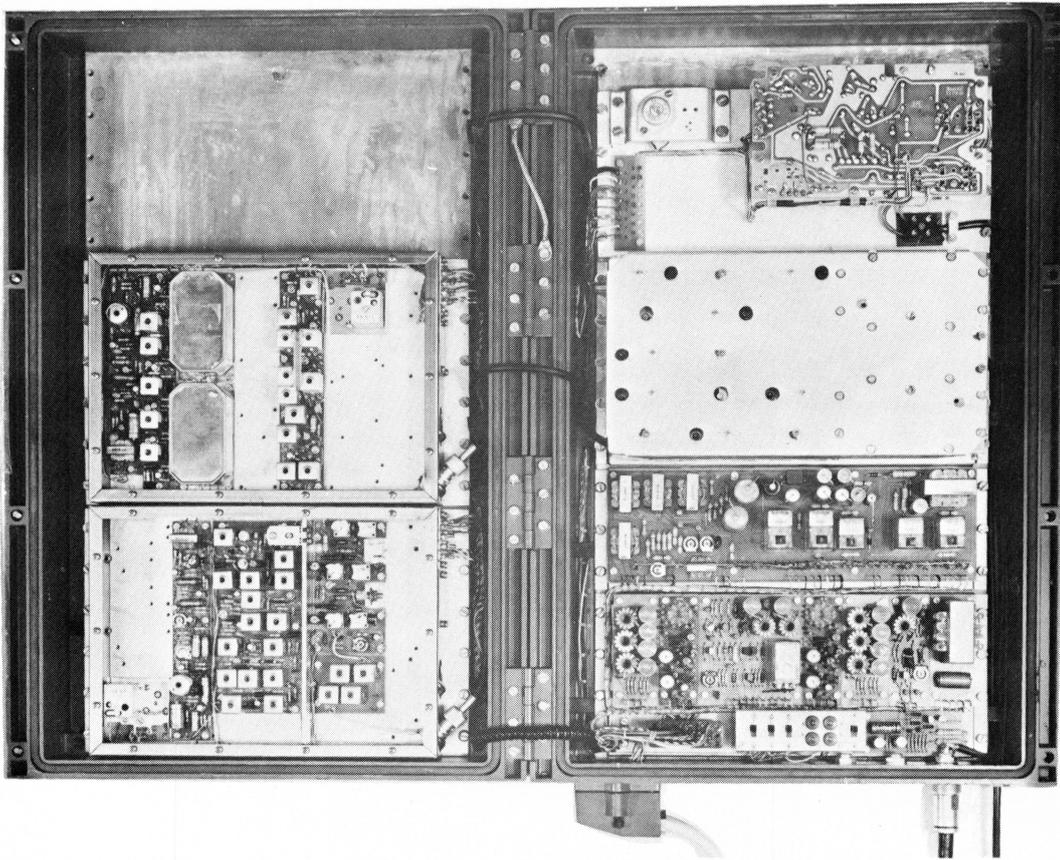


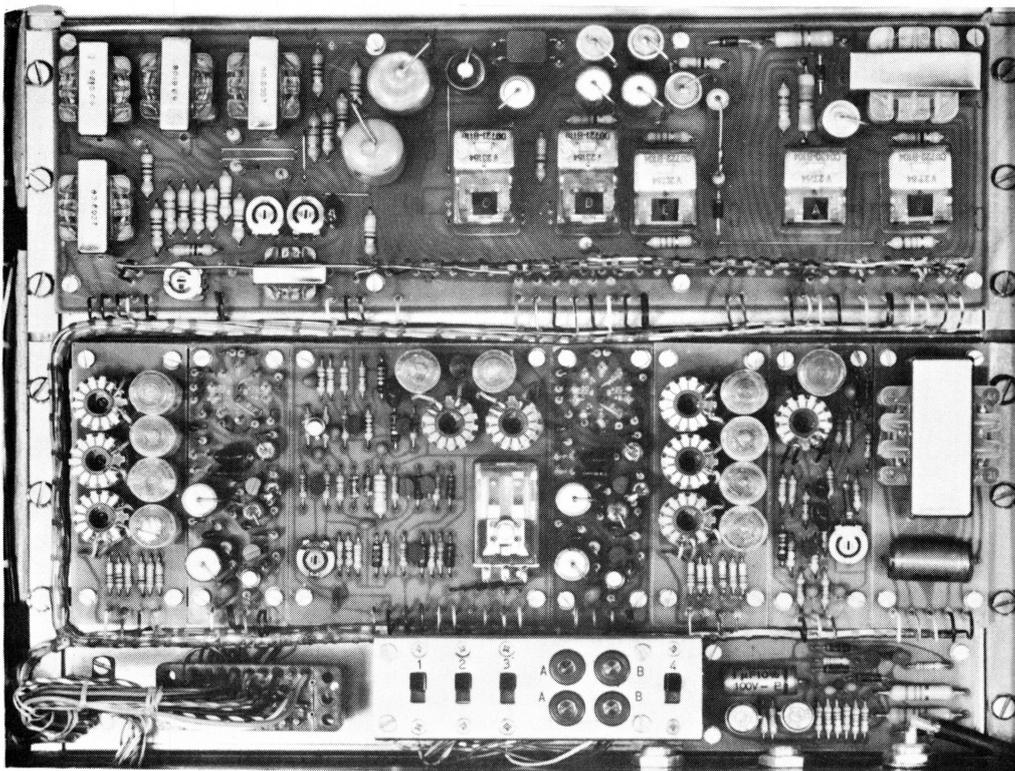
**TERMINAL EQUIPMENT
FOR
RADIOTELEPHONE LINK
CAF680-2001/01
CAF680-2001/02**

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 keys 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 keys 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 keys 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 keys 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 magneto 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 lb 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 activated 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 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 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 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 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

± 1%.

Output level

0.3 - 1.5V.

Output impedance

App. 10 kΩ.

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.

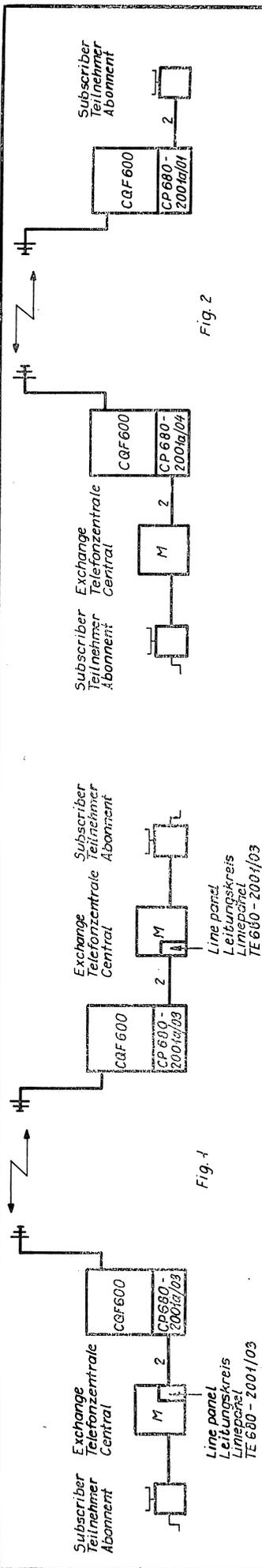


Fig. 1

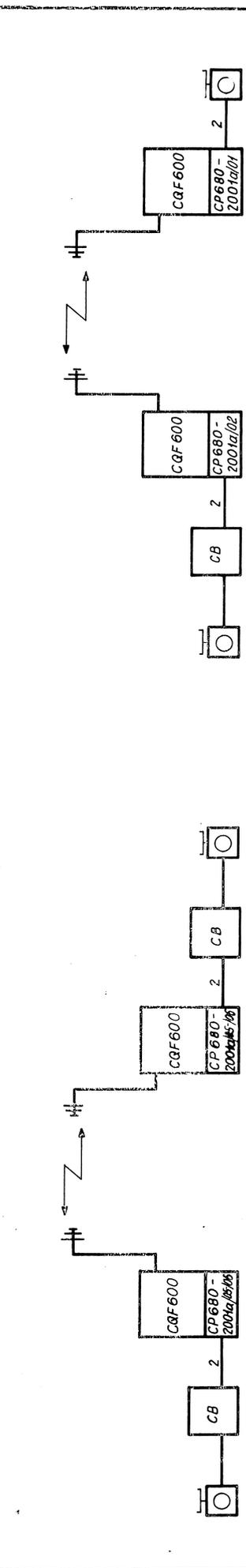


Fig. 2



Fig. 3

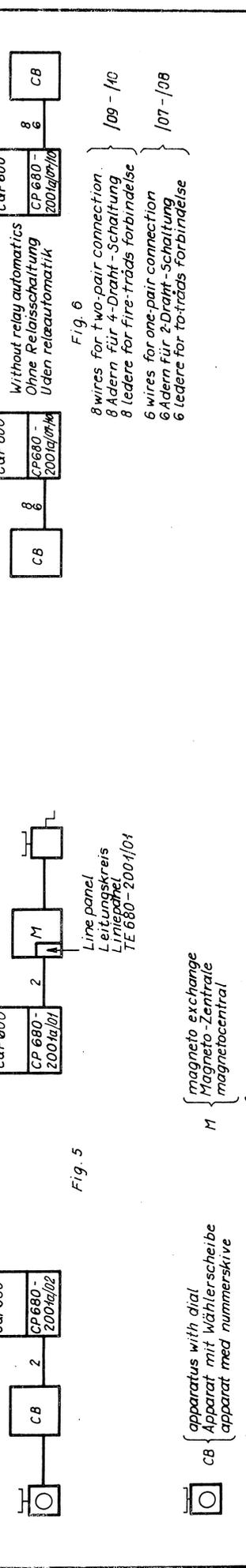


Fig. 4

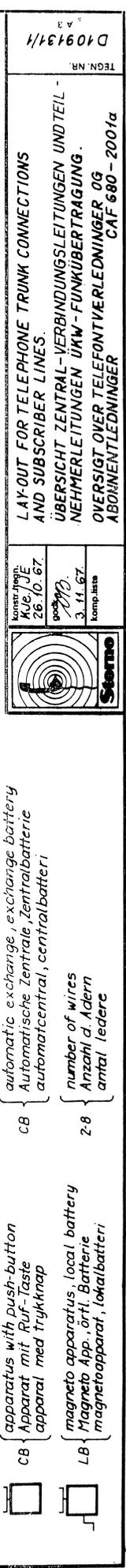


Fig. 5

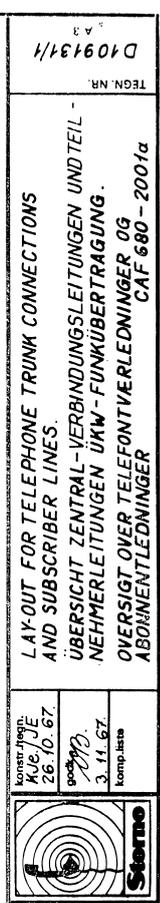


Fig. 6

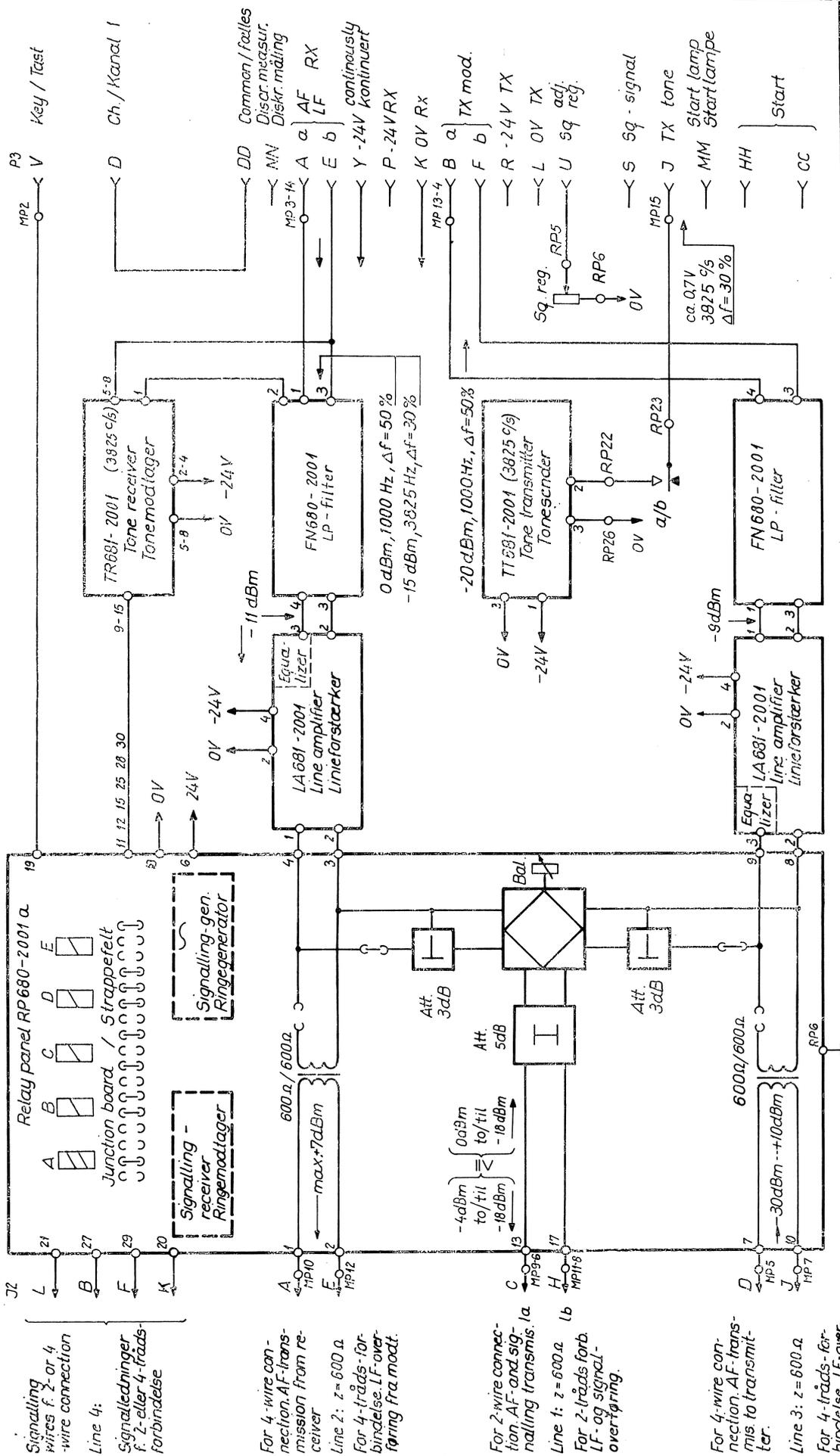
8 wires for two-pair connection.
 8 Adern für 4-Draht-Schaltung
 8 ledere for fire-trads forbindelse
 6 wires for one-pair connection
 6 Adern für 2-Draht-Schaltung
 6 ledere for to-trads forbindelse

TEGN. NR. D109131/1

konstr./wagn. A.Je./J.E. 26.10.67. 3.11.67. Komp. lists

LAY-OUT FOR TELEPHONE TRUNK CONNECTIONS AND SUBSCRIBER LINES.
 ÜBERSICHT ZENTRAL-VERBINDUNGSLEITUNGEN UND TEILNEHMERLEITUNGEN ÜKW-FUNKÜBERTRAGUNG.
 OVERSICHT OVER TELEFONTRUNKLEITUNGER OG ABONNENTLEDNINGER

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.



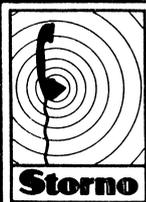
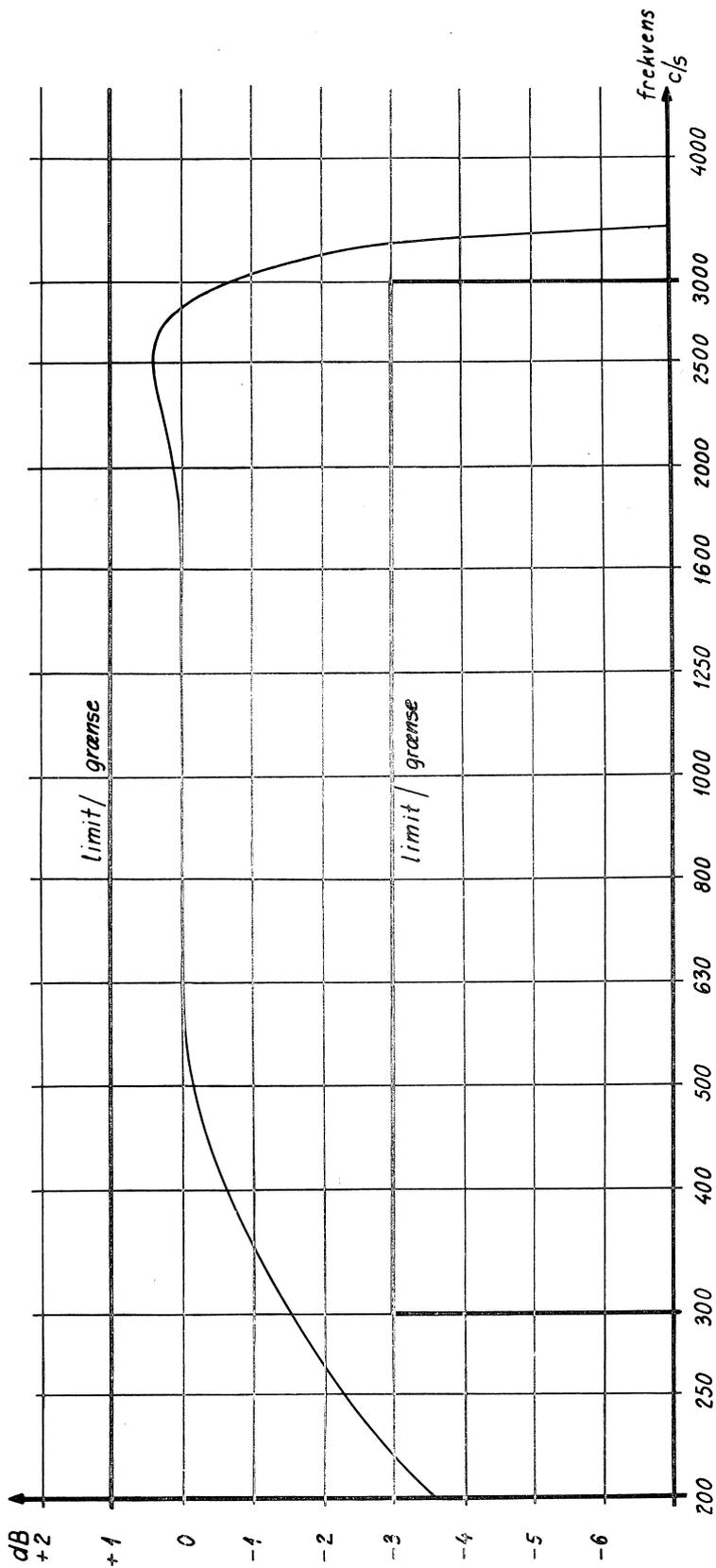
For 4-wire connection, AF-transmission from receiver
 Line 2: $z = 600 \Omega$
 For 4-tråds-forbindelse, LF-overføring fra modt.

For 2-wire connection, AF and signalling transmis. 1a
 Line 1: $z = 600 \Omega$
 For 2-tråds-forb. LF-og signal-overføring.

For 4-wire connection, AF-transmis. to transmitter.
 Line 3: $z = 600 \Omega$
 For 4-tråds-forbindelse, LF-overføring til senderen.

TEGN. NR. 101848010
 E 3
 KONSTRUKTØR: KJc/gh
 6.7.67
 GODKJØRT: 3.11.67.
 Kompletliste
 CONTROL PANEL FOR RADIO TELEPHONE LINK SYSTEMS.
 BLOCK AND LEVEL DIAGRAM.
 KONTROLPANEL FOR RADIO TELEFONLINKSYSTEMER.
 BLOK- OG NIVEAUDIAGRAM.
 CP 680-2001 a.

Level relative to 1000 c/s
 Niveau relativt til 1000 c/s



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

OV
 Field strength indication
 Feltstyrkeindikering
 Discr. measurement
 Diskriminatoremåling

P3 Field strength indication
 Feltstyrkeindikering
 NN Discr. measurement
 Diskriminatoremåling

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

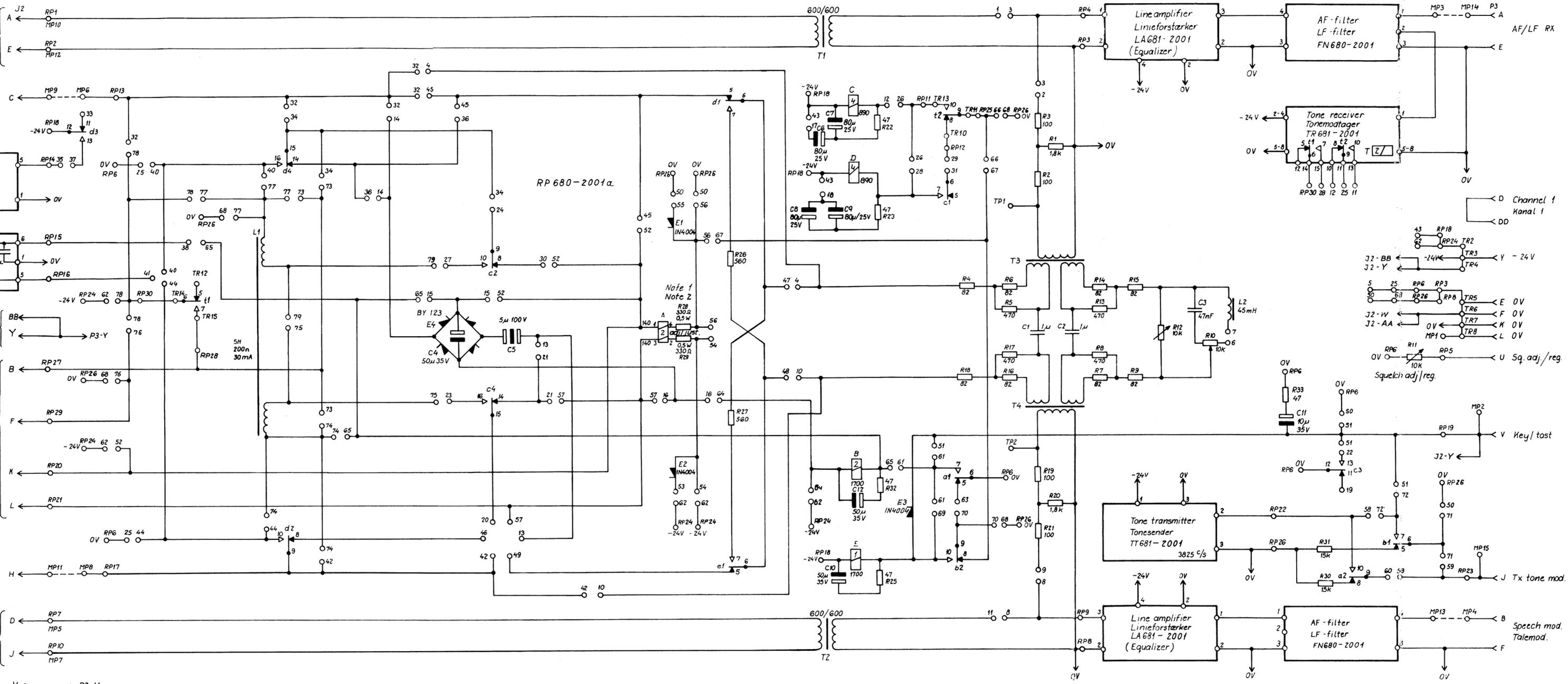
Signalling generator
 Ringegenerator
 PG 681 a
 PG 681 b

Signalling wires
 Line 4
 Signalledninger

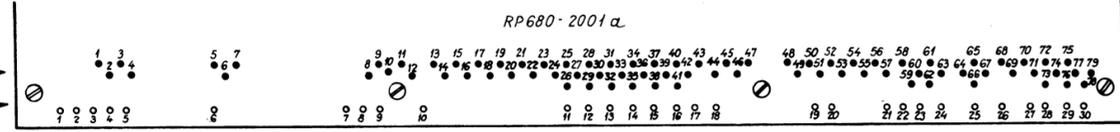
For 2-wire connection
 AF and signalling transmission.
 Line 1 b
 For 2-trådsforbindelse.
 LF og signaloverføring.

For 4-wire connection.
 AF-transmis. to transmitter.
 Line 3
 For 4-trådsforbindelse.
 LF-overføring til senderen.

Key / tast
 V P3-V

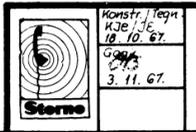


Junction board / strappfelt
 Terminals / terminaler



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

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. 5 J2

Discr. measurement
Diskriminatoremåling NN

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).

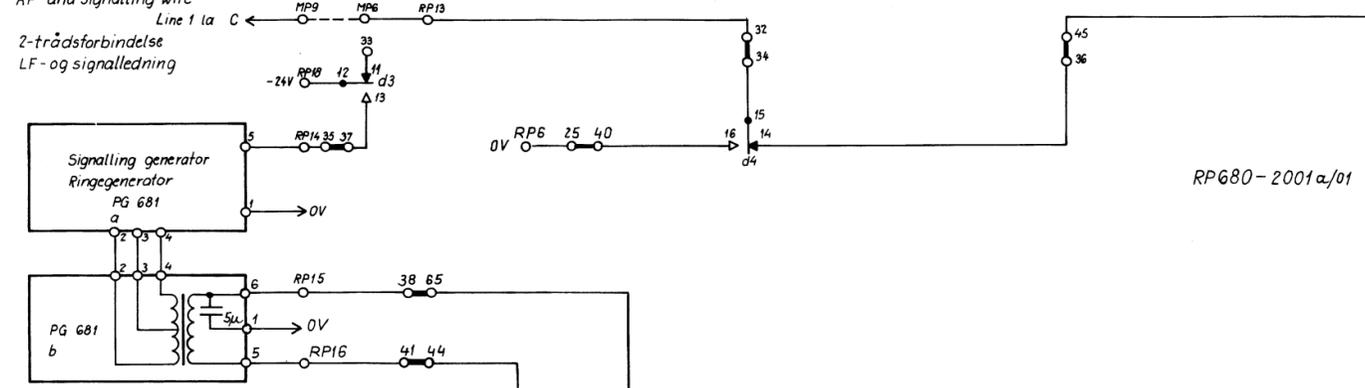
Ved magnetocentral i forbindelse med automatcentral må magnetocentralen være forsynet med et linepanel som TE 680-2001/01 (diagram D 109783/1).

P3 Field strength indication
Feltstyrkeindikering.

Discr. measurement
Diskriminatoremåling NN

0V W P3-K
AA
-24V BB P3-Y
Y

2-wire connection
AF- and signalling wire
2-trådsforbindelse
LF- og signalledning

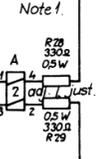
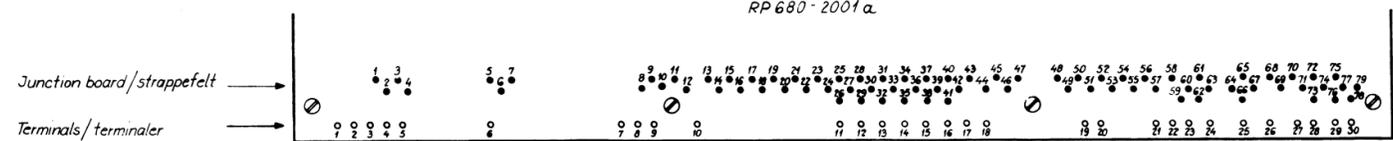


Max. loop resistance for line and subscriber set respectively for line and linepanel TE 680-2001/01 750 Ω (works at 850 Ω) concerning the signalling stop circuit.

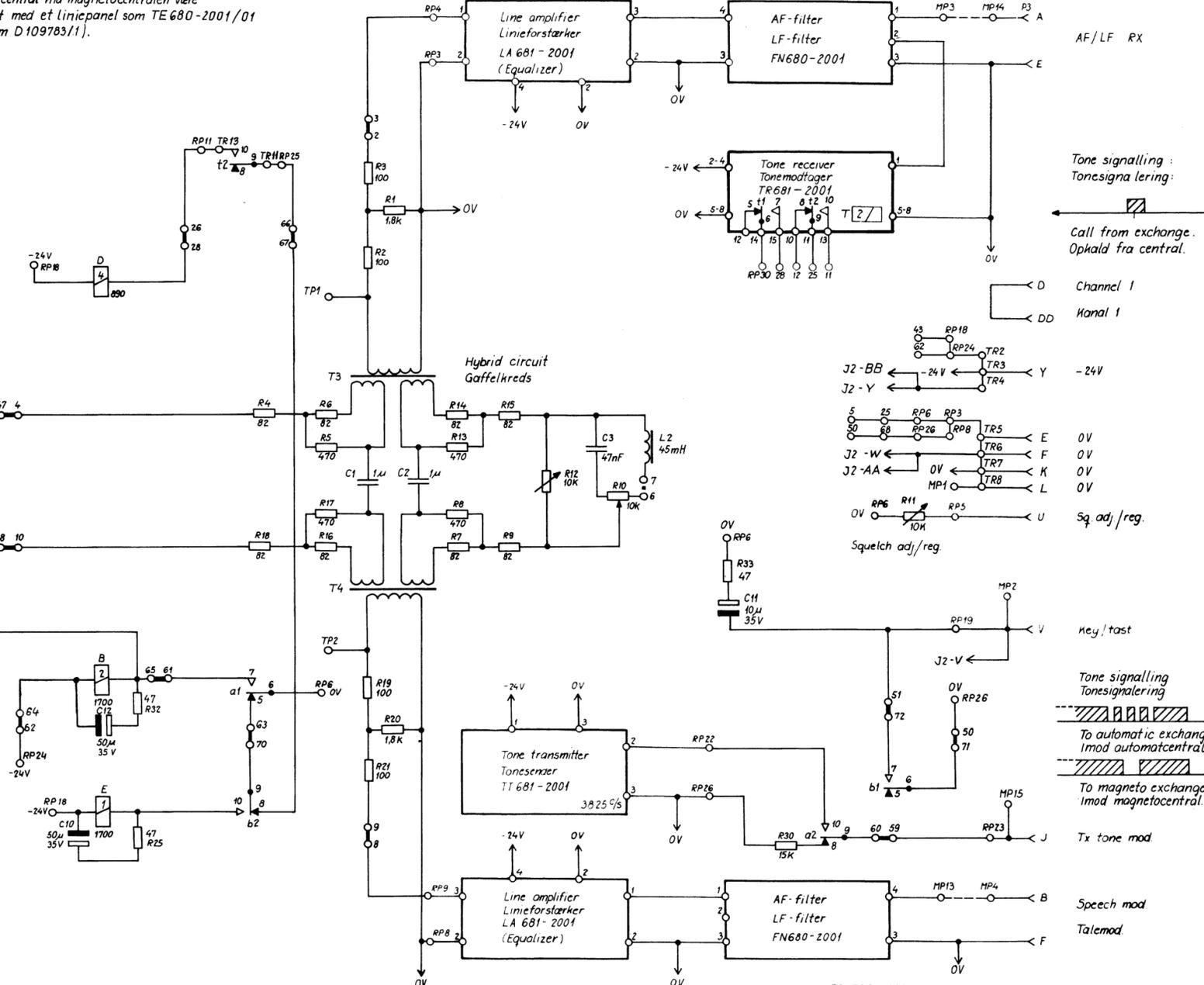
Max. sløjfemodstand for linie og CB-apparat eller for linie og linepanel TE 680-2001/01 er 750 Ω (virker ved 850 Ω) af hensyn til ringestopkreds-løbet.

2-wire connection
AF- and signalling wire
2-trådsforbindelse
LF- og signalledning

Key / tast V P3-V



Note 1.
Adjust R28 · R29 for 22-35 mA line current.
Juster R28 · R29 til 22-35 mA liniestrøm.



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

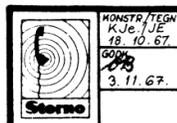
To automatic exchange
Imod automatcentral

To magneto exchange
Imod magnetocentral.

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



Field strength indication
Feltstyrkeindikering

Discr. measurement
Diskriminatoremåling

Field strength indication
Feltstyrkeindikering

Discr. measurement
Diskriminatoremåling

0V

-24V

2-wire connection
AF- and signalling wire

2-trådsforbindelse
LF- og signalledning.

AF/LF RX

Tone signalling
Tonesignalering

Channel 1
Kanal 1

-24V

0V

0V

0V

0V

Sq. adj./reg.

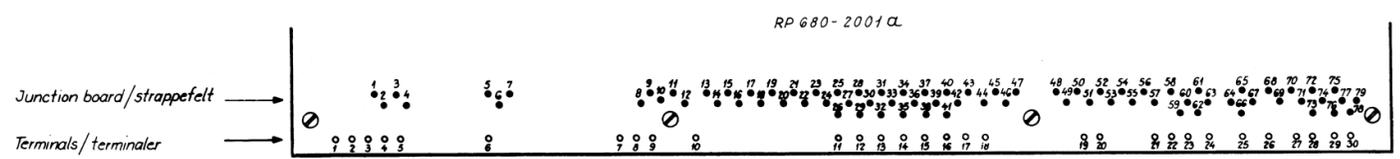
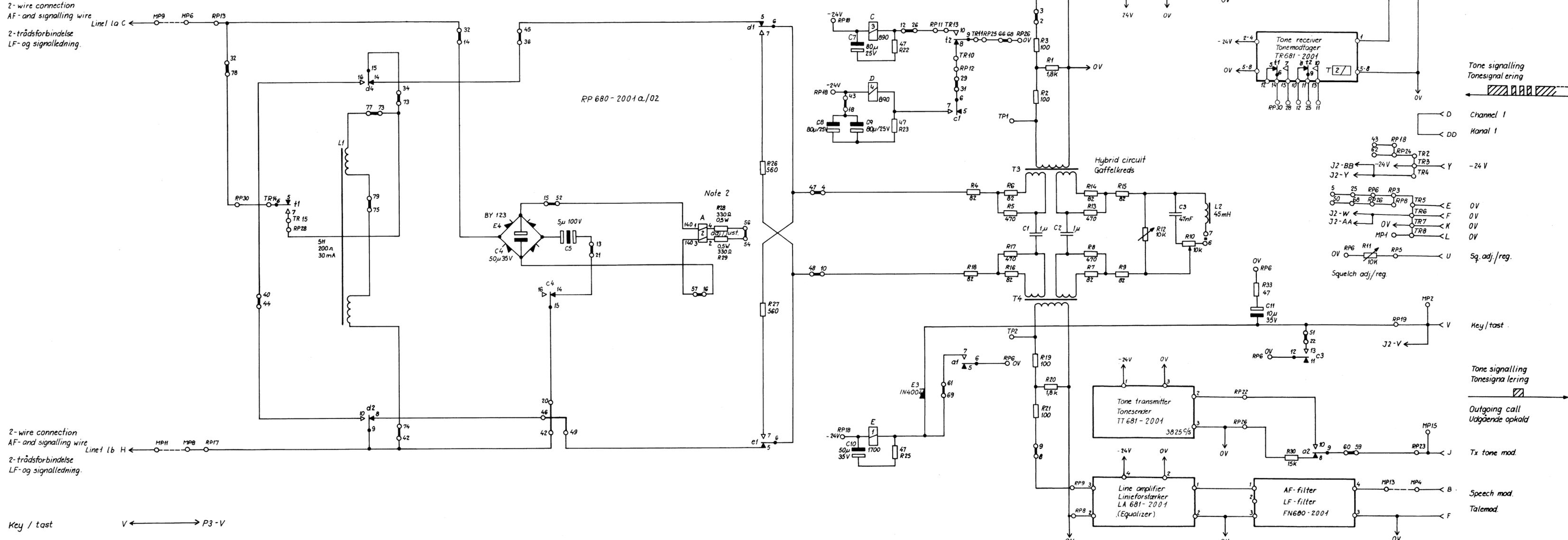
Key / tast

Tone signalling
Tonesignalering

Outgoing call
Udgående opkald

Tx tone mod.

Speech mod.
Talemød.

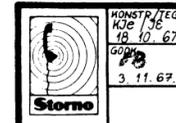


Note 2:
Adjust R28 or R29 to 20-40 mA signalling current in relay A.

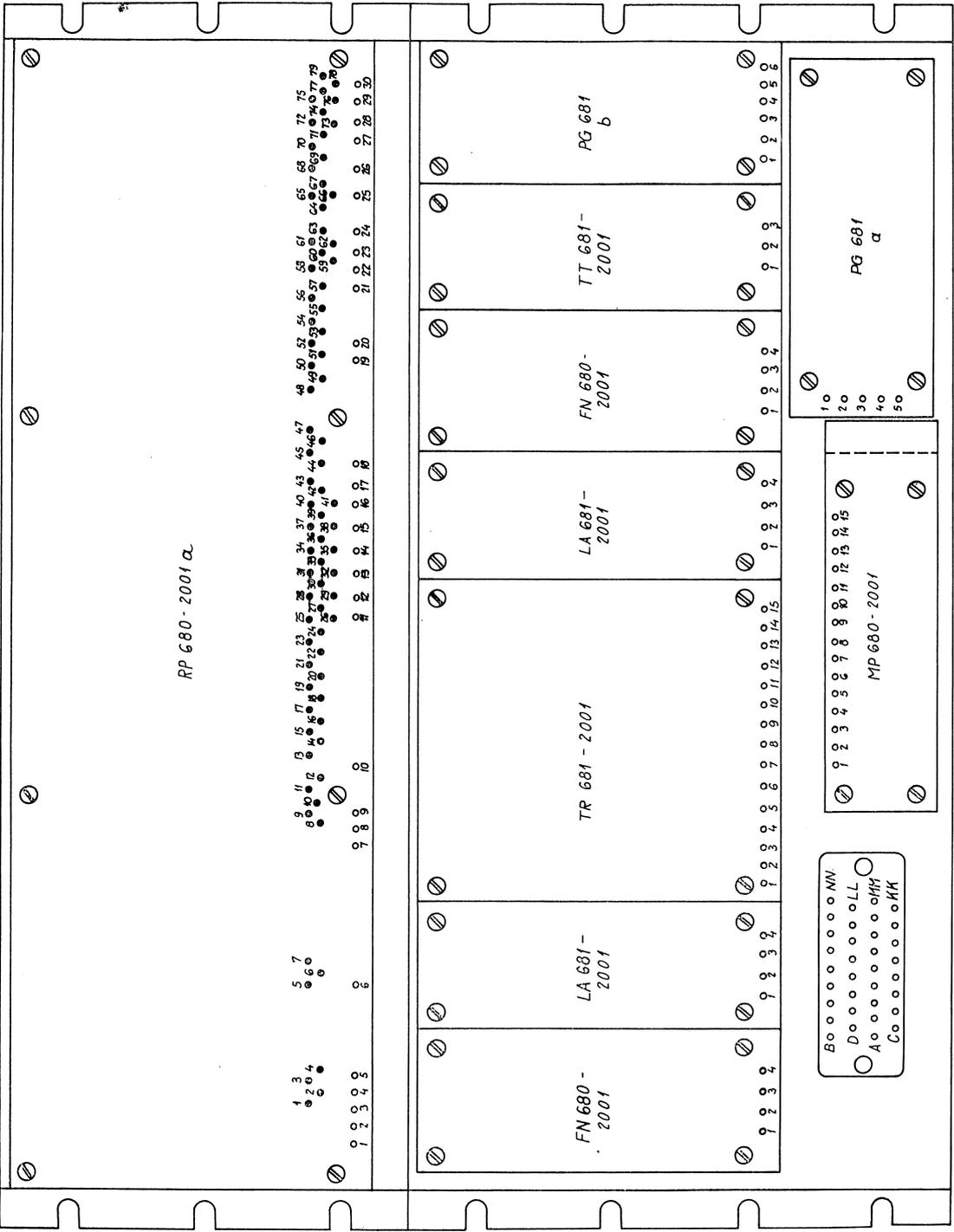
Juster R28 eller R29 til 20-40 mA ringestrøm i relæ A.

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

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



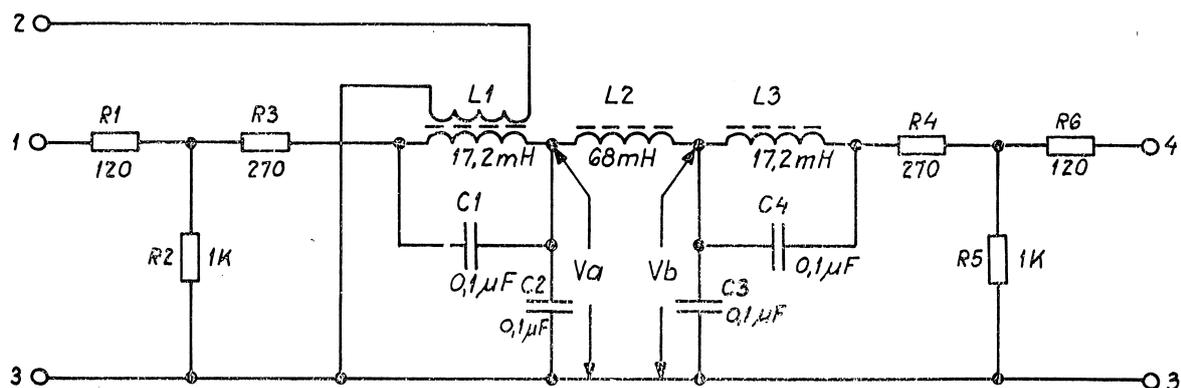
1/298662/1



TEGN. NR. D140001/1
A3

MECHANICAL LAY-OUT FOR CP 680 - 2001 alpha
MEKANISMS PLACERING AF CP 680 - 2001 alpha
KODE

Konstruktör:
P.O. J. E.
3-11-67.
godk.
3-11-67.
komp. liste

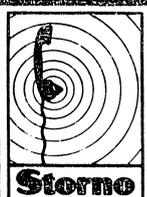


Adjustment:

- 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 inddrejes 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
15. 8. 67
komp.liste

3825 Hz
LOW PASS FILTER
LAVPASFILTER
FN 680 - 2001

KODE

TEGN. NR.

D109597

A 4

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
kontroll af
MS
tilh. diag.

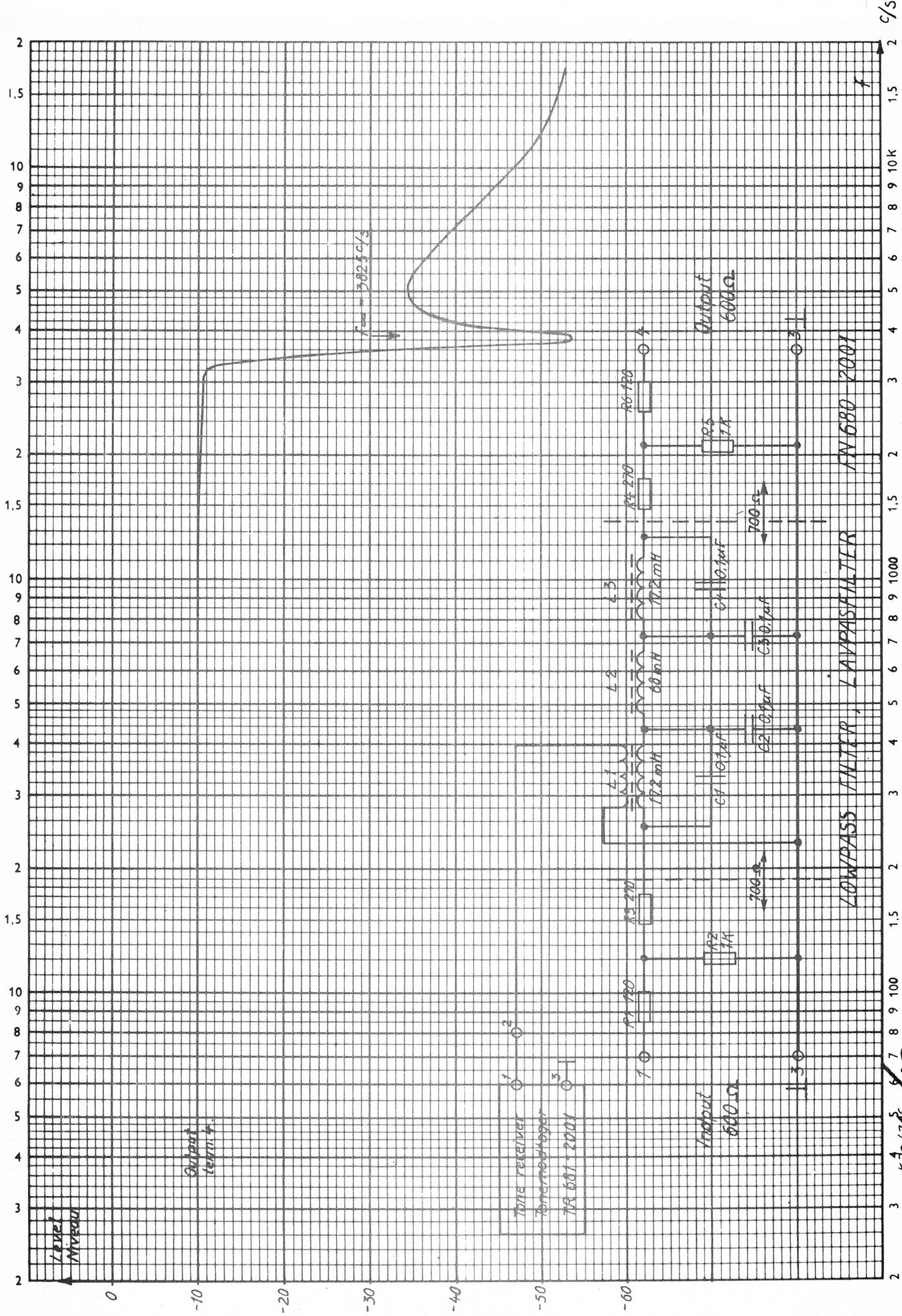
LF-filter
Stykliste

FN680-2001

*comp. liste

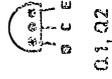
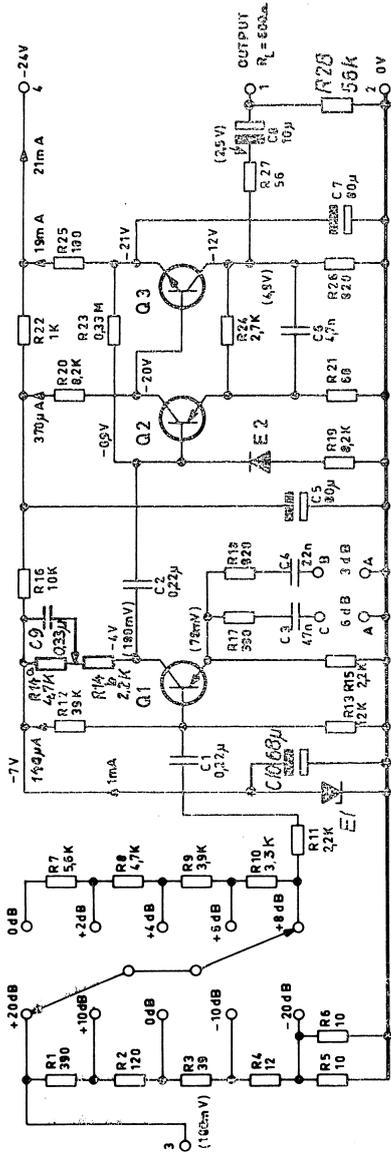
X112554

blad no. af



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

Copyright AGF 2013-8.



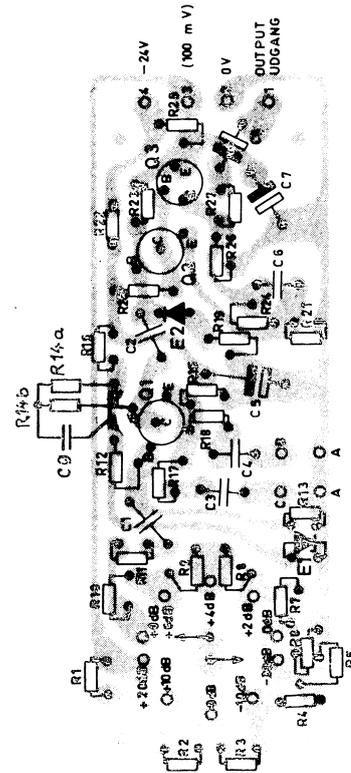
TOP VIEW
SET FRA GURDEN

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.

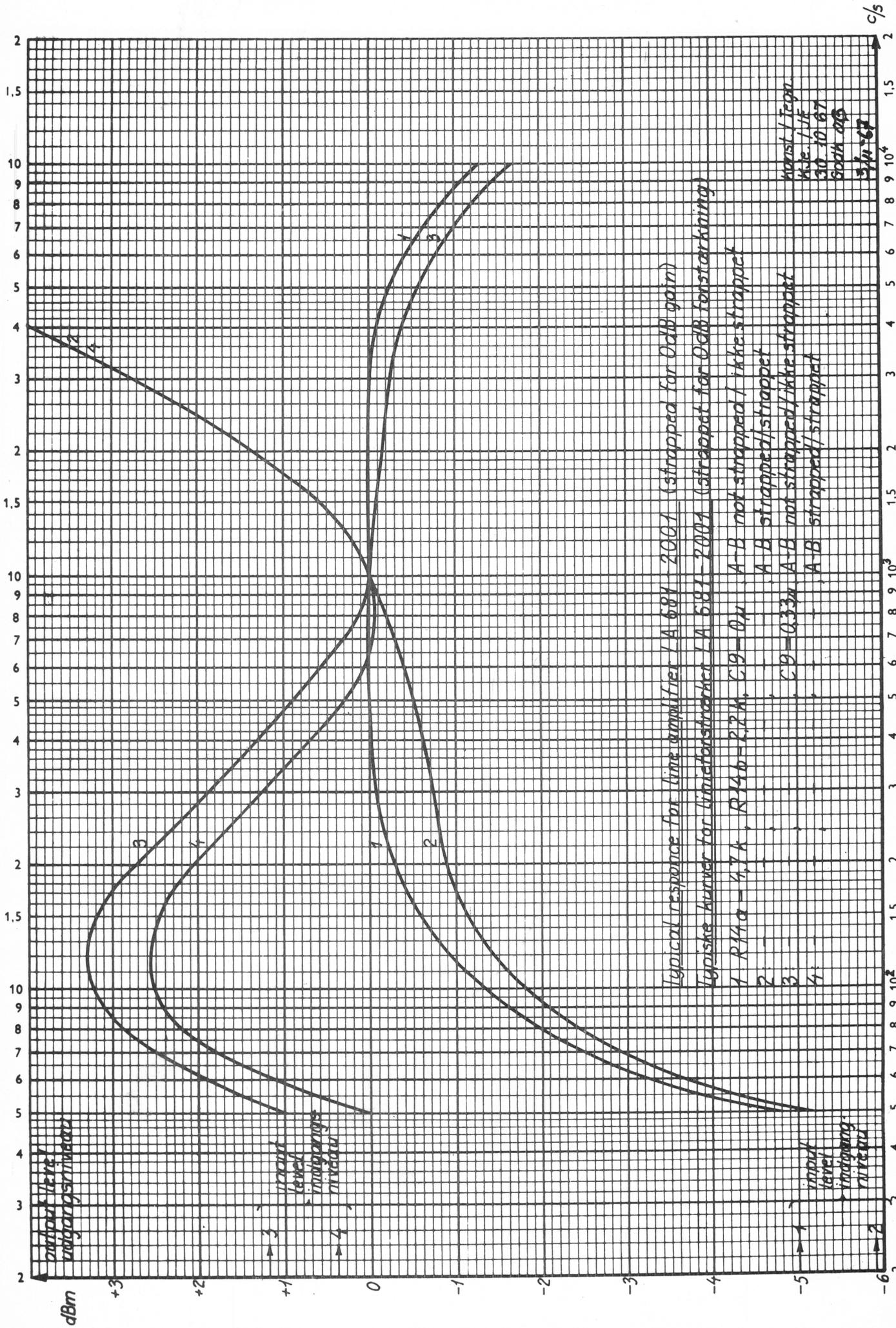


PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
 TRYKT KREDSLØB SET FRA KOMPONENTSIDEN

LINE AMPLIFIER
 LINIEFORSTÆRKER
 LA681-2001

AD/JAS KAT
 5.1.70 16.8.67

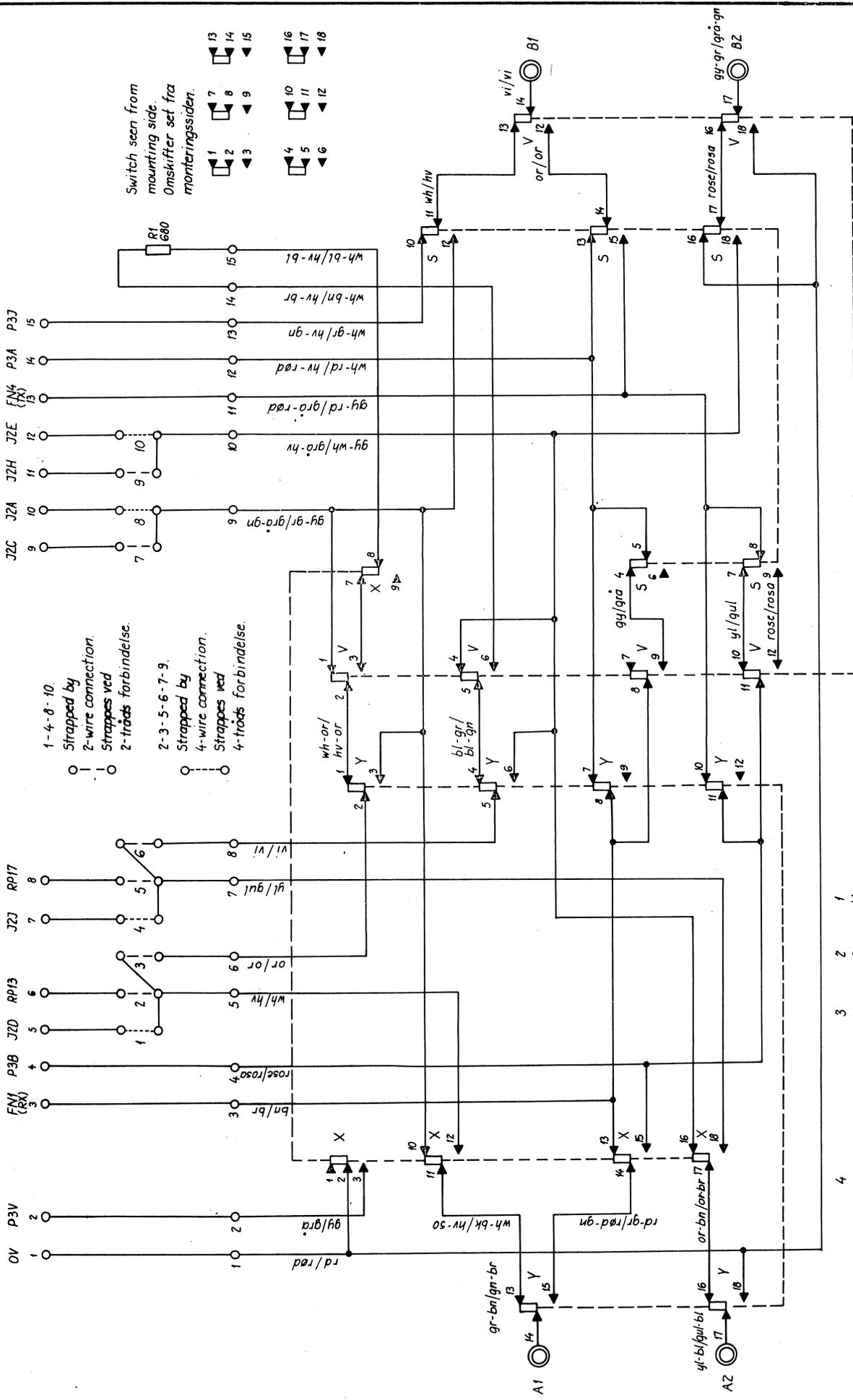
D109659



Typical response for line amplifiers LA 681 2001 (strapped for 0dB gain)
 Typiske kurver for linieforsterkere LA 681 2001 (strapped for 0dB forsterkning)

1	2	3	4
R14a = 4.7k	R14b = 2.2k	C19 = 0.1μ	A-B not strapped / ikke strappet
			A-B strapped / strappet
		C19 = 0.33μ	A-B not strapped / ikke strappet
			A-B strapped / strappet

Konst. / Teori
 Måle. / M
 30 10 67
 50th 205
 3/11/67

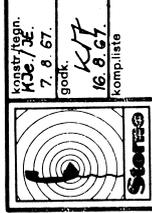
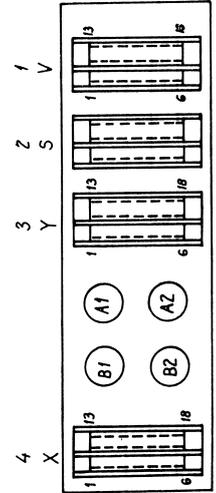


1-4-8-10
 Strapped by
 2-wire connection.
 Strappes ved
 2-tråds forbindelse.

2-3-5-6-7-9
 Strapped by
 4-wire connection.
 Strappes ved
 4-tråds forbindelse.

Switch seen from
 mounting side.
 Onskifter set fra
 monteringsiden.

Panel seen from
 mounting side.
 Panel set fra
 monteringsiden.

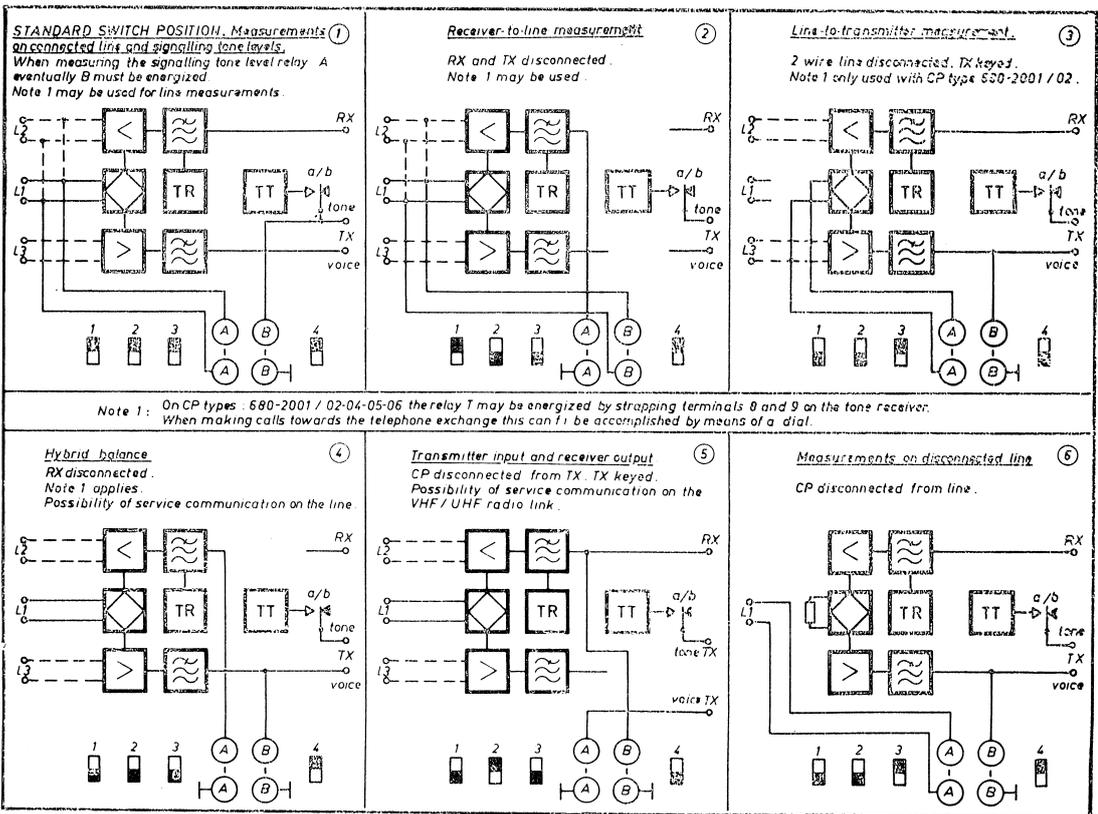
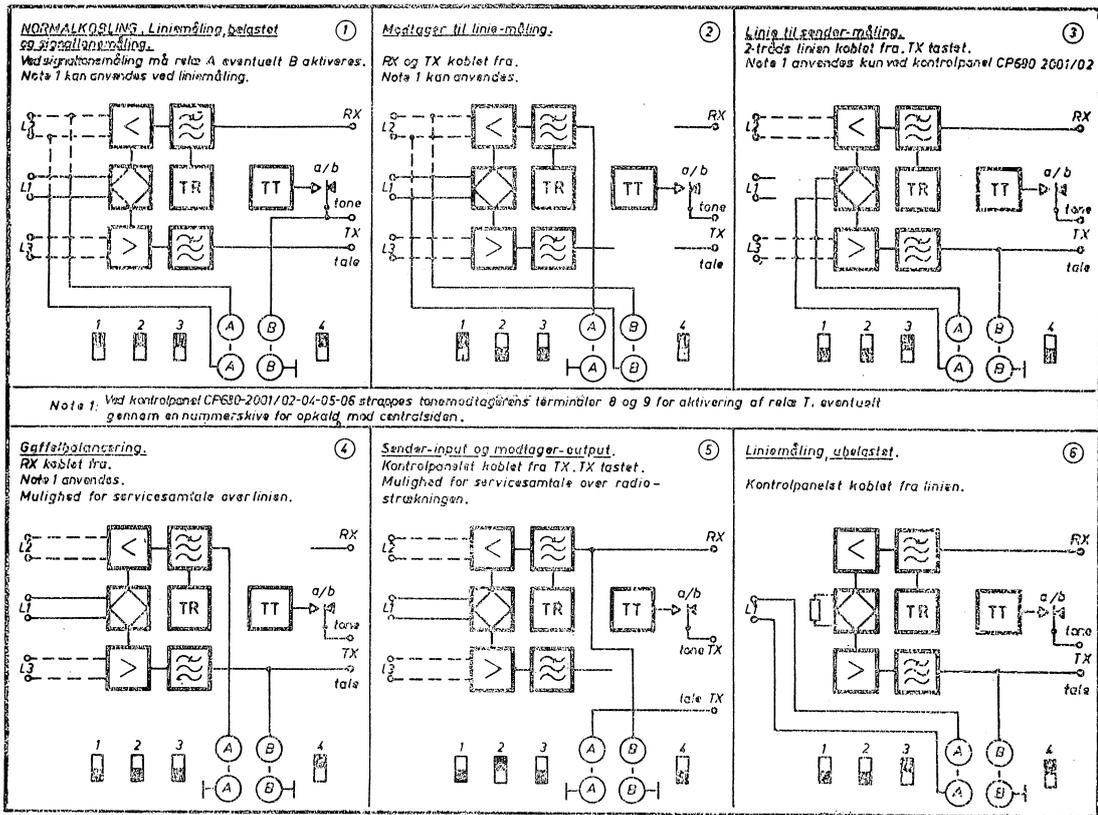


konstr./tegn.
 ACE/JE.
 7. 8. 87.
 godk.
 KJT
 16. 8. 87.
 komplette

MEASURING PANEL
 MÅLEPANEL MP 680 - 2001

KODE

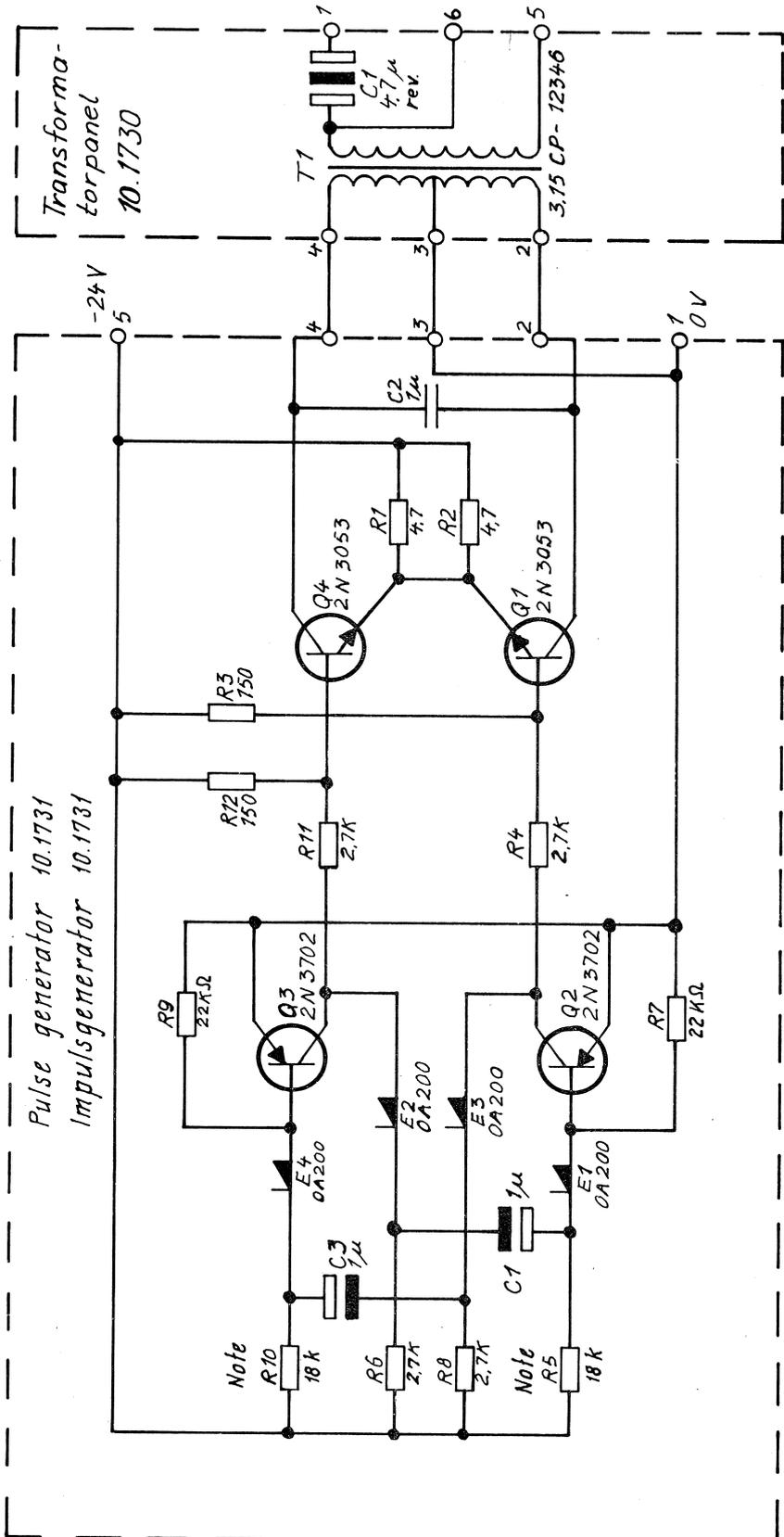
TEGN. NR.
 D 109955
 A3



INSTRUCTION FOR MEASUREMENT PANEL
 BETJENINGSOVERSIGT FOR MÅLEPANEL

MP 690 - 2001

KODE:



Note :
 Adjust R5 and R10 to a pulse frequency of 40 Hz ± 20%
 Juster R5 og R10 til en impulsfrekvens på 40 Hz ± 20%



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
 A 4

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			



udarb of
Kje/BHAN
12-2-69
kontrol of
M3
till diag

Ringegenerator
Stykliste

PG681

*comp liste

X112555

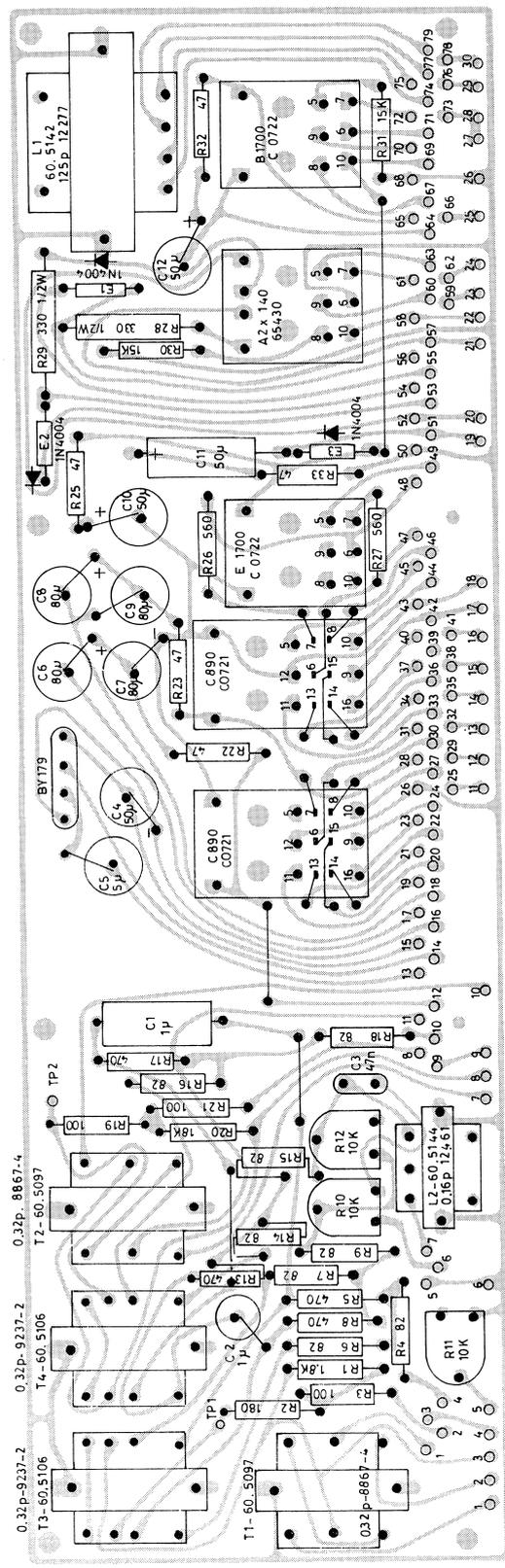
blad no of

no	code	data	no	code	data
C1	76.5078	1 μ F 10% polyestTB100V	R16	80.5436	82 Ω 5% kull 1/4W
C2	76.5078	1 μ F 10% polyestTB100V	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% elektrolyt 35V	R19	80 5437	100 Ω - " - -
C5	73.5007	5 μ F bipolar elektrolyt 100V	R20	80.5452	1,8K Ω - " - -
C6	73.5110	80 μ F -10+50% elektrolyt 25V	R21	80.5437	100 Ω - " - -
C7	73.5110	- " -	R22	80.5433	47 Ω - " - -
C8	73.5110	- " -	R23	80.5433	47 Ω - " - -
C9	73.5110	- " -	R25	80.5433	47 Ω - " - -
C10	73.5108	50 μ F -10+100% elektrolyt 35V	R26	80.5446	560 Ω - " - -
C11	73.5100	10 μ F -10+100% elektrolyt 35V	R27	80.5446	560 Ω - " - -
C12	73.5108	50 μ F -10+100% elektrolyt 35V	R28	81.5043	330 Ω - " - 1/2W
E1	99.5020	diode 1N4004	R29	81.5043	330 Ω - " - -
E2	99.5020	- " -	R30	80.5463	15K Ω - " - 1/4W
E3	99.5020	- " -	R31	80.5463	15K Ω - " - -
L1	605142	2 x (2,5H 100 Ω 30mA) drosselspole	R32	80.5433	47 Ω - " - -
L2	60.5144	spole med jernkerne	R33	80.5433	47 Ω - " - -
R1	80.5452	1,8k Ω 5% kull 1/4W	T1	60.5097	transf. 600/600 Ω
R2	80.5437	100 Ω - " - -	T2	60.5097	- " - - " -
R3	80.5437	100 Ω - " - -	T3	605106	gaffeltransf.
R4	80.5436	82 Ω - " - -	T4	60.5106	- " -
R5	80.5445	470 Ω - " - -	Relæ	58.5055	relæ V23154-C0721. B110 (154d-65721/93e) 8902
R6	80.5436	82 Ω - " - -	C & D		
R7	80.5436	82 Ω - " - -	Relæ	58.5062	relæ V23154-C0722- B104 (154c-65722/93d) 1700 Ω
R8	80.5445	470 Ω - " - -	B & E		
R9	80.5436	82 Ω - " - -	Relæ A	58.5032	relæ 154c-65430/93d, 2 x 140 Ω
R10	86.5039	10K Ω pot.lin 0,1W	E4	99.5150	broensretter BY 123 kan erstattes af 4 stk diode 1N4004 99.5020
R11	86.5039	- " - - " -			
R12	86.5039	- " - - " -			
R13	80.5445	470 Ω 5% kull 1/4W			
R14	80.5436	82 Ω - " - -			
R15	80.5436	82 Ω - " - -			



Relspanel
Stykliste RP680-2001a

copy list
X112556
of



VIEWED 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 ϕ

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).

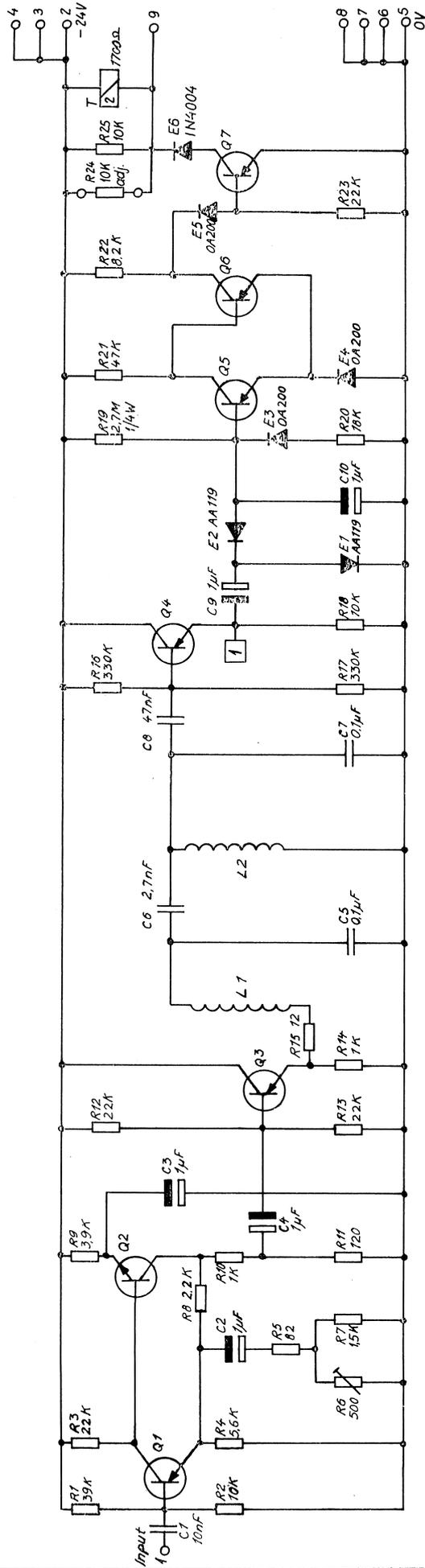
Strapping Arrangement in RP680-2001a/02

Wire: Soflex M49 0.4mm ϕ

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.

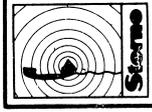
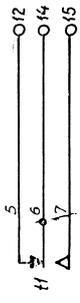


Q1, Q3, Q4, Q5, Q6, Q7 = 2N3702
 Q2 = BC108

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

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

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



Konstr./tegn.
 PL/DA5
 14.6.67
 godk.
 3.11.67
 komplette

TONE RECEIVER
 TONEMODTAGER

TR681-2001
 KODE

TEGN. NR.
 D110000
 A3

no	code	data	no	code	data
C1	76.5070	10nF 10% polyest 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% polyest 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 - " - -
E1	99.5074	diode par AA119	R18	80.5261	10kΩ - " - -
E2	99.5074	diode par AA119	R19	80.5490	2,7MΩ - " - 1/4W
E3	99.5028	diode 1N914	R20	80.5264	18kΩ - " - 1/8W
E4	99.5028	diode 1N914	R21	80.5269	47kΩ - " - -
E5	99.5028	diode 1N914	R22	80.5260	8,2kΩ - " - -
E6	99.5020	diode 1N4004	R23	80.5265	22kΩ - " - -
L1	61.1019	spole	R24	80.5261	10kΩ - " - -
L2	61.1019	spole	R25	80.5261	10kΩ - " - -
Q1	99.5144	transistor 2N3702	Re	58.5062	relæ V23154-C0722-B104 (154c-65722/93d) 1700Ω
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/BHA
12-2-69
kontrollert af
tilh. dater

Tonemodtager

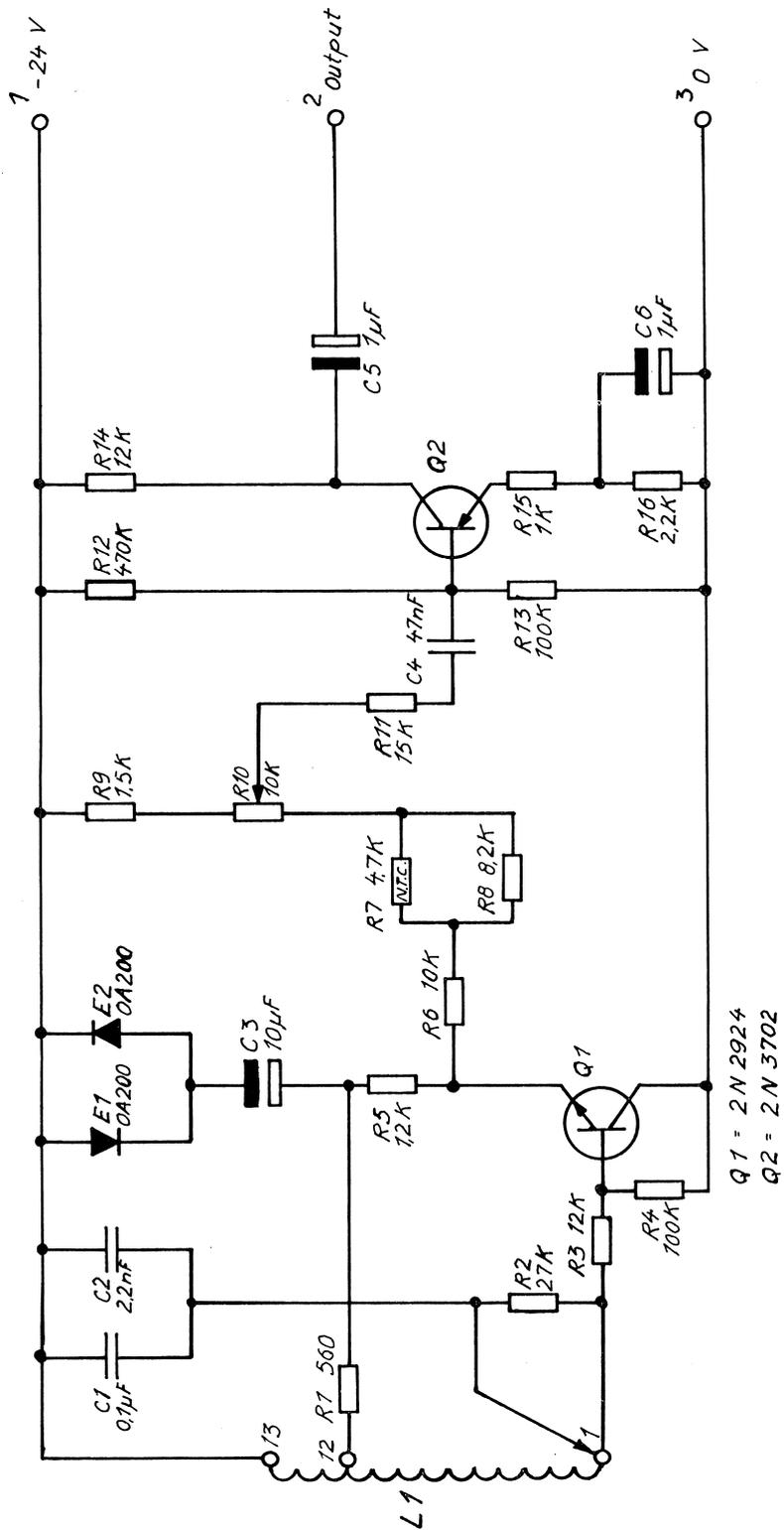
Stykliste

TR681-2001

comp liste

X112557

blad no



konstr./tegn.
MJe/JAS
14.6.67
godk.
KJF
16.8.67
komp.liste

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 o,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
KONTROL AF
[Signature]
tilh diagr

Tonegenerator

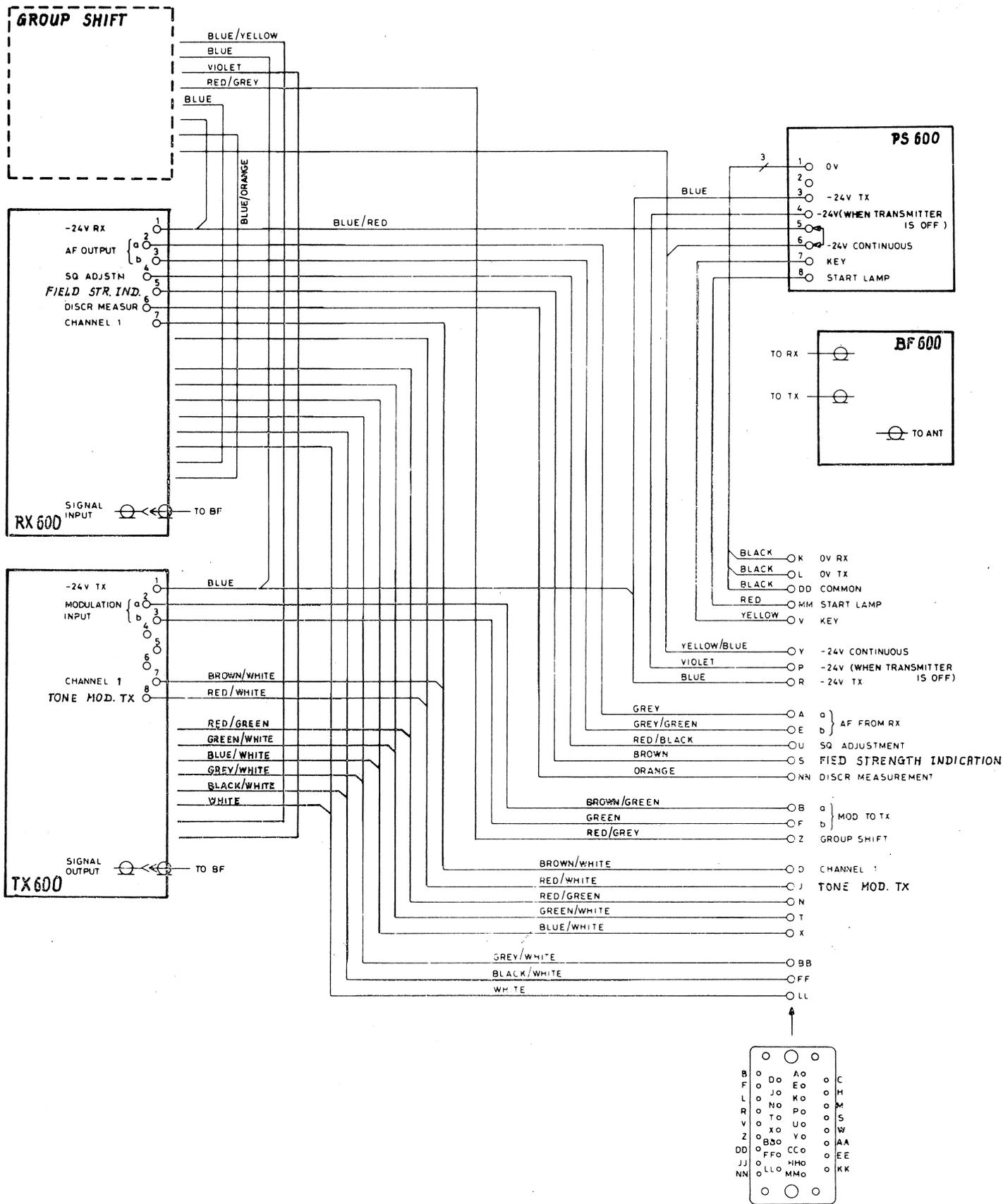
Stykliste

TT681-2001

comp list

X112558

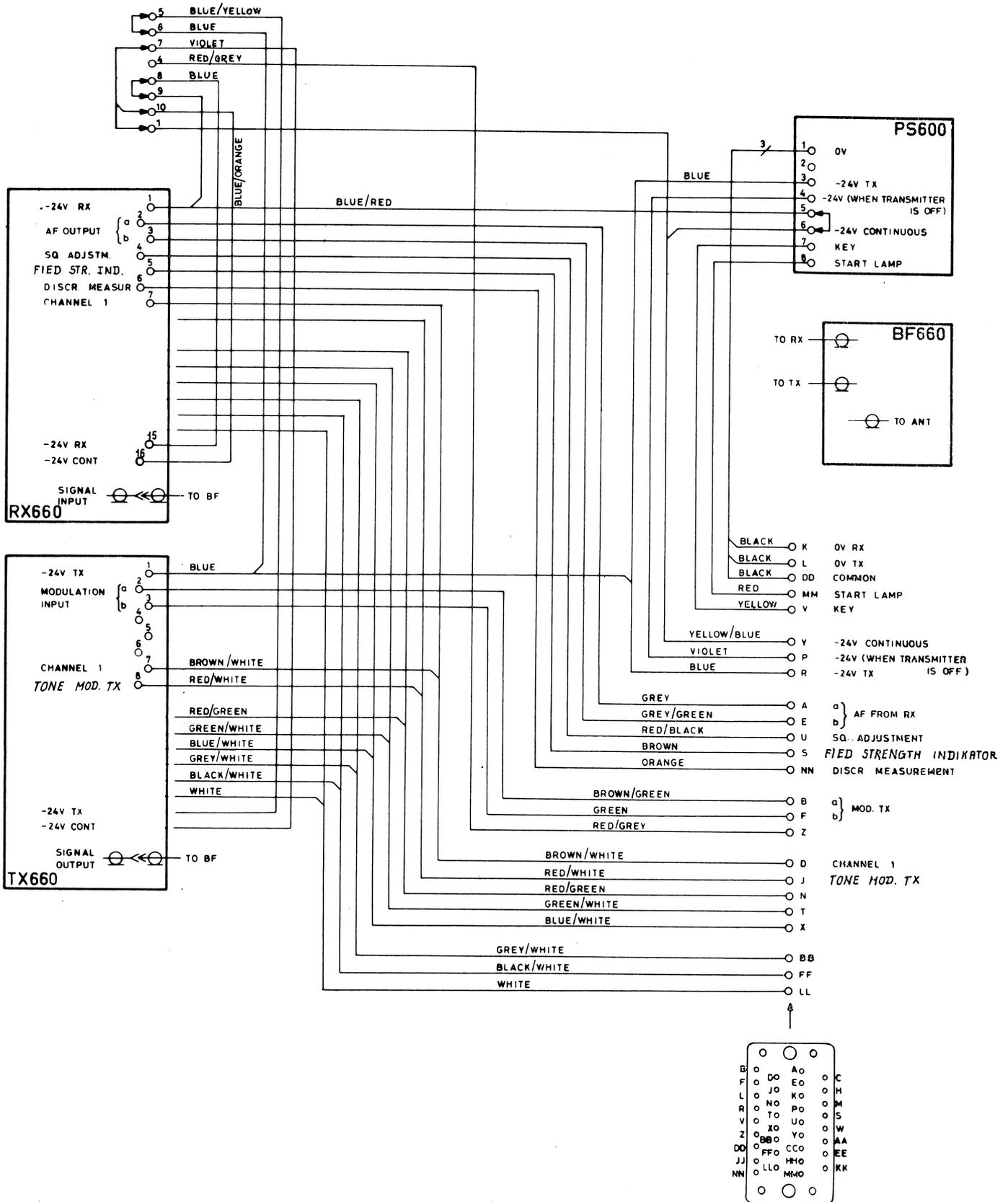
blad no of



CABLE FORM
KABLINGSDIAGRAM

CQF610, CQF630, CQF661 DUPLEX
- 2001

MB/HG
1-5-70
D 114537



CABLE FORM
KABLINGSDIAGRAM

CQF662, CQF663
- 2001

DUPLEX

M0/KG
1-5-70
D114538

Rød/hvid ledning (for styring af kanal 2) mellem TX-terminal 8 og RX-terminal 8 loddes 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.



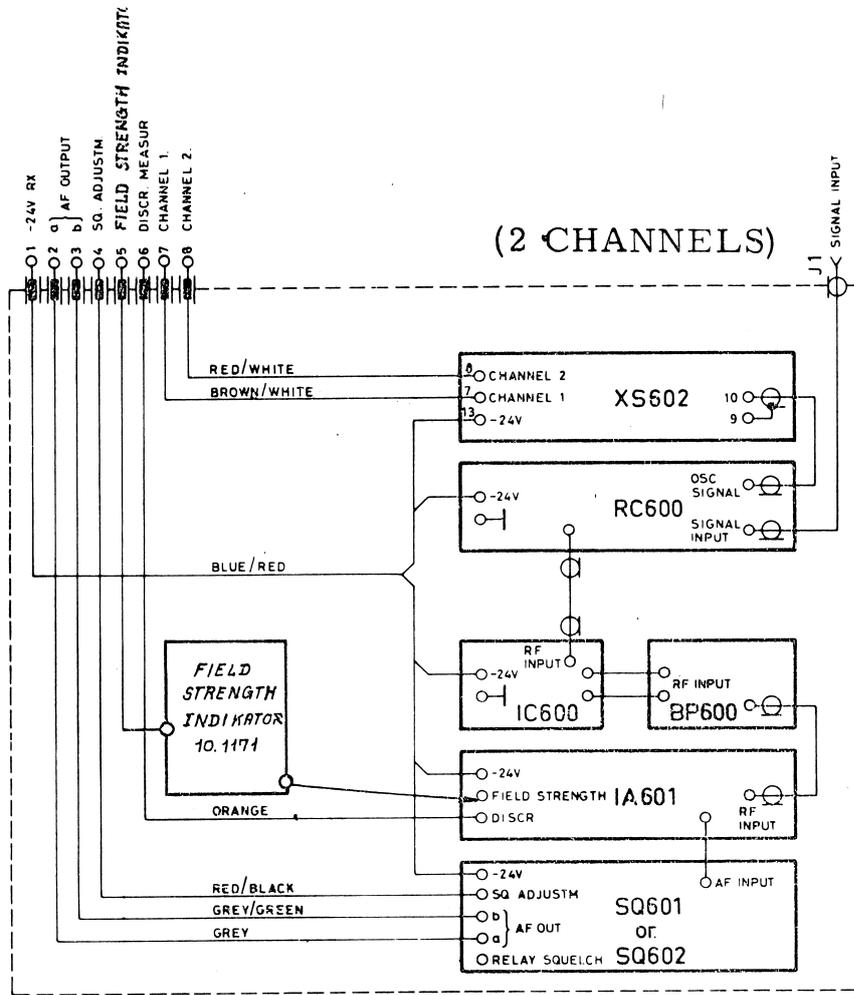
konstr./tegn.
Kje/HNi
4.5.70
godk.
komp.liste

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

KODE

TEGN.NR.
1114555

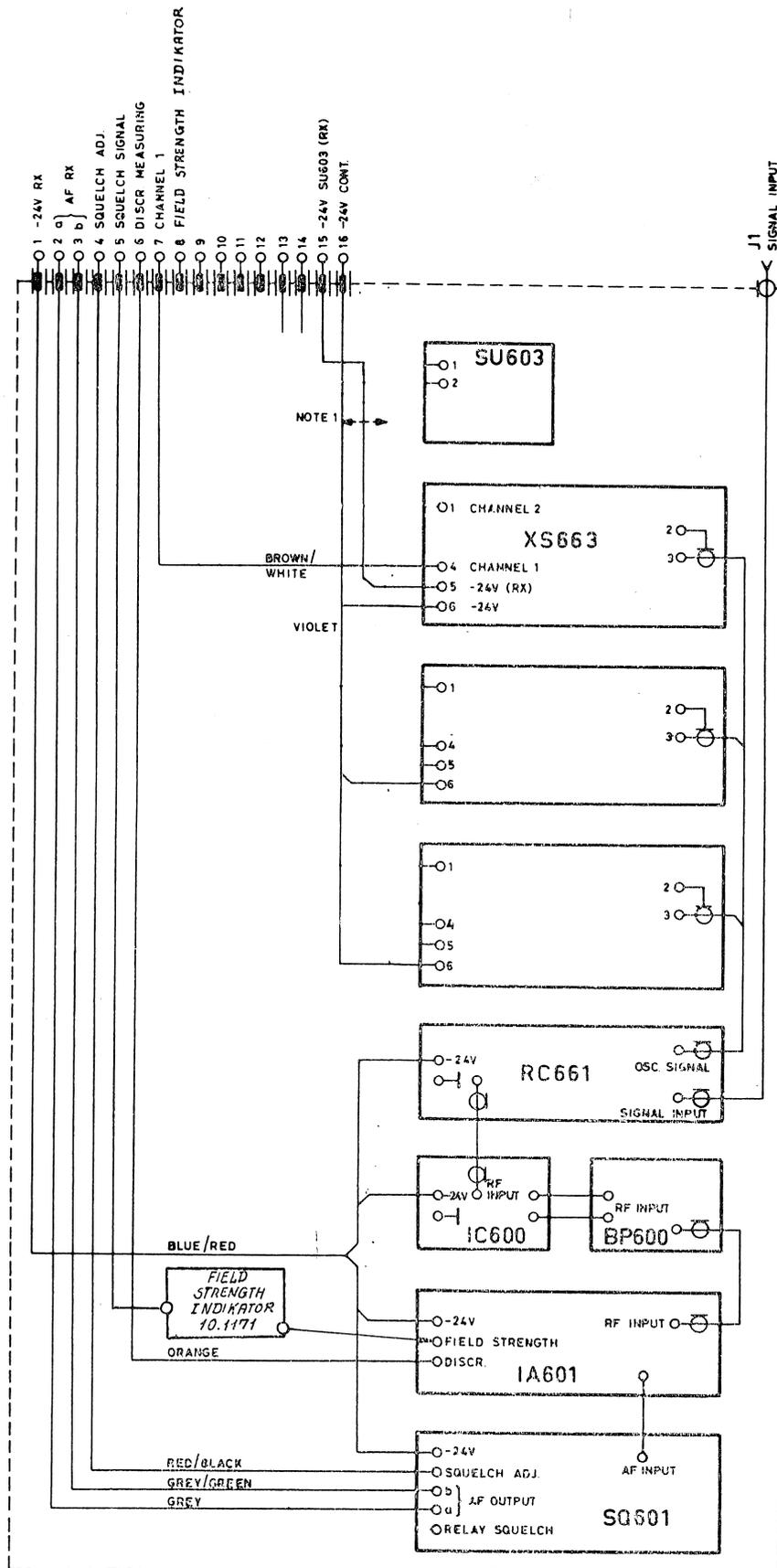
A 4



MØ/ KG
 1-5-70
 D114639

CABLE FORM
 KABLINGSDIAGRAM

RX610, RX630, RX661-2001



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.

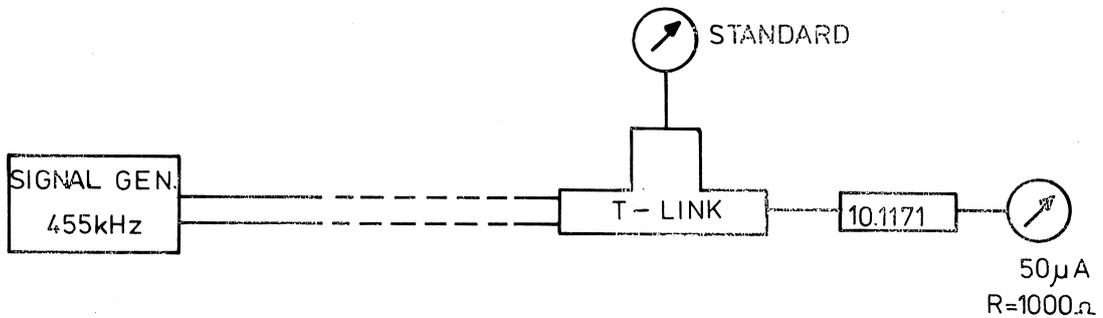
- | | |
|-------------------------------------------------------------|--------------------------------------------------------|
| <u>1. Input frequency</u> | 455 kHz. |
| <u>2. Voltage range</u> | 0 to 10 volts RF. |
| <u>3. Input impedance</u> | Approx. $1/8 \times$ DC load. |
| <u>4. Deflection on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

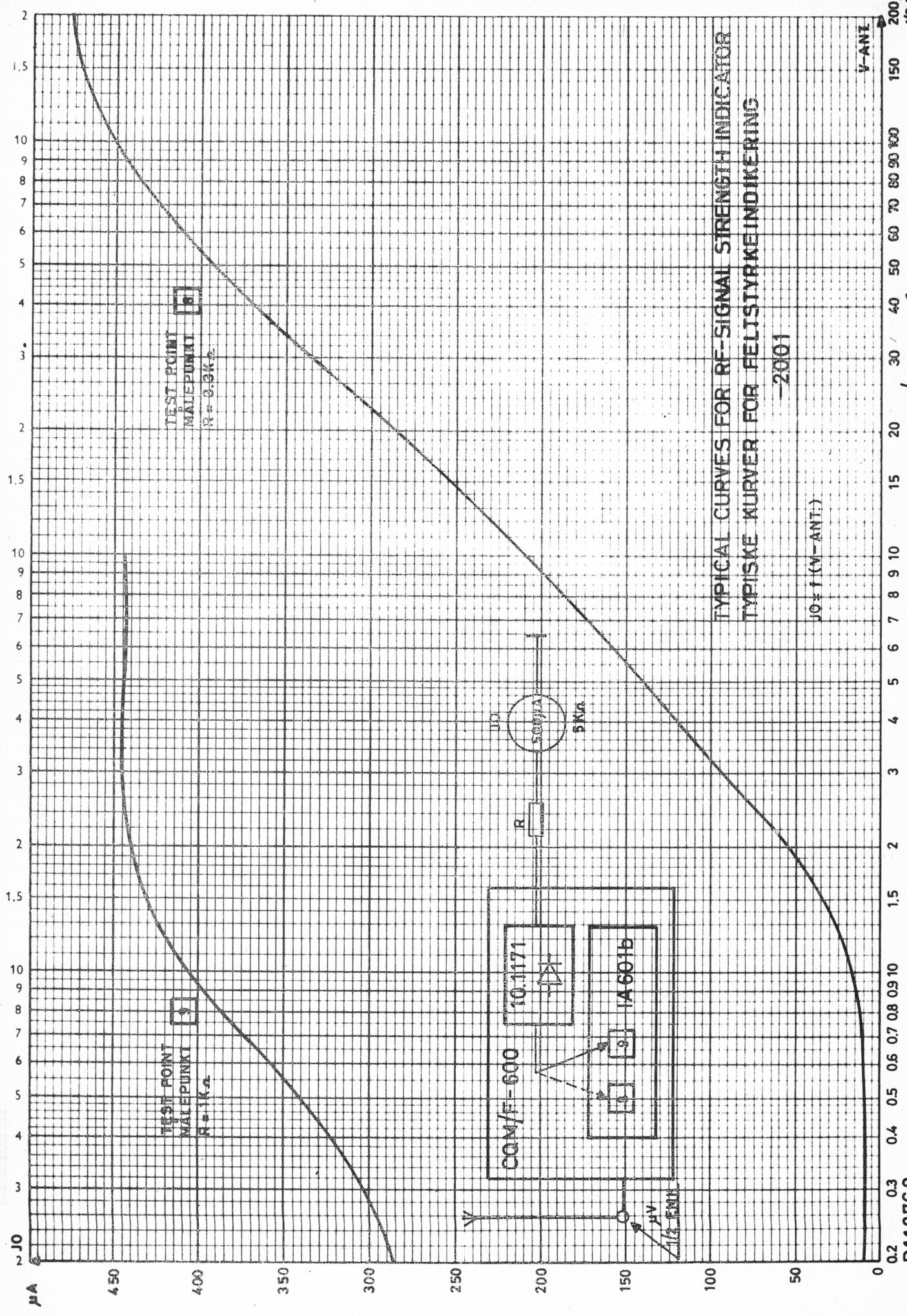
2. Set-up



3. Measurements:

The output voltage of the signal transmitter, at 455 kHz, is adjusted until the standard instrument indicates 100 mV, 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.: $7 \mu\text{A} \pm 1 \mu\text{A}$.



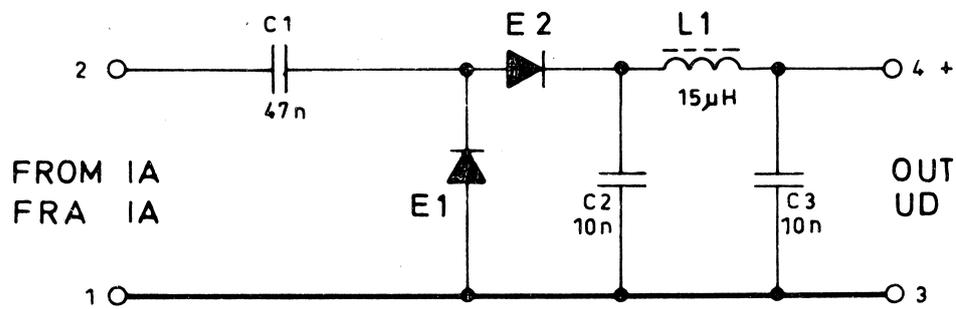
TYPICAL CURVES FOR RF-SIGNAL STRENGTH INDICATOR
 TYPISKE KURVER FOR FELSTYRKEINDIKERING

-2001

$J0 = 1 (V-ANT)$

KJe/EBH
 12.3.69
 MB.

D112768
 Ordinat 100 delinger : Foscisse 20-20.000 Hz.



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

FIELD-STRENGTH INDICATOR 10.1171
FELTSTYRKEINDIKATOR

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			

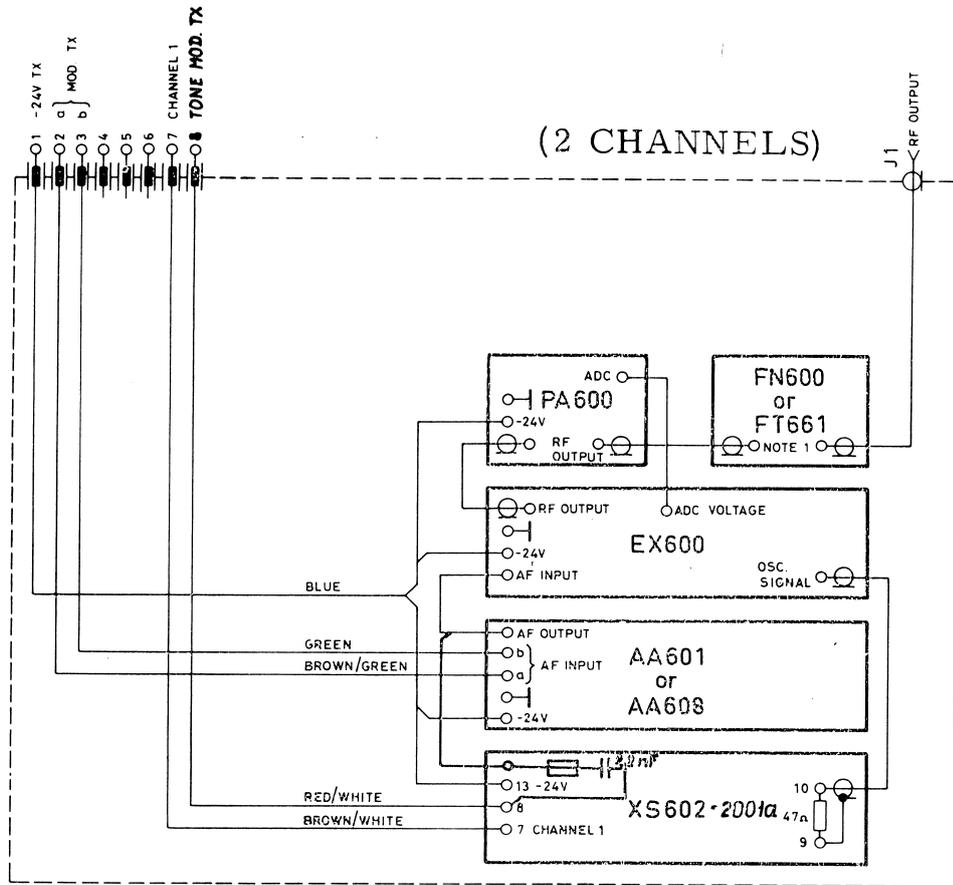


udarb af
KJe/IA a
kontrol af
titil drög

Parts list
Feltstyrkeindikator
Stykliste

101171

comp date
X112559
date no



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[∅] lægges fra XS602-2001, terminal 2 til AA601, LF-udgangsterminal (midterste term.).

30 mm orange wire.

Soflex M49 1 x 0,4 mm[∅] 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.

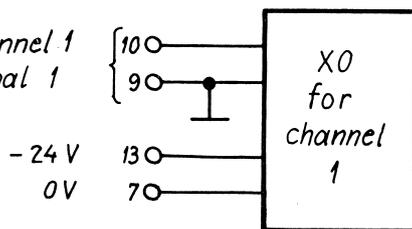
KODE

TEGN. NR.

I 114556

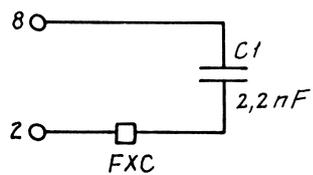
A4

RF-signal channel 1
HF-signal kanal 1

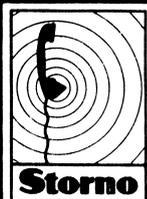


Tone mod. TX

Mod. to/til EX



1) FXC tilføjet



konstr./tegn.
KJe/JE
25. 8. 67.
godk.
OB.
komp.liste

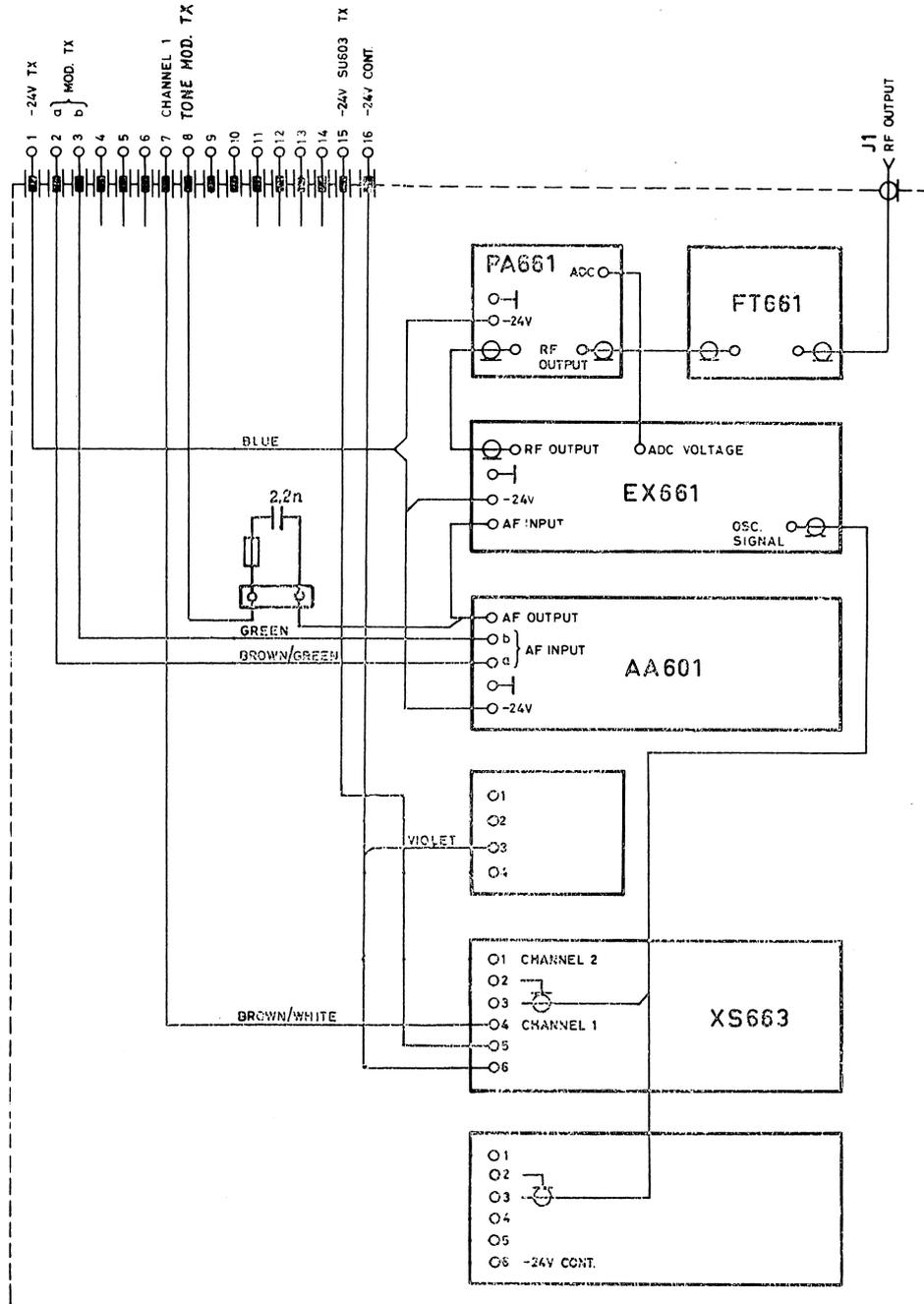
CRYSTAL OSCILLATOR PANEL

X5602-2001a KODE

TEGN. NR.

D 109928/1

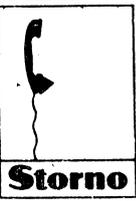
A 4



CABLE FORM
KABLINGSDIAGRAM

TX662, TX666-2001

1) ændr. 18.2.69



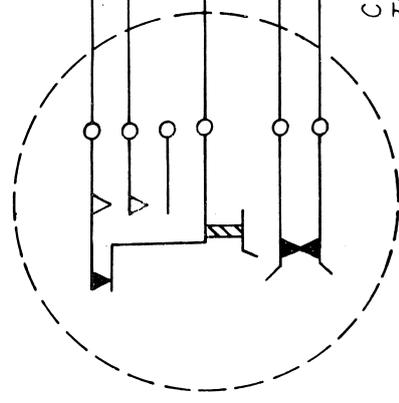
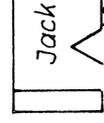
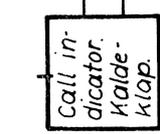
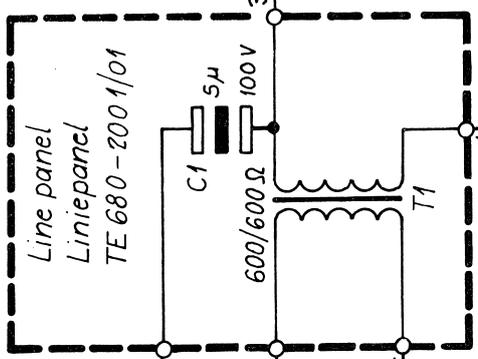
konstr. tavn.
KJe/JE
16.8.67
KJF
16.8.67
komp. liste

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.

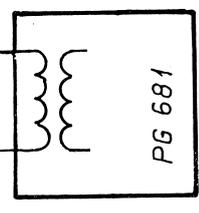
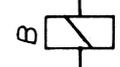
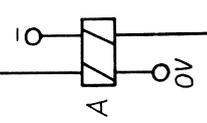
TEGN. NR.
D 109783/1
A 4

Magneto exchange
Magnetocentral.



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

Control panel
Kontrolpanel a
CP 680-2001/01



Dial
Nummerskive