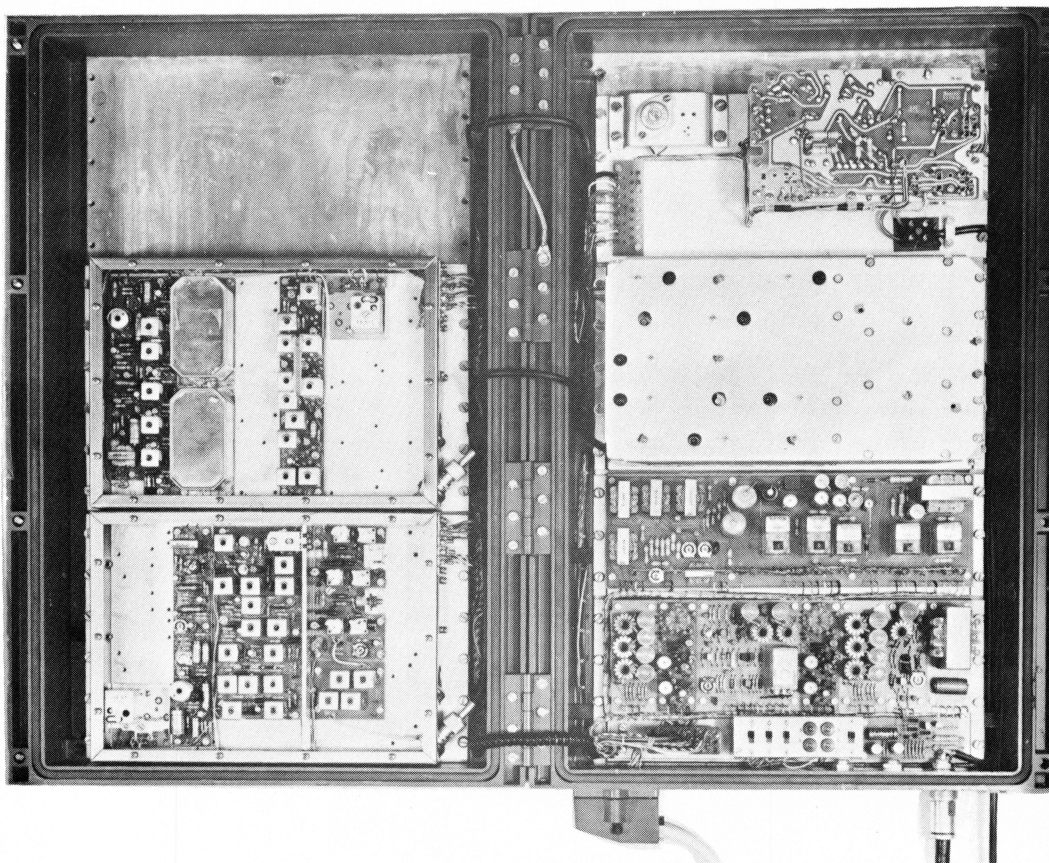


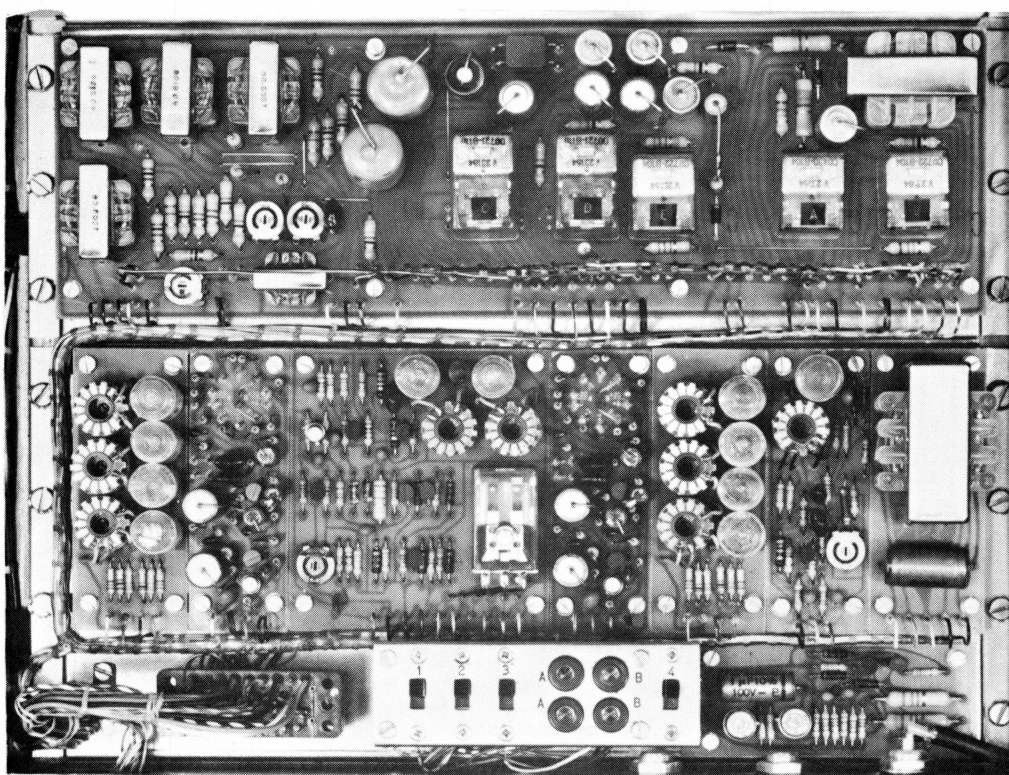
**TERMINAL EQUIPMENT
FOR
RADIOTELEPHONE LINK
CAF680-2001/01
CAF680-2001/02**

Storno

**TERMINAL EQUIPMENT
FOR
RADIOTELEPHONE LINK
CAF680-2001/01
CAF680-2001/02**



CQF600-2001



CP680-2001

Terminal Equipment for Radio Telephone Links

Type CAF680-2001a

General Remarks

The terminal equipment together with the VHF/UHF radio equipment operates as a single unattended terminal station in two-wire or four-wire telephone circuits for telephone channel transmission. A link system consisting of two sets of radio equipment complete with terminal equipment may be regarded as a short wire connection which may be utilized in most telephone systems is able to transmit information usually occurring on telephone lines.

System Specification

The terminal equipment operates with any fixed duplex VHF/UHF radio station of the CQF600 series independent of the channel separation (50, 25 and 20 kHz) and under the same climatic conditions as the radio equipment. The terminal equipment may be used with all ordinary telephone circuits. The same equipment (the control panel CP680-2001a, diagram D109715/1) may be used in both terminals with various strappings. The following connections can be established: (Please consult lay-out plan D109131/1 fig. 1-6).

Subscriber line between a subscriber and an automatic telephone exchange (see lay-out plan D109131/1 fig. 4).

The control panel at the subscriber must be strapped as CP680-2001a/01 (diagram D109861/1), and the subscriber is provided with a desk set of the CB type with dial.

The control panel at the automatic telephone exchange must be strapped as CP680-2001a/02 (diagram D109862/1).

Tie line between a megneto exchange and an automatic telephone exchange (see lay-out plan D109131/1 fig. 5).

The control panel at the magneto exchange must be strapped as CP680-2001a/01 (diagram

D109861/1), and the magneto exchange must be provided with a line panel TE680-2001/01 and an extra switching contact on the jack concerned in the switchboard and a dial (diagram D109783/1).

The control panel at the automatic telephone exchange must be strapped as CP680-2001a/02 (diagram D109862/1).

Subscriber line between a subscriber and a magneto exchange (lay-out plan D109131/1 fig. 2).

The control panel at the subscriber must be strapped as CP680-2001a/01 (diagram D109861/1), and the subscriber is provided with a desk set of the CB type with push-button but without dial.

The control panel at the magneto exchange must be strapped as CP680-2001a/04 (diagram D109864/1).

Tie line between two magneto exchanges (lay-out plan D109131/1 fig. 1).

The control panels of both terminal stations must be strapped as CP680-2001a/03, (diagram D109863/1). Both magneto exchanges are provided with a line panel TE680-2001/03 and an extra switching contact on the jack concerned in the switchboard for keying the transmitter (diagram D109784/1).

Two-wire tie line between two automatic telephone exchanges where the line is used both for audio and signal transmission (lay-out plan D109131/1 fig. 3).

The control panel must be strapped as CP680-2001a/05 when in- and out-going traffic is established by feeding a DC-voltage to the line (diagram D109865/1).

The control panel must be strapped as CP680-2001a/06 when in- and out-going traffic is established via a loop connection (diagram D109866/1).

Two-wire tie line between two automatic telephone exchanges with separate conductors for signalling (lay-out plan D109131/1 fig. 6) are used where the exchange equipment itself contains the necessary circuits for a tie-line connection. Positive or negative tone signalling may be used according to requirement. The transmitter works with continuous carrier wave.

The control panel must be strapped as CP680-2001a/07 when the signalling circuit is to be connected to the power supply of the exchange (diagram D109867/1).

The control panel must be strapped as CP680-2001a/08 when the signalling circuit is to be connected to the internal power supply (diagram D109868/1).

Four-wire tie line between two automatic telephone exchanges with separate conductors for signalling (lay-out plan D109131/1 fig. 6) is used where the exchange equipment itself contains the necessary circuits for a tie-line connection. Positive or negative tone signalling may be used according to requirement. The transmitter uses continuous carrier wave.

The control panel must be strapped as CP680-2001a/09 when the signalling circuit is to be connected to the power supply of the exchange (diagram D109869/1).

The control panel must be strapped as CP680-2001a/10 when the signalling circuit is to be connected to the internal power supply (diagram D109870/1).

Electrical Specification

The electrical lay-out of the control panel is shown on the block- and level diagram (D108460/1). It is composed of modules from the CAF600 system and in principle constitutes a two-wire to four-wire circuit with separate amplifiers in the 2 four-wire branches including the necessary tone signalling equipment and a relay panel for telephone line connection.

The control panel is designed to work either in a purely four-wire system, i.e. without a hybrid unit, or in a two-wire system.

It is further designed for 24-volt DC operation (+ to chassis), and usually receives its power from the PS unit of the VHF or UHF station.

The control panel converts voice signals from the two- or four-wire telephone line system into four-wire signals for the radio station and vice versa; it also converts line signals into tone signals for transmission by radio equipment and vice versa.

Maximum DC-loop resistance is 800Ω for line and subscriber equipment or line and exchange equipment in the types of equipment where DC is applied to the line for dialling purposes.

Voice signals are adjusted in accordance with the level diagram, and the audio-frequency response of the system may, if necessary, be compensated by making suitable adjustments in the AF-amplifiers included in the four-wire side of the control panel.

In the case of two-wire line circuits without any separate signal wires, the line is, via relay contacts and the hybrid unit, connected to a line amplifier and a LP-filter to the transmitter input terminal. Similarly, the line is, via other relay contacts and the hybrid unit, connected to a line amplifier and LP-filter to the receiver output terminal.

In the case of four-wire line circuits, the lines are, via separate line transformers, connected to separate line amplifiers and LP-filters, to the radio equipment.

The levels used are shown on the block and level diagram D108460/1. All level adjustments are made at 1000 Hz.

Since the system uses a continuous signal tone (pilot tone), the modulation depth of the total frequency deviation is as follows: 70% for voice modulation and the remaining 30% for the pilot tone.

The average voice modulation is 3 dB lower, i.e. 50% of the total frequency deviation.

This arrangement provides a reserve for voice peaks of 3 dB resulting in 70% frequency deviation. Voice exceeding the 70% level will be limited in the audio-frequency amplifier AA601 of the transmitter. The pilot tone, the frequency

of which is 3825 Hz at a constant level, is fed directly to the exciter through a special tone modulation input terminal.

Signalling

All signalling such as ringing, dialling, etc., is transmitted as signals via the radio path. A tone above the voice frequency range (3825 Hz) is used for this purpose. At the transmitting terminal, the line signalling operates a relay the contacts of which control the transmission of the signalling tone from a tone generator to a separate tone modulation input terminal of the VHF/UHF transmitter. On the receiving terminal the tone signal demodulated by the VHF/UHF receiver is taken via a tap on the LP-filter whereby increased signal tone frequency selection is obtained. By means of a relay in the tone receiver, the tone signals are reconverted into line signalling corresponding to the incoming line signalling to the transmitting terminal.

Operation

The operation of the individual telephone connections mentioned in section 2 (lay-out plan D109131 fig. 1 - 6) is described in the following.

Subscriber line between a subscriber and an automatic telephone exchange (lay-out plan D109131/1 fig. 4).

The subscriber uses a desk set of the CB type with dial. The subscriber control panel is of the type CP680-2001a/01 (diagram D109861/1), and the control panel at the automatic telephone exchange is of the type CP680-2001a/02 (diagram D109862/1).

Subscriber to telephone exchange call:

The subscriber end:

The subscriber lifts the handset and establishes a loop connection towards the line relay A which become energized. The contact a1 activates the relay B which keyes the transmitter through b1. Relay contacts a2 feeds the signal tone to the tone modulation input terminal of the transmitter.

The exchange end:

The signal tone is received and relay T in the tone receiver is activated. Contact t1 estab-

lishes a loop connection through the choke L1 towards the telephone exchange, which retransmits the dialling tone. Contact t2 activates the relay C, c3 keyes the transmitter, and the dialling tone of the telephone exchange is transmitted. At the same time c4 disconnects the ringing receiving circuit in order not to affect the following dialling pulses.

The subscriber end:

The subscriber receives the dialling tone and dials the desired number. The relay A follows the dialling pulses, and a2 causes the corresponding interruptions in the signal tone. Relay contact a1 activates the relay E via b2. Since both B and E have long release time, they remain activated and e1 breaks the connection between the line and the hybrid unit during the dialling cycle.

The exchange end:

The relay T follows the dialled signal tone. The contact t2 activates the relay D through c1. Since both C and D have long release time, they remain activated during each dialling cycle. Relay contacts d1, d2 and d4 break the connection between the line and the hybrid unit, d2 and d4 shortcircuit the choke coil L1 in order to obtain a better pulse shape, and t1 causes dialling pulses in the loop towards the telephone exchange. After cessation of dialling, the relay D is released and connects the telephone line with the hybrid unit. When the telephone exchange has connected the calling subscriber through, the connection is clear.

Disconnection:

Disconnection is brought about by the calling subscriber replacing the handset on the cradle, and line current, signal tone and keying of the subscriber transmitter cease. At the telephone exchange end the released tone receiver relay disconnects the keying of the transmitter and the loop towards the exchange.

Telephone exchange to subscriber call:

The exchange end:

A call from the telephone exchange is received as a ringing voltage which via the rectifier E4 activates the relay A. The contact a1 keyes the transmitter via the diode E3 and activates the

relay E. Contact e1 breaks the connection between the line and the hybrid unit during the ringing. Relay contact a2 feeds the signal tone to the tone modulation input terminal of the transmitter during the ringing sequence.

The subscriber end:

The relay T receives the tone pulse signal, and the relay D is activated via relay contacts a1, b2 and t2. The contacts d1, d2 and d4 break the connection between the line and the hybrid unit during the ringing cycle, d3 starts the ringing generator. The relay contacts d2 and d4 connect the ringing voltage to the telephone line and the bell in the subscriber telephone set commences to ring.

If the subscriber lifts the handset during the ringing pause, the relay A is activated by the telephone exchange loop. The contact a1 activates the relay B, which keyes the transmitter at b1, and a2 feeds the signal tone to the tone modulation input terminal of the transmitter. If the handset is lifted during the ringing cycle, the ringing stop circuit operates to prevent ringing in the ear of the subscriber. During the ringing cycle, the 1a wire from the telephone line as well as the output terminal 1 of the ringing generator are connected to 0 volt. The 1b wire is connected to the output terminal 5 of the ringing generator. A5 μ F capacitor blocks the DC from passing through this circuit. The terminal 6 of the ringing generator is connected to the relay B so that, by lifting the handset during the ringing cycle, a DC connection is established from 0 volt on the 1a wire via the loop in the subscriber telephone set, the 1b wire, the secondary transformer winding of the ringing generator and the relay B to -24 volts and relay B is energized. Relay contacts b1 key the transmitter and relay contacts b2 switch relay D off. The released D switches the ringing circuit off and reconnects the telephone line with the hybrid unit. This operation closes the DC-loop passing through the subscriber telephone set and relay A is energized. Relay A now keeps relay B energized instead of the switched off ringing stop circuit. It is of no importance that relay E is energized for a short period beginning from the time when relay B is energized and ending when relay A is energized. The a2 contact feeds the signal

tone to the tone modulation input terminal of the transmitter.

The telephone exchange end:

The tone signal is received and the relay T in the tone receiver is activated. Relay contact t2 activates the relay C, c3 keys the transmitter, and c4 disconnects the ringing receiver circuit. Contact t1 establishes a loop via the choke coil L1 towards the telephone exchange, which connects the calling subscriber to the telephone exchange.

Disconnection:

Disconnection is effected by the subscriber replacing the handset which causes cessation of line current, signal tone and keying of the transmitter at the subscriber end. At the exchange end the released tone receiver relay T breaks the keying of the transmitter and disconnects the loop towards the telephone exchange.

Tie line between a magneto exchange and an automatic exchange. (Lay-out plan D109131/1 fig. 5). The magneto exchange is fitted with a line panel like TE680-2001/01, together with an extra change-over contact on the jack concerned in the switchboard and a dial (diagram D109783/1). The control panel for the magneto exchange is CP680-2001a/01, (diagram D109861/1), and control panel for the automatic exchange is CP680-2001a/02 (diagram D109862/1).

Magneto exchange to automatic exchange call:

The magneto exchange end:

A magneto exchange subscriber wants to be connected to an automatic exchange subscriber. When the call plug is inserted into the jack for the tie line towards the automatic exchange, the change-over contact of the jack is activated, and a loop is established towards the control panel via the dial and the line transformer. The line relay A of the control panel is activated. The contact a1 activates the relay B, which keys the transmitter through b1, and a2 feeds the tone signal to the tone modulation input terminal of the transmitter.

The automatic exchange end:

The signal tone is received and the relay T of the tone receiver is activated. Contact t1

establishes a loop via the choke coil L1 towards the automatic exchange, which retransmits the dialling tone. Contact t2 activates the relay C, c3 keys the transmitter, and the dialling tone of the automatic exchange is transmitted. Contact c4 breaks the ringing receiver circuit in order not to affect the subsequent dialling cycle.

The megneto exchange end:

The operator receives the dialling tone and dials the desired automatic exchange number. The relay A follows the pulses occurring as line current interruptions. Contact a2 produces corresponding interruptions in the signal tone, and a1 activates the relay E via b2. Since both B and E have long release time, they remain activated, and e1 breaks the connection between the line and the hybrid unit during the dialling cycle.

The automatic exchange end:

The relay T follows the dialling cycle in the tone signal, and t2 activates the relay D via c1. Since both C and D have long release time they remain activated during each train of pulses, during which d1, d2 and d4 break the connection between the line and the hybrid unit, d2 and d4 shortcircuit the choke L1 to obtain a better pulse shape, and t1 causes dialling pulses in the loop current towards the automatic exchange. After dialling, the relay D is released and connects the line with the hybrid unit. When the automatic exchange has connected through the subscriber called, the connection is clear.

Disconnection:

After the call the magneto exchange receives a ringing off signal from the subscriber, and the tie line plug towards the automatic exchange is pulled out, and by which the loop towards the control panel breaks. Tone signal and keying of the transmitter at the magneto exchange end cease. At the automatic exchange end the released tone receiver relay breaks the keying of the transmitter and the loop towards the automatic exchange.

Automatic exchange to magneto exchange call:

The automatic exchange end:

A call from the automatic exchange as a ringing voltage is received via the rectifier E4 of the ringing receiver circuit and activates the relay A. The contact a1 keys the transmitter via the diode E3 and activates the relay E. Relay contact e1 breaks the connection between the line and the hybrid unit during the ringing cycle. The contact a2 feeds the tone signal to the tone modulation input terminal of the transmitter during the ringing sequence.

The magneto exchange end:

Relay T receives this tone pulse, and relay D is activated via a1, b2 and t2. The contacts d1, d2 and d4 break the connection between the line and the hybrid unit during the ringing cycle, d3 starts the ringing generator and d2 and d4 connect it to the line, and the call drop annunciator of the magneto exchange indicates a call. If the operator inserts the reply plug into the jack for the tie line during the ringing pause, relay A is activated by the loop from the magneto exchange. Contact a1 activates relay B which keys the transmitter at b1, and a2 feeds the signal tone to the tone modulation input terminal of the transmitter. If the operator inserts the reply plug into the jack for the tie line during the ringing cycle, the ringing stop circuit will operate to prevent ringing in the operators ear. During the ringing sequence, the 1a wire as well as the output terminal 1 of the ringing generator are connected to 0 volt, and the 1b wire is connected to the output terminal 5 of the ringing generator. A capacitor of 5 μ F blocks the DC through this circuit. Relay B is connected to the terminal 6 of the ringing generator. This means that relay B is activated if the relay plug is inserted into the jack during the ringing cycle, because a DC-path is established from 0 volt on the 1a wire via the loop in the subscriber telephone desk set, the 1b wire, the secondary transformer winding of the ringing generator and the relay B to -24 volts. Contact b1 keys the transmitter, and the current to relay D is broken at b2. Relay D, which is released, breaks the ringing circuit and connects the line to the hybrid unit.

Thereby relay A is activated through the loop from the magneto exchange and takes over the interrupted holding of the ringing stop circuit of relay B, which has a long release time. It

is of no importance that relay E is activated for the short period beginning at the time when relay B is activated and lasting until relay A is activated. Relay contact a2 feeds the tone signal to the tone modulation input terminal of the transmitter.

The automatic exchange end:

The tone signal is received and relay T of the tone receiver is activated. Contact t2 activates relay C, relay contact c3 keys the transmitter and c4 breaks the ringing receiver circuit. Contact t1 establishes a loop via the choke L1 towards the automatic exchange, which connects the calling subscriber, and the connection is established to the magneto exchange.

Disconnection:

Same as under paragraph 4.2.1.

Subscriber connection between a subscriber and a magneto exchange. (Lay-out plan D109131/1 fig. 2). The subscriber has a desk set of the type with push-button and without dial. The control panel at the subscriber is CP680-2001a/01, (diagram D109861/1), and the control panel at the exchange is CP680-2001a/04, (diagram D109864/1). The magneto exchange has no extra equipment.

Subscriber to telephone exchange call.

The subscriber end:

The subscriber lifts the handset and a loop is established towards line relay A, which is activated. Contact a1 activates relay B which keys the transmitter through b1, and a2 feeds the tone signal to the tone modulation input terminal of the transmitter.

The telephone exchange end:

The tone signal is received and relay T of the tone receiver is activated. Contact t2 activates relay C, relay contact c3 keys the transmitter and c4 breaks the ringing receiver circuit.

The subscriber end:

The subscriber presses his signalling button whereby the line current is broken for a short period. Relay A causes a corresponding break in the tone signal at a2. If the button is pressed for a longer period than the long release time of approx. 150 ms for relay B, the keying of the transmitter will also be broken until the line current re-occurs.

Relay E is activated as long as relay contact a1 is open, but only until relay contact b2, too, is opened, if ever. It is, however, of no importance that relay E operates in this function.

The telephone exchange end:

The tone receiver relay T is released during the interruption of the signal tone. Contact t2 thereby activates relay D via c1. Relay D remains activated as long as t2 is released, and the long release time of 250 ms for relay C keeps c1 activated. To this comes the long release time of approximately 250 ms of relay D. This means that relay D may be activated between 250 and 500 ms, during which interval the hybrid unit is disconnected from the line by d1, d2 and d4, while d2 and d4 connect the line to the output terminal of the ringing generator, which is started by d3. If the discontinuation of the tone signal on calling is longer than the release time for the relay C, the keying of the transmitter is discontinued until the tone signal re-appears. Ringing voltage causes the call drop annunciator of the exchange to indicate a call, and the subscriber may order his call.

Disconnection:

Disconnection is brought about by the subscriber replacing his handset, this causing line current, tone signal and keying of the transmitter at the subscriber end to cease. At the exchange end the released tone receiver relay breaks the keying of the transmitter, and owing to the long release time for the relays C and D, relay D transmits a ringing off voltage for approximately half a second towards the exchange. If ringing off from the exchange occurs before the subscriber replaces the handset, the ringing receiver circuit of the telephone exchange is still disconnected by c4, and only a weak buzzing tone is heard at the subscribers end. If ringing off from the telephone exchange occurs after the subscriber has replaced the handset, ringing off will go through to the subscribers bell.

Telephone exchange to subscriber call.

The telephone exchange end:

A call from the exchange in the form of a ringing voltage is applied to the rectifier E4 of the ringing receiver circuit; this call activates relay

A. Contact a1 keys the transmitter via the diode E3 and activates relay E, which, at e1, breaks the connection between the line and the hybrid unit during the ringing cycle. Contact a2 feeds the tone signal to the tone modulation input terminal of the transmitter, the tone signal has the same duration as the ringing cycle.

The subscriber end:

Relay T receives this tone pulse, and relay D is activated via a1, b2 and t2. The contacts d1, d2 and d4 break the connection between the line and the hybrid unit during the ringing sequence. Relay contact d3 starts the ringing generator and d2 and d4 connect its terminal to the line, and the subscribers telephone rings. If the subscriber lifts the handset after ringing has ceased, relay A is activated by the loop from the telephone. Contact a1 activates relay B which keys the transmitter through b1, and a2 feeds the tone signal to the tone modulation input terminal of the transmitter.

If the handset is lifted during the ringing cycle, the ringing stop circuit operates to prevent ringing in the subscribers ear. During the ringing sequence, the 1a wire as well as the output terminal 1 of the ringing generator are connected to 0 volt, and the 1b wire is connected to the output terminal 5 of the ringing generator. A capacitor of 5 μ F blocks the DC through this circuit. Relay B is connected to the terminal 6 of the ringing generator. This means that relay B is activated if the relay plug is inserted into the jack during the ringing cycle, because a DC-path is established from 0 volt on the 1a wire via the loop in the subscriber telephone desk set, the 1b wire, the secondary transformer winding of the ringing generator and the relay B to -24 volts. Contact b1 keys the transmitter, and the current to relay D is broken at b2. Relay D, which is released, breaks the ringing circuit and connects the line to the hybrid unit. This activates relay A through the loop from the subscribers telephone desk set and takes over the interrupted holding of the ringing circuit of relay B, which has a long release time. It is of no importance that relay E is activated for a short period: beginning at the time when relay B is activated and lasting until relay A is activated. Contact a2 feeds the tone signal to the tone modulation input terminal of the transmitter.

The telephone exchange end:

The tone signal is received and relay T of the tone receiver is activated. Contact t2 activates relay D, c3 keys the transmitter, c4 breaks the ringing receiver circuit and the connection is established.

Disconnection:

Same as under paragraph 4.3.1.

Tie line between two magneto exchanges (Lay-out plan D109131/1 fig. 1). The control panels at both terminal stations are CP680-2001a/03 (diagram D109863/1), and both magneto exchanges are fitted with line panels as TE680-2001/03 and an extra switching contact on the jack concerned in the switchboard (diagram D109784/1).

Telephone exchange A to telephone exchange B call. (Same operation for calls in the opposite direction).

The telephone exchange A end:

At telephone exchange A, the call plug is inserted into the jack for the tie line towards the exchange B. The extra switching contact at the jack establishes a loop through the choke coil L1 in the line panel towards the control panel where line relay A is activated and keys the transmitter at a1. The next call from the telephone exchange in the form of a ringing voltage is applied to the rectifier E4 of the ringing circuit and activates relay B. Contact b1 feeds the tone signal to the tone modulation input terminal of the transmitter; this tone signal has the same duration as the ringing cycle. Contact b2 breaks the line current to prevent relay A from being affected by the ringing voltage and at the same time takes over the keying function. However, there is sufficient time for relay A to follow a few of the ringing voltage periods before relay B takes over the keying function. The transmitter keying is due to the presence of the capacitor C11. Contact b2 activates also relay E, which breaks the connection between the line and the hybrid unit during the ringing cycle.

The telephone exchange B end:

Relay T of the tone receiver is activated during reception of the tone pulse, and relay D is activated via t2. The contacts d1, d2 and d4 break the connection between the line and the hybrid unit during the ringing cycle. Contact d3 starts the ringing generator, while d2 and d4 connect

its terminal to the line; the call drop annunciator of the telephone exchange B indicates a call. The operator inserts the reply plug into the jack for tie line, and a loop is established by the switching contact at the jack through the choke coil L1 in the line panel towards the control panel.

The line relay A is activated and keys the transmitter through a1. The operator answers, and the connection is established.

Disconnection:

After conclusion of the conversation the connected subscribers ring off. Ringing off of both subscribers cause the clearing drop annunciators of both telephone exchanges to indicate ringing off. Both operators remove the plugs from the jacks, and the loops towards the control panels are broken, this causes the A relays, and thereby the keying of the transmitters, to be released.

Two-wire tie line between two automatic exchanges, where the line is used for both audio and signal transmission. (Lay-out plan D109131/1, fig. 3). The control panels on the terminal stations are CP680 -2001a/05 when ingoing and outgoing traffic is established by feeding a DC current to the line (diagram D109865/1).

Telephone exchange A to telephone exchange B call.

(Same operation for calls in the opposite direction).

The telephone exchange A end:

The call from the telephone exchange towards the line is accomplished by feeding a DC current to the line whereby line relay A is activated. Contact a1 activates relay B which keys the transmitter through b1, and a2 feeds the signal tone to the tone modulation input terminal of the transmitter.

The telephone exchange B end:

The signal tone is received, and relay T of the tone receiver is activated. Contact t2 activates the relay C, and c3 keys the transmitter. A DC voltage is at the same time applied to the line towards telephone exchange B in the following way: from 0 volt voltage to -24 volts voltage via: one half of the choke L1, relay contact c2, the 1a wire, the line relay, etc., for the tie line in telephone exchange B, the 1b wire relay contact

c4, the other half of L1 and the relay contact t1 of the tone receiver. The connection has now been established between the telephone exchanges for the following dialling in the call direction.

The telephone exchange A end:

Relay A follows the dialling occurring as line current interruptions. Contact a2 establishes corresponding interruptions in the tone signal, and a1 activates relay E via b2. As both relays B and E have long release time they remain activated, and e1 breaks the connection between the line and the hybrid unit during the dialling cycle.

The telephone exchange B end:

The relay T follows the dialling in the signal tone, and t2 activates relay D via c1. Since both relays C and D have long release time they remain activated during each pulse train, during which d1 breaks the connection between the line and the hybrid unit. Both half parts of choke L1 are shortcircuited by d4 via c2 and by d2 via c4, respectively, in order to obtain better pulse shape. Contact t1 causes dialling in the line current towards the exchange. After dialling, relay D is released and connects the line to the hybrid unit, and the connection is established.

Disconnection:

As exchange A alone maintains the connection with the tone in the call direction and the keying function in both directions, the connection will be broken only, when exchange A breaks the DC voltage to the line. From the control panel at the telephone exchange B the DC voltage towards the telephone exchange is similarly broken.

Two-wire tie line between two automatic exchanges where the line is used for both audio and signal transmission. (Lay-out plan D109131/1 fig. 3). The control panels on the terminal stations are CP680 -2001a/06, when in- and outgoing traffic is established through a loop (diagram D109866/1).

Telephone exchange A to telephone exchange B call.

(Same operation for calls in the opposite direction).

The telephone exchange A end:

Calls from the telephone exchange towards the line are accomplished by establishing a DC loop

towards the line whereby line relay A is activates relay B which keys the transmitter through b1, and a2 applies the signal tone to the tone modulation input terminal of the transmitter. The telephone exchange B end:

The signal tone is received and relay T of the tone receiver is activated, and t2 activates relay C. Contact c3 keys the transmitter, and at the same time a DC loop is established towards the line to the telephone exchange B in the following way: from 0 volt of the exchange to -24 volts voltage of the exchange via: a diode and one half part of the coil of the line relay of the exchange, etc., to the 1a wire, the c1 contact of the control panel, one half of L1, t1, second half of L1, c4, the 1b wire, the second half part of the coil of the line relay of the exchange and a diode.

Connection has now been established between the exchanges for the following dialling in the call direction.

The telephone exchange A end:

Relay A follows the pulses occurring as line current interruptions. Contact a2 causes similar interruptions in the signal tone, a1 activates the relay E via b2. Since both relays B and E have long release time they remain activated and e1 breaks the connection between the line and the hybrid unit during the dialling cycle.

The telephone exchange B end:

The relay T follows the pulses in the signal tone, and t2 activates the relay D via c1. Since both relays C and D have long release time they remain activated during each pulse train during which d1 breaks the connection between the line and the hybrid unit. Both half parts of choke L1 are shortcircuited by d4 via c2 and by d2 via c4, respectively, in order to obtain better pulse shape. Contact t1 causes pulses in the line current towards the exchange. After dialling has ceased relay D is released and connects the line towards the hybrid unit and connection is established.

Disconnection:

As the telephone exchange A alone maintains the connection with the tone in the call direction and the keying function in both directions, the connection is broken only when exchange A breaks the DC loop towards the line.

From the control panel at the exchange B end,

the DC loop towards the exchange is broken in a similar way.

Two-wire tie line between two automatic telephone exchanges with separate conductors for signal transmission (lay-out plan D109131/1, fig. 6) is used where the exchange equipment itself contains the necessary circuits for a tie line connection. Either positive or negative dialling may be used according to requirement. The transmitters are permanently keyed.

The control panels on the terminal stations are CP680-2001a/07; the signalling circuit is connected to the power supply of the exchange (diagram D109867/1).

Telephone exchange A to telephone exchange B call.

(Same operation for calls in the opposite direction).

Exchange A feeds relay A of its own terminal station with call and dialling information which by means of the signal tone is re-transmitted via the radio path through the relay contact a2 and the tone modulation input terminal. The opposite terminal station receives the information of the signal tone; by contact t1 of the relay T. This information is re-transmitted to telephone exchange B. As the transmitter is permanently keyed, disconnection is brought about solely by the requisite information in the signal transmitting system.

Four-wire tie line between two automatic telephone exchanges with separate conductors for signal transmission (lay-out plan D109131/1 fig. 6) is used where the exchange equipment itself contains the necessary circuits for a tie line connection. Either positive or negative dialling according to requirement may be used. The transmitters are permanently keyed.

The control panels on the terminal stations are CP680-2001a/09, when the signal circuit is connected to the power supply of the exchange (diagram D109869/1).

Telephone exchange A to telephone exchange B call.

(Same operation for calls in the opposite direction).

Telephone exchange A feeds relay A of its own terminal station with call and dialling information which by means of the signal tone is retransmitted via the radio path through the relay contact a2 and the tone modulation input terminal. The opposite terminal station receives the information of the signal tone; by contact t1 of relay T. This information is re-transmitted to exchange B. As the transmitter is permanently keyed, disconnection is brought about solely by the requisite information in the signal transmitting system.

Four-wire tie line between two automatic exchanges with separate conductors for signal transmission (lay-out plan D109131/1, fig. 6) is used where the exchange equipment itself contains the necessary circuits for a tie line connection. Positive dialling may be used according to requirement. The transmitters are permanently keyed. The control panels on the terminal stations are CP680-2001a/10; when the signal circuit is connected to the internal power supply of the terminal station (diagram D109870/1).

Telephone exchange A to telephone exchange B call.

(Same operation for calls in the opposite direction).

Telephone exchange A feeds relay A of its own terminal station with call and dialling information which by means of the signal tone is retransmitted via the radio path through the relay contact a2 and the tone modulation input terminal. The opposite terminal station receives the information of the tone signal, and re-transmits directly to the exchange B by the contact t1 of the relay T. As the transmitter is permanently keyed, disconnection is brought about solely by means of the requisite information in the signal transmitting system.

Subunits

As already mentioned in para 3.1 the terminal equipment is based on an assembly of modules from the CAF600-programme. Each module composes a complete unit and the terminal equipment comprises the following units in alphabetical order:

LP-filter FN680-2001 (drg. D109597, response curve D109813). This LP-filter is used in both 4-wire branches partly to filter the signalling tone from the voice modulation at the receiver output and partly to attenuate voice signals found on the signalling tone frequency supplied to the transmitter input.

TYPICAL DATA

In- and output impedance

600 Ω .

Attenuation

11 dB.

f

3825 Hz.

Attenuation at f

40 dB.

Mechanical dimensions

32 x 80 mm.

Line amplifier LA681-2001 (drg. D109659 and response curves D110206).

TYPICAL DATA

In-, output impedance

600 Ω .

Adjustment of Amplification

Adjustable in 2 dB steps from: -20 to 28 dB.

Frequency response

(Variable by strapping) (drg. D110206).

1. Flat from 300 to 3000 Hz.
2. Flat from 300 to 1000 Hz and +3 dB at 3000 Hz with ref. to 1000 Hz.
3. +2 dB at 300 Hz with ref. to 1000 Hz and flat from 1000 Hz to 3000 Hz.
4. +1 dB at 300 Hz and +3 dB at 3000 Hz w. ref. to 1000 Hz.

Mechanical dimensions

28 x 80 mm.

Measuring Panel MP680-2001 (drg. D109955 and instruction D110532).

The measuring panel is used when the levels are to be adjusted. The panel consists of a chassis which carries 4 test jacks, 4 switches and is mounted on the top of a small strapping board.

The strappings for 2-wire or 4-wire operation are made in this board. When the levels in the CP680-2001a are to be adjusted instruction D110532 must be used.

The tonegenerator must have an output impedance of $600\ \Omega$. The VTVM for the readings must have an input impedance of $600\ \Omega$ when measurements on disconnected lines are made and an input impedance of f.i. $1\ M\Omega$ when measurements are made on connected lines.

When tests are made on the types of control panels, utilizing a constant signalling tone from the VHF radio equipment during the calls, the relay T in the tone receiver must be activated. This is necessary in order to ensure that the telephone line is connected to the hybrid unit. According to note 1 on the instruction D110532 this is done by adding a strap between the terminals 8 and 9 on the tone receiver.

Mechanical dimensions: 30 x 88 mm.

Relay panel RP680-2001a (drg. D109715/1).

This unit contains the hybrid unit for 2-wire connection, line transformers for 4-wire connection, the ringing detector circuit and the necessary relays for the signalling and the various connections. By means of suitable strappings the relay panel can be fitted to all normal telephone and exchange types.

For each type of telephone system a different strapping is used acc. to strapping lists.

It is important, that the limits for the line-current, found in note 1 on all diagrams for the various types of control panels, are not exceeded. Mechanical dimensions: 256 x 88 mm.

Ringing generator PG681 (drg. D109658).

The ringing generator is found in all different versions of the control panel CP680-2001, but is only utilized in the telephone circuits where the terminal must supply ringing signals to a telephone line.

The ringing generator consists of two separate modules i.e. a pulse generator and a transformer panel.

TYPICAL DATA

Output voltage (square wave)

(When the load is app. $3\ k\Omega$, equivalent to the impedance of a common telephone bell).

$60\ V \pm 10\ %$.

Frequency

$40\ Hz \pm 20\ %$.

Mechanical dimensions for both modules

32 x 80 mm.

Tone receiver TR681-2001 (drg. D110000).

TR681-2001 is a single tone receiver with relay output and is designed to receive a signalling tone from a VHF-radio link.

The tone receiver has a small time constant suited for the detection of dialling pulses from a fast dial (17/33).

TYPICAL DATA

Frequency

3825 Hz.

Frequency tolerance

$\pm 1\ %$.

Sensitivity

-20 to -30 dBm.

Input impedance

App. $8\ k\Omega$.

Output

2 change over contact sets.

Mechanical dimensions

72 x 80 mm.

Normally the tone receiver is adjusted to operate with an 8 dB safety margin (sensitivity margin).

Tone transmitter TT681-2001 (drg. D109598).

TT681-2001 is designed to control the tone receiver TR680-2001 through a VHF radio link. The output from the TT is connected directly to a special tone input terminal found in the transmitter of the VHF station.

TYPICAL DATA

Frequency

3825 Hz.

Frequency tolerance

$\pm 1\%$.

Output level

0.3 - 1.5 V.

Output impedance

App. 10 k Ω .

Mechanical dimensions

28 x 80 mm.

Measurements and adjustments

Every terminal panel is adjusted and controlled before leaving our works and fulfills the specifications and data as found in the previous chapters of this paper and on the enclosed diagrams.

Level measurements are made on the control panel CP680-2001a itself according to the block- and level plan drg. D108460/1. Measurements on the main branches i.e. on the line (4-wire or 2-wire) side and on the in- and output terminals to the VHF station are easily performed by means of the measuring panel MP680-2001. Please consult the instruction D110532E. Test tone for all level measurements is 1000 Hz. The measurements of the signalling tone levels, however, are made on the signalling frequency (3825 Hz).

N.B. If measurements of the transmitter modulation are substituted with measurements on reference-receiver please observe that the receiver used has a deemphasis curve which corresponds to the curve for the VHF receiver in the terminals.

The hybrid balance must be controlled eventually readjusted when a terminal has been installed.

The balance is adjusted by means of the potentiometers R10 and R12.

In most cases the telephone line acts as a capacitance and this can be compensated as a matter of course.

If, however, the line represents an inductive load (f.i. an extreme short line) an improved hybrid balance is obtainable by strapping the terminals 6 and 7 on the strapping board found on the relay panel. The inductance L2 is thereby connected to the balance circuit.

The instruction D110532E shows how the measuring panel must be operated when the balance is to be adjusted. R10 and R12 should be adjusted alternately until the optimal balance attenuation over the total voice frequency band is obtained. The hybrid balance must at least be 6 dB higher than the level difference across the hybrid at normal use.

In case of terminal panels connected to telephone exchanges a compromise in balance adjustment is necessary due to the different line lengths which can be connected through the exchange.

The pulse distortion is controlled before the terminal panels leave our works and normally no further adjustment is necessary.

If, however, the dialling pulse circuit has been serviced and components have been changed, the pulse distortion should be checked. The transmission on the dialling pulses on the VHF/UHF radiolink is made, as already described, by means of analog intermissions in the signalling tone transmission.

The ratio between on and off (pulse and intermission) is normally 2 : 1 and with the fast dials having a speed of 20 Hz (50 mS pulses) the time ratio is 17/33.

The time delay of a pulse train through the radio link is appr. 15 mS. If the accuracy of the reproduced pulses is insufficient the resistor R24 on the tone receiver must be changed. (R24 is placed on two solder terminals close to the relay). An oscilloscope or a fast recorder must be connected to the line - or pulse output terminals of the panel in question. On the transmitting terminal panel a dial with a known pulse- and intermission length, having a frequency within the range of 10 to 20 Hz must be connected to the line- or dialling terminals. (It is important that the controlling current through the dial contacts and hence through relay A during the adjustments, as well as under normal operation, is between 22 and 35 mA in order to obtain a precise relay operation). The current is adjusted by means of R28 and R29 (note 1 on the main diagram) or by means of a provisional series resistor added elsewhere to the circuit.

The squelch is adjusted with the potentiometer R11 found on the relay panel. Turning the potentiometer clockwise tightens the squelch.

RF-signal strength measurements can be made by means of the built-in indicator type 11.1171. It consists of a rectifier unit mounted on a circular printed board. It is mounted on two columns close to the IF-amplifier IA601b. The indicator is connected to the testpoints 8 or 9 on the IA-unit. (Please consult the handbook for the CQF6xy, VHF/UHF station).

As an indicating instrument a 500 mA f.d. meter with an internal resistance of 5 k Ω is used. The instrument plus an extra series resistor, as described below, is connected to the terminals S and W found on the connector J2-P2.

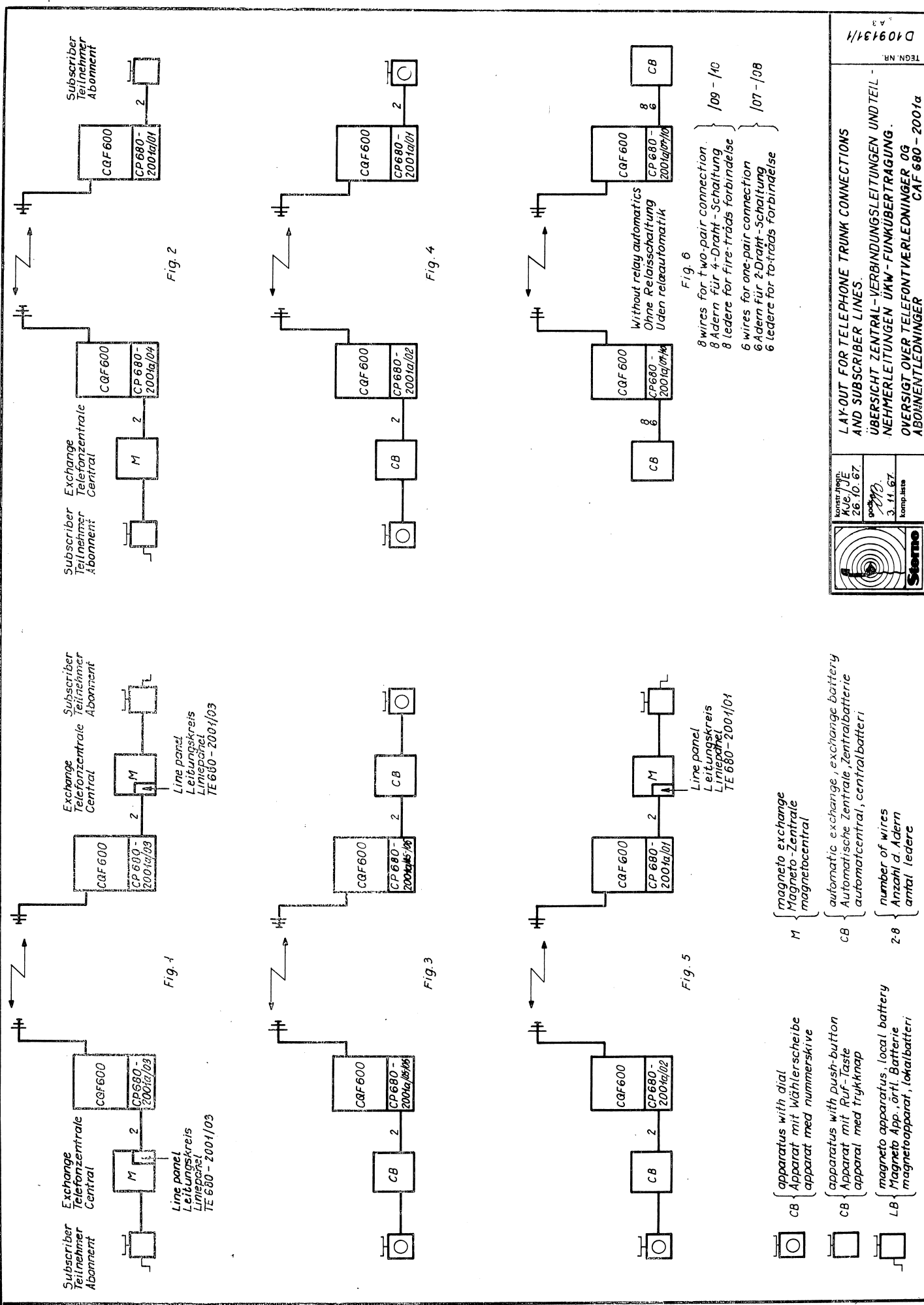
In order to obtain true readings with the indicator a set of curves should be made for each individual station by the use of a signal generator. On curve

sheet D112768 a set of typical curves are shown where the indicator is connected to the test points 8 and 9. For signals above 100 μ V (1/2 EMF) connect to the base of Q2 in IA601b. For each test point an individual series resistor should be used and be selected to give the highest possible reading for the stage in the limiting condition.

Discriminator measurements.

These tests are made by connecting an external 50 - 0 - 50 μ A instrument with an internal resistance of 1000 Ω to the terminals NN and W on the connector J2-P2 found on the radio station cabinet. (For eventual adjustments on the VHF/UHF receiver please consult the handbook).

Concerning measurements, tests and adjustments of the VHF/UHF radio equipment connected to antenna branching filter BF6x1 please consult the handbook.



- CB { apparatus with dial Apparät mit Wählerscheibe apparat med nummerskive
- CB { apparatus with push-button Apparät mit Ruf-Taste apparat med trykknop
- LB { magneto apparatus, local battery Magneto App., örtl. Batterie magnetoapparat, lokalbatterie
- M { magneto exchange Magneto-Zentrale magnetocentral
- CB { automatic exchange, exchange battery Automatiscche Zentrale, Zentralbatterie automatsentral, centralbatteri
- 2-8 { number of wires Anzahl d. Adern antal ledere

TEGN. NR.

D 109131/1

LAY-OUT FOR TELEPHONE TRUNK CONNECTIONS AND SUBSCRIBER LINES.

ÜBERSICHT ZENTRAL-VERBINDUNGSLEITUNGEN UND TEIL-NEHMERLEITUNGEN UKW-FUNKÜBERTRAGUNG.

OVERSICHT OVER TELEFONTRUNKLEITNINGER OG ABONNENTLEDNINGER

Konstr./Techn.

KJc./JE

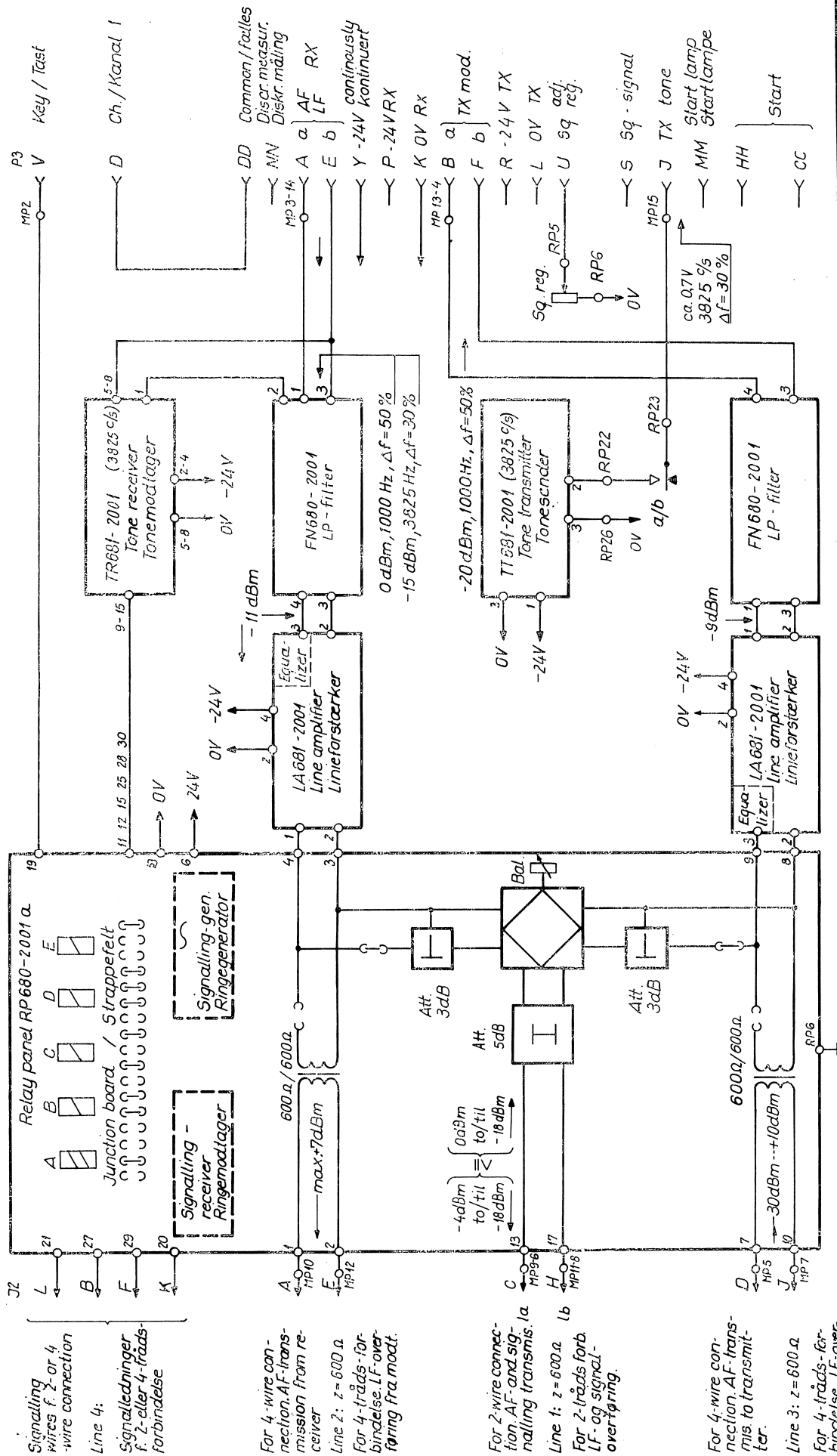
26.10.67

Druck

3.11.67

Komp. liste

The measuring tone levels indicated on the diagram correspond to a 50 % frequency deviation in the radioequipment measured at 1000 c/s.
De på diagrammet angivne testtoneniveauer svarer til et frekvenssving på 50 % over radioudstyret målt ved 1000 Hz.



TEGN. NR. 108460/1

CP 680-2001 a

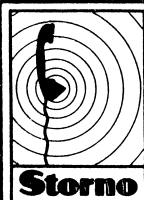
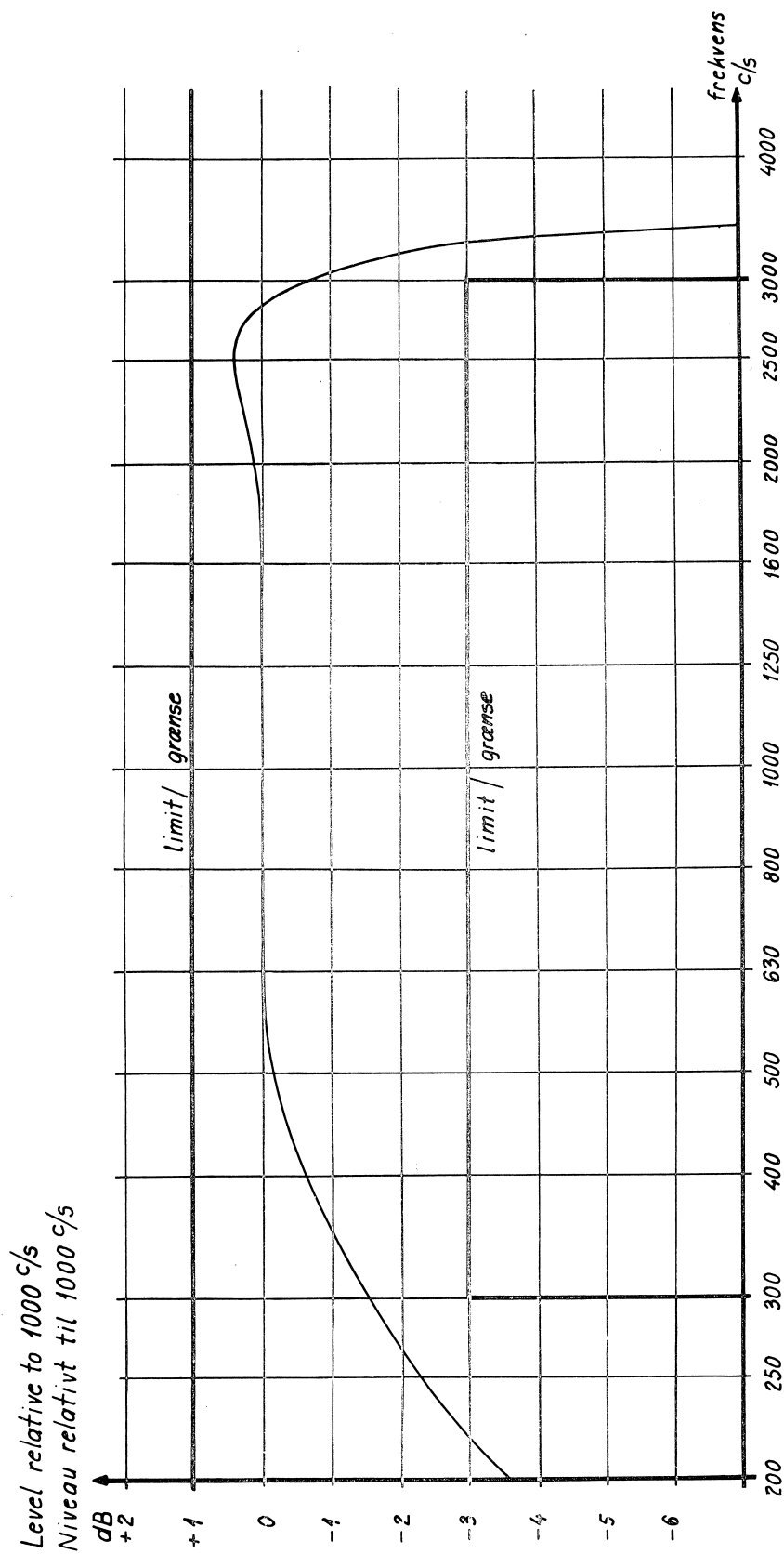
CONTROL PANEL FOR RADIO TELEPHONE LINX SYSTEMS.
BLOCK AND LEVEL DIAGRAM.

KONTROLPANEL FOR RADIOTELEFONLIXSYSTEMER.
BLOK- OG NIVEAUDIAGRAM.

Konstr./tegn. KJE/gh
6.7.67

godk. 3.11.67.

Kompliste



konstr./tegn.
KJe/JE
6. 10. 67.
godk.
OB
3-11-67.
komp.liste

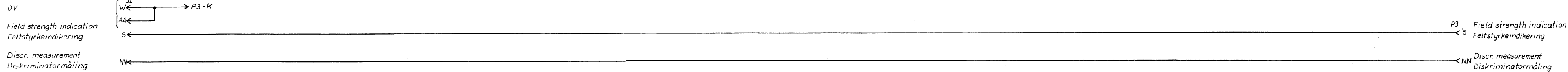
TYPICAL AF-RESPONSE FOR A RADIO
TELEPHONE LINK CONNECTION.
TYPISK LF-KARAKTERISTIK FOR EN
RADIOTELEFONLINKFORBINDELSE.

CAF680-2001.
KODE

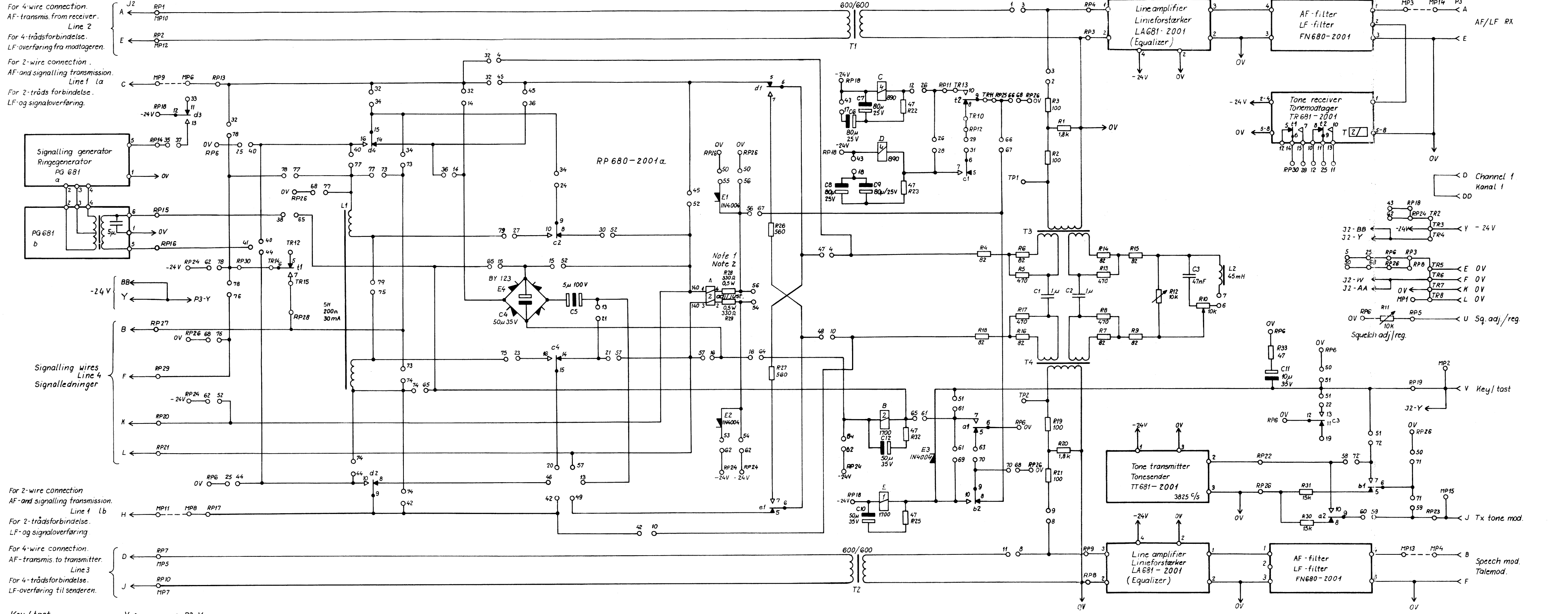
TEGN. NR.

D110056

A 4

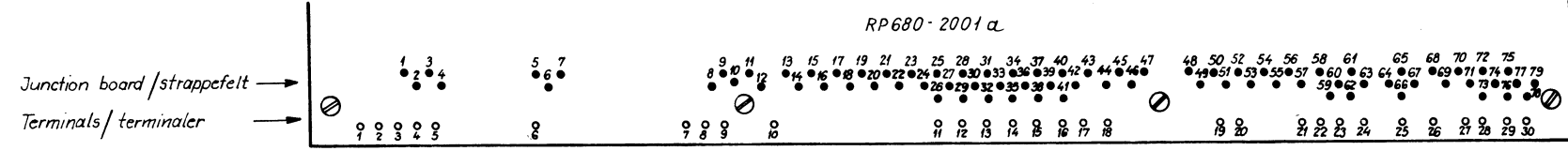


For 4-wire connection.
AF-transmis. from receiver.
Line 2
For 4-trådsforbindelse.
LF-overføring fra modtageren.
For 2-wire connection.
AF-and signalling transmission.
Line 1 la
For 2-tråds forbindelse.
LF-og signaloverføring.



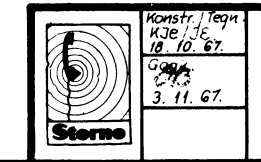
For 2-wire connection
AF-and signalling transmission.
Line 1 lb
For 2-trådsforbindelse.
LF-og signaloverføring.
For 4-wire connection.
AF-transmis. to transmitter.
Line 3
For 4-trådsforbindelse.
LF-overføring til senderen.

Key / tast
V → P3-V



Note 1:
Adjust R28 or R29 for
22-35 mA line current.
Juster R28 = R29 til
22-35 mA linestrøm.

Note 2:
Adjust R28 or R29 to 20-40 mA
signalling current in relay A.
Juster R28 eller R29 til 20-40 mA
ringestrøm i relæ A.



CONTROL PANEL FOR RADIO TELEPHONE
LINK SYSTEMS.
KONTROLPANEL FOR RADIOTELEFONLINKSYSTEMER.
CP 680-2001a

Field strength indication
Feltstyrkeindikering.

S J2

Discr. measurement
Diskriminatoremåling

NN

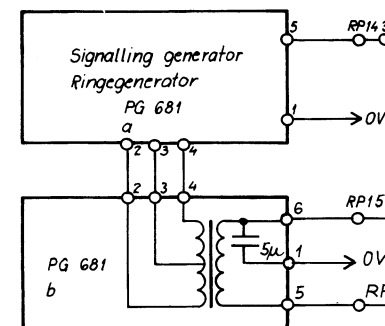
0V

W → P3-K
AA → P3-Y
BB → P3-Y
Y → P3-Y

-24V

2-wire connection
AF-and signalling wire

2-trådsforbindelse
LF- og signalledning



Max. loop resistance
for line and subscriber set
respectively for line and
linepanel TE 680-2001/01
750 Ω (works at 850 Ω)
concerning the signalling
stop circuit.

Max. sløjfemodstand for li-
nie og CB-apparat eller for
linie og linepanel TE 680-2001/01
er 750 Ω (virker ved 850 Ω)
af hensyn til ringestopkreds-
løbet.

2-wire connection
AF-and signalling wire

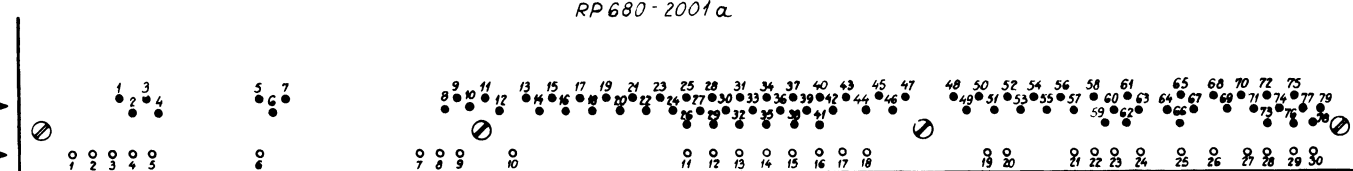
2-trådsforbindelse
LF- og signalledning

Key / tast

V → P3-V

Junction board / strappfelt

Terminals / terminaler



In case of a subscriber in connection
with a magneto exchange, the telephone
set at the subscriber must be of CB-type with
pushbutton and without dial.

Ved abonnent i forbindelse med magneto-
central må abonnenten være forsynet med
et CB-apparat med trykknop og uden
nummerskive.

In case of a subscriber in connection
with an automatic exchange, the telephone
set at the subscriber must be of CB-type
with dial.

Ved abonnent i forbindelse med automat-
central må abonnenten være forsynet med
et CB-apparat med nummerskive.

In case of interconnection between a
magneto and an automatic exchange, the
magneto exchange must be provided with a
linepanel like TE 680-2001/01
(diagram D 109783/1).

Ved magnetocentral i forbindelse med
automatcentral må magnetocentralen være
forsynet med et linepanel som TE 680-2001/01
(diagram D 109783/1).

P3 Field strength indication.
Feltstyrkeindikering.

Discr. measurement
Diskriminatoremåling.

AF/LF RX

Tone signalling :
Tonesignalering:

Call from exchange.
Opkald fra central.

Channel 1

Kanal 1

-24V

0V

0V

0V

0V

Sq. adj./reg.

Key/tast

Tone signalling
Tonesignalering

To automatic exchange
Imod automatcentral

To magneto exchange
Imod magnetocentral

Tx tone mod.

Speech mod

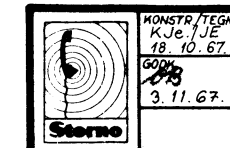
Talemod

CONTROL PANEL FOR CB-SUBSCRIBER IN CONNECTION
WITH MAGNETO-OR AUTOMATIC EXCHANGE, AND CONTROL
PANEL FOR MAGNETO EXCHANGE IN CONNECTION WITH
AUTOMATIC EXCHANGE. CP 680-2001a/01

KONTROLPANEL FOR CB-ABONNENT I FORBINDELSE MED
MAGNETOCENTRAL ELLER AUTOMATCENTRAL, OG
KONTROLPANEL FOR MAGNETOCENTRAL I FORBINDELSE
MED AUTOMATCENTRAL. CP 680-2001a/01

Note 1.
Adjust R28-R29 for
22-35 mA line current.

Juster R28-R29 til
22-35 mA liniestrøm.



D 109861/1

Field strength indication
Feltstyrkeindikering

Discr. measurement
Diskriminermåling

OV

-24 V

2-wire connection
AF- and signalling wire

2-trådsforbindelse
LF- og signalledning.

2-wire connection
AF- and signalling wire

2-trådsforbindelse
LF- og signalledning.

Key / tast

Junction board/strappfelt

Terminals/terminaler

J2

5

NN

W

AA

BB

V

Line 1a C

MP9

MP6

RP13

Line 1b H

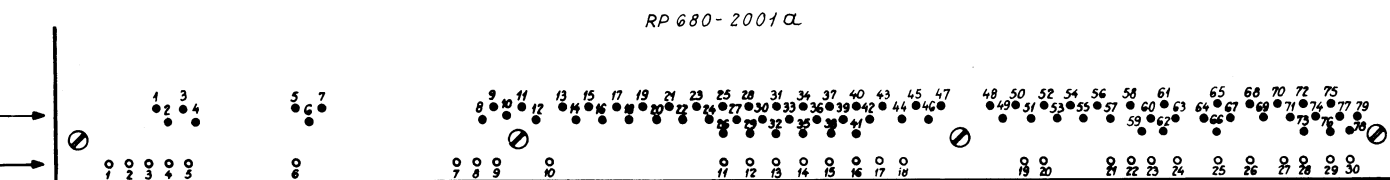
MP11

MP8

RP17

V

P3-V



RP 680-2001a/02

Note 2

Adjust R28 or R29 to 20-40 mA
signalling current in relay A.

Juster R28 eller R29 til 20-40 mA
ringestrøm i relæ A.

Note 2:

Adjust R28 or R29 to 20-40 mA
signalling current in relay A.

Juster R28 eller R29 til 20-40 mA
ringestrøm i relæ A.

CONTROL PANEL FOR AUTOMATIC EXCHANGE
IN CONNECTION WITH MAGNETO EXCHANGE
OR CB-SUBSCRIBER CP 680-2001a/02

KONTROLPANEL FOR AUTOMATCENTRAL I
FORBINDELSE MED MAGNETOCENTRAL
ELLER CB-ABONNENT CP 680-2001a/02

Field strength indication
Feltstyrkeindikering

Discr. measurement
Diskriminermåling

AF/LF RX

Tone signalling
Tonesignalering

Channel 1
Kanal 1

-24 V

OV

OV

OV

OV

Sq. adj./reg.

Key / tast

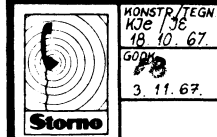
Tone signalling
Tonesignalering

Outgoing call
Udgående opkald

Tx tone mod.

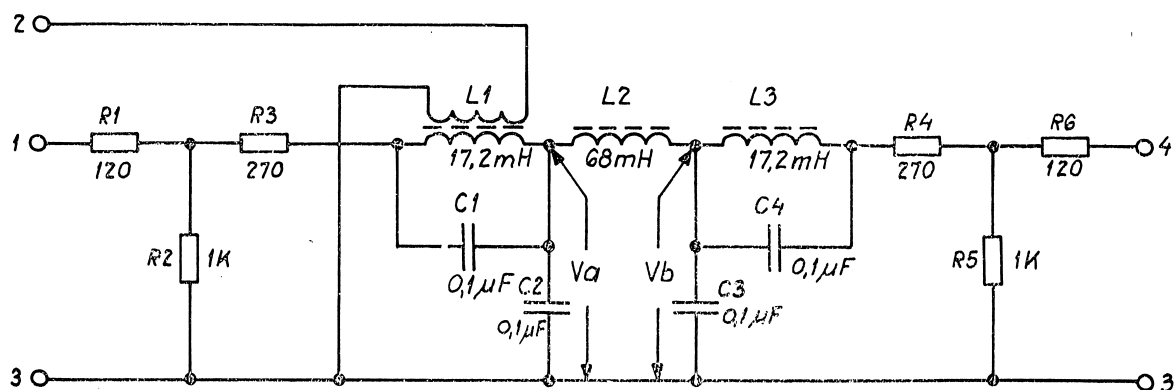
Speech mod.

Talemod.



MONSTR/TEGN
Høj 10 67
GØR
3. 11. 67

1/28861010

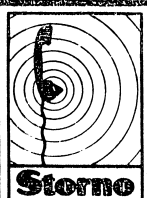


Adjustment:

- L2 is not to be adjusted, but the core is set to about medium position.
- L1 Output term. 4-3 is loaded with 600Ω.
A VTVM is connected to Va.
Input term 1-3 is supplied with 3825 c/s/0 dBm/600Ω. L1 is adjusted to minimum Va.
- L3 Input term. 1-3 is loaded with 600Ω.
A VTVM is connected to Vb.
Output term. 4-3 is supplied with 3825 c/s/0 dBm/600Ω. L3 is adjusted to minimum Vb.

Trimmevejledning:

- L2 trimmes ikke, men kernen indreges til ca, midterstilling.
- L1 Udgangsterm. 4-3 belastes med 600Ω.
Rørvoltmeter tilsluttes over Va.
Indgangsterm. 1-3 tilføres 3825 c/s/0 dBm/600Ω. L1 trimmes til minimum Va.
- L3 Indgangsterm. 1-3 belastes med 600Ω.
Rørvoltmeter tilsluttes over Vb.
Udgangsterm 4-3 tilføres 3825 c/s/0 dBm/600Ω. L3 trimmes til minimum Vb.



konstr./tegn.
HJe/JE
15.8.67
godk.
KJ
16.8.67
komp.liste

3825 Hz LOW PASS FILTER
LAVPASFILTER
FN 680 - 2001

KODE

TEGN. NR.

D109597

A4

no	code	data	no	code	data
C1	76.5068	0,1 μ F \pm 1% polystyr TB 30V 1S			
C2	- " -	- " -			
C3	- " -	- " -			
C4	- " -	- " -			
R1	80.5238	120 Ω 5% kull. 1/8W			
R2	80.5249	1k Ω 5% kull. 1/8W			
R3	80.5242	270 Ω 5% kull. 1/8W			
R4	80.5242	270 Ω 5% kull. 1/8W			
R5	80.5249	1k Ω 5% kull. 1/8W			
R6	80.5238	120 Ω 5% kull. 1/8W			
L1	61.1017	spole			
L2	61.1018	spole			
L3	61.1019	spole			



udarb af
Kje/BNA
12-2-69
kontrol af
tilh. diag.

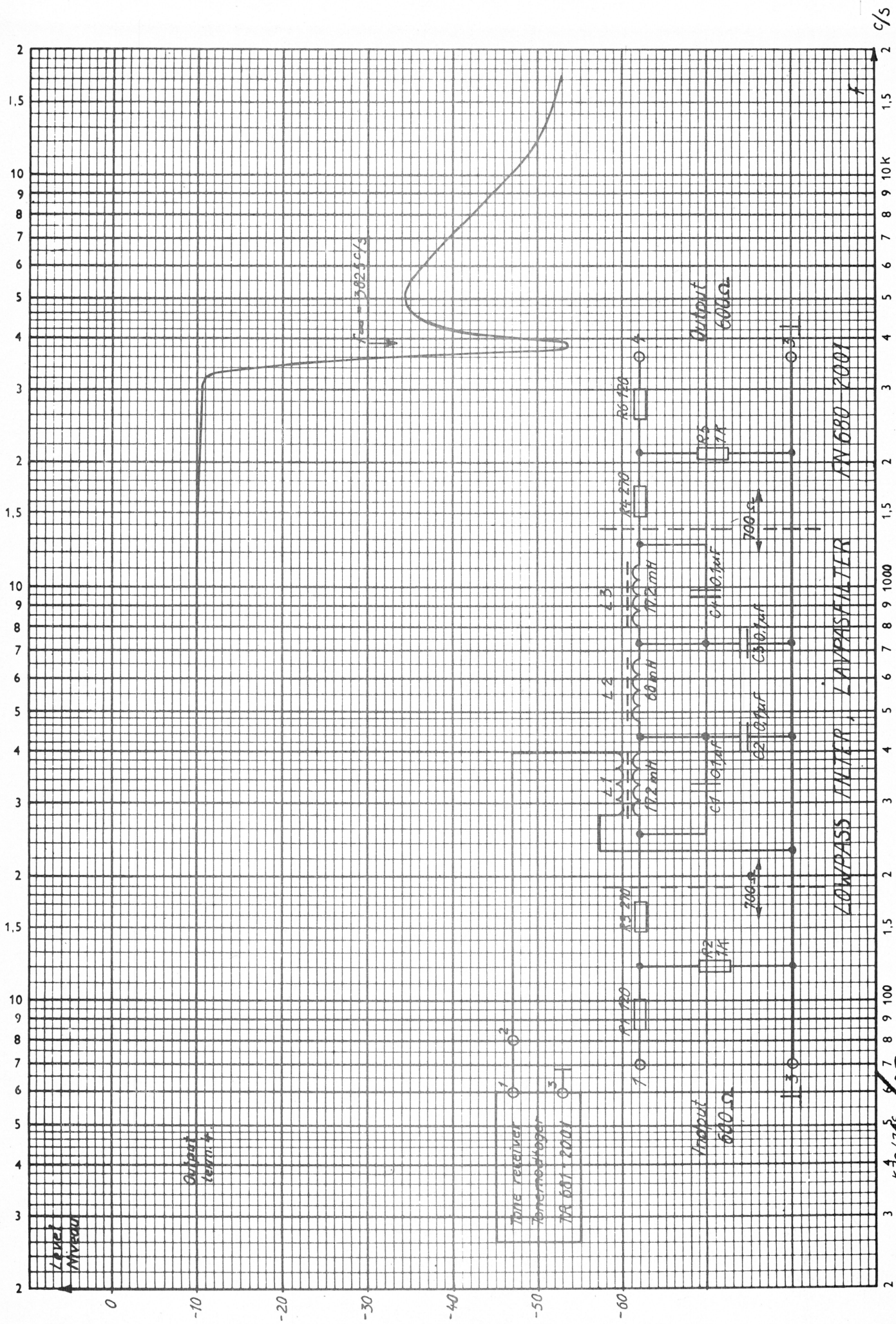
LF-filter
Stykliste

FN680-2001

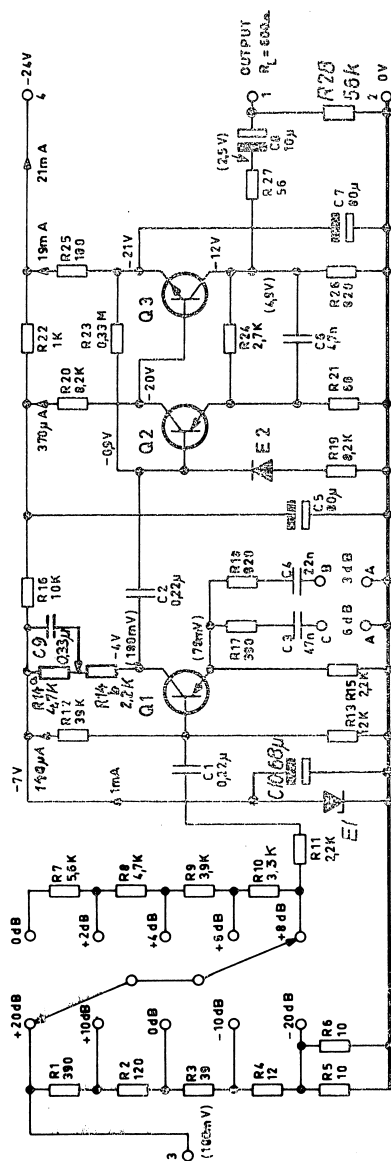
*comp. liste

X112554

blad no. af



D 109813
 15.8.67
 Ordinat 100 delinger - Abscisse 20-20.000 Hz.



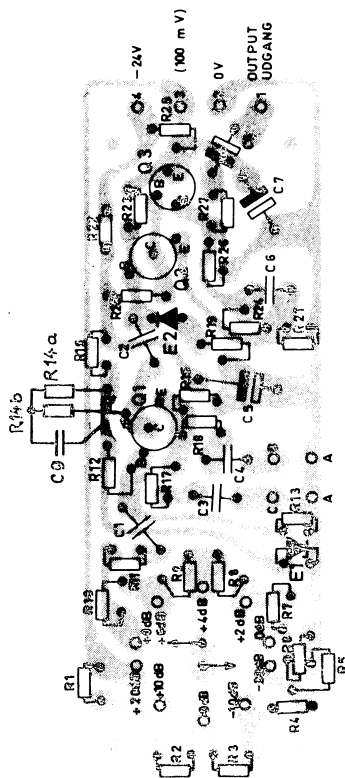
BOTTOM VIEW -
SET FRA GJØDEN

Equalizer/Modforvranger: A - B : 3 dB at/ved 3000 Hz
A - C : 6 dB at/ved 3000 Hz
A - B, A - C: 9 dB at/ved 3000 Hz

Amplification/Attenuation: From -20 dB to +28 dB.
Forstærkning/Dæmpning: Fra -20 dB til +28 dB.

The figures indicated in brackets are measurements at 1000 Hz with respect to 100 mV input signal.

Tallene i parentes viser målinger ved 1000 Hz i forhold til et indgangssignal på 100 mV.



PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN

LA681-
2001
LINE AMPLIFIER
LINIEFORSTÆRKER

D109659

AJ/JAS
5.1.70.

X 109699

Storno

Storno

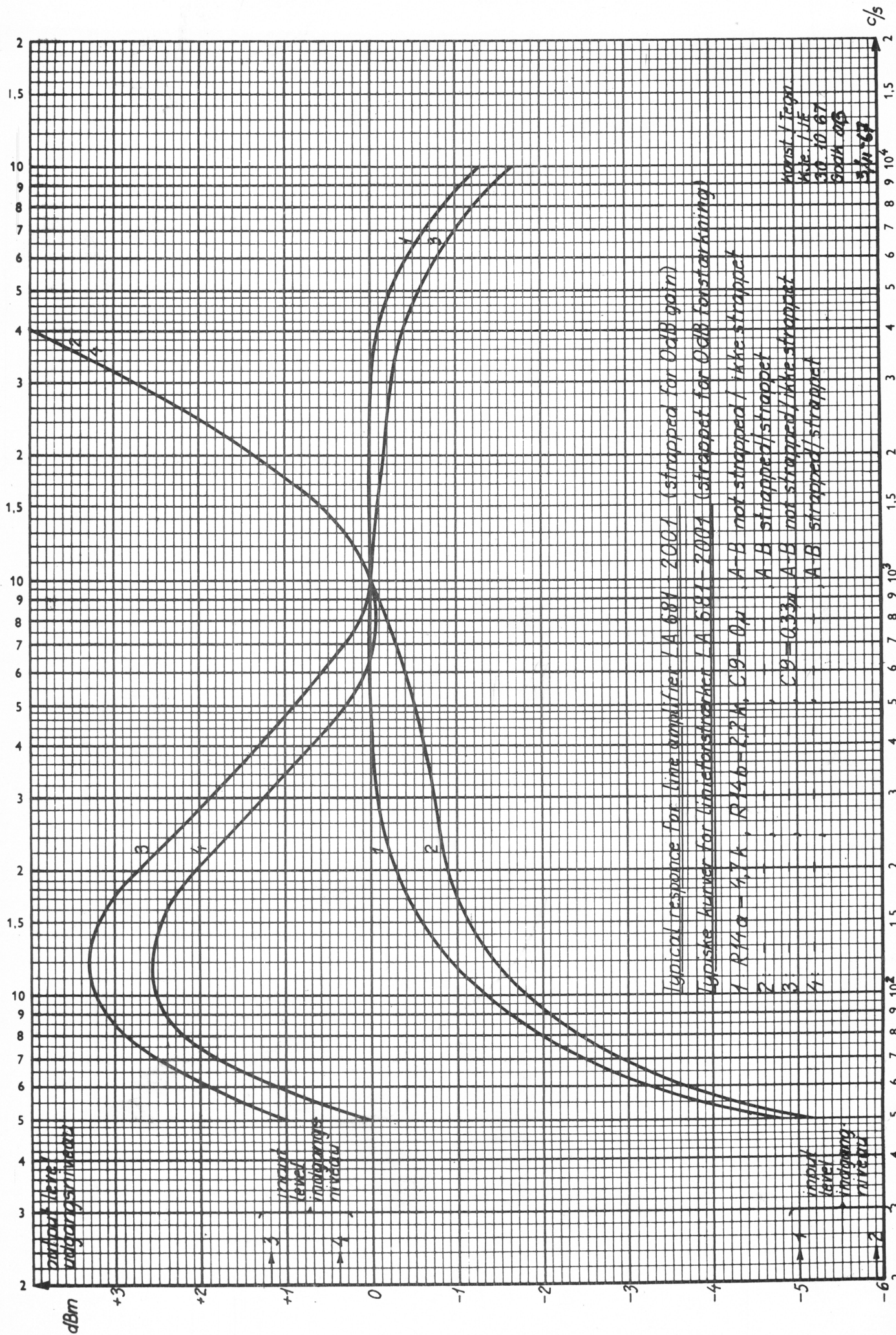
TYPE	NO.	CODE	DATA
C1	76. 5074	0, 22uF 10% polyester. TB	100V
C2	76. 5074	0, 22uF 10% polyester. TB	100V
C3	76. 5072	47nF 10% polyester. FL	50V
C4	76. 5071	22nF 10% polyester. FL	50V
C5	73. 5110	80uF -10 +50% electrol. FL	35V
C6	76. 5061	4, 7nF 10% polyester. FL	50V
C7	73. 5110	80uF -10 +50% electrol. FL	35V
C8	73. 5109	10uF 20% tantal	15V
C9	76. 5075	0,33 uF 10% polyester. TB	100V
R1	80. 5244	390k 5% carbon film	1/8W
R2	80. 5238	120k 5% carbon film	1/8W
R3	80. 5232	39k 5% carbon film	1/8W
R4	80. 5226	12k 5% carbon film	1/8W
R5	80. 5225	10k 5% carbon film	1/8W
R6	80. 5225	10k 5% carbon film	1/8W
R7	80. 5258	5, 6k 5% carbon film	1/8W
R8	80. 5257	4, 7k 5% carbon film	1/8W
R9	80. 5256	3, 9k 5% carbon film	1/8W
R10	80. 5255	3, 3k 5% carbon film	1/8W
R11	80. 5253	2, 2k 5% carbon film	1/8W
R12	80. 5268	39k 5% carbon film	1/8W
R13	80. 5262	12k 6% carbon film	1/8W
R14a	80. 5257	4, 7k 5% carbon film	1/8W
R15	80. 5253	2, 2k 5% carbon film	1/8W
R16	80. 5261	10k 5% carbon film	1/8W
R17	80. 5244	390k 5% carbon film	1/8W
R18	80. 5248	820k 5% carbon film	1/8W
R19	80. 5260	8, 2k 5% carbon film	1/8W
R20	80. 5260	8, 2k 5% carbon film	1/8W
R21	80. 5235	68k 5% carbon film	1/8W
R22	80. 5249	1 k 5% carbon film	1/8W
R23	80. 5279	330 k 5% carbon film	1/8W
R24	80. 5254	2, 7k 5% carbon film	1/8W
R25	80. 5240	180k 5% carbon film	1/8W
R26	80. 5448	820k 5% carbon film	1/4W
R27	80. 5234	56 k 5% carbon film	1/8W
R14b	80. 5253	2, 2k 5% carbon film	1/8W
E1	99. 5146	Zenerdiode BZY60	
E2	99. 5028	Diode OA200	
Q1	99. 5144	Transistor 2N3702	
Q2	99. 5144	Transistor 2N3702	
Q3	99. 5121	Transistor BC107	
C10	73. 5106	68 uF 20% tantal electrolyt	15V
R28	80. 5270	56k 5% carbon film	1/8W

D 109659

X109699

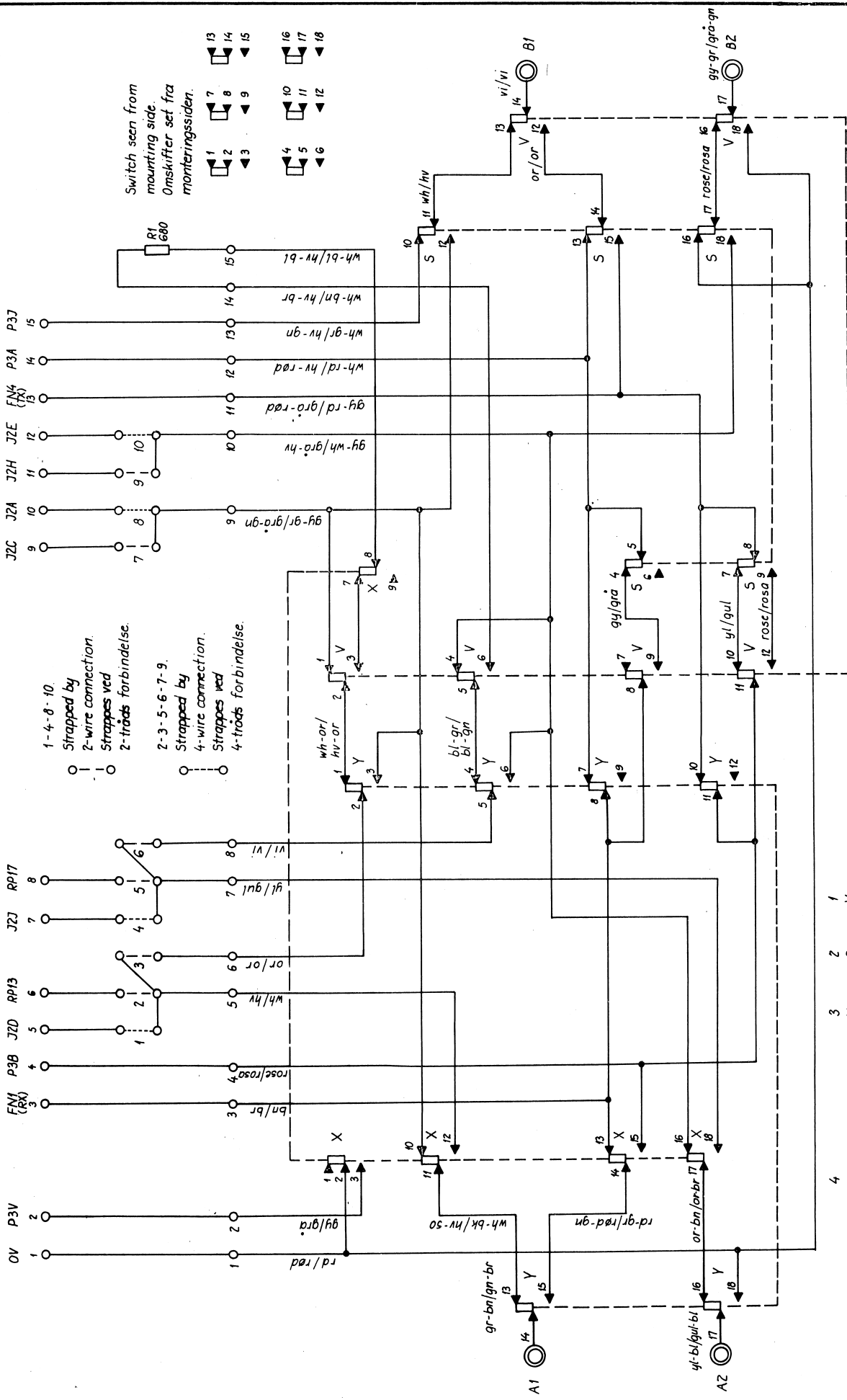
KJ/JAS
5.1.70.KJ
16.6.67.LINE AMPLIFIER
LINIEFORSTÆRKER

LA681 - 2001

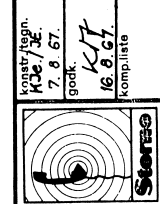
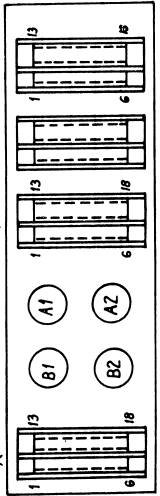


D110206

Ordinat 10 delinger - Abscisse 20-20.000 Hz.



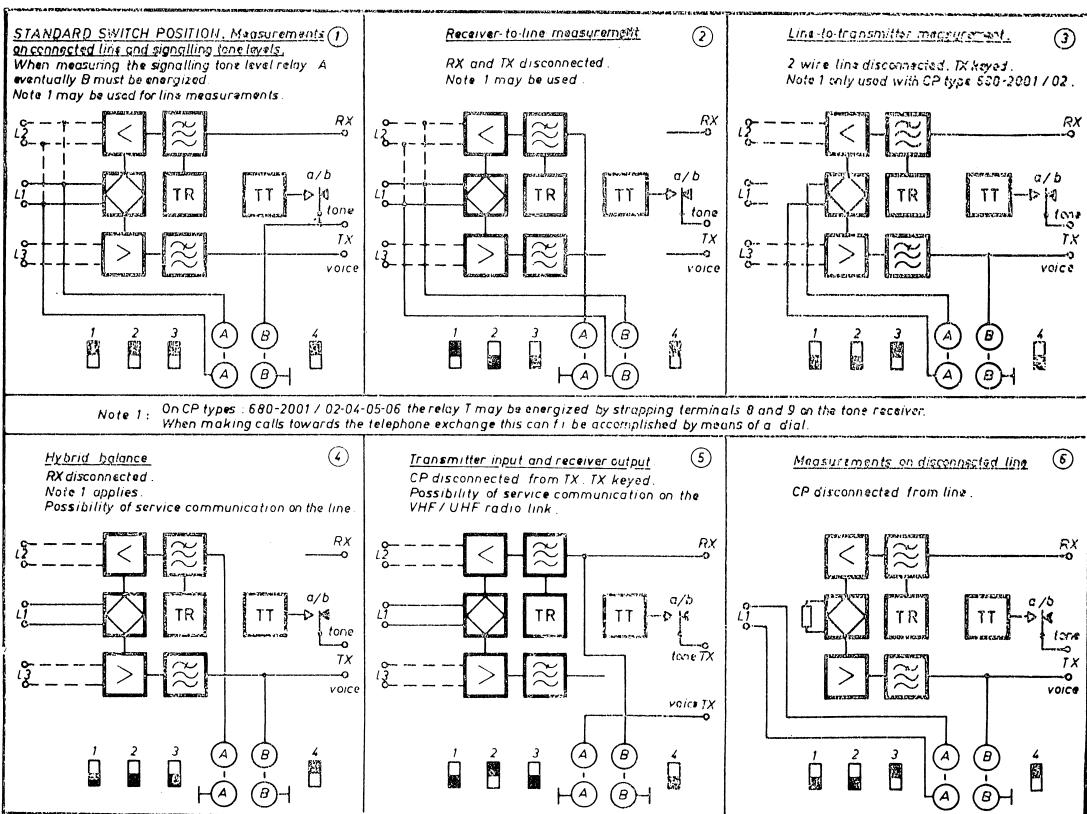
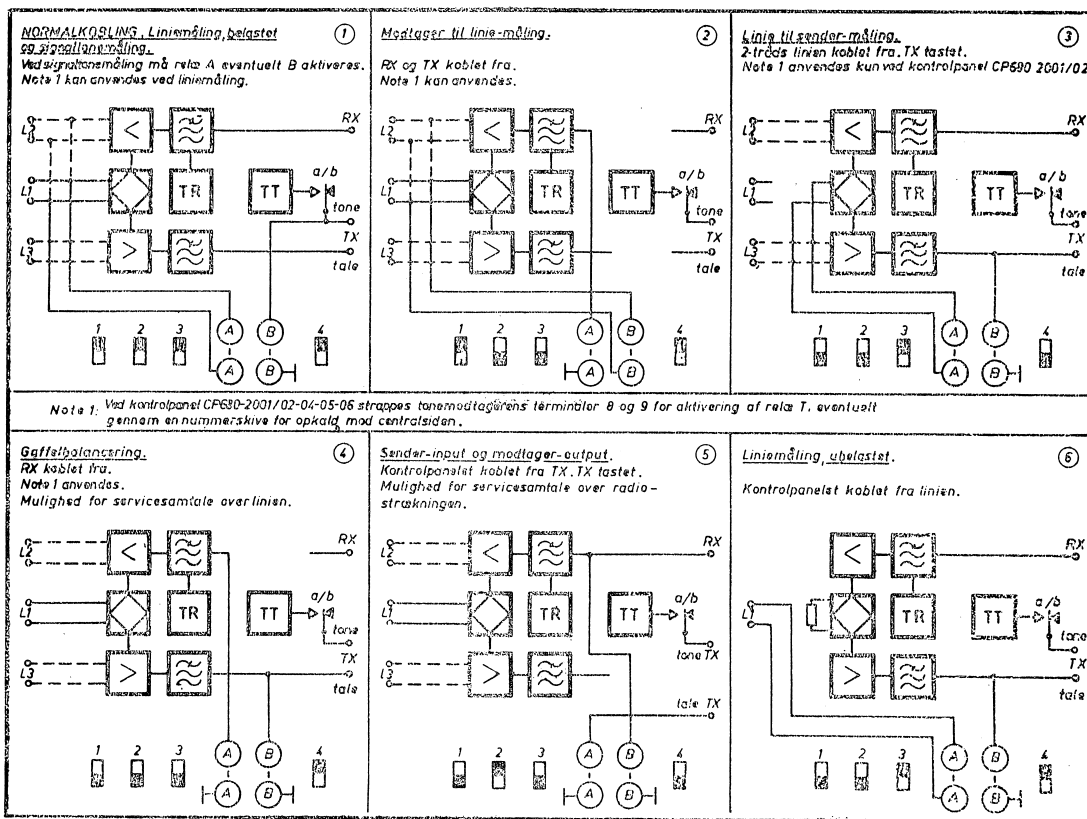
Panel seen from mounting side.
Panel set fra monteringsiden.



Konstr./tegn.
KJ
7. 8. 67.
godk.
KJ
16. 8. 67.
komplette

MEASURING PANEL MÅLEPANEL MP 680 - 2001

KODE



SELV
81/89

Lamp
Lamp

INSTRUCTION FOR MEASUREMENT PANEL

BETJENINGSOVERSIGT FOR MÅLEPANEL

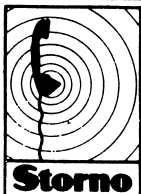
MP 680 - 2001

KODE:

TEGN. NR.

D 110532

A 3



konstr./tegn.
KJ/JAS
4.7.67
godk.
KAT
16.8.67.
komp.liste

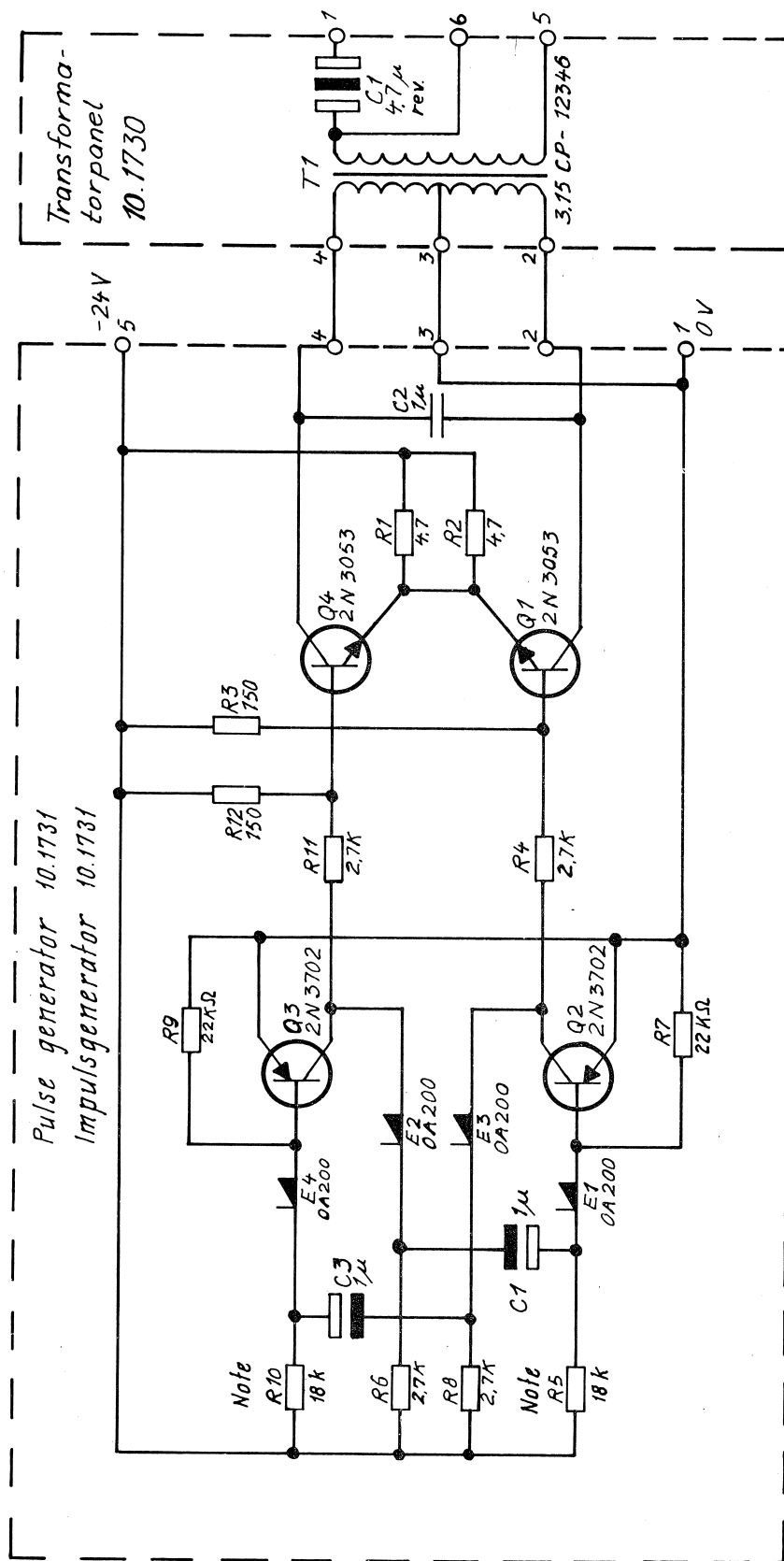
RINGING GENERATOR Ringegenerator PG 681 (10.1732)

KODE

TEGN.NR.

D 109658

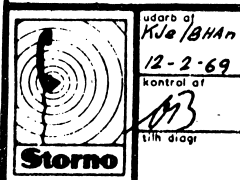
A4



Note :

Adjust R5 and R10 to a pulse frequency of 40 Hz \pm 20 %
Juster R5 og R10 til en impulsfrekvens på 40 Hz \pm 20 %

no	code	data	no	code	data
C1	73.5114	1 μ F 20% tantal 30V			
C2	76.5078	1 μ F 10% polyest TB100V			
C3	73.5114	1 μ F 20% tantal 30V			
C4	73.5007	5 μ F bipolar 100V			
E1	99.5028	diode 1N914 si			
E2	- " -	- " -			
E3	- " -	- " -			
E4	- " -	- " -			
Q1	99.5128	2N3053 transistor			
Q2	99.5144	2N3702 transistor			
Q3	99.5144	2N3702 transistor			
Q4	99.5128	2N3053 transistor			
R1	80.5221	4,7 Ω 5% kull. 1/8W			
R2	80.5221	4,7 Ω 5% kull. 1/8W			
R3	80.5239	150 Ω 5% kull. 1/8W			
R4	81.5054	2,7k 5% kull. 1/2W			
R5	80.5264	18k 5% kull. 1/8W			
R6	80.5254	2,7k 5% kull. 1/8W			
R7	80.5265	22k 5% kull. 1/8W			
R8	80.5254	2,7k 5% kull. 1/8W			
R9	80.5265	22k 5% kull. 1/8W			
R10	80.5264	18k 5% kull. 1/8W			
R11	81.5054	2,7k 5% kull. 1/2W			
R12	80.5239	150 Ω 5% kull. 1/8W			
T1	60.5143	impulstransformator			



Ringegenerator
Stykliste

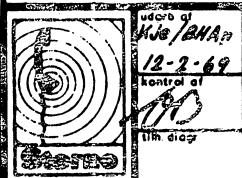
PG681

comp. liste

X112555

blad no. af

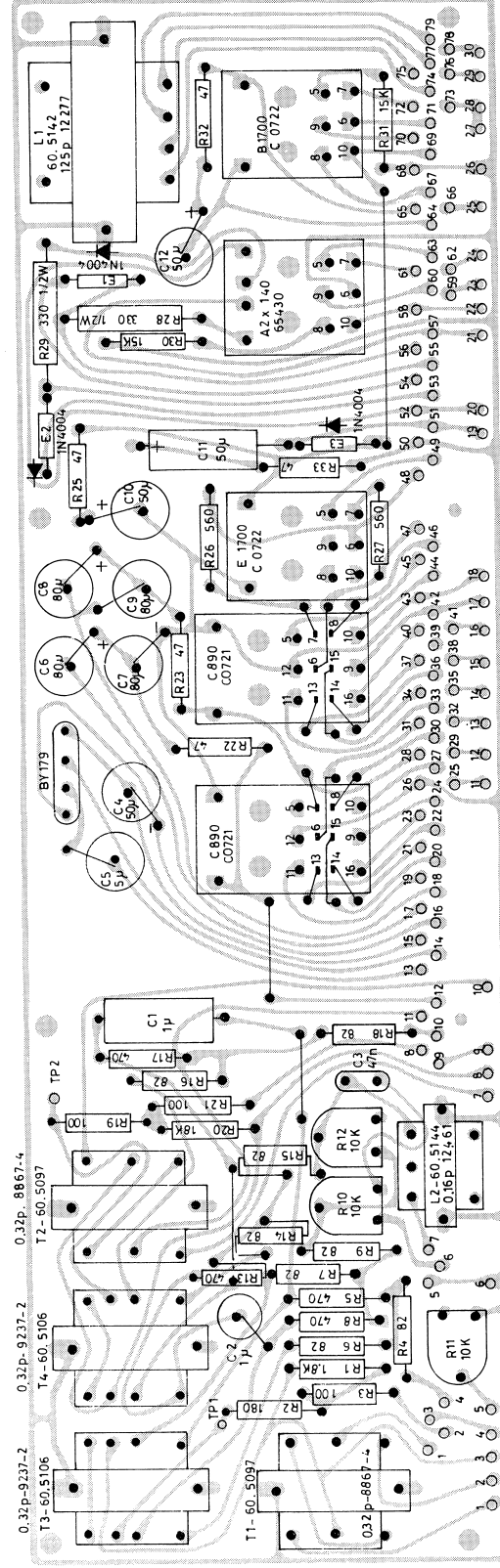
no	code	data		no	code	data	
C1	76.5078	1 μ F 10% polyest	TB100V	R16	80.5436	82 Ω	5% kull 1/4W
C2	76.5078	1 μ F 10% polyest	TB100V	R17	80.5445	470 Ω	- " - -
C3	76.5072	47nF 10%polyest	FL50V	R18	80.5436	82 Ω	- " - -
C4	73.5108	50 μ F -10+100%		R19	80 5437	100 Ω	- " - -
C5	73.5007	elektrolyt 35V		R20	80.5452	1,8K Ω	- " - -
C6	73.5110	5 μ F bipolar		R21	80.5437	100 Ω	- " - -
C7	73.5110	elektrolyt 100V		R22	80.5433	47 Ω	- " - -
C8	73.5110	80 μ F -10+50%		R23	80.5433	47 Ω	- " - -
C9	73.5110	elektrolyt 25V		R25	80.5433	47 Ω	- " - -
C10	73.5108	- " -		R26	80.5446	560 Ω	- " - -
C11	73.5100	- " -		R27	80.5446	560 Ω	- " - -
C12	73.5108	50 μ F -10+100%		R28	81.5043	330 Ω	- " - 1/2W
E1	99.5020	elektrolyt 35V		R29	81.5043	330 Ω	- " - -
E2	99.5020	10 μ F -10+100%		R30	80.5463	15K Ω	- " - 1/4W
E3	99.5020	elektrolyt 35V		R31	80.5463	15K Ω	- " - -
L1	605142	diode 1N4004		R32	80.5433	47 Ω	- " - -
L2	60.5144	- " -		R33	80.5433	47 Ω	- " - -
R1	80.5452	- " -		T1	60.5097	transf. 600/600 Ω	
R2	80.5437	2 x (2,5H 100 Ω 30mA)		T2	60.5097	- " - - " -	
R3	80.5437	drosselspole		T3	605106	gaffeltransf.	
R4	80.5436	spole med jernkerne		T4	60.5106	- " -	
R5	80.5445			Relæ	58.5055	relæ V23154-C0721.	
R6	80.5436	1,8k Ω 5% kull 1/4W		C & D		B110 (154d-65721/93e)	
R7	80.5437	100 Ω - " - -				8902	
R8	80.5437	100 Ω - " - -		Relæ	58.5062	relæ V23154-C0722-	
R9	80.5436	82 Ω - " - -		B & E		B104 (154c-65722/93d)	
R10	80.5445	470 Ω - " - -				1700 Ω	
R11	80.5436	82 Ω - " - -		Relæ A	58.5032	relæ 154c-65430/93d,	
R12	80.5436	82 Ω - " - -				2 x 140 Ω	
R13	80.5445	470 Ω - " - -		E4	99.5150	broensretter BY 123	
R14	80.5436	82 Ω - " - -				kan erstattes af 4 stk	
R15	80.5436	82 Ω - " - -				diode 1N4004 99.5020	



Relæpanel
Stykliste

RP680-2001a

X112556



VIED FROM COMPONENT SIDE

NOTE: THE LOWER ROW OF TERMINALS IS
INTENDED FOR CONNECTION OF CABLING
BUT NOT FOR STRAPPINGS.

RELAY PANEL RP680-2001a
RELÆ PANEL

116.891/2

Strapping Arrangement in RP680-2001a/01

Wire: Soflex M49 0.4mm[∅]

white	32 - 34	white-brown	36 - 45	black	62 - 64
yellow	41 - 44	white-brown	45 - 52	red-blue	61 - 65
brown	35 - 37	red	50 - 56	green-grey	63 - 70
orange	25 - 40	black	54 - 62	green-brown	2 - 3
pink	38 - 65	orange-blue	26 - 28	blue-white	8 - 9
grey	46 - 49	white-red	66 - 67	green-red	51 - 72
grey	49 - 57	blue-yellow	4 - 47	red	50 - 71
		black-white	10 - 48	green-blue	59 - 60

brown code wire (Dätw. 1607/L 0.25mm²).

Control panel for CB-subscriber in connection with magneto- or automatic exchange, and control panel for magneto exchange in connection with automatic exchange, CP680-2001a/01. In case of a subscriber in connection with a magneto exchange, the telephone set at the subscriber must be of CB-type with push-button and without dial.

In case of a subscriber in connection with an automatic exchange, the telephone set at the subscriber must be of CB-type with dial.

In case of interconnection between a magneto- and an automatic exchange, the magneto exchange must be provided with a linepanel like TE680-2001/01 (diagram D109783).

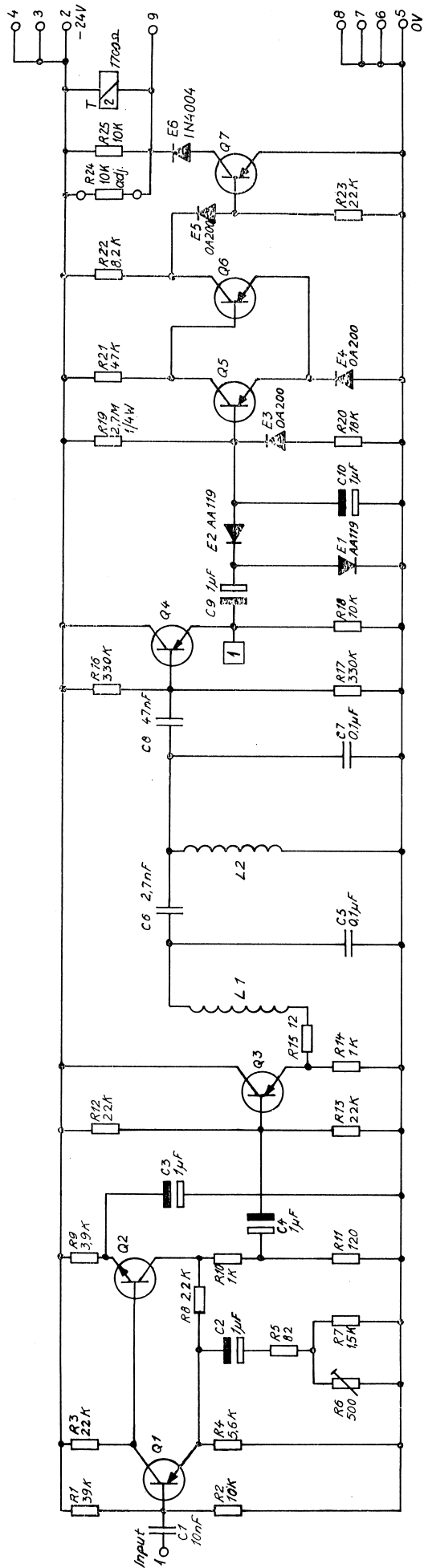
Strapping Arrangement in RP680-2001a/02

Wire: Soflex M49 0.4mm[∅]

white	14 - 32	white-brown	46 - 49	red	66 - 68
yellow	32 - 78	white-orange	36 - 45	red-blue	61 - 69
brown	40 - 44	brown-orange	13 - 21	green-grey	2 - 3
orange	34 - 73	orange-blue	16 - 57	green-brown	8 - 9
violet	73 - 77	white-red	4 - 47	blue-white	22 - 51
pink	75 - 79	blue-yellow	10 - 48	green-red	59 - 60
grey	20 - 42	black-white	12 - 26	green-blue	15 - 52
grey	42 - 74	green-white	29 - 31	grey-red	54 - 56
				black	18 - 43

red code wire (Dätw. 1607/L 0.25mm²).

Control panel for automatic exchange in connection with magneto exchange or CB-subscriber, CP680-2001a/02.

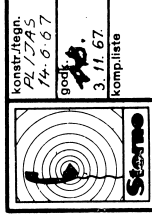
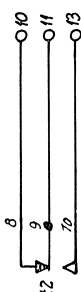
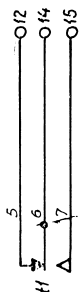


Q1 Q3 Q4 Q5 Q6 Q7 = 2N3702
Q2 = BC108

$f_0 = 3825 \text{ Hz}$
Input = -17 dBm

R6 just således at relæet
aktiveres ved -25 dBm.
på terminal 1

L1 og L2 justeres til max. på
testpunkt 1 målt med rørvoltmeter.



TONE RECEIVER
TONEMODTAGER

TR681-2001

TEGN. NR. D110000

KODE

Konstr./tegn.
PL/DA5
14.6.67
Godk.
3.11.67
Kompliste

no	code	data	no	code	data
C1	76.5070	10nF 10% polyester FL50V	R8	80.5253	2,2kΩ 5% kull. 1/8W
C2	73.5114	1μF 20% tantal 30V	R9	80.5256	3,9kΩ - " - -
C3	73.5114	1μF 20% tantal 30V	R10	80.5249	1kΩ - " - -
C4	73.5114	1μF 20% tantal 30V	R11	80.5238	120Ω - " - -
C5	76.5068	0,1μF 1% polystyr TB 30V 1S	R12	80.5265	22kΩ - " - -
C6	76.5019	2,7nF 5% polystyr TB 125V	R13	80.5265	22kΩ - " - -
C7	76.5068	0,1μF 1% polystyr TB 30V 1S	R14	80.5249	1kΩ - " - -
C8	76.5072	47nF 10% polyester FL50V	R15	80.5226	12Ω - " - -
C9	73.5114	1μF 20% tantal 30V	R16	80.5279	330kΩ - " - -
C10	73.5114	1μF 20% tantal 30V	R17	80.5279	330kΩ - " - -
			R18	80.5261	10kΩ - " - -
			R19	80.5490	2,7MΩ - " - 1/4W
E1	99.5074	diode par AA119	R20	80.5264	18kΩ - " - 1/8W
E2	99.5074	diode par AA119	R21	80.5269	47kΩ - " - -
E3	99.5028	diode 1N914	R22	80.5260	8,2kΩ - " - -
E4	99.5028	diode 1N914	R23	80.5265	22kΩ - " - -
E5	99.5028	diode 1N914	R24	80.5261	10kΩ - " - -
E6	99.5020	diode 1N4004	R25	80.5261	10kΩ - " - -
L1	61.1019	spole	Re	58.5062	relæ V23154-C0722-B104
L2	61.1019	spole			(154c-65722/93d)
					1700Ω
Q1	99.5144	transistor 2N3702			
Q2	99.5143	transistor BC108			
Q3	99.5144	transistor 2N3702			
Q4	99.5144	transistor 2N3702			
Q5	99.5144	transistor 2N3702			
Q6	99.5144	transistor 2N3702			
Q7	99.5144	transistor 2N3702			
R1	80.5268	39kΩ 5% kull. 1/8W			
R2	80.5261	10kΩ - " - -			
R3	80.5265	22kΩ - " - -			
R4	80.5258	5,6kΩ - " - -			
R5	80.5236	82Ω - " - -			
R6	86.5042	500Ω 20% trim.kull. 0,1W lin			
R7	80.5251	1,5kΩ - " - -			



udarb af
KJE/GHA
12-2-69
kontr. af
tilh. diag.

Tonemodtager

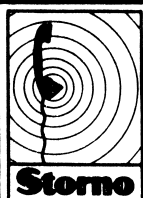
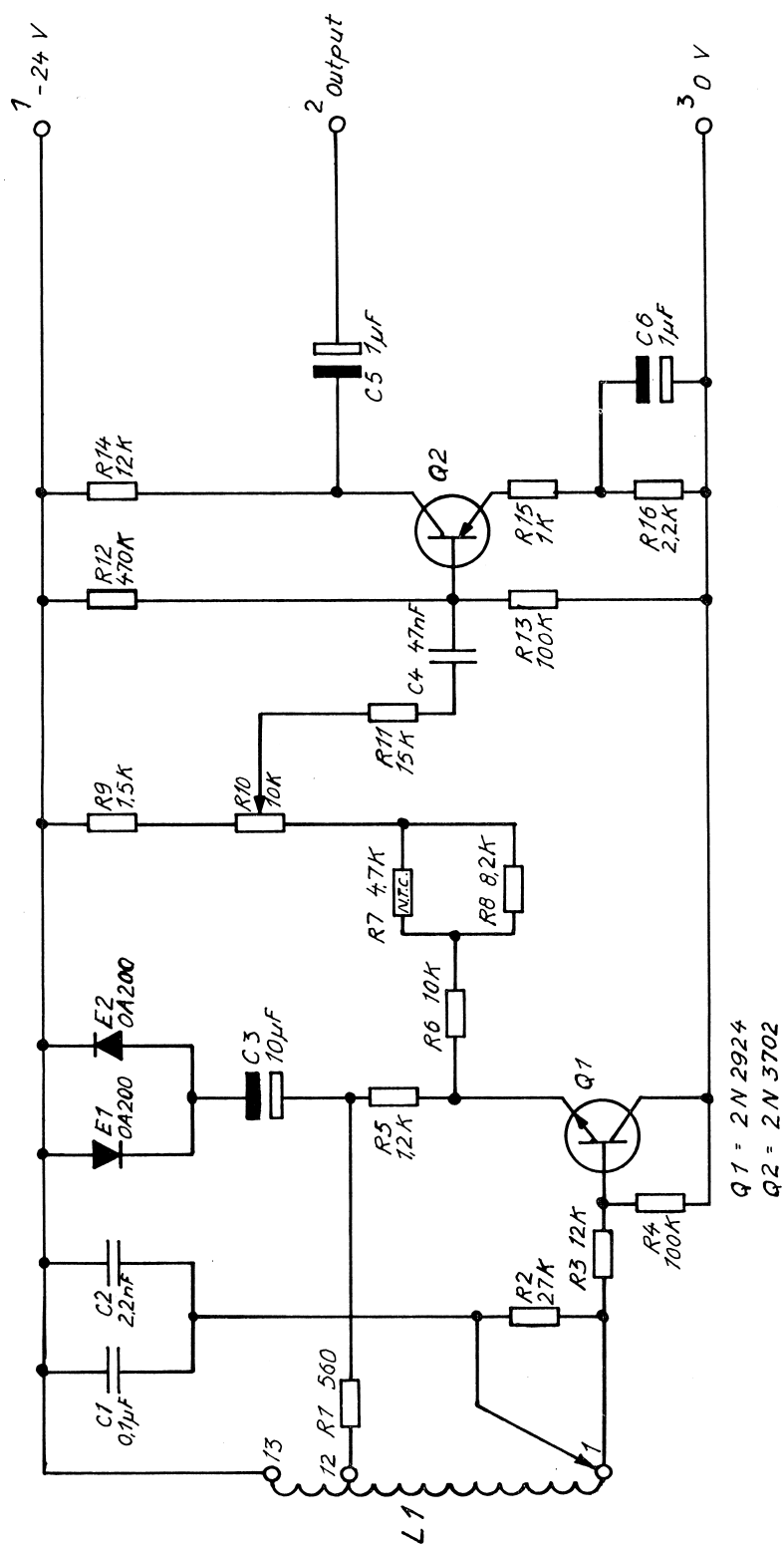
Stykliste

TR681-2001

comp list

X112557

blad no



konstr./tegn.
HJe/JAS
14.6.67
godk.
K17
16.8.67
kompiliste

TONESENDER

TT 681 - 2001

KODE

TEGN. NR.

D 109598

A 4

no	code	data	no	code	data
C1	76.5068	0,1 μ F 1% polystyr TB 30V 1S			
C2	76.5059	2,2nF 10% polyest FL 50V			
C3	73.5109	10 μ F 20% tantal 15V			
C4	76.5072	47nF 10% polyest FL 50V			
C5	73.5114	1 μ F 20% tantal 30V			
C6	73.5114	1 μ F 20% tantal 30V			
L1	61.1019	spole			
Q1	99.5117	transistor 2N2924			
Q2	99.5144	transistor 2N3702			
R1	80.5246	560 Ω 5% kull 1/8W			
R2	80.5266	27k Ω - " - -			
R4	80.5273	100k Ω - " - -			
R5	80.5250	1,2k Ω - " - -			
R6	80.5261	10k Ω - " - -			
R7	89.5009	4,7k Ω 20% NTC 0,6W			
R8	80.5260	8,2k Ω 5% kull 1/8W			
R9	80.5251	1,5k Ω - " - -			
R10	86.5039	10k Ω 20% trim kull 0,1W lin			
R11	80.5263	15k Ω 5% kull 1/8W			
R12	80.5281	470k Ω - " - -			
R14	80.5262	12k Ω - " - -			
R15	80.5249	1k Ω - " - -			
R16	80.5253	2,2k Ω - " - -			
E1	99.5028	diode 1N914			



udarb af
KJE/BHA
12-2-69
kontroll af
TJS
tilh diagi

Tonegenerator

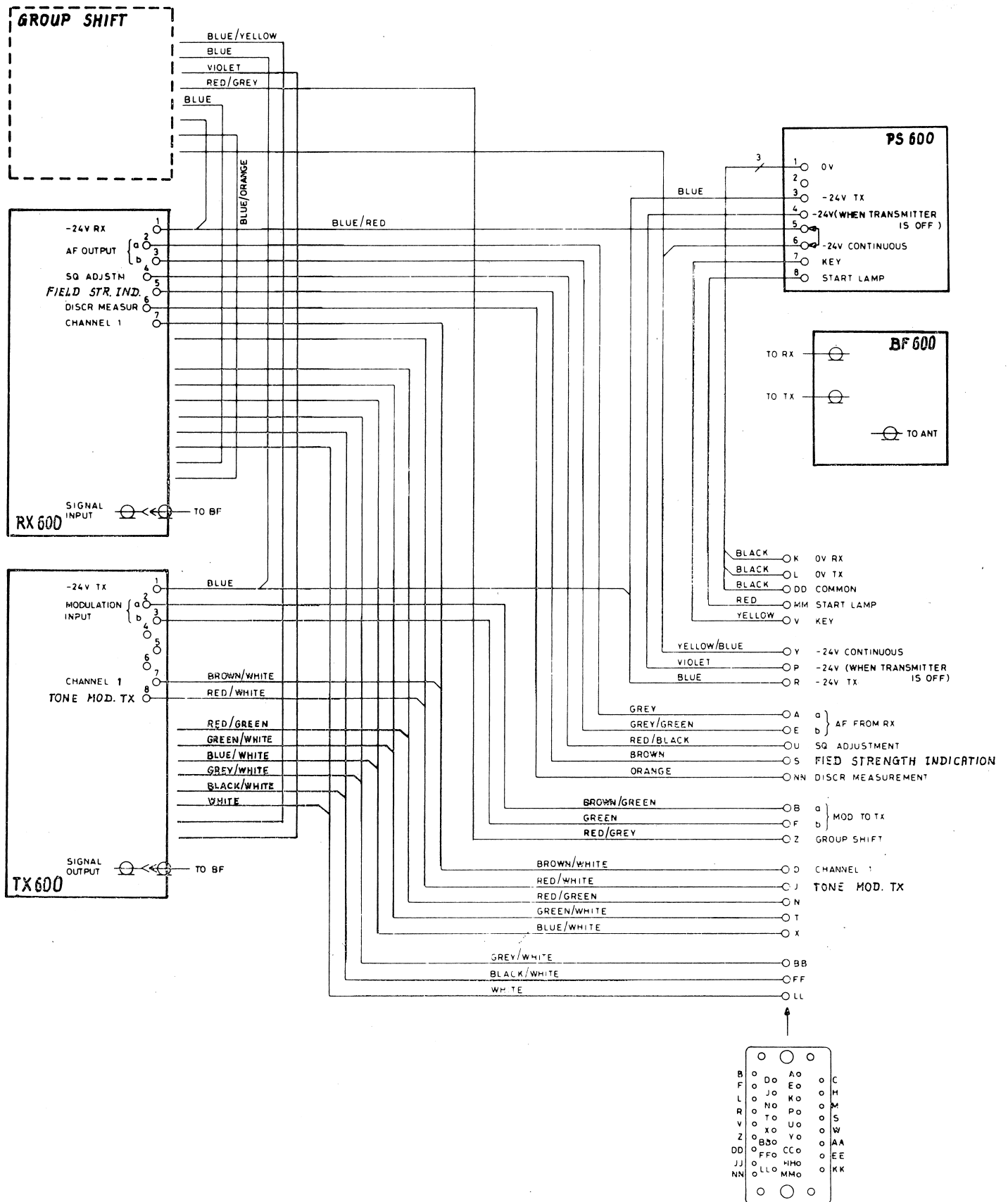
Stykliste

TT681-2001

comp liste

X112558

blad no af

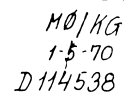


CABLE FORM
KABLINGS DIAGRAM

CQF610, CQF630, CQF661 DUPLEX
- 2001

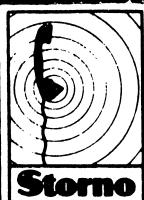
MD/KG
1-5-70
D 114537

Storno



Rød/hvid ledning (for styring af kanal 2) mellem TX-terminal 8 og RX-terminal 8 loddet fra ved TX-terminal 8 og isoleres med et stykke flex.

Rd/wh wire (for channel 2) between TX-terminal 8 and RX-terminal 8 is removed from TX terminal 8 and properly insulated.



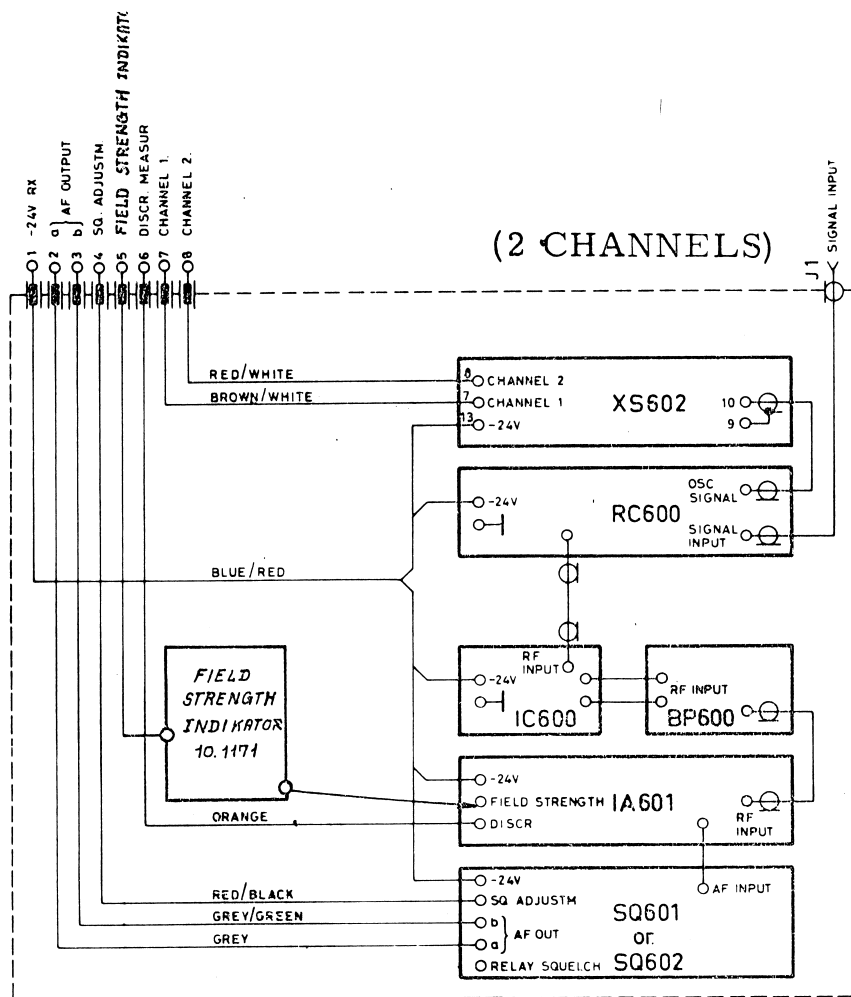
konstr./tegn. KJe/HNi 4.5.70
godk.
komp.liste

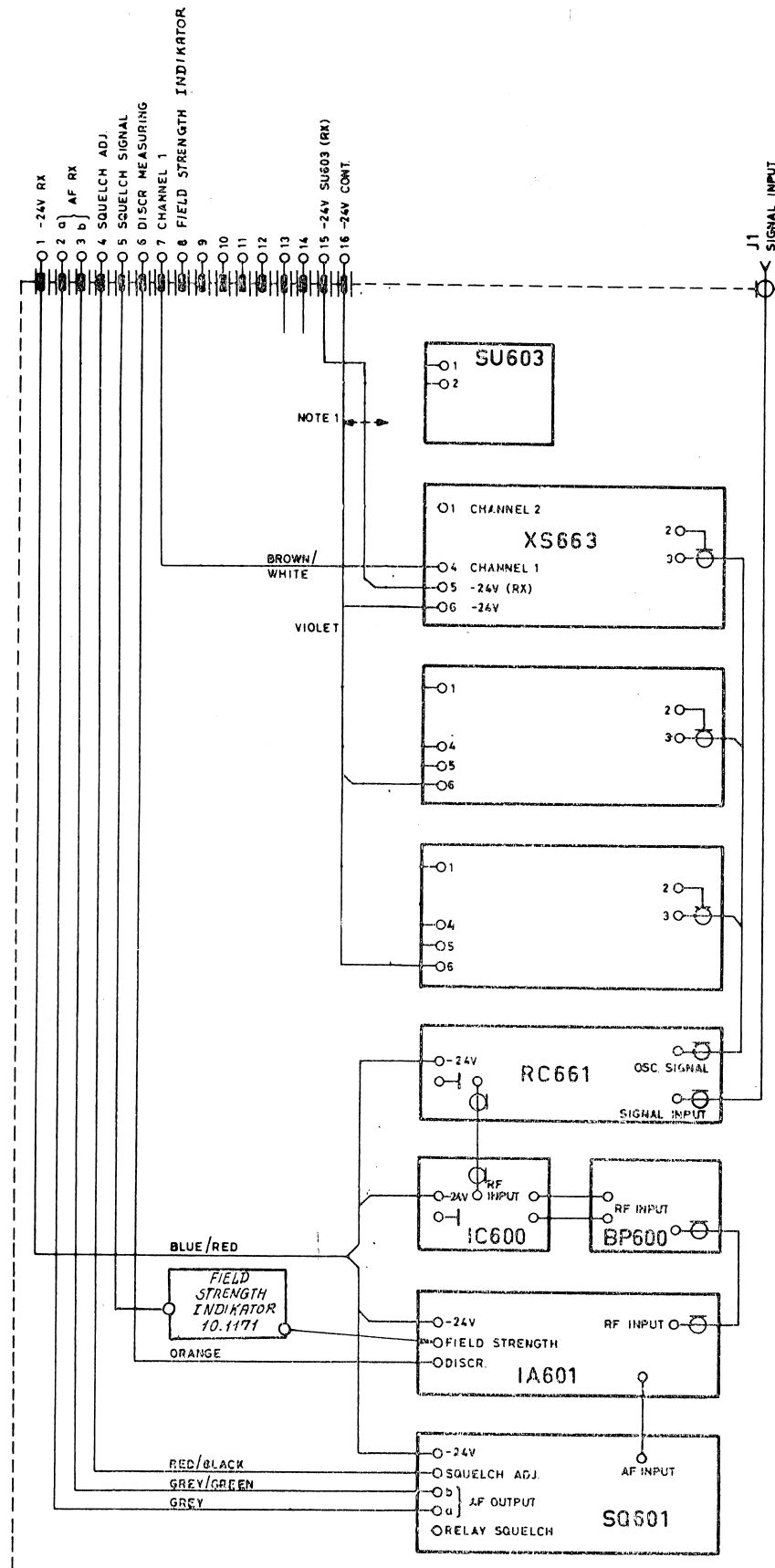
Change in cabling harness.
Instruktion for kablingsændring til
CQF6xy-2001.

KODE

TEGN. NR.
1114555

A 4





CABLE FORM
KABLINGSDIAGRAM

RX662, RX663-2001

M0/KG
1-5-70
D114540

Field Strength Indicator 10.1171.

A. Description.

The field strength indicator is intended for measurements on CQM/CQF600 stations.

The indicator is built in a printed circuit and consists of a rectifier designed as a voltage doubler and an AF filter. From the input terminal a short wire is connected to test point **8** or **9** in IA601.

Mounting of the field strength indicator in the CQM/CQF600 cabinet is performed by unscrewing the two middle clamping screws for SQ601 (the plastic spacers under the SQ unit are retained); the field strength indicator is then fastened by screws on its spacers in the holes and with the soldering side of the printed circuit turning up.

In case of field strength indications for receiver input signals between $0,3\mu\text{V}$ and $1,5\mu\text{V}$ (EMF) the indicator is connected to test point **9** in IA601/601b, and via available wire in the station cabling the output terminal is connected to a $500\mu\text{A}$ instrument ($R = 5\text{k}\Omega$). At IA601b a resistor of $1\text{k}\Omega$ is connected in series with the instrument.

In the event of field strength indications for receiver input signals between $1,5\mu\text{V}$ and $100\mu\text{V}$ (EMF) the indicator is connected to the test point **8** in IA601. At IA601 a resistor of $1,8\text{k}\Omega$ is connected in series with the $500\mu\text{A}$ instrument. At IA601b the series resistance must be $3,3\text{k}\Omega$.

B. Data.

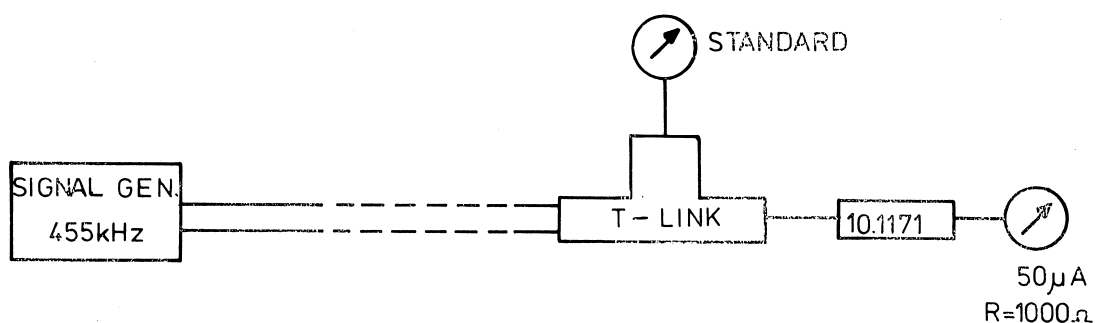
- | | |
|--|--|
| 1. <u>Input frequency</u> | 455 kHz. |
| 2. <u>Voltage range</u> | 0 to 10 volts RF. |
| 3. <u>Input impedance</u> | Approx. $1/8 \times$ DC load. |
| 4. <u>Deflection on $500\mu\text{A}$ instr.</u> | See the attached response curves. |
| 5. <u>Dimensions</u> | Circular printed circuit with diameter equal to 23 mm. |

C. Testing.

1. Instruments.

- 1 signal generator 455 kHz.
- 1 microammeter $50\mu\text{A}$ ($R_i = 1000\Omega$) or AVO-meter
- 1 RF load, 51Ω (Mx - 554/u)
- 1 T-link (UG - 274/u).

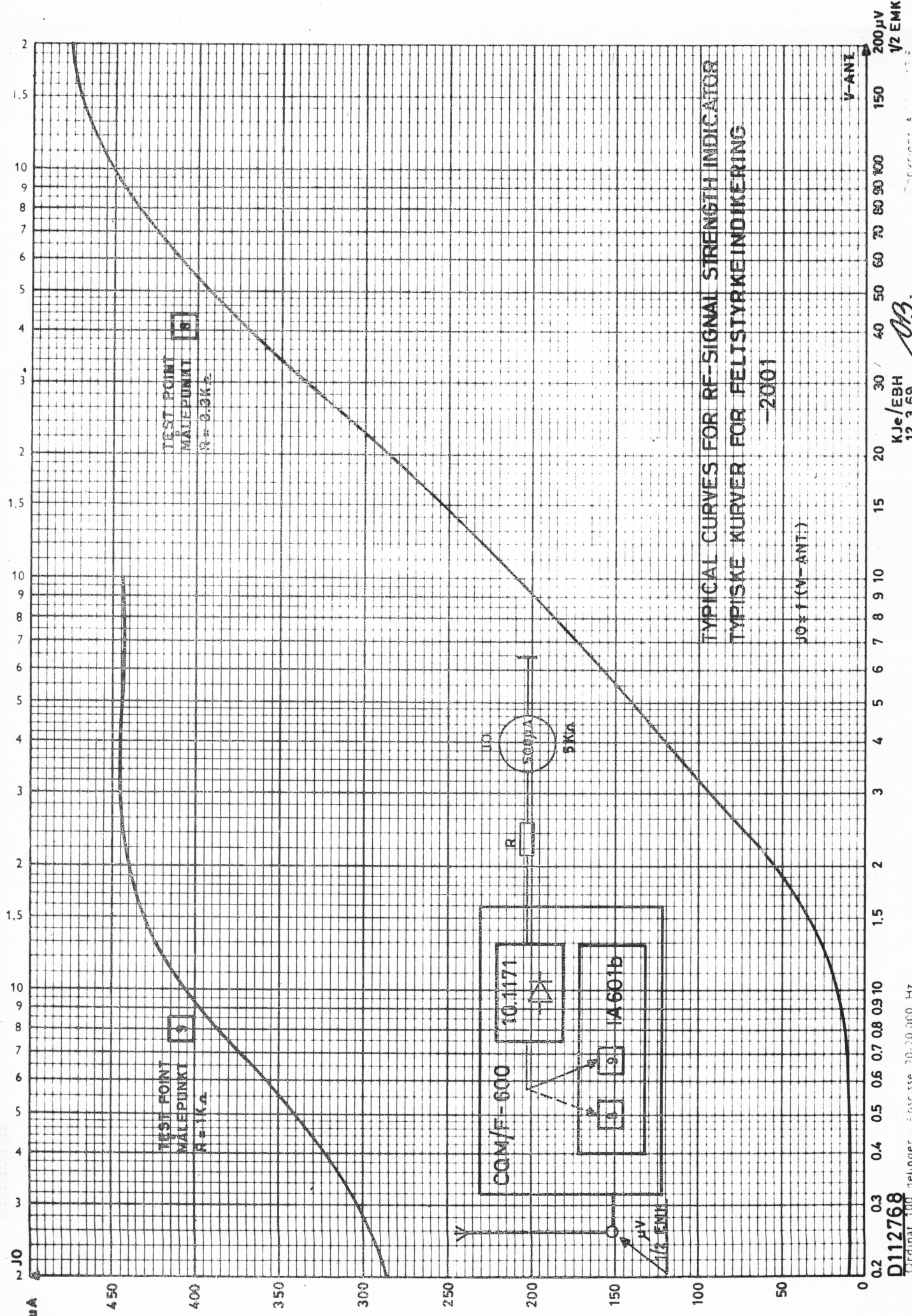
2. Set-up



3. Measurements:

The output voltage of the signal transmitter, at 455 kHz, is adjusted until the standard instrument indicates 100mV, and the output from the field strength indicator is read on the $50\mu\text{A}$ instrument.

Requirements: Deflection on the $50\mu\text{A}$ instr.: $7\mu\text{A} \pm 1\mu\text{A}$.



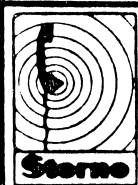
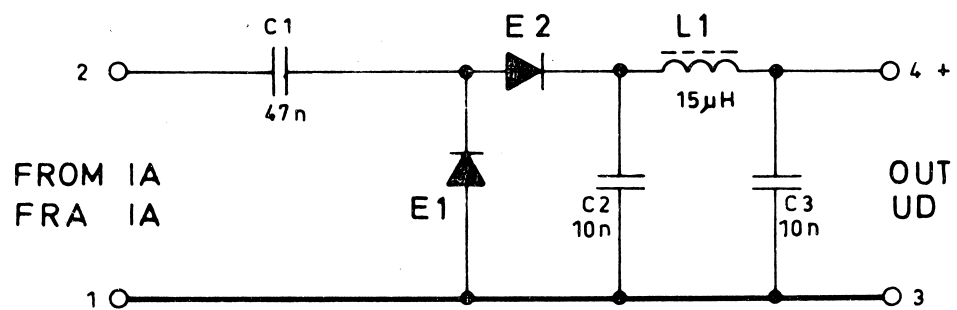
D112768

Ordinat 100 delinger Foscisse 20-20 000 Hz.

KJe/EBH
 12.3.59

MB.

Copyright A. 1959



konstr./tegn.
AHu/KKj
28.3.67
godk.
komp.lista

FIELD-STRENGTH INDICATOR
FELTSTYRKEINDIKATOR

10.1171

D400.719

no	code	data	no	code	data
C1	76.5072	47nF 10%polyestFL50V			
C2	76.5070	10nF 10%polyestFL50V			
C3	76.5070	10nF 10%polyestFL50V			
E1	99.5136	diode AA119			
E2	99.5136	diode AA119			
L1	61.5007	15 μ H 10% choke			



udarb af
KJe/IAa
kontrol af
tlf. diag.

Parts list
Feltstyrkeindikator
Stykliste

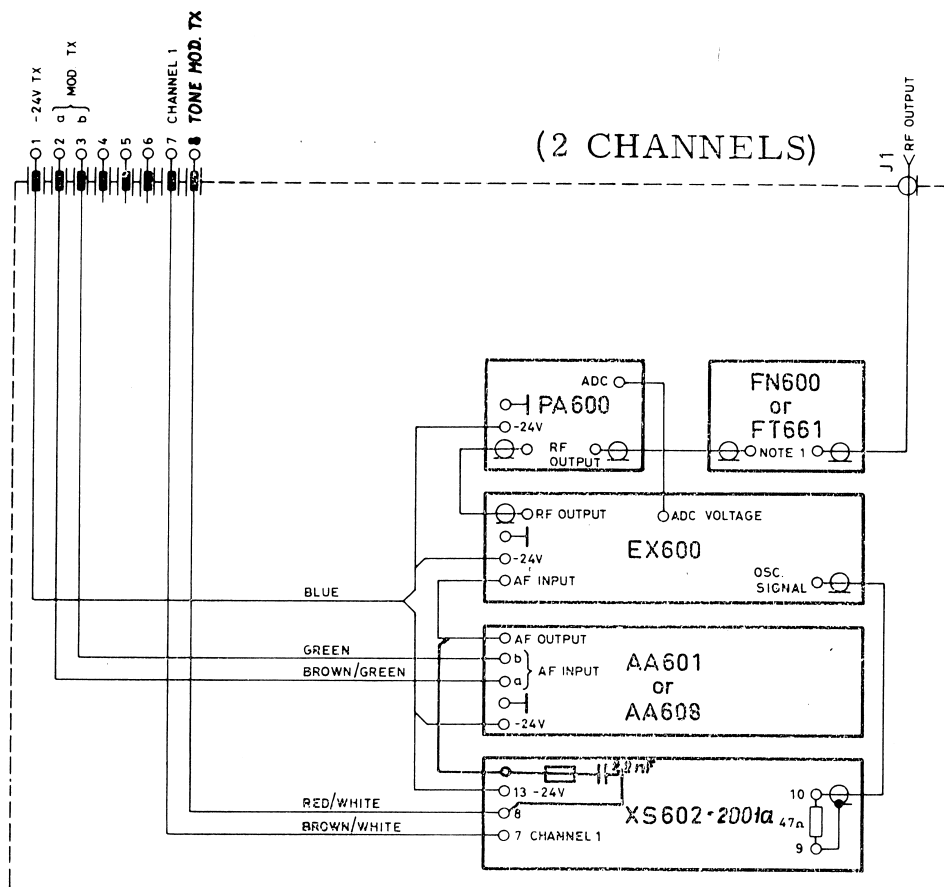
101171

comp. date
X112559

blad no af

Storno

Storno



CABLE FORM
KABLINGSDIAGRAM

TX610, TX630, TX661, TX665
- 2001

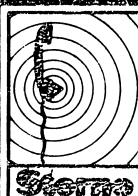
MØ/KG
1-5-70
D 114542

30 mm orange ledning.

Soflex M49 1 x 0,4 mm^Ø lægges fra XS602-2001, terminal 2 til AA601, LF-udgangsterminal (midterste term.).

30 mm orange wire.

Soflex M49 1 x 0,4 mm^Ø is put from XS602-2001, terminal 2 to AA601, AF-outputterminal (center term.).



konstr. tegn.
KJe/HNi
4 5 70
godk.

komp. liste

Change in cabling harness
Instruktion for kablingsændring til
TX610, TX630, TX661, TX665-2001.

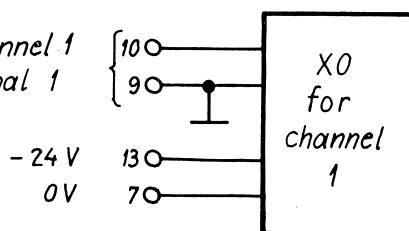
KODE

TEGN. NR.

I 114556

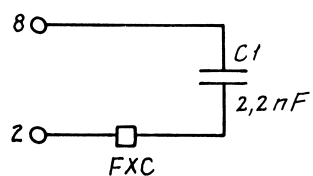
A4

RF-signal channel 1
HF-signal kanal 1

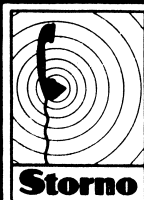


Tone mod. TX

Mod. to/til EX



1) FXC tilføjet



konstr./tegn.
KJe/JE
25.8.67.
godk. *BB.*
komp.liste

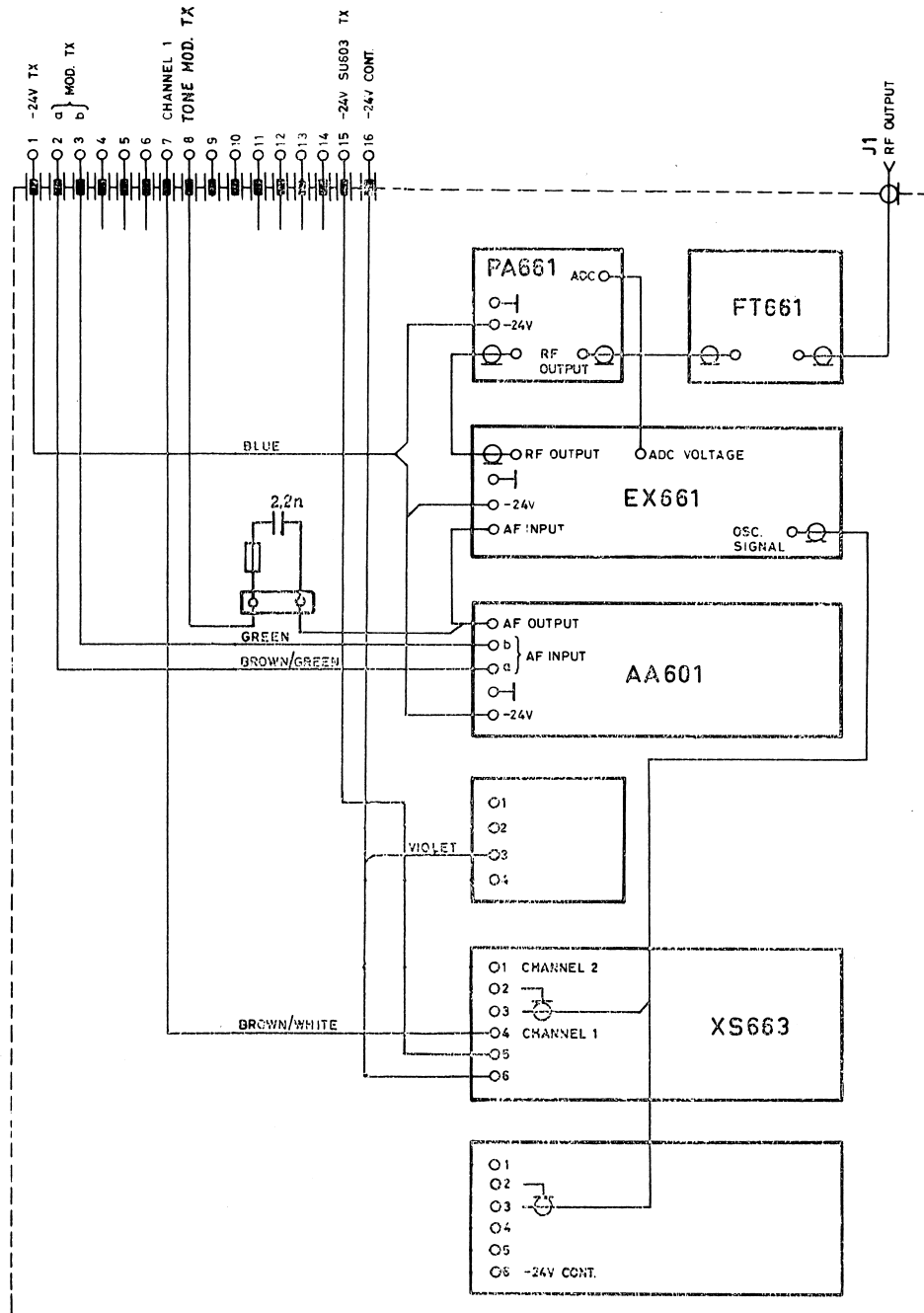
CRYSTAL OSCILLATOR PANEL

X5602-2001a KODE

TEGN. NR.

D 109928/1

A 4



CABLE FORM
KABLINGSDIAGRAM

TX662, TX666-2001

1) ændr. 18.2.69



konstr. tvin.
KJe/JE
16.8.67
gou.
KJ
16.8.67.
komp.liste

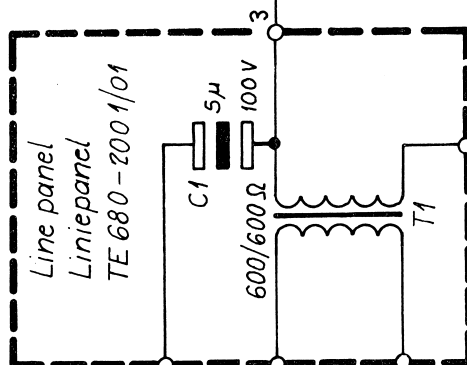
LINEPANEL TE 680-2001/01 FOR A MAGNETO EXCHANGE
CONNECTED TO AN AUTOMATIC EXCHANGE.

LINIEPANEL TE 680-2001/01 FOR MAGNETOCENTRAL VED
TVÆRLEDNING MELLEM EN MAGNETOCENTRAL OG EN
AUTOMATCENTRAL.

TEGN. NR.

D 109783/1
A 4

Magneto exchange
Magnetocentral.



Line panel
Liniepanel
TE 680-2001/01

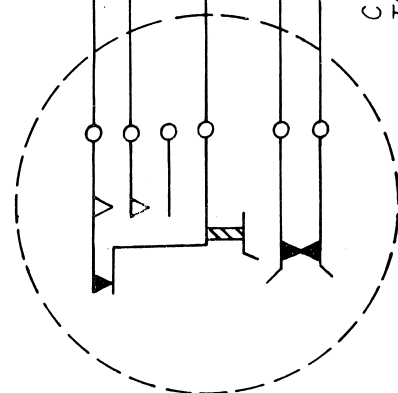
600/600 Ω

5 μF 100 V

T1

Call in-
dicator.
Kaldet.
klapp.

Jack



Dial

Nummerskive

C1 : 73.5007, 5 μF-10+100% 100V(BIP)
T1 : 60.5097, Transf. 600/600 Ω
JS 0.32p-8867/4

Control panel
Kontrolpanel a
CP 680-2001/01

A

OV

B

-

Signalling generator
Ringegenerator

PG 681