

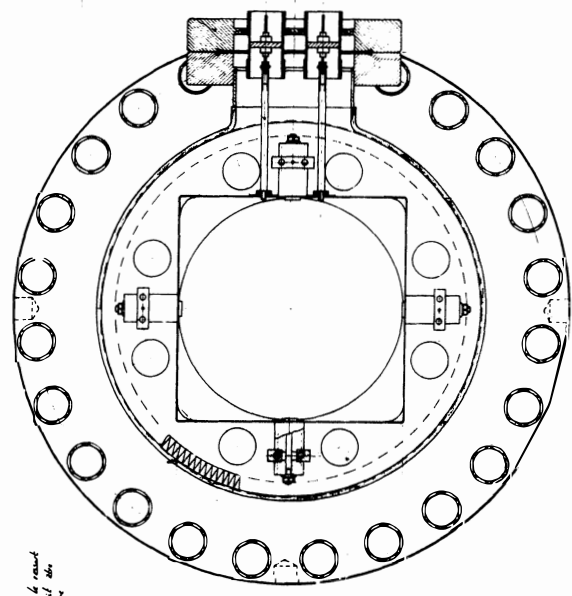
(1/1000)

X-X

7
17, 18, 10
9
8
6
12

X-X

2
11
5
15, 16
12



13

X-X

13/15

13/15

Course 1/15

Le contact entre le roulet
et la chambre doit être
ajusté en montage

13/15

Fig. 1

NO	DESCRIPTION	DATE	REVISION
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CERN LIBRARIES, GENEVA

CM-P00072449

P PROCESSING TEST SET-UP:

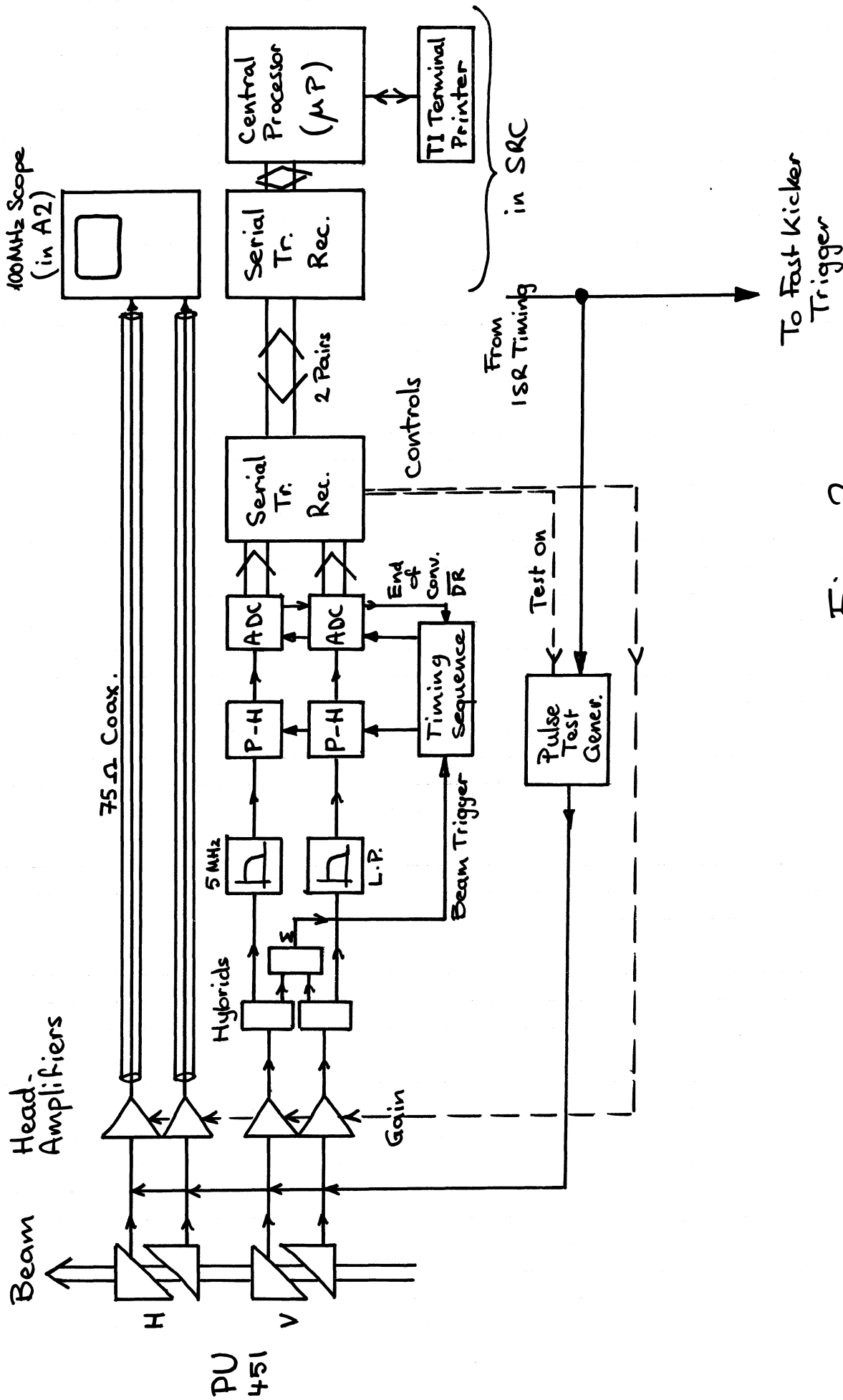
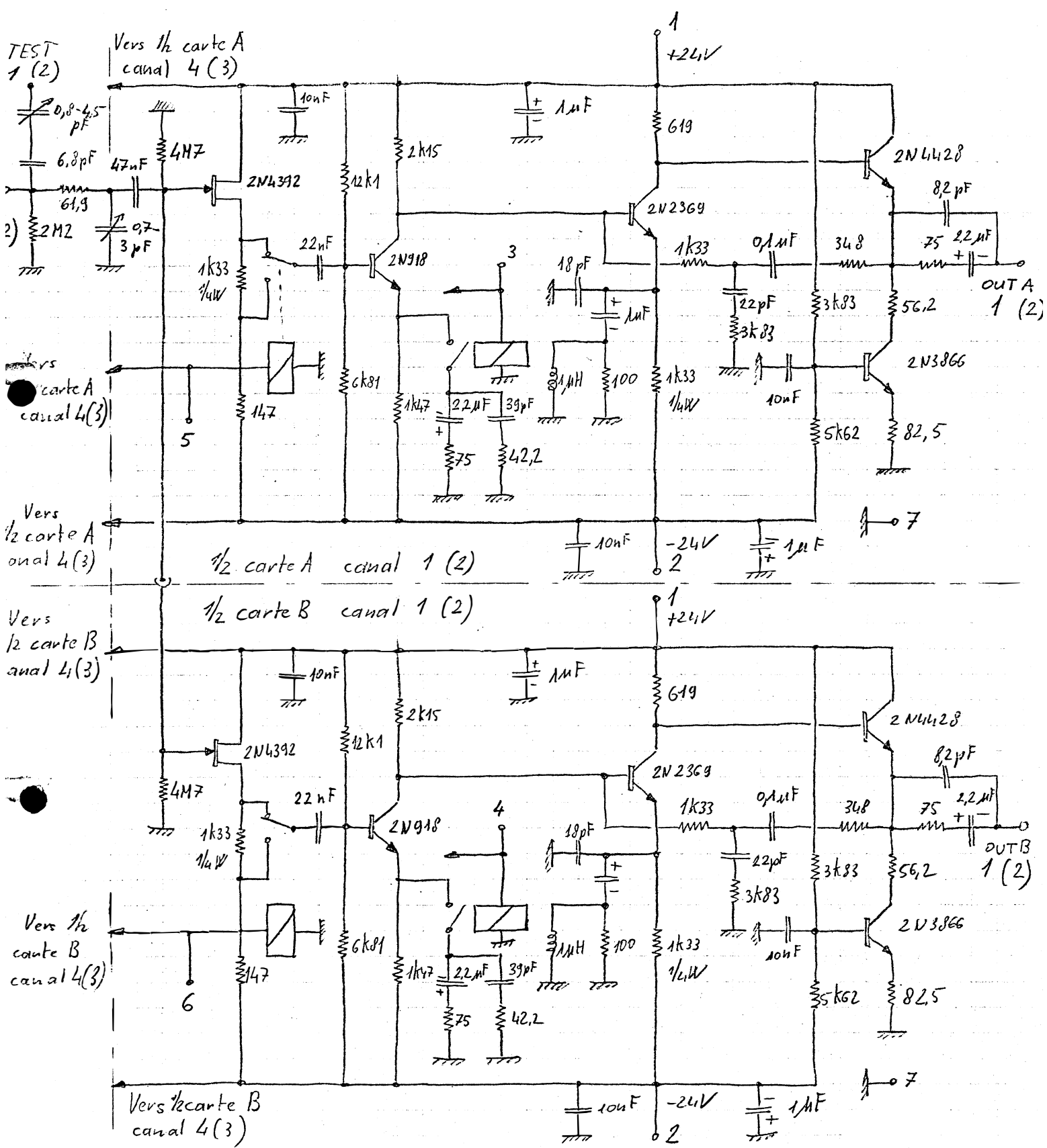


Fig. 2

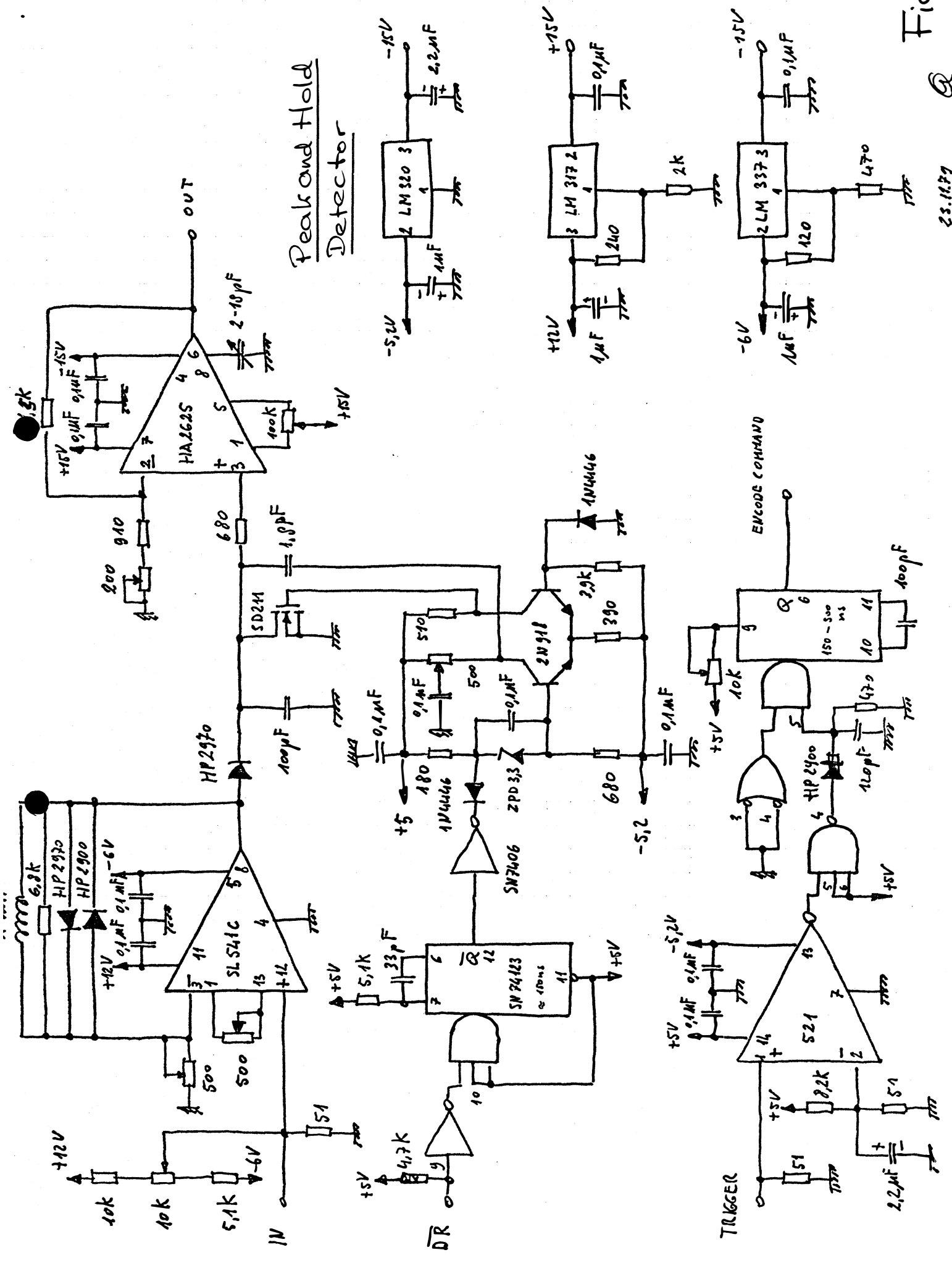


Ampli de tête HSP
canal 1 (2)

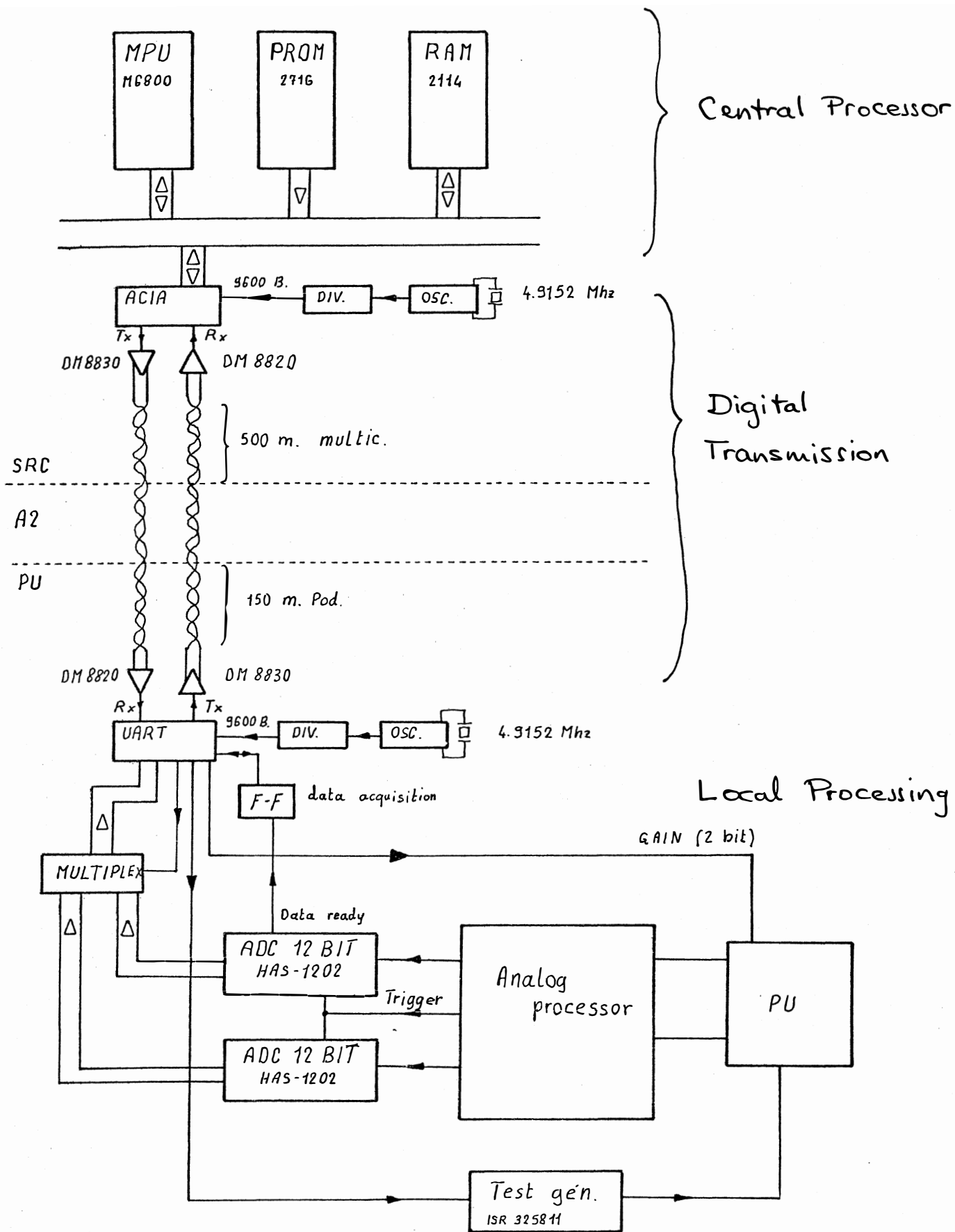
Resistances 1/10W

Fig. 3

Remarque : chaque boîtier contient 4 amplis. 2 en parallèle sur chaque entrée
13.4.73



Peak and Hold
Detector



PROCESSING CHAIN

Fig. 5

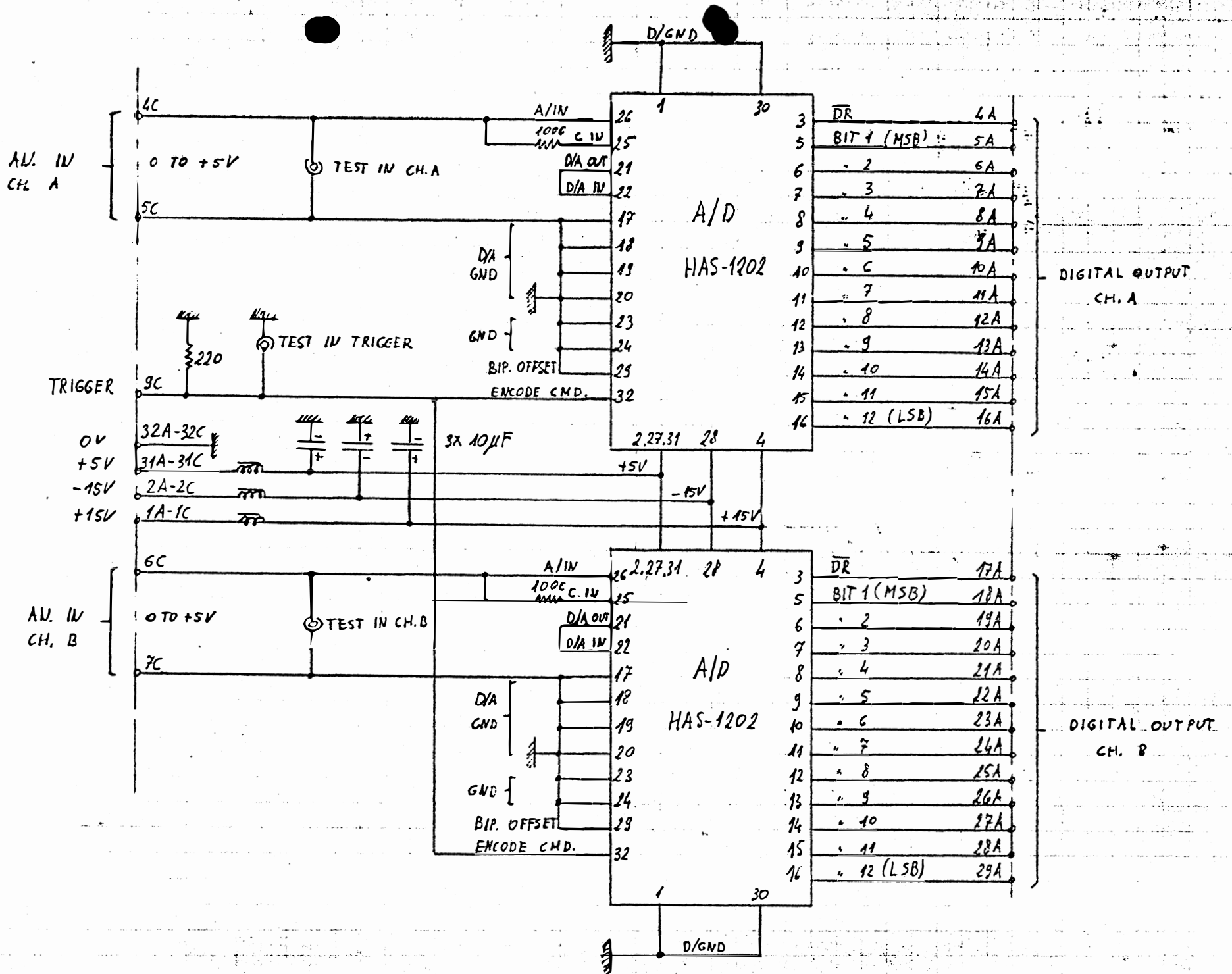


Fig. 6

30 nov. 79.

Fonction du système de mesure

Mesuré au laboratoire avec
des impulsions de 30 ns de
durée Log scale

ADC
 $V_{measured}$

4,095 V_{in} arbitraire x 5V

0,5V

0,05

0,005

↑ offset

B = 0,008
A = 0,012

Canal B Canal A

Amplitude pointe 5V V_{in}
Impulsion

Logar. Teilung / Division | 1-300 u. 1-10000 | Einheit / Unité | 62,5 mm

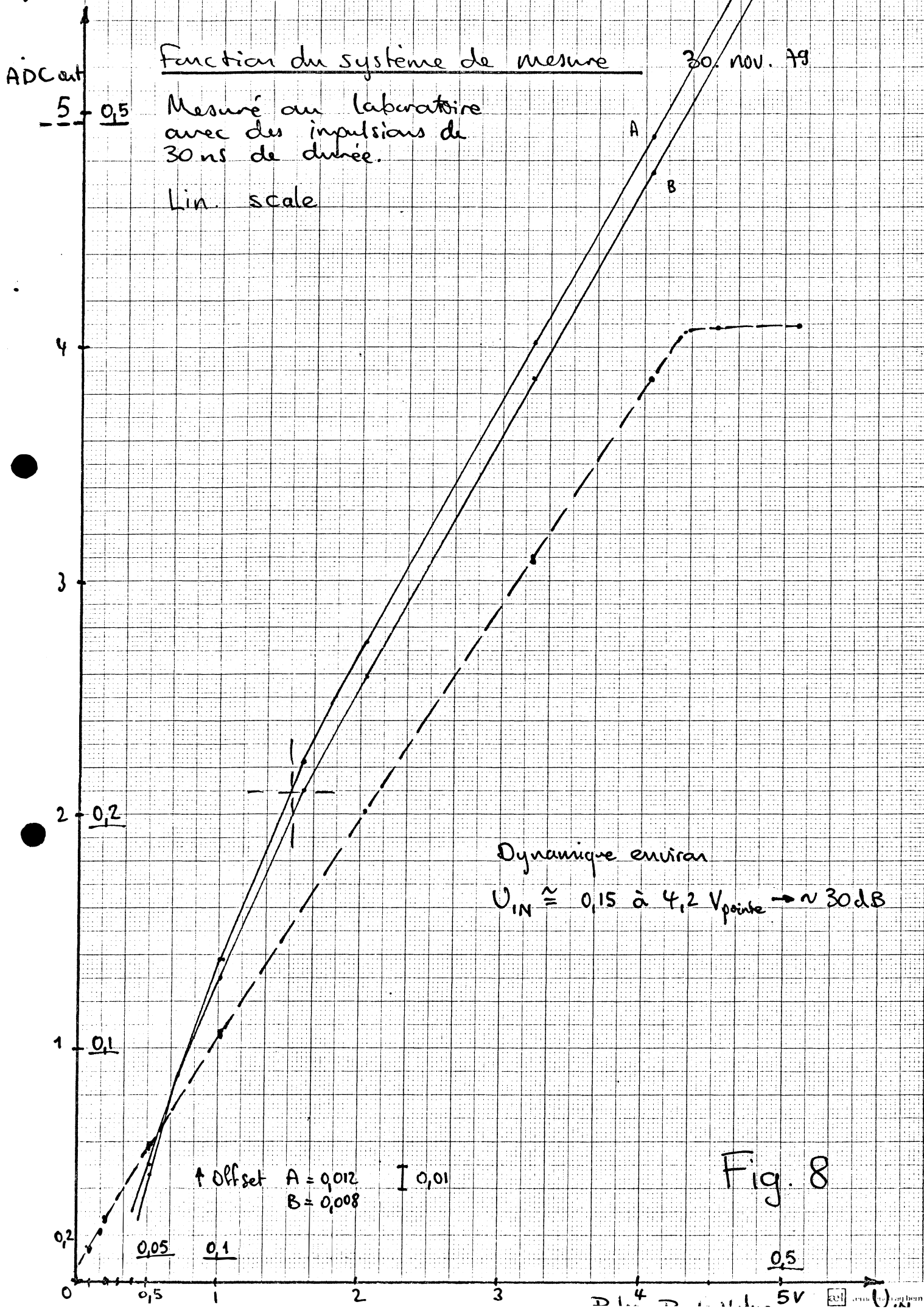
Fig. 7

Fonction du système de mesure

30. nov. 79

Mesuré au laboratoire
avec des impulsions de
30 ns de durée.

Lin. scale



READY
#RUN

FEUILLE 6106H14 GAIN \$82 SANS KICKER ET SANS INJ.
R = ((A-B) / (A+B)) * 51

A	B	R [MM]	+++++ = 1 MM
1184.000	1253.000	-1.443	+
1184.000	1252.000	-1.423	+
1184.000	1253.000	-1.443	+
1184.000	1253.000	-1.443	+
1184.000	1252.000	-1.423	+
1182.000	1253.000	-1.487	+
1184.000	1253.000	-1.443	+
1184.000	1253.000	-1.443	+
1182.000	1253.000	-1.487	+
1184.000	1252.000	-1.423	+
1184.000	1256.000	-1.504	+
1186.000	1256.000	-1.461	+
1184.000	1256.000	-1.504	+
1184.000	1256.000	-1.504	+
1184.000	1253.000	-1.443	+
1184.000	1252.000	-1.423	+
1183.000	1252.000	-1.445	+
1184.000	1253.000	-1.443	+
1183.000	1252.000	-1.445	+
1184.000	1252.000	-1.423	+
1184.000	1253.000	-1.443	+
1184.000	1252.000	-1.423	+
1184.000	1252.000	-1.423	+
1184.000	1253.000	-1.443	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1253.000	-1.465	+
1182.000	1252.000	-1.466	+
1183.000	1252.000	-1.445	+
1181.000	1252.000	-1.488	+
1182.000	1252.000	-1.466	+
1184.000	1252.000	-1.423	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1182.000	1251.000	-1.446	+
1184.000	1251.000	-1.403	+
1184.000	1252.000	-1.423	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1181.000	1252.000	-1.488	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1254.000	-1.485	+
1182.000	1253.000	-1.487	+
1181.000	1252.000	-1.488	+
1181.000	1252.000	-1.488	+

Position Measurement
with Test Generator

NOMBRE DE MESURES = 47.000
MOYENNE DES R = -1.452

Fig. 9

IDEM MAIS AVEC KICKER---
R=((A-B)/(A+B))*51

A	B	R[MM]	+++++++ =1 MM
1183.000	1252.000	-1.445	+
1181.000	1252.000	-1.488	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1253.000	-1.465	+
1183.000	1252.000	-1.445	+
1181.000	1253.000	-1.508	+
1181.000	1252.000	-1.488	+
1181.000	1252.000	-1.488	+
1181.000	1252.000	-1.488	+
1182.000	1252.000	-1.466	+
1181.000	1252.000	-1.488	+
1181.000	1252.000	-1.488	+
1181.000	1253.000	-1.508	+
1181.000	1252.000	-1.488	+
1182.000	1252.000	-1.466	+
1181.000	1252.000	-1.488	+
1181.000	1253.000	-1.487	+
1181.000	1252.000	-1.488	+
1184.000	1252.000	-1.423	+
1181.000	1253.000	-1.508	+
1182.000	1253.000	-1.487	+
1182.000	1253.000	-1.487	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1182.000	1253.000	-1.487	+
1183.000	1252.000	-1.445	+
1181.000	1253.000	-1.508	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1183.000	1252.000	-1.445	+
1182.000	1252.000	-1.466	+
1183.000	1252.000	-1.445	+
1182.000	1253.000	-1.487	+
1182.000	1253.000	-1.487	+
1182.000	1253.000	-1.487	+
1183.000	1252.000	-1.445	+

NOMBRE DE MESURES= 46.000
MOYENNE DES R = -1.466

READY
#

Position Measurement
with Test Generator
+ Fast Inj. Kicker
Triggered.

Fig. 10

MESURES FEUILLE N 6 .SANS ECRAN 1 BUNCH. 15 MA 06H00 GAIN 82
 $R = ((A-B)/(A+B)) \times 51$

A	B	R [MM]	+++++++ = .1 MM
170.000	178.000	-1.172	
142.000	150.000	-1.397	+
163.000	171.000	-1.221	+
142.000	152.000	-1.734	+
148.000	160.000	-1.987	+
164.000	173.000	-1.362	+
164.000	172.000	-1.214	+
148.000	156.000	-1.342	+
164.000	172.000	-1.214	+
170.000	178.000	-1.172	+
144.000	154.000	-1.711	+
163.000	171.000	-1.221	+
156.000	164.000	-1.275	+
148.000	156.000	-1.342	+
164.000	176.000	-1.799	+
170.000	176.000	-0.884	+
164.000	171.000	-1.065	+
146.000	155.000	-1.524	+
147.000	160.000	-2.159	+
164.000	173.000	-1.362	+
162.000	170.000	-1.228	+
164.000	172.000	-1.214	+
146.000	155.000	-1.524	+
156.000	166.000	-1.583	+
148.000	160.000	-1.987	+
164.000	171.000	-1.065	+
171.000	179.000	-1.165	+
176.000	182.000	-0.854	+
166.000	174.000	-1.199	+
157.000	168.000	-1.726	+
158.000	168.000	-1.564	+
144.000	154.000	-1.711	+
158.000	166.000	-1.259	+
162.000	170.000	-1.228	+
164.000	176.000	-1.799	+
146.000	155.000	-1.524	+
150.000	160.000	-1.645	+
154.000	164.000	-1.603	+
170.000	179.000	-1.315	+
168.000	176.000	-1.186	+
148.000	160.000	-1.987	+

Beam Position
Measurement

NOMBRE DE MESURES = 41.000
 MOYENNE DES R = -1.427

Fig. 11

MEMES CONDITIONS MAIS AVEC LS 451
 $R = ((A-B) / (A+B)) \times 51$

A	B	R[MM]	+++++	= 1 MM
164.000	176.000	-1.799		+
153.000	164.000	-1.769		+
166.000	176.000	-1.491		+
168.000	177.000	-1.330		+
158.000	169.000	-1.715		+
164.000	172.000	-1.214		+
162.000	171.000	-1.378		+
164.000	172.000	-1.214		+
146.000	155.000	-1.524		+
148.000	160.000	-1.987		+
164.000	176.000	-1.799		+
154.000	165.000	-1.758		+
162.000	171.000	-1.378		+
160.000	170.000	-1.545		+
142.000	151.000	-1.566		+
170.000	179.000	-1.315		+
141.000	150.000	-1.577		+
162.000	171.000	-1.378		+
166.000	176.000	-1.491		+
162.000	171.000	-1.378		+
169.000	178.000	-1.322		+
144.000	153.000	-1.545		+
131.000	152.000	-3.784		+
164.000	174.000	-1.508		+
147.000	155.000	-1.350		+
166.000	176.000	-1.491		+
164.000	173.000	-1.362		+
160.000	170.000	-1.545		+
165.000	176.000	-1.645		+
165.000	176.000	-1.645		+
170.000	181.000	-1.598		+
171.000	184.000	-1.867		+
159.000	171.000	-1.854		+
141.000	150.000	-1.577		+
138.000	145.000	-1.261		+
165.000	174.000	-1.353		+
162.000	170.000	-1.228		+
164.000	172.000	-1.214		+
166.000	176.000	-1.491		+
142.000	153.000	-1.901		+
NOMBRE DE MESURES = 40.000				
MOYENNE DES R = <u>-1.579</u>				

Beam Position
 Measurement
 with LS451 in the
 beam.

+
 odd point ?

READY
 #

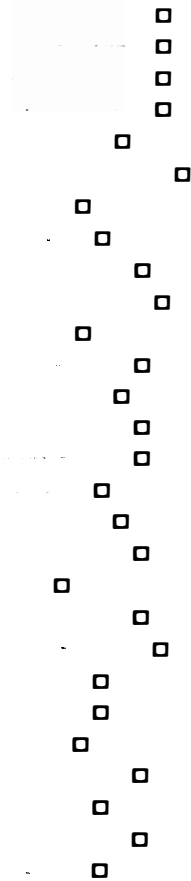
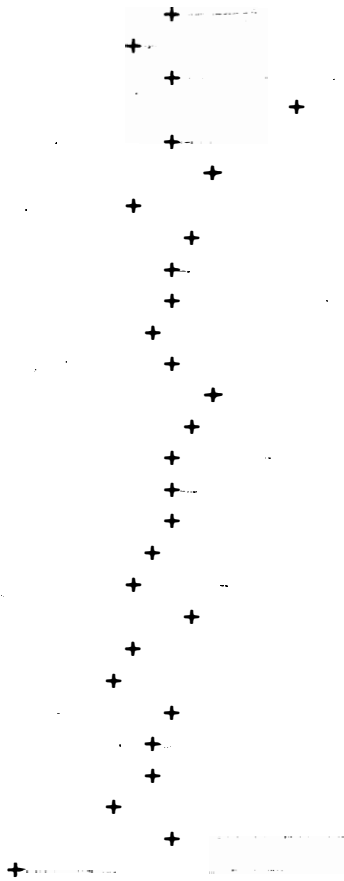
Fig. 12

Beam Position Jitter as measured with $\text{PU}(v)$ and $\beta\text{Det.}$ (p.b.p)

05H40 15 MA/1 BUNCH POS. CENTR.FEUILLE NO 5

POSITION
+++++ = 1 MM

BETA DETECT
0000000000 = 1 MM (mean : 5,4 mm)

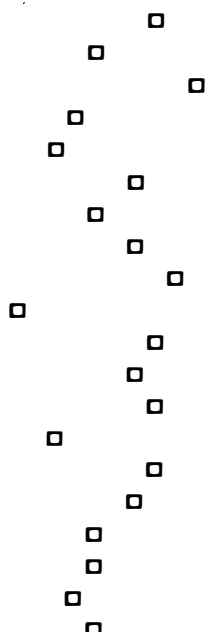
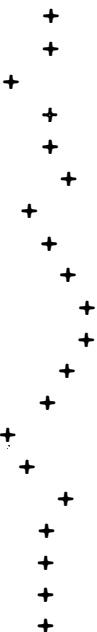


With 0,16 V
Signal level
(Minimum of dynamic range for the detector)

POSITION
+++++ = 1 MM

BETA DETECT
0000000000 = 1 MM

(mean : 2,4 mm)



With 0,8 V
Signal level

READY
#

Fig. 13

Vertical Position: Beam Steering
PU readings versus LS readings.

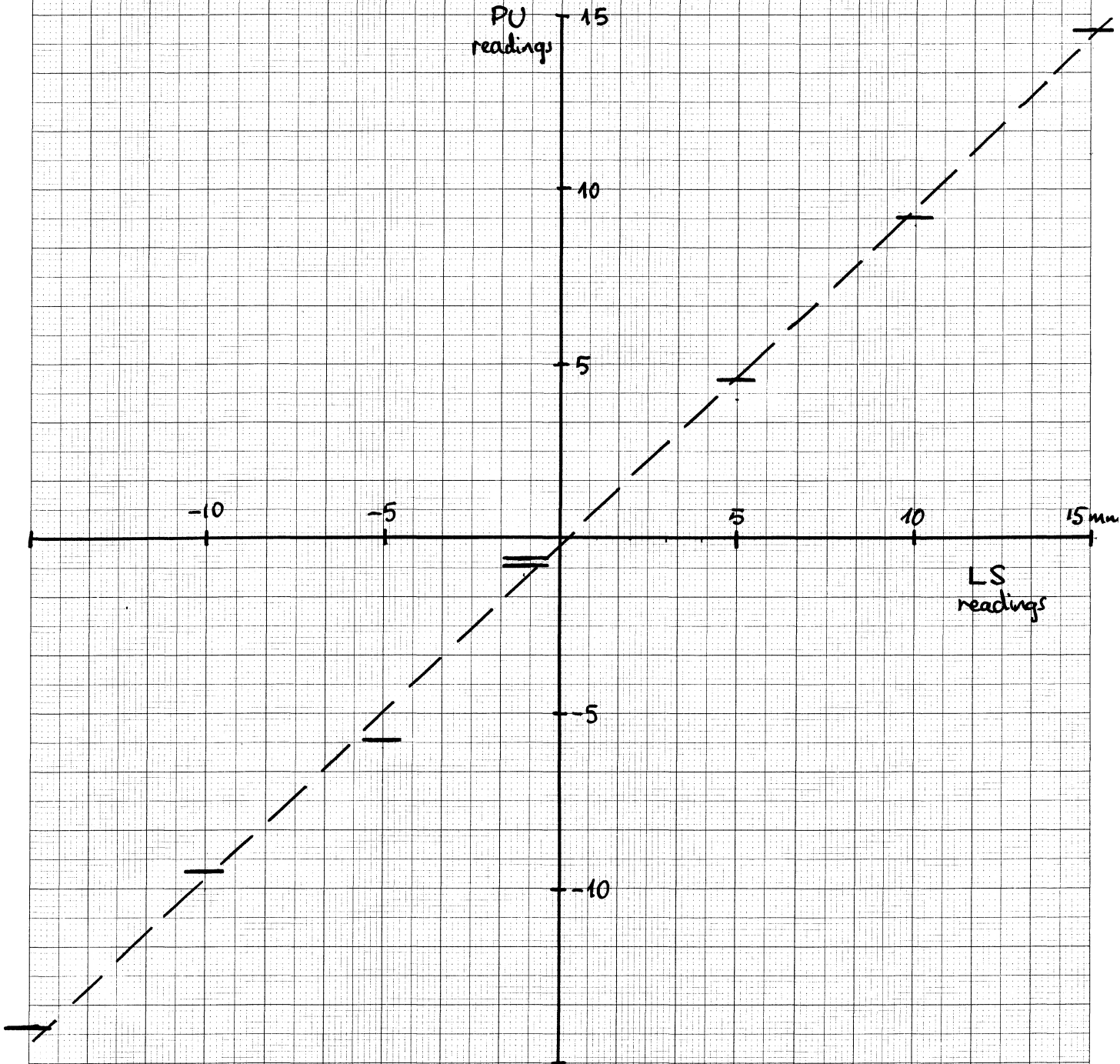


Fig. 14

commerciales sans autorisation écrite
 This drawing may not be used for commercial
 purposes without written authorisation

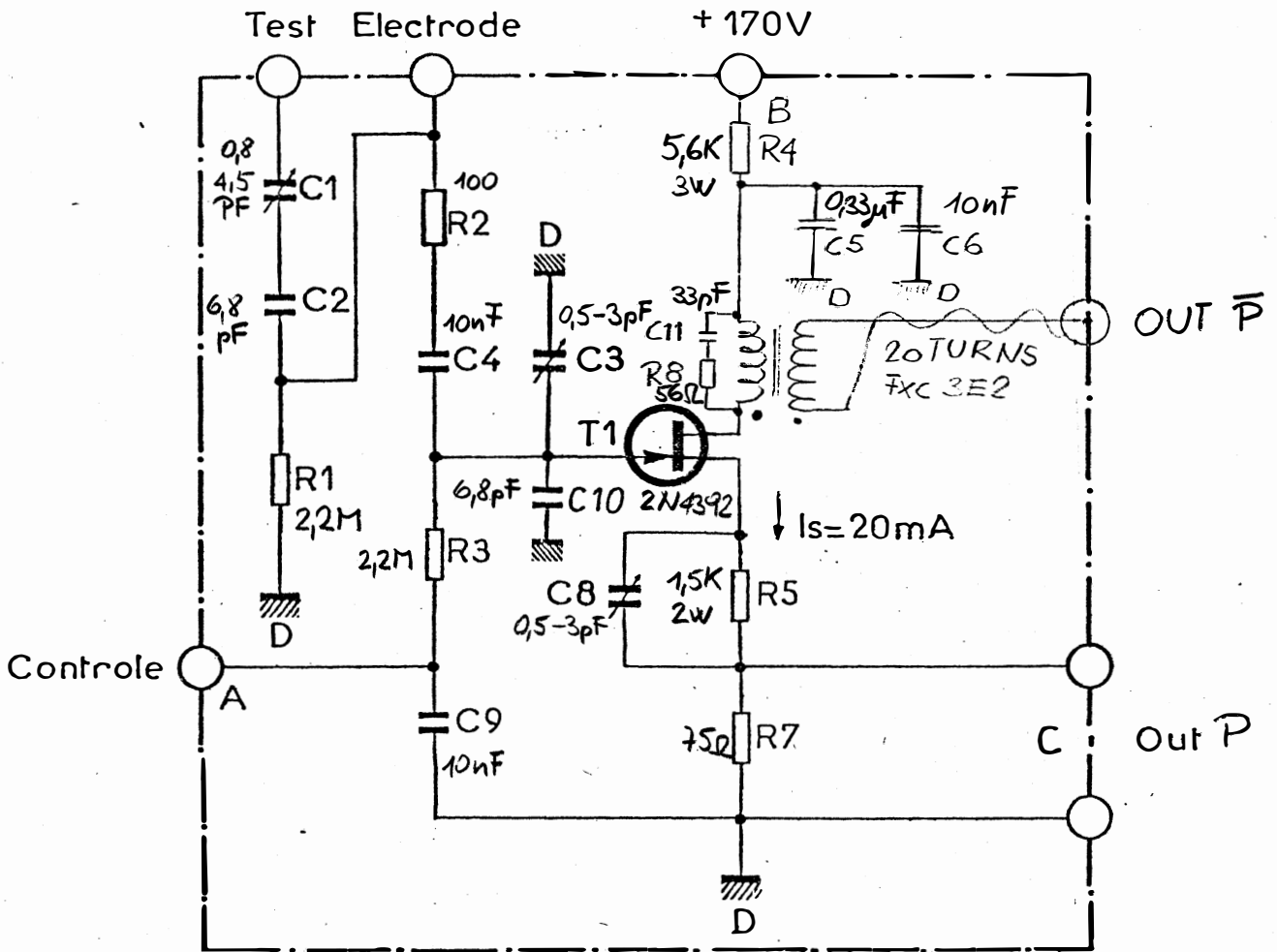
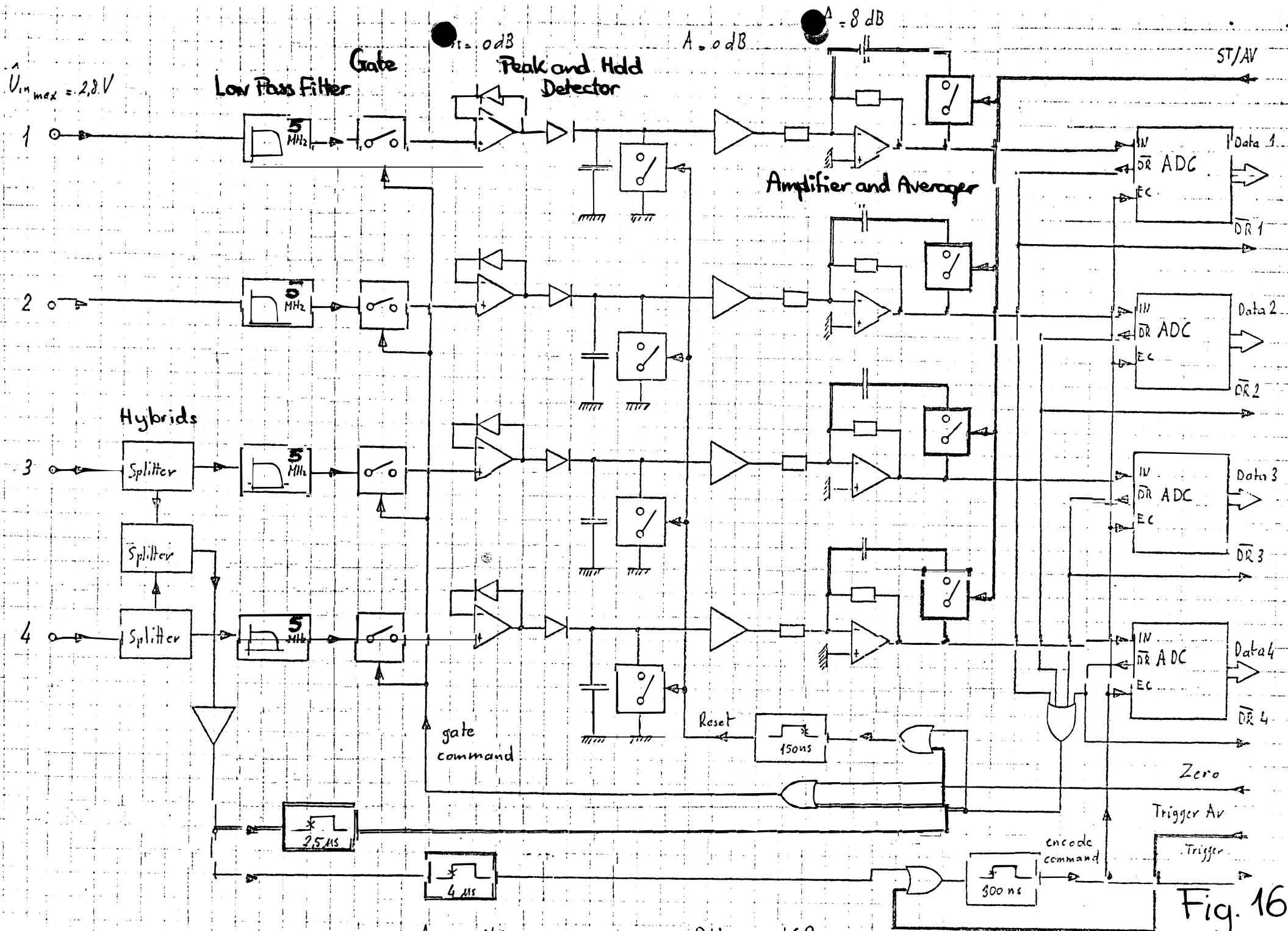


Fig. 15

N.S. CARD

Ensemble Assembly		S/ensemble S/assembly		Nom-Name		Date	Issue
HEAD AMPLIFIER				Dessiné		Erelectro	7.73
				Contrôlé		Danzeisen	24.9.73
CIRCUIT DIAGRAM				Echelle Scale			A
							B
							C
ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH CERN LAB 1 CH-1211 GENÈVE 23				C_ISR_3200/1			1

First angle projection
 Projection européenne



Acquisition des données P/N n 1CR

Fig. 16

PAGE 001 MESPRO

0010				NAM	MESPRO	
0020				DPT	D	
0025				DPT	NOG	
0030	E800			DRG	\$E800	
0031		8000	ACIA	EQU	\$8000	
0032		E108	OUTCH	EQU	\$E108	
0033		E0FA	OUTHL	EQU	\$E0FA	
0035		E130	PDATA1	EQU	\$E130	
0036		E11F	INCH	EQU	\$E11F	
0037		E0FE	OUTHR	EQU	\$E0FE	
0038		E173	OUT2H	EQU	\$E173	
0039		B000	MILLE	EQU	\$B000	STCK.TEMP
0000	E800	CE	E93C	LDX	#CONDI	
4010	E803	BD	E130	JSR	PDATA1	
4020	E806	BD	E11F	JSR	INCH	
4030	E809	81	05	CMPA	#\$5	CNTR E
4040	E80B	26	F9	BNE	CONT	
4050	E80D	CE	E952	LDX	#CRLF	
4060	E810	BD	E130	JSR	PDATA1	
0040	E813	BD	E8E9	JSR	ZERO	MESCON
0050	E816	86	21	LDAA	#\$21	RERE
0060	E818	BD	E845	JSR	COUT	
0070	E81B	86	01	LDAA	#1	
0080	E81D	BD	E845	JSR	COUT	
0090	E820	86	21	LDAA	#\$21	
0100	E822	BD	E845	JSR	COUT	
0110	E825	BD	E85B	JSR	CIN	
0120	E828	84	10	ANDA	#\$10	
0130	E82A	81	10	CMPA	#\$10	
0140	E82C	27	14	BEQ	LPUS	
0150	E82E	BD	E865	JSR	LECTA	
0160	E831	86	2D	LDAA	#'-	
0170	E833	BD	E108	JSR	OUTCH	
0180	E836	BD	E88F	JSR	LECTB	
0190	E839	CE	E952	LDX	#CRLF	
0200	E83C	BD	E130	JSR	PDATA1	
0210	E83F	7E	E813	JMP	MESCON	
0220	E842	7E	E816	JMP	RERE	LPUS

```

0510          ◆ROUTINES CONCERNANTS L'ACIA
0515          ◆TRANSM. LE CH. CONTENU EN A !UTILISE B
0520 E845 F6 8000 COUT LDAB ACIA
0530 E848 57          ASRB
0540 E849 57          ASRB
0550 E84A 24 F9          BCC COUT
0560 E84C B7 8001      STAA ACIA+1
0570 E84F 39          RTS
0580          ◆INITIALISATION DE L'ACIA
0600 E850 86 03      INIT LDAA #3          3=RESET ACIA
0610 E852 B7 8000      STAA ACIA
0620 E855 86 11          LDAA #$11          8BIT 2 STOP
0630 E857 B7 8000      STAA ACIA
0640 E85A 39          RTS
0650          ◆CIN =LECTURE ACIA
0660 E85B B6 8000      CIN LDAA ACIA
0670 E85E 47          ASRA
0680 E85F 24 FA          BCC CIN
0690 E861 B6 8001      LDAA ACIA+1
0700 E864 39          RTS
6500          ◆SOUS PROGR. LECTURE 12 BIT ADC
6510 E865 BD E850      LECTA JSR INIT
6520 E868 86 20          LDAA #$20
6530 E86A BD E845      JSR COUT
6540 E86D 86 00          LDAA #0
6550 E86F BD E845      JSR COUT
6560 E872 86 20          LDAA #$20
6570 E874 BD E845      JSR COUT
6580          ◆LECTURE 8 PREM. BIT
6590 E877 BD E85B      JSR CIN
6600 E87A B7 B000      STAA MILLE
6610          ◆DEMANDE TR. 4DER BIT
6620 E87D 86 21          LDAA #$21
6630 E87F BD E845      JSR COUT
6640 E882 86 01          LDAA #$1
6650 E884 BD E845      JSR COUT
6660 E887 86 21          LDAA #$21
6670 E889 BD E845      JSR COUT
6680          ◆LECT. 4 DER BIT
6690 E88C BD E85B      LE4 JSR CIN
6700 E88F B7 B001      STAA MILLE+1
6710          ◆IMPRESSION 4 DIGITS BCD
6712 E892 B6 B000      LDAA MILLE
6714 E895 44          LSRA
6715 E896 44          LSRA
6716 E897 44          LSRA
6717 E898 44          LSRA
6719 E899 F6 B001      LDAB MILLE+1
6721 E89C C4 0F          ANDB #$F
6730 E89E F7 B001      STAB MILLE+1
6740 E8A1 F6 B000      LDAB MILLE
6750 E8A4 C4 0F          ANDB #$0F
6751 E8A6 58          ASLB
6752 E8A7 58          ASLB

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Fig. 12

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6753 E8A8 58          ASLB
6754 E8A9 58          ASLB
6760 E8AA FB B001     ADDB MILLE+1
6770 E8AD CE B000     LDX #MILLE
6780 E8B0 BD E8FC     JSR CVBTD
6790 E8B3 86 04       LDAA #4
6800 E8B5 B7 B005     STAA MILLE+5
6810 E8B8 CE B001     LDX #MILLE+1
6820 E8BB BD E130     JSR PDATA1
6830 E8BE 39          RTS
6900 E8BF BD E850 LECTB JSR INIT
6910 E8C2 86 22       LDAA #22
6920 E8C4 BD E845     JSR COUT
6930 E8C7 86 02       LDAA #2
6935 E8C9 BD E845     JSR COUT
6940 E8CC 86 22       LDAA #22
6945 E8CE BD E845     JSR COUT
6950                *LECTURE 8 1ER BIT
6955 E8D1 BD E85B     JSR CIN
6960 E8D4 B7 B000     STAA MILLE
6965                *DEMANDE TR. 8 DERN BIT
6970 E8D7 86 23       LDAA #23
6975 E8D9 BD E845     JSR COUT
6980 E8DC 86 03       LDAA #3
6985 E8DE BD E845     JSR COUT
6990 E8E1 86 23       LDAA #23
6995 E8E3 BD E845     JSR COUT
6996 E8E6 7E E88C     JMP LE4          LECTURE 4 DER+PRINT
7000                *MISE A ZERO F-F CONV.
7010 E8E9 BD E850 ZERD JSR INIT
7020 E8EC 86 41       LDAA #41
7030 E8EE BD E845     JSR COUT
7040 E8F1 86 40       LDAA #40
7050 E8F3 BD E845     JSR COUT
7060 E8F6 86 41       LDAA #41
7070 E8F8 BD E845     JSR COUT
7080 E8FB 39          RTS
0010                *CONVERSION BIN-BCD -----
0011                *A= MSB DU NOMBRE A CONV
0012                *B= LSB
0013                *X=POINTEUR DE L'ADD. OU LES 5 CH. DECIMAUX EN
0030                B080   SAVEA EQU $B080
0040                B081   SAVEX EQU $B081   2BYTE
0050                B083   SAVEX1 EQU $B083   2 BYTE
0060 E8FC FF B081 CVBTD STX SAVEX
0070 E8FF CE E932     LDX #K10K
0080 E902 7F B080 CVDEC1 CLR SAVEA
0090 E905 E0 01     CVDEC2 SUBB 1,X
0100 E907 A2 00     SBCA 0,X
0110 E909 25 05     BCS CVDEC5
0120 E90B 7C B080     INC SAVEA
0130 E90E 20 F5     BRA CVDEC2
0140 E910 EB 01     CVDEC5 ADDB 1,X
0150 E912 A9 00     ADCA 0,X

```

Fig 17

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0160 E914 36          PSHA
0170 E915 FF B083    STX  SAVEX1
0180 E918 FE B081    LDX  SAVEX
0190 E91B B6 B080    LDAA SAVEX
0200 E91E 8B 30      ADDA #$30      CONV. A EN ASCII
0210 E920 A7 00      STAA 0,X
0220 E922 32          PULA
0230 E923 08          INX
0240 E924 FF B081    STX  SAVEX
0250 E927 FE B083    LDX  SAVEX1
0260 E92A 08          INX
0270 E92B 08          INX
0280 E92C 8C E93C    CPX  #K10K+10
0290 E92F 26 D1      BNE  CVDEC1
0300 E931 39          RTS
0310                *CONSTANTES DE CONVERSID
0320 E932 2710      K10K FDB 10000
0321 E934 03E8      FDB 1000
0322 E936 0064      FDB 100
0323 E938 000A      FDB 10
0324 E93A 0001      FDB 1
9000 E93C 0D        CONDI FCB $D,0,0,0,0,0,0,$A,$A
9005 E945 43        FCC  'CONDITIONS ?'
9010 E951 04        FCB  4
9020 E952 0A        CRLF FCB $A,$D,4
9999                END

```

TOTAL ERRORS 00000

APPENDIX 2:

Position Calculation and Plotting
Program

```

0002 READ CS:PRINTTAB(5):CS
0003 N=0:M1=0
0005 PRINT TAB(5);"R=((A-B)/(A+B))*51"
0006 PRINT : PRINT "      A      B      R[MM]      ++++++ = 1 MM"
0010 READ A,B
0015 IF A>8000 THEN 200
0020 R=((A-B)/(A+B))*51
0025 N=N+1
0030 M1=M1+R
0031 R1=INT(ABS(R*10))
0035 PRINT TAB(5);
0040 PRINT A;B;R;
0041 IF POS<R1+25 THEN PRINT " ";
0042 IF POS <> R1+25 THEN 41
0045 PRINT "+"
0050 GOTO 10
0200 PRINT TAB(5);"NOMBRE DE MESURES = ";N
0205 PRINT TAB(5);
0210 PRINT "MOYENNE DES R = ";M1/N
0215 PRINT :PRINT:PRINT
0220 IF A=9999 THEN 1
5000 DATA MESURES FEUILLE N 6 .SANS ECRAN 1 BUNCH. 15 MA 06H00 GAIN $82
5010 DATA 170,178,142,150,163,171,142,152,148,160,164,173
5020 DATA 164,172,148,156,164,172,170,178,144,154,163,171
5025 DATA 156,164,148,156,164,176,170,176,164,171,146,155
5030 DATA 147,160,164,173,162,170,164,172,146,155,156,166
5040 DATA 148,160,164,171,171,179,176,182,166,174,157,168
5050 DATA 158,168,144,154,158,166,162,170,164,176,146,155
5060 DATA 150,160,154,164,170,179,168,176,148,160,9999
5061 DATA 9999
5100 DATA MEMES CONDITIONS MAIS AVEC LS 451
5110 DATA 164,176,153,164,166,176,168,177,158,169,164,172
5120 DATA 162,171,164,172,146,155,148,160,164,176,154,165,162,171,160,170,142,
5130 DATA 170,179,141,150,162,171,166,176,162,171,169,178
5140 DATA 144,153,131,152,164,174,147,155,166,176,164,173
5150 DATA 160,170,165,176,165,176,170,181,171,184,159,171
5160 DATA 141,150,138,145,165,174,162,170,164,172,166,176
5170 DATA 142,153,8888,8888

```

APPENDIX 3:

Position and β detector plotting program.

```

0001 REM PROGRAMME "GRAS"
0010 READ C$,D$:PRINTC$,D$
0015 PRINT "      POSITION              BETA DETECT      "
0016 PRINT "  ++++++++=1 MM          0000000000=1 MM"
0017 PRINT
0020 READ A,B,B1
0025 IF A=9999 THEN200
0030 R=((A-B)/(A+B))*51
0040 R=INT(ABS(R*10))
0050 PRINT TAB(R);"+";
0060 P1=INT(B1*10)
0070 P1=P1-20
0080 IF POS<P1 THEN PRINT " ";
0090 IF POS >P1 THEN 80
0100 PRINT CHR$(111)
0110 GOTO 20
0200 END
5000 DATA 05H40 15 MA/1 BUNCH  POS.  CENTR.
5001 DATA FEUILLE NO 5
5010 REM LES DATA SONT A,B,BETA DETECT.
5020 DATA 164,173,5.72,169,177,5.73,160,169,5.7
5025 DATA 148,160,5.77,168,177,5.58,141,150,5.82
5030 DATA 170,178,5.33,166,176,5.46,162,171,5.61
5040 DATA 164,173,5.71,164,172,5.33,148,156,5.68
5050 DATA 172,183,5.53,172,182,5.62,160,169,5.61
5060 DATA 172,181,5.41,168,177,5.54,144,151,5.66
5070 DATA 170,178,5.29,156,165,5.64,146,153,5.77
5080 DATA 171,178,5.47,168,177,5.48,162,170,5.37
5090 DATA 162,170,5.62,170,177,5.48,145,153,5.65,176,180,5.42
5100 DATA 9999,0,0

```