Schlumberger

TECHNICAL MANUAL

851

Plug-in

5532

ENERTEC
Schlumberger

ENERTEC
DÉPARTEMENT INSTRUMENTS
5, RUE DAGUERRE 42030 SAINT-ÉTIENNE
CEDEX FRANCE TÉL (77) 25 22 64
TÉLEX 330696 CIRCE STETN
ADRESSE TÉLÉGRAPHIQUE CIRCE ST-ÉTIENNE

TECHNICAL MANUAL

851

Plug-in

5532

780911

790208

TABLE OF CONTENTS

PAGES	
	PLATES
P1	Front view
P2	Right side view
P3	Left side view
P4	Printed circuit card Z1
P5	Printed circuit cards Z2, Z3 and Z4
PAGES	**1. - TECHNICAL SPECIFICATIONS**
1	1.1 . - Introduction
	1.2 . - Sensitivity
	1.3 . - Bandwidth
2	1.4 . - Inputs A and B
	1.5 . - Interaction and delay between channels
	1.6 . - Operating modes
3	1.7 . - Trigger modes
	1.8 . - Ambient conditions
	1.9 . - Dimensions and weight
4	1.10. - Accessories
	2. - OPERATION
5	2.1 . - Preparation for use
	2.2 . - Control description
7	2.3 . - Balancing and gain adjustment
	2.3.1. - Input balancing
	2.3.2. - Gain adjustment
	2.4 . - Input coupling mode
	2.5 . - Vertical deflection factor
8	2.6 . - X5 Gain multiplier (channel A)
	2.7 . - Display polarity inversion (channel B)
	2.8 . - Y display mode selector
	2.8.1. - Single trace operation
9	2.8.2. - Dual trace operation
	2.8.3. - Algebraic sum
	2.9 . - Triggering

PAGES	3. - DESCRIPTION OF CIRCUITS
11	3.1 . - General principle
	3.1.1. - Attenuation and input stage
	3.1.2. - Y amplification
13	3.1.3. - Internal trigger source
	3.1.4. - Logic
	3.2 . - Attenuatord and input stages
	3.2.1. - Channel A input connection
14	3.2.2. - Channel A attenuators
15	3.2.3. - Channel A impedance
	3.2.4. - Channel B input - attenuator - impedance converter
	3.3 . - Channel A and B preamplifiers
16	3.3.1. - Channel A preamplifier
	3.3.2. - Channel B preamplifier
	3.3.3. - Channel switching
17	3.3.4. - Preamplifier A and B output circuit
	3.4 . - Common Y amplifier
18	3.5 . - Trigger amplifiers
	3.5.1. - Channel A trigger preamplifier
	3.5.2. - Channel B trigger preamplifier
19	3.5.3. - Trigger selector
20	3.6 . - Logic control
	3.6.1. - Y Mode
22	3.6.2. - Trigger mode
22bis	Annex : description of integrated circuit A250
	4. - MAINTENANCE
25	4.1 . - Maintenance of front panel
	4.2 . - Equipment required for adjustment and trouble-shooting
26	4.3 . - Access to internal elements
	4.3.1. - Side panels
	4.3.2. - Disassembly of printed circuits
27	4.4 . - Trouble-shooting
28	4.4.1. - Defective channel switching
29	4.4.2. - Vertical centering impossible
30	4.4.3. - Faulty triggering
31	4.5 . - Complete calibration
	4.5.1. - Balancing channels A and B
32	4.5.2. - Gain adjustment
33	4.5.3. - Pulse adjustment
34	4.5.4. - Adjustment of triggering
35	4.5.5. - Input attenuator correction

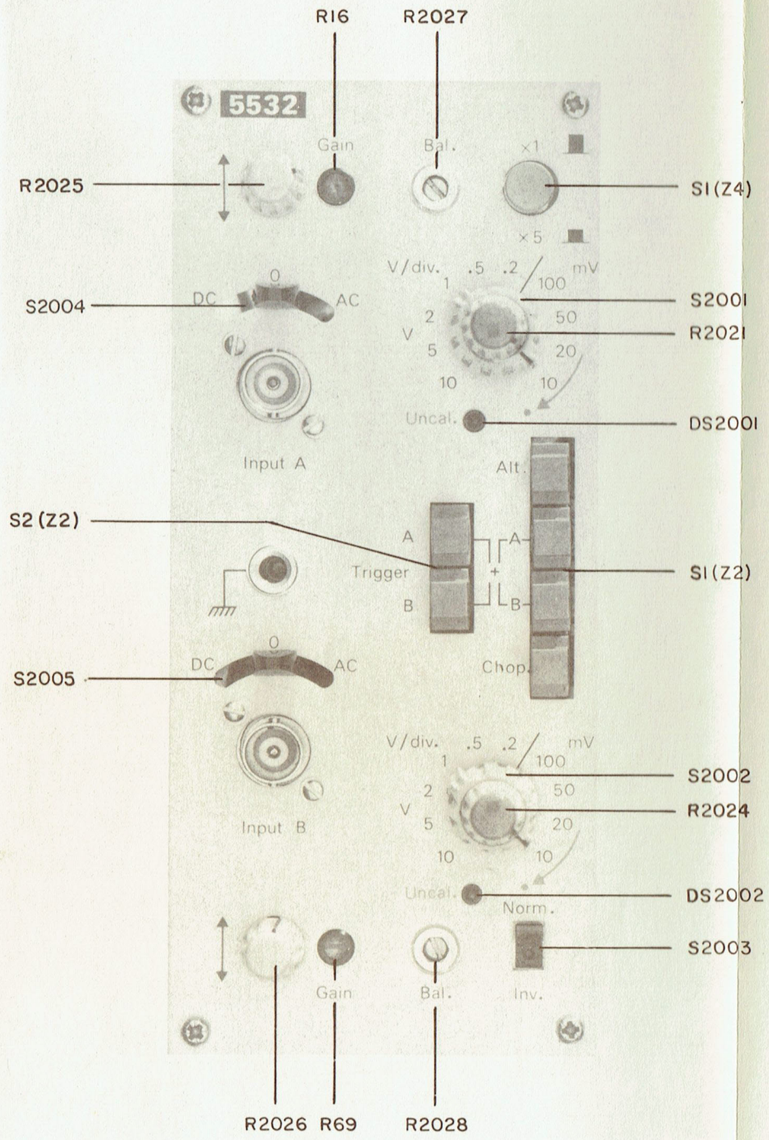
5. - SCHEMATICS

FIG.

1	Interconnection
2a	Channel A input
2b	Channel B input
3	Y amplifier - Y trigger selector
4	Y and trigger logic
5	A and B trigger preamplifier
6	Mode selector - Rear connector

6. - PARTS LIST

FRONT VIEW



Date 24 - 01 - 77	Dessiné par
Commandes exécutées	
Cde nº	App. nº

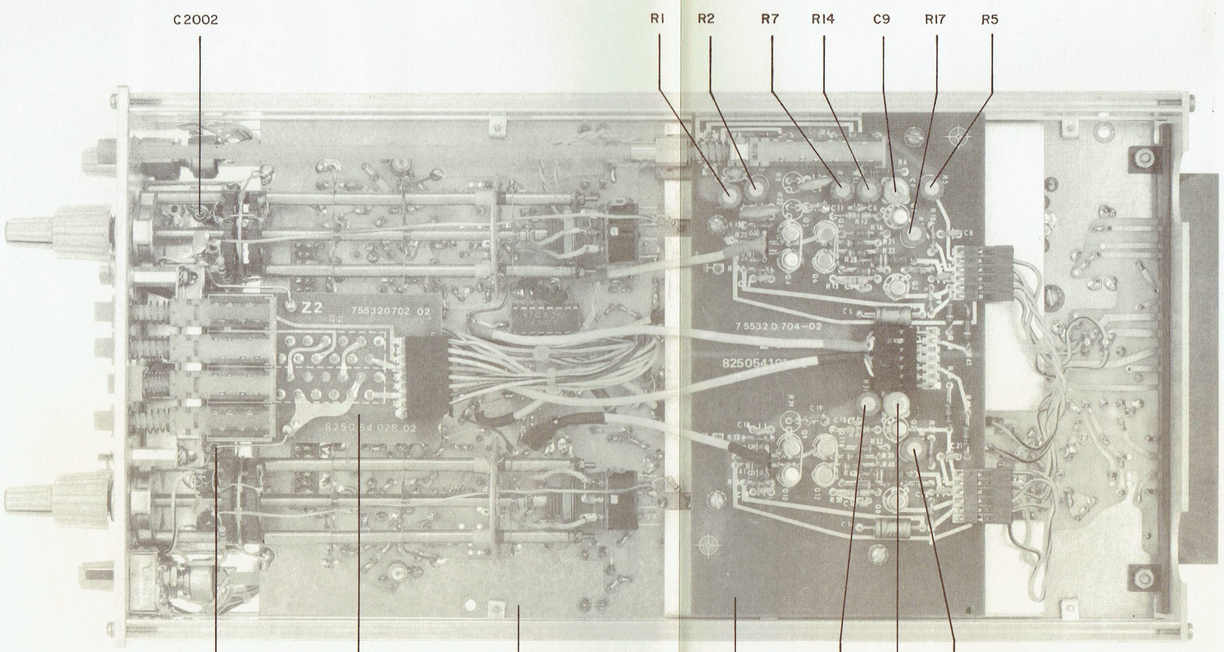
COMPTEURS
Schlumberger

Référence 5532

P1

6-5532-0822

VUE DE DROITE *RIGHT SIDE VIEW*



P2

Date 20 - 09 - 77 | Dessiné par

Commandes exécutées

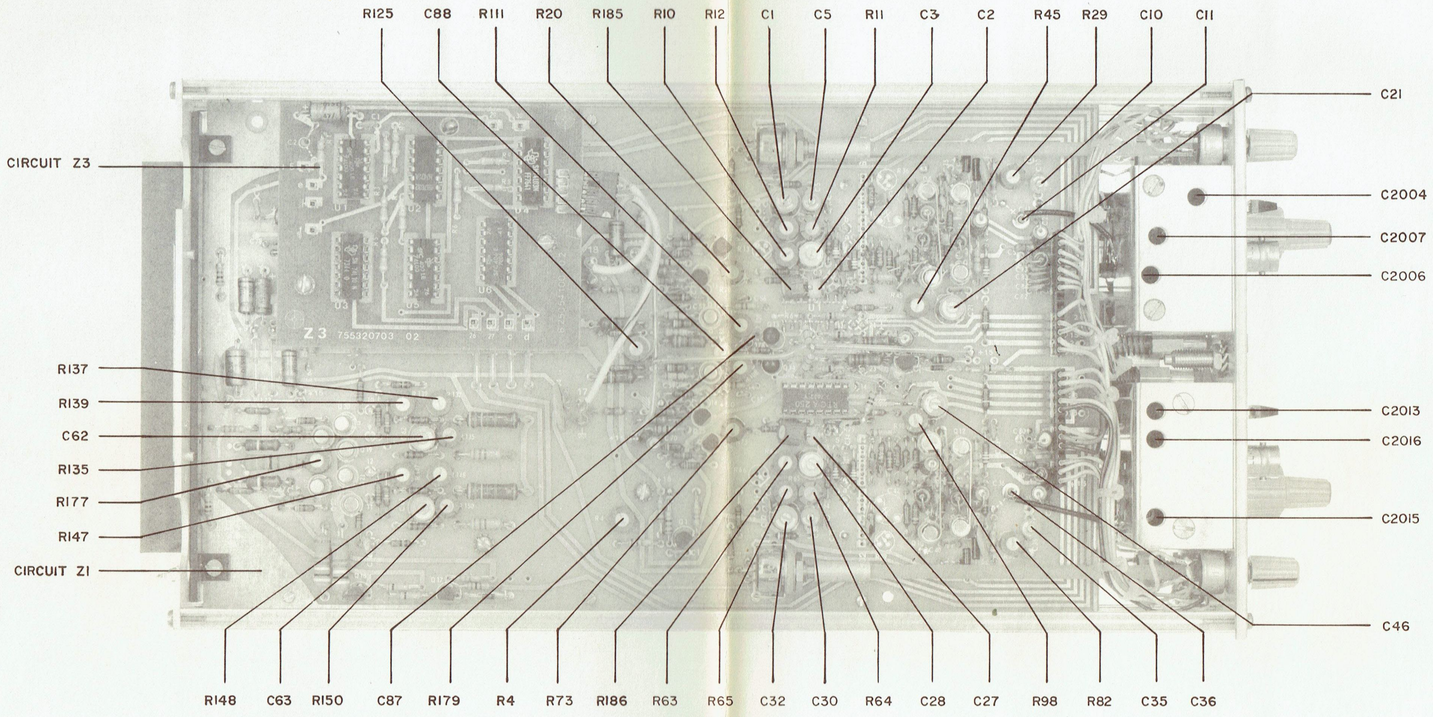
Cde nº | App. nº

COMPTEURS
Schlumberger

Référence 5532

6-5532-0823

VUE DE GAUCHE *LEFT SIDE VIEW*



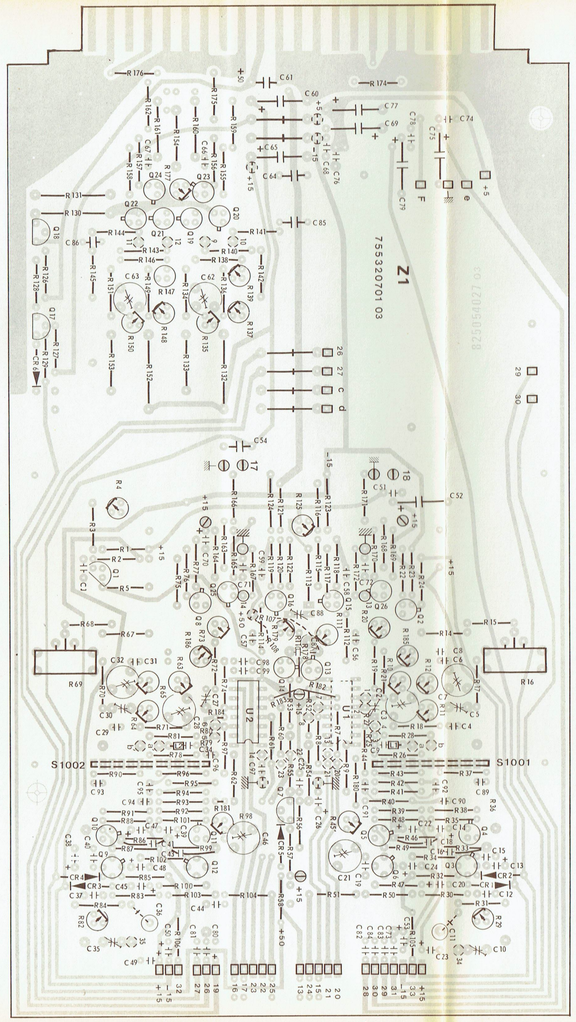
P3

Date 20 - 09 - 77	Dessiné par
Commandes exécutées	
Cde nº	App. nº

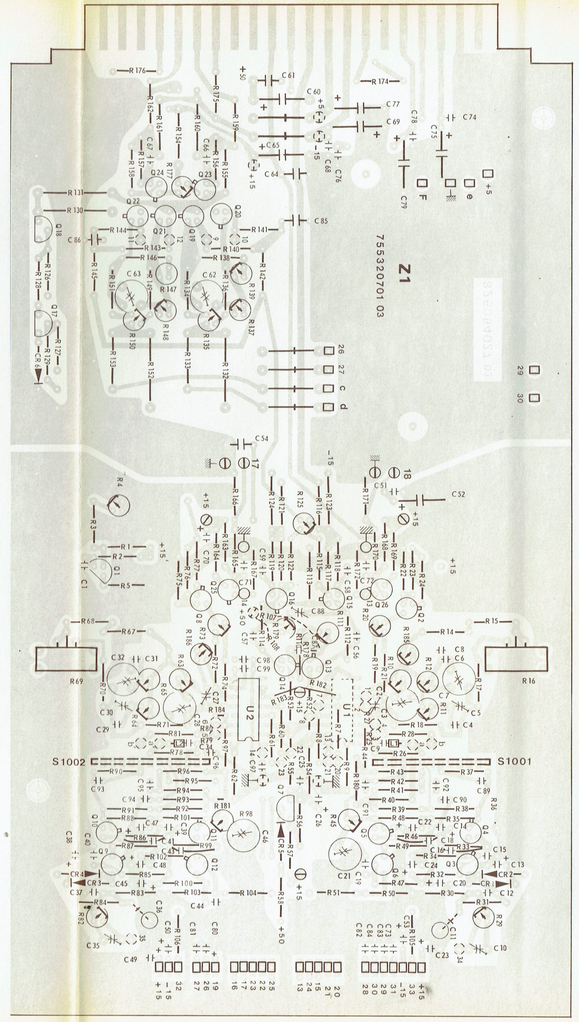
COMPTEURS
Schlumberger

Référence 5532

CIRCUIT IMPRIME Z1 *PRINTED CIRCUIT*



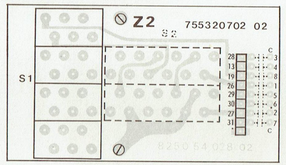
Coté composants *Components face*



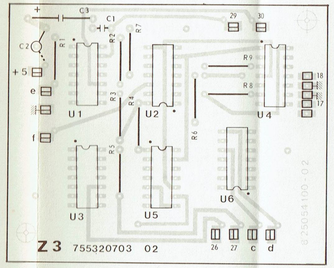
Date	Dessiné par
Commandes exécutées	
Cde nº	App. nº

COMPTEURS
Schlumberger

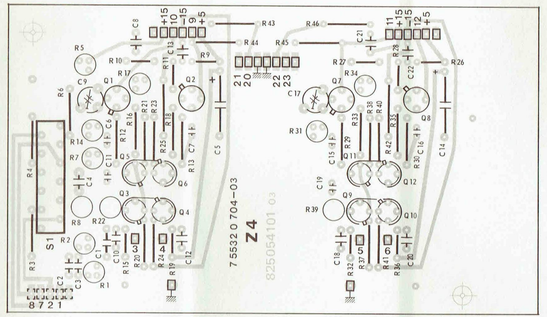
Référence **5532**



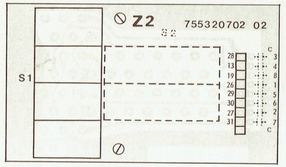
Coté composants
Components face

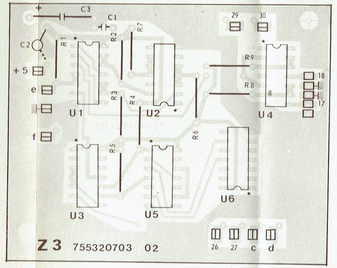


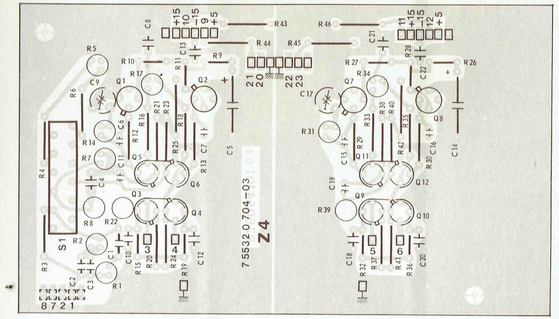
Coté composants
Components face



Coté composants
Components face







Date

Dessiné par

Commandes exécutées

Cde nº

App. nº

COMPTEURS
Schlumberger

Référence 5532

1. - TECHNICAL SPECIFICATION

1.1. - INTRODUCTION

The 5532 is a dual channel vertical amplifier plug-in for 55 series oscilloscopes.

The two channels can be used alone, alternated with each sweep or chopped at a fixed frequency. The algebraic sum of the two channels, A + B, can also be displayed.

Channel A has a x 5 gain multiplier facility to increase its sensitivity to 2 mV/div.

Channel B has a polarity inverter.

1.2. - SENSITIVITY

Channels A and B : 10 mV to 10 V/division, 10 ranges, 1-2-5 sequence

Channel A : 2 mV - 4 mV - 10 mV/div. with x 5 gain

Calibration accuracy : $\pm$ 3%

Continuous adjustment : by vernier, ratio $\geq$ 2.5 : 1, giving range overlap. The range selector is calibrated with the vernier turned fully clockwise. An "Uncal." lamp lights when the vernier is in use.

Stability with temperature : max. drift 200 µV/°C or 0.02 div./°C (in the range + 10°C to + 40°C) on the 10 mV/div. range.

1.3. - BANDWIDTH

Lower band edge to - 3 dB :

DC with DC coupling
2 Hz with AC coupling

Upper band edge to - 3 dB with 5500 mainframe :

Channel	Bandwidth	Calculated rise time	Range
A and B A	85 MHz 15 MHz	4.2 ns 23.4 ns	10 mV to 10 V/div. (x 1) 2 mV and 4 mV/div. (x 5)

1.4. - A AND B INPUTS

Input coupling modes :

DC : entire signal is transmitted

AC : DC component is blocked

0 : input jack is disconnected, and amplifier input grounded

Maximum admissible input voltage : ± 200 V DC or peak to peak AC

Maximum input current : 1 nA at + 40°C

Input impedance : 1 MΩ ± 2% paralleled by 22 pF ± 10%

Noise (tangential measurement) : 500 µV on 2 mV/div. range

Ratio of gains between Normal and Inverted positions (channel B) : 1 ± 2%

1.5. - INTER-CHANNEL CROSSTALK AND DELAY

Crosstalk : better than - 40 dB, for a 6 div. amplitude, 50 MHz signal on one channel

Delay differential between channels : less than 500 ps.

1.6. - OPERATING MODES

ALT Channels A and B alternated with each sweep

A Channel A only

B Channel B only

A + B Algebraic sum of A and B signals (push-buttons A and B depressed simultaneously)

CHOP A and B signals chopped at a fixed frequency (originating in main-frame). The duration of switching for each channel is about 2 µs.

1.7. - TRIGGER MODES

Trigger mode	Trigger signal source
A	Channel A
B	Channel B
A + B	- Channel A alternating with channel B at sweep repetition rate in ALT mode - Channels A and B mixed in A, B, A + B and CHOP modes

1.8. - ENVIRONMENT

Temperature :

. Operating temperature range : + 10°C to + 40°C
. Storage temperature range : - 20°C to + 70°C

Humidity test :

85% relative humidity at + 40°C for 10 days

Vibration test :

. frequency range : 0 to 23 Hz
. amplitude : ± 0.5 mm
. duration : 10 minutes on each axis

1.9. - DIMENSIONS - WEIGHT

Height : 158 mm
Width : 70 mm
Depth : 317 mm excluding knobs
345 mm overall
Weight : 1.4 kg

1.10. - ACCESSORIES

Accessories supplied :

Technical manual

Optional accessories

Active probes
Passive probes

2. - OPERATION

2.1. - PREPARATION FOR USE

With the oscilloscope switched off, insert 5532 plug-in in left-hand compartment intended for vertical deflection plug-in.

Switch on oscilloscope and wait about 20 minutes for thermal stability to be reached.

For information on display and horizontal deflection controls, see manual for mainframe and horizontal plug-in used.

2.2. - CONTROL DESCRIPTION

Reference		Function	
Channel A	Channel B		
S2001	S2002	V/div.	Range selectors, 10 positions : 10 to 100 mV/div. 0.2 to 10 V/div.
R2021	R2024		Verniers for continuous adjustment of sensitivity, giving range overlap. Range selector is calibrated when vernier is fully clockwise.
DS2001	DS2002	Uncal.	Lamps which light when vernier is uncalibrated.
		Input A Input B	Coaxial signal input jacks.

Reference		Function	
Channel A	Channel B		
S2994	S2005	DC 0 AC	Input coupling mode selectors : DC : direct coupling AC : DC component blocked 0 : input jack disconnected, and amplifier input grounded, for locating 0 reference level.
R16	R69	Gain	Screwdriver adjustments for trimming gain.
R2025	R2026	↕	Vertical shift controls.
R2027	R2028	Bal.	Screwdriver adjustments for balancing input circuits.
S1 (Z4)		x1 - x5	Gain multiplier push-button. Increases channel A gain by a factor of 5 when depressed.
	S2003	Norm. - Inv.	Slide switch for inverting display polarity of channel B.
S1 (Z2)			Push-button bank for selecting mode of display of channels A and B
		A	Channel A only
		B	Channel B only
		A + B	Algebraic sum of channels A and B
		ALT.	Channels A and B alternating with each sweep
		CHOP.	Channels A and B chopped at fixed frequency.
S2 (Z2)		Trigger	Push-button bank for selecting trigger signal source :
		A	Channel A
		B	Channel B
		A + B	Channels A and B alternately when S2 is in ALT. position Channels A and B mixed when S2 is in A + B or CHOP. position.

2.3. - BALANCING AND GAIN ADJUSTMENT

2.3.1. - Input balancing

Adjust potentiometers R2027 (channel A) and R2028 (channel B) so that trace does not move when range switch is turned through 10 mV, 20 mV, 50 mV and 100 mV positions.

2.3.2. - Gain adjustment

If the range selector calibration is no longer exactly correct, in particular when the plug-in has been fitted into another mainframe, the gain can be trimmed using the "Gain" potentiometers :

R16 (Channel A)
R69 (Channel B)

To do this, apply mainframe calibrator signal to inputs A and B and adjust gain by trimming R16 and R69. The mainframe calibrator accuracy must be allowed for.

2.4. - INPUT COUPLING MODE

For simultaneous display of the DC and AC components of a signal, use DC position of input coupling selector.

To display the AC component only of a signal, use AC position of input coupling selector. In this case the DC component is blocked by a capacitor in the input circuit. The lower cut-off frequency is about 2 Hz.

When the input coupling selector is in the 0 position, the input signal is disconnected from the amplifier input, and the amplifier input is grounded. This enables the 0 reference level to be found.

2.5. - VERTICAL DEFLECTION FACTOR

The vertical deflection obtained on the screen is a function of the input signal amplitude, of the attenuation of the probe in use (if any), of the range selector position, and of the vernier position.

The factor shown on the range selection is only valid when the vernier is in the fully clockwise position.

To avoid measurement errors, an "Uncal." lamp lights when the vernier is in use.

The vernier multiplies the deflection factor by up to about 2.5, to give range overlap. With the selector in the 10 V/div. position, a deflection factor of about 25 V/div. can be obtained.

2.6. - X5 GAIN MULTIPLIER (CHANNEL A)

When push-button S1 (Z4) is depressed, the gain of channel A is multiplied by 5. If selector S2001 is in the 10 mV position, the effective sensitivity becomes 2 mV/div. If the selector is in the 20 mV position, the sensitivity becomes 4 mV/div., etc...

2.7. - DISPLAY POLARITY INVERSION (CHANNEL B)

A polarity inversion switch, marked "Norm. -Inv.", is fitted to channel B. In the "Norm." position, the signal is displayed positive up. In the "Inv." position, the signal is inverted and displayed negative up.

When operating in A + B mode, this polarity inverter can be used to display either the sum of the two signals, A + B, or their difference, A - B.

2.8. - Y DISPLAY MODE SELECTOR

The Y display mode is selected with a 4-way push-button bank which gives display either of one signal applied to the input of one of the channels, or the two signals simultaneously, or the algebraic sum of the signals.

2.8.1. - Single trace operation

If only one signal is to be displayed, connect it to one of the inputs, A or B, and depress the corresponding A or B push-button.

When there are signals applied to both inputs (the same or different signals), the signal on one of the inputs can be displayed alone by depressing the corresponding push-button. If the two signals are not synchronous, take care to select the correct trigger source.

2.8.2. - Dual trace operation

This mode of operation is obtained by electronic switching. Two push-buttons, "ALT." and "CHOP.", are used for selection :

a) ALT : switching from one channel to the other occurs at the end of each sweep.

This mode can be used at all sweep rates ; however, at slow sweep rates, flickering first appears ; and then, as the rate is further reduced, the switching becomes visible. For sweep rates slower than 0.5 ms/div., therefore, it is preferable to use the chopped mode ("CHOP").

b) CHOP. : switching from one channel to the other occurs at a fixed frequency. This switching mode is used :

- with sweep rates slower than 0.5 ms/div.
- for displaying non-recurring phenomena. In this case, the sweep rate must be selected to take into account the chopping frequency and the required curve definition. For example, at 20 µs/div., using the 5500 mainframe, the trace is chopped into 100 segments.

2.8.3. - Algebraic sum

This mode is used for displaying the sum or difference of two signals connected to the two inputs. Depression of buttons A and B simultaneously selectes this mode. The polarity inverter on channel B is used for selecting either the sum A + B or the difference A - B.

The vertical deflection factor is that selected for the two channels, provided they are both the same.

NOTE : the 5532 plug-in is not fitted with a differential amplifier. In algebraic sum mode, care must be taken to center both traces on the screen.

2.9. - TRIGGERING

A pair of push-buttons select the source of the internal trigger signal. This signal is picked off channel A or channel B when this channel is used alone.

If both channels are used simultaneously :

- in algebraic sum (A + B) or chopped (CHOP.) modes : the trigger signal is obtained from the A and B signals mixed ;
- in alternate (ALT.) mode : the trigger signal is obtained alternately from each channel.

3. - DESCRIPTION OF CIRCUITS

3.1. - GENERAL PRINCIPLE

The block diagram for the 5532 on the following page, together with the interconnection diagram for the various printed circuit cards used in this module (see fig. 1), provide the user with a general idea of the plug-in, operating details being covered by examination of each diagram.

3.1.1. - Attenuation and input stage (fig. 2/a and b)

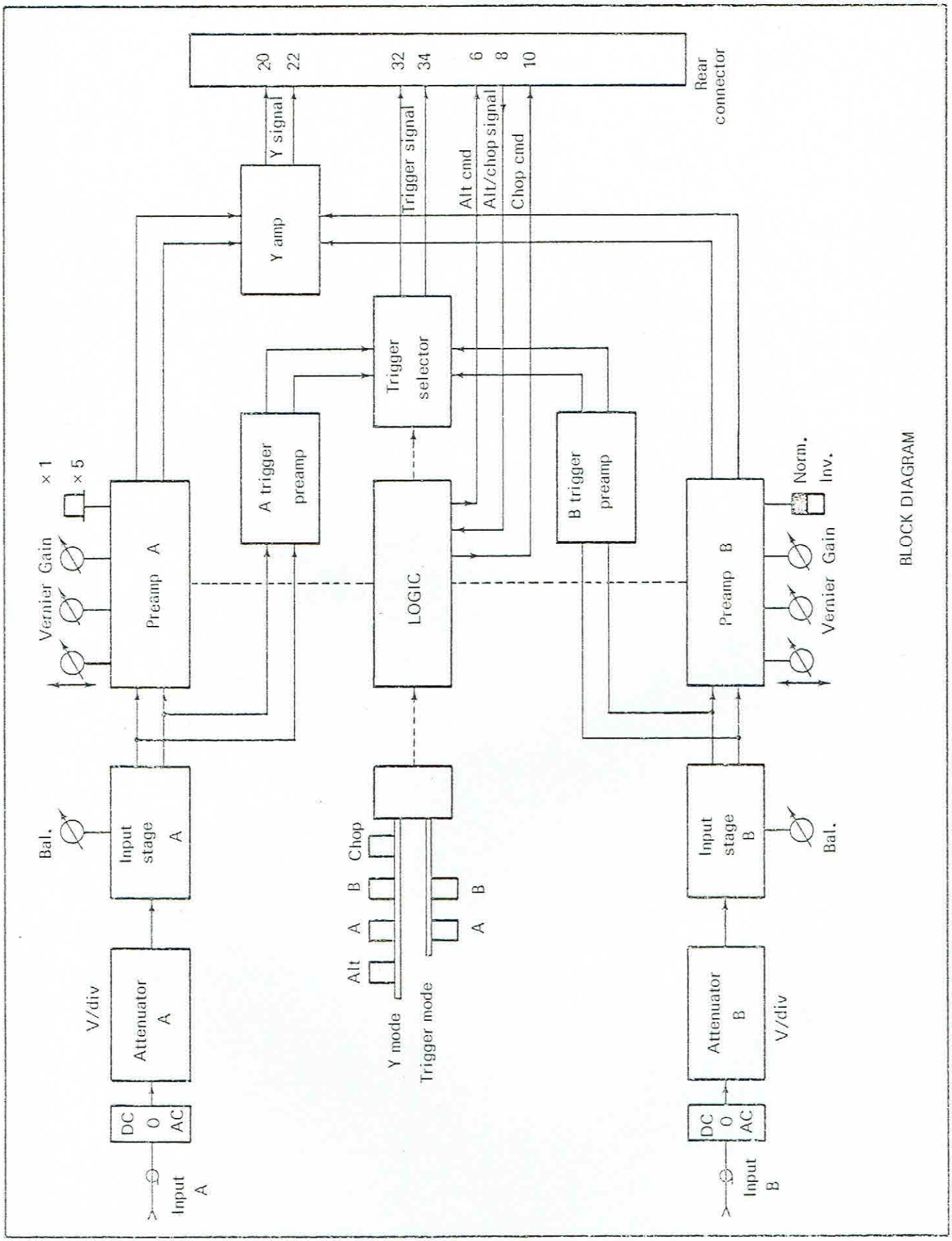
For each of channels A and B, the signal applied at input undergoes two successive attenuations : one at high impedance and the other, preceded by a matching stage, at low impedance. Combinations of the various ratios for these two attenuators determine the deflection factor, according to the position of selector "V/div.".

The signal is then sent to the Y amplification stages, providing vertical deflection, and to the amplifiers delivering the internal trigger signals.

3.1.2. - Y amplification and channel switching

This amplification function is provided separately, for channels A and B, by two Y preamplifiers (fig. 2/a and b), incorporating the shift and gain controls particular to each channel.

Only preamplifier A has a "x5 gain" control, while preamplifier B incorporates a signal polarity inversion selector.


Rear connector
20
22
32
34
6
8
10
Y signal
Trigger signal
Alt cmd
Alt/chop signal
Chop cmd
Y amp
Trigger selector
A trigger preamp
B trigger preamp
LOGIC
Preamp A
Preamp B
× 1
× 5
Vernier Gain
Norm.
Inv.
Vernier Gain
Bal.
Input stage A
Input stage B
Bal.
Chop
B
A
Alt
A
B
Y mode
Trigger mode
V/div
Attenuator A
Attenuator B
V/div
DC
0
AC
DC
0
AC
Input A
Input B
BLOCK DIAGRAM

Electronic channel selection is also made at this stage, by inhibiting or releasing one or other of the preamplifiers. The function of this selector is to switch channel A and/ or channel B to a common amplifier (fig. 3), and then to the Y circuits of the mainframe, according to the selection made on the four pushbuttons ("A", "B", "Alt." and "Chop") on Y mode selector S1 (fig. 6).

3.1.3. - Internal trigger source

Picked off from the input stages (fig. 2/a and b), the channel A and channel B signals are also sent to two trigger preamplifiers (fig. 5), and are then applied to a trigger selector (fig. 3). This selects as internal trigger source, either signal A, signal B, or a combination of the two, according to the selection made on the two pushbuttons ("A" and "B") of trigger mode selector S2 (fig. 6), and to send this signal to the mainframe trigger amplifier.

3.1.4. - Logic

The logic signals required to drive the two selectors mentioned above, are obtained by combinations of logic gates and circuits on card Z3 (fig. 4). This card receives command signals from the contacts of push-buttons S1 and S2 (fig. 6), and applies the signals to the channel preampli-fiers, and the trigger selector, using HF switching and alternation signals generated in the mainframe.

3.2. - ATTENUATORS AND INPUT STAGES

3.2.1. - Channel A input connection (fig. 2/a)

Selector S2004, which connects the input A coaxial socket to the attenuator, has three positions :

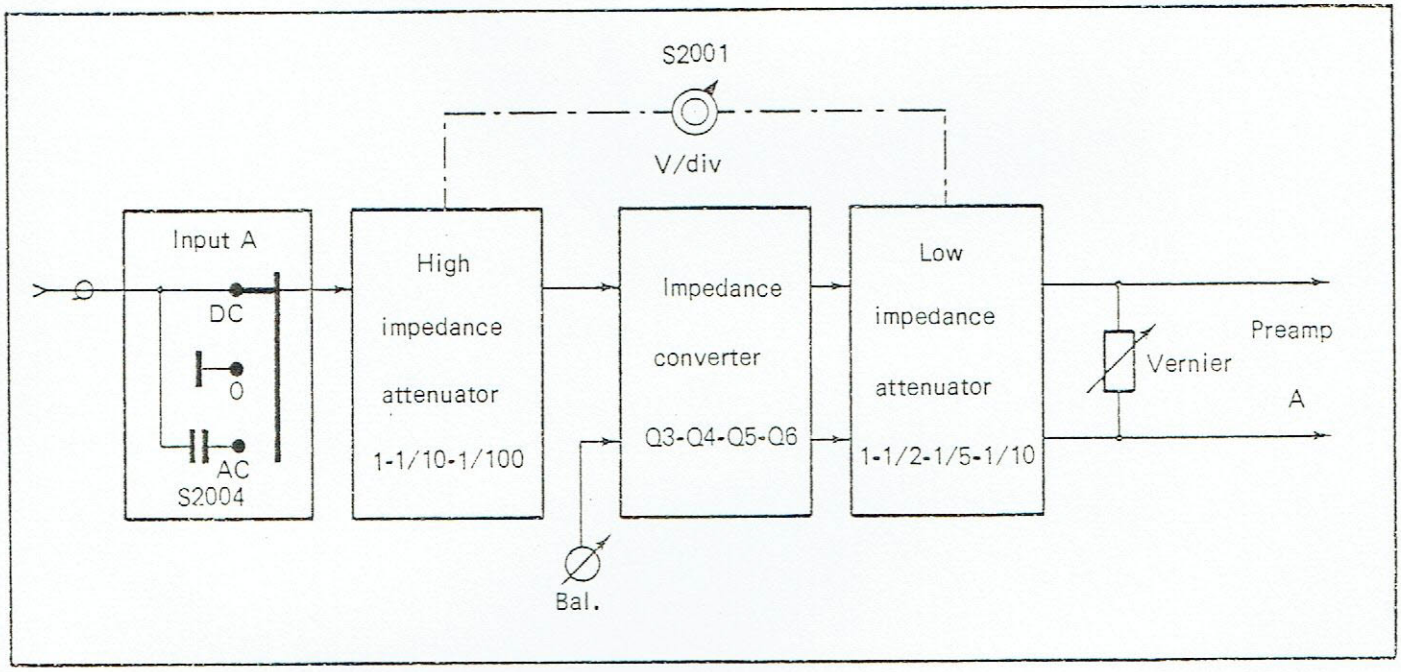
- "DC" : DC input
- "0" : attenuator input grounded
- "AC" : capacitor C2001 blocks the DC component of the signal.

3.2.2. - Channel A attenuators (fig. 2/a)

"V/div." rotary selector S2001 switches two attenuation stages :

- The first, input stage is a conventional attenuator, comprising RC cells. With a constant input impedance of 1 MΩ, paralleled by 22 pF, it provides ratios of 1, 1/10 and 1/100.
- The second, low impedance stage is placed between the balanced outputs of the adaptor stage, and gives ratios of 1, 1/2, 1/5 and 1/10.

Basic amplifier sensitivity is 10 mV/div., and the 10 deflection factors corresponding to the positions of selector S2001 are obtained by combining the ratios of these two attenuator stages.



3.2.3. - Channel A impedance converter (fig. 2/a)

The amplifier stage comprising two FETs, Q3 and Q6, followed by transistors Q4 and Q5 used in the follower mode, has high input impedance and low output impedance.

Transistor Q3 is protected against overloads appearing at input, by C12 - R31 - CR1 - CR2.

Balance (on Q6) is adjusted on front panel control R2029.

Constants R29 - C10 and R45 - C21 are used for HF correction.

Gain control R2021, connected between the emitters of transistors Q4 and Q5, provides for overlap between successive deflection factors.

When this control is in service, a switch closes, lighting "Uncal." lamp DS2001. A signal picked off its terminals is sent to input of the channel A preamplifier.

3.2.4. - Channel B input - attenuator - impedance converter (fig. 2/b)

The channel B circuits are identical to those for channel A.

The input connection selector is S2005.

The "V/div." attenuation selector is S2002.

The impedance converter circuit comprises transistors Q9, Q10, Q11 and Q12.

The balancing control is R2028, and the gain control is R2024.

3.3. - CHANNEL A AND B PREAMPLIFIERS

These preamplifiers essentially comprise circuits U1 and U2. The type A250 linear integrated circuit was specially designed and produced for incorporation in Schlumberger oscilloscopes. This is a differential amplifier, the characteristics and various applicational possibilities of which meet the specific requirements of oscilloscope amplifiers.

A block diagram and corresponding description are given at the end of chapter 3.

3.3.1. - Channel A preamplifier (fig. 2/a)

Integrated circuit U1 is powered by current generator Q2. Channel A balance (with x1 gain) is adjusted with potentiometer R20, gain is adjusted with potentiometer R16, and frequency compensation by cells :

R12 - C7
R11 - C5
R10 - C3
R185 - C2

Channel A shift adjustment is on control potentiometer R2025, connected between pins ④ and ⑤ of U1.

Gain can be multiplied by a factor of 5, by closure of switch S1 (fig. 5). Centering can then be adjusted on potentiometer R5 (Z4 - fig. 5), and frequency compensation on R1 and R2 (Z4 - fig. 5).

The + 10 V appearing on pins ⑧ and ⑨ of U1 is supplied by transistor Q1, and adjusted by potentiometer R4 (fig. 2/a). This voltage is also used to drive circuit U2.

Pin ① of circuit U1 receives the channel A switching signals.

3.3.2. - Channel B preamplifier (fig. 2/b)

Comprising integrated circuit U2 (type A250), this preamplifier is similar in design to that for channel A, and therefore requires no special description. Two differences should be noted, however :

- There is no "x5" gain control.
- A signal polarity inversion selector (S2003) is included. This switches the + 10 V (from transistor Q1 - fig. 2/a), either to pin ⑩ ("Norm."), or pin ⑨ ("Inv.").

3.3.3. - Channel switching

Channel switching signals are sent at low impedance to pin ① of integrated circuits U1 (fig. 2/a) and U2 (fig. 2/b), by transistors Q25 and Q26 (fig. 3). The preamplifier is cut off when the signal is high, and connected when the signal is low.

3.3.4. - Preamplifier A and B output circuit

Preamplifier output signals are picked off (differential mode) pins ② and ③ of circuit U1, connected in parallel with pins ② and ③ of circuit U2.

They are sent to the common Y amplifier via resistors R52 and R53. The second output of these circuits (pins ⑥ and ⑦) is not used.

"A + B" mode mean output level

For modes A, B and A and B "sweep alternate" or "chopped", for which the two channels are not in service simultaneously, mean output level is defined from the + 50 V, by the power supply current to U1 or U2 in load resistors R54 - R55, and resistors R56 and R57.

For the "A + B" mode, the U1 and U2 currents are added. To avoid modification of mean output level, resistor R56 is then shorted by transistor Q7 (fig. 2/a), saturated by a positive voltage applied to its base. This is obtained directly by simultaneous action of the "A" and "B" contacts of selector S1 (Z2 - fig. 6).

3.4. - COMMON Y AMPLIFIER (fig. 3)

The signals from preamplifier A or B, or A and B together are applied to differential amplifier Q13, Q14, Q15 and Q16, with negative feedback by resistors R117 and R120. This stage is designed to deliver a DC 0 V output signal. Centering is on potentiometer R125, and gain adjustment of R112 (set for channel A in the "x5" position).

Time constants R178 - C87 and R179 - C88 provide HF compensation.

Output signals are sent to the mainframe, with 40 mV/div. balanced sensitivity, via pins ⑳ and ㉒ on the plug-in rear connector.

Resistors R116 and R121 provide impedance matching (100 Ω balanced).

3.5. - TRIGGER AMPLIFIERS

The signals providing the internal trigger source are picked off output of the input attenuator/adaptor of each channel, and sent to the trigger preamplifiers :

- via resistors R25 and R27 for channel A (fig. 2a)
- via resistors R79 and R80 for channel B (fig. 2b)

3.5.1. - Channel A trigger preamplifier (Z4 - fig. 5)

Signal A is sent to the bases of transistors Q5 and Q6, forming a balanced cascode stage with Q1 and Q2, via transistors Q3 and Q4, used in the follower stage.

At output, the differential voltage between the collectors of Q1 and Q2 depends on the input signal, and also on the position of control R2025 (channel A shift - fig. 2a). As a result, the operating point for the trigger amplifier is always linked to the vertical position of the trace.

Frequency compensation can be adjusted by RC cell R14 - C9. When channel A is in the "x5" position, potentiometer R7, connected between the emitters of Q5 and Q6, also multiplies trigger gain by 5. Balance is then adjusted on control R17.

3.5.2. - Channel B trigger preamplifier (Z4 - fig. 5)

Arrangement is identical to that for channel A.

Balanced cascode stage Q11, Q12, Q7 and Q8, preceded by followers Q9 and Q10, is centered by potentiometer R34, frequency compensation being by R31 - C17. Output signal shift is slaved to channel B shift, by common control R2026 (fig. 2b).

3.5.3. - Trigger selector (Z1 - fig. 3)

Differential stage Q19 - Q20 receives the channel A trigger signals. Centering is adjusted with potentiometer R135, and gain with potentiometer R139, and frequency compensation is by R137 - C62. According to the voltage applied at point ⓓ , this stage :

. operates (high = + 13 V)
. is cut-off (low = 0 V).

Likewise stage Q21 - Q22 receives the channel B trigger signals. Centering and gain are adjusted with potentiometers R150 and R147 respectively, with HF compensation by R158 - C63. Cut-off voltage (0 V) or operating voltage (+ 13 V) is applied to point ⓒ .

These two stages therefore constitute an electronic selector, driven at points ⓒ and ⓓ by logic signals from card Z3 (fig. 4). The trigger signal sent to output transistors Q23 and Q24, is selected on the pushbuttons of the "trigger " selector (S2 - fig. 6) :

a) Pushbutton "A" depressed (ⓒ is low, and ⓓ is high) : the signal transmitted is that of channel A.

b) Pushbutton "B" depressed (ⓒ is high, and ⓓ is low) : the signal transmitted is that of channel B.

c) Pushbuttons "A" and "B" depressed ("A + B") : 2 cases are possible :

- if "sweep alternate" has been selected (S1 on "Alt."), the trigger signal transmitted is alternately the channel A signal, and the channel B signal,

- if the "sweep alternate" mode has not been selected (S1 on "A", "B", "A + B" or "Chop."), points ⓒ and ⓓ are both high, and the A and B signals are transmitted simultaneously, being mixed in the final stage.
  However, in the latter case, the mean currents for branch A (Q19 - Q20) and branch B (Q21 - Q22) are added.
  To avoid this current increase causing a rise in the mean potential of the bases of Q23 and Q24, additional current generator Q17 - Q18 is switched off. This provides the necessary compensation, and maintains the operating point of the final stage at the same level as for the other modes. Q18 is inhibited by cutting off Q17, the base of which is connected to ground (for "A + B" non-sweep-alternate mode), directly via the contacts of S1 and S2 (pin 19 - fig. 6).

The trigger signals, delivered at output at 0 V DC by transistors Q23 and Q24, are sent to the mainframe via pins ㉜ and ㉞ of the rear connector, with 40 mV/div. balanced sensitivity. Resistors R159 and R162 are used for impedance conversion (100 Ω balanced).

3.6. - LOGIC CONTROL (Z3 - fig. 4)

This circuit has a dual function :

- control of operating mode for the two channels of the plug-in, A and B, according to the selection made on pushbutton selector S1 (Z2 - fig. 6)

- control of plug-in internal trigger mode, according to the selection made on pushbutton selector S2 (Z2 - fig. 6).

TTL logic circuits U1 to U6 on card Z3 (fig. 4) provide these functions.

3.6.1. - Y mode

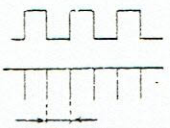
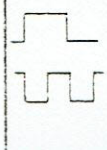
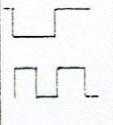
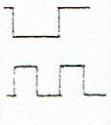
Selector S1 (fig. 6) provides a choice of five different possibilities:

- "A" : Channel A in service alone

- "B" : Channel B in service alone

- "Alt." : Channels A and B in service alternately, on each sweep ("sweep alternate" mode)
- "Chop" : Channels A and B chopped at a fixed frequency, imposed by the mainframe
- "A + B" : Channels A and B in service simultaneously.

The following table indicates the logic levels at different points of the circuit, according to selected Y mode, and can be used to plot the logic path of command signals. Logic high is "1", and logic low is "0".

Y MODE	(29)	(30)	U1	U2			(17)	(18)
			3	T	Q	$\overline{Q}$		
A	0	1	1		1	0	1	0
B	1	0	1		0	1	0	1
Alt.	1	1	1	5500 / 5501  1 sweep				
Chop	1	1	1	f	f/2	$\overline{f/2}$	f/2	$\overline{f/2}$
A + B	0	0	0				0	0

f = fixed frequency switching signals :
500 kHz with type 5500 2-channel mainframe
1 MHz with type 5501 single-channel mainframe

- Channel A only

At input, with pushbutton "A" depressed, pin (29) goes to "0", and with pushbutton "B" released, pin (30) goes to "1". At output, we obtain :

- a "1" state on pin (17), commanding inhibition of the channel B preamplifier (U2/1 - fig. 2b), via transistor Q25 (fig. 3),
- a "0" state on pin (18), cutting in the channel A preamplifier (U1/1 - fig. 2a), via transistor Q26 (fig. 3).

- Channel B only

Here we have the reverse situation : at input, pins (29) and (30) are at "1" and "0" respectively. At output, pins (17) and (18) are at "0" and "1" respectively, commanding cut-in of channel B (U2/1 - fig. 2b), and inhibition of channel A (U1/1 - fig. 2a), via transistors Q25 and Q26 (fig. 3).

- Channels A and B in "sweep alternate" mode

When the "Alt." pushbutton is depressed, an alternation command "0" state is sent to the mainframe, via pin (6) of the plug-in rear connector (fig. 6). On each flyback, the mainframe returns a logic change-of-state (type 5500 mainframe), or a short negative pulse (type 5501 mainframe), on pin (8) of the rear connector. These signals appear on point (f), and are applied to input T of flip-flop U2 (fig. 4), commanding a change-of-state on outputs (17) and (18), via outputs Q and $\overline{Q}$ of U2, and circuit U14. This inversion occurs on each sweep (type 5501 mainframe), or every two sweeps (type 5500 mainframe).

These logic signals sent by transistors Q25 and Q26 (fig. 3), command alternate cut-in and inhibition of the channel A preamplifier (U1/1 fig. 2a), and channel B preamplifier (U2/1 fig. 2b).

- Channels A and B "chopped"

When the "chop" pushbutton is depressed, the "0" state (switching command) is sent to the mainframe, via pin (10) of the plug-in rear connector (fig. 6). The negative return signals received on pin (8) of the rear connector, as applied to input T of flip-flop U2 (fig. 4), are at fixed frequency in this case (f = 1 MHz for the type 5501 mainframe, or 500 kHz for the type 5500). U2 operates as a bistable, and delivers logic states which are chopped at frequency f/2 on Q and $\overline{Q}$, and therefore to pins (17) and (18) (via U4). Operating time for each channel is therefore 1 µs or 2 µs.

- Channels A and B in service simultaneously

When pushbuttons "A" and "B" are both depressed, pins (29) and (30) are at "0", as also U1/3. Outputs (17) and (18) are both at "0", and command simultaneous operation of channels A and B.

3.6.2. - Trigger mode

Internal trigger source selector S2 (fig. 6) gives a choice of four possibilities :

- "A" : triggering by channel A signal
- "B" : triggering by channel B signal

- "A + B" : (with "sweep alternate" Y mode) :
  Alternate triggering by channel A signal and channel B signal, as each channel is cut in

- "A + B" : (Y mode other than "sweep alternate") :
  Triggering by sum of signals A and B.

The following table indicates the logic states at various points of the circuit, according to selected trigger mode, and can be used to follow the logic paths of command signals.

Trigger mode	㉖	㉗	ⓔ	U3		U5				ⓒ	ⓓ
				11	6	10	13	6	3		
A	1	0			0			1	0	0	1
B	0	1			0			0	1	1	0
A + B (S1 on "Alt.")	1	1	0	1	1	Alt	$\overline{\text{Alt}}$	Alt	$\overline{\text{Alt}}$	$\overline{\text{Alt}}$	Alt
A + B (S1 not on "Alt.")	1	1	1	0	0			0	0	1	1

- A trigger

With pushbutton "A" of S2 (fig. 6) depressed alone, input ㉖ (fig. 4), is at "1", and ㉗ is at "0". This gives at output :

. "0" state on point ⓒ , inhibiting channel B of the trigger amplifier (Q21 and Q22, fig. 3),

. "1" state on point ⓓ , connecting channel A of the trigger amplifier (Q19 and Q20, fig. 3).

- B trigger

This is the reverse situation : inputs ㉖ and ㉗ are at "0" and "1" respectively. Outputs ⓒ and ⓓ are at "1" and "0", cutting off channel A and connecting channel B of the trigger amplifier (fig. 3).

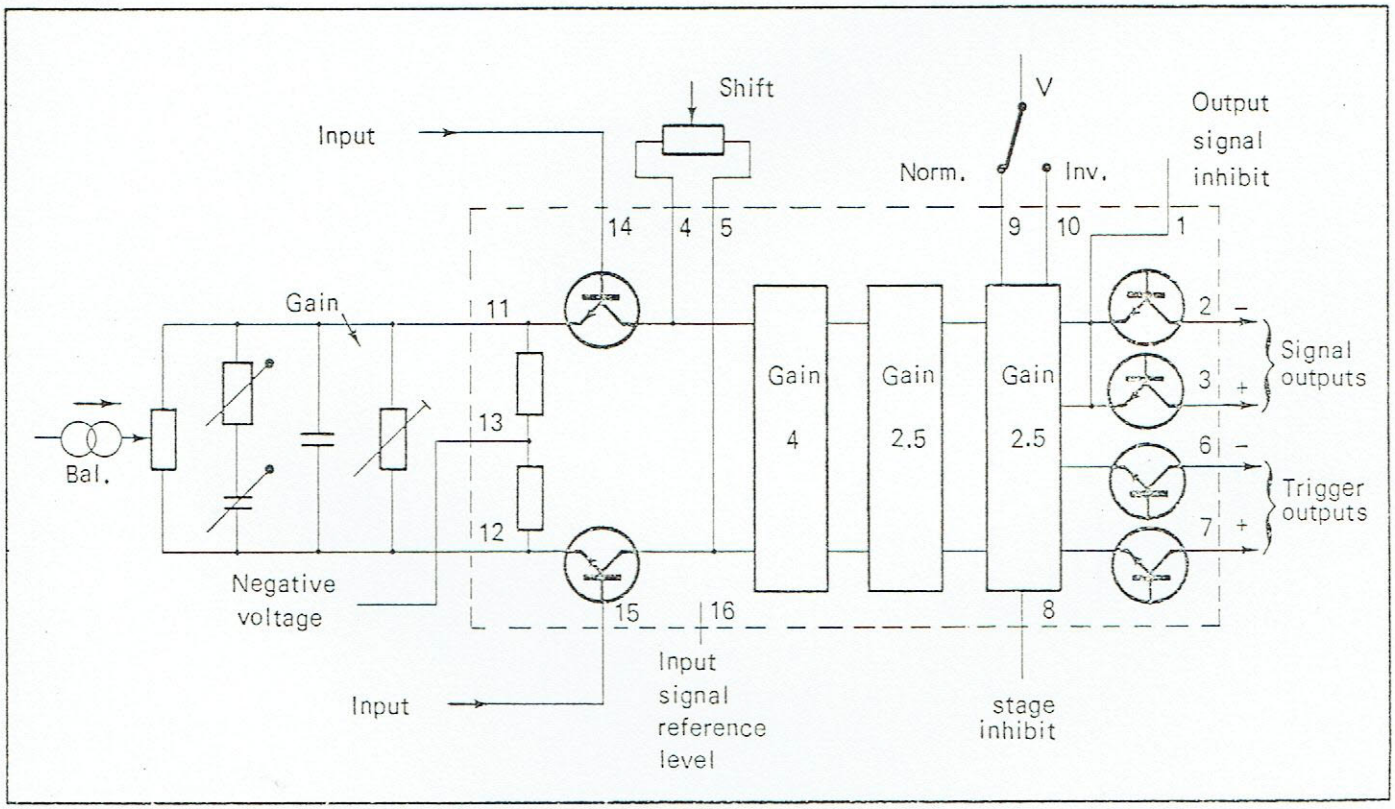
DESCRIPTION OF INTEGRATED CIRCUIT A250

The A250 HF amplifier is a linear integrated circuit comprising :

- a differential amplifier
- an inhibit circuit for this amplifier, used for channel switching
- a trigger signal pick-off amplifier
- polarity switching

Connections

- the input signals are applied to pins 14 and 15
- the input circuit is biased negative by application of a voltage of - 6 V on pin 13 or of a symmetrical current on pins 11 and 12
- the components for defining the gain and for frequency compensation are connected between pins 11 and 12
- the amplifier is centred by means of pins 4 and 5
- pin 16 must be connected to a DC voltage which corresponds to the mean level of the input signals
- the gain is increased by a factor of 2.5 by passing a current of 36 mA into pin 8
- the inhibit command is applied to pin 1
- polarity switching is obtained by applying a voltage of + 9.6 V with respect to pin 16, to pin 10 (Normal) or to pin 9 (Inverted)
- the differential signal output is on pins 2 and 3
- the differential trigger output is on pins 6 and 7.



Block diagram, integrated circuit A250

- A + B trigger

With both pushbuttons depressed, inputs (26) and (27) are both at "1".

. If S1 is in "Alt." position, point ⓔ is at "0", and alternate inversions of outputs Q and $\overline{Q}$ of U2 are transmitted, by U5 and U6, to outputs ⓒ and d , chopping the trigger channels at the same time as the Y channels.

. If S1 is in a position other than "Alt.", point e is at "1", U5 is no longer transparent to Q and $\overline{Q}$ states, and outputs ⓒ and ⓓ are maintained at "1". Channels A and B of the trigger amplifier are both connected.

4. - MAINTENANCE

The present chapter is designed to provide the user with sufficient information to enable him to repair or readjust his unit in case of need (component replacement, for example).

All calibration settings of the plug-in should be checked approximately every 1000 hours of operation.

4.1. - MAINTENANCE OF FRONT PANEL

The front panel may become dirty through constant use. To clean, unscrew the knobs of controls and selectors, and wash the photo-engraved faceplate with soapy water.

Solvents should not be used for cleaning, as they attack the paint and printed inscriptions.

4.2. - EQUIPMENT REQUIRED FOR ADJUSTMENT AND TROUBLE-SHOOTING

Unit	Minimum characteristics
- Calibrated mainframe (CRC 5500, 5501 or 5502)	
- Timebase plug-in (CRC 5526)	
- Calibrated test oscilloscope and probe	Sensitivity 5 mV
- Digital voltmeter (Schlumberger VM 4440 or equivalent)	Accuracy : 0.1%
- LF sine-wave generator (Schlumberger GBT 662 or equivalent)	50 Hz to 100 kHz
- HF sine-wave generator with constant output level	50 kHz to 100 MHz

Unit	Minimum characteristics
- Amplitude-calibrated square-wave signal generator	Accuracy : 1 % Voltage : 2 mV to 20 V pp Repetition frequency : approx. 1 kHz
- Pulse generator (Schlumberger GI 634 B + 6 dB attenuator, or equivalent)	Rise time : < 2 ns Flat top signal, amplitude 50 mV Repetition frequency : 100 Hz to 1 MHz.
- Type 52000 extender	

4.3. - ACCESS TO INTERNAL ELEMENTS

4.3.1. - Side panels

The two protective side panels are fixed without screws or clips. They can be removed simply by opening outwards, inserting a finger in the rear panel slot to obtain this result.

4.3.2. - Disassembly of printed circuits

Circuit Z1 acts as a mother board for the other circuits, Z3 on the left of the plug-in, and Z2 and Z4 on the right. It may be necessary to disengage some of these circuits, to unsolder certain components.

- Card Z3 : Disconnect the Berg input box from the two coaxial cables, extract the two card attachment screws, and disengage card Z3 from Z1, taking care not to twist the 10 rigid connection pins.
- Card Z4 : Disconnect the six Berg input boxes, undo the four attachment screws, and extract the card, disengaging the stem of pushbutton S1 from the front panel.
- Card Z2 : This card is integral with pushbutton selectors S1 and S2. The sub-assembly is disengaged by undoing the two screws for the spacers mounted on the front panel, and extracting rearwards.

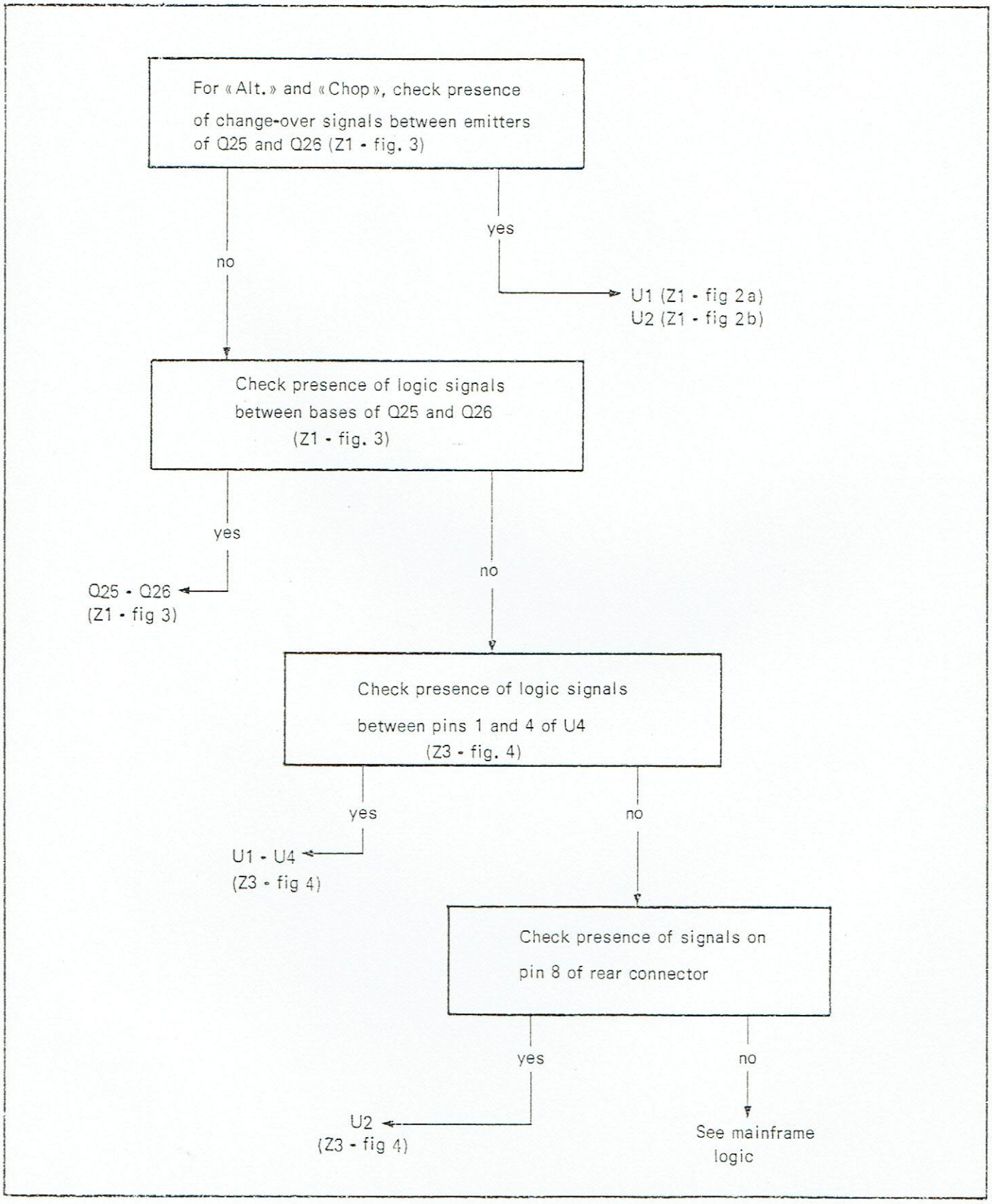
4.4. - TROUBLE-SHOOTING

Prior to any intervention in the event of faulty operation, inspect the circuits and check that no wires are broken or unsoldered, and that all transistors are correctly plugged in, etc.

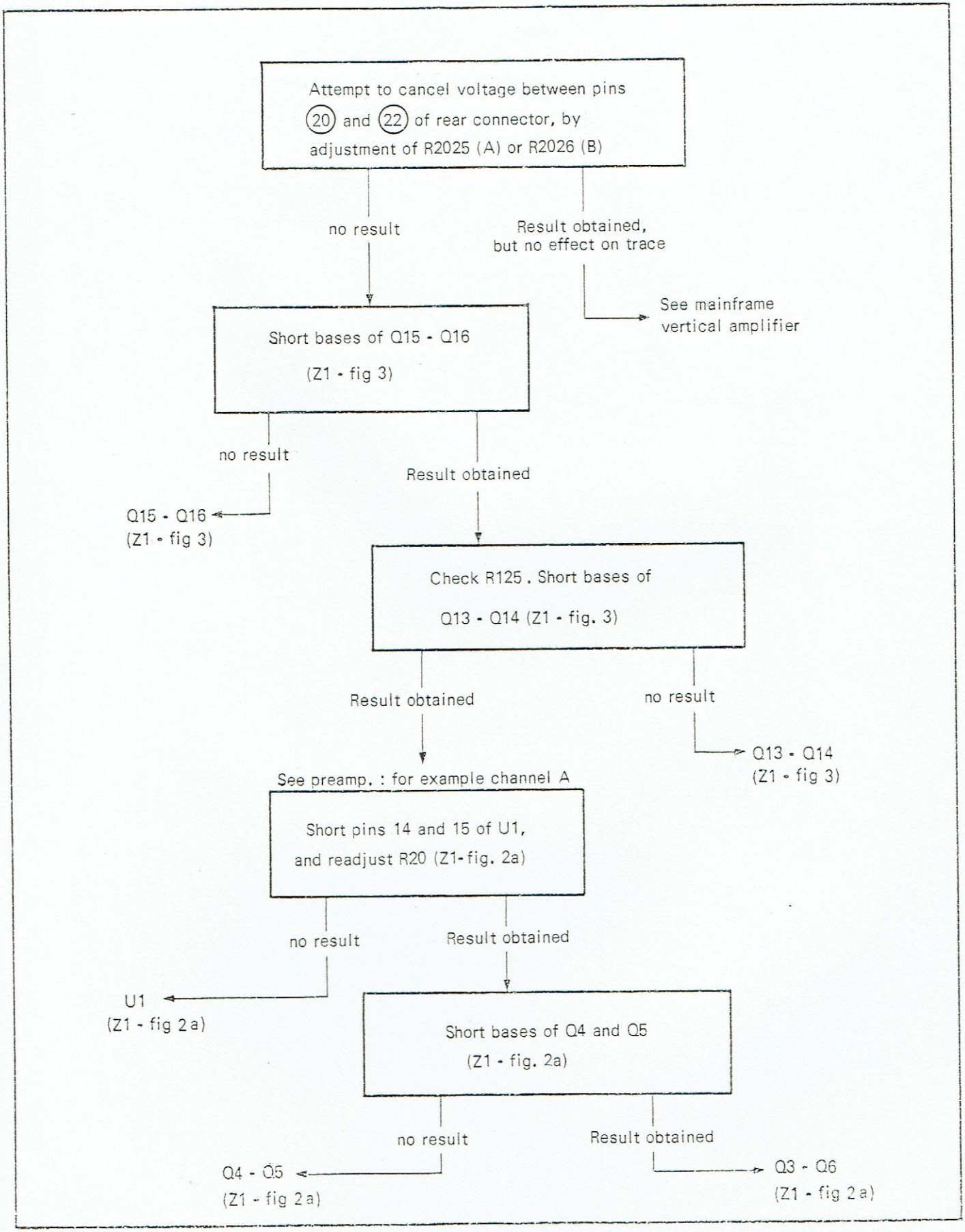
Before readjusting settings in the 5532, also check that the anomaly observed cannot be traced to the oscilloscope mainframe.

The following procedures can be used to identify the defective elements, in certain cases of faulty operation.

4. 4. 1. - Defective channel switching

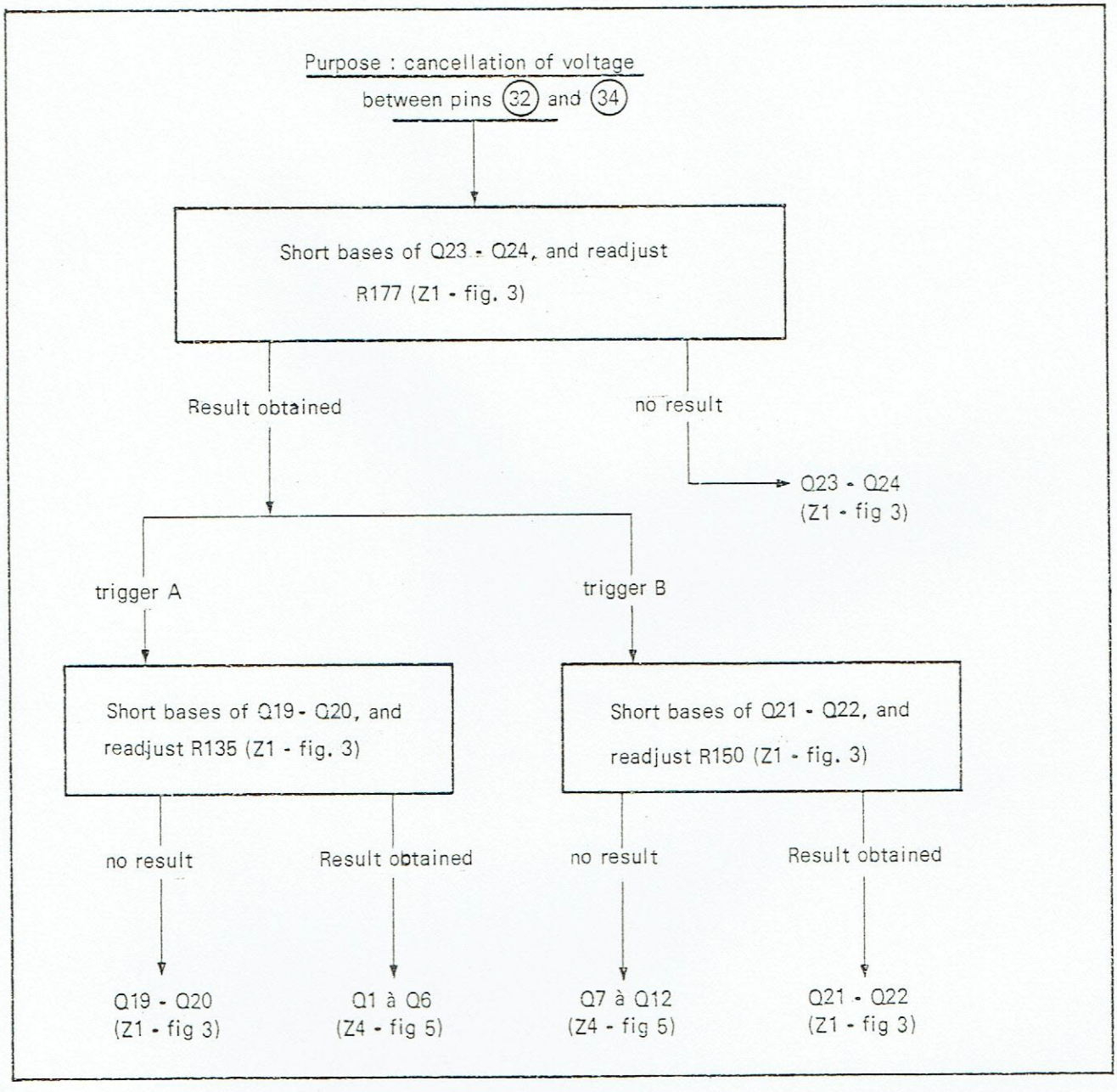


4. 4. 2. - Vertical centering impossible



4. 4. 3. - Faulty triggering

Trace centered vertically, pins (32) and (34) on rear connector not equipotential :



4.5. - COMPLETE CALIBRATION

In the following text, adjustable elements are designated by their individual references, followed where appropriate by that of the printed circuit, figure (wiring diagram) and plate (photograph) on which they appear. Example : control R20 on printed circuit Z1 is designated : R20 (Z1 - fig. 2a - P3).

Operations are described in the logical and functional order in which they should be executed.

Caution : Certain adjustable elements are not mentioned in the following procedure. Adjustment of same requires highly specialized equipment, and the settings of these elements should not be modified by the user, at the risk in particular of impairing plug-in interchangeability.

Preliminary precaution :

Before calibrating the plug-in, it is essential to check that the mainframe used is correctly calibrated, with particular reference to vertical amplifier gain and pulse response.

4.5.1. - Balancing channels A and B

Channel B : Set S1 (Z2) at "B", input B at "0", and S2003 at "Norm.".

- + 10.5 V power supply : Adjust R4 (Z1 - fig. 2a - P") to obtain + 10.5 V on the emitter of Q1.
- 10 - 20 - 50 - 100 mV/div. balance :

  Adjust front panel "Bal." control R2028 so that the trace remains stationary for all four positions of S2001.
- "Normal/Inverted" balance :

  Move shift control R2026 to its mid-way position. Adjust R73 (Z1 - fig. 2b - P3) so that the trace remains stationary when control S2003 is moved from "Norm." to "Inv.".
- Centering :

  Adjust R125 (Z1 - fig. 3 - P3) to bring the trace to the centre of the graticule.

- Switching input B from "0" to "DC", check that the offset voltage due to input current is < 1 mV.

Channel A : Position S1 (Z2) at "A", input A at "0", and S1 (Z4) at "x1".

- 10 - 20 - 50 - 100 mV balance : Adjust front panel "Bal." control R2027 so that the trace remains stationary, for all four positions of S2002.

- Centering :

  Move shift control R2025 to its mid-way position.

  . With S1 (Z4) at "x1", adjust R20 (Z1 - fig. 2a - P3) to bring the trace to the centre of the graticule.

  . With S1 (Z4) at "x5", adjust R5 (Z4 - fig. 5 - P2) to bring the trace to the centre of the graticule.

- Switch input A from "0" to "DC", and check that the offset voltage due to input current is < 1 mV.

4.5.2. - Gain adjustment

Channel A : Set S1 (Z2) at "A", S2004 at "DC", and S2001 at "10 mV/div.", with vernier R2021 turned fully clockwise (calibrated).

- S1 (Z4) at "x5" :

  Inject a 10 mV square wave signal at input, and adjust R111 (Z1 - fig. 3 - P3) to obtain a five division shift on the graticule.

- S1 (Z4) at "x1" :

  Inject a 50 mV signal at input and adjust front panel "Gain" control R16 to obtain a five division shift on the graticule.

Channel B : Set S1 (Z2) at "B", S2005 at "DC", and S2002 at "10 mV/div.", with vernier R2024 turned fully clockwise (CAL.).

- Inject a 50 mV signal at input, and adjust front panel "Gain" control R69 to obtain a five division shift on the graticule.

4. 5. 3. - Pulse adjustment

Channel A : Set S1 (Z2) at "A", S2004 at "DC", S1 (Z4) at "x1", vernier R2021 in the "calibrated" position, S2 (trigger) on "A", and S2001 at "20 mV/div.". Apply a 100 mV pulse from the GI 634 B pulse generator, with a 6 dB attenuator, on input A, terminated with a 50 Ω load, and adjust the following constants so as to obtain a pulse with minimum irregularities on the screen :

- S1 (Z4) at "x1" :

R10 - C3	(Z1 - fig. 2a - P3)
R11 - C5	"
R12 - C7	"
C2	"
R45 - C21	"
R29 - C10	"
C87 - (R178)	(Z1 - fig. 3 - P3)
R179 - C88	

Note : There is no strict chronological order for these adjustments, by reason of their interaction. For each adjustment, select pulse frequency (between 100 Hz and 1 MHz) according to the constant concerned. As a guide, the following characteristics should be obtained :

. rise time : < 5 ns
. overshoot : < 5 %

- S1 (Z4) at "x5" :

R1 - (C1)	(Z4 - fig. 5 - P2)
R2 - (C2)	

Channel B : same procedure as for channel A.

R63 - C28	(Z1 - fig. 2b - P3)
R64 - C30	"
R65 - C32	"
R98 - C46	"
C27	"
R82 - C35	"

4. 5. 4. - Adjustment of triggering

Channel A triggering : S2 at "A"

a) Centering

Connect a voltmeter between pins (32) and (34) of the plug-in rear connector.

- Momentarily short the bases of transistors Q23 and Q24 (Z1), to make same equipotential, and adjust R177 (Z1 - fig. 3 - P3) to obtain a 0 V reading on the voltmeter.
- Then short the bases of Q19 and Q20 (Z1), and adjust R135 (Z1 - fig. 3 - P3) to obtain a fresh 0 V reading on the voltmeter.
- Bring Y shift control R2025 to its central position, and adjust R17 (Z4 - fig. 5 - P2) to obtain 0 V on the voltmeter.

b) Gain

Apply a signal to input A, and note the number of divisions read on the screen.

Displaying the signal appearing on pin (32), with respect to ground, on the test oscilloscope, adjust the amplitude of this signal to 20 mV/div. on the screen :

- With S1 at "x1" : adjust R139 (Z1 - fig. 3 - P3)
- With S1 at "x5" : adjust R7 (Z4 - fig. 5 - P3).

Channel B triggering : S2 at "B"

a) Centering

Proceed as for channel A, nulling the voltage between pins (32) and (34) of the rear connector :

- With the bases of Q21 and Q22 shorted, adjust R150 (Z1 - fig. 3 - P3)
- With shift control R2026 in its midway position, adjust R34 (Z4 - fig. 5 - P2).

b) Gain

On pin (32), adjust R147 (Z1 - fig. 3 - P3) to obtain a screen display amplitude of 20 mV/div.

4.5.5. - Input attenuator correction

Connect a square wave signal generator to input A, and then input B, executing the following adjustments so as to eliminate pulse transmission faults.

Attenuator position	Element to be adjusted		
	Channel A	Channel B	
0.2 V/div. 2 V/div.	C2002 C2006	C2011 C2015	Z1 - P3 Z1 - P2

Adjustment of input capacitance

- Connect a square wave signal generator (frequency about 1 kHz), to input A (sensitivity : 10 mV/div.), via a type 50 036 passive probe. Correct the probe to obtain good transmission.
- Connect the probe to input B : balance channel B input capacitance if necessary, on C36 (Z1 - fig. 2b - P3).
- Without changing the probe setting, execute the following corrections (Z1 - fig. 2a and b - P3).

Attenuator position	Element to be adjusted	
	Channel A	Channel B
0.2 V/div. 2 V/div.	C2004 C2007	C2013 C2015

COMPTEURS

Schlumberger

Référence **5532**

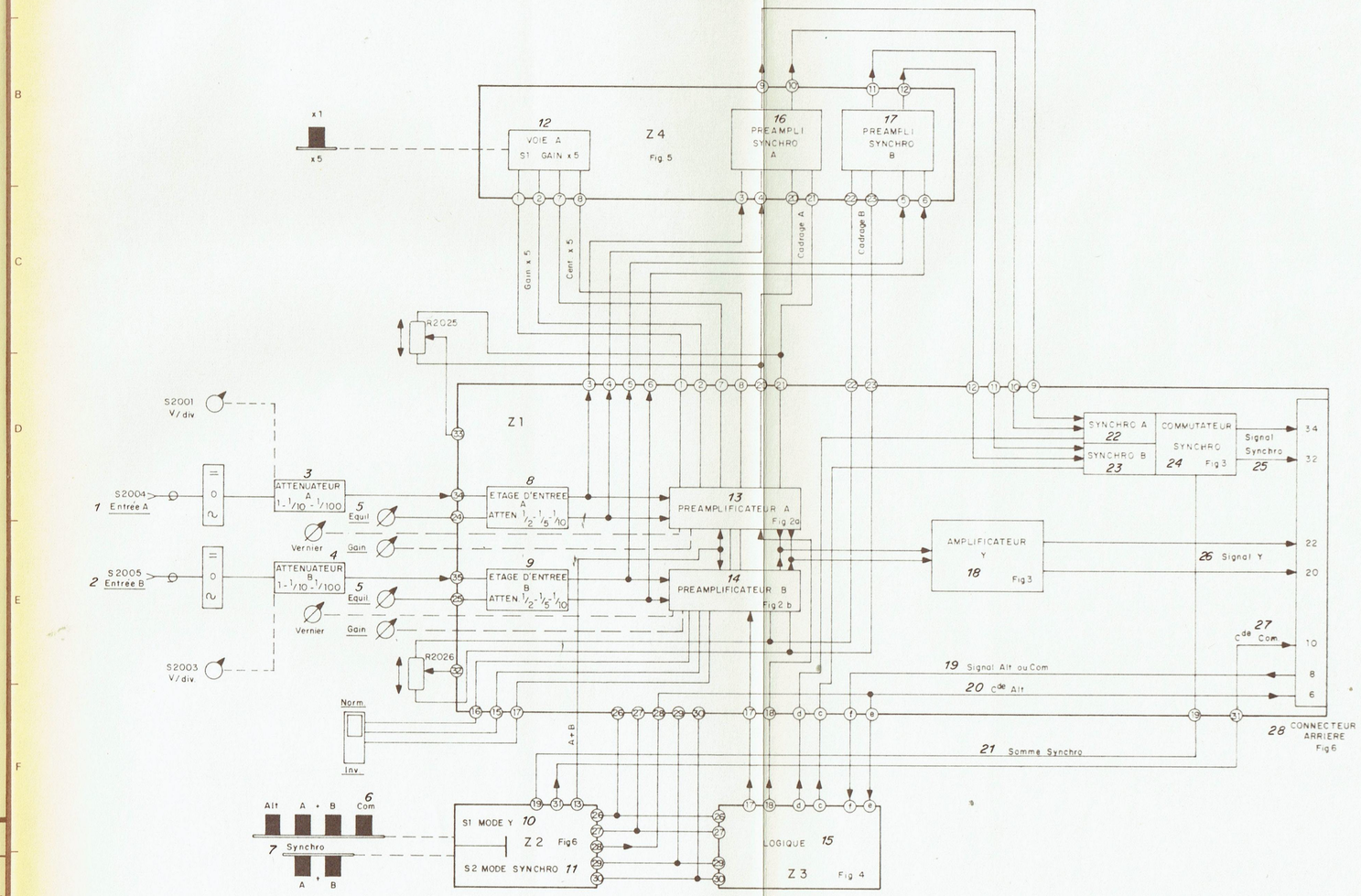
Date

Dessiné par

Commandes exécutées

Cde nº

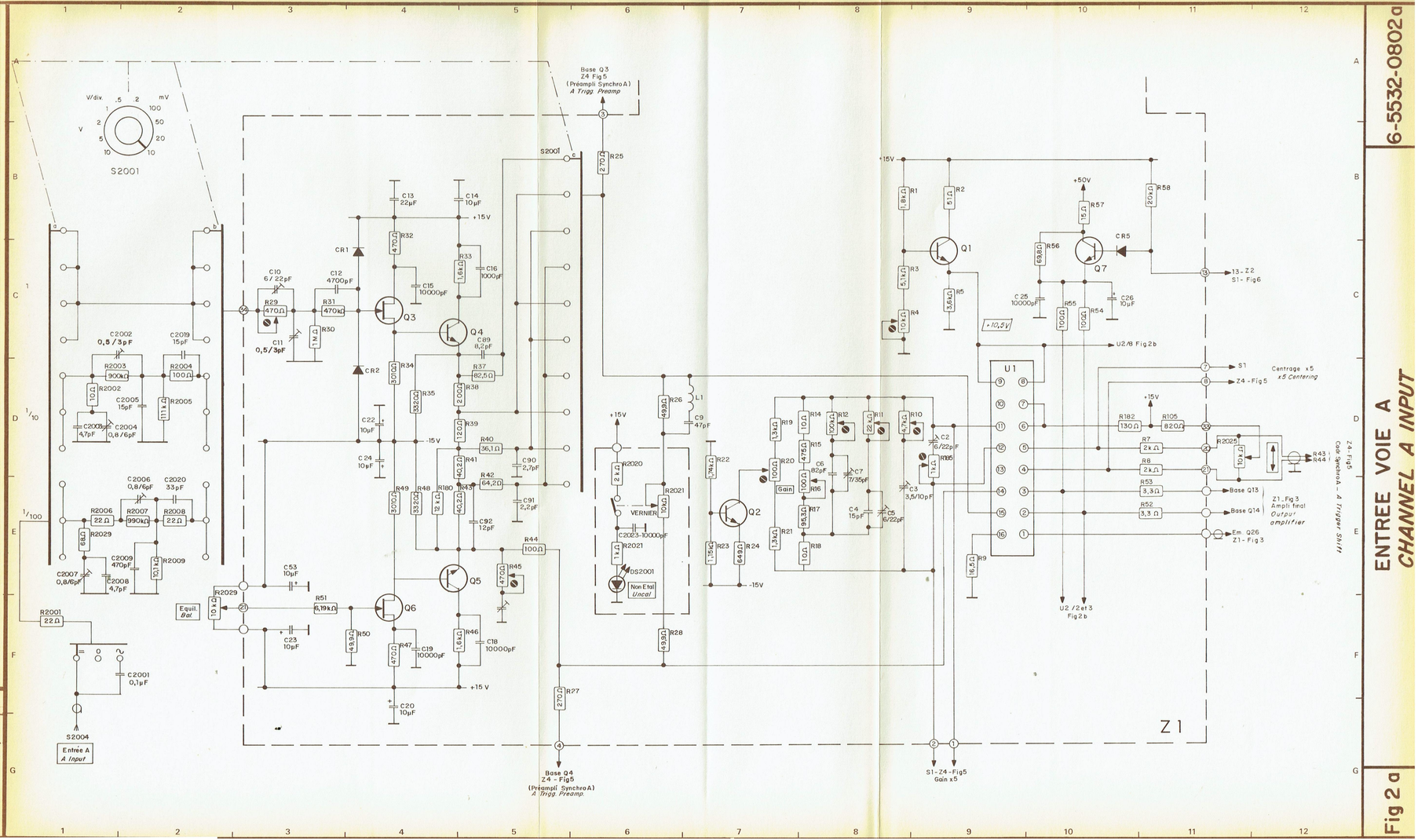
App. nº



6-5532-0801

INTERCONNECTION

Fig 1



COMPTEURS
Schlumberger

Référence **5532**

Date

Dessiné par

Commandes exécutées

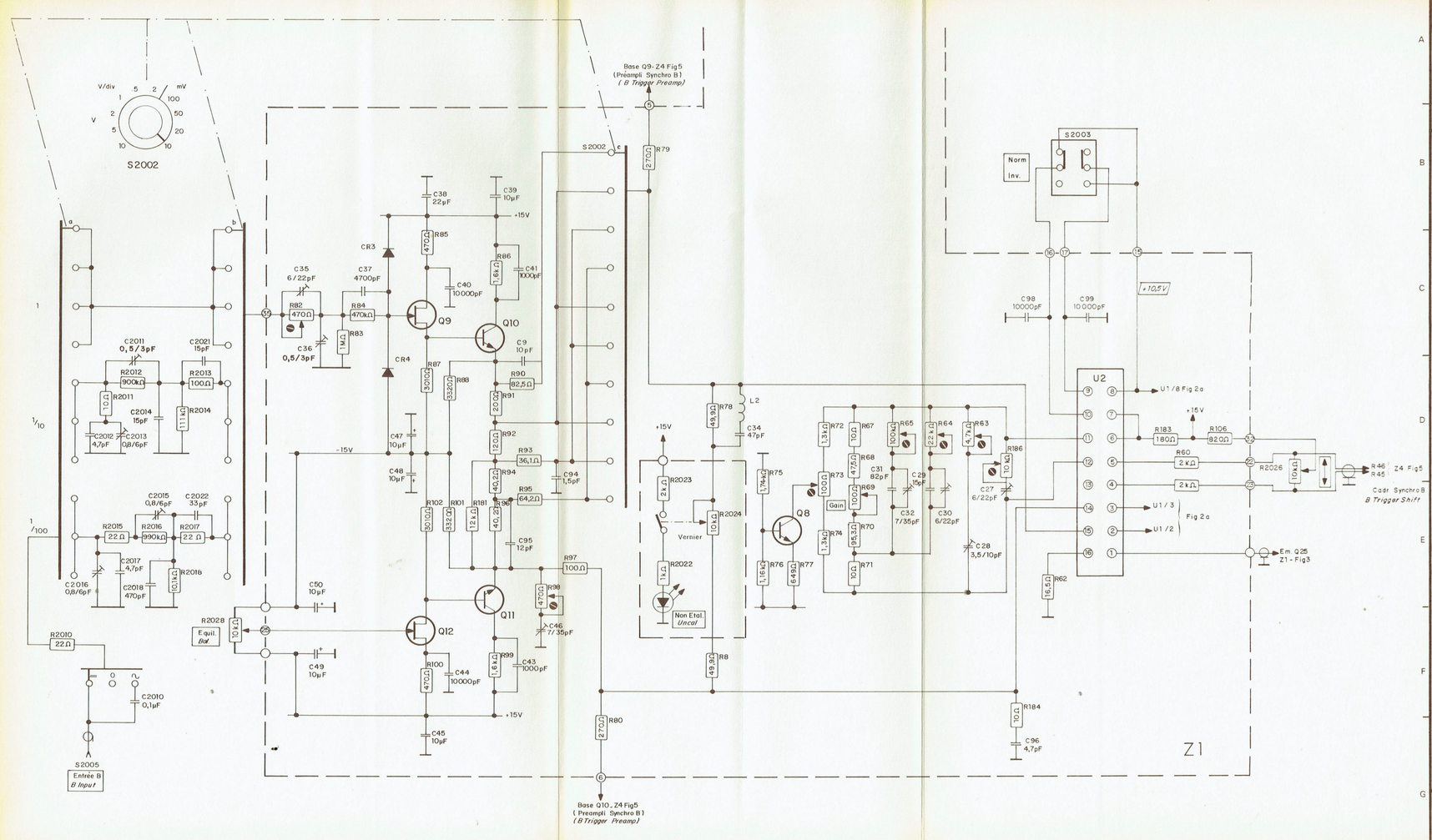
Cde nº

App. nº

ENTREE VOIE A
CHANNEL A INPUT

6-5532-0802a

Fig 2 a



COMPTEURS **Schlumberger**	Date	Dessiné par
Référence **5532**	Commandes exécutées	
	Cde n°	App. n°

6-5532-0802b

ENTREE VOIE B
CHANNEL B INPUT

Fig 2b

COMPTEURS
Schlumberger

Référence 5532

Date | Dessiné par

Commandes exécutées

Cde nº | App. nº

AMPLIFICATEUR Y - COMMUTATEUR DE SYNCHRONISATION
Y AMPLIFIER - Y TRIGGER SWITCH

6-5532-0803

Fig 3

Conditions de relevé des tensions : S1 sur Alt.
S2 sur A+B
Trace au centre du tube

Voltage measuring conditions : S1: Alt
S2: A+B
Trace centered

Z1

AMPLI VERTICAL
VERTICAL AMP

SYNCHRO A
A TRIGGER

SYNCHRO B
B TRIGGER

Coll. Q2 Z4-Fig5

U6/9 Z3-Fig4

Coll.Q1 Z4-Fig5

+50V

+13V +7V

+13,3V 0V

+11V

+11,3V

+7,4V

+4,3V

+15V

+4V

0V

-15V

C54 10nF

C87- 0,5/3pF

C62-7/35pF

C85 10nF

C86 10nF

C63-7/35pF

C66 1nF

C67 1nF

C56 1nF

C57 1nF

C58 1nF

C59 1nF

C88-3,5/10pF

C70 10pF

C71 120pF

C72 120pF

R107 5,83kΩ

R108 5,83kΩ

R178 100Ω

R110 787Ω

R111 470Ω

R112 36Ω

R114 36Ω

R179 1kΩ

R113 332Ω

R117 432Ω

R118 130Ω

R119 130Ω

R120 432Ω

R115 4,7kΩ

R116 28,7Ω

R123 604Ω

R124 604Ω

R121 28,7Ω

R122 4,7kΩ

R125 10kΩ

R126 10kΩ

R128 20Ω

R127 2,7kΩ

R129 100Ω

R132 3,74kΩ

R133 620Ω

R134 301Ω

R135 100Ω

R136 301Ω

R137 1kΩ

R138 66,5Ω

R139 100Ω

R140 200Ω

R141 200Ω

R142 105Ω

R130 9,09kΩ

R131 9,09kΩ

R143 200Ω

R144 200Ω

R145 105Ω

R147 100Ω

R146 66,5Ω

R148 1kΩ

R149 301Ω

R150 100Ω

R151 301Ω

R152 3,74kΩ

R153 620Ω

R154 348Ω

R177 22Ω

R155 432Ω

R156 82Ω

R157 82Ω

R158 432Ω

R160 619Ω

R161 619Ω

R159 28,7Ω

R162 28,7Ω

R163 820Ω

R164 51Ω

R165 820Ω

R166 820Ω

R167 274Ω

R168 820Ω

R169 51Ω

R170 820Ω

R171 820Ω

R172 274Ω

Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26

CR6

R53 Fig2a

R52 Fig2a

Connecteur Arriere *Rear connector*

Y1

Y2

Z2-Fig6 S1

Coll. Q8 Z4-Fig5

U6/10 Z3-Fig4

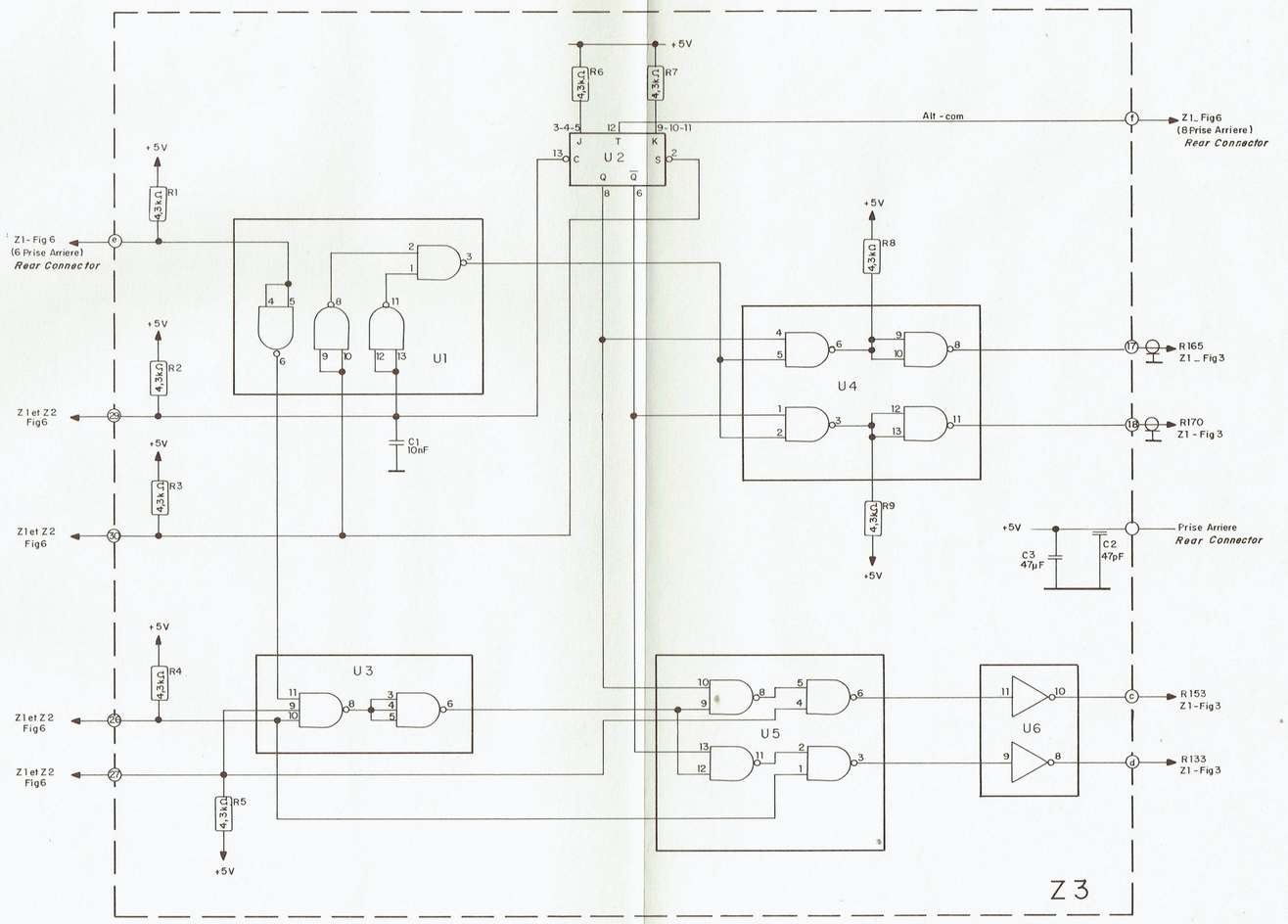
Coll. Q7 Z4-Fig5

U4/8 Z3-Fig4

U2/1 Fig 2b

U4/11 Z3-Fig4

U1/1 Fig2a



COMPTEURS

Schlumberger

Référence **5532**

Date

Dessiné par

Commandes exécutées

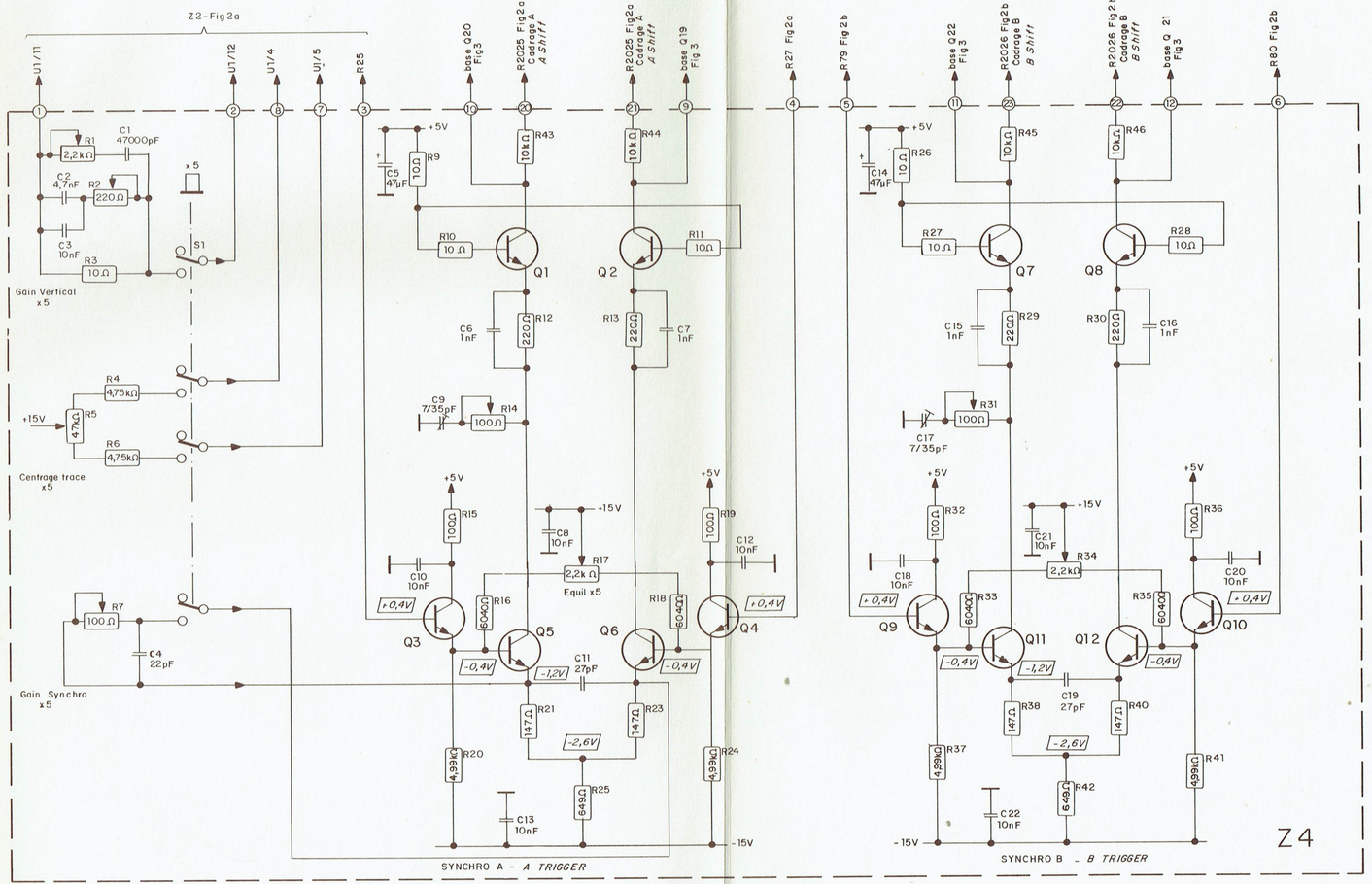
Cde nº

App. nº

LOGIQUE Y ET DE SYNCHRONISATION
Y AND TRIGGER LOGIC

6-5532-0804

Fig 4



COMPTEURS
Schlumberger

Référence 5532

Date

Dessiné par

Commandes exécutées

Cde nº

App. nº

6-5532-0805

PREAMPLIFICATEUR DE SYNCHRONISATION A ET B
A AND B TRIGGER PREAMPLIFIER

Fig 5

COMPTEURS
Schlumberger

Référence **5532**

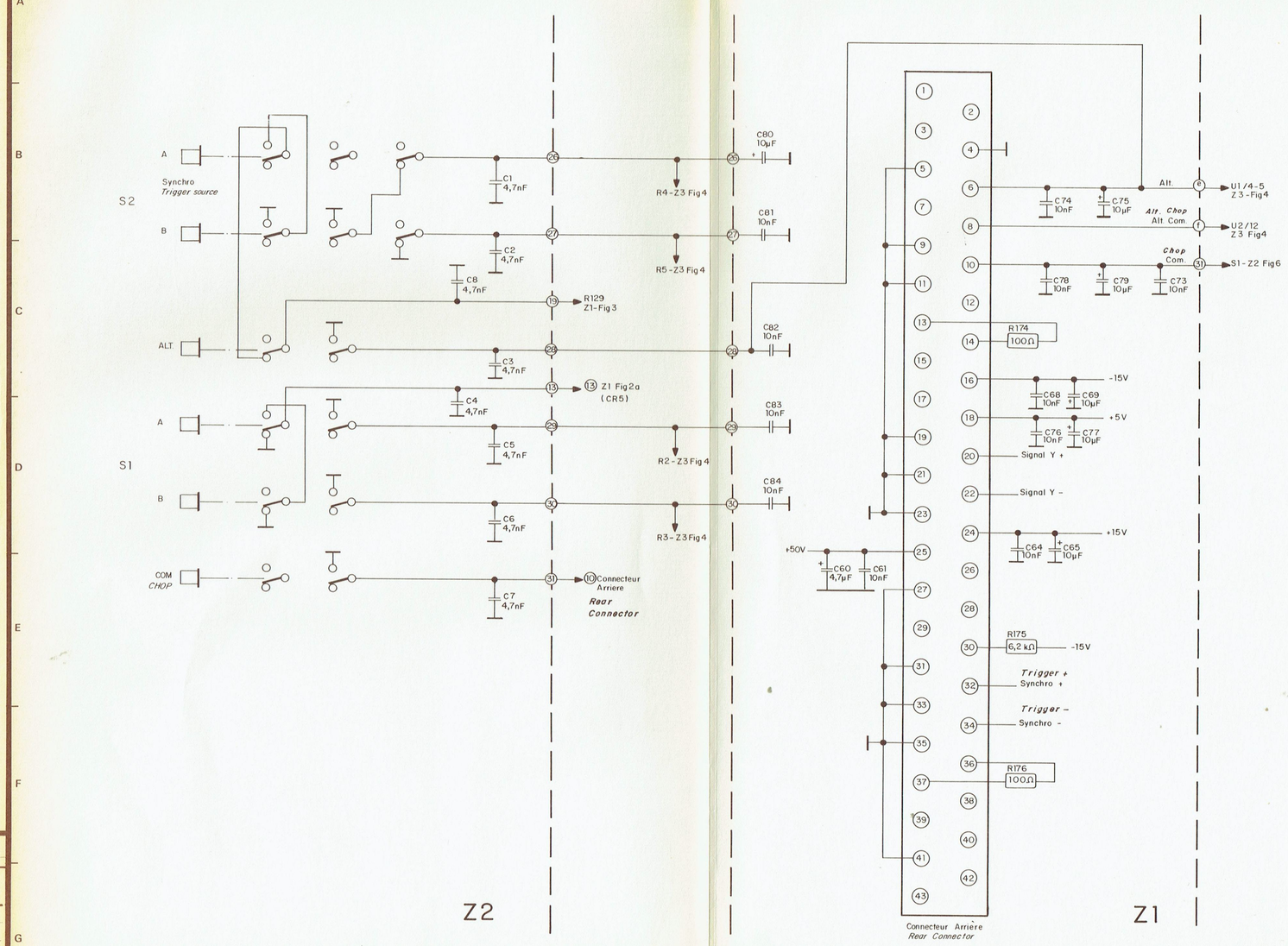
Date

Dessiné par

Commandes exécutées

Cde nº

App. nº



6-5532-0806

COMMUTATEUR DE MODE - CONNECTEUR ARRIERE
MODE SWITCH - REAR CONNECTOR

Fig 6

6. - NOMENCLATURE

RECAPITULATIF

-:-:-:-:-:-:-:-:-:-:-:-:-:-

7 - xxxx - 0001	- Codification des nomenclatures
7 - xxxx - 0002	- Référence fabricant des éléments repérés N0 dans la nomenclature
7 - 5532 - 0050	- Habillage
7 - 5532 - 0051	- Identification française et anglaise
7 - 5532 - 0100	- Platine avant
7 - 5532 - 0200	- Platine arrière
7 - 5532 - 0600/1 à 3	- Raccordement électrique et mécanique

FIGURE 2

7 - 5532 - 1022	- Commutateur et atténuateur voie A
7 - 5532 - 1023	- Commutateur et atténuateur voie B
7 - 5532 - 3021/1 à 12	- Circuit imprimé Z1

FIGURE 4

7 - 5532 - 1041	- Circuit imprimé Z3

FIGURE 5

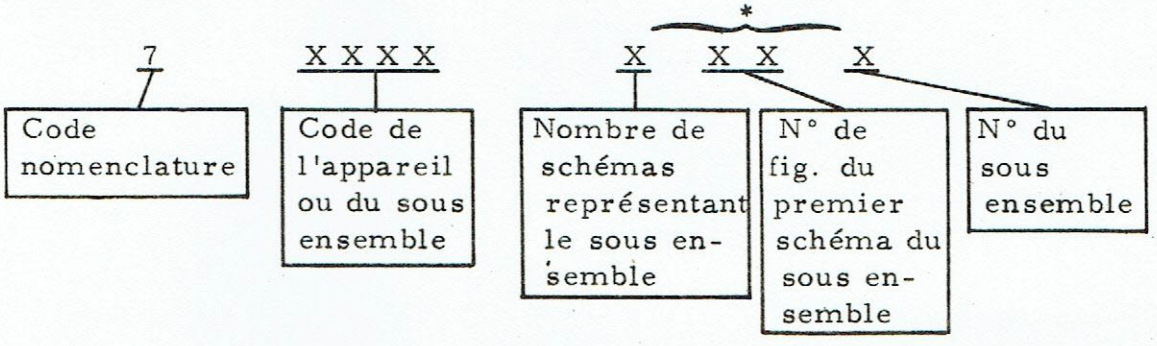
7 - 5532 - 1051/1 à 4	- Circuit imprimé Z4

FIGURE 6

7 - 5532 - 1062	- Circuit imprimé Z2

CODIFICATIONS DES NOMENCLATURES

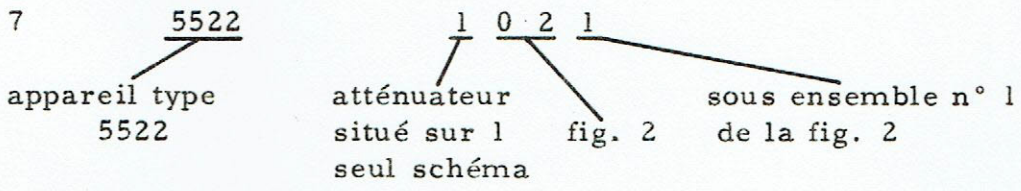
Le numéro des nomenclatures se décompose comme suit :



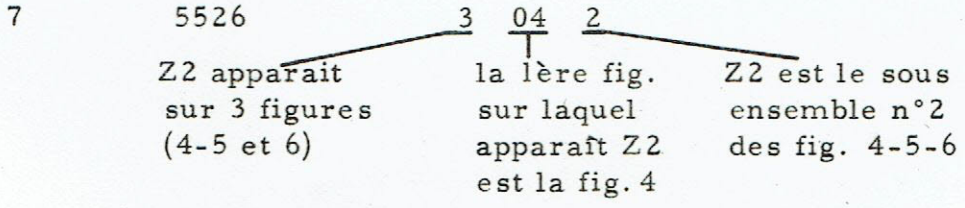
* sauf pour les pages de nomenclature ne se rapportant pas à un schéma (platine avant/arrière, divers général etc...).

Exemples

a) atténuateur fig.2 du tiroir 5522



b) circuit Z2 - fig. 6 du 5526



REFERENCE FABRICANT DES ELEMENTS

REPERES N0 DANS LA NOMENCLATURE

RESISTANCES

NO101	2,7 Ω - 4,7 Ω - 6,2 Ω	BB 1/8	ALLEN BRADLEY
	10 Ω à 150 kΩ	NK3	SOVCOR
	160 Ω à 100 MΩ	BB 1/8	ALLEN BRADLEY
NO102	1 Ω à 1 MΩ	CR25	COGECO
	0,22 à 2,2 MΩ	LCA 0207	DRALORIC
	0,5 à 5,1 MΩ	R25 J	ROHM
NO103	1 Ω à 1 MΩ	CR25	COGECO
	0,22 à 2,2 MΩ	LCA 0207	DRALORIC
NO106	2,2 Ω à 4,7 MΩ 5%	LCA 0411	DRALORIC
	4,7 Ω à 1 MΩ 5%	CR37	COGECO
	1,2 à 10 MΩ 10%	CR37	COGECO
	2,2 à 4,7 MΩ 5%	LCA 0411	DRALORIC
NO112	1 Ω à 1 MΩ	SMA 0207	DRALORIC
NO121	4,7 à 22 kΩ	ROP 2	SFERNICE
NO131	20 Ω à 39 kΩ	ROP 4	SFERNICE
NO141	20 Ω à 56 kΩ	ROP 6	SFERNICE
NO190	Réseau 7 x 68 Ω à 470 kΩ	784-1 R - xxx	BECKMANN

CONDENSATEURS

NO203	0,1 µF à 100 µF	TAG (1 à 11) F	I T T
NO205	1 µF à 330 µF	S1 - CTS 13	FIRADEC
NO220	4,7 µF à 2200 µF	SLVB F5	CHEMI-CON.
NO221	4,7 µF	2222-015-90003	COGECO
	10 µF	2222-015-16109	COGECO
	22 µF	2222-015-16229	COGECO
	4,7 µF 10 V	2222-015-14479	COGECO
	47 µF 63 V	2222-016-18479	COGECO
	100 µF 25 V	2222-016-16101	COGECO
	100 µF 63 V	2222-017-18101	COGECO
	470 µF	2222-017-16471	COGECO
	1000 µF	2222-017-16471	COGECO
NO227	680 à 47000 µF	Felsic 038	SIC SAFCO
	470 µF	Felsic 039	SIC SAFCO
NO242	470 pF	2222-630-03471	COGECO
	820 pF	2222-630-03821	COGECO
	1000 pF	2222-630-03102	COGECO
	1500 pF	2222-630-03152	COGECO
	2200 pF	2222-630-03222	COGECO
	3300 pF	2222-630-03332	COGECO
	4700 pF	GOX 742	LCC
	10000 pF	GOY 753	LCC
	47000 pF	GSY 612	LCC

NO243	68 pF à 470 pF	GIZ 606	LCC
	560 pF à 820 pF	GIZ 608	LCC
	1000 pF à 1800 pF	GIZ 611	LCC
	2200 pF à 3900 pF	GIZ 615	LCC
	4700 pF	GIX 611	LCC
	10000 pF	GIX 615	LCC
NO245	1 pF à 3,9 pF	GOA 604	LCC
	4,7 pF à 6,8 pF	GOC 604	LCC
	8,2 pF à 22 pF	GOC 731	LCC
	27 pF	GOC 742	LCC
	33 pF - 39 pF	GOC 742	LCC
	47 pF - 56 pF	GOU 731	LCC
	68 pF - 82 pF - 100 pF	GOU 742	LCC
	120 pF - 150 pF	GOU 753	LCC
	180 pF - 220 pF - 270 pF	GOU 764	LCC
	330 pF	GOU 765	LCC
NO246	1 pF à 3,3 pF	GUA 606	LCC
	3,9 pF à 6,8 pF	GUP 606	LCC
	8,2 pF à 12 pF	GUP 608	LCC
	15 pF à 22 pF	GUP 611	LCC
	27 pF et 33 pF	GUU 608	LCC
	39 pF à 56 pF	GUU 611	LCC
NO247	100 pF à 3300 pF	PLZ 912 E	LCC
	4700 pF et 5600 pF	PLZ 912 D	LCC
	10 000 pF	PLZ 912 C	LCC
	22 000 pF	PLZ 913 E	LCC
	47 000 pF	PLZ 913 D	LCC
NO248	1 pF à 150 pF	PLA 912 E	LCC
	180 pF - 220 pF	PLA 912 D	LCC
	330 pF - 470 pF	PLC 912 C	LCC
NO249	47 pF	BDBK - 400 V 20% N1500/1B	DRALORIC
	1000 pF	BDBK-400 V-20 + 80% R4000	DRALORIC
NO251	0,001 µF	KEI 210	LCC
	0,01 µF	KEG 213	LCC
	0,1 µF	KEF 218	LCC
	1 µF	KEF 231	LCC
NO263	0,01 µF - 0,022 µF	IFI 013	LCC
	0,047 µF - 0,1 µF	IFG 013	LCC
	0,22 µF	IFG 018	LCC
	0,47 µF	IFG 023	LCC
	1 µF	IFG 031	LCC
	0,1 µF - 400 V	IFI 018	LCC

POTENTIOMETRES

NO314	palier Ø 6 mm	P14 TRA	SFERNICE
	palier Ø 8 mm	P14 XRA	SFERNICE
NO332	montage horizontal	VA05 H	OHMIC
	montage vertical	VA05 V	OHMIC

NOMENCLATURE

Fig.
N° 7 5532 0050

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
	Capots de tiroir	SP	SCHLUMBERGER	8873-22010
	Bouton gris	021 2310	ELMA	2196-21231
	Capuchon gris	040 1010	ELMA	2196-14590
	Capuchon rouge	040 1030	ELMA	2196-14592
	Corps de bouton gris avec	023 3		2196-13155
	Douille de serrage	4918 06		
	Noix de serrage	4919 05		2196-00010
	Bouton gris	11602	JEANRENAUD	2104-00813

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par * pour lesquels il est impératif

5532	NOMENCLATURE IDENTIFICATIONS FRANCAISE ANGLAISE	Fig. N° 7 5532 0051

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
	Sérigraphie française			8668-08033
	Sérigraphie anglaise			8668-08060
	Plaque sérigraphiée			8668-22017

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

5532
PLATINE AVANT

NOMENCLATURE

Fig.
N° 7 5532 0100

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
	S.E commutateur et atténuateur V.A			7553-21022
	S.E commutateur et atténuateur V.B			7553-21023
DS2001	Diode électroluminescente rouge	TIL 209		2007-02090
DS2002	Diode électroluminescente rouge	TIL 209		2007-02090
R2025	Potentiomètre 10 kΩ 20% Ø4 long 10,5	CM 12 NA		1062-21001
R2026	Potentiomètre 10 kΩ 20% Ø4 long 10,5	CM 12 NA		1062-21001
R2027	Potentiomètre 10 kΩ 20% Ø4 long FT:16	CM 12 NA		1062-21001
R2028	Potentiomètre 10 kΩ 20% Ø4 long FT:16	CM 12 NA		1062-21001
S2003	Inverseur qualité professionnelle Bouton noir : H : 14 mm	51 MT	IR	2184-05113
S2004	Ensemble = 0 ∼	20009 1020A		3999-30000
	monté sur plan	SP	SCHLUMBERGER	8990-09132
S2005	Ensemble = 0 ∼	20009 1020 A		3999-30000
	monté sur plan	SP	SCHLUMBERGER	8990-09132
	Platine avant	SP	SCHLUMBERGER	8683-22019
	Ecrou de pot. pour R2027 R2028	SP	SCHLUMBERGER	8400-34007
	Canon de pot. pour R2027 R2028	SP	SCHLUMBERGER	8695-24002
	Ecrou rond pour R2025 R2026	Ø 10 x 0,75	SCHLUMBERGER	8400-34003
	Ecrou rond pour S2001 S2002	Ø 7 x 0,75	SCHLUMBERGER	8400-34004
	Canon pour axe de 4	SP	SCHLUMBERGER	8695-44001
	Embase panneau avant	640	JEANRENAUD	2155-06400
	Plaquette sérigraphie	SP	SCHLUMBERGER	8668-22017

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

5532 NOMENCLATURE

PLATINE ARRIERE

Fig. N° 7 5532 0200

Repère	Description	Fournisseur (1) Référence	Nom	Code CRC
	Platine arrière avec détrompeur			8688-22006
	à prendre dans 8688-22003			
	Guide protection de CI	SP	SCHLUMBERGER	8510-41001
	Plaquette signalétique	SP	SCHLUMBERGER	8670-22001
	Rivet chaubert	1131 0306	AVDEL	3012-24480

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par * pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
	Schéma électrique fig. 2			6553-20802
	Schéma électrique fig. 3			6553-20803
	Schéma électrique fig. 4			6553-20804
	Schéma électrique fig. 5			6553-20805
	Schéma électrique fig. 6			6553-20806
	Atténuateur voie A			
C2001	Cap. 0,1 µF polyester 400 V métal	NO 263		1705-31001
C2002	Cap. 0,5/3 pF ajustable	3120 09020		1549-03031
C2006	Cap. 0,8/6 pF ajustable	3120 09150		1549-03061
C2019	Cap. 15 pF 5% 63 V céramique I	NO 245		1490-01501
C2020	Cap. 33 pF 5% 63 V céramique I	NO 245		1490-03301
C2023	Cap. 10000pF 50 V céramique II	NO 242		1493-21002
R2001	Résistance 22 Ω 5% 1/4 W carbone	NO 102		0164-00220
R2002	Résistance 10 Ω 5% 1/4 W carbone	NO 102		0164-00100
R2003	Résistance 900 kΩ 1% 1/8 W métal	NO 112		0413-29000
R2004	Résistance 100 Ω 5% 1/4 W carbone	NO 102		0164-01000
R2006	Résistance 22 Ω 5% 1/4 W carbone	NO 102		0164-00220
R2007	Résistance 990 kΩ 1% 1/8 W métal	NO 112		0413-29900
R2008	Résistance 22 Ω 5% 1/4 W carbone	NO 102		0164-00220
R2029	Résistance 620 Ω 5% 1/4 W carbone	NO 102		0164-06200
R2030	Résistance 10 Ω 5% 1/4 W carbone	NO 102		0164-00100
	Atténuateur voie B			
C2010	Cap. 0,1 µF polyester 400 V métal	NO 263		1705-31001
C2011	Cap. 0,5/3 pF ajustable	3120 09020		1549-03031
C2015	Cap. 0,8/6 pF ajustable	3120 09150		1549-03061
C2021	Cap. 15 pF 5% 63 V céramique I	NO 245		1490-01501
C2022	Cap. 33 pF 5% 63 V céramique I	NO 245		1490-03301
C2024	Cap. 10000 pF 50 V céramique II	NO 242		1493-21002

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ⁎ pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
R2010	Résistance 22 Ω 5% 1/4 W carbone	NO 102		0164-00220
R2011	Résistance 10 Ω 5% 1/4 W carbone	NO 102		0164-00100
R2012	Résistance 900 kΩ 1% 1/8 W métal	NO 112		0413-29000
R2013	Résistance 100 Ω 5% 1/4 W carbone	NO 102		0164-01000
R2015	Résistance 22 Ω 5% 1/4 W carbone	NO 102		0164-00220
R2016	Résistance 990 kΩ 1% 1/8 W métal	NO 112		0413-29900
R2017	Résistance 22 Ω 5% 1/4 W carbone	NO 102		0164-00220
R2031	Résistance 10 Ω 5% 1/4 W carbone	NO 102		0164-00100
	CI Z1			
R2020	Résistance 2 kΩ 5% 1/4 W carbone	NO 102		0164-00220
R2023	Résistance 2 kΩ 5% 1/4 W carbone	NO 102		0164-00220
	Mini PV	47 217	BERG	2144-47439
	Boitier 13 contacts			
	Boitier 14 contacts			
	Boitier 9 contacts à prendre			
	Boitier 4 contacts dans	650 39/1		2144-50391
	Boitier 7 contacts			
	Boitier 6 contacts			
	Boitier 5 contacts			
	Raccordement mécanique			
	Sous ensemble CI Z1			7553-23021
	Sous ensemble CI Z2			7553-21062
	Sous ensemble CI Z3			7553-21041
	Sous ensemble CI Z4			7553-21051
	Sous ensemble Platine arrière			7553-20200
	Sous ensemble Platine avant			7553-20100
	Longeron supérieur à prendre dans	8730-27015		8583-24015
	Longeron inférieur à prendre dans	8730-27015		8583-24005

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

5532 NOMENCLATURE
RACCORDEMENT ELECTRIQUE ET MECANIQUE

Fig.
N° 7 5532 0600 /3

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
	Rondelle	Ø2,2x4,2x0,5	MFOM 00	3040-02040
	Ressort de verrouillage	SP	SCHLUMBERGER	8771-32015
	Oeillet	1840	MFOM	3020-18400
	Vis CRU CB 3 x 12		SCHLUMBERGER	3099-03012
	Rondelles Ø int. 3,2 x 5 x 0,5		MFOM 1D	3040-03050
	Equerre fixation carte mère	SP	SCHLUMBERGER	8410-14019
	Collier de cablage	TYB Z3	T & B	3005-00010
	Câble blindé 2 conducteurs	DFSG 485	FILOTEX	2402-04850
	Câble coaxial 1 conducteur	50 SMD	FILOTEX	2402-00050
	Souplisso téflon	AWG 18	LAM.RIVIERE	2525-00180

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par * pour lesquels il est impératif

5532 NOMENCLATURE Fig. 2

COMMUTATEUR ET ATTENUATEUR VOIE A N° 7 5532 1022

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
	Commutateur			
	Schéma électrique			6553-20802
S2001	Commutateur rotatif	7925-10023	JEANRENAUD	8925-10006
	Rondelle élastique	SP	SCHLUMBERGER	8475-36001
R2021	Potentiomètre 10 kΩ log.20% inter fin de course à droite		COREL	1114-01310
R2019	Résistance 1 kΩ 5% 1/4 W carbone	NO 102		0164-10100
	Rondelle	2,2x4,2x0,5	MFOM 00	3040-02040
	Colonnette	SP	SCHLUMBERGER	8345-34004
	Axe de commande pot.	SP	SCHLUMBERGER	8625-34016
	Atténuateur			
	Schéma électrique			6553-20802
C2003	Cap. 4,7 pF 0,25 pF 500 V céramique I	NO 246		1491-00471
C2004	Cap. 0,8/6 pF ajustable	C004 JA/6E		1510-00089
C2005	Cap. 15 pF 10%	2933 000		1290-00153
C2007	Cap. 0,8/6 pF	C004 JA/6E		1510-00089
C2008	Cap. 4,7 pF 0,25 pF 500 V céramique I	NO 246		1491-00471
C2009	Cap. 470 pF	2933 000		1290-04703
R2005	Résistance 111 kΩ 1% 1/8 W métal	NO 112		0413-21110
R2009	Résistance 10,1 kΩ 1% 1/8 W métal	NO 112		0413-20101
	Boitier atténuateur Voie A	SP	SCHLUMBERGER	8735-32008
	Equerre de boitier atténuateur	SP	SCHLUMBERGER	8410-32019

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

5532 NOMENCLATURE COMMUTATEUR ET ATTENUATEUR VOIE B				Fig. 2 N° 7 5532 1023
Repère	**Description**	**Fournisseur (1)** **Référence**	**Nom**	**Code CRC**
	Commutateur			
	Schéma électrique			6553-20802
S2002	Commutateur rotatif	925-10024	JEANRENAUD	8925-10007
	Rondelle élastique	SP	SCHLUMBERGER	8475-36001
R2024	Potentiomètre 10 kΩ log.20% inter fin de course à droite		COREL	1114-1310
R2022	Résistance 1 kΩ 5% 1/4 W carbone	NO 102		0164-10100
	Rondelle	2,2x4,2x05	MFOM 00	3040-02040
	Colonnette	SP	SCHLUMBERGER	8345-34004
	Axe de commande pot.	SP	SCHLUMBERGER	8625-34016
	Atténuateur			
	Schéma électrique			6553-20802
C2012	Cap. 4,7 pF 0,25 pF 500 V céramique I	NO 246		1491-00471
C2013	Cap. 0,8/6 pF ajustable	3120 09150	STETTNER	1549-03061
C2014	Cap. 15 pF 10%	2933 000		1290-00153
C2016	Cap. 0,8/6 pF ajustable	3120 09150	STETTNER	1549-03061
C2017	Cap. 4,7 pF 0,25 pF 500 V céramique I	NO 246		1491-00471
C2018	Cap. 470 pF 10%	2933 000		1290-04703
R2014	Résistance 111 kΩ 1% 1/8 W métal	NO 112		0413-21110
R2018	Résistance 10,1 kΩ 1% 1/8 W métal	NO 112		0413-20101
	Boitier atténuateur voie B	SP	SCHLUMBERGER	8735-32007
	Equerre de boitier atténuat.	SP	SCHLUMBERGER	8410-32020

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par * pour lesquels il est impératif

5532 CI Z1	NOMENCLATURE	Fig. 2 N° 7 5532 3021 /1

Repère	Description	Fournisseur (1) Référence	Nom	Code CRC
	Schéma électrique fig. 2			6553-20802
	Schéma électrique fig. 3			6553-20803
	Schéma électrique fig. 6			6553-20806
	Circuit imprimé CI Z1			7553-20701
	Berg post	48021	BERG	2144-48021
	Berg post	47310	BERG	2144-47330
	Plot de cablage	BFM 16/6 étamé com.		3685-01660
	Plot de cablage	SP	SCHLUMBERGER	8570-34001
	Plan du plot	SP	SCHLUMBERGER	8570-34001
	Broche molex	1938	MOLEX	2040-01938
	Barrette Molex	24608	MOLEX	2144-24608
	Rondelle caoutchouc		Maison du Caoutchouc	3285-07122
	Axe de potentiomètre	SP	SCHLUMBERGER	8625-54021
	Manchon pour raccord d'axe	SP	SCHLUMBERGER	8590-24001
	Montage suivant plan			8990-09009
	Entretoise décoltée	SP	SCHLUMBERGER	8450-34014
	Plaquette de blindage	SP	SCHLUMBERGER	8675-32015
	Entretoise	FFH 12		8451-34009
	Radiateur	SP	SCHLUMBERGER	8761-22006
	Radiateur	SP	SCHLUMBERGER	8761-22008
	Oeillet à ressort	DTO 3,6	COMATEL	3020-00010
C1	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C2	Cap. 6-22 pF ajustable	5STRIKO 04 N1500		1553-00622
C3	Cap. 3,5-10 pF ajustable	7STRIKO 02 N470		1557-00351
C4	Cap. 15 pF 5% 63 V céram.I	NO 245		1490-01501
C5	Cap. 6/22 pF ajustable	5STRIKO 04 N1500		1553-00622
C6	Cap. 82 pF 5% 63 V céram.I	NO 245		1490-08201
C7	Cap. 7/35 pF ajustable	7STRIKO 02 N1500		1557-00700
C9	Cap. 47 pF 5% 63 V céram.I	NO 245		1490-04701
C10	Cap. 6-22 pF ajustable	5STRIKO 04 N1500		1553-00622

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
C11	Cap. 0,5/3pF ajustable	3120 09020	STETTNER	1549-03031
C12	Cap. 4700 pF -20+50% céram.II	NO 243		1494-14701
C13	Cap. 22 µF 25 V chimic	NO 221		1566-12219
C14	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C15	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C16	Cap. 1000 pF 10% 63 V céram.II	NO 242		1495-11001
C18	Cap. 1000 pF 10% 63 V céram.II	NO 242		1495-11001
C19	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C20	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C21	Cap. 7/35 pF ajustable	7STRIKO 02 N1500		1557-00700
C22	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C23	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C24	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C25	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C26	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C27	Cap. 6/22 pF ajustable	5STRIKO 04 N1500		1553-00622
C28	Cap. 3,5/10 pF ajustable	7STRIKO 02 N470		1557-00351
C29	Cap. 15 pF 5% 63 V céram.I	NO 245		1490-01501
C30	Cap. 6/22 pF ajustable	5STRIKO 04 N1500		1553-00622
C31	Cap. 82 pF 5% 63 V céram.I	NO 245		1490-08201
C32	Cap. 7/35 pF ajustable	7STRIKO 02 N1500		1557-00700
C34	Cap. 47 pF 5% 63 V	NO 245		1490-04701
C35	Cap. 6/22 pF ajustable	5STRIKO 04 N1500		1553-00622
C36	Cap. 0,5/3 pF ajustable	3120 09020	STETTNER	1549-03031
C37	Cap. 4700 pF -20+50% 500 V céram.II	NO 243		1494-14701
C38	Cap. 22 µF 25 V chimic	NO 221		1566-12219
C39	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C40	Cap. 10000 pF -20 + 100% 50 V céram.II	NO 242		1493-21002
C41	Cap. 1000 pF 63 V 10% céram.II	NO 242		1495-11001
C43	Cap. 10000 pF 10% 63 V céram.II	NO 242		1495-11001
C44	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C45	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C46	Cap. 7/35 pF ajustable	7STRIKO 02 N1500		1557-00700

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Nom	Code CRC
C47	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C48	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C49	Cap. 10 pF 25 V chimic	NO 221		1566-11019
C50	Cap. 10 pF 25 V chimic	NO 221		1566-11019
C51	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C52	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C53	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C54	Cap. 10000 pF -20+50% 500 V céram.II	NO 243		1494-21001
C56	Cap. 1000 pF 10% 63 V céram.II	NO 242		1495-11001
C57	Cap. 1000 pF 10% 63 V céram.II	NO 242		1495-11001
C58	Cap. 1000 pF 10% 63 V céram.II	NO 242		1495-11001
C59	Cap. 1000 pF 10% 63 V céram.II	NO 242		1495-11001
C60	Cap. 4,7 µF 63 V chimic	NO 221		1566-04731
C61	Cap. 10000 pF -20+50% 500 V céram.II	NO 243		1494-21001
C62	Cap. 7/35 pF ajustable	7STRIKO 02 N1500		1557-00700
C63	Cap. 7/35 pF ajustable	7STRIKO 02 N1500		1557-00700
C64	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C65	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C66	Cap. 1000 pF 10% 63 V céram.II	NO 242		1495-11001
C67	Cap. 1000 pF 10% 63 V céram.II	NO 242		1495-11001
C68	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C69	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C70	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C71	Cap. 120 pF 5% 63 V céram.I	NO 245		1490-10121
C72	Cap. 120 pF 5% 63 V céram.I	NO 245		1490-10121
C73	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C74	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C75	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C76	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C77	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C78	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C79	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C80	Cap. 10 µF 25 V chimic	NO 221		1566-11019
C81	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C82	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
C83	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C84	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C85	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C86	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C87	Cap. 0,5/3 pF ajustable	3120 09020	STETTNER	1549-03031
C88	Cap. 3,5/10 pF ajustable	5STRIKO 04 N470		1553-00351
C89	Cap. 8,2 pF ± 0,25 pF 63 V céram.I	NO 245		1490-00820
C90	Cap. 2,7 pF ± 0,25 pF 63 V céram.I	NO 245		1490-00270
C91	Cap. 2,2 pF ± 0,25 pF 63 V céram. I	NO 245		1490-00220
C92	Cap. 12 pF 5% 63 V céram.I	NO 245		1490-01201
C93	Cap. 10 pF 5% 63 V céram. I	NO 245		1490-01001
C94	Cap. 1,5 pF ± 0,25 pF 63 V céram. I	NO 245		1490-00150
C95	Cap. 12 pF 5% 63 V céram. I	NO 245		1490-01201
C96	Cap. 4,7 pF ± 0,25 pF 63 V céram. I	NO 245		1490-00470
C97	Cap. 27 pF 5% 63 V céram. I	NO 245		1490-02701
C98	Cap. 10000 pF -20+100% 63 V céram. II	NO 242		1493-21002
C99	Cap. 10000 pF -20+100% 63 V céram.II	NO 242		1493-21002

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

5532 CI Z1	NOMENCLATURE	Fig. 2 N° 7 5532 3021/5

Repère	Description	Fournisseur (1) Référence	Nom	Code CRC
CR1	Diode	1N 3595		2003-03000
CR2	Diode	1N 3595		2003-03000
CR3	Diode	1N 3595		2003-03000
CR4	Diode	1N 3595		2003-03000
CR5	Diode	1N 4148		2003-41480
CR6	Diode	1N 4148		2003-41480
L1	Perle ferrite 3,5 x 1,2 x 3/4 A	4311 020 51340		2126-00100
L2	Perle ferrite 3,5 x 1,2 x 3/4 A	4311 020 51340		2126-00100
Q1	Transistor	BC 184		2001-01840
Q2	Transistor	BC 184		2001-01840
Q3	Transistor	ITS 3198		2702-44160
	Distribution Q3 - Q6			6553-20080
Q4	Transistor	2N 918 trié		2702-09182
	Distribution Q4 - Q5			6553-20081
	Transistor 2N 918	N2 083		2001-09188
Q5	Transistor	2N 918 trié		2702-09182
Q6	Transistor	ITS 3198		2702-44160
Q7	Transistor BC 184	N2 081		2001-01840
Q8	Transistor BC 184	N2 081		2001-01840
Q9	Transistor	ITS 3198		2702-44160
	Distribution Q9 - Q12			
Q10	Transistor	2N 918 trié		2702-09182
	Distribution Q10 - Q11			
	Transistor 2N 918	N2 083		2001-09188

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par * pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Nom	Code CRC
Q11	Transistor	2N 918 trié		2702-09182
	Distribution Q10 - Q11			
Q12	Transistor	ITS 3198		2702-44160
Q13-Q14	Transistors triés	PN 4258		2702-42582
	Distribution Q13 - Q14			6553-20082
Q15	Transistor	2N 3546 trié		2702-35461
	Distribution Q15 - Q16			6553-20083
	Transistor 2N 3546	N2 082		2001-35466
Q16	Transistor	2N 3546 trié		2702-35461
Q17	Transistor BC 184	N2 081		2001-01840
Q18	Transistor BC 214	N2 081		2001-02142
Q19	Transistor	2N 2894 trié		2702-28947
	Distribution Q19 - Q20			6553-20084
	Transistor	2N 2894	N2 082	2001-28948
Q20	Transistor	2N 2894 trié		2702-28947
Q21	Transistor	2N 2814 trié		2702-28947
	Distribution Q21 - Q22			
	Transistor 2N 2894	N2 082	N2 082	2001-28948
Q22	Transistor	2N 2894 trié		2702-28947
Q23	Transistor	2N 2894 trié		2702-28947
	Distribution Q23 - Q24			
	Transistor 2N 2894	N2 082		2001-28948
Q24	Transistor	2N 2894 trié		2702-28947
				6553-20084
Q25	Transistor	BC 184		2001-01840
Q26	Transistor	BC 184		2001-01840

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

5532 CI Z1

NOMENCLATURE

Fig. 2
N° 7 5532 3021/7

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
R1	Résistance 1,8 kΩ 5% 1/4 W carbone	NO 102		0164-10180
R2	Résistance 51 Ω 5% 1/4 W carbone	NO 102		0164-00510
R3	Résistance 5,1 kΩ 5% 1/4 W carbone	NO 102		0164-10510
R4	Potentiomètre 10 kΩ 20%	T7YB		1086-00310
R5	Résistance 3,6 kΩ 5% 1/4 W carbone	NO 102		0164-10360
R7	Résistance 2 kΩ 5% 1/4 W carbone	NO 102		0164-10200
R8	Résistance 2 kΩ 5% 1/4 W carbone	NO 102		0164-10200
R9	Résistance 16,5 Ω 1% 1/8 W métal	NO 112		0413-00165
R10	Potentiomètre 4,7 kΩ 10%	T7YB		1086-00247
R11	Potentiomètre 22 kΩ 20%	T7YB		1086-00322
R12	Potentiomètre 100 kΩ 20%	T7YB		1086-00410
R14	Résistance 10 Ω 1% 1/8 W métal	NO 112		0413-00100
R15	Résistance 47,5 Ω 1% 1/8 W métal	NO 112		0413-00475
R16	Potentiomètre 100 Ω 20%	P14T-F36		1088-10110
R17	Résistance 95,3 Ω 1% 1/8 W métal	NO 112		0413-00953
R18	Résistance 10 Ω 1% 1/8 W métal	NO 112		0413-00100
R19	Résistance 1,3 kΩ 1% 1/8 W métal	NO 112		0413-10130
R20	Potentiomètre 100 Ω 20%	T7YB		1086-00110
R21	Résistance 1,3 kΩ 1% 1/8 W métal	NO 112		0413-10130
R22	Résistance 1,74kΩ 5% 1/8 W métal	NO 112		0413-10174
R23	Résistance 1,15kΩ 5% 1/8 W métal	NO 112		0413-10115
R24	Résistance 649 Ω 5% 1/8 W métal	NO 112		0413-06490
R25	Résistance 270 Ω 5% 1/4 W carbone	NO 102		0164-02700
R26	Résistance 49,9 Ω 1% 1/8 W métal	NO 112		0413-00499
R27	Résistance 270 Ω 5% 1/4 W carbone	NO 102		0164-02700
R28	Résistance 49,9 Ω 1% 1/8 W métal	NO 112		0413-00499
R29	Potentiomètre 470 Ω 20%	T7YB		1086-00147
R30	Résistance 1 MΩ 1% 1/8 W métal	NO 112		0413-31000
R31	Résistance 470 kΩ 5% 1/4 W carbone	NO 102		0164-24700
R32	Résistance 470 Ω 5% 1/4 W carbone	NO 102		0164-04700
R33	Résistance 1,6 kΩ 5% 1/4 W carbone	NO 102		0164-10160
R34	Résistance 3010 Ω 1% 1/8 W métal	NO 112		0413-10301
R35	Résistance 3320 Ω 1% 1/8 W métal	NO 112		0413-10332

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
R37	Résistance 82,5 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-39825
R38	Résistance 200 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-30200
R39	Résistance 120 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-30120
R40	Résistance 36,1 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-39361
R41	Résistance 40,2 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-39402
R42	Résistance 64,2 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-39642
R43	Résistance 40,2 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-39402
R44	Résistance 100 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-30100
R45	Potentiomètre 470 Ω 20%	T7YB		1086-00147
R46	Résistance 1,6 kΩ 5% 1/4 W carbone	NO 102		0164-10160
R47	Résistance 470 Ω 5% 1/4 W carbone	NO 102		0164-04700
R48	Résistance 3320 Ω 1% 1/8 W métal	NO 112		0413-10332
R49	Résistance 3010 Ω 1% 1/8 W métal	NO 112		0413-10301
R50	Résistance 49,9 Ω 1% 1/8 W métal	NO 112		0413-00499
R51	Résistance 6,19 kΩ 1% 1/8 W métal	NO 112		0413-10619
R32	Résistance 3,3 Ω 5% 1/4 W carbone	NO 102		0164-00033
R53	Résistance 3,3 Ω 5% 1/4 W carbone	NO 102		0164-00033
R54	Résistance 100 Ω 1% 0,5 W métal	SMA 0411 50ppm		0753-40100
R55	Résistance 100 Ω 1% 0,5 W métal	SMA 0411 50ppm		0753-40100
R56	Résistance 69,8 Ω 1% 1/8 W métal	NO 112		0413-00698
R57	Résistance 15 Ω 1% 1/8 W métal	NO 112		0413-00150
R58	Résistance 20 kΩ 5% 1/4 W carbone	NO 102		0164-20200
R60	Résistance 2 kΩ 5% 1/4 W carbone	NO 102		0164-10200
R61	Résistance 2 kΩ 5% 1/4 W carbone	NO 102		0164-10200
R62	Résistance 16,5 Ω 1% 1/8 W métal	NO 112		0413-00165
R63	Potentiomètre 4,7 kΩ 20%	T7YB		1086-00247
R64	Potentiomètre 22 kΩ 20%	T7YB		1086-00322
R65	Potentiomètre 120 kΩ 20%	T7YB		1086-00410
R67	Résistance 10 Ω 1% 1/8 W métal	NO 112		0413-00100
R68	Résistance 47,5 Ω 1% 1/8 W métal	NO 112		0413-00475
R69	Potentiomètre 100 Ω 20%	P14T-F36		1088-10110
R70	Résistance 95,3 Ω 1% 1/8 W métal	NO 112		0413-00953
R71	Résistance 10 Ω 1% 1/8 W métal	NO 112		0413-00100
R72	Résistance 1,3 kΩ 1% 1/8 W métal	NO 112		0413-10130
R73	Potentiomètre 100 Ω 20%	T7YB		1086-00110

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Nom	Code CRC
R74	Résistance 1,3 kΩ 1% 1/8 W métal	NO 112		0413-10130
R75	Résistance 1,74kΩ 1% 1/8 W métal	NO 112		0413-10174
R76	Résistance 1,15kΩ 1% 1/8 W métal	NO 112		0413-10115
R77	Résistance 649 Ω 1% 1/8 W métal	NO 112		0413-06490
R78	Résistance 49,9 Ω 1% 1/8 W métal	NO 112		0413-00499
R79	Résistance 270 Ω 5% 1/4 W carbone	NO 102		0164-02700
R80	Résistance 270 Ω 5% 1/4 W carbone	NO 102		0164-02700
R81	Résistance 49,9 Ω 1% 1/8 W métal	NO 112		0413-00499
R82	Potentiomètre 470 Ω 20%	T7YB		1086-00147
R83	Résistance 1 MΩ 1% 1/8 W métal	NO 112		0413-31000
R84	Résistance 470 kΩ 5% 1/4 W carbone	NO 102		0164-24700
R85	Résistance 470 Ω 5% 1/4 W carbone	NO 102		0164-04700
R86	Résistance 1,6 kΩ 5% 1/4 W carbone	NO 102		0164-10160
R87	Résistance 3010 Ω 1% 1/8 W métal	NO 112		0413-10301
R88	Résistance 3320 Ω 1% 1/8 W métal	NO 112		0413-10332
...				
R90	Résistance 82,5 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-39825
R91	Résistance 200 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-30200
R92	Résistance 120 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-30120
R93	Résistance 35,1 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-39361
R94	Résistance 40,2 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-39402
R95	Résistance 64,2 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-39642
R96	Résistance 40,2 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-39402
R97	Résistance 100 Ω 0,5% 1/8 W métal	SMA 0207 50ppm		0752-30100
R98	Potentiomètre 470 Ω 20%	T7YB		1086-00147
R99	Résistance 1,6 kΩ 5% 1/4 W carbone	NO 102		0164-10160
R100	Résistance 470 Ω 5% 1/4 W carbone	NO 102		0164-04700
R101	Résistance 3320 Ω 1% 1/8 W métal	NO 112		0413-10332
R102	Résistance 3010 Ω 1% 1/8 W métal	NO 112		0413-10301
R103	Résistance 49,9 Ω 1% 1/8 W métal	NO 112		0413-00499
R104	Résistance 6,19 kΩ 1% 1/8 W métal	NO 112		0413-10619
R105	Résistance 820 Ω 5% 1/4 W carbone	NO 102		0164-08200
R106	Résistance 820 Ω 5% 1/4 W carbone	NO 102		0164-08200
R107	Résistance 3,83 kΩ 1% 0,5 W métal	SMA 0411 50ppm		0753-41383
R108	Résistance 3,83 kΩ 1% 0,5 W métal	SMA 0411 50ppm		0753-41383

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

5532 CI - Z1 NOMENCLATURE				Fig. 2 N° 7 5532 3021/ 10
Repère	**Description**	**Fournisseur (1) Référence**	**Nom**	**Code CRC**
R110	Résistance 787 Ω 1% 1/8 W métal	NO 112		0413-07870
R111	Potentiomètre 470 Ω 20%	T7YB		1086-00147
R112	Résistance 360 Ω 5% 1/4 W carbone	NO 102		0164-03600
R113	Résistance 332 Ω 1% 0,5 W métal	SMA 0411		0753-40332
R114	Résistance 360 Ω 5% 1/4 W carbone	NO 102		0164-03600
R115	Résistance 4,7 kΩ 5% 1/4 W carbone	NO 102		0164-10470
R116	Résistance 28,7 Ω 1% 1/8 W métal	NO 112		0413-00287
R117	Résistance 432 Ω 1% 1/8 W métal	NO 112		0413-04320
R118	Résistance 130 Ω 5% 1/4 W carbone	NO 102		0164-01300
R119	Résistance 130 Ω 5% 1/4 W carbone	NO 102		0164-01300
R120	Résistance 532 Ω 1% 1/8 W métal	NO 112		0413-04320
R121	Résistance 28,7 Ω 1% 1/8 W métal	NO 112		0413-00287
R122	Résistance 4,7 kΩ 5% 1/4 W carbone	NO 102		0164-10470
R123	Résistance 604 Ω 1% 0,5 W métal	SMA 0411 50ppm		0753-40604
R124	Résistance 604 Ω 1% 0,5 W métal	SMA 0411 50ppm		0753-40604
R125	Potentiomètre 10 kΩ 20%	T7YB		1086-00310
R126	Résistance 10 kΩ 5% 1/4 W carbone	NO 102		0164-20100
R127	Résistance 2,7 kΩ 5% 1/4 W carbone	NO 102		0164-10270
R128	Résistance 20 kΩ 5% 1/4 W carbone	NO 102		0164-20200
R129	Résistance 100 Ω 5% 1/4 W carbone	NO 102		0164-01000
R130	Résistance 9,09 kΩ 1% 0,7 W métal	SMA 0617		0754-41909
R131	Résistance 9,09 kΩ 1% 0,7 W métal	SMA 0617		0754-41909
R132	Résistance 3,74 kΩ 1% 0,7 W métal	SMA 0617		0754-41374
R133	Résistance 620 Ω 5% 0,5 W carbone	NO 106		0167-06200
R134	Résistance 301 Ω 1% 1/8 W métal	NO 112		0413-03010
R135	Potentiomètre 100 Ω 20%	T7YB		1086-00110
R136	Résistance 301 Ω 1% 1/8 W métal	NO 112		0413-03010
R137	Potentiomètre 1 kΩ 20%	T7YB		1086-00210
R138	Résistance 66,5 Ω 1% 1/8 W métal	NO 112		0413-00665
R139	Potentiomètre 100 Ω 20%	T7YB		1086-00110
R140	Résistance 200 Ω 1% 1/8 W métal	NO 112		0413-02000
R141	Résistance 200 Ω 1% 1/8 W métal	NO 112		0413-02000
R142	Résistance 105 Ω 1% 1/8 W métal	NO 112		0413-01050
R143	Résistance 200 Ω 1% 1/8 W métal	NO 112		0413-02000
R144	Résistance 200 Ω 1% 1/8 W métal	NO 112		0413-02000
R145	Résistance 105 Ω 1% 1/8 W métal	NO 112		0413-01050
R146	Résistance 66,5 Ω 1% 1/8 W métal	NO 112		0413-00665

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ⁎ pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
R147	Potentiomètre 100 Ω 20%	T7YB		1086-00110
R148	Potentiomètre 1 kΩ 20%	T7YB		1086-00210
R149	Résistance 301 Ω 1% 1/8 W métal	NO 112		0413-03010
R150	Potentiomètre 100 Ω 20%	T7YB		1086-00110
R151	Résistance 301 Ω 1% 1/8 W métal	NO 112		0413-03010
R152	Résistance 3,74 kΩ 1% 0,7 W métal	SMA 0617 50ppm		0754-41374
R153	Résistance 620 Ω 5% 0,5 W carbone	NO 106		0167-06200
R154	Résistance 348 Ω 1% 0,7 W métal	SMA 0617 50ppm		0754-40348
R155	Résistance 432 Ω 1% 1/8 W métal	NO 112		0413-04320
R156	Résistance 82 Ω 5% 1/4 W carbone	NO 102		0164-00820
R157	Résistance 82 Ω 5% 1/4 W carbone	NO 102		0164-00820
R158	Résistance 432 Ω 1% 1/8 W métal	NO 112		0413-04320
R159	Résistance 28,7 Ω 1% 1/8 W métal	NO 112		0413-00287
R160	Résistance 619 Ω 1% 0,5 W métal	SMA 0211 50ppm		0753-40619
R161	Résistance 619 Ω 1% 0,5 W métal	SMA 0411 50ppm		0753-40619
R162	Résistance 28,7 Ω 1% 1/8 W métal	NO 112		0413-00287
R163	Résistance 820 Ω 5% 1/4 W carbone	NO 102		0164-08200
R164	Résistance 51 Ω 5% 1/4 W carbone	NO 102		0164-00510
R165	Résistance 820 Ω 5% 1/4 W carbone	NO 102		0164-08200
R166	Résistance 820 Ω 5% 1/4 W carbone	NO 102		0164-08200
R167	Résistance 274 Ω 1% 1/8 W métal	NO 112		0413-02740
R168	Résistance 820 Ω 5% 1/4 W carbone	NO 102		0164-08200
R169	Résistance 51 Ω 5% 1/4 W carbone	NO 102		0164-00510
R170	Résistance 820 Ω 5% 1/4 W carbone	NO 102		0164-08200
R171	Résistance 820 Ω 5% 1/4 W carbone	NO 102		0164-08200
R172	Résistance 274 Ω 1% 1/8 W métal	NO 112		0413-02740
R174	Résistance 100 Ω 1% 1/8 W métal	NO 102		0164-01000
R175	Résistance 6,2 kΩ 1% 1/8 W métal	NO 102		0164-10620
R176	Résistance 100 Ω 1% 1/8 W métal	NO 102		0164-01000
R177	Potentiomètre 22 Ω 20%	T7YB		1086-00022
R178	Résistance 100 Ω 5% 1/4 W carbone	NO 102		0164-01000
R179	Potentiomètre 1 kΩ 20%	T7YB		1086-00210
R180	Résistance 12 kΩ 5% 1/4 W carbone	NO 102		0164-20120
R181	Résistance 12 kΩ 5% 1/4 W carbone	NO 102		0164-20120
R182	Résistance 130 Ω 5% 1/4 W carbone	NO 102		0164-01300

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par * pour lesquels il est impératif

5532 CI Z1	NOMENCLATURE	Fig. 2 N° 7 5532 3021/12

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
R183	Résistance 130 Ω 5% 1/4 W carbone	NO 102		0164-01300
R184	Résistance 10 Ω 5% 1/4 W carbone	NO 102		0164-00100
R185	Potentiomètre 1 kΩ 20%	T7YB		1086-00210
R186	Potentiomètre 1 kΩ 20%	T7YB		1086-00210
U1/U2	Circuits intégrés triés	A250	SCHLUMBERGER	2750-25001

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

5532 NOMENCLATURE CI - Z3						Fig. 4 N° 7 5532 1041
Repère	**Description**				**Fournisseur (1) Référence**	**Nom**	**Code CRC**
	Schéma électrique						6553-20804
	Circuit imprimé CI Z3						7553-20703
C1	Cap.	10000 pF	-20+100%	50 V céram.II	NO 242		1493-21002
C2	Cap.	47 pF	10%	disque	CFC 904		1317-04705
C3	Cap.	47 µF	10 V	chimic	NO 221		1566-14707
R1	Résistance	4,3 kΩ	5% 1/4 W	carbone	NO 102		0164-10430
R2	Résistance	4,3 kΩ	5% 1/4 W	carbone	NO 102		0164-10430
R3	Résistance	4,3 kΩ	5% 1/4 W	carbone	NO 102		0164-10430
R4	Résistance	4,3 kΩ	5% 1/4 W	carbone	NO 102		0164-10430
R5	Résistance	4,3 kΩ	5% 1/4 W	carbone	NO 102		0164-10430
R6	Résistance	4,3 kΩ	5% 1/4 W	carbone	NO 102		0164-10430
R7	Résistance	4,3 kΩ	5% 1/4 W	carbone	NO 102		0164-10430
R8	Résistance	4,3 kΩ	5% 1/4 W	carbone	NO 102		0164-10430
R9	Résistance	4,3 kΩ	5% 1/4 W	carbone	NO 102		0164-10430
U1	Circuit intégré				SN 74L00N		2608-07400
U2	Circuit intégré				SN 7472N		2606-07472
U3	Circuit intégré				SN 74L10N		2608-07410
U4	Circuit intégré				SN 74L03 N		2608-07403
U5	Circuit intégré				SN 74L00N		2608-07400
U6	Circuit intégré				SN 7406 N		2606-07406
	Mini PV vertical				7S 302-1	BERG	2144-47796
	Broche Molex				1938	MOLEX	2040-01938
	Barrette Molex				2460-7	MOLEX	2144-24607
	Berg Post				47310	BERG	2144-47330
	Berg Post				47311	BERG	2144-47331

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ⁎ pour lesquels il est impératif

5532	NOMENCLATURE CI - Z4 PREAMPLI SYNCHRO	Fig. 5 N° 7 5532 1051/1

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
C1	Cap. 47000 pF - 20+80% 50 V céram.II	NO 242		1493-24701
C2	Cap. 4700 pF -20+50% 50 V céram.II	NO 242		1493-14702
C3	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C4	Cap. 22 pF 5% 500V céram.I	NO 246		1491-02201
C5	Cap. 4,7 µF 10 V chimic	NO 221		1566-14707
C6	Cap. 1000 pF 10% 63 V	NO 242		1495-11001
C7	Cap. 1000 pF 10% 63 V	NO 242		1495-11001
C8	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C9	Cap. 7/35 pF ajustable	7 STRIKO 02N1500		1557-00700
C10	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C11	Cap. 27 pF 5% 63 V céram.I	NO 245		1490-02701
C12	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C13	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C14	Cap. 47 µF 10 V chimic	NO 221		1566-14707
C15	Cap. 1000 pF 10% 63 V	NO 242		1495-11001
C16	Cap. 10000 pF 10% 63 V	NO 242		1495-11001
C17	Cap. 7/35 pF ajustable	7STRIKO 02N1500		1557-00700
C18	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C19	Cap. 27 pF 5% 63 V céram.I	NO 245		1490-02701
C20	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C21	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
C22	Cap. 10000 pF -20+100% 50 V céram.II	NO 242		1493-21002
Q1	Transistor trié	2N 918		2702-09182
	Distribution Q1 - Q2			6553-20085
	Transistor 2N 918	N2 083		2001-09188
Q2	Transistor			2702-09182
Q3	Transistor trié	2N 918		2702-09182
	Distribution Q3 - Q4			
	Transistor 2N 918	N2 083		2001-09188
Q4	Transistor trié	2N 918		2702-09182

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par * pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
Q5	Transistor trié	2N 918		2702-09182
	Distribution Q5 - Q6			
	Transistor 2N 918	N2 083		2001-09188
Q6	Transistor trié	2N 918		2702-09182
Q7	Transistor trié	2N 918		2702-09182
	Distribution Q7 - Q8			
	Transistor 2N 918	N2 083		2001-09188
Q8	Transistor trié	2N 918		2702-09182
Q9	Transistor trié	2N 918		2702-09182
	Distribution Q9 - Q10			
	Transistor 2N 918	N2 083		2001-09188
Q10	Transistor trié	2N 918		2702-09182
Q11	Transistor trié	2N 918		2702-09182
	Distribution Q11 - Q12			
	Transistor 2N 918	N2 083		2001-09188
Q12	Transistor trié	2N 918		2702-09182
R1	Potentiomètre 2,2 kΩ 20%	T7YB		1086-00222
R2	Potentiomètre 220 Ω 20%	T7YB		1086-00122
R3	Résistance 10 Ω 1% 1/8 W métal	N0 112		0413-00100
R4	Résistance 4,75 kΩ 1% 1/8 W métal	N0 112		0413-10475
R5	Potentiomètre 47 kΩ 20%	T7YB		1086-00347
R6	Résistance 4,75 kΩ 1% 1/8 W métal	N0 112		0413-10475
R7	Potentiomètre 100 Ω 20%	T7YB		1086-00110
R9	Résistance 10 Ω 5% 1/8 W métal	N0 101		0352-03010
R10	Résistance 10 Ω 5% 1/8 W métal	N0 101		0352-03010
R11	Résistance 10 Ω 5% 1/8 W métal	N0 101		0352-03010
R12	Résistance 220 Ω 5% 1/4 W carbone	N0 102		0164-02200

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
R13	Résistance 220 Ω 5% 1/4 W carbone	NO 102		0164-02200
R14	Résistance 100 Ω 20%	T7YB		1086-00110
R15	Résistance 100 Ω 5% 1/8 W métal	NO 101		0352-03110
R16	Résistance 6040 Ω 1% 1/8 W métal	NO 112		0413-10604
R17	Potentiomètre 2,2 kΩ 20%	T7YB		1086-00222
R18	Résistance 6040 Ω 1% 1/8 W métal	NO 112		0413-10604
R19	Résistance 100 Ω 5% 1/8 W métal	NO 101		0352-03110
R20	Résistance 4,99 kΩ 1% 1/8 W métal	NO 112		0413-10499
R21	Résistance 147 Ω 1% 1/8 W métal	NO 112		0413-01470
R23	Résistance 147 Ω 1% 1/8 W métal	NO 112		0413-01470
R24	Résistance 4,99 kΩ 1% 1/8 W métal	NO 112		0413-10499
R25	Résistance 649 Ω 1% 0,5 W métal	SMA 0411 50ppm	C.R.L	0753-40649
R26	Résistance 10 Ω 5% 1/8 W métal	NO 101		0352-03010
R27	Résistance 10 Ω 5% 1/8 W métal	NO 101		0352-03010
R28	Résistance 10 Ω 5M 1/8 W métal	NO 101		0352-03010
R29	Résistance 220 Ω 5% 1/4 W carbone	NO 102		0164-02200
R30	Résistance 220 Ω 5% 1/4 W carbone	NO 102		0164-02200
R31	Potentiomètre 100 Ω 20%	T7YB		1086-00110
R32	Résistance 100 Ω 5% 1/8 W métal	NO 101		0352-03110
R33	Résistance 6040 Ω 1% 1/8 W métal	NO 112		0413-10604
R34	Potentiomètre 2,2 kΩ 20%	T7YB		1086-00222
R35	Résistance 6040 Ω 1% 1/8 W métal	NO 112		0413-10604
R36	Résistance 100 Ω 5% 1/8 W métal	NO 101		0352-03110
R37	Résistance 4,99 kΩ 1% 1/8 W métal	NO 112		0413-10499
R38	Résistance 147 Ω 1% 1/8 W métal	NO 112		0413-01470
R40	Résistance 147 Ω 1% 1/8 W métal	NO 112		0413-01470
R41	Résistance 4,99 kΩ 1% 1/8 W métal	NO 112		0413-10499
R42	Résistance 649 Ω 1% 0,5 W métal	SMA 0411 50ppm	C.R.L	0753-40649
R43	Résistance 10 kΩ 1% 1/8 W métal	NO 112		0413-20100
R44	Résistance 10 kΩ 1% 1/8 W métal	NO 112		0413-20100
R45	Résistance 10 kΩ 1% 1/8 W métal	NO 112		0413-20100
R46	Résistance 10 kΩ 1% 1/8 W métal	NO 112		0413-20100

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

5532 NOMENCLATURE PREAMPLI SYNCHRO CI - Z4

Fig. 5
N° 7 5532 - 1051/4

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
	Schéma électrique fig. 5			6553-20805
	Carte CI Z4			7553-20704
S1	Cellule 4 inverseurs	Type TJY		2104-01276
	Radiateurs	SP	SCHLUMBERGER	8761-22003
	Manchon raccord TJ	SP	SCHLUMBERGER	8590-24002
	Montage S. plan			8990-09086
	Axe de TJ	SP	SCHLUMBERGER	8625-54012
	Berg Post	47 310	BERG	2144-47330
	Berg Post	47 311	BERG	2144-47331

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par ※ pour lesquels il est impératif

5532 NOMENCLATURE

CI Z2

Fig. 6

N° 7 5532 1062

Repère	Description	Fournisseur (1) Référence	Fournisseur (1) Nom	Code CRC
	Circuit imprimé CI Z2			7553-20702
	Schéma électrique fig. 6			6553-20806
C1	Cap. 4700 pF -20+50% 50 V céram.II	NO 242		1493-14702
C2	Cap. 4700 pF -20+50% 50 V céram.II	NO 242		1493-14702
C3	Cap. 4700 pF -20+50% 50 V céram.II	NO 242		1493-14702
C4	Cap. 4700 pF -20+50% 50 V céram.II	NO 242		1493-14702
C5	Cap. 4700 pF -20+50% 50 V céram.II	NO 242		1493-14702
C6	Cap. 4700 pF -20+50% 50 V céram.II	NO 242		1493-14702
C7	Cap. 4700 pF -20+50% 50 V céram.II	NO 242		1493-14702
C8	Cap. 4700 pF -20+50% 50 V céram.II	NO 242		1493-14702
S1	Commutateur	SP	SCHLUMBERGER	8926-00019
S2	Commutateur	SP	SCHLUMBERGER	8926-00018
	Axe de commutateur	SP	SCHLUMBERGER	8625-44006
	Manchon	SP	SCHLUMBERGER	8590-24002
	Montage S.plan			8990-09086
	Entretoise	SP	SCHLUMBERGER	8451-34009
	Ecrou (pour entretoise)	HM 2,5		3100-00250
	Cosse	MFOM 5C		3001-00051
	Plaquette de protection	SP	SCHLUMBERGER	8675-42025
	Plot de cablage	SP	SCHLUMBERGER	8570-34001
	Plan du plot			8570-34001
	Berg Post	47 310	BERG	2144-47330
	Berg Post	47 311	BERG	2144-47331
	Plaquette isolante	SP	SCHLUMBERGER	8675-42019

(1) le fournisseur est donné à titre indicatif sauf dans les cas repérés par * pour lesquels il est impératif