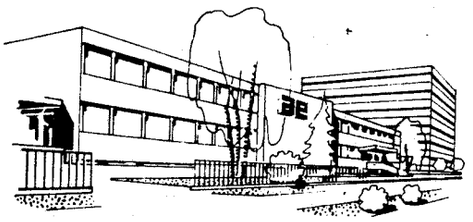
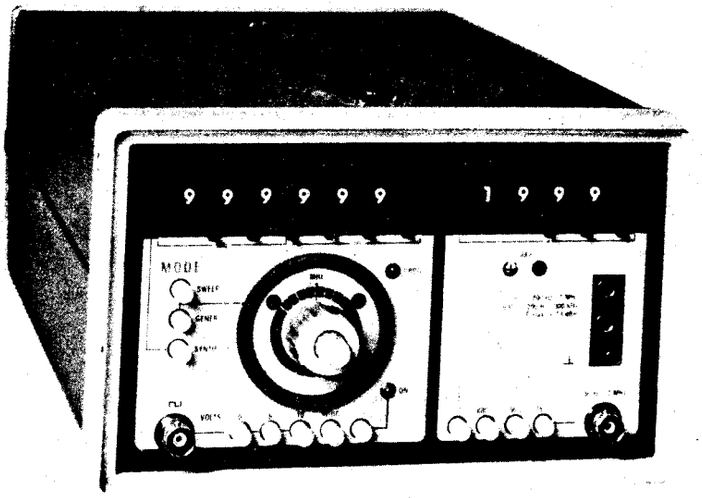
ADRET ELECTRONIQUE®





LEVEL GENERATOR
FREQUENCY SYNTHESIZER
50Hz_1MHz

2230A

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CHAPTER I

FUNCTIONAL DESCRIPTION

I FUNCTIONAL DESCRIPTION

The model 2230A is a programmable frequency and level generator which covers the 50 Hz to 1 MHz range with 1 Hz resolution.

The output frequency can be controlled according to four operating modes : digital setting by six lever/indicator switches, remote programming in parallel BCD code or through the IEEE bus, analogical setting by two verniers with graduated scale, frequency sweep by external signal.

Four output signals are simultaneously available :

- A main output with pushbutton selectable impedance : 75 Ω coaxial, 150 Ω balanced, 600 Ω balanced, or low-impedance balanced (key 0 Ω).
- An auxiliary output with Z < 1 Ω impedance.
- A square-wave output with 5 V or 10 V amplitude.
- A tracking output delivering a signal with 4 MHz offset with respect to the dialled or programmed frequency.

The output level of the main signal ranges from + 19.99 dBm to - 69.99 dBm for the 75 Ω impedance, and from + 13 dBm to - 69.99 dBm for the impedances with balanced output. The level setting is directly displayed in dBm into the selected impedance (75 Ω, 150 Ω or 600 Ω). Besides, an Inhibition key permits to suppress the output signal without switching off the instrument.

The frequency and level remote programming is achieved either in parallel BCD code (option 010), or through the IEEE bus (option 020). Besides, the output level regulation may be performed with two distinct time constants, which allows to reduce the level settling time to less than 10 ms for frequencies above 10 kHz.

CHAPTER II

SPECIFICATIONS

II SPECIFICATIONS

FREQUENCY

Main output :

- 75 Ω impedance : 50 Hz* to 1 MHz
- 150 Ω impedance : 200 Hz to 1 MHz
- 600 Ω impedance : 200 Hz to 300 kHz
- 0 Ω/150 Ω impedance : 200 Hz to 1 MHz
- 0 Ω/600 Ω impedance : 200 Hz to 300 kHz

Tracking output with 4 MHz offset : 4 MHz to 5 MHz

Square wave output : 50 Hz* to 1 MHz

Auxiliary output : 50 Hz* to 1 MHz

Resolution : 1 Hz

Selection : 6 lever/indicator switches

Stability : $\pm$ 3.10^{-6}/24 h, from / 10°C to + 40°C.

* *This instrument can be used down to 10 Hz on the 75 Ω, square-wave and auxiliary outputs with some restrictions in the specifications.*

EXTERNAL REFERENCE

Substitution of the external reference for the built-in Master Oscillator.

Frequency : 5 MHz

Level : 220 mVrms to 1 Vrms/50 Ω

REFERENCE OUTPUT

Frequency : 1 MHz

Level : approximately 500 mVrms/50 Ω

FREQUENCY CONTINUOUS ADJUSTMENT

Frequency range : as for digital setting.

Frequency adjustment : by two verniers with graduated scale and by switches controlling the 1 Hz, 10 Hz and 100 Hz increments.

Dial accuracy : $\pm$ 5 % of full scale.

In this operating mode, the output frequency can be compared to the digital setting of the switches controlling the 1 kHz, 10 kHz and 100 kHz increments, thanks to a frequency comparator with LED display.

FREQUENCY SWEEP

Frequency range : same as for digital setting.

Sweep : By ± 5 V external signal.

- Input impedance : 100 kΩ
- Sensitivity : 10 mVpeak for 1 kHz deviation
- Linearity : ± 10 %
- Bandwidth :

  DC to 500 Hz for ± 5 kHz deviation
  DC to 50 Hz for ± 50 kHz deviation
  DC to 5 Hz for ± 500 kHz deviation

In this operating mode, the center frequency around which the sweep is performed depends on the two verniers with graduated scale, as also on the switches controlling the 1 Hz, 10 Hz and 100 Hz increments.

Besides, the output frequency can be compared to the digital setting of the switches controlling the 1 kHz, 10 kHz and 100 kHz increments, thanks to a frequency comparator with LED display.

OUTPUT LEVEL

Several signals are simultaneously available :

- The main signal, delivered on the front panel with 0 Ω, 75 Ω, 150 Ω or 600 Ω impedance selected by pushbutton.
- A square-wave output, delivered on the front panel.
- A tracking signal with 4 MHz frequency offset, delivered on the rear panel.
- An auxiliary signal with very low output impedance, delivered on the rear panel.

Main output :

The main output is available with five pushbutton selectable impedances : 75 Ω coaxial, 150 Ω balanced, 600 Ω balanced, 0 Ω/150 Ω balanced (Z < 5 Ω) and 0 Ω/600 Ω balanced (Z < 20 Ω).

Level display : in dBm by four lever/indicator switches, with sign display by light-emitting diodes.

Resolution : 0.01 dB

Dynamic range : 89.98 dB for 75 Ω impedance and 82.99 dB for other impedances.

Output level :

- 75 Ω impedance : + 19.99 dBm to - 69.99 dBm/75 Ω
- 150 Ω impedance : + 13 dBm to - 69.99 dBm/150 Ω
- 600 Ω impedance : + 13 dBm to - 69.99 dBm/600 Ω
- 0 Ω/150 Ω impedance :

Electromotive force equal to that of 150 Ω impedance, that is 3.46 Vrms (+ 13 dBm setting) to 245 µVrms (- 69.99 dBm setting).

Maximum output current : 30 mA rms

- 0 Ω/600 Ω impedance :

Electromotive force equal to that of 600 Ω impedance, that is 6.92 Vrms (+ 13 dBm setting) to 490 µVrms (- 69.99 dBm setting).

Maximum output current : 15 mA rms

Accuracy at 0 dBm for a 10 kHz frequency : ± 0.2 dB

Output level flatness :

- 75 Ω impedance : + 0.05 dB from 50 Hz to 1 MHz
- 150 Ω and 0 Ω/150 Ω impedances : ± 0.05 dB from 200 Hz to 200 kHz
  ± 0.1 dB from 200 kHz to 620 kHz
  ± 0.2 dB from 620 kHz to 1 MHz
- 600 Ω and 0 Ω/600 Ω impedances : ± 0.05 dB from 200 Hz to 110 kHz
  ± 0.3 dB from 110 kHz to 300 kHz

Reflection loss :

- 75 Ω impedance : + 0 dBm to + 20 dBm : - 35 dB from 50 Hz to 1 MHz
  - 0 dBm to - 69.99 dBm : - 45 dB from 50 Hz to 1 MHz
- 150 Ω impedance : - 35 dB from 200 Hz to 200 kHz
  - 30 dB from 200 kHz to 1 MHz
- 600 Ω impedance : - 35 dB from 200 Hz to 110 kHz
  - 30 dB from 110 kHz to 300 kHz

Signal unbalance :

- 150 Ω impedance : - 50 dB from 200 Hz to 620 kHz
- 600 Ω impedance : - 50 dB from 200 Hz to 110 kHz

Attenuator accuracy :

- 0.01 dB steps : ± 0.005 dB per step, ± 0.01 dB maximum error
- 0.1 dB steps : ± 0.01 dB per step, ± 0.02 dB maximum error
- 1 dB steps : ± 0.03 dB per step, ± 0.05 dB maximum error
- 10 dB steps : ± 0.1 dB per step, ± 0.2 dB maximum error from 0 dBm to - 60 dBm.

Tracking output :

Level : + 6 dBm/75 Ω ± 2 dB

Square-wave output :

- Amplitude : 0 V, 5 V or 10 V typical
- Rise time : < 300 ns
- Fall time : < 100 ns

Auxiliary output :

- Impedance : Z < 1 Ω from 50 Hz to 500 kHz
  Z < 1.5 Ω from 500 kHz to 1 MHz
- Level : + 19.99 dBm/75 Ω to 0 dBm/75 Ω, depending on main output level.
- Output current : 50 mA rms maximum

Protection against short-circuits.

- Maximum capacitive loading : 4.7 nF from 50 Hz to 500 kHz
  1 nF from 500 kHz to 1 MHz
- Output level flatness : ± 0.5 dB from 50 Hz to 200 Hz
  ± 0.3 dB from 200 Hz to 1 MHz

SPECTRAL PURITY

Harmonic signals :

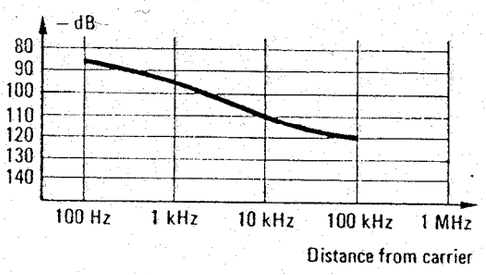
Main output (+ 10 dBm output level) :

- 75 Ω impedance : - 45 dB from 50 Hz to 300 Hz
  - 55 dB from 300 Hz to 1 MHz
- 150 Ω and 0 Ω/150 Ω impedances : - 50 dB from 200 Hz to 1 MHz
- 600 Ω and 0 Ω/600 Ω impedances : - 50 dB from 200 Hz to 300 kHz

Auxiliary output (+ 10 dBm/75 Ω output level) : - 40 dB from 50 Hz to 300 Hz
- 50 dB from 300 Hz to 1 MHz

Nonharmonic signals : - 60 dB for all outputs

Phase-noise in a 1 Hz band :



REMOTE PROGRAMMING

Remote programming of the instrument is achieved either in parallel BCD code (option 010) or through the IEEE bus (option 020).

Parallel BCD programming (option 010) :

- TTL compatible positive logic. "0" logic level : 0 V to + 0.8 V
  "1" logic level : + 2 V to + 5 V
- Parallel BCD code.

IEEE bus programming (option 020) :
Compatible with IEEE standard 488-1975.

SH0 : the instrument never emits data.

AH1 : the instrument accepts data.

T0-TE0 : the instrument is not a Talker.

L1-LE0 : the instrument is a basic Listener which recognizes its own address, does not get disaddressed on reception of the corresponding Talker address, and may be permanently addressed.

SR0 : the instrument has no Service Request capability.

PP0 : the instrument does not respond to Parallel Poll.

RL1 : the Remote mode is controlled through the IEEE bus.

DC1 : the instrument has complete Device Clear capability.

DT1 : the instrument has complete Device Trigger capability.

Frequency programming :

- Resolution : 1 Hz
- Settling time : 10^3 Hz to 10^5 Hz steps : 7 ms
  10^0 Hz to 10^2 Hz steps : 10 ms.

Level programming :

- Resolution : 0.01 dB
- Settling time : 10 dB steps between - 0 dBm and - 60 dBm : 10 ms

Switching between + 0 dBm and + 10 dBm, 1 dB, 0.1 dB and 0.01 dB steps :
5 ms with ALC time constant F > 10 kHz, 800 ms with ALC time constant F < 10 kHz.

Functional mode programming :

- Local/Prog.
- Output level inhibition
- ALC time constant

POWER REQUIREMENTS

Voltage : 115 V or 230 V (± 10 %)
Frequency : 50 Hz to 400 Hz
Consumption : 20 VA

Dimensions :
Height : 140 mm
Width : 200 mm
Overall depth : 352 mm
Adaptable to 19" rack (3 U)

Temperature range :
Operation : 0°C to + 50°C
Storage : - 20°C to + 70°C

Weight : 6 kg

III PRINCIPLE OF OPERATION

III-1 INTRODUCTION

The operation of ADRET synthesizers is based on the indirect frequency synthesis, making use of phase-locked loops composed of a voltage-controlled oscillator, a programmable counter and a phase comparator, as shown in figure III-1.

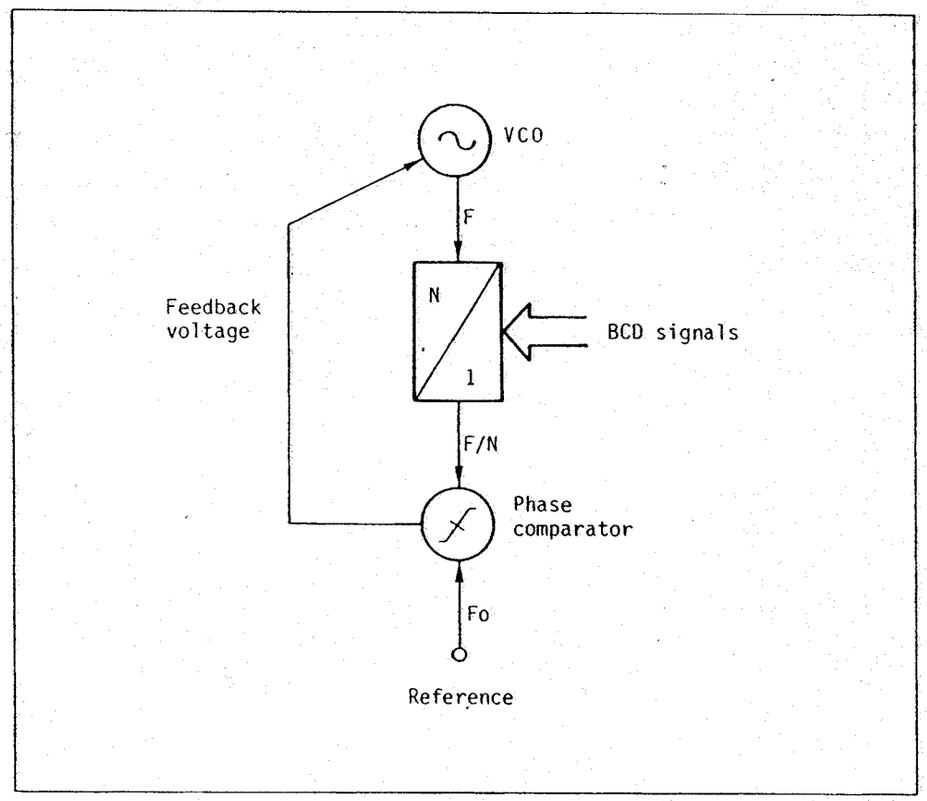


Figure III-1 PHASE-LOCKED LOOP PRINCIPLE

The F frequency delivered by the oscillator is applied to the programmable counter, the N division rate of which is controlled by BCD programming signals. The F/N frequency provided by the programmable counter is then compared to an F_o reference frequency in the phase comparator, which gives a phase-locking voltage allowing to maintain the F frequency of the oscillator equal to N times the F_o reference.

Such a phase-locked loop can thus generate ten different frequencies multiple of F_o when the N division rate of the programmable counter has ten different values.

III-2 PRINCIPLE OF THE 2230A SYNTHESIZER

The general principle of the 2230A synthesizer is represented in plate III-1.

The elaboration of the synthesizer output frequency is achieved through two phase-locked loops : the first loop generates the 10^0 Hz, 10^1 Hz and 10^2 Hz increments of the output frequency, while the second loop generates the 10^3 Hz, 10^4 Hz and 10^5 Hz increments. In the Generator and Sweeper modes, the phase-locking voltage which controls the oscillator of the second loop is replaced by a DC voltage issued from verniers (P1), upon which an external voltage applied to connector (J7) may be superimposed in Sweeper mode.

The mixing of the frequencies elaborated by the two phase-locked loops provides a signal ranging from 4 MHz to 5 MHz in 1 Hz steps, that constitutes the tracking output with 4 MHz offset available on connector (J4). This signal is then heterodyned down in the output mixer with a 4 MHz frequency, which provides a 10 Hz to 1 MHz signal. After amplification, this signal is fed to the shaper delivering the square wave available on connector (J3), to the amplifier of the Z < 1 Ω auxiliary output, and to an attenuator followed with an impedance transformer providing various impedances (75 Ω coaxial, 0 Ω balanced, 150 Ω balanced or 600 Ω balanced) to the main output.

The level of the main output is adjustable from - 69.99 dBm to + 19.99 dBm with 0.01 dB resolution through a digital-to-analog converter which acts upon the ALC loop and varies the level of the 4 MHz signal in 0.01 dB, 0.1 dB and 1 dB steps, whereas the output attenuator provides up to 70 dB attenuation in 10 dB steps.

CHAPTER IV

OPERATING INSTRUCTIONS

IV OPERATING INSTRUCTIONS

IV-1 CONTROLS DESCRIPTION

The various controls and connections on the front and rear panels of the 2230A synthesizer are described in the two following plates :

Plate IV-1 : Front-panel description.
Plate IV-2 : Rear-panel description.

IV-2 INSTALLATION

Connection to mains is achieved on socket (SO2) through a standard cord supplied with the instrument. Before applying power, check that mains voltage selector (K8) is on the position corresponding to the mains voltage, remembering that the 115 V and 230 V values admit ± 10 % variation.

The instrument is protected against short-circuits by fuse (F1) of 150 mA nominal value for a 230 V mains voltage, or 300 mA for a 115 V mains voltage.

Switching on the instrument is achieved by pressing key (K1), which lights up indicator (DS1).

IV-3 OUTPUT FREQUENCY

In Local mode, the output frequency can be controlled in three different ways selected by keyboard (K3) : Synthesizer mode, Generator mode, Sweeper mode.

IV-3-1 SYNTHESIZER MODE

In this operating mode, selected by pressing the "SYNTH." key of keyboard (K3), the output frequency is digitally set through lever/indicator switches (K2).

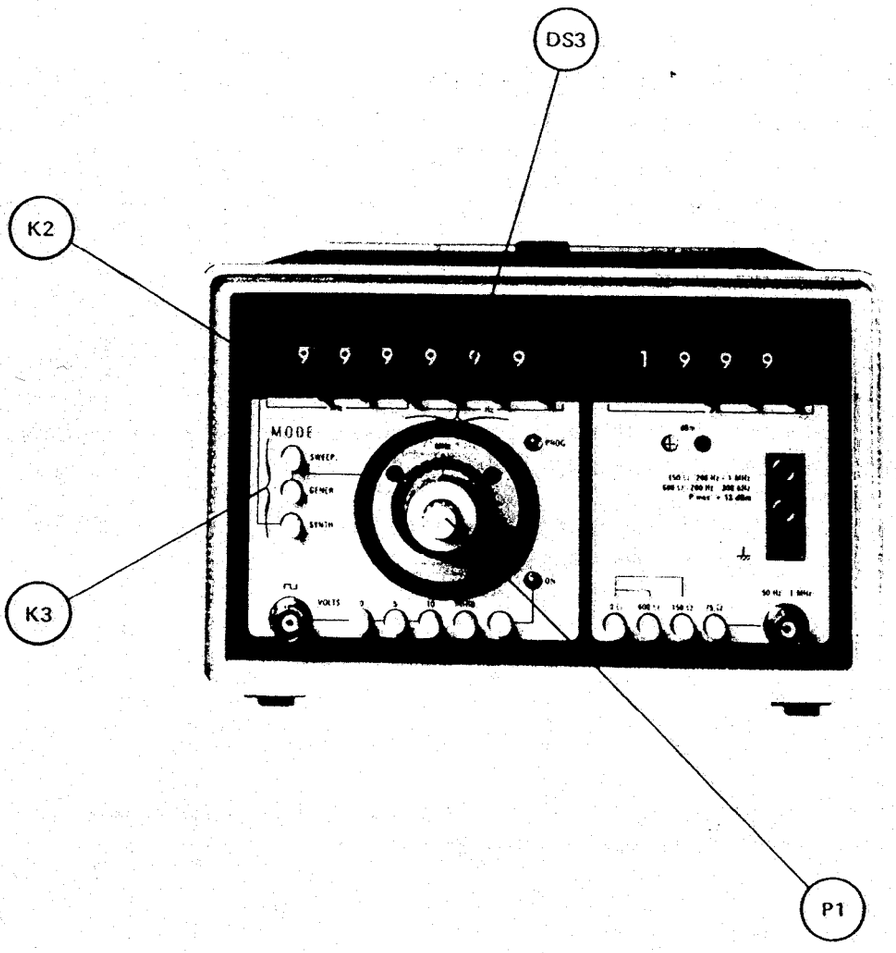
IV-3-2 GENERATOR MODE

This operating mode is obtained by pressing the "GENER." key of keyboard (K3).

The output frequency is determined both by the two verniers (P1) and by the (K2) switches controlling the 1 Hz, 10 Hz and 100 Hz frequency steps, whereas the three other (K2) switches are inhibited.

Two light-emitting diodes (DS3) allow to compare the output frequency to the digital display of switches (K2), this comparison being performed with the three switches controlling the 1 kHz, 10 kHz and 100 kHz frequency steps.

When the output frequency is superior to the digital display of switches (K2), the right-hand LED lights up and the left-hand LED goes out. On the contrary, the left-hand LED lights up and the right-hand LED goes out if the output frequency is inferior to the digital display. When the output frequency is approximately equal to the digital display of switches (K2), a very slow blinking of one LED is observed.



- Press the **GENER.** key of keyboard K3.
- Adjust the output frequency through verniers P1.
- For accurate determination of the output frequency, operate the three K2 switches controlling the 1 kHz, 10 kHz and 100 kHz steps so that one of indicator lights DS3 slowly blinks.
- If necessary, modify the output frequency with the three K2 switches controlling the 1 Hz, 10 Hz and 100 Hz steps.

Figure IV-1 GENERATOR MODE

IV-3-3 SWEEPER MODE

This operating mode, selected by pressing the "SWEEP." key of keyboard (K3), differs from the Generator mode only in the possibility to sweep the output signal around the frequency selected by verniers (P1) and by the (K2) switches controlling the 1 Hz, 10 Hz and 100 Hz frequency steps.

The frequency sweep is achieved by applying an external voltage to connector (J7) whose input sensitivity is 100 kHz per volt. As shown in figure IV-2, the entire frequency range can be swept by a 10 Vp-p signal with a DC offset depending on the setting of verniers (P1).

For instance, if verniers (P1) are set to 0.2 MHz, sweeping the entire frequency range is achieved by applying a signal with 10 Vp-p amplitude centered on + 3 V.

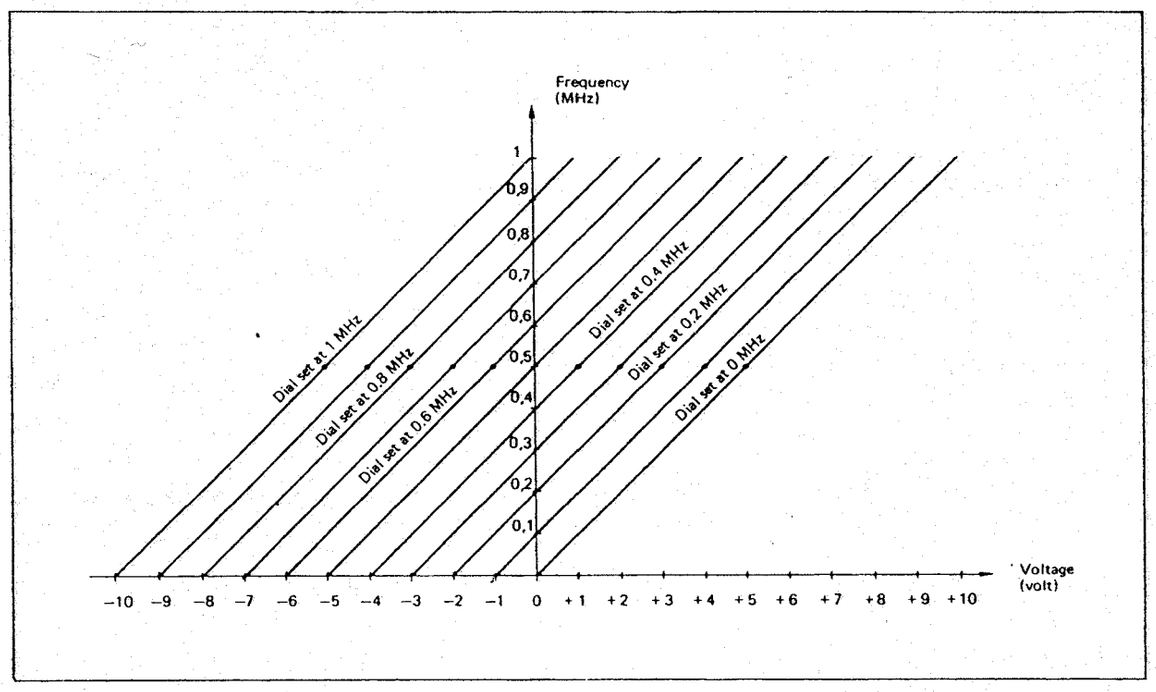


Figure IV-2 OUTPUT FREQUENCY SWEEP

As in the Generator mode, the (DS3) light-emitting diodes allow to compare the output frequency to the digital display of switches (K2), this comparison being performed with the three switches controlling the 1 kHz, 10 kHz and 100 kHz frequency steps.

IV-4 MAIN OUTPUT

Depending on the impedance selected on keyboard (K5), the main output signal is delivered either on coaxial connector (J1) or on balanced connector (J2).

IV-4-1 75 Ω IMPEDANCE

This impedance is selected by pressing the "75 Ω" key of keyboard (K5). The output signal is available on coaxial connector (J1) and the output level is digitally set in dBm/75 Ω through switches (K4), with sign display provided by indicator lights (DS4).

The usable frequency range goes from 10 Hz to 1 MHz, while the output level ranges from + 19.99 dBm (2.735 Vrms/75 Ω) to - 69.99 dBm (86.7 µVrms/75 Ω) with 0.01 dB resolution.

IV-4-2 150 Ω IMPEDANCE

This impedance is selected by pressing the "150 Ω" key of keyboard (K5). The output signal is available on balanced connector (J2) and the output level is digitally set in dBm/150 Ω through switches (K4), with sign display provided by indicator lights (DS4).

The usable frequency range goes from 200 Hz to 1 MHz, while the output level ranges from + 13 dBm (1.730 Vrms/150 Ω) to - 69.99 dBm (122.6 µVrms/150 Ω) with 0.01 dB resolution.

IV-4-3 600 Ω IMPEDANCE

This impedance is selected by pressing the "600 Ω " key of keyboard (K5). The output signal is available on balanced connector (J2) and the output level is digitally set in dBm/600 Ω through switches (K4)., with sign display provided by indicator lights (DS4).

The usable frequency range goes from 200 Hz to 300 kHz, while the output level ranges from + 13 dBm (3.460 Vrms/600 Ω) to - 69.99 dBm (245.2 µVrms/600 Ω) with 0.01 dB resolution.

IV-4-4 0 Ω/150 Ω IMPEDANCE

When both the "0 Ω" and "150 Ω" keys are pressed, connector (J2) delivers a signal with less than 5 Ω output impedance. The electromotive force of this signal is equal to that of the signal with 150 Ω output impedance, that is twice the level displayed in dBm/150 Ω by switches (K4) and indicator lights (DS4).

The usable frequency range goes from 200 Hz to 1 MHz, while the electromotive force ranges from 3.46 Vrms (+ 13 dBm/150 Ω display) to 245 µVrms (- 69.99 dBm/150 Ω display) in 0.01 dB steps.

IV-4-5 0 Ω/600 Ω IMPEDANCE

When both the "0Ω" and "600 Ω" keys are pressed, connector (J2) delivers a signal with less than 20 Ω output impedance. The electromotive force of this signal is equal to that of the signal with 600 Ω output impedance, that is twice the level displayed in dBm/600 Ω by switches (K4) and indicator lights (DS4).

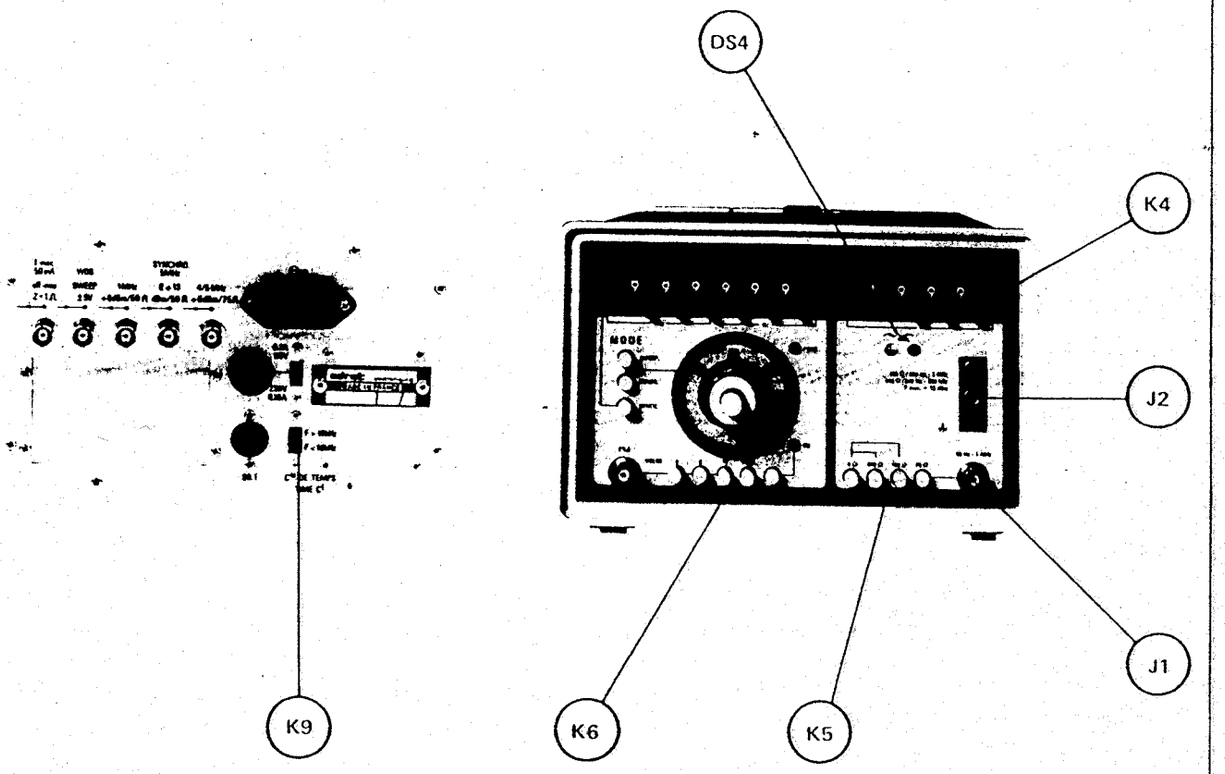
The usable frequency range goes from 200 Hz to 300 kHz, while the electromotive force ranges from 6.92 Vrms (+ 13 dBm/600 Ω display) to 490 µVrms (- 69.99 dBm/600 Ω display) in 0.01 dB steps.

IV-5 SQUARE-WAVE OUTPUT

Coaxial connector (J3) delivers a square wave with the same frequency as the main output signal and with 0 V, 5 V or 10 V amplitude selected on keyboard (K7). The "low" level of this square wave is 0V, which makes it compatible with TTL and C-MOS logical circuits.

IV-6 TRACKING OUTPUT

Coaxial connector (J4) permanently delivers a sinusoidal signal with + 6 dBm/75 Ω output level and 4 MHz frequency offset from the main output signal.



- Select the output impedance through keyboard **K5**. The output signal is delivered on connector **J1** for the 75 Ω impedance and on connector **J2** for the other impedances.
- In Local mode, set switch **K9** to **F < 10 kHz.**
- Adjust the output level through switches **K4**, the sign display being provided by indicator lights **DS4.**
- For suppressing the output signal without switching off the instrument, press key **K6.**

Figure IV-3 MAIN OUTPUT

IV-7 Z < 1 Ω AUXILIARY OUTPUT

A sinusoidal signal with less than 1 Ω output impedance and with the same frequency as the main output signal is available on coaxial connector (J8).

When the level setting of switches (K4) ranges from + 0 dBm to + 19.99 dBm, the electromotive force of this signal is equal to the level of the main output signal expressed in dBm/75 Ω.

When the level setting of switches (K4) ranges from - 0 dBm to - 69.99 dBm, the electromotive force varies from + 10 dBm/75 Ω to + 0.01 dBm/75 Ω according to the table below.

Setting of switches K4	- 0,00	- 9,99	- 10,00	- 19,99	- 20,00	- 29,99	- 30,00	- 39,99	- 40,00	- 49,99	- 50,00	- 59,99	- 60,00	- 69,99
Electromotive force in dBm/75 Ω	+ 10 ↘ + 0,01		+ 10 ↘ + 0,01		+ 10 ↘ + 0,01		+ 10 ↘ + 0,01		+ 10 ↘ + 0,01		+ 10 ↘ + 0,01		+ 10 ↘ + 0,01	

IV-8 ALC TIME CONSTANT

In order to optimize the output level settling time, this instrument is endowed with two ALC time constants selected through rear-panel switch (K9). The longer time constant provides level regulation over the entire frequency range (F < 10 kHz setting), whereas the other is reserved for frequencies higher than 10 kHz (F > 10 kHz setting).

In Local mode, it is well-advised to always set switch (K9) to the F < 10 kHz setting, which allows operation with any output frequency.

IV-9 OUTPUT LEVEL INHIBITION

Pressing front-panel key (K6) permits to suppress the main output signal, the Z < 1 auxiliary output signal and the square-wave signal without switching off the instrument.

IV-10 REFERENCE FREQUENCY

The 1 MHz reference frequency derived from the internal crystal oscillator is permanently available on connector (J6) with approximately 500 mVrms/50 Ω output level.

This internal crystal oscillator can be synchronized to a 5 MHz external reference signal applied to connector (J5) with 220 mVrms to 1 Vrms/50 Ω input level. In that case, the frequency delivered by the various outputs of the synthesizer has the stability of the reference frequency applied to connector (J5).

IV-11 SUPPLY VOLTAGES OUTPUT

Socket (S01), whose pin assignment is indicated in figure IV-4, provides + 12 V, + 6 V and - 12 V regulated voltages destined to external circuits.

Maximum current for each voltage : 100 mA.

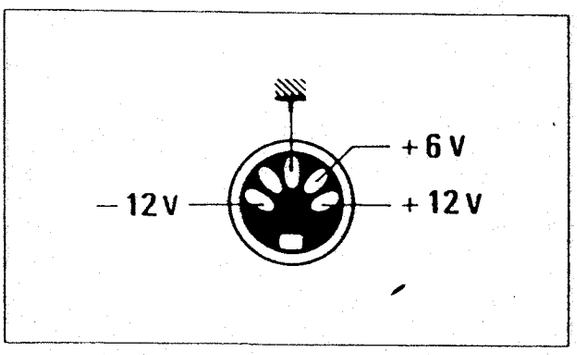


Figure IV-4 SOCKET (S01)

IV-12 PARALLEL BCD PROGRAMMING (OPTION 010)

Selection of the remote programming mode is achieved by applying a "0" logic level to pin 17 of connector (S03), which lights up indicator (DS2). All manual controls are then inhibited, save on/off switch (K1), impedance selection keyboard (K5), square-wave selection keyboard (K7), and mains voltage selector (K8).

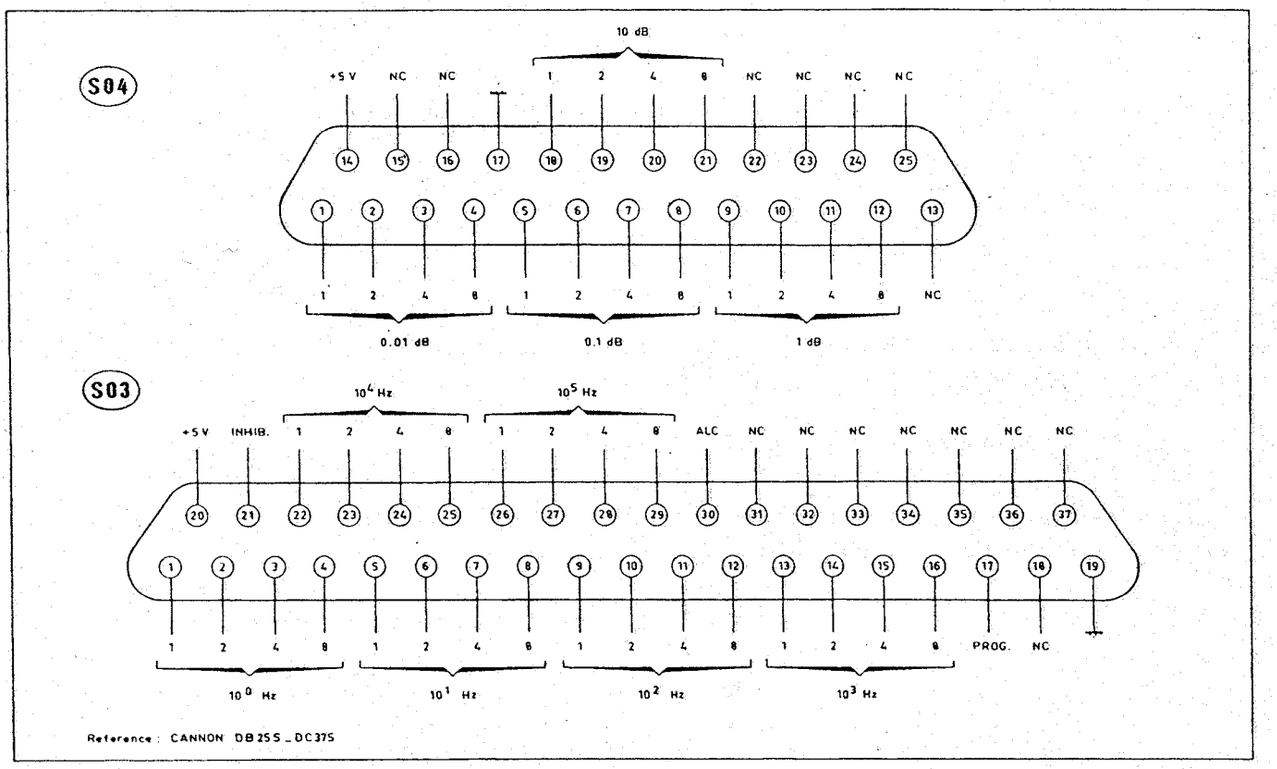


Figure IV-5 PARALLEL BCD PROGRAMMING CONNECTORS

The synthesized frequency programming is achieved in positive logic through TTL compatible signals applied to connector (S03) whose pin assignment is indicated in figure IV-5.

The output level is determined by programming the attenuation with respect to + 20 dBm. This attenuation programming is achieved in positive logic through TTL compatible signals applied to connector (S04). For instance, programming 9.32 dB provides + 10.68 dBm output level to the main signal.

The output level inhibition is obtained by applying a "0" logic level to pin 21 of connector (S03).

The ALC time constant programming is performed on pin 30 of connector (S03), a "0" logic level corresponding to F < 10 kHz and a "1" logic level corresponding to F > 10 kHz. The F < 10 kHz time constant may be selected with any output frequency, whereas the F > 10 kHz time constant is destined to the fast level switching of frequencies above 10 kHz.

Pin 20 of connector (S03) and pin 14 of connector (S04) continuously provide a + 5 V regulated voltage which can facilitate programming and be used as a pilot of the instrument operation (50 mA maximum current).

The input circuit of the programming signals consists of a 40097 buffer preceded with a 1N 4448 diode as shown in figure IV-6.

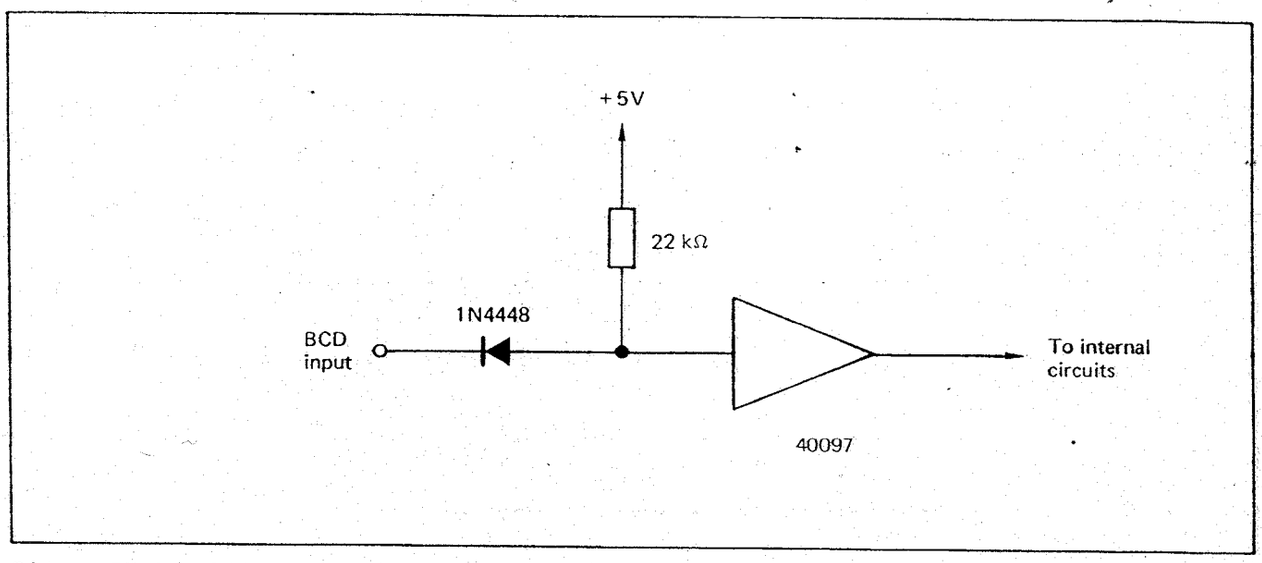


Figure IV-6 PROGRAMMING SIGNALS INPUT CIRCUIT

IV-13 IEEE BUS PROGRAMMING (OPTION 020)

The synthesizer programming through the IEEE bus is achieved in accordance with IEEE standard 488-1975 on connector (S05) whose pin assignment is indicated in figure IV-7.

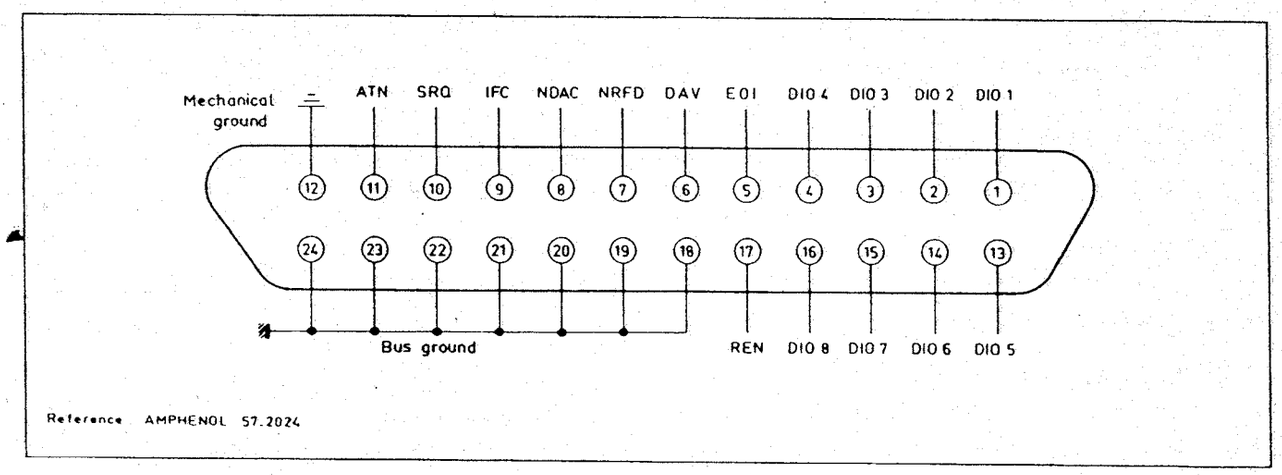


Figure IV-7 IEEE BUS CONNECTOR

IV-13-1 ADDRESSING

The instrument address is selected in binary code among numbers 0 to 30 through five digital switches (K10). This address is enabled by setting digital switch (K11) to "Addressable".

When switch (K11) is set to "Listen only", the instrument operates in continuous addressing.

Immediately after being addressed, the instrument goes to remote programming mode, which lights up indicator (DS2). The return to Local mode requires either reception of the GTL order (Go To Local), presence of a "1" logic level on line REN, or presence of a "0" logic level on line IFC.

In remote programming mode, all manual controls are inhibited, save on/off switch (K1), impedance selection keyboard (K5), square-wave selection keyboard (K7), and mains voltage selector (K8).

IV-13-2 FREQUENCY PROGRAMMING

The synthesized frequency programming is achieved by sending letter F followed with a whole number representing the frequency in Hz. If the transmitted number comprises a point, a comma, or more generally any character other than a figure, the figures sent after this character are ignored. This particularly prohibits the use of the floating point format.

Several characters may be inserted between letter F and the number representing the synthesized frequency. These characters are ignored by the instrument, provided that they are neither letter A, order CR (Carriage Return), or one of signs < and > .

IV-13-3 ALC TIME CONSTANT PROGRAMMING

Changing the ALC time constant is achieved by inserting sign < or > between letter F and the number representing the synthesized frequency, the < sign corresponding to F < 10 kHz and the > sign corresponding to F > 10 kHz. Without sign < or > inserted between letter F and the number representing the synthesized frequency, the ALC time constant remains unchanged.

The F < 10 kHz time constant may be selected with any output frequency, whereas the F > 10 kHz time constant is destined to the fast level switching of frequencies above 10 kHz.

IV-13-4 OUTPUT LEVEL PROGRAMMING

The output level is determined by programming the attenuation with respect to + 20 dBm. This attenuation programming is achieved by sending letter A followed with a whole number representing the attenuation in mB (0.01 dB). If the transmitted number comprises a point, a comma, or more generally any character other than a figure, the figures sent after this character are ignored by the instrument.

Several characters may be inserted between letter A and the number representing the output level attenuation. These characters are ignored by the instrument, provided that they are neither letter F, order CR (Carriage Return), or question mark ? .

IV-13-5 INHIBITION PROGRAMMING

The output level inhibition is programmed by sending letter A followed with question mark ? . This inhibition ends as soon as another attenuation is programmed.

IV-13-6 DATA ENABLE

The data received by the synthesizer are taken into account only after reception of order CR (Carriage Return), often sent automatically by the calculator at the end of the message, or order GET (Group Executive Trigger) that permits to simultaneously enable the data received by several instruments.

Inversely, orders A and F may be cancelled by sending either order DCL (Device Clear) or order SDC (Selective Device Clear).

IV-13-7 PROGRAMMING EXAMPLES

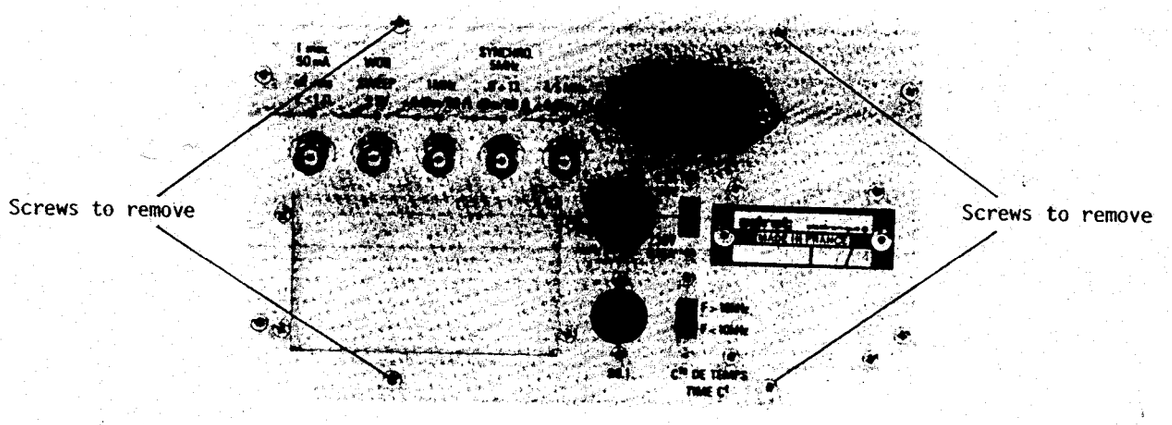
In the following examples, it is assumed that the instrument has been addressed and that the message ends by order CR (Carriage Return).

F < 1 9 7 8 A 0	Frequency 1978 Hz. Time constant F < 10 kHz. Level + 20 dBm.
F 2 0 0 0	Frequency 2000 Hz. Time constant unchanged. Level unchanged.
F R E Q U 5 2 5	Frequency 525 Hz (letters REQU and space are ignored). Time constant unchanged. Level unchanged.
F 1 5 0 0 . 3 5 F 1 5 0 0 , 3 5 F 1 5 0 0 3 5	Frequency 1500 Hz (the figures placed after the point, comma or space are ignored). Time constant unchanged. Level unchanged.
F > 5 9 2 8 1 A ?	Frequency 59281 Hz. Time constant F > 10 kHz. Level inhibition.
A 9 5 1	Frequency unchanged. Time constant unchanged. Level + 10.49 dBm (9.51 dB attenuation).
A T T E N . 9 5 1	Frequency unchanged. Time constant unchanged. Level + 10.49 dBm (letters TTEN and point are ignored).
A 9 5 1 . 2 5 A 9 5 1 , 2 5 A 9 5 1 2 5	Frequency unchanged. Time constant unchanged. Level + 10.49 dBm (the figures placed after the point, comma or space are ignored).
F < 5 0 0 0 A T T E N 9 5 1	Frequency 5000 Hz. Time constant F < 10 kHz. Level 10.49 dBm (letters TTEN are ignored).
F A 1 0 0 0	Frequency 1000 Hz. Time constant unchanged. Level + 10 dBm (10.00 dB attenuation).

IV-14 ADAPTATION TO 19" RACK

The synthesizer 2230 A can be incorporated in a 19" rack with the help of a cabinet reference 01 22309001 for the incorporation of one instrument, or reference 01 22309002 for the incorporation of two instruments. The procedure for inserting the 2230 A in either of these cabinets is as follows.

- Remove the four rear-panel screws holding the top and bottom covers.



- Pull out these two covers.
- Take off the top-cover handle (four screws to remove).
- Take off the four foots of the bottom cover.
- Set the covers back in their place without fixing them.
- Insert the 2230 A in the cabinet and screw back the four rear-panel screws.

APPENDIX

CHART OF ASCII CHARACTERS

BITS				b_7 b_6 b_5	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b_4	b_3	b_2	b_1	Row \ Column	0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE		0	@	P	`	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT	ESC	+	;	K	[	k	{
1	1	0	0	12	FF	FS	,	<	L	\	l	:
1	1	0	1	13	CR	GS	-	=	M	]	m	}
1	1	1	0	14	SO	RS	.	>	N	^	n	~
1	1	1	1	15	SI	US	/	?	O	—	o	DEL

IEEE BUS PROGRAMMING WITH CALCULATOR HP 9825A

```
0: "2230A programming with calculatcr HP9825":
1: "the instrument address is assumed to be 0":
2:
3: fmt 2f.0
4: ent "Frequency in Hertz",F
5: if F<10 or F>=1e6;dsp "Frequency out of range";gto "stop"
6: ent "Level in dBm",A
7: if A>20 or A<=-70;dsp "Level out of range";gto "stop"
8: if F<1e4;wrt 700,"F<",F,"A",2000-100*A;gto 4
9: wrt 700,"F>",F,"A",2000-100*A;gto 4
10: "stop":wrt 700,"A?";wait 1000;gto 4
11: end
```

CHAPTER V

CIRCUIT DESCRIPTION

V-1 INTRODUCTION

In all the schematics and figures of the present manual, the various circuits making up the instrument are designated by the following abbreviations :

A	Amplifier, buffer or shaper
CP	Phase comparator
D	Frequency divider
DP	Programmable frequency divider
DT	Level detector
FL	Filter
M	Mixer
O	Oscillator

V-2 GENERATION 10^0 Hz - 10^1 Hz - 10^2 Hz

Refer to block diagram in plate V-1 and figure V-1, and schematic in plate V-2.

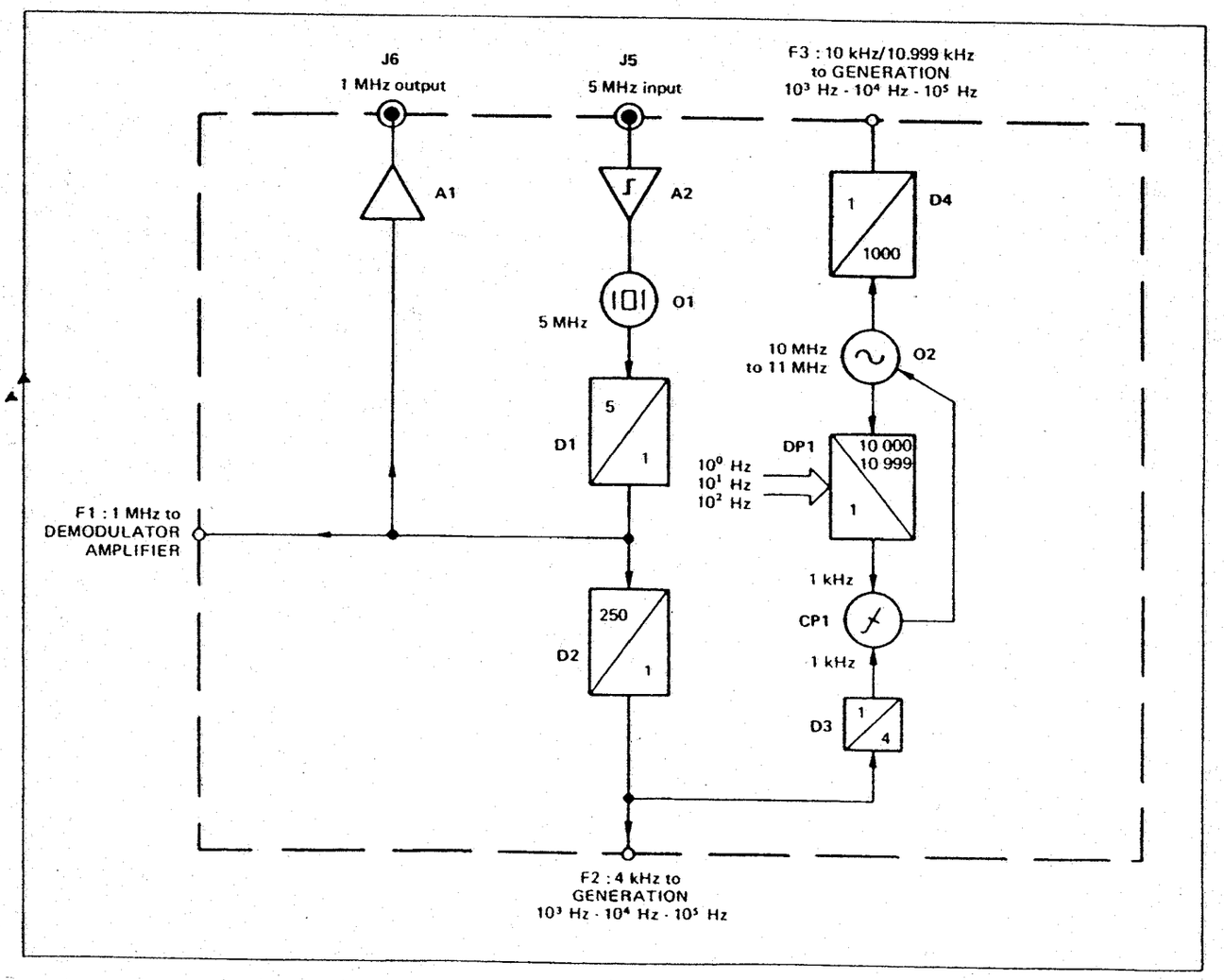


Figure V-1 GENERATION 10^0 Hz - 10^1 Hz - 10^2 Hz

This subassembly includes a phase-locked loop generating the 10^0 Hz, 10^1 Hz and 10^2 Hz increments of the output frequency, and the synthesizer time base.

The time base comprises crystal oscillator O2 which may be synchronized on an external 5 MHz frequency reference with 0 dBm to + 13 dBm/50 Ω input level thanks to shaper A2. The 5 MHz output frequency of oscillator O1 is divided by 5 in divider O1 in order to provide frequency F1 : 1 MHz required by the Demodulator Amplifier, and available on connector (J6) at a level of about + 6 dBm/50 Ω after amplification by A1. This frequency is then divided by 250 in divider D2 which delivers frequency F2 : 4 kHz to the Generation 10^3 Hz - 10^4 Hz - 10^5 Hz subassembly.

The phase-locked loop generating the 10^0 Hz, 10^1 Hz and 10^2 Hz increments of the output frequency includes oscillator O2, programmable counter DP1 and phase comparator CP1. Oscillator O1 generates a 10 MHz to 10.999 MHz frequency which is divided by the division rate N : 10 000 to 10 999 of programmable counter DP1. The output frequency of counter DP1 is then compared in phase comparator CP1 with a 1 kHz reference obtained by dividing frequency F2 : 4 kHz by 4 in divider D3. Phase comparator CP1 therefore provides a DC voltage which locks oscillator O1 onto a frequency equal to N times the reference frequency of 1 kHz.

The frequency generated by oscillator O1 is divided by 1000 in divider D4, which provides frequency F3 : 10 kHz/10.999 kHz routed to the Generation 10^3 Hz - 10^4 Hz - 10^5 Hz subassembly.

PRINCIPLE OF PROGRAMMABLE COUNTER DP1

Programmable counter DP1 includes two dividers with a division rate of 10 or 11, a divider with a division rate of 100 to 109, and two binary module comparators controlling respective dividers by 10 or 11.

During a count cycle, the front divider divides P times by 11, where P is the value of the 10^0 Hz digit programmed in positive logic on the corresponding binary module comparator (integrated circuit SN 16, plate V-2). During the remainder of the cycle, the division rate of this divider is equal to 10.

Similarly, the second divider by 10 or 11 divides Q times by 11 during each count cycle, where Q is the value of the 10^1 Hz digit programmed in positive logic on the binary module comparator SN17.

The divider by 100 to 109 is directly programmed in positive logic by the value R of the 10^2 Hz digit, its division rate being at all times equal to (100+R). The division rate N of programmable counter DP1 can thus be expressed as a function of P, Q and R as follows :

$$N = 10 \left[11Q + 10 (100 + R - Q) - P \right] + 11P$$

P, Q, R : 0 to 9

For example, if the programmed frequency is of the form --- 573 Hz, the front divider divides 3 times by 11 and 1054 times by 10. The second divider by 10 or 11 divides 7 times by 11 and 98 times by 10, while the divider by 100 to 109 continuously divides by 105. The division rate N is thus equal to 10573.

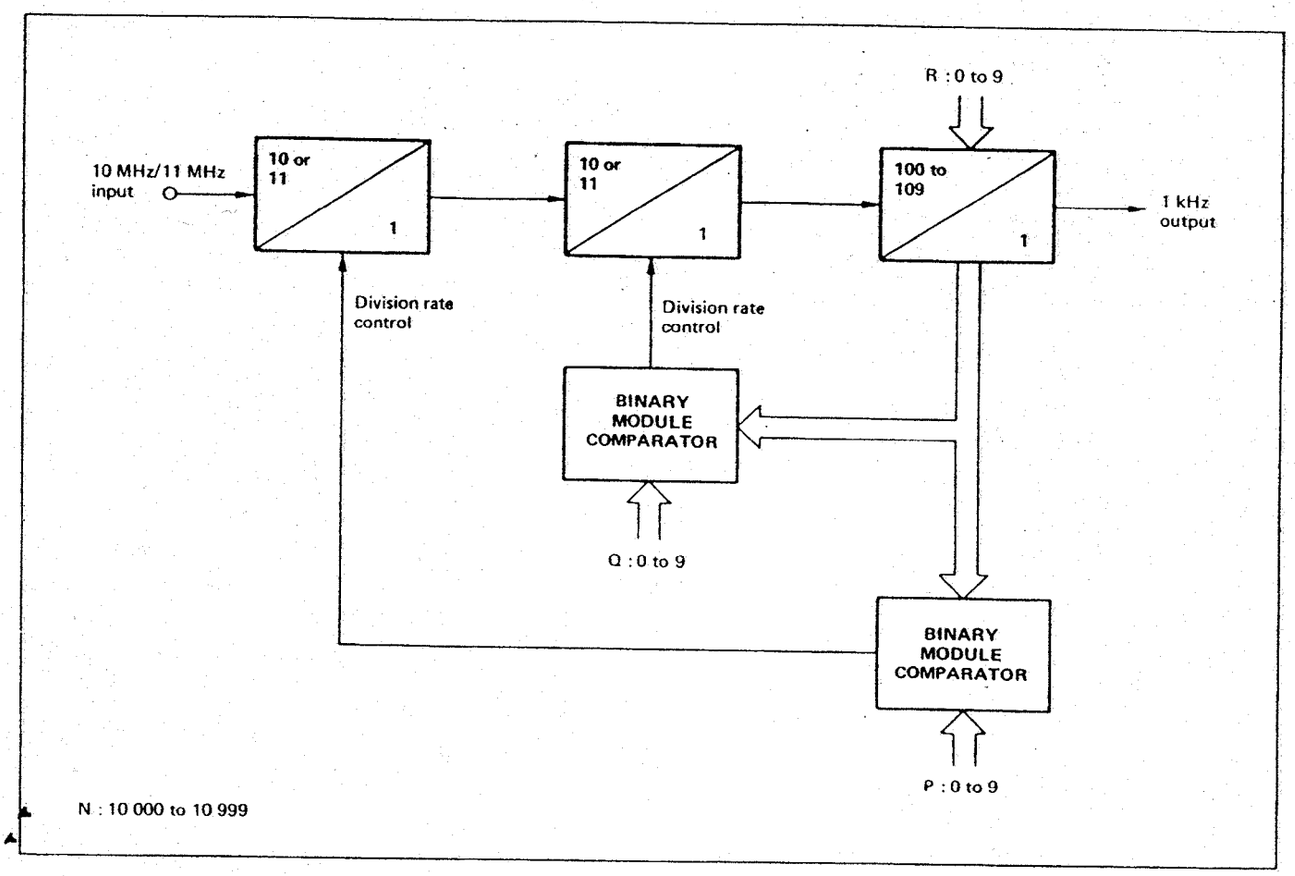


Figure V-2 PRINCIPLE OF COUNTER DP1

The front divider consists of a divider by 4 (integrated circuit SN11, plate V-2) preceded with a divider by 2 or 3 (integrated circuit SN10) whose division rate is controlled by two NAND gates (integrated circuit SN14). Depending on whether the whole must divide by 10 or 11, the sequence of division rates will be either 2 + 3 + 2 + 3 or 3 + 3 + 2 + 3.

The second divider by 10 or 11 is made up of integrated circuits SN12, SN13 and SN15, and operates on the same principle.

The divider by 100 to 109 consists of a BCD counter (integrated circuit SN18) followed by a binary counter (integrated circuit SN19). Inputs D8-D4-D2-D1 of the binary counter are continuously at state 1010, whereas those of the BCD counter receive the programming signals for the 10^2 Hz digit, which produces a division rate equal to (100 + R).

PHASE COMPARATOR PRINCIPLE

The operation of the phase comparator rests up on the generation of a sawtooth which is interrupted by a sampling pulse, as shown in figure V-3.

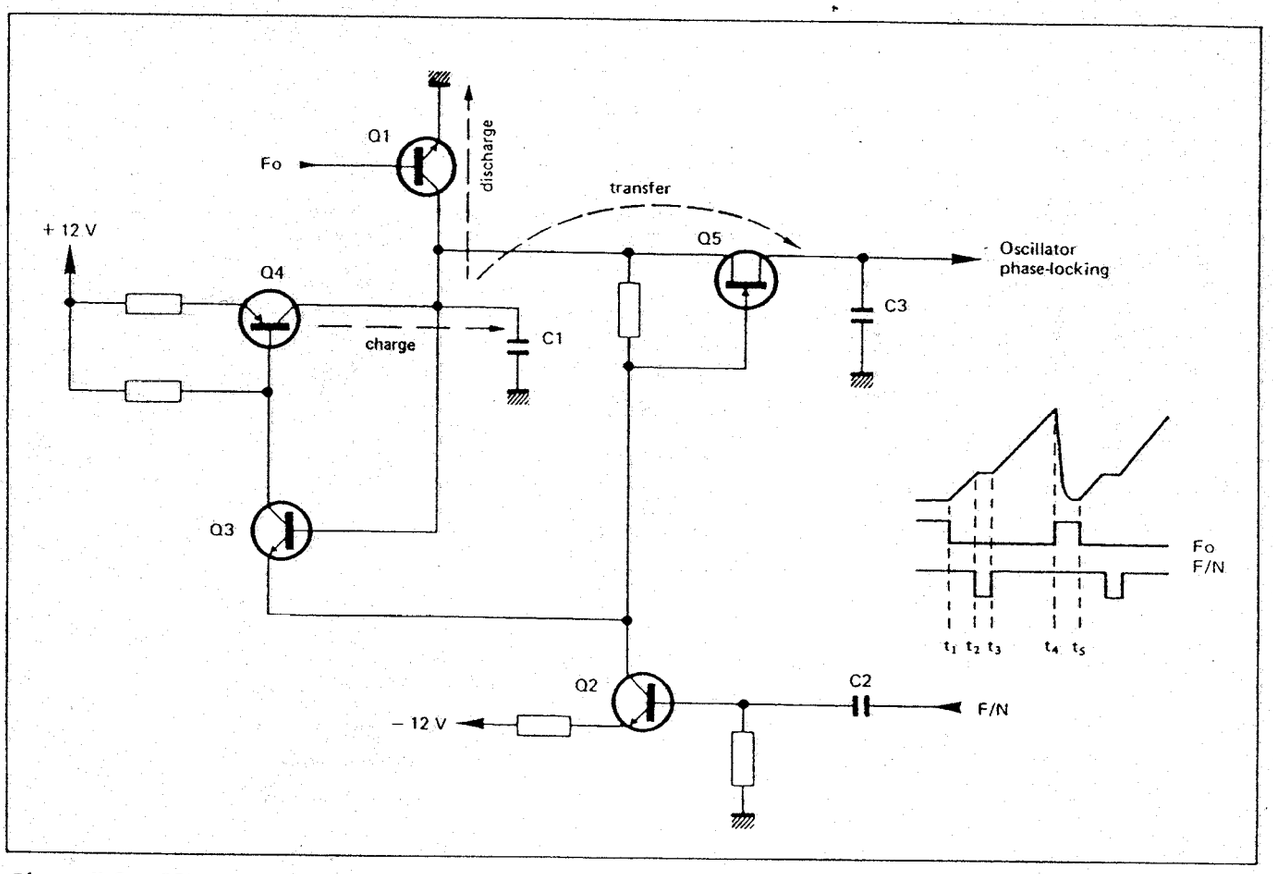


Figure V-3 PRINCIPLE OF PHASE COMPARATOR

At time t_1, the negative edge of the reference F_o cuts off transistor Q1, which starts the sawtooth by enabling capacitor C1 to charge at constant current.

At time t_2, the sawtooth is interrupted by the negative edge of the signal F/N from the programmable counter, which cuts off transistors Q2, Q3 and Q4. At the same time, field-effect transistor Q5 starts to conduct and transfers the charge from capacitor C1 to storage capacitor C3.

At time t_3, field-effect transistor Q5 is again cut off, whereas transistors Q2, Q3 and Q4 begin to conduct again, which restarts the sawtooth.

At time t_4, the positive edge of the reference signal F_o saturates transistor Q1 which therefore discharges capacitor C1. Another sawtooth begins at time t_5 on the negative edge of signal F_o.

Any relative phase shift affecting signals F_o and F/N shifts the time interval $(t_3 - t_2)$ towards time t_1 or time t_4. This displacement modifies the DC voltage stored in capacitor C3, which enables the frequency of the controlled oscillator to be corrected.

V-3 GENERATION 10^3 Hz - 10^4 Hz - 10^5 Hz

Refer to block diagram in plate V-1 and figure V-4, and schematic in plate V-3.

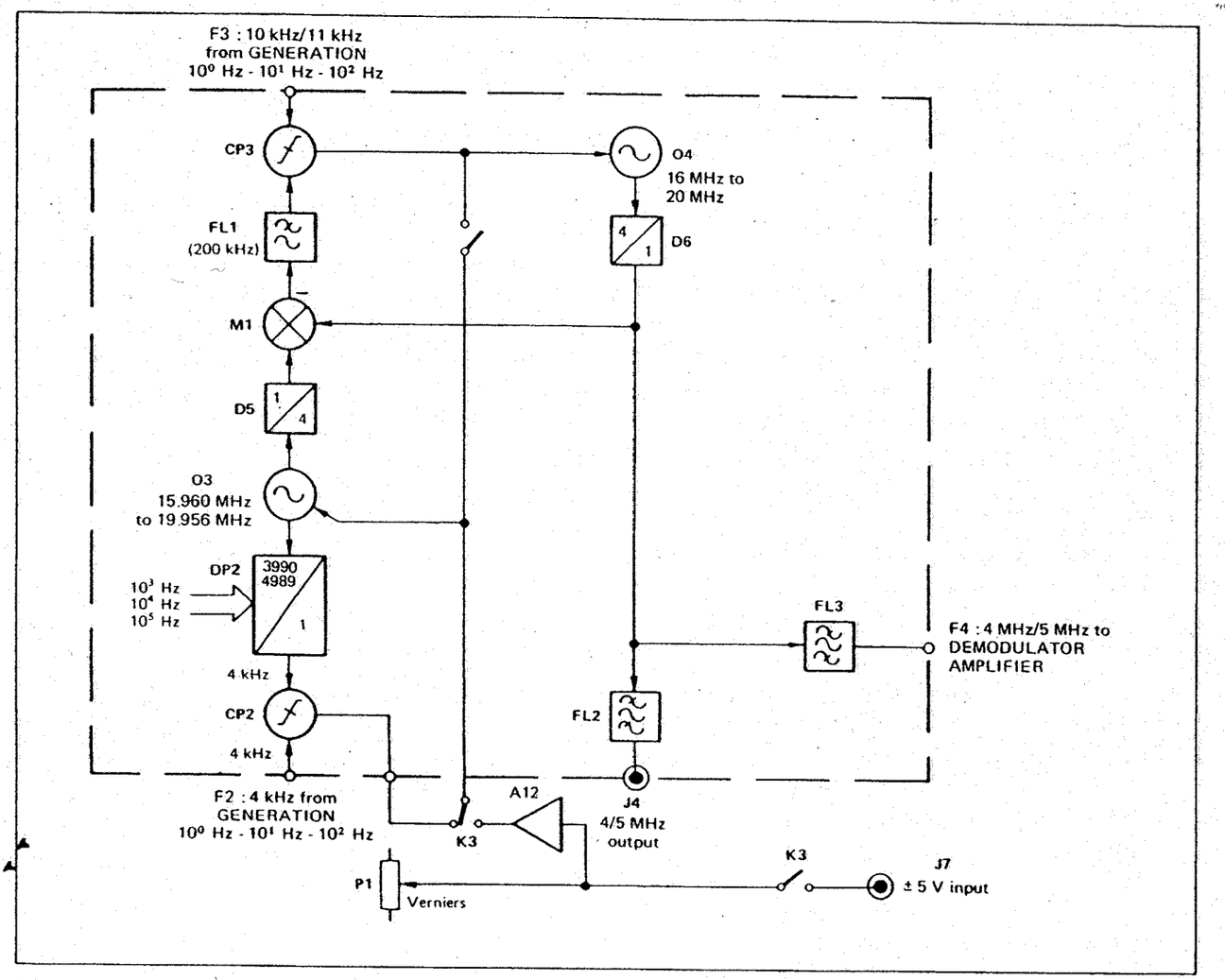


Figure V-4 GENERATION 10^3 Hz - 10^4 Hz - 10^5 Hz

This subassembly generates the 10^3 Hz, 10^4 Hz and 10^5 Hz increments of the output frequency while incorporating the 10^0 Hz, 10^1 Hz and 10^2 Hz increments carried by frequency F3 : 10 kHz/10.999kHz obtained at the output of the previously described subassembly.

The 10^3 Hz, 10^4 Hz and 10^5 Hz increments are generated by means of a phase-locked loop comprising oscillator O3, programmable counter DP2 and phase/frequency comparator CP2. Oscillator O3 delivers a frequency between 15.960 MHz and 19.956 MHz, that is divided by N : 3990 to 4989 in programmable counter DP2. The output frequency of counter DP2 is then compared in phase/frequency comparator CP2 with the reference frequency F2 : 4 kHz coming from Generation 10^0 Hz - 10^1 Hz - 10^2 Hz. In Synthesizer mode, comparator CP2 thus provides a DC voltage locking oscillator O3 onto a frequency equal to N times the reference frequency F2 : 4 kHz. In Generator or Sweeper mode, this control voltage is replaced by the output voltage of amplifier A12 (Control Circuits, plate V-7) providing for gradual variation of the output frequency of oscillator O3.

The combination of the 10^0 Hz, 10^1 Hz and 10^2 Hz increments carried by frequency F3 and the 10^3 Hz, 10^4 Hz and 10^5 Hz increments generated by oscillator O3 is effected by means of a second phase-locked loop comprising oscillator O4, divider D6, mixer M1, filter FL1 and phase/frequency comparator CP3.

Oscillator O4 delivers a frequency variable from 16 MHz to 20 MHz, that divider D6 divides by 4 in order to provide a 4 MHz to 5 MHz frequency. Mixer M1, made of an exclusive OR gate, beats this frequency with a 3.990 MHz to 4.989 MHz signal obtained by dividing the output frequency of oscillator O3 by 4 in divider D5.

Low-pass filter FL1 selects the difference frequency, and outputs a signal at a frequency variable between 10 kHz and 10.999 kHz, which is then compared in phase/frequency comparator CP3 with frequency F3 : 10 kHz/10.999 kHz coming from the Generation 10^0 Hz - 10^1 Hz - 10^2 Hz subassembly. Comparator CP3 therefore supplies a DC voltage which locks oscillator O4 onto a frequency comprising the 10^0 Hz to 10^2 Hz increments and also the 10^3 Hz to 10^5 Hz increments. In order to prevent oscillator O4 from locking onto a frequency below that generated by oscillator O3, mixer M1 and low-pass filter FL1 provide a signal in phase quadrature with the frequency to be compared. This signal is applied to the J input of one of the flip-flops of comparator CP3, and disables the phase comparison if the output frequency of divider D6 is less than that of divider D5.

The output signal of divider D6 is converted to a sinusoidal signal by band-pass filters FL2 and FL3, which respectively deliver frequency F4 : 4 MHz/5 MHz to connector (J4) on the rear panel of the instrument and to the Demodulator Amplifier subassembly.

During frequency changes involving the 10^3 Hz, 10^4 Hz or 10^5 Hz increments, an electronic switch consisting of transistors Q12 and Q13 (plate V-3) replaces the control voltage from comparator CP3 with an approach voltage obtained from comparator CP2 (Synthesizer mode) or from amplifier A12 (Generator or Sweeper mode). This substitution is intended to bring the output frequency of oscillator O4 close to its final value and is carried out when the difference between the control voltage and the approach voltage exceeds 0.6 volts.

PRINCIPLE OF PROGRAMMABLE COUNTER DP2

Programmable counter DP2 basically comprises two dividers by 10 or 11, a divider by 39 to 49, two BCD adders and two binary module comparators controlling respective dividers by 10 or 11.

During a count cycle, the front divider divides P times by 11, where P is the value of the 10^3 Hz digit programmed in positive logic on the corresponding binary module comparator (integrated circuit SN7, plate V-3). During the remainder of the cycle, the division rate of this divider is equal to 10.

The second divider by 10 or 11 divides Q times by 11 during each count cycle, where Q is the value of the 10^4 Hz digit shifted by 9. This shift is carried out by means of a BCD adder (integrated circuit SN11) whose inputs B8 - B4 - B2 - B1 are set to state 1001, while the inputs A8 - A4 - A2 - A1 receive the BCD programming signals of the 10^4 Hz digit.

For example, if the 10^4 Hz digit is 3, the BCD adder carries out the operation 9 + 3 = 12, and the binary module comparator SN8 receives the digit Q = 2, which gives a division rate of 11 twice per cycle.

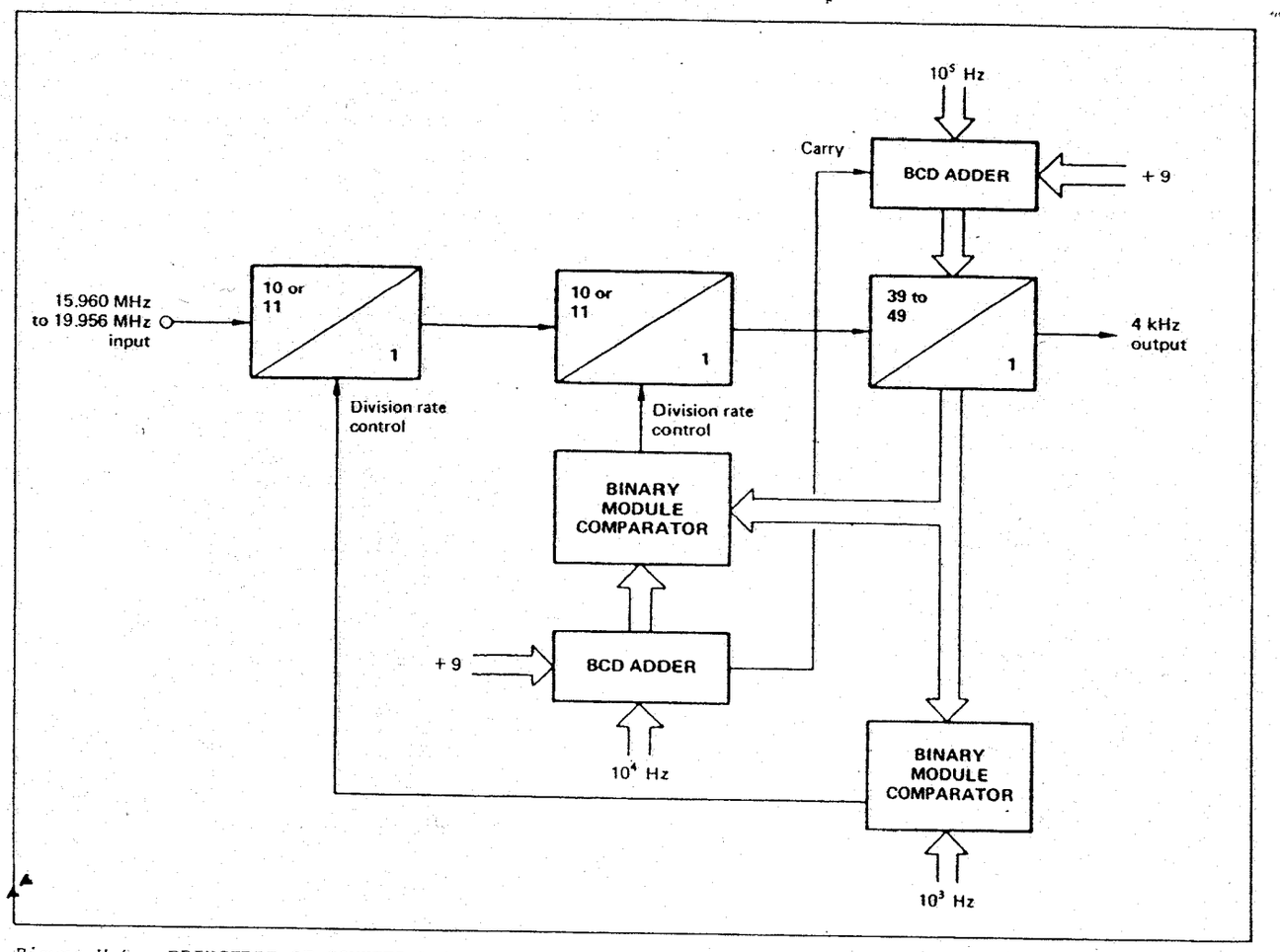


Figure V-5 PRINCIPLE OF COUNTER DP2

The divider by 39 to 49 is directly programmed in positive logic by the value R of the 10^5 Hz digit shifted by 9 or 10. As before, this shift is effected by means of a BCD adder (integrated circuit SN12) whose inputs B8 - B4 - B2 - B1 are set to state 1001. The input Cin receives the carry from adder SN11, and inputs A8 - A4 - A2 - A1 receive the programming signals of the 10^5 Hz digit. For example, if the 10^5 Hz and 10^4 Hz digits are respectively 5 and 3, the BCD adder achieves the operation 9 + 5 + carry = 15, and the counter by 39 to 49 receives the digit R = 5, which gives a division rate of 39 + R = 44.

The front divider consists of a divider by 4 (integrated circuit SN5) preceded with a divider by 2 or 3, the division rate of which is controlled by two NAND gates (integrated circuit SN5). Depending on whether the whole is to divide by 10 or 11, the sequence of division rates will be 2 + 3 + 2 + 3 or 3 + 3 + 2 + 3. The second divider by 10 or 11 comprises integrated circuits SN3, SN4 and SN6, and operates on the same principle.

The divider by 39 to 49 consists of a BCD counter (integrated circuit SN9) followed by a binary counter (integrated circuit SN10), whose inputs D8 - D4 - D2 - D1 receive the programming signals from adder SN12.

PRINCIPLE OF PHASE/FREQUENCY COMPARATOR

The operating principle of the phase/frequency comparator consists in generating pulses with a width proportional to the relative phase of the two compared signals, then in integrating these pulses so as to obtain a DC voltage permitting the phase-locking of an oscillator.

When the compared frequencies Fo and Fx are identical, the phase/frequency comparator acts as a phase comparator. When these two frequencies are unequal, the phase/frequency comparator indicates which one is larger, whence its appellation "phase/frequency comparator".

As shown in figure V-6,the digital section of the comparator consists of two J-K flip-flops whose outputs Q1 and Q2 are connected to an AND gate controlling the Reset input of each flip-flop.

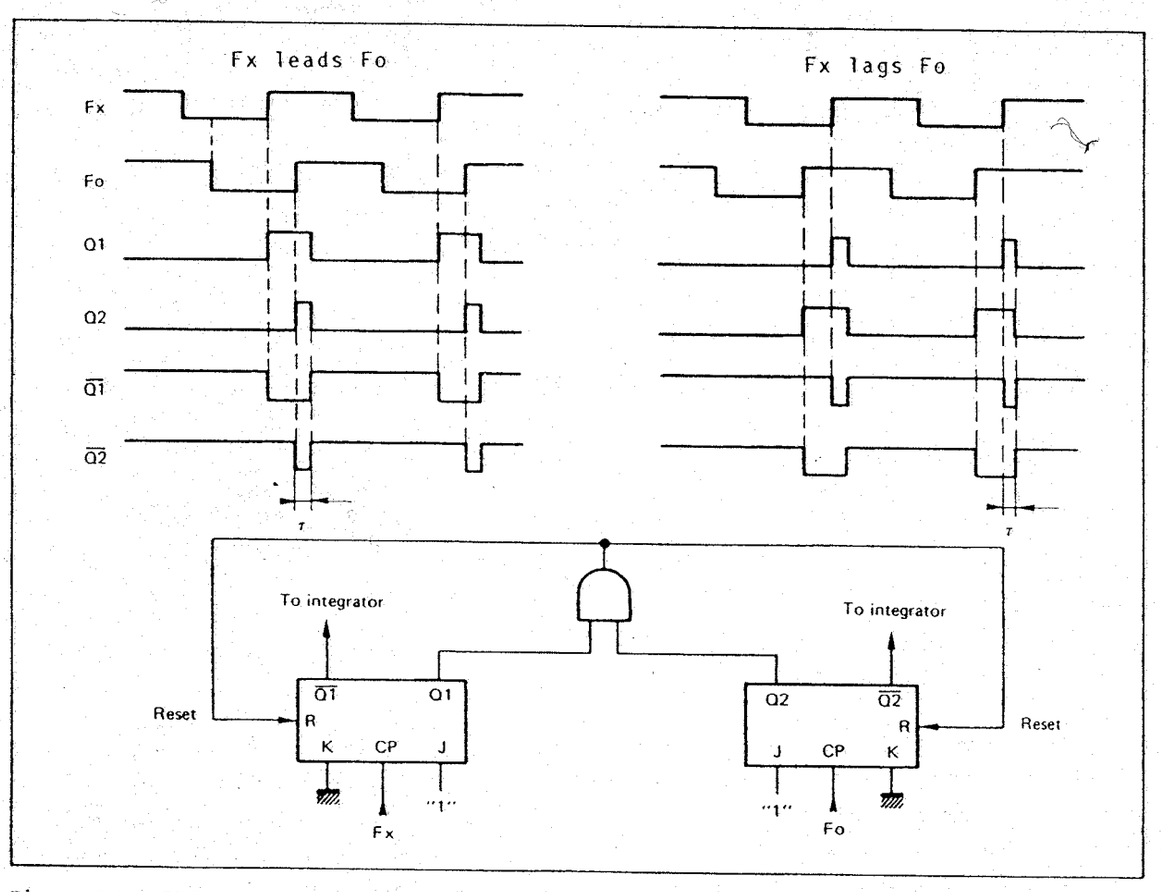


Figure V-6 PRINCIPLE OF PHASE/FREQUENCY COMPARATOR

The signals Fo and Fx to be compared are applied to the CP inputs of respective flip-flops. The K inputs are grounded and the J inputs receive a logic "1", so that the positive edges of the signals Fo and Fx cause a logic "1" to appear at the Q output of the corresponding flip-flop. Due to the reaction of the AND gate upon the Reset inputs, outputs Q1 and Q2 return to state "0" after they have both reached state "1", with a brief delay equal to the propagation time through the AND gate.

The difference between the widths of the pulses at outputs Q1 and Q2 is therefore proportional to the relative phase of the signals Fo and Fx. A DC voltage proportional to this relative phase is therefore obtained by integrating the output pulses by means of a differential integrator.

V-4 DEMODULATOR - AMPLIFIER

Refer to block diagram in plate V-1 and figure V-7, and schematic in plate V-4.

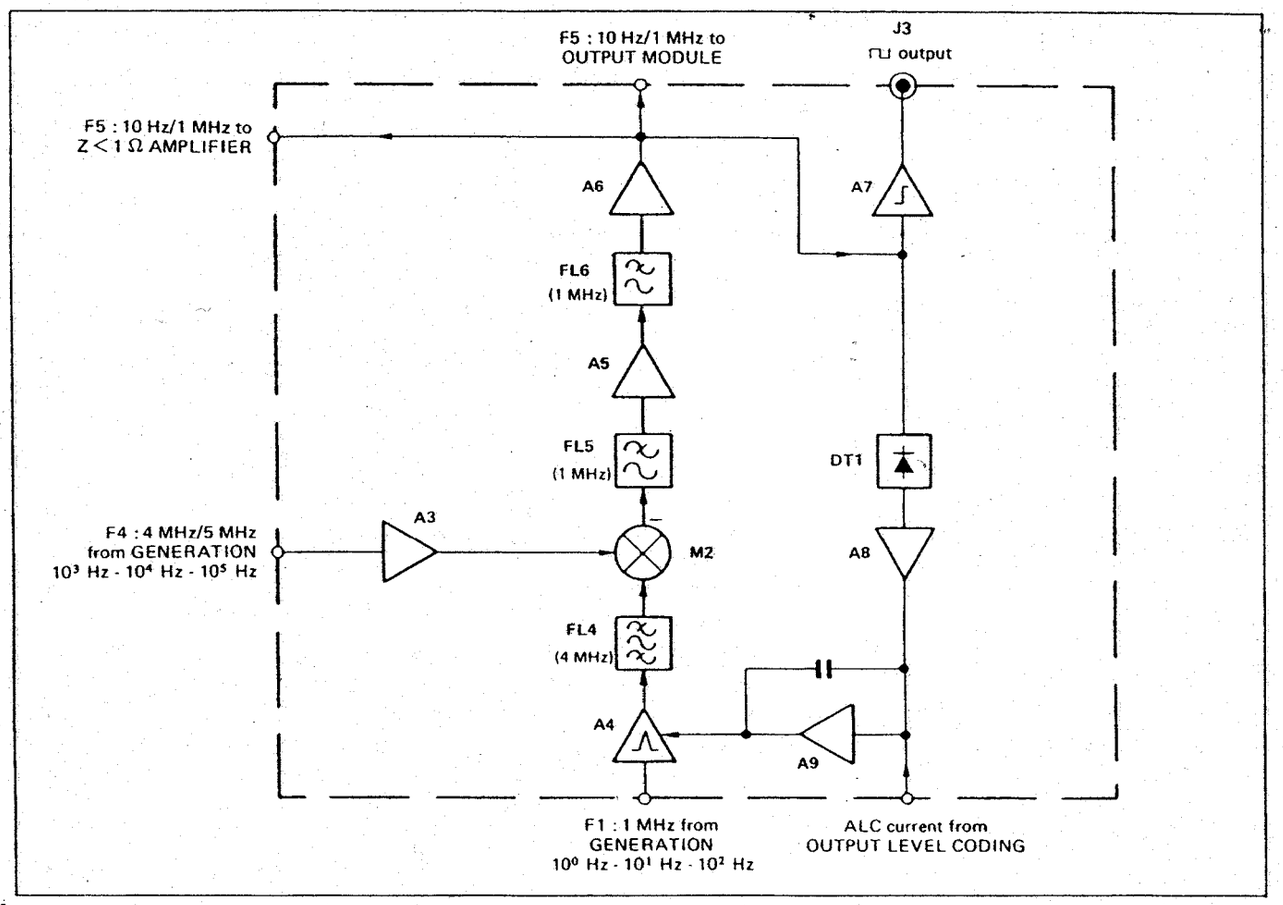


Figure V-7 DEMODULATOR - AMPLIFIER

The Demodulator Amplifier subassembly converts frequency F4, which is variable from 4 MHz to 5 MHz in steps of 1 Hz, to output frequency F5 : 10 Hz/1MHz and provides regulation of the output level.

Mixer M2 and low-pass filter FL5 carry out a substractive mixing of frequency F4 : 4 MHz/ 5 MHz coming from buffer A3 with a 4 MHz signal obtained by multiplying by 4 frequency F1 : 1 MHz issued from the Generation 10^0 Hz - 10^1 Hz - 10^3 Hz subassembly, this frequency multiplication being carried out by harmonic generator A4 and band-pass filter FL4. Frequency F5 : 10 Hz/1MHz obtained at the output of low-pass filter FL5 is amplified by amplifier A5, filtered through low-pass filter FL6 and again amplified by amplifier A6, providing an output signal between 550 mVrms and 5.5 Vrms, depending on the level set on switches (K4). The output signal of amplifier A6 is routed to the Output Module, to Z < 1 Ω Amplifier, and to shaper A7 providing square-wave signals at an amplitude of 5 V or 10 V to connector (J3).

The level of the signal at the output of amplifier A6 is detected by means of a full-wave detector DT1 whose outputs are connected to differential amplifier A8. This provides an ALC current which, following integration in amplifier A9, regulates the level of the 4 MHz signal applied to mixer M2 and consequently the level of the output signal. In addition to the ALC current from amplifier A8, integrator A9 receives a current proportional to the 1 dB, 0.1dB and 0.01dB increments of the output level from the Output Level Coding subassembly.

The ALC time constant is controlled by the parallel connection of a 10 µF capacitor with the integrating capacitor of amplifier A9, which has a value of 0.1 µF . The parallel connection of the 10 µF capacitor provides a long ALC time constant enabling the output level to be regulated over the entire frequency range. On the other hand, the switching out of circuit of this capacitor provides for rapid switching of frequencies above 10 kHz.

The output level inhibition is obtained by cutting off transistor Q1, which disables integrator A9 and removes the 4 MHz signal from mixer M2.

V-5 OUTPUT LEVEL CODING

Refer to block diagram in plate V-1 and figure V-8, and schematic in plate V-5.

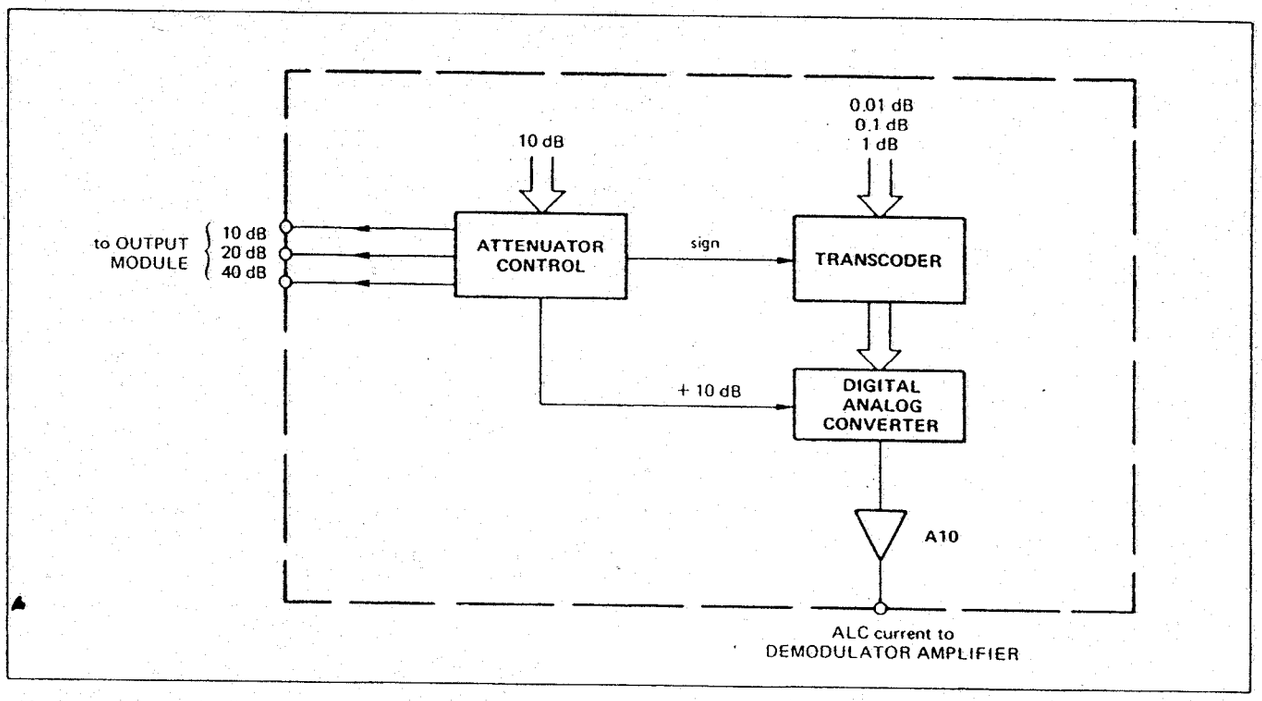


Figure V-8 OUTPUT LEVEL CODING

The Output Level Coding subassembly comprises attenuator control circuitry and a digital/analog converter which outputs a current proportionnal to the 1 dB, 0.1 dB and 0.01 dB increments of the output level.

The attenuator is controlled by means of a BCD/decimal decoder (integrated circuit SN1) and OR gates (integrated circuits SN2 and SN3) which switch the attenuating cells as a function of the output level 10 dB steps, as shown in the table of figure V-9. The signal obtained at output 0 of the BCD/decimal decoder is also sent to the digital/analog converter so as to increase by 10 dB the ALC current sent to the Demodulator Amplifier when the output level is between + 10 dBm + 20 dBm.

Setting of 10 dB steps	+ 10 dB ALC current	10 dB cell	20 dB cell	40 dB cell
+ 1	1	0	0	0
+ 0	0	0	0	0
- 0	0	1	0	0
- 1	0	0	1	0
- 2	0	1	1	0
- 3	0	0	0	1
- 4	0	1	0	1
- 5	0	0	1	1
- 6	0	1	1	1

Figure V-9 CODING OF 10-dB STEPS

The digital/analog converter comprises an operational amplifier (integrated circuit SN5) whose non-inverting input is connected to a resistor network switched by C-MOS switches (integrated circuits SN9 to SN13). The switching operation is controlled by a code converter consisting of three type 4561 integrated circuits providing a positive or negative count of the value of the 1 dB, 0.1 dB and 0.01 dB increments of the output level. In local mode between + 0 dBm and + 19.99 dBm, this value is counted in the positive sense, the type 4561 integrated circuits providing the 9's complement of the input signals. In local mode between - 0 dBm and - 69.99 dBm, and in Remote programming mode, the type 4561 integrated circuits are transparent and the value of the 1 dB, 0.1 dB and 0.01 dB steps is counted negatively.

Depending on the state of the 0 output of the BCD/decimal decoder SN1, the analog signal obtained from operational amplifier SN5 is transmitted directly to follower amplifier A10, or is first attenuated by 10 dB by means of resistors R20 and R21. In both cases, follower amplifier A10 supplies to the Demodulator Amplifier a current which is proportional to the level of the signal at the output of amplifier A6.

V-6 OUTPUT MODULE

Refer to block diagram in plate V-1 and figure V-10, and schematic in plate V-6.

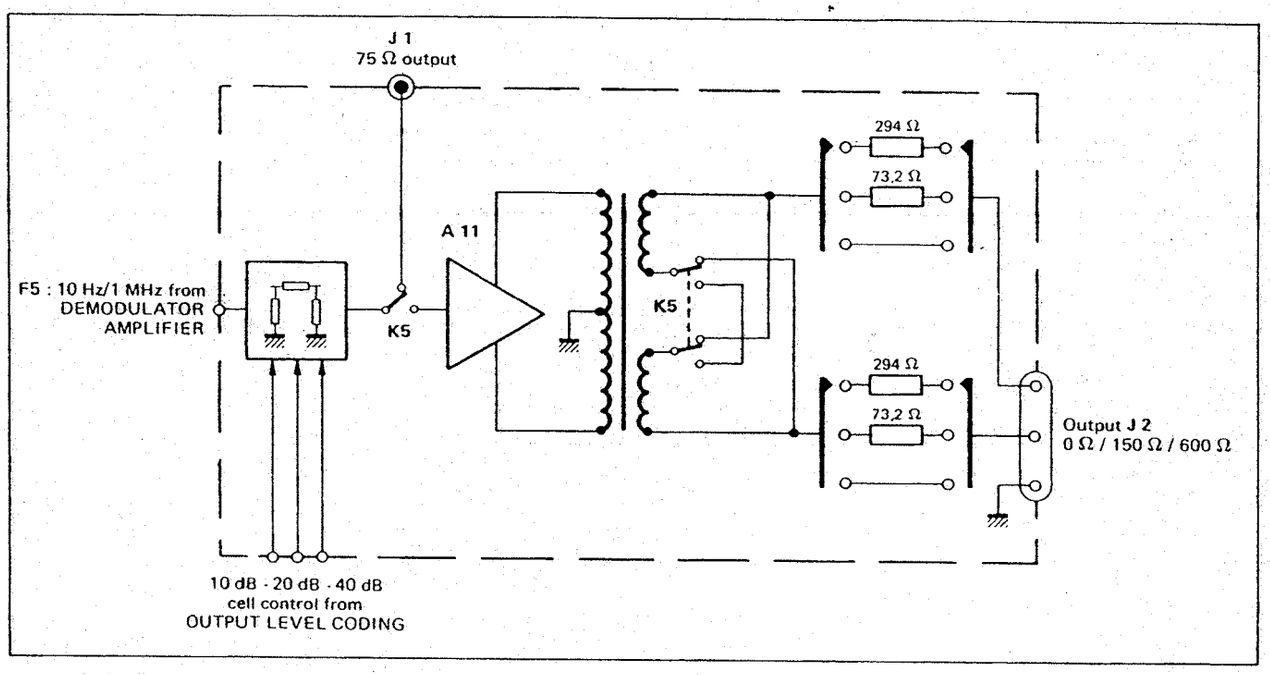


Figure V-10 OUTPUT MODULE

This module includes the output attenuator and the impedance converter circuit which enables the output signal of the synthesizer to be supplied at four different impedances.

The output attenuator includes three Π cells with 75 Ω characteristic impedance providing respectively 10 dB, 20 dB and 40 dB attenuation. Each of these cells is controlled by means of a - 12 V voltage issued from the Output Level Coding subassembly.

The impedance converter circuit consists of symmetrical amplifier A11, a transformer with four windings, and impedance selection keyboard (K5). In order to avoid all risk of the transformer core saturating, amplifier A 11 has an automatic DC current centering circuit consisting of operational amplifier SN2.

When an impedance of 75 Ω is selected on keyboard (K5), the signal provided by the output attenuator is applied directly to connector (J1). For all other impedances, this signal is routed to amplifier A11 and the impedance converter before being applied to connector (J2).

When the "150 Ω" key of keyboard (K5) is pressed, the two secondary windings of the transformer are connected in parallel and two 73.2 Ω resistors are connected to the output. These resistors are short-circuited if the "0 Ω" key is also pressed. When the "600 Ω" key is pressed, the two secondary windings are connected in series and two resistors of 294 Ω are connected to the output, these resistors being short-circuited if the "0 Ω" key is also pressed.

V-7 Z < 1 Ω AMPLIFIER

Refer to schematic in plate V-9.

This subassembly comprises an amplifier using complementary transistors which receives frequency F5 : 10 Hz/1 MHz from the Demodulator Amplifier. It provides a signal with 0 dBm/75 Ω to + 20 dBm/75 Ω electromotive force, depending on the level of the main output signal, at an impedance of less than 1 Ω.

V-8 PARALLEL BCD PROGRAMMING (OPTION 010)

Refer to schematic in plate V-12.

This option enables the logic signals from the manual controls of the synthesizer to be replaced by external parallel BCD signals applied to programming connectors (S03) and (S04) .

V-9 IEEE BUS PROGRAMMING (OPTION 020)

Refer to block diagram in figure V-11, and schematics in plates V-10 and V-11.

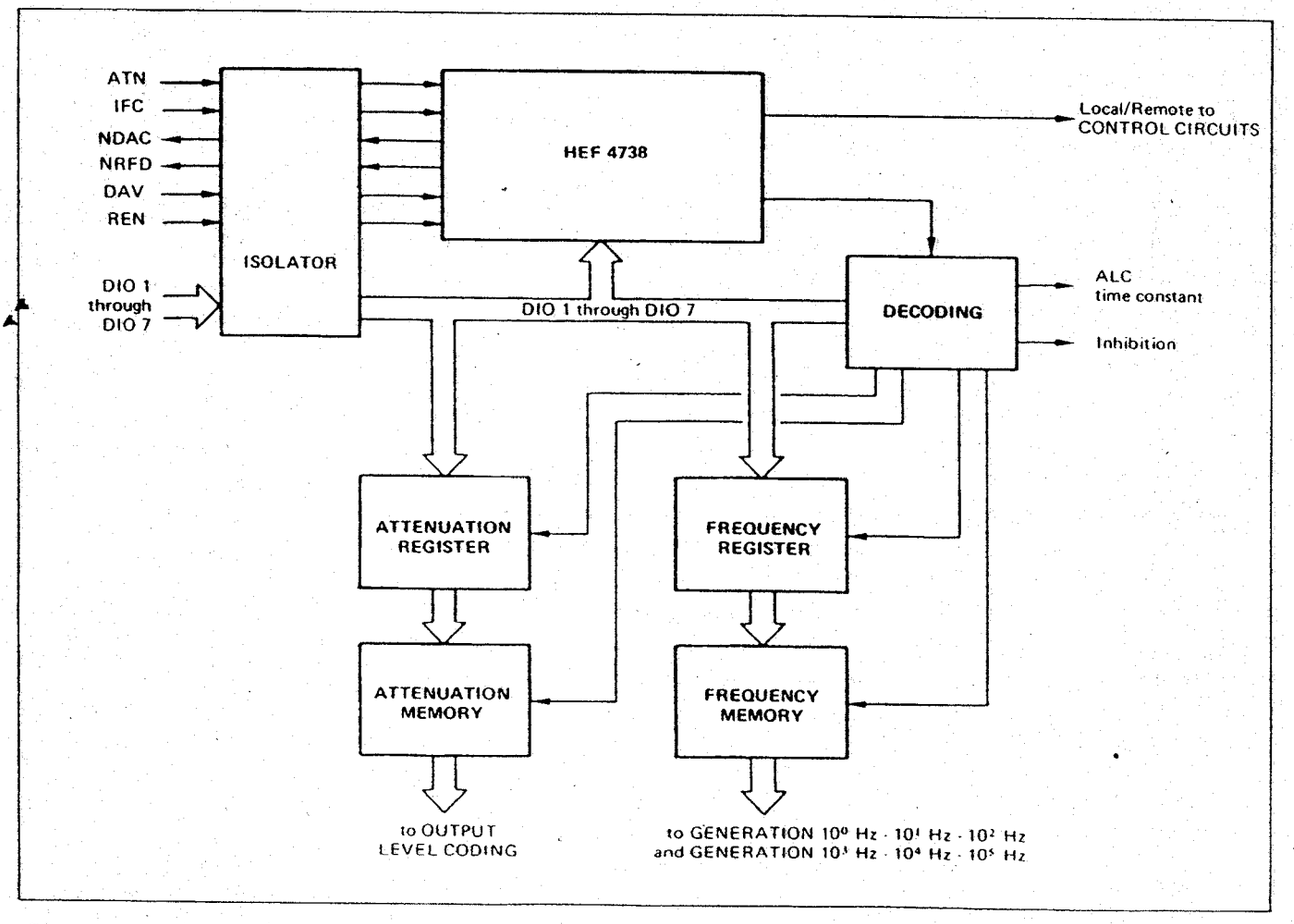


Figure V-11 IEEE BUS PROGRAMMING

This option, consisting of two subassemblies, converts the data supplied by the IEEE Bus into parallel BCD signals which are substituted in Programming mode for the logic signals from the manual synthesizer controls.

V-9-1 IEEE BUS ISOLATOR

This circuit comprises a series of Schmitt triggers (integrated circuits SN1 and SN2, plate V-10), followed by galvanic isolators (transformers T1, T2 and T3) which enable the ground of the IEEE bus to be isolated from that of the synthesizer. For this reason, the various circuits **upstream of the galvanic isolators are supplied by a +5 V floating voltage issued from the IEEE Bus** Registers subassembly.

The secondary winging of each transformer is connected in a feedback to a C-MOS gate (integrated circuits SN5, SN6 and SN7) which stores the transient pulse induced in the winding.

V-9-2 IEEE BUS REGISTERS

This circuit converts the data transmitted by the IEEE Bus Isolator subassembly into parallel BCD signals.

The handshake process with the IEEE bus is entirely controlled by the HEF 4738 integrated circuit, with the aid of a 4014 shift-register. These two integrated circuits provide for the recognition of the address selected by switches (K10) , for the Local/Remote control of the synthesizer, and for the control of the Decoding circuit. The HEF 4738 integrated circuit is controlled by a 2 MHz square-wave signal obtained by dividing by 2 the frequency generated by a 4 MHz oscillator (integrated circuit SN30).

The digits and the characters CR, A, ?, F, < and > are decoded by four decoders (integrated circuits SN4 and SN5 , plate V-11) followed by NOR gates (integrated circuits SN6 to SN9) and JK flip-flops (integrated circuits SN10 , SN11 and SN12) . The decoding circuit also controls transfer of data from lines DIO1 to DIO4 to the output registers, and supplies the Demodulator-Amplifier with the Inhibition and the ALC time constant programming signals.

The output level attenuation transmitted on lines DIO1 to DIO4 is transferred to the Attenuation Register consisting of 4 shift registers (integrated circuits SN14 and SN15) and to the Attenuation Memory consisting of 16 type D flip-flops (integrated circuits SN20 to SN23), which supplies this attenuation in parallel BCD code to the Output Level Coding subassembly.

The output frequency transmitted on lines DIO1 to DIO4 is transferred to the Frequency Register consisting of 8 shift registers (integrated circuits SN16 to SN19) and to the Frequency Memory consisting of 24 type D flip-flops (integrated circuits SN24 to SN29), which supplies this frequency in parallel BCD code to the Generation 10^0 Hz - 10^1 Hz - 10^2 Hz and Generation 10^3 Hz - 10^4 Hz - 10^5 Hz subassemblies.

CHAPTER VI

MAINTENANCE

The tests described in the following pages are designed to enable the user to check that the instrument conforms to the technical characteristics set out in chapter II. These tests may be carried out as acceptance tests, as periodic performance checks, or as a control on the instrument characteristics following repairs.

INSTRUMENTS REQUIRED FOR EXECUTING TESTS

TYPE OF INSTRUMENT	REFERENCE	CHARACTERISTICS
Alternostat		0 V to 260 V ; 200 W
Multimeter	FLUKE 8000 A	DC/AC ; accuracy $\pm$ 1%
Oscilloscope	H.P. 180C + 1808A + 1820C	75 MHz bandwidth
Frequencymeter	SCHLUMBERGER FH 2523	10 Hz to 500 MHz ; 9 digits
RF voltmeter	H.P. 3400 A	10 Hz to 10 MHz ; accuracy $\pm$ 1%
Milliwattmeter	WANDEL & GOLTERMANN EPM-1	10 kHz to 300 MHz ; accuracy $\pm$ 0.015 dB
Standard attenuator	SIEMENS D 2054	0 dB to 99.9 dB
Decibelmeter	ADRET 6101B + 6303B + 63032A + 63030B	DC to 11 MHz ; resolution 0.01 dB
Spectrum analyser	ADRET 6100B + 6303B + 6503A + 63032A	DC to 11 MHz ; dynamic range 120 dB
X-Y recorder	H.P. 7041A	Speed 76 cm/s
ECF 136	ADRET	Impedance transformer 75 Ω/150 Ω/600 Ω
ECF 141	ADRET	Asymmetry detector
Frequency difference multiplier	ADRET 4110A	Resolution 10^{-8} to 10^{-12}
Frequency standard	ADRET 3310A	300 Hz to 60 MHz ; stability $\pm$ 5.10^{-9}/24 h
DC source	ADRET 102	Accuracy $\pm$ 5.10^{-5}; output current 50 mA

N° d'ESSAI TEST NUMBER	CONDITIONS	SANCTIONS RESULTS
1	VISUAL CHECK Check the external appearance of the instrument and that protective fuse (F1) is of the correct rating (300 mA for 115V supply, 150 mA for 230 V supply).	
2 45 Hz to 450 Hz 115V - 230V power supply Alternostat Multimeter	MAINS SUPPLY REGULATION **Connect the instrument to a 45 Hz/450 Hz power supply** through an alternostat, as shown in figure VI-1.	

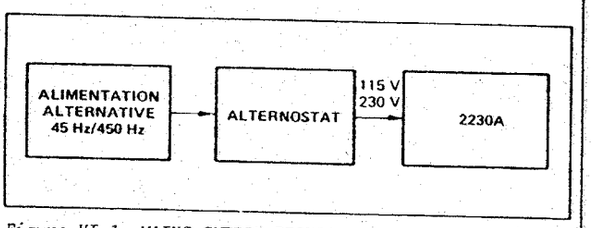


Figure VI-1 MAINS SUPPLY REGULATION

a) Vary the supply frequency between 45 Hz and 450 Hz for supply voltages of 115V and 230V.

Measure the voltages present at connector (S01) of the rear panel :
+ 12V relative to ground.
- 12V relative to ground.
+ 6V relative to ground.

Accuracy :
+ 11.8 V to + 12.5 V
- 11.8 V to - 12.5 V
+ 5.75 V to + 6.25 V

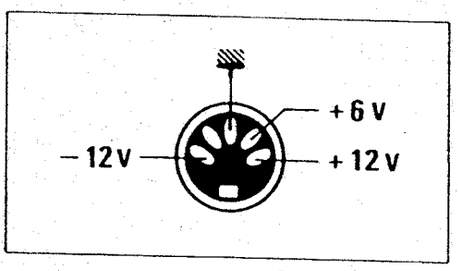


Figure VI-2 CONNECTOR (S01)

b) Repeat the above test using the alternostat to apply voltages of 115V ± 10% and 230V ± 10%.

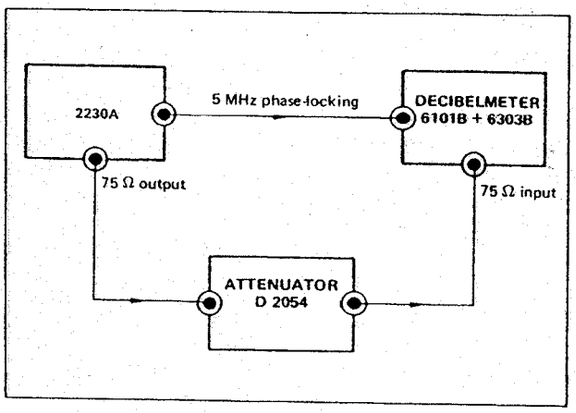
The previously measured voltages must remain substantially identical.

c) Use the multimeter to measure the current drawn by the instrument at both mains supply voltages. Calculate the apparent power consumption by means of the formula P = UI.

P < 20 VA

N° d'ESSAI TEST NUMBER	CONDITIONS	SANCTIONS RESULTS
3 Power supply Alternostat 250 Hz low-pass filter Oscilloscope	RESIDUAL LF RIPPLE With the instrument supplied at 50 Hz, use the 250 Hz low-pass filter and the oscilloscope to measure the LF ripple on the +12V, + 6V and -12V voltages available at connector (S01) .	Residual ripple < 5 mVp-p
4 Frequencymeter DC source	OUTPUT FREQUENCY a) Synthesizer mode : With the frequencymeter and the 2230A synthesizer connected to the same 5 MHz reference frequency, use the frequencymeter to check that the frequency at connector (J1) is the same as that set on switches (K2) . b) Generator mode : Set a frequency of 500 000 Hz on switches (K2) , set potentiometer (P1) to the 0.5 mark, and adjust the vernier of this potentiometer so as to obtain very slow flashing of indicator lights (DS3) . Then measure the output frequency at various positions of potentiometer (P1) , the vernier being left in its initial position. The maximum permissible error relative to the frequency indicated on the graduated dial is ± 50 kHz in all circumstances. If the error is greater than 50 kHz, the amplifier A12 of subassembly 02 7003 (Control Circuits, plate V-7) must be recalibrated as follows : - Set a frequency of 500 000 Hz on switches (K2) , release the three keys of keyboard (K3) , and set potentiometer P1 of subassembly 02 7003 so as to obtain very slow flashing of indicator lights (DS3) . - Depress the "GENER", key of keyboard (K3) , set potentiometer (P1) to 0.5, and adjust the vernier of this potentiometer so as to obtain a very slow flashing of indicator lights (DS3) . Then set potentiometer (P1) to 0.1 and adjust potentiometer P2 of subassembly 02 7003 to obtain an output frequency of 100 kHz. Then check the value of the output frequency when potentiometer (P1) is set to 1.	(P1) | Output frequency 0.1 | 100 ± 50 kHz 0.3 | 300 ± 50 kHz 0.5 | 500 kHz 0.7 | 700 ± 50 kHz 0.9 | 900 ± 50 kHz Output frequency : 1 MHz ± 50 kHz

N° d'ESSAI TEST NUMBER	CONDITIONS	SANCTIONS RESULTS
	c) Sweeper mode : Set a frequency of 500 000 Hz on switches (K2), set potentiometer (P1) to 0.5, and adjust the vernier of the potentiometer so as to obtain very slow flashing of indicator lights (DS3). Apply -5V to connector (J7) and use the frequencymeter to check that the output frequency is **less than 100 kHz. Then apply +5V to connector** (J7) and chech that the output frequency is between 900 kHz and 1.1 MHz.	Linearity : ± 10%
5 Milliwattmeter Standard attenuator Decibelmeter ECF 136	OUTPUT LEVEL a) In Synthesizer mode, set a frequency of 10 kHz on switches (K2) and select an output impedance of 75 Ω by means of keyboard (K5). Using the milliwattmeter, measure the output level at connector (J1) when -0.00 dBm and +0.00 dBm are set on switches (K4). If necessary, adjust the level at -0.00 dBm using potentiometer P1 and then the level at + 0.00dBm by means of potentiometer P2 of the Demodulator-Amplifier subassembly (plate V-4).	Accuracy at 0 dBm : ± 0.2 dB
	b) In Synthesizer mode, set a frequency of 10 kHz on switches (K2) and select an impedance of 150 Ω on keyboard (K5). Set +3.01 dBm on switches (K4) and measure the output level with the milliwattmeter, matching the impedances by setting the ECF 136 to 150 Ω (insertion loss 3.01 dB). If necessary, adjust potentiometer P1 of the Output Module (plate V-6) for calibrating this level.	Measured level : 0 dBm ± 0.2 dB
	c) In Synthesizer mode, set a frequency of 10 kHz on switches (K2) and select an impedance of 600 Ω on keyboard (K5). Set 9.03 dBm on switches (K4) and measure the output level using the milliwattmeter, matching the impedances by switching the ECF 136 to 600 Ω (insertion loss 9.03 dB).	Measured level : 0 dBm ± 0.2 dB
	d) In Synthesizer mode, set a frequency of 10 kHz and an impedance of 75 Ω, and check the accuracy of the 0.01 dB and 0.1 dB steps of the output level using the milliwattmeter.	0.01 dB steps : ± 0.005 per step, max.error ± 0.01 dB.

N° d'ESSAI TEST NUMBER	CONDITIONS	SANCTIONS RESULTS
	Then set up the circuit shown in figure VI-3 using the Siemens D 2054 standard attenuator and the Adret selective decibelmeter 6101B + 6303B to check the accuracy of the 1 dB and 10 dB Steps in the output level.	0.1 dB steps : ± 0.01 dB per step, max.error ± 0.02 dB. 1 dB steps : ± 0.03 dB per step, max.error ± 0.05 dB. 10 dB steps : ± 0.1 dB per step, max.error ± 0.2 dB from 0 dBm to -60 dBm.
		
	Figure VI-3 MEASUREMENT OF 1 dB AND 10 dB STEPS	
	The selective decibelmeter is tuned to the output frequency of the 2230A and its reference frequency is locked onto the 5 MHz signal obtained at connector (J6) on the synthesizer.	
6 Milliwattmeter ECF 136	OUTPUT LEVEL FLATNESS a) 75 Ω impedance : Set + 0.00 dBm on switches (K4), set switch (K9) to F < 10 kHz, and connect the milliwattmeter to output (J1). Vary the synthesized frequency from 50 Hz to 1 MHz, and measure the variation in the output level relative to the level at 10 kHz.	Level flatness : ± 0.05 dB from 50 Hz to 1 MHz.
	b) 150 Ω impedance : Set + 3.01 dBm on switches (K4), set switch (K9) to F < 10 kHz and connect the milliwattmeter to output (J2), matching the impedances by switching the ECF 136 to 150 Ω (insertion loss 3.01 dB). Vary the synthesized frequency from 200 Hz to 1 MHz and measure the output level variation.	Level flatness : ± 0.05 dB from 200 Hz to 200 kHz. ± 0.1 dB from 200 kHz to 620 kHz.
	c) 600 Ω impedance : Set + 9.03 dBm on switches (K4), set switch (K9)	

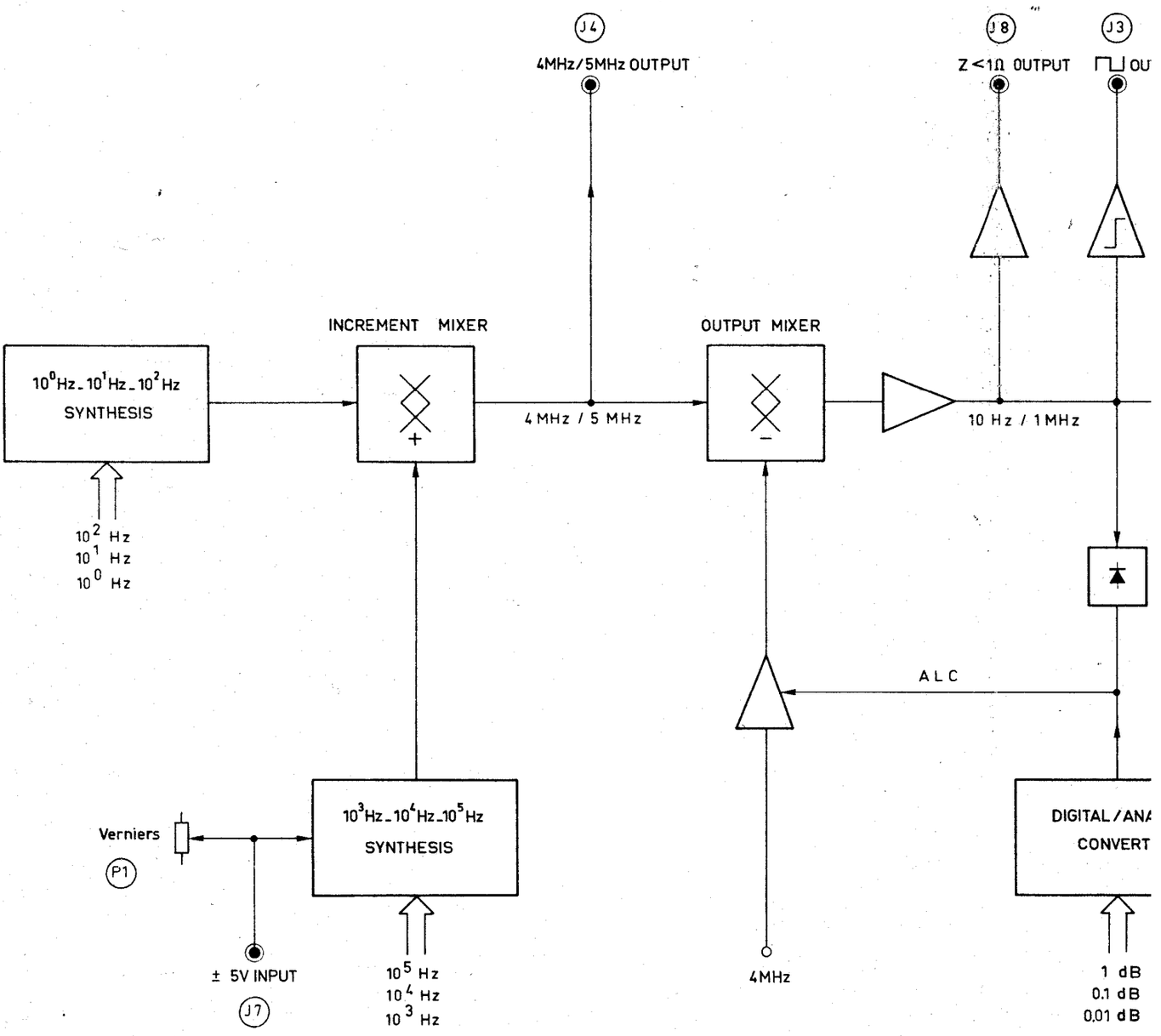
N° d'ESSAI TEST NUMBER	CONDITIONS	SANCTIONS RESULTS
	to F < 10 kHz and connect the milliwattmeter to output (J2), matching the impedances by switching the ECF 136 to 600 Ω (insertion loss 9.03 dB). Vary the synthesized frequency from 200 Hz to 300 kHz, and measure the output level variation.	± 0.2 dB from 620 kHz to 1 MHz. Level flatness : ± 0.05 dB from 200 Hz to 110 kHz. ± 0.3 dB from 110 kHz to 300 kHz.
7 RF voltmeter ECF 141	SIGNAL UNBALANCE a) 150 Ω impedance : Set + 6.00 dBm on switches (K4), set switch (K9) to F < 10 kHz and connect the ECF 141 (switched to 150 Ω) to connector (J2). Connect the output of the ECF 141 to the RF voltmeter and measure the signal level relative to 0 dBm/600 Ω while varying the synthesized frequency from 200 Hz to 620 kHz. b) 600 Ω impedance : Set + 0.00 dBm on switches (K4), set switch (K9) to F < 10 kHz and connect the ECF 141 (switched to 600 Ω) to connector (J2). Connect the output of the ECF 141 to the RF voltmeter and measure the signal level relative to 0 dBm/600 Ω while varying the synthesized frequency from 200 Hz to 110 kHz.	Signal unbalance : - 50 dB Signal unbalance : - 50 dB
8 Spectrum analyser X-Y recorder ECF 136	HARMONIC AND NONHARMONIC CONTENT a) 75 Ω impedance : Set + 10 dBm on switches (K4) and connect the spectrum analyser to output (J1), ensuring that the impedances are matched. Measure the relative levels of the harmonic and nonharmonic components at various frequencies between 50 Hz and 1 MHz, switch (K9) being set to F < 10 kHz for frequencies less than 10 kHz. b) 150 Ω impedance : Set + 10 dBm on switches (K4) and connect the spectrum analyser to output (J2), ensuring that the impedances are matched by switching the ECF 136 to 150 Ω (insertion loss 3.01 dB). Measure the relative levels of the harmonic and nonharmonic components at various frequencies	Harmonics at + 10 dBm : - 45 dB from 50 Hz to 300 Hz. - 55 dB from 300 Hz to 1 MHz. Nonharmonics : - 60 dB Harmonics at + 10 dBm : - 50 dB

N° d'ESSAI TEST NUMBER	CONDITIONS	SANCTIONS RESULTS
	between 200 Hz and 1 MHz, switch (K9) being set to F < 10 kHz for frequencies less than 10 kHz. c) 600 Ω impedance : Set + 10 dBm on switches (K4) and connect the spectrum analyser to output (J2), ensuring that the impedances are matched by switching the ECF 136 to 600 Ω (insertion loss 9.03 dB). Measure the relative levels of the harmonic and nonharmonic components at various frequencies between 200 Hz and 300 kHz, switch (K9) being set to F < 10 kHz for frequencies less than 10 kHz.	Nonharmonics : - 60 dB Harmonics at + 10 dBm : - 50 dB Nonharmonics : - 60 dB
9 Spectrum analyser X-Y recorder ECF 136	PHASE-NOISE Set + 10 dBm on switches (K4), select a 75 Ω impedance on keyboard (K5), and connect the spectrum analyser to output (J1). With switch (K9) set to F < 10 kHz, measure the phase-noise at 100 Hz, 1 kHz, 10 kHz and 100 kHz from carrier at various output frequencies. These measurements may also be carried out at the 150 Ω or 600 Ω output, using the ECF 136 adaptor.	Phase-noise in a 1 Hz band : - 85 dB at 100 Hz - 95 dB at 1 kHz - 110 dB at 10 kHz - 120 dB at 100kHz
10 Oscilloscope	SQUARE-WAVE OUTPUT Use the oscilloscope to measure the rise and fall times of the square-wave signals at connector (J3).	Rise time : 300 ns Fall time : 100 ns
11 RF voltmeter Spectrum analyser X-Y recorder	TRACKING OUTPUT a) Output level : Use the RF voltmeter to measure the level of the tracking signal available at connector (J4). b) Nonharmonic content : Use the spectrum analyser to measure the relative levels of nonharmonic components of the tracking signal.	Level : + 6 dBm/75 Ω ± 2 dB Nonharmonics : - 60 dB
12 Milliwattmeter Spectrum analyser X-Y recorder	AUXILIARY OUTPUT Z < 1 Ω a) Output level : Set a frequency of 10 kHz on switches (K2) at a level of +0.00 dBm on switches (K4). Use the milliwattmeter to measure the level of the signal at connector (J8) for a 75 Ω load.	Level : 0 dBm/75 Ω

N° d'ESSAI TEST NUMBER	CONDITIONS	SANCTIONS RESULTS
	If necessary, adjust this level by means of potentiometer P2 of the Z < 1 Ω Amplifier subassembly (plate V-9). b) Output level flatness : Set + 0.00 dBm on switches (K4), set switch (K9) to F < 10 kHz, and connect the milliwattmeter to connector (J8). Vary the synthesized frequency from 50 Hz to 1 MHz and measure the output level variation relative to 0 dBm. c) Harmonic and nonharmonic content : Set + 10 dBm on switches (K4) and connect the spectrum analyser to output (J8). Measure the relative levels of the harmonic and nonharmonic components at various frequencies between 50 Hz and 1 MHz, with switch (K9) set to F < 10 kHz for frequencies less than 10 kHz.	Level flatness : ± 0.5 dB from 50 Hz to 200 Hz. ± 0.3 dB from 200 Hz to 1 MHz. Harmonics at + 10 dBm : - 40 dB from 50 Hz to 300 Hz. - 50 dB from 300 Hz to 1 MHz. Nonharmonics : - 60 dB
13 RF voltmeter	1 MHz REFERENCE OUTPUT Use the RF voltmeter to measure the level of the 1 MHz reference output at connector (J6) for a load of 50 Ω.	Level : 550 mVrms/50 Ω ± 10 %
14 Frequency difference multiplier Frequency standard	MASTER OSCILLATOR STABILITY Use the frequency difference multiplier to measure the relative difference ΔF/F between the 5 MHz frequency available at connector (J6) and the 5 MHz signal from the frequency standard. Leave the synthesizer switched on, and measure the difference ΔF'/F between the two frequencies 24 hours later. If necessary, recalibrate the internal Master Oscillator by means of capacitor C13 located on the Generation 10^0 Hz - 10^1 Hz - 10^2 Hz subassembly.	$\left\lvert \frac{\Delta F'}{F} - \frac{\Delta F}{F} \right\rvert < 3.10^{-6}$ after 24 hours of continuous operation.
15 Oscilloscope Frequency standard	EXTERNAL REFERENCE FREQUENCY Connect the 5 MHz reference frequency from the frequency standard to connector (J5) on the synthesizer and to channel 1 on the oscilloscope. Connect output (J6) of the synthesizer to channel 2 of the oscilloscope, and check that the two signals appearing on the screen are stationary relative to one another as the level of the 5 MHz reference frequency applied to connector (J5) is varied from 220 mVrms/50 Ω to 1 Vrms/50 Ω.	

CHAPTER VII

PLATES, SCHEMATICS, PARTS LIST


J4
4MHz/5MHz OUTPUT
J8
Z<1Ω OUTPUT
J3
OU
INCREMENT MIXER
OUTPUT MIXER
10^0Hz_10^1Hz_10^2Hz
SYNTHESIS
4 MHz / 5 MHz
10 Hz / 1 MHz
10^2 Hz
10^1 Hz
10^0 Hz
A L C
Verniers
P1
10^3Hz_10^4Hz_10^5Hz
SYNTHESIS
DIGITAL/ANA
CONVERT
± 5V INPUT
J7
10^5 Hz
10^4 Hz
10^3 Hz
4MHz
1 dB
0,1 dB
0,01 dB

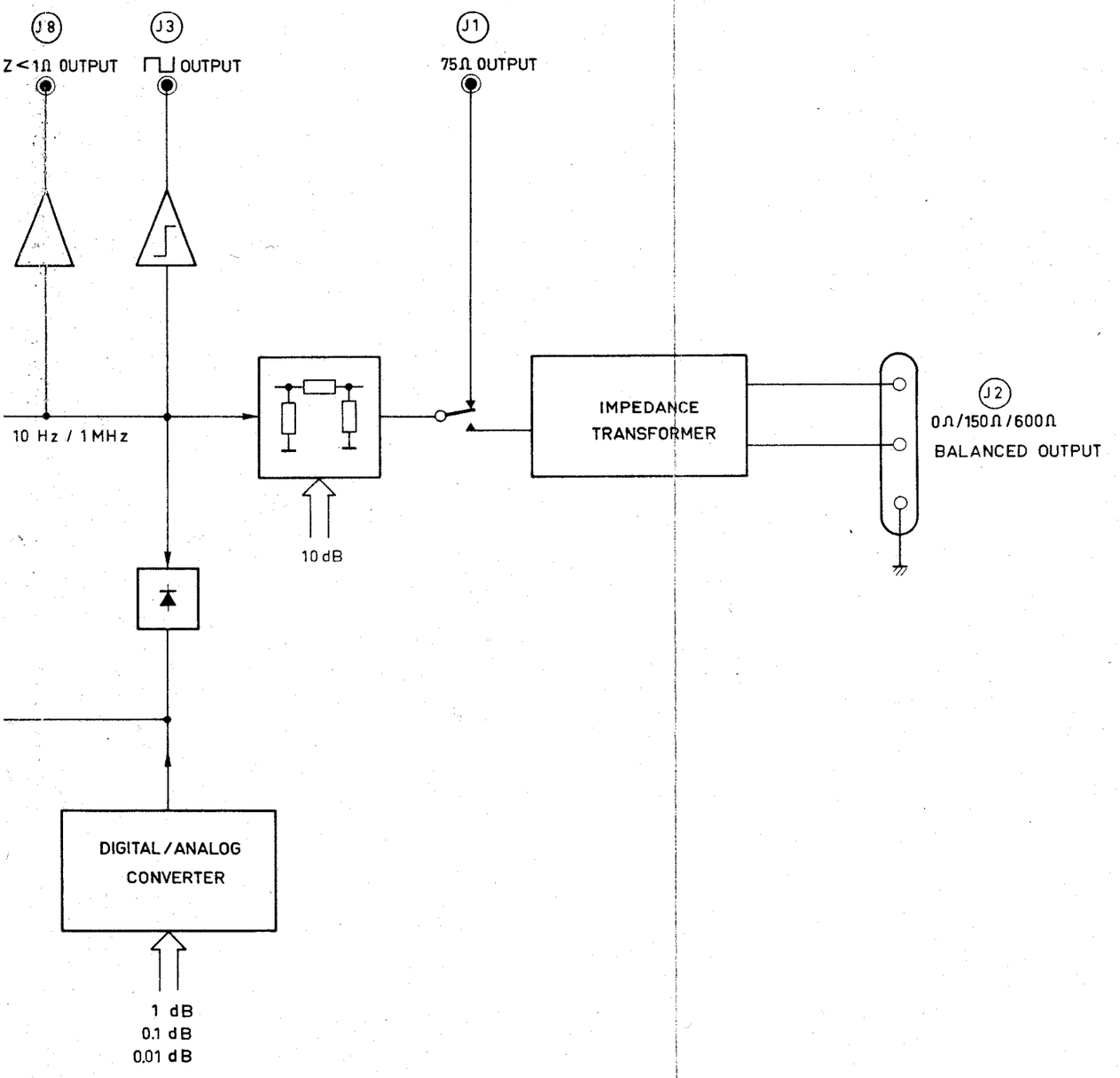


PLATE III-1

2230A - PRINCIPLE OF OPERATION

Lever/indicator switches for digital frequency setting.

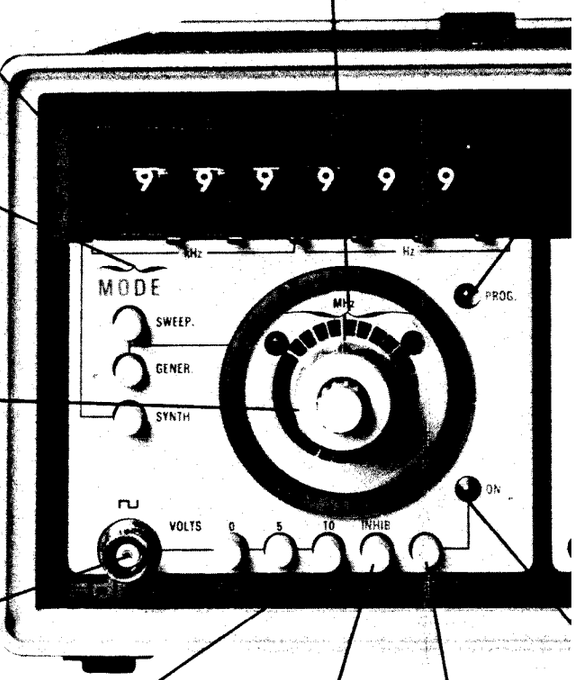
Indicator lights permitting to compare the output frequency in Generator or Sweeper mode with the digital display of switches **K2.**

K2

DS3

Mode selection of output frequency setting :
- Key **SYNTH.** pressed : digital setting by switches **K2.**
- Key **GENER.** pressed : analogical setting by verniers **P1.**
- Key **SWEEP.** pressed : analogical setting by verniers **P1** and sweep by external signal applied to connector **J7.**

K3



Analogical setting of output frequency in Generator or Sweeper mode.

P1

J3

Square-wave output.
0V, 5V or 10V amplitude selected by keyboard **K7.**

K7

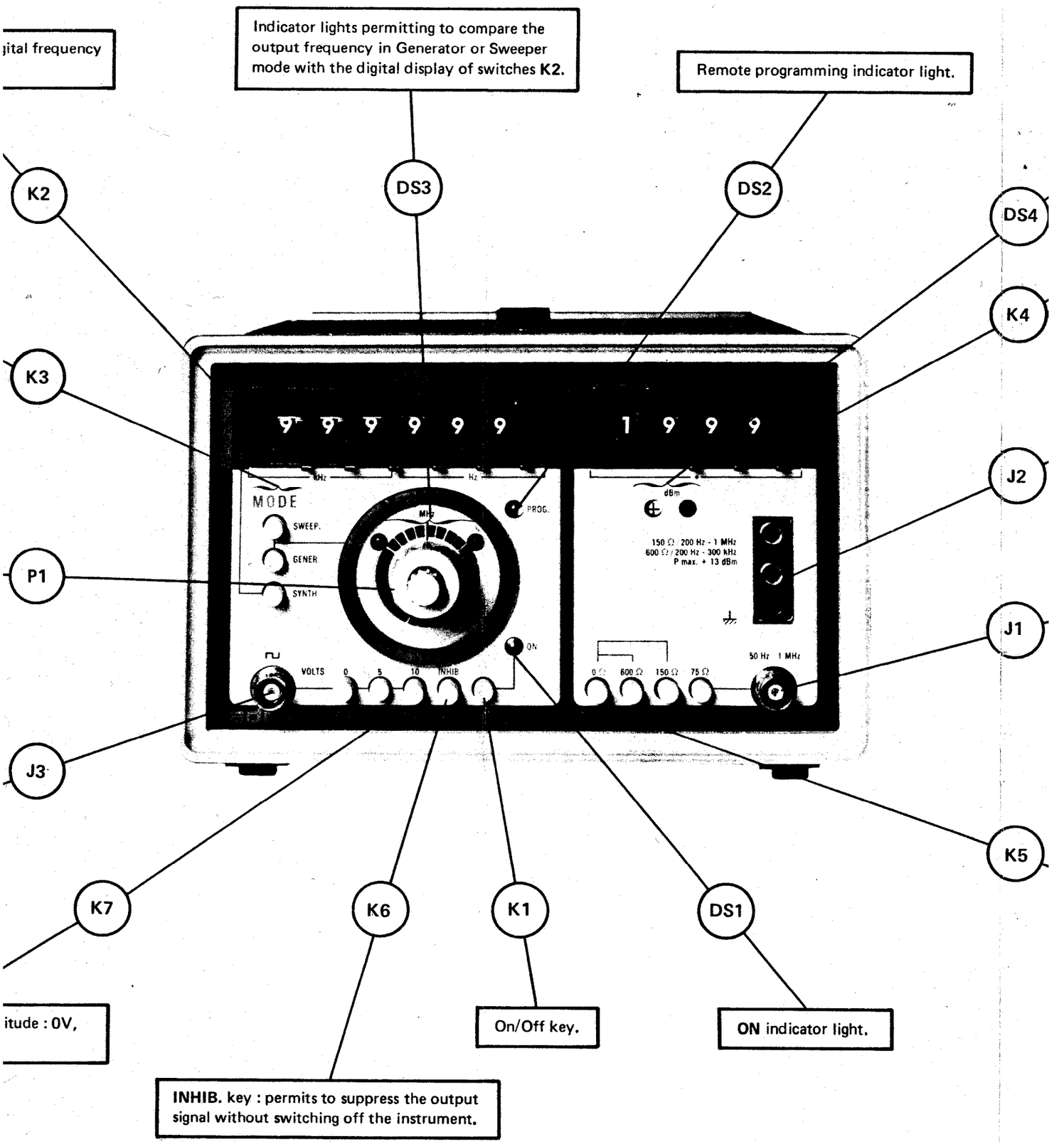
K6

K1

Selection of square-wave amplitude : 0V, 5V or 10V.

On/Off key.

INHIB. key : permits to suppress the output signal without switching off the instrument.

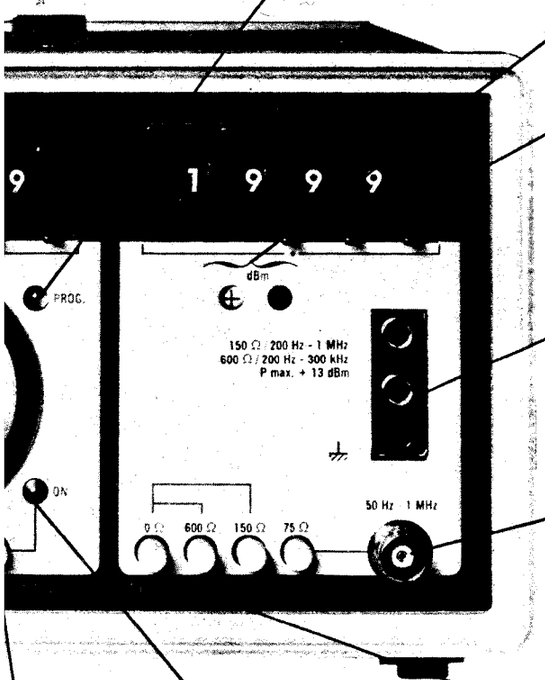

ital frequency
Indicator lights permitting to compare the output frequency in Generator or Sweeper mode with the digital display of switches K2.
Remote programming indicator light.
K2
DS3
DS2
DS4
K4
K3
J2
P1
J1
J3
K5
K7
K6
K1
DS1
itude : 0V,
On/Off key.
ON indicator light.
INHIB. key : permits to suppress the output signal without switching off the instrument.
MODE
SWEEP
GENER
SYNTH
PROG.
VOLTS
INHIB
ON
dBm
50 Hz 1 MHz

2230A

pare the
Sweeper
witches **K2.**

Remote programming indicator light.

Sign display of switches **K4.**



DS2

DS4

Lever/indicator switches for output level setting.

K4

Balanced output with 0 Ω, 150 Ω or 600 Ω impedance.

J2

Coaxial output with 75 Ω impedance.

J1

Output impedance selection :

- Key **75** Ω pressed : 75 Ω impedance, level in dBm/75 Ω.
- Key **150** Ω pressed : 150 Ω impedance, level in dBm/150 Ω.
- Key **600** Ω pressed : 600 Ω impedance, level in dBm/600 Ω.
- Keys **0** Ω and **150** Ω pressed : $Z < 5$ Ω, e.m.f. equal to that of 150 Ω impedance.
- Keys **0** Ω and **600** Ω pressed : $Z < 20$ Ω, e.m.f. equal to that of 600 Ω impedance.

K5

K1

DS1

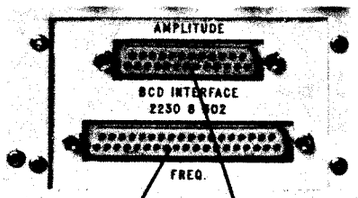
On/Off key.

ON indicator light.

PLATE IV-1

2230A - FRONT-PANEL DESCRIPTION

PARALLEL BCD PROGRAMMING
(Option 010)



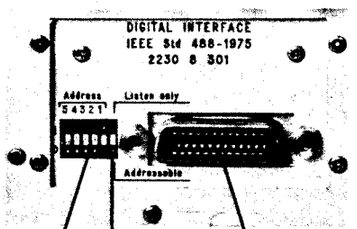
S04

S03

Output level programming connector

Output frequency programming connector

IEEE BUS PROGRAMMING
(Option 020)



K10

K11

S05

Address selection switches

IEEE bus connector

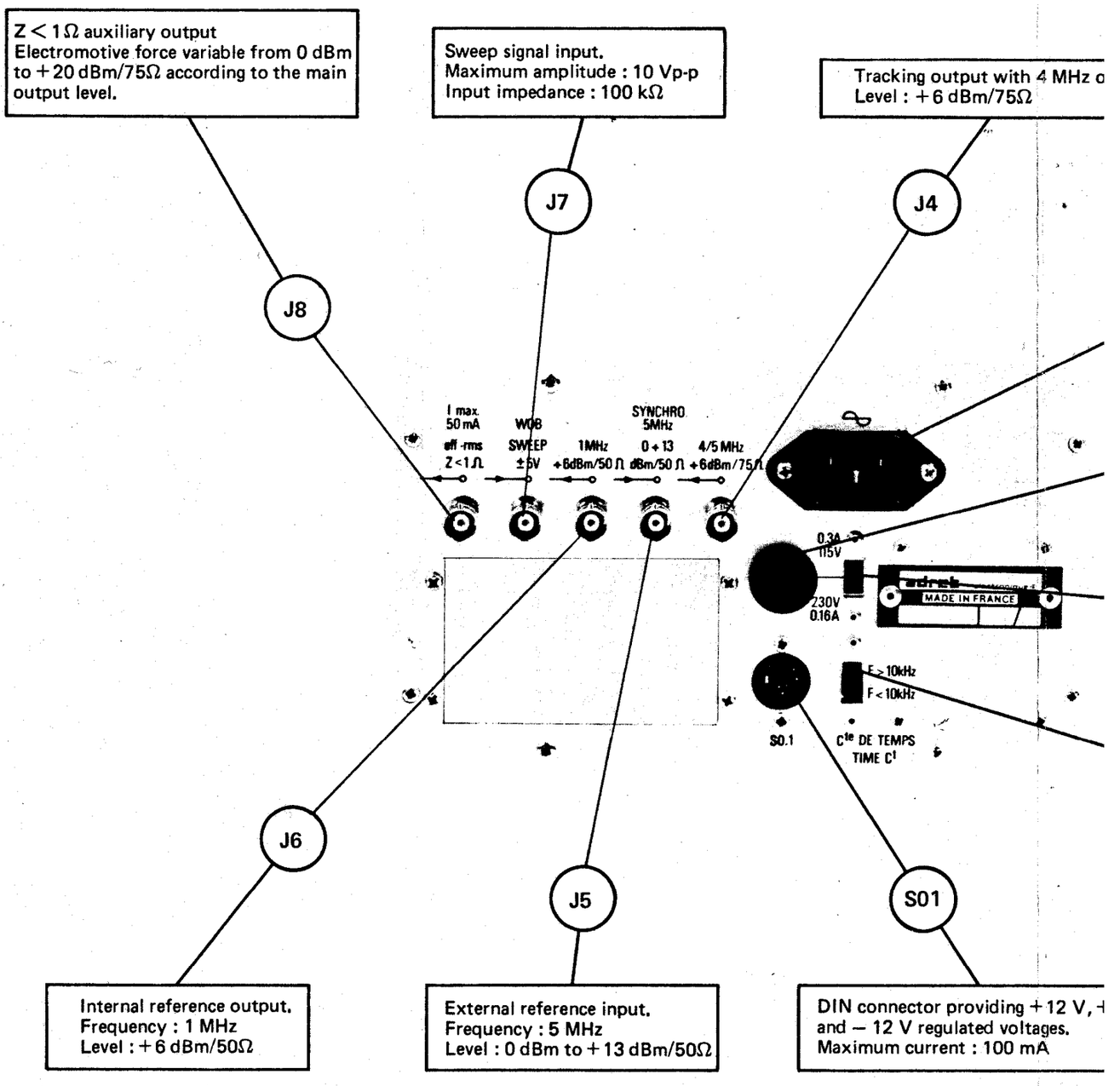
Address enable switch

Z < 1Ω auxiliary output
Electromotive force variable from 0 dBm to +20 dBm/75Ω according to the main output level.

J8

J6

Internal reference output.
Frequency : 1 MHz
Level : +6 dBm/50Ω


Z < 1Ω auxiliary output
Electromotive force variable from 0 dBm to +20 dBm/75Ω according to the main output level.
Sweep signal input.
Maximum amplitude : 10 Vp-p
Input impedance : 100 kΩ
Tracking output with 4 MHz o
Level : +6 dBm/75Ω
J7
J4
J8
I max. 50 mA
eff -rms
Z<1Ω
WOB SWEEP
±5V
1MHz
+6dBm/50Ω
SYNCHRO 5MHz
0 +13 dBm/50Ω
4/5 MHz
+6dBm/75Ω
0.3A 115V
230V 0.16A
MADE IN FRANCE
F>10kHz
F<10kHz
S0.1
Cte DE TEMPS
TIME C!
J6
J5
S01
Internal reference output.
Frequency : 1 MHz
Level : +6 dBm/50Ω
External reference input.
Frequency : 5 MHz
Level : 0 dBm to +13 dBm/50Ω
DIN connector providing +12 V, +
and — 12 V regulated voltages.
Maximum current : 100 mA

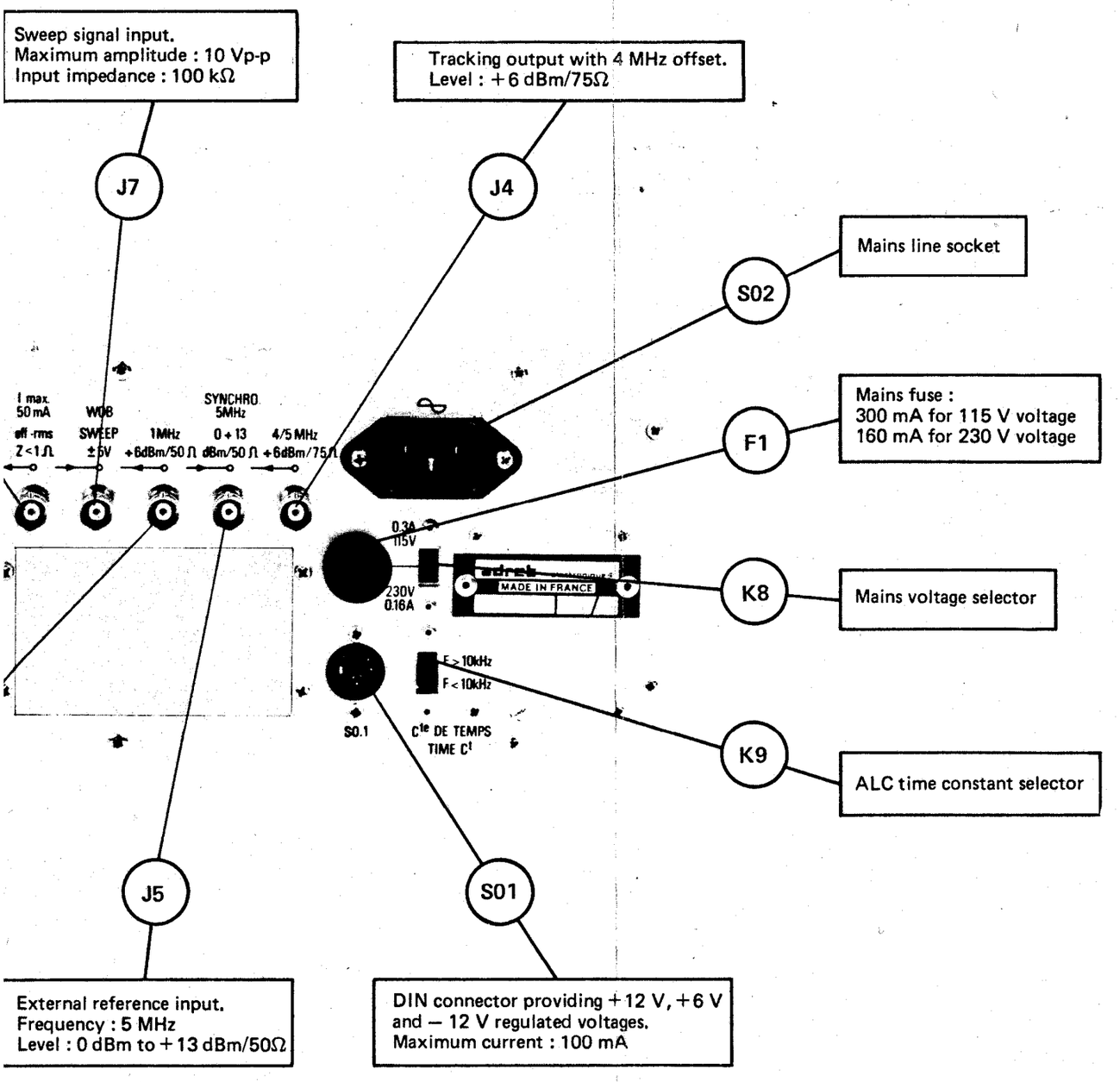


PLATE IV-2

2230A - REAR-PANEL DESCRIPTION

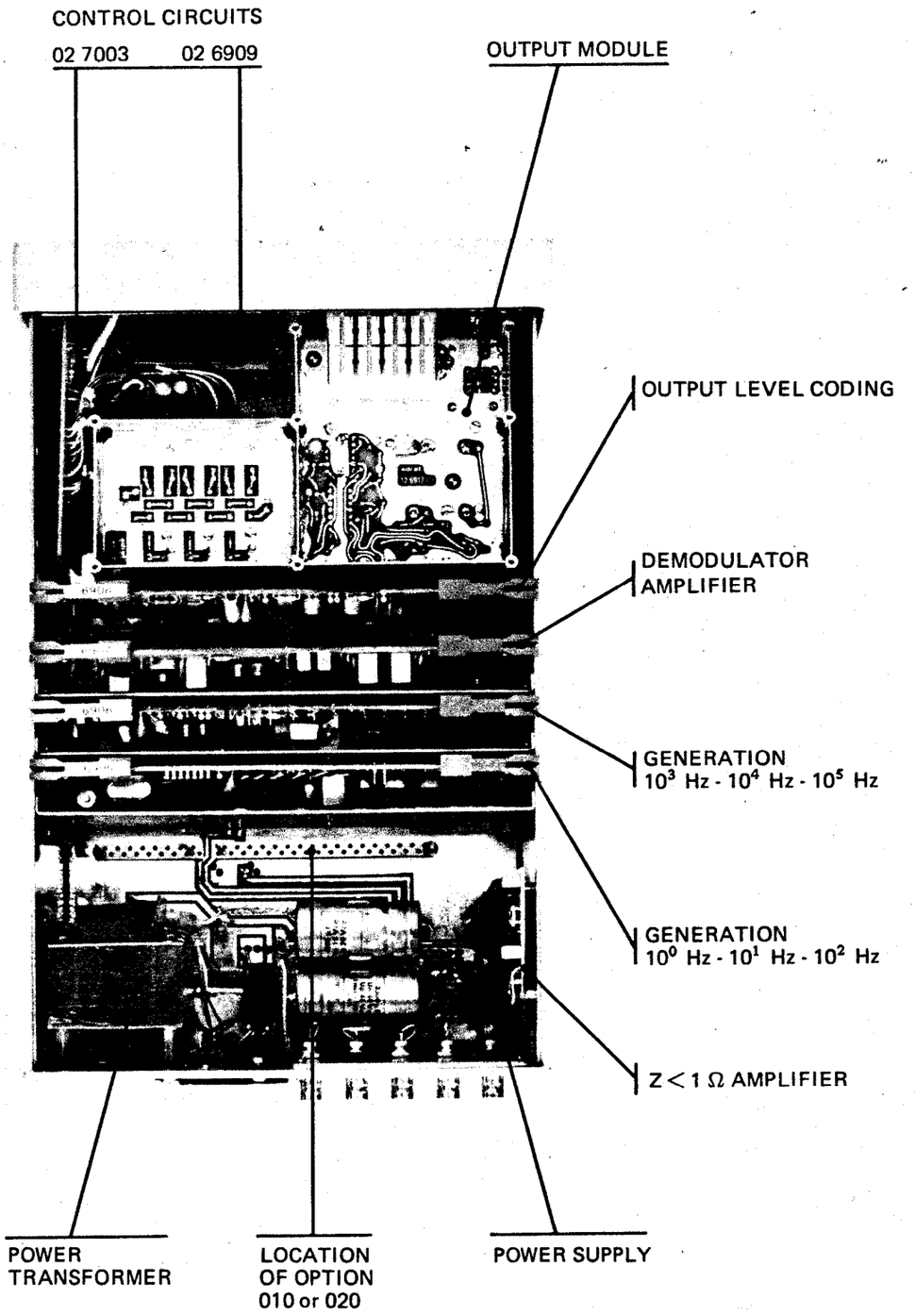
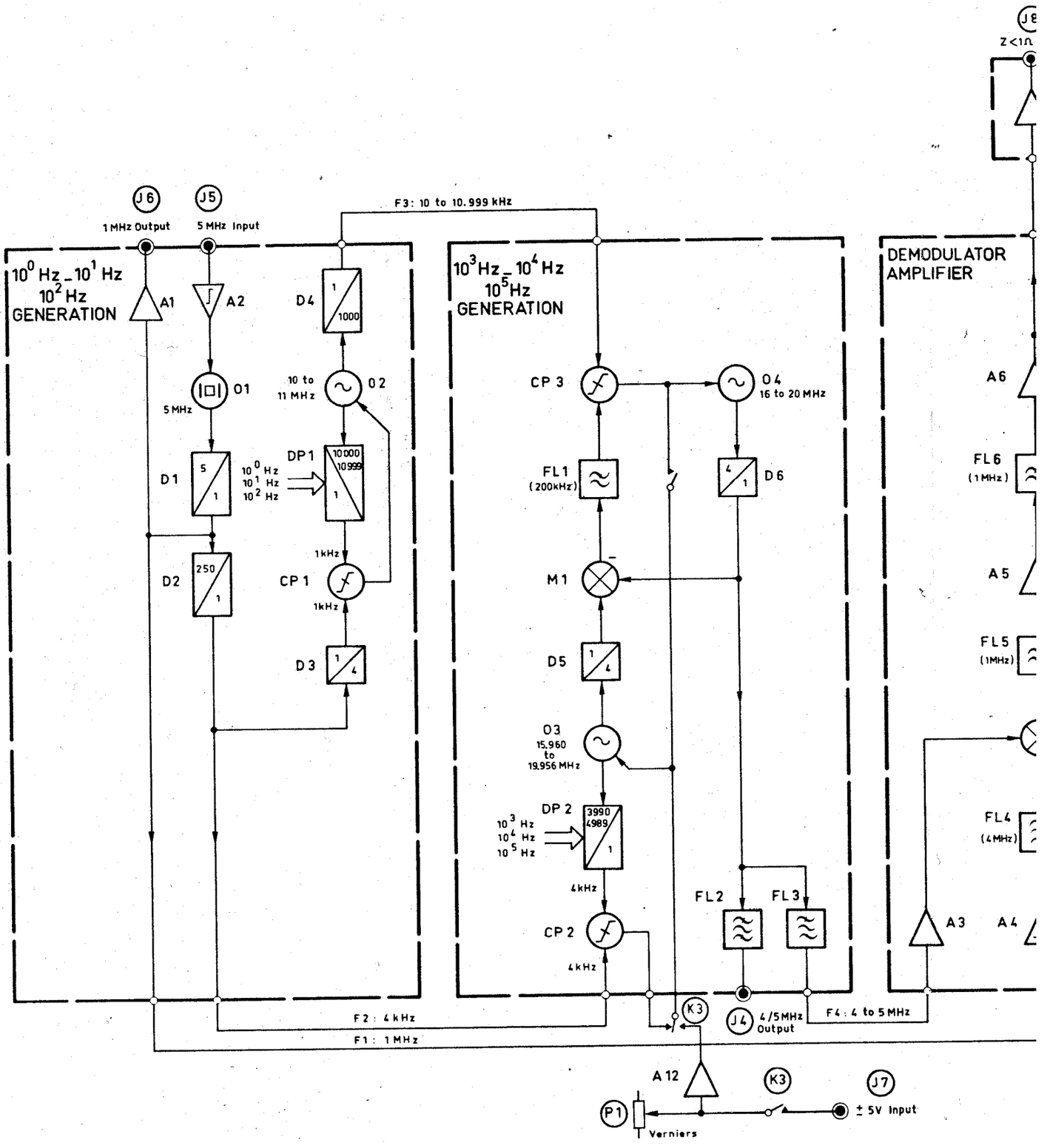
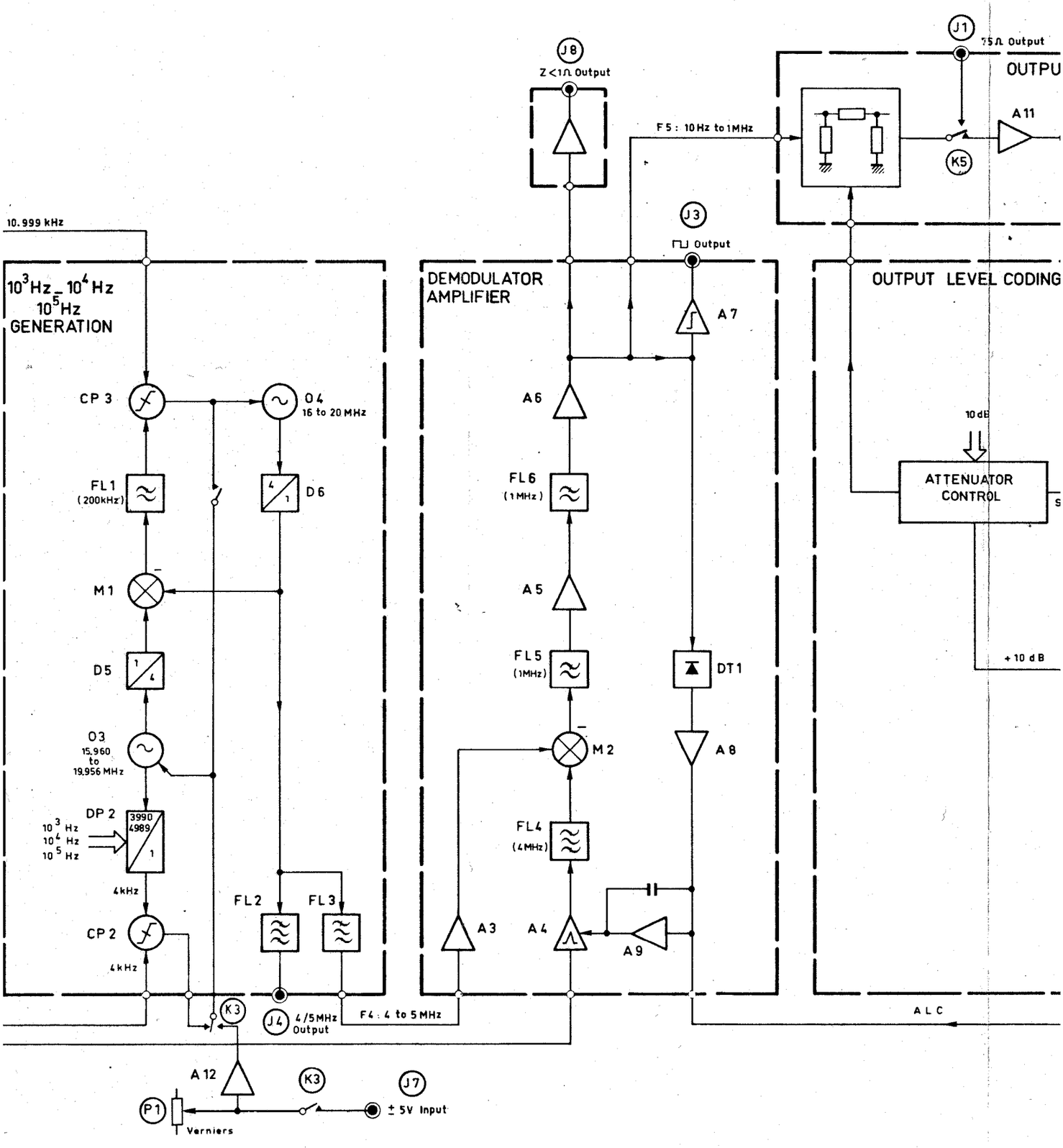


PLATE IV-3

2230A_INTERNAL DESCRIPTION


J6
1 MHz Output
J5
5 MHz Input
F3 : 10 to 10.999 kHz
10^0 Hz _ 10^1 Hz
10^2 Hz
GENERATION
A1
A2
D4
1/1000
O1
5 MHz
10 to
11 MHz
O2
D1
5/1
DP1
10^0 Hz
10^1 Hz
10^2 Hz
10000
10999
1
1kHz
D2
250/1
CP 1
1kHz
D3
1/4
10^3 Hz _ 10^4 Hz
10^5 Hz
GENERATION
CP 3
O4
16 to 20 MHz
FL1
(200kHz)
4/1
D6
M1
D5
1/4
O3
15,960
to
19,956 MHz
DP 2
10^3 Hz
10^4 Hz
10^5 Hz
3990
4989
1
4kHz
CP 2
4kHz
FL2
FL3
DEMODULATOR
AMPLIFIER
A6
FL6
(1MHz)
A5
FL5
(1MHz)
FL4
(4MHz)
A3
A4
F2 : 4 kHz
F1 : 1 MHz
K3
J4
4/5MHz
Output
F4 : 4 to 5 MHz
A12
K3
J7
P1
Verniers
± 5V Input


10.999 kHz
10^3Hz_10^4Hz
10^5Hz
GENERATION
CP 3
O4
16 to 20 MHz
FL1
(200kHz)
D6
M1
D5
O3
15.960
to
19.956 MHz
DP 2
10^3 Hz
10^4 Hz
10^5 Hz
3990
4989
1
4kHz
CP 2
4kHz
FL2
FL3
K3
J4
4/5MHz
Output
F4 : 4 to 5MHz
A12
K3
J7
P1
Verniers
± 5V Input
J8
Z<1Ω Output
F5 : 10Hz to 1MHz
J3
Output
DEMODULATOR
AMPLIFIER
A7
A6
FL6
(1MHz)
A5
FL5
(1MHz)
DT1
M2
A8
FL4
(4MHz)
A3
A4
A9
J1
75Ω Output
OUTPU
A11
K5
OUTPUT LEVEL CODING
10dB
ATTENUATOR
CONTROL
+10 dB
ALC

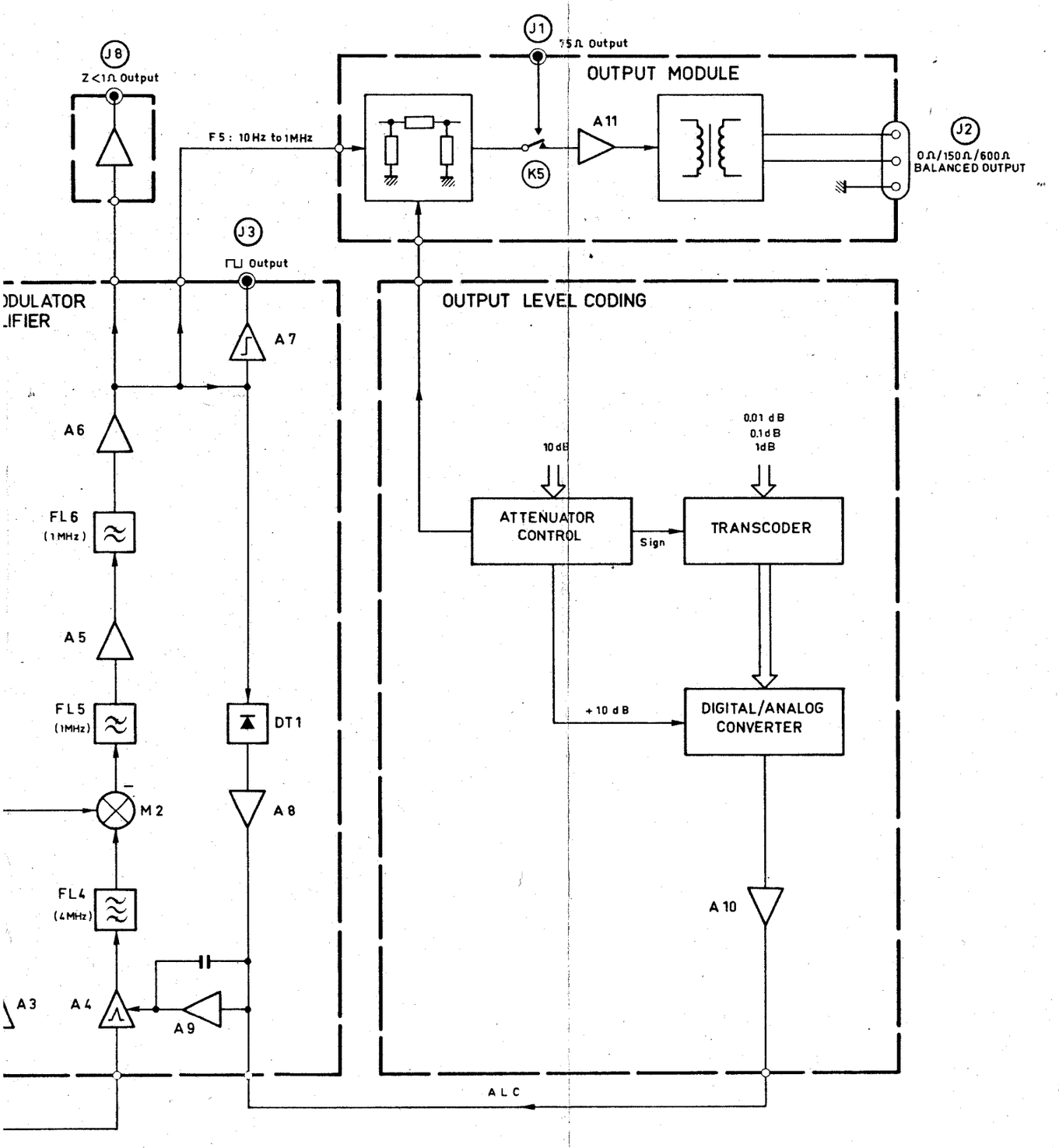


PLATE V_1

2230A_BLOCK DIAGRAM

ADRET ELECTRONIQUE

Improving communications

You have just bought an ADRET instrument.

We would like to thank you for trusting our know-how, and we hope your choice will be satisfying.

However, despite how carefully it has been designed and manufactured, you may encounter some troubles.

To help us overcome these failures, and to solve them, we need to know the nature of your applications, the conditions of use and the difficulties encountered.
You can help us by filling the reply card below.

On the other hand, we periodically publish a news LETTER dealing with our new products, our techniques, our organisation ...

By returning the coupon below, you will automatically be added to our new LETTER mailing list, and benefit from this useful mean of communication with you and between yourselves, users of ADRET equipments.

To tell us about any unusual or original applications you may have found particularly useful - we will publish them, with your permission - so that other users can enjoy the same benefits.

Instrument :

Model : ..... Serial N° : ..... Date of purchase : .....

Main applications and conditions of use : .....

.....

.....

Strong points : ..... Weak points - Difficulties encountered : .....

.....

.....

.....

Would you like to know more about the use of this instrument ? .....

.....

.....

Would you be interested by a visit from a sales engineer ? Yes ☐ No ☐

Would you like information on other Adret instruments ?

Yes ☐ Which : .....

.....

POSTCARD

Company : ....

Department : ....

Service : ....

Address : ....

....

City : ....

Country : ....

Name/firstname : ....

N° tel. : ....

N° telex : ....

ADRET Electronique
Service Commercial
BP 33

78192 TRAPPES CEDEX
FRANCE

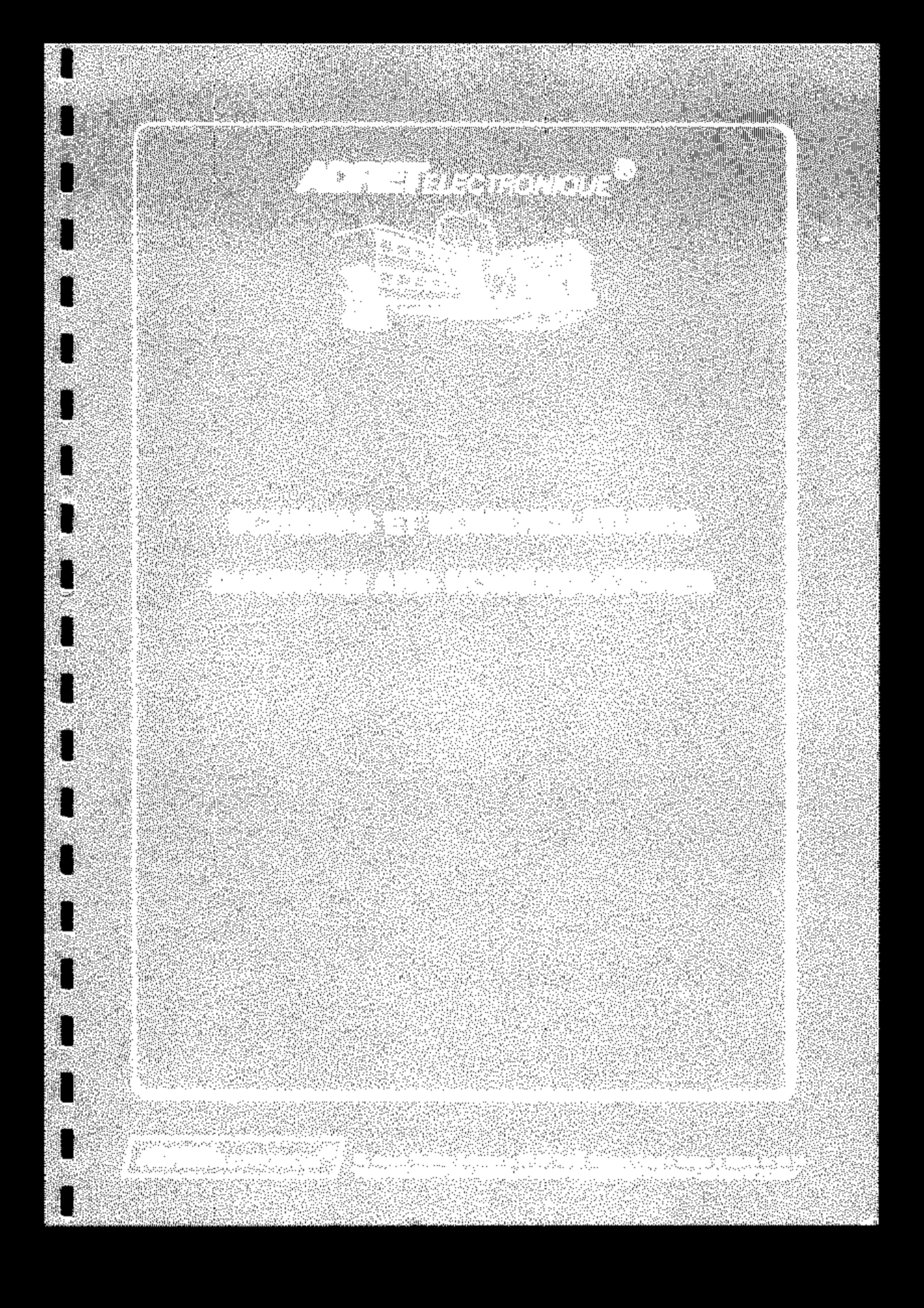


TABLE DES MATIERES

* SIGNIFICATION des codes sous/ensembles et Réf. Adret
* ARTICULATION et SYNOPTIQUE
* SCHEMAS et NOMENCLATURES
* LISTE des COMPOSANTS
* LISTE des SOUS-ENSEMBLES MAINTENANCE
  - Outillage
  - Rechange 100%
  - Rechange 70%
  - Composants maintenance
* Garantie et Assistance

CONTENT

* MEANING of the part number and Adret codes
* ARTICULATION and BLOCK DIAGRAM
* DIAGRAMS and NOMENCLATURES
* COMPONENTS LIST
* RECOMMENDED SUB-ASSEMBLIES or PC board
  - Extended boards
  - Set of 100% of repairs
  - Set of 70% or repairs
  - Set of components
* Warranty and Assistance

SIGNIFICATION des codes sous/ensembles et Ref. Adret

Dans le chapitre **SCHEMAS et NOMENCLATURES**, les deux premiers chiffres
- du code s/ensemble (page 1)
- et de la Ref. Adret (page 2 et suivantes),

correspondent à une famille de produits.
Le détail de ces familles est donné dans le tableau ci-après.

Exemples

Page 1 : Articulation

PAGE	CODE S/ENSEMBLE PART NUMBER	DESCRIPTION	*	PART DESCRIPTION	PLAN DRAWING
- 2	0471004009-*	16 OPTION AMPLI STD	*	16 OPTION AMPLI 650MHZ .	C94.....A98*97
- 5	0271520000-*	13 ATTENUATEUR	*	13 ATTENUATOR ASSEMBLY .	A92.....C98...
- 6	0273210000-*	03 CARTE BF AMPLI STD ..	*	03 BF BOARD AMPLI 650MHZ	A93.....
- 7	0274740000-*	02 CDE AMPLI STD	*	02 CONTROL AMPLI 650MHZ.	C93.....A97

Soit le code s/ensemble **02**71520000.

Le tableau ci-après indique qu'il s'agit d'un sous-ensemble (02).

Page 2 et suivantes : Nomenclature

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION		PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING
001	0271520000	13 ATTENUATEUR	*	13 ATTENUATOR ASSEMBLY .	A92.....C98...
001	0273210000	03 CARTE BF AMPLI STD ..	*	03 BF BOARD AMPLI 650MHZ	A93.....
001	0274740000	02 CDE AMPLI STD	*	02 CONTROL AMPLI 650MHZ.	C93.....A97
B -001	1400217300	KMV10 EMBASE'MALE'FIXAT. AVANT	*	KMV10 00 FRONT ANCHOR MALE ...	SEALECTRO
B -002	1420020700	TRF254 M 20 MALE A SOUDER	*	TRF254 M 20 MALE TO SOLDER	TRELEC
C	3100620000	FILTRE TRAVERSEE ZFN 5203-00A	*	PINCH FILTER ZFN 5203-00A	TDK
C -001	3150042200	0,22MMF 5 50V20% 3439050 E224M	*	0,22MMF 5 50V20% 3439050 E224M	AVX
C -002	3800042200	CHIPS 0,22MMF 20% 25V Z5U-1808	*	CHIPS 0,22MMF 20% 25V Z5U-1808	RTC
C -003	3120098200	8,2FF 2,5"E" 2222 678 09 828	*	8,2FF 2,5"E" 2222 678 09 828	COGECO
C -004	3800042200	CHIPS 0,22MMF 20% 25V Z5U-1808	*	CHIPS 0,22MMF 20% 25V Z5U-1808	RTC

Soit la Ref. Adret **3**150042200.

Le tableau ci-après indique qu'il s'agit d'un condensateur Céramique (31) et rappelle son repère (C).

PRODUITS	Repère	Famille	
		01	Option Client
		02	Sous-Ensemble
		04	Option Usine
COMPOSANTS D'INTERCONNEXIONS		10	Transformateurs
		11	Fils et câbles
		12	Circuits imprimés
		13	Accessoires de câblage
	B	14	Connecteurs
	K	15	Commutateurs
	K	16	Relais

PRODUITS	Repère	Famille	
		17	Protection, signalisation, lampes, fusibles...
		18	Galvanomètre, compteur horaire...
		19	Accessoires pour composants d'interconnexions
RESISTANCES	R	20	Thermistances CTN - CTP
	P	21	Potentiomètres
	R	22,23	Résistances usage courant
	R	24	Résistances usage courant
	R	25,26	Résistances à couche métallique
	R	27	Résistances très haute précision
	R	28	Résistances bobinées
	R	29	Résistances miniatures
CONDENSATEURS	C	31	Condensateurs céramiques
	C	32	Condensateurs film plastique
	C	33	Condensateurs mica
	C	35	Condensateurs électrochimiques
	C	36	Condensateurs variables
	C	37	Condensateurs tantales
	C	38	Condensateurs CHIPS, pastille céramique
		39	Accessoires
SEMI-CONDUCTEURS	D	40	Cellule photo émissive
	SN	41	Circuits intégrés logiques
	SN	42	Circuits intégrés analogiques
	Q	43	Transistors
	Q	44	Transistors à effet de champ
	D	45	Diodes et varicaps
	D	46	Diodes Zener
		48	Circuits hybrides
		49	Accessoires
AUTRES COMPOSANTS ELECTRONIQUES	Y	51	Quartz et accessoires
	F	52	Filtre
	L	53	Inductances surmoulées
		54	Composants pour bobinages
		55	Tubes ferrites
		56	Composants pour bobinages
		57	Accumulateur
		59	Transducteur
PIECES DETACHEES MECANIQUES		61	Vis
		62	Ecrous
		63	Rondelles
		64	Rivets, plots, circlips ...
		65	Boutons, cadrans ...
		67	Entretoises
MECANIQUE		71 à 91	

MEANING of the "part number" and "Ref. Adret" codes

In the **DIAGRAMS and NOMENCLATURES** chapter, the two first numbers of
- the part number (page 1)
- and the Ref. Adret (page 2 and following),

correspond to a product-family.
The details of those families are given in the following list.

Examples

Page 1 : Articulation

PAGE	CODE S/ENSEMBLE PART NUMBER	DESCRIPTION	* * PART DESCRIPTION	PLAN DRAWING
- 2	0471004009-*	16 OPTION AMPLI STD	* 16 OPTION AMPLI 650MHZ .	C94.....A98*97
- 5	0271520000-*	13 ATTENUATEUR	* 13 ATTENUATOR ASSEMBLY .	A92.....C98...
- 6	0273210000-*	03 CARTE BF AMPLI STD ..	* 03 BF BOARD AMPLI 650MHZ	A93.....
- 7	0274740000-*	02 CDE AMPLI STD	* 02 CONTROL AMPLI 650MHZ.	C93.....A97

Take the part number **02**71520000.
The following list indicates that it concerns a sub-assembly (02).

Page 2 and following : Nomenclature

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING
001	0271520000	13 ATTENUATEUR	* 13 ATTENUATOR ASSEMBLY .	A92.....C98...
001	0273210000	03 CARTE BF AMPLI STD ..	* 03 BF BOARD AMPLI 650MHZ	A93.....
001	0274740000	02 CDE AMPLI STD	* 02 CONTROL AMPLI 650MHZ.	C93.....A97
B -001	1400217300	KMV10 EMBASE'MALE'FIXAT. AVANT	* KMV10 00 FRONT ANCHOR MALE ...	SEALECTRO
B -002	1420020700	TRF254 M 20 MALE A SOUDER	* TRF254 M 20 MALE TO SOLDER	TRELEC
C	3100620000	FILTRE TRAVERSEE ZFN 5203-00A	* PINCH FILTER ZFN 5203-00A	TDK
C -001	3150042200	0,22MMF 5 50V20% 3439050 E224M	* 0,22MMF 5 50V20% 3439050 E224M	AVX
C -002	3800042200	CHIPS 0,22MMF 20% 25V Z5U-1808	* CHIPS 0,22MMF 20% 25V Z5U-1808	RTC
C -003	3120098200	8,2FF 2,5"E" 2222 678 09 828	* 8,2FF 2,5"E" 2222 678 09 828	COGECO
C -004	3800042200	CHIPS 0,22MMF 20% 25V Z5U-1808	* CHIPS 0,22MMF 20% 25V Z5U-1808	RTC

Take the Ref. Adret **31**50042200.
The following list indicates that it concerns a ceramic capacitor (31) and recalls its reference (C).

PRODUCTS	Reference	Family	
		01	Customer Option
		02	Sub-Assembly
		04	Factory Option
INTERCONNECTION COMPONENTS		10	Transformers
		11	Cables assembly
		12	Printed circuits
		13	Accessories
	B	14	Connectors
	K	15	Switches
	K	16	Relays

PRODUCTS	Reference Family		
		17	Protection, signalling, lights, fuses ...
		18	Galvanometer, time counter ...
		19	Accessories for interconnection components
RESISTORS	R	20	Thermistors CTN - CTP
	P	21	Potentiometers
	R	22,23	Resistors for running use
	R	24	Resistors for running use
	R	25,26	Resistors with metallic sheet
	R	27	Resistors very high accuracy
	R	28	Winded resistors
	R	29	Miniature resistors
CAPACITORS	C	31	Ceramic capacitors
	C	32	Capacitors film plastic
	C	33	Capacitors mica
	C	35	Electrochemical capacitors
	C	36	Variable capacitors
	C	37	Tantalum capacitors
	C	38	CHIPS capacitors, ceramic pastille
		39	Accessories
SEMI-CONDUCTORS	D	40	Photo emitting cell
	SN	41	Logic printed circuits
	SN	42	Analog printed circuits
	Q	43	Transistors
	Q	44	Field effect transistors
	D	45	Diodes and varicaps
	D	46	Zener diodes
		48	Hybrid circuits
		49	Accessories
OTHERS ELECTRONIC COMPONENTS	Y	51	Crystals and accessories
	F	52	Filter
	L	53	Surmoulded inductors
		54	Components for winding
		55	Ferrite tubes
		56	Components for winding
		57	Battery
		59	Transducer
MECANIC REPLACEMENT PARTS		61	Screws
		62	Nuts
		63	Washers
		64	Clinches, contacts, circlips ...
		65	Knobs, faces ...
		67	Spacer round
MECANICAL		71	to 91

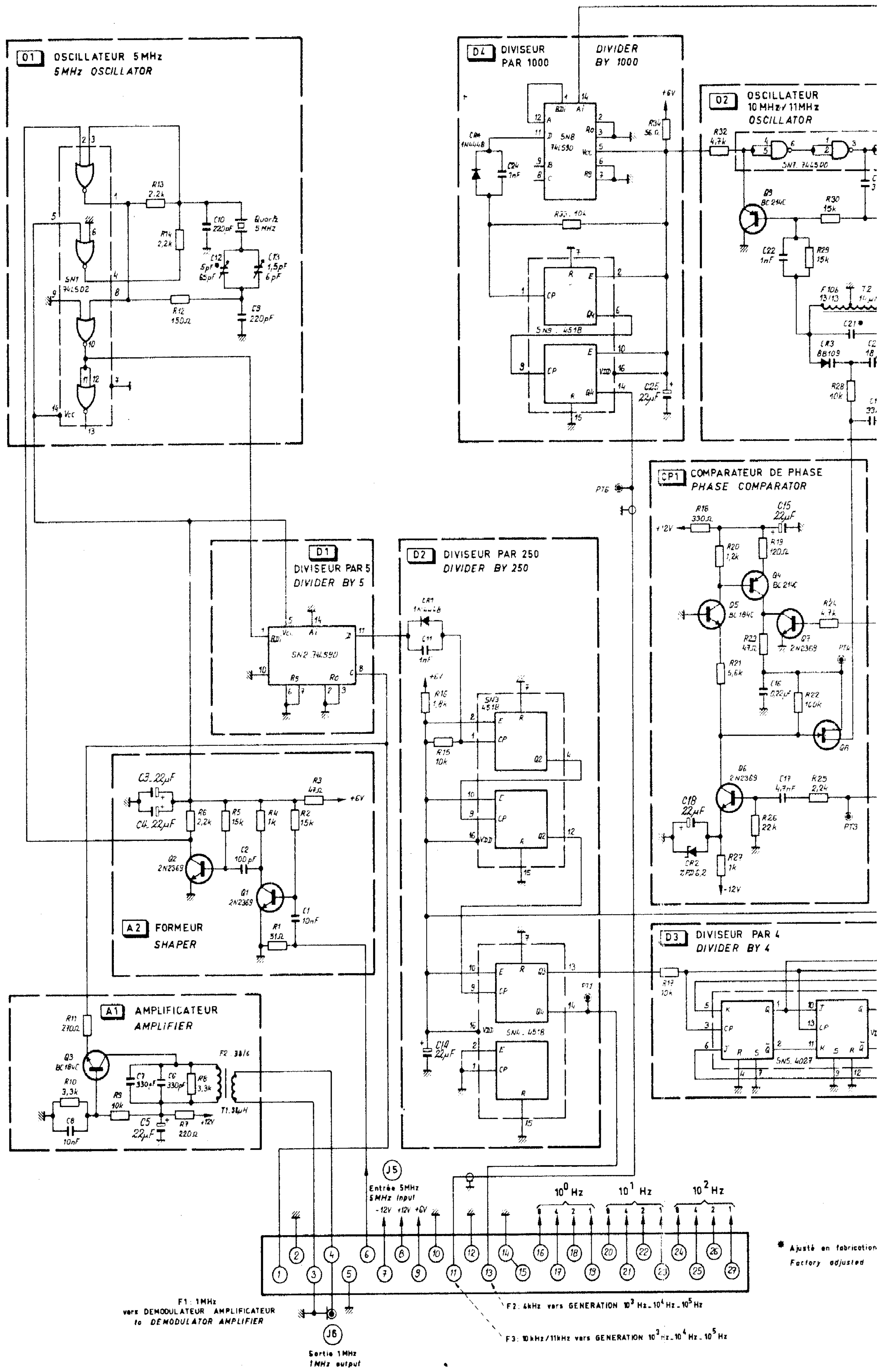
		ARTICULATION & OPTIONS 2230A	ARTICULATION & OPTIONS 2230A	09.86
PAGE	CODE S/ENSEMBLE PART NUMBER	DESCRIPTION	PART DESCRIPTION	PLAN DRAWING
- 2	0422301002-*	00 AVANT HABILLAGE Z=0 . 2230A	00 AVANT HABILLAGE Z=0 . 2230A	
- 3	0269050000-*	14 1ER GENERATION 2230A	14 FIRST GENERATION 2230A	M932502.A976905
- 5	0269060000-*	17 2EME GENERATION 2230A	17 SECOND GENERATION ... 2230A	M932344.E976906
- 8	0269070000-*	13 CARTE AMPLIFICATEUR . 2230A	13 AMPLIFIER BOARD 2230A	G932353.A976907
- 11	0269080000-*	06 CARTE COMMANDE NIVEAU 2230A	06 LEVEL CONTROL BOARD . 2230A	G932349.A976908
- 13	0269100000-*	11 BAQUET DE SORTIE 2230A	11 OUTPUT MODULE 2230A	J920871.C976910
- 14	0269110000-*	03 ATTENUATEUR 2230A	03 ATTENUATOR 2230A	C932524.....
- 15	0269120000-*	11 AMPLI SYMETRIQUE 2230A	11 SYMMETRICAL AMPLI ... 2230A	H932351 1&2/2..
- 16	0270080300-*	02 CHASSIS EQUIPE ZO ... 2230A	02 FITTED CHASSIS ZO ... 2230A	J910214.....
- 17	0269150100-*	07 PORTEUR EQUIPE 2230A	07 FITTED MOTHER BD 2230A	B920953.A976915
- 18	0270110000-*	08 PLAQUE AVANT MONTEE . 2230A	08 ASSEM. FRONT PLATE .. 2230A	L920934.....
- 19	0269090000-*	03 COMMUTATEUR TTL 2230A	03 TTL SWITCH 2230A	D932366.....
- 20	0270030100-*	09 COMMUTATEUR MODE 2230A	09 MODE SWITCH 2230A	J932523.B977003
- 21	0270100000-*	04 BLOC ROUES CODEES ... 2230A	04 SPIN WHEELS BLOCK ... 2230A	D920933.....
- 22	0270940000-*	01 AMPLI Z=0 ..... 2230A	01 AMPLI Z=0 ..... 2230A	E932549.A977094
- 23	0422308301-*	08 OPTION 2 IEEE 2230A	08 OPTION 2 IEEE 2230A	F932565
- 24	0269970000-*	06 CARTE REGISTRE IEEE . 2230A	06 IEEE REGISTER BOARD . 2230A	E932563.B976997
- 25	0274880000-*	02 CARTE ISOLATION IEEE 2230A	02 IEEE INSULATING BOARD 2230A	D932961.C977488
- 27	0422308302-*	03 OPTION 1 BCD 2230A	03 OPTION 1 BCD 2230A	A932555(2).....
- 28	0269130000-*	01CARTE OPTION BCD 2230A	01 BCD OPTION BOARD 2230A	932547. 976913

*7620022301 ARTICULATION & OPTIONS 2230A * ARTICULATION & OPTIONS 2230A NOTICES EDITION *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
001	0422301002	00 AVANT HABILLAGE Z=0 . 2230A	* 00 AVANT HABILLAGE Z=0 . 2230A		1
001	0422308301	08 OPTION 2 IEEE 2230A	* 08 OPTION 2 IEEE 2230A	F932565	1
001	0422308302	03 OPTION 1 BCD 2230A	* 03 OPTION 1 BCD 2230A	A932555(2).....	1
ZO	0122309001	KIT ASSEMBLAGE RACK 3U 1X2230A	* KIT ASSEMBLAGE RACK 3U 1X2230A	A910165	1
ZO	0122309002	KIT ASSEMBLAGE RACK 3U 2X2230A	* KIT ASSEMBLAGE RACK 3U 2X2230A	A910165	1
ZO	0122309003	00 PROLONGATEUR 27 1 GEN 2230A	* 00 PROLONGATEUR 27 1 GEN 2230A	*932610.....	1
ZO	0122309004	00 PROLONGATEUR 27 2 GEN 2230A	* 00 PROLONGATEUR 27 2 GEN 2230A	*932611.....	1
ZO	0122309005	00 PROLONG. OPT.IEEE+BCD 2230A	* 00 PROLONG. OPT.IEEE+BCD 2230A	A93.....	1
ZO	0122309006	00 PROLONG. CDE NIVEAU 2230A	* 00 PROLONG. CDE NIVEAU 2230A	A93.....	1
ZO	0122309007	00 PROLONGATEUR AMPLI .. 2230A	* 00 PROLONGATEUR AMPLI .. 2230A	A93.....	1
ZO	0422308304	01 OPTION 20/21MHZ 2230A	* 01 OPTION 20/21MHZ 2230A	A92 1&2/2	1

*0422301002 00 AVANT HABILLAGE Z=0 . 2230A * 00 AVANT HABILLAGE Z=0 . 2230A *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
001	0269050000 14	1ER GENERATION ..... 2230A *	14 FIRST GENERATION 2230A	M932502.A976905	1
001	0269060000 17	2EME GENERATION ..... 2230A *	17 SECOND GENERATION ... 2230A	M932344.E976906	1
001	0269070000 13	CARTE AMPLIFICATEUR . 2230A *	13 AMPLIFIER BOARD 2230A	G932353.A976907	1
001	0269080000 06	CARTE COMMANDE NIVEAU 2230A *	06 LEVEL CONTROL BOARD . 2230A	G932349.A976908	1
001	0269100000 11	BAQUET DE SORTIE .... 2230A *	11 OUTPUT MODULE 2230A	J920871.C976910	1
001	0270080300 02	CHASSIS EQUIPE Z0 ... 2230A *	02 FITTED CHASSIS Z0 ... 2230A	J910214.....	1
Z0	0422301300 02	LOT HABILLAGE ..... FANTOME *	02 LOT HABILLAGE ..... FANTOME		1


O1 OSCILLATEUR 5MHz
5MHz OSCILLATOR
D4 DIVISEUR PAR 1000
DIVIDER BY 1000
O2 OSCILLATEUR 10 MHz / 11MHz
OSCILLATOR
CP1 COMPARATEUR DE PHASE
PHASE COMPARATOR
D1 DIVISEUR PAR 5
DIVIDER BY 5
D2 DIVISEUR PAR 250
DIVIDER BY 250
A2 FORMEUR
SHAPER
A1 AMPLIFICATEUR
AMPLIFIER
D3 DIVISEUR PAR 4
DIVIDER BY 4
J5 Entrée 5MHz
5MHz input
J6 Sortie 1MHz
1MHz output
F1 : 1MHz vers DEMODULATEUR AMPLIFICATEUR
to DEMODULATOR AMPLIFIER
F2 : 4kHz vers GENERATION 10³ Hz - 10⁴ Hz - 10⁵ Hz
F3 : 10kHz/11kHz vers GENERATION 10³ Hz - 10⁴ Hz - 10⁵ Hz
10⁰ Hz
10¹ Hz
10² Hz
* Ajusté en fabrication
Factory adjusted

D1 DIVISEUR PAR 5
DIVIDER BY 5

D2 DIVISEUR PAR 250
DIVIDER BY 250

D4 DIVISEUR PAR 1000
DIVIDER BY 1000

O2 OSCILLATEUR 10 MHz / 11 MHz
OSCILLATOR

CP1 COMPARATEUR DE PHASE
PHASE COMPARATOR

D3 DIVISEUR PAR 4
DIVIDER BY 4

DP1 DIVISEUR PROGRAMMABLE
PROGRAMMABLE DIVIDER

J5 Entrée 5MHz
5MHz input

J6 ortie 1MHz
MHz output

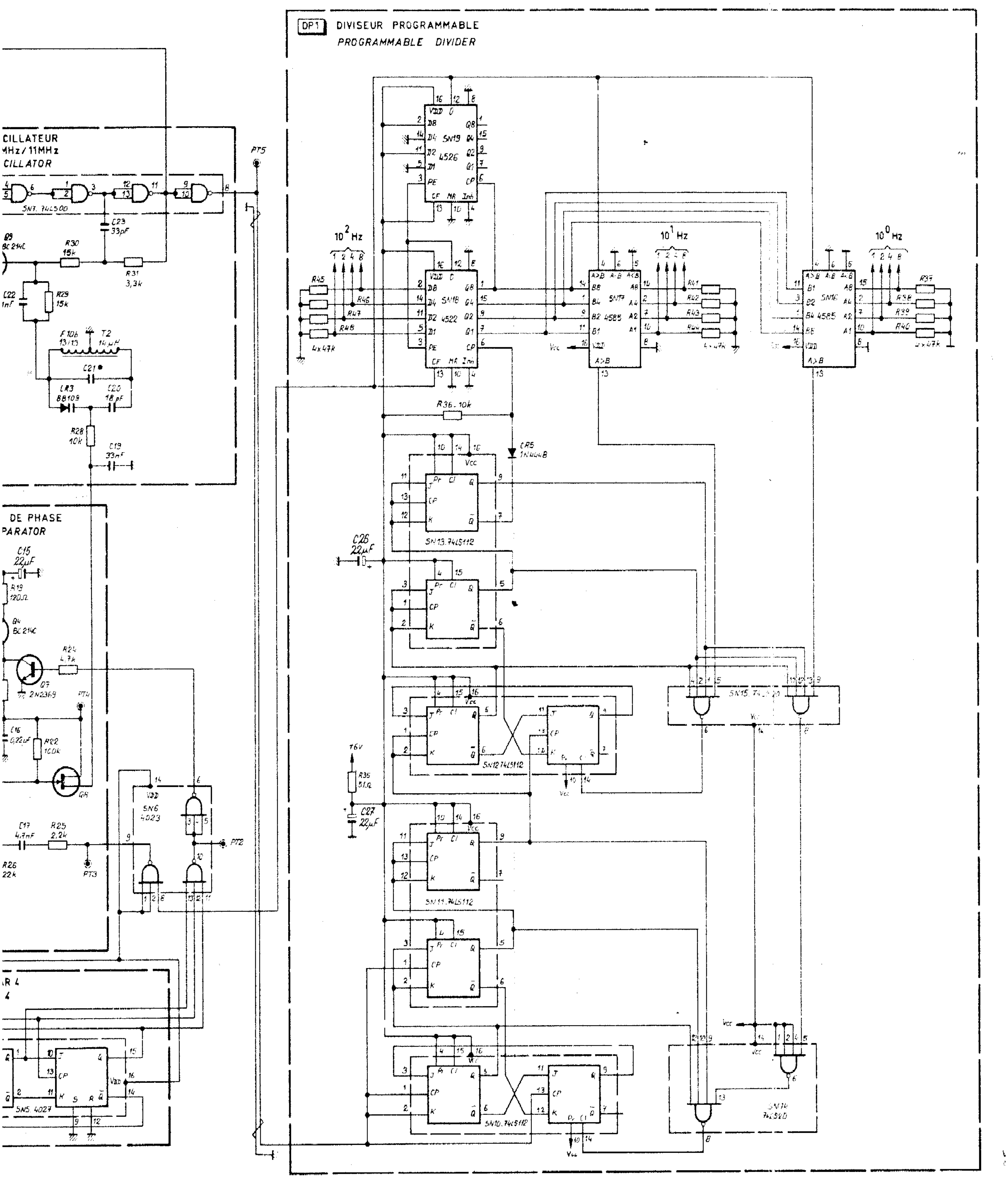
F2 : 4kHz vers GENERATION 10^3 Hz_10^4 Hz_10^5 Hz

F3 : 10kHz/11kHz vers GENERATION 10^3 Hz_10^4 Hz_10^5 Hz

10^0 Hz 10^1 Hz 10^2 Hz

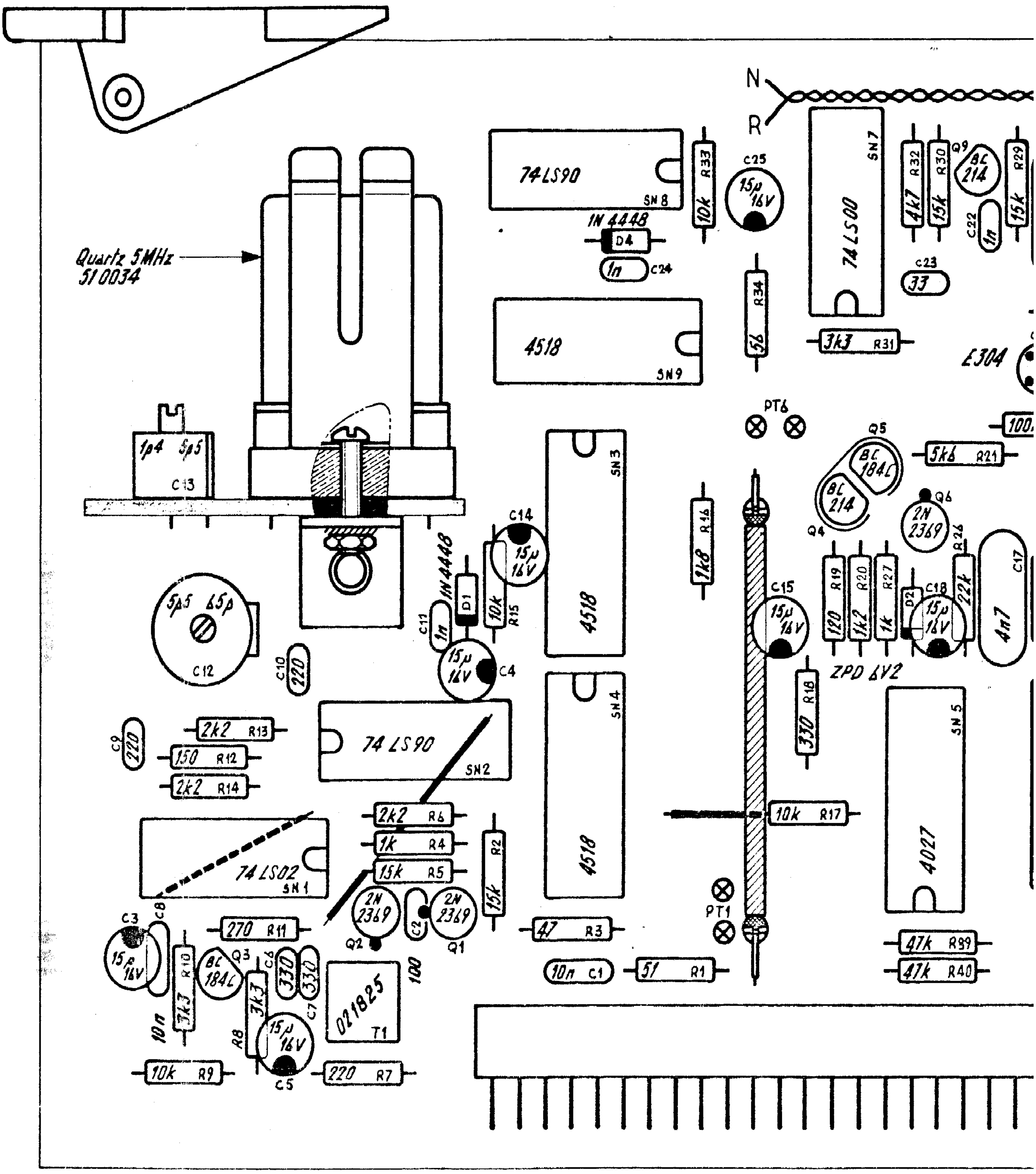
* Ajusté en fabrication
Factory adjusted

ÉTUDIÉ	DESSINÉ	VÉRI
	ACORT	H V

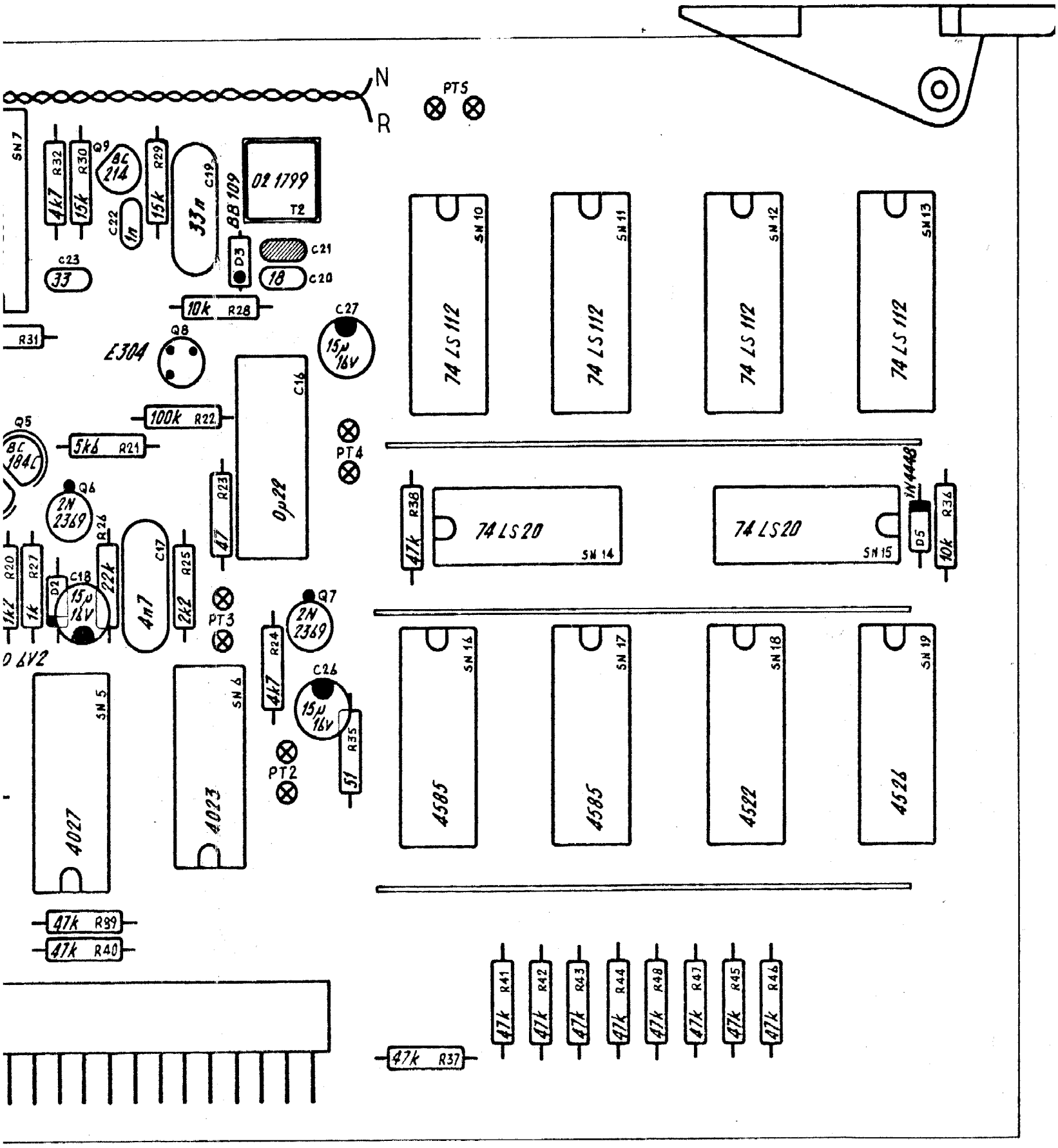


* Ajusté en fabrication
Factory adjusted

Ce document ne peut être communiqué ni reproduit sans autorisation		adret electronique	DATE : JUILLET 1978
ETUDIÉ	DESSINÉ	VERIFIÉ	2230 A	PAGE : 1 / 1
	ACORT	HK	GENERATION 10^0 Hz - 10^1 Hz - 10^2 Hz	976905A



Quartz 5MHz
510034
N
R
74LS90
SN8
10k R33
C25
15µ 16V
1N 4448
D4
1n C24
4518
SN9
5k6 R34
74LS00
SN7
4k7 R32
15k R30
Q9
BC 214
15k R29
C22
1n
C23
33
3k3 R31
L304
PT6
Q5
BC 184C
BC 214
Q4
5k6 R21
Q6
2N 2369
1p4 5p5
C13
SN3
4518
C14
15µ 16V
1N 4448
D1
10k R15
C11
1n
C4
15µ 16V
1k8 R16
C15
15µ 16V
120 R19
1k2 R20
1k R27
D2
C18
15µ 16V
22k R26
C17
4n7
ZPD 6V2
5p5 65p
C12
C10
220
C9
220
2k2 R13
150 R12
2k2 R14
74LS90
SN2
SN4
4518
330 R18
SN5
4027
10k R17
2k2 R6
1k R4
15k R5
15k R2
74LS02
SN1
2N 2369
Q2
C2
2N 2369
Q1
PT1
47 R3
10n C1
51 R1
47k R39
47k R40
C3
15µ 16V
C8
10n
3k3 R10
Q3
BC 184C
270 R11
3k3 R8
C6
330
C7
330
021825
T1
100
15µ 16V
C5
10k R9
220 R7


N
R
PT5
SN 7
R32 4k7
R30 15k
Q9 BC 214
R29 15k
C19 33n
C22 1n
BB 109
D3
02 1799
T2
C21
C20 18
C23 33
10k R28
R31
Q8 E304
C27 15µ 16V
100k R22
C16 0µ22
Q5 BC 184C
5k6 R21
PT4
Q6 2N 2369
R23 47
R26 22k
R20 1k2
R27 1k
D2
C18 15µ 16V
C17 4n7
R25 2k2
PT3
Q7 2N 2369
R24 4k7
C26 15µ 16V
R35 51
PT2
0 6V2
SN 5 4027
SN 6 4023
47k R39
47k R40
SN 10 74 LS 112
SN 11 74 LS 112
SN 12 74 LS 112
SN 13 74 LS 112
R38 47k
SN 14 74 LS 20
SN 15 74 LS 20
D5 1N 4448
R36 10k
SN 16 4585
SN 17 4585
SN 18 4522
SN 19 4526
47k R37
R41 47k
R42 47k
R43 47k
R44 47k
R48 47k
R47 47k
R45 47k
R46 47k

*0269050000 14 1ER GENERATION ..... 2230A * 14 FIRST GENERATION .... 2230A M932502.A976905 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
B -001	1427011600	TM 27 MCIG ..... MALE*CARTE*	TM 27 MCIG ..... MALE	TRELEC	1
C -001	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -002	3120011000	100PF 2,5 'N10'2222 680 58 101	100PF 2,5 'N10'2222 680 58 101	COGECO	1
C -003	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -004	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -005	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -006	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -007	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -008	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -009	3120012200	220PF 2,5 'N22'2222 680 58 221	220PF 2,5 'N22'2222 680 58 221	COGECO	1
C -010	3120012200	220PF 2,5 'N22'2222 680 58 221	220PF 2,5 'N22'2222 680 58 221	COGECO	1
C -011	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -012	3600070000	5,5/65PF JAUNE 2222 808 32659	5.5/65PF YELLOW 2222 808 32659	RTC(C010)	1
C -013	3600150000	1,4/5,5PF GRISE C010 808-11558	1.4/5.5PF GREY C010 808-11558	RTC(C010)	1
C -014	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -015	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -016	3224220000	0,22MMF 15(10%40V)POLYC CKB68	0,22MMF 15(10%40V)POLYC CKB68	GAM	1
C -017	3232470000	4700PF 10(10%400V)222236855472	4700PF 10(10%400V)222236855472	COGECO	1
C -018	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -019	3233330000	33NF 10(10%250V)222236845333	33NF 10(10%250V)222236845333	COGECO	1
C -020	3120001800	18PF 2,5 'J' 2222 680 10 189	18PF 2,5 'J' 2222 680 10 189	COGECO	1
C -021	3100000000	CONDENS CERAMIQUE A AJUSTER	CERAMIC CAPACITORS TO ADJUST	ADRET	1
C -022	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -023	3120003300	33PF 2,5 2222 680 10 339	33PF 2,5 2222 680 10 339	COGECO	1
C -024	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -025	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -026	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -027	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
D -001	4500310000	1 N 4448	1 N 4448	ITT	1
D -002	4600050000	ZPD 6,2	ZPD 6,2	ITT	1
D -003	4500452200	BB 409 ENTRE 9&11,5PF A 11V CE	BB 409 INPUT 9&11.5PF A 11V IC	ADRET C.ENTREE.	1
D -004	4500310000	1 N 4448	1 N 4448	ITT	1
D -005	4500310000	1 N 4448	1 N 4448	ITT	1
Q -001	4300050000	2N2369 A	2N2369 A	MOTOROLA	1
Q -002	4300050000	2N2369 A	2N2369 A	MOTOROLA	1
Q -003	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -004	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -005	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -006	4300050000	2N2369 A	2N2369 A	MOTOROLA	1
Q -007	4300050000	2N2369 A	2N2369 A	MOTOROLA	1
Q -008	4400080000	2N4416 .....CODE ACHAT	2N4416 ..... PURCHASE CODE	*930849	1
Q -009	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
R -001	2210005100	51R 5% N4	51R 5% N4	SOVCOR	1
R -002	2210031500	15K 5% N4	15K 5% N4	SOVCOR	1
R -003	2210004700	47R 5% N4	47R 5% N4	SOVCOR	1
R -004	2210021000	1K0 5% N4	1K0 5% N4	SOVCOR	1
R -005	2210031500	15K 5% N4	15K 5% N4	SOVCOR	1
R -006	2210022200	2K2 5% N4	2K2 5% N4	SOVCOR	1
R -007	2210012200	220R 5% N4	220R 5% N4	SOVCOR	1
R -008	2210023300	3K3 5% N4	3K3 5% N4	SOVCOR	1
R -009	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -010	2210023300	3K3 5% N4	3K3 5% N4	SOVCOR	1
R -011	2210012700	270R 5% N4	270R 5% N4	SOVCOR	1
R -012	2210011500	150R 5% N4	150R 5% N4	SOVCOR	1
R -013	2210022200	2K2 5% N4	2K2 5% N4	SOVCOR	1
R -014	2210022200	2K2 5% N4	2K2 5% N4	SOVCOR	1
R -015	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -016	2210021800	1K8 5% N4	1K8 5% N4	SOVCOR	1
R -017	2200031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -018	2210013300	330R 5% N4	330R 5% N4	SOVCOR	1
R -019	2210011200	120R 5% N4	120R 5% N4	SOVCOR	1
R -020	2210021200	1K2 5% N4	1K2 5% N4	SOVCOR	1
R -021	2210025600	5K6 5% N4	5K6 5% N4	SOVCOR	1
R -022	2210041000	100K 5% N4	100K 5% N4	SOVCOR	1
R -023	2210004700	47R 5% N4	47R 5% N4	SOVCOR	1
R -024	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -025	2210022200	2K2 5% N4	2K2 5% N4	SOVCOR	1
R -026	2210032200	22K 5% N4	22K 5% N4	SOVCOR	1
R -027	2210021000	1K0 5% N4	1K0 5% N4	SOVCOR	1
R -028	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -029	2210031500	15K 5% N4	15K 5% N4	SOVCOR	1
R -030	2210031500	15K 5% N4	15K 5% N4	SOVCOR	1
R -031	2210023300	3K3 5% N4	3K3 5% N4	SOVCOR	1
R -032	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -033	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -034	2210005600	56R 5% N4	56R 5% N4	SOVCOR	1
R -035	2210005100	51R 5% N4	51R 5% N4	SOVCOR	1
R -036	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -037	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1

*0269050000 14 1ER GENERATION ..... 2230A * 14 FIRST GENERATION .... 2230A M932502.A976905 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
R -038	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -039	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -040	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -041	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -042	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -043	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -044	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -045	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -046	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -047	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -048	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
SN -001	4150740200	SN 74 LS 02 N 3	SN 74 LS 02 N 3	TEXAS	1
SN -002	4150749000	SN 74 LS 90 N 3	SN 74 LS 90 N 3	TEXAS	1
SN -003	4160451800	C-MOS 4518	C-MOS 4518	RTC	1
SN -004	4160451800	C-MOS 4518	C-MOS 4518	RTC	1
SN -005	4160402700	C-MOS 4027	C-MOS 4027	RTC	1
SN -006	4160402300	C-MOS 4023	C-MOS 4023	RTC	1
SN -007	4150740000	SN 74 LS 00 N 3	SN 74 LS 00 N 3	TEXAS	1
SN -008	4150749000	SN 74 LS 90 N 3	SN 74 LS 90 N 3	TEXAS	1
SN -009	4160451800	C-MOS 4518	C-MOS 4518	RTC	1
SN -010	4157411200	SN 74 LS 112 N	SN 74 LS 112 N	'FU' TEXAS	1
SN -011	4157411200	SN 74 LS 112 N	SN 74 LS 112 N	'FU' TEXAS	1
SN -012	4157411200	SN 74 LS 112 N	SN 74 LS 112 N	'FU' TEXAS	1
SN -013	4157411200	SN 74 LS 112 N	SN 74 LS 112 N	'FU' TEXAS	1
SN -014	4150742000	SN 74 LS 20 N 3	SN 74 LS 20 N 3	TEXAS	1
SN -015	4150742000	SN 74 LS 20 N 3	SN 74 LS 20 N 3	TEXAS	1
SN -016	4160458500	C-MOS 4585	C-MOS 4585	'FU' RTC	1
SN -017	4160458500	C-MOS 4585	C-MOS 4585	'FU' RTC	1
SN -018	4160452200	C-MOS 4522	C-MOS 4522	RTC	1
SN -019	4160452600	C-MOS 4526	C-MOS 4526	RTC	1
T -001	0218250000	00 F2 38X6 SPIRES 2230A	00 F2 38X6 TURNS 2230A	Z94 F2.....44	1
T -002	0217990000	00 F10B 13+13 ..... 2200A	00 F10B 13+13 TURNS 2200A	Z94 F10B.....26	1
Y -001	5100550000	QUARTZ 5 MHZ .. REF JJ05E QC36	5 MHZ CRYSTAL . REF JJ05E QC36	HYQ	1
Z0	0206780000	00 ETIQUETTE 6905 ..... 2230A	00 LABEL 6905 ..... 2230A	942375.....	1
Z1	1100010000	FIL NOIR KY30-04	BLACK THREAD KY30-04	FILECA	0
Z1	1100030000	FIL ROUGE KY30-04	RED THREAD KY30-04	FILECA	0
Z1	1100430000	COAX KX 21 A	COAX KX 21 A	FILECA	0
Z1	1100530000	FIL.NU.ETAME.6/10	TINNED BARE THREAD 6/10	ELECTROFIL	0
Z1	1269050700	CI 1 GENERATION 2230A	PC 1 GENERATION 2230A	K996905.....TM	1
Z1	1269950000	CI SUPPORT QUARTZ 1'GENE 2200A	PC BASE QUARTZ 1'GENERAT 2200A	A996995	1
Z1	1300600000	SOUPLISSO 1X1,2 COUL. NATUREL	SPAGHETTI 1X1.2 GRAY COLORED	HABIA	0
Z1	1400109900	POINT TEST	TEST POINT	C940850	12
Z1	1900200000	EXTRACTEUR DE CARTE'ELEVATEUR'	BOARD EXTRACTOR 'LIFTER'	TRELEC	2
Z4	4900250000	ENTRETOISE TO18-019D	SPACER TO18-019D	JERMYN	4
Z5	5100060000	SUPPORT DE QUARTZ REF SQ2Z VFA	CRYSTAL SUPPORT REF SQ2Z VFA	UMD	1
Z5	5100090000	CLIPS POUR QUARTZ SQ	CLIPS FOR CRYSTAL SQ	UMD	1
Z5	5400050000	CALE ISOLANTE NEOSID POUR CI .	NEOSID INSULATING QUOIN FOR PC -940008		2
Z6	6130121000	LAD 2 X10 CYLINDRIQUE FENDUE	LAD 2 X10 CYLINDRIQUE FENDUE	SAGIC	1
Z6	6200020000	ECROU H M2 U NF E27-411-5 INOX	NUT H M2 U NF E27-411-5 INOX .	BD	1
Z6	6300031000	3,2X 7X 1 PLATE ..... INOX	3.2X 7X 1 FLAT ..... INOX	BD	1
Z6	6301020000	DI 2 EVENTAIL NFE 27-618 INOX	STEEL 2 FAN NFE 27-618 INOX	BD	1
Z6	6400040000	RIVET D 3 L 5 REF 3050	RIVET D 3 L 5 REF 3050	MFOM	1
Z6	6400280000	PLOT A FOURCHE SOUDE . BFMQ13C	SOLDERED FORK CONTACT BFMQ13C	COMATEL	2
Z6	6400510000	EQUERRE 10X10 LARG 10 EP 1	ANGLEBRACKET10X10 WIDTH10 EP 1	A943051	1
Z6	6400530000	OEILLET LAITON ..... N° 2070	FIXING EYELET BRASS .. N° 2070	MFOM	2
Z6	6400710000	BUS-BARRE PAS 12,7	BUS-BAR STEP 12.7	SEEM	0
Z8	8000290000	BLINDAGE POUR NEOSID	SHIELDING FOR NEOSID	B940048	1

CP3 COMPARATEUR PHASE / FREQUENCE
PHASE / FREQUENCY COMPARATOR

O4 OSCILLATEUR 16 MHz / 20 MHz
OSCILLATOR

FL1 FILTRE PASSE.BAS 200kHz
200kHz LOW_PASS FILTER

O3 OSCILLATEUR
15,960 MHz / 15,956 MHz
OSCILLATOR

M1 MELANGEUR
MIXER

D5 DIVISEUR PAR 4
DIVIDER BY 4

D6 DIVISEUR PAR 4
DIVIDER BY 4

FL3 FILTRE 4MHz / 5MHz
FILTER

FL2 FILTRE
4 MHz / 5 MHz
FILTER

CP2 COMPARATEUR PHASE / FREQUENCE
PHASE / FREQUENCY COMPARATOR

F4 : 4 MHz / 5 MHz
vers DEMODULATEUR AMPLIFICATEUR
to DEMODULATOR AMPLIFIER

F3 : 10 kHz / 11 kHz issu
de GENERATION
10^0 Hz .. 10^1 Hz .. 10^2 Hz

Tension d'asservissement
vers CIRCUITS DE COMMANDE
Phase locking voltage
to CONTROL _ CIRCUITS

J4 Sortie
4MHz / 5MHz
Output

DS3 HP4855 HP4855

DP2 DIVISEUR PROGRAMMABLE
PROGRAMMABLE DIVIDER

O3 OSCILLATEUR
15,960 MHz / 15,956 MHz
OSCILLATOR

FILTRE PASSE-BAS 200 kHz
200 kHz LOW-PASS FILTER

D5 DIVISEUR PAR 4
DIVIDER BY 4

CP2 COMPARATEUR PHASE / FREQUENCE
PHASE / FREQUENCY COMPARATOR

FILTRE 4 MHz / 5 MHz
FILTER

F4 : 4 MHz / 5 MHz
vers DEMODULATEUR AMPLIFICATEUR
to DEMODULATOR AMPLIFIER

F3 : 10 kHz / 11 kHz issu de GENERATION
10^0 Hz, 10^1 Hz, 10^2 Hz

F2 : 4 kHz issu de GENERATION
10^0 Hz, 10^1 Hz, 10^2 Hz

10^3 Hz 10^4 Hz 10^5 Hz

* Ajusté en fabrication
Factory adjusted

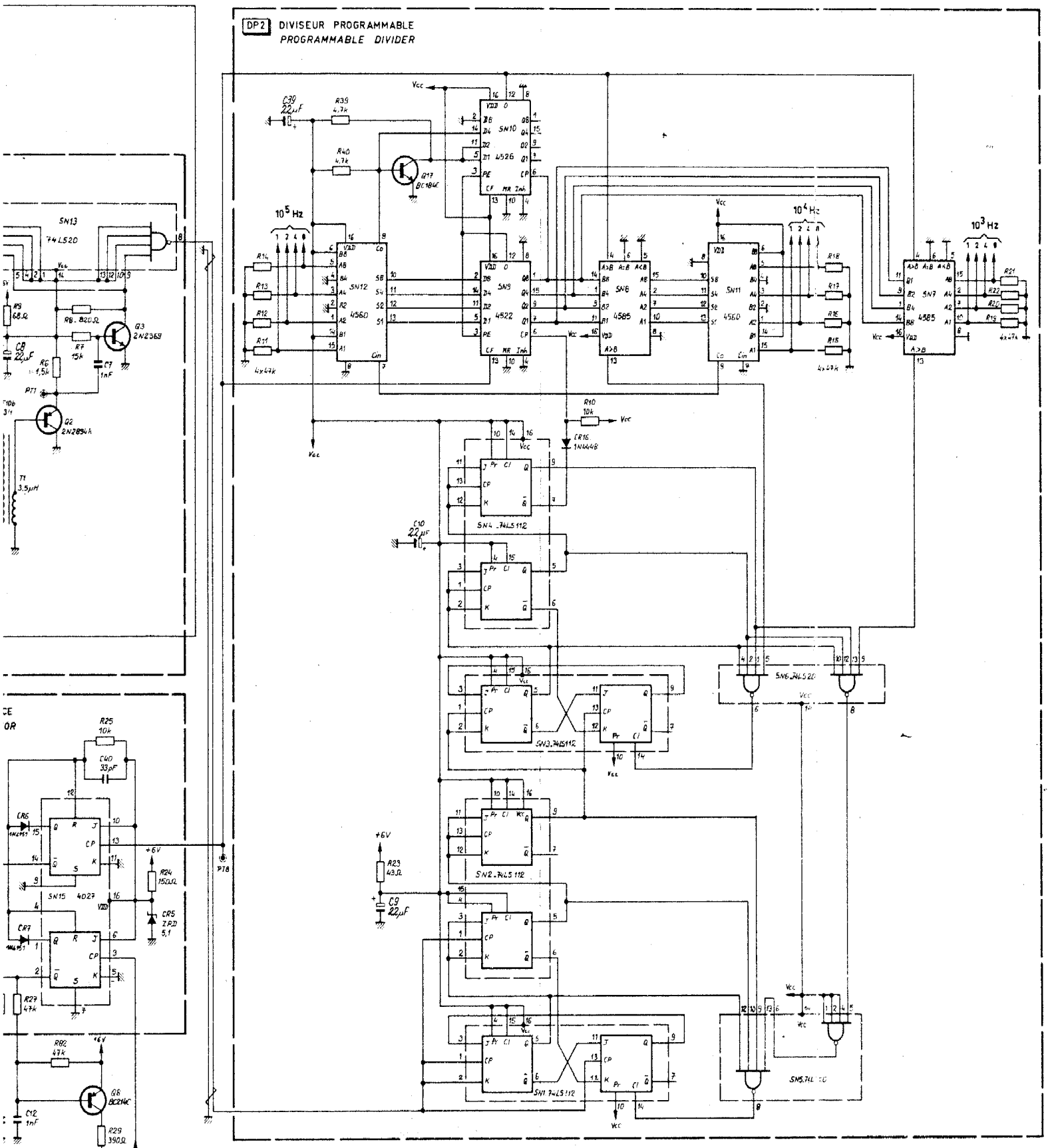
Tension d'asservissement
vers CIRCUITS DE COMMANDE
Phase-locking voltage
to CONTROL CIRCUITS

J4 Sortie 4 MHz / 5 MHz
Output

DS3 HP4855 HP4855

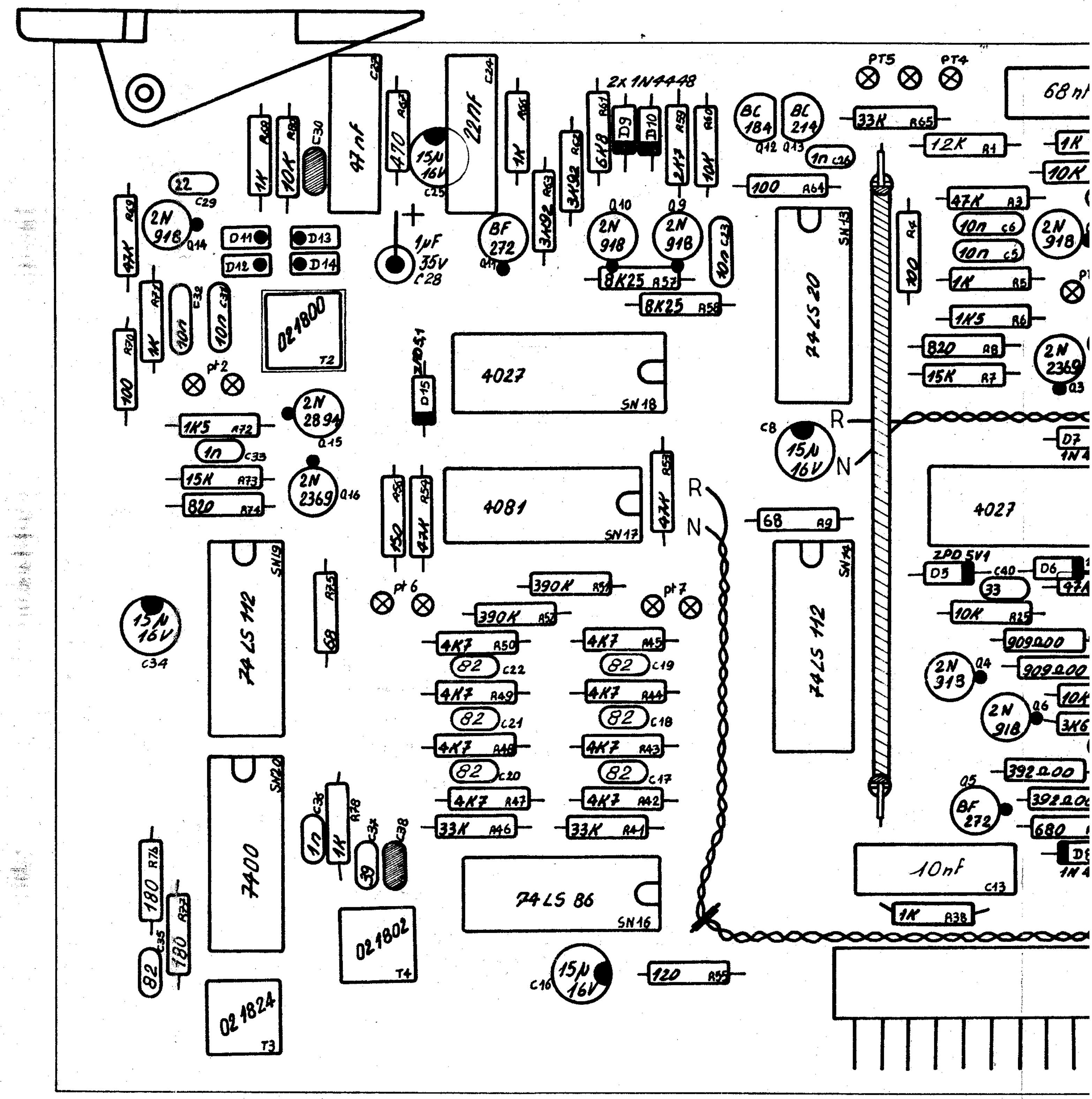
ÉTUDIÉ

DP2 DIVISEUR PROGRAMMABLE
PROGRAMMABLE DIVIDER

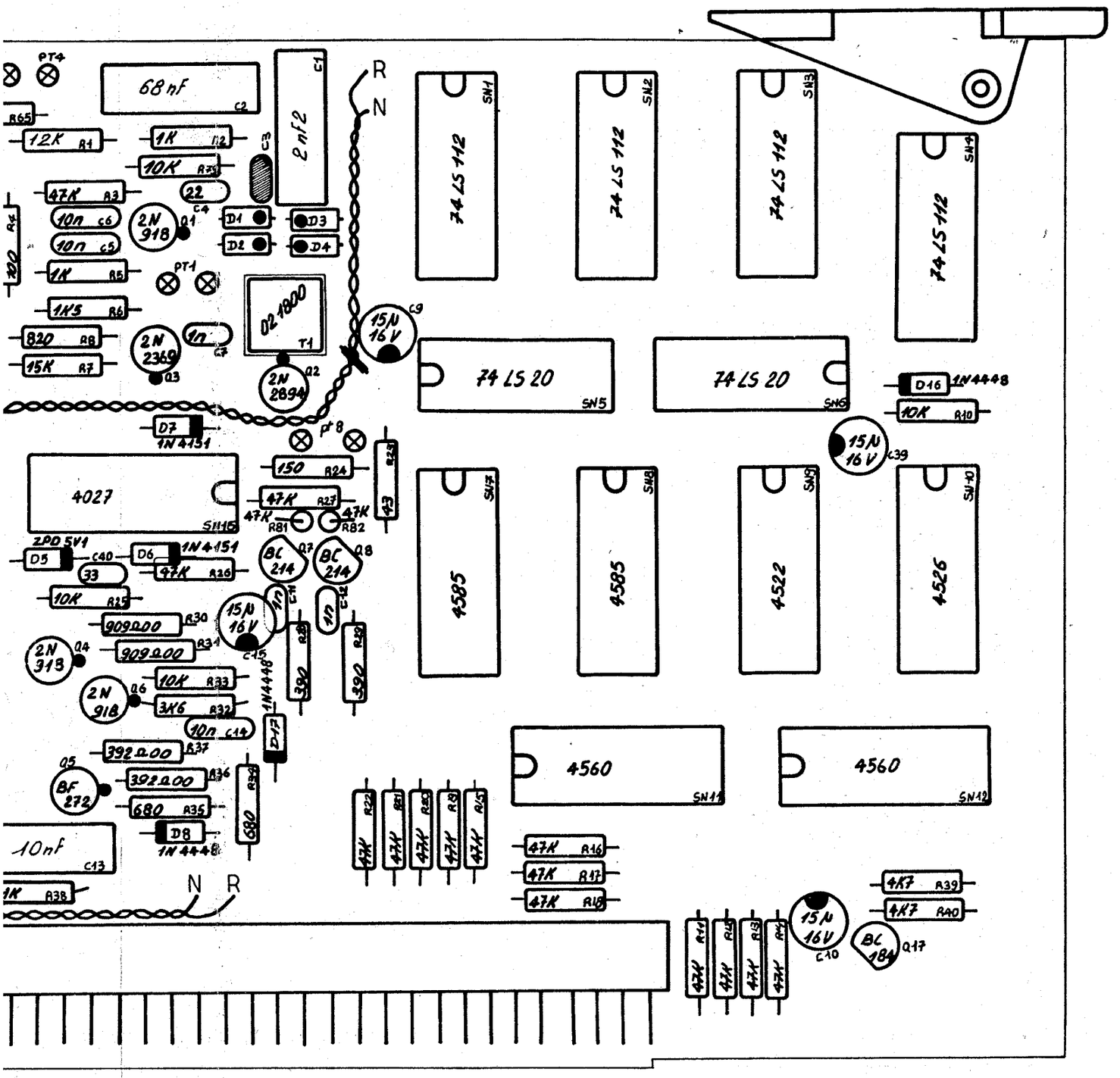


* Ajusté en fabrication
Factory adjusted

ÉTUDIE	DESSINÉ	VÉRIFIÉ	adrit électronique	DATE : JUILLET 1978
	ACORT	H.K.	2230 A GENERATION 10^3 Hz_10^4 Hz_10^5 Hz	PAGE : 1 / 1 976906E



74LS20
4027
4081
74LS112
74LS112
7400
74LS86
4027
021800
021802
021824
2x 1N4448
PT5
PT4
68nF
47nF
22nF
10nF


PT4
68nF
C2
C1
2nF2
C3
R
N
R65
12K R1
1K R2
10K R4
47K R3
22
C4
10n C6
10n C5
2N 918 Q1
D1
D2
D3
D4
100 R4
1K R5
PT1
1K5 R6
820 R8
15K R7
2N 2369 Q3
1n C7
OZ 1800 T1
2N 2894 Q2
15N 16V C9
74LS112 SN1
74LS112 SN2
74LS112 SN3
74LS112 SN4
74LS20 SN5
74LS20 SN6
D16 1N4448
10K R10
15N 16V C39
D7 1N4151
PT8
4027 SN16
150 R24
47K R27
47K R81
47K R82
43 R25
ZPD 5V1
D5
C40
D6 1N4151
33
47K R26
BC 214 Q7
BC 214 Q8
10K R25
909Ω00 R30
909Ω00 R31
15N 16V C15
C11
C12
390 R28
390 R29
2N 918 Q4
10K R33
2N 918 Q6
3K6 R32
10n C14
1N4448 D12
392Ω00 R37
Q5
BF 272
392Ω00 R36
680 R35
680 R34
D8 1N4448
10nF C13
1K R38
N R
4585 SN7
4585 SN8
4522 SN9
4526 SN10
4560 SN11
4560 SN12
47K R22
47K R21
47K R20
47K R19
47K R45
47K R46
47K R47
47K R48
4K7 R39
4K7 R40
15N 16V C10
BC 184 Q17
47K R11
47K R12
47K R13
47K R14

*0269060000 17 2EME GENERATION ..... 2230A * 17 SECOND GENERATION ... 2230A M932344.E976906 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
B -001	1427011600	TM 27 MCIG ..... MALE*CARTE*	TM 27 MCIG ..... MALE	TRELEC	1
C -001	3232220000	2200PF 10(10%400V)222236855222	2200PF 10(10%400V)222236855222	COGECO	1
C -002	3233680000	68NF 10(10%250V)222236845368	68NF 10(10%250V)222236845368	COGECO	1
C -003	3100000000	CONDENS CERAMIQUE A AJUSTER	CERAMIC CAPACITORS TO ADJUST	ADRET	1
C -004	3120002200	22PF 2,5 'K' 2222 680 10 229	22PF 2,5 'K' 2222 680 10 229	COGECO	1
C -005	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -006	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -007	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -008	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -009	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -010	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -011	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -012	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -013	3233100000	10NF 10(10%400V)222236855103	10NF 10(10%400V)222236855103	COGECO	1
C -014	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -015	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -016	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -017	3120008200	82PF 2,5 2222 680 10 829	82PF 2,5 2222 680 10 829	COGECO	1
C -018	3120008200	82PF 2,5 2222 680 10 829	82PF 2,5 2222 680 10 829	COGECO	1
C -019	3120008200	82PF 2,5 2222 680 10 829	82PF 2,5 2222 680 10 829	COGECO	1
C -020	3120008200	82PF 2,5 2222 680 10 829	82PF 2,5 2222 680 10 829	COGECO	1
C -021	3120008200	82PF 2,5 2222 680 10 829	82PF 2,5 2222 680 10 829	COGECO	1
C -022	3120008200	82PF 2,5 2222 680 10 829	82PF 2,5 2222 680 10 829	COGECO	1
C -023	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -024	3233470000	47NF 10(10%250V)222236845473	47NF 10(10%250V)222236845473	COGECO	1
C -025	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -026	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -027	3224220200	0,22MMF 10,2 10% 40V CKM501	0,22MMF 10,2 10% 40V CKM501	EUROFARAD	1
C -028	3700080000	4,7MMF/10V L9 20%..... CTS13	4,7MMF/10V L9 20%..... CTS13	SPRAGUE	1
C -029	3120002200	22PF 2,5 'K' 2222 680 10 229	22PF 2,5 'K' 2222 680 10 229	COGECO	1
C -030	3100000000	CONDENS CERAMIQUE A AJUSTER	CERAMIC CAPACITORS TO ADJUST	ADRET	1
C -031	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -032	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -033	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -034	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -035	3120011800	180PF 2,5 'N18'2222 680 58 181	180PF 2,5 'N18'2222 680 58 181	COGECO	1
C -036	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -037	3120003900	39PF 2,5 2222 680 10 399	39PF 2,5 2222 680 10 399	COGECO	1
C -038	3100000000	CONDENS CERAMIQUE A AJUSTER	CERAMIC CAPACITORS TO ADJUST	ADRET	1
C -039	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -040	3120003300	33PF 2,5 2222 680 10 339	33PF 2,5 2222 680 10 339	COGECO	1
C -041	3120011000	100PF 2,5 'N10'2222 680 58 101	100PF 2,5 'N10'2222 680 58 101	COGECO	1
D -001	0206520000	00 8XBB 409 D1àD4&D11àD14 2230	00 8XBB 409 D1àD4&D11àD14 2230	ADRET 8/SACHET	1
D -005	4600030000	ZPD5,1	ZPD5,1	ITT	1
D -006	4500020000	1N4151	1N4151	FU'ITT'	1
D -007	4500020000	1N4151	1N4151	FU'ITT'	1
D -008	4500310000	1 N 4448	1 N 4448	ITT	1
D -009	4500310000	1 N 4448	1 N 4448	ITT	1
D -010	4500310000	1 N 4448	1 N 4448	ITT	1
D -015	4600030000	ZPD5,1	ZPD5,1	ITT	1
D -016	4500310000	1 N 4448	1 N 4448	ITT	1
D -017	4500310000	1 N 4448	1 N 4448	ITT	1
Q -001	4300040000	2 N 918	2 N 918	SGS	1
Q -002	4300070000	2N2894	2N2894	MOTOROLA	1
Q -003	4300050000	2N2369 A	2N2369 A	MOTOROLA	1
Q -004	4300040000	2 N 918	2 N 918	SGS	1
Q -005	4300610000	BF 506	BF 506	MOTOROLA	1
Q -006	4300040000	2 N 918	2 N 918	SGS	1
Q -007	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -008	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -009	4300040000	2 N 918	2 N 918	SGS	1
Q -010	4300040000	2 N 918	2 N 918	SGS	1
Q -011	4300610000	BF 506	BF 506	MOTOROLA	1
Q -012	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -013	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -014	4300040000	2 N 918	2 N 918	SGS	1
Q -015	4300070000	2N2894	2N2894	MOTOROLA	1
Q -016	4300050000	2N2369 A	2N2369 A	MOTOROLA	1
Q -017	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
R -001	2210031200	12K 5% N4	12K 5% N4	SOVCOR	1
R -002	2210021000	1K0 5% N4	1K0 5% N4	SOVCOR	1
R -003	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -004	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -005	2210021000	1K0 5% N4	1K0 5% N4	SOVCOR	1
R -006	2210021500	1K5 5% N4	1K5 5% N4	SOVCOR	1
R -007	2210031500	15K 5% N4	15K 5% N4	SOVCOR	1
R -008	2210018200	820R 5% N4	820R 5% N4	SOVCOR	1
R -009	2210006800	68R 5% N4	68R 5% N4	SOVCOR	1
R -010	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1

*0269060000 17 2EME GENERATION ..... 2230A * 17 SECOND GENERATION ... 2230A M932344.E976906 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
R -011	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -012	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -013	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -014	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -015	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -016	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -017	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -018	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -019	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -020	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -021	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -022	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -023	2210004300	43R 5% N4	* 43R 5% N4	SOUCOR	1
R -024	2210011500	150R 5% N4	* 150R 5% N4	SOUCOR	1
R -025	2210031000	10K 5% N4	* 10K 5% N4	SOUCOR	1
R -026	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -027	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -028	2210013900	390R 5% N4	* 390R 5% N4	SOUCOR	1
R -029	2210013900	390R 5% N4	* 390R 5% N4	SOUCOR	1
R -030	2500090900	909R * 1% 0,3 W SMA207	* 909R * 1% 0,3 W SMA207	DRALORIC	1
R -031	2500090900	909R * 1% 0,3 W SMA207	* 909R * 1% 0,3 W SMA207	DRALORIC	1
R -032	2210023600	3K6 5% N4	* 3K6 5% N4	SOUCOR	1
R -033	2210031000	10K 5% N4	* 10K 5% N4	SOUCOR	1
R -034	2210016800	680R 5% N4	* 680R 5% N4	SOUCOR	1
R -035	2210011200	120R 5% N4	* 120R 5% N4	SOUCOR	1
R -035	2210016800	680R 5% N4	* 680R 5% N4	SOUCOR	1
R -036	2500039200	392R * 1% 0,3 W SMA207	* 392R * 1% 0,3 W SMA207	DRALORIC	1
R -037	2500039200	392R * 1% 0,3 W SMA207	* 392R * 1% 0,3 W SMA207	DRALORIC	1
R -038	2210021000	1K0 5% N4	* 1K0 5% N4	SOUCOR	1
R -039	2210024700	4K7 5% N4	* 4K7 5% N4	SOUCOR	1
R -040	2210024700	4K7 5% N4	* 4K7 5% N4	SOUCOR	1
R -041	2210023300	3K3 5% N4	* 3K3 5% N4	SOUCOR	1
R -042	2210024700	4K7 5% N4	* 4K7 5% N4	SOUCOR	1
R -043	2210024700	4K7 5% N4	* 4K7 5% N4	SOUCOR	1
R -044	2210024700	4K7 5% N4	* 4K7 5% N4	SOUCOR	1
R -045	2210024700	4K7 5% N4	* 4K7 5% N4	SOUCOR	1
R -046	2210023300	3K3 5% N4	* 3K3 5% N4	SOUCOR	1
R -047	2210024700	4K7 5% N4	* 4K7 5% N4	SOUCOR	1
R -048	2210024700	4K7 5% N4	* 4K7 5% N4	SOUCOR	1
R -049	2210024700	4K7 5% N4	* 4K7 5% N4	SOUCOR	1
R -050	2210024700	4K7 5% N4	* 4K7 5% N4	SOUCOR	1
R -051	2210043900	390K 5% N4	* 390K 5% N4	SOUCOR	1
R -052	2210043900	390K 5% N4	* 390K 5% N4	SOUCOR	1
R -053	2210033300	33K 5% N4	* 33K 5% N4	SOUCOR	1
R -054	2210033300	33K 5% N4	* 33K 5% N4	SOUCOR	1
R -056	2210011500	150R 5% N4	* 150R 5% N4	SOUCOR	1
R -057	2500182500	8K25 * 1% 0,3 W SMA207	* 8K25 * 1% 0,3 W SMA207	DRALORIC	1
R -058	2500182500	8K25 * 1% 0,3 W SMA207	* 8K25 * 1% 0,3 W SMA207	DRALORIC	1
R -059	2210022700	2K7 5% N4	* 2K7 5% N4	SOUCOR	1
R -060	2210031000	10K 5% N4	* 10K 5% N4	SOUCOR	1
R -061	2210026800	6K8 5% N4	* 6K8 5% N4	SOUCOR	1
R -062	2500139200	3K92 * 1% 0,3 W SMA207	* 3K92 * 1% 0,3 W SMA207	DRALORIC	1
R -063	2500139200	3K92 * 1% 0,3 W SMA207	* 3K92 * 1% 0,3 W SMA207	DRALORIC	1
R -064	2210011000	100R 5% N4	* 100R 5% N4	SOUCOR	1
R -065	2210033300	33K 5% N4	* 33K 5% N4	SOUCOR	1
R -066	2210021000	1K0 5% N4	* 1K0 5% N4	SOUCOR	1
R -067	2210011000	100R 5% N4	* 100R 5% N4	SOUCOR	1
R -068	2210021000	1K0 5% N4	* 1K0 5% N4	SOUCOR	1
R -069	2210034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -070	2210011000	100R 5% N4	* 100R 5% N4	SOUCOR	1
R -071	2210021000	1K0 5% N4	* 1K0 5% N4	SOUCOR	1
R -072	2210021500	1K5 5% N4	* 1K5 5% N4	SOUCOR	1
R -073	2210031500	15K 5% N4	* 15K 5% N4	SOUCOR	1
R -074	2210018200	820R 5% N4	* 820R 5% N4	SOUCOR	1
R -075	2210004700	47R 5% N4	* 47R 5% N4	SOUCOR	1
R -076	2210012200	220R 5% N4	* 220R 5% N4	SOUCOR	1
R -077	2210012200	220R 5% N4	* 220R 5% N4	SOUCOR	1
R -078	2210021000	1K0 5% N4	* 1K0 5% N4	SOUCOR	1
R -079	2210031000	10K 5% N4	* 10K 5% N4	SOUCOR	1
R -080	2210031000	10K 5% N4	* 10K 5% N4	SOUCOR	1
R -081	2200034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
R -082	2200034700	47K 5% N4	* 47K 5% N4	SOUCOR	1
SN -001	4157411200	SN 74 LS 112 N	* SN 74 LS 112 N	'FU' TEXAS	1
SN -002	4157411200	SN 74 LS 112 N	* SN 74 LS 112 N	'FU' TEXAS	1
SN -003	4157411200	SN 74 LS 112 N	* SN 74 LS 112 N	'FU' TEXAS	1
SN -004	4157411200	SN 74 LS 112 N	* SN 74 LS 112 N	'FU' TEXAS	1
SN -005	4150742000	SN 74 LS 20 N 3	* SN 74 LS 20 N 3	TEXAS	1
SN -006	4150742000	SN 74 LS 20 N 3	* SN 74 LS 20 N 3	TEXAS	1
SN -007	4160458500	C-MOS 4585	* C-MOS 4585	'FU' RTC	1

*0269060000 17 2EME GENERATION ..... 2230A * 17 SECOND GENERATION ... 2230A M932344.E976906 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION		PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
SN -008	4160458500	C-MOS 4585	*	C-MOS 4585	'FU' RTC	1
SN -009	4160452200	C-MOS 4522	*	C-MOS 4522	RTC	1
SN -010	4160452600	C-MOS 4526	*	C-MOS 4526	RTC	1
SN -011	4160456000	C-MOS 4560 ..... MC 14560 BCP	*	C-MOS 4560..... MC 14560 BCP	MOTOROLA	1
SN -012	4160456000	C-MOS 4560 ..... MC 14560 BCP	*	C-MOS 4560..... MC 14560 BCP	MOTOROLA	1
SN -013	4150742000	SN 74 LS 20 N 3	*	SN 74 LS 20 N 3.....	TEXAS	1
SN -014	4157411200	SN 74 LS 112 N	*	SN 74 LS 112 N	'FU' TEXAS	1
SN -015	4160402700	C-MOS 4027	*	C-MOS 4027	RTC	1
SN -016	4150748600	SN 74 LS 86 N 3	*	SN 74 LS 86 N 3	TEXAS	1
SN -017	4160408100	C-MOS 4081	*	C-MOS 4081	RTC	1
SN -018	4160402700	C-MOS 4027	*	C-MOS 4027	RTC	1
SN -019	4157411200	SN 74 LS 112 N	*	SN 74 LS 112 N	'FU' TEXAS	1
SN -020	4110740000	SN 7400 N	*	SN 7400 N	TEXAS	1
T -001	0218000000	01 F10B 13X1 ..... 2230A	*	01 F10B 13X1 TURNS 2230A	Z94 F10B.....14	1
T -002	0218000000	01 F10B 13X1 ..... 2230A	*	01 F10B 13X1 TURNS 2230A	Z94 F10B.....14	1
T -003	0216650000	00 F10B 18X6 SPIRES 4101	*	00 F10B 18X6 TURNS 4101	Z94 F10B.....24	1
T -004	0218020000	00 F10B 35X4 ..... 2200A	*	00 F10B 35X4 TURNS 2200A	Z94 F10B.....39	1
Z0	0206750000	00 ETIQUETTE 6906 ..... 2230A	*	00 LABEL 6906 ..... 2230A	942375.....	1
Z1	1100010000	FIL NOIR KY30-04	*	BLACK THREAD KY30-04	FILECA	0
Z1	1100030000	FIL ROUGE KY30-04	*	RED THREAD KY30-04	FILECA	0
Z1	1100430000	COAX KX 21 A	*	COAX KX 21 A	FILECA	0
Z1	1100520000	FIL.NU.ETAME.4/10	*	TINNED BARE THREAD 4/10	ELECTROFIL	0
Z1	1269060500	CI 2'GENERATION 2230A	*	PC 2'GENERATION 2230A	H996906	1
Z1	1300600000	SOUPLISSO 1X1,2 COUL. NATUREL	*	SPAGHETTI 1X1.2 GRAY COLORED	HABIA	0
Z1	1400109900	POINT TEST	*	TEST POINT	C940850	13
Z1	1900200000	EXTRACTEUR DE CARTE'ELEVATEUR'	*	BOARD EXTRACTOR 'LIFTER'	TRELEC	2
Z4	4900250000	ENTRETOISE T018-019D	*	SPACER T018-019D	JERMYN	9
Z5	5400050000	CALE ISOLANTE NEOSID POUR CI .	*	NEOSID INSULATING QUOIN FOR PC	-940008	4
Z6	6400280000	PLOT A FOURCHE SOUDE . BFMQ13C	*	SOLDERED FORK CONTACT BFMQ13C	COMATEL	2
Z6	6400530000	OEILLET LAITON ..... N° 2070	*	FIXING EYELET BRASS .. N° 2070	MFOM	2
Z8	8000290000	BLINDAGE POUR NEOSID	*	SHIELDING FOR NEOSID	B940048	2

FL4 FILTRE PASSE-BANDE 4 MHz
4 MHz BAND-PASS FILTER

M2 MELANGEUR
MIXER

FL5 FILTRE PASSE-BAS 1MHz
1 MHz LOW-PASS FILTER

A3 SEPARATEUR
BUFFER

A9 INTEGRATEUR
INTEGRATOR

A8 AMPLIFICATEUR
AMPLIFIER

DT1

A4 GENERATEUR D'HARMONIQUES
HARMONIC GENERATOR

ALC issu de CODAGE NIVEAU DE SORTIE
ALC from OUTPUT LEVEL CODING

F1 : 1MHz issu de GENERATION
10^6Hz . 10^1Hz . 10^2Hz

$\overline{C}$ de CIRCUITS DE COMMANDE
$\overline{C}$ from CONTROL CIRCUITS

F < 10 kHz ○ F > 10 kHz

K9

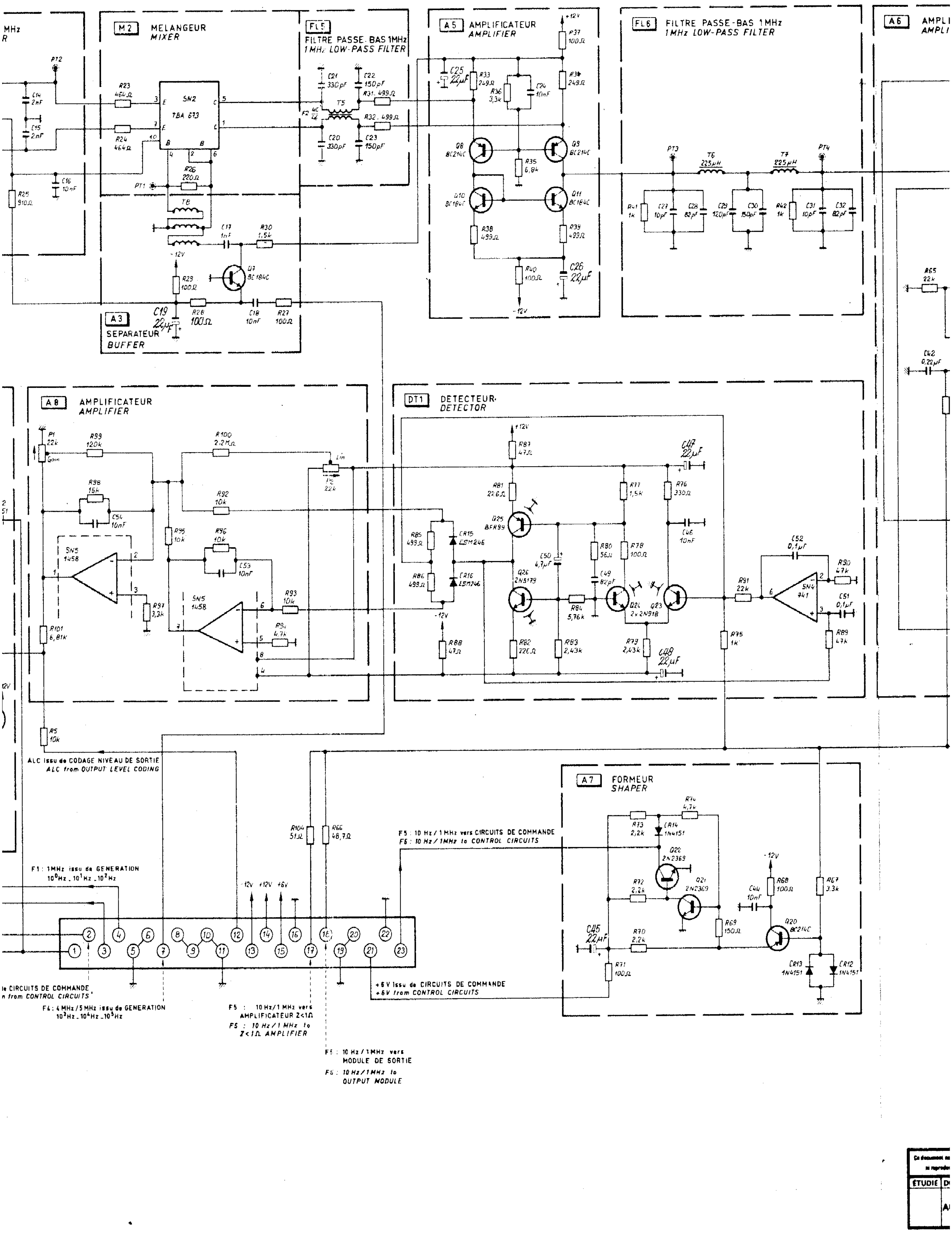
Inhibition issu de CIRCUITS DE COMMANDE
Inhibition from CONTROL CIRCUITS

F4 : 4 MHz / 5 MHz issu de GENERATION
10^3Hz . 10^4Hz . 10^5Hz

F5 : 10 Hz / 1 MHz vers AMPLIFICATEUR Z<1Ω
F5 : 10 Hz / 1 MHz to Z<1Ω AMPLIFIER

F5 : 10 Hz / 1 MHz vers MODULE DE SORTIE
F5 : 10 Hz / 1 MHz to OUTPUT MODULE

+6 V issu de CIRCUITS
+6 V from CONTROL C


M2 MELANGEUR
MIXER
FL5 FILTRE PASSE BAS 1MHz
1 MHz LOW-PASS FILTER
A5 AMPLIFICATEUR
AMPLIFIER
FL6 FILTRE PASSE-BAS 1MHz
1MHz LOW-PASS FILTER
A6 AMPLI
AMPLI
A3 SEPARATEUR
BUFFER
A8 AMPLIFICATEUR
AMPLIFIER
DT1 DETECTEUR
DETECTOR
A7 FORMEUR
SHAPER
ALC issu de CODAGE NIVEAU DE SORTIE
ALC from OUTPUT LEVEL CODING
F1: 1MHz issu de GENERATION
F5: 10 Hz / 1 MHz vers CIRCUITS DE COMMANDE
F6: 10 Hz / 1MHz to CONTROL CIRCUITS
+6 V issu de CIRCUITS DE COMMANDE
+6 V from CONTROL CIRCUITS
F4: 4 MHz / 5 MHz issu de GENERATION
F5: 10 Hz / 1 MHz vers AMPLIFICATEUR Z<1Ω
F5: 10 Hz / 1 MHz to Z<1Ω AMPLIFIER
F5: 10 Hz / 1 MHz vers MODULE DE SORTIE
F6: 10 Hz / 1MHz to OUTPUT MODULE
ETUDIE

A5 AMPLIFICATEUR
AMPLIFIER

FL6 FILTRE PASSE-BAS 1MHz
1MHz LOW-PASS FILTER

A6 AMPLIFICATEUR
AMPLIFIER

T1 DETECTEUR-
DETECTOR

A7 FORMEUR
SHAPER

10 Hz / 1 MHz vers CIRCUITS DE COMMANDE
10 Hz / 1MHz to CONTROL CIRCUITS

CIRCUITS DE COMMANDE
CONTROL CIRCUITS

ÉTUDIÉ	DESSINÉ	VÉRIFIÉ
	ACORT	HW

adret électronique

2230 A
DEMODULATEUR AMPLIFICATEUR
DEMODULATOR AMPLIFIER

DATE : JUILLET 1978

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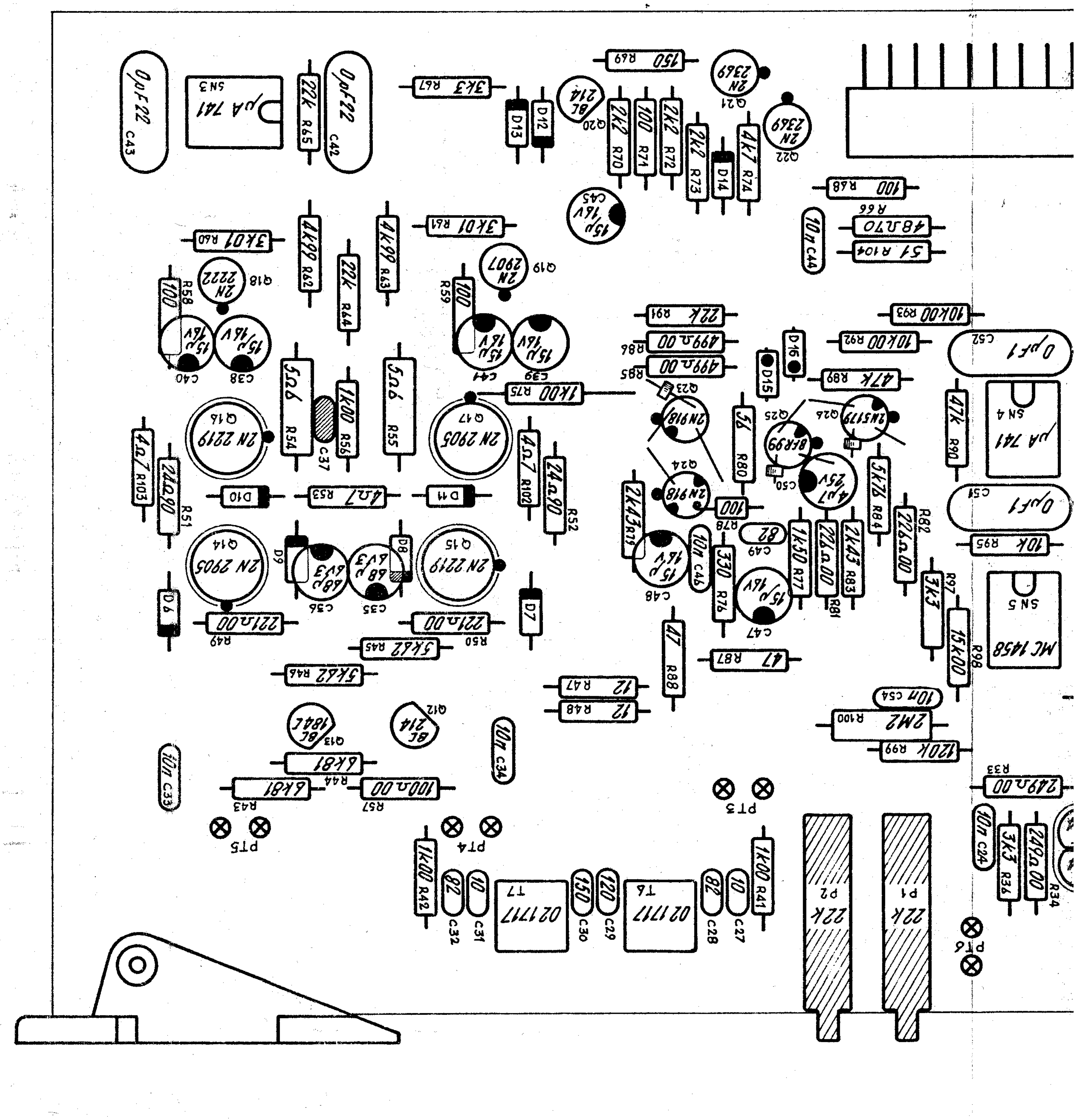
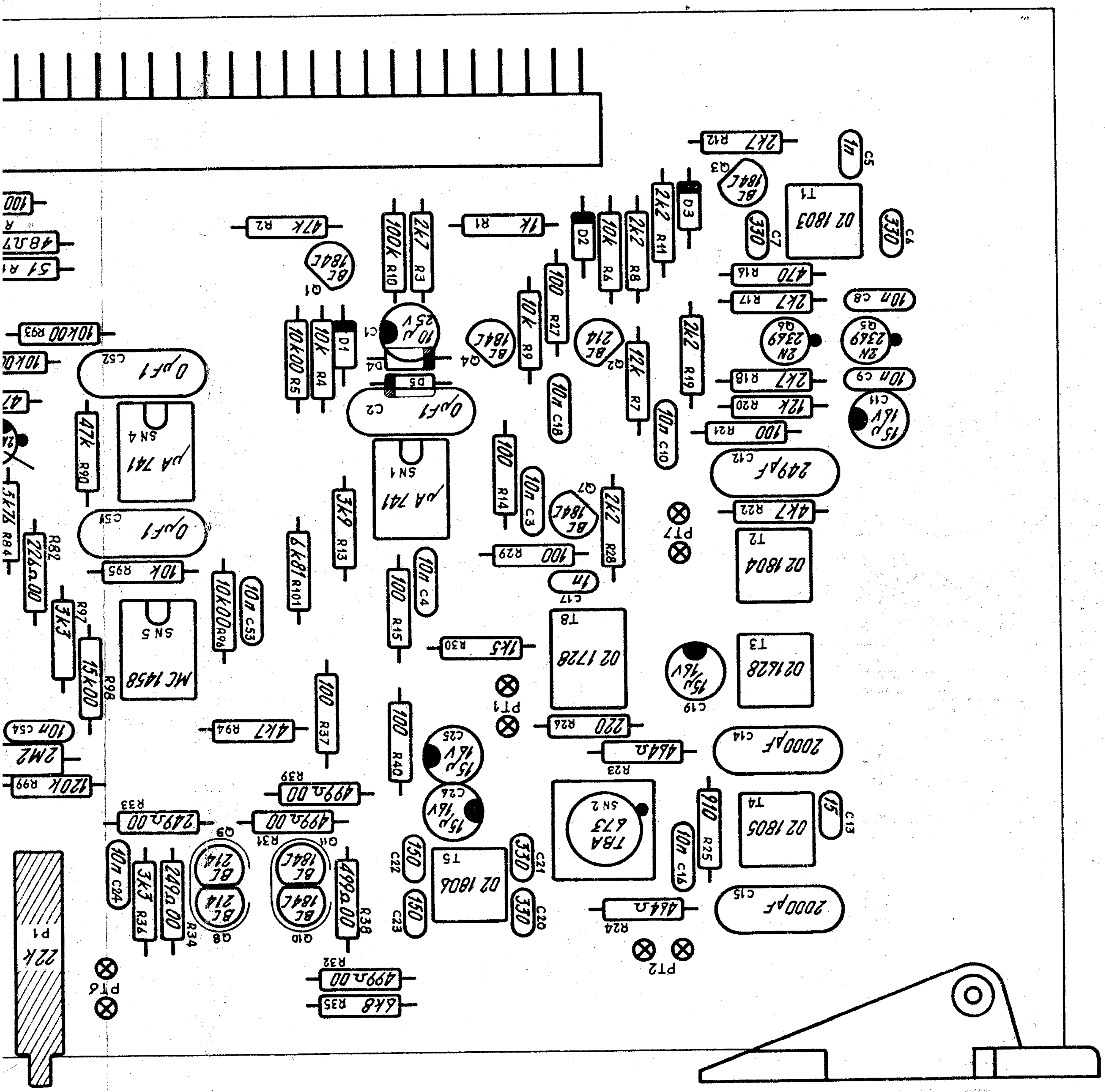
9 7 6 9 0 7 A



μA 741
SN3
SN4
SN5
MC 1458
2N 2219
2N 2905
2N 2222
2N 2907
2N 2369
2N918
2N5179
BFR99
BC 214
BC 184L
021717
T6
T7
P1
P2
22k
PT3
PT4
PT5
PT6



2K7 R12
1n C5
BC 184C Q3
OZ 1803 T1
330 C7
330 C6
D3
2K2 R11
2K2 R8
10K R6
D2
1K R1
2K7 R3
100K R10
47K R2
BC 184C Q1
470 R16
2K7 R17
10n C8
2N 2369 Q6
2N 2369 Q5
2K2 R19
12K R7
BC 214 Q2
100 R27
10K R9
BC 184C Q4
10µ 25V C1
D4
D1
10K R4
10K00 R5
10K00 R93
0µF1 C52
D5
0µF1 C2
2K7 R18
10n C9
12K R20
15µ 16V C11
100 R21
10n C10
10n C18
249pF C12
µA 741 SN4
47K R90
µA 741 SN1
100 R14
10n C3
BC 184C Q7
2K2 R28
4K7 R22
OZ 1804 T2
PT7
0µF1 C51
5K76 R84
224Ω00 R82
10K R95
10K00 R96
10n C53
6K81 R101
3K9 R13
100 R15
10n C4
100 R29
1n C17
3K3 R97
15K00 R98
MC 1458 SN5
1K5 R30
OZ 1728 T8
OZ 1628 T3
15µ 16V C19
PT1
10n C54
2M2
4K7 R94
100 R37
100 R40
220 R26
464Ω R23
2000pF C14
15µ 16V C25
120K R99
499Ω00 R39
249Ω00 R33
499Ω00 R31
15µ 16V C26
TBA 673 SN2
910 R25
OZ 1805 T4
15 C13
10n C24
3K3 R36
249Ω00 R34
BC 214 Q9
BC 214 Q8
BC 184C Q11
BC 184C Q10
499Ω00 R38
150 C22
150 C23
OZ 1806 T5
330 C21
330 C20
10n C16
464Ω R24
2000pF C15
PT2
22K P1
PT6
499Ω00 R32
6K8 R35

*0269070000 13 CARTE AMPLIFICATEUR . 2230A * 13 AMPLIFIER BOARD ..... 2230A G932353.A976907 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
B -001	14230000400	TM 23 MCIG ..... MALE*CARTE*	TM 23 MCIG ..... MALE	TRELEC	1
C -001	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -002	3234100100	0,1MMF 7,5 20% 100V MKS4	0,1MMF 7,5 20% 100V MKS4	WIMA	1
C -003	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -004	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -005	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -006	3120013300	330PF 2,5 'N33' 2222 680 58 331	330PF 2,5 'N33' 2222 680 58 331	COGECO	1
C -007	3120013300	330PF 2,5 'N33' 2222 680 58 331	330PF 2,5 'N33' 2222 680 58 331	COGECO	1
C -008	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -009	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -010	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -011	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -012	3300249000	249PF 7,6 2% 250V ... 59SP	249PF 7,6 2% 250V ... 59SP	GAM	1
C -013	3120001500	15PF 2,5 'H' 2222 680 10 159	15PF 2,5 'H' 2222 680 10 159	COGECO	1
C -014	3301200100	2000PF 7,62 5% 250V .. 59 SP	2000PF 7,62 5% 250V .. 59 SP	GAM	1
C -015	3301200100	2000PF 7,62 5% 250V .. 59 SP	2000PF 7,62 5% 250V .. 59 SP	GAM	1
C -016	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -017	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -018	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -019	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -020	3120013300	330PF 2,5 'N33' 2222 680 58 331	330PF 2,5 'N33' 2222 680 58 331	COGECO	1
C -021	3120013300	330PF 2,5 'N33' 2222 680 58 331	330PF 2,5 'N33' 2222 680 58 331	COGECO	1
C -022	3120011500	150PF 2,5 'N15' 2222 680 58 151	150PF 2,5 'N15' 2222 680 58 151	COGECO	1
C -023	3120011500	150PF 2,5 'N15' 2222 680 58 151	150PF 2,5 'N15' 2222 680 58 151	COGECO	1
C -024	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -025	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -026	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -027	3120001000	10PF 2,5 'F' 2222 680 10 109	10PF 2,5 'F' 2222 680 10 109	COGECO	1
C -028	3120008200	82PF 2,5 2222 680 10 829	82PF 2,5 2222 680 10 829	COGECO	1
C -029	3120011200	120PF 2,5 'N12' 2222 680 58 121	120PF 2,5 'N12' 2222 680 58 121	COGECO	1
C -030	3120011500	150PF 2,5 'N15' 2222 680 58 151	150PF 2,5 'N15' 2222 680 58 151	COGECO	1
C -031	3120001000	10PF 2,5 'F' 2222 680 10 109	10PF 2,5 'F' 2222 680 10 109	COGECO	1
C -032	3120008200	82PF 2,5 2222 680 10 829	82PF 2,5 2222 680 10 829	COGECO	1
C -033	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -034	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -035	3700250000	47MMF/6,3V 5,08 .. STAND L TAG	47MMF/6,3V 5,08 .. STAND L TAG	STC	1
C -036	3700250000	47MMF/6,3V 5,08 .. STAND L TAG	47MMF/6,3V 5,08 .. STAND L TAG	STC	1
C -037	3100000000	CONDENS CERAMIQUE A AJUSTER	CERAMIC CAPACITORS TO ADJUST	ADRET	1
C -038	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -039	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -040	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -041	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -042	3224220200	0,22MMF 10,2 10% 40V CKM501	0,22MMF 10,2 10% 40V CKM501	EUROFARAD	1
C -043	3224220200	0,22MMF 10,2 10% 40V CKM501	0,22MMF 10,2 10% 40V CKM501	EUROFARAD	1
C -044	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -045	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -046	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -047	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -048	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -049	3120008200	82PF 2,5 2222 680 10 829	82PF 2,5 2222 680 10 829	COGECO	1
C -050	3700100000	4,7MMF/35V 5,08 .. STAND L TAG	4,7MMF/35V 5,08 ...STAND L TAG	STC	1
C -051	3234100100	0,1MMF 7,5 20% 100V MKS4	0,1MMF 7,5 20% 100V MKS4	WIMA	1
C -052	3234100100	0,1MMF 7,5 20% 100V MKS4	0,1MMF 7,5 20% 100V MKS4	WIMA	1
C -053	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -054	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
D -001	4500020000	1N4151	1N4151	FU'ITT'	1
D -002	4500020000	1N4151	1N4151	FU'ITT'	1
D -003	4500020000	1N4151	1N4151	FU'ITT'	1
D -004	4500020000	1N4151	1N4151	FU'ITT'	1
D -005	4500020000	1N4151	1N4151	FU'ITT'	1
D -006	4500020000	1N4151	1N4151	FU'ITT'	1
D -007	4500020000	1N4151	1N4151	FU'ITT'	1
D -008	4500020000	1N4151	1N4151	FU'ITT'	1
D -009	4500020000	1N4151	1N4151	FU'ITT'	1
D -010	4500020000	1N4151	1N4151	FU'ITT'	1
D -011	4500020000	1N4151	1N4151	FU'ITT'	1
D -012	4500020000	1N4151	1N4151	FU'ITT'	1
D -013	4500020000	1N4151	1N4151	FU'ITT'	1
D -014	4500020000	1N4151	1N4151	FU'ITT'	1
D -015	4500540000	1N6263 D035 (EX ESM247&246)	1N6263 (SUBSTIT. ESM247&246)	RTC	1
D -016	4500540000	1N6263 D035 (EX ESM247&246)	1N6263 (SUBSTIT. ESM247&246)	RTC	1
P -001	2133220000	22K 3/4" 15T CERMET 43 P	22K 3/4" 15T CERMET 43 P	SPECTROL	1
P -002	2133220000	22K 3/4" 15T CERMET 43 P	22K 3/4" 15T CERMET 43 P	SPECTROL	1
Q -001	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -002	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -003	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -004	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -005	4300050000	2N2369 A	2N2369 A	MOTOROLA	1
Q -006	4300050000	2N2369 A	2N2369 A	MOTOROLA	1

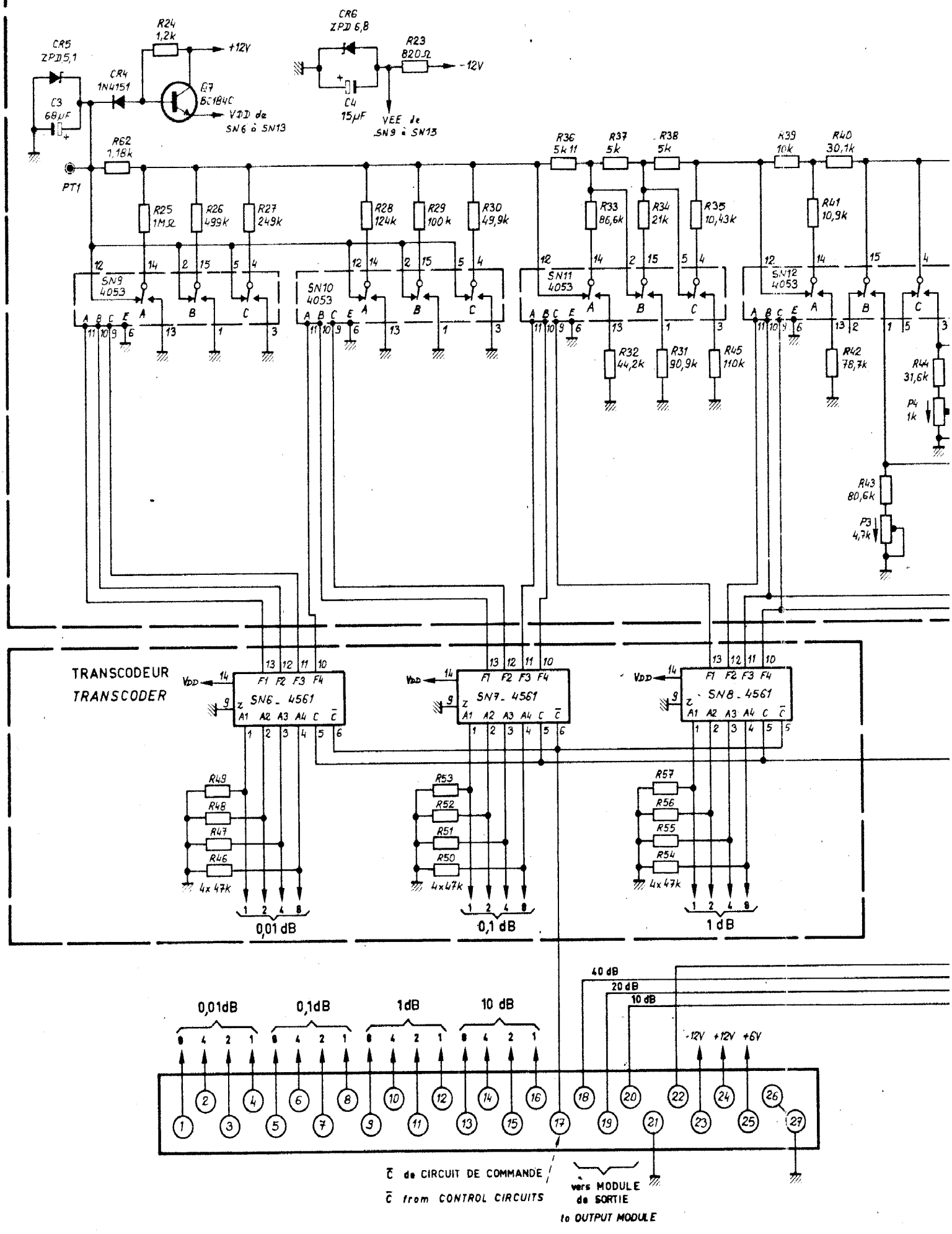
*0269070000 13 CARTE AMPLIFICATEUR . 2230A * 13 AMPLIFIER BOARD ..... 2230A G932353.A976907 *

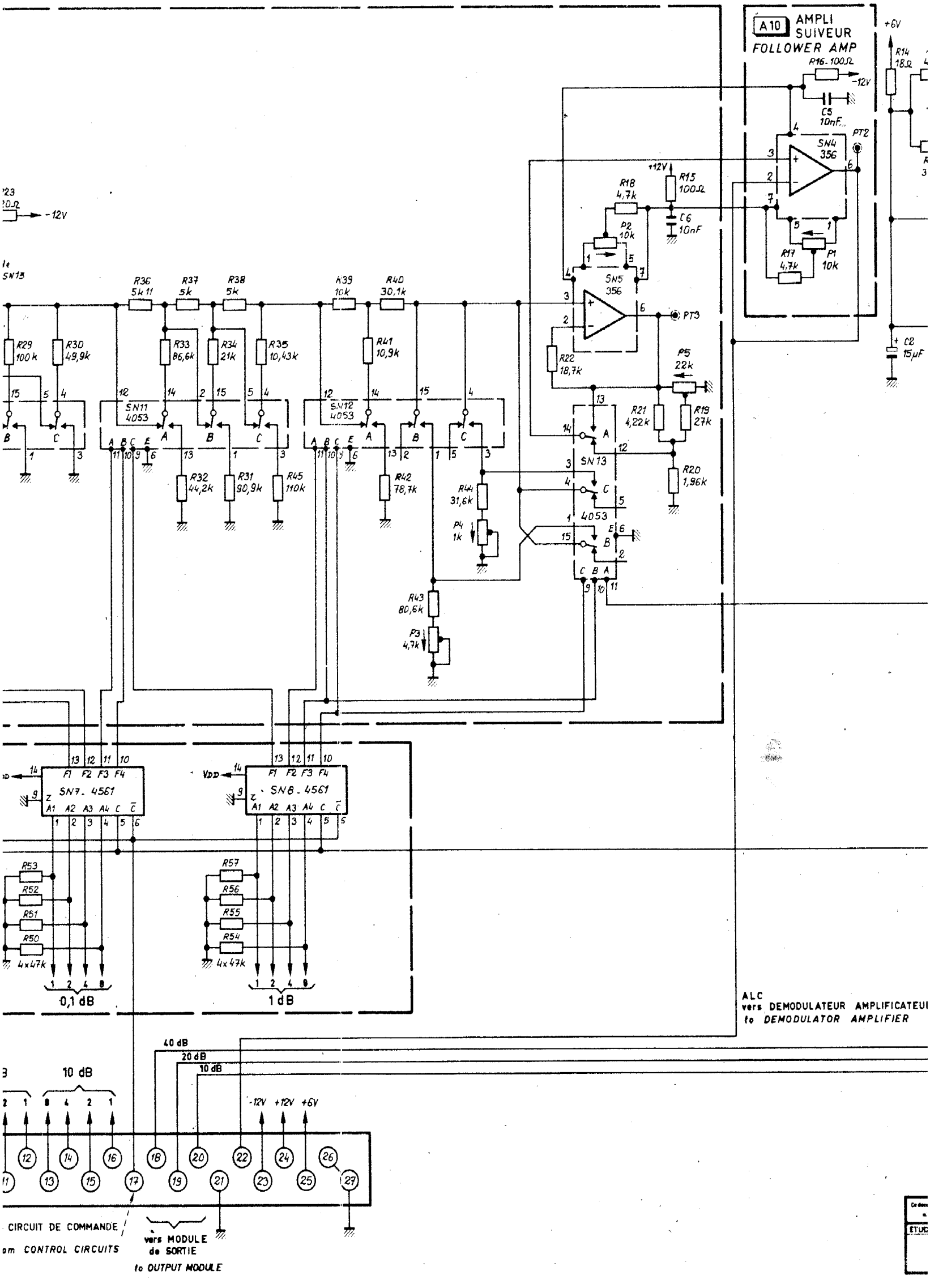
REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
Q -007	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -008	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -009	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -010	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -011	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -012	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -013	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -014	4800080000	2N2905	2N2905	RTC	1
Q -015	4800060000	2N2219	2N2219	RTC	1
Q -016	4800060000	2N2219	2N2219	RTC	1
Q -017	4800080000	2N2905	2N2905	RTC	1
Q -018	4300580000	BC 337-25 TO 92 ..... (2N2222)	BC 337-25 TO 92 ..... (2N2222)	ITT	1
Q -019	4300570000	BC 327-25 TO 92 .....(2N2907)	BC 327-25 TO 92 .....(2N2907)	ITT	1
Q -020	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -021	4300050000	2N2369 A	2N2369 A	MOTOROLA	1
Q -022	4300050000	2N2369 A	2N2369 A	MOTOROLA	1
Q -023	4300040000	2 N 918	2 N 918	SGS	1
Q -024	4300040000	2 N 918	2 N 918	SGS	1
Q -025	4300130000	BFR 99	BFR 99	MOTOROLA	1
Q -026	4300720000	BFY 90	BFY 90	RTC	1
R -001	2210021000	1K0 5% N4	1K0 5% N4	SOUCOR	1
R -002	2210034700	47K 5% N4	47K 5% N4	SOUCOR	1
R -003	2210022700	2K7 5% N4	2K7 5% N4	SOUCOR	1
R -004	2210031000	10K 5% N4	10K 5% N4	SOUCOR	1
R -005	2500210000	10K0 * 1% 0,3 W SMA207	10K0 * 1% 0,3 W SMA207	DRALORIC	1
R -006	2210031000	10K 5% N4	10K 5% N4	SOUCOR	1
R -007	2210031200	12K 5% N4	12K 5% N4	SOUCOR	1
R -008	2210022200	2K2 5% N4	2K2 5% N4	SOUCOR	1
R -009	2210031000	10K 5% N4	10K 5% N4	SOUCOR	1
R -010	2210041000	100K 5% N4	100K 5% N4	SOUCOR	1
R -011	2210022200	2K2 5% N4	2K2 5% N4	SOUCOR	1
R -012	2210022700	2K7 5% N4	2K7 5% N4	SOUCOR	1
R -013	2210023900	3K9 5% N4	3K9 5% N4	SOUCOR	1
R -014	2210011000	100R 5% N4	100R 5% N4	SOUCOR	1
R -015	2210011000	100R 5% N4	100R 5% N4	SOUCOR	1
R -016	2210014700	470R 5% N4	470R 5% N4	SOUCOR	1
R -017	2210022700	2K7 5% N4	2K7 5% N4	SOUCOR	1
R -018	2210022700	2K7 5% N4	2K7 5% N4	SOUCOR	1
R -019	2210022200	2K2 5% N4	2K2 5% N4	SOUCOR	1
R -020	2210031200	12K 5% N4	12K 5% N4	SOUCOR	1
R -021	2210011000	100R 5% N4	100R 5% N4	SOUCOR	1
R -022	2210024700	4K7 5% N4	4K7 5% N4	SOUCOR	1
R -023	2500046400	464R * 1% 0,3 W SMA207	464R * 1% 0,3 W SMA207	DRALORIC	1
R -024	2500046400	464R * 1% 0,3 W SMA207	464R * 1% 0,3 W SMA207	DRALORIC	1
R -025	2210019100	910R 5% N4	910R 5% N4	SOUCOR	1
R -026	2210012200	220R 5% N4	220R 5% N4	SOUCOR	1
R -027	2210011000	100R 5% N4	100R 5% N4	SOUCOR	1
R -028	2210022200	2K2 5% N4	2K2 5% N4	SOUCOR	1
R -029	2210011000	100R 5% N4	100R 5% N4	SOUCOR	1
R -030	2210021500	1K5 5% N4	1K5 5% N4	SOUCOR	1
R -031	2500049900	499R * 1% 0,3 W SMA207	499R * 1% 0,3 W SMA207	DRALORIC	1
R -032	2500049900	499R * 1% 0,3 W SMA207	499R * 1% 0,3 W SMA207	DRALORIC	1
R -033	2500024900	249R * 1% 0,3 W SMA207	249R * 1% 0,3 W SMA207	DRALORIC	1
R -034	2500024900	249R * 1% 0,3 W SMA207	249R * 1% 0,3 W SMA207	DRALORIC	1
R -035	2210026800	6K8 5% N4	6K8 5% N4	SOUCOR	1
R -036	2210023300	3K3 5% N4	3K3 5% N4	SOUCOR	1
R -037	2210011000	100R 5% N4	100R 5% N4	SOUCOR	1
R -038	2500049900	499R * 1% 0,3 W SMA207	499R * 1% 0,3 W SMA207	DRALORIC	1
R -039	2500049900	499R * 1% 0,3 W SMA207	499R * 1% 0,3 W SMA207	DRALORIC	1
R -040	2210011000	100R 5% N4	100R 5% N4	SOUCOR	1
R -041	2500110000	1K00 * 1% 0,3 W SMA207	1K00 * 1% 0,3 W SMA207	DRALORIC	1
R -042	2500110000	1K00 * 1% 0,3 W SMA207	1K00 * 1% 0,3 W SMA207	DRALORIC	1
R -043	2500168100	6K81 * 1% 0,3 W SMA207	6K81 * 1% 0,3 W SMA207	DRALORIC	1
R -044	2500168100	6K81 * 1% 0,3 W SMA207	6K81 * 1% 0,3 W SMA207	DRALORIC	1
R -045	2500156200	5K62 * 1% 0,3 W SMA207	5K62 * 1% 0,3 W SMA207	DRALORIC	1
R -046	2500156200	5K62 * 1% 0,3 W SMA207	5K62 * 1% 0,3 W SMA207	DRALORIC	1
R -047	2210001200	12R 5% N4	12R 5% N4	SOUCOR	1
R -048	2210001200	12R 5% N4	12R 5% N4	SOUCOR	1
R -049	2500022100	221R * 1% 0,3 W SMA207	221R * 1% 0,3 W SMA207	DRALORIC	1
R -050	2500022100	221R * 1% 0,3 W SMA207	221R * 1% 0,3 W SMA207	DRALORIC	1
R -051	2500924900	24R9 * 1% 0,3 W SMA207	24R9 * 1% 0,3 W SMA207	DRALORIC	1
R -052	2500924900	24R9 * 1% 0,3 W SMA207	24R9 * 1% 0,3 W SMA207	DRALORIC	1
R -053	2300094700	4R7 SFR 25 1/4W 5% RC2T	4R7 SFR 25 1/4W 5% RC2T	RTC	1
R -054	2300095600	5R6 SFR 25 1/4W 5% RC2T	5R6 SFR 25 1/4W 5% RC2T	RTC	1
R -055	2300095600	5R6 SFR 25 1/4W 5% RC2T	5R6 SFR 25 1/4W 5% RC2T	RTC	1
R -056	2500110000	1K00 * 1% 0,3 W SMA207	1K00 * 1% 0,3 W SMA207	DRALORIC	1
R -057	2500010000	100R * 1% 0,3 W SMA207	100R * 1% 0,3 W SMA207	DRALORIC	1
R -058	2210011000	100R 5% N4	100R 5% N4	SOUCOR	1
R -059	2210011000	100R 5% N4	100R 5% N4	SOUCOR	1

*0269070000 13 CARTE AMPLIFICATEUR . 2230A * 13 AMPLIFIER BOARD ..... 2230A G932353.A976907 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
R -060	2500130100	3K01 * 1% 0,3 W SMA207 *	3K01 * 1% 0,3 W SMA207	DRALORIC	1
R -061	2500130100	3K01 * 1% 0,3 W SMA207 *	3K01 * 1% 0,3 W SMA207	DRALORIC	1
R -062	2500149900	4K99 * 1% 0,3 W SMA207 *	4K99 * 1% 0,3 W SMA207	DRALORIC	1
R -063	2500149900	4K99 * 1% 0,3 W SMA207 *	4K99 * 1% 0,3 W SMA207	DRALORIC	1
R -064	2210032200	22K 5% N4 *	22K 5% N4	SOUCOR	1
R -065	2210032200	22K 5% N4 *	22K 5% N4	SOUCOR	1
R -066	2500948700	48R7 * 1% 0,3 W SMA207 *	48R7 * 1% 0,3 W SMA207	DRALORIC	1
R -067	2210023300	3K3 5% N4 *	3K3 5% N4	SOUCOR	1
R -068	2210011000	100R 5% N4 *	100R 5% N4	SOUCOR	1
R -069	2210011500	150R 5% N4 *	150R 5% N4	SOUCOR	1
R -070	2210022200	2K2 5% N4 *	2K2 5% N4	SOUCOR	1
R -071	2210011000	100R 5% N4 *	100R 5% N4	SOUCOR	1
R -072	2210022200	2K2 5% N4 *	2K2 5% N4	SOUCOR	1
R -073	2210022200	2K2 5% N4 *	2K2 5% N4	SOUCOR	1
R -074	2210024700	4K7 5% N4 *	4K7 5% N4	SOUCOR	1
R -075	2500110000	1K00 * 1% 0,3 W SMA207 *	1K00 * 1% 0,3 W SMA207	DRALORIC	1
R -076	2210013300	330R 5% N4 *	330R 5% N4	SOUCOR	1
R -077	2500115000	1K50 * 1% 0,3 W SMA207 *	1K50 * 1% 0,3 W SMA207	DRALORIC	1
R -078	2900011000	100R 5% NK3 *	100R 5% NK3	SOUCOR	1
R -079	2500124300	2K43 * 1% 0,3 W SMA207 *	2K43 * 1% 0,3 W SMA207	DRALORIC	1
R -080	2210005600	56R 5% N4 *	56R 5% N4	SOUCOR	1
R -081	2500022600	226R * 1% 0,3 W SMA207 *	226R * 1% 0,3 W SMA207	DRALORIC	1
R -082	2500022600	226R * 1% 0,3 W SMA207 *	226R * 1% 0,3 W SMA207	DRALORIC	1
R -083	2500124300	2K43 * 1% 0,3 W SMA207 *	2K43 * 1% 0,3 W SMA207	DRALORIC	1
R -084	2500157600	5K76 * 1% 0,3 W SMA207 *	5K76 * 1% 0,3 W SMA207	DRALORIC	1
R -085	2500049900	499R * 1% 0,3 W SMA207 *	499R * 1% 0,3 W SMA207	DRALORIC	1
R -086	2500049900	499R * 1% 0,3 W SMA207 *	499R * 1% 0,3 W SMA207	DRALORIC	1
R -087	2210004700	47R 5% N4 *	47R 5% N4	SOUCOR	1
R -088	2210004700	47R 5% N4 *	47R 5% N4	SOUCOR	1
R -089	2210034700	47K 5% N4 *	47K 5% N4	SOUCOR	1
R -090	2210034700	47K 5% N4 *	47K 5% N4	SOUCOR	1
R -091	2210032200	22K 5% N4 *	22K 5% N4	SOUCOR	1
R -092	2500210000	10K0 * 1% 0,3 W SMA207 *	10K0 * 1% 0,3 W SMA207	DRALORIC	1
R -093	2500210000	10K0 * 1% 0,3 W SMA207 *	10K0 * 1% 0,3 W SMA207	DRALORIC	1
R -094	2210024700	4K7 5% N4 *	4K7 5% N4	SOUCOR	1
R -095	2210031000	10K 5% N4 *	10K 5% N4	SOUCOR	1
R -096	2500210000	10K0 * 1% 0,3 W SMA207 *	10K0 * 1% 0,3 W SMA207	DRALORIC	1
R -097	2210023300	3K3 5% N4 *	3K3 5% N4	SOUCOR	1
R -098	2500215000	15K0 * 1% 0,3 W SMA207 *	15K0 * 1% 0,3 W SMA207	DRALORIC	1
R -099	2210041200	120K 5% N4 *	120K 5% N4	SOUCOR	1
R -100	2200052200	2M2 5% CB *	2M2 5% CB	ALLEN BRADLEY	1
R -101	2500168100	6K81 * 1% 0,3 W SMA207 *	6K81 * 1% 0,3 W SMA207	DRALORIC	1
R -102	2300094700	4R7 SFR 25 1/4W 5% RC2T *	4R7 SFR 25 1/4W 5% RC2T	RTC	1
R -103	2300094700	4R7 SFR 25 1/4W 5% RC2T *	4R7 SFR 25 1/4W 5% RC2T	RTC	1
R -104	2210005100	51R 5% N4 *	51R 5% N4	SOUCOR	1
SN -001	4200090000	LM 741 CN B+ . DIP 8 PATTES .. *	LM 741 CN B+ . DIP 8 PINS	NS	1
SN -002	4200110000	TBA 673 MODULATEUR 4 QUADRANS. *	TBA 673 MODULATOR 4 FACES	RTC	1
SN -003	4200090000	LM 741 CN B+ . DIP 8 PATTES .. *	LM 741 CN B+ . DIP 8 PINS	NS	1
SN -004	4200090000	LM 741 CN B+ . DIP 8 PATTES .. *	LM 741 CN B+ . DIP 8 PINS	NS	1
SN -005	4200180000	LM 1458 N B+ DIP 8 PATTES .... *	LM 1458 N B+ DIP 8 PINS	NS	1
T -001	0218030000	00 F2 30X38+38 ..... 2200A *	00 F2 30X38+38 TURNS ... 2200A	Z94 F2.....106	1
T -002	0218040000	00 F2 16X2 SPIRES ..... 2200A *	00 F2 16X2 TURNS 2200A	Z94 F2.....18	1
T -003	0216280000	01 F2 63 SPIRES ..... *	01 F2 63 TURNS	Z94 F2.....63	1
T -004	0218050000	00 F2 2X4+4 ..... 2200A *	00 F2 2X4+4 TURNS 2200A	Z94 F2.....10	1
T -005	0218060000	00 F2 46X46 SPIRES ..... 2200A *	00 F2 46X46 TURNS 2200A	Z94 F2.....92	1
T -006	0217170000	00 F2 95 SPIRES ..... *	00 F2 95 TURNS	Z94 F2.....95	1
T -007	0217170000	00 F2 95 SPIRES ..... *	00 F2 95 TURNS	Z94 F2.....95	1
T -008	0217280000	01 TORE FT5 T6 ..... *	01 TORE FT5 T6	ADRET.....	1
Z0 -004	0206760000	00 ETIQUETTE 6907 ..... 2230A *	00 LABEL 6907 ..... 2230A	942375.....	1
Z1	1269070400	CI DEMODULATEUR AMPLI .. 2230A *	PC AMPLI DEMODULATOR ... 2230A	L996907.....TM	1
Z1	1400109900	POINT TEST ..... *	TEST POINT	C940850	14
Z1	1900200000	EXTRACTEUR DE CARTE'ELEVATEUR' *	BOARD EXTRACTOR 'LIFTER'	TRELEC	2
Z4	4900070000	ENTRETOISE T05 ..... T05-001 *	SPACER T05 ..... T05-001	JERMYN	4
Z4	4900080000	ENTRETOISE DE CI ..... MON 10L *	PC SPACER ..... MON 10L	JERMYN	1
Z4	4900250000	ENTRETOISE T018-019D ..... *	SPACER T018-019D	JERMYN	4
Z5	5400050000	CALE ISOLANTE NEOSID POUR CI . *	NEOSID INSULATING QUOIN FOR PC -940008		7
Z5	5500170000	TORE 4B1 3,7X1,2X3,5 ..... *	TORE 4B1 3.7X1.2X3.5	RTC	3
Z6	6400530000	OEILLET LAITON ..... N° 2070 *	FIXING EYELET BRASS .. N° 2070	MFOM	2

CONVERTISSEUR NUMERIQUE / ANALOGIQUE
DIGITAL / ANALOG CONVERTER




A10 AMPLI SUIVEUR
FOLLOWER AMP
R16 100Ω
-12V
C5 10nF
PT2
SN4 356
+12V
R15 100Ω
R18 4,7k
C6 10nF
P2 10k
SN5 356
PT3
P5 22k
R22 18,7k
R21 4,22k
R19 27k
R20 1,96k
SN13 4053
R44 31,6k
P4 1k
R43 80,6k
P3 4,7k
R17 4,7k
P1 10k
+6V
R14 18Ω
C2 15µF
R29 100k
R30 49,9k
R36 5k11
R37 5k
R38 5k
R39 10k
R40 30,1k
R33 86,6k
R34 21k
R35 10,43k
R41 10,9k
SN11 4053
SN12 4053
R32 44,2k
R31 90,9k
R45 110k
R42 78,7k
SN7. 4561
SN8. 4561
R53
R52
R51
R50
4x47k
R57
R56
R55
R54
4x47k
0,1 dB
1 dB
ALC
vers DEMODULATEUR AMPLIFICATEUR
to DEMODULATOR AMPLIFIER
40 dB
20 dB
10 dB
10 dB
-12V +12V +6V
CIRCUIT DE COMMANDE
om CONTROL CIRCUITS
vers MODULE de SORTIE
to OUTPUT MODULE

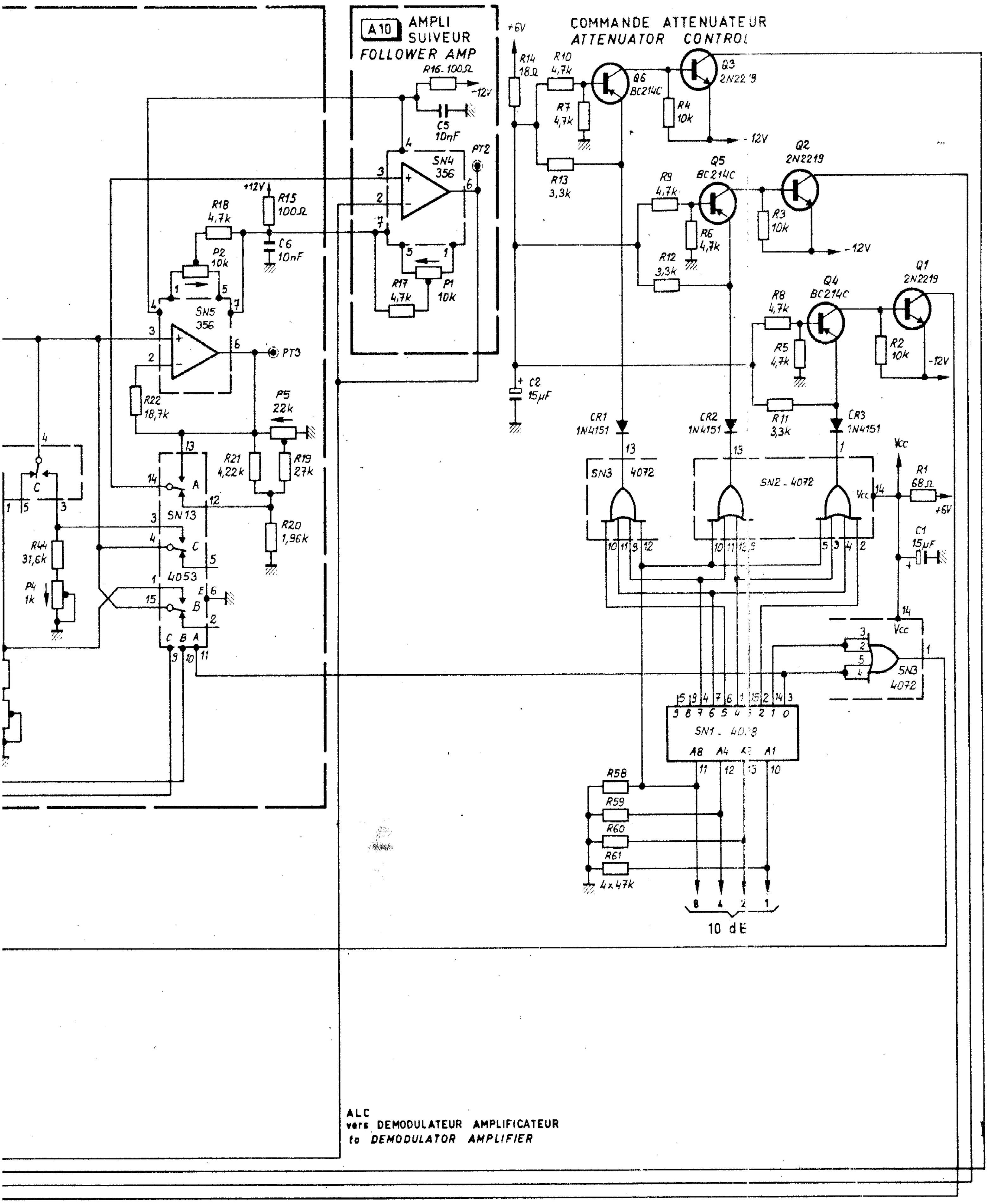
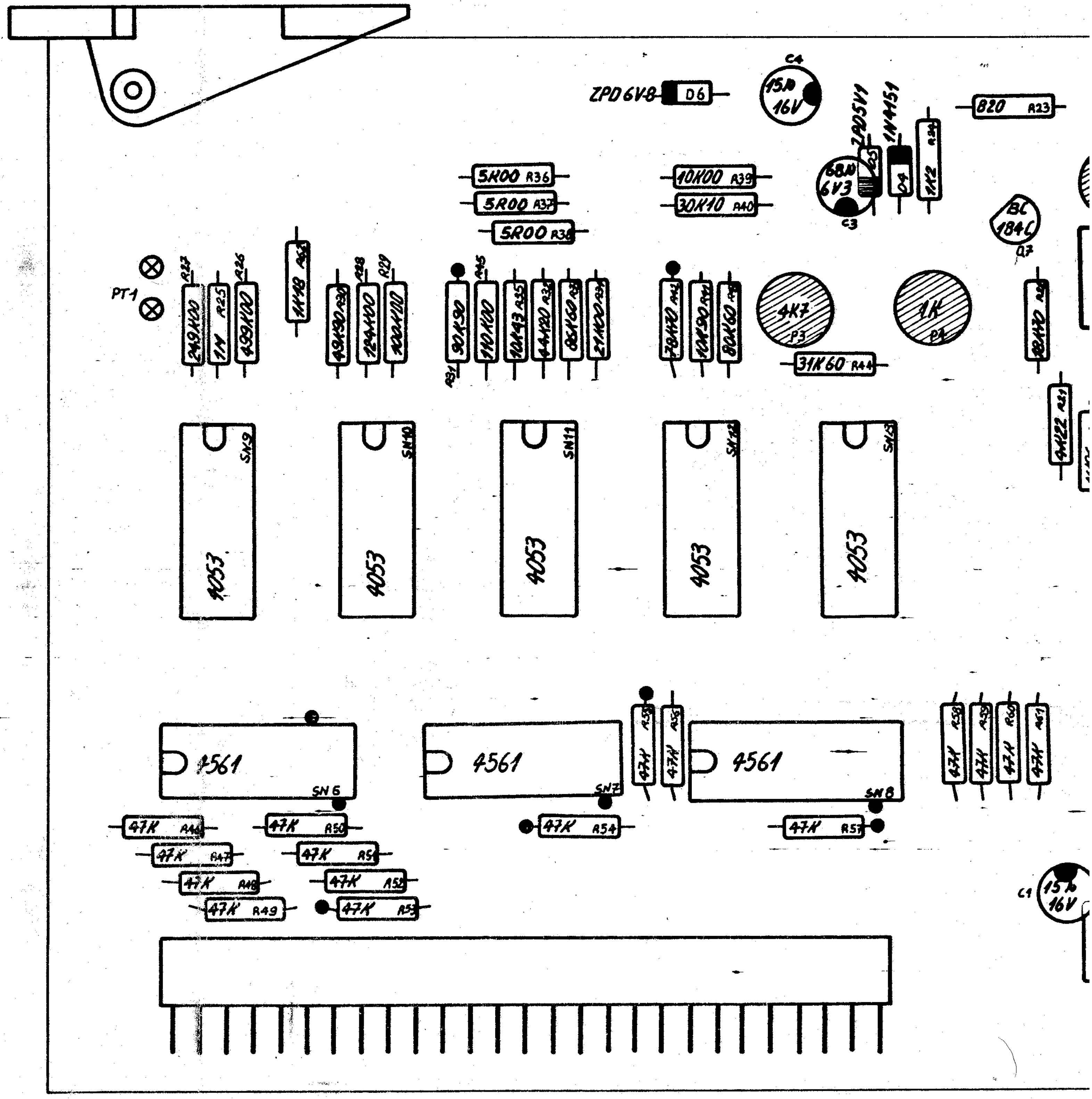


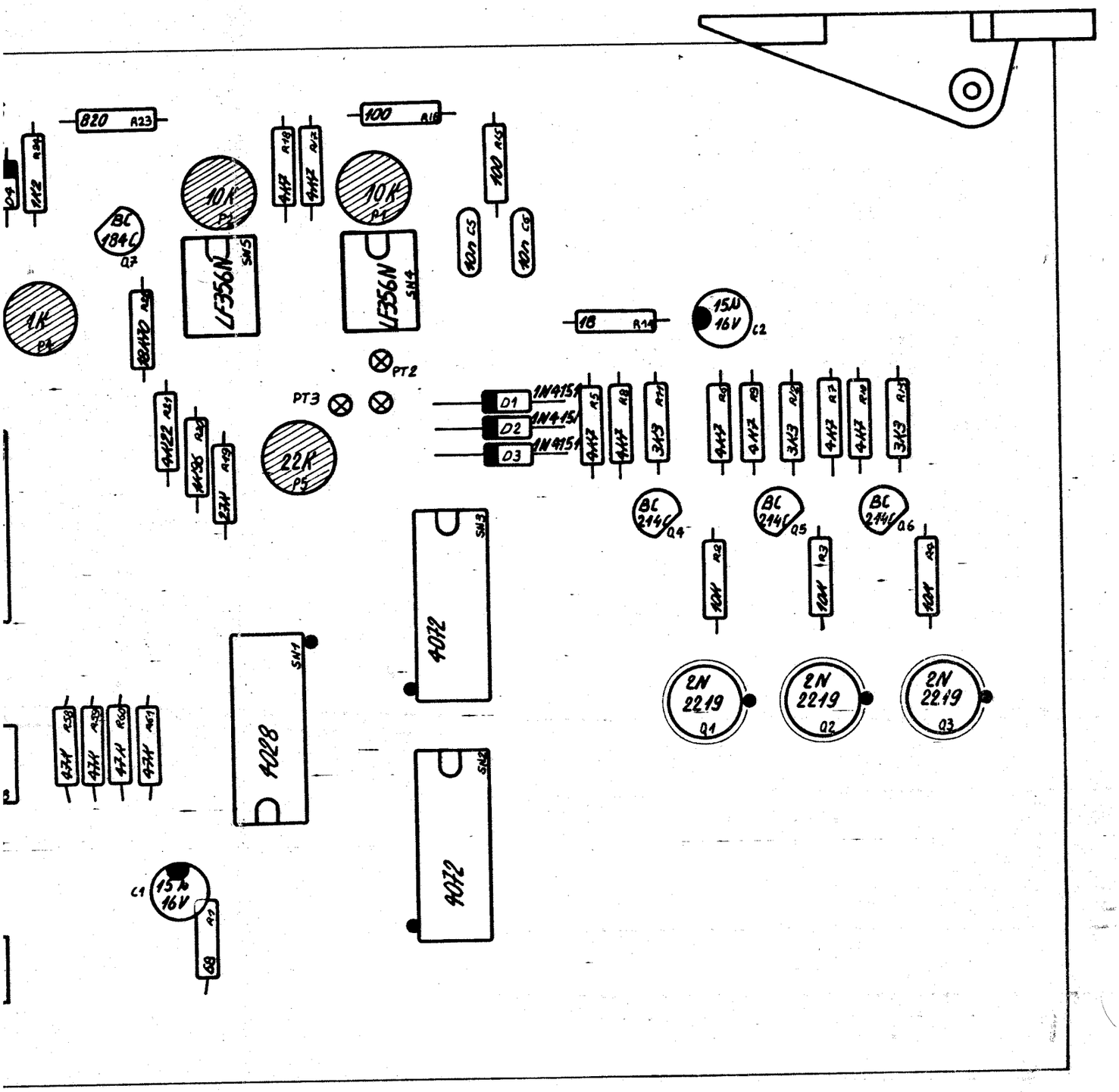
PLATE V_5

PLANCHE V_5

Ce document ne peut être communiqué ni reproduit sans autorisation			adret electronique	DATE : JUILLET 1978
ETUDIE	DESSINE	VERIFIE	2230 A	PAGE : 1 / 1
	ACORT	H K	CODAGE NIVEAU DE SORTIE *OUTPUT LEVEL CODING*	976908A



ZPD 6V8
D6
C4
15µ 16V
ZPD5V1
1N4151
820 R23
5K00 R36
5R00 R37
5R00 R38
10K00 R39
30K10 R40
68µ 6V3
C3
D4
1K2
BC 184C
Q7
PT 1
R27
R25
R26
R28
R29
R31
R45
R35
1K18
249K00
1K
499K00
49K90
124K00
100K00
90K90
110K00
10K43
44K20
86K60
274K00
78K70
10K90
80K60
4K7
P3
1K
P1
31K60 R44
38K40
44K22
SN9
SN10
SN11
SN12
SN13
4053
4053
4053
4053
4053
4561
4561
4561
SN 6
SN7
SN8
R55
R56
47K
47K
R58
R59
R60
R61
47K
47K
47K
47K
47K R46
47K R47
47K R48
47K R49
47K R50
47K R51
47K R52
47K R53
47K R54
47K R57
C1
15µ 16V


820 R23
100 R16
10K P4
10K P2
LF356N SN5
LF356N SN4
1K P1
22K P5
PT2
PT3
D1 1N4151
D2 1N4151
D3 1N4151
BC 184C Q7
BC 214C Q4
BC 214C Q5
BC 214C Q6
2N 2219 Q1
2N 2219 Q2
2N 2219 Q3
4028 SN1
4012 SN3
4012 SN2
15µ 16V C2
15µ 16V C1
100 C5
100 C6
18 R14

*0269080000 06 CARTE COMMANDE NIVEAU 2230A * 06 LEVEL CONTROL BOARD . 2230A G932349.A976908 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
B -001	1427011600	TM 27 MCIG ..... MALE*CARTE*	TM 27 MCIG ..... MALE	TRELEC	1
C -001	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -002	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -003	3700250000	47MMF/6,3V 5,08 .. STAND L TAG	47MMF/6,3V 5,08 .. STAND L TAG	STC	1
C -004	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -005	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -006	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
D -001	4500020000	1N4151	1N4151	FU'ITT'	1
D -002	4500020000	1N4151	1N4151	FU'ITT'	1
D -003	4500020000	1N4151	1N4151	FU'ITT'	1
D -004	4500020000	1N4151	1N4151	FU'ITT'	1
D -005	4600030000	ZPD5,1	ZPD5,1	ITT	1
D -006	4600080000	ZPD6,8	ZPD6,8	ITT	1
P -001	2153100000	10K T05 CERMET T 7 YA	10K T05 CERMET T 7 YA	SFERNICE	1
P -002	2153100000	10K T05 CERMET T 7 YA	10K T05 CERMET T 7 YA	SFERNICE	1
P -003	2152470000	4K7 T05 CERMET T 7 YA	4K7 T05 CERMET T 7 YA	SFERNICE	1
P -004	2152100000	1 K T05 CERMET T 7 YA	1 K T05 CERMET T 7 YA	SFERNICE	1
P -005	2153220000	22K T05 CERMET T 7 YA	22K T05 CERMET T 7 YA	SFERNICE	1
Q -001	4800060000	2N2219	2N2219	RTC	1
Q -002	4800060000	2N2219	2N2219	RTC	1
Q -003	4800060000	2N2219	2N2219	RTC	1
Q -004	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -005	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -006	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -007	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
R -001	2210006800	68R 5% N4	68R 5% N4	SOVCOR	1
R -002	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -003	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -004	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -005	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -006	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -007	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -008	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -009	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -010	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -011	2210023300	3K3 5% N4	3K3 5% N4	SOVCOR	1
R -012	2210023300	3K3 5% N4	3K3 5% N4	SOVCOR	1
R -013	2210023300	3K3 5% N4	3K3 5% N4	SOVCOR	1
R -014	2210001800	18R 5% N4	18R 5% N4	SOVCOR	1
R -015	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -016	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -017	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -018	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -019	2210032700	27K 5% N4	27K 5% N4	SOVCOR	1
R -020	2500119600	1K96 * 1% 0,3 W SMA207	1K96 * 1% 0,3 W SMA207	DRALORIC	1
R -021	2500142200	4K22 * 1% 0,3 W SMA207	4K22 * 1% 0,3 W SMA207	DRALORIC	1
R -022	2500218700	18K7 * 1% 0,3 W SMA207	18K7 * 1% 0,3 W SMA207	DRALORIC	1
R -023	2210018200	820R 5% N4	820R 5% N4	SOVCOR	1
R -024	2210021200	1K2 5% N4	1K2 5% N4	SOVCOR	1
R -025	2210051000	1M 5% N4	1M 5% N4	SOVCOR	1
R -026	2500349900	499K * 1% 0,3 W SMA207	499K * 1% 0,3 W SMA207	DRALORIC	1
R -027	2500324900	249K * 1% 0,3 W SMA207	249K * 1% 0,3 W SMA207	DRALORIC	1
R -028	2500312400	124K * 1% 0,3 W SMA207	124K * 1% 0,3 W SMA207	DRALORIC	1
R -029	2500310000	100K * 1% 0,3 W SMA207	100K * 1% 0,3 W SMA207	DRALORIC	1
R -030	2500249900	49K9 * 1% 0,3 W SMA207	49K9 * 1% 0,3 W SMA207	DRALORIC	1
R -031	2500290900	90K9 * 1% 0,3 W SMA207	90K9 * 1% 0,3 W SMA207	DRALORIC	1
R -032	2500244200	44K2 * 1% 0,3 W SMA207	44K2 * 1% 0,3 W SMA207	DRALORIC	1
R -033	2500286600	86K6 * 1% 0,3 W SMA207	86K6 * 1% 0,3 W SMA207	DRALORIC	1
R -034	2500221000	21K0 * 1% 0,3 W SMA207	21K0 * 1% 0,3 W SMA207	DRALORIC	1
R -035	2601104300	10K43 0,25% 50PPM H10	10K43 0,25% 50PPM H10	HOLCO	1
R -036	2500151100	5K11 * 1% 0,3 W SMA207	5K11 * 1% 0,3 W SMA207	DRALORIC	1
R -037	2600500000	5K00 0,25% 50PPM H10	5K00 0,25% 50PPM H10	HOLCO	1
R -038	2600500000	5K00 0,25% 50PPM H10	5K00 0,25% 50PPM H10	HOLCO	1
R -039	2601100000	10K00 0,25% 50PPM H10	10K00 0,25% 50PPM H10	HOLCO	1
R -040	2601301000	30K10 0,25% 50PPM H10	30K10 0,25% 50PPM H10	HOLCO	1
R -041	2601109000	10K90 0,25% 50PPM H10	10K90 0,25% 50PPM H10	HOLCO	1
R -042	2500278700	78K7 * 1% 0,3 W SMA207	78K7 * 1% 0,3 W SMA207	DRALORIC	1
R -043	2500280600	80K6 * 1% 0,3 W SMA207	80K6 * 1% 0,3 W SMA207	DRALORIC	1
R -044	2500231600	31K6 * 1% 0,3 W SMA207	31K6 * 1% 0,3 W SMA207	DRALORIC	1
R -045	2500311000	110K * 1% 0,3 W SMA207	110K * 1% 0,3 W SMA207	DRALORIC	1
R -046	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -047	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -048	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -049	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -050	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -051	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -052	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -053	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -054	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1

*0269080000 06 CARTE COMMANDE NIVEAU 2230A * 06 LEVEL CONTROL BOARD . 2230A G932349.A976908 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
R -055	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -056	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -057	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -058	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -059	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -060	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -061	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -062	2600118000	1K18 0,25% 50PPM H10	1K18 0,25% 50PPM H10	HOLCO	1
SN -001	4160402800	C-MOS 4028	C-MOS 4028	RTC	1
SN -002	4160407200	C-MOS 4072	C-MOS 4072	RTC	1
SN -003	4160407200	C-MOS 4072	C-MOS 4072	RTC	1
SN -004	4200320000	LF 356 N B+	LF 356 N B+	NS	1
SN -005	4200320000	LF 356 N B+	LF 356 N B+	NS	1
SN -006	4160456100	C-MOS 4561 ..... MC 14561 BCP	C-MOS 4561 ..... MC 14561 BCP	MOTOROLA	1
SN -007	4160456100	C-MOS 4561 ..... MC 14561 BCP	C-MOS 4561 ..... MC 14561 BCP	MOTOROLA	1
SN -008	4160456100	C-MOS 4561 ..... MC 14561 BCP	C-MOS 4561 ..... MC 14561 BCP	MOTOROLA	1
SN -009	4160405300	C-MOS 4053	C-MOS 4053	RTC	1
SN -010	4160405300	C-MOS 4053	C-MOS 4053	RTC	1
SN -011	4160405300	C-MOS 4053	C-MOS 4053	RTC	1
SN -012	4160405300	C-MOS 4053	C-MOS 4053	RTC	1
SN -013	4160405300	C-MOS 4053	C-MOS 4053	RTC	1
Z0	0206770000	00 ETIQUETTE 6908 ..... 2230A	00 LABEL 6908 ..... 2230A	942375.....	1
Z1	1269080600	CI COMMANDE NIVEAU 2230A	PC LEVEL CONTROL 2230A	G996908	1
Z1	1400109900	POINT TEST	TEST POINT	C940850	5
Z1	1900200000	EXTRACTEUR DE CARTE'ELEVATEUR'	BOARD EXTRACTOR 'LIFTER'	TRELEC	2
Z4	4900070000	ENTRETOISE T05 ..... T05-001	SPACER T05 ..... T05-001	JERMYN	3
Z4	4900310000	16 SUPPORT C.I. DIL J23-5016	16 CONNECTOR P.C. DIL J23-5016	JERMYN	5
Z6	6400530000	OEILLET LAITON ..... N° 2070	FIXING EYELET BRASS .. N° 2070	MFOM	2

ATTENUATEUR
ATTENUATOR
02 6911

C3 1nF
CR3 1N4448
C2 1nF
CR2 1N4448
C1 1nF
CR1 1N4448

R10 24,9Ω
R2 106,6Ω
R5 371,2Ω
R8 3,75k
R1 144,4Ω
R3 144,4Ω
R4 91,6Ω
R6 91,6Ω
R7 76,5Ω
R9 76,5Ω

Cellule 10 dB
10 dB Cell
Cellule 20 dB
20 dB Cell
Cellule 40 dB
40 dB Cell

+12V
-12V
1 2 3 4 5 6 7 8 9 10
40dB 20dB 10dB
issu de CODAGE NIVEAU DE SORTIE
from OUTPUT LEVEL CODING
F5 : 10 Hz / 1 MHz
issu du DEMODULATEUR AMPLIFICATEUR
from DEMODULATOR AMPLIFIER

A11 AMPLIFICATEUR
AMPLIFIER

+12V
-12V
C1 15µF
C7 15
R6 100Ω
R7 100Ω
C4 1µ
C3 1µF
7
4
R2 330Ω
3
SN1 318
6
R1 75Ω
2
R4 1k
C11 5,6pF
C5 18pF
R21 10k
C10 3,3nF
R22 82k
R3 523Ω
R5 15k

02 6912

A11 AMPLIFICATEUR
AMPLIFIER

ule 40 dB
dB Cell

10 Hz / 1 MHz
du DEMODULATEUR AMPLIFICATEUR
n DEMODULATOR AMPLIFIER

ETUDIE	DE
	AC

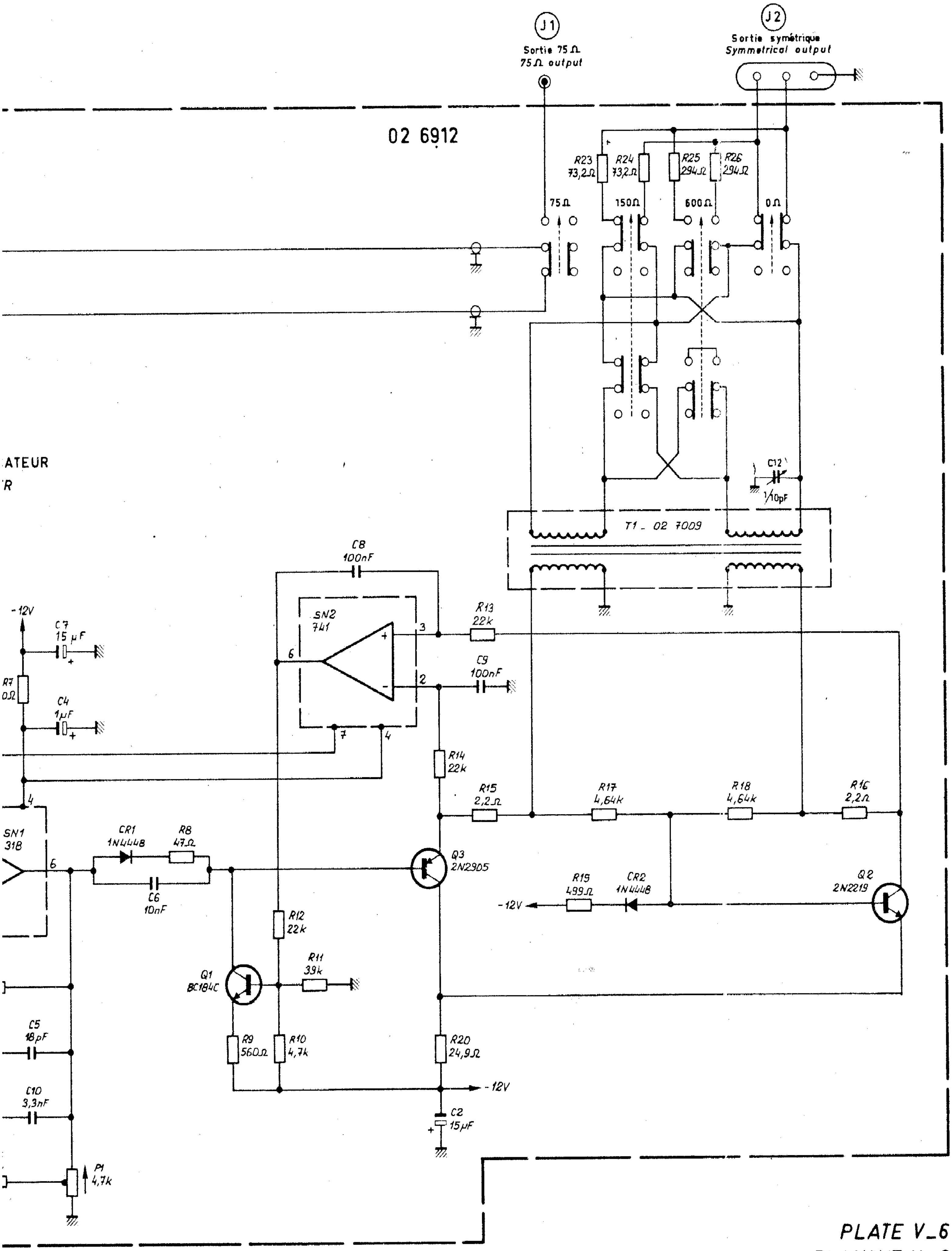

J1
Sortie 75 Ω
75 Ω output
J2
Sortie symétrique
Symmetrical output
02 6912
R23
73,2 Ω
R24
73,2 Ω
R25
294 Ω
R26
294 Ω
75 Ω
150 Ω
600 Ω
0 Ω
ATEUR
C12
1/10pF
T1 _ 02 7009
C8
100nF
SN2
741
R13
22k
C9
100nF
-12V
C7
15 µF
R7
C4
1µF
R14
22k
R15
2,2 Ω
R17
4,64k
R18
4,64k
R16
2,2 Ω
SN1
318
CR1
1N4448
R8
47 Ω
C6
10nF
Q3
2N2905
R19
499 Ω
CR2
1N4448
Q2
2N2219
R12
22k
Q1
BC184C
R11
39k
C5
18pF
R9
560 Ω
R10
4,7k
R20
24,9 Ω
C10
3,3nF
C2
15µF
P1
4,7k

PLATE V_6

PLANCHE V_6

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ÉTUDIÉ	DESSINÉ	VÉRIFIÉ	2230 A MODULE DE SORTIE *OUTPUT MODULE*	PAGE : 1 / 1
	ACORT	HK		976910C

N
R
Bu
73Ω20 R23
73Ω20 R24
294Ω00 R25
294Ω00 R26
15µ 16V C2
330 R2
5230Ω00 R3
75Ω00 R1
15K R5
1K00 R4
10K R21
47p C11
15p C5
82K R22
1µ 25V C4
1µ 25V C3
3nf3 C10
100 R7
4K7 R10
560 R9
15µ 16V C7
499Ω00 R19
BC184 Q1
LM318 SN1
10n C6
D1
15µ 16V C1
240Ω90 R20
MA741 SN2
4K7 R8
100 R6
39K R11
22K R12
0nf1 C8
0nf1 C9
4K64 R17
4K64 R18
D2
22K R14
22K R13
2Ω2 R15
2Ω2 R16
2N2905 Q3
2N2219 Q2

15p C5
3nf3 C10
10n C6
D1
15µ 16V C4
47 R8
100 R6

R1
142Ω40
R3
142Ω40
R4
91Ω60
R6
91Ω60
R7
76Ω50
R9
76Ω50
106Ω60 R2
371Ω25 R5
3K75 R8
R10
24Ω90
D1 1N4448
D2 1N4448
D3 1N4448
1n C1
1n C2
1n C3

*0269100000 11 BAQUET DE SORTIE .... 2230A * 11 OUTPUT MODULE ..... 2230A J920871.C976910 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
001	0269110000	03 ATTENUATEUR 2230A	* 03 ATTENUATOR 2230A	C932524.....	1
001	0269120000	11 AMPLI SYMETRIQUE 2230A	* 11 SYMMETRICAL AMPLI ... 2230A	H932351 1&2/2..	1
C -012	3600050000	2/10 PF ... REF C010 808 23109	* 2/10 PF ... REF C010 808 23109	RTC (C010)	1
P -001	2152470000	4K7 T05 CERMET T 7 YA	* 4K7 T05 CERMET T 7 YA	SFERNICE	1
Z0	0270090000	02 TRANSFO DE SORTIE ... 2230A	* 02 OUTPUT TRANSFO 2230A	A920936.....	1
Z1	1100030000	FIL ROUGE KY30-04	* RED THREAD KY30-04	FILECA	0
Z1	1100070000	FIL BLEU KY30-04	* BLUE THREAD KY30-04	FILECA	0
Z1	1100440000	CABLE BLINDE GRIS FMA2R	* GREY ARMORED CABLE FMA2R	FILECA	0
Z1	1100530000	FIL.NU.ETAME.6/10	* TINNED BARE THREAD 6/10	ELECTROFIL	0
Z1	1100550000	FIL.NU.ETAME.10/10	* TINNED BARE THREAD10/10	ELECTROFIL	0
Z1	1300450000	GAINE F4,8 FP301 3/16 . SFM 48	* SHEATH F4.8 FP301 3/16 SFM 48	HELLERMANN	0
Z1	1300610000	PASSE.FIL .....REF 751	* FEED-THROUGH SLEEVE ...REF 751	MFOM	1
Z1	1400215800	BNC EMBASE ECROU'FEMEL'R141559	* BNC BASE THUMB FEMALE .R141559	RADIALL	1
Z1	1400217200	PRISE SIEMENS C42334 A176 A11	* SIEMENS PLUG C42334 A176 A11	SIEMENS	1
Z1	1410007600	TB 10 M ..... MALE	* TB 10 M ..... MALE	TRELEC	1
Z1	1520412300	04 TOUCHES ORE 10 BAQSYM 2230A	* 04 TOUCHES ORE 10 BAQSYM 2230A	D932472	1
Z1	1600090000	RELAIS 2 INV. G2V-234P-NT.12DC	* RELAYS 2 REV. G2V-234P-NT.12DC	OMRON	3
Z1	1900010000	GUIDE CARTE ANTIV.FIXAT. PIONS	* BOARD GUIDE FIXATION PIONS	TRELEC	1
Z3	3100430000	1000PF TRAVERSEE 8020D4000400V	* 1000PF PINCH 8020D4000400V	BDBQ 5 STETTNER	2
Z5	5500110000	TUBE B30 GT 4,1X2X12,5	* TUBE B30 GT 4.1X2X12.5	COFELEC	1
Z6	6100030800	TCB M3X 8 U DIN7985-4,8 INOX	* TCB M3X 8 U DIN7985-4,8 INOX	BD	2
Z6	6107241900	N'4X19 ACI A TOLE F/80' CRUCIF	* N'4X19 ACI A TOLE F/80' CRUCIF	SAGIC	2
Z6	6130110400	LAD 2,5X 4 CYLINDRIQUE FENDUE	* LAD 2,5X 4 CYLINDRIQUE FENDUE	SAGIC	16
Z6	6130110500	LAD 2,5X 5 CYLINDRIQUE FENDUE	* LAD 2.5 X 5 CYLINDER SLOT	SAGIC	6
Z6	6130111000	LAD 2,5X10 CYLINDRIQUE FENDUE	* LAD 2.5 X 10 CYLINDER SLOT ...	SAGIC	2
Z6	6200010000	ECROU H M2,5 U NFE27-411-5INOX	* NUT H M2.5 U NFE27-411-5 INOX	BD	3
Z6	6200030000	ECROU H M3 U NF E27-411-5 INOX	* NUT H M3 U NF E27-411-5 INOX .	BD	2
Z6	6220010000	LAI 2,5 HEXAGONAL USUEL 'H'	* BRASS 2.5 USUAL HEXAGON 'H'	SAGIC	2
Z6	6301010000	DI 2,5 EVENTAIL NFE27-618 INOX	* DI 2.5 FAN .... NFE27-618 INOX	BD	2
Z6	6305030000	ACI 3 CONTACT REF 55-03-01	* STEEL 3 CONTACT REF 55-03-01	NOMEL	2
Z6	6400350000	COSSE A SOUDER 2003E	* SOLDERING TERMINAL 2003E	MFOM	1
Z6	6400670000	RIVET POP 3,2 L 4 ALU ABS 41	* POP RIVET 3.2 L 4 ALU ABS 41	MFOM	2
Z8	8006710600	FOND AMPLI-ATTENUATEUR . 2230A	* AMPLI-ATT. BACKGROUND .. 2230A	E932163.....	1
Z8	8006710800	PLATINE AVANT AMPLI-ATTE 2230A	* AMPLI-ATT.FRONT MOUNTING 2230A	D942100	1
Z8	8006710900	COUVERCLE AMPLI-ATTENUAT 2230A	* AMPLI-ATTENUATOR COVER . 2230A	C932162	1
Z8	8006733000	RONDELLE BNC 12X10X2 2230A	* WASHER BNC 12X10X2 ..... 2230A	A942291	2
Z8	8006763200	TOUCHE GRISE D6H11 OREOR 2230A	* GREY TOUCH D6H11 OREOR 2230A	A942431	4
Z8	8106710300	01 BAQ AMPLI ATTENUATEUR 2230A	* 01 ATTEN. AMPLI MODULE . 2230A	D920776	1

*0269110000 03 ATTENUATEUR ..... 2230A * 03 ATTENUATOR ..... 2230A C932524..... *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
C -001	3120021000	1 NF 2,5 2222 630 51 102 *	1 NF 2,5 2222 630 51 102	COGECO	1
C -002	3120021000	1 NF 2,5 2222 630 51 102 *	1 NF 2,5 2222 630 51 102	COGECO	1
C -003	3120021000	1 NF 2,5 2222 630 51 102 *	1 NF 2,5 2222 630 51 102	COGECO	1
D -001	4500310000	1 N 4448 ..... *	1 N 4448	ITT	1
D -002	4500310000	1 N 4448 ..... *	1 N 4448	ITT	1
D -003	4500310000	1 N 4448 ..... *	1 N 4448	ITT	1
R -001	2609144400	144R4 0,25% 50PPM REF H10 *	144R4 0,25% 50PPM REF H10	HOLCO	1
R -002	2609106600	106R6 0,25% 50PPM REF H10 *	106R6 0,25% 50PPM REF H10	HOLCO	1
R -003	2609144400	144R4 0,25% 50PPM REF H10 *	144R4 0,25% 50PPM REF H10	HOLCO	1
R -004	2608916000	91R6 0,25% 50PPM REF H10 *	91R6 0,25% 50PPM REF H10	HOLCO	1
R -005	2683712500	371.25 0,1% 25PPM AVL *	371.25 0,1% 25PPM AVL	GEKA	1
R -006	2608916000	91R6 0,25% 50PPM REF H10 *	91R6 0,25% 50PPM REF H10	HOLCO	1
R -007	2608765000	76R5 0,25% 50PPM REF H10 *	76R5 0,25% 50PPM REF H10	HOLCO	1
R -008	2693750000	3K75 0,1% 25PPM AVL *	3K75 0,1% 25PPM AVL	GEKA	1
R -009	2608765000	76R5 0,25% 50PPM REF H10 *	76R5 0,25% 50PPM REF H10	HOLCO	1
R -010	2500924900	24R9 * 1% 0,3 W SMA207 *	24R9 * 1% 0,3 W SMA207	DRALORIC	1
Z1	1100020000	FIL MARRON ..... KY30-04 *	BROWN THREAD KY30-04	FILECA	0
Z1	1100060000	FIL VERT ..... KY30-04 *	GREEN THREAD KY30-04	FILECA	0
Z1	1100090000	FIL GRIS ..... KY30-04 *	GREY THREAD KY30-04	FILECA	0
Z1	1100430000	COAX KX 21 A ..... *	COAX KX 21 A	FILECA	0
Z1	1269110200	CI ATTENUATEUR ..... 2230A *	PC ATTENUATOR 2230A	F996911.....SF	1
Z6	6400280000	PLOT A FOURCHE SOUDE . BFMQ13C *	SOLDERED FORK CONTACT BFMQ13C	COMATEL	2

*0269120000 11 AMPLI SYMETRIQUE .... 2230A * 11 SYMMETRICAL AMPLI ... 2230A H932351 1&2/2.. *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
C -001	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -002	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -003	3700020000	1MMF/35V 5,08 .... STAND L TAG	1MMF/35V 5,08 .... STAND L TAG	STC	1
C -004	3700020000	1MMF/35V 5,08 .... STAND L TAG	1MMF/35V 5,08 .... STAND L TAG	STC	1
C -005	3120001800	18PF 2,5 'J' 2222 680 10 189	18PF 2,5 'J' 2222 680 10 189	COGECO	1
C -006	3150031000	10NF 5,08 63V GOX 767 14	10NF 5,08 63V GOX 767 14	LCC	1
C -007	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -008	3234100000	0,1MMF 10(10%250V)222236845104	0,1MMF 10(10%250V)222236845104	COGECO	1
C -009	3234100000	0,1MMF 10(10%250V)222236845104	0,1MMF 10(10%250V)222236845104	COGECO	1
C -010	3232330000	3300PF 10(10%400V)222236855332	3300PF 10(10%400V)222236855332	COGECO	1
C -011	3120095600	5,6PF 2,5'C' 2222 680 09 568	5,6PF 2,5'C' 2222 680 09 568	COGECO	1
D -001	4500310000	1 N 4448	1 N 4448	ITT	1
D -002	4500310000	1 N 4448	1 N 4448	ITT	1
Q -001	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -002	4800060000	2N2219	2N2219	RTC	1
Q -003	4800080000	2N2905	2N2905	RTC	1
R -001	2500975000	75R0 * 1% 0,3 W SMA207	75R0 * 1% 0,3 W SMA207	DRALORIC	1
R -002	2210013300	330R 5% N4	330R 5% N4	SOVCOR	1
R -003	2500052300	523R * 1% 0,3 W SMA207	523R * 1% 0,3 W SMA207	DRALORIC	1
R -004	2500110000	1K00 * 1% 0,3 W SMA207	1K00 * 1% 0,3 W SMA207	DRALORIC	1
R -005	2210031500	15K 5% N4	15K 5% N4	SOVCOR	1
R -006	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -007	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -008	2210004700	47R 5% N4	47R 5% N4	SOVCOR	1
R -009	2210015600	560R 5% N4	560R 5% N4	SOVCOR	1
R -010	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -011	2210033900	39K 5% N4	39K 5% N4	SOVCOR	1
R -012	2210032200	22K 5% N4	22K 5% N4	SOVCOR	1
R -013	2210032200	22K 5% N4	22K 5% N4	SOVCOR	1
R -014	2210032200	22K 5% N4	22K 5% N4	SOVCOR	1
R -015	2300092200	2R2 SFR 25 1/4W 5% RC2T	2R2 SFR 25 1/4W 5% RC2T	RTC	1
R -016	2300092200	2R2 SFR 25 1/4W 5% RC2T	2R2 SFR 25 1/4W 5% RC2T	RTC	1
R -017	2500146400	4K64 * 1% 0,3 W SMA207	4K64 * 1% 0,3 W SMA207	DRALORIC	1
R -018	2500146400	4K64 * 1% 0,3 W SMA207	4K64 * 1% 0,3 W SMA207	DRALORIC	1
R -019	2500049900	499R * 1% 0,3 W SMA207	499R * 1% 0,3 W SMA207	DRALORIC	1
R -020	2500924900	24R9 * 1% 0,3 W SMA207	24R9 * 1% 0,3 W SMA207	DRALORIC	1
R -021	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -022	2210038200	82K 5% N4	82K 5% N4	SOVCOR	1
R -023	2500973200	73R2 * 1% 0,3 W SMA207	73R2 * 1% 0,3 W SMA207	DRALORIC	1
R -024	2500973200	73R2 * 1% 0,3 W SMA207	73R2 * 1% 0,3 W SMA207	DRALORIC	1
R -025	2500029400	294R * 1% 0,3 W SMA207	294R * 1% 0,3 W SMA207	DRALORIC	1
R -026	2500029400	294R * 1% 0,3 W SMA207	294R * 1% 0,3 W SMA207	DRALORIC	1
SN -001	4200330000	LM 318 N B+	LM 318 N B+	NS	1
SN -002	4200090000	LM 741 CN B+ . DIP 8 PATTES ..	LM 741 CN B+ . DIP 8 PINS	NS	1
Z1	1100010000	FIL NOIR KY30-04	BLACK THREAD KY30-04	FILECA	0
Z1	1100030000	FIL ROUGE KY30-04	RED THREAD KY30-04	FILECA	0
Z1	1100070000	FIL BLEU KY30-04	BLUE THREAD KY30-04	FILECA	0
Z1	1100430000	COAX KX 21 A	COAX KX 21 A	FILECA	0
Z1	1100530000	FIL.NU.ETAME.6/10	TINNED BARE THREAD 6/10	ELECTROFIL	0
Z1	1269120500	CI AMPLI 2230A	PC AMPLI 2230A	K996912.....TM	1
Z1	1300590000	SOUPLISSO 0,6X0,9 COUL.NATUREL	SPAGHETTI 0.6X0.9 GRAY COLORED	HABIA	0
Z4	4900060000	DISSIPATEUR T05-204	DISSIPATOR T05-204	JERMYN	2
Z4	4900070000	ENTRETOISE T05 ..... T05-001	SPACER T05 ..... T05-001	JERMYN	2
Z5	5500110000	TUBE B30 GT 4,1X2X12,5	TUBE B30 GT 4.1X2X12.5	COFELEC	1
Z6	6400080000	RIVET D 1,5 L 2,4 XC 42	RIVET D 1.5 L 2.4 XC 42	MFOM	1

*0270080300 02 CHASSIS EQUIPE ZO ... 2230A * 02 FITTED CHASSIS ZO ... 2230A J910214.....*

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION		PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
001	0269150100	07 PORTEUR EQUIPE 2230A	07 FITTED MOTHER BD 2230A		B920953.A976915	1
001	0270110000	08 PLAQUE AVANT MONTEE . 2230A	08 ASSEM. FRONT PLATE .. 2230A		L920934.....	1
001	0270940000	01 AMPLI Z=0 ..... 2230A	01 AMPLI Z=0 ..... 2230A		E932549.A977094	1
ZO	0270130000	03 NATTE 26'171''177'L140 2230	03 FLAT-T.26'171 177'L140 2230		ADRET.....	1
ZO	0271050000	03 NATTE 26'171''177'L190 2230	03 FLAT-T.26'171 177'L190 2230		ADRET.....	1
Z1	1000270000	ALIMENTATION 2230A	POWER SUPPLY 2230A		E932214.....	1
Z1	1100010000	FIL NOIR KY30-04	BLACK THREAD KY30-04		FILECA	0
Z1	1100020000	FIL MARRON KY30-04	BROWN THREAD KY30-04		FILECA	0
Z1	1100030000	FIL ROUGE KY30-04	RED THREAD KY30-04		FILECA	0
Z1	1100040000	FIL ORANGE KY30-04	ORANGE THREAD KY30-04		FILECA	0
Z1	1100060000	FIL VERT KY30-04	GREEN THREAD KY30-04		FILECA	0
Z1	1100070000	FIL BLEU KY30-04	BLUE THREAD KY30-04		FILECA	0
Z1	1100080000	FIL VIOLET KY30-04	PURPLE THREAD KY30-04		FILECA	0
Z1	1100090000	FIL GRIS KY30-04	GREY THREAD KY30-04		FILECA	0
Z1	1100430000	COAX KX 21 A	COAX KX 21 A		FILECA	1
Z1	1100440000	CABLE BLINDE GRIS FMA2R	GREY ARMORED CABLE FMA2R		FILECA	0
Z1	1100450000	CABLE BLINDE GRIS FMA4R	GREY ARMORED CABLE FMA4R		FILECA	0
Z1	1100520000	FIL.NU.ETAME.4/10	TINNED BARE THREAD 4/10		ELECTROFIL	0
Z1	1100950000	VERT/JAUNE .. H07-V-K(1X1,5ET)	GREEN/YELLOW H07-V-K(1X1.5ET)		FILECA	1
Z1	1300080000	COLLIER ..... REF H3P	COLLAR ..... REF H3P		HELLERMANN	1
Z1	1300090000	COLLIER ..... REF H4P	COLLAR ..... REF H4P		HELLERMANN	3
Z1	1300450000	GAINE F4,8 FP301 3/16 . SFM 48	SHEATH F4.8 FP301 3/16 SFM 48		HELLERMANN	0
Z1	1300460000	GAINE F6,4 FP301 1/4 . SFM 64	SHEATH F6.4 FP301 1/4 . SFM 64		HELLERMANN	0
Z1	1300540000	LACING ..... REF T2 VP NOIR	LACING ..... REF T2 VP NOIR		HELLERMANN	1
Z1	1300590000	SOUPLISSO 0,6X0,9 COUL.NATUREL	SPAGHETTI 0.6X0.9 GRAY COLORED		HABIA	0
Z1	1400200500	BNC EMBASE FEMEL ECROU R141557	BNC FEMALE SOCKET NUT R141557		RADIALL	5
Z1	1405000900	EMBASE DIN ... LUMBERG REF B51	DIN SOCKET ... LUMBERG REF B51		LIENARD SOVAL	1
Z1	1410007700	TB 10 F ..... FEMELLE	TB 10 F ..... FEMALE		TRELEC	1
Z1	1530202000	INVERSEUR REF:0391584-710 NOIR	REVERSER REF:0391584-710 BLACK		METALLO	1
Z1	1530208400	INVERSEUR ... REF:039-1584-110	REVERSER REF:039-1584-110		METALLO	1
Z1	1700340000	FILTRE 220V+NEUTRE 3A P.EUROPE	FILTER 220V+NEUTRAL3A P.EUROPE		EUROPAVIA	1
Z1	1710003900	PORTE FUSIBLE D5&D6 031-1603	FUSE BLOCK D5&D6 031-1603		ARNOULD	1
Z1	1710004000	TETE 6,3X32(17100039) 031-1613	HEAD 6.3X32(17100039) 031-1613		ARNOULD	1
Z1	1720004900	160MA FST6332 034-3409	160MA FST6332 034-3409		ARNOULD	1
Z1	1900180000	GUIDE CARTE ANTIVIBR. REF R221	BOARD GUIDE ..... REF R221		TRELEC	10
Z4	4200220000	7806 UC REGUL.6V/1A TO220	7806 UC REGUL.6V/1A TO220		FAIRCHILD	1
Z4	4200280000	7812 UC REGUL.12V/1A TO 220	7812 UC REGUL.12V/1A TO 220		FAIRCHILD	1
Z4	4200290000	MC 7912 CP REGUL.-12V/1A TO220	MC 7912 CP REGUL.-12V/1A TO220		MOTOROLA	1
Z4	4500310000	1 N 4448	1 N 4448		ITT	1
Z4	4900130000	CALE TO 220 REF:AY537-490537	MICA QUOIN FOR TO 220 REF C75		GETELEC	3
Z4	4900220000	CANON ISOLANT TO 220 EPAUL.3,5	INSULATING CANNON 220 EP. 3.5		MOTOROLA	3
Z5	5500110000	TUBE B30 GT 4,1X2X12,5	TUBE B30 GT 4.1X2X12.5		COFELEC	7
Z6	6100030600	TCB M3X 6 U DIN7985-4,8 INOX	TCB M3X 6 U DIN7985-4,8 INOX		BD	20
Z6	6100030800	TCB M3X 8 U DIN7985-4,8 INOX	TCB M3X 8 U DIN7985-4,8 INOX		BD	14
Z6	6100031200	TCB M3X12 U DIN7985-4,8 INOX	TCB M3X12 U DIN7985-4,8 INOX		BD	6
Z6	6101032000	TF/90 M3X20 U DIN965-4,8 INOX	TF/90 M3X20 U DIN965-4,8 INOX		BD	3
Z6	6101040600	ACF 4 X 6 FRAISEE F/90 CRUCIF	ACF 4 X 6 FRAISEE F/90'CRUCIF		SAGIC	4
Z6	6107020600	TCL 2,2X6,5 POINT.DIN7981BINOX	TCL 2.2X6.5 NIBBL.DIN7981BINOX		BD	6
Z6	6200030000	ECROU H M3 U NF E27-411-5 INOX	NUT H M3 U NF E27-411-5 INOX .		BD	11
Z6	6300030000	Z 3U (6X0,8) NF E27-611 INOX	Z 3U (6X0,8) NF E27-611 INOX		BD	3
Z6	6300030100	M 3U (8X0,8) NF E27-611 INOX	INOX M3 X 8X0.8 FLAT .... MEAN		BD	8
Z6	6305030000	ACI 3 CONTACT REF 55-03-01	STEEL 3 CONTACT REF 55-03-01		NOMEL	8
Z6	6400040000	RIVET D 3 L 5 REF 3050	RIVET D 3 L 5 REF 3050		MFOM	4
Z6	6400160000	COSSE A SOUDER 3,2 519	SOLDERING TERMINAL 3.2 ... 519		MFOM	1
Z6	6400350000	COSSE A SOUDER 2003E	SOLDERING TERMINAL 2003E		MFOM	5
Z6	6400510000	EQUERRE 10X10 LARG 10 EP 1	ANGLEBRACKET10X10 WIDTH10 EP 1		A943051	4
Z6	6400540000	RIVET POP 2,4 L 5 ALU AD32-ABS	POP RIVET 2.4 L 5 ALU AD32-ABS		MFOM	24
Z6	6400780000	RIVET D 20 L 4	RIVET D 20 L 4		MFOM	20
Z8	8006703600	PANNEAU ARRIERE 1MHZ ... 2230A	1MHZ REAR PANEL 2230A		E932706.B932451	1
Z8	8006710100	CLOISON DE CARTE 2230A	BOARD DIVISION 2230A		A932170	3
Z8	8006721600	GLISSIERE HABILLAGE 2230A	LAGGING SLIDEWAY 2230A		C932358	2
Z8	8006722900	RADIATEUR CARRE 12 ..... 2230A	SQUARE 12 DISSIPATOR ... 2230A		A942290	1
Z8	8106711300	FLASQUE LAT. CHASSIS ... 2230A	CHASSIS LAT. FLASK 2230A		F920846	2

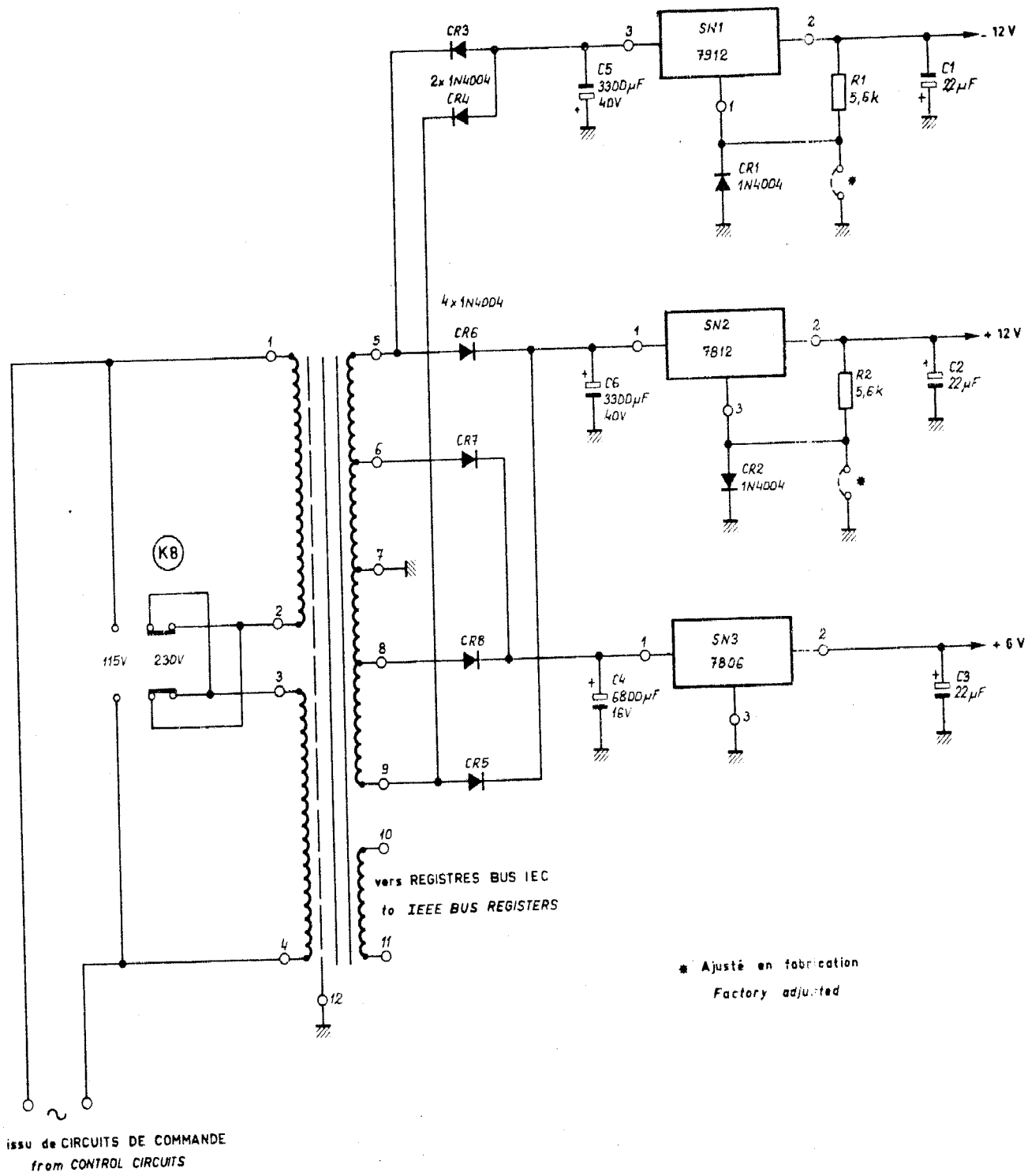

PLATE V-8

PLANCHE V-8

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ÉTUDIE	DESSINÉ	VÉRIFIÉ	2230 A ALIMENTATION POWER SUPPLY	PAGE : 1 / 1
	ACORT	H.K.		976915 A

*0269150100 07 PORTEUR EQUIPE ..... 2230A * 07 FITTED MOTHER BD .... 2230A B920953.A976915 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
C -001	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -002	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -003	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -004	3500430000	6800MMF 16V RELSIC 033	6800MMF 16V RELSIC 033	SIC SAFCO	1
C -005	3500440000	3300MMF 40V RELSIC 033	3300MMF 40V RELSIC 033	SIC SAFCO	1
C -006	3500440000	3300MMF 40V RELSIC 033	3300MMF 40V RELSIC 033	SIC SAFCO	1
D -001	4500040000	1N4004	1N4004	ITT	1
D -002	4500040000	1N4004	1N4004	ITT	1
D -003	4500040000	1N4004	1N4004	ITT	1
D -004	4500040000	1N4004	1N4004	ITT	1
D -005	4500040000	1N4004	1N4004	ITT	1
D -006	4500040000	1N4004	1N4004	ITT	1
D -007	4500040000	1N4004	1N4004	ITT	1
D -008	4500040000	1N4004	1N4004	ITT	1
D -009	4500310000	1 N 4448	1 N 4448	ITT	1
D -010	4500310000	1 N 4448	1 N 4448	ITT	1
D -011	4500310000	1 N 4448	1 N 4448	ITT	1
D -012	4500310000	1 N 4448	1 N 4448	ITT	1
D -013	4500310000	1 N 4448	1 N 4448	ITT	1
D -014	4500310000	1 N 4448	1 N 4448	ITT	1
D -015	4500310000	1 N 4448	1 N 4448	ITT	1
D -016	4500310000	1 N 4448	1 N 4448	ITT	1
D -017	4500310000	1 N 4448	1 N 4448	ITT	1
D -018	4500310000	1 N 4448	1 N 4448	ITT	1
D -019	4500310000	1 N 4448	1 N 4448	ITT	1
D -020	4500310000	1 N 4448	1 N 4448	ITT	1
D -021	4500310000	1 N 4448	1 N 4448	ITT	1
D -022	4500310000	1 N 4448	1 N 4448	ITT	1
D -023	4500310000	1 N 4448	1 N 4448	ITT	1
D -024	4500310000	1 N 4448	1 N 4448	ITT	1
D -025	4500310000	1 N 4448	1 N 4448	ITT	1
D -026	4500310000	1 N 4448	1 N 4448	ITT	1
D -027	4500310000	1 N 4448	1 N 4448	ITT	1
D -028	4500310000	1 N 4448	1 N 4448	ITT	1
R -001	2210025600	5K6 5% N4	5K6 5% N4	SOVCOR	1
R -002	2210025600	5K6 5% N4	5K6 5% N4	SOVCOR	1
Z1	1100520000	FIL.NU.ETAME.4/10	TINNED BARE THREAD 4/10	ELECTROFIL	0
Z1	1100540000	FIL.NU.ETAME.8/10	TINNED BARE THREAD 8/10	ELECTROFIL	0
Z1	1269150600	CI PORTEUR 2230A	PC MOTHER 2230A	E996915	1
Z1	1300950000	EMBASE (TY-RAP) .. REF LPMM-5S	SOCKET (TY-RAP) .. REF LPMM-5S	PANDUIT	3
Z1	1300960000	TY-RAP L 142MM REF PLT 1,5M	TY-RAP L 142MM REF PLT 1.5M	PANDUIT	3
Z1	1417030000	17PTS .EMEL. 6823-17-64-14-335	17PTS .EMEL. 6823-17-64-14-335	SOURIAU	1
Z1	1423029600	23PTS FEMEL. 8623-23-64-14-335	23PTS FEMAL. 8623-23-64-14-335	SOURIAU	1
Z1	1427030100	27PTS FEMEL. 8623-27-64-14-335	27PTS FEMALE 8623-27-64-14-335	SOURIAU	3
Z1	1435030200	35PTS FEMEL. 8623-35-64-14-335	35PTS FEMALE 8623-35-64-14-335	SOURIAU	1
Z6	6400020000	RIVET D 2,2 L 3,7 2237..2035	RIVET D 2.2 L 3.7 2237..2035	MFOM	7
Z6	6400030000	RIVET D 3 L 4,2 3042	RIVET D 3 L 4.2 3042	MFOM	3
Z6	6400060000	RIVET D 1,2 L 2,4 XC 39	RIVET D 1.2 L 2.4 XC 39	MFOM	8
Z6	6400270000	PLOT A FOURCHE SERTI BFM13-16	SQUEEZED FORK CONTACT BFM13-16	COMATEL	7
Z6	6400280000	PLOT A FOURCHE SOUDE . BFMQ13C	SOLDERED FORK CONTACT BFMQ13C	COMATEL	13

*0270110000 08 PLAQUE AVANT MONTEE . 2230A * 08 ASSEM. FRONT PLATE .. 2230A L920934..... *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
001	0269090000	03 COMMUTATEUR TTL 2230A	03 TTL SWITCH 2230A	D932366.....	1
001	0270030100	09 COMMUTATEUR MODE 2230A	09 MODE SWITCH 2230A	J932523.B977003	1
001	0270100000	04 BLOC ROUES CODEES ... 2230A	04 SPIN WHEELS BLOCK ... 2230A	D920933.....	1
Z0	0206500000	00 NATTE 16'137''137'L190	00 FLAT-TOP 16'137''137'L190 .	ADRET.....	1
Z1	1100010000	FIL NOIR KY30-04	BLACK THREAD KY30-04	FILECA	0
Z1	1100020000	FIL MARRON KY30-04	BROWN THREAD KY30-04	FILECA	0
Z1	1100030000	FIL ROUGE KY30-04	RED THREAD KY30-04	FILECA	0
Z1	1100040000	FIL ORANGE KY30-04	ORANGE THREAD KY30-04	FILECA	0
Z1	1100050000	FIL JAUNE KY30-04	YELLOW THREAD KY30-04	FILECA	0
Z1	1100060000	FIL VERT KY30-04	GREEN THREAD KY30-04	FILECA	0
Z1	1100070000	FIL BLEU KY30-04	BLUE THREAD KY30-04	FILECA	0
Z1	1100080000	FIL VIOLET KY30-04	PURPLE THREAD KY30-04	FILECA	0
Z1	1100090000	FIL GRIS KY30-04	GREY THREAD KY30-04	FILECA	0
Z1	1100100000	FIL BLANC KY30-04	WHITE THREAD KY30-04	FILECA	0
Z1	1100110000	FIL ROSE KY30-04	PINK THREAD KY30-04	FILECA	0
Z1	1100440000	CABLE BLINDE GRIS FMA2R	GREY ARMORED CABLE FMA2R	FILECA	0
Z1	1100530000	FIL.NU.ETAME.6/10	TINNED BARE THREAD 6/10	ELECTROFIL	0
Z1	1300050000	RELAIS ..... REF 1072 K	RELAYS ..... REF 1072 K	ATI	1
Z1	1300450000	GAINE F4,8 FP301 3/16 . SFM 48	SHEATH F4.8 FP301 3/16 SFM 48	HELLERMANN	0
Z1	1300460000	GAINE F6,4 FP301 1/4 . SFM 64	SHEATH F6.4 FP301 1/4 . SFM 64	HELLERMANN	0
Z1	1300590000	SOUPLISSO 0,6X0,9 COUL.NATUREL	SPAGHETTI 0.6X0.9 GRAY COLORED	HABIA	0
Z1	1400200500	BNC EMBASE'FEMEL'ECROU R141557	BNC FEMALE SOCKET NUT R141557	RADIALL	1
Z1	1700020000	LUCIOLE M.MIDJET AN643 5V/75MA	BRIGHT FIREFLY ..AN643 5V/75MA	MAZDA	1
Z2	2122500500	4K7/10K LIN PK16-DCS 3X32+6X16	4K7/10K LIN PK16-DCS 3X32+6X16	MCB COUPER 3X26	1
Z4	4000010000	LED ROUGE '5' ... REF COV 20-4	RED LED '5' ..... REF COV 20-4	SIEMENS	2
Z4	4000060000	LED VERTE '5' ... REF COV 25-6	GREEN LED '5' ... REF COV 25-6	SIEMENS	1
Z4	4000070000	LED JAUNE '5' ... REF COV 23-6	YELLOW LED '5' .. REF COV 23-6	SIEMENS	3
Z4	4000140000	LED 5 SUPPORT REF HLHP-0103	BASE 5 LED ..... REF HLHP-0103	HP	6
Z4	4900180000	BRIDE DIP-LOCK CA 16 200 DL	BRIDLE DIP-LOCK CA 16 200 DL	EUROPAVIA	1
Z5	5500110000	TUBE B30 GT 4,1X2X12,5	TUBE B30 GT 4.1X2X12.5	COFELEC	1
Z6	6101031200	TF/90 M3X12 U DIN965-4,8 INOX	TF/90 M3X12 U DIN965-4,8 INOX	BD	4
Z6	6101110400	TF M2,5X 4 U NFE27-113-5,6INOX	TF M2,5X 4 U NFE27-113-5,6INOX	BD	1
Z6	6131120600	LAD 2 X 6 FRAISEE F/90'FENDUE	LAD 2 X 6 FRAISEE F/90'FENDUE	SAGIC	10
Z6	6200020000	ECROU H M2 U NF E27-411-5 INOX	NUT H M2 U NF E27-411-5 INOX .	BD	8
Z6	6200030000	ECROU H M3 U NF E27-411-5 INOX	NUT H M3 U NF E27-411-5 INOX .	BD	4
Z6	6301020000	DI 2 EVENTAIL NFE 27-618 INOX	STEEL 2 FAN NFE 27-618 INOX	BD	8
Z6	6305030000	ACI 3 CONTACT REF 55-03-01	STEEL 3 CONTACT REF 55-03-01	NOMEL	4
Z6	6360011000	BAK 2,6X 5X 1 PLATE 100A	BAK 2.6X 5X 1 PLATE 100A	MFOM	1
Z6	6400160000	COSSE A SOUDER 3,2 519	SOLDERING TERMINAL 3.2 ... 519	MFOM	1
Z6	6400350000	COSSE A SOUDER 2003E	SOLDERING TERMINAL 2003E	MFOM	1
Z6	6701240000	ENLIS 2 L 4	ENLIS 2 L 4	ACCEL	4
Z6	6900300000	SCOTCH ELECTRIQUE 19MM REF 33	ELECTRICAL SCOTCH 19MM REF 33	3M	0
Z6	6900320000	COLLE CYANILIT.....REF:IS496	CYANALIT GLUE.....REF:IS496	FIV	4
Z8	8006710500	PLAQUE AVANT CHASSIS ... 2230A	CHASSIS FRONT PLATE 2230A	E932265	1
Z8	8006740700	DIFFUSEUR CADRAN FREQU. 2230A	FREQUENCY DIAL DIFFUSER 2230A	A942239	1

*0269090000 03 COMMUTATEUR TTL ..... 2230A * 03 TTL SWITCH ..... 2230A D932366..... *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
C -001	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -002	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
D -001	4500310000	1 N 4448	1 N 4448	ITT	1
K -001	1520512400	05 TOUCHES ORE 10 .TTL. 2230A	05 TOUCHES ORE 10 .TTL. 2230A	C932473	1
R -001	2210012200	220R 5% N4	220R 5% N4	SOVCOR	1
R -002	2210021200	1K2 5% N4	1K2 5% N4	SOVCOR	1
R -003	2210016800	680R 5% N4	680R 5% N4	SOVCOR	1
R -004	2210023300	3K3 5% N4	3K3 5% N4	SOVCOR	1
R -005	2210005100	51R 5% N4	51R 5% N4	SOVCOR	1
R -006	2210002200	22R 5% N4	22R 5% N4	SOVCOR	1
R -007	2210002200	22R 5% N4	22R 5% N4	SOVCOR	1
Z1	1269090300	CI COMMUTATEUR TTL 2230A	PC TTL SWITCHER 2230A	D996909	1
Z6	6400280000	PLOT A FOURCHE SOUDE . BFMQ13C	SOLDERED FORK CONTACT BFMQ13C	COMATEL	2
Z8	8006763200	TOUCHE GRISE D6H11 OREOR 2230A	GREY TOUCH D6H11 OREOR 2230A	A942431	5

20 x 1N 4448

10^5 Hz { 8 4 2 1 — CR9 CR10 CR11 CR12
10^4 Hz { 8 4 2 1 — CR17 CR18 CR19 CR20
10^3 Hz { 8 4 2 1 — CR13 CR14 CR15 CR16
10^2 Hz { 8 4 2 1 — CR21 CR22 CR23 CR24
10^1 Hz { 8 4 2 1 — CR25 CR26 CR27 CR28

N B : Ces diodes sont situées sur le circuit porteur 02 6915 01

These diodes are on the interconnection board.

10^5 Hz 10^4 Hz 10^3 Hz 10^2 Hz 10^1 Hz

8 4 2 1

8 2 1 4 1 4 1 4 1 4 1 4 8 "1" "0"

vers circuit porteur
to Interconnection board

Toutes diodes: 1N4448
All diodes : 1N4448

Detection F<10

02 7003

A 12 AMPLIFICATEUR
AMPLIFIER

+6V R26 10k R24 47k R25 47k Q3 BC184C Q2 BC184C

V+ 16 C 5 4 3 6 E 7 VEE 8 VSS 14 A 13 12 A B C 11 10 9

Tension d'asserv. de GENERATION 10^3 Hz_10^4 Hz 10^5 Hz
Phase locking voltage

C3 22µF CR4 ZPD6,8 R12 820Ω P1 10k R11 11,3k R7 10k R10 69,8k R13 40,2k

V- R1 100Ω -12V C1 22µF

V+ R2 100Ω +12V C2 22µF

SN2 1458 R9 7,87k P2 4,7k R8 3,32k

SN2 1458 R14 24,9k

+6V R18 22k

R20 2,2k CR5 1N4448

CR3 2x 1N4448 CR2 1N4448 CR1 Q1 BC337

R3 1,2k +12V +6V

R4 390Ω R27 270Ω +6V +6V

HP4555 DS2 HP4555 DS1

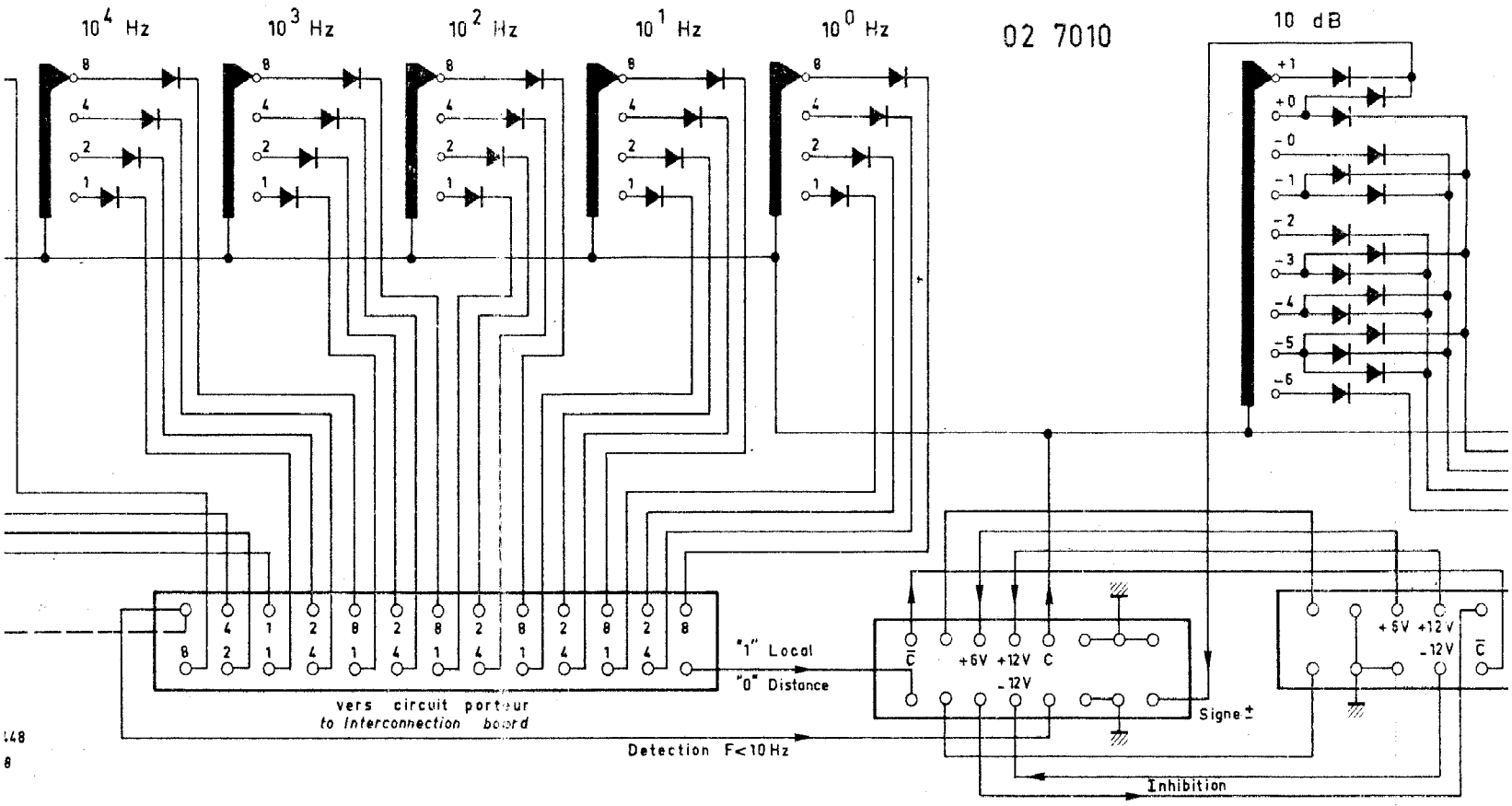
R5 22k +12V SYNTH. GENER. WOBUL. *SWEEP*

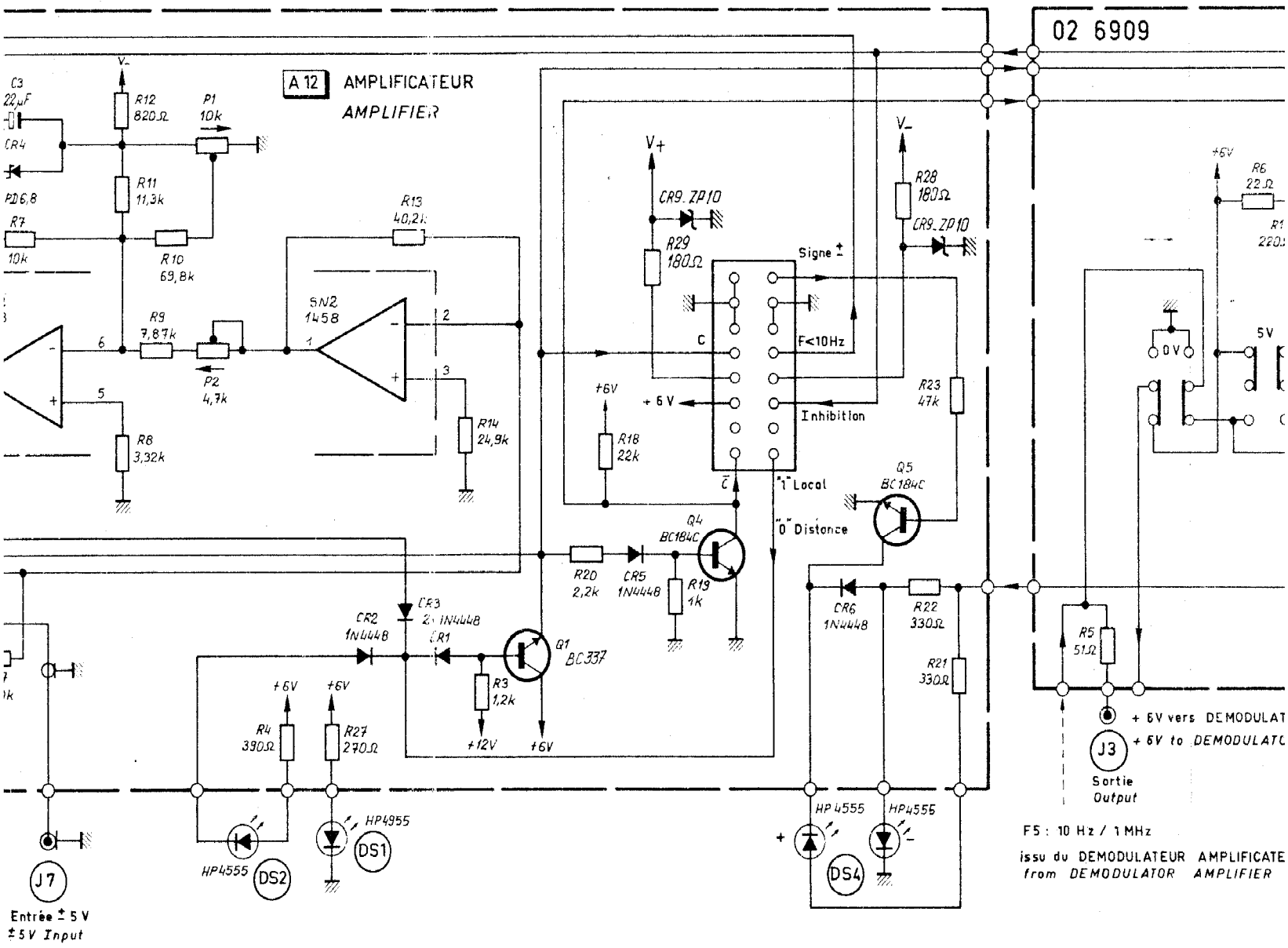
R17 100k R6 33Ω R16 2,2MΩ R15 162k

V- V+ 4,7k 10k P1

Cadran *Dial*

J7 Entrée ± 5 V
± 5 V Input





ÉTUDIÉ	DESSIN
	ACOR

Hz

10^0 Hz

02 7010

10 dB

1 dB

0,1 dB

0,01 dB

"1" Local

"0" Distance

ction F<10 Hz

Signe ±

Inhibition

vers circuit porteur

to Interconnection board

02 6909

R29 180Ω

CR9. ZP10

R28 180Ω

CR9. ZP10

Signe ±

C

F<10Hz

Inhibition

+6V

+ 6 V

R18 22k

R23 47k

"1" Local

"0" Distance

Q5 BC184C

Q4 BC184C

R20 2,2k

CR5 1N4448

R19 1k

CR6 1N4448

R22 330Ω

R21 330Ω

BC337

R5 51Ω

+ 6V vers DEMODULATEUR AMPLIFICATEUR

+ 6V to DEMODULATOR AMPLIFIER

J3

Sortie

Output

HP4555

HP4555

DS4

F5 : 10 Hz / 1 MHz

issu du DEMODULATEUR AMPLIFICATEUR

from DEMODULATOR AMPLIFIER

+6V

R6 22Ω

C2 22µF

R1 220Ω

R2 1,2k

+12V

R7 22Ω

C1 22µF

R3 580Ω

R4 3,3k

0V

5V

10V

INHIB.

CR1 1N4448

K6

MARCHE

ON

K1

F1

vers transformateur d'alimentation

to power transformer

S02

adret électronique

ÉTUDIÉ	DESSINÉ	VÉRIFIÉ
	ACORT	H.K.

2230 A

CIRCUITS DE COMMANDE

CONTROL CIRCUITS

DATE : JUILLET 1978

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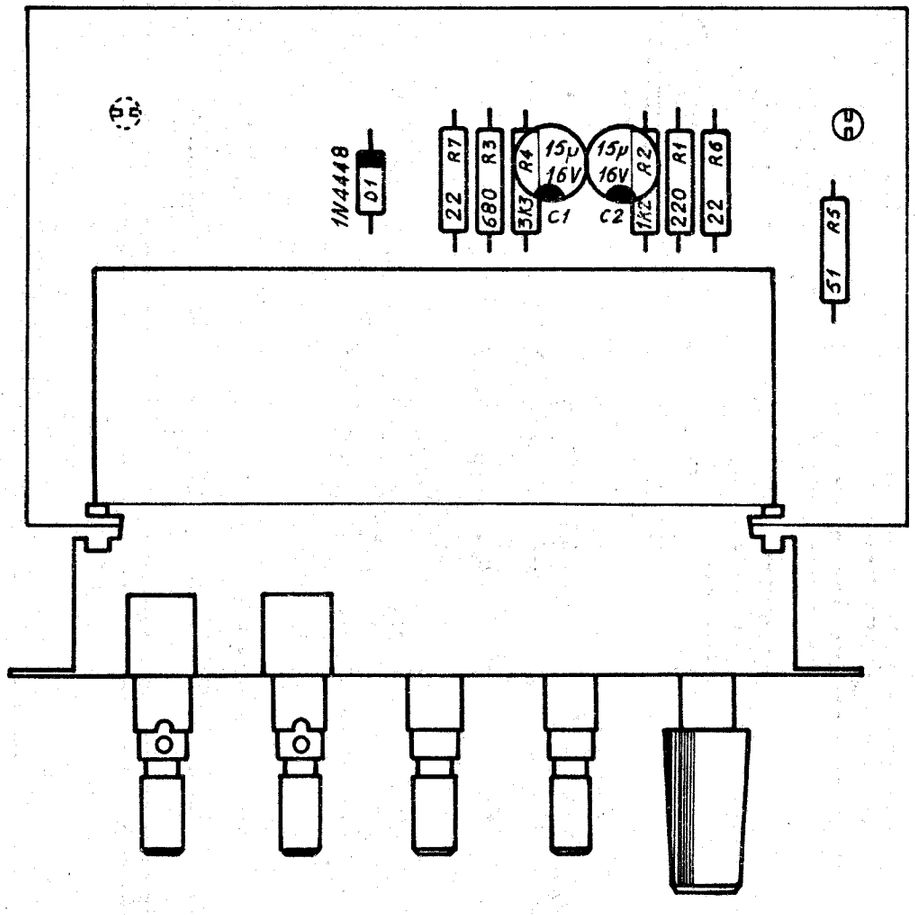
97703B


1N4448
D1
R7
22
R3
680
R4
3K3
15µ
16V
C1
15µ
16V
C2
R2
1K2
R1
220
R6
22
R5
51

BC 184C Q4
2N 2222 Q1
1M R10
2K2 R20
D5
33 R6
D1
D3
22K R18
390 R4
D2
1K2 R3
22K R5
100K00 R17
2M2 R16
200K00 R15
40K20 R13
24K90 R14
2x15nf
C2
C3
3K32 R8
1458
SM2
ZPD6V8
D4
100 R1
100 R2
15µ 16V C1
220 R27
10K R26
820 R12
11K30 R11
69K80 R10
10K00 R7
7K87 R9
4K7 P2
47K R24
47K R25
BC 184C Q2
BC 184C Q3
BC 184C Q5
330 R21
D6
330 R22
47K R23
10K P1
4053B
SM1

*0270030100 09 COMMUTATEUR MODE .... 2230A * 09 MODE SWITCH ..... 2230A J932523.B977003 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
C -001	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -002	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -003	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
D -001	4500310000	1 N 4448	1 N 4448	ITT	1
D -002	4500310000	1 N 4448	1 N 4448	ITT	1
D -003	4500310000	1 N 4448	1 N 4448	ITT	1
D -004	4600080000	ZPD6,8	ZPD6,8	ITT	1
D -005	4500310000	1 N 4448	1 N 4448	ITT	1
D -006	4500310000	1 N 4448	1 N 4448	ITT	1
D -007	4600170000	ZPD 10	ZPD 10	ITT	1
D -008	4600170000	ZPD 10	ZPD 10	ITT	1
K -001	1520312200	03 TOUCHES ORE 10 .MODE. 2230A	03 TOUCHES ORE 10 .MODE. 2230A	C932471	1
P -001	2133100000	10K 3/4" 15T CERMET 43 P	10K 3/4" 15T CERMET 43 P	SPECTROL	1
P -002	2132470000	4K7 3/4" 15T CERMET 43 P	4K7 3/4" 15T CERMET 43 P	SPECTROL	1
Q -001	4300580000	BC 337-25 TO 92 ..... (2N2222)	BC 337-25 TO 92 ..... (2N2222)	ITT	1
Q -002	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -003	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -004	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -005	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
R -001	2210006800	68R 5% N4	68R 5% N4	SOVCOR	1
R -002	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -003	2210021200	1K2 5% N4	1K2 5% N4	SOVCOR	1
R -004	2210013900	390R 5% N4	390R 5% N4	SOVCOR	1
R -005	2210032200	22K 5% N4	22K 5% N4	SOVCOR	1
R -006	2210003300	33R 5% N4	33R 5% N4	SOVCOR	1
R -007	2500210000	10K0 * 1% 0,3 W SMA207	10K0 * 1% 0,3 W SMA207	DRALORIC	1
R -008	2500133200	3K32 * 1% 0,3 W SMA207	3K32 * 1% 0,3 W SMA207	DRALORIC	1
R -009	2500178700	7K87 * 1% 0,3 W SMA207	7K87 * 1% 0,3 W SMA207	DRALORIC	1
R -010	2500269800	69K8 * 1% 0,3 W SMA207	69K8 * 1% 0,3 W SMA207	DRALORIC	1
R -011	2500211300	11K3 * 1% 0,3 W SMA207	11K3 * 1% 0,3 W SMA207	DRALORIC	1
R -012	2210018200	820R 5% N4	820R 5% N4	SOVCOR	1
R -013	2500240200	40K2 * 1% 0,3 W SMA207	40K2 * 1% 0,3 W SMA207	DRALORIC	1
R -014	2500224900	24K9 * 1% 0,3 W SMA207	24K9 * 1% 0,3 W SMA207	DRALORIC	1
R -015	2500316200	162K * 1% 0,3 W SMA207	162K * 1% 0,3 W SMA207	DRALORIC	1
R -016	2200052200	2M2 5% CB	2M2 5% CB	ALLEN BRADLEY	1
R -017	2500310000	100K * 1% 0,3 W SMA207	100K * 1% 0,3 W SMA207	DRALORIC	1
R -018	2210032200	22K 5% N4	22K 5% N4	SOVCOR	1
R -019	2210021000	1K0 5% N4	1K0 5% N4	SOVCOR	1
R -020	2210022200	2K2 5% N4	2K2 5% N4	SOVCOR	1
R -021	2210013300	330R 5% N4	330R 5% N4	SOVCOR	1
R -022	2210013300	330R 5% N4	330R 5% N4	SOVCOR	1
R -023	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -024	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -025	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -026	2210031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -027	2210012700	270R 5% N4	270R 5% N4	SOVCOR	1
R -028	2210011800	180R 5% N4	180R 5% N4	SOVCOR	1
R -029	2210011800	180R 5% N4	180R 5% N4	SOVCOR	1
SN -001	4160405300	C-MOS 4053	C-MOS 4053	RTC	1
SN -002	4200180000	LM 1458 N B+ DIP 8 PATTES	LM 1458 N B+ DIP 8 PINS	NS	1
Z1	1100520000	FIL.NU.ETAME.4/10	TINNED BARE THREAD 4/10	ELECTROFIL	0
Z1	1270030400	CI CIRCUIT MODE 2230A	PC MODE CIRCUIT 2230A	D997003	1
Z1	1300600000	SOUPLISSO 1X1,2 COUL. NATUREL	SPAGHETTI 1X1.2 GRAY COLORED	HABIA	0
Z4	4900310000	16 SUPPORT C.I. DIL J23-5016	16 CONNECTOR P.C. DIL J23-5016	JERMYN	1
Z6	6400280000	PLOT A FOURCHE SOUDE . BFMQ13C	SOLDERED FORK CONTACT BFMQ13C	COMATEL	3
Z8	8006763200	TOUCHE GRISE D6H11 OREOR 2230A	GREY TOUCH D6H11 OREOR 2230A	A942431	3

*0270100000 04 BLOC ROUES CODEES ... 2230A * 04 SPIN WHEELS BLOCK ... 2230A D920933..... *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
	0270010000	02 ROUE CODEE EQUIPEE .. 2230A	02 FITTED SPIN WHEEL ... 2230A	*942914.....	9
	1100530000	FIL.NU.ETAME.6/10	TINNED BARE THREAD 6/10	ELECTROFIL	0
	1270100300	CI ROUE CODEUSE 2230A	PC SPIN WHEEL 2230A	E997010	1
	1426020000	26 TRANSITION COUDE 3429-5003	26 BENDED LINKAGE .. 3429-5003	3M	2
	1540007800	ECROU FENDU M2	SPLIT THUMB M2	CONTRAVES	8
	1540011600	JOUE BLOC ROUE CODEE 509-1153	FLANGE BLOCK COD.WHEEL509-1153	CHERRY	4
	1541012000	9PTS SPECIAL TAM.&LEV.20-255 M	9PTS SPECIAL TAM.&LEV.20-255 M	CHERRY	1
	4500310000	1 N 4448	1 N 4448	ITT	15
	4900150000	16 SUPPORT NATTE 'S'CA-16S-TDS	16 MAT CONNECTOR 'S'CA-16S-TDS	EUROPAVIA	1
	6130121200	LAD 2 X12 CYLINDRIQUE FENDUE	LAD 2 X12 CYLINDRIQUE FENDUE	SAGIC	4
	6200020000	ECROU H M2 U NF E27-411-5 INOX	NUT H M2 U NF E27-411-5 INOX .	BD	4
	6300010000	Z 2,5U(5X0,5) NF E27-611 INOX	Z 2,5U(5X0,5) NF E27-611 INOX	BD	8
	6301020000	DI 2 EVENTAIL NFE 27-618 INOX	STEEL 2 FAN NFE 27-618 INOX	BD	8
	6360011000	BAK 2,6X 5X 1 PLATE 100A	BAK 2.6X 5X 1 PLATE 100A	MFOM	4
	6800220000	TIGE FILETEE M2 LAITON	THREADED PIN M2 BRASS	WEBER	0
	6900160000	COLLE D'ARRET ROUGE . 9036 BIS	RED STOP GLUE ..... 9036 BIS	MESPOULET	1

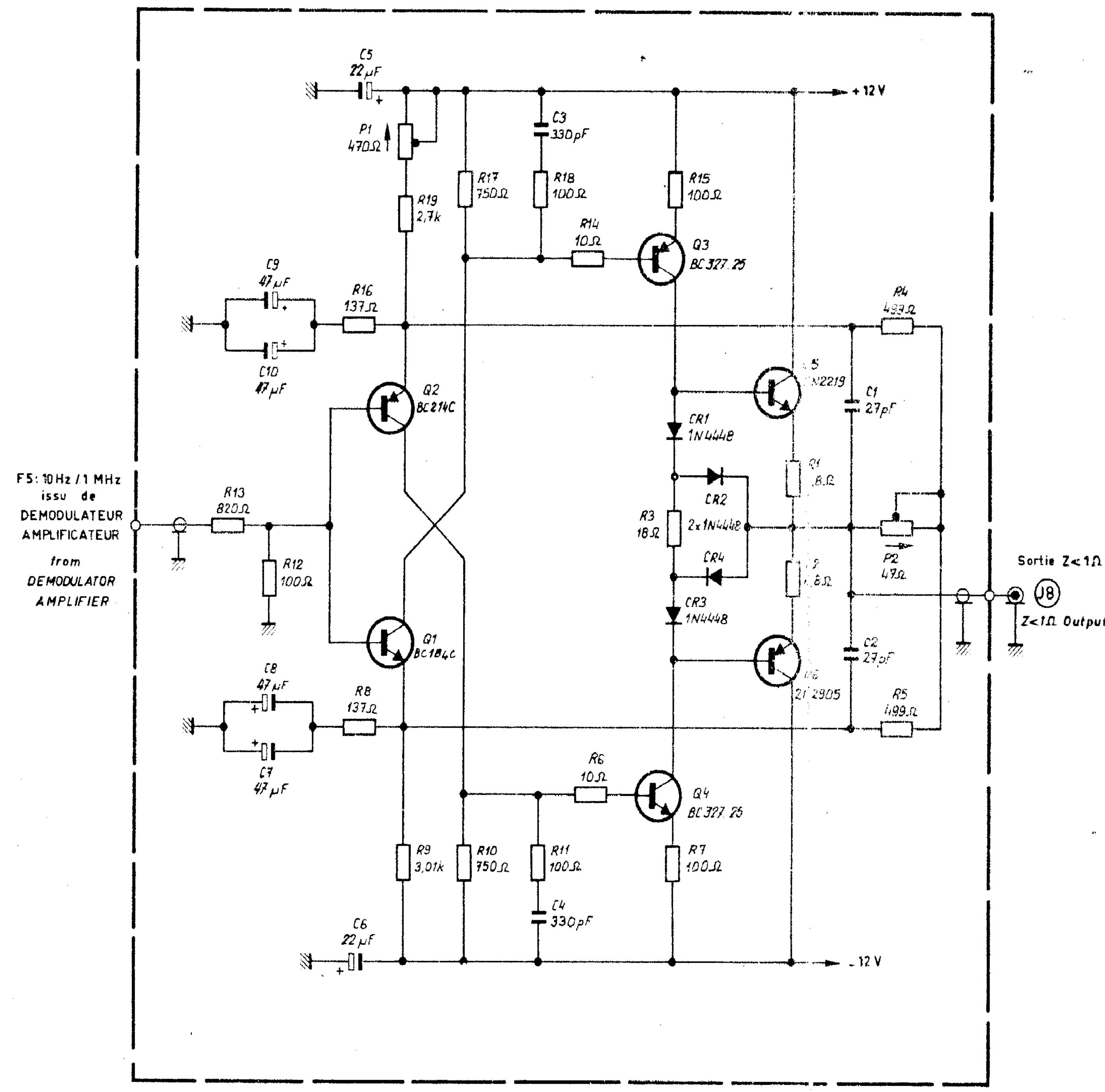


PLATE V-9

PLANCHE V-9

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ÉTUDIÉ	DESSINÉ	VÉRIFIÉ	2230 A AMPLIFICATEUR Z<1Ω Z<1Ω AMPLIFIER	PAGE : 1 / 1
	ACORT	HK		977094A

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
C -001	3120002700	27PF 2,5 'L' 2222 680 10 279	27PF 2,5 'L' 2222 680 10 279	COGECO	1
C -002	3120002700	27PF 2,5 'L' 2222 680 10 279	27PF 2,5 'L' 2222 680 10 279	COGECO	1
C -003	3120013300	330PF 2,5 'N33' 2222 680 58 331	330PF 2,5 'N33' 2222 680 58 331	COGECO	1
C -004	3120013300	330PF 2,5 'N33' 2222 680 58 331	330PF 2,5 'N33' 2222 680 58 331	COGECO	1
C -005	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -006	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -007	3700250000	47MMF/6,3V 5,08 .. STAND L TAG	47MMF/6,3V 5,08 .. STAND L TAG	STC	1
C -008	3700250000	47MMF/6,3V 5,08 .. STAND L TAG	47MMF/6,3V 5,08 .. STAND L TAG	STC	1
C -009	3700250000	47MMF/6,3V 5,08 .. STAND L TAG	47MMF/6,3V 5,08 .. STAND L TAG	STC	1
C -010	3700250000	47MMF/6,3V 5,08 .. STAND L TAG	47MMF/6,3V 5,08 .. STAND L TAG	STC	1
D -001	4500310000	1 N 4448	1 N 4448	ITT	1
D -002	4500310000	1 N 4448	1 N 4448	ITT	1
D -003	4500310000	1 N 4448	1 N 4448	ITT	1
D -004	4500310000	1 N 4448	1 N 4448	ITT	1
P -001	2131470000	470R 3/4" 15T CERMET 43 P	470R 3/4" 15T CERMET 43 P	SPECTROL	1
P -002	2130470000	47R 3/4" 15T CERMET 43 P	47R 3/4" 15T CERMET 43 P	SPECTROL	1
Q -001	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -002	4300110000	BC560C /416C/415C/559C(BC214C)	BC560C /413C/415C/559C(BC214C)	RTC	1
Q -003	4300570000	BC 327-25 TO 92 .....(2N2907)	BC 327-25 TO 92 .....(2N2907)	ITT	1
Q -004	4300580000	BC 337-25 TO 92 ..... (2N2222)	BC 337-25 TO 92 ..... (2N2222)	ITT	1
Q -005	4800060000	2N2219	2N2219	RTC	1
Q -006	4800080000	2N2905	2N2905	RTC	1
R -001	2300096800	6R8 SFR 25 1/4W 5% RC2T	6R8 SFR 25 1/4W 5% RC2T	RTC	1
R -002	2300096800	6R8 SFR 25 1/4W 5% RC2T	6R8 SFR 25 1/4W 5% RC2T	RTC	1
R -003	2210001800	18R 5% N4	18R 5% N4	SOVCOR	1
R -004	2500049900	499R * 1% 0,3 W SMA207	499R * 1% 0,3 W SMA207	DRALORIC	1
R -005	2500049900	499R * 1% 0,3 W SMA207	499R * 1% 0,3 W SMA207	DRALORIC	1
R -006	2900001000	10R 5% NK3	10R 5% NK3	SOVCOR	1
R -007	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -008	2500013700	137R * 1% 0,3 W SMA207	137R * 1% 0,3 W SMA207	DRALORIC	1
R -009	2500130100	3K01 * 1% 0,3 W SMA207	3K01 * 1% 0,3 W SMA207	DRALORIC	1
R -010	2500075000	750R * 1% 0,3 W SMA207	750R * 1% 0,3 W SMA207	DRALORIC	1
R -011	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -012	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -013	2210018200	820R 5% N4	820R 5% N4	SOVCOR	1
R -014	2900001000	10R 5% NK3	10R 5% NK3	SOVCOR	1
R -015	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -016	2500013700	137R * 1% 0,3 W SMA207	137R * 1% 0,3 W SMA207	DRALORIC	1
R -017	2500075000	750R * 1% 0,3 W SMA207	750R * 1% 0,3 W SMA207	DRALORIC	1
R -018	2210011000	100R 5% N4	100R 5% N4	SOVCOR	1
R -019	2210022700	2K7 5% N4	2K7 5% N4	SOVCOR	1
Z1	1100010000	FIL NOIR KY30-04	BLACK THREAD KY30-04	FILECA	0
Z1	1100030000	FIL ROUGE KY30-04	RED THREAD KY30-04	FILECA	0
Z1	1100070000	FIL BLEU KY30-04	BLUE THREAD KY30-04	FILECA	0
Z1	1100430000	COAX KX 21 A	COAX KX 21 A	FILECA	0
Z1	1270940000	CI AMPLI Z=0 ..... 2230A	PC AMPLI Z=0 ..... 2230A	C997094	1
Z4	4900010000	DISSIPATEUR T 05 .. REF 207-AB	DISSIPATOR T 05 .. REF 207-AB	SPETELEC	2
Z4	4900070000	ENTRETOISE T05 ..... T05-001	SPACER T05 ..... T05-001	JERMYN	2
Z6	6400280000	PLOT A FOURCHE SOUDE . BFMQ13C	SOLDERED FORK CONTACT BFMQ13C	COMATEL	2
Z8	8101120000	ECROU A SERTIR M3 H4 NICKELE	NUT TO SQUEEZE M3 H4 NICKEL	91+71	2

*0422308301 08 OPTION 2 IEEE ..... 2230A * 08 OPTION 2 IEEE ..... 2230A F932565 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION		PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
001	0269970000	06 CARTE REGISTRE IEEE . 2230A	*	06 IEEE REGISTER BOARD . 2230A	E932563.B976997	1
001	0274880000	02 CARTE ISOLATION IEEE 2230A	*	02 IEEE INSULATING BOARD 2230A	D932961.C977488	1
Z0	0205430000	00 NATTE 26'171''177'L90 2230A	*	00 FLAT-T.26'171 177'L90 2230A	ADRET.....	1
Z0	0206700000	00 NATTE 26'171''171'L200 2230	*	00 FLAT-T.26'171 171'L200 2230	ADRET.....	1
Z1	1100530000	FIL.NU.ETAME.6/10	*	TINNED BARE THREAD 6/10	ELECTROFIL	0
Z1	1269990000	CARTE INTERCONNEXION 2230A IEC	*	INTERCONNECTION BOARD2230A IEC	C996999.....SF	1
Z1	1424018400	24PTS CI'IEEE' REF 57-20240-14	*	24PTS PC'IEEE' REF 57-20240-14	AMPHENOL	1
Z1	1530214500	DOUBLE INVERSEUR CI TS 2 BLEU	*	DOUBLE REVERSER PC TS 2 BLUE	JEANRENAULT	3
Z6	6100030600	TCB M3X 6 U DIN7985-4,8 INOX	*	TCB M3X 6 U DIN7985-4,8 INOX	BD	4
Z6	6100031200	TCB M3X12 U DIN7985-4,8 INOX	*	TCB M3X12 U DIN7985-4,8 INOX	BD	2
Z6	6200010000	ECROU H M2,5 U NFE27-411-5INOX	*	NUT H M2.5 U NFE27-411-5 INOX	BD	2
Z6	6200030000	ECROU H M3 U NF E27-411-5 INOX	*	NUT H M3 U NF E27-411-5 INOX .	BD	2
Z6	6303010000	ACI 2,5 ONDUFLEX REF 50025132	*	STEEL 2.5 ONDUFLEX REF50025132	NOMEL	2
Z6	6303030000	ACI 3 ONDUFLEX REF 52030132	*	STEEL 3 ONDUFLEX REF 52030132	NOMEL	8
Z6	6305030000	ACI 3 CONTACT REF 55-03-01	*	STEEL 3 CONTACT REF 55-03-01	NOMEL	2
Z6	6701240000	ENLIS 2 L 4	*	ENLIS 2 L 4	ACCEL	2
Z8	6700200000	ENMET 2 L 5 M3X0,50 TT	*	ENMET 2 L 5 M3X0,50 TT	ACCEL	2
Z8	8006702000	PANNEAU OPTION 'I E C' . 2230A	*	'I E C' OPTION PANEL ... 2230A	B942235.A942236	1
Z8	8006733100	FIXATION STANDARD IEC . 2230A	*	IEC STANDARD ANCHOR 2230A	C942347	2

DECODAGE
DECODING

SN4 . 4556

SN7 4002

Décodage CR . *CR decoding*

Décodage A? *A? decoding*

SN10 4027

SN8 . 4002

Décodage F> *F> decoding*

Décodage F< *F< decoding*

SN11 4027

SN6 4085

Chiffre Digit

SN5 . 4556

SN9 . 4002

Décodage F *F decoding*

SN12 4027

Décodage A *A decoding*

SN13 4082

R10 R11 R12 R13 R14 R9 6 x 47k

+5V

CR7 1N4448

R8 47k

CR8 1N4448

SN3 4049

REGISTRE ATTENUATION . *ATTENUATION REGISTER*

SN14 . 4015 SN14 . 4015 SN15 . 4015 SN15 . 4015

REGISTRE FREQUENCE

SN16 . 4015

MEMOIRE ATTENUATION . *ATTENUATION MEMORY*

SN20 4076 SN21 . 4076 SN22 . 4076 SN23 . 4076

SN24 . 4076

SN3? 74LS26

CR5 1N4004

Vcc

C5 47µF C6 47µF

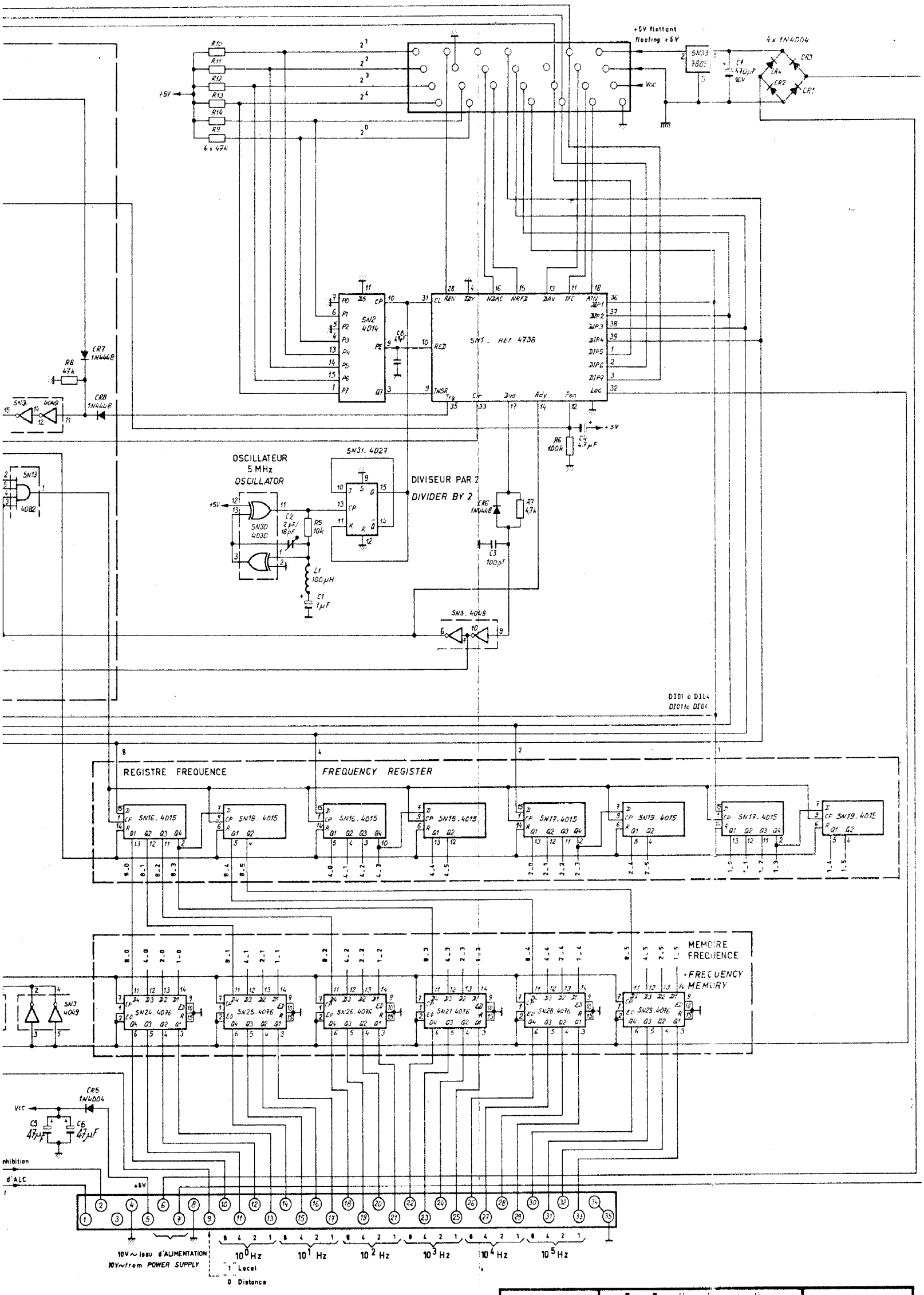
Inhibition

Constante de temps d'ALC
ALC time constant

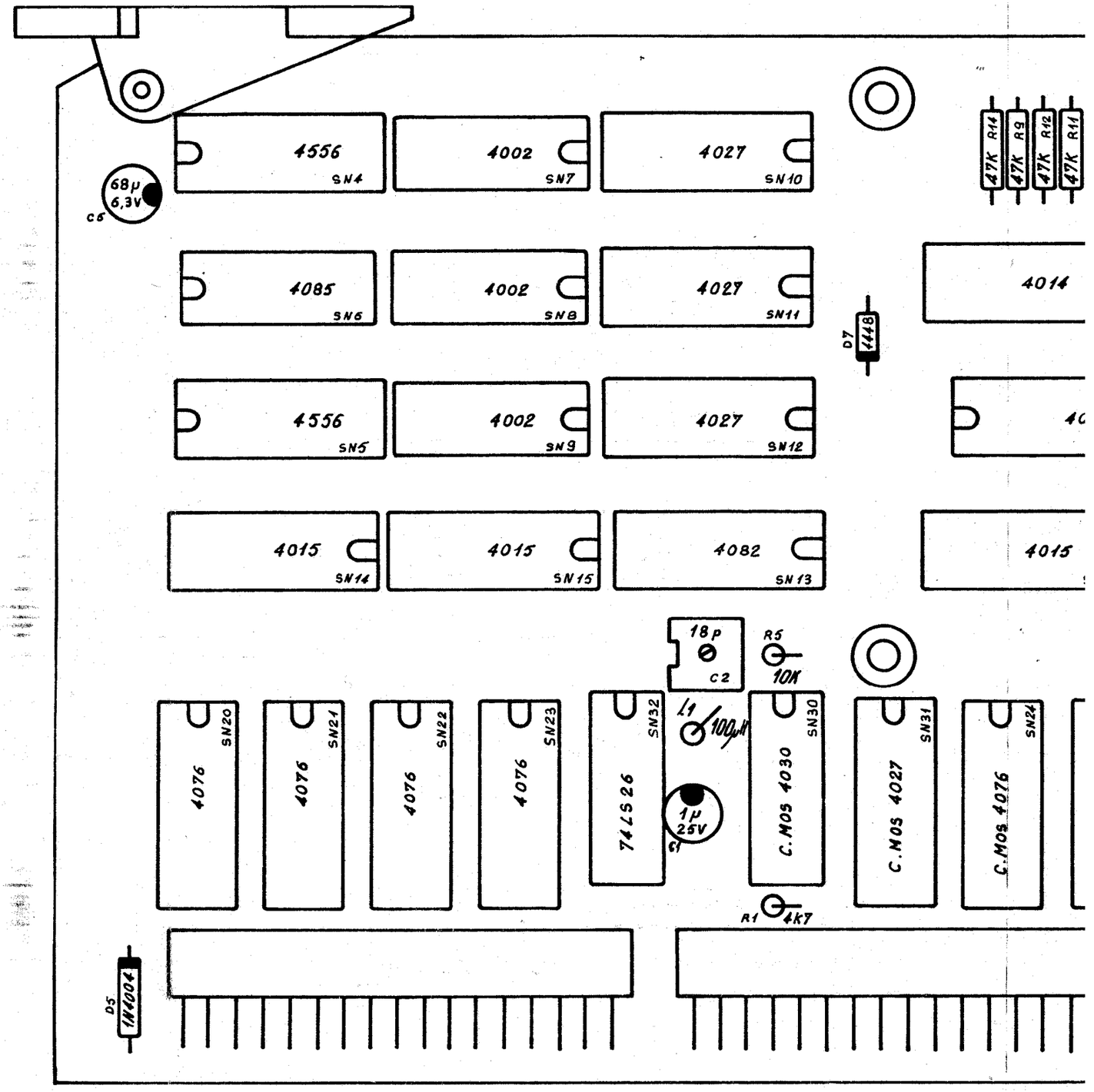
+6V

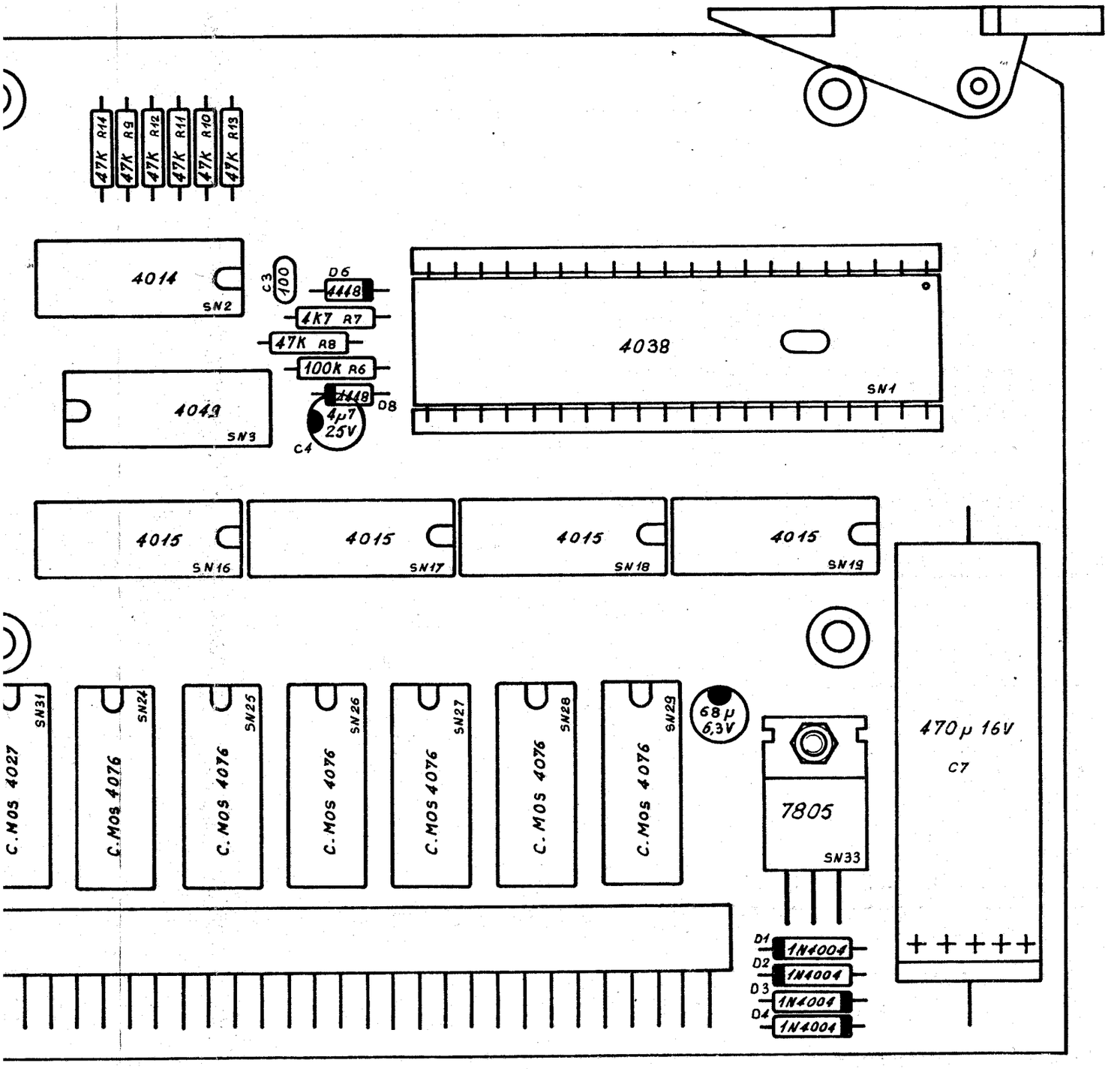
0,01 dB 0,1 dB 1 dB 10 dB

10V~ issu d'ALIMENTATION
10V~ from POWER SUPPLY



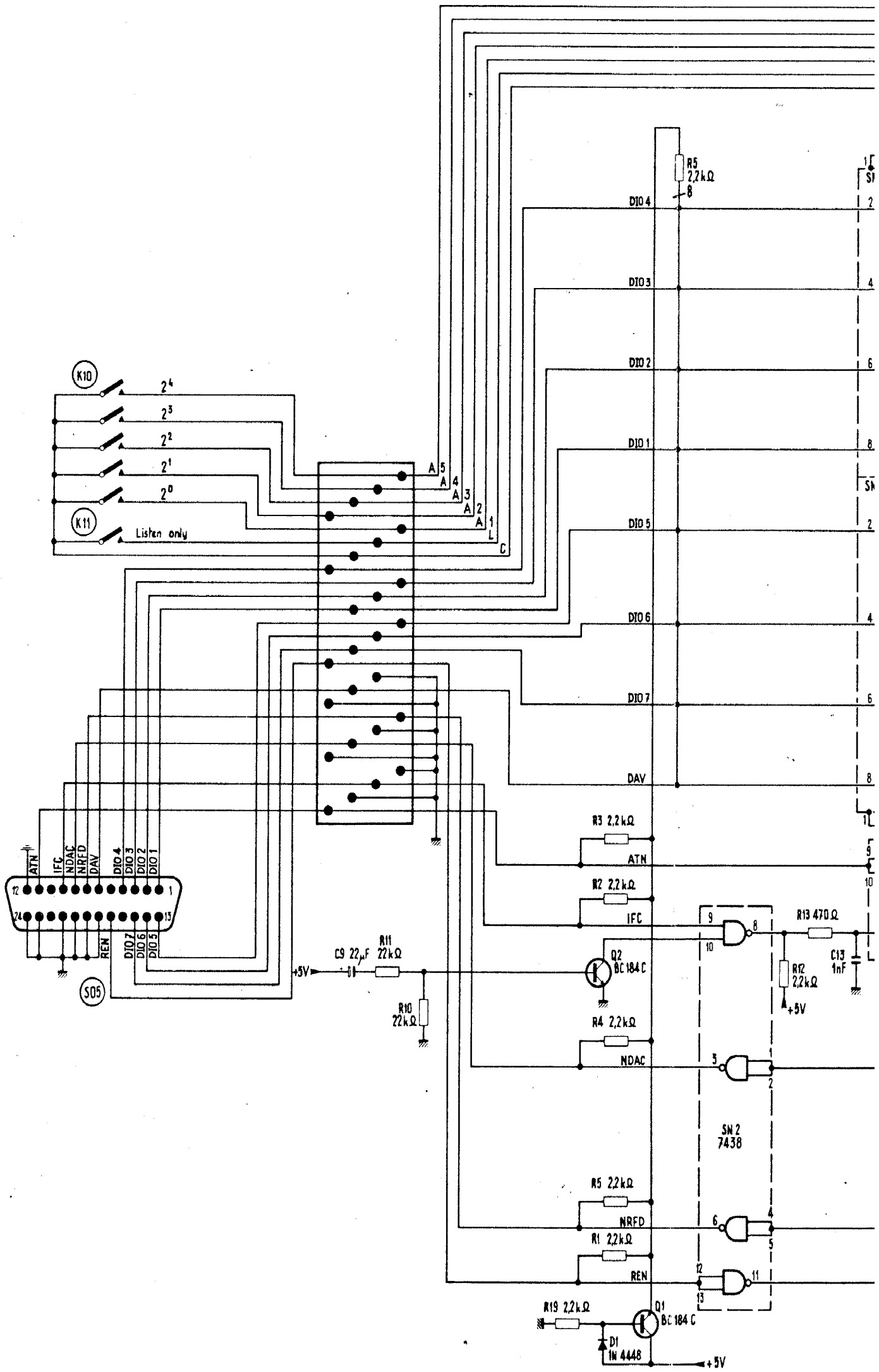
ETUDIE	DESSINE	VERIFIE	sdrat électronique	DATE : JUILLET 1978
	ACORT	DB	2230 A REGISTRES BUS IEC *IEEE BUS REGISTERS*	PAGE : 1 / 1 97697B

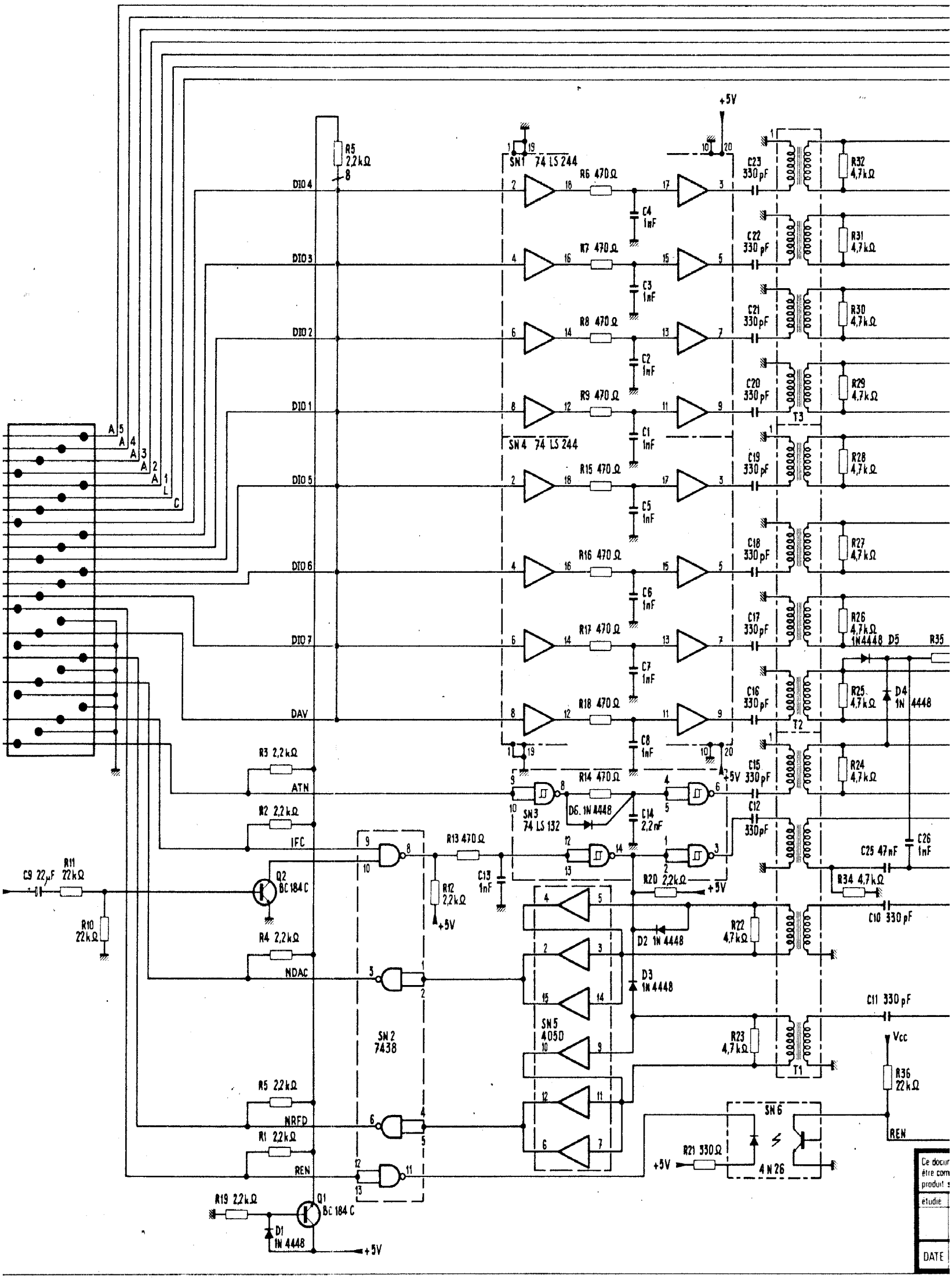

4556
SN4
4002
SN7
4027
SN10
68µ
6,3V
C6
47K R14
47K R9
47K R12
47K R11
4085
SN6
4002
SN8
4027
SN11
4014
D7
4148
4556
SN5
4002
SN9
4027
SN12
4015
SN14
4015
SN15
4082
SN13
4015
18p
C2
R5
10K
L1
100µH
4076
SN20
4076
SN21
4076
SN22
4076
SN23
74LS26
SN32
1µ
25V
C1
C.MOS 4030
SN30
C.MOS 4027
SN31
C.MOS 4076
SN24
R1
4K7
D5
1N4004

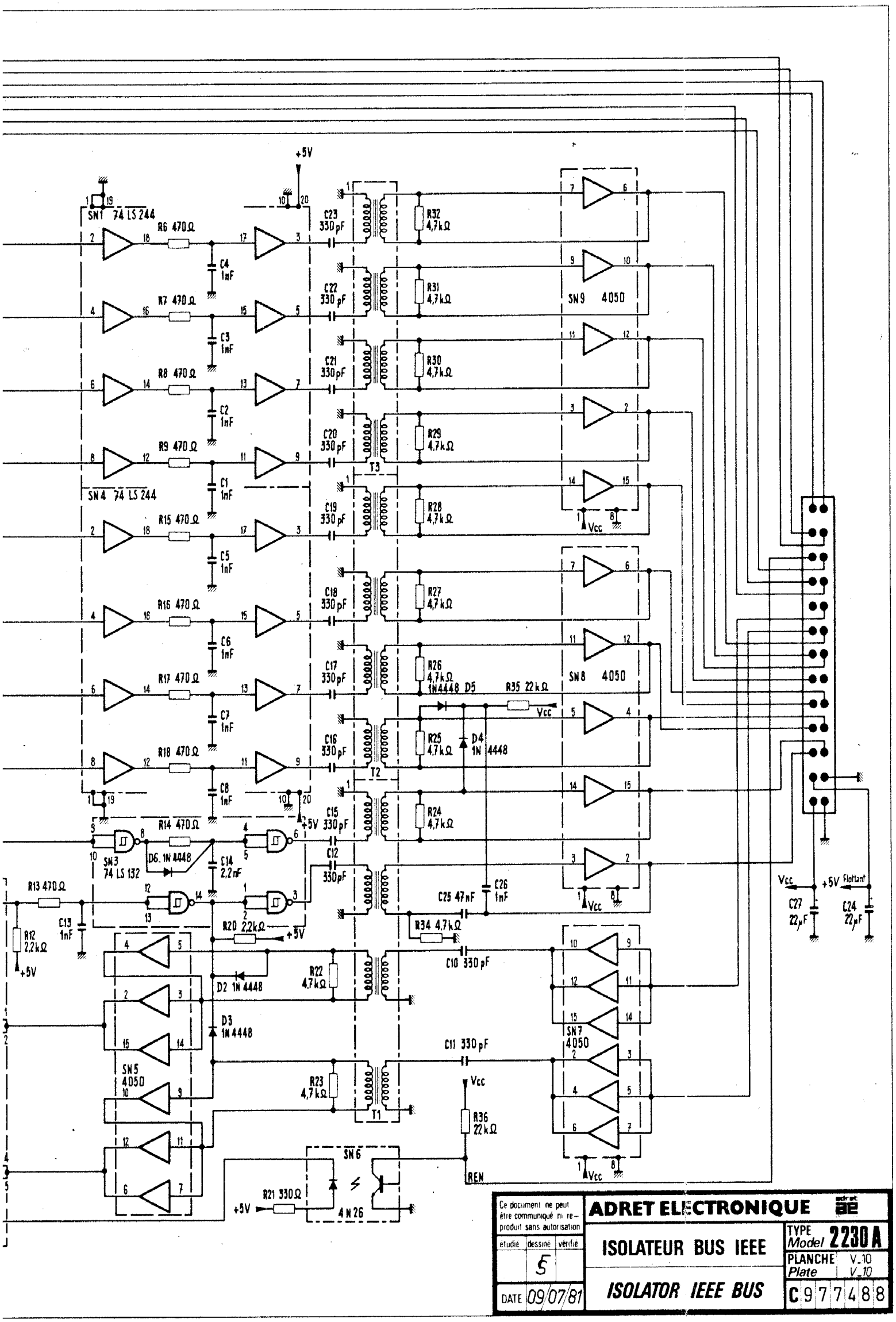

47K R14
47K R9
47K R12
47K R11
47K R10
47K R13
4014
SN2
C3
100
D6
4148
4K7 R7
47K R8
100K R6
4148
D8
4µ7
25V
C4
4049
SN3
4038
SN1
4015
SN16
4015
SN17
4015
SN18
4015
SN19
C.MOS 4027
SN31
C.MOS 4076
SN24
C.MOS 4076
SN25
C.MOS 4076
SN26
C.MOS 4076
SN27
C.MOS 4076
SN28
C.MOS 4076
SN29
68µ
6,3V
7805
SN33
470µ 16V
C7
D1
1N4004
D2
1N4004
D3
1N4004
D4
1N4004

*0269970000 06 CARTE REGISTRE IEEE . 2230A * 06 IEEE REGISTER BOARD . 2230A E932563.B976997 *

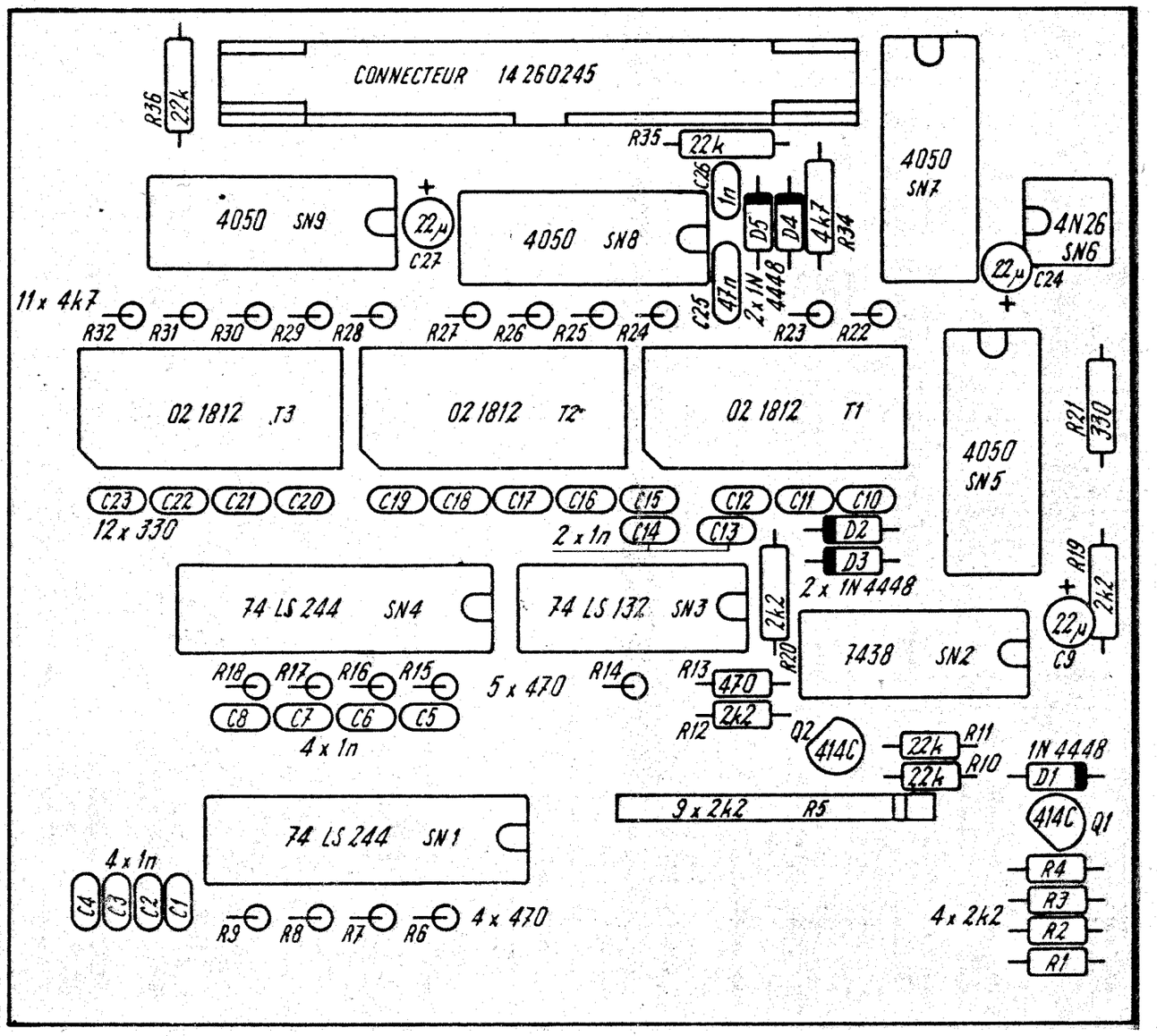
REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
B -001	1417016300	TM 17 MCIG ..... MALE"CARTE"	TM 17 MCIG ..... MALE	TRELEC	1
B -002	1435004600	TM 35 MCIG ..... MALE"CARTE"	TM 35 MCIG	TRELEC	1
C -001	3700020000	1MMF/35V 5,08 .... STAND L TAG	1MMF/35V 5,08 .... STAND L TAG	STC	1
C -002	3600120000	4/20 PF ....REF C010 808 23209	4/20 PF ....REF C010 808 23209	RTC(C010)	1
C -003	3120011000	100PF 2,5 'N10'2222 680 58 101	100PF 2,5 'N10'2222 680 58 101	COGECO	1
C -004	3700100000	4,7MMF/35V 5,08 .. STAND L TAG	4,7MMF/35V 5,08 ...STAND L TAG	STC	1
C -005	3700250000	47MMF/6,3V 5,08 .. STAND L TAG	47MMF/6,3V 5,08 .. STAND L TAG	STC	1
C -006	3700250000	47MMF/6,3V 5,08 .. STAND L TAG	47MMF/6,3V 5,08 .. STAND L TAG	STC	1
C -007	3500280000	470MMF 16V PROMISIC 031	470MMF 16V PROMISIC 031	SIC SAFCO	1
C -008	3120004700	47PF 2,5 2222 680 10 479	47PF 2,5 2222 680 10 479	COGECO	1
D -001	4500040000	1N4004	1N4004	ITT	1
D -002	4500040000	1N4004	1N4004	ITT	1
D -003	4500040000	1N4004	1N4004	ITT	1
D -004	4500040000	1N4004	1N4004	ITT	1
D -005	4500040000	1N4004	1N4004	ITT	1
D -006	4500310000	1 N 4448	1 N 4448	ITT	1
D -007	4500310000	1 N 4448	1 N 4448	ITT	1
D -008	4500310000	1 N 4448	1 N 4448	ITT	1
L -001	5300460000	100MMH ORE 53870 DEL 1025-68	100MMH ORE 53870 DEL 1025-68	OREGA DELEVAN	1
R -001	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -005	2200031000	10K 5% N4	10K 5% N4	SOVCOR	1
R -006	2210041000	100K 5% N4	100K 5% N4	SOVCOR	1
R -007	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -008	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -009	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -010	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -011	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -012	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -013	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
R -014	2210034700	47K 5% N4	47K 5% N4	SOVCOR	1
SN -001	4160473800	C-MOS 4738	C-MOS 4738	RTC	1
SN -002	4160401400	C-MOS 4014	C-MOS 4014	RTC	1
SN -003	4160404900	C-MOS 4049	C-MOS 4049	RTC	1
SN -004	4160455600	C-MOS 4556	C-MOS 4556	RTC	1
SN -005	4160455600	C-MOS 4556	C-MOS 4556	RTC	1
SN -006	4160408500	C-MOS 4085	C-MOS 4085	RTC	1
SN -007	4160400200	C-MOS 4002	C-MOS 4002	RTC	1
SN -008	4160400200	C-MOS 4002	C-MOS 4002	RTC	1
SN -009	4160400200	C-MOS 4002	C-MOS 4002	RTC	1
SN -010	4160402700	C-MOS 4027	C-MOS 4027	RTC	1
SN -011	4160402700	C-MOS 4027	C-MOS 4027	RTC	1
SN -012	4160402700	C-MOS 4027	C-MOS 4027	RTC	1
SN -013	4160408200	C-MOS 4082	C-MOS 4082	RTC	1
SN -014	4160401500	C-MOS 4015	C-MOS 4015	RTC	1
SN -015	4160401500	C-MOS 4015	C-MOS 4015	RTC	1
SN -016	4160401500	C-MOS 4015	C-MOS 4015	RTC	1
SN -017	4160401500	C-MOS 4015	C-MOS 4015	RTC	1
SN -018	4160401500	C-MOS 4015	C-MOS 4015	RTC	1
SN -019	4160401500	C-MOS 4015	C-MOS 4015	RTC	1
SN -020	4160407600	C-MOS 4076	C-MOS 4076	RTC	1
SN -021	4160407600	C-MOS 4076	C-MOS 4076	RTC	1
SN -022	4160407600	C-MOS 4076	C-MOS 4076	RTC	1
SN -023	4160407600	C-MOS 4076	C-MOS 4076	RTC	1
SN -024	4160407600	C-MOS 4076	C-MOS 4076	RTC	1
SN -025	4160407600	C-MOS 4076	C-MOS 4076	RTC	1
SN -026	4160407600	C-MOS 4076	C-MOS 4076	RTC	1
SN -027	4160407600	C-MOS 4076	C-MOS 4076	RTC	1
SN -028	4160407600	C-MOS 4076	C-MOS 4076	RTC	1
SN -029	4160407600	C-MOS 4076	C-MOS 4076	RTC	1
SN -030	4160407000	C-MOS 4070	C-MOS 4070	RTC	1
SN -031	4160402700	C-MOS 4027	C-MOS 4027	RTC	1
SN -032	4150742600	SN 74 LS 26 N 3	SN 74 LS 26 N 3	TEXAS	1
SN -033	4200260000	7805 UC 1A ..... REGULATEUR	7805 UC 1A ..... REGULATOR	FAIRCHILD	1
Z0	0206460000	00 ETIQUETTE 6997 . IEC 2230A	00 LABEL 6997 ..... IEC 2230A "942375.....		1
Z1	1269970200	CI CARTE REGISTRE . IEEE.2230A	PC REGISTER BOARD . IEEE.2230A	F996997	1
Z1	1900200000	EXTRACTEUR DE CARTE'ELEVATEUR'	BOARD EXTRACTOR 'LIFTER'	TRELEC	2
Z4	4900340000	40 SUPPORT C.I. DIL J23.5040	40 CONNECTOR P.C. DIL J23.5040	JERMYN	1
Z6	6100030600	TCB M3X 6 U DIN7985-4,8 INOX	TCB M3X 6 U DIN7985-4,8 INOX	BD	1
Z6	6200030000	ECROU H M3 U NF E27-411-5 INOX	NUT H M3 U NF E27-411-5 INOX .	BD	1
Z6	6300030000	Z 3U (6X0,8) NF E27-611 INOX	Z 3U (6X0,8) NF E27-611 INOX	BD	1
Z6	6400530000	OEILLET LAITON ..... N° 2070	FIXING EYELET BRASS .. N° 2070	MFOM	2
Z8	8100120000	00 COLONNETTE A SERTIR 4500	00 PILLAR TO SQUEEZE 4500	ADRET	4


K10
2^4
2^3
2^2
2^1
2^0
K11
Listen only
A 5
A 4
A 3
A 2
A 1
L
C
R5 2,2kΩ
8
DIO 4
DIO 3
DIO 2
DIO 1
DIO 5
DIO 6
DIO 7
DAV
R3 2,2kΩ
ATN
R2 2,2kΩ
IFC
R4 2,2kΩ
NDAC
R5 2,2kΩ
NRFD
R1 2,2kΩ
REN
R19 2,2kΩ
Q1 BC 184 C
D1 1N 4448
+5V
R13 470Ω
C13 1nF
R12 2,2kΩ
Q2 BC 184 C
C9 22µF
R11 22kΩ
R10 22kΩ
SN 2 7438
ATN
IFC
NDAC
NRFD
DAV
DIO 4
DIO 3
DIO 2
DIO 1
REN
DIO 7
DIO 6
DIO 5
S05


+5V
R5 2,2kΩ
8
DIO 4
DIO 3
DIO 2
DIO 1
DIO 5
DIO 6
DIO 7
DAV
SN1 74 LS 244
SN4 74 LS 244
R6 470Ω
R7 470Ω
R8 470Ω
R9 470Ω
R15 470Ω
R16 470Ω
R17 470Ω
R18 470Ω
C4 1nF
C3 1nF
C2 1nF
C1 1nF
C5 1nF
C6 1nF
C7 1nF
C8 1nF
C23 330pF
C22 330pF
C21 330pF
C20 330pF
C19 330pF
C18 330pF
C17 330pF
C16 330pF
C15 330pF
C12 330pF
R32 4,7kΩ
R31 4,7kΩ
R30 4,7kΩ
R29 4,7kΩ
R28 4,7kΩ
R27 4,7kΩ
R26 4,7kΩ
1N4448 D5
R35
R25 4,7kΩ
D4 1N 4448
R24 4,7kΩ
T3
T2
T1
R3 2,2kΩ
ATN
R2 2,2kΩ
IFC
R4 2,2kΩ
NDAC
R5 2,2kΩ
NRFD
R1 2,2kΩ
REN
R14 470Ω
D6. 1N 4448
C14 2,2nF
SN3 74 LS 132
R13 470Ω
C13 1nF
R12 2,2kΩ
+5V
C9 22µF
R11 22kΩ
R10 22kΩ
Q2 BC 184 C
SN2 7438
R20 2,2kΩ
D2 1N 4448
D3 1N 4448
SN5 4050
R22 4,7kΩ
R23 4,7kΩ
C25 47nF
C26 1nF
R34 4,7kΩ
C10 330pF
C11 330pF
Vcc
R36 22kΩ
REN
SN6
4N26
R21 330Ω
R19 2,2kΩ
Q1 BC 184 C
D1 1N 4448
A5
A4
A3
A2
A1
L
C



Ce document ne peut être communiqué ni reproduit sans autorisation	ADRET ELECTRONIQUE	
étudié / dessiné / vérifié: 5	ISOLATEUR BUS IEEE	TYPE Model 2230A
DATE 09/07/81	ISOLATOR IEEE BUS	PLANCHE Plate V_10 V_10
		C 9 7 7 4 8 8


CONNECTEUR 14 260245
R36 22k
R35 22k
4050 SN7
4050 SN9
22µ C27
4050 SN8
C26 1n
D5
D4
4k7 R34
47n C25
2x 1N 4448
4N26 SN6
22µ C24
11 x 4k7
R32 R31 R30 R29 R28 R27 R26 R25 R24 R23 R22
02 1812 T3
02 1812 T2
02 1812 T1
4050 SN5
R21 330
C23 C22 C21 C20 C19 C18 C17 C16 C15 C12 C11 C10
12 x 330
2 x 1n C14 C13
D2
D3
2 x 1N 4448
74 LS 244 SN4
74 LS 132 SN3
2k2 R20
7438 SN2
R19 2k2
22µ C9
R18 R17 R16 R15
C8 C7 C6 C5
4 x 1n
5 x 470
R14
R13 470
R12 2k2
Q2 414C
22k R11
22k R10
1N 4448 D1
9 x 2k2 R5
414C Q1
R4
R3
R2
R1
4 x 2k2
74 LS 244 SN1
4 x 1n
C4 C3 C2 C1
R9 R8 R7 R6 4 x 470

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
B -001	1426024500	26 TRANSITION DROIT 3429-6002	26 STRAIGHT LINKAGE 3429-6002	3M	1
C -001	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -002	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -003	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -004	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -005	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -006	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -007	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -008	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -009	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -010	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -011	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -012	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -013	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -014	3232220200	2200PF 5,08 10% IRD607	2200PF 5,08 10% IRD607	LCC	1
C -015	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -016	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -017	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -018	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -019	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -020	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -021	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -022	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -023	3120013300	330PF 2,5 'N33'2222 680 58 331	330PF 2,5 'N33'2222 680 58 331	COGECO	1
C -024	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
C -025	3233470300	47NF 5,08 10% IRD607	47NF 5,08 10% IRD607	LCC	1
C -026	3120021000	1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	1
C -027	3700180000	22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	1
D -001	4500310000	1 N 4448	1 N 4448	ITT	1
D -002	4500310000	1 N 4448	1 N 4448	ITT	1
D -003	4500310000	1 N 4448	1 N 4448	ITT	1
D -004	4500310000	1 N 4448	1 N 4448	ITT	1
D -005	4500310000	1 N 4448	1 N 4448	ITT	1
D -006	4500310000	1 N 4448	1 N 4448	ITT	1
Q -001	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
Q -002	4300190000	BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	1
R -001	2900022200	2K2 5% NK3	2K2 5% NK3	SOVCOR	1
R -002	2900022200	2K2 5% NK3	2K2 5% NK3	SOVCOR	1
R -003	2900022200	2K2 5% NK3	2K2 5% NK3	SOVCOR	1
R -004	2900022200	2K2 5% NK3	2K2 5% NK3	SOVCOR	1
R -005	2610922200	9X2K2 2% 4310R-101-222	9X2K2 2% 4310R-101-222	BOURNS	1
R -006	2200014700	470R 5% N4	470R 5% N4	SOVCOR	1
R -007	2200014700	470R 5% N4	470R 5% N4	SOVCOR	1
R -008	2200014700	470R 5% N4	470R 5% N4	SOVCOR	1
R -009	2200014700	470R 5% N4	470R 5% N4	SOVCOR	1
R -010	2900032200	22K 5% NK3	22K 5% NK3	SOVCOR	1
R -011	2900032200	22K 5% NK3	22K 5% NK3	SOVCOR	1
R -012	2900022200	2K2 5% NK3	2K2 5% NK3	SOVCOR	1
R -013	2900014700	470R 5% NK3	470R 5% NK3	SOVCOR	1
R -014	2200014700	470R 5% N4	470R 5% N4	SOVCOR	1
R -015	2200014700	470R 5% N4	470R 5% N4	SOVCOR	1
R -016	2200014700	470R 5% N4	470R 5% N4	SOVCOR	1
R -017	2200014700	470R 5% N4	470R 5% N4	SOVCOR	1
R -018	2200014700	470R 5% N4	470R 5% N4	SOVCOR	1
R -019	2210022200	2K2 5% N4	2K2 5% N4	SOVCOR	1
R -020	2210022200	2K2 5% N4	2K2 5% N4	SOVCOR	1
R -021	2210013300	330R 5% N4	330R 5% N4	SOVCOR	1
R -022	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -023	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -024	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -025	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -026	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -027	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -028	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -029	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -030	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -031	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -032	2200024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -034	2210024700	4K7 5% N4	4K7 5% N4	SOVCOR	1
R -035	2210032200	22K 5% N4	22K 5% N4	SOVCOR	1
R -036	2210032200	22K 5% N4	22K 5% N4	SOVCOR	1
SN -001	4157424400	SN 74 LS 244 N 3	SN 74 LS 244 N 3	TEXAS	1
SN -002	4110743800	SN 7438 N	SN 7438 N	TEXAS	1
SN -003	4157413200	SN 74 LS 132 N 3	SN 74 LS 132 N 3	TEXAS	1
SN -004	4157424400	SN 74 LS 244 N 3	SN 74 LS 244 N 3	TEXAS	1
SN -005	4160405000	C-MOS 4050	C-MOS 4050	RTC	1
SN -006	4000200000	COUPLEUR OPTO 4N26	OPTO COUPLER 4N26	MOTOROLA	1
SN -007	4160405000	C-MOS 4050	C-MOS 4050	RTC	1
SN -008	4160405000	C-MOS 4050	C-MOS 4050	RTC	1

*0274880000 02 CARTE ISOLATION IEEE 2230A * 02 IEEE INSULATING BOARD 2230A D932961.C977488 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION		PART DESCRIPTION		FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
SN -009	4160405000	C-MOS 4050	*	C-MOS 4050		RTC	1
T -001	0218120000	01 TRANSFO ISOLATION ... 2230A	*	01 INSULATING TRANSFO ..	2230A	ADRET.....	1
T -002	0218120000	01 TRANSFO ISOLATION ... 2230A	*	01 INSULATING TRANSFO ..	2230A	ADRET.....	1
T -003	0218120000	01 TRANSFO ISOLATION ... 2230A	*	01 INSULATING TRANSFO ..	2230A	ADRET.....	1
Z1	1274880000	CI CARTE ISOLATION 2230A	*	INSULATION BOARD PC	2230A	A997488	1

*0422308302 03 OPTION 1 BCD ..... 2230A * 03 OPTION 1 BCD ..... 2230A A932555(2)..... *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION		PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
001	0269130000	01CARTE OPTION BCD 2230A	*	01 BCD OPTION BOARD 2230A	932547. 976913	1
Z0	0206730000	00 NATTE 25'171''179'L210 2230	*	00 FLAT-T.25'171 179'L210 2230	ADRET.....	1
Z0	0206740000	00 NATTE 37'180''181'L150 2230	*	00 FLAT-T.37'180 181'L150 2230	ADRET.....	1
Z1	1900120000	VERROUILLAGE FEMELLE . 8630-01	*	FEMALE LOCKING 8630-01	SOURIAU	4
Z6	6100030800	TCB M3X 8 U DIN7985-4,8 INOX	*	TCB M3X 8 U DIN7985-4,8 INOX	BD	4
Z8	8000090000	ETIQUETTE SIGNALETIQUE . ADRET	*	LABEL ..... ADRET	A940006	1
Z8	8006701200	PANNEAU OPTION 'B C D' . 2230A	*	'B C D' OPTION PANEL ... 2230A	B942187.A942185	1

S04

Constante de
ALC time c

Inhibition

"1" Local
"0" Distance

+5V

1 2 4 8

8 4 2 1

CR31 CR30 CR29 CR28 CR35 CR34 CR33 CR32 CR39 CR38 CR37 CR36 CR43 CR42 CR41 CR40 CR25 CR26

R31 R30 R29 R28 R35 R34 R33 R32 R39 R38 R37 R36 R43 R42 R41 R40 R25 R26

SN8 40097 SN7 40097 SN6 40097

E

CR4 CR3 C.

R4 R3 R2

CR44

R27

Vcc

SN1 74LS26

C1. 22µF

CR27

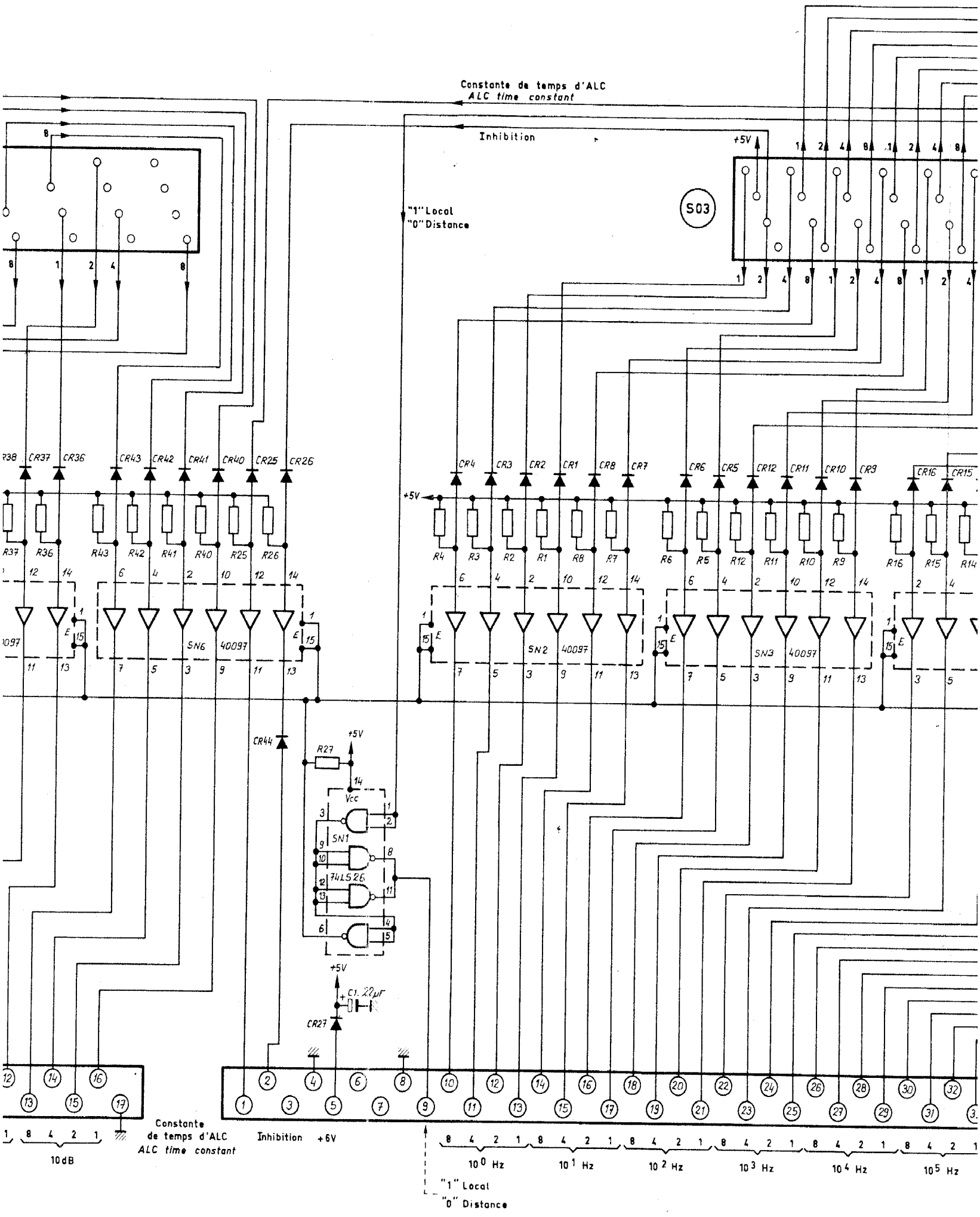
Constante
de temps d'ALC
ALC time constant

Inhibition +6V

0,01dB 0,1dB 1dB 10dB

10^0 Hz

"1" Local
"0" Distance


Constante de temps d'ALC
ALC time constant
Inhibition
"1" Local
"0" Distance
S03
+5V
CR38 CR37 CR36 CR43 CR42 CR41 CR40 CR25 CR26
CR4 CR3 CR2 CR1 CR8 CR7 CR6 CR5 CR12 CR11 CR10 CR9 CR16 CR15
R37 R36 R43 R42 R41 R40 R25 R26
R4 R3 R2 R1 R8 R7 R6 R5 R12 R11 R10 R9 R16 R15 R14
SN6 40097
SN2 40097
SN3 40097
CR44
R27
Vcc
SN1
74LS26
C1. 22µF
CR27
Constante de temps d'ALC
ALC time constant
Inhibition +6V
10dB
10 0 Hz
10 1 Hz
10 2 Hz
10 3 Hz
10 4 Hz
10 5 Hz
"1" Local
"0" Distance

istante de temps d'ALC
LC time constant

Inhibition

+5V

S03

1 2 4 8 1 2 4 8

1 2 4 8 1 2 4 8 1 2 4 8 1 2 4 8

CR3 CR2 CR1 CR8 CR7 CR6 CR5 CR12 CR11 CR10 CR9 CR16 CR15 CR14 CR13 CR20 CR19 CR18 CR17 CR24 CR23 CR22 CR21

R3 R2 R1 R8 R7 R6 R5 R12 R11 R10 R9 R16 R15 R14 R13 R20 R19 R18 R17 R24 R23 R22 R21

4 2 10 12 14 6 4 2 10 12 14 2 4 6 14 12 10 2 4 6 14 12 10

SN2 40097 SN3 40097 SN4 40097 SN5 40097

5 3 9 11 13 7 5 3 9 11 13 3 5 7 13 11 9 3 5 7 13 11 9

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

4 2 1 8 4 2 1 8 4 2 1 8 4 2 1 8 4 2 1 8 4 2 1

10^0 Hz 10^1 Hz 10^2 Hz 10^3 Hz 10^4 Hz 10^5 Hz

ocal
istance

Toutes diodes : 1N 4448
All diodes : 1N4448

Toutes résistances : 22 kΩ
All resistors : 22 kΩ

adret electronique

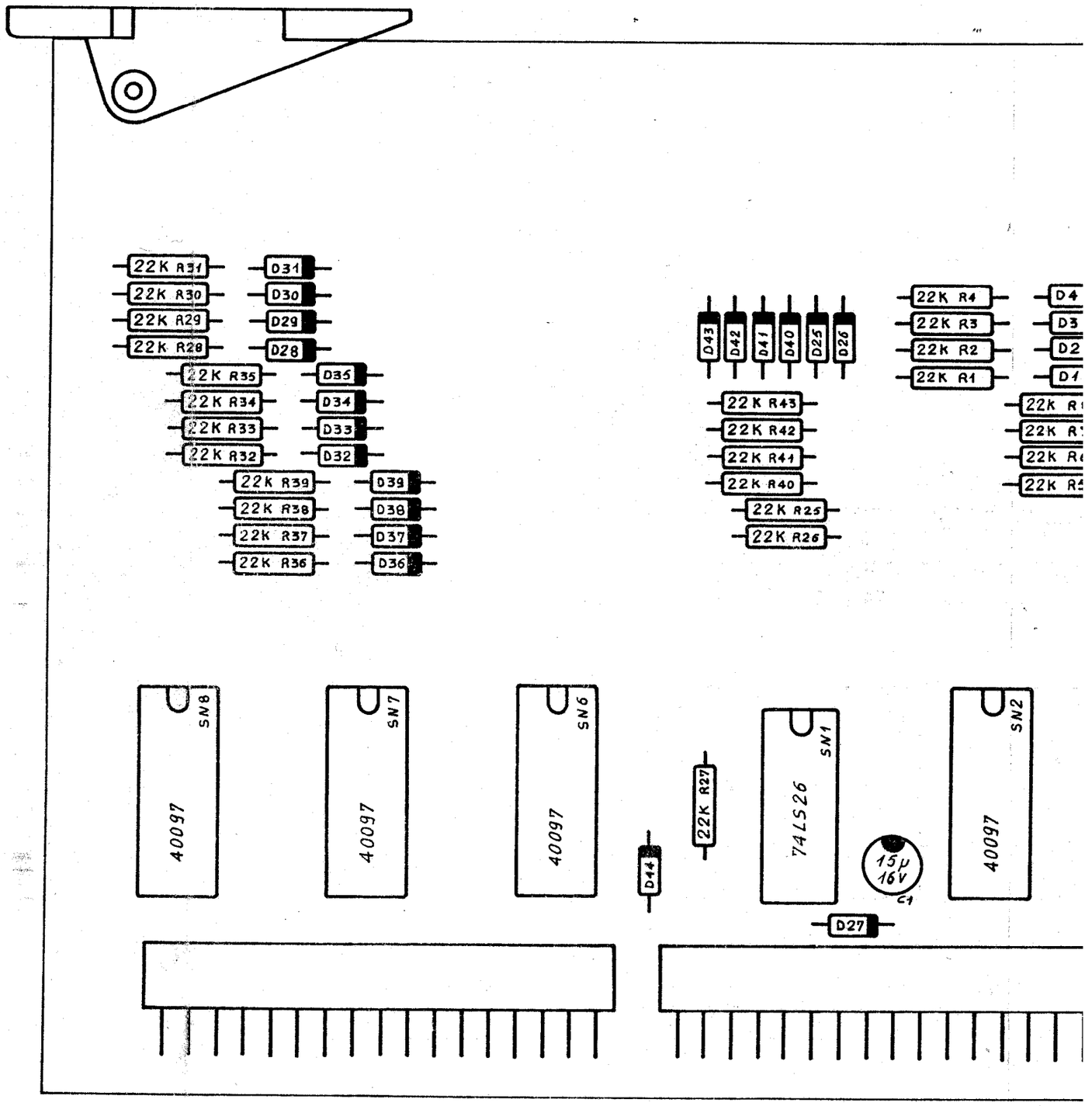
DATE : JUILLET 1978

ÉTUDIÉ	DESSINÉ	VÉRIFIÉ
	ACORT	HK

2230A
PROGRAMMATION BCD PARALLELE
PARALLEL BCD PROGRAMMING

PAGE : 1 / 1

9 7 6 9 1 3 A


22K R31
22K R30
22K R29
22K R28
D31
D30
D29
D28
22K R35
22K R34
22K R33
22K R32
D35
D34
D33
D32
22K R39
22K R38
22K R37
22K R36
D39
D38
D37
D36
D43
D42
D41
D40
D25
D26
22K R43
22K R42
22K R41
22K R40
22K R25
22K R26
22K R4
22K R3
22K R2
22K R1
D4
D3
D2
D1
40097
SN8
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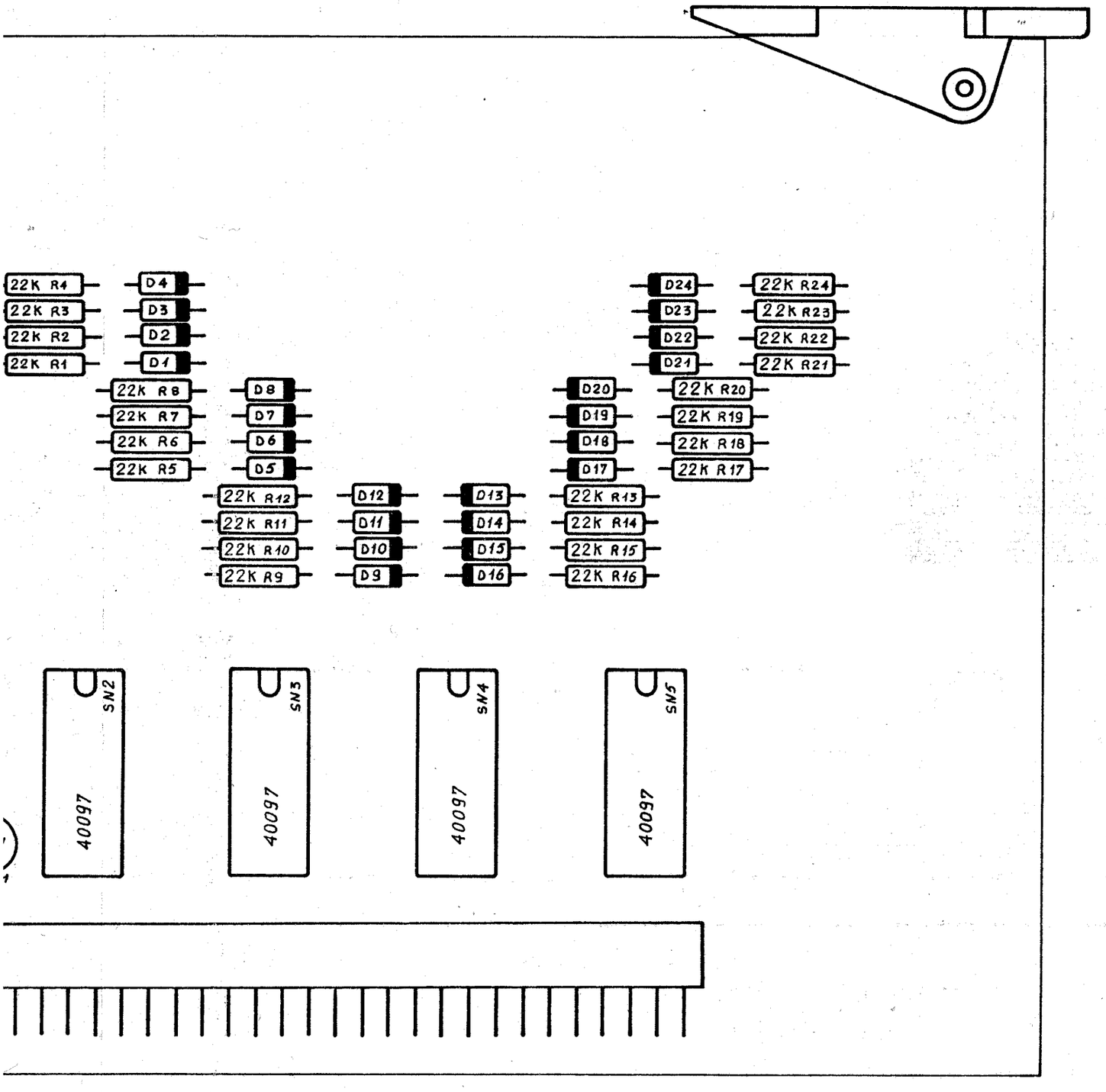
SN1
15µ
16V
C1
D27
40097
SN2


22K R4
22K R3
22K R2
22K R1
D4
D3
D2
D1
22K R8
22K R7
22K R6
22K R5
D8
D7
D6
D5
22K R12
22K R11
22K R10
22K R9
D12
D11
D10
D9
D13
D14
D15
D16
22K R13
22K R14
22K R15
22K R16
D20
D19
D18
D17
22K R20
22K R19
22K R18
22K R17
D24
D23
D22
D21
22K R24
22K R23
22K R22
22K R21
SN2
40097
SN3
40097
SN4
40097
SN5
40097

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
B -001	1417016300	TM 17 MCIG ..... MALE*CARTE*	* TM 17 MCIG ..... MALE	TRELEC	1
B -002	1435004600	TM 35 MCIG ..... MALE*CARTE*	* TM 35 MCIG	TRELEC	1
C -001	3700180000	22MMF/16V 5,08 ... STAND L TAG	* 22MMF/16V 5,08 ... STAND L TAG	STC	1
D -001	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -002	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -003	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -004	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -005	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -006	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -007	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -008	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -009	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -010	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -011	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -012	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -013	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -014	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -015	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -016	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -017	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -018	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -019	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -020	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -021	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -022	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -023	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -024	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -025	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -026	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -027	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -028	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -029	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -030	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -031	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -032	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -033	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -034	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -035	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -036	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -037	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -038	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -039	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -040	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -041	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -042	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -043	4500310000	1 N 4448	* 1 N 4448	ITT	1
D -044	4500310000	1 N 4448	* 1 N 4448	ITT	1
R -001	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -002	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -003	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -004	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -005	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -006	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -007	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -008	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -009	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -010	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -011	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -012	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -013	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -014	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -015	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -016	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -017	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -018	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -019	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -020	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -021	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -022	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -023	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -024	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -025	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -026	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -027	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -028	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -029	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -030	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -031	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1
R -032	2210032200	22K 5% N4	* 22K 5% N4	SOVCOR	1

*0269130000 01CARTE OPTION BCD ..... 2230A * 01 BCD OPTION BOARD .... 2230A 932547. 976913 *

REPERE INDEXE	REF. ADRET PART NUMBER	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN SUPPLIER/DRAWING	QTE QTY
R -033	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
R -034	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
R -035	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
R -036	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
R -037	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
R -038	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
R -039	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
R -040	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
R -041	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
R -042	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
R -043	2210032200	22K 5% N4	22K 5% N4	SOUCOR	1
SN -001	4150742600	SN 74 LS 26 N 3	SN 74 LS 26 N 3	TEXAS	1
SN -002	4164009700	C-MOS 40097	C-MOS 40097	RTC	1
SN -003	4164009700	C-MOS 40097	C-MOS 40097	RTC	1
SN -004	4164009700	C-MOS 40097	C-MOS 40097	RTC	1
SN -005	4164009700	C-MOS 40097	C-MOS 40097	RTC	1
SN -006	4164009700	C-MOS 40097	C-MOS 40097	RTC	1
SN -007	4164009700	C-MOS 40097	C-MOS 40097	RTC	1
SN -008	4164009700	C-MOS 40097	C-MOS 40097	RTC	1
Z0	0206510000	00 ETIQUETTE 2230A	00 LABEL 2230A	A&942375.....	1
Z1	1269130300	CI OPTION BCD 2230A	PC OPTION BCD 2230A	E996913	1
Z1	1900200000	EXTRACTEUR DE CARTE'ELEVATEUR'	BOARD EXTRACTOR 'LIFTER'	TRELEC	2
Z6	6400530000	OEILLET LAITON ..... N° 2070	FIXING EYELET BRASS .. N° 2070	MFOM	2

ADRET ELECTRONIQUE

LISTE DES COMPOSANTS

COMPONENTS LIST

ADRET ELECTRONIQUE

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN / SUPPLIER/DRAWING	N O R M E
			2230A *			
0122309001	1,00		KIT ASSEMBLAGE RACK 3U 1X2230A *	KIT ASSEMBLAGE RACK 3U 1X2230A	A910165	XX
0122309002	1,00		KIT ASSEMBLAGE RACK 3U 2X2230A *	KIT ASSEMBLAGE RACK 3U 2X2230A	A910165	XX
0122309003	1,00	00	PROLONGATEUR 27 1 GEN 2230A *	00 PROLONGATEUR 27 1 GEN 2230A	*932610.....	XX
0122309004	1,00	00	PROLONGATEUR 27 2 GEN 2230A *	00 PROLONGATEUR 27 2 GEN 2230A	*932611.....	XX
0122309005	1,00	00	PROLONG. OPT.IEEE+BCD 2230A *	00 PROLONG. OPT.IEEE+BCD 2230A	A93.....	XX
0122309006	1,00	00	PROLONG. CDE NIVEAU 2230A *	00 PROLONG. CDE NIVEAU 2230A	A93.....	XX
0122309007	1,00	00	PROLONGATEUR AMPLI .. 2230A *	00 PROLONGATEUR AMPLI .. 2230A	A93.....	XX
0205430000	1,00	00	NATTE 26'171''177'L90 2230A *	00 FLAT-T.26'171 177'L90 2230A	ADRET.....	XX
0206460000	1,00	00	ETIQUETTE 6997 . IEC 2230A *	00 LABEL 6997 ..... IEC 2230A	*942375.....	XX
0206500000	1,00	00	NATTE 16'137''137'L190 .... *	00 FLAT-TOP 16'137''137'L190 .	ADRET.....	XX
0206510000	1,00	00	ETIQUETTE ..... 2230A *	00 LABEL 2230A	A&942375.....	XX
0206520000	1,00	00	8XBB 409 D1àD4&D11àD14 2230 *	00 8XBB 409 D1àD4&D11àD14 2230	ADRET 8/SACHET	XX
0206700000	1,00	00	NATTE 26'171''171'L200 2230 *	00 FLAT-T.26'171 171'L200 2230	ADRET.....	XX
0206730000	1,00	00	NATTE 25'171''179'L210 2230 *	00 FLAT-T.25'171 179'L210 2230	ADRET.....	XX
0206740000	1,00	00	NATTE 37'180''181'L150 2230 *	00 FLAT-T.37'180 181'L150 2230	ADRET.....	XX
0206750000	1,00	00	ETIQUETTE 6906 ..... 2230A *	00 LABEL 6906 ..... 2230A	942375.....	XX
0206760000	1,00	00	ETIQUETTE 6907 ..... 2230A *	00 LABEL 6907 ..... 2230A	942375.....	XX
0206770000	1,00	00	ETIQUETTE 6908 ..... 2230A *	00 LABEL 6908 ..... 2230A	942375.....	XX
0206780000	1,00	00	ETIQUETTE 6905 ..... 2230A *	00 LABEL 6905 ..... 2230A	942375.....	XX
0208790000	1,00	01	COAX '112''---'L500 2230A *	01 COAX '112''---'L500 2230A	ADRET.....	XX
0209630000	1,00	02	COAX '112''---'L200 2230A *	02 COAX '112''---'L200 2230A	ADRET.....	XX
0210890000	2,00	02	F40 4+4 SPIRES ..... 2230A *	02 F40 4+4 TURNS 2230A	Z94 F40.....8	XX
0211280000	1,00	02	F10B 22 SPIRES ..... 2230A *	02 F10B 22 TURNS 2230A	Z94 F10B.....22	XX
0216280000	1,00	01	F2 63 SPIRES ..... *	01 F2 63 TURNS	Z94 F2.....63	XX
0216600000	1,00	00	F40 4X4+4 SPIRES .... 2230A *	00 F40 4X4+4 TURNS 2230A	Z94 F40.....12	XX
0216650000	1,00	00	F10B 18X6 SPIRES ..... 4101 *	00 F10B 18X6 TURNS 4101	Z94 F10B.....24	XX
0217170000	2,00	00	F2 95 SPIRES ..... *	00 F2 95 TURNS	Z94 F2.....95	XX
0217280000	1,00	01	TORE FT5 T6 ..... *	01 TORE FT5 T6	ADRET.....	XX
0217990000	1,00	00	F10B 13+13 ..... 2200A *	00 F10B 13+13 TURNS 2200A	Z94 F10B.....26	XX
0218000000	2,00	01	F10B 13X1 ..... 2230A *	01 F10B 13X1 TURNS 2230A	Z94 F10B.....14	XX
0218010000	1,00	01	F10B 35X6 SPIRES .... 2230A *	01 F10B 35X6 TURNS 2230A	Z94 F10B.....41	XX
0218020000	1,00	00	F10B 35X4 ..... 2200A *	00 F10B 35X4 TURNS 2200A	Z94 F10B.....39	XX
0218030000	1,00	00	F2 30X38+38 ..... 2200A *	00 F2 30X38+38 TURNS ... 2200A	Z94 F2.....106	XX
0218040000	1,00	00	F2 16X2 SPIRES ..... 2200A *	00 F2 16X2 TURNS 2200A	Z94 F2.....18	XX
0218050000	1,00	00	F2 2X4+4 ..... 2200A *	00 F2 2X4+4 TURNS 2200A	Z94 F2.....10	XX
0218060000	1,00	00	F2 46X46 SPIRES ..... 2200A *	00 F2 46X46 TURNS 2200A	Z94 F2.....92	XX
0218120000	3,00	01	TRANSFO ISOLATION ... 2230A *	01 INSULATING TRANSFO .. 2230A	ADRET.....	XX
0218250000	1,00	00	F2 38X6 SPIRES ..... 2230A *	00 F2 38X6 TURNS 2230A	Z94 F2.....44	XX
0219710000	1,00	00	F10B .....6+6X6 SPIRES *	00 F10B .....6+6X6 TURNS.	F10B.....18	XX
0254002400	8,16	00	POULIE F10 EQUIPEE *EMBASE* *	00 FITTED PULLEY F10 *SOCKET*	ADRET..... .....XX	
0254002700	8,16	00	POULIE F 2 EQUIPEE *EMBASE* *	00 FITTED PULLEY F 2 *SOCKET*	ADRET.....	XX
0254002900	3,06	00	POULIE F40 EQUIPEE *EMBASE* *	00 FITTED PULLEY F40 *SOCKET*	ADRET.....	XX
0269050000	1,00	14	1ER GENERATION ..... 2230A *	14 FIRST GENERATION 2230A	M932502.A976905	XX
0269060000	1,00	17	2EME GENERATION ..... 2230A *	17 SECOND GENERATION ... 2230A	M932344.E976906	XX
0269070000	1,00	13	CARTE AMPLIFICATEUR . 2230A *	13 AMPLIFIER BOARD 2230A	G932353.A976907	XX
0269080000	1,00	06	CARTE COMMANDE NIVEAU 2230A *	06 LEVEL CONTROL BOARD . 2230A	G932349.A976908	XX
0269090000	1,00	03	COMMUTATEUR TTL ..... 2230A *	03 TTL SWITCH 2230A	D932366.....	XX
0269100000	1,00	11	BAQUET DE SORTIE .... 2230A *	11 OUTPUT MODULE 2230A	J920871.C976910	XX
0269110000	1,00	03	ATTENUATEUR ..... 2230A *	03 ATTENUATOR 2230A	C932524.....	XX
0269120000	1,00	11	AMPLI SYMETRIQUE .... 2230A *	11 SYMMETRICAL AMPLI ... 2230A	H932351 1&2/2..	XX
0269130000	1,00	01	CARTE OPTION BCD ..... 2230A *	01 BCD OPTION BOARD 2230A	932547. 976913	XX
0269150100	1,00	07	PORTEUR EQUIPE ..... 2230A *	07 FITTED MOTHER BD 2230A	B920953.A976915	XX

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN / SUPPLIER/DRAWING	NORME
0269970000	1,00		06 CARTE REGISTRE IEEE . 2230A	06 IEEE REGISTER BOARD . 2230A	E932563.B976997	XX
0270010000	9,00		02 ROUE CODEE EQUIPEE .. 2230A	02 FITTED SPIN WHEEL ... 2230A	*942914.....	XX
0270030100	1,00		09 COMMUTATEUR MODE 2230A	09 MODE SWITCH 2230A	J932523.B977003	XX
0270080300	1.00		02 CHASSIS EQUIPE ZO ... 2230A	02 FITTED CHASSIS ZO ... 2230A	J910214.....	XX
0270090000	1,00		02 TRANSFO DE SORTIE ... 2230A	02 OUTPUT TRANSFO 2230A	A920936.....	XX
0270100000	1,00		04 BLOC ROUES CODEES ... 2230A	04 SPIN WHEELS BLOCK ... 2230A	D920933.....	XX
0270110000	1,00		08 PLAQUE AVANT MONTEE . 2230A	08 ASSEM. FRONT PLATE .. 2230A	L920934.....	XX
0270130000	1,00		03 NATTE 26'171''177'L140 2230	03 FLAT-T.26'171 177'L140 2230	ADRET.....	XX
0270940000	1.00		01 AMPLI Z=0 ..... 2230A	01 AMPLI Z=0 ..... 2230A	E932549.A977094	XX
0271050000	1,00		03 NATTE 26'171''177'L190 2230	03 FLAT-T.26'171 177'L190 2230	ADRET.....	XX
0274880000	1,00		02 CARTE ISOLATION IEEE 2230A	02 IEEE INSULATING BOARD 2230A	D932961.C977488	XX
0281067428	1,00		CAPUCHON PERCE A 10,2 .. 2230A	BORED CAP TO 10.2 ..... 2230A	D942176	XX
0422301002	1,00		00 AVANT HABILLAGE Z=0 . 2230A	00 AVANT HABILLAGE Z=0 . 2230A		XX
0422301300	1,00		02 LOT HABILLAGE ..... FANTOME	02 LOT HABILLAGE ..... FANTOME		XX
0422308301	1.00		08 OPTION 2 IEEE 2230A	08 OPTION 2 IEEE 2230A	F932565	XX
0422308302	1,00		03 OPTION 1 BCD 2230A	03 OPTION 1 BCD 2230A	A932555(2).....	XX
0422308304	1,00		01 OPTION 20/21MHZ 2230A	01 OPTION 20/21MHZ 2230A	A92 1&2/2	XX
1000270000	1,00		ALIMENTATION 2230A	POWER SUPPLY 2230A	E932214.....	
1100010000	1,53	M	FIL NOIR KY30-04	BLACK THREAD KY30-04	FILECA	NFC UTEC 93-521
1100020000	0,54	M	FIL MARRON KY30-04	BROWN THREAD KY30-04	FILECA	NFC UTEC 93-521
1100030000	1,21	M	FIL ROUGE KY30-04	RED THREAD KY30-04	FILECA	NFC UTEC 93-521
1100040000	0,53	M	FIL ORANGE KY30-04	ORANGE THREAD KY30-04	FILECA	NFC UTEC 93-521
1100050000	0,30	M	FIL JAUNE KY30-04	YELLOW THREAD KY30-04	FILECA	NFC UTEC 93-521
1100060000	0,39	M	FIL VERT KY30-04	GREEN THREAD KY30-04	FILECA	NFC UTEC 93-521
1100070000	0,93	M	FIL BLEU KY30-04	BLUE THREAD KY30-04	FILECA	NFC UTEC 93-521
1100080000	0,38	M	FIL VIOLET KY30-04	PURPLE THREAD KY30-04	FILECA	NFC UTEC 93-521
1100090000	0,51	M	FIL GRIS KY30-04	GREY THREAD KY30-04	FILECA	NFC UTEC 93-521
1100100000	0,20	M	FIL BLANC KY30-04	WHITE THREAD KY30-04	FILECA	NFC UTEC 93-521
1100110000	0,13	M	FIL ROSE KY30-04	PINK THREAD KY30-04	FILECA	NFC UTEC 93-521
1100430000	2,59	M	COAX KX 21 A	COAX KX 21 A	FILECA	NFC UTEC 93-550
1100440000	0,80	M	CABLE BLINDE GRIS FMA2R	GREY ARMORED CABLE FMA2R	FILECA	
1100450000	0,55	M	CABLE BLINDE GRIS FMA4R	GREY ARMORED CABLE FMA4R	FILECA	
1100520000	0,17	M	FIL.NU.ETAME.4/10	TINNED BARE THREAD 4/10	ELECTROFIL	
1100530000	0,32	M	FIL.NU.ETAME.6/10	TINNED BARE THREAD 6/10	ELECTROFIL	
1100540000	0,02	M	FIL.NU.ETAME.8/10	TINNED BARE THREAD 8/10	ELECTROFIL	
1100550000	0,50	M	FIL.NU.ETAME.10/10	TINNED BARE THREAD10/10	ELECTROFIL	
1100620000	21,20	M	FIL CU SOUD.EMAIL GRAD1 8/100E	CU THREAD ENEMAL GRAD1 8/100E	ELECTROFIL	
1100650000	21,15	M	FIL CU SOUD.EMAIL GRA1 12/100E	CU THREAD ENEMAL GRA1 12/100E	ELECTROFIL	
1100670000	6,00	M	FIL CUIVRE SOUD. EMAIL 15/100E	CU THREAD SOLD. ENEMAL 15/100E	ELECTROFIL	
1100680000	1,80	M	FIL CUIVRE SOUD SOIE 15/100ES	CU THREAD SOLD. SILK 15/100ES	ELECTROFIL	
1100720000	6,00	M	FIL CUIVRE SOUD.SOIE 20/100ES	CU THREAD SOLD. SILK 20/100ES	ELECTROFIL	
1100840000	0,19	M	CABLE PLAT 16 CONDUCTEURS 3365	FLAT CABLE 16 CONDUCTORS 3365	3M	
1100860000	3,00	M	FIL 15/100E VERT	THREAD 15/100E GREEN	ELECTROFIL	
1100870000	3,00	M	FIL 15/100E INCOLORE	THREAD 15/100E GRAY	ELECTROFIL	
1100910000	0,91	M	CABLE PLAT 26 CONDUCTEURS 3365	FLAT CABLE 26 CONDUCTORS 3365	3M	
1100920000	0,19	M	CABLE PLAT 40 CONDUCTEURS 3365	FLAT CABLE 40 CONDUCTORS 3365	3M	
1100930000	0,60	M	4FILS TEFLON JGE 30 ST/MM 4061	4THREAD TEFLON JGE30 ST/MM4061	SODIMATEL	
1100950000	1,00	M	VERT/JAUNE .. HO7-V-K(1X1,5ET)	GREEN/YELLOW HO7-V-K(1X1.5ET)	FILECA	
1269050700	1,00		CI 1 GENERATION 2230A	PC 1 GENERATION 2230A	K996905.....TM	B
1269060500	1,00		CI 2'GENERATION 2230A	PC 2'GENERATION 2230A	H996906	B
1269070400	1,00		CI DEMODULATEUR AMPLI .. 2230A	PC AMPLI DEMODULATOR ... 2230A	L996907.....TM	B
1269080600	1,00		CI COMMANDE NIVEAU 2230A	PC LEVEL CONTROL 2230A	G996908	B
1269090300	1,00		CI COMMUTATEUR TTL 2230A	PC TTL SWITCHER 2230A	D996909	B
1269110200	1,00		CI ATTENUATEUR 2230A	PC ATTENUATOR 2230A	F996911.....SF	B

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN / SUPPLIER/DRAWING	NORME
1269120500	1,00		CI AMPLI 2230A	PC AMPLI 2230A	K996912.....TM	B
1269130300	1,00		CI OPTION BCD 2230A	PC OPTION BCD 2230A	E996913	B
1269150600	1,00		CI PORTEUR 2230A	PC MOTHER 2230A	E996915	B
1269950000	1,00		CI SUPPORT QUARTZ 1'GENE 2200A	PC BASE QUARTZ 1'GENERAT 2200A	A996995	B
1269970200	1,00		CI CARTE REGISTRE . IEEE.2230A	PC REGISTER BOARD . IEEE.2230A	F996997	B
1269990000	1,00		CARTE INTERCONNEXION 2230A IEC	INTERCONNECTION BOARD2230A IEC	C996999.....SF	B
1270030400	1,00		CI CIRCUIT MODE 2230A	PC MODE CIRCUIT 2230A	D997003	B
1270100300	1,00		CI ROUE CODEUSE 2230A	PC SPIN WHEEL 2230A	E997010	B
1270940000	1,00		CI AMPLI Z=0 ..... 2230A	PC AMPLI Z=0 ..... 2230A	C997094	B
1272350000	3,00		CI PROLONGATEUR 2230A	EXTENDER PC 2230A	*997235	B
1274880000	1,00		CI CARTE ISOLATION 2230A	INSULATION BOARD PC 2230A	A997488	B
1276410000	1,00		OO CI PROLONGATEUR 2230A	OO EXTENDER PC 2230A	A997641	B
1276420000	1,00		OO CI PROLONGATEUR 2230A	OO EXTENDER PC 2230A	A997642	B
1276610000	1,00		CI OPTION 20/21MHZ 2230A	20/21MHZ OPTION PC 2230A	A997661.....SF	B
1300050000	1,02		RELAIS ..... REF 1072 K	RELAYS ..... REF 1072 K	ATI	
1300080000	1,02		COLLIER ..... REF H3P	COLLAR ..... REF H3P	HELLERMANN	
1300090000	3,06		COLLIER ..... REF H4P	COLLAR ..... REF H4P	HELLERMANN	
1300430000	0,05	M	GAINE F2,4 FP301 3/32 . SFM 24	SHEATH F2.4 FP301 3/32 SFM 24	HELLERMANN	
1300450000	0,13	M	GAINE F4,8 FP301 3/16 . SFM 48	SHEATH F4.8 FP301 3/16 SFM 48	HELLERMANN	
1300460000	0,04	M	GAINE F6,4 FP301 1/4 . SFM 64	SHEATH F6.4 FP301 1/4 . SFM 64	HELLERMANN	
1300540000	1,00	M	LACING ..... REF T2 VP NOIR	LACING ..... REF T2 VP NOIR	HELLERMANN	
1300590000	0,11	M	SOUPLISSO 0,6X0,9 COUL.NATUREL	SPAGHETTI 0.6X0.9 GRAY COLORED	HABIA	
1300600000	0,10	M	SOUPLISSO 1X1,2 COUL. NATUREL	SPAGHETTI 1X1.2 GRAY COLORED	HABIA	
1300610000	1,02		PASSE.FIL .....REF 751	FEED-THROUGH SLEEVE ...REF 751	MFOM	
1300950000	3,06		EMBASE (TY-RAP) .. REF LPMM-S5	SOCKET (TY-RAP) .. REF LPMM-S5	PANDUIT	
1300960000	3,06		TY-RAP L 142MM REF PLT 1,5M	TY-RAP L 142MM REF PLT 1.5M	PANDUIT	
1400109900	44,88		POINT TEST	TEST POINT	C940850	A
1400200500	6,00		BNC EMBASE'FEMEL'ECROU R141557	BNC FEMALE SOCKET NUT R141557	RADIALL	A
1400209000	2,00		KMC12-1 EMBASE'MALE' DROITE CI	KMC12-1 BASE MALE STRAIGHT PC	SEALECTRO	A
1400211200	2,00		KMC3 FICHE COUDEE'FEMELL KX21A	KMC3 FEMALE BENDED PLUG KX21A	SEALECTRO	A
1400215800	1,00		BNC EMBASE ECROU'FEMEL'R141559	BNC BASE THUMB FEMALE .R141559	RADIALL	A
1400217200	1,00		PRISE SIEMENS C42334 A176 A11	SIEMENS PLUG C42334 A176 A11	SIEMENS	A
1405000900	1,00		EMBASE DIN ... LUMBERG REF B51	DIN SOCKET ... LUMBERG REF B51	LIENARD SOUAL	A
1405009800	1,00		TB 5 F ..... FEMELLE	TB 5 F ..... FEMALE	TRELEC	A
1405011400	1,00		TB 5 MCID ..... MALE*PORTEUR*	TB 5 MCID ..... MALE	TRELEC	A
1410007600	1,00		TB 10 M ..... MALE	TB 10 M ..... MALE	TRELEC	A
1410007700	1,00		TB 10 F ..... FEMELLE	TB 10 F ..... FEMALE	TRELEC	A
1416013700	2,00		16CTS TYPE DIP'16' 3416-0000	16CTS TYPE DIP'16' 3416-0000	3M	A
1417016300	3,00		TM 17 MCIG ..... MALE*CARTE*	TM 17 MCIG ..... MALE	TRELEC	A
1417026000	1,00		TM 17 FCIG FEMEL.COUDEE*CARTE*	TM 17 FCIG FEMALE BENDED	TRELEC	A
1417030000	2,00		17PTS .EMEL. 6823-17-64-14-335	17PTS .EMEL. 6823-17-64-14-335	SOURIAU	A
1423000400	2,00		TM 23 MCIG ..... MALE*CARTE*	TM 23 MCIG ..... MALE	TRELEC	A
1423003300	1,00		TM 23 FCIG ... FEMELLE*COUDEE*	TM 23 FCIG .... FEMALE*BENDED*	TRELEC	A
1423029600	2,00		23PTS FEMEL. 8623-23-64-14-335	23PTS FEMAL. 8623-23-64-14-335	SOURIAU	A
1424018400	1,00		24PTS CI'IEEE' REF 57-20240-14	24PTS PC'IEEE' REF 57-20240-14	AMPHENOL	A
1425017900	1,00		25 CONTACTS'FEMELLE'POUR NATTE	25 CONTACTS 'FEMALE' FOR MAT		A
1426017100	6,00		26CTS TYPE PCB REF 3434-0000	26CTS TYPE PCB REF 3434-0000	3M	A
1426017700	3,00		26CTS TRANSITION WWP 3399-6000	26CTS WWP LINKAGE .. 3399-6000	3M	A
1426020000	2,00		26 TRANSITION COUDE 3429-5003	26 BENDED LINKAGE .. 3429-5003	3M	A
1426024500	1,00		26 TRANSITION DROIT 3429-6002	26 STRAIGHT LINKAGE 3429-6002	3M	A
1427011600	6,00		TM 27 MCIG ..... MALE*CARTE*	TM 27 MCIG ..... MALE	TRELEC	A
1427013400	3,00		TM 27 FCIG ... FEMELLE*CARTE*	TM 27 FCIG ..... FEMALE	TRELEC	A
1427030100	6,00		27PTS FEMEL. 8623-27-64-14-335	27PTS FEMALE 8623-27-64-14-335	SOURIAU	A
1435004600	3,00		TM 35 MCIG ..... MALE*CARTE*	TM 35 MCIG	TRELEC	A

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN / SUPPLIER/DRAWING	NORME
1435013500	1,00		TM 35 FCIG .... FEMELLE*CARTE*	TM 35 FCIG	TRELEC	A
1435030200	2,00		35PTS FEMEL. 8623-35-64-14-335	35PTS FEMALE 8623-35-64-14-335	SOURIAU	A
1437018000	1,00		37CTS´FEMELLE´NATTE 609-37S	37CTS MAT ´FEMALE´ 609-37S	ANSLEY	A
1440018100	1,00		40CTS TYPE PCB REF 3418-0000	40CTS TYPE PCB REF 3418-0000	3M	A
1520312200	1,00		03 TOUCHES ORE 10 .MODE. 2230A	03 TOUCHES ORE 10 .MODE. 2230A	C932471	A
1520412300	1,00		04 TOUCHES ORE 10 BAQSYM 2230A	04 TOUCHES ORE 10 BAQSYM 2230A	D932472	A
1520512400	1,00		05 TOUCHES ORE 10 .TTL. 2230A	05 TOUCHES ORE 10 .TTL. 2230A	C932473	A
1530202000	1,00		INVERSEUR REF:0391584-710 NOIR	REVERSER REF:0391584-710 BLACK	METALLO	A
1530208400	1,00		INVERSEUR ... REF:039-1584-110	REVERSER REF:039-1584-110	METALLO	A
1530214500	3,00		DOUBLE INVERSEUR CI TS 2 BLEU	DOUBLE REVERSER PC TS 2 BLUE	JEANRENAULT	A
1540007800	8,16		ECROU FENDU M2	SPLIT THUMB M2	CONTRAVES	A
1540011600	4,00		JOUE BLOC ROUE CODEE 509-1153	FLANGE BLOCK COD.WHEEL509-1153	CHERRY	A
1541011500	9,00		10 PTS TAMB.& LEV.MAT 20-260 M	10 PTS TAMB.& LEV.MAT 20-260 M	CHERRY	A
1541012000	1,00		9PTS SPECIAL TAM.&LEV.20-255 M	9PTS SPECIAL TAM.&LEV.20-255 M	CHERRY	A
1600090000	3,00		RELAIS 2 INV. G2V-234P-NT.12DC	RELAYS 2 REV. G2V-234P-NT.12DC	OMRON	
1700020000	1,02		LUCIOLE M.MIDJET AN643 5V/75MA	BRIGHT FIREFLY ..AN643 5V/75MA	MAZDA	
1700340000	1,00		FILTRE 220V+NEUTRE 3A P.EUROPE	FILTER 220V+NEUTRAL3A P.EUROPE	EUROPAVIA	
1710003900	1,00		PORTE FUSIBLE D5&D6 031-1603	FUSE BLOCK D5&D6 031-1603	ARNOULD	
1710004000	1,00		TETE 6.3X32(17100039) 031-1613	HEAD 6.3X32(17100039) 031-1613	ARNOULD	
1720004900	1,00		160MA FST6332 034-3409	160MA FST6332 034-3409	ARNOULD	
1900010000	1,02		GUIDE CARTE ANTIV.FIXAT. PIONS	BOARD GUIDE FIXATION PIONS	TRELEC	
1900120000	4,00		VERROUILLAGE FEMELLE . 8630-01	FEMALE LOCKING 8630-01	SOURIAU	
1900180000	10,20		GUIDE CARTE ANTIVIBR. REF R221	BOARD GUIDE ..... REF R221	TRELEC	
1900200000	22,00		EXTRACTEUR DE CARTE´ELEVATEUR´	BOARD EXTRACTOR ´LIFTER´	TRELEC	
2122500500	1,00		4K7/10K LIN PK16-DCS 3X32+6X16	4K7/10K LIN PK16-DCS 3X32+6X16	MCB COUPER 3X26	
2130470000	1,00		47R 3/4" 15T CERMET 43 P	47R 3/4" 15T CERMET 43 P	SPECTROL	
2131470000	1,00		470R 3/4" 15T CERMET 43 P	470R 3/4" 15T CERMET 43 P	SPECTROL	
2132470000	1,00		4K7 3/4" 15T CERMET 43 P	4K7 3/4" 15T CERMET 43 P	SPECTROL	
2133100000	1,00		10K 3/4" 15T CERMET 43 P	10K 3/4" 15T CERMET 43 P	SPECTROL	PM63 T19P 93253
2133220000	2,00		22K 3/4" 15T CERMET 43 P	22K 3/4" 15T CERMET 43 P	SPECTROL	PM63 T19P 93253
2152100000	1,00		1 K T05 CERMET T 7 YA	1 K T05 CERMET T 7 YA	SFERNICE	
2152470000	2,00		4K7 T05 CERMET T 7 YA	4K7 T05 CERMET T 7 YA	SFERNICE	
2153100000	2,00		10K T05 CERMET T 7 YA	10K T05 CERMET T 7 YA	SFERNICE	AP8PY NFC 83251
2153220000	1,00		22K T05 CERMET T 7 YA	22K T05 CERMET T 7 YA	SFERNICE	AP8PY NFC 83251
2200014700	9,18		470R 5% N4	470R 5% N4	SOVCOR	
2200024700	12,24		4K7 5% N4	4K7 5% N4	SOVCOR	
2200031000	2,04		10K 5% N4	10K 5% N4	SOVCOR	
2200034700	2,04		47K 5% N4	47K 5% N4	SOVCOR	
2200052200	2,04		2M2 5% CB	2M2 5% CB	ALLEN BRADLEY	
2210001200	2,04		12R 5% N4	12R 5% N4	SOVCOR	
2210001800	2,04		18R 5% N4	18R 5% N4	SOVCOR	
2210002200	2,04		22R 5% N4	22R 5% N4	SOVCOR	RC-2T NFC 83230
2210002700	1,02		27R 5% N4	27R 5% N4	SOVCOR	RC-2T NFC 83230
2210003300	1,02		33R 5% N4	33R 5% N4	SOVCOR	RC-2T NFC 83230
2210004300	1,02		43R 5% N4	43R 5% N4	SOVCOR	
2210004700	6,12		47R 5% N4	47R 5% N4	SOVCOR	RC-2T NFC 83230
2210005100	4,08		51R 5% N4	51R 5% N4	SOVCOR	RC-2T NFC 83230
2210005600	3,06		56R 5% N4	56R 5% N4	SOVCOR	RC-2T NFC 83230
2210006800	3,06		68R 5% N4	68R 5% N4	SOVCOR	RC-2T NFC 83230
2210011000	27,54		100R 5% N4	100R 5% N4	SOVCOR	RC-2T NFC 83230
2210011200	4,08		120R 5% N4	120R 5% N4	SOVCOR	RC-2T NFC 83230
2210011500	4,08		150R 5% N4	150R 5% N4	SOVCOR	RC-2T NFC 83230
2210011800	2,04		180R 5% N4	180R 5% N4	SOVCOR	RC-2T NFC 83230
2210012200	6,12		220R 5% N4	220R 5% N4	SOVCOR	RC-2T NFC 83230

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2210012700	2,04		270R 5% N4 *	270R 5% N4	SOVCOR	RC-2T NFC 83230
2210013300	7,14		330R 5% N4 *	330R 5% N4	SOVCOR	RC-2T NFC 83230
2210013900	3,06		390R 5% N4 *	390R 5% N4	SOVCOR	RC-2T NFC 83230
2210014700	2,04		470R 5% N4 *	470R 5% N4	SOVCOR	RC-2T NFC 83230
2210015600	1,02		560R 5% N4 *	560R 5% N4	SOVCOR	RC-2T NFC 83230
2210016800	3,06		680R 5% N4 *	680R 5% N4	SOVCOR	RC-2T NFC 83230
2210018200	5,10		820R 5% N4 *	820R 5% N4	SOVCOR	RC-2T NFC 83230
2210019100	1,02		910R 5% N4 *	910R 5% N4	SOVCOR	
2210021000	22,44		1K0 5% N4 *	1K0 5% N4	SOVCOR	RC-2T NFC 83230
2210021200	4,08		1K2 5% N4 *	1K2 5% N4	SOVCOR	RC-2T NFC 83230
2210021500	3,06		1K5 5% N4 *	1K5 5% N4	SOVCOR	RC-2T NFC 83230
2210021800	1,02		1K8 5% N4 *	1K8 5% N4	SOVCOR	RC-2T NFC 83230
2210022200	15,30		2K2 5% N4 *	2K2 5% N4	SOVCOR	RC-2T NFC 83230
2210022700	6,12		2K7 5% N4 *	2K7 5% N4	SOVCOR	RC-2T NFC 83230
2210023300	13,26		3K3 5% N4 *	3K3 5% N4	SOVCOR	RC-2T NFC 83230
2210023600	1,02		3K6 5% N4 *	3K6 5% N4	SOVCOR	
2210023900	1,02		3K9 5% N4 *	3K9 5% N4	SOVCOR	RC-2T NFC 83230
2210024700	26,52		4K7 5% N4 *	4K7 5% N4	SOVCOR	RC-2T NFC 83230
2210025600	3,06		5K6 5% N4 *	5K6 5% N4	SOVCOR	
2210026800	2,04		6K8 5% N4 *	6K8 5% N4	SOVCOR	RC-2T NFC 83230
2210031000	20,40		10K 5% N4 *	10K 5% N4	SOVCOR	RC-2T NFC 83230
2210031200	3,06		12K 5% N4 *	12K 5% N4	SOVCOR	RC-2T NFC 83230
2210031500	7,14		15K 5% N4 *	15K 5% N4	SOVCOR	RC-2T NFC 83230
2210032200	57,12		22K 5% N4 *	22K 5% N4	SOVCOR	RC-2T NFC 83230
2210032700	1,02		27K 5% N4 *	27K 5% N4	SOVCOR	
2210033300	3,06		33K 5% N4 *	33K 5% N4	SOVCOR	RC-2T NFC 83230
2210033900	1,02		39K 5% N4 *	39K 5% N4	SOVCOR	RC-2T NFC 83230
2210034700	58,14		47K 5% N4 *	47K 5% N4	SOVCOR	RC-2T NFC 83230
2210038200	1,02		82K 5% N4 *	82K 5% N4	SOVCOR	RC-2T NFC 83230
2210041000	3,06		100K 5% N4 *	100K 5% N4	SOVCOR	RC-2T NFC 83230
2210041200	1,02		120K 5% N4 *	120K 5% N4	SOVCOR	RC-2T NFC 83230
2210043900	2,04		390K 5% N4 *	390K 5% N4	SOVCOR	
2210051000	1,02		1M 5% N4 *	1M 5% N4	SOVCOR	RC-2T NFC 83230
2300092200	2,04		2R2 SFR 25 1/4W 5% RC2T *	2R2 SFR 25 1/4W 5% RC2T	RTC	RC-21 U RCMMO
2300094700	3,06		4R7 SFR 25 1/4W 5% RC2T *	4R7 SFR 25 1/4W 5% RC2T	RTC	
2300095600	2,04		5R6 SFR 25 1/4W 5% RC2T *	5R6 SFR 25 1/4W 5% RC2T	RTC	
2300096800	2,04		6R8 SFR 25 1/4W 5% RC2T *	6R8 SFR 25 1/4W 5% RC2T	RTC	
2500010000	1,02		100R * 1% 0,3 W SMA207 *	100R * 1% 0,3 W SMA207	DRALORIC	
2500013700	2,04		137R * 1% 0,3 W SMA207 *	137R * 1% 0,3 W SMA207	DRALORIC	
2500022100	2,04		221R * 1% 0,3 W SMA207 *	221R * 1% 0,3 W SMA207	DRALORIC	
2500022600	2,04		226R * 1% 0,3 W SMA207 *	226R * 1% 0,3 W SMA207	DRALORIC	RS-63Y NY5
2500024900	2,04		249R * 1% 0,3 W SMA207 *	249R * 1% 0,3 W SMA207	DRALORIC	
2500029400	2,04		294R * 1% 0,3 W SMA207 *	294R * 1% 0,3 W SMA207	DRALORIC	
2500039200	2,04		392R * 1% 0,3 W SMA207 *	392R * 1% 0,3 W SMA207	DRALORIC	
2500046400	2,04		464R * 1% 0,3 W SMA207 *	464R * 1% 0,3 W SMA207	DRALORIC	
2500049900	9,18		499R * 1% 0,3 W SMA207 *	499R * 1% 0,3 W SMA207	DRALORIC	RS-63Y NY5
2500052300	1,02		523R * 1% 0,3 W SMA207 *	523R * 1% 0,3 W SMA207	DRALORIC	
2500075000	2,04		750R * 1% 0,3 W SMA207 *	750R * 1% 0,3 W SMA207	DRALORIC	
2500090900	2,04		909R * 1% 0,3 W SMA207 *	909R * 1% 0,3 W SMA207	DRALORIC	
2500110000	5,10		1K00 * 1% 0,3 W SMA207 *	1K00 * 1% 0,3 W SMA207	DRALORIC	
2500115000	1,02		1K50 * 1% 0,3 W SMA207 *	1K50 * 1% 0,3 W SMA207	DRALORIC	
2500119600	1,02		1K96 * 1% 0,3 W SMA207 *	1K96 * 1% 0,3 W SMA207	DRALORIC	
2500124300	2,04		2K43 * 1% 0,3 W SMA207 *	2K43 * 1% 0,3 W SMA207	DRALORIC	
2500130100	3,06		3K01 * 1% 0,3 W SMA207 *	3K01 * 1% 0,3 W SMA207	DRALORIC	

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION				PART DESCRIPTION				FOURNISSEUR/PLAN / SUPPLIER/DRAWING	NORME
2500133200	1,02		3K32	* 1%	0,3 W	SMA207	* 3K32	* 1%	0,3 W	SMA207	DRALORIC	
2500139200	2,04		3K92	* 1%	0,3 W	SMA207	* 3K92	* 1%	0,3 W	SMA207	DRALORIC	
2500142200	1,02		4K22	* 1%	0,3 W	SMA207	* 4K22	* 1%	0,3 W	SMA207	DRALORIC	
2500146400	2,04		4K64	* 1%	0,3 W	SMA207	* 4K64	* 1%	0,3 W	SMA207	DRALORIC	
2500149900	2,04		4K99	* 1%	0,3 W	SMA207	* 4K99	* 1%	0,3 W	SMA207	DRALORIC	
2500151100	1,02		5K11	* 1%	0,3 W	SMA207	* 5K11	* 1%	0,3 W	SMA207	DRALORIC	CC NY5
2500156200	2,04		5K62	* 1%	0,3 W	SMA207	* 5K62	* 1%	0,3 W	SMA207	DRALORIC	
2500157600	1,02		5K76	* 1%	0,3 W	SMA207	* 5K76	* 1%	0,3 W	SMA207	DRALORIC	
2500168100	3,06		6K81	* 1%	0,3 W	SMA207	* 6K81	* 1%	0,3 W	SMA207	DRALORIC	
2500178700	1,02		7K87	* 1%	0,3 W	SMA207	* 7K87	* 1%	0,3 W	SMA207	DRALORIC	
2500182500	2,04		8K25	* 1%	0,3 W	SMA207	* 8K25	* 1%	0,3 W	SMA207	DRALORIC	
2500210000	5,10		10K0	* 1%	0,3 W	SMA207	* 10K0	* 1%	0,3 W	SMA207	DRALORIC	
2500211300	1,02		11K3	* 1%	0,3 W	SMA207	* 11K3	* 1%	0,3 W	SMA207	DRALORIC	
2500215000	1,02		15K0	* 1%	0,3 W	SMA207	* 15K0	* 1%	0,3 W	SMA207	DRALORIC	
2500218700	1,02		18K7	* 1%	0,3 W	SMA207	* 18K7	* 1%	0,3 W	SMA207	DRALORIC	
2500221000	1,02		21K0	* 1%	0,3 W	SMA207	* 21K0	* 1%	0,3 W	SMA207	DRALORIC	
2500224900	1,02		24K9	* 1%	0,3 W	SMA207	* 24K9	* 1%	0,3 W	SMA207	DRALORIC	
2500231600	1,02		31K6	* 1%	0,3 W	SMA207	* 31K6	* 1%	0,3 W	SMA207	DRALORIC	
2500240200	1,02		40K2	* 1%	0,3 W	SMA207	* 40K2	* 1%	0,3 W	SMA207	DRALORIC	
2500244200	1,02		44K2	* 1%	0,3 W	SMA207	* 44K2	* 1%	0,3 W	SMA207	DRALORIC	RS-63Y NY5
2500249900	1,02		49K9	* 1%	0,3 W	SMA207	* 49K9	* 1%	0,3 W	SMA207	DRALORIC	
2500269800	1,02		69K8	* 1%	0,3 W	SMA207	* 69K8	* 1%	0,3 W	SMA207	DRALORIC	
2500278700	1,02		78K7	* 1%	0,3 W	SMA207	* 78K7	* 1%	0,3 W	SMA207	DRALORIC	
2500280600	1,02		80K6	* 1%	0,3 W	SMA207	* 80K6	* 1%	0,3 W	SMA207	DRALORIC	
2500286600	1,02		86K6	* 1%	0,3 W	SMA207	* 86K6	* 1%	0,3 W	SMA207	DRALORIC	
2500290900	1,02		90K9	* 1%	0,3 W	SMA207	* 90K9	* 1%	0,3 W	SMA207	DRALORIC	
2500310000	2,04		100K	* 1%	0,3 W	SMA207	* 100K	* 1%	0,3 W	SMA207	DRALORIC	
2500311000	1,02		110K	* 1%	0,3 W	SMA207	* 110K	* 1%	0,3 W	SMA207	DRALORIC	
2500312400	1,02		124K	* 1%	0,3 W	SMA207	* 124K	* 1%	0,3 W	SMA207	DRALORIC	
2500316200	1,02		162K	* 1%	0,3 W	SMA207	* 162K	* 1%	0,3 W	SMA207	DRALORIC	
2500324900	1,02		249K	* 1%	0,3 W	SMA207	* 249K	* 1%	0,3 W	SMA207	DRALORIC	
2500349900	1,02		499K	* 1%	0,3 W	SMA207	* 499K	* 1%	0,3 W	SMA207	DRALORIC	
2500924900	4,08		24R9	* 1%	0,3 W	SMA207	* 24R9	* 1%	0,3 W	SMA207	DRALORIC	
2500948700	1,02		48R7	* 1%	0,3 W	SMA207	* 48R7	* 1%	0,3 W	SMA207	DRALORIC	
2500973200	2,04		73R2	* 1%	0,3 W	SMA207	* 73R2	* 1%	0,3 W	SMA207	DRALORIC	
2500975000	1,02		75R0	* 1%	0,3 W	SMA207	* 75R0	* 1%	0,3 W	SMA207	DRALORIC	
2600118000	1,00		1K18	0,25%	50PPM	H10	* 1K18	0,25%	50PPM	H10	HOLCO	
2600500000	2,00		5K00	0,25%	50PPM	H10	* 5K00	0,25%	50PPM	H10	HOLCO	
2601100000	1,00		10K00	0,25%	50PPM	H10	* 10K00	0,25%	50PPM	H10	HOLCO	
2601104300	1,00		10K43	0,25%	50PPM	H10	* 10K43	0,25%	50PPM	H10	HOLCO	
2601109000	1,00		10K90	0,25%	50PPM	H10	* 10K90	0,25%	50PPM	H10	HOLCO	
2601301000	1,00		30K10	0,25%	50PPM	H10	* 30K10	0,25%	50PPM	H10	HOLCO	
2608765000	2,00		76R5	0,25%	50PPM	REF H10	* 76R5	0,25%	50PPM	REF H10	HOLCO	
2608916000	2,00		91R6	0,25%	50PPM	REF H10	* 91R6	0,25%	50PPM	REF H10	HOLCO	
2609106600	1,00		106R6	0,25%	50PPM	REF H10	* 106R6	0,25%	50PPM	REF H10	HOLCO	
2609144400	2,00		144R4	0,25%	50PPM	REF H10	* 144R4	0,25%	50PPM	REF H10	HOLCO	
2610922200	1,00		9X2K2	2%		4310R-101-222	* 9X2K2	2%		4310R-101-222	BOURNS	
2683712500	1,00		371.25	0,1%	25PPM	AVL	* 371.25	0,1%	25PPM	AVL	GEKA	
2693750000	1,00		3K75	0,1%	25PPM	AVL	* 3K75	0,1%	25PPM	AVL	GEKA	
2900001000	2,04		10R			5% NK3	* 10R			5% NK3	SOVCOR	
2900011000	1,02		100R			5% NK3	* 100R			5% NK3	SOVCOR	
2900014700	1,02		470R			5% NK3	* 470R			5% NK3	SOVCOR	
2900022200	5,10		2K2			5% NK3	* 2K2			5% NK3	SOVCOR	
2900032200	2,04		22K			5% NK3	* 22K			5% NK3	SOVCOR	

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN / SUPPLIER/DRAWING	NORME
2905014700	1,02		470R 5,08 CC 5% NK3	470R 5,08 CC 5% NK3	SOVCOR	RC-8U NFC 83230
3100000000	5,00		CONDENS CERAMIQUE A AJUSTER	CERAMIC CAPACITORS TO ADJUST	ADRET	
3100430000	2,00		1000PF TRAVERSEE 8020D4000400V	1000PF PINCH 8020D4000400V	BDBQ 5 STETTNER	
3120001000	3,06		10PF 2,5 'F' 2222 680 10 109	10PF 2,5 'F' 2222 680 10 109	COGECO	CE-13L TCE 13L
3120001500	1,02		15PF 2,5 'H' 2222 680 10 159	15PF 2,5 'H' 2222 680 10 159	COGECO	CE-13L TCE 13L
3120001800	2,04		18PF 2,5 'J' 2222 680 10 189	18PF 2,5 'J' 2222 680 10 189	COGECO	CE-13L TCE 13L
3120002200	2,04		22PF 2,5 'K' 2222 680 10 229	22PF 2,5 'K' 2222 680 10 229	COGECO	CE-13L TCE 13L
3120002700	2,04		27PF 2,5 'L' 2222 680 10 279	27PF 2,5 'L' 2222 680 10 279	COGECO	CE-13L TCE 13L
3120003300	2,04		33PF 2,5 2222 680 10 339	33PF 2,5 2222 680 10 339	COGECO	CE-13L TCE 13L
3120003900	1,02		39PF 2,5 2222 680 10 399	39PF 2,5 2222 680 10 399	COGECO	
3120004700	2,04		47PF 2,5 2222 680 10 479	47PF 2,5 2222 680 10 479	COGECO	CE-13L TCE 13L
3120005600	1,02		56PF 2,5 2222 680 10 569	56PF 2,5 2222 680 10 569	COGECO	CE-13L TCE 13L
3120006800	7,14		68PF 2,5 2222 680 10 689	68PF 2,5 2222 680 10 689	COGECO	CE-13L TCE 13L
3120008200	9,18		82PF 2,5 2222 680 10 829	82PF 2,5 2222 680 10 829	COGECO	CE-13L TCE 13L
3120011000	3,06		100PF 2,5 'N10' 2222 680 58 101	100PF 2,5 'N10' 2222 680 58 101	COGECO	CE-13L TCE 13L
3120011200	1,02		120PF 2,5 'N12' 2222 680 58 121	120PF 2,5 'N12' 2222 680 58 121	COGECO	CE-13L TCE 13L
3120011500	3,06		150PF 2,5 'N15' 2222 680 58 151	150PF 2,5 'N15' 2222 680 58 151	COGECO	CE-13L TCE 13L
3120011800	1,02		180PF 2,5 'N18' 2222 680 58 181	180PF 2,5 'N18' 2222 680 58 181	COGECO	CE-13L TCE 13L
3120012200	2,04		220PF 2,5 'N22' 2222 680 58 221	220PF 2,5 'N22' 2222 680 58 221	COGECO	CE-13L TCE 13L
3120013300	20,40		330PF 2,5 'N33' 2222 680 58 331	330PF 2,5 'N33' 2222 680 58 331	COGECO	CE-13L TCE 13L
3120021000	25,50		1 NF 2,5 2222 630 51 102	1 NF 2,5 2222 630 51 102	COGECO	CE-13L TCE 13L
3120095600	1,02		5,6PF 2,5'C' 2222 680 09 568	5,6PF 2,5'C' 2222 680 09 568	COGECO	
3120098200	4,08		8,2PF 2,5"E" 2222 680 09 828	8,2PF 2,5"E" 2222 680 09 828	COGECO	CE-13L TCE 13L
3150031000	28,56		10NF 5,08 63V G0X 767 14	10NF 5,08 63V G0X 767 14	LCC	
3224220000	1,00		0,22MMF 15(10%40V)POLYC CKB68	0,22MMF 15(10%40V)POLYC CKB68	GAM	
3224220200	3,00		0,22MMF 10,2 10% 40V CKM501	0,22MMF 10,2 10% 40V CKM501	EUROFARAD	
3232220000	1,02		2200PF 10(10%400V)222236855222	2200PF 10(10%400V)222236855222	COGECO	
3232220200	1,02		2200PF 5,08 10% IRD607	2200PF 5,08 10% IRD607	LCC	CPM-7 IAI
3232330000	1,02		3300PF 10(10%400V)222236855332	3300PF 10(10%400V)222236855332	COGECO	
3232470000	1,02		4700PF 10(10%400V)222236855472	4700PF 10(10%400V)222236855472	COGECO	
3233100000	1,02		10NF 10(10%400V)222236855103	10NF 10(10%400V)222236855103	COGECO	
3233330000	1,02		33NF 10(10%250V)222236845333	33NF 10(10%250V)222236845333	COGECO	
3233470000	1,02		47NF 10(10%250V)222236845473	47NF 10(10%250V)222236845473	COGECO	
3233470300	1,02		47NF 5,08 10% IRD607	47NF 5,08 10% IRD607	LCC	
3233680000	1,02		68NF 10(10%250V)222236845368	68NF 10(10%250V)222236845368	COGECO	
3234100000	2,04		0,1MMF 10(10%250V)222236845104	0,1MMF 10(10%250V)222236845104	COGECO	
3234100100	3,06		0,1MMF 7,5 20% 100V MKS4	0,1MMF 7,5 20% 100V MKS4	WIMA	
3300249000	1,00		249PF 7,6 2% 250V ... 59SP	249PF 7,6 2% 250V ... 59SP	GAM	
3300470000	1,00		470PF 7,6 5% 300V .. 59 SP	470PF 7,6 5% 300V .. 59 SP	GAM	
3301200100	2,00		2000PF 7,62 5% 250V .. 59 SP	2000PF 7,62 5% 250V .. 59 SP	GAM	
3500280000	1,00		470MMF 16V PROMISIC 031	470MMF 16V PROMISIC 031	SIC SAFCO	
3500430000	1,00		6800MMF 16V RELSIC 033	6800MMF 16V RELSIC 033	SIC SAFCO	
3500440000	2,00		3300MMF 40V RELSIC 033	3300MMF 40V RELSIC 033	SIC SAFCO	
3600050000	1,00		2/10 PF ... REF C010 808 23109	2/10 PF ... REF C010 808 23109	RTC (C010)	LNZ 106
3600070000	1,00		5,5/65PF JAUNE 2222 808 32659	5.5/65PF YELLOW 2222 808 32659	RTC(C010)	
3600120000	1,00		4/20 PF ....REF C010 808 23209	4/20 PF ....REF C010 808 23209	RTC(C010)	
3600150000	1,00		1,4/5,5PF GRISE C010 808-11558	1.4/5.5PF GREY C010 808-11558	RTC(C010)	
3700020000	4,08		1MMF/35V 5,08 .... STAND L TAG	1MMF/35V 5,08 .... STAND L TAG	STC	
3700080000	1,00		4,7MMF/10V L9 20%..... CTS13	4,7MMF/10V L9 20%..... CTS13	SPRAGUE	NFC-UTEC 83-112
3700100000	2,04		4,7MMF/35V 5,08 .. STAND L TAG	4,7MMF/35V 5,08 ...STAND L TAG	STC	
3700180000	52,02		22MMF/16V 5,08 ... STAND L TAG	22MMF/16V 5,08 ... STAND L TAG	STC	
3700250000	9,18		47MMF/6,3V 5,08 .. STAND L TAG	47MMF/6,3V 5,08 .. STAND L TAG	STC	
4000010000	2,04		LED ROUGE '5' ... REF CQV 20-4	RED LED '5' ..... REF CQV 20-4	SIEMENS	C
4000060000	1,00		LED VERTE '5' ... REF CQV 25-6	GREEN LED '5' ... REF CQV 25-6	SIEMENS	C

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION	*	PART DESCRIPTION	FOURNISSEUR/PLAN / SUPPLIER/DRAWING	N O R M E
4000070000	3,00		LED JAUNE '5' ... REF CQV 23-6	*	YELLOW LED '5' .. REF CQV 23-6	SIEMENS	C
4000140000	6,12		LED 5 SUPPORT REF HLHP-0103	*	BASE 5 LED ..... REF HLHP-0103	HP	C
4000200000	1,00		COUPLEUR OPTO 4N26	*	OPTO COUPLER 4N26	MOTOROLA	C
4101010500	1,00		MC 10105 P	*	MC 10105 P	MOTOROLA	D
4110740000	1,00		SN 7400 N	*	SN 7400 N	TEXAS	D
4110743800	1,00		SN 7438 N	*	SN 7438 N	TEXAS	D
4150740000	2,00		SN 74 LS 00 N 3	*	SN 74 LS 00 N 3	TEXAS	D
4150740200	1,00		SN 74 LS 02 N 3	*	SN 74 LS 02 N 3	TEXAS	D
4150742000	5,00		SN 74 LS 20 N 3	*	SN 74 LS 20 N 3	TEXAS	D
4150742600	2,00		SN 74 LS 26 N 3	*	SN 74 LS 26 N 3	TEXAS	D
4150748600	1,00		SN 74 LS 86 N 3	*	SN 74 LS 86 N 3	TEXAS	D
4150749000	2,00		SN 74 LS 90 N 3	*	SN 74 LS 90 N 3	TEXAS	D
4150749300	1,00		SN 74 LS 93 N 3	*	SN 74 LS 93 N 3	TEXAS	D
4157411200	10,00		SN 74 LS 112 N	*	SN 74 LS 112 N	'FU' TEXAS	D
4157413200	1,00		SN 74 LS 132 N 3	*	SN 74 LS 132 N 3	TEXAS	D
4157424400	2,00		SN 74 LS 244 N 3	*	SN 74 LS 244 N 3	TEXAS	D
4160400200	3,00		C-MOS 4002	*	C-MOS 4002	RTC	D
4160401400	1,00		C-MOS 4014	*	C-MOS 4014	RTC	D
4160401500	6,00		C-MOS 4015	*	C-MOS 4015	RTC	D
4160402300	1,00		C-MOS 4023	*	C-MOS 4023	RTC	D
4160402700	7,00		C-MOS 4027	*	C-MOS 4027	RTC	D
4160402800	1,00		C-MOS 4028	*	C-MOS 4028	RTC	D
4160404900	1,00		C-MOS 4049	*	C-MOS 4049	RTC	D
4160405000	4,00		C-MOS 4050	*	C-MOS 4050	RTC	D
4160405300	6,00		C-MOS 4053	*	C-MOS 4053	RTC	D
4160407000	1,00		C-MOS 4070	*	C-MOS 4070	RTC	D
4160407200	2,00		C-MOS 4072	*	C-MOS 4072	RTC	D
4160407600	10,00		C-MOS 4076	*	C-MOS 4076	RTC	D
4160408100	1,00		C-MOS 4081	*	C-MOS 4081	RTC	D
4160408200	1,00		C-MOS 4082	*	C-MOS 4082	RTC	D
4160408500	1,00		C-MOS 4085	*	C-MOS 4085	RTC	D
4160451800	3,00		C-MOS 4518	*	C-MOS 4518	RTC	D
4160452200	2,00		C-MOS 4522	*	C-MOS 4522	RTC	D
4160452600	2,00		C-MOS 4526	*	C-MOS 4526	RTC	D
4160455600	2,00		C-MOS 4556	*	C-MOS 4556	RTC	D
4160456000	2,00		C-MOS 4560 ..... MC 14560 BCP	*	C-MOS 4560..... MC 14560 BCP	MOTOROLA	D
4160456100	3,00		C-MOS 4561 ..... MC 14561 BCP	*	C-MOS 4561 ..... MC 14561 BCP	MOTOROLA	D
4160458500	4,00		C-MOS 4585	*	C-MOS 4585	'FU' RTC	D
4160473800	1,00		C-MOS 4738	*	C-MOS 4738	RTC	D
4164009700	7,00		C-MOS 40097	*	C-MOS 40097	RTC	D
4200090000	4,00		LM 741 CN B+ . DIP 8 PATTES ..	*	LM 741 CN B+ . DIP 8 PINS	NS	D
4200110000	2,00		TBA 673 MODULATEUR 4 QUADRANS.	*	TBA 673 MODULATOR 4 FACES	RTC	D
4200180000	2,00		LM 1458 N B+ DIP 8 PATTES	*	LM 1458 N B+ DIP 8 PINS	NS	D
4200220000	1,00		7806 UC REGUL.6V/1A TO220	*	7806 UC REGUL.6V/1A TO220	FAIRCHILD	D
4200260000	1,00		7805 UC 1A ..... REGULATEUR	*	7805 UC 1A ..... REGULATOR	FAIRCHILD	D
4200280000	1,00		7812 UC REGUL.12V/1A TO 220	*	7812 UC REGUL.12V/1A TO 220	FAIRCHILD	D
4200290000	1,00		MC 7912 CP REGUL.-12V/1A TO220	*	MC 7912 CP REGUL.-12V/1A TO220	MOTOROLA	D
4200320000	2,00		LF 356 N B+	*	LF 356 N B+	NS	D
4200330000	1,00		LM 318 N B+	*	LM 318 N B+	NS	D
4300040000	8,00		2 N 918	*	2 N 918	SGS	D
4300050000	10,20		2N2369 A	*	2N2369 A	MOTOROLA	D
4300070000	2,00		2N2894	*	2N2894	MOTOROLA	D
4300110000	14,28		BC560C /416C/415C/559C(BC214C)	*	BC560C /413C/415C/559C(BC214C)	RTC	D
4300130000	1,00		BFR 99	*	BFR 99	MOTOROLA	D

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN / SUPPLIER/DRAWING	NORME
4300150000	1,02		MPS 2369	MPS 2369	MOTOROLA	D
4300190000	20,40		BC550C /414C/413C/549C(BC184C)	BC550C /414C/413C/549C(BC184C)	RTC	D
4300570000	2,04		BC 327-25 TO 92 .....(2N2907)	BC 327-25 TO 92 .....(2N2907)	ITT	D
4300580000	3,06		BC 337-25 TO 92 ..... (2N2222)	BC 337-25 TO 92 ..... (2N2222)	ITT	D
4300600000	2,04		MPS 3640	MPS 3640	MOTOROLA	D
4300610000	2,04		BF 506	BF 506	MOTOROLA	D
4300720000	1,00		BFY 90	BFY 90	RTC	D
4400080000	1,00		2N4416 .....CODE ACHAT	2N4416 ..... PURCHASE CODE	*930849	D
4500020000	20,40		1N4151	1N4151	FU'ITT'	D
4500040000	13,26		1N4004	1N4004	ITT	D
4500310000	150,96		1 N 4448	1 N 4448	ITT	D
4500450000	10,18		BB 409 (STANDARD)	BB 409 (STANDARD)	SIEMENS	D
4500452200	9,18		BB 409 ENTRE 9&11,5PF A 11V CE	BB 409 INPUT 9&11.5PF A 11V IC	ADRET C.ENTREE.	D
4500540000	2,00		1N6263 DO35 (EX ESM247&246)	1N6263 (SUBSTIT. ESM247&246)	RTC	D
4600030000	3,06		ZPD5,1	ZPD5,1	ITT	D
4600050000	1,02		ZPD 6,2	ZPD 6,2	ITT	D
4600080000	2,04		ZPD6,8	ZPD6,8	ITT	D
4600170000	2,04		ZPD 10	ZPD 10	ITT	D
4800060000	7,00		2N2219	2N2219	RTC	D
4800080000	4,00		2N2905	2N2905	RTC	D
4900010000	2,04		DISSIPATEUR T 05 .. REF 207-AB	DISSIPATOR T 05 .. REF 207-AB	SPETELEC	
4900060000	2,04		DISSIPATEUR TO5-204	DISSIPATOR TO5-204	JERMYN	
4900070000	11,22		ENTRETOISE TO5 ..... TO5-001	SPACER TO5 ..... TO5-001	JERMYN	
4900080000	2,04		ENTRETOISE DE CI ..... MON 10L	PC SPACER ..... MON 10L	JERMYN	
4900130000	3,06		CALE TO 220 REF:AY537-490537	MICA QUOIN FOR TO 220 REF C75	GETELEC	
4900150000	1,02		16 SUPPORT NATTE 'S'CA-16S-TDS	16 MAT CONNECTOR 'S'CA-16S-TDS	EUROPAVIA	
4900180000	1,02		BRIDE DIP-LOCK CA 16 200 DL	BRIDLE DIP-LOCK CA 16 200 DL	EUROPAVIA	
4900220000	3,06		CANON ISOLANT TO 220 EPAUL.3,5	INSULATING CANNON 220 EP. 3.5	MOTOROLA	
4900250000	17,34		ENTRETOISE TO18-019D	SPACER TO18-019D	JERMYN	
4900310000	6,00		16 SUPPORT C.I. DIL J23-5016	16 CONNECTOR P.C. DIL J23-5016	JERMYN	
4900340000	1,00		40 SUPPORT C.I. DIL J23.5040	40 CONNECTOR P.C. DIL J23.5040	JERMYN	
5100060000	1,00		SUPPORT DE QUARTZ REF SQ2Z VFA	CRYSTAL SUPPORT REF SQ2Z VFA	UMD	
5100090000	1,00		CLIPS POUR QUARTZ SQ	CLIPS FOR CRYSTAL SQ	UMD	
5100550000	1,00		QUARTZ 5 MHZ .. REF JJ05E QC36	5 MHZ CRYSTAL . REF JJ05E QC36	HYQ	
5100620000	1,00		16MHZ (B HC35U) SP.3000-Y-3205	16MHZ (B.HC35U) SP.3000-Y-3205	QE	
5300460000	1,00		100MMH ORE 53870 DEL 1025-68	100MMH ORE 53870 DEL 1025-68	OREGA DELEVAN	
5400010000	19,76		EMBASE 7X7X12	SOCKET 7X7X12	SIRPM(NEOSID)	
5400030000	19,38		CAPOT METAL 7X7X12 .... TYPE 7	METAL COVERING 7X7X12 . TYPE 7	SIRPM(NEOSID)	
5400040000	8,32		POULIE F10B W3,9	PULLEY F10B W3.9	SIRPM(NEOSID)	
5400050000	13,26		CALE ISOLANTE NEOSID POUR CI .	NEOSID INSULATING QUOIN FOR PC	-940008	
5400070000	8,32		POULIE F2 W 3,9	PULLEY F2 W 3.9	SIRPM(NEOSID)	
5400090000	3,12		POULIE F40 W 3,9	PULLEY F40 W 3.9	SIRPM(NEOSID)	
5400240000	8,16		COUPELLE K06 F10B/H07	CUPEL K06 F10B/H07	SIRPM(NEOSID)	
5400270000	8,16		COUPELLE K06 F2/H 7	CUPEL H06 F2/H07	FRANCSID	
5400290000	3,06		COUPELLE K06-F40 DANS K07 B-CI	CUPEL K06-F40 IN K07 B-CI	SIRPM(NEOSID)	
5500020000	1,02		BOITIER POUR TORE	COLLET FOR TOROID	A940011	
5500030000	6,12		EPINGLE LAITON 65/100	BRASS PINCH 65/100	BOHIN	
5500110000	12,24		TUBE B30 GT 4,1X2X12,5	TUBE B30 GT 4.1X2X12.5	COFELEC	
5500170000	3,06		TORE 4B1 3,7X1,2X3,5	TORE 4B1 3.7X1.2X3.5	RTC	
5500210000	3,06		16 SUPPORT COMPOSANT CA-16P-02	16 COMPONENT SUPPORT CA-16P-02	EUROPAVIA	
5500220000	3,06		CAPOT POUR 550021 . 16-400-000	CAP FOR 550021 . 16-400-000	EUROPAVIA	
5500280000	1,02		TORE 3E2 6X4X2 REF432202097040	TORE 3E2 6X4X2 REF432202097040	RTC	
5500300000	12,24		3E2 4X2,2X1,1 REF432202097030	3E2 4X2.2X1.1 REF432202097030	RTC	
6100030600	25,50		TCB M3X 6 U DIN7985-4,8 INOX	TCB M3X 6 U DIN7985-4,8 INOX	BD (CRUCIFORME)	

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION		PART DESCRIPTION	FOURNISSEUR/PLAN / SUPPLIER/DRAWING	N O R M E
6100030800	30,60		TCB M3X 8 U DIN7985-4,8 INOX	*	TCB M3X 8 U DIN7985-4,8 INOX	BD	(CRUCIFORME)
6100031200	8,16		TCB M3X12 U DIN7985-4,8 INOX	*	TCB M3X12 U DIN7985-4,8 INOX	BD	(CRUCIFORME)
6100040600	6,12		TCB M4X 6 U DIN7985-4,6 INOX	*	TCB M4X 6 U DIN7985-4,6 INOX	DB	
6101031200	4,08		TF/90 M3X12 U DIN965-4,8 INOX	*	TF/90 M3X12 U DIN965-4,8 INOX	BD	(CRUCIFORM)
6101032000	3,06		TF/90 M3X20 U DIN965-4,8 INOX	*	TF/90 M3X20 U DIN965-4,8 INOX	BD	(CRUCIFORM)
6101040600	4,08		ACF 4 X 6 FRAISEE F/90'CRUCIF	*	ACF 4 X 6 FRAISEE F/90'CRUCIF	SAGIC	
6101041000	16,32		TF M4X10 U DIN965-5,6 INOX	*	TF M4X10 U DIN965-5,6 INOX	BD	(CRUCIFORME)
6101110400	1,02		TF M2,5X 4 U NFE27-113-5,6INOX	*	TF M2,5X 4 U NFE27-113-5,6INOX	BD	(FENDU)
6105041200	4,08		TRL M4X12T NFE27-128(CRUC)INOX	*	ACF 4 X12 'POELIERS' CRUCIF	BD	
6107020600	6,12		TCL 2,2X6,5 POINT.DIN7981BINOX	*	TCL 2.2X6.5 NIBBL.DIN7981BINOX	BD	(CRUCIFORME)
6107241900	2,04		N'4X19 ACI A TOLE F/80' CRUCIF	*	N'4X19 ACI A TOLE F/80' CRUCIF	SAGIC	
6130110400	16,32		LAD 2,5X 4 CYLINDRIQUE FENDUE	*	LAD 2,5X 4 CYLINDRIQUE FENDUE	SAGIC	
6130110500	6,12		LAD 2,5X 5 CYLINDRIQUE FENDUE	*	LAD 2.5 X 5 CYLINDER SLOT	SAGIC	
6130111000	2,04		LAD 2,5X10 CYLINDRIQUE FENDUE	*	LAD 2.5 X 10 CYLINDER SLOT ...	SAGIC	
6130121000	1,02		LAD 2 X10 CYLINDRIQUE FENDUE	*	LAD 2 X10 CYLINDRIQUE FENDUE	SAGIC	
6130121200	4,08		LAD 2 X12 CYLINDRIQUE FENDUE	*	LAD 2 X12 CYLINDRIQUE FENDUE	SAGIC	
6131120600	10,20		LAD 2 X 6 FRAISEE F/90'FENDUE	*	LAD 2 X 6 FRAISEE F/90'FENDUE	SAGIC	
6200010000	5,10		ECROU H M2,5 U NFE27-411-5INOX	*	NUT H M2.5 U NFE27-411-5 INOX	BD	HEXAGONAL USUEL
6200020000	13,26		ECROU H M2 U NF E27-411-5 INOX	*	NUT H M2 U NF E27-411-5 INOX .	BD	HEXAGONAL USU L
6200030000	20,40		ECROU H M3 U NF E27-411-5 INOX	*	NUT H M3 U NF E27-411-5 INOX .	BD	HEXAGONAL USU L
6200040000	22,44		ECROU H M4 U NF E27-411-5 INOX	*	NUT H M4 U NF E27-411-5 INOX .	BD	HEXAGONAL USUEL
6204030100	4,08		ACI 3 CAGE .. REF 4843B M3	*	STEEL 3 CAGE .. REF 4843B M3	RAPID	
6220010000	2,04		LAI 2,5 HEXAGONAL USUEL 'H'	*	BRASS 2.5 USUAL HEXAGON 'H'	SAGIC	
6255040000	2,04		NYL 4 HEXAGONALE	*	NYL 4 HEXAGON	SAGIC	
6300010000	8,16		Z 2,5U(5X0,5) NF E27-611 INOX	*	Z 2,5U(5X0,5) NF E27-611 INOX	BD	(PLATE ETROITE)
6300030000	4,08		Z 3U (6X0,8) NF E27-611 INOX	*	Z 3U (6X0,8) NF E27-611 INOX	BD	
6300030100	14,28		M 3U (8X0,8) NF E27-611 INOX	*	INOX M3 X 8X0.8 FLAT .... MEAN	BD	
6300031000	1,02		3,2X 7X 1 PLATE ..... INOX	*	3.2X 7X 1 FLAT ..... INOX	BD	
6301010000	2,04		DI 2,5 EVENTAIL NFE27-618 INOX	*	DI 2.5 FAN .... NFE27-618 INOX	BD	
6301020000	17,34		DI 2 EVENTAIL NFE 27-618 INOX	*	STEEL 2 FAN NFE 27-618 INOX	BD	
6303010000	2,04		ACI 2,5 ONDUFLEX REF 50025132	*	STEEL 2.5 ONDUFLEX REF50025132	NOMEL	
6303030000	12,24		ACI 3 ONDUFLEX REF 52030132	*	STEEL 3 ONDUFLEX REF 52030132	NOMEL	
6305030000	16,32		ACI 3 CONTACT REF 55-03-01	*	STEEL 3 CONTACT REF 55-03-01	NOMEL	
6305040000	18,36		ACI 4 CONTACT REF 55-04-01-32	*	STEEL 4 CONTACT REF55-04-01-32	NOMEL	
6360011000	5,10		BAK 2,6X 5X 1 PLATE 100A	*	BAK 2.6X 5X 1 PLATE 100A	MFOM	
6400020000	7,14		RIVET D 2,2 L 3,7 2237..2035	*	RIVET D 2.2 L 3.7 2237..2035	MFOM	
6400030000	3,06		RIVET D 3 L 4,2 3042	*	RIVET D 3 L 4.2 3042	MFOM	
6400040000	5,10		RIVET D 3 L 5 REF 3050	*	RIVET D 3 L 5 REF 3050	MFOM	
6400060000	8,16		RIVET D 1,2 L 2,4 XC 39	*	RIVET D 1.2 L 2.4 XC 39	MFOM	
6400080000	1,02		RIVET D 1,5 L 2,4 XC 42	*	RIVET D 1.5 L 2.4 XC 42	MFOM	
6400160000	2,04		COSSE A SOUDER 3,2 519	*	SOLDERING TERMINAL 3.2 ... 519	MFOM	
6400270000	7,14		PLOT A FOURCHE SERTI BFM13-16	*	SQUEEZED FORK CONTACT BFM13-16	COMATEL	
6400280000	26,52		PLOT A FOURCHE SOUDE . BFMQ13C	*	SOLDERED FORK CONTACT BFMQ13C	COMATEL	
6400350000	7,14		COSSE A SOUDER 2003E	*	SOLDERING TERMINAL 2003E	MFOM	
6400510000	5,10		EQUERRE 10X10 LARG 10 EP 1	*	ANGLEBRACKET10X10 WIDTH10 EP 1	A943051	
6400530000	22,44		OEILLET LAITON ..... N° 2070	*	FIXING EYELET BRASS .. N° 2070	MFOM	
6400540000	24,48		RIVET POP 2,4 L 5 ALU AD32-ABS	*	POP RIVET 2.4 L 5 ALU AD32-ABS	MFOM	
6400670000	2,04		RIVET POP 3,2 L 4 ALU ABS 41	*	POP RIVET 3.2 L 4 ALU ABS 41	MFOM	
6400680000	2,04		RIVET POP 3,2 L 7,5 ALU ABS 43	*	POP RIVET 3.2 L 7.5 ALU ABS 43	MFOM	
6400710000	0,18	M	BUS-BARRE PAS 12,7	*	BUS-BAR STEP 12.7	SEEM	
6400780000	20,40		RIVET D 20 L 4	*	RIVET D 20 L 4	MFOM	
6500530000	1,02		CAPUCHON GRIS D14 REF 040-3010	*	GREY CAP D14 REF 040-3010	ELMA	
6500570000	1,02		D21 CADRAN VIERGE D53 042-4020	*	D21 BLANK FACE D53 042-4020	ELMA	
6500580000	1,00		21 BOUTON BL/GRIS 6 050-4441	*	21 BL/GREY BUTTON 6 050-4441	ELMA	

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION	PART DESCRIPTION	FOURNISSEUR/PLAN / SUPPLIER/DRAWING	NORME
6500600000	1,02		21 CAPUCHON GR/CLAIR 040-4110	21 BRIGHT GREY CAP 040-4110	ELMA	
6500610000	1,02		10 CAPUCHON GR/CLAIR 040-2110	10 BRIGHT GREY CAP 040-2110	ELMA	
6500720000	1,00		10 BOUTON BL/GRIS 3 050-2141	10 BUT. BLUE/GREY 3 050-2141	ELMA	
6700200000	2,04		ENMET 2 L 5 M3X0,50 TT	ENMET 2 L 5 M3X0,50 TT	ACCEL	
6700830000	4,08		ENINT 1 L 20	ENINT 1 L 20	ACCEL	
6701240000	6,12		ENLIS 2 L 4	ENLIS 2 L 4	ACCEL	
6800220000	0,30	M	TIGE FILETEE M2 LAITON	THREADED PIN M2 BRASS	WEBER	G
6800330000	0,14	BI	TOLES E+I(SERVIR BOITE) 30EJ1	PLATES E+I(BOX LOCK) 30EJ1	METALIMPHY	G
6800340000	1,02		CARCASSE TRANSFO EJ 42 N°365	TRANSFO FRAME EJ 42 N°365	ISOLAPHONE	G
6800350000	9,18		PICOT N°7 TRANSFO	PICOT N°7 TRANSFO	ISOLAPHONE	G
6800360000	2,00		PIED 'AVANT'.... REF 10603-023	"FRONT" FOOT ... REF 10603-023	SCHROFF	G
6800370000	2,00		PIED'ARRIERE' .. REF 10603-024	"REAR" FOOT .... REF 10603-024	SCHROFF	G
6800900000	1,00		POINEE ..... REF PK 4	POINEE ..... REF PK 4	OPELEC	G
6900140000	0,19	BI	COLLE ARALDITE	ARALDITE GLUE	SODIEMA	G
6900160000	1,01	TB	COLLE D'ARRET ROUGE . 9036 BIS	RED STOP GLUE ..... 9036 BIS	MESPOULET	G
6900280000	0,01	BM	WUNNS SILICONE ..... REF 0217	WUNNS SILICONE ..... REF 0217	FIV	G
6900300000	0,05	M	SCOTCH ELECTRIQUE 19MM REF 33	ELECTRICAL SCOTCH 19MM REF 33	3M	G
6900320000	4,00	G	COLLE CYANILIT.....REF:IS496	CYANALIT GLUE.....REF:IS496	FIV	G
6900390000	2,05	FU	SCOTCHCAL PLASTIQUE NOIR 8015	BLACK PLASTIC SCOTCHCAL . 8015	3M	G
6900600000	0,20	M	RUBAN L9MMXE8MM.10M . REF 4774	SCOTCH L9MMXE8MM.10M REF 4774	TESA	G
7100134200	4,08		ENTRETOISE EQUERRE CONTACT 102	CONTACT BRACKET SPACER 102	*940069	F
7101120000	2,08		USINAGE.....	MACHINING.....	D940586	F
7106703400	1,00		USINAGE PANNEAU RACK 2X2230A	RACK PANEL MACHINING 2X2230A	A932493	F
7106703500	1,00		USINAGE PANNEAU RACK 1X2230A	RACK PANEL MACHINING 1X2230A	A932494	F
7106761400	1,00		CADRE USINE 2230A	MACHINED FRAME 2230A	ADRET	F
7106761500	1,00		FONDERIE CADRE 2230A	FRAME FOUNDRY 2230A	A920840	F
7615203200	1,00		BOITIER SC100 3 TOUCH 2 INVERS	BOITIER SC100 3 TOUCH 2 INVERS	OREOR	
7615204400	1,00		BOITIER SC100 4 TOUCH 4 INVERS	BOITIER SC100 4 TOUCH 4 INVERS	OREOR	
7615205200	1,00		BOITIER SC100 5 TOUCH 2 INVERS	BOX SC100 5 TOUCHS 2 REVERSERS	OREOR	
8000090000	2,04		ETIQUETTE SIGNALETIQUE . ADRET	LABEL ..... ADRET	A940006	E
8000121700	4,00		ECROU A RIVETE SUR CHAMP . 102	ECROU A RIVETE SUR CHAMP . 102	B940340	E
8000290000	3,00		BLINDAGE POUR NEOSID	SHIELDING FOR NEOSID	B940048	E
8006701200	1,00		PANNEAU OPTION 'B C D' . 2230A	'B C D' OPTION PANEL ... 2230A	B942187.A942185	E
8006702000	1,00		PANNEAU OPTION 'I E C' . 2230A	'I E C' OPTION PANEL ... 2230A	B942235.A942236	E
8006702100	1,00		PANNEAU CACHE OPTION ... 2230A	OPTION FLIPPER PANEL ... 2230A	A942253	E
8006703600	1,00		PANNEAU ARRIERE 1MHZ ... 2230A	1MHZ REAR PANEL 2230A	E932706.B932451	E
8006703700	1,00		COUVERCLE BLEU NUIT ALU 2230A	BLUE NIGHT COVER ALU 2230A	B921225.....	E
8006703800	1,00		FOND BLEU NUIT ..... ALU 2230A	BLUE NIGHT BACKGR. ALU 2230A	F921224.....	E
8006710100	3,00		CLOISON DE CARTE 2230A	BOARD DIVISION 2230A	A932170	E
8006710500	1,00		PLAQUE AVANT CHASSIS ... 2230A	CHASSIS FRONT PLATE 2230A	E932265	E
8006710600	1,00		FOND AMPLI-ATTENUATEUR . 2230A	AMPLI-ATT. BACKGROUND .. 2230A	E932163.....	E
8006710800	1,00		PLATINE AVANT AMPLI-ATTE 2230A	AMPLI-ATT.FRONT MOUNTING 2230A	D942100	E
8006710900	1,00		COUVERCLE AMPLI-ATTENUAT 2230A	AMPLI-ATTENUATOR COVER . 2230A	C932162	E
8006713600	6,00		GLISSIERE ... RACK 3U .. 2230A	SLIDEWAY .... RACK 3U .. 2230A	B920986	E
8006713700	1,00		EQUERRE DE FIXAT.R. 3U 1X2230A	ANGLE BRACKET RACK 3U 1X2230A	A932495	E
8006713800	1,00		EQUERRE DE FIXAT. R.3U 2X2230A	ANGLE BRACKET RACK 3U 2X2230A	A932496	E
8006721600	2,00		GLISSIERE HABILLAGE 2230A	LAGGING SLIDEWAY 2230A	C932358	E
8006722900	1,00		RADIATEUR CARRE 12 ..... 2230A	SQUARE 12 DISSIPATOR ... 2230A	A942290	E
8006733000	2,04		RONDELLE BNC 12X10X2 2230A	WASHER BNC 12X10X2 ..... 2230A	A942291	E
8006733100	2,00		FIXATION STANDARD IEC . 2230A	IEC STANDARD ANCHOR 2230A	C942347	E
8006740700	1,00		DIFFUSEUR CADRAN FREQU. 2230A	FREQUENCY DIAL DIFFUSER 2230A	A942239	E
8006763200	12,24		TOUCHE GRISE D6H11 OREOR 2230A	GREY TOUCH D6H11 OREOR 2230A	A942431	E
8006799900	1,00		PAN.AVANT 80067010-002 2230A	FRONT PANEL 80067010-002 2230A	ADRET	E
8014490000	22,44		PINCE ASSEMB CLOISON 1 9419548	1 DIVISION ASSEMB CLIP 9419548	B941954	E

REF ADRET / PART NUMBER	QTE / QTY	U / M	DESCRIPTION		PART DESCRIPTION	FOURNISSEUR/PLAN / SUPPLIER/DRAWING	NORME
8100120000	4,00		00 COLONNETTE A SERTIR 4500	*	00 PILLAR TO SQUEEZE 4500	ADRET	E
8101120000	2,04		ECROU A SERTIR M3 H4 NICKELE	*	NUT TO SQUEEZE M3 H4 NICKEL	91+71	E
8106701100	1,00		01CADRAN FREQUENCE 2230A	*	01 FREQUENCY DIAL 2230A	ADRET	E
8106703400	1,00		PANNEAU ADAPT RACK 3U 2X2230A	*	PANEL ADAPT RACK 3U 2X2230A	A932493	E
8106703500	1,00		PANNEAU ADAPT RACK 3U 1X2230A	*	PANEL ADAPT RACK 3U 1X2230A	A932494	E
8106710300	1,00		01 BAQ AMPLI ATTENUATEUR 2230A	*	01 ATTEN. AMPLI MODULE . 2230A	D920776	E
8106711300	2,00		FLASQUE LAT. CHASSIS ... 2230A	*	CHASSIS LAT. FLASK 2230A	F920846	E
8106761400	1,00		CADRE HABILLAGE 2230A	*	LAGGING FRAME 2230A	ADRET	E
9100120000	4,00		TRAIT CAD BIC DE LA COLON	*	TREATMENT CAD BIC OF PILLAR		F
9101120000	2,04		NICKELAGE 7101120000.....	*	NICKEL-PLATING TREATMENT	942667.....	F
9106701100	1,00		SERIGRAPHIE CADRAN FREQ 2230A	*	FREQUENCY DIAL ARTWORKING2230A	B942192	F
9106703400	1,00		PEINTURE PANNEAU RACK 2X2230A	*	RACK PANEL PAINTING 2X2230A	A932324	F
9106703500	1,00		PEINTURE PANNEAU RACK 1X2230A	*	RACK PANEL PAINTING 1X2230A	A932324	F
9106710300	1,00		USINAGE MONTAGE TRAIT .. 2230A	*	TREATMENT ASSE.MACHINING 2230A	C920776	F
9106711300	2,00		USINAGE MONTAGE TRAIT .. 2230A	*	TREATMENT ASSE.MACHINING 2230A	F920846	F
9106761400	1,00		PEINTURE CADRE 2230A	*	FRAME PAINTING 2230A	A942324	F
9106761500	1,00		USINAGE CADRE 2230A	*	FRAME MACHINING 2230A	C920844	F
9615203122	1,00		03 TOUCHES ORE 10 .MODE. 2230A	*	03 TOUCHES ORE 10 .MODE. 2230A	C932471	
9615204123	1,00		04 TOUCHES ORE 10 BAQSYM 2230A	*	04 TOUCHES ORE 10 BAQSYM 2230A	D932472	
9615205124	1,00		05 TOUCHES ORE 10 .TTL. 2230A	*	05 TOUCHES ORE 10 .TTL. 2230A	C932473	

ADRET ELECTRONIQUE®

Liste des sous-ensembles

M A I N T E N A N C E

R E C O M M E N D E D sub-assemblies

or PC board

ADRET ELECTRONIQUE®

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Telefax [illegible] • Telex ADRET 697421 F • [illegible]

REF ADRET / PART NUMBER	QTE QTY	DESCRIPTION	PART DESCRIPTION	SUPPLIER/DRAWING	NORME
		2230A			
0122309003	1	00 PROLONGATEUR 27 1 GEN 2230A	* 00 PROLONGATEUR 27 1 GEN 2230A	*932610.....	
0122309004	1	00 PROLONGATEUR 27 2 GEN 2230A	* 00 PROLONGATEUR 27 2 GEN 2230A	*932611.....	
0122309005	1	00 PROLONG. OPT.IEEE+BCD 2230A	* 00 PROLONG. OPT.IEEE+BCD 2230A	A93.....	
0122309006	1	00 PROLONG. CDE NIVEAU 2230A	* 00 PROLONG. CDE NIVEAU 2230A	A93.....	
0122309007	1	00 PROLONGATEUR AMPLI .. 2230A	* 00 PROLONGATEUR AMPLI .. 2230A	A93.....	

REF ADRET / PART NUMBER	QTE / QTY	DESCRIPTION		PART DESCRIPTION		SUPPLIER/DRAWING	NORME
			2230A				
0269050000	1	14 1ER GENERATION	2230A	* 14 FIRST GENERATION	2230A	M932502.A976905	
0269060000	1	17 2EME GENERATION	2230A	* 17 SECOND GENERATION ...	2230A	M932344.E976906	
0269070000	1	13 CARTE AMPLIFICATEUR .	2230A	* 13 AMPLIFIER BOARD	2230A	G932353.A976907	
0269080000	1	06 CARTE COMMANDE NIVEAU	2230A	* 06 LEVEL CONTROL BOARD .	2230A	G932349.A976908	
0269100000	1	11 BAQUET DE SORTIE	2230A	* 11 OUTPUT MODULE	2230A	J920871.C976910	
0270100000	1	04 BLOC ROUES CODEES ...	2230A	* 04 SPIN WHEELS BLOCK ...	2230A	D920933.....	
0422308301	1	08 OPTION 2 IEEE	2230A	* 08 OPTION 2 IEEE	2230A	F932565	
0422308302	1	03 OPTION 1 BCD	2230A	* 03 OPTION 1 BCD	2230A	A932555(2).....	

REF ADRET / PART NUMBER	QTE / QTY	DESCRIPTION	PART DESCRIPTION	SUPPLIER/DRAWING	NORME
		2230A			
0269070000	1	13 CARTE AMPLIFICATEUR . 2230A	* 13 AMPLIFIER BOARD 2230A	G932353.A976907	
0269100000	1	11 BAQUET DE SORTIE 2230A	* 11 OUTPUT MODULE 2230A	J920871.C976910	

REF ADRET / PART NUMBER	QTE / QTY	DESCRIPTION	*	PART DESCRIPTION	SUPPLIER/DRAWING	NORME
		2230A				
0206520000	1	00 8XBB 409 D1àD4&D11àD14 2230	*	00 8XBB 409 D1àD4&D11àD14 2230	ADRET 8/SACHET	
0270010000	1	02 ROUE CODEE EQUIPEE .. 2230A	*	02 FITTED SPIN WHEEL ... 2230A	*942914.....	
0270030100	1	09 COMMUTATEUR MODE 2230A	*	09 MODE SWITCH 2230A	J932523.B977003	
0281067428	1	CAPUCHON PERCE A 10,2 .. 2230A	*	BORED CAP TO 10.2 ..... 2230A	D942176	
1000270000	1	ALIMENTATION 2230A	*	POWER SUPPLY 2230A	E932214.....	
1520312200	1	03 TOUCHES ORE 10 .MODE. 2230A	*	03 TOUCHES ORE 10 .MODE. 2230A	C932471	
1520412300	1	04 TOUCHES ORE 10 BAQSYM 2230A	*	04 TOUCHES ORE 10 BAQSYM 2230A	D932472	
1520512400	1	05 TOUCHES ORE 10 .TTL. 2230A	*	05 TOUCHES ORE 10 .TTL. 2230A	C932473	
1600090000	1	RELAIS 2 INV. G2V-234P-NT.12DC	*	RELAYS 2 REV. G2V-234P-NT.12DC	OMRON	
1700020000	1	LUCIOLE M.MIDJET AN643 5V/75MA	*	BRIGHT FIREFLY ..AN643 5V/75MA	MAZDA	
1720004900	1	160MA FST6332 034-3409	*	160MA FST6332 034-3409	ARNOULD	
2122500500	1	4K7/10K LIN PK16-DCS 3X32+6X16	*	4K7/10K LIN PK16-DCS 3X32+6X16	MCB COUPER 3X26	
2130470000	1	47R 3/4" 15T CERMET 43 P	*	47R 3/4" 15T CERMET 43 P	SPECTROL	
2131470000	1	470R 3/4" 15T CERMET 43 P	*	470R 3/4" 15T CERMET 43 P	SPECTROL	
2132470000	1	4K7 3/4" 15T CERMET 43 P	*	4K7 3/4" 15T CERMET 43 P	SPECTROL	
2133100000	1	10K 3/4" 15T CERMET 43 P	*	10K 3/4" 15T CERMET 43 P	SPECTROL	PM63 T19P 932
2133220000	1	22K 3/4" 15T CERMET 43 P	*	22K 3/4" 15T CERMET 43 P	SPECTROL	PM63 T19P 932
2152100000	1	1 K T05 CERMET T 7 YA	*	1 K T05 CERMET T 7 YA	SFERNICE	
2152470000	1	4K7 T05 CERMET T 7 YA	*	4K7 T05 CERMET T 7 YA	SFERNICE	
2153100000	1	10K T05 CERMET T 7 YA	*	10K T05 CERMET T 7 YA	SFERNICE	AP8PY NFC 832
2153220000	1	22K T05 CERMET T 7 YA	*	22K T05 CERMET T 7 YA	SFERNICE	AP8PY NFC 832
2610922200	1	9X2K2 2% 4310R-101-222	*	9X2K2 2% 4310R-101-222	BOURNS	
3234100000	1	0,1MMF 10(10%250V)222236845104	*	0,1MMF 10(10%250V)222236845104	COGECO	
3500280000	1	470MMF 16V PROMISIC 031	*	470MMF 16V PROMISIC 031	SIC SAFCO	
3500430000	1	6800MMF 16V RELSIC 033	*	6800MMF 16V RELSIC 033	SIC SAFCO	
3500440000	1	3300MMF 40V RELSIC 033	*	3300MMF 40V RELSIC 033	SIC SAFCO	
3600050000	1	2/10 PF ... REF C010 808 23109	*	2/10 PF ... REF C010 808 23109	RTC (C010)	LNZ 106
3600070000	1	5,5/65PF JAUNE 2222 808 32659	*	5.5/65PF YELLOW 2222 808 32659	RTC(C010)	
3600120000	1	4/20 PF ....REF C010 808 23209	*	4/20 PF ....REF C010 808 23209	RTC(C010)	
3600150000	1	1,4/5,5PF GRISE C010 808-11558	*	1.4/5.5PF GREY C010 808-11558	RTC(C010)	
3700020000	1	1MMF/35V 5,08 .... STAND L TAG	*	1MMF/35V 5,08 .... STAND L TAG	STC	
3700080000	1	4,7MMF/10V L9 20%..... CTS13	*	4,7MMF/10V L9 20%..... CTS13	SPRAGUE	NFC-UTEC 83-1
3700100000	1	4,7MMF/35V 5,08 .. STAND L TAG	*	4,7MMF/35V 5,08 ...STAND L TAG	STC	
3700180000	2	22MMF/16V 5,08 ... STAND L TAG	*	22MMF/16V 5,08 ... STAND L TAG	STC	
3700250000	1	47MMF/6,3V 5,08 .. STAND L TAG	*	47MMF/6,3V 5,08 .. STAND L TAG	STC	
4000010000	1	LED ROUGE '5' ... REF CQV 20-4	*	RED LED '5' ..... REF CQV 20-4	SIEMENS	
4000060000	1	LED VERTE '5' ... REF CQV 25-6	*	GREEN LED '5' ... REF CQV 25-6	SIEMENS	
4000070000	1	LED JAUNE '5' ... REF CQV 23-6	*	YELLOW LED '5' .. REF CQV 23-6	SIEMENS	
4000140000	1	LED 5 SUPPORT REF HLHP-0103	*	BASE 5 LED .... REF HLHP-0103	HP	
4000200000	1	COUPLEUR OPTO 4N26	*	OPTO COUPLER 4N26	MOTOROLA	
4101010500	1	MC 10105 P	*	MC 10105 P	MOTOROLA	
4110740000	1	SN 7400 N	*	SN 7400 N	TEXAS	
4110743800	1	SN 7438 N	*	SN 7438 N	TEXAS	
4150740000	1	SN 74 LS 00 N 3	*	SN 74 LS 00 N 3	TEXAS	
4150740200	1	SN 74 LS 02 N 3	*	SN 74 LS 02 N 3	TEXAS	
4150742000	1	SN 74 LS 20 N 3	*	SN 74 LS 20 N 3	TEXAS	
4150742600	1	SN 74 LS 26 N 3	*	SN 74 LS 26 N 3	TEXAS	
4150748600	1	SN 74 LS 86 N 3	*	SN 74 LS 86 N 3	TEXAS	
4150749000	1	SN 74 LS 90 N 3	*	SN 74 LS 90 N 3	TEXAS	
4150749300	1	SN 74 LS 93 N 3	*	SN 74 LS 93 N 3	TEXAS	
4157411200	1	SN 74 LS 112 N	*	SN 74 LS 112 N	'FU' TEXAS	
4157413200	1	SN 74 LS 132 N 3	*	SN 74 LS 132 N 3	TEXAS	
4157424400	1	SN 74 LS 244 N 3	*	SN 74 LS 244 N 3	TEXAS	
4160400200	1	C-MOS 4002	*	C-MOS 4002	RTC	
4160401400	1	C-MOS 4014	*	C-MOS 4014	RTC	
4160401500	1	C-MOS 4015	*	C-MOS 4015	RTC	
4160402300	1	C-MOS 4023	*	C-MOS 4023	RTC	
4160402700	1	C-MOS 4027	*	C-MOS 4027	RTC	
4160402800	1	C-MOS 4028	*	C-MOS 4028	RTC	
4160404900	1	C-MOS 4049	*	C-MOS 4049	RTC	
4160405000	1	C-MOS 4050	*	C-MOS 4050	RTC	
4160405300	1	C-MOS 4053	*	C-MOS 4053	RTC	
4160407000	1	C-MOS 4070	*	C-MOS 4070	RTC	
4160407200	1	C-MOS 4072	*	C-MOS 4072	RTC	
4160407600	1	C-MOS 4076	*	C-MOS 4076	RTC	
4160408100	1	C-MOS 4081	*	C-MOS 4081	RTC	
4160408200	1	C-MOS 4082	*	C-MOS 4082	RTC	
4160408500	1	C-MOS 4085	*	C-MOS 4085	RTC	
4160451800	1	C-MOS 4518	*	C-MOS 4518	RTC	
4160452200	1	C-MOS 4522	*	C-MOS 4522	RTC	
4160452600	1	C-MOS 4526	*	C-MOS 4526	RTC	
4160455600	1	C-MOS 4556	*	C-MOS 4556	RTC	
4160456000	1	C-MOS 4560 ..... MC 14560 BCP	*	C-MOS 4560..... MC 14560 BCP	MOTOROLA	
4160456100	1	C-MOS 4561 ..... MC 14561 BCP	*	C-MOS 4561 ..... MC 14561 BCP	MOTOROLA	
4160458500	1	C-MOS 4585	*	C-MOS 4585	'FU' RTC	
4160473800	1	C-MOS 4738	*	C-MOS 4738	RTC	
4164009700	1	C-MOS 40097	*	C-MOS 40097	RTC	

REF ADRET PART NUMBER	QTE QTY	DESCRIPTION	*	PART DESCRIPTION	SUPPLIER/DRAWING	NORME
4200090000	1	LM 741 CN B+ . DIP 8 PATTES ..	*	LM 741 CN B+ . DIP 8 PINS	NS	
4200110000	1	TBA 673 MODULATEUR 4 QUADRANS.	*	TBA 673 MODULATOR 4 FACES	RTC	
4200180000	1	LM 1458 N B+ DIP 8 PATTES	*	LM 1458 N B+ DIP 8 PINS	NS	
4200220000	1	7806 UC REGUL.6V/1A TO220	*	7806 UC REGUL.6V/1A TO220	FAIRCHILD	
4200260000	1	7805 UC 1A ..... REGULATEUR	*	7805 UC 1A ..... REGULATOR	FAIRCHILD	
4200280000	1	7812 UC REGUL.12V/1A TO 220	*	7812 UC REGUL.12V/1A TO 220	FAIRCHILD	
4200290000	1	MC 7912 CP REGUL.-12V/1A TO220	*	MC 7912 CP REGUL.-12V/1A TO220	MOTOROLA	
4200320000	1	LF 356 N B+	*	LF 356 N B+	NS	
4200330000	1	LM 318 N B+	*	LM 318 N B+	NS	
4300040000	1	2 N 918	*	2 N 918	SGS	
4300050000	1	2N2369 A	*	2N2369 A	MOTOROLA	
4300070000	1	2N2894	*	2N2894	MOTOROLA	
4300110000	1	BC560C /416C/415C/559C(BC214C)	*	BC560C /413C/415C/559C(BC214C)	RTC	
4300130000	1	BFR 99	*	BFR 99	MOTOROLA	
4300150000	1	MPS 2369	*	MPS 2369	MOTOROLA	
4300190000	1	BC550C /414C/413C/549C(BC184C)	*	BC550C /414C/413C/549C(BC184C)	RTC	
4300570000	1	BC 327-25 TO 92 .....(2N2907)	*	BC 327-25 TO 92 .....(2N2907)	ITT	
4300580000	1	BC 337-25 TO 92 ..... (2N2222)	*	BC 337-25 TO 92 ..... (2N2222)	ITT	
4300600000	1	MPS 3640	*	MPS 3640	MOTOROLA	
4300610000	1	BF 506	*	BF 506	MOTOROLA	
4300720000	1	BFY 90	*	BFY 90	RTC	
4400080000	1	2N4416 .....CODE ACHAT	*	2N4416 ..... PURCHASE CODE	*930849	
4500020000	1	1N4151	*	1N4151	FU'ITT'	
4500040000	1	1N4004	*	1N4004	ITT	
4500310000	4	1 N 4448	*	1 N 4448	ITT	
4500450000	1	BB 409 (STANDARD).....	*	BB 409 (STANDARD).....	SIEMENS	
4500452200	1	BB 409 ENTRE 9&11.5PF A 11V CE	*	BB 409 INPUT 9&11.5PF A 11V IC	ADRET C.ENTREE.	
4500540000	1	1N6263 DO35 (EX ESM247&246)	*	1N6263 (SUBSTIT. ESM247&246)	RTC	
4600030000	1	ZPD5,1	*	ZPD5,1	ITT	
4600050000	1	ZPD 6,2	*	ZPD 6,2	ITT	
4600080000	1	ZPD6,8	*	ZPD6,8	ITT	
4600170000	1	ZPD 10	*	ZPD 10	ITT	
4800060000	1	2N2219	*	2N2219	RTC	
4800080000	1	2N2905	*	2N2905	RTC	
5300460000	1	100MMH ORE 53870 DEL 1025-68	*	100MMH ORE 53870 DEL 1025-68	OREGA DELEVAN	
6500530000	1	CAPUCHON GRIS D14 REF 040-3010	*	GREY CAP D14 REF 040-3010	ELMA	
6500570000	1	D21 CADRAN VIERGE D53 042-4020	*	D21 BLANK FACE D53 042-4020	ELMA	
6500580000	1	21 BOUTON BL/GRIS 6 050-4441	*	21 BL/GREY BUTTON 6 050-4441	ELMA	
6500600000	1	21 CAPUCHON GR/CLAIR 040-4110	*	21 BRIGHT GREY CAP 040-4110	ELMA	
6500610000	1	10 CAPUCHON GR/CLAIR 040-2110	*	10 BRIGHT GREY CAP 040-2110	ELMA	
6500720000	1	10 BOUTON BL/GRIS 3 050-2141	*	10 BUT. BLUE/GREY 3 050-2141	ELMA	

Garantie et Assistance - Warranty and Assistance

Ce produit ADRET ELECTRONIQUE est garanti pour une durée d'un an à compter de la date de livraison.

La garantie s'applique aux appareils ayant subi des dommages mécaniques causés lors de l'expédition en partance de ADRET ELECTRONIQUE ou présentant, à la suite de défaillance d'un élément ou d'un sous-ensemble, des caractéristiques non conformes aux spécifications techniques. Sont toutefois exclus de la garantie les dommages occasionnés par une utilisation anormale de l'instrument.

Le client s'engage, pour sa part, à ne pas intervenir sur le produit pendant la période de garantie sous peine de la perdre définitivement. Le retour et la réexpédition de l'appareil lors d'une opération de maintenance sous garantie sont pris en charge pour moitié par ADRET ELECTRONIQUE.

Passé le délai de garantie, la Société reste bien entendu au service de ses clients en leur offrant son concours pour toutes éventuelles opérations de maintenance.

Pour tous renseignements complémentaires, veuillez contacter votre représentant ADRET le plus proche, les coordonnées de nos principaux agents étant données dans le tableau ci-dessous.

The ADRET ELECTRONIQUE product is guaranteed for a period of one year from the date of delivery.

The warranty applies to equipment with mechanical damage sustained during shipping from ADRET ELECTRONIQUE, or failing to conform to the technical specification due to faulty components of sub-assemblies. The warranty does not cover damage caused by incorrect use of the instrument.

The client for his part undertakes not to interfere with the equipment during the warranty period, failing which the warranty is rendered void. One half of the cost of returning and re-shipping the equipment for maintenance under warranty will be met by ADRET ELECTRONIQUE.

After expiry of the warranty period, the Company will of course remain at the service of its customers and will offer its help to them for any maintenance work that may be necessary.

For any further information, please contact your nearest ADRET representative. The addresses of our main agents are given in the table below.

Réseau commercial ADRET - ADRET commercial network

FRANCE

Société BASCOUL ELECTRONIQUE
31200 TOULOUSE - 35, rue du luchet
Tél : 61 48 99 29 - Télex : 521 508
33600 BORDEAUX PESSAC - 76 Avenue Pasteur
Tél : 56 45 01 90 - Télex : 541 720

Société DIMEL Immeuble "Le Marino"
83000 TOULON - Avenue Claude Farrère
Tél : 94 41 49 63 - Télex 430 093

JCF ELECTRONIQUE
74019 ANNECY CEDEX - Annecy le Vieux - BP 964
Tél : 50 23 63 64 - Télex : 385 417

Société SOREDIA
"Les Guittais" - Chatillon sur Seiche
35015 RENNES CEDEX - BP 1413
Tél : 99 50 50 29 - Télex : 950 359

AFRIQUE DU SUD - SOUTH AFRICA

K.B.A. INSTRUMENTATION PTY
P O BOX 41062 - Avenue Sandton 2199
CRAIGHALL TRANSVAAL 2024
Tél : (11) 788 1700/05 - Télex : 422 033

ALLEMAGNE - GERMANY

S.P.E.A. GmBh - Schützenweg 62
D 6305 GROSSEN BUSECK
Tél : (64) 08 2081 Code 299 - Télex : 484 296

ARGENTINE - ARGENTINA

RAYO ELECTRONICA
1092 BUENOS AIRES - Belgrano 990
Tél : (01) 381779 - Télex : 22153

AUSTRALIE - AUSTRALIA

VICOM INTERNATIONAL PTY
57 City Road - South Melbourne
VICTORIA 3205
Tél : (03) 626 931 - Télex : 36935
Telefax : (61) 3622325

AUTRICHE et EUROPE DE L'EST - EAST EUROPE

S.P.E.A. GES.m.b.H. Stiftgasse 27
A 1100 WIEN - Tél : (222) 62 61 41
Telex : 116 084

BELGIQUE et LUXEMBOURG - Belgium and Luxembourg

SAIT ELECTRONICS
B 1190 BRUXELLES - 66 Chaussée de Ruisbroek
Tél : (02) 376 20 30 Code 280 - Télex : 61807

BRESIL - BRAZIL

GRADIENTE ELECTRONICA LTDA
Staub Agency Division - Rua Sorocaba 316
CEP 22271 BOTAFOGO - RIO DE JANEIRO
Tél : (21) 286 8722 - Télex : 21 21131

CANADA

AIM ELECTRONICS INC
376 Churchill Avenue - Suite 108
OTTAWA - ONTARIO K1Z 5C3
Tél : (613) 7228286 Code 284
(514) 3322762 (Montréal) - Télex : 534862

DANEMARK - DENMARK

METRIC A.S.
Skodsborgvej 305 - D. K. 2850 - NAERUM
Tél : (02) 80 4200 Code 285 - Télex : 37163

ESPAGNE - SPAIN

TELCO
Gravina 27 - MADRID
Tél : (01) 231 71 01 Code 279 - Télex : 27348

ETATS-UNIS - UNITED STATES

COMSTRON CORP
10 Hub Drive - MELVILLE - NEW YORK 11747
Tél : (516) 756 1100
Télex : 4973525
Telefax : (516) 756 1167

FINLANDE - FINLAND

ORBIS OY
Sorolantie 16 - P O BOX 15 - 00421 HELSINKI 42
Tél : (358) 05664066 Code 283 - Télex : 123134

GRANDE-BRETAGNE - GREAT BRITAIN

RACAL DANA
Duke Street - WINDSOR BERKS SL4 1SB
Tél : (75) 38 68 101 Code 274 - Télex : 847013

GRECE - GREECE

SCIENTIFIC ENTERPRISES C.O.
45, Agion Saranta St - 18 346 ATHENES
Tél : (1) 482 34 21 - Télex : 221770

HONG KONG

I N F A
19 Austin Road - TSIMSHATSUI, KOWLOON - HONG KONG
Tél : (852) 5 7211151 - Télex : 54016

INDE - INDIA

HINDUSTAN INSTRUMENTS LTD
603 Vishal Bhavan - 95 Nehru Place
NEW DELHI 110 019
Tél : (11) 6410529 - Télex : 31 61209

ITALIE

LP INSTRUMENTS
Paolo Pallia 5 - 20139 MILANO
Tél : (02) 5392440 Code 277 - Télex : 315085

KOWEIT - MOYEN ORIENT

ABDUL AZIZ YOUSUF ESSA et CO WLL
P O BOX 3562 - SAFAT
Télex : 23576

NORVEGE - NORWAY

TERCO A.S.
P O BOX 98 - N 1540 VESTBY
Tél : (02) 951000 Code 287 - Télex : 74464

NOUVELLE ZELANDE - NEW ZEALAND

NEECO
17 Adelaide Road - P O BOX 9749
NEWTOWN WELLINGTON
Tel : (64) 4858689 - Telex : NX 3582
Telefax : (64) 4850510

PAYS-BAS - NETHERLAND

CN ROOD BV
11.13. Cort V.D Lindenstraat - P O BOX 42
2280 RIJSWIJK
Tél : (70) 996 360 Code 281 - Télex 31238

PORTUGAL

RUALDO LDA
9 - 15 Rua de San Jose - 1198 LISBOA CODEX
Tél : (01) 373461 Code 286 - Télex : 16447

REP. POPULAIRE DE CHINE - CHINA

COMPAGNIE OLIVIER
Peking Hôtel - Gui Bin Shi n°3 - BEIJING
Télex : 22375

SINGAPOUR - SINGAPORE

COSMOTEC ENTERPRISES LTD
70 Bendemeer Road - Hiap Huat House 05-04
SINGAPOUR 1233
Tél : (65) 2967766 - Télex 36992

SUEDE - SWEDEN

SAVEN AB
Nytorpsvagen 30 - P O BOX 504 - S 18325 TABY
Tél : 87921100 Code 282 - Télex : 12986

SUISSE - SWITZERLAND

AMOTEC ELECTRONIC AG
RoftluhstraBe 38 - 8702 ZOLLIKON
Tél : (01) 3915630 - Télex : 816906
Telefax : (01) 3915633

TAIWAN

CATHAY ENTERPRISE CO Ltd
P O BOX 1778 - 102 Thun hua Road - TAITEI
Tél : (886) 7310558 - Télex : 22392
Telefax : (886) 7732227