MOBILE RADIOTELEPHONE
MODEL STORNOPHONE 600

TYPE CQM611
TYPE CQM612
TYPE CQM613
TYPE CQM614
146...174 MHz

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80.08.

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GENERAL SPECIFICATIONS

Type	CQM611	CQM612	CQM613	CQM614
Frequency range	146-174 MHz	146-174 MHz	146-174 MHz	146-174 MHz
Min. channel spacing	50 kHz	25 kHz	20 kHz	12.5 kHz
Max. frequency deviation	±15 kHz	±5 kHz	±4 kHz	±2.5 kHz
Frequency stability	Conforms with Government Regulations			
Max. bandwidth	1000 kHz			
Antenna impedance	50 Ω nominal			
Number of RF-channels	Max. 12			
Dimensions, transmitter/ receiver	340 x 190 x 85 mm (13 1/3" x 7 1/2" x 3 3/4")			
Dimensions, control box CB601	140 x 150 x 50 mm (5 1/2" x 6" x 2")			
Weight, transmitter/receiver	5.2 kg (11.5 lbs)			
Weight, control box CB601	0.6 kg (1.3 lbs)			

TRANSMITTER SPECIFICATIONS

RF-output power	10 watt with possibility of reduction to lower output power
Modulation	CQM611, CQM612, and CQM613: Phase modulation 300-3000 Hz CQM614: Phase modulation 300-2600 Hz
FM noise	CQM611: 50 dB below standard test modulation CQM612, CQM613, CQM614: 40 dB below standard test modulation
Spurious and Harmonic radiation	Below 2×10^{-7} watts

RECEIVER SPECIFICATIONS

Sensitivity	0.35 μV at 20 dB S/N (with duplex filter BF612: 0.5 μV)
Squelch	Electronic, adjustable
Adjacent channel selectivity	CQM611, CQM612, CQM613: 85 dB (EIA two-signal method) CQM614: ±10.2 kHz (GPO measuring method).
Spurious radiation	Less than 2×10^{-9} watts
Intermodulation	CQM611, CQM612, CQM613: 70 dB (EIA measuring method) CQM614: 58 dB (GPO measuring method)
Image and spurious attenuation	CQM611, CQM612, CQM613: Min. 85 dB CQM614: Min. 75 dB
AF-output power	2 watts, adjustable

POWER SUPPLY SPECIFICATIONS

Battery voltage	6,3 V	12.6 V	25.2 V
Current consumption:			
Stand-by	0.55 A	0.25 A	0.14 A
Transmit	8.0	3.2	1.5

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CHAPTER 1. GENERAL DESCRIPTION

A. Design Details

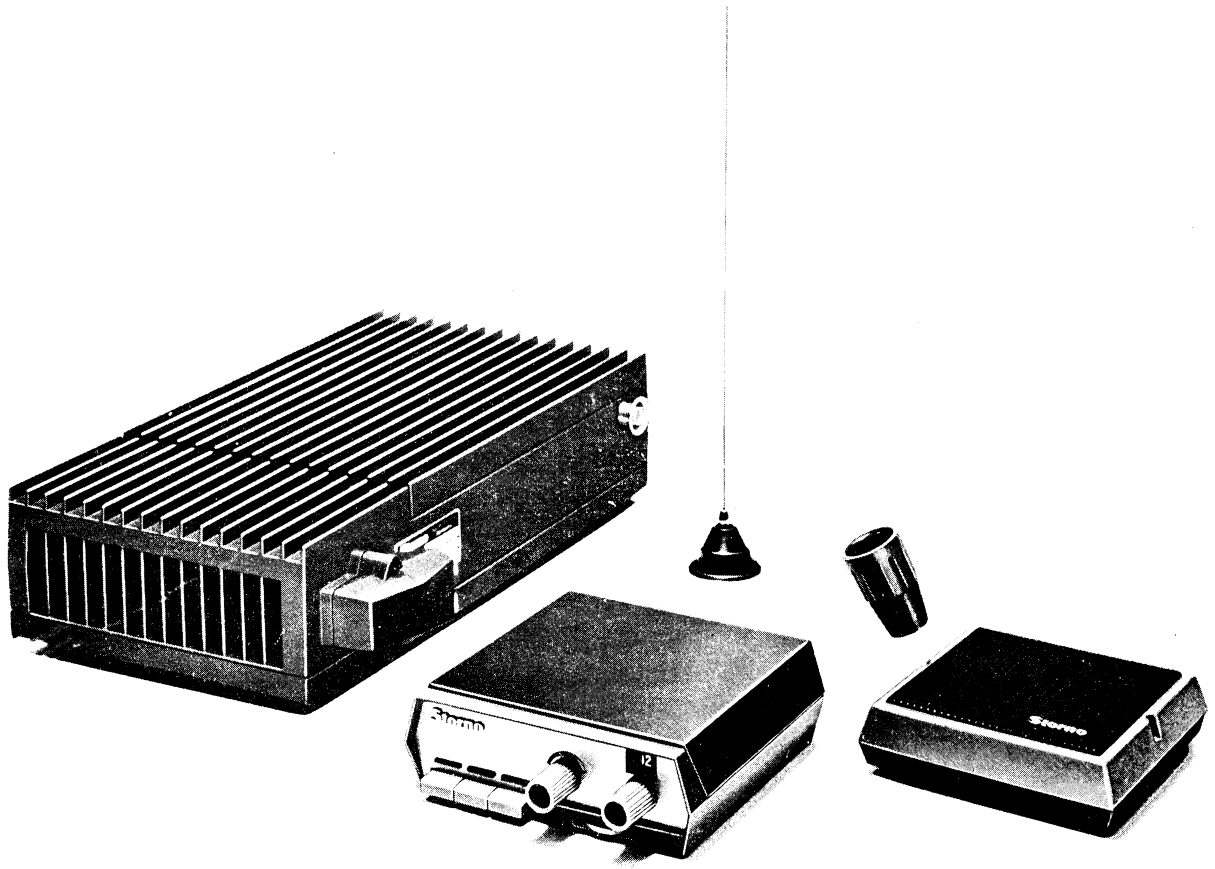
Introduction

The STORNOPHONE 600 mobile radiotelephone is a transmitter/receiver combination for simplex or duplex operated FM radio communication in one of the following frequency ranges: 68-88 MHz, 146-174 MHz, and 420-470 MHz.

The complete radiotelephone comprises a transmitter/receiver cabinet, a control box, a microphone or handset, and antenna and installation materials.

This manual contains a detailed description of the STORNOPHONE 600 and the standard accessories which are available. Because we at STORNO are constantly processing the experience we gain during the production, testing, and operation of our radiotelephones, minor modifications and corrections will be made regularly.

If your STORNOPHONE 600 is a special version, descriptions of the necessary modifications will be condensed into an appendix which is placed last in the book.



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Standard Versions

The STORNOPHONE 600 is available in the following versions for either simplex or duplex operation:

Type	Frequency Range	Channel Separation
CQM611	146-174 MHz	50 kHz
CQM612	146-174 MHz	25 kHz
CQM613	146-174 MHz	20 kHz
CQM614	146-174 MHz	12.5 kHz
CQM631	68-88 MHz	50 kHz
CQM632	68-88 MHz	25 kHz
CQM633	68-88 MHz	20 kHz
CQM634	68-88 MHz	12.5 kHz
CQM661-12	420-470 MHz	50 kHz
CQM662-12	420-470 MHz	25 kHz
CQM663-12	420-470 MHz	20 kHz

Where it is not necessary to distinquish between radiotelephones with different channel separations, the following description will employ common designations for radiotelephones inside the same frequency band. Thus, the CQM611, CQM612, CQM613, and CQM614 2-metre radiotelephones will be covered under the common designation of CQM610.

The STORNOPHONE 600 can be operated from 12- and 24-volt DC power supplies. The voltage changeover operation is performed outside the transmitter/receiver cabinet and is very easy to make. A maximum of 12 RF channels can be provided.

For 2- and 4-metres radiotelephones the transmitter power output is 10 watts and for 0.7-metres radiotelephones 12 watts with provision for operation at reduced power.

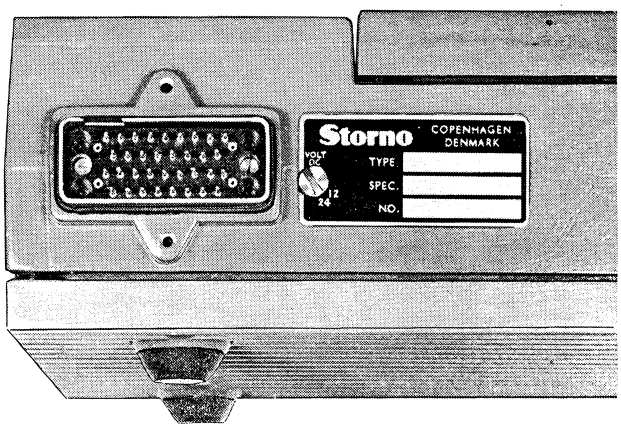
Space is provided in the transmitter/ receiver cabinet for an additional receiver converter for use in the maritime and similar service where larger bandwidth of the receiver input circuits is required.

A comprehensive line of standard tone equipment makes it possible to add various forms of selective calling systems to the STORNOPHONE 600.

The choice is not limited by the space available in the transmitter/receiver cabinet as all tone equipment is designed for installation in the control box.

Construction

The transmitter/receiver equipment is housed in a die-cast cabinet which is both dust-proof and splash-proof. The lid and bottom of the cabinet are heavily fluted so that they dissipate a maximum of heat away from the equipment. Inside, the cabinet is divided into three compartments; these accomodate the transmitter, receiver, and power supply sections. The transmitter section becomes accessible on removal of the lid of the cabinet whilst removal of the bottom plate permits direct access to the receiver section and the power supply section.



A multiwire connector on the cabinet provides connection for multiwire cable and battery cable, and a voltage switch on the side of the cabinet permits switching between battery voltages of 12 and 24 volts. Other voltages are available upon request.

Futhermore the cabinet of simplex operated radiotelephones has an antenna connector whereas the duplex versions have two antenna connectors which provide connections for both receiver and transmitter antennas or a branching filter.

Both the transmitter and receiver consists of a number of modules built on printed wiring boards. These are screw-mounted side by side in the cabinet, with their components facing outwards. The power supply section is an integral unit having only one wiring board, with its wiring side facing outwards.

This unit, as well as the transmitter and receiver modules, are easily removable from the cabinet; the only thing to do is loosen the screws which hold particular unit in place and unsolder its cabling.

B. Control Equipment

The accessories listed below are available for use with the transmitter/receiver unit. They are grouped solely for practical reasons. For instance, there is nothing to prevent use of the watertight control box with the non-watertight handset.

Standard Control Equipment

This group of control equipment will normally be employed in passenger cars, in commercial vehicles, and in buses etc. where the equipment will not be directly exposed to moisture, so that watertight or particularly rugged construction is not a requirement.

CB601	Control box of die-cast light-alloy metal with control knobs and lamps on the front panel. An loudspeaker (see below) can be fastened to the bottom of the box. A loudspeaker amplifier and various types of tone equipment can be installed. Mounting hardware is supplied with the box.
LS601.	High-efficiency loudspeaker. Mounting hardware is supplied.
MC601.	Fixed microphone with built-in amplifier. Mounting hardware is supplied.
MC602.	Fixed microphone with built-in amplifier and 10-cm gooseneck.
MC603.	Fixed microphone with built-in amplifier and 20-cm gooseneck.
MC604.	Fixed microphone with built-in amplifier and 40-cm gooseneck.
MC606.	Fist microphone with built-in amplifier, push-to-talk key, and hang-up bracket. Mounting hardware is supplied.
MT601.	Handset with built-in amplifier, push-to-talk key, and hang-up bracket. Mounting hardware is supplied.
MT704	Handset with retainer and built-in amplifiers.

Watertight Control Equipment

This group of control equipment will normally be used in open vehicles, (lorries, fork lifts, tractors, etc.) in ships, and in locomotives etc.

This equipment is watertight and dusttight as well as corrosion-proof and saltwater-proof; it is also rugged and consequently will stand up to rough handling. The size and shape of the control knobs permit them to be operated by a person wearing working gloves.
Lastly, this equipment is designed for use under conditions of high ambient noise.

CB602.	Watertight control box in grey die-cast light-alloy metal, with heavy-duty control knobs (military type). A loudspeaker amplifier and various types of tone equipment can be installed in the box. Mounting hardware is supplied.

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LS602. Watertight, saltwater-proof folded, horn loudspeaker.

MT602. Watertight, impact-proof handset with built-in amplifier and transmit button. Normally, the MT602 handset is permanently connected to the control box but can be supplied with watertight plug if desired. A holder and mounting hardware are supplied.

Antennas

The STORNOPHONE 600 is designed for operation with a 50 ohm antenna. STORNO can supply the following standard types, all of which have bases designed to permit mounting from the outside without damaging the car upholstery.

AN39-5 1/4 wavelenght whip antenna for the frequency range 68-88 MHz.

AN19-5 1/4 wavelenght whip antenna for the frequency range 174 MHz.

AN69-3 1/4 wavelenght whip antenna for the frequency range 420-470 MHz.

AN69-4 5/8 wavelenght whip antenna for the frequency range 420-470 MHz.

Other types, such as a 5/8-wavelenght rear-mounting antenna, tilt-over antenna or magnetic antenna may be used if desired.

Branching Filters

The branching filters specified below are used with radiotelephones for duplex operation, when the transmitter and the receiver are to be connected to the same antenna.
The filter is housed in a die-cast cabinet similar to that of the transmitter/receiver. It can be mounted either on top of the transmitter/receiver cabinet, for which purpose mounting hardware is supplied, or separately by means of an installation kit No. 37.065 (see under Installation Kit).

BF632 Branching filter for the frequency range 68-88 MHz

BF612 Branching filter for the frequency range 146-174 MHz.

BF662 Branching filter for the frequency range 420-470 MHz.

Installation kit

In addition to a number of the accessories listed above, the installation of a STORNOPHONE 600 radiotelephone requires a kit of parts. These are specified below:

17.014 Standard kit of accessories consisting of multiwire connector for control cable, antenna connector, fuse holder and set of cable shoes for battery cable.

19.063 Standard installation kit consisting of 6 metres of multi-core cable, 8 metres of battery cable, and 4 metres of antenna cable. These lenghts are sufficient for installing a radiotelephone, even in large vehicles.

Also available are:

37.065 Mounting plate with hardware and screws for mounting the transmitter/receiver cabinet or a branching filter.

37.072 Mounting strap with hardware and screws for mounting the transmitter/receiver cabinet.

Tone Equipment

The STORNOPHONE 600 has provision for subsequent addition of tone equipment. The installation job is simple, space for a tone transmitter and a tone receiver having been provided in the control box. Additional space for an alarm circuit is also available in the control box.

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If the STORNOPHONE 600 is supplied with tone equipment, you will find description, circuit diagrams etc. of such equipment in a separate technical manual.

Installation Instructions

Brief installation instructions are supplied with each individual accessory. However, Chapter 4 of this manual contains a complete description of how to install both the transmitter/receiver cabinet and the accessories.

Otherwise, STORNO will be glad to supply all such information as cannot be obtained by a study of this manual.

Operation

A booklet containing very detailed operating instructions is supplied with the STORNOPHONE 600. Accordingly, this manual contains no operating instructions.

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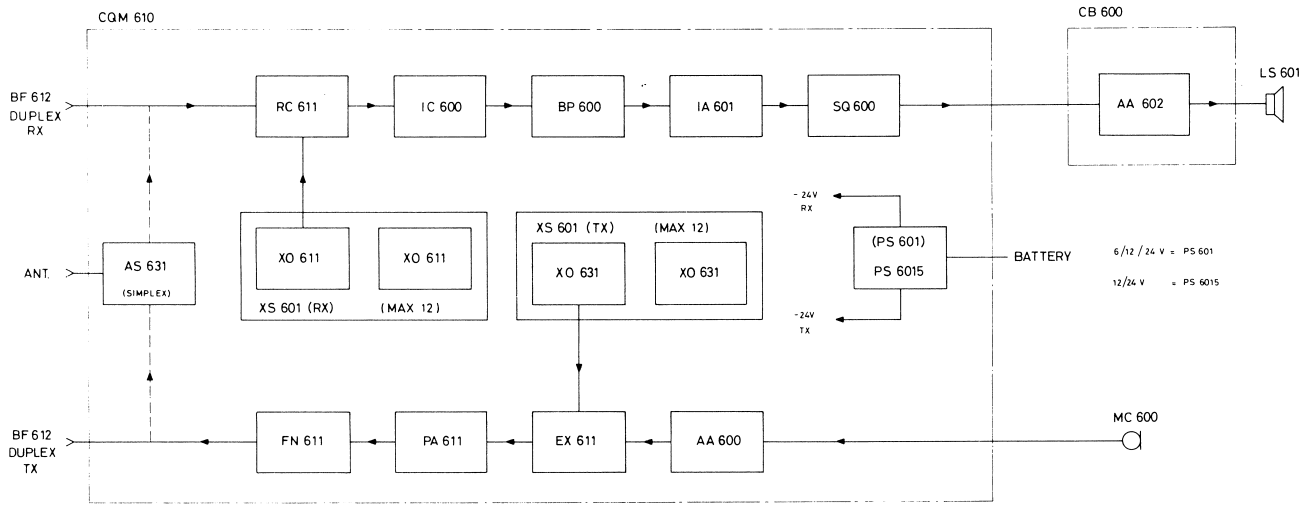
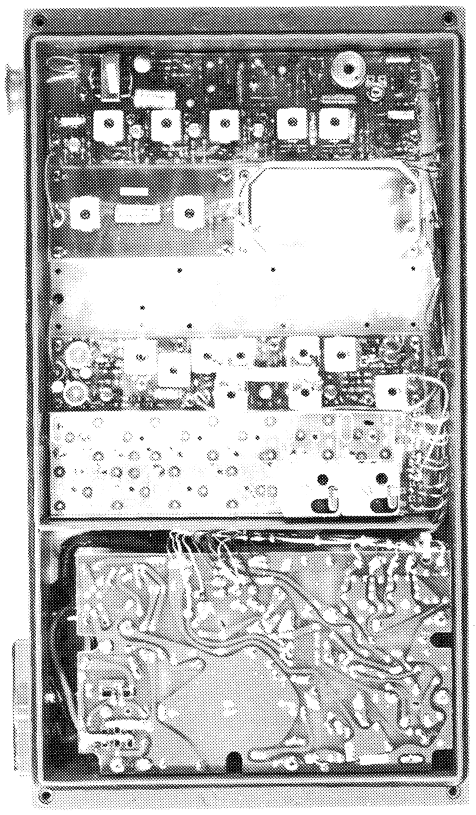
CHAPTER 2. THEORETICAL CIRCUIT ANALYSIS

A. General Description

146-174 MHz Equipment



Both the receiver and transmitter are divided into a number of subunits each of which is built on a printed circuit board. This division has been made in order to make the equipment easily accessible for adjustments and repairs, and follows strictly logical lines.



Receiver Section

The receiver is a double-conversion superheterodyne using intermediate frequencies of 10.7 MHz and 455 kHz. The necessary selectivity is obtained by means of two block filters. A maximum of 12 crystal oscillators - one for each channel - can be provided.
The receiver is composed of the following modules:

RC611	Receiver converter with RF amplifier and 1st mixer.
XO611	Crystal oscillator (1 - 12 pcs)

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IC600 Intermediate frequency converter with 10.7 MHz crystalfilter, 2nd mixer, and 2nd local oscillator. The following list shows the type as used for the various channel separations:

IC601: 50 kHz channel separation
IC602: 25 kHz channel separation
IC603: 20 kHz channel separation

12.5 kHz channel separation equipment use intermediate converter type IC605 which has a 5-circuit L-C 10.7 MHz filter.

BP600 Bandpass 455 kHz filter as follows:
BP601: 50 kHz channel separation
BP602: 25/20 kHz channel separation
BP6012: 12.5 kHz channel separation

IA601 Intermediate frequency amplifier and discriminator, 455 kHz.

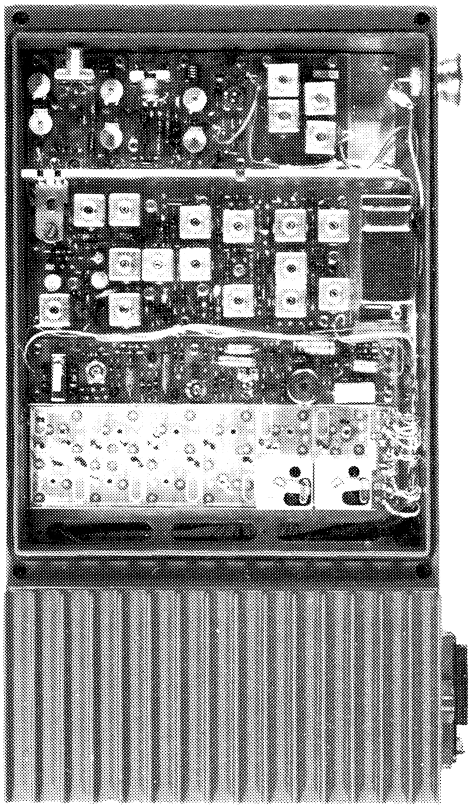
SQ600 Squelch and audioamplifier unit
SQ601: 20/25/50 kHz channel separation
SQ602: 12.5 kHz channel separation

Transmitter Section

The transmitter is phase modulated and its output frequency is twelve times the crystal oscillator frequency. Phase modulation is performed at the fundamental frequency. A maximum of 12 crystal oscillators - one for each channel - can be provided. The transmitter is composed of the following units:

AA601 Audio amplifier for 20/25/50 kHz modulator.
AA608 Audio amplifier for 12.5 kHz modulator.
XO631 Crystal oscillator (1 - 12 pcs)

EX611 Exciter and modulator.



PA611 RF Power amplifier.

FN611 Antenna filter.

The following subunits are used in both the receiver section and in the transmitter section:

AS631 Antenna shift unit for simplex operation.
BF612 Antenna branching filter for duplex operation.
XS601 Crystal oscillator panel (one in the receiver section and one in the transmitter section).

Power Supply Section

The radiotelephone can be fitted with one of the following power supply units:

PS601 6/12/24 volt DC converter and regulator.
PS6015 12/24 volt DC converter and regulator.

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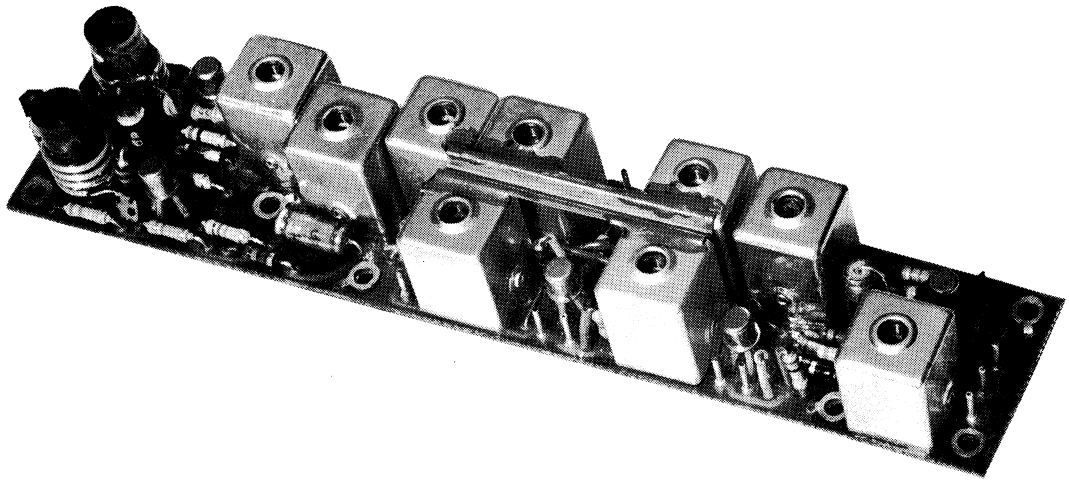
Receiver Converter RC611



The receiver converter is built on a wiring board. It consists of the following stages:

Signal Frequency Amplifier
Mixer
Oscillator-Signal Amplifier
Oscillator-Signal Tripler.

The converter amplifies the incoming signal and converts it to a high intermediate frequency of 10.7 Mc/s, for which purpose an oscillator signal, amplified and multiplied, is injected into the mixer.
All transistors used in this unit are silicon-type n-p-n transistors.

Mode of Operation

Signal Frequency Amplifier

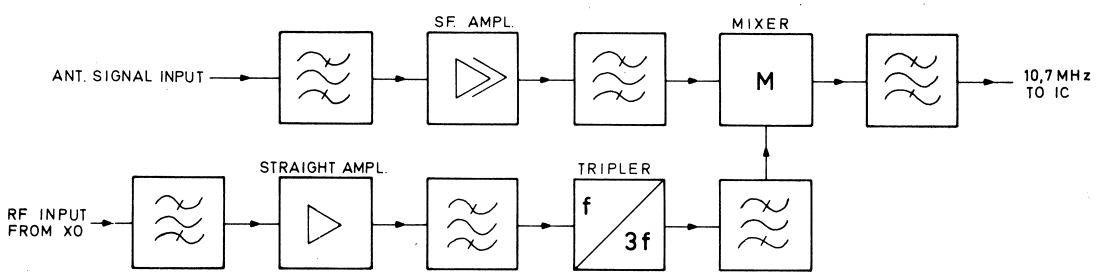
The incoming signal is applied - via a bandpass filter (L1, L2) - to the signal frequency amplifier. Good separation between the input and output circuits of this amplifier ensures good stability. - The amplified signal is fed through a four-circuit filter to the emitter of the mixer transistor.

Mixer

Whilst the amplified and filtered signal from the antenna is applied to the emitter of the mixer, the output signal of the tripler is applied to the base. In other words, additive mixing is used. The mixer works into a 10.7 Mc/s filter (L8) which can be matched to the following IF converter unit by means of a simple strapping operation.
(See circuit diagram of the RC611 receiver converter at the back of this manual).

Amplifier and Tripler

The output of the crystal oscillator is amplified by a straight amplifier stage. This is followed



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by a tripler the collector circuit of which consists of a double bandpass filter tuned to the third harmonic of the oscillator frequency. From there, the signal is fed to the base of the mixer transistor.

Technical Specifications

Frequency Range

146 - 174 Mc/s.

Gain

Voltage gain from antenna to input of mixer: 10-12 dB.

Input Impedance

Nominal: 50 ohms.

Crystal Frequency Calculation

For 146 - 160 Mc/s range:

$$fx = \frac{fsig + 10.7}{3} \text{ Mc/s.}$$

For 156 - 174 Mc/s range:

$$fx = \frac{fsig - 10.7}{3} \text{ Mc/s.}$$

where fx is the crystal frequency in Mc/s, and fsig is the signal frequency in Mc/s.

Dimensions

160 x 32 mm.

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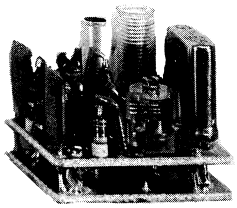
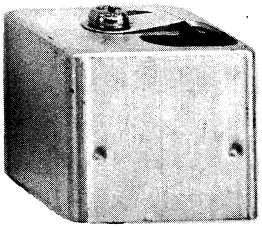
Receiver Oscillator Unit XO611





The receiver oscillator unit is a crystal-controlled oscillator. It is built on a double wiring board, and is a totally enclosed plug-in unit. The oscillator unit plugs into a crystal oscillator panel which has pins mating with sockets on the oscillator unit.

Mode of Operation

The oscillator is a third overtone series resonant Colpitts oscillator with the crystal connected at low-impedance points to ensure good frequency stability.
Undesired pulling of the oscillator frequency is minimized through damping of the collector circuit.

The oscillator is started up by connecting the CHANNEL SHIFT terminal to chassis through the channel selector in the control box. A diode in series with the -24V supply lead prevents any flow of undesired current in the unit.
The oscillator signal is fed to the receiver converter via the crystal oscillator panel.
The operating frequency can be adjusted by means of a trimmer capacitor located close to the crystal.

Technical Specifications

Crystal Frequency Range

48.4 - 56.9 Mc/s.

Frequency Pulling

$\frac{\Delta f}{f}$: $\pm 30 \times 10^{-6}$.

Frequency Stability

For voltage variations within 24V ±2.5%:
Better than $\pm 0.2 \times 10^{-6}$.

In temperature range $-30^{\circ}C$ to $+80^{\circ}C$:
Better than $\pm 2 \times 10^{-6}$.

Load Impedance

50 ohms.

Power Output

Approx. 1 mW.

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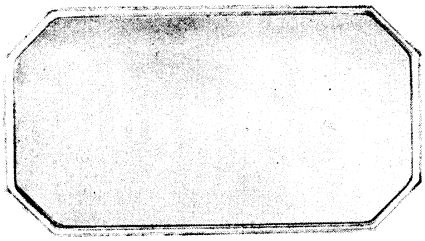
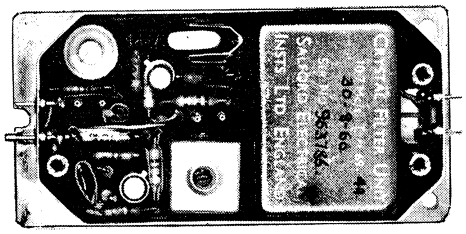
IF CONVERTER IC601, IC602, IC603, and IC607





The IF converter unit is built on a wiring board, and is housed in a metal box with screw-on lid.

The unit consists of the following stages:

Crystal Filter
Oscillator
Mixer

The IF converter filters the high intermediate frequency signal at 10.7 MHz and converts it to a low intermediate frequency signal at 455 kHz.

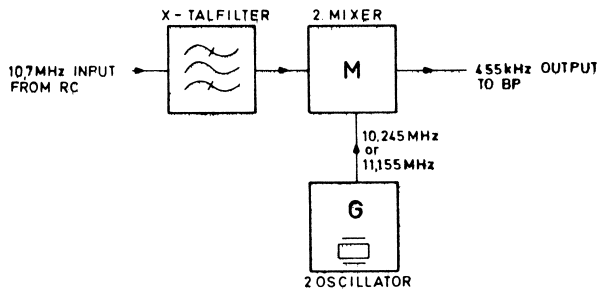
IF converter IC601 is used in equipments with 50 kHz channel separation.

IF converter IC602 is used in equipments with 25 kHz channel separation.

IF converter IC603 is used in equipments with 20 kHz channel separation.

IF converter IC607 is used in equipment with 12.5 kHz channel separation.

The converters use different crystal filters but are otherwise quite identical.



Mode of Operation

Crystal Filter

From the receiver converter unit, RC, the high intermediate frequency signal at 10.7 MHz is fed to the crystal filter. The filter connects to the mixer via a parallel resonant circuit, which ensures a perfect impedance match.

Oscillator

The oscillator is a crystal-controlled Colpitts oscillator. The crystal is normally 10.245 MHz, but in cases where one of the harmonics of the local oscillator coincides with the frequency of the incoming signal, which might cause interference, a crystal frequency of 11.155 MHz is chosen instead. The crystal oscillates in a parallel resonant circuit, and frequency adjustment is performed with a trimmer capacitor.

Mixer

Both the 10.7 MHz signal and the oscillator signal are applied to the base of the mixer transistor. The low intermediate frequency signal at 455 kHz is taken off at the collector.

Technical Specifications

Input Frequency

10.7 MHz

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Output Frequency

455 kHz

Input Impedance

910 Ω //20 pF

Output Impedance

4.7 KΩ //480 pF.

Maximum Frequency Swing

IC601: ± 15 kHz
IC602: ± 5 kHz
IC603: ± 4 kHz
IC607: ± 2.5 kHz

Bandwidth

IC601 At 3 dB attenuation relative to 10.7 MHz: < ±14.5 kHz.

At 50 dB attenuation relative to 10.7 MHz: > ± 50 kHz.

IC602 At 3 dB attenuation relative to 10.7 MHz: < ± 7 kHz.

At 50 dB attenuation relative to 10.7 MHz: > ± 25 kHz.

IC603 At 3 dB attenuation relative to 10.7 MHz: < ± 5.5 kHz.

At 50 dB attenuation relative to 10.7 MHz: > ± 20 kHz.

IC607 At 3 dB attenuation relative to 10.7 MHz: < ± 2.75 kHz.

At 50 dB attenuation relative to 10.7 MHz: > ± 7.5 kHz.

Bandpass Ripple

IC601 > 2 dB
IC602 > 1.5 dB
IC603 > 1.5 dB
IC607 > 2 dB

Oscillator Frequency

Calculation of crystal frequency (fx):

fx = 10.7 MHz - 0.455 MHz - 10.245 MHz

However, at certain incoming frequencies the low crystal frequency must not be used owing to the risk of harmonic radiation. In this cases the high crystal frequency is used.

The calculation of the high crystal frequency is as follows:

fx = 10.7 MHz + 0.455 MHz = 11.155 MHz.

The lists below specifies what type of crystal which is to be used within the various frequency ranges.

A = 10.245 MHz
B = 11.155 MHz

146-174 MHz

Receiver frequency range	fx.
146.0 - 152.5 MHz	A
152.5 - 154.9 MHz	B
154.9 - 162.7 MHz	A
162.7 - 165.1 MHz	B
165.1 - 174.0 MHz	A

68-88 MHz

Receiver frequency range	fx.
68.0 - 70.5 MHz	A
70.5 - 72.9 MHz	B
72.9 - 80.8 MHz	A
80.8 - 83.2 MHz	B
83.2 - 88.0 MHz	A

420-470 MHz

Receiver frequency range	fx.
420.0 - 421.5 MHz	B
421.5 - 428.8 MHz	A
428.8 - 431.7 MHz	B
431.7 - 439.1 MHz	A
439.1 - 442.0 MHz	B
442.0 - 449.3 MHz	A
449.3 - 452.2 MHz	B
452.2 - 459.6 MHz	A
459.6 - 462.5 MHz	B
462.5 - 470.0 MHz	A

Crystal Specification

In the temperature range -15°C to +60°C: S-98-8.

In the temperature range -25°C to +65°C: S-98-12.

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Frequency Pulling Range for Osc.

$< \pm 50 \times 10^{-6}$.

Available Power Gain

With 10.245 MHz crystal: < 15 dB

With 11.155 MHz crystal: < 14 dB

Dimensions

80 x 40 x 29 mm.

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IF FILTER BP601b, BP602b, and BP6013

The filter is a selective band pass filter consisting of a ceramic filter coupled to tuned input and output impedance transformers.

IF filter BP601b is used in equipments with 50 kHz channel separation.

IF filter BP602b is used in equipments with 20/25 kHz channel separation.

IF filter BP6013 is used in equipments with 12.5 kHz channel separation.

Technical Specifications

Centre Frequency

455 kHz.

Generator Impedance

4.7 KΩ //480 pF.

Load Impedance

1 KΩ //480 pF.

Bandwidth

BP601b At 3 dB attenuation relative to 455 kHz:
$> \pm$ 15 kHz.
$\leq \pm$ 20 kHz.
At 50 dB attenuation relative to 455 kHz.
$\leq$ 40 kHz.

BP602b At 3 dB attenuation relative to 455 kHz:
$> \pm$ 7 kHz.
$\leq \pm$ 10 kHz.
At 50 dB attenuation relative to 455 kHz:
$\leq \pm$ 20 kHz.

BP6013 At 3 dB attenuation relative to 455 kHz:
$> \pm$ 4 kHz.
$\leq \pm$ 8 kHz.
At 15 dB attenuation relative to 455 kHz:
$\leq \pm$ 10 kHz.

Insertion Loss

BP601b $<$ 8 dB
BP602b $<$ 9 dB
BP6013 $<$ 8 dB

Filter Ripple

$\leq$ 2 dB

Dimensions

80 x 40 x 24 mm.

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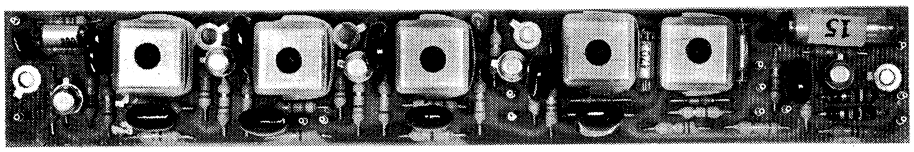
IF Amplifier IA601



The IF amplifier is built on a wiring board. It consists of the following stages:

Four IF Amplifier Stages
Discriminator
Output Amplifier

The IF amplifier serves the purpose of amplifying and rectifying the low intermediate-frequency signal at 455 kc/s. It also amplifies the audio output delivered by the discriminator.

Mode of Operation

IF Amplifier Stages

From the filter (BP), the low intermediate-frequency signal at 455 kc/s is applied to the IF amplifier unit.
Interstage coupling consists of a single tuned collector circuit capacitively tapped for the base of the transistor of the following stage. The last IF amplifier stage works into the discriminator. The last two amplifier stages operate as voltage limiters.

Discriminator and Output Amplifier

The discriminator is an inductively coupled Foster Seeley discriminator the output circuit of which comprises a voltage divider consisting of resistors R29, R30, and R31. By shifting a strap back and forth between two taps on the voltage divider, the audio output voltage may be altered so that the IF amplifier unit can be used for different channel separations.

The strap marked I in the photograph is used in equipments with 20 or 25 kc/s channel separation.
The strap marked II in the photograph is used in equipments with 50 kc/s channel separation (see also circuit diagram of the IA601 IF amplifier at the back of this manual).

In order to ensure that the discriminator will be loaded lightly, the following audio amplifier stage is an emitter follower using a high-resistance base biasing network.

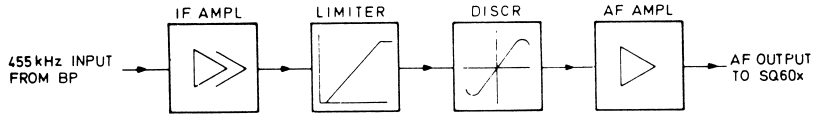
Technical Specifications

Intermediate Frequency

455 kc/s.

Max. Frequency Swing

±15 kc/s or ±5 kc/s/±4 kc/s, depending on strap used.



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Storno

IF Bandwidth

±20 kc/s at 3 dB attenuation.

Generator Impedance

1 k ohm/0.25 mH.

Input Impedance

1 k ohm // 480 pF.

Output Impedance

340 ohms.

Discriminator Bandwidth

Linear to ±20 kc/s.

Discriminator Slope

Measured with instrument with Ri = 1000 ohms: 2.2 μA/kc/s.

Discriminator Centre Frequency Stability

±1 kc/s.

Gain

The gain is determined as the input voltage at which the audio output voltage has dropped 1 dB below max. audio output voltage. Δf = ±10.5 kc/s and fmod = 1000 c/s: 1.6 μV.

Audio Output Level

At fmod = 1000 c/s.
For ΔF = ±2.8 kc/s, strapped for ΔFmax. = ±5 kc/s: 0.9 V.
For ΔF = ±3.5 kc/s, strapped for ΔFmax. = ±5 kc/s: 1.1 V.
For ΔF = ±10.5 kc/s, strapped for ΔFmax. = ±15 kc/s: 1.1 V.

Demodulation Characteristic

Flat: +0/-1 dB.
Deviation relative to 1000 c/s in the range 300 - 3000 c/s. ΔFmax. = 0.2 x ΔFmax. at 1000 c/s.

Distortion

In the range 3000 - 3000 c/s:
For ΔF = ±15 kc/s, strapped for ΔFmax. = ±15 kc/s: 1.4 %.
For ΔF = ±5 kc/s, strapped for ΔFmax. = ±5 kc/s: 1.2 %.

Min. Load Impedance

In the range 300 - 3000 c/s: approx. 2 k ohms.

Current Drain

10 mA.

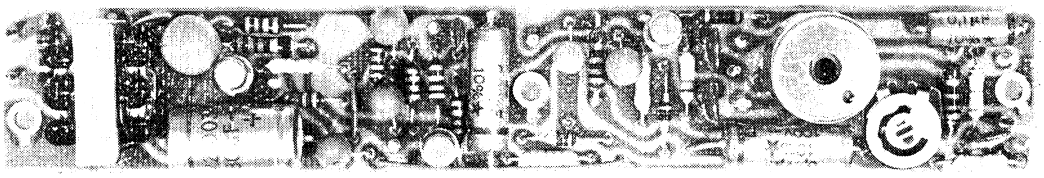
Dimensions

160 x 24 mm.

37.389-E1

Storno

Squelch and Audio Amplifier SQ601



The squelch and audio amplifier unit is built on a wiring board. It consists of the following stages:

Noise Amplifier
Noise Rectifier
Audio Amplifier.

The audio amplifier stage serves the purpose of amplifying the demodulated signal delivered by the discriminator whilst the squelch circuit - in the absence of an incoming signal - amplifies and rectifies the discriminator noise, permitting use of the rectified noise voltage for muting the audio amplifier stage.

Mode of Operation

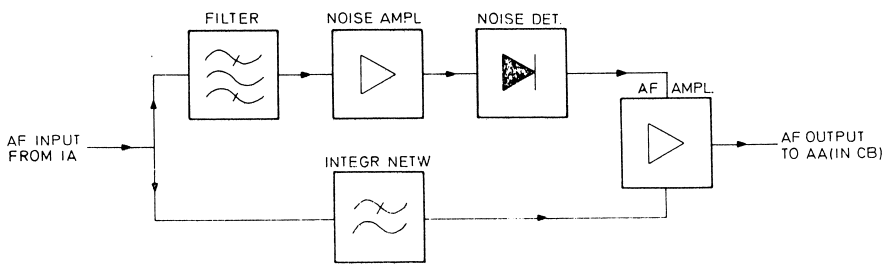
Audio Amplifier

The audio signal from the discriminator in the preceding intermediate frequency amplifier unit, IA, is applied to the audio amplifier stage via an integrating network and a potentiometer.

The integrating network, which in the case of phase modulation consists of resistor R16 and capacitor C12, produces a -6dB/octave frequency characteristic. For frequency modulation, C12 is replaced by a resistor, R18, resulting in a flat frequency characteristic. The following potentiometer, R15, makes it possible to adjust the gain for nominal power output (3dBm). The audio amplifier has transformer output with an output impedance of 600 ohms.

Squelch Circuit

A portion of the noise from the discriminator is filtered in the bandpass filter (L1, C2) and fed to the noise amplifier stage. The transistor of this stage is biased in such a manner that only noise peaks of a certain magnitude can make the transistor conductive. The noise voltage consequently generated in the collector circuit is rectified by a diode and applied to transistor Q2, which operates as a DC amplifier.



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Storno

When a sufficiently high noise voltage is applied to the noise rectifier, the collector-emitter impedance of the DC amplifier will be so low that the base bias for the audio amplifier disappears, thereby muting the latter.

The bias for the noise amplifier, and consequently the squelch sensitivity, can be adjusted with a squelch potentiometer located in the control box.

The resonant frequency of the bandpass filter in the input circuit of the squelch unit can be altered by strapping, permitting use of the filter at channel separations of 20, 25, and 50 kc/s.

NOTE 1 in the photograph of the unit shows the strap for 20 and 25 kc/s.

NOTE 2 in the photograph of the unit shows the strap for 50 kc/s.

Technical Specifications

Input Impedance

In the range 300 - 3000 c/s:
Greater than 3 k ohms.

Output Impedance

At 1000 c/s: 600 ohms.

Nominal Load Impedance

600 ohms.

Audio Output Level

At 1000 c/s and input voltage of 0.6V and R15 in the fully clockwise position: 1.3V.

Frequency Characteristic (PM)

In the range 300 - 3000 c/s relative to 1000 c/s: -6dB/octave +0/-1dB.

Frequency Characteristic (FM)

In the range 300 - 3000 c/s relative to 1000 c/s: Flat ±0 dB.

Distortion

At 3dBm power output and 1000 c/s: 2%.

Output Noise Attenuation

Unsquelched: better than 50 dB
Squelched: better than 70 dB.

Squelch Sensitivity

For $\Delta F = 0.7 \times \Delta F_{max}$. and fmod = 1000 c/s, full unsquelching occurs at:
Min. signal-to-noise ratio in speech channel: 3 dB.
Max. signal-to-noise ratio in speech channel: 23 dB.

Squelch Hang

At max. squelch sensitivity: approx. 0.5 sec.
At min. squelch sensitivity: approx. 0.1 sec.

Channel Separation

50 kc/s or 25/20 kc/s depending on strap.

Delay

Approx. 50 msec.

Current Drain

For unsquelched operation (audio output): 12 mA.
For squelched operation (no audio output): 8.5 mA.

Dimensions

148 x 24 mm.

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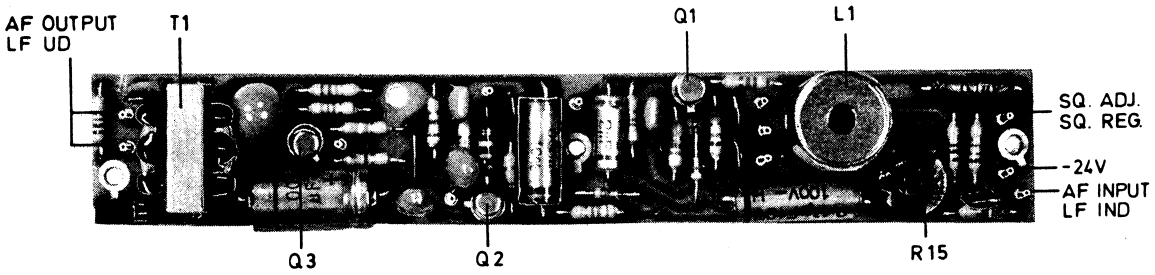
Storno

Squelch and Audio Amplifiers SQ602 and SQ603



The squelch and audio amplifier unit is built on a wiring board. It consists of the following stages:

Noise Amplifier
Noise Rectifier
Audio Amplifier

The audio amplifier stage serves the purpose of amplifying the demodulated signal delivered by the discriminator whilst the squelch circuit - in the absence of an incoming signal - amplifies and rectifies the discriminator noise, permitting use of the rectified noise voltage for muting the audio amplifier stage.

Mode of Operation

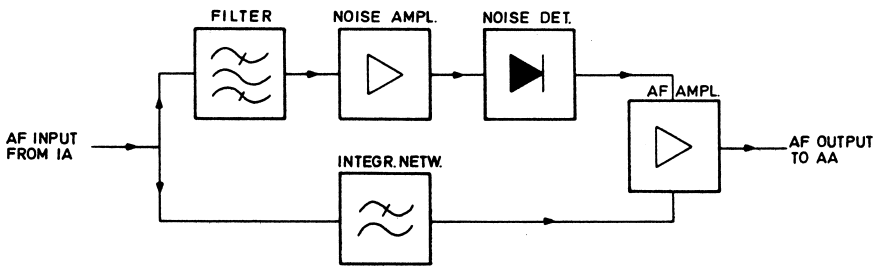
Audio Amplifier

The audio signal from the discriminator in the preceding intermediate frequency amplifier unit, IA, is applied to the audio amplifier stage via an integrating network and a potentiometer.

The integrating network, which in the case of phase modulation consists of resistor R16 and capacitor C12, produces a -6dB/octave frequency characteristic. For frequency modulation, C12 is replaced by a resistor, R18, resulting in a flat frequency characteristic. The following potentiometer, R15, makes it possible to adjust the gain for nominal power output (3dBm). The audio amplifier has transformer output with an output impedance of 600 ohms.

Squelch Circuit

A portion of the noise from the discriminator is filtered in the bandpass filter (L1, C2) and fed to the noise amplifier stage. The transistor of this stage is biased in such a manner that only noise peaks of a certain magnitude can make the transistor conductive. The noise voltage consequently generated in the collector circuit is rectified by a diode and applied to transistor Q2, which operates as a DC amplifier.



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Storno

When a sufficiently high noise voltage is applied to the noise rectifier, the collector-emitter impedance of the DC amplifier will be so low that the base bias for the audio amplifier disappears, thereby muting the latter.

The bias for the noise amplifier, and consequently the squelch sensitivity, can be adjusted with a squelch potentiometer located in the control box.

The resonant frequency of the bandpass filter in the input circuit of the squelch unit can be altered by strapping, permitting use of the filter at channel separations of 12, 5, 20, 25, and 50 kc/s.

(see notes on diagram).

Technical Specifications

Input Impedance

In the range 300 - 3000 c/s:
Greater than 3 k ohms.

Output Impedance

At 1000 c/s: 600 ohms.

Nominal Load Impedance

600 ohms.

Audio Output Level

At 1000 c/s and input voltage of 0.6V and R15 in the fully clockwise position: 1.3V.

Frequency Characteristic (PM)

In the range 300 - 3000 c/s relative to 1000 c/s: -6dB/octave +0/-1dB.

Frequency Characteristic (FM)

In the range 300 - 3000 c/s relative to 1000 c/s: Flat ±0 dB.

Distortion

At 3dBm power output and 1000 c/s: 2%.

Output Noise Attenuation

Unsquelched: better than 50 dB
Squelched: better than 70 dB.

Squelch Sensitivity

For $\Delta F = 0.7 \times \Delta F_{max.}$ and fmod = 1000 c/s, full unsquelching occurs at:
Min. signal-to-noise ratio in speech channel: 3 dB.
Max. signal-to-noise ratio in speech channel: Adjusted to max. 20 dB S/N.

Squelch Hang

At max. squelch sensitivity: approx. 0.5 sec.
At min. squelch sensitivity: approx. 0.1 sec.

Channel Separation

50 kc/s or 25/20 kc/s depending on strap.

Delay

Approx. 50 msec.

Current Drain

For unsquelched operation (audio output): 12 mA.
For squelched operation (no audio output): 8.5 mA.

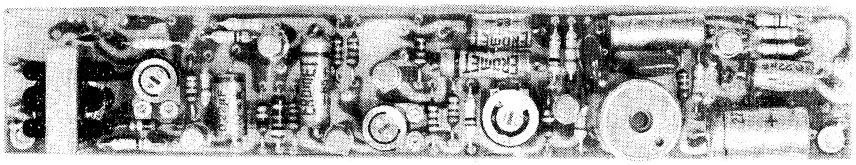
Dimensions

148 x 24 mm.

37.568-E1

Storno

Audio Amplifiers AA601 and AA608



Audio amplifiers AA601 and AA608 are built on wiring boards. They consist of the following stages:

Differentiating network
1st amplifier
Limiter
Integrating network
2nd amplifier
Splatter filter
Output amplifier.

The audio amplifier performs two important functions: it amplifies the signal from the microphone to a level suitable for the modulator, and it limits the amplitude of the said signal so that the maximum permissible frequency swing will not be exceeded.
Besides, the AA601 attenuates frequencies above 3000 Hz and the AA608 frequencies above 2500 Hz, thus preventing adjacent-channel interference.

Mode of Operation

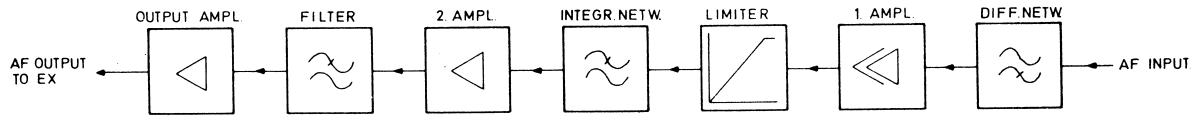
Differentiating Network

Each audio amplifier has 600-ohm balanced transformer input followed by a potentiometer, R27, for sensitivity adjustment. The following differentiating network (pre-emphasis network) is switchable between two different time constants: the strap designated NOTE 1 cuts in the differentiating network R2, C3, which provides straight phase modulation, whilst the strap designated NOTE 2 cuts in the network composed of (R1 + R2) and C1, which provides mixed phase and frequency modulation, a phase modulation characteristic being obtained for modulating frequencies below 1000 Hz and frequency modulation for modulating frequencies above 1000 Hz. From the differentiating network, the signal is fed to the 1st amplifier stage.

1st Amplifier and Limiter

The 1st amplifier consists of two transistor stages in a conventional emitter circuit. The use of un-bypassed emitter resistors results in a high degree of negative feedback. The following limiter consists of two transistors with a common emitter resistor. Limiting is accomplished in the following manner:

When the input voltage of transistor Q3 becomes positive with respect to the emitter voltage, Q3 will attempt to draw more current, and the emitter/base voltage of transistor Q4 will consequently decrease, causing the latter transistor to draw less current. A further increase in input voltage will cause Q3 to draw so much cur-



37.569-E1

Storno

rent that Q4 will cut off, thus limiting the signal amplitude. If the input signal of Q3 becomes negative with respect to the emitter voltage, the full current will flow through Q4. In this case, Q3 will cut off, again causing limiting. The symmetry of the limiting is adjustable with potentiometer R28.

Integrating Network

The integrating network consists of the output impedance of transistor Q4 in conjunction with capacitor C6. This capacitor is connected via a strap; by removing the strap, the capacitor can be left out while making measurements on the limiter, thereby avoiding integration.

The following potentiometer, R29, controls the output voltage of the audio amplifier and hence also the maximum frequency swing of the transmitter with the limiter operative.

2nd Amplifier and Splatter Filter

The 2nd amplifier consists of a single transistor stage with an un-by-passed emitter resistor, resulting in a high degree of negative feedback. The amplifier stage is followed by a splatter filter. This is a pi-network whose cutoff frequency is 3000 Hz in the AA601 and 2500 Hz in the AA608 It serves the purpose of attenuating higher frequencies such as harmonics generated by the clipper and amplifier stage.

Output Amplifier

The output amplifier consists of a single transistor stage with an un-bypassed emitter resistor. The collector resistor is a voltage divider (R25 and R17), making it possible to alter the output voltage - and hence the frequency swing - by a restrapping operation.

Depending on the frequency band in use and the desired frequency swing (channel separation), the units should be strapped in accordance with the notes on the associated diagrams.

Technical Specifications

Current Drain

13 mA.

Clipping Level (1000 Hz)

Peak value of clipped voltage at test point 24 with strap designated NOTE 3 removed: 2.9 V peak.

Minimum Input Voltage for Clipping (1000 Hz)

The input voltage at which clipping occurs with potentiometer R27 turned full on (and with strap designated NOTE 3 removed): 34 mV.

Maximum Output Voltage (1000 Hz)

Maximum output voltage across 10 k ohm load resistor, at full clipping and with potentiometer R29 turned full on (with straps designated NOTE 3 and NOTE 4 inserted): In AA601: 3.5V peak. In AA608: 1.9 V peak.

Harmonic Distortion (1000 Hz)

Distortion is measured at output voltage of 0.8V, corresponding to 0.7 ΔF max. Potentiometer R29 is adjusted so that the output voltage across 10 k ohms is 1.5 V peak for an input voltage of 20 dB above clipping level. The input voltage is reduced to 110 mV, and potentiometer R27 is adjusted for an output voltage of 0.8 V across 10 k ohms: 0.5%.

Frequency Response:

The unit is adjusted as for measurement of harmonic distortion. The input voltage is reduced by 20 dB to 11 mV.

Frequency response, AA601:
flat between 300 and 3000 Hz +0.2/0.8 dB; at 5 kHz the voltage has dropped 12 dB below 0 dB at 1000 Hz.
Frequency response, AA608:
flat between 300 and 2500 Hz +0.2/0.8 dB; at 5 kHz the voltage has dropped 12 dB below 0 dB at 1000 Hz.

Input Impedance

600 ohms. Input impedance is floating.

Output Impedance

3.9 k ohms or 1.2 k ohms, depending on strapping.

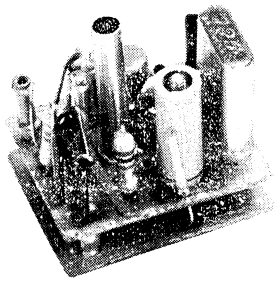
Dimensions

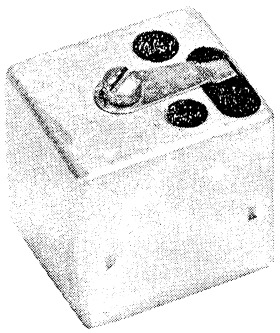
160 x 28 mm.

37.569-E1

Storno

Transmitter Oscillator Unit X0631





The transmitter oscillator unit is a crystal-controlled oscillator and is built on a double wiring board. It is a totally enclosed plug-in unit.
The oscillator units plugs into a crystal oscillator panel which has pins mating with sockets on the oscillator unit.

Mode of Operation

The oscillator uses a parallel-resonant Colpitts circuit with the crystal loosely coupled to the transistor. The oscillator is started up by connecting the CHANNEL SHIFT terminal to chassis through the channel selector in the control box. A diode in series with the -24 V supply lead prevents any flow of undesired current in the unit.
The oscillator signal is fed via the crystal oscillator panel to the RF input of the exciter.
The operating frequency can be adjusted by means of a trimmer capacitor located close to the crystal.

Technical Specifications

Crystal Frequency Range

11.3 - 14.66 Mc/s.

Frequency Pulling

$\frac{\Delta f}{f} : \pm 30 \times 10^{-6}$

Frequency Stability

For voltage variations within 24V ± 2.5% :
Better than $\pm 1 \times 10^{-6}$.

Load Impedance

25 ohms.

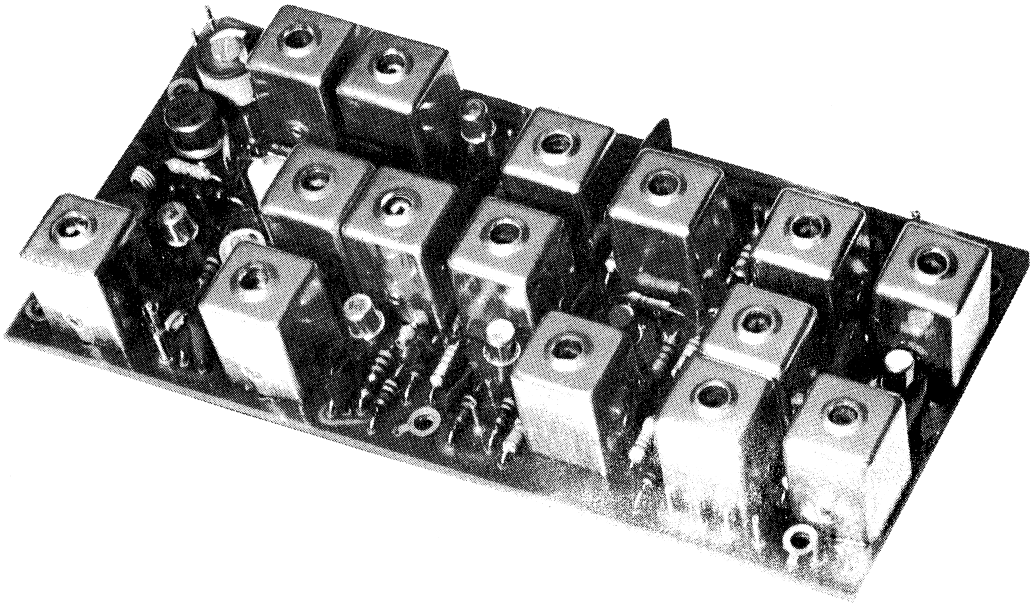
Power Output

Approx. 80 μV.

37.376-E1

Storno

Exciter EX611



The exciter is built on a wiring board. It consists of the following stages:

1st Buffer
Modulator
2nd Buffer
1st Frequency Doubler
Frequency Tripler
2nd Frequency Doubler
1st Power Amplifier
2nd Power Amplifier

The exciter performs two main functions: it modulates the RF oscillator signal and converts it to a frequency and a level suitable for the following power amplifier unit, PA.

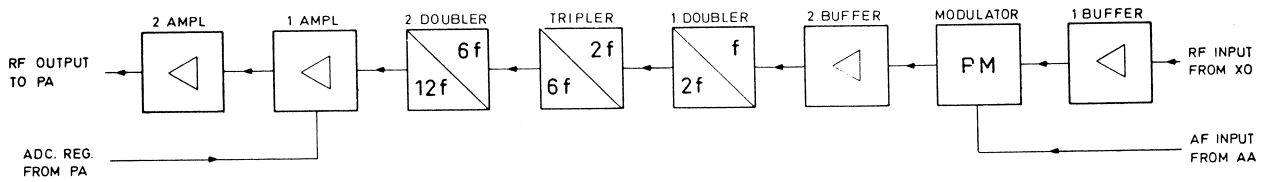
Mode of Operation

1st Buffer

The RF signal from the oscillator is applied to the 1st buffer (transistor Q1), which has tuned LC circuits in its base and collector leads. The stage is not neutralized; stability is accomplished by damping the collector circuit, L2, with a resistor. This stage amplifies the input signal to a level suitable for the modulator. The base circuit serves as an impedance transformer, providing an input impedance of approx. 50 ohms.

Phase Modulator

The phase modulator is a modified bridged T network composed of reactances. This circuit has



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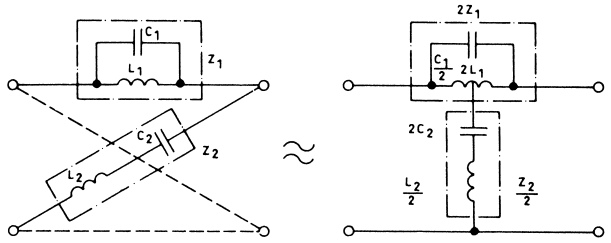
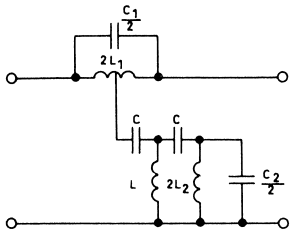
Storno

low insertion loss, constant four-terminal impedances, and produces a relatively large linear phase swing. The bridged T network is derived from a lattice section as shown below.



In these networks, the insertion loss is zero (no-loss reactances) and the four-terminal impedance is constant if the value of $Z_1 \times Z_2$ is constant. The phase shift introduced by the network can be varied by varying the impedances; however, this must be done in such a way that $Z_1 \times Z_2$ remains constant. In order to make the circuit practically applicable as a phase modulator, the series resonant circuit is replaced by a quarter wave transformer and a parallel circuit.



The advantage of this arrangement is that the phase shift can be varied by varying the two circuit capacitances in the same manner. This also meets the requirement that $Z_1 \times Z_2$ must be constant. The circuit capacitances are capacitance diodes on whose bias the modulating voltage is superimposed.
Attenuating networks inserted on either side of the modulator reduce interaction between the modulator and the buffer stage during alignment.

2nd Buffer

This stage is largely identical with the 1st buffer. It, too, has tuned LC circuits in its base and collector leads. Both circuits are damped by parallel resistors to keep the stage stable. Similarly, the damping of the circuits of the first and second buffer stages cause the operation of the modulator to become less dependent on the tuning of the buffer stages.

Frequency Multipliers

The frequency multiplier chain comprises a doubler, a tripler, and another doubler, with a total frequency multiplication factor of twelve. These stages are not neutralized, the tuned circuit being damped by resistors in the interests of good stability. The circuits between the multipliers and between the last doubler and the 1st power amplifier are double-tuned bandpass filters with close-to-critical coupling between circuits. These bandpass filters set a limit to the bandwidth of the exciter by attenuating undesired harmonics generated in the frequency multiplication process.

Power Amplifiers

The 1st and 2nd power amplifiers raise the signal level to approx. 500 mW in a 50-ohm load. Impedance matching between stages is accomplished by means of a tapped parallel resonant circuit (L14). The tap connects - via a series resonant circuit consisting of C42 and L15 - to the base of transistor Q7 of the 2nd power amplifier. Battery voltage for the 1st power amplifier is taken from the drive control circuit of the following RF amplifier unit, PA. The power output delivered by the exciter is adjusted by varying this voltage. The emitter resistor of the 2nd power amplifier is un-bypassed in the interests of better stability; another advantage of omitting bypassing is that transistor tolerances are then without importance. In order to be able to tune the power amplifier stages over the entire 2-metre band it was found necessary to divide it into two frequency bands, 146-168 Mc/s and 168-174 Mc/s. Switching between these subbands is performed by means of straps in the collector circuits of the amplifier stages.

A pi-network provides impedance matching to the 50-ohm load imposed by the following RF power amplifier unit.

Technical Specifications

Frequency Range

146-174 Mc/s.

Frequency Multiplication Factor

12.

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Crystal Frequency Bands

12.16 - 14.50 Mc/s.

Power Output

700 mW.

Power Input

40 μW.

Generator Impedance

50 ohms.

Load Impedance

50 ohms.

Audio Input Impedance

At 1000 c/s: 10 k ohms.

Modulation

Phase modulation, +6 dB/octave ±1 dB within 300 - 3000 c/s.

Modulation Sensitivity

Modulating voltage (for $\Delta f = 0.7 \times \Delta F_{max.}$ at 1000 c/s): 0.85V.

Modulation Distortion

Measured without de-emphasis: 5%.

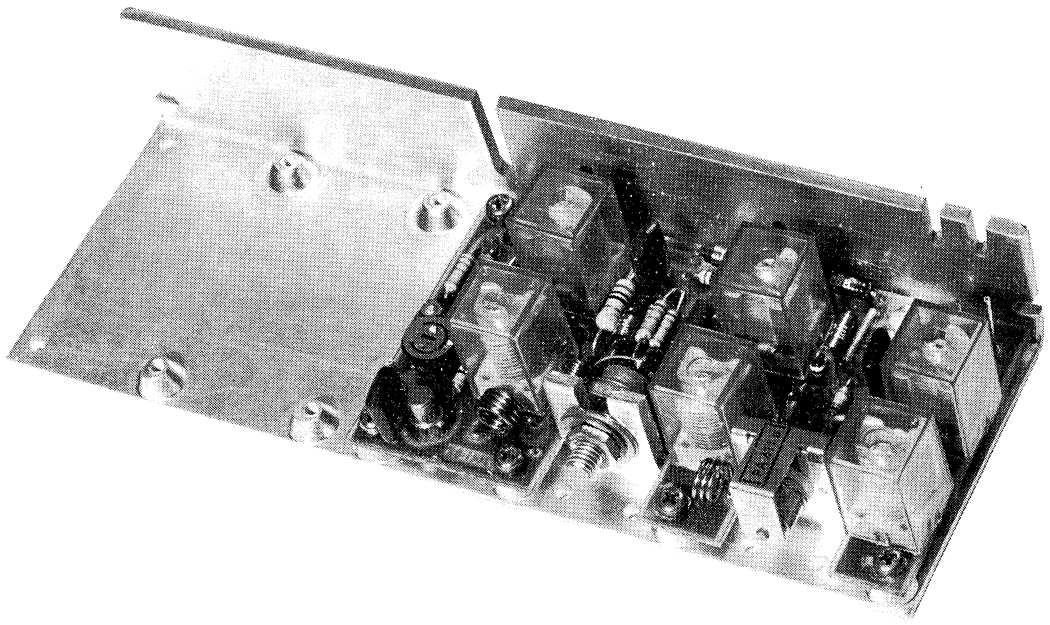
Dimensions

68 x 140 x 25 mm.

37.377-E1

Storno

RF Power Amplifier PA611



The power amplifier is built on a wiring board. It consists of the following stages:

1st Power Amplifier (Driver)
2nd Power Amplifier (Output)
ADC Circuit (Automatic Drive Control Circuit).

The RF power amplifier is a Class C amplifier. It raises the RF signal level to approx. 10 watts in a 50-ohm load. An ADC circuit ensures constant current through the output transistor and so prevents it from being overloaded. This circuit also causes the output of the RF power amplifier to be less dependent on variations in supply voltage and ambient temperature.

Mode of Operation

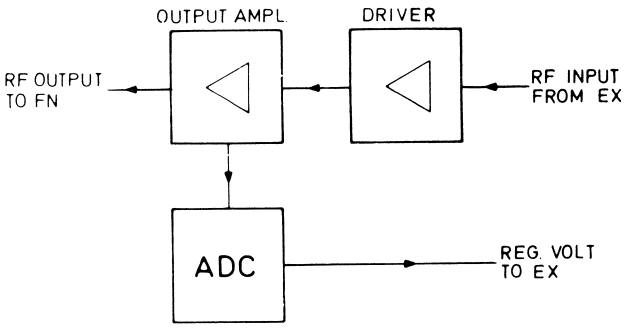
Driver Stage and Output Stage

The driver amplifies the signal from the EX exciter to a level (approx. 3 - 4 watts) suitable for driving the following output amplifier.

Pi-networks are used for matching the output stage to the driver and to the load impedance into which it works.

ADC Circuit (Automatic Drive Control Circuit)

This circuit consists of one transistor stage operating as a DC amplifier. The transistor base receives, via a potentiometer, a reference voltage which is produced by a zener diode. There is a DC path from the emitter of this transistor to the emitter of the output stage of the power amplifier unit, where a 1-ohm resistor provides operating voltage for the drive control circuit.
Lastly, the collector of the control transistor connects to the 1st power amplifier stage of the EX exciter.



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Storno

An increase in the current through the output stage will result in a voltage drop across the emitter resistor and hence also in a decrease in the base-emitter voltage of the control transistor. Consequently, the supply voltage applied to the 1st power amplifier stage will decrease, and so will the drive applied to the output stage. This will reduce the current through the output stage.

Technical Specifications

Frequency Range

146 - 174 Mc/s.

Power Output

10 W. Adjustable by means of the ADC circuit.

Current Drain

750 mA at 10 watts power output.

Input Impedance

50 ohms.

Output Impedance

50 ohms.

Gain

15 dB at 156 Mc/s.
The gain varies over the frequency range.

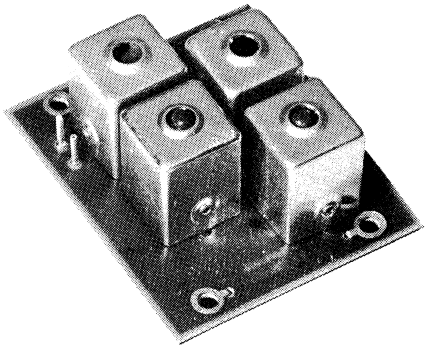
Dimensions

56 x 160 x 29 mm.

37.379-E1

Storno

Antenna Filter FN611



The antenna filter is built on a wiring board. It consists of a bandpass filter having low insertion loss.
This bandpass filter, composed of four LC circuits (two series resonant circuits and two parallel resonant circuits), serves the purpose of preventing the transmitter from radiating signals at undesired frequencies, such as harmonics of the signal frequency.

Technical Specifications

Frequency Range

146 - 174 Mc/s.

Input Impedance

50 ohms.

Output Impedance

50 ohms.

Bandwidth (3 dB)

72 Mc/s.

Insertion Loss

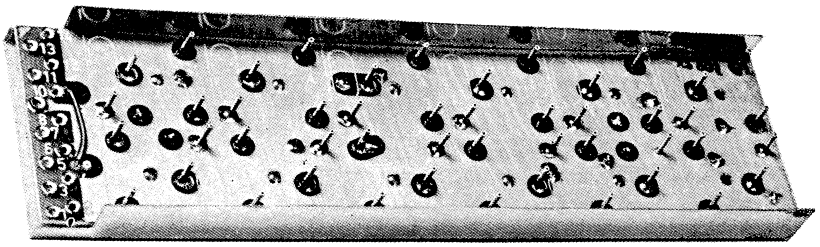
146 - 174 Mc/s: 0.4 dB.

Dimensions

52 x 44 mm.

Storno

Crystal Oscillator Panel XS601



The crystal oscillator panel consists of a wiring board with conductors on both sides, and a screen. The station uses two panels of this type, one for the transmitter-oscillator units and one for the receiver-oscillator units.

The front of the wiring board has plug pins for connection of up to 12 oscillator units, a crystal oscillator unit being required for each frequency channel provided in the station.
In order to ensure that the channels are equipped with the correct oscillators - and hence the correct frequencies - the plug pins of the wiring board are marked with the channel numbers 1-12.

Mode of Operation

Channel Switching

Channel switching is performed with the channel selector in the control desk or control box of the station. The switch contacts connect the transmitter and receiver oscillator units of the selected channel to chassis, thereby applying power to them since all transmitter and receiver oscillators connect to the -24V potential during transmit and receive, respectively.
If the station is equipped with more than 8 channels, a group switching system is used which incorporates a group switching relay, located outside the crystal oscillator panel. This system serves the purpose of limiting the number of conductors in the control cable.

When the group switching feature is provided, the oscillators are divided into two groups - A and B. Group A covers channels 1-8, group B comprising channels 9-12. Each group has a common minus lead which - via the contacts of the switch relay - is always open for one group when it is closed for the other one. The group switching relay is not operated when channels 1-8 are in use.

For channels 9-12, the relay is operated, being energized via an extra contact pair on the channel switch. This will cause the relay contacts in the minus lead of group A to break, instead causing those of group B to make.

The crystal oscillator units for the first four and the last four channels have pairwise common chassis leads, in this sequence: 1+9, 2+10, 3+11, and 4+12. On the channel switch, the same pairwise positions are shorted. But because the group switching relay has opened the minus lead of the unused group of channels, only one transmitter oscillator and one receiver oscillator will be in operation at any time.

If the radio station is equipped with a type PS601 or PS604 power supply unit, the group switching relay (Re C) is inserted in that unit when the group switching function is installed; besides, two straps in the power supply unit are removed (see circuit diagram of PS in question).

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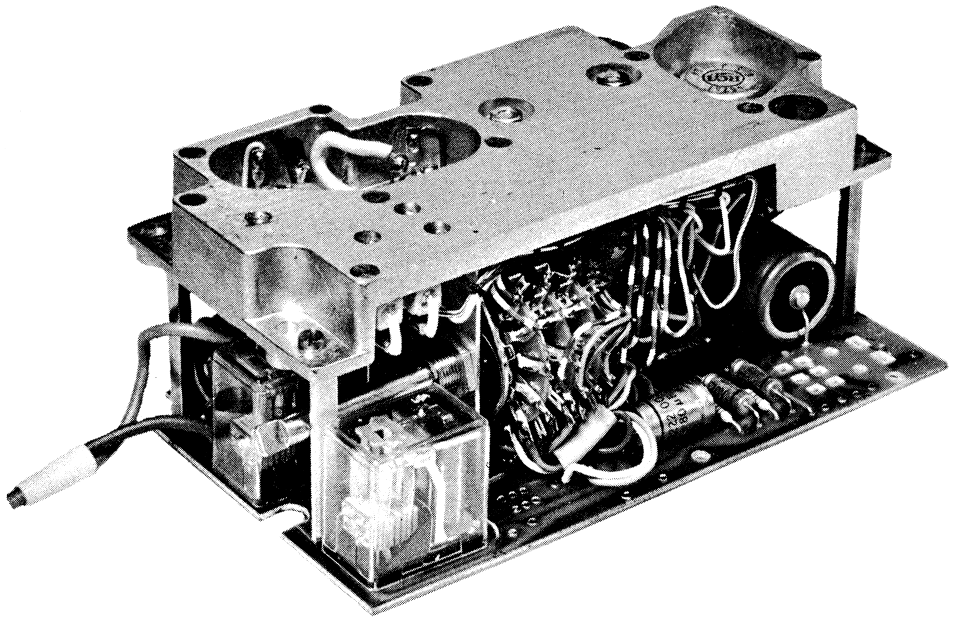
Storno

Power Supply Unit PS601



The power supply unit is built on a cast chassis and a wiring board. It consists of these units:

DC Converter with Voltage Switch
Series Regulator
Starter and Transmit Relay
Group Switching Relay (if provided)

The power supply unit primarily serves the purpose of converting 6, 12, or 24 volts from a battery into 24-volt stabilized DC for the transmitter and receiver sections.
Besides, the power supply unit houses such relays as are naturally associated with the power supply.

Mode of Operation

DC Converter

The DC converter is a conventional push-pull oscillator with two transistors in a common-emitter circuit and the transformer inserted in the collector circuit whilst the feedback windings connect to the bases. The converter frequency is between 1 and 4 kc/s.
The transformer primary is composed of four identical centre-tapped windings which are connected either in series or in parallel depending on the battery voltage. They are in parallel for 6 volts; for 12 volts they are partly in series and partly in parallel; for 24 volts they are in series.
An inductance between the bases of the two transistors is so dimensioned that its core will saturate before that of the transformer. In this way excessive peak currents through the transistors are avoided.
The transformer secondary has a main winding with taps for matching, and an auxiliary winding. The main winding connects to a bridge rectifier. Normally the connection providing the maximum number of turns is used but in cases where most operation occurs at high battery voltages the number of turns must be reduced, in which case the matching tap is used (see circuit diagram). This results in improved efficiency. The secondary auxiliary winding is used for producing a positive auxiliary voltage for the following series regulator and also furnishes power for the starter lamp.

Series Regulator

The series regulator consists of a series transistor, a control transistor, and an amplifier transistor.

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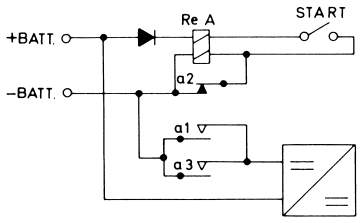
Storno

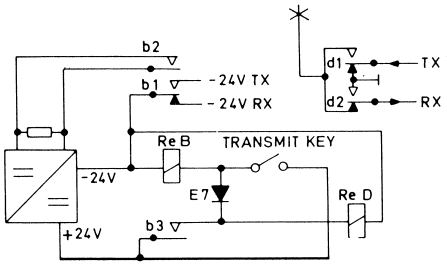
The base of the amplifier transistor receives, via an alignment potentiometer, a portion of the stabilized output voltage. In the emitter circuit there is a reference diode, and the DC voltage at this point is compared with the base voltage. The collector of the amplifier transistor connects to the base of the control transistor. If the output voltage begins to increase, so will the collector current of the amplifier transistor, and the base voltage for the control transistor will decrease. This will cause the base voltage for the series transistor to decrease and the voltage drop across the latter to increase, thereby causing the output voltage to decrease.
The output voltage is adjusted for -24 volts by means of alignment potentiometer R14.
In order to protect the transmitter-receiver modules against overvoltage in the case of defects in the series regulator, a zener diode across the output of the regulator prevents the voltage from exceeding a certain potential (approx. 30 volts).

Starter Relay



The starter relay, Re. A, is operated from the control box. It serves the purpose of turning the battery voltage for the power supply unit on and off; this is done via contact sets a1 and a3. The relay has two windings, but only one of them is energized when the relay is operated to start up the equipment, the other winding being short-circuited via one of the contact pairs or the relay (a2). When the equipment has been started, this latter contact set will break, thereby connecting the two windings in series and reducing the holding current.
A diode in series with the relay protects the power supply unit against incorrect battery voltage polarity.

Transmit Relay



Transmit relay (Re. B) is operated from the control box or control equipment. This relay switches the supply voltage back and forth between the receiver and transmitter sections (contact set b1) and short-circuits a feedback resistance in the DC converter during transmission (contact set b2); the latter operation is performed in order to obtain maximum efficiency at varying loads on the converter.
When the transmit relay is operated, the antenna switching relay - which is located outside the power supply unit - is energized via the DC path through diode E7 and the transmit button to earth. This occurs simultaneously with the operation of the transmit relay, but since the operating time of the antenna switching relay is shorter than that of the transmit relay, the antenna will be connected to the transmitter before the latter begins to operate and can deliver any power.
On switching to receive, the transmit relay will be de-energized before the antenna relay due to the fact that the latter relay remains operated via contact set b3 of the transmit relay.

Group Switching Relay

If more than 8 channels are provided, the power supply unit will contain a group switching relay. The frequency channels are divided into groups, group A covering channels 1 - 8 and group B channels 9 - 12. Either group of channels has a common earth return lead, and switching of the -24 V potential from one group to the other is performed by means of the group switching relay.
The relay is operated from a channel selector in the control box. For additional information about the channel switching functions see the description of the XS crystal oscillator panel.

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Technical Specifications

Supply Voltages

Measured at input terminals.

Supply Voltage	Minimum	Nominal	Maximum
6 V	5.0 V	6.3 V	7.5 V
12 V	10.0 V	12.6 V	16.5 V
24 V	20.0 V	25.2 V	33.0 V

Output Voltage

Regulated. -27 V.

Output Voltage Variation

For temperature and load variations
Less than ±0.6 V.

Output Load

Receive, max. 0.3 A
Transmit, max. 1.4 A.

Output Voltage Ripple

Less than 10 mV p-p.

Current Drain

Voltage	Idling	Receive 0.3A	Transmit 1.4A
6.3V	0.3A	2.1 A	10.5 A
12.4V	0.14A	1.0 A	4.8 A
25.2V	0.08A	0.55 A	2.2 A

Converter Frequency

1 - 4 kc/s.

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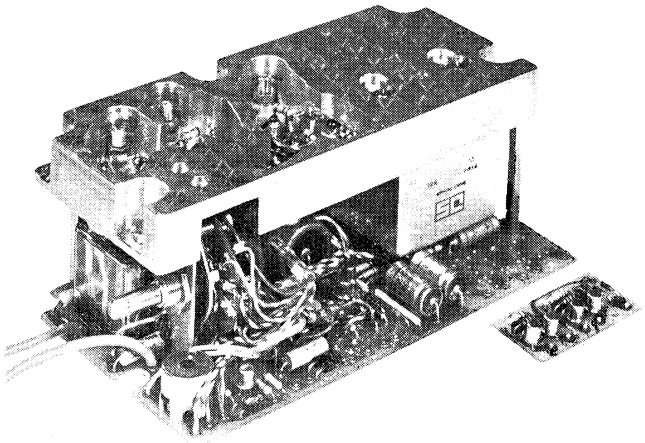
Storno

Power Supply Unit PS6015a



PS6015 is a power supply unit which, operated from 12 V or 24 V battery, supplies 24 V stabilized DC to the transmitter and receiver sections of the radiotelephone and 7.5 V DC to the start lamp of the control unit.

Switching between 12 V and 24 V battery voltage is performed with the voltage switch of the power supply unit. The switch is accessible from the outside of the radio cabinet.

The unit is built on a cast chassis with its associated printed circuit board. It comprises the following circuits:

DC converter
Series regulators
Start relay
Electronic transmit/receive switching circuit
Electronic crystal group switching unit, type SU607 (only in radiotelephones with 9-12 channels).

Mode of Operation

DC Converter

The DC converter is a conventional push-pull type with two transistors in a common-emitter configuration and a transformer, T1, inserted in the collector circuit.

A transformer, T2 is connected between the bases of the two transistors. This Transformer is dimensioned to go into saturation before the transistors so that excessive peak currents through them are avoided.

The primary of converter transformer T1 is composed of two identical windings which are connected in series. Each winding has a centre tap. The voltage switch cuts in the full number or half the number of primary windings, depending on whether the power supply unit is set at 24 V or 12 V battery voltage.

T1 has three secondary windings:
A main winding for 24 V supply voltage (transformer terminals 11 and 12).
An auxiliary winding for generating an auxiliary voltage for the series regulator circuit of the power supply unit (transformer terminals 9 and 10).
A special auxiliary winding (transformer terminals 7 and 8) is designed to deliver min. 7.5 V, 2A power to certain types of special equipment.

Normally, the only load on this rectifier section is the start lamp, connecting to terminal MM.

To ensure that the DC converter will start under all conditions, a starting circuit incorporating

Storno

a programmed unijunction transistor is connected to the base of converter transistor Q2. A positive charge from the battery, through the primary winding of T1, begins to build up on C4 until it reaches a level where it causes Q11 to open. As C4 discharges through Q11, the base of Q12 becomes forward biased and the transistor turns on, thus starting the converter action. Since the starting frequency is much lower than the converter frequency, the starting circuit will remain passive during operation.

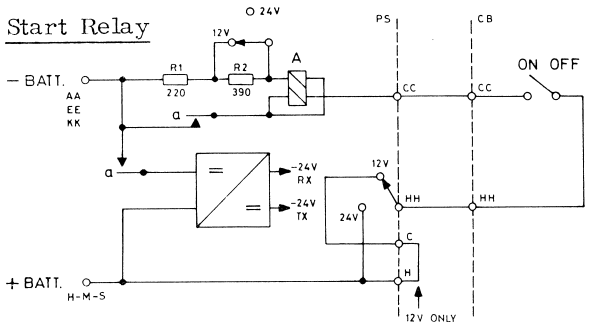
Series Regulators

The power unit includes two identical series regulator circuits which supply -24 V stabilized DC to the transmitter and the receiver sections, respectively.

Each series regulator is composed of a series element, a control stage and an amplifier stage incorporating a reference diode.

The series element is a transistor, Q3 (Q5), operating in a common-emitter configuration. The control stage, Q4 (Q6), is a β-multiplier which is controlled by the amplifier stage, Q8 (Q10), whose base registers output voltage variations with respect to the reference voltage across the diode E9 (E14).

In order to protect transmitter and receiver sections of the radiotelephone against overvoltage in case of a fault in the series regulators, a Zener diode, E22, across the regulator outputs via E15 and E16 prevents the output voltages from exceeding a certain level (approx. 27 V). Potentiometers R13 and R22 set the output voltages of the series regulators to -24 V.



START CIRCUIT PS 6015a

The start relay is powered from the battery via the on/off switch. Initially, the relay draws current across its own contacts 8 and 9. When the relay is activated, battery power is applied to the converter circuit via the remaining contacts.
Contacts 8 and 9 break, inserting resistor R1 in series with relay coils. This reduces the current drain during operation. Diode E1 protects against incorrect battery polarity.

Electronic Transmit/Receive Switching Circuit

The electronic transmit/receive switching circuit, composed of transistors Q7 and Q9, is controlled from the radiotelephone control unit or from an external transmit button. The transmit/receive switching circuit switches the -24 V stabilized supply voltage between the transmitter and receiver sections of the radiotelephone. Normally, the -24 V supply voltage is applied to the receiver functions via transistor Q5 to terminal P.

When transmitting, the base of Q7 is shorted to 0V (the same potential as its emitter) via terminal V. Now that Q7 no longer conducts, the voltage at its collector (and also at the base of Q4) increases to where Q3 can conduct and begin to pass current to the transmitter section through terminal R.

The rising negative voltage at the collector of Q3 begins to forward bias Q9 through divider resistors R18 and R19. Q9 begins to conduct more and more until, finally, it acts as a virtual short circuit from 0V to the base of Q6, thus turning Q5 off. No current is then available at terminal P to supply the receiver section.

Releasing the transmit button breaks the shorting connection to terminal V. Then the current path from Zener diode E17 to 0V through resistor network R8, R9 and R10 is re-established, forward biasing Q7 again, and the circuit switches back to receive. Change-over time from the moment the transmit button is operated until the -24 V supply voltage reaches 90% of its final value is less than 15 ms.

Electronic Crystal Group Switching Unit SU607

Crystal group switching is employed only in equipment with crystals for more than 8 channels.

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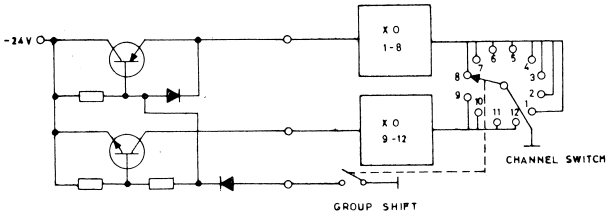
Crystal group switching unit SU607 is built on a separate printed circuit board which has plug pins for soldering to the power supply p.c. board.

The frequency channels of the radiotelephone are divided into two groups: Group A, comprising channels 1 - 8; and group B, channels 9 - 12.



CHANNEL GROUP SWITCHING

Each channel group has a common minus lead, and switching of the -24 V supply between them is made by means of crystal group switching unit SU607.

The crystal group switching unit is operated from a channel switch in the control unit of the radiotelephone.

Technical Specifications

Input Voltages

Measured at input terminals:

Battery voltage	Minimum	Nominal	Maximum
12 V	10.0 V	12.6 V	16.5 V
24 V	20.0 V	25.2 V	33.0 V

Output Voltage

Regulated -24 V

Output Voltage Variation

For temperature and load variations: less than 0.6 V

Output Load

Receive, max. : 0.3 A
Transmit, max. : 1.4 A

Output Voltage Ripple

Less than 30 mVpp

Current Drain

Voltage	No signal receive	No signal transmit	Receive 300 mA	Transmit 1.4 A
12.6 V	450 mA	450 mA	1.5 A	6.0 A
25.2 V	250 mA	250 mA	0.8 A	3.0 A

Converter Frequency

3-25 kHz

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CHAPTER III. ACCESSORIES

Storno

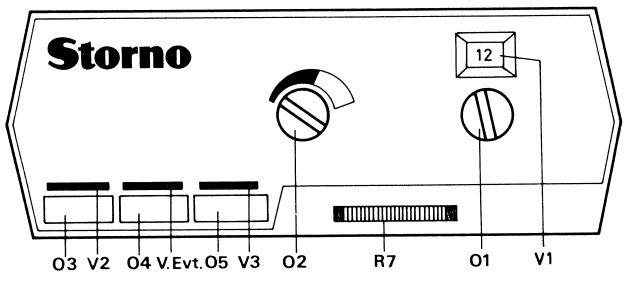
Control Box CB601

The CB601 control box is intended for remote control of the STORNOPHONE 600 in cases where watertight or specially rugged construction is not a requirement. It can be mounted under the dashboard of a car, hung on a wall, or placed wherever it will not be exposed to physical damage.

The CB601 control box is of die-cast metal. It has a lid which can easily be removed by pressing a spring on the back of the box, thereby providing easy access to all cable connections and circuits. The bottom plate is held by two screws so that it can be easily removed to provide access to the terminal strips to which the control cable, loudspeaker cable etc. are soldered.
Instead of the bottom plate, a loudspeaker can be mounted on the box by means of two screws if desired.

Front Panel

All controls and lamps are located on the front panel of the control box as shown in the drawing.



The position designations, which are also those used in the circuit diagram, cover the following functions:

01. Knob.	Channel selector (for max. 12 channels) with illuminated dial.
02. Knob.	On/off switch and volume control with dial.
03. Self-releasing push-button.	Transmit button (if a built-in tone transmitter is not provided). Tone button (if a built-in tone transmitter is provided).
04. Self-releasing push-button.	This button turns on the loudspeaker if a built-in tone receiver is provided.
05. Self-releasing push-button.	This button may be used to cut out the loudspeaker if a built-in tone receiver is provided.
V1. White lamp.	Start lamp, for use with channel indicator.
V2. Red lamp.	Transmit indicator lamp.
V3. Green lamp.	Calling lamp for use with selective calling.
V. Available.	An additional lamp for some special application can be placed here.
R7. Potentiometer.	Squelch control.

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General Functions

Channel Selector

The channel selector (01) has 12 positions, corresponding to the maximum number of RF channels that can be provided. The channel dial, which is illuminated when the radiotelephone is in operation, shows which channel has been selected. The channel switching system uses the group switching method in order to reduce the number of control cable conductors. For this reason the channel selector switch has two sections one of which handles voltage switching between the individual oscillator units whilst the other one performs the group switching function. The channel switching system is described in detail under the crystal oscillator panel, XS.

On/off Switch and Volume Control

The switch (02) controls the loudspeaker volume in six steps. In its extreme anti-clockwise position it turns the equipment off. A semicircular dial above the knob shows how much the volume control is advanced.

Transmit Button

A steering-wheel switch, foot switch, microphone key etc. will usually be preferred as transmit button.
However, button 03 on the control box can also be used as transmit button if no tone transmitter is provided in the box (see under selective functions).
The red transmit indicator lamp shows light while the transmit button is depressed.

Squelch

The electronic squelch system in the receiver can be adjusted with the squelch potentiometer (R7). To do this, turn the potentiometer in a clockwise direction until you hear set noise (hiss); then turn it anti-clockwise until the noise disappears.

Selective Functions

Turning the Loudspeaker On and Off

When selective calling is used, the loudspeaker will be operative during incoming calls. The loudspeaker can be cut out on termination of calls by depressing button 05. Only calls intended for the operator will then turn the loudspeaker on.

If you want to monitor the channel for traffic, you turn the loudspeaker on by depressing button 04. The channel should always be monitored before pressing the transmit button, and for this reason the tone receiver unit incorporates a circuit to prevent operation of the transmitter before button 04 has been depressed and the loudspeaker turned on.

Tone Transmission

Button 03 is used to turn on the built-in tone transmitter, in which case an external push-button is used as transmit button (for instance a steering-wheel button or microphone key).

Calling Lamp

The green calling lamp (V3) is installed only if selective equipment is provided. It shows light when selective calls are received and transmitted and in the former case continues to show light until the loudspeaker is turned off by depressing button 05.

Built-in Units

The control box houses the receiver audio output amplifier unit, AA602, which is screw-mounted on top of the wiring board of the box so that it becomes accessible on removal of the lid.
The audio output amplifier is described separately in this Chapter.

The control box also accomodates a tone-transmitter and a tone-receiver unit. These units are similarly screw-mounted on top of the wiring board of the box.

Additional information about the installation of tone equipment is contained in a separate manual covering tone equipment for the STORNOPHONE 600.

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Control Box CB602

Control box Type CB602 is a rugged watertight box for remote control of a CQM600 or CQF600 radiotelephone, the latter being employed as a mobile station.

The control box is of grey die-cast light-alloy metal. It has sturdy controls. It can be mounted on a plane surface, wall etc. by means of the four screws supplied with it.

The box is divided into two sections, a lid and a bottom, which are hinged together below and held together by two screws at the top. On loosening these screws, the lid can be tilted down, thereby providing easy access to the circuitry and to the terminal strips to which the control cable, loudspeaker cable etc. are soldered.

The bottom of the box has three cable entries with associated gland nuts, and a covered cut-out in which a handset connector socket may be installed if desired.

Front Panel

All controls and lamps are located on the front panel as shown in the sketch.

The position designations, which are also those used in the circuit diagram, cover the following functions:

01. Knob.
    Channel selector (for max. twelve channels) with illuminated dial.

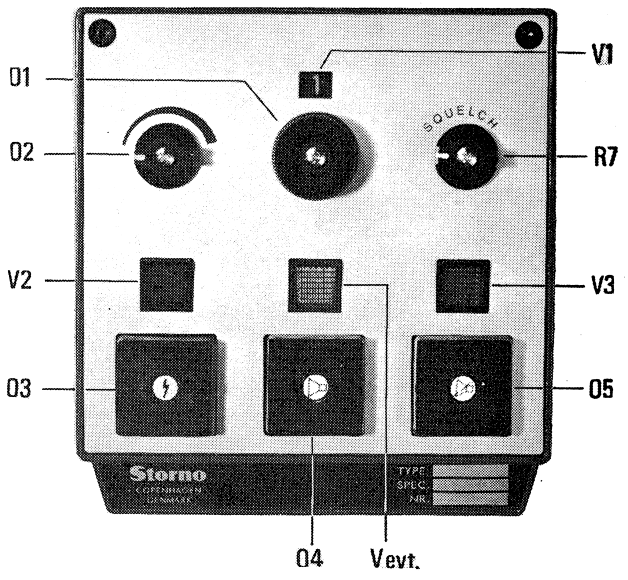
02. Knob.
    Combined on/off switch and volume control with dial.

03. Self-releasing push-button.
    Transmit button (without built-in tone transmitter).

04. Self-releasing push-button.
    "Speaker In". This button cuts in the loudspeaker if a built-in tone receiver is provided.

05. Self-releasing push-button.
    "Speaker Out". This button may be used to cut out the loudspeaker if a built-in tone receiver is provided.

V1. White lamp.
    Start lamp, for use with channel indicator.



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V2. Red lamp.
Transmit indicator lamp.

V3. Green lamp.
Calling lamp to indicate incoming selective calls.

V. Available.
An additional lamp for some special application may be placed here.

R7. Potentiometer.
Squelch control.

General Functions

Channel Selector

The channel selector (01) has 12 positions, corresponding to the maximum number of RF channels that can be provided. The channel dial, illuminated when the radiotelephone is in operation, shows which channel has been selected. The channel switching system uses the group switching method in order to reduce the number of control cable conductors. For this reason the channel selector switch has two sections one of which handles voltage switching between the individual oscillator units whilst the other one performs the group switching function. The channel switching system is described in detail under the crystal oscillator panel, XS.

On/off Switch and Volume Control

The switch (02) controls the loudspeaker volume in six steps. When turned fully left, it switches the equipment off. A semicircular dial above the knob indicates the volume control setting.

Transmit Button

An external switch (such as a microphone switch, handset key etc.) will usually be preferred for use as a transmit button.

However, button 03 on the control box can also be used as transmit button if no tone transmitter is provided in the box (see under Selective Functions below).

The red transmit indicator lamp shows light while the transmit button is kept depressed.

Squelch

The electronic squelch system in the receiver can be adjusted with the squelch potentiometer (R7). To do this, turn the potentiometer in a clockwise direction until you hear set noise (hiss); then turn it anti-clockwise until the noise disappears.

Selective Functions

Cutting the Loudspeaker In and Out

When selective calling is used, the loudspeaker will be operative during incoming calls. The loudspeaker can be cut out on termination of calls by depressing the button 05. Only calls intended for the operator will then cut the loudspeaker in.
If you want to monitor the channel for traffic, you cut in the loudspeaker by pressing the button 04. The channel should always be monitored before pressing the transmit button, for which reason the tone receiver incorporates a circuit to prevent operation of the transmitter before the button 04 has been depressed and the loudspeaker cut in.

Tone Transmission

In this case the button 03 is used to switch on the built-in tone transmitter, and an external push-button is used as transmit button (for instance a microphone switch or handset key).

Calling Lamp

The green calling lamp (V3) is installed only if selective equipment is provided. It shows light when selective calls are received and transmitted and in the former case continues to show light until the loudspeaker is cut out by depressing the button 05.

Built-in Units

The control box houses the receiver audio output amplifier, AA602, which is screw-mounted to the right on the bottom of the box so that it will become accessible on removal of the lid. The audio amplifier is described separately in this chapter.
The control box will also accomodate a tone transmitter and tone receiver - and an alarm circuit AC683. These units are similarly mounted on the bottom plate whilst the alarm circuit is mounted on top of the audio amplifier unit.
Additional information about the installation of tone equipment is contained in a separate manual covering tone equipment for the STORNOPHONE 600.

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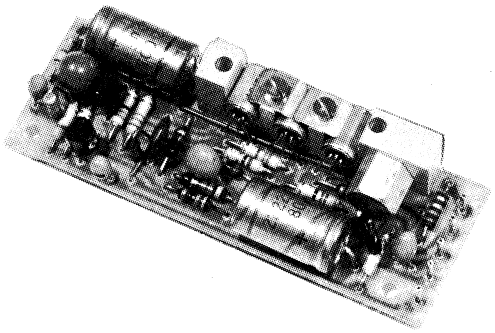
Storno

Audio Output Amplifier AA602



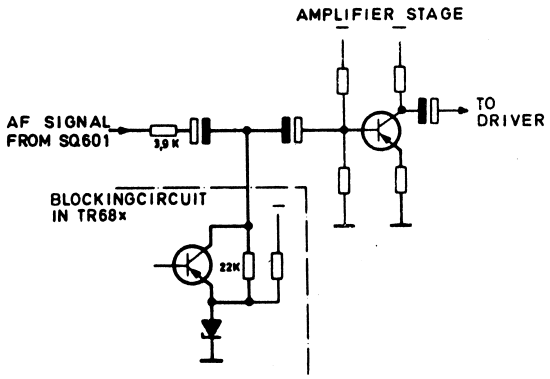
The audio output amplifier is built on a wiring board. It consists of these stages:

Blocking attenuation circuit
Pre-amplifier stage
Driver
Complementary output stage with temperature compensator.

The audio output amplifier is a transformerless push-pull amplifier which is capable of delivering 2 watts of power output. This unit is located in the control box.

Mode of Operation

The blocking attenuation network in the input circuit of the audio output amplifier is used only if a selective tone receiver is provided, in which case the attenuation network (a T-network) is made up of the pre-amplifier input impedance, a series resistor, and the output impedance of the tone-receiver blocking circuit, the latter impedance should be less than 1.5 ohms if the desired blocking attenuation is to be achieved (see sketch below).



The signal is fed to the output stage via the pre-amplifier stage and the driver stage, both of which receive negative feedback voltage from the output stage. Temperature compensation of the output stage is accomplished by biasing a transistor connected between the bases of the output transisitors. The type of compensation employed is base-emitter voltage compensation. The output stage operates in Class B push-pull in a common-collector circuit. It is transformerless, with a loudspeaker load of approx. 15 ohms.

Warning Never short-circuit the loudspeaker output (terminals 2 and 4) as this will cause permanent damage to transistors.

Reducing the Input sensitivity

If a reduction in the output amplifier sensivity is desired, a 1/8-watt resistor (see table below for resistance value) may be inserted between terminal 3 of the unit and the wiring board in CB60x.

INPUT SENSITIVITY FOR 2 WATTS OUTPUT	RESISTANCE VALUE
+3 dBm	22 k ohms
0 dBm	12 k ohms
-3 dBm	6.8 k ohms
-6 dBm	2.7 k ohms
-9 dBm	0 ohms

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Technical Specifications

Supply Voltage
24 V ±5%.

Resistance in Power Supply Cable
R_{cable}: max. 14 ohms.

Current Drain
At 24V: without signal 20 mA
at 2 watts output 175 mA
blocked 20 mA

Power Output
Max. 2 watts.

Loudspeaker Impedance
15 ohms.

Input Impedance
6.5 k ohms.

Input Sensitivity
For 2 watts into 15 ohms and R_{cable} = 0 ohms.
Better than -9 dBm.

Frequency Response
Measuring level 1W (ref. 1000 c/s): 300 - 3000 c/s +0.5 dB -1.5 dB.

Distortion
Less than 5%.

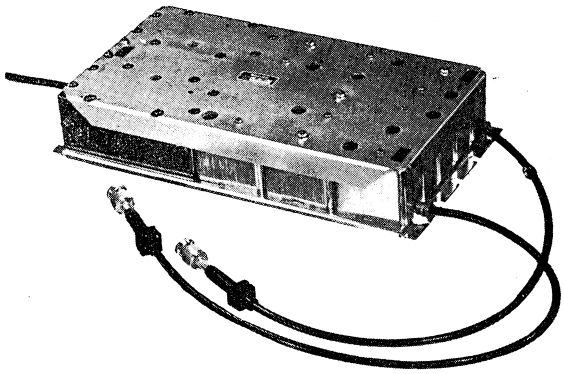
Hum and Noise
Attenuated 60 dB.

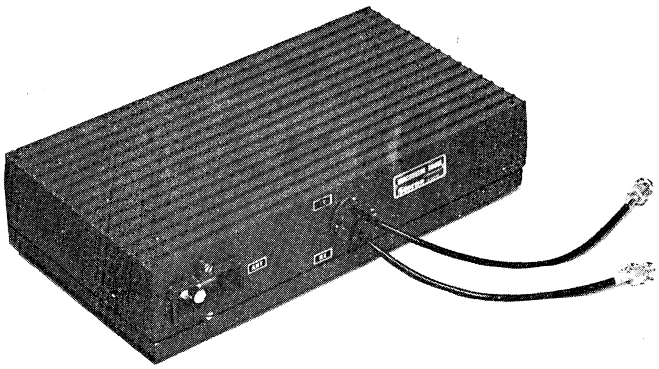
Blocking
Earthing the blocking lead through tone receiver TR68x or 1.5-ohm resistor: 50 dB.

Dimensions
28 x 80 mm.

Storno

Branching Filters BF611 and BF612





Branching networks BF611 and BF612 are used with radio stations operating in duplex service with the transmitter and receiver connected to the same antenna inside the frequency range 146-174 MHz.

Branching network BF611 is used in the fixed radio station CQF610, where it is mounted in the station cabinet.

The unit is housed in a screen box, the interior of which is divided up into a number of mutually screened compartments containing the various filter circuits.
A number of holes on the top of the screen box provide access for adjustment of the filter.

Two cables fitted with connectors are used for connecting the filter to the transmitter signal output and the receiver signal input whilst a third cable is connected to the antenna connector of the station cabinet.

Branching network BF612 is used in conjunction with the mobile radiotelephone CQM610. BF612 consists of a type BF611 branching network housed in a cabinet which may either be installed separately or mounted to the cabinet of the radiotelephone.

Branching network BF612 is - just like BF611 - equipped with two cables with connectors for connection to the transmitter output and receiver input of the radio station whilst the antenna terminal of the network is a connector which is mounted on the cabinet.

Mode of Operation

The branching network is composed of two band-stop filters the transmitter section of which has four series-resonant traps and the receiver section five series-resonant traps.
These traps are identical except for L4, C4 and L5, C5, which are two identical series-resonant traps of considerably higher Q than the other circuits, to compensate for the insertion loss introduced by the filter.
In order to accomplish sufficiently high surge impedance in the individual series-resonant traps and consequently sufficiently narrow stop-bandwidth in the filter, all coils of the series-resonant traps have taps.

The series-resonant traps connect to each other through quarter-wave cables, except that compensating circuits L10, C10, and L11, C11 are inserted between series-resonant traps L1, C1, and L2, C2 and between L8, C8 and L9, C9.

The quarter-wave cables going to series-resonant traps L4, C4 and L5, C5 have an impedance of only 25 ohms because of the lower impedance of these traps. The 25-ohm impedance is accomplished by connecting two lengths of 50-ohm cable in parallel.

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In order to facilitate adjustment, short-circuiting holes are provided above traps L4, C4 and L5, C5 through which the short-circuit points shown in the circuit diagram can be connected to chassis.

Technical Specifications

Frequency Range

146-174 MHz.

Duplex Spacing (spacing between transmitting frequency and receiving frequency).

Greater than, or equal to, 4 MHz.

Insertion Loss, Transmitter Section

For 4 MHz duplex spacing: approx. 1.2 dB.
For 10 MHz duplex spacing: approx. 0.6 dB.

Insertion Loss, Receiver Section

For 4 MHz duplex spacing: approx. 1.3 dB.
For 10 MHz duplex spacing: approx. 0.8 dB.

Pass Band

0.6 MHz.

Isolation, Transmitter Section

Min. 45 dB.

Peak Isolation, Transmitter Section

Approx. 75 dB.

Isolation, Receiver Section

Min. 55 dB.

Peak Isolation, Receiver Section

Approx. 90 dB.

Nominal Impedance

50 ohms.

Standing-wave Ratio

Less than 2.

Maximum Power Input

25 watts.

Temperature Range

$-30^{\circ}C$ to $+80^{\circ}C$.

Stable against shocks and vibrations in ordinary mobile service.

Overall Dimensions

BF611: 274mm x 149mm x 53mm
BF612: 307mm x 160mm x 72mm.

Weight

BF611: 2.2 kilos
BF612: 3.8 kilos.

37.647-E1

Fixed Microphone MC601

Microphone MC601a

The MC601a microphone is designed for fixed mounting and a speaking distance of approx. 30 - 40 cm. The microphone housing contains a 600-ohm microphone cartridge and a Type AA604 50-dB amplifier with integrated circuits. This microphone may be used with the CB601 control box.

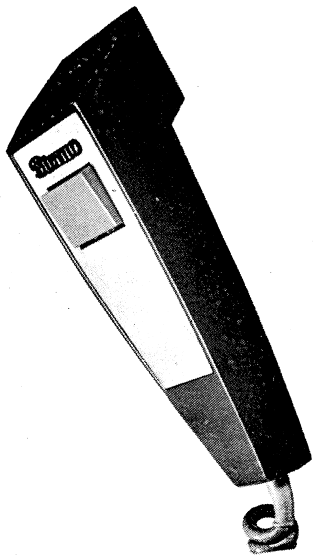
Fixed Microphones MC602, MC603, MC604

Microphones MC602a, MC603a, and MC604a

These microphones are identical with the Type MC601a in regard to technical details and operation; however, they have goosenecks of different lengths.

MC602a	11-cm gooseneck
MC603a	21-cm gooseneck
MC604a	41-cm gooseneck

Fist Microphone MC606

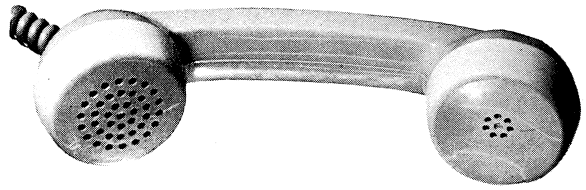


Microphone MC606a

The MC606a microphone is a fist microphone. A transmit button is provided on the housing. The MC606 microphone contains a 600-ohm dynamic microphone cartridge and a Type AA606 50-dB integrated amplifier.
The fist microphone is used with the CB601 control box.

Storno

Handset MT601



Handset MT601

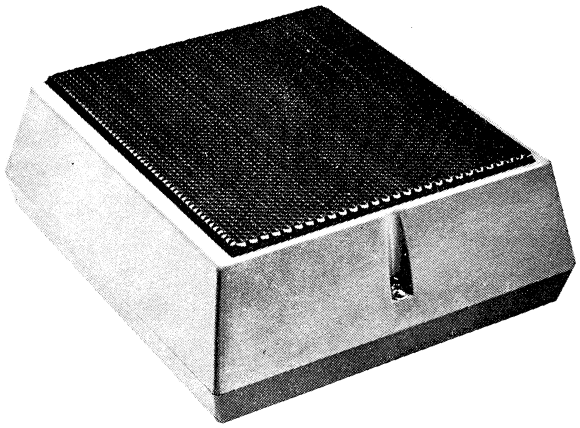
The MT601 handset is a conventional handset with transmit key. It contains a telephone cartridge and a microphone cartridge with a built-in amplifier.
The MT601 handset may be used with the CB601 control box.

Handset MT602

Handset MT602

The MT602 handset is a watertight handset with transmit button. It contains a telephone cartridge and a microphone cartridge with a Type AA605 one-stage transistor amplifier which provides approx. 20 dB gain. The MT601 handset may be used with either the CB601 or the CB602 control box.

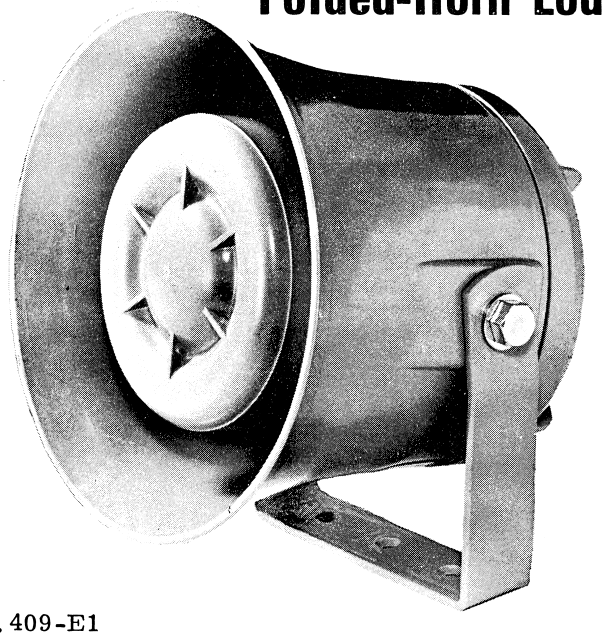
Loudspeaker LS601



Loudspeaker LS601a

The Type LS601a loudspeaker is a 2-watt 15-ohm loudspeaker mounted in a plastic housing. It may be mounted wherever convenient (mounting hardware is supplied). It can also be mounted on the CB601 control box.

Folded-Horn Loudspeaker LS602



Folded-Horn Loudspeaker LS602

The Type LS602 folded-horn Loudspeaker is a watertight high-efficiency loudspeaker with pronounced directional properties. For this reason it is excellently suited for outdoor mounting, for instance in conjunction with motorcycle installations.

Technical Data

Impedance: 20 ohms
Power capacity: 10 watts
Lower limiting frequency: 560 c/s
Dimensions: 150-mm dia. x 140 mm.

37.409-E1

Storno

CHAPTER IV. INSTALLATION

A. General

Introduction

It is most important that the equipment is properly installed in accordance with the instructions in this chapter. The performance of the equipment can be seriously impaired if the installation is carried out without due care.

The instructions given in this chapter should be read and followed carefully by the personnel installing the equipment.

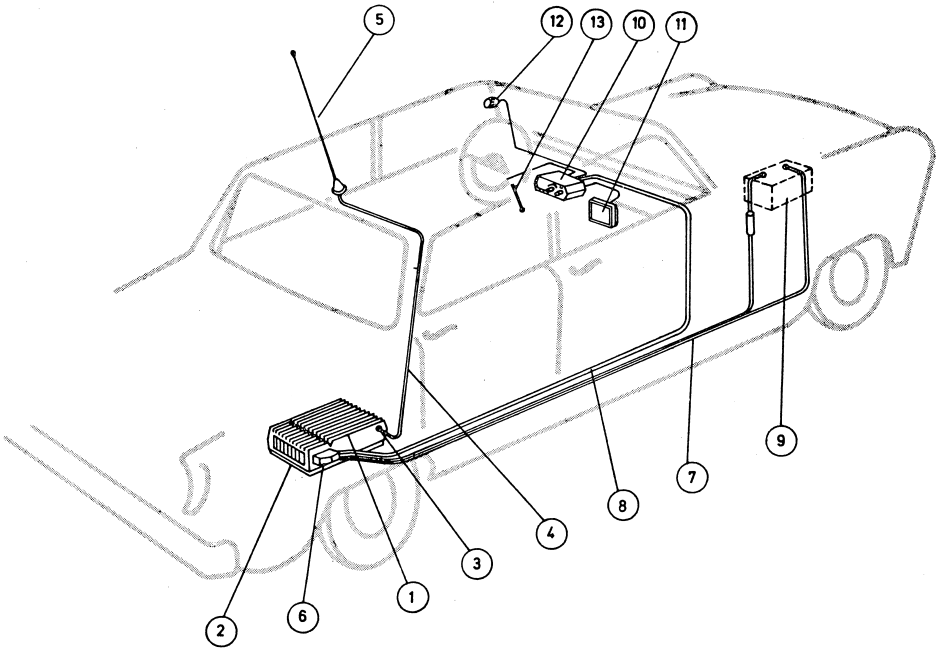
It is not possible to give precise instructions for each particular vehicle, as there are so many different types and different customers who have different requirements.

Apart from vehicles, there are special problems associated with the installation of the Stornophone 600 in vessels, fork-lift trucks, coaches, locomotives etc.

Inspection

Each equipment, with its accessories, should be checked against the packing note or invoice on arrival, for possible damage or short shipment. Storno should be notified immediately of any damage or shortage.

If equipment is returned to Storno under guarantee or for repair, the original expanded polystyrene packing should be used. The test sheet should also be enclosed.



1. Transmitter/receiver
2. Cradle or girth
3. Antenna connector
4. Antenna cable
5. Whip antenna
6. Cable connector
7. Battery cable
8. Multicore cable between equipment and control box
9. Vehicle battery
10. Control box
11. Loudspeaker
12. Microphone
13. Steering wheel switch

Basic Items

In order to carry out a satisfactory installation the following items are required:

1. Transmitter/receiver unit
2. Mounting cradle or girths 37.065 or 37.072
3. Standard set of installation cables
4. Standard set of accessories comprising a connector, a fuse holder, fuse and cable shoes.
5. Control box (type CB 601 or CB 602).
6. Loudspeaker, microphone or handset or other system of microphone and steering wheel switch.
7. Antenna base and whip.

An instruction sheet is automatically sent with each major accessory.

Standard Procedures

Before the installation commences, the cable runs should be decided before the work begins. The following points should be noted:

a. The cables should be as short as possible.
b. The cables should be kept away from moving parts such as the handbrake, shock absorbers etc.
c. The cables should not be run near the engine or the exhaust manifold and pipe.
d. The cables should be run, wherever possible, in parallel with existing cable forms and through the same holes in the chassis members. Suitable grommets must always be used if special holes are drilled in the metalwork.
The cable should not be run externally underneath the vehicle. Cable cleats should be used wherever the cable is likely to sag e. g. on long straight runs on coaches etc.
e. The length of battery cable on 6 volt systems must not exceed 12 feet. (4 metre).
f. The in-line fuse should be placed as near to the battery as possible.
g. Ensure that the cables are not strained, sharp bends are to be avoided.

Soldering

For soldering, the multicore cable to the control box a 25 watt iron should be used, but a 65 watt iron should be used for the connector. Ensure that the coaxial braiding is firmly soldered to the connector, however, care must be taken to prevent the insulation melting.

Temperature

The circuits on the Stornophone 600 are designed to operate over a wide range of temperature, and the case is designed to provide maximum heat loss without louvres or vents.
The surrounding temperature should not normally exceed the limits - 15°C to + 50°C but the equipment will continue to operate within the range -30°C to +60°C, for a limited period when these temperatures are reached e. g. on a winter night or a summer day.
The radio equipment can be stored at a higher or lower temperature without damage.
Care should be taken, therefore, before commencing the installation to choose a position for the radio equipment which is protected as far as possible from extreme heat or cold. In cases of operation in warmer climate, adequate ventilation must be provided so that the cabinet can operate as a heat sink.

Special Installations

In cases where special installations are required e. g. where shock absorbers are required, or an installation on a solo motorcycle is required, then special installation instructions will be provided with the goods.

B. Installation of the Radio Equipment

Selection of Position

When selecting a position in the vehicle for installing the transmitter/receiver unit, several important points should be noted. As mentioned in the previous section, the unit must conduct the heat away, therefore, the floor of the boot is not the best place as the transmitter/receiver can be covered with baggage. It is better to

mount the set on the sides of the boot or on the bulkhead at the back.
In larger trucks there is usually sufficient space under the driver's seat to install the unit.
In vessels and locomotives there are many possibilities and, therefore, a position should be chosen which gives maximum protection against direct sunlight or direct rain and spray.
Sufficient space must be left to enable a service engineer to remove the equipment and the cables should be left sufficiently free to permit the equipment to be withdrawn from its cradle or girths.

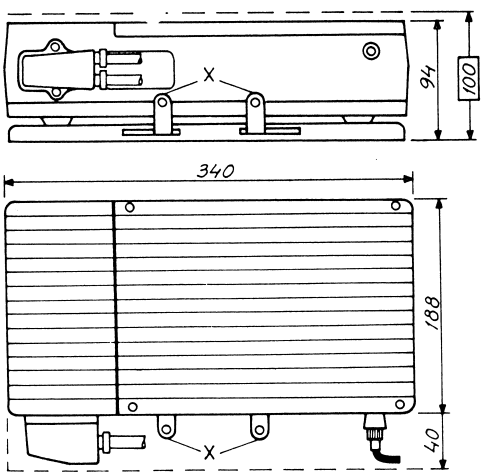
Installation of Transmitter/Receiver Unit

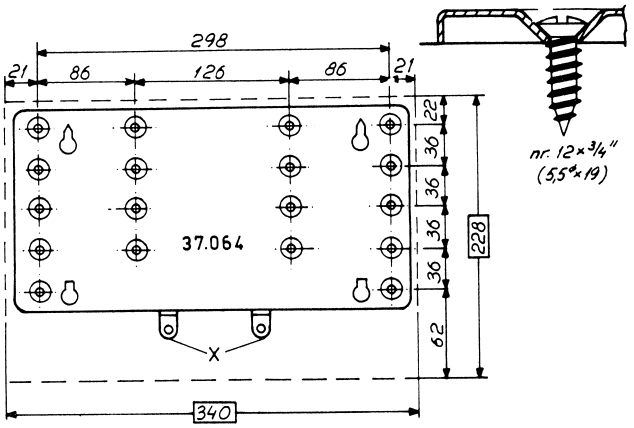
There are two methods of securing the transmitter/receiver unit and the appropriate material is supplied in each case:

37.065 Cradle complete with fixing screws
37.072 Girths with brackets and fixing screws.

The cradle permits installation in any position, whereas the girths can only be used when the surface is flat and level.
The cradle itself is used as a template for drilling the fixing holes at the position chosen.
The cradle has a series of countersunk holes so that it may be affixed at the suitable points.
A selection of self-tapping screws are provided.
The number of screws used to hold the cradle depends on the positioning of the cradle, but the minimum number of screws should be four, one at each corner or as far apart as possible.

The drawing gives the dimensions of the set and the cradle:





All dimensions are in millimetres.

The transmitter/receiver unit is fitted into the cradle by first bringing the two locking bars (marked X on the diagram) together and then inserting the four feet on the base of the equipment in the four slotted holes on the cradle.
The locking bars are then moved outwards to secure the equipment firmly in the cradle.

Cables

The standard installation kit (19.063) consists of the following cables:

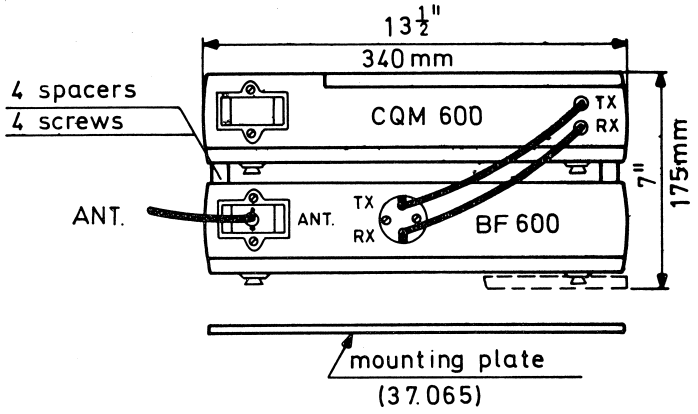
Antenna cable, 4 yards, (4 metres) type RG58/U or UR76 (Storno type 075.5013).

Battery cable, 8 yards, (8 metres), PVC covered, 2 x 4 mm^2 (Storno type 073.5022).

Control cable, 6 yards, (6 metres), 26 way PVC covered, 4 x 0,25 mm^2 + 22 x 0,125 mm^2, (Storno type 074.5014).

These lengths will be sufficient for most standard installations for private cars and small trucks. Extra lengths of cable may be supplied on request.

Branching Filter Assembly BF600



If the radio equipment operates in the duplex mode from a single antenna, a branching filter, BF600 is inserted between the transmitter/receiver unit and the antenna.

The branching filter, which is contained in a die cast casing similar to the transmitter/receiver unit is supplied complete with suitable coaxial leads and terminations for connection to the radio equipment and antenna.

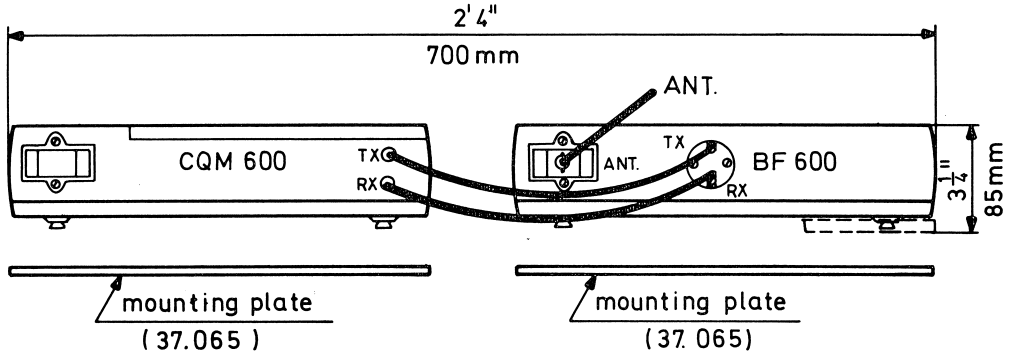
The filter unit can be installed, as illustrated, underneath or at the side of the transmitter/receiver cabinet, depending on the space available.

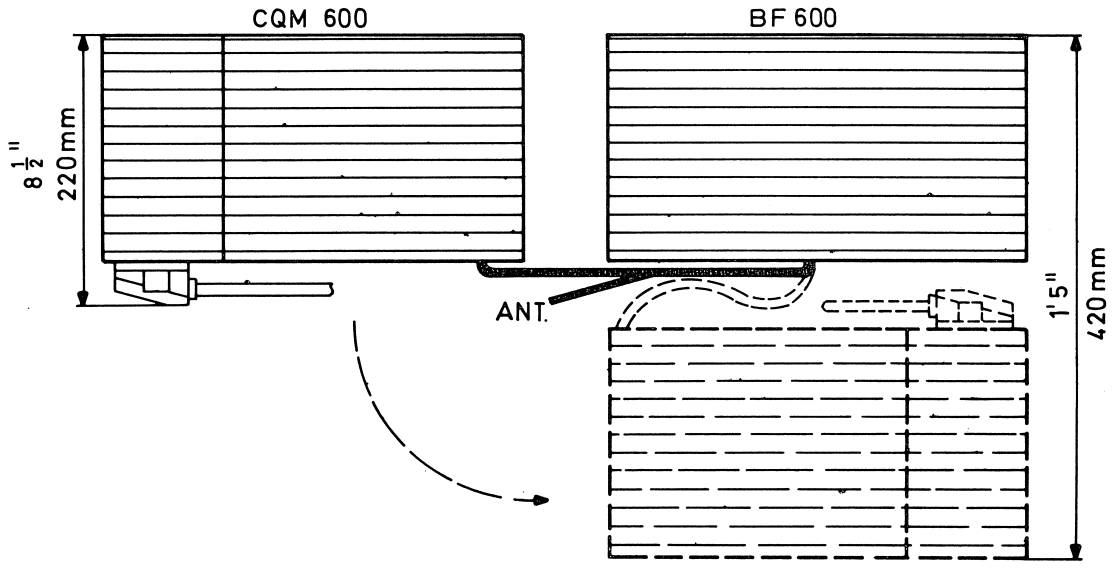
If the units are to be installed on top of each other, they are anchored together by means of the 4 spacers and screws which are supplied with the unit. The branching filter, being the lower unit is then inserted and locked into position in the standard mounting plate (37.065).

The mounting plate is supplied as part of the standard accessory kit with the transmitter/receiver unit and the method of fixing to a vehicle is described earlier in this chapter.

If the units are to be installed side by side, they must be positioned so that the interconnecting cables can be fitted to the units without strain. In this case 2 mounting plates are required.

The additional mounting plate should be specified when ordering the equipment.





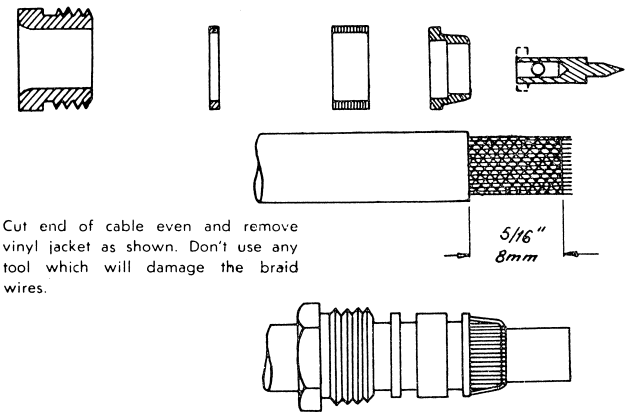
Connectors (17.014)

A plastic bag is supplied containing the following items:

Antenna connector UG88/U
(Storno type 41.5120)
Waterproof multi-way connector
(Storno type 41.149)
Fuse holder with fuse
Battery cable shoes

The assembly instructions for these items are given below:

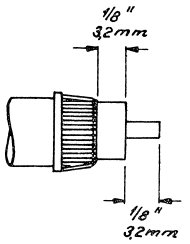
Antenna Connector



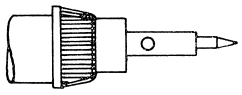
Cut end of cable even and remove vinyl jacket as shown. Don't use any tool which will damage the braid wires.

Comb out braid wires and fan out over end of cable. Slide the different parts on vinyl jacket in the order shown.

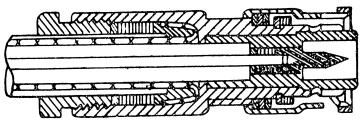
Fold braid wires back on clamp in one layer, and keep wires from crossing. Trin braid wires as shown. Bare 1/8 inch of center conductor without nicking it. Do not use a pair of deisolating pliers.



Tin center conductor and female contact carefully together. Do not use any soldering fluid and cool in spirit. Scrape off superfluous resin and solder with a sharp knife. Check the centering of the male contact.



Slide connector body carefully into end of cable and tighten sleeve moderately with a wrench.



Multi-way Connector

The multi-way connector (41.149) has two cable entries for the battery cable and control cable respectively. Due to the proximity of the pins to each other, it is advisable to fit short insulating sleeves on the individual wires before soldering. The sleeves are then pulled down over the pin when the connection is made. The control cable is soldered to the pins on the connector as indicated in the table overleaf.

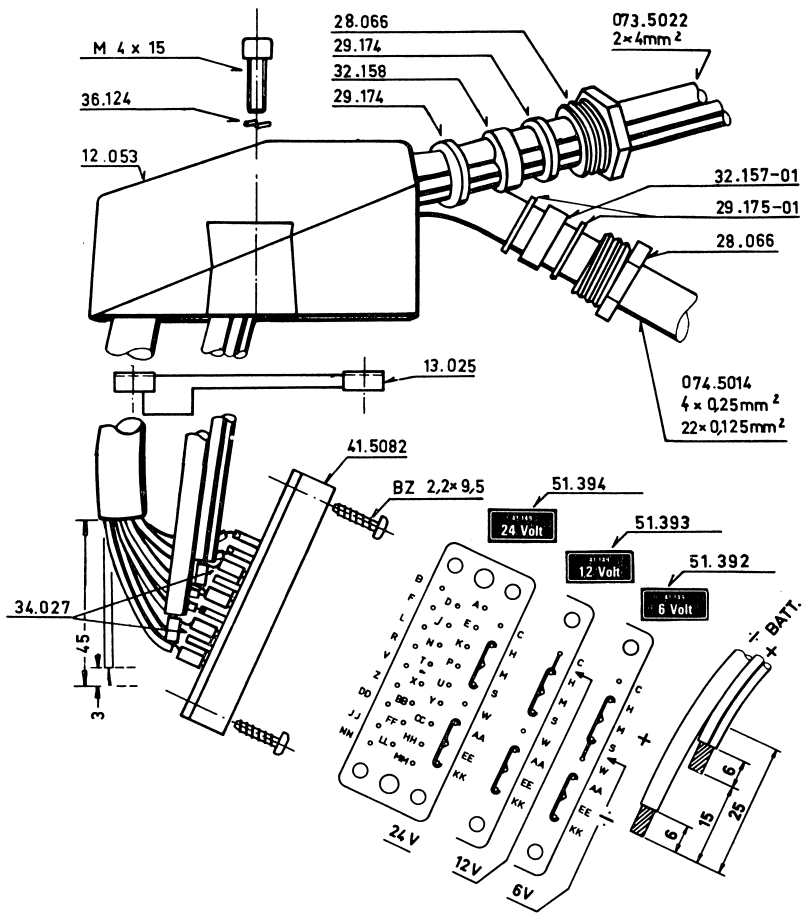
Terminal	Colour	Terminal	Colour
B	green/white	T	yellow/grey
F	green/grey	X	brown/white
L	red/yellow	BB	brown/grey
R	black/yellow	FF	grey/white
V	violet	LL	green/red
Z	grey/red	A	green
DD	grey	E	green/brown
JJ	orange	K	red
NN	yellow	P	blue
D	yellow/white	U	brown
J	yellow/green	Y	black
N	yellow/brown	CC	red/brown
		HH	blue/brown
		MM	white

NOTE: Due to difficulty of supply, some control cable supplied may not correspond with the table given above. In all cases, irrespective of the colour wire, the terminals will match on the connector and control box i.e. DD is wired to DD, and K to K etc.

The equipment is sometimes supplied with the multicable already soldered to the connector. The shorting links should be soldered to terminals one of them joining AA, EE and KK together, the other one joining H, M, and S together as shown according to the operating voltage required:

For 6 volts: join terminals S and W
For 12 volts: join terminals H and C
For 24 volts: no connections.

After threading on the gland nut and the packing washers, the battery cable is fed through the entry as shown on the diagram. The negative cable is soldered to the shorting link joining AA, EE, KK whilst the positive lead is connected to the shorting link joining H, M, S. The connector is pulled into the housing and the key way 13.025 is fitted into position before the connector is screwed to the housing by means of the two screws. The battery voltage that is being used is marked on the connector by affixing the appropriate voltage label to the countersunk space on the back of



the connector housing. Before affixing the label ensure that the space is clean and grease free. If not clean with petrol or other grease remover.

Fuse Holder and Cable Shoes

In cars with negative to chassis the fuse holder (46.5010) is inserted in the positive lead of the battery (the marked cable) as close to the battery as possible. If the car has positive to chassis the fuse is inserted in the negative lead instead.

The lead is cut, bared and fitted to the two halves of the fuse holder.

The label shown below is attached to the fuse holder. The end of the battery cable is prepared and the battery shoes are soldered to the cable.

C. Installation of Standard Control Equipment

General

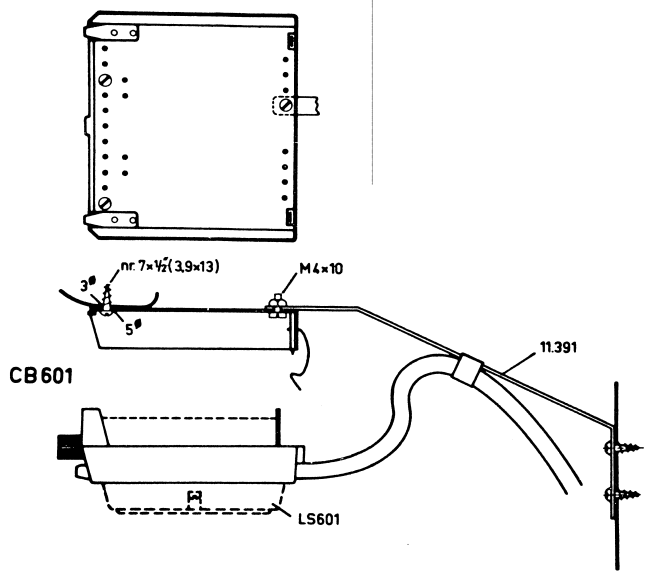
For normal passenger car use, where there is no special requirement for robust or splash proof equipment, the following items may be used:

Control box	CB 601
Loudspeaker	LS 601
Fixed Microphone	MC601, MC602, MC603, MC604
or	
Steering Column Microphone	MC 607
or	
Hand set	MT 601
or	
Fist Microphone	MC 606a

Steering wheel switch SU 601 or SU 602 (used with fixed microphone only if required).

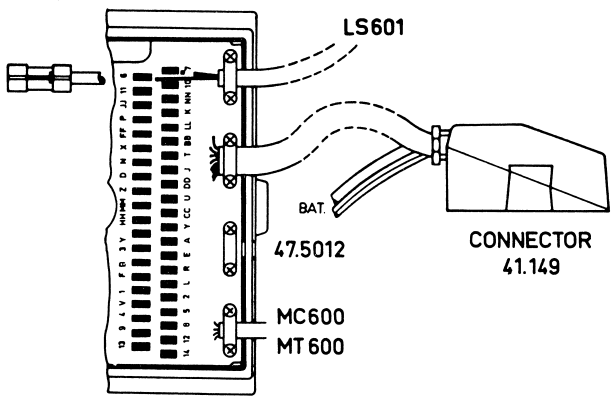
Control Box CB601

The control box CB 601 can be fitted under the car dashboard, vertically on the facia, or any other position convenient for the operator. The control box must be fitted firmly in the position chosen. The material to which the control box is fitted must be capable of carrying the load imposed by the weight of the control box. If a flat surface cannot be found, then the control box may be installed in the manner shown below, by using the supporting strips 11. 391 supplied.
The back plate is used as a template. A line of drilling points is given as a guide and the hole should be drilled to provide the most secure fixing, using support strips as necessary.



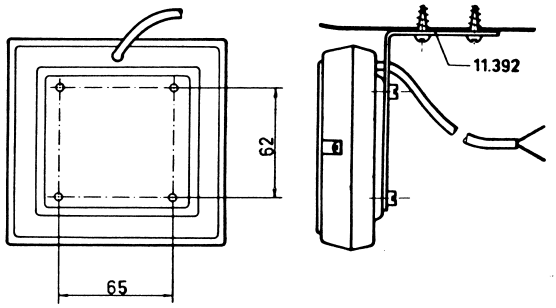
Control Cable

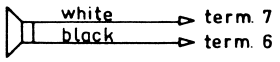
The cable is cut to length and the wires are bared. Each wire is soldered to the terminals on the terminal strip in accordance with the table on page 4 - 4.
Terminals are provided on the control box for the addition of various types of microphone, loudspeaker, alarm circuits etc.



Loudspeaker LS601

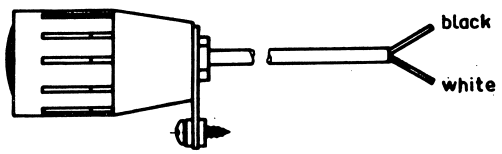
The loudspeaker can either be mounted on the base of the control box or as a separate unit connected to the control box. For integral mounting, the base plate on the control box is removed and the loudspeaker is fitted in its place. For independent mounting, the loudspeaker may be mounted on a flat surface or by means of the support strips 11. 391 as illustrated.

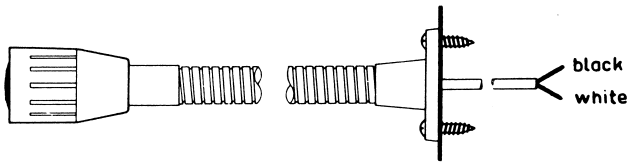


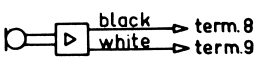


Fixed Microphone MC601, MC602, MC603, MC604

The fixed microphone is fitted in a suitable position so that the normal speaking distance is 30 - 40 cms (12 - 16 inches). The most convenient position in passenger cars is the corner of the windscreen on the drivers' side.

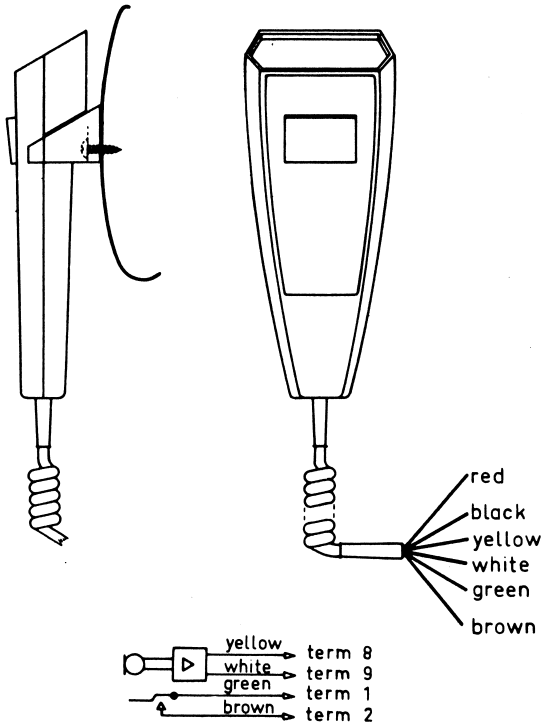






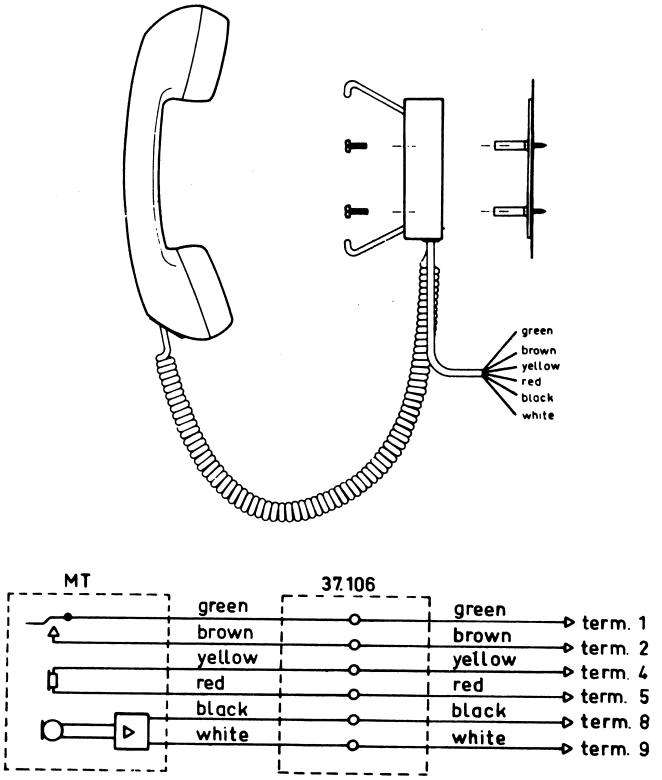
Fist Microphone MC606

The fist microphone is fitted in a convenient position near the control box and within easy reach of the operator. The stowage is used as a template for the fixing screws. The leads from the microphone are connected to the control box as indicated in the diagram.



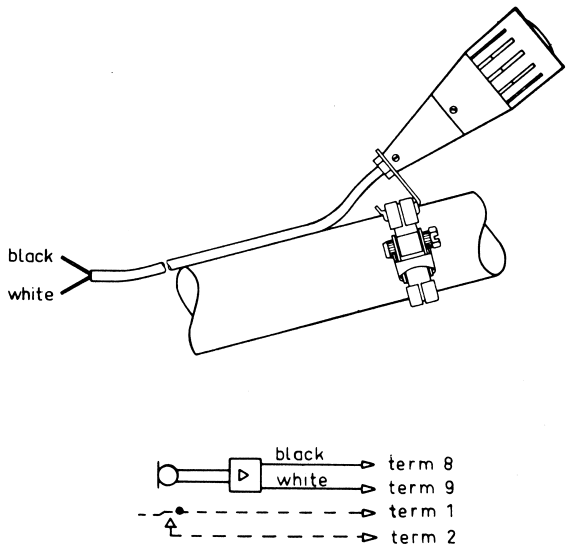
Handset MT601

The handset and its stowage is fitted in a convenient position near the control box, and within easy reach of the operator. The leads from the handset are connected to the control box as indicated on the diagram.



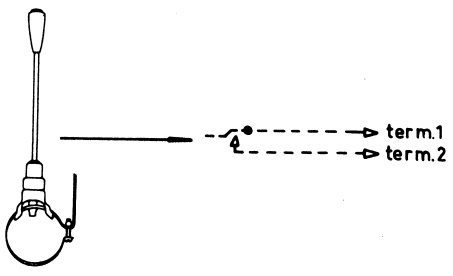
Steering Column Microphone MC607

The steering column microphone is fitted as shown and the leads are connected to the control box as indicated in the diagram.



Steering Column Switch

The steering column switch is used as a keying switch when the microphones MC601, MC602, MC603, MC604, and MC607 are used. The leads from the switch are connected to the terminals on the control box as indicated. The keying circuit must be isolated from the chassis.



D. Installation of Waterproof Control Equipment

In cases where special requirements have been made for equipment being watertight, salt-resistant and able to withstand rough handling, the following parts are required for the installation:

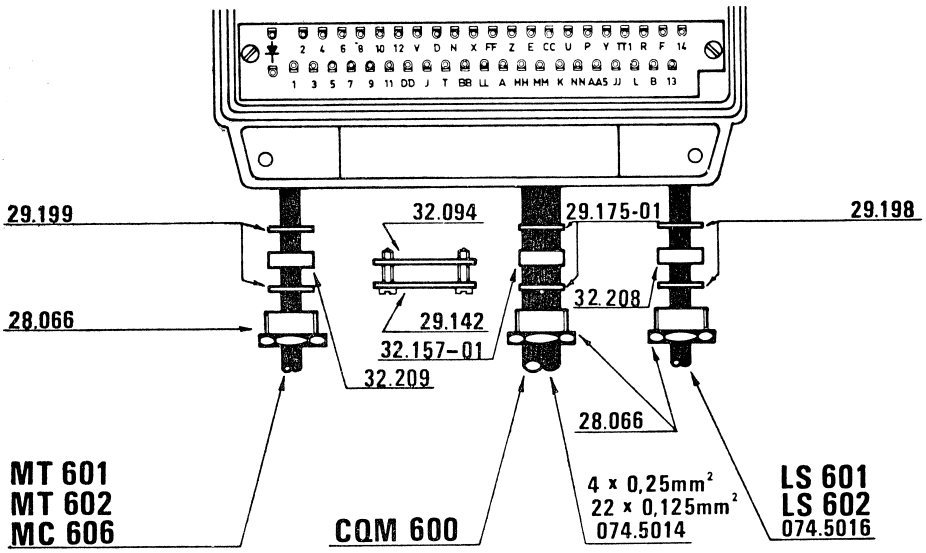
Control box	CB 602
Handset	MT 602
Loudspeaker	LS 602

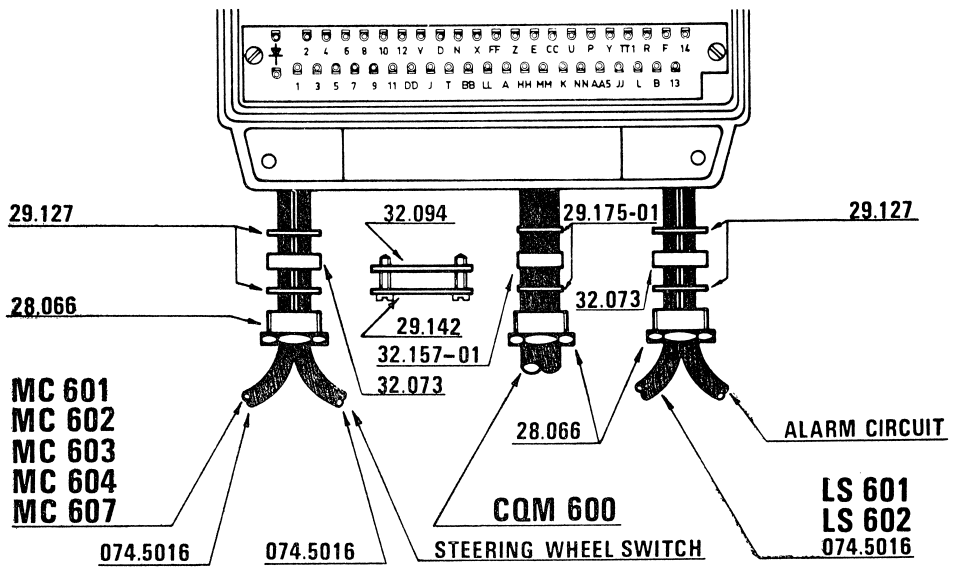
Control Box CB602

The control box CB602 is watertight and intended to be mounted on a plane surface, It may also be mounted on a supporting bracket for use on motor cycles, fork-lift trucks etc.

By unscrewing the two screws at the top of the control box, the front can be hinged down revealing the terminal strip, to which the multicore cable is attached.

The cables are fed in through the apertures at the base of the body of the control box in accordance with the diagram below. The leads are stripped and soldered to the terminals as shown on the table on page 4-4. The accessories are fitted as detailed below.

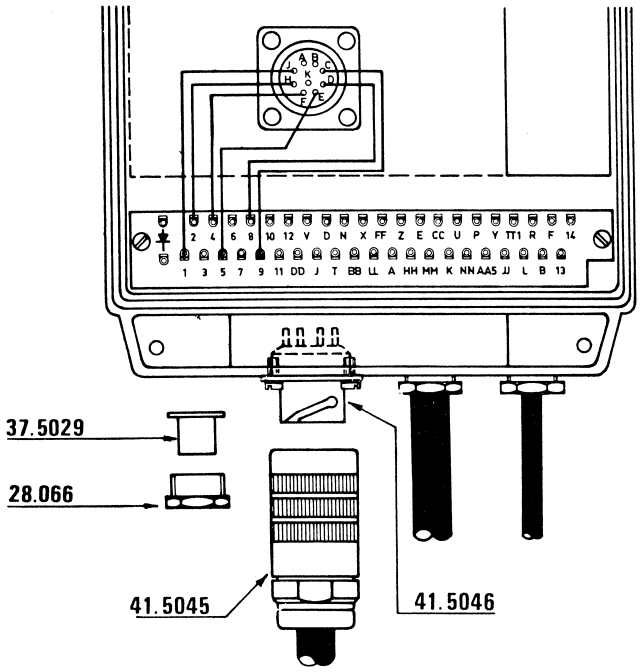




Assembly of Connector for MT602

The handset MT602 is designed for use with the control box CB602 and the lead from it is normally soldered to the common terminal board in the control box.

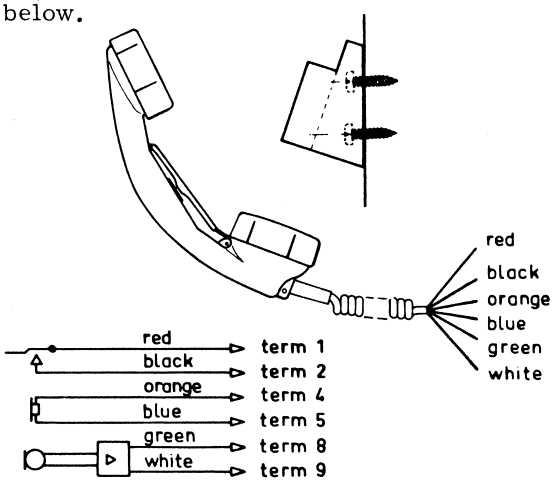
However, it is possible to supply a detachable handset cord and a socket in the space provided on the control box. The blanking plate is removed and a socket 41.5046 is inserted in the hole. Wire up the socket in accordance with the diagram given below, and fit the bung 37.5029 and captive gland nut 28.066 to cover up the hole normally used for the handset cord.



MT 602

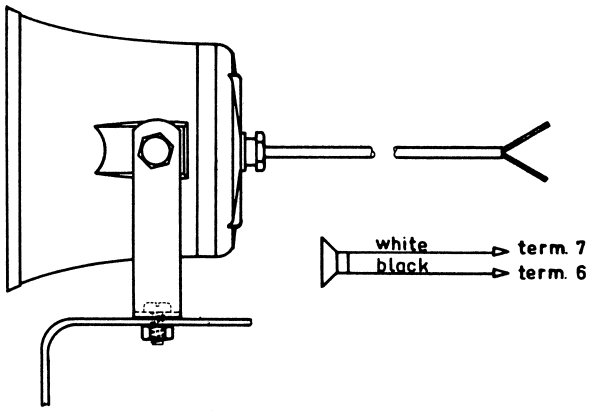
Handset MT602

The handset and its holder should be securely fixed in a suitable position near the control box. The connections for the control box are given below.



Waterproof Loudspeaker LS602

The waterproof re-entrant horn loudspeaker is designed for outdoor use. A bracket is supplied, together with fixing screws to enable the loudspeaker to be mounted in a convenient position. The lead is fed into the control box and the connections are made in accordance with the diagram below.



E. Standard Antennas

The antenna should be placed as high as possible and free from obstruction in order to obtain the best possible matching and radiation. The antenna should be placed on the roof of the vehicle. Mounting the antenna on a fender or on the lid of the luggage compartment should be avoided as undesired directivity and poor impedance matching will be introduced.

Antenna Base

The coaxial cable can be attached to the base in two ways, either by using a special crimping tool as shown, or the conventional soldering method.

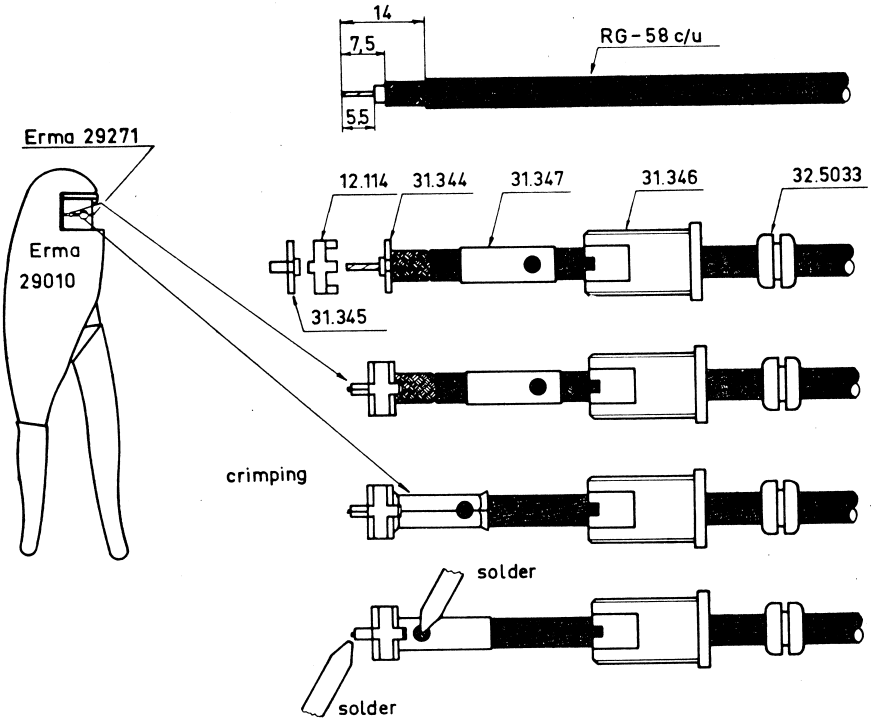
Procedure

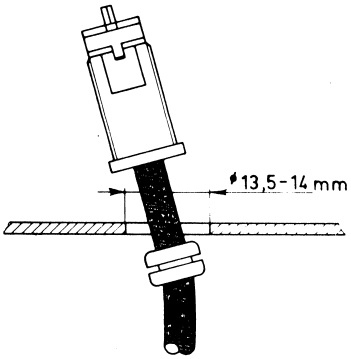
Cut the coaxial cable as shown below, taking care not to damage the inner conductor or the braiding.
Thread the grommet 32.5033, the bush 31.346, the crimping tube 31.347, on the cable in that order.
Fit the collar 31.344 between the braid and the insulating material, and then thread the insulating washer 12.114 and the final collar 31.345 on the cable as shown below.
The assembly is completed by either crimping the tube 31.347 and the collar 31.345 on to the cable by means of the special crimping tool, or by soldering the end of the conductor and the tube. Both methods are illustrated below.

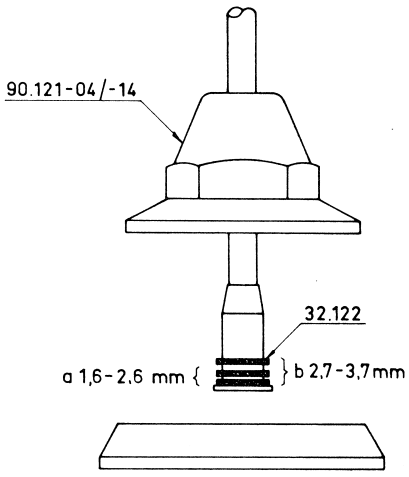
Fitting

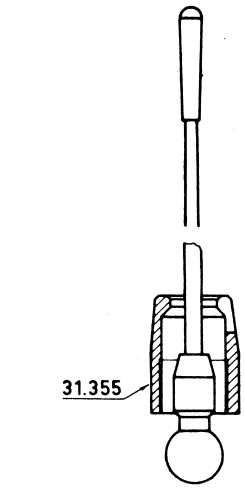
Drill a hole 13.5 - 14 mm (17/32") at the point selected. Push the free end of the coaxial cable through the hole, and run it between the roof and the headlining to the transmitter/receiver unit.

Insert the antenna base half way into the hole as shown in the diagram. Thread the large spiral washer through the hole so that it is under the roof material.
Pull the base back through the hole until the spiral washer is held up against the roof material, add the washer 29.146 and tighten down the nut 29.145.
There are two versions of whip section which may be added to the base, the AN69-3 and AN69-4 (UHF) and the AN19-5 and AN39-5 (VHF) which may be folded down. These are attached by placing the sealing washer 32.104 over the base assembly and screwing down the plastic hood 90.121-04/14.
The AN69-3 and AN69-4 is supplied with a number of packing rings which are threaded over the antenna as shown to compensate for the varying roof thicknesses.
For 1.6 - 2.6 mm. (5/64" - 7/64") two washers are used, whilst for fibre glass which is between 2.7 - 3.7 mm (7/64" - 9/64") three washers should be used.

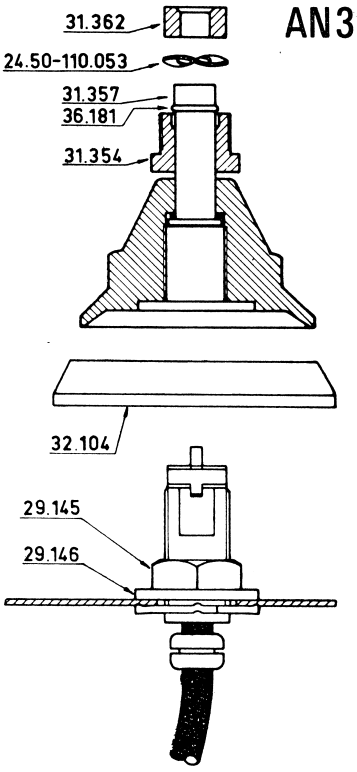


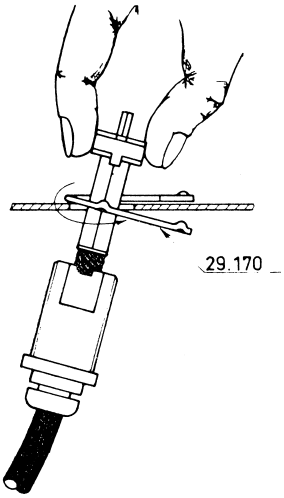


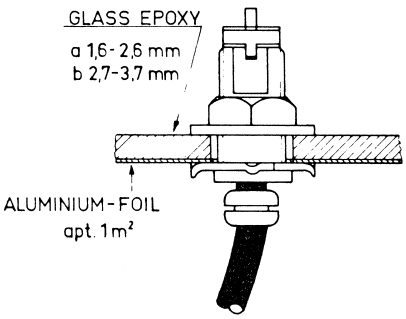


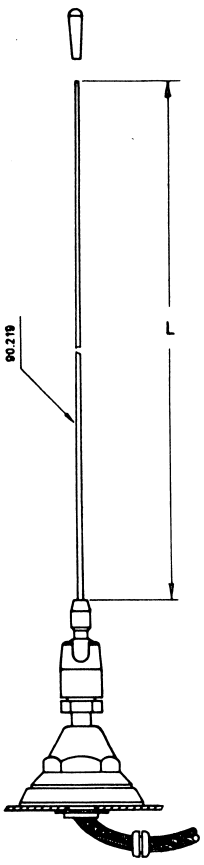


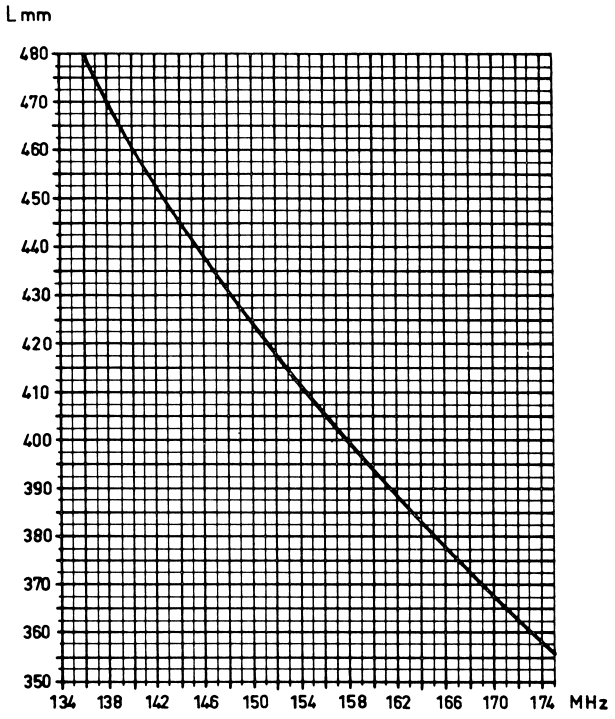
AN19-5
AN39-5





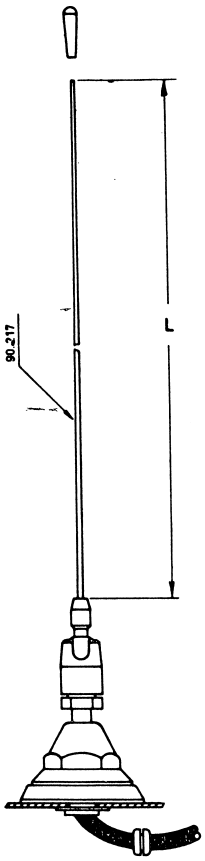


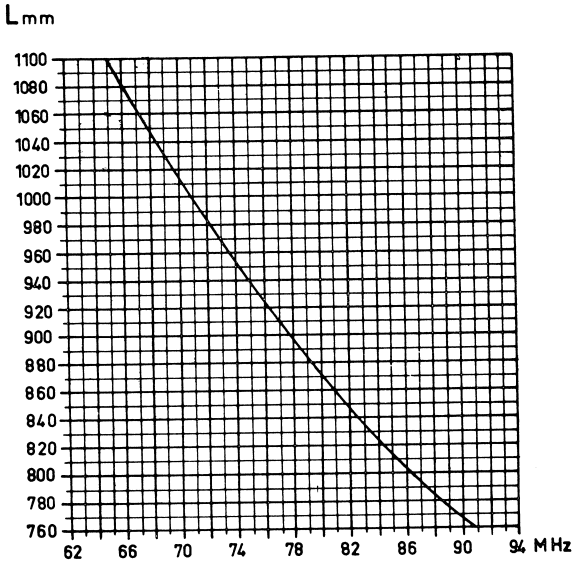




AN19-5

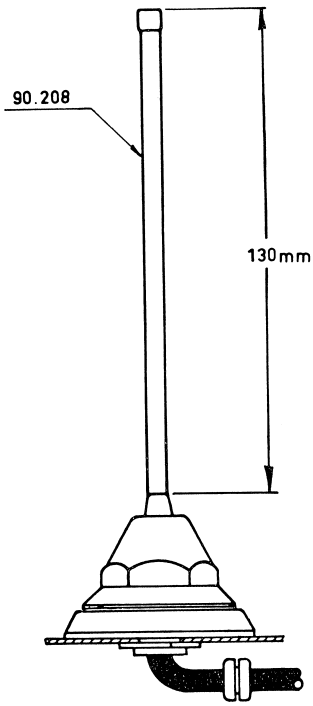
The antenna whip should be cut to frequency as shown on the chart. If the transmitter and receiver frequency differ then the mean is taken.

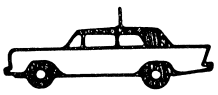


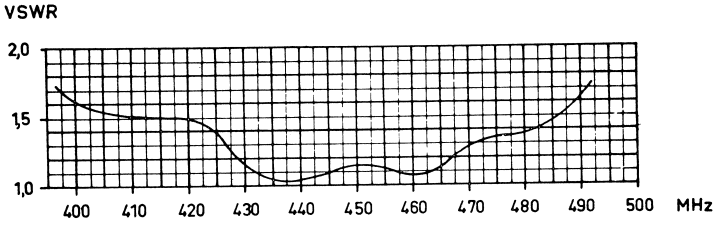


AN39-5

The antenna whip should be cut to frequency as shown on the chart. If the transmitter and receiver frequency differ then the mean is taken.

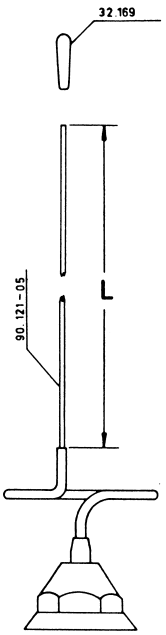


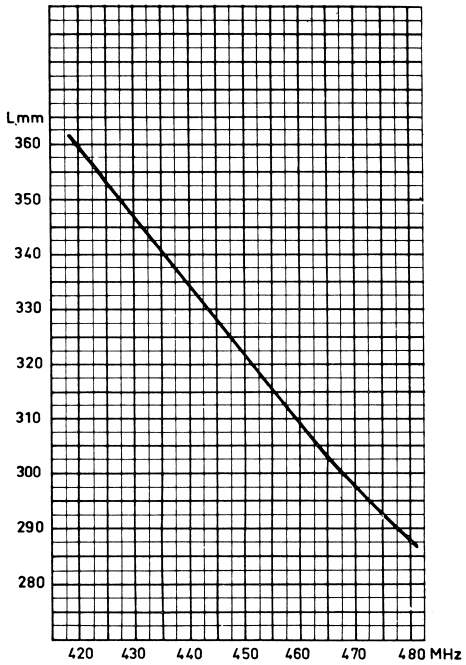


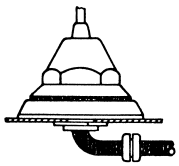


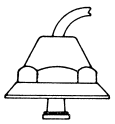
AN69-3

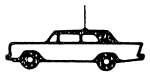
The antenna whip is a fixed 1/4 λ antenna. The standing wave ratio at various frequencies within the 450 MHz band is shown on the chart.











AN69-4

The antenna whip should be cut to frequency as shown on the chart. If the transmitter and receiver frequency differ then the mean is taken.

F. Noise Suppression

Introduction

Noise interference in mobile radio communication can either be caused by the vehicle's or vessel's own electrical system or be generated by external noise sources such as other vehicles, electrical generators, electrical wires, X-ray apparatus, etc.

The external noise cannot be avoided, but care has been taken in the design of the Stornophone 600 to reduce the effect as much as possible. Such noisy periods will normally be of short duration if the vehicle is on the move.

The electrical noise generated by the vehicle's or vessel's own electrical system can often be suppressed sufficiently by simple means.

It should be noted that as long as the radiotelephone equipment is operating close to the base station the noise will normally not be noticed. The noise will only be heard in the loudspeaker, when the equipment moves away from the base station, where the signal into the receiver is somewhat weaker.

Complete noise suppression of an electrical system can be very difficult in certain cases, but normally it is possible to achieve satisfactory results if the simple advice given below is followed. Moreover, it is recommended that the special handbooks about noise suppression published by the manufactors of electrical automobile accessories (such as Bosch, Lucas, etc.) be studied.

Ignition Noise

The most common noise source is the ignition system of a petrol engine, and this noise is characterized by a regular ticking sound, which is syncronized with the motor speed. In case the vehicle is not noise suppressed from the factory it is necessary to insert suppression resistors in series with each spark plug or replace the spark plugs with spark plugs having built-in resistors. If suppression resistors are used, wire-wound resistors (5 kΩ) are recommended as these types resistors suppress the noise better

than the carbon types (10-15 kΩ). Suppression resistors in the spark plug leads must be placed as close as possible to the spark plugs, and the spark gap shold be increased by 0.1mm (.004"). Further noise suppression may be obtained by inserting a suppressor resistor in the cable between the ignition coil and the distributor as close to the latter. The best solution is to replace the distributor rotor by a special rotor with a built-in resistor.
If the steps mentioned above does not result in a satisfactory noise suppression, a 0.1μF coaxial condenser should be mounted between the primary of the ignition coil and chassis. The condenser should be fitted near the coil with the chassis wire as short as possible.
Finally, it should be borne in mind that dirty or pitted distributor contacts may cause noise similar to ignition noise.

Dynamo Noise

The dynamo noise is characterized by a whine, where the frequency and strength is syncronized with the motor speed. Normally this noise is due to arcing between dirty or worn brushes and the commutator. Cleaning, or possibly, replacement of the carbon brushes will normally remove the noise.
In some cases it may be necessary to insert a filter in the dynamo circuit. A noise suppressor condensor should be inserted in the lead from the ignition coil (connection to ignition switch) and in the battery lead from the dynamo terminal. Do not remove more insulating material than absolutely necessary in order to minimize the risk of shorting.

Other Noise Sources

Noise from the voltage regulator can be identified by a rasping noise in the loudspeaker. This noise can normally be removed by mounting a coaxial condenser in the dynamo lead, as close as possible to the regulator housing. The other end of the condensor should be connected to chassis.
All electrical instruments and motors may introduce noise into the radiotelephone. The windscreen wiper motor can for example be suppressed by a conventional noise suppression condensor. The different noise sources can be easily detected by switching on and off the suspected noise sources one by one. Other noise sources are the electric clock, the petrol gauge, the oil lamp, etc., and in all cases the noise can be sufficiently suppressed by correct use of condensors.
Tyre static can sometimes produce interference and in such cases a big improvement may be obtained by mounting special shorting springs on each wheel.

G. Testing of Installed Equipment

Before Switching On

When the Stornophone 600 radiotelephone has been installed in accordance with the instructions above, it should be checked for possible installation faults before the equipment is switched on. The following points should be checked:

1. Check that the multi-way connector is strapped according to the voltage to be applied.
2. Check that the fuse holder contains the correct fuse for the voltage to be applied:

   16 amps for 6 volts
   6 amps for 12 volts
   3 amps for 24 volts
3. In cars with negative to chassis check that the fuse is in the positive lead (marked) and thet the lead is connected to the positive terminal of the battery. In cars with positive to chassis check that the fuse is in the negative lead and that the lead is connected to the negative terminal of the battery.
4. Check that the antenna is properly made off. Check the insulation.
5. Check that the equipment is set to the correct channel.

The equipment is checked and correctly adjusted before leaving the factory and only one further adjustment of the modulation sensitivity should be made to complete the installation.

Switching On

The equipment is switched on by turning the volume control to its centre position. The equipment is ready to receive.
With no incoming signal, the squelch control is advanced so that noise is heard in the loudspeaker. Adjust the control about the cut-off to ensure positive squelch action. The squelch control is set so that the noise just disappears.

Equipment with Selective Calling

If the receiver has been fitted with selective calling equipment, the "loudspeaker in" button should be pressed before carrying out the above check. The green lamp will be lit. Check that the noise disappears when the "loudspeaker out" button is operated, and reappears when the "loudspeaker in" button is pressed again. The squelch control is set as above and the "loudspeaker out" button is pressed.

Transmitter

The transmitter is keyed by pressing the appropriate button or switch, upon which the red keying lamp is lit.
In equipment fitted with a selective tone transmitter, the keying button on the control box must be pressed to transmit the tones.

Test Calls

Test calls are made to the associated base station to ascertain that transmission quality is good and that reception is good. In selective calling systems, the "loudspeaker in" button is pressed to check if the channel is free before the test call is made.
If the channel is free, the tone is transmitted, whereupon the base station should reply, reporting the strength and quality of the signal.
The base station is then requested to call the mobile, and the "loudspeaker out" is pressed.
On reception of the selective call from the base, the loudspeaker will be switched into circuit and the green lamp will light.
If external calling devices are fitted, these should operate when the call is received. Subsequent messages are passed without use of the selective calling.

Modulation Sensitivity Adjustment

The modulation is adjusted by means of R4 in the control box, so that the speech level is set for correct modulation of the transmitter. This is best achieved by using the voice of the operator who will use the set most.
The adjustment must not be such that the ambient noise is sufficient to fully modulate the transmitter.
If the speech/noise level is too low, then the microphone must be brought closer to the operator. With handsets, and fist microphones, the speech/noise level is sometimes too high thus it will be necessary to reduce the sensitivity.
If the sensitivity is too high, the message will be broken up and if it is too low, the message will be clear but weak. The optimum adjustment is found when shouting into the microphone just causes the message to begin to break up.

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CHAPTER V. SERVICE
A. Maintenance

Preventive Service Inspections

When a STORNOPHONE 600 has been properly installed and checked for satisfactory operation it should not thereafter be left to itself until breakdowns begin to occur. Every equipment should be inspected at regular intervals and readjusted if necessary. The frequency of such routine inspections will depend on the conditions under which the equipment is operated and on the total number of operating hours, but twelve months is the maximum time that should be permitted to elapse from one preventive service inspection to the next.

Thanks to the application of conservative design principles, the STORNOPHONE 600 may be expected to have long life. Easy service and fault finding were two other important design considerations. All significant currents and voltages are specified in the circuit diagrams. On each circuit diagram is printed a screen picture of the wiring board, showing the diagram symbols of the individual components.

Moreover, all modules have easily accessible test points to permit rapid checking of the operational condition of the equipment. When a module is to be serviced on the bench it is usually a good plan to illuminate the board strongly from behind, which will cause the printed wiring to stand out clearly.

Test Points

Most modules have two kinds of test points - DC test points, which are designated by numbers in circles (1); and signal test points, designated by numbers in squares, [2]. Measurements at DC test points should be made with a multimeter having an internal resistance of at least 20kΩ/V. RF signal measurements may be made with a multimeter in conjunction with a STORNO Type 95,089 RF probe. Audio-frequency signal measurements require the use of a vacuum-tube voltmeter.

Readings at Test Points

The list below specifies all test points in the equipment and the respective readings. Readings are intended only as a guide.

CQM611/612/613/614

POINT	UNIT	INSTR	MEASUREMENT
[1]	RC611	Probe A	● 10-30 mV
[2]	RC611	Probe A	●◆ 30-80 mV
[3]	RC611	Probe B	0.6-1.2V
[4]	RC611	Probe B	0.3-0.8V
[7]	IC60X	Probe B	0.2-0.8V
[8]	IA601	Probe A	□ 0.3-2.0μV
[10]	IA601	AF-voltm.	■ 12.5kHz: 0.4-0.5V 20 kHz: 0.8-0.9V 25 kHz: 0.9-1.1V 50 kHz: 1.3-1.4V
[14]	SQ600	AF-voltm.	■ 1.1V
[27]	AA600	AF-voltm.	▲ 0.5-1.0V
[30]	EX611	Probe B	0.5-1.4V
[32]	EX611	Probe B	1.0-1.6V
[33]	EX611	Probe C	3.0-5.0V
[34]	EX611	Probe C	2.0-6.5V
[35]	EX611	Probe B	1.5-2.5V
[36]	PA611	Probe D	○ 15-20V
(37)	PA611	mA-instr.	✱ 10W: 150-300 mA 6W: 50-150 mA
(38)	PA611	mA-instr.	✱ 10W: 500-800 mA 6W: 300-400 mA

CQM631/632/633/634

POINT	UNIT	INSTR	MEASUREMENT
1	RC631	Probe A	● 5-20 mV
2	RC631	Probe A	●◆ 10-40 mV
3	RC631	Probe B	0.4-1.0V
4	RC631	Probe B	0.4-1.0V
7	IC60X	Probe B	0.2-0.8V
8	IA601	Probe A	□ 0.3-2.0 μV
10	IA601	AF-voltm.	■ 12.5kHz: 0.4-0.5V 20 kHz: 0.8-0.9V 25 kHz: 0.9-1.1V 50 kHz: 1.3-1.4V
14	SQ600	AF-voltm.	■ 1.1V
27	AA600	AF-voltm.	▲ 0.5-1.0V
30	EX63X	Probe B	0.5-0.9V
32	EX63X	Probe B	1.4-1.8V
33	EX63X	Probe C	2.6-5.0V
35	EX63X	Probe B	0.3-0.8V
36	PA631	Probe D	o 14-16V
(37)	PA631	DC-voltm.	* 10W: 0.2-0.45V
(38)	PA631	DC-voltm.	* 10W: 0.6-0.85V

● Antenna signal - EMF for 10 μA.

◆ Without oscillator signal.

□ Antenna signal - EMF for 40 μA.

■ Antenna signal 1 μV EMF, 0.7 x ΔFmax. and 1000 Hz.

▲ Frequency deviation 0.7 x ΔFmax. and 1000 Hz.

o Measured across a 47 Ω resistor.

* Measured at nominal output power.

Probe A: Probe + 0-50 μA instrument (Ri=1kΩ)
Probe B: Probe + 0-2, 5V instrument (20kΩ/V)
Probe C: Probe + 0-10V instrument (20kΩ/V)
Probe D: Probe + 0-25V instrument (20kΩ/V)

Routine Inspections

A normal routine inspection should cover checks of all test points in the equipment, and the readings taken should thereafter be checked against readings obtained in previous routine inspections. However, each routine inspection should also comprise the operations specified below:

1) Inspect (visually) transistors, diodes etc. Fasten any components that may have worked loose.
2) Check the supply voltage. It should not be outside these values: 6.3V ±20%, 12.6V ±20%, and 25.2V ±20%.
3) Check cable connections, fuse box, battery (look for corroded joints; top up with distilled water if necessary). Also check the current drain.
4) Measure the carrier power delivered by the transmitter. Readjust the ADC-circuit if necessary.
5) Measure the receiver sensitivity and readjust the receiver input circuits if necessary.
6) Call the base station and perform speech test.
7) Check the antenna mounting, especially for rust.

Replacement of Modules

In certain situations time can be saved by replacing a probably defective module with a new module of the same type.
Even if it is known to be fully aligned, such a newly inserted module may require a few minor readjustments.

B. Fault-finding and Repairs

Fault Finding

Fault-finding should be performed only by skilled personnel who have the necessary measuring instruments etc. at their disposal and have previously studied the operating principles of the STORNOPHONE 600.

Before starting work, find out whether the fault is located in the accessories, in the outside power source, in the installation cabling, or in the transmitter/receiver equipment itself.

Keep in mind when making check measurements and adjustments that the STORNOPHONE 600

has a number of adjustments that should not be touched unless the necessary measuring instruments are available. In any case it is important that the directions given in Sec. C (Adjustment Procedure) be followed closely in each individual case if a satisfactory result is to be obtained.

Resistance Measurement

Two precautionary measures are necessary when making resistance measurements on transistor circuits. Firstly, it is necessary to make sure that the ohmmeter current does not exceed one milliampere, which may very well be the case with certain types of vacuum-tube voltmeters. Secondly, the ohmmeter voltage may cause the transistors to become conductive, with incorrect readings as the obvious result. Since most faults are either short circuits or open circuits, accurate measurements of resistance are not normally required.

Soldering on Semiconductors

Never forget, when soldering on semiconductors, that the soldering operation should be performed quickly and as a general rule it is not advisable to solder closer to semiconductors than approx. 5mm - germanium transistors, for instance, will not stand temperatures above 85-90°C.

However, a transistor should not be replaced until it has been determined with reasonable certainty that it is defective. Even transistors of the same type and make may show fairly wide variations in their data. For this reason it is usually necessary, in the case of replacements, to check the transistor circuits and readjust them if necessary.

Wiring Boards

The wiring boards used in the STORNOPHONE 600 are very rugged, but in unfortunate cases it is possible for the printed wiring to break or detach itself from the board. This usually happens when excessive heat is applied when soldering or when a soldering operation lasts longer than it should. Fine cracks in the wiring or in the wiring board itself are mostly difficult to spot with the naked eye, in which cases a magnifying glass will be a good help. This type of fault can also be the cause of trouble of an intermittent nature.

Such faults are easily corrected by soldering a short end of wire across the broken place on the board. The wiring boards also carry some fixed capacitances. Here, repairs must be made with some caution in order to avoid changes in capacitance.

Replacement of Components

Replacement of resistors, capacitors and similar components on printed wiring boards require the use of a small pencil-type soldering iron of 30- to 75-watt rating so as to permit rapid soldering. The use of a tin sucker to drain away melted solder is also advisable. Do not attempt to pull any component off the wiring board until the solder flows smoothly as there is otherwise a risk of pulling some of the printed wiring off the board. As a general rule the soldering iron should not be applied to the board for a longer time than strictly necessary. Care should be taken, when soldering a new component to the wiring board, that no short circuits are caused by excess solder. Do not use more solder than strictly necessary. Large blobs of solder can reduce the spacing between the printed wires, which can produce undesirable effects in RF circuits even if no actual short circuit exists.

C. Adjustment Procedure

General

The directions given in this section are intended as an aid in aligning a STORNOPHONE 600 and consequently must not be considered the only correct adjustment procedure. However, departures from the directions given here should be made only in cases where the technician can foresee with certainty that modified alignment methods will neither degrade the specifications stipulated nor complicate subsequent alignment procedures.

Only such skilled radio technicians as have already acquainted themselves with the operation of the STORNOPHONE 600 should perform adjustments and repairs.

Each individual radiotelephone is checked and tested before being dispatched from STORNO. In the absence of any special agreement, the Testing Department has:

1) Inserted oscillator units with quartz crystals for the channels ordered.
2) Aligned the complete radiotelephone so that the accuracy of the transmitting and receiving frequencies is better than 1×10^{-6}.
3) Adjusted the receiver audio output and the speech limiter clipping level according to specifications.
4) Adjusted and tested the built-in tone equipment (if provided).

When the installation has been completed and its proper execution checked, the transmitter modulation sensitivity should be adjusted. (R4 in CB60x).

CAUTION: The greatest care should be shown when measuring currents, voltages etc. in the circuits of the STORNOPHONE 600 as even brief short circuits, such as may be caused by the test prods of a measuring instrument, may in certain cases cause permanent damage to a transistor.

Types of Radiostations

This adjustment procedure applies to the following radiotelephones:

Type	Frq. Band	Chann. Separation
CQM611	146-174 MHz	50 kHz
CQM612	146-174 MHz	25 kHz
CQM613	146-174 MHz	20 kHz
CQM614	146-174 MHz	12.5 kHz
CQM631	68-88 MHz	50 kHz
CQM632	68-88 MHz	25 kHz
CQM633	68-88 MHz	20 kHz
CQM634	68-88 MHz	12.5 kHz

Directions for adjusting the TR68x tone receiver and the TT68x tone transmitter are also given.

Measuring Equipment

While adjustments are being performed, the STORNOPHONE 600 should be connected to a control box and a power supply unit via a standard installation cable with fuse holder and fuse mounted in place.

The power supply should be adjusted to deliver the voltage for which the voltage switch and connector straps of the equipment have been set. Voltages should be as follows:

For 6-volt operation: 6.3 volts (as measured at input terminals of power supply unit PS601).

For 12-volt operation: 12.6 volts (as measured at input terminals of power supply unit PS601).

For 24-volt operation: 25.2 volts (as measured at input terminals of power supply unit PS601).

The following instruments are required:

A power supply rated at 5.0 - 33 V/15 A.

A signal generator, for 146 - 174 Mc/s (CQM61x) or 68 - 88 Mc/s (CQM63x).

A crystal-controlled signal generator for 455 kc/s. (e. g. STORNO-sweepgenerator type L20).

An audio voltmeter.

A distortion meter.

A standard receiver with calibrated discriminator.

A wattmeter, 0-10 watts/0-25 watts.

A dummy load.

A tone generator.

An RF probe (STORNO Type 95.089).

A multimeter, 20 k ohms per volt.

A microammeter, 50-0-50 μA, Ri = 1000 ohms.

A milliammeter, 0 - 500 milliamps.

An ammeter, 0 - 1 amp.

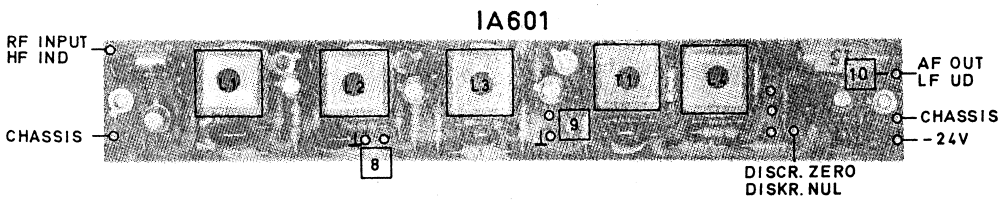
With these instruments available, the STORNOPHONE 600 can always be restored to operating condition.

RECEIVER ALIGNMENT

Before starting alignment of the receiver, first check the internal supply voltage, -24 volts. If necessary, adjust it for the correct value, using potentiometer R14 in power supply unit PS601.

Also check that the straps in receiver converter RC6x1, intermediate-frequency amplifier IA601 and squelch and audio amplifier SQ601/SQ602 are in accordance with the channel separation in use (see circuit diagrams of the respective units).

Alignment of Low IF Channel and Discriminator, IC60x and IA601



Apply a 455 kHz signal (approx. 3μV) to the input of BP60x without cutting off the connection between IC60x and BP60x.

Connect RF probe and multimeter at testpoint [9].

Adjust coils L1, L2, and L3 in IA601 for maximum meter reading, approx. 10 μA.

Apply a 455 kHz signal (approx. 1mV) to the input of IA601 without cutting off the connection between BP60x and IA601.

Connect 50-0-50 microammeter to tap marked "Discriminator Zero".

Adjust coil L4 (discriminator secondary) for zero reading on 50-0-50 microammeter.

Adjust transformer coil T1 (discriminator primary) for best symmetry at 455 kc/s ±15 kc/s.

Since these two circuits interact, the discriminator zero must be constantly checked and readjusted.

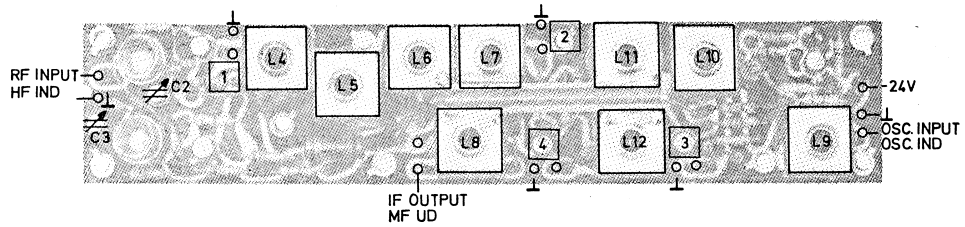
Reading for ±15 kc/s at 1 mV input signal: 37.5 μA ±2 μA.

Linearity at ±15 kc/s: 2.5 μA per kc/s.

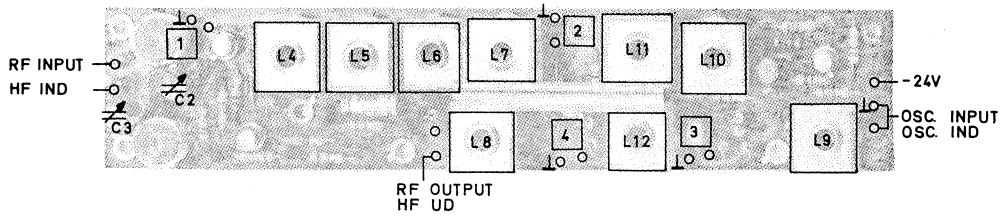
Low-IF block filter BP60x is aligned and artificially aged at the factory, making subsequent realignment unnecessary.

Alignment of Signal Frequency Amplifier and High IF Channel, RC6x1 and XO6xx

RC611



RC631



Calculation of the crystal frequency (fx) for a given signal frequency (fsig):

CQM63x: $fx = \frac{fsig + 10.7}{2}$ Mc/s

CQM61x:

146 - 160 Mc/s: $fx = \frac{fsig + 10.7}{3}$ Mc/s

156 - 174 Mc/s: $fx = \frac{fsig - 10.7}{3}$ Mc/s

Connect RF probe and multimeter at testpoint [3].

Adjust coil L1 in the used oscillator unit XO6xx for maximum meter reading.

Adjust coils L9 and L10 in RC6x1 for maximum meter reading (see list of test point readings).

Connect RF probe with multimeter at test point [4].

Adjust coils L11 and L12 in RC6x1 for maximum meter reading (see list of test point readings).

Connect the signal generator to the antenna input and set it to the signal frequency.

Connect RF probe and multimeter at test point [1].

Adjust trimmer capacitor C2 and C3 and coil L4 for maximum meter reading.

Adjust coil L5 in RC6x1 for minimum meter reading.

Adjust coil L6 in RCx1 for maximum meter reading.

Adjust coil L7 in RCx1 for minimum meter reading.

NOTE: In RC611 there is only a small difference between maximum and minimum readings.

Connect RF probe and multimeter at test point [8] in IA601.

All stations except CQM614 and CQM634

Readjust coils L4, L5, L6, L7, and L8 in RC6x1 and L1 in IC60x for maximum meter reading. The level should be so low that limiting does not occur while the adjustment of L8 in RC6x1 and L1 in IC60x is taking place (approx. 1-4 μV).

CQM614 and CQM634 only

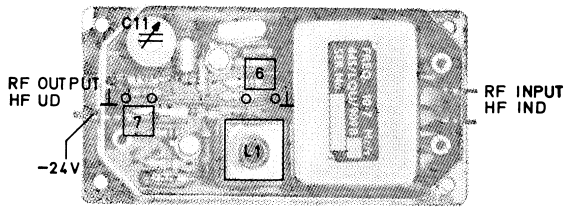
Readjust coils L4, L5, L6, L7, and L8 in RC6x1 for maximum meter reading. The level should be so low that limiting does not occur (below 200 μA).

Adjustment of Oscillator, XO6xx

The oscillator unit is adjusted before leaving the factory. However, if a frequency counter is available, the oscillator can be adjusted by means of a trimmer capacitor C4 in the unit, with the frequency counter connected at test point [3] in RC6x1 via a capacitor. The oscillator must be adjusted to frequency with an accuracy better than 1×10^{-6}.

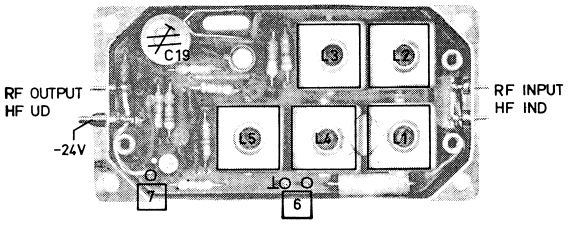
Checking the Oscillator in IC60x

IC601, IC602, IC603



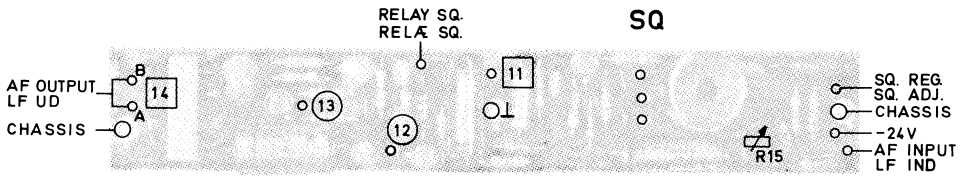
To adjust the oscillator frequency, connect a frequency counter at test point [7] and, using trimmer capacitor C11, adjust the oscillator to exact frequency (10.245 Mc/s or 11.155 Mc/s).

IC605



To adjust the oscillator frequency, connect a frequency counter at test point [7] and, using trimmer capacitor C9, adjust the oscillator to exact frequency (10.245 Mc/s or 11.155 Mc/s).

Filter Matching, Sensitivity, and Audio Level Adjustment, IC60x, IA601 and SQ601/602



Connect the signal generator to the antenna input of RX6x1 and set it to the signal frequency. Set the frequency swing to 70% of the maximum permissible limit:

1.75 kc/s for 12.5 kc/s channel separation
2.8 kc/s for 20 kc/s channel separation
3.5 kc/s for 25 kc/s channel separation
10.5 kc/s for 50 kc/s channel separation

The modulating frequency should be 1000 c/s. The RF level should be 100 - 1000 μV.

In CQM614 and CQM634 only

Connect RF probe and multimeter at test point [8] in IA601.

Adjust coil L8 in RC6x1 and coils L1, L2, L3, L4, and L5 in IC605 for maximum meter reading. The level should be so low that limiting does not occur (below 200 μA).

Connect the distortion meter and the audio voltmeter at test point [10] in IA601.

Check the distortion, k $\leqslant$ 5%.

Switch to the receiving channel using the highest frequency.

Set the signal generator to the signal frequency selected, still keeping the frequency swing at 70% of the maximum permissible limit and the modulating frequency at 1000 c/s.
Adjust the signal generator output for 100-1000μV.

Adjust, by means of potentiometer R15 in SQ601/SQ602 the output level for 3 dBm, corresponding to 1.1V across a 600-ohm load.

Connect the autio voltmeter and the distortion meter at test point [14] in SQ601/SQ602 (at output terminals) or the terminals A and E in the control Box.

Calibrate the distortion meter so that the sum of signal, noise, and distortion corresponds to 100% when the filter is not inserted.

Insert filter to remove the modulating frequency.

Reduce the output of the signal generator until the distortion meter reading increases to 25%, corresponding to a 12-dB ratio between signal + noise + distortion and noise + distortion (12 dB SINAD).

Distortion: less than 3.5%.

Carefully adjust the input filter in RC611 or RC631 for best possible signal-to-noise ratio. It should be possible to obtain a 12-dB signal-to-noise ratio for an electromotive force of 0.8 μV.

NOTE: The 600-ohm load is located in the control box, where it serves as level control.

Squelch Sensitivity

Keep the signal generator connected to the antenna input of RCx1 and keep it set at the signal frequency. Set the frequency swing to 70% of the maximum permissible limit. The modulating frequency should be 1000 c/s.

Check that the squelch control is working; that is, it must be capable of cutting in the receiver output and turning it off again in the absence of an incoming RF signal.

The squelch control is located in the control box.

Set the squelch control to the threshold value (in the absence of an incoming RF signal). Again apply an RF signal and increase it until the squelch circuit opens the signal path through the receiver.

Minimum signal-to-noise ratio in the speech channel: 4 dB, typical.

"Tighten up" the squelch control and increase the RF signal level until the squelch circuit opens the signal path.

Maximum signal-to-noise ratio in the speech channel: 21 dB, typical.

TRANSMITTER ALIGNMENT

Check that the straps in units EX6xx, PA6x1 and AA601/AA608 are in accordance with the channel separation in use and the frequency band in use (see circuit diagram).

Transfer the signal lead connecting exciter EX6xx to power amplifier PA6x1 to the 47-ohm load resistor in PA6x1, testpoint [36] which loads the exciter during adjustments.

The transmitter must operate under carrier-on conditions during the subsequent adjustments. This is accomplished by depressing the transmit button or by connecting terminals V and K-L together.

Set the ADC control potentiometer (R4 in PA631; R5 in PA611) at mid-scale.

Alignment of Exciter EX6xx

Alignment of the exciter should be performed without modulating signal from AA601/AA608.

Ex611 (in CQM611, CQM612, CQM613 and CQM614)

Check that the exciter is strapped for the frequency band in use.

Connect RF probe and multimeter at test point [30].

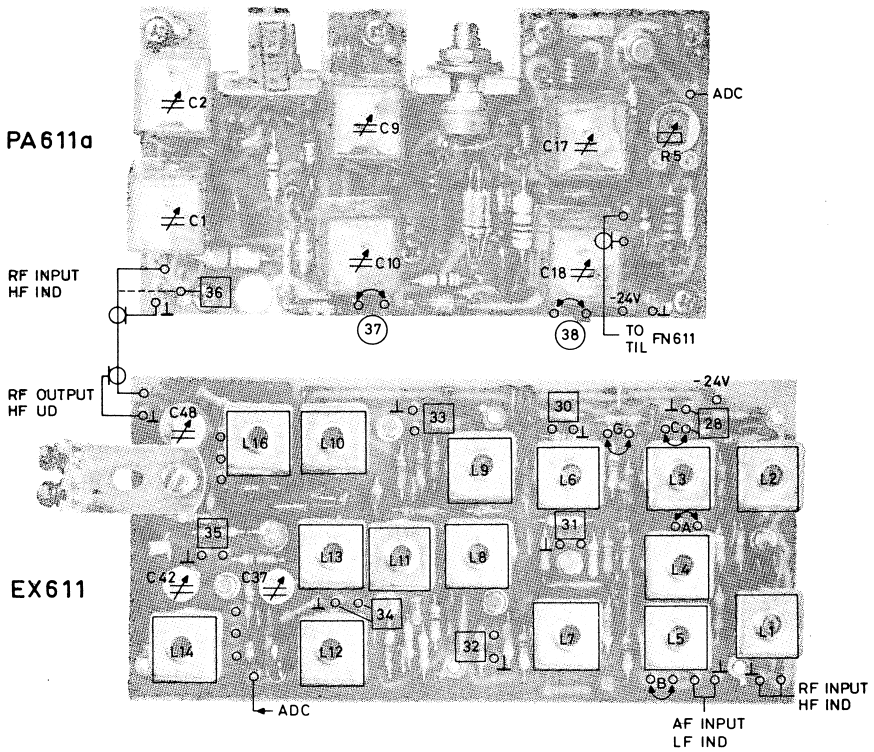
Adjust L1, L2, and L6 for maximum meter reading, approx. 0.5V.

Insert straps marked G and A.

Adjust coil L3 for maximum meter reading, approx. 0.5V.

Insert straps marked G and B instead.

Adjust coil L4 for minimum reading, approx. 0.05V.



Insert straps marked G and C instead.

Adjust coil L5 for minimum meter reading, approx. 0.05V.

Repeat alignment of coils L3, L4, and L5 (this is necessary because of interaction between the circuits) until minima and maxima are obtained.

Remove straps.

NOTE: This completes the alignment of the modulator. Henceforth the modulator must not be adjusted for minimum distortion.

Connect RF probe and multimeter at test point 32 .

Adjust coil L7 for maximum meter reading, approx. 1.0V.

Connect RF probe and multimeter at test point 33 .

Adjust coils L8 and L9 for maximum meter reading. Repeat the adjustment of these coils several times. Reading: approx. 4.0V.

Connect RF probe and multimeter at test point 34 .

Adjust coils L10 and L11 for maximum meter reading, approx. 4.0V.

Connect RF probe and multimeter at test point 35 .

Adjust coils L12 and L13 as well as trimmer capacitor C37 for maximum meter reading, approx. 2.0V.

Connect RF probe and multimeter at test point 36 in PA611 (across 47-ohm load resistor R8).

Adjust coils L14 and L16 as well as trimmer capacitors C42 and C48 for maximum meter reading, approx. 15V.

EX631 (in CQM631 and EX632 (CQM632/633/634)

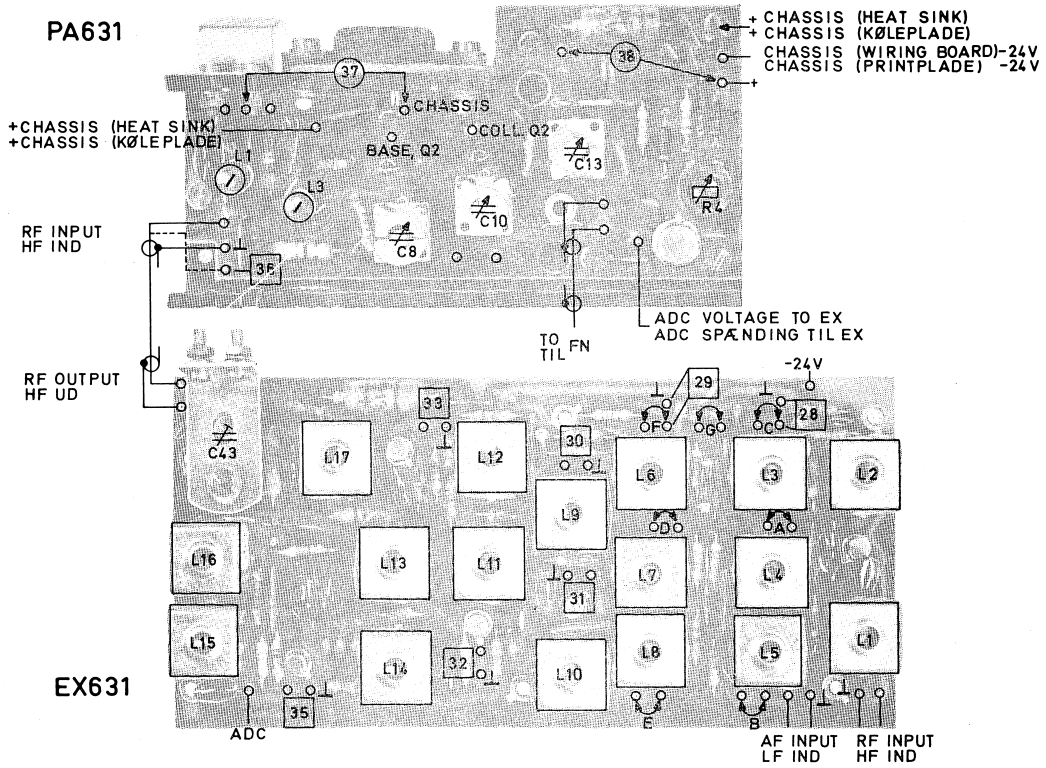
Connect RF probe and multimeter at test point 30

Adjust coils L1, L2, and L9 for maximum meter reading, approx. 0.5V.
Insert straps marked G and A.

Adjust coil L3 for maximum meter reading, approx. 0.5V.

Insert straps marked G and B instead.

Adjust coil L4 for minimum meter reading, approx. 0.05V.



Insert straps marked G and C instead.

Adjust coil L5 for minimum meter reading, approx. 0.05 V.

Repeat alignment of coils L3, L4, and L5 (this is necessary because of interaction between the circuits) until minima and maxima are obtained.

Remove straps.

Again adjust coils L1, L2, and L9 for maximum meter reading, approx. 0.5V.

Adjustment of 2nd Modulator in EX631

Connect RF probe and multimeter at test point [30].
Insert straps marked G and D.
Adjust coil L6 for maximum meter reading, approx. 0,5 V.
Insert straps marked G and E.
Adjust coil L7 for minimum meter reading, approx. 0,05 V.
Insert straps marked G and F.
Adjust coil L8 for minimum meter reading, approx. 0,05 V.
Repeat alignment of coils L6, L7, and L8 (this is necessary because of interaction between the circuit) until minima and maxima are obtained.
Remove straps.

NOTE: This completes the alignment of the modulator. Henceforth the modulator must not be adjusted for minimum distortion.

Connect RF probe and multimeter at test point [32].

Adjust coil L10 for maximum meter reading, approx. 1.6 V.

Connect RF probe and multimeter at test point [33].

Alternately adjust coils L11 and L12 for maximum meter reading, approx. 3.0V.

Connect RF probe and multimeter at test point [35].

Alternately adjust coils L13 and L14 for maximum meter reading, approx. 0.4V.

Connect RF probe and multimeter at test point [36] in PA631 (across the 47-ohm load resistor, R7).

Adjust coils L15, L16, and L17 and trimmer capacitor C43 for maximum meter reading, approx. 15V.

Release the transmit button (or remove strap between terminals V and K-L).

Adjustment of Power Amplifier Stage, PA6x1

First, the signal lead from the exciter should be transferred from the load resistor to the input of PA6x1.

Connect a wattmeter and a dummy load across the output of power amplifier PA6x1.

PA611 (in CQM611, COM612, CQM613 and CQM614)

Remove strap designated (37) and replace it with a 500-mA meter.

Remove strap designated (38) and replace it with a 1-amp. meter.

Back off the ADC potentiometer, R5, (anti-clockwise).

Depress the transmit button (or strap terminals V and K-L together).

Carefully advance the ADC potentiometer, adjusting trimmer capacitors C1, C2, C9, C10, C17, and C18 for maximum power output.

When maximum power output has been obtained with the ADC potentiometer at maximum and the entire stage completely adjusted, reduce the power output to 10 watts, using the ADC potentiometer.

Readjust trimmer capacitors C17 and C18 for maximum power output.

Again adjust the ADC potentiometer for 10 watts power output.

At full power output, the current at test point (37), as measured with the milliammeter, should not exceed 250 mA, and the current at test point (38), as measured with the 1-amp. meter, should not exceed 700 mA.

CAUTION: Sometimes, in the low end of the frequency band, the transmitter may deliver more than 15 watts of power output. Sinde the resulting current drain will cause permanent damage to the power supply unit, care should be taken that the above currents at test points (37) and (38) will not exceed the stated values.

PA631 (in CQM631, CQM632, CQM633 and CQM634)

Back off the ADC potentiometer, R4, (anti-clockwise).

Depress the transmit button (or strap terminals V and K-L together).

Carefully advance the ADC potentiometer, adjusting coils L1 and L3 and trimmer capacitors C8, C10, and C13 for maximum power output.

When maximum power output has been obtained with the ADC potentiometer at maximum and the entire stage is completely adjusted, reduce the power output to 10 watts, using the ADC potentiometer.

Readjust trimmer capacitors C10 and C13 for maximum power output.

Again adjust the ADC potentiometer for 10 watts power output.

At full power output, the voltage at test point (37) should be less than 0.48V, corresponding to a maximum driver emitter current of 320 mA. The voltage at test point (38) should be less than 0.8V, corresponding to a maximum power-amplifier collector current of 800 mA.

Adjusting the Power Amplifier for 6 Watts Power Output, PA6x1

Adjust the unit for maximum obtainable power output as described above.

Using the ADC potentiometer, reduce the power output to 7-8 watts.

In PA611: Readjust trimmer capacitors C17 and C18 for maximum power output.

In PA631: Readjust trimmer capacitors C10 and C13 for maximum power output.

Adjust the ADC potentiometer for 5 watts power output.

Again readjust the trimmer capacitors for maximum power output.

Lastly, using the ADC potentiometer, adjust the power output level for 6 watts.

Currents and voltages at the test points should be as follows:

PA611:	(37)	less than 180 mA.
	(38)	less than 500 mA.
PA631:	(37)	less than 180 mA, corresponding to 0.27 V.
	(38)	less than 500 mA, corresponding to 0.5 V.

Antenna Filter FN6x1

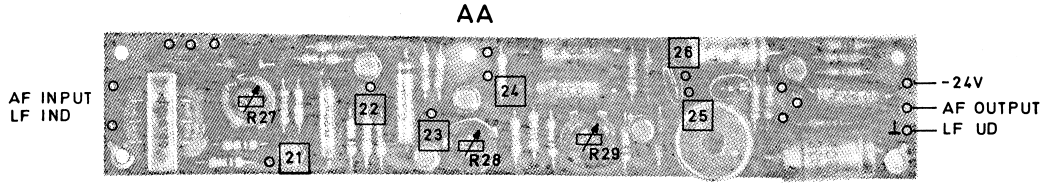
The antenna filter is adjusted before leaving the factory and subsequent adjustment is unnecessary.

Crystal Oscillator X0631

Crystal oscillators are as a general rule adjusted before leaving the factory, for which reason frequency adjustment is necessary only when a new crystal has been inserted.
A frequency counter is required for making the exact adjustment.

In this case the transmitter should be aligned first, because the frequency is most easily measured at the transmitter output.
The frequency accuracy should be better than 1×10^{-6}.

Modulation Adjustment, AA601 or AA608



Make sure that the unit is strapped for phase modulation (see circuit diagram).

Set potentiometer R28 at mid-scale.

Connect standard receiver and distortion meter to the transmitter output through attenuating networks.

Connect audio voltmeter and tone generator to terminals B and F in the control box (modulation input of the transmitter).

Adjust the input signal from the tone generator for modulation level, 110 mV + 20 dB, corresponding to 1.1 V.

AA601 (all stations except CQM614 and CQM634

Vary the frequency between 300 and 3000 c/s while adjusting for maximum frequency swing.

CQM611 and CQM631: ΔF max. - ±15 kc/s
CQM612 and CQM632: ΔF max. - ±5 kc/s
CQM613 and CQM633: ΔF max. - ±4 kc/s.

Adjust, by means of potentiometer R29 in AA601 the frequency swing so that it will not exceed the maximum value (ΔF max.) anywhere inside the frequency range 300 - 3000 c/s. This should be checked at both negative and positive modulation peaks.

AA608 (in CQM614 and CQM634 only)

Vary the frequency between 300 and 2600 c/s while adjusting for maximum frequency swing.

CQM614 and CQM634: ΔF max. = ±2.5 kc/s.

Adjust, by means of potentiometer R29 in AA608, the frequency swing so that it will not exceed the maximum value (ΔF max.) anywhere inside the frequency range 300-2600 c/s. This should be checked at both negative and positive modulation peaks.

Using potentiometer R27, adjust the modulation sensitivity so that a 110 mV input voltage at 1000 c/s from the tone generator produces a frequency swing that is 70% of the maximum permissible swing.

Repeat the adjustment of potentiometers R29 and R27.

Adjust, at the 110 mV (1000 c/s) input voltage, the symmetry of the limiter for minimum distortion, using potentiometer R28.

Recheck the modulation sensitivity and readjust it if it has changed.

Read the distortion meter. Distortion should be less than 8%.

NOTICE! Distortion should be measured with de-emphasis.

UNITS IN CONTROL BOX

Checking the AA602 Audio Output Amplifier

Connect the signal generator to the antenna input of the receiver and set it to the signal frequency at a frequency swing that is 70% of the maximum permissible swing at 1000 c/s.

Connect a 15-ohm 3-watt load resistor across the output terminals of the AA602 output amplifier. Also connect an audio voltmeter across the same terminals.

Turn the volume control of the control box fully open. The voltage across the load should be at least 6.3 V.

Tone Receiver TR68x

This unit is adjusted before leaving the factory and requires no subsequent readjustment.

Tone Transmitter TT68x

Connect an audio voltmeter to the output of the tone transmitter and connect a standard receiver to the antenna output of the transmitter section.

Adjust the coil of the tone transmitter for a tone frequency of 1060 c/s.

Apply power to the tone transmitter.

Adjust, by means of the alignment potentiometer of the tone transmitter unit, the tone transmitter output level for 110 mV, corresponding to a measuring level of -17 dB.

If a two-tone transmitter is used, each transmitter section should deliver only half the voltage specified above. This is performed by short-circuiting one of the tone-coils and thus cut out one of the oscillators. Then adjust the output level for 55 mV.

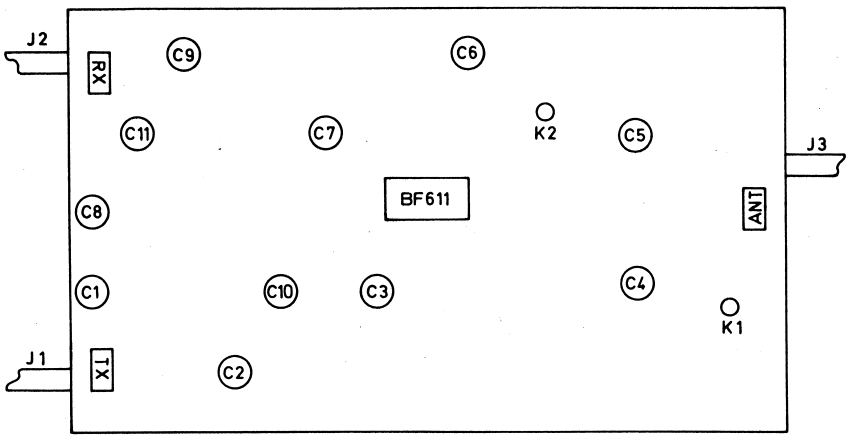
Check the frequency swing at 1060 c/s.

Adjust the tone transmitter coil for the desired tone frequency. Recheck the frequency swing.

Frequency swing for single-tone transmitter: 70% +1, -2 dB of maximum frequency swing.

Frequency swing for two-tone transmitter: 35% for each tone.

Adjustment of Antenna Branching Filter BF612



Switch the radiotelephone to a channel in the centre of its channel coverage range.

Detune all series traps of the filter by means of trimmer capacitors C1, C2, C3, C4, C5, C6, C7, C8, and C9. Take care not to screw the tubular trimmer capacitors too far down.

Set trimmer capacitors C10 and C11 at minimum capacitance.

Adjustment of the Transmitter Section for Isolation of the Receiving Frequency

Connect a signal generator, set to the receiving frequency (modulation 1000 Hz), to J1.

Connect a 50-ohm load to J2.

Connect the receiver to J3.

Strap short-circuit point K2 to chassis.

Adjust the transmitter section of the branching filter by successively tuning the series traps (C1, C2, C3, and C4) for minimum signal at the receiver input.

Adjustment of the Receiver Section for Isolation of the Transmitting Frequency

Connect a wattmeter to J1.

Connect a tapped 50-ohm load to J2. Connect the tap to an RF millivoltmeter.

Connect the transmitter to J3.

Strap short-circuit point K1 to chassis.

Turn on the transmitter.

Adjust the receiver section of the branching filter by successively tuning the series traps (C5, C6, C7, C8, and C9) for minimum signal reading on the RF millivoltmeter.

Adjustment of the Transmitter Section for Minimum Attenuation of the Transmitting Frequency

Connect the transmitter to J1.

Connect a 50-ohm load to J2.

Connect a wattmeter to J3.

Turn on the transmitter.

Adjust trimmer capacitor C10 for maximum wattmeter reading, choosing the larger of the two peaks.

Adjust the transmitter output stage for maximum wattmeter reading, taking care that the transmitter does not "squegg" (parametric oscillations).

Adjustment of the Receiver Section for Minimum Attenuation of the Receiving Frequency

Connect the transmitter to J1.

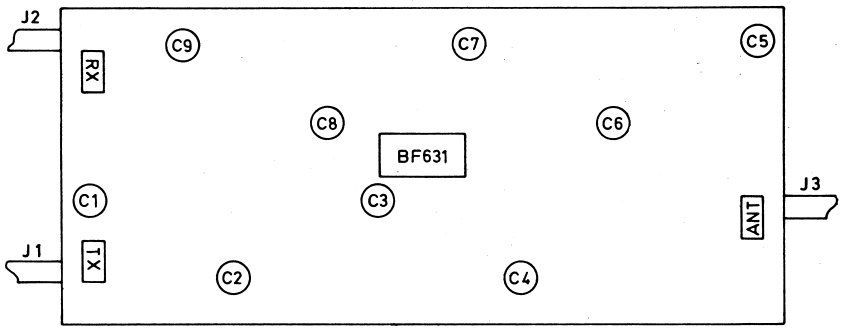
Connect the receiver to J2.

Connect a tapped 50-ohm load to J3. Connect the tap to a signal generator set to the receiving frequency (modulation: 1000 Hz).

Adjust trimmer capacitor C11 for maximum signal input to the receiver, choosing the larger of the two signal peaks.

Adjust the receiver input stage for maximum sensitivity.

Adjustment of Antenna Branching Filter BF632



Switch the radiotelephone to a channel in the centre of its channel coverage range.

Detune all the series traps of the filter by means of trimmer capacitors C1, C2, C3, C4, C5, C6, C7, C8, and C9. Take care not to screw the tubular trimmer capacitors too far down.

Adjustment of the Transmitter section for Isolation of the Receiving Frequency

Connect a signal generator, set to the receiving frequency (modulation 1000 Hz), to J1.

Connect the receiver to J2.

Connect a 50-ohm load J3.

Adjust the transmitter section of the branching filter by successively tuning the series traps (C1, C2, C3, and C4) for minimum signal at the receiver input.

Adjustment of the Receiver Section for Isolation of the transmitting frequency

Connect the transmitter to J1.

Connect a tapped 50-ohm load to J2. Connect the tap to an RF millivoltmeter.

Connect a wattmeter to J3.

Turn on the transmitter.

Adjust the receiver section of the branching filter by successively tuning the series straps (C5, C6, C7, C8, and C9) for minimum signal reading on the RF millivoltmeter.

Repeat the adjustment of the transmitter section for isolation of the receiving frequency.

Adjustment of the Output Stages of the Transmitter for Maximum Power Output

Connect the transmitter to J1.

Connect the receiver to J2.

Connect a wattmeter to J3.

Turn on the transmitter.

Adjust the transmitter output stage (PA600) for maximum wattmeter reading, take care that the transmitter does not "squegg" (parametric oscillations).

Adjustment of the Input Stages of the Receiver for maximum sensitivity

Connect the transmitter to J1.

Connect the receiver to J2.

Connect a tapped 50-ohm load to J3. Connect the tap to a signal generator set to the receiving frequency (modulation 1000 Hz).

Adjust the receiver input stage (RC600) for maximum sensitivity.

Storno

CHAPTER VI. DIAGRAMS AND PARTS LISTS

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)

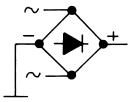

Transformer with adjustable RF cores


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

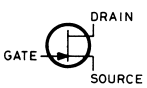

Transistor, NPN


Light-sensitive transistor


Unipolar transistor with N-type base

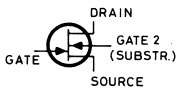

Unipolar transistor with P-type base

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

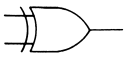
OR gate

NAND gate

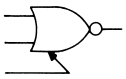
NOR gate

GRAPHICAL SYMBOLS USED IN STORNO CIRCUIT DIAGRAMS

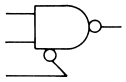
Gates, continued



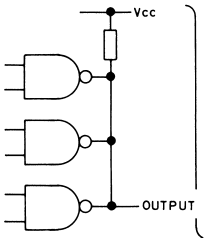
Exclusive OR gate



NOR gate with expander input (high)



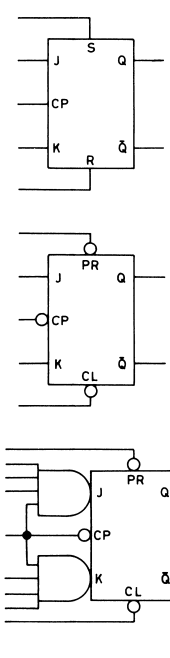
NAND gate with expander input (low)



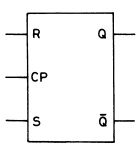
Wired-OR (combined OR outputs) (presentation at top is used in detailed diagrams; presentation below is used in functional diagrams)

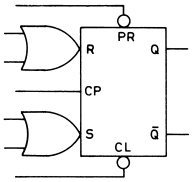
Flip-flops

Abbreviations used: S = Set
R = Reset
CP = Clock Pulse
PR = Preset
CL = Clear

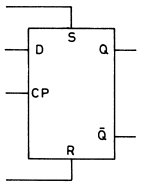


J-K Flip-flops



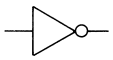


R-S Flip-flops



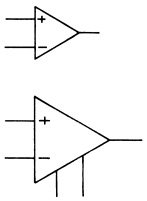
D Flip-flop

Inverters



Inverter

Operational Amplifiers

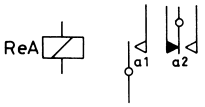


Operational amplifiers

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

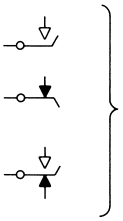
Make contacts, delayed operation

Make contacts, delayed release

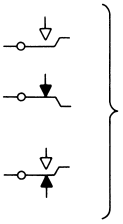
Mechanically coupled make contacts

Switches and Keys (O)

On/off switch



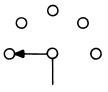
Locking keys or switches; push on, push off



Non-locking self-releasing keys or switches

Locking mutually releasing keys or switches (in row of push-buttons etc.)

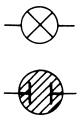
Self-releasing switch (overcurrent switch etc.)



Rotary switch

GRAPHICAL SYMBOLS USED IN STORNO CIRCUIT DIAGRAMS

Lamps (V)



Indicator lamp

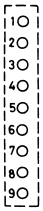
Neon lamp

Fuses and Cut-outs (S)

Fuse

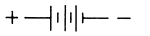
Circuit-breaker

Tag Strips (KL)



Tag strip - dashed frame may be wholly or partly omitted

Batteries (BT)



Battery

Feedthrough Filters (F)

Feedthrough filter

Ferrite Beads (FB)

Ferrite bead

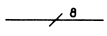
Crystals (X)

Crystal

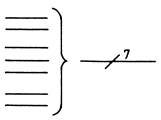
Cables and Wires (W)

Usual conductor

Three conductors



Eight conductors



Shift from multiple-line to single-line presentation

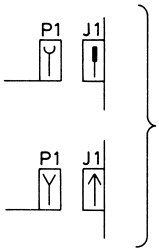
Screened wire

Coaxial cable

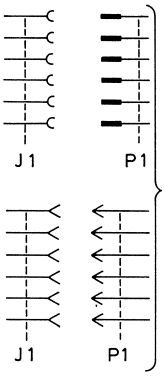
Connectors (J and P)

Female connector (socket). Lower symbol discontinued

Male connector (plug). Lower symbol discontinued



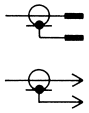
Schematic symbols for multi-wire connectors. (Upper symbol will gradually supersede lower symbol)
Multi-wire connectors are always designated "J" when permanently mounted on a cabinet or unit etc., "P" when fitted to cables



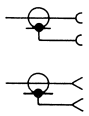
Detail symbols for multi-wire connectors. (Upper symbol will gradually supersede lower symbol)
Where both connectors are fitted to cables, male connector is designated "P" and female connector "J"

Coaxial plug

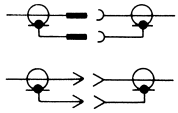
Coaxial socket



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

DC test point

AC test point

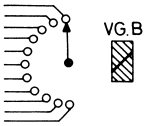
Replaceable Connections

Cross-field connection (jumper)

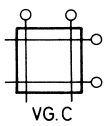
Strap

Selectors (VG)

Schematic symbol for rotary selector with designation of number of contact points

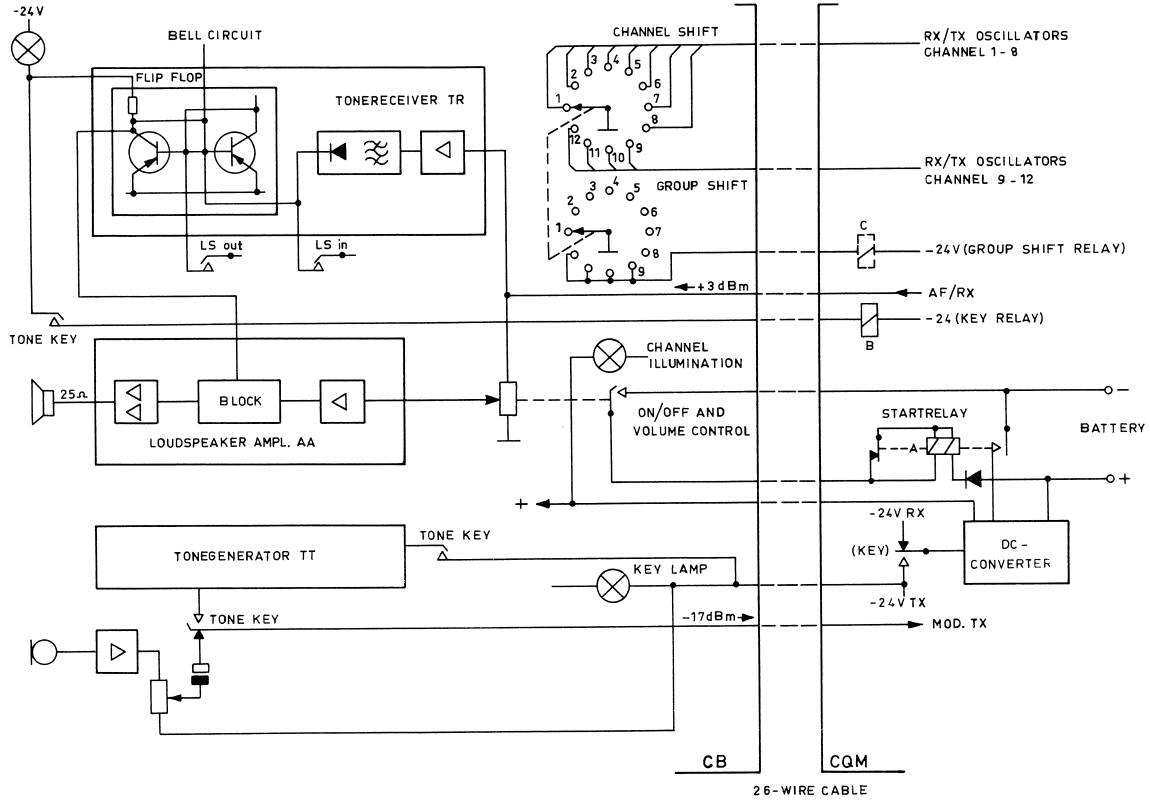


Detail symbol for rotary selector



Co-ordinate selector

STORNO

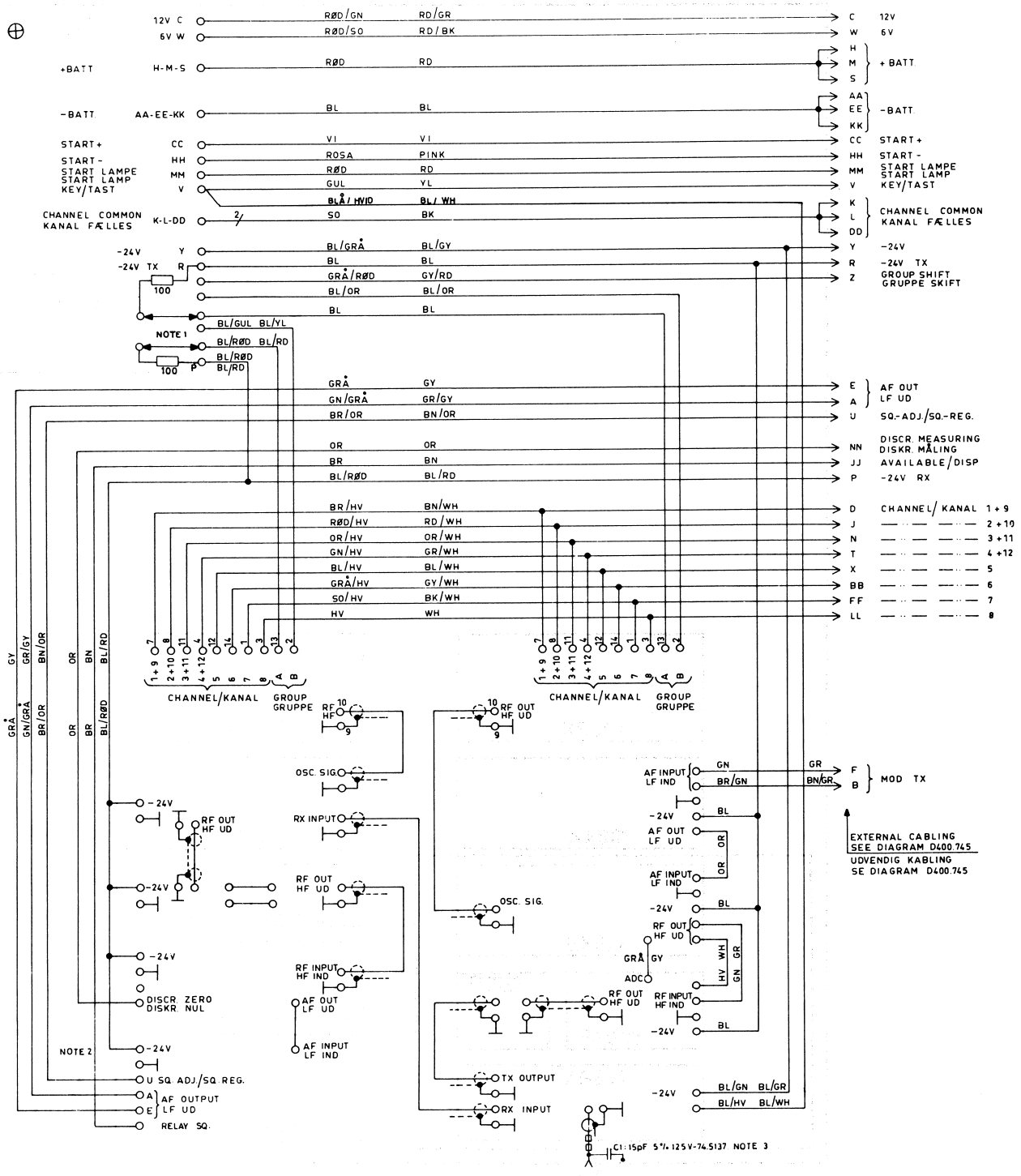


FUNCTION DIAGRAM
FUNKTIONSDIAGRAM

CQM600

D400.673

Storno



Note 1: SU607 is inserted in equipment provided with more than 8 channels only
When omitting SU607 two straps are inserted in PS6015 (see diagram of this unit).

Note 2: Connection with SR6841 only.
Forbindelse kun med SR6841

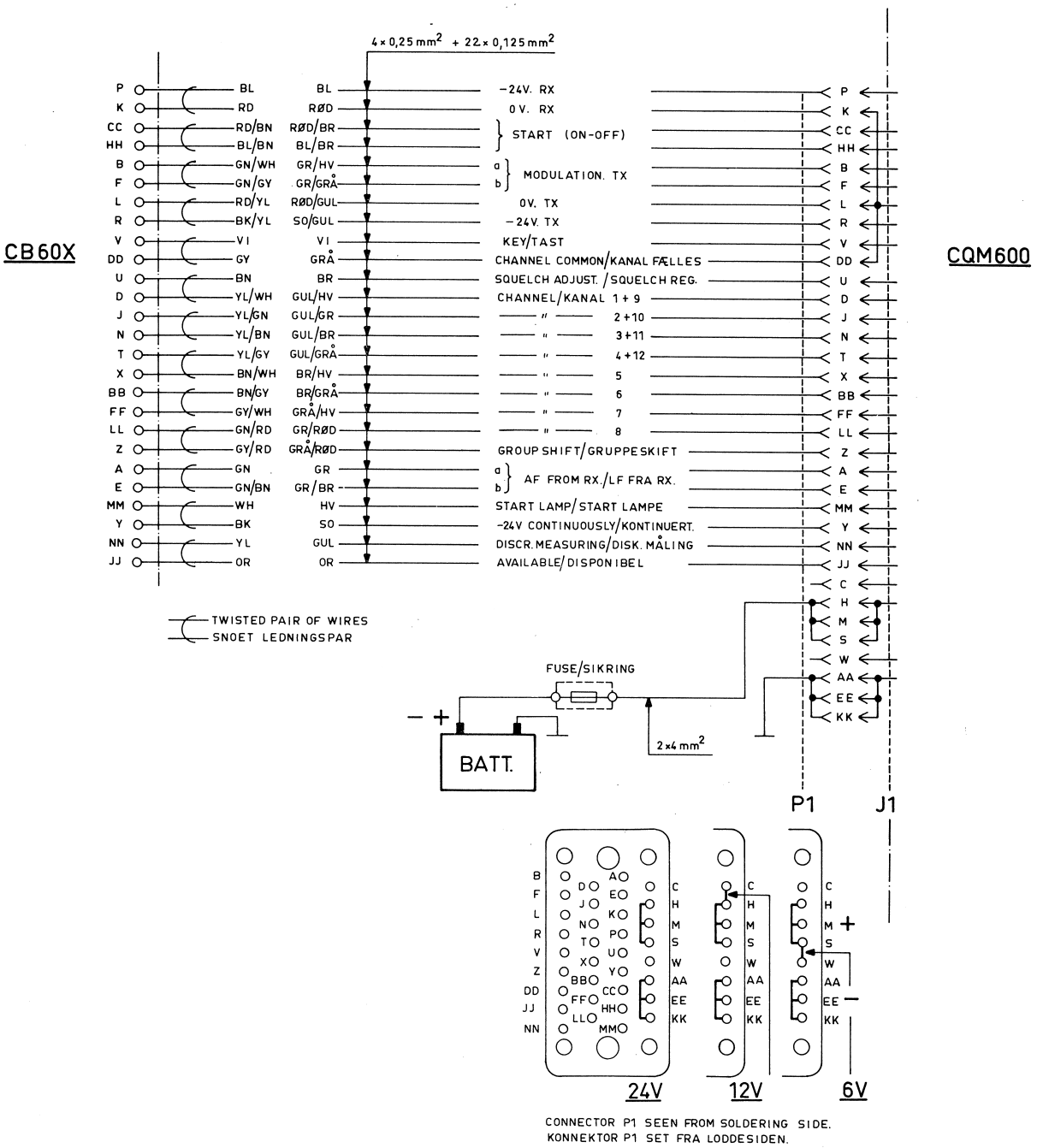
Note 3: CQM610 only
Kun CQM610

CABLEFORM
KABLINGSDIAGRAM CQM610, CQM630, SIMPLEX

D400.675/5

Storno

Storno

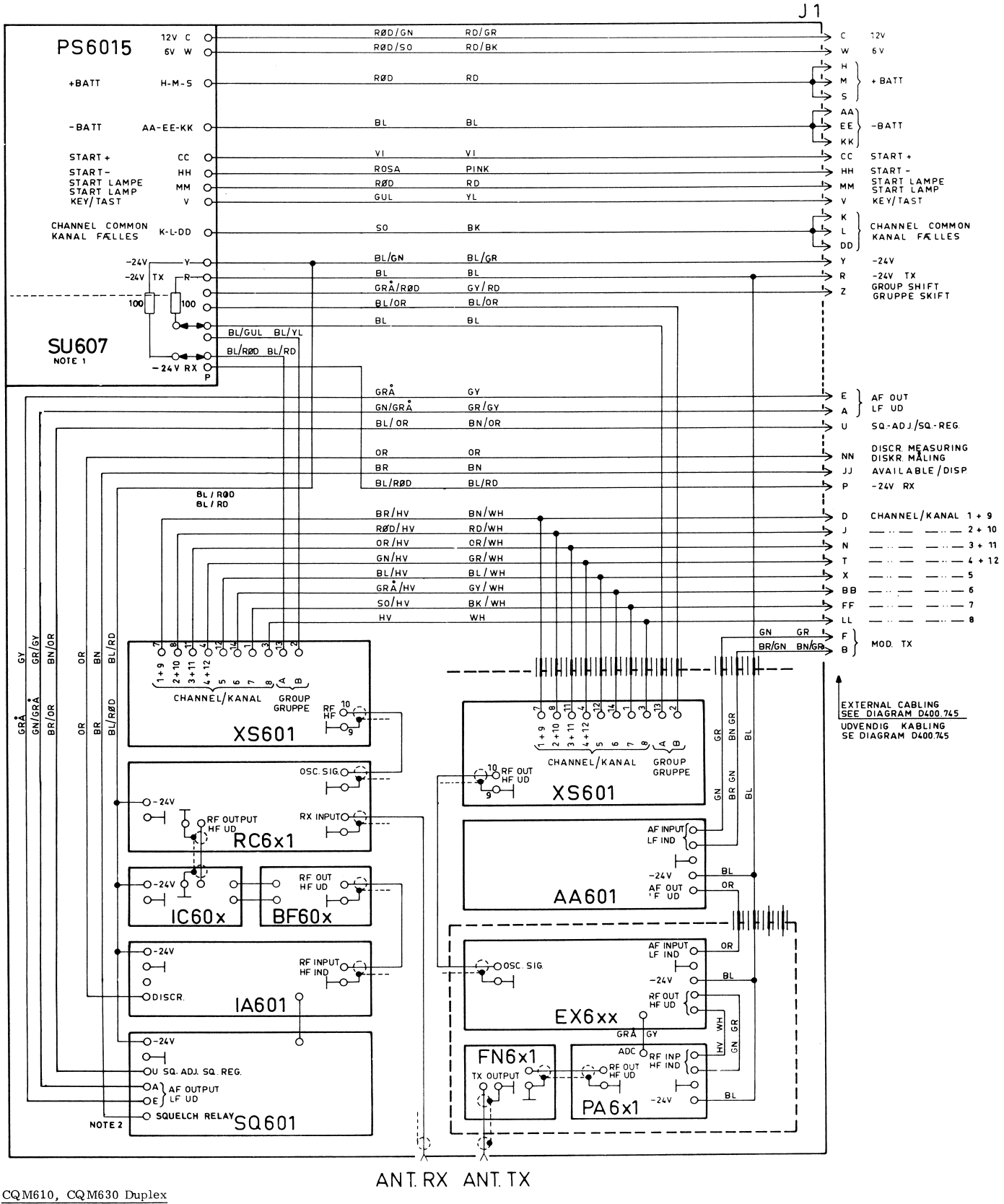


STANDARD INSTALLATION CABLING
STANDARD INSTALLATIONSKABLING

STORNOPHONE 600

D400.745/3

Storno



CQM610, CQM630 Duplex

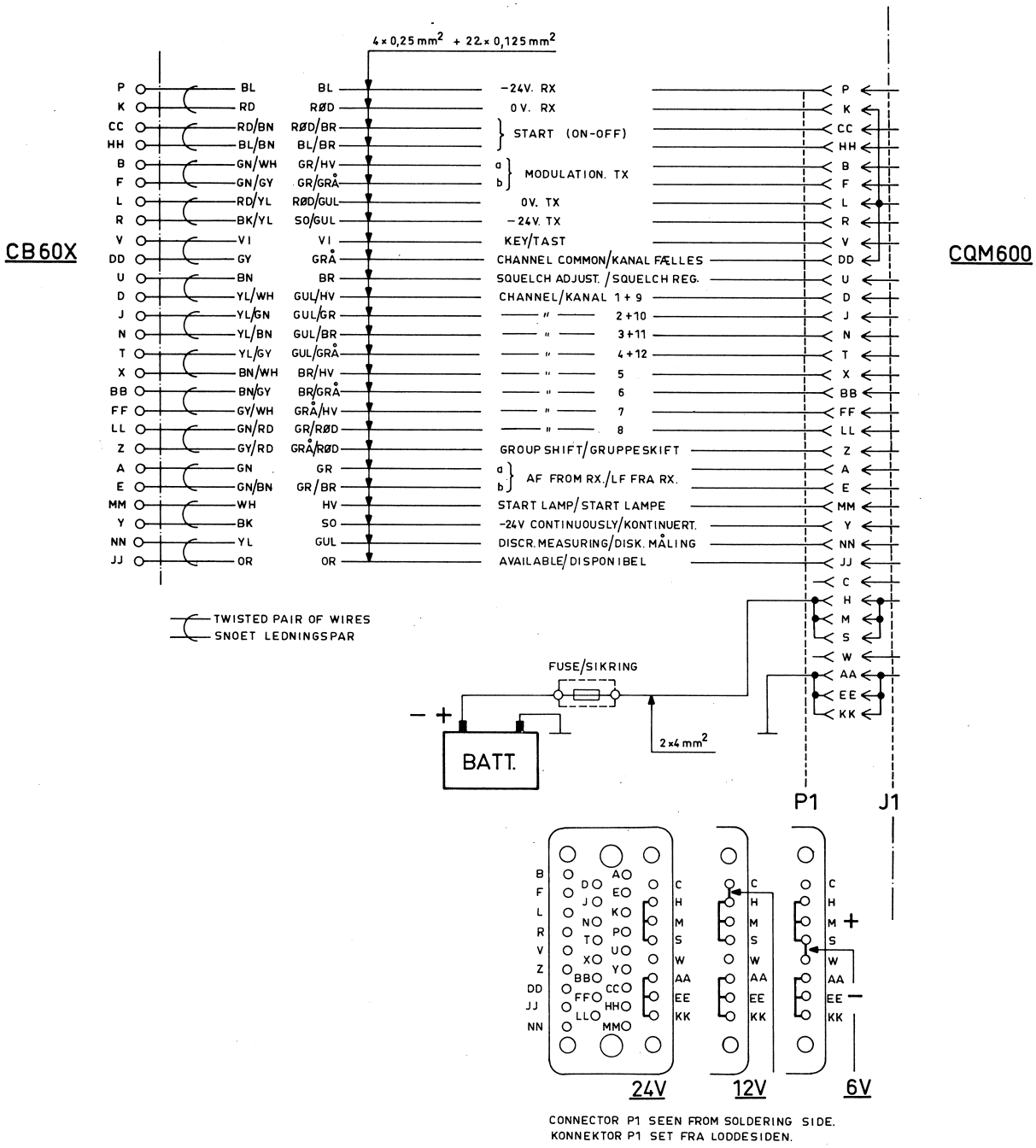
Note 1: SU607 is inserted in equipment provided with more than 8 channels only
When omitting SU607 two straps are inserted in PS6015 (see diagram of this unit).

Note 2: Connection with SR6841 only.
Forbindelse kun med SR6841

CABLE FORM
KABLINGSDIAGRAM CQM610, CQM630, DUPLEX

D400.795/2

Storno



CONNECTOR P1 SEEN FROM SOLDERING SIDE.
KONNEKTOR P1 SET FRA LODDESIDEN.

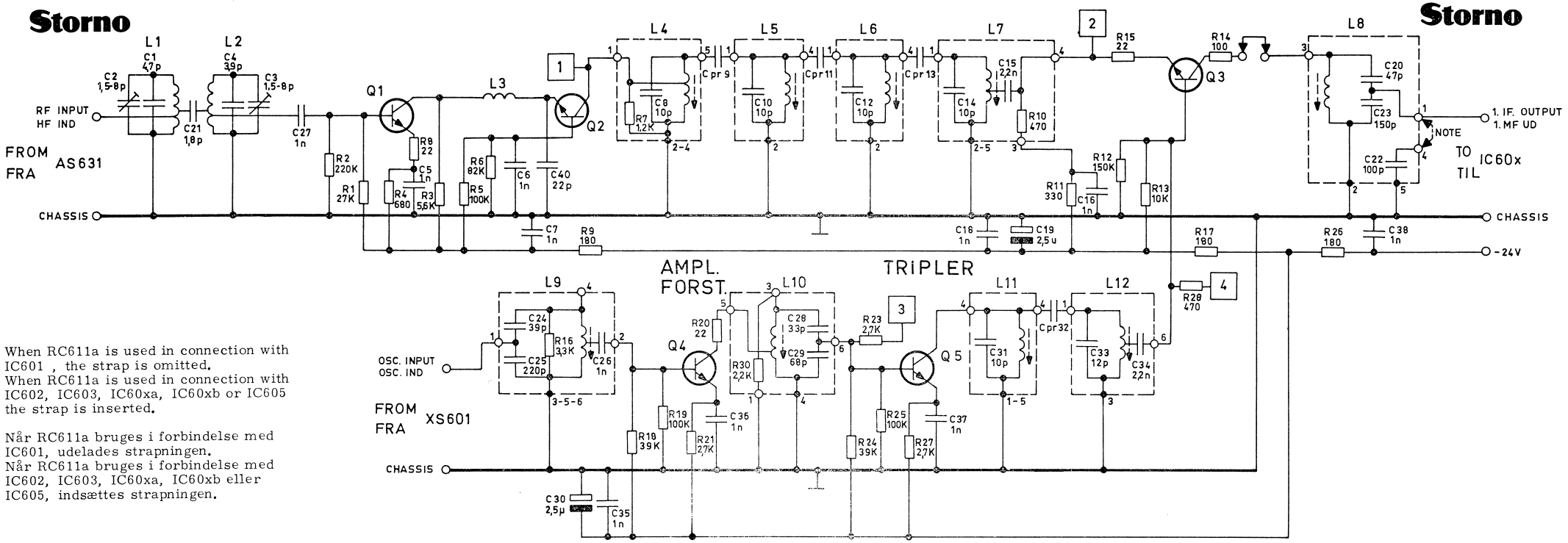
STANDARD INSTALLATION CABLING
STANDARD INSTALLATIONSKABLING

STORNOPHONE 600

D400.745/3

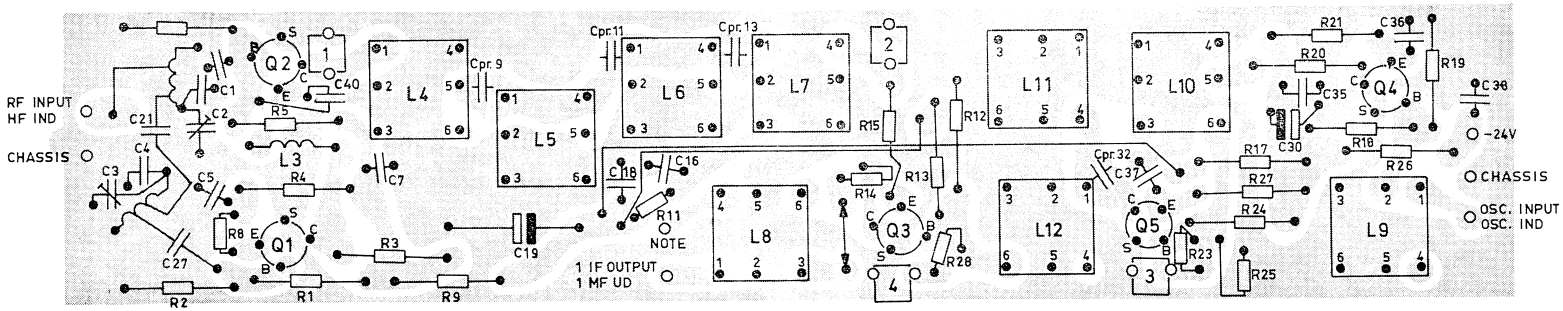
SF. MX.

Storno Storno



e: When RC611a is used in connection with IC601 , the strap is omitted.
When RC611a is used in connection with IC602, IC603, IC60xa, IC60xb or IC605 the strap is inserted.

Når RC611a bruges i forbindelse med IC601, udelades strapningen.
Når RC611a bruges i forbindelse med IC602, IC603, IC60xa, IC60xb eller IC605, indsættes strapningen.



RECEIVER CONVERTER
MODTAGER KONVERTER

RC611a

D400.833/2

TYPE	NO.	CODE	DATA	
	C1	74.5131	4,7pF ± 0,25pF N150 DI	500V
	C2	78.5034	1,5-8pF trimmer NPO TB	125V
	C3	78.5034	1,5-8pF trimmer NPO TB	125V
	C4	74.5130	3,9pF ± 0,25pF N150 DI	500V
	C5	74.5155	1nF -20 +50% ceram. PL	63V
	C6	74.5155	1nF -20 +50% ceram. PL	63V
	C7	74.5155	1nF -20 +50% ceram. PL	63V
	C8	74.5110	10pF ± 0,5pF ceram. NO75 TB	250V
	C9		print capacitance/printkapacitet	
	C10	74.5110	10pF ± 0,5pF ceram. NO75 TB	250V
	C11		print capacitance/printkapacitet	
	C12	74.5110	10pF ± 0,5pF ceram. NO75 TB	250V
	C13		print capacitance/printkapacitet	
	C14	74.5110	10pF ± 0,5pF ceram. NO75 TB	250V
	C15	76.5059	2,2nF 10% polyest. FL	50V
	C16	74.5155	1nF -20 +50% ceram. PL	63V
	C18	74.5155	1nF -20 +50% ceram. PL	63V
	C19	73.5064	2,5µF -10 +50% elco	70V
	C20	74.5118	47pF ± 2% ceram. NO75 TB	250V
	C21	74.5126	1,8pF ± 0,25pF N150 BD	250V
	C22	76.5079	100pF 5% polystyr. TB	125V
	C23	76.5062	150pF 5% polystyr. TB	125V
	C24	74.5117	39pF 2% ceram. TB	250V
	C25	76.5063	220pF 5% polystyr.	125V
	C26	74.5059	1nF 10% polyest. FL	50V
	C27	74.5155	1nF -20 +50% ceram. PL	63V
	C28	74.5116	33pF 2% ceram. NO75 TB	250V
	C29	74.5144	68pF 2% ceram. NO75 TB	250V
	C30	73.5064	2,5µF -10 +50% elco	70V
	C31	74.5110	10pF ± 0,5pF ceram. NO75 TB	250V
	C32		print capacitance/printkapacitet	
	C33	74.5141	12pF ± 0,5pF ceram. NO75 TB	250V
	C34	76.5059	2,2nF 10% polyest. FL	50V
	C35	74.5155	1nF -20 +50% ceram. PL	63V
	C36	74.5155	1nF -20 +50% ceram. PL	63V
	C37	74.5155	1nF -20 +50% ceram. PL	63V
	C38	74.5155	1nF -20 +50% ceram. PL	63V
	C40	74.5106	22 pF ± 0,5 pF NO75 TB	160V
	R1	80.5266	27kΩ 5% carbon film	1/8W
	R2	80.5277	0,22MΩ 5% carbon film	1/8W
	R3	80.5258	5,6kΩ 5% carbon film	1/8W
	R4	80.5247	680kΩ 5% carbon film	1/8W
	R5	80.5273	0,1MΩ 5% carbon film	1/8W
	R6	80.5272	82kΩ 5% carbon film	1/8W
	R7	80.5250	1,2kΩ 5% carbon film	1/8W
	R8	80.5259	22Ω 5% carbon film	1/8W
	R9	80.5240	180Ω 5% carbon film	1/8W
	R10	80.5045	470Ω 5% carbon film	1/10W

TYPE	NO.	CODE	DATA	
	R11	80.5243	330Ω 5% carbon film	1/8W
	R12	80.5275	0,15MΩ 5% carbon film	1/8W
	R13	80.5261	10kΩ 5% carbon film	1/8W
	R14	80.5237	100Ω 5% carbon film	1/8W
	R15	80.5229	22Ω 5% carbon film	1/8W
	R16	80.5055	3,3kΩ 5% carbon film	1/10W
	R17	80.5240	180Ω 5% carbon film	1/8W
	R18	80.5268	39kΩ 5% carbon film	1/8W
	R19	80.5273	0,1MΩ 5% carbon film	1/8W
	R20	80.5229	22Ω 5% carbon film	1/8W
	R21	80.5254	2,7kΩ 5% carbon film	1/8W
	R23	80.5254	2,7kΩ 5% carbon film	1/8W
	R24	80.5268	39kΩ 5% carbon film	1/8W
	R25	80.5273	0,1MΩ 5% carbon film	1/8W
	R26	80.5240	180Ω 5% carbon film	1/8W
	R27	80.5254	2,7kΩ 5% carbon film	1/8W
	R28	80.5245	470Ω 5% carbon film	1/8W
	R30	80.5253	2.2kΩ 5% carbon film	1/10W
	L1	62.759	RF coil/HF-spole 146-174MHz	
	L2	62.758	RF coil/HF-spole 146-174MHz	
	L3	62.659	RF choke/HF-drosselspole	
	L4	61.1034	RF coil/HF-spole (C8, R7)	
	L5	61.868-01	RF coil/HF-spole (C10)	
	L6	61.869-01	RF coil/HF-spole (C12)	
	L7	61.870-01	RF coil/HF-spole (C14, C15, R10)	
	L8	61.871-01	RF coil/HF-spole (C20, C21, C22, C23)	
	L9	61.872-01	RF coil/HF-spole (C24, C25, C26, R16)	
	L10	61.1033	RF coil/HF-spole (C28, C29, R30)	
	L11	61.874-02	RF coil/HF-spole (C31)	
	L12	61.875-02	RF coil/HF-spole (C33, C34)	
	Q1	99.5177	Transistor BF166	
	Q2	99.5118	Transistor BF115	
	Q3	99.5168	Transistor BF173	
	Q4	99.5166	Transistor BF167	
	Q5	99.5166	Transistor BF167	

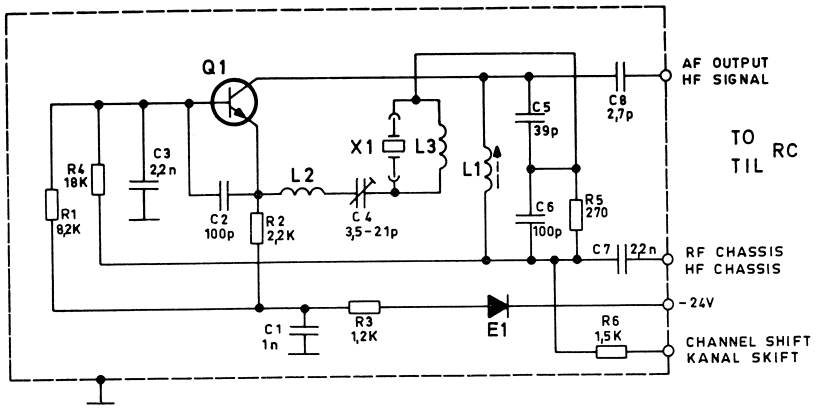
RECEIVER CONVERTER
MODTAGER KONVERTER

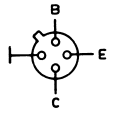
RC611a

X400.888/2

Storno

Storno





Q1

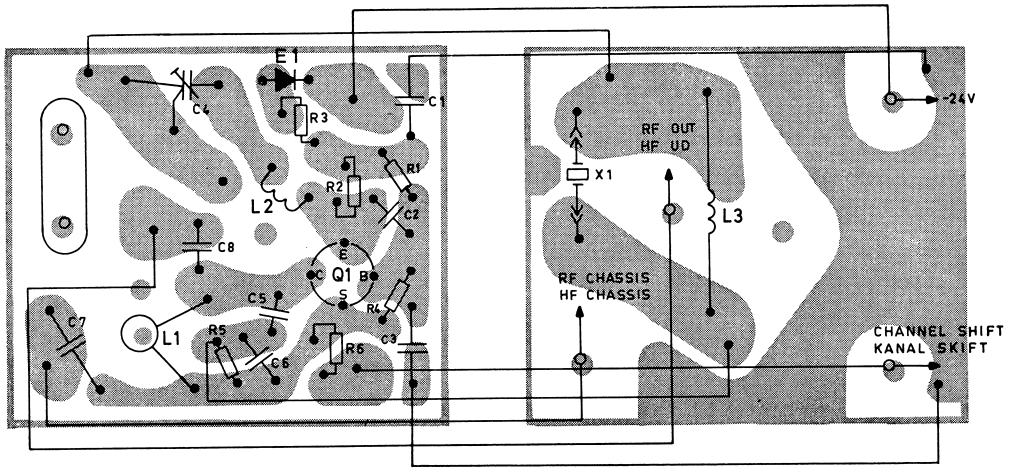
BOTTOM VIEW
SET FRA BUNDEN

UPPER PRINTED WIRING BOARD VIEWED
FROM COMPONENT SIDE

ØVERSTE TRYKTE KREDSLØB SET
FRA KOMPONENTSIDEN

LOWEST PRINTED WIRING BOARD VIEWED
FROM COMPONENT SIDE

NEDERSTE TRYKTE KREDSLØB SET
FRA KOMPONENTSIDEN



CRYSTALOSCILLATOR FOR RX.

XO611a

D400.667/4

Storno

TYPE	NO.	CODE	DATA	
	C1	76.5069	1nF 10% polyester FL	50V
	C2	76.5102	100pF 2,5% polystyr	30V
	C3	76.5059	2,2nF 10% polystyr FL	50V
	C4	78.5044	2 - 18 pF trimmer	300V
	C5	74.5117	39 pF ±2% ceram NO75TB	250V
	C6	76.5102	100pF 2,5% polystyr	30V
	C7	76.5059	2,2nF 10% polyester FL	50V
	C8	74.5128	2,7pF ±0,25pF ceram N150BD	250V
	R1	80.5260	8,2kΩ 5% carbon film	1/8W
	R2	80.5253	2,2kΩ 5% " "	1/8W
	R3	80.5250	1,2kΩ 5% " "	1/8W
	R4	80.5264	18 kΩ 5% " "	1/8W
	R5	80.5242	270Ω 5% " "	1/8W
	R6	80.5251	1,5 kΩ 5% " "	1/8W
	E1	99.5028	Diode 1N914	
	L1	61.876	RF coil/HF-spole 48-57 MHz	
	L2	62.662	Filter coil/Drosselspole	
	L3	62.652-01	Filter coil/Drosselspole	
	Q1	99.5028	Transistor BF167	
	X1		Crystal	

Storno

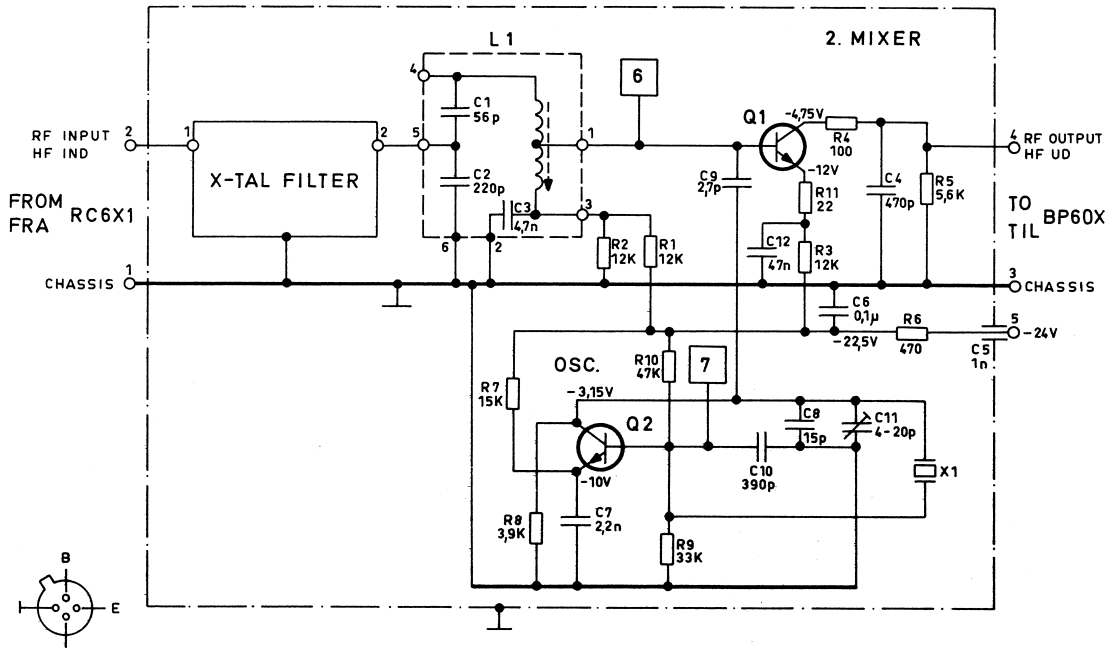
TYPE	NO.	CODE	DATA

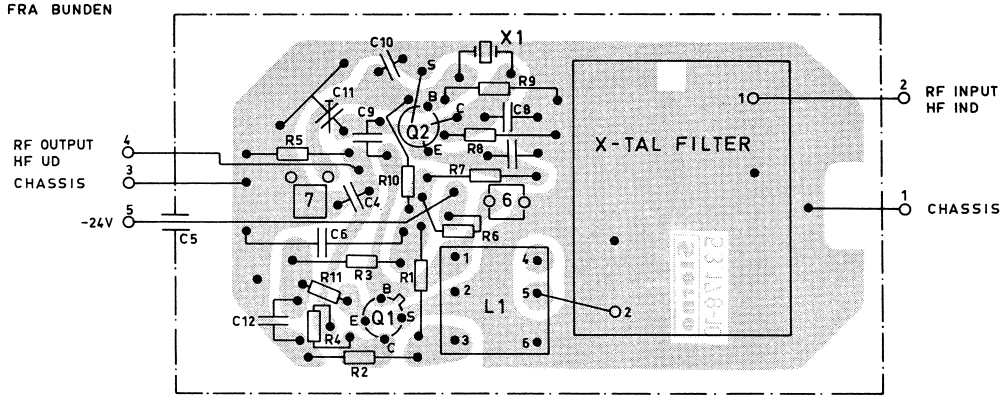
CRYSTALOSCILLATOR FOR RX.

XO611a

X400.686/3

Storno





PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN

IF-CONVERTER
MF-KONVERTER

IC601b, IC602b, IC603b

D400.664/3

Storno

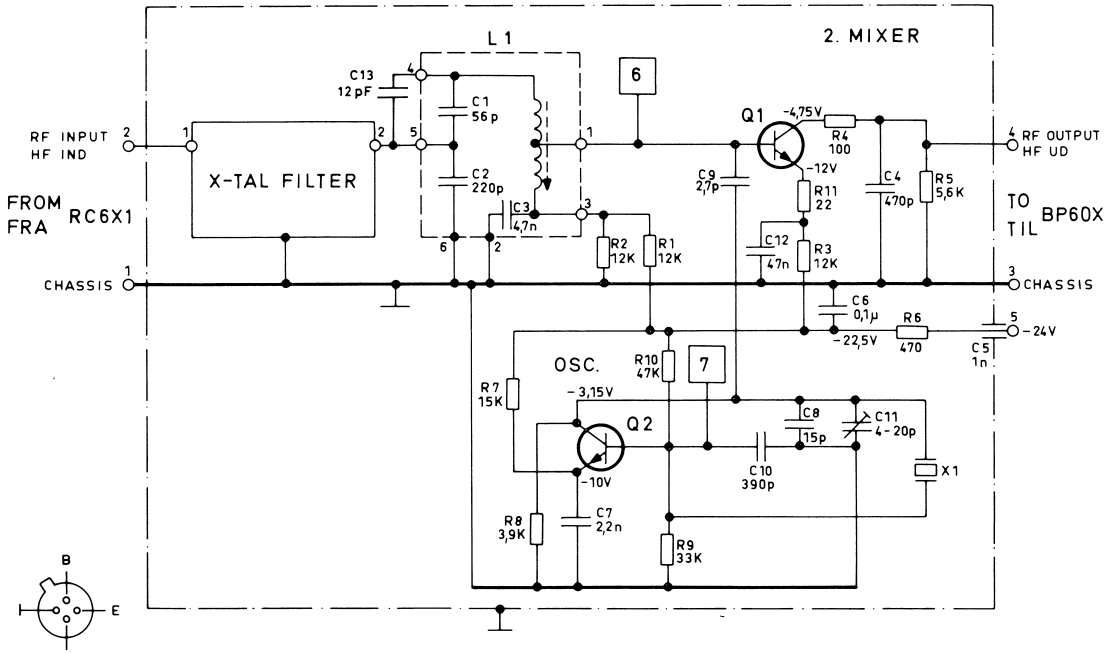
TYPE	NO.	CODE	DATA
	C1	74.5111	56 pF 2% ceram NO75 TB 250V
	C2	76.5063	220 pF 5% polystyr. TB 125V
	C3	76.5061	4,7nF 10% polyest. FL 50V
	C4	76.5065	470 pF 5% polystyr. TB 125V
	C5	74.5167	1 nF -20/+50% ceram. FT 300V
	C6	76.5073	0,1µF 10% polyest. TB 100V
	C7	76.5059	2.2nF 10% " FL 50V
	C8	74.5142	18 pF ±0.5pF ceram. NO75 TB 250V
	C9	74.5107	2,7pF 2% " NO75 TB 250V
	C10	76.5017	390 pF 5% polystyr. TB 125V
	C11	78.5031	40/20pF ceram trimmer N470 DI 100V
	C12	76.5072	47 nF 10% polyest. 50V
	R1	80.5262	12 kΩ 5% carbon film 1/8W
	R2	80.5262	12 kΩ 5% " " 1/8W
	R3	80.5262	12 kΩ 5% " " 1/8W
	R4	80.5237	100 Ω 5% " " 1/8W
	R5	80.5258	5.6kΩ 5% " " 1/8W
	R6	80.5245	470Ω 5% " " 1/8W
	R7	80.5263	15 kΩ 5% " " 1/8W
	R8	80.5256	3.9kΩ 5% " " 1/8W
	R9	80.5267	33 kΩ 5% " " 1/8W
	R10	80.5269	47 kΩ 5% " " 1/8W
	R11	80.5229	22 Ω 5% " " 1/8W
	L1	61.977	Coil/spole 10.7 MHz (C1, C2, C3)
	Q1	99.5166	Transistor BF 167
	Q2	99.5166	Transistor BF 167
	X1	98.5004	10.2450 MHz crystal, Storno type 98-8 or/eller
		98.5005	11.1550 MHz crystal, Storno type 98-8
IC601b		69.5010	10.7 MHz X-tal filter/krystalfilter 50 kHz
IC602b		69.5009	10.7 MHz X-tal filter/krystalfilter 25 kHz
IC603b		69.5008	10.7 MHz X-tal filter/krystalfilter 20 kHz

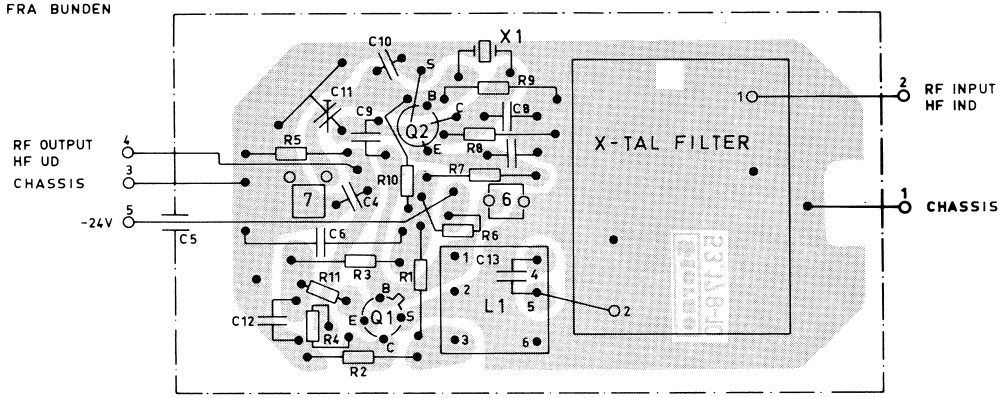
TYPE	NO.	CODE	DATA

IF-CONVERTER
MF-KONVERTER IC601b, IC602b, IC603b

X400.684/3

Storno





PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN

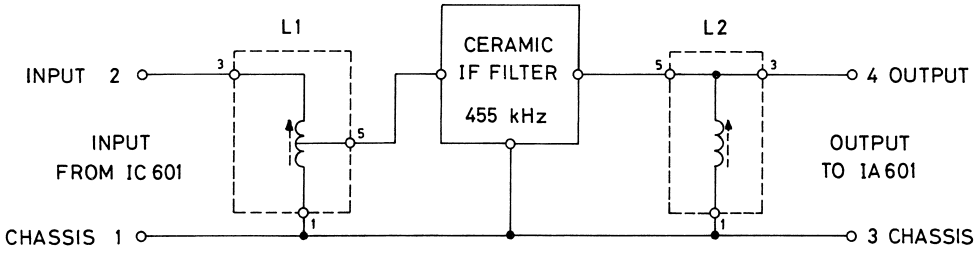
IF-CONVERTER
MF-KONVERTER

IC 607

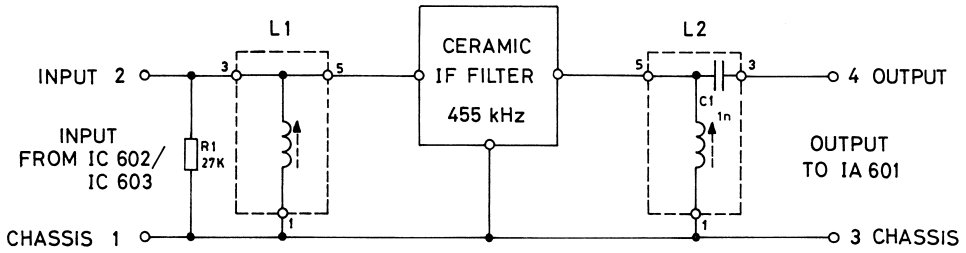
D 402.456

Storno

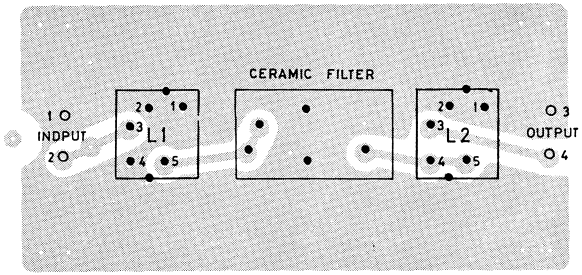
BP 601b



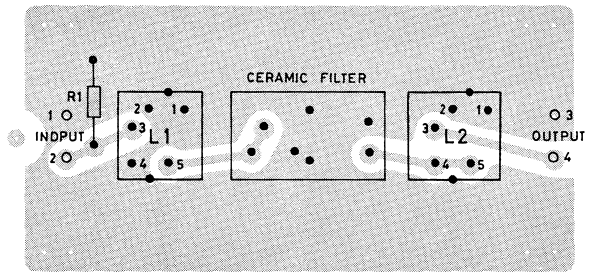
BP 602b



BP 601b



BP 602b



IF FILTERS BP 601b, BP 602b.

D 402.051/2

TYPE	NO.	CODE	DATA
BP601b		10.1213-02	455 KHz IF Filter Channel separation 50 KHz
	L1	61.1306	IF coil 455 KHz
	L2	61.1100	IF coil 455 KHz
	CF	69.5013	Ceramic IF filter 50 KHz
BP602b		10.1214-02	455 KHz IF Filter Channel separation 20/25 KHz
	C1	76.5109	1 nF 2.5% polystyr TB 30V
	R1	80.5266	27KΩ 5% carbon film 1/8W
	L1	61.1304	IF coil 455 KHz
	L2	61.1305	IF coil 455 KHz
	CF	69.5014	Ceramic IF filter 20/25 KHz

Storno

TYPE	NO.	CODE	DATA

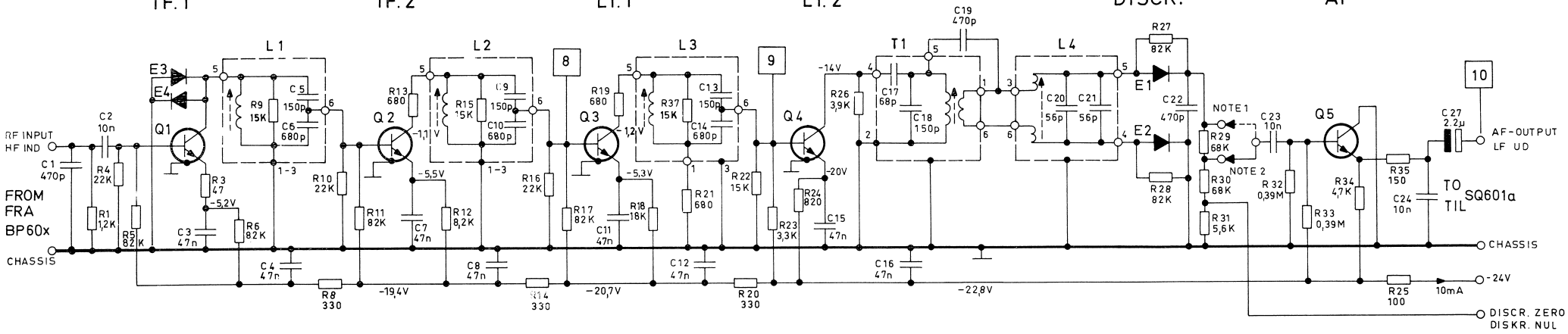
IF FILTER BP601b, BP602b

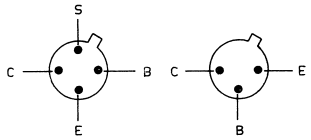
X402.157

Storno

IF.1 IF.2 LI.1 LI.2 DISCR. AF

Storno

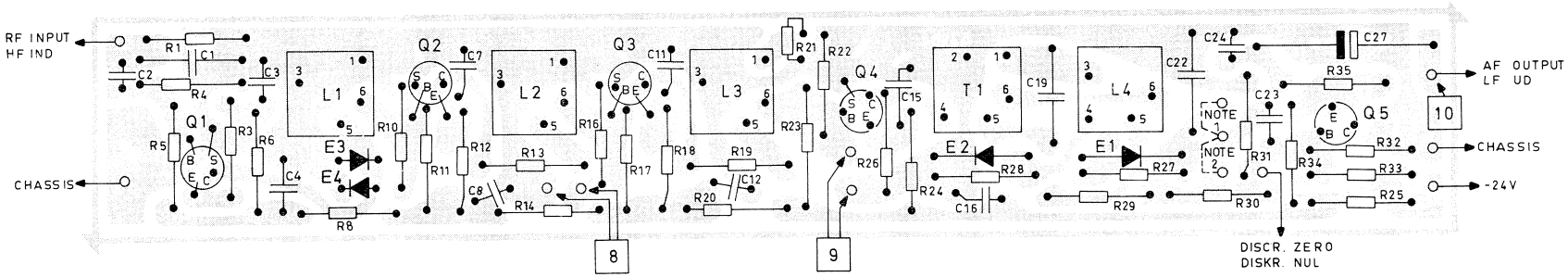




NOTE 1. CONNECTION FOR ±4kHz OR ±5kHz FREQ. DEVIATION
NOTE 2. CONNECTION FOR ±15kHz FREQ. DEVIATION

NOTE 1. FORBINDELSE VED ±4kHz ELLER ±5kHz FREKVENSSVING.
NOTE 2. FORBINDELSE VED ±15kHz FREKVENSSVING.

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



IF-AMPLIFIER
MF-FORSTÆRKER

IA601c

D401.042/3

TYPE	NO.	CODE	DATA	
	C1	76.5065	470 pF 5% polystyr TB	125V
	C2	76.5070	10 nF 10% polyest. FL	50V
	C3	76.5072	47 nF 10% polyest. FL	50V
	C4	76.5072	47 nF 10% polystyr FL	50V
	C5	76.5103	150 pF 2,5% polystyr TB	30V
	C6	76.5107	680 pF 2,5% polystyr TB	30V
	C7	76.5072	47 nF 10% polyest. FL	50V
	C8	76.5072	47 nF 10% polyest. FL	50V
	C9	76.5103	150 pF 2,5% polyest. TB	30V
	C10	76.5107	680 pF 2,5% polystyr. TB	30V
	C11	76.5072	47 nF 10% polyest. FL	50V
	C12	76.5072	47 nF 10% polyest. FL	50V
	C13	76.5103	150 pF 2,5% polystyr. TB	30V
	C14	76.5107	680 pF 2,5% polystyr. TB	30V
	C15	76.5072	47 nF 10% polyest. FL	50V
	C16	76.5072	47 nF 10% polyest. FL	50V
	C17	76.5101	68 pF 2,5% polystyr. TB	30V
	C18	76.5103	150 pF 2,5% polystyr TB	30V
	C19	76.5065	470 pF 5% polystyr TB	125V
	C20	74.5111	56 pF 2% ceram. NO75 TB	250V
	C21	74.5111	56 pF 2% ceram. NO75 TB	250V
	C22	76.5065	470 pF 5% polystyr. TB	125V
	C23	76.5070	10 nF 10% polyest. FL	50V
	C24	76.5070	10 nF 10% polyest. FL	50V
	C27	73.5064	2.2 μF -10+100% elco	63V
	R1	80.5250	1,2 kΩ 5% carbon film	1/8W
	R3	80.5233	47 Ω 5% carbon film	1/8W
	R4	80.5265	22 kΩ 5% carbon film	1/8W
	R5	80.5272	82 kΩ 5% carbon film	1/8W
	R6	80.5260	8,2 kΩ 5% carbon film	1/8W
	R8	80.5243	330 Ω 5% carbon film	1/8W
	R9	80.5064	18 kΩ 5% carbon film	1/10W
	R10	80.5265	22 kΩ 5% carbon film	1/8W
	R11	80.5272	82 kΩ 5% carbon film	1/8W
	R12	80.5260	8,2 kΩ 5% carbon film	1/8W
	R13	80.5247	680 Ω 5% carbon film	1/8W
	R14	80.5243	330 Ω 5% carbon film	1/8W
	R15	80.5064	18 kΩ 5% carbon film	1/10W
	R16	80.5265	22 kΩ 5% carbon film	1/8W
	R17	80.5272	82 kΩ 5% carbon film	1/8W
	R18	80.5264	18 kΩ 5% carbon film	1/8W
	R19	80.5247	680 Ω 5% carbon film	1/8W
	R20	80.5243	330 Ω 5% carbon film	1/8W
	R21	80.5247	680 Ω 5% carbon film	1/8W
	R22	80.5263	15 kΩ 5% carbon film	1/8W
	R23	80.5255	3,3 kΩ 5% carbon film	1/8W
	R24	80.5248	820 Ω 5% carbon film	1/8W

Storno

TYPE	NO.	CODE	DATA	
	R25	80.5237	100 Ω 5% carbon film	1/8W
	R26	80.5256	3,9 kΩ 5% carbon film	1/8W
	R27	80.5272	82 kΩ 5% carbon film	1/8W
	R28	80.5272	82 kΩ 5% carbon film	1/8W
	R29	80.5271	68 kΩ 5% carbon film	1/8W
	R20	80.5271	68 kΩ 5% carbon film	1/8W
	R31	80.5258	5,6 kΩ 5% carbon film	1/8W
	R32	80.5280	0,39 MΩ 5% carbon film	1/8W
	R33	80.5280	0,39 MΩ 5% carbon film	1/8W
	R34	80.5257	4,7 kΩ 5% carbon film	1/8W
	R35	80.5239	150 Ω 5% carbon film	1/8W
	R37	80.5064	18 kΩ 5% carbon film	1/10W
	L1	61.811-02	Coil/spole 455 kHz (C5-C6-R9)	
	L2	61.811-02	Coil/spole 455 kHz (C9-C10-R15)	
	L3	61.811-02	Coil/spole 455 kHz (C13-C14-R37)	
	L4	61.813-01	Coil/spole 455 kHz discr. (C20-C21)	
	T1	61.812-02	Trafo 455 kHz (C17-C18)	
	E1	99.5028	Diode 1N914	
	E2	99.5028	Diode 1N914	
	E3	99.5028	Diode 1N914	
	E4	99.5021	Diode 1N914	
	Q1	99.5166	Transistor BF167	
	Q2	99.5166	Transistor BF167	
	Q3	99.5166	Transistor BF167	
	Q4	99.5168	Transistor BF173	
	Q5	99.5143	Transistor BC108	

IF-AMPLIFIER
MF-FORSTÆRKER

IA601c

X400.797/5

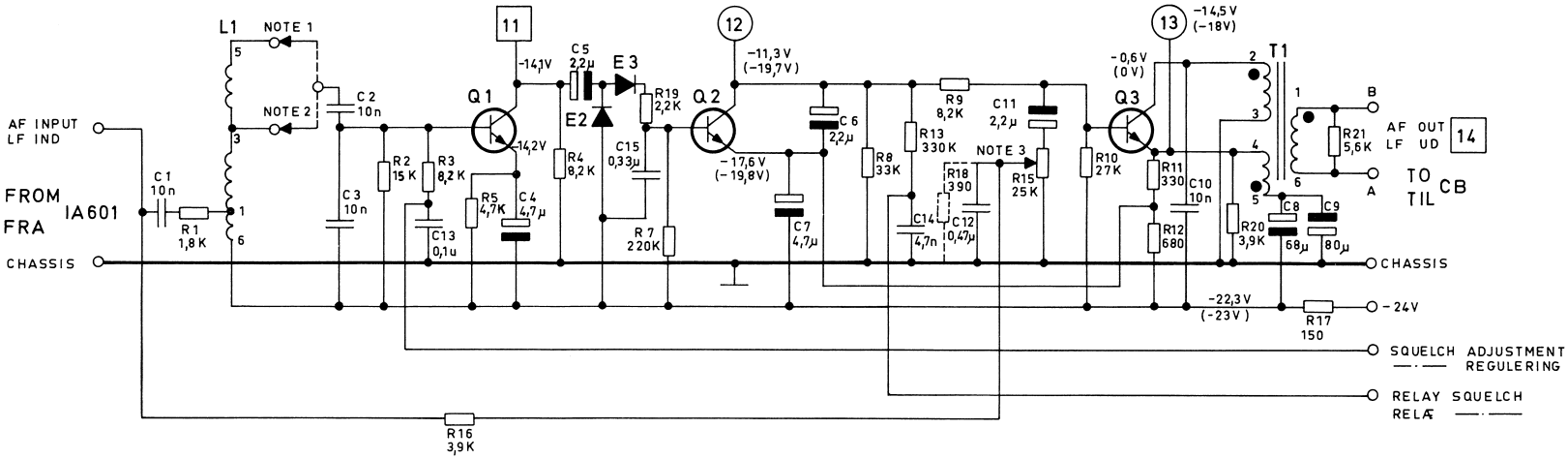
Storno

NOISE AMP
STØJFORST.

NOISE DETECTOR
STØJDETEKTOR

AF AMP
LF FORST

Storno

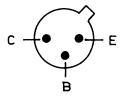


NOTE 1. CONNECTED IF 20 OR 25KHz CHANNEL SEPARATION IS USED.
NOTE 2. CONNECTED IF 50KHz CHANNEL SEPARATION IS USED.
NOTE 3. IF FM IS USED INSTEAD OF PM, C12 IS REPLACED BY R18(390Ω)

NOTE 1. STRAPPES VED 20/25KHz KANALAFSTAND.
NOTE 2. STRAPPES VED 50KHz KANALAFSTAND.
NOTE 3. VED FM UDBYTTES C12 MED R18(390Ω)

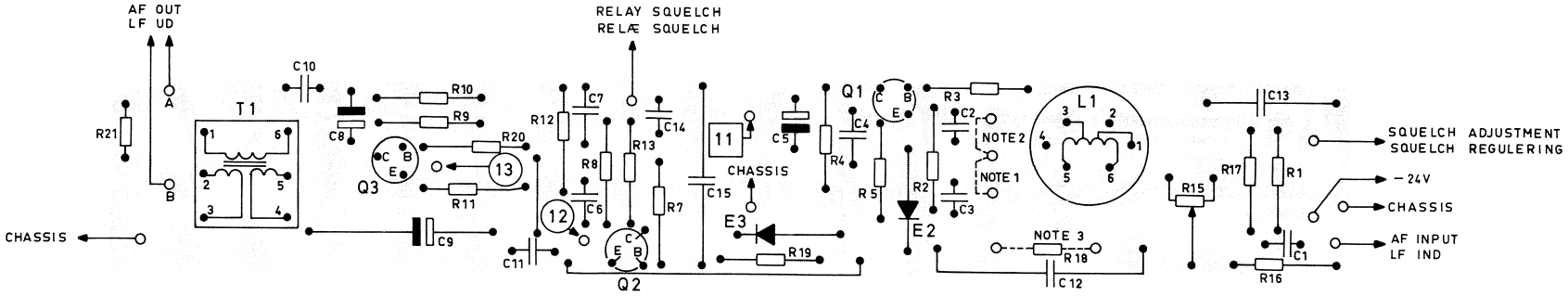
DC VOLTAGES WITHOUT PARENTHESES ARE MEASURED WITH SQUELCH OFF (AF-SIGNAL OUT).
DC VOLTAGES IN PARENTHESES ARE MEASURED WITH SQUELCH ON (NO AF-SIGNAL OUT).
SQUELCH REGULATOR ADJUSTED TO 10KΩ.

DC SPÆNDINGER UDEN PARENTES MÅLT VED SQUELCH OFF (LF-SIGNAL UD).
DC SPÆNDINGER I PARENTES MÅLT VED SQUELCH ON (INTET LF-SIGNAL UD).
SQUELCH REG. INDSTILLET TIL 10KΩ.



Q1, Q2 Q3
BOTTOM VIEW
SET FRA BUNDEN

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



AF-AMPLIFIER AND SQUELCH
LF-FORSTÆRKER OG SQUELCH

SQ601a

D400.661/5

Storno

TYPE	NO.	CODE	DATA	
	C1	76.5070	10nF 10% polyest. FL	50V
	C2	76.5070	10nF 10% polyest. FL	50V
	C3	76.5070	10nF 10% polyest. FL	50V
	C4	73.5103	4,7uF 20% tantal	15V
	C5	73.5102	2,2µF 20% tantal	35V
	C6	73.5102	2,2uF 20% tantal	35V
	C7	73.5103	4,7uF 20% tantal	15V
	C8	73.5106	68uF 20% tantal	15V
	C9	73.5110	80uF -10/+50% elco	25V
	C10	76.5070	10nF 10% polyest. FL	50V
	C11	73.5102	2,2uF 20% tantal	35V
	C12	76.5076	0,47uF 20% polyest. TB	100V
	C13	76.5073	0,1uF 10% polyest. TB	100V
	C14	76.5061	4,7nF 10% polyest. FL	50V
	C15	76.5075	0,33uF 10% polyest. TB	100V
	R1	80.5252	1,8k 5% carbon film	1/8W
	R2	80.5263	15k 5% carbon film	1/8W
	R3	80.5260	8,2k 5% carbon film	1/8W
	R4	80.5260	8,2k 5% carbon film	1/8W
	R5	80.5257	4,7k 5% carbon film	1/8W
	R7	80.5277	220k 5% carbon film	1/8W
	R8	80.5267	33k 5% carbon film	1/8W
	R9	80.5260	8,2k 5% carbon film	1/8W
	R10	80.5266	27k 5% carbon film	1/8W
	R11	80.5243	330Ω 5% carbon film	1/8W
	R12	80.5247	680Ω 5% carbon film	1/8W
	R13	80.5279	330k 5% carbon film	1/8W
	R15	86.5044	25k 20% potm. lin.	0,1W
	R16	80.5256	3,9k 5% carbon film	1/8W
	R17	80.5239	150Ω 5% carbon film	1/8W
	R19	80.5253	2,2k 5% carbon film	1/8W
	R20	80.5256	3,9k 5% carbon film	1/8W
	R21	80.5258	5,6k 5% carbon film	1/8W
	L1	61.816-01	coil/spole	
	T1	60.5134	Trafo 2400Ω/600Ω	
	E2	99.5028	Diode 1N914	
	E3	99.5028	Diode 1N914	
	Q1	99.5143	Transistor BC108	
	Q2	99.5121	Transistor BC107	
	Q3	99.5121	Transistor BC107	

TYPE	NO.	CODE	DATA

AF-AMPLIFIER AND SQUELCH
LF-FORSTÆRKER OG SQUELCH

SQ601a

X400.682/4

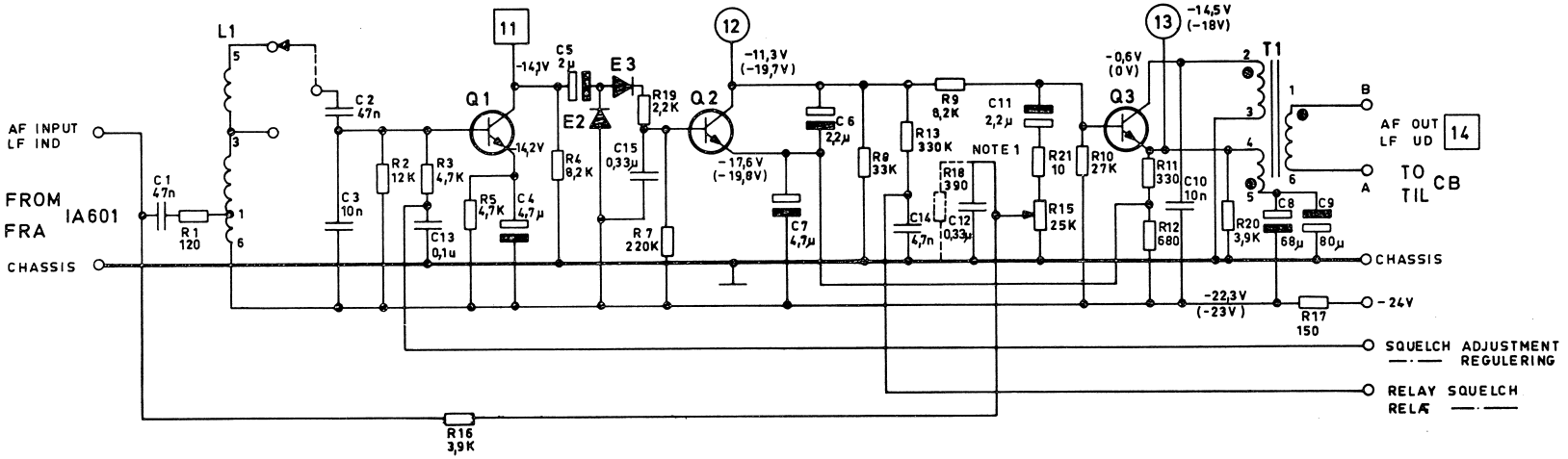
Storno

NOISE AMP
STØJFORST.

NOISE DETECTOR
STØJDETEKTOR

AF AMP
LF FORST

Storno

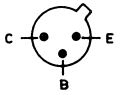


NOTE 1. IF FM IS USED INSTEAD OF PM, C12 IS REPLACED BY R18(390Ω)

NOTE 1. VED FM UDBYTTES C12 MED R18(390Ω)

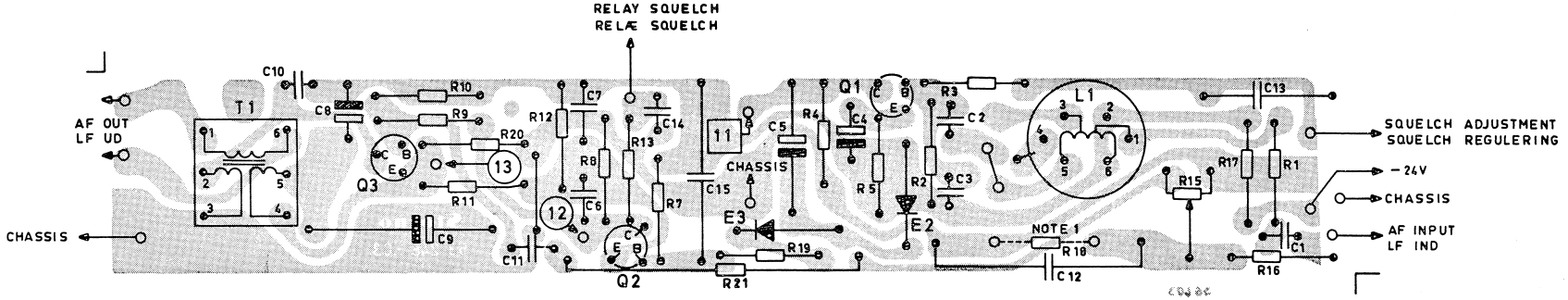
DC VOLTAGES WITHOUT PARENTHESES ARE MEASURED WITH SQUELCH OFF (AF-SIGNAL OUT).
DC VOLTAGES IN PARENTHESES ARE MEASURED WITH SQUELCH ON (NO AF-SIGNAL OUT).
SQUELCH REGULATOR ADJUSTED TO 10KΩ.

DE SPÆNDINGER UDEN PARENTES MÅLT VED SQUELCH OFF (LF-SIGNAL UD).
DE SPÆNDINGER I PARENTES MÅLT VED SQUELCH ON (INTET LF-SIGNAL UD).
SQUELCH REG. INDSTILLET TIL 10KΩ.



Q1, Q2 Q3
BOTTOM VIEW
SET FRA BUNDEN

PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



AF-AMPLIFIER AND SQUELCH
LF-FORSTÆRKER OG SQUELCH

SQ 602

D400.844

TYPE	NO.	CODE	DATA	
	C1	76.5072	47 nF 10% polyest.	50V
	C2	76.5072	47 nF 10% polyest.	50V
	C3	76.5070	10 nF 10% polyest. FL	50V
	C4	73.5103	4,7 µF 20% tantal	15V
	C5	73.5102	2,2 µF 20% tantal	35V
	C6	73.5102	2,2 µF 20% tantal	35V
	C7	73.5103	4,7 µF 20% tantal	15V
	C8	73.5106	68 µF 20% tantal	15V
	C9	73.5110	80 µF -10 +50% elco	25V
	C10	76.5070	10 nF 10% polyest. FL	50V
	C11	73.5102	2.2 µF 20% tantal	35V
	C12	76.5075	0.33 µF 10% polyest. TB	100V
	C13	76.5073	0,1 µF 10% polyest. TB	100V
	C14	76.5061	4,7 nF 10% polyest. FL	50V
	C15	76.5075	0,33 µF 10% polyest. TB	100V
	R1	80.5238	120 Ω 5% carbon film	1/8W
	R2	80.5262	12 kΩ 5% carbon film	1/8W
	R3	80.5257	4,7 kΩ 5% carbon film	1/8W
	R4	80.5260	8,2 kΩ 5% carbon film	1/8W
	R5	80.5257	4,7 kΩ 5% carbon film	1/8W
	R7	80.5277	0,22 MΩ 5% carbon film	1/8W
	R8	80.5267	33 kΩ 5% carbon film	1/8W
	R9	80.5260	8,2 kΩ 5% carbon film	1/8W
	R10	80.5266	27 kΩ 5% carbon film	1/8W
	R11	80.5243	330 Ω 5% carbon film	1/8W
	R12	80.5247	680 Ω 5% carbon film	1/8W
	R13	80.5279	0,33 MΩ 5% carbon film	1/8W
	R15	86.5044	25 kΩ 20% potm. Lin.	0,1W
	R16	80.5256	3,9 kΩ 5% carbon film	1/8W
	R17	80.5239	150 Ω 5% carbon film	1/8W
	R19	80.5253	2.2 kΩ 5% carbon film	1/8W
	R20	80.5256	3,9 kΩ 5% carbon film	1/8W
	R21	80.5225	10 Ω 5% carbon film	1/8W
	L1	61.816	Coil/spole	
	T1	60.5134	Transformer 2400 Ω/600 Ω	
	E2	99.5028	Diode 1N914	
	E3	99.5028	Diode 1N914	
	Q1	99.5143	Transistor BC108	
	Q2	99.5121	Transistor BC107	
	Q3	99.5121	Transistor BC107	

Storno

TYPE	NO.	CODE	DATA

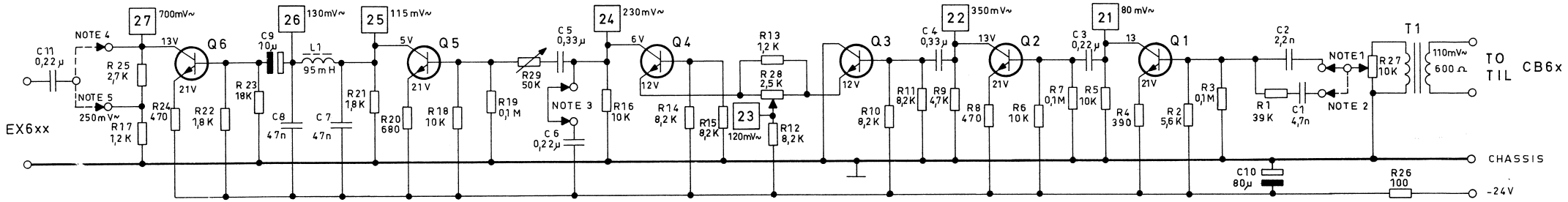
AF-AMPLIFIER AND SQUELCH
LF-FORSTÆRKER OG SQUELCH

SQ602

X400.845/2

Storno

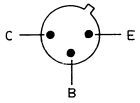
3. AMPLIFIER	2. AMPLIFIER	INTEGRAT. CIRCUIT	LIMITER	1. AMPLIFIER	DIFFERENTIATOR
3. FORSTÆRKER	2. FORSTÆRKER	INTEGRAT. LED	BEGRÆNSER	1. FORSTÆRKER	DIFFERENTIATIONSLED



AC VALUES MEASURED AT 1000Hz
AC VÆRDIER MÅLT VED 1000Hz

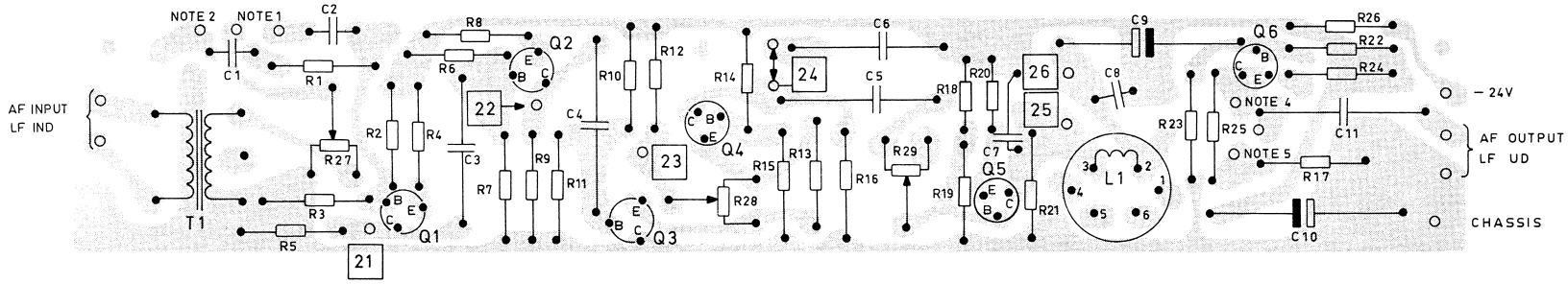
NOTE 1. DIFFERENTATION CIRCUIT FOR PURE PHASE MODULATION
NOTE 2. DIFFERENTATION CIRCUIT FOR MIXED PHASE AND FREQUENCY MODULATION.
NOTE 3. THE SHORTING LINK IS REMOVED AT MEASUREMENTS WHERE INTEGRATION IS UNWANTED.
NOTE 4. CONNECTION FOR 50kHz AND 25kHz IN 4 METER AND 50kHz CHANNEL SEPARATION IN 2 METER EQUIPMENT.
NOTE 5 CONNECTION FOR 25kHz AND 20kHz CHANNEL SEPARATION IN 2 METER EQUIPMENT.

NOTE 1. DIFFERENTIATIONSLED FOR REN FASEMODULATION
NOTE 2. DIFFERENTIATIONSLED FOR BLANDET FASE-OG FREKVENS-MODULATION.
NOTE 3. VED MÅLINGER HVOR INTEGRATION ER UØNSKET FJERNES STRAPNINGEN.
NOTE 4. TILSLUTNING FOR 50kHz OG 25kHz I 4 METER OG 50kHz KANALAFSTAND I 2 METER ANLÆG.
NOTE 5 TILSLUTNING FOR 25kHz OG 20kHz KANALAFSTAND I 2 METER ANLÆG.



BOTTOM VIEW
SET FRA BUNDEN

PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



AF-AMPLIFIER
LF-FORSTÆRKER

AA601

D 400.671/3

TYPE	NO.	CODE	DATA	
		10.1189-01	AF Amplifier	
	C1	76.5061	4,7nF 10% polyest. FL	50V
	C2	76.5059	2,2nF 10% polyest. FL	50V
	C3	76.5074	0,22uF 10% polyest. TB	100V
	C4	76.5073	0,1 uF 10% polyest	100V
	C5	73.5104	4.7 uF 10% elco	100V
	C6	76.5094	0.47 uF 20% polyest	100V
	C7	76.5072	47nF 10% polyest. FL	50V
	C8	76.5072	47nF 10% polyest. FL	50V
	C9	73.5001	10uF -10 +50% elco	25V
	C10	73.5110	80uF -10 +50% elco	25V
	C11	73.5104	4.7 uF 10% elco	100V
	R1	80.5268	39kΩ 5% carbon film	1/8W
	R2	80.5258	5,6kΩ 5% carbon film	1/8W
	R3	80.5273	100kΩ 5% carbon film	1/8W
	R4	80.5244	390Ω 5% carbon film	1/8W
	R5	80.5261	10kΩ 5% carbon film	1/8W
	R6	80.5261	10kΩ 5% carbon film	1/8W
	R7	80.5273	100kΩ 5% carbon film	1/8W
	R8	80.5245	470Ω 5% carbon film	1/8W
	R9	80.5257	4,7kΩ 5% carbon film	1/8W
	R10	80.5260	8,2kΩ 5% carbon film	1/8W
	R11	80.5260	8,2kΩ 5% carbon film	1/8W
	R12	80.5260	8,2kΩ 5% carbon film	1/8W
	R13	80.5250	1,2kΩ 5% carbon film	1/8W
	R14	80.5260	8,2kΩ 5% carbon film	1/8W
	R15	80.5260	8,2kΩ 5% carbon film	1/8W
	R16	80.5261	10kΩ 5% carbon film	1/8W
	R17	80.5250	1,2kΩ 5% carbon film	1/8W
	R18	80.5261	10kΩ 5% carbon film	1/8W
	R19	80.5273	100kΩ 5% carbon film	1/8W
	R20	80.5244	390 ohm 5% carbon film	1/8W
	R21	80.5252	1,8kΩ 5% carbon film	1/8W
	R22	80.5252	1.8kΩ 5% carbon film	1/8W
	R23	80.5264	18 kΩ 5% carbon film	1/8W
	R24	80.5245	470Ω 5% carbon film	1/8W
	R25	80.5254	2,7kΩ 5% carbon film	1/8W
	R26	80.5237	100Ω 5% carbon film	1/8W
	R27	86.5039	10kΩ 20% trim lin	0,1W
	R28	86.5043	2,5kΩ 20% trim lin	0,1W
	R29	86.5040	50 kΩ 20% trim lin	0,1W
	L1	61.824	Filter coil/Filterspole	95 mH
	T1	60.5130	Transformator LF600/1000Ω	
	Q1	99.5143	Transistor BC108	
	Q2	99.5143	Transistor BC108	
	Q3	99.5143	Transistor BC108	

Storno

TYPE	NO.	CODE	DATA
	Q4	99.5143	Transistor BC108
	Q5	99.5143	Transistor BC108
	Q6	99.5143	Transistor BC108

AF-AMPLIFIER
LF-FORSTÆRKER

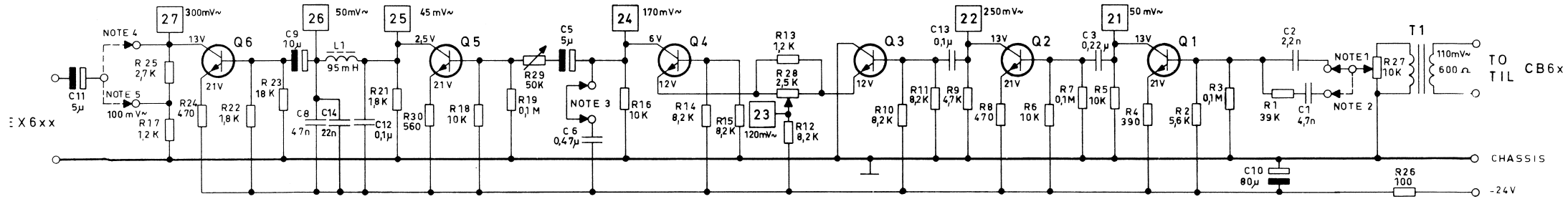
AA601a

X400.683/4

Storno

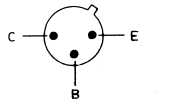
Storno

3. AMPLIFIER	2. AMPLIFIER	INTEGRAT. CIRCUIT	LIMITER	1. AMPLIFIER	DIFFERENTIATOR
3. FORSTÆRKER	2. FORSTÆRKER	INTEGRAT. LED	BEGRÆNSER	1. FORSTÆRKER	DIFFERENTIATIONSLED



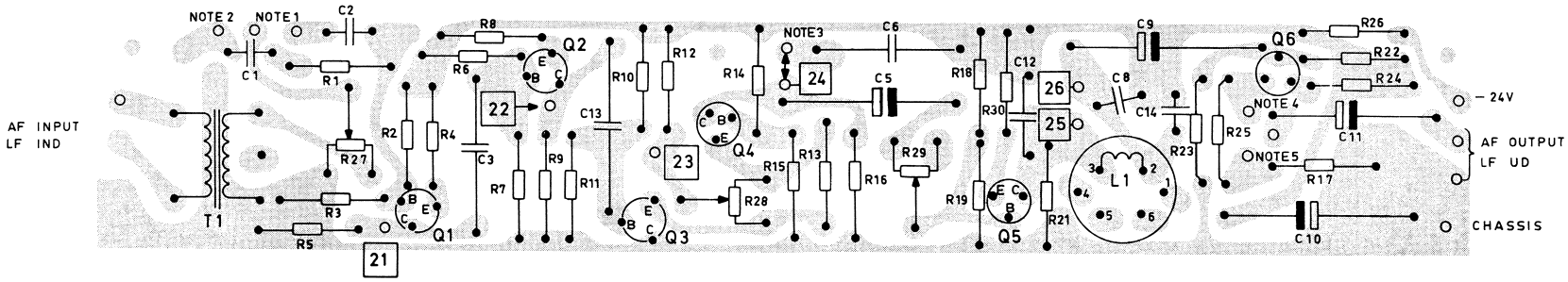
NOTE 1. DIFFERENTATION CIRCUIT FOR PURE PHASE MODULATION
NOTE 2. DIFFERENTATION CIRCUIT FOR MIXED PHASE AND FREQUENCY MODULATION.
NOTE 3. THE SHORTING LINK IS REMOVED AT MEASUREMENTS WHERE INTEGRATION IS UNWANTED.
NOTE 4. CONNECTION FOR 12,5kHz CHANNEL SEPARATION IN 4 METER EQUIPMENT.
NOTE 5 CONNECTION FOR 12,5kHz CHANNEL SEPARATION IN 2 METER EQUIPMENT.

NOTE 1. DIFFERENTIATIONSLED FOR REN FASEMODULATION
NOTE 2. DIFFERENTIATIONSLED FOR BLANDET FASE-OG FREKVENS-MODULATION.
NOTE 3. VED MÅLINGER HVOR INTEGRATION ER UØNSKET FJERNES STRAPNINGEN.
NOTE 4. TILSLUTNING FOR 12,5kHz KANALAFSTAND I 4 METER ANLÆG.
NOTE 5 TILSLUTNING FOR 12,5kHz KANALAFSTAND I 2 METER ANLÆG



BOTTOM VIEW
SET FRA BUNDEN

PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



AF-AMPLIFIER
LF-FORSTÆRKER

AA608

D400.838/2

TYPE	NO.	CODE	DATA	
	C1	76.5061	4.7 nF 10% polyest. FL	50V
	C2	76.5059	2.2 nF 10% " FL	50V
	C3	76.5074	0.22 µF 10% " TB	100V
	C5	73.5104	5 µF 10/+100% elco	100V
	C6	76.5094	0.47 µF 20% polyest. FL	
	C8	76.5072	47 nF 10% polyest. FL	50V
	C9	73.5001	10 µF -10/+50% elco	25V
	C10	73.5110	80 µF -10/+50% elco	25V
	C11	73.5104	5 µF 10/+100% elco	100V
	C12	76.5073	0.1 µF 10% polyest. FL	50V
	C13	76.5073	0.1 µF 10% polyest. FL	50V
	C14	76.5071	22 nF 10% polyest. FL	50V
	R1	80.5268	39 kΩ 5% carbon film	1/8W
	R2	80.5258	5.6 kΩ 5% " "	1/8W
	R3	80.5273	0.1 MΩ 5% " "	1/8W
	R4	80.5244	390 Ω 5% " "	1/8W
	R5	80.5261	10 kΩ 5% " "	1/8W
	R6	80.5261	10 kΩ 5% " "	1/8W
	R7	80.5273	0.1 MΩ 5% " "	1/8W
	R8	80.5245	470 Ω 5% " "	1/8W
	R9	80.5257	4.7 kΩ 5% " "	1/8W
	R10	80.5260	8.2 kΩ 5% " "	1/8W
	R11	80.5260	8.2 kΩ 5% " "	1/8W
	R12	80.5260	8.2 kΩ 5% " "	1/8W
	R13	80.5250	1.2 kΩ 5% " "	1/8W
	R14	80.5260	8.2 kΩ 5% " "	1/8W
	R15	80.5260	8.2 kΩ 5% " "	1/8W
	R16	80.5261	10 kΩ 5% " "	1/8W
	R17	80.5250	1.2 kΩ 5% " "	1/8W
	R18	80.5261	10 kΩ 5% " "	1/8W
	R19	80.5273	0.1 MΩ 5% " "	1/8W
	R21	80.5252	1.8 kΩ 5% " "	1/8W
	R22	80.5252	1.8 kΩ 5% " "	1/8W
	R23	80.5264	18 kΩ 5% " "	1/8W
	R24	80.5245	470 Ω 5% " "	1/8W
	R25	80.5254	2.7 kΩ 5% " "	1/8W
	R26	80.5237	100 Ω 5% " "	1/8W
	R27	86.5039	10 kΩ 20% potentiometer lin.	0.1W
	R28	86.5043	2.5 kΩ 20% " "	0.1W
	R29	86.5040	50 kΩ 20% " "	0.1W
	R30	80.5246	560 Ω 5% carbon film	1/8W
	L1	61.824-01	Filter coil/Filterspole	95 mH
	T1	60.5130	Transformer 600/1000 Ω	
	Q1	99.5143	BC108 Transistor	

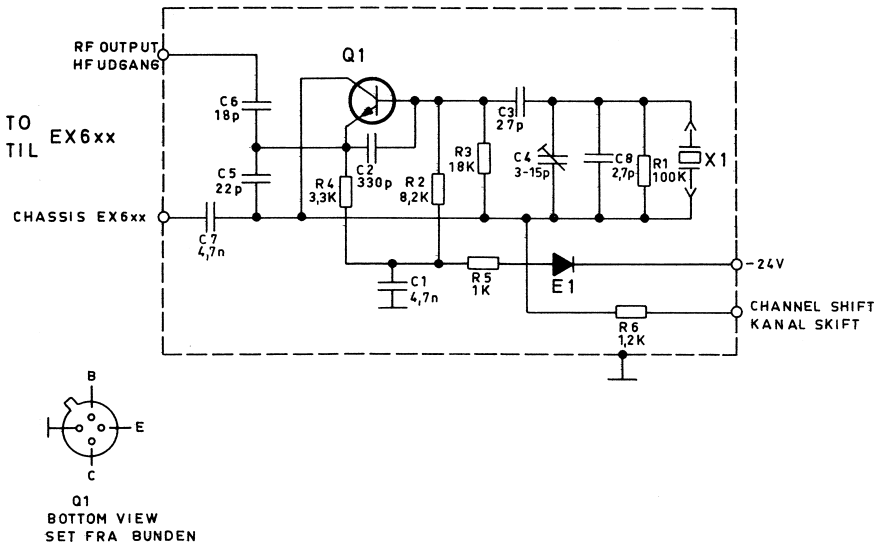
TYPE	NO.	CODE	DATA
	Q2	99.5143	BC108 Transistor
	Q3	99.5143	BC108 Transistor
	Q4	99.5143	BC108 Transistor
	Q5	99.5143	BC108 Transistor
	Q6	99.5143	BC108 Transistor

AF-AMPLIFIER
LF-FORSTÆRKER

AA608

X400.850/2

Storno



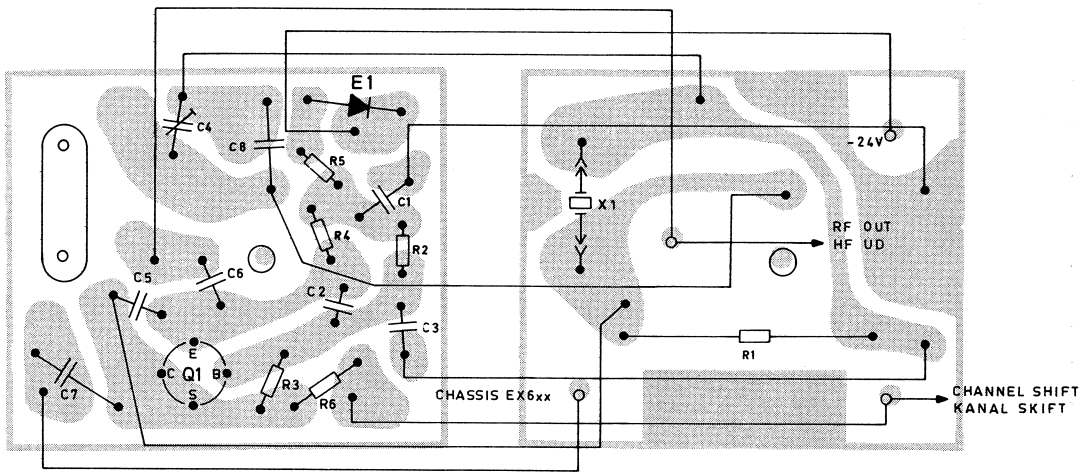
Q1
BOTTOM VIEW
SET FRA BUNDEN

UPPER PRINTED WIRING BOARD VIEWED
FROM COMPONENT SIDE

ØVERSTE TRYKTE KREDSLØB SET
FRA KOMPONENTSIDEN

LOWEST PRINTED WIRING BOARD VIEWED
FROM COMPONENT SIDE

NEDERSTE TRYKTE KREDSLØB SET
FRA KOMPONENTSIDEN



CRYSTALOSCILLATOR FOR TX.

XO631a

D400.666/3

TYPE	NO.	CODE	DATA	
	C1	76.5061	4, 7nF ± 10% polyester FL	50V
	C2	76.5105	330pF 2, 5% polystyren	30V
	C3	74.5107	27pF ± 0, 5pF ceram NO75TB	250V
	C4	78.5032	3-15pF trimmer ceram NPOTB	500V
	C5	74.5106	22 pF ± 0, 5pF ceram NO75TB	250V
	C6	74.5142	18 pF ± 0, 5pF " NO75TB	250V
	C7	76.5061	4, 7nF ± 10% polyester	50V
	C8	74.5128	2, 7pF ± 0, 25pF ceram N150DI	250V
	R1	80.5273	100 kΩ 5% carbon film	1/8W
	R2	80.5260	8, 2 kΩ 5% " "	1/8W
	R3	80.5264	18 kΩ 5% " "	1/8W
	R4	80.5255	3, 3kΩ 5% " "	1/8W
	R5	80.5249	1 kΩ 5% " "	1/8W
	R6	80.5250	1, 2 kΩ 5% " "	1/8W
	E1	99.5028	Diode OA200	
	Q1	99.5118	Transistor BF115	
	X1	98.	Crystal	

Storno

TYPE	NO.	CODE	DATA

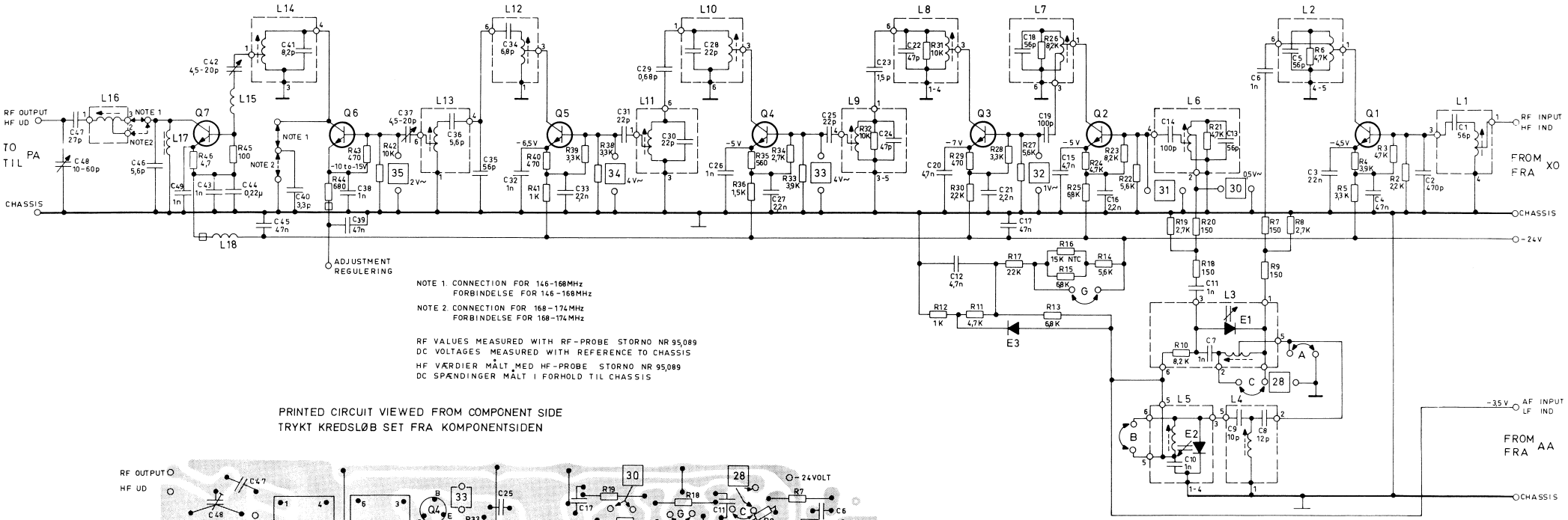
CRYSTALOSCILLATOR FOR TX.

XO631

X400.680/2

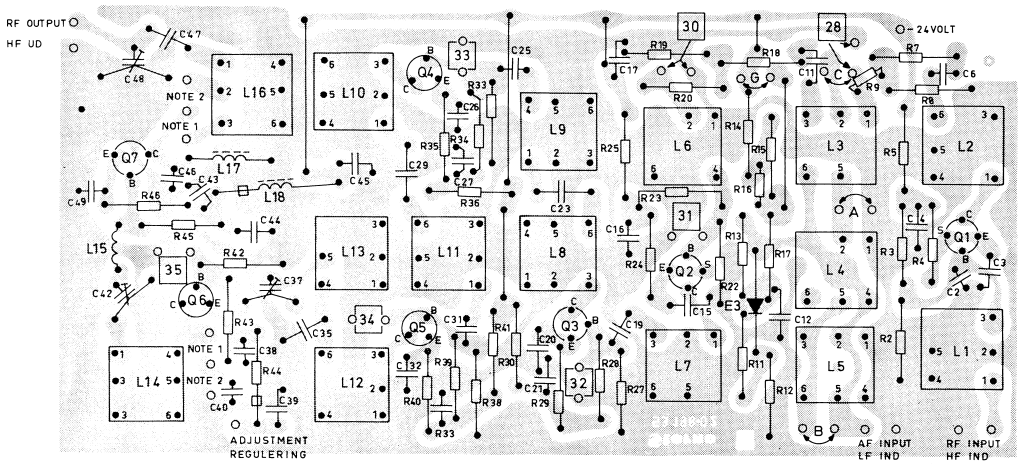
Storno **Storno**

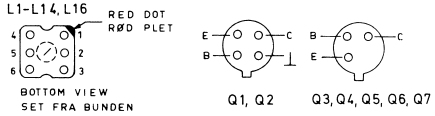
2. PA 1. PA 2. DOUBLER / 2. DOBLER TRIPLER 1. DOUBLER / 1. DOBLER 2. BUFFER 1. BUFFER



MODULATOR

PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN





EXCITER STYRESENDER EX611

D400.670/4

TYPE	NO.	CODE	DATA	
	C1	74.5111	56pF 2% ceram TB	250V
	C2	74.5161	470pF -20/+50% ceram PL	63V
	C3	76.5071	22nF 10% polyest. FL	50V
	C4	74.5163	2,2nF -20/+50% ceram PL	63V
	C5	74.5111	56pF 2% ceram TB	250V
	C6	74.5155	1 nF -20/+50% ceram PL	63V
	C7	74.5155	1 nF -20/+50% " PL	63V
	C8	74.5136	12pF 5% ceram DI	125V
	C9	74.5135	10pF 5% " DI	125V
	C10	74.5155	1 nF -20/+50% ceram PL	63V
	C11	74.5155	1 nF -20/+50% " PL	63V
	C12	74.5164	4,7nF -20/+50% " PL	63V
	C13	74.5111	56 pF 2% ceram TB	250V
	C14	74.5013	100pF 20% " DI	500V
	C15	74.5164	4.7nF -20/+50% ceram PL	63V
	C16	74.5163	2,2nF -20/+50% " PL	63V
	C17	76.5072	47nF 10% polyest. FL	50V
	C18	74.5111	56pF 2% ceram TB	250V
	C19	74.5013	100pF 20% ceram DI	500V
	C20	74.5164	4.7nF -20/+50% ceram PL	63V
	C21	74.5163	2.2nF -20/+50% " PL	63V
	C22	74.5118	47pF 2% ceram TB	250V
	C23	74.5125	1.5pF ±0.25pF ceram BO	250V
	C24	74.5118	47 pF 2% ceram TB	250V
	C25	74.5106	22 pF ±0,5pF ceram TB	250V
	C26	74.5155	1 nF -20/+50% " PL	63V
	C27	74.5163	2,2 nF -20/+50% " PL	63V
	C28	74.5106	22 pF ±0,5pF " TB	250V
	C29	74.5121	0,68pF ±0,1pF " BD	250V
	C30	74.5106	22pF ±0.5pF " TB	250V
	C31	74.5106	22pF ±0.5pF " TB	250V
	C32	74.5155	1 nF -20/+50% " PL	63V
	C33	74.5163	2.2nF -20/+50% " PL	63V
	C34	74.5133	6.8pF ±0.25pF " DI	250V
	C35	74.5111	56pF 2% ceram TB	250V
	C36	74.5132	5.6pF ±0,25pF ceram DI	250V
	C37	78.5026	4.5-20pF Trimmer ceram	100V
	C38	74.5155	1 nF -20/+50% ceram PL	63V
	C39	76.5072	47nF 10% polyest. FL	50V
	C40	74.5129	3.3pF ±0,25pF ceram DI	250V
	C41	74.5134	8,2pF ±0,25pF " DI	250V
	C42	78.5026	4.5-20pF Trimmer ceram	100V
	C43	74.5155	1 nF -20/+50% ceram PL	63V
	C44	76.5074	0.22 µF 10% polyest. TB	100V
	C45	76.5072	47nF 10% " FL	50V
	C46	74 5132	5.6pF ±0.25pF ceram DI	250V
	C47	74.5107	27pF 2% ceram TB	250V
	C48	78.5030	10-60pF Trimmer ceram	250V

Storno

TYPE	NO.	CODE	DATA	
	C49	76.5072	47nF 10% polyest. FL	50V
	C50	74.5155	1 nF -20/+50 ceram PL	63V
	R2	80.5253	2.2 kΩ 5% carbon film	1/8W
	R3	80.5257	4.7 kΩ 5% " "	1/8W
	R4	80.5256	3.9 kΩ 5% " "	1/8W
	R5	80.5255	3.3 kΩ 5% " "	1/8W
	R6	80.5057	4.7 kΩ 5% " "	1/8W
	R7	80.5239	150 Ω 5% " "	1/8W
	R8	80.5254	2,7 kΩ 5% " "	1/8W
	R9	80.5239	150 Ω 5% " "	1/8W
	R10	80.5060	8.2 kΩ 5% " "	1/10W
	R11	80.5257	4.7 kΩ 5% " "	1/8W
	R12	80.5249	1 kΩ 5% " "	1/8W
	R13	80.5259	6.8 kΩ 5% " "	1/8W
	R14	80.5258	5.6 kΩ 5% " "	1/8W
	R15	80.5259	6.8 kΩ 5% " "	1/8W
	R16	89.5010	15 kΩ 10% NTC	0.6W
	R17	80.5265	22 kΩ 5% carbon film	1/8W
	R18	80.5239	150 Ω 5% " "	1/8W
	R19	80.5254	2.7 kΩ 5% " "	1/8W
	R20	80.5239	150 Ω 5% " "	1/8W
	R21	80.5057	4.7 kΩ 5% " "	1/10W
	R22	80.5257	4.7 kΩ 5% " "	1/8W
	R23	80.5260	8.2 kΩ 5% " "	1/8W
	R24	80.5257	4.7 kΩ 5% " "	1/8W
	R25	80.5259	6.8 kΩ 5% " "	1/8W
	R26	80.5060	8.2 kΩ 5% " "	1/10W
	R27	80.5259	6.8 kΩ 5% " "	1/8W
	R28	80.5255	3.3 kΩ 5% " "	1/8W
	R29	80.5245	470 Ω 5% " "	1/8W
	R30	80.5253	2.2 kΩ 5% " "	1/8W
	R31	80.5061	10 kΩ 5% " "	1/10W
	R32	80.5061	10 kΩ 5% " "	1/10W
	R33	80.5256	3.9 kΩ 5% " "	1/8W
	R34	80.5254	2.7 kΩ 5% " "	1/8W
	R35	80.5246	560 Ω 5% " "	1/8W
	R36	80.5251	1.5 kΩ 5% " "	1/8W
	R38	80.5255	3.3 kΩ 5% " "	1/8W
	R39	80.5255	3.3 kΩ 5% " "	1/8W
	R40	80.5245	470 Ω 5% " "	1/8W
	R41	80.5249	1 kΩ 5% " "	1/8W
	R42	80.5261	10 kΩ 5% " "	1/8W

EXCITER
STYRESENDER

EX611

X400.690/4

TYPE	NO.	CODE	DATA
	R43	80.5245	470 Ω 5% carbon film 1/8W
	R44	80.5247	680 Ω 5% " " 1/8W
	R45	80.5237	100 Ω 5% " " 1/8W
	R46	80.5221	4.7 Ω 10% " " 1/8W
	L1	61.825	Coil/spole 12, 16-14, 5 MHz (C1,)
	L2	61.826	Coil/spole 12, 16-14, 5 MHz (C5, R6)
	L3	61.827	Coil/spole 12, 16-14, 5 MHz (C7, R10, E1)
	L4	61.828	Coil/spole 12, 16-14, 5 MHz (C8, C9)
	L5	61.829	Coil/spole 12, 16-14, 5 MHz (C10, E2)
	L6	61.846	Coil/spole 12, 16-14, 5 MHz (C13, C14, R21)
	L7	61.847	Coil/spole 12, 16-14, 5 MHz (C18, R26)
	L8	61.848	Coil/spole 24, 33-29 MHz (C22, R31)
	L9	61.849	Coil/spole 24, 33-29 MHz (C24, R32)
	L10	61.850	Coil/spole 73-87 MHz (C28)
	L11	61.851	Coil/spole 73.87 MHz (C30)
	L12	61.852	Coil/spole 146-174 MHz (C34)
	L13	61.853	Coil/spole 146-174 MHz (C36)
	L14	61.854	Coil/spole 146-174 MHz (C41)
	L15	62.715	Coil/spole 146-174 MHz
	L16	61.856	Coil/spole 146-174 MHz
	L17	61.5007	Filter coil/Filterspole 15μH 20% 200mA
	L18	63.5008	Filter coil/Filterspole 0,47μH 20% 2.2A
	E1	99.5140	Capacitance diode BA101C
	E2	99.5140	Capacitance diode BA101C
	E3	99.5136	Diode AA119
	Q1	99 5118	Transistor BF115
	Q2	99.5118	Transistor BF115
	Q3	99.5139	Transistor BSX19
	Q4	99.5139	Transistor BSX19
	Q5	99.5139	Transistor BSX19
	Q6	99.5139	Transistor BSX19
	Q7	99.5138	Transistor 2N3866

Storno

TYPE	NO.	CODE	DATA

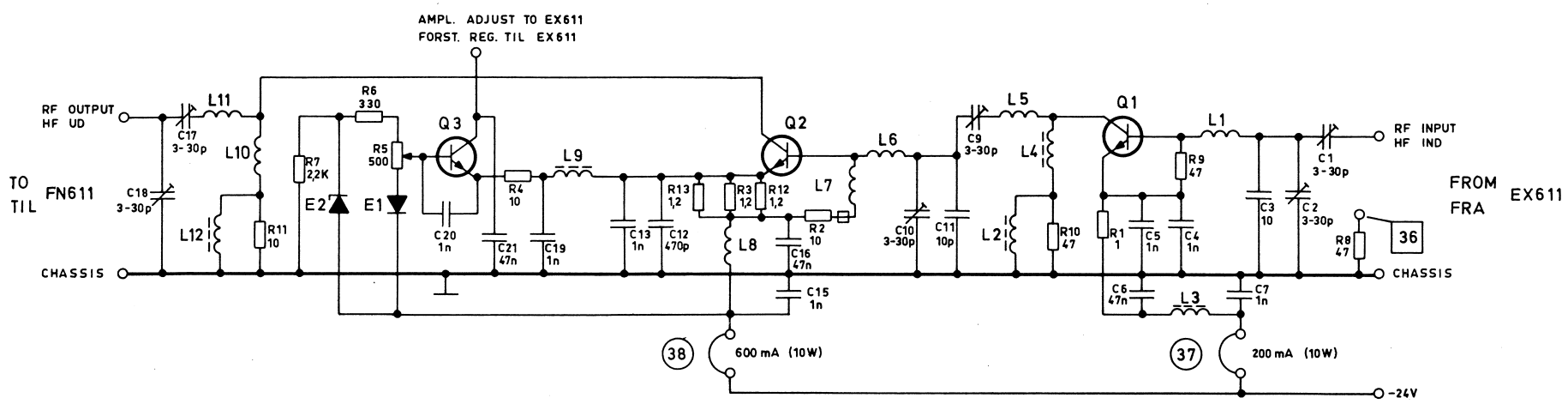
EXCITER
STYRESENDER

EX611

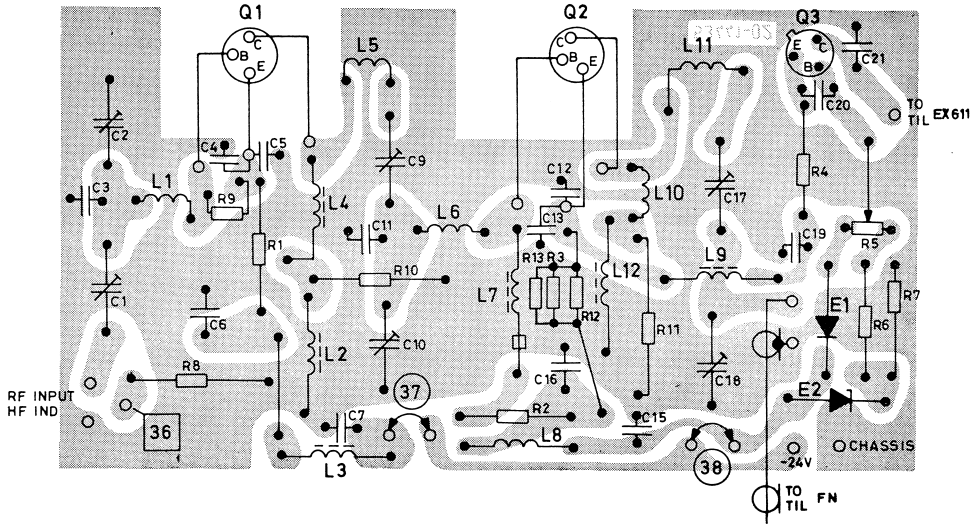
X400.690/4

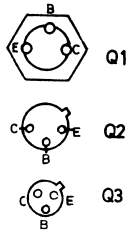
Storno

ADC PA DRIVER



PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE.
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN.





BOTTOM VIEW
SET FRA BUNDEN

NOTE 1: THE SHORT CIRCUITS ARE REPLACED BY mA-INSTRUMENTS DURING ADJUSTMENT.

NOTE 1: KORTSLUTNINGERNE ERSTATTES AF mA-METRE UNDER JUSTERING

RF POWER AMPLIFIER
HF-EFFEKTFORSTÆRKER

PA611a

D400.669/5

TYPE	NO.	CODE	DATA	
	C1	78.5029	3-30 pF trimmer	300V
	C2	78.5029	3-30 pF "	300V
	C3	74.5135	10 pF 5% ceram N150	125V
	C4	74.5155	1 nF -20 +50% ceram PL	63V
	C5	74.5155	1 nF -20 +50% " PL	63V
	C6	76.5072	47 nF 10% polyest. FL	500V
	C7	74.5155	1 nF -20 +50% ceram PL	63V
	C9	78.5029	3-30 pF trimmer	300V
	C10	78.5029	3-30 pF "	300V
	C11	74.5135	10 pF 5% ceram N150	125V
	C12	74.5161	470 pF -20 +50% ceram PL	63V
	C13	74.5155	1 nF -20 +50% ceram PL	63V
	C15	74.5155	1 nF -20 +50% " PL	63V
	C16	76.5072	47 nF 10% polyest. FL	500V
	C17	78.5029	3-30 pF trimmer	300V
	C18	78.5029	3-30 pF "	300V
	C19	74.5155	1 nF -20 +50% ceram PL	63V
	C20	74.5155	1 nF -20 +50% " PL	63V
	C21	76.5072	47 nF 10% polyest. FL	500V
	R1	80.5213	1 Ω 10% carbon film	1/8W
	R2	80.5225	10 Ω 5% " "	1/8W
	R3	80.5214	1.2 Ω 10% " "	1/8W
	R4	80.5225	10 Ω 5% " "	1/8W
	R5	86.5042	500 Ω 20% potentiometer	0.1W
	R6	80.5243	330 Ω 5% carbon film	1/8W
	R7	80.5253	2.2 kΩ 5% " "	1/8W
	R8	80.5433	47 Ω 5% " "	1/4W
	R9	80.5233	47 Ω 5% " "	1/8W
	R10	80.5233	47 Ω 5% " "	1/8W
	R11	81.5025	10 Ω 5% " "	1/2W
	R12	80.5214	1.2 Ω 10% " "	1/8W
	R13	80.5214	1.2 Ω 10% " "	1/8W
	L1	62.718	RF-coil/HF spole 146-174 MHz	
	L2	63.5007	15 μH 10% choke/drossel	0.5A
	L3	63.5006	2.2 μH 20% " "	0.6A
	L4	63.5008	0.47 μH 20% " "	2 A
	L5	62.719	RF-coil/HF spole 146-174 MHz	
	L6	62.718	RF-coil/HF spole 146-174 MHz	
	L7	63.5008	0.47 μH 20% choke/drossel	2 A
	L8	63.5008	0.47 μH 20% " "	2 A
	L9	63.5006	2.2 μH 20% " "	0.6A
	L10	62.717	RF-coil/HF-spole	
	L11	62.716	RF-coil/HF-spole 146-174 MHz	
	E1	99.5028	OA 200 Diode	
	E2	99.5114	BZY 57 Zenerdiode	

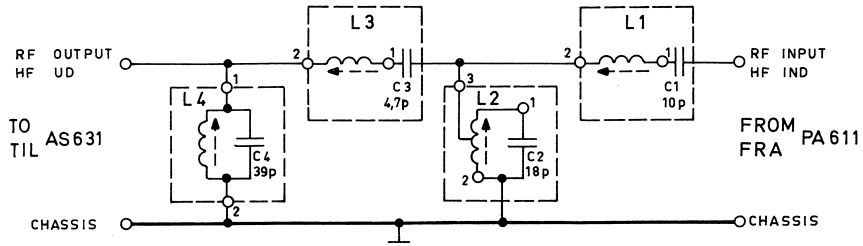
Storno

TYPE	NO.	CODE	DATA
	Q1	99.5129	2N3553 Transistor
	Q2	99.5137	2N3632 Transistor
	Q3	99.5121	BC107 Transistor

RF-POWER AMPLIFIER
HF-EFFEKTFORSTÆRKER

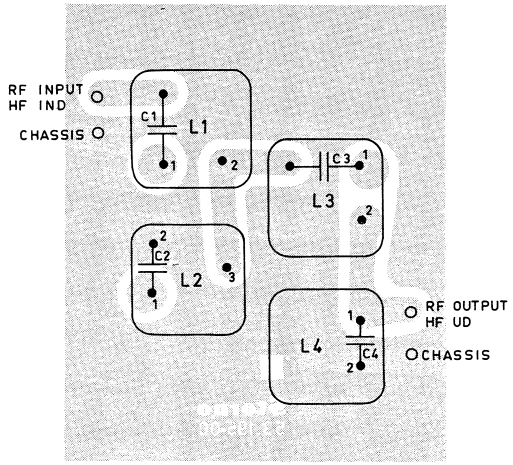
PA611a

X400.678/4



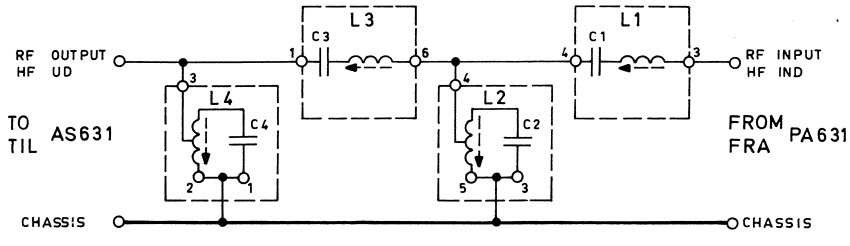
FN611

PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



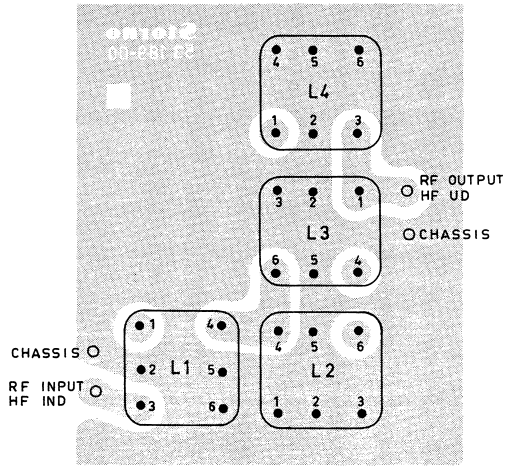
FN611

Storno



FN631

PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



FN631

ANTENNA FILTER
ANTENNE FILTER

FN611 FN631

D 400.668/2

TYPE	NO.	CODE	DATA
611	C1	74.5135	10pF 5% ceram. N15 DI 125V
631	C1	74.5106	22pF ±0,5pF " NO75 TB 250V
611	C2	74.5138	18pF 5% " N150 DI 250V
631	C2	74.5117	39pF ±2% " NO75 TB 250V
611	C3	74.5131	4,7pF ±0,25pF " N150 DI 250V
631	C3	74.5141	12pF ±0,5pF " NO75 TB 250V
611	C4	74.5117	39pF ±2% " NO75 TB 250V
631	C4	74.5106	22pF ±0,5pF " NO75 TB 250V
611	L1	61.861	Coil/Spole 146-174 MHz (C1)
631	L1	61.807	Coil/Spole 68-88 MHz (C1)
611	L2	61.862	Coil/Spole 146-174 MHz (C2)
631	L2	61.808	Coil/Spole 68-88 MHz (C2)
611	L3	61.863	Coil/Spole 146-174 MHz (C3)
631	L3	61.809	Coil/Spole 68-88 MHz (C3)
611	L4	61.864	Coil/Spole 146-174 MHz (C4)
631	L4	61.810	Coil/Spole 68-88 MHz (C4)

Storno

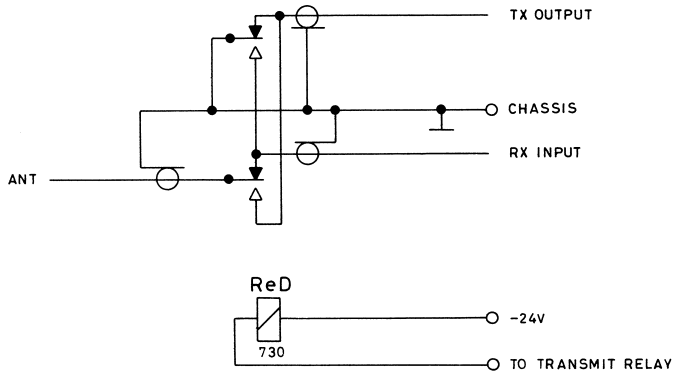
TYPE	NO.	CODE	DATA

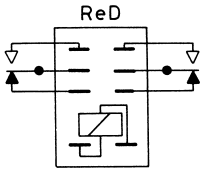
ANTENNA FILTER
FOR TX.

FN611, FN631

X400.689

Storno





BOTTOM VIEW
SET FRA BUNDEN

ReD: 58.5063 RELAY/RELÆ 24V 730Ω

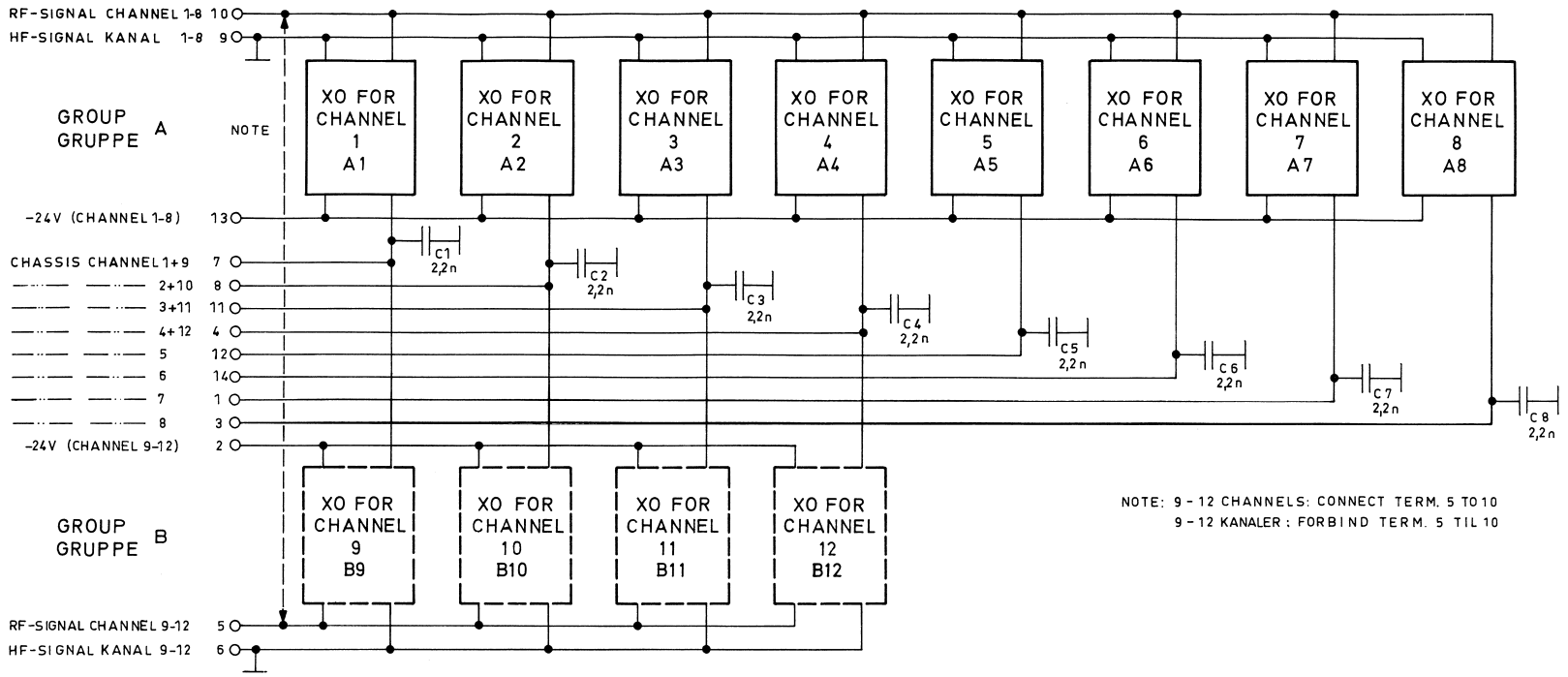
ANTENNA SWITCHING UNIT
ANTENNESKIFTEENHED

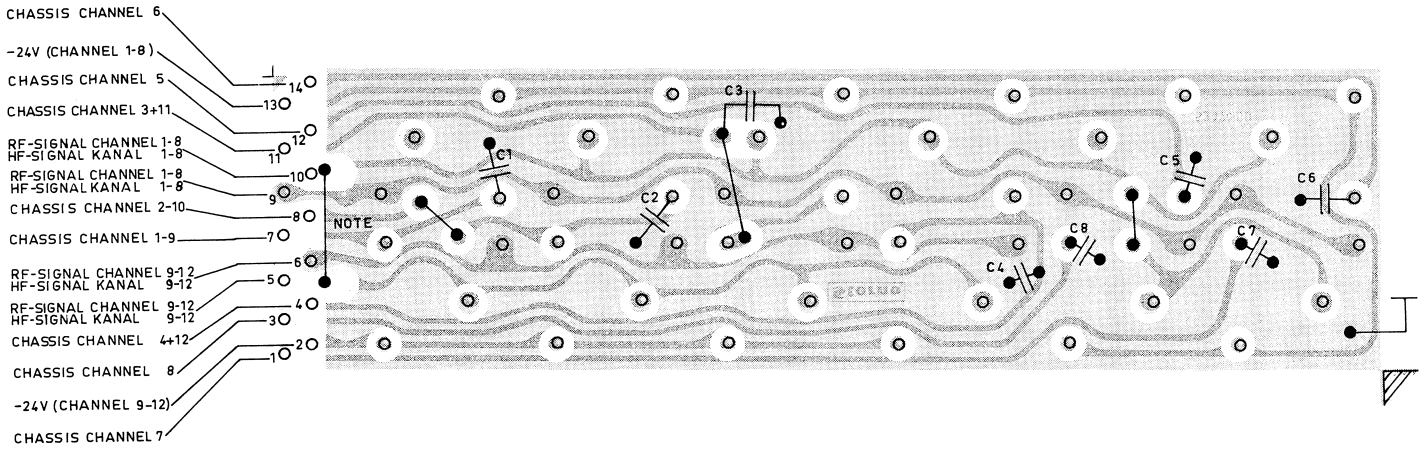
AS631a

D400.660/3

Storno

Storno





CRYSTAL OSCILLATOR PANEL XS601

D400.722

TYPE	NO.	CODE	DATA
	C1	76.5059	2.2 nF 10% polyest. FL 50V
	C2	76.5059	2.2 nF 10% " FL 50V
	C3	76.5059	2.2 nF 10% " FL 50V
	C4	76.5059	2.2 nF 10% " FL 50V
	C5	76.5059	2.2 nF 10% " FL 50V
	C6	76.5059	2.2 nF 10% " FL 50V
	C7	76.5059	2.2 nF 10% " FL 50V
	C8	76.5059	2.2 nF 10% " FL 50V

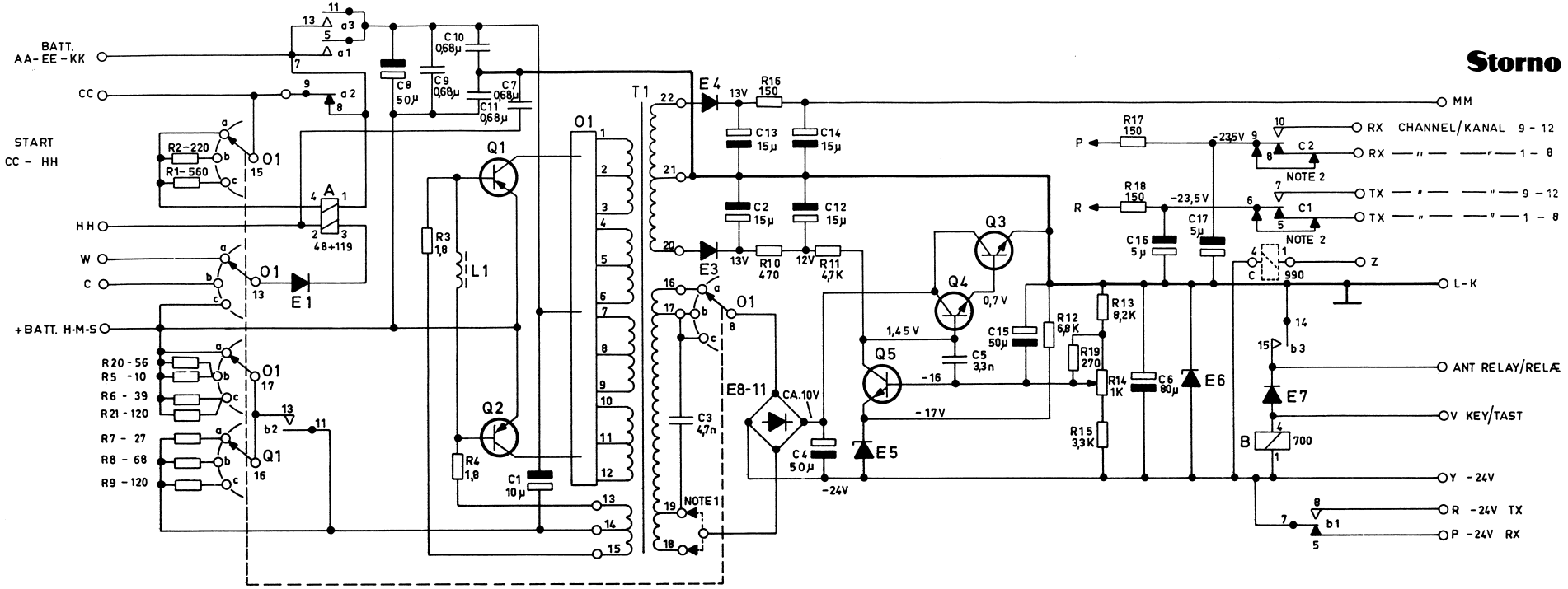
Storno

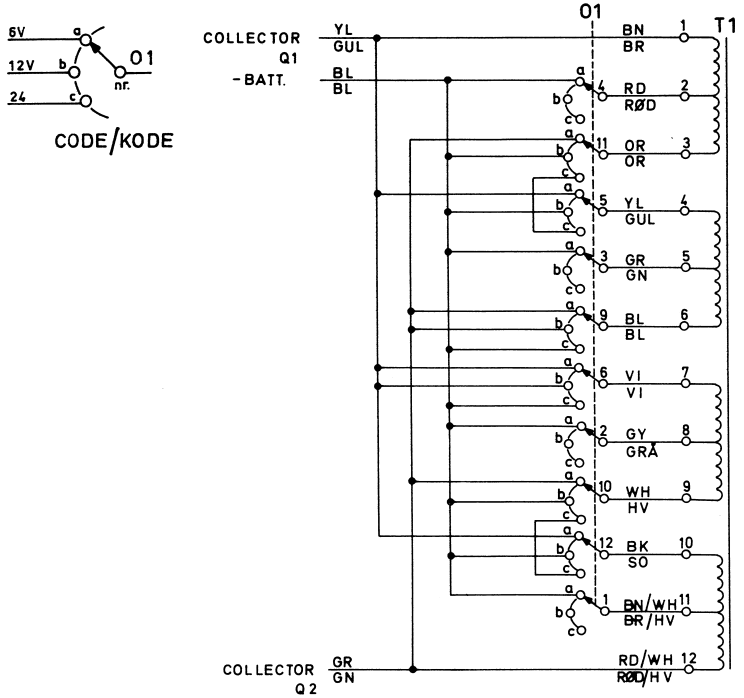
TYPE	NO.	CODE	DATA

CRYSTAL OSCILLATOR PANEL XS601

X400.875

Storno



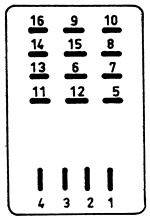


Note 1. Normal supply voltage: Connect E8-11 to term. 18 on T1.
High supply voltage: Connect E8-11 to term. 19 on T1.

Note 1. Normal driftspænding: Forbind E8-11 til terminal 18 på T1.
Høj driftspænding: Forbind E8-11 til terminal 19 på T1.

Note 2. Group switching relay C is inserted if more than 8 frequency channels are provided.
If relay C is omitted two strappings will be made (as shown).

Note 2. Gruppeskifterelæ C er isat, hvis anlægget er bestykket med mere end 8 frekvenskanaler.
Er relæ C udeladt, indlægges de viste to strapninger.



RELAY/RELÆ A-B-C
BOTTOM VIEW
SET FRA BUNDEN

POWER SUPPLY UNIT
STRØMFORSYNINGSENHED

PS601a

D400 760/5

TYPE	NO.	CODE	DATA	
	C1	73.5100	10 µF -10/+100 % elco	35V
	C2	73.5105	15 µF ± 20 % tantal	15V
	C3	76.5061	4,7 nF 10 % polyest. FL	50V
	C4	73.5101	50 µF -10/+100 % elco	70V
	C5	76.5060	3,3 nF 10% polyest. FL	50V
	C6	73.5110	80 µF -10/+50% elco	25V
	C7	76.5077	0.68 µF 10% polyest. TB	100V
	C8	73.5101	50 µF -10/+100 % elco	70V
	C9	76.5077	0.68 µF 10% polyest. TB	100V
	C10	76.5077	0.68 µF 10% polyest. TB	100V
	C11	76.5077	0.68 µF 10% polyest. TB	100V
	C12	73.5105	15 µF ± 20% tantal	15V
	C13	73.5105	15 µF ± 20% tantal	15V
	C14	73.5105	15 µF ± 20% tantal	15V
	C15	73.5030	50 µF -10/+100% elco	25V
	C16	73.5104	5 µF -10/+100% elco	70V
	C17	73.5104	5 µF -10/+100% elco	70V
	R1	82.5046	560 Ω 5% carbon film	1 W
	R2	81.5041	220 Ω 5% carbon film	1/2 W
	R3	84.5022	1,8 Ω 10% wirewound	5 W
	R4	84.5022	1,8 Ω 10% wirewound	5 W
	R5	84.5019	10 Ω 10% wirewound	5,5 W
	R6	81.5032	39 Ω 5% carbon film	1/2 W
	R7	81.5030	27 Ω 5% carbon film	1/2 W
	R8	80.5435	68 Ω 5% carbon film	1/4 W
	R9	80.5438	120 Ω 5% carbon film	1/4 W
	R10	80.5245	470 Ω 5% carbon film	1/8 W
	R11	80.5257	4,7 kΩ 5% carbon film	1/8 W
	R12	80.5259	6,8 kΩ 5% carbon film	1/8 W
	R13	80.5260	8,2 kΩ 5% carbon film	1/8 W
	R14	86.5045	1 kΩ potm. lin. carbon film	0,15 W
	R15	80.5255	3,3 kΩ 5% carbon film	1/8 W
	R16	80.5239	150 Ω 5% carbon film	1/8 W
	R17	80.5239	150 Ω 5% carbon film	1/8 W
	R18	80.5239	150 Ω 5% carbon film	1/8 W
	R19	80.5242	270 Ω 5% carbon film	1/8 W
	L1	61.803	Coil/spole	
	T1	60.5133	Transformer 6-12-24V/24V 70VA 1-3 kHz	
	ReA	58.5053	Relay/Relæ 6V 48 + 119 Ω 1-1-2	
	ReB	58.5052	Relay/Relæ 24V 700 Ω 21-21	
	ReC	58.5055	Relay/Relæ 24V 890 Ω 21-21-21	
	01	47.367	Selector/omskifter	

Storno

TYPE	NO.	CODE	DATA
	E1	99.5020	Diode 1N4004
	E3	99.5020	Diode 1N4004
	E4	99.5020	Diode 1N4004
	E5	99.5146	Zenerdiode 6,9V 5% 0,275 W
	E6	99.5132	Zenerdiode 30V 5% 0.2 W
	E7	99.5020	Diode 1N4004
	E8	99.5020	Diode 1N4004
	E9	99.5020	Diode 1N4004
	E10	99.5020	Diode 1N4004
	E11	99.5020	Diode 1N4004
	Q1	99.5126	Transistor 2N2492
	Q2	99.5126	Transistor 2N2492
	Q3	99.5130	Transistor 40251
	Q4	99.5128	Transistor 2N3053
	Q5	99.5121	Transistor BC107

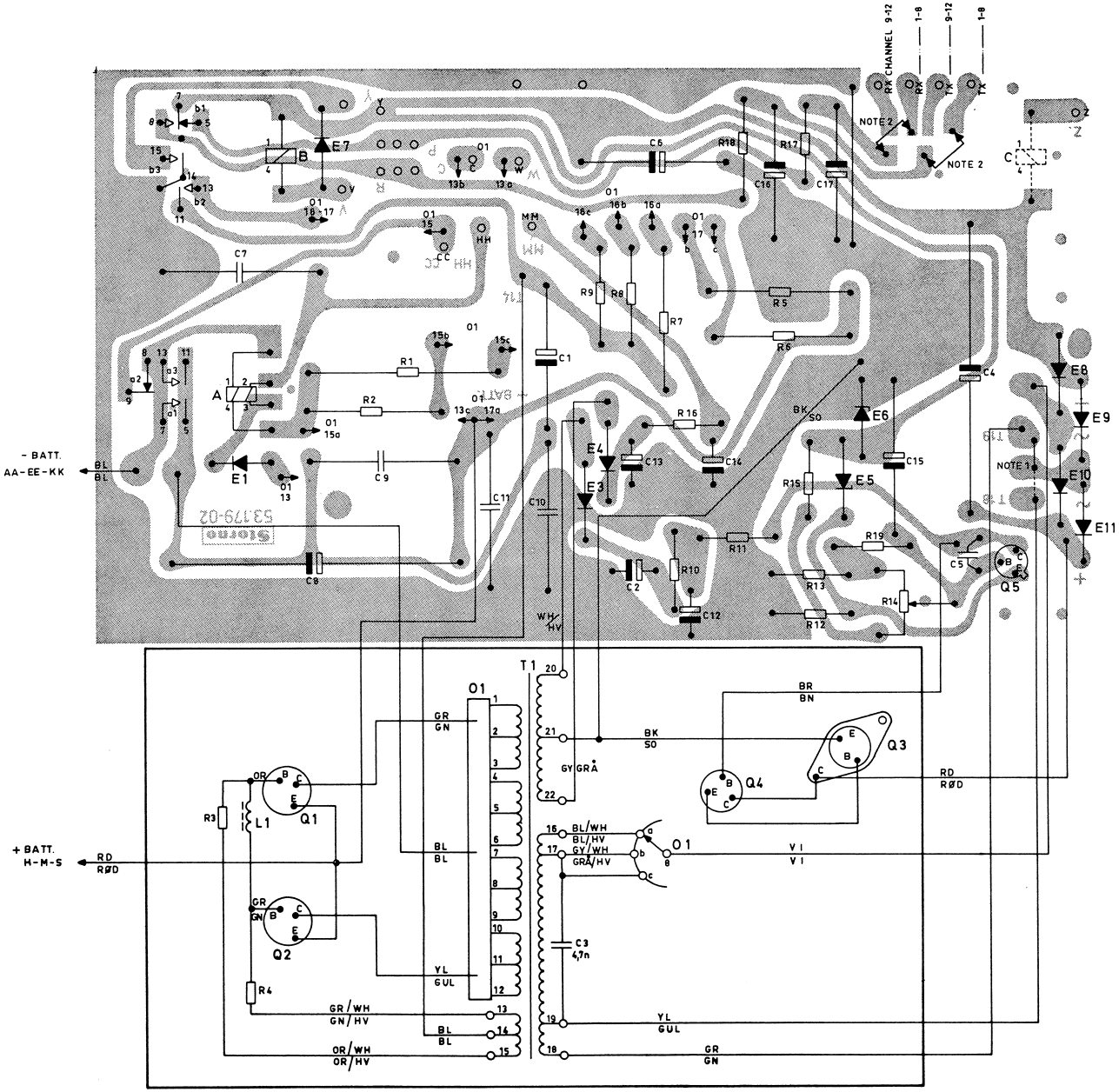
POWER SUPPLY UNIT
STRØMFORSYNINGSENHED

PS601a

X400.688/5

Storno

Storno



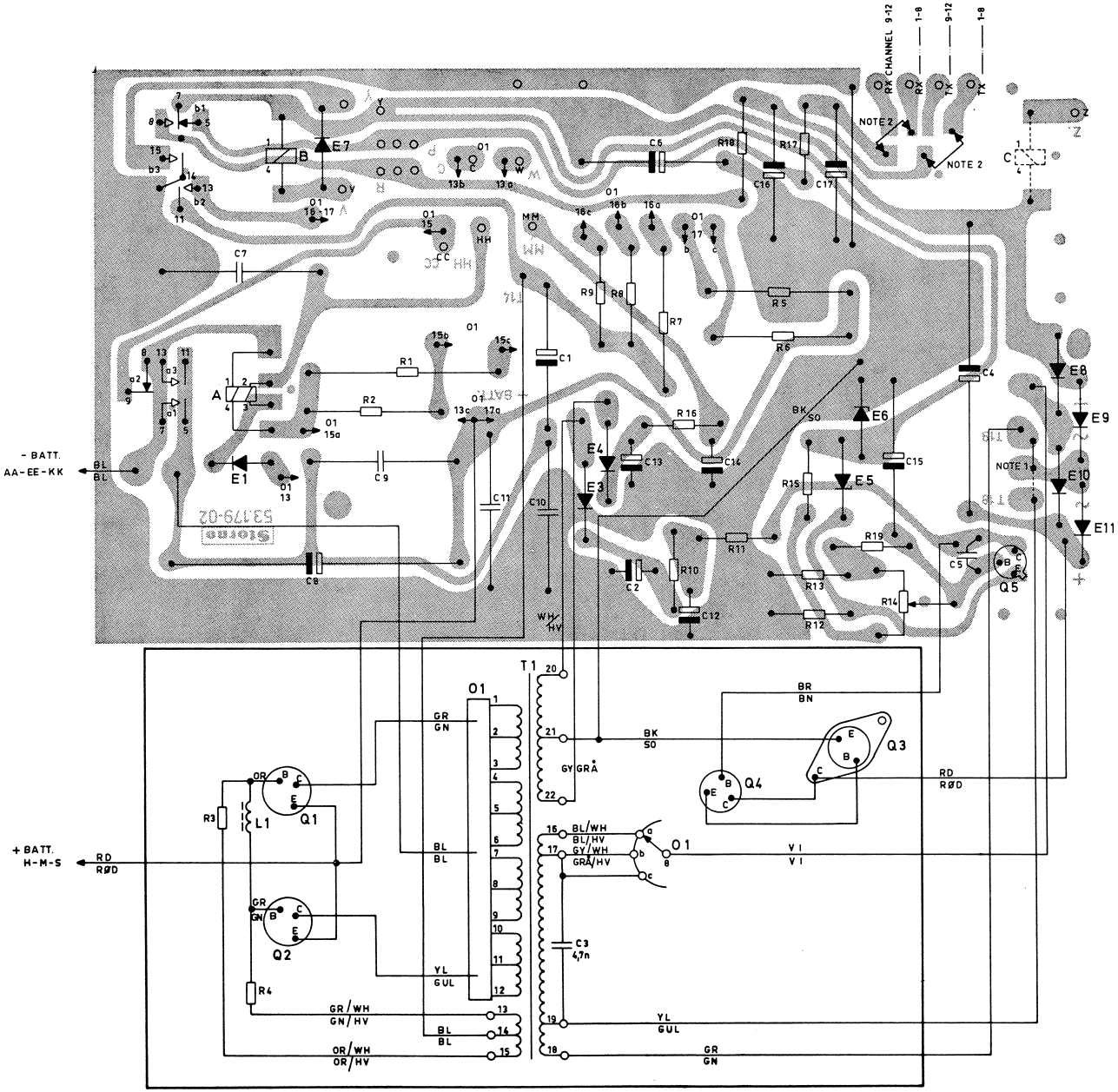
POWER SUPPLY UNIT
STRØMFORSYNING

PS601a

D400.787/2

Storno

Storno

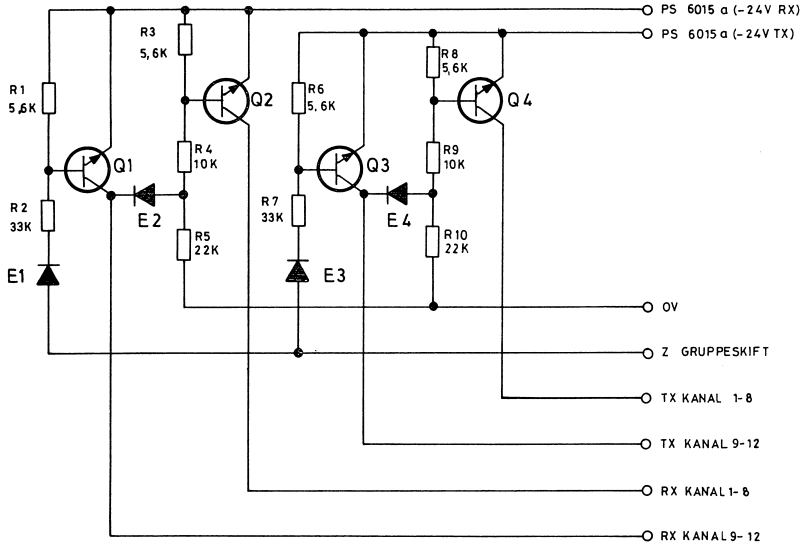


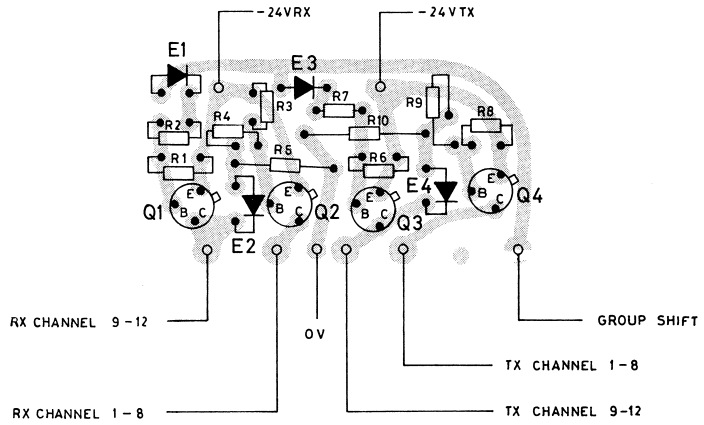
POWER SUPPLY UNIT
STRØMFORSYNING

PS601a

D400.787/2

Storno





SWITCH UNIT SU607a

D402.005

TYPE	NO.	CODE	DATA
SU607a		10.2566	Switch unit
	R1	80.5258	5.6KΩ 5% carbon film 1/8W
	R2	80.5267	33KΩ 5% " 1/8W
	R3	80.5258	5.6KΩ 5% " 1/8W
	R4	80.5261	10KΩ 5% " 1/8W
	R5	80.5265	22KΩ 5% " 1/8W
	R6	80.5258	5.6KΩ 5% " 1/8W
	R7	80.5267	33KΩ 5% " 1/8W
	R8	80.5258	5.6KΩ 5% " 1/8W
	R9	80.5261	10KΩ 5% " 1/8W
	R10	80.5265	22KΩ 5% " 1/8W
	E1	99.5028	1N914 Diode
	E2	99.5028	1N914 Diode
	E3	99.5028	1N914 Diode
	E4	99.5028	1N914 Diode
	Q1	99.5121	BC107 Transistor
	Q2	99.5121	BC107 Transistor
	Q3	99.5121	BC107 Transistor
	Q4	99.5121	BC107 Transistor

Storno

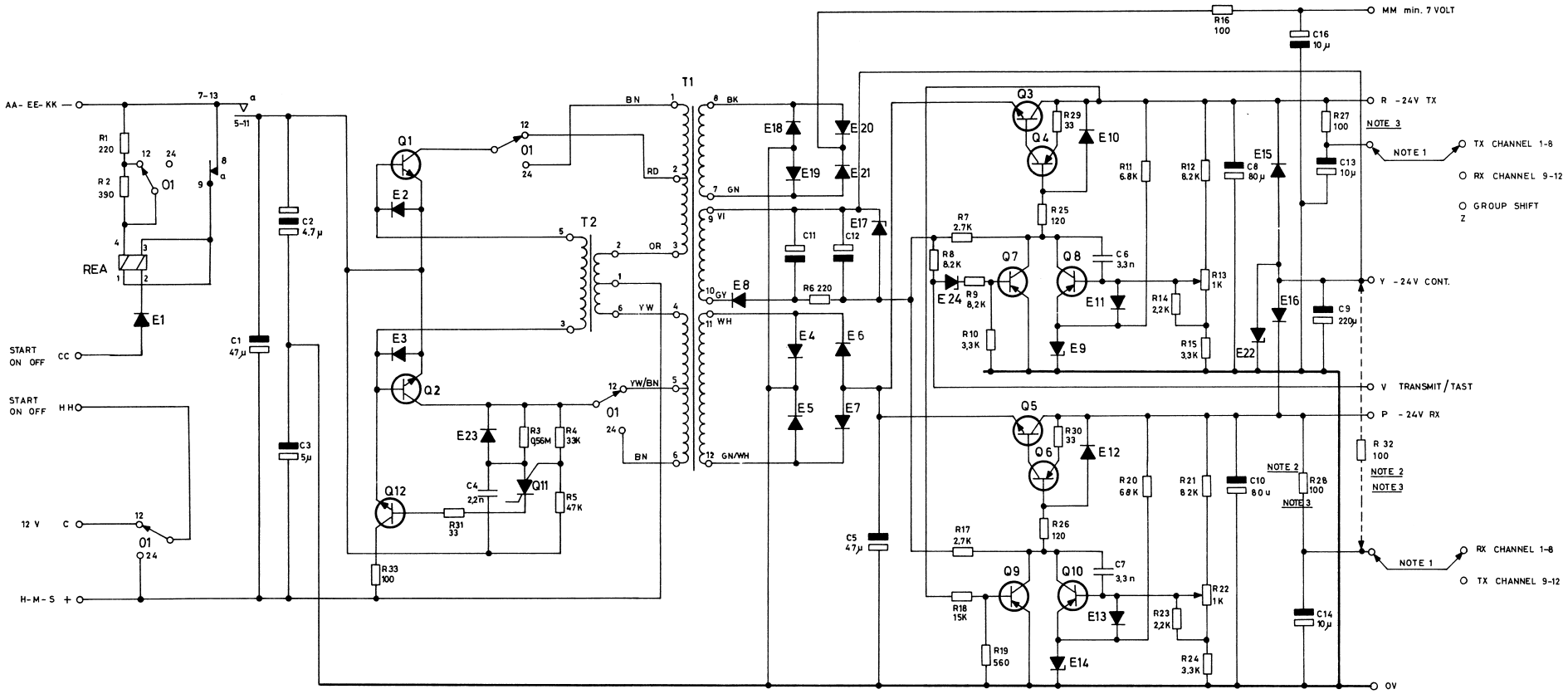
TYPE	NO.	CODE	DATA

SWITCH UNIT SU607a

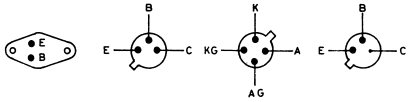
X402.099

Storno

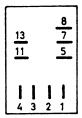
Storno



Q 1, Q 2, Q3, Q5. Q7, Q8, Q9, Q10. Q11 Q4, Q6.



BOTTOM VIEW
SET FRA BUNDEN



RELAY RELÆ A
BOTTOM VIEW
SET FRA BUNDEN

NOTE 1:

GROUP SWITCHING UNIT SU 607 IS INSERTED IF MORE THAN 8 FREQUENCY CHANNELS ARE PROVIDED
IF THE UNIT IS OMITTED TWO STRAPPINGS WILL BE MADE (AS SHOWN)

GRUPPESKIFTE ENHED SU 607 ER ISAT HVIS ANLÆGGET ER BESTYKKET MED MERE END 8 FREKVENSKANALER
ER ENHEDEN UDELADT INDLÆGGES DE VISTE TO STRAPNINGER

NOTE 2:

FOR DUPLEX OPERATION: INSERT R32, 100Ω 5% 1/8W 80.5237
REMOVE R28

FOR DUPLEKSDRIFT: ISÆT R32, 100Ω 5% 1/8W 80.5237
FJERN R28

NOTE 3:

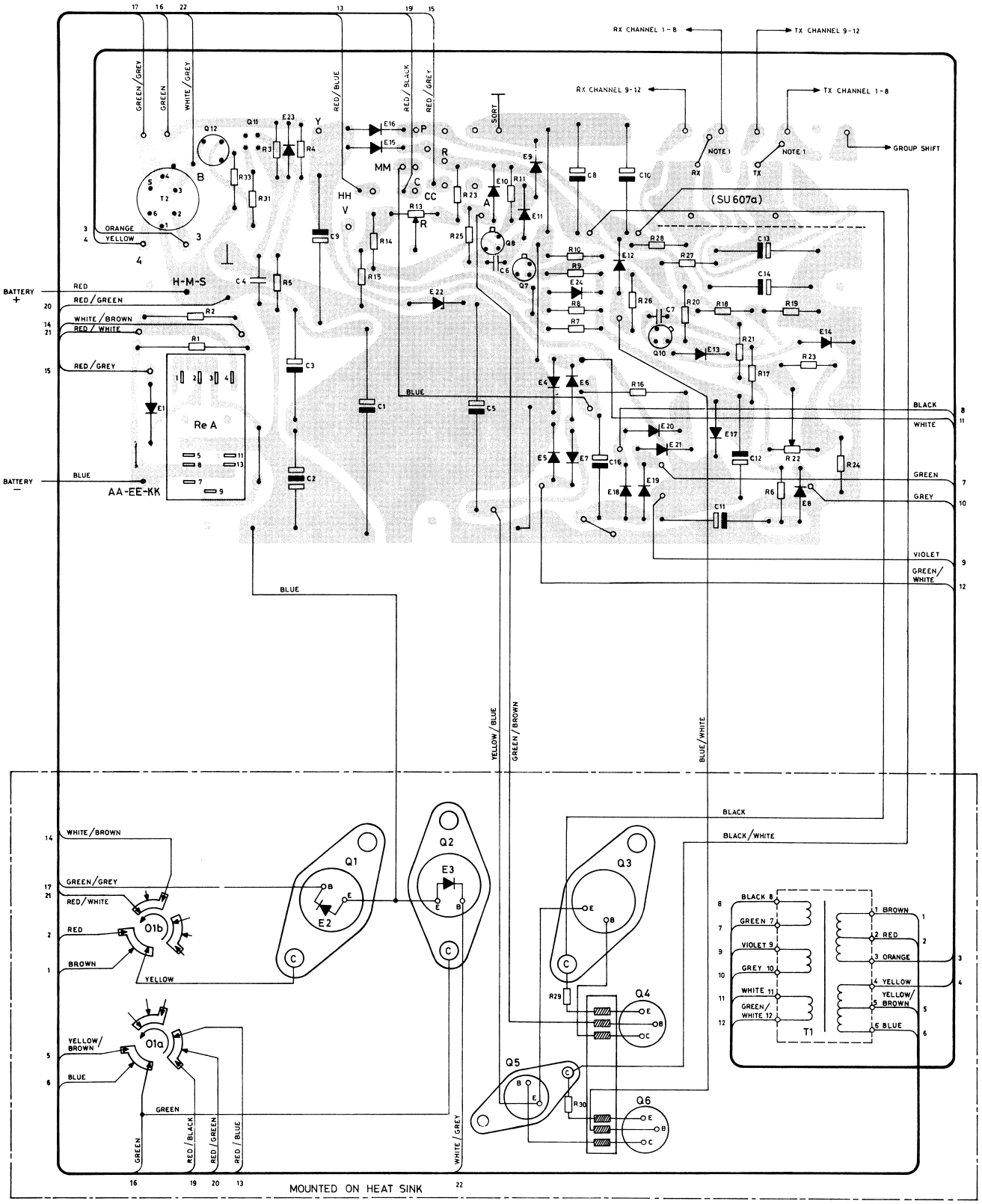
CQM 612 x 18 + CQM 6x2x24
REMOVE R27 AND R28
INSERT R32

FJERN R27 OG R28
ISÆT R32

POWER SUPPLY UNIT PS6015a

D 402.041

Storno



POWER SUPPLY UNIT PS6015a

D402.140

Storno

TYPE	NO.	CODE	DATA
PS6015a		10.2551-01	Power supply unit 12V - 24V
	C1	73.5101	47µF -10 + 80% elco 75/90V
	C2	73.5161	47µF -10 + 50% elco bip. 63V
	C3	73.5104	5µF -10 + 100% elco 70V
	C4	76.5059	2.2nF 10% polyest FL 50V
	C5	73.5101	47µF -10 + 80% elco 75/90V
	C6	76.5060	3.3nF 10% polyest FL 50V
	C7	76.5060	3.3nF 10% polyest FL 50V
	C8	73.5110	80µF -10 + 100% elco 25V
	C9	73.5110	80µF -10 + 100% elco 25V
	C10	73.5110	80µF -10 + 100% elco 25V
	C11	73.5100	10µF -10 + 100% elco 40V
	C12	73.5100	10µF -10 + 100% elco 40V
	C13	73.5100	10µF -10 + 100% elco 40V
	C14	73.5100	10µF -10 + 100% elco 40V
	C15		Not used
	C16	73.5100	10µF -10 + 100% elco 40V
	R1	81.5041	220 Ω 5% carbon film 1/2W
	R2	82.5206	390 Ω 10% wire wound 1W
	R3	80.5282	560KΩ 5% carbon film 1/8W
	R4	80.5267	33KΩ 5% " 1/8W
	R5	80.5269	47KΩ 5% " 1/8W
	R6	80.5241	220 Ω 5% " 1/8W
	R7	80.5254	2.7KΩ 5% " 1/8W
	R8	80.5260	8.2KΩ 5% " 1/8W
	R9	80.5260	8.2KΩ 5% " 1/8W
	R10	80.5255	3.3KΩ 5% " 1/8W
	R11	80.5259	6.8KΩ 5% carbon film 1/8W
	R12	80.5250	8.2KΩ 5% " 1/8W
	R13	80.5045	1KΩ 5% potentiometer 0.15W
	R14	80.5253	2.2KΩ 5% carbon film 1/8W
	R15	80.5255	3.3KΩ 5% " 1/8W
	R16	81.5037	100 Ω 5% " 1/2W
	R17	80.5254	2.7KΩ 5% " 1/8W
	R18	80.5263	15KΩ 5% " 1/8W
	R19	80.5246	560 Ω 5% " 1/8W
	R20	80.5259	6.8KΩ 5% " 1/8W
	R21	80.5260	8.2KΩ 5% " 1/8W
	R22	86.5045	1KΩ potentiometer 0.15
	R23	80.5253	2.2KΩ 5% carbon film 1/8W
	R24	80.5255	3.3KΩ 5% " 1/8W
	R25	80.5238	120 Ω 5% " 1/8W
	R26	80.5238	120 Ω 5% " 1/8W
	R27	80.5237	100 Ω 5% " 1/8W
	R28	80.5237	100 Ω 5% " 1/8W
	R29	80.5231	33 Ω 5% " 1/8W
	R30	80.5231	33 Ω 5% " 1/8W
	R31	80.5231	33 Ω 5% " 1/8W
	R32	80.5237	100 Ω 5% " 1/8W
	R33	80.5237	100 Ω 5% " 1/8W
	T1	60.5157	Transformer 12/24V - 24V 70VA
	T2	61.1284	Transformer, saturation
	E1	99.5020	1N4004 Diode
	E2	99.5296	BY201/2 Diode
	E3	99.5296	BY201/2 Diode
	E4	99.5296	BY201/2 Diode
	E5	99.5296	BY201/2 Diode
	E6	99.5296	BY201/2 Diode
	E7	99.5296	BY201/2 Diode
	E8	99.5296	BY201/2 Diode
	E9	99.5146	6,8 5% Zener Diode
	E10	99.5020	1N4004 Diode
	E11	99.5020	1N4004 Diode
	E12	99.5020	1N4004 Diode
	E13	99.5020	1N4004 Diode
	E14	99.5146	6.8V 5% Zener Diode
	E15	99.5020	1N4004 Diode
	E16	99.5020	1N4004 Diode
	E17	99.5224	4.7V 5% Zener Diode
	E18	99.5296	BY201/2 Diode
	E19	99.5296	BY201/2 Diode
	E20	99.5296	BY201/2 Diode
	E21	99.5296	BY201/2 Diode
	E22	99.5222	27V 5% Zener Diode
	E23	99.5237	1N4148 Diode
	E24	99.5224	4.7V 5% Zener Diode
	Q1	99.5177	2N3055 Transistor
	Q2	99.5177	2N3055 Transistor
	Q3	99.5177	2N3055 Transistor
	Q4	99.5254	MM5006 or BFS93 Transistor
	Q5	99.5193	2N6261 Transistor
	Q6	99.5254	MM5006 or BFS93 Transistor
	Q7	99.5251	BC177 Transistor

POWER SUPPLY UNIT PS6015a

X402.098/2

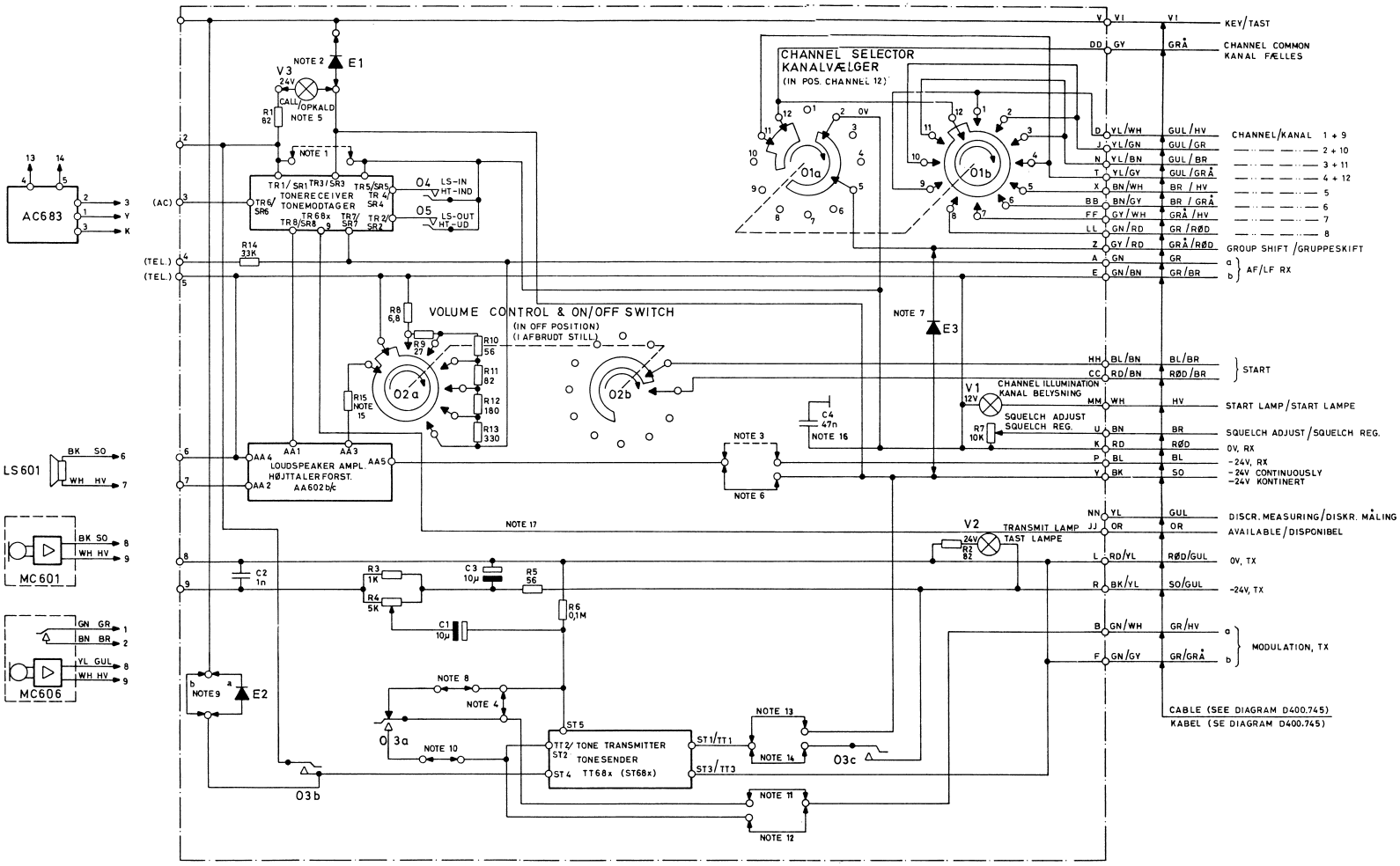
TYPE	NO.	CODE	DATA
	Q8	99.5251	BC177 Transistor
	Q9	99.5251	BC177 Transistor
	Q10	99.5251	BC177 Transistor
	Q11	99.5238	BRY39 Transistor
	Q12	99.5128	2N3053 Transistor
	ReA	58.5053	Relay 6V 48+119Ω 1-1-2

Storno

TYPE	NO.	CODE	DATA

POWER SUPPLY UNIT PS6015a

X402.098/2



Note 1: Strap in CB without Tone Receiver TR680, SR680, or SR6841
Strappes i CB uden tonemodtager TR680, SR680 eller SR6841

Note 2: Diode, Code No. 99.5020 is inserted in CB with tone Receiver TR680, SR680, or SR6841
Diode, Kode nr. 99.5020 isættes i CB med tonemodtager TR680, SR680 eller SR6841

Note 3: Strap in CB without Tone Receiver and in CB for Duplex Operation
Strappes i CB uden tonemodtager og i CB for duplex drift

Note 4: Strap in CB without Tone Transmitter TT680 or ST680
Strappes i CB uden tonesender TT680 eller ST680

Note 5: Socket and Lamp V3 is inserted in CB with Tone Receiver TR680, SR680, or SR6841
Fatning og lampe V3 monteres i CB med tonemodtager TR680, SR680 eller SR6841

Note 6: Strap in CB with Tone Receiver TR680, SR680, or SR6841
Strappes i CB med tonemodtager TR680, SR680 eller SR6841 og i CB for simplex drift.

Note 7: Diode, Code No. 99.5020 is inserted in CB with 9-12 channels and with TR680, SR680, or SR6841
Diode, Kode Nr. 99.5020 isættes i CB med 9-12 kanaler og med TR680, SR680 eller SR6841

Note 8: Strap in CB with TT680
Strappes i CB med TT680

Note 9: a) Diode (Code No. 99.5020) is inserted in CB with ST680 if Transmit Button 03 is used for Tone Calling and External Transmit Button is used for Transmitting.
b) A Strap is inserted in CB with TT680 and in CB with ST680 for Identification and in CB without Tone Equip-Transmitter
a) Diode (Kode nr. 99.5020) isættes i CB med ST680, hvis tast 03 bruges til tonesending og udvendig tast bruges til sending.
b) Strappes i CB med TT680 og i CB med ST680 anvendt til identifikation samt i CB uden tonesender

Note 10: Strap in CB with TT680
Strappes i CB med TT680

Note 11: Remove strap in CB with ST680
Fjern strapning i CB med ST680

Note 12: Strap in CB with ST680.
Strappes i CB med ST680

Note 13: Strap in CB with ST680
Strappes i CB med ST680

Note 14: Strap in CB with TT680
Strappes i CB med TT680

Note 15:

Input Sensitivity for 2W Indgangsfølsomhed for 2W	+3dBm	0dBm	-3dBm	-6dBm	-9dBm
R15	22 kΩ	12 kΩ	6,8 kΩ	2,7 kΩ	0 Ω

Note 16: Capacitor C4 (47 nF - Code No. 76.5072) is inserted in CB with Tone Equipment
Kondensator C4 (Kode nr. 76.5072) isættes CB med toneudstyr

Note 17: Connection with Tone Receiver SR6841 only
Forbindelse kun med tonemodtager SR6841

CONTROL BOX
MANØVRE BOKS

CB601b

D400.659/6

TYPE	NO.	CODE	DATA	
	C1	73.5100	10 µF -10 +100 % elco	35V
	C2	74.5155	1 nF -20 +50 % ceram PL	63V
	C3 1)	73.5100	10 µF -10 +100 % elco	35V
	C4 1)	76.5072	47 nF 10 % polyest. FL	50V
	R1	80.5236	82 Ω 5% carbon film	1/8W
	R2	80.5236	82 Ω 5% " "	1/8W
	R3	80.5449	1 kΩ 5% " "	1/4W
	R4	86.5046	5 kΩ 20 % potentiom. lin.	0.15W
	R5	80.5234	56 Ω 5% carbon film	1/8W
	R6	80.5273	0.1 MΩ 5% " "	1/8W
	R7	86.004	10 kΩ potentiom. lin.	0.1W
	R8	80.5223	6.8 Ω 5% carbon film	1/8W
	R9	80.5230	27 Ω 5% " "	1/8W
	R10	80.5234	56 Ω 5% " "	1/8W
	R11	80.5236	82 Ω 5% " "	1/8W
	R12	80.5240	180 Ω 5% " "	1/8W
	R13	80.5243	330 Ω 5% " "	1/8W
	R14	80.5249	1 kΩ 5% " "	1/8W
	R15	80.52xx	See Note 15 - se note 15	
	V1	92.5003	Lamp BA7 24V 25 mA	
	V2 1)	92.5004	Lamp BA7 12V 50 mA	
	V3 1)	92.5003	Lamp BA7 24V 25 mA	
	O1	47.373	Switch (channel)/omskifter (kanal)	
	O2	47.372	Switch (volume)/omskifter (styrke)	
	O3-4-5	47.374	Push-button section/trykknapprække	
	E1 1)	99.5020	Diode 1N4004	
	E2 1)	99.5020	Diode 1N4004	
	E3 1)	99.5020	Diode 1N4004	

1) Components inserted in connection with Tone Equipment.
Komponenter, der isættes i forbindelse med toneudstyr.

Storno

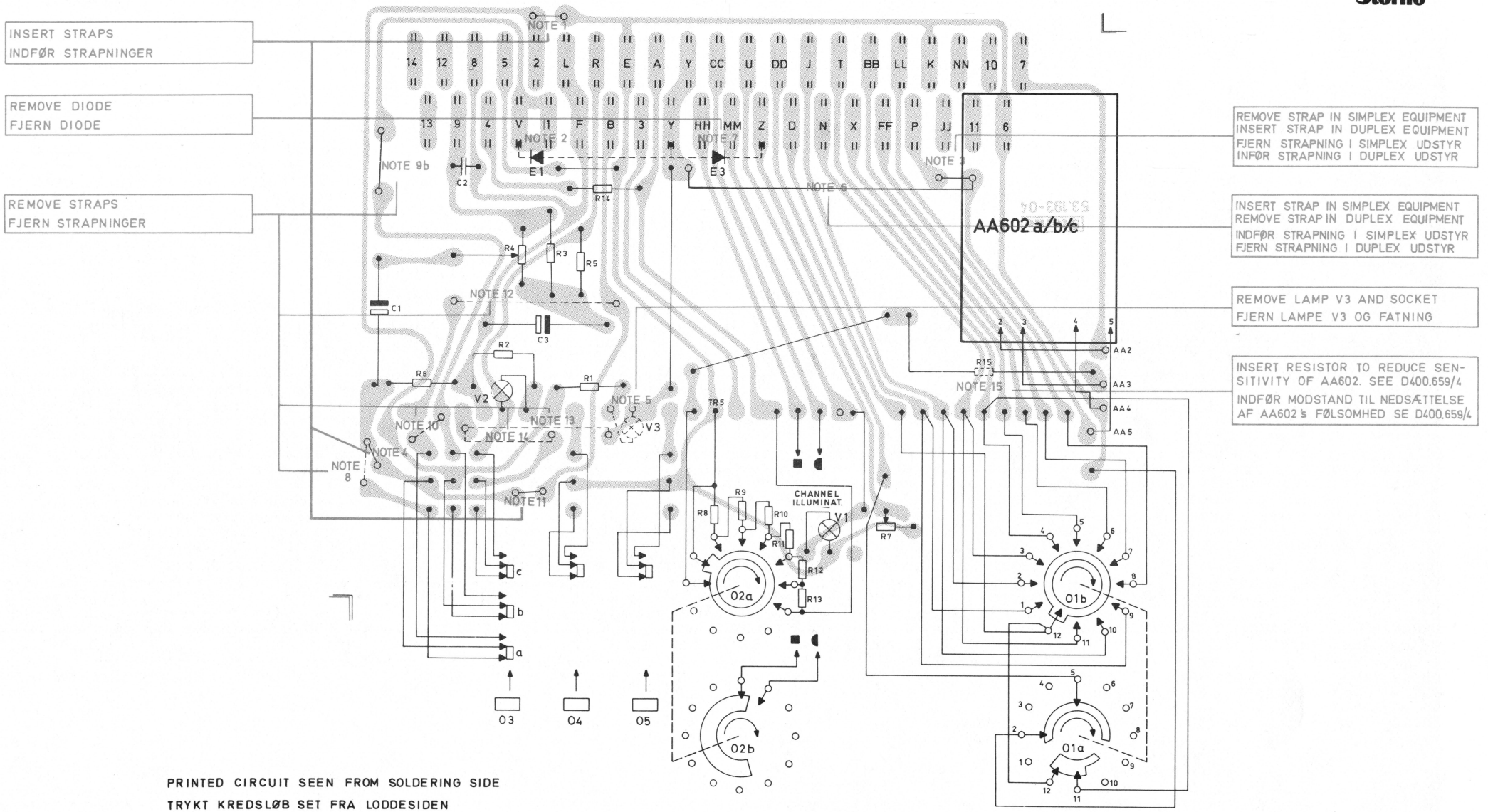
TYPE	NO.	CODE	DATA

CONTROL BOX
MANØVRE BOKS CB601b

X400.685/3

Storno

Storno

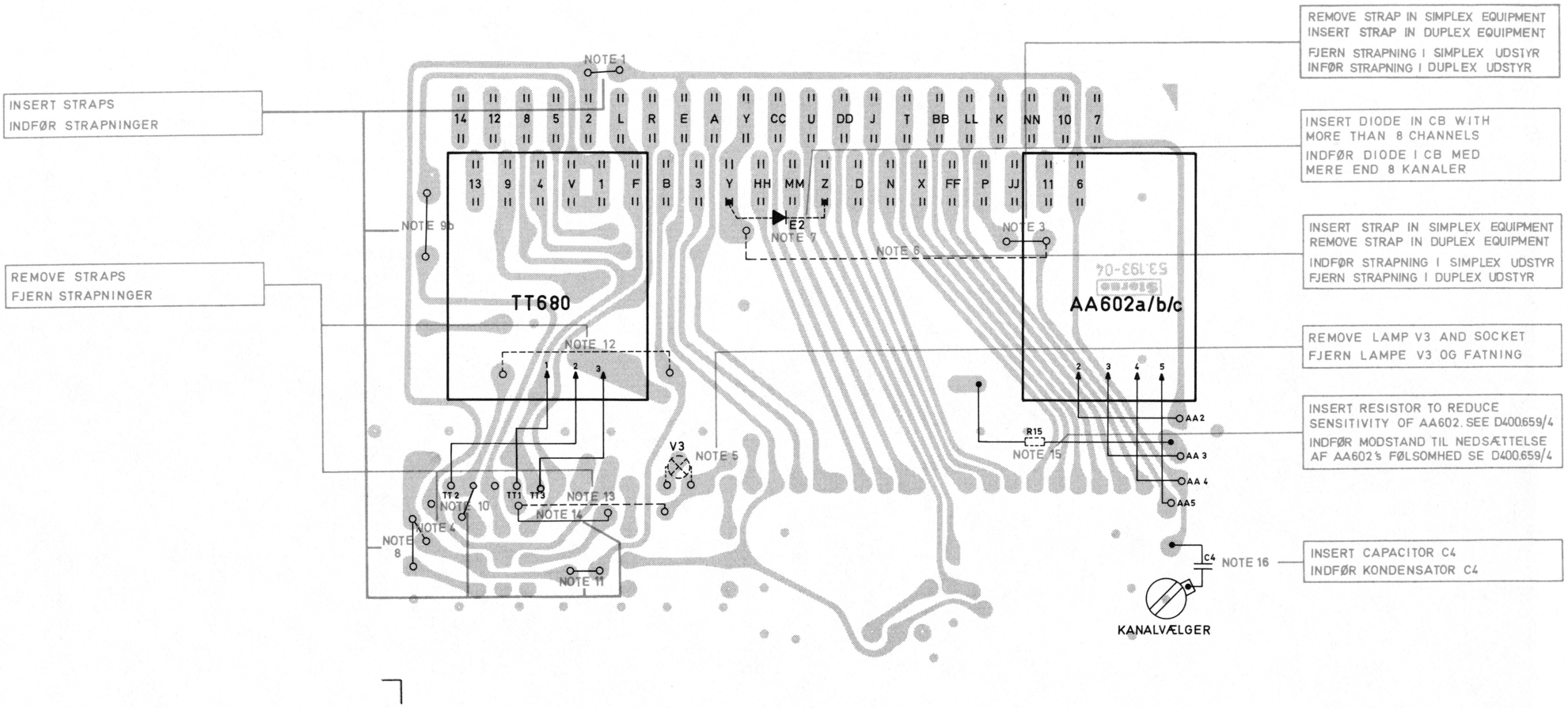


PRINTED CIRCUIT SEEN FROM SOLDERING SIDE
TRYKT KREDSLØB SET FRA LODDESIDEN

CONTROL BOX CB601 WITHOUT TONE EQUIPMENT
KONTROL BOKS CB601 UDEN TONE UDSTYR

D400.761/2

Storno

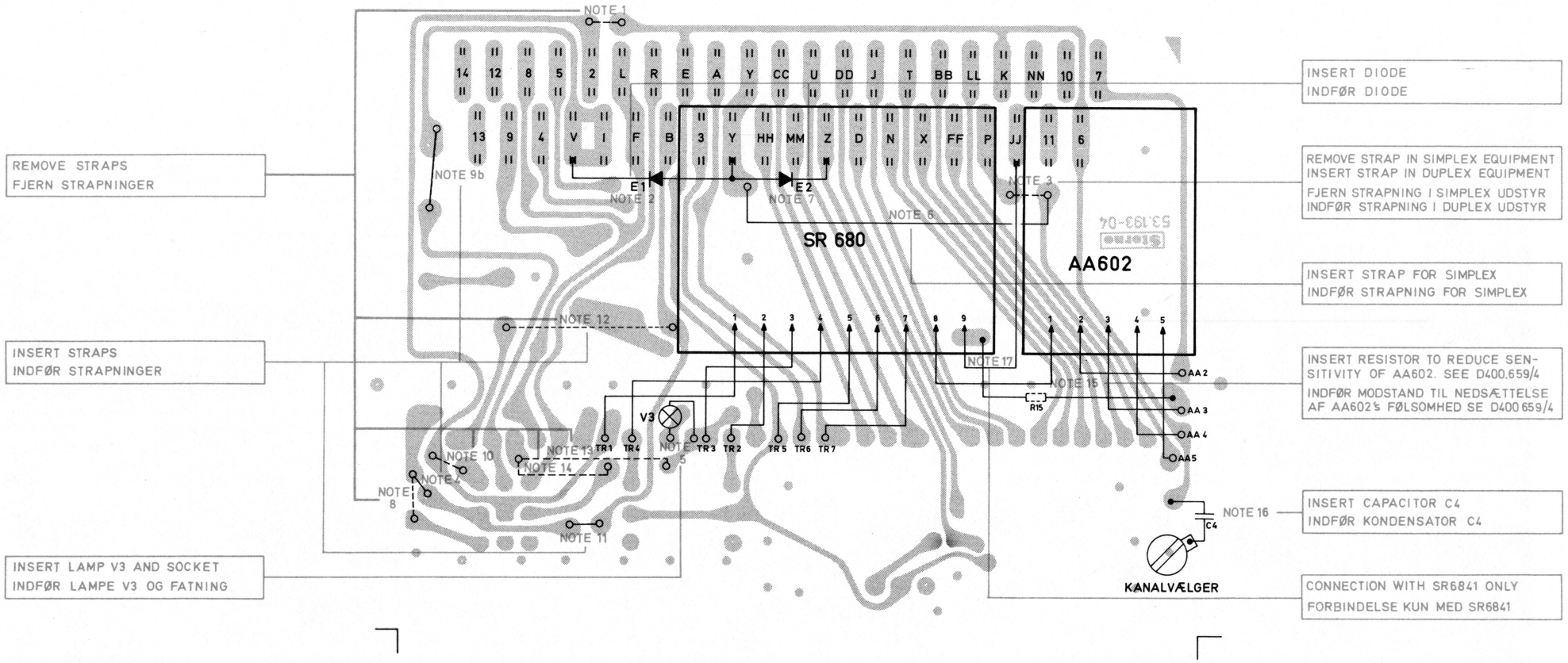


INSTALLATION OF TT680 IN CB601b
INDBYGNING AF TT680 I CB601b

D400.945/2

Storno

Storno

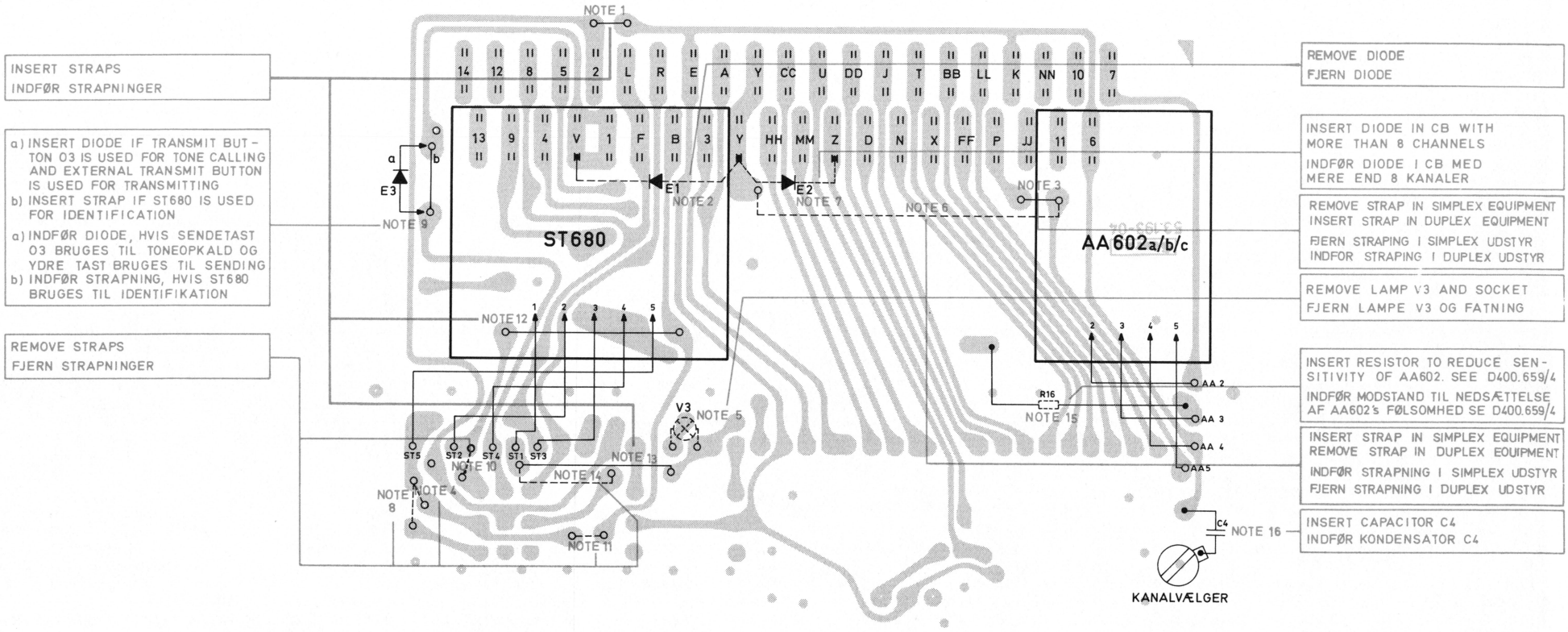


INSTALLATION OF TR680, SR680, OR SR6841 IN CB601b
INDBYGNING AF TR680, SR680 ELLER SR6841 I CB601b

D400.946/3

Storno

Storno

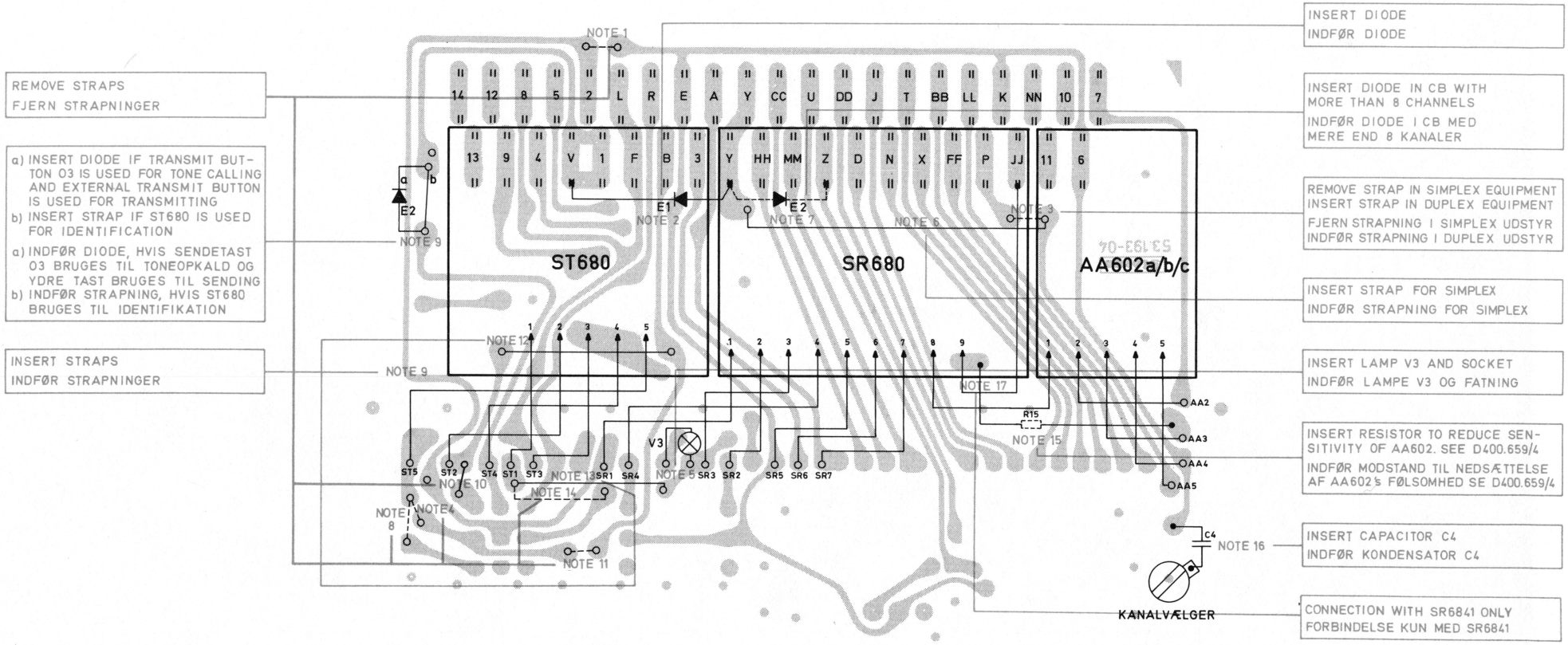


INSTALLATION OF ST680 IN CB601b

INDBYGNING AF ST680 I CB601b

D400.947/2

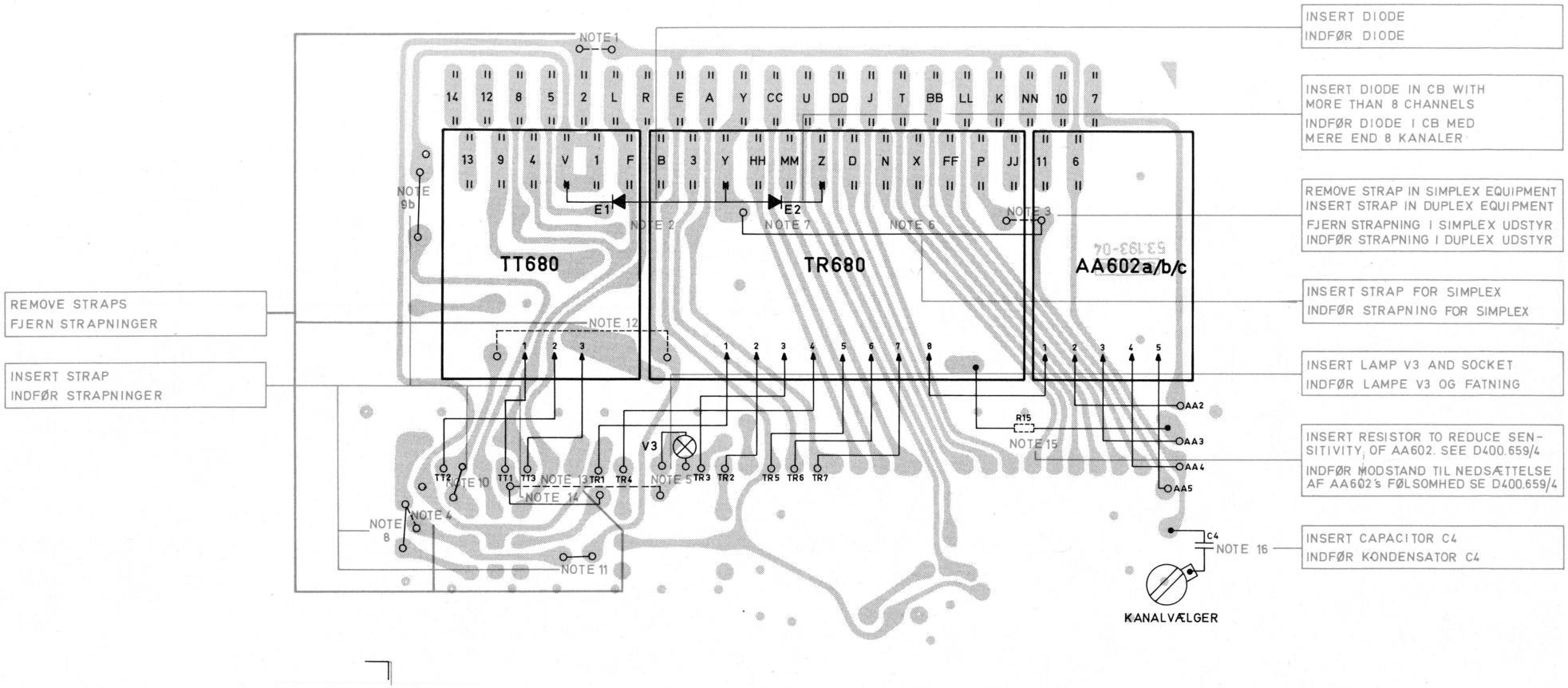
Storno



INSTALLATION OF SR680 OR SR6841 AND ST680 IN CB601b
INDBYGNING AF SR680 ELLER SR6841 OG ST680 I CB601b

D400.971/3

Storno

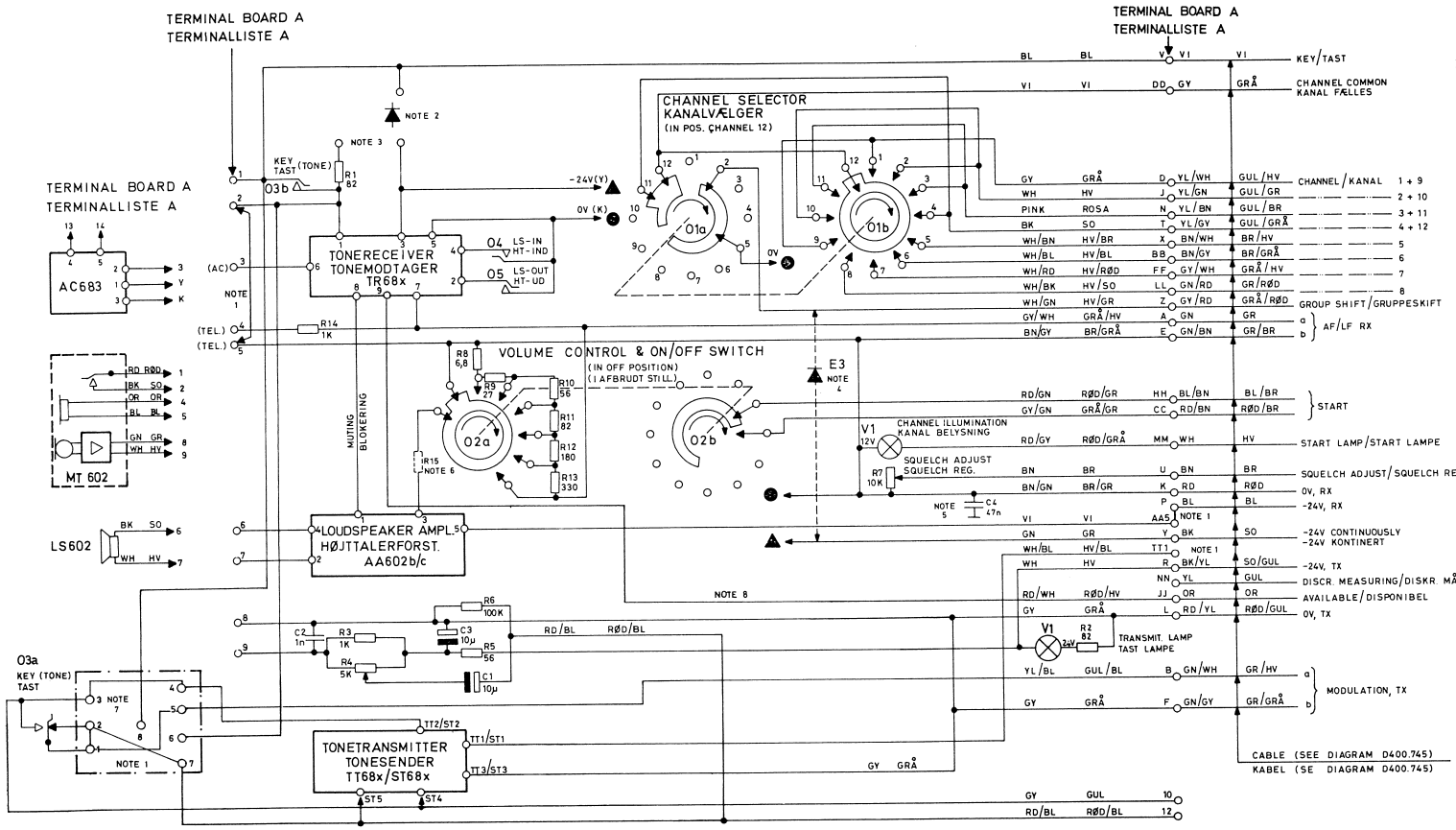


INSTALLATION OF TR680 AND TT680 IN CB601b

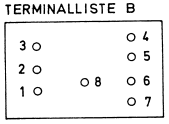
INDBYGNING AF TR680 OG TT680 I CB601b

D400.972/2

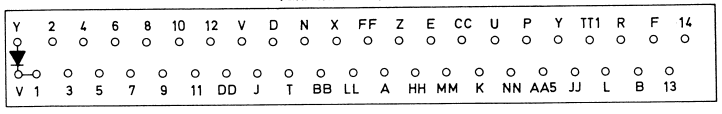
Storno



TERMINAL BOARD B
TERMINALLISTE B



TERMINAL BOARD A
TERMINALLISTE A



IN THE DIAGRAM CONNECTIONS ARE SHOWN A CONTROL BOX WITHOUT EQUIPMENT.
FOR INSTALLATION OF TONE EQUIPMENT SEE D 401.052

PÅ DIGRAMMET ER VIST FORBINDELSER FOR EN KONTROLBOKS UDEN TONEUDSTYR.
VED INDBYGNING AF TONEUDSTYR SE D 401.052

NOTE 1. CONNECTIONS WITHOUT TONE EQUIPMENT
FORBINDELSER UDEN TONEUDSTYR

Term. Board A	Term. Board B
2 - 5	1 - 2
P - AA5	1 - 5
	2 - 7
	3 - 4

CONNECTIONS WITH TT680 BUT WITHOUT TR680
FORBINDELSER MED TT680, MEN UDEN UDEN TR680

Term. Board A	Term. Board B
2 - 5	1 - 5
P - AA5	2 - 7
TT1 - R	3 - 4

CONNECTIONS WITH TT680 AND TR680
FORBINDELSER MED TT680 OG TR680

Term. Board A	Term. Board B
Y - AA5	1 - 5
TT1 - R	2 - 7
	3 - 4

CONNECTIONS WITH TR680 BUT WITHOUT TT680
FORBINDELSER MED TR680, MEN UDEN TT680

Term. Board A	Term. Board B
Y - AA5	1 - 2
	1 - 5
	2 - 7

CONNECTION WITH ST680 BUT WITHOUT SR680 OR SR6841
FORBINDELSER VED ST680, MEN UDEN SR680 ELLER SR6841

Term. Board A	Term. Board B
Y - AA5	1 - 6
TT1 - Y	3 - 8 (See NOTE 7)
2-5	4 - 5

CONNECTIONS WITH ST680 AND SR680, OR ST680 AND SR6841
FORBINDELSER MED ST680 OG SR680, ELLER ST680 OG SR6841

Term. Board A	Term. Board B
Y - AA5	1 - 6
TT1 - Y	3 - 8 (See NOTE 7)

CONNECTIONS WITH SR680 OR SR6841 BUT WITHOUT ST680
FORBINDELSER MED SR680 ELLER SR6841, MEN UDEN ST680

Term. Board A	Term. Board B
Y - AA5	1 - 2
	1 - 5
	2 - 7

NOTE 2. DIODE E1 IS INSERTED IN CB WITH TONE RECEIVER
DIODE E1 INDSÆTTES I CB MED TONEMODTAGER

NOTE 3. LAMP V3 IS INSERTED IN CB WITH TONE RECEIVER
LAMPE V3 INDSÆTTES I CB MED TONEMODTAGER

NOTE 4. DIODE E3 IS INSERTED IN CB WITH TONE EQUIPMENT AND MORE THAN 8 CHANNELS
DIODE E3 INDSÆTTES I CB MED TONEUDSTYR OG MERE END 8 KANALER

NOTE 5. CAPACITOR C4 IS INSERTED IN CB WITH TONE EQUIPMENT
KONDENSATOR C4 INDSÆTTES I CB MED TONEUDSTYR

NOTE 6. INPUT SENSITIVITY FOR 2W

Indgangsfølsomhed for 2W	+3dBm	0dBm	-3dBm	-6dBm	-9dBm
R15	22 kΩ	12 kΩ	6,8 kΩ	2,7 kΩ	0 Ω

NOTE 7. DIODE IS INSERTED IN CB WITH ST680 IF TRANSMIT BUTTON 03 IS USED FOR TONE CALLING AND EXTERNAL TRANSMIT BUTTON IS USED FOR TRANSMITTING
STRAP IS INSERTED IN CB WITH ST680 FOR IDENTIFICATION
DIODE INDSÆTTES I CB MED ST680. HVIS SENDETAST 03 BRUGES TIL TONEOPKALD OG YDRE SENDETAST BRUGES TIL SENDING
STRAPNING INDSÆTTES I CB MED ST680 FOR IDENTIFIKATION

NOTE 8. CONNECTION WITH TONE RECEIVER SR6841 ONLY
FORBINDELSE KUN MED TONEMODTAGER SR6841

CONTROL BOX
MANØVRE BOKS

CB602a

D400.809/5

TYPE	NO.	CODE	DATA	
	C1	73.5100	10 µF -10 +100% elco TB	35V
	C2	74.5155	1 nF -20 +50% ceram PL	63V
	C3	73.5100	10 µF -10 +100% elco TB	35V
	C4	76.5072	47 nF 10% polyest. FL	50V
	R1	80.5236	82 Ω 5% carbon film	1/8W
	R2	80.5236	82 Ω 5% " "	1/8W
	R3	80.5449	1 kΩ 5% " "	1/8W
	R4	86.5046	5 kΩ potentiometer lin.	0.15W
	R5	80.5234	56 Ω 5% carbon film	1/8W
	R6	80.5273	0.1 MΩ 5% carbon film	1/8W
	R7	86.007	10 kΩ potentiometer lin.	1/10W
	R8	80.5223	6.8 Ω 5% carbon film	1/8W
	R9	80.5230	27 Ω 5% " "	1/8W
	R10	80.5234	56 Ω 5% " "	1/8W
	R11	80.5236	82 Ω 5% " "	1/8W
	R12	80.5240	180 Ω 5% " "	1/8W
	R13	80.5243	330 Ω 5% " "	1/8W
	R14	80.5249	1 kΩ 5% " "	1/8W
	R15	80.52xx	See Note 6 - se note 6	
	V1	92.5003	Lamp BA7 24V 25 mA	
	V2	92.5004	Lamp BA7 12V 50 mA	
	V3	92.5003	Lamp BA7 24V 25 mA	
	E1	99.5020	Diode 1N4004	
	E2	99.5020	Diode 1N4004	
	E3	99.5020	Diode 1N4004	
	O1	47.392	Switch (channel)/omskifter (kanal)	
	O2	47.391	Switch (volume)/omskifter (styrke)	
	O3	49.141	Push-button/Trykknap	
	O4	49.142	Push-button/Trykknap	
	O5	49.142	Push-button/Trykknap	

Storno

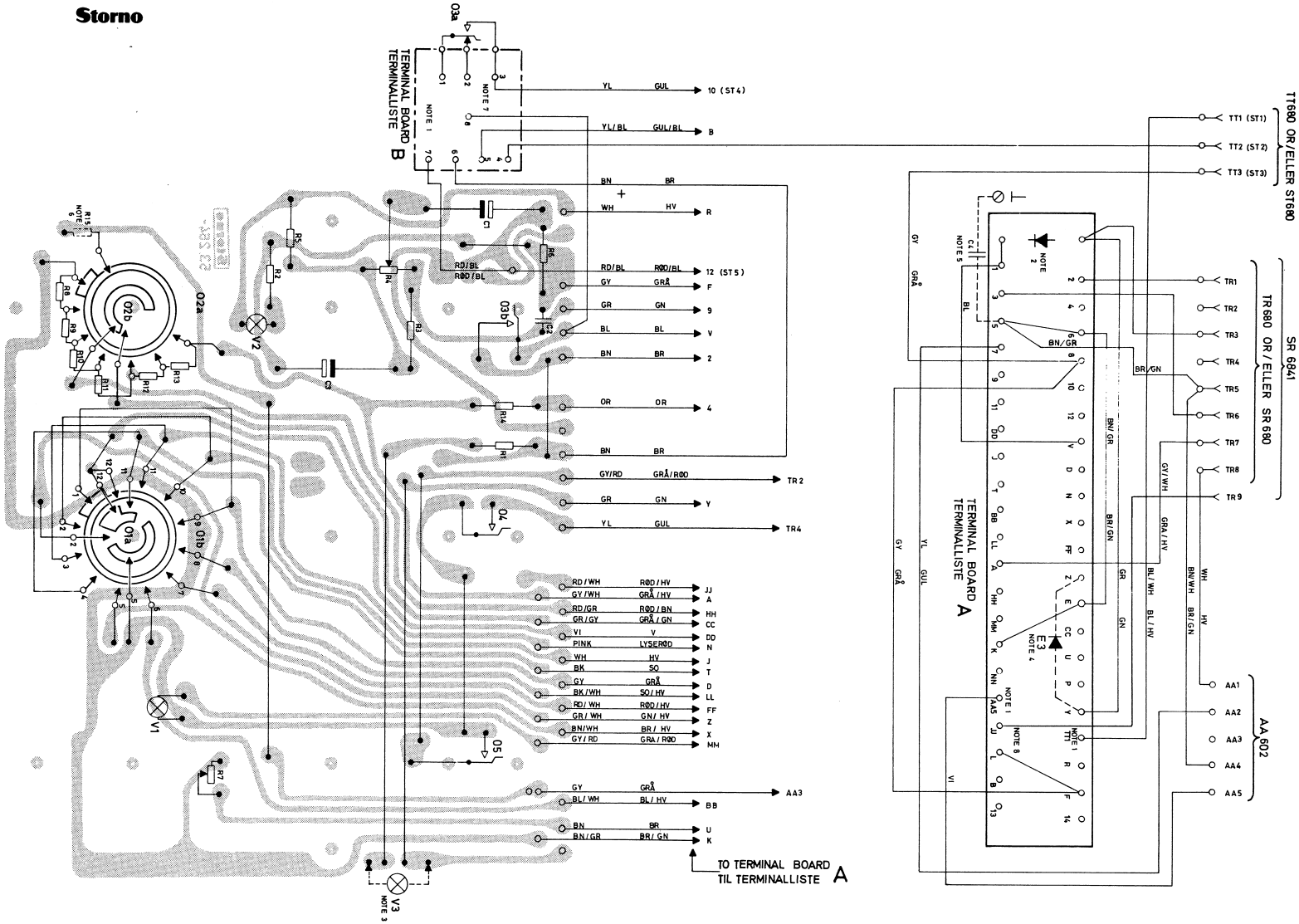
TYPE	NO.	CODE	DATA

CONTROL BOX
MANØVRE BOKS

X400.811/2

CB602a

Storno



Storno

NOTE 1. CONNECTIONS WITHOUT TONE EQUIPMENT
FORBINDELSER UDEN TONEUDSTYR

Term. Board A	Term. Board B
2 - 5	1 - 2
P - AA5	1 - 5
	2 - 7
	3 - 4

CONNECTIONS WITH TT680 BUT WITHOUT TR680
FORBINDELSER MED TT680, MEN UDEN TR680

Term. Board A	Term. Board B
2 - 5	1 - 5
P - AA5	2 - 7
TT1 - R	3 - 4

CONNECTIONS WITH TT680 AND TR680
FORBINDELSER MED TT680 OG TR680

Term. Board A	Term. Board B
Y - AA5	1 - 5
TT1 - R	2 - 7
	3 - 4

CONNECTIONS WITH TR680 BUT WITHOUT TT680
FORBINDELSER MED TR680, MEN UDEN TT680

Term. Board A	Term. Board B
Y - AA5	1 - 2
	1 - 5
	2 - 7

CONNECTION WITH ST680 BUT WITHOUT TR680 OR TR6841
FORBINDELSER VED ST680, MEN UDEN TR680 ELLER TR6841

Term. Board A	Term. Board B
Y - AA5	1 - 6
TT1 - Y	3 - 8 (See NOTE 7)
2-5	4 - 5

CONNECTIONS WITH ST680 AND TR680 OR WITH ST680 AND TR6841
FORBINDELSER MED ST680 OG TR680 ELLER MED ST680 OG TR6841

Term. Board A	Term. Board B
Y - AA5	1 - 6
TT1 - Y	3 - 8 (See NOTE 7)

CONNECTIONS WITH TR680 OR TR6841 BUT WITHOUT ST680
FORBINDELSER MED TR680 ELLER TR6841 MEN UDEN ST680

Term. Board A	Term. Board B
Y - AA5	1 - 2
	1 - 5
	2 - 7

NOTE 2. DIODE E1 IS INSERTED IN CB WITH TONE RECEIVER
DIODE E1 INDSÆTTES I CB MED TONEMODTAGER

NOTE 3. LAMP V3 IS INSERTED IN CB WITH TONE RECEIVER
LAMPE V3 INDSÆTTES I CB MED TONEMODTAGER

NOTE 4. DIODE E3 IS INSERTED IN CB WITH TONE EQUIPMENT AND MORE THAN 8 CHANNELS
DIODE E3 INDSÆTTES I CB MED TONEUDSTYR OG MERE END 8 KANALER

NOTE 5. CAPACITOR C4 IS INSERTED IN CB WITH TONE EQUIPMENT
KONDENSATOR C4 INDSÆTTES I CB MED TONEUDSTYR

NOTE 6. INPUT SENSITIVITY FOR 2W

Indgangsfølsomhed for 2W	+3dBm	0dBm	-3dBm	-6dBm	-9dBm
R15	22 kΩ	12 kΩ	6,8 kΩ	2,7 kΩ	0 Ω

NOTE 7. DIODE IS INSERTED IN CB WITH ST680 IF TRANSMIT BUTTON 03 IS USED FOR TONE CALLING AND EXTERNAL TRANSMIT BUTTON IS USED FOR TRANSMITTING
STRAP IS INSERTED IN CB WITH ST680 FOR IDENTIFICATION
DIODE INDSÆTTES I CB MED ST680, HVIS SENDETAST 03 BRUGES TIL TONEOPKALD OG YDRE SENDETAST BRUGES TIL SENDING
STRAPNING INDSÆTTES I CB MED ST680 FOR IDENTIFIKATION

NOTE 8. WITH SR6841 INSERT STRAP
MED SR6841 INDFØR STRAPNING

CONTROL BOX
MANØVRE BOKS

CB602a

D400.810/5

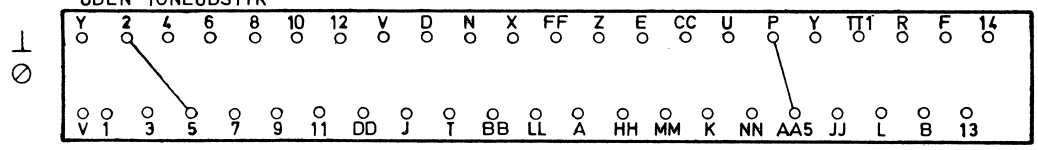
Storno

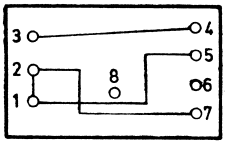
TERMINAL BOARD A
TERMINALLISTE

TERMINAL BOARD B
TERMINALLISTE

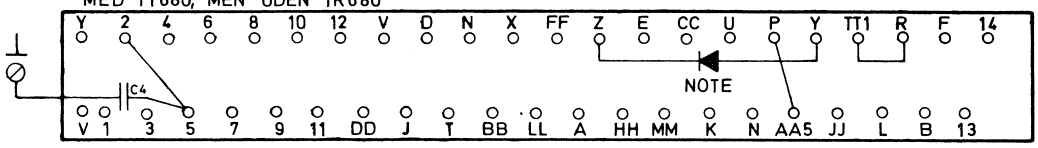
Storno

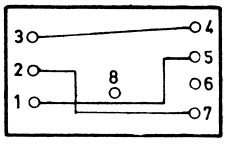
1. WITHOUT TONE EQUIPMENT
UDEN TONEUDSTYR



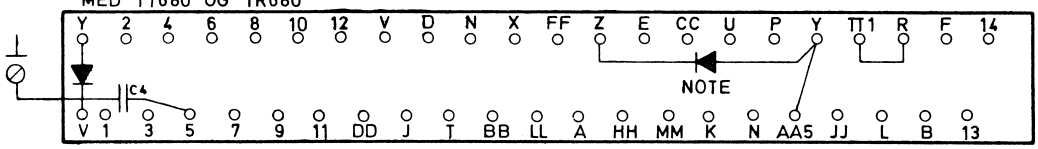


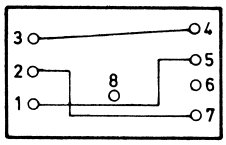
2. WITH TT680, BUT WITHOUT TR680
MED TT680, MEN UDEN TR680





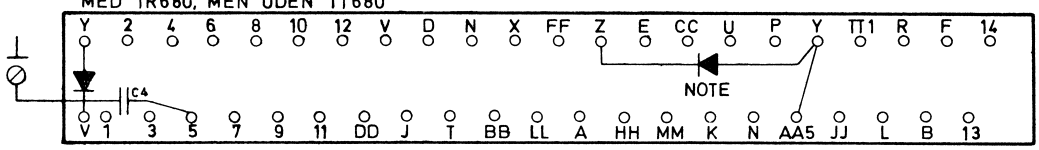
3. WITH TT680 AND TR680
MED TT680 OG TR680

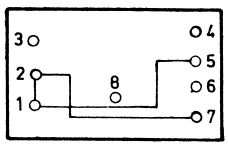




V3 INSERTED
ISÆTTES

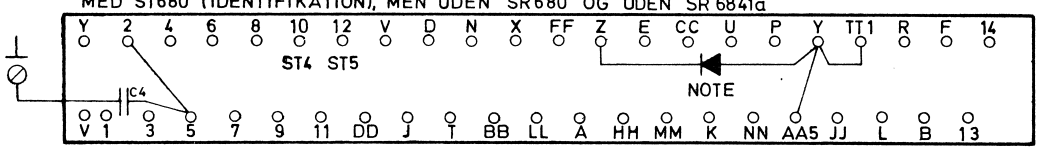
4. WITH TR680, BUT WITHOUT TT680
MED TR680, MEN UDEN TT680

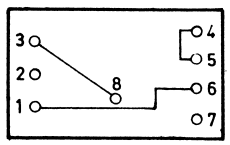




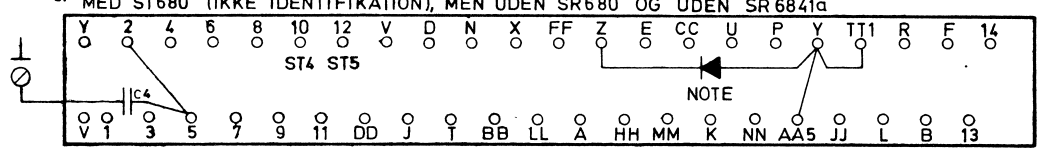
V3 INSERTED
ISÆTTES

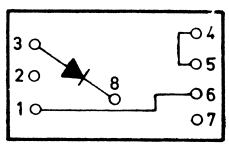
5. WITH ST680 (IDENTIFICATION), BUT WITHOUT SR680 OR SR 6841a
MED ST680 (IDENTIFIKATION), MEN UDEN SR680 OG UDEN SR 6841a





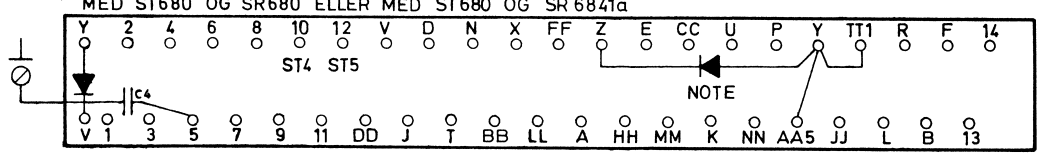
6. WITH ST680 (NOT IDENTIFICATION), BUT WITHOUT SR680 AND SR 6841a
MED ST680 (IKKE IDENTIFIKATION), MEN UDEN SR680 OG UDEN SR 6841a

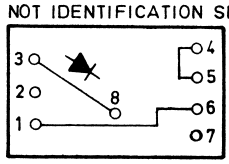




7. WITH ST680 AND SR680 OR ST680 AND SR6[illegible]a
MED ST680 OG SR680 ELLER MED ST680 OG SR 6841a

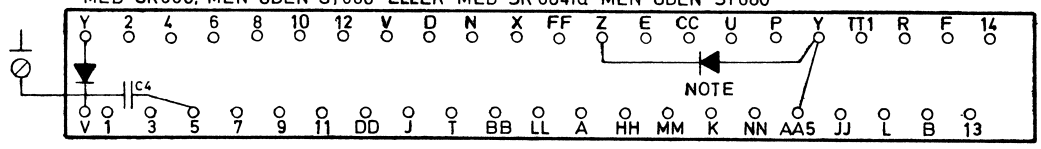
IDENTIFICATION SEE 5.
NOT IDENTIFICATION SEE 6.

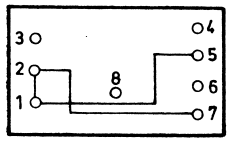




V3 INSERTED
ISÆTTES

8. WITH SR680, BUT WITHOUT ST680 OR WITH SR 6841a BUT WITHOUTH ST680
MED SR680, MEN UDEN ST680 ELLER MED SR 6841a MEN UDEN ST680





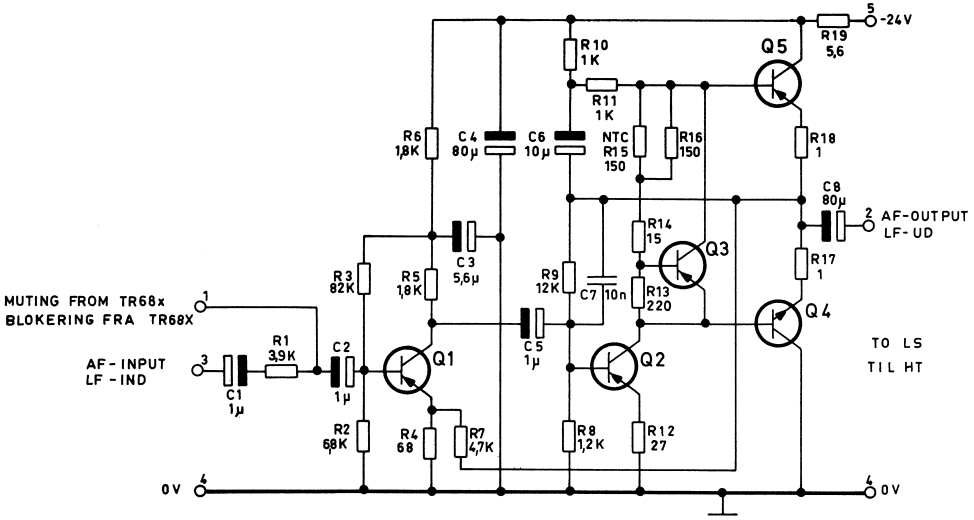
V3 INSERTED
ISÆTTES

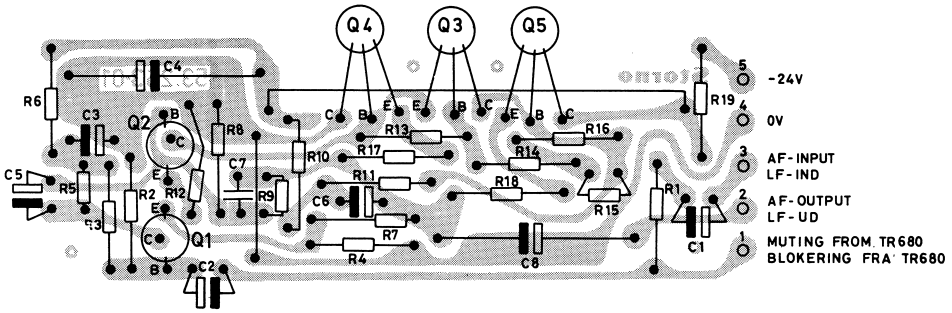
NOTE
DIODE IS INSERTED IN EQUIPMENT WITH TONE UNITS AND MORE THAN 8 CHANNELS
DIODE INDSÆTTES I UDSTYR MED TONEENHEDER OG MERE END 8 KANALER

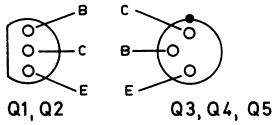
INSTALLATION OF TONE EQUIPMENT IN CB602a
INDBYGNING AF TONEUDSTYR I CB602a

D401.052/3

Storno







BOTTOM VIEW
SET FRA BUNDEN

AF-AMPLIFIER
LF-FORSTÆRKER

AA602c

D400.836/3

TYPE	NO.	CODE	DATA
	C1	73.5114	1 µF 20% Tantal 30V
	C2	73.5114	1 µF 20% " 30V
	C3	73.5113	5.6 µF 20% " 35V
	C4	73.5110	80 µF -10 +50% elco 25V
	C5	73.5114	1 µF 20% Tantal 30V
	C6	73.5109	10 µF 20% " 15V
	C7	76.5070	10 nF 10% polyest FL 50V
	C8	75.5110	80 µF -10 +50% elco 25V
	R1	80.5256	3.9 kΩ 5% carbon film 1/8W
	R2	80.5259	6.8 kΩ 5% " " 1/8W
	R3	80.5272	82 kΩ 5% " " 1/8W
	R4	80.5235	68 Ω 5% " " 1/8W
	R5	80.5252	1.8 kΩ 5% " " 1/8W
	R6	80.5252	1.8 kΩ 5% " " 1/8W
	R7	80.5257	4.7 kΩ 5% " " 1/8W
	R8	80.5250	1.2 kΩ 5% " " 1/8W
	R9	80.5262	12 kΩ 5% " " 1/8W
	R10	80.5249	1 kΩ 5% " " 1/8W
	R11	80.5249	1 kΩ 5% " " 1/8W
	R12	80.5230	27 Ω 5% " " 1/8W
	R13	80.5241	220 Ω 5% " " 1/8W
	R14	80.5227	15 Ω 5% " " 1/8W
	R15	89.5029	150 Ω 10% NTC 0.6W
	R16	80.5239	150 Ω 5% " 1/8W
	R17	80.5213	1 Ω 5% " 1/8W
	R18	80.5213	1 Ω 5% " 1/8W
	R19	81.5102	5.6 Ω 10% wirewound 1/2W
	Q1	99.5144	2N3702 Transistor
	Q2	99.5144	2N3702 "
	Q3	99.5106	AC125 "
	Q4, Q5	99.5165	AC176/128 "

Storno

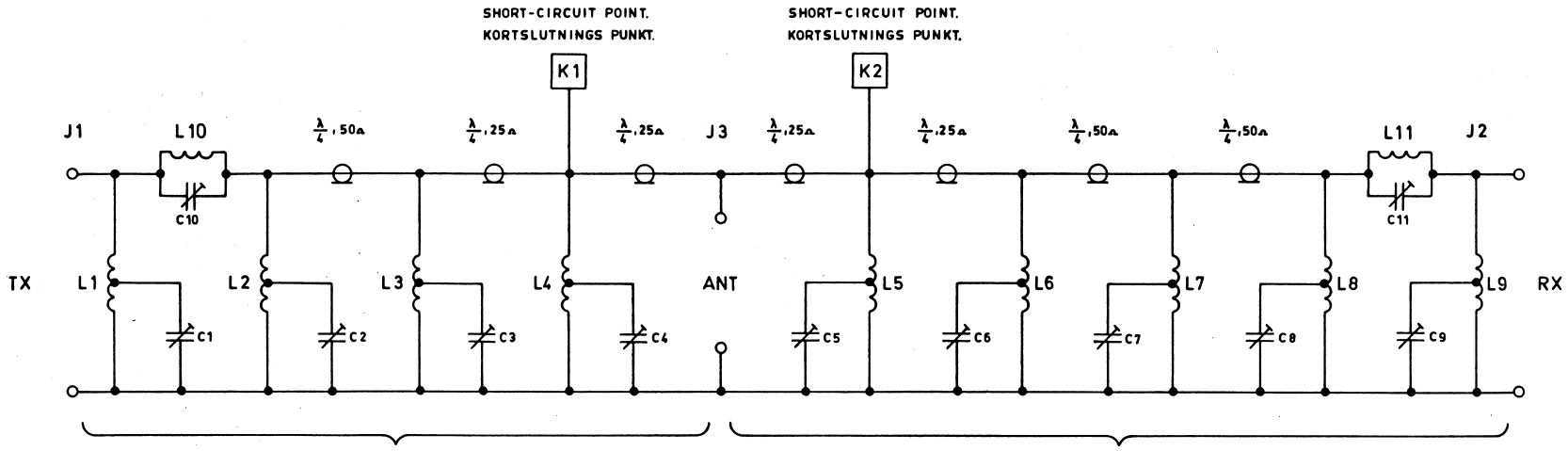
TYPE	NO.	CODE	DATA

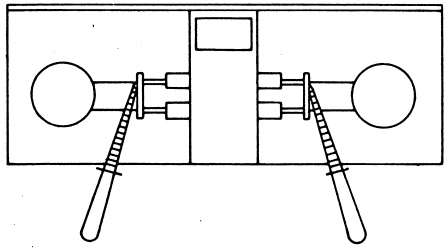
AF-AMPLIFIER
LF-FORSTÆRKER

AA602c

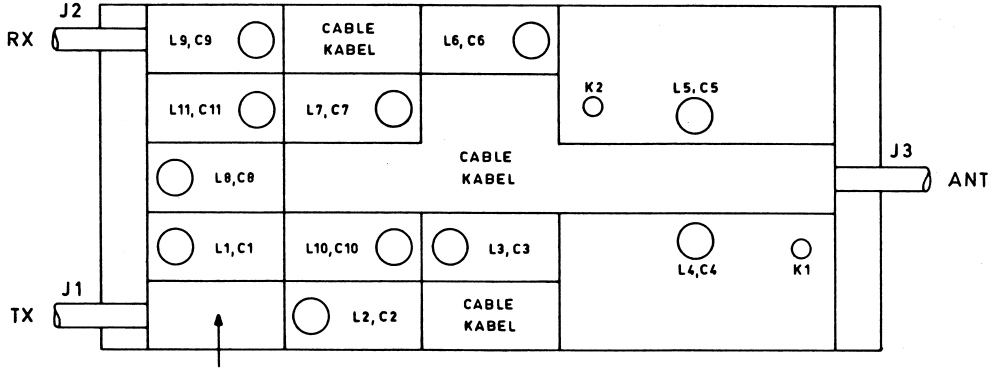
X400.677/5

Storno





SHORT-CIRCUITING PINS FOR K1 AND K2.
KORTSLUTNINGSPINDE TIL K1 OG K2.



EMPTY CAN (FOR RELAY, IF ANY)
TOM DÅSE (TIL EVT. RELÆ)

BRANCHING FILTER
DELEFILTER

BF611, BF612

D400.828/2

Storno

TYPE	NO.	CODE	DATA
	C1	78.5040	0.4 - 6.3 pF trimmer TB 500V
	C2	78.5040	0.4 - 6.3 pF trimmer TB 500V
	C3	78.5040	0.4 - 6.3 pF trimmer TB 500V
	C4	78.5040	0.4 - 6.3 pF trimmer TB 500V
	C5	78.5040	0.4 - 6.3 pF trimmer TB 500V
	C6	78.5040	0.4 - 6.3 pF trimmer TB 500V
	C7	78.5040	0.4 - 6.3 pF trimmer TB 500V
	C8	78.5040	0.4 - 6.3 pF trimmer TB 500V
	C9	78.5040	0.4 - 6.3 pF trimmer TB 500V
	C10	78.5041	4 - 60 pF " 500V
	C11	78.5041	4 - 60 pF " 500V
	L1	62.742	Coil/spole
	L2	62.742	"
	L3	62.742	"
	L4	62.748	"
	L5	62.748	"
	L6	62.742	"
	L7	62.742	"
	L8	62.742	"
	L9	62.742	"
	L10	62.749	"
	L11	62.749	"
	C10-L10	69.008	L-C circuit/kreds
	C11-L11	69.007	L-C circuit/kreds
BF612a		10.2042	CA6012 cabinet

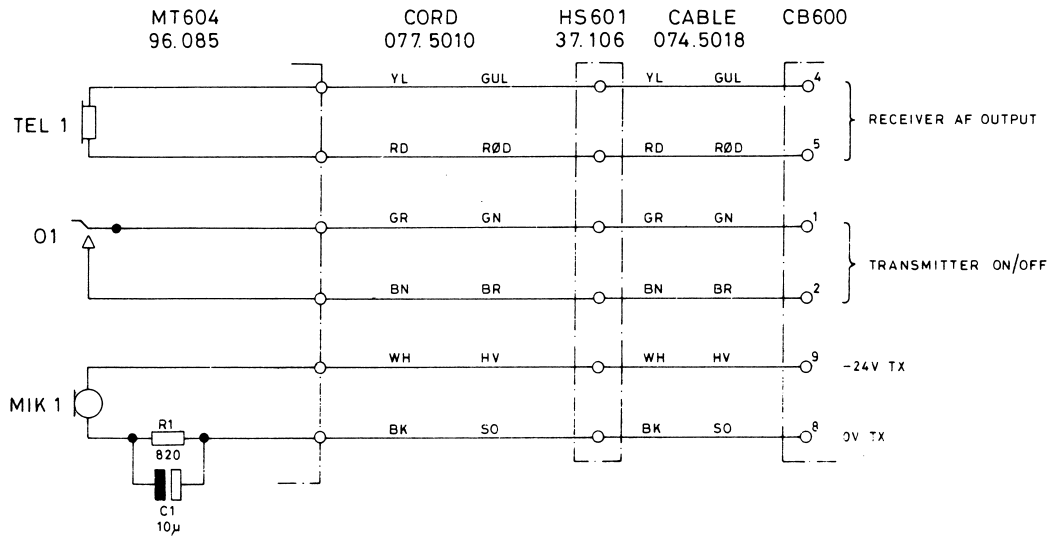
TYPE	NO.	CODE	DATA

BRANCHING FILTER
DELEFILTER

BF611, BF612a

X401.094

Storno



HANDSET MT601

D400.793/2

Storno

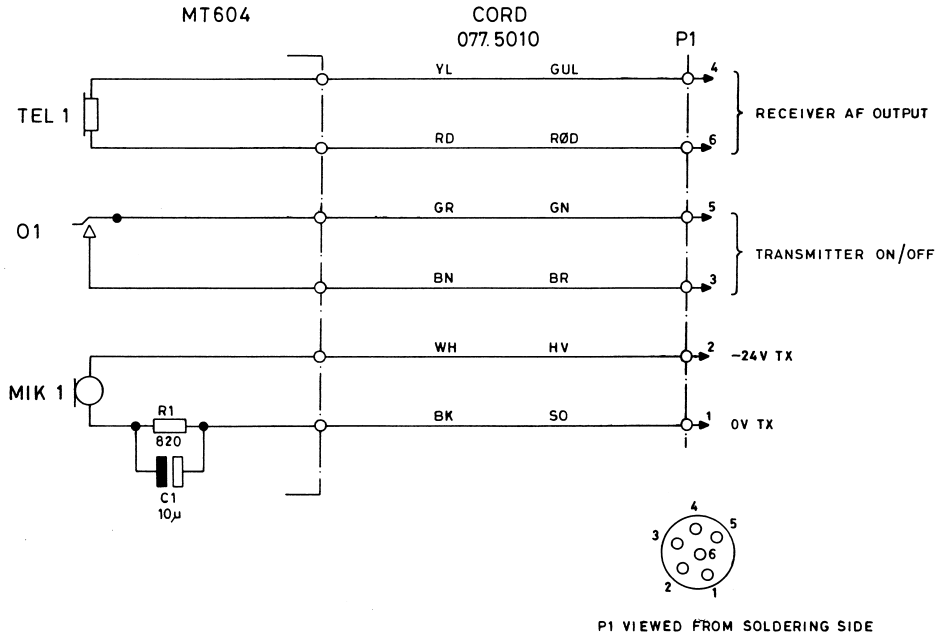
TYPE	NO.	CODE	DATA
MT601			Handset (Comprising MT604 and HS601) Mikrotelefon (omfattende MT604 og HS601)
MT604		96.085	Handset
HS601		37.106	Handset retainer
	C1	73.5109	10 µF 20% tantal 15V
	R1	80.5248	820 Ω 5% carbon film 1/8W
	O1	47.5039	Microswitch
	MIK1	96.5074	Microphone, dyn. 1500 Ω
	TEL1	96.5073	Receiver, dyn. 300 Ω

TYPE	NO.	CODE	DATA

HANDSET MT601

X401.225

Storno



HANDSET MT603

D400.910/2

TYPE	NO.	CODE	DATA
MT603			Handset (Comprising MT604 and Connector 41.5093)
MT604		96.085	Handset
	C1	73.5109	10 μF 20% tantal 15V
	R1	80.5248	820 Ω 5% carbon film 1/8W
	MIK1	96.5074	Microphone, dyn. 1500 Ω
	TEL1	96.5073	Receiver, dyn. 300 Ω
	P1	41.5093	Connector, 6-contact. Male

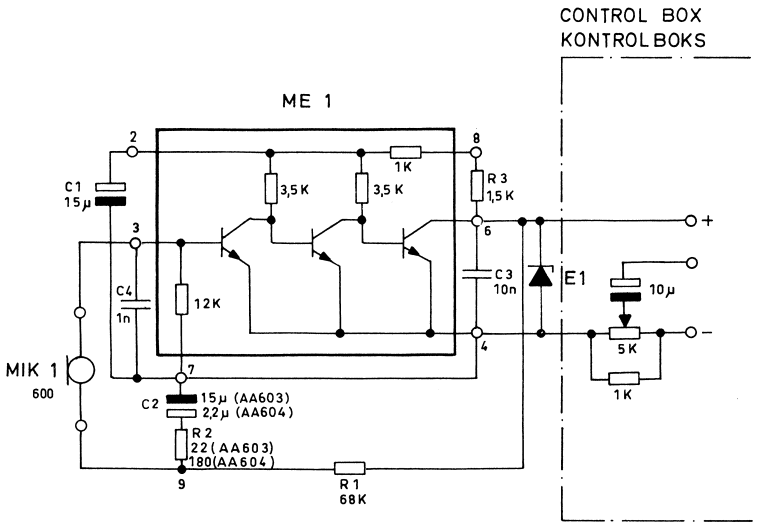
Storno

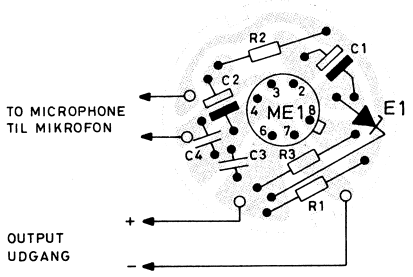
TYPE	NO.	CODE	DATA

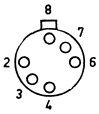
HANDSET MT603

X401.226

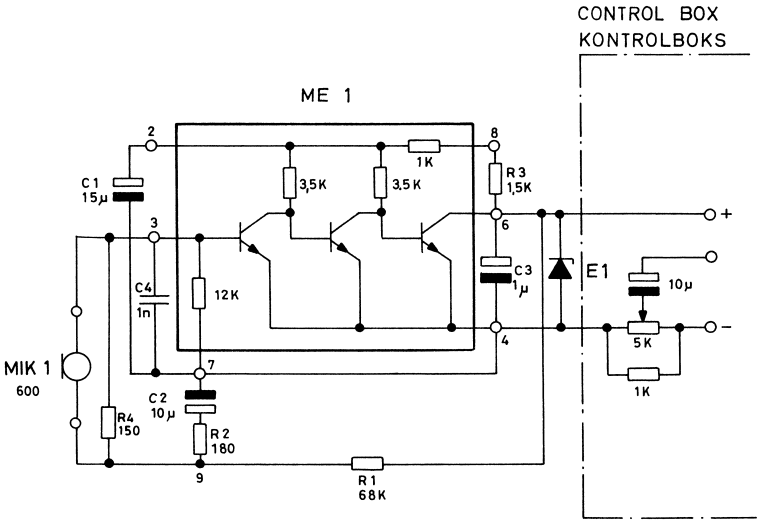
Storno

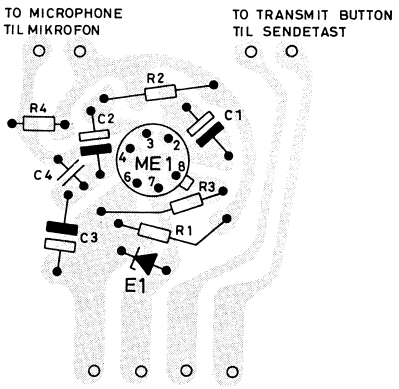


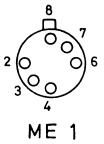




AA603, AA604







AA606

AF-AMPLIFIER
LF-FORSTÆRKER
AA603, AA604, AA606

D400.700/3

TYPE	NO.	CODE	DATA
	C1	73.5105	15 µF 20% tantal 15V
AA603	C2	73.5105	15 µF 20% tantal 15V
AA604	C2	73.5102	2.2 µF 20% tantal 35V
AA606	C2	73.5105	15 µF 20% tantal 15V
	C3	76.5070	1 nF 10% polyest FL 50V
	R1	80.5271	68 kΩ 5% carbon film 1/8W
AA603	R2	80.5229	22 Ω 5% " " 1/8W
AA604	R2	80.5240	180 Ω 5% " " 1/8W
AA606	R2	80.5240	180 Ω 5% " " 1/8W
	R3	80.5251	1.5 kΩ 5% " " 1/8W
	E1	99.5042	Zenerdiode 9,1V 5%
	ME1	14.5001	LF-forstærker 65 dB 40 mW AF-Amplifier

Storno

TYPE	NO.	CODE	DATA

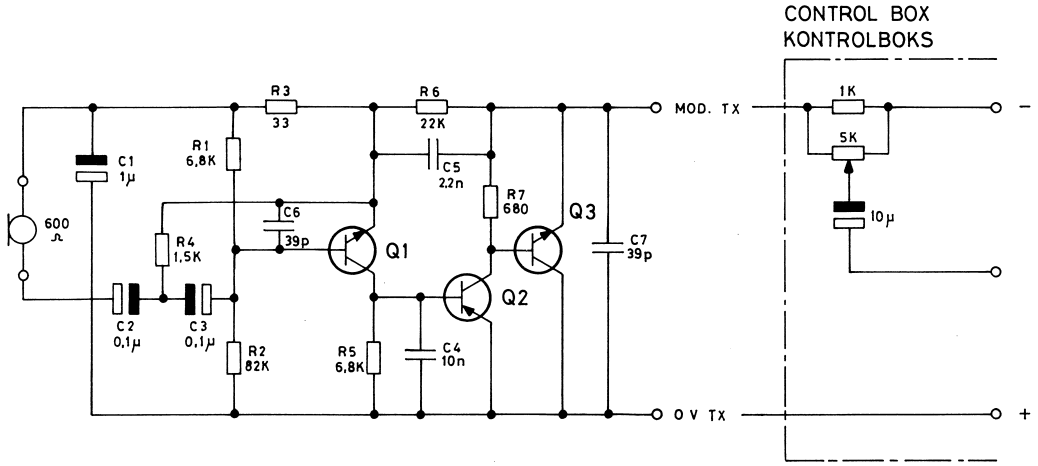
AF-AMPLIFIER
LF-FORSTÆRKER

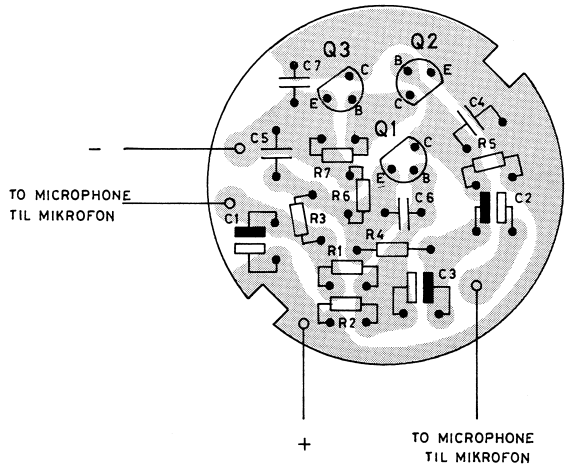
AA603, AA604, AA606

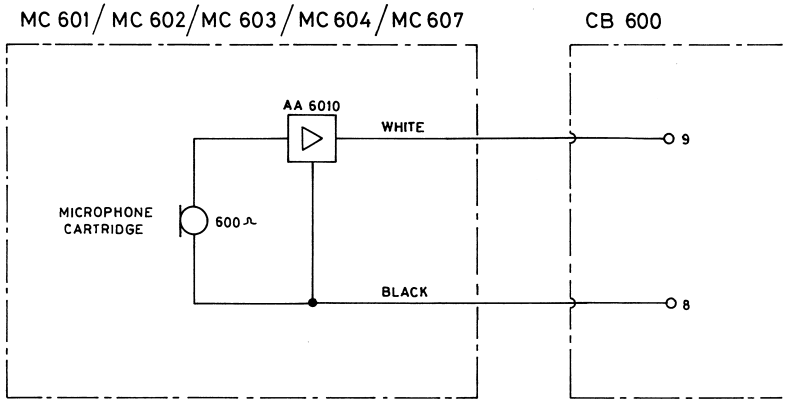
X400.909

Storno

Storno







MICROPHONE PREAMPLIFIER
MIKROFONFORSTÆRKER

AA6010

D 402.207/2

TYPE	NO.	CODE	DATA
AA6010		96.0099	Microphone Preamplifier
	C1	73.5114	1µF 20% tantal 35V
	C2	73.5089	0.1µF 20% tantal 35V
	C3	73.5089	0.1µF 20% tantal 35V
	C4	76.5070	10nF 10% polyest FL 50V
	C5	76.5059	2.2nF 10% polyest FL 50V
	C6	74.5187	39pF 10% ceram PL 25V
	C7	74.5187	39pF 10% ceram PL 25V
	R1	80.5259	6.8 KΩ 5% carbon film 1/8W
	R2	80.5272	82 KΩ 5% " 1/8W
	R3	80.5231	33 Ω 5% " 1/8W
	R4	80.5251	1.5 KΩ 5% " 1/8W
	R5	80.5259	6.8 KΩ 5% " 1/8W
	R6	80.5265	22 KΩ 5% " 1/8W
	R7	80.5247	680 Ω 5% " 1/8W
	Q1	99.5143-01	BC548 Transistor
	Q2	99.5230-01	BC558 Transistor
	Q3	99.5143-01	BC548 Transistor

Storno

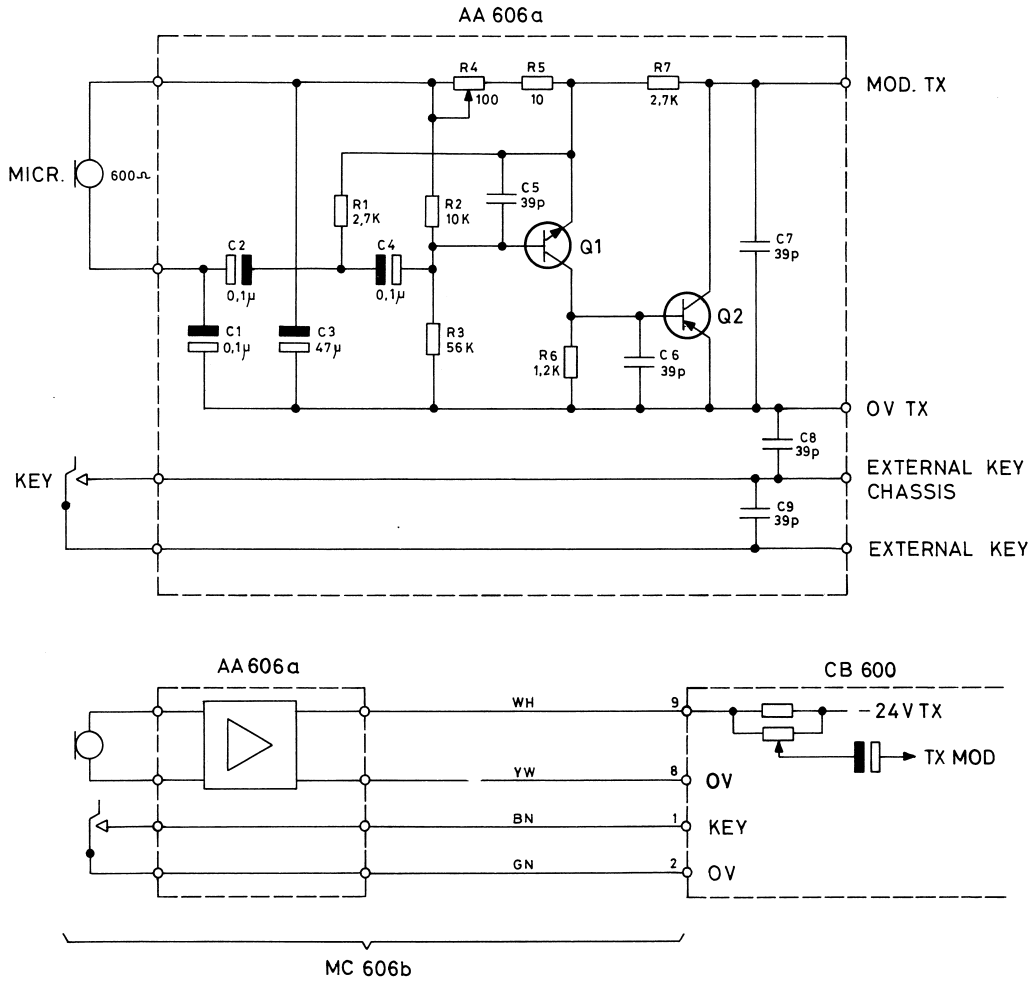
TYPE	NO.	CODE	DATA

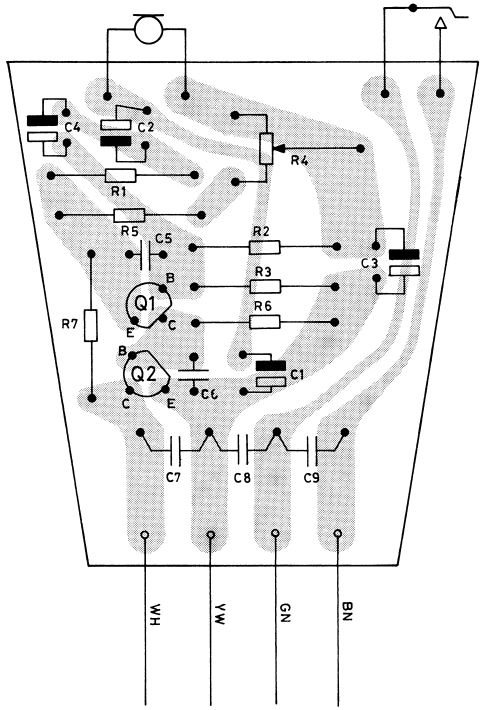
MICROPHONE PREAMPLIFIER
MIKROFONFORSTÆRKER

AA6010

X401.946

Storno





FIST MICROPHONE
HÅNDMIKROFON

MC 606b

D 402.208

Storno

TYPE	NO.	CODE	DATA
MC606b		96.0074-02	Fist M crophone
		96.5069	Microphone Cartridge
		10.1580-o1	Microphone Preamplifier
	01	47.5040	Micro Switch
AA606a		10.1580-01	Micro hone Preamplifier
	C1	73.5089	0.1µF 20% tantal 35V
	C2	73.5089	0.1µF 20% tantal 35V
	C3	73.5124	47µF 2o% tantal 6.3V
	C4	73.5089	0.1µF 20% tantal 35V
	C5	74.5187	39pF 10% ceram PL 25V
	C6	74.5187	39pF 10% ceram PL 25V
	C7	74.5187	39pF 10% cer m PL 25V
	C8	74.5187	39pF 10% ceram PL 25V
	C9	74.5187	39pF 10% ceram PL 25V
	R1	80.5254	2.7 KΩ 5% carbo film 1/8W
	R2	80.5261	10 KΩ 5% " 1/8W
	R3	80.5270	56 KΩ 5% " 1/8W
	R4	86.5 51	100 Ω 20% potentiometer 1/10W
	R5	80.5225	10 Ω 5% carbon film 1/8W
	R6	80.5250	1.2 KΩ 5% " 1/8W
	R7	80.5254	2.7 KΩ 5% " 1/8W
	Q1	99.5117	2N2924 Transistor
	Q2	99.5144	BC214L Transistor

Storno

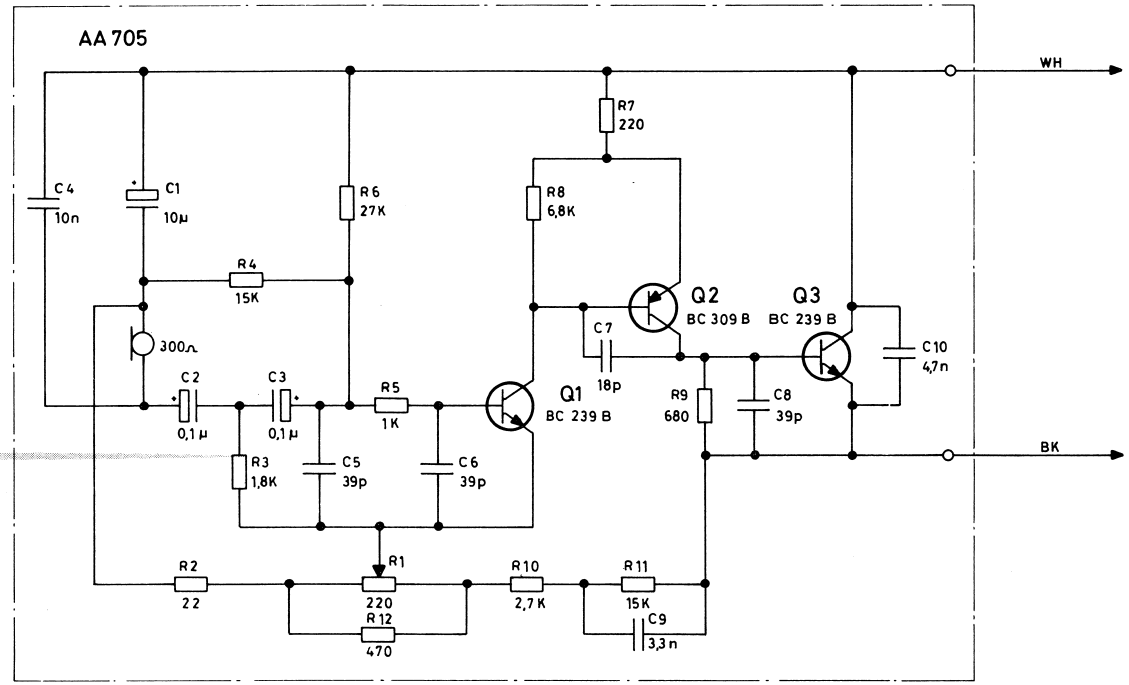
TYPE	NO	CODE	DATA

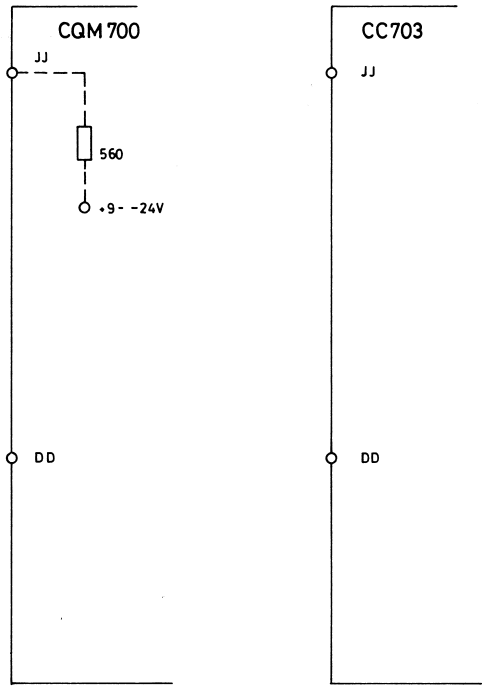
FIST MICROPHONE
HÅNDMIKROFON

MC606

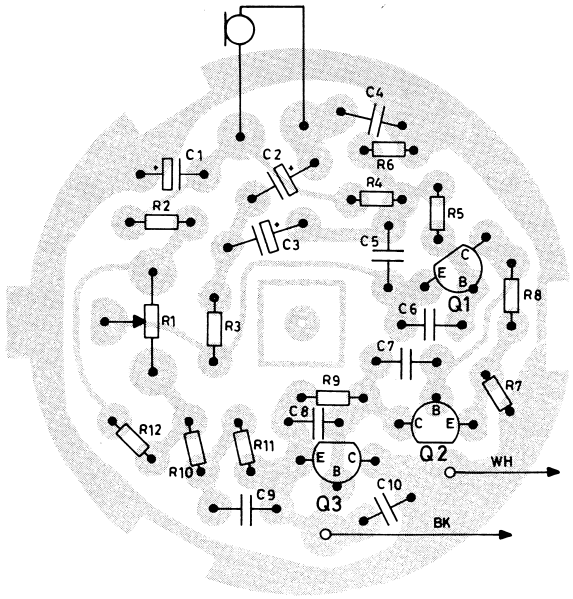
X401.947

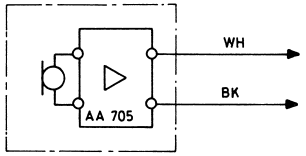
Storno



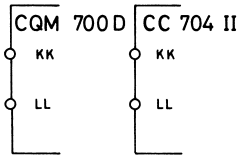


CQM 700 a

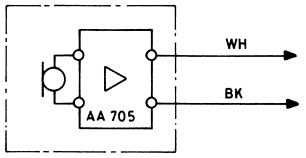




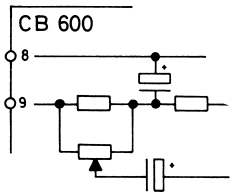
MC 704



CQM 700 D



MC 704



CQM 600

MICROPHONE MC 704
W. AMPLIFIER AA 705

D402.666

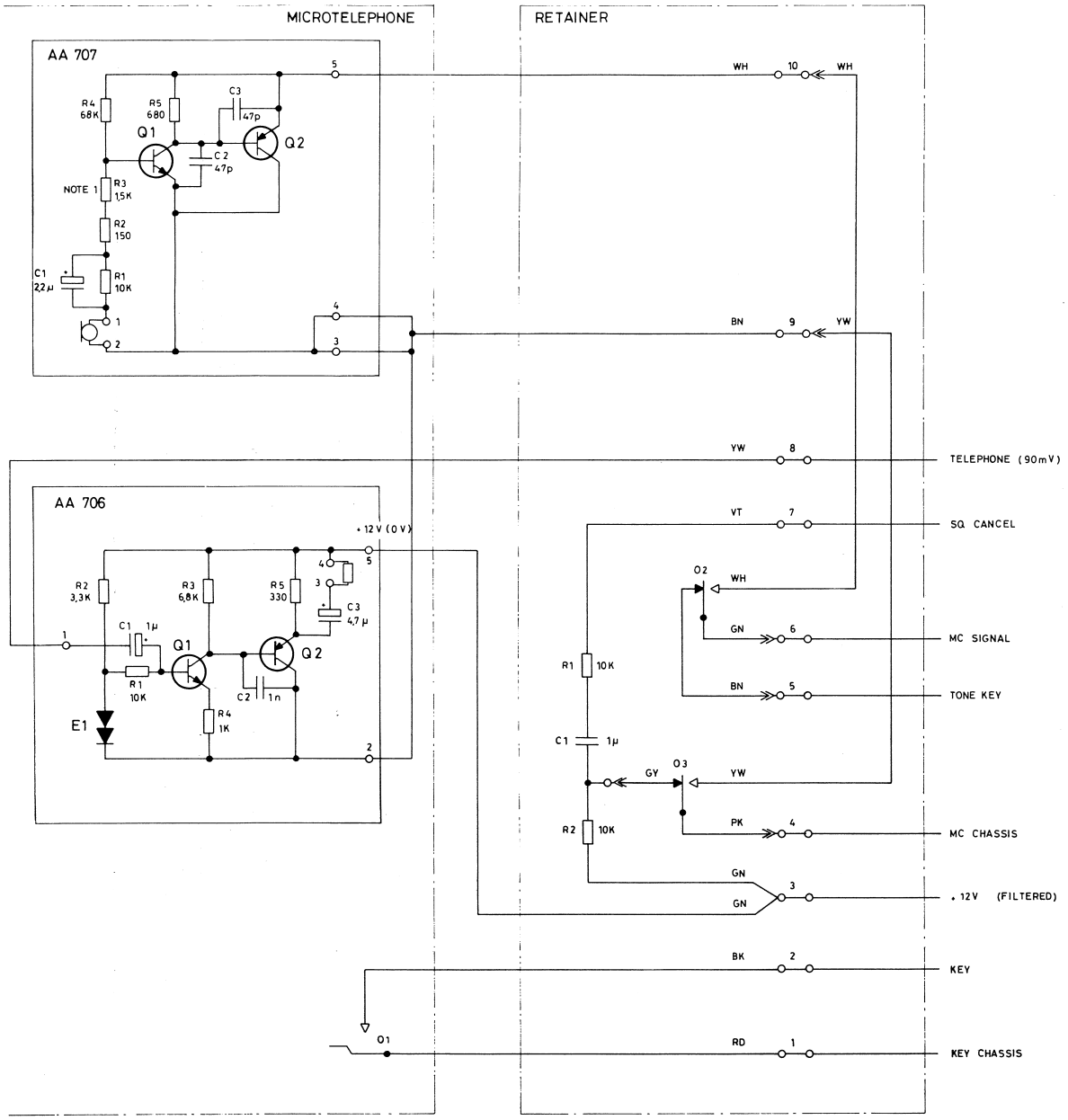
TYPE	Nº	CODE	DATA			
		96.0102	MC704		Microphone	
		10.3614	AA705		AF amplifier	
		17.0062	Installation Kit			
			AA705			
	C1	73.5109	10uF	±20%	tantal	16V
	C2	73.5089	0.1uF	±20%	tantal	35V
	C3	73.5089	0.1uF	±20%	tantal	35V
	C4	74.5109	10nF		cer	
	C5	74.5187	39pF	10%	cer	25V
	C6	74.5187	39pF	10%	cer	25V
	C7	74.5138	18pF	5%	cer	125V
	C8	74.5187	39pF	10%	cer	25V
	C9	76.5060	3.3n		polyester	50V
	C10	74.5108	4.7nF		cer	20V
	R1	86.5076	220ohm	20%	potentiometer	0.1W
	R2	80.5229	22ohm	5%	carbon film	1/8W
	R3	80.5252	1.8kohm	5%	carbon film	1/8W
	R4	80.5263	15kohm	5%	carbon film	1/8W
	R5	80.5249	1kohm	5%	carbon film	1/8W
	R6	80.5266	27kohm	5%	carbon film	1/8W
	R7	80.5241	220kohm	5%	carbon film	1/8W
	R8	80.5259	6.8kohm	5%	carbon film	1/8W
	R9	80.5247	680kohm	5%	carbon film	1/8W
	R10	80.5254	2.7kohm	5%	carbon film	1/8W
	R11	80.5263	15kohm	5%	carbon film	1/8W
	R12	80.5245	470ohm	5%	carbon film	1/8W
	Q1	99.5201			transistor BC 239B	
	Q2	99.5115			transistor BC 309B	
	Q3	99.5201			transistor BC 239B	

Storno

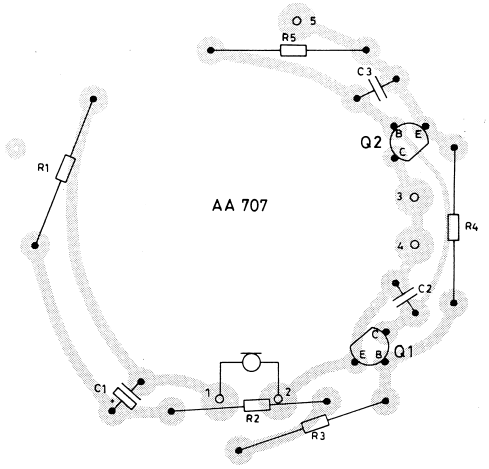
TYPE	Nº	CODE	DATA

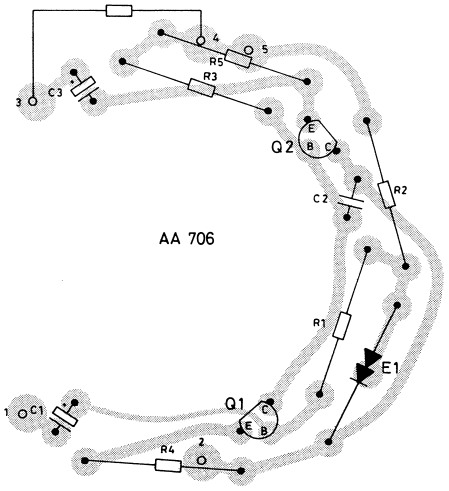
MICROPHONE MC704

X402.651



NOTE 1: R3 TO BE SHORT CIRCUITED WHEN AA707 IS USED IN CONJUNCTION WITH CQM700a OR CQM600. SEE I 25171.





MICROTELEPHONE MT 704 WITH RETAINER

D402.667

TYPE	Nº	CODE	DATA			
		96.0101	MT704		Micro- Telephone	
		96.0104			microphone with amp.	
		96.5088-01			retainer with switch	
		10.3616	AA706		telephone amplifier	
		10.3617	AA707		microphone amplifier	
	C1	76.5078	1uF	10%	polyester TB	100V
	R1	80.5061	10kohm	5%	carbon	1/10W
	R2	80.5061	10kohm	5%	carbon	1/10W
		17.0115			Kit for 600-series	
			AA706			
	C1	73.5114	1uF	20%	tantal	35V
	C2	74.5345	1nF	10%	ceram 2PL	65V
	C3	73.5126	4.7uF	20%	tantal	35V
	R1	80.5261	10kohm	5%	carbon film	1/8W
	R2	80.5255	3.3kohm	5%	carbon film	1/8W
	R3	80.5259	6.8kohm	5%	carbon film	1/8W
	R4	80.5249	1kohm	5%	carbon film	1/8W
	R5	80.5243	330ohm	5%	carbon film	1/8W
	Q1	99.5143			transistor BC238	
	Q2	99.5230			transistor BC308	
	E1	99.5209			stabilizing diode	1.5V
			AA707			
	C1	73.5102	2.2uF	20%	tantal	35V
	C2	74.5186	47pF	10%	cer N 750 PL	25V
	C3	74.5186	47pF	10%	cer N 750 PL	25V
	R1	80.5261	10kohm	5%	carbon film	1/8W
	R2	80.5239	150ohm	5%	carbon film	1/8W
	R3	80.5251	1.5kohm	5%	carbon film	1/8W
	R4	80.5271	68ohm	5%	carbon film	1/8W
	R5	80.5247	680ohm	5%	carbon film	1/8W
	Q1	99.5143			transistor BC 238	
	Q2	99.5230			transistor BC 308	
			Kit for 600-series			
		80.5237	100ohm	5%	carbon film	1/8W
		80.5251	1.5ohm	5%	carbon film	1/8W

Storno

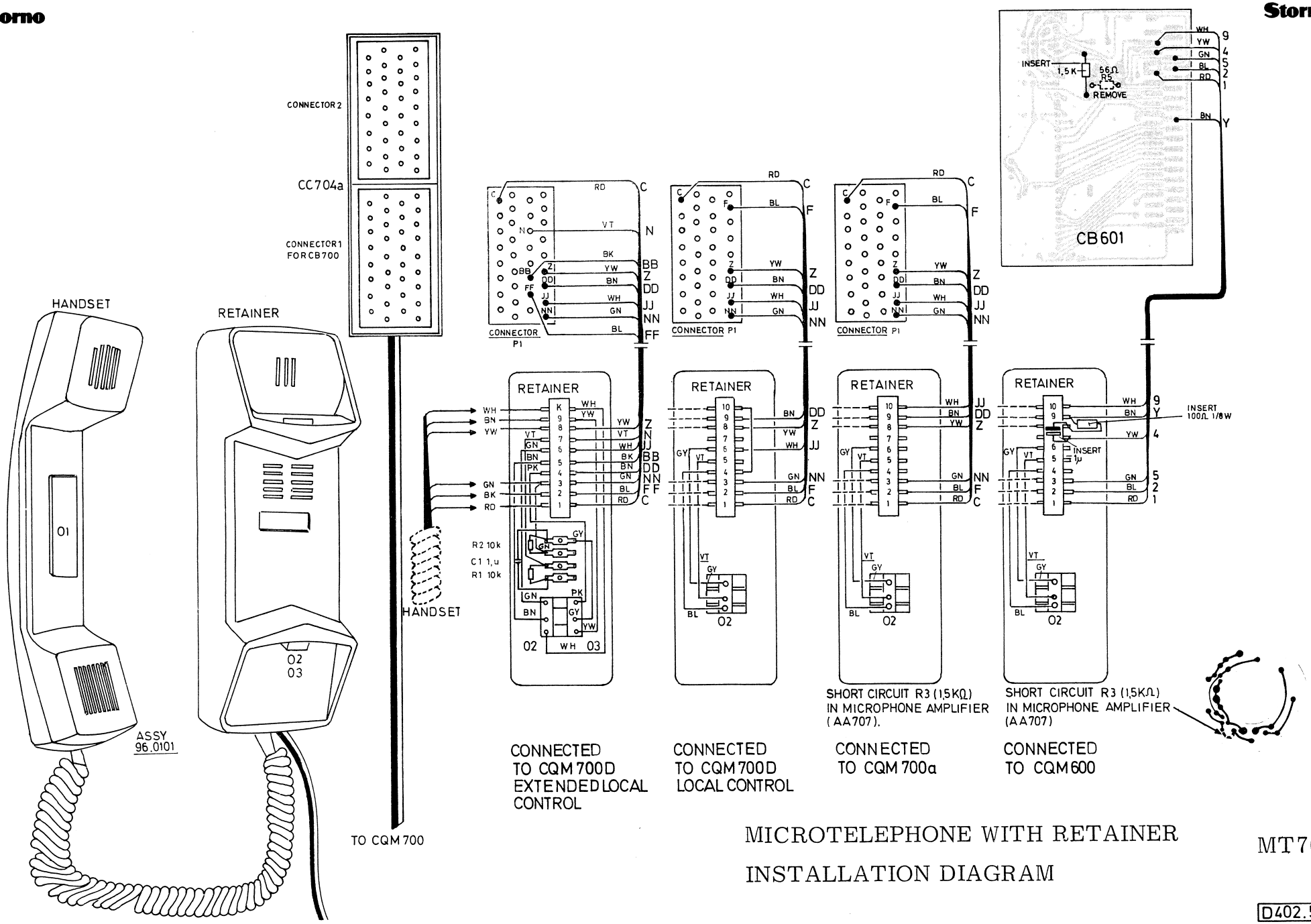
TYPE	Nº	CODE	DATA

HANDSET MT704

X402.650

Storno

Storno



MICROTELEPHONE WITH RETAINER INSTALLATION DIAGRAM

MT704

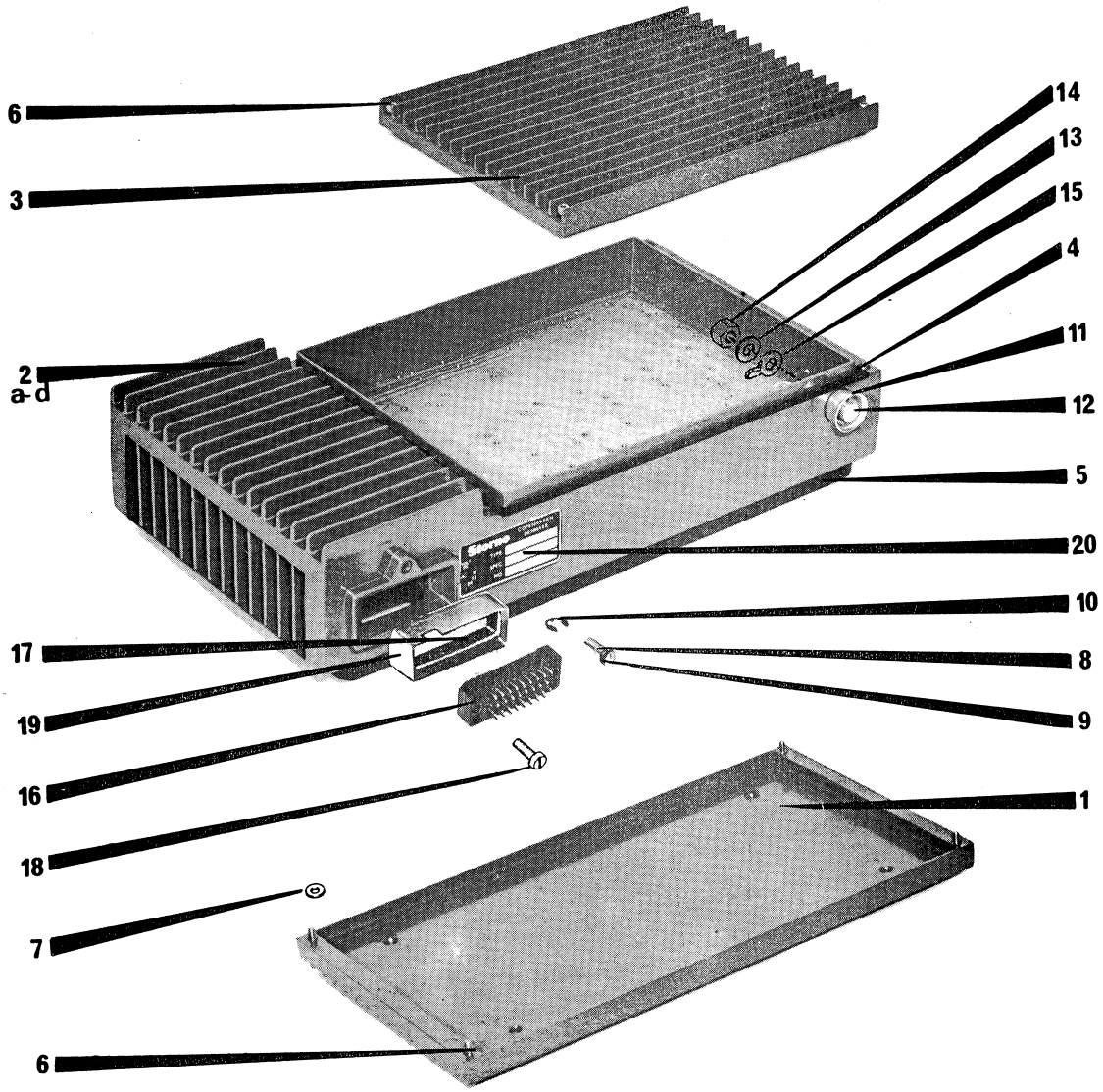
D402.507/3

Storno

CHAPTER VII. MECHANICAL PARTS LISTS

When ordering mechanical parts from Storno please state the code numbers and descriptions given in the parts lists.

Storno

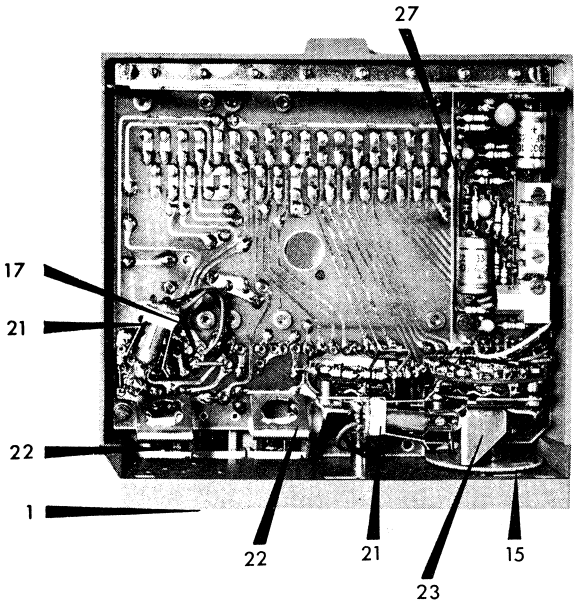


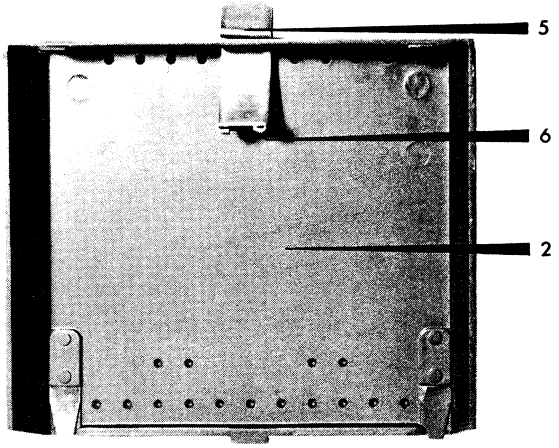
CABINET FOR CQM600
GEHÄUSE FÜR SQM600

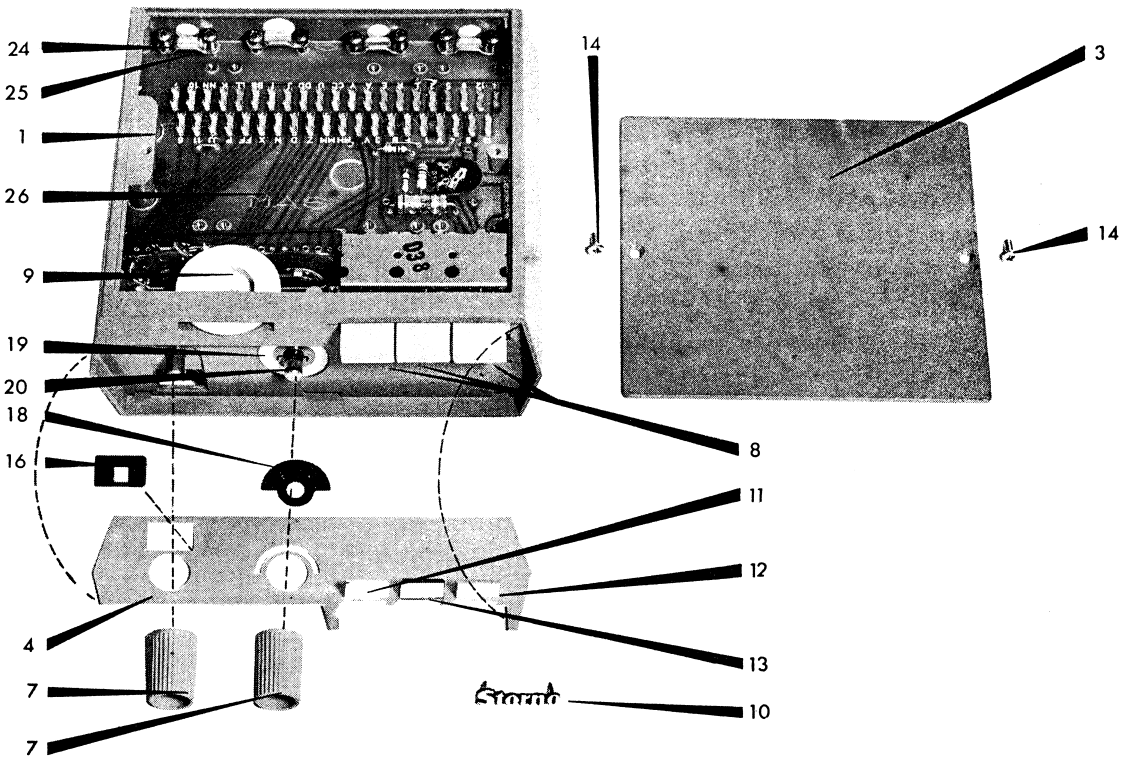
M405.012

ITEM	CODE	DESCRIPTION
	10.1157	Cabinet CA601 for CQM610 and CQM630 with one hole for antenna connector
	10.1555	Cabinet CA608 for CQM610 and CQM630 with two holes for antenna connectors
	10.2111	Cabinet CA6014 for CQM660 with one hole for antenna connector
	10.2112	Cabinet CA6015 for CQM660 with two holes for antenna connectors
1	12.059-00	Base plate Bundplade
2a	12.057-00	Intermediate cabinet section for CA601 Kabinet mellemplade til CA601
2b	12.103	Intermediate cabinet section for CA608 Kabinet mellemplade til CA608
2c	12.134	Intermediate cabinet section for CA6014 Kabinet mellemplade til CA6014
2d	12.135	Intermediate cabinet section for CA6015 Kabinet mellemplade til CA6015
3	12.058-00	Lid Låg
4	32.149	Gasket Pakning
5	32.150	Gasket Pakning
6	20.033-040.15	Screw Skrue
7	36.124	Lock-ring Låsering
8	55.017-01	Extension piece for voltage switch Omskifteraksel
9	32.5018	Gasket Pakning
10	24.45-110.050	Lock-ring Låsering
11	38.042	Connector collar Konnektorbrønd
12	41.150-01	Antenna connector Antenne konnektor
13	32.194	Gasket Pakning
14	29.180	Nut Møtrik
15	34.038	Soldering lug Loddeflig
16	41.5081	34-way connector, male 34-polet konnektor, han
17	32.160	Gasket Pakning
18	20.022-026.06	Screw M2.6 x 6 Skrue M2,6 x 6
19	13.031	Code screen Kodeskærm
20	51.362	Type plate Typeskilt

CABINET FOR CQM600
KABINET FOR CQM600







CONTROL BOX
BEDIENUNGSGERÄT

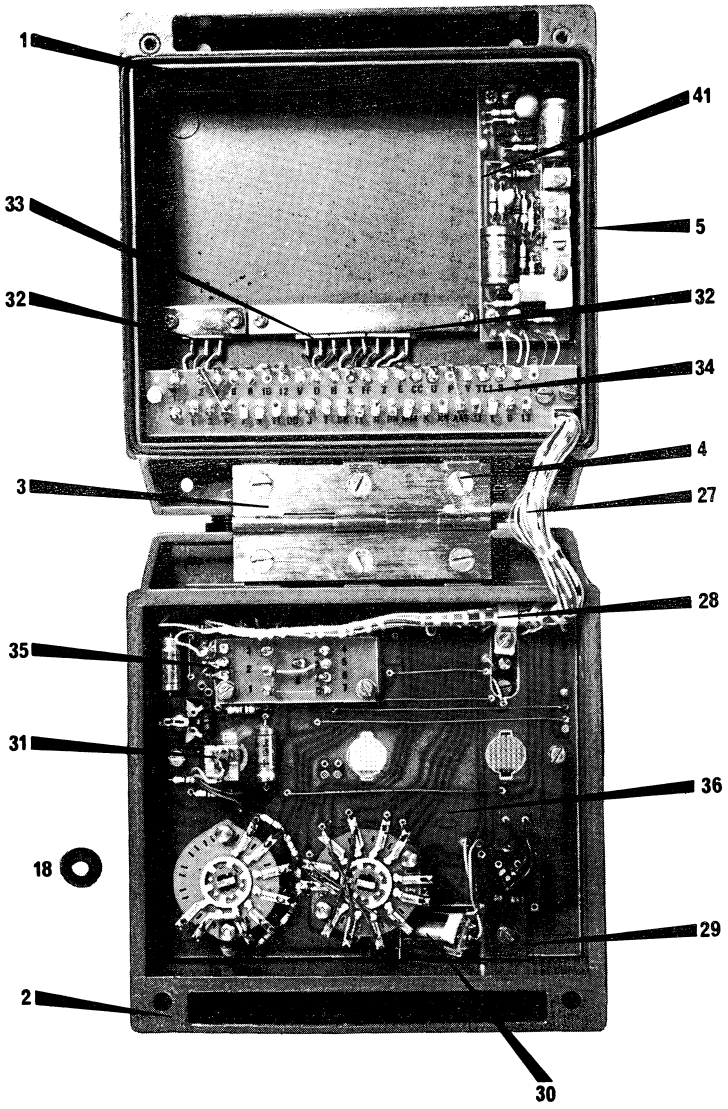
CB601

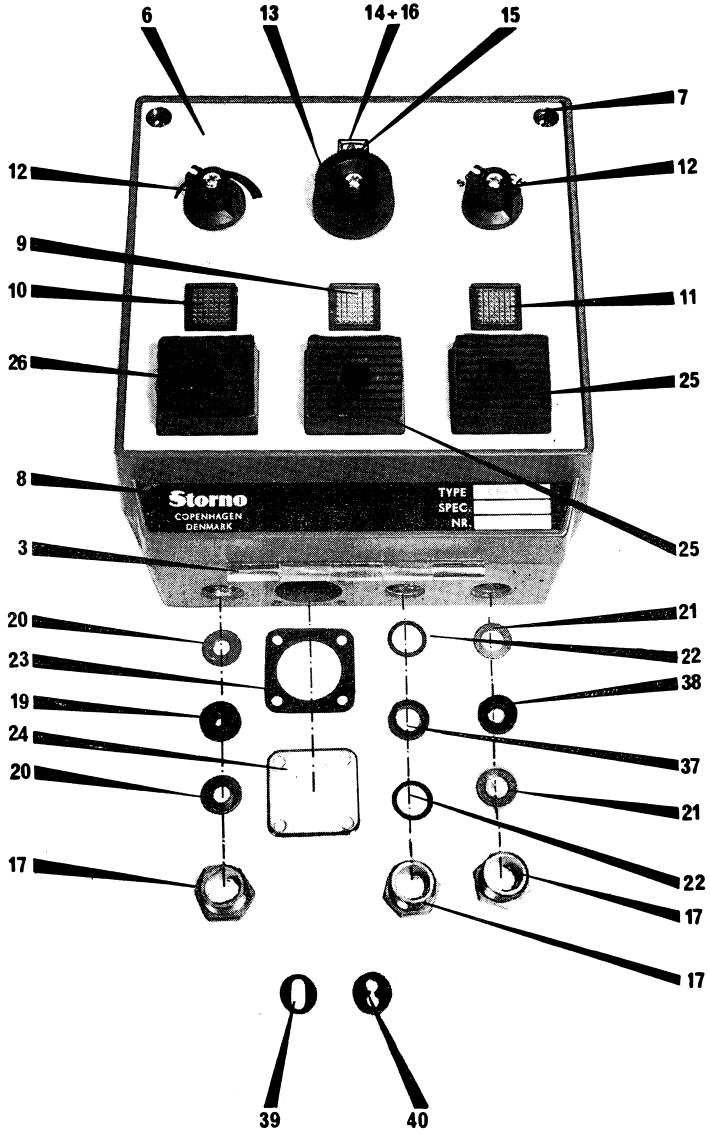
M405.003/2

ITEM	CODE	DESCRIPTION
1	12.060	Cabinet Kabinet
2	12.061	Cover Låg
3	52.023	Blanking Plate Bundplade
4	51.352-01	Escutcheon Forplade
5	36.125	Spring Clip Låsefjeder
6	33.180	Retaining Clamp Stopbøjle
7	49.111-01	Control Knob Assembly Knap, komplet
8	49.5020	Push Button Trykknap
9	86.004	Squelch Knob, Integral Part of R7 Knap med potentiometer R7
10	51.354	Motif Firmaskilt
11	48.005	Lens, Green Lampeglas, grønt
12	48.006	Lens, Red Lampeglas, rødt
13	48.007	Lens, Black Lampeglas, sort
14	21.122-030.08	Screw M3x8 Skrue
15a	50.020	Channel Indicator, Numbered Kanalvælgerskala med tal
15b	50.024	Channel Indicator, Blank Kanalvælgerskala uden tal
16	52.022	Window Piece Ramme
17	20.022-026.08	Screw M2.6x8 Skrue
18	32.153-01	Volume Scale Skalaindikator
19	32.154	Washer Underlagsskive
20	36.128	Spring Fjeder for underlagsskive
21	46.008	Lamp Holder Lampeholder
22	33.179	Lamp Holder Bracket Vinkel for lampeholder
23	33.181	Switch Bracket Vinkel for omskifter
24	20.412-029.13	Screw BZ2.9x13 Skrue
25	38.5011	Clamp Aflastningsbøjle
26	53.193-04.25	Printed Circuit Board Ledningsplade uden komponenter
27	10.1589-03	AF Output Amplifier AA602 LF-forstærkerenhed AA602

CONTROL BOX CB601

Storno





CONTROL BOX
BEDIENUNGSGERÄT

CB602a

M405.001

Storno

ITEM	CODE	DESCRIPTION
1	12.079-01	Cabinet rear part Kabinet underdel
2	12.078	Cabinet front part Kabinet overdel
3	37.093	Hinge Hængsel
4	20.041-030.06	Screw M3 x 6 (Hinge) Skrue for hængsel
5	32.092	Gasket Tætningsliste
6	51.397	Escutcheon Forplade
7	20.033-040.36	Screw M4 x 36 Skruer
8	51.480	Nameplate Skilt
9	48.5024	Lens, yellow Lampeglas (gul)
10	48.5023	Lens, red Lampeglas (rød)
11	48.5022	Lens, green Lampeglas (grøn)
12	49.081	Knob, small Knap (lille)
13	49.086	Knob, large Knap (stor)
14	50.021	Channel indicator, numbered Skala samlet
15	29.138	Window Skalarude
16	50.026	Channel indicator, blank Kanalvælgerskive u. tal
17	28.066	Threaded nipple Nippel
18	32.5001	O-Ring 5.3 ID, 10.1 OD Pakning under betjeningsknapper
19	32.209	Sealing ring Pakning
20	29.199	Washer Skiver
21	29.198	Washer Skiver
22	29.175-01	Fibre washer Fiberskiver
23	32.094	Flange gasket Gummiskive
24	29.142	Flange plate Dækplade
25	49.142-01	Push button switch assembly Trykknap komplet
26	49.141-01	Push button switch assembly Trykknap komplet
27	18.526	Cableform Kabling
28	38.5017	P-Clip Ledningsholder

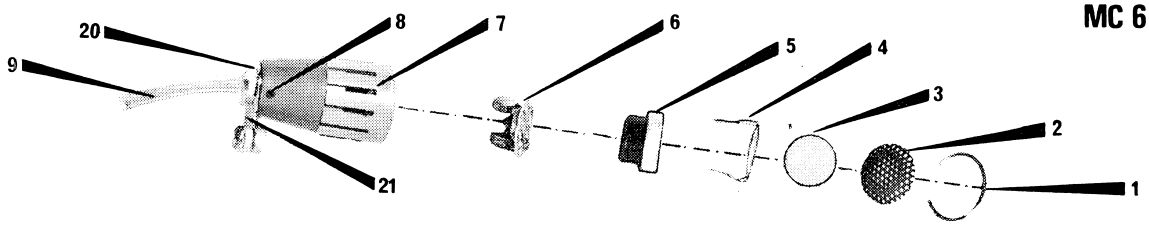
CONTROL BOX CB602a

Storno

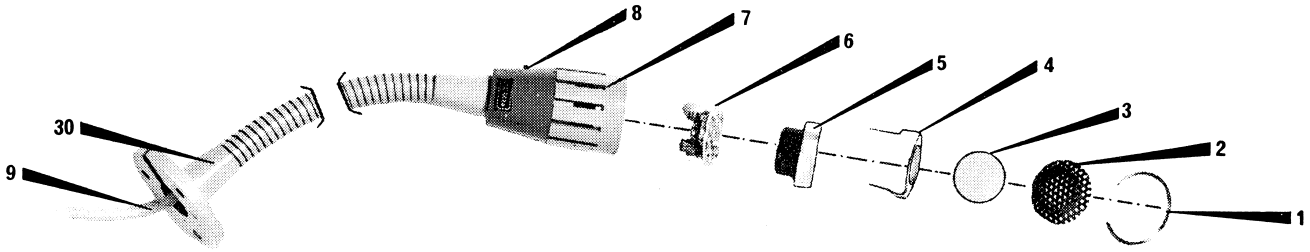
ITEM	CODE	DESCRIPTION
29	33.230	Lamp bracket Vinkelbøjle
30	46.008	Lamp holder Lampeholder
31	46.008	Lamp holder Lampeholder
32	41.153	3 way connector, female Konnektor 3-pol.
33	41.154	5 way connector, female Konnektor 5-pol.
34	43.066	Terminal board Terminalbrædt
35	43.067	Terminal board Terminalbrædt
36	53.264	Printed circuit without components Printplade u. komponenter
37	32.157-01	Sealing ring Gummibøsning
38	32.208	Sealing ring Gummibøsning
39	29.127	Fibre washer Pakring
40	32.073	Sealing ring (battery cable) Gummibøsning

Storno

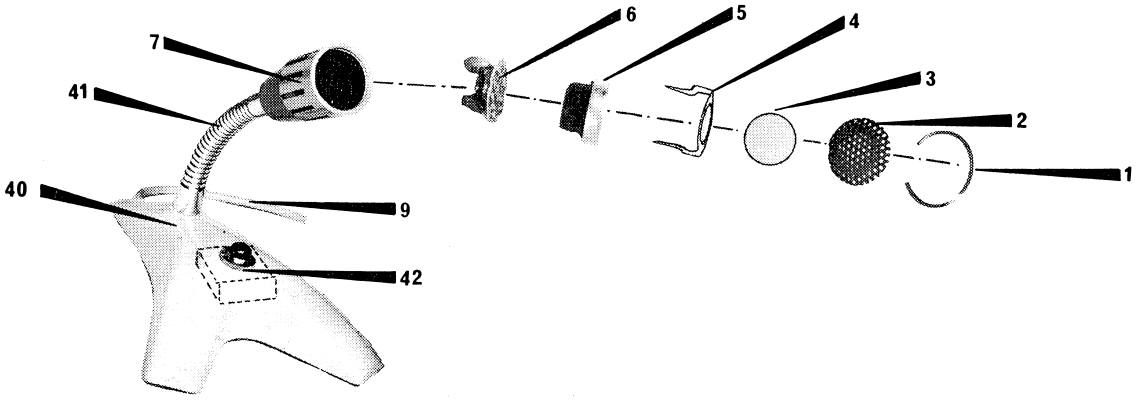
MC 601a



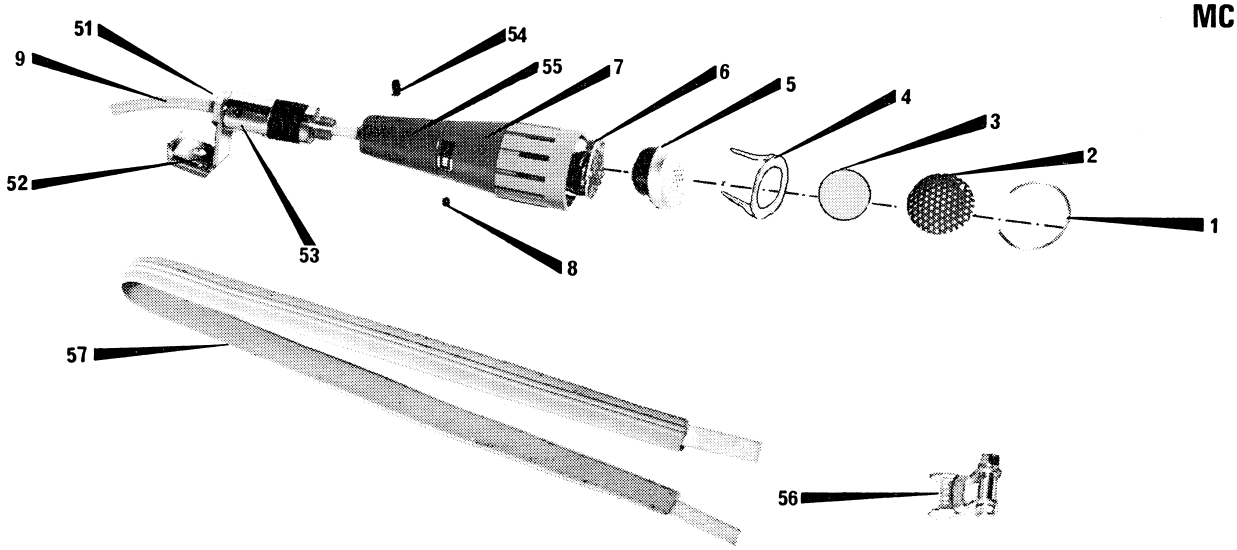
MC 602a–MC 603a–MC 604a



MC 605



MC 607



FIXED MICROPHONE
FESTMIKROFON

MC600

M405.005

ITEM	CODE	DESCRIPTION
		MC601a
	96.065	Fixed microphone, MC601a Fast mikrofon, MC601a
1	36.127	Lock-ring Låsefjeder
2	52.020	Grille Mikrofonnet
3	52.021	Dust cover Beskyttelsesnet
4	36.0151-01	Microphone clamp Bøjle for mikrofon
5	96.5069	Microphone cartridge Mikrofonkapsel
6	10.1335	Amplifier AA604 Forstærker AA604
7	12.066	Microphone housing complete Mikrofonhus, komplet
8	20.063-030.06	Screw Unbraco skrue
9	074.5016	Microphone cable Mikrofonkabel
20	28.065	Threaded nipple Gevindnippel
21	37.092	Microphone retainer Mikrofonophæng
		MC602a - MC603a - MC604a
	96.066	Fixed microphone, MC602a Fast mikrofon, MC602a
	96.067	Fixed microphone, MC603a Fast mikrofon, MC603a
	96.068	Fixed microphone, MC604a Fast mikrofon, MC604a
1	36.127	Lock-ring Låsefjeder
2	52.020	Grille Mikrofonnet
3	52.021	Dust cover Beskyttelsesnet
4	36.0151-01	Microphone clamp Bøjle for mikrofon
5	96.5069	Microphone cartridge Mikrofonkapsel
6	10.1335	Amplifier AA604 Forstærker AA604
7	12.066	Microphone housing complete Mikrofonhus, komplet
8	20.063-030.06	Screw Unbraco skrue
9	074.5016	Microphone cable Mikrofonkabel
30	37.078	Gooseneck 110 mm (used in MC602a) Svanehals 110 mm (anvendes i MC602a)
	37.077	Gooseneck 210 mm (used in MC603a) Svanehals 210 mm (anvendes i MC603a)

FIXED MICROPHONE
FAST MIKROFON

MC600

ITEM	CODE	DESCRIPTION
	37.059	Gooseneck 410 mm (used in MC604a) Svanehals 410 mm (anvendes i MC604a)
		MC605
	96.071	Fixed microphone, MC605 Fast mikrofon, MC605
1	36.127	Lock-ring Låsefjeder
2	52.020	Grille Mikrofonnet
3	52.021	Dust cover Beskyttelsesnet
4	36.0151-01	Microphone clamp Bøjle for mikrofon
5	96.5069	Microphone cartridge Mikrofonkapsel
6	10.1334	Amplifier AA603 Forstærker AA603
7	12.066	Microphone housing complete Mikrofonhus, komplet
8	20.063-030.06	Screw Unbraco skrue
9	074.5018	Microphone cable Mikrofonkabel
40	37.5024	Microphone base complete Mikrofonfod, komplet
41	37.5025	Gooseneck 110 mm Svanehals 110 mm
42	47.5034	Push-button switch Trykknapafbryder
		MC607
	96.076	Fixed microphone, MC607 Fast mikrofon, MC607
1	36.127	Lock-ring Låsefjeder
2	52.020	Grille Mikrofonnet
3	52.021	Dust cover Beskyttelsesnet
4	36.0151-01	Microphone clamp Bøjle for mikrofon
5	96.5069	Microphone cartridge Mikrofonkapsel
6	10.1334	Amplifier AA603 Forstærker AA603
7	12.066	Microphone housing complete Mikrofonhus komplet
8	20.063-030.06	Screw Unbraco skrue
9	074.5016	Microphone cable Mikrofonkabel
51	28.065	Threaded nipple Gevindnippel
52	33.275	Microphone retainer Mikrofonophæng

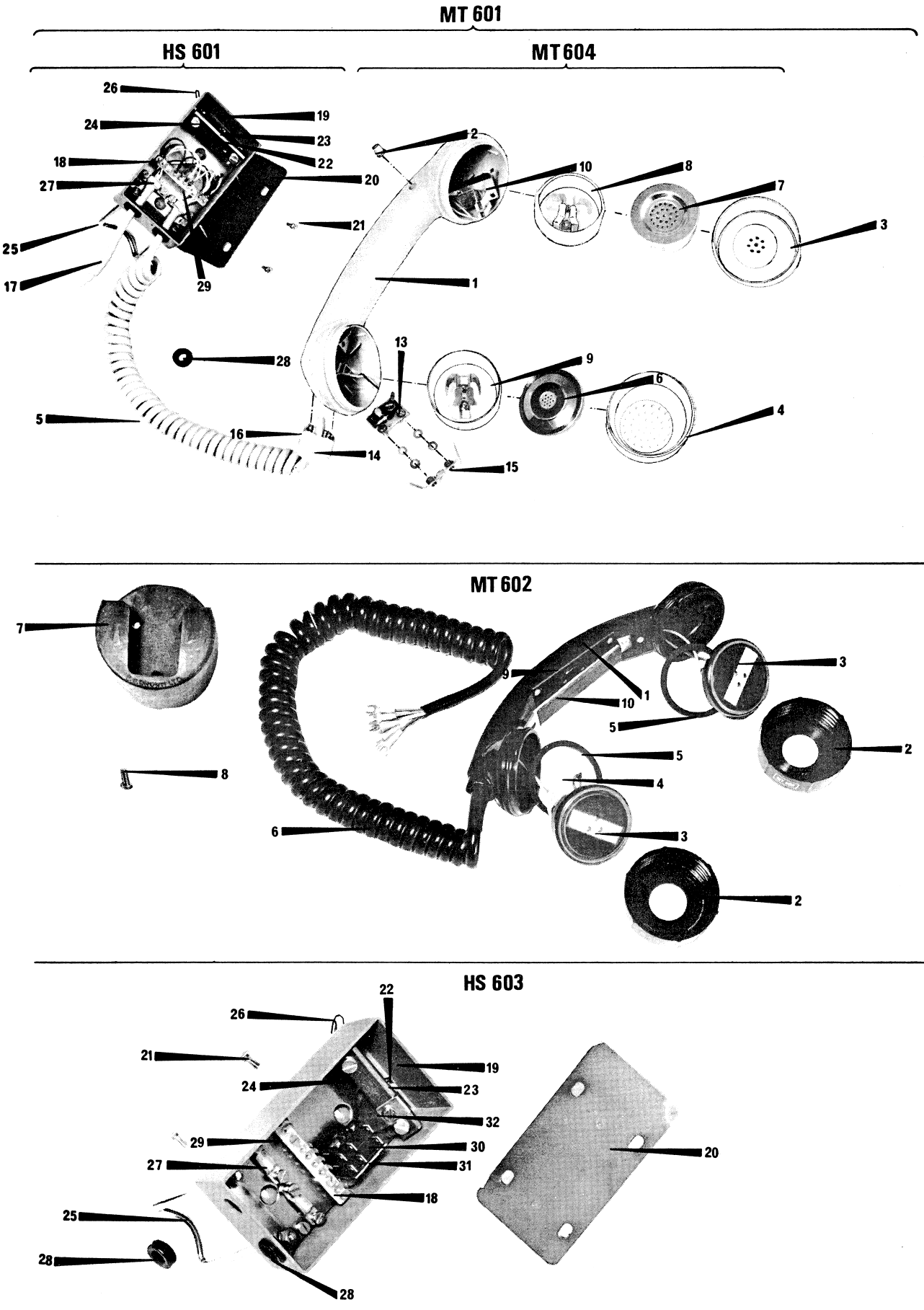
FIXED MICROPHONE
FAST MIKROFON

MC600

ITEM	CODE	DESCRIPTION
53	56.5010	Vibration damper Svingningsdæmper
54	20.063-030.10	Screw Unbraco skrue
55	31.340	Bush for microphone housing Bøsning for mikrofonhus
56	37.5032	Clamp for suspension hoop Slangebinderbøjle
57	44.074	Suspension hoop Slangebånd

FIXED MICROPHONE
FAST MIKROFON

MC600



HANDSET MT600 AND HANG-UP BRACKET HS600
HANDAPPARAT MT600 UND AUFHÄNGUNG HS600

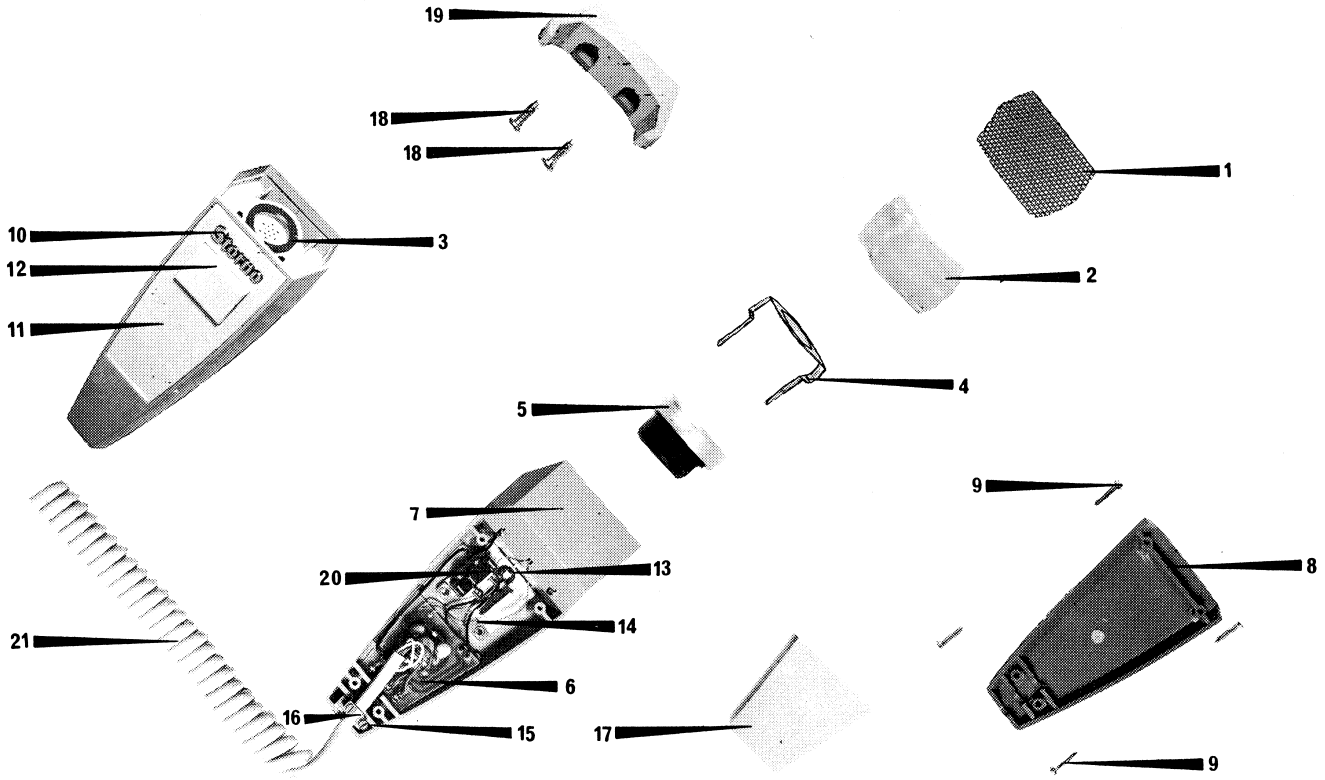
M405.006/2

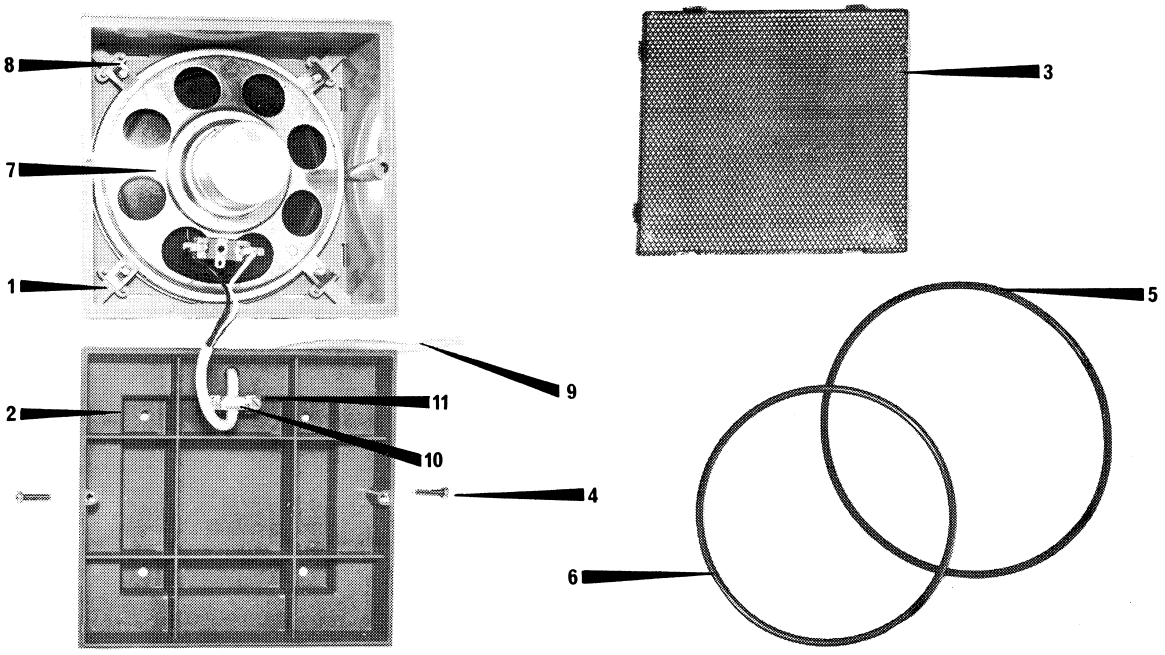
ITEM	CODE	DESCRIPTION
		HANDSET MT601 (Comprising MT604 and HS601) MIKROTELEFON MT601 (omfattende MT604 og HS601)
1-16	96.085	Handset type MT604 Komplet mikrotelefon type MT604
1	96D5023-00	Handle, grey Mikrotelefonhus, grå (C39175A1C1)
2	49.145	Push button, grey Trykknap, grå
3	96D5017-00	Receiver cover, grey Dæksel for telefonkapsel, grå (C39175A1B3)
4	96D5018-00	Microphone cover, grey Dæksel for mikrofonkapsel, grå (C39175A1-B10)
5	177.5010	Coiled lead, 6 core Spiralsnøre, 6 leder
6	96.5074	Microphone, dynamic 1500 ohms Mikrofon, dynamisk 1500 Ω
7	96.5073	Receiver, dynamic 300 ohms Telefonkapsel, dynamisk 300 Ω
8	96D5019-00	Receiver housing complete Telefonindsats komplet (C39175A1B2)
9	96D5020-00	Microphone housing complete Telefonindsats komplet (C39175A1B1)
10	47.0550	Microswitch Mikroswitch komplet m. holder og fjeder
11	30.5040	Tubular rivet Rørnitte
13	43.053	Terminal board Terminalbræt
14	96D5021-00	Cable entry Snøreindføring (C39175A1C8)
15	44.057	Slamp strip Aflastningsbøjle
16	96D5022-00	Cable clamp Aflastningsbøjle (C39175A1D1)
17	174.5018	6 core lead Multikabel 6 x 0,14 mm
18-29	37.106	Handset retainer type HS601 Komplet mikrofongaffel type HS601
18	43.061	Terminal board Terminalbræt
19	37.096	Cover Dæksel
20	11.465	Bottom plate Bundplade
21	28.077	Screw Skrue
22	36.171	Spring, left hand Fjeder, venstre
23	36.170	Spring, right hand Fjeder, højre
24	37.097	Plate Laske
25	44.062	Retaining arm, fixed Bøjle

HANDSET MT600 AND HANG-UP BRACKET HS603

ITEM	CODE	DESCRIPTION
26	44.063	Retaining arm, sprung Bøjle
27	38.5011	Clamp Aflastningsbøjle
28	32.5008	Grommet Gummitylle
29	31.329	Spacer for item 18 Stag for terminalbræt
		HANDSET MT602 MIKROTELEFON MT602
1-10	96.073	Handset type MT602 Komplet mikrotelefon type MT602
1	96.5008	Handle, black Mikrofongreb
2	96D5024-00	Capsule cover Dæksel (B101475)
3	96.5006	Receiver and Microphone Mikrofon- og telefonkapsel
4	10.1506	Amplifier AA605 Forstærker type AA605
5	96D5031-00	Gasket Gummipakning (SD/A 136969)
6	177.5005	Coiled lead 6 core Snøre, 6 koret
7	96.5010	Handset retainer Gummiophæng
8	20422-039.13	Screw B3.9 x 13 Skrue
9	47D5003-00	Key switch assembly Omskifter komplet (B103101)
10	96D5025-00	Keying bar Trykarm for omskifter (SD/A 135490)
11	30.5040	Tubular rivet Rørnitte
		HANDSET RETAINER HS603 MIKROFONGAFFEL HS603
18-29		Items as for HS601 Se tilsvarende positioner for HS601 i mikrotelefon MT601
30	47.5040	Microswitch Mikroswitch
31	33.259	Bracket Bøjle
32	36.178	Spring Fjeder
18-32	37.111	Handset retainer HS603 Komplet mikrofongaffel type HS603

HANDSET MT600 AND HANG-UP BRACKET HS603





FIST MICROPHONE MC606 - LOUDSPEAKER LS601
HANDMIKROFON MC606 - LAUTSPRECHER LS601

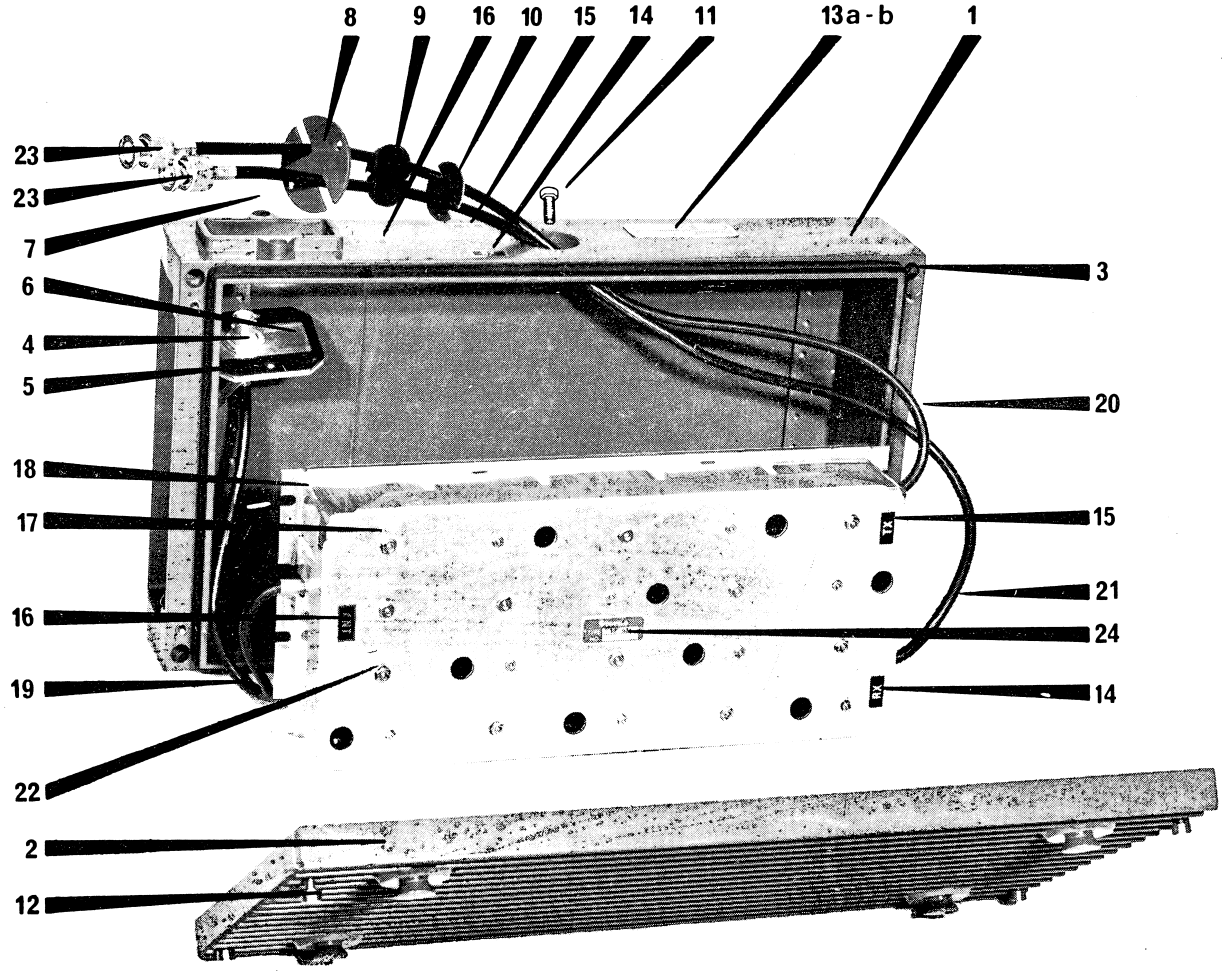
ITEM	CODE	DESCRIPTION
1	12.098	Cabinet front part Kabinet forside
2	12.067-01	Cabinet rear part Kabinet bagside
3	52.024-00	Grille Højttalernet
4	20.022-030.12	Screw M3 x 12 Skrue
5	32.5025	O-Ring 109.5 ID, 115.5 OD O-ring, 109,5 mm.
6	32.5024	O-Ring 94.5 ID, 100.5 OD O-ring, 94,5mm.
7	97.5018	Speaker Højttaler
8	29.5006	Speed nut Speed-nuts
9	074.5016	Cable Kabel
10	38.5011	Clamp Aflastningsbøjle
11	20.011-030.06	Screw M3 x 6 Skrue
1-11	97.010	Speaker type LS601a Komplet højttaler type LS601a.

LOUDSPEAKER LS601

ITEM	CODE	DESCRIPTION
1	52.026	Grille Mikrofonnet
2	52.027	Dust cover Beskyttelsesnet
3	32.186-01	Gasket Gummipakning
4	37.076	Microphone Clamp Bøjle til mikrofon
5	96.5069	Microphone Mikrofon
6	10.1580	Amplifier AA606 Forstærker AA606
7	12.069	Microphone housing Mikrofonhus
8	12.068	Cover plate Bagstykke
9	20.412-0.22.13	Screw BZ2.2 x 13 Skrue
10	51.354	Motif Firmaskilt
11	51.355	Front plate Forplade
12	49.114	Keying button Mikrofonknap
13	2447-080030	Retaining spring Seeger tandring
14	36.202	Spring assembly Fjeder komplet
15	20.022-0.20.10	Screw M2 x 12 Skrue
16	44.055	Clamp Aflastningsbøjle
17	32.191	Foam neoprene packing Skumindlæg
18	20.412-0.42.13	Screw BZ 4.2 x 13 Skrue
19	12.085	Microphone retainer Ophæng
20	47.5040	Microswitch Mikroswitch
21	77.5010	Coiled Lead, 6 core Snøre, 6 leder
1-21	96.074	Fist microphone, type MC606a Komplet håndmikrofon type MC606a

FIST MICROPHONE MC606

Storno



BRANCHING FILTER
ANTENNENWEICHE

BF612a, BF632a

M405.013

ITEM	CODE	DESCRIPTION
		Branching Filter Type BF612 consists of a cabinet type CA6012 housing a branching filter type BF611. BF612 antennefilter består af kabinet CA6012 + antennefilter BF611.
		Branching Filter Type BF632 consists of a cabinet type CA6012 housing a branching filter type BF631. BF632 antennefilter består af kabinet CA6012 + antennefilter BF631.
	10.2042	Cabinet CA6012 Kabinet CA6012
1	12.126	Cabinet Cover Låg for kabinet
2	12.119	Cabinet Base Kabinetbund
3	32.150	Gasket Gummipakning
4	41.5149	Connector BNC, female Konnektor BNC, hun
5	32.256	Gasket Pakning
6	11.642	Connector Bracket Holder for konnektor
7	20.011-040.40	Screw M4 x 40 Skrue M4 x 40
8	11.644	Cover Plate Dæksel
9	32.257	Packing Pakning
10	11.643	Plate Plade
11	20.011-040.08	Screw M4 x 8 Skrue M4 x 8
12	20.033-040.15	Screw M4 x 15 Skrue M4 x 15
13a	51.003(BF612)	Type Plate BF612 Typeskilt BF612
13b	51.003(BF632)	Type Plate BF632 Typeskilt BF632
14	51.496	RX Label RX-skilt
15	51.495	TX Label TX-skilt
16	51.498	Antenna Label Antenneskilt
	90.171	Branching Filter Type BF611 Antennefilter BF611 komplet.
14	51.496	RX Label RX-skilt
15	51.495	TX Label TX-skilt

BRANCHING FILTER
ANTENNENWEICHE

BF612a, BF632a

M405.013/2

ITEM	CODE	DESCRIPTION
16	51.498	Antenna Label Antenneskilt
17	11.536	Cover Låg for chassis
18	11.530-10	Chassis
19	19.076	Antenna Cable Antennekabel
20	19.077-20	TX CAble and Connector TX-kabel med konnektor
21	19.078-20	RX Cable and Connector RX-kabel med konnektor
22	23.01-030.055	Nut Møtrik
23	41.5148	Connector BNC, Male Konnektor BNC, han
24	51.004 (BF611)	Type Plate Typeskilt
	90.172	Branching Filter Type BF631 Antennefilter BF631 komplet.
14	51.496	RX Label RX-skilt
15	51.495	TX Label TX-skilt
16	51.498	Antenna Label Antenneskilt
17	11.481	Cover Låg for chassis
18	11.480-10	Chassis
19	19.076	Antenna Cable Antennekabel
20	19.077-20	TX Cable and Connector TX-kabel med konnektor
21	19.078-20	RX Cable and Connector RX-kabel med konnektor
22	23.01-030.055	Nut Møtrik
23	41.5148	Connector BNC, Male Konnektor BNC, han
24	51.004(BF631)	Type Plate Typeskilt.

BRANCHING FILTER
ANTENNEDELEFILTER

BF612a, BF632a