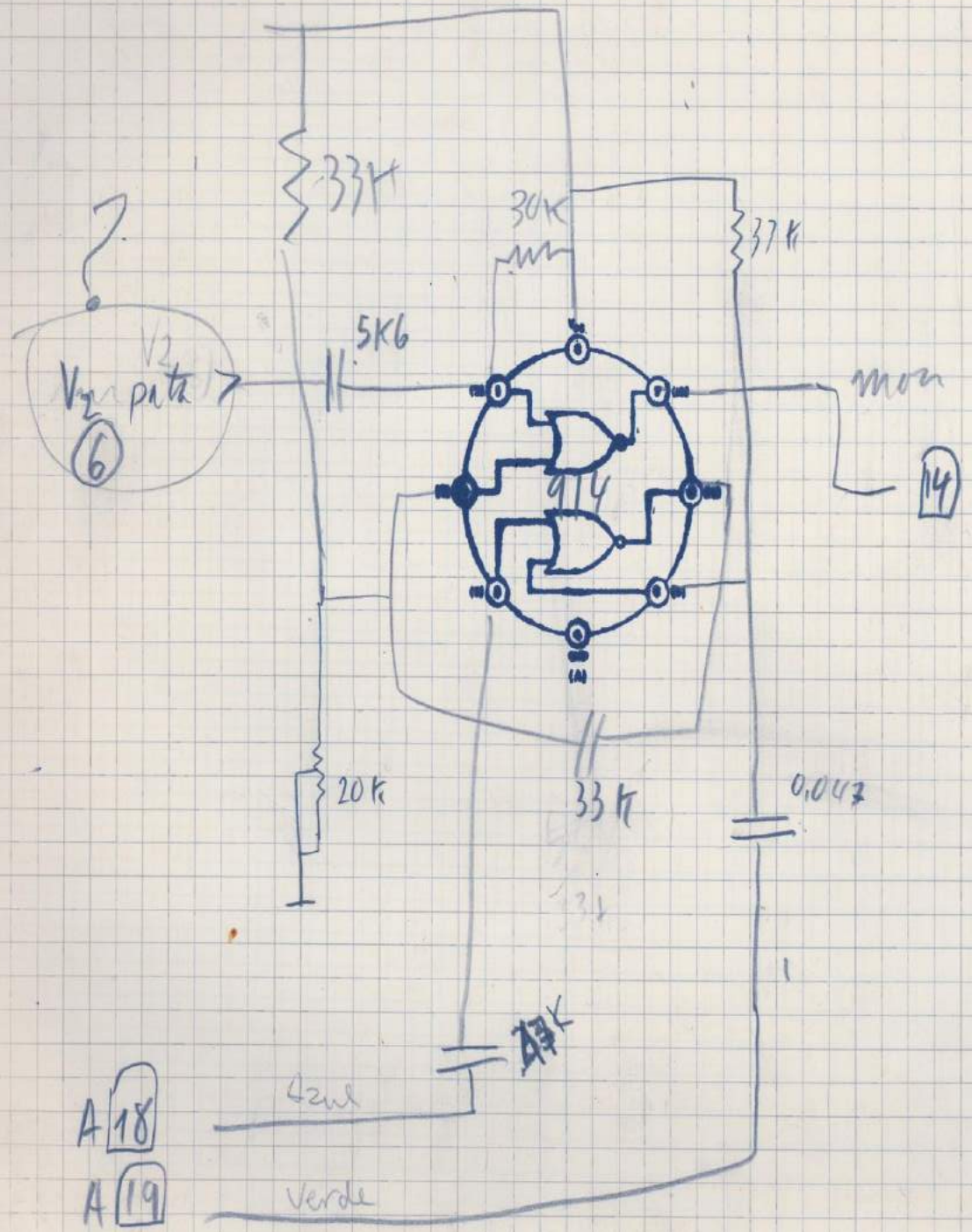
21 +4V

22 ~~vert~~ horz 1,2V

stopper Bung

~~30 x 5 vias~~ 60 x 5 vias





A

A vacantes → 3 8 ~~11~~ 14

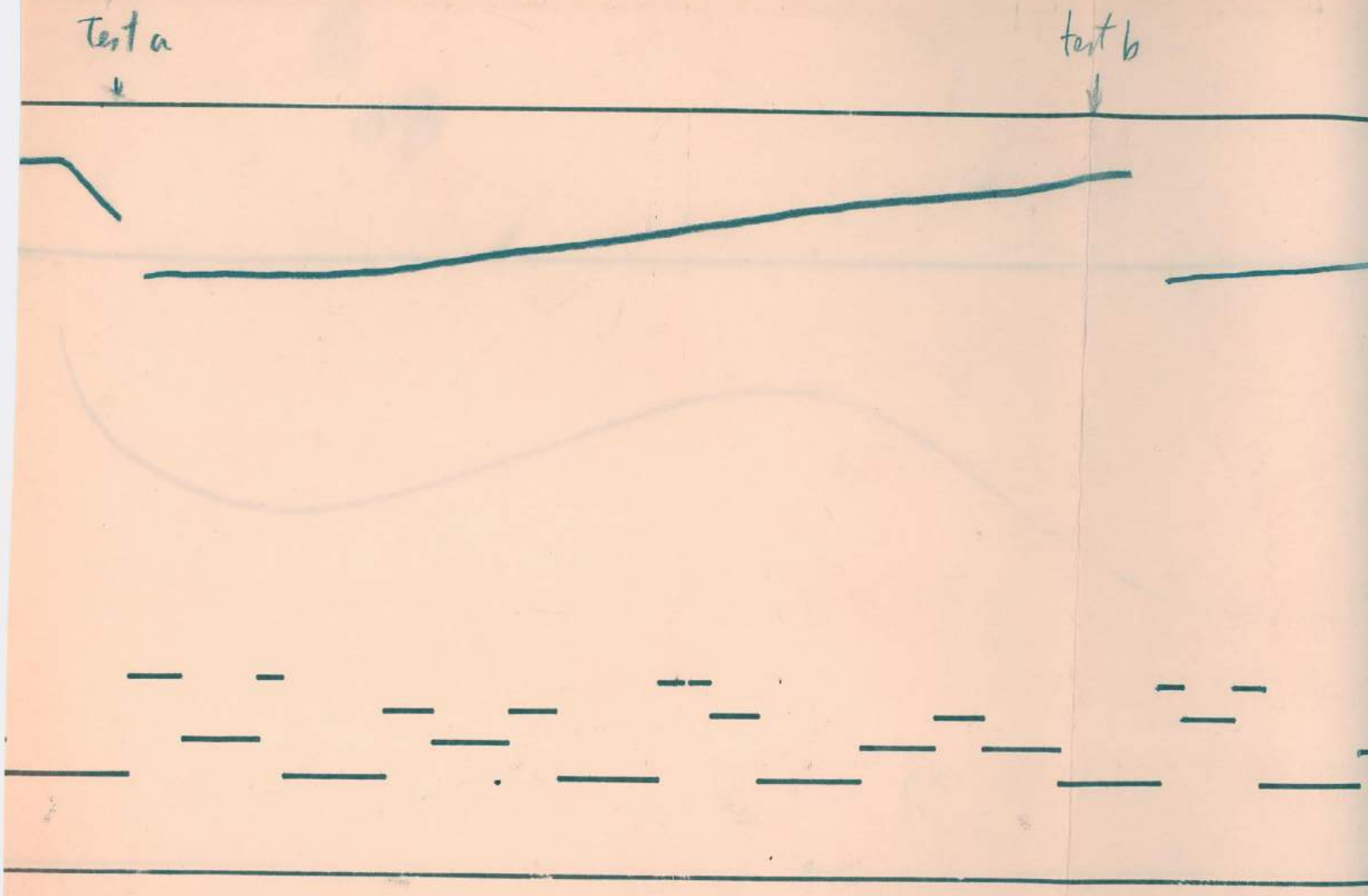
18 ~~19~~

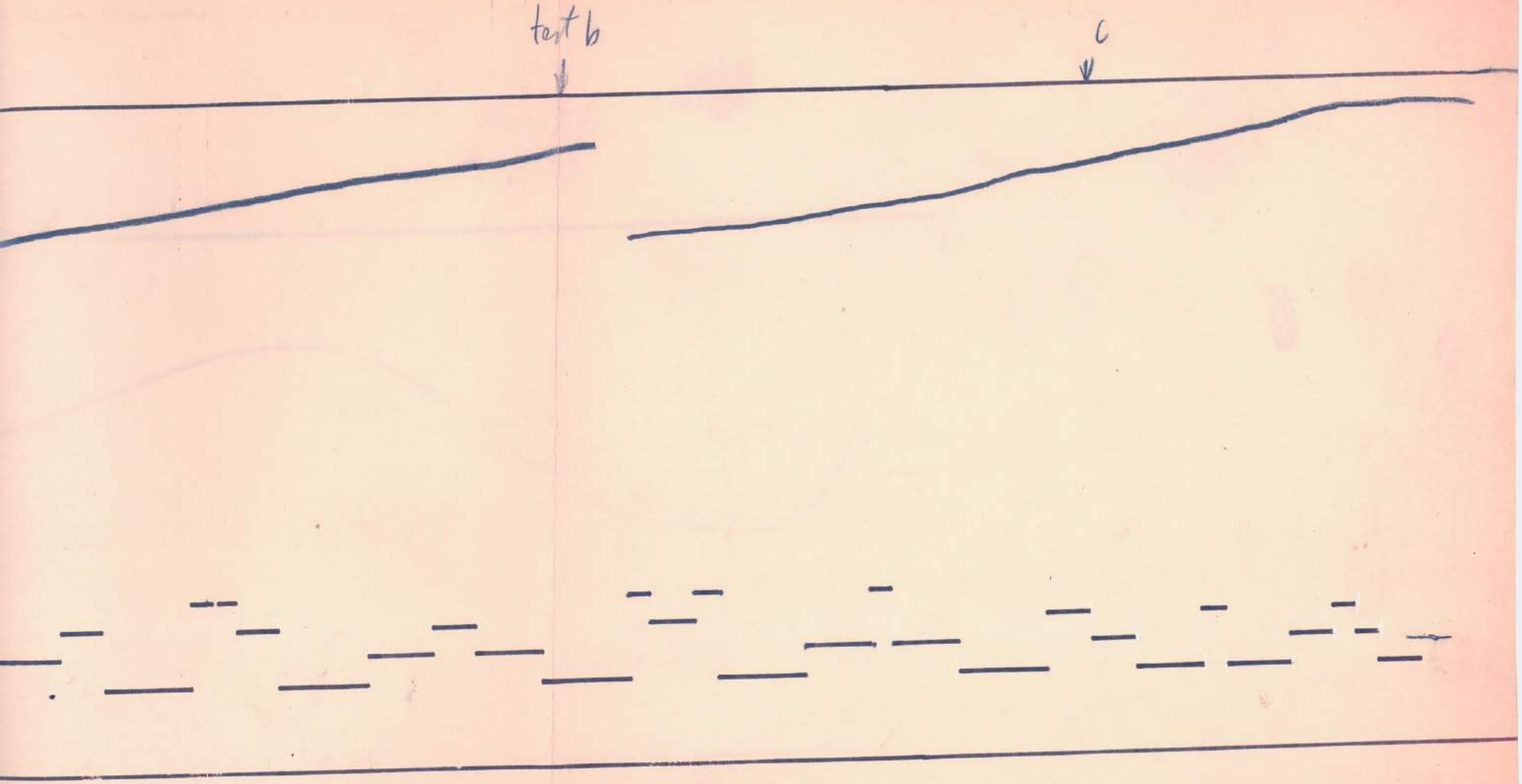
B vacantes 1 4 ~~5 8 9 10~~ 11

~~12 13 14 15~~

17 18 19

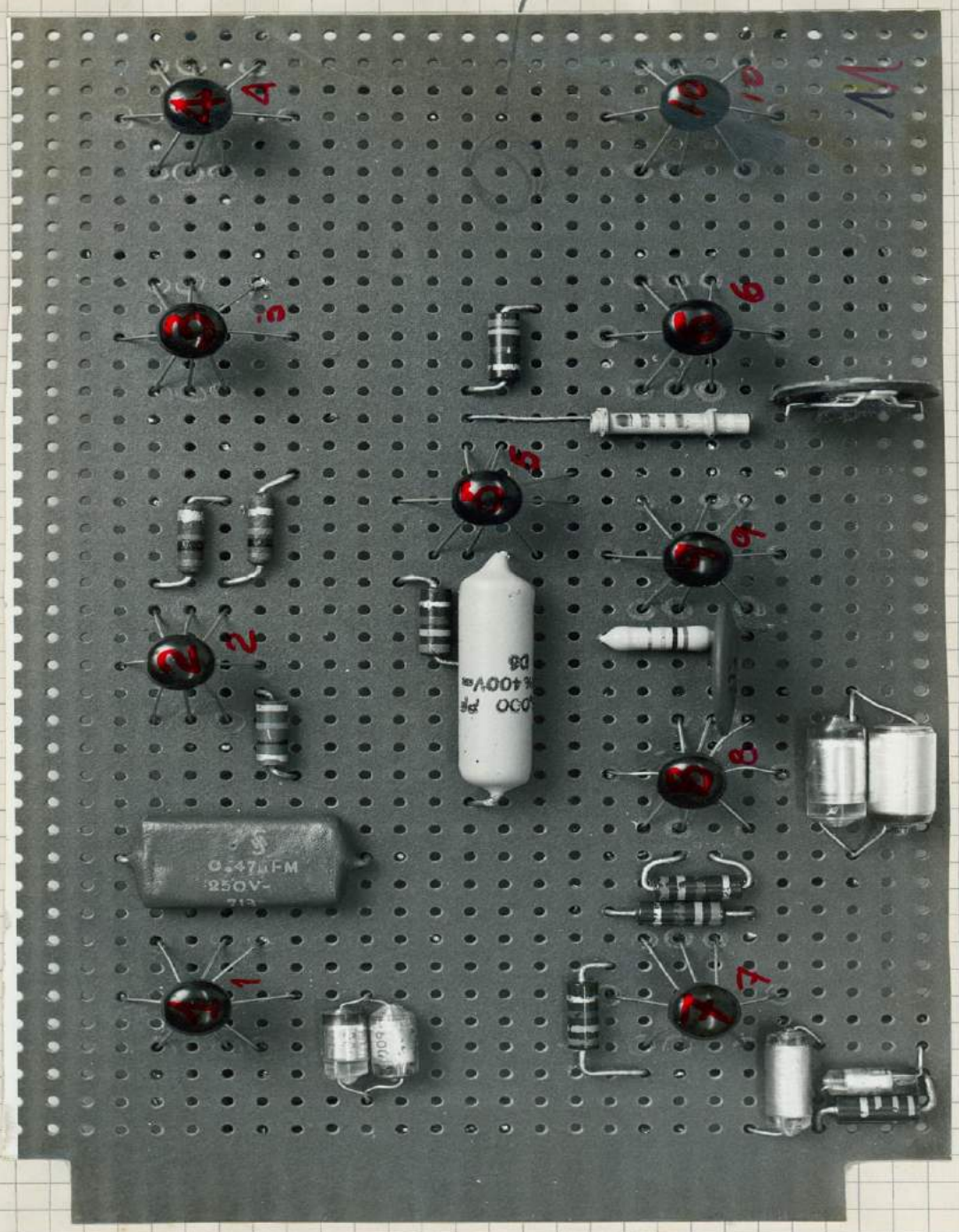
~~20 22~~


Test a
test b


test b
c

A

914 display digital



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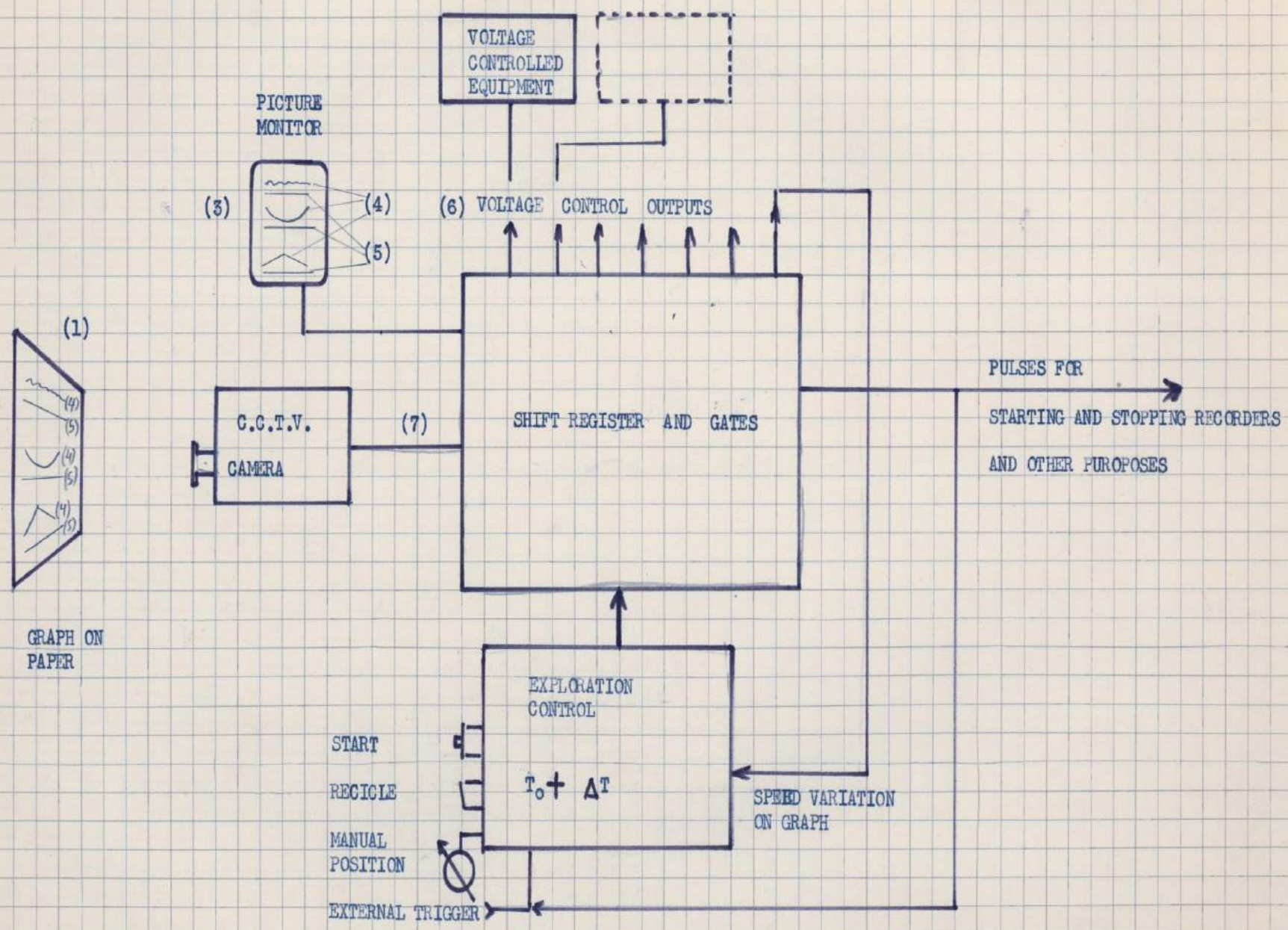
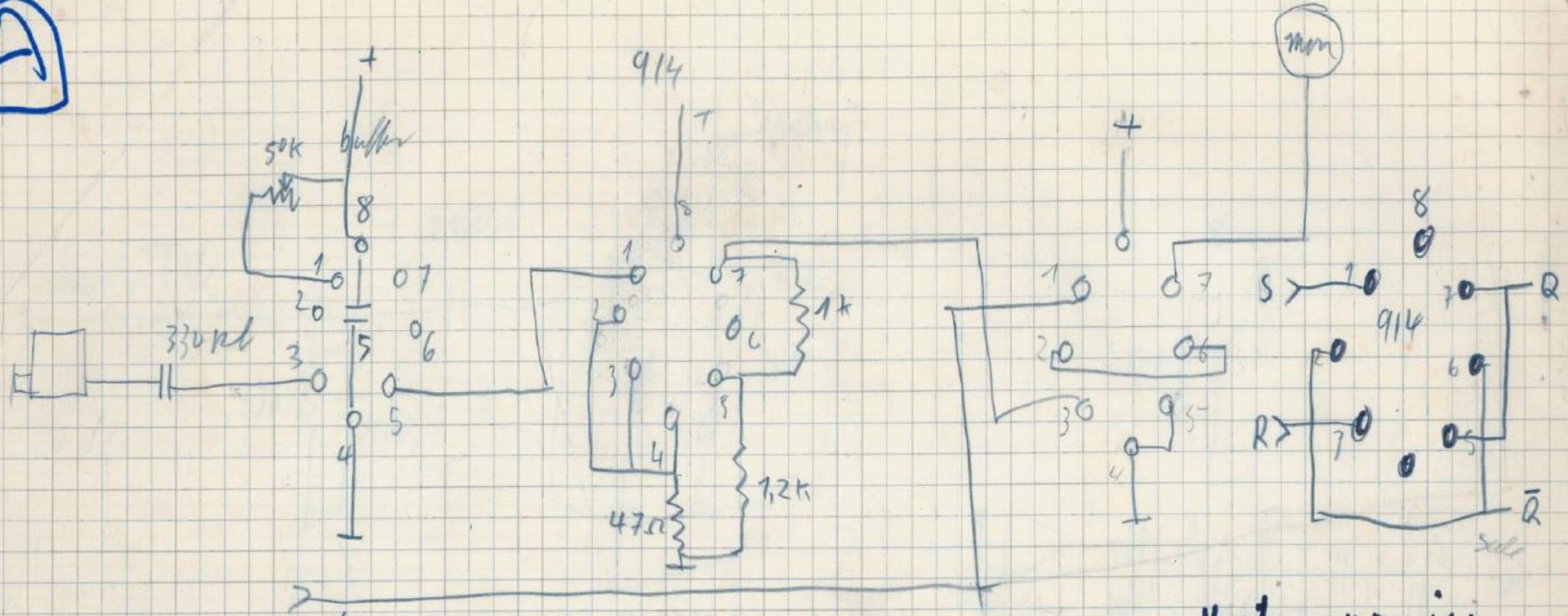
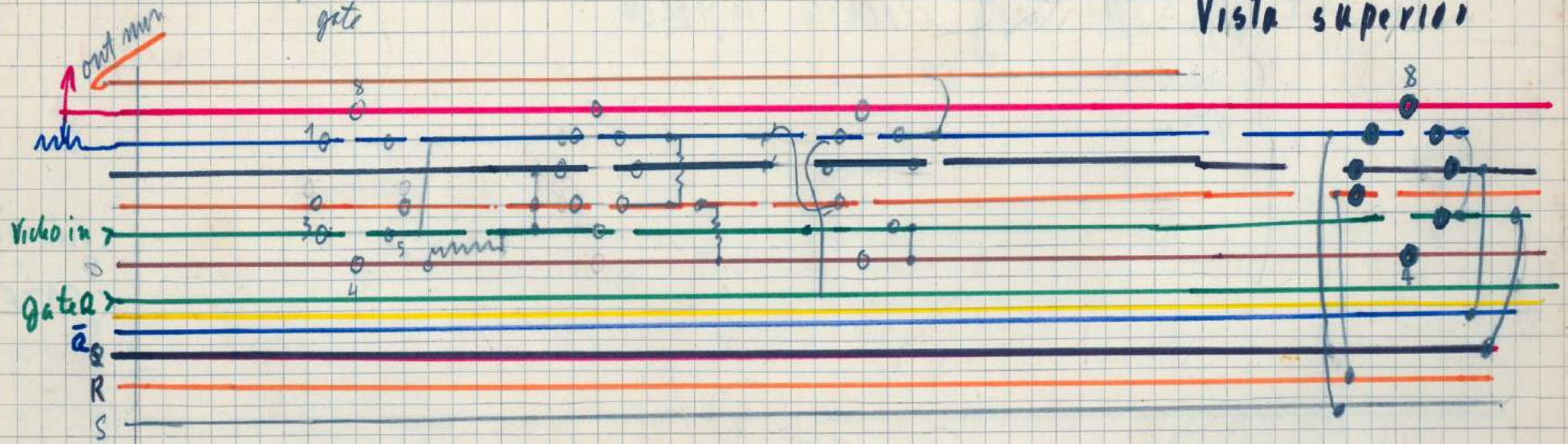

VOLTAGE CONTROLLED EQUIPMENT
PICTURE MONITOR
(3)
(4)
(5)
(6) VOLTAGE CONTROL OUTPUTS
(1)
(4)
(5)
C.C.T.V. CAMERA
(7)
SHIFT REGISTER AND GATES
PULSES FOR
STARTING AND STOPPING RECORDERS
AND OTHER PUROPOSES
GRAPH ON PAPER
EXPLORATION CONTROL
START
RECICLE
$T_o + \Delta T$
SPEED VARIATION ON GRAPH
MANUAL POSITION
EXTERNAL TRIGGER

15

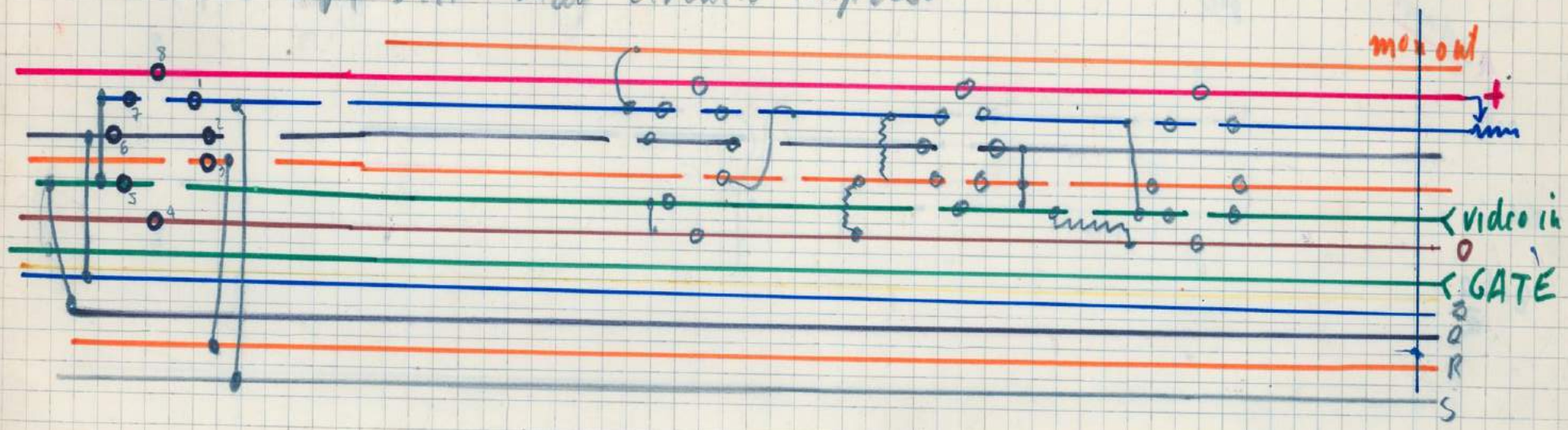
A

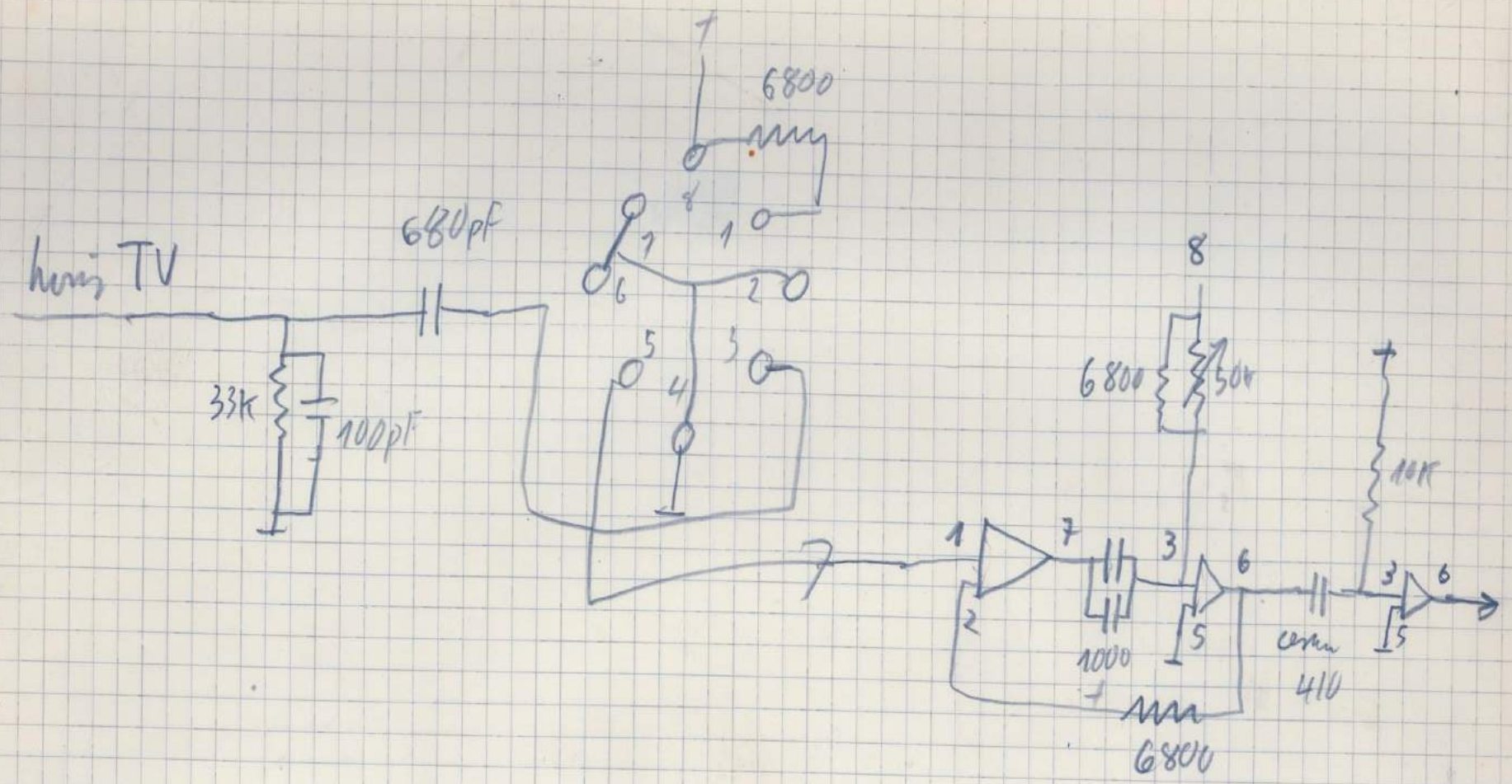


Vista superioi



VISTA lado circuito impreso

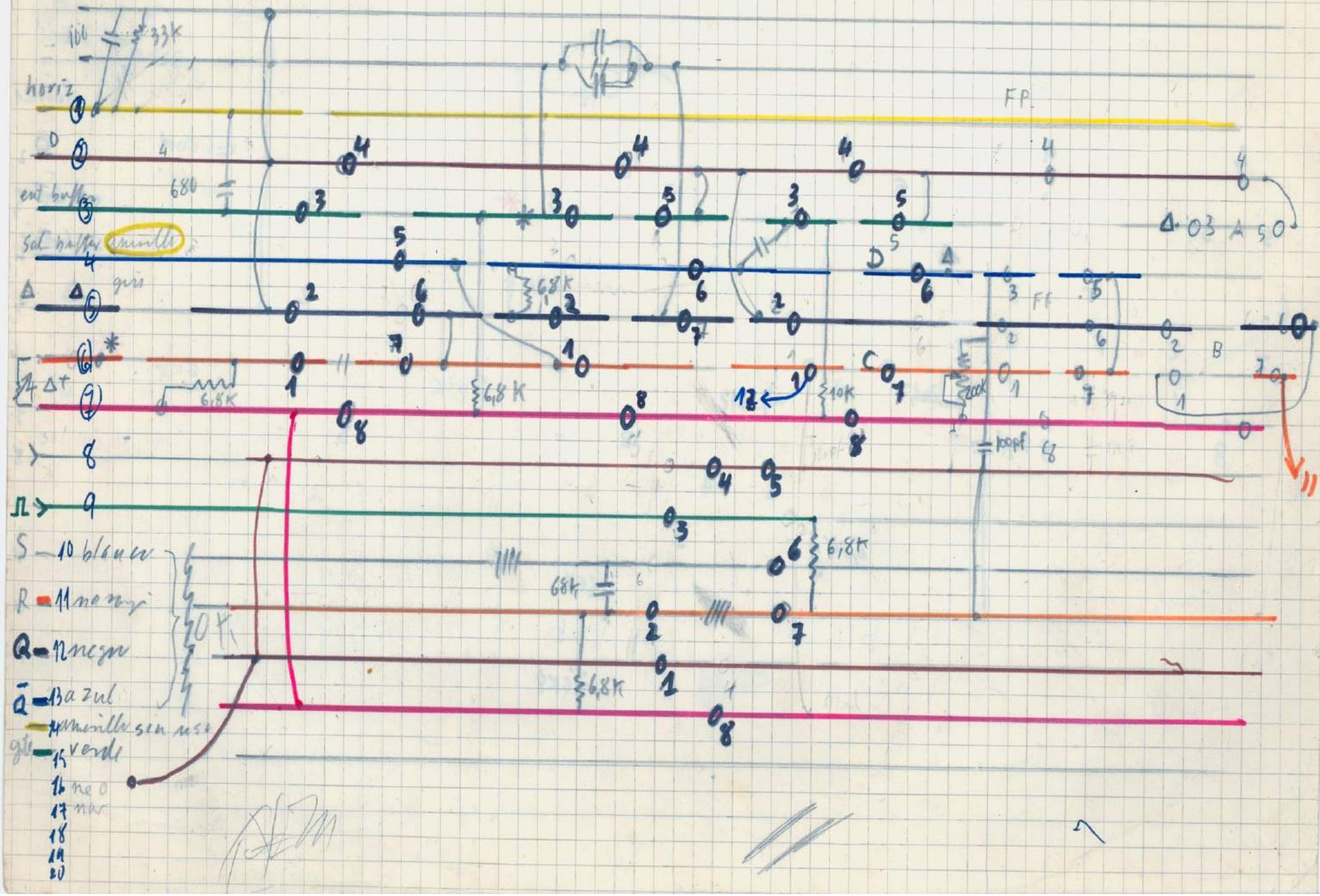


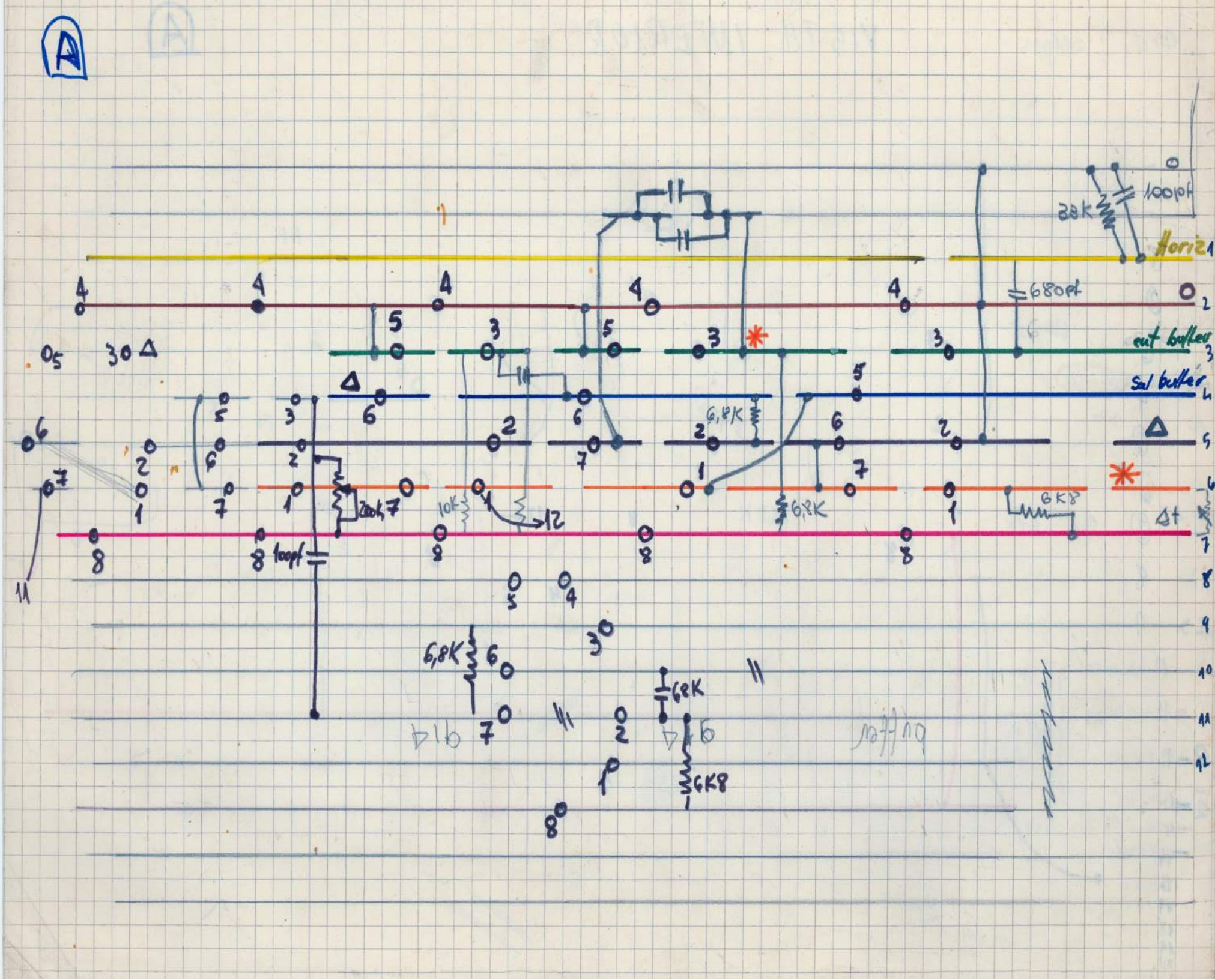

horiz TV
680pF
33K
100pF
6800
8
6800
50K
1000
6800
10K
410

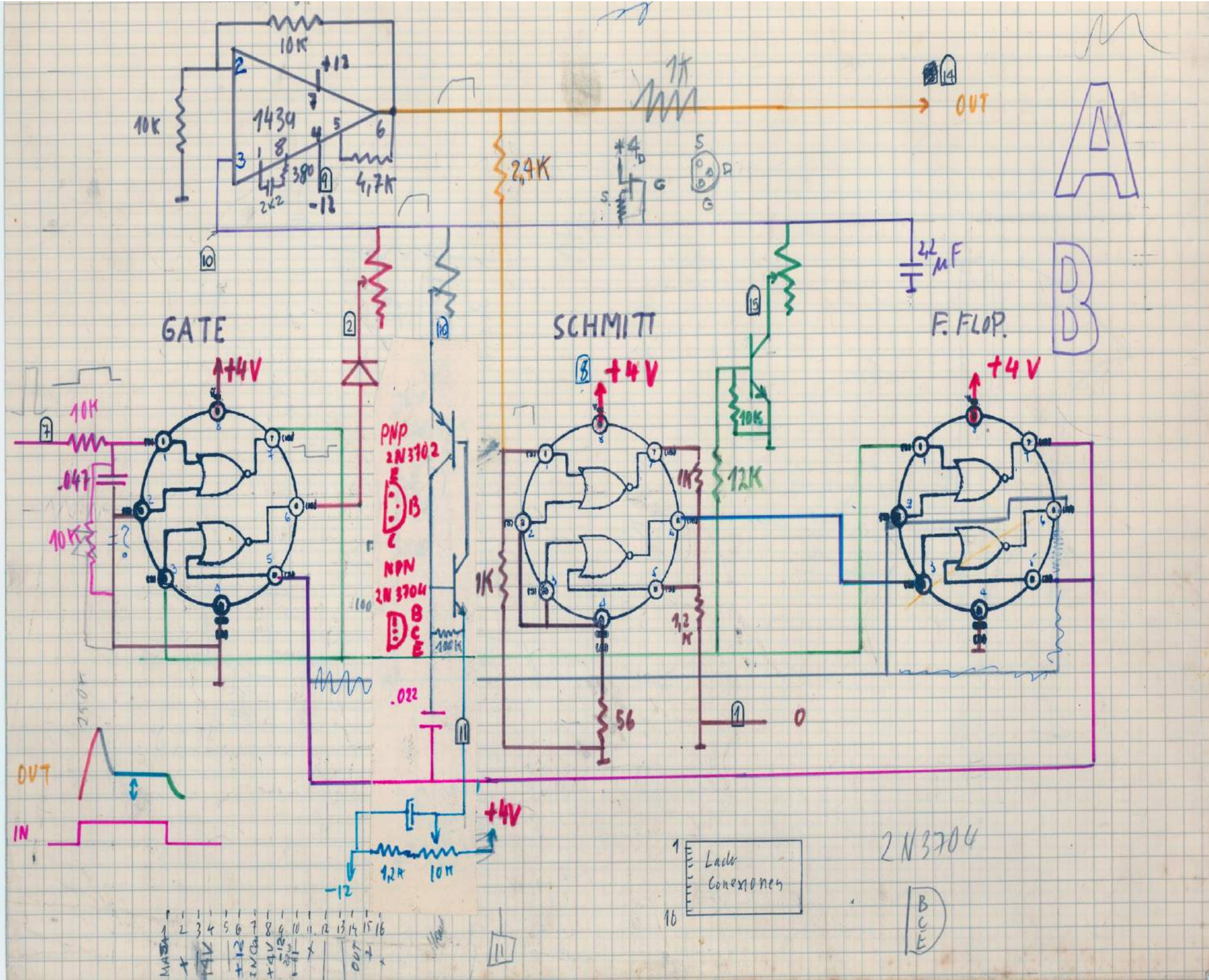
9 + 3 cign

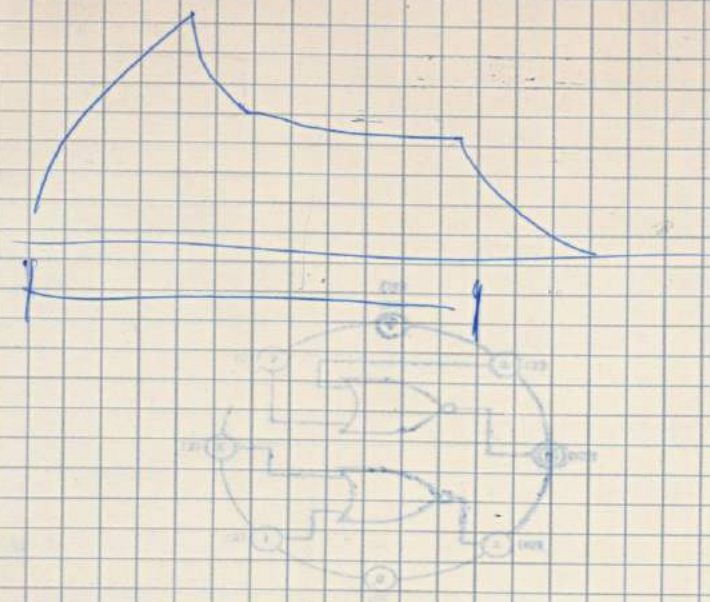
VISTA INFERIOR

A

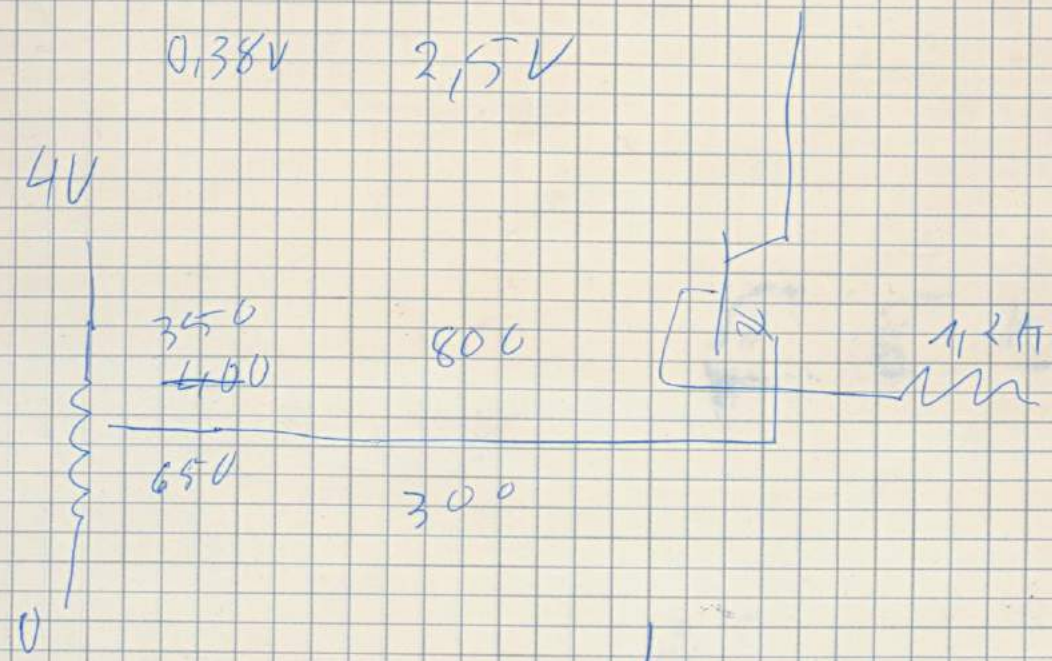


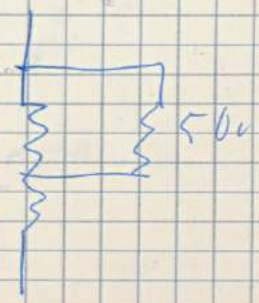

A
Horiz
out buffer
Sal buffer
100pf
28k
680pf
6,8K
10K
12
6K8
100pf
6,8K
6K8
6,8K
6K8

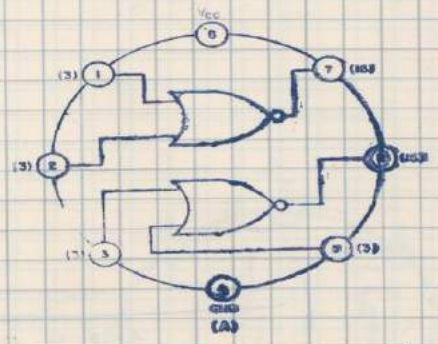

10K
+12
1434
10K
380
242
-12
4,7K
2,4K
1K
OUT
A
2,2 µF
B
GATE
SCHMITT
F. FLOP.
+4V
10K
.047
10K
PNP
2N3702
NPN
2N3704
100K
.022
1K
12K
10K
1K
1,2 K
56
0
OUT
IN
+4V
-12
1,2K
10K
2N3704
Lado Conexiones
1
16
B
C
E

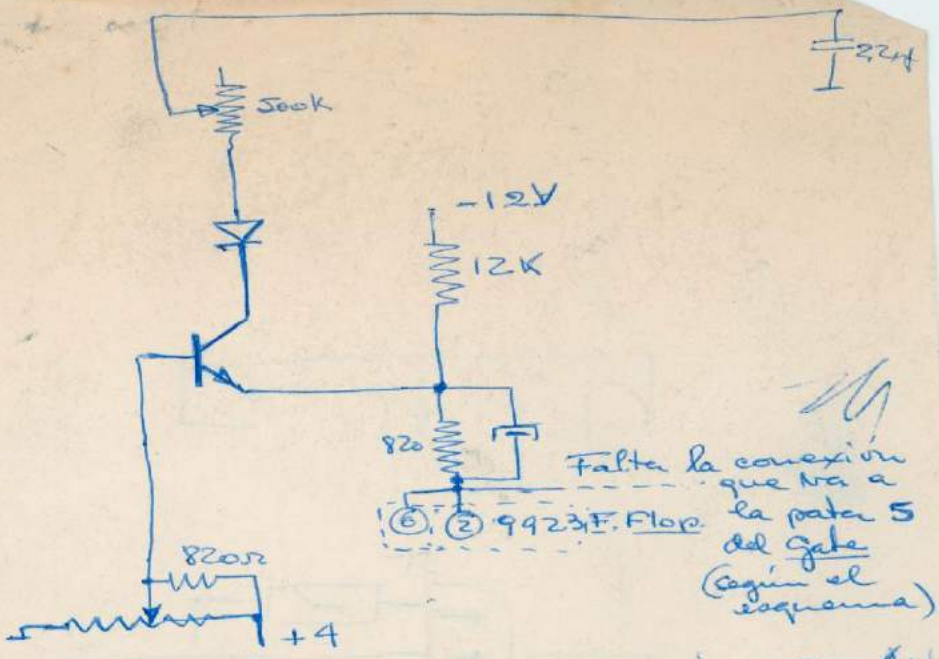


0,38V 2,5V

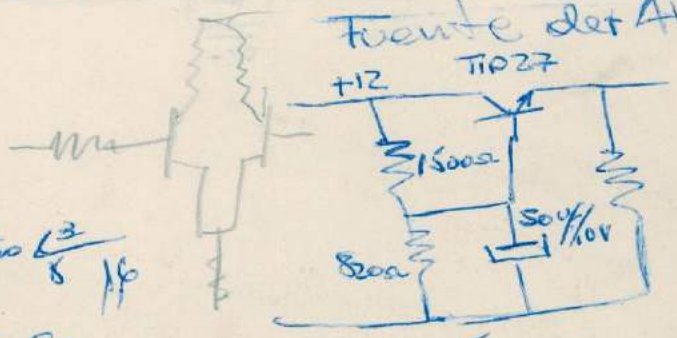




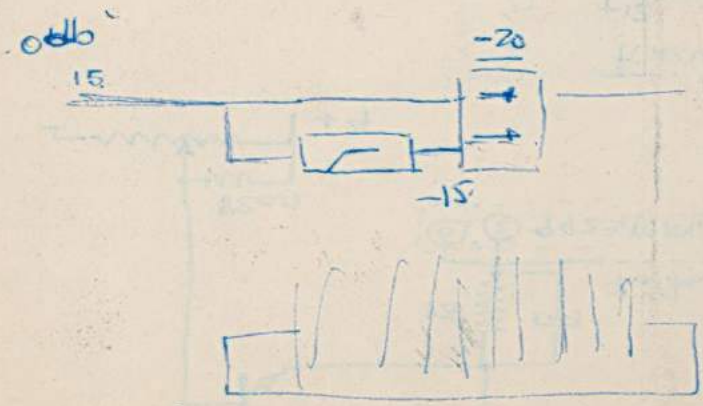

Vcc
6
(3) 1
7 (10)
(3) 2
8 (10)
(3) 3
9 (3)
5
GND
(A)



Fuente del AV

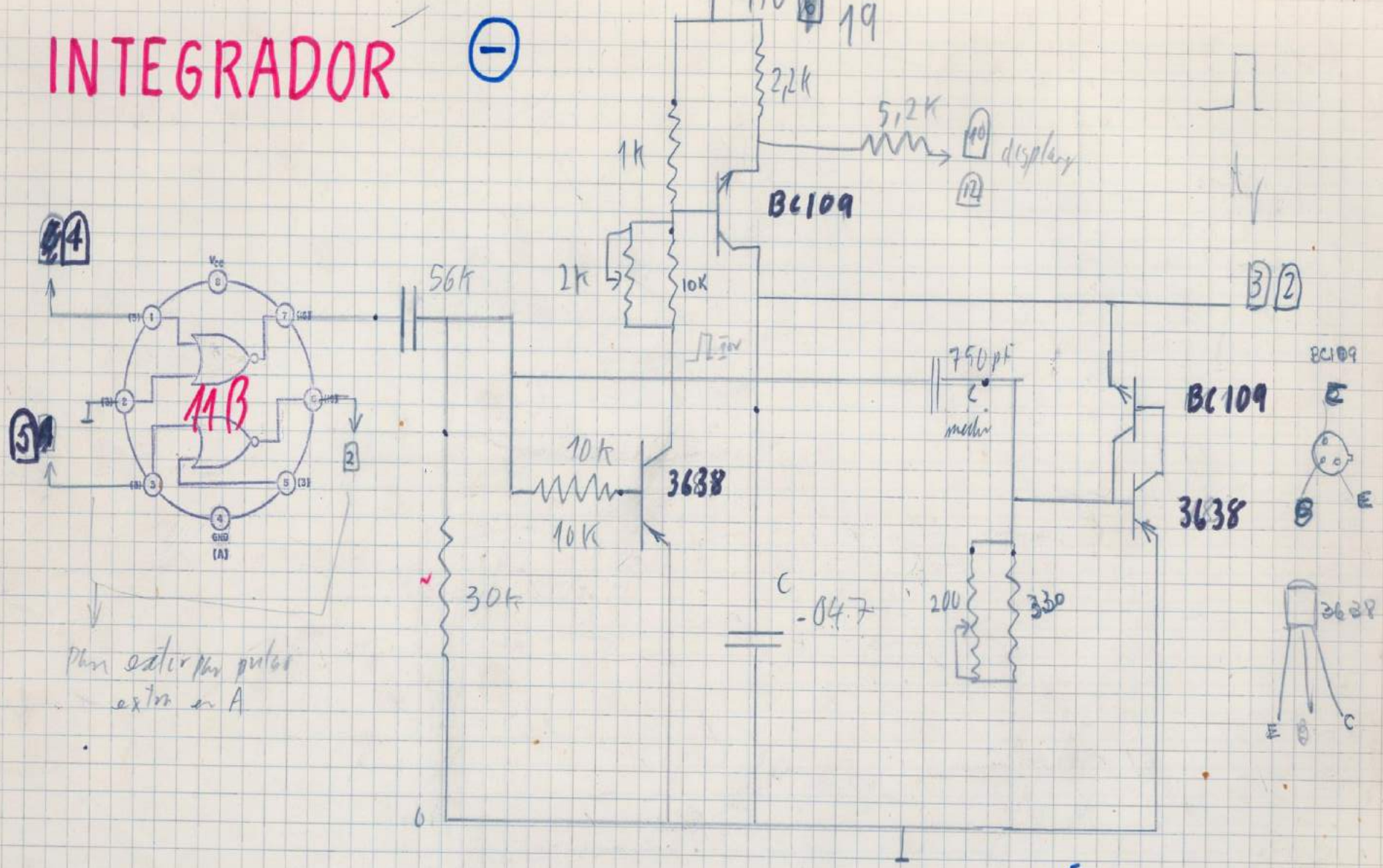


falta +12V

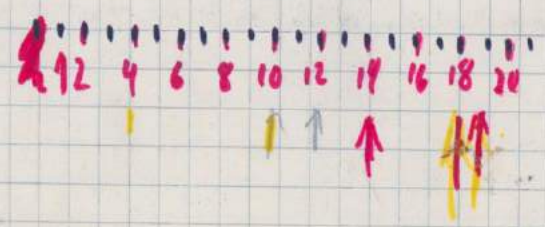

15
-20
-15

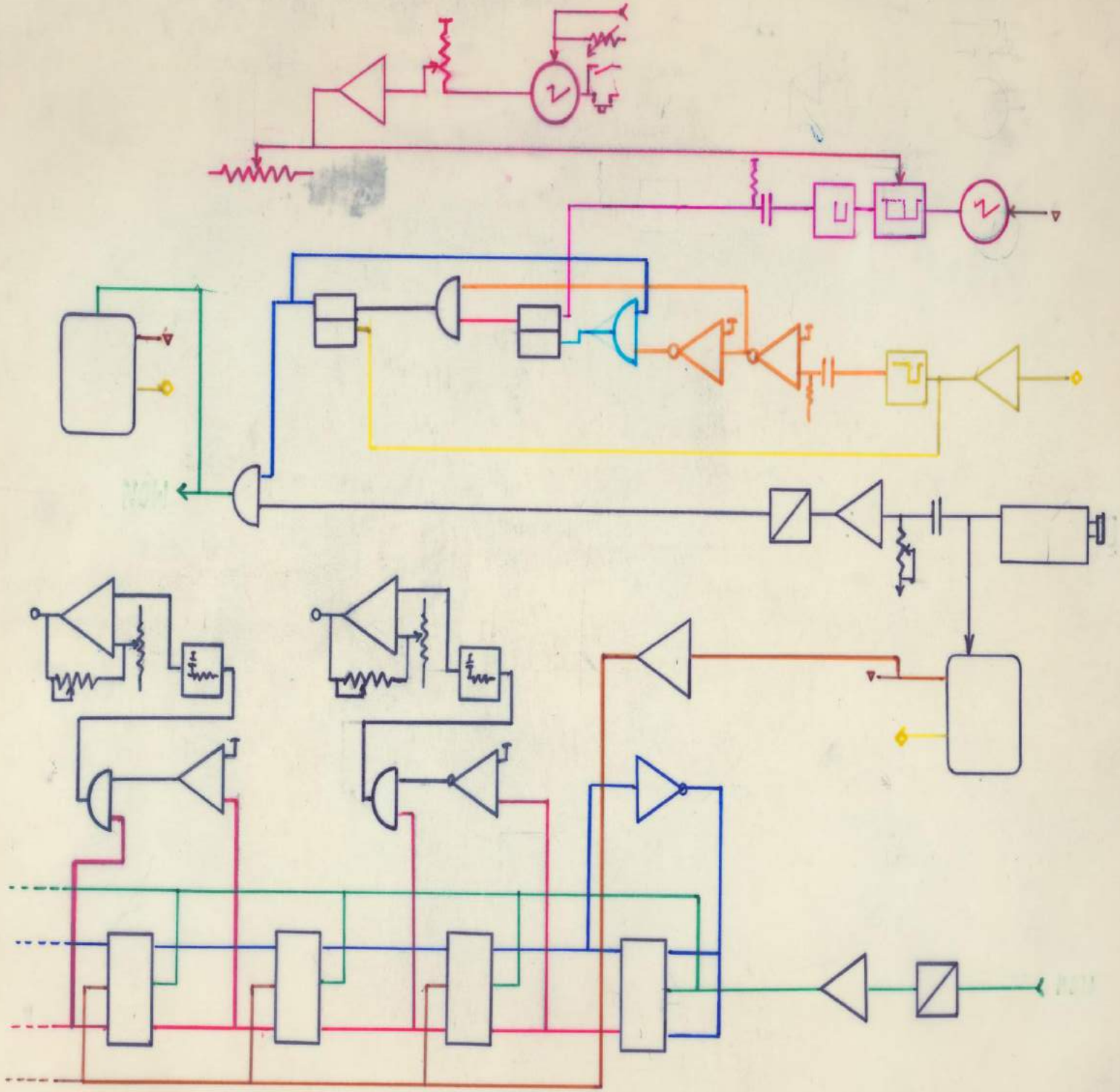
FOTOS Convertidor B

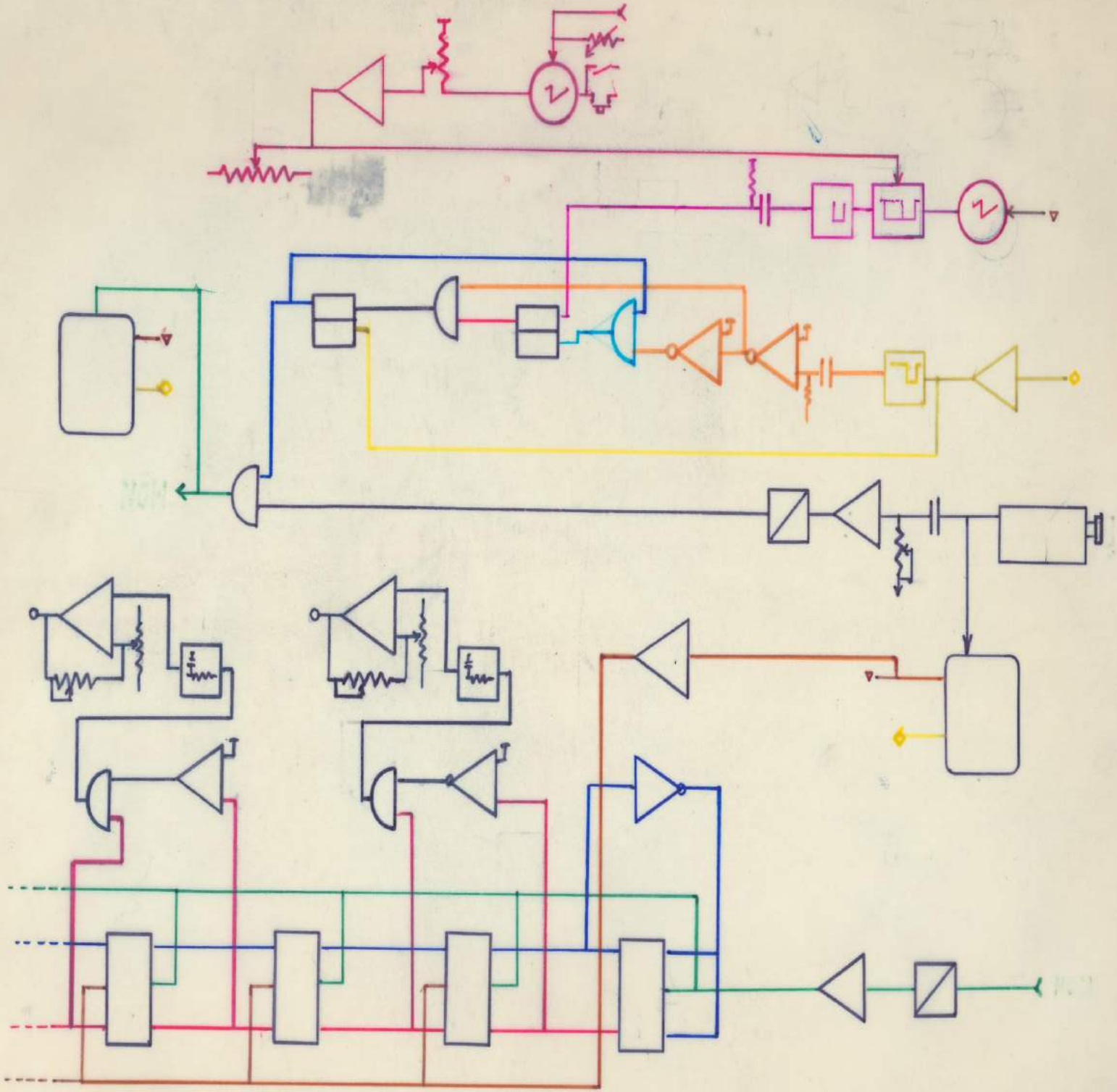
INTEGRADOR ⊖



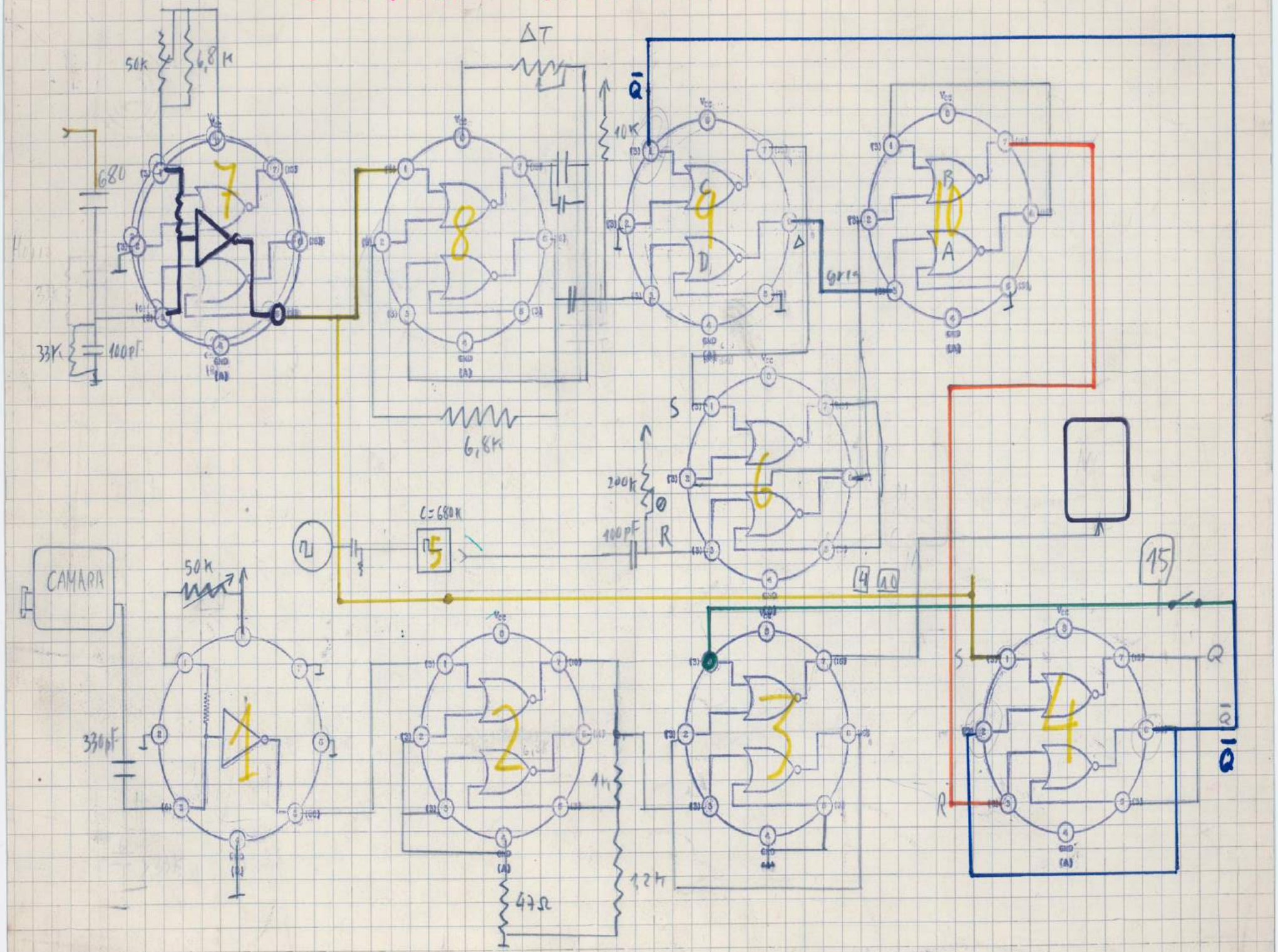
A 250pF
B821



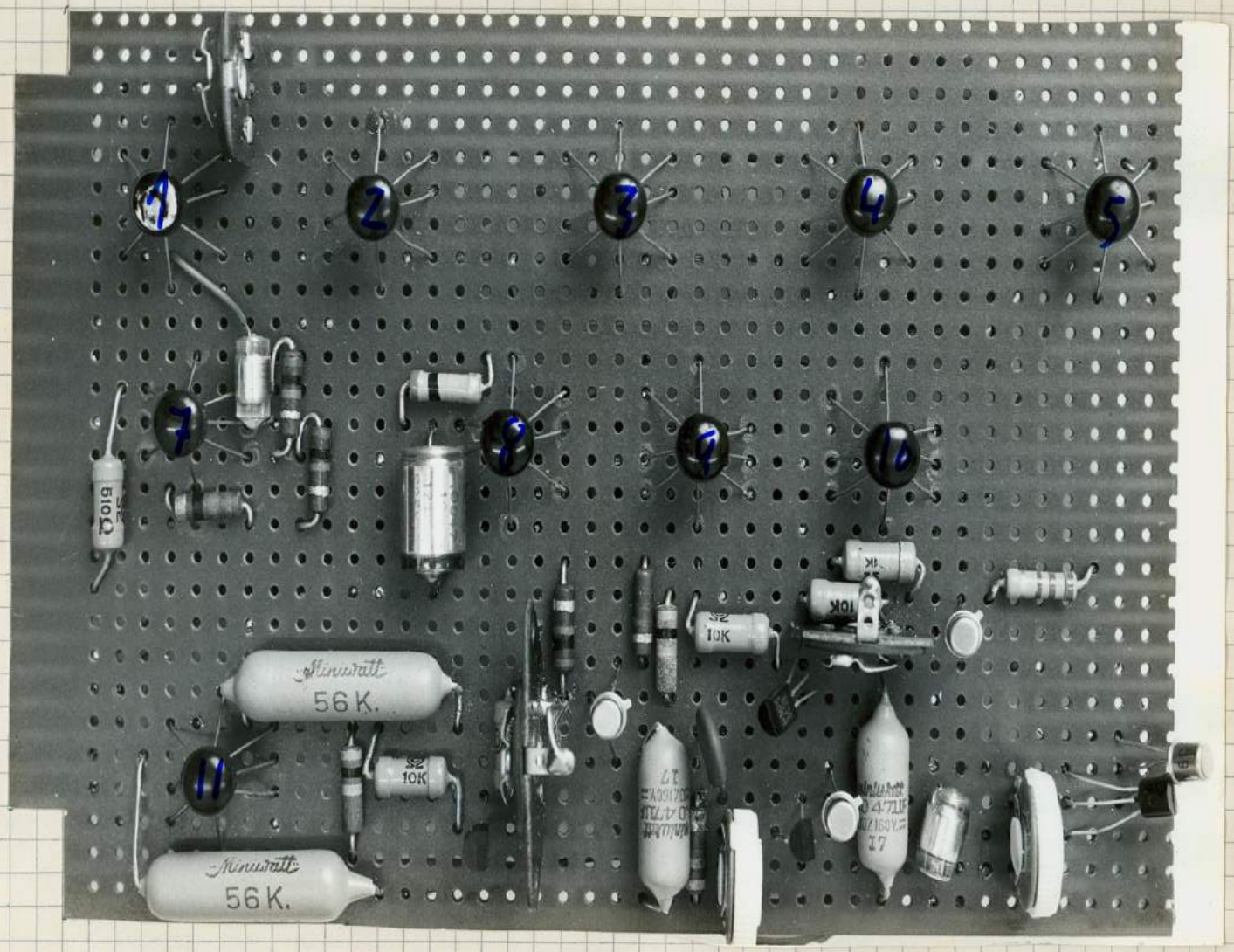




CAMARA → COMPUERTAS



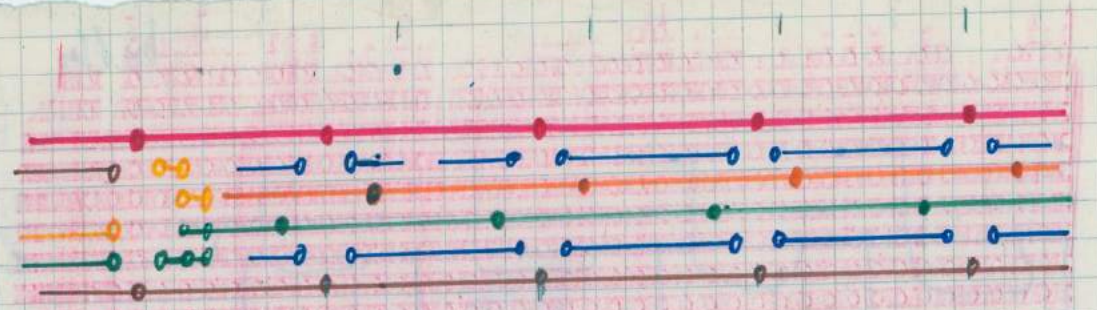
B

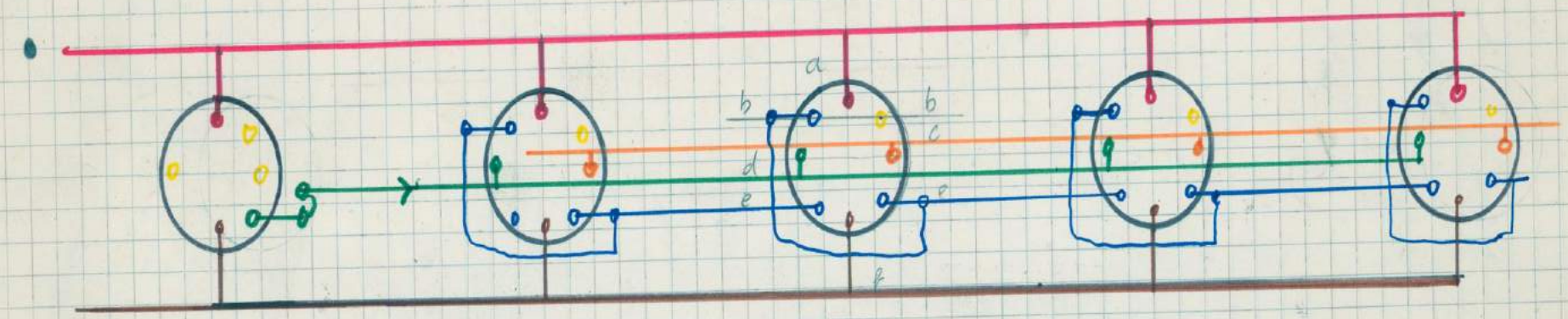


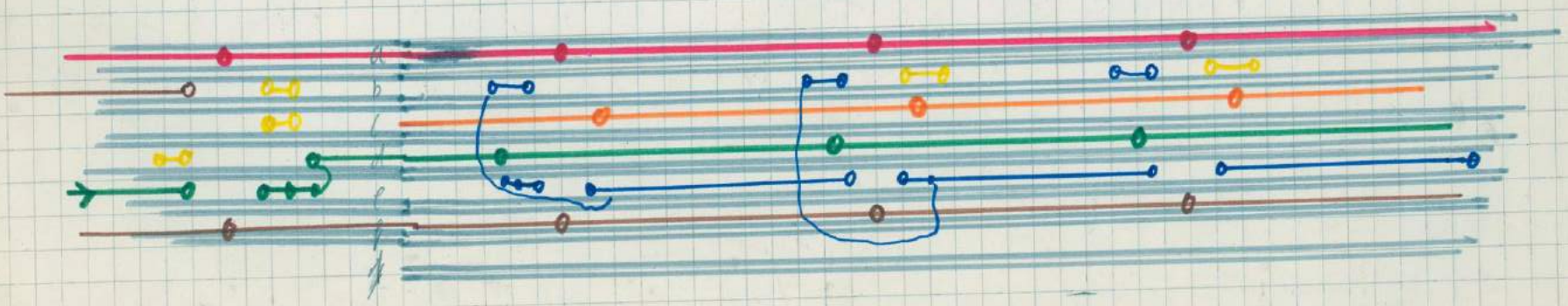
Card B

Card B

Lado posterior y l'c's

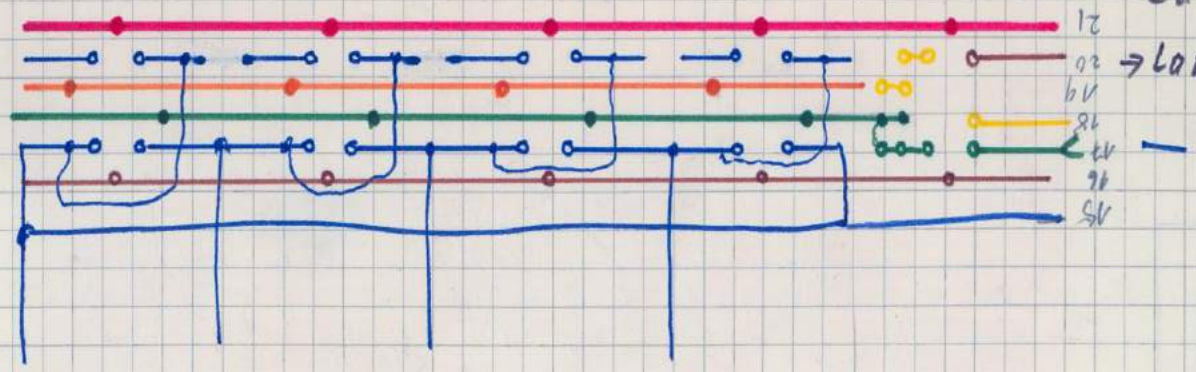






butter

Lady conex

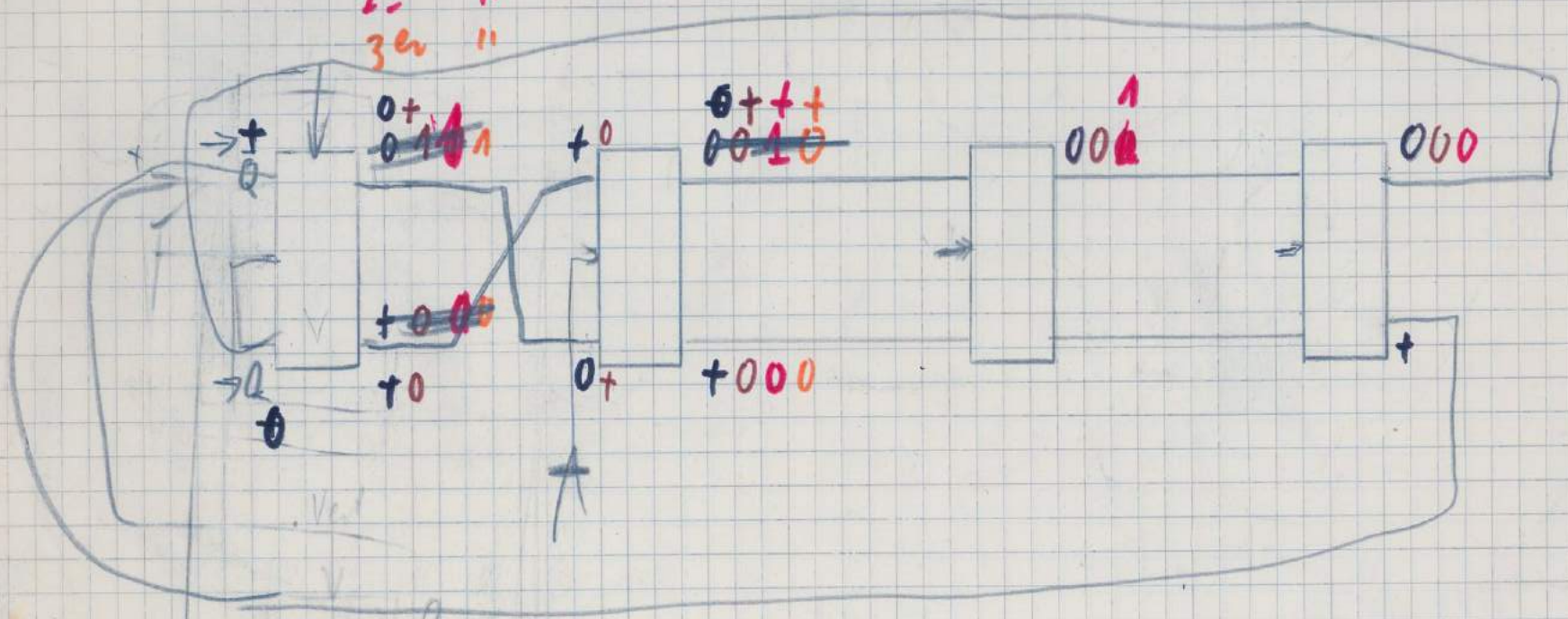


1 Estado inicial

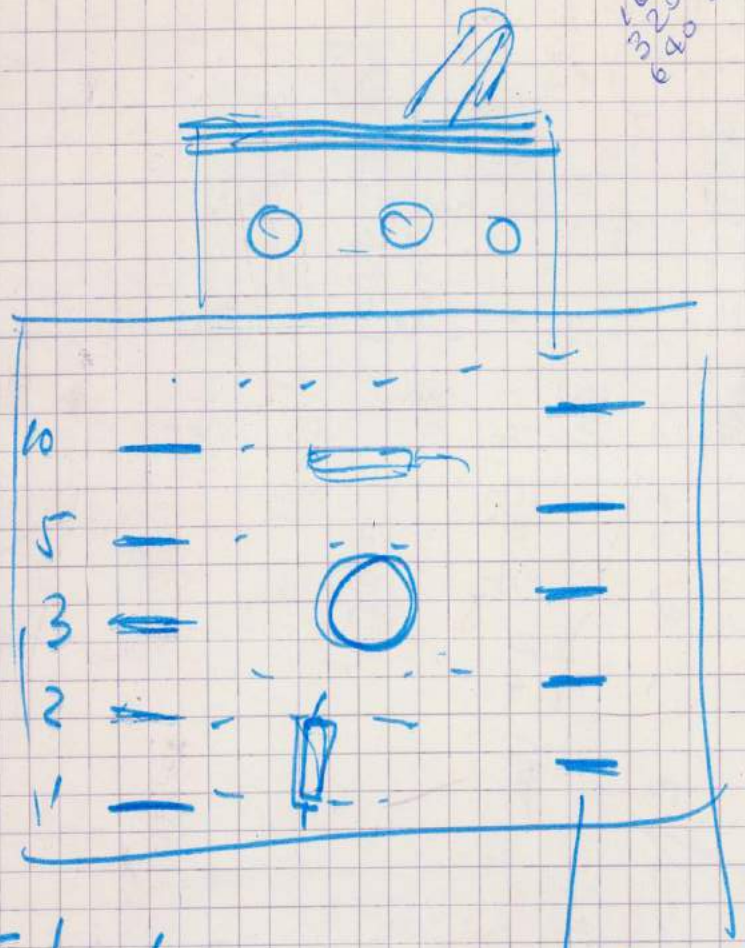
1er pulso

2º "

3er "



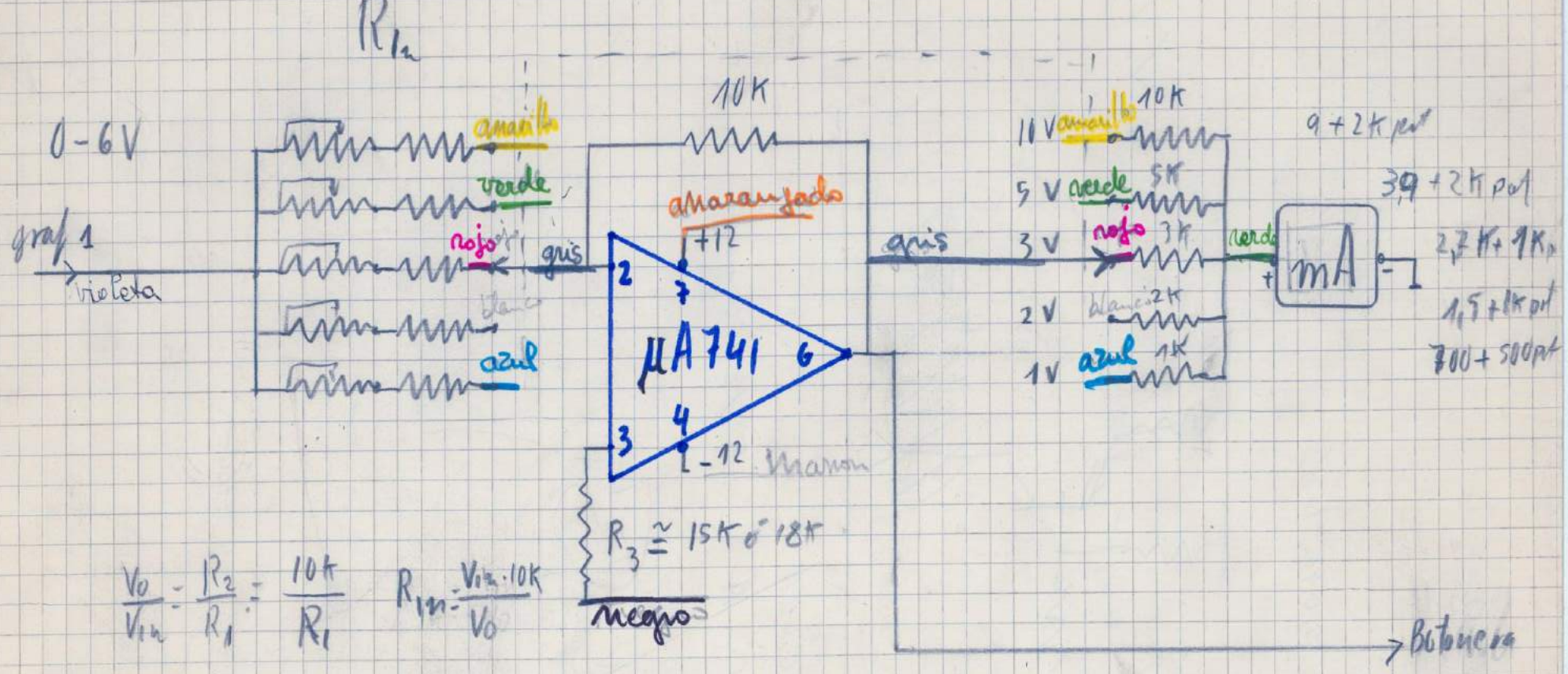
1 2 3 5 10



V. Entrada

inst.

	1	2	3	5
60				
120				
240				
960				



$$\frac{V_0}{V_{1n}} = \frac{R_2}{R_1} = \frac{10K}{R_1} \qquad R_{1n} = \frac{V_{1n} \cdot 10K}{V_0}$$

10V $R_1 = \frac{60}{10} = 6K = 5K + 2K$ pot

5V $R_1 = \frac{60}{5} = 12K = 10K + 1K + 2K$ pot

3V $= \frac{60}{3} = 20K = 18K + 4K$ pot

2V $\frac{60}{2} = 30K = 27K + 10K$ pot

1V $\frac{60}{1} = 60K = 50K + 20K$ pot

$$R_3 \cong \frac{R_1 \cdot R_2}{R_1 + R_2}$$

Cura actual 500 Ω

$R \frac{E}{I}$

$I = \frac{E}{R_{VOR} + R}$

1000 3500

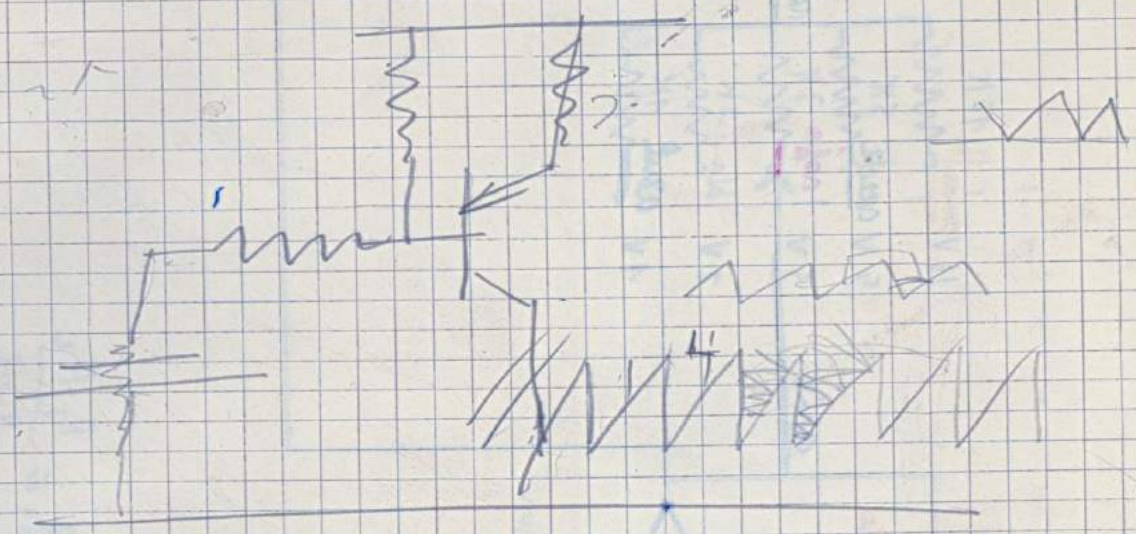
2000 7000

$I = \frac{5}{500} = 0{,}010\ A$

$R \frac{E}{I}$

$\frac{250}{2500} = 0{,}100\ A$

25V



500 Ω mA

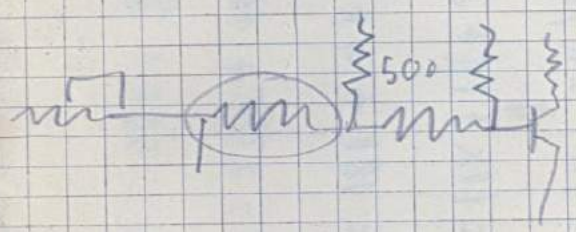
I

$E = I \times R = 500 \cdot 0{,}001$

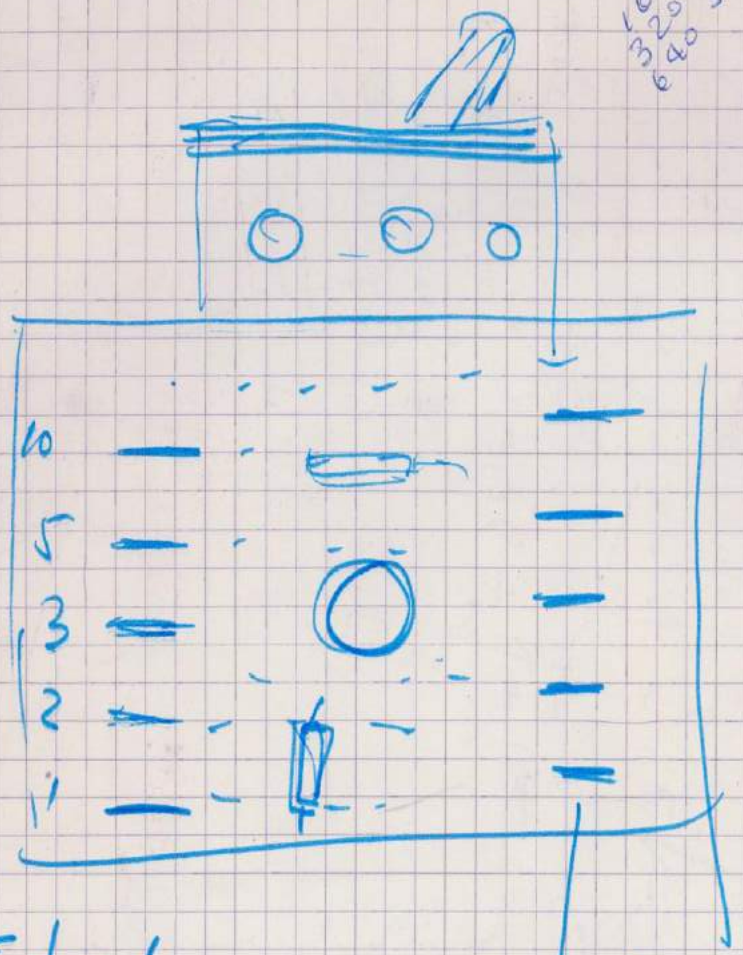
0,5 V = 1 mA 5 V = 10 mA

+ 3V

3,5V = 1mA



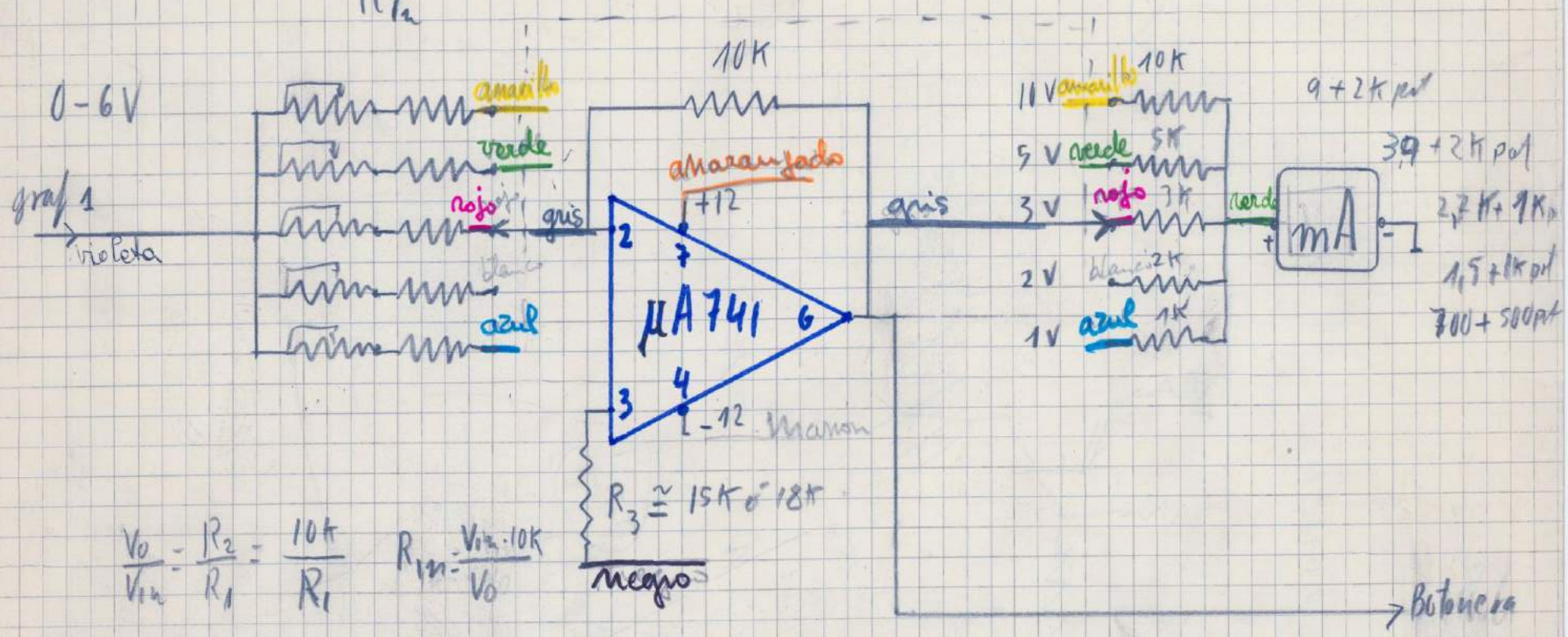
1 2 3 5 10



V. Entrada

inst.

60	1
120	2
240	3
960	5



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10V $R_1 = \frac{60}{10} = 6K = 5K + 2K$ pot

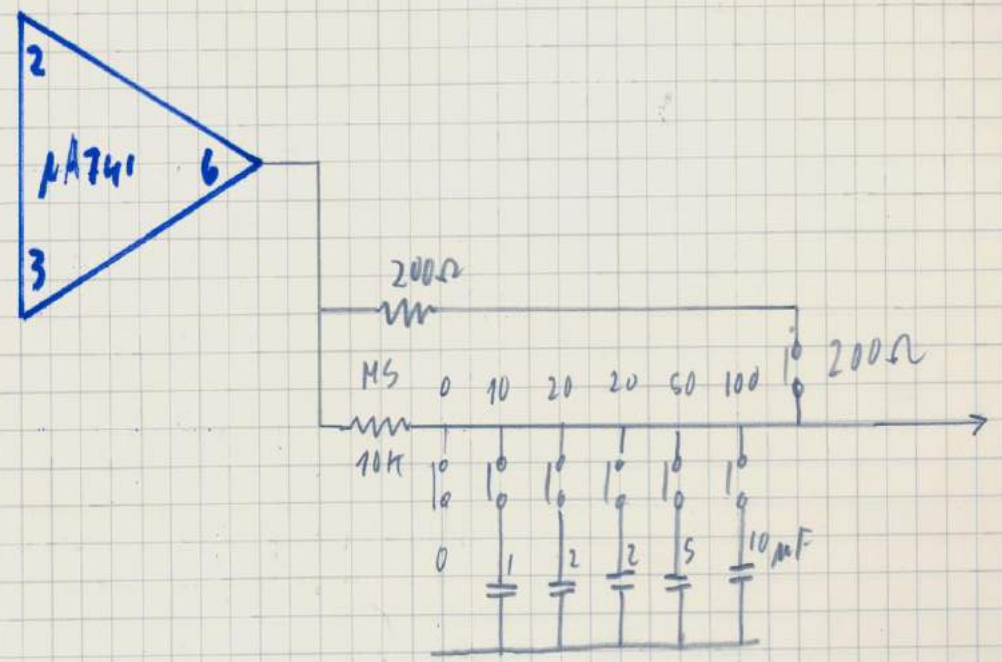
5V $R_1 = \frac{60}{5} = 12K = 10K + 1K + 2K$ pot

3V $= \frac{60}{3} = 20K = 18K + 4K$ pot

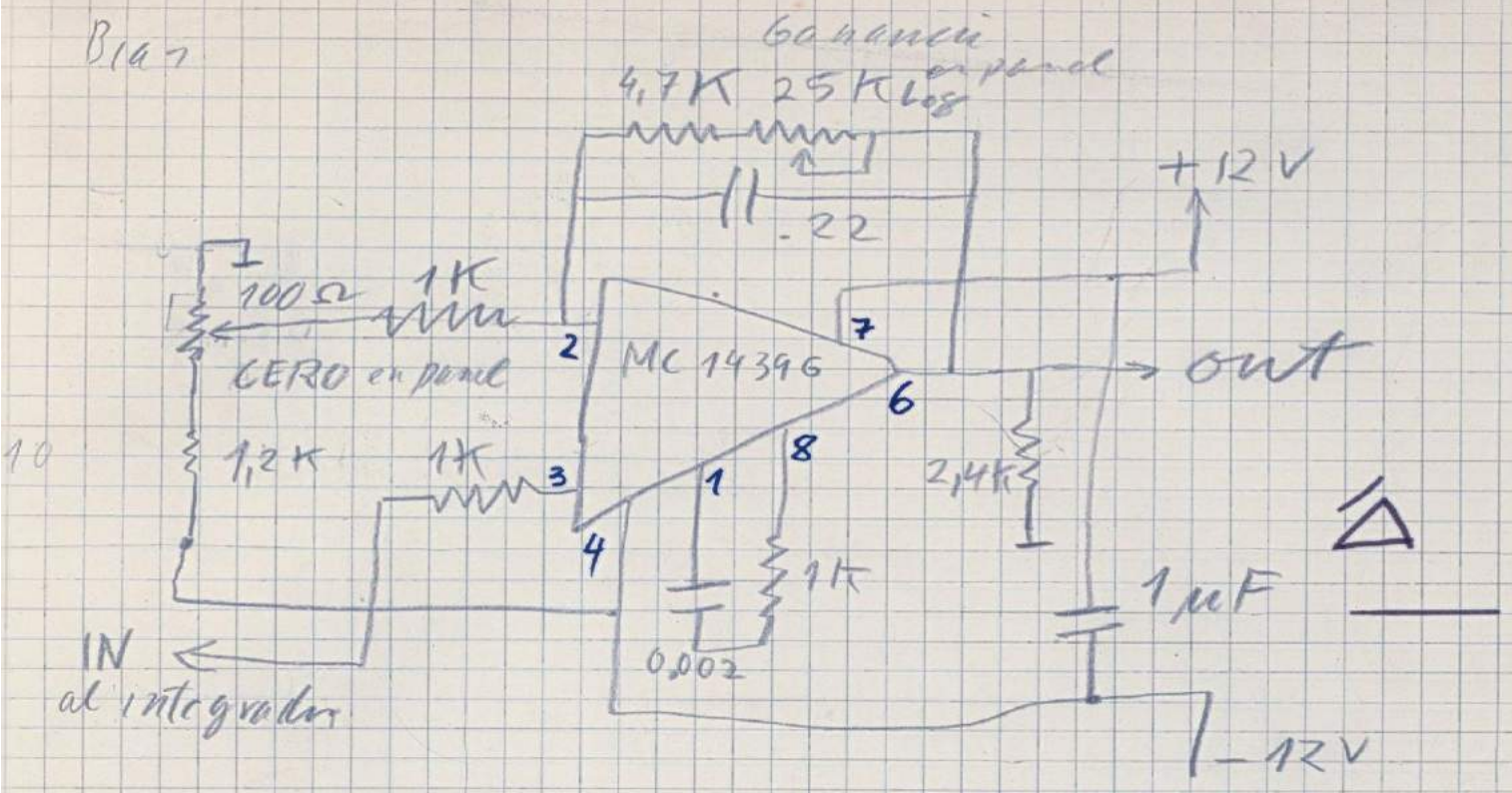
2V $\frac{60}{2} = 30K = 27K + 10K$ pot

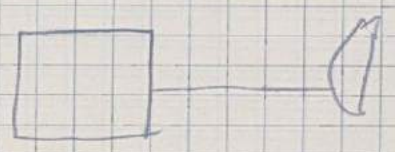
1V $\frac{60}{1} = 60K = 50K + 20K$ pot

$$R_3 = \frac{R_1 \cdot R_2}{R_1 + R_2}$$


2
μA741
6
3
200Ω
MS
10K
0
10
20
20
60
100
200Ω
0
1
2
2
5
10 μF

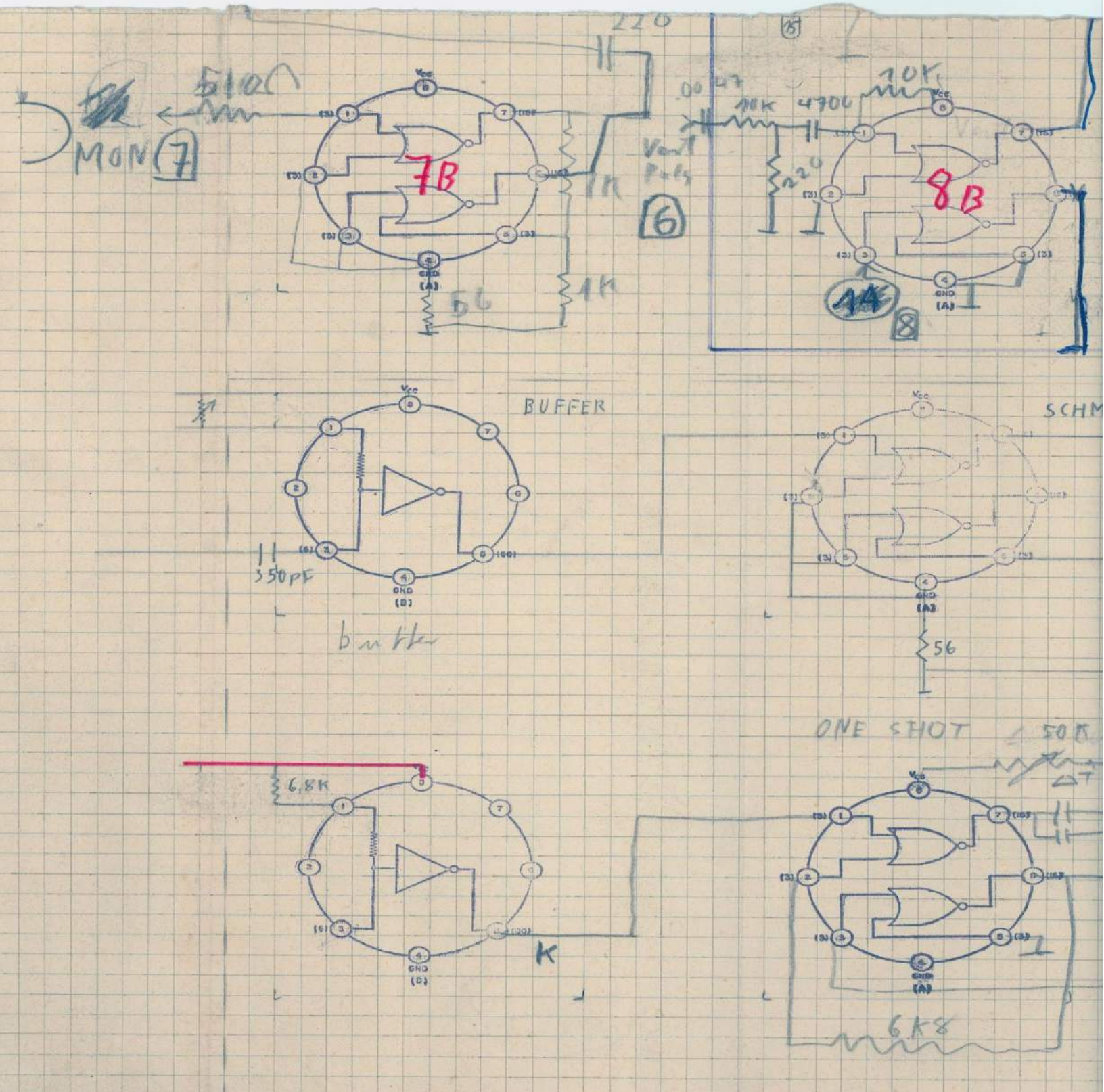
Bia 1

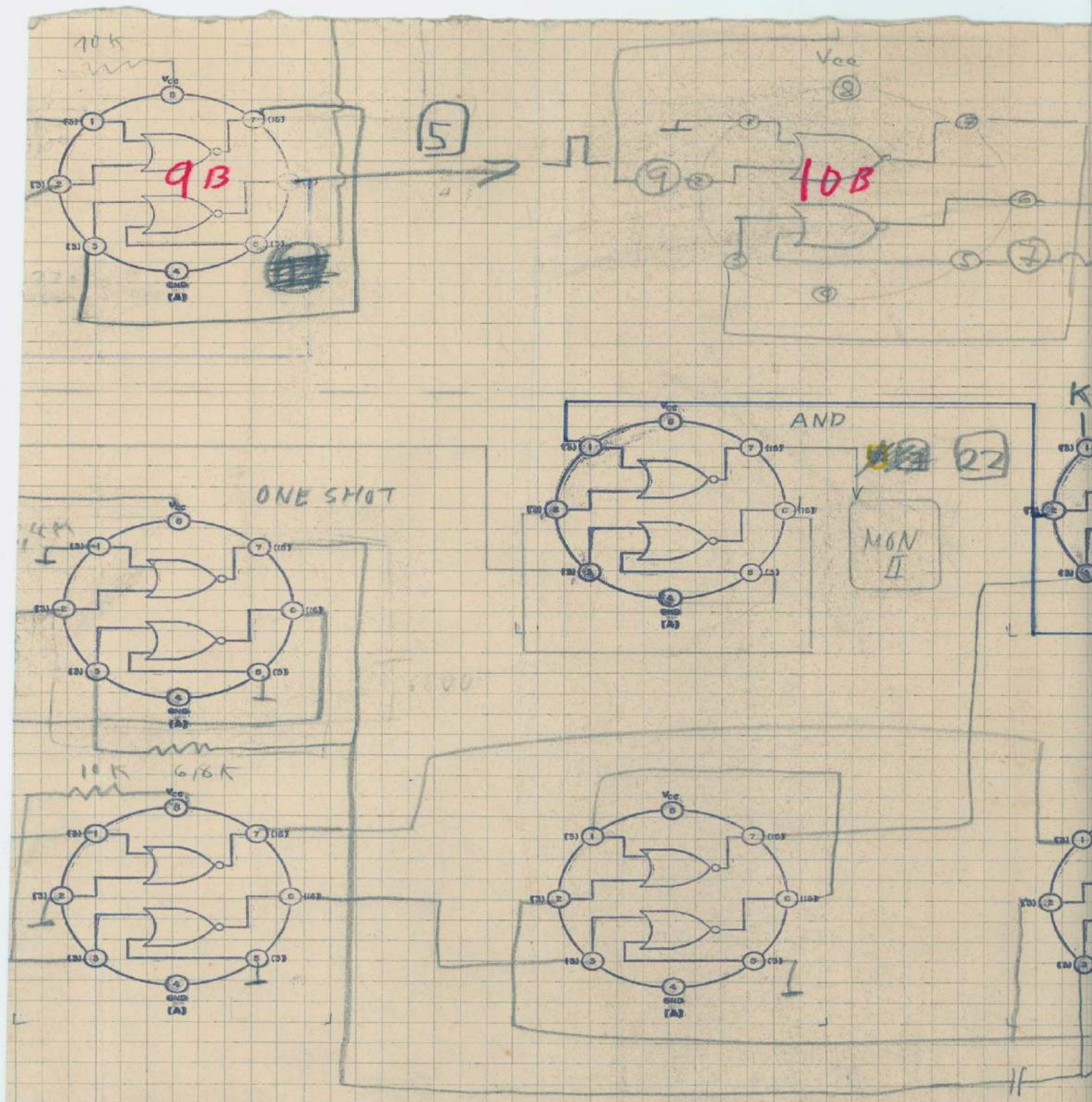

Ganancia en panel
4,7K
25K log
.22
+12V
100Ω
1K
CERO en panel
MC 14396
2
7
6
out
1,2K
1K
3
1
8
2,4K
4
1K
0,002
1μF
IN
al integrador
-12V

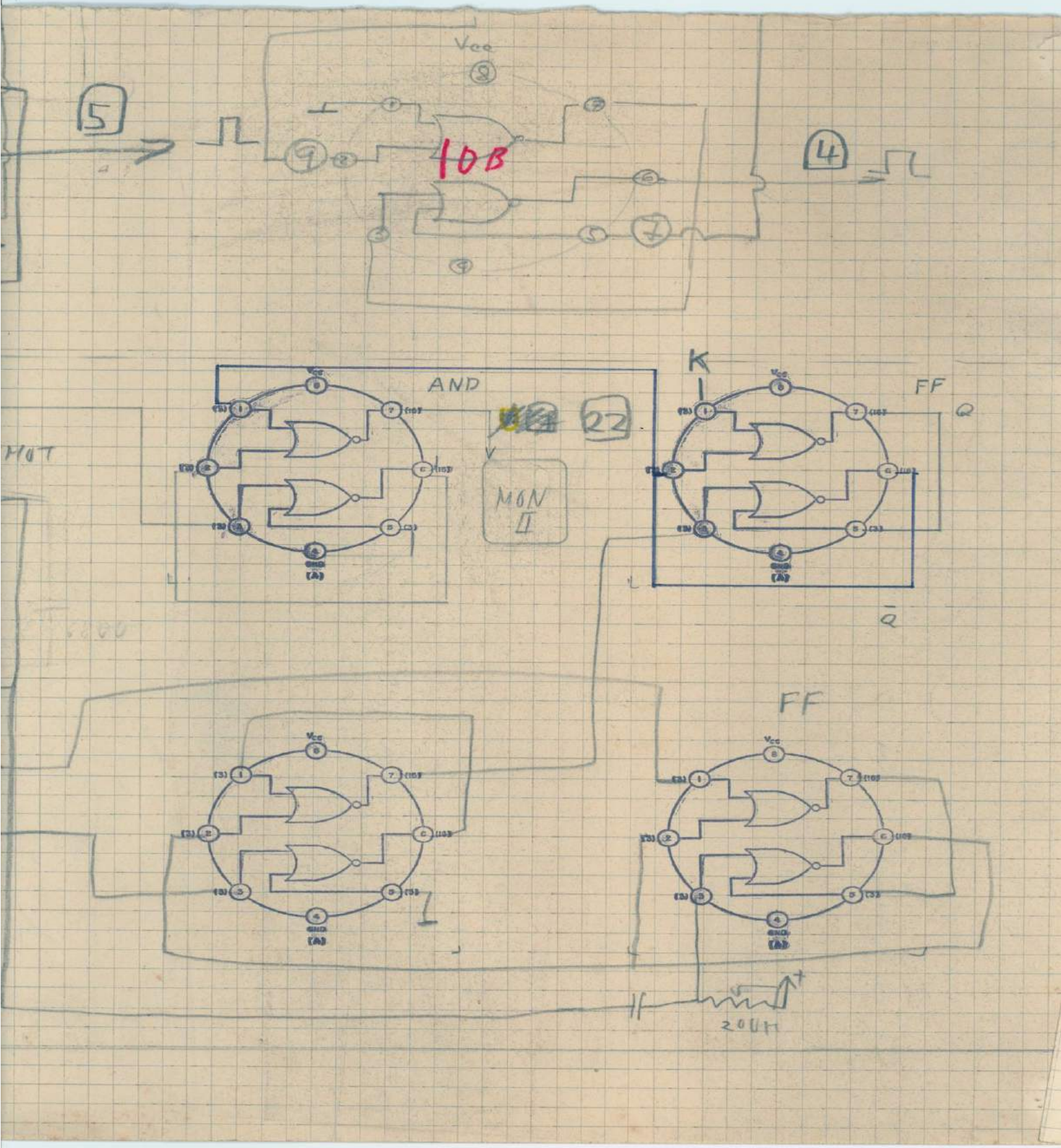


1 = 00K

PK


MON 7
510Ω
220
7B
56
1K
6
10K
4700
8B
14
8
BUFFER
350pF
buffer
SCHM
56
ONE SHOT
50K
6,8K
K
6K8


10K
9B
5
10B
AND
22
MON
II
ONE SHOT
10K
6/6K

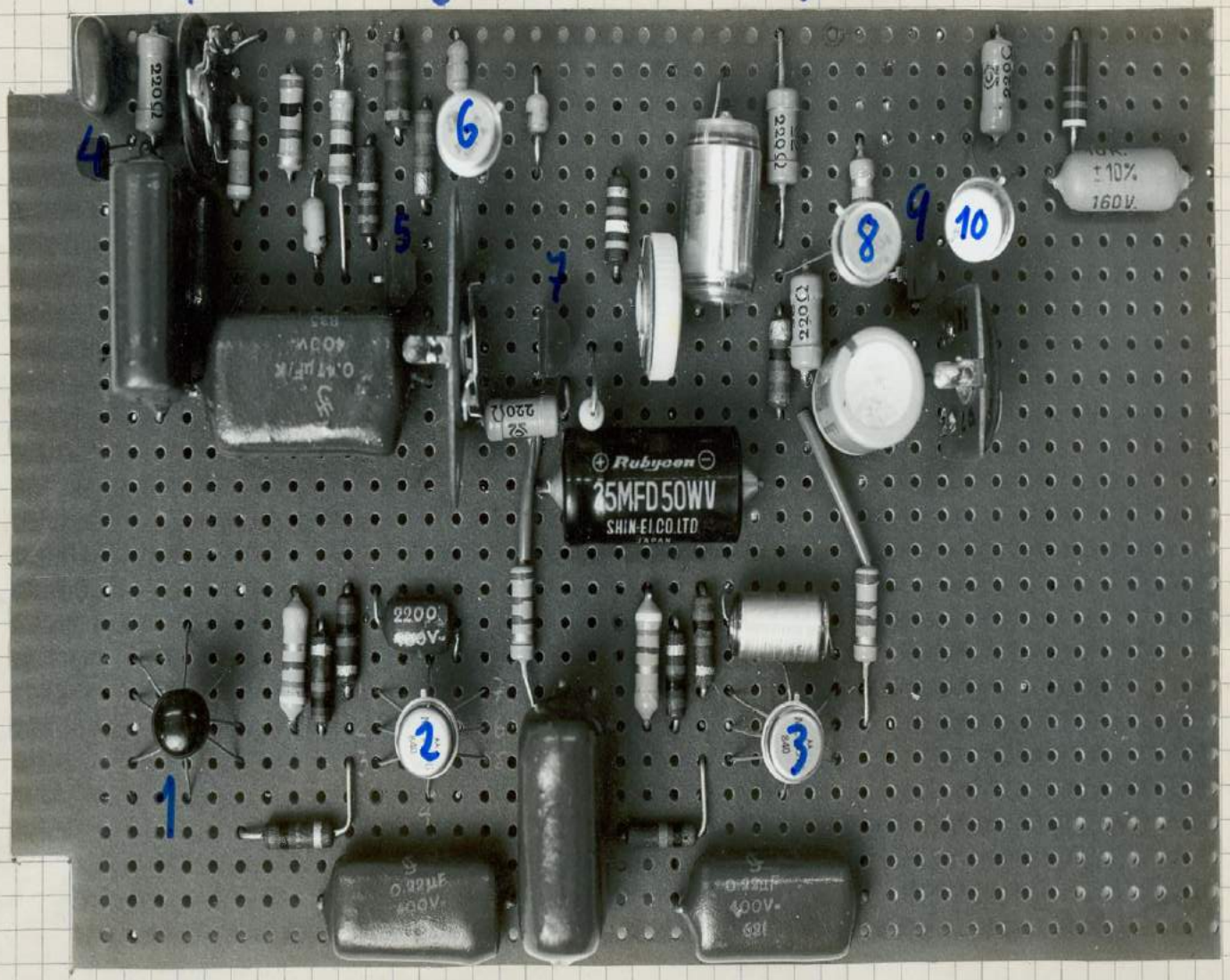

5
Vcc
8
9
10B
4
AND
22
MON
II
K
FF
Q
$\bar{Q}$
MOT
FF
20kΩ

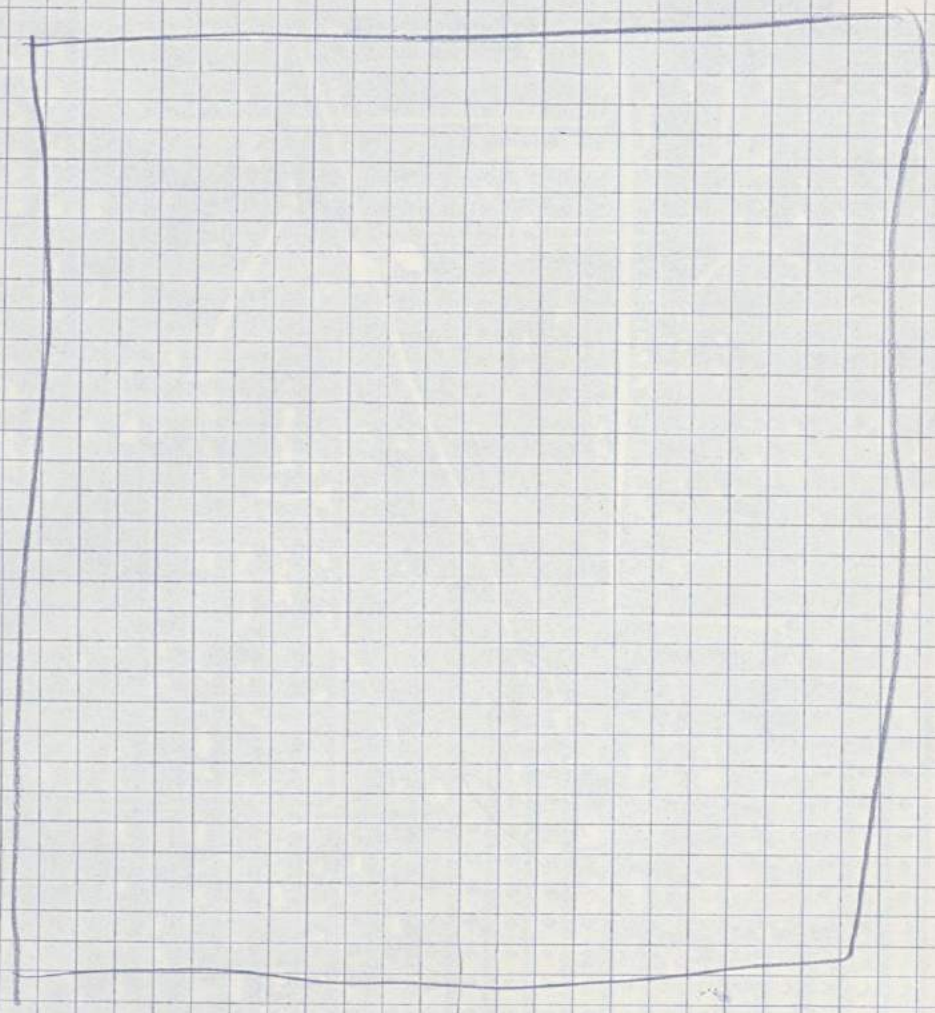
FOTOS Convertidor C

2-5 V

100K
50 c/s

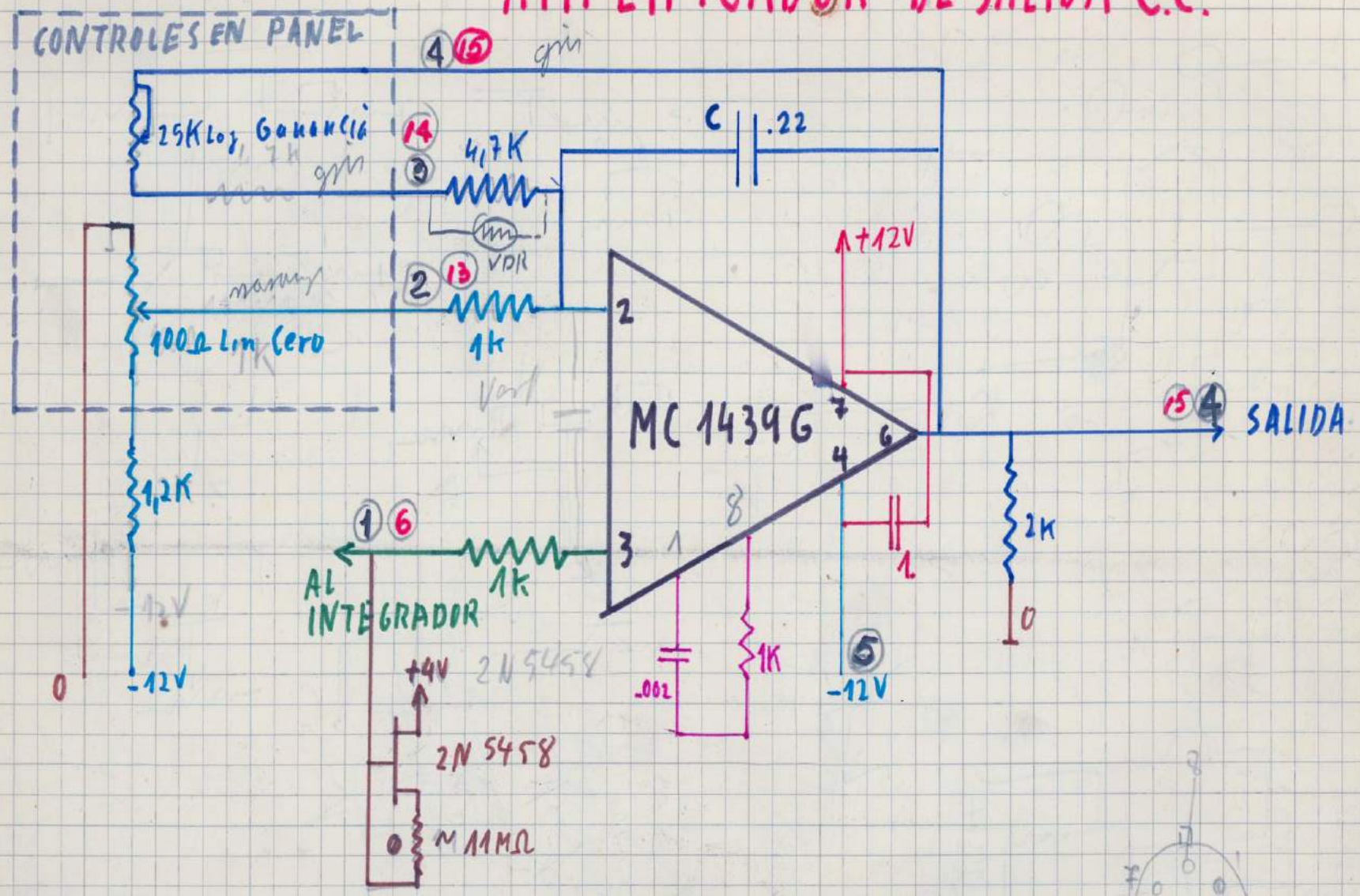
5K
pos

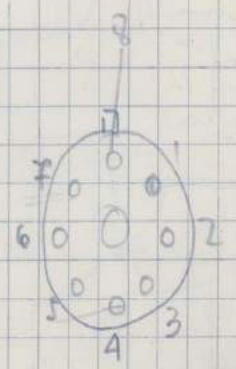




AMPLIFICADOR DE SALIDA C.C.

C





Nota: Los números en negro indican las barras a las que están conectadas las salidas del amplificador "A" y los que están en rojo al las del amplificador "B"

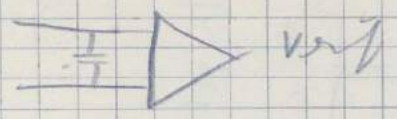
Verif 907 Fairchild

Supprim ripple:

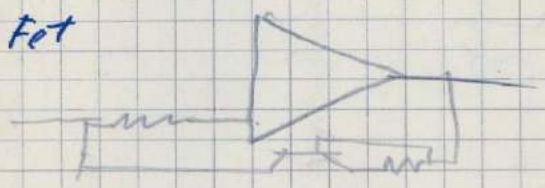
1º compensación entrada Z lin

2º integración C(t) grande respuesta transitoria

1º a) Realim positiva



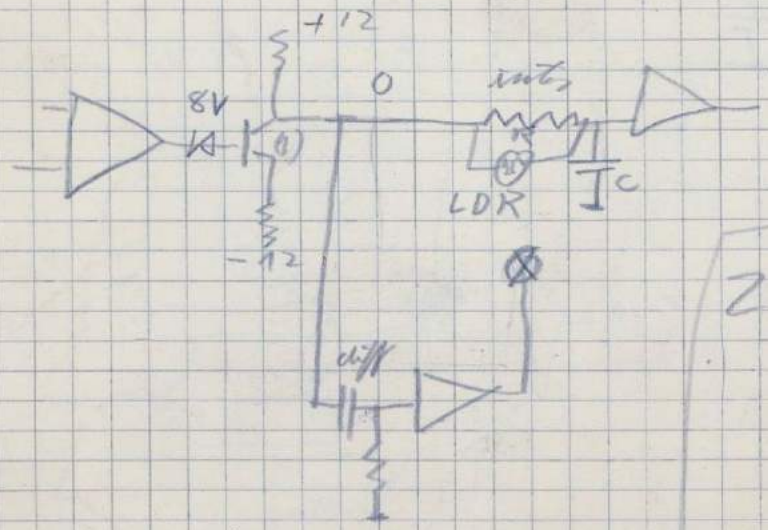
b) Fet

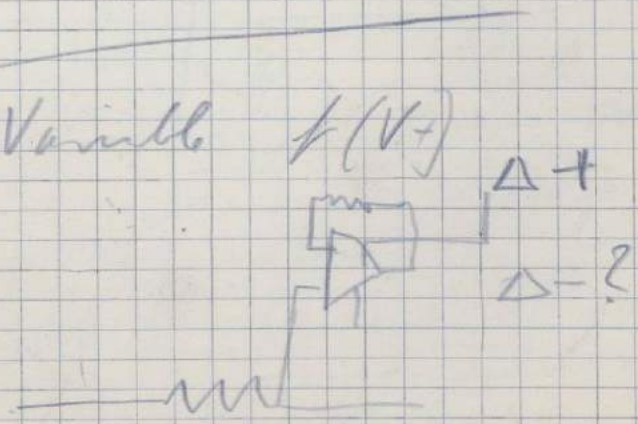


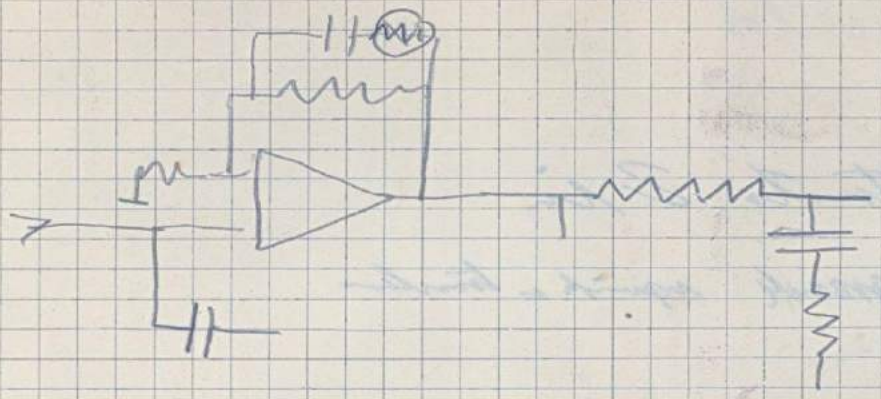
−10 3mΩ

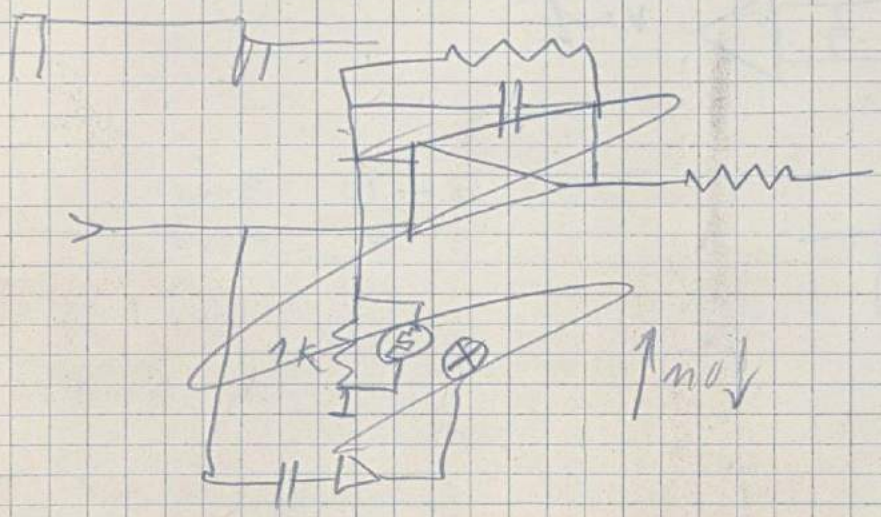
0 2mΩ

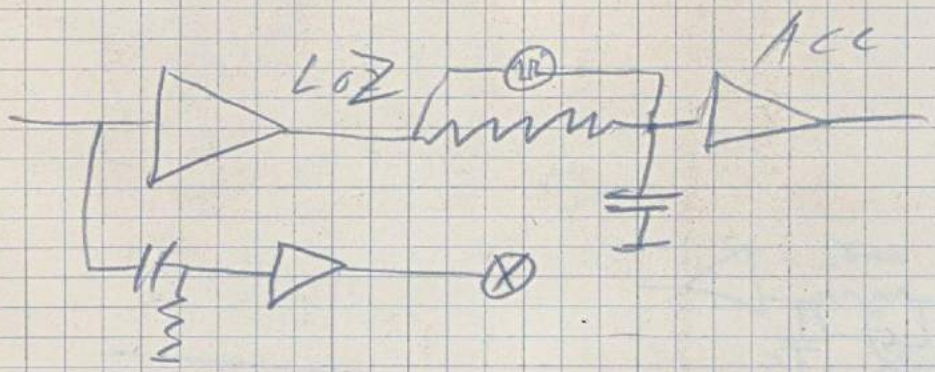
2º



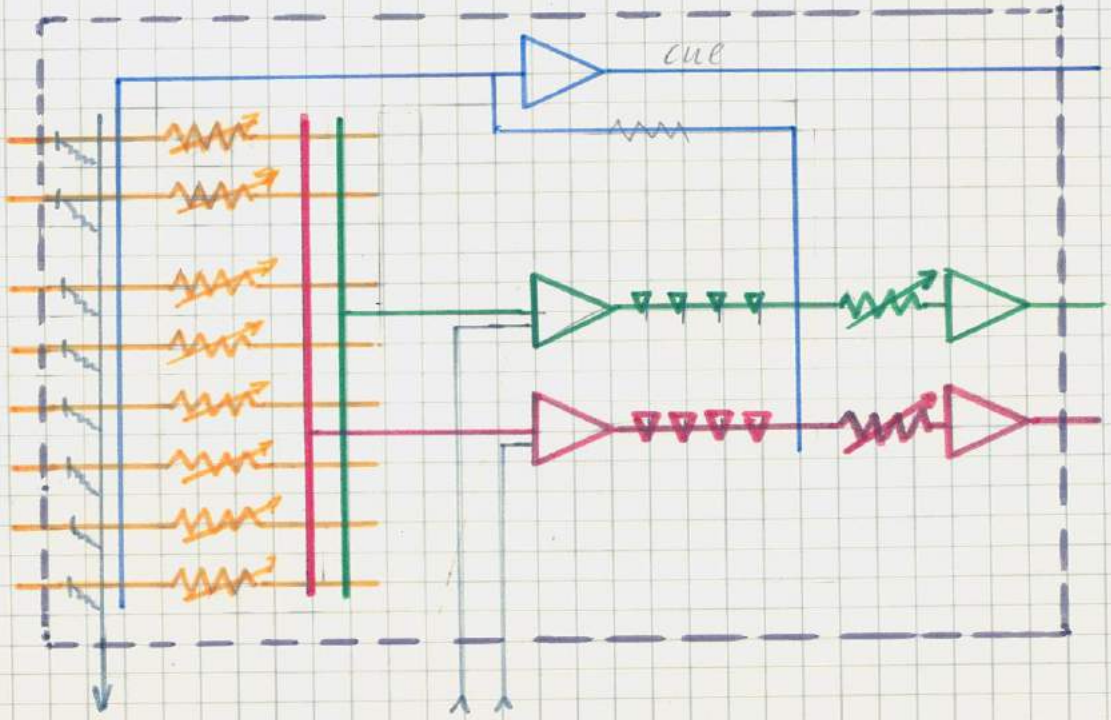


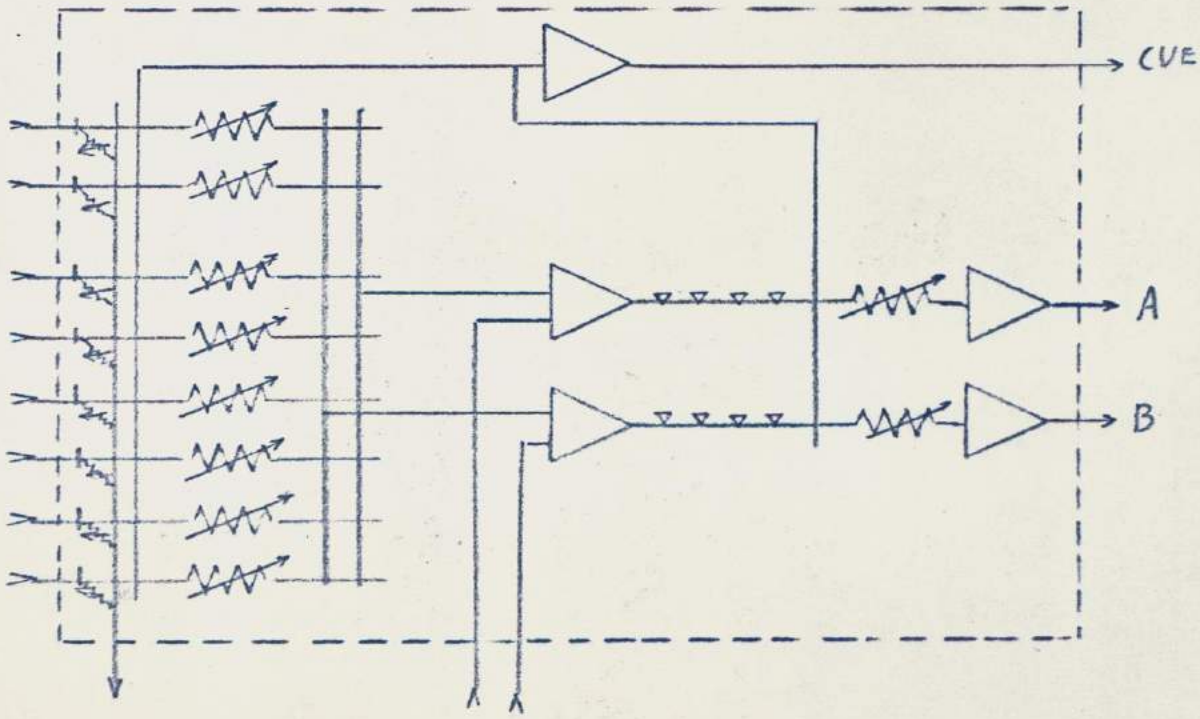


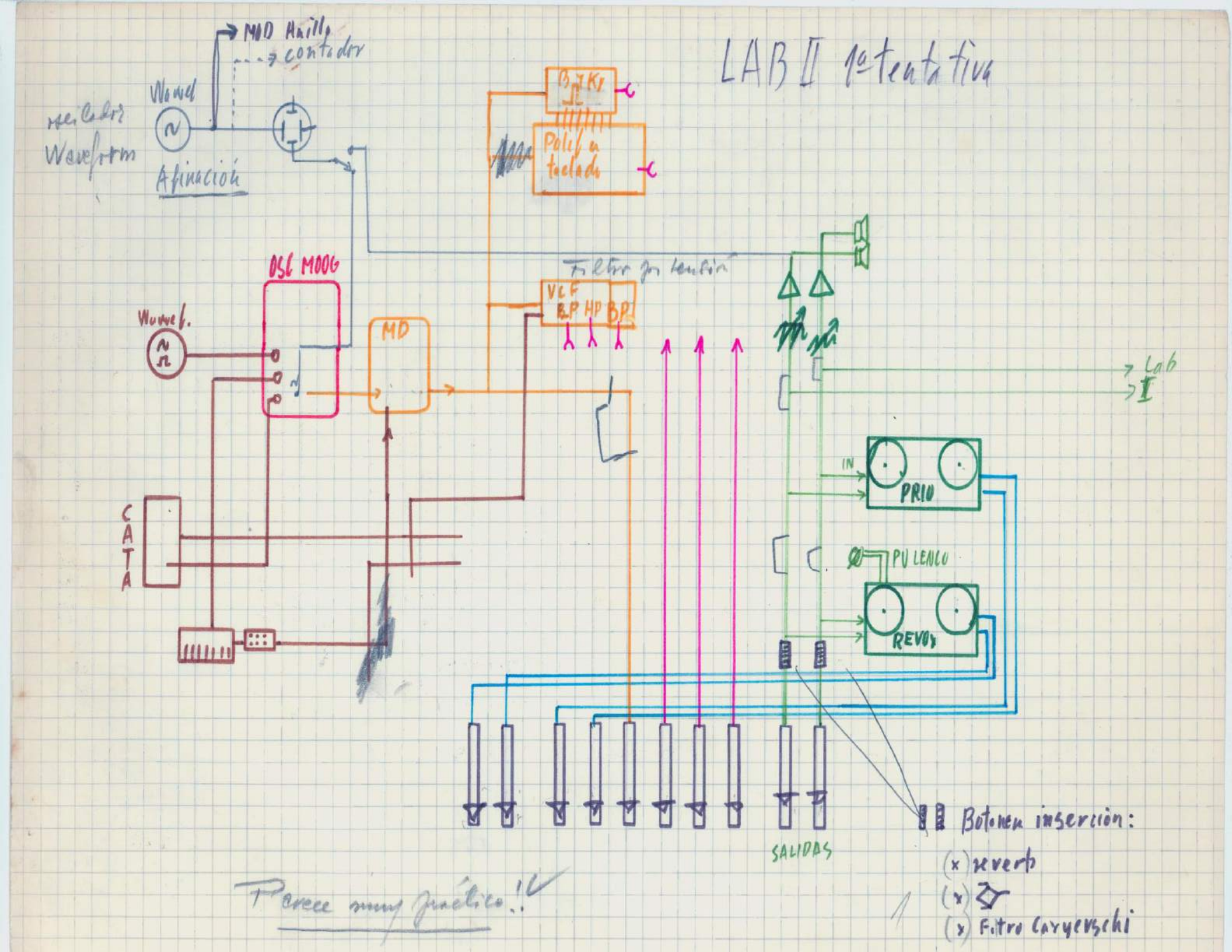

2K
mod

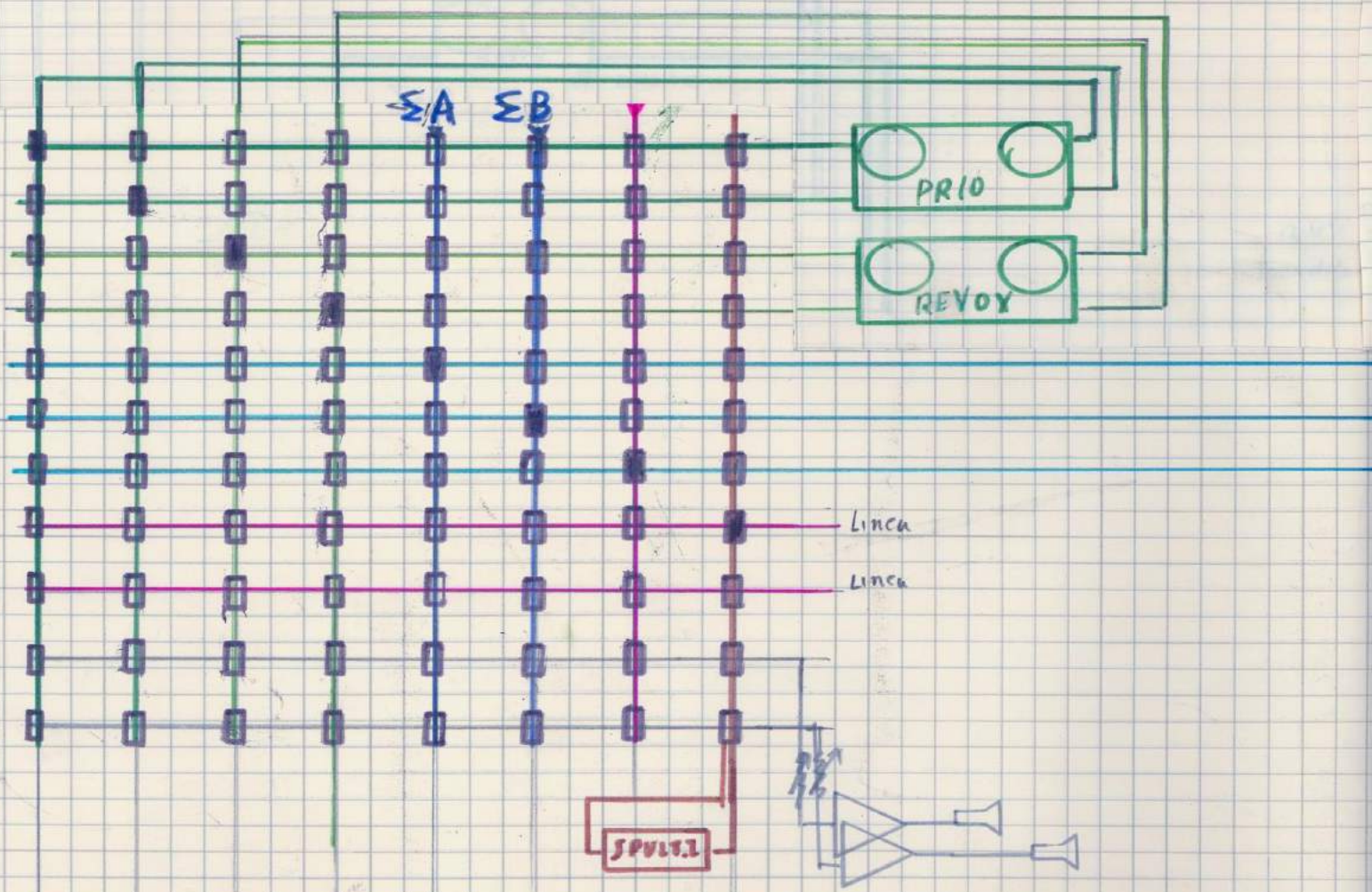

LOZ
Acc

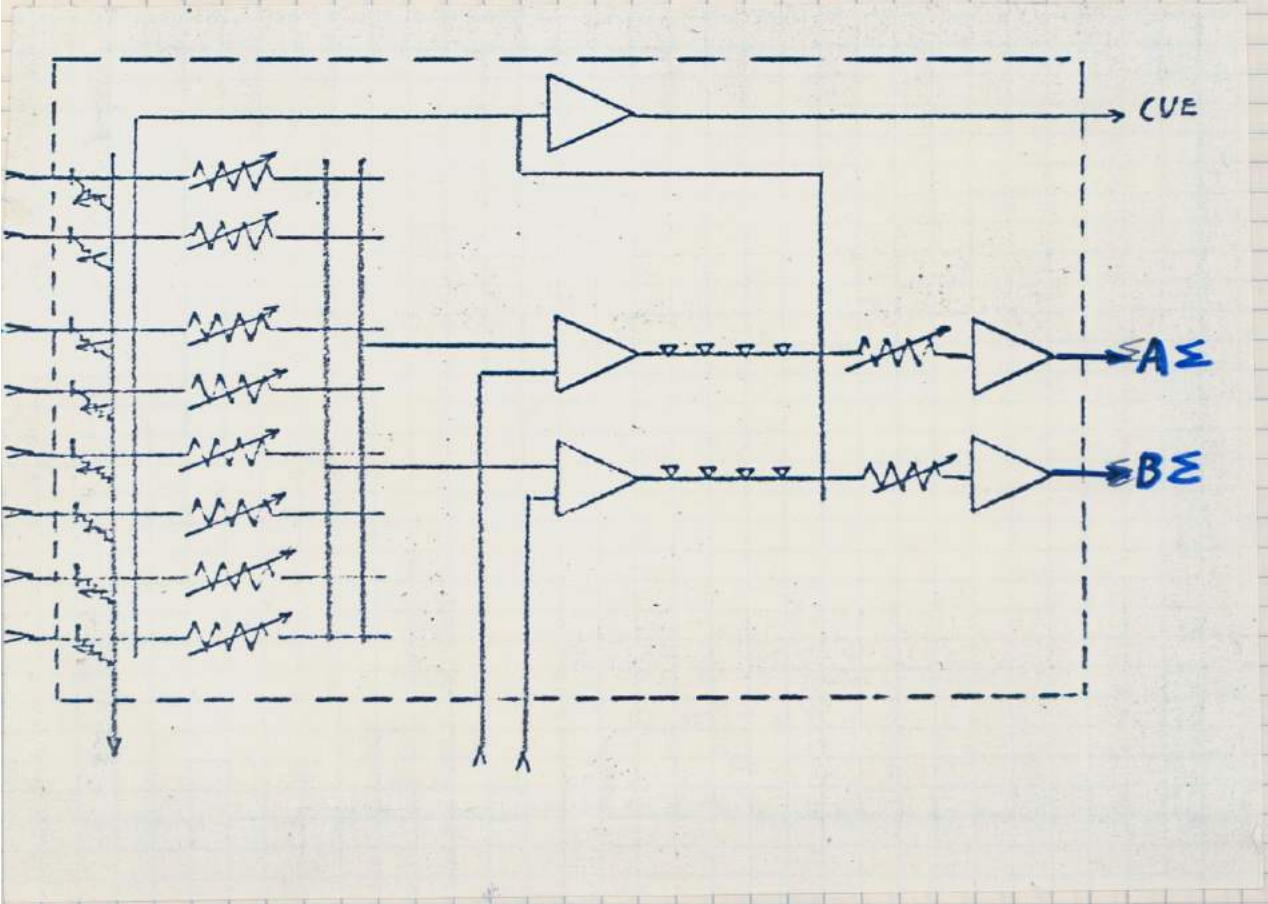
LAB II


cue

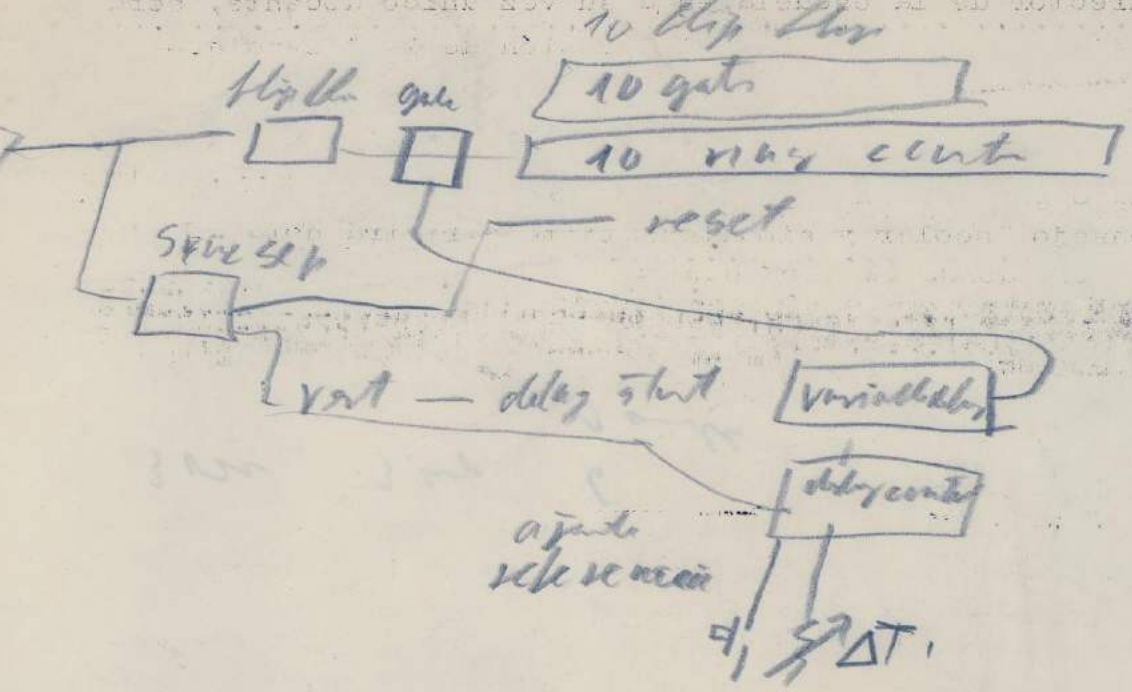

CUE
A
B

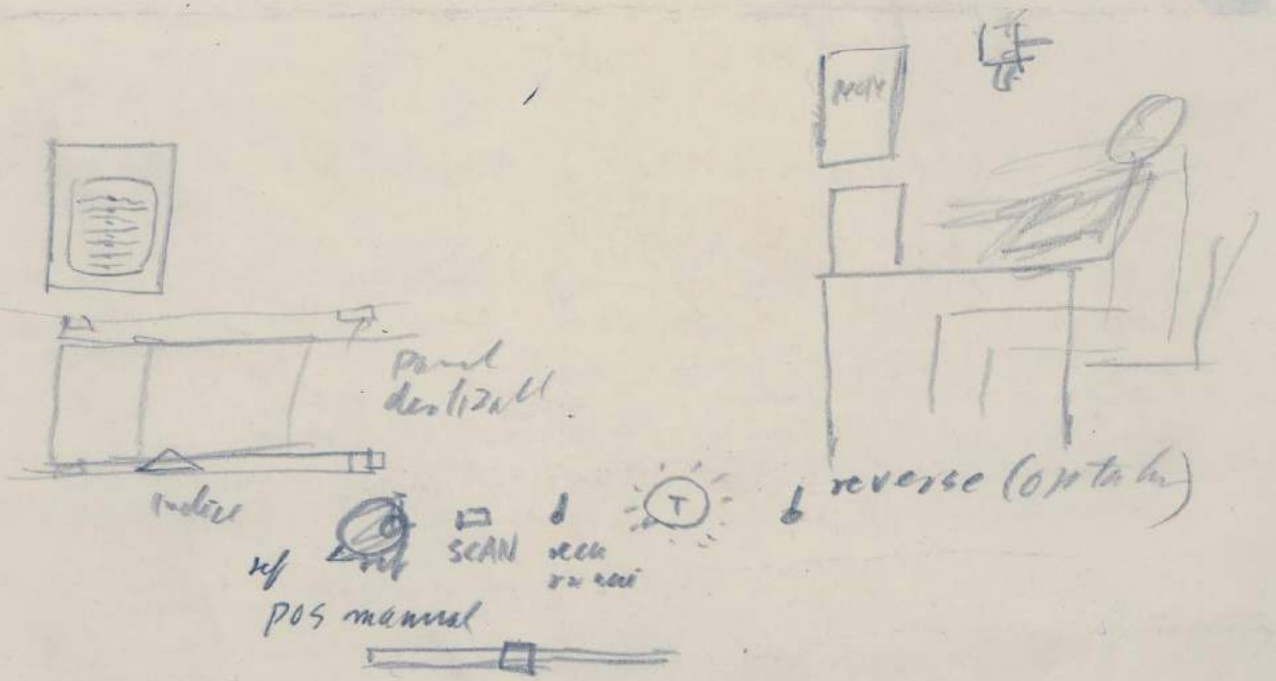

LAB II 1ª tentativa
MID Hall
contador
Wave
seleccionar Waveform
Afinación
Polif a teclado
OSC MOOG
Wave
MD
Filtro por tensión
VCF
LP HP BP
CATA
PRIO
IN
PU LENTO
REVOX
Lab
I
SALIDAS
Botones inserción:
(x) reverb
(x)
(x) Filtro Cavyerschi
Parece muy gráfico!!


ΣA
ΣB
PR10
REVOY
Linea
Linea
SPULT.1

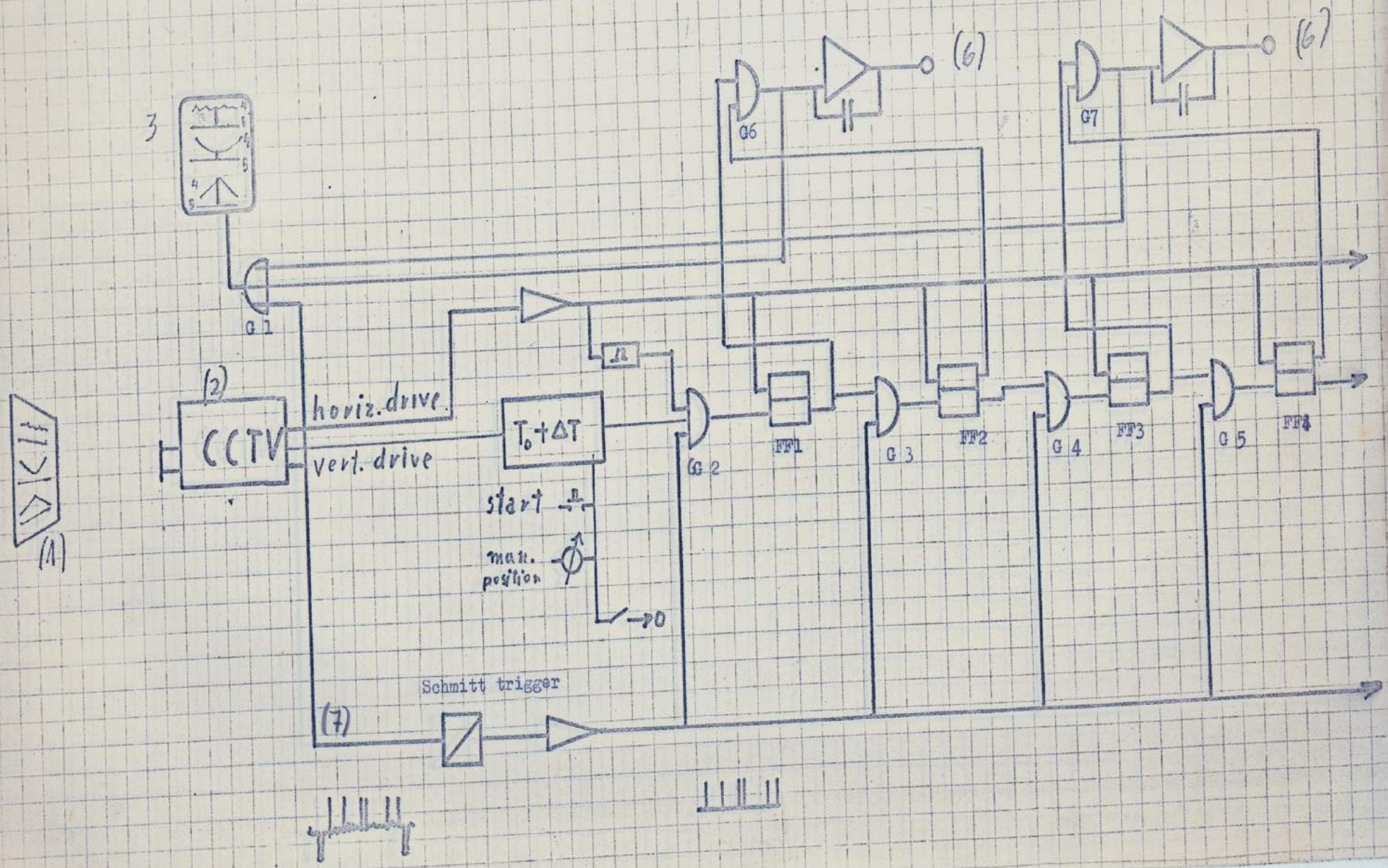

CUE
AΣ
BΣ

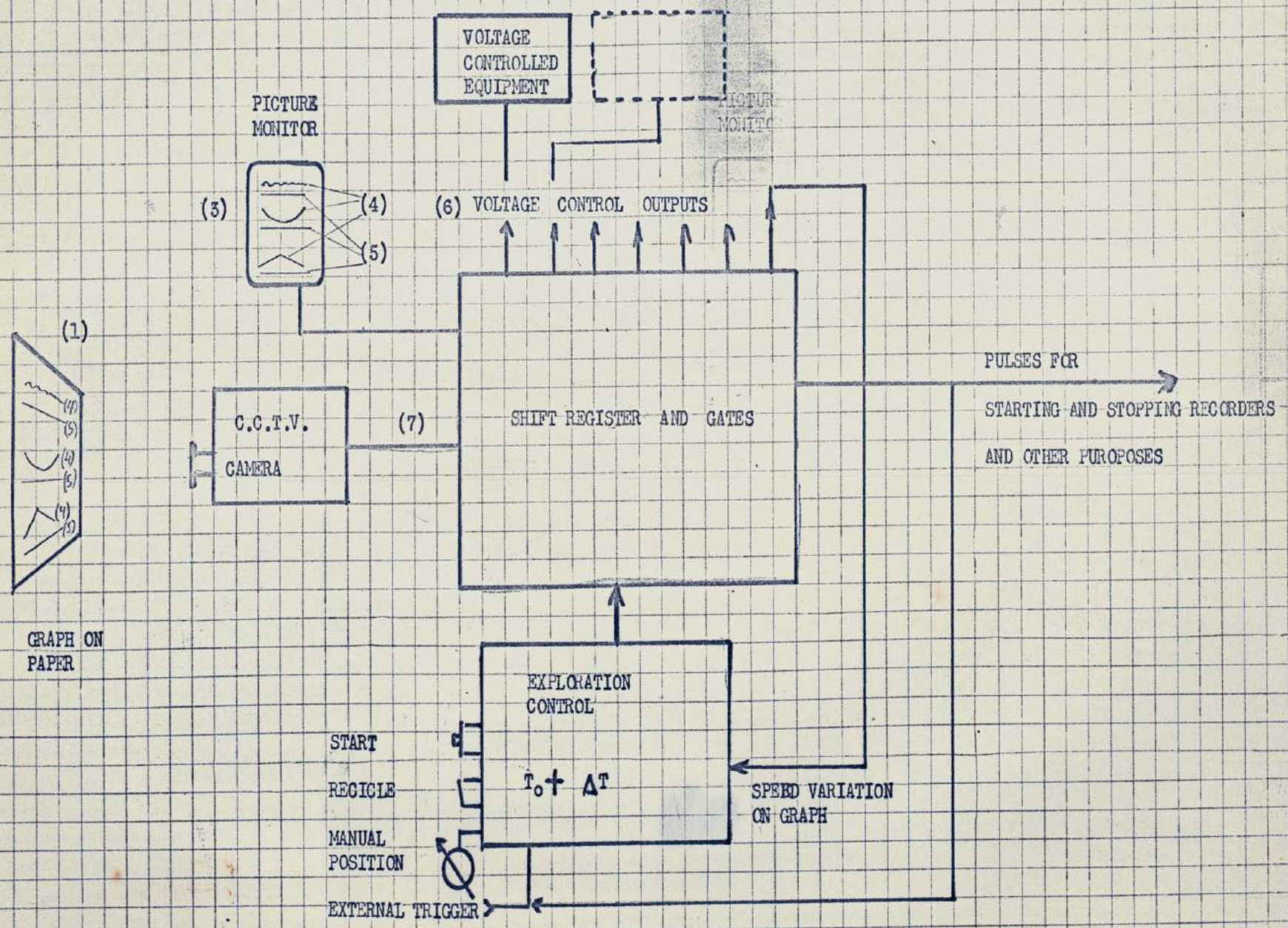
Proy Conversación a revisa

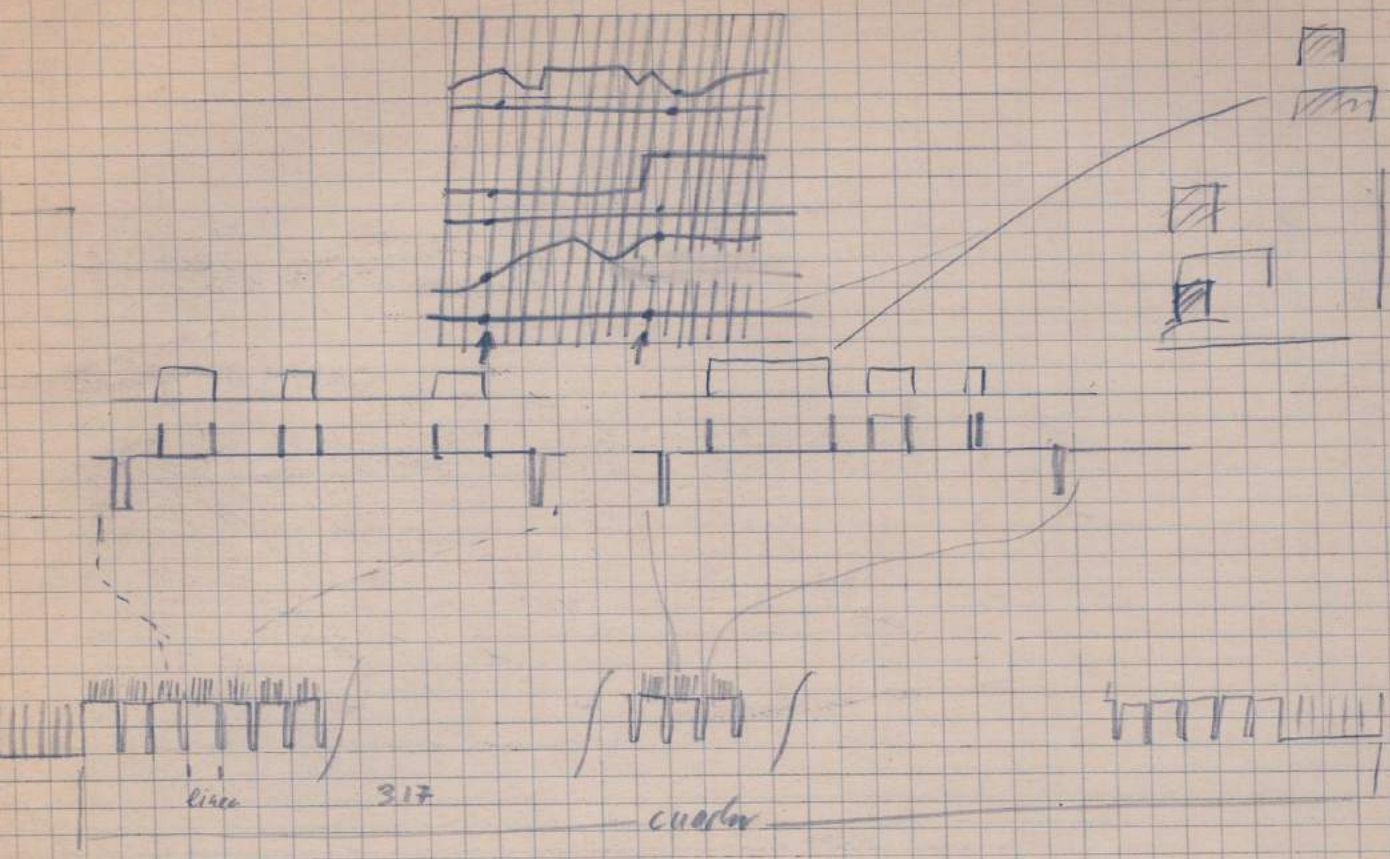

10 flip flop
10 gate
10 ring counter
reset
start stop
start — delay start
variable delay
delay counter
ajuste
referencia
ΔT


panel destizable
indice
ref
SCAN
POS manual
reverse (ortoh)

```
10 REM SIMULDISCADO TELEFONICO
20 INPUT"INGRESE UN NUMERO TELEFONICO";A$

30 L=LEN(A$)
40 FOR I=1 TO L

50 Z$=MID$(A$,I,1)
60 A(I)=VAL(Z$)

70 NEXT I
80 GOSUB 3000

90 PRINT"TERMINO"
100 END
3000 FOR K=1 TO L

3010 FOR J=1 TO A(L)
3020 PRINT CHR$(7)
3030 NEXT J
3040 FOR T=1 TO 200:NEXT T
3050 NEXT K
3060 RETURN
```


3
(1)
(2)
CCTV
horiz. drive
vert. drive
G 1
$T_0 + \Delta T$
start
max. position
Schmitt trigger
(7)
G 2
FF1
G 3
FF2
G 4
FF3
G 5
FF4
G6
G7
(6)
(6)


VOLTAGE CONTROLLED EQUIPMENT
PICTURE MONITOR
(3)
(4)
(5)
(6) VOLTAGE CONTROL OUTPUTS
(1)
(4)
(5)
(4)
(5)
(4)
(5)
C.C.T.V. CAMERA
(7)
SHIFT REGISTER AND GATES
PULSES FOR STARTING AND STOPPING RECORDERS AND OTHER PUROPOSES
GRAPH ON PAPER
EXPLORATION CONTROL
START
RECICLE
$T_o + \Delta T$
MANUAL POSITION
EXTERNAL TRIGGER
SPEED VARIATION ON GRAPH


linea
3.17
cuadro

FUENTE +40 -40V LABORATORIO

plied to the N++ gallium arsenide layers.

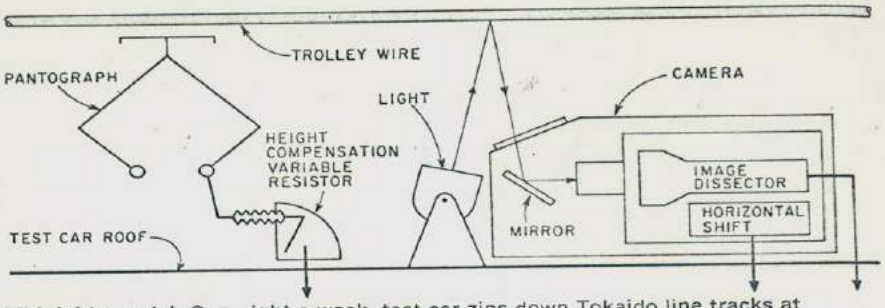
In operation. Researchers at Nippon Electric last year showed that by injecting a small sinusoidal voltage they could synchronize the frequency of the spiky Gunn oscillations in such devices and change fundamental frequency over a range of about two to one. Ability to synchronize the frequency is important when the device is used as a generator of clock pulses—an oscillator operating in stable cavity can be used to set system frequency. Oscillations are in the order of 1 gigahertz, with pulse widths of 0.2 nanoseconds.

The pulse generator is biased in the negative resistance region. Pulse repetition frequency depends on domain transit time, while pulse width depends slightly on carrier density. As the domain being transported reaches anode and is extinguished, a new domain is nucleated and the process repeats.

For operation as a pulse regenerator, the device is biased just below the threshold. When a small trigger pulse is applied, a high-field domain is nucleated and current through the device falls. Current returns to the original quiescent value after the domain transits the device and is extinguished. Pulse width in this mode is reciprocal of free-running repetition frequency, and is in the range of 0.5 to 2 nanoseconds.

Problems. There are still a number of bugs to be ironed out. For one, there is an insensitive region just above the threshold in some of the diodes in which noisy, incoherent oscillations are produced. This diode type still can be used as a pulse generator, but not for pulse regenerators, where operation extends into the noisy region.

Another problem is fabricating devices with desired impedance level. With voltage at about 30 volts, power dissipation must be kept at moderate levels—and devices have been fabricated with impedance levels of about 1,000 ohms. However, this provides power matching to the 75-ohm circuit generally used in high-speed pulse equipment such as pcm but further work is needed.



Midnight special. One night a week, test car zips down Tokaido line tracks at 125 mph while image-dissection tv camera checks overhead electrical wire wear.

Wire-sleuthing

Rejecting such modern developments as lasers in favor of a 35-year old superannuated device, Japanese National Railways has come up with a method of measuring wear in railroad overhead electric wires—at 125 miles per hour. What's more, readings are taken every 11 inches, compared with every 82 feet under an earlier method, which also required a four-man team.

Developed jointly with the Hamamatsu TV Co., the system uses an image-dissection television tube, invented in 1934. Even with electron multiplier assemblies, the image dissector is not used in television pickup systems because other tubes, notably the image orthicon, offer higher sensitivity. Where the latter tube scans an image on a charged plate in the tube by an electron beam, the image dissector moves the image, in the form of an electron bundle, across a pickup head.

A flat spot develops and gets progressively wider as the initially round electric wire used in feeding power to railroad trains wears away. When the wire is worn to about 70% of its original area it must be replaced because it is no longer thick enough to withstand the high pull—up to one metric ton—that dampens vibration.

Man-days. Normally, teams of four workers measure wear manually with micrometers. One man does the measuring, the second man holds the ladder, the third writes down data, and the fourth looks out for approaching trains. Measurements usually are made opposite support poles, which are 165 feet apart, and halfway between poles. This accounts for 20% of all the man-days required for maintenance of power feeding wires—including replacing wires and insulators, and periodic cleaning of insulators.

On standard train lines, with 1,500-volt d-c electrification, measurements can be made under operating conditions because a bamboo ladder provides sufficient insulation. But on the new Tokaido line, with 25,000-volt a-c electrification, power must be turned off before taking measurements; thus they have to be made during early morning hours before the start of the day's service.

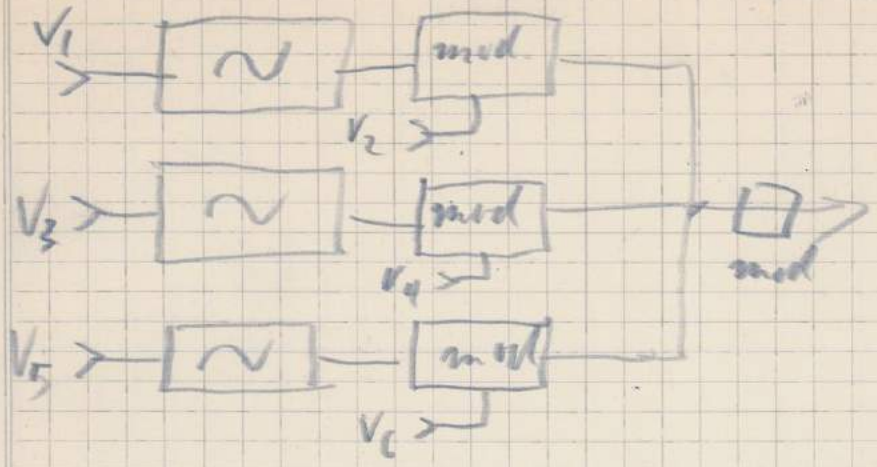
The new system is designed to measure at 125 mph. One night a week a test car is driven down the tracks on the Tokaido line at this speed. Because of the new equipment in this car, wear data can be gathered with little labor, except that which is needed to analyze the records after the run has been completed.

The pantograph collector shoe keeps the flat area shiny while the remainder of the wire becomes coated with corrosion products. Since the test car is run at night, the wire can be illuminated from below with a strong return of light from the flat part and almost no reflection from the remainder of wire and surrounding space, providing there is good differentiation (high contrast) between the flat area and remainder of the wire.

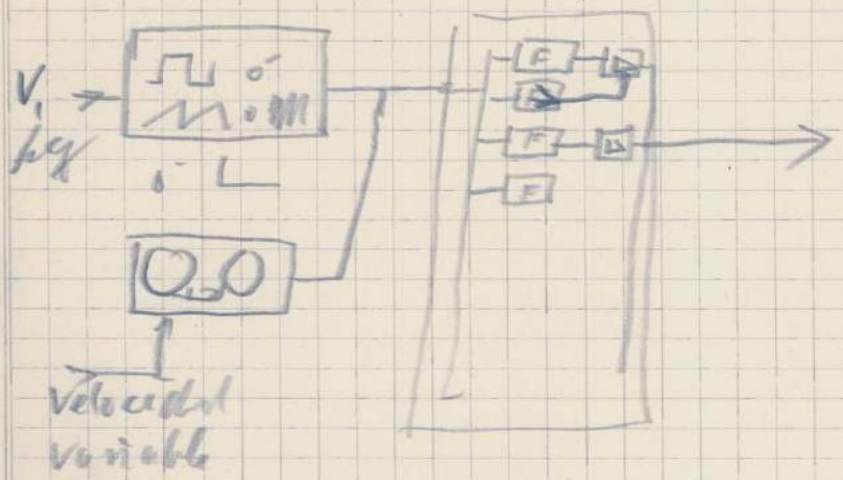
Blurring. In initial experiments the image of wire was picked up

Ampere entrinsecos de cinta

Síntesis aditiva



Síntesis sustractiva



Problemas: ~~varias~~ (1) ΔF ΔL al mayor menor de componente posible

~~Dos~~ + Sumar varios mayor ΔF ΔL en adicionante.

Asignatura _____ Comisión _____

Nombre y apellido _____

Nº. de Registro _____ Fecha _____ Firma _____

Editorial Macchi
CORDOBA 2015 — BUENOS AIRES