STORNOPHONE 800

MAINTENANCE MANUAL

Section 1.

TITLE		CODE
CQP800	Technical Specifications	60.164-E2
CQP800U-IS	Technical Specifications	60.430-EI
CQP810U	Technical Specifications	60.351-E1
CQP830U	Technical Specifications	60.336-E1
CQP860U	Technical Specifications	60.355-E1
CQP800	General Description and Operating Instructions	60.237-E1
CQP800-IS	Technical Specifications	60.299-E1
CQP800-IS	Description	60.293-E1
CRP800	Technical Specifications	60.319-E1
CRP800	General Description and Operating Instructions	60.313-E1
CQP800U	General Description and Operating Instructions	60.357-E1
CQP800U-IS	General Description and Operation Instructions	60.432-E1
CQP800U-IS 0.2W	General Description	60.433-E1
	Adjustment Procedure	60.431-E1
CQP800U-IS 1W	General Description	60.434-E1

Service Coordination

06 - 80

STORNOPHONE 800U-IS 1W and 0.2W
TECHNICAL SPECIFICATIONS

TYPE CQP 800			813U-IS	814U-IS	833U-IS	834U-IS	863U-IS
GENERAL	Channel separation	kHz	20/25	12.5	20/25	12.5	20/25
	Frequency band	MHz	146-174		68-88		420/470
	Maximum RF bandwidth	MHz	1.5		1.5		2.0
	Number of RF channels		2, 4, 8, or 12 channels				
	Antenna Impedance	Ω	50				
	Ambient temperature range Operating range Functioning		 -25°C - +55°C -30°C - +60°C				
TRANSMITTER	RF output	W	0.2 - 1		0.2 - 1		0.2 - 1
	Modulation		Phase (PM)				
	AF response		+6dB pr. octave preemphasis				
	Phase modulation	Hz	300-3000	300-2400	300-3000	300-2400	300-3000
	Maximum frequency swing	kHz	±4/±5	±2.5	±4/±5	±2.5	±4/±5
	Spurious and harmonic radioation		Attenuated to meet government specifications				
RECEIVER	Sensitivity e.m.f. for: 12dB SINAD (EIA) 20dB S/N (FTZ)	 uV uV	 0.5 0.6		 0.5 0.6		 0.7 0.8
	Intermodulation attenuation	dB	75		75		70
	Adjacent channel selectivity	dB	85				
	Spurious attenuation	dB	85				
	AF output power	W	0.2				
	AF response		-6dB pr. octave deemphasis				
	Phase modulation		300-3000	300-2400	300-3000	300-2400	300-3000
BATTERY	Type of battery		BU809 (1W), BU805 (0.2W)				
	Min. voltage		10.0V				
	Nom. voltage		12.4V				
	Max. voltage		15.3V				
	Max. RF output power		1.0W				

STORNOPHONE 800U-IS

INTRINSICALLALLY SAFE RADIOTELEPHONE

GENERAL DESCRIPTION AND OPERATING INSTRUCTIONS.

INTRODUCTION

The intrinsically safe radiotelephone type CQP800U-IS is intended for radiocommunication in hazardous areas where flameable concentration of gases and vapours may be present.

Items of the Equipment

In terms of intrinsic safety, the various items comprising a complete equipment falls in two catagories:

Category A - Items approved for use in hazardous environment

Radioset for 2-metre band:

CQP813U-IS 1W
CQP814U-IS 1W

Radioset for 4-metre band:

CQP833U-IS 1W
CQP834U-IS 1W

Radioset for 0.7 metre band:

CQP863U-IS 1W

Battery type BU809

Antennas

2-metre band: AN815, AN816
4-metre band: AN834
0.7-metre band: AN864, AN865

Control Units

All frequency bands: CB804-IS, CB805-IS
2-metre band: CB812-IS
4-metre band: CB831-IS
0.7 metre band: CB861-IS

Category B - Items for use outside hazardous areas only

Key for locking the battery, code 17.0086-00

Battery charger type CU806.

Construction

The CQP800U may be either local controlled or remote controlled, and can be fitted with 2, 4, 8, or 12 channels plus optional tone signalling equipment, according to individual customer requirements.

A complete radiotelephone unit consists of four sections, beginning from the bottom these are:

1) the battery
2) the transmitter and receiver modules
3) the tone equipment
4) the control head

Local control

Local controlled sets have all of their operating controls as well as the speaker/microphone and the antenna connector placed in the control head, itself, and is fastened to the top of the radiotelephone.

Remote control

On remote controlled radios a control unit containing the transmitter key, tone key, and loudspeaker/ squelch buttons, the speaker/microphone and an earphone socket, is connected to the set by means of a cable. Connecting the control unit automatically operates a switch which transfers the functions of the control head to the control unit.

Control units with the following functions are available:

CB804-IS Contains loudspeaker/microphone, transmitter key, and a squelch cancelling button.

CB805-IS Contains loudspeaker/microphone, transmitter key, tone key I, tone key II, a combined squelch cancel-loudspeaker in/out button, call indicator, and earphone socket.

CB812-IS Contains loudspeaker/microphone, transmitter key, tone key I, tone key II, a combined squelch cancel-loudspeaker in/out-button, call indicator, and a threaded antenna socket. The unit is used for equipment operating in the 146-174 MHz band.

CB831-IS Contains loudspeaker/microphone, transmitter key, tone key I, tone key II, a combined squelch cancel-loudspeaker in/out-button, call indicator, and a threaded antenna socket. The unit is used for equipment operating in the 68-88 MHz band.

CB861-IS Contains loudspeaker/microphone, transmitter key, tone key I, tone key II, a combined squelch cancel-loudspeaker in/out-button, call indicator, and a threaded antenna socket. The unit is used for equipment operating in the 420-470 MHz band.

The length of a particular equipment will depend upon the number of channels, and whether it includes tone equipment or not.

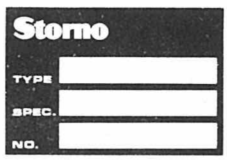
Type specification is as follows:

Specification	code
0.1-1.0W RF output power	1
Universal control head CP808-IS	C8
2 channels	X2
4 channels	X4
8 channels	X8
12 channels	X12
Tone equipment	T

Thus a 1W , four-channel radiotelephone with universal control head and selective calling would be designated:

1 C8 X4T

For easy identification, each equipment has a type plate such as the one pictured below, showing the type and specification.



OPERATING INSTRUCTIONS

Local controlled equipments are fitted with CP808 control heads which interconnect with the various transmitter and receiver modules, channel switch and tone equipment, where applicable, via an internal wiring harness.

The following functions are incorporated in the CP808:

1. push button for keying the transmitter
2. push button for tone keying, tone I
3. push button for tone keying, tone II
4. push button for squelch cancelling-LS in/out.
5. dial-type knob for volume control and on/off switch.
6. 12-position dial-type channel knob
7. call indicator
8. hinged lid for access to the antenna tuning circuit
9. socket for remote control unit
10. socket cover
11. threaded antenna base

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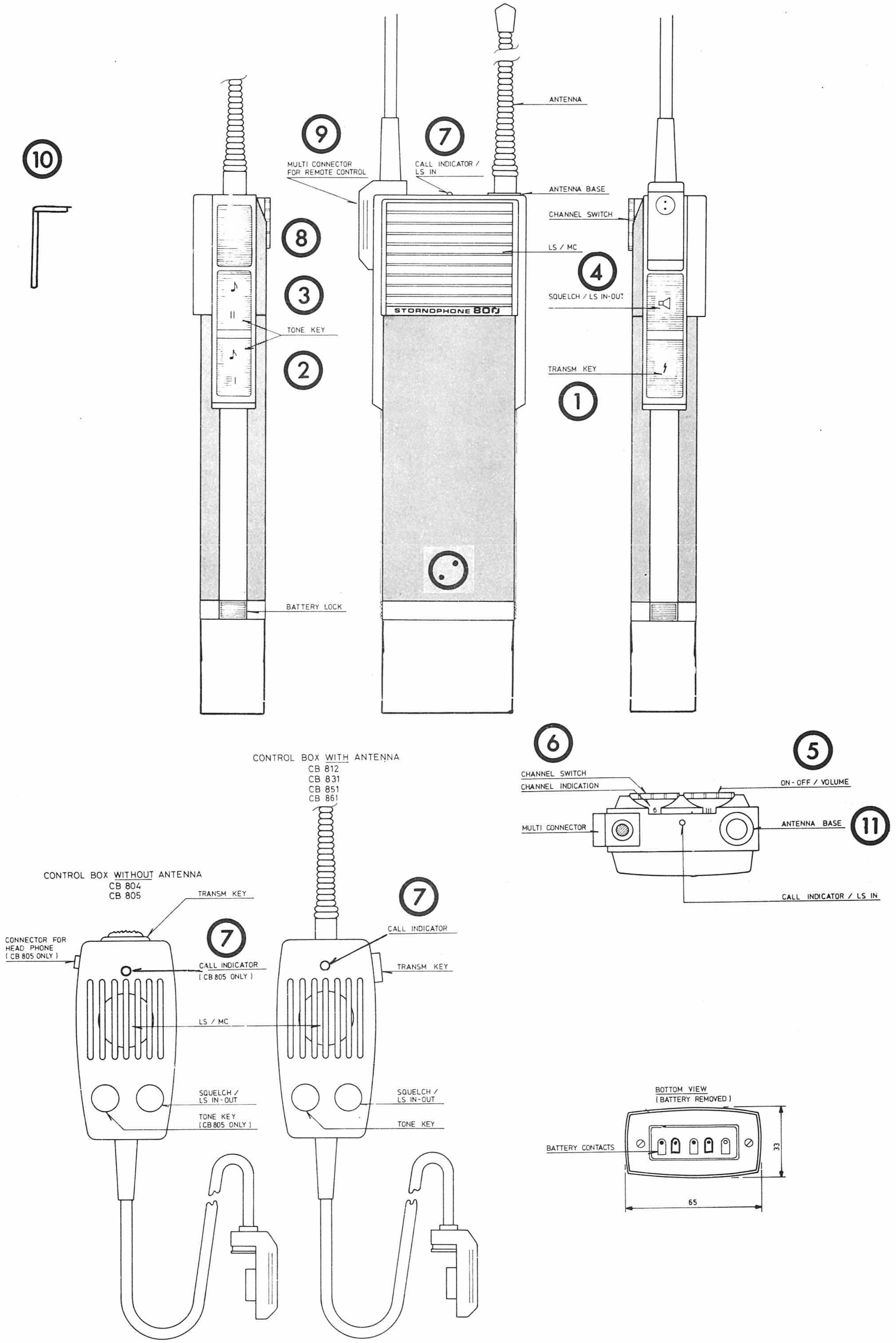
10
9
MULTI CONNECTOR FOR REMOTE CONTROL
7
CALL INDICATOR / LS IN
ANTENNA
ANTENNA BASE
CHANNEL SWITCH
LS / MC
8
3
4
SQUELCH / LS IN-OUT
TONE KEY
2
TRANSM KEY
1
STORNOPHONE 80
BATTERY LOCK
CONTROL BOX WITH ANTENNA
CB 812
CB 831
CB 851
CB 861
6
CHANNEL SWITCH
CHANNEL INDICATION
5
ON-OFF / VOLUME
MULTI CONNECTOR
ANTENNA BASE
11
CALL INDICATOR / LS IN
CONTROL BOX WITHOUT ANTENNA
CB 804
CB 805
TRANSM KEY
CONNECTOR FOR HEAD PHONE (CB 805 ONLY)
7
CALL INDICATOR (CB 805 ONLY)
7
CALL INDICATOR
TRANSM KEY
LS / MC
SQUELCH / LS IN-OUT
TONE KEY (CB 805 ONLY)
SQUELCH / LS IN-OUT
TONE KEY
BOTTOM VIEW (BATTERY REMOVED)
BATTERY CONTACTS
33
65

Before switching the set on, ensure that the antenna and battery are properly connected.

Receiving (without selective calling)

Turn the radiotelephone on by turning the volume control counter clockwise.

If no signal can be heard, the volume control can be set by pressing the squelch cancelling button while adjusting the volume control for the desired sound level, using the background noise for sound.
Set the channel selector to the channel to be used and release the squelch cancelling button. Any traffic on that channel will now be heard from the loudspeaker.

Receiving (with selective calling)

Adjusting the sound level is done as in the sets without tone equipment except that it is necessary to press the SQ/LS button momentarily to switch on the loudspeaker before opening the squelch circuit.

After the setting of the volume control again press the SQ/LS button momentarily to switch off the loudspeaker.

Transmitting (without selective calling)

When the channel is clear, simply press the transmitter key button and speak with a normal voice into the loudspeaker, which functions as a microphone when transmitting.

Transmitting (with selective tone receiver)

To initiate a call, turn on the loudspeaker with the LS IN/OUT button, do not transmit until the channel is free.

Press the transmitter key and speak into the loudspeaker/microphone.

To return to stand by, turn off the loudspeaker again with the LS IN/OUT button.

Transmitting (with selective tone transmitter)

Turn on the loudspeaker with the LS IN/OUT button, do not transmit until the channel is free.
Press the tone key button. When the connection is made, use the ordinary transmitter key button when transmitting (when the tone key is activated the microphone is blocked).

When no longer in use, switch the radiotelephone off by turning the volume control completely clockwise, i.e. the O on the dial is visible.
NB; In the case of 0.2W equipments powered by BU805 then the ordinary transmit key must be pressed together with the appropiate tone-key.

ACCESSORIES

Antennas
The following antennas are approved for use with intrinsically safe radiotelephones type CQP800U-IS and can be attached to either the control head CP808-IS or the control unit.

AN834 200 mm Heliflex Antenna	68 - 88 MHz
AN815 500 mm Whip Antenna	68 - 88 MHz and 146-174 MHz
AN816 150 mm Heliflex Antenna	146-174 MHz
AN864 46 mm Heliflex Antenna	420-470 MHz
AN865 155 mm Whip Antenna	420-470 MHz

All antennas are fitted with a threaded bolt that fits the antenna socket on the control head and on the control units type CB812-IS, CB831-IS, or CB861-IS

Battery
To power the equipment only battery type BU809 is approved for the 1W version (NB; reverse polarity for safety reasons and BU805 for the 0.2W versions.

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The BU809 battery is encased in a high-impact cast plastic cassette with snap locks which automatically secures the battery when slid into place. A battery lock on the cabinet ensures that the battery cannot be removed when the equipment is used in the danger area.

Electrically the battery contains a cell pack of 11 NiCd cylindrial button cells and four fold-back current limiters.
A detailed description of the unit and its properties is enclosed separately.

Battery Charger
CU806 Charger for 6 batteries type BU809.
This charger is built for quick charging, 4.5 hour rate followed by trickle charging.
The battery charger can be operated from either a 110V or a 220V AC mains.

The corresponding charger for BU805 is CU805, this unit has indentical characteristics as CU806 except for reverse polarity.

Tone Equipment

The radio set can be fitted with tone equipment which is contained in a separate panel placed between the control head and the transmitter/receiver circuitry. Incorporating tone equipment into an existing radio set increases the total lenght of the unit and requires a new, longer casing. Tone signalling sub-units for CQP800U are as follows:

ST801-IS	four or five tone sequential tone transmitter, tone frequencies from 885Hz to 2800Hz.
ST802-IS	four or five tone sequential tone transmitter, tone frequencies, from 960Hz to 2110Hz.
SR801-IS	four or five tone sequential tone receiver, tone frequencies from 885Hz to 2900Hz. (can also be coded for use as a double tone receiver).
SR802-IS	four or five tone sequential tone receiver, tone frequencies from 960Hz to 2110Hz.

Carrying Devices
The following devices are available for carrying the CQP800U:

CK801a	carrying harness for all types of equipment, mounting hardware, short and long straps, belt and clamps.
CK802	screw mounted pocket clip.
CK803a	shoulder strap with retainer for remote control unit. (for remote control, only).

Conditions of use
Before the Stornophone 800U-IS is operated in hazardous areas, the user must be fully aware of the conditions of use. Failure to observe these conditions will invalidate the certificate of intrinsic safety.

The full meaning of the conditions can be summarised as follows:

a. Only the appropiate intrinsically safe battery types BU805 or BU809 may be used.

b. No attempt must be made to remove or change the battery in the danger area.

c. Items of the equipment listed under category B must not be brought into or used in the danger area.

d. The equipment complies with the following specifications:
   1. VDE 0170/171 category Sch i/ Ex is G5
   2. BASEFA SFA3012: 1972 Category EExibIICT4

STORNOPHONE 800U-IS 0.2W

INTRINSICALLY SAFE VERSION

General

This handbook refers to the intrinsically safe radiotelephone model STORNOPHONE 800U-IS and is intended to supplement the contents of the descriptions of the standard editions of the equipment.

Introduction

The intrinsically safe Stornophone 800U-IS equipment is intended for radiocommunication in hazardous areas where flameable concentration of gases and vapours may be present.
The Stornophone 800U-IS is a special version of the standard handheld or remote controlled radiotelephone which has been modified in accordance with the requirements of the safety Authorities.

Items of the Equipment

In terms of intrinsic safety, the various items comprising a complete equipment falls in two categories:

Category 1 - Items approved for use in hazardous environment.

Radioset for 2-metre band:	Type CQP813U-IS 0.2W
	Type CQP814U-IS 0.2W
Radioset for 4-metre band:	Type CQP833U-IS 0.2W
	Type CQP834U-IS 0.2W
Radioset for 0.7-metre band:	Type CQP863U-IS 0.2W

Battery type BU805

Antennas

2-metre band:	AN815, AN816
4-metre band:	AN834
0.7-metre band:	AN864, AN865

Control Units

All frequency bands:	CB804-IS, CB805-IS
2-metre band:	CB812-IS
4-metre band:	CB831-IS
0.7-metre band:	CB861-IS

Category 2 - Items for use outside hazardous areas only.

Key for locking the battery code 31.0592.
Battery charging unit type CU804, CU805.

Modifications

For the purpose of converting to standards of intrinsic safety, the radioset is modified as indicated below.

RF unit

AD801	is removed and replaced by two paralleled resistors for setting the transmitter power, located between pin 10 and 16 of PA8x1.
VR801-IS	value of C2 has been changed to 3.3uF.
FN803/4-IS	values of C18 and C22 have been changed to 3.3uF.
RC811-IS	value of C19 has been changed to 0.39uF. value of R4 has been changed to 1Kohm.
RC831-IS	value of C19 has been changed to 0.39uF. value of R4 has been changed to 1Kohm.
RC861-IS	value of C19 has been changed to 0.39uF. value of R11 has been changed to 1Kohm.
CA80x-IS	a battery lock for BU805 has been provided.

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Tone Equipment

ST801-IS	Sequential tone transmitter ZVEI
ST802-IS	Sequential tone transmitter CCIR
SR801-IS	Sequential tone receiver ZVEI
SR802-IS	Sequential tone receiver CCIR

Control Head

CB808-IS	A 15ohm resistor has been inserted in series with C1 the two being incapsulated in moulded epoxy. The values of R1, R2, R3, R4, and R5 (volume control) have been changed to 47kohm, 27kohm, 12kohm, 3.9kohm, and 820 ohm, respectively. R6, 47kohm, has been added. The dial lamp V1 has been removed.

The transmitter output power has been reduced to 0.2W causing the transmitter current drain to be $\leq$150mA.

In all other aspects, the modified radio set is identical with the standard equipment and should therefore be aligned and maintained in accordance with instructions contained in the standard handbook description applicable to the type in use.

Battery

The BU805 battery consists of 11 nickel-cadmium, rechangeable, cylindrical cells of 225mA capacity. The unit also contains two cascaded active current limiters. The intrinsically safe properties of the battery are entirely governed by the function of the limiters. A detailed description of the unit is enclosed separately.

Conditions of use

Before the Stornophone 800U-IS is operated in hazardous areas, the user must be fully aware of the conditions of use. Failure to observe these conditions will invalidate the certificate of intrinsic safety.

The full meaning of the conditions can be summarised as follows:

a. Only the intrinsically safe battery type BU805 must be used.

b. No attempt must be made to remove or change the battery in the danger area.

c. Items of the equipment listed under category 2 must not be brought into or used in the danger area.

CQP800U-IS 0.2W
ADJUSTMENT PROCEDURE

Adjustment of the CQP800U-IS is similar to the STORNOPHONE 800U ADJUSTMENT PROCEDURE with the following amendments:

Selecting the resistor to adjust the transmitter current drain and power output.

The intrinsically safe version of the STORNOPHONE 800U has no 4DC circuit to protect the power stage and to regulate the power output. Instead a resistor is used to drop the supply to the first stage of the driver unit (PA8x1). The dropping resistor is composed of two 1/10W resistors of 470ohm and 560ohm in parallel and soldered to pin 2 and pin 5 normally used by the AD801. The final adjustment of the power output and the current drain is performed by replacing one or both of these resistors.

Adjusting the multiplier chain and PA stages

Connect the CQP800U-IS through a BNC-adaptor, type SI805, to a wattmeter.
Set the channel selector to a channel close to the center frequency, if more than one.
To ease the alignment turn all tuning slugs in the units PM811/PM861 - FD811/PM831/FD861 - FD813/FD832/FD863 - BP811/BP831/BP861 to their innermost position for low channel frequencies, their middle positions for medium channel frequencies, and outermost position for high channel frequencies. This procedure must be followed strichtly for CQP830U-IS as it is possible to resonate FD832 at the third harmonic (approx. 66MHz) for oscillator frequencies around 22MHz.

Units FD811/FD812 - FD812/FD831/FD862 - FD813 - FD832/FD863 - BP8x1 are first adjusted for maximum current drain. Then the coils PA8x1 and PA8x2 are adjusted for maximum power output. The multipliers are now adjusted for minimum supply voltage to the first driver (set the voltage selector on C35 to ADC), and the PA8x1 and PA8x2 are adjusted for maximum power output. To obtain a clear peak, when adjusting the first doubler stage, it may be necessary to detune the second doubler stage.
Check the supply voltage to be 11V (no current limiting).
Normally the RF output power will be less than specified (0.2W) and the total transmitter current drain will be less than 170mA.

By changing the dropping resistors mentioned in the beginning of this description the current drain is adjusted to 170mA ±5mA.
Set the power supply current limiter to 170mA and select a pair of resistors that folds the supply voltage back to 10.5V.
Finally the multiplier chain and the PA stages are realigned.

Requirements: $P_{out} = 0.2W$
$I_{max} = 170mA$

For adjustment of modulation and reciever, refer to the STORNOPHONE 800U Adjustment Procedure.

Storno

STORNOPHONE800U-IS 1W
INTRINSICALLY SAFE RADIOTELEPHONE
MECHANICAL AND CIRCUIT DESCRIPTION

Mechanical Construction.

The main parts of radiotelephone type CQP800U-IS 1W is arranged as segregated areas and from the bottom these are:

Battery Connector
High power 360 mA zone
Barrier zone
Low power 150 mA zone
Crystal oscillator chassis
Optional tone equipment
Control panel CP808.

The radiounits are housed in a cabinet type CA80x-IS whose surface is covered by protective leather. The bottom end is designed to hold the battery and has a battery lock which can be opened with a key.

The battery connects to the circuits via five spring contacts and the supply lines are all decoupled by RF filter circuits.

The high power units of the transmitter are separated from the remaining part by a barrier zone in which are mounted zener diodes on the receiver and transmitter supply lines in order to avoid overvoltage.
In this zone is also an enable circuit which is operated by the 7.5V TX. This circuit enables the 360 mA supply from the battery to the high power modules of the transmitter.

The low power zone contains the remaining parts of the transmitter and the receiver.

Both transmitter and receiver are separate chassis units acting as motherboards for the modules.

The crystal oscillator chassis may contain up to 12 receiver oscillators and up to 12 transmitter oscillators.

The tone equipment modules are selfcontained units that mount between the oscillator chassis and the control head at the top.

All units are stacked and held together by rails, one in each side, passing through ducts and fastened to the control head.

The interconnection of the units are by means of cable looms that run on the wiring side of the motherboards and where passing the barrier zone through a conduit.

The intrinsically safe battery, type BU809, consists of two sections, a regulator section and a battery cell pack held together by two screws.

The cell pack contains 11 NiCd button cells mounted between glass fibre printed wiring boards and potted in quarz-filled polyurethan. Two contacts on the regulator engage with sockets on the cell pack.

The regulator section contains a 150 mA current limiter and a 360 mA current limiter . These limiters have fold-back characteristics and each consists of two cascaded limiter circuits.

The battery can only be charged in battery charger type CU806.

For description of the transmitter, and receiver circuits refer to circuit description of the CQP810U, CQP830U, or CQP860U.

Storno

Pilot Tone Unit TQ801

The pilot tone unit contains a combined tone transmitter and tone receiver for the Stornophone 800 radiotelephone.

The unit consists of a chassis with a motherboard for four subassemblies.

When used as a pilot tone transmitter, the unit generates a low frequency signal for modulation of the transmitter.

Used as a pilot tone receiver the unit, when receiving a pilot tone modulated RF carrier, provide a logic control signal for the squelch circuit.

A 5-position switch on the motherboard is set to one of the 5 frequencies to which the unit has been adjusted. The 5 frequencies are to be selected from a series of 8 in the frequency range 71.9 Hz to 136 Hz. The receiving frequency and the generated frequency are identical.

Circuit Description

Pilot tone receiving mode.

A third order active filter suppresses the speech modulation contents of the input signal. The pilot tone modulation is applied to a limiter stage ensuring a constant drive for the band pass selection circuit. This circuit, which is a second order active filter of the state variable type, determines the tone to which the receiver responds. The selected signal is applied to a detector followed by a DC amplifier. The TQ signal output will assume a low state output (~ 0V), when a tone of the correct frequency is received.

A third order high pass filter suppresses the tone modulation before the speech modulation is applied to the terminal connecting to the AF output amplifier.

Pilot tone transmitting mode.

When keying the transmitter, battery voltage is applied to the transmitter key terminal (24) on the TQ801. The voltage turns diode E7 on thereby opening a renerative feed-back loop. The charging of C13 injects a pulse into the circuit ensuring a rapid start of oscillations. The generated signal is applied to the pilot tone terminal (39).

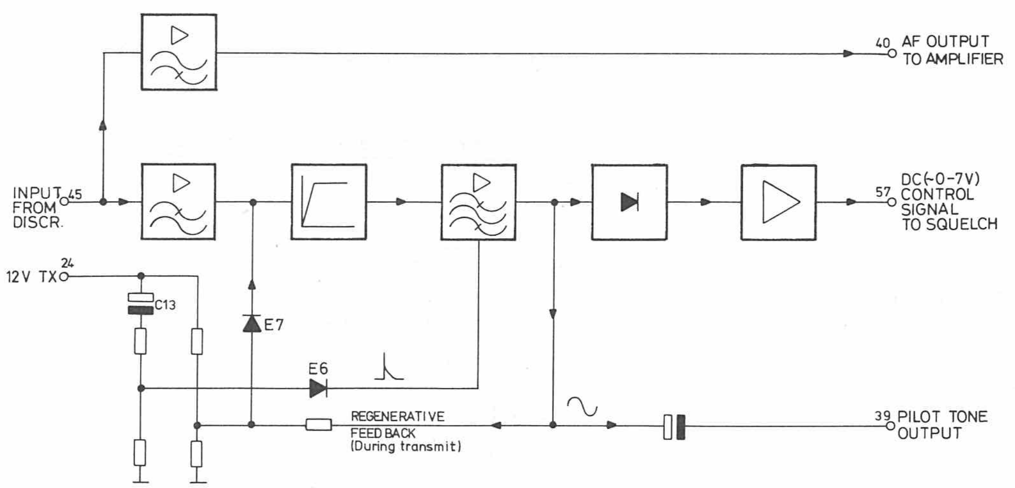
Regarding the mechanical construction the unit is divided into three thick film circuits and one printed circuit, all with plug-in pins for a common motherboard. Thick film circuit 14.0043 contains the low pass and the high pass filters, the limiter and the detector.

Thick film circuit 14.0047 and 14.0049 together with the printed circuit 15.0139 composes the band pass filter.

In order to achieve a frequency tolerance of 0.05% the series resistors R34 - R38 placed on thick film 14.0049 is adjusted during an operational test.

The frequency determining part of TQ801 is subassembly 15.0139 consisting of an epoxy glass fibre printed circuit on which six metal film resistors, 2 polystyrene capacitors and ten pins are mounted.

The five frequencies are to be selected from the series below and the corresponding resistor values are given.



60.265-E1

Storno

Frequency Hz	period µ sec.	Code no	Description
71.9	13908.2	89.5044-00	191 kΩ 1% metalfilm 0.25 W
82.5	12121.2	89.5041-00	143 kΩ 1% metalfilm 0.25 W
94.8	10548.5	89.5040-00	105 kΩ 1% metalfilm 0.25 W
103.5	9661.8	89.5039-00	93.1 kΩ 1% metalfilm 0.25 W
110.9	9017.1	89.5038-00	80.6 kΩ 1% metalfilm 0.25 W
118.8	8417.5	89.5037-00	71.5 kΩ 1% metalfilm 0.25 W
127.3	7855.4	89.5049-00	61.9 kΩ 1% metalfilm 0.25 W
136.5	7326.0	89.5067-00	53.6 kΩ 1% metalfilm 0.25 W

Normally R27 will have the higher value and the following resistors decreasing values to R31 as the lower.

Technical Specifications

General

Tone frequencies (EIA - RS220)

71.9Hz. 82,5Hz, 94,8Hz, 103,5Hz, 110,9Hz, 118,8Hz, 127,3Hz, and 136,5Hz.

Adjustment tolerance

$\frac{\Delta 8}{fo} = 0.05\%$

Frequency stability

0.5%

Temperature range

$-25^{o}C - +60^{o}C$.

Polarity

Negative chassis

Dimensions

56.4mm x 14.3mm x 25.8mm

Tone transmitter

Supply voltage

9,6V - 15V

Current drain

2 mA

Activating signal

Positive

Output impedance

600 Ω; AC or DC coupling

Load

$\geq$ 1 kΩ

Output level

2.2V ± 1 dB (R_L = 10 kΩ)

Distortion

0.1%

Response time

5 ms.

Tone Receiver

Supply voltage

a: 9.6V - 15V

b: 7.5V stabilized

Current drain

0.6 mA

Activating signal

Continuous tone input

Selectivity

The tone receiver will react with certainty within a bandwidth of ± 1%, but not to the adjacent tone.

Signal to noise sensitivity

2 dB

Response time

100 ms

Activating input level

15.7 mV ± 6 dB

Generator impedance of input signal

$\leq$ 3 kΩ

Input impedance

30 kΩ

Input frequency response

Flat; linear

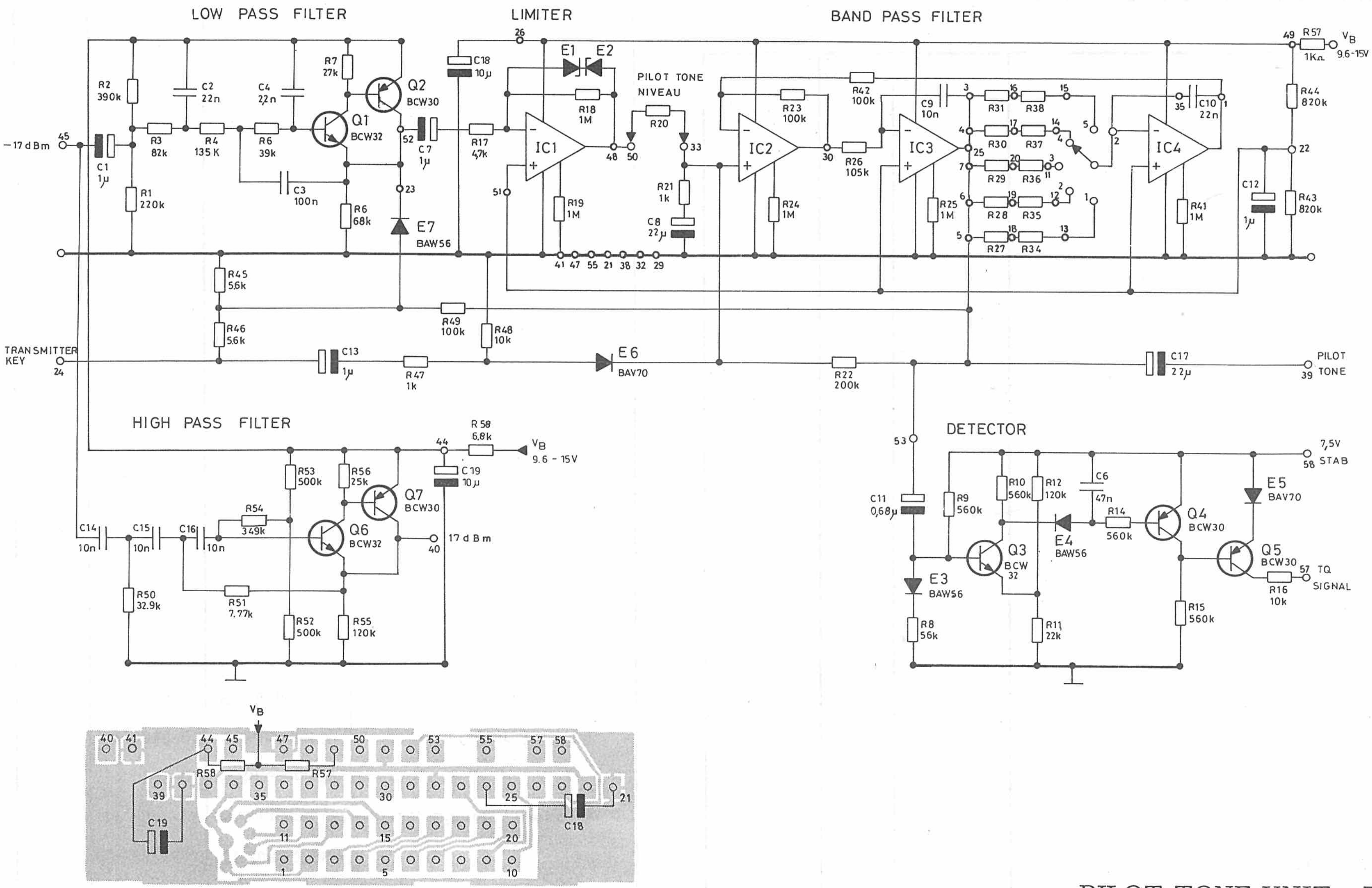
Output level

Not activated: 7 V; Internal resistance 10 kΩ

Activated: Disconnection; Internal resistance $\geq$ 10 kΩ

60.265-E1

Storno



PILOT TONE UNIT TQ801a

D401.804/2

Storno

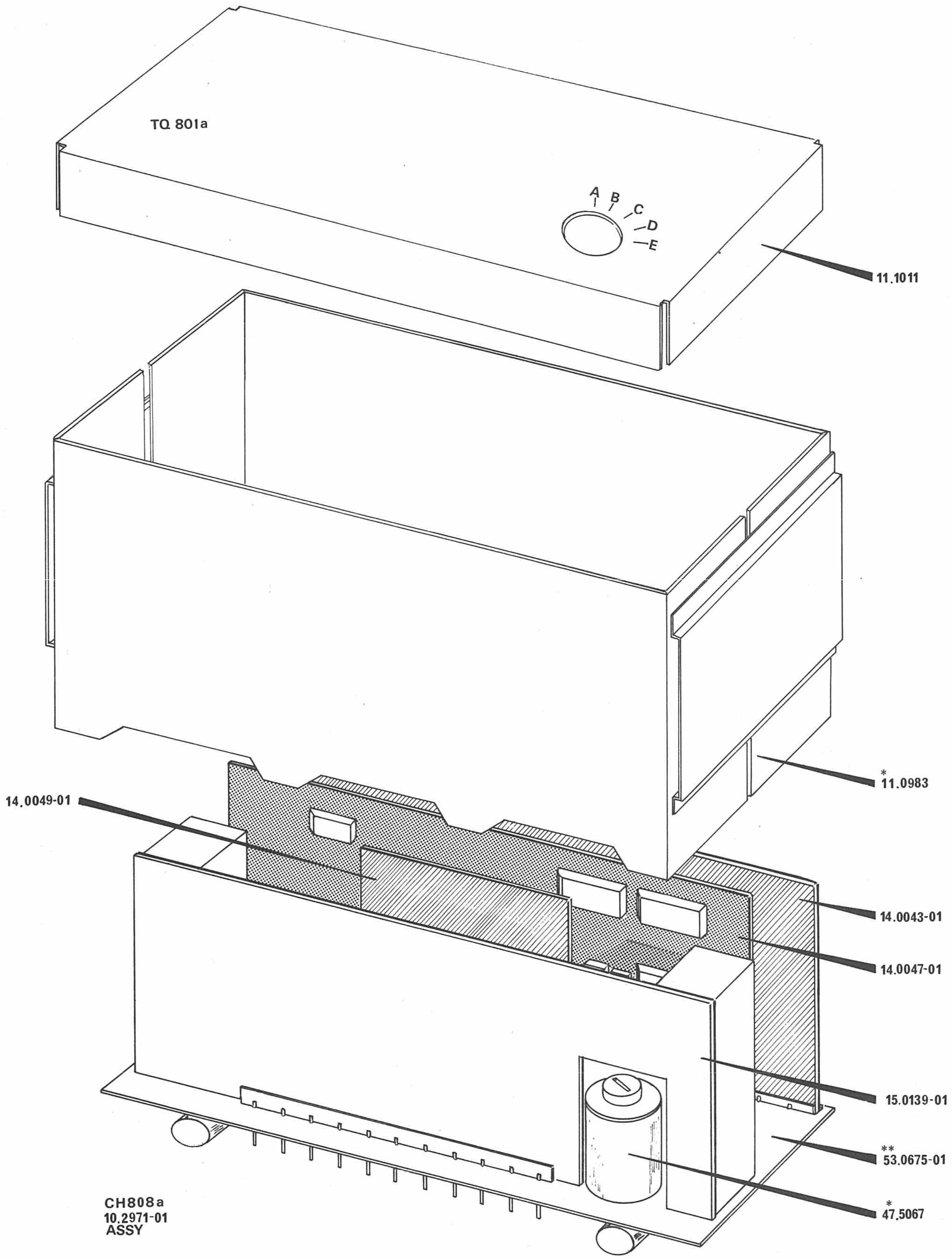
TYPE	Nº	CODE	DATA
TQ801a		10.2882-01	Pilot tone receiver/transmitter
		10.2971-01	CH808a Chassis
		14.0043-01	Subassembly; Filters, Limiter, Detector
		14.0047-01	Subassembly
		14.0049-01	Subassembly } Bandpass filter
		15.0039-01	Subassembly

Storno

TYPE	Nº	CODE	DATA

PILOT TONE UNIT TQ801

X402.262



PILOT TONE UNIT TQ801a

Mechanical Lay-out

VEHICLE ADAPTOR

MN802

The vehicle adaptor MN802 is designed to hold a STORNOPHONE 800U radiotelephone when used as a mobile radio. It fits all standard versions of CQP800U and provides:

- immediate operation with a discharged battery
- charging current for the battery during operation
- maintenance of fully charged battery
- overvoltage protection and protection against reversed polarity
- connection for mobile antenna

An external loudspeaker with a built-in 3 W AF amplifier, type LS801, and a microphone and key switch (MC5000 or MC704 and SU701/2) must be used.

MN802 is composed of a control panel, a main unit, and a housing.

MODE OF OPERATION

CONTROL PANEL

The control panel contains push-buttons with built-in LEDs:

- Power on/off
- Loudspeaker in/out (Squelch IN/OUT)
- Tone Key I
- Tone Key II (option)

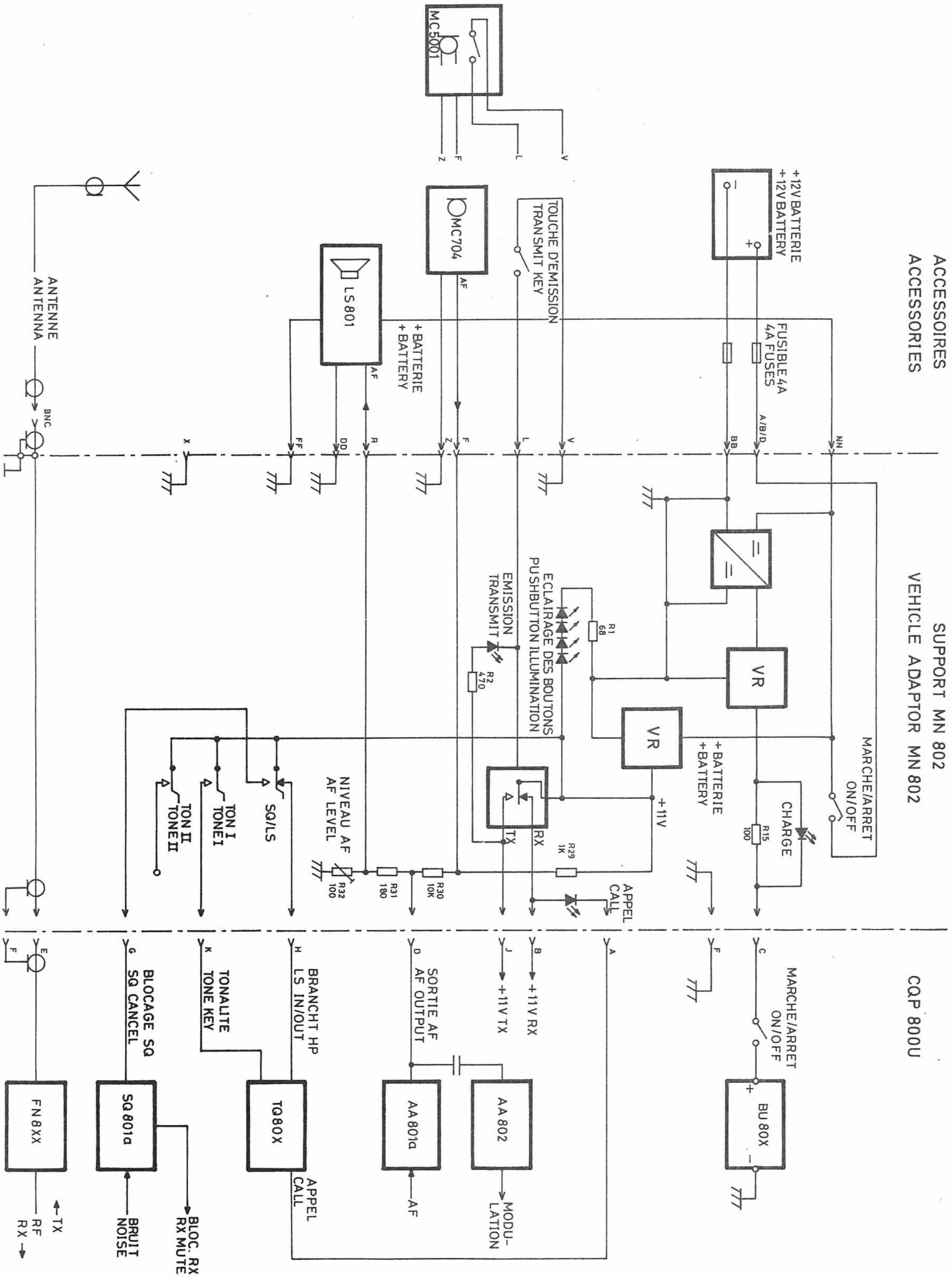
There are 3 indicators (LEDs) on the control panel:

- Transmit indicator (red)
- Call indicator (green)
- Charge indicator (yellow)

Channel selection and volume control are operated on the STORNOPHONE 800U. The adaptor has a clasp for automatic connector switch and security lock which must be operated to establish all connections with the STORNOPHONE 800U.

MAIN UNIT

The MAIN UNIT is provided with:
Voltage protection circuit
Charging circuit
Power supply circuit
Keying circuit
AF Attenuation circuit
The voltage protection circuit protects against reversed polarity, transients and overvoltage.
The charging circuit operates only when the CQP800U is switched ON and charges the CQP800U battery with approximately 40 mA.
The charging time for a completely discharged battery is 6 hours for 225 mAh batteries and 12 hours for 450 mAh batteries.
Options for charging when the CQP800U is switched OFF can be arranged by a slight modification in CP808 - inserting a diode across the ON/OFF switch.
The power supply circuit provides immediate operation with a completely discharged battery. The keying circuit will key the transmitter by means of a simple non-locking switch.
The a.f. attenuation circuit adjusts the level for external microphone and loudspeaker.
A preset loudspeaker volume control is part of the a.f. attenuation circuit.



SCHEMA DE PRINCIPE MN802

FIG. 1 FUNCTIONAL DIAGRAM MN802

D402. 887

CIRCUIT DESCRIPTION

CHARGER

See Functional Diagram Fig. 1.

The DC converter is composed of transformer T1 and transistor Q2. Transistor Q1 in conjunction with R1, R2, R3 compensates the variations of power supply. The zener diode E1 protects, together with external fuses, against overvoltage, reversed polarity and transients.

The oscillator is a constant current type, which together with R10, R14, R15 gives a charging current of approximately 40 mA. The current may be slightly adjusted by means of R6. The zener diode E6 limits the charging voltage, and the network E2, E8, R9, C5 protects Q2 against voltage transients from the transformer T1.

In order to protect the CQP800U battery it is necessary to reduce the charging current at low and high temperatures. This reduction is accomplished by the PTC resistor R12 at low temperatures, and by the NTC resistor R11 at high temperatures. R11 and R12 are mounted on a small printed circuit placed separately in the housing to avoid the influence of heat from the heatsink. If the ambient temperature is out of normal working range the resistance will decrease in either the PTC or the NTC resistor. The base current to Q3 decreases and brings the transistor out of saturation. This will increase the emitter voltage of Q3 and the voltage across the zener diodes E4 and E5 who will gradually turn on, taking over the constant current from the converter. The charging current to the battery will then decrease.

POWER SUPPLY

The power supply is a stabilized series regulator. The output voltage is adjusted to 11 V by means of R20. E8 protects the CQP800U against any overvoltage.

KEYING CIRCUIT

The keying circuit will switch V_{bb} from the power supply between receiver (RX) and transmitter (TX) by grounding E9 or E10 with an external key switch.

AF ATTENUATOR

The AF attenuator network consists of R29, R30, R31, R32. The DC supply to the microphone amplifier is fed through R29. The network adjusts the AF level from the microphone to CQP800U and the AF level to the external loudspeaker amplifier R32 can be adjusted to obtain the best sound level in the vehicle. The adjustment can be performed from the outside during installation.

CONTROL PANEL

The control panel is connected to the main unit via a print connector. All electrical connections from CQP800U, including RF connection for external antenna, are established via the connector switch. The control panel contains:

ON/OFF, LS IN/OUT, TONE KEY I, (TONE KEY II).

The ON/OFF switch also breaks the current to the loudspeaker amplifier in LS801.

The built-in LEDs are lit only when the power is ON.

The 3 indicators are placed on the control panel. The charge indicator (yellow) is connected across R15. It is lit when the battery is charging. The call indicator (green) shows that a call has been received.

TECHNICAL SPECIFICATIONS

Supply voltage

nominal voltage: 13.6 V
voltage range: 10.5-16 V
polarity: negative ground

Maximum current drain

13.6 V, voltage regulator unloaded:	270 mA
13.6 V, load current 800 mA:	1070 mA
10.5 V, load current 800 mA:	1170 mA
16 V, load current 800 mA:	1020 mA

Typical charging current

225/450 mAh, +10° - +45°C: 40 mA

Temperature range

Working range, normal charging current: +10°C to +45°C
Working range, reduced charging current: -25°C to +70°C

Power supply

Regulated output voltage at nominal supply voltage: 11 V±2%
Maximum regulated output current: 0.8 A

Dimensions:

210 x 173 x 47 mm

Weight:

1.250 kg

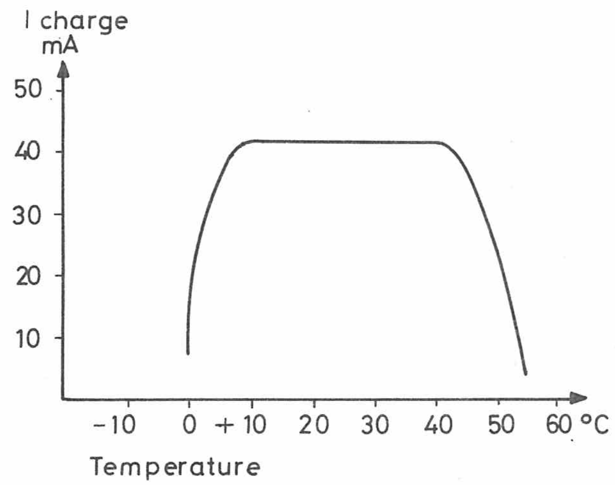


Fig. 2 CHARGING CURRENT/AMBIENT TEMPERATURE

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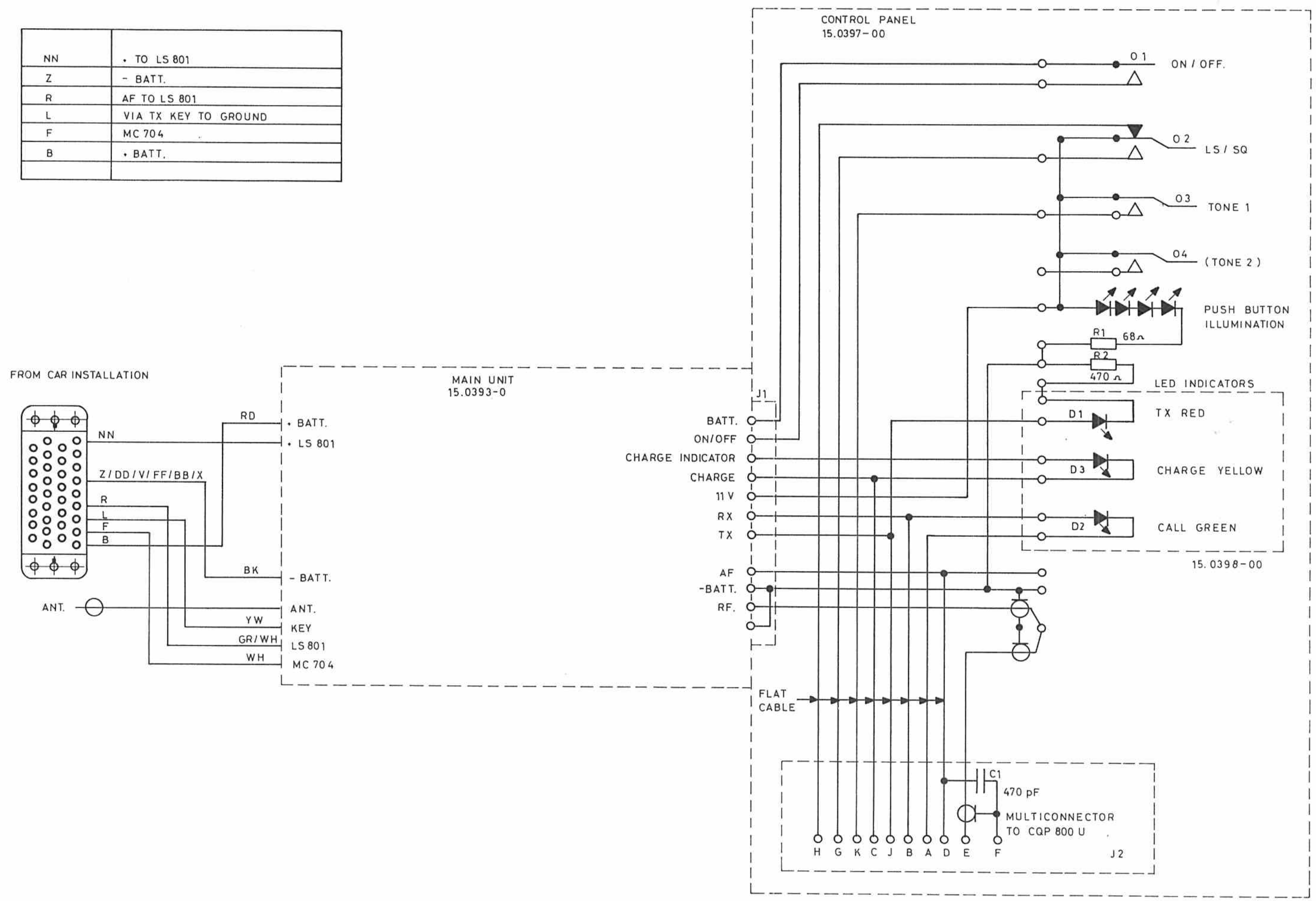
NN	+ TO LS 801
Z	- BATT.
R	AF TO LS 801
L	VIA TX KEY TO GROUND
F	MC 704
B	+ BATT.



CAR ADAPTOR MN802

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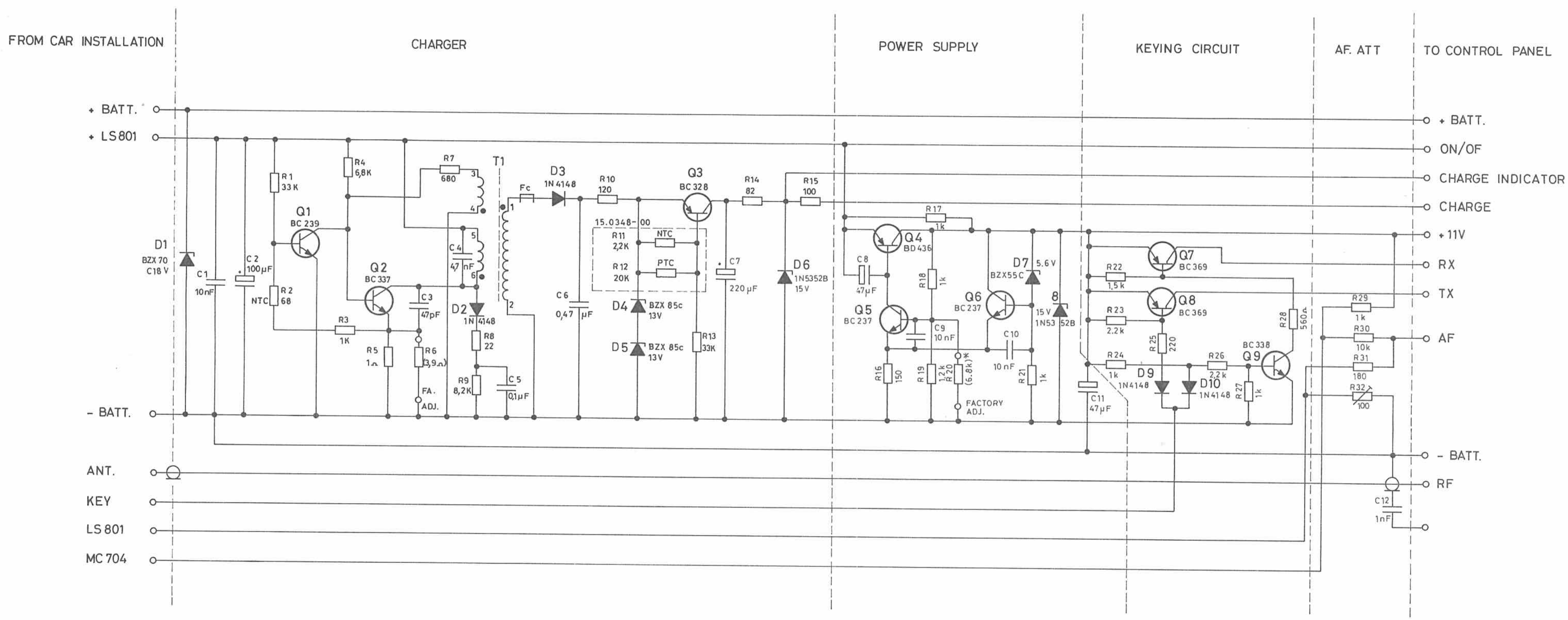

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CAR ADAPTOR MN802

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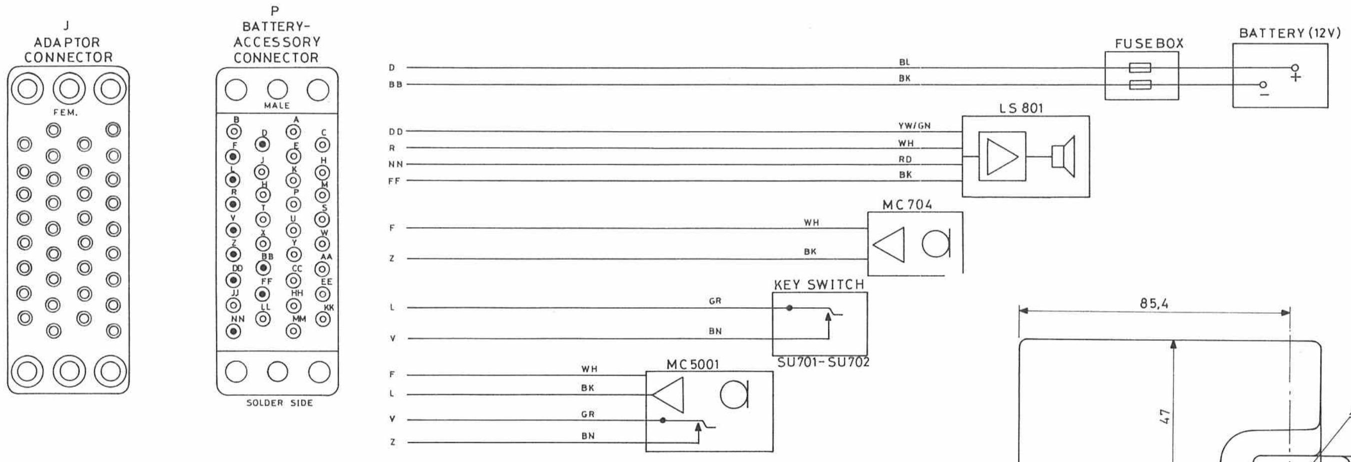
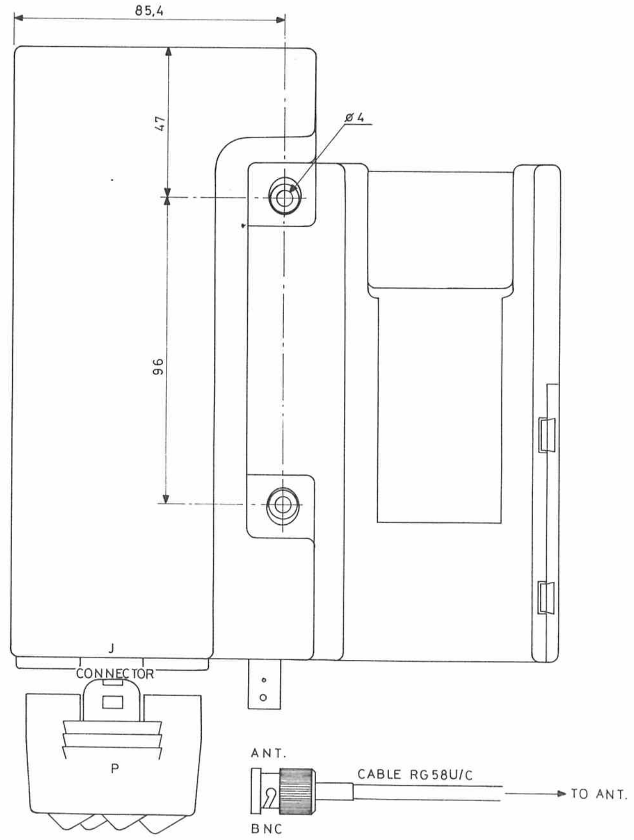
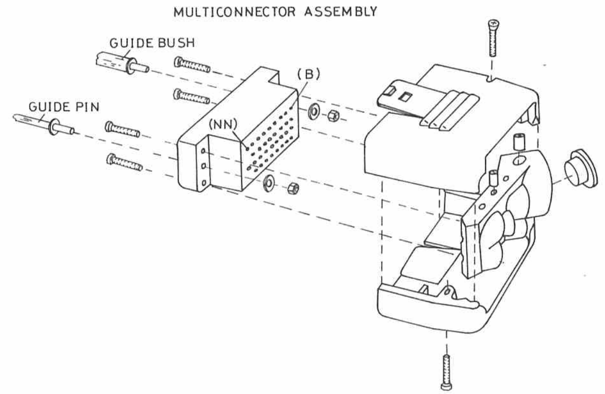
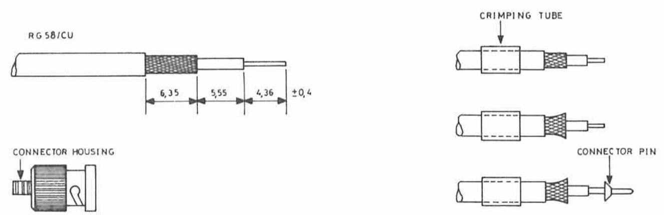


MC5001 - 10.3782-00
SU701 - 10.2460-00
MC704 - 96.0102-00
LS801 - 97.0017-00
CK804 - 10.3492-00







VEHICLE ADAPTOR MN802 INSTALLATION

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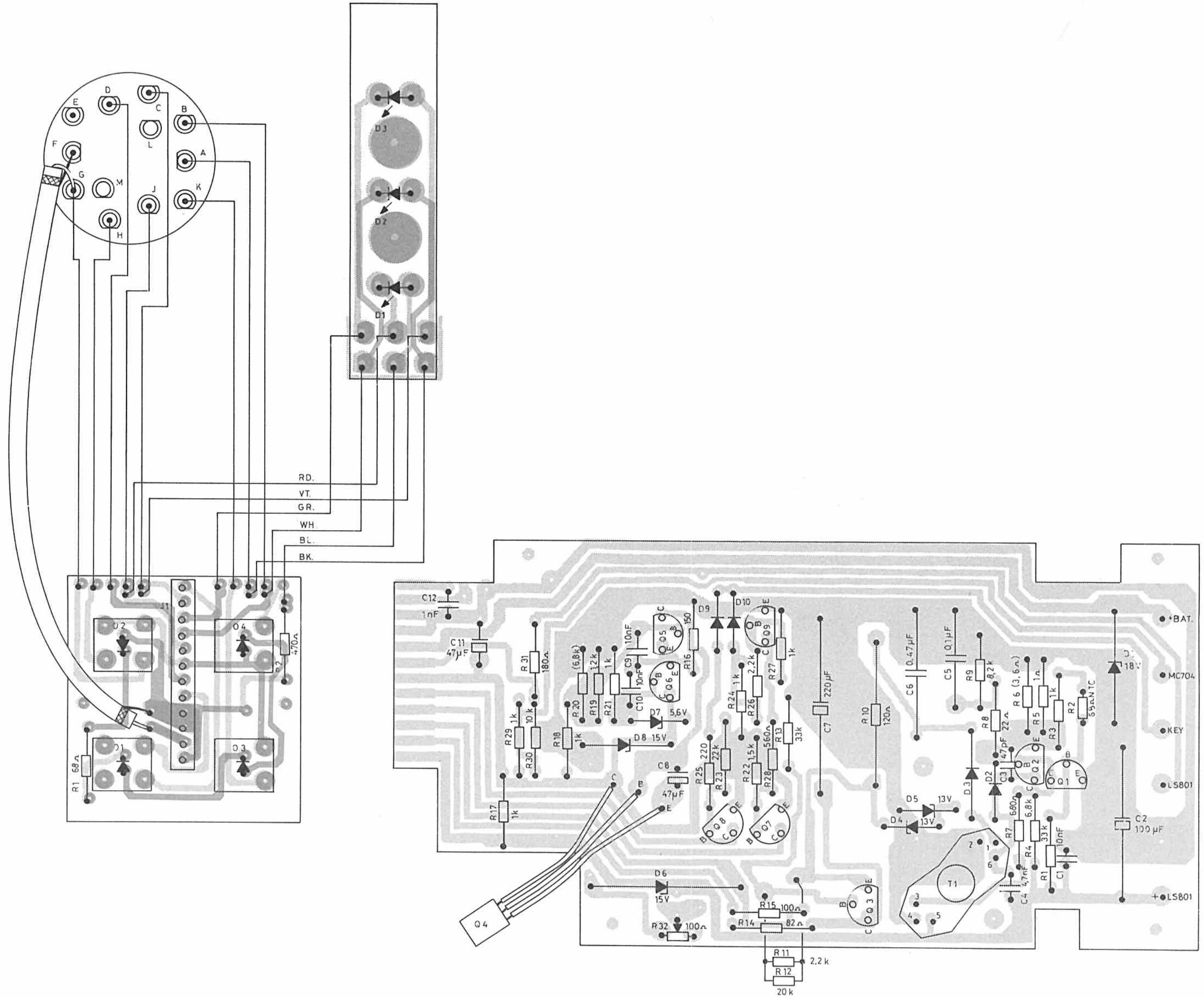
Storno



CAR ADAPTOR MN802
COMPONENT LAYOUT

D402.865

STORNOPHONE 800
MAINTENANCE MANUAL
Section 2.

TITLE		CODE
CQP810	Circuit Description	60.239-E1
	Technical Specifications	60.241-E1
	Adjustment Procedure	60.248-E1
CQP810U	Circuit Description	60.352-E1
	Adjustment Procedure	60.331-E1
CQP810U-IS	Circuit Description	60.427-E1
CQP800-IS	Adjustment Procedure	60.334-E1
CQP810U-RC2	Tecnical Specifications	60.418-E1
	Circuit Description	60.421-E1
	Adjustment Procedure	60.426-E1
CQP8414U	Technical Specifications	60.424-E1
	Circuit Descriptions	60.425-E1

Service Coordination
06 - 80

CQP810U-IS
CIRCUIT DESCRIPTION

Transmitter Circuit (see block diagram)

The transmitter is built up of several modules, each of which is completely enclosed (shielded) and has connector pins protruding from the bottom of the module. All the modules are then mounted onto a mother board.

The transmitter section consists of the following modules:

XO812	Crystal Oscillator
AA802	Modulation Amplifier
FN803-IS	Modulation Filter for 20/25kHz channel separation
or	
FN804-IS	Modulation Filter for 12.5kHz channel separation
PM811	Phase Modulator
FD811	1st Frequency Doubler
FD812	2nd Frequency Doubler
FD813	3rd Frequency Doupler
BP811	Band Pass Filter
PA811a-IS	1st Power Amplifier
PA812a-IS	2nd Power Amplifier and Antenna Switch
FN811	Antenna Filter
AD801	ADC Circuit
VR801-IS	Voltage Regulator

Modulation Amplifier AA802 and FN803/FN804-IS

The modulation amplifier function is carried out by the Modulation Amplifier, AA802 in conjunction with a Modulation Filter, FN803-IS or FN804-IS. The microphone signal is applied to an operational amplifier; the degree of negative feedback, and thus the amplifier gain, can be adjusted by means of an external resistor. Microphone sensitivity can then be adjusted to suit individual requirements. In radio sets with built-in tone transmitters or sequential tone transmitters, the microphone amplifier is disabled by the tone key.

The amplified AF signal is applied to a limiter via a differentiating network. The limiter is likewise an operational amplifier utilising negative feedback. Following the limiter is an integration network and an active lowpass filter where the active element is another operational amplifier. The active filter removes any harmonics of the original input signal that arise during limiting action, and it also keeps the frequency excursions within the tolerances required for the channel spacing used in the particular equipment. An extra limiter is inserted between the integration network and the active low-pass filter to prevent strong input signals of low frequencies from overloading the filter.

Transmitter Oscillator XO812

The transmitter exciter signal is generated by a crystal, Colpitts-type oscillator operating on the crystal's fundamental frequency, which will be in the range of 17 to 22MHz. The oscillator starts when the channel selector completes the circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection. Thus several oscillators can be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit. The maximum number of channels is 12, with all oscillators placed in an oscillator panel.

Phase Modulator PM811

The PM811 Phase Modulator consists of an input- and an output buffer plus a phase modulator stage. The exciter signal from the oscillator is fed to the input buffer stage. This amplifier, with following π network, ensures a constant sine wave signal to the phase modulator. The modulator is a transistor amplifier stage where the modulating audio signal is applied to the emitter, which is RF decoupled. The modulation signal varies the transconductance (g_m) of the amplifier and thus the phase angle (φ) of the RF signal at its output. To function properly, the modulator must work into a constant load and is therefore followed by a buffer stage whose output signal is sufficient en amplitude to drive the following stage, a frequency doubler.

Multiplier Chain FD811 and FD812, FD813

The multiplier chain consists of tree very similar frequency doubler stages. Each frequency doubler operates as a grounded emitter transistor amplifier followed by two inductively coupled LC circuits that are tuned to the second harmonic of the input frequency.

Band Pass Filter BP811

To ensure suppression of the undesired harmonics that arise in the frequency multiplying process, the multiplier chain is terminated by a double tuned band pass filter, the BP811.

Power Amplifier PA811a-IS and PA812a-IS

The output power from the multiplier chain (approx. 10mW) is amplified to the required antenna power in a three-stage amplifier composed of the two modules, PA811a-IS and PA812a-IS.

PA811a-IS contains two amplifier stages. The collector voltage to the first transistor is supplied via the ADC Circuit, and is variable. If more gain is required to drive the following stage, PA812a-IS, the collector supply (ADC) voltage will rise. On the other hand, if the drive signal is more than enough, the ADC voltage will drop.

PA812a-IS contains the final transmitter power amplifier, plus a circuit for electronically switching the antenna between the transmitter and the receiver. Collector current for the second transistor in PA811a-IS passes through the switching diodes, whereby they can be considered to be virtual short circuits. This connects the Power Amplifier output to the antenna while short circuiting the receiver input. When receiving, the diodes become reverse biased, effectively isolating the transmitter from the antenna while connecting the antenna to the receiver input.

ADC Circuit AD801 (1W versions only)

This circuit is omitted in 0.2W transmitters and replaced by two voltage dropping resistors. The transmitter output current is kept very nearly constant by means of the ADC Circuit.

The voltage drop across a small resistor in the output transistor's collector return is monitored by the ADC stage, which then regulates the collector voltage to the first transistor amplifier in the PA811a-IS with the net effect of cancelling any variations and thus keeping the RF output at a constant value. The amount of current through the output stage, and thus the output power, can be set by means of a resistor mounted on the mother board.

Antenna Filter FN811

A nine-pole, low-pass filter having a cutoff frequency of 180MHz is inserted between the transmitter output and the antenna. The filter suppresses any harmonics created in PA812a-IS.

Receiver Circuit (see block diagram)

The receiver is a double conversion superheterodyne using intermediate frequencies of 21.4MHz

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IF Converter IC801

The first IF frequency (21.4MHz) is converted to the second IF frequency (103.5kHz) in this module, which contains an amplifier, a mixer and an oscillator. The output signal is taken off from a center tap on the coil in the mixer transistor's collector circuit and applied to an intermediate frequency amplifier, IA801.

IF Amplifier and Discriminator IA801 and IA802

The first Intermediate Frequency Amplifier, IA801, consists of two differential amplifiers in cascade. The output signal is applied to the second Intermediate Frequency Amplifier, IA802, which contains a 103.5kHz bandpass filter, a quadrature detector, a lowpass filter and an audio frequency amplifier.

The IF amplifier, detector and AF amplifier are all included in one integrated circuit.

The balanced quadrature detector has excellent AM suppression and contains only one tuned circuit. Inserted between the detector and the AF amplifier is an active lowpass filter which removes any superimposed IF signal. The detector bandwidth and the audio amplifier output voltage can be regulated by means of two external resistors on the mother board (AF output at 1000Hz= 110mV).

AF Amplifier AA801a-IS

The audio frequency signal from IA802 is fed to the AA801a-IS AF Amplifier where it becomes amplified to the desired audio power level. First the signal passes through an active highpass filter that suppresses any pilot tones or low noise frequencies (noise). Next comes an integrated circuit containing two separate amplifiers which make up the preamplifier and output stage. The volume control is inserted between these two amplifiers. The preamplifier also operates as an active lowpass filter suppressing frequencies above 3000Hz and the output amplifier gives the required receiver de-emphasis (integration).

The Squelch Circuit can block the AF signal path by grounding the squelch terminal (5). When the squelch output goes positive again, the audio amplifier will operate normally.

Squelch Circuit SQ801a

The receiver Squelch Circuit operates automatically, according to the noise content of the antenna signal. Weak signals contain greater noise than acceptable signal levels. The output AF signal from IA802 is also present at the input to SQ801a, where it must first pass through an active highpass filter that suppresses frequencies under 7kHz. Higher frequencies become amplified, then detected and whenever the signal-to-noise ratio is objectionable, the detected noise signal will be sufficient to turn off the audio amplifier. With an acceptable signal strength at the antenna, the noise content will be too low to trigger the squelch, and the positive collector supply ($+V_{cc}$) will be available to the audio amplifiers, allowing them to operate normally.

An external resistor sets the squelch to open the path for a signal-to-noise ratio of $\geq$12dB SINAD. A pushbutton on the control head/control unit allows manual cancelling of the squelch function.

Power Supply and Voltage Regulator VR801-IS

Because of variations in the battery voltage as the battery discharges, two VR801-IS type Voltage Regulators are employed to supply many of the transmitter and receiver circuits in the CQP800-IS with a constant 7.5V potential. The regulators are short circuit protected.

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TECHNICAL SPECIFICATIONS

CQP810U-RC2

Specifications are based on measuring methods as prescribed in EIA publications RS152A and RS204A, GPO W6771, and CEPT.
Figures given in brackets are guaranteed values.

GENERAL

Frequency Range
146 - 174MHz

Channel Spacing
CQP813U-2RC: 20/25kHz
CQP814U-2RC: 12.5kHz

Frequency Deviation
CQP813U-2RC: 4/5kHz
CQP814U-2RC: 2.5kHz

Modulation Frequency Range
CQP813U-2RC: 300 - 3000Hz
CQP814U-2RC: 300 - 2400Hz

Maximum RF Bandwidth
1.5MHz

(Two channel groups in the 146 - 174MHz range)

Antenna Impedance
50ohm
(Multiconnector output)

Maximum Number of Channels
2, 4, 8, or 12 channels

Temperature
Working Range: -25°C to +55°C
Transmitter functioning Range: -30°C to +60°C

TRANSMITTER

RF Power Output
CQP810U-2RC 1W: 0.1 - 1.0W ±1dB
CQP810U-2RC 3W: 1.0 - 3.0W ±1dB
Measured at V_B = 11 Volt (BU806-BU807) and at 25°C.
Degradation under extreme conditions according to CEPT.

Crystal Frequency Range
18.25 MHz to 21.75 MHz

Crystal Frequency Calculation
$fx=\frac{fant}{8}$ MHz

Frequency Stability
Conforms with demands of the local authorities.

Spurious Radiation
Harmonics: less than 0.2µW
Other : less than 0.2µW

Side Band Noise, MPT

CQP814U-2RC: 1μW (10μW)

Side Band Noise , CEPT

CQP813U-2RC: -80dB (-70dB)

CQP814U-2RC: -70dB (-60dB)

Tone Input Modulation Sensitivity

110 mV

(terminal voltage for 0.6 x Δf_{max}, 1KHz)

Modulation Frequency Characteristics, CEPT

CQP813U-2RC: +0/-2.5dB (+1/-3dB)
300 - 3000 Hz

CQP814U-2RC: +0/-2.5dB (+1/-3dB)
300 - 2400 Hz

(relative to 1000 Hz and 6dB/octave)

Modulation Distortion, CEPT

2% (10%)

measured with 750μsec deemphasis and psophometric filter

FM Hum and Noise, CEPT

CQP813U-2RC: -50dB (-40dB)

CQP814U-2RC: -45dB (-40dB)

RECEIVER

Sensitivity, EIA

0.7μV (1.2μV)

(e.m.f. for 12dB SINAD at 25°C)

Sensitivity, CEPT

0.9μV (1.4μV)

(e.m.f. for 20dB SINAD at 25°C)

Squelch Sensitivity, EIA

0.6μV (1.2μV)

Crystal Frequency Range

124.6 MHz to 152.6 MHz

Crystal Frequency Calculation

fx = fant - 21.4 MHz

Frequency Stability

Conforms with the demands of the local authorities.

Modulation Pass Band, EIA

CQP813U-2RC: ± 7KHz. (± 5 KHz)

CQP814U-2RC: ± 4KHz (± 2.5 KHz)

Adjacent Channel Selectivity, EIA

CQP813U-2RC: 85dB

(measured at 25°C)

Adjacent Channel Selectivity, CEPT

CQP813U-2RC: 65dB (60dB)

Adjacent Channel Selectivity, GPO

3/15 mV e.m.f. (2/10 mV e.m.f.)

Spurious Selectivity, CEPT

75dB (70dB)

Intermodulation Attenuation, EIA

70dB (60dB)

Intermodulation Attenuation, CEPT

CQP813U-2RC: 75dB (70dB)

Blocking, GPO

150 mV (100 mV)

Chassis Emission, CEPT

Less than 2 nV

AF Output Power

500 mW (400 mW)

(R_L=25 ohm, 1 KHz, 10% distortion, V_B=11 V)

AF Output Power, CEPT

250 mW (200 mW)

($\Delta f = 0.7 \times \Delta f_{max}$, 10% distortion)

Distortion

2% (7%)

($\Delta f = \frac{2}{3}\Delta f_{max}$; 300 mW; 25°C)

AF charateristic, CEPT

CQP813U-2RC: +0/-1.5dB (+1/-3dB)

relative to 1000Hz and-6dB/octave)

SUPPLY VOLTAGE AND CURRENT DRAIN

Nominal Battery Voltage

11 Volt

Supply Voltage Range

9.6V to 13.5V

Transmitter Current Drain

1W: 350 mA (380 mA)

3W: 750 mA (800 mA)

(less tone equipment at nominal supply)

Receiver Current Drain

Standby:	6.5 mA (7.5 mA)
Receive:	65 mA (80 mA)

AF output 250 mW

Battery types

BU802/BU806:	225 mAh
BU803/BU807:	450 mAh

Battery dimensions

BU802:	63 x 32 x 51 mm
BU803:	63 x 32 x 94 mm
BU806:	63 x 32 x 51 mm
BU807:	63 x 32 x 73 mm

Battery Weight

BU802:	140g
BU803:	260g
BU806:	140g
BU807:	215g

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CQP810U-RC2

CIRCUIT DESCRIPTION

The transmitter and receiver circuits are built as plug-in modules which are completely shielded and has connector pins protroding from the bottom of the modules. All modules of the transmitter and receiver are inserted in two motherboards both assembled with the bottom connector and the control head to form the complete radio. Chassis interconnections are by means of a sewn cable loom.

Transmitter section

The transmitter section consists of the following:

CH8014 Transmitter Chassis (motherboard).
AA802 Modulation Amplifier
FN803 Modulation Filter for 20/25 kHz channel separation
or
FN804 Modulation Filter for 12.5 kHz channel separation
PM811 Phase Modulator
FD811 1st Frequency Doubler
FD812 2nd Frequency Doubler
FD813 3rd Frequency Doubler
BP813 RF Band Pass Filter
PA811a 1st Power Amplifier for 1W
PA812a 2nd Power Amplifier for 1W and Antenna Switch
or
PA813 1st Power Amplifier for 3W
PA814 2nd Power Amplifier for 3W and Antenna Switch
FN811 Antenna Filter
AD801 ADC Circuit (Automatic Drive Control)
VR801 Voltage Regulator
XO812 Crystal Oscillator, maximum 12.

or
XO815 Crystal Oscillator for pilot tone modulation

Modulation Amplifier AA802 and FN803/FN804

The modulation amplifier function is carried out by the Modulation Amplifier, AA802 in conjunction with a Modulation Filter, FN803 or FN804.
The microphone signal is applied to an operational amplifier; the degree of negative feedback, and thus the amplifier gain, can be adjusted by means of an external resistor. Microphone sensitivity can then be adjusted to suit individual requirements. In radio sets with built-in tone
transmitters or sequential tone transmitters, the microphone amplifier is disabled by the tone key.

The amplified AF signal is applied to a limiter via a differentiating network. The limiter is likewise an operational amplifier utilising negative feedback. Following the limiter is an integration network and an active lowpass filter where the active element is another operational amplifier. The active filter removes any harmonics of the original input signal that arise during limiting action, and it also keeps the frequency excursions within the tolerances required for the channel spacing used in the particular equipment. An extra limiter is inserted between the integration network and the active low-pass filter to prevent strong input signals of low frequencies from overloading the filter.

Transmitter Oscillator XO812

The transmitter exciter signal is generated by a crystal, Colpitts-type oscillator operating on the crystal's fundamental frequency, which will be in range of 18.25 to 21.75 MHz. The oscillator starts when the channel selector completes the circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection. Thus several oscillators can be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit. The maximum number of channels is 12, with all oscillators placed in an oscillator panel.

Crystal Oscillator XO815

In radiotelephones with pilot tone facilities, a special oscillator very similar to the XO812 is used. This oscillator, however, includes an extra variable capacitance diode in the crystal circuit which, when driven by the subaudio pilot tone signal, frequency modulates the exciter oscillator.

Phase Modulator PM811

The Phase Modulator consists of an input- and an output buffer plus a phase modulator stage. The exiter signal from the oscillator is fed to the input buffer stage. This amplifier, with following π network, ensures a constant sine wave signal to the phase modulator. The modulator is a transistor amplifier stage where the modulating audio signal is applied to the emitter, which is RF decoupled. The modulation signal varies the transconductance (g_m) of the amplifier and thus the phase angle (φ) of the RF signal at its output. To function properly, the modulator must work into a constant load and is therefore followed by a buffer stage whose output signal is sufficient in amplitude to drive the following stage, a frequency doubler.

Multiplier Chain FD811, FD812, FD813

The multiplier chain consists of three very similar frequency doubler stages. Each frequency doubler operates as a grounded emitter transistor amplifier followed by two inductively coupled LC circuits that are tuned to the second harmonic of the input frequency.

Band Pass Filter BP811

To ensure suppression of the undesired harmonics that arise in the frequency multiplying process, the multiplier chain is terminated by a double tuned band pass filter, the BP811.

Power Amplifiers PA811a - PA812a and PA813 - PA814

The output power from the Multiplier Chain (approx. 10 mW) is amplified to the required antenna power (0.1W to 1.0W or 1.0W to 3.0W) in a three-stage amplifier composed of two modules. PA811a and PA812a are for r.f. antenna power 0.1W to 1.0W; PA813 and PA814 for 1.0W to 3.0W.

PA811a and PA813 contain two amplifier stages. The collector voltage to the first transistor is supplied via the ADC circuit, and is variable. If more gain is required to drive the following stage, PA812a or PA814, the collector supply (ADC) voltage will rise. On the other hand, if the drive signal is more than enough, the ADC voltage will drop.

PA812a and PA814 contain the final transmitter power amplifier, 0.1W to 1.0W and 1.0 to 3.0W, respectively, plus a circuit for electronically switching the antenna between the receiver and the transmitter. Collector current to the second transistor in PA811a/ PA813 passes through the switching diodes, whereby they can be considered to be virtual short circuits. This connects the Power Amplifier output to the antenna while short circuiting the receiver input. When receiving, the diodes become reverse biased, effectively isolating the transmitter from the antenna while connecting the antenna to the receiver input.

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ADC Circuit AD801

The transmitter output current is kept very nearly constant by means of the ADC Circuit. The voltage drop across a small resistor in the output transistor's collector return is monitored by the ADC stage, which then regulates the collector voltage to the first transistor amplifier in the PA811a/PA813 with the net effect of cancelling any variations and thus keeping the RF output at a constant value. The amount of current through the output stage, and thus the output power, can be set by means of a resistor mounted on the mother board.

Antenna Filter FN811

A nine-pole, low-pass filter having a cutoff frequency of 180 MHz is inserted between the transmitter output and the antenna. The filter suppresses any harmonics created in PA812a/PA814.

Receiver Circuit (see block diagram)

The receiver is a double conversion superheterodyne using intermediate frequencies of 21.4 MHz and 103.5 kHz. The RF circuits are tuned by capacitance diodes which can switch the receiver front-end to a second channel 'Window'. This allows receptions of two signal groups of virtual frequency spacing within the 146-174 MHz band. Group selection is performed by grounding terminal 17 via a diode matrix which is coupled to the channel selector.
The matrix arrangement permits the channels to be chosen arbitrarily from the simplex and semiduplex frequency groups.

Channel selectivity is achieved by means of a crystal filter in the first IF circuit. The radiotelephone can be fitted with up to 12 channels, one oscillator per channel. All the oscillators are arranged in parallel on a special oscillator panel which also contains the transmitter oscillators. The receiver employs an electronic squelch circuit whose treshold can be set with a resistor on the mother board. There is a pushbutton for cancelling the squelch on the control head or the control unit, whichever is used.

The receiver consists of the following modules:

CH809	Receiver Chassis (motherboard)
RC812	Receiver Converter
XF803	Crystal Filter for 20/25 kHz channel separation.
or	
XF804	Crystal Filter for 12.5 kHz channel separation.
IC801	IF converter 21.4 MHz/103.5 kHz
IA801	1st IF amplifier
IA802	2nd IF amplifier and detector.
SQ801a	Squelch Circuit
AA801a	AF amplifier
VR801	Voltage regulator
XO811	Crystal oscillator (maximum 12).

Function

Receiver Converter RC812 allows receptions of 2 signal groups of virtual frequency spacing within the 146-174 MHz band. Selection of the groups is performed by grounding terminal 17 on RC812 via.the diode matrix wich is coupled to the channel selector. By modifying the matrix the channels may be chosen virtually from the simplex or semiduplex frequency groups.

Receiver Converter RC812

The RC812 converts the frequency of the received signal to the 1st IF frequency of 21.4 MHz.
The incoming path from the antenna is through the Antenna Filter, FN811, and then via the input of the RC812. The signal then passes through a two-element band pass filter to a field-effect-transistor (J-FET) operating as agrounded gate amplifier. After amplifica-

tion, the signal passes through a three-element VHF filter consisting of L3, L4 and L5. This filter is what mainly determines the r.f. selectivity of the converter. Both the two-element filter and the three-element filter circuits are tuned by capacitance diodes biased by a switching network. When switching between channels allocated in the two frequency groups the diode bias voltage is changed and hence the r.f. circuits tuned to the frequency band of the second channel group.
The r.f. signal is taken off the L5 and applied to the mixer which is a field-effect-transistor (J-FET) in a grounded source configuration. The injection signal is applied to the gate of the mixer via a two-element bandpass filter which, like the r.f. circuits, is tuned by capacitance diodes.
The IF signal (21.4 MHz) is taken off via a combination autotransformer/L-network which is designed to match the impedance of the following crystal filter.
The input impedance of XF803 is 1600ohm and 700ohm for XF804.

Diode Bias Network

The capacitance diodes that tunes the r.f. filters are biased by a voltage determined by a potentiometer and a fixed resistor. The potentiometer is shunted by a transistor the base of which is accessible at a control terminal. When this terminal is grounded by the channel selector, via a diode matrix, the shunting transistor saturates and the diode bias voltage will be at maximum. Letting the control terminal float the bias voltage will be as set by the potentiometer.
A diode in series with the bias voltage supply compensates for variations due to changes in temperature.

Technical Specifications RC812

Frequency Rangs
146-174 MHz

Injection Frequency Range
124.6-152.6

IF Frequency
21.4 MHz

Input Impedance
Antenna: 50ohm
Injection: 50ohm

Output Impedance
700/1600ohm

Channel Group Allocations
2 x 1.5 MHz within the band Limits

Injection Frequency Signal Level
1mV into 50ohm

Supply Voltage
9-15V unregulated
7.5V Stabilized

Current Drain
4mA (11V)
0.1mA (7.5V)

Oscillator XO811

The local oscillator signal of 124 to 153 MHz is generated in the Hartley type crystal oscillator where the transistor operates as a grounded base amplifier. The oscillator starts when the channel selector switch completes the emitter circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection. Thus several oscillators can all be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit.

The local oscillator signal frequency lies 21.4MHz under the antenna frequency and the formula for calculating the crystal frequency is therefore:

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$f_x = f_a$ 21.4 MHz

(where f_x = crystal frequency and f_a = antenna frequency)

Crystal Filter XF803 and XF804

The Crystal Filter unit comprises an eight-pole monolithic crystal filter and an impedance matching transformer for matching the output to the impedance of the following IF converter. Practically all of the receiver selectivity is achieved in the crystal filter.

XF803 is employed in equipment with 20/25 kHz channel spacing.

XF804 is employed in equipment with 12.5 kHz channel spacing.

IF Converter IC801

The first IF frequency (21.4 MHz) is converted to the second IF frequency (103.5 kHz) in this module, which contains an amplifier, a mixer and an oscillator. The output signal is taken off from a center tap on the coil in the mixer transistor's collector circuit and applied to an intermediate frequency amplifier, IA801.

IF Amplifier and Discriminator IA801 and IA802

The first Intermediate Frequency Amplifier, IA801, consists of two differential amplifiers in cascade.
The output signal is applied to the second Intermediate Frequency Amplifier, IA802, which contains a 103.5 kHz bandpass filter, a quadrature detector, a lowpass filter and an audio frequency amplifier.

The IF amplifier, detector and AF amplifier are all included in one integrated circuit.

The balanced quadrature detector has excellent AM suppression and contains only one tuned circuit. Inserted between the detector and the AF amplifier is an active lowpass filter which removes any superimposed IF signal. The detector bandwidth and the audio amplifier output voltage can be regulated by means of two external resistors on the mother board (AF output at 1000 Hz = 110 mV for Δf=66%)

AF Amplifier AA801a

The audio frequency signal from IA802 is fed to the AA801a AF Amplifier where it becomes amplified to the desired audio power level. First the signal passes through an active highpass filter that suppresses any pilot tones or low frequencies (noise). Next comes an integrated circuit containing two separate amplifiers which make up the preamplifier and the output stage. The volume control is inserted between these two amplifiers.

The preamplifier also operates as an active lowpass filter suppressing frequencies above 3000 Hz and the amplifier gives the required receiver de-emphasis (integration).

The Squelch Circuit can block the AF signal path by grounding the squelch terminal (5). When the squelch output goes positive again, the audio amplifier will operate normally.

Squelch Circuit SQ801a.

The receiver Squelch Circuit operates automatically, according to the noise content of the antenna signal. Weak signals contain greater noise than acceptable signal levels. The output AF signal from IA802 is also present at the input to SQ801a, where it must first pass through an active highpass filter that suppresses frequencies under 7 kHz. Higher frequencies become amplified, then detected and whenever the signal-to-noise ratio is objectionable, the detected noise signal will be sufficient to turn off the audio amplifier. With an acceptable signal

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strenght at the antenna, the noise content will be too low to trigger the squelch, and the positive collector supply (+ V_{CC}) will be available to the audio amplifier's gating terminal allowing it to operate normally. An external resistor sets the squelch to open the path for a signal-to-noise ratio of $\geq$12 dB SINAD.

A pushbutton on the control head/control unit allows manual cancelling of the squelch function.

Oscillator Chassis.

All Crystal Oscillators for both transmitter and receiver is inserted in a separate chassis. Depending on the maximum channels the chassis will have a type designation as follows:

CH803 Chassis with accommodations for up to 2 channels.

CH804 Chassis with accommodations for up to 4 channels.

CH805 Chassis with accommodations for up to 8 channels.

CH806 Chassis with acccommodations for up to 12 channels.

The oscillator chassis has diodes mounted on it to form a matrix by which the simplex and semiduplex channels are selected. When the simplex/semiduplex frequencies and channel number assignation are known, modification of the diode matrix can be made . With the diode in place the channel selector, in addition to activating the oscillator units, also switches the receiver front-end to the highest frequency 'window'. Thus if the simplex frequency is higher than the duplex frequency, the diodes should be removed from the semi-duplex channels. If the duplex frequency is higher than the simplex frequency, the diodes should be removed from the simplex channels. In the case of a two channel radio, channel 1 has arbitarily been chosen as the highest receiver frequency. This can, if required, be reversed by transferring the front-end control lead from pin 4 on RX channel 1 to pin 4 on RX channel 2.

Power Supply and Voltage Regulator VR801

Because of variations in the battery voltage as the battery discharges, two VR801 type Voltage Regulators are employed to supply many of the transmitter and receiver circuits in the CQP800 with a constant 7,5 V potential. The regulators are short circuit protected.

The radiotelephone is powered by a rechargeable battery which slides into the bottom of the radio. The battery makes contact with a terminal board, type TB802, which also holds the terminals used for measurements and tests.

CQP810-2RC

ADJUSTMENT PROCEDURE

The adjustment procedure for CQP810 (document 60.331-E1) also applies to CQP810-2RC when the procedure for adjustment of RC811 is replaced by the following procedure for RC812a.

As the adjustment of L5 and L7 interacts mutually screw the slugs of L3, L5, and L7 completely into the coil forms, and the slug of L4 completely to its outer position.

It's important that the coil adjustments are performed on the channel whose frequency is nearest to the center frequency of the higher channel group, and R16 on the channel whose frequency is nearest to the center frequency of the lower channel group.

Set the DCVM switch to RC.

Select the center frequency of the high channel group.

Adjust L8 for maximum deflection on the DCVM.

Turn L7 outwards until a 0.2V increase in the DCVM reading is obtained.

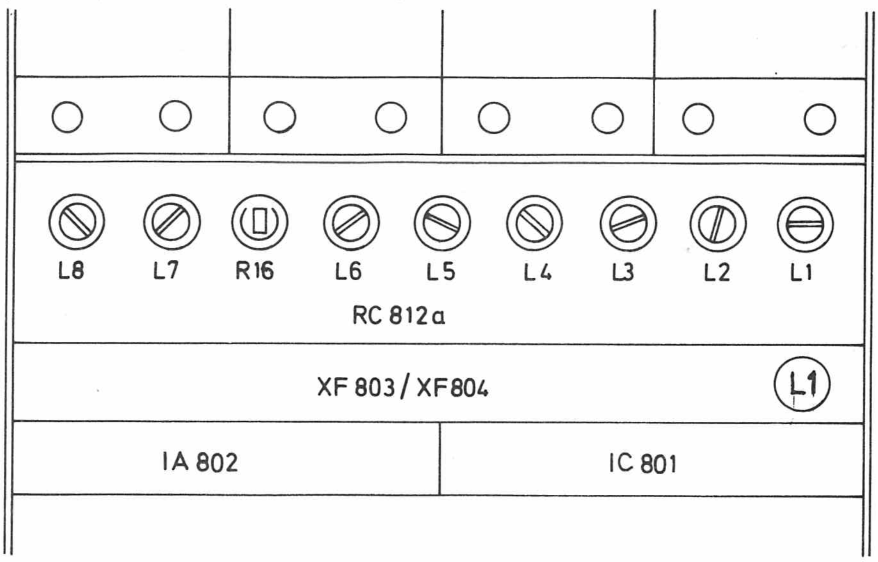
Connect the RF signal generator to the antenna connector and set its frequency to the receiver frequency.

Modulate the signal with 1 KHz as follows:

- $\pm$ 3.5 KHz for 25 KHz channel spacing.
- $\pm$ 2.8 KHz for 20 KHz channel spacing
- $\pm$ 1.75 KHz for 12,5 KHz channel spacing

Set the SQ OUT switch down.
Set the LINE OUT-LS/MICR switch down.

Adjust the signal generator output until 12dB SINAD (25% distortion) is obtained on the distortion meter. As the receiver is adjusted the sensitivity increases and hence the signal input must be reduced to maintain 12 dB SINAD.



Adjust L4 for maximum sensitivity.
This is the only adjustment of L4 and it must not be touched later on.

Screw L5 to its outer position and adjust the following coils for best signal to noise L3, L5, L2, and L1.

Adjust L8 for maximum deflection on the DCVM

Slowly turn L7 outwards while observing the sensitivity. Adjust L7 for the highest injection signal without reducing the sensitivity.

Adjust L5 for maximum sensitivity.

Set the channel selector to the channel whose frequency is nearest to the center frequency of the lower channel group.

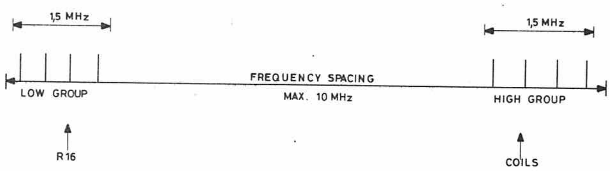
Set the RF signal generator to the receiver frequency.

Adjust R16 for maximum sensitivity.

Adjust L6 for minimum distortion.

Adjust L1 in XF803/XF804 for minimum distortion.

Receiver oscillator adjustments
See 60.331-E1



With the receiver properly adjusted the following requirements should be fulfilled on all channels:

Measurement	Conditions	Requirement
V_{GS} mixer	without antenna and oscillator signal	1 - 4V
V_{GS} mixer voltage increase	without antenna signal, with oscillator signal	> 0.1
Distortion	antenna signal 100 uV e.m.f.	< 2.5%
Sensitivity	12 dB SINAD	Better than 0.6 uV e.m.f.

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CQP8414 (U)
TECHNICAL SPECIFICATIONS

Specifications are based on the measuring methods prescribed in EIA publications RS152A and RS204A, GPO specification W6771, and CEPT specifications.
Figures given in parenthesis are guaranteed values.

GENERAL

Frequency Range
Receiver: 132-146MHz
Transmitter: 105-108MHz

Channel Separation
12.5kHz

Max. Frequency Deviation
±2.5kHz

Modulation Frequency Range
300-2400Hz

VHF Bandwidth
1.5MHz

Number of Channels
2, 4, 8, or 12 channels

Antenna Impedance
50ohm

Temperature Range
Operating range: -25°C to +50°C
Functioning range: -30°C to +60°C

TRANSMITTER

RF Power Output
1W (0.1 -1W ±1dB)
Measured at V_B= 11V (BU806-BU807) and 25°C.
Degradation under extreme conditions according to CEPT.

Crystal Frequency Range
17.5-18 MHz

Crystal Frequency Formula

$$fx = \frac{f_{ant}}{6}$$

Frequency Stability
Conforms with the Authorities' specification

Spurious Radiation, CEPT
Less than 0.2uW

Side Band Noise, MPT
1uW (10uW)

Side Band Noise, CEPT
-70dB (-60dB)

60.425-E1

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Tone Input Modulation Sensitivity

Terminal voltage for 60% Δf_{max}, 1kHz

110mV

Modulation Frequency Characteristic, CEPT

+0/-2.5dB (+1/-3.0dB)

relative to 1000Hz, 6dB/octave

Modulation Distortion

2% (10%)

measured with 750u sec. de-emphasis

FM Hum and Noise

-45dB (-40dB)

RECEIVER

Sensitivity, EIA

0.5uV at 25°C (1uV)

e.m.f. for 12dB SINAD

Sensitivity, CEPT

0.7uV at 25°C (1.2uV)

e.m.f. for 20dB S/N

Squelch Sensitivity, EIA

0.4uV at 25°C (1.0uV)

Crystal Frequency Range

110.6-124.6MHz

Crystal Frequency Formula

$fx=f_{ant}-21.4$ MHz

Frequency Stability

Conforms with Authorities' specification

Modulation Pass Band

±4kHz (±2.5kHz)

Adjacent Channel Selectivity

3/15mV e.m.f. (2/10mV)

Spurious Selectivity CEPT

75dB (70dB)

Intermodulation, EIA

70dB (65dB)

Blocking, GPO

150mV (100mV)

Spurious Radiation, CEPT

Less than 2nW

AF Output Power

500mW (400mW)

measuring conditions:

R_L=25ohm, distortion 10%, 1kHz, V_B= 11V

AF Output Power, CEPT

250mW (200mW)

measuring conditions:

Δf= 70% Δf_{max}, 1kHz, max. distortion 10%

AF Distortion

3% (8%)

measuring conditions:

Δf= 66% Δf_{max}, 1kHz, 300mW, 25°C

AF Frequency Characteristic, CEPT

+0/-1.5dB (+1/-3dB)

relative to 1000Hz, -6dB/octave

SUPPLY VOLTAGE AND CURRENT DRAIN

Nominal Supply Voltage

11V

Supply Voltage Range

9.9V-13.5V

Transmitter Current Drain

(less tone equipment, at 11V)

350mA (380mA)

Receiver Current Drain

(less tone equipment, at 11V)

Standby: 7mA (8mA)

Receive: 65mA (80mA)

AF= 250mW

CQP8414 (U)

CIRCUIT DESCRIPTION

Transmitter Circuit (see block diagram).
The transmitter is built up of several modules, each of which is completely enclosed (shielded) and has connector pins protruding from the bottom of the module. All the modules are then mounted onto a mother board.

The transmitter section consists of the following modules:

XO812 or XO815	Crystal Oscillator
AA802	Modulation Amplifier
FN804	Modulation Filter for 12,5kHz channel sepatation
PM811	Phase Modulator
FT841	Frequency Tripler
FD842	Frequency Doubler
BP841	Band Pass Filter
PA841	1st Power Amplifier
PA842	2nd Power Amplifier and Antenna Switch
FN841	Antenna Filter
AD801	ADC Circuit
VR	Voltage Regulator

Modulation Amplifier AA802 and FN804
The modulation amplifier function is carried out by the Modulation Amplifier, AA802 in conjunction with a Modulation Filter, FN804. The microphone signal is applied to an operational amplifier; the degree of negative feedback, and thus the amplifier gain, can be adjusted by means of an external resistor. Microphone sensitivity can then be adjusted to suit individual requirements. In radio sets with built-in tone transmitters or sequential tone transmitters, the microphone amplifier is disabled by the tone key.

The amplified AF signal is applied to a limiter via a differentiating network. The limiter is likewise an operational amplifier utilising negative feedback. Following the limiter is an integration network and an active lowpass filter where the active element is another operational amplifier. The active filter removes any harmonics of the original input signal that arise during limiting action, and it also keeps the frequency excursions within the tolerances required for the channel spacing used in the particular equipment. An extra limiter is inserted between the integration network and the active low-pass filter to prevent strong input signals of low frequencies from overloading the filter.

Transmitter Oscillator XO812
The transmitter exciter signal is generated by a crystal, Colpitts-type oscillator operating on the crystal's fundamental frequency, which will be in the range of 17.5 to 18MHz. The oscillator starts when the channel selector completes the circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonent circuit whenever the channel switch breaks the ground connection. Thus several oscillators can be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit.
The maximum number of channals is 12, with all oscillators placed in an oscillator panel.

Crystal Oscillator XO815
In radiotelephones with pilot tone facilities, a special oscillator very similar to the XO812 is used. This oscillator, however, includes an extra variable capacitance diode in the crystal circuit which, when driven by the subaudio pilot tone signal, frequency modulates the exciter oscillator.

Phase Modulator PM811
The Phase Modulator consists of an input- and an output buffer plus a phase modulator stage.

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The exciter signal from the oscillator is fed to the input buffer stage. This amplifier, with following π network, ensures a constant sine wave signal to the phase modulator. The modulator is a transistor amplifier stage where the modulating audio signal is applied to the emitter, which is RF decoupled. The modulation signal varies the transconductance (g_m) of the amplifier and thus the phase angle (φ) of the RF signal at its output. To function properly, the modulator must work into a constant load and is therefore followed by a buffer stage whose output signal is sufficient in amplitude to drive the following stage, a frequency doubler.

Frequency Multiplier Chain FT841, FD842

The frequency multiplier stages are contained in two modules of which the FT841 operates as frequency tripler and FD842 as frequency doubler. The FT841 receives its input signal from the phase modulator unit PM811 and consists of a class-A amplifier input stage and a frequency tripler stage whose tank circuit is constituted by L1, C7, C8 and C9. The tank circuit is tuned to the third harmonic of the input frequency and attennuates the fundamental and other harmonic frequencies.

The FD842 frequency doubler stage consists of a transistor in a grounded emitter configuration and a bandpass filter tuned the second harmonic of the input frequency (6 x fx). The filter consists of the transistor collector load L1 and C1 which is inductively coupled to L2, C4 and C5. The filter attenuates the input frequency and the third and higher order harmonics.

Band Pass Filter BP841

To ensure suppression of the undesired harmonics that arise in the frequency multiplying process, the multiplier chain is terminated by a double tuned band pass filter, the BP841.

Power Amplifiers PA841, PA842

The output power from the Multiplier Chain (approx. 10mW) is amplified to the required antenna power (0.1 to 1.0W) in a three-stage amplifier composed of two modules.

PA841 contains two amplifier stages. The collector voltage to the first transistor is supplied via the ADC circuit, and is variable. If more gain is required to drive the following stage, PA842 the collector supply (ADC) voltage will rise. On the other hand, if the drive signal is more than enough, the ADC voltage will drop.

PA842 contains the final transmitter power amplifier, 0.1W to 1.0W, plus a circuit for electronically switching the antenna between the receiver and the transmitter. Collector current to the second transistor in PA842 passes through the switching diodes, whereby they can be considered to be virtual short circuits. This connects the Power Amplifier output to the antenna while short circuiting the receiver input. When receiving, the diodes become reverse biased, effectively isolating the transmitter from the antenna while connecting the antenna to the receiver input.

ADC Circuit AD801

The transmitter output current is kept very nearly constant by means of the ADC Circuit. The voltage drop across a small resistor in the output transistor's collector return is monitored by the ADC stage, which then regulates the collector voltage to the first transistor amplifier in the PA841 with the net effect of cancelling any variations and thus keeping the RF output at a constant value. The amount of current through the output stage, and thus the output power, can be set by means of a resistor mounted on the mother board.

Antenna Filter FN841

A 8-pole, low-pass filter having a cutoff frequency of 146MHz is inserted between the transmitter output and the antenna. The filter suppresses any harmonics created in PA842.

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Receiver Circuit (see block diagram)

The receiver is a double conversion superheterodyne using intermediate frequencies of 21.4MHz and 103.5kHz. Channel selectivity is achieved by means of a crystal filter in the first IF circuit. The radiotelephone can be fitted with up to 12 channels, one oscillator per channel. All the oscillators are arranged in parallel on a special oscillator panel which also contains the transmitter oscillators. The receiver employs an electronic squelch circuit whose threshold can be set with a resistor on the mother board. There is a pushbutton for cancelling the squelch on the control head or the control unit, whichever is used.

The receiver consists of the following modules:

RC813	Receiver Converter
XO813	Crystal Oscillator
XF803	Crystal Filter for 20/25kHz
or	channel separation
XF804	Crystal Filter for 12.5kHz channel separation
IC801	IF Converter
IA801	1st IF Amplifier
IA802	2nd IF Amplifier and Discriminator
SQ801a	Squelch Circuit
AA801a	AF Amplifier
VR801	Voltage Regulator

Receiver Converter RC813

The RC811 converts the frequency of the antenna signal to the 1st IF frequency of 21.4MHz. The incoming signal path from the antenna is through Antenna Filter, FN841, and then via the antenna switching circuit to the input of the RC813.

The signal then passes through a two-element bandpass filter to a field effect transistor (J-FET) operating as a grounded gate amplifier. After amplification, the signal passes through a three-element VHF filter consisting of L3, L4 and L5. This filter is what mainly determines the r.f. selectivity of the converter. The signal is taken off at a 50ohm tap and fed to the mixer via L6, a transformer that serves as an adjustment for achieving optimal sensitivity/gain. The local oscillator signal from the XO module(s), after passing through a two-element bandpass filter, is applied to the mixer gate. The bandpass filter ensures sufficient attenuation of any harmonics present. The mixer transistor is also a J-FET, this time in a grounded source configuration.

The IF signal is taken off via a combination autotransformer/L network to match the impedance of the following crystal filter.

Oscillator XO813

The local oscillator signal of 110.6-124.6MHz is generated in the Hartley type crystal oscillator where the transistor operates as a grounded base amplifier. The oscillator starts when the channel selector switch completes the emitter circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection. Thus several oscillators can all be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit.

The local oscillator signal frequency lies 21.4MHz under the antenna frequency and the formula for calculating the crystal frequency is therefore:

$f_x = f_a - 21.4\text{MHz}$

(where f_x= crystal frequency and f_a= antenna frequency)

Crystal Filter XF804

The Crystal Filter unit comprises an eight-pole monilithic crystal filter and an impedance matching transformer for matching the output to the impedance of the following IF converter. Practically all of the receiver selectivity is achieved in the crystal filter.

IF Converter IC801

The first IF frequency (21.4MHz) is converted to the second IF frequency (103.5kHz) in this module, which contains an amplifier, a mixer

Storno

and an oscillator. The output signal is taken off from a center tap on the coil in the mixer transistor's collector circuit and applied to an intermediate frequency amplifier, IA801.

IF Amplifier and Discriminator IA801 and IA802
The first Intermediate Frequency Amplifier, IA801, consists of two differential amplifiers in cascade. The output signal is applied to the second Intermediate Frequency Amplifier, IA802, which contains a 103.5kHz bandpass filter, a quadrature detector, a lowpass filter and an audio frequency amplifier.

The IF amplifier, detector and AF amplifier are all included in one integrated circuit.

The balanced quadrature detector has excellent AM suppression and contains only one tuned circuit. Inserted between the detector and the AF amplifier is an active lowpass filter which removes any superimposed IF signal. The detector bandwidth and the audio amplifier output voltage can be regulated by means of two external resistors on the mother board (AF output at 1000Hz= 110mV).

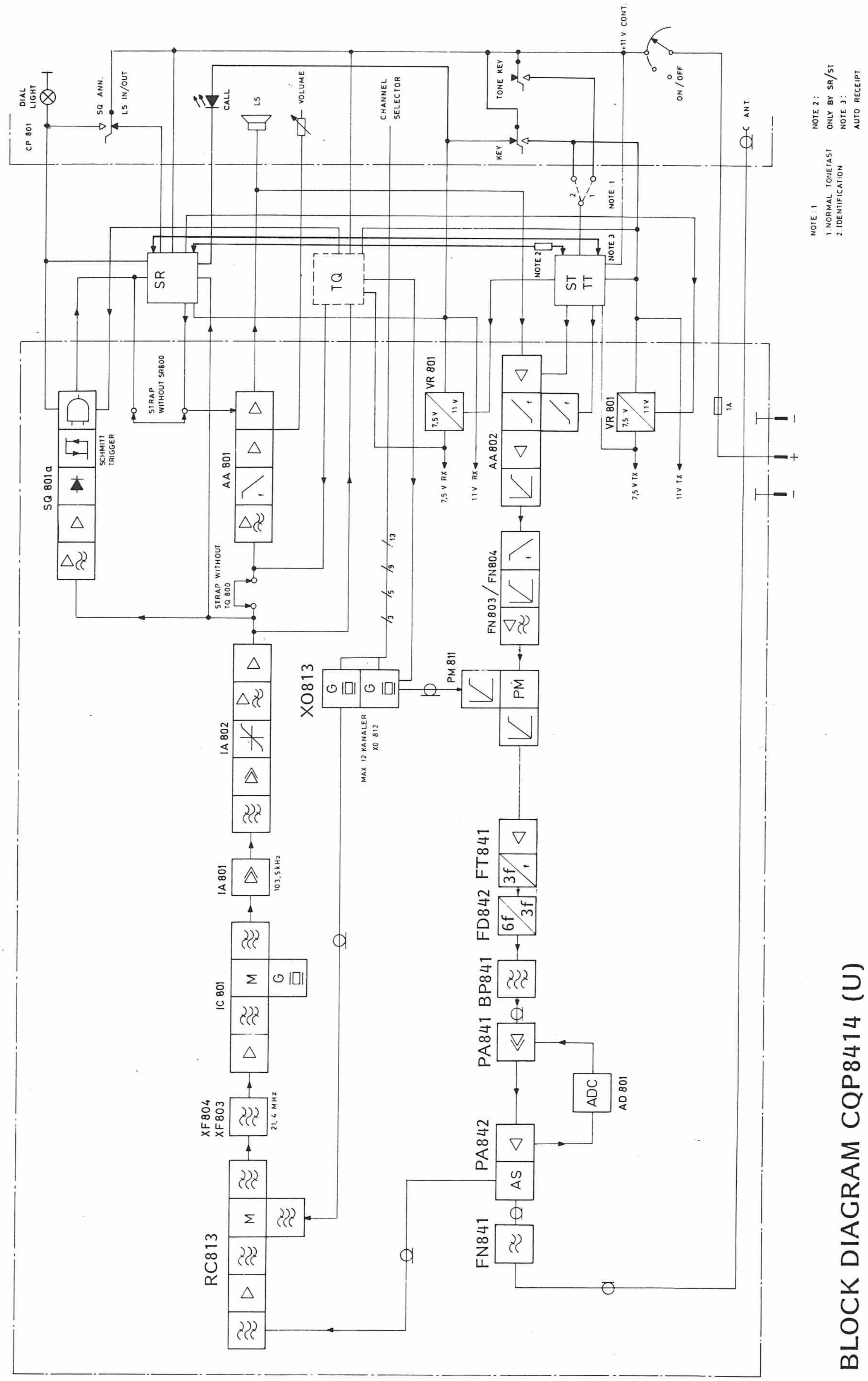
AF Amplifier AA801a
The audio frequency signal from IA802 is fed to the AA801a AF Amplifier where it becomes amplified to the desired audio power level. First the signal passes through an active highpass filter that suppresses any pilot tones or low frequencies (noise). Next comes an integrated circuit containing two separate amplifiers which make up the preamplifier and the output stage. The volume control is inserted between these two amplifiers.

The preamplifier also operates as an active lowpass filter suppressing frequencies above 3000Hz and the output amplifier gives the required receiver de-emphasis (integration).

The Squelch Circuit can block the AF signal path by grounding the squelch terminal (5). When the squelch output goes positive again, the audio amplifier will operate normally.

Squelch Circuit SQ801a
The receiver Squelch Circuit operates automatically, according to the noise content of the antenna signal. Weak signals contain greater noise than acceptable signal levels. The output AF signal from IA802 is also present at the input to SQ801a, where it must first pass through an active highpass filter that suppresses frequencies under 7kHz. Higher frequencies become amplified, then detected and whenever the signal-to-noise ratio is objectionable, the detected noise signal will be sufficient to turn off the audio amplifier.
With an acceptable signal strength at the antenna, the squelch, and the positive collector supply (+V_{cc}) will be available to the audio amplifier's gating terminal allowing it to operate normally. An external resistor sets the squelch to open the path for a signal-to-noise ratio of $\geq$12dB SINAD. A pushbutbon on the control head/control unit allows manual cancelling of the squelch function.

Power Supply and Voltage Regulator VR801
Because of variations in the battery voltage as the battery discharges, two VR801 type Voltage Regulators are employed to supply many of the transmitter and receiver circuits in the CQP8414 with a constant 7.5V potential. The regulators are short circuit protected.



BLOCK DIAGRAM CQP8414 (U)

STORNOPHONE 800
MAINTENANCE MANUAL
Section 3.

TITLE		CODE
CQP830	Circuit Description	60.240-E1
	Technical Specification	60.242-E1
	Adjustment Procedure	60.249-E1
CQP830U	Circuit Description	60.354-E1
	Adjustment Procedure	60.332-E1
CQP830U-IS	Circuit Description	60.428-E1

Service Coordination
06-80

CQP830U-IS
CIRCUIT DESCRIPTION

Transmitter Circuit (see block diagram)

The transmitter is built up of several modules, each of which is completely enclosed (shielded) and has connector pins protruding from the bottom of the module. All the modules are then mounted onto a mother board that is common to both transmitter and receiver circuits. The transmitter section consists of the following modules:

XO812	Crystal Oscillator
AA802	Modulation Amplifier
FN803-IS	Modulation Filter for 20/25kHz channel separation
or	
FN804-IS	Modulation Filter for 12.5kHz channel separation
PM811	1st Phase Modulator
PM831	2nd Phase Modulator
FD831	1st Frequency Doubler
FD832	2nd Frequency Doubler
BP831	Band Pass Filter
PA831-IS	1st Power Amplifier
PA832-IS	2nd Power Amplifier and Antenna Switch
FN831	Antenna Filter
AD801	ADC Circuit
VR801-IS	Voltage Regulator

Modulation Amplifier AA802 and FN803/FN804-IS

The modulation amplifier function is carried out by the Modulation Amplifier, AA802 in conjunction with a Modulation Filter, FN803-IS or FN804-IS. The microphone signal is applied to an operational amplifier, the degree of negative feedback, and thus the amplifier gain, can be adjusted by means of an external resistor. Microphone sensitivity can then be adjusted to suit individual requirements. In radio sets with built-in tone transmitters or sequential tone transmitters, the microphone amplifier is disabled by the tone key.

The amplified AF signal is applied to a limiter via a differentiating network. The limiter is likewise an operational amplifier utilising negative feedback. Following the limiter is an integration network and an active lowpass filter where the active element is another operational amplifier. The active filter removes any harmonics of the original input signal that arise during limiting action, and it also keeps the frequency excursions within the tolerances required for the channel spacing used in the particular equipment. An extra limiter is inserted between the integration network and the active lowpass filter to prevent strong input signals of low frequencies from overloading the filter.

Transmitter Oscillator XO812

The transmitter exciter signal is generated by a crystal, Colpitts-type oscillator operating on the crystal's fundamental frequency, which will be in the range of 17 to 22MHz. The oscillator starts when the channel selector completes the circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection. Thus several oscillators can be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit. The maximum number of channels is 12, with all oscillators placed in an oscillator panel.

Phase Modulator PM811/PM831

The PM811 Phase Modulator consists of an input- and an output buffer plus a phase modulator

Storno

stage. The exciter signal from the oscillator is fed to the input buffer stage. This amplifier, with following π network, ensures a constant sine wave signal to the phase modulator. The modulator is a transistor amplifier stage where the modulating audio signal is applied to the emitter, which is RF decoupled. The modulation signal varies the transconductance (g_m) of the amplifier and thus the phase angle (φ) of the RF signal at its output. To function properly, the modulator must work into a constant load and is therefore followed by a buffer stage whose output signal is applied to an additional phase modulator, PM831, whose circuitry is similar to PM811. The output from PM831 is taken off from a capacitive voltage divider and works into a buffer amplifier at the input of FD831.

Multiplier Chain FD831 and FD832

The multiplier chain consists of two frequency doubler stages, FD831 and FD832. In addition to the input buffer, the FD831 module also includes an amplifier whose output is tuned to the second harmonic of the input frequency. The FD832 module has only one amplifier, a doubler whose two output LC circuits likewise are tuned to the second harmonic of the input frequency. The final frequency is thus four times the oscillator frequency.

Band Pass Filter BP831

To ensure suppression of the undesired harmonics that arise in the frequency multiplying process, the multiplier chain is terminated by a double tuned band pass filter, the BP831.

Power Amplifier PA831-IS and PA832-IS

The output power from the multiplier chain (approx. 10mW) is amplified to the required antenna power in a three-stage amplifier composed of the PA831-IS and the PA832-IS modules.

PA831-IS contains two amplifier stages. The collector voltage to the first transistor is supplied via the ADC Circuit, and is variable. If more gain is required to drive the following PA832-IS stage, the collector supply (ADC) voltage will rise. On the other hand, if the drive signal is more than enough, the ADC voltage will drop.

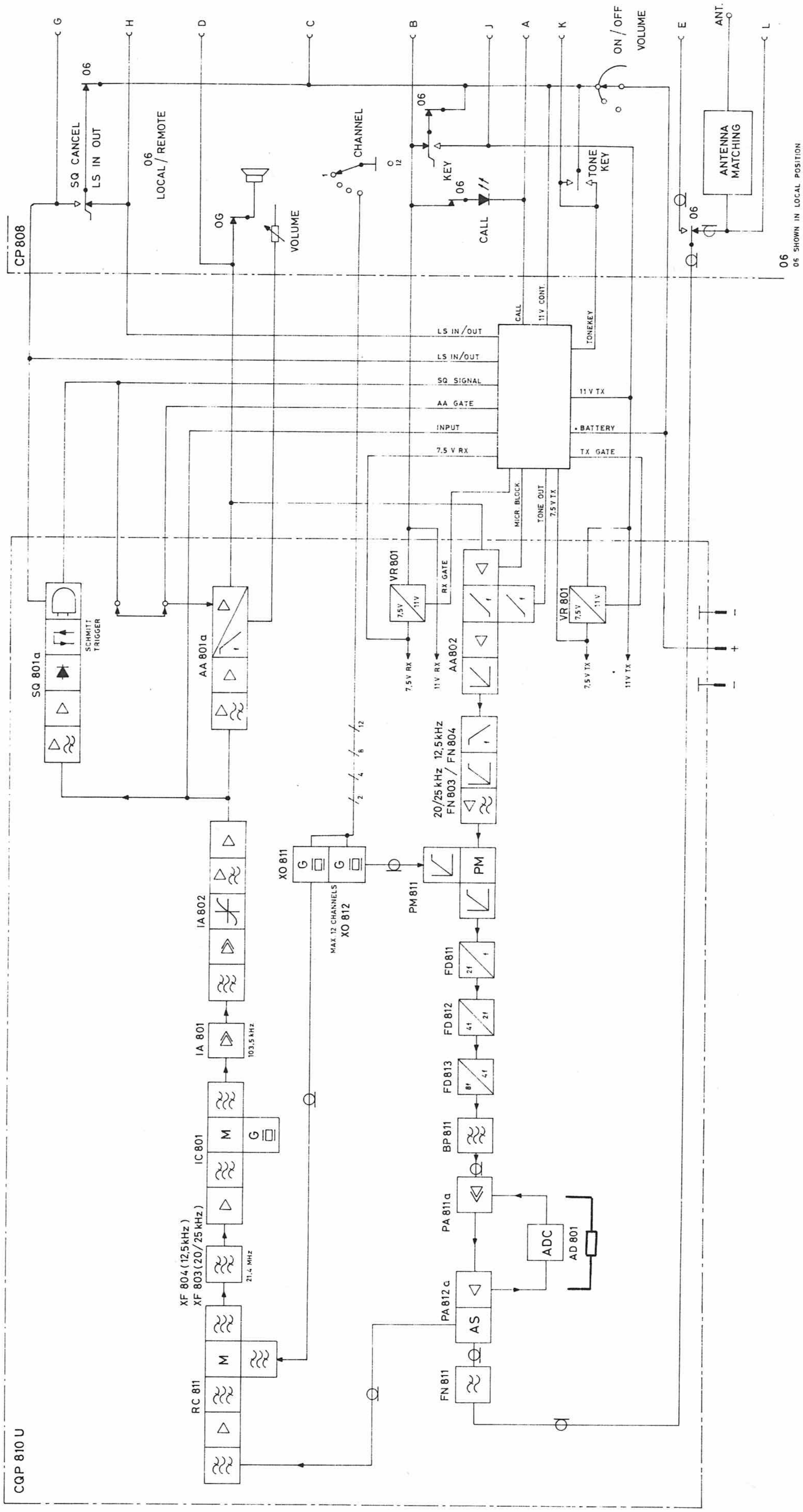
PA832-IS contains the transmitter final amplifier plus a circuit for electronically switching the antenna between the transmitter and the receiver. Collector current for the second transistor in PA831-IS passes through the switching diodes, whereby they can be considered to be virtual short circuits. This connects the Power Amplifier output to the antenna while short circuiting the receiver input. When receiving, the diodes become reverse biased, effectively isolating the transmitter from the antenna while connecting the antenna to the receiver input.

ADC Circuit AD801 (1W versions only)

This circuit is omitted in 0.2W transmitters and replaced by two voltage dropping resistors. The transmitter output current is kept very nearly constant by means of the ADC Circuit. The voltage drop across a small resistor in the output transistor's collector return is monitored by the ADC stage, which then regulates the collector voltage to the first transistor amplifier in the PA831-IS stage with the net effect of cancelling any variations and thus keeping the RF output at a constant value. The amount of current through the output stage, and thus the output power, can be set by means of a resistor mounted on the mother board.

Antenna Filter FN831

A nine-pole, lowpass filter having a cutoff frequency of 90MHz is inserted between the transmitter output and the antenna. The filter suppresses any harmonics created in PA832-IS.


CP808
CQP 810 U
SQ CANCEL
LS IN OUT
06 LOCAL/REMOTE
OG
VOLUME
CHANNEL
KEY
CALL
TONE KEY
ON/OFF
VOLUME
ANT.
ANTENNA MATCHING
06 SHOWN IN LOCAL POSITION
LS IN/OUT
SQ SIGNAL
AA GATE
INPUT
7,5 V RX
CALL
11V CONT.
TONEKEY
11 V TX
+ BATTERY
TX GATE
MICR BLOCK
TONE OUT
7,5 V TX
SQ 801a
SCHMITT TRIGGER
AA 801a
VR 801
RX GATE
7,5V RX
11V RX
AA802
11V TX
20/25 kHz 12,5 kHz
FN 803 / FN 804
XO 811
MAX 12 CHANNELS
XO 812
PM 811
PM
IA 802
IA 801
103,5 kHz
IC 801
FD811
FD 812
FD 813
BP 811
PA 811a
ADC
AD 801
PA 812a
AS
FN 811
XF 804 (12,5kHz)
XF 803 (20/25 kHz)
21,4 MHz
RC 811

and 103.5kHz. Channel selectivity is achieved by means of a crystal filter in the first IF circuit. The radiotelephone can be fitted with up to 12 channels, one oscillator per channel. All the oscillators are arranged in parallel on a special oscillator panel which also contains the transmitter oscillators. The receiver employs an electronic squelch circuit whose threshold can be set with a resistor on the mother board. There is a pushbutton for cancelling the squelch on the control head or the control unit, whichever is used.

The receiver consists of the following modules:

RC811-IS	Receiver Converter
XO811	Crystal Oscillator
XF803	Crystal Filter for 20/25kHz channel separation
or	
XF804	Crystal Filter for 12.5kHz channel separation
IC801	IF Converter
IA801	1st IF Amplifier
IA802	2nd IF Amplifier and Discriminator
SQ801a	Squelch Circuit
AA801a-IS	AF Amplifier
VR801-IS	Voltage Regulator

Receiver Converter RC811-IS

The RC811-IS converts the frequency of the antenna signal to the 1st IF frequency of 21.4MHz. The incoming signal path from the antenna is through the Antenna Filter, FN811, and then via the antenna switching circuit to the input of the RC811-IS. The signal then passes through a two-element bandpass filter to a field effect transistor (J-FET) operating as a grounded gate amplifier. After amplification, the signal passes through a three-element VHF filter consisting of L3, L4 and L5. This filter is what mainly determines the r.f. selectivity of the converter. The signal is taken off at a 50ohm tap and fed to the mixer via L6, a transformer that serves as an adjustment for achieving optimal sensitivity/gain. The local oscillator signal from the XO module(s), after passing through a two-element bandpass filter, is applied to the mixer gate. The bandpass filter ensures sufficient attenuation of any harmonics present. The mixer transistor is also a J-FET, this time in a grounded source configuration.

The IF signal is taken off via a combination autotransformer/L network to match the impedance of the following crystal filter.

Oscillator XO811

The local oscillator signal of 124 to 153MHz is generated in the Hartley type crystal oscillator where the transistor operates as a grounded base amplifier. The oscillator starts when the channel selector switch completes the emitter circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection. Thus several oscillators can be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit.

The local oscillator signal frequency lies 21.4MHz <u>under</u> the antenna frequency and the formula for calculating the crystal frequency is therefore:

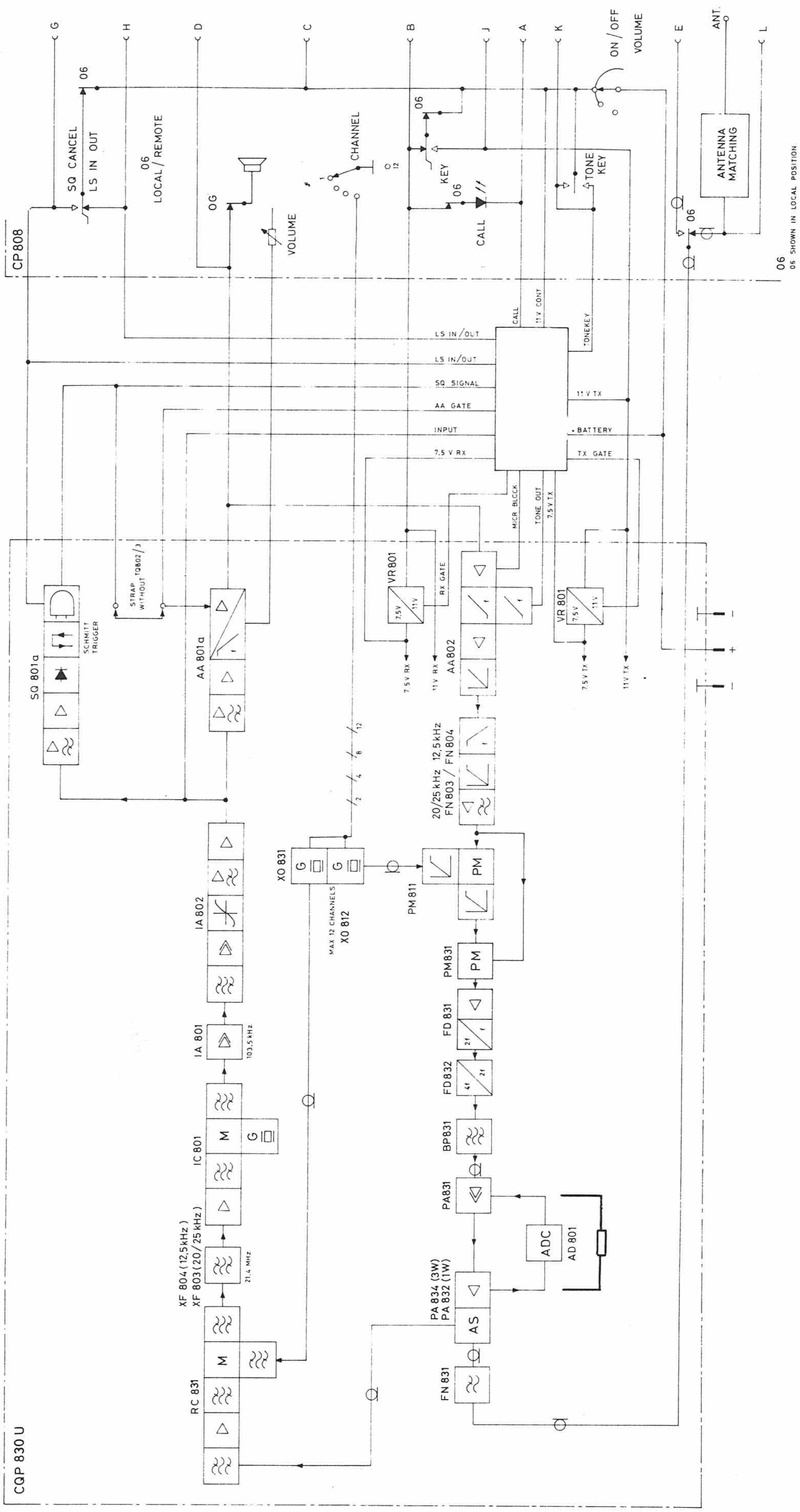
$$f_x = f_a + 21.4\text{MHz}$$

(where f_x = crystal frequency and
f_a = antenna frequency)

Crystal Filter XF803 and XF804

The Crystal Filter unit comprises an eight-pole monolithic crystal filter and an impedance matching transformer for matching the output to the impedance of the following IF converter. Practically all of the receiver selectivity is achieved in the crystal filter.

XF803 is employed in equipment with 20/25kHz channel spacing.
XF804 is employed in equipment with 12.5kHz channel spacing.


CP 808
CQP 830 U
SQ CANCEL
LS IN OUT
LOCAL / REMOTE
CHANNEL
VOLUME
KEY
CALL
TONE KEY
ON / OFF
ANTENNA MATCHING
ANT.
06 SHOWN IN LOCAL POSITION
LS IN/OUT
SQ SIGNAL
AA GATE
INPUT
7.5 V RX
11 V TX
+ BATTERY
TX GATE
CALL
11 V CONT
TONEKEY
MICR BLOCK
TONE OUT
7.5 V TX
SQ 801a
SCHMITT TRIGGER
STRAP WITHOUT TQ802/3
AA 801a
VR 801
RX GATE
AA 802
20/25 kHz 12,5 kHz
FN 803 / FN 804
XO 831
MAX 12 CHANNELS
XO 812
PM 811
PM 831
FD 831
FD 832
BP 831
PA 831
ADC
AD 801
PA 834 (3W)
PA 832 (1W)
AS
FN 831
IA 802
IA 801
103,5 kHz
IC 801
XF 804 (12,5 kHz)
XF 803 (20/25 kHz)
21,4 MHz
RC 831

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Receiver Circuit (see block diagram)

The receiver is a double conversion superheterodyne using intermediate frequencies of 21.4MHz and 103.5kHz. Channel selectivity is achieved by means of a crystal filter in the first IF circuit. The radiotelephone can be fitted with up to 12 channels, one oscillator per channel. All the oscillators are arranged in parallel on a special oscillator panel which also contains the transmitter oscillators. The receiver employs an electronic squelch circuit whose threshold can be set with a resistor on the mother board. There is a pushbutton on the control panel for cancelling the squelch on the control head or on the control unit whichever is used.

The receiver consists of the following modules:

RC831-IS	Receiver Converter
XO831	Crystal Oscillator
XF803	Crystal Filter for 20/25kHz channel separation
or	
XF804	Crystal Filter for 12.5kHz channel separation
IC801	IF Converter
IA801	1st IF Amplifier
IA802	2nd IF Amplifier and Discriminator
SQ801a	Squelch Circuit
AA801a-IS	AF Amplifier
VR801-IS	Voltage Regulator

Receiver Converter RC831-IS

The RC831-IS converts the frequency of the antenna signal to the 1st IF frequency of 21.4MHz. The incoming signal path from the antenna is through the Antenna Filter, FN831, and then via the antenna switching circuit in PA832-IS to the input of the RC831-IS. The signal then passes through a two-element bandpass filter to a field effect transistor (J-FET) operating as a grounded gate amplifier. After amplification, the signal passes through a three-element VHF filter consisting of L3, L4 and L5. This filter is what mainly determines the selectivity of the converter. The signal is taken off at a 50ohm tap and fed to the mixer via L6, a transformer that serves as an adjustment for achieving optimal sensitivity/gain. The local oscillator signal from the XO module(s), after passing through a two-element bandpass filter, is applied to the mixer gate. The bandpass filter
ensures sufficient attenuation of any harmonics present. The mixer transistor is also a J-FET, this time in a grounded source configuration.

The IF signal is taken off via a combination autotransformer/L network to match the impedance of the following crystal filter.

Oscillator XO831

The local oscillator signal of 90 to 110MHz is generated in the Hartley type crystal oscillator where the transistor operates as a grounded base amplifier, the oscillator starts when the channel selector switch completes the emitter circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection. Thus several oscillators can be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit.

The local oscillator signal frequency lies 21.4MHz <u>over</u> the antenna frequency and the formula for calculating the crystal frequency is therefore:

$$f_x = f_a + 21.4\text{MHz}$$

(where f_x = crystal frequency
and f_a = antenna frequency)

Crystal Filter XF803 and XF804

The Crystal Filter unit comprises an eight-pole monolithic crystal filter and an impedance matching transformer for matching the output to the impedance of the following IF converter. Practically all of the receiver selectivity is achieved in the crystal filter.

XF803 is employed in equipment with 20/25kHz channel spacing. XF804 is employed in equipment with 12.5kHz channel spacing.

IF Converter IC801

The first IF frequency (21.4MHz) is converted to the second IF frequency (103.5kHz) in this module, which contains an amplifier, a mixer and an oscillator. The output signal is taken off from a center tap on the coil in the mixer transistor's collector circuit and applied to an intermediate frequency amplifier, IA801.

IF Amplifier and Discriminator IA801 and IA802

The first Intermediate Frequency Amplifier, IA801, consists of two differential amplifiers in cascade. The output signal is applied to the second Intermediate Frequency Amplifier, IA802, which contains a 103.5kHz bandpass filter, a quadrature detector, a lowpass filter and an audio frequency amplifier.

The IF amplifier, detector and AF amplifier are all included in one integrated circuit.

The balanced quadrature detector has excellent AM suppression and contains only one tuned circuit. Inserted between the detector and the AF amplifier is an active lowpass filter which removes any superimposed IF signal. The detector bandwidth and the audio amplifier output voltage can be regulated by means of two external resistors on the mother board (AF output at 1000Hz= 110mV).

AF Amplifier AA801a-IS

The audio frequency signal from IA802 is fed to the AA801a-IS AF Amplifier where it becomes amplified to the desired audio power level. First the signal passes through an active highpass filter that rejects any pilot tones and low frequencies (noise). Next comes an integrated circuit containing two separate amplifiers which make up the preamplifier and output stage. The volume control is inserted between these two amplifiers. The preamplifier also operates as an active lowpass filter suppressing frequencies above 3000Hz and the output amplifier gives the required receiver de-emphasis (integration).

The Squelch Circuit can block the AF signal path by grounding the squelch terminal (5). When the squelch output goes positive again, the audio amplifier will operate normally.

Squelch Circuit SQ801a

The receiver Squelch Circuit operates automatically, according to the noise content of the antenna signal. Weak signals contain greater noise than acceptable signal levels. The output AF signal from IA802 is also present at the input to SQ801a, where it must first pass through an active highpass filter that suppresses frequencies under 7kHz. Higher frequencies become amplified, then detected and whenever the signal-to-noise ratio is objectionable, the detected noise signal will be sufficient to turn off the audio amplifier. With an acceptable signal strength at the antenna, the noise content will be too low to trigger the squelch, and the positive collector supply ($+V_{cc}$) will be available to the audio amplifiers, allowing them to operate normally.
An external resistor sets the squelch to open the path for a signal-to-noise ratio of $\geq$12dB SINAD. A pushbutton on the control head/control unit allows manual cancelling of the squelch function.

Power Supply and Voltage Regulator VR801-IS

Because of variations in the battery voltage as the battery discharges, two VR801 type Voltage Regulators are employed to supply many of the transmitter and receiver circuits in the CQP800-IS with a constant 7.5V potential. The regulators are short circuit protected.

TITLE		CODE
CQP860	Circuit Description	60.238-E1
	Technical Specification	60.243-E1
	Adjustment Procedure	60.250-E1
CQP860U	Circuit Description	60.356-E1
	Adjustment Procedure	60.333-E1
CQP860U-IS	Circuit Description	60.429-E1
CQP853U	Technical Specifications	60.416-E1
	Circuit Description	60.417-E1
	Adjustment Procedure	60.420-E1
RF864	Circuit Description	60.322-E1
RF864	Circuit Descripttion	60.323-E1

CQP860U-IS
CIRCUIT DESCRIPTION

Transmitter Circuit (see block diagram)

The transmitter is built up of several modules, each of which is completely enclosed (shielded) and has connector pins protruding from the bottom of the module. All the modules are then mounted onto a mother board.

The transmitter section consists of the following modules:

XO812	Crystal Oscillator
AA802	Modulation Amplifier
FN803-IS	Modulation Filter for 20/25kHz channel separation
PM861	Phase Modulator
FD861	1st Frequency Doubler
FD862	2nd Frequency Doubler
FD863	3rd Frequency doubler
BP861	Band Pass Filter
PA863	1st Power Amplifier
PA862a	2nd Power Amplifier and Antenna Switch
or	
AS861	Antenna Switch (0.2W)
FN861	Antenna Filter
AD801	ADC Circuit
VR801-IS	Voltage Regulator

Modulation Amplifier AA802 and FN803-IS

The modulation amplifier function is carried out by the Modulation Amplifier, AA802 in conjunction with a Modulation Filter, FN803-IS. The microphone signal is applied to an operational amplifier; the degree of negative feedback, and thus the amplifier gain, can be adjusted by means of an external resistor. Microphone sensitivity can then be adjusted to suit individual requirements. In radio sets with built-in tone transmitters or sequential tone transmitters, the microphone amplifier is disabled by the tone key.

The amplified AF signal is applied to a limiter via a differentiating network. The limiter is likewise an operational amplifier utilising negative feedback. Following the limiter is an integration network and an active element is another operational amplifier. The active filter removes any harmonics of the original input signal that arise during limiting action, and it also keeps the frequency excursions within the tolerances required for the channel spacing used in the particular equipment. An extra limiter is inserted between the integration network and the active lowpass filter to prevent strong input signals of low frequencies from overloading the filter.

Transmitter Oscillator XO812

The transmitter exciter signal is generated by a crystal, Colpitts-type oscillator operating on the crystal's fundamental frequency, which will be in the range of 52.50 to 58.75MHz. The oscillator starts when the channel selector completes the circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection. Thus several oscillators can be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit. The maximum number of channels is 12, with all oscillators placed in an oscillator panel.

Phase Modulator PM861

The Phase Modulator consists of an input- and an output buffer plus a phase modulator stage. The exciter signal from the oscillator is fed to the input buffer stage. This amplifier, with following π network, ensures a constant sine wave signal to the phase modulator. The modu-

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lator is a transistor amplifier stage where the modulating audio signal is applied to the emitter, which is RF decoupled. The modulation signal varies the transconductance (g_m) of the amplifier and thus the phase angle (φ) of the RF signal at its output. To function properly, the modulator must work into a constant load and is therefore followed by a buffer stage whose output signal is sufficient en amplitude to drive the following stage, a frequency doubler.

Multiplier Chain FD861 and FD862, FD863

The multiplier chain consists of tree very similar frequency doubler stages. Each frequency doubler operates as a grounded emitter transistor amplifier followed by two inductively coupled LC circuits that are tuned to the second harmonic of the input frequency.

Band Pass Filter BP861

To ensure suppression of the undesired harmonics that arise in the frequency multiplying process, the multiplier chain is terminated by a double tuned band pass filter, the BP861.

Power Amplifier PA863 and PA862a or AS861

The output power from the multiplier chain (approx. 15mW) is amplified to the required antenna power in the PA863.

PA863 contains two amplifier stages. The collector voltage to the first transistor is supplied via the ADC Circuit, and is variable. If more gain is required to drive the following PA862a, the collector supply (ADC) voltage will rise. On the other hand, if the drive signal is more than enough, the ADC voltage will drop.

PA862a contains the transmitter final amplifier, plus a circuit for electronically switching the antenna between the transmitter and the receiver. Collector current for the second transistor in PA863 passes through the switching diodes, whereby they can be considered to be virtual short circuits. This connects the Power Amplifier output to the antenna while short circuiting the receiver input. When receiving, the diodes become reverse biased, effectively isolating the transmitter from the antenna while connecting the antenna to the receiver input.

In 0.2W transmitters the PA862a is replaced by AS861 which contains the antenna switch circuit only.

ADC Circuit AD801 (1W versions only)

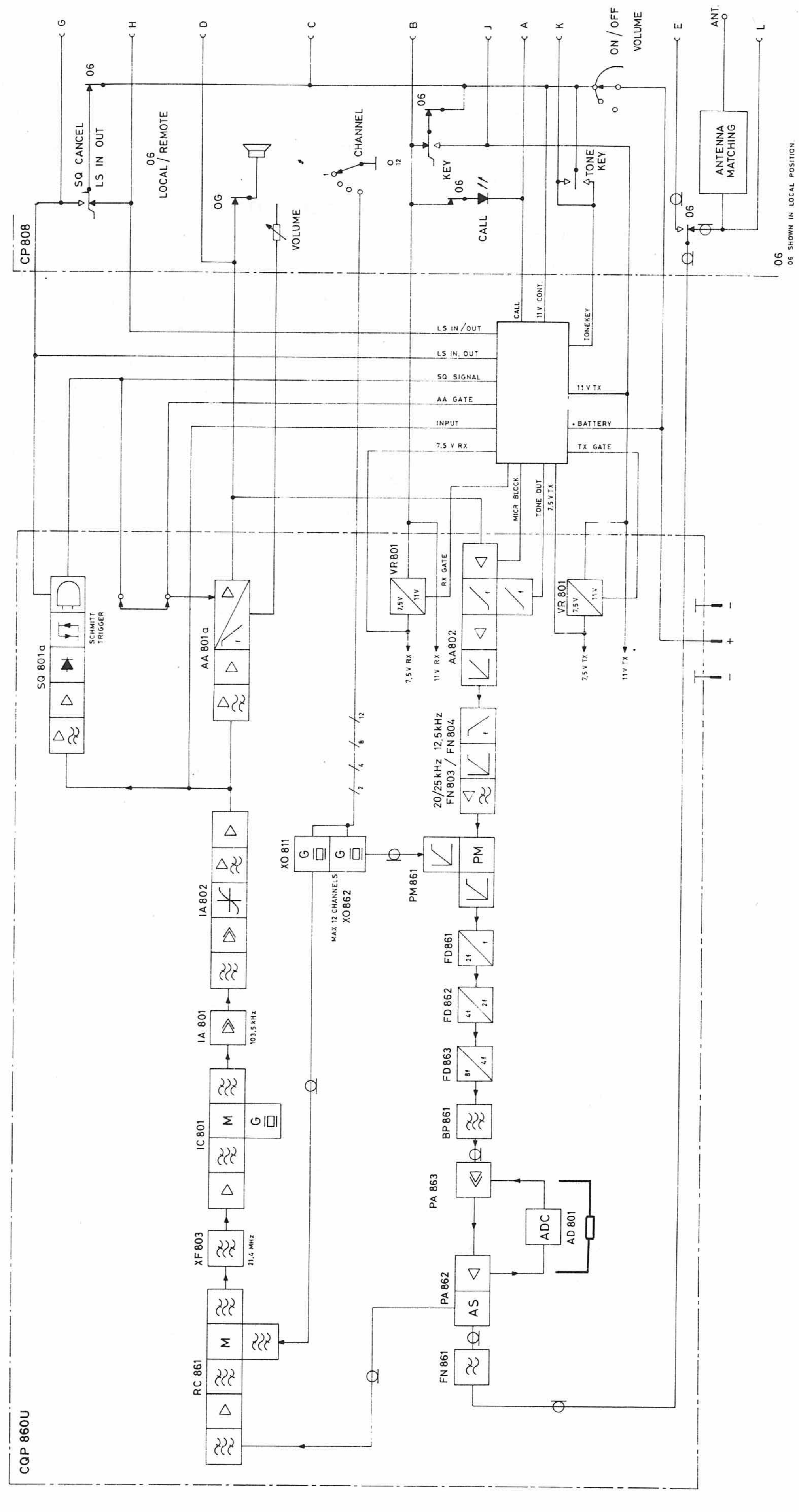
This circuit is omitted in 0.2W transmitters and replaced by two voltage dropping resistors. The transmitter output current is kept very nearly constant by means of the ADC Circuit. The voltage drop across a small resistor in the output transistor's collector return is monitored by the ADC stage, which then regulates the collector voltage to the first transistor amplifier in the PA863 stage with the net effect of cancelling any variations and thus keeping the RF output at a constant value. The amount of current through the output stage, and thus the output power, can be set by means of a resistor mounted on the mother board.

Antenna Filter FN861

A nine-pole, lowpass filter having a cutoff frequency of 470MHz is inserted between the transmitter output and the antenna. The filter suppresses any harmonics created in PA862a. A 21.4MHz band stop filter at the FN861 input prevents any signals close to the intermediate frequency from reaching the receiver circuits.

Receiver Circuit (see block diagram)

The receiver is a double conversion superheterodyne using intermediate frequencies of 21.4MHz and 103.5kHz. Channel selectivity is achieved by means of a crystal filter in the


CP 808
CQP 860U
SQ CANCEL
LS IN OUT
LOCAL / REMOTE
OG
VOLUME
CHANNEL
KEY
CALL
TONE KEY
ON / OFF
VOLUME
ANT.
ANTENNA MATCHING
06 SHOWN IN LOCAL POSITION
LS IN/OUT
SQ SIGNAL
AA GATE
INPUT
7,5 V RX
11 V TX
BATTERY
TX GATE
MICR BLOCK
TONE OUT
7,5 V TX
11 V CONT
TONEKEY
SQ 801a
SCHMITT TRIGGER
AA 801a
VR 801
RX GATE
AA 802
VR 801
20/25 kHz 12,5 kHz
FN 803 / FN 804
XO 811
MAX 12 CHANNELS
XO 862
PM 861
PM
IA 802
IA 801
103,5 kHz
IC 801
FD 861
FD 862
FD 863
BP 861
PA 863
ADC
AD 801
XF 803
21,4 MHz
PA 862
AS
RC 861
FN 861

first IF circuit. The radiotelephone can be fitted with up to 12 channels, one oscillator per channel.
All the oscillators are arranged in parallel on a special oscillator panel which also contains the transmitter oscillators. The receiver employs an electronic squelch circuit whose threshold can be set with a resistor on the mother board. There is a pushbutton for cancelling the squelch on the control head or the control unit, whichever is used.

The receiver consists of the following modules:

RC861-IS	Receiver Converter
XO811	Crystal Oscillator
XF803	Crystal Filter for 20/25kHz channel separation
IC801	IF Converter
IA801	1st IF Amplifier
IA802	2nd IF Amplifier and Discriminator
SQ801a	Squelch Circuit
AA801a-IS	AF Amplifier
VR801-IS	Voltage Regulator

Receiver Converter RC861-IS

The RC861-IS converts the frequency of the antenna signal to the 1st IF frequency of 21.4MHz. The incoming signal path from the antenna is through the Antenna Filter, FN861, and then via the antenna switching circuit to the input of the RC861-IS. The signal then passes through a two-element bandpass filter to a transistor operating as a grounded base amplifier. After amplification, the signal passes through a three-element UHF filter. This filter is what mainly determines the r.f. selectivity of the converter. The signal is taken off at a 50ohm tap and fed to the mixer via L7, a transformer that serves as an adjustment for achieving optimal sensitivity/gain. The local oscillator signal from the XO module(s), after passing through a lowpass filter, proceeds to a frequency tripler. The filter allows only the oscillator signal to reach the tripler. The signal from the tripler output is then applied to the gate of the mixer transistor, which is a field effect transistor operating in the grounded source configuration.

The IF signal is taken off via a combination autotransformer/L network to match the impedance of the following crystal filter.

Oscillator XO811

The local oscillator signal of 124 to 153MHz is generated in the Hartley type crystal oscillator where the transistor operates as a grounded base amplifier. The oscillator starts when the channel selector switch completes the emitter circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection. Thus several oscillators can be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit.

The local oscillator signal frequency lies 21.4MHz <u>under</u> the antenna frequency and the formula for calculating the crystal frequency is therefore:

$$f_x = \frac{f_a - 21.4}{3} \text{ MHz}$$

(where f_x = crystal frequency and f_a = antenna frequency)

Crystal Filter XF803

The Crystal Filter unit comprises an eight-pole monolithic crystal filter and an impedance matching transformer for matching the output to the impedance of the following IF converter. Practically all of the receiver selectivity is achieved in the crystal filter.
XF803 is employed in equipment with 20/25kHz channel spacing.

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IF Converter IC801

The first IF frequency (21.4MHz) is converted to the second IF frequency (103.5kHz) in this module, which contains an amplifier, a mixer and an oscillator. The output signal is taken off from a center tap on the coil in the mixer transistor's collector circuit and applied to an intermediate frequency amplifier, IA801.

IF Amplifier and Discriminator IA801 and IA802

The first Intermediate Frequency Amplifier, IA801, consists of two differential amplifiers in cascade. The output signal is applied to the second Intermediate Frequency Amplifier, IA802, which contains a 103.5kHz bandpass filter, a quadrature detector, a lowpass filter and an audio frequency amplifier.

The IF amplifier, detector and AF amplifier are all included in one integrated circuit.

The balanced quadrature detector has excellent AM suppression and contains only one tuned circuit. Inserted between the detector and the AF amplifier is an active lowpass filter which removes any superimposed IF signal. The detector bandwidth and the audio amplifier output voltage can be regulated by means of two external resistors on the mother board (AF output at 1000Hz= 110mV).

AF Amplifier AA801a-IS

The audio frequency signal from IA802 is fed to the AA801a-IS AF Amplifier where it becomes amplified to the desired audio power level. First the signal passes through an active highpass filter that rejects any pilot tones and low frequencies (noise). Next comes an integrated circuit containing two separate amplifiers which make up the preamplifier and output stage. The volume control is inserted between these two amplifiers.

The preamplifier also operates as an active lowpass filter suppressing frequencies above 3000Hz and the output amplifier gives the required receiver de-emphasis (integration).

The Squelch Circuit can block the AF signal path by grounding the squelch terminal (5). When the squelch output goes positive again, the audio amplifier will operate normally.

Squelch Circuit SQ801a

The receiver Squelch Circuit operates automatically, according to the noise content of the antenna signal. Weak signals contain greater noise than acceptable signal levels. The output AF signal from IA802 is also present at the input to SQ801a, where it must first pass through an active highpass filter that suppresses frequencies under 7kHz. Higher frequencies become amplified, then detected and whenever the signal-to-noise ratio is objectionable, the detected noise signal will be sufficient to turn off the audio amplifier. With an acceptable signal strength at the antenna, the noise content will be too low to trigger the squelch, and the positive collector supply (+ V_{cc}) will be available to the audio amplifiers, allowing them to operate normally. An external resistor sets the squelch to open the path for a signal-to-noise ratio of $\geq$12dB SINAD. A pushbutton on the control head/control unit allows manual cancelling of the squelch function.

Power Supply and Voltage Regulator VR801-IS

Because of variations in the battery voltage as the battery discharges, two VR801-IS type Voltage Regulators are employed to supply many of the transmitter and receiver circuits in the CQP800-IS with a constant 7.5V potential. The regulators are short circuit protected.

CQP853U

TECHNICAL SPECIFICATIONS

Specifications are based on the measuring methods prescribed in EIA publications RS152A, GPO specification W6771, and CEPT specifications. Figures given in backets are guaranteed values.

GENERAL

Frequency Range
370-420 MHz

Channel Separation
20/25 kHz

Max Frequency Deviation
±4 kHz or ±5 kHz

Modulation Frequency Range
300 - 3000 Hz

Number of Channels
2, 4, 8, or 12 channels

Antenna Impedance
Multiwire connector: 50ohm

Temperature Range
Operating range: -25°C to +55°C
Functionning range: -30°C to +60°C

UHF Bandwidth
2.0 MHz

TRANSMITTER

RF Power Output
Measured at V_b= 11V (BU806-BU807) and 25°C
Degradation under extreme conditions according to CEPT.

1W: 0.1 - 1.0W ±1dB

Crystal Frequency Range
46.25 MHz to 52.50 MHz

Crystal Frequency Calculation

$$f_x = \frac{f_{ant}}{8}$$

Frequency Stability
Conforms with the Authorities ' specifications.

Spurious Radiation, CEPT
Less than 0.2uW

Side Band Noise, CEPT
-75dB (-70dB)

Tone Input Modulation Sensitivity
terminal voltage for 0.6 x Δf_{max}; 1 kHz
110mV

Modulation Frequency Characteristic, CEPT
relative to 1000Hz, 6dB/octave
+0/-2,5dB (+1/-3dB) 300-3000Hz

Modulation Distortion, CEPT
measured with de-emphasis 750 uS
2% (10%)

FM Hum and Noise, CEPT
-50dB (-40dB)

RECEIVER

Sensitivity, EIA

e. m. f. for 12dB SINAD

0.6µV at 25°C (1µV)

Sensitivity, CEPT

e. m. f. for 20dB S/N

0.7µV at 25°C (1.2µV)

Squelch Sensitivity, EIA

0.5µV at 25°C (1µV)

Crystal Frequency Range

130.466 MHz to 147.133 MHz

Crystal Frequency Calculation

$\frac{f_{ant} + 21.4}{3}$ MHz

Frequency stability

Conforms with the Authorities' Specifications

Modulation Pass Band EIA

masured at 25°C

±7kHz (±5kHz)

Adjacent Channel Selectivity, EIA

measured at 25°C

85dB (80dB)

Adjacent Channel Selectivity, CEPT

65dB (60dB)

Spurious Selectivity, CEPT

75dB (70dB)

Intermodulation Attenuation, CEPT

75dB (70dB)

Intermodulation, Attenuation, EIA

70dB (65dB)

Blocking (GPO)

100mV (90mV)

Spurious Radiation, CEPT

Less than 2nW

AF Output Power

500mW (400mW)

Measuring conditions: R_L = 25ohm; distortion 10%; 1kHz, V_B = 11V

AF Output Power, CEPT

250mW (200mW)

($\Delta f = 0.7 \times \Delta F_{max}$; 1 kHz; distorsion <10%

AF Distortion

2% (7%)

(measured at $\Delta f = \frac{2}{3} \Delta f_{max}$; 1 kHz; 300mW , 25°C)

AF Frequency Characteristic, CEPT

relative to 1000Hz; -6dB/octave

+0dB/-1.5dB/ (+1db/-3dB)

SUPPLY VOLTAGE AND CURRENT DRAIN

Nominal Supply Voltage

11V

Supply Voltage Range

9.6 to 13.5V

Transmitter Current Drain

(less tone equipment at nominal supply)

1W: 380mA (420mA)

Receiver Current Drain

(less tone equipment at nominal supply)

Standby: 8.5mA (9.5mA)

Receive, AF output 250mW: 65mA (80mA)

CQP853 (U)
CIRCUIT DESCRIPTION

Transmitter Circuit (see block diagram)

The transmitter is built of several modules, each of which is completely enclosed (shielded) and has connector pins protruding from the bottom of the module. All the modules are then mounted onto a mother board.

The transmitter section consists of the following modules:

XO851	Crystal Oscillator
AA802	Modulation Amplifier
FN803	Modulation Filter for 20/25 kHz channel separation
PM851	Phase Modulator
FD851	1st Frequency Doubler
FD852	2nd Frequency Doubler
FD853	3rd Frequency Doubler
BP851	Band Pass filter
PA851	1st Power Amplifier and Antenna Switch
PA852	2nd Power Amplifier and Antenna Switch
FN861	Antenna Filter
AD801	ADC Circuit
VR801	Voltage Regulator.

Modulation Amplifier AA802 and FN803

The modulation amplifier function is carried out by the Modulation Amplifier, AA802 in conjunction with a Modulation Filter, FN803. The microphone signal is applied to an operational amplifier, the degree of negative feedback, and thus the amplifier gain, can be adjusted by means of an external resistor.

Microphone sensitivity can then be adjusted to suit individual requirements.
In radio sets with built-in tone transmitter or sequential tone transmitters, the microphone amplifier is disabled by the tone key.

The amplified AF signal is applied to a limiter via a differentiating network. The limiter is likewise an operational amplifier utilising negative feedback. Following the limiter is an integration network and an active filter whose element is another operational amplifier. The active filter removes any harmonics of the original input that arise during limiting action, and it also keeps the frequency excursions within the tolerances required for the channel spacing used in the particular equipment. An extra limiter is inserted between the integration network and the active lowpass filter to prevent strong input signals of low frequencies from overloading the filter.

Transmitter Oscillator XO851 (XO852)

The oscillator type XO852 is used when a temperature compensated frequency stability is required.
The transmitter exciter signal is generated by a crystal, Colpitts-type oscillator operating on the crystal's fundamental frequency, which will be in the range of 46.25 to 52.50MHz. The oscillator starts when the channel selector completes the circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection.
Thus several oscillators can be tied in parallel without mutual loading effects. The output signal is capacitively taken off the tank circuit. The maximum number of channels is 12, with all oscillators placed in an oscillator panel.

Phase Modulator PM851

The Phase Modulator consists of an input and an output buffer plus a phase modulator stage. The exciter signal from the oscillator is fed

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to the input buffer stage. This amplifier, with following network, ensures a constant sine wave signal to the phase modulator. The modulator is a transistor amplifier stage where the modulating audio signal is applied to the emitter, which is RF decoupled. The modulation signal varies the transcondutance (g_m) of the amplifier and thus the phase angle (φ) of the RF signal at its output. To function properly, the modulator must work into a constant load and is therefore followed by a buffer stage whose output signal is sufficient in amplitude to drive the following stage, a frequency doubler.

Multiplier Chain FD851, FD852, FD853

The multiplier chain consists of three very similar frequency doubler stages. Each frequency doubler operates as a grounded emitter transistor amplifier followed by two inductively coupled LC circuits that are tuned to the second harmonic of the input frequency.

Band Pass Filter BP851

To ensure suppression of the undesired harmonics that arise in the frequency multiplying process, the multiplier chain is terminated by a double tuned band pass filter, the BP851.

Power Amplifier PA851 and PA852/PA853.

The output power from the Multiplier chain (approx. 15 mW) is amplified to the required antenna power (0. 1 to 1. 0W or 1. 0 to 3. 0W) in a three-stage amplifier composed of the PA852 (1W) or PA853 (3W) modules.

PA851 contains two amplifier stages. The collector voltage to the first transistor is supplied via the ADC Circuit, and is variable. If more gain is required to drive the following PA852/PA853 the collector supply (ADC) voltage will rise, On the other hand, if the drive signal is more than enough, the ADC voltage will drop.

PA852/PA853 contains the transmitter final amplifier plus a circuit for electronically switching the antenna between the transmitter and the receiver. Collector current for the second transistor in PA851 passes through the switching diodes, whereby they can be considered to be virtual short circuits. This connects the Power Amplifier output to the antenna while short circuiting the receiver input. When receiving, the diodes become reverse biased, effectively isolating the trans mitter from the antenna while connecting the antenna to the receiver input.

ADC Circuit AD801

The transmitter output current is kept very nearly constant by means of the ADC Circuit. The voltage drop across a small resistor in the output transistor's collector return is monitored by the ADC stage, which then regulates the collector voltage to the first transistor amplifier in the PA853 stage with the net effect of cancelling any variations and thus keeping the RF output at a constant value. The amount of current through the output stage, and thus the output power, can be set by means of a resistor mounted on the mother board.

Antenna Filter FN861

A nine-pole lowpass filter having a cutoff frequency of 470 MHz is inserted between the transmitter output and the antenna. The filter suppresses any harmonics created in PA852/ PA853: A21. 4MHz band stop filter at the FN861 input prevets any signals close to the intermediate frequency from reaching the receiver circuits.

Receiver Circuit (see block diagram)

The receiver is a double conversion superhetero dyne using intermediate frequencies of 21. 4MHz and 103. 5MHz. Channel selectivity is achieved by means of a crystal filter in the first IF circuit. The radiotelephone can be fitted with up to 12 channels, one oscillator per channel.
All the oscillators are arranged in parallel on

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a special oscillator panel which also contains the transmitter oscillators. The receiver employs an electronic squelch circuit whose threshold can be set with a resistor on the mother board. There is a pushbutton for cancelling the squelch on the head or on the control unit, whichever is used.

The receiver consists of the following modules:

RC851	Receiver Converter
XO811	Crystal Oscillator
XF803	Crystal Filter for 20/25kHz channel separation
IC801	IF Converter
IA801	1st IF Amplifier
IA802	2nd Amplifier and Discriminator
SQ801a	Squelch Circuit
AA801	AF Amplifier
VR801	Voltage Regulator

Receiver Converter RC851

The RC851 converts the frequency of the antenna signal to the 1st IF frequency of 21.4MHz. The incoming signal path from the antenna is through the Antenna Filter, FN861, and then via the antenna switching circuit to the input of the RC851. The signal then passes through a two-element bandpass filter to a transistor operating as a grounded base amplifier. After amplification, the signal passes trough a three-element UHF filter. This filter is what mainly determines the r.f. selectivity of the converter. The signal is taken off at a 50ohm tap and fed to the mixer via L7, a transformer that serves as an adjustment for achieving optimal sensitivity/ gain. The local oscillator signal from the XO module(s), after passing through a lowpass filter, proceeds to a frequency tripler. The filter allows only the oscillator signal to reach the tripler. The signal from the tripler output is then applied to the gate of the mixer transistor, which is a field effect transistor operating in the grounded source configuration.

The IF signal is taken off via a combination autotransformer/L network to match the impedance of the following crystal filter.

Oscillator XO811

The local oscillator signal of 130.46 to 147.13 MHz is generated in the Hartley type crystal oscillator where the transistor operates as a grounded base amplifier. The oscillator starts when the channel selector switch completes the emitter circuit path to chassis ground. The collector circuit is tuned by a variable capacitance diode which also detunes the resonant circuit whenever the channel switch breaks the ground connection. Thus several oscillators can be tied in parallel without mutual loading effects.
The output signal is capacitively taken off the tank circuit.

The local oscillator signal frequency lies 21.4MHz <u>above</u> the antenna frequency and the formula for calculating the crystal frequency is therefore:

$$fx = \frac{fa + 21.4\ \text{MHz}}{3}$$

(where fx= crystal frequency and fa= antenna frequency)

Crystal Filter XF803

The Crystal Filter unit comprises an eight-pole monolithic crystal filter and an impedance matching transformer for matching the output to the impedance of the following IF converter. Practically all of the receiver selectivity is achieved in the crystal filter.

XF803 is employed in equipment with 20/25 kHz channel spacing.

IF Converter IC801

The first IF frequency (21.4 MHz) is converted to the second IF frequency (103.5kHz) in this module, which contains an amplifier, a mixer and an oscillator. The output signal is taken off from a center tap on the coil in the mixer transistor's collector circuit and applied to an intermediate frequency amplifier, IA801.

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IF Amplifier and Discriminator IA801 and IA802

The first Intermediate Frequency Amplifier, IA801, consists of two differential amplifiers in cascade. The output signal applied to the second Intermediate Frequency Amplifier, IA802, which contains a 103.5 kHz bandpass filter, a quadrature detector, a lowpass filter and an audio frequency amplifier.

The IF amplifier, detector and AF amplifier are all included in one integrated circuit.

The balanced quadrature detector has excellent AM suppression and contains only one tuned circuit. Inserted between the detector and the AF amplifier is an active lowpass filter which removes any superimposed IF signal. The detector bandwidth and the audio amplifier output voltage can be regulated by means of two external resistors on the mother board (AF output at 1000Hz=110mV.)

AF Amplifier AA801a

The audio frequency signal from IA802 is fed to the AA801a AF Amplifier where it becomes amplified to the desired audio power level. First the signal passes through an active highpass filter that rejects any low frequencies (noise).
Next comes an integrated circuit containing two separate amplifiers which make up the preamplifier and output stage. The volume control is inserted between these two amplifiers.
The Preamplifier also operates as an active low-pass filter suppressing frequencies above 3000 Hz and the output amplifier gives the required receiver de-emphasis (integration).

The Squelch Circuit can block the AF signal path by grounding the squelch terminal (5). When the squelch output goes positive again, the audio amplifier will operate normally.

Squelch Circuit SQ801a

The receiver Squelch Circuit operates automatically, according to the noise content of the antenna signal. Weak signals contain greater noise than acceptable signal levels. The output AF signal from IA802 is also present at the input to SQ801a, where it must first pass through an active highpass filter that suppresses frequencies under 7 kHz. Higher frequencies become amplified, then detected and whenever the signal-to-noise ratio is objectionable, the detected noise signal will be sufficient to turn off the audio amplifier.

With an acceptable signal strength at the antenna, the noise content will be too low to trigger the squelch, and the positive collector supply (+Vcc) will be avaible to the audio amplifier's gating terminal allowing it to operate normally. An external resistor sets the squelch to open the path for a signal-to-noise ratio of 12dB SINAD. A pushbutton on the control head/control unit allows manual cancelling of the squelch function.

Power Supply and Voltage Regulator VR801

Because of variations in the battery voltage as the battery discharges, two VR801 type Voltage Regulators are employed to supply many of the transmitter and receiver circuits in the CQP800 with a constant 7.5V potential. The regulators are short circuit protected.

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PORTABLE RADIOTELEPHONE

CQP853(U)

The portable radiotelephone type CQP853(U) is, in general, identical to type CQP863(U) except for the frequency range which is 370MHz to 420MHz.

This means that some of the modules are engineered to that frequency range, but otherwise have the same functions as those for 420-470MHz. Henceforth the adjustment procedure for CQP863U is applicable also to CQP853(U) if the types of these modules are changed as follows:

CQP863(U)	CQP853(U)
XO862	XO852
PM861	PM851
FD861	FD851
FD862	FD852
FD863	FD853
BP861	BP851
PA861	PA851
PA862	PA852
PA863	
PA864	PA853
RC861	RC851

TITLE		CODE
AC801	Alarm Circuit	60.314-E1
BU802-7	Batteries	60.318-E2
BU805	Battery	60.298-E1
BU809	Battery, IS	60.435-E1
CU801, CU802	Charging Unit	60.264-E2
CU801	Charging unit, spec.	60.289-E1
CU801	Charging unit, test.	60.291-E1
CU802	Charging unit, spec.	60.290-E1
CU802	Charging unit, test.	60.292-E1
CU803	Charging unit	60.317-E1
CU804	Charging unit	60.339-E1
CU805	Charging unit	60.321-E1
CU806	Charging Unit	60.447-E1
DU801	Delay Unit	60.392-E1
LS801	Loudspeaker and Amplifier	60.340-E1
MN801	Vehicle Adaptor	60.320-E2
MN801	Vehicle Adaptor, installation	D402.439
	Tone Equipment	60.282-E1
MN803/4	Vehicle Adaptor	60.394-E1
MN803	Schematic Diagram	D402.593
MN803	Installation Diagram	D402.600/1
MN804	Installation Diagram	D402.599
SI804	Battery Tester	60.436-E1
	Schematic Diagram	D402.696
SI805	Test Adaptor	60.397-E1
SR801	Sequential Tone Receiver	60.315-E1
SR801	Functional Diagram	D402.152
SR801/802	Sequential Tone Receiver	I402.142
SR801/802-IS	Schematic Diagram	D402.630
SR801	Sequential Tone Receiver	D402.097/5
SR802	Sequential Tone Receiver	D402.137/3
ST801/802	Sequential Tone Transmitter	60.281-E1
ST801	Functional Diagram	D402.151
ST801/802	Sequential Tone Transmitter	I402.144
ST801/802	Sequential Tone Transmitter	D402.042/3
ST801a/802a	Sequential Tone Transmitter	D402.533
ST801a/802a-IS	Schematic Diagram	D402.629
TS-D37	Test Set	60.362-E1
	Layout	M405.092
	Schematic Diagram	D402.703
	Component Layout	D402.724
	Part List	X402.702

TITLE		CODE
TT801	Tone Transmitter	60.283-E1
TT801	Tone Transmitter	I402.143
TT801/802	Tone Transmitter	D402.043
TT801a/802a	Tone Transmitter	D402.532
TQ801	Pilot Tone Unit	60.265-E1
TQ801a	Pilot Tone Unit	I402.271/2
TQ801a	Pilot Tone Unit	D401.804
TQ802	Sequential Tone Unit	60.337-E1
TQ802/803	Schematic Diagram	D402.315/2
	Component Layout	D402.563/2
	Parts List	X402.531
	Mechanical Layout	D402.514
SU801	Switching Unit	60.400-E1
SU802	Switching Circuit	60.316-E1
	Schematic Diagram	D402.058
SU804	Switching Unit	60.404-E1
	Schematic Diagram	D402.677
SU805	Switching Unit	60.403-E1
	Schematic Diagram	D402.676
SU806	Switching Unit	60.402-E1
SU807	Dual Channel Watch Unit	60.376-E1
	Schematic Diagram	D402.331
	Mechanical Layout	I402-382
SU808	Group Call Unit	60.338-E1
	Schematic Diagram	D402.407/2
41.0222-00	BNC ANT. Connector Adaptor	60.412-E1
AN800	Technical Specifications	60.266-E2
AN800-IS	Antenna Types	60.410-E1
AN811	Compact Antenna	60.273-E1
AN812	Whip Antenna	60.276-E1
AN813	Whip Antenna	60.280-E1
AN814	Adjustment Procedure	60.268-E1
AN831	Compact Antenna	60.274-E1
AN832	Whip Antenna	60.277-E1

TITLE		CODE
AN833	Whip Antenna	60.275-E1
AN841	Heliflex Antenna	60.300-E1
AN861	Compact Antenna	60.272-E1
AN862	Whip Antenna	60.278-E1
AN863	Heliflex Antenna	60.305-E1
AN800	Adjustment Procedure	60.279-E1

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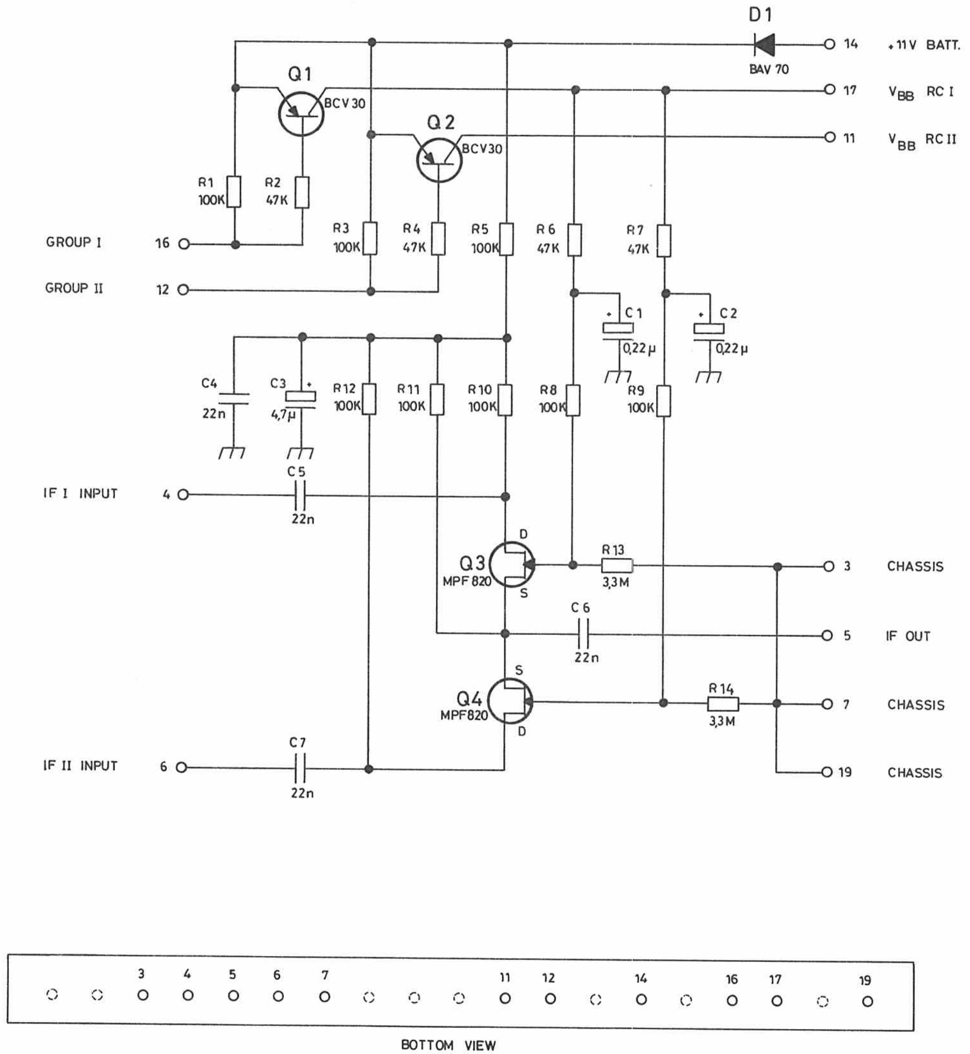

IF SWITCHING UNIT SU 804

D402.677

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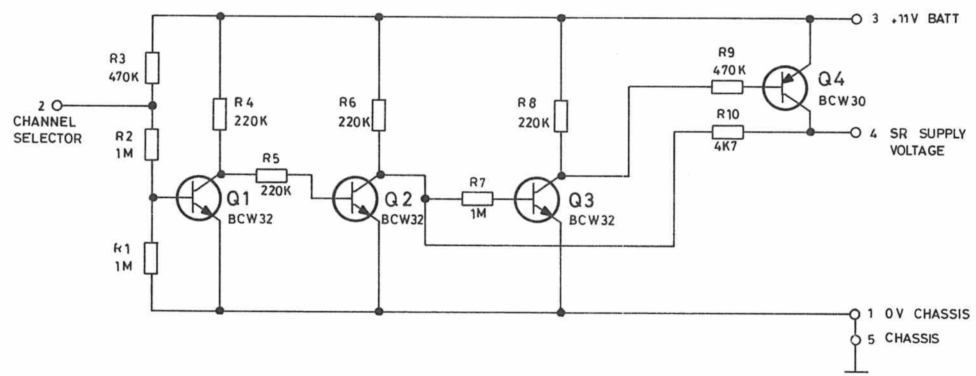

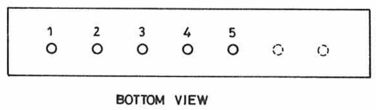

SR SWITCHING UNIT SU 805

D402.676

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INTRINSICALLY SAFE BATTERY
TYPE BU809

GENERAL

Battery unit BU809 is intended for applications requiring intrinsic safety, i.e. for use of STORNOPHONE 800-IS (1W) in explosive atmospheres encountered in coal mines, petrochemical industries and the like.

The battery unit consists of two sub-units. The first sub-unit is the cell unit, containing 11 nickel-cadmium, rechargeable, cylindrical cells of 225mAh capacity. The middle value open circuit voltage of the cell unit is approx. 13.6V.

In order to provide mechanical stability the cells are mounted between two glass-fibre circuit boards which are then placed in an ABS (plastic) housing. The entire housing is then filled with a flame retarding, polyurethan, moulding compound with quartz filler which provides further mechanical stability and improves heat dissipation capability.

The cell unit is provided with a connector which engages with the second unit, i.e. the active current limiter unit. The intrinsically safe properties of the battery are entirely governed by the function of these limiter circuits.

In order to provide sufficient DC power to the radio equipment without exceeding thermal or current limits, the limiter consists of two double, cascaded current limiting circuits with separate outputs and output enabling circuits. The two limiting circuits are designed as fold-back limiters and are realised as thick film units for good thermal performance. The limiting levels are chosen as 360mA for the high power section of the radio set, and 150mA for the low power section of the radio set. Intrincic segregation of the two sections of the radio set is maintained within the set by means of a so-called "barrier zone".

The thick film circuits are placed in an ABS housing which is also filled with same polyurethan compound as the cell unit for mechanical stability and good thermal dissipation properties.

Finally the two are locked together by screws which are locked by sealing compound.

CIRCUITS FUNCTION

Fig. 1 shows the circuits diagram of one of the cascaded limiter units. As indicated by the note on the diagram the fold-back limit is set to either 360mA or 150mA by strapping resistors R2/R10 in or out of the circuit.

Since each half circuit is identical, the limiting action of limiter Q1, Q2, Q3 will be treated in detail.

Diode E2 compensates the base-emitter voltage of Q2, and since both are operating at low currents (less than 2mA) good temperature tracking is ensured.

When the voltage drop across resistor R3 exceeds the voltage drop across R1 then the transistor pair Q2 and Q1 will be turned on and the output voltage "V_2" will be nearly equal to the input voltage "V_1". Under these conditions the bias point "A" is determined by the two resistors R4 and R7 together with the third resistor R8 and the input voltage V_1. R4 and R7 will, very nearly, be in parallel (ignoring voltage drop across Q1) and together with R8 perform as a voltage divider giving a bias "V_A" at point A, which establishes an emitter current in Q3. Q3's collector current, which is very nearly equal to the emitter current, passes mainly through the network E2 - R3 thus causing a voltage drop across R3. This voltage drop, as mentioned ear-

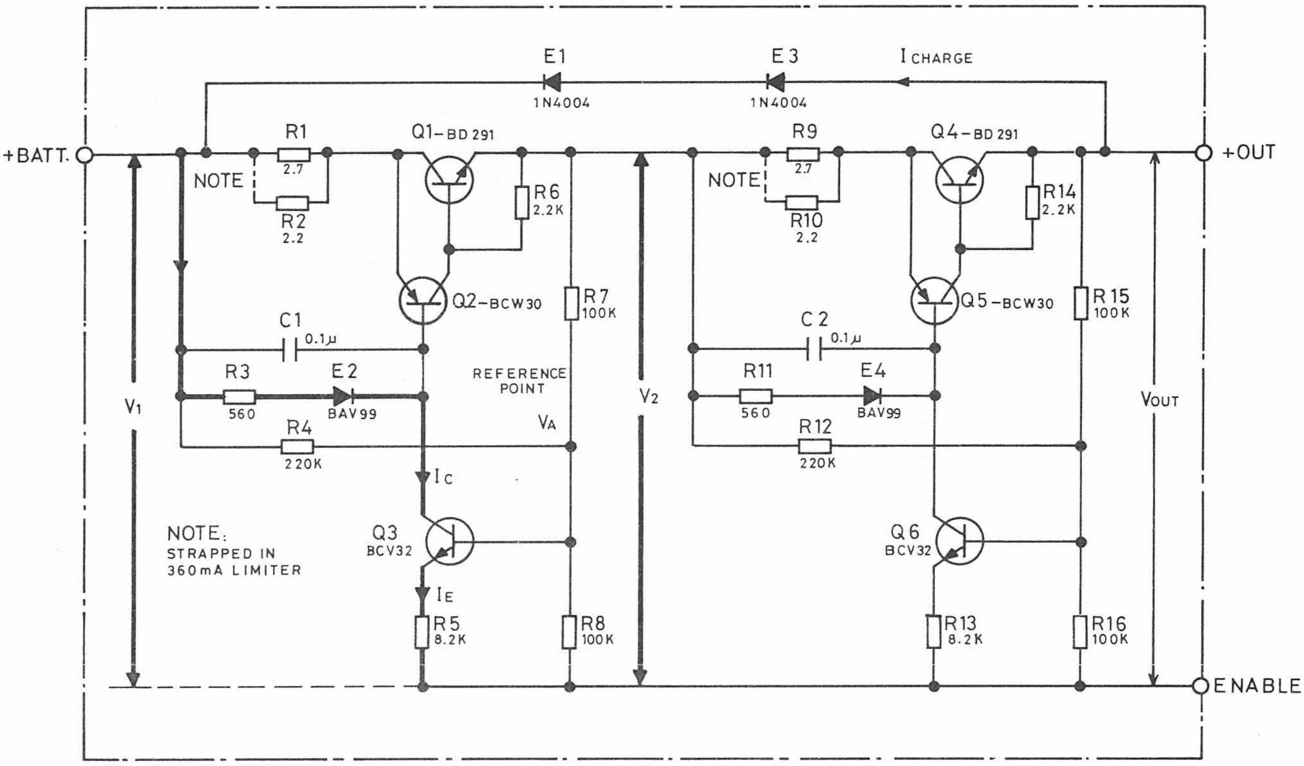

FIG. 1. BU809 CURRENT LIMITER

lier, ensures that the compound transistor pair Q2, Q1 are turned on, thus causing the output voltage V_2 to be very nearly equal to the input voltage V_1.

Upon application of a load "R_L", the load current passes mainly through the series element Q1 and entirely through the low value measuring resistor R1. As the load increases the voltage drop across R1 rises and eventually Q2 and Q1 begin to cut-off. When Q1 begins to cut off the output voltage V_2 begins to fall and the bias delivered by resistor R7 to point "A" also falls. In the limiting case when output voltage V_2 is zero (short-circuit load) the bias at point "A" is determined by the potential divider R4 and R7 in parallel with R8.

As mentioned earlier, the current limiting effect of Q1, Q2 is approximately proportional with the voltage drop across R3. This voltage drop is again approximately proportional to the bias voltage "V_A.

This means that by suitable choice of R4, R7 and R8, the maximum current limiting value for the circuit, and the short circuit current limiting value for the circuit can be established independently of each other, i.e. a fold-back characteristic is obtained.

MEASURED CHARACTERISTICS

Fig. 2 illustrates the nominal fold-back characteristic of the 150mA limiter circuit.
Fig. 3 illustrates the corresponding characteristic of the the 360mA circuit. The limiting action is essentially instantaneous and independent of the load.

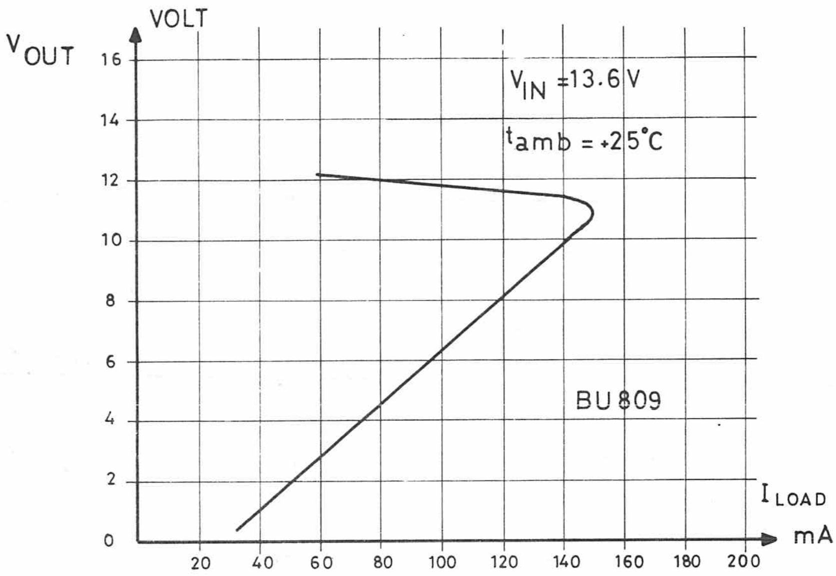

FIG. 2. TYPICAL 150 mA LIMITER CHARACTERISTIC

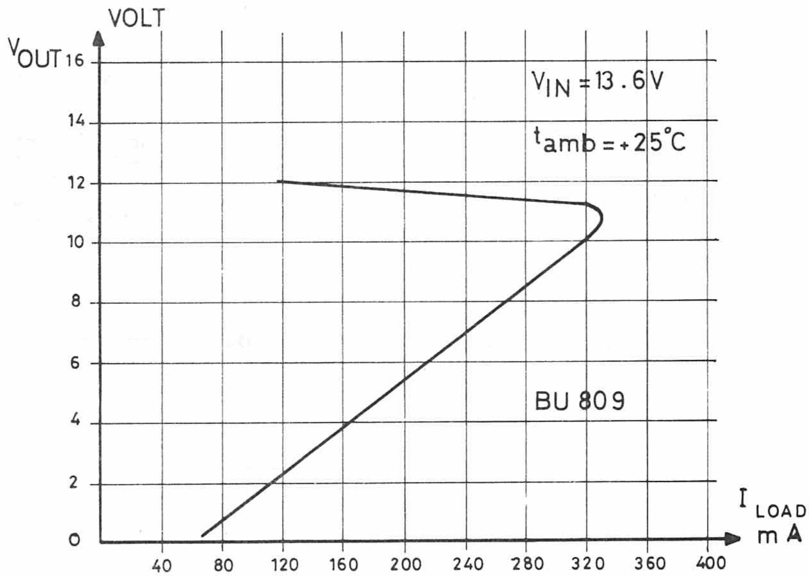

FIG. 3. TYPICAL 360 mA LIMITER CHARACTERISTIC

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ENABLE CIRCUIT

Since each limiter circuit has an own shunt consumption af approx. 1mA the battery is provided with an enable terminal for each circuit. This prevents the limiter from self-discharging the cells.

Fig. 4 illustrates the enable function - these functions are also used for circuit switching.

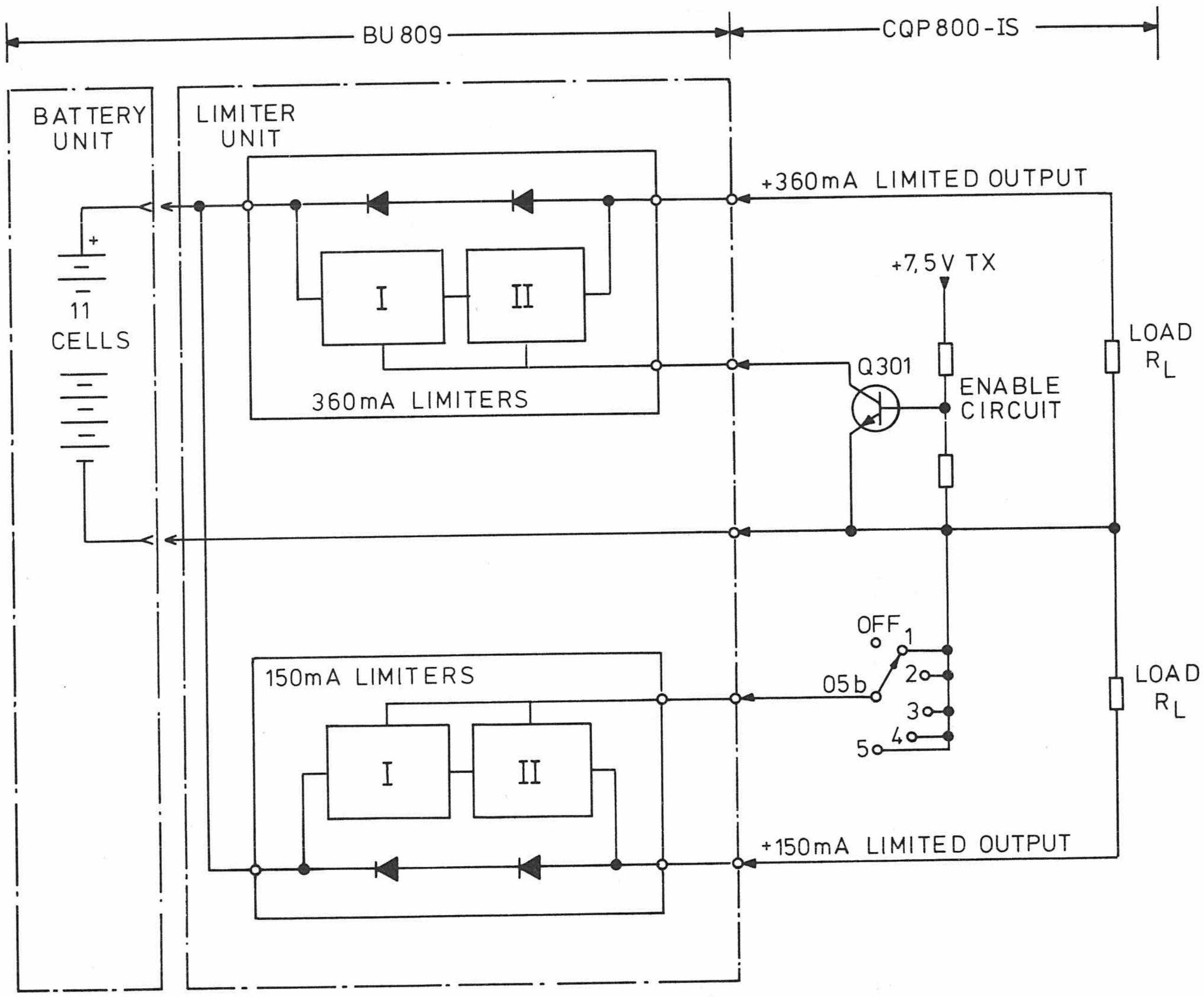

FIG.4. ENABLE FUNCTION

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CHARGING

Each limiter pair is bridged by a power rectifier, thus permitting charging at the 5 hour rate of 45mA for a period of 7 hours.

TECHNICAL SPECIFICATIONS

Nominal battery voltage

13.6V

Nominal battery capacity

225mAh

Number of cells

11

Maximum short circuit current

150mA output: Less than 40mA

360mA output: Less than 70mA

Maximum load current

150mA

360mA

Dimensions

94 x 63 x 32

Weight

BATTERY CHARGER CU806

General

The battery charger CU806 is powered from the mains and has 6 charging outlets for BU809 batteries. The charger is designed as a desk apparatus, but may be installed on a wall.

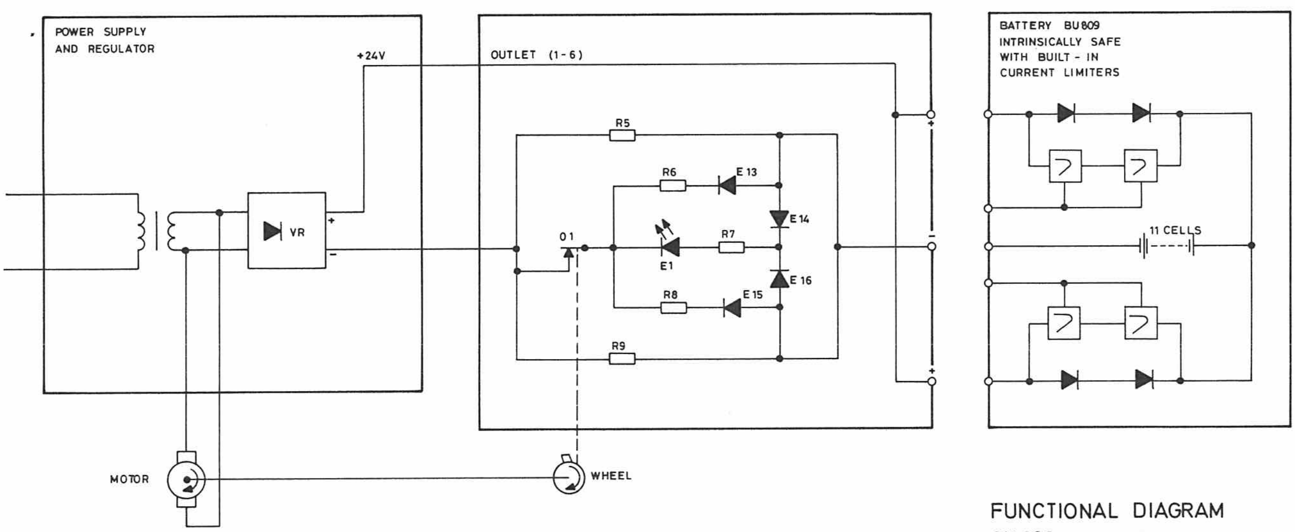
The electronic circuits of CU806 are built on one printed circuit board common to the power supply and the outlets.

Method of Charging and Operating Instructions.

The synchronous motor drives 6 timing wheels which actuate microswitches at the end of the charging time. The switches are in series with the charging circuits and the charging indicators (LED), one for each of the outlets.

When the microswitch interrupts, the charging indicator extinguishes and the current to the battery is switched to trickle charge. The friction transmission of the 6 wheels can be set independant of each other so the charging time on each outlet can be adjusted from 0 to 4½ hour. The charging indicator is only lit with the battery inserted and with the wheel set to the desired charging time.

It is recommended to select a charging time corresponding approximately to the consumed battery capacity; e.g. a battery assumed to be half discharged should be given half charging time, i.e. 2 1/4 hour. Thereby a longer life time in the form of a larger number of discharge/charge cycles is achieved. The CU806 is short circuit proof, and no



FUNCTIONAL DIAGRAM
CU 806

discharging of the batteries inserted takes place via the charger's circuits without mains voltage applied. It must be noticed that highest battery capacity is reached when charging at nominal ambient temperature (20°C).

For the trickle charge there is no time limits.

Mode of Operation

The batteries are charged with a constant 24V DC supply, IC1.

The intrinsic safe battery, BU809, is charged via all series resistors and two series diodes in parallel with the built-in regulator circuit.

When microswitch 01 interrupts, the trickle charge current flows through R5 or R9. This principle of operation ensures that the battery receive correct charging current independant of the charging outlets.

Technical Specifications

Number of Outlets

6 outlets for BU809 (outlets cannot be coded for other types of batteries).

Nominal Mains Supply Voltage

110V, 120V, 220V, or 240V; 50Hz.
Tolerance ±10%

Consumption, measured at nom. mains voltage

35W with 6 x BU807
8W no load condition.

Charging Temperature Range

Nominal ambient temperature: +20°C
Ambient temperature range: +5°C to +35°C

Charging Time

Max. 4½ hour for a completely discharged battery. The charging time is adjustable from 0 to 4½ hour for each outlet, independantly of each other.

Charging Current, Typical Value

70mA

Trickle Charge Current, Typical Value

13mA

Battery Capacity

Typical 100% battery capacity is reached after 4½ hours of charging at nominal temperature.

Dimensions

360 x 160 x 95mm

Weight

4,2Kg.

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BATTERY TESTER SI804

The battery tester is designed to measure the state of charge of NiCd batteries. The unit is a selfcontained box with a battery connector and a meter at the top. A row of pushbuttons enables the unit to be used for BU802, BU803, BU804, BU805, BU806, and BU807 of the Stornophone 800 (U) series, and a TEST button applies a nominal load to the battery under test, when depressed.

Operating Instructions

Depress the pushbutton corresponding to the battery to be tested.
Insert the battery. The meter will read the open circuit voltage of the battery.
Depress the TEST button to load the battery.
The meter must not read below the green range, otherwise the battery need to be charged.

Circuit Description

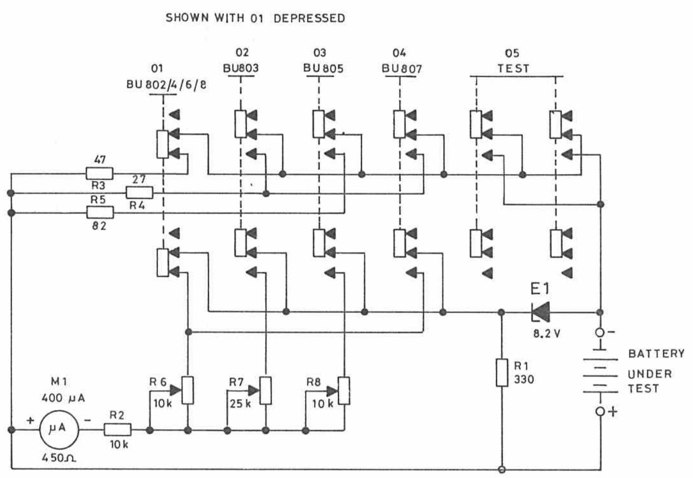
The test circuit is designed as an expanded scale Voltmeter which reads the voltage of the battery. Depressing one of the four push buttons selects a resistor that loads the battery under test, and it also selects the calibrated voltage range.
The meter scale is divided into three ranges which are red, yellow, and green.

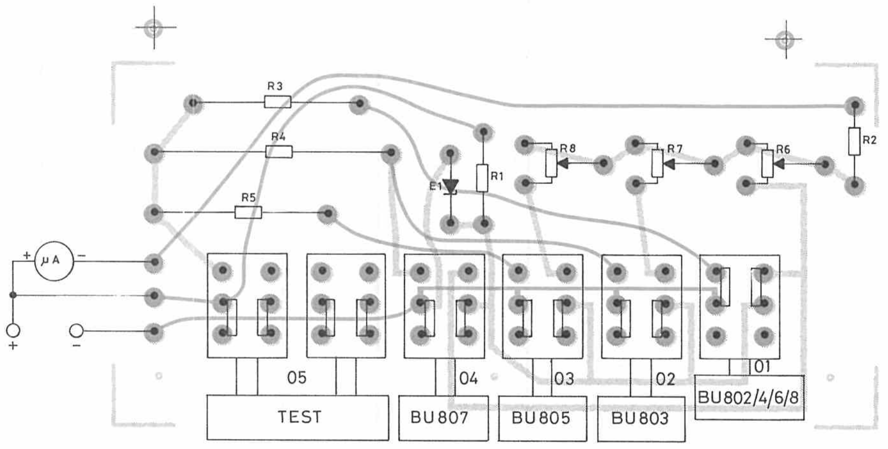
CALIBRATION PROCEDURE

1. Connect a variable DC power supply to the tester's battery contacts.
   Set the power supply voltage to 11.25V.
   Depress the BU802/4/6/8 button.
   Adjust R6 until the meter deflection is between the green and yellow ranges.

2. Adjust the power supply voltage to 12.5V.
   Depress the BU803 button.
   Adjust R7 until the meter deflection is between the green and yellow ranges.

3. Adjust the power supply voltage to 11.75V.
   Depress the BU805 button.
   Adjust R8 until the meter deflection is between the green and yellow ranges.





BATTERY TESTER SI804

D402.696

Storno

TYPE	Nº	CODE	DATA
		10.3651	SI804 Battery Tester.
	R1	80.5443	330 ohm 5% carbon film 0.25 W
	R2	80.5261	10 Kohm 5% carbon film 0.125W
	R3	84.5228	47 ohm wirewound 4 W
	R4	84.5227	27 ohm wirewound 7 W
	R5	84.5224	82 ohm wirewound 4 W
	R6	86.5039	10 Kohm carbon potentiom 0.1 W
	R7	86.5044	25 Kohm carbon potentiom 0.1 W
	R8	86.5039	10 Kohm carbon potentiom 0.1 W
	01-5	47.0645	Switch assembly
	E1	99.5226	8.2V Zenerdiode 0.25 W
	M1	95.5021	400 uA meter

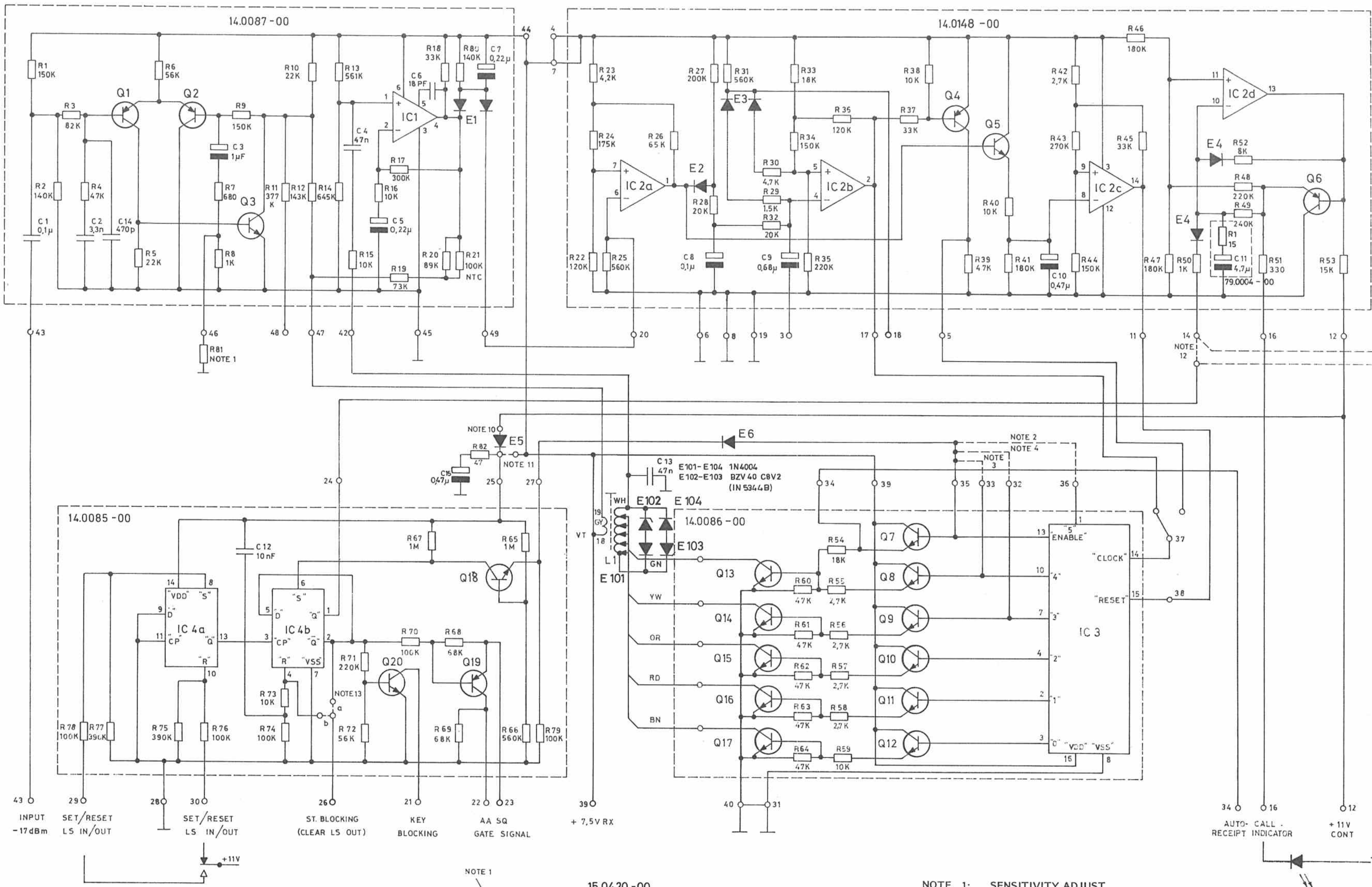
Storno

TYPE	Nº	CODE	DATA

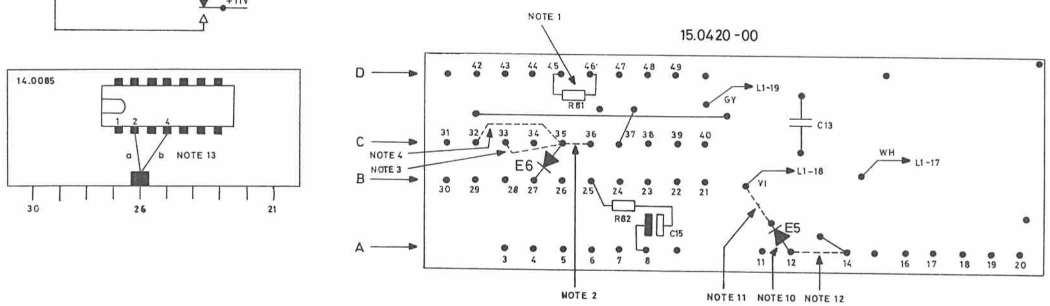
BATTERY TESTER SI804

X402.800

Storno



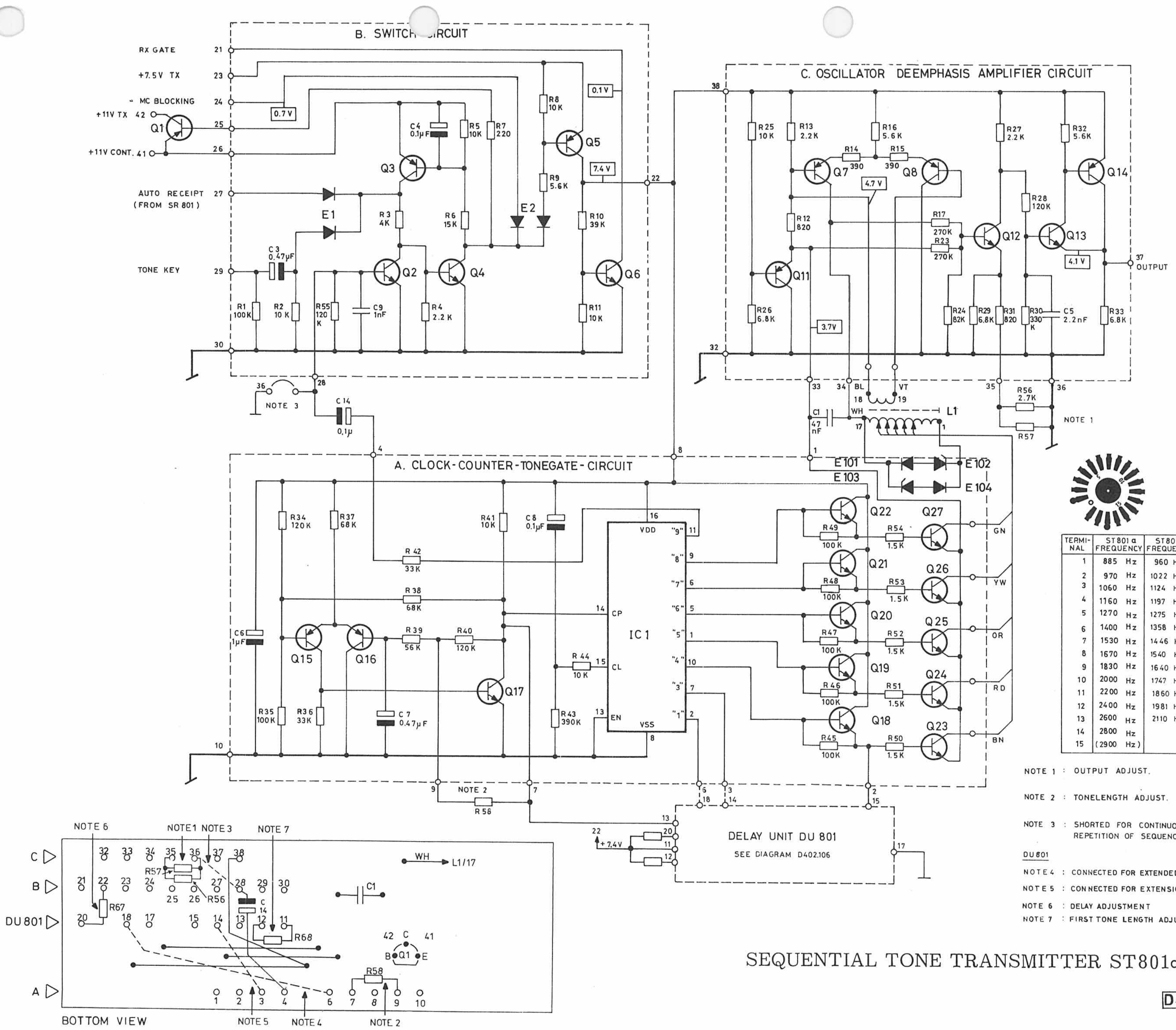
TERMINAL	SR 801 FREQUENCY	SR 802 FREQUENCY
1	885 Hz	960 Hz
2	970 Hz	1022 Hz
3	1060 Hz	1124 Hz
4	1160 Hz	1197 Hz
5	1270 Hz	1275 Hz
6	1400 Hz	1358 Hz
7	1530 Hz	1446 Hz
8	1670 Hz	1540 Hz
9	1830 Hz	1640 Hz
10	2000 Hz	1747 Hz
11	2200 Hz	1860 Hz
12	2400 Hz	1981 Hz
13	2600 Hz	2110 Hz
14	2800 Hz	
15	(2900 Hz)	



NOTE 1: SENSITIVITY ADJUST
NOTE 2: SHORTED FOR 5-TONE SEQUENCE CALL
NOTE 3: SHORTED FOR 4-TONE SEQUENCE CALL
NOTE 4: SHORTED FOR 3-TONE SEQUENCE CALL
NOTE 10: REMOVE IN CRP800
NOTE 11: SHORTED IN CRP800
NOTE 12: OPEN IN CRP800 WITH SU802
NOTE 13: IN CRP800 WITH SU802 THE CONNECTION TO TERMINAL 26 IS MOVED FROM a TO b.

SEQUENTIAL TONE RECEIVER SR801,-SR802-IS

D402.630/2



TERMINAL	ST801a FREQUENCY	ST802a FREQUENCY
1	885 Hz	960 Hz
2	970 Hz	1022 Hz
3	1060 Hz	1124 Hz
4	1160 Hz	1197 Hz
5	1270 Hz	1275 Hz
6	1400 Hz	1358 Hz
7	1530 Hz	1446 Hz
8	1670 Hz	1540 Hz
9	1830 Hz	1640 Hz
10	2000 Hz	1747 Hz
11	2200 Hz	1860 Hz
12	2400 Hz	1981 Hz
13	2600 Hz	2110 Hz
14	2800 Hz	
15	(2900 Hz)	

NOTE 1 : OUTPUT ADJUST.

NOTE 2 : TONELENGTH ADJUST.

NOTE 3 : SHORTED FOR CONTINUOUS REPETITION OF SEQUENCE.

DU 801

NOTE 4 : CONNECTED FOR EXTENDED DELAY OF FIRST TONE.

NOTE 5 : CONNECTED FOR EXTENSION OF THE FIRST TONE.

NOTE 6 : DELAY ADJUSTMENT

NOTE 7 : FIRST TONE LENGTH ADJUSTMENT

SEQUENTIAL TONE TRANSMITTER ST801a,-ST802a - IS

D402.629

Storno

TEST SET TS-D37

General

The TS-D37 is a test instrument designed to be used when adjusting the antenna matching circuit built into the control head of a Stornophone 800 U.

The test instrument comprises an antenna, an RF detector, a BNC socket for connecting an RF signal generator, an RF detector, and a moving coil meter. A dummy connector on the unit engages with the multiway receptacle on the CQP800U and retains the instrument while the adjustments are performed.

Circuit Description

The RF output from the CQP800 antenna is coupled loosely to the test instrument antenna which in turn is coupling to the RF detector.
The RF detector is a voltage doubler configuration, and the resultant DC voltage is applied to a moving coil meter. A switch with six positions and calibration resistors enables the instrument to be used for three frequency ranges, 68-88 MHz, 140-190 MHz, and 410-470 MHz, and two power ranges, 1 W and 3 W.

Note: The band/power selector can be rotated through 12 positions of which only six are usable.
The knob pointer is set to one of these positions.

The instrument is calibrated to give a uniform deflection independent of the selected range.

Operating Instructions

Remove the multiwire receptacle cover and place the TS-D37 on the receptacle.

Set the Band/Power selector to the appropriate position as follows.

1 = 4m - 1W (68-88 MHz, 1 watt transmitter)
2 = 4m - 3W (68-88 MHz, 3 watt transmitter)
3 = 2m - 1W (140-190 MHz, 1watt transmitter)
4 = 2m - 3W (140-190 MHz, 3 watt transmitter)
5 = 0.7m - 1W (410-470 MHz, 1 watt transmitter)
6 = 0.7m - 3W (410-470 MHz, 3 watt transmitter)

Raise the hinged lid giving access to the adjustment holes.
Key the transmitter and adjust the antenna matching circuit for maximum meter deflection (refer to the adjustment procedure for the CQP800U).

CQP830 (68-88MHz)

When adjusting CQP830U it is important to adjust the RX branch of the matching circuit for best signal-to-noise ratio. To accomplish this connect an RF signal generator to the BNC conector on the TS-D37 and adjust for best receiver signal-to-noise ratio (refer to CQP830U adjustment procedure).
The coaxial cable feeding the RF signal to the TS-D37 is covered by ferrite beads and is available as accesory. The cable, code nr. 19B0028, is to be ordered separately.

Technical specifications

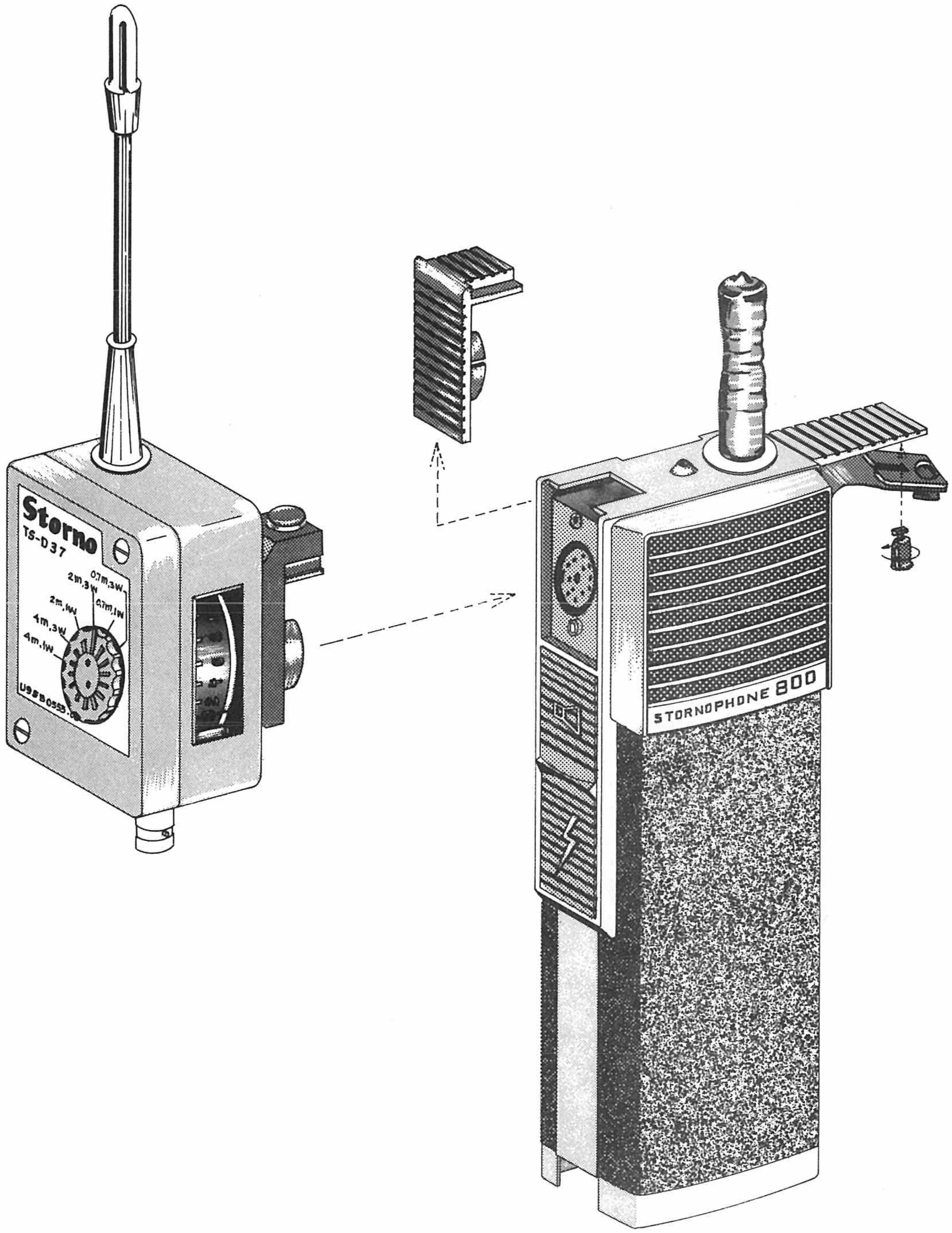
Frequency Ranges
68-88 MHz, 140-190 MHz, and 410 to 470 MHz

Power Ranges
1Watt and 3Watt

Meter Deflection Calibration
6 (for nominal power)

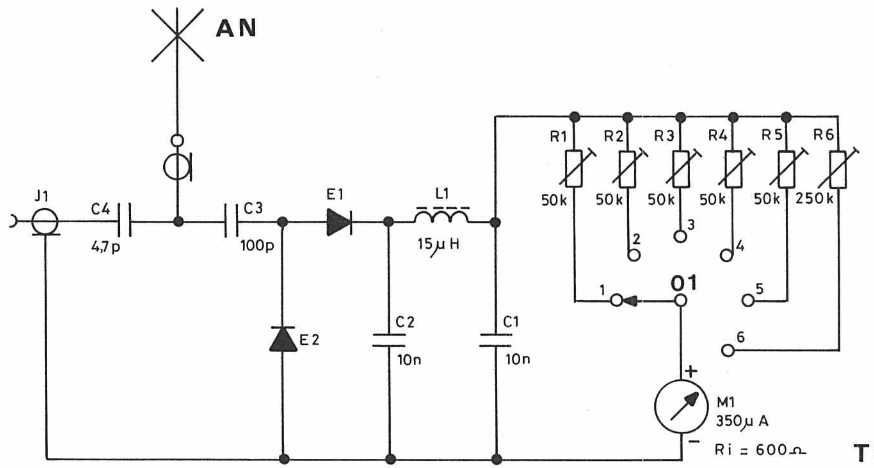
Dimensions
Unit: 35 x 50 x 65 mm (less antenna)
Antenna length: $\leq$ 110 mm

60.362-E1



ANTENNA TEST INSTRUMENT
TS – D37

M 405.092

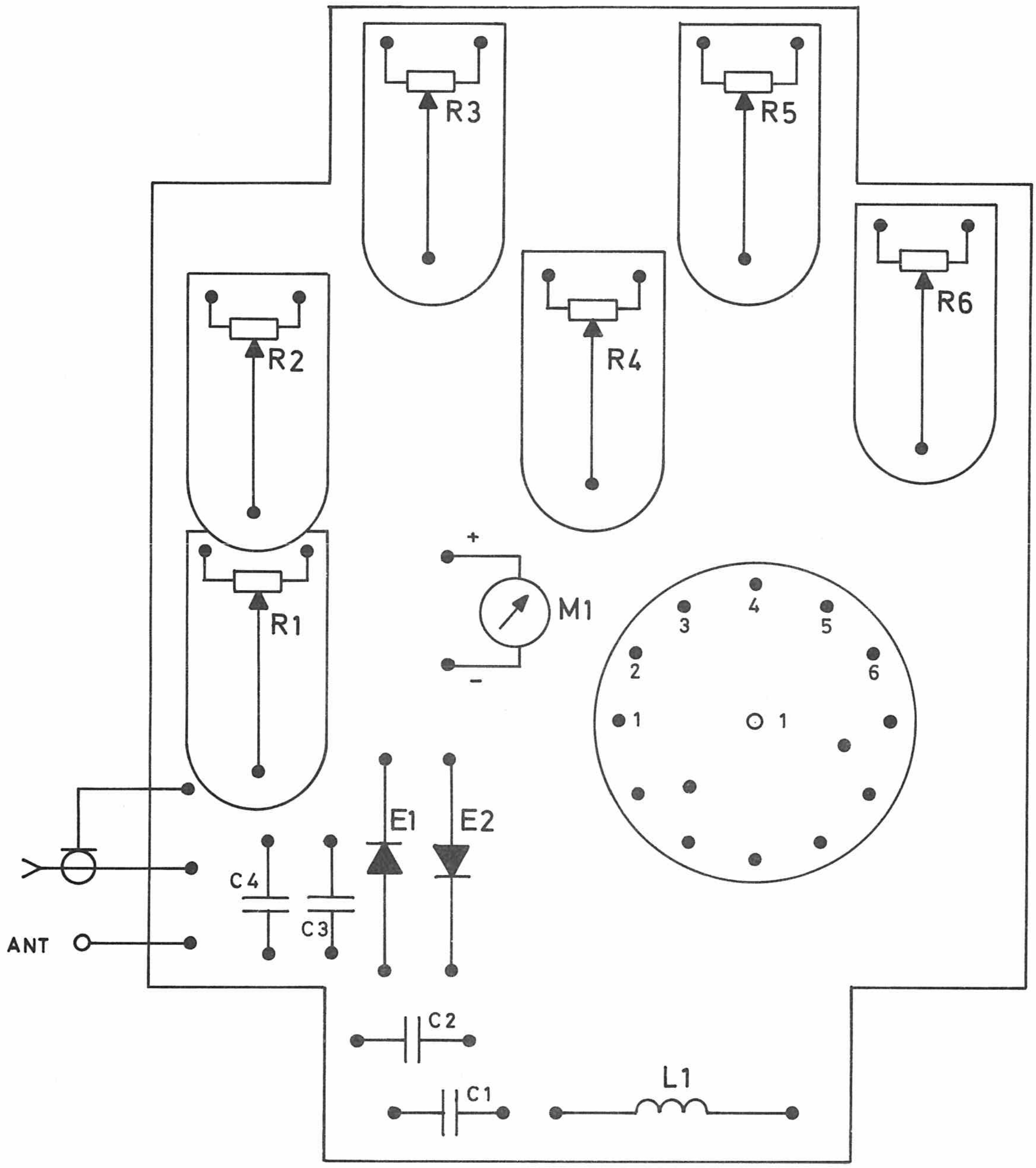


TS - D 37

ANTENNA TEST INSTRUMENT
TS - D 37

D402.703

Storno



COMPONENT LOCATION
PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE

ANTENNA TEST INSTRUMENT
TS - D37

D402.724

Storno

TYPE	Nº	CODE	DATA		
		95B0555-00	Test Instrument TS-D37		
	C1	74.5109	10nF -20 +80%	Ceram PL	20V
	C2	74.5109	10nF -20 +80%	Ceram PL	20V
	C3	74.5013	100pF 20%	Ceram	400V
	C4	74.5131	4.7pF ±0.25pF	Ceram DI	250V
	R1	86.5036	50Kohm	Potentiometer	
	R2	86.5036	50Kohm	Potentiometer	
	R3	86.5036	50Kohm	Potentiometer	
	R4	86.5036	50Kohm	Potentiometer	
	R5	86.5036	50Kohm	Potentiometer	
	R6	86.5056	250Kohm	Potentiometer	
	L1	63.5007	15uH	RF choke	
	E1	99.5074	AA119	Diode Mached pair	
	E2	99.5074	AA119	Diode	
	M1	95B5042	350uA meter	R = 600ohm	
	J1	41.0166	BNC socket		
	O1	47.5068	Rotary switch 1 x 6		
	AN	90B0001-00	Antenna		

Storno

TYPE	Nº	CODE	DATA

TEST INSTRUMENT TS-D37

X402.702

SEQUENTIAL TONE UNIT

TQ805 - TQ806

TQ805/TQ806 is a combined tone transmitter - tone receiver, the functions of which are independant of each other and which can process 3, 4, or 5-tone signals. The unit is designed to fit into the portable STORNOPHONE 800 radiotelephone equipment. The unit is built on three printed circuit boards interconnected by wires and can be dismounted by desoldering the four spacers from the motherboard. Replacing the connections with wires enables the unit to be operated for service and fault tracing. The electrical design appear from the block diagram.

The tone frequencies are the STORNO series 855 Hz to 2800 Hz in TQ805 and the CCIR series 960 Hz to 2110 Hz in TQ806. The combinations for the tone receiver and the tone transmitter are selected by soldering colour coded wires to the tone coil or by establishing the connections on the motherboard.

In standby, when turning on the equipment, the unit is in the tone receiver mode and set to the 1st tone of the combination. Reception of a sequential tone signal matching the combination, will cause the following events to take place:

- The Key Blocking is cancelled (Q30).
- The Loudspeaker Blocking is cancelled (U5c).
- The visual LED call indicator is turned on (Q26).

With the TQ connected for Auto Receipt a correct tone call will automatically key the sequential tone transmitter and after having generated the last tone of the sequential tone signal the unit reverts to the condition described above, i.e. the loudspeaker is on.

Accordingly, in position LS, the tone transmitter can be manually activated by pressing the Tone Key button. With 70 ms tone lengths in TQ805 and 100 ms in TQ806 the interval between pressing the Tone Key and generation of the 1st tone is approximately 220 ms and 320 ms. When using 3 tones or 4 tones in the sequence this interval may be extended if the unused tone gate wires are left unconnected. In a similar manner a "hole" in the sequential tone signal may be established.

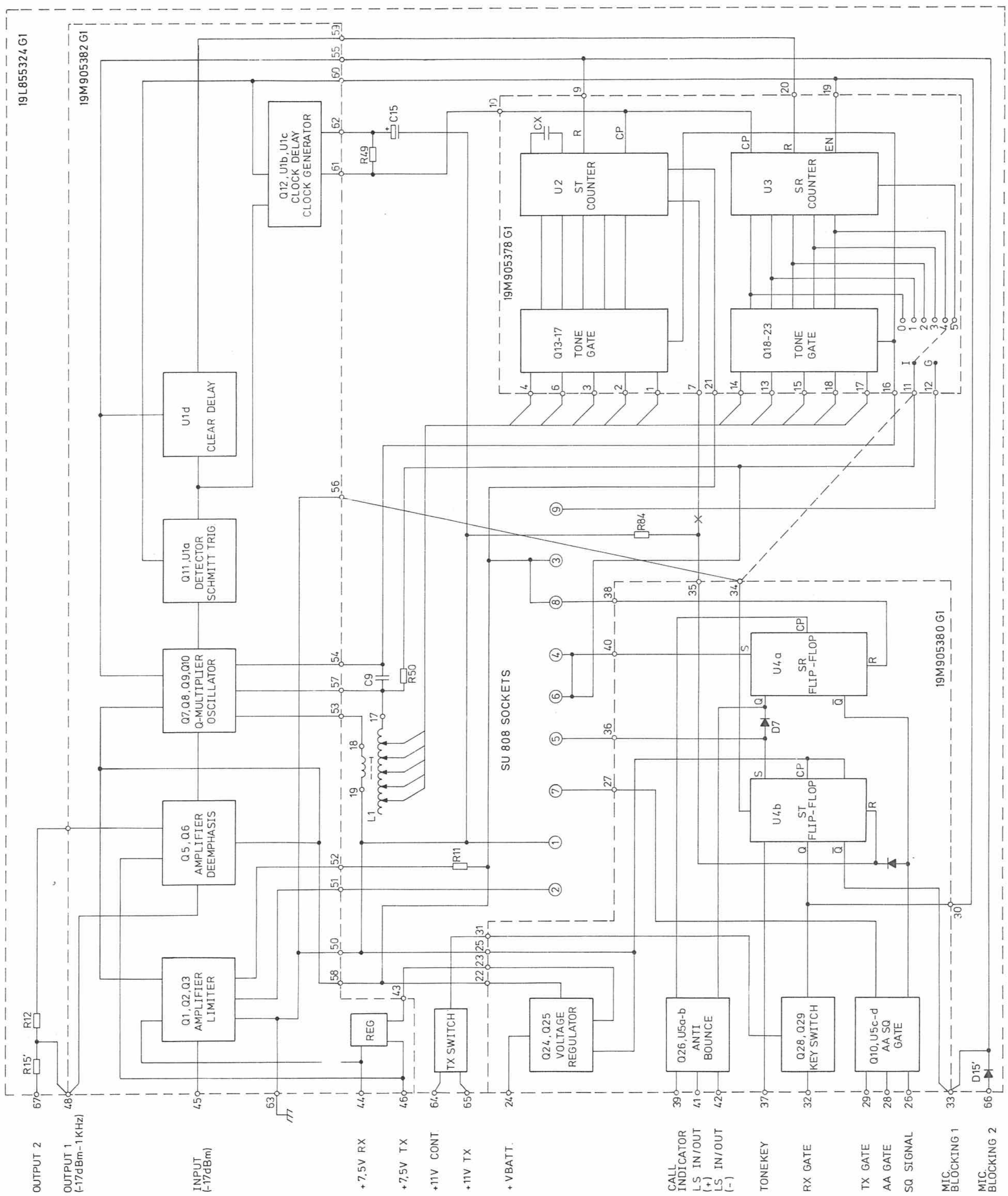
The transmitter remains keyed for approximately 640 ms (TQ805) or 920 ms (TQ806) even if the Tone Key button is pressed for a shorter or longer period. Simultaneously with the transmitter being keyed the following control functions are activated:

- Microphone amplifier blocking (U4b).
- Receiver blocking (Q28).

The blocking signals are suspended after the last tone, that is when the unit reverts to standby.
If the unit has to repeat the sequential tone signal continuously, disconnect the conductor between terminal 35 and terminal 7 on the motherboard, and connect a resistor R84 (180 Kohm) between terminal 35 and terminal 56.

The interval between consecutive tone signals will be approx. 280 ms in TQ805 and approx. 400 ms (4 tone lengths) in TQ806. The sequential tone generator can hereafter only be stopped by switching the loudspeaker off, or turning the equipment off.

Identification is achieved by connecting the Tone Key terminal directly to 11 V TX and disconnecting the Tone Key. With the TQ arranged for identification a tone signal will be emitted each time the transmitter is keyed.



FUNCTIONAL DIAGRAM TQ805/806

D403.285

The unit can accomodate a Group Call subunit SU808, when an extension of the call tone system is required, and the unit may be used as a combined single tone transmitter and a sequential tone receiver.

MODE OF OPERATION

In standby the TQ unit is set to the sequential tone receiver mode. When a tone signal having the proper code is applied to the input the following events take place:
The 1st tone is amplified and limited in the input stage. The signal is then, via a coupling link, applied to the selective circuit. In standby the 1st tone gate, Q19, selects the 1st tone of the combination.

The active part of the selective circuit is a Q-multiplier, which also operates as amplifier when the selective circuit is part of the tone oscillator. Due to the high signal voltage across the selective circuit the gate transistors are biased in the nonconductive direction, and simultaneously the tone and oscillator signal amplitude is limited.

If the level of the 1st tone is within the sensitivity range of the tone receiver the detected signal will trigger the Schmitt trigger, U1a. The negative trailing edge produced at the Schmitt trigger output is delayed approximately 17 ms by the Clock Delay circuit.
At the same time the Schmitt trigger rapidly charges the Clear Delay circuit ,U1d in order to enable the Counter, U3, before the 1st tone appears at the CP-delay output.

At the end of the 1st tone the Schmitt trigger reverts to standby and the positive leading edge is fed, via the CP-delay, to the counter's clock input. The counter steps forward and the next tone gate tunes the selective circuit to the 2nd tone. The gate transistors all have their collectors connected to one of the tone coil terminals. The sequential tone receiver is now set to receive the 2nd tone of the signal and remains in this state for approximately 120 ms, the time being determined by the Clear Delay. Except for the requirement of a tone length of approximately 40 ms the tone receiver is independent of the duration of the signal elements as the counter first switches to the next tone gate at the end of a tone. If the 2nd tone is not accepted within approximately 120 ms, the counter is reset to standby, i.e. ready for the 1st tone. The 2nd, 3rd, 4th, and 5th tone of a sequential signal are received as described for the 1st. When the 5th tone has been accepted the counter information is read to Latch U4a, which cancels the key and loudspeaker blockings.

At the same time a visual call indicator is turned on, and the call may also cause an automatic receipt transmission to take place, if used.

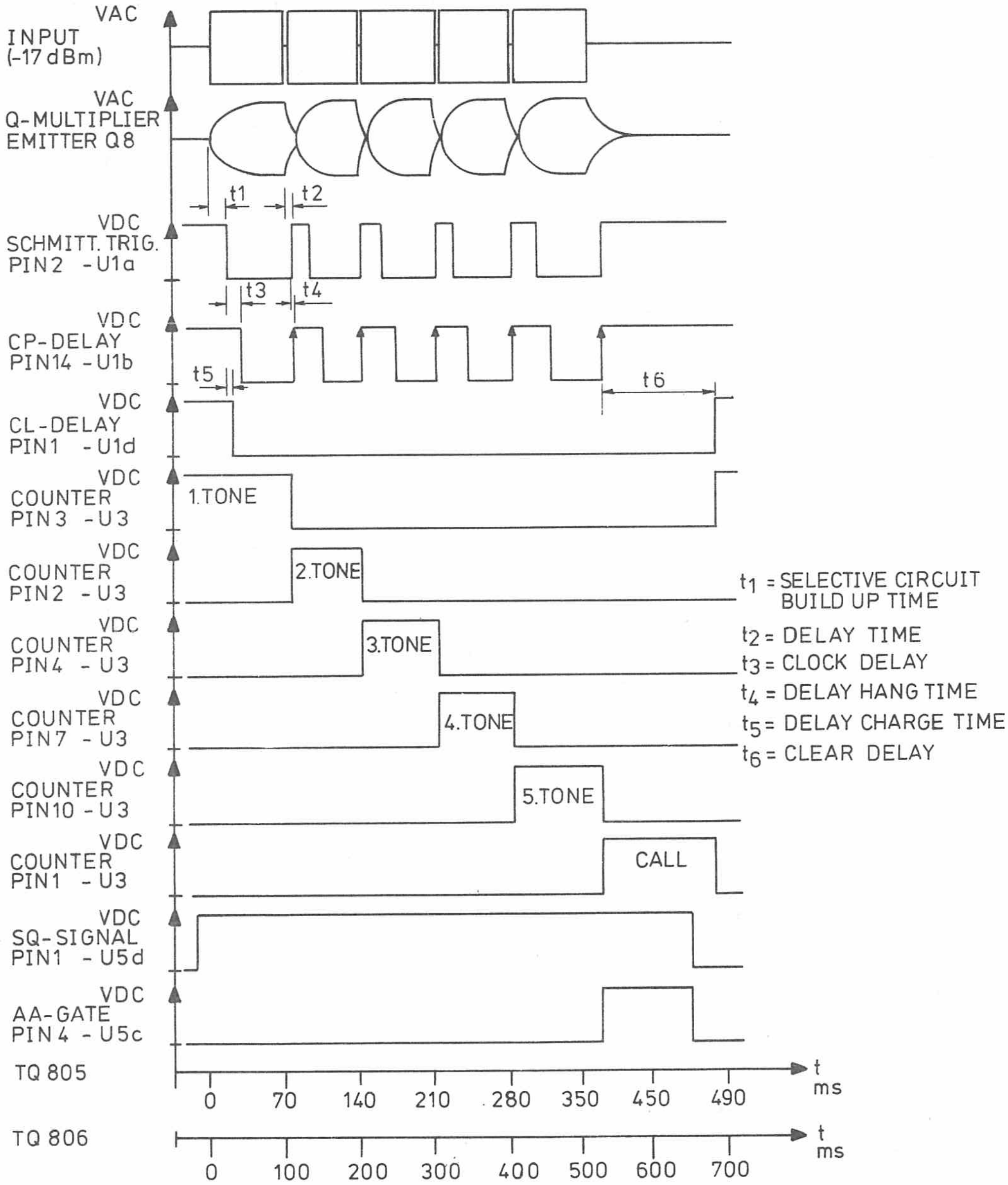
The colour coded wires from the tone generator gates are soldered to the tone coil terminals, but if the same tone code is used for both tone transmitter and tone receiver the code can be set by arranging the wires on the motherboard.

With the loudspeaker turned on, depressing the Tone Key button causes the following to take place:
A positive pulse from the Tone Key button toggles the latch U4b whose Q and $\bar{Q}$ outputs control the internal conversion from receive to transmit, and U4b also controls the Transmitter Key switch and the Microphone and Receiver Blocking. When the clock generator, U1c, starts, the Schmitt trigger, U1a, and the counter U3, are inhibited by the Q-output. The $\bar{Q}$-output enables the tone transmitter counter U2, inhibits the Clock Delay circuit, and turns on Q7 which increases the gain of the Q-multiplier Q8. The clock generator pulses are applied to the counter U2.

The repetition rate is 70 ms. Upon arrival of the 3rd clock pulse the 1st tone gate transistor is turned on and the tone oscillator generates the 1st tone of the signal code. The oscillator output is passing an amplifier and a de-emphasis network before being applied to the output terminal. The de-emphasis characteristic follows an RC-function, f_c = 1000 Hz, which corresponds to the STORNO tone signal modulation characteristic. The output voltage is adjustable by means of an external resistor.

The 4th, 5th, 6th, and 7th clock pulse successively turn on the remaining gate transistors to accomplish the signal code. The 8th clock pulse is used to introduce an interval before the 9th clock pulse resets the latch, U4b, and the TQ reverts to the tone receive mode with the loudspeaker turned on.

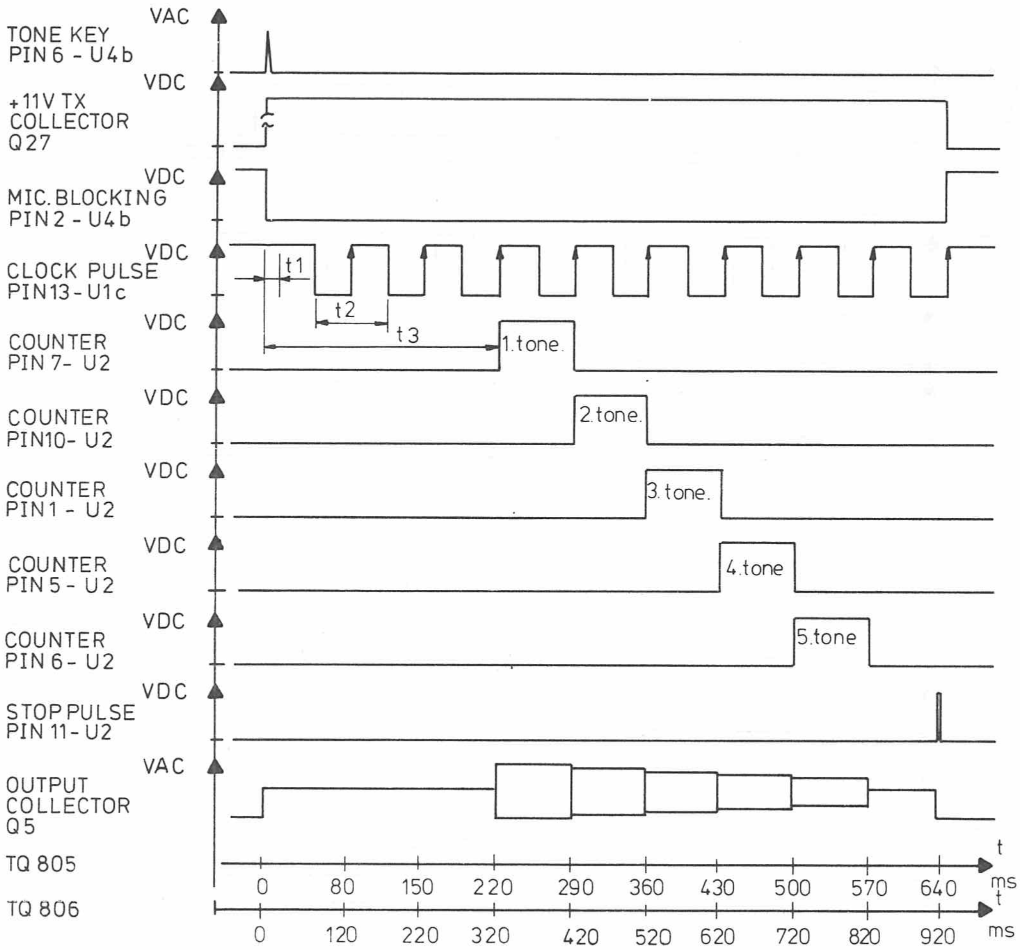
PULSE-TIME DIAGRAM FOR 5-TONE SEQUENTIAL CALL RECEIVER: TQ 805/806



TQ 805/806

D403.248

PULSE-TIME DIAGRAM FOR 5-TONE SEQUENTAL CALL TRANSMITTER TQ 805/806



LOUDSPEAKER MANUALLY TURNED ON

t_1 = CHARGING TIME FOR CLOCK GENERATOR

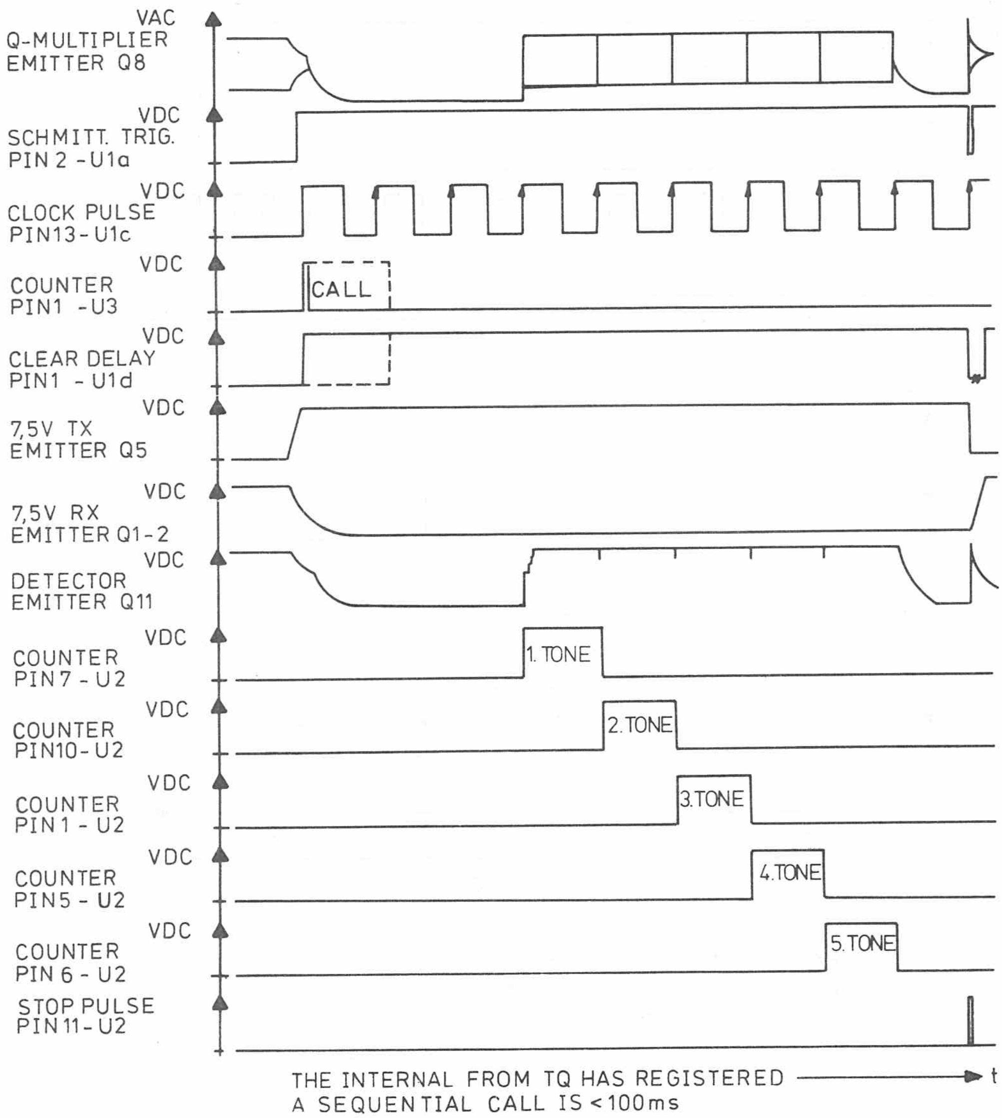
t_2 = CLOCK PULSE PERIOD (TONE LENGHT)

t_3 = UNMODULATED PULSE BEFORE THE 1.ST TONE

TQ 805/806

D403.249

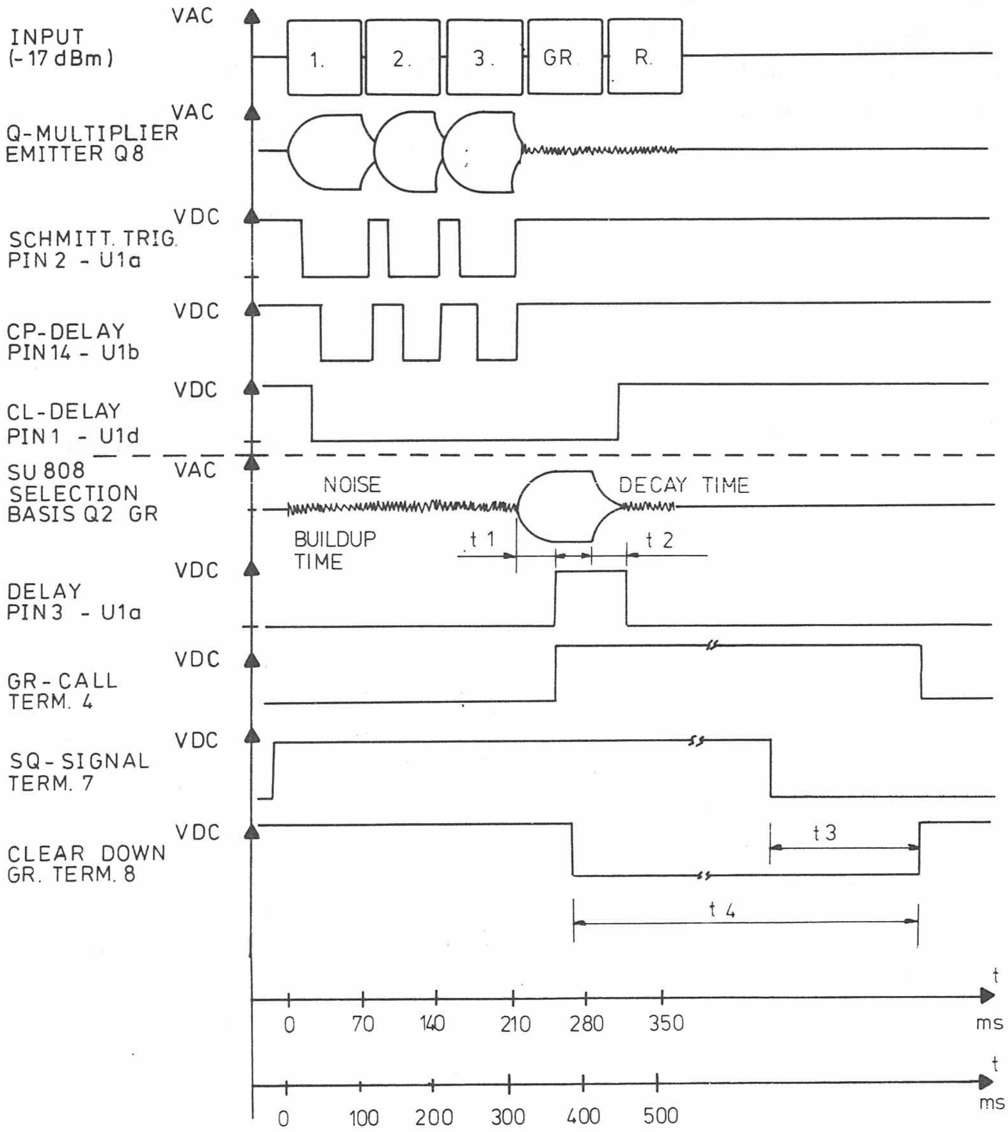
PULSE-TIME DIAGRAM FOR AUTOMATIC RECEIPT AFTER A CALL



TQ 805/806

D403.250

PULSE-TIME DIAGRAM FOR 5-TONE SEQUENTIAL CALL WITH GROUP CALL ON 4th DIGIT



IN PERIOD t_4 THE AUTOMATIC RECEIPT, TONEKEY AND LS IN/OUT FUNCTIONS ARE INHIBITED

t_1 = BUILD-UP TIME + DELAY

t_2 = DECAY TIME + HANGTIME

t_3 = SQUELCH DELAY

TQ 805/806

D403.251

CIRCUIT DESCRIPTION

INPUT AMPLIFIER AND LIMITER

Transistors Q1, Q2, and Q3 compose a differential input amplifier/limiter, and Q4 is the resonant circuit driver. The received tone signal is amplified the gain being constant and determined by the ratio of R6 to R7. Signal levels higher than the minimum sensitivity (approx. 55 mV) will cause limiting. The tone signal is then applied to the Group Call unit SU808, terminal 2, and to driver Q4. Transistor Q4 operates as current generator with its collector connected to a separate winding on the tone coil. The sensitivity and thus the sequential tone receiver bandwidth is adjustable with R11. The amplifier is inhibited when depressing the Tone Key button causing the 7.5 V RX to be switched off. Less than 100 ms after reverting from the tone transmit mode the unit is ready to receive a call.

RESONANT CIRCUIT

The band pass filter consists of tone coil L1 and capacitor C9. The signal from the input amplifier is coupled to the parallel resonant circuit via the coupling link. The colour coded wires from the tone gates switches the tone coil taps into the circuit in parallel with capacitor C9.

Q-MULTIPLIER, LIMITER, REFERENCE VOLTAGE AND DETECTOR

These circuits consists of Q7, Q8, Q9, Q10, and Q11 and their associated components.

A portion of selected tone signal is fed via the Q-multiplier Q8 back to the coupling link and in phase with the input signal. This increases the bandpass filter Q-factor to approximately 30. Resistors R23 - R50 linearize this factor throughout the band, and the NTC-resistor in the Q8 emitter compensates the Q-factor variations as function of ambient temperature.

The tone signal is rectified by transistor Q11 and the resultant d.c. voltage is applied to Schmitt trigger U1a. Q7 is turned on by U4b when depressing the Tone Key; this increases the feedback so the resonant circuit and Q8, which is the active component, form an oscillator. The signal voltage across the resonant circuit is amplitude limited by Q9 in order to attain a constant signal output level from the oscillator and to reduce the decay time for strong signals. The gate transistor bias and the detector bias are derived from Q10.

OUTPUT AMPLIFIER AND DE-EMPHASIS

The desired frequency characteristic for the oscillator signals is achieved by R16, R17, R18, and C4 which all together have a f_0 of 1000 Hz. The oscillator signals are amplified by Q5 and Q6 the gain being set by an external resistor, R12. The amplifier's supply voltage is taken from +7.5 V TX and is present only when depressing the Tone Key button.

SCHMITT TRIGGER

The Schmitt trigger is built around U1a. Its trigger reference level is determined by voltage divider R30, R31, R32, R33 and controlled by the Q-output of latch U4b. The rectified tone signal increases the d.c. voltage to the inverting input of the comparator, and when the level exceeds the reference voltage the output of U1a changes from 7.2 V to 0 V.

This labile state is determined by the length of the tone and as the d.c. level shifts at U1a's output are applied to its noninverting input via R33 a hysteresis of circa 0.15 V is produced to offset the rectified tone signal ripple.

At the end of the tone the Schmitt trigger reverts to its stable state, its output voltage being 7.2 V. When depressing the Tone Key, U1a is inhibited in its standby state by the Q-output of U4b.

CLOCK DELAY AND CLOCK PULSE GENERATOR

The clock circuits comprise U1b, U1c, transistor Q12 and their auxiliary components. In standby the charge of capacitor C7 is neutral due to discharge through D2 and R15 via latch U4b's Q-output. The clock generator U1c is inhibited in its off position. The Schmitt trigger output in standby, is 7.2 V causing Q12 to be saturated and C6 to be discharged. The reference voltage, which is shared by U1b and U1c, is via voltage divider R37, R38, and R39 applied to the noninverting inputs of the comparators. When the Schmitt trigger is activated Q12 goes off and C6 begins to charge through R35 and R36. The moment the rising voltage of C6 reaches the reference voltage, U1b is triggered and the output voltage falls to 0 V.

The charging time of C6 corresponds to the clock delay and is approximately 17 ms. At the end of the tone C6 again discharges via Q12 and R36. This produces a positive going voltage edge at the U1b output which is applied to the clock inputs of counters U2 and U3 whose outputs switch the circuits to the next tone gate. If the Schmitt trigger detects a new tone the procedure is repeated as previously described.

The Schmitt trigger will, in its inhibited state (Tone Key depressed), hold Q12 saturated and thus U1b off. Contrariwise, the clock generator U1c is released by biasing D2 off. C7 is charged through resistors R40, R41, and R42 until reaching the common reference voltage and the output of U1c falls to 0 V. This d.c. voltage transition is fed, via R39, back to the noniverting input and thus forms a hysteresis to which C7 is discharged. This positive edge is used as clock input to counter U2. The period time is adjusted by means of an external resistor, R49, to be 70 ms in TQ805 and 100 ms in TQ806.

CLEAR DELAY

Comparator U1d is controlled directly by the Schmitt trigger. In standby the charge of C8 is neutral as D1 is reverse biased. The output level of U1d corresponds to the supply voltage, 7,5 V, and counter U3 is cleared and set to the 1st tone gate. Triggering the Schmitt trigger enables C8 to charge via D1 and R44. When the voltage of C8 has fallen to the reference level U1d changes its output to 0 V and releases the counter, U3, which now is ready to receive the clock pulses from the clock delay circuit. The clear delay circuit is built and functions similar to the clock delay but without hysteresis.

The U1d reference level is controlled by U4b's $\bar{Q}$-output which in standby is approximately 7.5 V.
Depressing the Tone Key button causes the reference level to fall to 0 V and U1d is blocked in its standby position, and hence counter U3 is blocked accordingly. As long as the Schmitt trigger is active, D1 will maintain the charge of C8. When the last tone ceases, the Schmitt trigger reverts to standby and D1 is reverse biased. The discharge of C8 is determined by R43 and R44 which within circa 120 ms reduces the charge of the capacitor until it corresponds to the reference level. The U1d output voltage reverts to 7.5 V and clears the counter, U3, after which the 1st tone gate is reengaged, and the tone receiver is ready to receive a new call. As the intervals between the individual tones in a sequential tone call are far less than the above mentioned 120 ms, the clear delay retains its state for this period.

COUNTER AND TONE GATES

Two decimal counters are employed as tone generator pulse counter, U2, and tone receiver pulse counter, U3. The counter outputs directly control the tone gates, Q13 - Q23.

Determined by the clock generator period counter U2's outputs will, consecutively, open gate transistors Q13 to Q17. Their collectors are tied to the tone coil tags. This produces the tones of the sequential tone signal. The first gate transistor connects to the third counter output. For this reason a period of 220 ms elapses in TQ805 and 320 ms in TQ806 corresponding to the three first clock pulses -before generation of the 1st tone. This period may be prolonged by connecting an external capacitor between pin 2 and pin 13 of the counter. The time following the 9th clock pulse is utilized to discharge detector Q11, and the 10th clock pulse is fed via R56 to latch U4b as a "stop" information. In order to hold the gate transistors effectively cut off, their emitters are biased at 4.3 V.

The clear input of U2 controlled by U4's Q-output and hence the counter is inhibited in standby and first released when depressing the Tone Key button.

Counter U3 opens the tone receiver gate transistors, Q19 - Q23. The control signals for the counter are derived from the clock delay, U1b, and the clear delay, U1d, respectively. In standby the counter is inhibited by U1d and the 1st tone gate is opened by "0" output. The mode of operation for counter U3 is similar to that of U2 the clock pulse period corresponding to the received tone pulse length.

Approximately 120 ms after the cessation of the last tone the counter is reset to standby by U1d. All counter outputs of U3 are accessible on the thick film for setting the individual and the group call combinations (see instructions for coding and strapping).

Transistor Q18 is, together with the counter enable input, controlled by U4b's Q-output, which in standby is 0 V. Depressing the Tone Key button blocks the U3 clock input, and at the same time the 1st tone gate is blocked by Q18. The necessary of time to transmit, or receive, a 5-tone sequential signal appears from the time-pulse diagrams.

LATCH, LOUDSPEAKER IN/OUT TONE KEY AND LED BUFFER

As latch for the tone receiver and tone transmitter functions a dual-D-flip-flop, U4, is employed of which U4b is directly controlled by U4a via diodes D7 and D8. A R-S flip-flop, U5a-U5b, avoids that contact bounce in the LS in/out button operate the latch.

After a succesful tone call, or after having manually opened the loudspeaker, the LED buffer, Q26 is engaged.

When applying the supply voltage (7.5 V RX/TX) U4a is forced into position "LS out" by the positive pulse fed to the latch reset input via C14. The call pulse is derived from one of the counter U3's outputs and applied to U4a's set input and, to U4b as a receipt pulse.

After a received tone call U4a remains in position "LS in" until manually reset by depressing the LS in/out button. The tone transmitter latch, U4b, is inhibited in standby via diode D8 and, accordingly, the information from the Tone Key input terminal is short-circuited via D7. To perform a tone call, U4a must thus be toggled manually to reverse bias D7 and D8.

KEY SWITCH, RX/TX GATE, AND MICROPHONE BLOCKING

The key switch driver, Q29, is controlled directly by the Q-output of latch U4b, which in standby is 0 V. When depressing the Tone Key button, Q29 is activated and drives key switch Q27 as well as RC gate transistor Q28 into saturation. Q27 applies the battery voltage to the transmitter and Q28 inhibits the receiver voltage regulator. As U4a must be triggered (LS in) in order to perform the tone-call, the TX gate Q30 is off and the transmitter voltage regulator is enabled along with the battery voltage. The $\bar{Q}$-input of U4b is directly used to block the microphone amplifier. When the last tone ceases counter U2 produces a positive stop pulse to the reset input of U4b after which the circuit reverts to standby, i.e. Q27, Q28, and Q29 are all off.

AA GATE AND SQ BUFFER/INVERTER

The output of AA gate U5c is connected to AA801, and to cancel the blocking, (0 V), U4a must be triggered (LS in) and simultaneously SQ buffer U5d must supply a signal for received carrier (0 V). If the above conditions are met, U5c's output is logic '1', i.e. approximately 7.3 V.

VOLTAGE REGULATOR

The tone unit is supplied from a constant regulated voltage. 7.5 V RX and 7.5 V TX are used as reference and applied to the base of Q25 via diodes D5a and D5b. The short drop outs in the regulated supply voltage, when operating the Transmit button, are eliminated by C12 and R65.

Transistors Q24 and Q25 are coupled to form an amplifier for maintaining the supply voltage, and diode D3 is employed in temperature stabilization. Transistor Q24 connects directly to the battery by-passing the equipment on/off switch.

CODING AND STRAPPING

For TQ805/806 the sequential tone transmitter and sequential tone receiver codes are independant of each other for which reason examples are given separately. Also see notes on the schematic diagram.

The sequential tone receiver is capable of receiving 3, 4, or 5 consecutive tones in decade system in which each digit is represented by a specific tone.

From terminal I a wire is soldered to either terminal 3, 4, or 5 corresponding to 3, 4, and 5-tone calls.

SEQUENTIAL TONE RECEIVER, INDIVIDUAL CALL

The wire colours indicate the order of the tone gates, BN, RD, OR, YW, and GN for the sequential tone transmitter code, BL, VT, GY, WH, and BK for the sequential tone receiver code. Each wire soldered to the tone coil represents one digit of the call number. If the actual call number contains identical digits following each other a repeat tone is used for the latter of the two.

As an example the number 33333 is coded 3R3R3.

When coding 3-tone calls and 4-calls the remaining wires are connected, on the p.c.b., to the last digit.

If the tone transmitter code and the tone receiver code are identical the tone gate wires may be interconnected on the p.c.b. as shown:
Tone transmitter code: 23354 (23R54).
Tone receiver 23543.

		5 - tone call	4 - tone call	3 - tone call
Blue wire	1st tone	1st digit	1st digit	1st digit
Violet wire	2nd tone	2nd digit	2nd digit	2nd digit
Gray wire	3rd tone	3rd digit	3rd digit	3rd digit
White wire	4th tone	4th digit	4th digit	3rd digit
Black wire	5th tone	5th digit	4th digit	3rd digit

GROUP DIGIT CODING

TQ805/806 can accomodate a group call unit, SU808, designed for group calls with 1 digit. A connection between terminal G and terminal 2, 3, or 4 allows group calls with 1 group call tone on the 3rd tone, 4th tone or 5th tone. For code combinations and their limitations see Coding of SU808.

TONE COIL

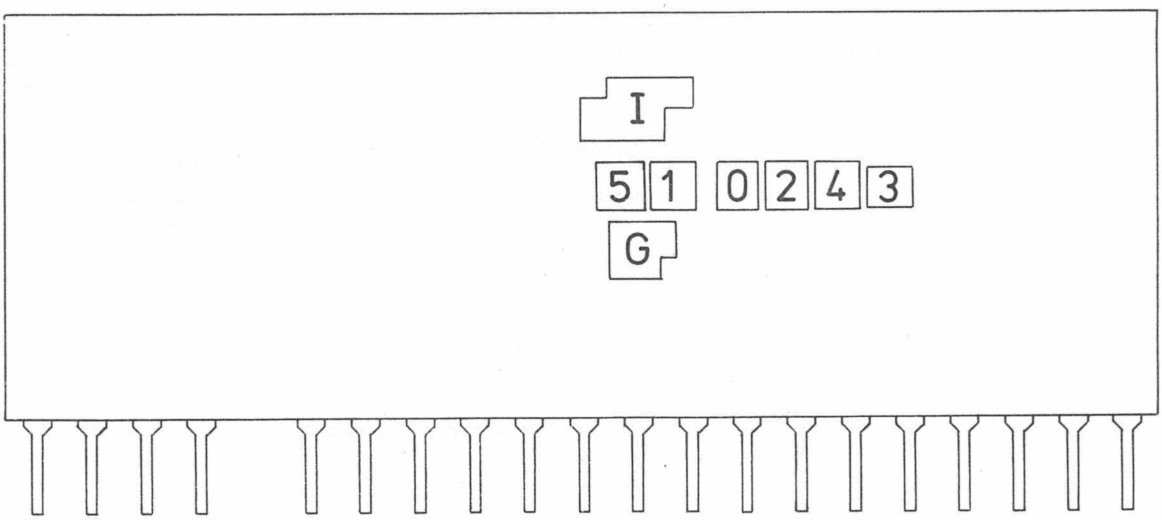
Terminal numbers on the coil tags and their relating digits and frequencies appear from the table:

Terminal	Digit	TQ805 ZVEI	TQ806 CCIR
		Frequency Hz	
1	X	855	960
2	Y	970	1022
3	1	1060	1124
4	2	1160	1197
5	3	1270	1275
6	4	1400	1358
7	5	1530	1446
8	6	1670	1540
9	7	1830	1640
10	8	2000	1747
11	9	2200	1860
12	0	2400	1981
13	R	2600	2110
14	A	2800	

R = Repeat

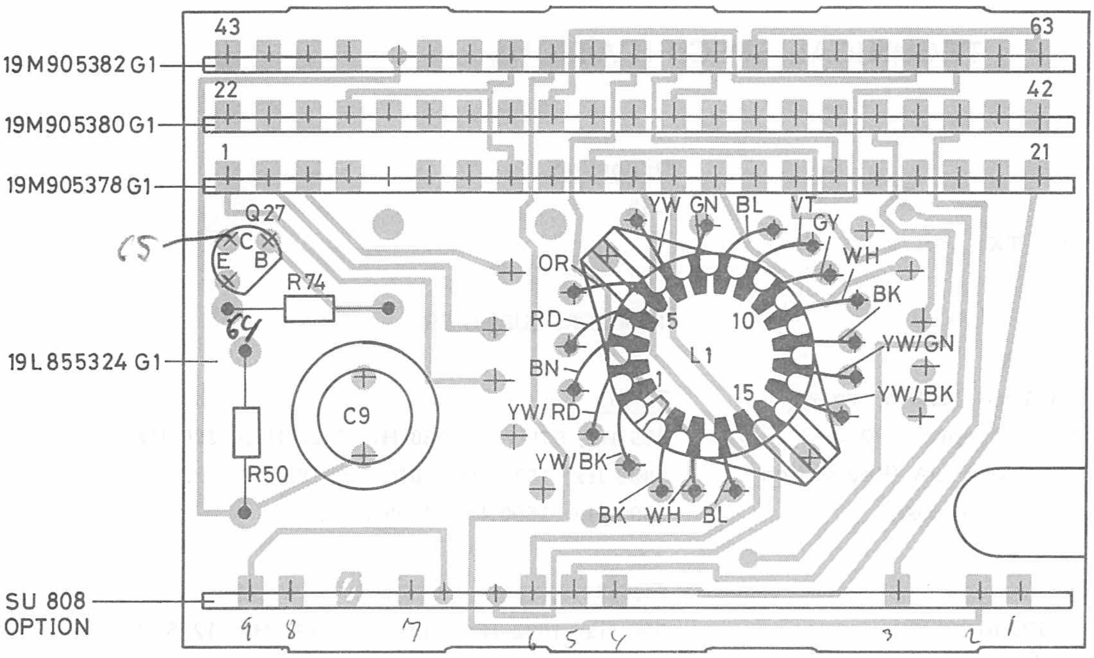
A = Alarm

X and Y: Special tones, used for A and R in 12.5 kHz channel spacing equipment.



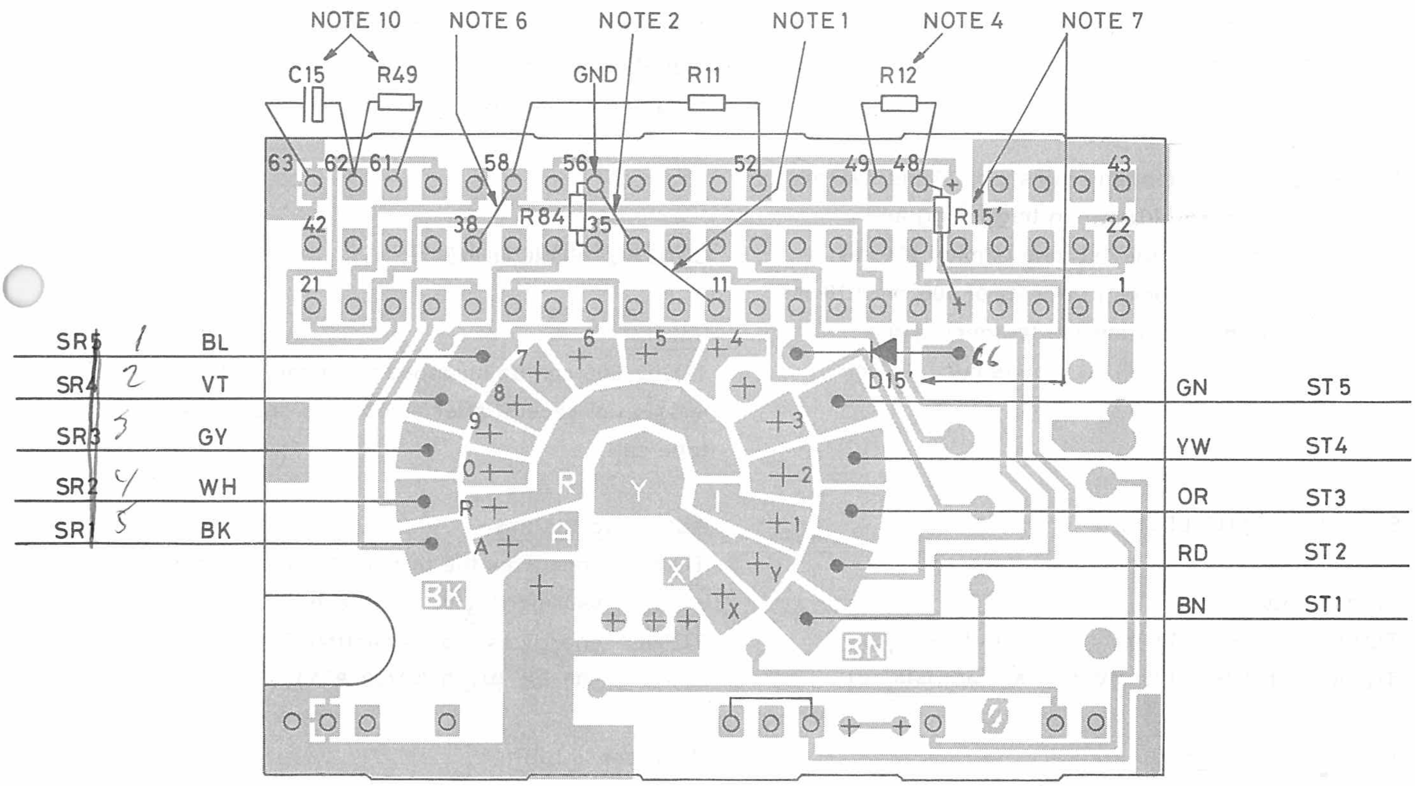
SEQUENTIAL TONE MODULE
CODING TQ805/806
D403.277

 60.616-E1



SEQUENTIAL TONE MODULE
ENCODER/DECODER TQ805/806
COMPONENT LAYOUT

D403.265



SEQUENTIAL TONE MODULE
CODING TQ805/806

D403.276

TECHNICAL SPECIFICATIONS

Supply Voltage

Battery: 9-13.5 V

Regulated: 7.5 V ±2% (RX-TX)

Current Drain

Standby: <3 mA

Engaged (LED): <3.5 mA (LED drive at 11.3 V approx. 12 mA)

Engaged (KEY): approx. 9 mA (Key switch approx. 43 mA).

Temperature Range

Working range: -25°C to +60°C

Functioning range: -30°C to +70°C

SEQUENTIAL TONE TRANSMITTER

Output Impedance

<200 ohm

Load Impedance

≥2 Kohm//10 nF

Output Signal

TQ805: 3, 4, or 5 tones in bursts of 70 ms ±15 ms
The interval between triggering and emission of the 1st tone is min. 200 ms.

TQ806: 3, 4, or 5 tones in bursts of 100 ms ±10 ms
The interval between triggering and emission of the 1st tone is min. 300 ms.

SIGNAL OUTPUT LEVEL

Signal voltage

TQ805 970 Hz: 112 mV r.m.s. (adjustable)

TQ806 1022 Hz: 109 mV r.m.s. (adjustable)

Frequency response

De-emphasis according to an RC-function with f_c = 1000 Hz

Tolerance

±1 dB

Distortion

<3%

TONE FREQUENCIES

TQ805

855 Hz, 970 Hz, 1060 Hz, 1160 Hz, 1270 Hz, 1400 Hz, 1530 Hz, 1670 Hz, 1830 Hz, 2200 Hz, 2400 Hz, 2600 Hz, 2800 Hz.

TQ806

960 Hz, 1022 Hz, 1124 Hz, 1197 Hz, 1275 Hz, 1358 Hz, 1446 Hz, 1540 Hz, 1640 Hz, 1747 Hz, 1860 Hz, 1981 Hz, 2110 Hz.

FREQUENCY ACCURACY

Typical deviation (2 δ)	: 1%
Maximum deviation	: 1.4%
Relative frequency accuracy	: 0.3%
Adjustment accuracy	: 0.1%
Frequency stability	: 1%

CONTROL FUNCTIONS

Receipt

TQ805/806 can be strapped to automatic transmission of receipt after a received sequential tone call.

Automatic keying

TQ805: energizes the transmitter for approx. 640 ms (V_B 0.4 V/0.8 A).

TQ806: energizes the transmitter for approx. 900 ms (V_B 0.4 V/0.8 A).

Receiver inhibit

Chassis connection for receiver inhibit (0.1 V/1 mA).

Microphone inhibit

Chassis connection for microphone amplifier inhibit (0.5 V/0.5 mA)

SEQUENTIAL TONE RECEIVER

Input Impedance

>30 Kohm: DC isolation

Generator impedance

<600 ohm

Input Response

De-emphasis according to an RC-function with f_c = 2900 Hz.

Signalling Code

3, 4, 5 tone bursts of min. 55 ms duration.

Activation Level

110 mV ±6 dB

Distortion

The TQ805/806 can process tone signals having 20% distortion.

TONE FREQUENCIES

TQ805

855 Hz, 970 Hz, 1060 Hz, 1160 Hz, 1270 Hz, 1400 Hz, 1530 Hz, 1670 Hz, 1830 Hz, 2200 Hz, 2400 Hz, 2600 Hz, 2800 Hz.

TQ806

960 Hz, 1022 Hz, 1124 Hz, 1197 Hz, 1275 Hz, 1358 Hz, 1446 Hz, 1540 Hz, 1640 Hz, 1747 Hz, 1860 Hz, 1981 Hz, 2110 Hz.

Frequency Accuracy

±0.3%

Selectivity

The Tone Receiver responds to tones with a frequency deviation ≤1.4%.
The Tone Receiver is not sensitive to adjacent tones or other tones of the same standard series.

Reset Time

<140 ms

>90 ms

Reaction Time

<45 ms

>20 ms

Signal to Noise Conditions

The Tone Receiver will accept a noise level corresponding to SINAD = 5 dB as measured in the speech channel of the CQP800.

OUTPUT FUNCTIONS

A successful call produces the following output signals:

1. Optical Indicator Control Signal
   Chassis connection for LED, continuously.
   0.5 V/16 mA.
2. Cancel AF Blocking.
   6.0 V to 13.5 V, squelch controlled.
3. Cancel Key Blocking
   0 V to 13.5 V: R_i > 1 Mohm
4. Auto receipt
   ≥7.0 V: I max. = 0.5 mA for 90 - 140 ms.

Manual activation of the TQ (LS in) establishes the output function as above except the Auto Receipt.

Switching the LS off produces the following output signals:

1. The optical call indication is cancelled;
   R_i <1 Mohm
2. Key blocking signal: ≤ 0.3 VDC; I max. = 0.5 mA
3. AF blocking signal: ≤ 0.4 VDC; I max. = 0.25 mA

Dimensions

Width: 40 mm

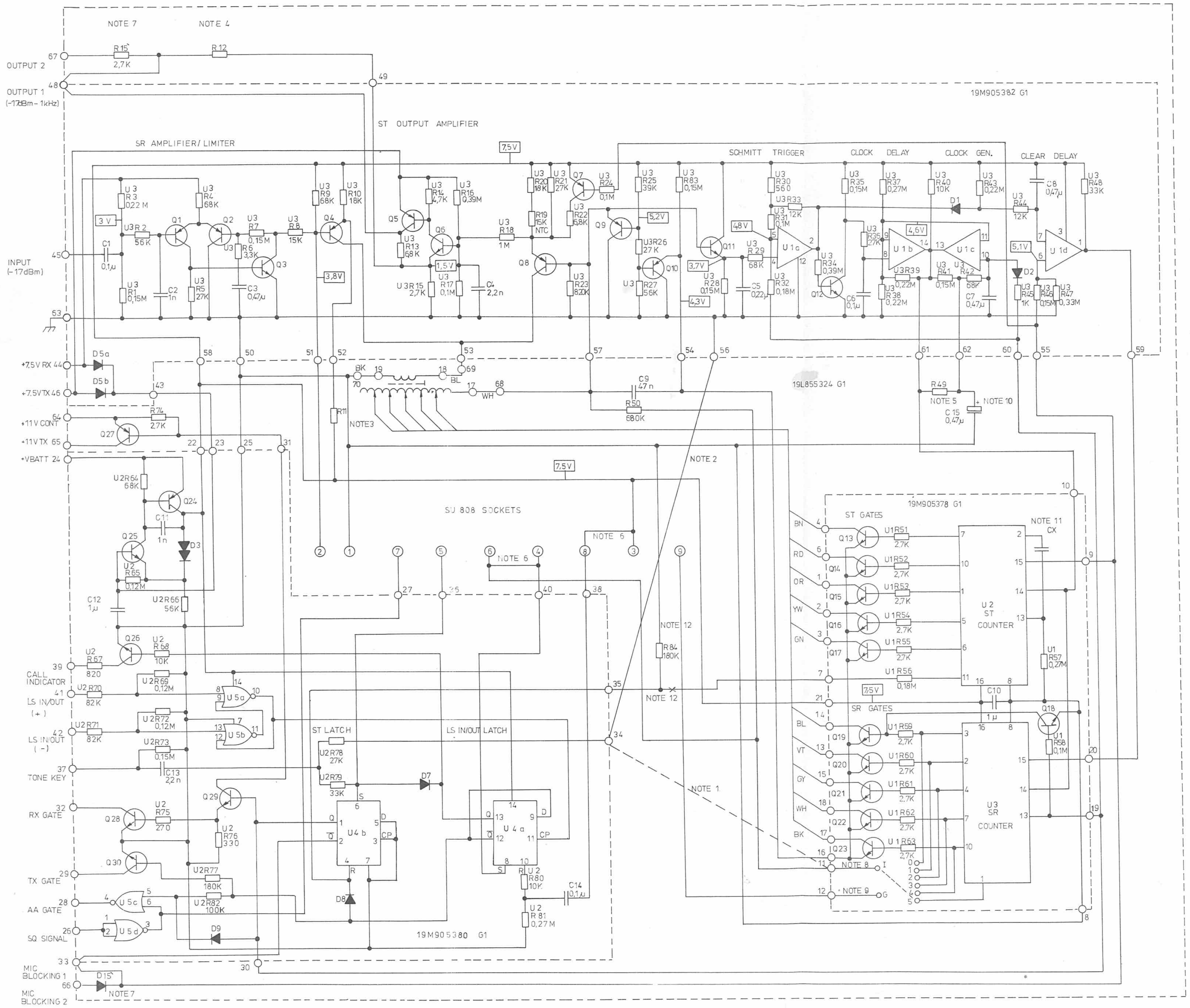
Length: 55 mm

Height: 21 mm

Weight

60 g

Storno



NOTES:

1: SHORTED FOR AUTO RECEIPT
2: OPEN FOR AUTO RECEIPT
3: BANDWITH ADJUST
4: OUTPUT ADJUST
5: TONELENGTH ADJUST
6: REMOVE WITH GROUP CALL
7: R15` AND D15` ARE ONLY TO BE MOUNTED FOR TOUCH TONE EQUIPMENT.
8: SEQUENCE CALL.
INDV. 3: 3-TONE SEQUENCE CALL
INDV. 4: 4 TONE SEQUENCE CALL
INDV. 5: 5 TONE SEQUENCE CALL
9: SHORTED FOR GROUP CALL.
GR. 2: GROUP CALL ON 3 RD. DIGIT.
GR. 3: GROUP CALL ON 4 TH. DIGIT.
GR. 4: GROUP CALL ON 5 TH. DIGIT.
10: FOR ALTERING THE TQ TO A COMBINED 5 TONE SEQUENTAL TONE RECEIVER AND SINGLE TONE TRANSMITTER, MOUNT C15 AND REMOVE R49, SEE DESCRIPTION.
11: TO PROLONG THE TIME BETWEEN ACTIVATING TQ AND GENERATION OF THE FIRST TONE, MOUNT AN EXTRA CAPACITOR CX.
12: FOR CONTINOUS REPEAT OF SEQUENTAL TONESIGNAL, MOUNT R84 AND REMOVE THE CONDUCTOR BETWEEN TERMINAL 35 AND 7 ON MOTHERBOARD.

TERM. NO.	DIGIT	TQ 805 Hz	TQ 806 CCIR Hz
1	X	885	960
2	Y	970	1022
3	1	1060	1124
4	2	1160	1197
5	3	1270	1275
6	4	1400	1358
7	5	1530	1446
8	6	1670	1540
9	7	1830	1640
10	8	2000	1747
11	9	2200	1860
12	0	2400	1981
13	REPEAT	2600	2110
14	A	2800	

SEQUENTIAL TONE MODULE ENCODER/DECODER TQ805/806

D403.252

TITLE		CODE
CQP800	Reference Guide	60.287-E1
CQP800U	Reference Guide	60.396-E1
CQP800-IS	Reference Guide	60.288-E1
CQP810	Parts List	X402.341
CQP830	Parts List	X402.342
CQP860	Parts List	X402.343
CQP810/ 810U	Modification Kit	60.383-E1
	Parts List	X402.583
CQP830/ 830U	Modification Kit	60.384-E1
	Parts List	X402.584
CQP860/ 860U	Modification Kit	60.385-E1
CQP810U	Parts List	X402.583
CQP830U	Parts List	X402.584
CQP860U	Parts List	X402.585
CQP810U-IS 0,2W	Parts List	X402.705
CQP830U-IS 0,2W	Parts List	X402.709
CQP860U-IS 0.2W	Parts List	X402.692
CQP810U-IS 1W	Parts List	X402.704
CQP830U-IS 1W	Parts List	X402.708
CQP860U-IS 1W	Parts List	X402.693
CQP8141(3)xC9x4TQ	Parts List	X402.706
CQP810IS	Parts List	X402.401
CQP830IS	Parts List	X402.402
CQP860IS	Parts List	X402.403
CQP800	System Layout	D401.726
CQP810, CQP830	Module Location	D402.074
CQP810U, CQP830U	Module Location	D402.579
CQP860	Module Location	D402.075/2
CQP860U	Module Location	D402.578
CQP810, CQP830	Pin Location	D402.068
CQP810U, CQP830U	Pin Location	D402.473
CQP814C7x2TQ	Pin Location	D402.279/2
CQP860	Pin Location	D402.069
CQP860U	Pin Location	D402.474

TITLE		CODE
CQP810,		
CQP830	Wiring Diagram	D402.073/2
CQP814C7x2TQ	Wiring Diagram	D402.272/2
CQP8141C9x4TQ	Wiring Diagram	D402.699
	Component Layout	D402.700
	Pin Location	D402.698
CQP810U,		
CQP830U	Wiring Diagram	D402.471/4
CQP860	Wiring Diagram	D402.072/2
CQP860U	Wiring Diagram	D402.470/2
CH803/	Schematic Diagram	D402.665
CH806	Wiring Diagram	D402.070
CQP800	Tone Equipment	D402.141
CQP800U	Tone Equipment	D402.472
CQP800U	Tone Equipment	D402.561
CQP800-IS	Tone Equipment	D402.701
CRP810/		
830	Wiring without SR	D402.235/2
CRP810/		
830	Wiring	D402.236/2
CRP860	Wiring	D402.391/2
CP801	Wiring Diagram	D402.071/3
	Parts List	X402.267
CP801IS	Part List	X402.400
CP802	Schematic Diagram	D402.026
	Parts List	X402.101
	Wiring Diagram	D402.133
CP802IS	Schematic Diagram	D402.358
	Parts List	X402.399
CP807	Schematic Diagram	D402.170/3
CP808	Schematic Diagram	D402.595
	Parts List	X402.575
CP808-IS	Schematic Diagram	D402.726

TITLE		CODE
CB801	Schematic Diagram	D402.607
CB801-IS	Schematic Diagram	D402.638
CB802	Schematic Diagram	D402.025/4
	Parts List	X402.376
CB802-IS	Schematic Diagram	D402.359
	Parts List	X402.380
CB803	Schematic Diagram	D402.168/3
	Parts List	X402.377
CB804	Schematic Diagram	D402.525/2
	Parts List	X402.564
CB805	Schematic Diagram	D402.526/2
	Parts List	X402.565
CB811	Schematic Diagram	D402.169/5
	Parts List	X402.260
CB812	Schematic Diagram	D402.528
	Parts List	X402.566
CB831	Schematic Diagram	D402.529
	Parts List	X402.567
CB861	Schematic Diagram	D402.530
	Parts List	X402.568
CU801	Schematic Diagram	D401.971
CU802	Schematic Diagram	D401.960
	Parts List	X402.102
	Wiring Diagram	D402.281
CU801/2	Component Layout	D402.278
CU803	Schematic Diagram	D402.405
	Parts List	X402.435
CU804	Schematic Diagram	D402.252
	Parts List	X402.436
CU805	Schematic Diagram	D402.160
	Parts List	X402.437
CU806	Schematic Diagram	D402.711
	Parts list	X402.712

TITLE		CODE
LS801	Schematic Diagram	D402.423/1
	Parts List	X402.432
	Mobile Adapter	M405.073/2+d402.439/3
MN801	Schematic Diagram	D402.362
	Parts List	X402.433
MN802	Parts List	X402.826
MN803	Schematic Diagram	D402.593/2
MN803	Installation	D402.600/1
MN804	Installation	402.599/2
MN804-S1	Installation	D402.697
CQP813/814	Schematic Diagram	D401.968
CQP833/834	Schematic Diagram	D402.067
CQP863	Schematic Diagram	D402.094
CQP810IS	Schematic Diagram	D402.114
CQP830IS	Schematic Diagram	D402.115
CQP860IS	Schematic Diagram	D402.116
CQP810U	Schematic Diagram	D402.462
CQP830U	Schematic Diagram	D402.534
CQP853U	Schematic Diagram	D402.686
CQP860U	Schematic Diagram	D402.536
CQP810U-IS 0,2W	Schematic Diagram	D402.655
CQP810U-IS 1W	Schematic Diagram	D402.626/2
CQP830U-IS 0,2W	Schematic Diagram	D402.654
CQP830U-IS 1W	Schematic Diagram	D402.634/2
CQP863U-IS 0,2W	Schematic Diagram	D402.656
CQP863U-IS 1W	Schematic Diagram	D402.625/2
CQP810U/3W	Schematic Diagram	D402.551
CQP830U/3W	Schematic Diagram	D402.552
CQP860U/3W	Schematic Diagram	D402.553
CRP810	Schematic Diagram	D402.356/2
CRP830	Schematic Diagram	D402.230/2
CRP860	Schematic Diagram	D402.355/2

TITLE		CODE
RF864	Wiring Diagram	D402.723/1
RF865	Schematic Diagram	D402.480
	Wiring Diagram	D402.590
RX8063	Schematic Diagram	D402.478
TX8603		
0.1W	Schematic Diagram	D402.475
TX8603		
0.015W	Schematic Diagram	D402.476
CTP810	Block Diagram	D402.457
	Schematic Diagram	D402.454
CTP830	Block Diagram	D402.458
	Schematic Diagram	D402.455
CTP863-S2	Block Diagram	D402.138
	Schematic Diagram	D402.092

Storno

	CABINET		CABLEFORMS					CONTROL HEAD		OSCILLATOR CHASSIS		MODULE CHASSIS	
	Type	Code No.	CP-RF Code No.	Coax Ant. Code No.	Tone Code No.	Channel Code No.	Coax. chan. Code No.	Type	Code No.	Type	Code No.	Type	Code No.
CQP810 C1x 2	CA801- 82	10.2890-16	18.0749-00	18.0758-04		18.0743-00	18.0758-01	CP801	10.2837-00	CH803	10.2710-00	CH801	10.2835-00
- C1x 4	CA801- 90	10.2890-18	18.0749-00	18.0758-05		18.0746-00	18.0758-01	CP801	10.2837-00	CH804	10.2711-00	CH801	10.2835-00
- C1x 8	CA801-102	10.2890-21	18.0750-00	18.0758-12		18.0786-00	18.0758-01	CP801	10.2837-00	CH805	10.2712-00	CH801	10.2835-00
- C1x12	CA801-118	10.2890-25	18.0750-00	18.0758-13		18.0787-00	18.0758-01	CP801	10.2837-00	CH806	10.2713-00	CH801	10.2835-00
- C1x 2T	CA801-122	10.2890-26	18.0751-00	18.0758-04	18.0801-00	18.0748-00	18.0758-01	CP801	10.2837-00	CH803	10.2710-00	CH801	10.2835-00
- C1x 4T	CA801-130	10.2890-28	18.0751-00	18.0758-05	18.0744-00	18.0748-00	18.0758-01	CP801	10.2837-00	CH804	10.2711-00	CH801	10.2835-00
- C1x 8T	CA801-142	10.2890-31	18.0752-00	18.0758-12	18.0745-00	18.0748-00	18.0758-01	CP801	10.2837-00	CH805	10.2712-00	CH801	10.2835-00
- C1x12T	CA801-158	10.2890-35	18.0752-00	18.0758-13	18.0747-00	18.0802-00	18.0758-01	CP801	10.2837-00	CH806	10.2713-00	CH801	10.2835-00
- C2x 2	CA801- 82	10.2890-16	18.0749-00	18.0758-04		18.0743-00	18.0758-01	CP802	10.2967-00	CH803	10.2710-00	CH801	10.2835-00
- C2x 4	CA801- 90	10.2890-18	18.0749-00	18.0758-05		18.0746-00	18.0758-01	CP802	10.2967-00	CH804	10.2711-00	CH801	10.2835-00
- C2x 8	CA801-102	10.2890-21	18.0750-00	18.0758-12		18.0786-00	18.0758-01	CP802	10.2967-00	CH805	10.2712-00	CH801	10.2835-00
- C2x12	CA801-118	10.2890-25	18.0750-00	18.0758-13		18.0787-00	18.0758-01	CP802	10.2967-00	CH806	10.2713-00	CH801	10.2835-00
- C2x 2T	CA801-122	10.2890-26	18.0751-00	18.0758-04	18.0801-00	18.0748-00	18.0758-01	CP802	10.2967-00	CH803	10.2710-00	CH801	10.2835-00
- C2x 4T	CA801-130	10.2890-28	18.0751-00	18.0758-05	18.0744-00	18.0748-00	18.0758-01	CP802	10.2967-00	CH804	10.2711-00	CH801	10.2835-00
- C2x 8T	CA801-142	10.2890-31	18.0752-00	18.0758-12	18.0745-00	18.0748-00	18.0758-01	CP802	10.2967-00	CH805	10.2712-00	CH801	10.2835-00
- C2x12T	CA801-158	10.2890-35	18.0752-00	18.0758-13	18.0747-00	18.0802-00	18.0758-01	CP802	10.2967-00	CH806	10.2713-00	CH801	10.2835-00
CQP830 C1x 2	CA801- 82	10.2890-16	18.0749-00	18.0758-04		18.0743-00	18.0758-01	CP801	10.2837-00	CH803	10.2710-00	CH801	10.2835-00
- C1x 4	CA801- 90	10.2890-18	18.0749-00	18.0758-05		18.0743-00	18.0758-01	CP801	10.2837-00	CH804	10.2711-00	CH801	10.2835-00
- C1x 8	CA801-102	10.2890-21	18.0750-00	18.0758-12		18.0786-00	18.0758-01	CP801	10.2837-00	CH805	10.2712-00	CH801	10.2835-00
- C1x12	CA801-118	10.2890-25	18.0750-00	18.0758-13		18.0787-00	18.0758-01	CP801	10.2837-00	CH806	10.2713-00	CH801	10.2835-00
- C1x 2T	CA801-122	10.2890-26	18.0751-00	18.0758-04	18.0801-00	18.0748-00	18.0758-01	CP801	10.2837-00	CH803	10.2710-00	CH801	10.2835-00
- C1x 4T	CA801-130	10.2890-28	18.0751-00	18.0758-05	18.0744-00	18.0748-00	18.0758-01	CP801	10.2837-00	CH804	10.2711-00	CH801	10.2835-00
- C1x 8T	CA801-142	10.2890-31	18.0752-00	18.0758-12	18.0745-00	18.0748-00	18.0758-01	CP801	10.2837-00	CH805	10.2712-00	CH801	10.2835-00
- C1x12T	CA801-158	10.2890-35	18.0752-00	18.0758-13	18.0747-00	18.0802-00	18.0758-01	CP801	10.2837-00	CH806	10.2713-00	CH801	10.2835-00
- C2x 2	CA801- 82	10.2890-16	18.0749-00	18.0758-04		18.0743-00	18.0758-01	CP802	10.2967-00	CH803	10.2710-00	CH801	10.2835-00
- C2x 4	CA801- 90	10.2890-18	18.0749-00	18.0758-05		18.0746-00	18.0758-01	CP802	10.2967-00	CH804	10.2711-00	CH801	10.2835-00
- C2x 8	CA801-102	10.2890-21	18.0750-00	18.0758-12		18.0786-00	18.0758-01	CP802	10.2967-00	CH805	10.2712-00	CH801	10.2835-00
- C2x12	CA801-118	10.2890-25	18.0750-00	18.0758-13		18.0787-00	18.0758.01	CP802	10.2967-00	CH806	10.2713-00	CH801	10.2835-00
- C2x 2T	CA801-122	10.2890-26	18.0751-00	18.0758-04	18.0801-00	18.0748-00	18.0758-01	CP802	10.2967-00	CH803	10.2710-00	CH801	10.2835-00
- C2x 4T	CA801-130	10.2890-28	18.0751-00	18.0758-05	18.0744-00	18.0748-00	18.0758-01	CP802	10.2967-00	CH804	10.2711-00	CH801	10.2835-00
- C2x 8T	CA801-142	10.2890-31	18.0752-00	18.0758-12	18.0745-00	18.0748-00	18.0758-01	CP802	10.2967-00	CH805	10.2712-00	CH801	10.2835-00
- C2x12T	CA801-158	10.2890-35	18.0752-00	18.0758-13	18.0747-00	18.0802-00	18.0758-01	CP802	10.2967-00	CH806	10.2713-00	CH801	10.2835-00
CQP860 C1x 2	CA801- 94	10.2890-19	18.0749-00	18.0758-06		18.0743-00	18.0758-16	CP801	10.2837-00	CH803	10.2710-00	CH802	10.2836-00
- C1x 4	CA801-102	10.2890-21	18.0750-00	18.0758-07		18.0746-00	18.0758-16	CP801	10.2837-00	CH804	10.2711-00	CH802	10.2836-00
- C1x 8	CA801-114	10.2890-24	18.0750-00	18.0758-14		18.0786-00	18.0758-16	CP801	10.2837-00	CH805	10.2712-00	CH802	10.2836-00
- C1x12	CA801-130	10.2890-28	18.0751-00	18.0758-15		18.0787-00	18.0758-16	CP801	10.2837-00	CH806	10.2713-00	CH802	10.2836-00
- C1x 2T	CA801-134	10.2890-29	18.0751-00	18.0758-06	18.0801-00	18.0748-00	18.0758-16	CP801	10.2837-00	CH803	10.2710-00	CH802	10.2836-00
- C1x 4T	CA801-142	10.2890-31	18.0752-00	18.0758-07	18.0744-00	18.0748-00	18.0758-16	CP801	10.2837-00	CH804	10.2711-00	CH802	10.2836-00
- C1x 8T	CA801-154	10.2890-34	18.0752-00	18.0758-14	18.0745-00	18.0802-00	18.0758-16	CP801	10.2837-00	CH805	10.2712-00	CH802	10.2836-00
- C1x12T	CA801-170	10.2890-38	18.0753-00	18.0758-15	18.0747-00	18.0802-00	18.0758-16	CP801	10.2837-00	CH806	10.2713-00	CH802	10.2836-00
- C2x 2	CA801- 94	10.2890-19	18.0749-00	18.0758-06		18.0743-00	18.0758-16	CP802	10.2967-00	CH803	10.2710-00	CH802	10.2836-00
- C2x 4	CA801-102	10.2890-21	18.0750-00	18.0758-07		18.0746-00	18.0758-16	CP802	10.2967-00	CH804	10.2711-00	CH802	10.2836-00
- C2x 8	CA801-114	10.2890-24	18.0750-00	18.0758-14		18.0786-00	18.0758-16	CP802	10.2967-00	CH805	10.2712-00	CH802	10.2836-00
- C2x12	CA801-130	10.2890-28	18.0751-00	18.0758-15		18.0787-00	18.0758-16	CP802	10.2967-00	CH806	10.2713-00	CH802	10.2836-00
- C2x 2T	CA801-134	10.2890-29	18.0751-00	18.0758-06	18.0801-00	18.0748-00	18.0758-16	CP802	10.2967-00	CH803	10.2710-00	CH802	10.2836-00
- C2x 4T	CA801-142	10.2890-31	18.0752-00	18.0758-07	18.0744-00	18.0748-00	18.0758-16	CP802	10.2967-00	CH804	10.2711-00	CH802	10.2836-00
- C2x 8T	CA801-154	10.2890-34	18.0752-00	18.0758-14	18.0745-00	18.0802-00	18.0758-16	CP802	10.2967-00	CH805	10.2712-00	CH802	10.2836-00
- C2x12T	CA801-170	10.2890-38	18.0753-00	18.0758-15	18.0747-00	18.0802-00	18.0758-16	CP802	10.2967-00	CH806	10.2713-00	CH802	10.2836-00

	CABINET		CABLEFORMS KIT	OSCILLATOR	CHASSIS	RECEIVER	TRANSMITTER
	Type	Code No.	Code No.	Type	Code No.	MODULE CHASSIS	MODULE CHASSIS 1W + 3W
CQP 810U 1C8X2	CA 802-82	10.3600-16	18.0874-00	CH 803	10.2710-00	10.3228-00	10.3505-00
CQP 810U 1C8X4	CA 802-90	10.3600-18	18.0875-00	CH 804	10.2711-00	10.3228-00	10.3505-00
CQP 810U 1C8X8	CA 802-102	10.3600-21	18.0876-00	CH 805	10.2712-00	10.3228-00	10.3505-00
CQP 810U 1C8X12	CA 802-118	10.3600-25	18.0877-00	CH 806	10.2713-00	10.3228-00	10.3505-00
CQP 810U 1C8X2T	CA 802-122	10.3600-26	18.0878-00	CH 803	10.2710-00	10.3228-00	10.3505-00
CQP 810U 1C8X4T	CA 802-130	10.3600-28	18.0879-00	CH 804	10.2711-00	10.3228-00	10.3505-00
CQP 810U 1C8X8T	CA 802-142	10.3600-31	18.0880-00	CH 805	10.2712-00	10.3228-00	10.3505-00
CQP 810U 1C8X12T	CA 802-158	10.3600-35	18.0881-00	CH 806	10.2713-00	10.3228-00	10.3505-00
CQP 830U 1C8X2	CA 802-82	10.3600-16	18.0874-00	CH 803	10.2710-00	10.3228-00	10.3505-00
CQP 830U 1C8X4	CA 802-90	10.3600-18	18.0875-00	CH 804	10.2711-00	10.3228-00	10.3505-00
CQP 830U 1C8X8	CA 802-102	10.3600-21	18.0676-00	CH 805	10.2712-00	10.3228-00	10.3505-00
CQP 830U 1C8X12	CA 802-118	10.3600-25	18.0877-00	CH 806	10.2713-00	10.3228-00	10.3505-00
CQP 830U 1C8X2T	CA 802-122	10.3600-26	18.0878-00	CH 803	10.2710-00	10.3228-00	10.3505-00
CQP 830U 1C8X4T	CA 802-130	10.3600-28	18.0879-00	CH 804	10.2711-00	10.3228-00	10.3505-00
CQP 830U 1C8X8T	CA 802-142	10.3600-31	18.0880-00	CH 805	10.2712-00	10.3228-00	10.3505-00
CQP 830U 1C8X12T	CA 802-158	10.3600-35	18.0881-00	CH 806	10.2713-00	10.3228-00	10.3505-00
CQP 860U 1C8X2	CA 802-94	10.3600-19	18.0884-00	CH 803	10.2710-00	10.3230-00	10.3505-00
CQP 860U 1C8X4	CA 802-102	10.3600-21	18.0885-00	CH 804	10.2711-00	10.3230-00	10.3505-00
CQP 860U 1C8X8	CA 802-114	10.3600-24	18.0886-00	CH 805	10.2712-00	10.3230-00	10.3505-00
CQP 860U 1C8X12	CA 802-130	10.3600-28	18.0887-00	CH 806	10.2713-00	10.3230-00	10.3505-00
CQP 860U 1C8X2T	CA 802-134	10.3600-29	18.0888-00	CH 803	10.2710-00	10.3230-00	10.3505-00
CQP 860U 1C8X4T	CA 802-142	10.3600-31	18.0889-00	CH 804	10.2711-00	10.3230-00	10.3505-00
CQP 860U 1C8X8T	CA 802-154	10.3600-34	18.0890-00	CH 805	10.2712-00	10.3230-00	10.3505-00
CQP 860U 1C8X12T	CA 802-170	10.3600-38	18.0891-00	CH 806	10.2713-00	10.3230-00	10.3505-00

			Cabinets														RF814-IS + RF813-IS 10.3345 10.3344	RF834-IS + RF833-IS 10.3347 10.3346	RF863-IS 10.3348	CH803 10.2710	CH804 10.2711	CH805 10.2712	CH806 10.2713	CP801-IS 10.3349	CP802-IS 10.3350	BATTERY LOCK 17.0084	2 × Dummy Chassis 20 11.0991
			102890-16	102890-18	102890-19	102890-21	102890-24	102890-25	102890-26	102890-27	102890-28	102890-29	102890-31	102890-34	102890-35	102890-38											
CQP813 + CQP814	C1 × 2	SI	×														×			×				×		×	
-	C1 × 4	-		×													×				×			×		×	
-	C1 × 8	-				×											×					×		×		×	
-	C1 × 12	-						×									×						×	×		×	
-	C2 × 2	IS	×														×			×					×	×	
-	C2 × 4	-		×													×				×				×	×	
-	C2 × 8	-				×											×					×			×	×	
-	C2 × 12	-						×									×						×		×	×	
-	C1 × 2T	IS							×								×			×				×		×	×
-	C1 × 4T	-									×						×				×			×		×	×
-	C1 × 8T	-											×				×					×		×		×	×
-	C1 × 12T	-													×		×						×	×		×	×
-	C2 × 2T	IS							×								×			×					×	×	×
-	C2 × 4T	-									×						×				×				×	×	×
-	C2 × 8T	-											×				×					×			×	×	×
-	C2 × 12T	-													×		×						×		×	×	×
CQP833 + CQP834	C1 × 2	IS	×															×		×				×		×	
-	C1 × 4	-		×														×			×			×		×	
-	C1 × 8	-				×												×				×		×		×	
-	C1 × 12	-						×										×					×	×		×	
-	C2 × 2	IS	×															×		×					×	×	
-	C2 × 4	-		×														×			×				×	×	
-	C2 × 8	-				×												×				×			×	×	
-	C2 × 12	-						×										×					×		×	×	
-	C1 × 2T	IS							×									×		×				×		×	×
-	C1 × 4T	-									×							×			×			×		×	×
-	C1 × 8T	-											×					×				×		×		×	×
-	C1 × 12T	-													×			×					×	×		×	×
-	C2 × 2T	IS							×									×		×					×	×	×
-	C2 × 4T	-									×							×			×				×	×	×
-	C2 × 8T	-											×					×				×			×	×	×
-	C2 × 12T	-													×			×					×		×	×	×
CQP863	C1 × 2	IS			×														×	×				×		×	
-	C1 × 4	-				×													×		×			×		×	
-	C1 × 8	-					×												×			×		×		×	
-	C1 × 12	-									×								×				×	×		×	
-	C2 × 2	IS			×														×	×					×	×	
-	C2 × 4	-				×													×		×				×	×	
-	C2 × 8	-					×												×			×			×	×	
-	C2 × 12	-									×								×				×		×	×	
-	C1 × 2T	IS								×									×	×				×		×	×
-	C1 × 4T	-											×						×		×			×		×	×
-	C1 × 8T	-												×					×			×		×		×	×
-	C1 × 12T	-														×			×				×	×		×	×
-	C2 × 2T	IS								×									×	×					×	×	×
-	C2 × 4T	-											×						×		×				×	×	×
-	C2 × 8T	-												×					×			×			×	×	×
-	C2 × 12T	-														×			×				×		×	×	×

STORNOPHONE 800-IS
INTRINSICALLY SAFE
REFERENCE GUIDE

60.288-E1

TYPE	Nº	CODE	DATA
			Modules
		10.2687	AA801 Audio amplifier
		10.2688	AA802 Audio amplifier
		10.2691	AD801 Automatic drive control
		10.2680	BP811 Band pass filter
		10.2835	CH801 Chassis assembly
		10.2677	FD811 Frequency doubler
		10.2678	FD812 Frequency doubler
		10.2679	FD813 Frequency doubler
813		10.2694	FN803 Filter network
814		10.2695	FN804 Filter network
		10.2685	IA801 IF-amplifier
		10.2808	IA802 IF-amplifier/discriminator
		10.2686	IC801 IF-converter
		10.2682-01	PA811a Power amplifier
		10.2683-01	PA812a Power amplifier
		10.2676	PM811 Phase modulator
		10.2675	RC811 Receiver converter
		10.2689-01	SQ801 Squelch unit
		10.2690	VR801 Voltage regulator
813		10.2692	XF803 Crystal filter
814		10.2693	XF804 Crystal filter
		10.2608	XO811 Crystal oscillator
		10.2609	XO811 Crystal oscillator
X2		10.2710	CH803 Oscillator chassis 2 channels
X4		10.2711	CH804 Oscillator chassis 4 channels
X8		10.2712	CH805 Oscillator chassis 8 channels
X12		10.2713	CH806 Oscillator chassis 12 channels
C1		10.2837	CP801 Local control head
C2		10.2967	CP802 Extended control head
			Components mounted on CH801
	C1	74.5279	4.7 nF ± 20%
	C2	74.5161	470 pF -20 +80% ceram PL 63V
	C3	74.5161	470 pF -20 +80% ceram PL 63V
	C7	74.5161	470 pF -20 +80% ceram PL 63V
813	R1	80.5058	5.6 KΩ 5% carbon film 1/10W
814	R1	80.5066	27 KΩ 5% " " 1/10W
	R2	80.5081	470 KΩ 5% " " 1/10W
	R3	80.50xx	ADJ 5% " " 1/10W
	R4	80.50xx	ADJ 5% " " 1/10W
	R5	80.50xx	ADJ 5% " " 1/10W
	R6	80.5057	4.7 KΩ 5% " " 1/10W
	R7	80.50xx	ADJ 5% " " 1/10W
	R8	80.5040	180 Ω 5% " " 1/10W
	R10	80.50xx	ADJ 5% " " 1/10W
	R11	80.50xx	ADJ 5% " " 1/10W

TYPE	Nº	CODE	DATA
	R12	80.5060	8.2 KΩ 5% carbon film 1/10W
	R13	80.50xx	ADJ 5% " " 1/10W
	L1	61.5014	2.2 μH 20% AF-choke 0.5A
	L2	62.0614	0.26 μH RF choke
	S1	92.5112	Fuse 1,0A

STORNOPHONE CQP810

TYPE	Nº	CODE	DATA
			Modules
		10.2687	AA801 Audio amplifier
		10.2688	AA802 Audio amplifier
		10.2691	AD801 Automatic drive control
		10.3037	BP831 Band pass filter
		10.2835	CH801 Chassis assembly
		10.3035	FD831 Frequency doubler
		10.3036	FD832 Frequency doubler
833		10.2694	FN803 Filter network
834		10.2695	FN804 Filter network
		10.2685	IA801 IF-amplifier
		10.2808	IA802 IF-amplifier/discriminator
		10.2686	IC801 IF-converter
		10.3039	PA831 Power amplifier
		10.3040	PA832 Power amplifier
		10.2676	PM811 Phase modulator
		10.3034	PM831 Phase modulator
		10.3033	RC831 Receiver converter
		10.2689	SQ801a Squelch unit
		10.2690	VR801 Voltage regulator
833		10.2692	XF803 Crystal filter
834		10.2693	XF804 Crystal filter
		10.2709	XO812 Crystal oscillator
		10.3067	XO831 Crystal oscillator
X2		10.2710	CH803 Oscillator chassis 2 channels
X4		10.2711	CH804 Oscillator chassis 4 channels
X8		10.2712	CH805 Oscillator chassis 8 Channels
X12		10.2713	CH806 Oscillator chassis 12 channels
C1		10.2837	CP801 Local control head
C2		10.2967	CP802 Extended control head
			Components mounted on CH801
	C1	74.5279	4.7 nF ±20%
	C2	74.5161	470 pF -20 +80% ceram PL 63V
	C3	74.5161	470 pF -20 +80% ceram PL 63V
	C7	74.5161	470 pF -20 +80% ceram PL 63V
833	R1	80.5058	5.6 KΩ 5% carbon film 1/10W
834	R1	80.5066	27 KΩ 5% " " 1/10W
	R2	80.5081	470 KΩ 5% " " 1/10W
	R3	80.50xx	ADJ 5% " " 1/10W
	R4	80.50xx	ADJ 5% " " 1/10W
	R5	80.50xx	ADJ 5% " " 1/10W
	R6	80.5057	4.7 KΩ 5% " " 1/10W
	R7	80.50xx	ADJ 5% " " 1/10W
	R8	80.5043	330 Ω 5% " " 1/10W
	R9	80.5043	330 Ω 5% " " 1/10W
	R10	80.50xx	ADJ 5% " " 1/10W

TYPE	Nº	CODE	DATA
	R11	80.50xx	ADJ 5% carbon film 1/10W
	R12	80.5060	8.2 KΩ 5% " " 1/8 W
	R13	80.50xx	
	L1	60.5014	2.2 μH 20% AF choke 0.5A
	L2	62.0614	0.26 μH RF choke
	S1	92.5112	Fuse 1.0 A

STORNOPHONE CQP830

X402.342

TYPE	Nº	CODE	DATA
			Modules
		10.2687	AA801 Audio amplifier
		10.2688	AA802 Audio amplifier
		10.2691	AD801 Automatic drive control
		10.2704	BP861 Band pass filter
		10.2836	CH802 Chassis assembly
		10.2701	FD861 Frequency doubler
		10.2702	FD862 Frequency doubler
		10.2703	FD863 Frequency doubler
		10.2694	FN803 Filter network
		10.2705	FN861 Filter network
		10.2685	IA801 IF-amplifier
		10.2808	IA802 IF-amplifier/discriminator
		10.2686	IC801 IF-converter
		10.2706	PA861 Power amplifier
		10.2707	PA862 Power amplifier
		10.2700	PM861 Phase modulator
		10.2699	RC861 Receiver converter
		10.2689	SQ801a Squelch unit
		10.2690	VR801 Voltage regulator
		10.2692	XF803 Crystal filter
		10.2708	XO811 Crystal oscillator
		10.2885	XO862 Crystal oscillator
X2		10.2710	CH803 Oscillator chassis 2 channels
X4		10.2711	CH804 Oscillator chassis 4 channels
X8		10.2712	CH805 Oscillator chassis 8 channels
X12		10.2713	CH806 Oscillator chassis 12 channels
	C1	10.2837	CP801 Local control head
	C2	10.2967	PC802 Extended control head
			Components mounted on CH802
	C2	74.5161	470 pF -20 +80% ceram PL 63V
	C3	74.5161	470 pF -20 +80% " PL 63V
	C4	74.5275	470 pF 20%
	C5	74.5275	470 pF 20%
	C6	74.5275	470 pF 20%
	C7	74.5161	470 pF -20 +80% ceram PL 63V
	C8	74.5161	470 pF -20 +80% " PL 63V
	R1	80.5058	5.6 KΩ 5% carbon film 1/10W
	R2	80.5081	470 KΩ 5% " " 1/10W
	R3	80.50xx	ADJ 5% " " 1/10W
	R4	80.50xx	ADJ 5% " " 1/10W
	R5	80.50xx	ADJ 5% " " 1/10W
	R6	80.5047	4.7 KΩ 5% " " 1/10W
	R7	80.50xx	ADJ 5% " " 1/10W
	R10	80.50xx	ADJ 5% " " 1/10W
	R11	80.50xx	ADJ 5% " " 1/10W

TYPE	Nº	CODE	DATA
	R12	80.5060	8.2 KΩ 5% carbon film 1/10W
	R14	80.5039	150 Ω 5% " " 1/10W
	L2	62.0614	0.26 µH RF choke
	S1	92.5112	Fuse 1.0A

STORNOPHONE CQP860

X402.343

ITEM CODES	Description / Modification Kit Code Number	17.0089-00	17.0090-00	17.0091-00	17.0092-00	17.0093-00	17.0094-00	17.0095-00	17.0096-00
10.3600-16	CA 802-82 (X2)	1							
10.3600-18	CA 802-90 (X4)		1						
10.3600-21	CA 802-102 (X8)			1					
10.3600-25	CA 802-118 (X12)				1				
10.3600-26	CA 802-122 (2T)					1			
10.3600-28	CA 802-130 (X4T)						1		
10.3600-31	CA 802-142 (X8T)							1	
10.3600-35	CA 802-158 (X12T)								1
10.3375-00	CP 808	1	1	1	1	1	1	1	1
10.2687-01	AA 801 a	1	1	1	1	1	1	1	1
15.0316-00	antenna matching network	1	1	1	1	1	1	1	1
18.0874-00	wiring and cable X2	1							
18.0875-00	wiring and cable X4		1						
18.0876-00	wiring and cable X8			1					
18.0877-00	wiring and cable X12				1				
18.0878-00	wiring and cable X2T					1			
18.0879-00	wiring and cable X4T						1		
18.0880-00	wiring and cable X8T							1	
18.0881-00	wiring and cable X 12T								1
51.0886-00	type label	1	1	1	1	1	1	1	1
51.0893-00	transparant label	1	1	1	1	1	1	1	1

SURVEY
MODIFICATION KIT
CQP810 TO CQP810U

60.383-E1

Storno

ITEM CODES	Modification Kit Code Number / Description	17.0097-00	17.0098-00	17.0099-00	17.0100-00	17.0101-00	17.0102-00	17.0103-00	17.0104-00
10.3600-16	CA 802-82 (X2)	1							
10.3600-18	CA 802-90 (X4)		1						
10.3600-21	CA 802-102 (X8)			1					
10.3600-25	CA 802-118 (X12)				1				
10.3600-26	CA 802-122 (2T)					1			
10.3600-28	CA 802-130 (X4T)						1		
10.3600-31	CA 802-142 (X8T)							1	
10.3600-35	CA 802-158 (X12T)								1
10.3375-00	CP 808	1	1	1	1	1	1	1	1
10.2687-01	AA 801 a	1	1	1	1	1	1	1	1
15.0329-00	antenna matching network	1	1	1	1	1	1	1	1
18.0874-00	wiring and cable X2	1							
18.0875-00	wiring and cable X4		1						
18.0876-00	wiring and cable X8			1					
18.0877-00	wiring and cable X 12				1				
18-0878-00	wiring and cable X2T					1			
18.0879-00	wiring and cable X4T						1		
18.0880-00	wiring and cable X8T							1	
18.0881-00	wiring and cable X12T								1
51.0886-00	Type label	1	1	1	1	1	1	1	1
51.0898-00	transparant label	1	1	1	1	1	1	1	1

SURVEY
MODIFICATION KIT
CQP830 TO CQP830U

60.384-E1

ITEM CODES	Modification Kit Code Number / Description	17.0105-00	17.0106-00	17.0107-00	17.0108-00	17.0109-00	17.0110-00	17.0111-00	17.0112-00
10.3600-19	CA 802-94 (X2)	1							
10.3600-21	CA 802-102 (X4)		1						
10.3600-24	CA 802-114 (X8)			1					
10.3600-28	CA 802-130 (X12)				1				
10.3600-29	CA 802-134 (2T)					1			
10.3600-31	CA 802-142 (X4T)						1		
10.3600-34	CA 802-154 (X8T)							1	
10.3600-38	CA 802-170 (X12T)								1
10.3375-00	CP 808	1	1	1	1	1	1	1	1
10.2687-01	AA 801 a	1	1	1	1	1	1	1	1
15.0327-00	antenna matching network	1	1	1	1	1	1	1	1
18.0884-00	wiring and cable X2	1							
18.0885-00	wiring and cable X4		1						
18.0886-00	wiring and cable X8			1					
18.0887-00	wiring and cable X12				1				
18.0888-00	wiring and cable X2T					1			
18.0889-00	wiring and cable X4T						1		
18.0890-00	wiring and cable X8T							1	
18.0891-00	wiring and cable X12T								1
51.0886-00	type label	1	1	1	1	1	1	1	1
51.0893-00	transparant label	1	1	1	1	1	1	1	1

SURVEY
MODIFICATION KIT
CQP860 TO CQP860U

60.385-E1

Storno

TYPE	NO	CODE	DATA
TX813	1W	10. 3588-00	Transmitter unit 1. 0W-20/25kHz
TX813	3W	10. 3589-00	Transmitter unit 3. 0W-20/25kHz
TX814	1W	10. 3590-00	Transmitter unit 1. 0W-12. 5kHz
TX814	3W	10. 3591-00	Transmitter unit 3. 0W-12. 5kHz
			Transmitter subunits
		10. 2688	AA802 Modulation amplifier
		10. 2691	AD801 ADC circuit
		10. 2680	BP811 Bandpass filter
		10. 3505	CH8014 Chassis
		10. 2677	FD811 Frequency doubler
		10. 2678	FD812 Frequency doubler
		10. 2679	FD813 Frequency doubler
TX813		10. 2694	FN803 Modulation filter 20/25kHz
TX814		10. 2695	FN804 Modulation filter 12. 5kHz
		10. 2681	FN811 Antenna filter
		10. 2682-01	PA811a Power amplifier (1W)
		10. 2683-01	PA812a Power amplifier (1W)
		10. 3413	PA813 Power amplifier (3W)
		10. 3414	PA814 Power amplifier (3W)
		10. 2676	PM811 Phase modulator
		10. 2690	VR801 Voltage regulator
RX813		10. 3433-00	Receiver unit 20/25kHz
RX814		10. 3434	Receiver unit 12. 5kHz
			Receiver subunits
		10. 2687-01	AA801a Audio Amplifier
		10. 3228	CH809 Chassis
		10. 2685	IA801 IF amplifier
		10. 2808	IA802 IF amplifier/detector
		10. 2686	IC801 IF converter
		10. 2675	RC811 Receiver converter
		10. 2689-01	SQ801a Squelch circuit
		10. 2690	VR801 Voltage regulator
RX813		10. 2692	XF803 Crystal Filter 20/25kHz
RX814		10. 2693	XF804 Crystal Filter 12. 5kHz

Storno

TYPE	NO	CODE	DATA
			Components mounted on TX/RX
CQP813U	R1	80. 5058	5. 6kohm 5% carbon film 1/10W
CQP814U	R1	80. 5066	27kohm 5% carbon film 1/10W
	R2	80. 5081	470k 5% carbon film 1/10W
	R3	80. 50xx	Adj. 110mV
	R4	80. 50xx	Adj. Squelch
	R6	80. 5057	4. 7kohm 5% carbon film 1/10W
	R7	80. 50xx	Adj. ADC
	R10	80. 50xx	Adj Deviation
	R11	80. 50xx	Adj. Deviation
	R12	80. 5054	2. 7kohm 5% carbon film 1/10W
		10. 3587	TB802 Terminal board
	C1-C6	74. 5277	1nF 20% ceram 50V
	Fb	65. 5102	Ferrite bead
	S1	92. 5117	Fuse 2A
		10. 3375	CP808 control head
		10. 2710	CH803 Chassis, 2 channels
		10. 2711	CH804 Chassis, 4 channels
		10. 2712	CH805 Chassis, 8 channels
		10. 2714	CH806 Chassis, 12 channels
		10. 2708	XO811 Receiver oscillator
		10. 2709	XO812 Transmitter oscillator

Storno

TYPE	Nº	CODE	DATA
TX833	1W	10.3592	Transmitter unit 1.0W-20/25kHz
TX833	3W	10.3593	Transmitter unit 3.0W-20/25kHz
TX834	1W	10.3594	Transmitter unit 1.0W-12.5kHz
TX834	3W	10.3595	Transmitter unit 2.0W-12.5kHz
			Transmitter subunits
		10.2688	AA802 Modulation amplifier
		10.2691	AD801 ADC circuit
		10.3037	BP831 Band pass filter
		10.3505	CH8014 Chassis
		10.3035	FD831 Frequency doubler
		10.3036	FD832 Frequency doubler
TX833		10.2694	FN803 Modulation filter 20/25kHz
TX834		10.2695	FN804 Modulation filter 12.5kHz
		10.3038	FN831 Antenna filter
		10.3039	PA831 Power amplifier
		10.3040	PA832 Power amplifier
		10.3416	PA834 Power amplifier
		10.2676	PM811 Phase modulator
		10.3034	PM831 Phase modulator
		10.1690	VR801 Voltage regulator
RX833		10.3337	Receiver unit 20/25kHz
RX834		10.3435	Receiver unit 12.5kHz
			Receiver subunits
		10.2687-01	AA801a Audio amplifier
		10.3228	CH809 Chassis
		10.2685	IA801 IF amplifier
		10.2808	IA802 IF amplifier/detector
		10.2686	IC801 IF converter
		10.3033	RC831 Receiver converter
		10.2689-01	SQ801a Squelch circuit
		10.2690	VR801 Voltage regulator
RX833		10.2692	XF803 Crystal filter 20/25kHz
RX834		10.2693	XF804 Crystal filter 12.5kHz

Storno

TYPE	Nº	CODE	DATA	
			Componets mounted on TX/RX	
CQP833U	R1	80.5058	5.6kohm 5% carbon film	1/10W
CQP834U	R1	80.5066	27kohm 5% carbon film	1/10W
	R2	80.5081	470kohm 5% carbon dilm	1/10W
	R3	80.50xx	Adj. 110mV	
	R4	80.50xx	Adj. Squelch	
	R6	80.5057	4.7kohm 5%	1/10W
	R7	80.50xx	Adj. ADC	
	R8	80.5048	820ohm 5% carbon film	1/10W
	R10	8050xx	Adj. Deviation	
	R11	80.50xx	Adj. Deviation	
	R12	80.5054	2.7kohm 5% carbon film	1/10W
	R13	80.50xx	Adj. Deviation	
	C1	74.5279	4.7nF 20% ceram	50V
	L1	61.5014	2.2uH 20% RF choke	0.5A
	E1	99.5257	2.1V Stab. diode	
		10.3587	TB802 Terminal board	
	C1-C6	74.5277	1nF 20% ceram 50V	
	Fb	65.5102	Ferrite bead	
	S1	92.5117	Fuse 2A	
		10.3375	CB808 Control head	
		10.2710	CH803 Chassis, 2 channels	
		10.2711	CH804 Chassis, 4 channels	
		10.2712	CH805 Chassis, 8 channels	
		10.2714	CH806 Chassis, 12 channels	
		10.2709	XO812 Transmitter oscillator	
		10.3067	XO831 Receiver oscillator	

Storno

TYPE	Nº	CODE	DATA
TX863	1W	10.3596	Transmitter unit 1.0W - 20/25kHz
TX863	3W	10.3597	Transmitter unit 3.0W - 20/24kHz
			Transmitter subunits
		10.2688	AA802 Modulation amplifier
		10.2691	AD801 ADC circuit
		10.2704	BP861 Band pass filter
		10.3505	CH8014 Chassis
		10.2701	FD861 Frequency doubler
		10.2702	FD862 Frequency doubler
		10.2703	FD863 Frequency doubler
		10.2694	FN803 Modulation filter
		10.2705	FN861 Antenna filter
		10.2707-01	PA862a Power amplifier
		10.3417	PA863 Power amplifier
		10.3418	PA864 Power amplifier
		10.2700	PM861 Phase modulator
		10.2690	VR801 Voltage regulator
RX863		10.3436	Receiver unit 20/25kHz
			Receiver subunits
		10.2687-01	AA801a Audio amplifier
		10.3230	CH8010 Chassis
		10.2685	IA801 IF amplifier
		10.2808	IA802 IF amplifier/detector
		10.2686	IC801 IF converter
		10.2699	RC861 Receiver converter
		10.2689-01	SQ801a Squelch circuit
		10.2690	VR801 Voltage regulator
		10.2692	XF803 Crystal filter

Storno

TYPE	Nº	CODE	DATA	
			Components mounted on TX/RX	
	R1	80.5058	5.6k ohm 5% carbon film	1/0W
	R2	80.5081	470k ohm 5% carbon film	1/10W
	R3	80.50XX	Adj. 110mV	
	R4	80.50XX	Adj. Squelch	
	R6	80.5057	4.7k ohm 5% carbon film	1/10W
	R7	80.50XX	Adj. ADC	
	R10	80.50XX	Adj. Deviation	
	R11	80.50XX	Adj. Deviation	
	R12	80.5054	2.7k ohm 5% carbon film	1/10W
	C4	74.5275	470pF 20% ceram	
	C5	74.5275	470pF 20% ceram	
	C6	74.5275	470pF 20% ceram	
		10.3587	TB802 Terminal board	
	C1-C6	74.5277	1nF 20% ceram	50V
	Fb	65.5102	Ferrite bead	
	S1	92.5117	Fuse 2A	
		10.3375	CP808 Control head	
		10.2710	CH803 Chassis, 2 channels	
		10.2711	CH804 Chassis, 4 channels	
		10.2712	CH805 Chassis, 8 channels	
		10.2714	CH806 Chassis, 12 channels	
		10.2708	XO811 Receiver oscillator	
		10.2885	XO862 Transmitter oscillator	

Storno

TYPE	Nº	CODE	DATA	
CQP813U		10.3933	TX813-IS	Transmitter
CQP814U		10.3035	TX814-IS	Transmitter
CQP813U		10.3934	RX813-IS	Receiver
CQP814U		10.3936	RX814-IS	Receiver
		10.3587	TB802	Terminal Board
		10.3932	CP808-IS	Control Head
X2-IS		10.3600-16	CA802-82	Cabinet 2 Channels
X4-IS		10.3600-18	CA802-90	Cabinet 4 Channels
X8-IS		10.3600-21	CA802-102	Cabinet 8 Channels
X12-IS		10.3600-25	CA802-118	Cabinet 8 Channels
X2T-IS		10.3600-26	CA802-122	Cabinet 2 Channels
X4T-IS		10.3600-28	CA802-130	Cabinet 4 Channels
X8T-IS		10.3600-31	CA802-142	Cabinet 8 Channels
X12T-IS		10.3600-35	CA802-158	Cabinet 12 Channels
X2(T)-IS		10.2710	CH803	Oscillator chassis
X4(T)-IS		10.2711	CH804	Oscillator chassis
X8(T)-IS		10.2712	CH805	Oscillator chassis
X12(T)-IS		10.2713	CH806	Oscillator chassis
			Transmitter Modules	
		10.2676	PM811	Phase modulator
		10.2677	FD811	Frequency doubler
		10.2678	FD812	Frequency doubler
		10.2679	FD813	Frequency doubler
		10.2680	BP811	Filter network
		10.2682	PA811a	Power amplifier
		10.2683	Pa812a	Power amplifier
		10.3351	VR801-IS	Voltage regulator
813		10.3352	FN803-IS	Filter network
814		10.3353	FN804-IS	Filter network
		10.3505	CH8014	Transmitter chassis
		10.2688	AA802	Modulation amplifier
		10.2709	XO812	Transmitter oscillator
			Receiver Modules	
		10.3354	RC811-IS	Receiver converter
		10.2685	IA801	IF amplifier
		10.2808	IA802	IFamplifier/discriminator
		10.2686	IC801	IF converter
		10.4075	AA801a-IS	Audio amplifier
		10.2689-01	SQ801a	Squelch circuit
		10.3351	VR801-IS	Voltage regulator
		10.2692	XF803	Crystal filter

Storno

TYPE	Nº	CODE	DATA		
		10.3228	CH809	Receiver chassis	
		10.2708	XO812	Receiver oscillator	
813	R1	80.5058	5.6Kohm 5%	Carbon film	0.1W
814	R1	80.5066	27Kohm 5%	Carbon film	0.1W
	R2	80.5181	470Kohm 5%	Carbon film	0.1W
	R3	80.50xx	ADJ (110mV) 5%	Carbon film	0.1W
	R4	80.50xx	ADJ (SQ) 5%	Carbon film	0.1W
	R6	80.5059	6.8Kohm 5%	Carbon film	0.1W
	R7	80.50xx	ADJ (Po) 5%	Carbon film	0.1W
	R10	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R11	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R12	80.5054	2.7Kohm 5%	Carbon film	0.1W
	C3	74.5161	470pF -20 +80%	Ceram PL	63V

VHF RADIOTELEPHONE CQP813U-IS 0.2W
CQP814U-IS 0.2W

X402.705

TYPE	Nº	CODE	DATA	
CQP833U		10.3937	TX833-IS	Transmitter
CQP834U		10.3939	TX834-IS	Transmitter
CQP833U		10.3938	RX833-IS	Receiver
CQP834U		10.3940	RX834-IS	Receiver
		10.3587	TB802	Terminal board
		10.3932	CP808-IS	Control head
X2-IS		10.3600-16	CA802-82	Cabinet 2 Channels
X4-IS		10.3600-18	CA802-90	Cabinet 4 Channels
X8-IS		10.3600-21	CA802-102	Cabinet 8 Channels
X12-IS		10.3600-25	CA802-118	Cabinet 12 Channels
X2T-IS		10.3600-26	CA802-122	Cabinet 2 Channels + T
X4T-IS		10.3600-28	CA802-130	Cabinet 4 Channels + T
X8T-IS		10.3600-31	CA802-142	Cabinet 8 Channels + T
X12T-IS		10.3600-IS	CA802-158	Cabinet 12 Channels + T
X2(T)-IS		10.2710	CH803	Oscillator chassis
X4(T)-IS		10.2711	CH804	Oscillator chassis
X8(T)-IS		10.2712	CH805	Oscillator chassis
X12(T)-IS		10.2713	CH806	Oscillator chassis
			Transmitter Modules	
		10.2676	PM811	Phase modulator
		10.3034	PM831	Phase modulator
		10.3035	FD831	Frequency doubler
		10.3036	FD832	Frequency doubler
		10.3037	BP831	Bandpass filter
		10.3038	FN831	Filter network
		10.3696	PA831-IS	Power amplifier
		10.3040	PA832	Power amplifier
		10.2688	AA802	Audio amplifier
		10.3351	VR801-IS	Voltage regulator
833U		10.3352	FN803-IS	Filter network
834U		10.3353	FN804-IS	Filter network
		10.3505	CH8014	Oscillator chassis
		10.2709	XO812	Transmitter oscillator
			Receiver Modules	
		10.3355	RC831-IS	Receiver circuit
		10.2685	IA801	IF amplifier
		10.2808	IA802	IF amplifier/discriminator
		10.2686	IC801	IF converter
		10.4075	AA801a-IS	Audio amplifier
		10.2689-01	SQ801a	Squelch circuit
		10.3351	VR801-IS	Voltage regulator
		10.2692	XF803	Crystal filter

Storno

TYPE	Nº	CODE	DATA		
		10.3228	CH809	Oscillator chassis	
		10.3067	XO831	Receiver oscillator	
833U	R1	80.5058	5.6Kohm 5%	Carbon film	0.1W
834U	R1	80.5066	27Kohm 5%	Carbon film	0.1W
	R2	80.5081	470Kohm 5%	Carbon film	0.1W
	R3	80.50xx	ADJ (110mV) 5%	Carbon film	0.1W
	R4	80.50xx	ADJ (SQ) 5%	Carbon film	0.1W
	R6	80.5059	6.8Kohm 5%	Carbon film	0.1W
	R7	80.50xx	ADJ (PO) 5%	Carbon film	0.1W
	R8	80.5048	820ohm 5%	Carbon film	0.1W
	R10	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R11	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R12	80.5054	2.7Kohm 5%	Carbon film	0.1W
	R13	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R14	80.5234	560ohm 5%	Carbon film	0.125W
	C1	74.5279	4.7nF 2%	Ceramic 2C1	50V
	E1	99.5257	2.1V	Stabilizing diode	
	L1	61.5014	2.2uH 20%	HF choke	0.6A

VHF RADIOTELEPHONE CQP833U-IS 0.2W

CQP834U-IS 0.2W

X402.709

Storno

TYPE	Nº	CODE	DATA	
		10.3941	TX863-IS	Transmitter 0.2W
		10.3942	RX863-IS	Receiver
		10.3587	TB802	Terminal Board
		10.3932	CP808-IS	Control Head
X2		10.3600-19	CA802-94	Cabinet 2 channels
X4		10.3600-21	CA802-102	Cabinet 4 channels
X8		10.3600-24	CA802-114	Cabinet 8 channels
X12		10.3600-28	CA802-130	Cabinet 12 channels
X2T		10.3600-29	CA802-134	Cabinet 2 channels +T
X4T		10.3600-31	CA802-142	Cabinet 4 channels +T
X8T		10.3600-34	CA802-154	Cabinet 8 channels +T
X12T		10.3600-38	CA802-170	Cabinet 12 channels +T
X2(T)		10.2710	CH803	Oscillator chassis
X4(T)		10.2711	CH804	Oscillator chassis
X8(T)		10.2712	CH805	Oscillator chassis
X12(T)		10.2713	CH806	Oscillator chassis
			Transmitter Modules	
		10.2688	AA802	Modulation amplifier
		10.3944	AS861	Antenna switch
		10.2704	BP861	Bandpass filter
		10.2701	FD861	Frequency doubler
		10.2702	FD863	Frequency doubler
		10.2703	FD864	Frequency doubler
		10.3352	FN803-IS	Filter network
		10.2705	FN861	Filter network
		10.3943	PA863-IS	Power amplifier
		10.2700-01	PM861a	Phase modulator
		10.3351	VR801-IS	Voltage regulator
		10.3505	CH8014	Transmitter chassis
		10.2885	XO862	Crystal oscillator.

Storno

TYPE	Nº	CODE	DATA		
			Receiver Modules		
		10.2687	AA801a-IS	Audio amplifier	
		10.2685	IA801	IF amplifier	
		10.2808	IA802	IF amplifier/discriminator	
		10.2686	IC801	IF converter	
		10.3356	RC861-IS	Receiver converter	
		10.2689	SQ801a	Squelch unit	
		10.3351	VR801-IS	Voltage regulator	
		10.2692	XF803	Crystal filter	
		10.3230	CH8010	Chassis	
		10.2708	XO811	Crystal oscillator	
	R1	80.5058	5.6 kohm 5%	Carbon film	0.1W
	R2	80.5081	470 Kohm 5%	Carbon film	0.1W
	R3	80.50xx	ADJ (110mV) 5%	Carbon film	0.1W
	R4	80.50xx	ADJ (SQ) 5%	Carbon film	0.1W
	R6	80.5059	6.8 Kohm 5%	Carbon film	0.1W
	R10	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R11	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R12	80.5054	2.7 Kohm 5%	Carbon film	0.1W
	C4	74.5275	470pF 20%	Ceramic	
	C5	74.5275	470pF 20%	Ceramic	
	C6	74.5275	470pF 20%	Ceramic	

UHF RADIOTELEPHONE CQP863U-IS 0.2W

X402-692

Storno

TYPE	Nº	CODE	DATA	
CQP813U		10.4079	TX813-1W-IS	Transmitter 1W
CQP814U		10.4080	TX814-1W-IS	Transmitter 1W
CQP813U		10.3934	RX813-IS	Receiver
CQP814U		10.3936	RX814-IS	Receiver
		10.4084	TB803	Terminal Board
		10.4083	CP808-1W-IS	Control Head
X2-IS		10.4074-19	CA802-IS-94	Cabinet 2 Channels
X4-IS		10.4074-21	CA802-IS-102	Cabinet 4 Channels
X8-IS		10.4074-24	CA802-IS-114	Cabinet 8 Channels
X12-IS		10.4074-28	CA802-IS-130	Cabinet 12 Channels
X2T-IS		10.4074-29	CA802-IS-134	Cabinet 2 Channels + T
X4T-IS		10.4074-31	CA802-IS-142	Cabinet 4 Channels + T
X8T-IS		10.4074-34	CA802-IS-154	Cabinet 8 Channels + T
X12T-IS		10.4074-38	CA802-IS-170	Cabinet 12 Channels + T
X2(T)-IS		10.2710	CH803	Oscillator chassis
X4(T)-IS		10.2711	CH804	Oscillator chassis
X8(T)-IS		10.2712	CH805	Oscillator chassis
X12(T)-IS		10.2713	CH806	Oscillator chassis
			Transmitter Modules	
		10.2676	PM811	Phase modulator
		10.2677	FD811	Frequency doubler
		10.2678	FD812	Frequency doubler
		10.2679	FD813	Frequency doubler
		10.2680	BP811	Bandpass filter
		10.2681	FN811	Filter network
		10.4081	PA811a-IS	Power amplifier
		10.4082	PA812a-IS	Power amplifier
		10.4076	AD801-IS	ADC circuit
813U		10.3351	VR801-IS	Voltage regulator
814U		10.3352	FN803-IS	Filter network
		10.4078	CH8015	Transmitter chassis
		10.2688	AA802	Modulation amplifier
		10.2709	XO812	Transmitter oscillator
			Receiver Modules	
		10.3354	RC811-IS	Receiver converter
		10.2685	IA801	IF amplifier
		10.2808	IA802	IF amplifier/discriminator
		10.2686	IC801	IF converter
		10.4075	AA801a-IS	Audio amplifier
		10.2689-01	SQ801a	Squelch circuit
		10.3351	VR801-IS	Voltage regulator

Storno

TYPE	Nº	CODE	DATA		
		10.2692	XF803	Crystal filter	
		10.3228	CH809	Receiver chassis	
		10.2708	XO812	Receiver oscillator	
813U	R1	80.5058	5.6Kohm 5%	Carbon film	0.1W
814U	R1	80.5058	27Kohm 5%	Carbon film	0.1W
	R2	80.5181	470Kohm 5%	Carbon film	0.1W
	R3	80.50xx	ADJ (110mV) 5%	Carbon film	0.1W
	R4	80.50xx	ADJ (SQ) 5%	Carbon film	0.1W
	R6	80.5060	8.2Kohm 5%	Carbon film	0.1W
	R7	80.50xx	ADJ (PO) 5%	Carbon film	0.1W
	R10	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R11	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R12	80.5054	2.7Kohm 5%	Carbon film	0.1W
	R13	80.5246	560ohm 5%	Carbon film	0.125W
	C101	74.5155	1nF -20 +80%	Ceram	63V
	C102	74.5155	1nF -20 +80%	Ceram	63V
	C103	74.5155	1nF -20 +80%	Ceram	63V
	C104	74.5155	1nF -20 +80%	Ceram	63V
	C105	74.5155	1nF -20 +80%	Ceram	63V
	C106	74.5155	1nF -20 +80%	Ceram	63V
	R101	80.5049	1Kohm 5%	Carbon film	0.1W
	R102	80.5058	5.6Kohm 5%	Carbon film	0.1W
	R103	80.5069	47Kohm 5%	Carbon film	0.1W
	R104	80.5061	10Kohm 5%	Carbon film	0.1W
	E101	99.5366	8.2V 5%	Zenerdiode	5W
	E102	99.5366	8.2V 5%	Zenerdiode	5W
	E103	99.5366	8.2V 5%	Zenerdiode	5W
	E104	99.5366	8.2V 5%	Zenerdiode	5W
	Q101	99.5121	BC237	Transistor	

VHF RADIOTELEPHONE CQP813U-IS 1W
CQP814U-IS 1W

X402.704

Storno

TYPE	Nº	CODE	DATA	
CQP833		10.4085	TX833-1W-IS	Transmitter 1W
CQP834		10.4086	TX834-1W-IS	Transmitter 1W
CQP833		10.3938	RX833-IS	Receiver
CQP834		10.3940	RX834-IS	Receiver
		10.4084	TB803	Terminal Board
		10.4083	CP808-IS	Control Head
X2-IS		10.4074-19	CA802-IS-94	Cabinet 2 Channels
X4-IS		10.0474-21	CA802-IS-102	Cabinet 4 Channels
X8-IS		10.4074-24	CA802-IS-114	Cabinet 8 Channels
X12-IS		10.4074-28	CA802-IS-130	Cabinet 12 Channels
X2T-IS		10.4074-29	CA802-IS-134	Cabinet 2 Channels + T
X4T-IS		10.4074-31	CA802-IS-142	Cabinet 4 Channels + T
X8T-IS		10.4074-34	CA802-IS-154	Cabinet 8 Channels + T
X12T-IS		10.4074-38	CA802-IS-170	Cabinet 12 Channels + T
X2(T)-IS		10.2710	CH803	Oscillator chassis
X4(T)-IS		10.2710	CH804	Oscillator chassis
X8(T)-IS		10.2712	CH805	Oscillator chassis
X12(T)-IS		10.2713	CH806	Oscillator chassis
			Transmitter Modules	
		10.2676	PM811	Phase modulator
		10.3034	PM831	Phase modulator
		10.3035	FD831	Frequency doubler
		10.3036	FD832	Frequency doubler
		10.3037	BP831	Bandpass filter
		10.3038	FN831	Filter network
		10.4087	PA831	Power amplifier
		10.4088	PA832	Power amplifier
		10.2688	AA802	Modulation amplifier
		10.4076	AD801-IS	ADC circuit
		10.3351	VR801-IS	Voltage regulator
833U		10.3352	FN803-IS	Filter network
834U		10.3353	FN804-IS	Filter network
		10.4078	CH8015	Oscillator chassis
			Receiver Modules	
		10.3355	RC831-IS	Receiver circuit
		10.2685	IA801	IF amplifier
		10.2808	IA802	IF amplifier/discriminator
		10.2686	IC801	IF converter
		10.4075	AA801a-IS	Audio amplifier
		10.2689-01	SQ801a	Squelch circuit
		10.3351	VR801-IS	Voltage regulator
		10.2692	XF803	Crystal filter

Storno

TYPE	Nº	CODE	DATA		
		10.3228	CH809	Oscillator chassis	
833U	R1	80.5058	5.6Kohm 5%	Carbon film	0.1W
834U	R1	80.5066	27Kohm 5%	Carbon film	0.1W
	R2	80.5081	470Kohm 5%	Carbon film	0.1W
	R3	80.50xx	ADJ (110mV) 5%	Carbon film	0.1W
	R4	80.50xx	ADJ (SQ) 5%	Carbon film	0.1W
	R6	80.5060	8.2Kohm 5%	Carbon film	0.1W
	R7	80.50xx	ADJ (Po) 5%	Carbon film	0.1W
	R8	80.5052	1.8Kohm 5%	Carbon film	0.1W
	R9	80.5052	1.8Kohm 5%	Carbon film	0.1W
	R10	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R11	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R12	80.5054	2.7Kohm 5%	Carbon film	0.1W
	R13	80.50xx	ADJ (Dev) 5%	Carbon film	0.1W
	R14	80.5234	560ohm 5%	Carbon film	0.125W
	C101	74.5155	1nF -20 +80%	Ceram PL	63V
	C102	74.5155	1nF -20 +80%	Ceram PL	63V
	C103	74.5155	1nF -20 +80%	Ceram PL	63V
	C104	74.5155	1nF -20 +80%	Ceram PL	63V
	C105	74.5155	1nF -20 +80%	Ceram PL	63V
	C106	74.5155	1nF -20 +80%	Ceram PL	63V
	R101	80.5049	1Kohm 5%	Carbon film	0.1W
	R102	80.5058	5.6Kohm 5%	Carbon film	0.1W
	R103	80.5069	47Kohm 5%	Carbon film	0.1W
	R104	80.5061	10Kohm 5%	Carbon film	0.1W
	E101	99.5366	8.2V 5%	Zenerdiode	5W
	E102	99.5366	8.2V 5%	Zenerdiode	5W
	E103	99.5366	8.2V 5%	Zenerdiode	5W
	E104	99.5366	8.2V 5%	Zenerdiode	5W
	Q101	99.5121	BC237	Transistor	

VHF RADIOTELEPHONE CQP833U-IS 1W
CQP834U-IS 1W

X402.708

Storno

TYPE	Nº	CODE	DATA		
		10.4089	TX863-1W IS	Transmitter	1W
		10.3942	RX863-IS	Receiver	
		10.4084	TB803	Terminal Board	
		10.4083	CP808-IS	Control Head	
X2-IS		10.4074-22	CA802-IS-106	Cabinet 2 channels	
X4-IS		10.4074-25	CA802-IS-114	Cabinet 4 channels	
X8-IS		10.4074-28	CA802-IS-126	Cabinet 8 channels	
X12-IS		10.4074-31	CA802-IS-142	Cabinet 12 channels	
X2T-IS		10.4074-32	CA802-IS-146	Cabinet 2 channels +T	
X4T-IS		10.4074-34	CA802-IS-154	Cabinet 4 channels +T	
X8T-IS		10.4074-37	CA802-IS-166	Cabinet 8 channels +T	
X12T-IS		10.4074-41	CA802-IS-182	Cabinet 12 channels	
X2(T)		10.2710	CH803	Oscillator chassis	
X4(T)		10.2711	CH804	Oscillator chassis	
X8(T)		10.2712	CH805	Oscillator chassis	
X12(T)		10.2713	CH806	Oscillator chassis	
			Transmitter Modules		
		10.2688	AA802	Modulation Amplifier	
		10.2704	BP861	Bandpass filter	
		10.2701	FD861	Frequency doubler	
		10.2702	FD862	Frequency doubler	
		10.2703	FD863	Frequency doubler	
		10.3352	FN803-IS	Filter network	
		10.2705	FN861	Filter network	
		10.4091	PA863-IS	Power amplifier	
		10.4090	PA862a-IS	Power amplifier	
		10.4076	AD801-IS	ADC circuit	
		10.2700-01	PM861a	Phase modulator	
		10.3351	VR801-IS	Voltage regulator	
		10.2885	XO862	Crystal oscillator	
		10.4087	CH8015	Transmitter chassis	
			Receiver Modules		
		10.2687	AA801a-IS	Audio amplifier	
		10.2685	IA801	IF amplifier	
		10.2808	IA802	IF amplifier/discriminator	
		10.2686	IC801	IF converter	
		10.3356	RC861-IS	Receiver converter	
		10.2689	SQ801a	Squelch circuit	
		10.3351	VR801-IS	Voltage regulator	
		10.2692	XF803	Crystal filter	
		10.2708	XO811	Crystal oscillator	
		10.3230	CH8010	Receiver chassis	

Storno

TYPE	Nº	CODE	DATA		
	R1	80.5058	5.6Kohm 5%	carbon film	0.1W
	R2	80.5081	470Kohm 5%	carbon film	0.1W
	R3	80.50xx	ADJ (110mV) 5%	carbon film	0.1W
	R4	80.50xx	ADJ (SQ) 5%	carbon film	0.1W
	R6	80.5060	8.2Kohm 5%	carbon film	0.1W
	R7	80.50xx	ADJ (Po) 5%	carbon film	0.1W
	R10	80.50xx	ADJ (Dev) 5%	carbon film	0.1W
	R11	80.50xx	ADJ (Dev.) 5%	carbon film	0.1W
	R12	80.5060	8.2Kohm 5%	carbon film	0.1W
	R13	80.5234	560ohm 5%	carbon film	0.125W
	C5	74.5275	470pF 20%	ceram	
	C6	74.5275	470pF 20%	ceram	
	C7	74.5275	470pF 20%	ceram	
	R101	80.5049	1Kohm 5%	carbon film	0.1W
	R102	80.5058	5.6Kohm 5%	carbon film	0.1W
	R103	80.5069	47Kohm 5%	carbon film	0.1W
	R104	80.5061	10Kohm 5%	carbon film	0.1W
	C101	74.5155	1nF -20+80%	ceramic	63V
	C102	74.5155	1nF -20+80%	ceramic	63V
	C103	74.5155	1nF -20+80%	ceramic	63V
	C104	74.5155	1nF -20+80%	ceramic	63V
	C105	74.5155	1nF -20+80%	ceramic	63V
	C106	74.5155	1nF -20+80%	ceramic	63V
	E101	99.5366	8.2V	Zener diode	5W
	E102	99.5366	8.2V	Zener diode	5W
	E103	99.5366	8.2V	Zener diode	5W
	E104	99.5366	8.2V	Zener diode	5W
	a101	99.5121	BC237	Transistor	

UHF RADIOTELEPHONE CQP863U-IS 1W

X402.693

Storno

TYPE	Nº	CODE	DATA	
		10.3590	TX814-1W	Transmitter
		10.3591	TX814-3W	Transmitter
		10.3434	RX814	Receiver
		10.2711	CH804	Oscillator Chassis
		10.3729	CP809	Control Head
		10.2882-01	TQ801a	Pilot Tone Unit
		10.3587	TB802	Terminal Board
		10.3730	CA800 S6	Cabinet
		10.3245	CB811	Control Unit
		10.2708	XO811	Receiver Oscillator
		10.2883	XO815	Transmitter Oscillator
			Transmitter Modules	
		10.2688	AA802	Modulation amplifier
		10.2691	AD801	ADC circuit
		10.2680	BP811	Bandpass filter
		10.3505	CH8014	Chassis
		10.2677	FD811	Frequency doubler
		10.2678	FD812	Frequency doubler
		10.2679	FD813	Frequency doubler
		10.2695	FN804	Modulation filter
		10.2681	FN811	Antenna filter
1W		10.2682	PA811a	Power amplifier
1W		10.2683-01	PA812a	Power amplifier
3W		10.3413	PA813	Power amplifier
3W		10.3414	PA814	Power amplifier
		10.2676	PM811	Phase modulator
		10.2690	VR801	Voltage regulator
			Receiver Modules	
		10.2687-01	AA801a	Audio amplifier
		10.3228	CH809	Chassis
		10.2685	IA801	IF amplifier
		10.2808	IA802	IF amplifier/detector
		10.2686	IC801	IF converter
		10.2676	RC811	Receiver converter
		10.2689-01	SQ801a	Squelch circuit
		10.2690	VR801	Voltage regulator
		10.2693	XF804	Crystal filter
	R1	80.5066	27Kohm 5%	Carbon film 0.1W
	R2	80.5081	470Kohm 5%	Carbon film 0.1W
	R3	80.50xx	ADJ (BW) 5%	Carbon film 0.1W

Storno

TYPE	Nº	CODE	DATA		
	R4	80.50xx	ADJ (SQ) 5%	Carbon film	0.1W
1W	R6	80.5057	4.7Kohm 5%	Carbon film	0.1W
3W	R6	80.5056	3.9Kohm 5%	Carbon film	0.1W
	R12	80.5063	15Kohm 5%	Carbon film	0.1W
	R14	80.5061	10Kohm 5%	Carbon film	0.1W
	C8	73.5134	0.4uF 20%	Tantal	16V
	E2	99.5237	1N4148	Diode	
	E3	99.5237	1N4148	Diode	
	E4	99.5237	1N4148	Diode	

Storno

TYPE	Nº	CODE	DATA
			Modules CQP813-IS and CQP814-IS
		10.2687	AA801 Audio amplifier
		10.2688	AA802 Audio amplifier
		10.2680	BP811 Band pass filter
		10.2835	CH801 Chassis assembly
		10.2677	FD811 Frequency doubler
		10.2678	FD812 Frequency doubler
		10.2679	FD813 Frequency doubler
813-IS		10.3352	FN803-IS Filter network
814-IS		10.3353	FN804-IS Filter network
		10.2685	IA801 IF-amplifier
		10.2808	IA802 IF-amplifier/discriminator
		10.2686	IC801 IF-converter
		10.2682-01	PA811a Power amplifier
		10.2683-01	PA812a Power amplifier
		10.2676	PM811 Phase modulator
		10.3354	RC811-IS Receiver converter
		10.2689-01	SQ801 Squelch unit
		10.3351	VR801-IS Voltage regulator
813-IS		10.2692	XF803 Crystal filter
814-IS		10.2693	XF804 Crystal filter
		10.2608	XO811 Crystal oscillator
		10.2609	XO811 Crystal oscillator
X2		10.2710	CH803 Oscillator chassis 2 channels
X4		10.2711	CH804 Oscillator chassis 4 channels
X8		10.2712	CH805 Oscillator chassis 8 channels
X12		10.2713	CH806 Oscillator chassis 12 channels
C1		10.3349	CP801-IS Local control head
C2		10.3350	CP802-IS Extended control head
			Components mounted on CH801
	C3	74.5161	470 pF -20 +80% ceram PL 63 V
	C7	74.5161	470 pF -20 +80% " PL 63 V
	C9	74.5161	470 pF -20 +80% " PL 63 V
813-IS	R1	80.5058	5.6 KΩ 5% carbon film 1/10 W
814-IS	R1	80.5066	27 KΩ 5% " " 1/10 W
	R2	80.5081	470 KΩ 5% " " 1/10 W
	R3	80.50xx	ADJ 5% " " 1/10 W
	R4	80.50xx	ADJ 5% " " 1/10 W
	R6	80.50xx	ADJ 5% " " 1/10 W
	R7	80.50xx	ADJ 5% " " 1/10 W
	R10	80.50xx	ADJ 5% " " 1/10 W
	R11	80.50xx	ADJ 5% " " 1/10 W
	R12	80.5060	8.2 KΩ 5% " " 1/10 W
	L2	62.0614	0.26 μH RF choke

Storno

TYPE	Nº	CODE	DATA

STORNOPHONE CQP810-IS

X402.401

Storno

TYPE	Nº	CODE	DATA
			Modules CQP833-IS and CQP834-IS
		10.2687	AA801 Audio amplifier
		10.2688	AA802 Audio amplifier
		10.3037	BP831 Band pass filter
		10.2835	CH801 Chassis assembly
		10.3035	FD831 Frequency doubler
		10.3036	FD832 Frequency doubler
833-IS		10.3352	FN803-IS Filter network
834-IS		10.3353	FN804-IS Filter network
		10.2685	IA801 IF-amplifier
		10.2808	IA802 IF-amplifier/discriminator
		10.2686	IC801 IF-converter
		10.3039	PA831 Power amplifier
		10.3040	PA832 Power amplifier
		10.2676	PM811 Phase modulator
		10.3034	PM831 Phase modulator
		10.3355	RC831-IS Receiver converter
		10.2689	SQ801a Squelch unit
		10.3351	VR801-IS Voltage regulator
833-IS		10.2692	XF803 Crystal filter
834-IS		10.2693	XF804 Crystal filter
		10.2709	XO812 Crystal oscillator
		10.3067	XO831 Crystal oscillator
X2		10.2710	CH803 Oscillator chassis 2 channels
X4		10.2711	CH804 Oscillator chassis 4 channels
X8		10.2712	CH805 Oscillator chassis 8 channels
X12		10.2713	CH806 Oscillator chassis 12 channels
C1		10.3349	CP801-IS Local control head
C2		10.3350	CP802-IS Extended control head
			Components mounted on CH801
	C3	74.5161	470 pF -20 +80% ceram PL 63 V
	C7	74.5161	470 pF -20 +80% ceram PL 63 V
833-IS	R1	80.5058	5.6 KΩ 5% carbon film 1/10 W
834-IS	R1	80.5066	27 KΩ 5% " " 1/10 W
	R2	80.5081	470 KΩ 5% " " 1/10 W
	R3	80.50xx	ADJ 5% " " 1/10 W
	R4	80.50xx	ADJ 5% " " 1/10 W
	R6	80.50xx	ADJ 5% " " 1/10 W
	R7	80.50xx	ADJ 5% " " 1/10 W
	R10	80.50xx	ADJ 5% " " 1/10 W
	R11	80.50xx	ADJ 5% " " 1/10 W
	R12	80.5060	8.2 KΩ 5% " " 1/10 W
	R13	80.50xx	ADJ 5% " " 1/10 W
	L2	62.0614	0.26 µH RF choke

Storno

TYPE	Nº	CODE	DATA

STORNOPHONE CQP830-IS

Storno

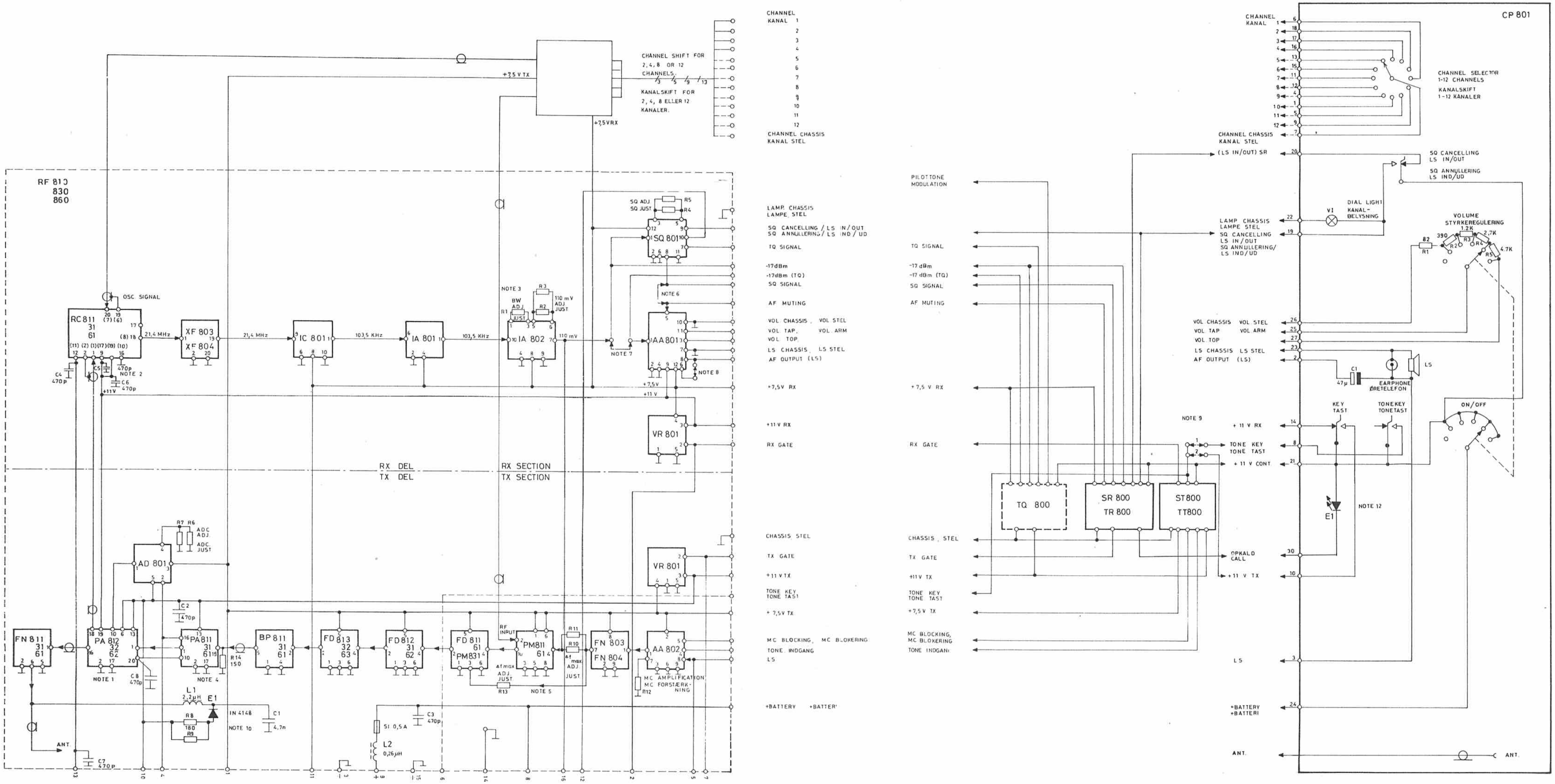
TYPE	NO	CODE	DATA
			Modules CQP863-IS
		10.2687	AA801 Audio amplifier
		10.2688	AA802 Audio amplifier
		10.2704	BP861 Band pass filter
		10.2836	CH802 Chassis assembly
		10.2701	FD861 Frequency doubler
		10.2702	FD862 Frequency doubler
		10.2703	FD863 Frequency doubler
		10.3352	FN803-IS Filter network
		10.2705	FN861 Filter network
		10.2685	IA801 IF-amplifier
		10.2808	IA802 IF-amplifier/discriminator
		10.2686	IC801 IF-converter
		10.2706	PA861 Power amplifier
		10.2707	PA862 Power amplifier
		10.2700	PM861 Phase modulator
		10.3356	RC861-IS Receiver converter
		10.2689	SQ801a Squelch unit
		10.3351	VR801-IS Voltage regulator
		10.2692	XF803 Crystal filter
		10.2708	XO811 Crystal oscillator
		10.2885	XO862 Crystal oscillator
X2		10.2710	CH803 Oscillator chassis 2 channels
X4		10.2711	CH804 Oscillator chassis 4 channels
X8		10.2712	CH805 Oscillator chassis 8 channels
X12		10.2713	CH806 Oscillator chassis 12 channels
C1		10.3349	CP801 Local control head
C2		10.3350	CP802 Extended control head
			Components mounted on CH802
	C3	74.5161	470 pF -20 +80% ceram PL 63 V
	C4	74.5275	470 pF 20%
	C5	74.5275	470 pF 20%
	C6	74.5175	470 pF 20%
	C7	74.5161	470 pF -20 +80% ceram PL 63 V
	C8	74.5161	470 pF -20 +80% " PL 63 V
	R1	80.5058	5.6 KΩ 5% carbon film 1/10 W
	R2	80.5081	470 KΩ 5% " " 1/10 W
	R3	80.50xx	ADJ 5% " " 1/10 W
	R4	80.50xx	ADJ 5% " " 1/10 W
	R6	80.50xx	ADJ 5% " " 1/10 W
	R7	80.50xx	ADJ 5% " " 1/10 W
	R10	80.50xx	ADJ 5% " " 1/10 W
	R11	80.50xx	ADJ 5% " " 1/10 W
	R12	80.5060	8.2 KΩ 5% " " 1/10 W

Storno

TYPE	NO	CODE	DATA
	R14	80.5039	150 Ω 5% carbon film 1/10 W
	L2	62.0614	0.26 μH RF choke

STORNOPHONE CQP860-IS

X402.403



NOTE 1: PIN 13 ON PA812 ONLY.
C8 IN RF860 ONLY.

NOTE 2: () PIN NUMBER FOR RC860.
C4, C5, C6 IN RF860 ONLY.

NOTE 3: 5.6K IN RF813, RF833, AND RF863.
27K IN RF814 AND RF834.

NOTE4: PIN 14 AND R14 IN PA861 ONLY.

NOTE 5: R13 IN RF830 ONLY.

NOTE 6: STRAP WITHOUT SR/TR800.

NOTE 7: STRAP WITHOUT TQ800:

NOTE 8: STRAP IN RF814 AND RF834.

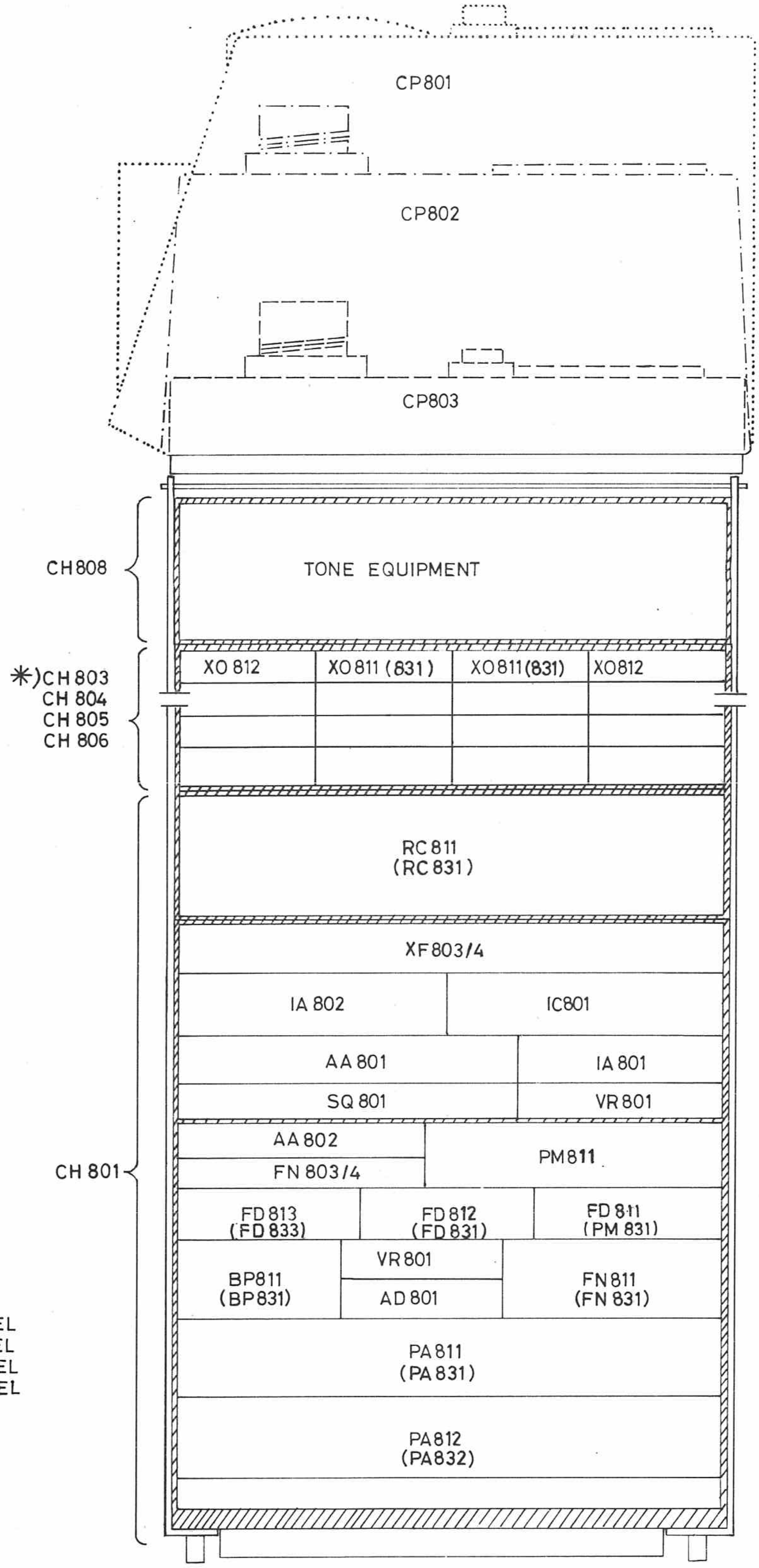
NOTE 9: 1-TONE KEY. 2-IDENTIFICATION.

NOTE 10: C1, E1, L1 IN RF810 AND RF830 ONLY.
R8: 180 ohm IN RF810.
R8-R9: 1.8K IN RF830.
R9 IN RF830 ONLY.

NOTE 11: R14 IN RF860 ONLY.

NOTE 12: E1 EMPLOYED WITH TONE EQUIPMENT ONLY.

SYSTEM LAY-OUT
SYSTEMDIAGRAM
CQP 800
D401.726

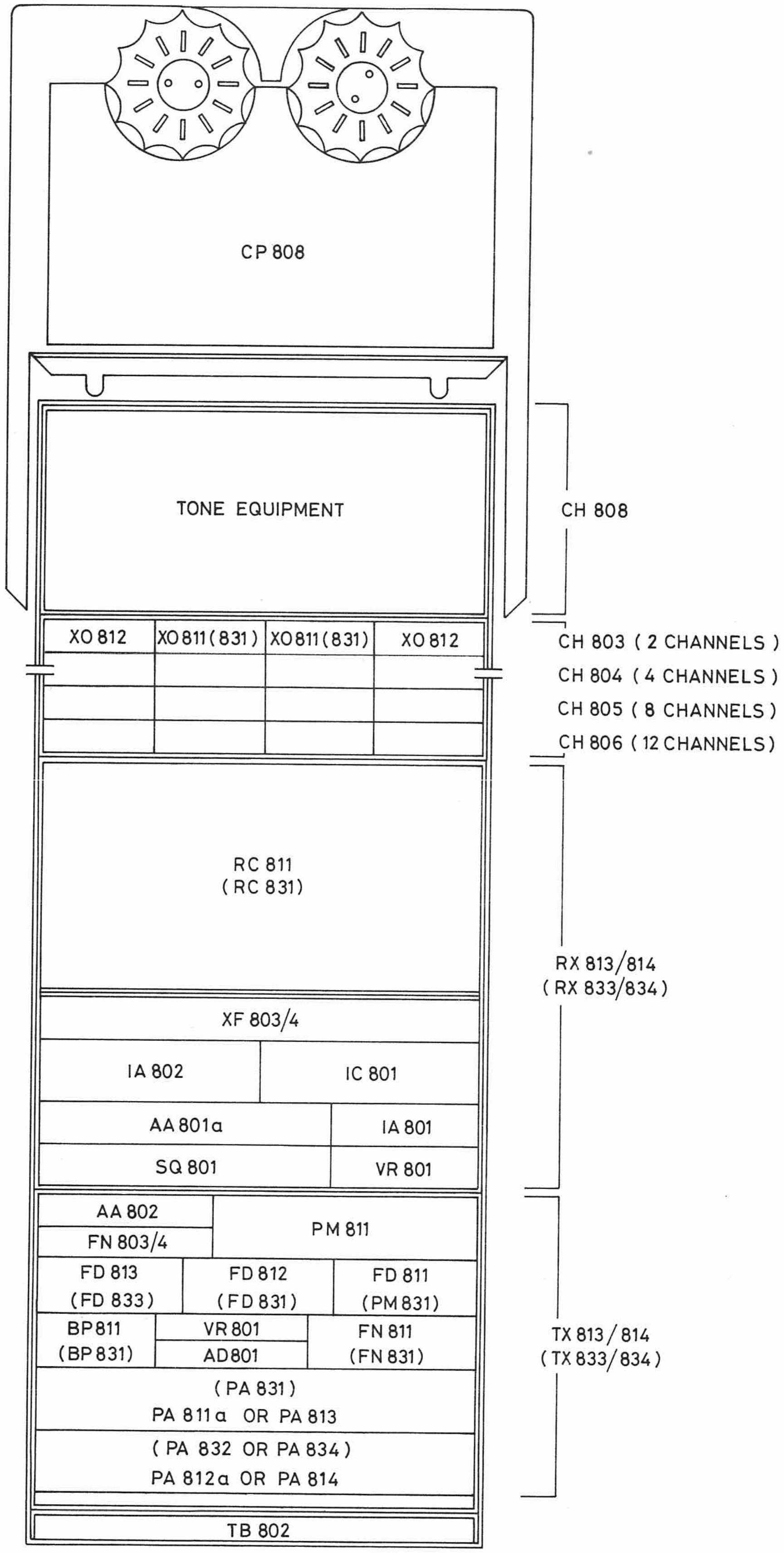


*) CH803 = 2 CHANNEL
CH804 = 4 CHANNEL
CH805 = 8 CHANNEL
CH806 = 12 CHANNEL

MODULE LOCATION CQP810, CQP830

Storno

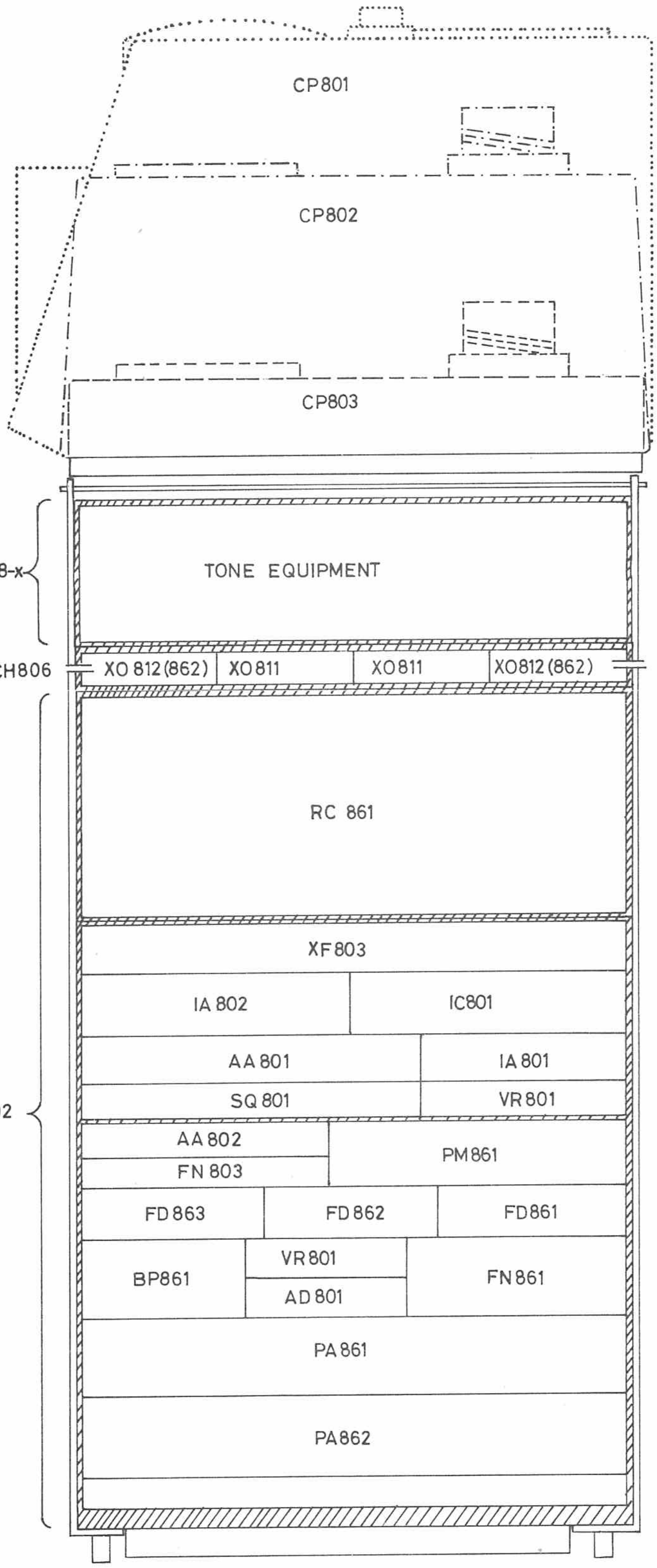
Storno



MODULE LOCATION CQP 810U, CQP 830U

D402.579

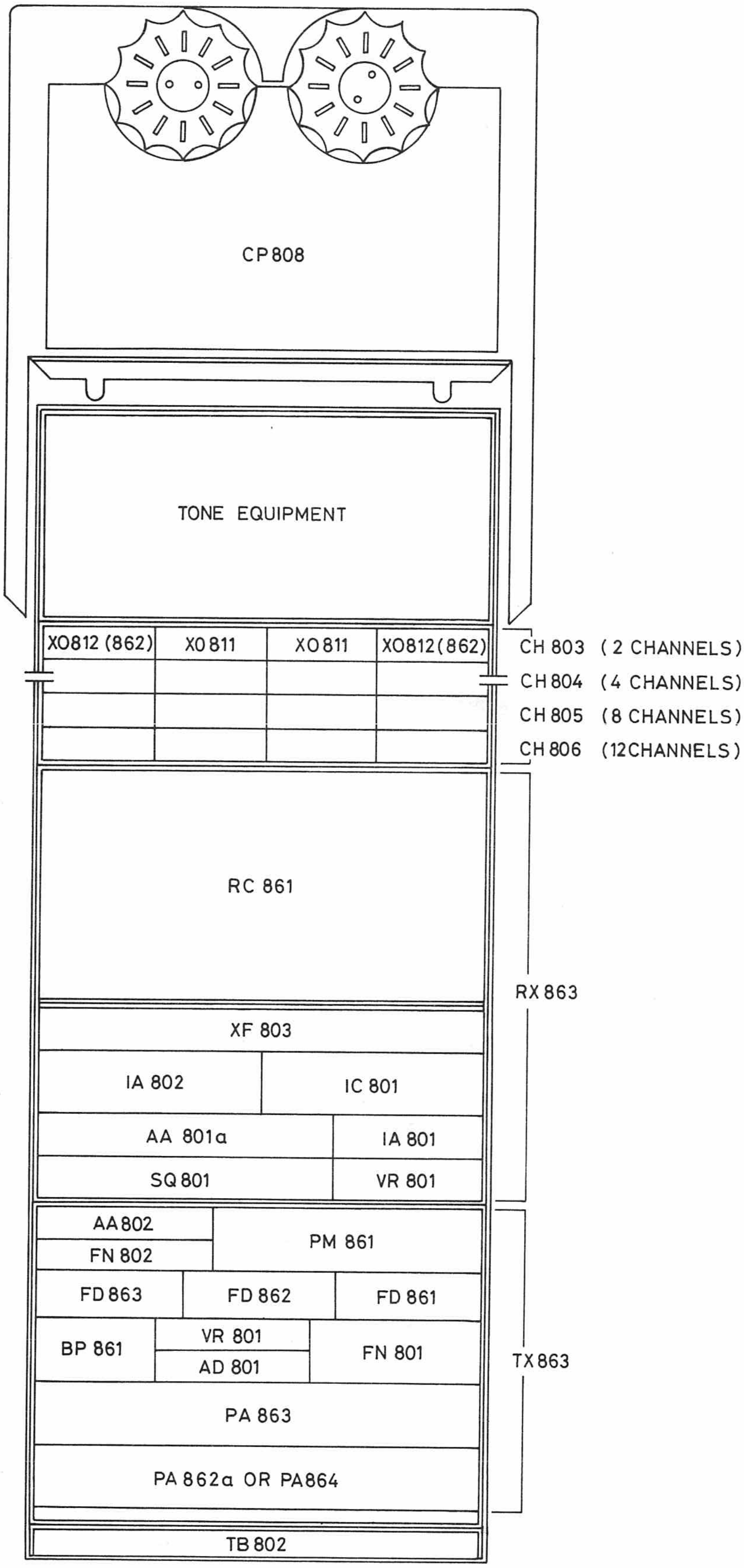
Storno



*) CH803 = 2 CHANNEL
CH804 = 4 CHANNEL
CH805 = 8 CHANNEL
CH806 = 12 CHANNEL

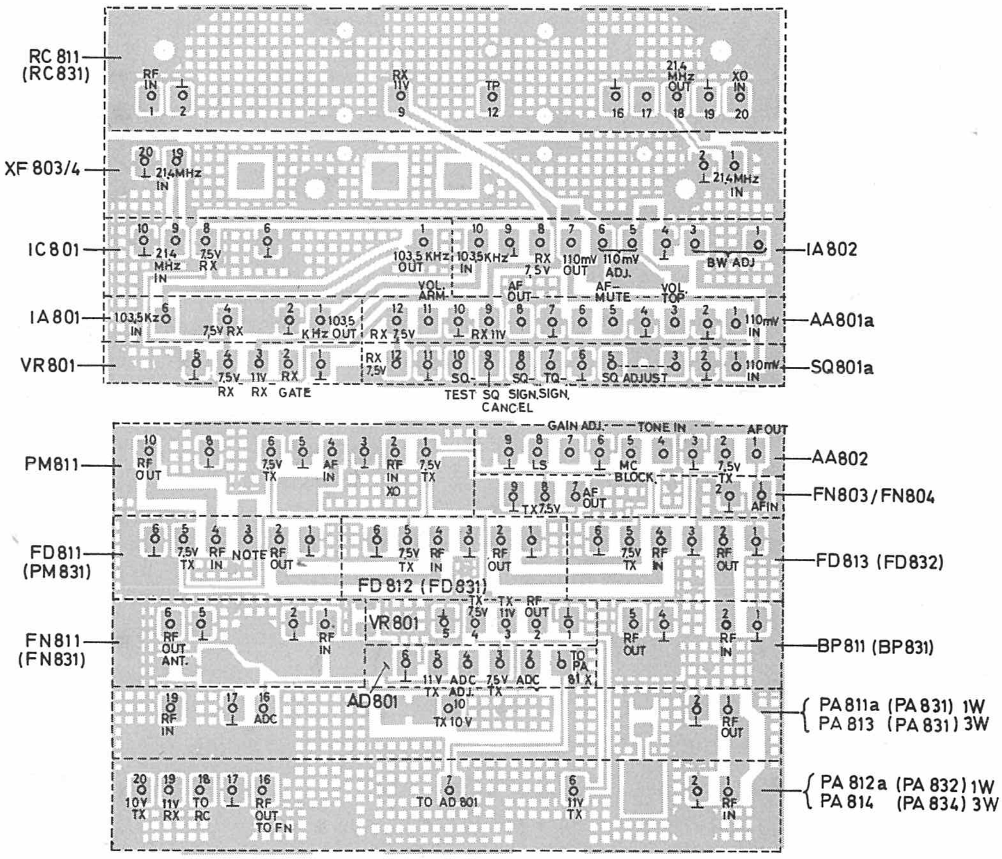
MODULE LOCATION CQP860

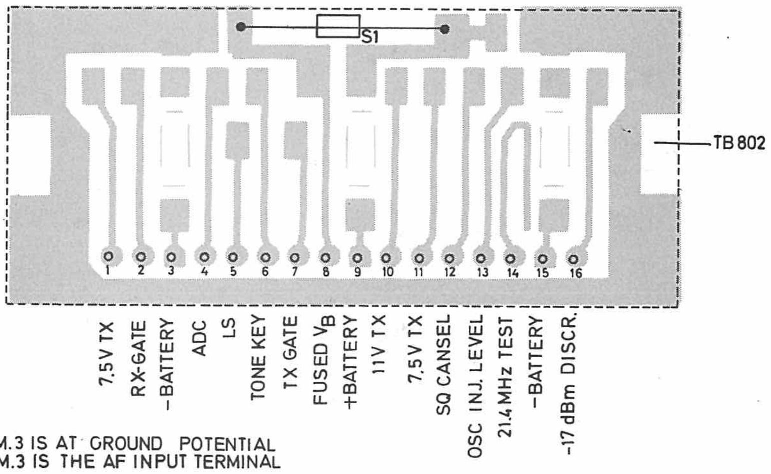
Storno



MODULE LOCATION CQP 860 U

 Storno



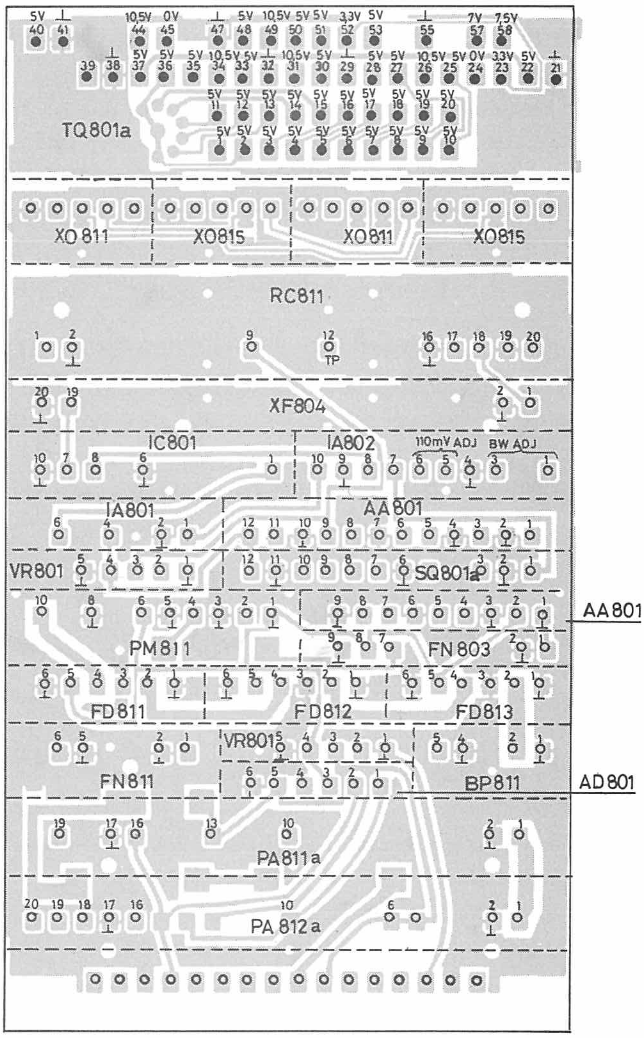


CQP 830 = (   )

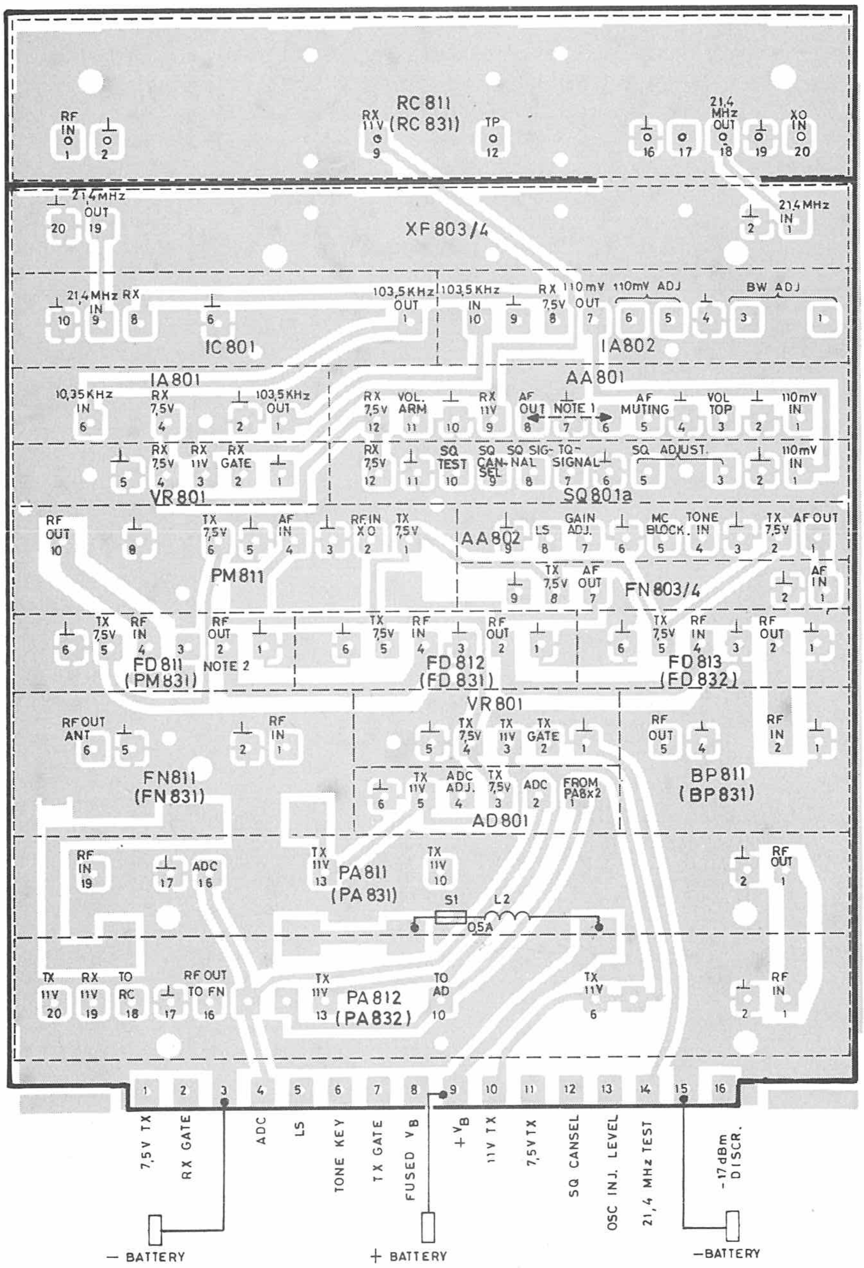
NOTE: IN FD 811, TERM. 3 IS AT GROUND POTENTIAL
IN PM 831, TERM. 3 IS THE AF INPUT TERMINAL

PIN LOCATION CQP810U, CQP830U

D402.473



PIN LOCATION CQP814 C7 x 2 TQ

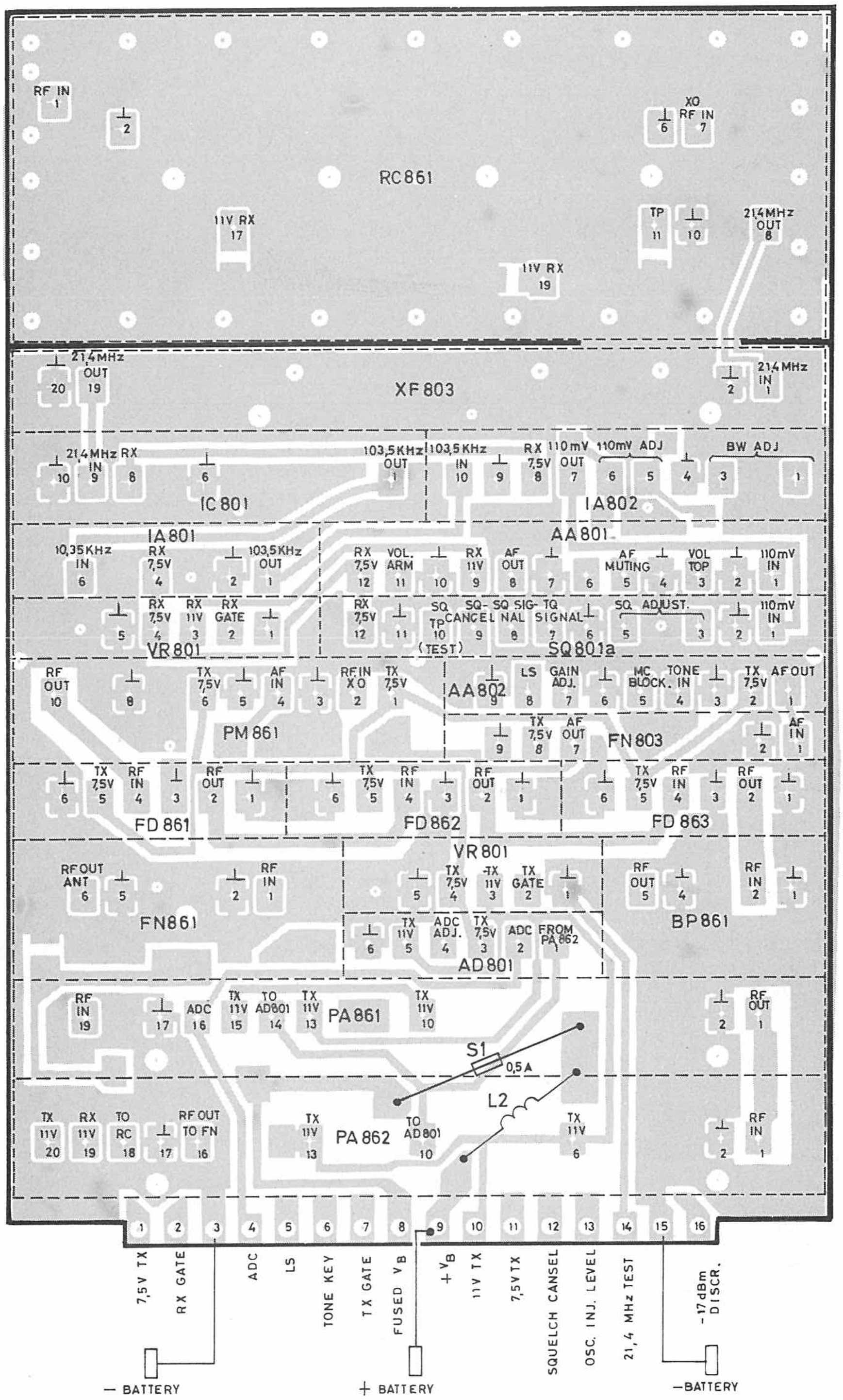


NOTE 1. 12,5 kHz ONLY

NOTE 2. IN FD811, TERM. 3 IS AT GROUND POTENTIAL
IN PM831, TERM. 3 IS THE AF INPUT TERMINAL

PIN LOCATION CQP810, CQP830

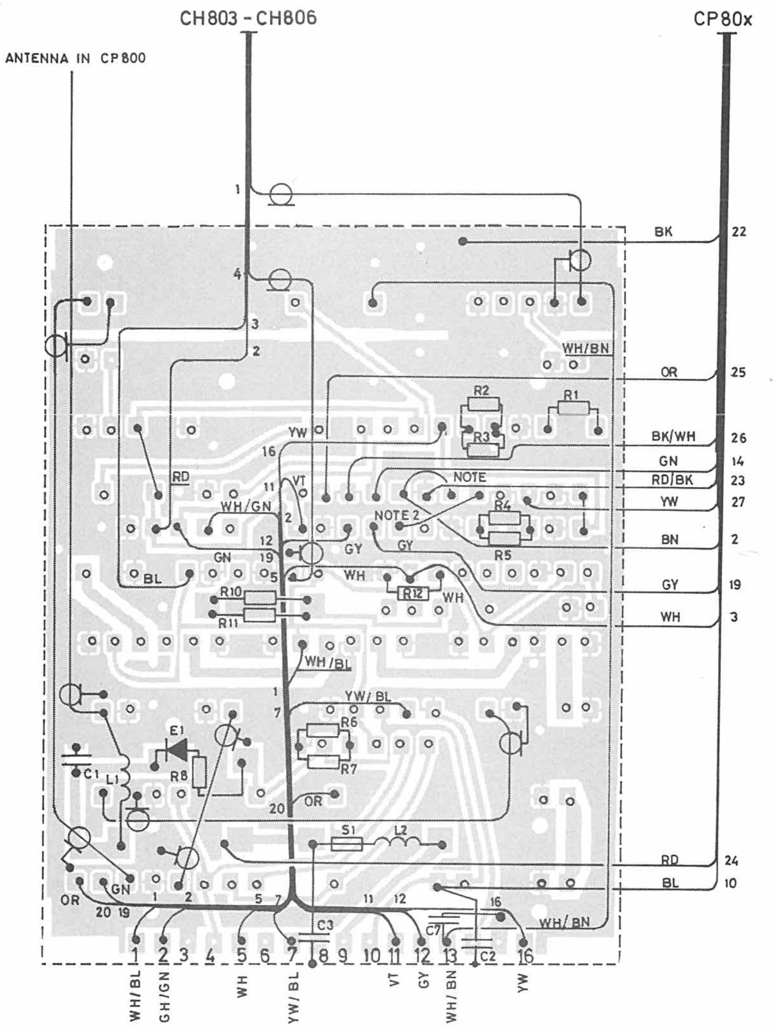
Storno



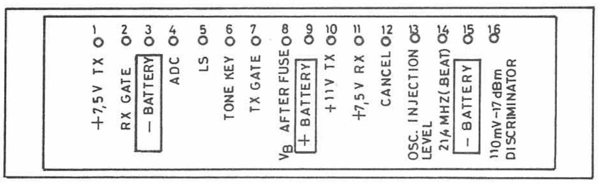
PIN LOCATION CQP860

D402.069

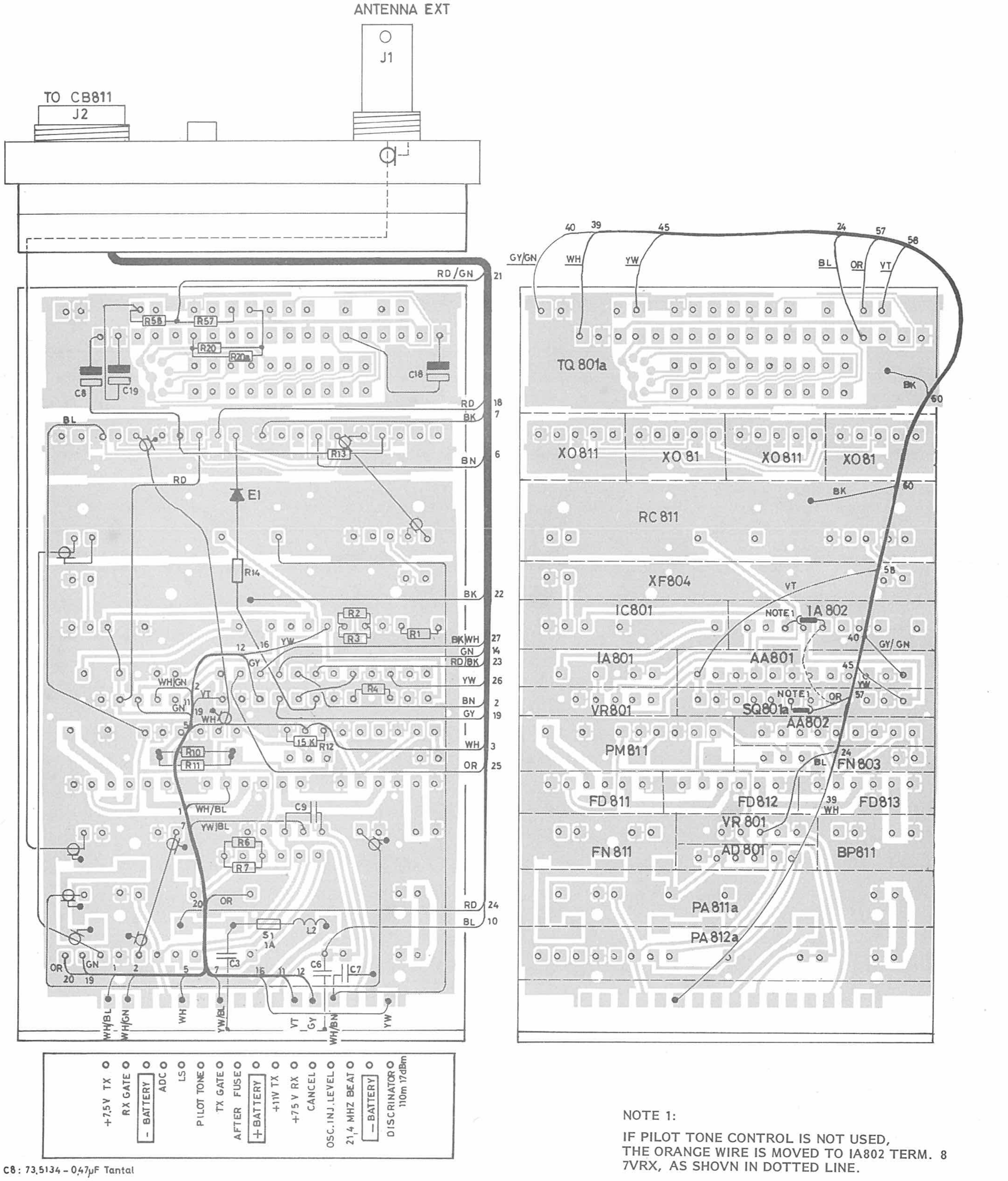
Storno



NOTE. 12,5 kHz ONLY
NOTE 2. REMOVE WHEN USING SR801/802



WIRING DIAGRAM CQP810, CQP830



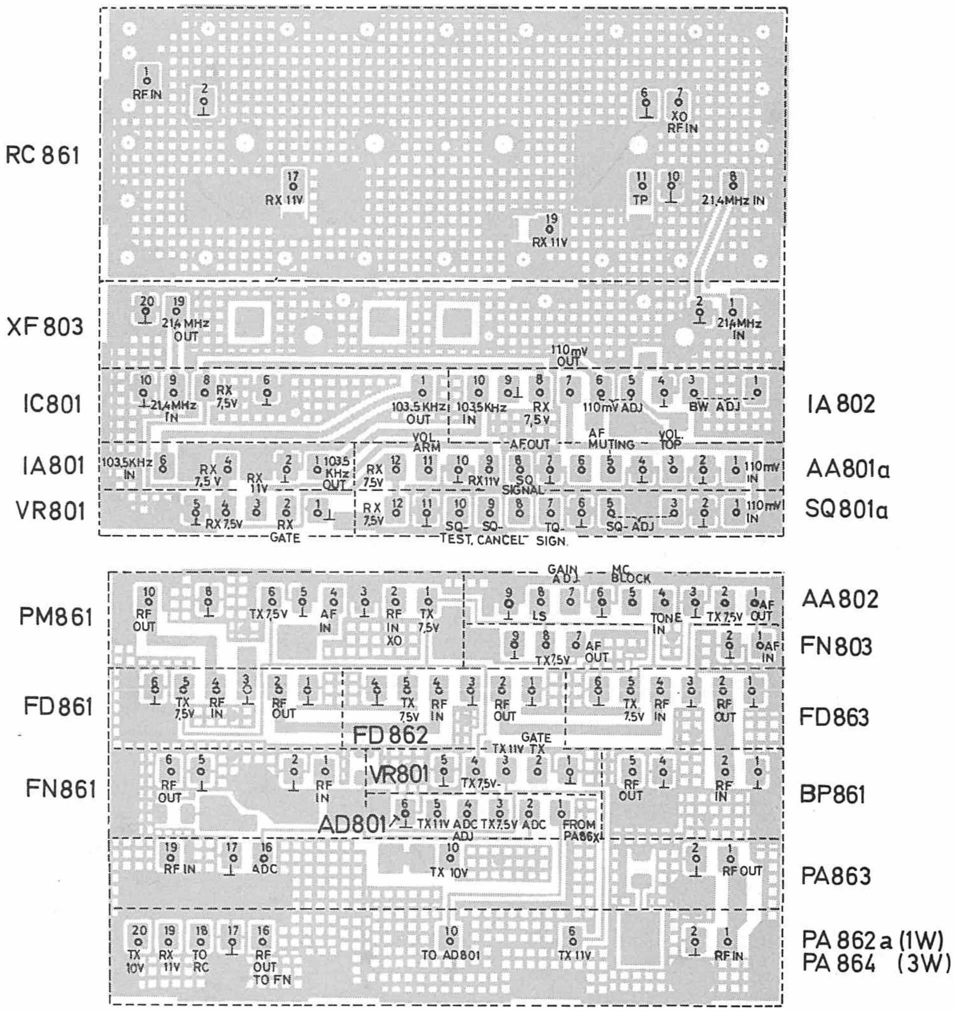
C8: 73.5134 - 0,47μF Tantal

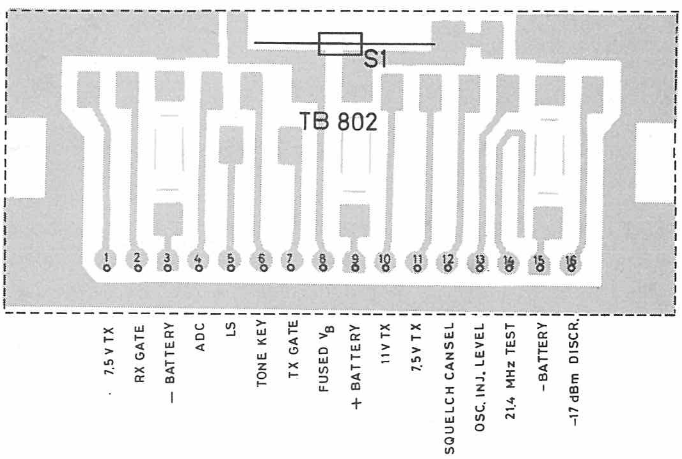
NOTE 1:

IF PILOT TONE CONTROL IS NOT USED, THE ORANGE WIRE IS MOVED TO IA802 TERM. 8 7VRX, AS SHOVN IN DOTTED LINE.

WIRING CQP814 C7 x 2 TQ

D402.272/2

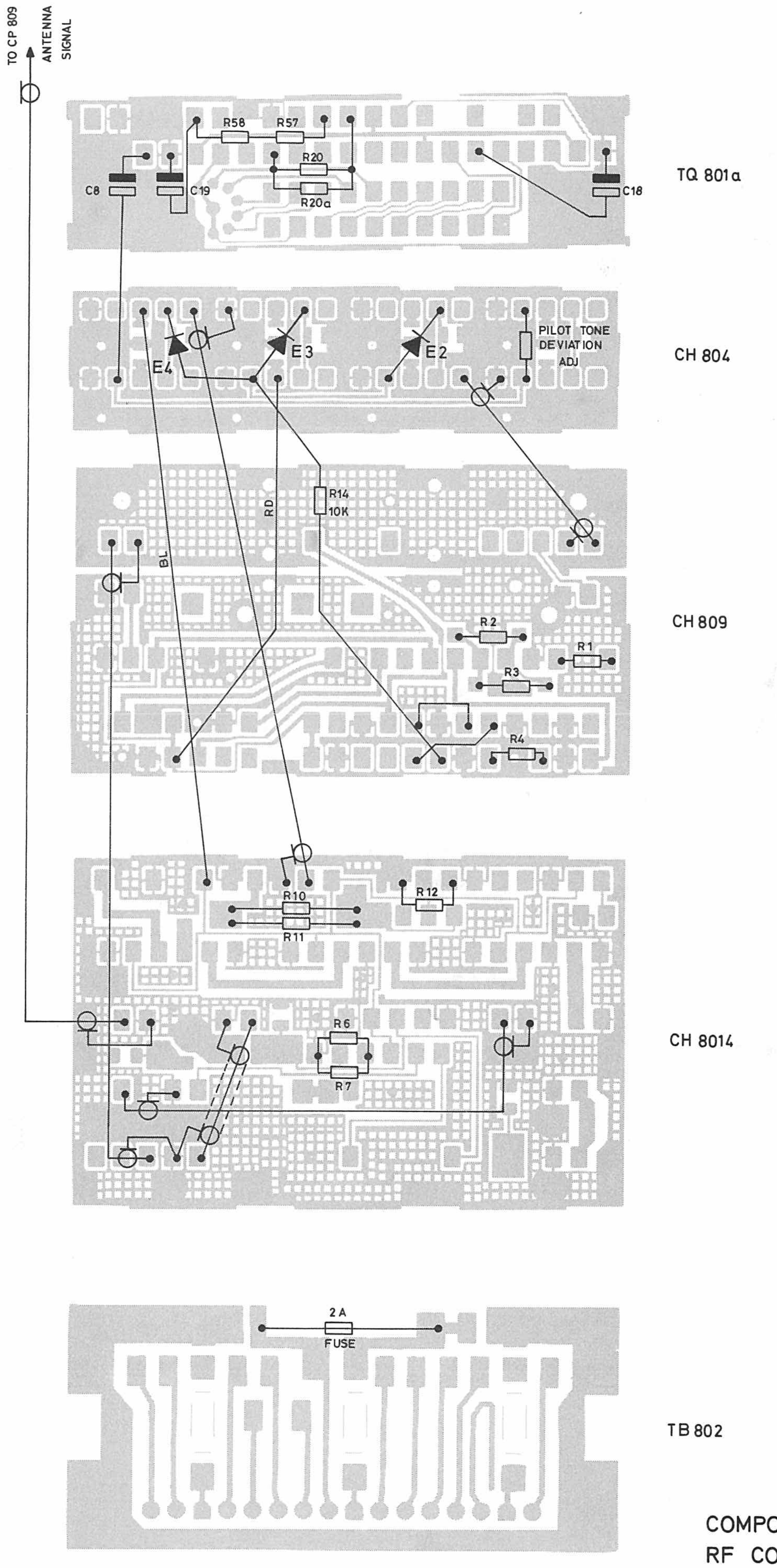




PIN LOCATION CQP860U

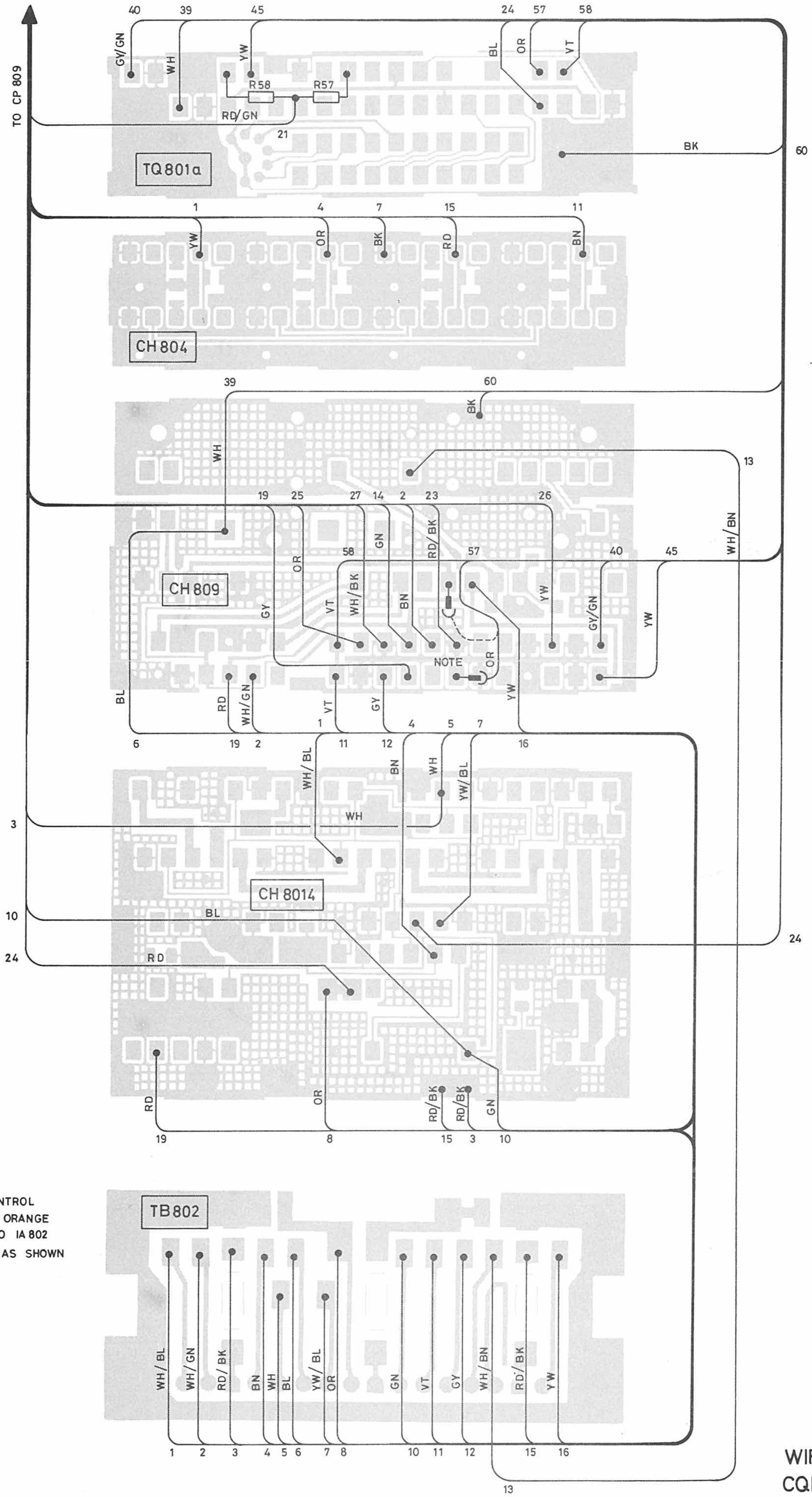
D402.474

Storno



COMPONENT LAY - OUT
RF COAX CABLING
CQP 814 1 C9 x 4 TQ
CQP 814 3 C9 x 4 TQ

D402.700



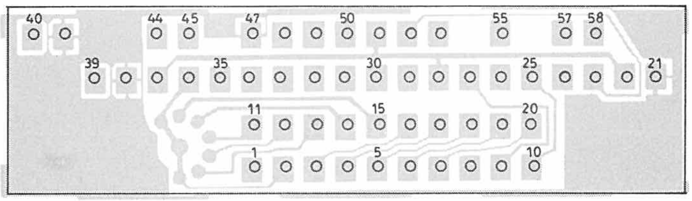
NOTE 1

IF PILOT TONE CONTROL IS NOT USED THE ORANGE WIRE IS MOVED TO IA 802 TERM. 8 (7,5 V RX), AS SHOWN IN DOTTED LINE

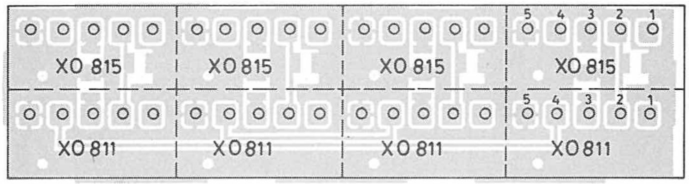
WIRING LOCATION
CQP 814 1 C9 x 4 TQ
CQP 814 3 C9 x 4 TQ

D402.699

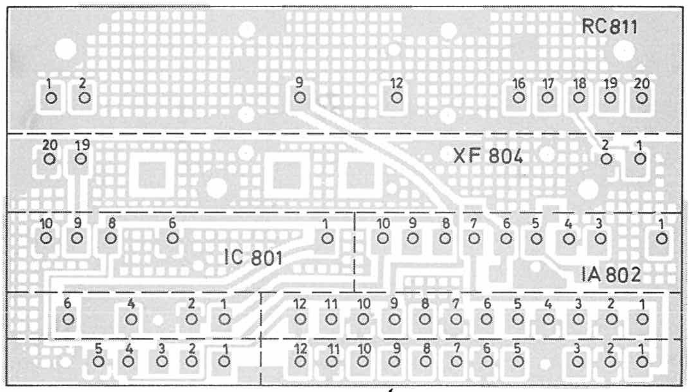
TQ 801a



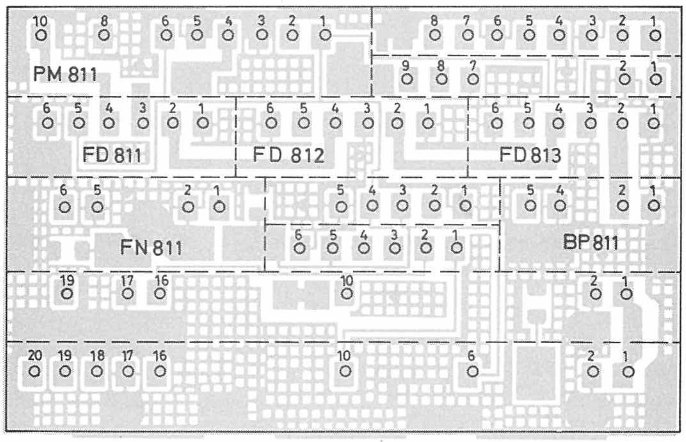
CH 804



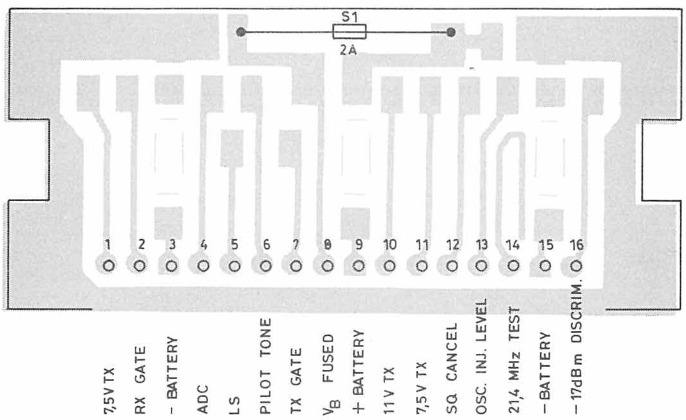
CH 809
IA 801
VR801
AA 801a
SQ 801a



CH 8014
AA 802
FN804
VR 801
AD801
PA 811a - 1W
PA 813 - 3W
PA 812a - 1W
PA 814 - 3W

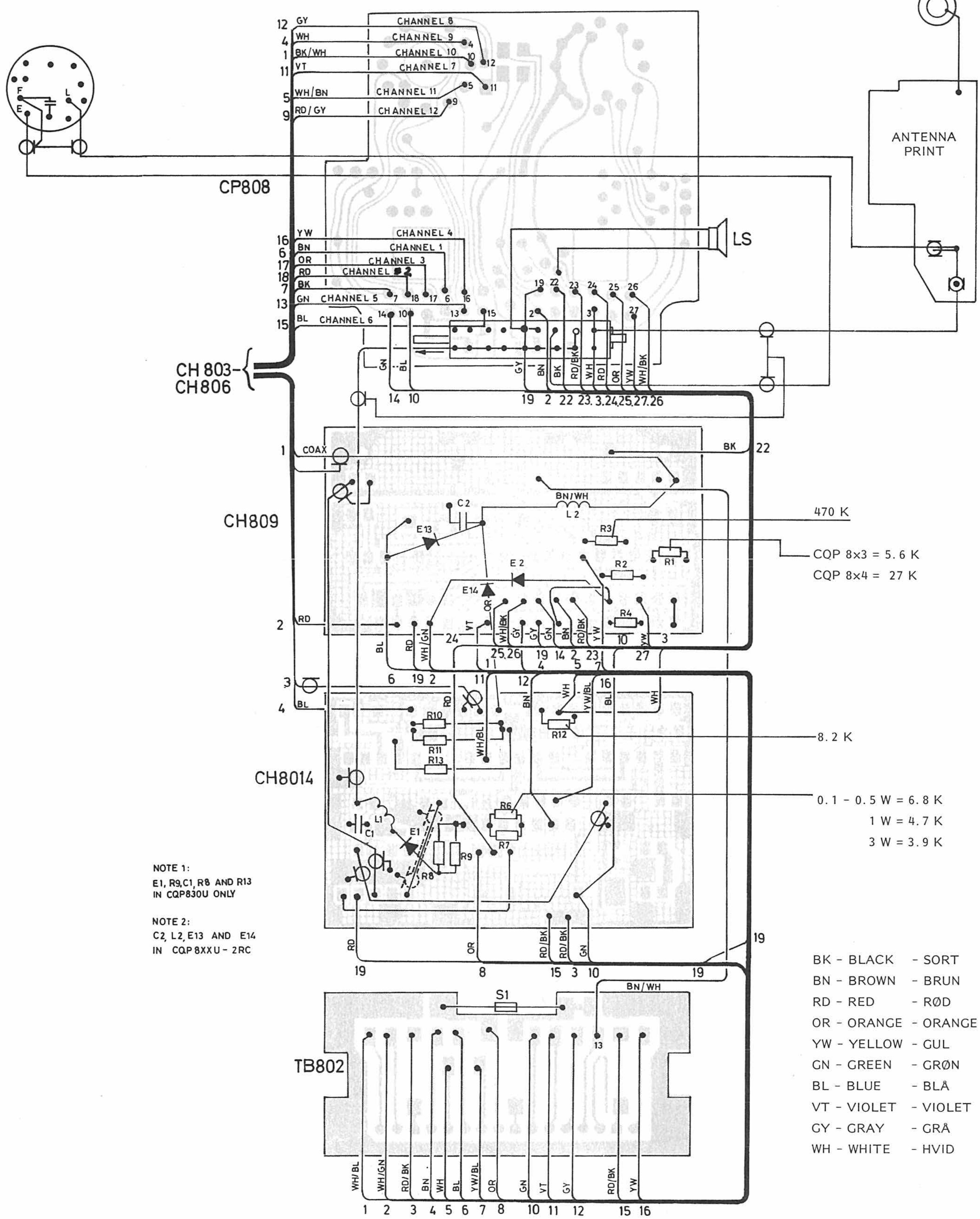


TB 802



PIN LOCATION
CQP 1C9 x 4TQ
CQP 3C9 x 4TQ

D402.698



NOTE 1:
E1, R9, C1, R8 AND R13 IN CQP830U ONLY

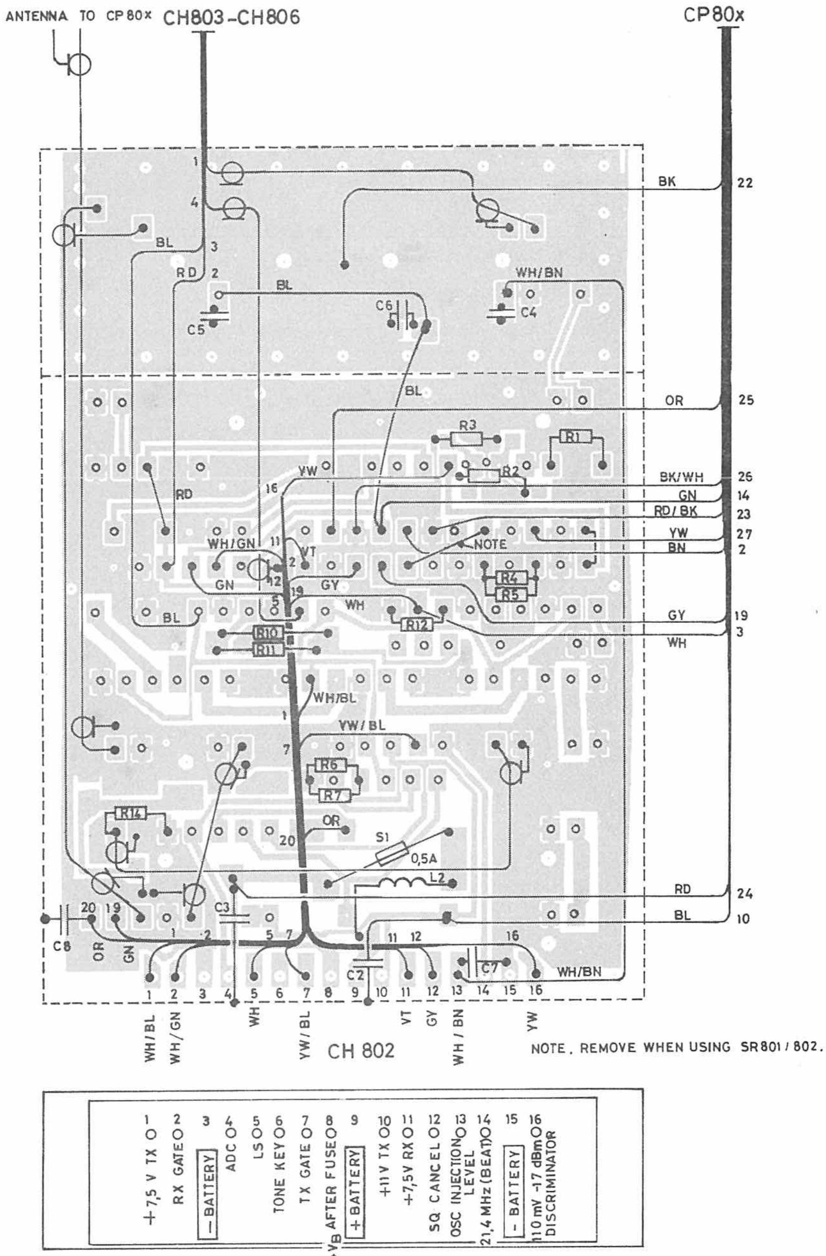
NOTE 2:
C2, L2, E13 AND E14 IN CQP8XXU - 2RC

BK - BLACK		- SORT
BN - BROWN		- BRUN
RD - RED		- RØD
OR - ORANGE		- ORANGE
YW - YELLOW		- GUL
GN - GREEN		- GRØN
BL - BLUE		- BLÅ
VT - VIOLET		- VIOLET
GY - GRAY		- GRÅ
WH - WHITE		- HVID

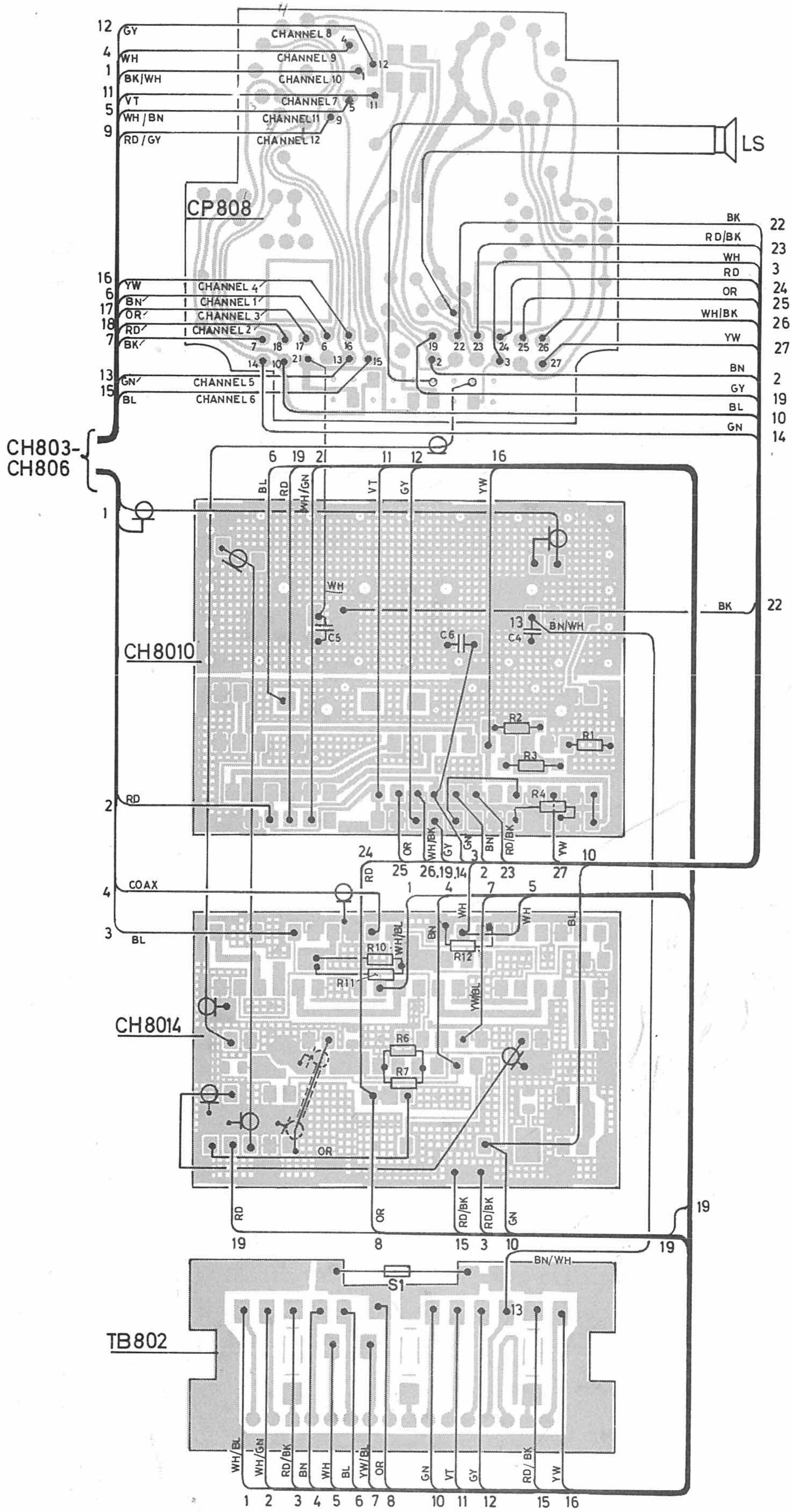
WIRING DIAGRAM CQP810U, CQP830U

CQP810U-2RC, CQP830U-2RC D402.471/4

Storno

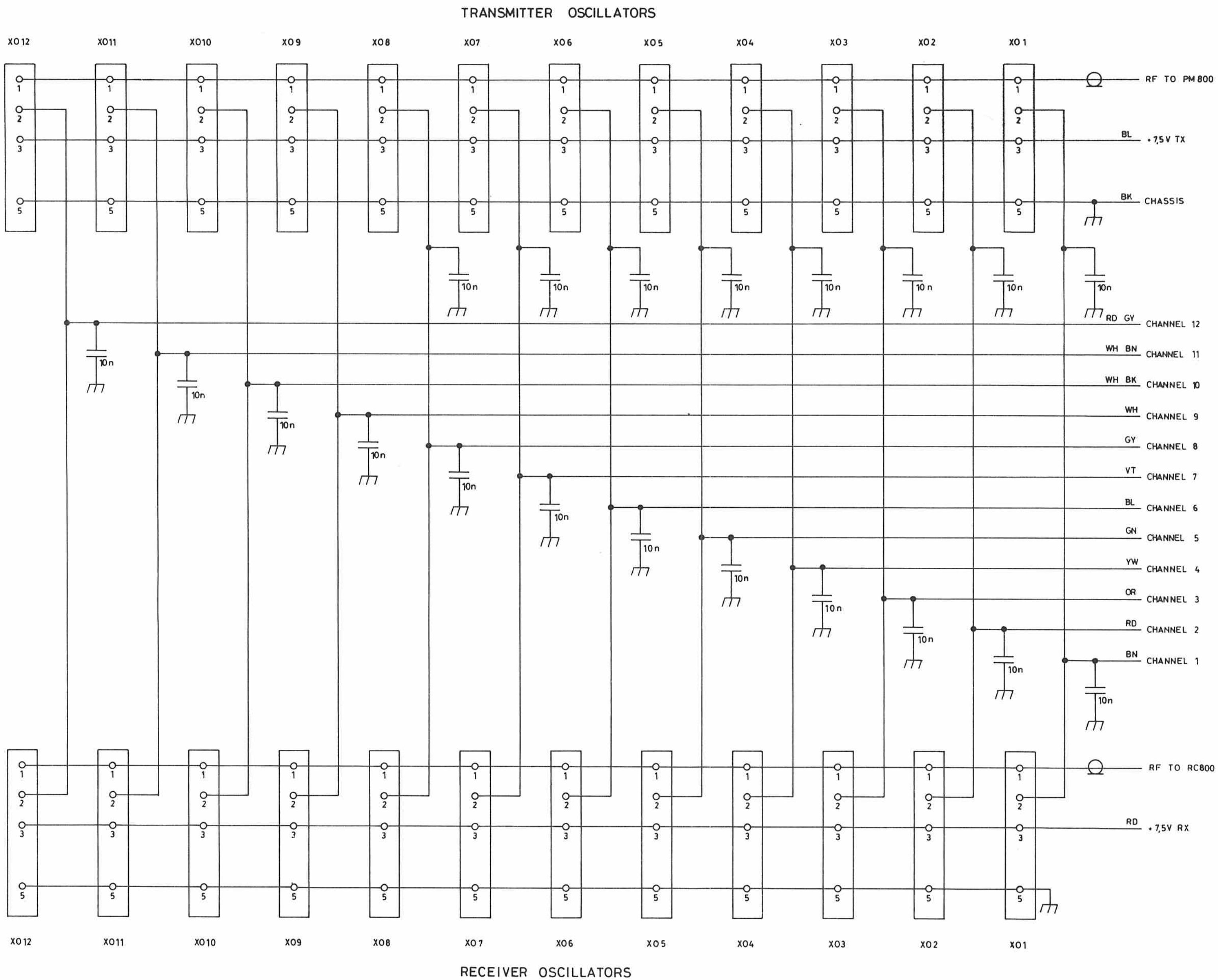


WIRING DIAGRAM CQP860



WIRING DIAGRAM CQP860U

D402.470/2

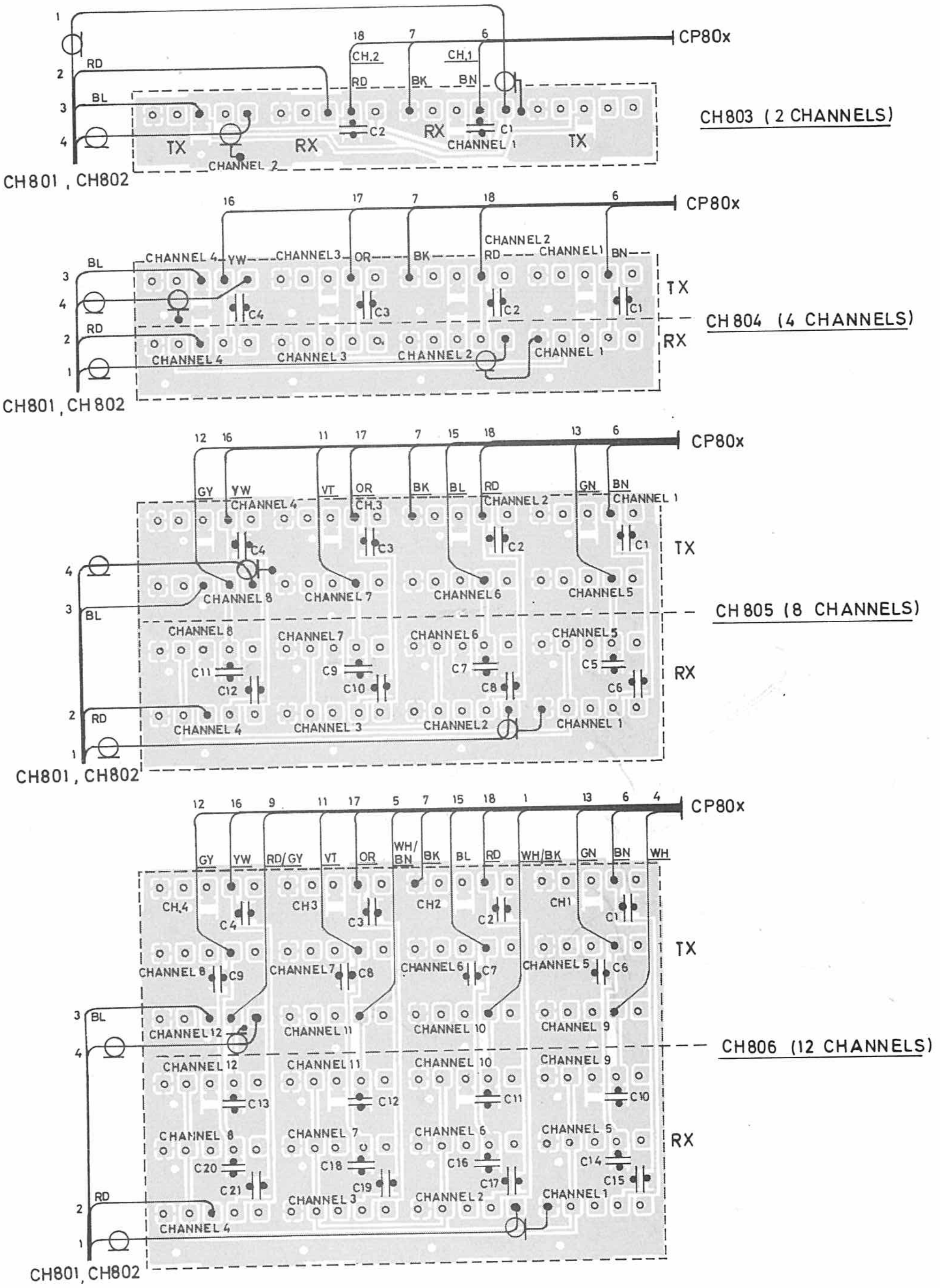


CH 803	CH804	CH805	CH806
XO1 - XO2	XO1 - XO4	XO1 - XO8	XO1 - XO12
C1 - C2	C1 - C4	C1 - C12	C1 - C20

C1 - C20 : 74.5280 10nF 50V
CAPACITOR NUMBERS INTENTIONALLY OMITTED DUE TO DIFFERENT NUMBER SEQUENCES ON THE UNITS.
REFER TO WIRING DIAGRAM.

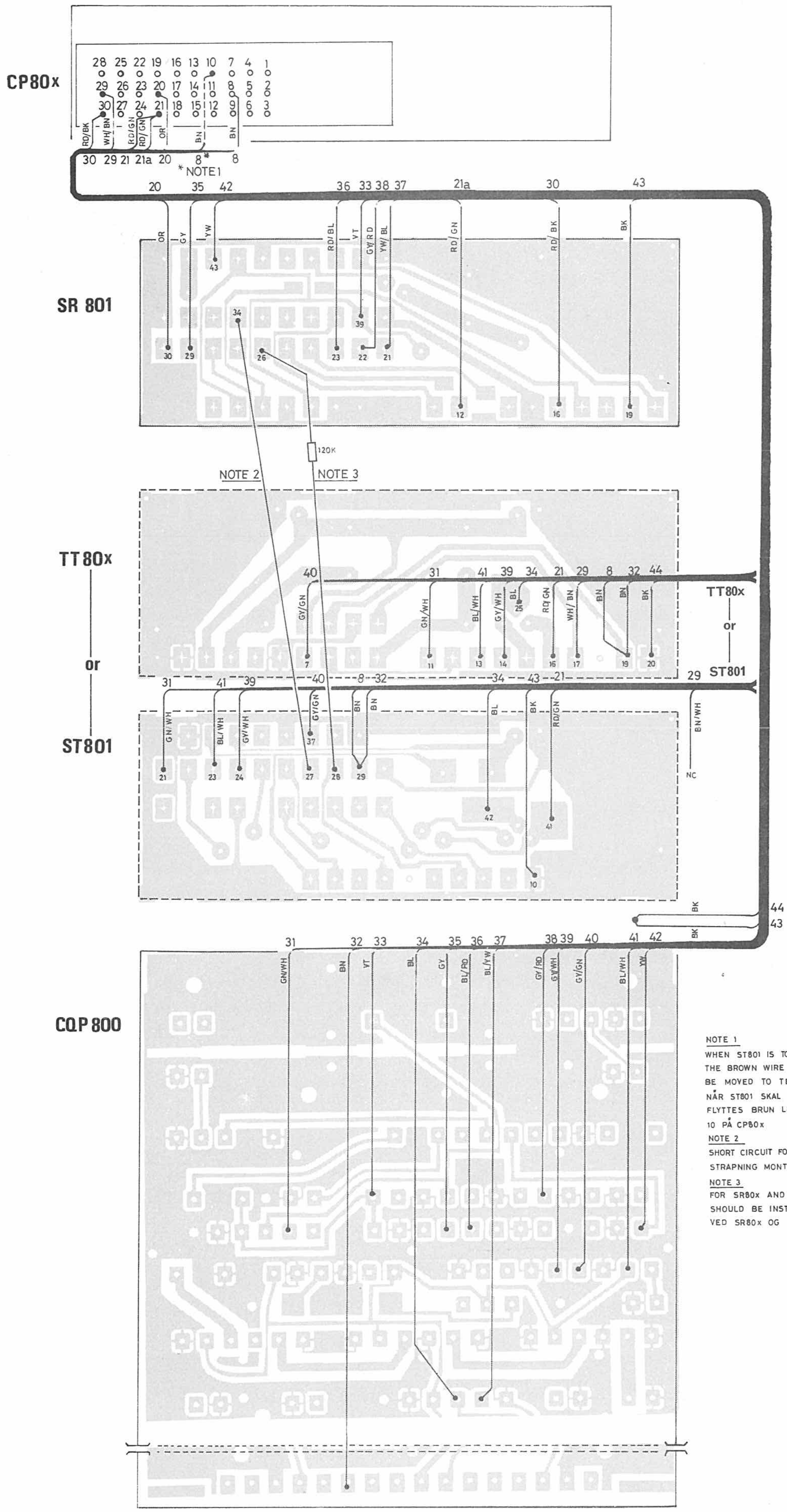
OSCILLATOR CHASSIS
CH803, CH804, CH805, CH806

D402.665



WIRING DIAGRAM CH803, CH804, CH805, CH806

D402.070



NOTE 1

WHEN ST801 IS TO BE USED FOR IDENTIFICATION THE BROWN WIRE AT TERMINAL 8, CP80x, SHOULD BE MOVED TO TERMINAL 10.

NÅR ST801 SKAL KOBLES FOR IDENTIFIKATION FLYTTES BRUN LEDNING FRA TERMINAL 8 TIL 10 PÅ CP80x

NOTE 2

SHORT CIRCUIT FOR AUTOMATIC RECEIPT.

STRAPNING MONTERES FOR AUTOMATISK KVITTERING.

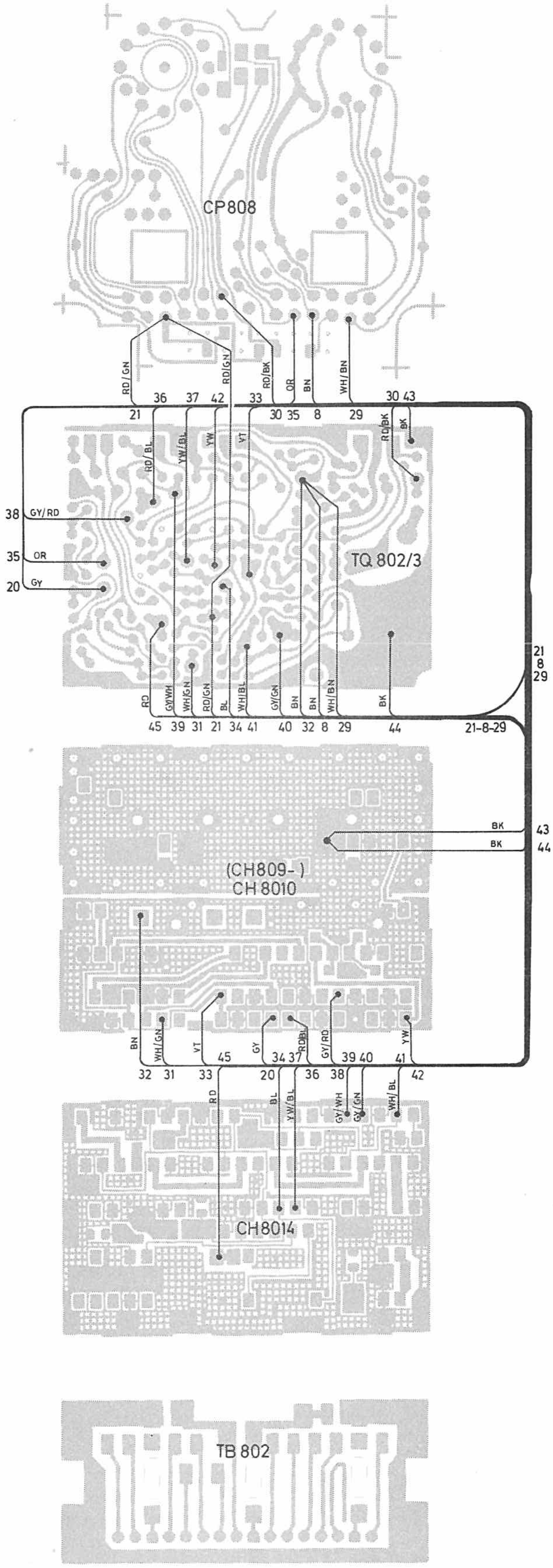
NOTE 3

FOR SR80x AND ST80x A RESISTOR, 120KΩ, 5%, 1/10W SHOULD BE INSTALLED.

VED SR80x OG ST80x MONTERES MODSTAND, 120KΩ, 5%, 1/10W

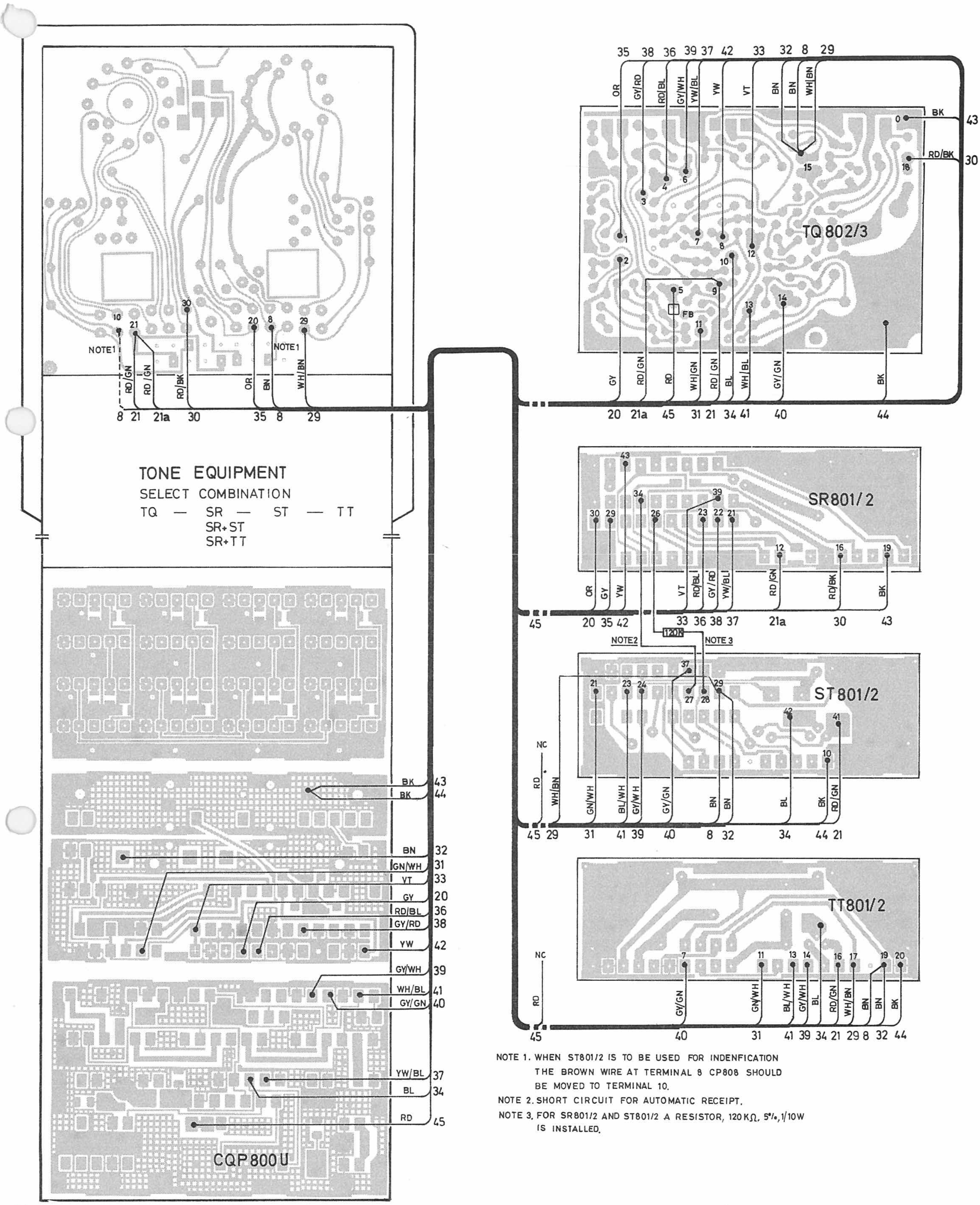
TONE EQUIPMENT WIRING CQP800

Storno



TONE EQUIPMENT WIRING DIAGRAM CQP800U

D402.472



NOTE 1. WHEN ST801/2 IS TO BE USED FOR INDENFICATION THE BROWN WIRE AT TERMINAL 8 CP808 SHOULD BE MOVED TO TERMINAL 10.

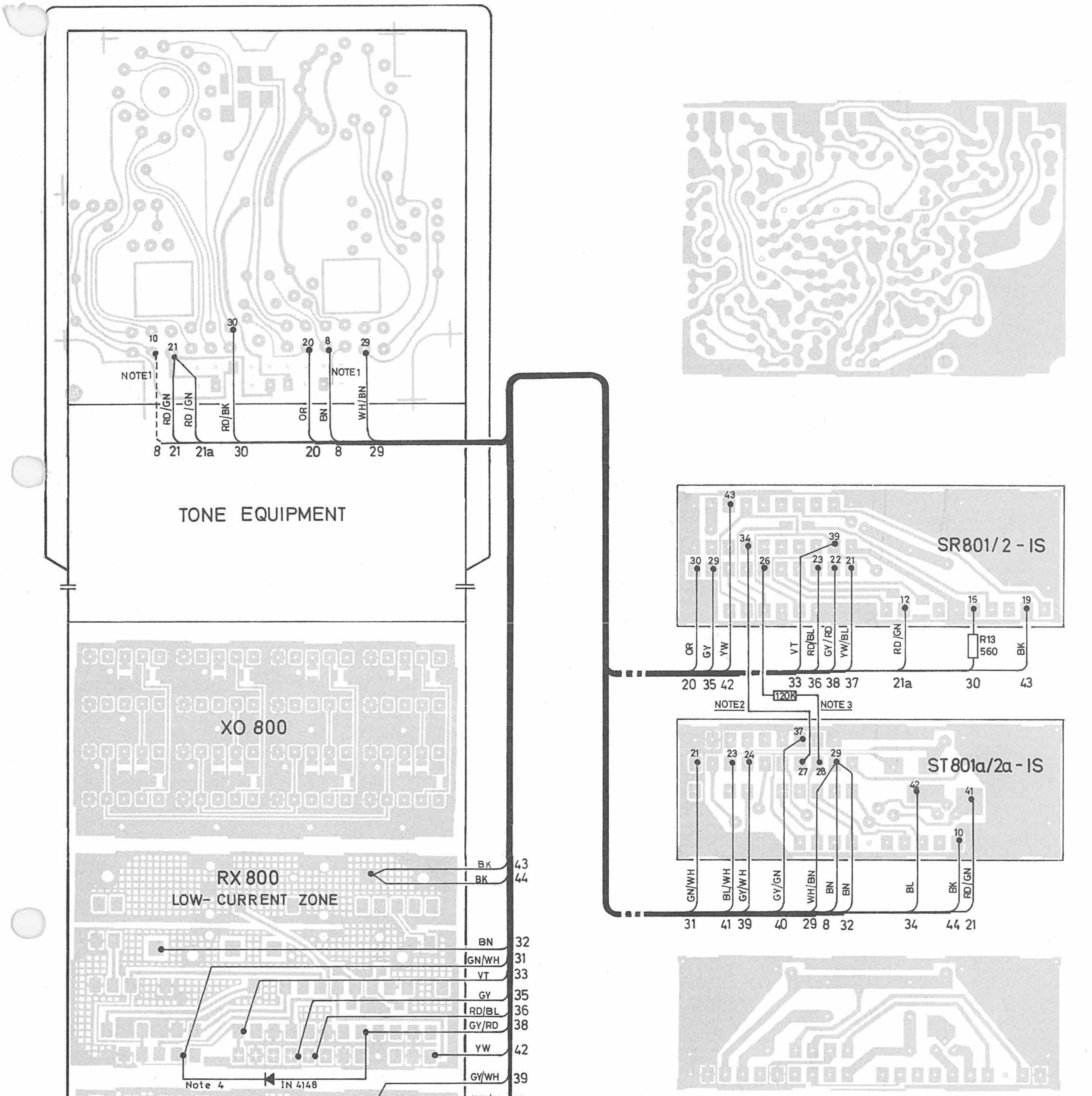
NOTE 2. SHORT CIRCUIT FOR AUTOMATIC RECEIPT.

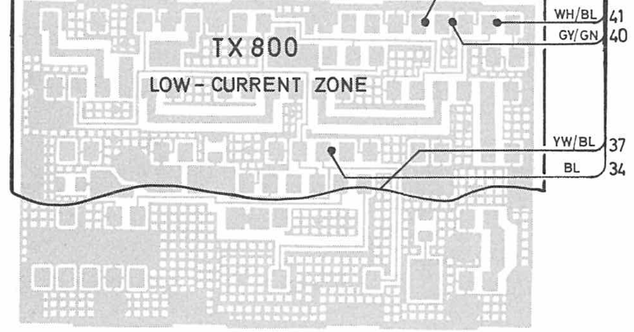
NOTE 3. FOR SR801/2 AND ST801/2 A RESISTOR, 120 KΩ, 5%, 1/10W IS INSTALLED.

TONE EQUIPMENT WIRING CQP800U

D402.561

Storno





NOTE 1. WHEN ST801/2 IS TO BE USED FOR INDENFICATION THE BROWN WIRE AT TERMINAL 8 CP808 SHOULD BE MOVED TO TERMINAL 10.

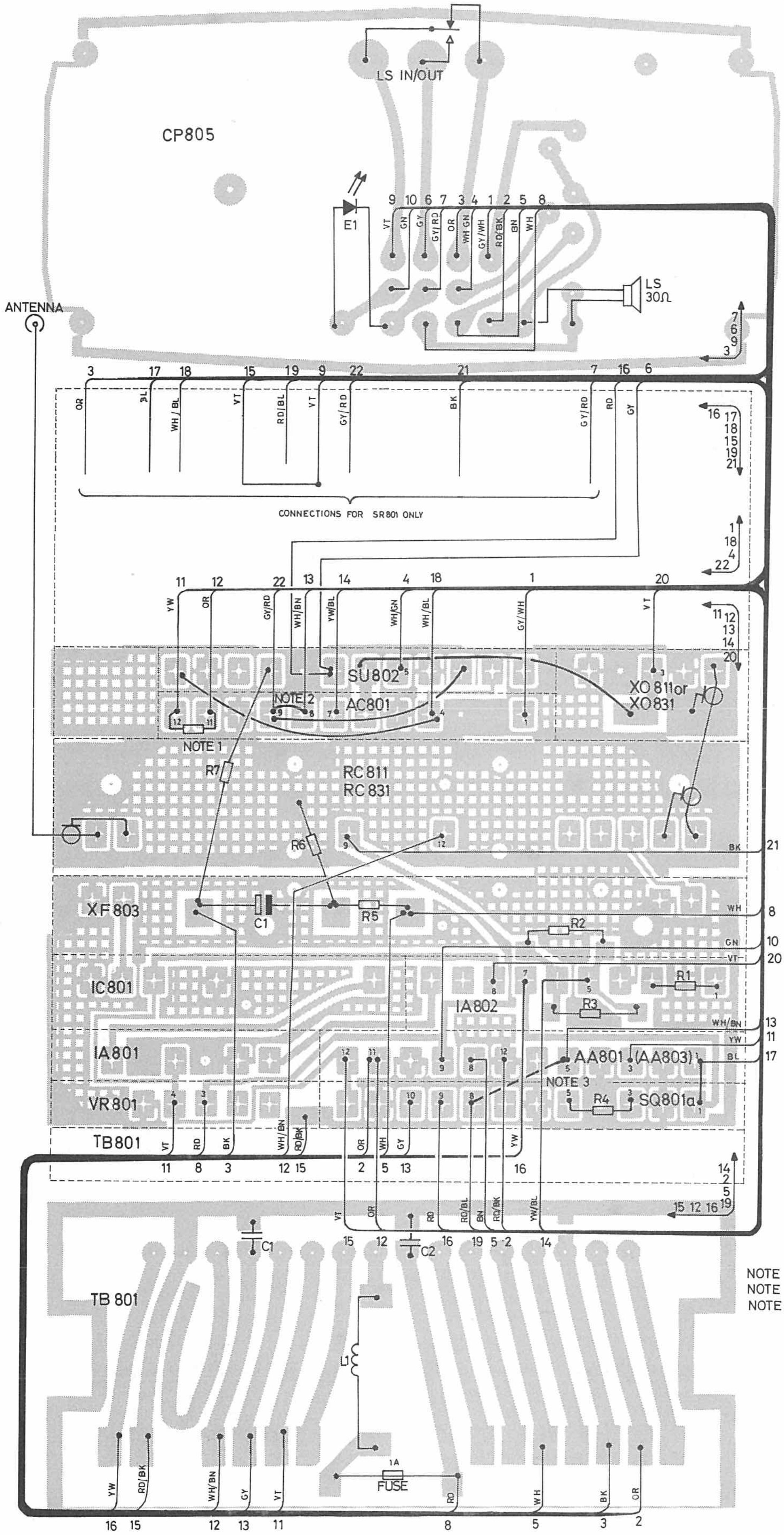
NOTE 2. SHORT CIRCUIT FOR AUTOMATIC RECEIPT.

NOTE 3. FOR SR801/2 AND ST801/2 A RESISTOR, 120 KΩ, 5%, 1/10W IS INSTALLED.

NOTE 4. DIODE ONLY TO BE INSTALLED IN CQP863U WITH ST801

TONE EQUIPMENT WIRING CQP800U - IS

D402.701

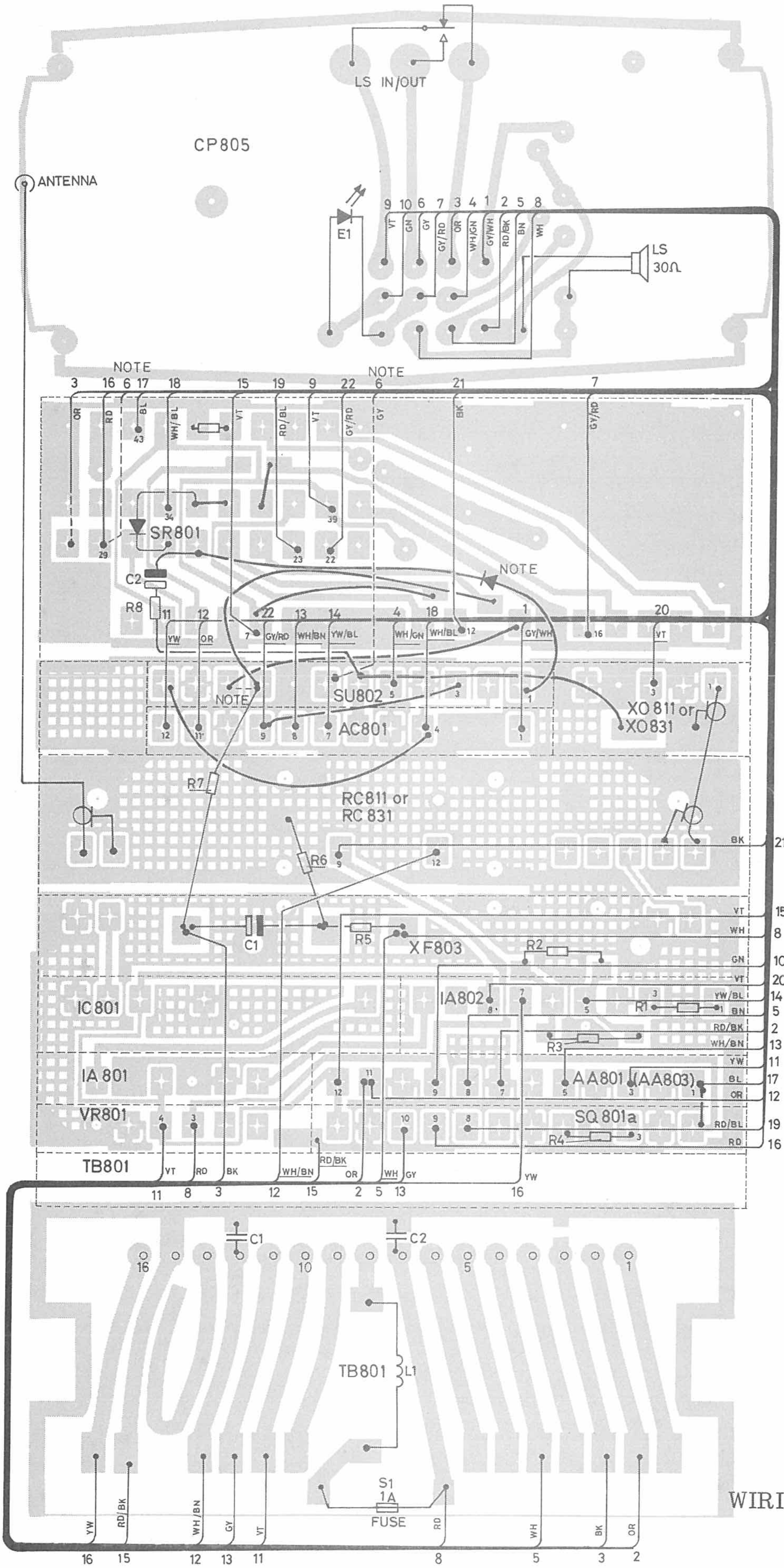


NOTE 1 2,7K WITHOUT AC801.
NOTE 2 STRAP WITHOUT AC801.
NOTE 3 STRAP WITHOUT SR801.

WIRING
without SR800

CRP810, CRP830

D402.235/2



NOTE

WITHOUT SU802:

a. INSERT DUMMY MODULE 68.0174-00
b. MOVE GY WIRE FROM SU7 TO SR29
c. CONNECT OR WIRE TO SR30
d. OMIT DIODE
e. SHORT TERMINALS SU9 - SU10
f. SEE NOTE 13 ON SR801 DIAGRAM

WIRING CRP810, CRP830

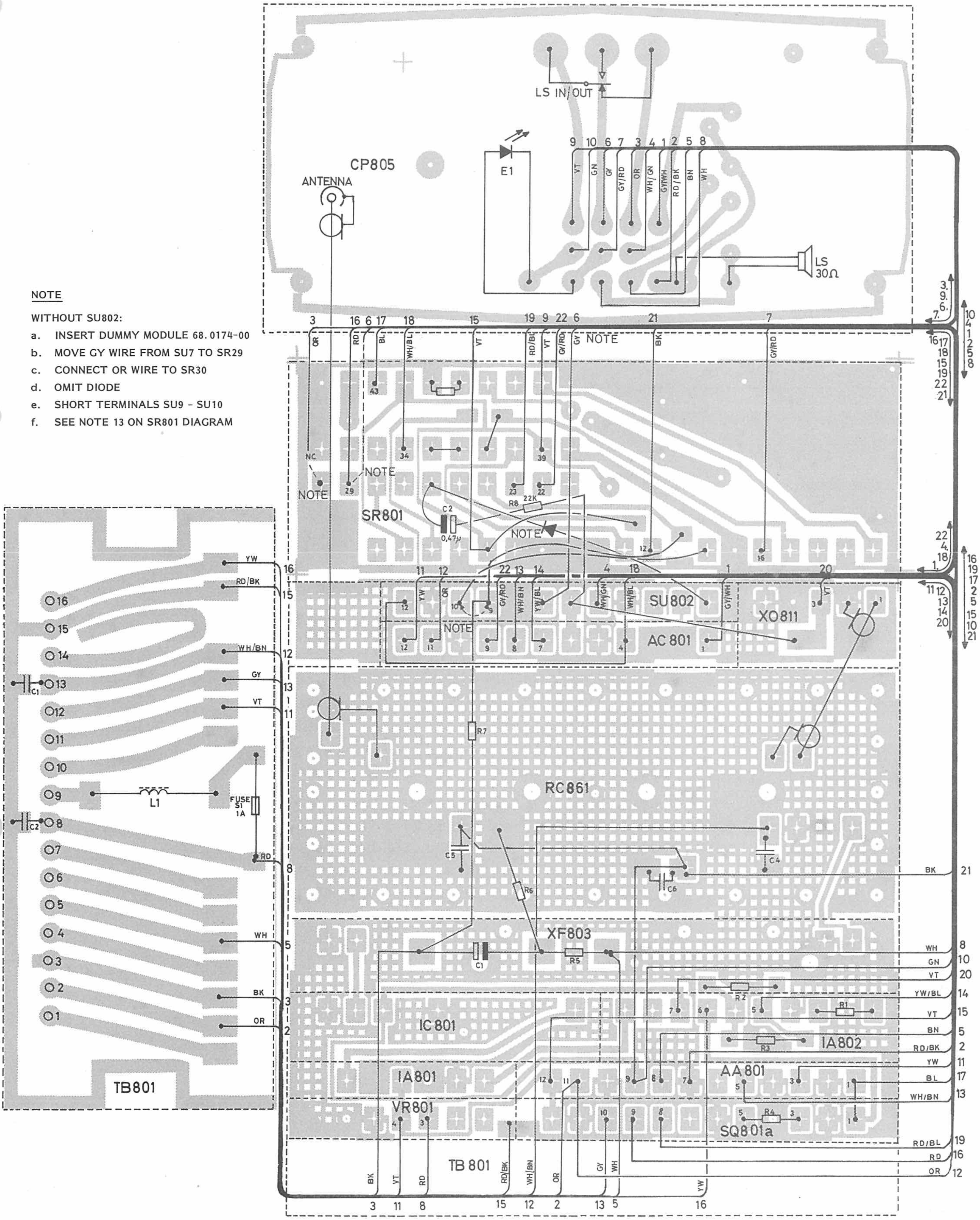
D402.236/2

Storno

NOTE

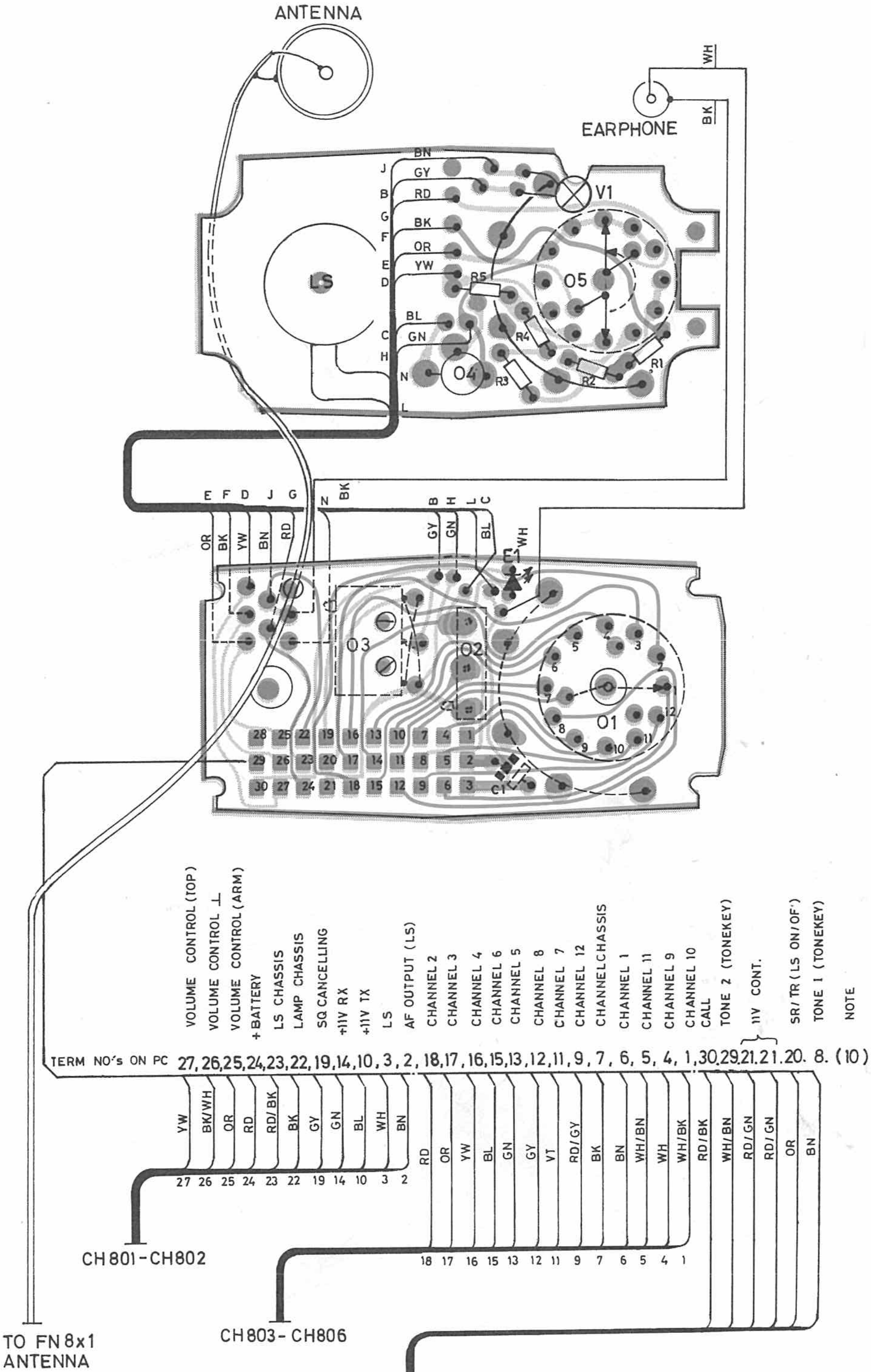
WITHOUT SU802:

a. INSERT DUMMY MODULE 68.0174-00
b. MOVE GY WIRE FROM SU7 TO SR29
c. CONNECT OR WIRE TO SR30
d. OMIT DIODE
e. SHORT TERMINALS SU9 - SU10
f. SEE NOTE 13 ON SR801 DIAGRAM



WIRING DIAGRAM CRP860

D402.391/2



NOTE. TONETAST ALM. TERM.8
ORDINARY TONE KEY TERM.8
IDENTIFIKATION TERM.10
IDENFICATION KEY TERM.10

WIRING DIAGRAM CP801

TYPE	Nº	CODE	DATA
CP801		10.2837-00	Control Panel
	C1	73.5149	47 µF 20% tantal 16V
	R1	80.5036	82 Ω 5% carbon film 1/10W
	R2	80.5044	390 Ω 5% " " 1/10W
	R3	80.5050	1.2KΩ 5% " " 1/10W
	R4	80.5054	2.7KΩ 5% " " 1/10W
	R5	80.5057	4.7KΩ 5% " " 1/10W
	E1	99.5306	Light emitting diode 1.6V
	O1	47.0596	Switch assembly, channel
	O2	47.5077	Micro switch, key
	O3	47.5070	Micro switch, LS/SQ/Dial Light
	O4	47.5077	Micro switch, tone
	O5	47.0597	Switch assembly, volume
	J1	41.0199	Connector, antenna
	J2	41.5160	Connectro, earphone
	V1	92.5113	Lamp 12V

Storno

TYPE	Nº	CODE	DATA

CONTROL PANEL CP801

Storno

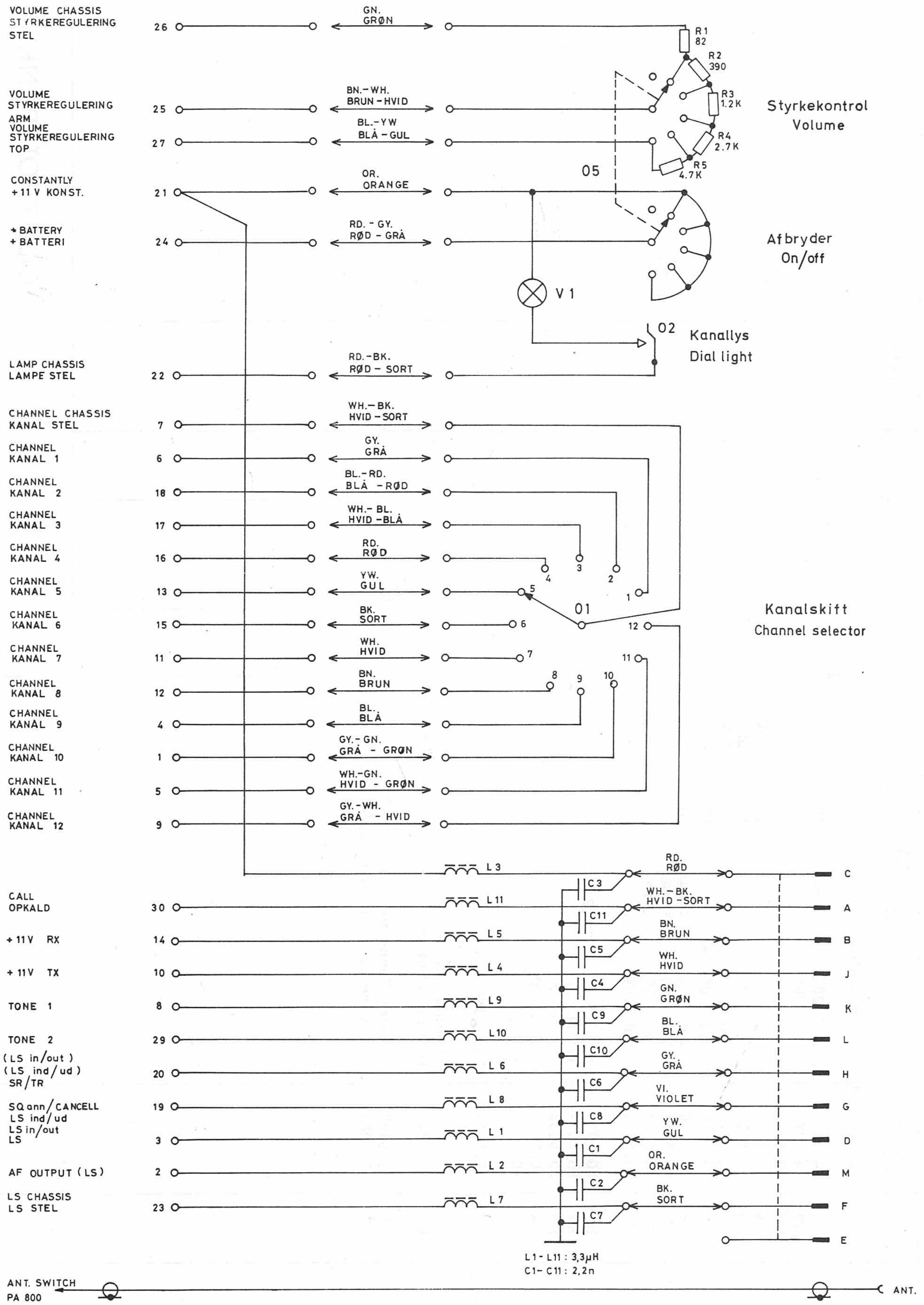
TYPE	Nº	CODE	DATA
CP801-IS		10.3349-00	Control Panel (Intrinsically Safe)
	C1	79.0003	47 µF/10 Ω moulded assy. 16 V
	R1	80.5048	820 Ω 5% carbon film 1/10 W
	R2	80.5056	3.9 KΩ 5% " " 1/10 W
	R3	80.5062	1.2 KΩ 5% " " 1/10 W
	R4	80.5066	2.7 KΩ 5% " " 1/10 W
	R5	80.5069	4.7 KΩ 5% " " 1/10 W
	E1	99.5306	Light emitting diode 1.6 V
	O1	47.0596	Switch assembly, channel
	O2	47.5077	Micro switch, key
	O3	47.5070	Micro switch, LS/SQ/Dial Light
	O4	47.5077	Micro switch, tone
	O5	47.0597	Switch assembly, volume
	J1	41.0199	Connector, antenna
	J2	41.5160	Connector, earphone

Storno

TYPE	Nº	CODE	DATA

CONTROL HEAD CP801-IS

X402.400



CONTROL PANEL CP802

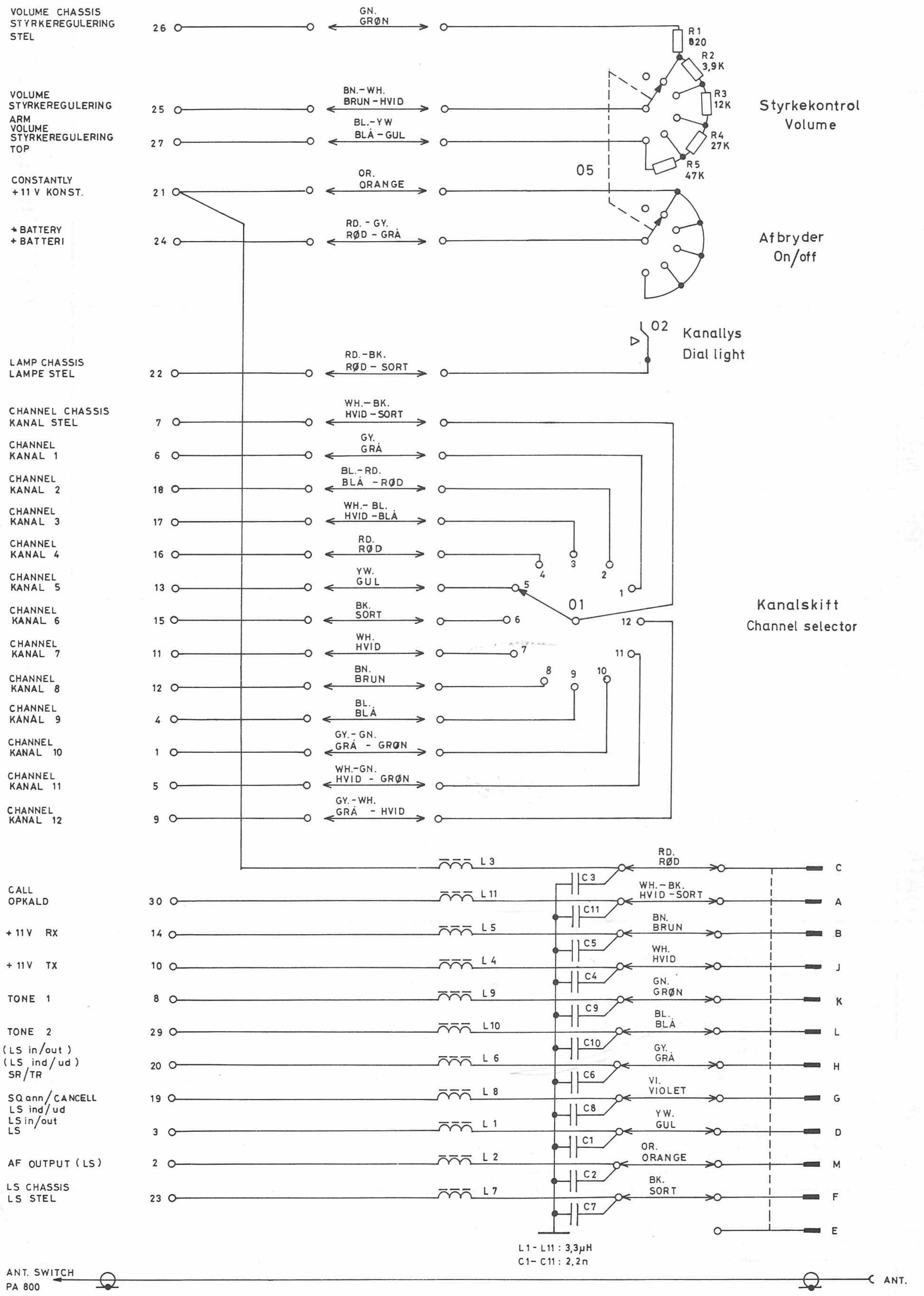
D402.026

TYPE	NO.	CODE	DATA
CP802		10.2967-00	Remote Control Head
	C1	74.5278	2.2nF 20% ceram CP 50V
	C2	74.5278	2.2nF 20% ceram CP 50V
	C3	74.5278	2.2nF 20% ceram CP 50V
	C4	74.5278	2.2nF 20% ceram CP 50V
	C5	74.5278	2.2nF 20% ceram CP 50V
	C6	74.5278	2.2nF 20% ceram CP 50V
	C7	74.5278	2.2nF 20% ceram CP 50V
	C8	74.5278	2.2nF 20% ceram CP 50V
	C9	74.5278	2.2nF 20% ceram CP 50V
	C10	74.5278	2.2nF 20% ceram CP 50V
	C11	74.5278	2.2nF 20% ceram CP 50V
	R1	80.5036	82 Ω 5% carbon film 1/10W
	R2	80.5044	390 Ω 5% " 1/10W
	R3	80.5050	1.2KΩ 5% " 1/10W
	R4	80.5044	2.7KΩ 5% " 1/10W
	R5	80.5047	4.7KΩ 5% " 1/10W
	V1	92.5105	Lamp 18V; 26mA
	01	47.0613	Channel switch
	02	49.0243	Dial light button
	J1	41.0199	Antenna Connector
	J2	41.5085	Multiwire Connector for CB800

Storno

TYPE	NO.	CODE	DATA

CONTROL PANEL CP802



CONTROL PANEL CP802 - IS

D40 2.358

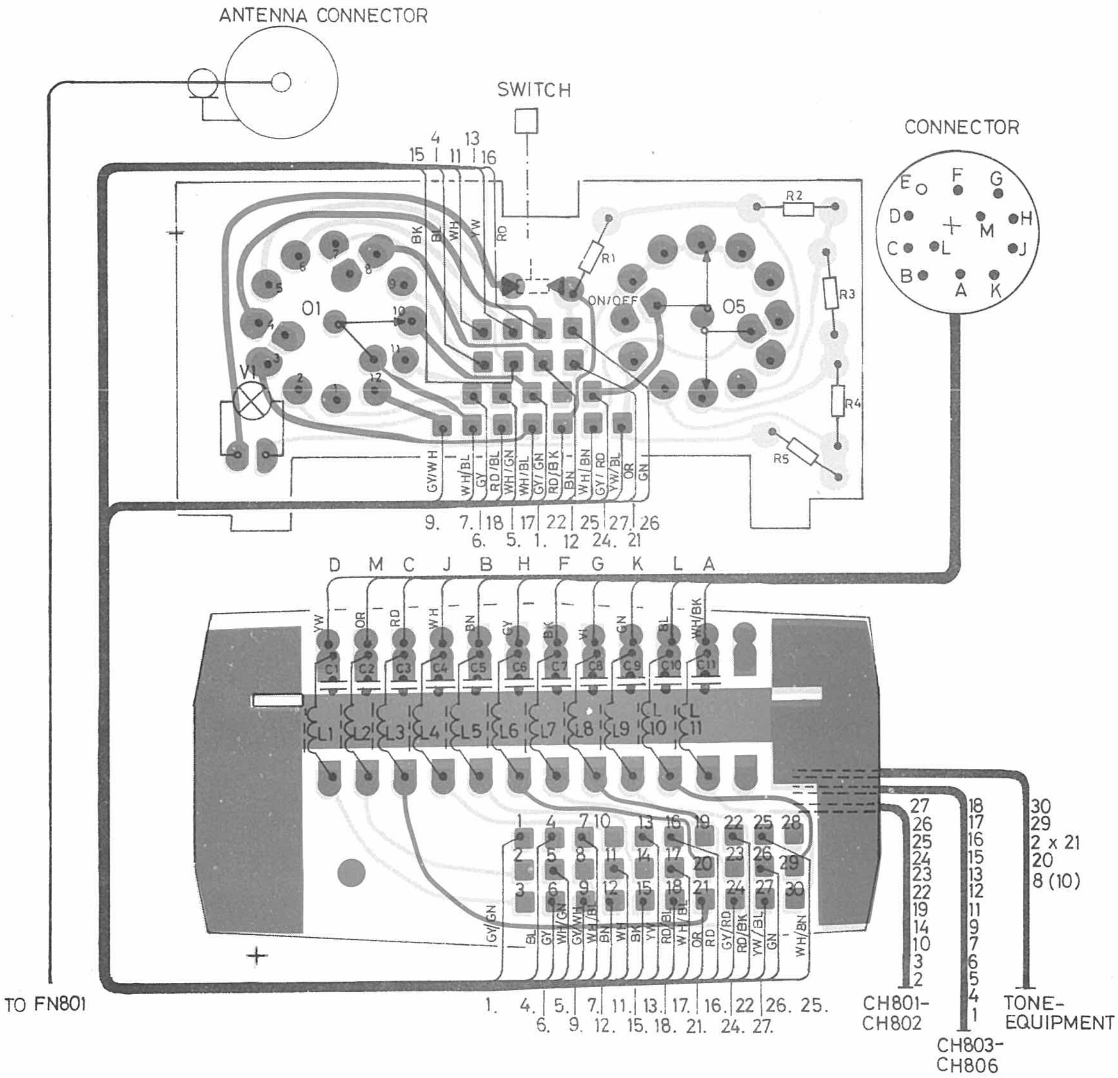
TYPE	Nº	CODE	DATA
CP802-IS		10.3350-00	Remote Control Head (Intrinsically Safe)
	C1	74.5278	2.2 nF 20% ceram CP 50 V
	C2	74.5278	2.2 nF 20% " CP 50 V
	C3	74.5278	2.2 nF 20% " CP 50 V
	C4	74.5278	2.2 nF 20% " CP 50 V
	C5	74.5278	2.2 nF 20% " CP 50 V
	C6	74.5278	2.2 nF 20% " CP 50 V
	C7	74.5278	2.2 nF 20% " CP 50 V
	C8	74.5278	2.2 nF 20% " CP 50 V
	C9	74.5278	2.2 nF 20% " CP 50 V
	C10	74.5278	2.2 nF 20% " CP 50 V
	C11	74.5278	2.2 nF 20% " CP 50 V
	R1	80.5048	820 Ω 5% carbon film 1/10 W
	R2	80.5056	3.9 Ω 5% " " 1/10 W
	R3	80.5062	1.2 KΩ 5% " " 1/10 W
	R4	80.5066	2.7 KΩ 5% " " 1/10 W
	R5	80.5069	4.7 KΩ 5% " " 1/10 W
	O1	47.0613	Channel switch
	O5	47.0611	Volume switch
	J1	41.0199	Antenna Connector
	J2	41.5085	Multiwire Connector for CB800

Storno

TYPE	Nº	CODE	DATA

CONTROL HEAD CP802-IS

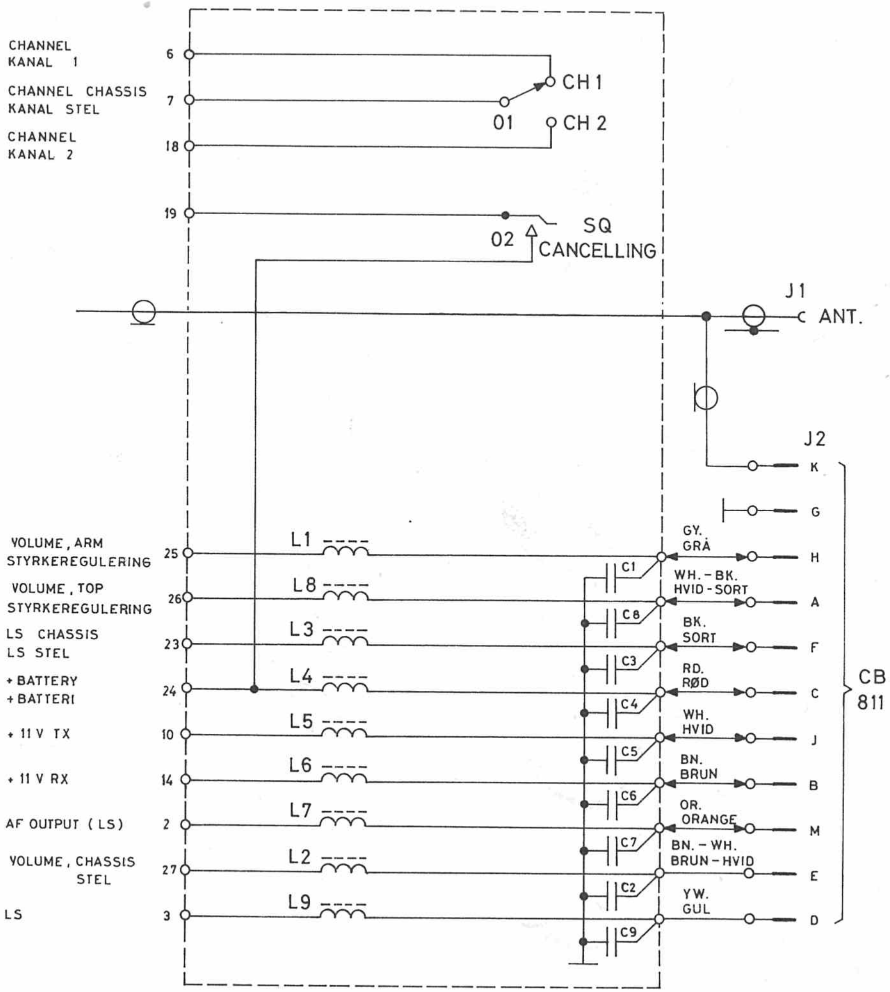
X402.399



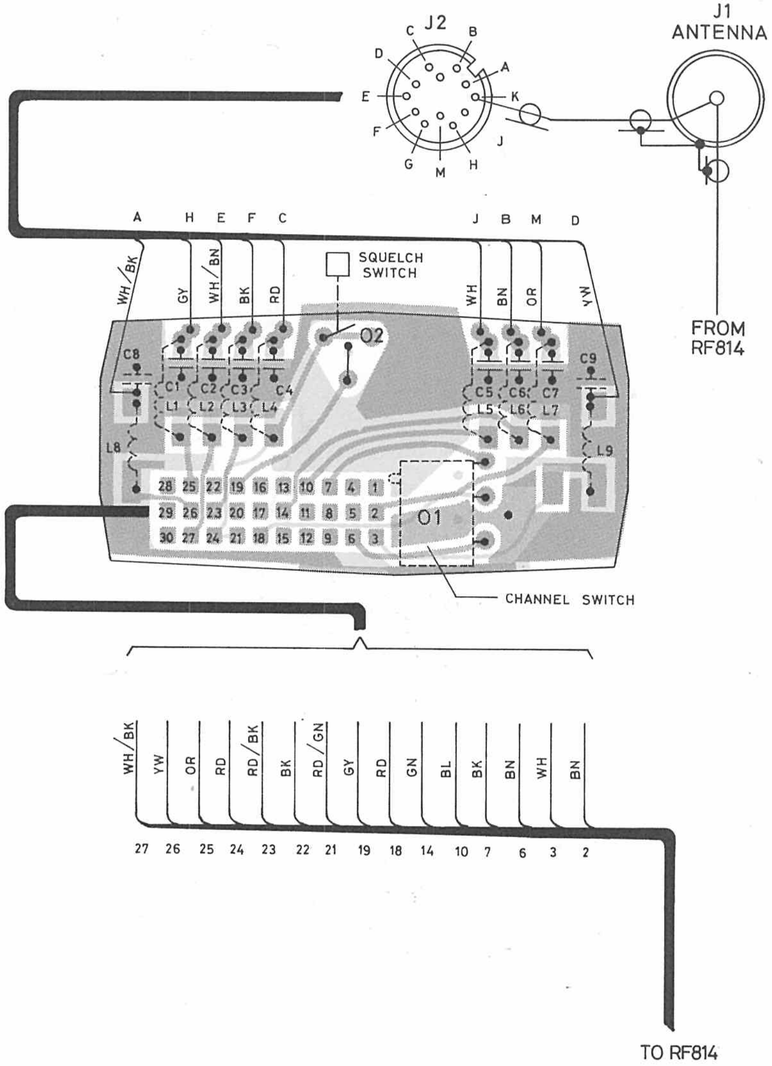
WIRING DIAGRAM CP802.

D 402.133

Storno



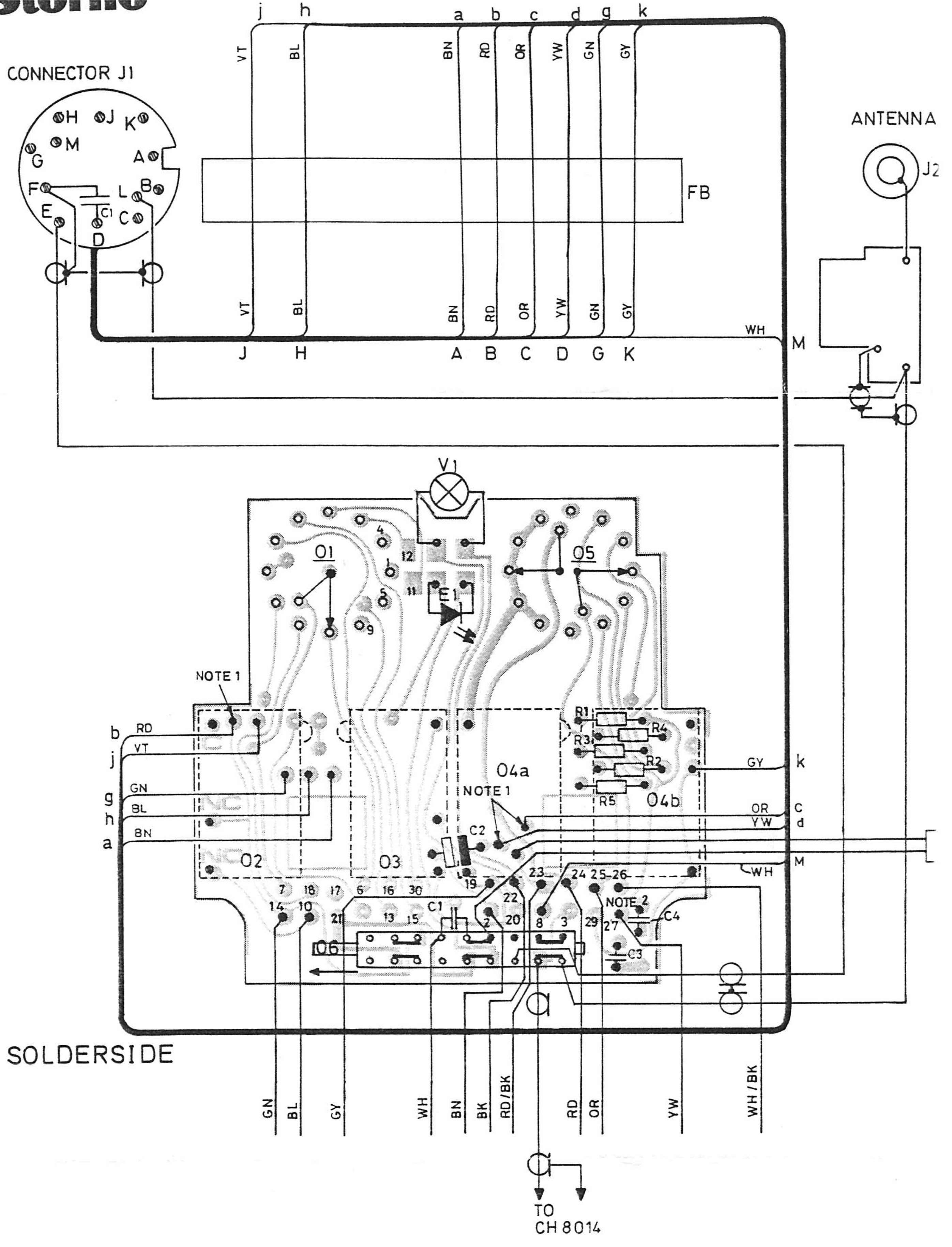
Storno



CONTROL PANEL CP807

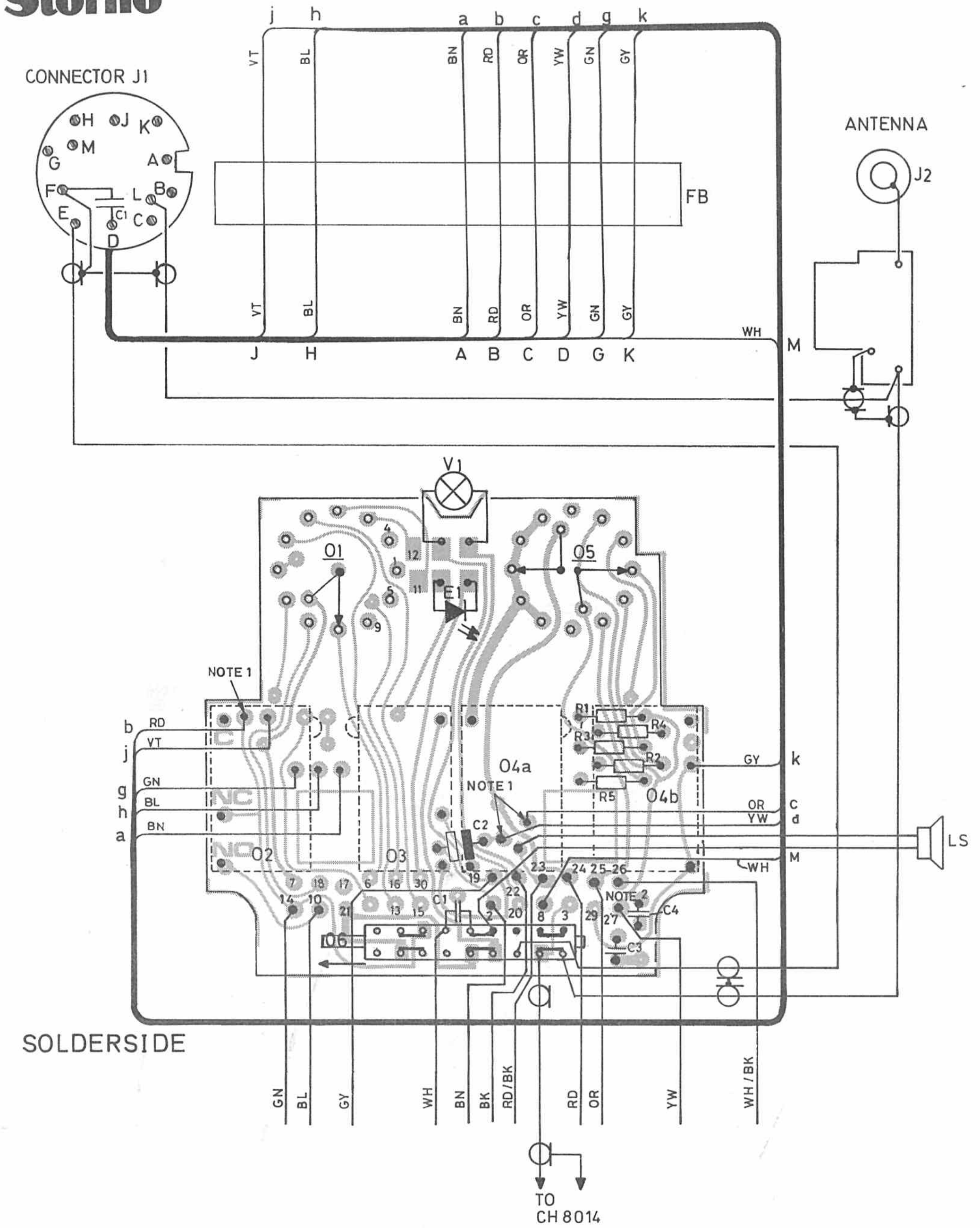
D402.170/3

Storno



CONNECTOR J1
H
J
K
M
G
A
F
L
B
C1
E
C
D
j
h
a
b
c
d
g
k
VT
BL
BN
RD
OR
YW
GN
GY
FB
J
H
A
B
C
D
G
K
WH
M
ANTENNA
J2
V1
O1
O5
E1
NOTE 1
O4a
O4b
R1
R2
R3
R4
R5
O2
O3
C2
C1
C3
C4
NOTE 2
O6
TO
CH 8014
SOLDERSIDE
WH/BK
RD/BK
BK

Storno

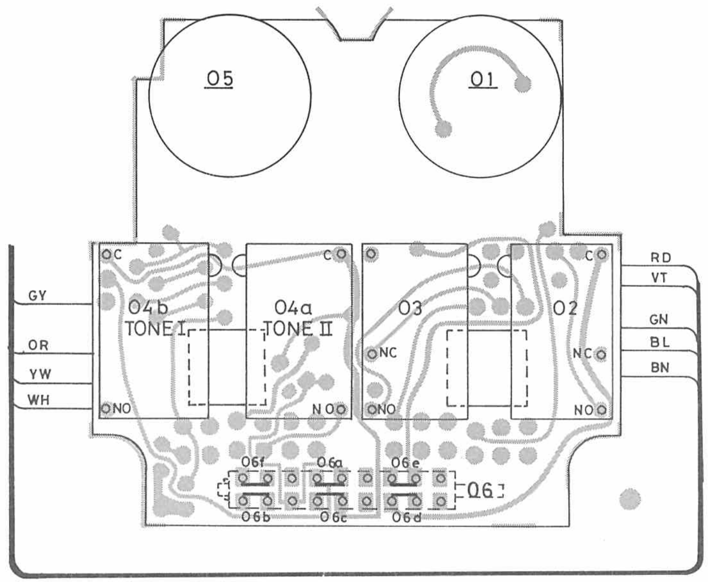


SOLDERSIDE

Storno

NOTE 1:
L1, L2, L3, VALUE 0,27μ, CODE NO. 19A700024 P6
MOUNTED IN CQP860U ONLY

NOTE 2:
R6, 27K (ON TERMINAL 27)
MOUNTED ONLY IN CP808IS

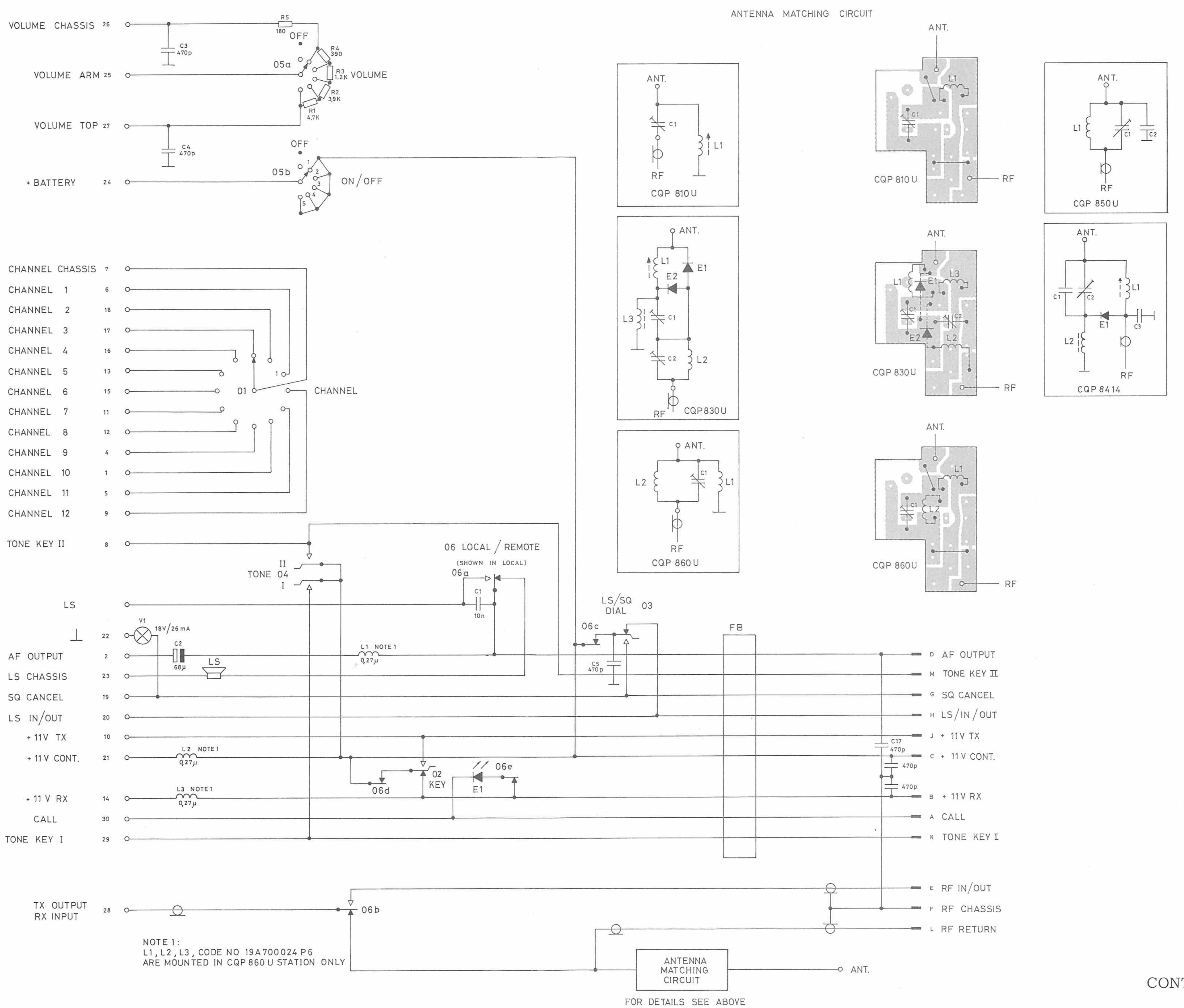


SWITCHSIDE

CONTROL HEAD CP808,
CP808 0,2W-IS, CP808 1W-IS, CP80XX
WIRING

D403.247

Storno

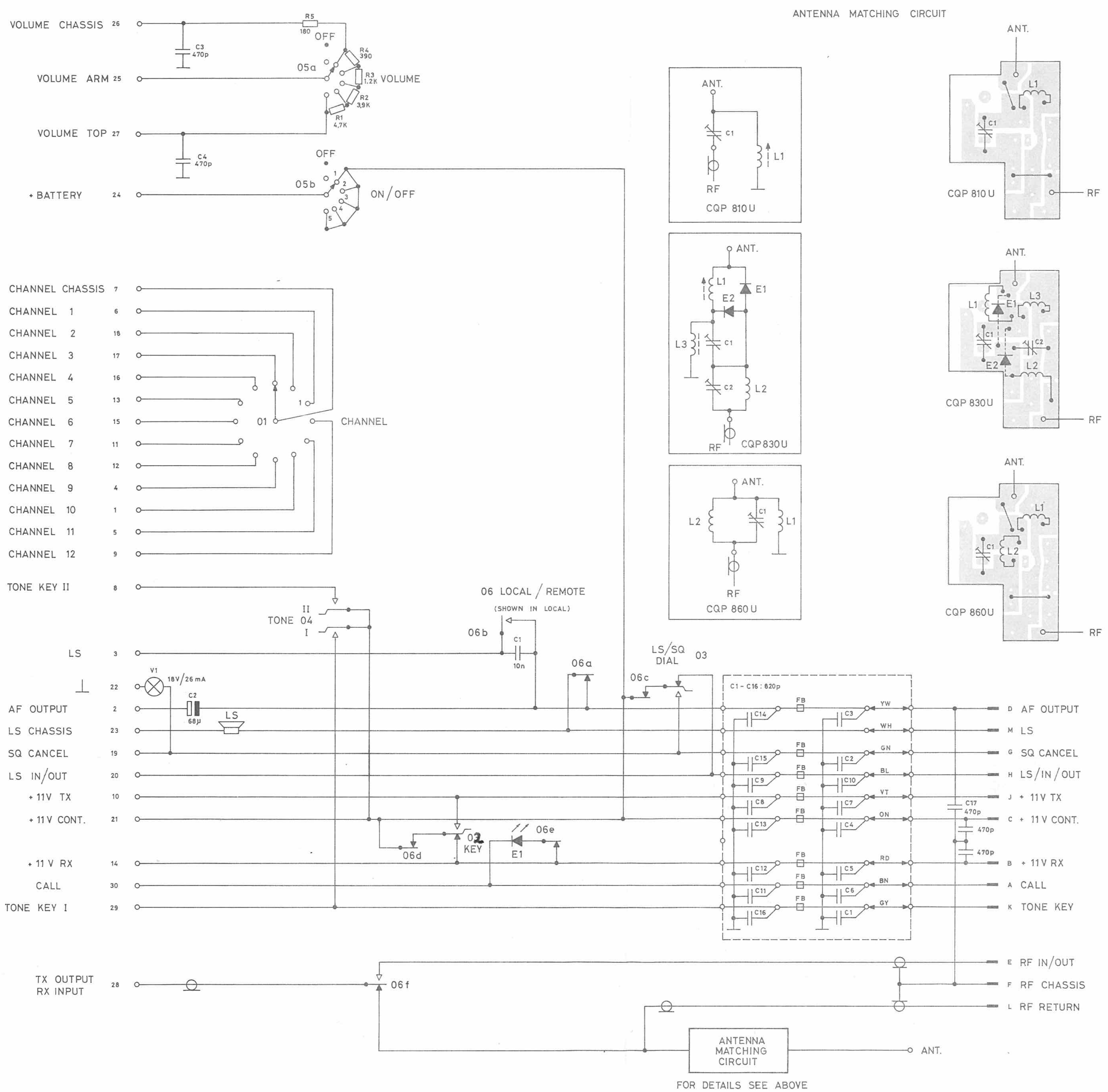


CONTROL HEAD CP808

D 402.595/2

Storno

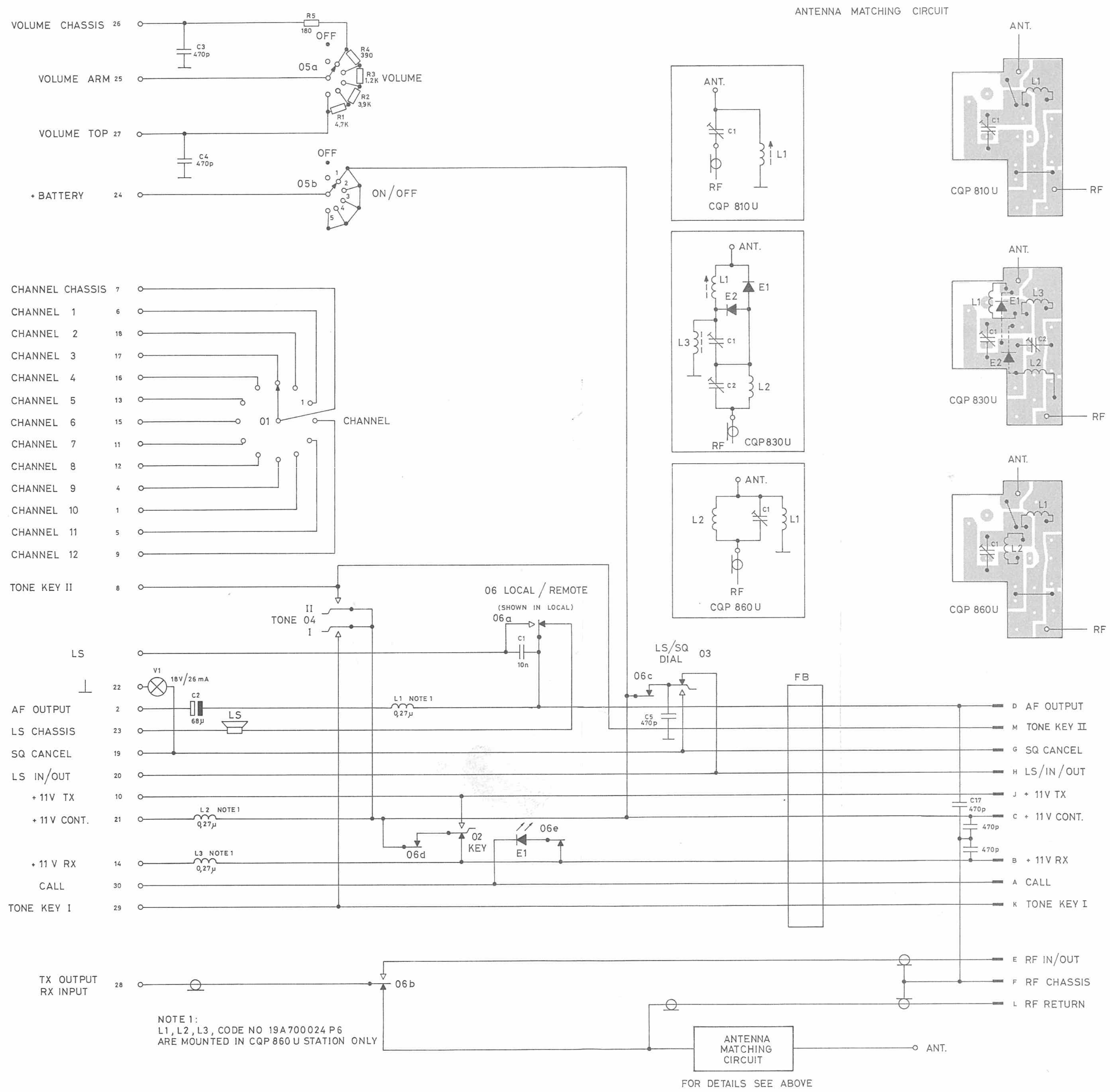
Storno



CONTROL HEAD CP808

D402.595

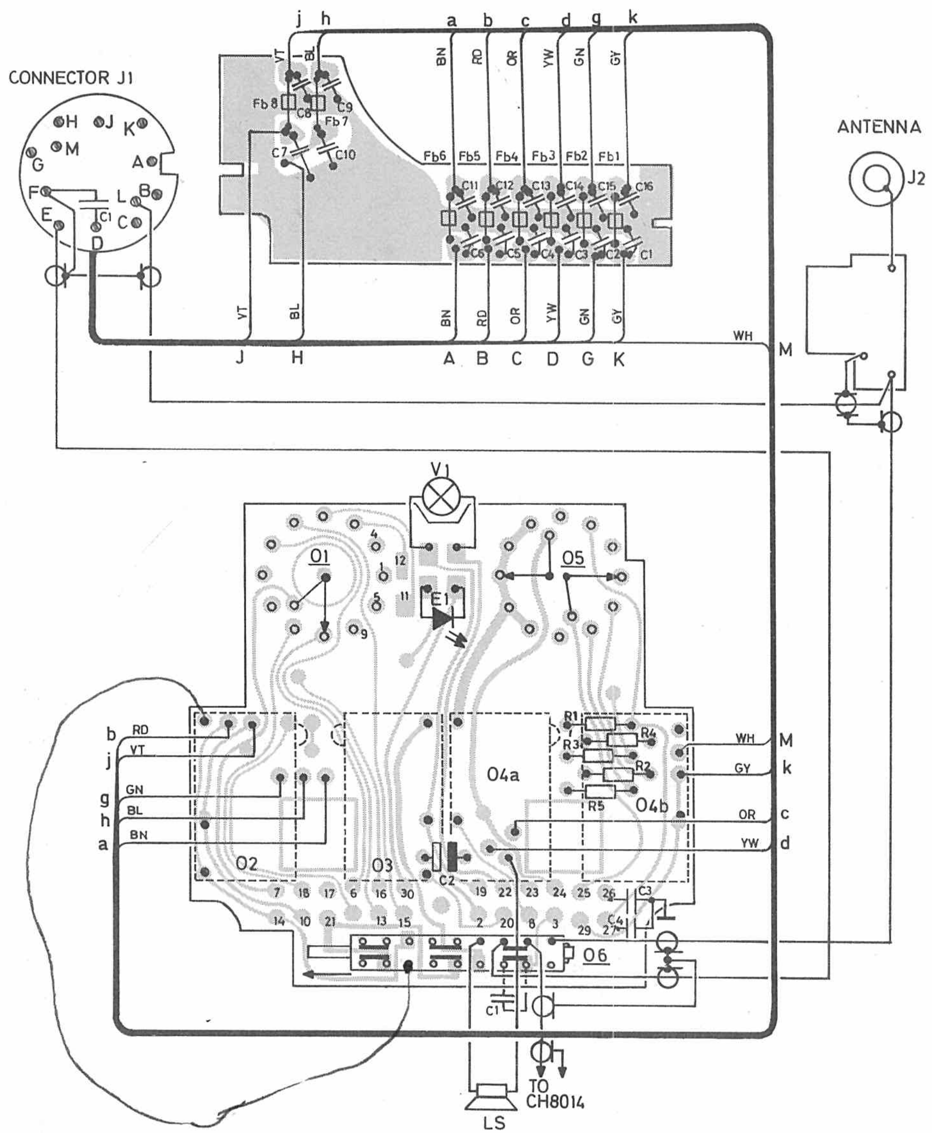
Storno



CONTROL HEAD CP808

D 402.595/2

Storno



CONTROL HEAD CP808

D402.469

Storno

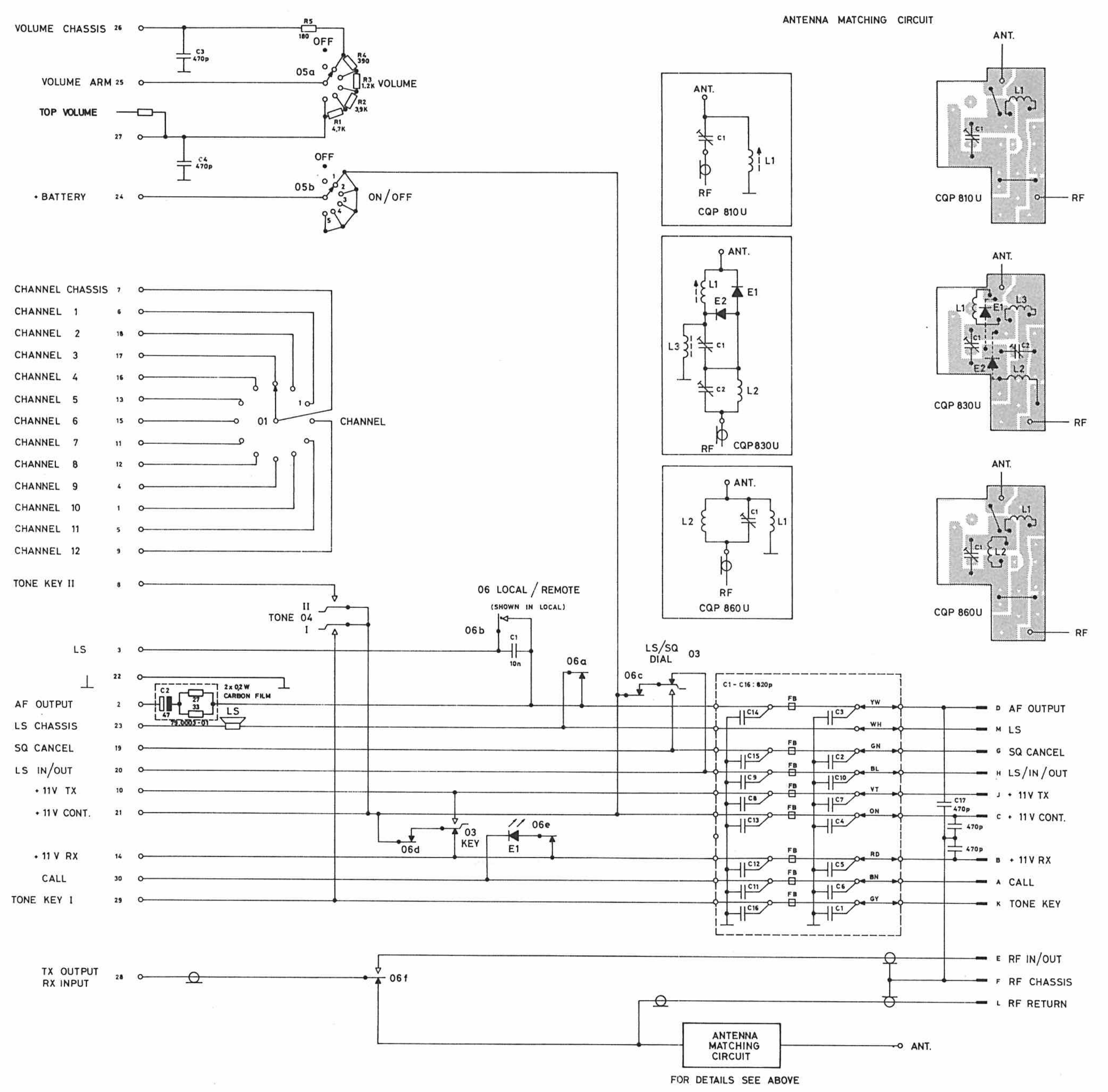
TYPE	Nº	CODE	DATA	
		10.3375	Control Head CP808	
		15.0314-01	Switch, p.c.b. assembly	
	C1	74.5280	10nF 20% ceram CP	50V
	C2	73.5106	68uF 20% tantal	16V
	C3	74.5312	470pF-20/+80% ceram PL	63V
	C4	74.5312	470pF-20/+80% ceram PL	63V
	R1	80.5057	4.7kohm 5% carbon film	1/10W
	R2	80.5056	3.9kohm 5% carbon film	1/10W
	R3	80.5050	1.2kohm 5% carbon film	1/10W
	R4	80.5044	390ohm 5% carbon film	1/10W
	R5	80.5040	120ohm 5% carbon film	1/10W
	02	47.5092	Microswitch, Key	
	03	47.5092	Microswitch, LS/SQ	
	04	47.5092	Microswitch, Tone	
	06	47.5092	Microswitch, Tone	
		15.0315	Filter, p.c.b. assembly	
	C1-16	74.5314	820pF 20% ceramic	
	Fb	65.5109	Ferrite bead	
	01	47.0626	Rotary switch 1x12	
	05	47.0627	Rotary switch 2x6	
	E1	99.5339	LD 30/11 LED	
	V1	92.5115	Lamp, 18V/26mA	
	LS	97.5037	Loudspeaker	
	J1	41.0218	12-pin Connector, female	
	C17	74.5312	470pF-20+80% ceram PL	63V
	C18	74.5312	470pF-20+80% ceram PL	63V
	C19	74.5312	470pF-20+80% ceram PL	63V
CQP810U		15.0313	Antenna Matching Network 146-174MHz	
	C1	78.5046	2-18pF trimmer N350	300V
	L1	61.1359	RF coil	
CQP830		15.0329	Antenna Matching network 68-88MHz	
	C1	78.5046	2-18pF trimmer N350	300V
	C2	78.5046	2-18pF trimmer N350	300V
	L1	61.1363	RF coil	
	L2	62.0954	RF coil	
	L3	61.5015	3.3uH 20% RF choke	0.7A
	E1	99.5187	BA243 Diode	
	E2	99.5187	BA243 Diode	
CQP860U		15.0327	Antenna Matching Network 420-470MHz	
	C1	78.5046	2-18pF trimmer N350	300V
	L1	62.0948	RF coil	
	L2	62.0947	RF coil	

Storno

TYPE	Nº	CODE	DATA

CONTROL HEAD CP808

X402.575



CONTROL HEAD CP808 - IS

D 402.726

 Storno

CONTROL PANEL WITH TONE SWITCHING

CP8017

CP8017 is a variant of the control panel to be used in conjunction with the CQP800U family. CP8017 has the same function as CP808 and beside these, CP8017 include facilities for 2 telegram tone switching, with one fixed telegram and one variable 100 call telegram. Operation of the 2 telegram tone switching is done by means of the Tone Key pushbuttons I and II.

Tone Key I will send the fixed telegram preset at the factory.
Tone Key II will send the variable telegram. Two of the 5 sequential tones can be selected by means of 2 rotary switches placed on the loudspeaker panel.

MODE OF OPERATION

OPERATING INSTRUCTIONS

The fixed telegram sent by depressing Tone Key I is used to call the base station.
The variable telegram sent by depressing Tone Key II is used to call other portables via the base station which works as a repeater.

Calling a portable
If the portable has a specific calling number 62 for ex.:
Turn the rotary switch X10 on 6 and X1 on 2.
Push Tone Key I which establishes contact with the base station.
If the channel is free, push Tone Key II and wait for an answer from the other portable station.
Then the transmission can take place.

FUNCTION

Tone Key I
Fixed telegram.

When Tone Key I is activated, a logic "1" will be applied to the latch formed of IC1a and IC1b, causing a logic "1" from pin 4 IC1b to the gates IC2a pin 2 and IC2b pin 5.

In the same time TQ802/3 has also been activated from Tone Key I, and when the counter IC2, according to the selected digits combination in TQ802/3, applies a logic "1" via terminal B to the gate IC2b, this will go "high" in this particular sequence and via terminal D activate the chosen ST gate transistor.
In the same way the gate IC2a will activate the next chosen ST gate via the connections to the TQ802/3.

Tone Key II
Variable telegram.

The 2 rotary switches have to be set to the requested figures in the variable telegram. When Tone Key II is activated, a logic "1" will be applied to the latch formed of IC1a and IC1b, causing a logic "1" from pin 3 IC1a to the gates IC2c pin 9 and IC2d pin 12.

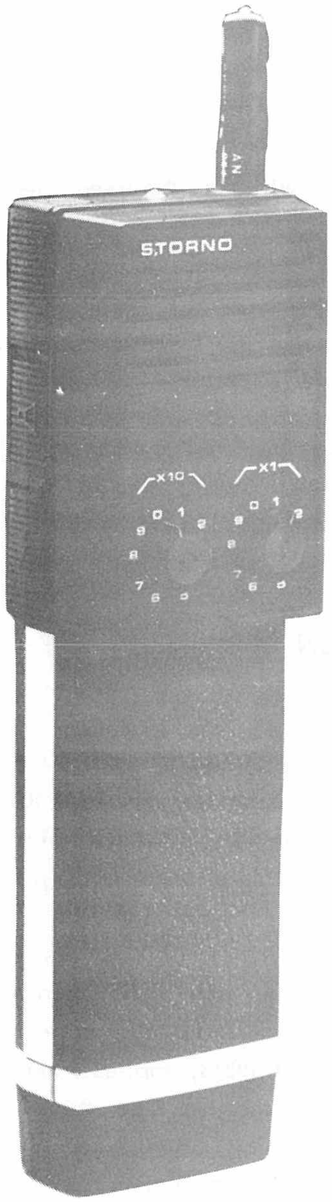


Fig. 1 CQP800U RS

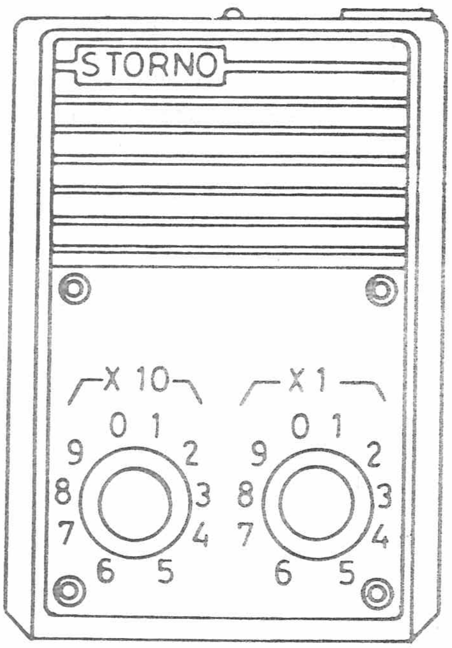


Fig. 2 Control Panel CP8017

These 2 gates will be activated sequentially when they receive a logic "1" on pin 8 or 13 from the ST counter IC2 in TQ802/3, in the same manner as described under Tone Key I for the gates IC2a and IC2b.

When IC2c and IC2d in turn goes "high", they will activate the ST gate transistors Q1 and Q2 on the CP8017, and thereby in turn make connections for the rotary switches X10 and X1, which are wired to L1 in TQ802/3.

CODING AND STRAPPING

Coding and strapping instructions for TQ802/3 will be unchanged for the fixed telegram transmitted by Tone Key I.

When coding and strapping a CP8017/TQ802/3, the following decisions must be made:

1) Which digits will be the variable ones, to be dialled on X10 and X1.
2) frequencies of the fixed tones.

NUMBER COMBINATIONS

<u>Digits 2 and 4 variable</u>

1) Ex:

3	V_1	3	V_2	3

To allow the greatest number of combinations, strap CP8017 as follows:
Cut the PWB just outside the soldering terminal 3 at the printed switches X10 and X1 and strap soldering points 3 to soldering point for repeat tone R or Y. (see fig. 3.)
R= repeat tone in 20/25 kHz channel spacing equipment.
Y= repeat tone in 12.5 kHz channel spacing equipment.

2) Ex:

2	V_1	4	V_2	3

Strap CP8017 as follows:
Cut the PWB just outside the soldering terminal 2 at the printed switch X10 and outside the soldering terminal 4 at X1 and strap 2 and 4 to soldering for repeat tone R or Y.
(see fig. 4.)

3) Summary.

If the fixed code is represented by A, B and C:

A	V_1	B	V_2	C

If A/B/C and CP8017 is strapped as above all combinations will be permissible.

If A/B/C, CP8017 strapped, there are 21 limitations:
- V_1 must not be selected equal to B.
- V_2 must not be selected equal to C.

<u>Digits 3 and 5 variable</u>

A	B	V_1	C	V_2

10 limitations

V_1 must not be selected equal to C.

Strapping:
Cut at X10 terminal corresponding to fixed tone B, cut at X1 terminal corresponding to fixed tone C and strap both to repeat tone R or Y.

<u>Digits 4 and 5 variable</u>

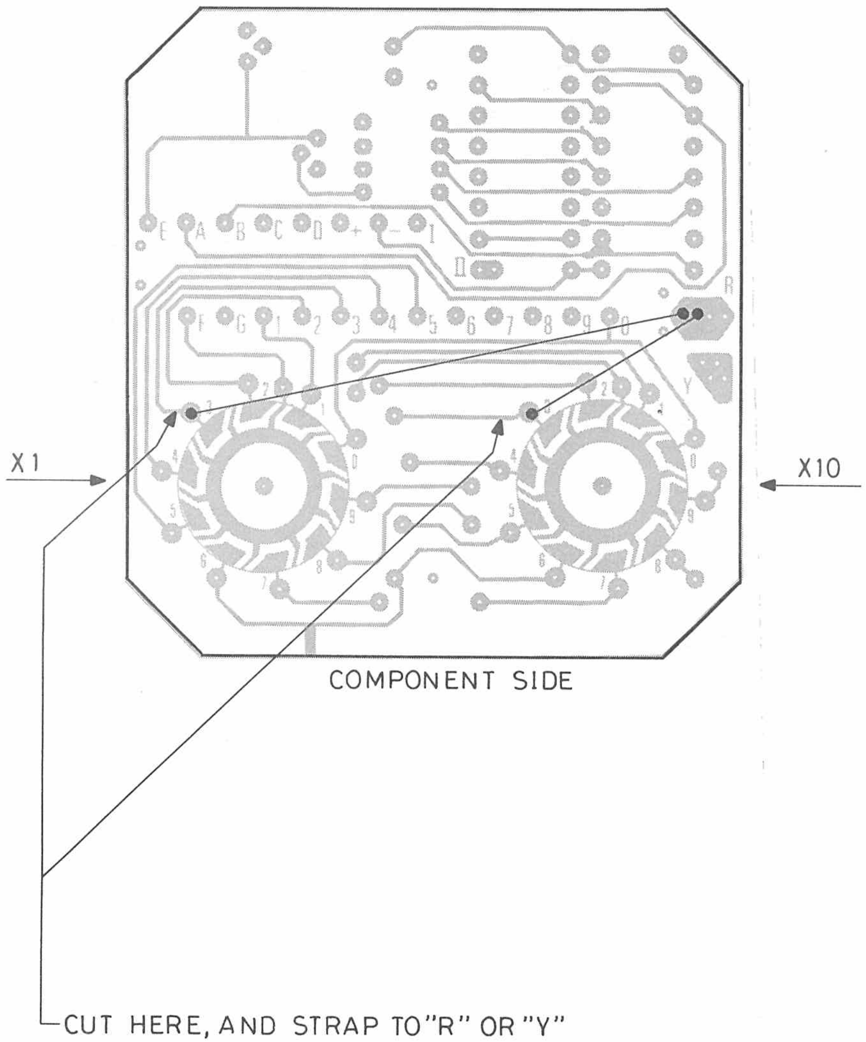
A	B	C	V_1	V_2

10 limitations

V_1 must not be selected equal to V_2.

Strapping:
Cut at X10 terminal corresponding to fixed tone C and strap to repeat tone R or Y.

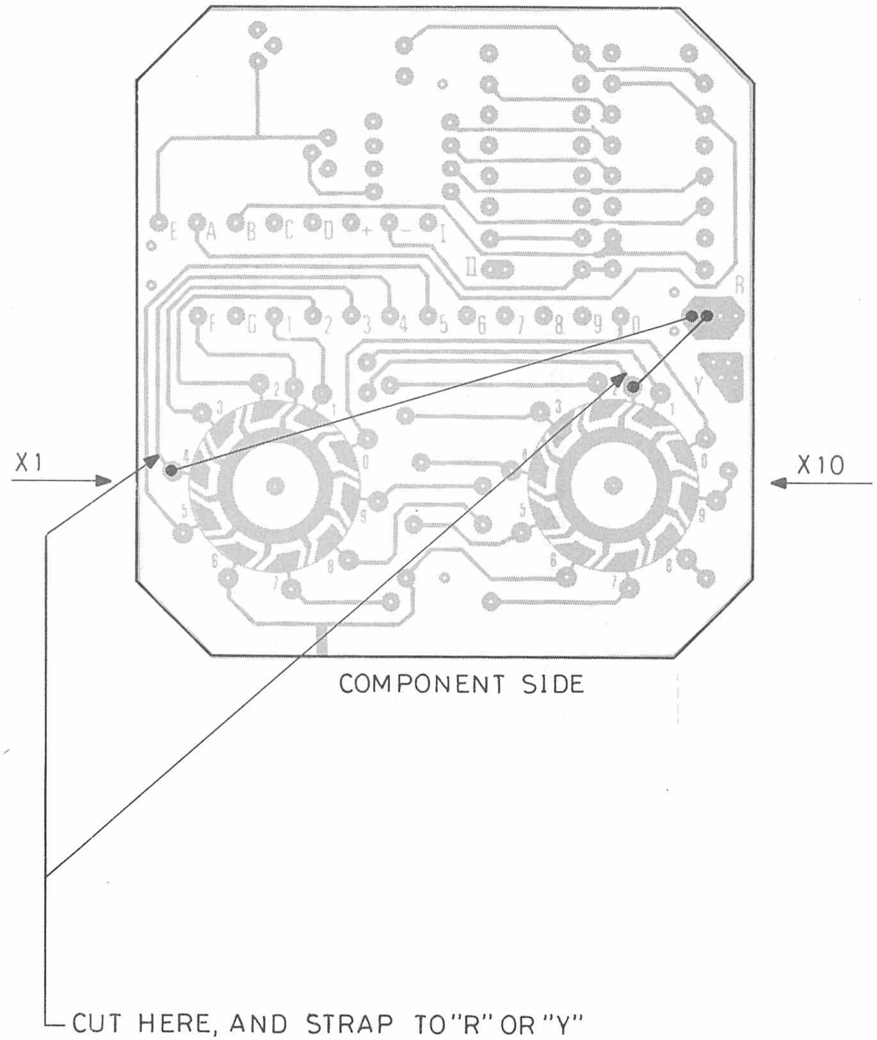
Fig. 3 Example for use of repeat tones in call number 3 V_1 3 V_2 3.



CODING AND STRAPPING CP8017

D403.058

Fig. 4 Example for use of repeat tones in call number 2 V_1 4 V_2 3.



CODING AND STRAPPING CP 8017

D403.057

X1 = units, X10 = decade units in the variable part of the call number.

Digits 1 and 3 variable

V_1	A	V_2	B	C

21 limitations

V_1 must not be selected equal to A.
V_2 must not be selected equal to B.

Strapping:
Cut at X1 terminal corresponding to fixed tone A and strap to repeat tone R or Y.

COMBINATIONS OF THE VARIABLE DIGITS IN TQ802/3

Individual combinations of the variable digits in TQ802/3 are possible, even though digits 3 and 5 are the most common.
For establishing the connection of the variable digits, see fig. 5 and fig. 6.
Terminals BD represent the "decade units" and terminals AC represent the "units" in the variable part of the call number.

If for example digits 2 and 4 in a 5 tone sequential call number are chosen to be the variable ones, connections of the terminals A - B - C - D must be done in the following way.

Digits 2 (decade units)
Cut the PWB outside A2/B2 (fig. 6))
Connect terminal B to the soldering terminal A2/B2 and terminal D to the soldering terminal C2/D2.

Digits 4 (units)
Cut the PWB outside A4/B4 (fig. 6))
Connect terminal A to the soldering terminal A4/B4 and terminal C to the soldering terminal C4/D4.

Coding and strapping of the SR part of TQ802/3 will be unchanged, and the remaining tones in the variable telegram will be the same as in the fixed telegram.

This completes the establishing of the two variable digits.
Other combinations may be done in a similar way.

CODING AND STRAPPING CP8017

D403.056

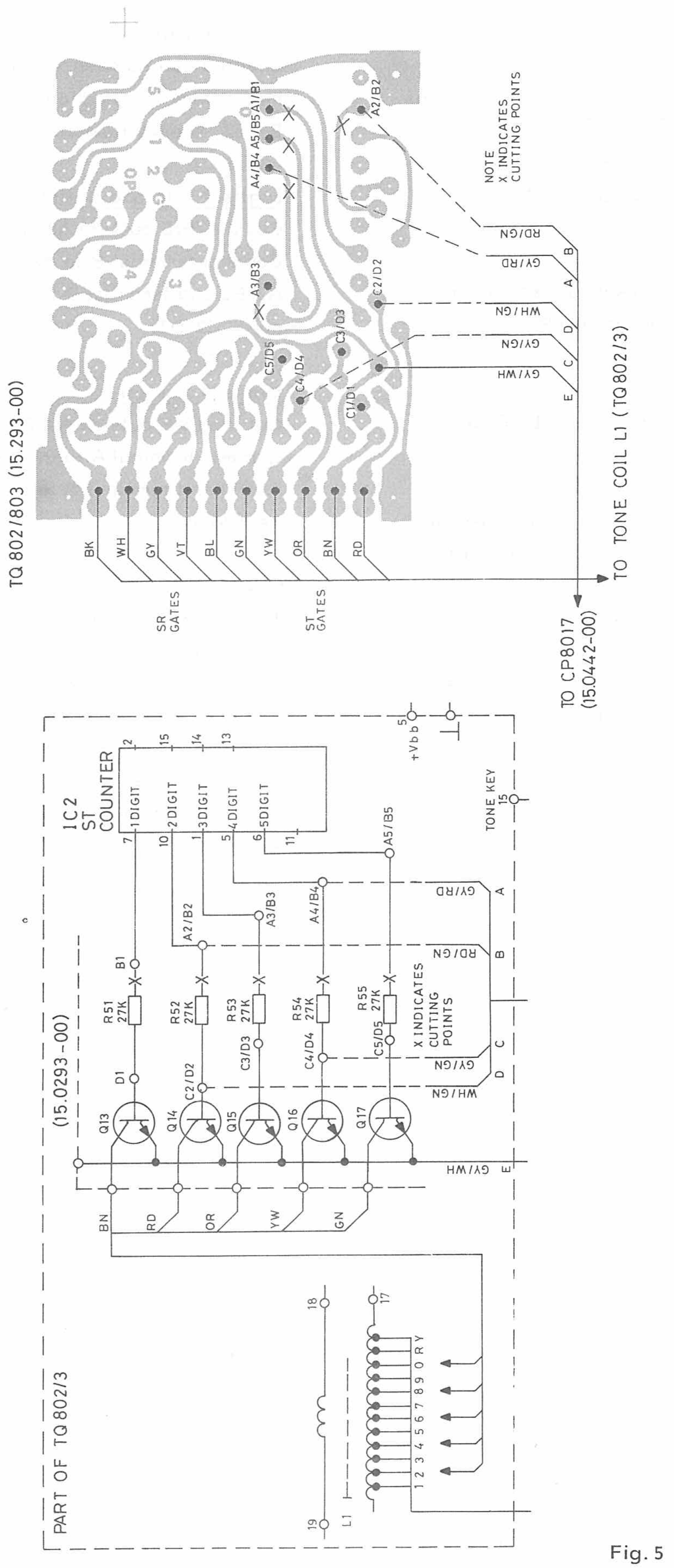


Fig. 5

WIRING DIAGRAM CP8017

D403.055

TERM	DIGIT	TQ 802 ZWEI Hz	TQ 803 CCIR Hz
1	X	885	960
2	Y	970	1022
3	1	1060	1124
4	2	1160	1197
5	3	1270	1275
6	4	1400	1358
7	5	1530	1446
8	6	1670	1540
9	7	1830	1640
10	8	2000	1747
11	9	2200	1860
12	0	2400	1981
13	REPEAT	2600	2110
14	A	2800	

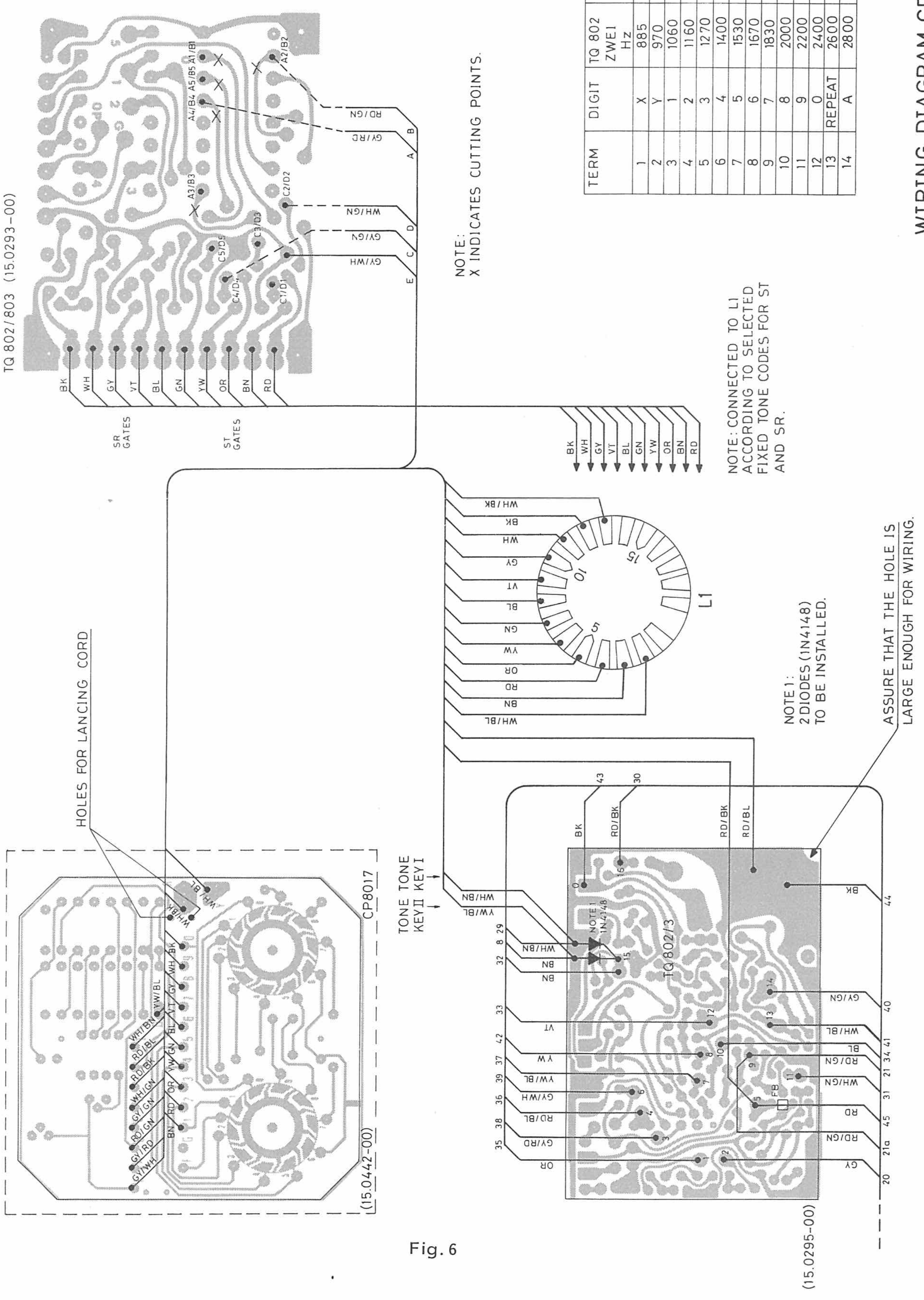


Fig. 6

CONTROL PANEL WITH TONE SWITCHING

CP8017

CP8017 is a variant of the control panel to be used in conjunction with the CQP800U family. CP8017 has the same function as CP808 and beside these, CP8017 include facilities for 2 telegram tone switching, with one fixed telegram and one variable 100 call telegram. Operation of the 2 telegram tone switching is done by means of the Tone Key pushbuttons I and II.

Tone Key I will send the fixed telegram preset at the factory.
Tone Key II will send the variable telegram. Two of the 5 sequential tones can be selected by means of 2 rotary switches placed on the loudspeaker panel.

MODE OF OPERATION

OPERATING INSTRUCTIONS

The fixed telegram sent by depressing Tone Key I is used to call the base station.
The variable telegram sent by depressing Tone Key II is used to call other portables via the base station which works as a repeater.

Calling a portable
If the portable has a specific calling number 62 for ex.:
Turn the rotary switch X10 on 6 and X1 on 2.
Push Tone Key I which establishes contact with the base station.
If the channel is free, push Tone Key II and wait for an answer from the other portable station.
Then the transmission can take place.

FUNCTION

Tone Key I
Fixed telegram.

When Tone Key I is activated, a logic "1" will be applied to the latch formed of IC1a and IC1b, causing a logic "1" from pin 4 IC1b to the gates IC2a pin 2 and IC2b pin 5.

In the same time TQ802/3 has also been activated from Tone Key I, and when the counter IC2, according to the selected digits combination in TQ802/3, applies a logic "1" via terminal B to the gate IC2b, this will go "high" in this particular sequence and via terminal D activate the chosen ST gate transistor.
In the same way the gate IC2a will activate the next chosen ST gate via the connections to the TQ802/3.

Tone Key II
Variable telegram.

The 2 rotary switches have to be set to the requested figures in the variable telegram. When Tone Key II is activated, a logic "1" will be applied to the latch formed of IC1a and IC1b, causing a logic "1" from pin 3 IC1a to the gates IC2c pin 9 and IC2d pin 12.

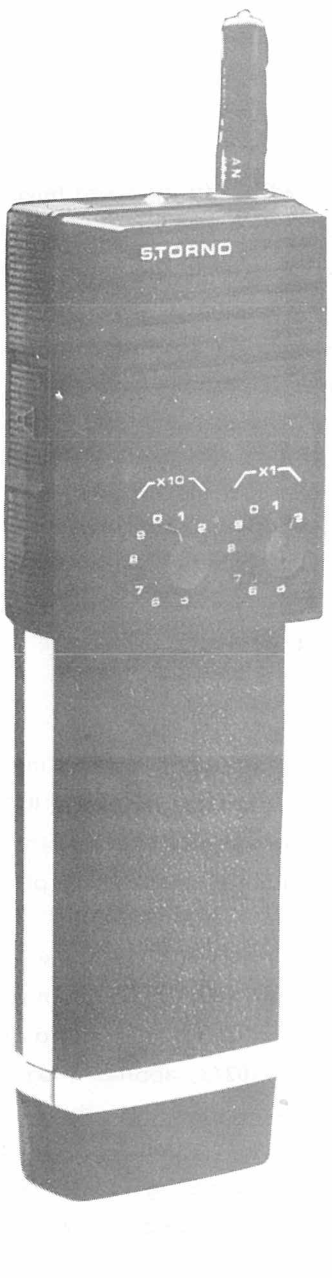


Fig. 1 CQP800U RS

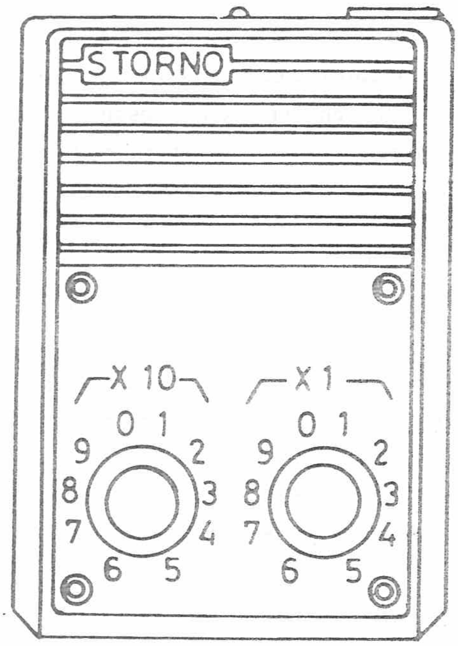


Fig. 2 Control Panel CP8017

Digits 1 and 3 variable

V_1	A	V_2	B	C

21 limitations

V_1 must not be selected equal to A.
V_2 must not be selected equal to B.

Strapping:
Cut at X1 terminal corresponding to fixed tone A and strap to repeat tone R or Y.

COMBINATIONS OF THE VARIABLE DIGITS IN TQ802/3

Individual combinations of the variable digits in TQ802/3 are possible, even though digits 3 and 5 are the most common.
For establishing the connection of the variable digits, see fig. 5 and fig. 6.
Terminals BD represent the "decade units" and terminals AC represent the "units" in the variable part of the call number.

If for example digits 2 and 4 in a 5 tone sequential call number are chosen to be the variable ones, connections of the terminals A - B - C - D must be done in the following way.

Digits 2 (decade units)
Cut the PWB outside A2/B2 (fig. 6))
Connect terminal B to the soldering terminal A2/B2 and terminal D to the soldering terminal C2/D2.

Digits 4 (units)
Cut the PWB outside A4/B4 (fig. 6))
Connect terminal A to the soldering terminal A4/B4 and terminal C to the soldering terminal C4/D4.

Coding and strapping of the SR part of TQ802/3 will be unchanged, and the remaining tones in the variable telegram will be the same as in the fixed telegram.

This completes the establishing of the two variable digits.
Other combinations may be done in a similar way.

CODING AND STRAPPING CP8017

D403.056

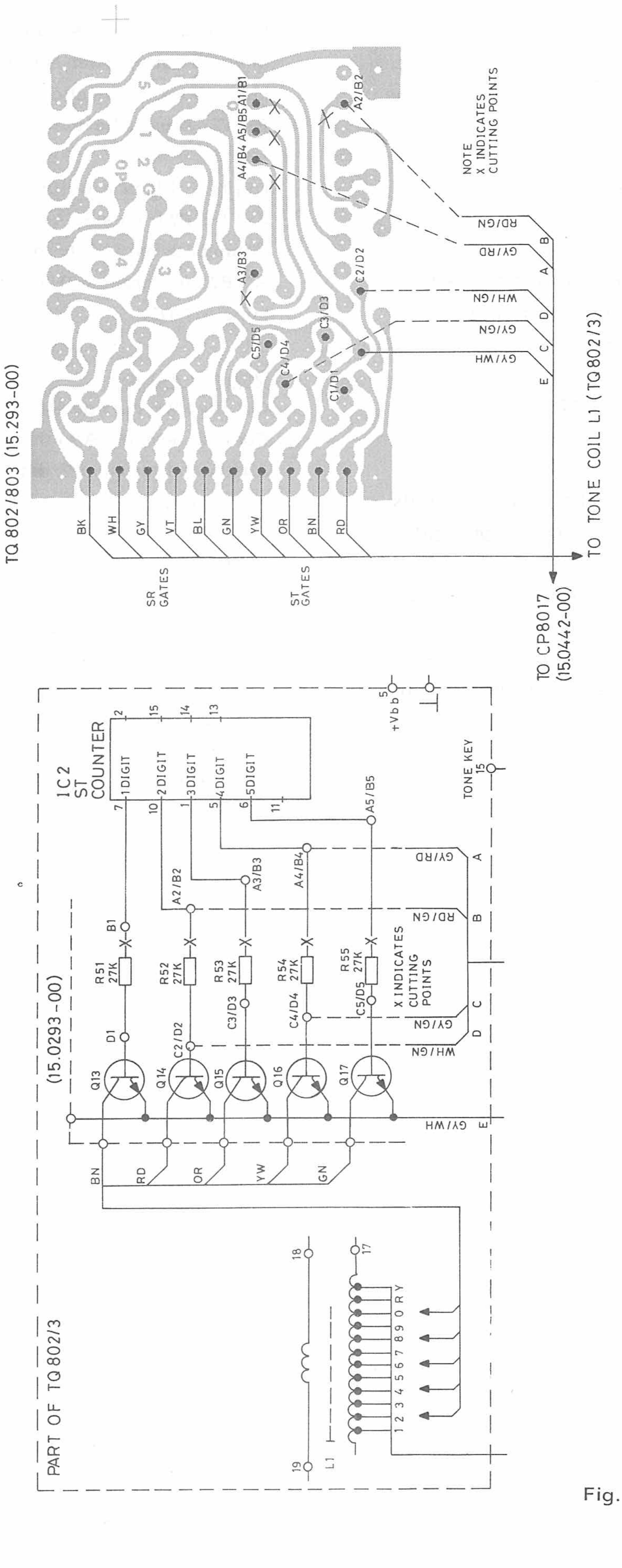
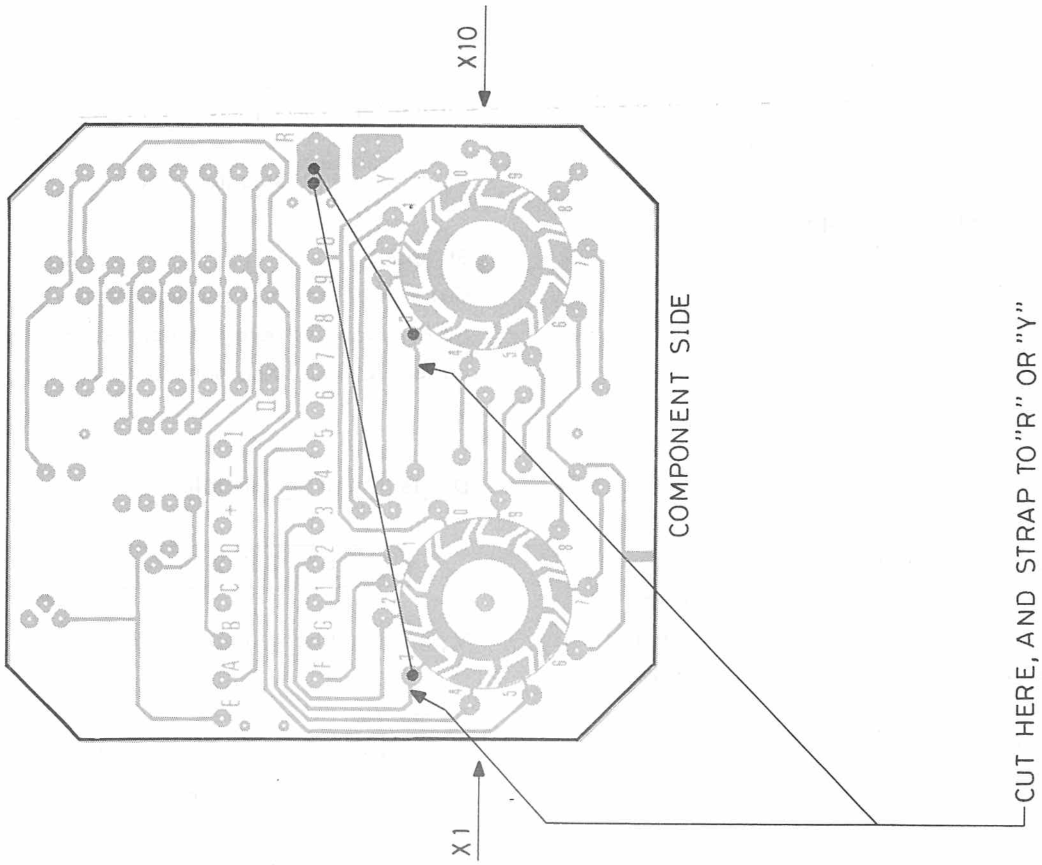


Fig. 5

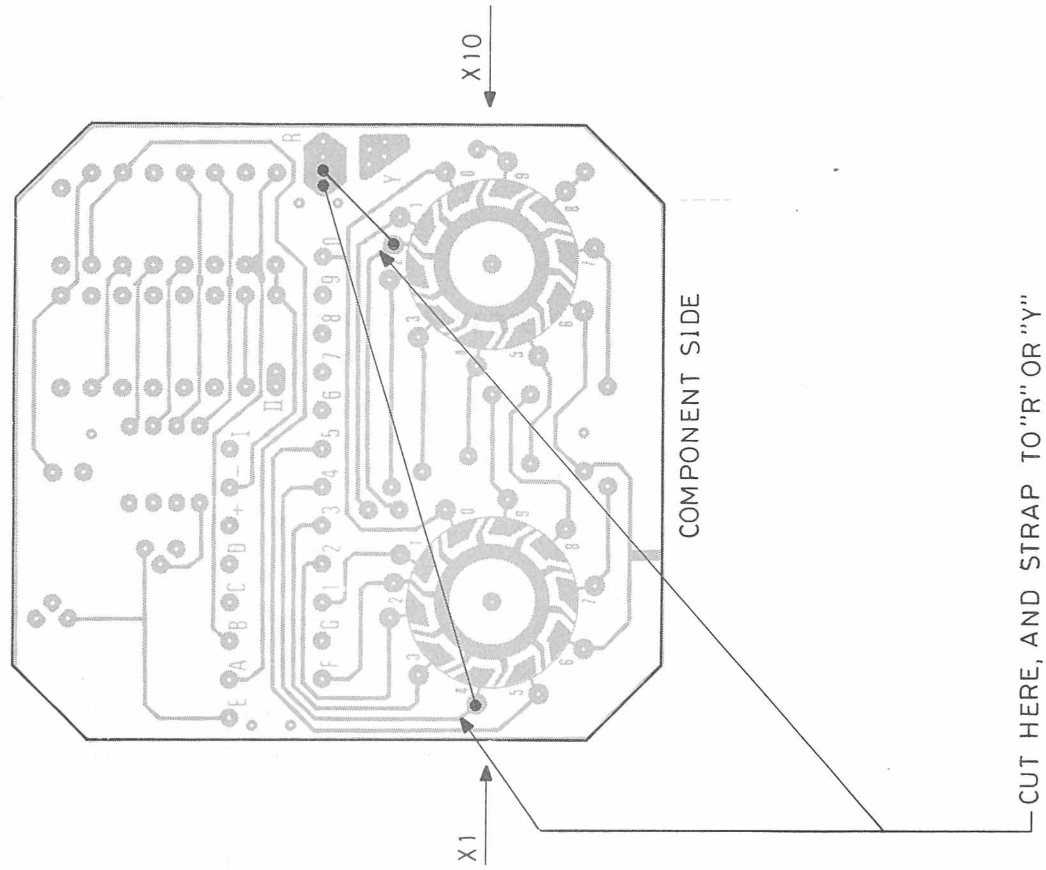
Fig. 3 Example for use of repeat tones in call number 3 V_1 3 V_2 3.



CODING AND STRAPPING CP8017

D403.058

Fig. 4 Example for use of repeat tones in call number 2 V_1 4 V_2 3.



CODING AND STRAPPING CP 8017

D403.057

X1 = units, X10 = decade units in the variable part of the call number.

These 2 gates will be activated sequentially when they receive a logic "1" on pin 8 or 13 from the ST counter IC2 in TQ802/3, in the same manner as described under Tone Key I for the gates IC2a and IC2b.

When IC2c and IC2d in turn goes "high", they will activate the ST gate transistors Q1 and Q2 on the CP8017, and thereby in turn make connections for the rotary switches X10 and X1, which are wired to L1 in TQ802/3.

CODING AND STRAPPING

Coding and strapping instructions for TQ802/3 will be unchanged for the fixed telegram transmitted by Tone Key I.

When coding and strapping a CP8017/TQ802/3, the following decisions must be made:

1) Which digits will be the variable ones, to be dialled on X10 and X1.
2) frequencies of the fixed tones.

NUMBER COMBINATIONS

Digits 2 and 4 variable

1) Ex: | 3 | V_1 | 3 | V_2 | 3 |

To allow the greatest number of combinations, strap CP8017 as follows:
Cut the PWB just outside the soldering terminal 3 at the printed switches X10 and X1 and strap soldering points 3 to soldering point for repeat tone R or Y. (see fig. 3.)

R= repeat tone in 20/25 kHz channel spacing equipment.

Y= repeat tone in 12.5 kHz channel spacing equipment.

2) Ex: | 2 | V_1 | 4 | V_2 | 3 |

Strap CP8017 as follows:
Cut the PWB just outside the soldering terminal 2 at the printed switch X10 and outside the soldering terminal 4 at X1 and strap 2 and 4 to soldering for repeat tone R or Y.
(see fig. 4.)

3) Summary.

If the fixed code is represented by A, B and C:

A	V_1	B	V_2	C

If A/B/C and CP8017 is strapped as above all combinations will be permissible.

If A/B/C, CP8017 strapped, there are 21 limitations:
- V_1 must not be selected equal to B.
- V_2 must not be selected equal to C.

Digits 3 and 5 variable

A	B	V_1	C	V_2

10 limitations

V_1 must not be selected equal to C.

Strapping:
Cut at X10 terminal corresponding to fixed tone B, cut at X1 terminal corresponding to fixed tone C and strap both to repeat tone R or Y.

Digits 4 and 5 variable

A	B	C	V_1	V_2

10 limitations

V_1 must not be selected equal to V_2.

Strapping:
Cut at X10 terminal corresponding to fixed tone C and strap to repeat tone R or Y.

WIRING DIAGRAM CP8017

D 403.055

TERM	DIGIT	TQ 802 ZWEI Hz	TQ 803 CCIR Hz
1	X	885	960
2	Y	970	1022
3	1	1060	1124
4	2	1160	1197
5	3	1270	1275
6	4	1400	1358
7	5	1530	1446
8	6	1670	1540
9	7	1830	1640
10	8	2000	1747
11	9	2200	1860
12	0	2400	1981
13	REPEAT	2600	2110
14	A	2800	

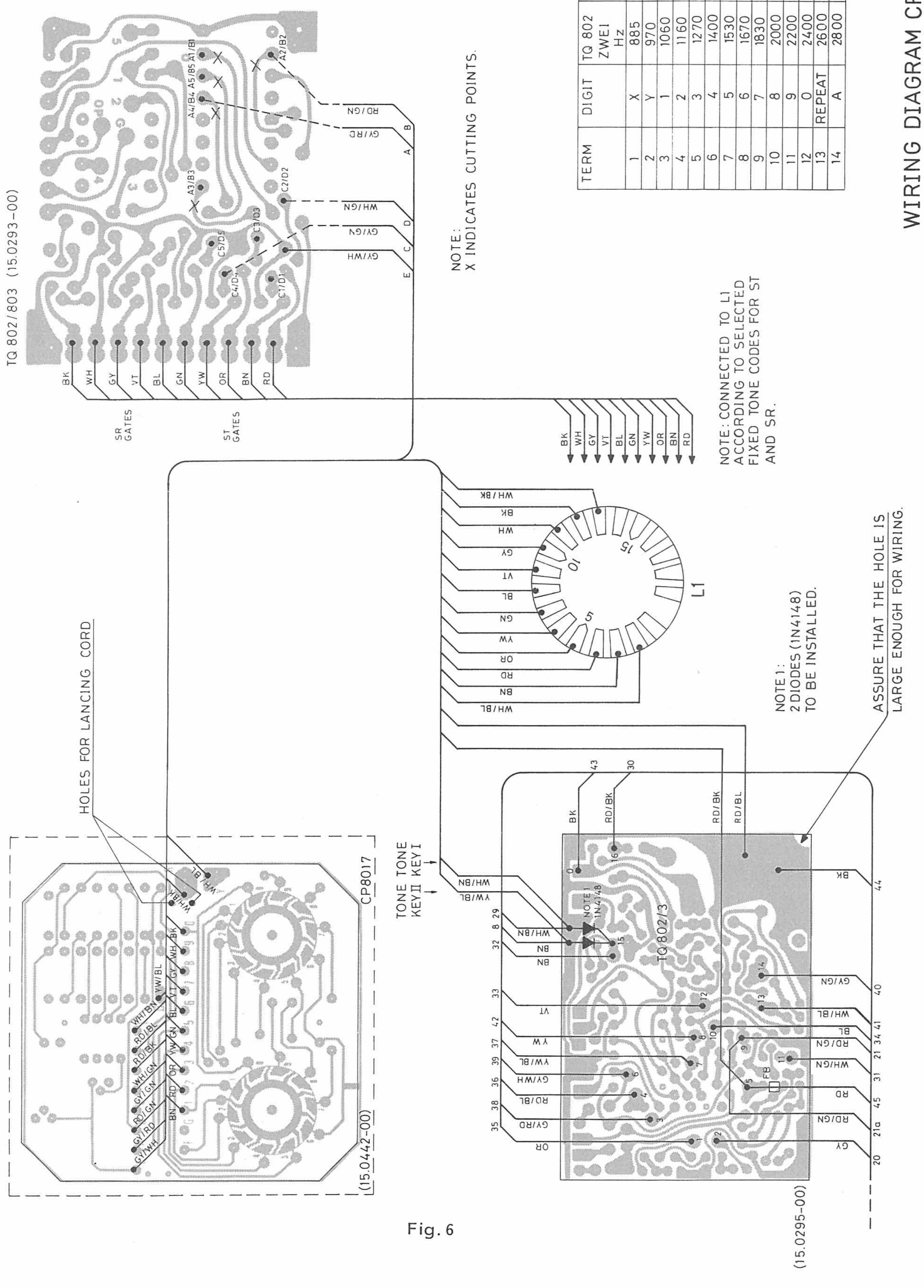
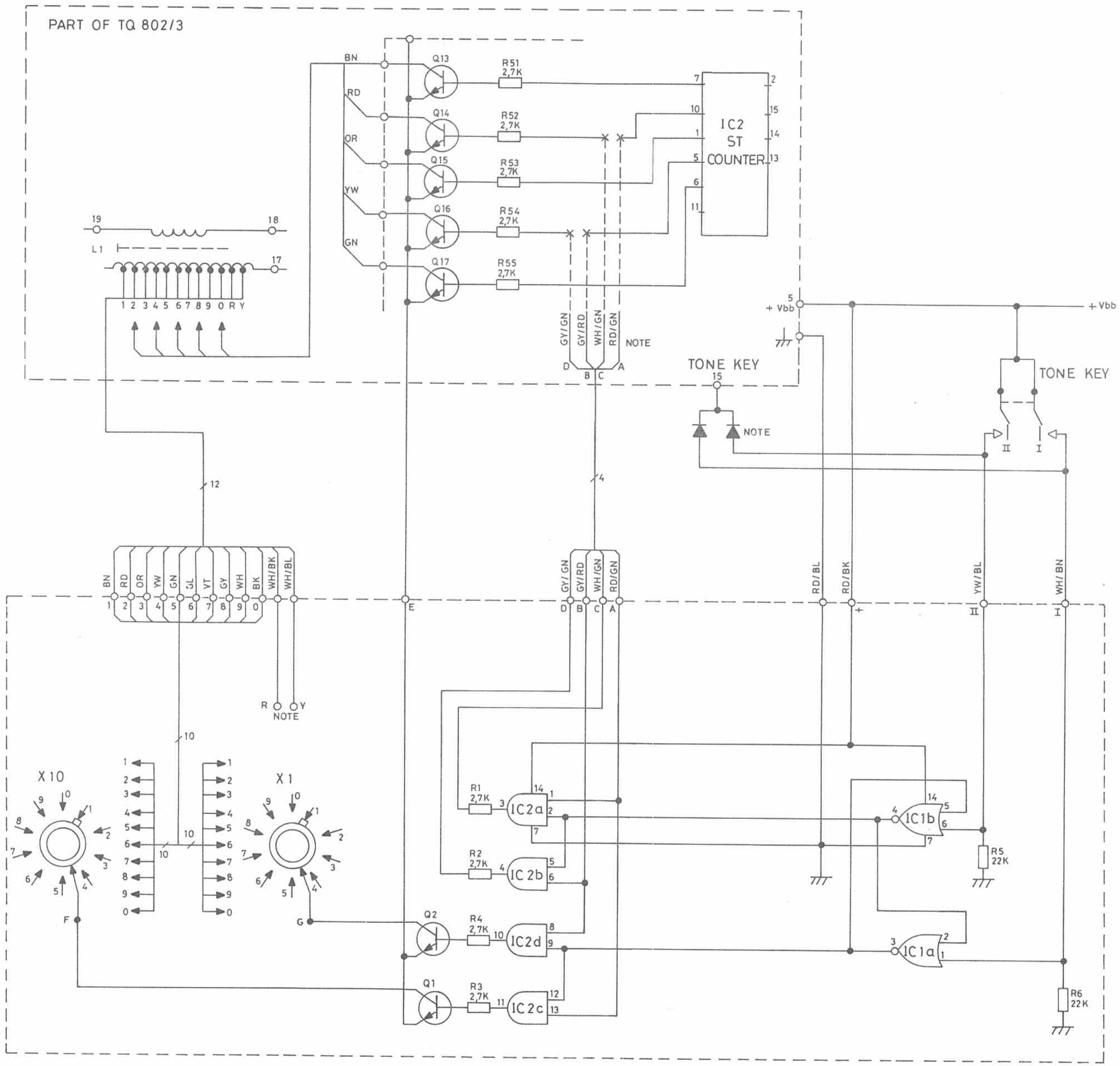


Fig. 6

Storno



NOTE:
SEE CODING AND STRAPPING

CONTROL PANEL CP8017

D403.059

Storno

CONTROL PANEL WITH TONE SWITCHING

CP8017

CP8017 is a variant of the control panel to be used in conjunction with the CQP800U family. CP8017 has the same function as CP808 and beside these, CP8017 include facilities for 2 telegram tone switching, with one fixed telegram and one variable 100 call telegram. Operation of the 2 telegram tone switching is done by means of the Tone Key pushbuttons I and II.

Tone Key I will send the fixed telegram preset at the factory.
Tone Key II will send the variable telegram. Two of the 5 sequential tones can be selected by means of 2 rotary switches placed on the loudspeaker panel.

MODE OF OPERATION

OPERATING INSTRUCTIONS

The fixed telegram sent by depressing Tone Key I is used to call the base station.
The variable telegram sent by depressing Tone Key II is used to call other portables via the base station which works as a repeater.

Calling a portable
If the portable has a specific calling number 62 for ex.:
Turn the rotary switch X10 on 6 and X1 on 2.
Push Tone Key I which establishes contact with the base station.
If the channel is free, push Tone Key II and wait for an answer from the other portable station.
Then the transmission can take place.

FUNCTION

Tone Key I
Fixed telegram.

When Tone Key I is activated, a logic "1" will be applied to the latch formed of IC1a and IC1b, causing a logic "1" from pin 4 IC1b to the gates IC2a pin 2 and IC2b pin 5.

In the same time TQ802/3 has also been activated from Tone Key I, and when the counter IC2, according to the selected digits combination in TQ802/3, applies a logic "1" via terminal B to the gate IC2b, this will go "high" in this particular sequence and via terminal D activate the chosen ST gate transistor.
In the same way the gate IC2a will activate the next chosen ST gate via the connections to the TQ802/3.

Tone Key II
Variable telegram.

The 2 rotary switches have to be set to the requested figures in the variable telegram.
When Tone Key II is activated, a logic "1" will be applied to the latch formed of IC1a and IC1b, causing a logic "1" from pin 3 IC1a to the gates IC2c pin 9 and IC2d pin 12.

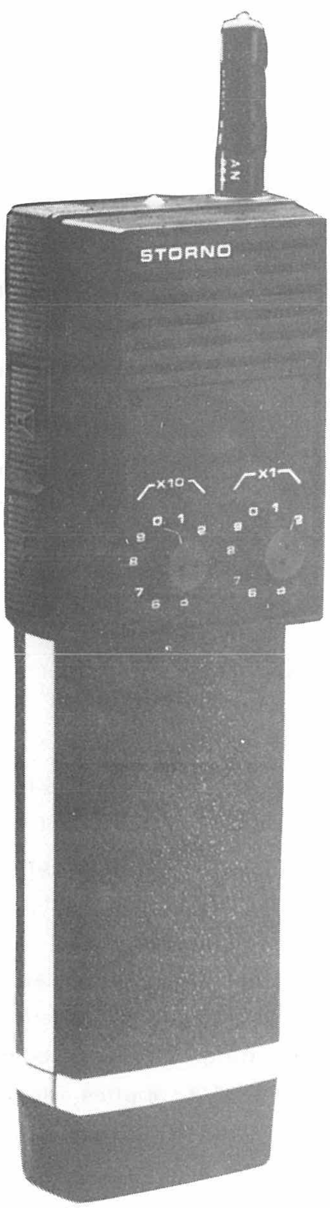


Fig. 1 CQP800U RS

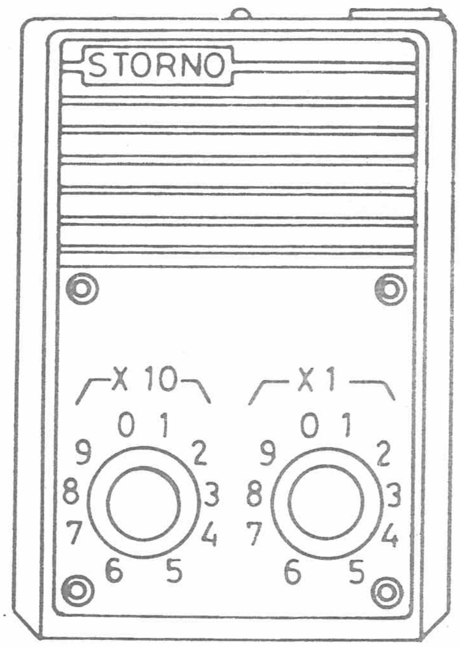
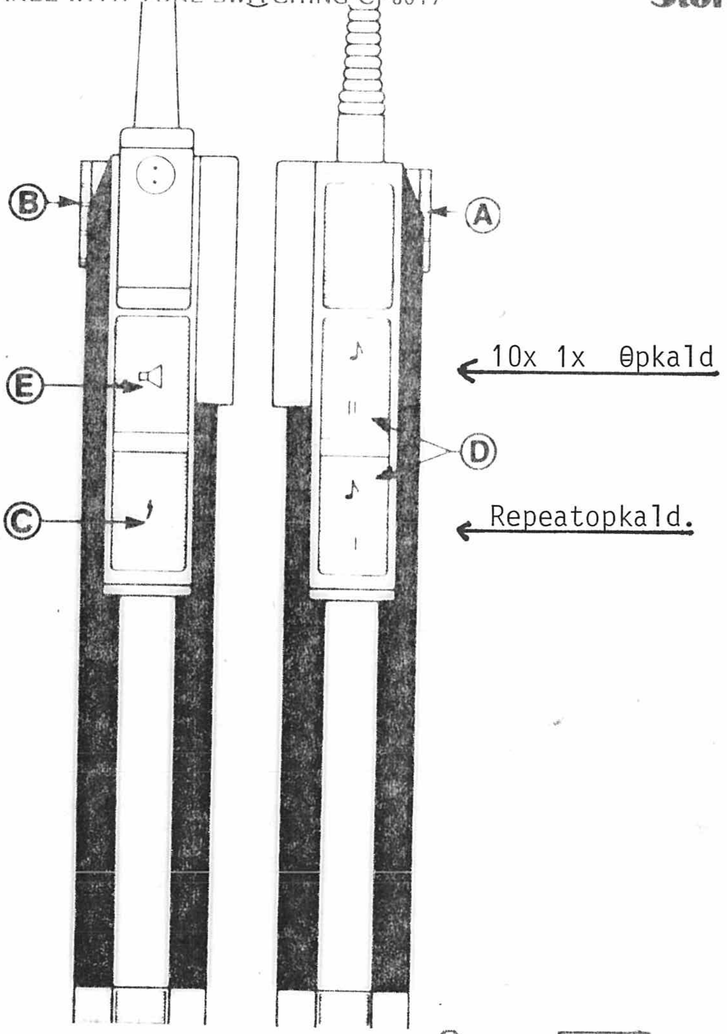


Fig. 2 Control Panel CP8017



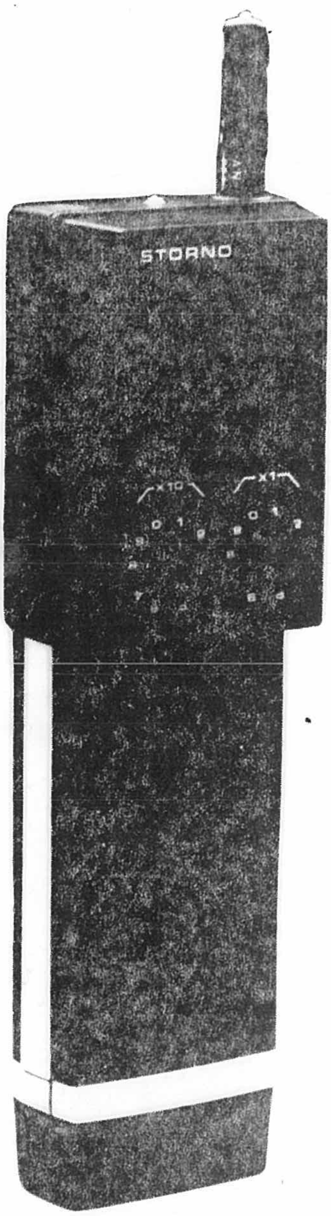


Fig. 1 CQP800U RS

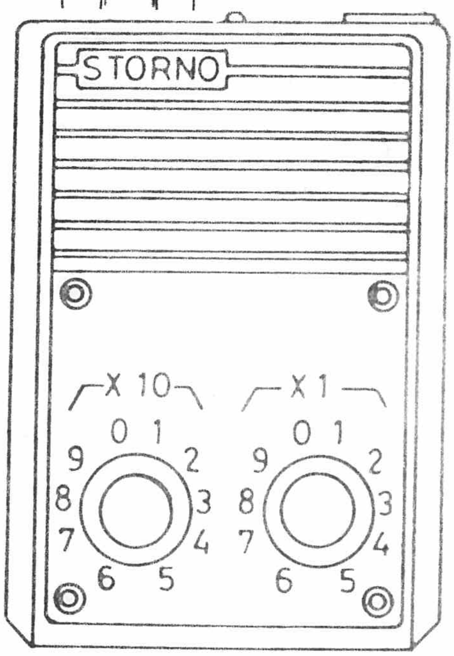


Fig. 2 Control Panel CP8017

These 2 gates will be activated sequentially when they receive a logic "1" on pin 8 or 13 from the ST counter IC2 in TQ802/3, in the same manner as described under Tone Key I for the gates IC2a and IC2b.

When IC2c and IC2d in turn goes "high", they will activate the ST gate transistors Q1 and Q2 on the CP8017, and thereby in turn make connections for the rotary switches X10 and X1, which are wired to L1 in TQ802/3.

CODING AND STRAPPING

Coding and strapping instructions for TQ802/3 will be unchanged for the fixed telegram transmitted by Tone Key I.

When coding and strapping a CP8017/TQ802/3, the following decisions must be made:

1) Which digits will be the variable ones, to be dialled on X10 and X1.
2) frequencies of the fixed tones.

NUMBER COMBINATIONS

Digits 2 and 4 variable

1) Ex: | 3 | V_1 | 3 | V_2 | 3 |

To allow the greatest number of combinations, strap CP8017 as follows:
Cut the PWB just outside the soldering terminal 3 at the printed switches X10 and X1 and strap soldering points 3 to soldering point for repeat tone R or Y. (see fig. 3.)

R= repeat tone in 20/25 kHz channel spacing equipment.

Y= repeat tone in 12.5 kHz channel spacing equipment.

2) Ex: | 2 | V_1 | 4 | V_2 | 3 |

Strap CP8017 as follows:
Cut the PWB just outside the soldering terminal 2 at the printed switch X10 and outside the soldering terminal 4 at X1 and strap 2 and 4 to soldering for repeat tone R or Y.
(see fig. 4.)

3) Summary.

If the fixed code is represented by A, B and C:

A	V_1	B	V_2	C

If A/B/C and CP8017 is strapped as above all combinations will be permissible.

If A/B/C, CP8017 strapped, there are 21 limitations:
- V_1 must not be selected equal to B.
- V_2 must not be selected equal to C.

Digits 3 and 5 variable

A	B	V_1	C	V_2

10 limitations

V_1 must not be selected equal to C.

Strapping:
Cut at X10 terminal corresponding to fixed tone B, cut at X1 terminal corresponding to fixed tone C and strap both to repeat tone R or Y.

Digits 4 and 5 variable

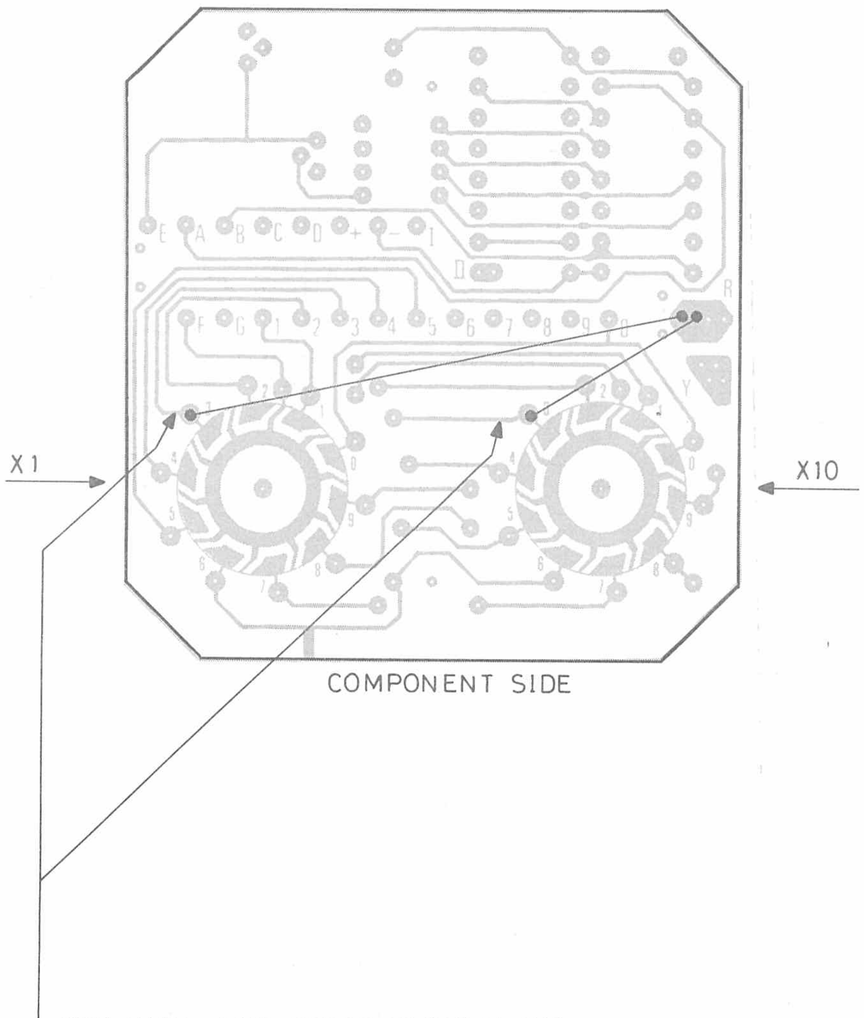
A	B	C	V_1	V_2

10 limitations

V_1 must not be selected equal to V_2.

Strapping:
Cut at X10 terminal corresponding to fixed tone C and strap to repeat tone R or Y.

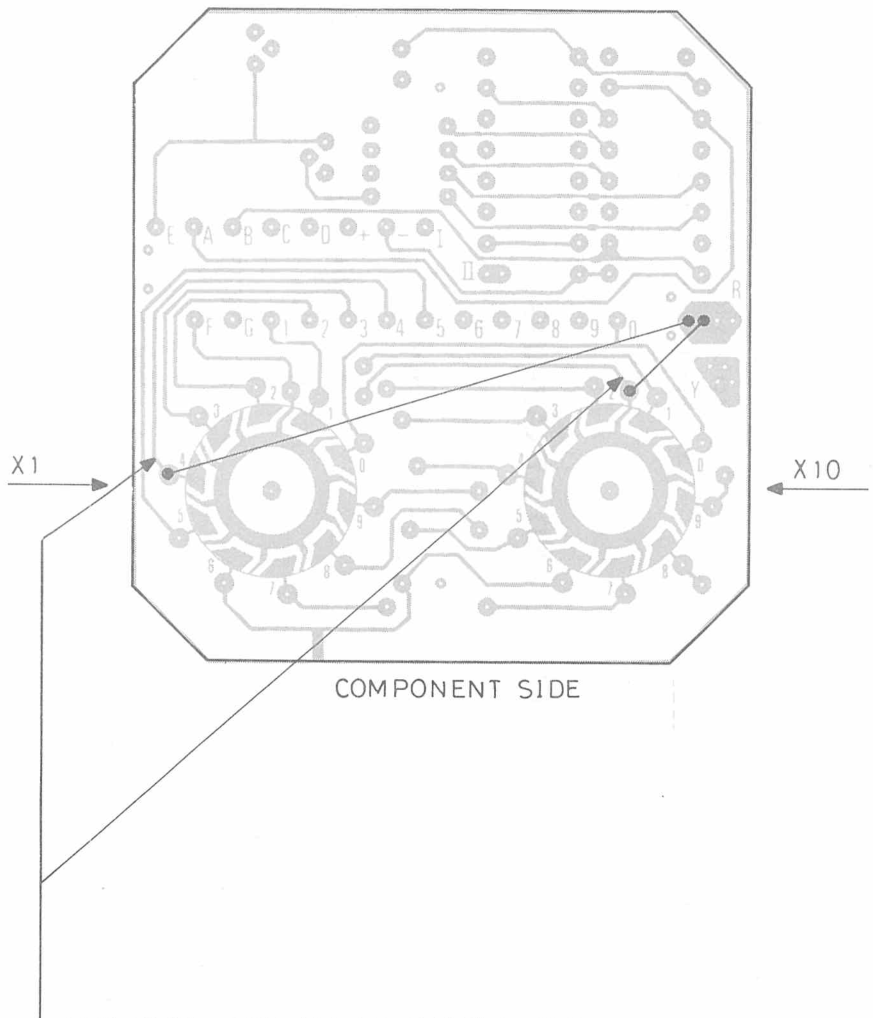
Fig. 3 Example for use of repeat tones in call number 3 V_1 3 V_2 3.



CODING AND STRAPPING CP8017

D403.058

Fig. 4 Example for use of repeat tones in call number 2 V_1 4 V_2 3.



CODING AND STRAPPING CP 8017

D403.057

X1 = units, X10 = decade units in the variable part of the call number.

Digits 1 and 3 variable

V_1	A	V_2	B	C

21 limitations

V_1 must not be selected equal to A.
V_2 must not be selected equal to B.

Strapping:
Cut at X1 terminal corresponding to fixed tone A and strap to repeat tone R or Y.

COMBINATIONS OF THE VARIABLE DIGITS IN TQ802/3

Individual combinations of the variable digits in TQ802/3 are possible, even though digits 3 and 5 are the most common.
For establishing the connection of the variable digits, see fig. 5 and fig. 6.
Terminals BD represent the "decade units" and terminals AC represent the "units" in the variable part of the call number.

If for example digits 2 and 4 in a 5 tone sequential call number are chosen to be the variable ones, connections of the terminals A - B - C - D must be done in the following way.

Digits 2 (decade units)
Cut the PWB outside A2/B2 (fig. 6))
Connect terminal B to the soldering terminal A2/B2 and terminal D to the soldering terminal C2/D2.

Digits 4 (units)
Cut the PWB outside A4/B4 (fig. 6))
Connect terminal A to the soldering terminal A4/B4 and terminal C to the soldering terminal C4/D4.

Coding and strapping of the SR part of TQ802/3 will be unchanged, and the remaining tones in the variable telegram will be the same as in the fixed telegram.

This completes the establishing of the two variable digits.
Other combinations may be done in a similar way.

CODING AND STRAPPING CP8017

D403.056

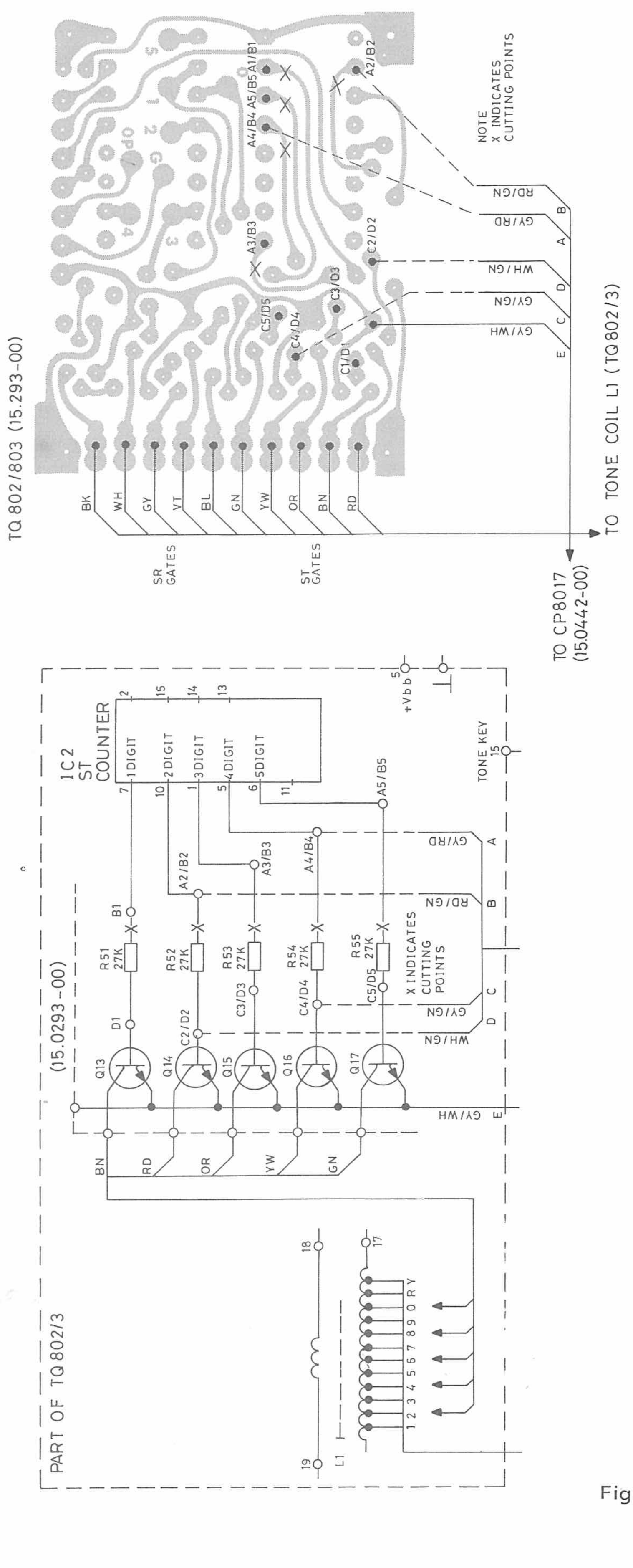
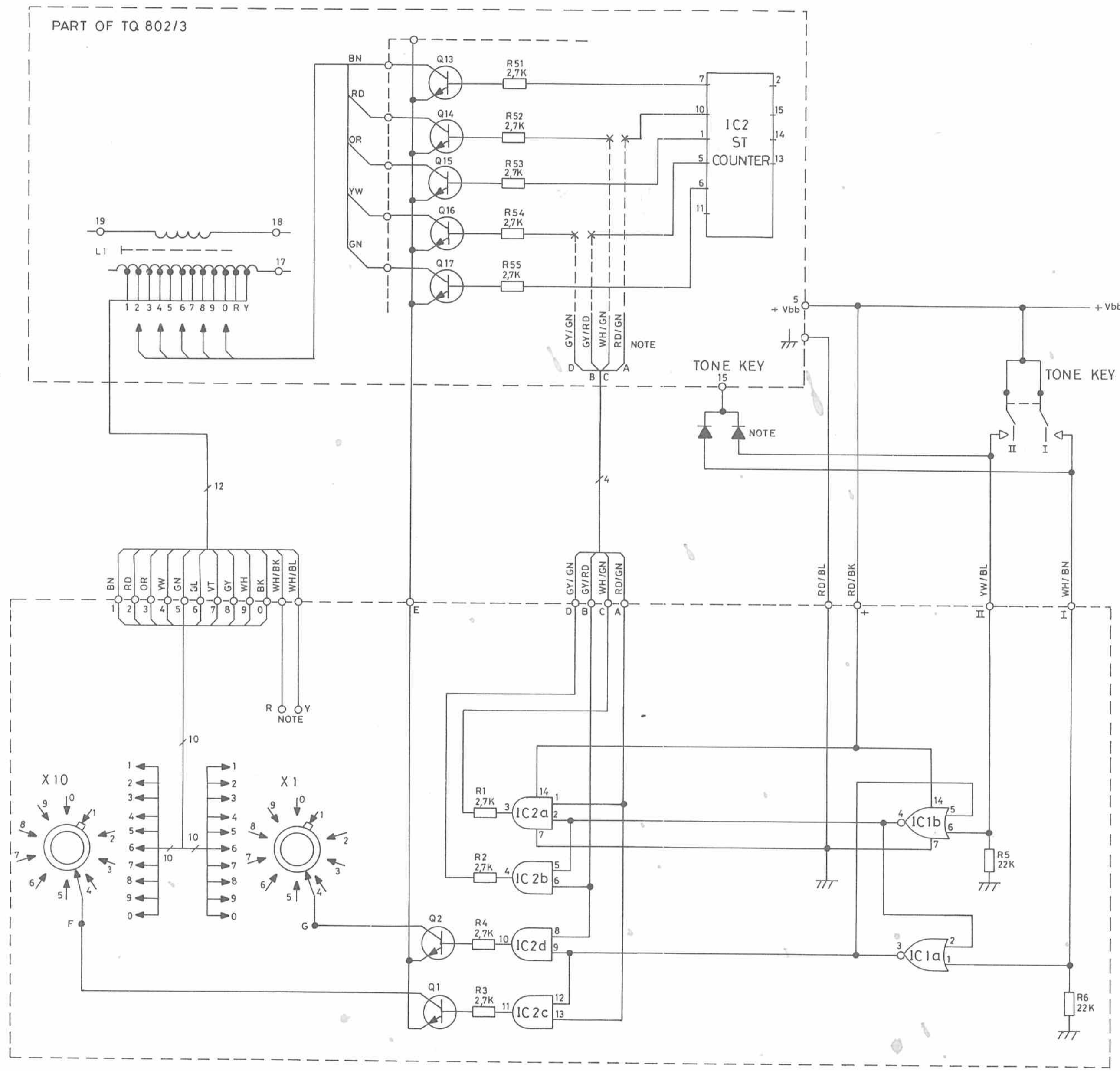


Fig. 5



NOTE:
SEE CODING AND STRAPPING

CONTROL PANEL CP8017

D403.059

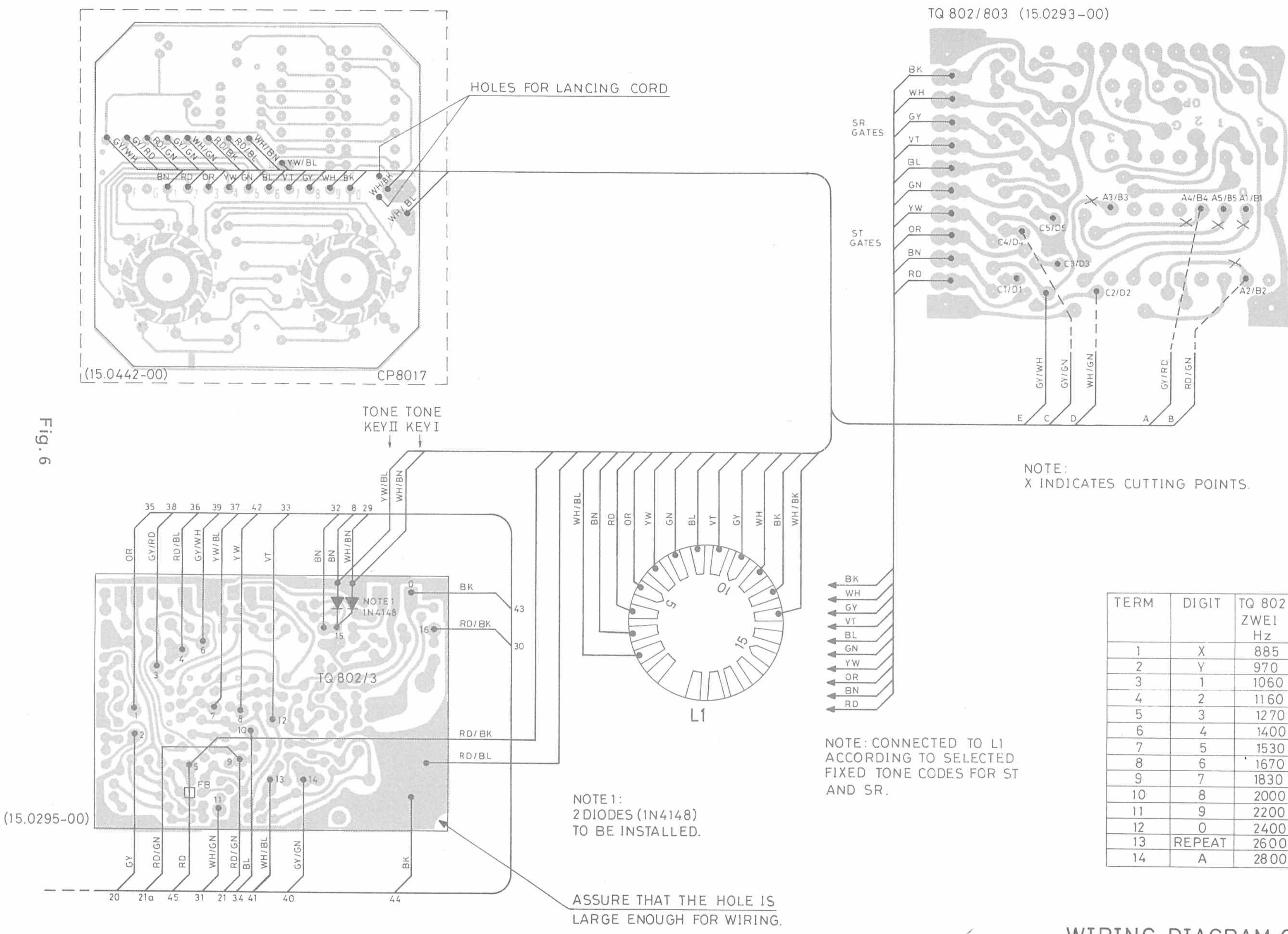


Fig. 6

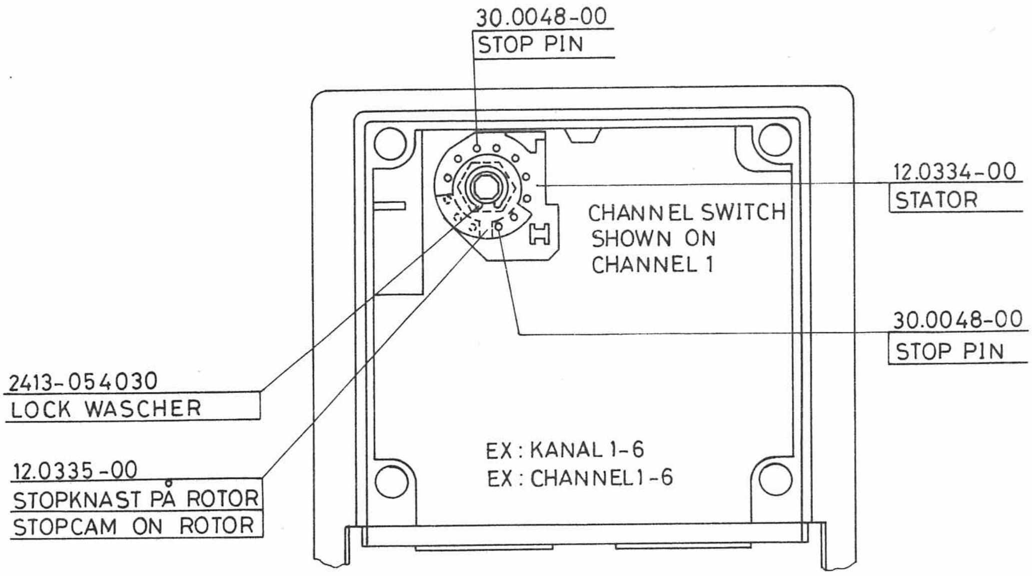
TERM	DIGIT	TQ 802 ZWEI Hz	TQ 803 CCIR Hz
1	X	885	960
2	Y	970	1022
3	1	1060	1124
4	2	1160	1197
5	3	1270	1275
6	4	1400	1358
7	5	1530	1446
8	6	1670	1540
9	7	1830	1640
10	8	2000	1747
11	9	2200	1860
12	0	2400	1981
13	REPEAT	2600	2110
14	A	2800	

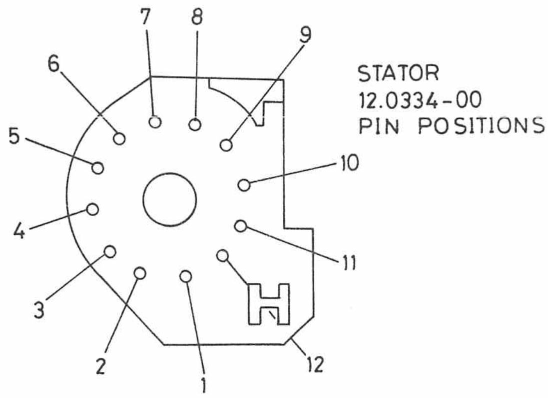
WIRING DIAGRAM CP8017

D403.055

Storno

Storno





KANAL
CHANNEL

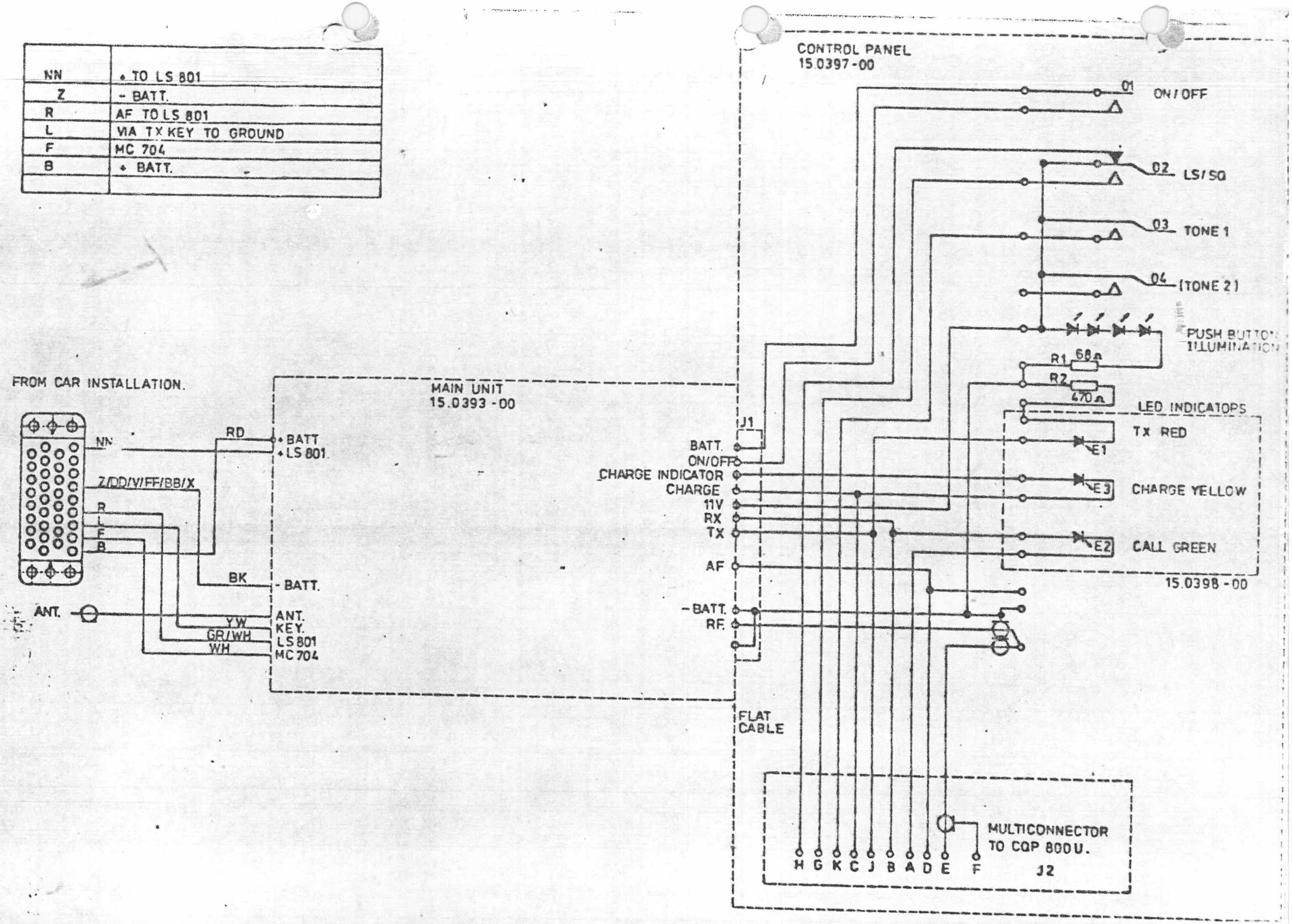
STIFT I POS.
PIN IN POS.

			1	2	3	4	5	6	7	8	9	10	11	12
1			X	X										
1 - 2			X		X									
1 - 3			X			X								
1 - 4			X				X							
1 - 5			X					X						
1 - 6			X						X					
1 - 7			X							X				
1 - 8			X								X			
1 - 9			X									X		
1 - 10			X										X	
1 - 11			X											X
1 - 12														

CHANNEL SWITCH STOP CQP 800

D 403.036

NN	+ TO LS 801
Z	- BATT.
R	AF TO LS 801
L	VIA TX KEY TO GROUND
F	MC 704
B	+ BATT.

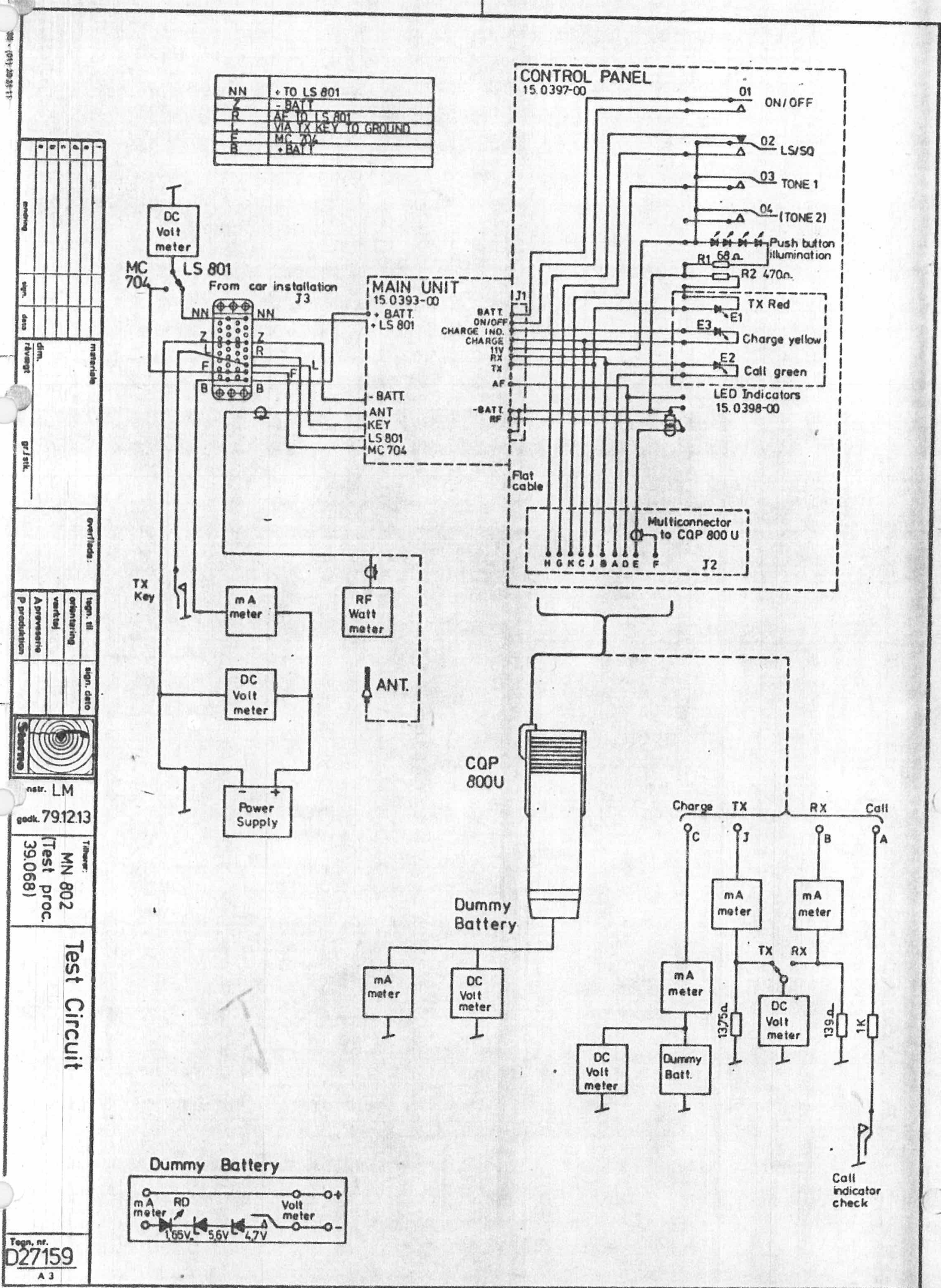


10.4124 -00

Mq. 23

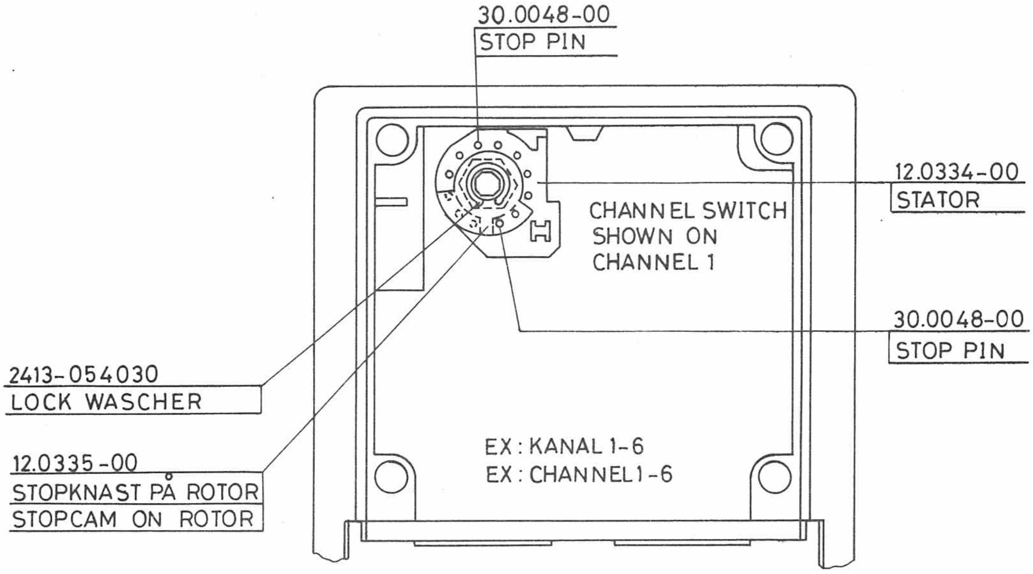
r.LM/KPL

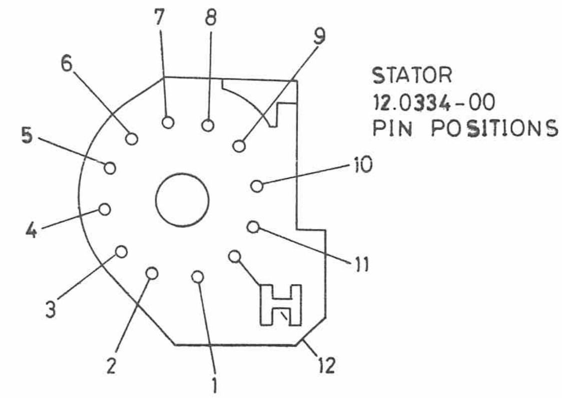
DIAGRAM
MN 802



NN + TO LS 801
Z - BATT
R AF TO LS 801
L VIA TX KEY TO GROUND
F MC 704
B + BATT
CONTROL PANEL
15.0397-00
01 ON/OFF
02 LS/SQ
03 TONE 1
04 (TONE 2)
Push button illumination
R1 68Ω
R2 470Ω
TX Red
E1
E3
Charge yellow
E2
Call green
LED Indicators
15.0398-00
MAIN UNIT
15.0393-00
+ BATT.
+ LS 801
- BATT.
ANT
KEY
LS 801
MC 704
J1
BATT
ON/OFF
CHARGE IND.
CHARGE
11V
RX
TX
AF
-BATT
RF
Flat cable
Multiconnector to CQP 800 U
H G K C J B A D E F
J2
DC Volt meter
MC 704
LS 801
From car installation
J3
NN
Z
R
L
F
B
TX Key
mA meter
RF Watt meter
DC Volt meter
ANT.
Power Supply
CQP 800U
Dummy Battery
mA meter
DC Volt meter
Charge
TX
RX
Call
C
J
B
A
mA meter
mA meter
TX
RX
mA meter
DC Volt meter
13,75Ω
139Ω
1K
DC Volt meter
Dummy Batt.
Call indicator check
Dummy Battery
mA meter
RD
Volt meter
1,65V
5,6V
4,7V
materiale
ændring
sign.
dato
dim. råvægt
gr./stk.
overflade:
tegn. til
orientering
værktøj
A prøveserie
P produktion
sign. dato
Storno
konstr. LM
godk. 79.12.13
Tilhører:
MN 802
(Test proc. 39.068)
Test Circuit
Tegn. nr.
D27159
A 3

Storno





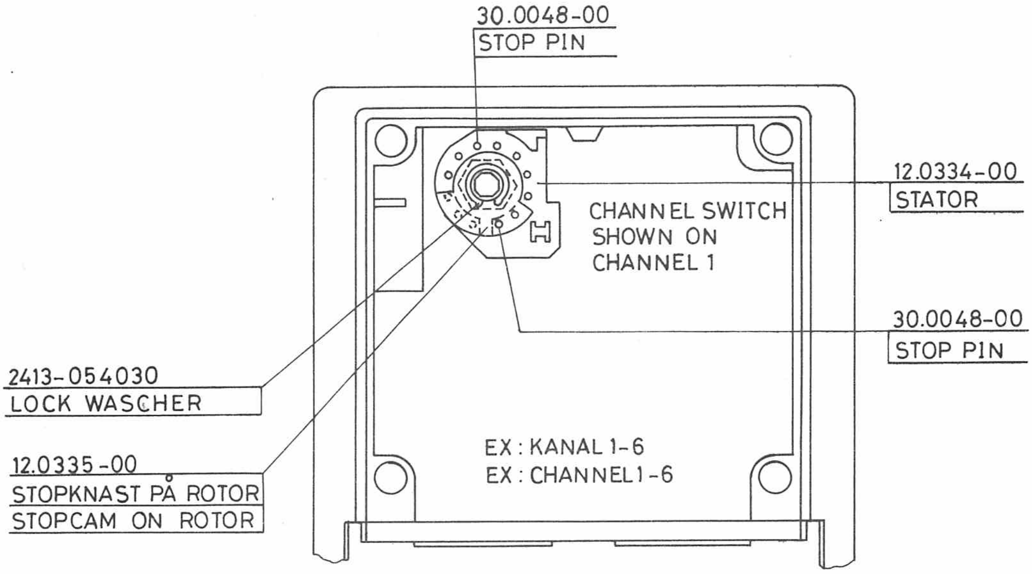
KANAL
CHANNEL

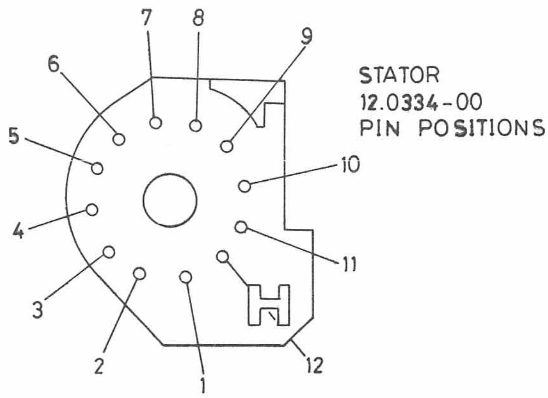
STIFT I POS.
PIN IN POS.

			1	2	3	4	5	6	7	8	9	10	11	12
1			X	X										
1 - 2			X		X									
1 - 3			X			X								
1 - 4			X				X							
1 - 5			X					X						
1 - 6			X						X					
1 - 7			X							X				
1 - 8			X								X			
1 - 9			X									X		
1 - 10			X										X	
1 - 11			X											X
1 - 12														

CHANNEL SWITCH STOP CQP 800

D403.036





KANAL
CHANNEL

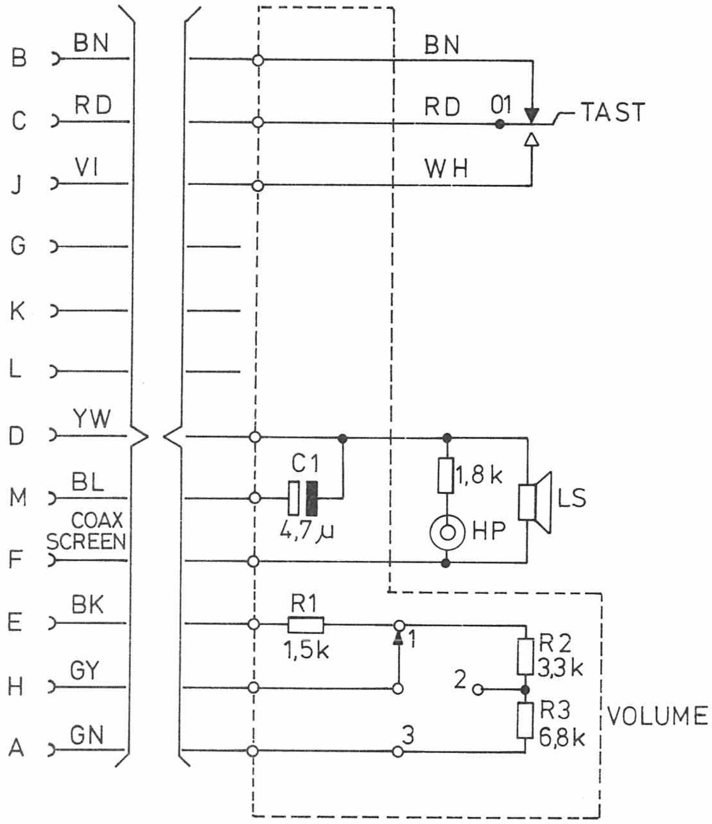
STIFT I POS.
PIN IN POS.

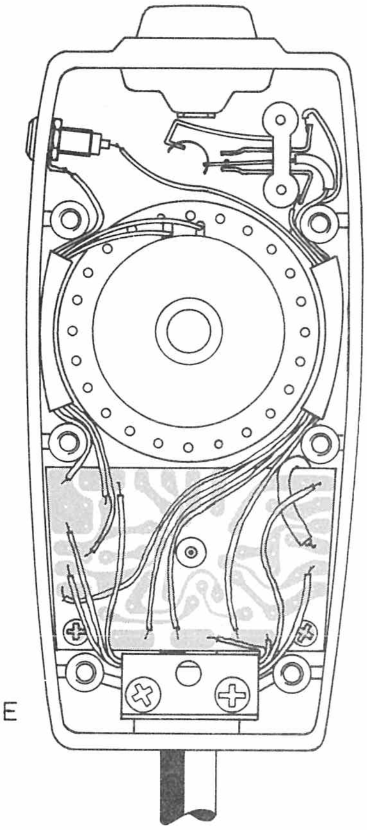
			1	2	3	4	5	6	7	8	9	10	11	12
1			X	X										
1 - 2			X		X									
1 - 3			X			X								
1 - 4			X				X							
1 - 5			X					X						
1 - 6			X						X					
1 - 7			X							X				
1 - 8			X								X			
1 - 9			X									X		
1 - 10			X										X	
1 - 11			X											X
1 - 12														

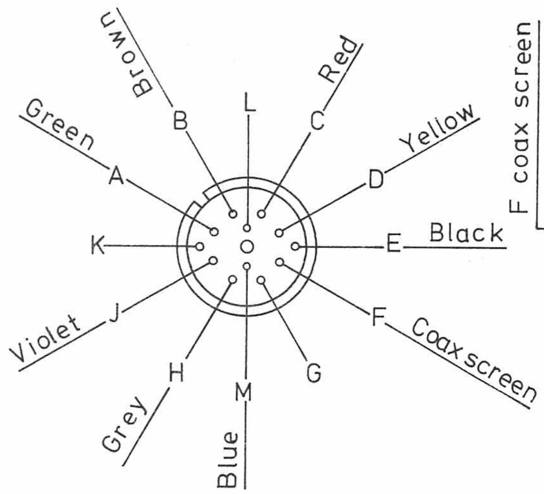
CHANNEL SWITCH STOP CQP 800

D 403.036

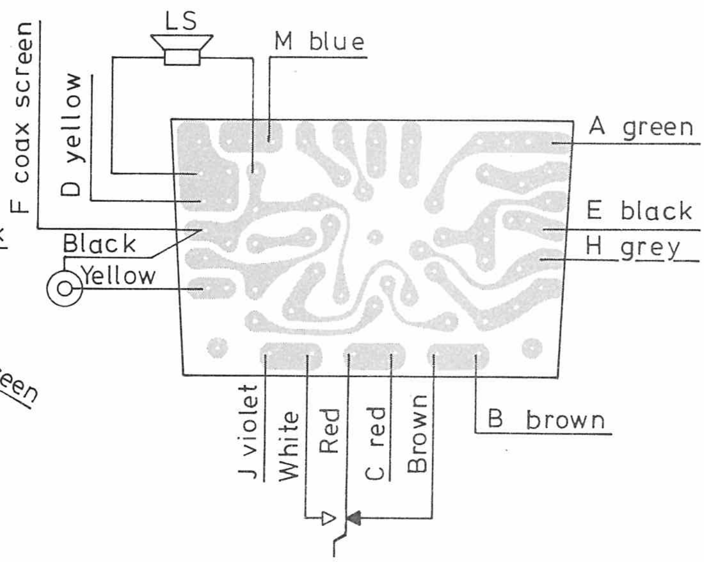
Storno

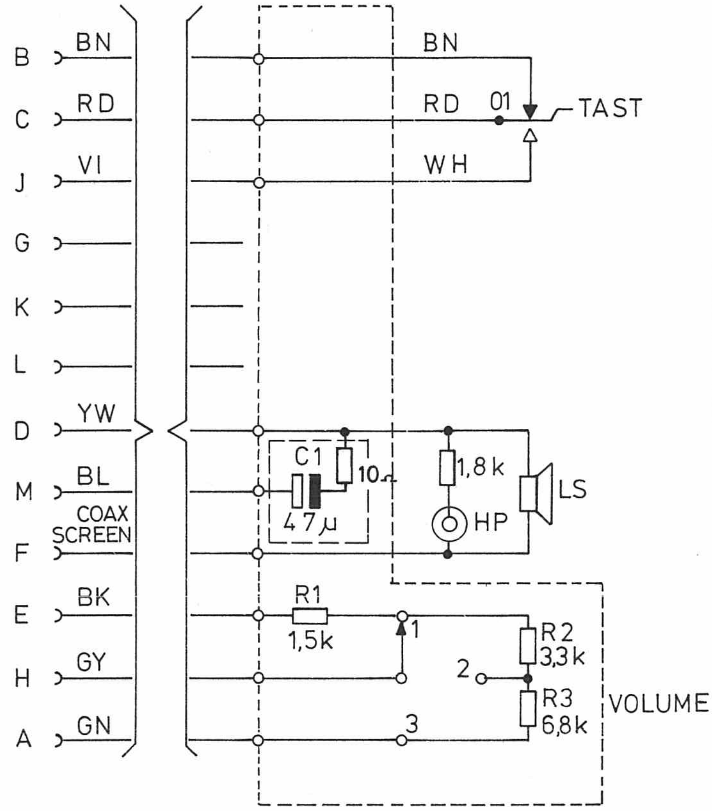


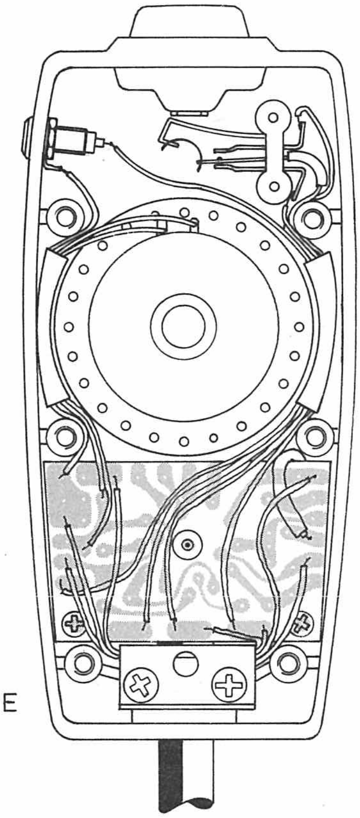


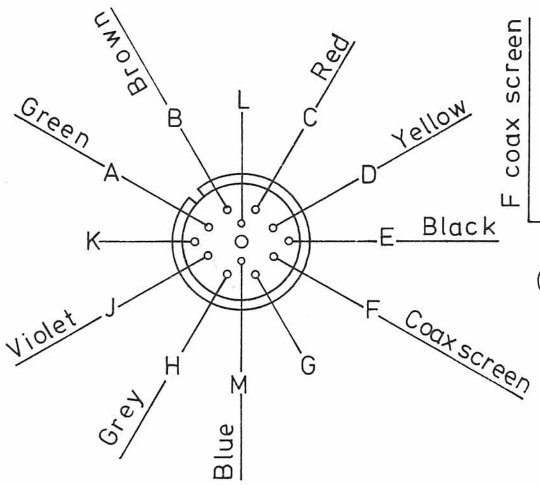


Seen at solder terminal

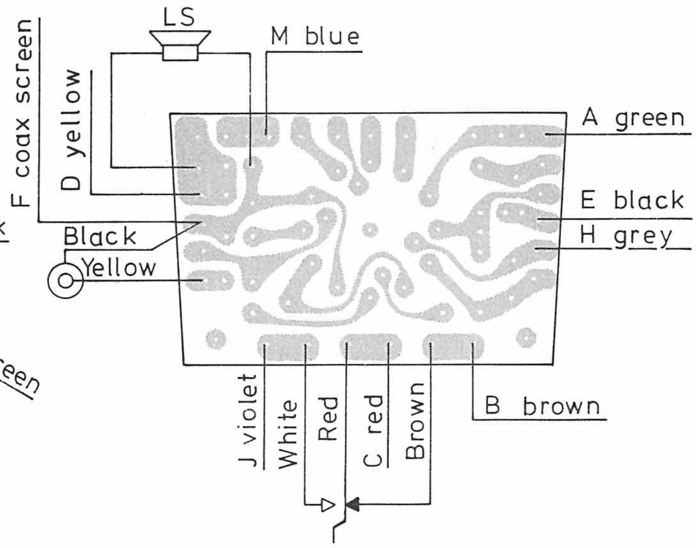






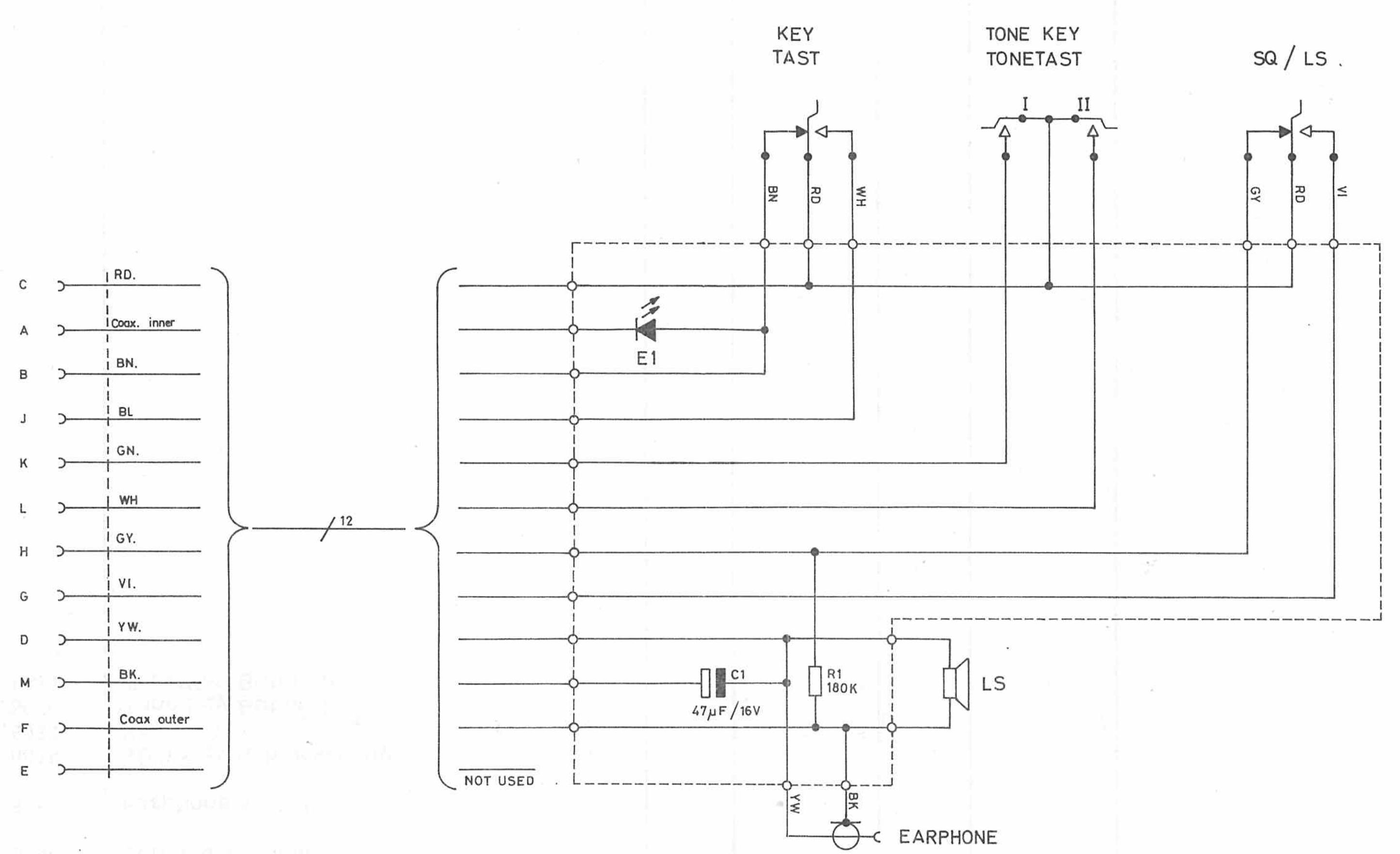


Seen at solder terminal



CONTROL UNIT CB801-IS

D402.638



CONTROL UNIT CB802

D402.025/4

Storno

TYPE	Nº	CODE	DATA
		10.3158	Control Unit CB802
	C1	73.5149	47 µF 20% tantal 16 V
	R1	80.5076	180 KΩ 5% carbon film 0.1 W
	E1	99.5306	LED 1.6 V; 20 mA
		41.5160	Earphone socket
		47.0614	SQ/LS Switch assembly
		47.5033	Key switch
		47.5079	Tone Key Button I
		47.5079	Tone Key Button II

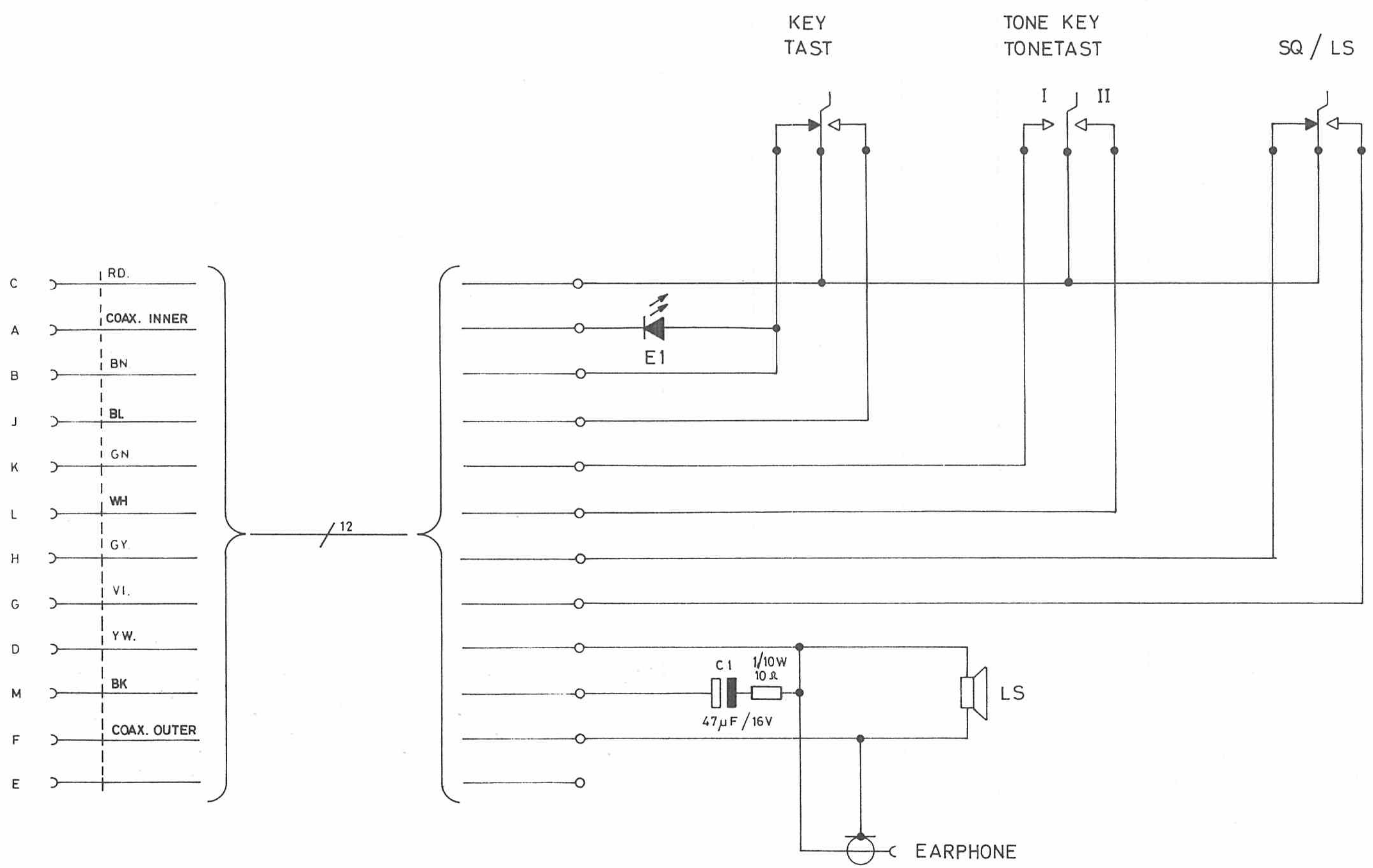
Storno

TYPE	Nº	CODE	DATA

CONTROL UNIT CB802

X402.376

Storno



CONTROL UNIT CB802 - IS

D 402.359/3

Storno

TYPE	Nº	CODE	DATA
		10.3358	Control Unit CB802-IS
	C1	79.0003	47 µF/10 Ω Moulded assy. 16 V
	R1	80.5076	180 KΩ 5% carbon film 0.1 W
	E1	99.5306	LED 1.6 V; 20 mA
		41.5160	Earphone Socket
		47.0614	SQ/LS Switch assembly
		47.5033	Key switch
		47.5079	Tone Key Button I
		47.5079	Tone Key Button II

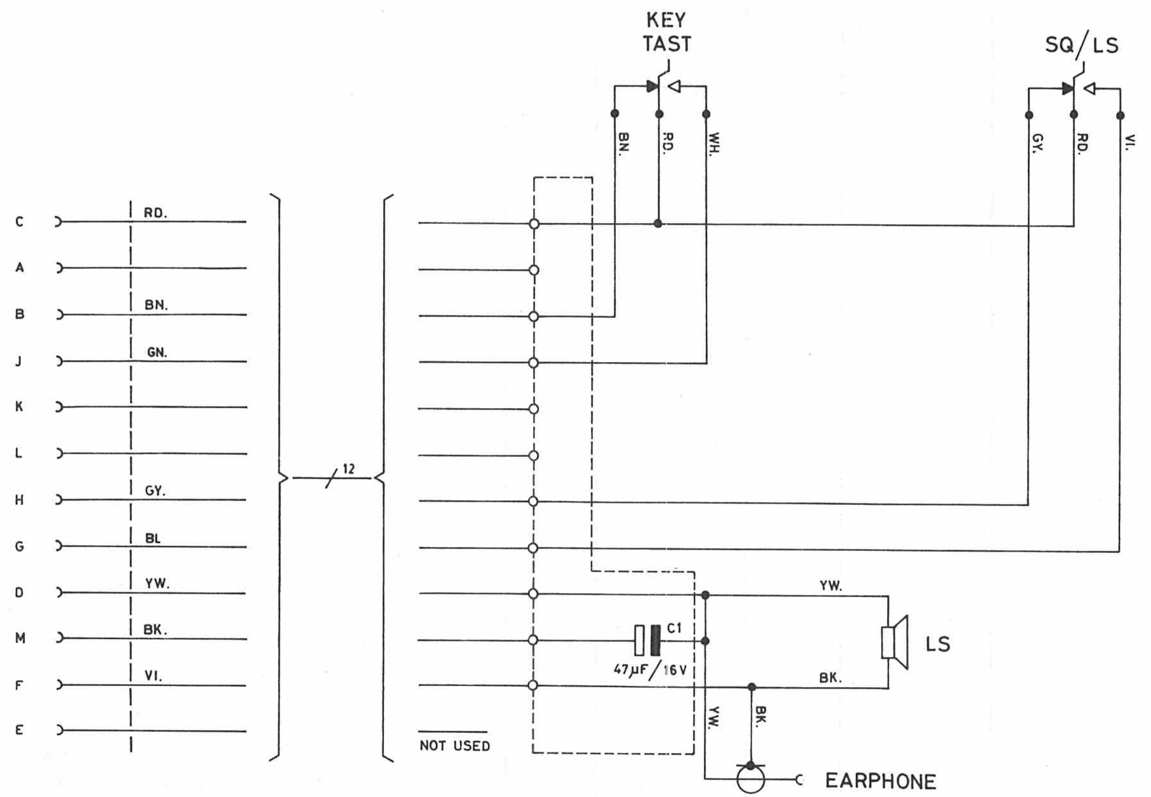
Storno

TYPE	Nº	CODE	DATA

CONTROL UNIT CB802-IS

X402.380

Storno



CONTROL UNIT CB803

D.402.168/3

Storno

TYPE	Nº	CODE	DATA
		10.3159	Control Unit CB803
	C1	73.5149	47 µF 20% tantal 16 V
	LS	96.5086	Dynamic microphone 20 Ω
		41.5160	Earphone socket
		47.0614 47.5033	SQ/LS Switch assembly Key Switch

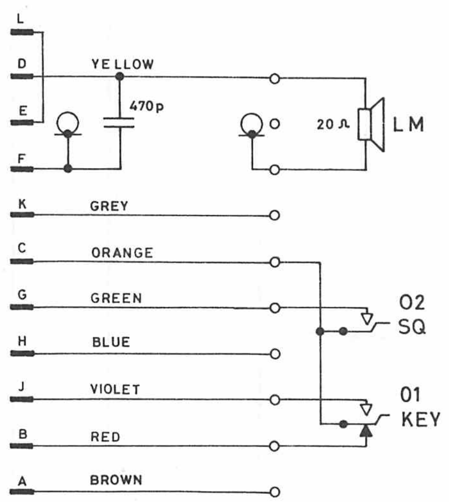
Storno

TYPE	Nº	CODE	DATA

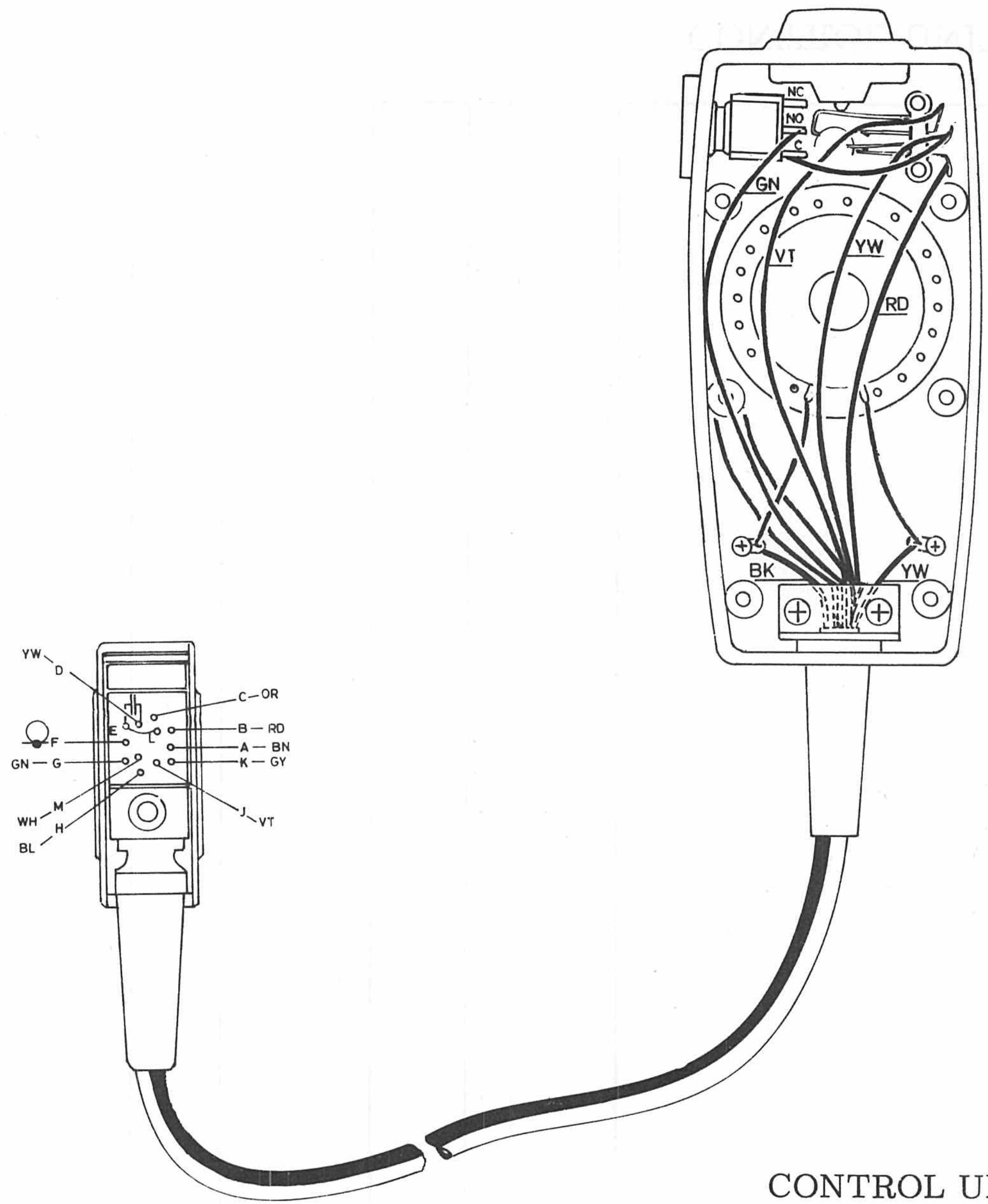
CONTROL UNIT CB803

X402.377

Storno



CB 804



CONTROL UNIT CB804

D402.525/2

Storno

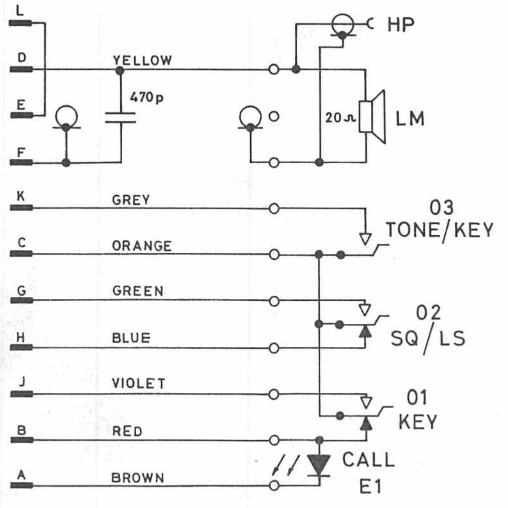
TYPE	Nº	CODE	DATA
CB804		10.3602	Control Unit
	01	47.5033	Switch, Key
	02	47.0635	Switch, SQ
	LM	96.5086	Microphone, dynamic 20 Ohm

Storno

TYPE	Nº	CODE	DATA

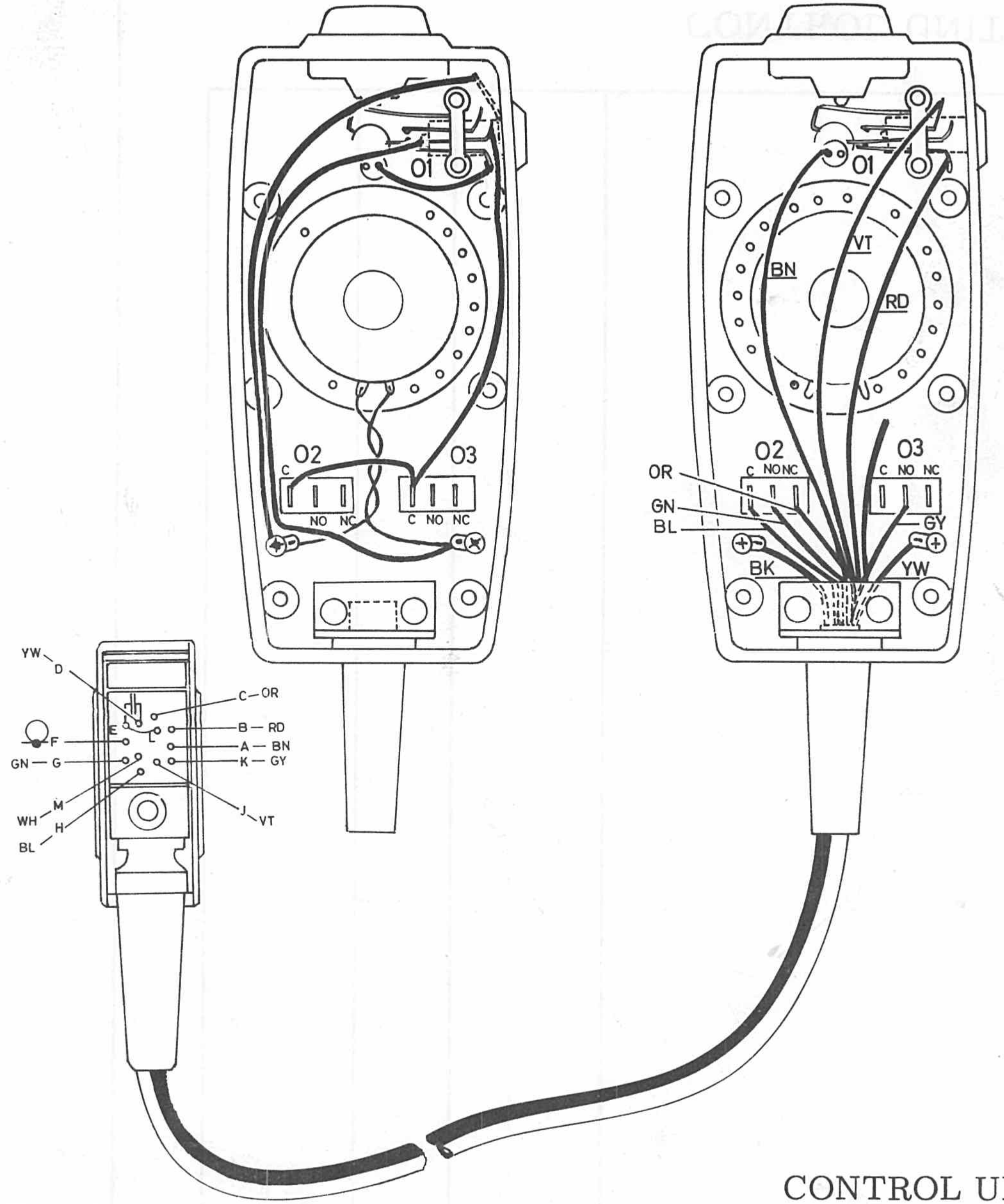
CONTROL UNIT CB804

X402.564



CB 805

Kabel: 19.0106-00



CONTROL UNIT CB805

D 402.526/2

Storno

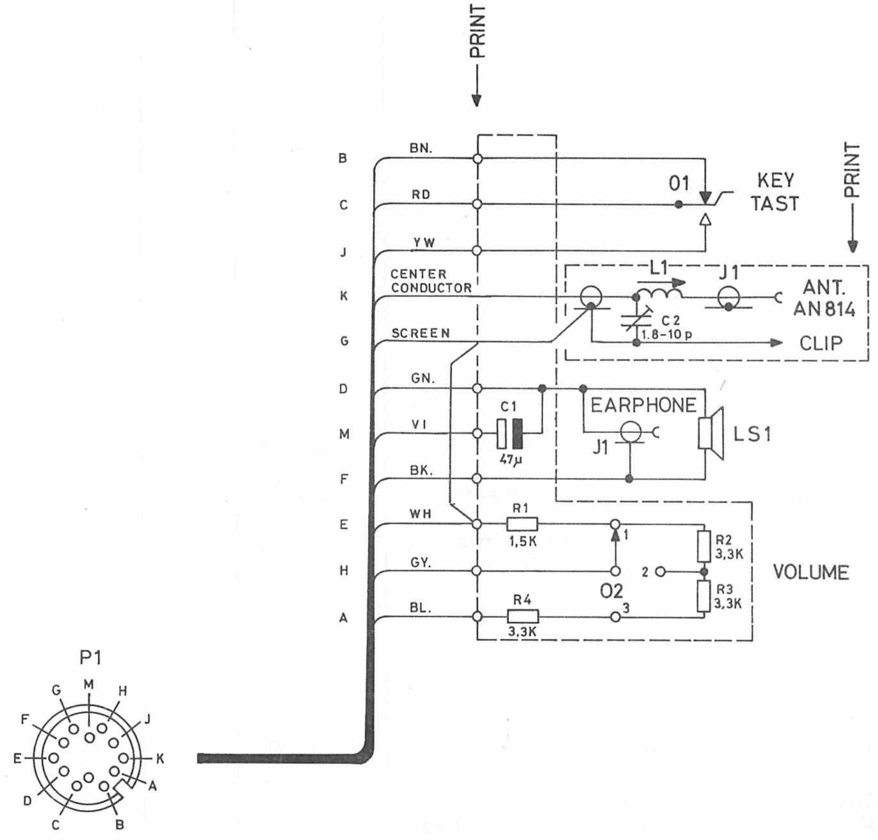
TYPE	Nº	CODE	DATA
CB805		10.3603	Control Unit
	01	47.5033	Switch, Key
	02	47.0635	Switch, SQ/LS
	03	47.0635	Switch, Tone Key
	LM	96.5086	Microphone, dynamic 20 Ohm

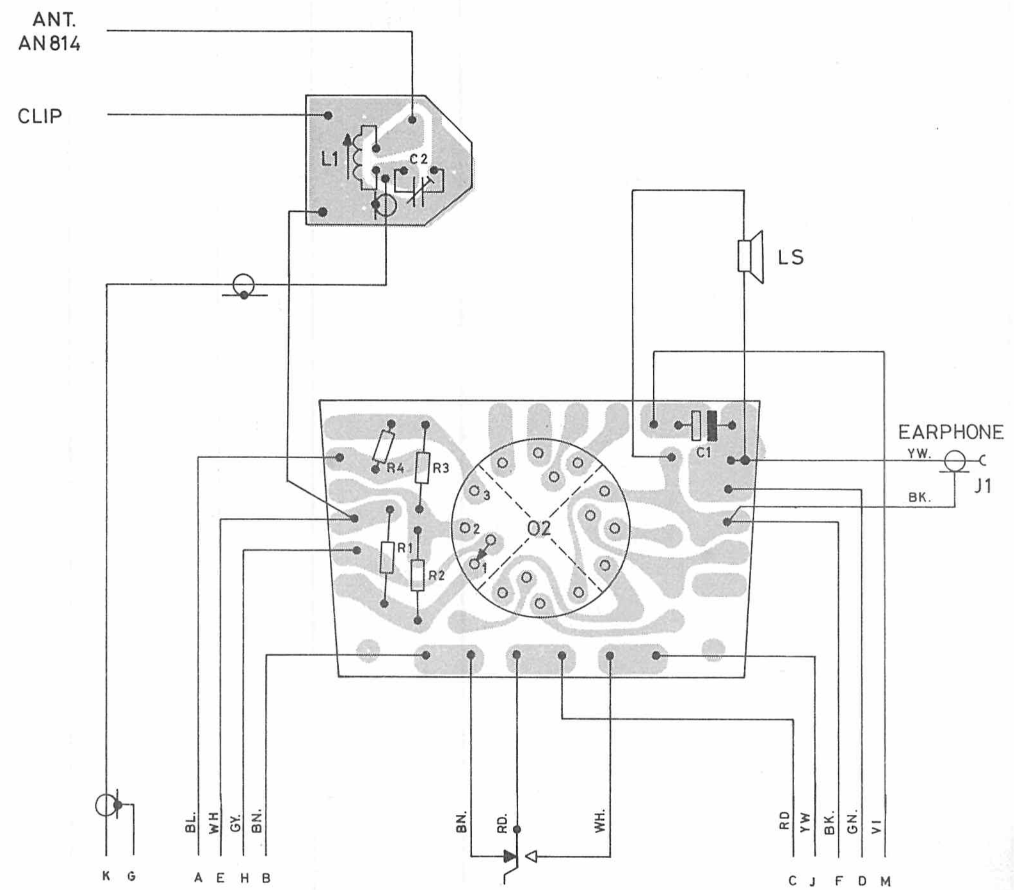
Storno

TYPE	Nº	CODE	DATA

CONTROL UNIT CB805

X402.565





CONTROL UNIT CB 811

D.402.169/5

Storno

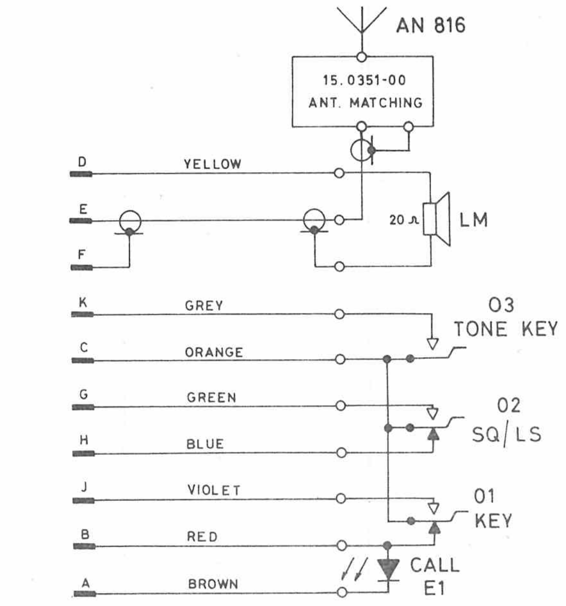
TYPE	Nº	CODE	DATA
CB811		10.3245-00	Control Unit
	C1	73.5149	47 µF 20% tantal 16V
	C2	78.5048	1.8 - 10 pF trimmer 300V
	R1	80.5051	1.5 KΩ 5% carbon film 0.1W
	R2	80.5052	1.8 KΩ 5% " " 0.1W
	R3	80.5055	3.3 KΩ 5% " " 0.1W
	R4	80.5059	6.8 KΩ 5% " " 0.1W
	L1	61.1314	Coil
	O1	47.0621	Switch; key
	O2	47.5072	Switch; volume
	P1	41.0157	Connector
	LS	96.5086	Microphone

Storno

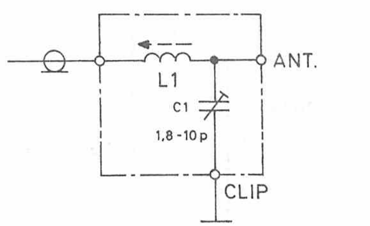
TYPE	Nº	CODE	DATA

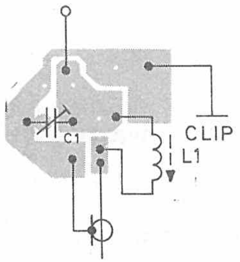
CONTROL UNIT CB811

Storno

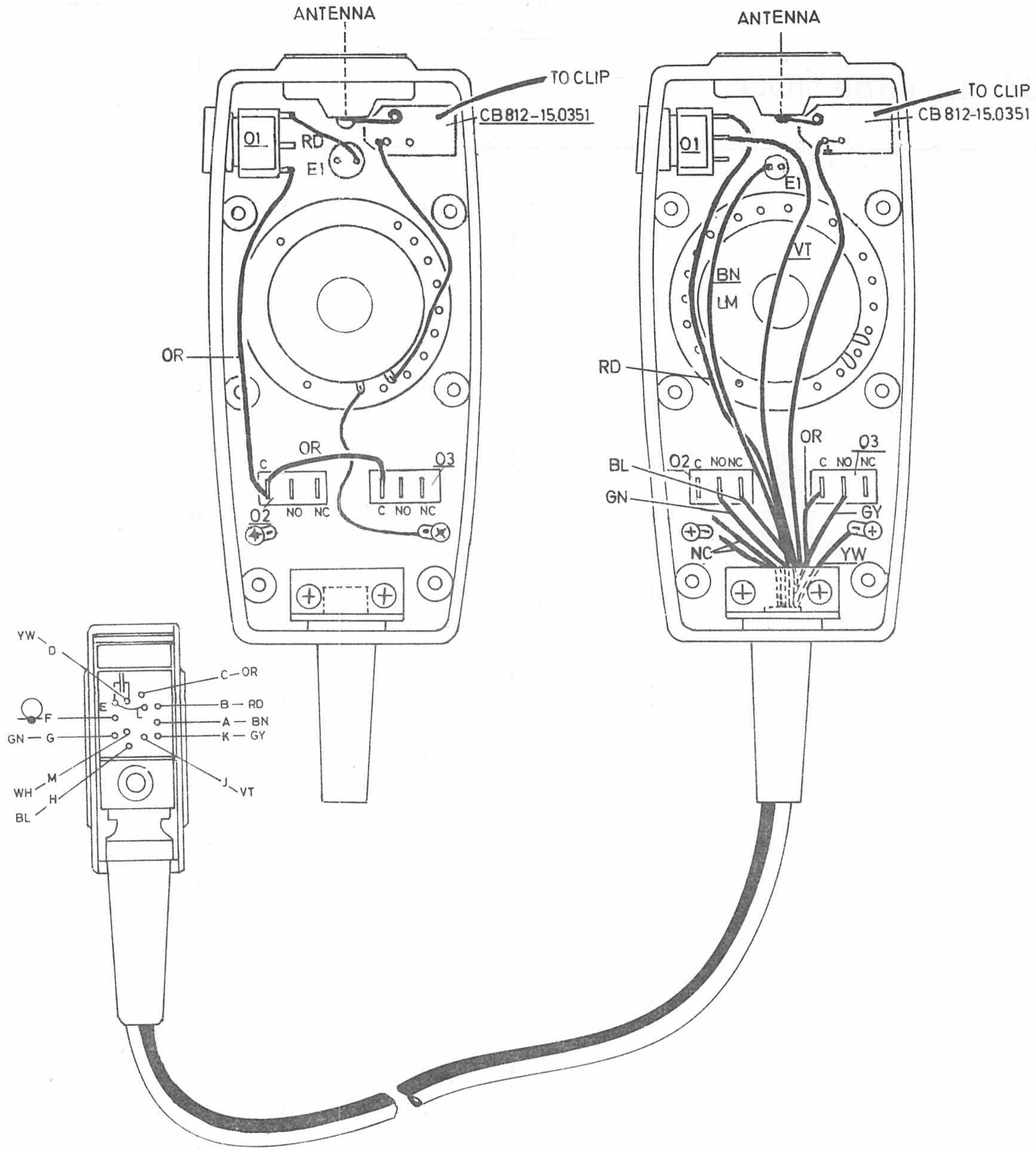


CB 812 (146 - 174 MHz)





ANTENNA MATCHING NETWORK



CONTROL UNIT CB812

D 402.528

Storno

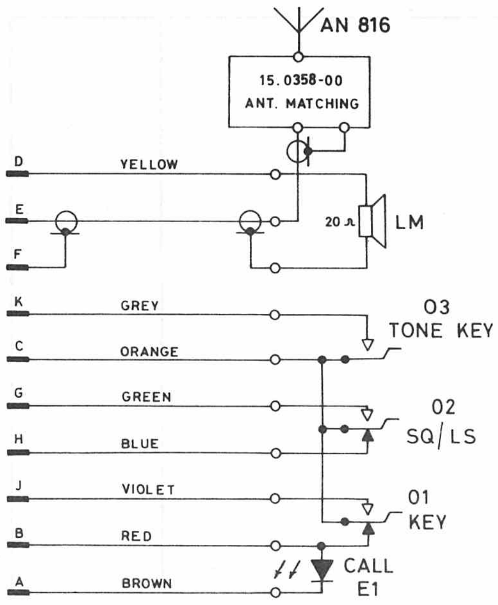
TYPE	Nº	CODE	DATA
CB812		10.3605	Control Unit (146 - 174 MHz)
	01	47.0635	Switch, Key
	02	47.0635	Switch, LS/SQ
	03	47.0635	Switch, Tone Key
	E1	99.5339	Light Emitting Diode
	LM	96.5086	Microphone, dynamic 20 Ohm
		15.0531	Antenna Matching Network
	C1	78.5048	1.8-10pF 300V
	L1	61.1371	Coil

Storno

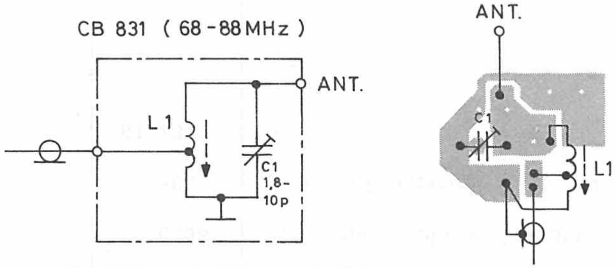
TYPE	Nº	CODE	DATA

CONTROL UNIT CB812

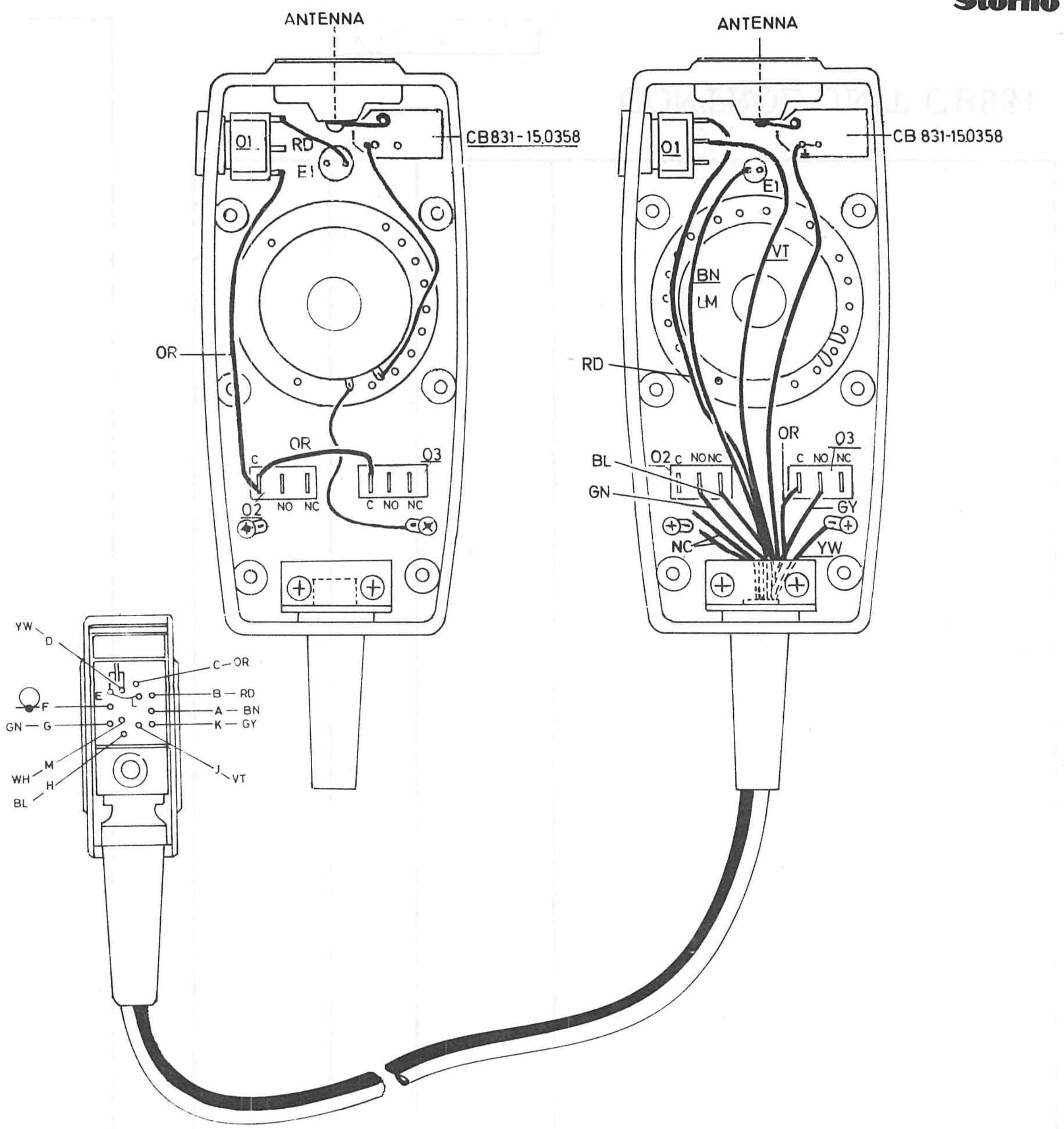
Storno



CB 831



ANTENNA MATCHING NETWORK



CONTROL UNIT CB831

D 402.529

Storno

TYPE	Nº	CODE	DATA
CB831		10.3606	Control Unit (68-88 MHz)
	01	47.0635	Switch, Key
	02	47.0635	Switch. SQ/LS
	03	47.0635	Switch, Tone Key
	E1	99.5339	Light Emitting Diode
	LM	96.5086	Microphone, dynamic 20 Ohm
		15.0358	Antenna Matching Network
	C1	78.5048	1.8-10pF trimmer 300V
	L1	61.1377	Coil

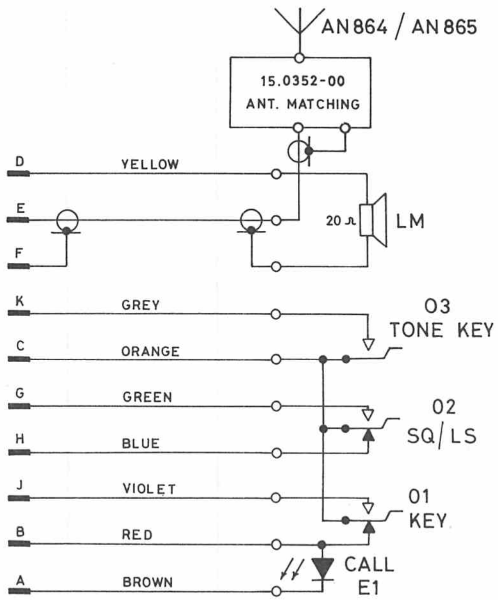
Storno

TYPE	Nº	CODE	DATA

CONTROL UNIT CB831

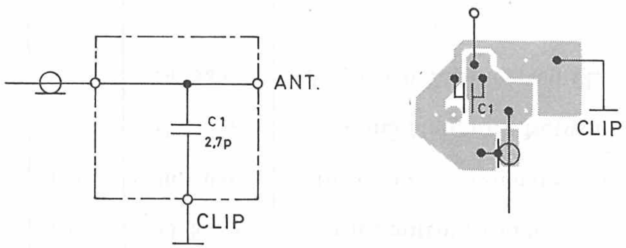
X402.567

Storno

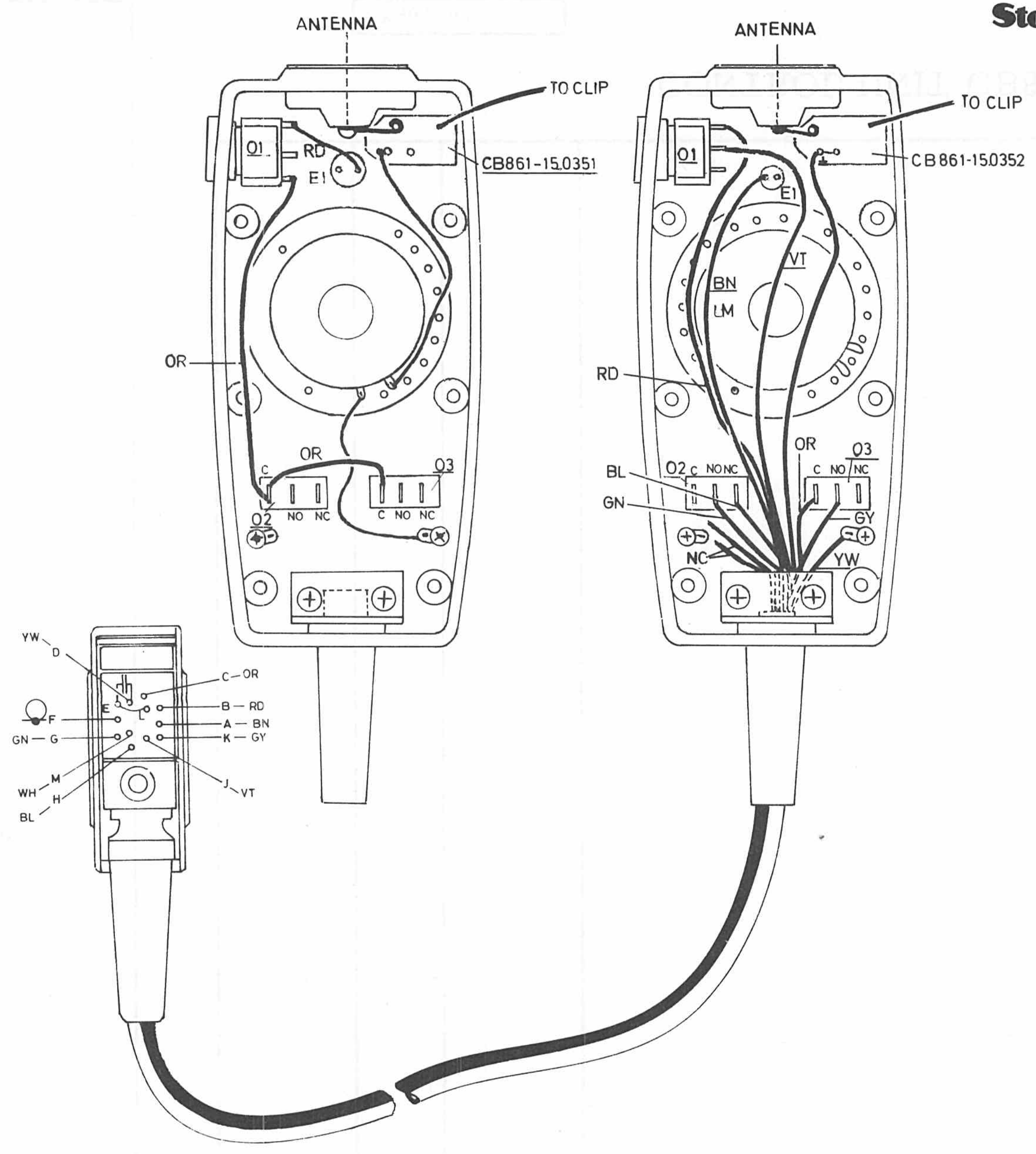


CB 861

CB 861 (420 - 470 MHz)



ANTENNA MATCHING NETWORK



Storno

CONTROL UNIT CB861

D 402.530

Storno

TYPE	Nº	CODE	DATA
CB861		10.3607	Control Unit (420-470 MHz)
	01	47.0635	Switch, Key
	02	47.0635	Switch, LS/SQ
	03	47.0635	Switch, Tone Key
	E1	99.5339	Light Emitting Diode
	LM	96.5086	Microphone, dynamic 20 Ohm
		15.0352	Antenna Matching Network
	C1	74.5300	2.7pF $\pm$ 0.25pF ceram PL 63V

Storno

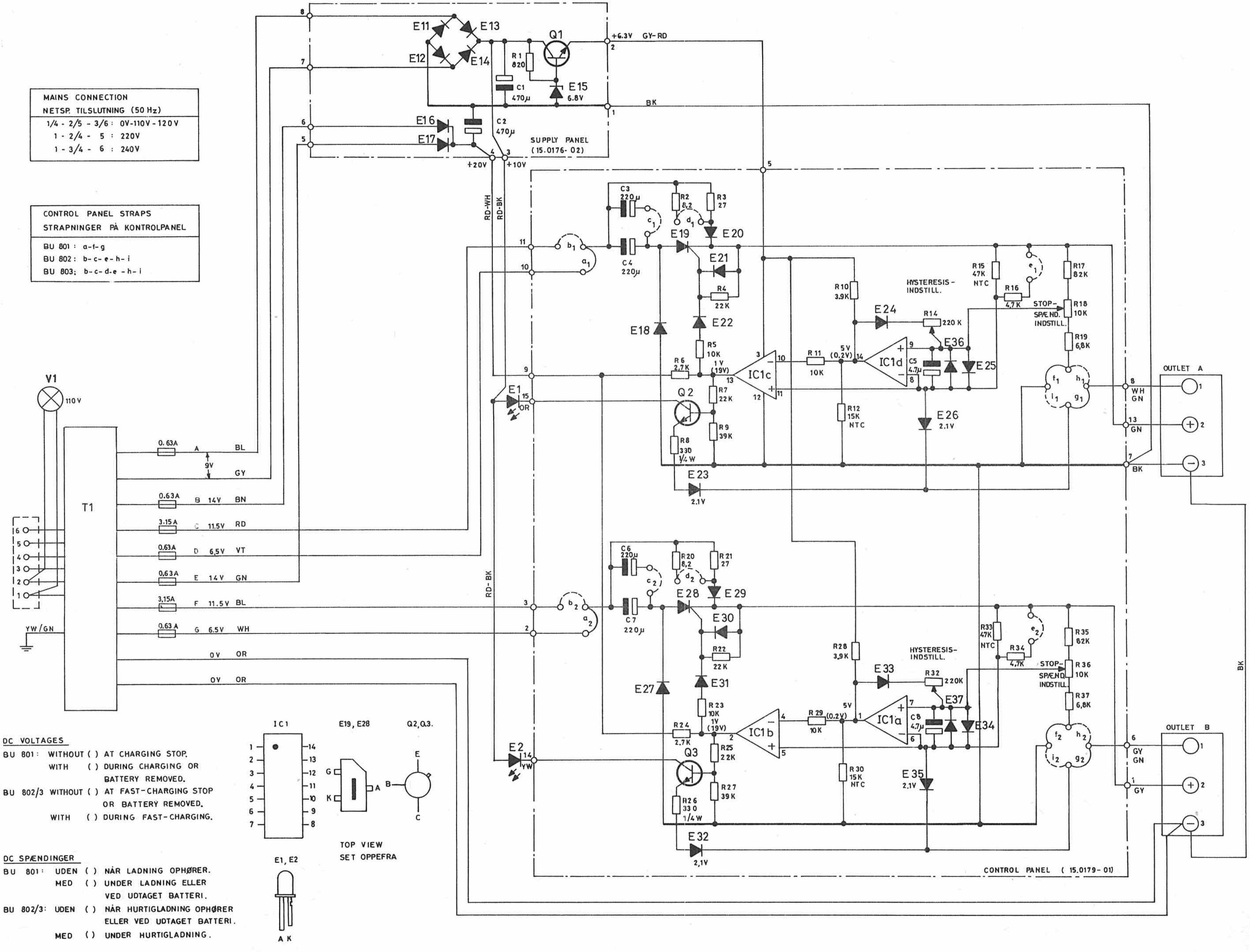
TYPE	Nº	CODE	DATA

CONTROL UNIT CB861

X402.568

Storno

Storno



MAINS CONNECTION NETSP. TILSLUTNING (50 Hz)
1/4 - 2/5 - 3/6 : 0V-110V-120V
1 - 2/4 - 5 : 220V
1 - 3/4 - 6 : 240V

CONTROL PANEL STRAPS STRAPNINGER PÅ KONTROLPANEL
BU 801 : a-f-g
BU 802 : b-c-e-h-i
BU 803 : b-c-d-e-h-i

DC VOLTAGES

BU 801: WITHOUT ( ) AT CHARGING STOP.
WITH ( ) DURING CHARGING OR BATTERY REMOVED.
BU 802/3 WITHOUT ( ) AT FAST-CHARGING STOP OR BATTERY REMOVED.
WITH ( ) DURING FAST-CHARGING.

DC SPÆNDINGER

BU 801: UDEN ( ) NÅR LADNING OPHØRER.
MED ( ) UNDER LADNING ELLER VED UDTAGET BATTERI.
BU 802/3: UDEN ( ) NÅR HURTIGLADNING OPHØRER ELLER VED UDTAGET BATTERI.
MED ( ) UNDER HURTIGLADNING.

BATTERY CHARGING UNIT CU801

D401.971

Storno

CU 802 (10.2975-00)

CONTROL PANEL STRAPS STRAPNINGER PÅ KONTROLPANEL
BU 801: a-f-g BU 802: b-e-h-i BU 803: b-d-e-h-i

DC VOLTAGES

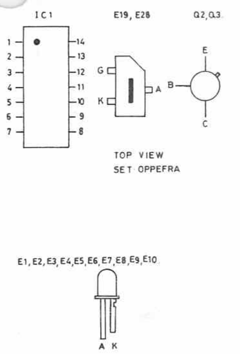
BU 801: WITHOUT ( ) AT CHARGING STOP.
WITH ( ) DURING CHARGING OR BATTERY REMOVED.

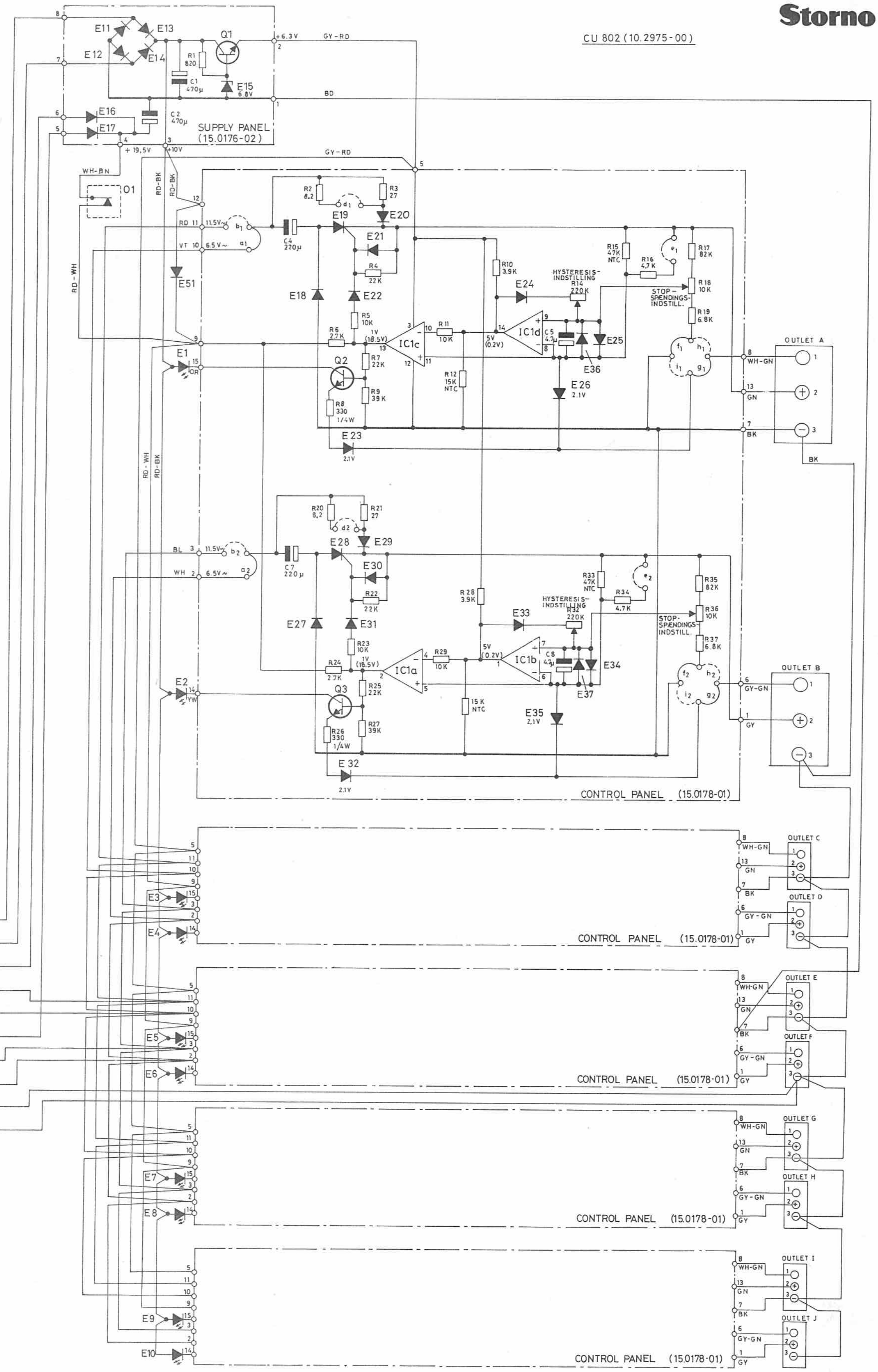
BU 802/3: WITHOUT ( ) AT FAST-CHARGING STOP OR BATTERY REMOVED.
WITH ( ) DURING FAST-CHARGING

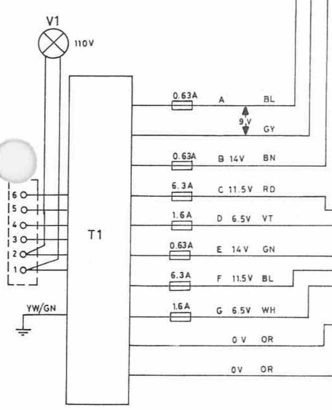
DC SPÆNDINGER

BU 801: UDEN ( ) NÅR LADNING OPHØRER.
MED ( ) UNDER LADNING ELLER VED UDTAGET BATTERI.

BU 802/3: UDEN ( ) NÅR HURTIGLADNING OPHØRER ELLER VED UDTAGET BATTERI.
MED ( ) UNDER HURTIGLADNING.







MAINS CONNECTION NETSP. TILSLUTNING (50 Hz)	
1/4 - 2/5 - 3/6	0V-110V-120V
1 - 2/4 - 5	220V
1 - 3/4 - 6	240V

CHARGING UNIT CU802

D401.960

Storno

TYPE	NO.	CODE	DATA
CU801 CU802		10.2974-00 10.2975-00	Battery Charger; 2 positions Battery Charger; 10 positions
	C1	73.5138	470µF -10/+100% elco 25V
	C2	73.5138	470µF -10/+100% elco 25V
	C3	73.5159	220µF -10/+ 50% bipol. elco 40V
	C4	73.5159	220µF -10/+ 50% bipol. elco 40V
	C5	73.5126	4.7µF 20% tantal 35V
	C6	73.5159	220µF -20/+ 50% bipol. elco 40V
	C7	73.5159	220µF -20/+ 50% bipol. elco 40V
	C8	73.5126	4.7µF 20% tantal 35V
	R1	80.5248	820 Ω 5% carbon film 1/8W
	R2	80.5224	8.2 Ω 5% " 1/8W
	R3	80.5230	27 Ω 5% " 1/8W
	R4	80.5256	22KΩ 5% " 1/8W
	R5	80.5261	10KΩ 5% " 1/8W
	R6	80.5254	2.7KΩ 5% " 1/8W
	R7	80.5265	22KΩ 5% " 1/8W
	R8	80.5443	330 Ω 5% " 1/8W
	R9	80.5268	39KΩ 5% " 1/8W
	R10	80.5256	3.9KΩ 5% " 1/8W
	R11	80.5261	10KΩ 5% " 1/8W
	R12	89.5010	15KΩ 20% NTC 0.6W
	R13		Not used
	R14	86.5071	220KΩ 20% potentiometer lin. 1/20W
	R15	80.5135	47KΩ 20% NTC 0.6W
	R16	80.5257	4.7KΩ 5% carbon film 1/8W
	R17	80.5275	82KΩ 5% " 1/8W
	R18	86.5039	10KΩ 20% potentiometer lin. 0.1W
	R19	80.5228	6.8KΩ 5% carbon film 1/8W
	R20	80.5224	8.2 Ω 5% " 1/8W
	R21	80.5230	27 Ω 5% " 1/8W
	R22	80.5265	22KΩ 5% " 1/8W
	R23	80.5261	10KΩ 5% " 1/8W
	R24	80.5254	2.7KΩ 5% " 1/8W
	R25	80.5265	22KΩ 5% " 1/8W
	R26	80.5443	330 Ω 5% " 1/8W
	R27	80.5268	39KΩ 5% " 1/8W
	R28	80.5256	3.9KΩ 5% " 1/8W
	R29	80.5261	10KΩ 5% " 1/8W
	R30	80.5010	15KΩ 20% NTC 0.6W
	R31		Not used
	R32	86.5071	220KΩ 20% potentiometer lin. 1/20W
	R33	80.5035	47KΩ 20% NTC 0.6W
	R34	80.5257	4.7KΩ 5% carbon film 1/8W
	R35	80.5275	82KΩ 5% " 1/8W
	R36	80.5039	10KΩ 20% potentiometer lin. 0.1W

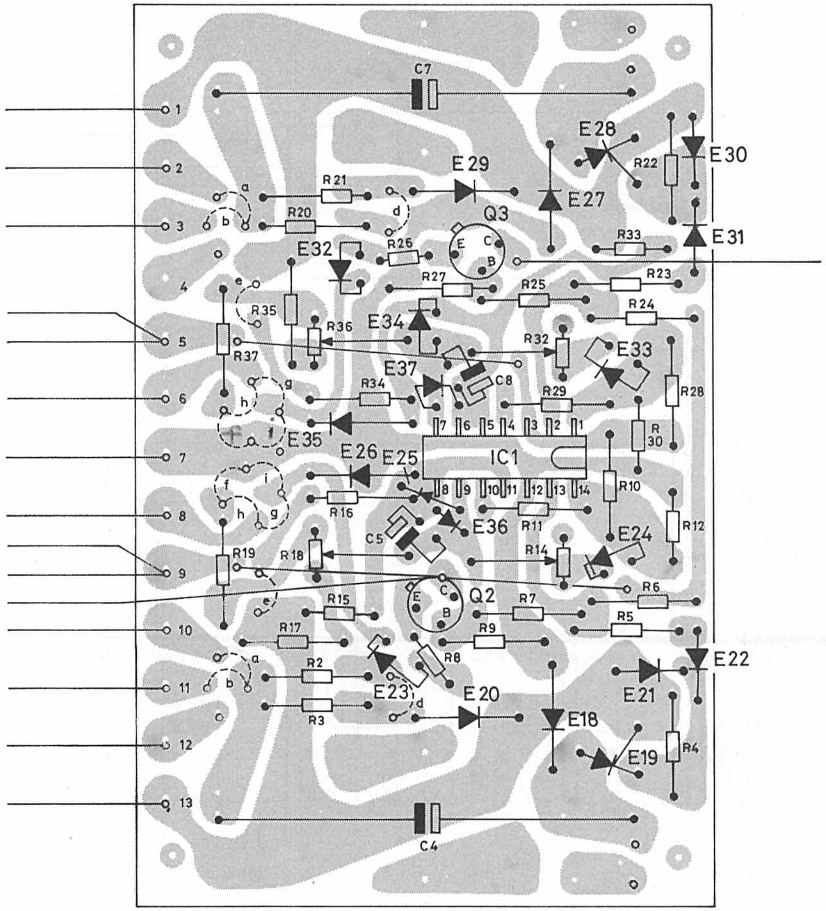
Storno

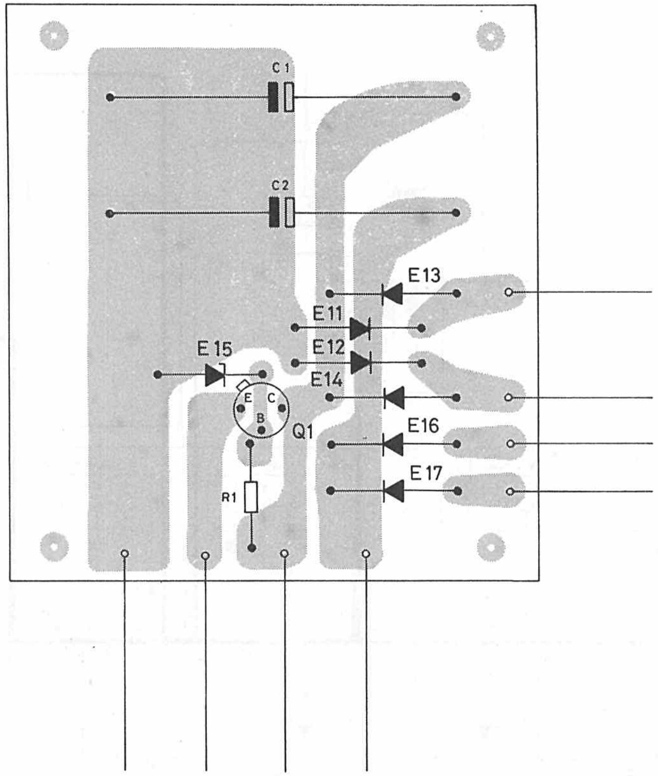
TYPE	NO.	CODE	DATA
	R37	80.5228	6.8KΩ 5% carbon film 1/8W
	T1	60.5164	Mains transformer
	E1	99.5255	Diode LED. 1.6V/20mA
	E2	99.5255	Diode LED. 1.6V/20mA
CU802	E3-E10	99.5255	Diode LED. 1.6V/20mA
	E11	99.5020	Diode 1N4004
	E12	99.5020	Diode 1N4004
	E13	99.5020	Diode 1N4004
	E14	99.5020	Diode 1N4004
	E15	99.5146	Zenerdiode 6.8V 5% 1/4W
	E16	99.5020	Diode 1N4004
	E17	99.5020	Diode 1N4004
	E18	99.5020	Diode 1N4004
	E19	99.5190	SCR C106F2
	E20	99.5020	Diode 1N4004
	E21	99.5237	Diode 1N4148
	E22	99.5237	Diode 1N4148
	E23	99.5257	Diode 2.1V STAB
	E24	99.5237	Diode 1N4148
	E25	99.5237	Diode 1N4148
	E26	99.5257	Diode 2.1V STAB
	E27	99.5020	Diode 1N4004
	E28	99.5190	SCR C106F2
	E29	99.5020	Diode 1N4004
	E30	99.5237	Diode 1N4148
	E31	99.5237	Diode 1N4148
	E32	99.5257	Diode 2.1V STAB
	E33	99.5237	Diode 1N4148
	E34	99.5237	Diode 1N4148
	E35	99.5257	Diode 2.1V STAB
	E36	99.5237	Diode 1N4148
	E37	99.5237	Diode 1N4148
	Q1-Q3	99.5121	BC107 Transistor
	IC1	14.5019	MC3302P Quad Comparator

BATTERY CHARGER CU801
BATTERY CHARGER CU802

X402.102

Storno





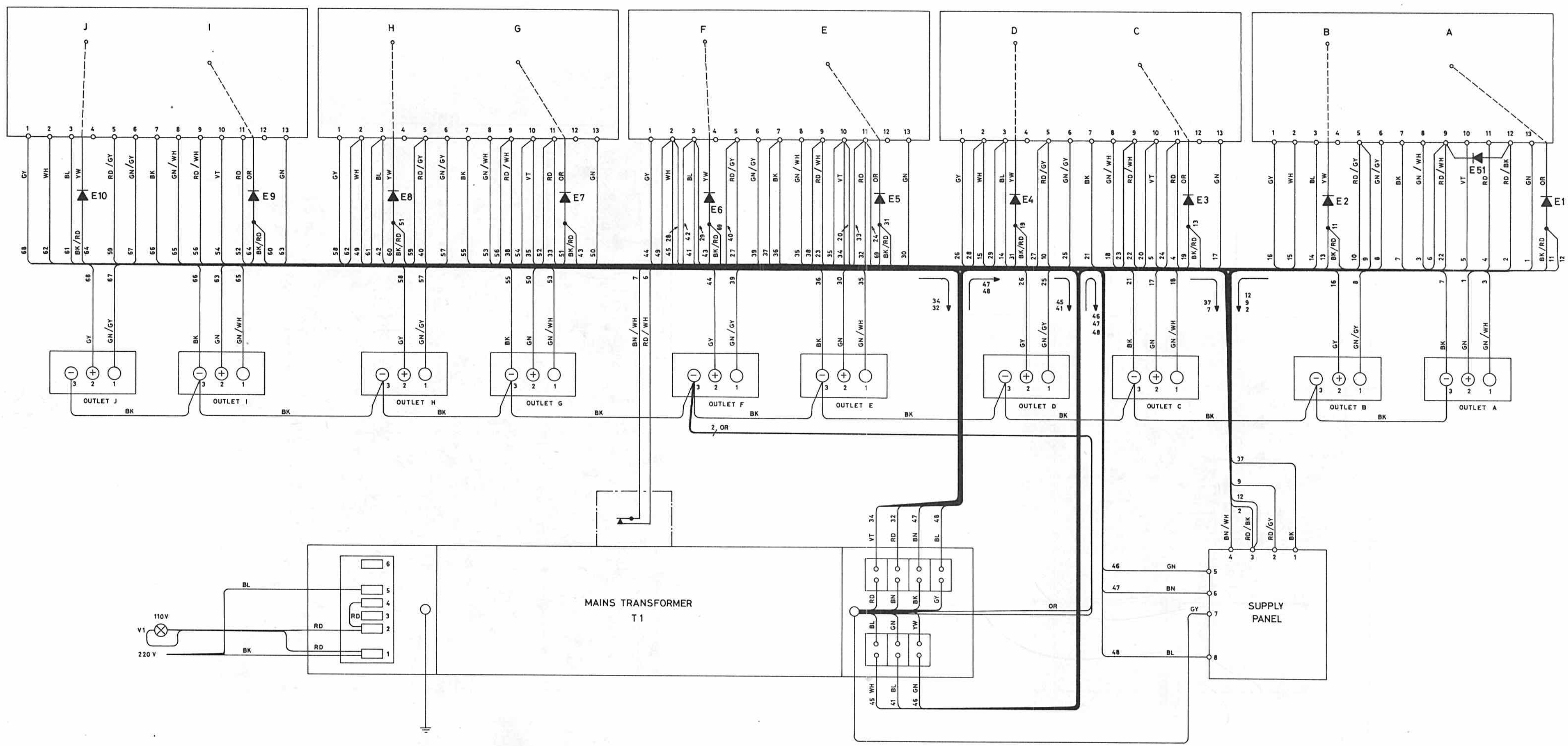
COMPONENT LAY-OUT
Printed Circuit Boards

CU801, CU802

D402.278

Storno

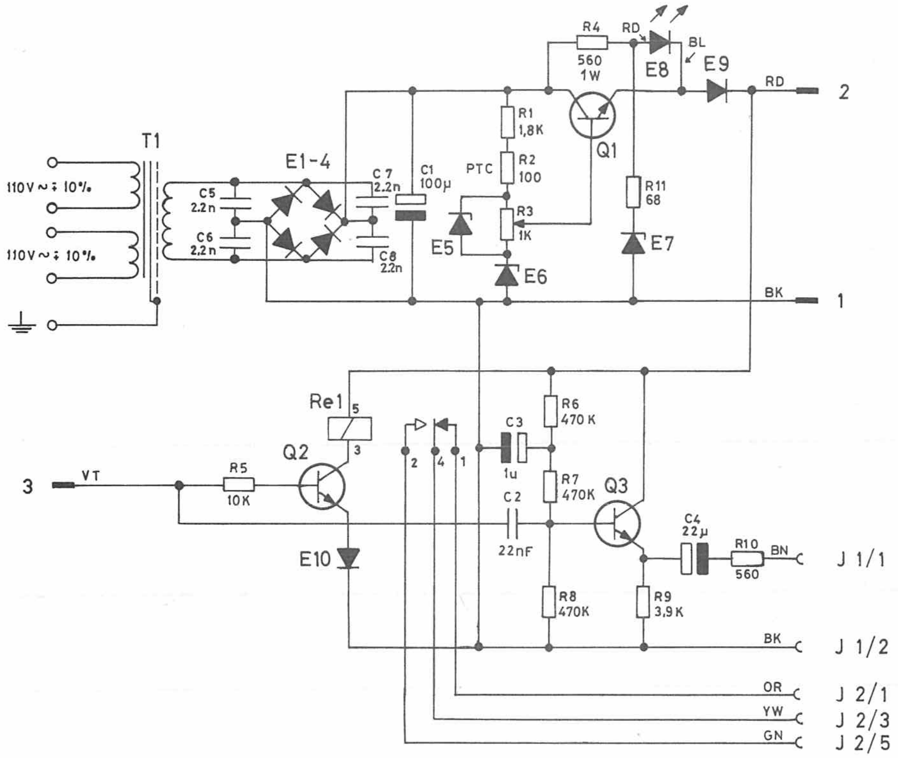
Storno

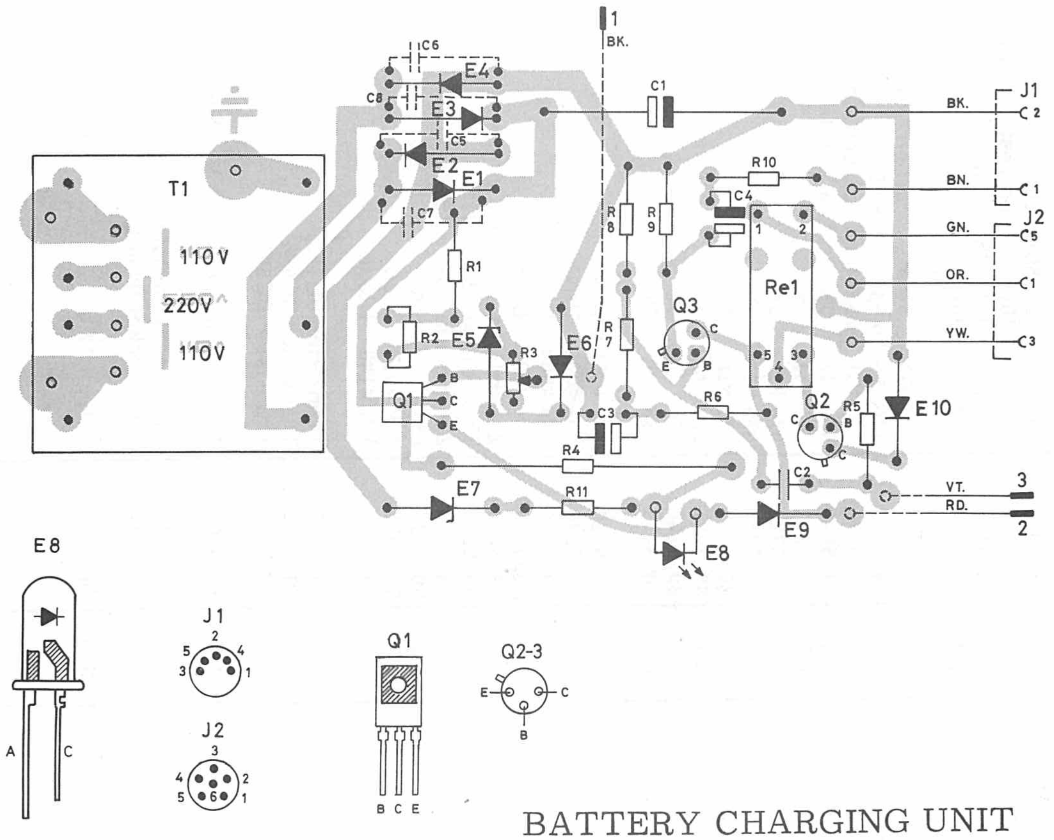


COMPONENT LAY-OUT AND WIRING CU802

D402.281

Storno





BATTERY CHARGING UNIT CU803

D402.405

Storno

TYPE	Nº	CODE	DATA
CU803		10.3240-00	Charging Unit
	C1	73.5071	100 µF -10/+50% elco 40 V
	C2	76.5071	22 nF 10% polyest FL 50 V
	C3	73.5135	1 µF -20/+50% tantal 16 V
	C4	73.5127	22 µF 20% tantal 16 V
	R1	80.5252	1.8 KΩ 5% carbon film 1/8 W
	R2	89.5068	100 Ω - 50 KΩ PTC 30 V
	R3	86.5075	1 KΩ 20% trim. carbon lin. 0.1 W
	R4	82.5046	560 Ω 5% carbon film 1 W
	R5	80.5261	10 KΩ 5% " " 1/8 W
	R6	80.5281	470 KΩ 5% " " 1/8 W
	R7	80.5281	470 KΩ 5% " " 1/8 W
	R8	80.5281	470 KΩ 5% " " 1/8 W
	R9	80.5256	3.9 KΩ 5% " " 1/8 W
	R10	80.5246	560 Ω 5% " " 1/8 W
	R11	80.5235	68 Ω 5% " " 1/8 W
	E1	99.5020	1 N 4004 Diode
	E2	99.5020	1 N 4004 Diode
	E3	99.5020	1 N 4004 Diode
	E4	99.5020	1 N 4004 Diode
	E5	99.5224	Zenerdiode 5% 4.7 V 0.4 W
	E6	99.5223	Zenerdiode 5% 12 V 0.4 W
	E7	99.5205	Zenerdiode 5% 15 V 0.4 W
	E8	99.5325	LED 2 mA 2.4 V
	E9	99.5020	1 N 4004 Diode
	E10	99.5237	1 N 4148 Diode
	Q1	99.5235	Transistor BD135
	Q2	99.5143	Transistor BC548
	Q3	99.5143	Transistor BC548
	T1	60.5166	Transf. 110/220 V 24 V 2.9 VA
	J1	41.5090	5 pin socket female
	J2	51.5091	6 pin socket female
	Re1	58.5075	Relay 12 V 890 Ω

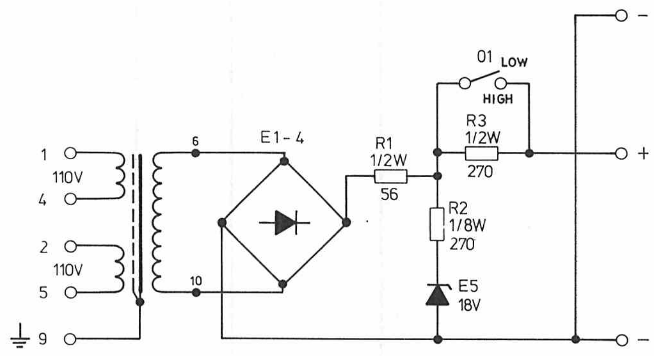
Storno

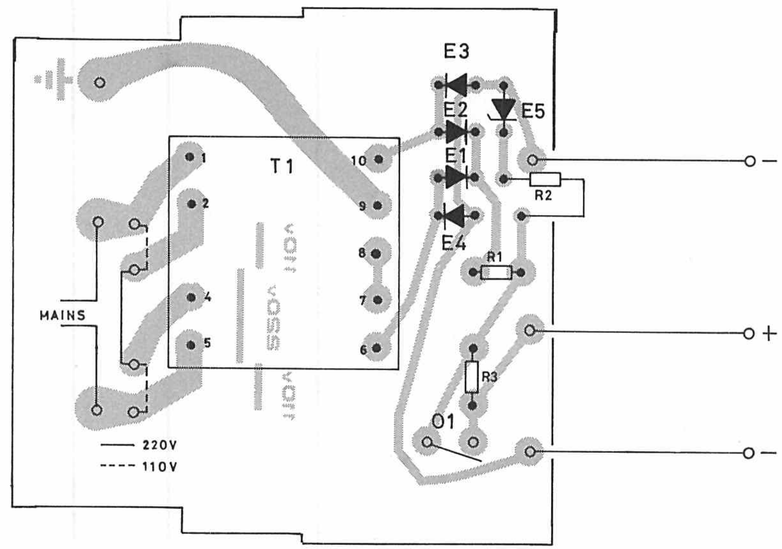
TYPE	Nº	CODE	DATA

BATTERY CHARGING UNIT CU803

X402.435

Storno





CHARGING UNIT CU804

D402.252

Storno

TYPE	Nº	CODE	DATA
CU804		10.3412	Charging Unit
	R1	81.5034	56 Ω 5% carbon film 1/2 W
	R2	80.5242	270 Ω 5% " " 1/8 W
	R3	81.5042	270 Ω 5% " " 1/2 W
	E1	99.5237	1 N 4148 Diode
	E2	99.5237	1 N 4148 Diode
	E3	99.5237	1 N 4148 Diode
	E4	99.5237	1 N 4148 Diode
	E5	99.5228	Zenerdiode 18 V 5% 0.4 W
	O1	47.5062	Slide-switch
	T1	60.5167	Transformer 110/220 V, 2x12 V 1 VA

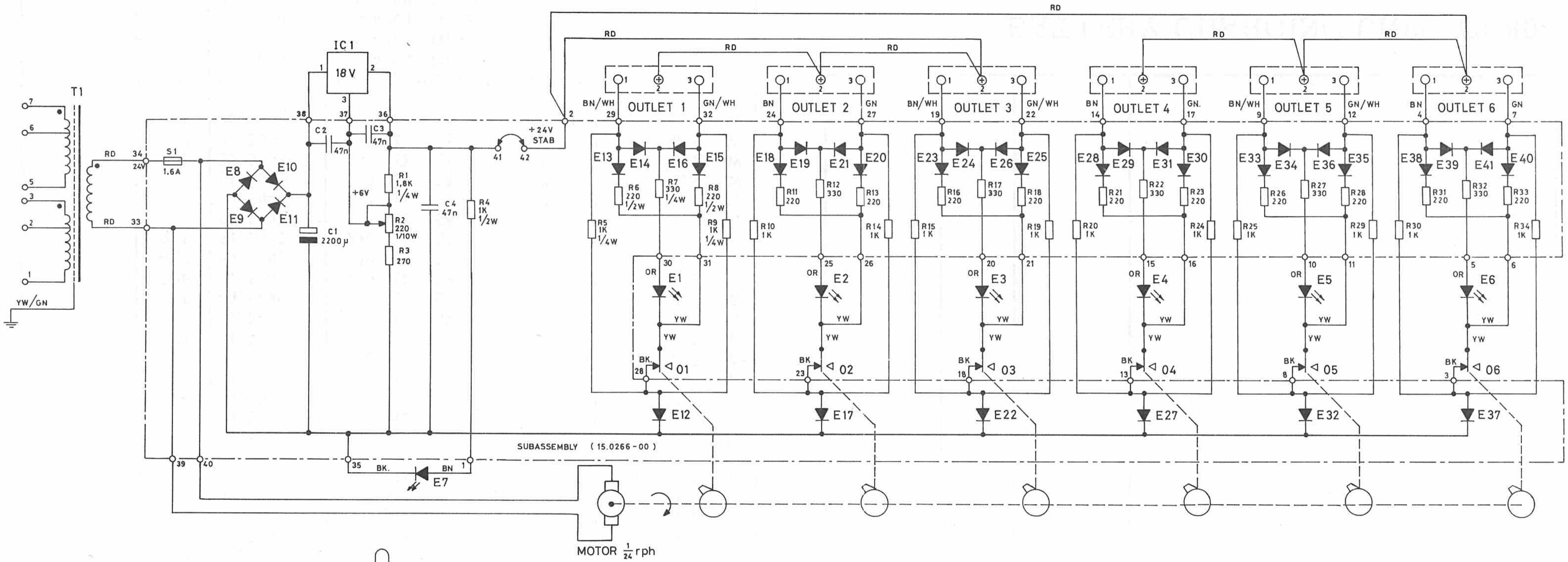
Storno

TYPE	Nº	CODE	DATA

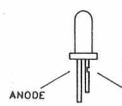
BATTERY CHARGING UNIT CU804

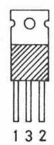
X402.436

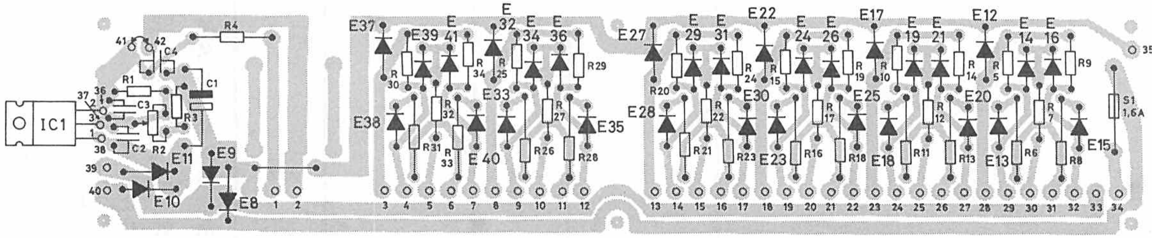
Storno



MAINS CONNECTIONS: NETSP. TILSLUTNING:	(50 Hz)
1/5 - 2/6 - 3/7 :	0V - 110V - 120V
1 - 2/5 - 6 :	220V
1 - 3/5 - 7 :	240V







BATTERY CHARGING UNIT CU805

(10.3241-00)

D 402.160

Storno

TYPE	Nº	CODE	DATA
CU805		10.3241	Charging Unit, 4h
	C1	73.5139	2200 µF -10/+50% elco 40 V
	C2	76.5072	47 nF 10% polyester 50 V
	C3	76.5072	47 nF 10% polyester 50 V
	C4	76.5072	47 nF 10% polyester 50 V
	R1	80.5452	1.8 KΩ 5% carbon film 0.25 W
	R2	86.5073	220 Ω 20% trim. carbon film lin. 0.1 W
	R3	80.5242	270 Ω 5% carbon film 0.125 W
	R4	81.5049	1 KΩ 5% " " 0.5 W
	R5	80.5449	1 KΩ 5% " " 0.25 W
	R6	81.5041	220 Ω 5% " " 0.5 W
	R7	80.5443	330 Ω 5% " " 0.25 W
	R8	81.5041	220 Ω 5% " " 0.5 W
	R9	80.5449	1 KΩ 5% " " 0.25 W
	R10	80.5449	1 KΩ 5% " " 0.25 W
	R11	81.5041	220 Ω 5% " " 0.5 W
	R12	80.5443	330 Ω 5% " " 0.25 W
	R13	81.5041	220 Ω 5% " " 0.5 W
	R14	80.5449	1 KΩ 5% " " 0.25 W
	R15	80.5449	1 KΩ 5% " " 0.25 W
	R16	81.5041	220 Ω 5% " " 0.5 W
	R17	80.5443	330 Ω 5% " " 0.25 W
	R18	81.5041	220 Ω 5% " " 0.5 W
	R19	80.5449	1 KΩ 5% " " 0.25 W
	R20	80.5449	1 KΩ 5% " " 0.25 W
	R21	81.5041	220 Ω 5% " " 0.5 W
	R22	80.5443	330 Ω 5% " " 0.25 W
	R23	81.5041	220 Ω 5% " " 0.5 W
	R24	80.5449	1 KΩ 5% " " 0.25 W
	R25	80.5449	1 KΩ 5% " " 0.25 W
	R26	81.5041	220 Ω 5% " " 0.5 W
	R27	80.5443	330 Ω 5% " " 0.25 W
	R28	81.5041	220 Ω 5% " " 0.5 W
	R29	80.5449	1 KΩ 5% " " 0.25 W
	R30	80.5449	1 KΩ 5% " " 0.25 W
	R31	81.5041	220 Ω 5% " " 0.5 W
	R32	80.5443	330 Ω 5% " " 0.25 W
	R33	81.5041	220 Ω 5% " " 0.5 W
	R34	80.5449	1 KΩ 5% " " 0.25 W
	E1 -E7	99.5255	Light emitt. diode 20 mA 1.6 V
	E8 -E12	99.5020	1 N 4004 Diode
	E13-E16	99.5237	1 N 4148 Diode
	E17	99.5020	1 N 4004 Diode
	E18-E21	99.5237	1 N 4148 Diode
	E22	99.5020	1 N 4004 Diode

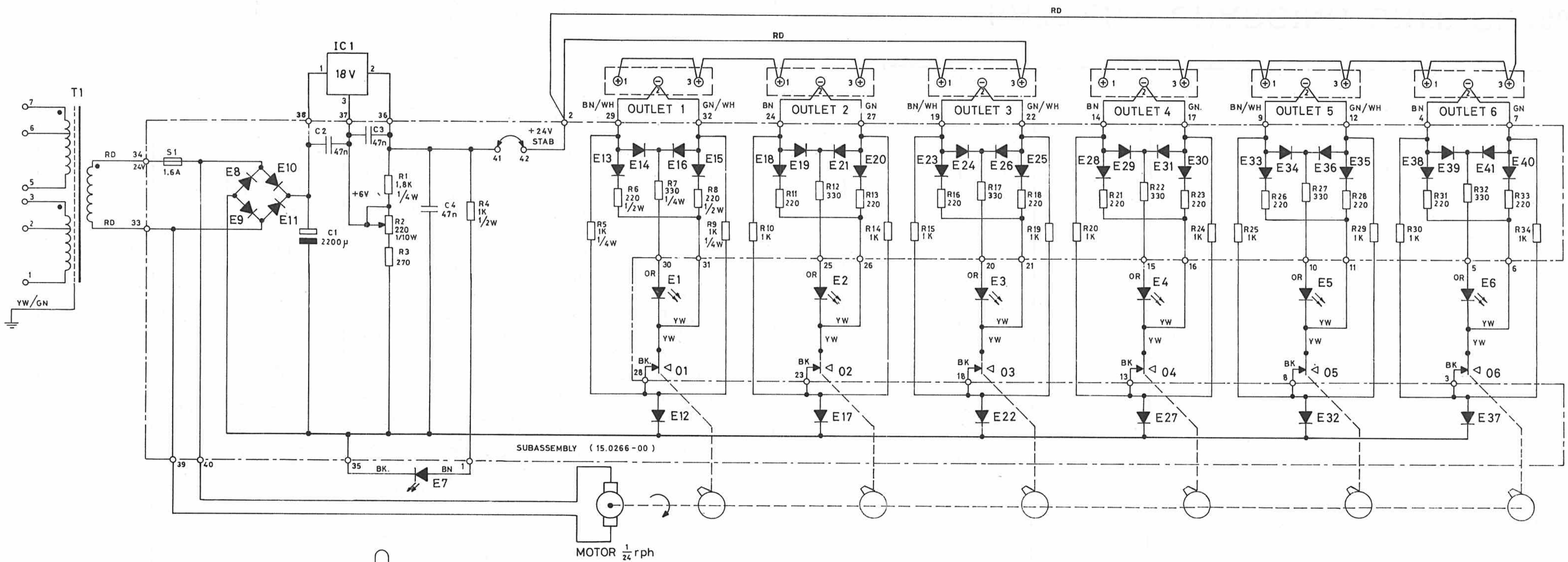
Storno

TYPE	Nº	CODE	DATA
	E23-E26	99.5237	1 N 4148 Diode
	E27	99.5020	1 N 4004 Diode
	E28-E31	99.5237	1 N 4148 Diode
	E32	99.5020	1 N 4004 Diode
	E33-E36	99.5237	1 N 4148 Diode
	E37	99.5020	1 N 4004 Diode
	E38-E41	99.5237	1 N 4148 Diode

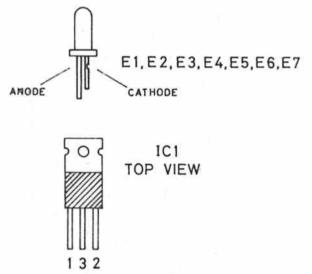
BATTERY CHARGING UNIT CU805

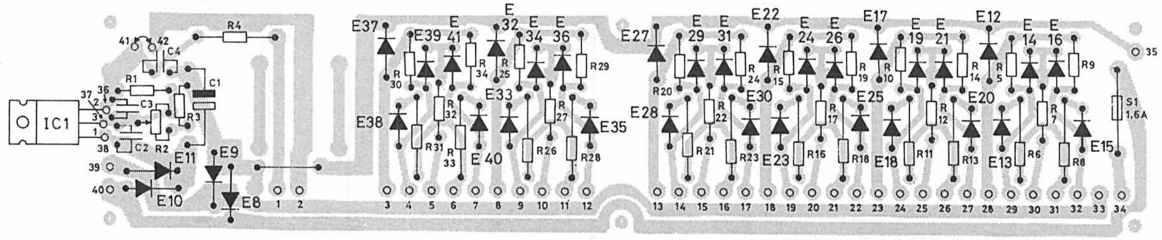
X402.437

Storno



MAINS CONNECTIONS: NETSP. TILSLUTNING:	(50Hz)
1/5 – 2/6 – 3/7 :	0V – 110V – 120V
1 – 2/5 – 6 :	220V
1 – 3/5 – 7 :	240V





BATTERY CHARGING UNIT CU806

(10.4077-00)

D402.711

Storno

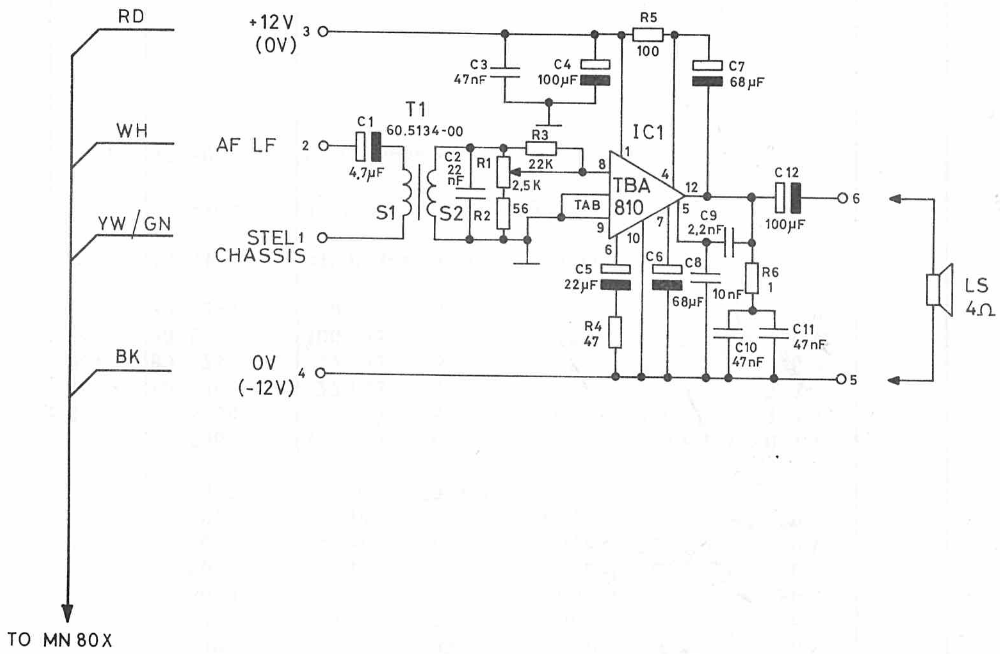
TYPE	Nº	CODE	DATA	
	C01	73.5139	2200uF, -10/+50%, Elco	40 V
	C02	76.5072	47 nF, 10%, Polyester	50 V
	C03	76.5072	47 nF, 10%, Polyester	50 V
	C04	76.5072	47 nF, 10%, Polyester	50 V
	E01-07	99.5255	20 mA, LED	1.6 V
	E08-12	99.5020	1N4004, Diode	
	E13-16	99.5237	1N4148, Diode	
	E17	99.5020	1N4004, Diode	
	E22	99.5020	1N4004, Diode	
	E23-26	99.5237	1N4148, Diode	
	E27	99.5020	1N4004, Diode	
	E28-31	99.5237	1N4148, Diode	
	E33-36	99.5237	1N4148, Diode	
	E37	99.5020	1N5020, Diode	
	E38-41	99.5237	1N4148, Diode	
	IC01	14.5106	Voltage regulator	18 V/1 A
	R01	80.5452	1.8 Kohm, 5%, Carbon film	0.25 W
	R02	86.5073	220 ohm, 20% trim., Carbon film lin.	
	R03	80.5242	270 ohm, 5%, Carbon film	0.125 W
	R04	81.5049	1 Kohm, 5%, Carbon film	0.5 W
	R05	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R06	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R07	80.5443	330 ohm, 5%, Carbon film	0.25 W
	R08	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R09	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R10	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R11	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R13	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R14	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R15	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R16	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R17	80.5443	330 ohm, 5%, Carbon film	0.25 W
	R18	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R19	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R20	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R21	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R22	80.5443	330 ohm, 5%, Carbon film	0.25 W
	R23	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R24	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R25	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R26	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R27	80.5443	330 ohm, 5%, Carbon film	0.25 W
	R28	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R29	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R30	80.5449	1 Kohm, 5%, Carbon film	0.25 W
	R31	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R32	80.5443	330 ohm, 5%, Carbon film	0.25 W

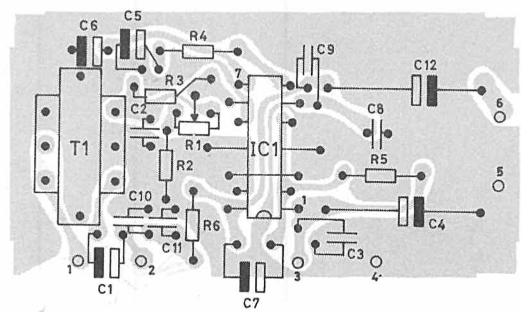
TYPE	Nº	CODE	DATA	
	R33	81.5041	220 ohm, 5%, Carbon film	0.5 W
	R34	80.5449	1 Kohm, 5%, Carbon film	0.25 W

BATTERY CHARGING UNIT CU806

X402.712

Storno





Storno

LOUDSPEAKER LS801

D402.423/1

Storno

TYPE	Nº	CODE	DATA
		97.0017	LS801 Loudspeaker with amplifier
	C1	73.5126	4.7 µF 20% tantal 35 V
	C2	76.5071	22 nF 10% polyest FL 50 V
	C3	76.5072	47 nF 10% polyest FL 50 V
	C4	73.5071	100 µF -10/+50% elco 40 V
	C5	73.5127	22 µF 20% tantal 16 V
	C6	73.5106	68 µF 20% tantal 16 V
	C7	73.5106	68 µF 20% tantal 16 V
	C8	76.5070	10 nF 10% polyest FL 50 V
	C9	76.5059	2.2 nF 10% polyest FL 50 V
	C10	76.5072	47 nF 10% polyest FL 50 V
	C11	76.5072	47 nF 10% polyest FL 50 V
	C12	73.5071	100 µF -10/+50% elco 40 V
	R1	86.5067	2.5 KΩ 20% potentiometer lin. 0.1 W
	R2	80.5234	56 Ω 5% carbon film 1/8 W
	R3	80.5265	22 KΩ 5% " " 1/8 W
	R4	80.5233	47 Ω 5% " " 1/8 W
	R5	80.5237	100 Ω 5% " " 1/8 W
	R6	80.5213	1.0 Ω 5% " " 1/8 W
	T1	60.5134	AF Transformer 600 Ω
	IC1	14.5104	TBA810 AF amplifier
	LS1	97.5035	Loudspeaker

Storno

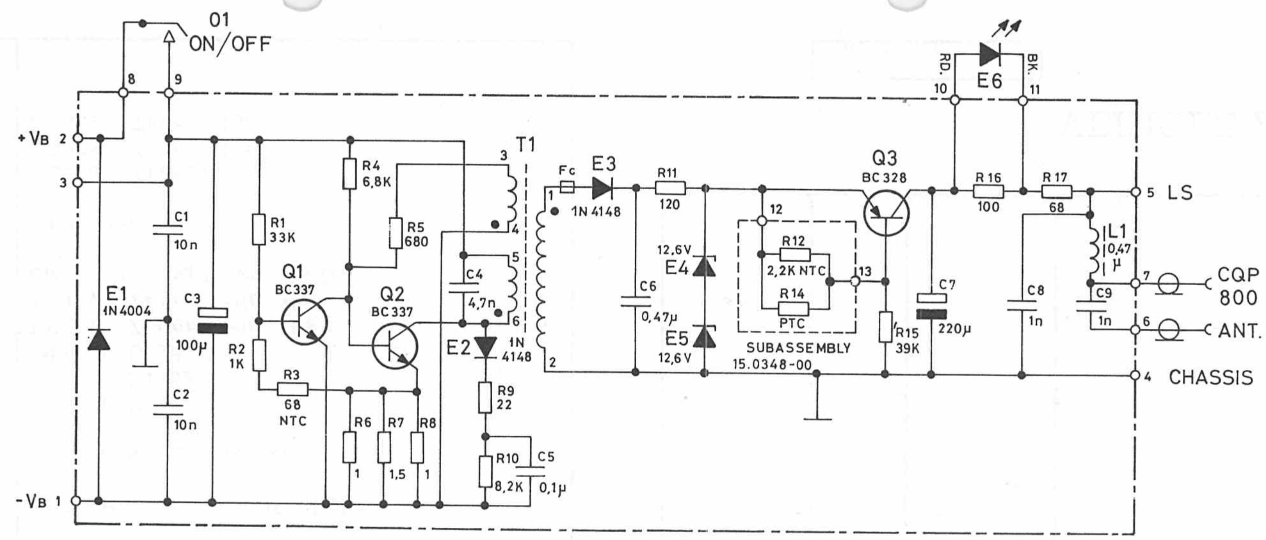
TYPE	Nº	CODE	DATA

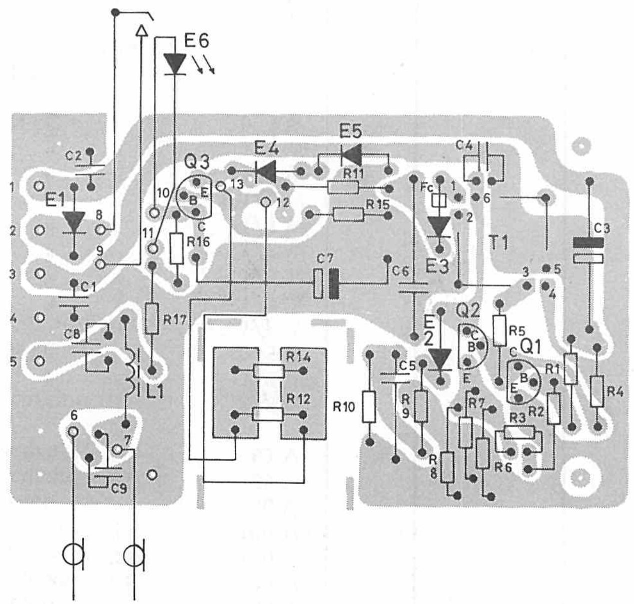
LOUDSPEAKER WITH AMPLIFIER LS801

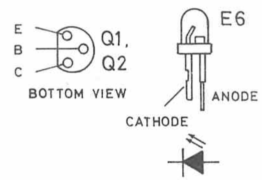
X402.432

Storno

Storno







VEHICLE ADAPTOR MN801

D402.362

Storno

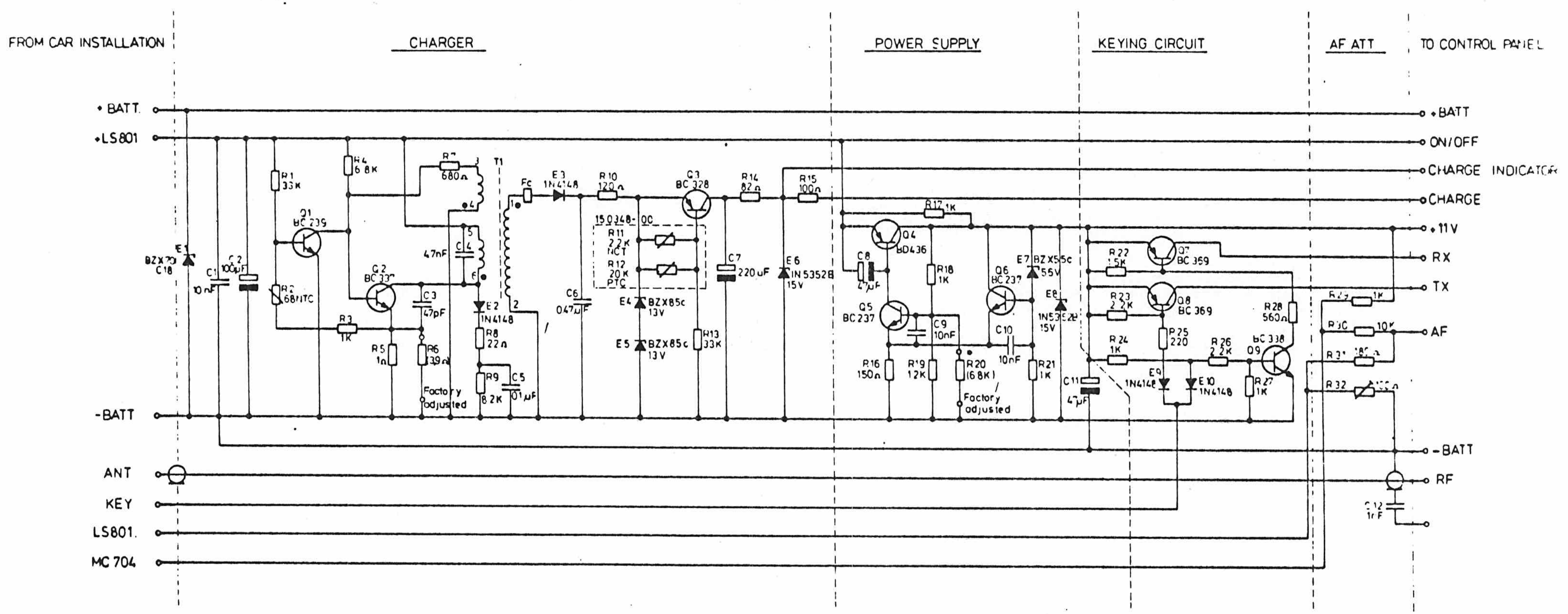
TYPE	Nº	CODE	DATA
		10.3476	MN801 Vehicle adapter
	C1	74.5109	10 nF -20/+80% ceram PL 20 V
	C2	74.5109	10 nF -20/+80% ceram PL 20 V
	C3	73.5071	100 µF -10/+50% elco 40 V
	C4	74.5108	4.7 nF -20/+80% ceram PL 20 V
	C5	76.5073	0.1 µF 10% polyest TB 100 V
	C6	76.5076	0.47 µF 10% polyest TB 100 V
	C7	73.5152	220 µF -10/+50% elco 40 V
	C8	74.5155	1 nF -20/+80% ceram PL 63 V
	C9	74.5155	1 nF -20/+80% ceram PL 63 V
	R1	80.5267	33 KΩ 5% carbon film 1/8 W
	R2	80.5249	1 KΩ 5% " " 1/8 W
	R3	89.5061	68 Ω 20% NTC 0.5 W
	R4	80.5259	6.8 KΩ 5% carbon film 1/8 W
	R5	80.5267	680 Ω 5% " " 1/8 W
	R6	80.5213	1.0 Ω 5% " " 1/8 W
	R7	80.5215	1.5 Ω 5% " " 1/8 W
	R8	80.5213	1.0 Ω 5% " " 1/8 W
	R9	80.5229	22 Ω 5% " " 1/8 W
	R10	80.5260	8.2 KΩ 5% " " 1/8 W
	R11	80.5438	120 Ω 5% " " 1/4 W
	R12	89.5078	2.2 KΩ 10% NTC 0.5 W
	R14	89.5077	20-100 KΩ PTC 30 V
	R15	80.5268	39 KΩ 5% carbon film 1/8 W
	R16	80.5237	100 Ω 5% " " 1/8 W
	R17	80.5435	68 Ω 5% " " 1/4 W
	L1	63.5008	0.47 µH 10% RF-choke
	T1	61.1369	Converter transformer
	E1	99.5020	1N4004 Diode
	E2	99.5237	1N4148 Diode
	E3	99.5237	1N4148 Diode
	E4	99.5030	12.6 V Zenerdiode 10% 1 W
	E5	99.5030	12.6 V Zenerdiode 10% 1 W
	E6	99.5255	Light Emitting Diode (LED)
	O1	47.5040	Micro Switch
	Q1	99.5305	BC328 Transistor
	Q2	99.5305	BC328 Transistor
	Q3	99.5333	BC337 Transistor

Storno

TYPE	Nº	CODE	DATA

VEHICLE ADAPTOR MN801

X402 433



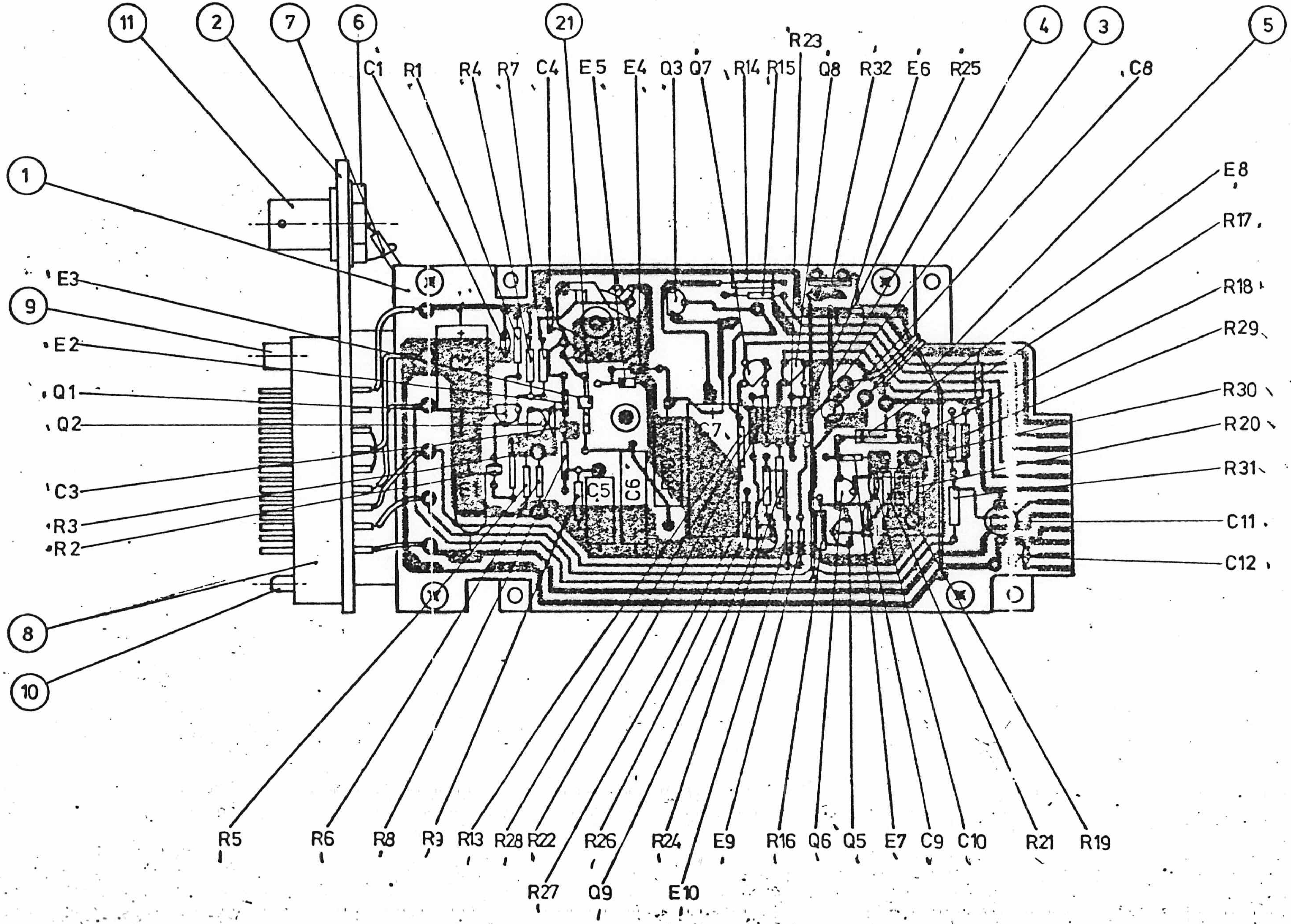
materiale	overflade:	tegn. til / orientering / værktøj / A prøveserie / P produktion	sign dato
dim. / råvægt	gr/stk.		

Storno

LM/KPL 79 Mq 13

Tilhører MN 802
150J93-00

DIAGRAM MAIN UNIT



22		175.5
21	FC	65.
20		173.5
19		173.
18		173.
17		173.
16		173.
15		173.
14		173.
13		173.
12		173.
11		41.0
10		31.0
9		31.0
8		41.5
7		34.
6		29.
5		173.
4		173.
3		173.
2		11,12
E10	1N4148	99.
E9	1N4148	99.
E8	15 V	99.
E7	5.6 V	99.
E6	15 V	99.
E5	12.6 V	99.
E4	12.6 V	99.
E3	1N4148	99.

TYPE	Nº	CODE	DATA		
		10.4124	Vehicle Adaptor for CQP800U		
			MAIN UNIT		
	C1	74.5109	10 nF -20 +80%	Ceram PL	20 V
	C2	73.5071	100 uF -10 +50%	Elco	40 V
	C3	74.5279	47 pF 5%	Ceram DI	50 V
	C4	74.5108	4.7 nF -20 +80%	Ceram PL	20 V
	C5	76.5073	0.1 uF 10%	Polyester TB	100 V
	C6	76.5076	0.47 uF 10%	Polyester TB	100 V
	C7	73.5152	220 uF -10 +5%	Elco	40 V
	C8	73.5149	47 uF 20%	Tantal	16 V
	C9	74.5109	10 nF -20 +80%	Ceram PL	20 V
	C10	74.5109	10 nF -20 +80%	Ceram PL	20 V
	C11	73.5149	47 uF 20%	Tantal	16 V
	C12	74.5397	1 nF 20%	Ceram DI	50 V
	R1	80.5267	33 Kohm 5%	Carbon film	1.125 W
	R2	89.5061	68 ohm 20%	NTC	0.5 W
	R3	80.5249	1 Kohm 5%	Carbon film	0.125 W
	R4	80.5259	6.8 Kohm 5%	Carbon film	0.125 W
	R5	80.5213	1 ohm 5%	Carbon film	0.125 W
	R6	80.52xx	ADJ 5%	Carbon film	0.125 W
	R7	80.5247	680 ohm 5%	Carbon film	0.125 W
	R8	80.5229	22 ohm 5%	Carbon film	0.125 W
	R9	80.5260	8.2 Kohm 5%	Carbon film	0.125 W
	R10	81.5038	120 ohm 5%	Carbon film	0.5 W
	R11	89.5078	2.2 Kohm 10%	NTC	0.5 W
	R12	89.5077	20-100 Kohm	PTC	30 V
	R13	80.5267	33 Kohm 5%	Carbon film	0.125 W
	R14	80.5438	82 ohm 5%	Carbon film	0.25 W
	R15	80.5237	100 ohm 5%	Carbon film	0.125 W
	R16	80.5239	150 ohm 5%	Carbon film	0.125 W
	R17	80.5249	1 Kohm 5%	Carbon film	0.125 W
	R18	80.5249	1 Kohm 5%	Carbon film	0.125 W
	R19	80.5250	1.2 Kohm 5%	Carbon film	0.125 W
	R20	80.52xx	ADJ 5%	Carbon film	0.125 W
	R21	80.5249	1 Kohm 5%	Carbon film	0.125 W
	R22	80.5251	1.5 Kohm 5%	Carbon film	0.125 W
	R23	80.5253	2.2 Kohm 5%	Carbon film	0.125 W
	R24	80.5249	1 Kohm 5%	Carbon film	0.125 W
	R25	80.5241	220 ohm 5%	Carbon film	0.125 W
	R26	80.5253	2.2 Kohm 5%	Carbon film	0.125 W
	R27	80.5249	1 Kohm 5%	Carbon film	0.125 W
	R28	80.5246	560 ohm 5%	Carbon film	0.125 W
	R29	80.5249	1 Kohm 5%	Carbon film	0.125 W
	R30	80.5265	22 Kohm 5%	Carbon film	0.125 W
	R31	80.5240	180 ohm 5%	Carbon film	0.125 W
	R32	86.5082	100 ohm 20%	Pot. meter	0.1 W

Storno

TYPE	Nº	CODE	DATA		
	T1	61.1369	Transformer		
	E1	99.5367	18 V	Zener diode	2.5 W
	E2	99.5237	1N4148	Diode	
	E3	99.5237	1N4148	Diode	
	E4	99.5030	12.6 V 10%	Zener diode	1 W
	E5	99.5030	12.6 V 10%	Zener diode	1 W
	E6	99.5360	15 V 5%	Zener diode	5 W
	E7	99.5114	5.6 V 5%	Zener diode	0.4 W
	E8	99.5360	15 V 5%	Zener diode	5 W
	E9	99.5237	1N4148	Diode	
	E10	99.5237	1N4148	Diode	
	Q1	99.5201	BC239	Transistor	
	Q2	99.5333	BC337	Transistor	
	Q3	99.5305	BC328	Transistor	
	Q4	99.5352	BD436	Transistor	
	Q5	99.5121	BC237	Transistor	
	Q6	99.5121	BC237	Transistor	
	Q7	99.5337	BC369	Transistor	
	Q8	99.5337	BC369	Transistor	
	J2	41.0166	BNC	Coax. connector	
	J3	41.5081	34-pole	Male connector	
			CONTROL PANEL		
	C1	74.5312	470 pF -20 +80%	Ceram PL	63 V
	R1	80.5235	68 ohm 5%	Carbon film	0.125 W
	R2	80.5245	470 ohm 5%	Carbon film	0.125 W
	O1	47.5090	Pushbutton switch ON/OFF		
	O2	47.5104	Pushbutton switch, SQ		
	O3	47.5088	Pushbutton switch, TONE 1		
	O4	47.5088	Pushbutton switch, TONE 2		
	J1	41.5564	12-pole connector, female		
	E1	99.5229	LED	1.6 V/20 mA Red	
	E2	99.5338	LED	2.4 V/20 mA Green	
	E3	99.5270	LED	2.4 V/20 mA Yellow	
	E4	99.5338	LED	2.4 V/20 mA Green	

VEHICLE ADAPTOR MN802

X402.826

Storno

TYPE	Nº	CODE	DATA
	E5	99.5338	LED 2.4 V/20 mA Green
	E6	99.5338	LED 2.4 V/20 mA Green
	E7	99.5338	LED 2.4 V/20 mA Green

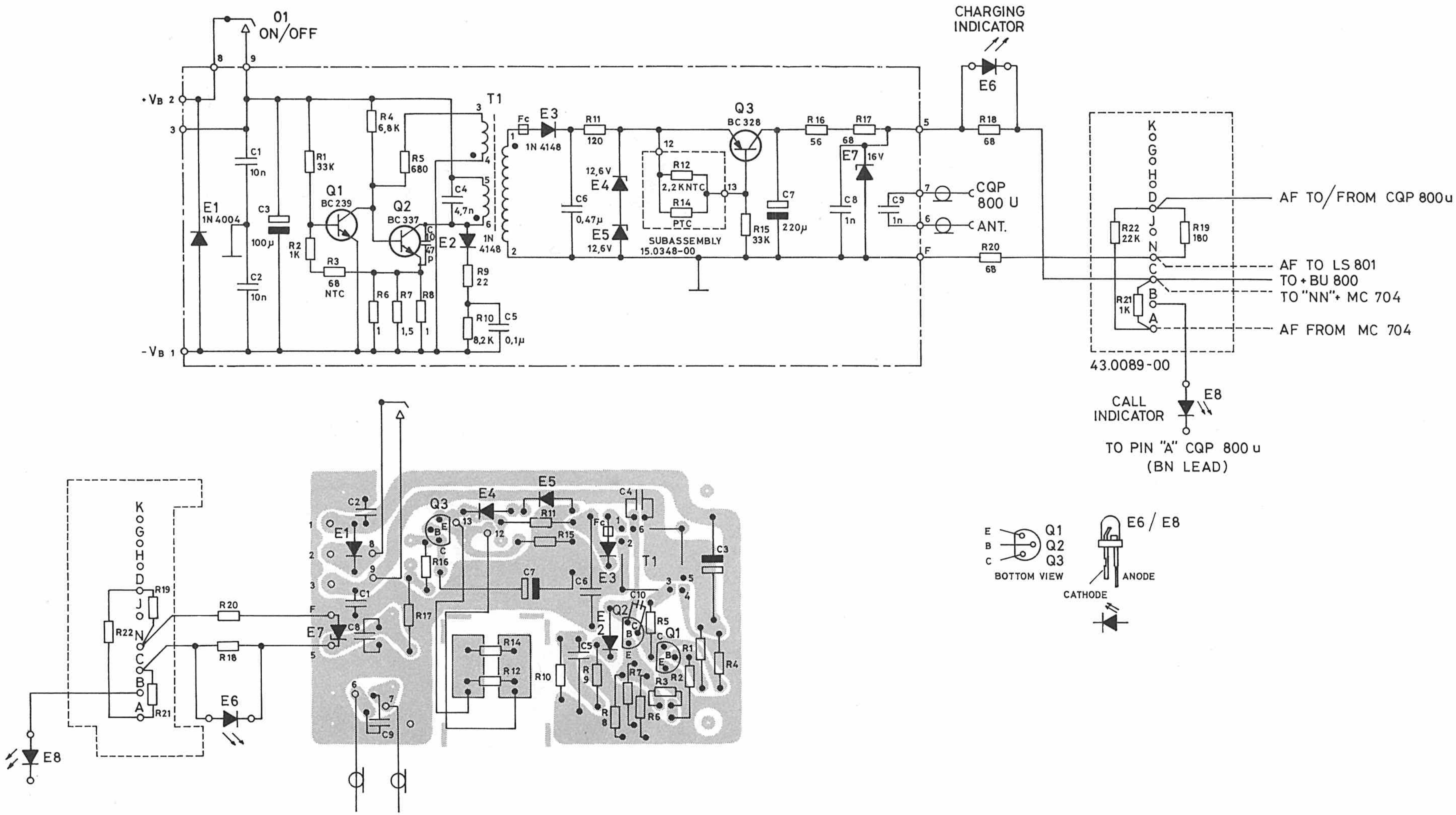
Storno

TYPE	Nº	CODE	DATA

VEHICLE ADAPTOR MN802

X402.826

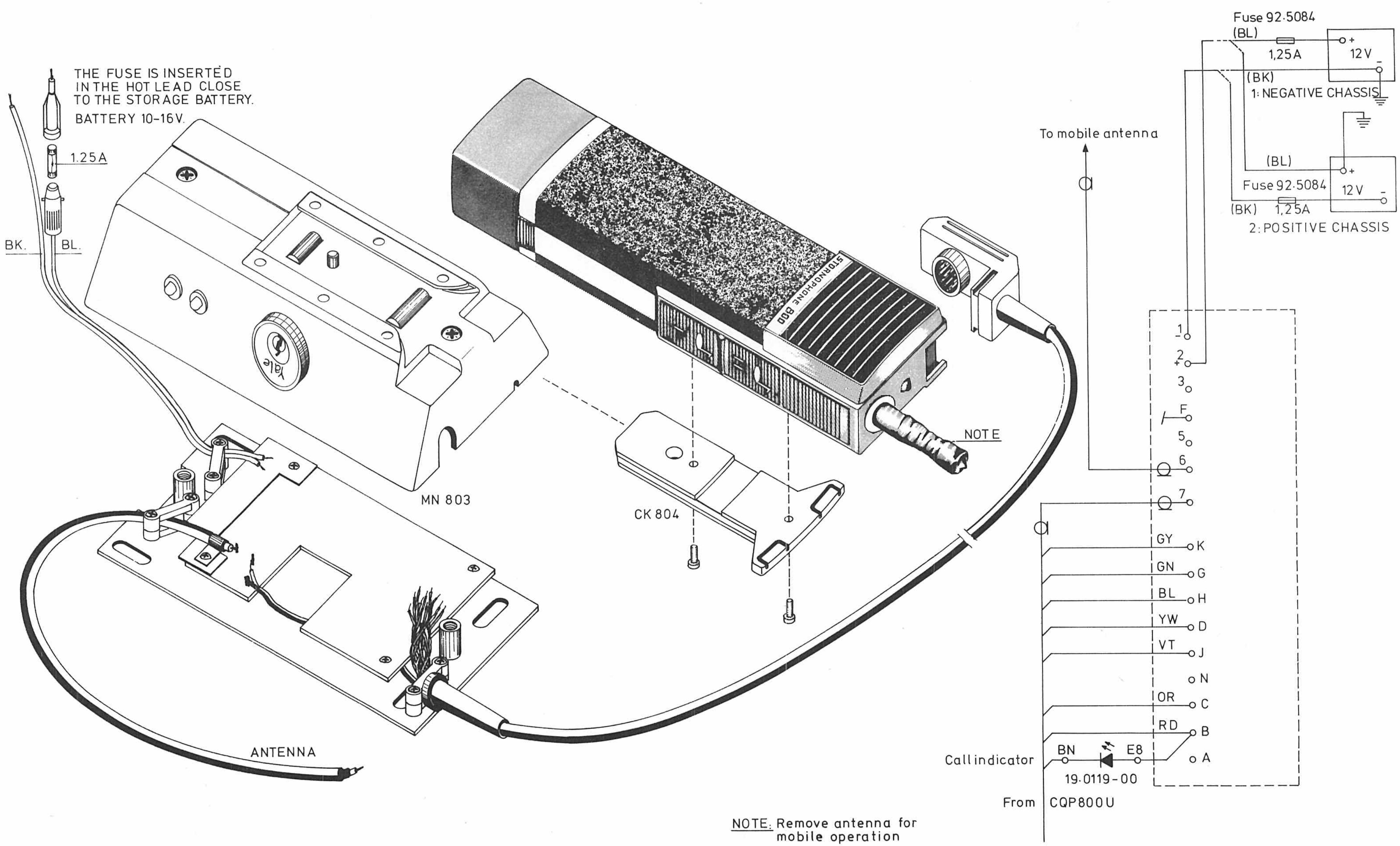
Storno



VEHICLE ADAPTOR MN803

D 402.593/2

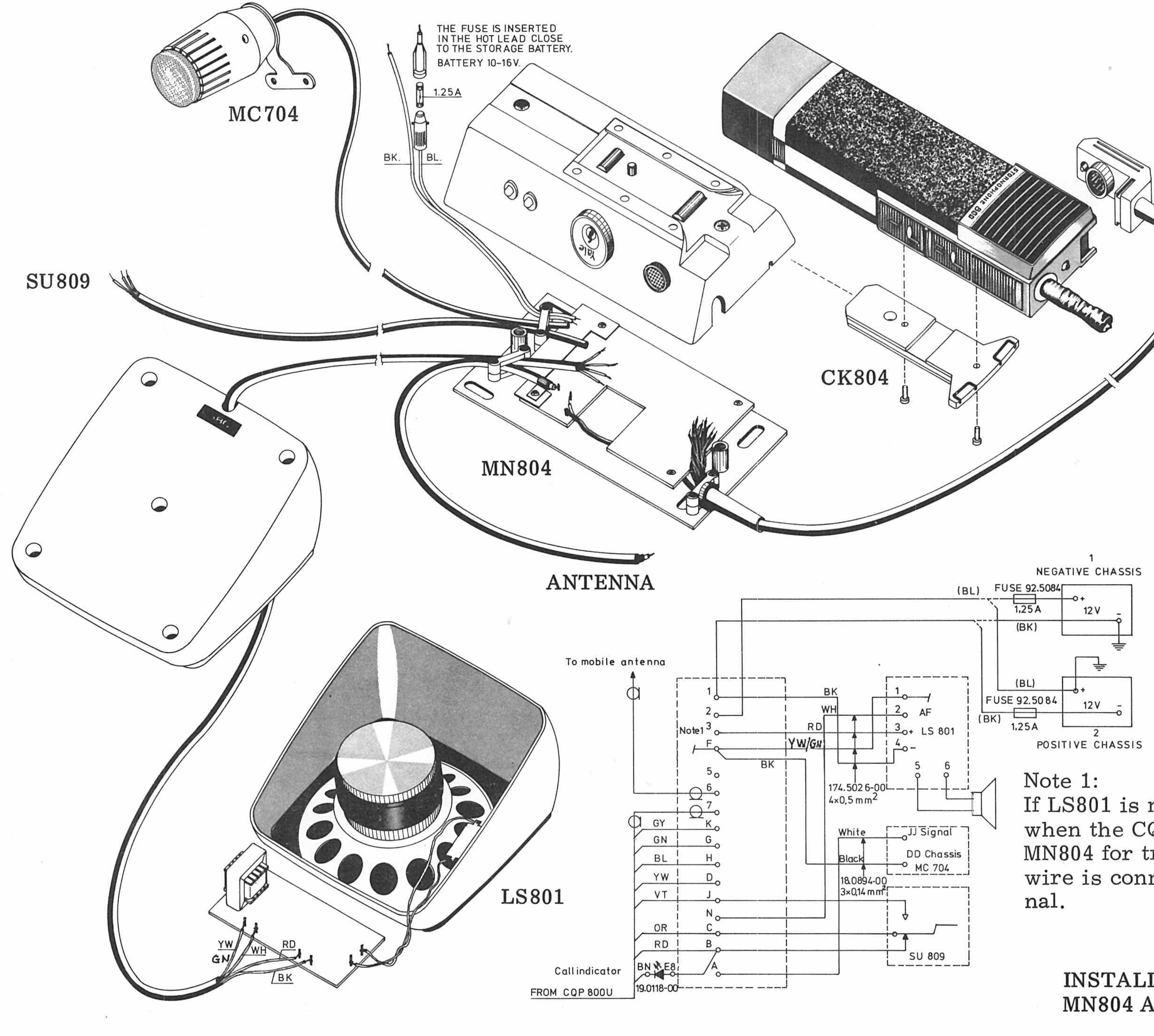
Storno



NOTE: Remove antenna for mobile operation

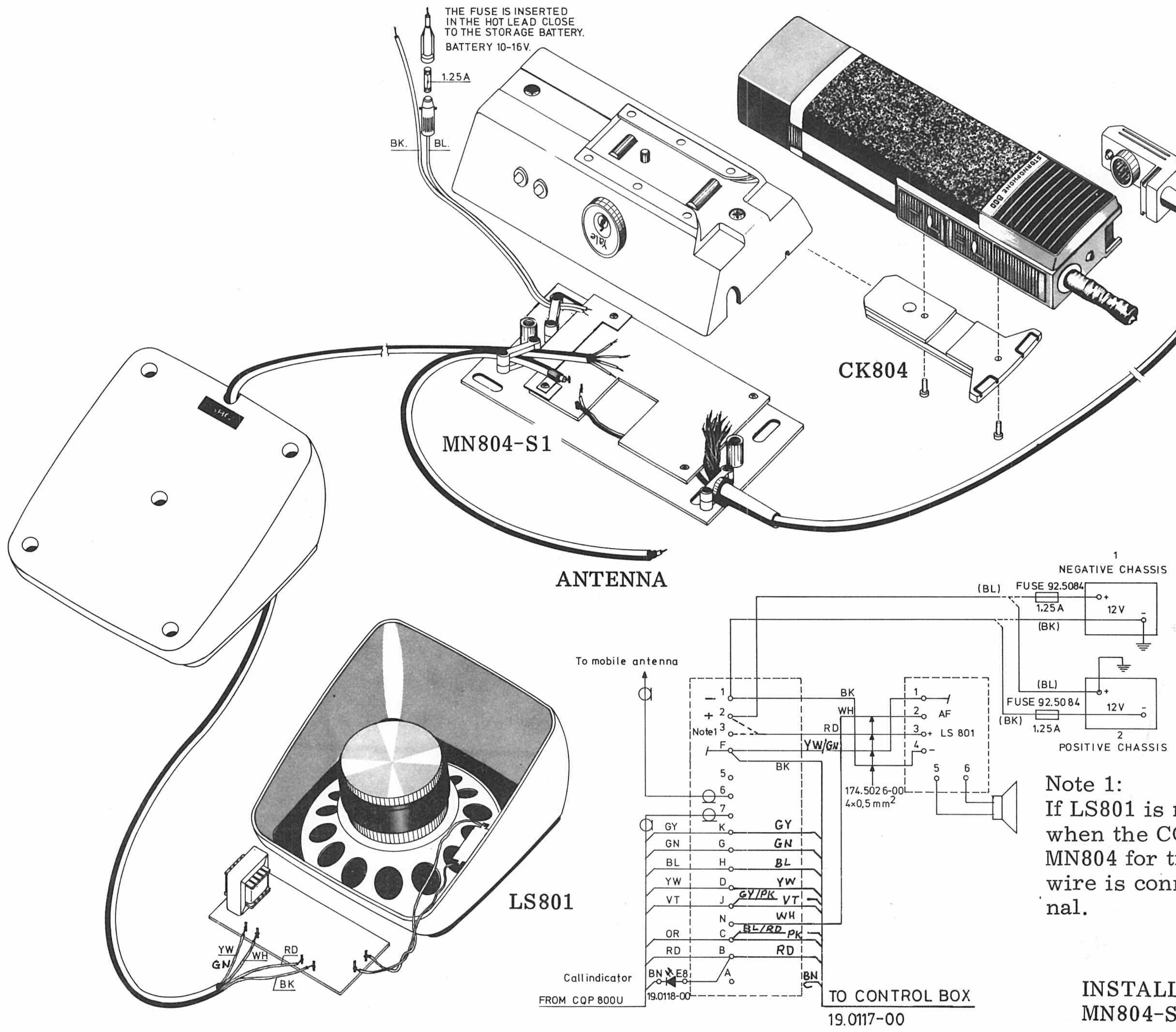
INSTALLATION DIAGRAM FOR MN 803

D402.600/1



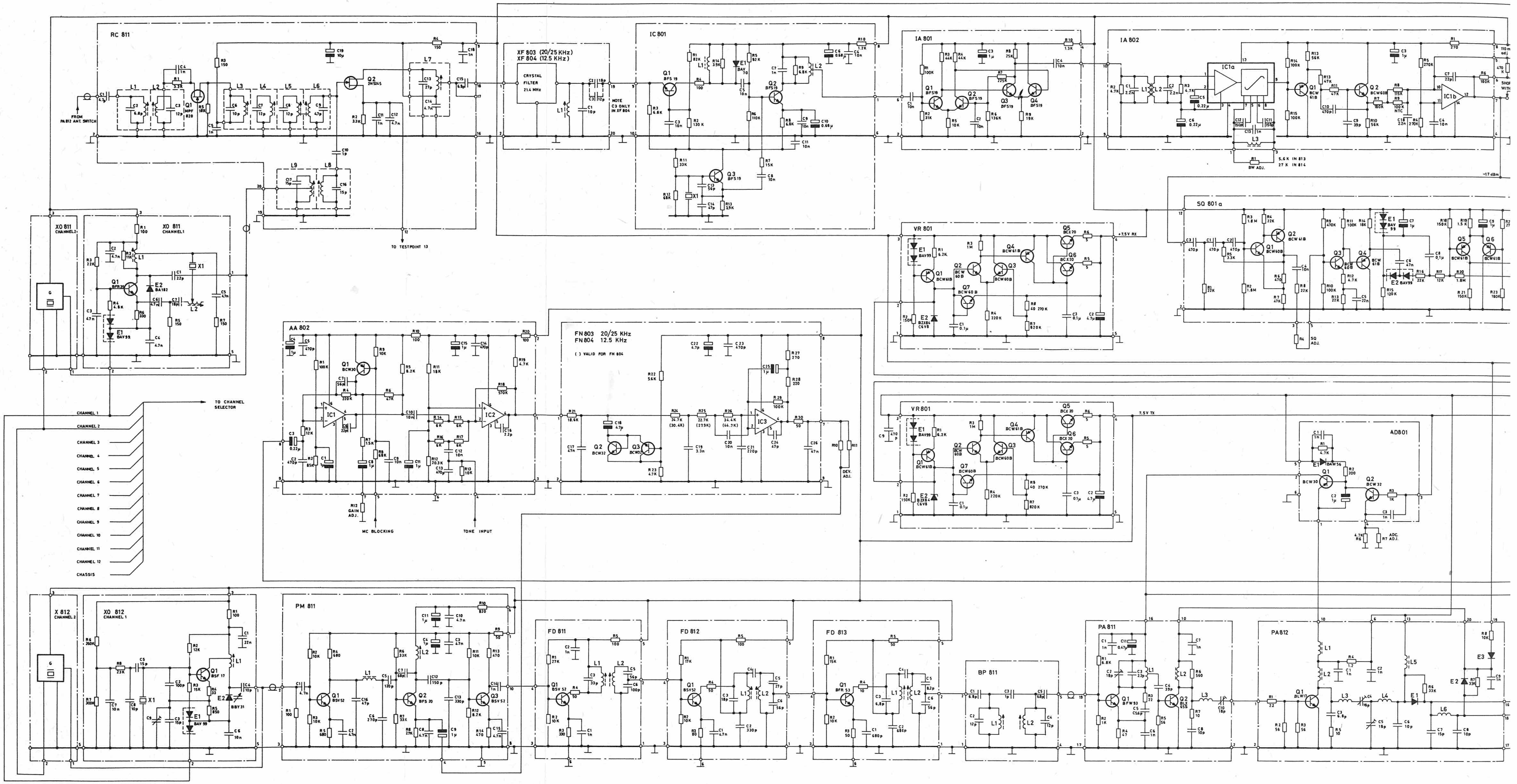
Note 1:
If LS801 is not to be disconnected when the CQP800 is removed from MN804 for transmitting, the red wire is connected to the (+) terminal.

INSTALLATION DIAGRAM FOR MN804 AND LS801 D 402.599/2

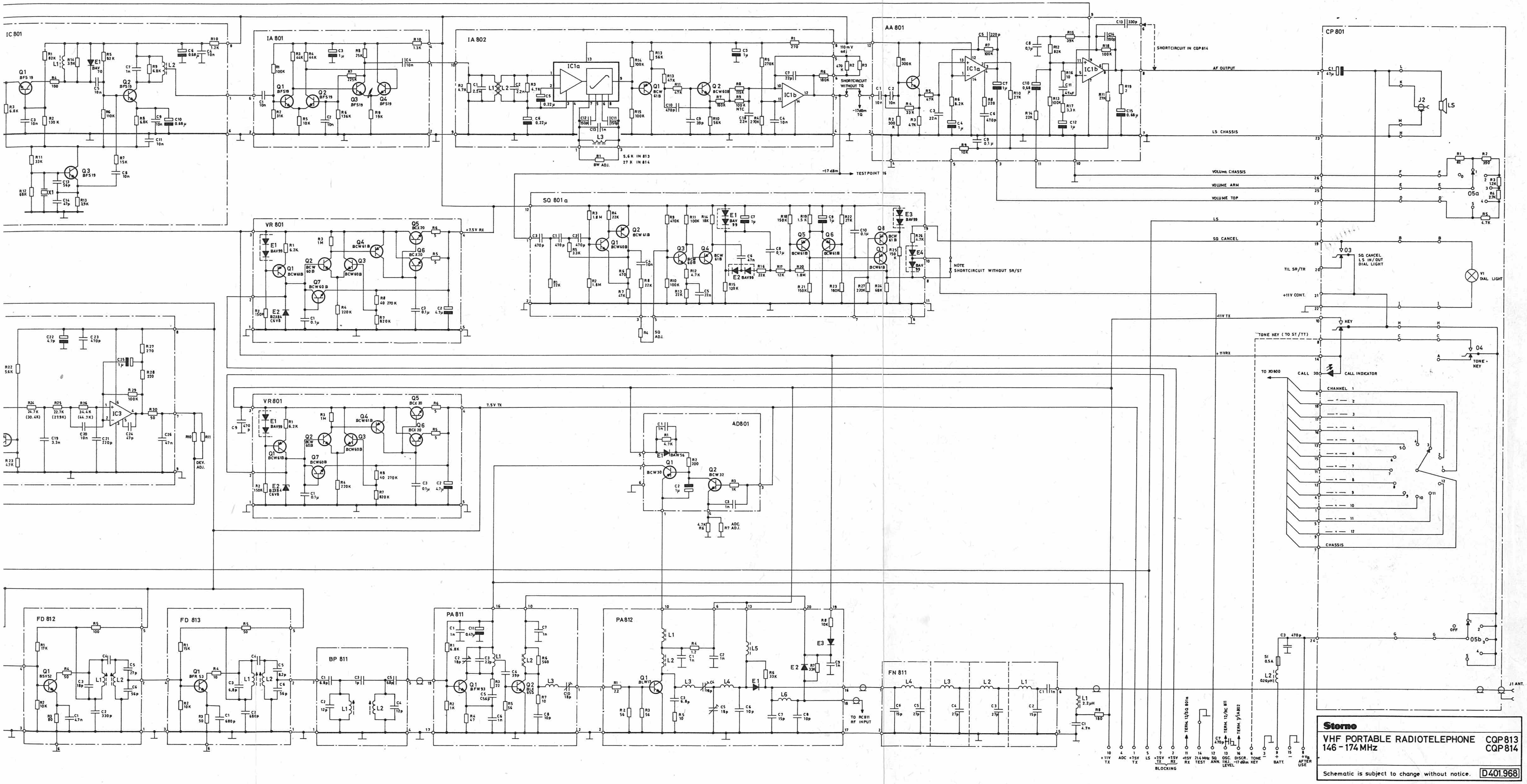


Note 1:
If LS801 is not to be disconnected when the CQP800 is removed from MN804 for transmitting, the red wire is connected to the (+) terminal.

INSTALLATION DIAGRAM FOR MN804-S1 & LS801 D402.697



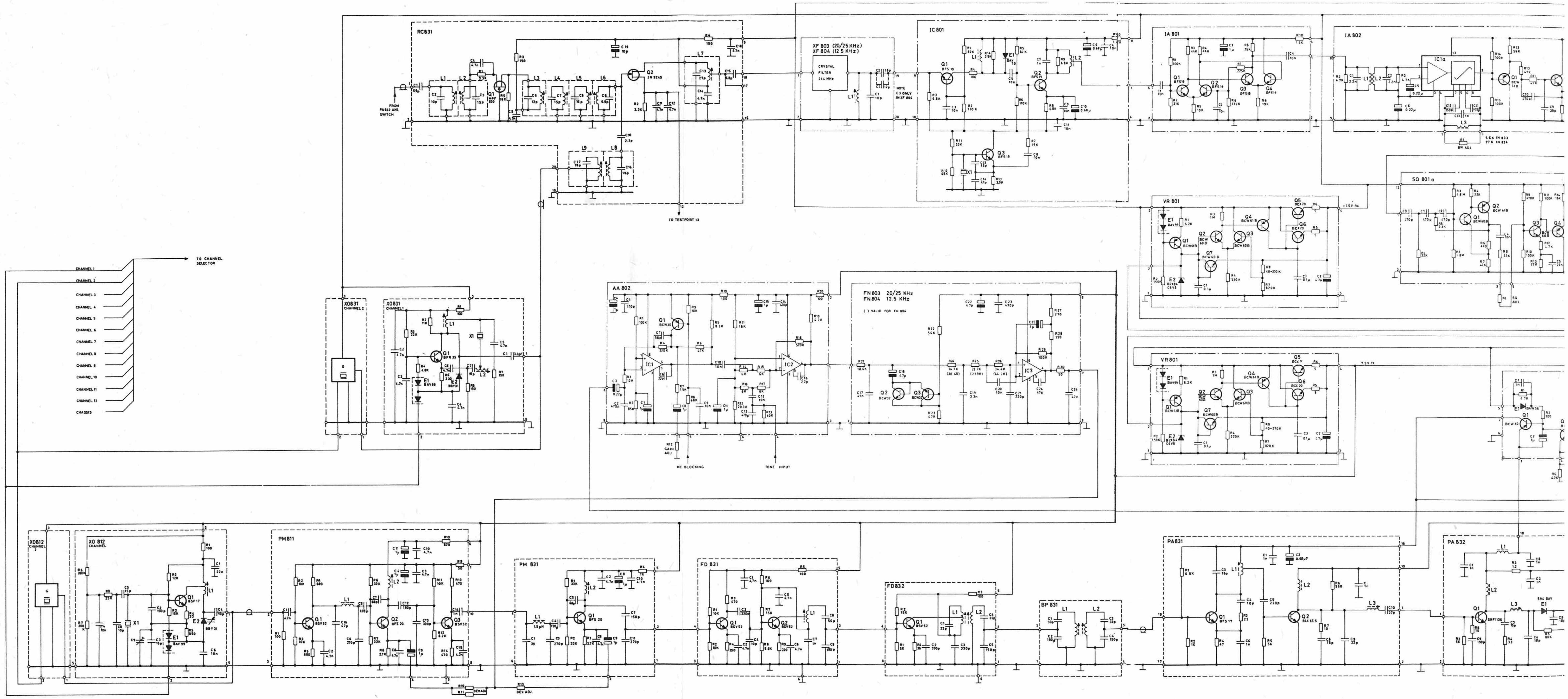
RC 811
XF 803 (20/25 KHz)
XF 804 (12.5 KHz)
CRYSTAL FILTER
IC 801
IA 801
IA 802
XO 811
VR 801
SQ 801a
AA 802
FN 803 20/25 KHz
FN 804 12.5 KHz
( ) VALID FOR FN 804
TO TESTPOINT 13
TO CHANNEL SELECTOR
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHASSIS
MC BLOCKING
TONE INPUT
AD801
X 812
XO 812
PM 811
FD 811
FD 812
FD 813
BP 811
PA 811
PA 812

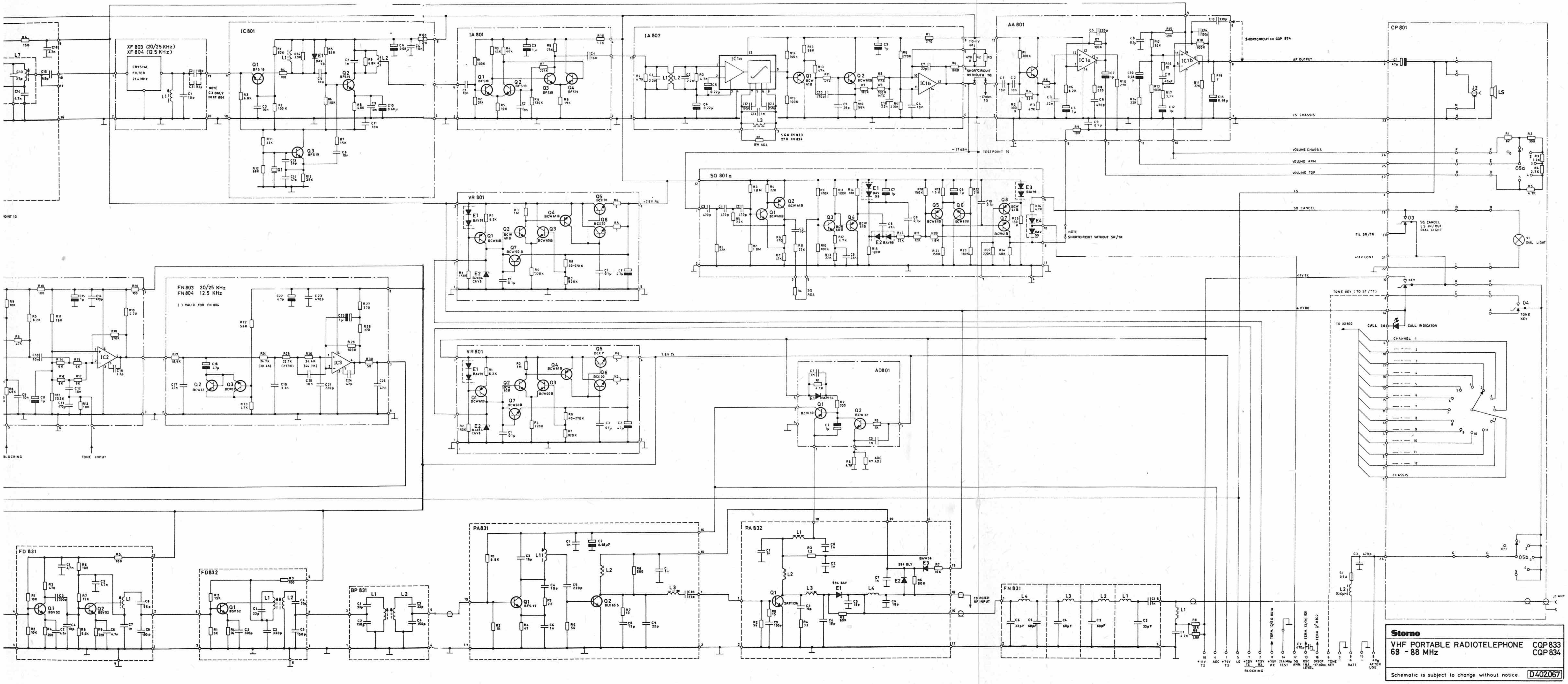


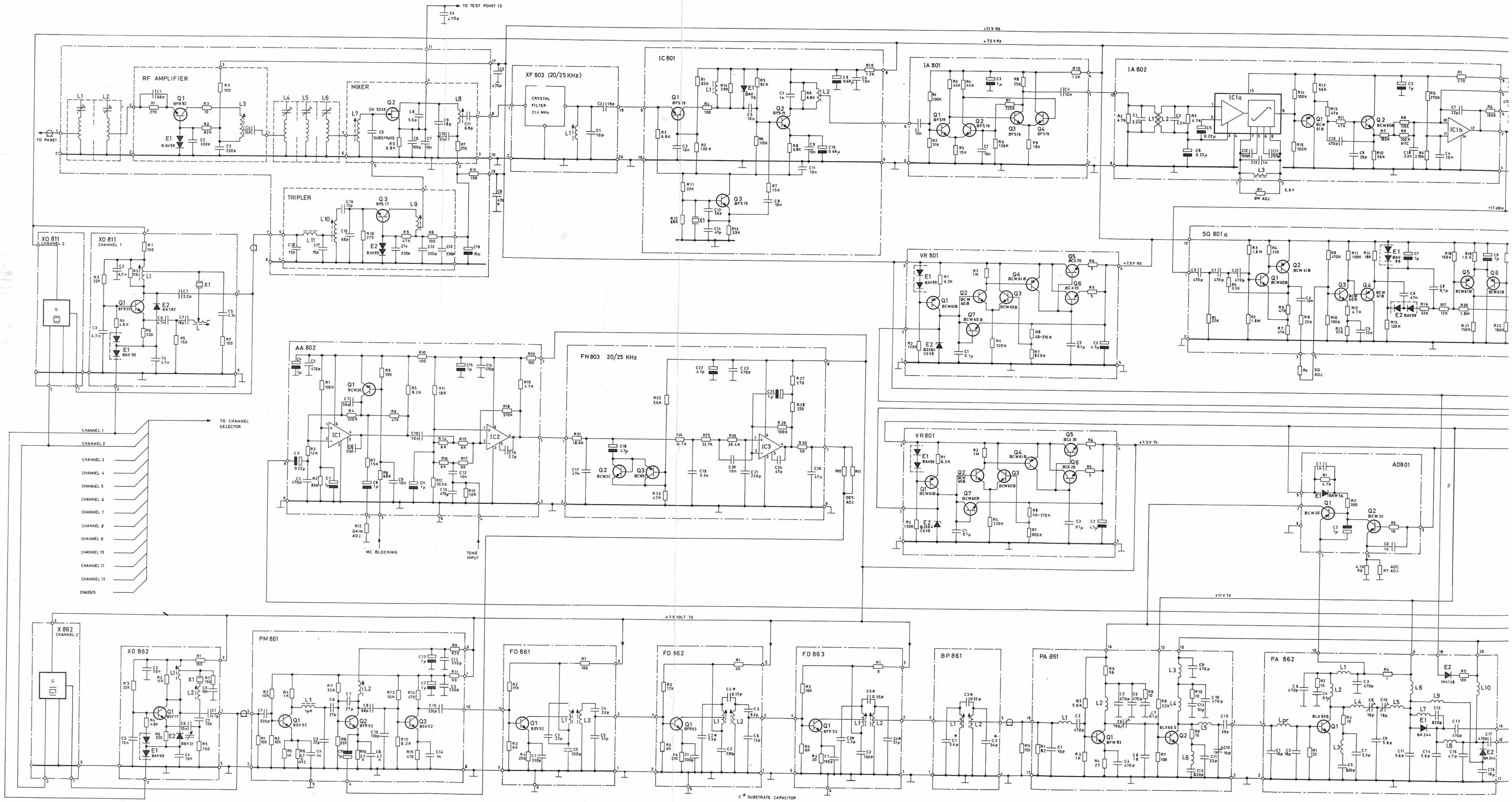
Storno

VHF PORTABLE RADIOTELEPHONE CQP813
146 - 174 MHz CQP814

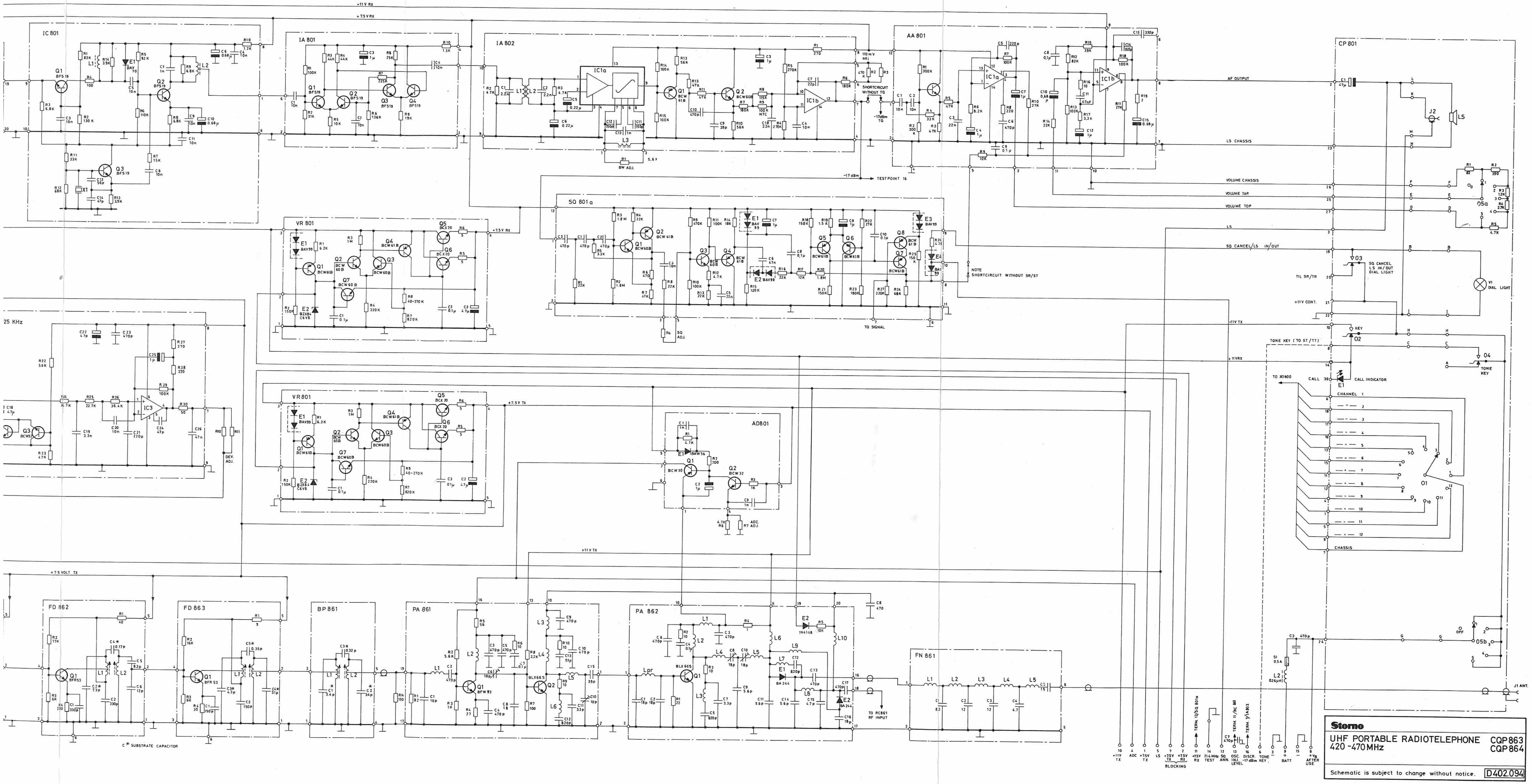
Schematic is subject to change without notice. D401.968

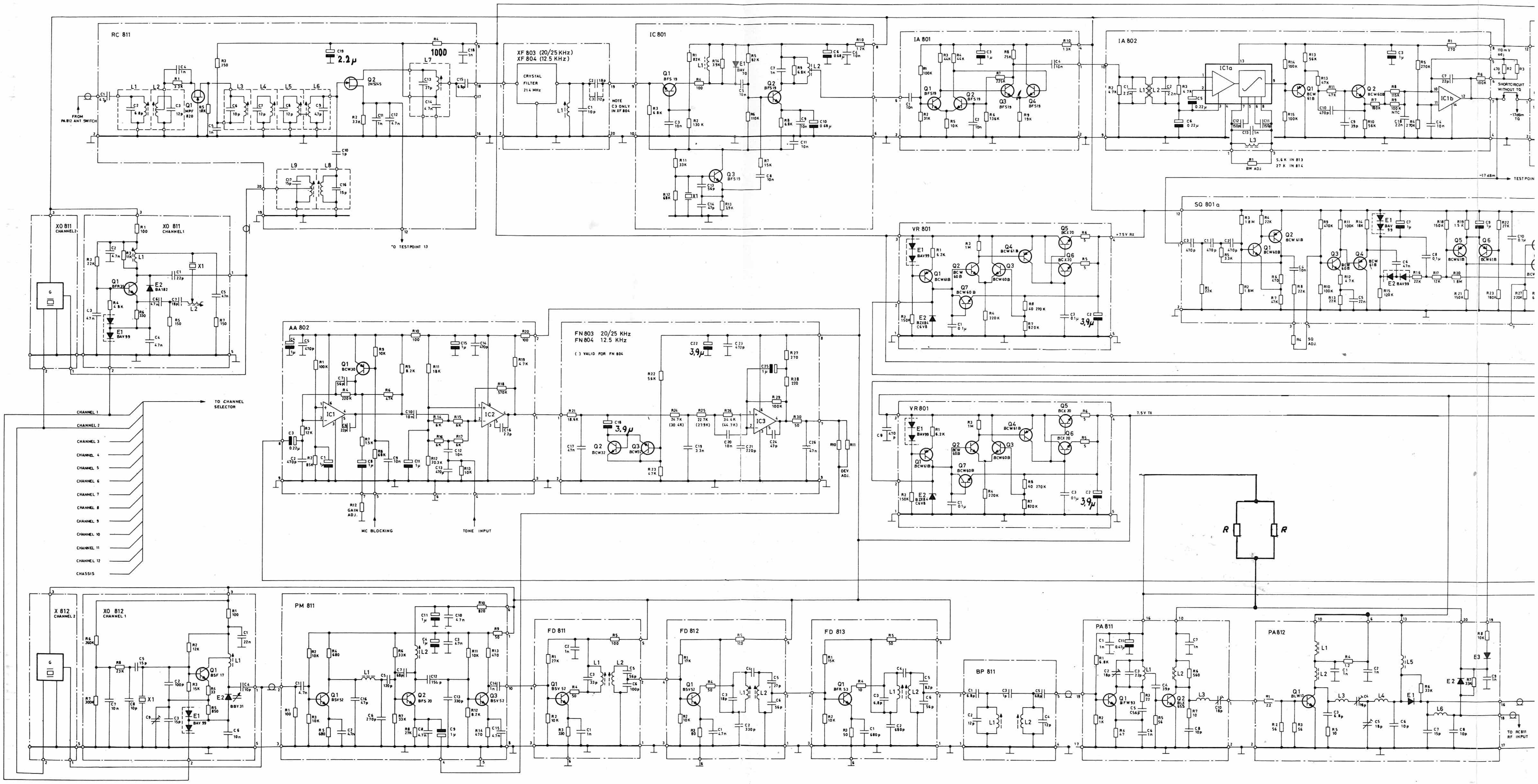

RC831
FROM PA832 ANT. SWITCH
TO TESTPOINT 13
XF 803 (20/25 KHz)
XF 804 (12.5 KHz)
CRYSTAL FILTER
NOTE C3 ONLY IN XF 804
IC 801
IA 801
IA 802
VR 801
SQ 801a
AA 802
MC BLOCKING
TONE INPUT
GAIN ADJ
FN 803 20/25 KHz
FN 804 12.5 KHz
( ) VALID FOR FN 804
TO CHANNEL SELECTOR
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHASSIS
XO831 CHANNEL 2
XO812 CHANNEL 3
XO 812 CHANNEL
PM811
PM 831
FD 831
FD832
BP 831
PA831
PA 832
DEV.ADJ.


Storno
VHF PORTABLE RADIOTELEPHONE CQP833
68 - 88 MHz CQP834
Schematic is subject to change without notice.
D402067
IC 801
IA 801
IA 802
AA 801
CP 801
SQ 801a
VR 801
AD801
FN803 20/25 KHz
FN804 12.5 KHz
FD 831
FD832
BP 831
PA831
PA 832
FN 831
XF 803 (20/25 KHz)
XF 804 (12.5 KHz)

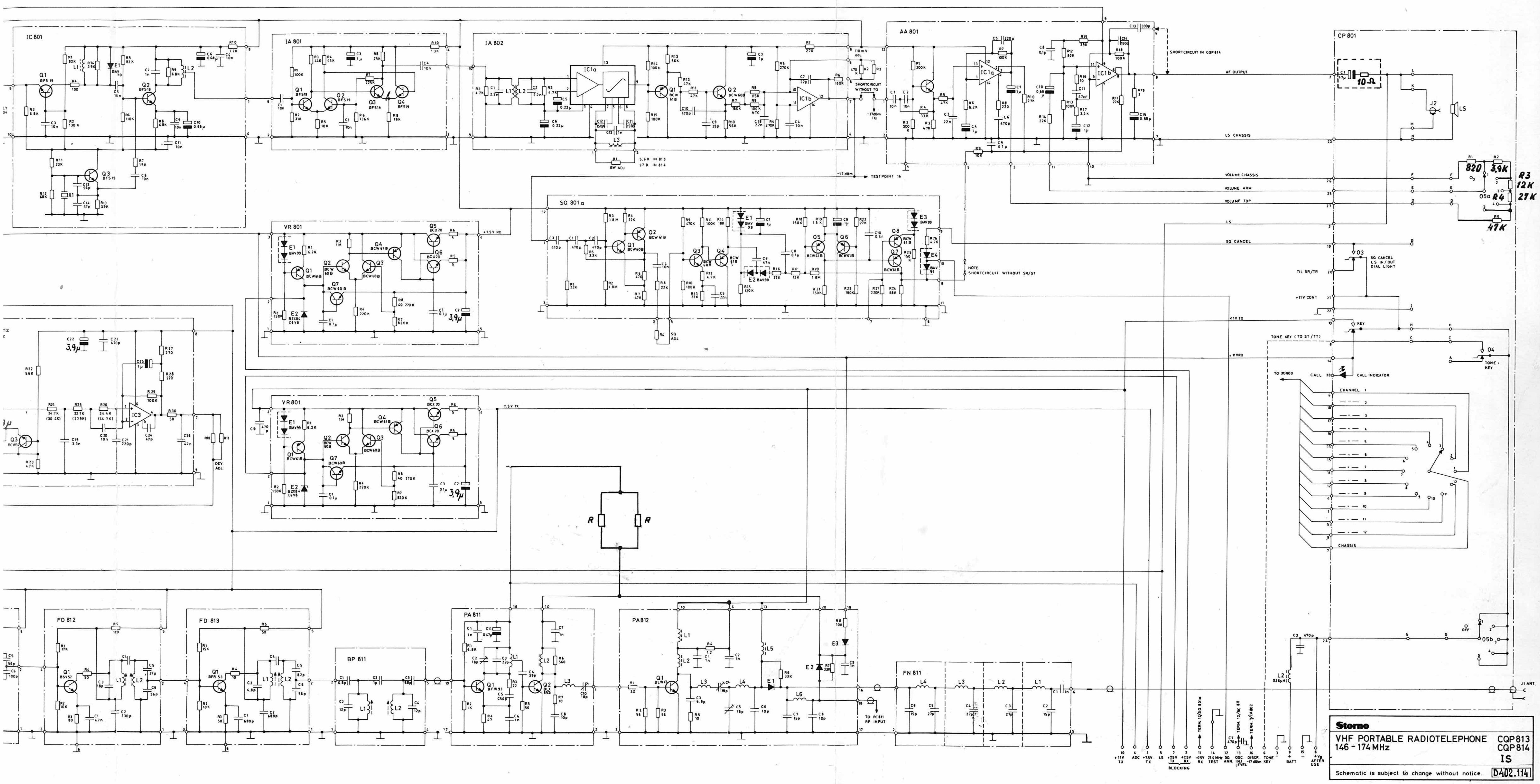


TO TEST POINT 13
RF AMPLIFIER
MIXER
TRIPLER
XF 803 (20/25 KHz)
CRYSTAL FILTER 21.4 MHz
IC 801
IA 801
IA 802
SQ 801 a
VR 801
XO 811 CHANNEL 2
XO 811 CHANNEL 1
TO PA861
AA 802
FN 803 20/25 KHz
TO CHANNEL SELECTOR
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHASSIS
MC BLOCKING
TONE INPUT
GAIN ADJ.
DEV. ADJ.
SQ ADJ.
BW ADJ.
AD801
ADC ADJ.
+11 V RX
+7.5 V RX
+7.5 V TX
+11 V TX
+7.5 VOLT TX
X 862 CHANNEL 2
XO 862
PM 861
FD 861
FD 862
FD 863
BP 861
PA 861
PA 862
C* SUBSTRATE CAPACITOR


Storno
UHF PORTABLE RADIOTELEPHONE CQP863 CQP864
420 - 470 MHz
Schematic is subject to change without notice.
D402.094
C* SUBSTRATE CAPACITOR



RC 811
XF 803 (20/25 KHz)
XF 804 (12.5 KHz)
IC 801
IA 801
IA 802
XO 811
AA 802
FN 803 20/25 KHz
FN 804 12.5 KHz
VR 801
SQ 801 a
X 812
XO 812
PM 811
FD 811
FD 812
FD 813
BP 811
PA 811
PA812
TO CHANNEL SELECTOR
MIC BLOCKING
TONE INPUT
TO TESTPOINT 13

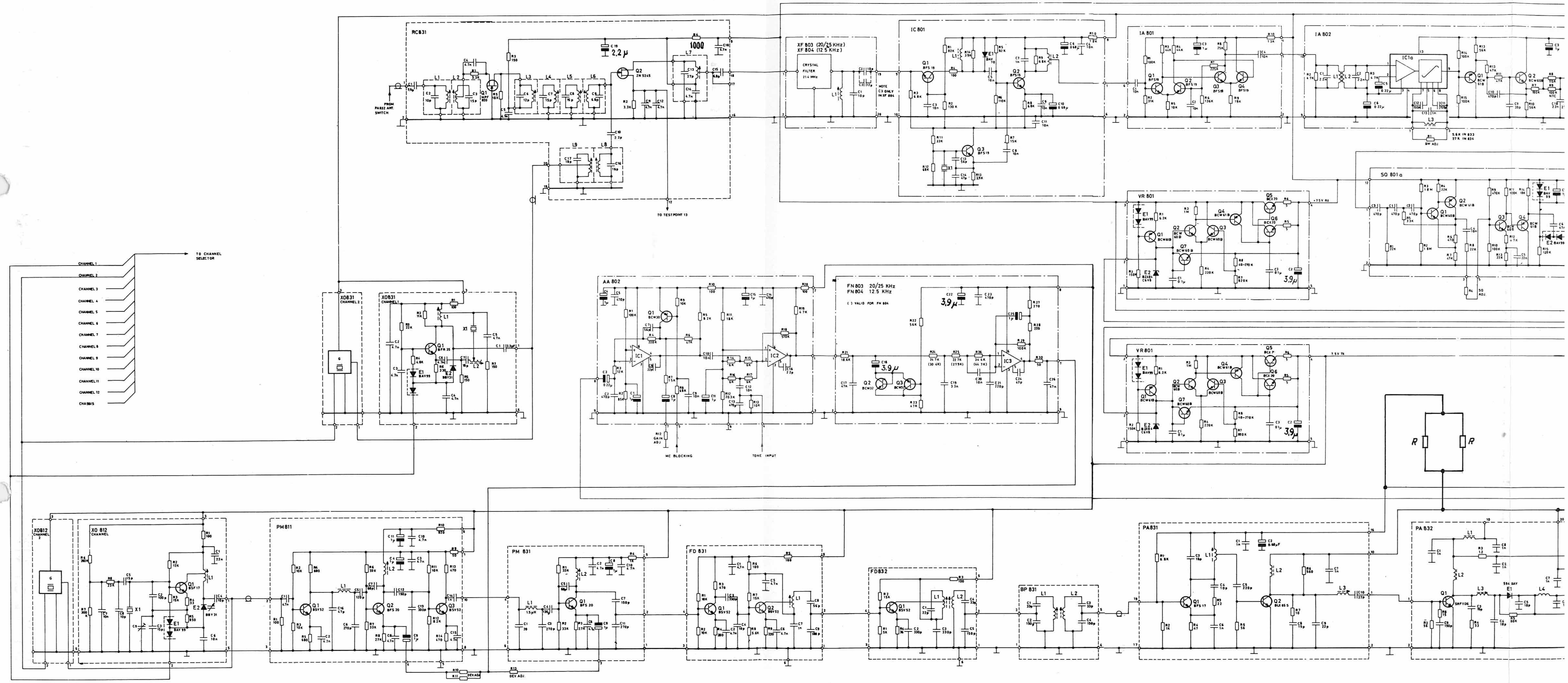


Storno

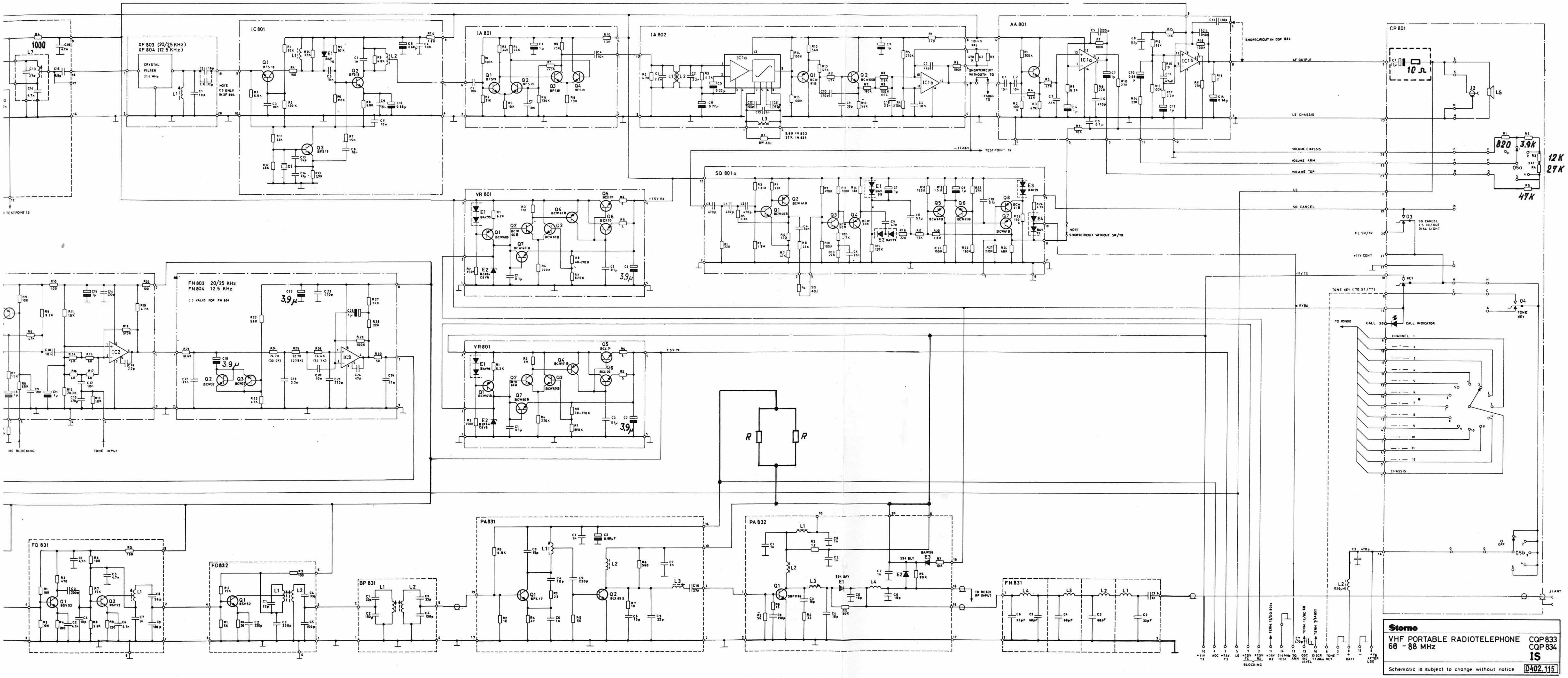
VHF PORTABLE RADIOTELEPHONE 146 - 174 MHz

CQP813
CQP814
IS

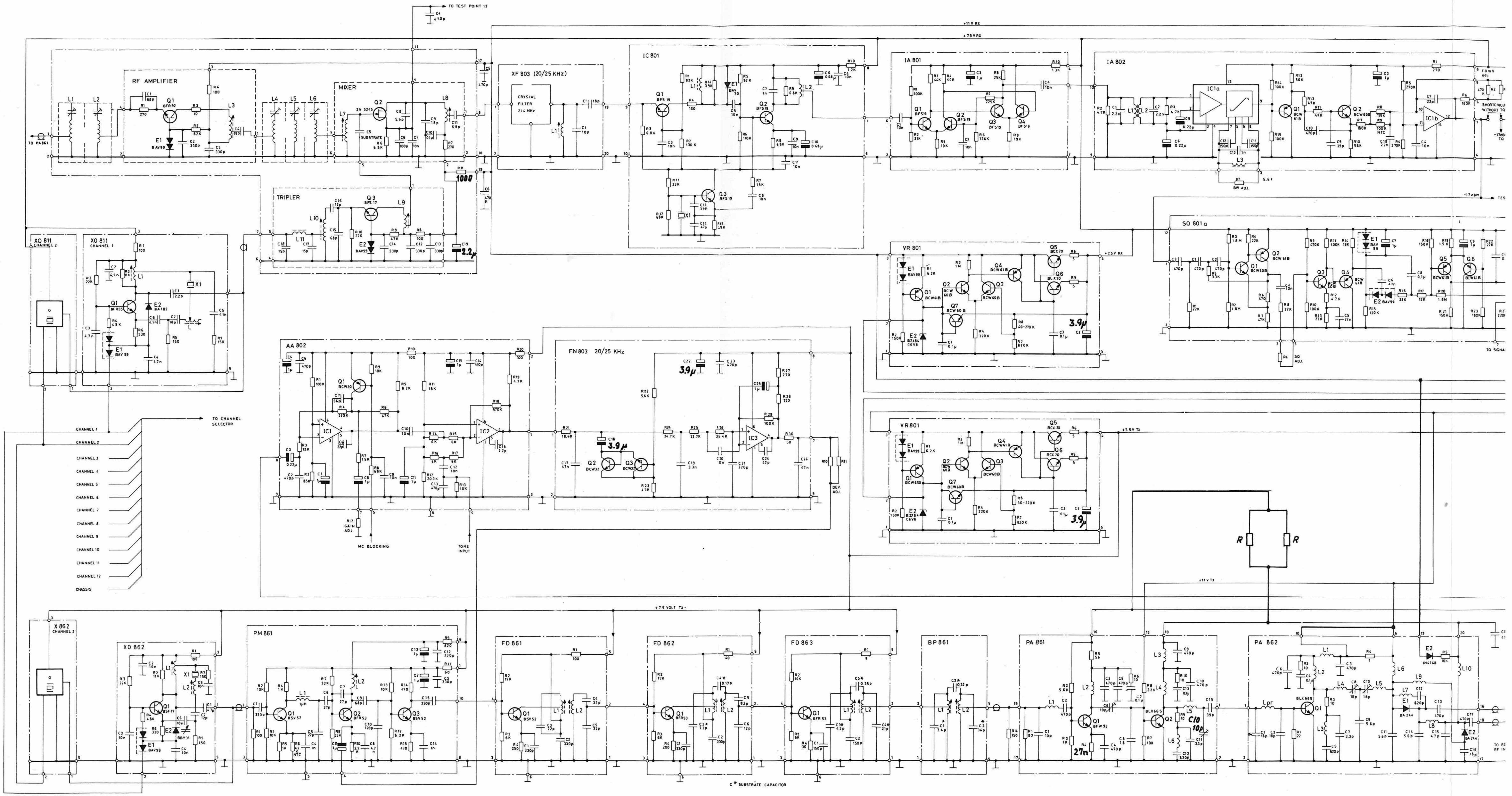
Schematic is subject to change without notice. D402.114



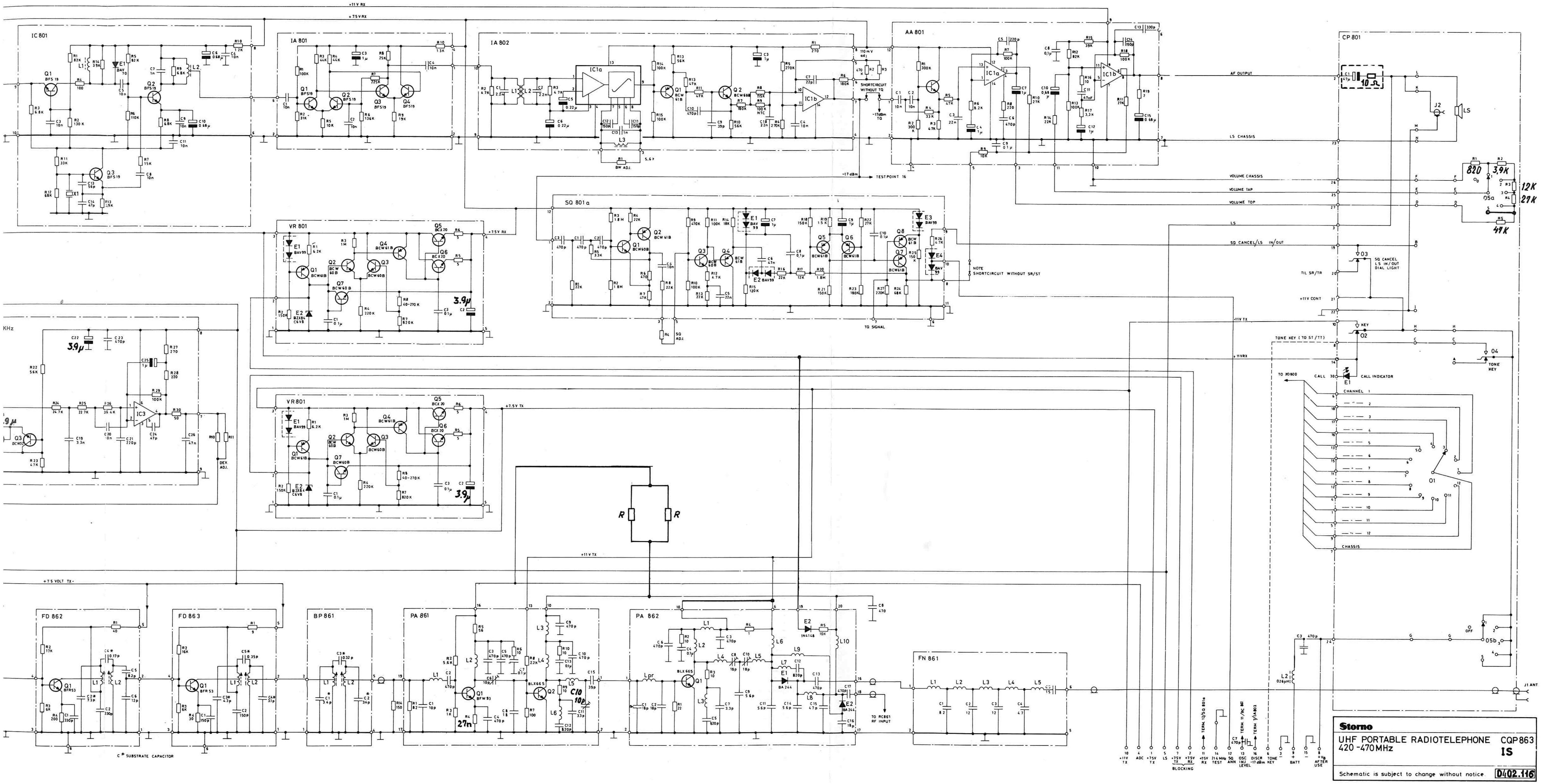
RC831
XF 803 (20/25 KHz)
XF 804 (12.5 KHz)
IC 801
IA 801
IA 802
VR 801
SQ 801a
AA 802
FN 803 20/25 KHz
FN 804 12.5 KHz
XO831
XO812
XO 812
PM811
PM 831
FD 831
FD832
BP 831
PA831
PA 832
TO CHANNEL SELECTOR
TO TESTPOINT 13
MC BLOCKING
TONE INPUT
GAIN ADJ
DEV ADJ
R
R

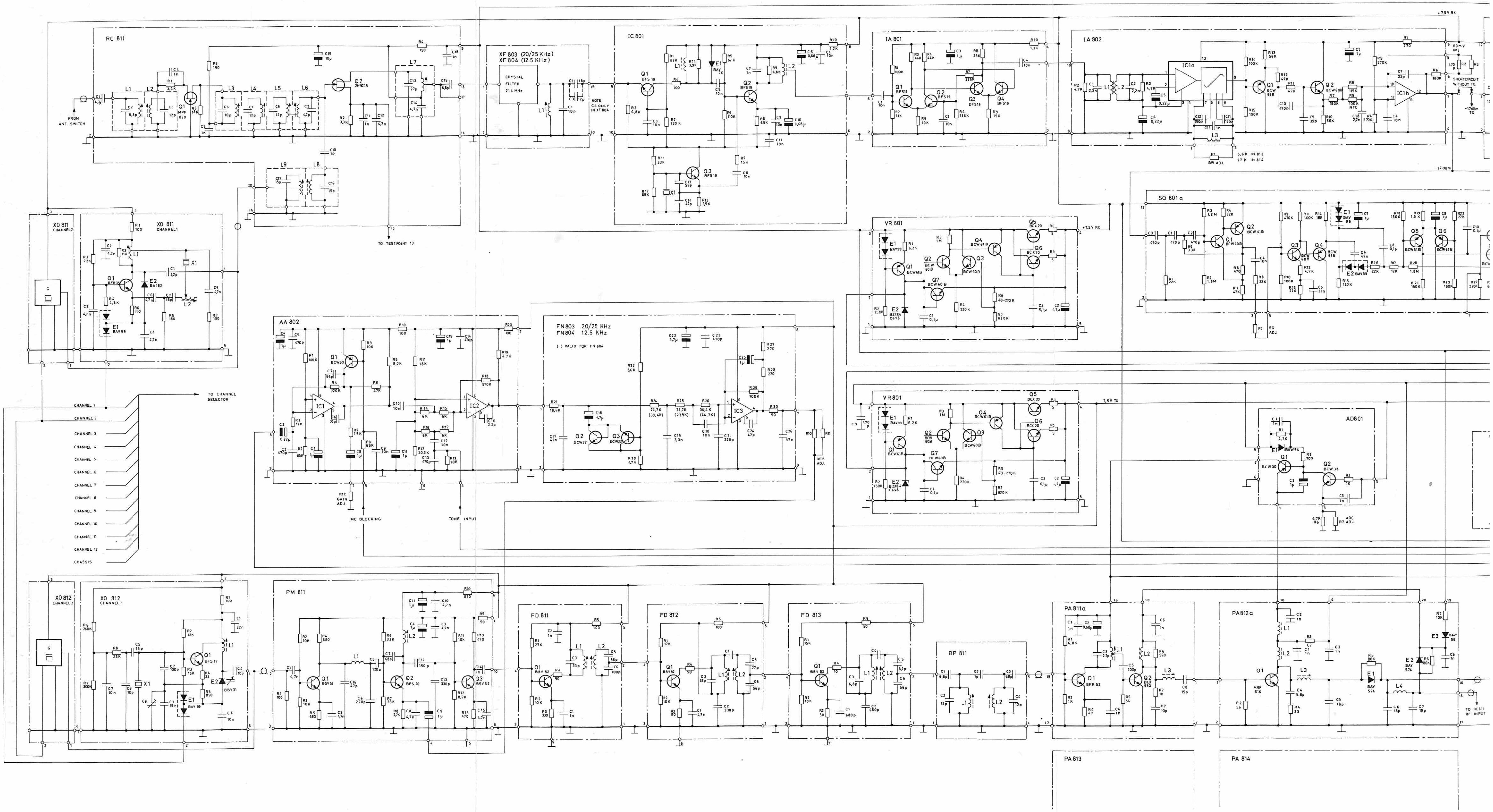


XF 803 (20/25 KHz)
XF 804 (12.5 KHz)
IC 801
IA 801
IA 802
AA 801
CP 801
SQ 801 a
VR 801
FN 803 20/25 KHz
FN 804 12.5 KHz
FD 831
FD 832
BP 831
PA 831
PA 832
FN 831
AF OUTPUT
LS CHASSIS
VOLUME CHASSIS
VOLUME ARM
VOLUME TOP
SQ CANCEL
TESTPOINT 16
MIC BLOCKING
TONE INPUT
CALL INDICATOR
CHANNEL
CHASSIS
J1 ANT
BATT
AFTER USE
Storno
VHF PORTABLE RADIOTELEPHONE
68 - 88 MHz
CQP 833
CQP 834
IS
Schematic is subject to change without notice
D402.115

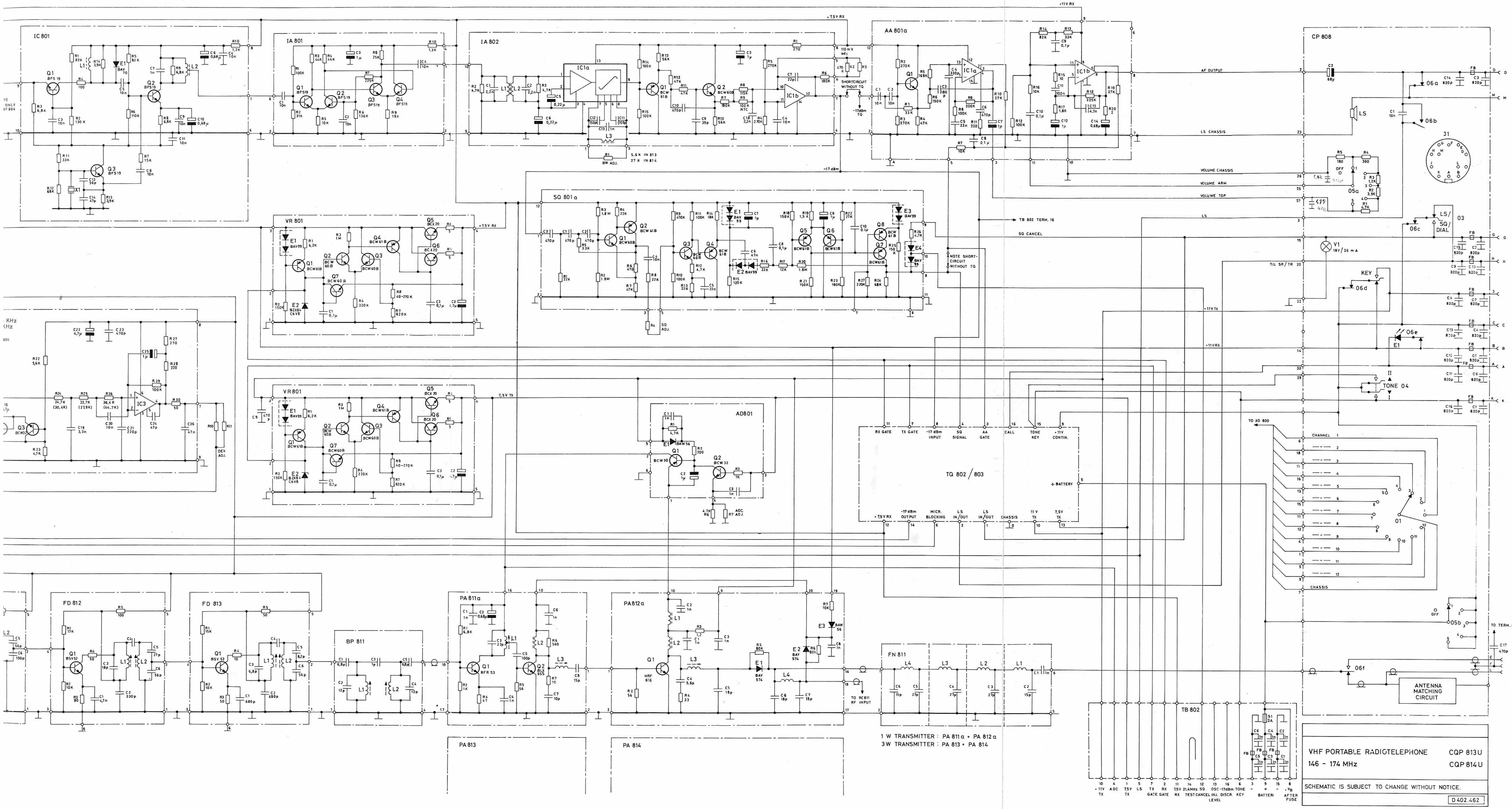


RF AMPLIFIER
MIXER
TRIPLER
XF 803 (20/25 KHz)
IC 801
IA 801
IA 802
XO 811
SQ 801 a
VR 801
AA 802
FN 803 20/25 KHz
TO CHANNEL SELECTOR
X 862
XO 862
PM 861
FD 861
FD 862
FD 863
BP 861
PA 861
PA 862
TO TEST POINT 13
MC BLOCKING
TONE INPUT
C* SUBSTRATE CAPACITOR

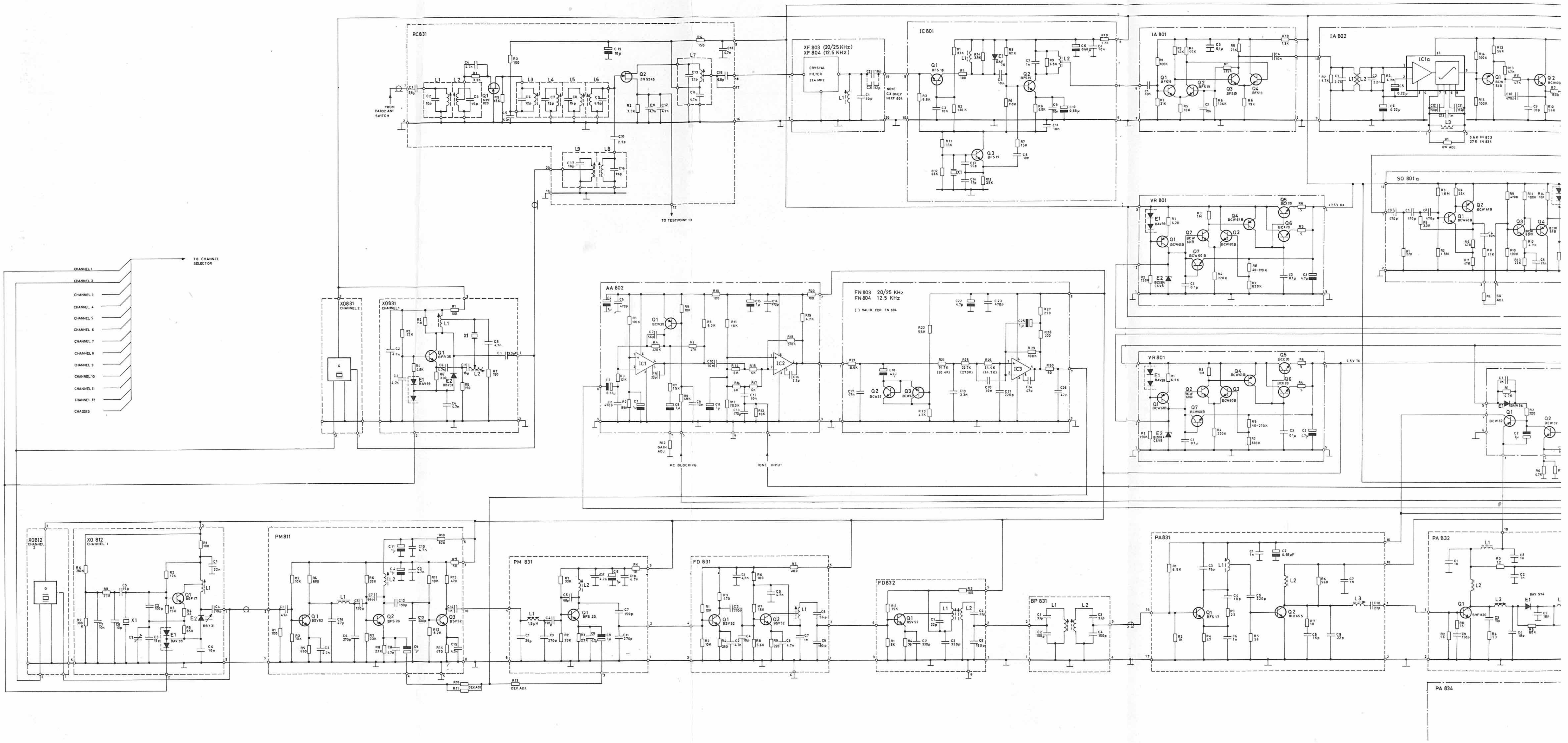

Storno
UHF PORTABLE RADIOTELEPHONE CQP863
420-470 MHz
IS
Schematic is subject to change without notice
D402.116

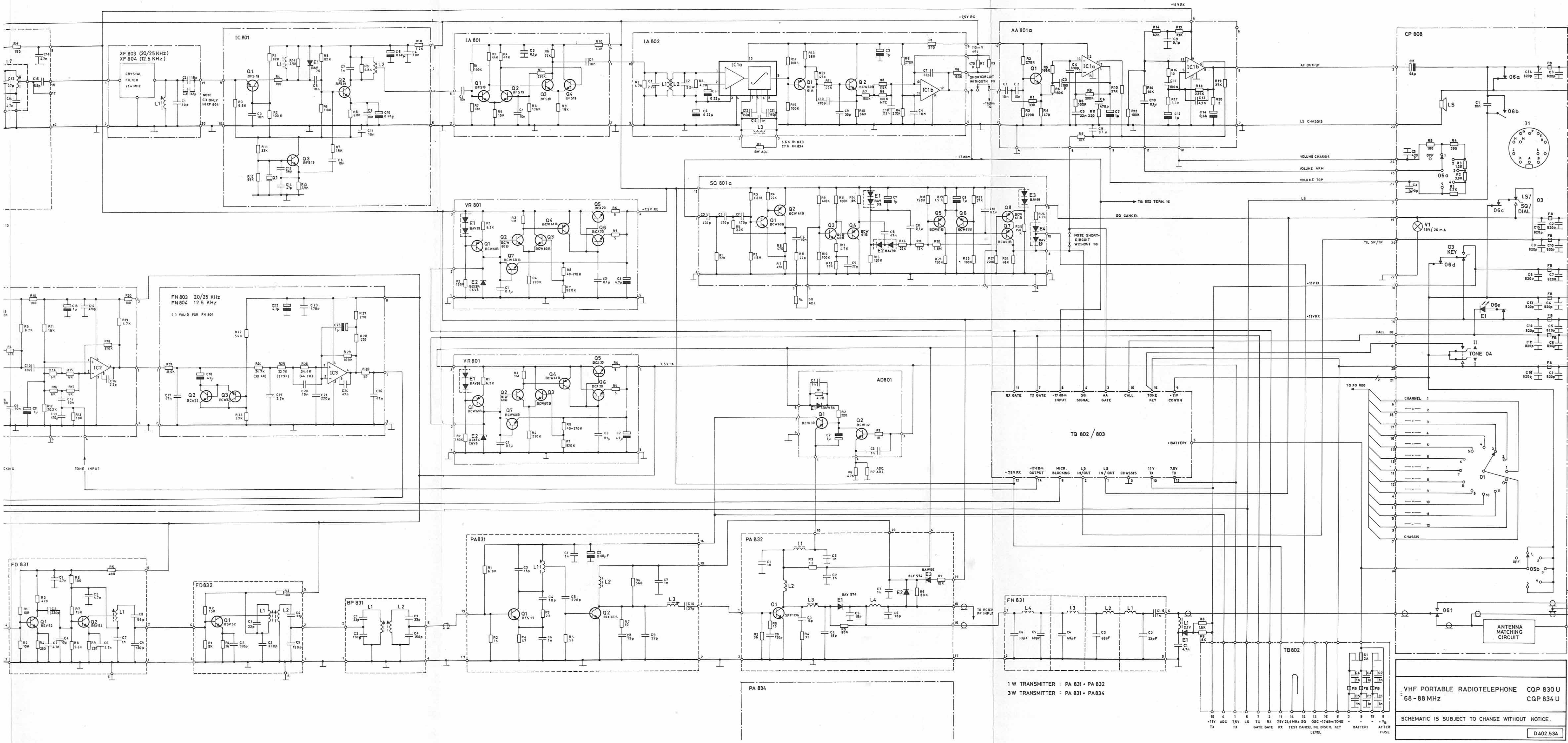


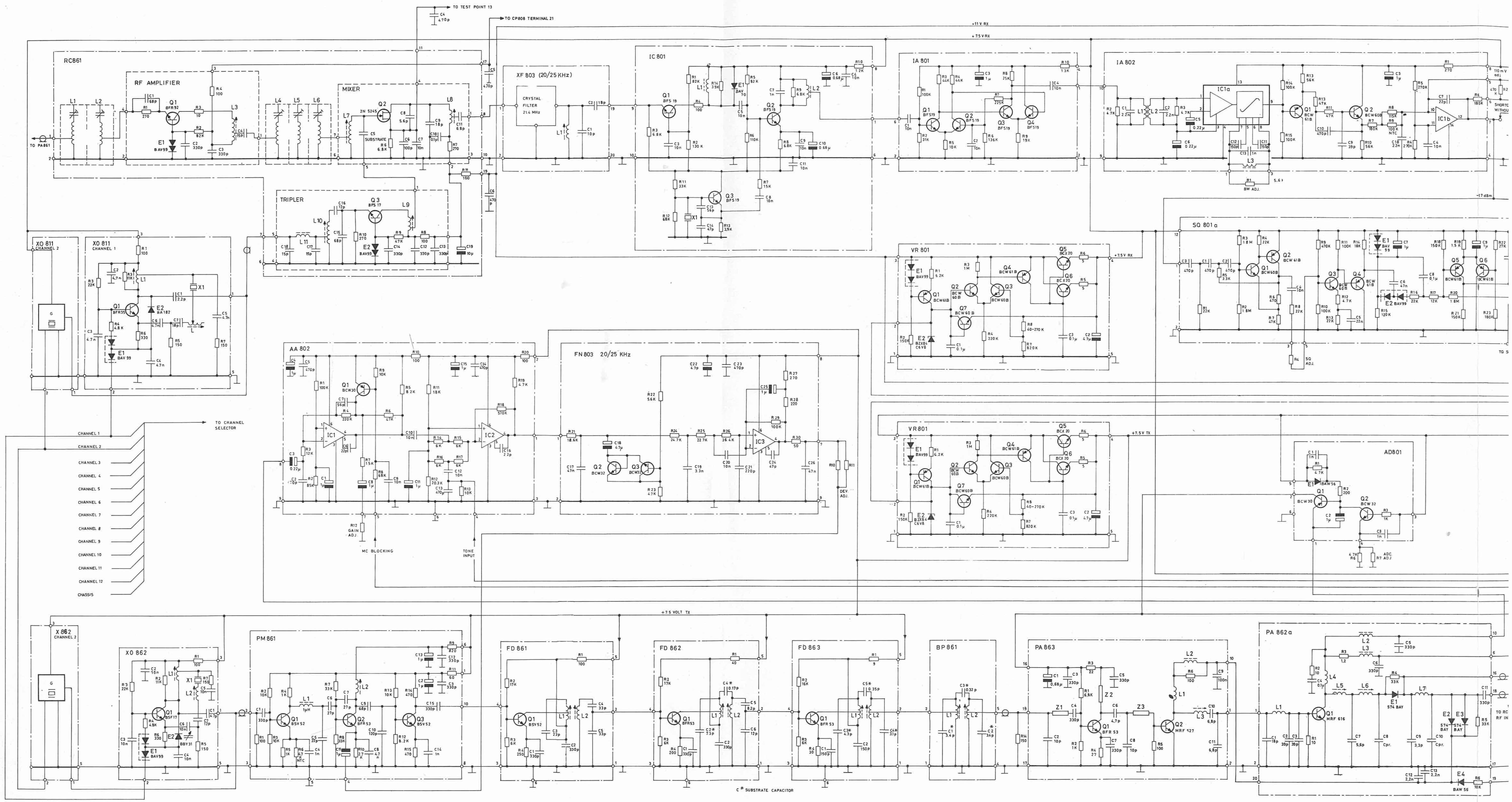
RC 811
FROM ANT SWITCH
TO TESTPOINT 13
XF 803 (20/25 KHz)
XF 804 (12.5 KHz)
CRYSTAL FILTER 21.4 MHz
NOTE C3 ONLY IN XF 804
IC 801
IA 801
IA 802
+7.5V RX
SHORTCIRCUIT WITHOUT TQ
5,6K IN 813
27 K IN 814
BW ADJ.
-17 dBm
XO 811 CHANNEL 2
XO 811 CHANNEL 1
VR 801
SQ 801 a
SQ ADJ.
AA 802
GAIN ADJ
MC BLOCKING
TONE INPUT
FN 803 20/25 KHz
FN 804 12.5 KHz
( ) VALID FOR FN 804
DEV. ADJ.
TO CHANNEL SELECTOR
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHASSIS
+7.5V TX
AD801
ADC R7 ADJ.
XO 812 CHANNEL 2
XO 812 CHANNEL 1
PM 811
FD 811
FD 812
FD 813
BP 811
PA 811a
PA 812a
TO RC 811 RF INPUT
PA 813
PA 814



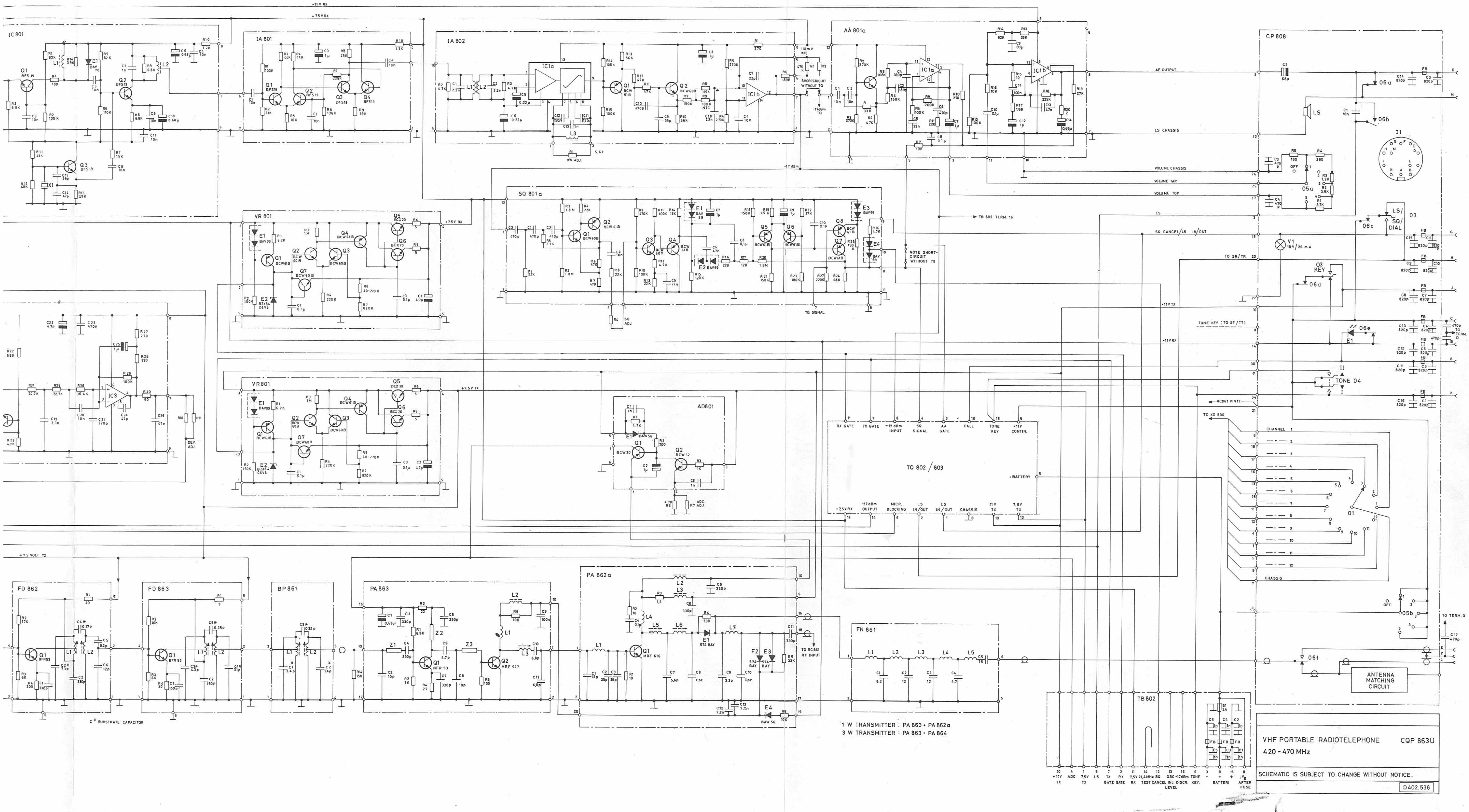
IC 801
IA 801
IA 802
AA 801a
CP 808
VR 801
SQ 801a
AD801
TQ 802 / 803
FD 812
FD 813
BP 811
PA 811a
PA 812a
PA 813
PA 814
FN 811
TB 802
ANTENNA MATCHING CIRCUIT
1 W TRANSMITTER : PA 811a + PA 812a
3 W TRANSMITTER : PA 813 + PA 814
VHF PORTABLE RADIOTELEPHONE
146 - 174 MHz
CQP 813U
CQP 814U
SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.
D402.462

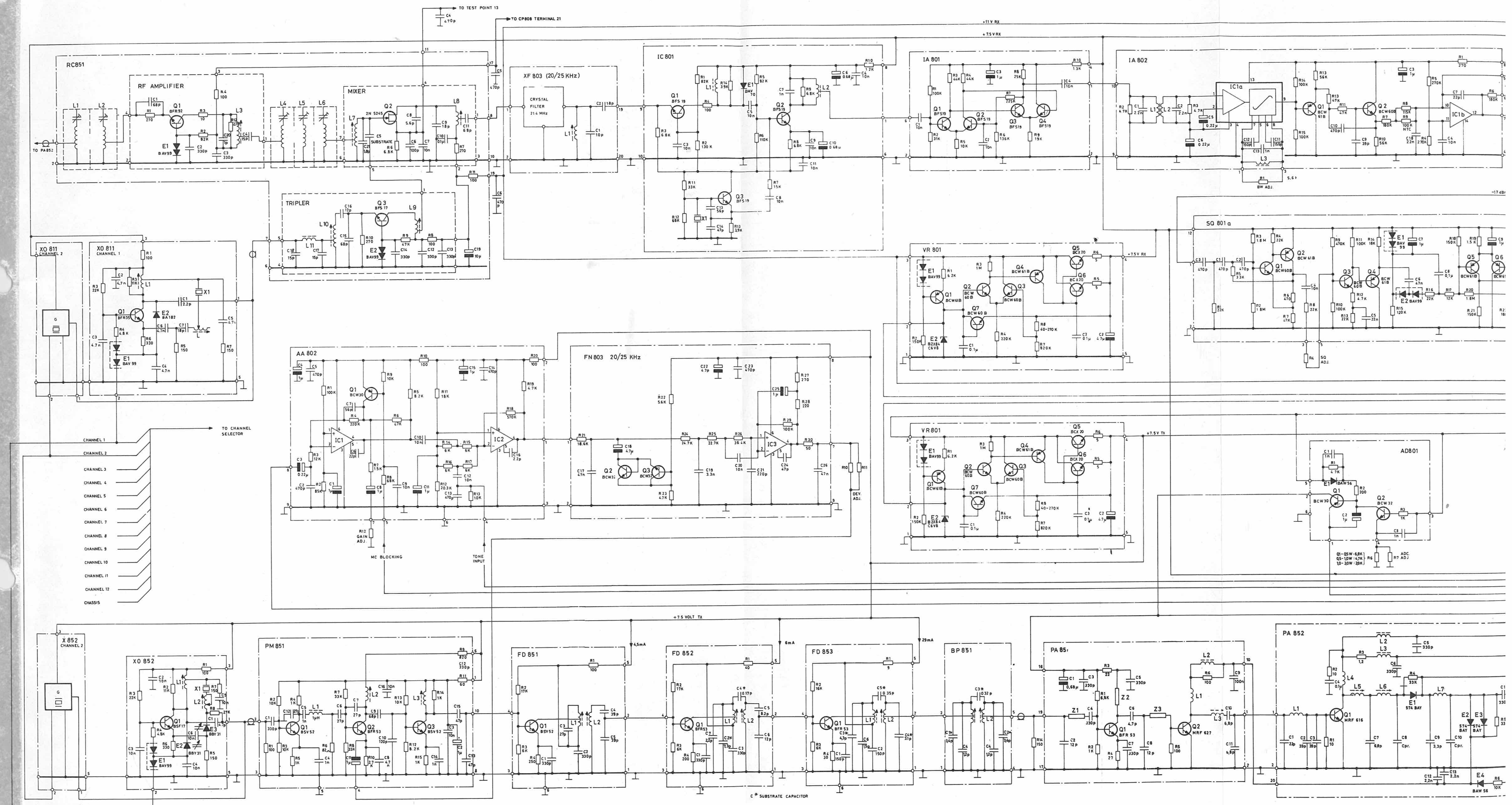

RC831
XF 803 (20/25 KHz)
XF 804 (12.5 KHz)
CRYSTAL FILTER 21.4 MHz
IC 801
IA 801
IA 802
FROM PA832 ANT SWITCH
TO TESTPOINT 13
VR 801
SQ 801 a
TO CHANNEL SELECTOR
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHASSIS
XO831 CHANNEL 2
XO831 CHANNEL 1
AA 802
FN 803 20/25 KHz
FN 804 12.5 KHz
( ) VALID FOR FN 804
MC BLOCKING
TONE INPUT
GAIN ADJ
XO812 CHANNEL 2
XO 812 CHANNEL 1
PM811
PM 831
FD 831
FD832
BP 831
PA831
PA 832
PA 834
DEV ADJ
SQ ADJ
BW ADJ

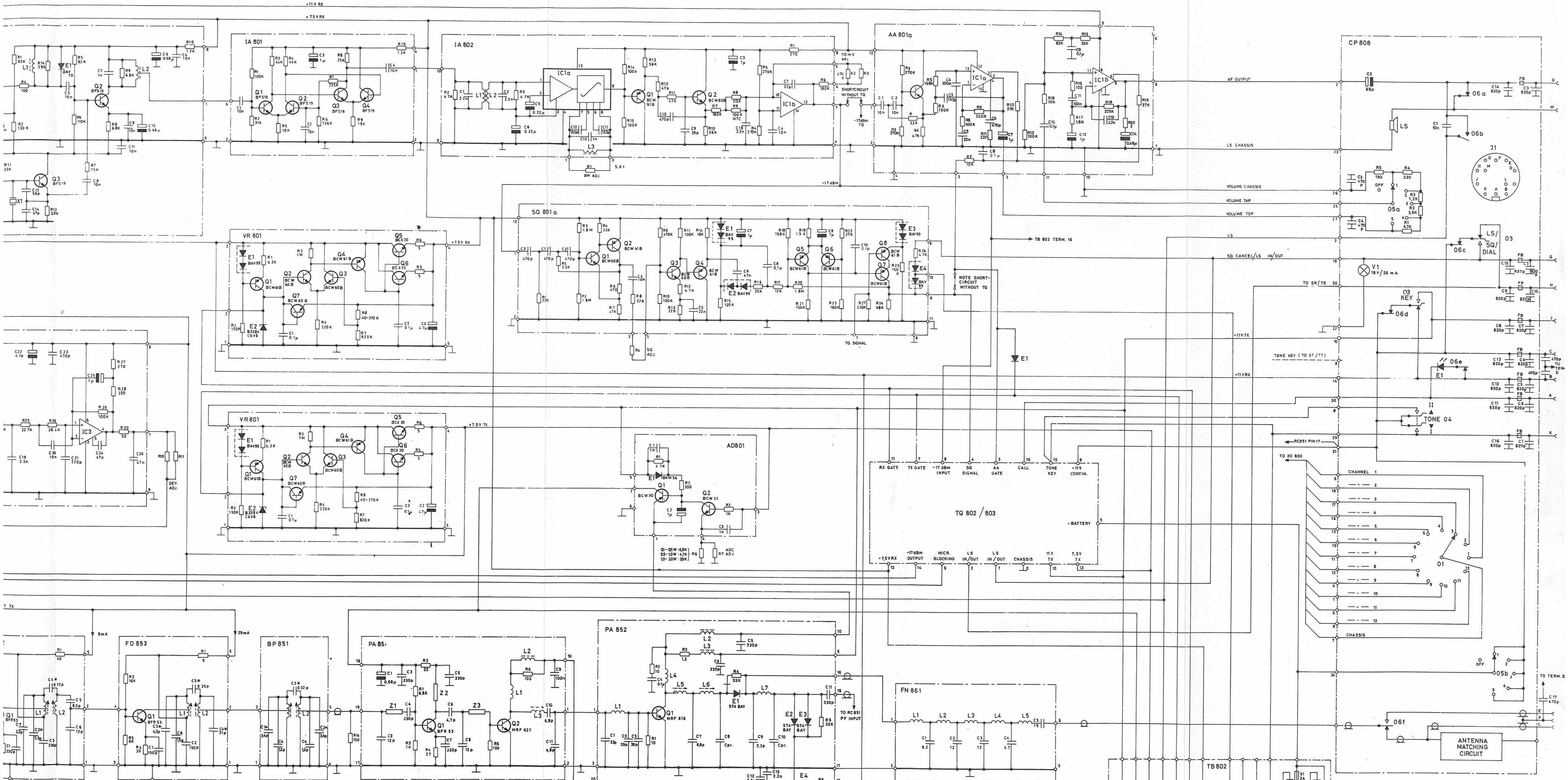

IC 801
IA 801
IA 802
AA 801a
CP 808
SQ 801a
VR 801
FN 803 20/25 KHz
FN 804 12.5 KHz
AD801
TQ 802 / 803
FD 831
FD832
BP 831
PA831
PA 832
PA 834
FN 831
TB802
ANTENNA
MATCHING
CIRCUIT
ANT.
1 W TRANSMITTER : PA 831 + PA 832
3 W TRANSMITTER : PA 831 + PA834
VHF PORTABLE RADIOTELEPHONE CQP 830 U
68 - 88 MHz CQP 834 U
SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.
D402.534



TO TEST POINT 13
TO CP808 TERMINAL 21
+11 V RX
+7.5 V RX
RC861
RF AMPLIFIER
MIXER
TRIPLER
TO PA861
XF 803 (20/25 KHz)
CRYSTAL FILTER 21.4 MHz
IC 801
IA 801
IA 802
BW ADJ.
SQ 801 a
SQ ADJ.
VR 801
XO 811
CHANNEL 2
CHANNEL 1
AA 802
GAIN ADJ.
MC BLOCKING
TONE INPUT
FN 803 20/25 KHz
DEV. ADJ.
AD801
TO CHANNEL SELECTOR
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHASSIS
+7.5 VOLT TX
X 862
XO 862
PM 861
FD 861
FD 862
FD 863
BP 861
PA 863
PA 862 a
C* SUBSTRATE CAPACITOR


VHF PORTABLE RADIOTELEPHONE
CQP 863U
420 - 470 MHz
SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.
D402.536
1 W TRANSMITTER : PA 863 + PA 862a
3 W TRANSMITTER : PA 863 + PA 864
C* SUBSTRATE CAPACITOR


TO TEST POINT 13
TO CP808 TERMINAL 21
RC851
RF AMPLIFIER
MIXER
TRIPLER
TO PA852
XF 803 (20/25 KHz)
CRYSTAL FILTER 21.4 MHz
IC 801
IA 801
IA 802
SQ 801 a
VR 801
XO 811 CHANNEL 2
XO 811 CHANNEL 1
AA 802
FN 803 20/25 KHz
AD801
TO CHANNEL SELECTOR
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHASSIS
GAIN ADJ
MC BLOCKING
TONE INPUT
DEV. ADJ.
+7.5 VOLT TX
X 852 CHANNEL 2
XO 852
PM 851
FD 851
FD 852
FD 853
BP 851
PA 85
PA 852
C* SUBSTRATE CAPACITOR

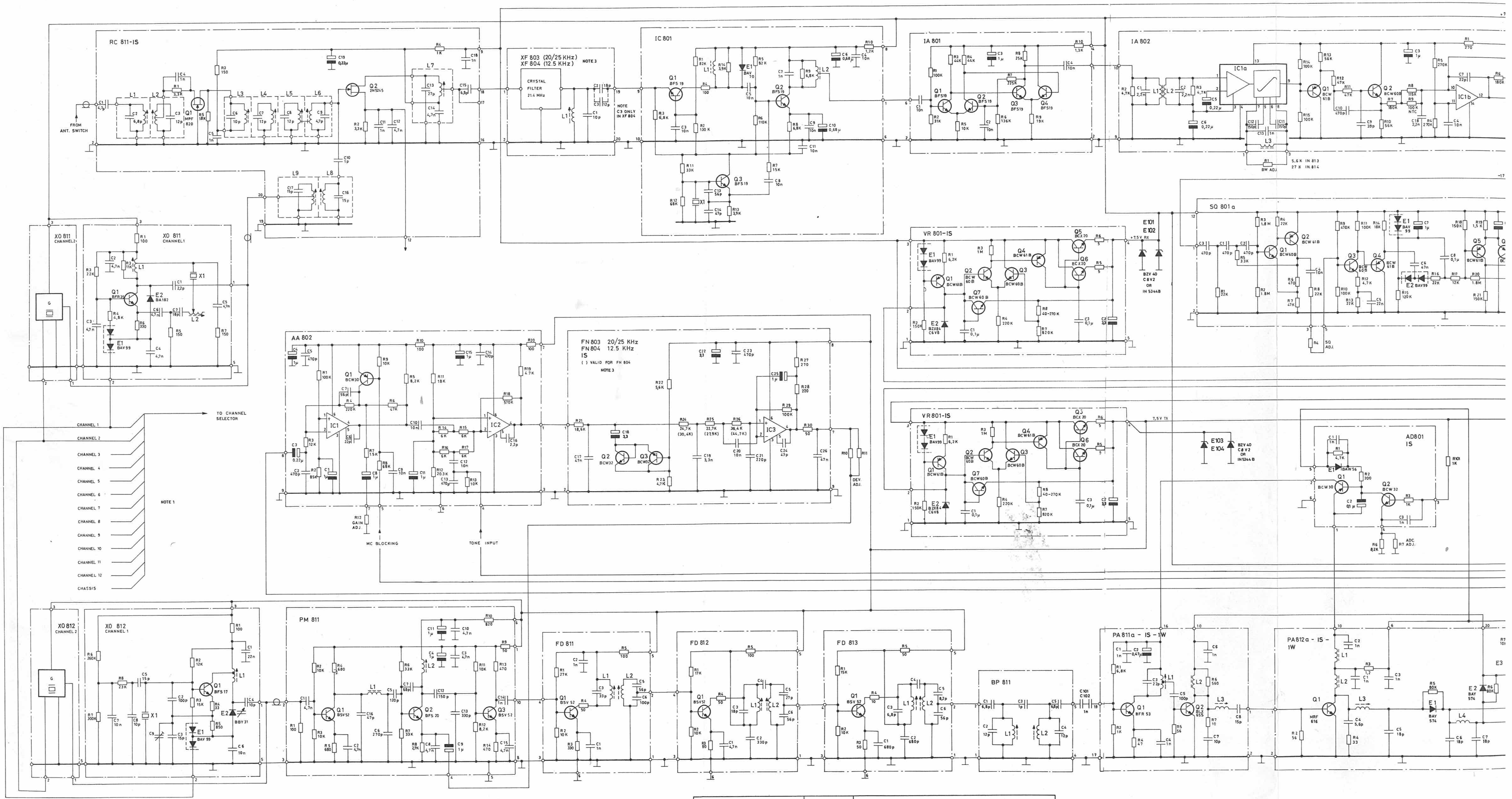


VHF PORTABLE RADIOTELEPHONE CQP 853 U

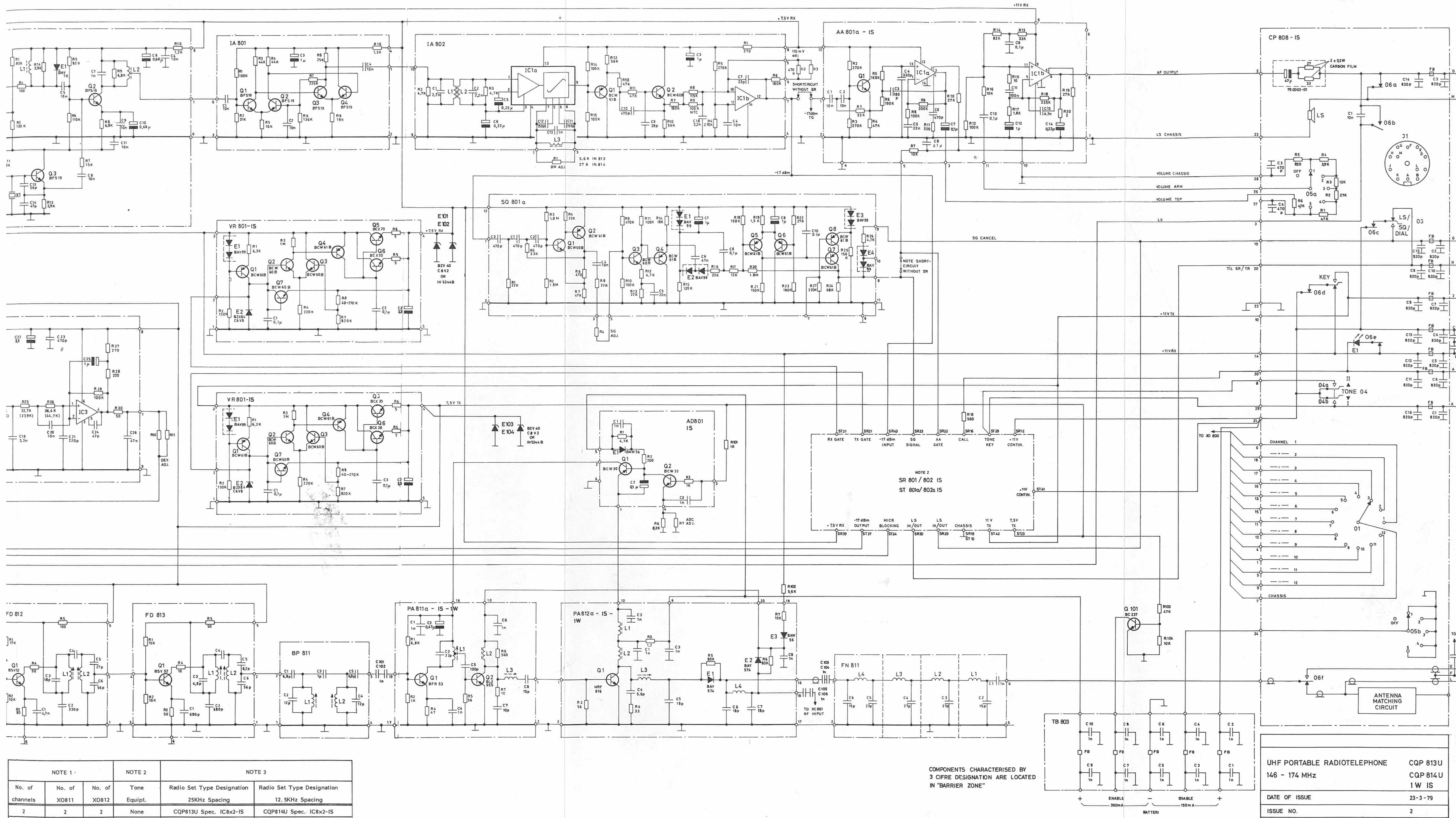
370 – 420 MHz

SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.

D402.686



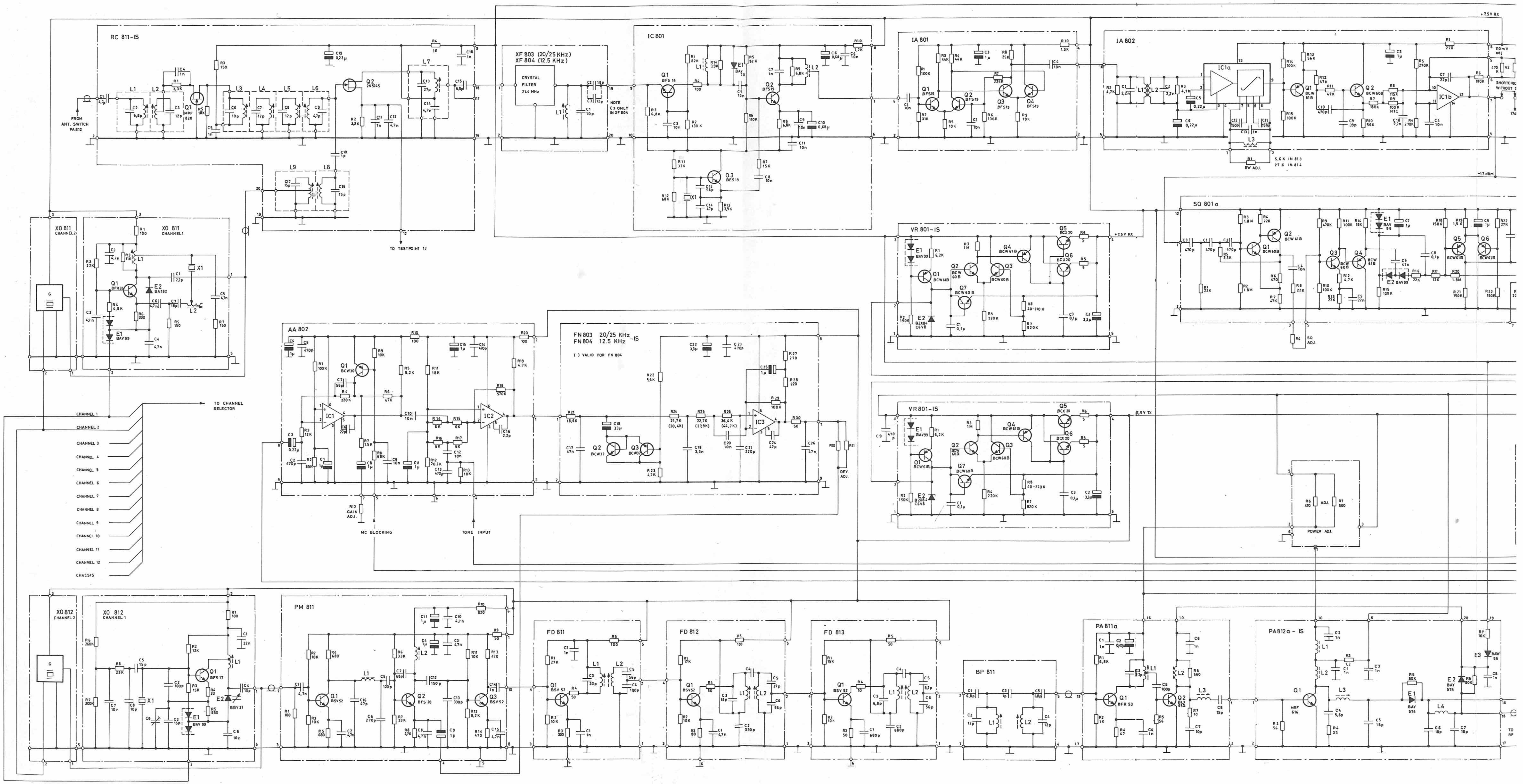
NOTE 1			NOTE 2	NOTE 3	
No. of channels	No. of XO811	No. of XO812	Tone Equipt.	Radio Set Type Designation 25KHz Spacing	Radio Set Type Designation 12.5KHz Spacing
2	2	2	None	CQP813U Spec. IC8x2-IS	CQP814U Spec. IC8x2-IS
4	4	4	None	CQP813U Spec. IC8x4-IS	CQP814U Spec. IC8x4-IS
8	8	8	None	CQP813U Spec. IC8x8-IS	CQP814U Spec. IC8x8-IS
12	12	12	None	CQP813U Spec. IC8x12-IS	CQP814U Spec. IC8x12-IS
2	2	2	SR801/802-IS ST801/801-IS	CQP813U Spec. IC8x2T-IS	CQP814U Spec. IC8x2T-IS
4	4	4	SR801/802-IS ST801/802-IS	CQP813U Spec. IC8x4T-IS	CQP814U Spec. IC8x4T-IS
8	8	8	SR801/802-IS ST801/802-IS	CQP813U Spec. IC8x8T-IS	CQP814U Spec. IC8x8T-IS
12	12	12	SR801/802-IS ST801/802-IS	CQP813U Spec. IC8x12T-IS	CQP814U Spec. IC8x12T-IS



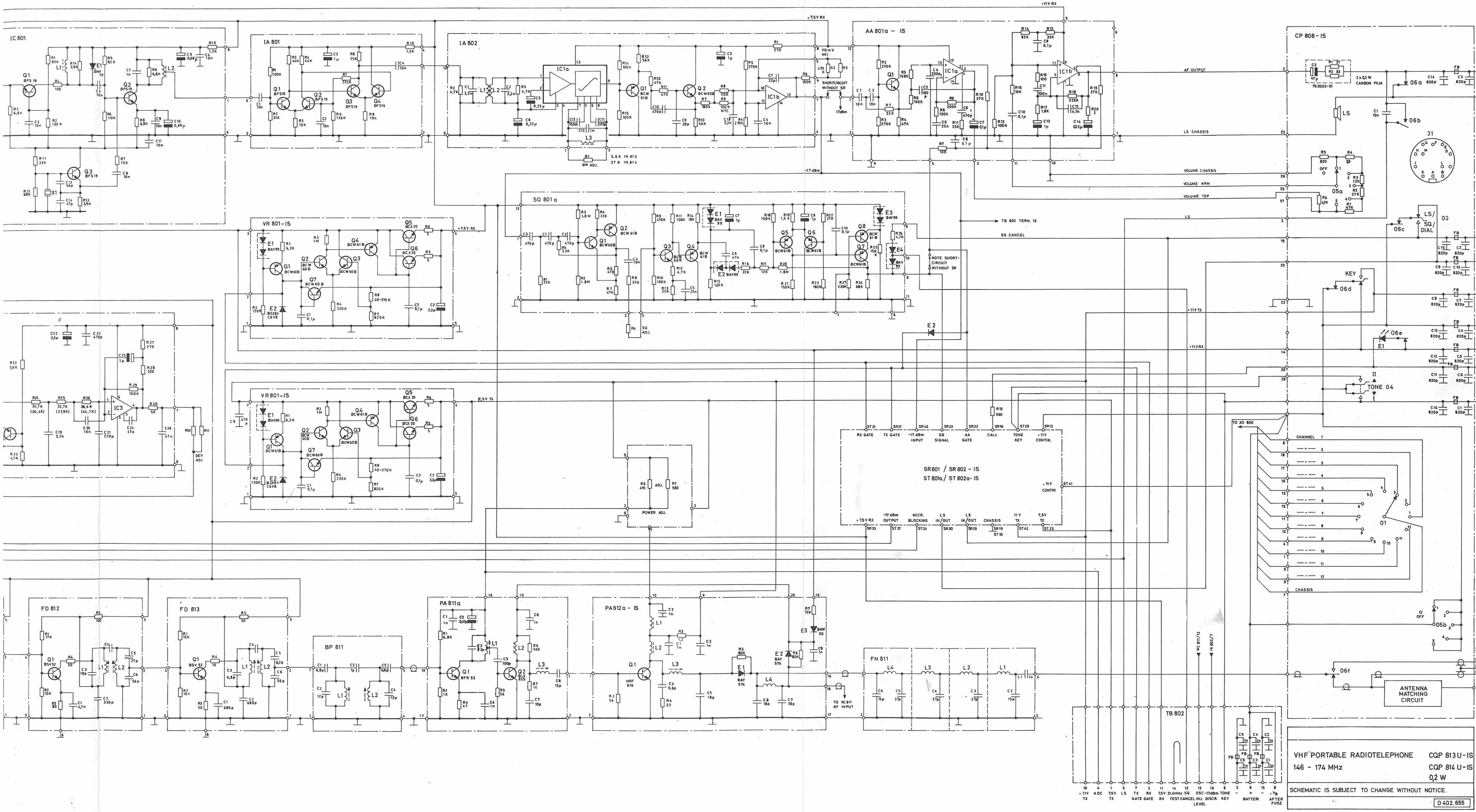
NOTE 1			NOTE 2	NOTE 3	
No. of channels	No. of XO811	No. of XO812	Tone Equipt.	Radio Set Type Designation 25KHz Spacing	Radio Set Type Designation 12,5KHz Spacing
2	2	2	None	CQP813U Spec. IC8x2-IS	CQP814U Spec. IC8x2-IS
4	4	4	None	CQP813U Spec. IC8x4-IS	CQP814U Spec. IC8x4-IS
8	8	8	None	CQP813U Spec. IC8x8-IS	CQP814U Spec. IC8x8-IS
12	12	12	None	CQP813U Spec. IC8x12-IS	CQP814U Spec. IC8x12-IS
2	2	2	SR801/802-IS ST801/801-IS	CQP813U Spec. IC8x2T-IS	CQP814U Spec. IC8x2T-IS
4	4	4	SR801/802-IS ST801/802-IS	CQP813U Spec. IC8x4T-IS	CQP814U Spec. IC8x4T-IS
8	8	8	SR801/802-IS ST801/802-IS	CQP813U Spec. IC8x8T-IS	CQP814U Spec. IC8x8T-IS
12	12	12	SR801/802-IS ST801/802-IS	CQP813U Spec. IC8x12T-IS	CQP814U Spec. IC8x12T-IS

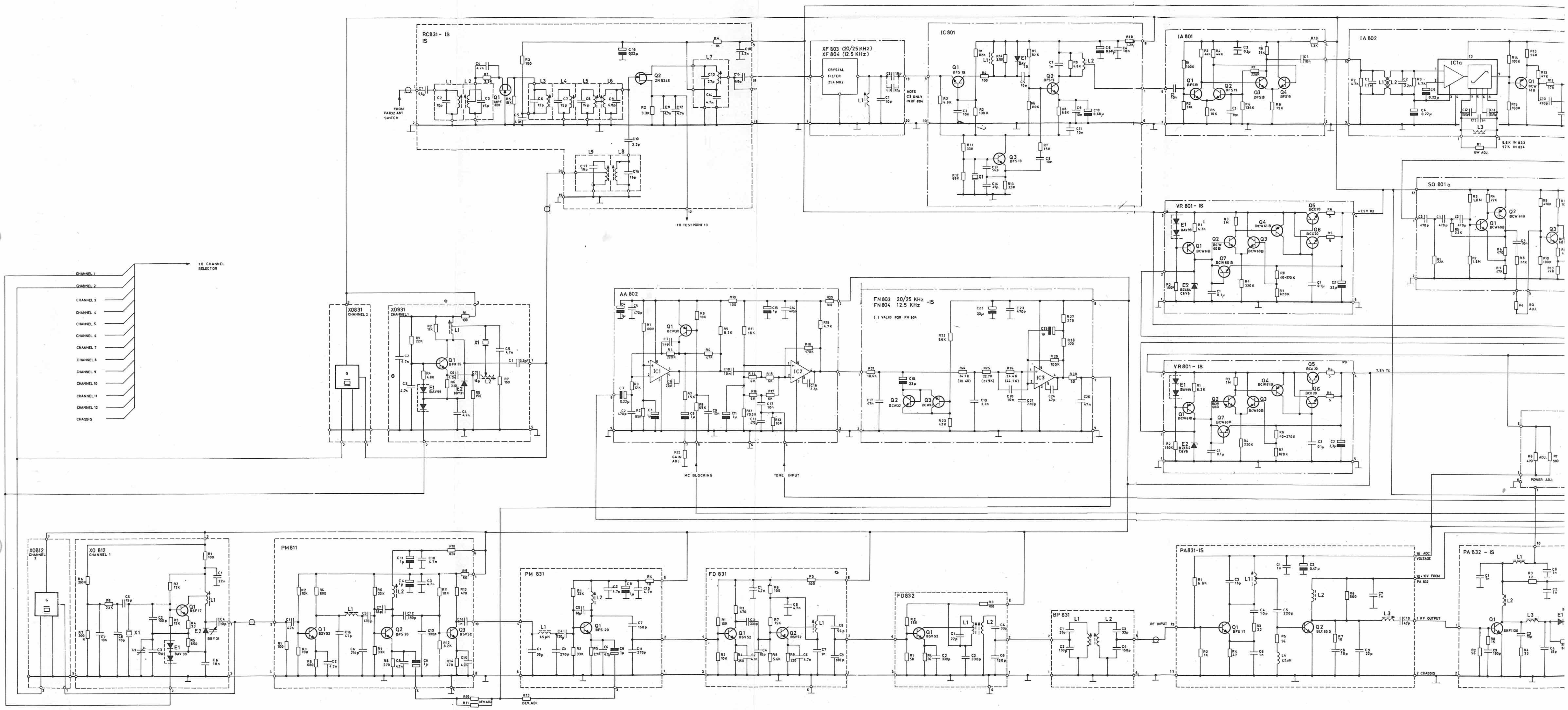
COMPONENTS CHARACTERISED BY 3 CIFRE DESIGNATION ARE LOCATED IN "BARRIER ZONE"

UHF PORTABLE RADIOTELEPHONE 146 - 174 MHz	CQP 813U CQP 814U 1W IS
DATE OF ISSUE	23-3-79
ISSUE NO.	2
DIAGRAM NO.	D402.626/2
Storno	

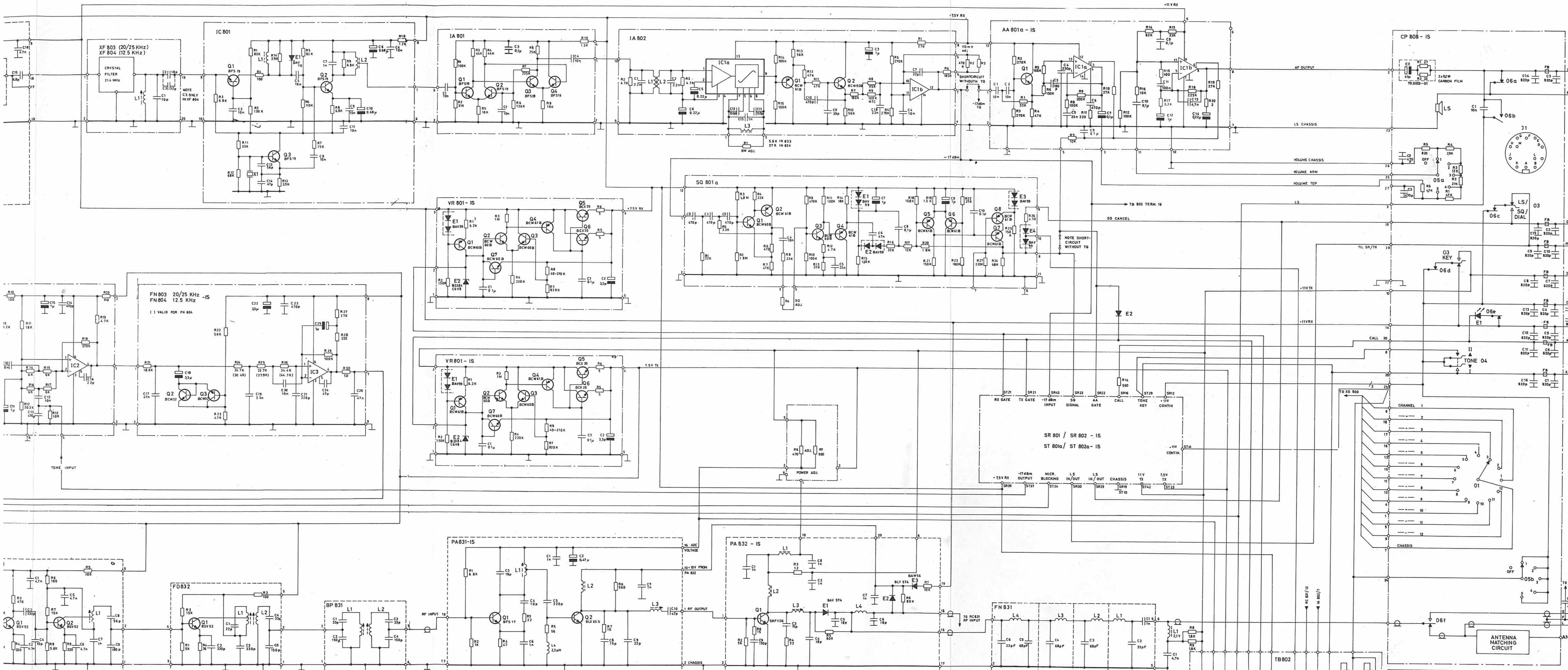


RC 811-IS
FROM ANT. SWITCH PA 812
TO TESTPOINT 13
XF 803 (20/25 KHz)
XF 804 (12.5 KHz)
CRYSTAL FILTER 21.4 MHz
IC 801
IA 801
IA 802
IC1a
IC1b
BW ADJ.
+7.5V RX
XO 811
SQ 801 a
SQ ADJ.
VR 801-IS
AA 802
GAIN ADJ.
MC BLOCKING
TONE INPUT
FN 803 20/25 KHz
FN 804 12.5 KHz -IS
( ) VALID FOR FN 804
DEV. ADJ.
TO CHANNEL SELECTOR
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHASSIS
POWER ADJ.
XO 812
PM 811
FD 811
FD 812
FD 813
BP 811
PA 811a
PA 812a - IS


IC 801
IA 801
IA 802
AA 801a - IS
CP 808 - IS
SQ 801a
VR 801 - IS
VR 801 - IS
SR 801 / SR 802 - IS
ST 801a / ST 802a - IS
POWER ADJ.
FD 812
FD 813
BP 811
PA 811a
PA 812a - IS
FN 811
TB 802
ANTENNA
MATCHING
CIRCUIT
VHF PORTABLE RADIOTELEPHONE
146 - 174 MHz
CQP 813 U - IS
CQP 814 U - IS
0,2 W
SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.
D 402.655



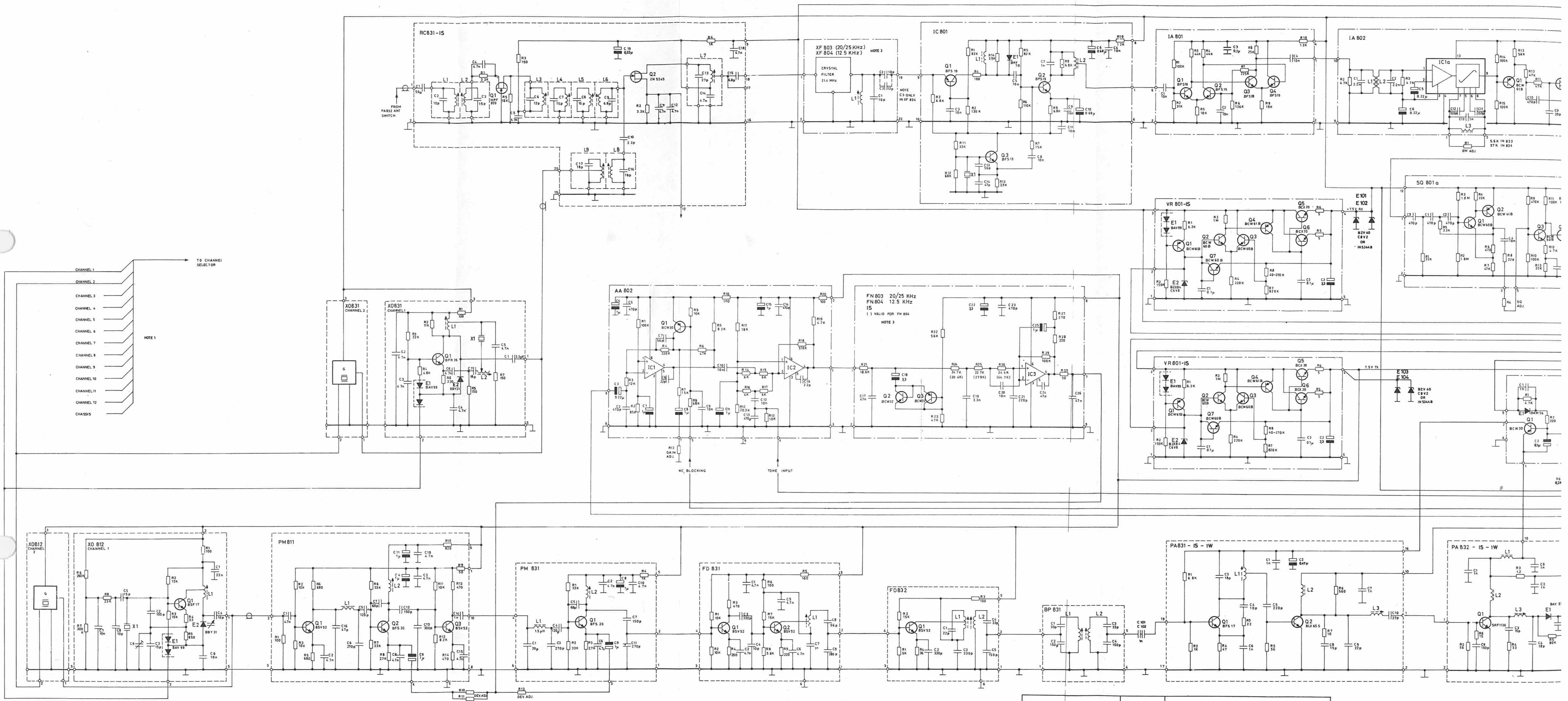
RC831- IS
FROM PA832 ANT SWITCH
TO TESTPOINT 13
XF 803 (20/25 KHz)
XF 804 (12.5 KHz)
CRYSTAL FILTER 21.4 MHz
IC 801
IA 801
IA 802
SQ 801 a
VR 801- IS
TO CHANNEL SELECTOR
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHASSIS
XO831
AA 802
MIC BLOCKING
TONE INPUT
FN 803 20/25 KHz
FN 804 12.5 KHz -IS
POWER ADJ.
XO812
XO 812
PM811
PM 831
FD 831
FD832
BP 831
RF INPUT
PA831-IS
RF OUTPUT
PA 832 - IS
DEV.ADJ.



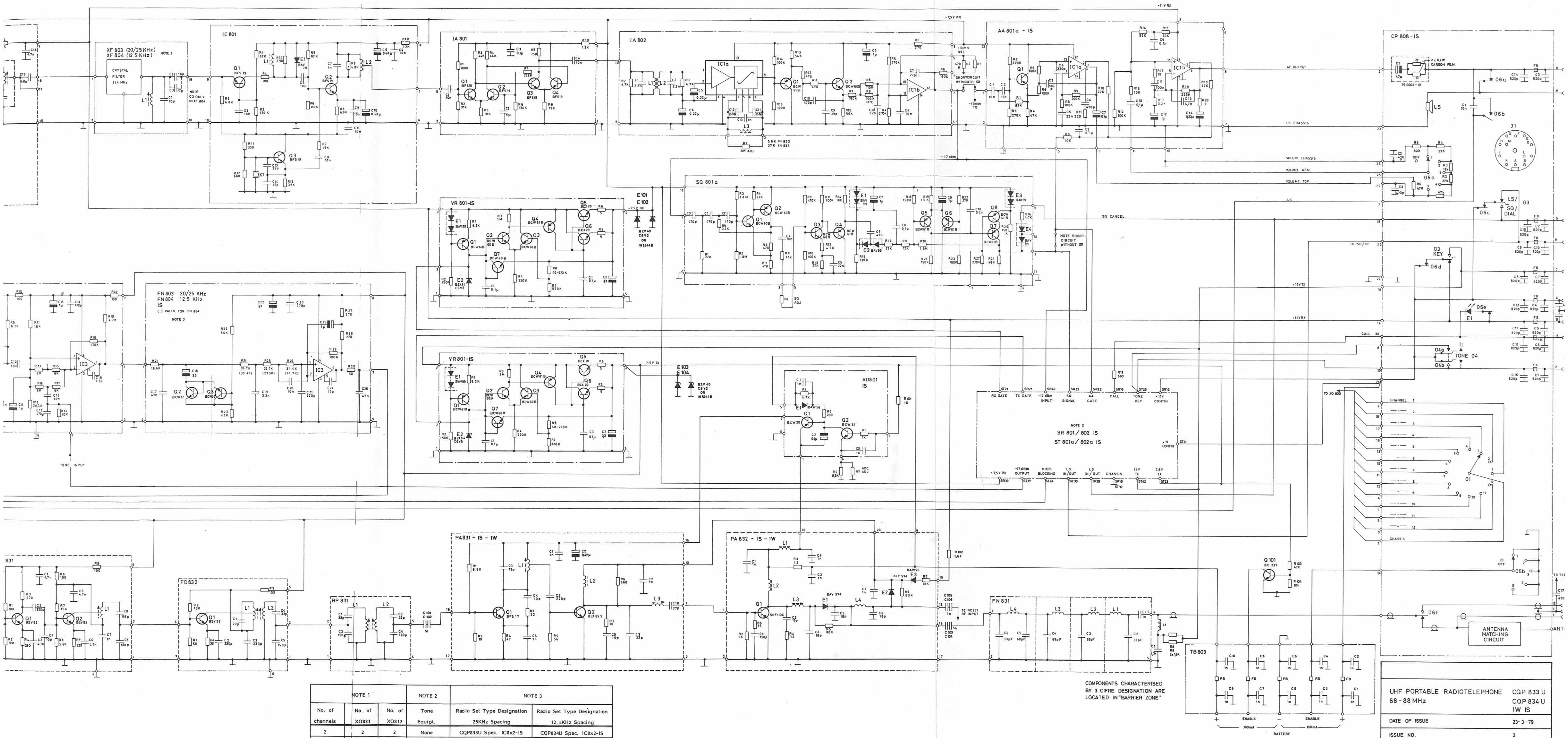
VHF PORTABLE RADIOTELEPHONE CQP 833 U-IS
68-88 MHz CQP 834 U-IS
0,2 W

SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.

D402.654



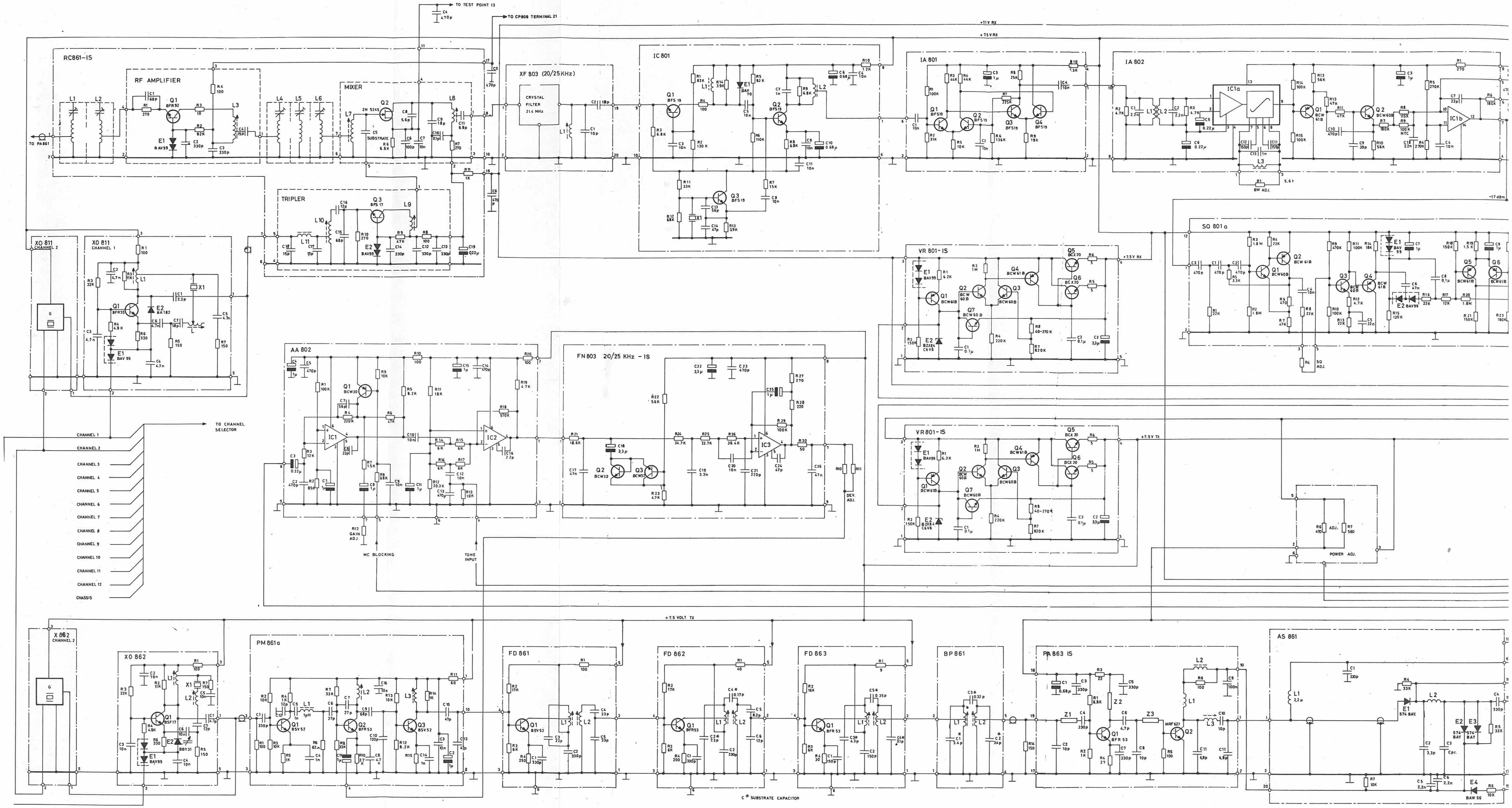
NOTE 1			NOTE 2	NOTE 3	
No. of channels	No. of XO831	No. of XO812	Tone Equipt.	Radio Set Type Designation 25KHz Spacing	Radio Set Type Designation 12.5KHz Spacing
2	2	2	None	CQP833U Spec. IC8x2-IS	CQP834U Spec. IC8x2-IS
4	4	4	None	CQP833U Spec. IC8x4-IS	CQP834U Spec. IC8x4-IS
8	8	8	None	CQP833U Spec. IC8x8-IS	CQP834U Spec. IC8x8-IS
12	12	12	None	CQP833U Spec. IC8x12-IS	CQP834U Spec. IC8x12-IS
2	2	2	SR801/802-IS ST801/801-IS	CQP833U Spec. IC8x2T-IS	CQP834U Spec. IC8x2T-IS
4	4	4	SR801/802-IS ST801/802-IS	CQP833U Spec. IC8x4T-IS	CQP834U Spec. IC8x4T-IS
8	8	8	SR801/802-IS ST801/802-IS	CQP833U Spec. IC8x8T-IS	CQP834U Spec. IC8x8T-IS
12	12	12	SR801/802-IS ST801/802-IS	CQP833U Spec. IC8x12T-IS	CQP834U Spec. IC8x12T-IS



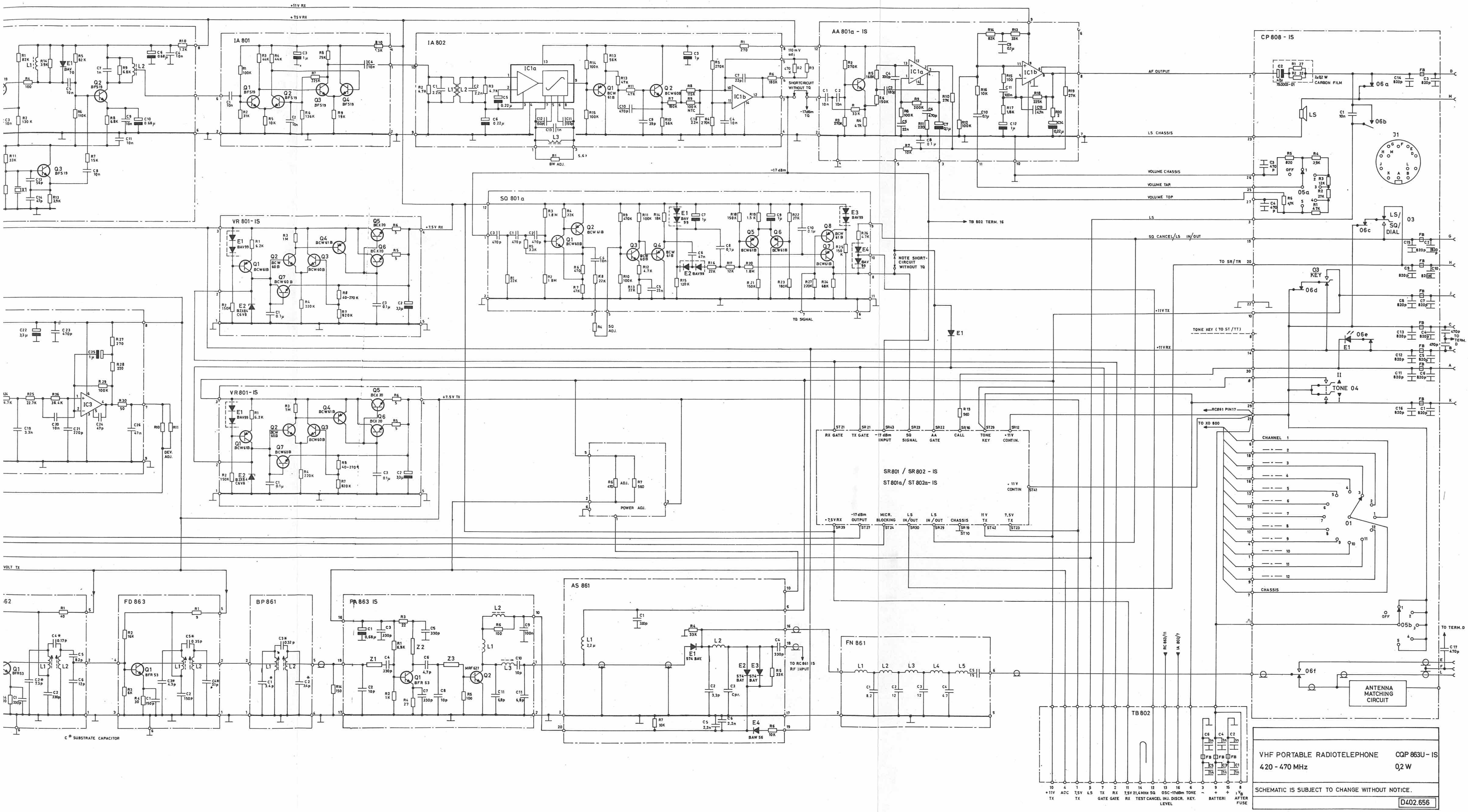
COMPONENTS CHARACTERISED BY 3 CIFRE DESIGNATION ARE LOCATED IN "BARRIER ZONE"

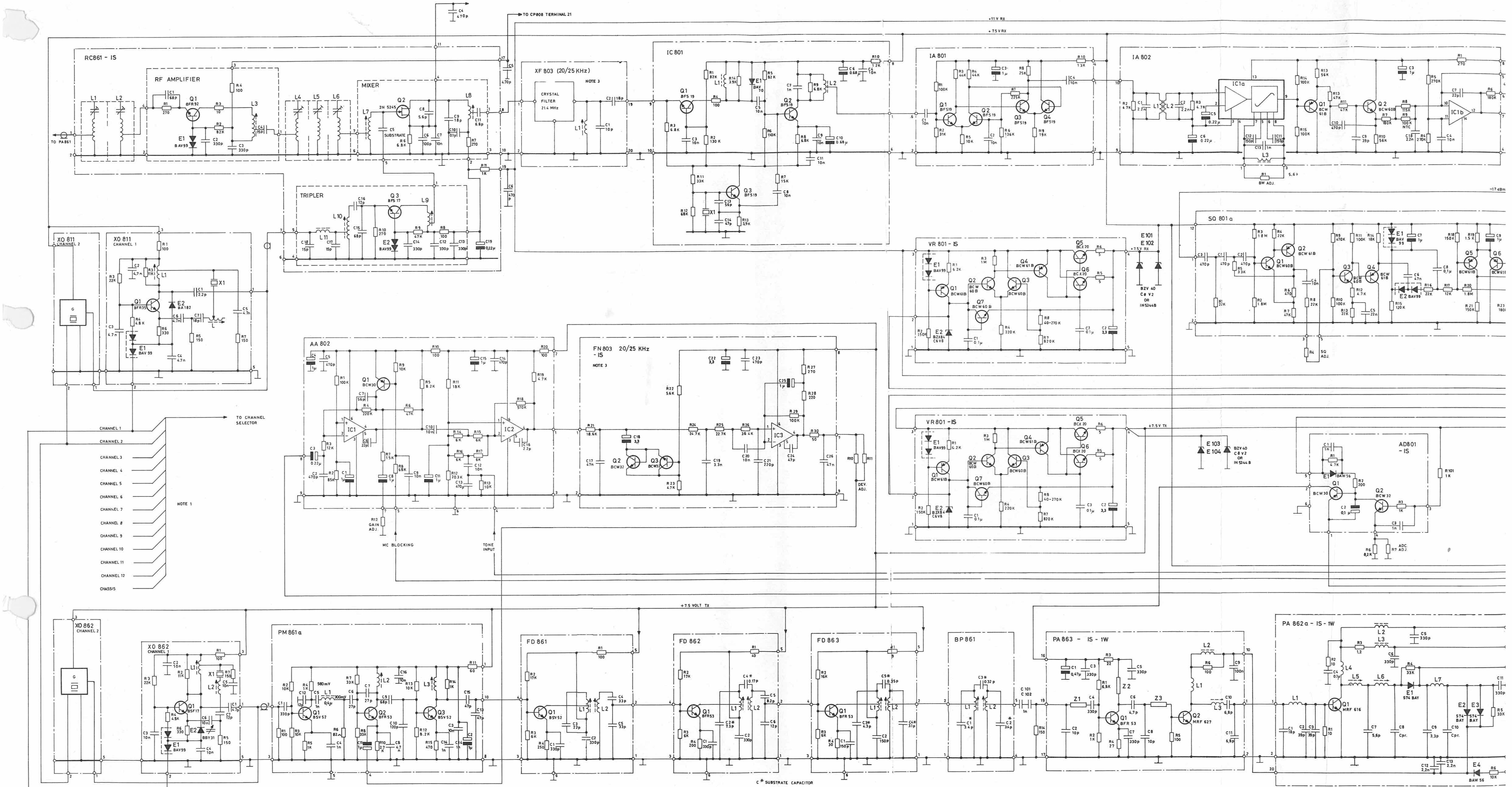
NOTE 1			NOTE 2	NOTE 3	
No. of channels	No. of XO831	No. of XO812	Tone Equipt.	Radio Set Type Designation 25KHz Spacing	Radio Set Type Designation 12.5KHz Spacing
2	2	2	None	CQP833U Spec. IC8x2-IS	CQP834U Spec. IC8x2-IS
4	4	4	None	CQP833U Spec. IC8x4-IS	CQP834U Spec. IC8x4-IS
8	8	8	None	CQP833U Spec. IC8x8-IS	CQP834U Spec. IC8x8-IS
12	12	12	None	CQP833U Spec. IC8x12-IS	CQP834U Spec. IC8x12-IS
2	2	2	SR801/802-IS ST801/801-IS	CQP833U Spec. IC8x2T-IS	CQP834U Spec. IC8x2T-IS
4	4	4	SR801/802-IS ST801/802-IS	CQP833U Spec. IC8x4T-IS	CQP834U Spec. IC8x4T-IS
8	8	8	SR801/802-IS ST801/802-IS	CQP833U Spec. IC8x8T-IS	CQP834U Spec. IC8x8T-IS
12	12	12	SR801/802-IS ST801/802-IS	CQP833U Spec. IC8x12T-IS	CQP834U Spec. IC8x12T-IS

UHF PORTABLE RADIOTELEPHONE 68 - 88 MHz	CQP 833 U CQP 834 U 1W IS
DATE OF ISSUE	23-3-79
ISSUE NO.	2
DIAGRAM NO.	D402.634/2
Storno	

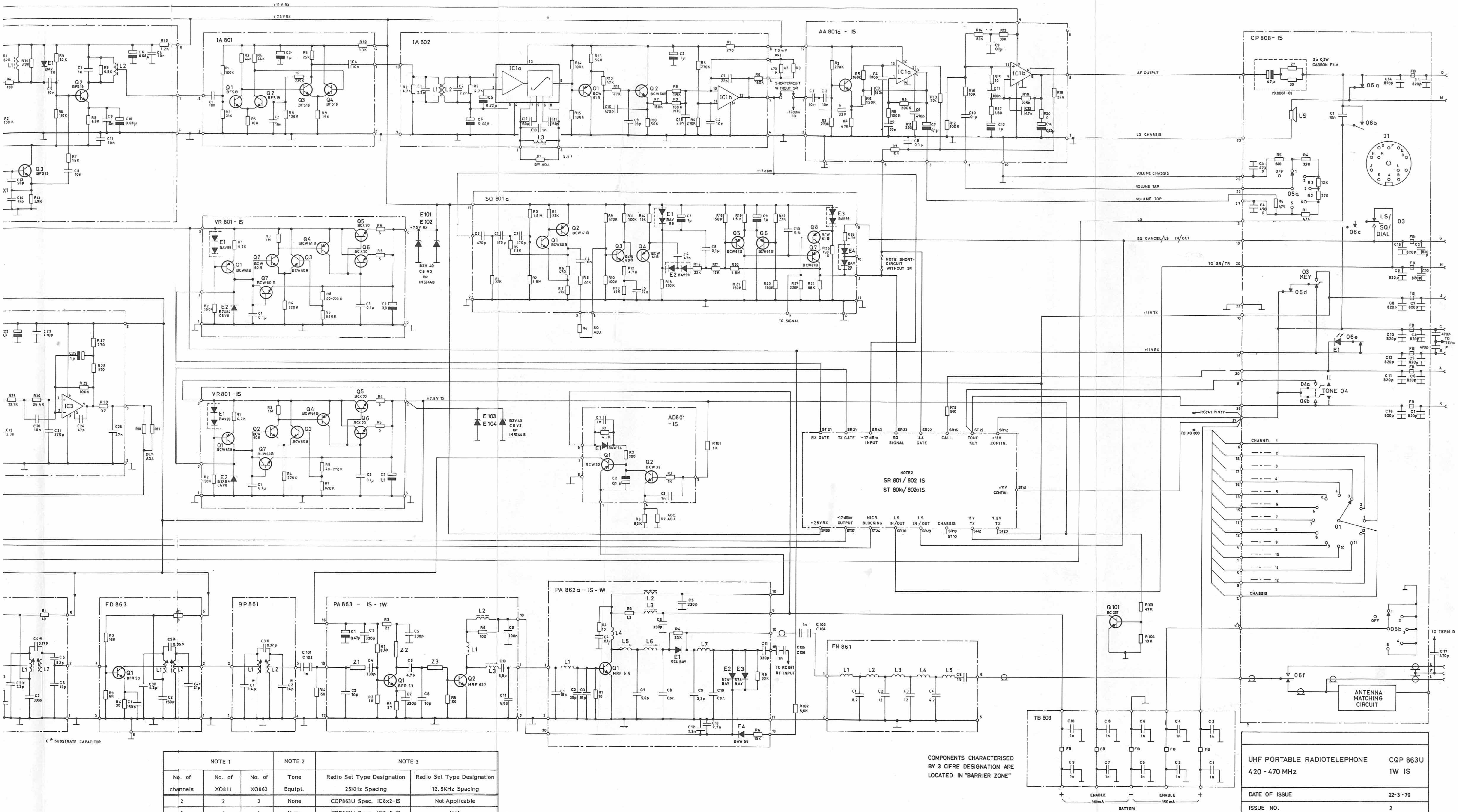


TO TEST POINT 13
TO CP808 TERMINAL 21
+11 V RX
+7.5 V RX
RC861-IS
RF AMPLIFIER
MIXER
TRIPLER
TO PA861
XF 803 (20/25KHz)
CRYSTAL FILTER 21.4 MHz
IC 801
IA 801
IA 802
BW ADJ.
XO 811 CHANNEL 2
XO 811 CHANNEL 1
TO CHANNEL SELECTOR
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHASSIS
AA 802
GAIN ADJ.
MC BLOCKING
TONE INPUT
FN 803 20/25 KHz - IS
DEV. ADJ.
VR 801-IS
VR 801-IS
SQ 801a
SQ ADJ.
POWER ADJ.
+7.5 VOLT TX
X 862 CHANNEL 2
XO 862
PM 861a
FD 861
FD 862
FD 863
BP 861
PA 863 IS
AS 861
C* SUBSTRATE CAPACITOR


VHF PORTABLE RADIOTELEPHONE CQP 863U - IS
420 - 470 MHz 0,2 W
SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.
D402.656
CP 808 - IS
AA 801a - IS
IA 801
IA 802
SQ 801a
VR 801 - IS
SR801 / SR802 - IS
ST801a / ST802a - IS
POWER ADJ.
FD 863
BP 861
PA 863 IS
AS 861
FN 861
TB 802
ANTENNA MATCHING CIRCUIT
C* SUBSTRATE CAPACITOR



NOTE 1			NOTE 2	NOTE 3	
No. of channels	No. of XO811	No. of XO862	Tone Equipt.	Radio Set Type Designation 25KHz Spacing	Radio Set Type Designation 12.5KHz Spacing
2	2	2	None	CQP863U Spec. IC8x2-IS	Not Applicable
4	4	4	None	CQP863U Spec. IC8x4-IS	N/A
8	8	8	None	CQP863U Spec. IC8x8-IS	N/A
12	12	12	None	CQP863U Spec. IC8x12-IS	N/A
2	2	2	SR801/802-IS ST801/801-IS	CQP863U Spec. IC8x2T-IS	N/A
4	4	4	SR801/802-IS ST801/802-IS	CQP863U Spec. IC8x4T-IS	N/A
8	8	8	SR801/802-IS ST801/802-IS	CQP863U Spec. IC8x8T-IS	N/A
12	12	12	SR801/802-IS TR801/802-IS	CQP863U Spec. IC8x12T-IS	N/A

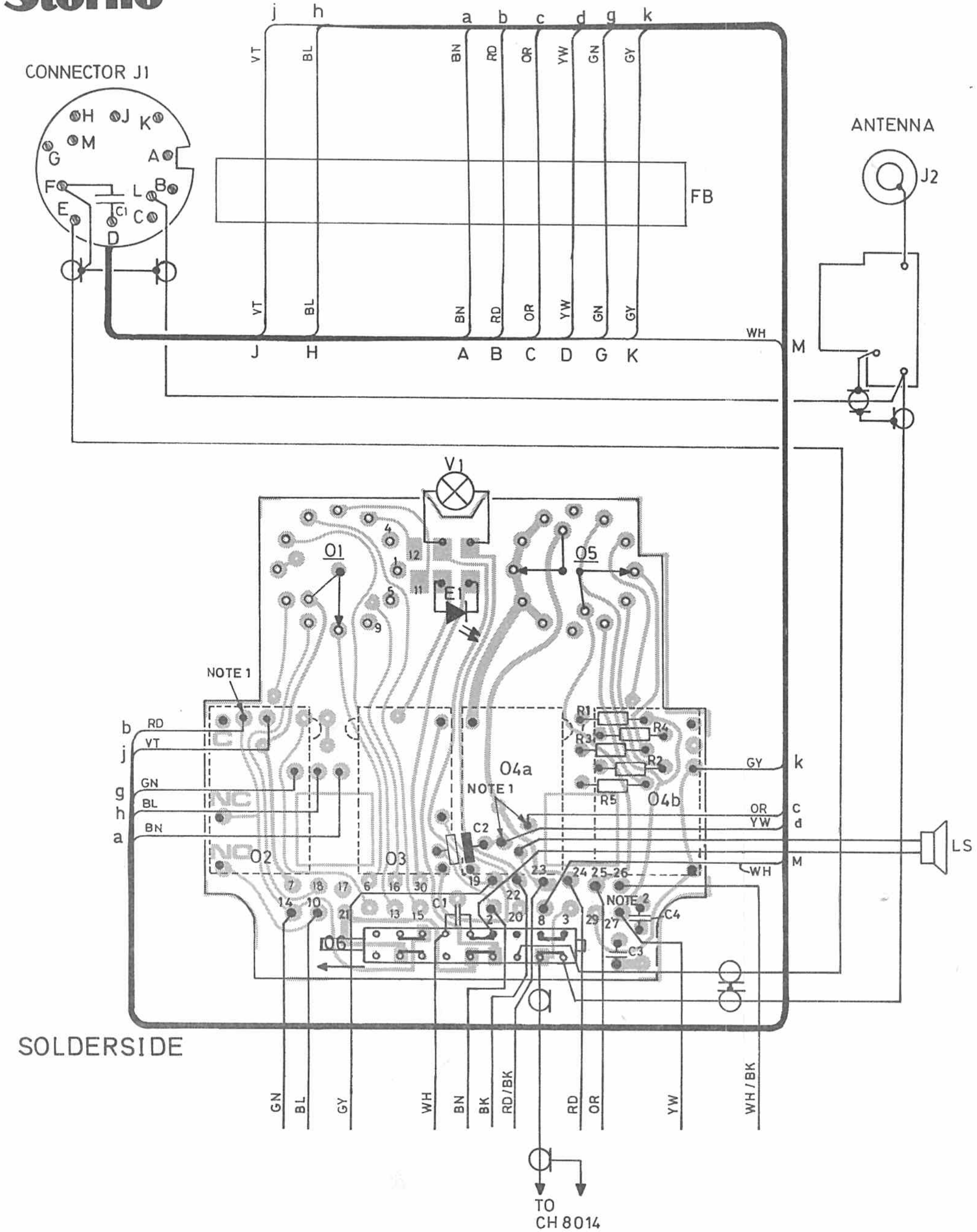


COMPONENTS CHARACTERISED BY 3 CIFRE DESIGNATION ARE LOCATED IN "BARRIER ZONE"

UHF PORTABLE RADIOTELEPHONE 420 - 470 MHz	CQP 863U 1W IS
DATE OF ISSUE	22-3-79
ISSUE NO.	2
DIAGRAM NO.	D402.625/2
Storno	

NOTE 1			NOTE 2	NOTE 3	
No. of channels	No. of XO811	No. of XO862	Tone Equipt.	Radio Set Type Designation 25KHz Spacing	Radio Set Type Designation 12.5KHz Spacing
2	2	2	None	CQP863U Spec. IC8x2-IS	Not Applicable
4	4	4	None	CQP863U Spec. IC8x4-IS	N/A
8	8	8	None	CQP863U Spec. IC8x8-IS	N/A
12	12	12	None	CQP863U Spec. IC8x12-IS	N/A
2	2	2	SR801/802-IS ST801/801-IS	CQP863U Spec. IC8x2T-IS	N/A
4	4	4	SR801/802-IS ST801/802-IS	CQP863U Spec. IC8x4T-IS	N/A
8	8	8	SR801/802-IS ST801/802-IS	CQP863U Spec. IC8x8T-IS	N/A
12	12	12	SR801/802-IS TR801/802-IS	CQP863U Spec. IC8x12T-IS	N/A

Storno

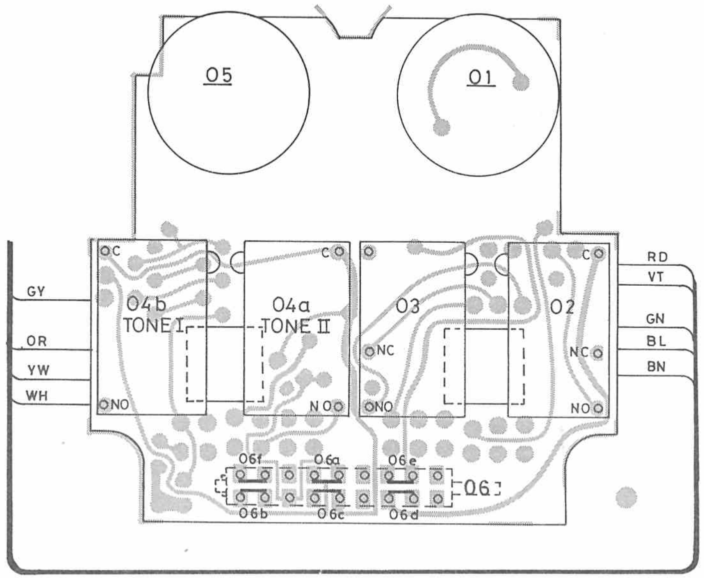


SOLDERSIDE

Storno

NOTE 1:
L1, L2, L3, VALUE 0,27μ, CODE NO. 19A700024 P6
MOUNTED IN CQP860U ONLY

NOTE 2:
R6, 27K (ON TERMINAL 27)
MOUNTED ONLY IN CP808IS

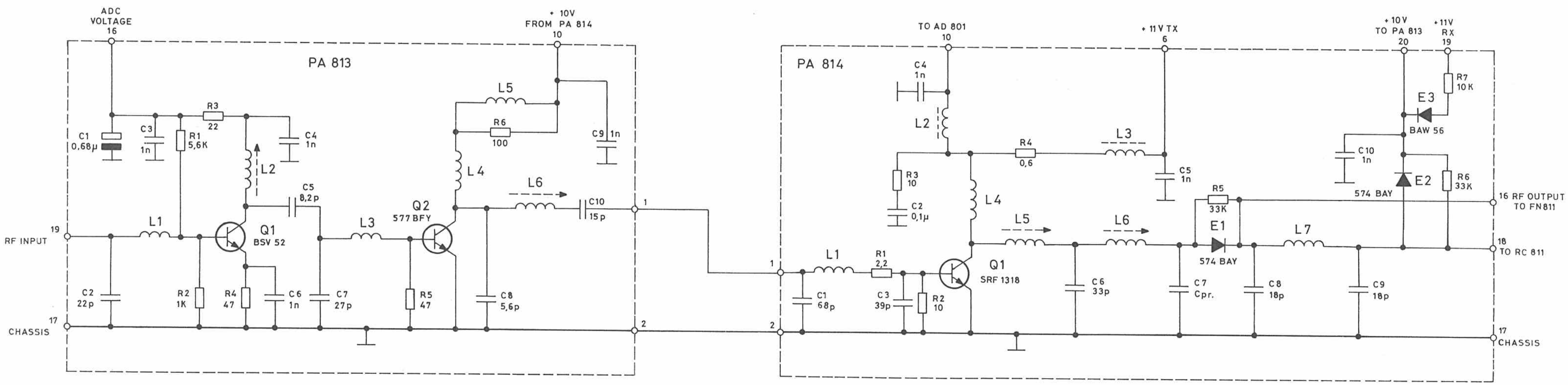


SWITCHSIDE

CONTROL HEAD CP808,
CP808 0,2W-IS, CP808 1W-IS, CP80XX
WIRING

D403.247

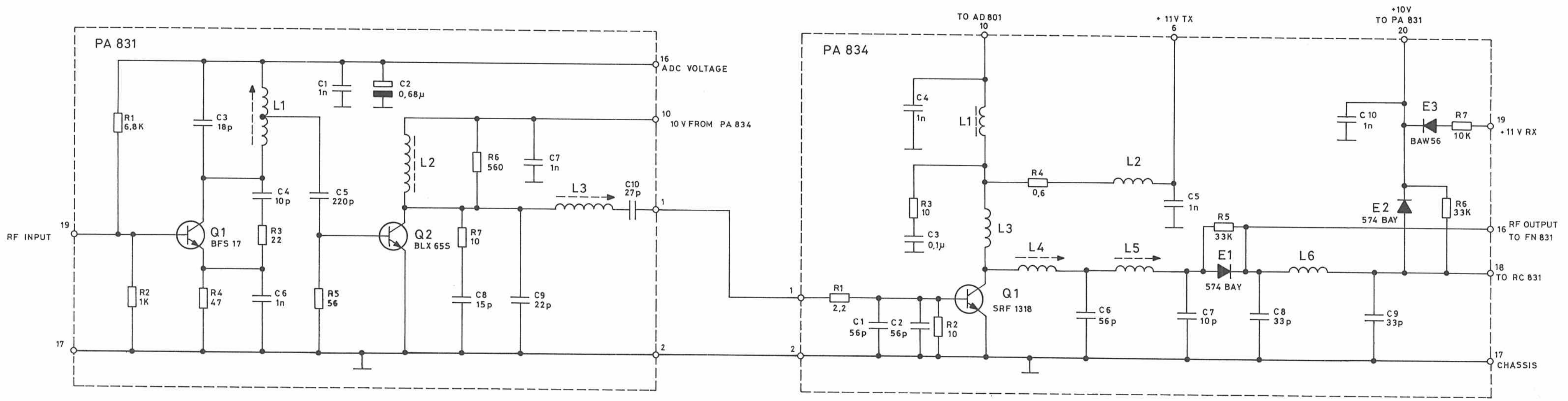
Storno



STORNOPHONE 800
3W TRANSMITTER CQP 810, CQP 810U

D 402.551

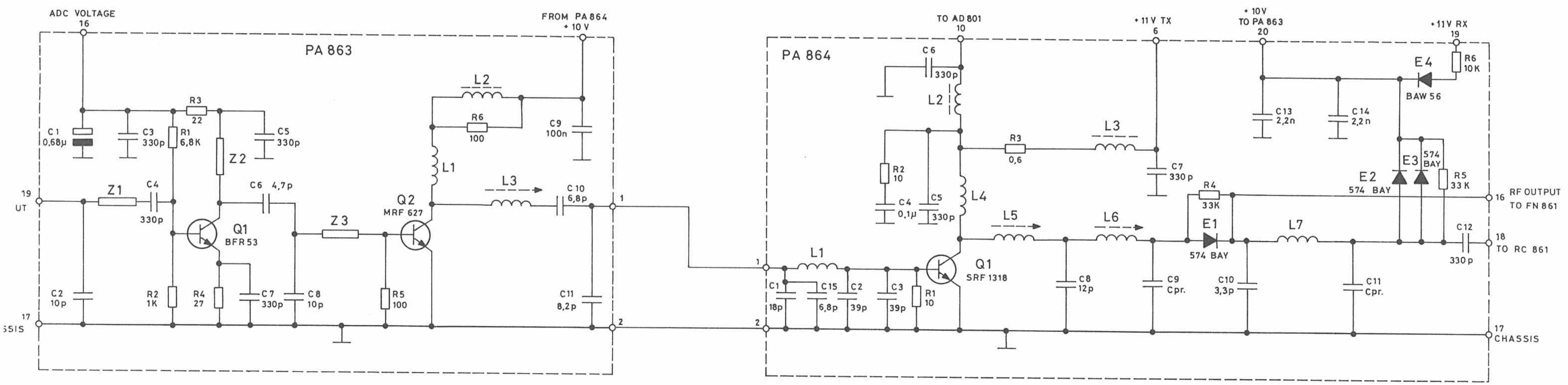
Storno



STORNOPHONE 800
3W TRANSMITTER
CQP 830, CQP 830U

D402.552

Storno

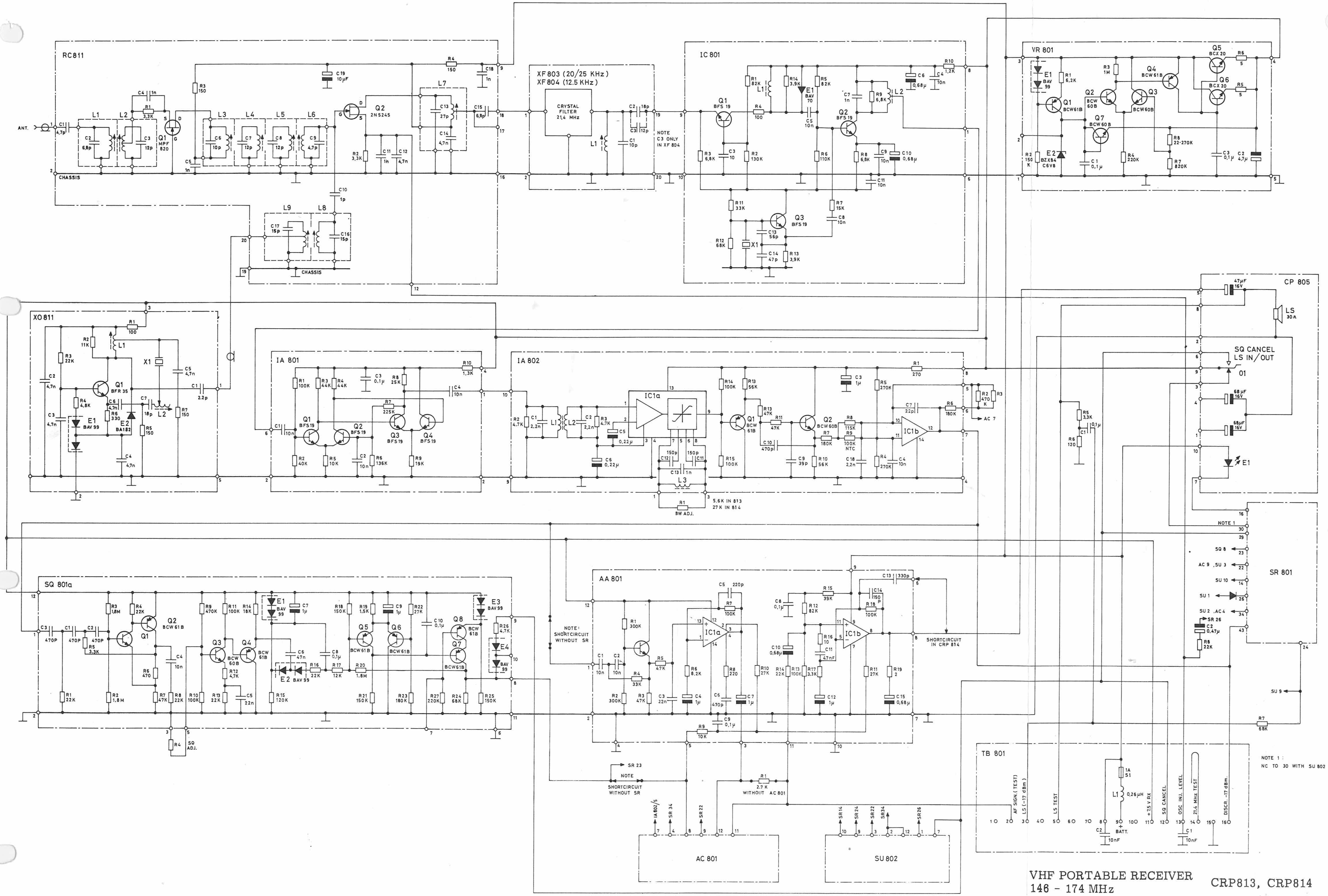


STORNOPHONE 800
3W TRANSMITTER

CQP 860, CQP 860 U

D 402.553

Storno

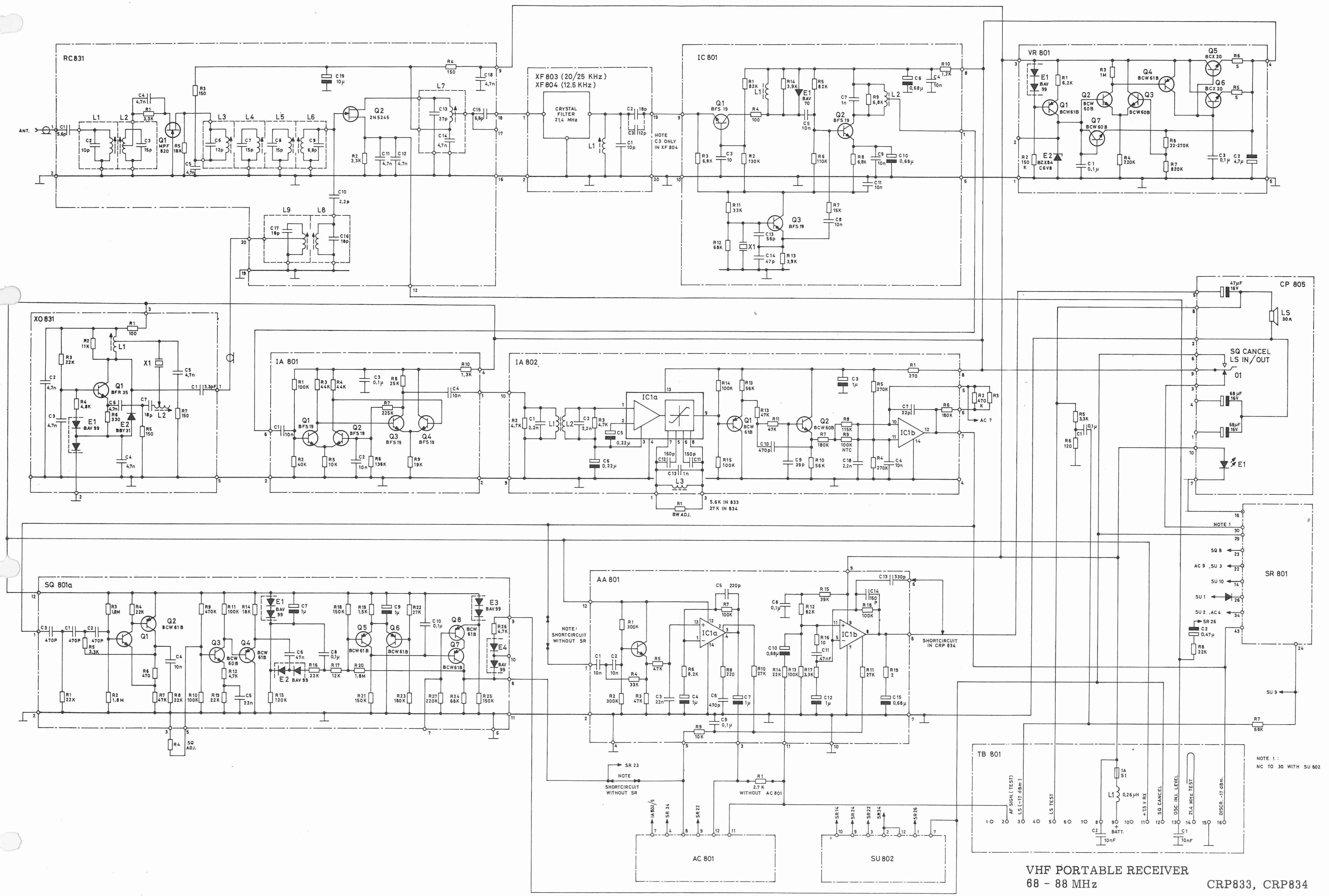


VHF PORTABLE RECEIVER
146 - 174 MHz

CRP813, CRP814

D 402.356/2

Storno



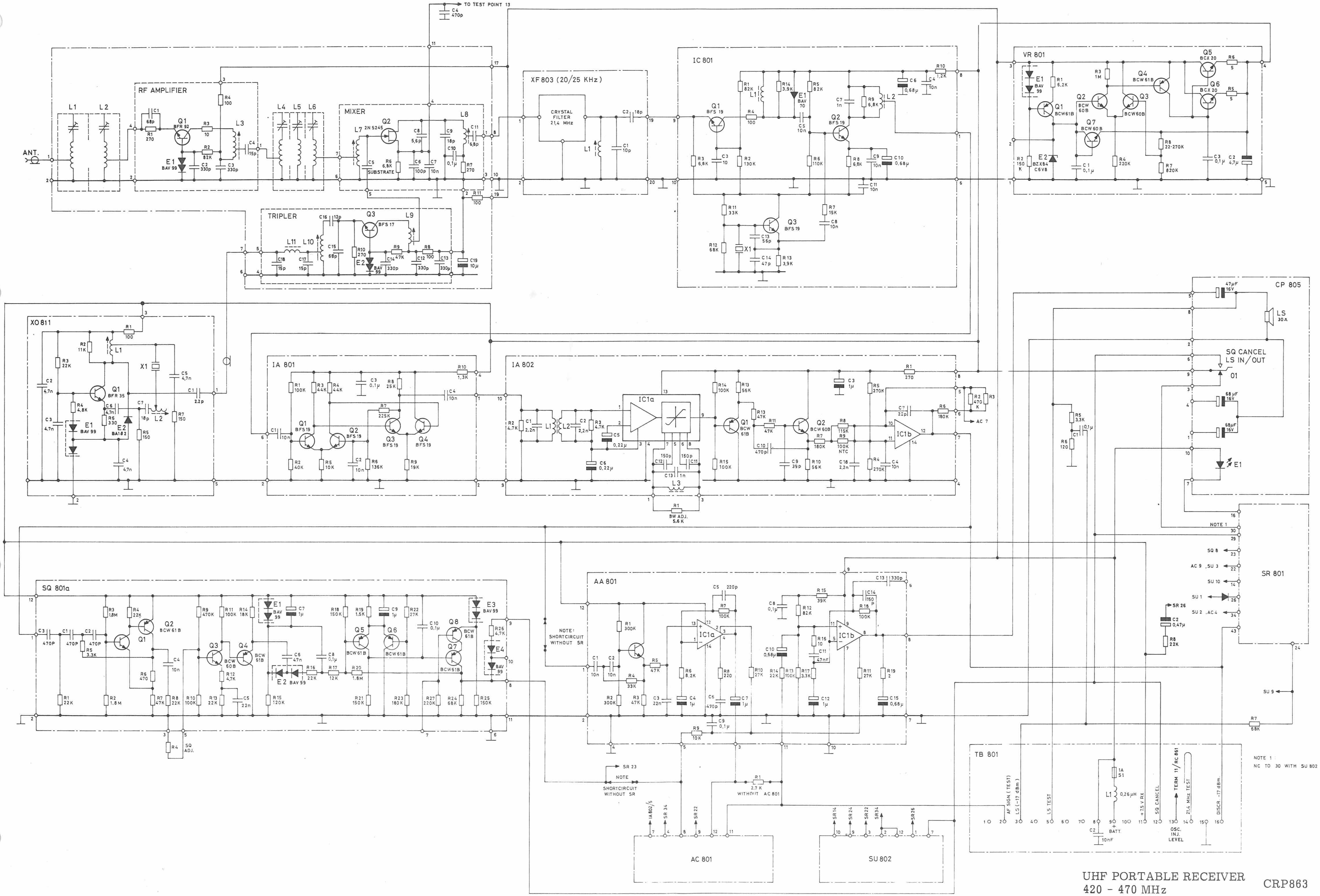
VHF PORTABLE RECEIVER
68 - 88 MHz

CRP833, CRP834

D 402.230/2

Storno

Storno

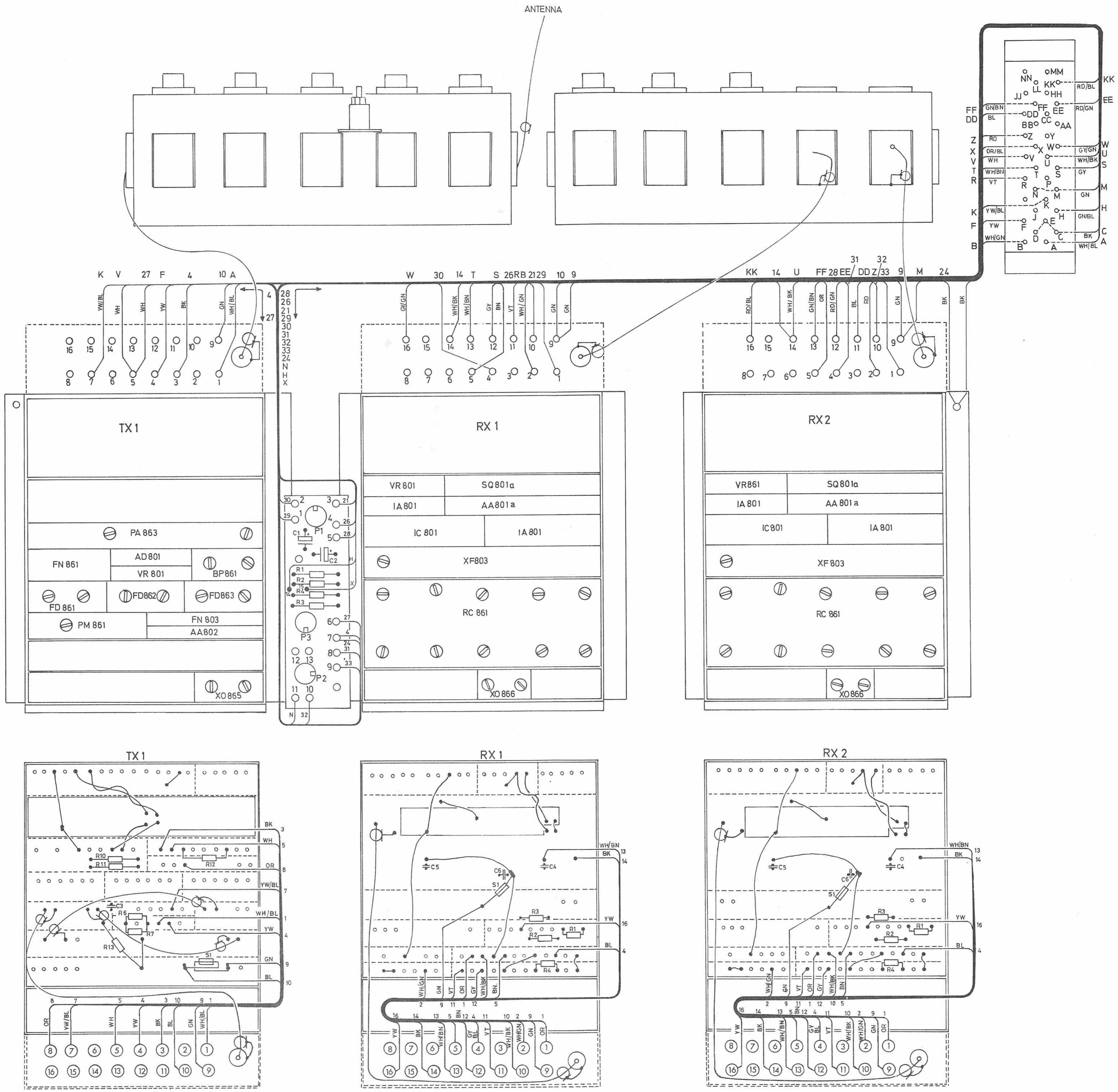


UHF PORTABLE RECEIVER
420 - 470 MHz

CRP863

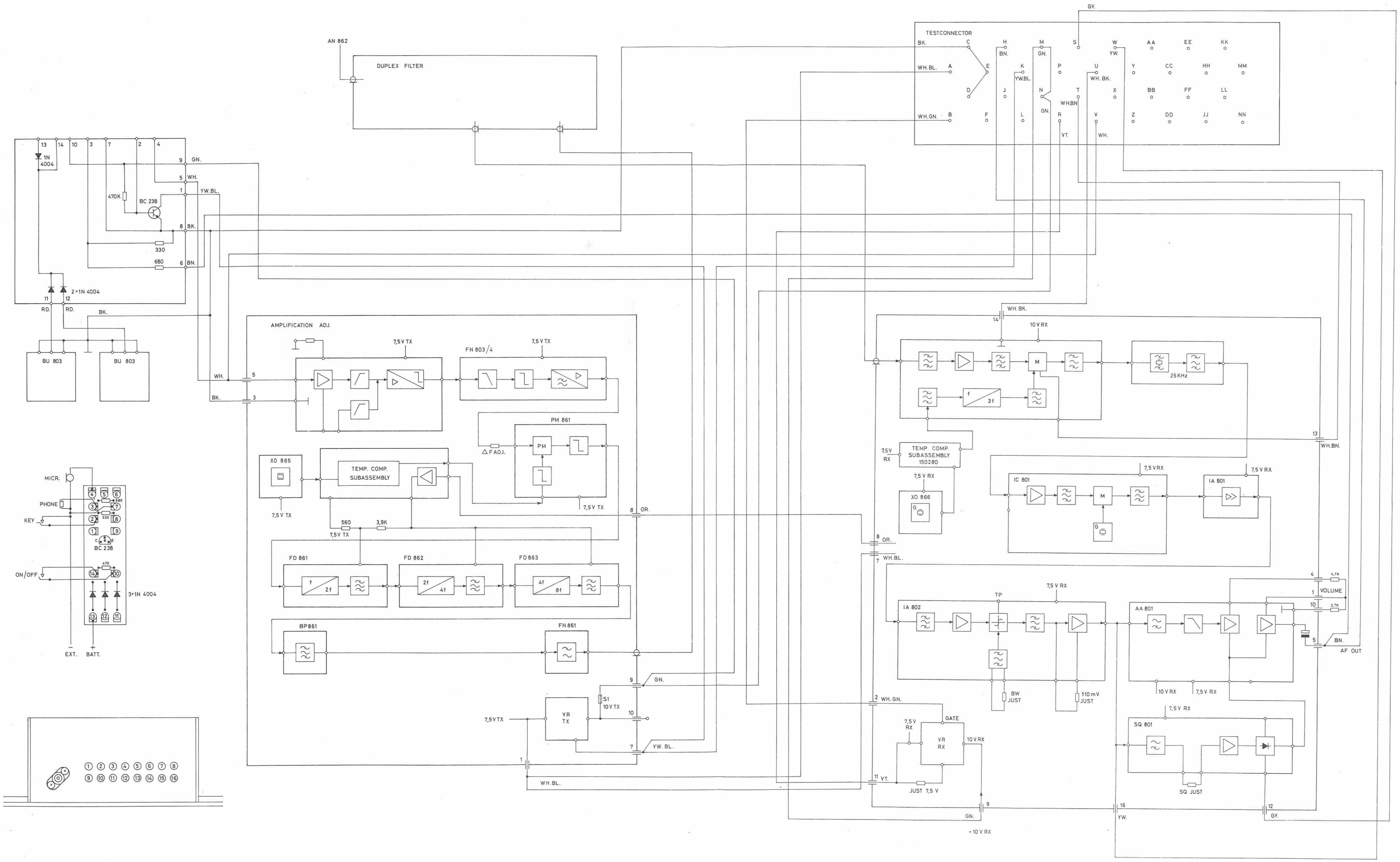
D 402.355/2

Storno



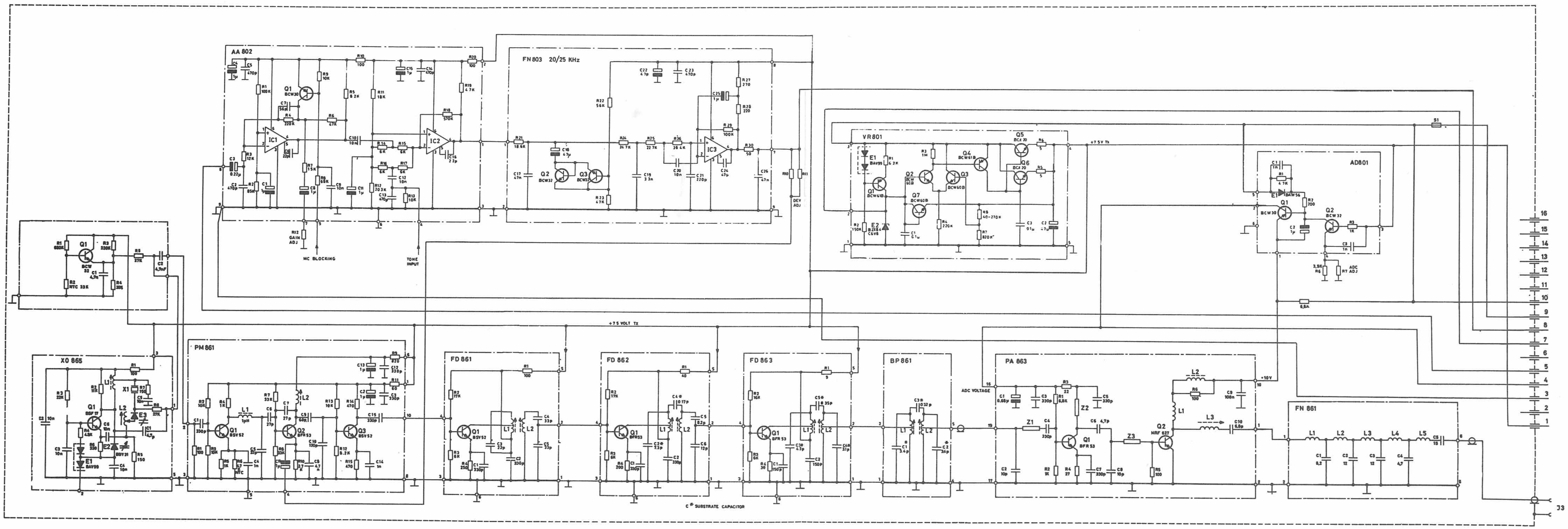
RF UNIT RF 864a

D402.723/1



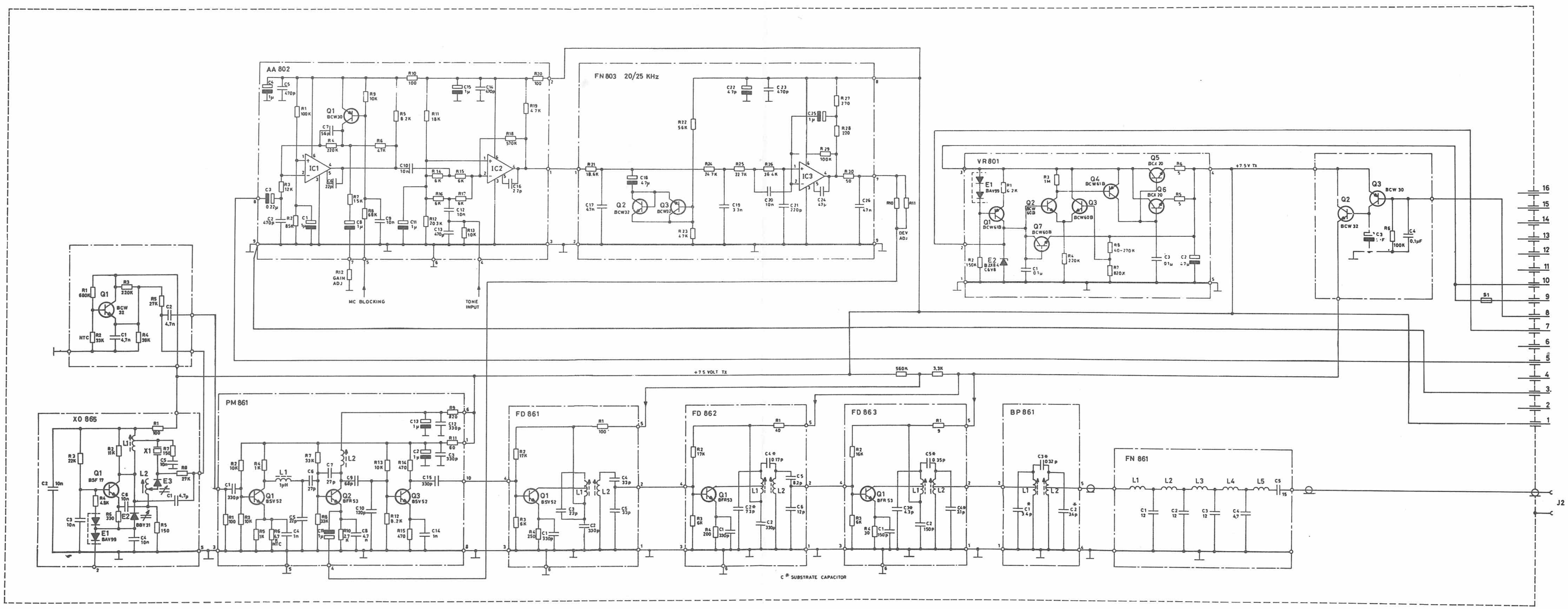
UHF RADIO UNIT RF 865

D 402.480



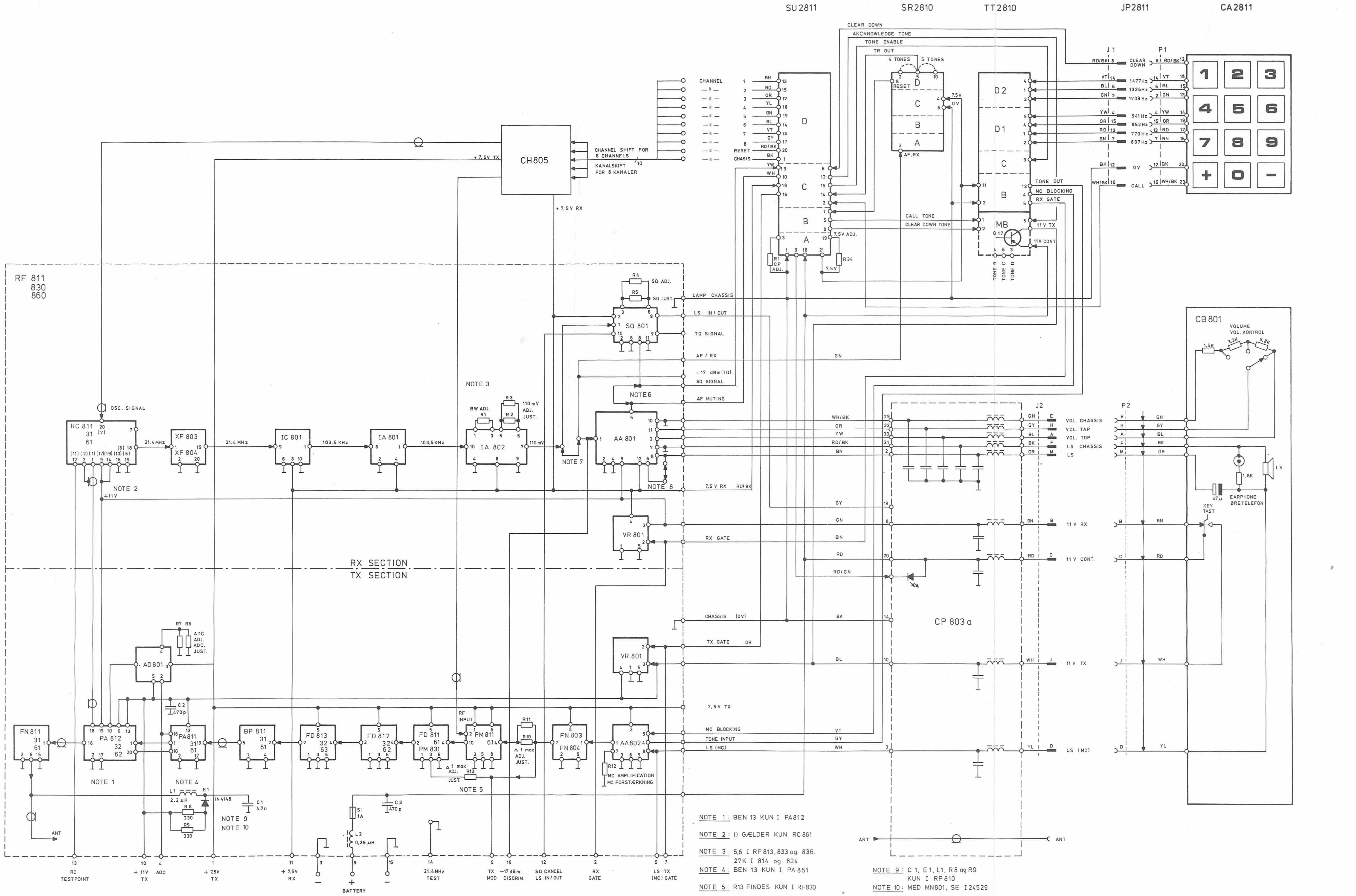
TRANSMITTER TX 8603
0,1 W

D402.475



TRANSMITTER TX 8603
0,015 W

D 402.476



NOTE 1 : BEN 13 KUN I PA812

NOTE 2 : () GÆLDER KUN RC861

NOTE 3 : 5,6 I RF813, 833 og 836.
27K I 814 og 834

NOTE 4 : BEN 13 KUN I PA861

NOTE 5 : R13 FINDES KUN I RF830

NOTE 6 : AFBRYDES

NOTE 7 : FORBINDES

NOTE 8 : KORTSLUTTET I RF814 / RF835

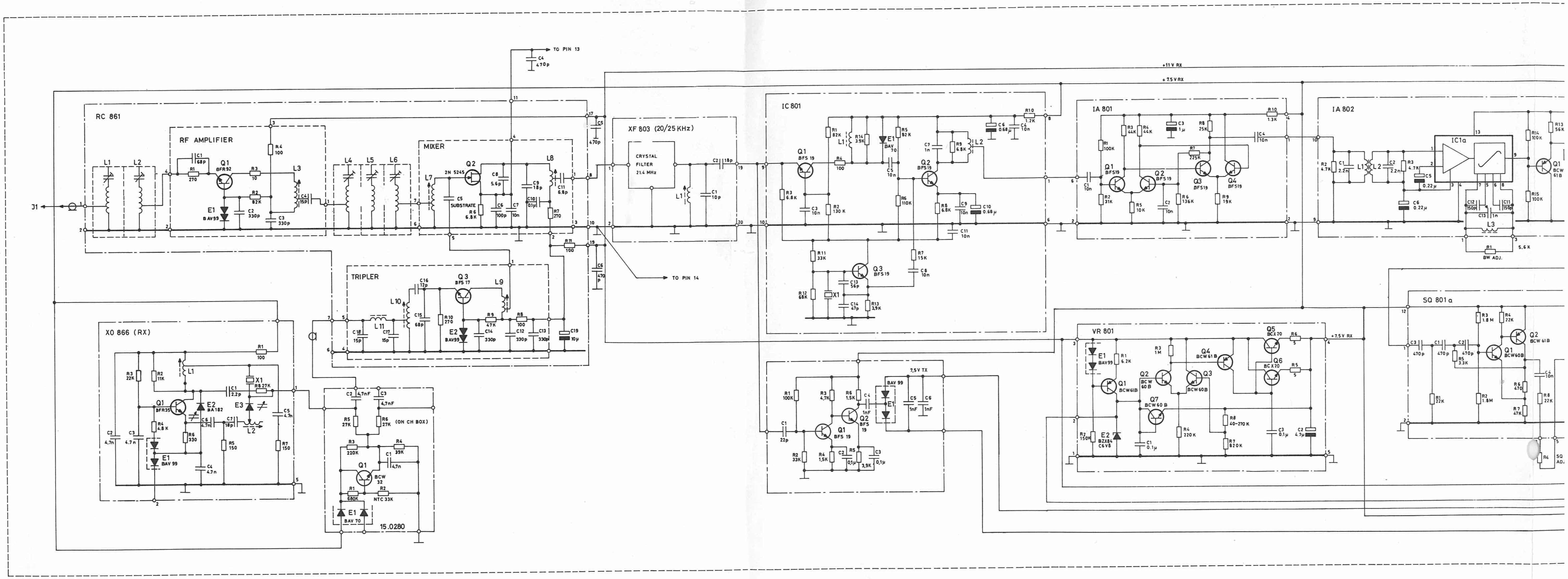
NOTE 9 : C 1, E1, L1, R8 og R9
KUN I RF810

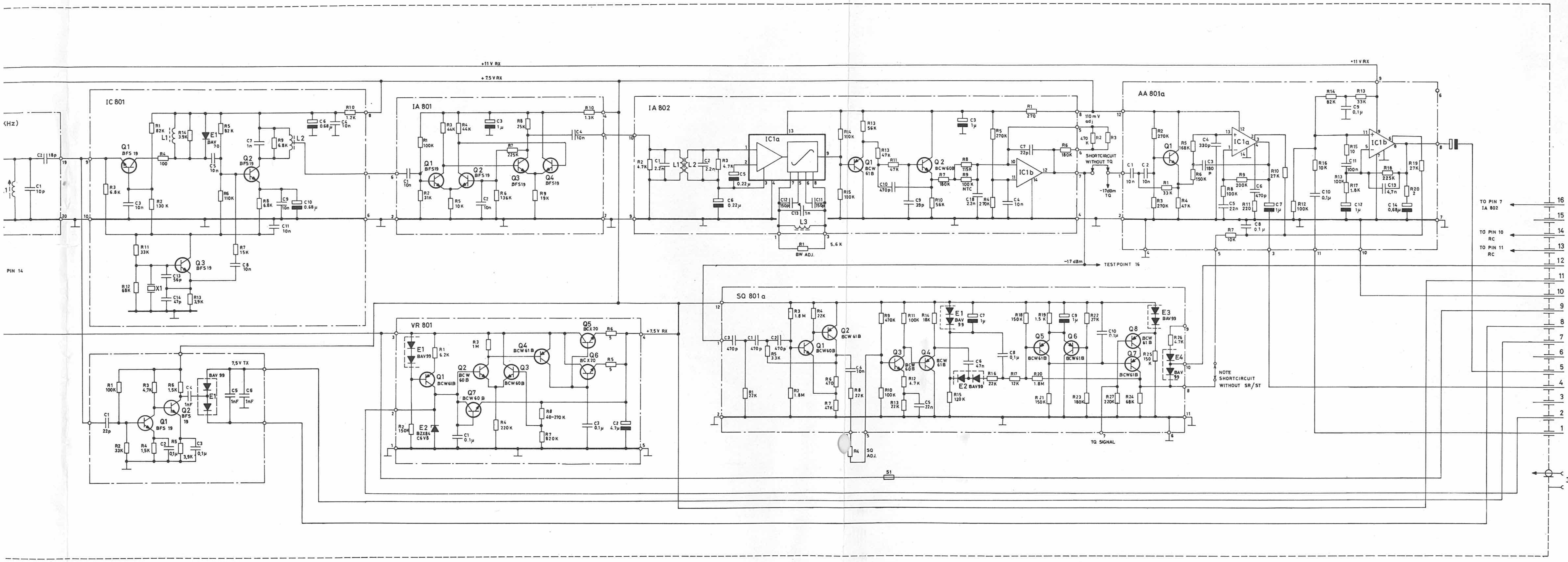
NOTE 10 : MED MN801, SE I24529

Storno
RADIO COMMUNICATION SYSTEM

SYSTEM LAY-OUT
CQP 800 - 2004 a
WITH REMOTE CONTROL

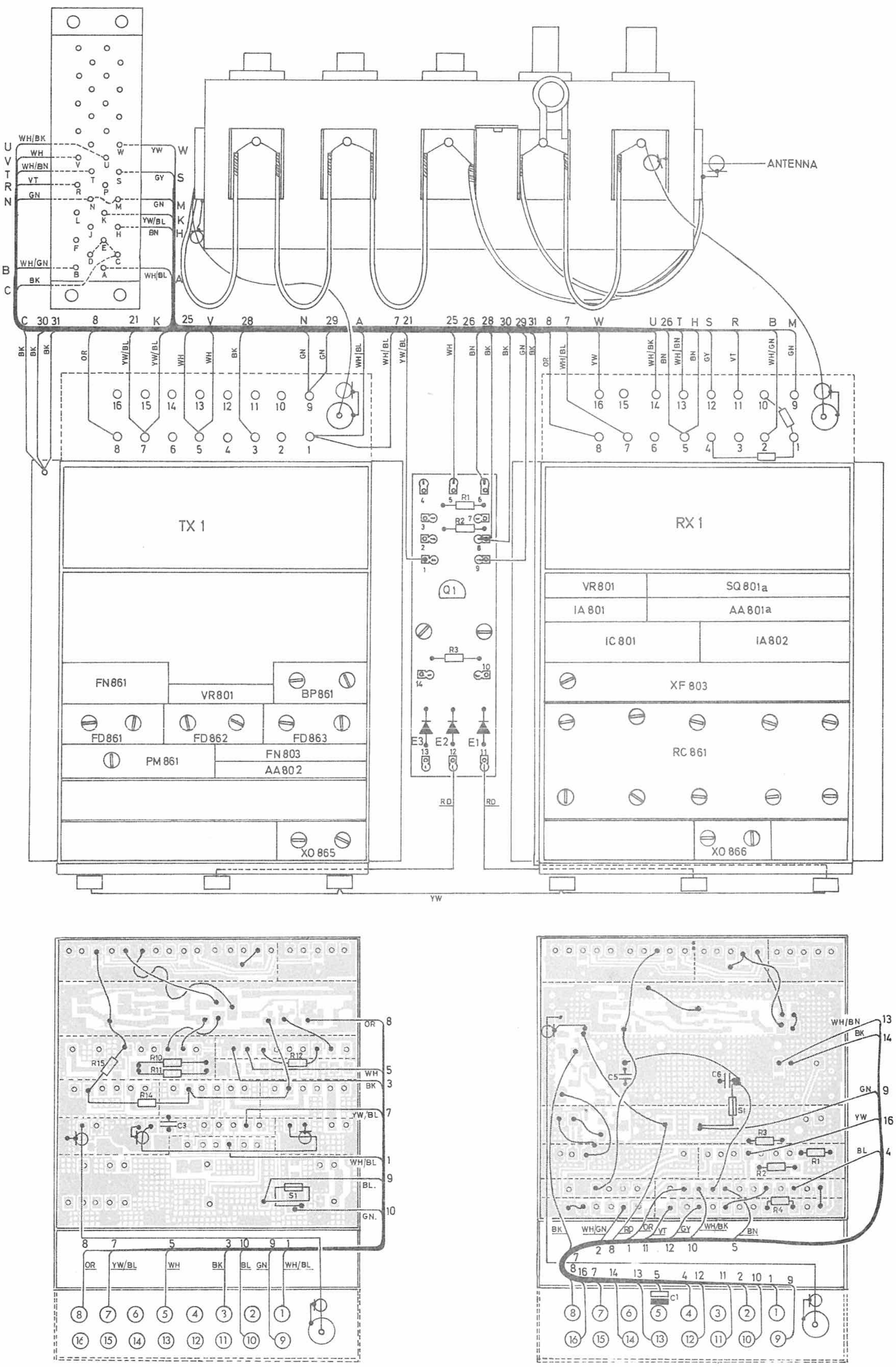
SD402.049/1


RC 861
RF AMPLIFIER
MIXER
TRIPLER
XO 866 (RX)
(ON CH BOX)
15.0280
TO PIN 13
TO PIN 14
XF 803 (20/25 KHz)
CRYSTAL FILTER 21.4 MHz
IC 801
IA 801
IA 802
VR 801
SQ 801 a
+11 V RX
+7.5 V RX
7,5 V TX
BW ADJ.
J1



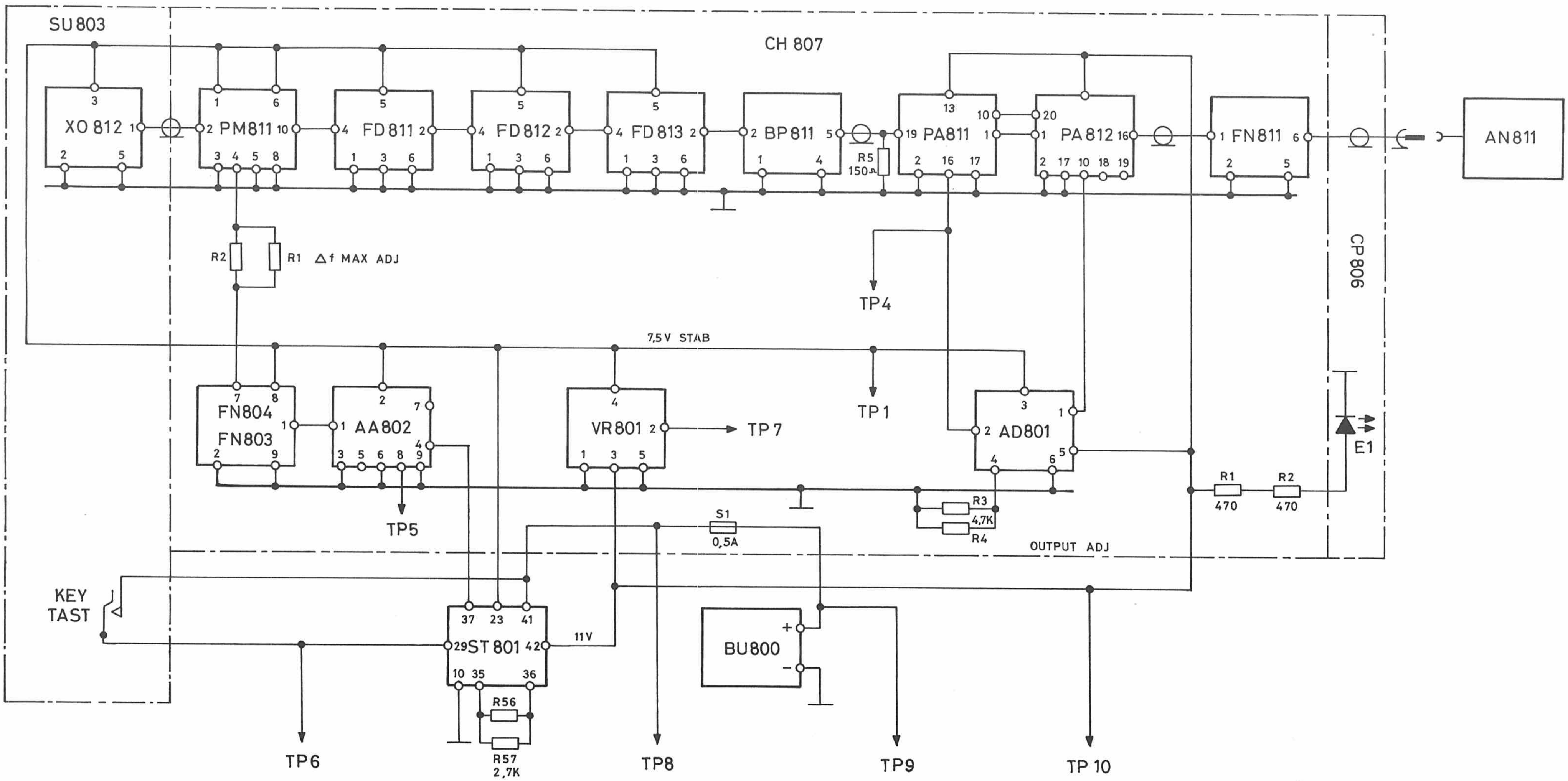
RECEIVER RX 8063
REG. DRIVER

D 402.478



WIRING DIAGRAM RF865

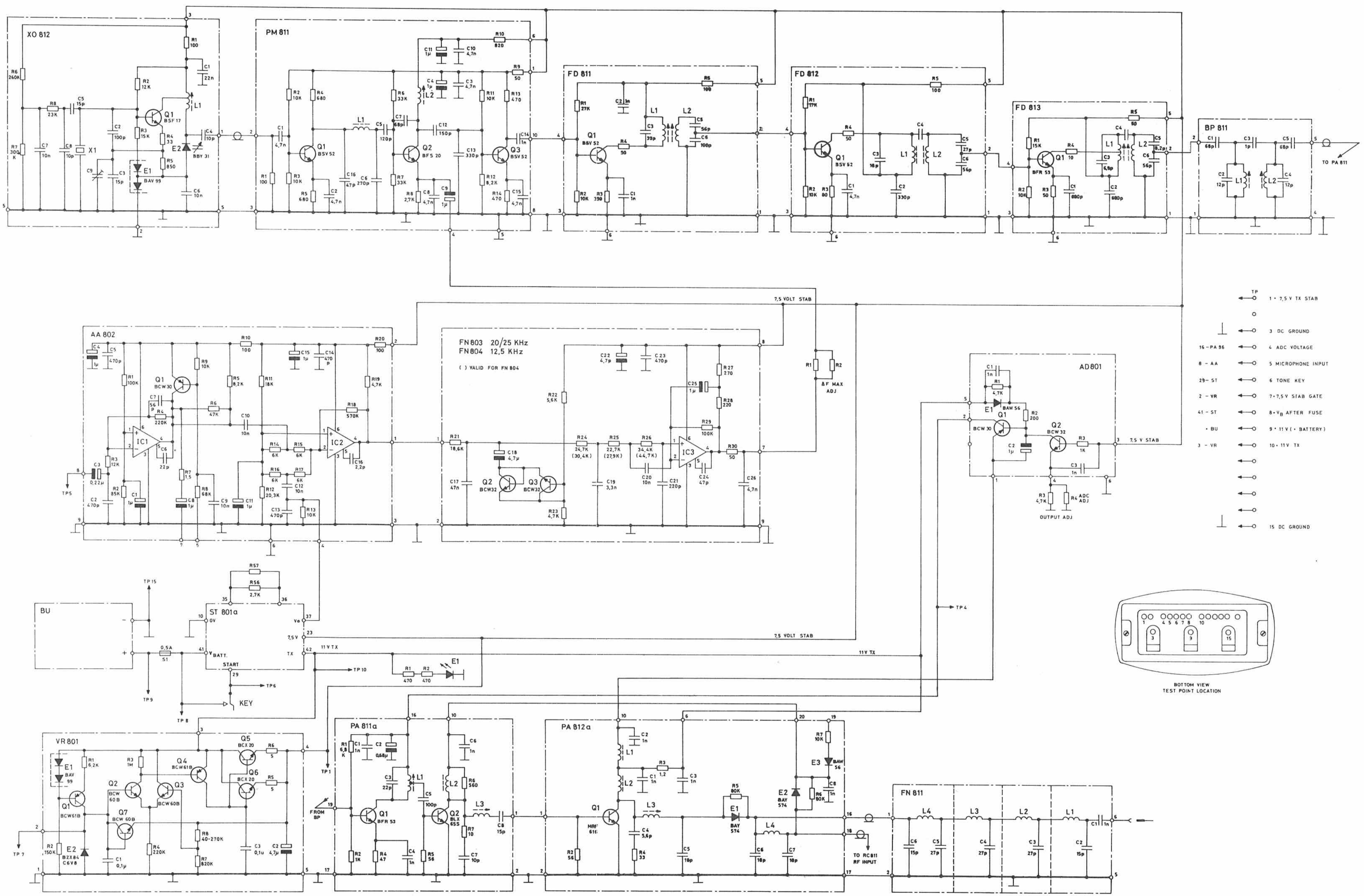
D 402.590



ALARM

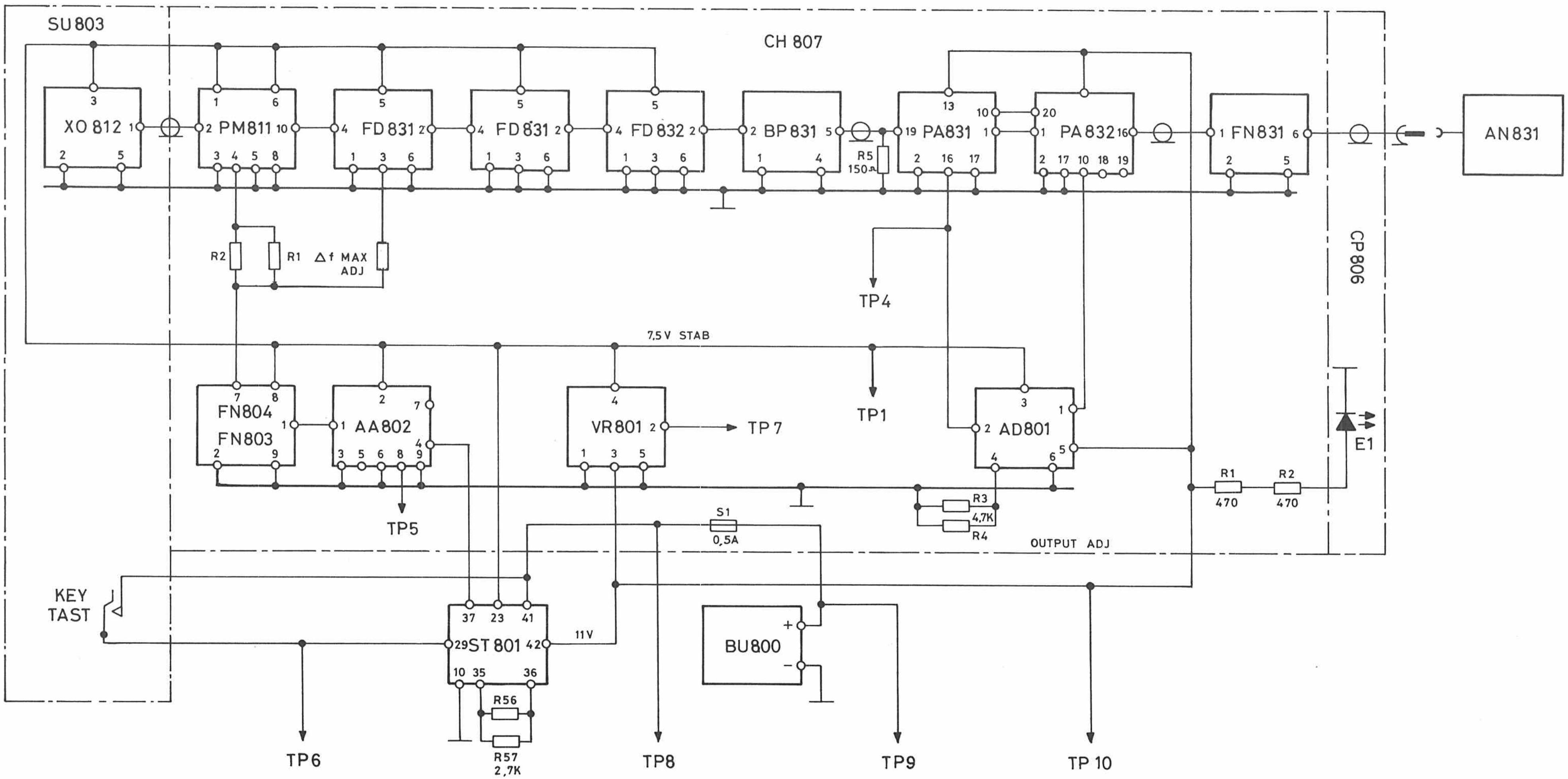
TRANSMITTER CTP 810

D 402.457



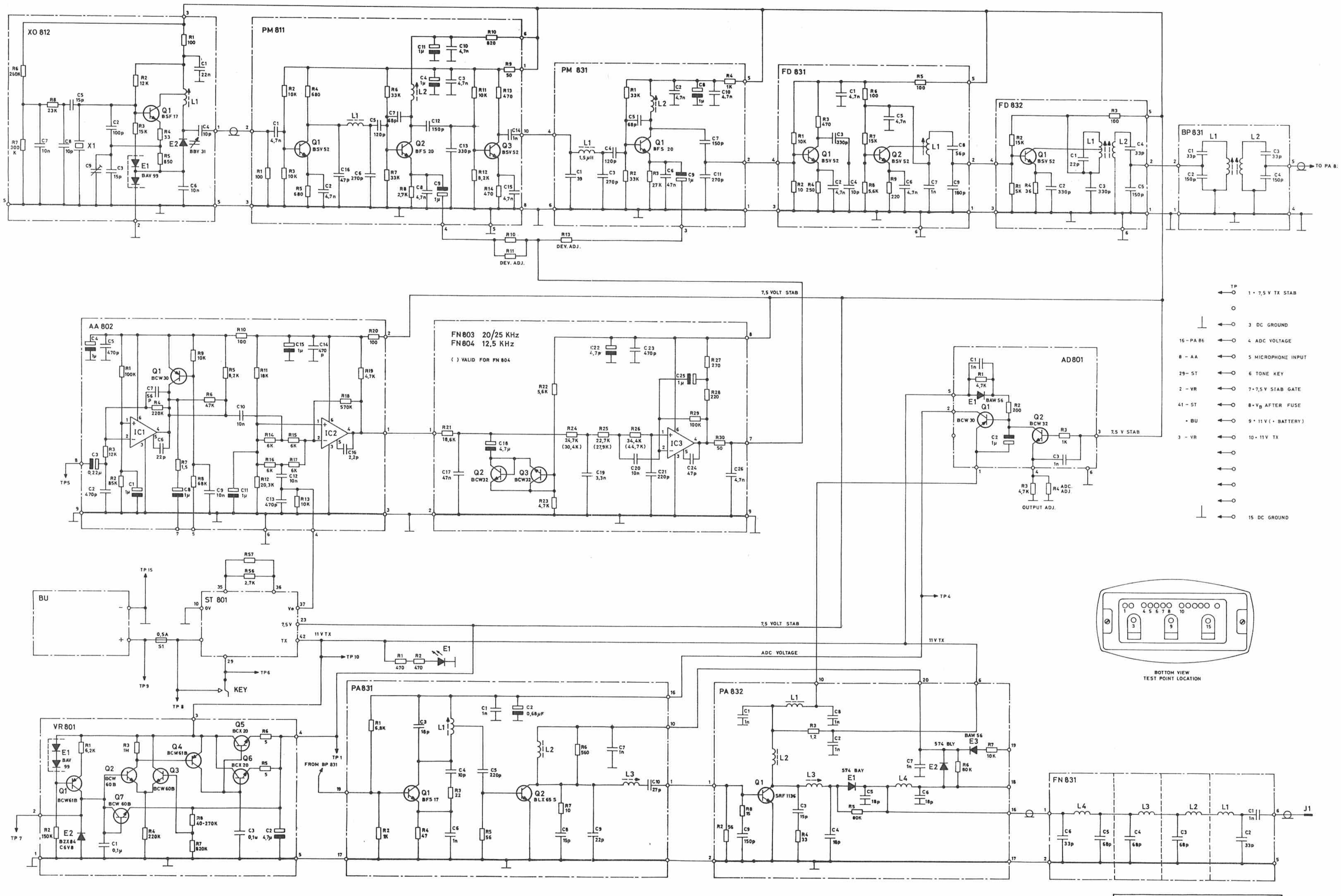
PORTABLE TRANSMITTER
CTP 813 , CTP 814

D 402.454



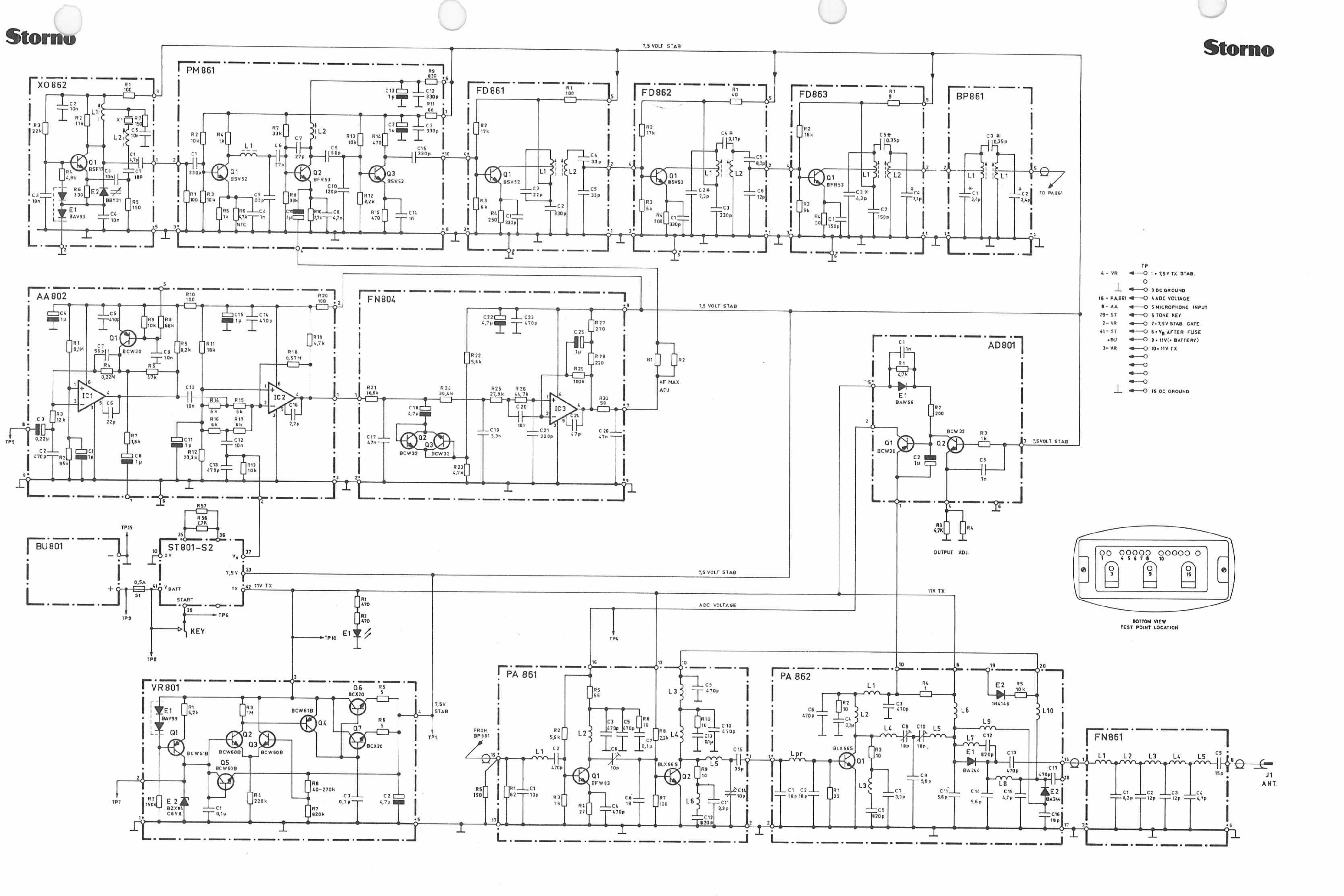
ALARM
TRANSMITTER CTP 830

D 402.458



PORTABLE TRANSMITTER
CTP 833 , CTP 834

D 402.455



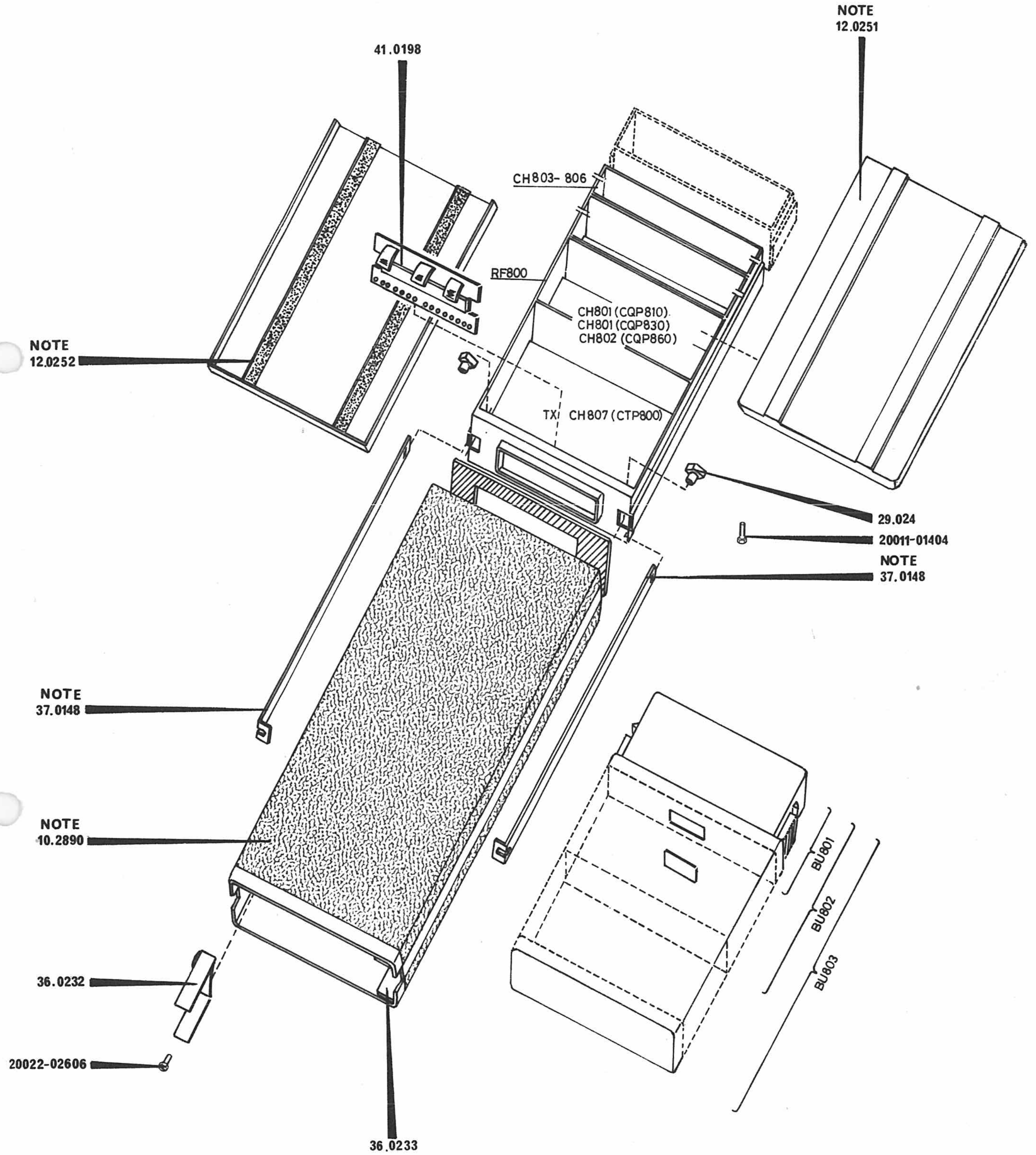
PORTABLE TRANSMITTER
CTP 863 sp. S2

D 402.092

TITLE		Code
CQP800	Mechanical layout	M405.061
CQP800-2004	Mechanical layout	
	+ Spare Parts No.	M405.054
CQP800U	Mechanical layout	M405.088/2
CQP814C7x2TQ	Mechanical layout	M405.065/2
CQP8141C9x4TQ	Mechanical layout	M405.095
CRP800	Mechanical layout	
	+ Spare Parts No.	M405.064/4
CTP800	Mechanical layout	
	+ Spare Parts No.	M405.063
CP801	Mechanical layout	M405.053/5
CP802	Mechanical layout	M405.057/4
CP808	Mechanical layout	M405.083
CP808	Mechanical layout	M405.098/2
CP808-IS	Mechanical layout	M405.099
CB801	Mechanical layout	M405.094
CB802	Mechanical layout	M405.058/5
CB803	Mechanical layout	M405.059/4
CB804	Mechanical layout	M405.086/2
CB805	Mechanical layout	M405.084/2
CB811	Mechanical layout	M405.066/3
CB812/831/861	Mechanical layout	M405.090
CA800-IS	Mechanical layout	M405.069
CP801-IS	Mechanical layout	M405.067/2
CP802-IS	Mechanical layout	M405.068
CU803	Mechanical layout	M405.074
CU804	Mechanical layout	M405.075/5
CU805	Mechanical layout	M405.072
HP801	Mechanical layout	M405.079
MN801	Mechanical layout	M405.073/2
MN803/4	Mechanical layout	M405.093/2
TS-D37	Mechanical layout	M405092

Service Coordination
10.81.

TITLE		Code
CQP800	Mechanical layout	M405.061
CQP800U	Mechanical layout	M405.088
CQP814C7x2TQ	Mechanical layout	M405.065/2
CQP8141C9x4TQ	Mechanical layout	M405.095
CRP800	Mechanical layout	M405.064/4
CP801	Mechanical layout	M405.053/5
CP802	Mechanical layout	M405.057/4
CP808	Mechanical layout	M405.083
CP808	Mechanical layout	M405.098
CB801	Mechanical layout	M405.094
CB802	Mechanical layout	M405.058/5
CB803	Mechanical layout	M405.059/4
CB804	Mechanical layout	M405.086/2
CB805	Mechanical layout	M405.084/2
CB811	Mechanical layout	M405.066/3
CB812/831/861	Mechanical layout	M405.090
CA800	Mechanical layout	M405.069
CP801-IS	Mechanical layout	M405.067/2
CP802-IS	Mechanical layout	M405.068
CU803	Mechanical layout	M405.074
CU804	Mechanical layout	M405.075/4
CU805	Mechanical layout	M405.072
HP801	Mechanical layout	M405.079
MN801	Mechanical layout	M405.073/2
MN803/4	Mechanical layout	M405.093/2

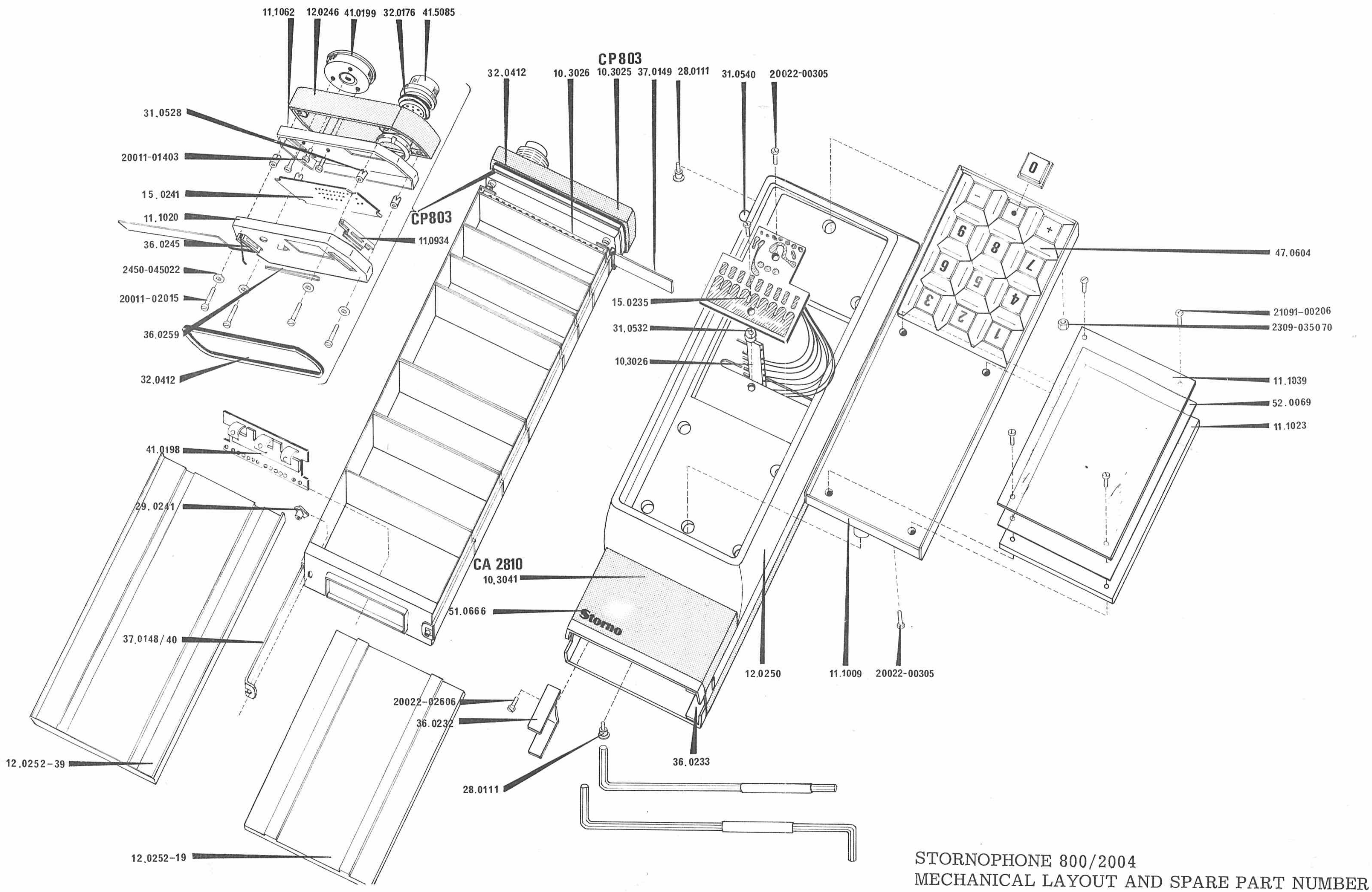


STORNOPHONE 800

MECHANICAL LAYOUT

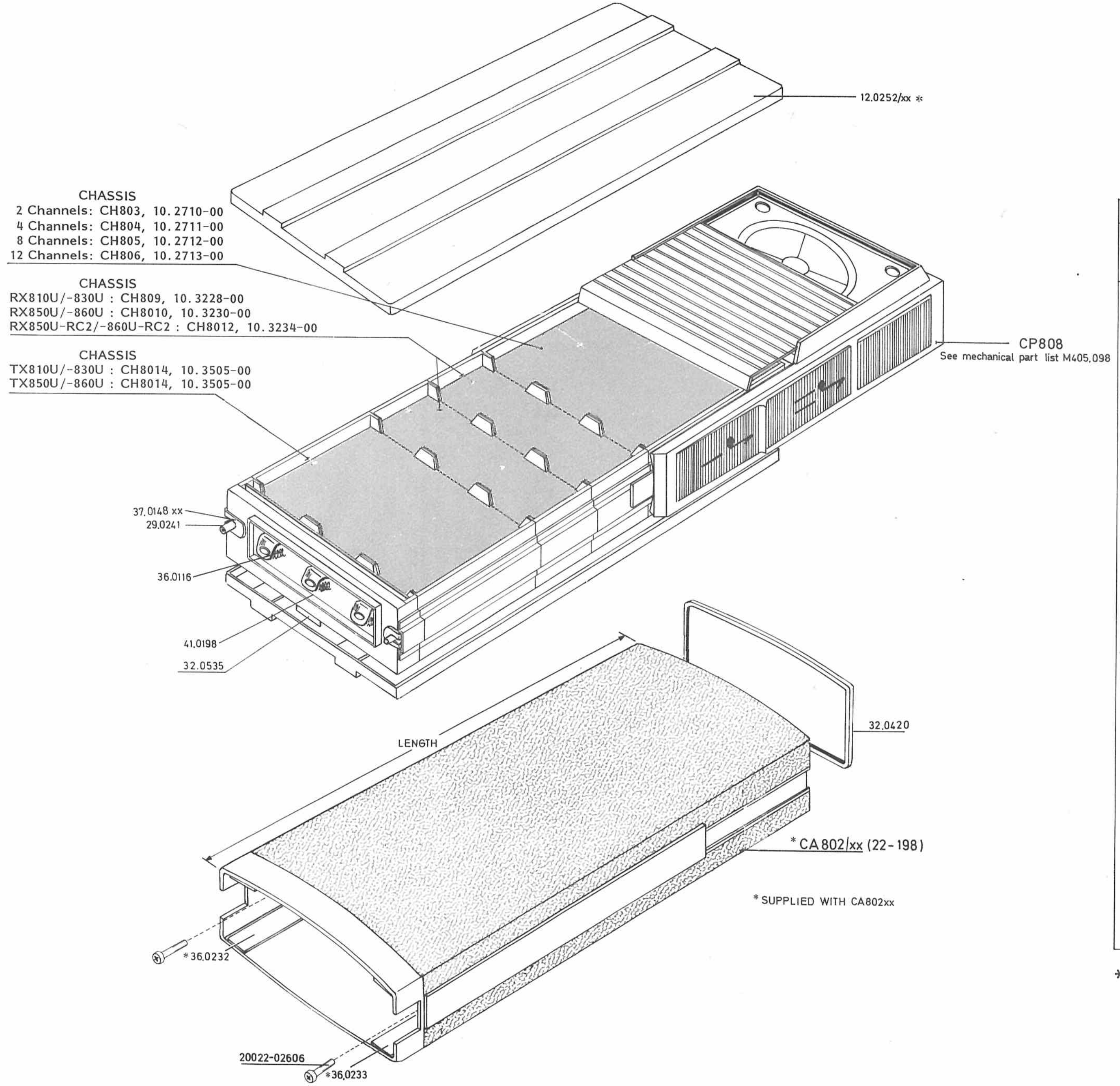
M405.061

Storno



STORNOPHONE 800/2004
MECHANICAL LAYOUT AND SPARE PART NUMBER.

M405.054



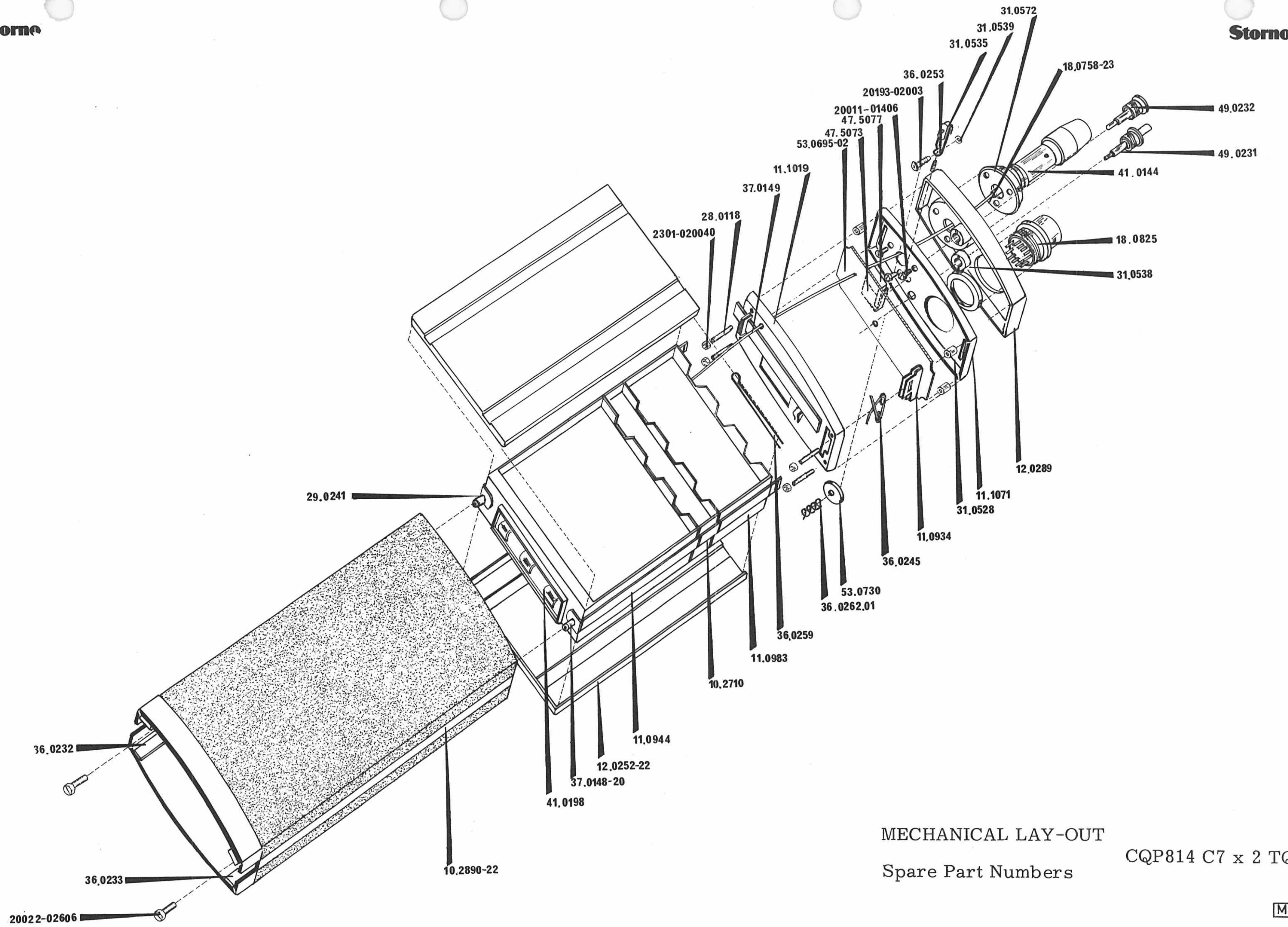
CASING				
LENGTH IN MM.	CASING TYPE	ASSY. CODE NO.	JUNCTION RAIL CODE NO.	* INSULATING SET CODE NO.
60.25	CA802-22	10.3600-01	37.0148-01	12.0252-45
64.25	CA802-26	10.3600-02	37.0148-02	-- " --
68.25	CA802-30	10.3600-03	37.0148-03	-- " --
72.25	CA802-34	10.3600-04	37.0148-04	-- " --
76.25	CA802-38	10.3600-05	37.0148-05	-- " --
80.25	CA802-42	10.3600-06	37.0148-06	-- " --
84.25	CA802-46	10.3600-07	37.0148-07	-- " --
88.25	CA802-50	10.3600-08	37.0148-08	-- " --
92.25	CA802-54	10.3600-09	37.0148-09	-- " --
96.25	CA802-58	10.3600-10	37.0148-10	-- " --
100.25	CA802-62	10.3600-11	37.0148-11	-- " --
104.25	CA802-66	10.3600-12	37.0148-12	-- " --
108.25	CA802-70	10.3600-13	37.0148-13	-- " --
112.25	CA802-74	10.3600-14	37.0148-14	-- " --
116.25	CA802-78	10.3600-15	37.0148-15	-- " --
120.25	CA802-82	10.3600-16	37.0148-16	-- " --
124.25	CA802-86	10.3600-17	37.0148-17	-- " --
128.25	CA802-90	10.3600-18	37.0148-18	-- " --
132.25	CA802-94	10.3600-19	37.0148-19	-- " --
136.25	CA802-98	10.3600-20	37.0148-20	-- " --
140.25	CA802-102	10.3600-21	37.0148-21	-- " --
144.25	CA802-106	10.3600-22	37.0148-22	-- " --
148.25	CA802-110	10.3600-23	37.0148-23	-- " --
152.25	CA802-114	10.3600-24	37.0148-24	-- " --
156.25	CA802-118	10.3600-25	37.0148-25	-- " --
160.25	CA802-122	10.3600-26	37.0148-26	-- " --
164.25	CA802-126	10.3600-27	37.0148-27	-- " --
168.25	CA802-130	10.3600-28	37.0148-28	-- " --
172.25	CA802-134	10.3600-29	37.0148-29	-- " --
176.25	CA802-138	10.3600-30	37.0148-30	-- " --
180.25	CA802-142	10.3600-31	37.0148-31	-- " --
184.25	CA802-146	10.3600-32	37.0148-32	-- " --
188.25	CA802-150	10.3600-33	37.0148-33	-- " --
192.25	CA802-154	10.3600-34	37.0148-34	-- " --
196.25	CA802-158	10.3600-35	37.0148-35	-- " --
200.25	CA802-162	10.3600-36	37.0148-36	-- " --
204.25	CA802-166	10.3600-37	37.0148-37	-- " --
208.25	CA802-170	10.3600-38	37.0148-38	-- " --
212.25	CA802-174	10.3600-39	37.0148-39	-- " --
216.25	CA802-178	10.3600-40	37.0148-40	-- " --
220.25	CA802-182	10.3600-41	37.0148-41	-- " --
224.25	CA802-186	10.3600-42	37.0148-42	-- " --
228.25	CA802-190	10.3600-43	37.0148-43	-- " --
232.25	CA802-194	10.3600-44	37.0148-44	-- " --
236.25	CA802-198	10.3600-45	37.0148-45	-- " --

* Insulating set's length trimmed according to the casing type.

STORNOPHONE 800 U
MECHANICAL LAYOUT

M405.088/2

Storno

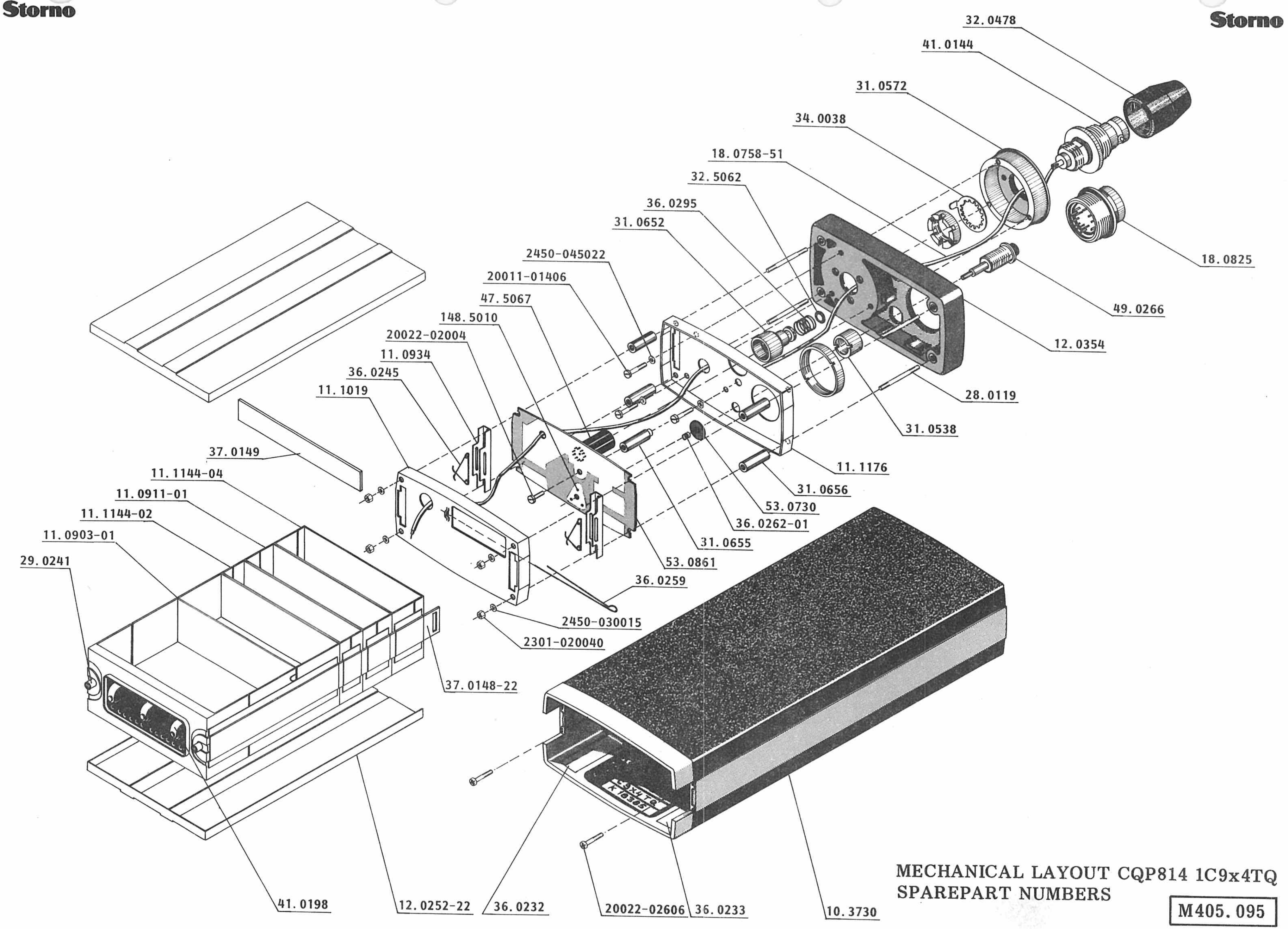


MECHANICAL LAY-OUT

Spare Part Numbers

CQP814 C7 x 2 TQ

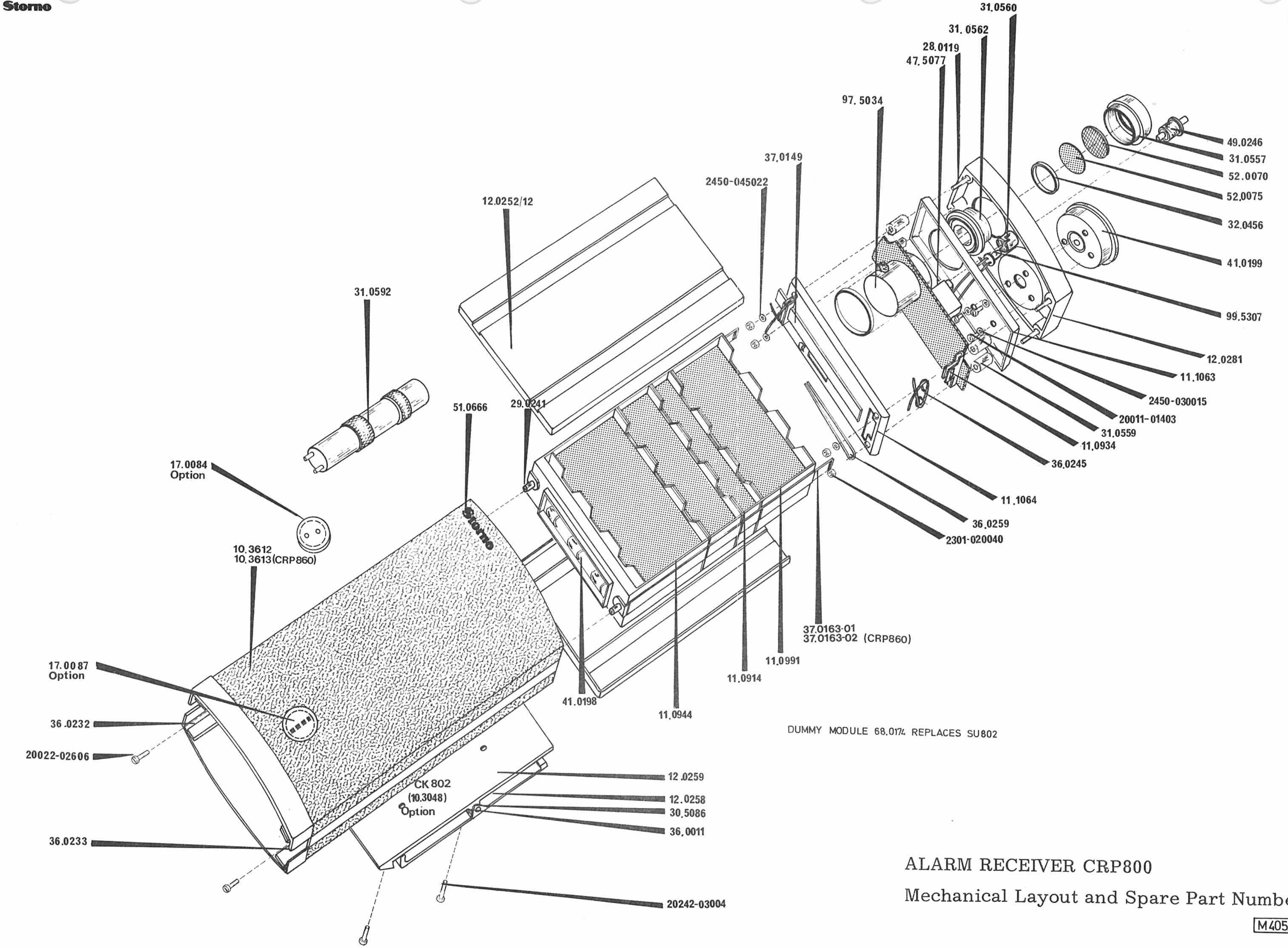
M405.065/2



MECHANICAL LAYOUT CQP814 1C9x4TQ
SPAREPART NUMBERS

M405.095

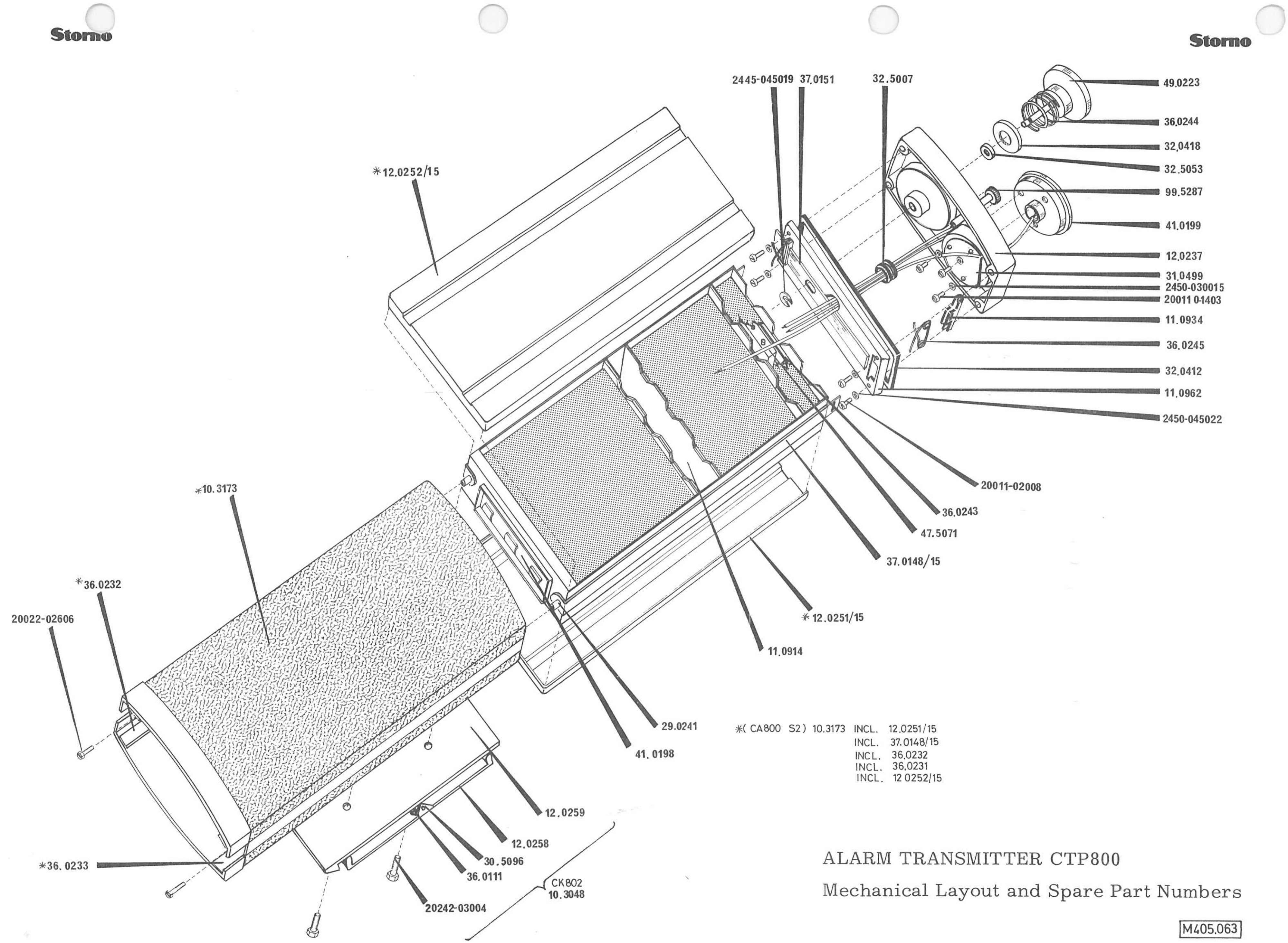
Storno



ALARM RECEIVER CRP800

Mechanical Layout and Spare Part Numbers

M405.064/4

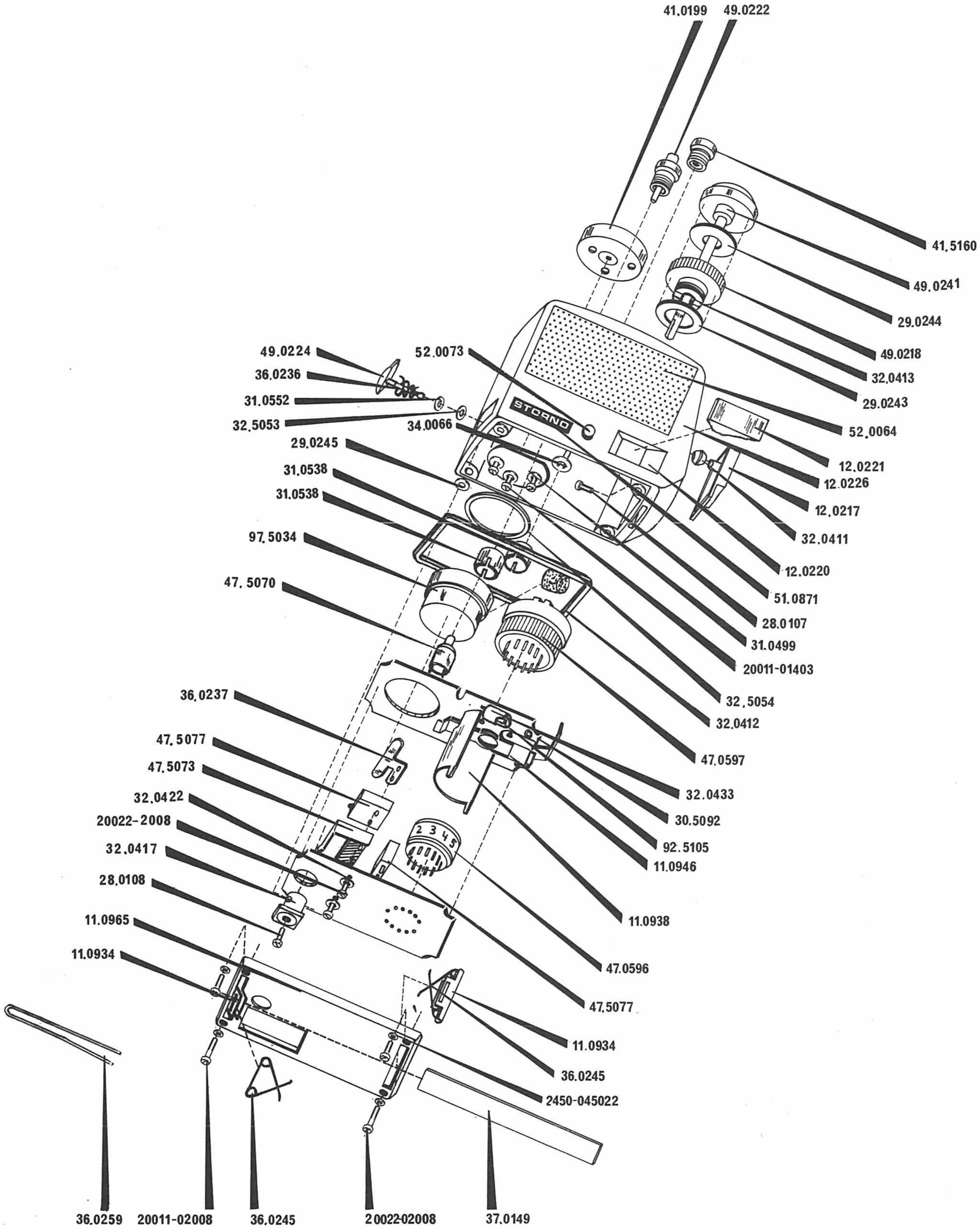


*(CA800 S2)	10.3173	INCL.	12.0251/15
		INCL.	37.0148/15
		INCL.	36.0232
		INCL.	36.0231
		INCL.	12.0252/15

ALARM TRANSMITTER CTP800

Mechanical Layout and Spare Part Numbers

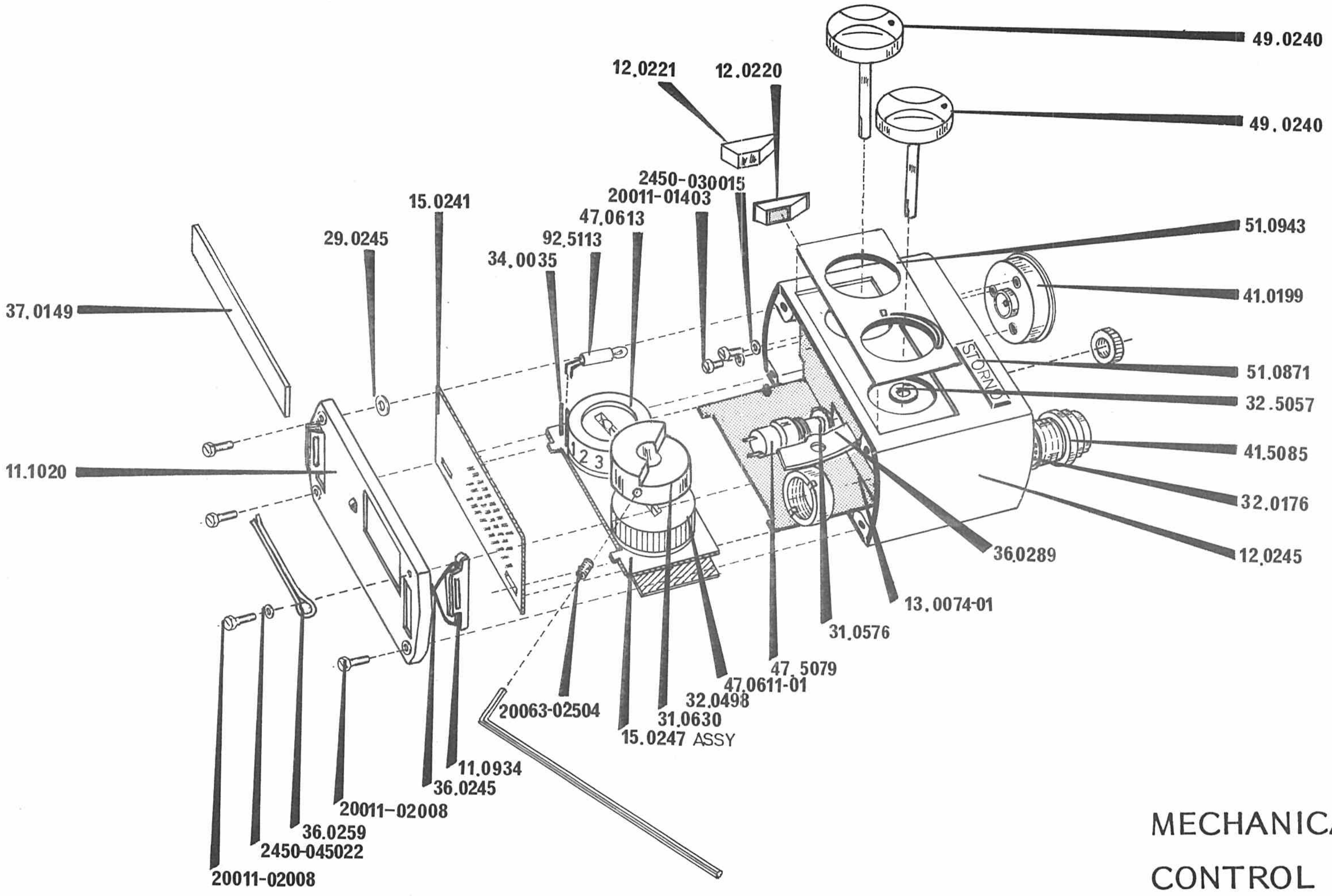
M405.063



MECHANICAL LAYOUT
CONTROL HEAD CP801.

M405.053/5

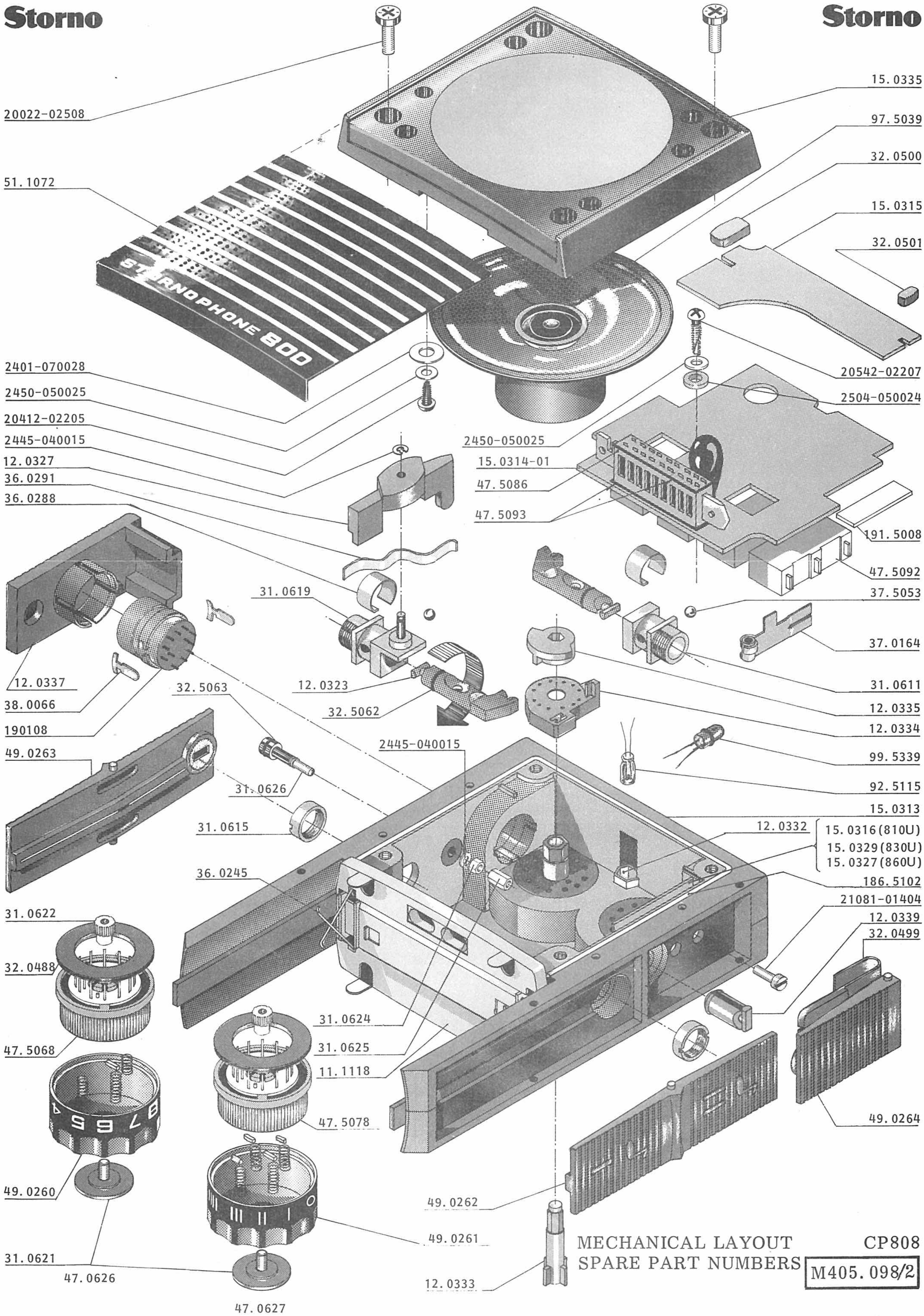
Storno



MECHANICAL LAYOUT
CONTROL HEAD CP802.

M405.057/4

Storno Storno

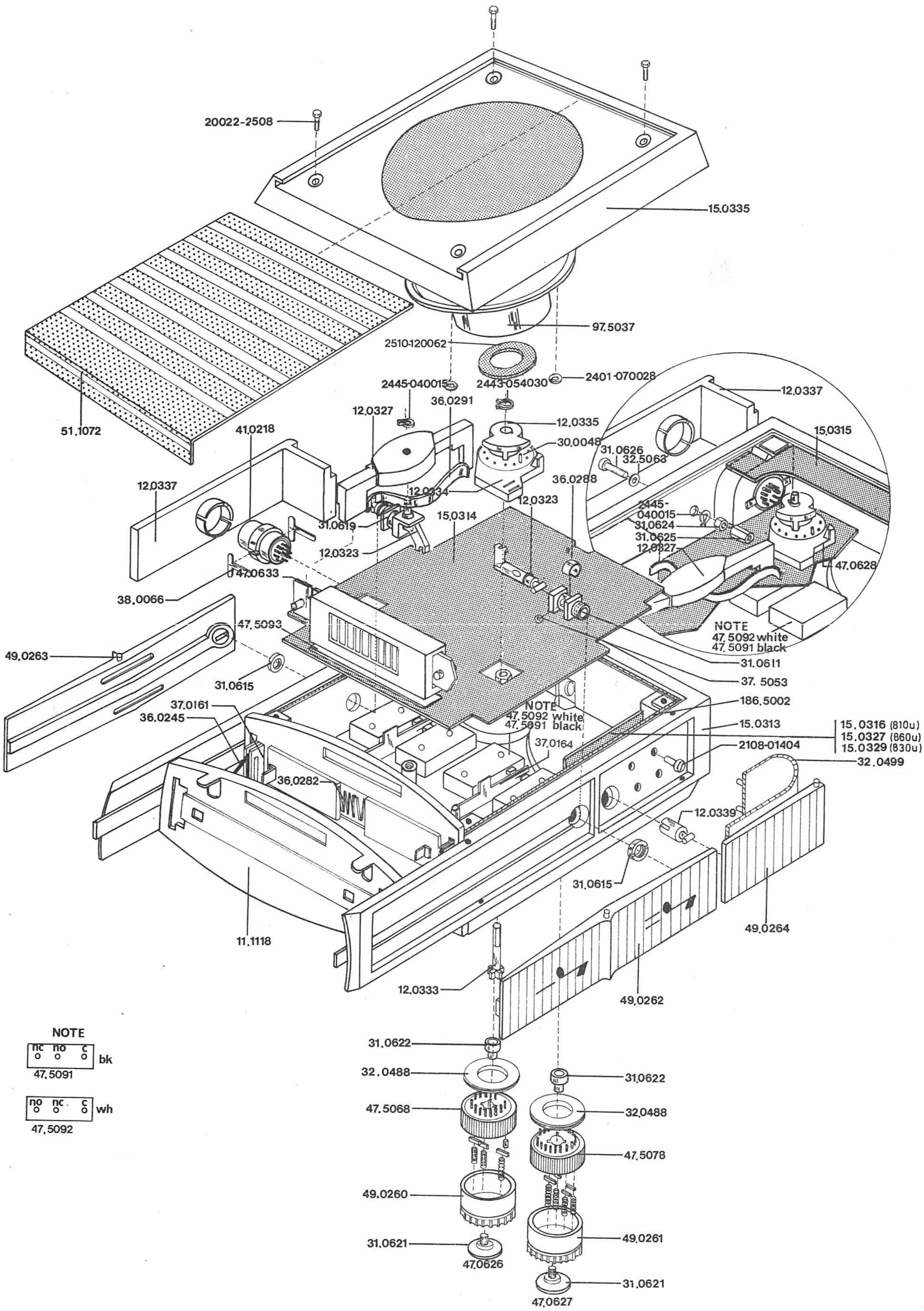


MECHANICAL LAYOUT
SPARE PART NUMBERS

CP808

M405.098/2

Storno



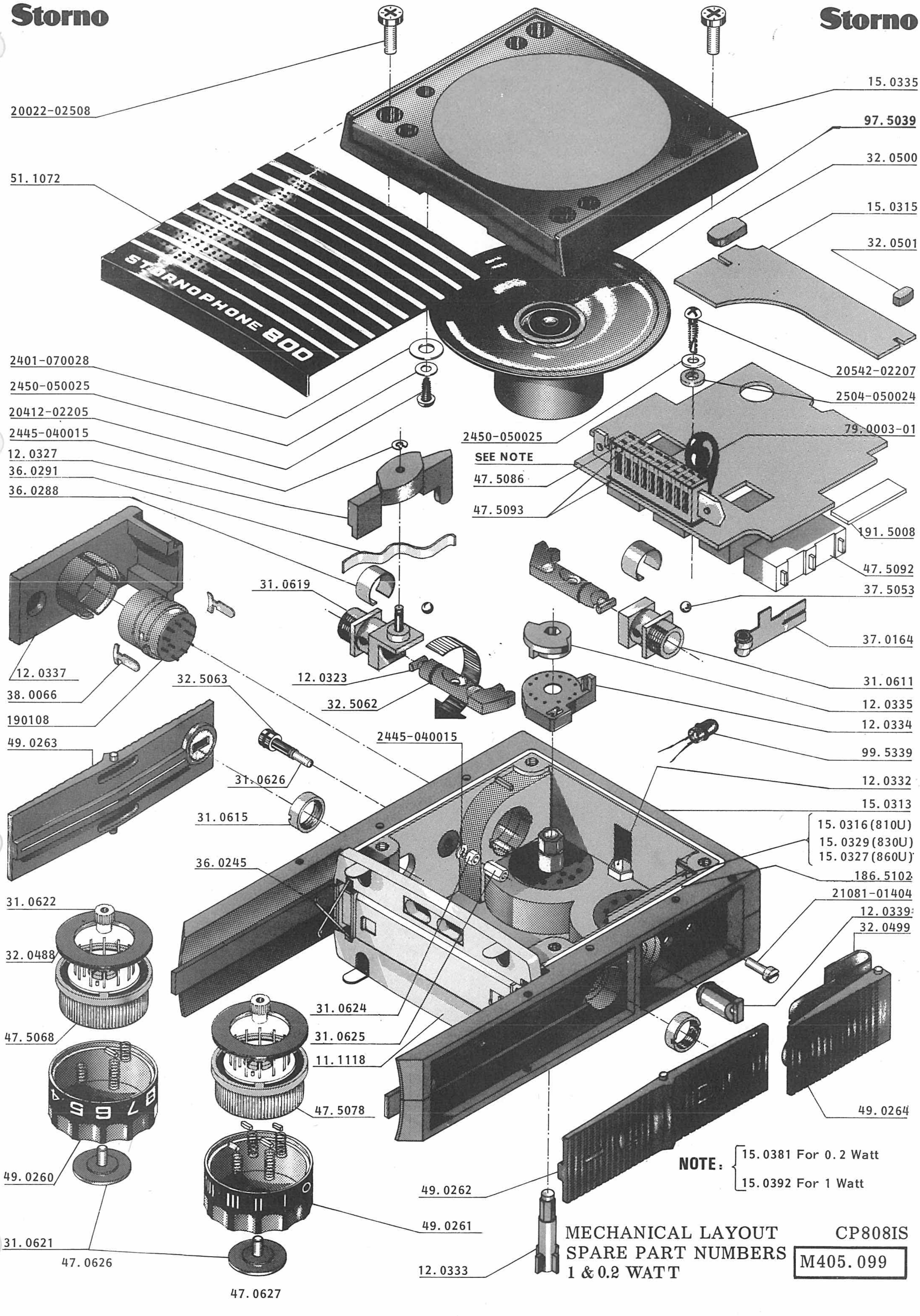
CONTROL HEAD

MECHANICAL LAY OUT

CP808

M405.083

Storno Storno

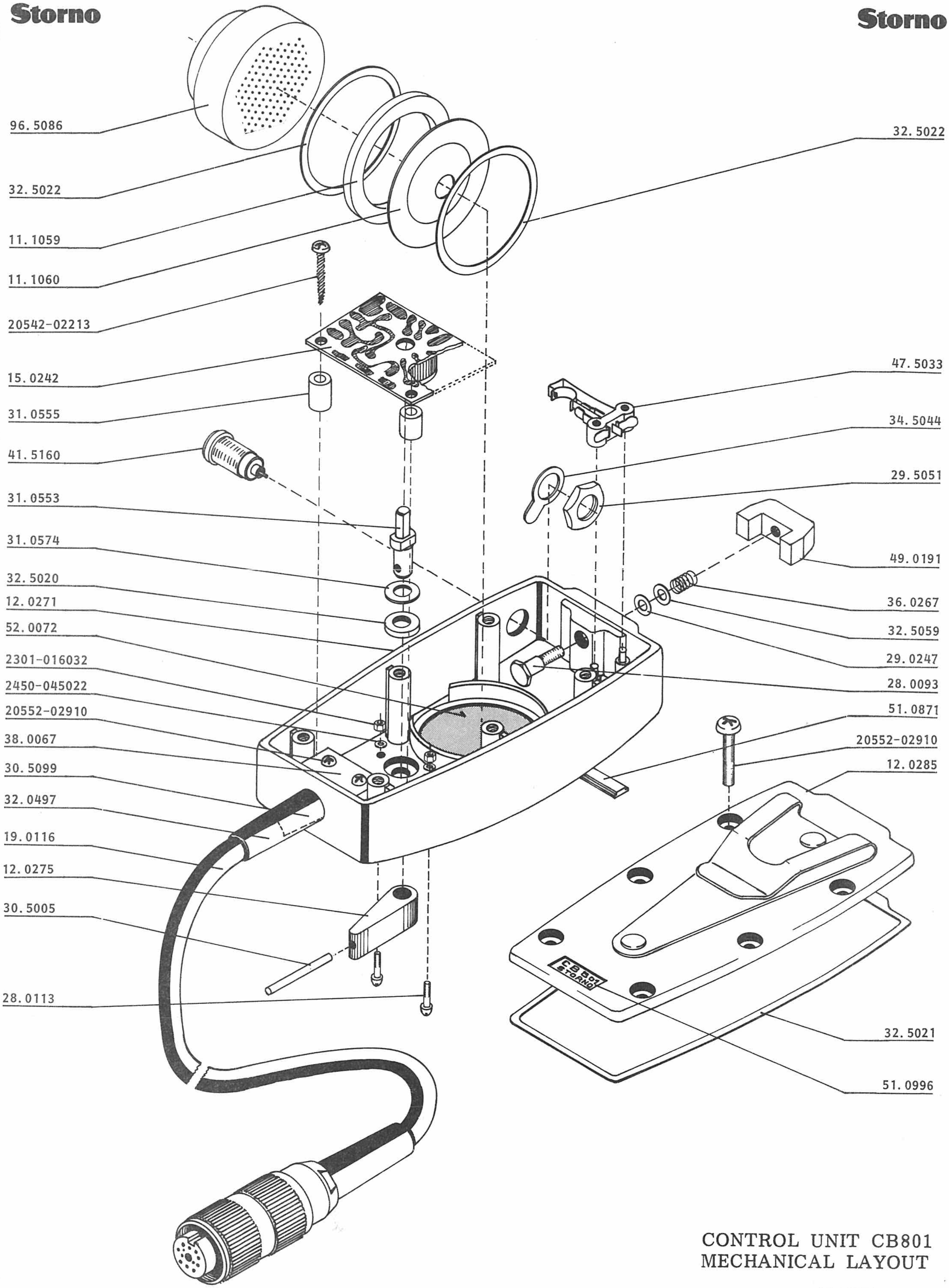


MECHANICAL LAYOUT
SPARE PART NUMBERS
1 & 0.2 WATT

CP808IS

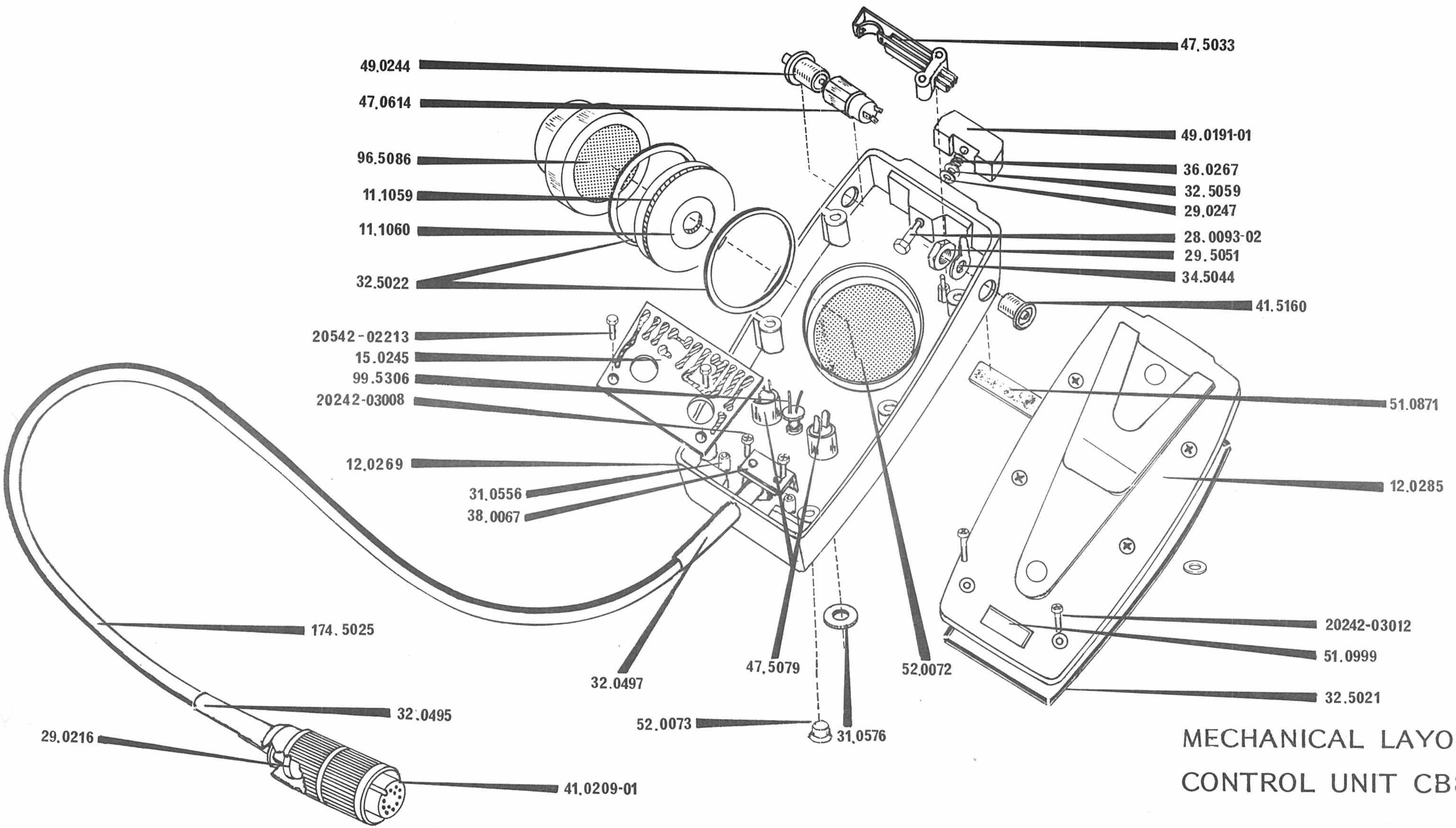
M405.099

Storno



CONTROL UNIT CB801
MECHANICAL LAYOUT

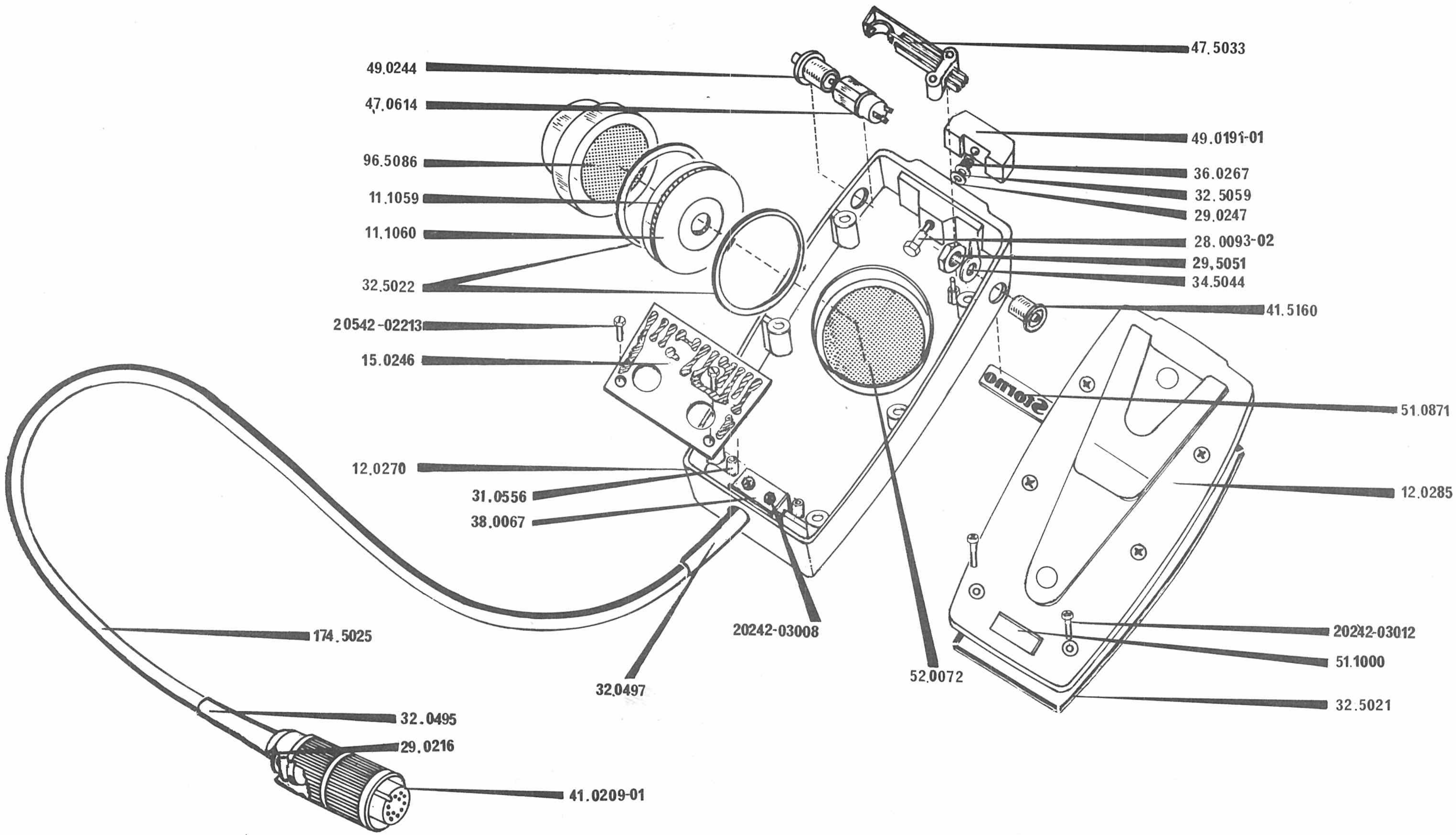
M405.094



MECHANICAL LAYOUT CONTROL UNIT CB802.

M405.058/5

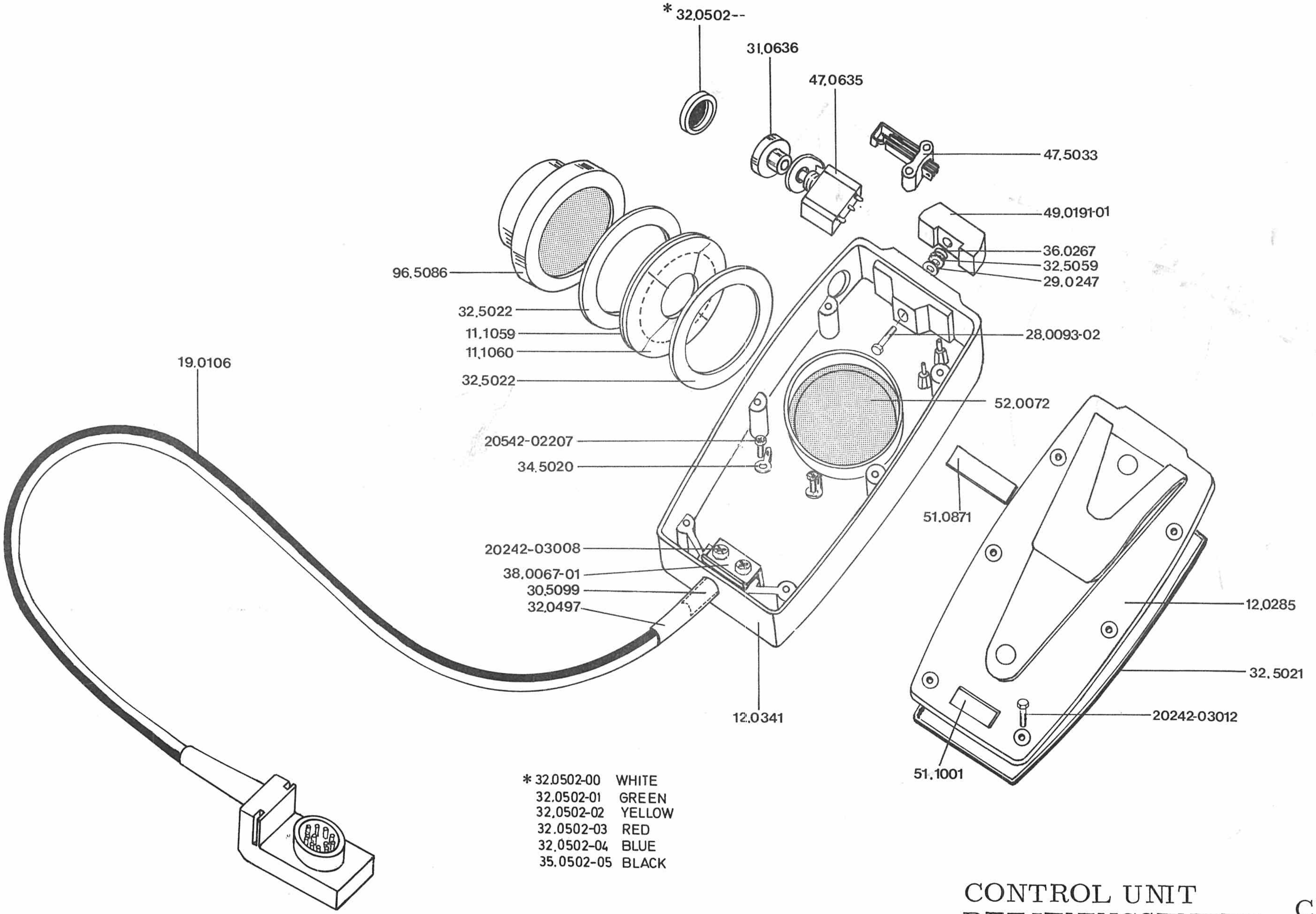
Storno



MECHANICAL LAYOUT
CONTROL UNIT CB803

M405.059/4

Storno



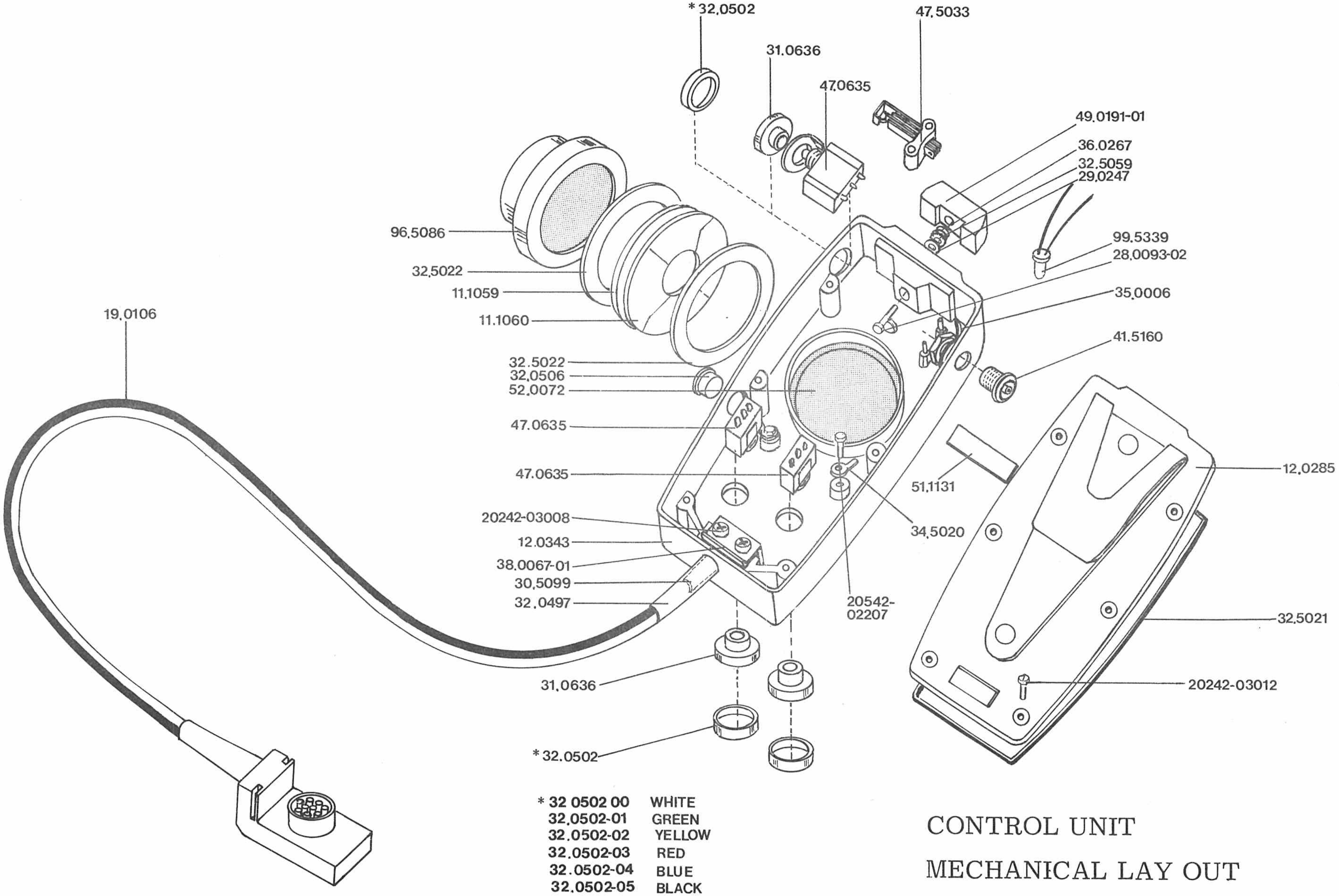
* 32,0502-00	WHITE
32,0502-01	GREEN
32,0502-02	YELLOW
32,0502-03	RED
32,0502-04	BLUE
35,0502-05	BLACK

CONTROL UNIT
BETJENINGSENHED

CB804

M405.086/2

Storno



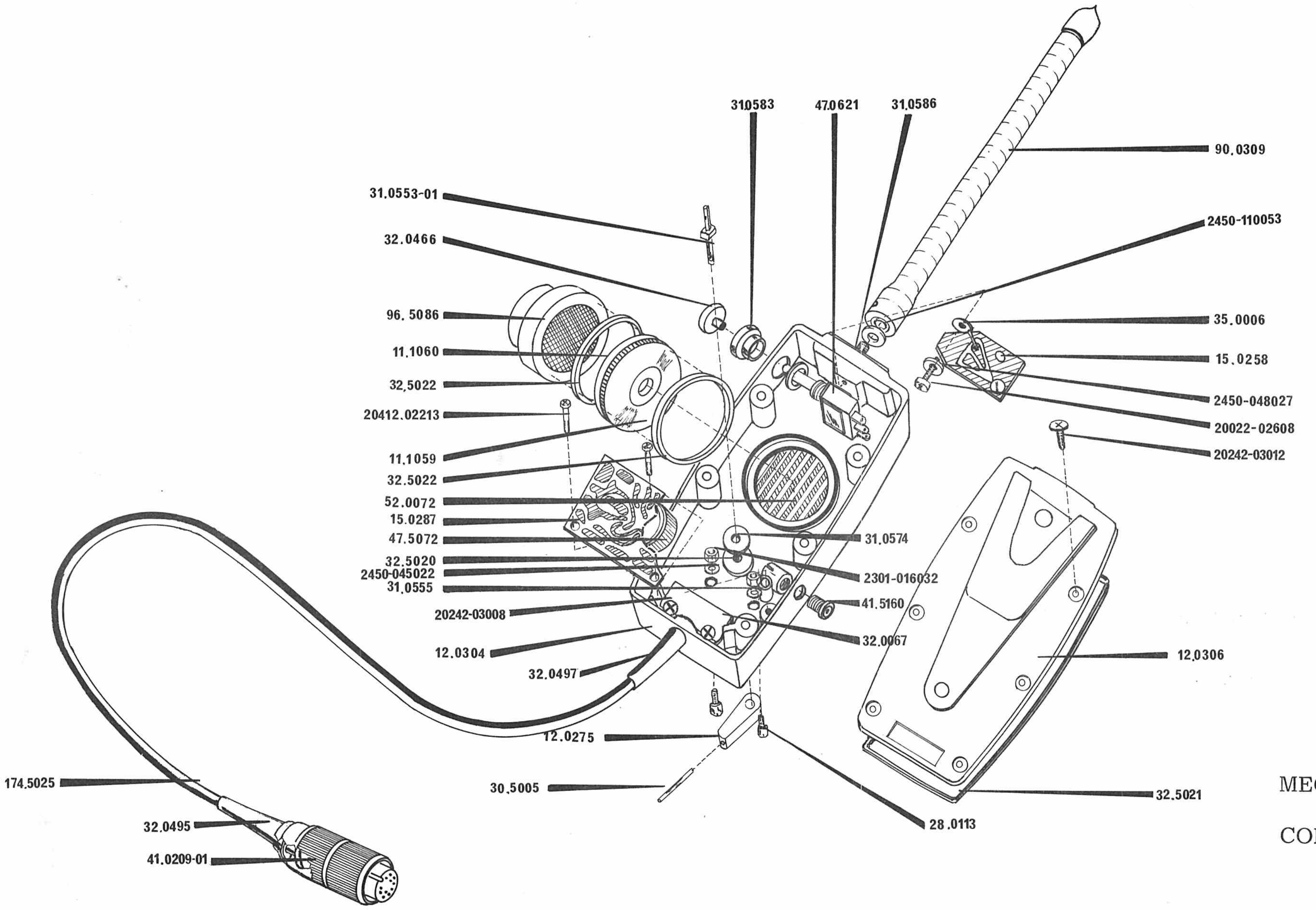
* 32 0502 00	WHITE
32,0502-01	GREEN
32,0502-02	YELLOW
32,0502-03	RED
32,0502-04	BLUE
32,0502-05	BLACK

CONTROL UNIT
MECHANICAL LAY OUT

CB805

M405.084/2

Storno

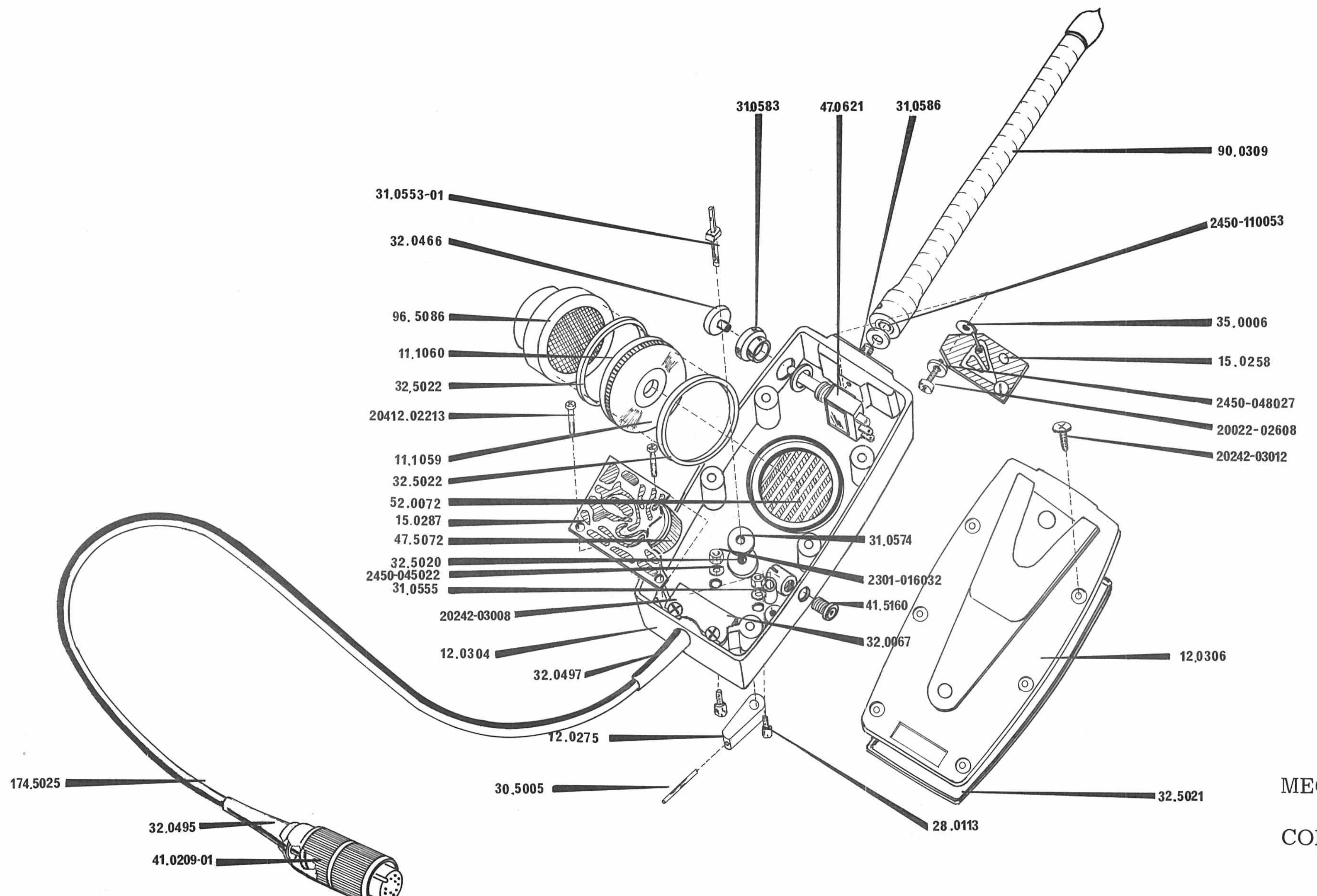


MECHANICAL LAY-OUT

CONTROL UNIT CB811

M405.066/3

Storno

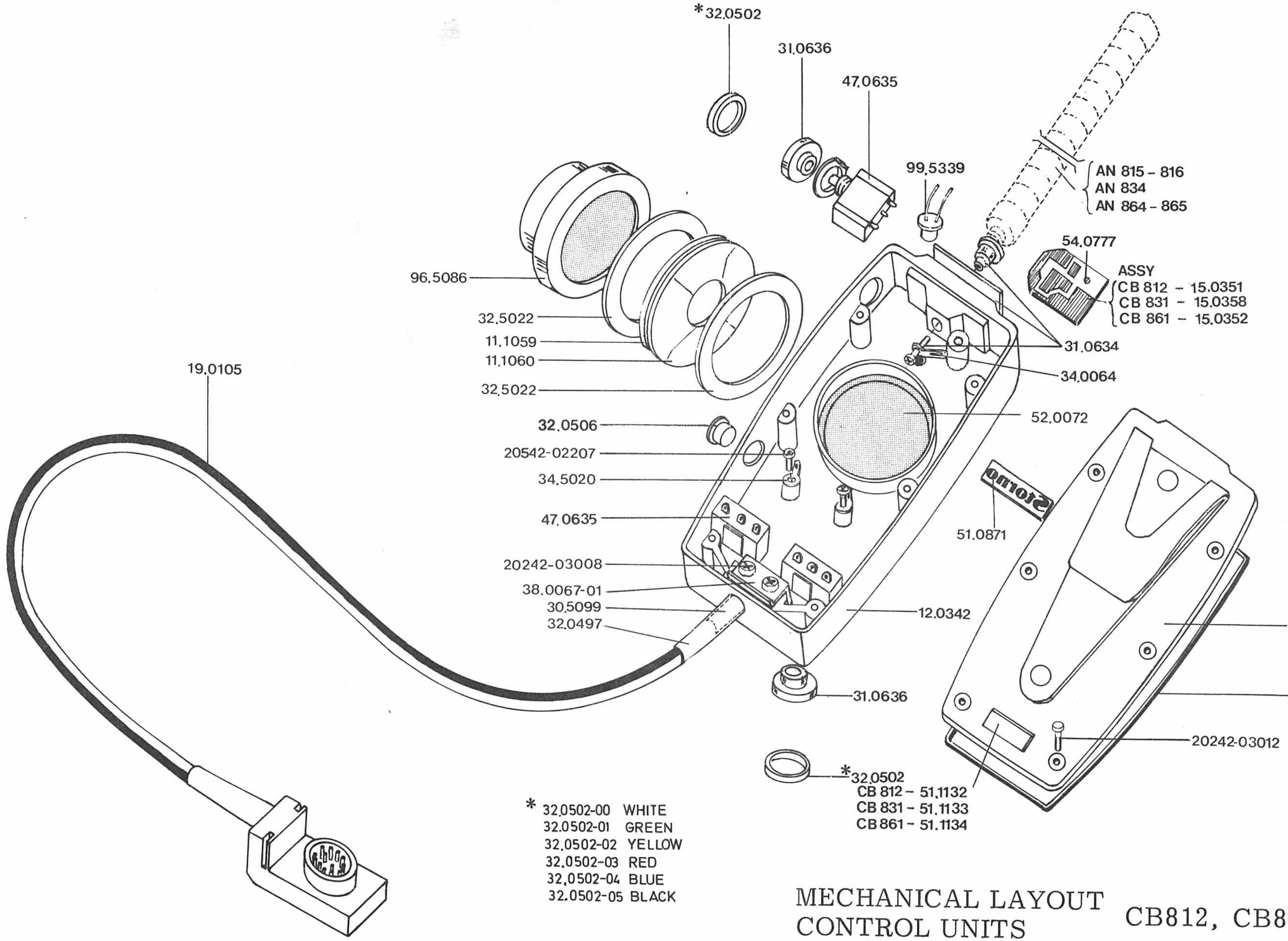


MECHANICAL LAY-OUT

CONTROL UNIT CB811

M405.066/3

Storno

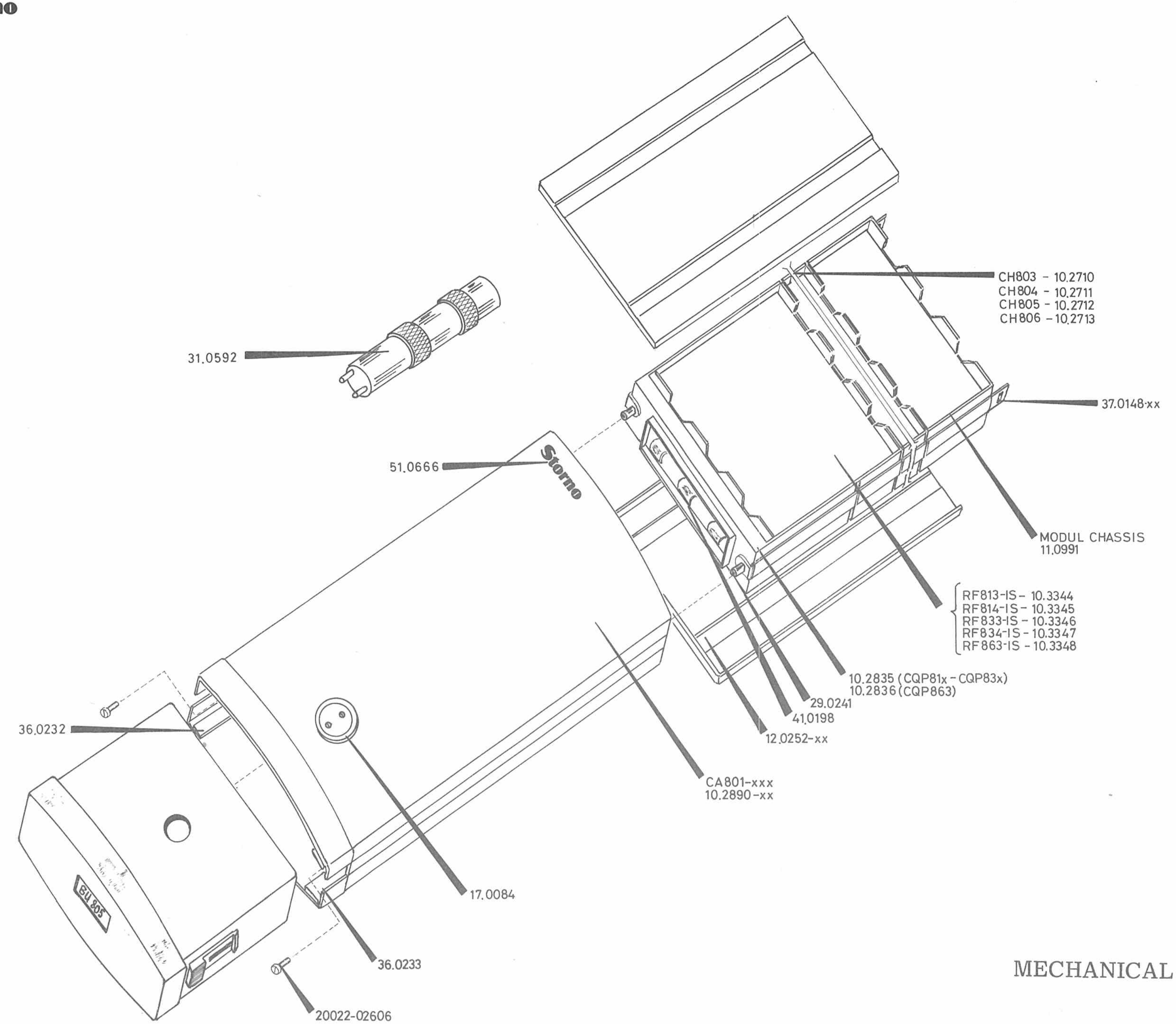


MECHANICAL LAYOUT CONTROL UNITS

CB812, CB831, CB861

M405.090

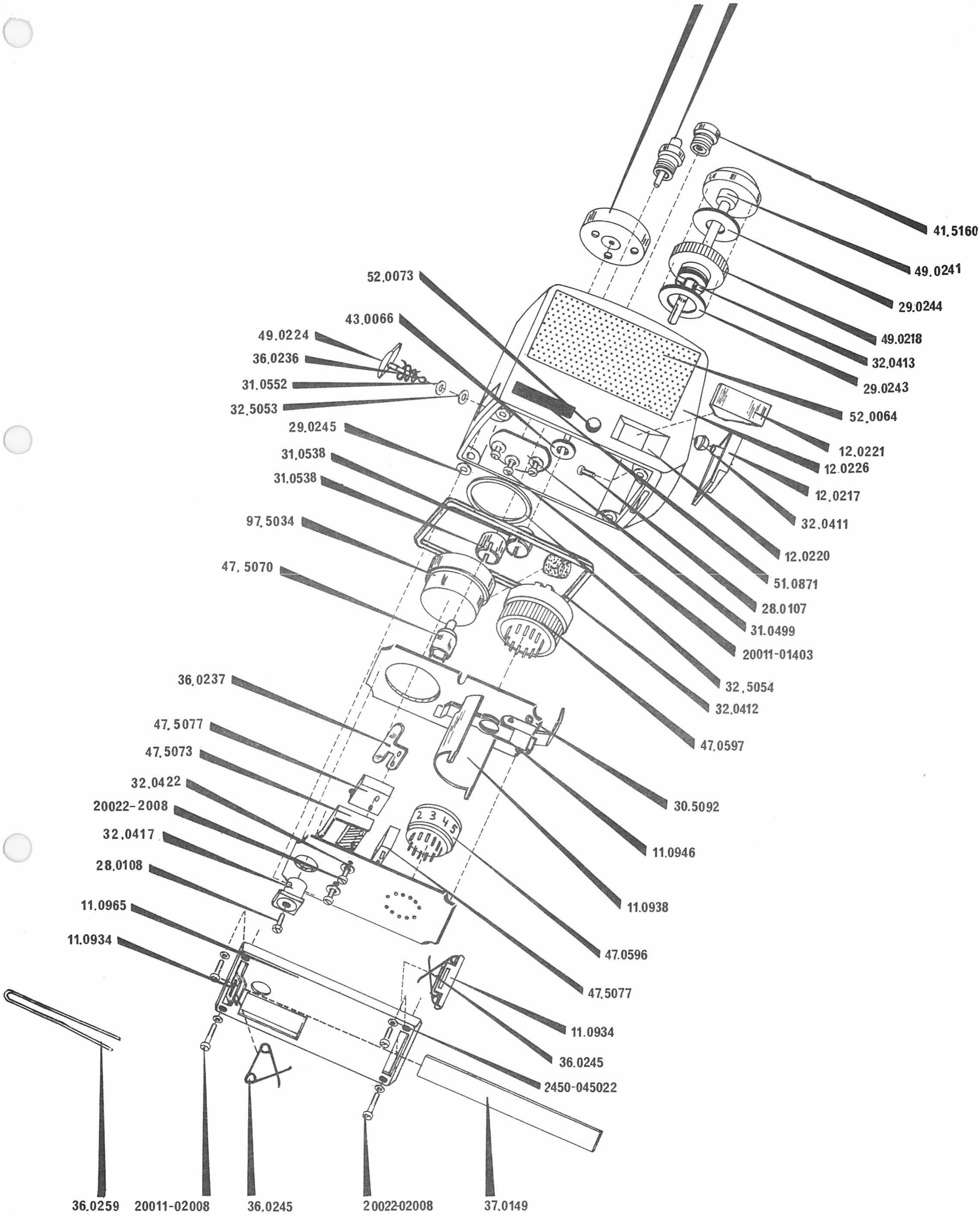
Storno



MECHANICAL LAY-OUT CA800-IS

M405.069

Storno

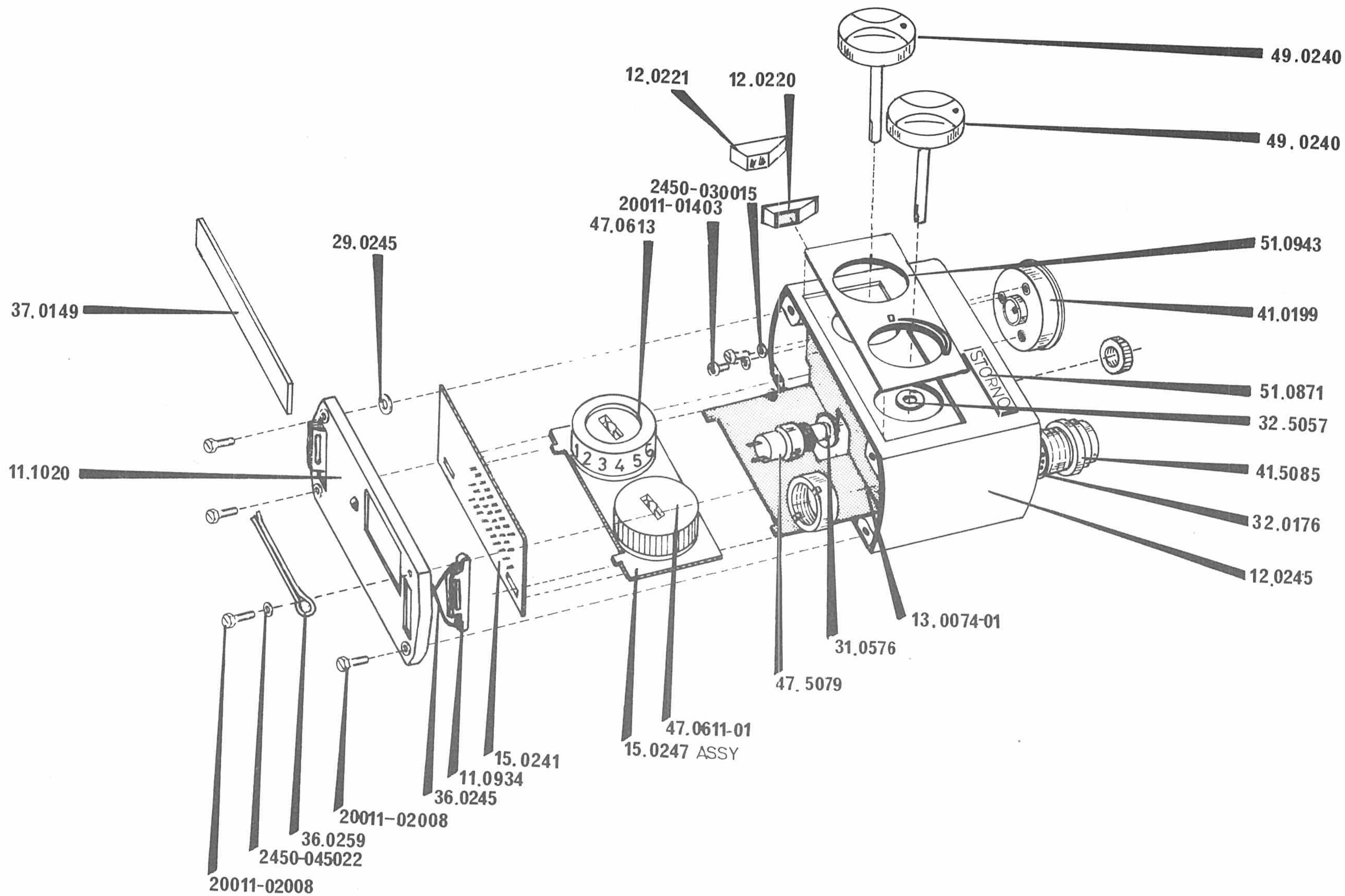


MECHANICAL LAY-OUT
CONTROL HEAD

CP801-IS

Storno

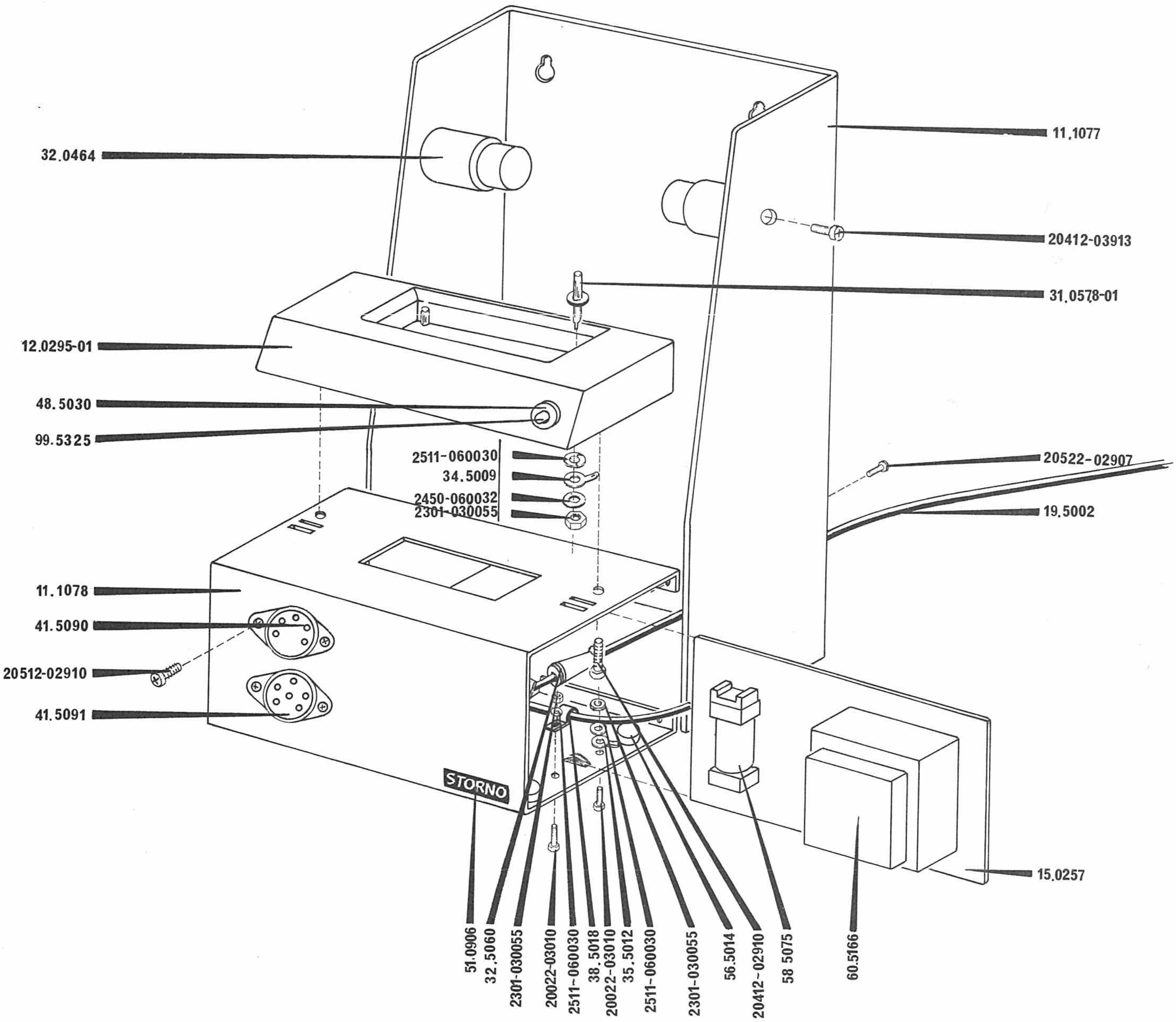
Storno



MECHANICAL LAY-OUT
CONTROL HEAD

CP802-IS

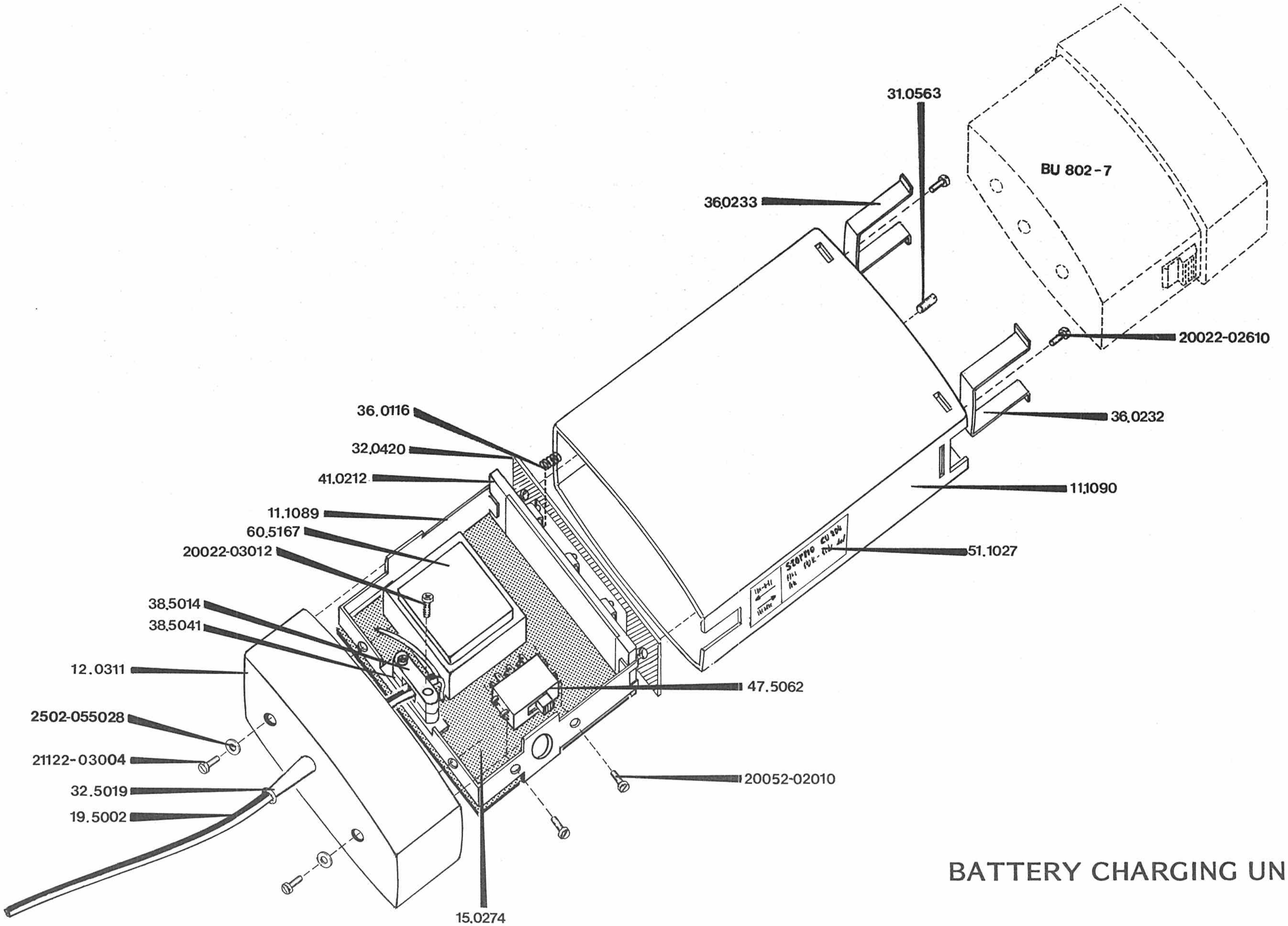
M405.068



BATTERY CHARGING UNIT CU803

M405.074

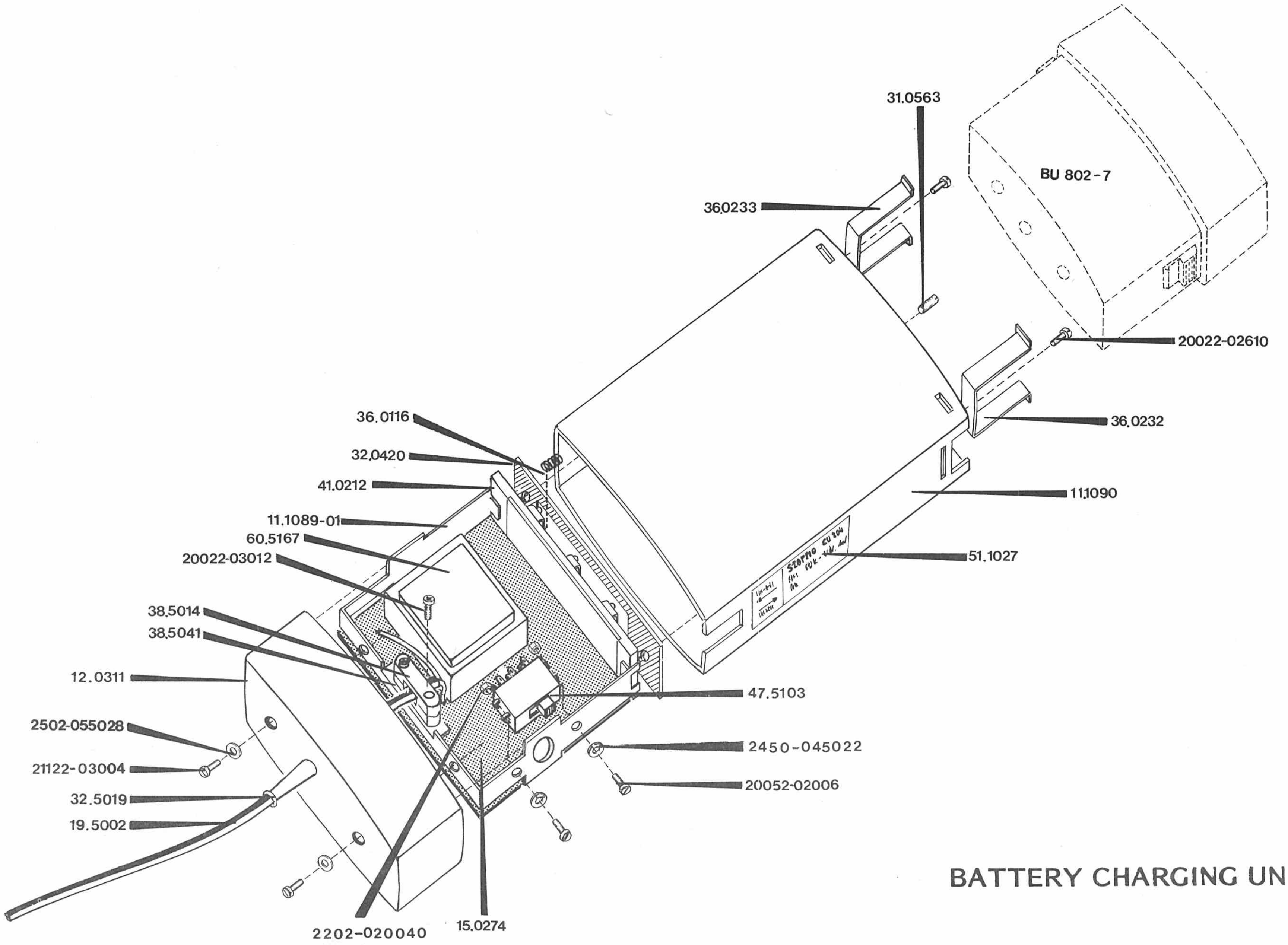
Storno



BATTERY CHARGING UNIT CU804

M405.075/4

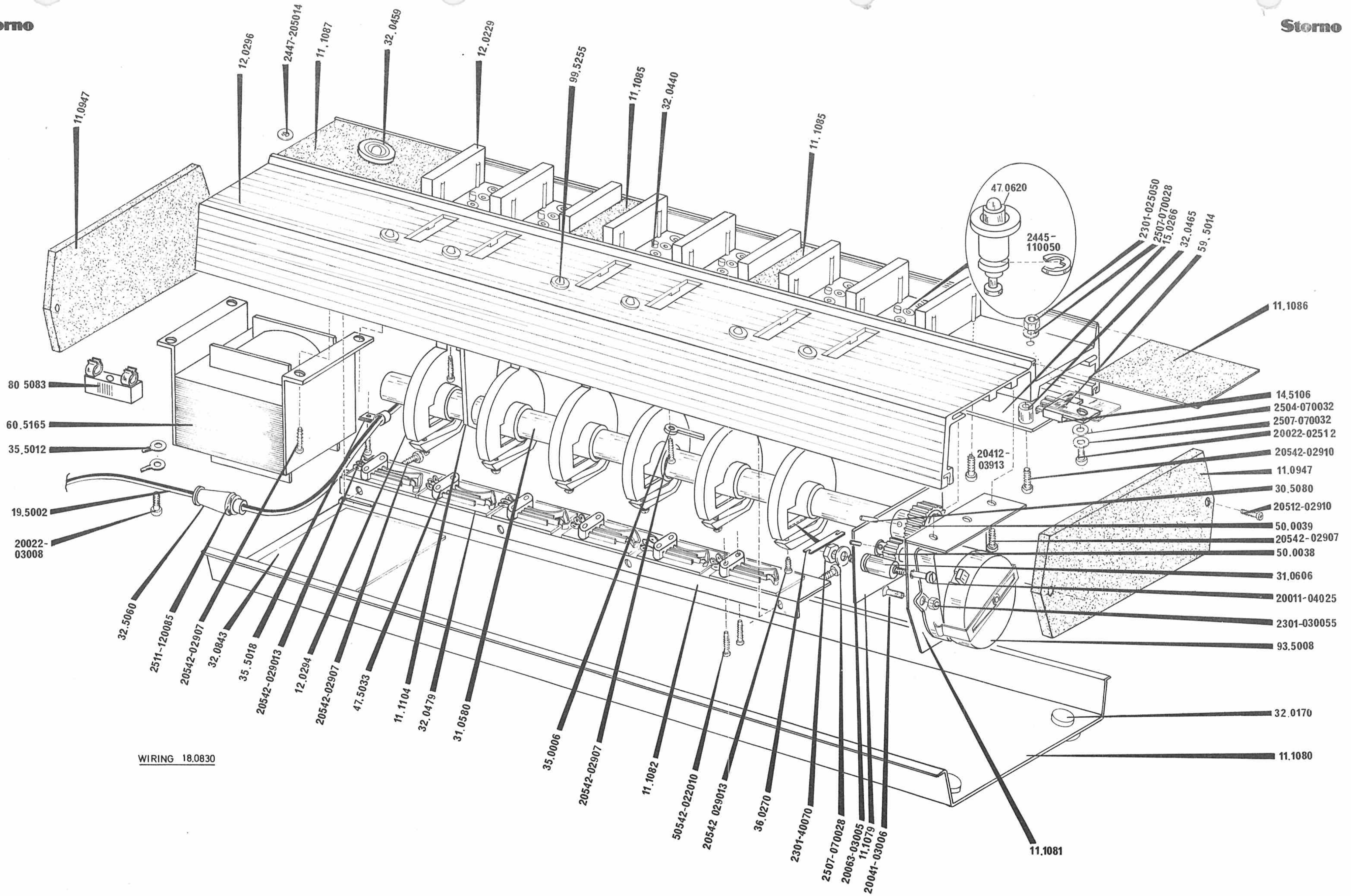
Storno



BATTERY CHARGING UNIT CU804

M405.075/5

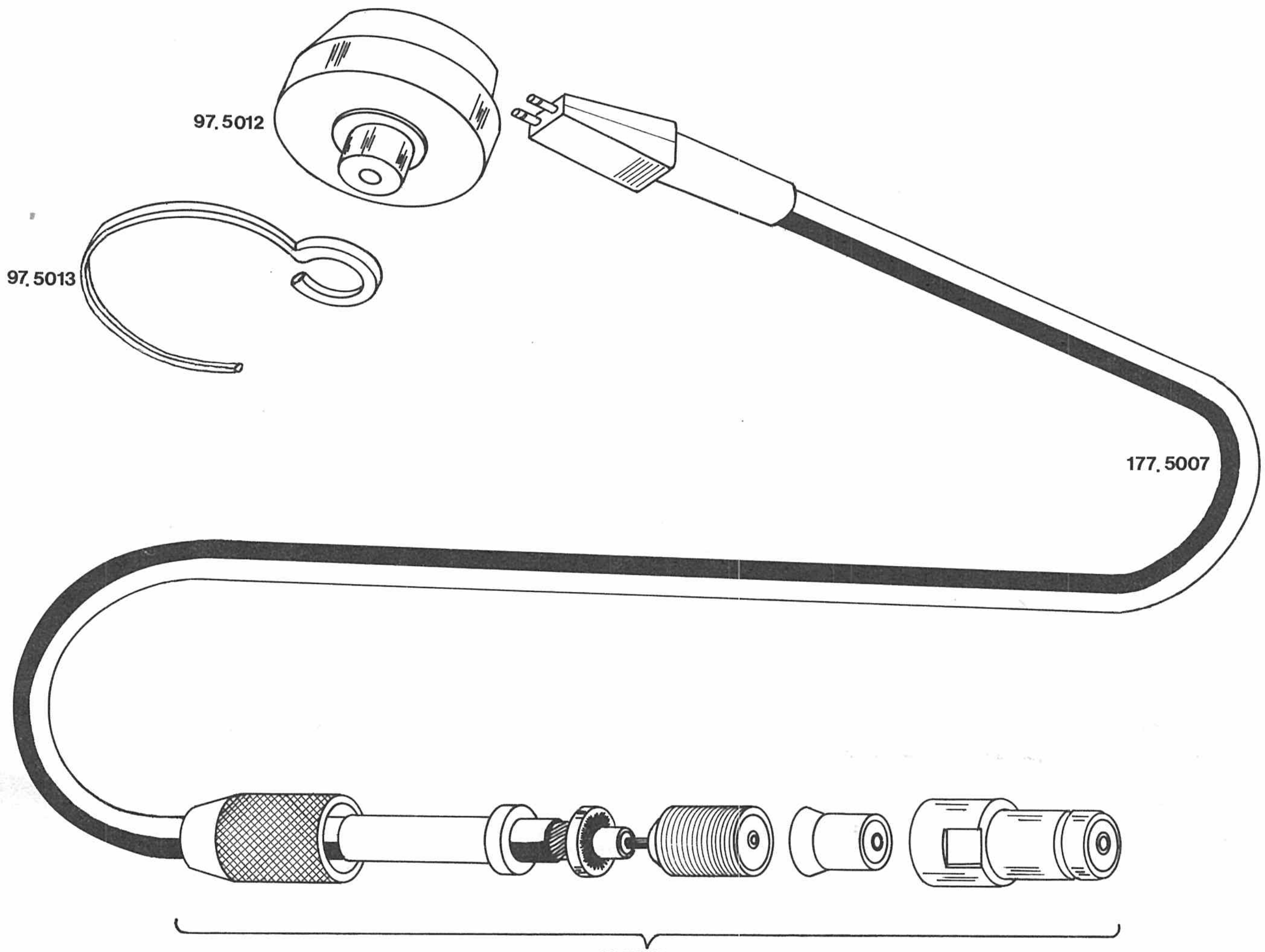
Storno



BATTERY CHARGING UNIT CU805

M405.072

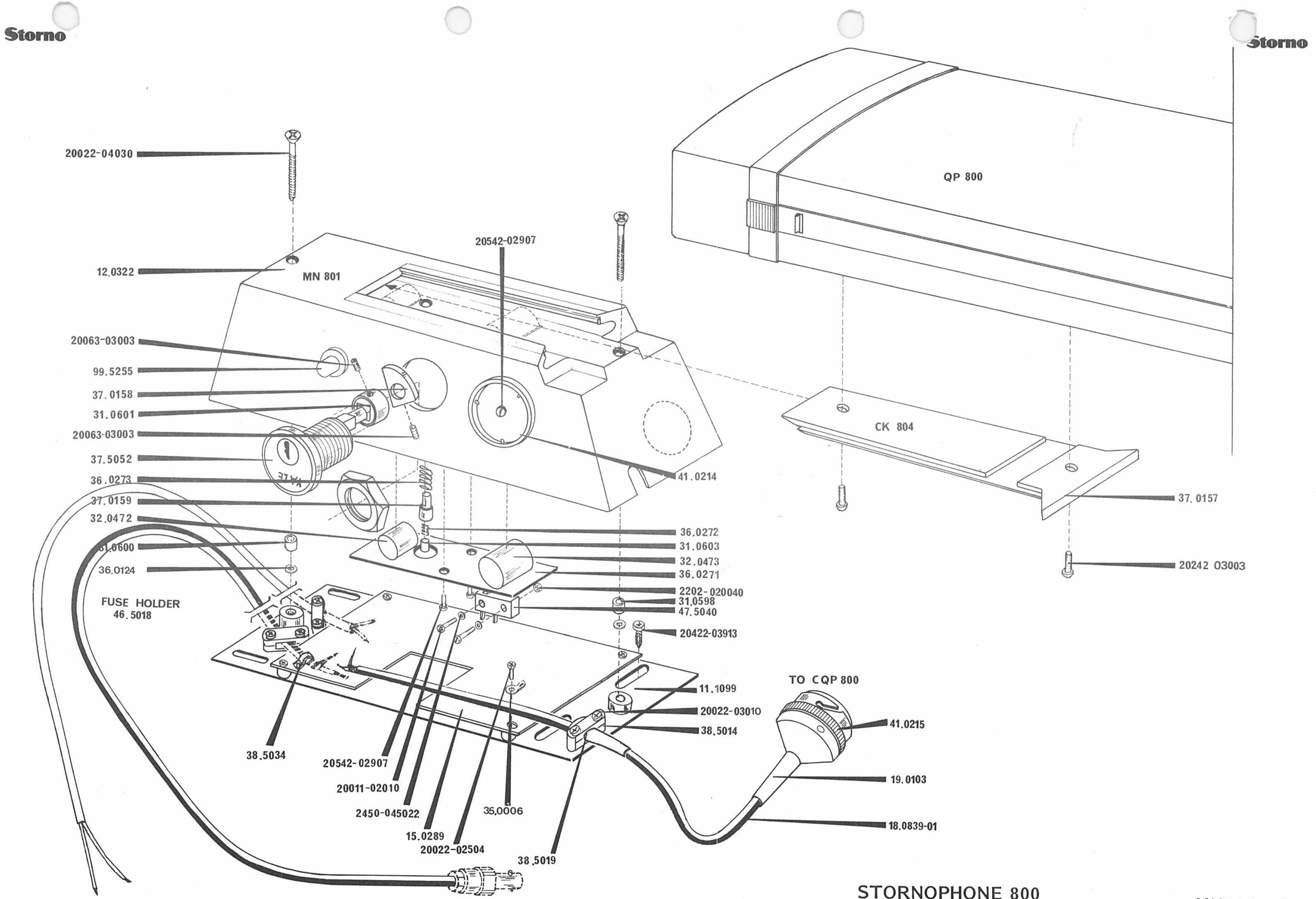
Storno



J 709 414 P1

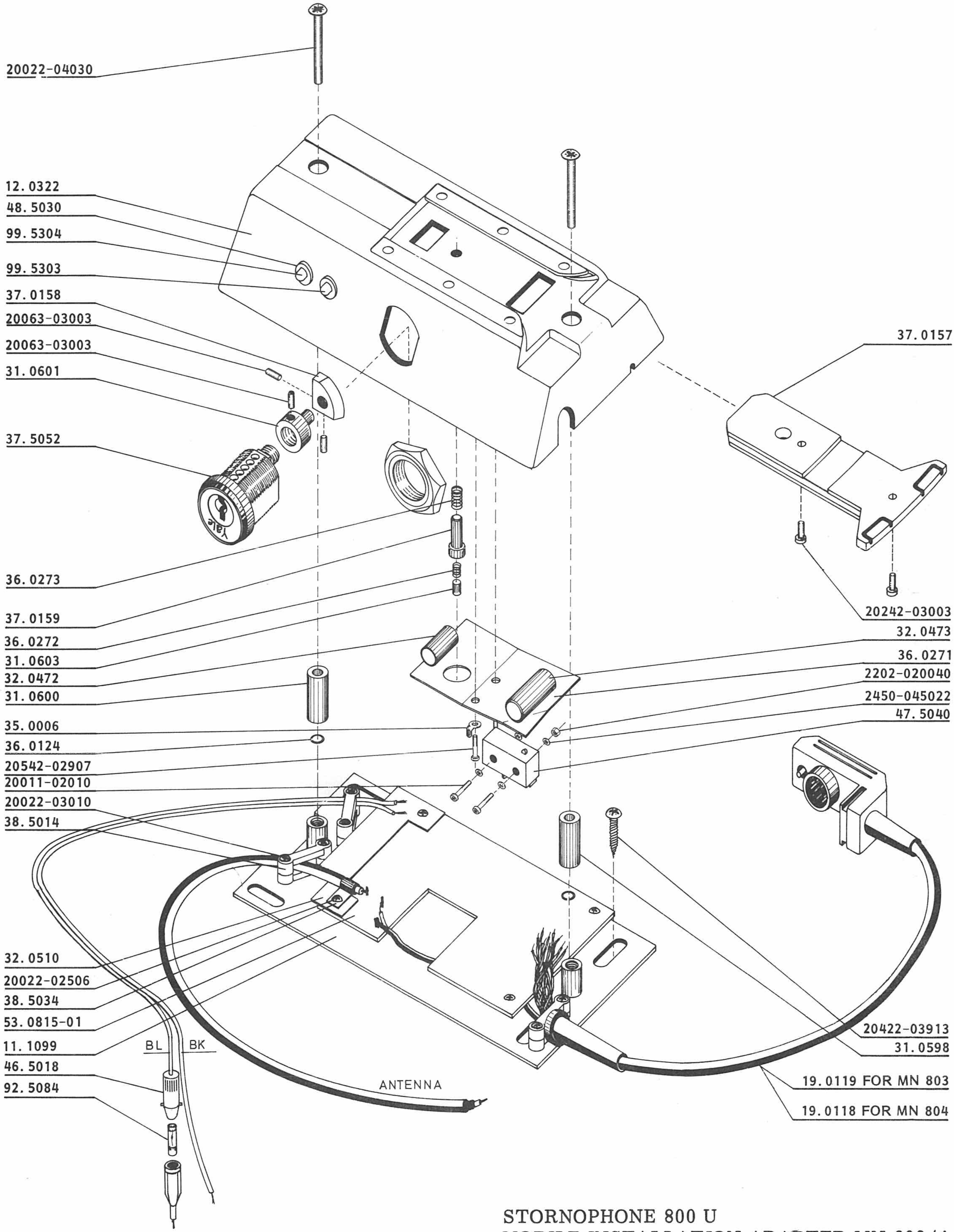
EARPHONE HP801

M405.079



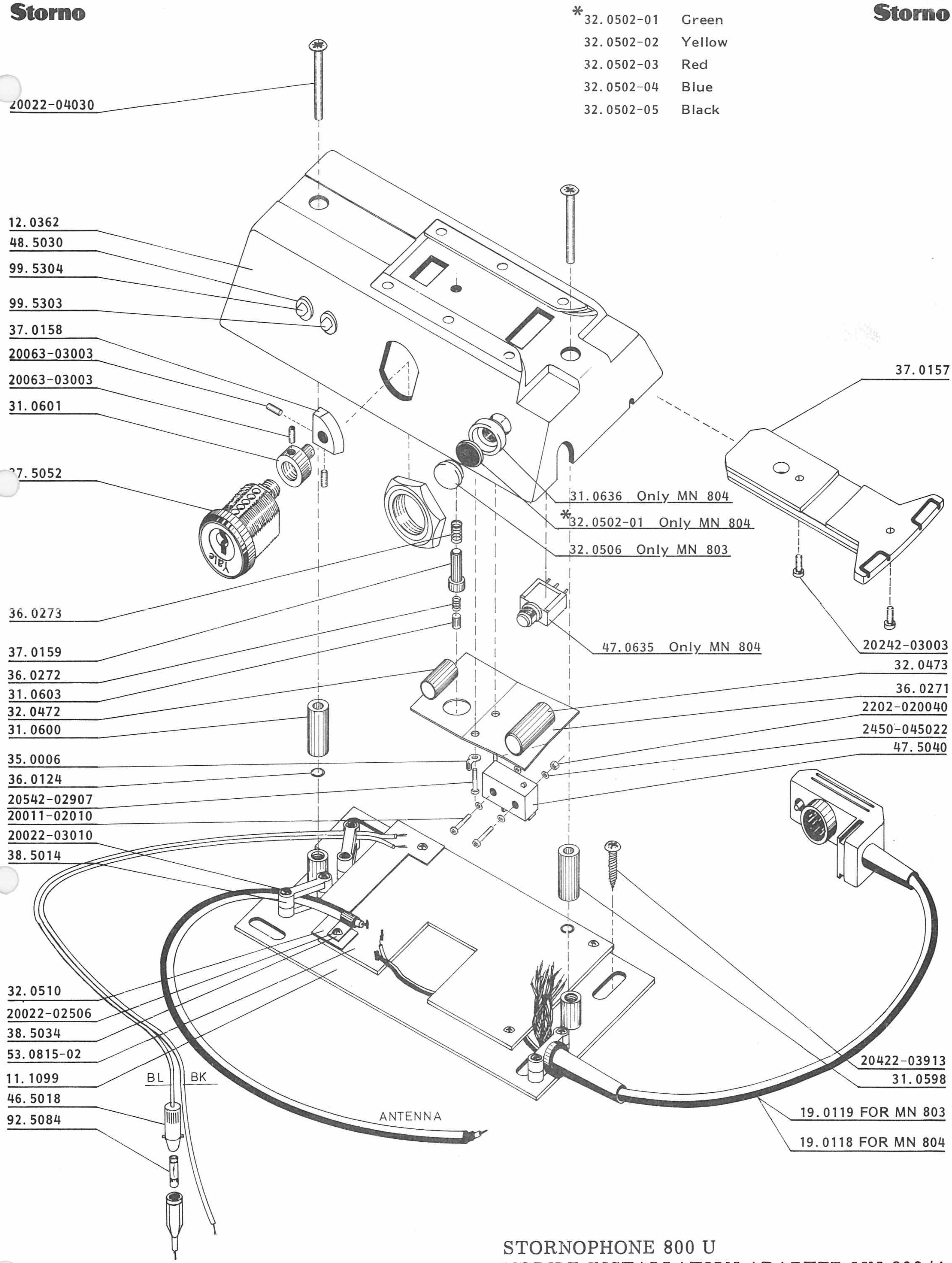
STORNOPHONE 800
MOBILE INSTALLATION ADAPTER MN801

M405.073/2



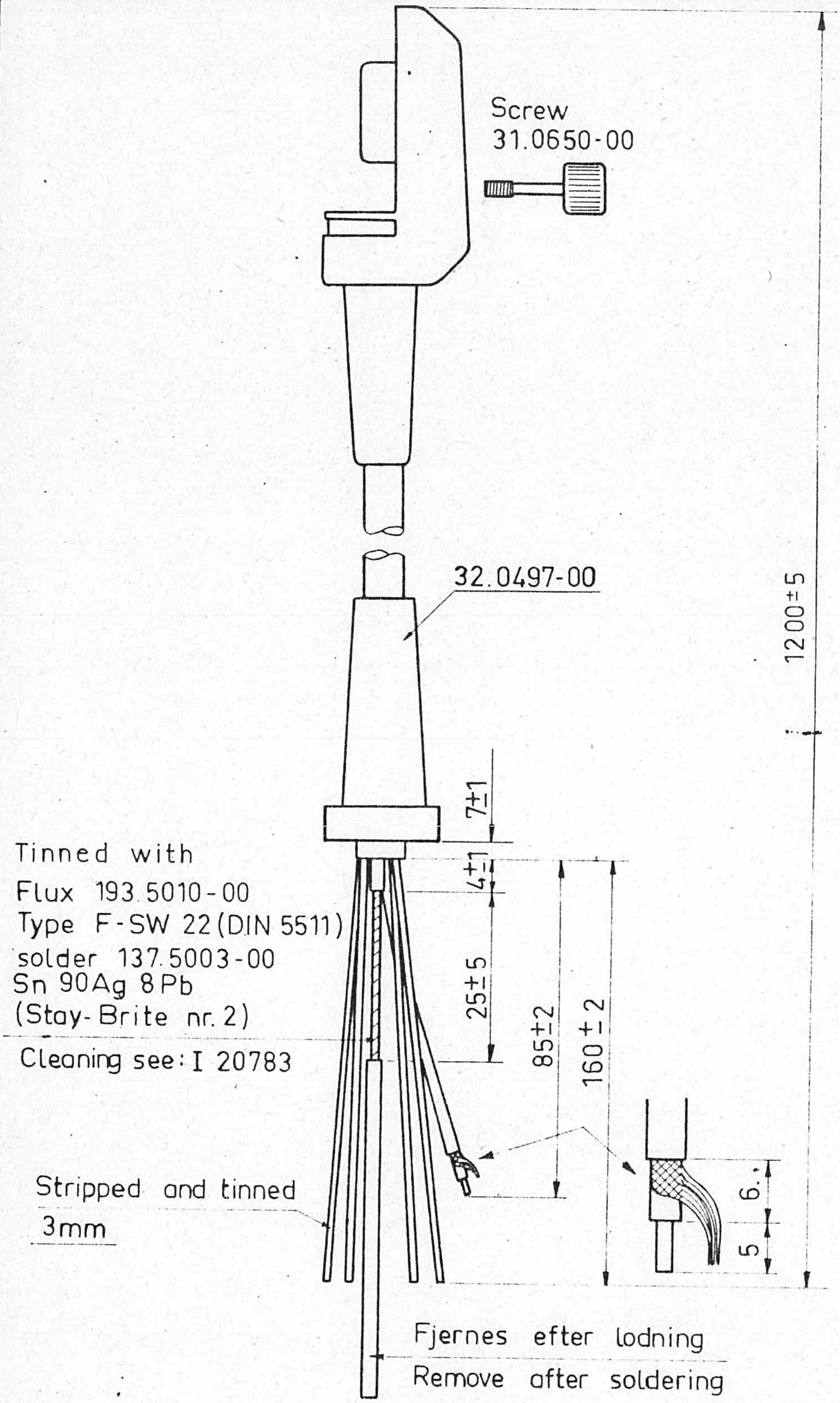
STORNOPHONE 800 U
MOBILE INSTALLATION ADAPTER MN 803/4

M 405.093



STORNOPHONE 800 U
MOBILE INSTALLATION ADAPTER MN 803/4

M405.093/2



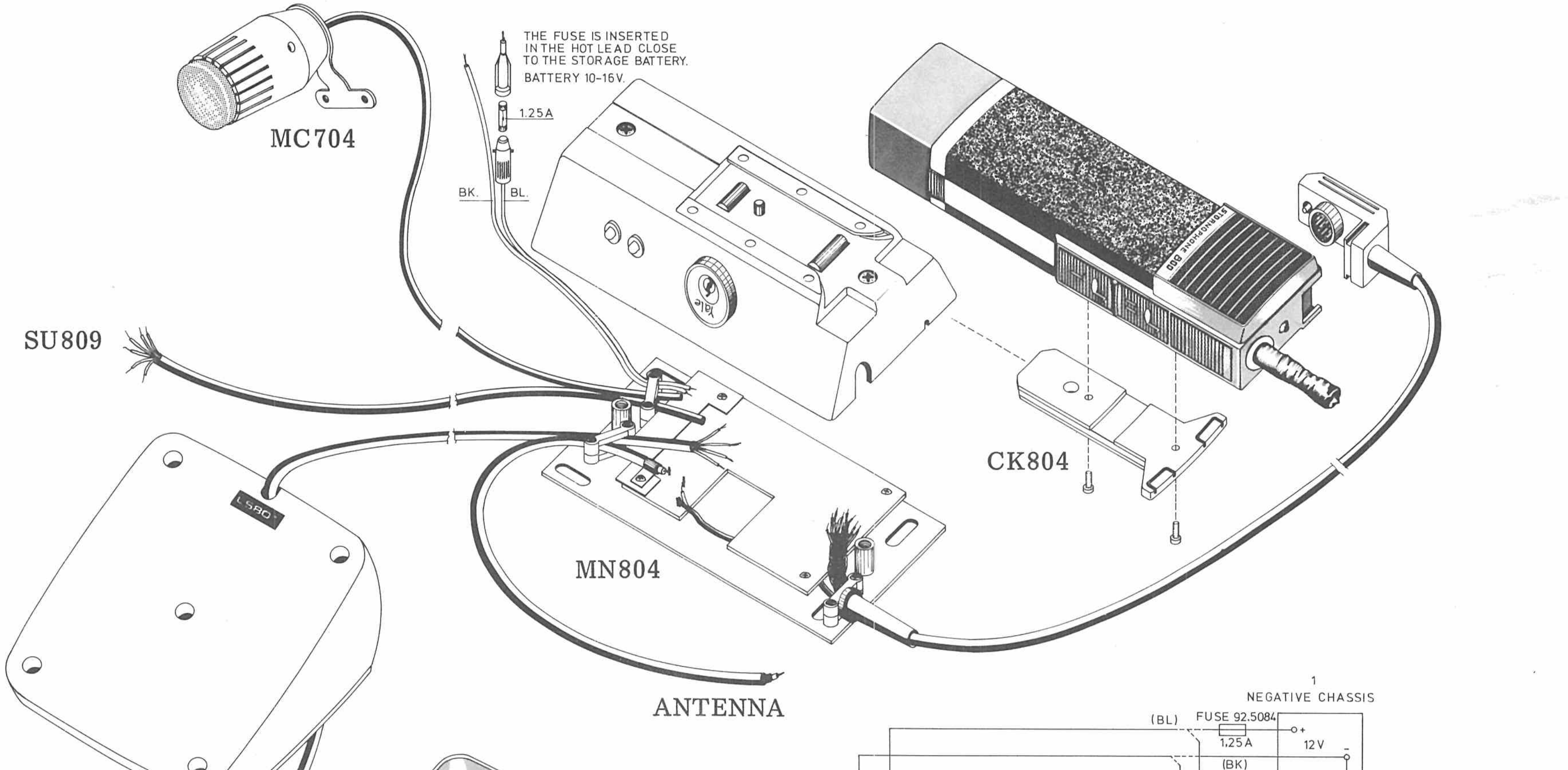
scale:

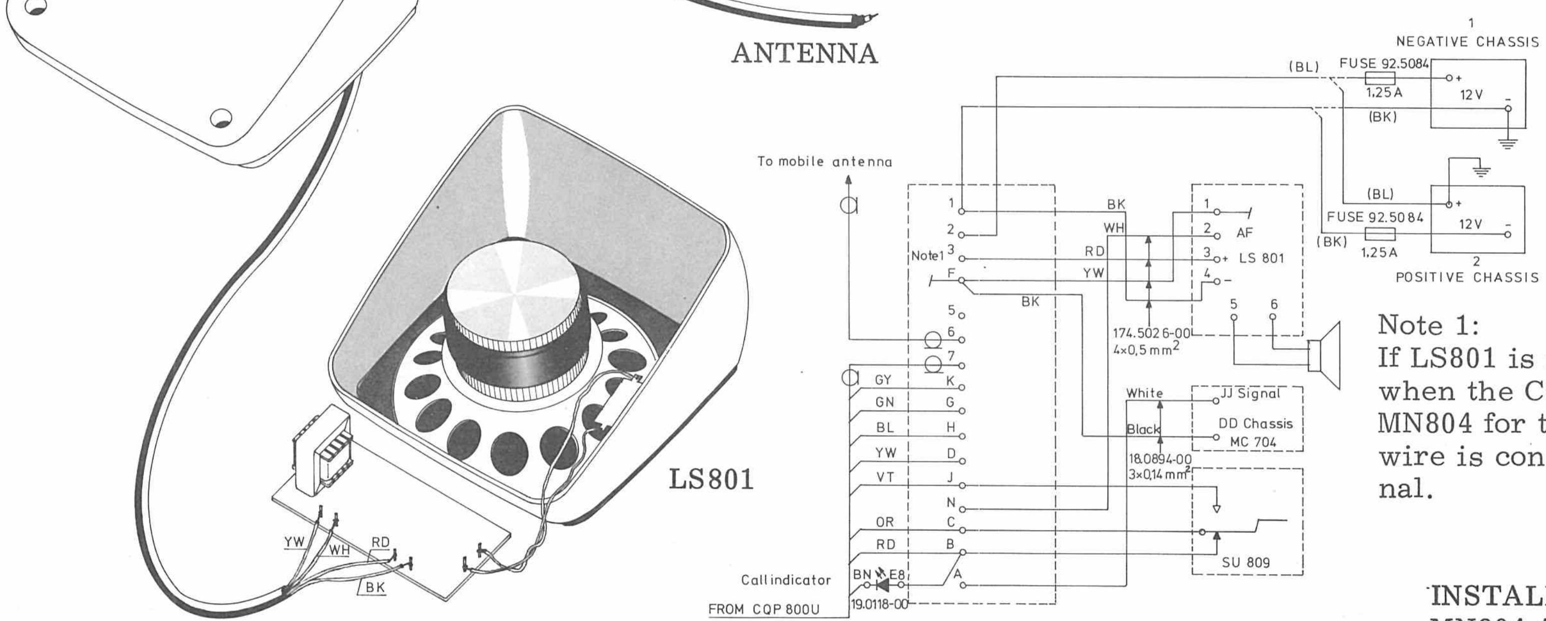
revisions	sign	date	workpiece	finish	approved for	sign date
f			19.0120-00		inform	
e					tooling	
d					A pilot prod	78 jan 23
c			dim		P production	
b			weight g/piece			
a						

Sterno	designer LM/LSK	date 78-1-23	first made for MN 803	CABLE WITH CONN. 19.0119-00 part no	draw no K25827 A4

Storno

Storno



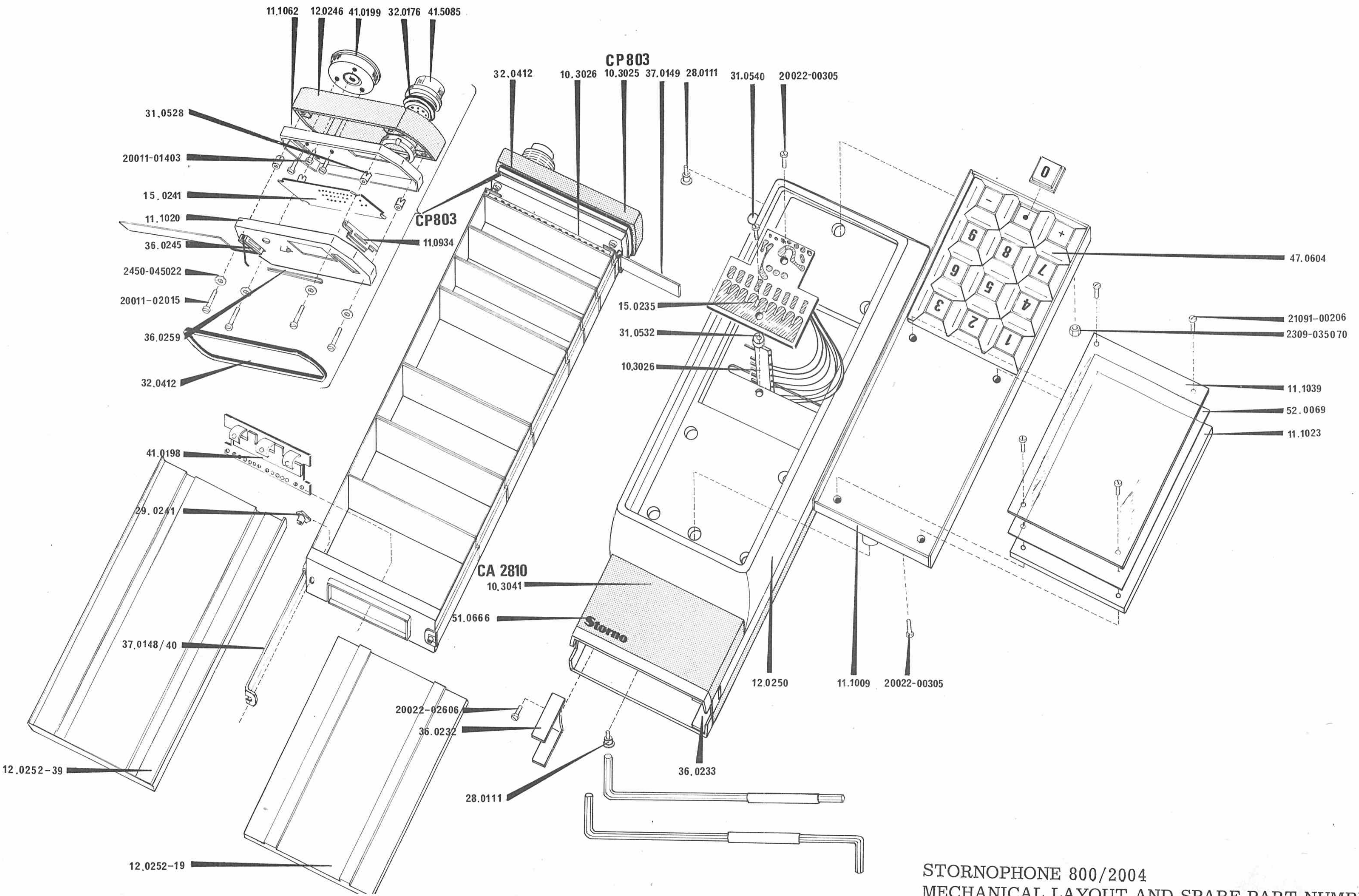


Note 1:
If LS801 is not to be disconnected when the CQP800 is removed from MN804 for transmitting, the red wire is connected to the (+) terminal.

INSTALLATION DIAGRAM FOR MN804 AND LS801

D 402.599

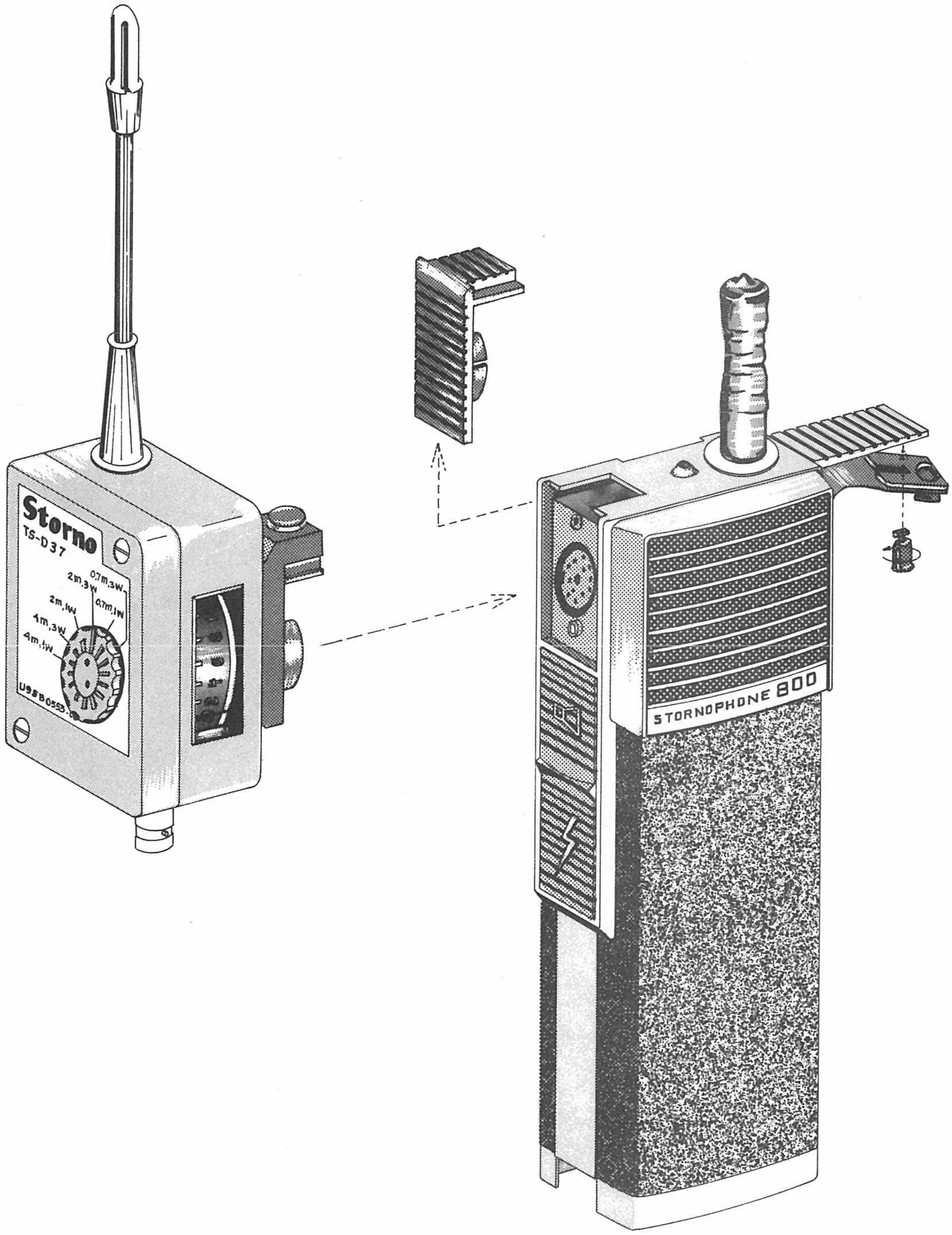
Storno Storno



STORNOPHONE 800/2004
MECHANICAL LAYOUT AND SPARE PART NUMBER.

M405.054

Storno



ANTENNA TEST INSTRUMENT
TS - D37

M 405·092

11.2.82

64 Opkald Part Liste

Part nummer	stk	Beskrivelse
12.0395-01	1	L S Ramme
J 70 6178 P1	2	Bøsning (31.5009-) } forefindes på eget Lager
12.0394-00	1	Ramme for 8017
* 186.5102-00	0.5m	Pakning 1.5mm Ø 215mm Lang
32.0534-00	1	Pakning for kabling
52.0092-00	1	Net for Højttaler - rustfri
J 706 266 P3	2	Ferritperle (erstatter PC filter jnf. AN 705)
J 70 6338 P1	2	Rotor - ITT omskifter
12.0423-00	1	forplade - boret (med Tal)
32.5057-00	2	O-Ring - til omskifter akse
12.0406-00	2	Knap
12.0408-00	2	Rotor - for omskifter
37.5041-00	4	Kugle - for omskifter
36.0306-00	4	fjeder - for omskifter
28.0125-00	4	skrue - til forplade montering - unbrako
~~32.0550-01~~	1	Plastik rør - afstandsstyk L=5.5mm
~~32.0551-01~~	1	Plastikrør - afstandsstyk L= 7mm
32.0286-01	2	Skive - Teflon - til omskifter
	1	Kabling
* (186.5177-00	E.Varer)	
31.0621-00	2	Skrue for omskifter knap
	*	Dybdal E-vare lager

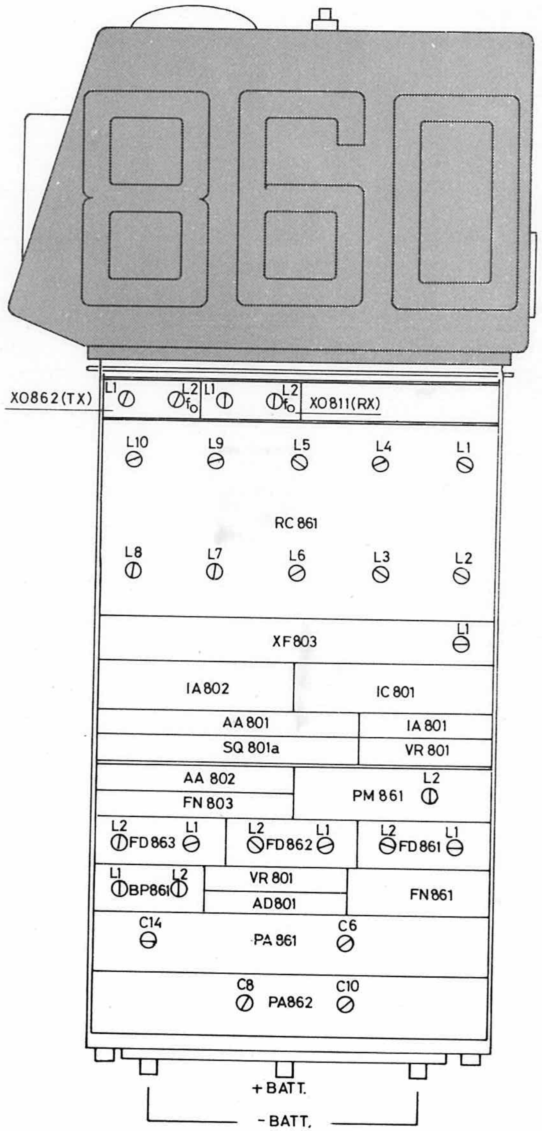
STORNOPHONE 800
MAINTENANCE MANUAL
Section 9.

TITLE		Code
CQP810	Aligment card	D402.089
CQP830	Aligment card	D402.090
CQP860	Aligment card	D402.091
CQP810U	Aligment card	D402.540
CQP830U	Aligment card	D402.539
CQP860U	Aligment card	D402.541

Storno
RADIO COMMUNICATION SYSTEMS

ALIGNMENT CARD

SERIES 800

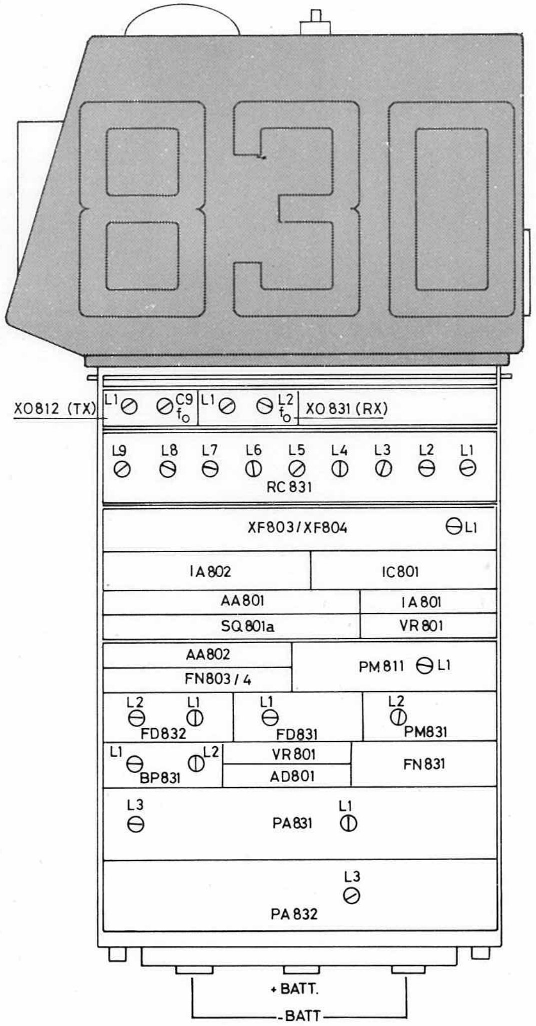


D402.091

Storno
RADIO COMMUNICATION SYSTEMS

ALIGNMENT CARD

SERIES 800

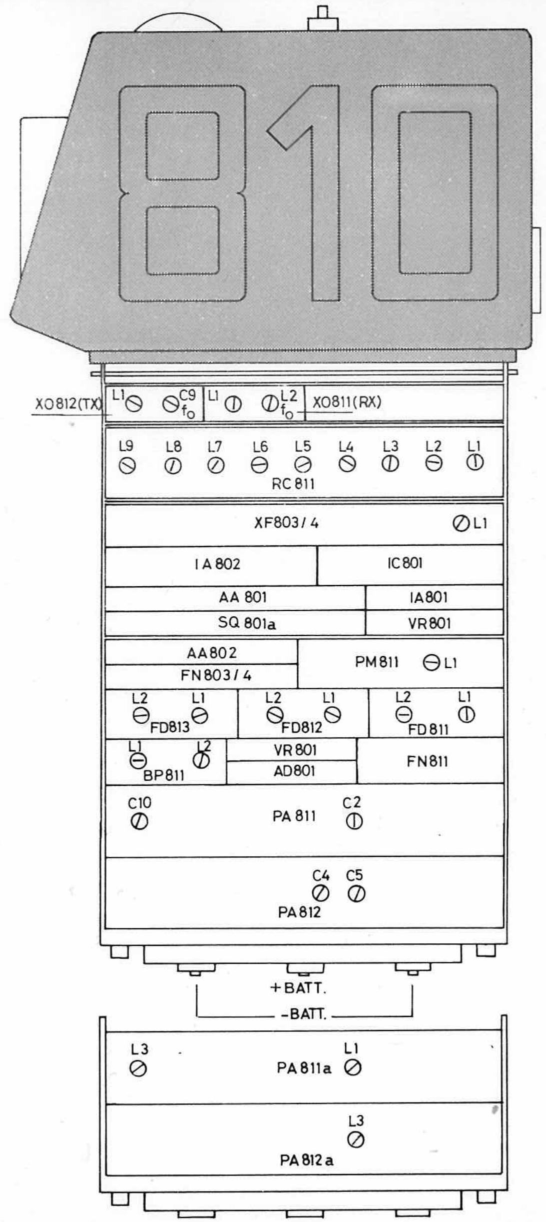


D402.090

Storno
RADIO COMMUNICATION SYSTEMS

ALIGNMENT CARD

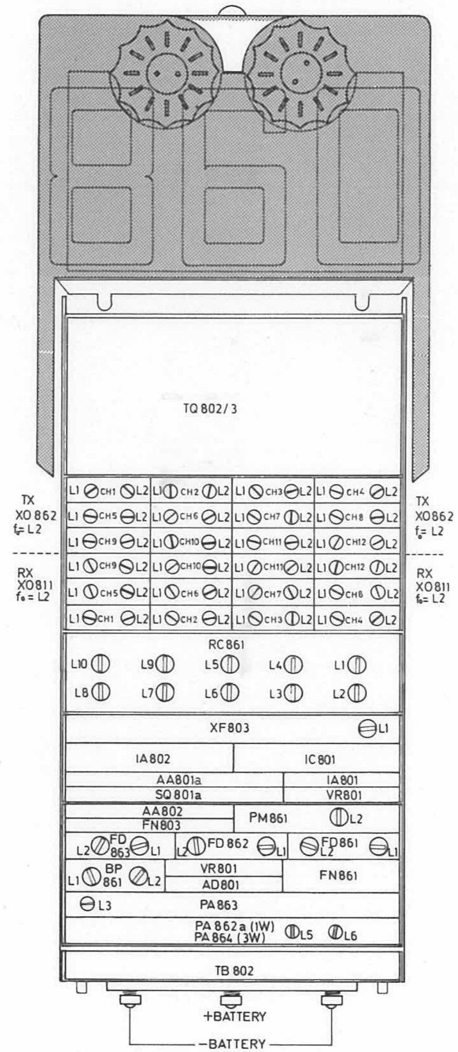
SERIES 800



D402.089

Storno

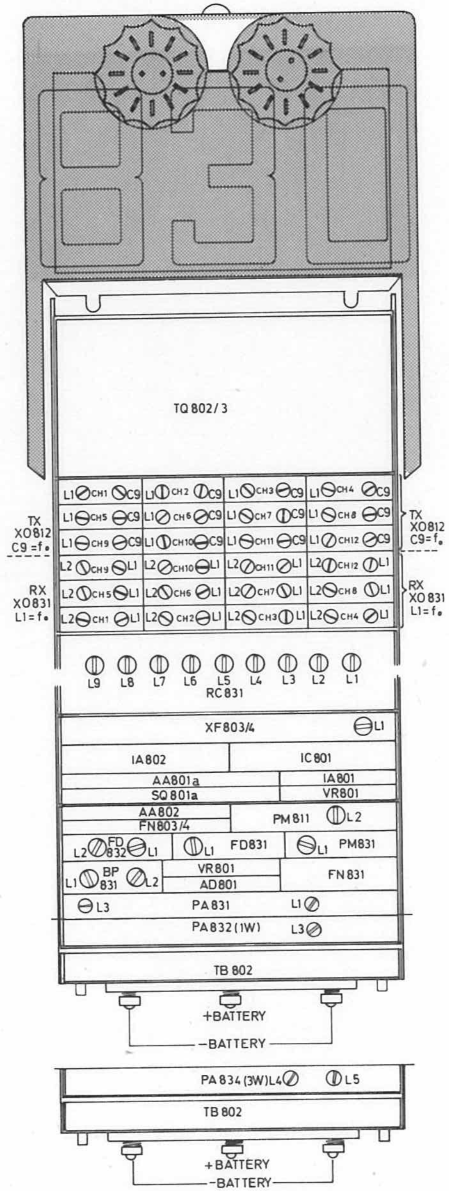
ALIGNMENT CARD — CQP800U



D402.541

Storno

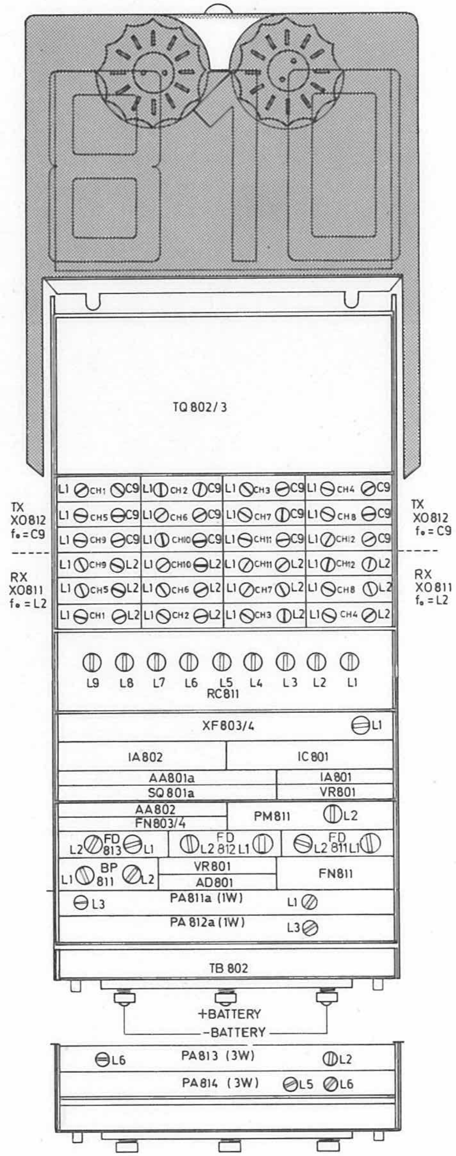
ALIGNMENT CARD — CQP800U



D402.539

Storno

ALIGNMENT CARD — CQP800U



D402.540

STORNOPHONE 800
MAINTENANCE MANUAL
Section 10.

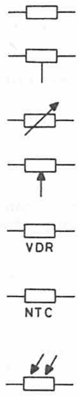
TITLE
Graphical Symbols

Code
60.085-E1

Service Coordination
2 - 79

GRAPHICAL SYMBOLS USED IN STORNO CIRCUIT DIAGRAMS

Resistors (R)



- Resistor
- Resistor with fixed tap
- Variable resistor
- Resistor with movable tap
- Varistor (voltage-dependent resistor)
- Temperature-dependent resistor with negative temperature coefficient
- Light-sensitive resistor (Photosensitive resistor)

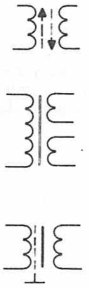
Capacitors (C)

- Capacitor
- Variable capacitor
- Trimmer capacitor
- Feedthrough capacitor
- Electrolytic capacitor

Coils (L)

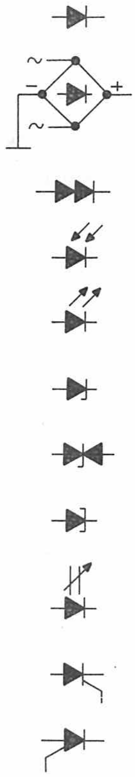
- RF coil, air core
- Coupled RF coils, air core
- RF coil with core
- RF coil with adjustable core
- AF choke

Transformers (T)



- Transformer with adjustable RF cores
- Transformer with iron core
- Transformer with screen connected to chassis

Diodes (E)

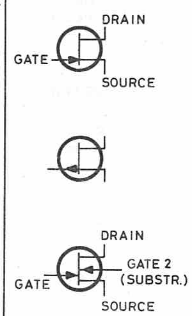


- Diode
- Bridge rectifier
- Series-connected stabilizer diodes within one case
- Light-sensitive diode (Photosensitive diode)
- Light-emitting diode
- Zener diode (unidirectional)
- Zener diode (bidirectional)
- Tunnel diode
- Varactor diode (capacitance diode)
- Controlled rectifier, PNPN (N-thyristor)
- Controlled rectifier, NPNP (P-thyristor)

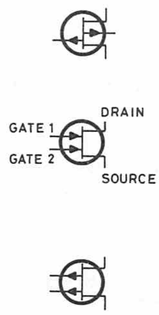
Transistors (Q)

- Transistor, PNP
- Transistor, NPN
- Light-sensitive transistor
- Unipolar transistor with N-type base
- Unipolar transistor with P-type base

Junction Field Effect Transistors (JFET)

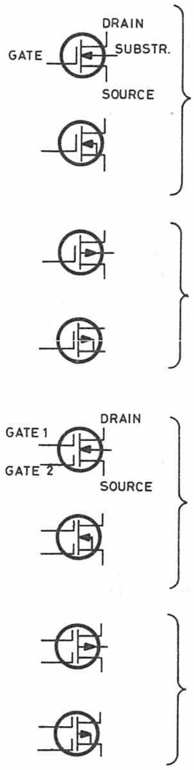


- N-channel JFET
- P-channel JFET
- N-channel dual gate JFET



- P-channel dual gate JFET
- N-channel JFET tetrode
- P-channel JFET tetrode

Insulated Gate Field Effect Transistors (IGFET or MOS)

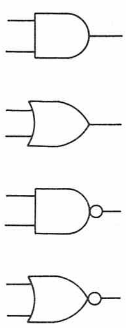


- N-channel IGFET (MOS)
- P-channel IGFET (MOS)
- N-channel dual gate IGFET (MOS)
- P-channel dual gate IGFET (MOS)

Integrated Circuits (IC)

Several integrated circuits contained within one case are designated by one common number followed by an identifying letter (a, b, c etc.). Thus, circuits IC1a, IC1b and IC1c are contained within one case.

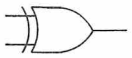
Gates

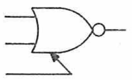


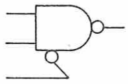
- AND gate
- OR gate
- NAND gate
- NOR gate

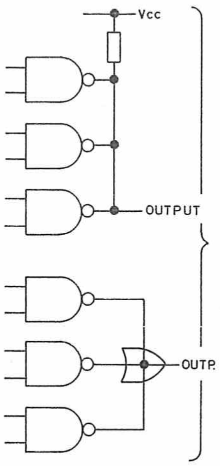
GRAPHICAL SYMBOLS USED IN STORNO CIRCUIT DIAGRAMS

Gates, continued


Exclusive OR gate


NOR gate with expander input (high)

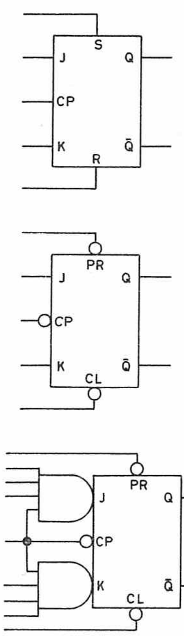

NAND gate with expander input (low)



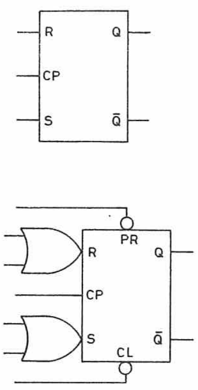
Wired OR (combined OR outputs) (presentation at top is used in detailed diagrams; presentation below is used in functional diagrams)

Flip-flops

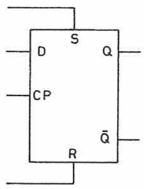
Abbreviations used: S = Set
R = Reset
CP = Clock Pulse
PR = Preset
CL = Clear



J-K Flip-flops

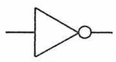


R-S Flip-flops

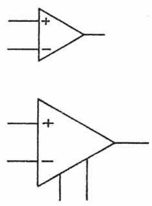


D Flip-flop

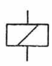
Inverters

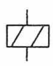

Inverter

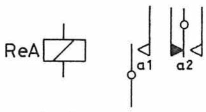
Operational Amplifiers


Operational amplifiers

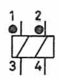
Relays (RE)


Single-coil relay

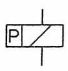

Dual-coil relay



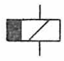
Relay with make contacts and change-over contacts

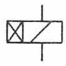


Relay with direction of winding indicated. Dot indicates two coils wound in the same direction



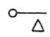
Polarized relay


Coil for slow-release relay


Coil for slow-acting relay

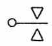
Contacts

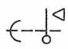
Contacts are always shown in their non-operated positions unless otherwise specified

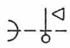

Make contacts

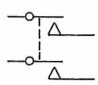

Break contacts


Change-over contacts

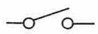

Change-over contacts, centre off

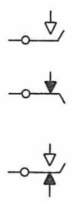

Make contacts, delayed operation

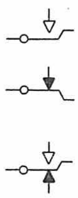

Make contacts, delayed release

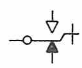

Mechanically coupled make contacts

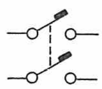
Switches and Keys (O)

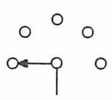

On/off switch


Locking keys or switches; push on, push off


Non-locking self-releasing keys or switches


Locking mutually releasing keys or switches (in row of push-buttons etc.)


Self-releasing switch (overcurrent switch etc.)


Rotary switch

GRAPHICAL SYMBOLS USED IN STORNO CIRCUIT DIAGRAMS

Lamps (V)

- Indicator lamp
- Neon lamp

Fuses and Cut-outs (S)

- Fuse
- Circuit-breaker

Tag Strips (KL)

1O 2O 3O 4O 5O 6O 7O 8O 9O

- Tag strip - dashed frame may be wholly or partly omitted

Batteries (BT)

- Battery

Feedthrough Filters (F)

- Feedthrough filter

Ferrite Beads (FB)

- Ferrite bead

Crystals (X)

- Crystal

Cables and Wires (W)

- Usual conductor
- Three conductors
- Eight conductors (8)
- Shift from multiple-line to single-line presentation (7)
- Screened wire
- Coaxial cable

Connectors (J and P)

- Female connector (socket). Lower symbol discontinued
- Male connector (plug). Lower symbol discontinued
- P1 J1 / P1 J1 — Schematic symbols for multi-wire connectors. (Upper symbol will gradually supersede lower symbol) Multi-wire connectors are always designated "J" when permanently mounted on a cabinet or unit etc., "P" when fitted to cables
- J1 P1 / J1 P1 — Detail symbols for multi-wire connectors. (Upper symbol will gradually supersede lower symbol) Where both connectors are fitted to cables, male connector is designated "P" and female connector "J"
- Coaxial plug
- Coaxial socket
- Coaxial plug for floating screen
- Coaxial socket for floating screen
- Coaxial plug with mating socket

Loudspeakers (LS)

- Loudspeaker

Telephones (TEL)

- Telephone
- Single headphone (earphone)
- Double headphone (headset)

Microphones (M)

Meters etc.

- Indicating instrument
- Balancing instrument
- Inkwriter, recording instrument

Test Points

- 1 — DC test point
- 2 — AC test point

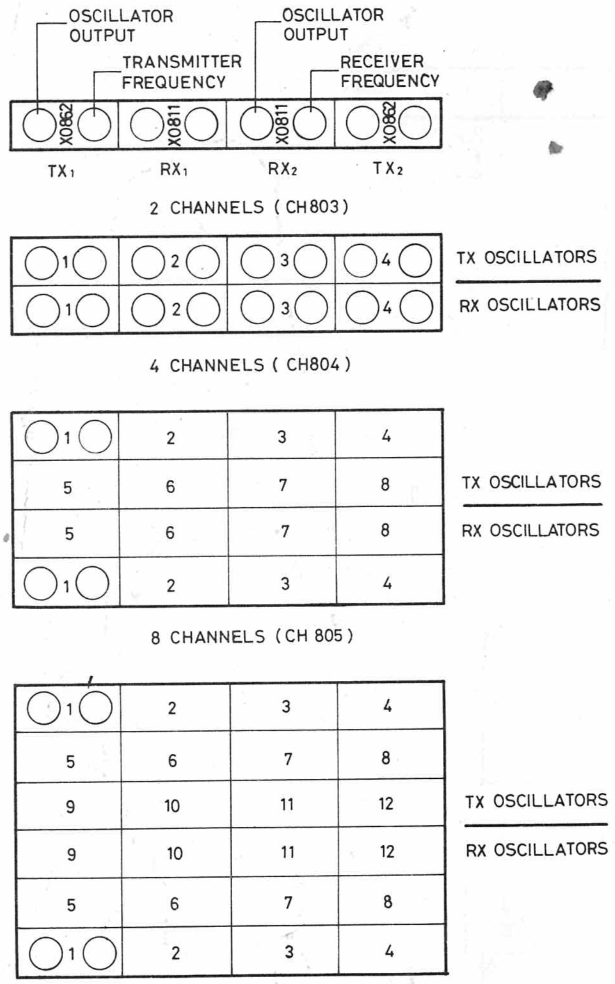
Replaceable Connections

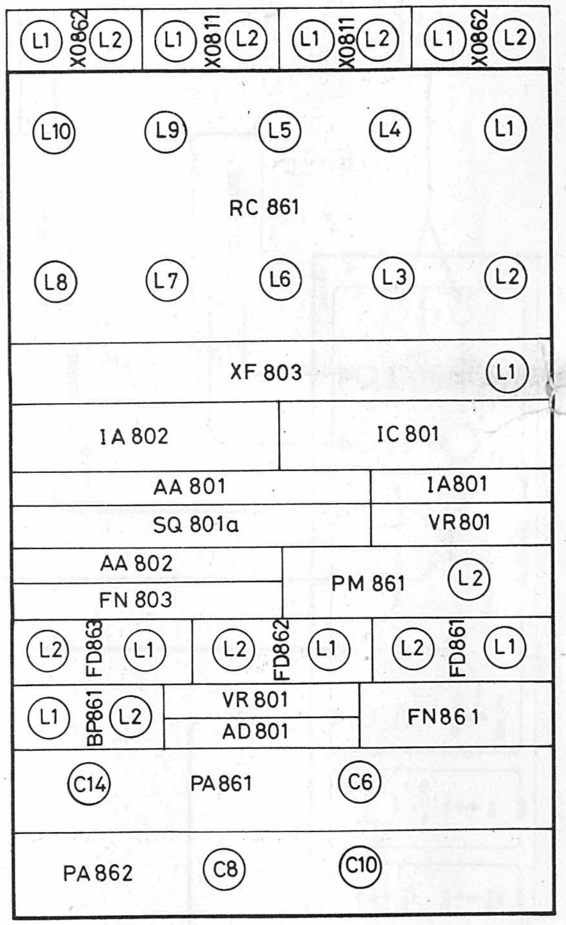
- Cross-field connection (jumper)
- Strap

Selectors (VG)

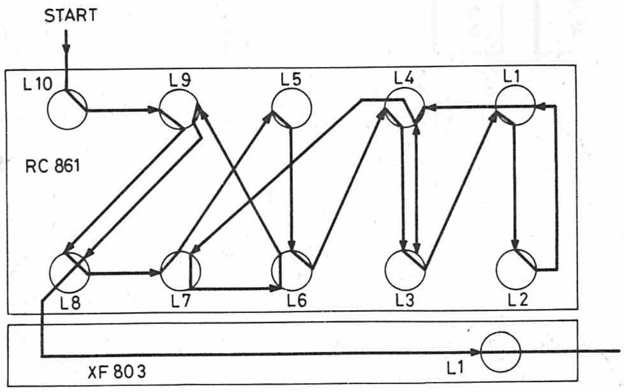
- VG. A, 25 — Schematic symbol for rotary selector with designation of number of contact points
- VG.B — Detail symbol for rotary selector
- VG.C — Co-ordinate selector

LOCATION OF OSCILLATORS





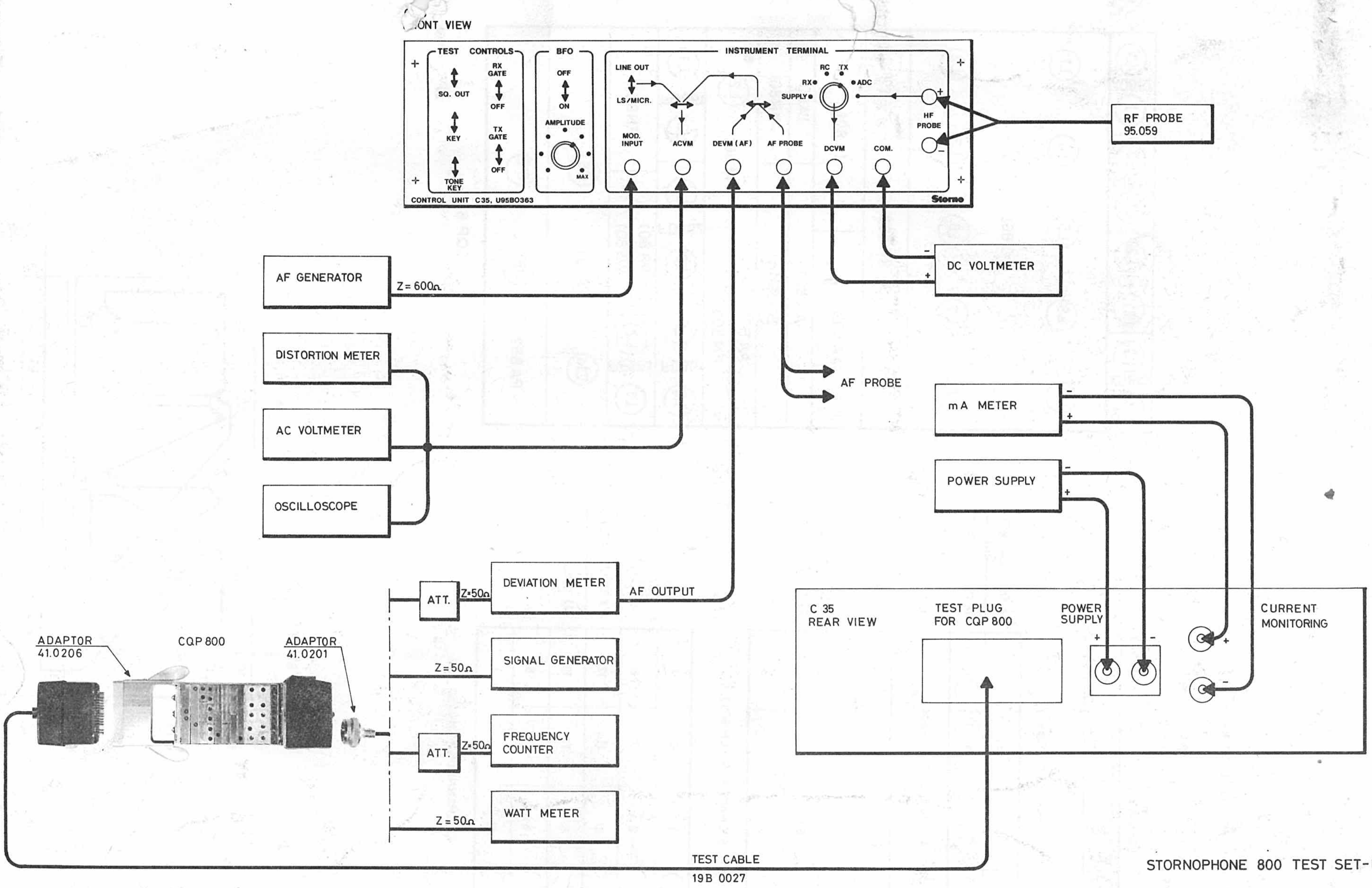
CQP 860



RC 861 L7, L9, L10 : Maximum voltage (Vgs)
L1, L2, L3, L4, L5, L6, L7 : Maximum sensitivity
L8 : Minimum distortion.

XF 803 L1 : Minimum distortion.

60.250-E1



STORNOPHONE 800 TEST SET-UP

D402.093