

**AUTOMATIC
MOBILE TELEPHONE SYSTEM**

CAF680-2003

**FOR
1 CHANNEL**

Storno

**AUTOMATIC
MOBILE TELEPHONE SYSTEM
CAF680-2003
FOR
1 CHANNEL**

CONTENTS

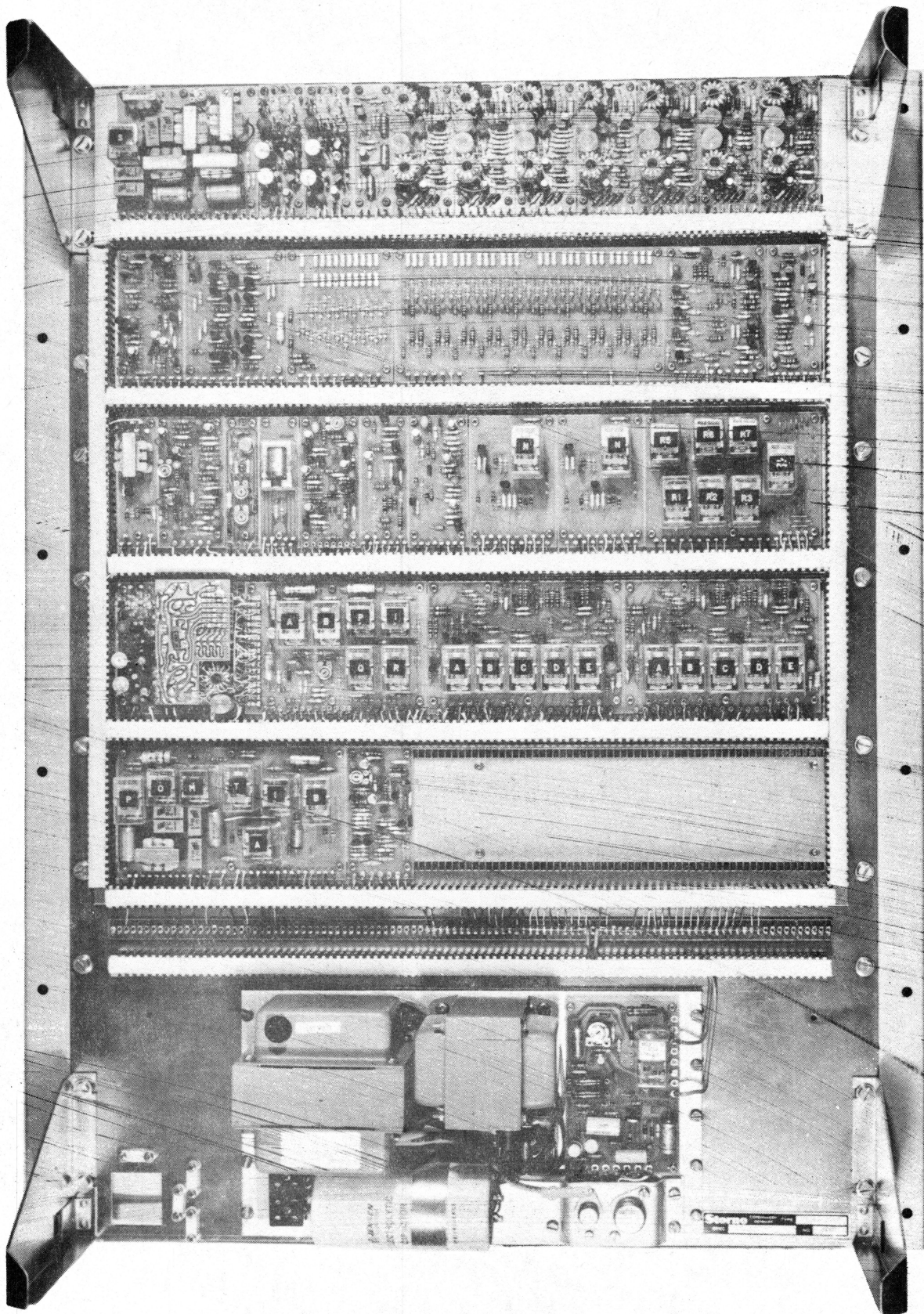
1. System Lay-out
System Description CAF680/600-2003
2. Installation Lay-out
Cabling Diagram TE680-2003
3. Function Diagram TE680-2003
Level Diagram CAF680-2003
4. Principle Diagrams
PABX Interface Panels
Operation Instructions CAF680-2003
5. Terminal Unit, units TE680-2003
6. Control Panel, units CP680-2003
7. Mobile Control Box, units CB601-2003/01
CB601-2003/02
8. Special Systems CAF600/680-2003 spec.

Storno

Storno



CB601-2003/01



TE680-2003

CAF680-2003

A F S N I T 1 :

CAF680-2003	D114093
CAF680-2003	D114095
CAF680-2003	T113760

A F S N I T 2 :

TE680-2003	D113952
TE680-2003	D114146

A F S N I T 3 :

TE680-2003	D114034
CAF680-2003	D115972
CAF680-2003	D114094
CAF680-2003	T114147

A F S N I T 4 :

CAF680-2002/2003	D113267
CAF680-2003	T115987
FDR-x(LME)	D113227
FLR(LME)	D113228
CAF680-2003	D112865
CAF680-2003	D112866

Betjeningsvejledninger

A F S N I T 5 :

AA6811	D400867/2
AA6811	X400877
AA6811	37.600-E1
AA6811	37.587-E1
AA6811	37.588-E1
CR681	D400739/2
CR681	X400861
DU680-2002/1	T115346
DU680-2002/1	D110520
DU680-2002/1	D113509
DU680-2002/1	X110521
FF680-2003/01	D111429
FF680-2003/01	D113422
FF680-2003/01	X113233
FF680-2003/02	D113185
FF680-2003/02	D113391

FF680-2003/02	X110654
HU680-2003	D113709
HU680-2003	D113734
HU680-2003	X113730
LA681	D400767/2
LA681	X400759/4
LA681	36.162-E1
NU680-2003	D111665
NU680-2003	D113400
NU680-2003	X113239
NU680-2003/01	D111664
NU680-2003/01	D113389
NU680-2003/01	X113240
PG680-2003/01	D112191
PG680-2003/01	D113418
PG680-2003/01	X113243
PS603	37.645-E1
PS603	D400746/4
PS603	X400752/3
PS604	37.646-E1
PS604	D400790/3
PS604	X400862
RP680-2003	T111481
RP680-2003	D111381
RP680-2003	D113401
RP680-2003	X113247
RP680-2003/01	D111426
RP680-2003/01	D113374
RP680-2003/01	X113252
RP680-2003/02	D111451
RP680-2003/02	D113402
RP680-2003/02	X113254
RP680-2003/03	D111871
RP680-2003/03	D113421
RP680-2003/03	X113255
RP680-2002/06	D111296
RP680-2002/06	D113403
RP680-2002/06	X113256

CAF680/600-2003

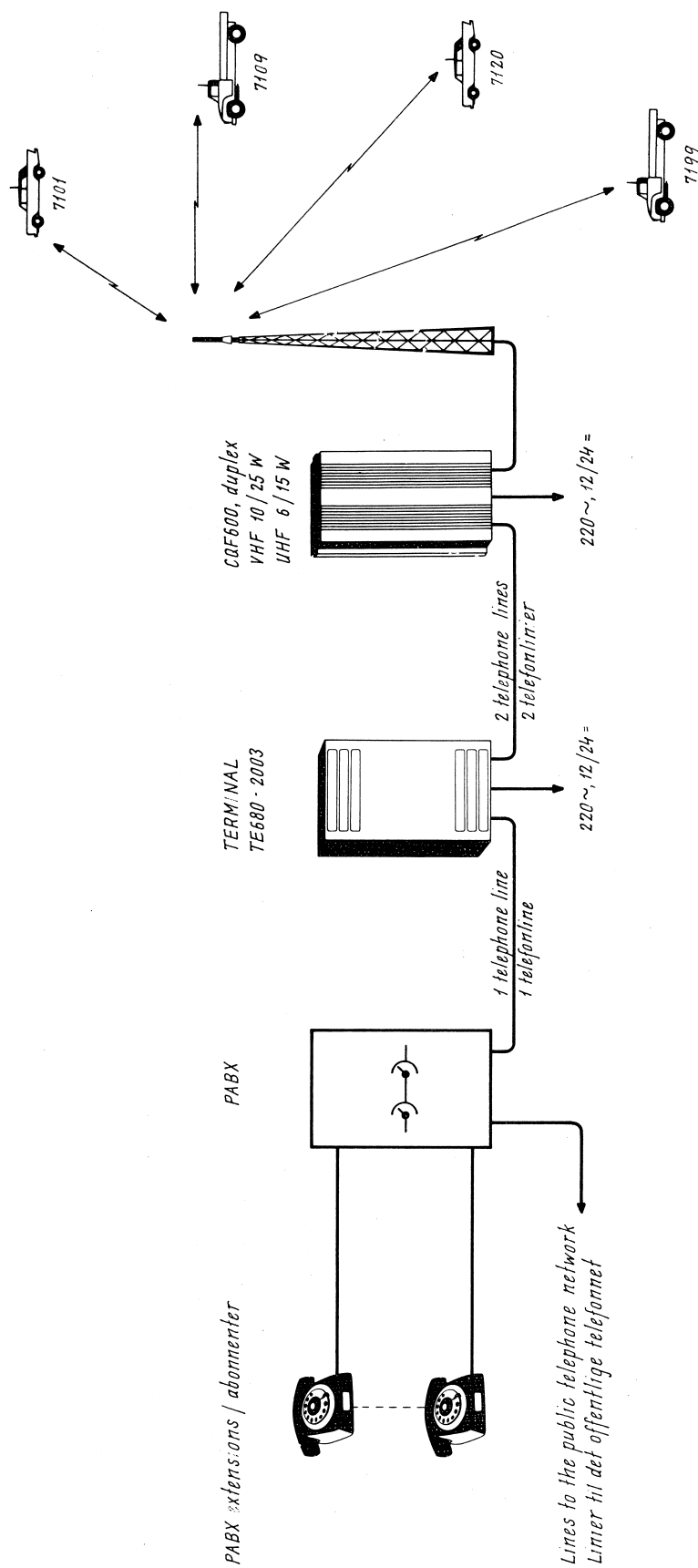
RP680-2002/06	T115434-E1	DA681	36.171-E1
RP680-2002/09	D113183	DA680-6232	D112857
RP680-2002/09	D114074	DA680-6232/01	D112901
RP680-2002/09	D113426	DA680-6232/01	X113140
RP680-2002/09	X113273	DA680-6232/02	D112902
ST684-2003	D113324	DA680-6232/02	X113141
ST684	X400865	RP680-2003/04	D113702
ST684	36.163-E1	RP680-2003/04	D113754
SU680-2003/02	D110661	RP680-2003/04	X113731
SU680-2003/02	D113376		
SU680-2003/02	X110662	AFSNIT 7:	
SU680-2003/03	D111795	AA602c	D400836/3
SU680-2003/03	D113385	AA602c	X400677/5
SU680-2003/03	X113258	AA602	37.405-E1
SU680-2003/04	D113223	CB601-2003/01	D112873
SU680-2003/04	D113387	CB601-2003/01	D113820
SU680-2003/04	X113224	CB601-2003/01	D113824
TR6811a	D401024	RP680-2003/01	K304306
TR6811a	X401061	RP680-2003/01	C304305
TR6811a	37.744-E1	CB601-2003/02	T114028
TR6811a	37.745-E1	CB601-2003/02	D112889
TR6811a	37.746-E1	CB601-2003/02	D113972
TT680-2002	D111382	CB601-2003/02	X114092
TT680-2002	D113504	CB601-2003/02	D114134
TT680-2002	X113263	CB601-2003/02	D114135
TT680-2002	T115345	CB601-2003/02	K304549
TT680-2003	D111453	CB601-2003/02	C304550
TT680-2003	D113505	RP600-2003	D112687
TT680-2003	X113272	RP600-2003	D113419
TT680-2003	T115344	RP600-2003	X113245
TU680-2003	D111425	JB600-2003/02	D113056
TU680-2003	D113384	NU600-2003	D113736
TU680-2003	X113259	NU600-2003	D113733
TU680-2003	T115350	NU600-2003	X113737
		RP600-2003/01	D113846
AFSNIT 6:		RP600-2003/01	D113825
CP680-2003	D113699	RP600-2003/01	X114391
		RP600-2003/03	D113826
CP680-2003, HU680-2003	T115348	RP600-2003/01	D113827
DA681	400821/2	RP600-2003/02	D113420
DA681	X400851/3		

CAF680-2003

RP600-2003/02	X113235
RP600-2003/02	T115359
SR684	D400912/3
SR684	X400975/2
SR684	D400989
SU600-2003	D110180
SU600-2003	D113579
SU600-2003	X110181
SU600-2003/01	D112985
SU600-2003/01	D113417
SU600-2003/01	X113257
TT681, TT682, TT683	D500771/3
TT681, TT682, TT683	X400751/2
TT682, TT687	37.485-E1
SU600-2003/2 spec.6588	D120203
SU600-2003/2	I120204
SU600-2003/2	D120200
SU600-2003/2	I120201
SU600-2003/2	X120202
MT601-2003	D119044

AFSNIT 8:

0113760



Kontaktnr. 08 / JWA 23 - 1 - 70	godk. <i>as</i>	Komp. liste
---------------------------------------	-----------------	-------------

SYSTEM LAY-OUT / SYSTEMOVERSIGT
FULLY AUTOMATIC RADIOTELEPHONE SYSTEM WITH
SELECTION DIALLING IN BOTH DIRECTIONS / FULDAUTO-
MATISK RADIOTELEFONSYSTEM MED AUTOMATVÆLG I
BEGGE RETNINGER

CAF680 - 2003

KODE

TEGN. NR.

0114093

A 3

Automatic Mobile Telephone
System for one channel
Type number CAF680-2003.

1. Introduction.

1.1 General.

This mobile radio system provides for two-way automatic telephone connection to a private branch exchange, where mobiles function as subscribers.

Connection with the mobile subscribers is achieved by means of an unattended base station, which may be in either the VHF or the UHF band.

1.2 Main features.

- A. Selective calling of any mobile station by dialling from any telephone instrument connected to the exchange.
- B. Selection of any subscriber, (mobile or telephone) from all mobile stations.
- C. Single channel operation with a capacity of 90 mobile stations.
- D. Duplex or semi-duplex operation.
- E. Signalling by means of AF tones.
- F. Full privacy within the system.

1.3 System Lay-out.

The unattended base station operates full duplex and is connected to the exchange via the terminal unit. The exchange must have a facility for trunk connection but the design of the terminal unit is flexible, permitting connection to different makes of telephone exchange.

The mobile station consists of a transmitter-receiver unit and a control unit with accessories. It is possible for simplex or duplex mobile stations to operate in a common system.

Signalling from base to mobile stations is achieved by the transmission of four AF tones in a sequence lasting less than 0.5 second. (Sequential tone calling). Each mobile station has its own two digit code number, which is represented by the last two tones in the sequential signal, the first two tones being predetermined for a particular system.

Signalling from a mobile to the base station is arranged by transmitting two AF tones simultaneously (double tone signalling). Each digit to be

dialled, from 0 to 9, together with a "start" and "stop" signal, is represented by a different double tone combination.

2. Mode of Operation.

2.1 Calling a mobile station.

Normal telephone procedure is followed in order to establish an outgoing call. The handset is lifted, the radio system number and the car number (two digits) are selected on the dial.

In the terminal equipment the dialling impulses are converted into a corresponding AF sequential tone code. When dialling is completed the tone code is transmitted automatically.

The mobile station which has been called responds by automatically transmitting an AF tone signal of about 1 sec. duration back to the base station, thus indicating to the subscriber that the call has been received.

Absence of the acknowledgement signal indicates to the caller that the mobile in question is unobtainable, and that the call should be repeated later. A call which is in progress will immediately block the radio channel to all mobiles in order to prevent them obtaining access to the system.

When the calling signal is decoded in the mobile station, an attention tone will be heard over the loudspeaker, and a call lamp switched on. All other mobiles remain blocked whilst the call is in progress, and are provided with a visual engaged signal.

The call may be cancelled by the calling party, or from both sides, depending on the type of telephone exchange.

2.2 Calling a telephone subscriber.

Calls from a mobile are initiated by pressing the push button marked T. This is the equivalent of lifting the handset from a telephone instrument. A double tone signal is sent to the base station, and in the terminal unit this signal is converted into a DC function to provide a loop to exchange. When connection to the exchange is established a dialling tone from the exchange is transmitted back to the mobile.

Selection of the number to be called is made by means of push-buttons on the front of the mobile station control unit. The digits are transmitted one by one. Successive digits can only be sent if a tone signal is received back from the base station indicating that the preceding digit has been properly received.

If one digit is not received, the mobile station is blocked to prevent further dialling this condition is indicated by means of a lamp. In such a case the call must be cancelled and started again.

When dialling from the mobile is completed, the normal ringing signal is heard in the loudspeaker. When the called subscriber lifts his telephone handset, conversation is conducted in the normal way.

The call may be cancelled by pressing the push button marked X, resulting in disconnection of the DC loop between the terminal and the exchange. If the call is not cancelled disconnection is carried out automatically in the terminal unit.

2.3 Mobile-to-mobile facility.

The base station is provided with the facility for talk-through operation. A mobile-to-mobile call is initiated by pressing the push button marked M, followed by the button marked T.

When the dialling tone is heard, the desired mobile number can be selected as described in para. 2.2. Mobile-to-mobile traffic always works in the semi-duplex mode regardless of whether the mobile is simplex or duplex.

When the system is occupied an engaged indication will appear on all other mobile control units, and telephone subscribers attempting to make a call will hear the normal engaged signal.

Cancelling the call may be achieved from both cars by pressing the X button, and automatic disconnection is provided as previously described.

2.4 Pre-selected subscribers.

In this type of communication system certain subscriber numbers will be used more frequently than others.

In order to ease operation on the mobile side, the terminal unit at the base station is provided with a facility which enables it to select ten predetermined subscriber numbers upon reception of only one double tone code from the mobile.

To make a call from the mobile, the operator presses the A button, followed by the T button. When the dialling tone is heard, one of the dialling push buttons corresponding to a particular subscriber's number is activated. Thereafter, the selection of the required number is carried out automatically in the terminal unit. Cancelling the call is done in the normal way.

A simple control unit may be provided for calling only the ten pre-selected subscribers, where full dialling facilities are not required.

3. Optional facilities.

3.1 General.

Due to the flexibility inherent in the system, certain extra features may be incorporated.

3.2 Group or General call.

The selective calling system may be extended to cover group or general calls as well as individual calls. This provides the subscriber the facility of calling a group, or all cars, by dialling two digits. The same facility is made available for mobile-to-mobile traffic.

3.3 Time limiting.

In order to improve the peak-hour capacity of the system, a timing device may be provided in the terminal unit. The timer disconnects the circuit after a pre-determined period, which is variable and can be set up on installation. Disconnection is preceded by a short period of warning tone.

3.4 Automatic Identification of mobiles.

For debiting purposes, the signalling system can be extended to provide mobile identification. This is achieved by means of a four or five digit sequential tone code transmitted from the mobile.

4. Equipment.

4.1 Base Station.

The base station in this system is the standard Storno type CQF600, operating in the 80, 160 or 450 MHz bands, with 25 or 12,5 kHz channel spacing. The power supply to the base station can be 220, 240 V, 50 Hz or 24 VDC.

4.2 Terminal Equipment.

The terminal equipment is Storno type TE680-2003, designed for 19" rack or wall mounting on runners. The power supply can be 220, 240 V 50 Hz, or 24 VDC.

An interface panel is required between the terminal and the exchange. This can normally be supplied by the exchange manufacturer.

4.3 Mobile Stations.

Standard mobile stations in the Storno CQM600 series are used. The following types of mobile control unit may be used in the same system.

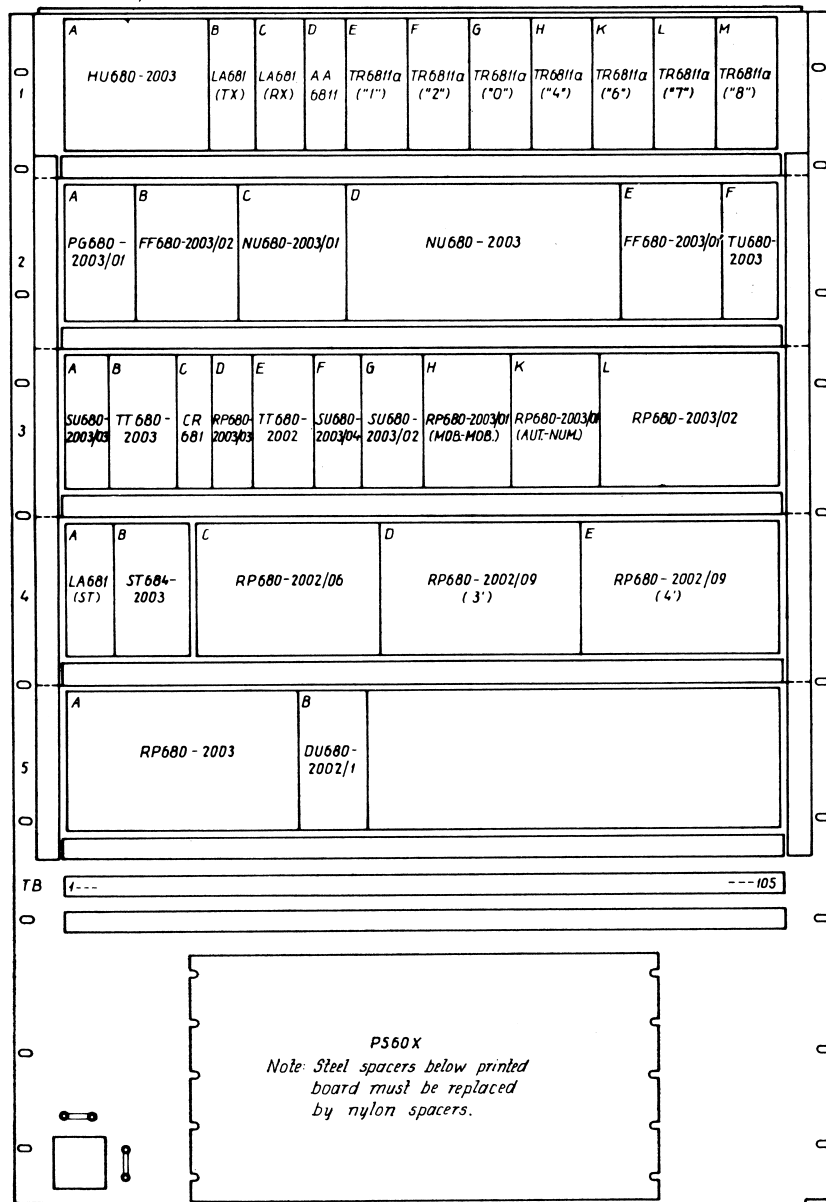
- A. CB601-2003/01. A control unit with full dialling facilities, combined with selection of pre-determined subscribers.
- B. CB601-2003/02. A control unit for ten pre-selected subscribers only.

Apart from the normal accessories such as, loudspeaker, microphone, or handset, a small junction box is supplied in connection with CB600-2003/01. The junction box serves as a cable terminal, and the control unit is connected to it by means of a flying lead with a connector.

5. Telephone lines, specification.

5.1 Connection between terminal unit TE680-2003 and the base station CQF600.

Number of lines	2 pairs (4 wire).
Line impedance	600 ohm.
Line voltage	Max. 24 V DC $\pm 5\%$.
Line current	Max. 25 mA DC.
Loop resistance	Max. 1,5 k ohm.
Attenuation	Max. 10 dB at 1 kHz.
Frequency response	Flat to within ± 3 dB relative to 1 kHz, over range 0.3 to 3.0 kHz.
Line length	Max. approximately 10 km.

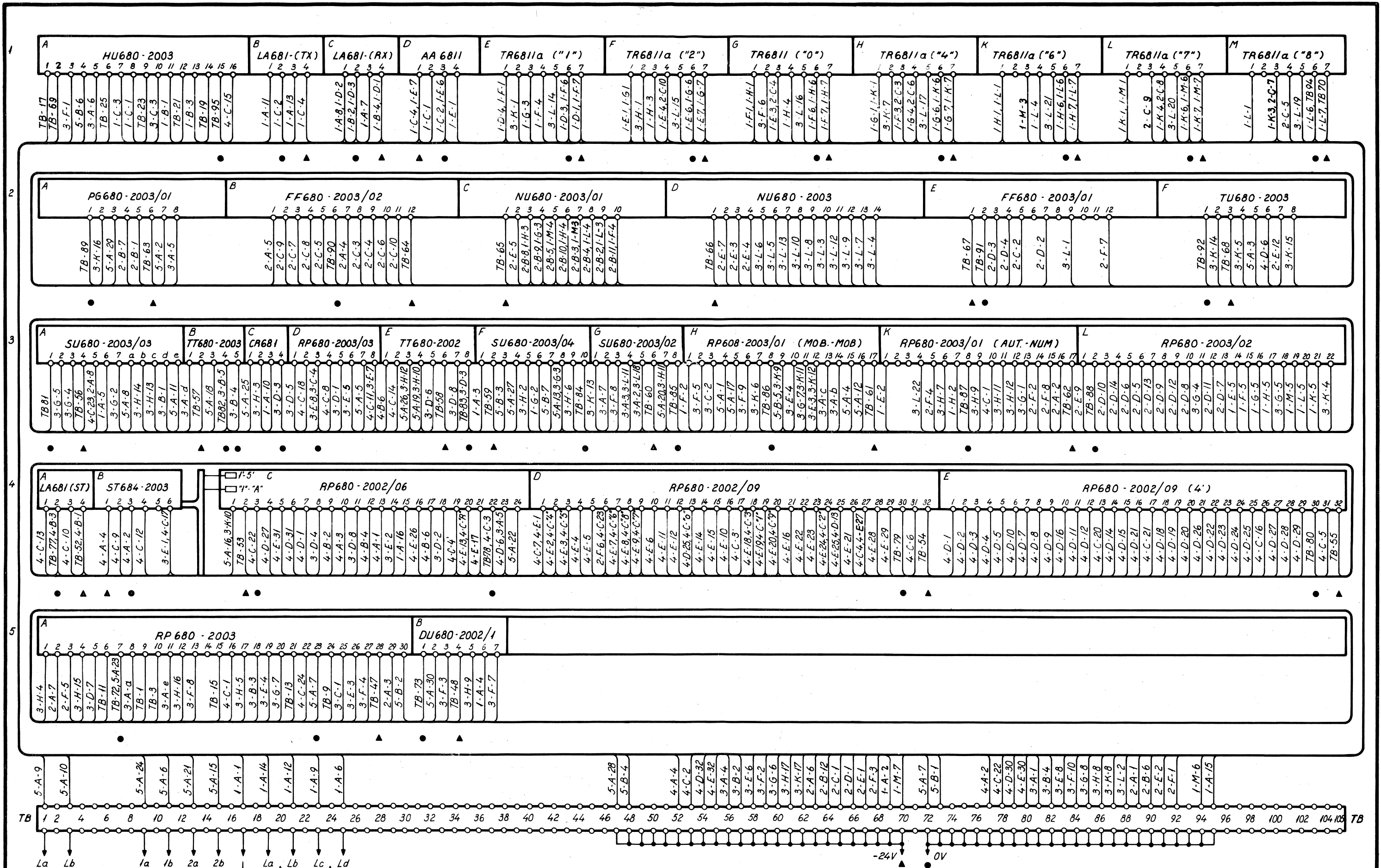


MOBILE UNIT
05/80
11/7/89
950K
06
Temp Use

INSTALLATION LRY-OUT
TE 680-2003

TEGN. NR.

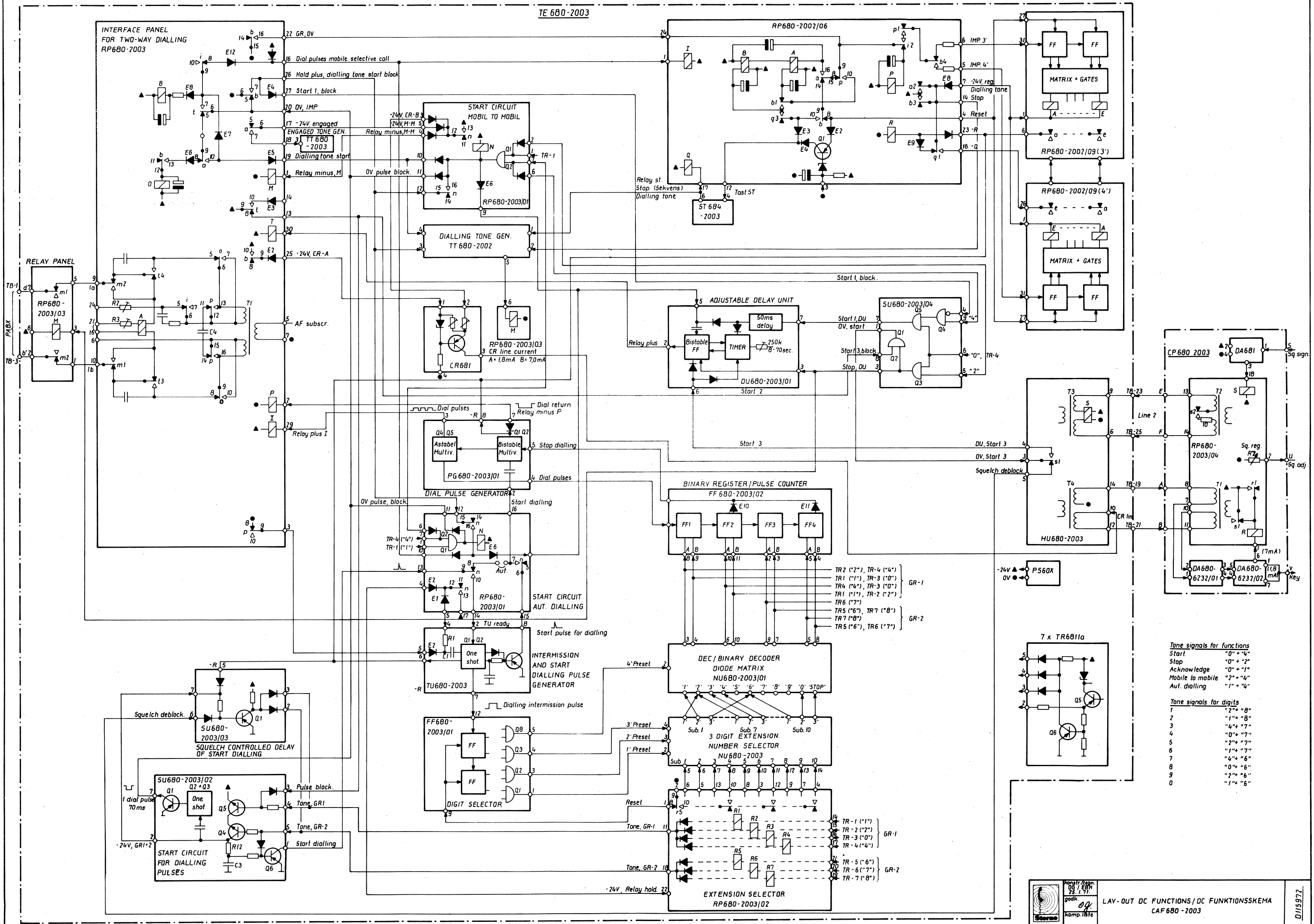
D 113952E

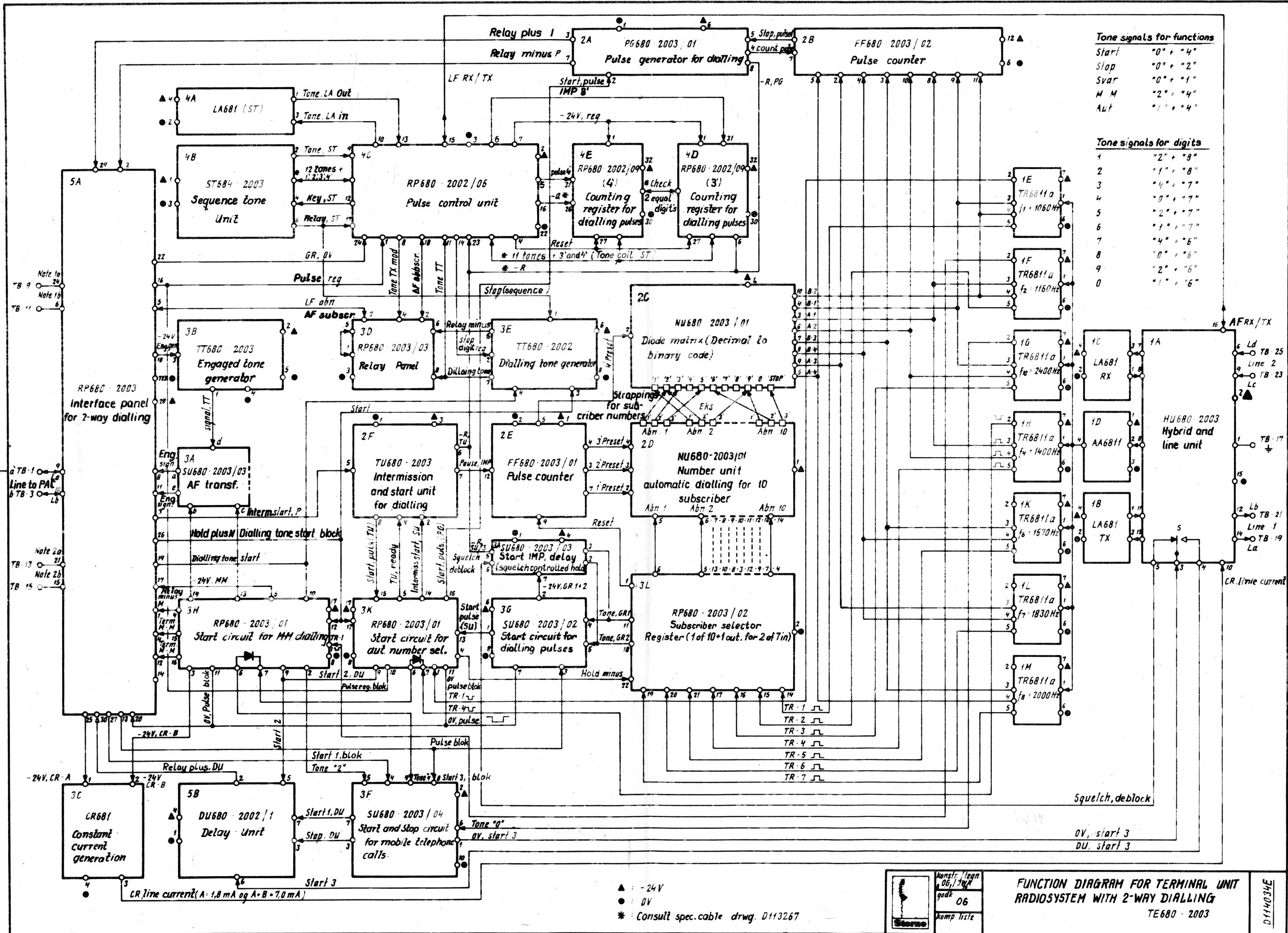


konstr./tegn.
O.G./A.H.
10-4-70
godk.
komp. liste

CABLEFORM
KABLING
TE680-2003

TEGN. NR.
D-114/46





FUNCTION DIAGRAM FOR TERMINAL UNIT
RADIO SYSTEM WITH 2-WAY DIALLING
TE680-2003

D114034E

Automatic Mobile Telephone System, Type CAF680-2003.

Base Station - Theory of Operation.

Read description of system T113760 first.

Calling a mobile station.

The PABX exchange number to the radio system is selected, and from the interface panel for 2-way dialling connected to the PABX, a loop connection is established to, or voltage is applied to, the interface panel RP680-2003 of the terminal unit TE680-2003.

The relay A in RP680-2003 is activated. Contact a9-10 feeds, via E7 and E8, 0 volt to the B relay, which is activated after about 20ms.

Via E5, contact a9-10 also feeds 0 volt to terminal 19, which is connected to the terminal 4 of the dialling tone transmitter TT680-2002. From the terminal 5 of TT2, -24 volts is applied to terminal 6 of RP/03 causing relay M to be activated.

A dialling tone signal from TT2, terminal 7, is, via RP/03-8, contact m7-6 and RP/03-7, feed to the interface panel RP680-2003, terminal 5. Via T1, o-contacts, the capacitors C1 and C7, and m-contacts the signal passes to the line to the PABX exchange.

From the contact a9-10 in RP680-2003, 0 volt is also applied, via E7, i9-8 and 12 to terminal 16 (pulse). From there 0 volt is applied to the pulse control panel RP680-2002/06, terminal 1, where relay I is activated.

On operating the B relay in RP, 0 volt is, from contact b15-16, applied to terminal 22 (GR, 0 volt), and from there to RP/06-24. In RP/06, 0 volt is, via p9-8, a15,14, b9-8 and terminal 4 (reset), applied to terminal 27 of the two counter registers RP/09 causing the electronic pulse counters to be reset.

Contact b6-7 feeds 0 volt to terminal 26, which passes to TT2-3, causing blocking of the activation of the dialling tone transmitter. 0 volt is also, via E4 and terminal 27, applied to SU/04-4 causing blocking of any mobile tone calls.

Contact b10-9 feeds, via E2 and terminal 25, -24 volts to the constant current generator CR681, terminal 1. From CR681, 1,8mA is, via HU680-2003 and the remote control line 1, fed to the control panel CP680-2003 of the base station. From the CP unit DA680-6232/02, terminal 1 or terminal 7 0 volt is applied to the keying of the transmitter.

In all mobile stations, engaged signals are given by lamp indication.

Engaged indication in the mobile stations prevents the latter from making calls to the base station and from listening in to conversations. Immediately after reception of the dialling tone signal from the terminal unit of the radio system, the PABX subscriber can dial the 2-digit call number of the desired mobile station. In RP680-2003, the A relay repeats the pulses produced by rotating the dial. Contact a9-10 feeds on the pulses to the relay I in RP680-2002/06. During the reception of the number pulses, contact a9-8 activates the relay O, which is delayed in drop-out. The contacts o6-7 and o9-10 short-circuit the transformer T1 and disconnect the latter's load of the A relay.

The relay functions in the pulse control panel RP/06 are shown on the diagram D11296. The pulses of the first digit selection are fed to the counter register RP/09 (3'), whereas the pulses of the second digit selection are fed to RP/09 (4').

The relay functions of the counter register appear from the diagram D114074. The two registers operate the 3rd and 4th tones of the tone sequence transmitter ST684-2003, indicating the selective tone code of the mobile stations. How to connect the tone coils to the registers appears from the diagram D113267.

On reception of the first dialling pulse, the dialling tone ceases by -24 volts from RP/06-14 to TT2-2 (stop, digit register).

About 140ms after the reception of the last pulse from the 2nd digit selection, the tone sequence transmitter is activated, and the 4-tone selective call is then transmitted. During the tone transmitting period (420ms), the Q relay in RP/06 is activated.

When the PABX subscriber replaces his handset, the system is disconnected. In case it is desired that the mobile station called shall be able to disconnect (by activating the X-button), TE680-2003 must be equipped with a relay panel RP680-2003 03. The two relay contacts of RP/03 are connected in series to the line wires passing from the interface panel in TE to the PABX interface panel. During the reception of the tone combination for the mobile disconnection (X-button), 0 volt is fed from SU680-2003/04, terminal 3. This terminal passes to RB/03-3.

This system can be used for PABX interface panels, which are switched off by briefly disconnecting the line connection. See interface panel for 2-way dialling LME type FLR (BCG 2730), shown on diagram D113228.

Mobile - to - Subscriber Call.

When calling an individually selected number, a double tone combination consisting of the tones "4" = 1400Hz and "0" = 2400Hz is transmitted.

From two of the tone receivers TR6811a, approx. -15 volts is, after the lapse of about 350ms, obtained from the terminals 2. These D.C. signals are fed to the terminals 9 and 6 of SU680-2003/04 (starting and stopping circuit for mobile telephone calls).

An AND circuit consisting of the transistors Q4 and Q5 is activated, and a 0 volt signal from terminal 7 (starting 1, DU) is fed to the time delay unit DU680-2002/1, terminal 7.

DU is activated after a delay of approx. 50-100ms (in DU/1 the potentiometer R14 is replaced by a 250k Ω potentiometer to obtain an adjustable delay of approx. 8 to 70 seconds).

A 0 volt signal is fed from terminal 2 to the interface panel RP680-2003, terminal 30, where the relay T is activated.

Contact t6-7 feeds 0 volt to the B relay, which is activated after approx. 20ms. Contact b6-7 feeds, via E4 and terminal 27 (start 1, block), 0 volt to SU/04, terminal 4. This blocks the start pulse to DU-1 (Q5 goes OFF).

When the T relay operated, 0 volt was applied from t6-7, via i9-8, E12 and terminal 16 (PULSE), to RP/06, terminal 1, where the I relay operates. Contact b15-16 feeds 0 volt, via RP/06, for resetting of the counter circuit in RP/09.

Starting of the dialling tone transmitter is blocked by 0 volt from contact b6-7 in RP680-2003. Contact b10-9 in RP feeds -24 volts to CR681, from where 1,8mA is, via line 1, fed to CP680-2003 for keying of the transmitter of the base station. The reception of carrier waves in the mobile stations from which no calls have been made will cause engaged signals to appear by lamp indication. Contact t9-8 disconnects the -24 volts blocking voltage which was applied to SU/04-8 (start 3, block) and SU/02-3 (PULSE BLOCK).

When the T relay is being activated, the contacts t12-13 and t15-16 will cause "lift signals" to be fed the PABX interface panel. Depending upon what is connected to the terminals 6 and 24 (see note 1), this signal will be in the form of an ohm loop or a DC voltage. The t contacts mentioned will at the same time switch off the connection to the A relay.

The dialling tone signal received from the telephone exchange is, as modulation, audio-frequency fed to the transmitter of the base station. See level diagram D114094. As soon as the dialling tone is heard in the mobile station which made the call to the base station, extension calls can be made by activating the proper keys of the digit keyboard. One digit is

transmitted at a time.

Tone signalling to the base station is based on the application of two simultaneously emitted tone frequencies. 7 of the 12 Storno standard tone frequencies are employed. These are divided into two groups. Group 1 consists of the tones "1", "2", "0" and "4" and are used for the transmission of the following functions: start (call), stop (end signal), reply (from mobile station called), M-M (repeater call) and Aut. (automatic number selection). 5 of the 6 possible tone combinations are thus employed.

Group 2 consists of the tones "6", "7" and "8". In connection with digit transmission one tone is emitted from either of the two tone frequency groups. See schedule of function and digit tone combinations on the function diagram for TE680-2003, D114034.

If, say, digit 7 is the first digit, the mobile station will emit the tones "4" = 1400Hz and "6" = 1670Hz. The tone signal time will usually be from approx. 0,7 - 1,5 seconds. From the terminals 3, 4 and 5 of the two corresponding tone receivers TR6811a, 0 volt potential is applied after approx. 350ms. These signals pass to RP680-2003/02, terminals 17 and 21. In RP/02 the signals pass on, via the diodes E21 and E20, to terminal 11 (tone, GR 1) and terminal 18 (tone, GR 2), leading to the terminals 4 and 5 of SU680-2003/02 (starting circuit for digit pulsation).

The AND circuit consisting of Q4 and Q5 feeds -24 volts to terminal 2 leading to terminal 7 of SU/03. Here the transistor Q1 is operated, and 0 volt is applied from the terminals 3 and 2 back to the input terminals of SU/02. Thus, the circuit is not disconnected even if the tone signal ceases

In SU/02 -24 volts from Q4 activated the monostable stages Q2 and Q3. The transistor Q1 goes OFF for approx. 70ms causing cessation of 0 volt from terminal 7, which - via RP-20, t6-7, i9-8, E12 and terminal 16 (PULSE) - leads to RP/06-1. The I relay in RP/06 is released for 70 ms and one counter pulse is thereby fed to the register for the 3rd tone of the sequential tone signal RP/09 (3').

In SU/02, C3 is charged to -9,1 volts during approx. 100ms at -24 volts from Q4 via R12. The base circuit of Q6 is blocked by 0 volt from terminal 5.

In the hybrid and line circuit HU680-2003, the S relay is activated as long as a carrier wave is being received from a mobile station. In the control panel CP680-2003 the unit DA681 is being activated by a D.C. signal from the squelch circuit of the radio receiver. The squelch signal is approx. 50ms delayed on the reception of the carrier wave, and from 0,1 - 0,5 seconds delayed in drop-out at the cessation of the carrier wave received (depending upon the squelch adjustment).

When reception of the digit tone signal ceases, the S relay will, on account of the squelch signal, be released a little later after cessation of the output signal from the activated tone receivers (output from TR681a is approx. 100 ms delayed in cessation).

When the S relay is released, 0 volt is applied from HU-5 to SU/03-6 whereby transistor Q1 goes OFF, and 0 volt to SU/02-4 and 5 disappears whereby Q4 and Q5 go OFF. Blocking of Q6 ceases, and C3 is discharged through the base circuit of Q6.

Q6 becomes conductive for about 30 ms. This 0 volt pulse is fed from terminal 1 (start IMP, SU) via RP/01-13, n 9-8, strapping "AUT." and RP/01-16 to PG680-2003/01, terminal 2 (start IMP). The pulse starts an astable multivibrator whose pulses correspond to the number pulsation brought about by dialling an ordinary telephone apparatus. Regarding exchange types with 10 Hz number pulsation, the nominal value of the break pulses is 66 ms and of the connecting pulses 34 ms.

The pulses from PG/01-3 pass to RP-29 where relay I is activated for periods of 66 ms with intervals of 34 ms.

At the same time as number pulsation is started, -24 volts from PG/01-7 is fed to RP-2, whereby the P relay is, and remains, operated during the entire number pulsation. The contacts p11-12 and p14-15 disconnect C4's capacitive load of the pulsation circuit (contact i5-7 and R2) and short-circuit the two coils a-b and c-d of T1 so that a pure Ohm loop is established to the PABX and at the same time is achieved muting of pulse noise from the transmitter of the base station.

During the tone signal reception time for the digit transmitted (in this example digit 7), a total of four 0 volt signals were fed from two of the tone receivers to the pulse counter FF680-2003/02.

FF/02 consists of four flip-flop circuits connected in such a way that they form a 4-bit binary counter. Each flip-flop stage has also two preset inputs which are used to set each of the bistable stages in one of the two possible positions. The register can thus be set in 16 different positions.

The 10 positions are used for the registration of the 10 digits at four 0 volt signals from the 7 tone receivers, whereas an 11th position is applied via a diodematrix in order to give stop signal to the pulse gene-

rator PG680-2003/01.

Regarding this example where digit 7 is used, 0 volt was fed from the tone receiver for the tones "4" and "6" to FF/02, terminals 8 (A-1), 10 (A-2), 3 (B-3) and 4 (B-4). Measured on the four flip-flop B terminals, the binary digit '1100' will thus be registered.

The binary counter will be in the following positions on reception of the 10 digits:

DIGIT	0	9	8	7	6	5	4	3	2	1	STOP
B-1	0	1	0	1	0	1	0	1	0	1	0
B-2	0	0	1	1	0	0	1	1	0	0	1
B-3	0	0	0	0	1	1	1	1	0	0	0
B-4	0	0	0	0	0	0	0	0	1	1	1
Tone 1	"1"	"2"	"0"	"4"	"1"	"2"	"0"	"4"	"1"	"2"	
Tone 2	"6"	"6"	"6"	"6"	"7"	"7"	"7"	"7"	"8"	"8"	

It will be seen that tone 1 determines the positions of FF1 and FF2, whereas tone 2 determines the positions of FF3 and FF4. It will also be seen that stop signal is obtained when both B-2 and B-4 are logic 1 (-6, 8 volts).

When PG/01 received the start pulse to terminal 2, the bistable stage (Q1 and Q2) was operated, which caused the P relay in RP and the R relay in RP/06 to be activated. The astable multivibrator (Q4 and Q5) starts by voltage from Q2 via R10 and the zenerdiode E7.

In addition to the I relay in the interface panel, the pulses are also fed to the counter register terminal 4 (Count, IMP). Each counter pulse received causes the binary information of the counter register to move one position (to the right on the schedule).

When the B terminals of the counter after the latest number pulse is in the position '0101', none of the diodes E10 and E11 in FF/02 will be conductive. In PG/01 this fact causes the blocking of the transistors Q9, Q8 and Q3 to cease with the result that they go ON and thus cause Q1 and Q2 to go OFF. The pulsation has thus ceased. The P and R relays are released.

Number pulsation of a digit to PABX has thus been accomplished, and the next digit may be fed from the mobile station. To indicate to the mobile

operator that the number pulsation to the exchange has been completed and that the radio connection has not been disconnected during the signalling period, a "receipt signal" to this effect should be transmitted to the mobile station.

As described above, digit 1 was registered in the register RP/09 (3'), the two tones causing output signal from the tone receiver to be emitted. During the number pulsation, contact i9-8 will feed break pulses to the I relay RP/06. The pulses are registered in RP/09 (4'). After the last pulse, a sequential tone signal is emitted consisting of the permanently selected 1st tone.

Further are transmitted the 2nd and 3rd tones equal to tone "1" as well as the 4th tone equal to the digit emitted to the telephone exchange. The signal transmitted indicates to the mobile operator that the next digit can be transmitted. The signal is heard in the loudspeaker and may at the same time give lamp indication. If the digit acknowledgement signal is not received, a lamp can be caused to indicate faults (as in CB601-2003/01).

As the acknowledgement signal conveys information as to which digit was transmitted to the telephone exchange, the mobile equipment may be so designed that it can control number pulsation done correctly. In practice, however, this has proved unnecessary (ref. the municipality of Frederiksberg).

When all digits for the subscriber number have been transmitted the usual ringing signal from the telephone exchange will be heard at the mobile station.

The connection is switched off in the following way: the mobile station transmits the clear down tone signal by pressing the X button. Thereby -15 volts is fed to the terminals 5 and 6 of SU/04. The transistors Q3 and Q4 go ON, which causes 0 volt to be applied from terminal 3 (Stop, DU) to DU/1-3. The relay T in RP680-2003 is released; thereafter the relay B and the remaining switched on functions are released.

0 volt from transistor Q3 in SU/04 is, via E4, fed to the blocking of Q1. By this, 0 volt disappears from terminal 1, and is - via the s-contact in HU - applied to terminal 6 (start 3) in DU/1. Thereby is removed the start and reset signal which is being fed to DU/1 in connection with each mobile carrier wave received.

If the mobile station does not transmit a disconnection signal, the time unit DU680-2002/1 will give automatic disconnection if no mobile carrier wave is received within a certain period. This period is adjustable in DU/1 and ranges between approx. 8 to 70 seconds.

Mobile-to-mobile call.

Transmission of the double tone combination "2" + "4" initiates a mobile-to-mobile call. From the corresponding two tone receivers is applied -15 volts to the terminals 1 (TR-1) and -7 (TR-4) of RP680-2003/01, the latter constituting the starting circuit for M-M number selection.

The transistors Q1 and Q2 go ON with the result that relay N operates. 0 volt from Q1c is, via E6 and terminal 9 (start 2, DU), fed to DU/1-5. From DU/1-2, 0 volt is applied to RP-30 where relay T operates. The B relay is activated by contact t6-7, and the relay I in RP/06 is activated by 0 volt from terminal 16. Contact b15-16 feeds 0 volt to RP/06 for resetting of the counter circuits of the registers RP/09. Contact b10-9 feeds -24 volts to CR681 for line current of 1,8mA.

0 volt from contact b6-7 is fed from terminal 26 to RP/01-12 (M-M) via n15-16 for the operation of the relay N when the call signal disappears.

Via contact n13-12 and terminal 4, -24 volt is fed to RP-1 thereby causing the M relay to be activated. The contacts m9-10 and m6-7 establish connection from the PABX line direct to the A relay and, via C2 and C5, to the transformer terminal of the engaged tone transmitter. The transformer is placed in the unit SU680-2003/03 and is not switched on until contact n9-10 in RP/01 (M-M) is connected. See level diagram D114094.

If a subscriber makes a call to the radio system while this is being used for a mobile-to-mobile call, the A relay will operate a loop (voltage) connection being established from the PABX to the interface panel of the TE.

From RP/01-5, -24 volts is applied to RP-17. As the A relay operates, -24 volts is, via contact a6-7 and terminal 18 (-24 volts, Engaged gen.), applied to the engaged tone transmitter TT680-2003, terminal 3. From TT3-1, an engaged signal (intermittent 425Hz tone signal with tone length = 175 ms and pause length = 470ms) is, via T1 in SU/03 and via the interface panel, fed to the connected subscriber.

As also appears from the level diagram, the audio transformer in the interface panel is terminated with 560Ω by connecting an n-contact in RP/01 (m-M).

After call from the mobile station, a dialling tone signal is transmitted from the terminal equipment of the base station. The dialling tone transmitter is started, 0 volt being fed from terminal 10 in RP/01 (M-M) to TT680-2002, terminal 4. Relay M in RP/680-2003/03 is activated at -24 volts from TT2-5. The signal is fed to the modulation input of the transmitter as will be seen from the level diagram.

After reception of the dialling tone, selective calls can be made from the mobile station to the desired mobile station by transmitting the latter's 2-digit call number.

On reception of the first digit tone combination, digit 1 will not, as is the case in connection with telephone subscriber number selection, be registered in the register for the 3rd tone of the sequence code.

The pulse produced in SU/02 on reception of a digit tone combination is blocked by 0 volt from RP/01-11 (0 volt, IMP, block). RP/09 (3') will thus register the number of pulses received from PG680-2003/01 after activation from SU/02-1.

After reception of the second digit signal, the pulses for the digit concerned will be registered in the register RP/09 (4').

On cessation of the digit pulsation, the registered sequential tone signal is automatically transmitted, and the registers are cleared down.

Dialling tone signal was stopped at -24 volts from RP/06-14 (dialling tone stop) when the first digit pulse was produced.

Conversations are conducted in semiduplex (simplex operation with repetition via the base station) irrespective of whether the mobile stations are equipped with radio equipment for two-frequency simplex or duplex operation.

The repeater functions were, in connection with the base station call, incorporated in the control panel CP680-2003 of the base station by -24 volts from RP/01-3 being fed to CR681, terminal 2. The current in line 1 was thus 7mA. 7mA to DA680-6232/01 in CP produces 0 volt from DA680-6232/20, terminal 6, whereby relay R in RP680-2003/04 is activated.

On reception of speech from a mobile station the signal is, via a 20dB attenuator and an s contact, fed to the modulation input of the transmitter, thereby causing the signal to be transmitted to another mobile station. (See diagram for CP680-2003, D113699, and the level diagram D114055).

The call is terminated either by one of the operating mobile stations by pressing the X button, or, automatically, after the lapse of a certain period during which no carrier wave from the mobile stations is received.

Automatic number selection for pre-selected subscribers.

Transmission of the tone combination '1' + '4' initiates mobile calling. In TE680-2003, -15 volts is. from the two corresponding tone receivers TR6811a, terminal 2, fed to the starting circuit for automatic number selection, RP680-2003/01, terminals 1 and 7.

In RP/01, Q1 and Q2 go ON, which causes relay N to operate. From Q1c, 0 volt is - from terminal 9 and via E6 - fed to DU/1-5 (start 2). The time delay unit DU/1 is activated, causing the relays T and B in RP680-2003 to become activated.

As is the case in connection with individual number election calling, the transmitter of the base station is keyed, and a dialling tone is received from the PABX exchange.

In RP/01 (aut.) relay N remains operated at 0 volt to terminal 12 via contact n15 16. From terminal 11, 0 volt is applied for the blocking of the break pulse from SU/02 the break pulse being produced on reception of the tone signal for digits. From the terminal 10 0 volt is applied to RP/06-1 in such a way that the automatical number pulsation transmitted to the exchange will not cause the relay I in RP/06 to pulse. Contact n13-12 feeds -24 volts to the diodes E1 and E2. -24 volts from terminal 5 is applied to the pause time unit TU680-2003, terminal 4 (TU, clear), and from terminal 4 -24 volts is fed to the relay panel RP680-2003/02 terminal 22 (hold minus)

When the PABX dialling tone has been received by the mobile station, the digit key corresponding to the number of the subscriber called is activated.

As an example let us suppose that activation of the digit key 7 is to give number pulsation for subscriber No. 234. From terminal 5 of the tone receivers TR6811a for tone "4" and tone "6", a 0 volt signal is applied to the terminals 17 and 21 of the subscriber selector register RP/02. In RP/02 the relays R4 and R5 are activated. The relays remain operated 0 volt from contact r5, 6-7 via E15 to the relay -5 and on from the contacts r5, E25, f1, r2, r3 and r4 to r3 and r4 to relay -R4.

Contact r5, 9-8, breaks 0 volt to terminal 1 (reset) leading to the diode matrix NU/01 terminal 2. From the diode matrix, four 0 volt signals are received from the terminals 4, 6, 7 and 5, resulting in binary combinations for stop signal to the pulse counter FF/02, the tone signal for the digit transmitted ceasing.

Contact r5, 9-10 in RP/02 feeds 0 volt, via three r-contacts and r4 6-7 to terminal 12 (subscriber 7). From there, 0 volt is applied to NU680-

2003, terminal 11. At NU a voltage of approx. 5,6 volts is produced via R17. Thereby the electrolytes C7, C17 and C27 are charged to approx. 5 volts.

When the S relay in HU is released shortly after cessation of the digit tone signal, the transistor Q1 in SU/03 is blocked. From SU/02-1 an approx. 30ms 0 volt pulse is obtained, which, via RP/01-13 (aut.) and RP/01-14 (aut.), is fed to TU680-2003, terminal 2 (pause start, SU).

From Q1 and Q2 in TU, forming a monostable flip-flop, a pulse of the duration of approx. 0,5 second is obtained. The pulse is fed to the pulse counter FF680-2003/01, terminal 12 from TU-7. FF/01 contains two bistable flip-flops connected as a binary counter with 4 positions. To the counter are connected four transistor-gate-terminals controlled by a diode matrix.

On reception of the first counter pulse 0 volt from Q1c is fed to terminal 7 (1', preset), which is connected to NU680-2003, terminal 2. When approx. 0,4 volt is applied to the anode of E7, the potential of the negative side of the electrolyte C7, which is charged to approx. 5 volts, will be approx. -1 volt. The potential of the positive side of C7 measured in relation to the 0 volt potential will then be approx. +4 volt. The diode E17 will then conduct and discharge C7 through the circuit connected to terminal 1', subscriber 7.

This terminal is by strapping connected to the terminal '2' (decimal digit 2, preset) of NU680-2003/01. In the diode matrix, the applied positive pulse is converted into 4 positive positive pulses which are fed to 4 preset inputs of FF/02 now registers the binary information which will cause the counter to release a stop signal to PG/01 after reception of 2 counter pulses.

As the 0,5 second pulse from TU ceases, a 0 volt pulse from TU-5 (start, PULSE) of the duration of approx. 30ms is obtained. Via RP/01-15 (aut.) contact n6-7 and RP/01-16, this pulse is fed to PG/01-2 (start, pulse).

This starts the number pulsation of the first digit of the extension number in this case, as an example, being 234. Two pulses are fed to the PABX exchange (I-relay) and, as counter pulses, to FF/02. After two pulses, PG/01 is stopped by FF/02 which causes the pulsation to cease.

In RP680-2003 the P relay is released. Contact p8-9 feeds 0 volt to terminal 3 (pause, start, P), leading to TU-5. While the P relay was operated, C1 was charged through R1 and E11. While applying 0 volt to the diode E2, C1 is discharged through E3. The pulse thus produced activates the monostable stage consisting of Q1 and Q2. This, in its turn, produces a

pulse of approx. 0,5 second.

This pulse is fed to FF/01, which counts one step ahead. From FF/01-3 a pulse is fed to NU-3 (2' preset). The electrolyte C17 is discharged, and the pulse thus produced is, via a strapping from terminal 2', subscriber 7, fed to terminal 3' of the diode matrix NU/01. Binary information is fed to FF/02 for the reception of 3 number pulses.

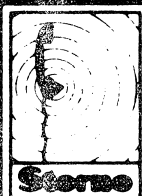
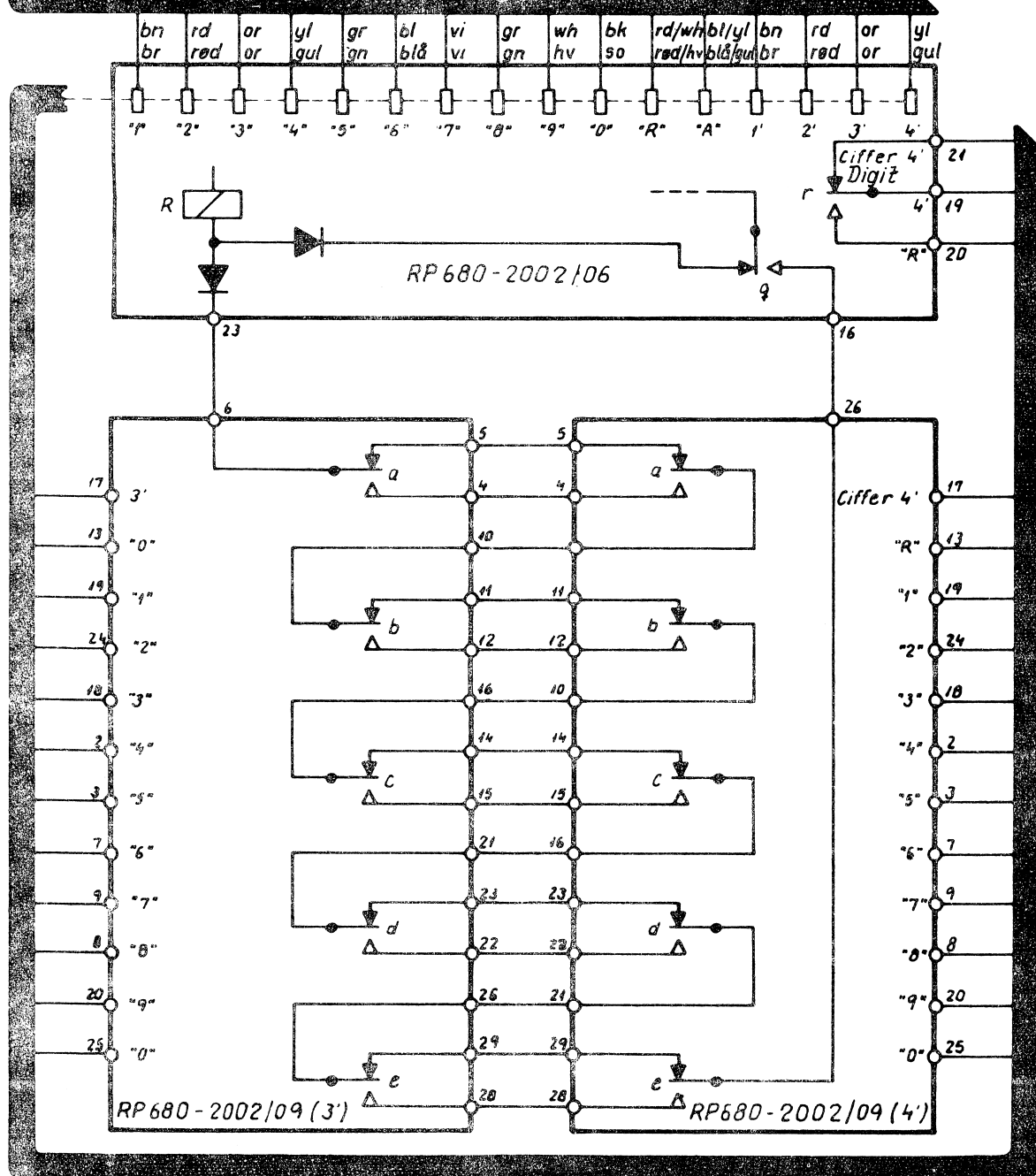
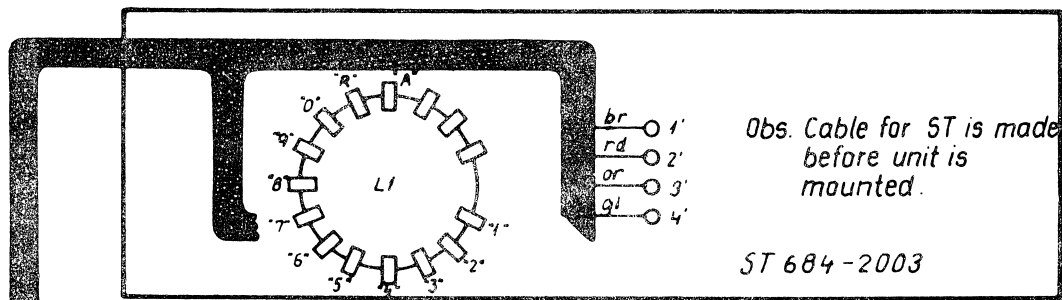
At the cessation of the 0,5 second long pause signal, the number of the 2nd digit of the extension number is started. Regarding the example dealt with here, another pause pulse is obtained after 3 number pulses. Then 4 pulses are obtained, and at the subsequent pause signal, the pulsation-stop-information from FF/01-5 is read to NU/01-2 (4' preset), and from there, binarily, to FF/02.

As the pause after the 3rd digit ceases, the pulse transmitter PG680-2003 /01 will not - during the release of the P relay in RP - be activated, since stop signal from FF/02 is being received at the same time.

In case the automatic number selection consists of less than 3 digits, a strapping must be established from the last "digitless" strap terminal of NU to NU/01, terminal 'STOP'. See example on the diagram for NU680-2003, D111665, and the example on the function diagram D114034.

During the entire number pulsation period, including the pause periods, the R relay in RP/06 is operated so that the modulation path to the transmitter of the base station is blocked for pulsation noise.

After the extension number selection automatically made, a ringing signal is heard in the usual way from the PABX. The conversation is disconnected either, in the usual way, by pressing the X button of the mobile box, or, automatically, after a certain period fixed in advance during which no mobile carrier wave has been received.



konstr. Regn.
06/AMM
7 8 69
godk.
06
komp. liste

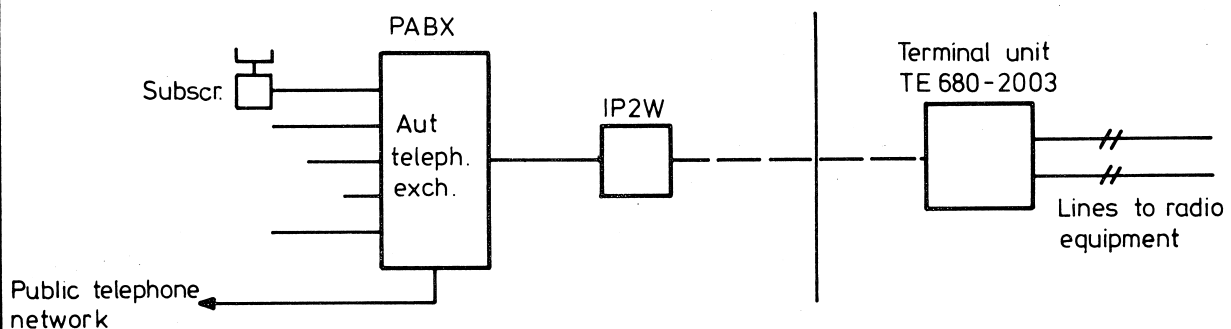
CABLING SCHEMATIC DIAGRAM FOR CHECK
OF IDENTICAL DIGITS IN RP/09, AND FOR
TONE TERMINAL CONNECTIONS FROM ST 684-2003
CAF 680-2002/2003

KODE

TEGN. NR
D113267E
A 4

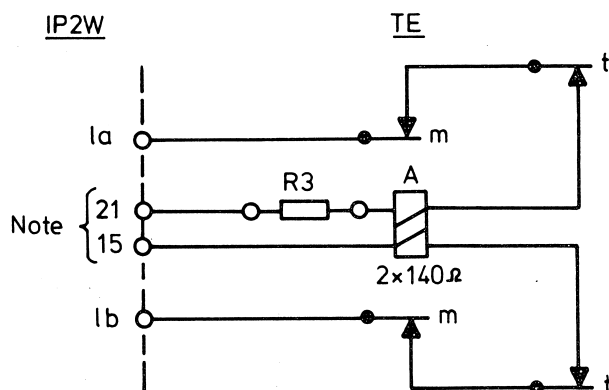
Specifications for interface panel for 2 way dialling through to be connected between an automatic telephone exchange (PABX) and Storno terminal unit TE680-2003.

In order to connect the fully automatic radio telephone system CAF680-2003 with an automatic telephone exchange, an interface panel for 2-way dialling through (in the following: IP2W) must be inserted between the telephone exchange and the terminal unit TE680-2003 (in the following: TE). The type of IP2W to be used depends on the telephone exchange in question.



The in- and output functions from the TE680-2003, depending on the call direction, described in the following paras are intended for use as a guide when a proper IP2W has to be selected or designed.

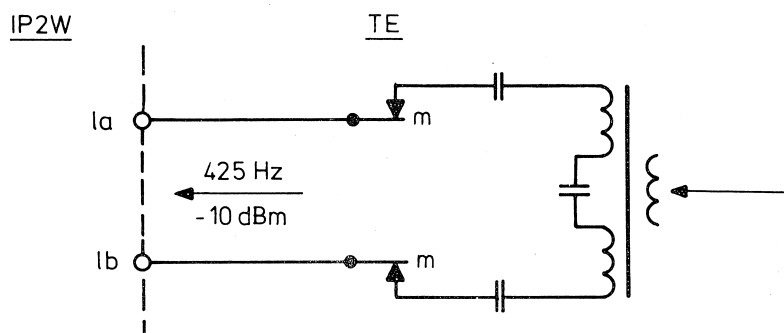
1. Calls from PABX-subscriber to mobile station.
 - 1.1 The telephone subscriber dials the extension number for the radio terminal.
The P2W must close a loop or supply a voltage across la/lb towards the TE.



Note:
R3 is selected for
I relay_A = 22 mA.
Terminals 21 and
15 may be strapped
or connected to 0 V
and -24 V respec-
tively.

After the call to the radio terminal has been accepted by the TE, the PABX must allow dialling pulses to pass on to the TE.

- 1.2 The dialling tone from the TE is fed to the IP2W.



- 1.3 The telephone subscriber dials the 2-digit number of the mobile station by means of a normal dial telephone set. The dialling tone from the TE ceases.

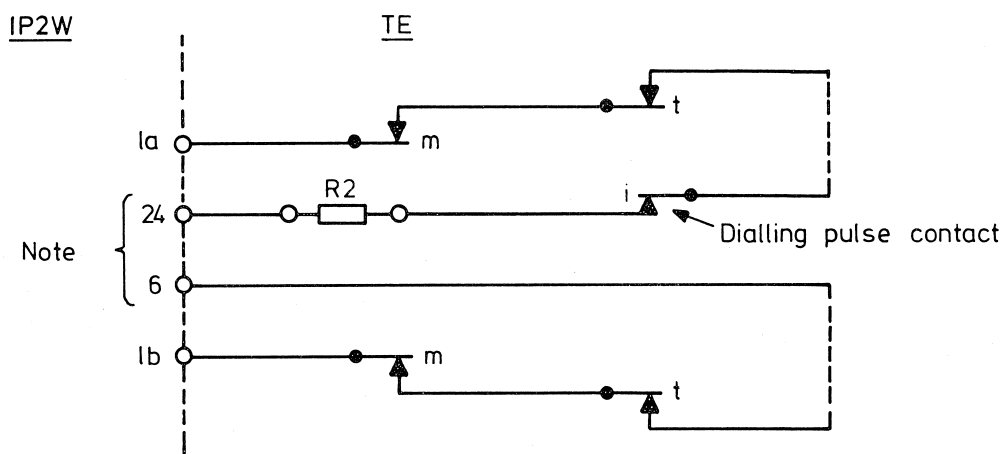
- 1.4 Switching off an established connection.

- 1.4.1 The telephone subscriber places the handset on its cradle and the loop will be disconnected, the DC voltage will be switched off.

- 1.4.2 In case of exchange types where switching off is possible, when a short interruption in the line circuit takes place, the mobile station may switch the established connection off.

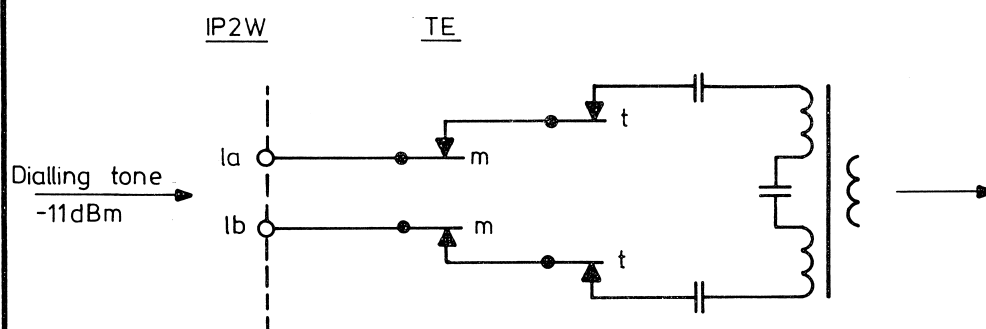
2. Calls from mobile station to PABX subscriber.

- 2.1 A "lifting the handset off the cradle" signal is sent towards the IP2W.



Note: Depending on the type of IP2W the terminals 6 and 24 are either strapped or connected to a voltage source (eventually from the PABX). R_2 is selected to achieve the nominal line current for the dialling relay in the IP2W.

- 2.2 A dialling tone from the telephone exchange is fed to the TE and is transmitted to the mobile stations.



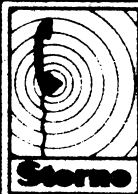
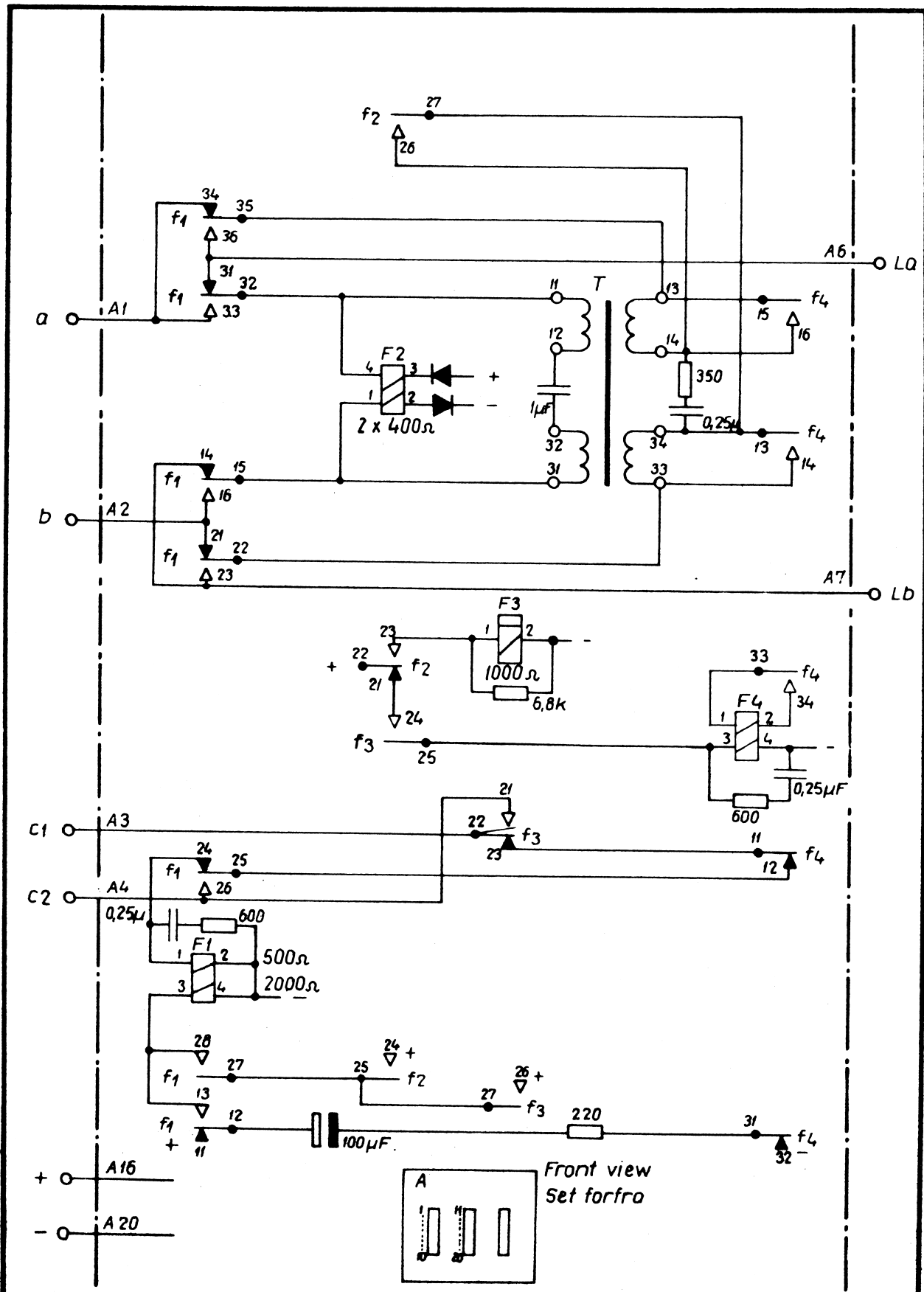
- 2.3 Dialling pulses are transmitted from the TE towards the IP2W (relay contact Δ opens and closes. Consult fig. in para 2.1).
TE dialling pulses towards IP2W 10Hz, 66 ms off period, 34 ms on period measured with pure resistive loop. In the IP2W the dialling relay must be deenergized when line current is in the off period.
- 2.4 The ringing signal which is transmitted from the telephone exchange towards the telephone subscriber should also be transmitted towards the TE in order to inform the mobile calling party that ringing takes place.
- 2.5 Switching off the established connection from the mobile party releases a "line switching off" signal.
3. Calls from mobile station to the public telephone network.
- 3.1 As para. 2.1.
- 3.2 As para. 2.2.
- 3.3 The mobile station transmits a tone signal which in TE is converted to the dialling of one digit towards the telephone exchange (consult para

2.3). This particular digit may not be used as the first digit in the subscriber numbers for the PABX f.i. "1". If this digit is dialled initially in a call, a connection is established towards the public telephone network.

- 3.4 A dialling tone from the public telephone exchange is fed to the TE and is transmitted towards the mobile stations.
- 3.5 The dialling pulses are transmitted from the TE, through the IP2W and to the public telephone exchange (as described in para 2.3).
- 3.6 The ringing signal is transmitted towards the public telephone subscriber and to the mobile calling party as described in para 2.4.
- 3.7 Switching off the established connection: consult para 2.5.

4. Mobile to mobile calls.

If a mobile to mobile call is established a busy signal, consisting of a 425 Hz tone signal, transmitted in 175 ms followed by 470 ms intermission, with a level of -10 dBm, is transmitted towards the IP2W.



konstr. Zeichn.
06 / 80
24. 6. 69
godk.
komp. liste

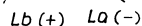
FDR-X (BCL12507) INTERFACE PANEL FOR
2-WAY DIALLING THROUGH.
FOR USE BETWEEN LME PABX TYPE
ARD 624 AND TE 680-2003

(LME DRWG. 365471)

TEGN. NR.

D113227E

A4

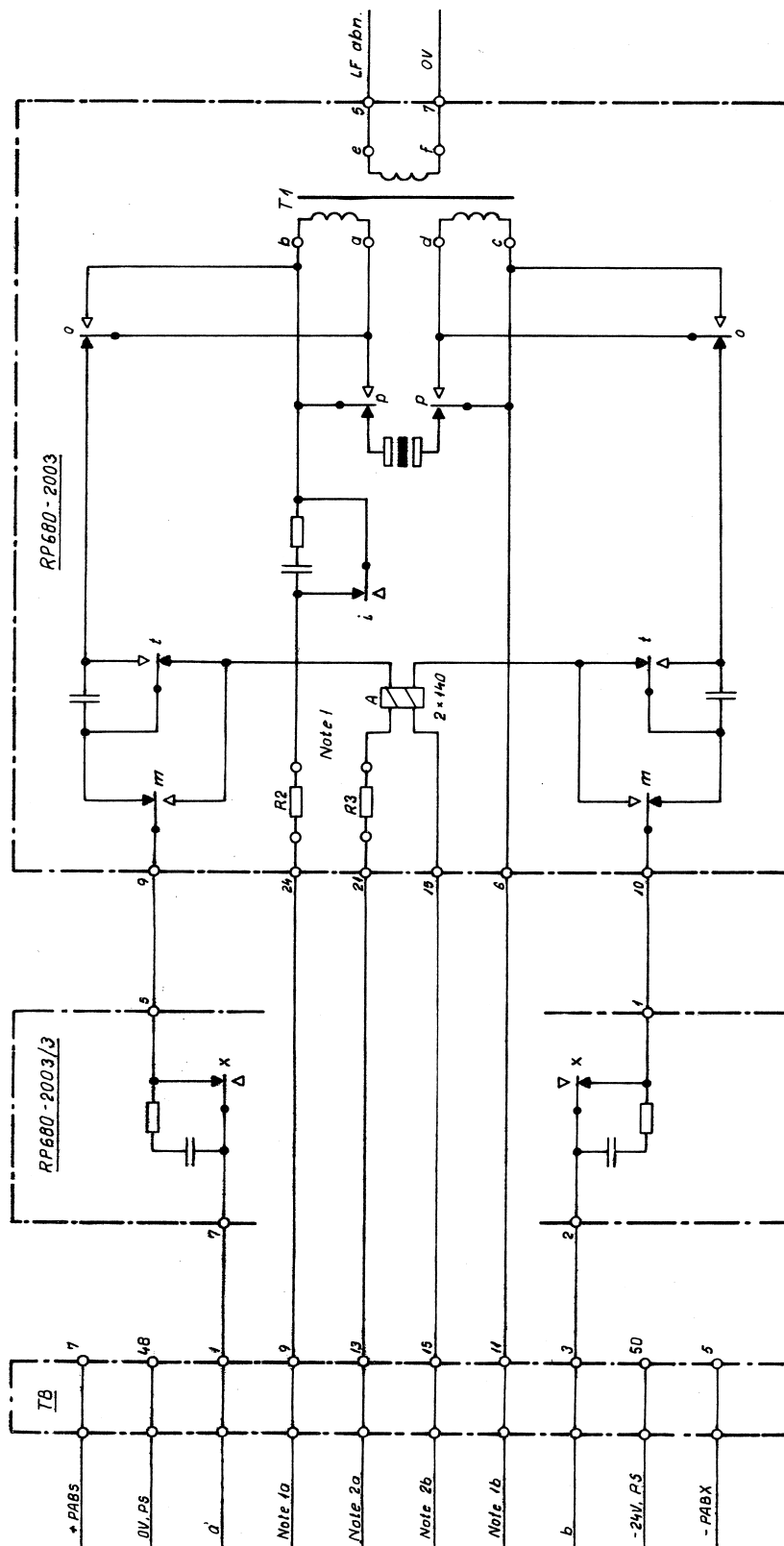


konstr./tegn. 06 / 80 31.7.68	godk.	
		komp.liste

FLR (BC 2730) INTERFACE PANEL FOR 2-WAY
DIALING THROUGH FOR USE BETWEEN STORNO
VAB PABX AND TE680-2003.
FLR (BG 2730) DOBBELTRETET OVERDRAGER FOR
FORBINDELSE MELLEM STORNO VAB PABX
OG TE680-2003
LME 254779

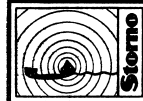
TEGN. NR.

D 113228
A 3



See drwg.
 Se tegn. for: TB 680-2003 : DH2867
 RP 680-2003/3 : DH1874
 RP 680-2003 : DH1381

Note 1: See the resistor value on diagram in question central type.
 (de angivne værdier er max.-værdier).
 (The indicated values are max. values).

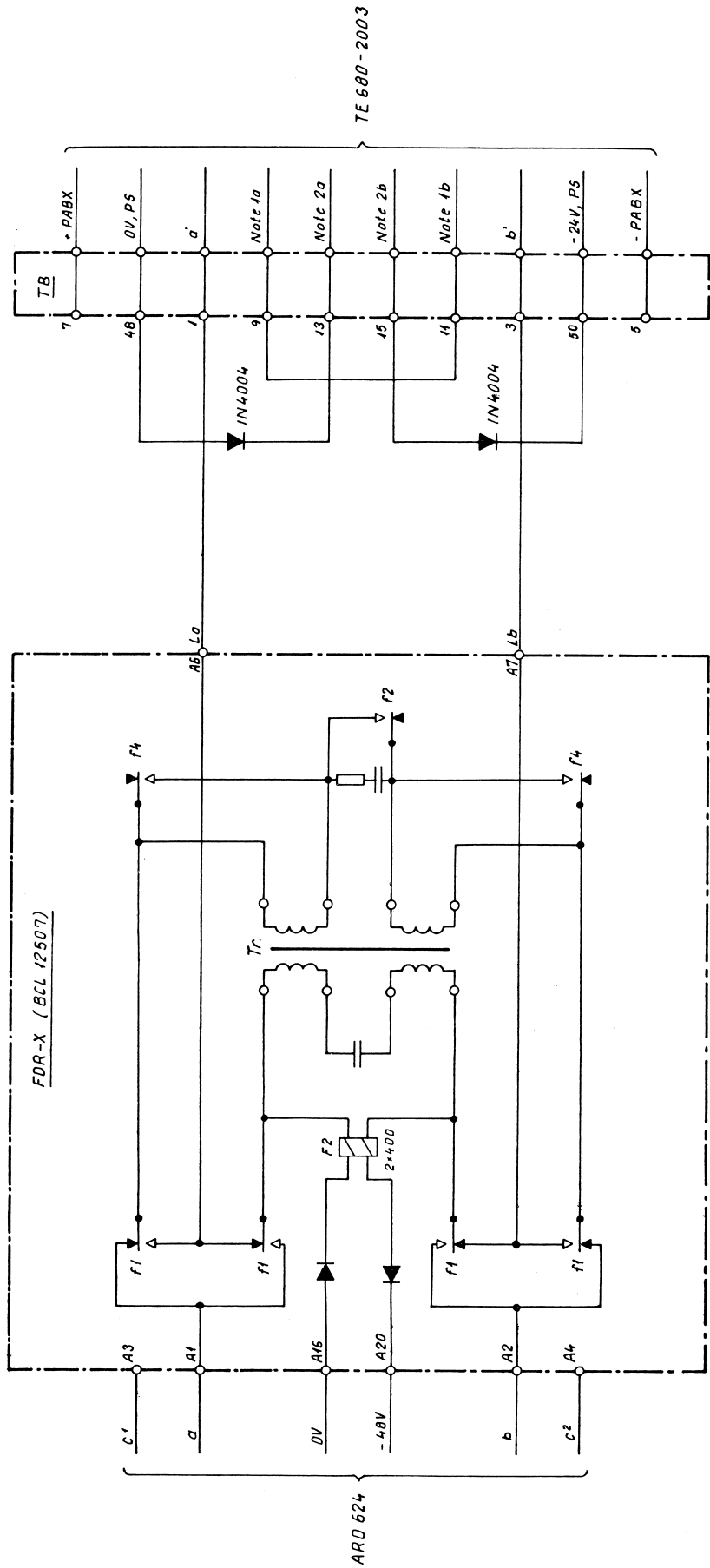


Kontakthjælp
 1. 4. 6. 9.
 godk.
 Komp. liste

FUNCTION DIAGRAM
 FUNKTIONSSKEMA
 OVER TELEFON / RADIOOVERDRAGER /
 TE 680-2003 CAF 680-2003
 OF TELEPHONE / RADIO TERM. INTERFACE

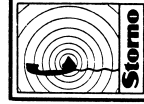
TEGN. NR.
 D112865
 A3

Outgoing call : $F1 \rightarrow F2 \rightarrow F3$ [$F2$ (impulser) $\rightarrow F4$ (holds during impulsing)]
 Incoming call : Loop from RP, TE $\rightarrow F2 \rightarrow F3$ (breaks for $F4$) [\quad]
 Udgående opkald : $F1 \rightarrow F2 \rightarrow F3$ [$F2$ (impulser) $\rightarrow F4$ (holder under impulsering)]
 Indgående opkald : Sløjfe fra RP, TE $\rightarrow F2 \rightarrow F3$ (bryder for $F1$) [\quad]



Se tegn. for : LME PABX : LME 363972
 LME-FDR-X : LME 365471
 TB680-2003 : D112867
 T/R term.interface : D112865/
 TR overdager : D112865.

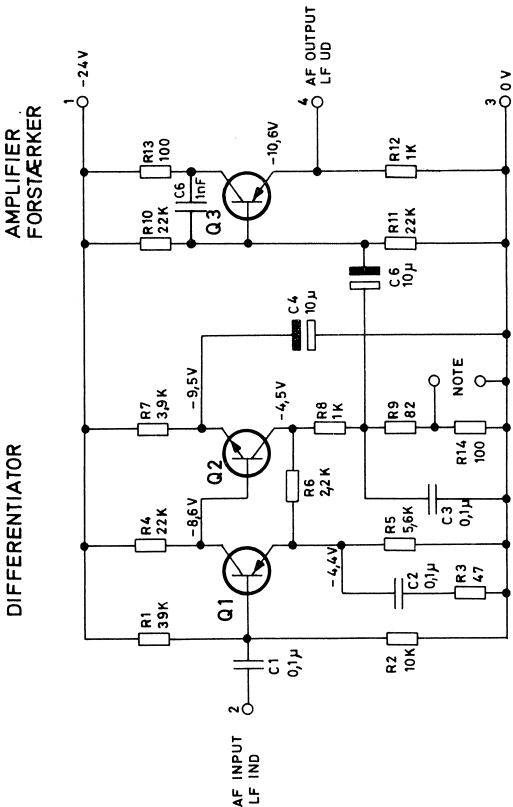
Note 1 : 1 RP680-2003 er $R2 \leq 1060 \Omega / 1/4 W (1k\Omega)$
 $R3 \leq 620 \Omega / 1/4 W (560 \Omega)$



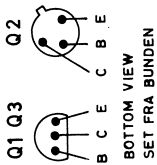
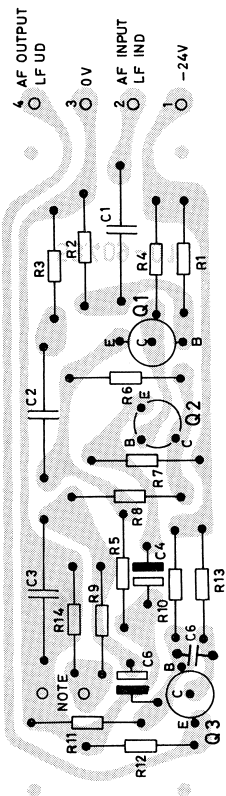
FUNCTION LAY-OUT, CONNECTION OF LME PABX TYPE ARD
 624 VIA TERMINAL INTERFACE FOR-X (BCL 12507) TO
 TE680-2003. CAF680-2003
 FUNKTIONSSKEMA OVER TILSLUTNING AF LME PABX
 TYPE ARD 624 VIA OVERDRAGER FOR-X (BCL 12507) TIL
 TE680-2003. CAF680-2003

Konstr./tegn.
 DG/AMM
 1. 4. 6. 9.
 godk.
 komp. liste

TEGN. NR.
 0112865
 A3



PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



AF-AMPLIFIER
LF-FORSTÆRKER

AA6811

D400.867/3

Storno

TYPE	NO.	CODE	DATA
	C1	76.5073	0, 1 μ F 10% polyester. TB
	C2	76.5073	0, 1 μ F 10% TB
	C3	76.5073	0, 1 μ F 10% TB
	C4	73.5109	10 μ F 20% tantal
	C5	73.5109	10 μ F 20% tantal
	C6	74.5155	1 nF - 20 +80% ceram PL
	R1	80.5268	39 k Ω 5% carbon film
	R2	80.5261	10 k Ω 5% "
	R3	80.5233	47 Ω 5% "
	R4	80.5265	22 k Ω 5% "
	R5	80.5258	5.6 k Ω 5% "
	R6	80.5253	2.2 k Ω 5% "
	R7	80.5256	3.9 k Ω 5% "
	R8	80.5249	1 k Ω 5% "
	R9	80.5236	82 Ω 5% "
	R10	80.5265	22 k Ω 5% "
	R11	80.5265	22 k Ω 5% "
	R12	80.5249	1 k Ω 5% "
	R13	80.5237	100 Ω 5% "
	R14	80.5237	100 Ω 5% "
	Q1	99.5144	Transistor BC214
	Q2	99.5143	Transistor BC108
	Q3	99.5144	Transistor BC214

Storno

TYPE	NO.	CODE	DATA

AF AMPLIFIER
LF FORSTÆRKER

AA6811

X400.877/2

AF-Amplifier AA6811

Description.

AF-amplifier type AA6811 is designed for use with one or more tone receivers type TR6811.

Type AA6811 is a 3-stage amplifier, the two first stages of which are DC-coupled and serve to compensate for the de-emphasis in a conventional receiver (phase modulation). These stages also limit the amplitude of signals fed to TR6811 to a value of not more than 7dB above the normal trigger level.

Frequency compensation is accomplished through negative feedback in the stages. C2 emphasizes frequencies on the RC-principle with $f_0 = 1$ kHz. C3 and R3 reduce amplification of frequencies above the operating range of the tone receiver.

The amplitude is limited in Q2, and a tapping on the collector resistor provides a suitable output level. The magnitude of this level will depend upon the type of the following receiver, whether it is designed for single-tone or double-tone handling. When single-tone handling is chosen, R14 shall be strapped.

The 3rd stage is an emitter follower, which provides the low output impedance of approx. 4Ω , which is required to match the coil filter in the input of the tone receiver.

AA6811

Specification.

	<u>Typical values at 24V</u>
1. <u>Input impedance:</u>	6k Ω .
2. <u>Output impedance:</u>	4 Ω .
3. <u>Frequency response</u>	
Amplification increases with frequency within the range 1000-3000Hz according to a RC-function with a transition frequency about 1000Hz.	
4. <u>Gain at 1000Hz</u>	
With strapping (single tone)	-18dB.
Without strapping (multi-tone)	-11dB.
5. <u>Max. output voltage:</u>	345mV.
6. <u>Max. output power:</u>	30mW.
7. <u>Current drain:</u>	17mA.
8. <u>Temperature range</u>	
Working range:	-25° to +50°C.
Operating range:	-30° to +60°C.
9. <u>Dimensions:</u>	80 x 24mm.

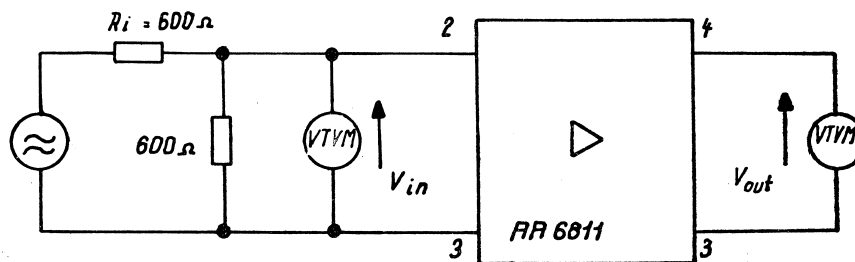
AA6811

Test Instructions.

1. Instruments required.

- 1 ea power supply unit 24V (25mA).
- 1 ea VT-voltmeter (PH-6012).
- 1 ea tone generator (HP-200cd).
- 1 ea resistor 600Ω , $1/8W$.

2. Test Set-up.



3. Measurements and Test.

3.1 Testing of amplification (single-tone)

Strap R14 and adjust V_{in} at 1000Hz to 550mV. Measure V_{out} and remove strapping over R14.

Requirement: $V_{out} = 75mV \pm 1dB$.

3.2 Testing of amplification (multi-tone).

Adjust V_{in} at 1000Hz to 550mV. Measure V_{out} .

Requirement: $V_{out} = 165mV \pm 1dB$.

3.3 Testing of frequency response (single-tone).

Strap R14 and adjust V_{in} to 70mV. On the amplifier output measure the deviation relative to 1000Hz in the range up to 3000Hz.

Requirement: See enclosed graph paper I.

3.4 Testing of frequency response (multi-tone).

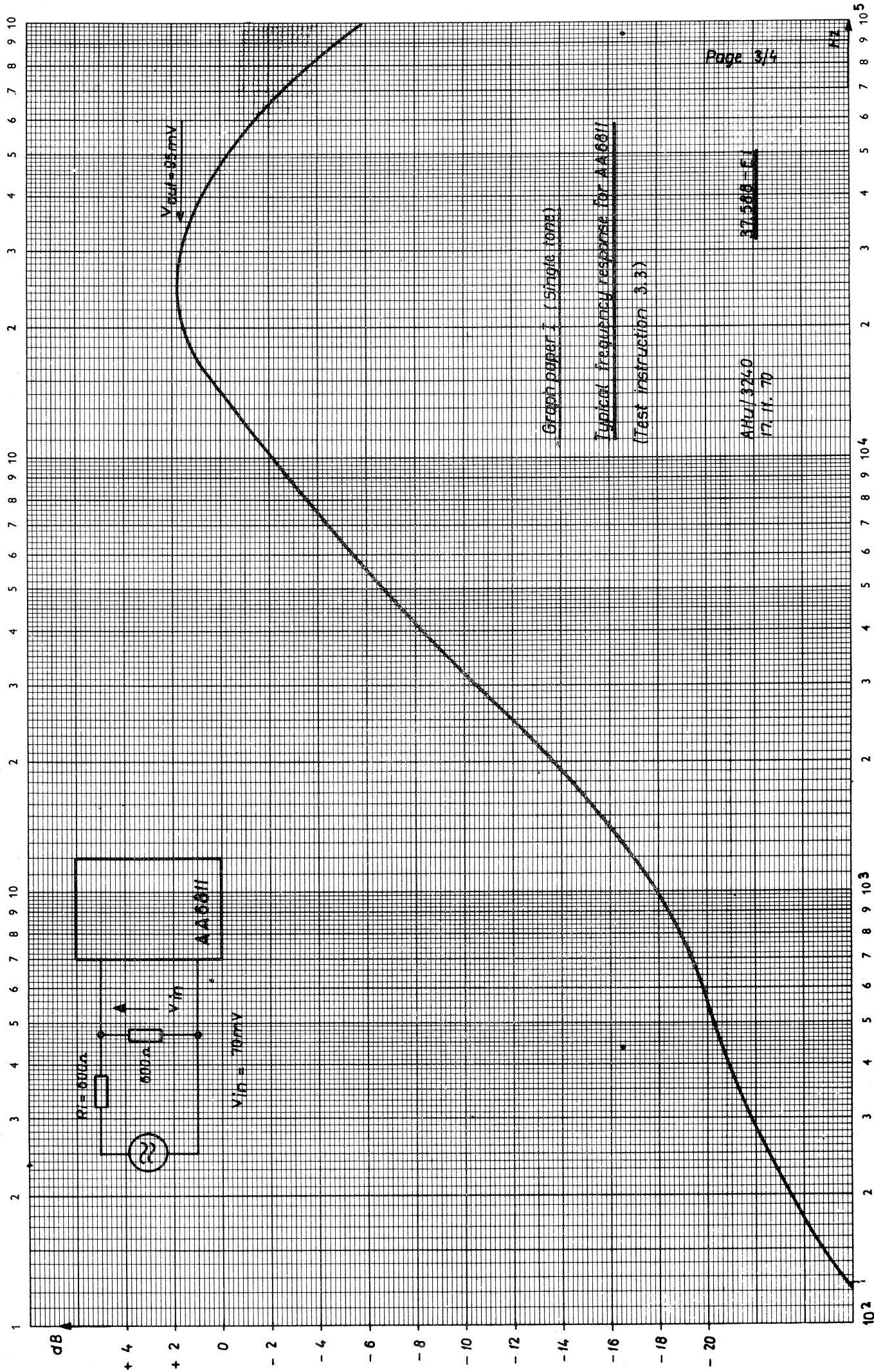
Remove strapping across R14 and adjust V_{in} to read 85mV. On the amplifier output measure the deviation relative to 1000Hz within the range 1000 to 3000Hz.

Requirement: See enclosed graph paper II.

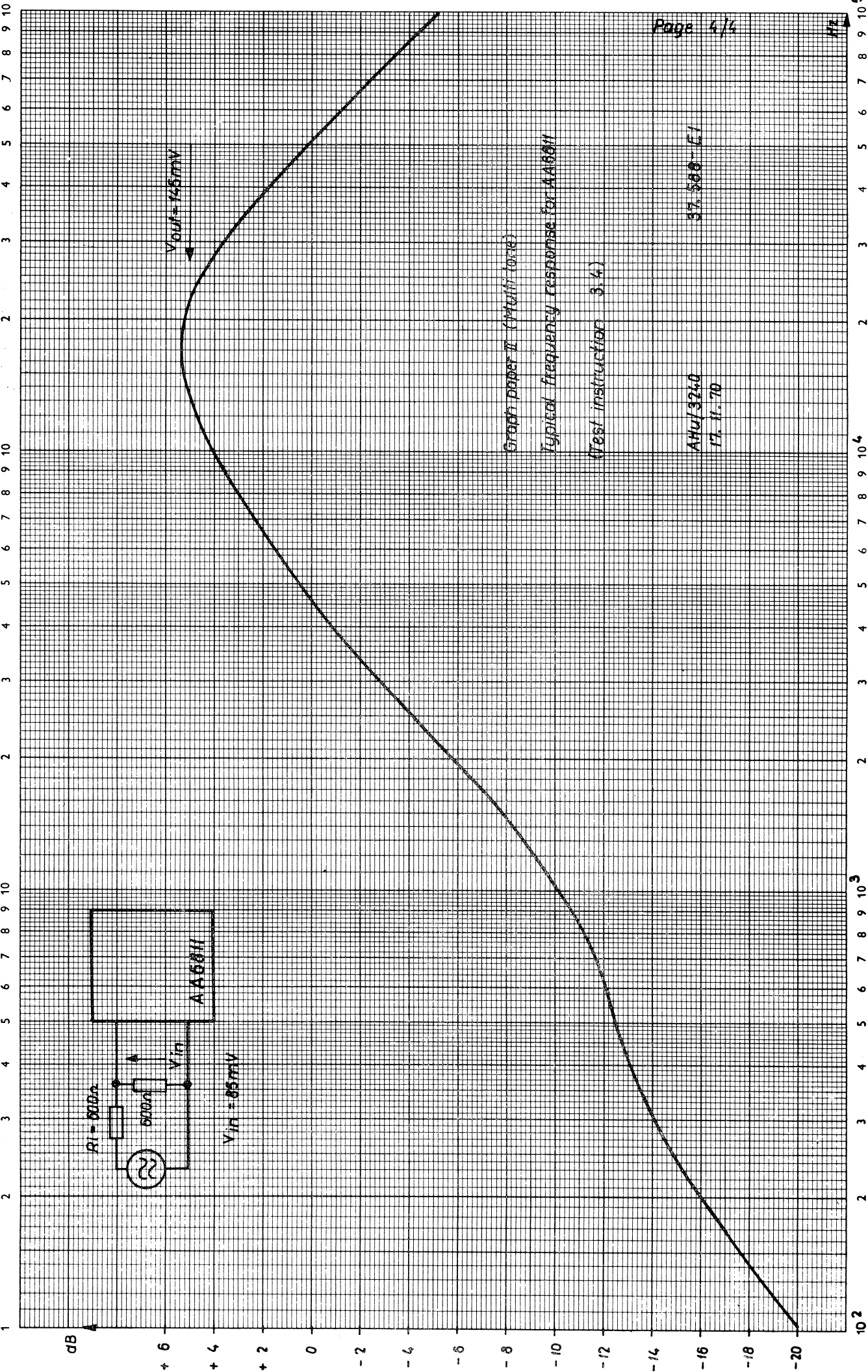
3.5 Check of current drain.

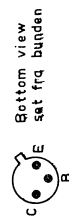
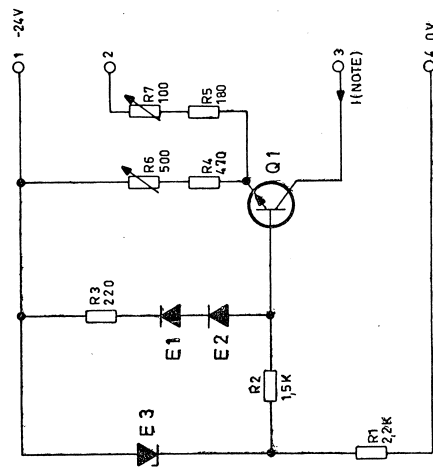
Measure current consumption at -24V.

Requirement: 17mA \pm 1,5mA.



Ordinat 170 mm - Abscisse 3 dekader a 90 mm.



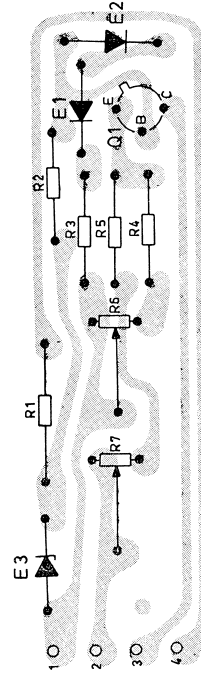


Transistor BF11D

NOTE.

- I_1 (term. 1 not connected to term. 2).
 $I = 1,8 \text{ mA} \pm 10\%$
- I_2 (term. 1 connected to term. 2).
 $I = 7 \text{ mA} \pm 10\%$

- I_1 (term. 1 ikke forbundet med term. 2).
 $I = 1,8 \text{ mA} \pm 10\%$
- I_2 (term. 1 forbundet til term. 2).
 $I = 7 \text{ mA} \pm 10\%$



CONSTANT-CURRENT REGULATOR KONSTANTSTRØMHOLDER

CR681

Storno

TYPE	NO.	CODE	DATA
	R1	80.5453	2, 2 k Ω 5% carbon film
	R2	80.5251	1, 5 k Ω 5% " "
	R3	80.5241	220 Ω 5% " "
	R4	80.5240	180 Ω 5% " "
	R5	80.5245	470 Ω 5% " "
	R6	86.5042	500 Ω 20% potentiometer lin.
	R7	86.5051	100 Ω 20% " "
	E1	99.5028	OA200 Diode
	E2	99.5028	OA200 Diode
	E3	99.5114	BZY57 Zenerdiode
	Q1	99.5179	BF110 Transistor

1/4W
1/8W
1/8W
1/8W
1/8W
0.1W
0.1W

Storno

TYPE	NO.	CODE	DATA

CONSTANT-CURRENT REGULATOR CR681
KONSTANTSTRØMHOLDER

X400.861

Delay unit DU680-2002/1.

1. General:

DU680-2002/1 is an electronic DU where the time delay is adjustable. The unit consists of several stages which are activated by 3 different "Start" terminals and can be reset by a quick acting "stop" terminal. The delay is started respectively stopped by the connection of 0V for a minimum of 10ms to the following terminals: Terminal "start 2". 0V on term. 5 causes an immediate 0V signal on the output term. 2. The output signal remains 0V and the term. 5 is inactive during the delay period.

Terminal "start 3": 0V on term. 6 causes an immediate 0V signal on the output term. 2. The delay period, however, begins only when the 0V signal on term. 6 is removed.

If term. 6 is activated again during the delay period, the delay period is zero-set. When the 0V signal on term. 6 is removed the delay period begins again.

Terminal "start 1": Input term. 7 is connected to a timing circuit which causes a delay in the activation of the output from the delay circuit. The delay in the 0V output signal from term. 2 is nominal 50ms (40-75ms).

Terminal "stop": 0V on term. 3 for min. 10ms will stop the delay function and thus the output function

2. Data.

Supply voltage:	-24V $\pm 5\%$.
Current consumption: standby	22mA.
activated	32mA.
Output function, 0V:	max. load 100mA.
Time delay: nom.	15sec. ± 7 sec.
adjustm. toler.	± 2 sec.
Temperature range:	operating -30 to +60°C.
Mechanical dimensions:	40 x 80mm.
Change in delay time:	Consult diagram D110520.
Note: When DU680-2002/1 is used in TE680-2003 potentiometer R ₁₄ is changed from 50k Ω to 250k Ω (Storno code:86.5056)	

3. Theory of operation:

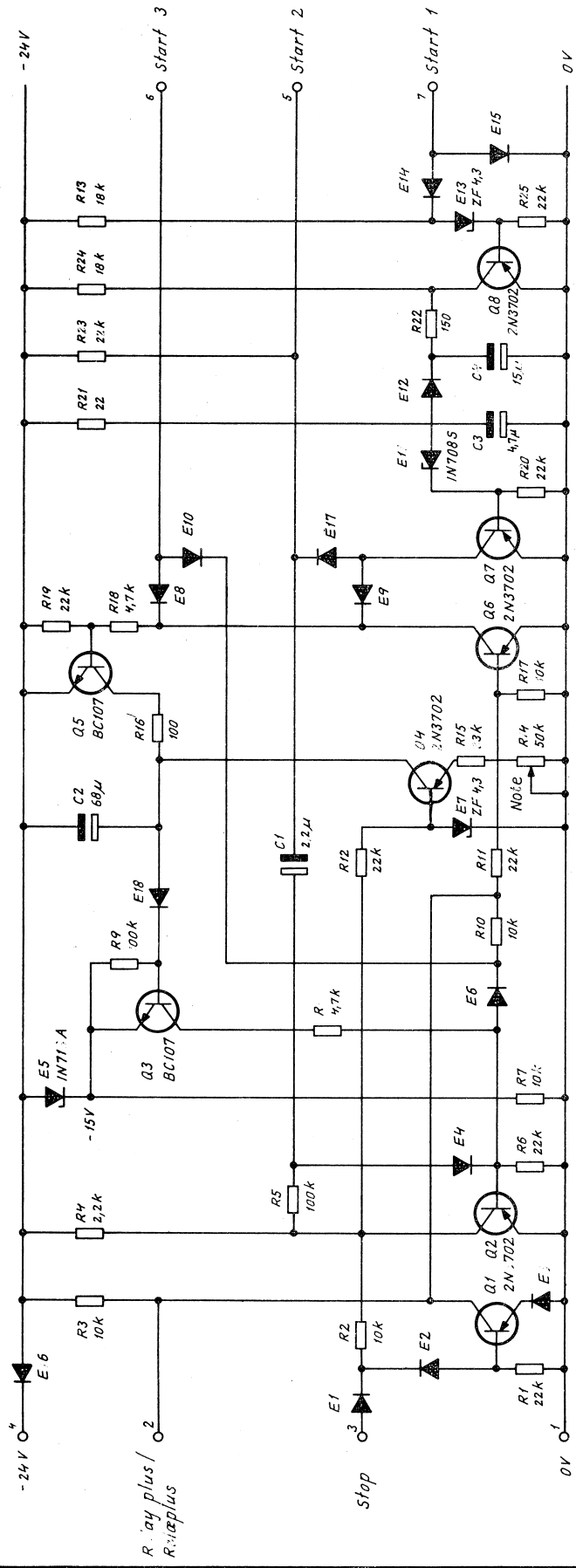
The transistors Q_1 and Q_2 form a bistable stage. Due to the diode E_3 , Q_2 is ON and Q_1 is OFF after connection to the supply voltage.

When one of the input terminals have been activated Q_1 switches ON and Q_2 switches OFF. Q_4 being a part of a constant current generator, receives its base voltage from Q_2 and its collector current charges C_2 linearly as regards time.


After expiration of the delay time, adjusted by means of R_{14} , C_2 is charged to a threshold voltage equal to the sum of the voltage across the zener diode E_5 (9,1V), V_{BE} from Q_3 and the voltage across E_{18} . Now Q_3 begins to conduct.

The collector current from Q_3 is fed to the base of Q_2 through R_8 . Q_2 conducts and Q_1 is blocked. A relay connected to term. 2 would be deenergized. The voltage on Q_1 's collector causes Q_6 and Q_5 to conduct. Q_5 discharges C_2 through R_{16} . Now the unit can be activated again.

If the delay unit is activated from term. 7 (start 1), transistor Q_8 is blocked. The capacitor C_4 is charged through R_{22} and R_{24} . When the voltage across C_4 reaches app. 8V, Q_7 starts conducting. In this manner the actual timing circuit is activated with a time delay of app. 50ms. Q_5 is kept conducting by a supply of 0V through Q_7 and E_9 in a manner not charging C_2 by the current from Q_4 . The charging of C_2 begins only when the start activation has ceased. When Q_8 switches ON, C_4 is decharged through R_{22} . In case of a repeated activation, C_2 is discharged after 50ms in a manner providing the timing period to begin again when the activation has ceased.



Delay time T_D adjusted to ± 15 sek. ± 2 sek. (med R14) } with
 Forsinkelsetiden T_D justeres til ± 15 sek. ± 2 sek. (med R14) }
 $T_D \approx 15$ sec. ± 7 sec
 $T_D \approx 0-14$ sec. (R15 = 220k) } Max. opnødelige tidsområder
 $T_D \approx 8-70$ sec. (R14 = 250k) } Max. time periods to be obtained
 All diodes / alle dioder : 1N914



Konstr. tegnet af
OG / JWA
3.1.67
godk.
Kontrollert af
Kontrollatør
X110521

DELAY - UNIT

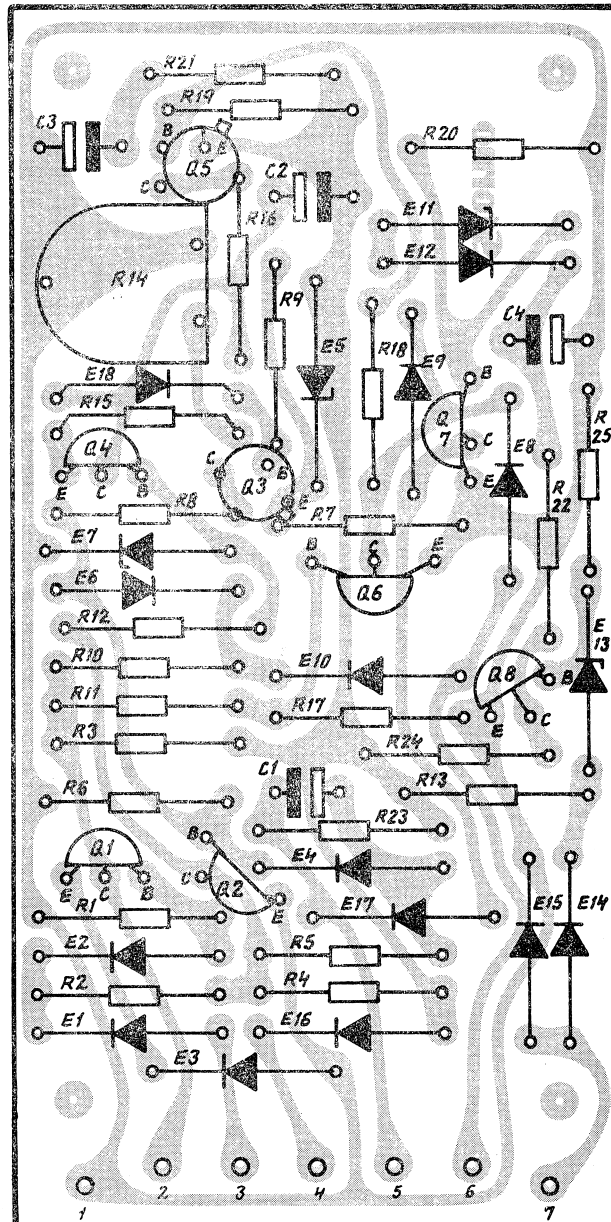
DU 680 - 2002 / 1

TIDSFORSINKELSESENHED

KODE

TEGN. NR.
D110520
A3

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr./tegn.
OG / JWA
17.9.69
godk.
OG
komp.liste
X110521
D110520

DELAY - UNIT
TIDSFORSINKELSESENHED

DU680 - 2002 / 1
KODE

TEGN. NR.

D113509

A4

no	code	data	no	code	data
C1	73.5102	2,2 μ F 20% tantal 35 V	E13	99.5116	Zenerdiode 4,3 V
C2	73.5106	68 μ F 20% tantal 15V	E14-18	99.5228	Diode 1N914
C3	73.5126	4,7 μ F 20% tantal 35V	Q1-2	99.5144	Transistor BC214 L
C4	73.5105	15 μ F 20% tantal 15V	Q3	99.5121	- BC107
R1	80.5265	22k Ω 5% 1/8 W	Q4	99.5144	- BC214 L
R2	80.5261	10k Ω 5% 1/8W	Q5	99.5121	- BC107
R3	80.5261	10k Ω 5% 1/8W	Q6-8	99.5144	- BC214 L
R4	80.5253	2,2k Ω -			
R5	80.5273	100k Ω - -			
R6	80.5265	22k Ω - -			
R7	80.5261	10k Ω -			
R8	80.5257	4,7k Ω - -			
R9	80.5273	100k Ω - -			
R10	80.5261	10k Ω - -			
R11	80.5265	22k Ω - -			
R12	80.5265	- - -			
R13	80.5264	18k - -			
R14	86.5040	50k Ω pot. lin. 0,1W			
R15	80.5267	33k Ω 5% 1/8W			
R16	80.5237	100 Ω - -			
R17	80.5261	10k Ω - -			
R18	80.5257	4,7k Ω - -			
R19	80.5265	22k Ω - -			
R20	80.5265	22k Ω - -			
R21	80.5229	22 Ω - -			
R22	80.5239	150 Ω - -			
R23	80.5265	22k Ω - -			
R24	80.5264	18k Ω - -			
R25	80.5265	22k Ω - -			
E14	99.5028	Diode 1N914			
E5	99.5042	Zenerdiode 9,1V			
E6	99.5028	Diode 1N914			
E7	99.5116	Zenerdiode 4,3V			
E8-10	99.5228	Diode 1N914			
E11	99.5114	Zenerdiode 5,6V			
E12	99.5228	Diode 1N914			

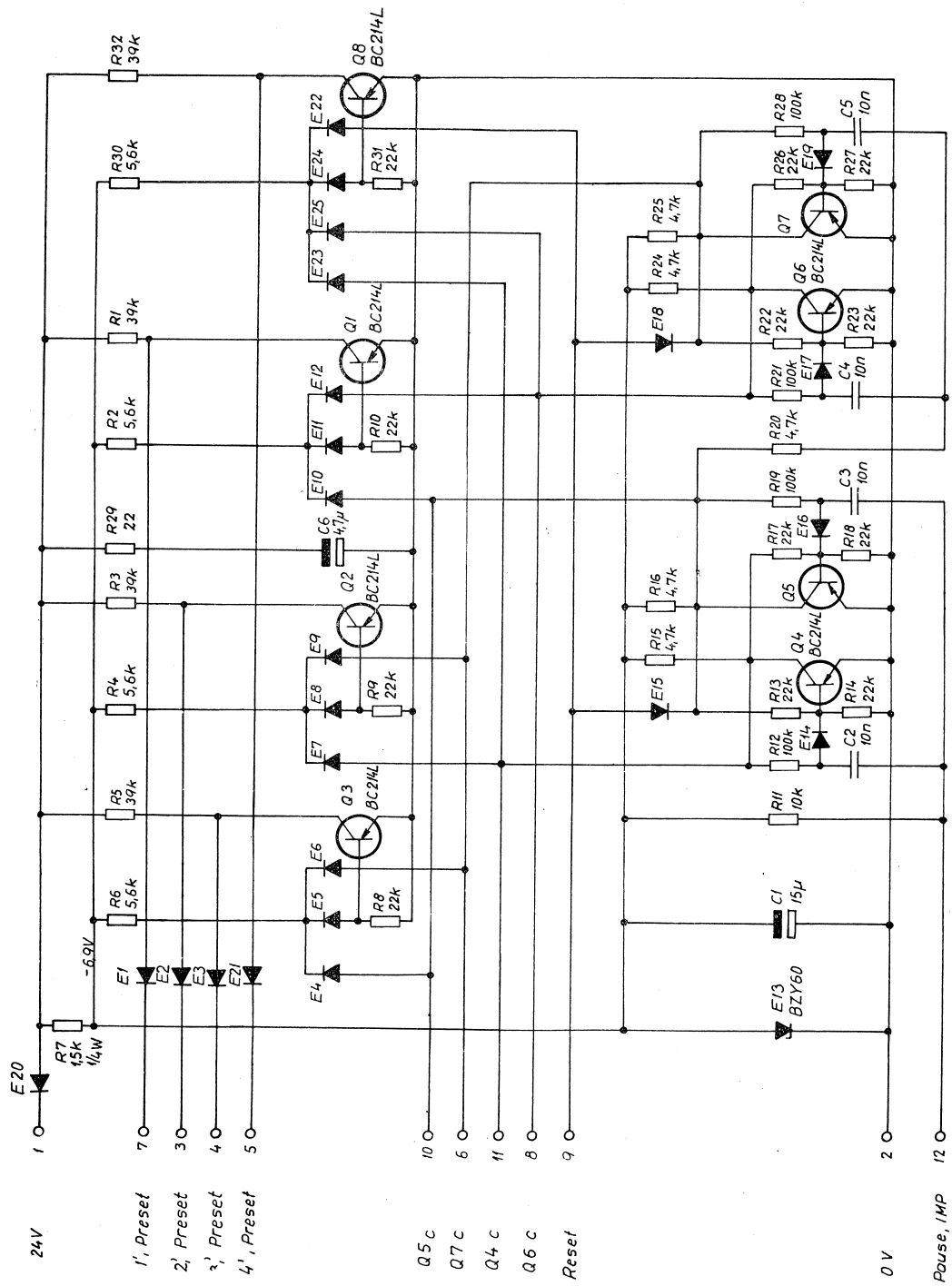


udarb of
 OG/HNI
 3.1.68
 kontrol of
MB
 in diag
 D110520

Parts list
 Stykliste


DU680-2002/1

comp. list
 X110521
 diag no
 of



AA117: E1, 2, 3, 4, 6, 7, 9, 10, 12, 15, 18, 21, 22, 23 og 25
 IN914: E5, 8, 11, 14, 16, 17, 19, 20 og 24.

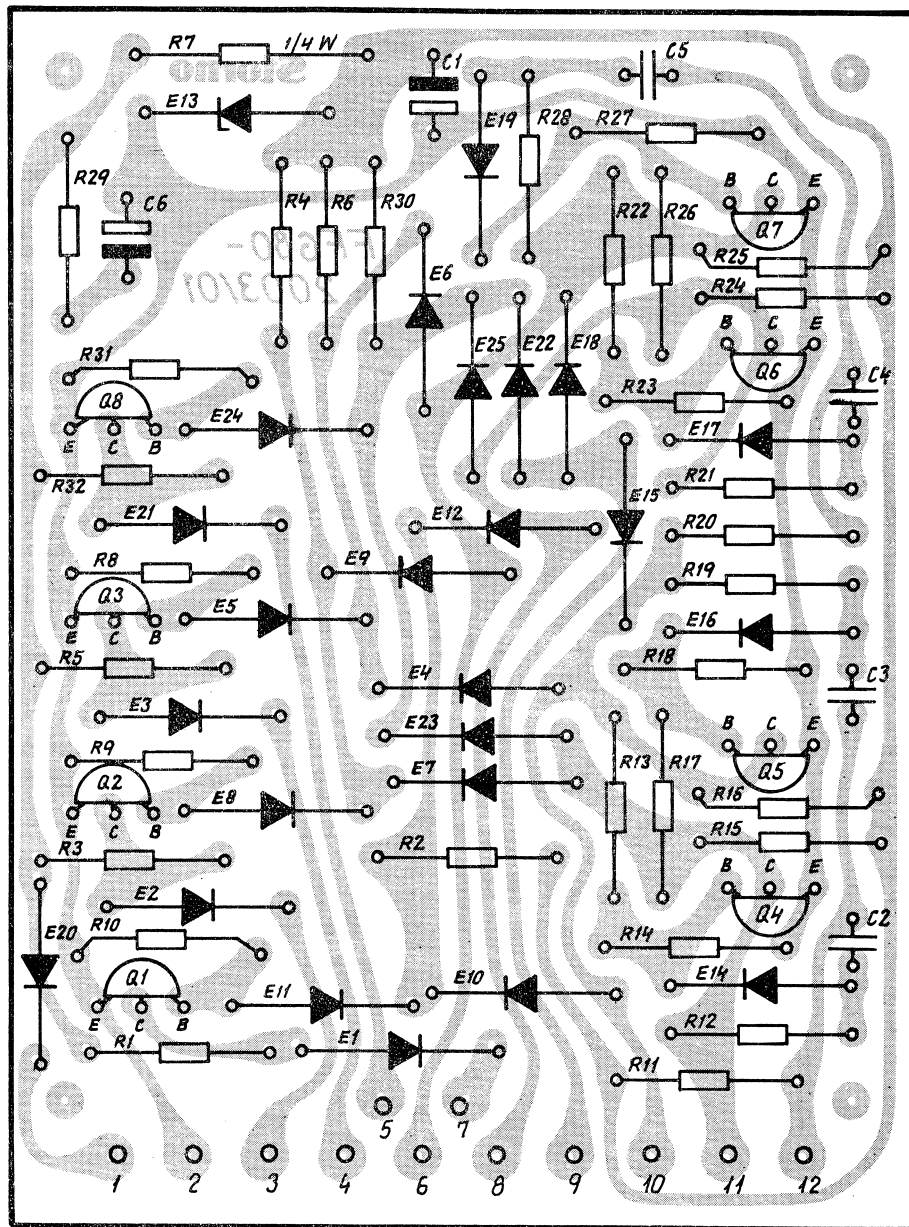
PULSE COUNTER FOR CONTROL OF 4 PULSES
 IN SEQUENCE
 IMPULSTÆLLER FOR AFGIVELSE AF 4 IMPULSER
 I SEKVENSS
 FF680-2003/Q1



STERN
 20-6-68
 godk. 08
 Komp. liste
 X143233

TEGN. NR. D111429
 A3

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



konstr./tegn
OG/AMM
10.9.69.
godk.
OG
komp.liste
DI11429
X113233

PULSE COUNTER FOR CONTROL OF 4 PULSES
IN SEQUENCE
IMPULSTÆLLER FOR AFGIVELSE AF 4 IMPULSER
I SEKVEN
FF680-2003/01

KODE

TEGN NR.

D113422

A4

no	code	data	no	code	data
C1	76.5070	15μ 20% tantal 15V	E16	99.5028	Diode 1N914
C2	76.5070	10nF 10% polyest.	E17	99.5028	- - -
		FL 50V	E18	99.5123	Diode AA117
C3	76.5070	- - - -	E19	99.5028	Diode 1N914
C4	6.5070	- - - -	E20	99.5028	- - -
C5	76.5070	- - - -	E21	99.5123	Diode AA117
C6	73.5126	4,7μ 20% tantal 35V	E22	99.5123	- - -
			E23	99.5123	- - -
R1	80.5268	39kΩ 5% carb. film 1/8W	E24	99.5028	Diode 1N914
R2	80.5258	5,6kΩ - - -	E25	99.5123	Diode AA117
R3	80.5268	39kΩ - - -			
R4	80.5258	5,6kΩ - - -	Q1		
R5	80.5268	39kΩ - - -	Q8	99.5144	BC214L
R6	80.5258	5,6kΩ - - -			
R7	80.5451	1,5kΩ 5% carb. film 1/4W			
R8	80.5265	22kΩ 5% carb. film 1/8W			
R9	80.5265	- - - -			
R10	80.5265	- - - -			
R11	80.5261	10kΩ - - -			
R12	80.5273	100kΩ - - -			
R13	80.5265	22kΩ - - -			
R14	80.5265	- - - -			
R15	80.5257	4,7kΩ - - -			
R16	80.5257	- - - -			
R17	80.5265	22kΩ - - -			
R18	80.5265	- - - -			
R19	80.5273	100kΩ - - -			
R20	80.5257	4,7kΩ - - -			
R21	80.5273	100kΩ - - -			
R22	80.5265	22kΩ - - -			
R23	80.5265	- - - -			
R24	80.5257	4,7kΩ - - -			
R25	80.5257	- - - -			
R26	80.5265	22kΩ - - -			
R27	80.5265	- - - -			
R28	80.5273	100kΩ - - -			
R29	80.5265	22kΩ - - -			
R30	80.5258	5,6kΩ - - -			
R31	80.5265	22kΩ - - -			
R32	80.5268	39kΩ - - -			
E1	99.5123	Diode AA117			
E2	99.5123	- - -			
E3	99.5123	- - -			
E4	99.5123	- - -			
E5	99.5028	Diode 1N914			
E6	99.5123	Diode AA117			
E7	99.5123	- - -			
E8	99.5028	Diode 1N914			
E9	99.5123	Diode AA117			
E10	99.5123	- - -			
E11	99.5028	Diode 1N914			
E12	99.5123	Diode AA117			
E13	99.5146	Diode BZY60			
E14	99.5028	Diode 1N914			
E15	99.5123	Diode AA117			
E16					



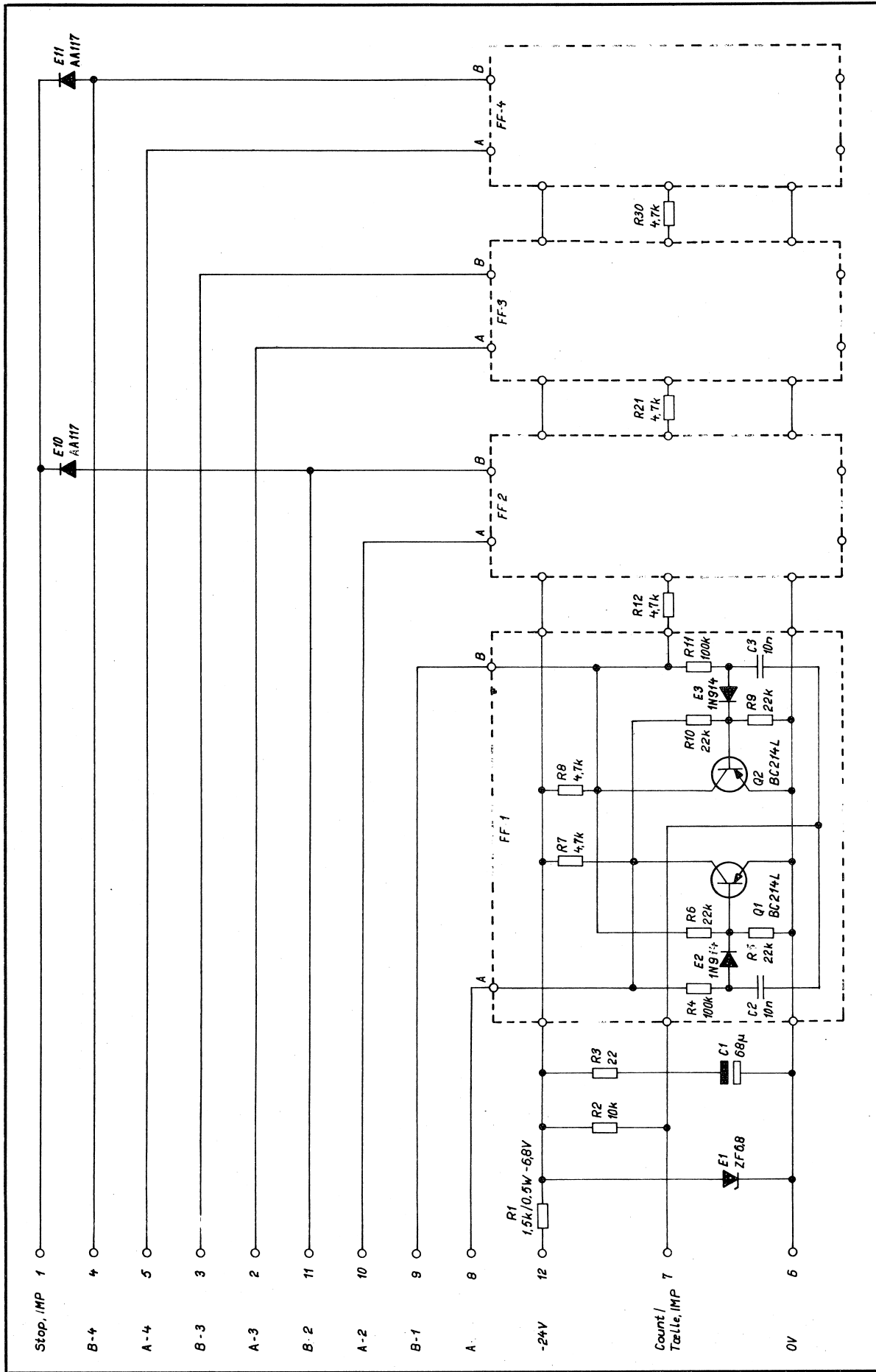
udarb. at
 OG/SL
 12.8.69
 kontrol. at
 OG
 till. drag
 D11429

PARTS LIST
 STYKLISTE

FF680-2003/01

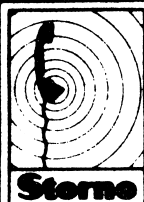
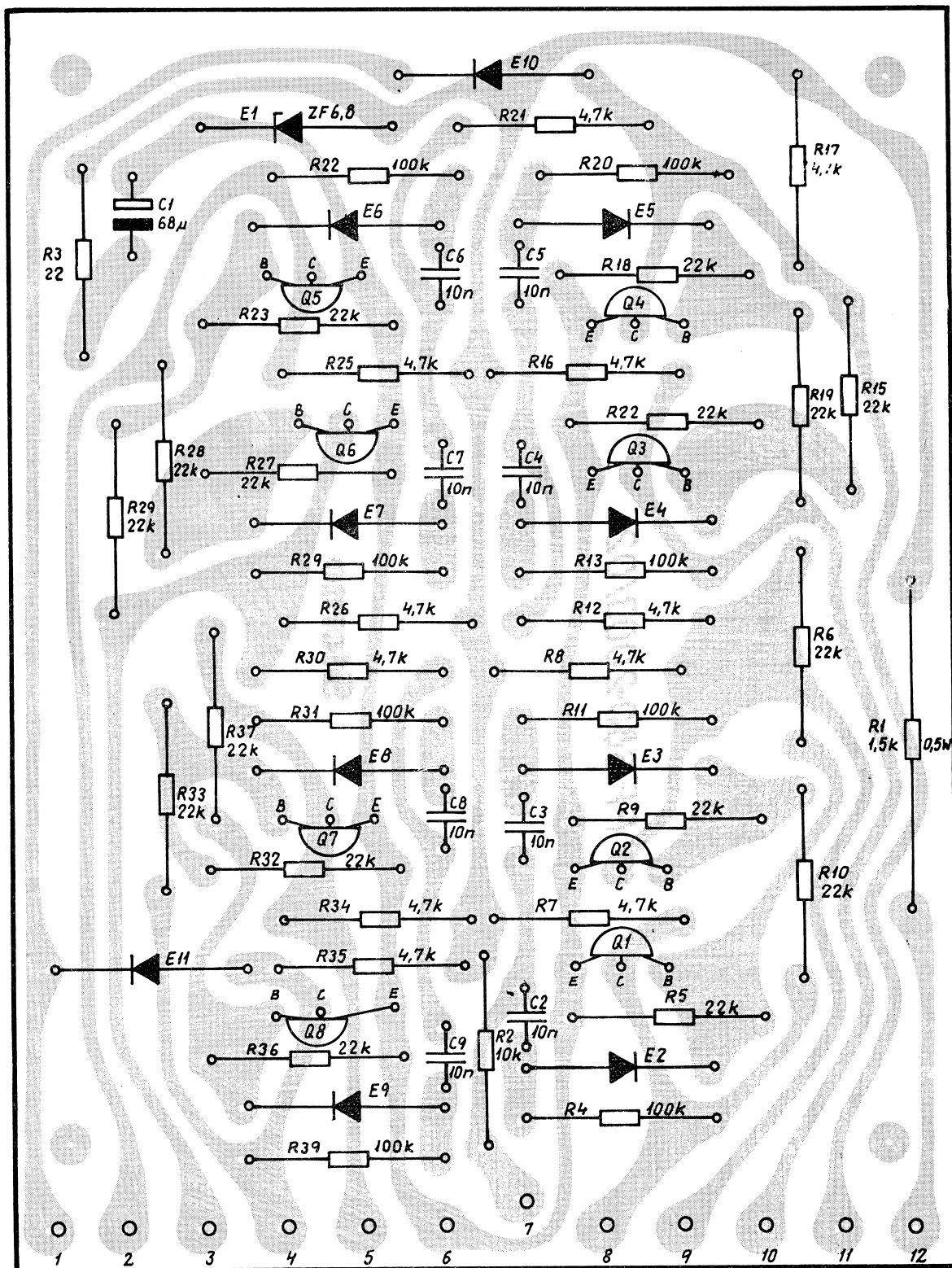
komp. liste
 X 113233

bad no 1
 at 1



		Konstruktør: 061 K 71 20. 4. 71		godk.: 06		Komponent: X1126.4	
PULSE COUNTER IMPULSTÆLLER				FF 680 - 2003/02			
D113185				TEKN. NR.			

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr./tegn.
OG/JWA
27.8.69
godk.
OG
komp.liste
X110654
D113185

PULSE COUNTER
IMPULSTÅLLER FF680 - 2003/02

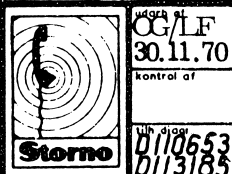
KODE

TEGN. NR.

D113391

A4

no	code	data	no	code	data
C1	73.5106	68 μ F 20% tantal 15V	R22	80.5273	100k Ω 5% carb. film 1/8W
C2-9	76.5070	10nF 10% polyest. FL50V	R23	80.5265	22k Ω 5% carb. film 1/8W
R1	81.5051	1,5k Ω 5% carb. film 1/2W	R24	80.5265	22k Ω 5% carb. film 1/8W
R2	80.5261	10k Ω 5% carb. film 1/8W	R25	80.5257	4,7k Ω 5% carb. film 1/8W
R3	80.5229	22 Ω 5% carb. film 1/8W	R26	80.5257	4,7k Ω 5% carb. film 1/8W
R4	80.5273	100k Ω 5% carb. film 1/8W	R27	80.5265	22k Ω 5% carb. film 1/8W
R5	80.5265	22k Ω 5% carb. film 1/8W	R28	80.5265	22k Ω 5% carb. film
R6	80.5265	22k Ω 5% carb. film 1/8W	R29	80.5273	100k Ω 5% carb. film 1/8W
R7	80.5257	4,7k Ω 5% carb. film 1/8W	R30	80.5257	4,7k Ω 5% carb. film 1/8W
R8	80.5257	4,7k Ω 5% carb. film 1/8W	R31	80.5273	100k Ω 5% carb. film 1/8W
R9	80.5265	22k Ω 5% carb. film 1/8W	R32	80.5265	22k Ω 5% carb. film 1/8W
R10	80.5265	22k Ω 5% carb. film 1/8W	R33	80.5265	22k Ω 5% carb. film 1/8W
R11	80.5273	100k Ω 5% carb. film 1/8W	R34	80.5257	4,7k Ω 5% carb. film 1/8W
R12	80.5257	4,7k Ω 5% carb. film 1/8W	R35	80.5257	4,7k Ω 5% carb. film 1/8W
R13	80.5273	100k Ω 5% carb. film 1/8W	R36	80.5265	22k Ω 5% carb. film 1/8W
R14	80.5265	22k Ω 5% carb. film 1/8W	R37	80.5265	22k Ω 5% carb. film 1/8W
R15	80.5265	22k Ω 5% carb. film 1/8W	R38	80.5273	100k Ω 5% carb. film 1/8W
R16	80.5257	4,7k Ω 5% carb. film 1/8W	E1	99.5146	Zenerdiode 6,9V 5% 0,275W
R17	80.5257	4,7k Ω 5% carb. film 1/8W	E2-9	99.5028	Diode 1N914
R18	80.5265	22k Ω 5% carb. film	E10-11	99.5123	Diode AA117
R19		1/8W	Q1-8	99.5144	Transistor BC214L
R19	80.5265	22k Ω 5% carb. film 1/8W			
R20	80.5273	100k Ω 5% carb. film 1/8W			
R21	80.5257	4,7k Ω 5% carb. film 1/8W			



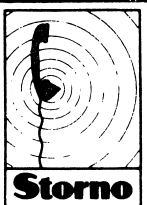
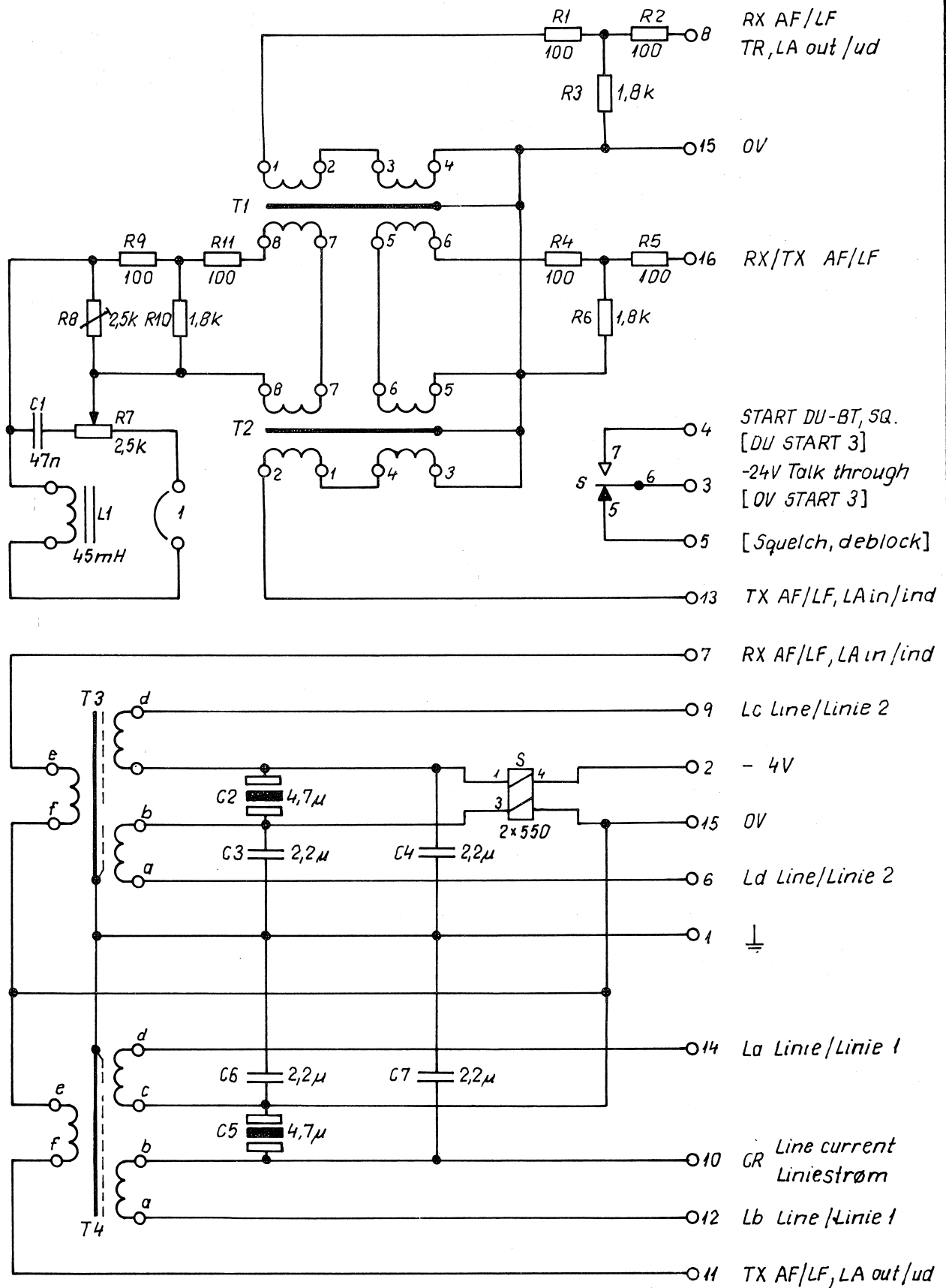
Parts list

Stykliste

FF680-2003/02 og
FF680-2003

comp liste
X110654

blad no 1 af 1



konstr./tegn.
OG/AMM
23.10.69.
godk.
OG
komp liste
X113730

HYBRID AND LINE CIRCUIT
GAFFEL OG LINIEKREDS
HU 680-2003

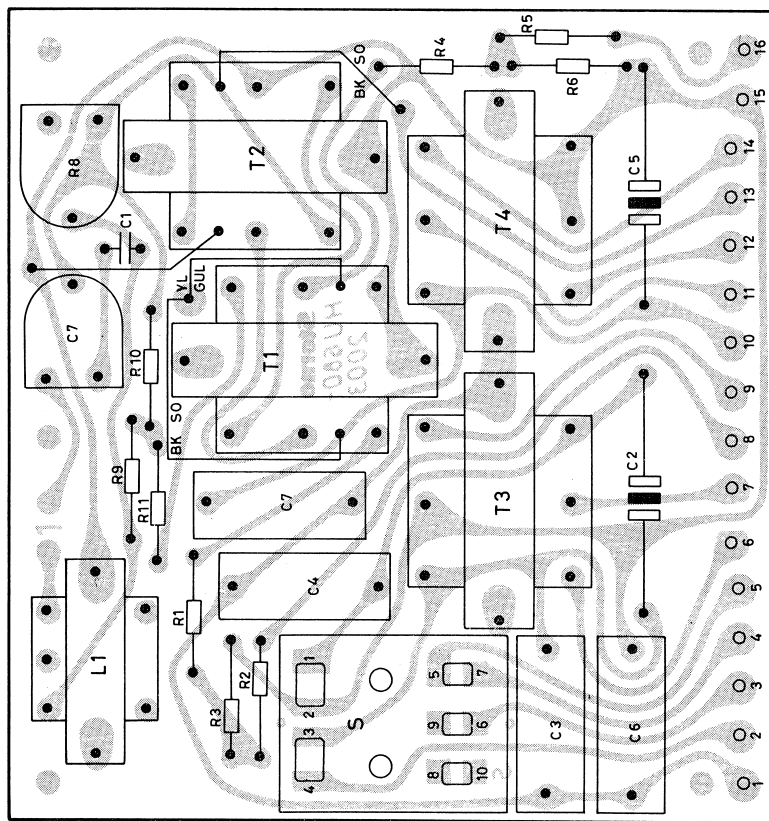
KODE

TECN NR.

D 13709

4

PRINTED CIRCUIT SEEN FROM PRINT SIDE
TRYKT KREDSLØB SET FRA PRINTSIDEN



Werkzeug
05 / AMW
28.10.69
Spez. 06
Kontrollnr.
X77330
DMJ709

HYBRID - AND LINE CI CUIT
GAFFEL - OG LINEKREDS
HU 680 - 2003

KO E

TEGN. NR.

D113734
A3

no	code	data	no	code	data
C1	76.5072	47nF 10% polyest. 50V	T3	60.5097	Transformer, AF 150/150/600Ω
C2	73.5007	4,7μF -10+100% elko 100V (Bi-pol)	T4	60.5097	Transformer, AF 150/150/600Ω
C3	76.5081	2,2μF 5% polyest. FL63V			
C4	76.5081	2,2μF 5% polyest. FL63V			
C5	73.5007	4,7μF -10+100% elko 100V (Bi-pol)			
C6	76.5081	2,2μF 5%polyest. FL63V			
C7	76.5081	2,2μF 5% polyest. FL63V			
R1	80.5237	100Ω 5% carbon film 1/8W			
R2	80.5237	100Ω 5% carbon film 1/8W			
R3	80.5252	1,8kΩ 5% carbon film 1/8W			
R4	80.5237	100 Ω 5% carbon film 1/8W			
R5	80.5237	100 Ω 5% carbon film 1/8W			
R6	80.5252	1,8kΩ 5% carbon film 1/8W			
R7	86.5043	2,5kΩ 20% trim. car- bon film 1/10W			
R8	86.5043	2,5kΩ 20% trim. car- bon film 1/10W			
R9	80.5237	100Ω 5% carbon film 1/8W			
R10	80.5252	1,8kΩ 4% carbon film 1/8W			
R11	80.5237	100Ω 5% carbon film 1/8W			
L1	60.5144	Coil with iron core 0mAdc 45mH			
ReS	58.5060	Relay 24V 2x550Ω 21- 21			
T1	60.5106	Transformer, AF 150/150/300/300Ω			
T2	60.5106	Transformer, AF 150/150/300/300Ω			

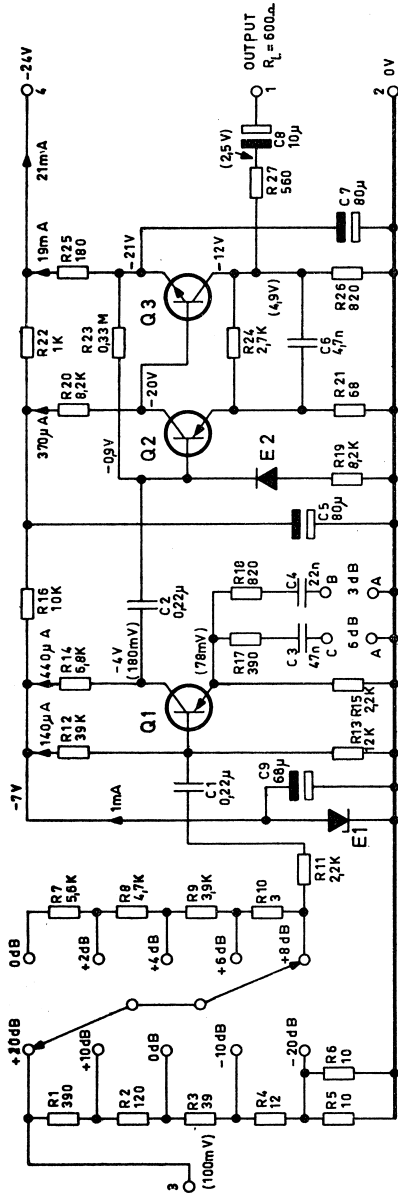


CG/LF
13.10.70
kontrol at
till diag

Parts list
Styckliste

HU680-2003

scop list
X113730
bi d no 1 of 1



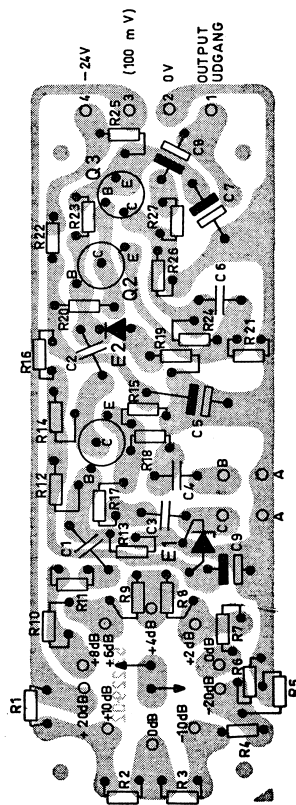
BOTTOM VIEW
SET FRA BUNDEN

Equalizer/Modforvrænger: 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

D400.767/2

Storno

Storno

TYPE	NO.	CODE	DATA
C1	76.5074	76.5074	0, 22 μ F 10% polyester. TB
C2	76.5074	76.5074	0, 22 μ F 10% polyester. TB
C3	76.5072	76.5072	47nF 10% polyester. FL
C4	76.5071	76.5071	22nF 10% polyester. FL
C5	73.5110	73.5110	80 μ F -10 +50% electrol.
C6	76.5061	76.5061	4, 7nF 10% polyester. FL
C7	73.5110	73.5110	80 μ F -10 +50% electrol.
C8	73.5109	73.5109	10 μ F 20% tantal
C9	73.5106	73.5106	68 μ F 20% tantal
R1	80.5244	80.5244	390 Ω 5% carbon film
R2	80.5238	80.5238	120 Ω 5% carbon film
R3	80.5232	80.5232	39 Ω 5% carbon film
R4	80.5226	80.5226	12 Ω 5% carbon film
R5	80.5225	80.5225	10 Ω 5% carbon film
R6	80.5225	80.5225	10 Ω 5% carbon film
R7	80.5258	80.5258	5, 6 k Ω 5% carbon film
R8	80.5257	80.5257	4, 7 k Ω 5% carbon film
R9	80.5256	80.5256	3, 9 k Ω 5% carbon film
R10	80.5255	80.5255	3, 3 k Ω 5% carbon film
R11	80.5253	80.5253	2, 2 k Ω 5% carbon film
R12	80.5268	80.5268	39 k Ω 5% carbon film
R13	80.5262	80.5262	12 k Ω 6% carbon film
R14	80.5259	80.5259	6, 8 k Ω 5% carbon film
R15	80.5253	80.5253	2, 2 k Ω 5% carbon film
R16	80.5261	80.5261	10 k Ω 5% carbon film
R17	80.5244	80.5244	390 Ω 5% carbon film
R18	80.5248	80.5248	820 Ω 5% carbon film
R19	80.5260	80.5260	8, 2 k Ω 5% carbon film
R20	80.5260	80.5260	8, 2 k Ω 5% carbon film
R21	80.5235	80.5235	68 Ω 5% carbon film
R22	80.5249	80.5249	1 k Ω 5% carbon film
R23	80.5279	80.5279	330 k Ω 5% carbon film
R24	80.5254	80.5254	2, 7 k Ω 5% carbon film
R25	80.5240	80.5240	180 Ω 5% carbon film
R26	80.5448	80.5448	820 Ω 5% carbon film
R27	80.5246	80.5246	560 Ω 5% carbon film
E1	99.5146	99.5146	Zenerdiode BZY60
E2	99.5028	99.5028	Diode OA200
Q1	99.5144	99.5144	Transistor 2N3702
Q2	99.5144	99.5144	Transistor 2N3702
Q3	99.5121	99.5121	Transistor BC107

TYPE	NO.	CODE	DATA

LINE AMPLIFIER
LINEFORSTÆRKER

LA681

X400.759/4

Line Amplifier LA681

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

Attenuator

Equalizer

Amplifier stage

The line amplifier serves the purpose of amplifying or attenuating the input signal. Its frequency response can be altered by means of a system of straps.

Mode of Operation

Attenuator

An attenuator in the input circuit can be adjusted to provide either gain or attenuation between +28dB and -20dB in steps of 2dB.

The overall resistance of R1, R2, R3, R4, R5, and R6 provides an input impedance of 600 ohms. Taps between the resistors permit reducing the impedance in steps of 10 dB. Resistors R7, R8, R9, R10, and R11 in combination with the input impedance of transistor Q1 form an additional voltage divider which permits further gain or attenuation adjustment in steps of 2 dB.

Equalizer

Transistor Q1 employs frequency-dependent negative feedback. The frequency response can be altered through a system of straps in the emitter circuit of Q1.

Without straps inserted, the emitter circuit will consist solely of resistor R15. This provides flat frequency response between 300 and 3400 Hz.

With terminals A and B strapped together, R18 and C4 are connected in parallel with R15, producing a 3 dB rise at 3000 Hz.

With terminals A and C strapped together, R17 and C3 are connected in parallel with R15, producing a 6 dB rise at 3000 Hz.

With both of the above-mentioned straps inserted, the frequency response is raised 9 dB at 3000 Hz.

By altering the frequency response as described it is possible to compensate the line capacitance for line lengths of 0.4 km, 8 km, and 12 km, respectively.

Resistors R17 and R18 in the two strap circuits serve the purpose of limiting the gain at very high frequencies.

Amplifier

The amplifier is composed of transistors Q2 and Q3, which are directly coupled to each other and provide a voltage gain of 15.

Distortion is minimized through heavy negative feedback (R21 and R24). The amount of feedback increases with frequency, due to capacitor C6, in order to reduce gain at very high frequencies.

Temperature compensation for variations in the gain provided by transistor Q2 is effected by diode E2, whose temperature coefficient corresponds to that of the diode represented by the emitter and base of the transistor.

There is DC negative feedback from the emitter of transistor Q3, via resistor R23.

The output impedance of the unit is largely determined by resistor R27.

Data

Supply Voltage

24V \pm 5%.

Temperature Range

-30°C to +80°C.

Gain

Max. 28 dB \pm 1 dB.

The attenuator permits gain adjustment from +28 dB to -20 dB in steps of 2 dB.

Harmonic Distortion

Less than 1%.

Crosstalk from Supply Voltage

Less than 30 dB from 300 to 3000 Hz.

Frequency Response

Without straps: Flat from 300 Hz to 3400 Hz ± 1 dB.

Strap A-B: +3 dB at 3000 Hz.

Strap A-C: +6 dB at 3000 Hz.

Straps A-B and A-C: +9 dB at 3000 Hz.

Input Impedance

600 ohms $\pm 20\%$.

Output Impedance

600 ohms $\pm 20\%$.

Output Voltage

Max. output voltage is 0 dBm with the amplifier terminated in 600 ohms in parallel with 0.5 μ F.

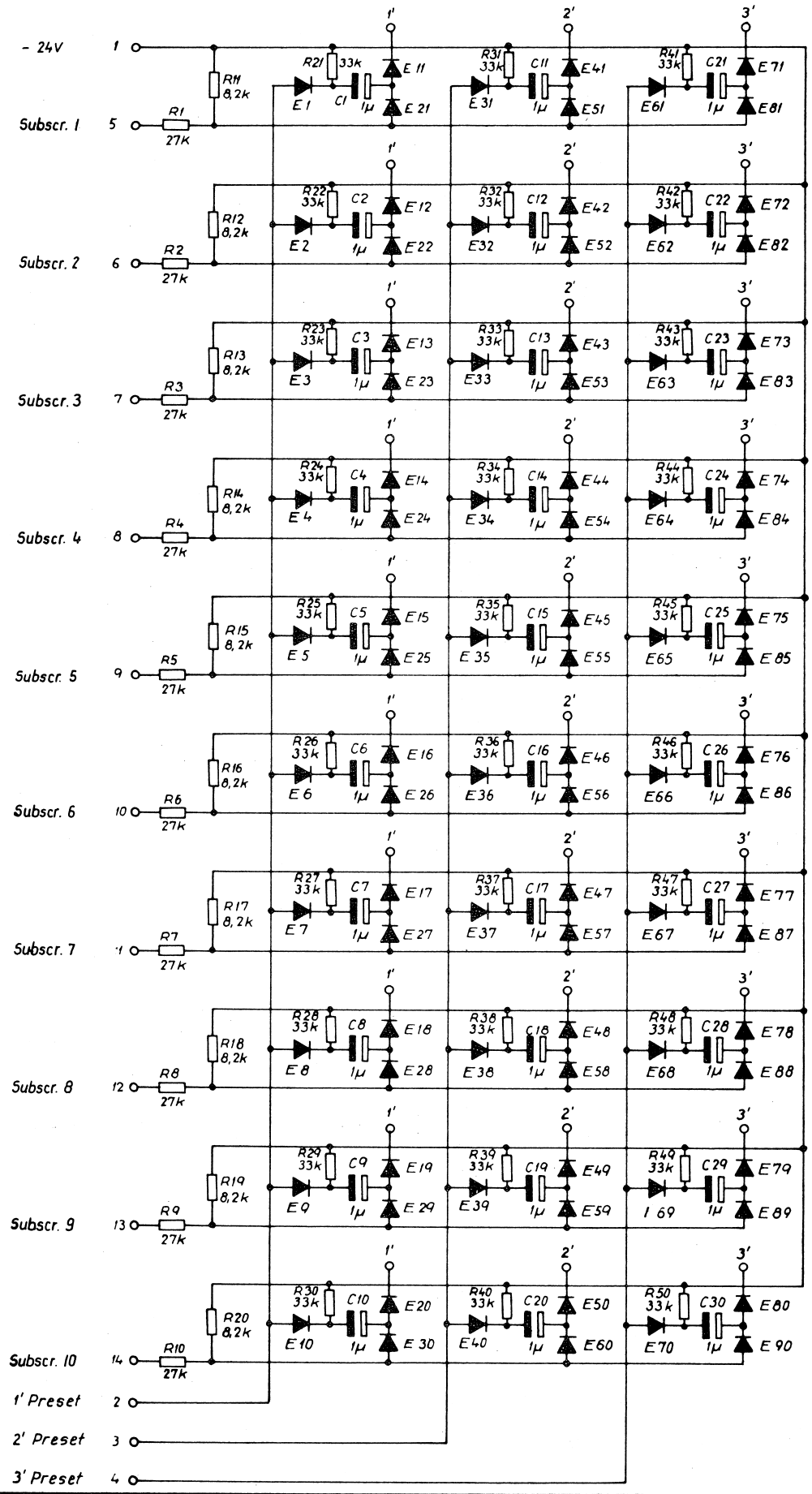
Dimensions

28 x 80 mm.

Note : Subscriber number are coded by connecting the terminals 1', 2 and 3' to the digit terminals on NU680-2003/1 (consult drawing D116654)

Subscriber number 235: 1' to 2', 2' to 3' and 3' to 5'

Subscriber number 43: 1' to 4', 2' to 3' and 3' to 5'



Model	NU680-2003
Code	06
Lot	X113239

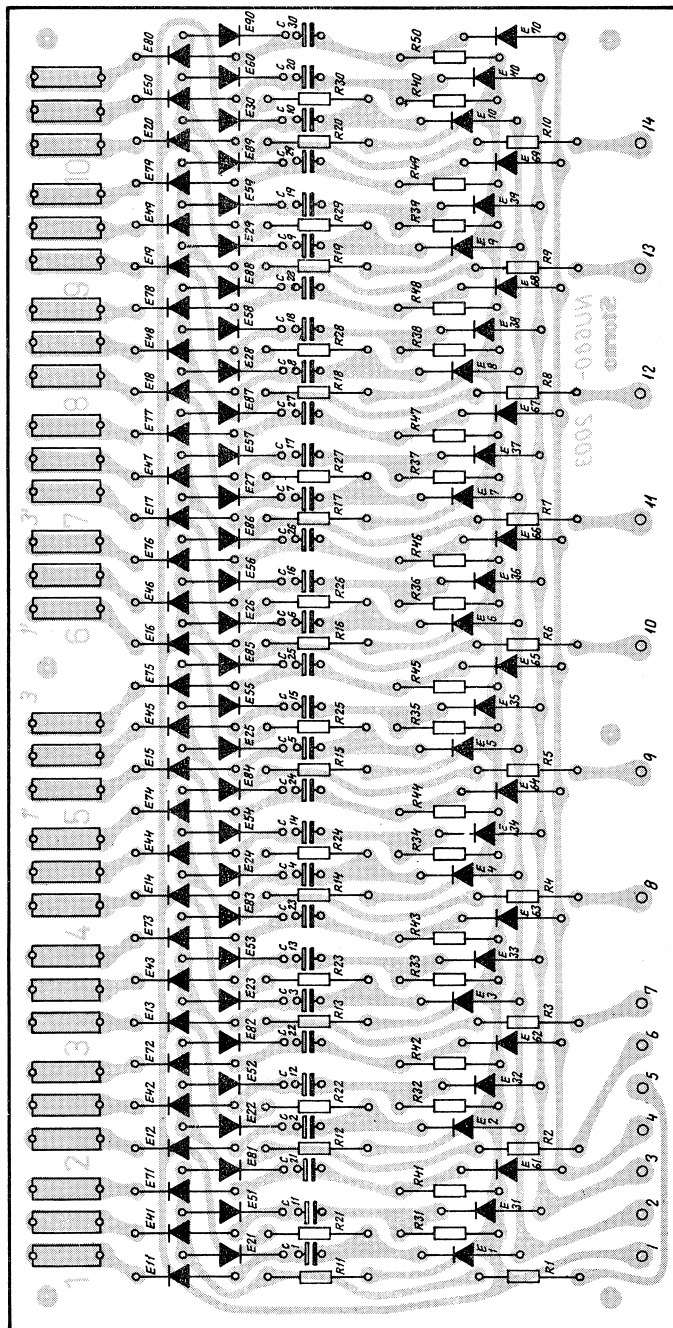
NUMBER UNIT FOR AUTOMATIC NUMBER SELECTION
OF 10 SUBSCRIBERS.

NU680-2003

CODE

TECH. NR.
D 116654
A3

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



NOTAT (NOM)
08/ANN
28.8.69.
sgokk DG
Kontrollat
D11665
K113234

NUMBER UNIT FOR AUTOMATIC NUMBER SELECTION
NUMMERENHED FOR AUTOMATISK NUMMERVALG
AF 10 ABONNENTER. NU680-2003.
Kode

TECH. NH
D113400
A 3

no	code	data	no	code	data
C1- C30	73.5114	1 μ F 20% tantal 35V			
R1- R10	80.5266	27k Ω 5% carb. film 1/8W			
R11- R20	80.5260	8, 2k Ω 5% carb. film 1/8W			
R21- R50	80.5267	33k Ω 5% carb. film 1/8W			
E1- E90	99.5028	1N914 Diode			



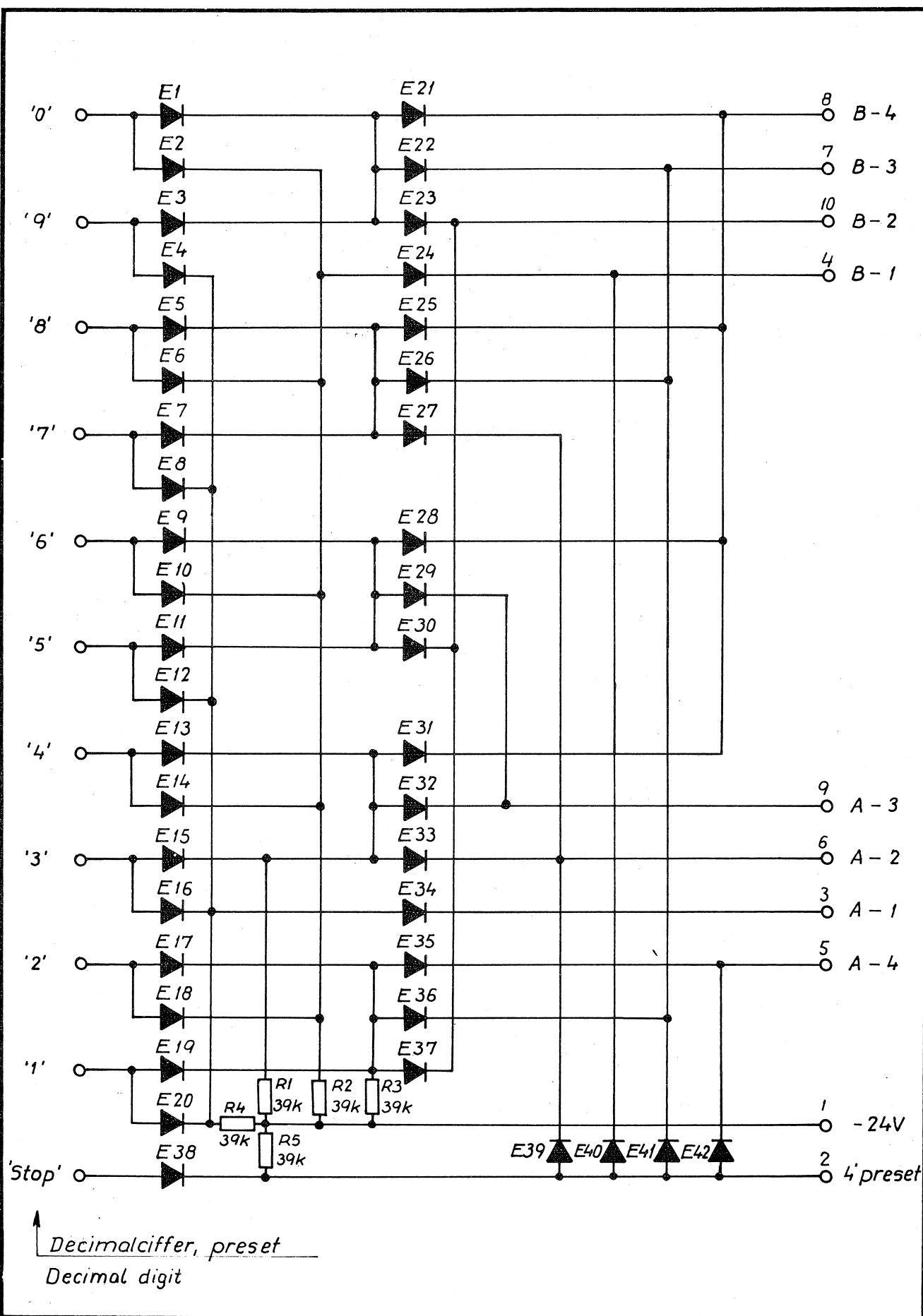
udarb at
 OG/SL
 11.8.69
 kontrol at
 06
 lth. diagr
 0111665

PARTS LIST
 STYKLISTE

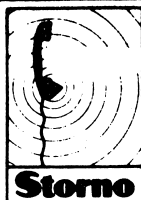
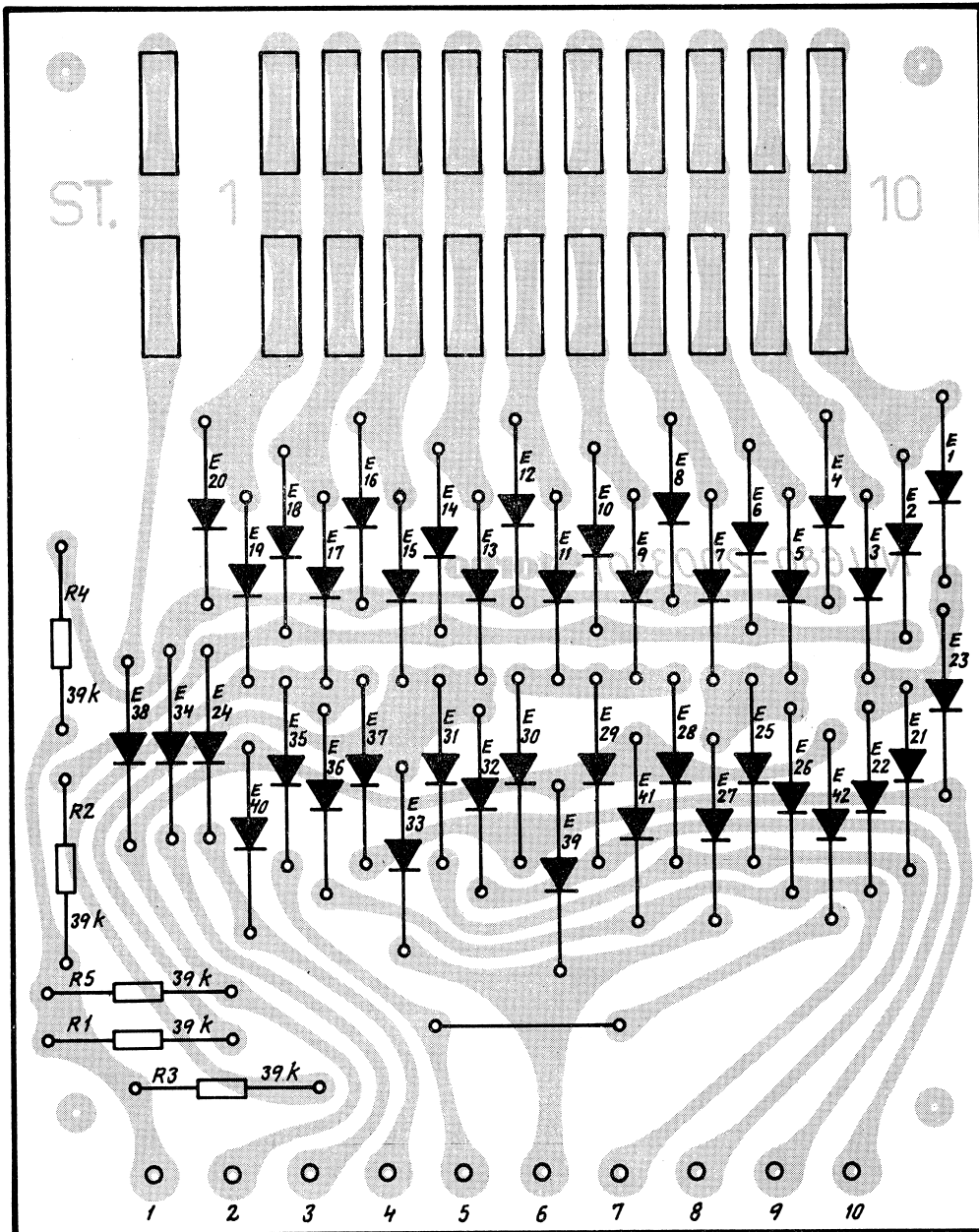
NU680-2003

comp liste
 X 113239

blad no at



PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr. Regn.
OG / JWA
27. 8. 69
godk.
OG
komp. liste
X 113240
0111664

DIODE MATRIX (DECADIC TO BINARY CODE).
DIODEMATRIX (DEKADISK TIL BINÆR KODE)

NU680 - 2003 / 01

KODE

TEGN. NR.

0113389

A4

no	code	data	no	code	data
R1- R5	80.5268	39k Ω 5% carb. film 1/8W			
E1- E42	99.5028	Diode 1N914			

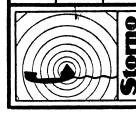
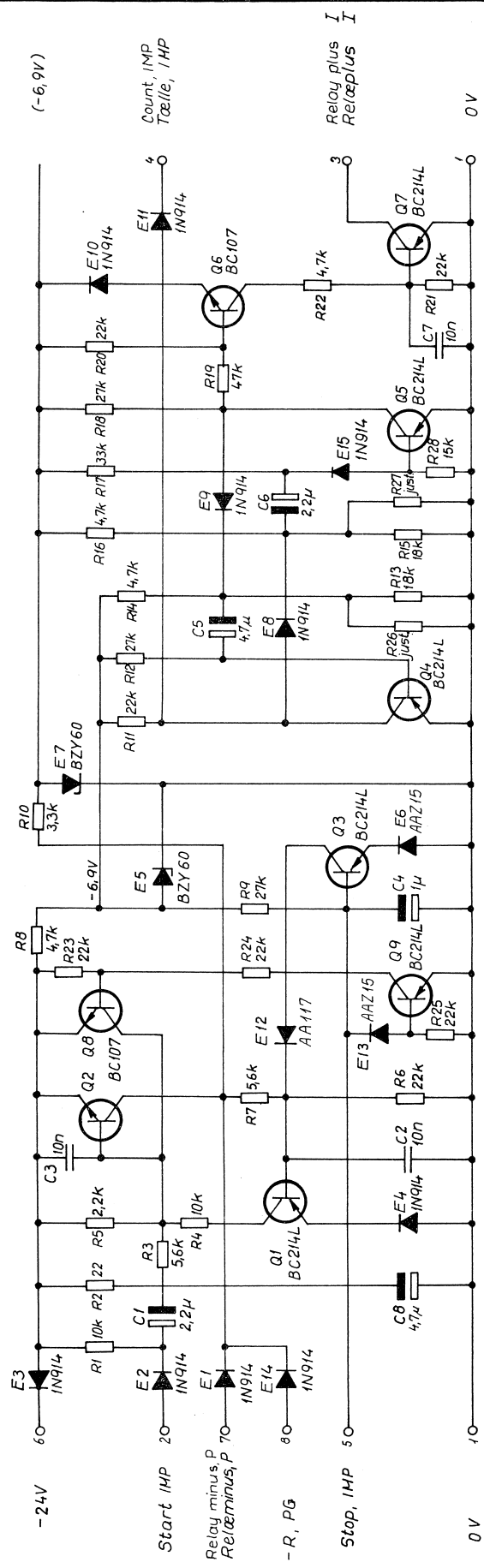


udarb at
 OG/SL
 11.869
 kontrol at
 06
 tilh diagr
 0111664

PARTS LIST
 STYKLISTE

NU680-2003/01

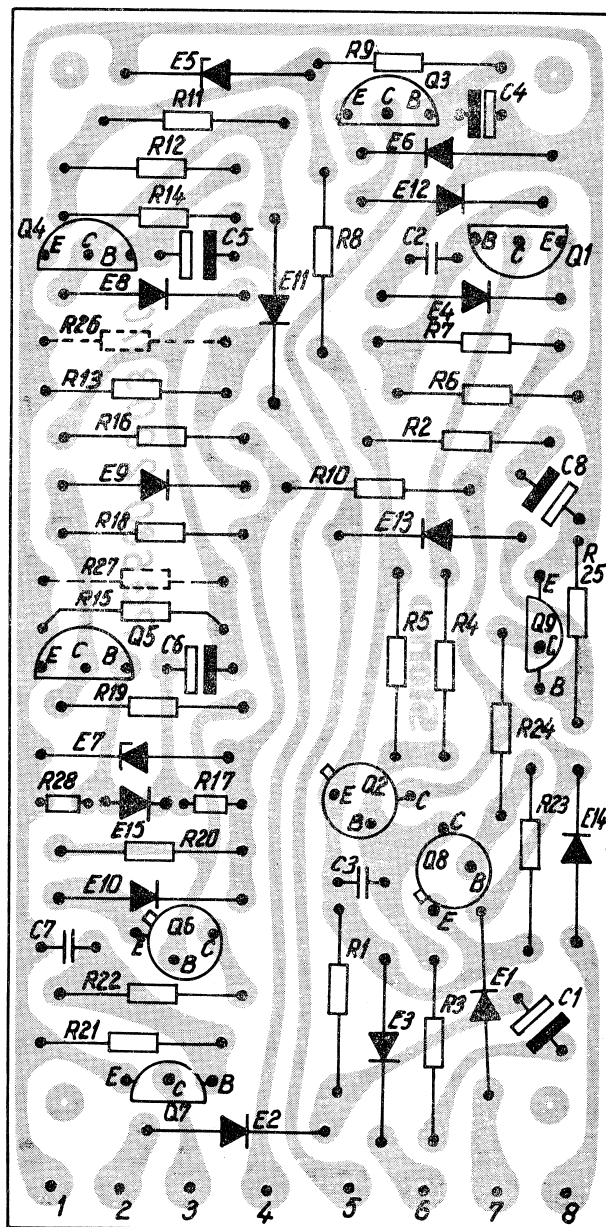
komp list
 X113240
 blad no
 at



105/180
29-8-68
geek. OG
Kontrollierte
X172243

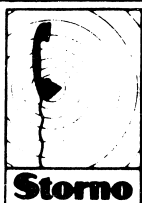
PULSE GENERATOR FOR NUMBER SELECTION
IMPULSGIVER FOR NUMMERVALG
Pg680 - 2003/01
KODE

T66 NR. 1
D 112191
A 3



Trykt kredsløb set fra komponentsiden.

Printed circuit viewed from component side.



konstr./tegn.
KEM/EMJ
15. 11. 70
godk.

09
komp.liste
X113243
D112191

LAY-OUT
Placeringsstegning

PG 680-2003/01
KODE

TEGN NR

D 113418

A 4

no	code	data	no	code	data
C1	73.5102	2,2 μ F 20% tantal 25V	R17	80.5267	33k Ω 5% carb. film 1/8W
C2	76.5070	10nF 10% polyest. PL 50V	R18	80.5266	27k Ω 5% carb. film 1/8W
C3	76.5070	10nF 10% polyest. PL 50V	R19	80.5269	47k Ω 5% carb. film 1/8W
C4	73.5114	1 μ F 20% tantal 35V	R20	80.5265	22k Ω 5% carb. film 1/8W
C5	73.5126	4,7 μ F 20% tantal 35V	R21	80.5265	22k Ω 5% carb. film 1/8W
C6	73.5102	2,2 μ F 20% tantal 35V	R22	80.5257	4,7k Ω 5% carb. film 1/8W
C7	76.5070	10nF 10% polyest. FL 50V	R23	80.5265	22k Ω 5% carb. film 1/8W
C8	73.5126	4,7 μ F 20% tantal 35V	R24	80.5265	22k Ω 5% carb. film 1/8W
R1	80.5261	10k Ω 5% carb. film 1/8W	R25	80.5265	22k Ω 5% carb. film 1/8W
R2	80.5229	22 Ω 5% carb. film 1/8W	R26	80.52xx	adjusted
R3	80.5228	5,6k Ω 5% carb. film 1/8W	R27	80.52xx	adjusted
R4	80.5261	10k Ω 5% carb. film 1/8W	R28	80.5263	15k Ω 5% carb. film 1/8W
R5	80.5253	2,2k Ω 5% carb. film 1/8W	E1	99.5028	1N914
R6	80.5265	22k Ω 5% carb. film 1/8W	E2	99.5028	1N914
R7	80.5258	5,6k Ω 5% carb. film 1/8W	E3	99.5028	1N914
R8	80.5257	4,7k Ω 5% carb. film 1/8W	E4	99.5028	1N914
R9	80.5266	27k Ω 5% carb. film 1/8W	E5	99.5146	BZY60
R10	80.5255	3,3k Ω 5% carb. film 1/8W	E6	99.5219	AAZ15
R11	80.5265	22k Ω 5% carb. film 1/8W	E7	99.5146	BZY60
R12	80.5266	27k Ω 5% carb. film 1/8W	E8	99.5028	1N914
R13	80.5264	18k Ω 5% carb. film 1/8W	E9	99.5028	1N914
R14	80.5257	4,7k Ω 5% carb. film 1/8W	E10	99.5028	1N914
R15	80.5264	18k Ω 5% carb. film 1/8W	E11	99.5028	1N914
R16	80.5257	4,7k Ω 5% carb. film 1/8W	E12	99.5123	AA117
			E13	99.5219	AAZ15
			E14	99.5028	1N914
			E15	99.5028	1N914
			Q1	99.5144	BC214L
			Q2	99.5121	BC107



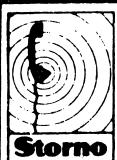
udarb af
OG/LE
30.11.70
kontrol af
D/12191

PARTS LIST
STYKLISTE

PG680-2003/01

comp list
X113243
blad no 1 af 2

no	code	data	no	code	data
Q3	99.5144	BC214L			
Q4	99.5144	BC214L			
Q5	99.5144	BC214L			
Q6	99.5121	BC107			
Q7	99.5144	BC214L			
Q8	99.5121	BC107			
Q9	99.5144	BC214L			



udarb af

kontrol af

tíðn. diagr

PARTS LIST
STYKLISTE

PG680-2003/01

comp list
X113243

blad no 2 af 2

POWER SUPPLY UNIT PS603a

Power supply unit PS603 is operated from the mains. It converts 220V or 240V AC to 24V stabilized DC.

The unit is built on a module chassis, and is intended for installation in a CQF600 station cabinet. It consists of the following main components:

Power transformer
Rectifier
Filter
Series regulator
Electronic protective circuit
Transmit relay.

Circuit Description

Power Transformer

The transformer has three windings. A primary for 220V and 240V, and two secondaries, one for 39/43V and one for 15-0-15V. The 39V tap is used if the mains voltage does not decrease by more than 10%. When using the 43V tap, mains-voltage drops of up to 20% are permissible. A fuse is inserted in the primary circuit.

The transformer meets CCE standard, class II (4 kV primary-to-secondary and primary-to-chassis).

Rectifier and Filter

Rectifier E1 is a bridge-type silicon rectifier. The filter consists of a swinging choke and an electrolytic capacitor C1, chosen in the interests of low ripple, low internal resistance, and reasonable physical dimensions.

Series Regulator

The series regulator is composed of three transistors, a voltage amplifier Q3, a current amplifier Q2, and a series transistor Q1. The base of amplifier transistor Q3 receives, via potentiometer R16, a portion of the output voltage, which it compares with the reference voltage across the zener diode E6 in the emitter circuit of the transistor.

The loop consisting of transistors Q3, Q2, and Q1 will oppose any change in output voltage by regulating the voltage across series transistor Q1 at a value that will keep the output voltage constant.

Electronic Protective Circuit

This circuit cuts off the output current in the case of short-circuits or overloads. It operates on the principle of registering the voltage across a resistor R5, inserted in the collector circuit of series transistor Q1. If the voltage across R5 increases to a value corresponding to approx. 2.8A or more, transistor Q5 will saturate, causing transistors Q1 and Q2 to cut off.

This condition is stable even if the fault which caused the protective circuit to function disappears. The circuit is reset by removing the mains voltage and cutting it in again after approx. 15 seconds, when capacitor C1 will be sufficiently discharged.

The RX and TX voltage outputs are protected against overload by means of transistor Q5 and diodes E12 and E13.

The -24 volts at either the RX or TX terminal will cause either diode E12 or diode E13

to conduct. This will hold the base potential of transistor Q5 below the conducting level.

An overload will cause a voltage drop at the collector of the conducting switch transistor (Q7 or Q8). If the output voltage drops below -23 volts, the base potential of Q5 will raise accordingly. This will bring transistors Q4 and Q5 into the stable condition previously described, causing transistors Q1 and Q2 to cut off.

The output voltage is protected against overvoltage by zener diode E7 which is connected directly across the output. If, for example, the series transistor short-circuits, the output voltage will become so high that E7 becomes conductive and melts, whereafter the fuse S1 in the transformer circuit blows. Both the fuse and the zener diode must be replaced in order to put the equipment back into operation.

Receive-Transmit change-over Circuit

The receive-transmit change-over circuit is composed of transistors Q6, Q7, Q8 and associated components.

In receiving mode transistors Q6 and Q7 are OFF and transistor Q8 is ON, as base current is allowed to flow through diode E10 and resistors R28, R29 and R30. -24 volt is then present at the RX-terminal (4).

Grounding the KEY terminal (7) will bias transistor Q6 ON through resistor R31.

The current through transistor Q6 and resistors R29 and R30 will bring transistor Q7 into saturation placing -24 volt on the TX-terminal (3).

The collector voltage of Q6 will be lower than the break-down voltage of zener diode E10 and transistor Q8 is OFF, as it is deprived of its base current. Consequently the RX voltage is cut off.

Grounding the KEY terminal (7) will also operate the antenna switch relay, which is placed outside the power supply unit. Diode E9 suppresses voltage spikes arising from the antenna relay being released.

NOTE: The power supply unit may be used for both simplex and duplex operation of a radio station. In the latter case a strap must be inserted between terminals 4 and 5.

Technical Specifications

Supply Voltage

220V or 240V +10, -20%, 50 to 60 Hz.

Current Consumption

Approx. 0.5A at max. load of 1.9A.

Output Voltage

24V + 2.5%
Ripple less than 10 mV p-p.

Output Current

Max. 1.9A
-24V RX : 0.3A
-24V TX : 1.3A

Loss

Approx. 60 watts at 264V supply voltage (primary 240V tap) and at maximum output load (1.9A).

Type of Service

Continuous

Temperature

PS603 is intended for mounting on a heat sink, which may assume the following temperatures:

Working range: -25°C to +65°C
Function range: -30°C to +75°C

Weight

4.8 kilos

Dimensions

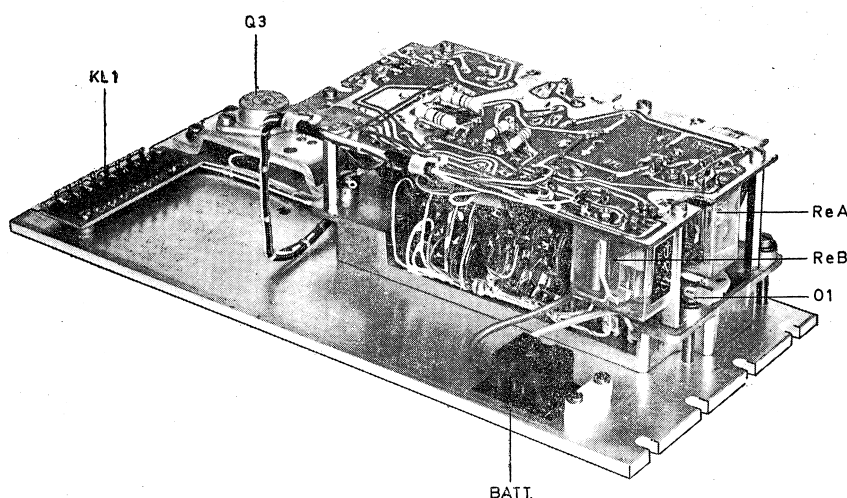
275mm x 150mm x 88mm



TYPE	NO.	CODE	DATA
PS603a	C1	10.1240-01	Power Supply Unit
	C2	73.5111	6000 μ F -10+50% elco
	C3	73.5071	100 μ F -10+50% elco
	C4	76.5089	1 μ F 10% polycarb. FL
	C5	76.5059	2.2 nF 10 polyester FL
	C6	73.5107	25 μ F -10+100% elco
	C7	76.5073	0.1 μ F 10% polyester TB
		73.5126	4.7 μ F 20% tantal
	R1	84.5001	1.8 K Ω 5% wirewound
	R2	84.5001	1.8 K Ω 5% -
	R3	80.5235	68 Ω 5% carbon film
	R4	80.5247	680 Ω 5% -
	R5	83.5501	0.47 Ω 10% wirewound
	R6	80.5229	22 Ω 5% carbon film
	R7	80.5233	47 Ω 5% -
	R8	80.5263	15 K Ω 5% -
	R9	80.5261	10 K Ω 5% -
	R10	80.5261	10 K Ω 5% -
	R11	80.5264	18 K Ω 5% -
	R12	80.5264	18 K Ω 5% -
	R13	80.5249	1 K Ω 5% -
	R14	80.5259	6.8 K Ω 5% -
	R15	80.5259	6.8 K Ω 5% -
	R16	86.5058	1 K Ω 20% potentiometer lin.
	R17	80.5254	2.7 K Ω 5% carbon film
	R18	89.5004	50 Ω 10% NTC
	R19	80.5238	120 Ω 5% carbon film
	R20	80.5257	4.7 K Ω 5% -
	R21	82.5207	470 Ω 10% wirewound
	R22	80.5242	270 Ω 5% carbon film
	R23	80.5268	39 K Ω 5% -
	R24	80.5249	1 K Ω 5% -
	R25	80.5249	1 K Ω 5% -
	R26	80.5249	1 K Ω 5% -
	R27	80.5249	1 K Ω 5% -
	R28	80.5448	820 Ω 5% -
	R29	84.5224	82 Ω 5% wirewound
	R30	84.5224	82 Ω 5% -
	R31	80.5258	5.6 K Ω 5% carbon film
	R32	80.5259	6.8 K Ω 5% -
L1		60.5136	Filter choke 60 mH 2A
T1		60.5135	Mains transformer 100 VA
E1		99.5174	Rectifier 100 V 3 A
E2		99.5020	1N4004 Diode

TYPE	NO.	CODE	DATA
	E3	99.5020	1N4004 Diode
	E4	99.5020	1N4004 Diode
	E5	99.5028	1N914 Diode
	E6	99.5146	Zenerdiode 6.8 V 5%
	E7	99.5132	Zenerdiode 30 V 5%
	E8	99.5146	Zenerdiode 6.8 V 5%
	E9	99.5020	1N4004 Diode
	E10	99.5114	Zenerdiode 5.6 V 5%
	E11	99.5205	Zenerdiode 15 V 5%
	E12	99.5028	1N914 Diode
	E13	99.5028	1N914 Diode
	Q1	99.5171	2N3055 Transistor
	Q2	99.5193	2N3054 Transistor
	Q3	99.5121	BC107 Transistor
	Q4	99.5173	2S301 Transistor
	Q5	99.5214	BCY65 Transistor
	Q6	99.5235	BD135 Transistor
	Q7	99.5171	2N3055 Transistor
	Q8	99.5171	2N3055 Transistor
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W
			1/4 W

Power Supply Unit PS604



Power supply unit PS604 is a converter power supply which converts 12 or 24 volts of battery voltage into a 24-volt stabilized DC voltage.

The unit is built on a module chassis, and is intended for installation in a CQF600 station cabinet. It consists of the following main components:

- DC converter with voltage switch
- Series regulator
- Starter and transmit relay

Voltage switching is performed by means of a rotary switch. Besides, when switching from 24V to 12V battery voltage a strap must be inserted between the C terminal of the power supply unit and the +Batt. terminal (see circuit diagram of PS604).

Mode of Operation

DC Converter

The DC converter is a conventional push-pull type with two transistors in a common-emitter circuit and the transformer inserted in the collector circuit, the feedback windings being connected to the bases.

The converter frequency is between 1 and 4 kHz.

The transformer primary consists of four identical centre-tapped windings which are connected either in series or in parallel depending on the battery supply voltage. For 12V, they are partly in series and partly in parallel; for 24V, they are in series.

An inductance between the bases of the two transistors is so dimensioned that its core will saturate before that of the transformer. This arrangement protects the transistors from excessive peak currents.

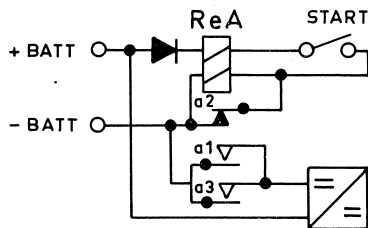
The transformer secondary has a main winding with taps for matching, and an auxiliary winding. The main winding connects to a bridge rectifier. The secondary auxiliary winding is used to furnish a positive auxiliary voltage for the following series regulator and also powers the starter lamp of the radio station.

Series Regulator

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

The base of the amplifier transistor receives, via an alignment potentiometer, a portion of the output voltage. A reference diode in the emitter circuit compares the voltage across it with the base voltage. The collector of the amplifier transistor connects to the base of the control begins to increase, so will the collector current of the amplifier transistor, and the base voltage for the control transistor will decrease. This will cause the base voltage for the series transistor to decrease, and the voltage drop across the latter will increase, resulting in a drop in output voltage. The output voltage is adjusted for -24V by means of alignment potentiometer R14. A zener diode across the regulator output protects the transmitter-receiver modules against overvoltage in the case of defects in the series regulator since the voltage cannot exceed a certain potential (approx. 30V).

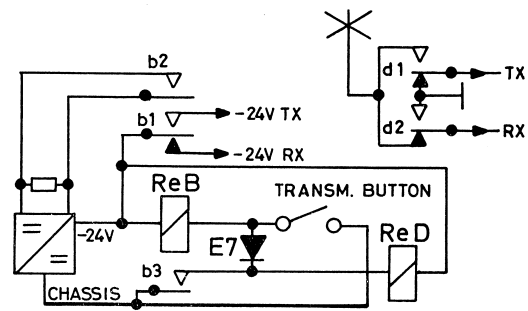
Starter Relay



The starter relay (Re. A) serves the purpose of turning the battery voltage for the power supply unit on and off; this is done via contact pairs a1 and a3. The relay has two coils, but only one of them is energized for starting, the other coil being short-circuited via one of the contact pairs of the relay (a2). After the station has been started, this latter contact pair will break, thereby connecting the two coils in series and reducing the holding current. A diode in series with the relay protects the power supply unit against incorrect battery voltage polarity.

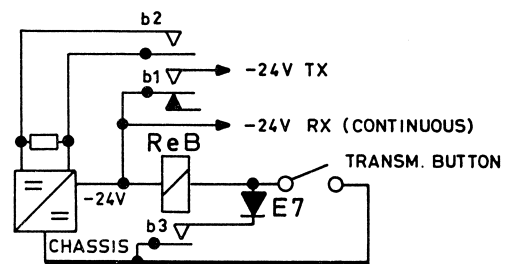
Transmit Relay (function in simplex operation)

Transmit relay (Re. B) is operated from the control box or control equipment. This relay switches the supply voltage back and forth be-



tween the receiver and transmitter sections (contact set b1) and short-circuits a feedback resistance in the DC converter during transmission (contact set b2); the latter operation is performed in order to obtain maximum efficiency at fluctuating converter loads. When the transmit relay is operated, the antenna switching relay - placed outside the power supply unit - is energized via the DC path through diode E7 and the transmit button to earth. This occurs simultaneously with the operation of the transmit relay, but since the operating time of the antenna switching relay is shorter than that of the transmit relay, the antenna will be connected to the transmitter before the latter begins to operate and can deliver any power. On switching to receive, the transmit relay will be de-energized before the antenna relay because the latter relay remains operated via contact set b3 of the transmit relay.

(function in duplex operation)



In duplex operation, the antenna switching function is not performed, and the power supply unit delivers -24V for the receiver section continuously.

Technical Specifications

Supply Voltages

Measured at input terminals

Supply Voltage	Minimum	Nominal	Maximum
12V	10.0V	12.6V	16.5V
24V	20.0V	25.2V	33.0V

Output Voltage

Regulated, -24V.

Output Voltage Fluctuation

For temperature and load fluctuations.

Less than $\pm 0.6V$.

Current Consumption, typical

Voltage	Receiver Setting		Transmitter Setting	
	$I_{out} = 0A$	$I_{out} = 0.5A$	$I_{out} = 0A$	$I_{out} = 1.6A$
12.6V	0.2A	1.9A	0.5A	6.2A
25.2V	0.11A	0.88A	0.2A	2.7A

Output Load

Receive: max. 0.5A.

Transmit: max. 1.6A.

Output Voltage Ripple

Less than 10 mV p-p.

Converter Frequency

1-4 kHz.

Temperature Range

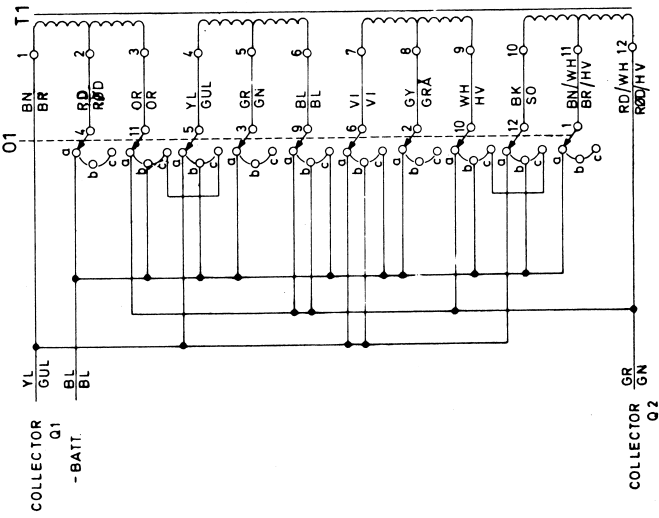
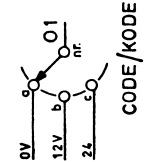
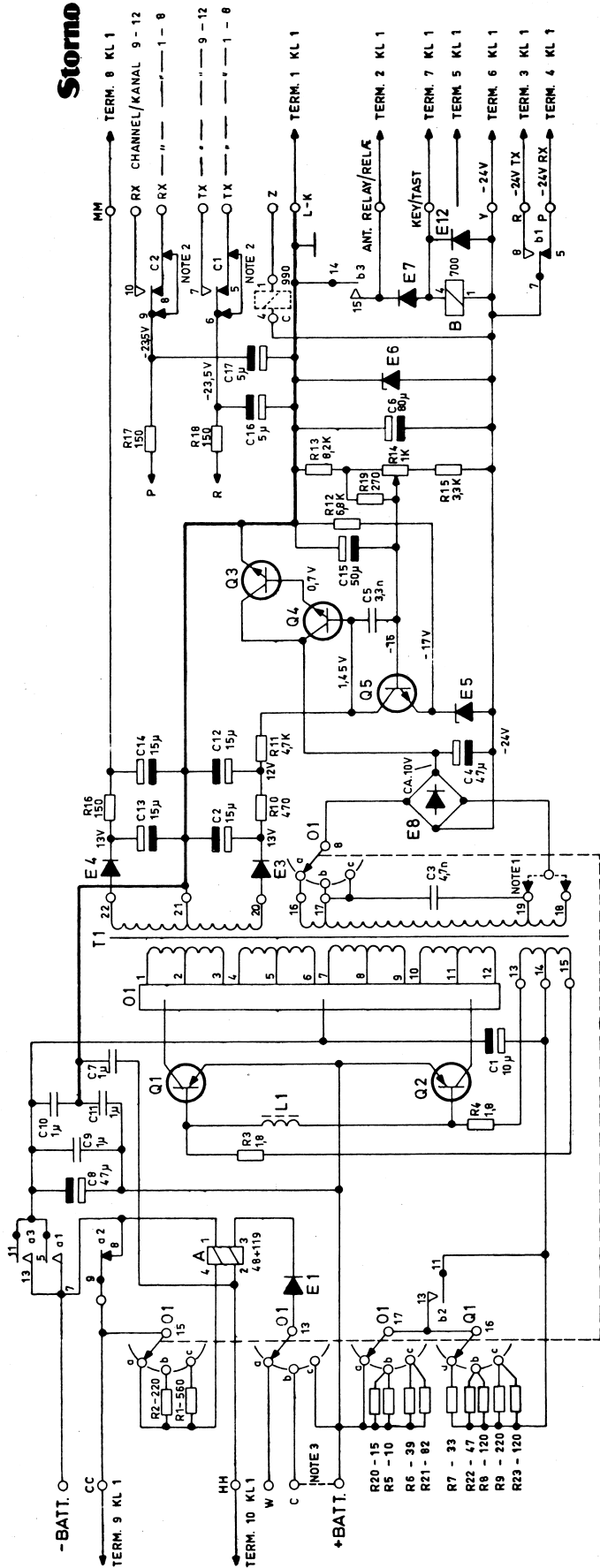
Ambient temperature:

Working range: $-25^{\circ}C$ to $+70^{\circ}C$.

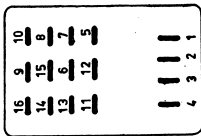
Function range: $-30^{\circ}C$ to $+80^{\circ}C$.

Storno

Storno



- Note 1. Normal supply voltage: Connect E8-11 to term. 18 on T1.
High supply voltage: Connect E8-11 to term. 19 on T1.
- Normal driftspending: Forbind E8-11 til terminal 18 på T1.
Høj driftspending: Forbind E8-11 til terminal 19 på T1.
- Note 2. Group switching relay C is inserted if more than 8 frequency channels are provided.
If relay C is omitted two strappings will be made (as shown).
Gruppeskifterelæ C er isat, hvis anlægget er bestykket med mere end 8 frekvenskanaler.
Er relæ C udeladt, indlægges de viste to strappinger.
- Note 3. Connection for operating on 12 V.
Forbindelse ved 12 V drift.



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

POWER SUPPLY UNIT STRØMFORSYNINGSENHED

PS604

D400.790/4

TYPE	NO.	CODE	DATA
	C1	73.5100	10 μ F -10/+100 % elco
	C2	73.5105	15 μ F \pm 20 % tantal
	C3	76.5061	4, 7 nF 10 % polyester, FL
	C4	73.5101	47 μ F -10/+100 % elco
	C5	76.5060	3, 3 nF 10% polyester, FL
	C6	73.5110	80 μ F -10/+50% elco
	C7	76.5078	1 μ F 10 % polyester, TB
	C8	73.5101	47 μ F -10/+100 % elco
	C9	76.5078	1 μ F 10% polyester, TB
	C10	76.5078	1 μ F 10% polyester, TB
	C11	76.5078	1 μ F 10% polyester, TB
	C12	73.5105	15 μ F \pm 20% tantal
	C13	73.5105	15 μ F \pm 20% tantal
	C14	73.5105	15 μ F \pm 20% tantal
	C15	73.5030	50 μ F -10/+100% elco
	C16	73.5064	2 μ F -10/+100% elco
	C17	73.5064	2 μ F -10/+100% elco
	R1	82.5046	560 Ω 5% carbon film
	R2	81.5041	220 Ω 5% " "
	R3	84.5022	1, 8 Ω 10% wirewound
	R4	84.5022	1, 8 Ω 10% " "
	R5	84.5019	10 Ω 10% " "
	R6	81.5032	39 Ω 5% carbon film
	R7	81.5031	33 Ω 5% " "
	R8	80.5438	120 Ω 5% " "
	R9	80.5441	220 Ω 5% " "
	R10	80.5245	470 Ω 5% " "
	R11	80.5257	4, 7 k Ω 5% " "
	R12	80.5259	6, 8 k Ω 5% " "
	R13	80.5260	8, 2 k Ω 5% " "
	R14	86.5045	1 k Ω potm. lin. carbon film
	R15	80.5255	3, 3 k Ω 5% carbon film
	R16	80.5239	150 Ω 5% " "
	R17	80.5239	150 Ω 5% " "
	R18	80.5239	150 Ω 5% " "
	R19	80.5242	270 Ω 5% " "
	R20	81.5027	15 Ω 5% " "
	R21	81.5036	82 Ω 5% " "
	R22	80.5433	47 Ω 5% " "
	R23	80.5438	120 Ω 5% " "
	L1	61.803	Coil/spole
	T1	60.5133	Transformer 6-12-24V/24V 70VA 1-3kHz
	ReA	58.5053	Relay/Relæ 6V 48 + 119 Ω 1-1-2
	ReB	58.5052	Relay/Relæ 24V 700 Ω 21-21

TYPE	NO.	CODE	DATA
	ReC	58.5055	Relay/Relæ 24V 890 Ω 21-21-21-21
	01	47.367	Selector/omskifter
	E1	99.5020	Diode 1N4004
	E3	99.5020	Diode 1N4004
	E4	99.5020	Diode 1N4004
	E5	99.5146	Zenerdiode 6, 9V 5%, 0, 275 W
	E6	99.5132	Zenerdiode 30V 5% 0, 2 W
	E7	99.5020	Diode 1N4004
	F8	99.5174	Rectifier 3A 100V
	E12	99.5020	Diode 1N4004
	Q1	99.5126	Transistor 2N2492
	Q2	99.5126	Transistor 2N2492
	Q3	99.5130	Transistor 40251
	Q4	99.5128	Transistor 2N3053
	Q5	99.5121	Transistor BC107

POWER SUPPLY UNIT
STRØMFORSYNINGSENHED PS604

X400.862/2

Radio Telephone System Interface Panel for 2-way Dialling, Automatic Selection,

RP680-2003.

1. Application.

The interface panel is used as a connection circuit between private, fully automatic telephone exchanges and terminal equipment for Storno's radio telephone system for 2-way automatic selection, type CAF680-2003. The interface panel may, e.g., be connected to L.M.E. FLR(BCG 2730).

2. Brief System Description of CAF680-2003:

2.1 2-way automatic selection.

2.1.1 Calls, outgoing.

The subscriber first dials the "radio number" of the PAC, which causes the FLR to activate the interface panel of the terminal equipment. Dialling tone is received from the terminal equipment when connection has been established. The transmitter of the base station is keyed, and engaged signal by lamp indication is received in the mobile stations. At the same time tone keying will be blocked in the mobile stations. The subscriber then dials the number of the mobile station. The number pulses are registered in the terminal equipment and are converted into a mobile selective tone call (4 tones in sequence). The radio side is disconnected by the exchange side replacing the handset.

2.1.2 Calls, incoming.

From the calling mobile station a calling tone signal is transmitted. When the dialling tone from the exchange is heard in the loudspeaker, the number of the subscriber is pressed on a keying board.

The double tone signals received in the terminal equipment are converted into pulse trains, which correspond to the dialling pulses to the exchange. A digit control signal is transmitted for each digit back to the mobile station as check of correct pulsation to PAC. Connection is switched off by an end signal (tone signal) from the mobile station. If no switching off signal is transmitted, automatic disconnection will occur after a short while. (Adjustable, max. of 70 seconds after reception of latest carrier wave from the mo-

bile station).

2.2 Mobile-to-mobile call.

Any mobile station can be called individually by any other mobile station. In connection with calling, a particular tone call signal is first transmitted; then the dialling tone is obtained from the terminal equipment. In the interface panel, RP680-2003, the audio frequency connection between the telephone and the radio side is disconnected, the line pulsation relay being connected in the usual way to the line to the exchange side. If a subscriber dials the radio number of the exchange, an engaged tone signal is received from the terminal equipment.

The calling mobile station calls another mobile station by pressing the number on the keying board. The tone signals are converted into number pulsation to the register for the tone call transmitter. The selective tone call is transmitted automatically when 2 digits are received.

Disconnection is effected in the usual way by an end signal being transmitted from one of the communicating mobile stations - or automatically after a certain period.

2.3 Automatic number selection.

The terminal equipment is also able to transmit automatically number pulsation for pre-selected subscribers. This principle is applied if relatively cheap mobile equipment is to be connected to the system. From the mobile stations, a special call tone signal is transmitted. When the dialling tone from the exchange is heard in the loudspeaker, only one subscriber button is activated after pre-setting of a subscriber selector (maximum 10 subscribers).

Number pulsation for the whole of the subscriber number (maximum 3 digits) is then transmitted automatically to the PAC.

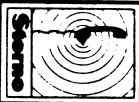
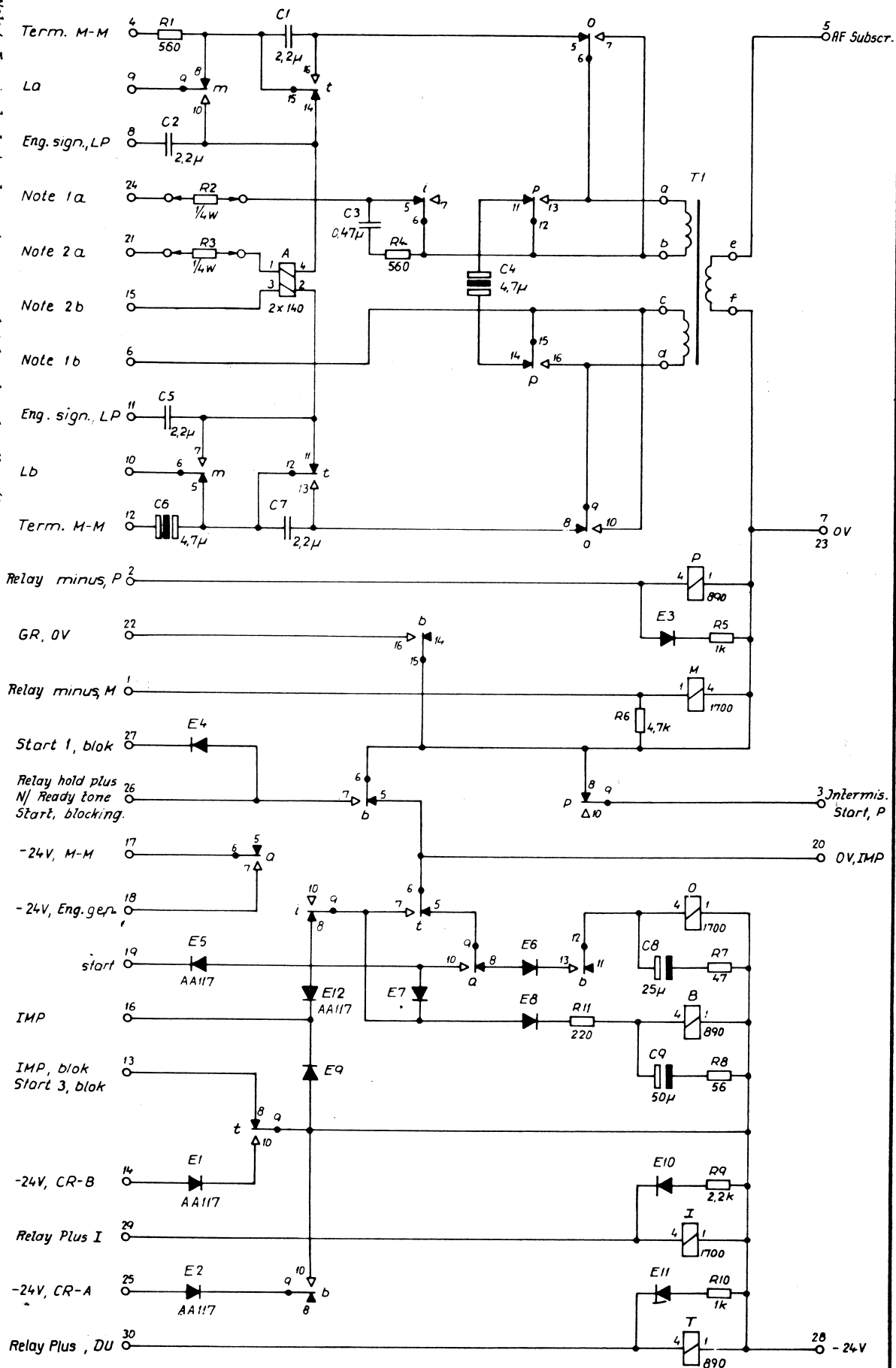
The conversation is disconnected by clearing down of the tone transmission or automatically after the lapse of a certain period.

3. Relay functions, RP680-2003.

- A Outgoing call pulsation relay.
- I Ingoing call pulsation relay.
- O Operates during outgoing call pulsation.
- P Operates during ingoing call pulsation.
- B Ingoing and outgoing traffic connection relay.
- T Mobile call connection relay. Time-held at DU.(Delay circuit).

Note 1: Terminals to be strapped or connected to external voltage (i.e. from exchange) R2 selected for nominal line current for dial pulse relay in exchange interface panel.

Note 2: Terminals to be strapped or connected to 0 and -24V. R3 selected for JA = 22 mH.

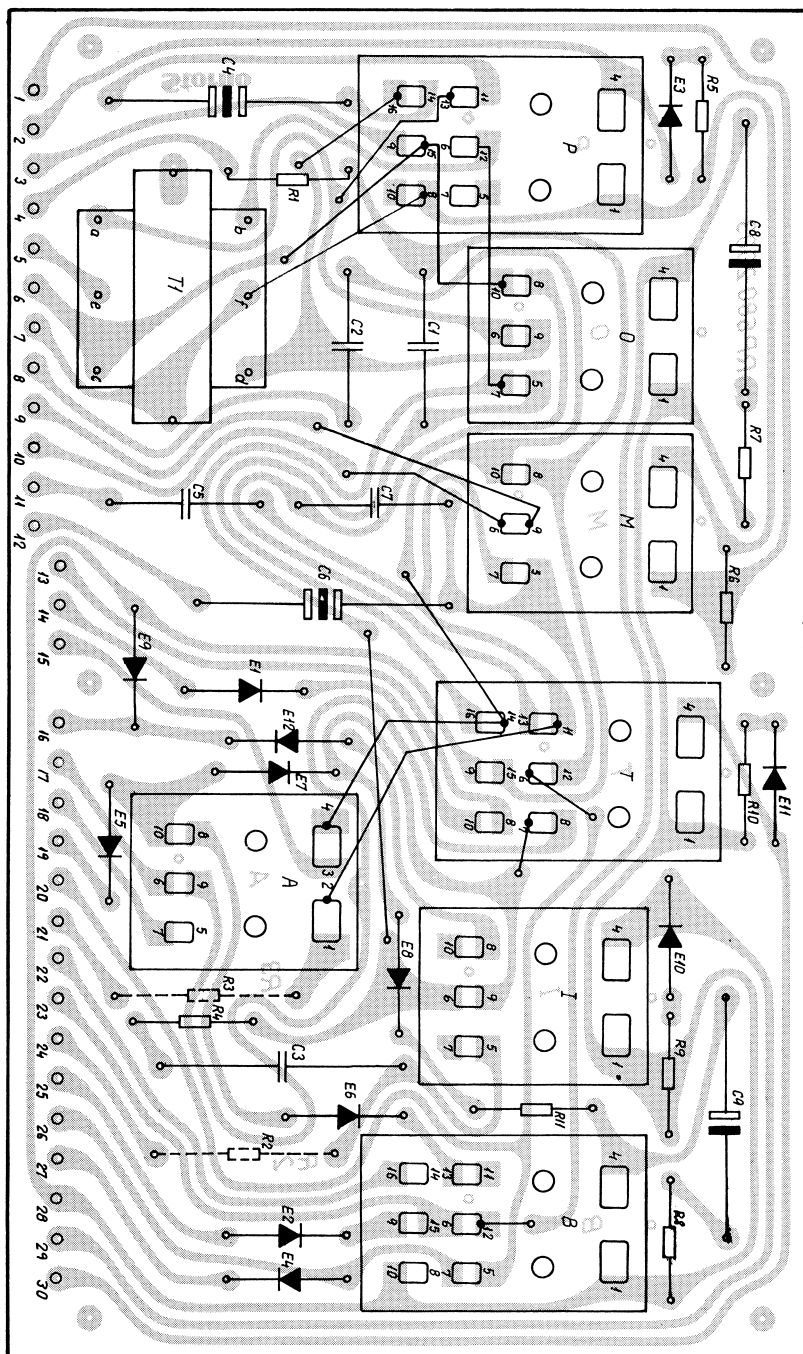


TECHNICAL
RP 680-2003
(2-WAY DRILLING)

TECHNICAL
RP 680-2003
(2-WAY DRILLING)

TECHN. NR
D 111381 E
A3

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRIKT KREDSLØB SET FRA KOMPONENTSIDEN



NOTAT: Ingen
06/AMM
28.8.59.
spdk.
06
DHI381
X113247

TERMINAL INTERFACE RELAY PANEL
OVERDRAGER FOR RADIOTELEFONSYSTEM
MED 2-VÆTS AUTOMATVÆLG
RP 680-2003
(2 WAY DIALLING)

TEGN NR
D113401
A 3

no	code	data	no	code	data
C1	76.5081	2,2 μ F polyest. FL 68V			
C2	76.5081	2,2 μ F polyest FL 68V			
C3	76.5076	0,47 μ 10% polyest. TB 100V			
C4	73.5007	4,7 μ F -10+100% (Bip) 100V			
C5	76.5081	2,2 μ F polyest. FL 68V			
C6	73.5007	4,7 μ F -10+100% (Bip) 100V			
C7	76.5081	2,2 μ F polyest. FL 68V			
C8	73.5107	25 μ F -10+100% elko 35V			
C9	73.5030	50 μ F -10+100% elko 25V			
R1	80.5246	560 Ω 5% carb. film 1/8W			
R2	80.52xx	adjusted 1/4W			
R3	80.52xx	- - - - -			
R4	80.5246	560 Ω 5% carb. film 1/8W			
R5	80.5249	1k Ω - - - - -			
R6	80.5257	4,7k Ω - - - - -			
R7	80.5233	47 Ω - - - - -			
R8	80.5234	56 Ω - - - - -			
R9	80.5253	2,2k Ω - - - - -			
R10	80.5249	1k Ω - - - - -			
R11	80.5241	220 Ω - - - - -			
E1	99.5123	AA117			
E2	99.5123	- -			
E3	99.5028	1N914			
E4	99.5028	- -			
E5	99.5123	AA117			
E6	99.5028	1N914			
E7	99.5028	- -			
E8	99.5028	- -			
E9	99.5028	- -			
E10	99.5028	- -			
E11	99.5028	- -			
E12	99.5123	AA117			
ReA	58.5032	Relay 12V 2x140 Ω 21-21			
ReP	58.5055	Relay 24V 890 Ω 21-21, 21-21			
ReM	58.5062	Relay 24V 1700 Ω 21-21			
ReO	58.5062	Relay 24V 1700 Ω 21-21			
ReB	58.5055	Relay 24V 890 Ω 21-21 21-21			
ReI	58.5062	Relay 24V 1700 Ω 21-21			
ReT	58.5055	Relay 24V 890 Ω 21-21 21-21			
T1	60.5097	JSO, 32P 8867-4			



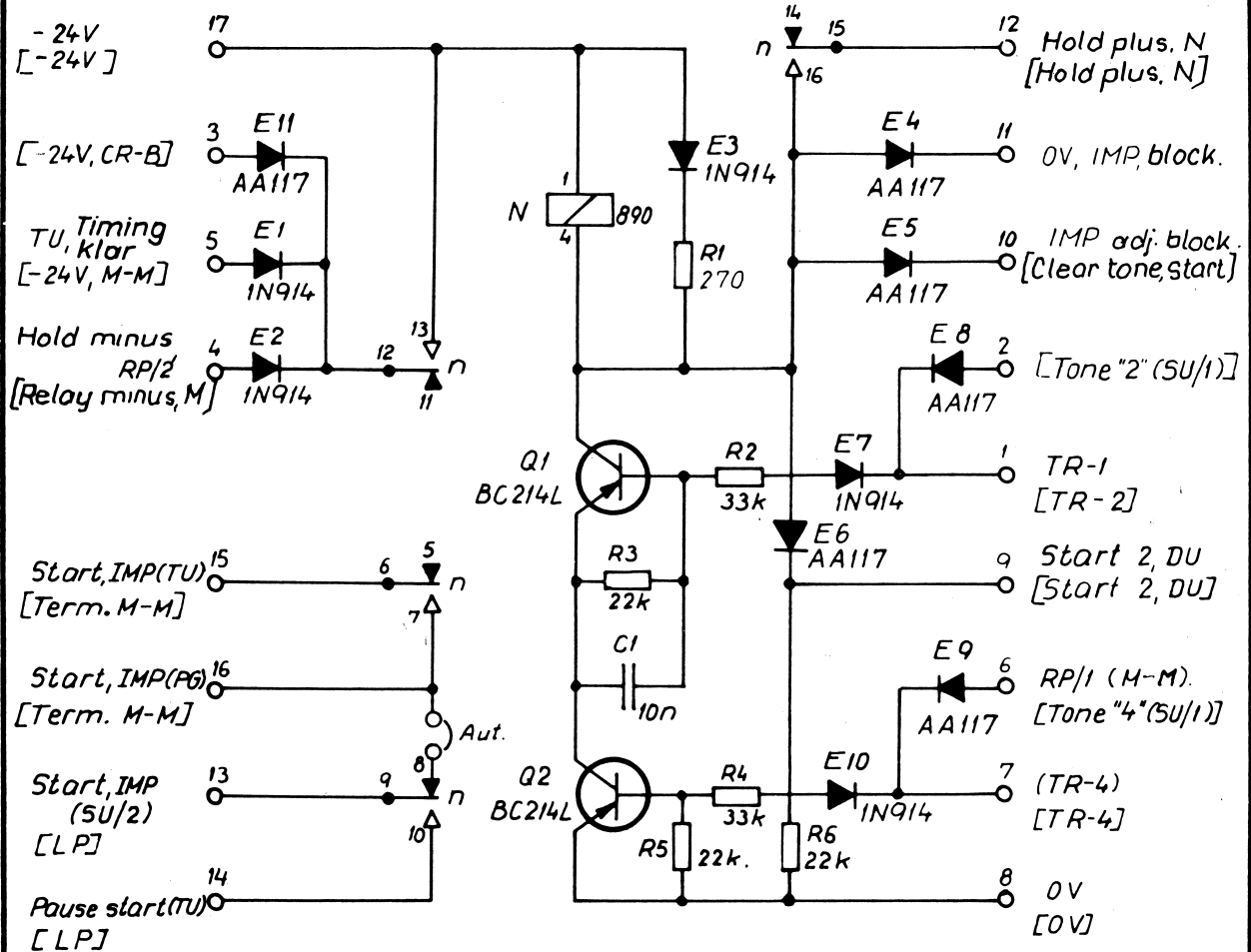
OG/SL
11.8.69
kontrol of
06
třih. diag.
D11381

PARTS LIST
STYKLISTE

RP680-2003

comp list
X113247

blad no 1 of 1



konstr./tegn.
06 / 80
18-6-68

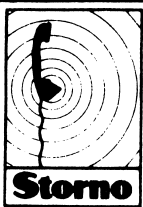
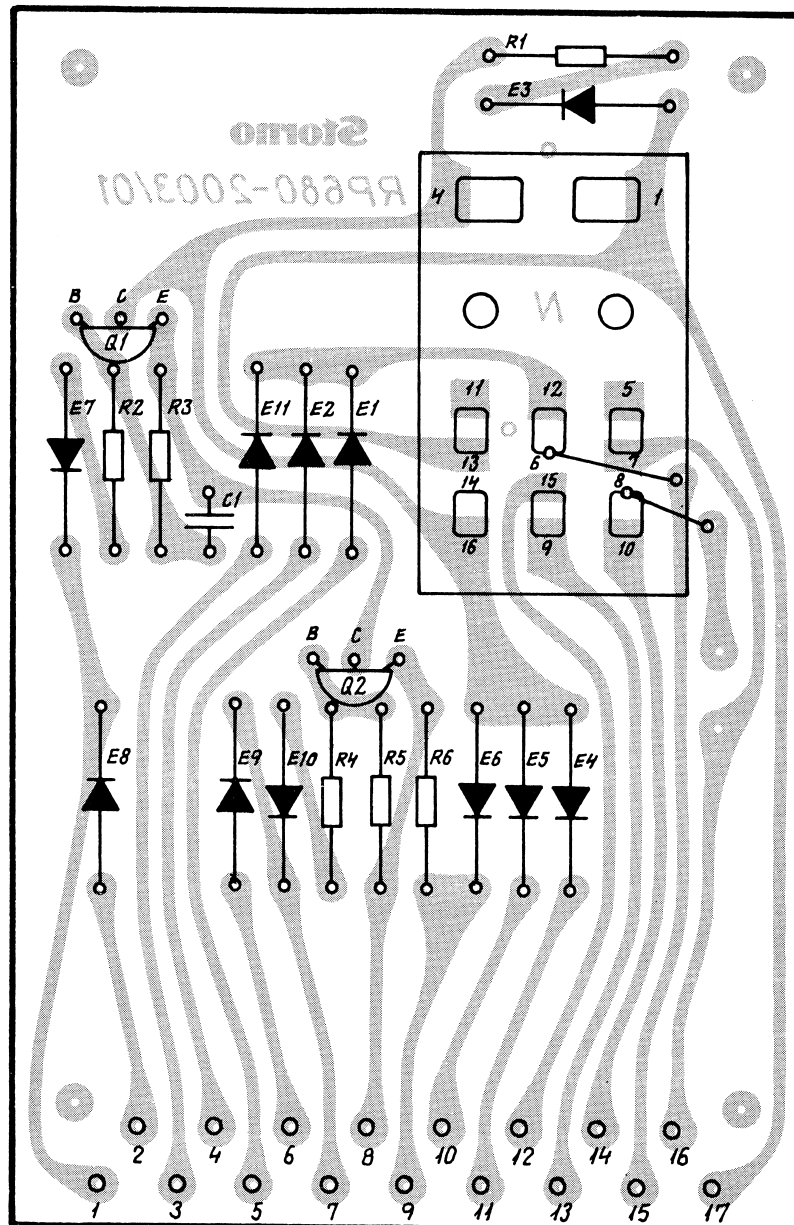
godk.
06

komp.liste
X113252

START CIRCUIT FOR AUTOMATIC NUMBER SELECTION
(START CIRCUIT FOR MOBILE-MOBILE NUMBER SEL.)
STARTKREDS FOR AUTOMATISK NUMMERVERG
(STARTKREDS FOR MOBIL-MOBIL NUMMERVERG)
RP680-2003/01

TEGN. NR.
D 111426E
A 4

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



konstr./tegn.
OG/AMM
10.9.69
godk.
OG
komp.liste
DH3374
X113252

START CIRCUIT FOR AUTOMATIC NUMBER SELECTION
(START CIRCUIT FOR MOBILE-MOBILE NUMBER SEL.)
STARTKREDS FOR AUTOMATISK NUMMERVALG
(STARTKREDS FOR MOBIL-MOBIL NUMMERVALG
RP680-2003/01

TEGN. NR.

D113374

A4

no	code	data	no	code	data
C1	76.5070	10nF 10% polyest. FL 50V			
R1	80.5242	270Ω 5% carb. film 1/8W			
R2	80.5267	33kΩ - - - -			
R3	80.5265	22kΩ - - - -			
R4	80.5267	33kΩ - - - -			
R5	80.5265	22kΩ - - - -			
R6	80.5265	- - - -			
E1	99.5028	1N914			
E2	99.5028	- -			
E3	99.5028	- -			
E4	99.5123	AA117			
E5	99.5123	- -			
E6	99.5123	- -			
E7	99.5028	1N914			
E8	99.5123	AA117			
E9	99.5123	- -			
E10	99.5028	1N914			
E11	99.5123	AA117			
Q1	99.5144	BC214L			
Q2	99.5144	- - -			
ReN	58.5055	Relay 24V 890Ω 21-21, 21-21			



udarb of
OG/SL
18.69
kontrol of
06
třih. diagr
0111426

PARTS LIST
STYKLISTE

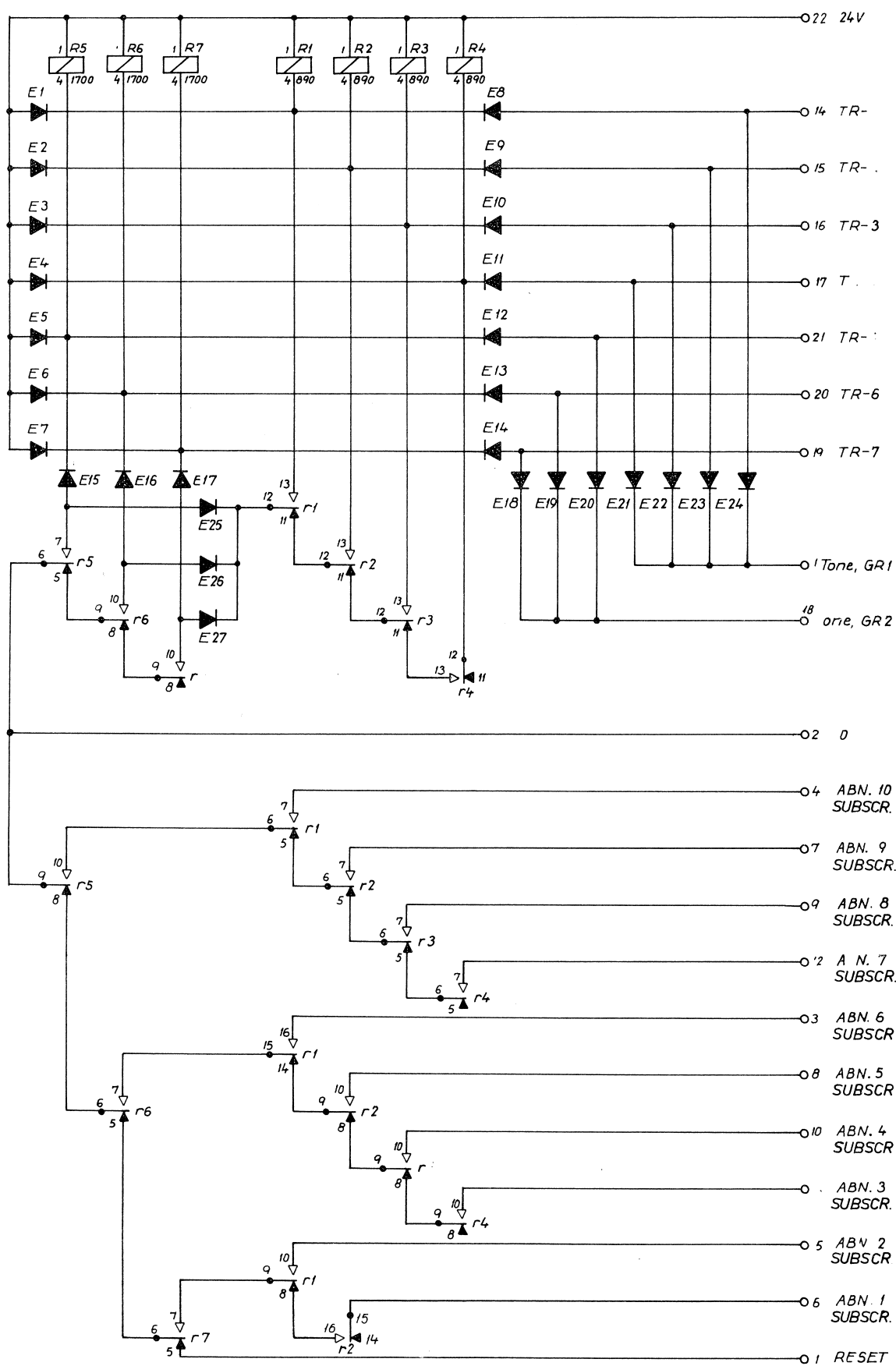
RP680-2003/01

comp list
X113252

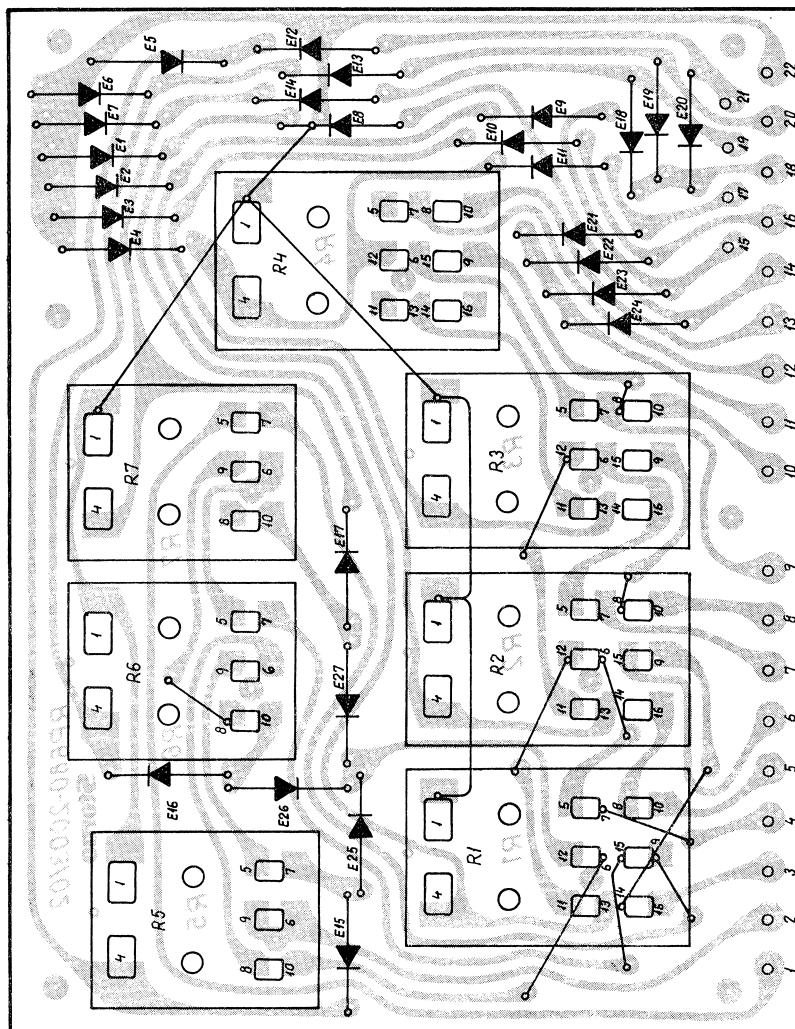
blad no 1 of 1


REGISTER (1 OF 10) OUT, FOR 2 OF 7 IN)
REGISTER (1 AF10+1 UD, FOR 2 A.7 IND)
RP680 - 2003/02

D 111 51
A 3



PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



	KVALITET 0,6 / 100 28 8 59 spak OG KVALITET 0,6 / 100 28 8 59 spak OG
--	--

REGISTER (1 OF 10+1 OUT FOR 2 OF 7 IN)
REGISTER (1 AF 10+1 UD, FOR 2 AF 7 IND).

RP 680-2003/02

KODE

A3

TECH NR
D113402

no	code	data	no	code	data
E1- E27	99-5028	Diode 1N914			
ReR1	58.5055	Relæ 24V 890Ω 21-21, 21 -21			
ReR2	58.5055	- - - - -			
ReR3	58.5055	- - - - -			
ReR4	58.5055	- - - - -			
ReR5	58.5062	- - - - -			
ReR6	58.5062	- - - - -			
ReR7	58.5062	- - - - -			



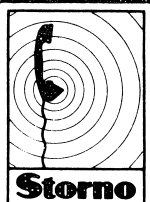
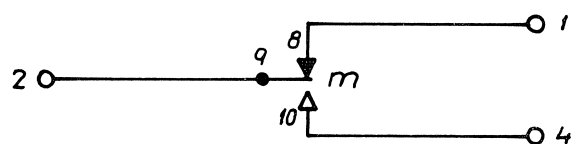
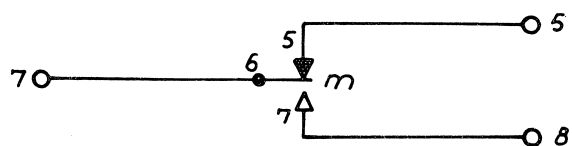
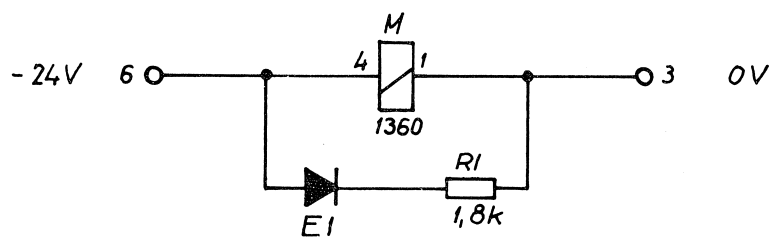
udarb af
H.8.89
kontrol af
06
tilh diagr
DH1451

PARTS LIST
STYKLISTE

RP680-2003/02

comp liste
X113254

blad no 1 af 1



konstr./tegn.
OG/80
18-9-68
godk.
OG
komp.liste
X113255

RELAY PANEL
RELÆPANEL

RP680 - 2003/03

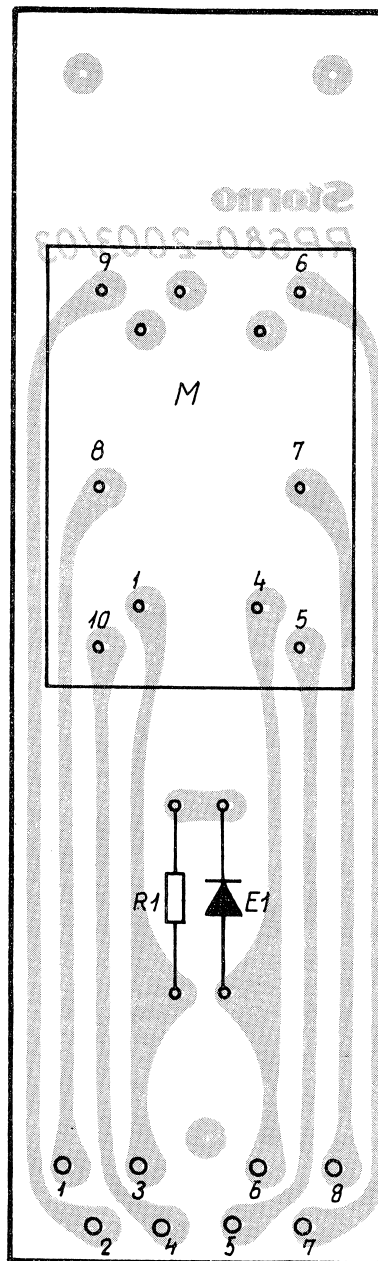
KODE

TEGN. NR.

D111871

A4

PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
 TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr./tegn.
 OG / AMM
 3. 9. 69.
 godk.
 06
 komp liste
 D118771
 X113255

RELAY PANEL, RELÆPANEL
 RP 680-2003/03

KODE

TEGN NR

D113421

A 4

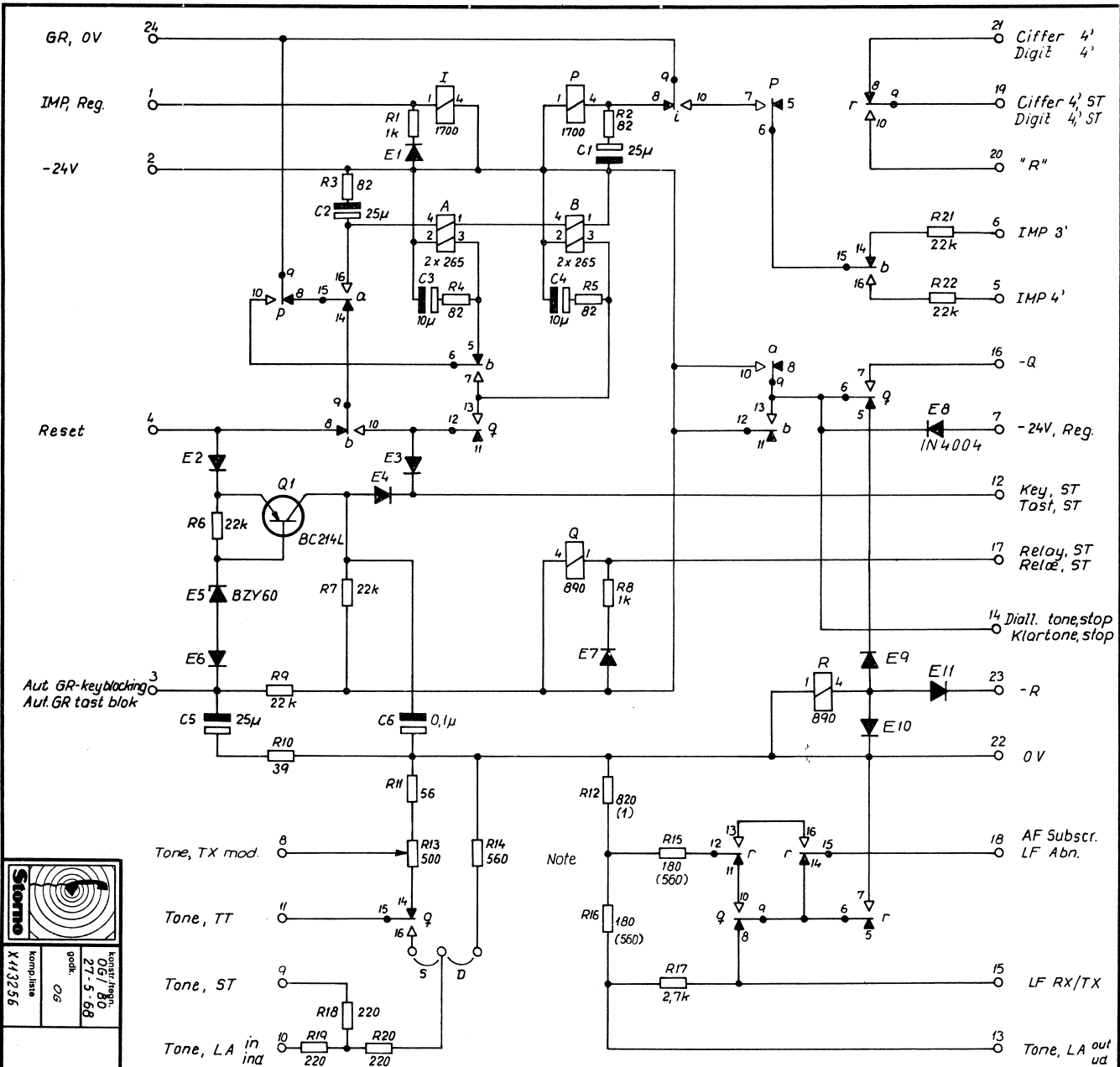
no	code	data	no	code	data
R1	80.5252	1,8k Ω 5% carbon film 1/8W			
E1	99.5028	1N914 Diode			
ReM	58.5069	Relais 24V 1360 Ω 21 - 21			

	udarb of
	OG/HNi
	22.10.70
	kontrol at
	OG
	titih diagr
	D111 871

PARTS LIST
STYKLISTE

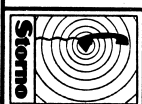
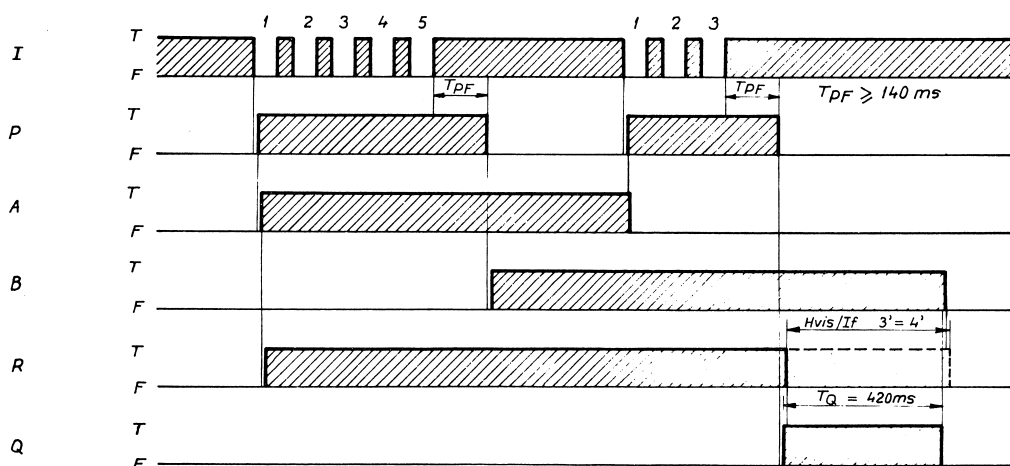
RP680-2003/03

comp liste
X113255
blad no 1 of 1



Note: Værdierne i parantes isættes, dersom der ikke ønskes sekvens-tonemedhør.
Values in () are used if monitoring of the sequence tone signal in the subscriber sets is undesired.

Relay Function Plan / Relæ Funktionsskema



Konstr. / tegn. 06/80
27-5-68
godk. 06
K413256

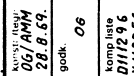
PULSE CONTROL PANEL RP680-2002/06
IMPULSKONTROLPANEL

KODE

TEGN. NR.
D 111296
A3

TEGN NR

XODE



no	code	data	no	code	data
C1	73.5107	25 μ F -10+100% elko 35V	ReQ	58.5055	Relay 24V 890 Ω 21-21 21-21 A
C2	73.5107	- - - - -	ReR	58.5055	- - - - -
C3	73.5100	10 μ F -10+100% elko TB 35V	Q1	99.5144	BC 214 L
C4	73.5100	10 μ F -10+100% elko TB 35V			
C5	73.5107	25 μ F -10+100% elko 35V			
C6	73.5089	0,1 μ F 20% tantal 35V			
R1	80.5249	1k Ω 5% carbon film 1/8W			
R2	80.5236	82 Ω - - - -			
R3	80.5236	- - - - -			
R4	80.5236	- - - - -			
R5	80.5236	- - - - -			
R6	80.5265	22k Ω - - - -			
R7	80.5265	- - - - -			
R8	80.5249	1k Ω - - - -			
R9	80.5265	22k Ω - - - -			
R10	80.5232	39 Ω - - - -			
R11	80.5234	56 Ω - - - -			
R12	80.5248	820 Ω - - - -			
R13	86.5042	500 Ω 20% trim. carbon film 0.1W lin.			
R14	80.5246	560 Ω 5% carbon film 1/8W			
R15	80.5240	180 Ω - - - -			
R16	80.5240	- - - - -			
R17	80.5254	2,7 k Ω - - - -			
R18	80.5241	220 Ω - - - -			
R19	80.5241	- - - - -			
R20	80.5241	- - - - -			
R21	80.5265	22k Ω - - - -			
R22	80.5265	22k Ω - - - -			
E1	99.5028	1N914 Diode			
E2	99.5028	- - - -			
E3	99.5028	- - - -			
E4	99.5028	- - - -			
E5	99.5146	Zenerdiode 6,8V 5% 0,240W BZY60			
E6	99.5028	1N914 Diode			
E7	99.5028	- - - -			
E8	99.5020	1N4004 Diode			
E9	99.5028	1N914 Diode			
E10	99.5028	- - - -			
E11	99.5028	- - - -			
ReA	58.5061	Relay 24V 2 x 265 Ω 21-21, 21-21			
ReB	58.5061	Relay 24V 2 x 265 Ω 21-21, 21-21			
ReP	58.5062	Relay 24V 1700 Ω 21-21 A			
ReI	58.5062	- - - - -			



udarb at
OG/SL
11.8.69
kontrol at
08
Dih diag
D11/296

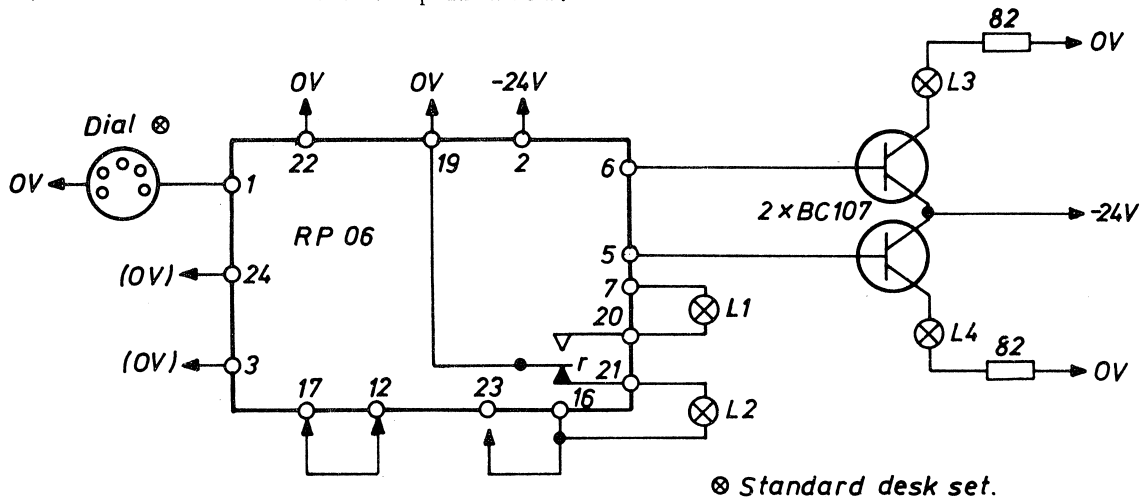
PARTS LIST
STYKLISTE

RP680-2002/06

comp list
X113256
blad no 1 of 1

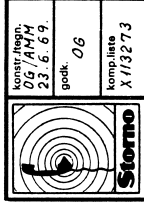
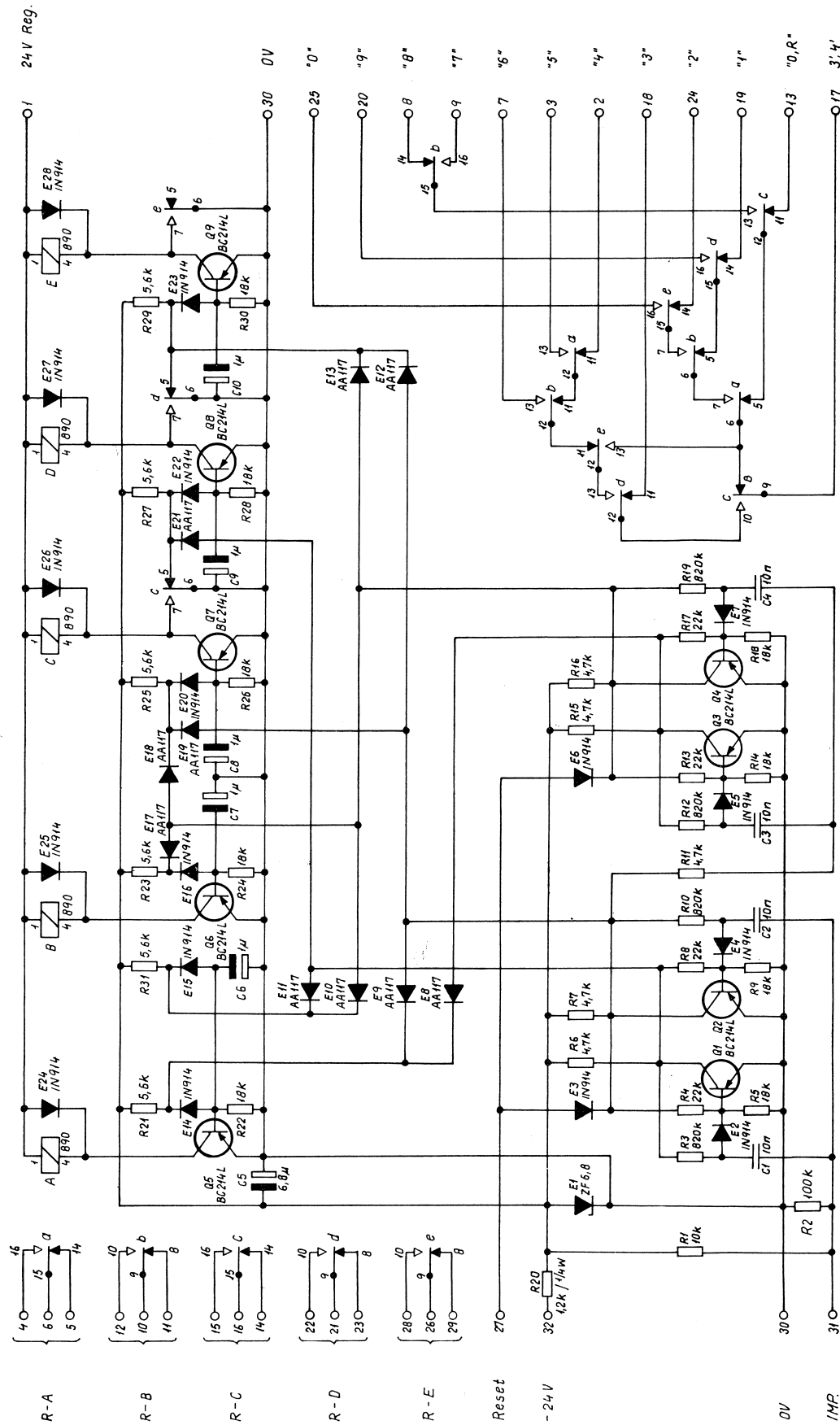
RP680-2002/06.
Test procedure.

1. The shown test set-up is used.



2. When the external PS is connected relay I will be energized. Connect term. 24 to 0V.
3. Dial digit 3. The relays are energized as shown on drwg. D111296*
4. When the first digit is dialled lamp L₁ wil illuminate and lamp L₃ will flash in time with the dialling pulses. When the second digit is dialled lamp L₄ will flash.
5. When the second digit has been dialled L₁ will extinguish and L₂ will be illuminated.
6. Connect term. 16 with 23. Now relay R will be energized, L₂ will extinguish and L₁ will illuminate again.
7. Break the connection between the term. 12 and 17. The Q, B and R relays will be released and L₁ will extinguish.
8. Repeat 3 and 7.

* Impulse control panel RP680-2002/06

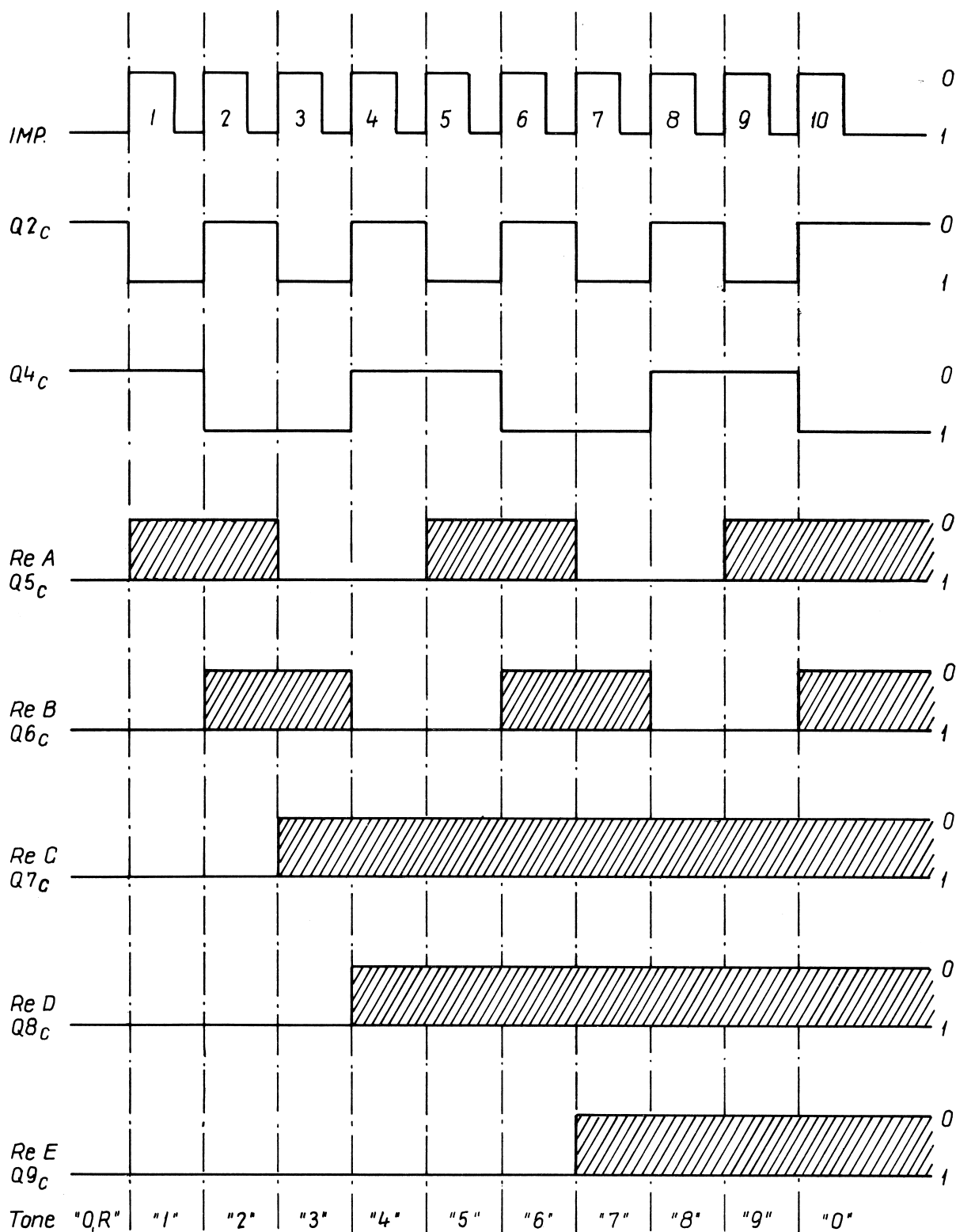


konst./høyt.
06/AMH
23.6.69.
godk. 06
kompl. lste
X/13273

TALLEREGISTER FOR NUMMERSKIVEIMPULSER
COUNTING REGISTER FOR DIALLING PULSES
RP680-2002/09

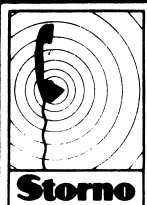
KODE

TEGN. NR.
D/13183
A3



0 = 0V, transistor ON, Relay energized / Relæ aktiveret.

1 = Negative voltage / Negativ spænd., Relay de-energized / Relæ uaktiveret.



konstr./tegn.
OG / EBH
20.1.70
godk.
OG
komp.liste

SIGNAL WAVEFORMS FOR COUNTING REGISTER
IMPULSSKEMA FOR TÆLLEREGISTER
RP 680-2002/09

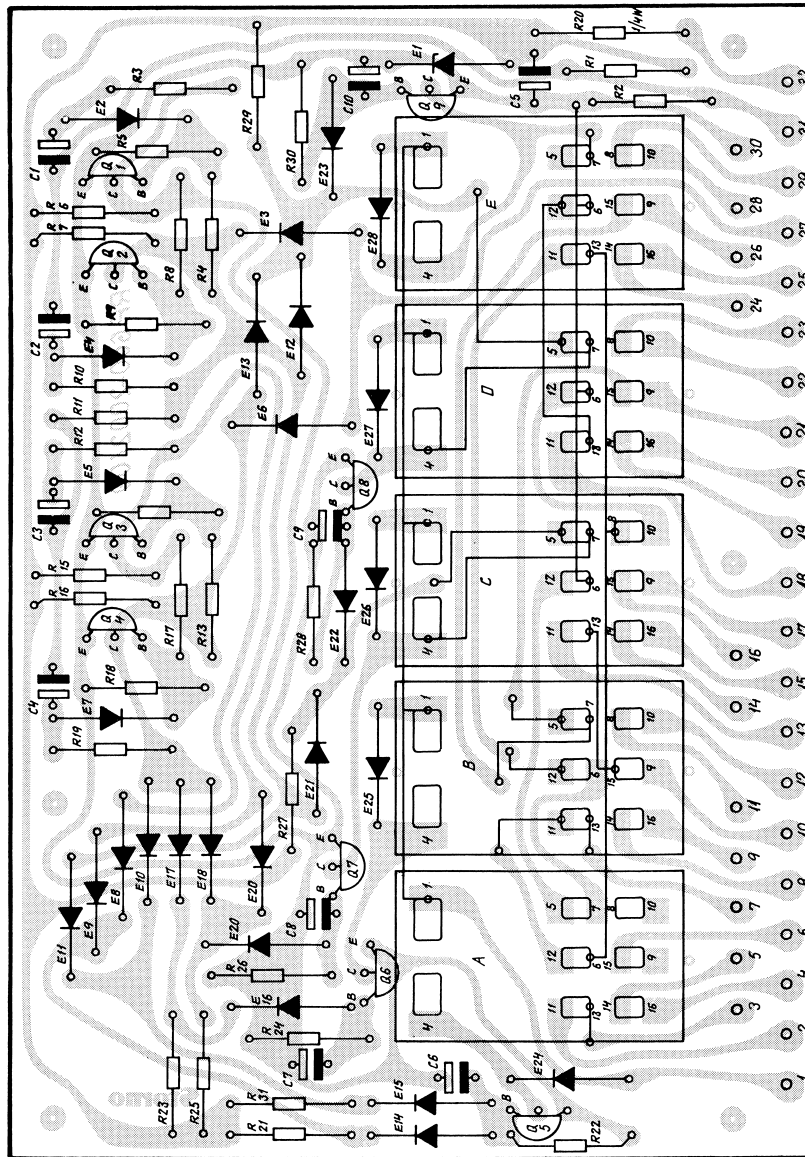
KODE

TEGN. NR.

D114074

A 4

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



Konst. nr. 06/AMH
9.9.69.
opdr. 06
Kontroll. nr. DH3183
XH3273

TÆLLERREGISTER FOR NUMMERSKIVEIMPULSER
COUNTING REGISTER FOR DIALING PULSES
RP 680 - 2002/09

KODE

D113426
1214 NR

no	code	data	no	code	data
C1	76.5070	10nF 10% polyester FL 50V	E22- E28	99.5028	diode 1N914
C2	76.5070	- - - - -	Q1- Q9	99.5144	Transistor BC214L
C3	76.5070	- - - - -			
C4	76.5070	- - - - -			
C5	73.5106	68μF 20% tantal 15V	Re		
C6	73.5114	1μF 20% tantal 35V	A		
C7	73.5114	- - - - -	B	58.5055	Relay 24V 890Ω
C8	73.5114	- - - - -	C		21-21, 21-21
C9	73.5114	- - - - -	D		
C10	73.5114	- - - - -	E		
R1	80.5261	10kΩ 5% carbon film 1/8W			
R2	80.5273	100kΩ - - - -			
R3	80.5284	820kΩ - - - -			
R4	80.5265	22kΩ - - - -			
R5	80.5264	18kΩ - - - -			
R6	80.5257	4,7kΩ - - - -			
R7	80.5257	- - - - -			
R8	80.5265	22kΩ - - - -			
R9	80.5264	18kΩ - - - -			
R10	80.5284	820kΩ - - - -			
R11	80.5257	4,7kΩ - - - -			
R12	80.5284	820kΩ - - - -			
R13	80.5265	22kΩ - - - -			
R14	80.5264	18kΩ - - - -			
R15	80.5257	4,7kΩ - - - -			
R16	80.5257	- - - - -			
R17	80.5265	22kΩ - - - -			
R18	80.5264	18kΩ - - - -			
R19	80.5284	820kΩ - - - -			
R20	80.5450	1,2kΩ - - -1/4W			
R21	80.5258	5,6kΩ - - -1/8W			
R22	80.5264	18kΩ - - - -			
R23	80.5258	5,6kΩ - - - -			
R24	80.5264	18kΩ - - - -			
R25	80.5258	5,6kΩ - - - -			
R26	80.5264	18kΩ - - - -			
R27	80.5258	5,6kΩ - - - -			
R28	80.5264	18kΩ - - - -			
R29	80.5258	5,6kΩ - - - -			
R30	80.5264	18kΩ - - - -			
R31	80.5258	5,6kΩ - - - -			
E1	99.5146	Zenerdiode 6,8V 5% 0,250W			
E2- E7	99.5028	diode 1N914			
E8- E13	99.5123	diode AA117			
E14- E16	99.5028	diode 1N914			
E17- E19	99.5123	diode AA117			
E20	99.5028	diode 1N914			
E21	99.5123	diode AA117			

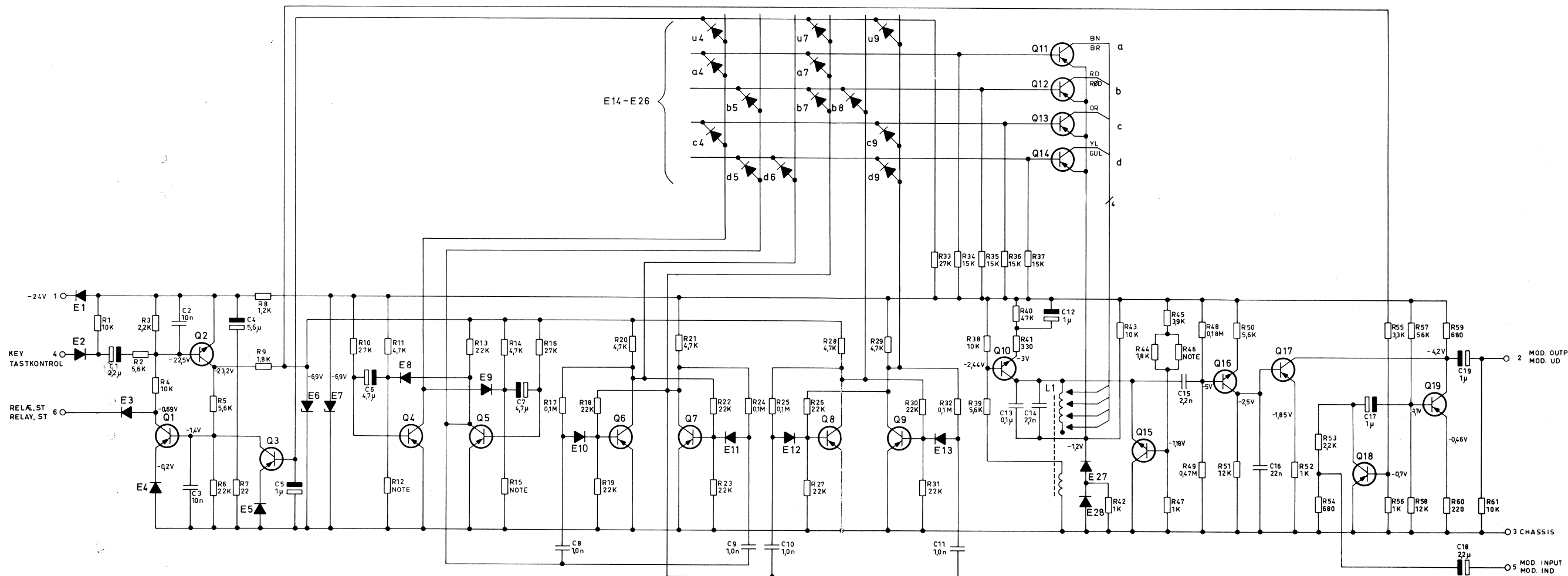


udars at
OG/S
12.8.89
kontrol at
OG
tth diag
DH3183

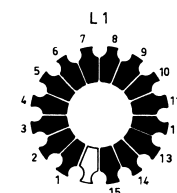
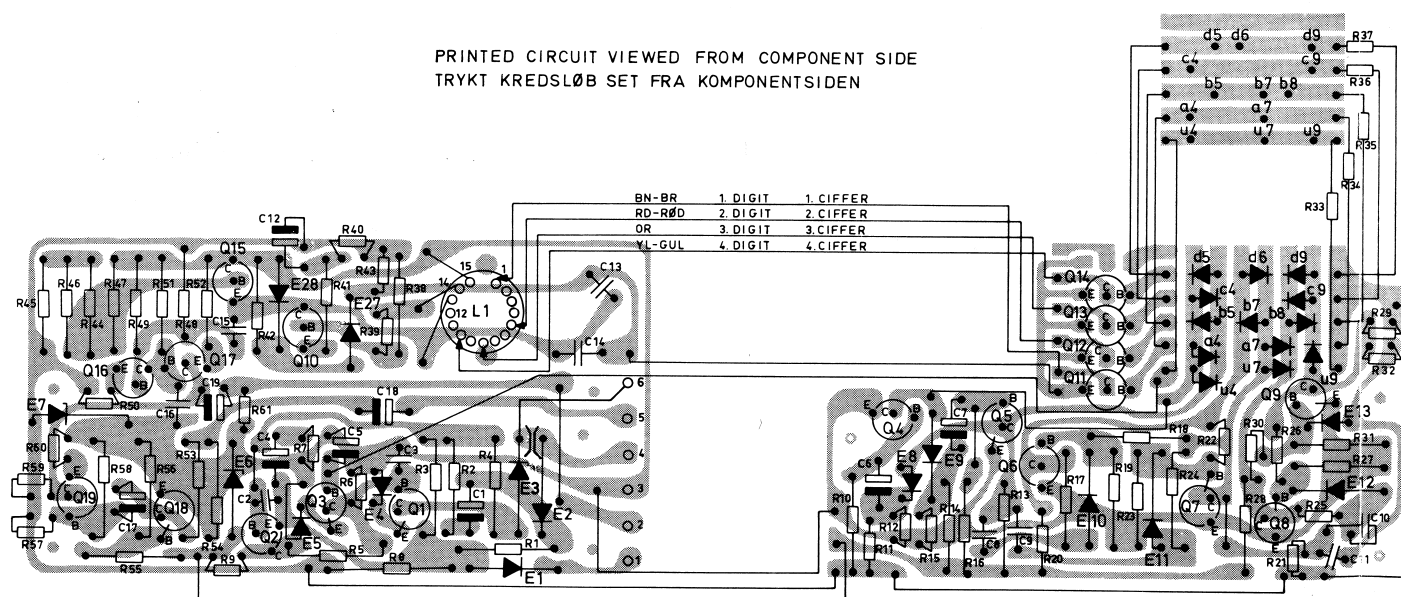
PARTS LIST
STYKLISTE

RP680-2002/09

OG/S
X113273
blad no 4 at 1



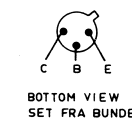
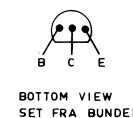
PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



TERM	FREQ.	DIGIT/CIFFER
1	1060 Hz	1
2	1160 -	2
3	1270 -	3
4	1400 -	4
5	1530 -	5
6	1670 -	6
7	1830 -	7
8	2000 -	8
9	2200 -	9
10	2400 -	0
11	2600 -	REPEAT
12	2800 -	ALARM

NOTE: VALUES ADJUSTED
VÆRDIER TILPASSET

Q1, Q3, Q4, Q5, Q6, Q7, Q8, Q9
Q11, Q12, Q13, Q14, Q17, Q18, Q19



konstr./tegn.
OG/AMM
25.8.69.
godk.
OG
komp.liste
X400 865

TONE SEQUENCE UNIT
SEKVENSTONEENHED

ST684-2003

KODE

TEGN. NR.
D113.324
A3

Storno

TYPE	NO.	CODE	DATA
	C1	73.5102	2.2 μ F 20% Tantal
	C2	76.5070	10 nF 10% Polyester. FL
	C3	76.5070	10 nF 10% Polyester. FL
	C4	73.5126	4.7 μ F 20% Tantal
	C5	73.5114	1 μ F 20% Tantal
	C6	73.5103	4.7 μ F 20% Tantal
	C7	73.5103	4.7 μ F 20% Tantal
	C8	76.5069	1 nF 10% Polyester. FL
	C9	76.5069	1 nF 10% Polyester. FL
	C10	76.5069	1 nF 10% Polyester. FL
	C11	76.5069	1 nF 10% Polyester. FL
	C12	73.5114	1 μ F 20% Tantal
	C13	76.5068	0.1 μ F 1% Polystyr. TB
	C14	75.5019	2.7 nF 5% Polystyr. TB
	C15	76.5059	2.2 nF 10% Polystyr. FL
	C16	76.5071	22 nF 10% Polyester. FL
	C17	73.5114	1 μ F 20% Tantal
	C18	73.5102	2.2 μ F 20% Tantal
	C19	73.5114	1 μ F 20% Tantal
	R1	80.5261	10 k Ω 5% Carbon film
	R2	80.5258	5.6 k Ω 5% " "
	R3	80.5253	2.2 k Ω 5% " "
	R4	80.5261	10 k Ω 5% " "
	R5	80.5258	5.6 k Ω 5% " "
	R6	80.5265	22 k Ω 5% " "
	R7	80.5229	22 Ω 5% " "
	R8	80.5450	1.2 k Ω 5% " "
	R9	80.5252	1.8 k Ω 5% " "
	R10	80.5266	27 k Ω 5% " "
	R11	80.5257	4.7 k Ω 5% " "
	R12	80.52xx	adjusted/tilpasset
	R13	80.5265	22 k Ω 5% Carbon film
	R14	80.5257	4.7 k Ω 5% " "
	R15	80.52xx	adjusted/tilpasset
	R16	80.5266	27 k Ω 5% Carbon film
	R17	80.5273	0.1 M Ω 5% " "
	R18	80.5265	22 k Ω 5% " "
	R19	80.5265	22 k Ω 5% " "
	R20	80.5257	4.7 k Ω 5% " "
	R21	80.5257	4.7 k Ω 5% " "
	R22	80.5265	22 k Ω 5% " "
	R23	80.5265	22 k Ω 5% " "
	R24	80.5273	0.1 M Ω 5% " "
	R25	80.5273	0.1 M Ω 5% " "
	R26	80.5265	22 k Ω 5% " "
	R27	80.5265	22 k Ω 5% " "
	R28	80.5257	4.7 k Ω 5% " "

Storno

TYPE	NO.	CODE	DATA
	R29	80.5257	4.7 k Ω 5% Carbon film
	R30	80.5265	22 k Ω 5% " "
	R31	80.5265	22 k Ω 5% " "
	R32	80.5273	0.1 M Ω 5% " "
	R33	80.5263	15 k Ω 5% " "
	R34	80.5263	15 k Ω 5% " "
	R35	80.5263	15 k Ω 5% " "
	R36	80.5263	15 k Ω 5% " "
	R37	80.5266	27 k Ω 5% " "
	R38	80.5261	10 k Ω 5% " "
	R39	80.5258	5.6 k Ω 5% " "
	R40	80.5269	47 k Ω 5% " "
	R41	80.5243	330 Ω 5% " "
	R42	80.5249	1 k Ω 5% " "
	R43	80.5261	10 k Ω 5% " "
	R44	80.5252	1.8 k Ω 5% " "
	R45	80.5256	3.9 k Ω 5% " "
	R46	80.52xx	adjusted/tilpasset
	R47	80.5249	1 k Ω 5% Carbon film
	R48	80.5276	0.18 M Ω 5% " "
	R49	80.5281	0.47 M Ω 5% " "
	R50	80.5258	5.6 k Ω 5% " "
	R51	80.5262	12 k Ω 5% " "
	R52	80.5249	1 k Ω 5% " "
	R54	80.5247	680 Ω 5% " "
	R55	80.5255	3.3 k Ω 5% " "
	R56	80.5249	1 k Ω 5% " "
	R57	80.5270	56 k Ω 5% " "
	R58	80.5273	0.1 M Ω 5% " "
	R59	80.5247	680 Ω 5% " "
	R60	80.5242	270 Ω 5% " "
	R61	80.5261	10 k Ω 5% " "
	L1	61.994	Coil/Spole
	E1	99.5020	Diode 1N4004
	E2	99.5028	Diode OA200
	E3	99.5028	Diode OA200
	E4	99.5028	Diode OA200
	E5	99.5028	Diode OA200
	E6	99.5146	Zenerdiode BZY60
	E7	99.5146	Zenerdiode BZY60

STONE SEQUENCE UNIT
SEKVENSTONEEHED

ST684

X400.865/2

Storno

TYPE	NO.	CODE	DATA
E8- E28		99. 5028	Diode OA200
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19		99. 5144 99. 5121 99. 5144 99. 5144 99. 5144 99. 5144 99. 5144 99. 5144 99. 5144 99. 5143 99. 5144 99. 5144 99. 5144 99. 5144 99. 5143 99. 5143 99. 5144 99. 5144 99. 5144	Transistor BC214L Transistor BC107 Transistor BC214L Transistor BC214L Transistor BC214L Transistor BC214L Transistor BC214L Transistor BC214L Transistor BC214L Transistor BC108 Transistor BC214L Transistor BC214L Transistor BC214L Transistor BC214L Transistor BC108 Transistor BC108 Transistor BC214L Transistor BC214L Transistor BC214L

Storno

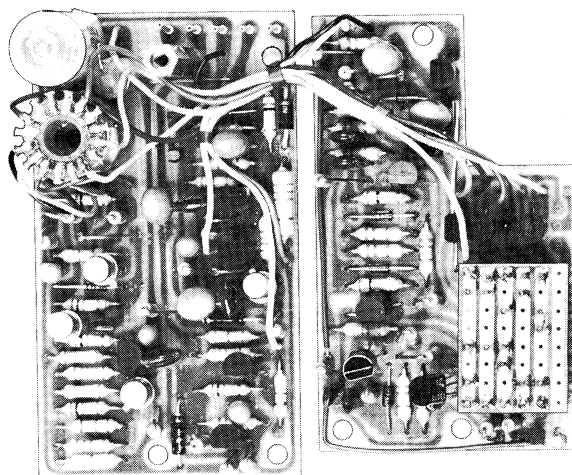
TYPE	NO.	CODE	DATA

STONE SEQUENCE UNIT
SEKVENSTONEENHED

ST684

X400. 865 / 2

Tone Sequence Transmitter ST684



Application

Tone sequence transmitter ST684 is used as a selective calling unit in mobile radiotelephones forming part of an identification system. However, the tone sequence transmitter may also be used for conventional selective calls.

Functions

The tone sequence transmitter performs the following functions:

It short-circuits the voice modulation path to the transmitter during transmission of tone calls.

It transmits a combination of tones consisting of four consecutive tones, each of them selected from a 12-tone frequency series inside the frequency range 1060-2800 Hz.

Construction

The tone sequence transmitter is built on two wiring boards which are clamped together with the component sides facing each other, by means of four tie-rods and associated screws.

It comprises the following circuits:

Transmit and locking circuit

Astable multivibrator

Two bistable multivibrators (flip-flop circuits)

Diode matrix

Oscillator

Oscillator amplifier

AF gate and amplifier.

Mode of Operation

General

When the tone-call button is pressed, the tone sequence transmitter gives off six consecutive pulses of 70 msec. duration each. The two initial pulses are unmodulated. The subsequent four pulses are modulated by a series of pre-set tones selected from a total of twelve available tone frequencies.

An AF gate short-circuits the voice modulation during the tone sequence. After transmission of the six sequence pulses - approx. 420 msec. - a release pulse is transmitted, causing the transmitter to return to its non-operated condition even if the tone-call button remains depressed.

The entire tone sequence will be transmitted even if the button is pressed for less than 420 msec.

Transmit and Locking Circuit

The transmit and locking circuit uses transistors Q1, Q2, and Q3. In the non-operated condition, these transistors are switched off, and capacitor C1 is neutral with respect to the minus potential.

When the transmit contact is connected to chassis, diode E2 and capacitor C1 will cause a positive-going pulse to reach the base of Q2, which will consequently draw current. This causes Q1 to switch on, and current will flow through voltage divider R3, R4. As a result of this, positive bias will be applied to the base of Q2, and a stable condition sets in - in other words, a flip-flop function results.

The transmit relay, connected between terminals 1 and 4, is kept connected to chassis potential via E3, Q1, and E4 during the tone sequence.

When Q2 is on, current will flow through resistor R9 to zener diode E6. The resulting voltage across E6 will throw the multivibrators out of their non-operated condition and activate the AF gate, Q18.

On completion of the sequence, the base of Q3 receives a release pulse from the matrix, thereby switching Q3 on, with the following consequences: the base of Q1 is short-circuited to chassis; current ceases to flow through voltage divider R3, R4; Q2 switches off. The transmit and locking circuit is now back in its non-operated condition.

Astable Multivibrator

The astable multivibrator consists of transistors Q4 and Q5 and their associated components. The multivibrator generates square-wave pulses with a repetition time of 140 msec.

In the non-operated condition, transistor Q4 is on and Q5 is off. Capacitor C6 is kept charged via R10 and R12.

When voltage is applied to it, transistor Q5 switches on, and Q4 switches off because C7 acts as a short-circuit, permitting Q5 to draw a high value of base current, determined by R14, R15, R16.

When transistor Q5 switches on, capacitor C6 will feed a positive pulse to the base of Q4. Transistor Q4 will be cut off during an interval determined by R10 and C6 and by the voltage at the junction of R11 and R12. At the end of this interval, Q5 will switch off and Q4 on. The length of the interval during which Q5 is switched off is determined by C7, R16 and by the voltage at the junction of R14, R15.

Diodes E8 and E9 ensure rapid voltage switch-over. A differentiated square-wave pulse is fed to the bases of Q6 and Q7 via C8 and C9.

Bistable Multivibrators (Flip-flop Circuits)

The bistable multivibrators are identical. They comprise transistors Q6, Q7 and Q8, Q9 and their associated components.

In the non-operated condition, transistors Q6 and Q8 are on and Q7 and Q9 are off as only Q6

and Q8 can receive base current.

When voltage is applied, Q6 remains on because its base bias, controlled by the collector-emitter voltage of Q7, remains unchanged. Q7 remains off due to the fact that the potential at the collector of Q6 is low.

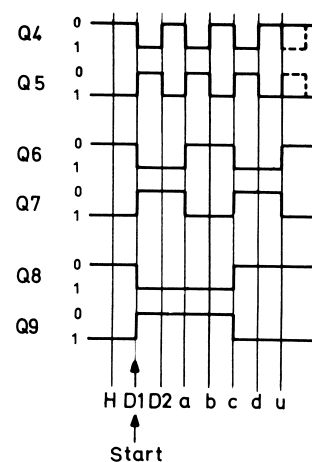
A control pulse is required to accomplish switch-over. This is obtained by cutting off the conductive transistor.

When the voltage at the input, C8 and C9, moves in a positive direction, a positive pulse is applied to the bases of Q6 and Q7, causing the conductive transistor to cut off and a switch-over to occur.

When the voltage at the input, C8 and C9, moves in a negative direction, the negative pulse will have no influence, due to diodes E10 and E11. The repetition frequency will be halved.

Diode Matrix

The diode matrix comprises diodes E14-E26, resistors R33-R37, and transistors Q11-Q14. The matrix performs the function of controlling transistors Q11-Q14 and hence switching the desired coil taps into the circuit in a previously determined sequence. Oscillator Q10 is in operation when one of the transistors Q11-Q14 is on. This condition obtains when the matrix diodes are cut off, permitting the transistors to draw base current through resistors R33-R37. If only one of the diodes is conductive, the base potential of the transistor concerned will be large enough to switch on the transistor. The diode potentials are controlled by the three multivibrators. Collector potentials are diagrammed below.



"1" DENOTES NEGATIVE VOLTAGE

In order to have these voltage patterns translated in such a manner that the tones will be transmitted in the proper sequence, the diode matrix has this appearance:

a4			a7			→ Q11 "on"
	b5		b7	b8		→ Q12 "on"
c4					c9	→ Q13 "on"
	d5	d6			d9	→ Q14 "on"
u4			u7		u9	→ CUT OUT

Oscillator

The oscillator comprises transistors Q10 and Q15 and their associated components.

A Hartley oscillator is used, with voltage clipping across the tank circuit, performed by level clipper Q15.

Transistor Q10 functions as an amplifier; it receives positive feed-back through the reaction winding.

Clipping is determined by the difference between the base voltage at Q15 and the voltage drop across diodes E27 and E28. The oscillator output level is adjusted by varying the value of resistor R46. The emitters of Q11-Q14 are connected to the junction of E27, C14, and R43. This point is negative with respect to chassis so that the inactive transistors can be effectively cut off.

Diodes E27 and E28 also help to improve temperature stability. In order to obtain the same output signal level (± 0.5 dB) when connected to the same coil tap, transistors Q11-Q14 should have a collector impedance that does not exceed 25 ohms.

Oscillator Amplifier

The oscillator amplifier comprises transistors Q16 and Q17 and their associated components.

The amplifier is a two-stage DC-coupled amplifier. It steps the oscillator signal up to the desired level and provides the desired output impedance and frequency characteristic.

Transistor Q16 has high input impedance so that the circuit will not load the oscillator.

Capacitor C16 together with the output impedance of Q16 and the input impedance of Q17 provides the desired frequency characteristic.

AF Gate

The AF gate comprises transistors Q18 and Q19 and their associated components. When the tone sequence transmitter is inoperative, Q18 is off and voice modulation is fed via C17 to the base of Q19. Transistor Q19 amplifies the signal to the desired level.

When the tone sequence transmitter is operated, negative bias is applied to the base of Q18, causing Q18 to switch on and so short-circuit the voice modulation. The tone sequence is taken off across R59, which is the common collector resistor of transistors Q17 and Q19.

Data

Supply Voltage

-24V $\pm 5\%$.

Temperature Range

-30°C to +60°C.

Frequency Stability

Better than $\pm 1\%$.

Frequency Accuracy

Better than 0.5%.

Battery Drain

Stand-by: 25mA ± 2 mA.

Tone-call button depressed: 41mA ± 3 mA.

Frequency Response

Falling, 4 dB per octave.

Tone Frequencies

1060 Hz, 1160 Hz, 1270 Hz, 1400 Hz, 1530 Hz, 1670 Hz, 1830 Hz, 2000 Hz, 2200 Hz, 2400 Hz, 2600 Hz, 2800 Hz.

Output Impedance

600 ohms $\pm 20\%$.

Output Level (at 1060 Hz)

-17 dBm ± 2 dBm.

Pulse Sequences

2 pulses (unmodulated), 70 msec \pm 15 msec each.

4 pulses (modulated), 70 msec \pm 15 msec each.

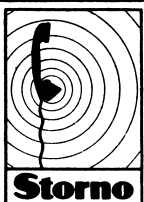
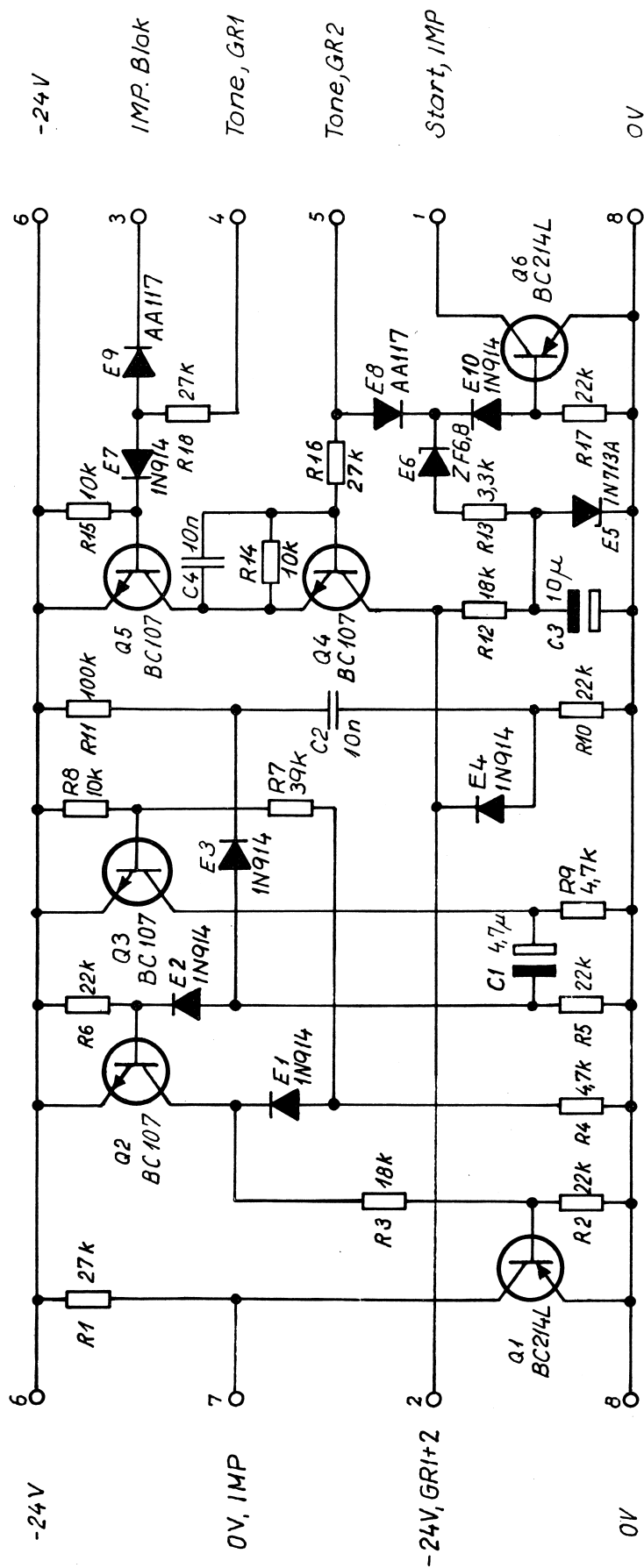
Max. time between pulses: 15 msec.

Installation

In the CQM600 mobile radiotelephone, the tone

sequence transmitter is mounted in the control box - Type CB601 or Type CB602.

In the CQL600 mobile radiotelephone, the tone sequence transmitter is mounted in the control panel (CP601) of the radio cabinet if the radiotelephone is locally controlled. If the radiotelephone is remotely controlled, the tone sequence transmitter is mounted in the control box (CB603).



konstr./tegn.
OG/A.M.C.
25. 4. 68.
godk.
komp.liste
X110662

START CIRCUIT FOR DIGIT DIALLING
STARTKREDS FOR CIFFERIMPULSERING
5U680-2003/02

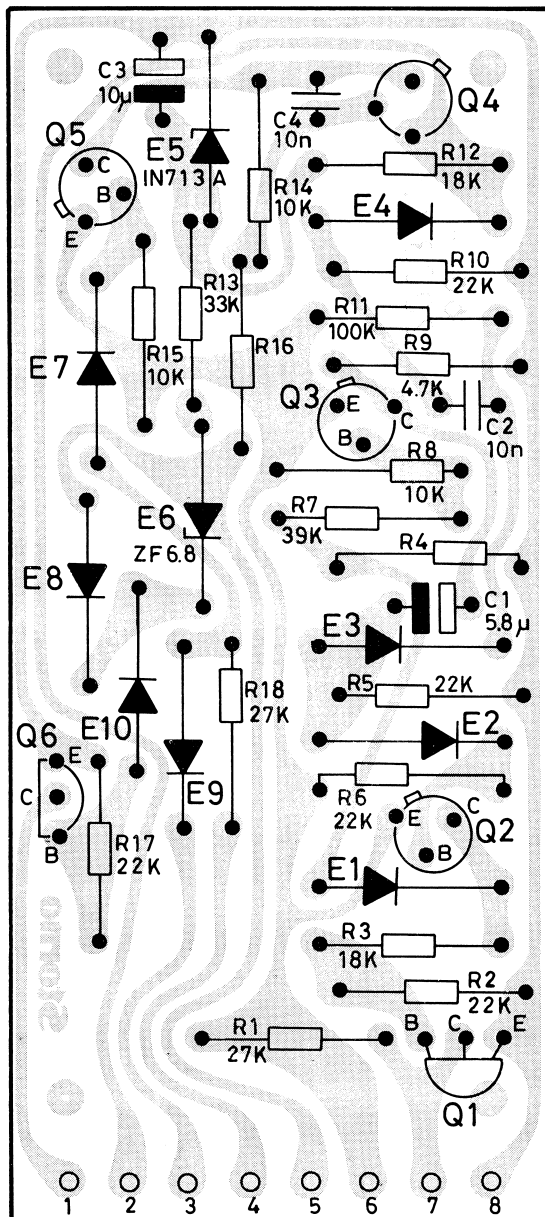
KODE

TEGN. NR.

D110661

A4

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr. tegn.
06 / JWA
25 · 8 · 69
godk.
06
komp. liste
X110662
D110661

START CIRCUIT FOR DIGIT DIALLING
STARTKREDS FOR CIFFERIMPULSERING

SU680 - 2003 / 02

KODE

TEGN. NR.

D113376

A4

no	code	data	no	code	data
C1	73.5126	4,7 μ F 20% tantal 35V	Q1	99.5144	Transistor BC214L (2N3702)
C2	76.5070	10nF 10% polyest. 50V			
C3	73.5109	10 μ F 20% tantal 15V	Q2-5	99.5121	Transistor BC107
C4	76.5070	10nF 10% polyest. 50V	Q6	99.5144	Transistor BC214L (2N3702)
R1	80.5266	27k Ω 5% carb. film 1/8W			
R2	80.5265	22k Ω 5% carb. film 1/8W			
R3	80.5264	18k Ω 5% carb. film 1/8W			
R4	80.5257	4,7k Ω 5% carb. film 1/8W			
R5	80.5265	22k Ω 5% carb. film 1/8W			
R6	80.5265	22k Ω 5% carb. film 1/8W			
R7	80.5268	39k Ω 5% carb. film 1/8W			
R8	80.5261	10k Ω 5% carb. film 1/8W			
R9	80.5257	4,7k Ω 5% carb. film 1/8W			
R10	80.5265	22k Ω 5% carb. film 1/8W			
R11	80.5273	100k Ω 5% carb. film 1/8W			
R12	80.5264	18k Ω 5% carb. film 1/8W			
R13	80.5255	3,3k Ω 5% carb. film 1/8W			
R14	80.5261	10k Ω 5% carb. film 1/8W			
R15	80.5261	10k Ω 5% carb. film 1/8W			
R16	80.5266	27k Ω 5% carb. film 1/8W			
R17	80.5265	22k Ω 5% carb. film 1/8W			
R18	80.5266	27k Ω 5% carb. film 1/8W			
E1-4	99.5028	Diode 1N914 (earlyer OA200)			
E5	99.5042	Zenerdiode 9,1V 5% 1/4W			
E6	99.5146	Zenerdiode 6,8V 5% 1/4W			
E7	99.5028	Diode 1N914 (earlyer OA200)			
E8-9	99.5123	Diode AA117			
E10	99.5028	Diode 1N914(ea. OA200)			



CG/LF
30.11.70
kontrol at
Tih diag

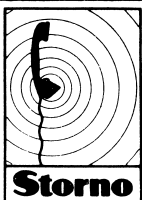
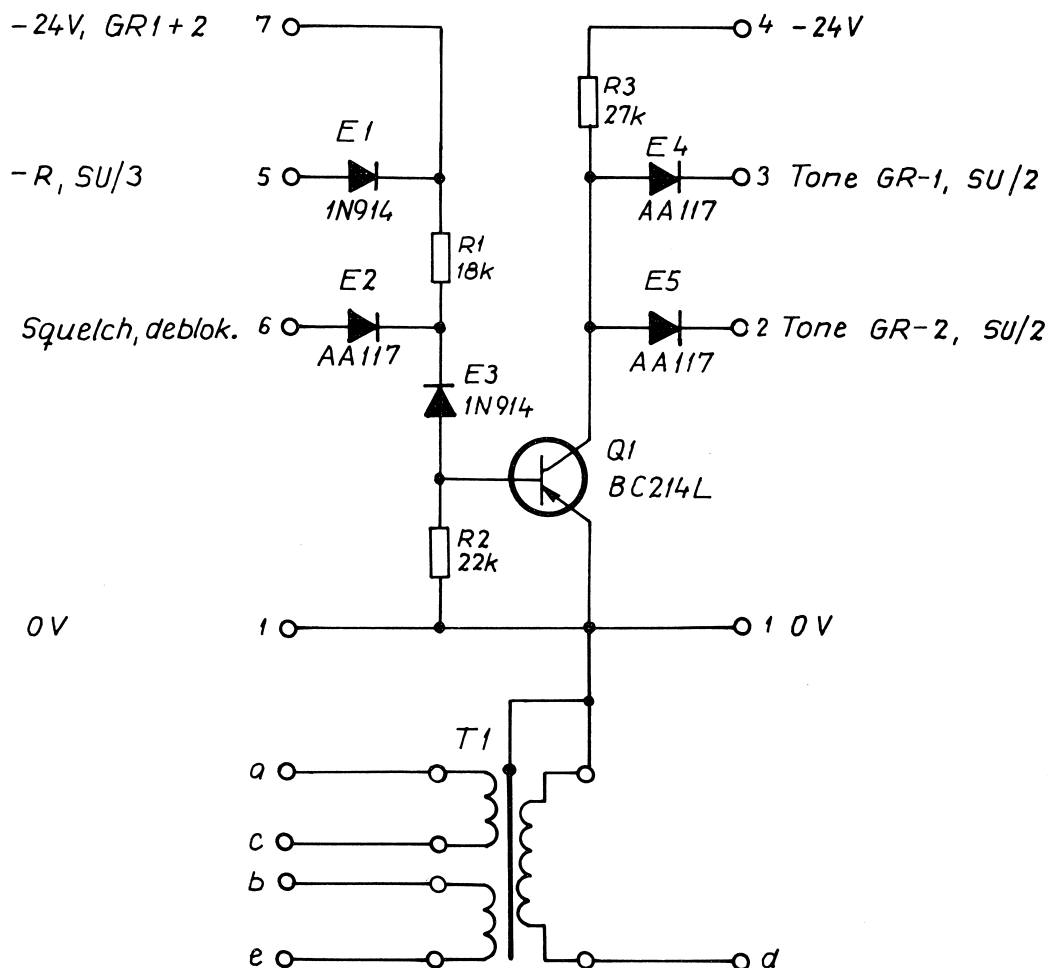
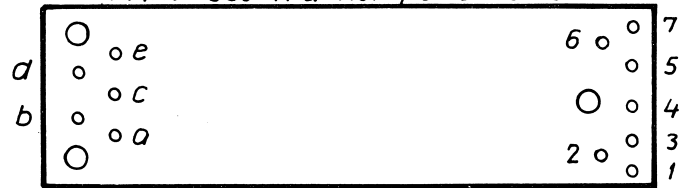
Parts list

Stykliste

SU680-2003/02

*Comp list
X110662
blad no 1 of 1

Printed circuit view d from component side
 Print set fra komponentsiden



konstr./tegn.
 OG/80
 3.9.68
 godk.
 OG
 komp.liste
 X113258

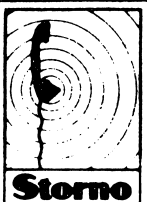
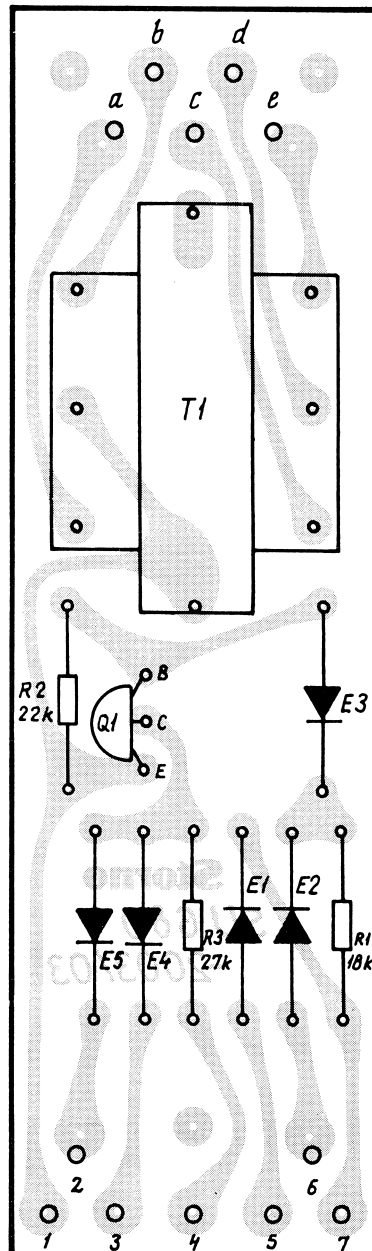
SWITCHING UNIT/OMSKIFTERENHED SU680-2003/03
 START CIRCUIT FOR DIALLING PULSES
 SQUELCHSTYRET HOLDNING AF SU680-2003/02 I
 2003 SYSTEM MED REPEATERFUNKTION KODE

TEGN. NR.

D 111795

A4

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr./tegn
OG / TWA
26.8.69
godk.
OG
komp. liste
X113258
0111795

SWITCHING UNIT / OMSKIFTERENHED SU680-2003/03
START CIRCUIT FOR DIALLING PULSES
SQUELCHSTYRET HOLONING AF SU680-2003/02
I 2003 SYSTEM MED REPEATERFUNKTION KODE

TEGN. NR.

0113385

A4

no	code	data	no	code	data
R1	80.5264	18k Ω 5% carb.film 1/8W			
R2	80.5265	22k Ω - - - - -			
R3	80.5266	27k Ω - - - - -			
E1	99.5028	Diode 1N914			
E2	99.5123	Diode AA117			
E3	99.5028	Diode 1N914			
E4	99.5123	Diode AA117			
E5	99.5123	- - - - -			
Q1	99.5144	Transistor BC214L			
T1	60.5097	Transformer LF150/150/600 Ω			



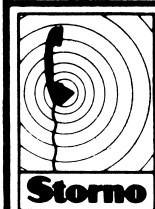
order of
 OG/SL
 12.8.69
 control of
 06
 till date
 01/11/95

PARTS LIST
 STYKLISTE

SU680-2003/03

X 11 3258

blad no 1 of 1



konstr./tegn.
OG / JWA
3. 7. 69
godk.
OG
komp.liste
X113224

START AND STOPCIRCUIT FOR MOBILE TELEPHONE CALL START OG STOPKREDS FOR MOBILE TELEFONOPKALL

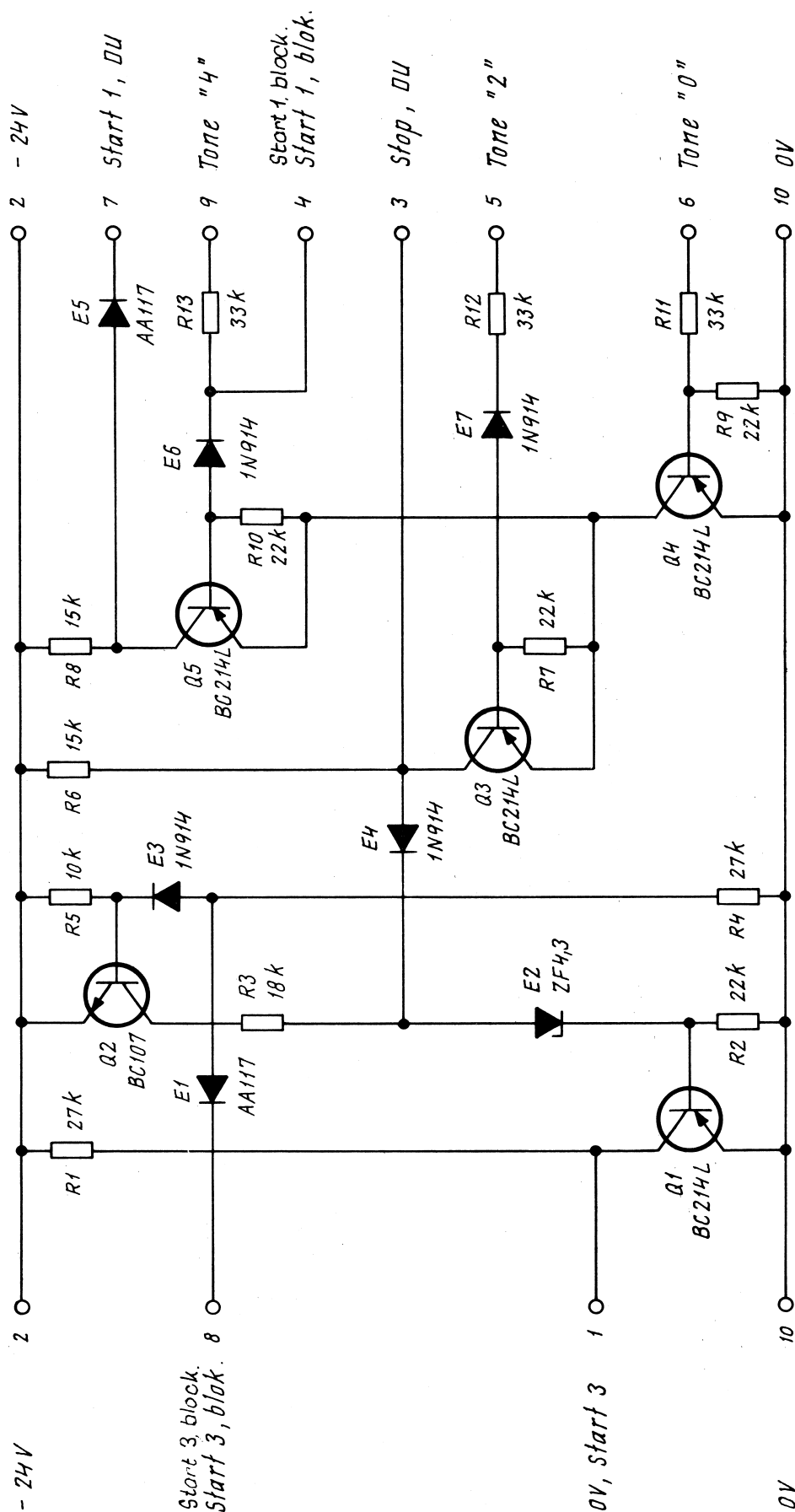
SU680-2003/04

KODE

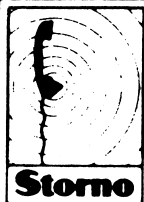
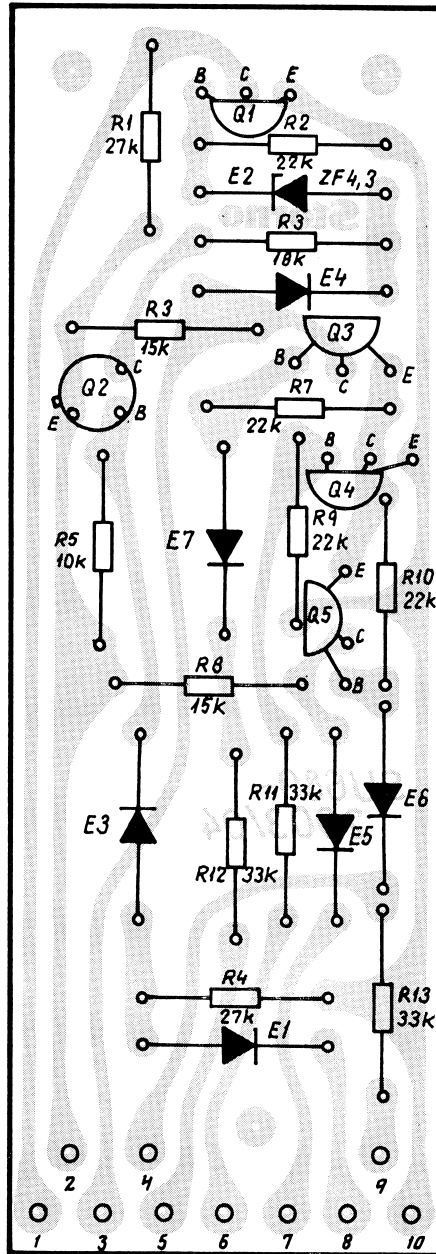
TEGN. NR.

D113223

A 4



PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN

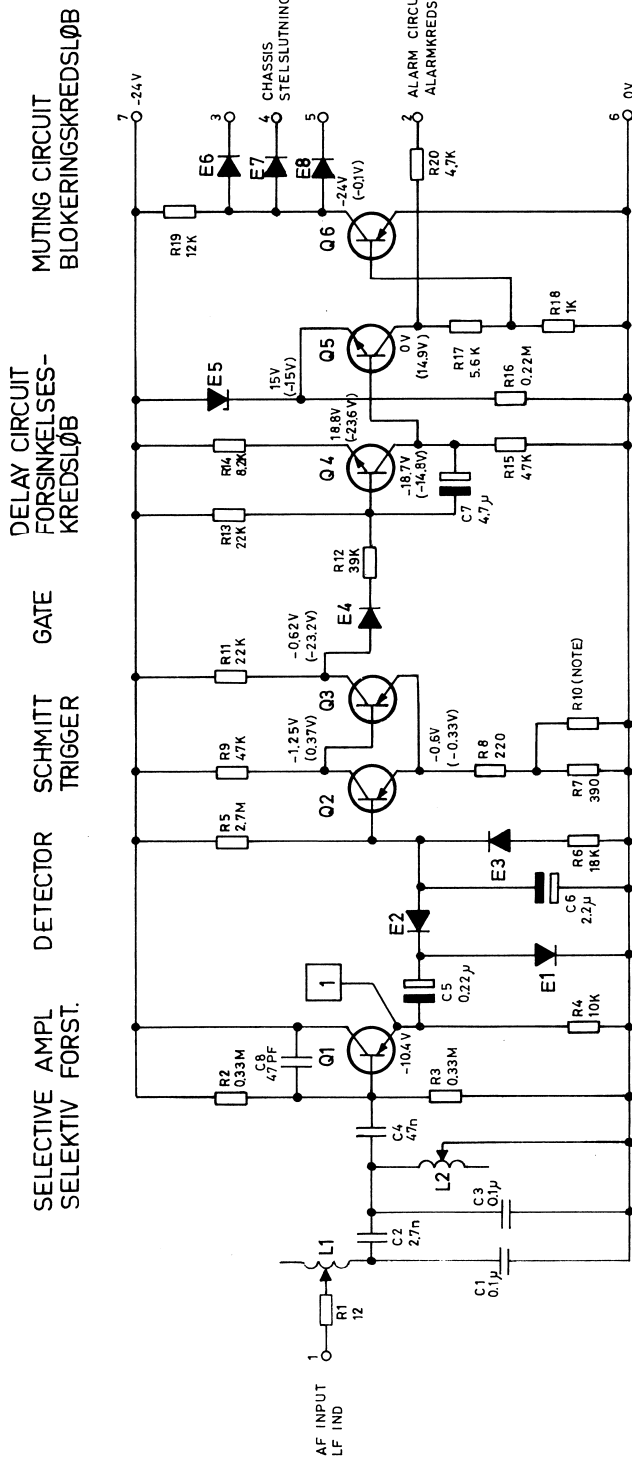


konstr./tegn.
OG / JWA
26 · 8 · 67
godk.
OG
komp. liste
X 113224
0113223

START AND STOP CIRCUIT FOR MOBILE TELEPHONE
CALL
START OG STOPKREDS FOR MOBILE TELEFONOPKALD
SU680-2003/04
KODE

TEG. NR.
0113387
A4

no	code	data	no	code	data
R1	80.5266	27kΩ 5% carb.film 1/8W			
R2	80.5265	22kΩ - - - - -			
R3	80.5264	18kΩ - - - - -			
R4	80.5266	27kΩ - - - - -			
R5	80.5261	10kΩ - - - - -			
R6	80.5263	15kΩ - - - - -			
R7	80.5265	22kΩ - - - - -			
R8	80.5263	15kΩ - - - - -			
R9	80.5265	22kΩ - - - - -			
R10	80.5265	22kΩ - - - - -			
R11	80.5267	33kΩ - - - - -			
R12	80.5267	- - - - -			
R13	80.5267	- - - - -			
E1	99.5123	diode AA117			
E2	99.5116	Zenerdiode 4,3V 5% 1/4W			
E3	99.5028	diode 1N914			
E4	99.5028	- - - - -			
E5	99.5123	diode AA117			
E6	99.5028	diode 1N914			
E7	99.5028	- - - - -			
Q1	99.5144	transistor BC214L			
Q2	99.5121	transistor BC107			
Q3	99.5144	transistor BC214L			
Q4	99.5144	- - - - -			
Q5	99.5144	- - - - -			



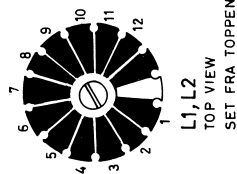
NOT BRACKETED DC VOLTAGES ARE MEASURED WITHOUT SIGNAL.

BRACKETED DC VOLTAGES ARE MEASURED WITH SIGNAL $V_{IN} = 170\text{mV}$, $f = 1060\text{ Hz}$.

DC SPÆNDINGER UDEN PARANTES MÅLT UDEN SIGNAL

DC SPÆNDINGER I PARANTES MÅLT MED SIGNAL $V_{IN} = 170\text{mV}$, $f = 1060\text{ Hz}$

NOTE: VALUE ADJUSTED
VÆRDI TILPASSET



TOP VIEW
SET FRA TOPPEN

TERM.	FREQ.
1	1060 Hz
2	1150 -
3	1270 -
4	1400 -
5	1530 -
6	1670 -
7	1830 -
8	2000 -
9	2200 -
10	2400 -
11	2600 -
12	2900 -

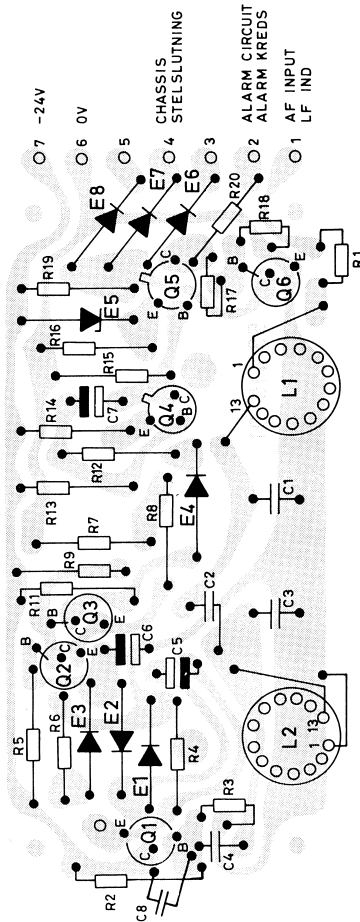
Q1, Q2, Q3, Q6



Q4, Q5



BOTTOM VIEW
SET FRA BUNDEN



TR6811a TONE RECEIVER TONE MODTAGER

Storno

Storno

TYPE	NO.	CODE	DATA
C1		76.5068	0, 1 μ F 1% polyester. TB
C2		76.5019	2, 7 nF 5% polystyr. TB
C3		76.5068	0, 1 μ F 1% polyester. TB
C4		76.5072	47 nF 10% " FL
C5		73.5118	0, 22 μ F 20% tantal
C6		73.5102	2, 2 μ F 20% "
C7		73.5103	4, 7 μ F 20% "
C8		74.5186	47 pF 10% ceram PL
R1		80.5226	12 Ω 5% carbon film
R2		80.5279	0, 33 M Ω 5% carbon film
R3		80.5279	0, 33 M Ω 5% "
R4		80.5261	10 k Ω 5% "
R5		80.5490	2, 7 M Ω 5% "
R6		80.5264	18 k Ω 5% "
R7		80.5244	390 Ω 5% "
R8		80.5241	220 Ω 5% "
R9		80.5269	47 k Ω 5% "
R10		80.52xx	Adjusted/Tilpasset
R11		80.5265	22 k Ω 5% "
R12		80.5268	39 k Ω 5% "
R13		80.5265	22 k Ω 5% "
R14		80.5260	8, 2 k Ω 5% "
R15		80.5269	47 k Ω 5% "
R16		80.5277	0, 22 M Ω 5% "
R17		80.5258	5, 6 k Ω 5% "
R18		80.5249	1 k Ω 5% "
R19		80.5262	12 k Ω 5% "
R20		80.5257	4, 7 k Ω 5% "
L1		61.840	Tone coil/Tonespole
L2		61.840	Tone coil/Tonespole
E1		99.5219	Diode AAZ15
E2		99.5219	Diode AAZ15
E3		99.5028	Diode 1 N 914
E4		99.5028	Diode 1 N 914
E5		99.5042	Zenerdiode 9, 1V 5%
E6		99.5219	Diode AAZ15
E7		99.5219	Diode AAZ15
E8		99.5219	Diode AAZ15
Q1		99.5144	Transistor BC214
Q2		99.5144	Transistor BC214
Q3		99.5144	Transistor BC214
Q4		99.5143	Transistor BC108
Q5		99.5143	Transistor BC108
Q6		99.5144	Transistor BC214

TR6811a
RECEIVER
MODTAGER

X401.061/2

Tone Receiver TR6811a.

Description.

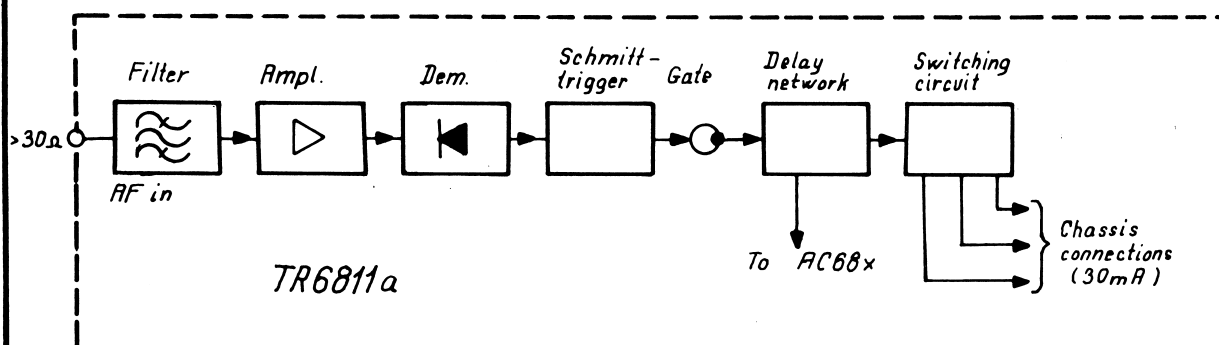
1. General.

TR6811a is a selective tone receiver, which - in conjunction with AA6811 - is used in tone calling systems employed by the CQF600 series radio telephone systems.

The function of TR6811a is to respond to the reception of a tone (pre-selected from a total of 12 fixed frequencies).

The call tone activates the tone receiver after a time period, which is permanently adjusted (250m sec.). On activation the three diode output are connected to chassis, and a DC signal is applied to an alarm circuit, if used. This condition ceases shortly after the end of the tone signal.

The unit is built up as shown in the below block diagram:



2. Principle of Operation.

2.1 Filter.

The first circuit element is a band-pass filter, consisting of a series circuit with capacitive coupling to a parallel circuit, both circuits being tuned to one of the twelve frequencies available. A series resistor of 12Ω is inserted in the input, which is to be connected to a generator impedance of approx. 40Ω . This resistor serves two purposes:

1. To render the Q-factor of the circuits more stable.
2. To isolate the filter from other parallel-coupled units.

2.2 Amplifier.

The filter is connected to an emitter-follower, which provides a high load impedance (100k Ω) to the filter, and a low generator impedance to the following signal demodulator.

2.3 Demodulator.

The signal demodulator is designed as a voltage-doubler rectifier, so that even a very low AF-level in the filter will activate the Schmitt-trigger following the demodulator.

2.4 Schmitt-trigger.

The Schmitt-trigger employs a minimum number of components. The common emitter resistor provides for compensation of deviations in the current gain of the transistors employed. Temperature stabilization of the trigger is achieved by means of a diode E3 inserted in the base of the 1st transistor.

2.5 Gate Circuit.

After the Schmitt-trigger follows a gate-circuit in the form of a diode gate, the function of which is to activate the following delay network.

2.6 Delay Network.

The delay network comprises two transistors, the latter of which performs the keying function proper. The time-integrator, the first transistor, can be adjusted to various time periods by replacement of C7. The time delay is determined by R13, C7 and the current gain of the transistor. The time delay network is restored in about 1/5 of the time for activation (determined by R12).

Q5 performs the deying function. The emitter potential is fixed, determined by the Zener voltage across E5. When conducting, Q5 supplies a negative voltage across the collector resistor, which can activate an alarm circuit. At the same time, it activates a switching circuit Q6.

2.7 Switching Circuit.

When conducting, the switching circuit causes chassis connection to the three diode outputs. This function can be utilized for activation of lamps or relays (max. permissible current drain is 30mA at each diode output).

TR6811a
Specification.

- | | | <u>Typical values at 24V</u> |
|---------------------------------------|--|--|
| 1. <u>Input impedance:</u> | | $> 30\Omega$. |
| | Within the range 1000 to 2900Hz | |
| 2. <u>Frequency range: (12 tones)</u> | One of the following frequencies:
1060Hz, 1160Hz, 1270Hz, 1400Hz,
1530Hz, 1670Hz, 1830Hz, 2000Hz,
2200Hz, 2400Hz, 2600Hz, 2900Hz. | |
| 3. <u>Frequency accuracy:</u> | | $< 0, 3\%$. |
| | Deviation of f_0 for the remaining
tone frequencies, when the unit is
adjusted for 1060Hz. | |
| 4. <u>Filter band with:</u> | | |
| | At 3dB attenuation rel. to f_0 | $\frac{f_n}{f_0} \frac{f_0}{f_\phi} = 0.978$. |
| 5. <u>Center frequency variation.</u> | | $< 0, 5\%$. |
| | At 3dB attenuation rel. to f_0 within
temperature range -30 to +60°C. | |
| 6. <u>Sensitivity:</u> | | 85mV. |
| | Trigger level within the range
1000Hz to 2900Hz. | |
| 7. <u>Input level:</u> | | 170mV. |
| | Trigger level inclusive 6dB allowance | |
| 8. <u>Delay:</u> | | 250m sec. |
| 9. <u>Current drain:</u> | | |
| | Without signal | 4mA. |
| | With signal | 8mA. |
| 10. <u>Max. load:</u> | | |
| | Current drain at term. 3, 4 and 5 | $\leq 30\text{mA}$ at each term. |

11. Temperature range:

Working range

-25 to +50°C.

Operating range

-30 to 60°C.

12. Dimensions:

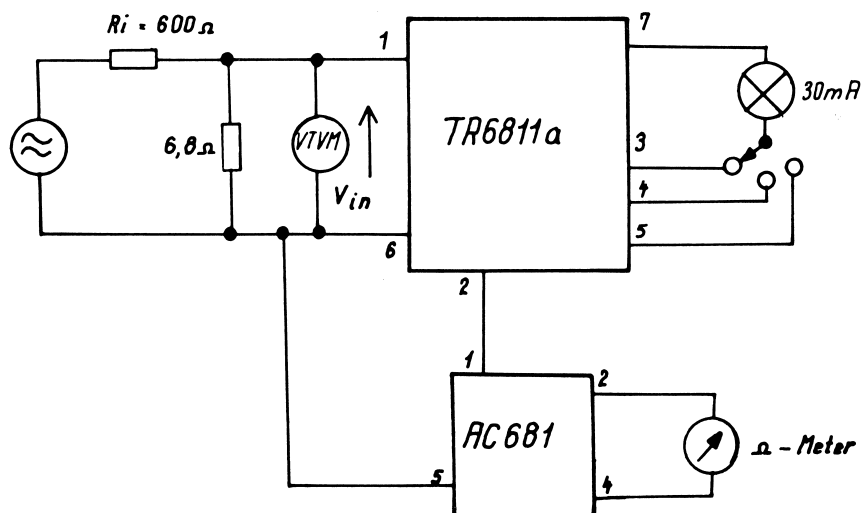
80 x 36mm.

TR6811a.
Test Instructions.

1. Instruments required.

- 1 ea power supply 24V (150mA).
- 1 ea VT-voltmeter (PH-6012)
- 1 ea tone generator (HP-200 cd)
- 1 ea resistor 100Ω 1/8W
- 1 ea resistor $6,8\Omega$ 1/8W
- 1 ea alarm circuit AC681
- 1 ea frequency counter (1000 to 3000Hz)
- 1 ea resistor-decade max. $1k\Omega$ (Danbridge)

2. Test set-up.



3. Alignment and adjustment.

Set-up as under para. 2.

3.1 Solder connecting leads for tone coils L1 and L2 for 1060Hz (term. start and 1).

3.2 Using the frequency counter adjust the tone generator to 1060Hz, and adjust V_{in} to read 170mV. Connect the VT-voltmeter over R4 (test point 1).

3.3 Shunt L2 with 100 Ω , which causes the VT-voltmeter reading to drop about 45dB. Then align L1 for max. deflection of the VT-voltmeter over R4, and remove the 100 Ω resistor over L2.

3.4 Shunt L1 with 100 Ω , which causes the VT-voltmeter reading to drop about 20dB. Then align L2 for max. deflection of the VT-voltmeter over R4, and remove the 100 Ω resistor over L1.

3.5 Repeat as under 3.3 and 3.4

3.6 Seal cores in L1 and L2 with liquid silicone rubber.

3.7 Change VT-voltmeter to the TR input and adjust V_{in} to 85mV.

3.8 Insert R10 in form of the resistor cascade. Adjust the decade to a high ohmic value, and decrease until the tone receiver is just activated. Then insert the standard value nearest to the R10 reading (R10 approx. 100 Ω).

3.9 Decrease V_{in} to 0V. Then increase V_{in} slowly, checking that the tone receiver is activated when $V_{in} = 85mV$.

4. Testing of frequency accuracy.

Connect L1 and L2 for 1060Hz (term. start and 1). Adjust tone generator for max. VT-voltmeter deflection at test point 1, while maintaining V_{in} below the activation level of the tone receiver.

Using the frequency counter, check the frequency of the tone generator. All other tone frequencies are checked in the same way.

Requirement: Max. deviation: 0,3%.

6. Testing of trigger level.

If carried out simultaneously with the testing under 4 above, this test is quickly made, since the tone frequencies are tuned with the frequency counter connected to the tone generator for each tapping on L1 and L2. For each tone frequency measure the value of V_{in} at which the tone receiver is activated and deactivated.

Requirement: Activation level: 85mV \pm 1dB

De-activation level: 60mV \pm 1dB.

7. Testing of delay.

Connect L1 and L2 for one of the 12 tone frequencies, and adjust V_{in} at the same frequency until the tone receiver is positively activated. Measure the time period from the moment the tone signal was applied until the tone receiver is activated.

Requirement: Delay: 250m sec. \pm 50m sec.

8. Checking the activation of the alarm circuit.

With the alarm circuit AC681 (term. 1) connected to the tone receiver (term. 2) measure the DC-voltage on TR term. 2 at $V_{in} <$ and $V_{in} >$ the level of activation.

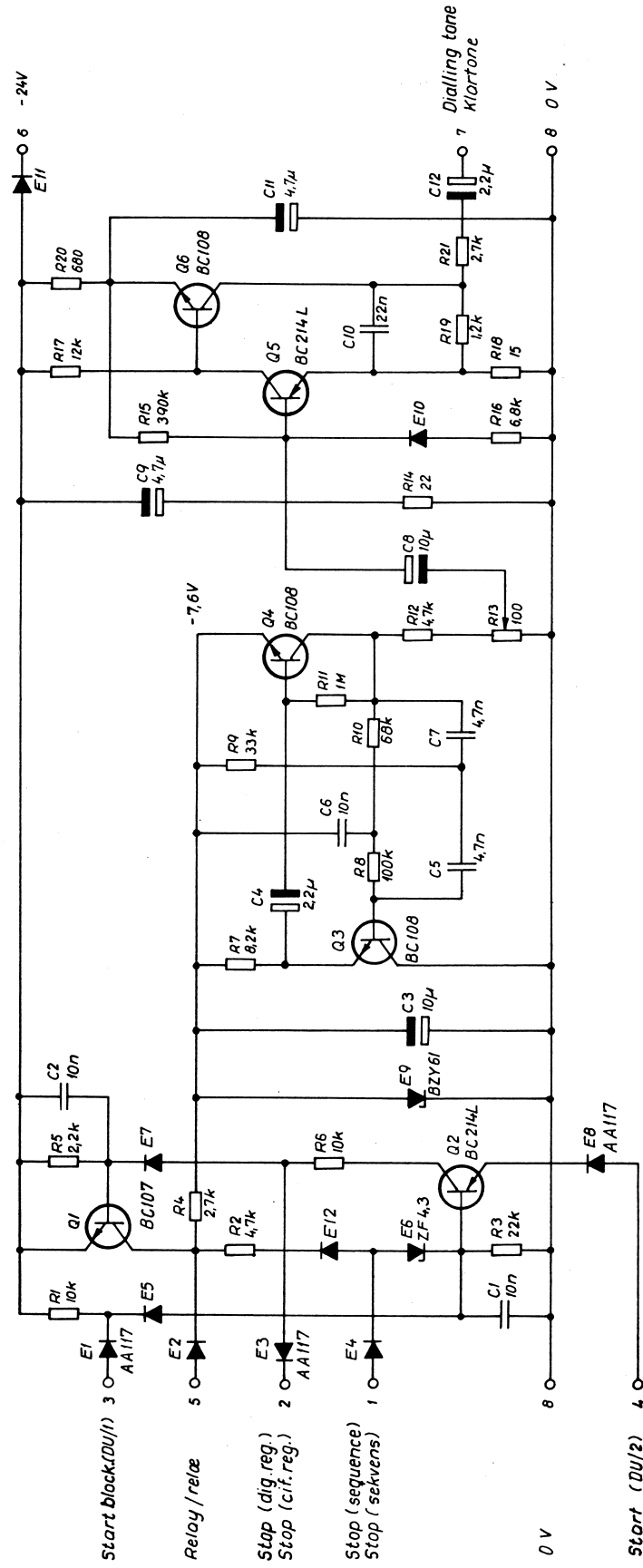
Requirement: DC = 0V at $V_{in} <$ activationlevel

DC \geq 8,5V at $V_{in} >$ activation level.

9. Checking the chassis connections.

Apply a load of 30mA (lamp) between -24V and the following terminals, one at a time, : 3, 4, and 5.

Requirement: Chassis connection at $V_{in} >$ 85mV.



TEGN. NR. D 111382

KODE TT 680-2002

KLARTONEGENERATOR

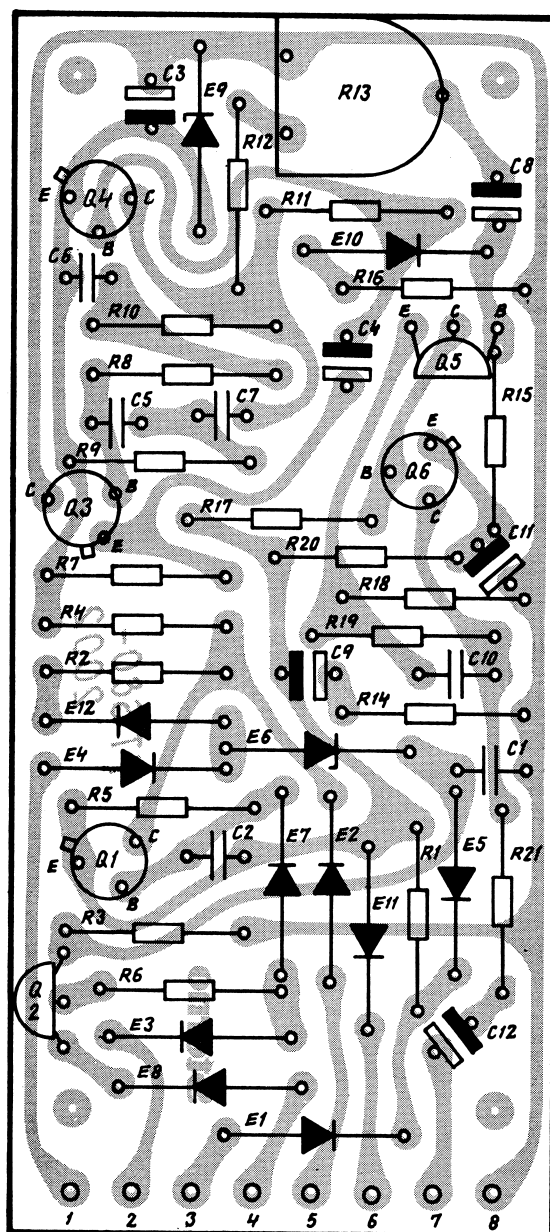
Kontrollnr. 06/80

18-6-68

gok. 06

Komp. liste X 113263

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr./tegn.
OG / JWA
17. 9. 69
godk.
OG
komp.liste
X113263
D111382

DILLING TONE GENERATOR
KLARTONEGENERATOR

TT680 - 2002
KODE

TEGN. NR.

D113504

A 4

no	code	data	no	code	data
C1	76.5070	10nF 10% polyest FL 50V	E9	99.5075	Zenerdiode 7, 5V 5% 0, 25W
C2	76.5070	- - - - -	E10	99.5028	Diode 1N914
C3	73.5109	10μF 20% tantanl 15V	E11	99.5028	- - - -
C4	73.5102	2, 2μF 20% tantanl 35V	E12	99.5028	- - - -
C5	76.5061	4, 7nF 10% polyest. FL 50V	Q1	99.5121	Transistor BC107
C6	76.5070	10nF 10% polyest. FL 50V	Q2	99.5144	Transistor BC214L
C7	76.5061	4, 7nF 10% polyest. FL 50V	Q3	99.5143	Transistor BC108
C8	73.5109	10μF 20% tantanl 15V	Q4	99.5143	Transistor BC108
C9	73.5126	4, 7 μF 20% tantanl 35V	Q5	99.5144	Transistor BC214L
C10	76.5071	22nF 10% polyest. FL 50V	Q6	99.5143	Transistor BC108
C11	73.5126	4, 7 μF 20% tantanl. 35V			
C12	73.5102	2, 2μF 20% tantanl 35V			
R1	80.5261	10kΩ 5% carbon film 1/8W			
R2	80.5257	4, 7kΩ - - - -			
R3	80.5265	22kΩ - - - -			
R4	80.5254	2, 7kΩ - - - -			
R5	80.5253	2, 2kΩ - - - -			
R6	80.5261	10kΩ - - - -			
R7	80.5260	8, 2kΩ - - - -			
R8	80.5273	100kΩ - - - -			
R9	80.5267	33kΩ - - - -			
R10	80.5271	68kΩ - - - -			
R11	80.5285	1MΩ - - - -			
R12	80.5257	4, 7kΩ - - - -			
R13	86.5051	100Ω 20% trim. carbon film 0, 1W lin.			
R14	80.5229	22Ω 5% carbon film 1/8W			
R15	80.5280	390kΩ 5% carbon film 1/8W			
R16	80.5259	6, 8kΩ - - - -			
R17	80.5262	12kΩ - - - -			
R18	80.5227	15Ω - - - -			
R19	80.5250	1, 2kΩ - - - -			
R20	80.5247	680Ω - - - -			
R21	80.5254	2, 7kΩ - - - -			
E1	99.5123	Diode AA117			
E2	99.5028	Diode 1N914			
E3	99.5123	Diode AA117			
E4	99.5028	Diode 1N914			
E5	99.5128	- - - -			
E6	99.5116	Zenerdiode 4, 3V 5% 0, 25W			
E7	99.5028	Diode 1N914			
E8	99.5123	Diode AA117			



udarb at
OG / SL
12.8.69
kontrol at
OG
třih diagr
D111382

PARTS LIST

STYKLISTE

TT680-2002

comp list
X113263

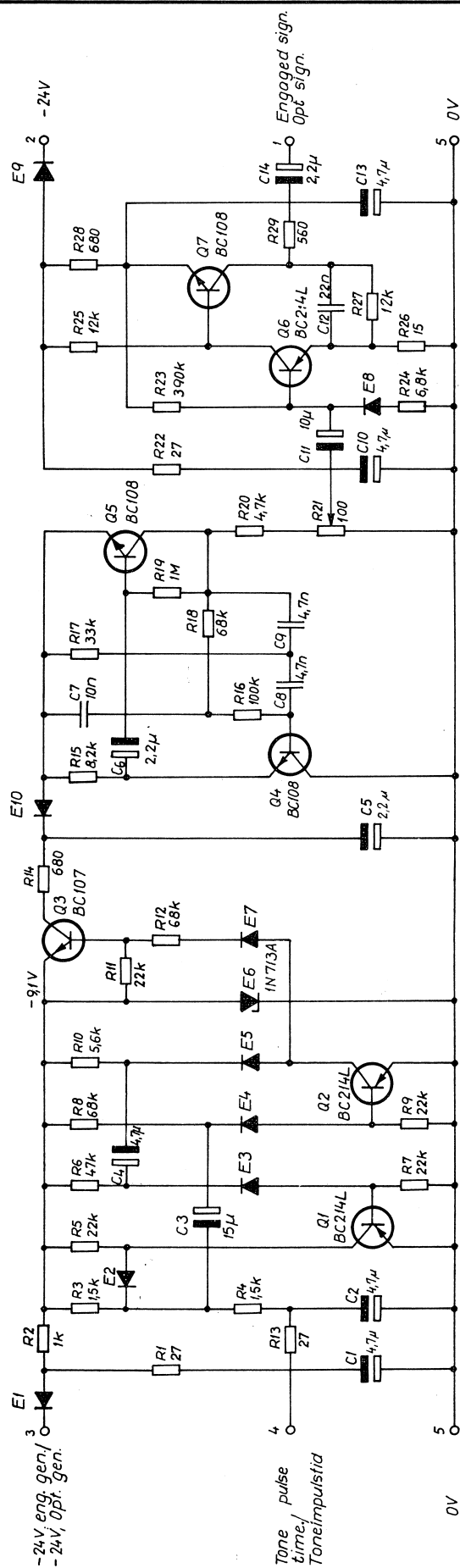
blad no 1 of 1

TT680-2002
Test procedure.

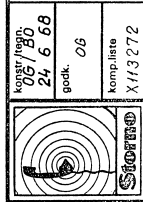
1. Connect 0V to term. 8 and -24V to term. 6. Connect a 330Ω resistor to term. 7 and 8.
2. Connect an oscilloscope to term. 7 and 8.
3. Connect 0V to term. 3 and next also to term. 4. The TT must not begin to oscillate.
4. Connect 0V to term. 4 and next to term. 3. The scope must show a sinusoidal signal with $f = 425\text{Hz}$ equiv. to period time $t_p \simeq 2,35\text{ms}$. (The potentiometer R_{13} must be turned to max. output signal).
5. Connect a 24V lamp to 0V and to term. 5. The lamp must illuminate.
6. The lamp must extinguish when either:
 - a) 0V is connected to term. 4,
 - b) or 0V is connected to term. 1,
 - c) or -24V is connected to term. 2,

Not: The lamp must illuminate again when 4 is repeated.

7. Measure the max. tone output signal with R_{13} turned to max signal:
 $U_{\text{max}} \simeq 1,4V_{\text{pp}}$. In normal usage in a system with $R_B \simeq 300\Omega$ the max. output signal will be $1V_{\text{pp}}$ and the normal dialling tone level will be $0,5V_{\text{pp}}$ corresponding with approximately $0,35V_{\text{pp}}$ across the desk set when connected through a 600Ω line.
8. Check $I_{\text{std.by}} \simeq 11\text{mA}$ and
 $I_{\text{act.}} \simeq 22,5\text{mA}$.



$t_{\text{TONE}} = 175 \text{ ms}$
 $t_{\text{PAUSE}} = 470 \text{ ms}$ (term. 4-5 kortsl.) (term. 4-5 open)
 $t_{\text{PAUSE}} = 825 \text{ ms}$ (term. 4-5 öpen.) (term. 4-5 strappad)



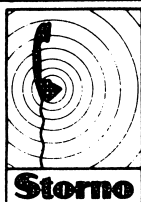
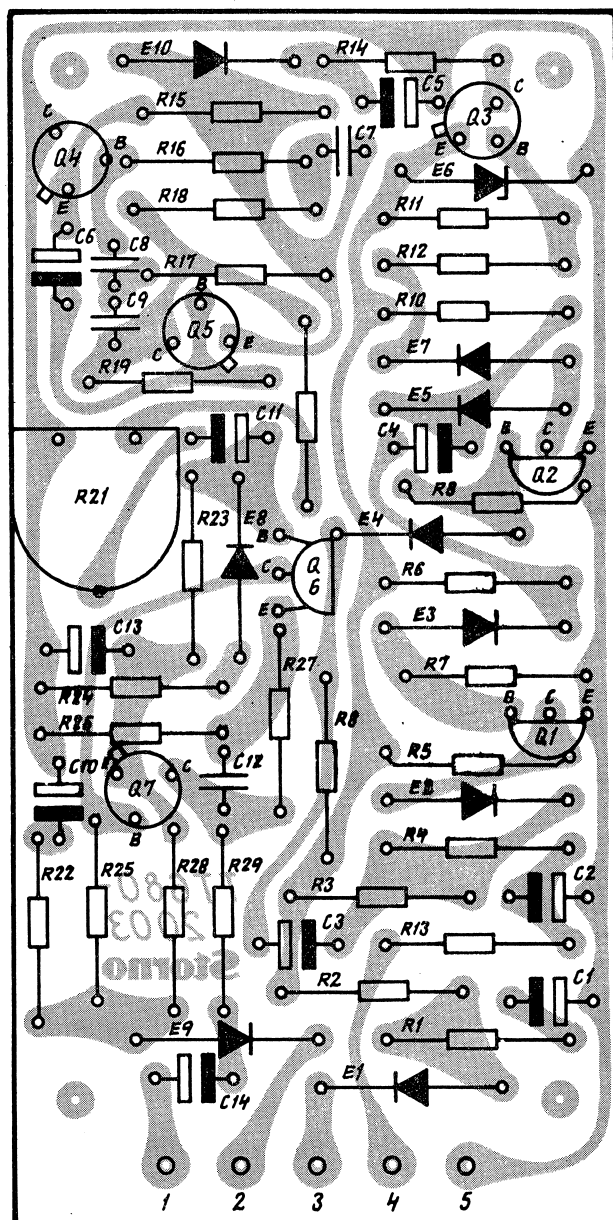
ENGAGED TONE GENERATOR
 OPTAGET TONEGENERATOR
 TT 680-2003

KODE:

TEGN. NR.

D 111453 A3

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr./tegn.
OG / JWA
16. 9. 69
godk.
OG
komp.liste
X113272
0111453

ENGAGED TONE GENERATOR
OPTAGET TONEGENERATOR

TT680 - 2003
KODE

TEGN. NR.

0113505

A 4

no	code	data	no	code	data
C1	73.5126	4,7 μ F 20% tantal 35V	E4	99.5028	Diode 1N914
C2	73.5126	- - - - -	E5	99.5028	- - - - -
C3	73.5105	15 μ F 20% tantal 15V	E6	99.5042	Zenerdiode 9,1V 5% 0,250W
C4	73.5126	4,7 μ F 20% tantal 35V	E7	99.5028	Diode 1N914
C5	73.5102	2,2 μ F 20% tantal 35V	E8	99.5028	- - - - -
C6	73.5102	- - - - -	E9	99.5028	- - - - -
C7	76.5070	10nF 10% polyest. FL 50V	E10	99.5028	- - - - -
C8	76.5061	4,7nF 10% polyest. FL 50V	Q1	99.5144	Transistor BC214L
C9	76.5061	- - - - -	Q2	99.5144	- - - - -
C10	73.5126	4,7 μ F 20% tantal 35V	Q3	99.5121	Transistor BC107
C11	73.5109	10 μ F 20% tantal 15V	Q4	99.5143	Transistor BC108
C12	76.5071	22nF 10% polyest FL 50V	Q5	99.5143	Transistor BC108
C13	73.5126	4,7 μ F 20% tantal 35V	Q6	99.5144	Transistor BC214L
C14	73.5102	2,2 μ F 20% tantal 35V	Q7	99.5143	Transistor BC108
R1	80.5230	27 Ω 5% carbon film 1/8W			
R2	80.5249	1k Ω - - - - -			
R3	80.5251	1,5k Ω - - - - -			
R4	80.5251	- - - - -			
R5	80.5265	22k Ω - - - - -			
R6	80.5269	47k Ω - - - - -			
R7	80.5265	22k Ω - - - - -			
R8	80.5271	68k Ω - - - - -			
R9	80.5265	22k Ω - - - - -			
R10	80.5258	5,6k Ω - - m - -			
R11	80.5265	22k Ω - - - - -			
R12	80.5271	68k Ω - - - - -			
R13	80.5230	27 Ω -- - - -			
R14	80.5247	680 Ω - - - - -			
R15	80.5260	8,2k Ω - - - - -			
R16	80.5273	100k Ω - - - - -			
R17	80.5267	33k Ω - - - - -			
R18	80.5271	68k Ω - - - - -			
R19	80.5285	1M Ω - - - - -			
R20	80.5257	4,7k Ω - - - - -			
R21	86.5051	100 Ω 20% trim. car- bon film 0,1W lin.			
R22	80.5230	27 Ω 5%			
R23	80.5280	390k Ω - - - - -			
R24	80.5259	6,8k Ω - - - - -			
R25	80.5262	12k Ω - - - - -			
R26	80.5227	15 Ω - - - - -			
R27	80.5250	1,2k Ω - - - - -			
R28	80.5247	680 Ω - - - - -			
R29	80.5246	560 Ω - - - - -			
E1	99.5028	Diode 1N914			
E2	99.5028	- - - - -			
E3	99.5028	- - - - -			



udarb at
OG/SL
12.8.69
kontrol at
06
tjth diagr
D111453

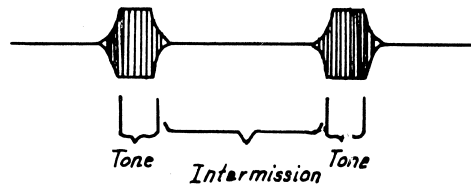
PARTS LIST
STYKLISTE

TT680-2003

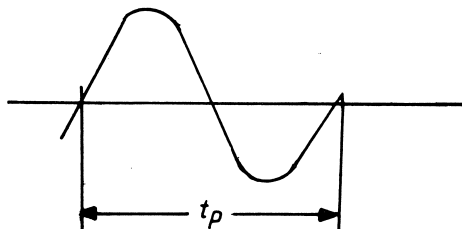
Comp list
X113272
Bud no 1 of 1

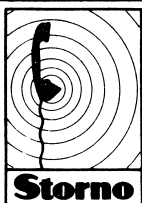
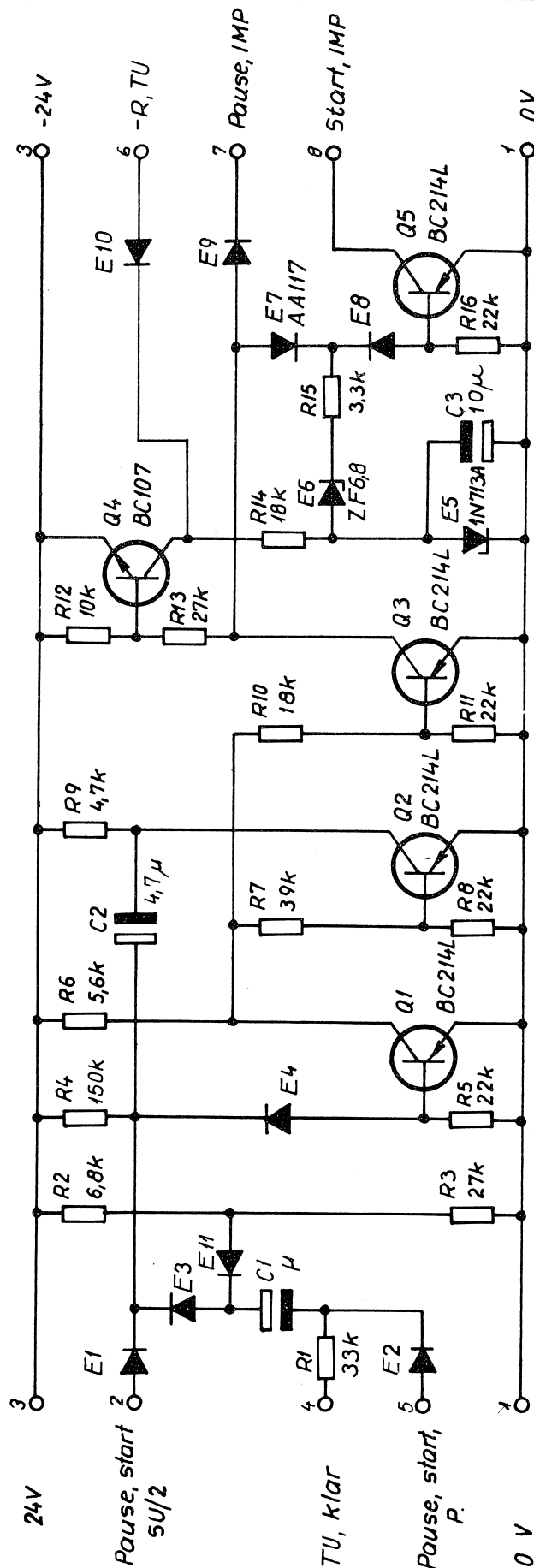
TT680-2003
Test procedure.

1. Connect 0V to term. 5 and -24V to term. 2. Check $I_{\text{stand by}} \simeq 8\text{mA}$. Connect a 560Ω resistor to term. 1 and 5.
2. Connect an oscilloscope to term. 1 and 5. When term. 3 is connected to -24V check $I_{\text{act.}} \simeq 22,5\text{mA}$ and control that the tone signal has the following appearance:



3. Check $t_{\text{tone}} \simeq 175\text{ms}$ and $t_{\text{interm.}} \simeq 825\text{ms}$ both to be within $\pm 10\%$.
4. Connect 0V to term. 4. The duration of the intermission between the tone bursts is now changed to $t_{\text{interm.}} \simeq 470\text{ms} \pm 10\%$.
5. Connect 0V to the collector of Q_2 (anode of E_5 or E_7). The tone signal will now change to a constant sinusoidal signal where one top is slightly "cut".
6. Adjust potentiometer R21 to max. output $U_{\text{out}} \geq 4,5V_{\text{pp}}$
7. Adjust sweep time on the scope to $0,5\text{ms/cm}$. Check the period time to $t_p \simeq 2,35\text{ms}$. This corresponds to $f = 1/t_p = 425\text{Hz}$.





konstr./tegn.
06/80
18-6-68
godk.
06
komp liste
X 113259

INTERMISSION AND START UNIT FOR DIALLING.
PAUSETIDSENHED OG STARTENHED FOR CIFFER-
IMPULSERING.

TU680-2003

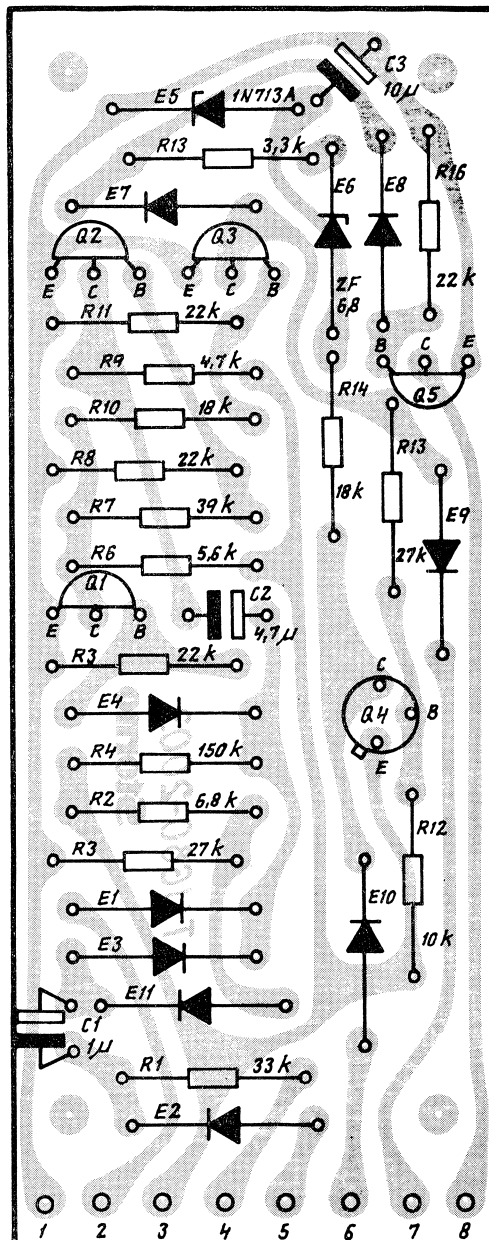
KODE

TEGN NR.

D 111425

A 4

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr. tegn
06 / JWA
26 · 8 · 69
godk.
06
komp. liste
X113259
0111425

INTERMISSION AND START UNIT FOR DIALLING.
PAUSETIDSENHED OG STARTENHED FOR CIFFER-
IMPULSERING.

TU680-2003

KODE

TEGN. NR.

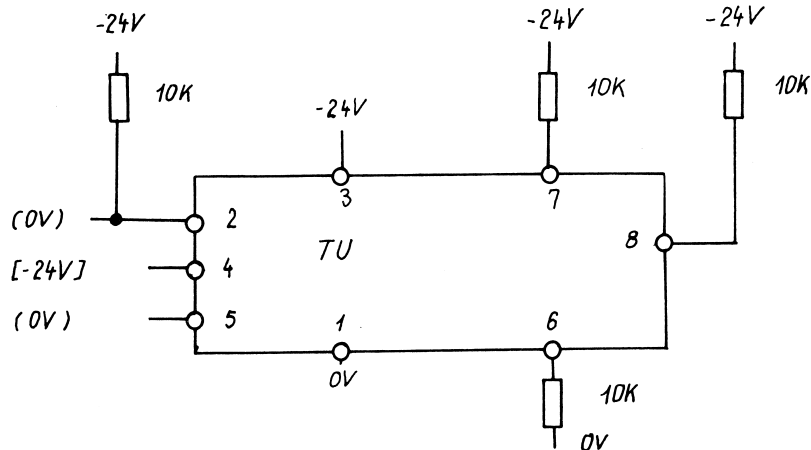
0113384

A 4

no	code	data	no	code	data
C1	73.5114	1 μ F 20% tantal 35V			
C2	73.5126	4,7 μ F 20% tantal 35V			
C3	73.5109	10 μ F 20% tantal 15V			
R1	80.5267	33k Ω 5% carb. film 1/8W			
R2	80.5259	6,8k Ω - - - -			
R3	80.5266	27k Ω - - - -			
R4	80.5275	150k Ω - - - -			
R5	80.5265	22k Ω - - - -			
R6	80.5258	5,6k Ω - - - -			
R7	80.5268	39k Ω - - - -			
R8	80.5265	22k Ω - - - -			
R9	80.5257	4,7k Ω - - - -			
R10	80.5264	18k Ω - - - -			
R11	80.5265	22k Ω - - - -			
R12	80.5261	10k Ω - - - -			
R13	80.5266	27k Ω - - - -			
R14	80.5264	18k Ω - - - -			
R15	80.5255	3,3k Ω - - - -			
R16	80.5265	22k Ω - - - -			
E1	99.5028	Diode 1N914			
E2	99.5028	- - - -			
E3	99.5028	- - - -			
E4	99.5028	- - - -			
E5	99.5042	Zenerdiode 9,1V 5% 0,250W			
E6	99.5146	Zenerdiode 6,8V 5% 0,250W			
E7	99.5123	Diode AA117			
E8	99.5028	Diode 1N914			
E9	99.5028	- - - -			
E10	99.5028	- - - -			
E11	99.5028	- - - -			
Q1	99.5144	Transistor BC214L			
Q2	99.5144	- - - - -			
Q3	99.5144	- - - - -			
Q4	99.5121	Transistor BC107			
Q5	99.5144	Transistor BC214L			

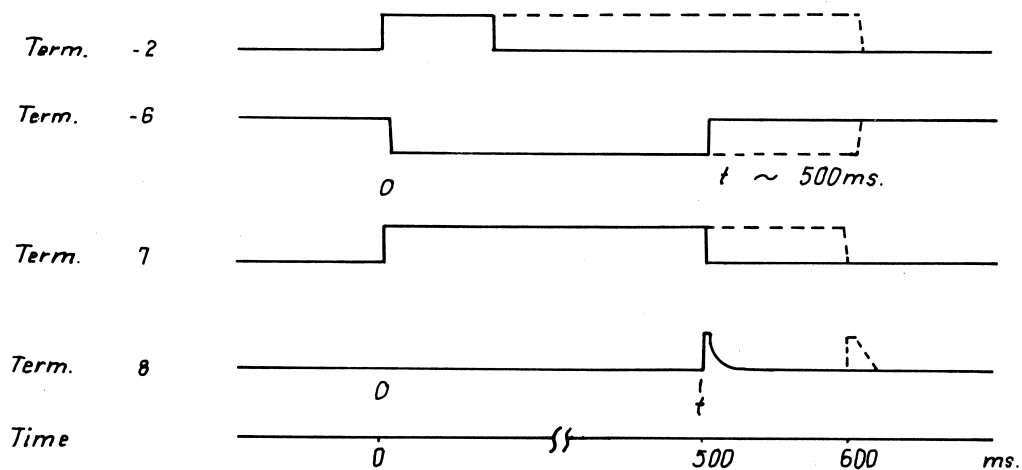
TU680-2003
Test procedure.

The shown test set-up is used.

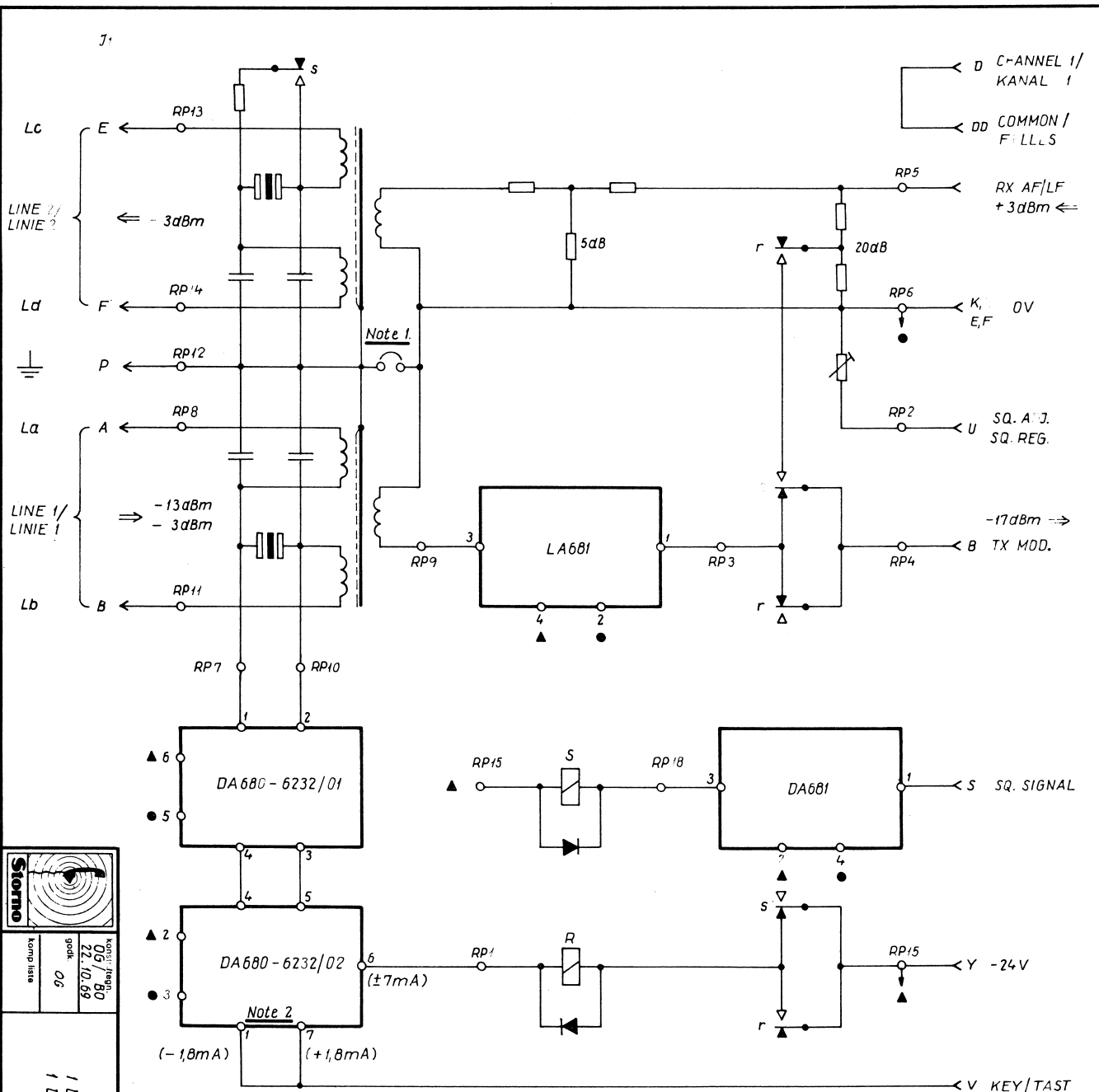


When 0V is connected to term. 1 and -24V is connected to term. 3 transistor Q_1 is ON, transistors Q_2 to Q_5 are OFF and $I_{stand\ by} \approx 5mA$ can be measured at term. 3.

1. Connect an oscilloscope to the terminals 2, 6, 7, and 8 in turn with term. 1 as reference (sweep: 100ms/cm, sensitiv: 5V/cm). When 0V is connected to term. 2 measure $I_{act} \approx 8mA$ and the following curves can be seen on the scope:



2. The output signal (from term. 6, 7, and 8) must change 500ms (+ 100ms) after term. 2 has been connected briefly to 0V.
3. If term. 2 is connected longer than 500ms to 0V the output signal (from term. 6, 7, and 8) will change simultaneously with the removal of the 0V potential from term. 2.
4. Connect -24V to term. 4. When 0V is connected to term. 5 the same output curves will be obtained as shown above. The output signals, however, will change app. 500ms after the connection of the 0V potential independent of how long time the 0V potential has been connected.



Note 1. OV is normally connected from PS via CQF chassis- antenna cable and mast to ground.
If no separate telephone ground connection is used, OV is strapped to the telephone ground terminal P.

Note 2. Select suitable resistance values for R19, R41 and R28 (in DA680-6232/02) to obtain OV output from the terminals 7, 1 and 6 for +1,4mA, -1,4mA and $\pm 5,5$ mA line current respectively.

The line current has the following system functions:
1: 1,8mA keys transmitter
2: 7,0mA repeater function/on switched.

CAF680-2002

- 1a: After mobile call to telephone subscriber.
- 2a: When teleph. subscriber lifts handset from cradle
- 2b: After mobile rep. call and group call.

CAF680-2003

- 1b: When call from PABX subscriber is received.
- 1c: When mobile is calling teleph. subscriber.
- 2c: When calls for mobile to mobile communication are received.

The squelch signal transmitted towards TE through line 2 is only used in conditions 2b, 1c and 2c.

14	14	25	7	4
DA/01	DA/02	RP/04	LA	DA
P2				



Kontroll. Regn.
22.10.69
06/80
gokk
06
komp. liste

CONTROL PANEL/KONTROL PANEL
1 DUPLEX CHANNEL WITH REPEATER FUNCTION
1 DUPLEX KANAL MED REPEATERFUNKTION
CP680-2003

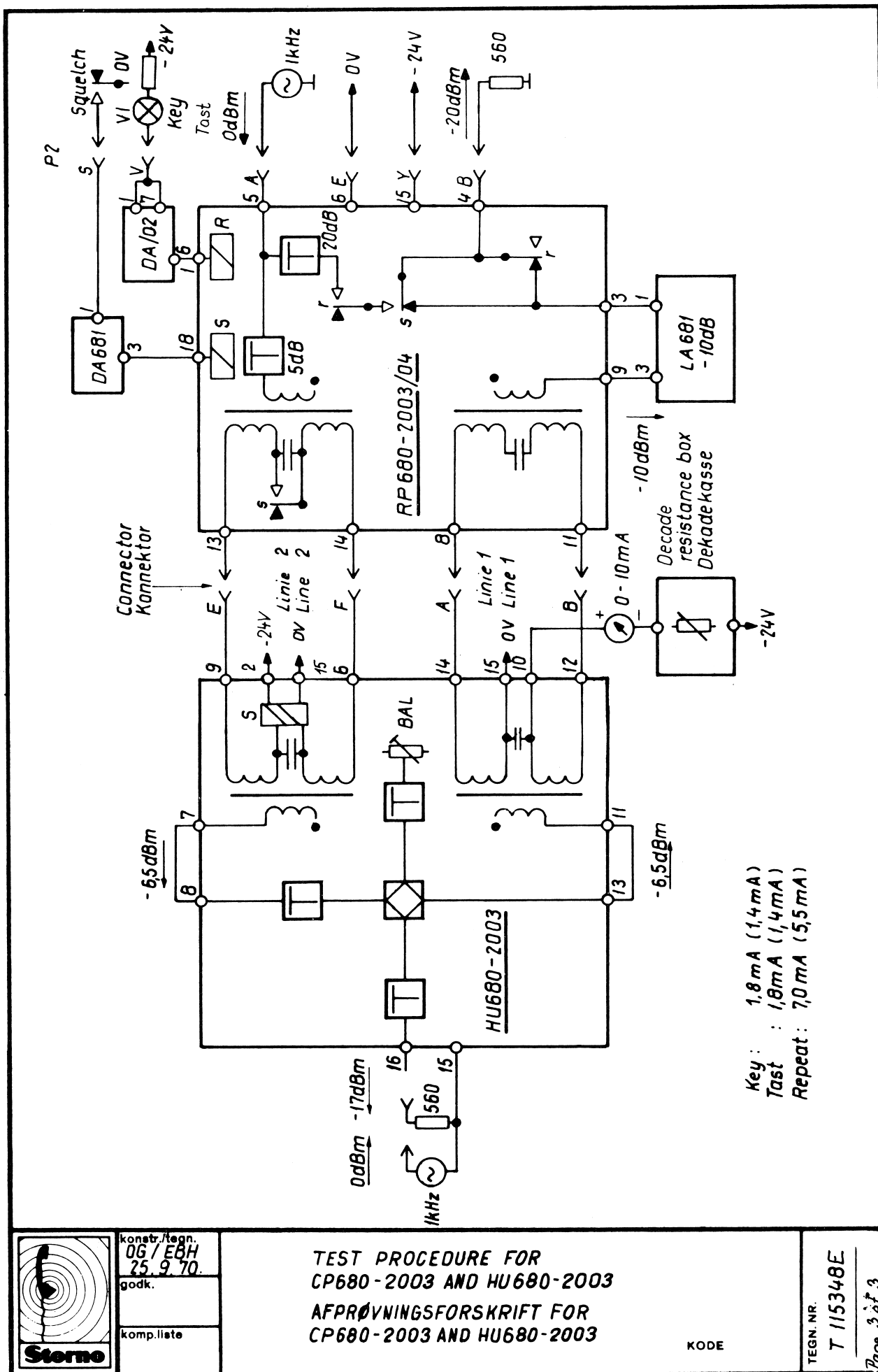
TEGN. NR.
D 113699 E
A 3

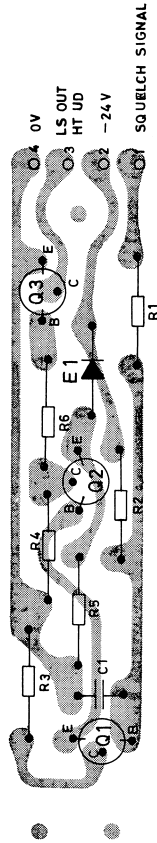
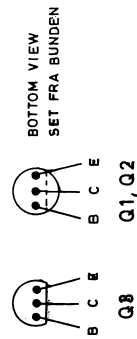
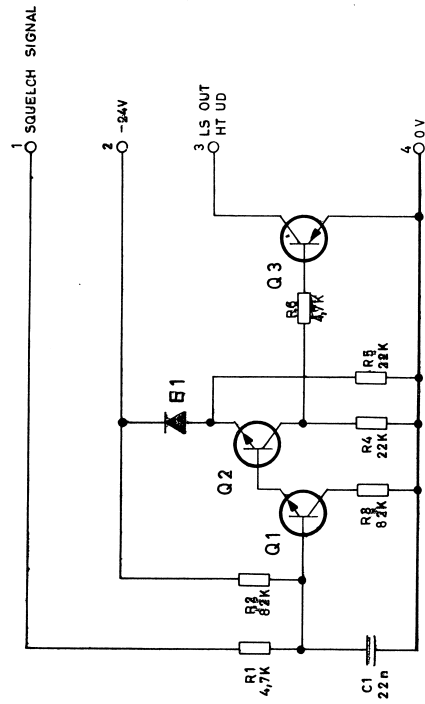
CP680-2003 and HU680-2003

Test procedure.

1. The test set-up shown is used
2. By means of the shown external decade resistance box adjust the line current to 1,4mA. A second decade resistance box is connected to DA680-6232/02 as R41. Adjust "R41" until lamp V1 "Key" is illuminated. Replace "R41" with nearest std. resistor. Interchange lines A and B and repeat the adjustment for R19.
3. Adjust the line current to 5,5mA and insert the second decade resistance box as R28 in DA680-6232/02. Adjust "R28" until relay R is energized. Replace "R28" with nearest std. value resistor.
4. Check the functions described in 2 and 3 with 1,8 and 7,0mA line current.
5. Without line current connect 0V to term. S on connector P2 (corresponding to term. 1 on DA681) . Relay S on RP680-2003/04 as well as relay S on HU680-2003 must operate.
6. Adjust for 7,0mA line current in line 1. Lamp V1 must illuminate.
7. Remove 0V from terminal S (on P2). Both S relays must be released and relay R must operate.
8. Connect 0V again to terminal S. Both S relays must be energized and relay R must stay energized.
9. Without line current connect a tone generator (level= 0dBm, f = 1kHz), to term. A and E on P2. Check levels to be in accordance with those shown on the level plan.
10. Connect a VTVM to term. 11 and 15 on the HU-unit. Adjust the hybrid balance potentiometers R₇ and R₈ for minimum deflection on the VTVM app. -50dBm.
11. Adjust for 7,0mA line current in line 1 and connect a VTVM to term. B and E on P2. Connect 0V to term S. Relay S on the RP/04 will operate and the VTVM must show app. -20dBm.
12. Without line current. connect tone generator with 0dBm output to term. 16 and 15 on the HU-unit. Check the following levels: app. -6,5 dBm between term 11 and 15 on the HU-unit, app. -10dBm between term. 9

- and 6 on the RP/04 unit and -20dBm between terminals B and E on P2.
13. Connect 0V to term. S on P2. Relay S will operate and output level between term. B and E on P2 must not change. (Tone generator connected as in 12).





PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN

SQUELCH AMPLIFIER
SQUELCH FORSTÆRKER

DA681

D400.821/2

Storno

TYPE	NO.	CODE	DATA

SQUELCH AMPLIFIER
SQUELCH FORSTÆRKER

DA681

X40Q.851/3

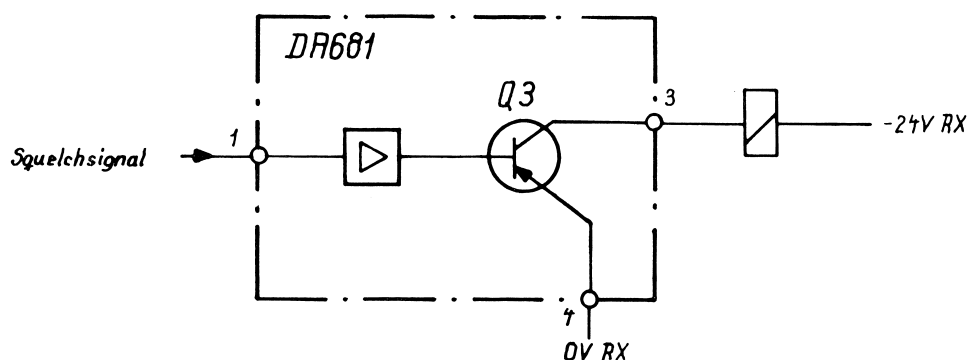
DC-Amplifier DA681

Application

The function of DC-amplifier 681 is to switch on and off the loudspeaker, depending upon the level of the squelch signal.

Operation.

The squelch signal is fed from the receiver to the DC-amplifier stages Q1 and Q2. The amplified signal is then applied to the base of transistor Q3, the collector of which is connected to -24V via an external relay, which controls switching of the speaker.



At a squelch level between -16V and -8V on terminal 1, transistor Q3 becomes conducting, which causes the relay to operate, and the speaker to be switched on.

A squelch level above -16V cuts off Q3, and the relay releases, switching off the loudspeaker.

Specification.

Squelch levels:

Cut-off	-24V.
Open	-8V.
Opening level	-16V $\pm 20\%$.

Collector current in Q3:

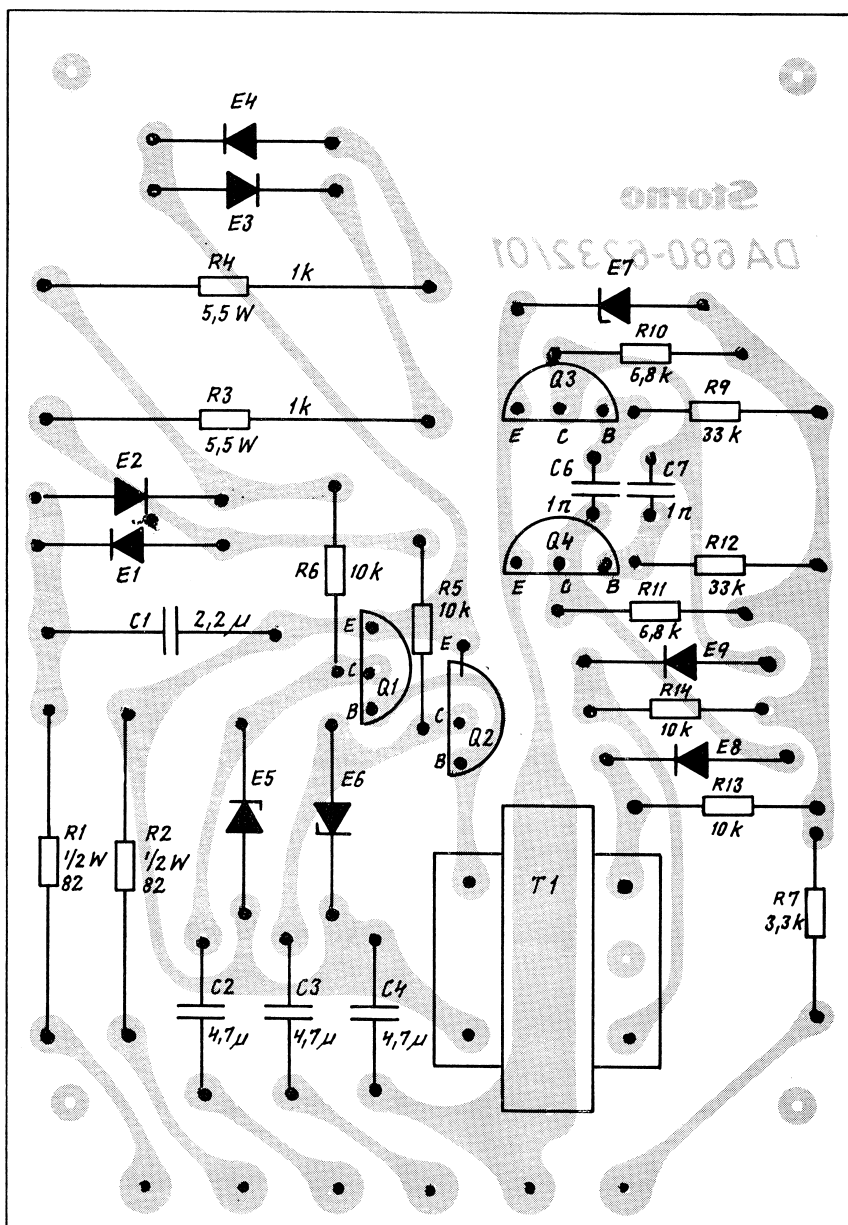
Max. 100mA.

Temperature range:

-30°C to +60°C.

Supply voltage:

-24V $\pm 5\%$.



Hou / JWA
14 . 4 . 69

NH

Diag. nr. D112857

PLACERINGSTEGNING FOR DA 680 - 6232/01
COMPONENT LOCATION DRAWING FOR " "

D112901

no	code	data	no	code	data
C1	76.5081	2, 2 μ F 5% polyest. FL 63V	E8-9	99.5028	Diode 1N914
C2	74.5146	4, 7nF -20+50% ceram. II DI 5000V	Q1	99.5181	Transistor 2N3704
C3	74.5146	4, 7nF -20+50% ceram. II DI 5000V	Q2-4	99.5144	Transistor BC214L
C4	74.5146	4, 7nF -20+50% ceram.	T1	60.5130	Transformer
C6	76.5069	1nF 10% polyest. FL 50V			
C7	76.5069	1nF 10% polyest. FL 50V			
R1	81.5036	82 Ω 5% carbon film 1/2W			
R2	81.5036	82 Ω 5% carbon film 1/2W			
R3	84.5006	1 k Ω 10% wirewound 5.5W			
R4	84.5006	1 k Ω 10% wirewound 5.5W			
R5	80.5261	10k Ω 5% carbon film 1/8W			
R6	80.5261	10k Ω 5% carbon film 1/8W			
R7	80.5255	3.3 k Ω 5% carbon film 1/8W			
R9	80.5267	33 k Ω 5% carbon film 1/8W			
R10	80.5259	6.8k Ω 5% carbon film 1/8W			
R11	80.5259	6.8k Ω 5% carbon film 1/8W			
R12	80.5267	33 k Ω 5% carbon film 1/8W			
R13	80.5261	10 k Ω 5% carbon film 1/8W			
R14	80.5261	10k Ω 5% carbon film 1/8W			
E1-4	99.5020	Diode 1N4004			
E5	99.5042	Zener-diode 9.1V 5% 0.25W			
E6	99.5042	Zener-diode 9.1V 5% 0.25W			
E7	99.5114	Zener-diode 5.6V 5% 0.25W			



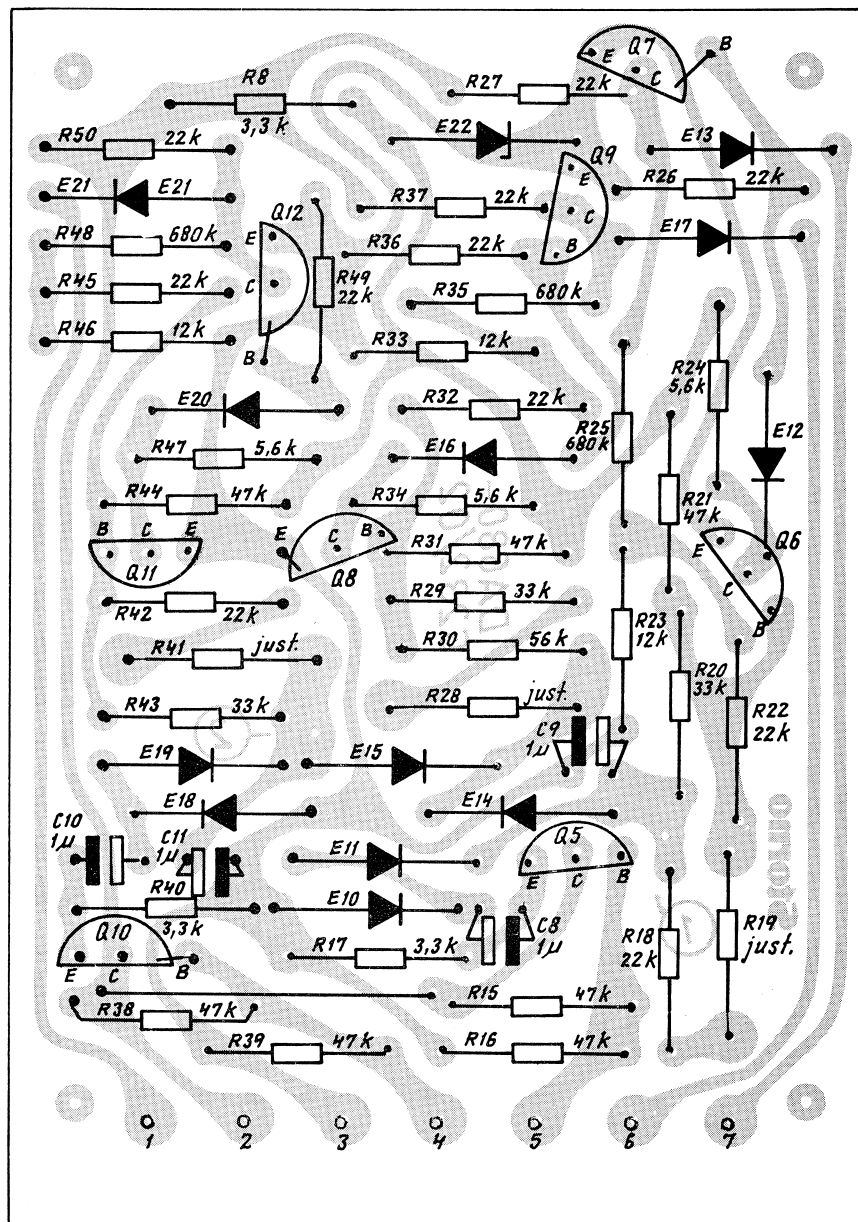
users of
KH/HN
9.10.70
KH
with diag
DI12857

PARTS LIST
STYKLISTE

DA680-6232/01

comp list
X113140

blad no 1 of 1



Hou / JWA
14. 4. 69
NH

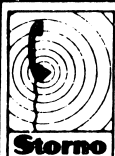
PLACERINGSTEGNING FOR
COMPONENT LOCATION DRAWING FOR

DA680 - 6232 / 02
" "

Diag.nr. D112857.

D112902

no	code	data	no	code	data
C8-11	73.5114	1 μ F 20% tantal 30V	R38	80.5269	47 k Ω 5% carbon film 1/8W
R8	80.5255	3.3 k Ω 5% carbon film 1/8W	R39	80.5269	47 k Ω 5% carbon film 1/8W
R15	80.5269	47 k Ω 5% carbon film 1/8W	R40	80.5255	3.3 k Ω 5% carbon film 1/8W
R16	80.5269	47 k Ω 5% carbon film 1/8W	R42	80.5265	22 k Ω 5% carbon film 1/8W
R17	80.5255	3.3 k Ω 5% carbon film 1/8W	R43	80.5267	33 k Ω 5% carbon film 1/8W
R18	80.5265	22 k Ω 5% carbon film 1/8W	R44	80.5269	47 k Ω 5% carbon film 1/8W
R20	80.5267	33 k Ω 5% carbon film 1/8W	R45	80.5265	22 k Ω 5% carbon film 1/8W
R21	80.5269	47 k Ω 5% carbon film 1/8W	R46	80.5262	12 k Ω 5% carbon film 1/8W
R22	80.5265	22 k Ω 5% carbon film 1/8W	R47	80.5258	5.6 k Ω 5% carbon film 1/8W
R23	80.5262	12 k Ω 5% carbon film 1/8W	R48	80.5283	680 k Ω 5% carbon film 1/8W
R24	80.5258	5.6 k Ω 5% carbon film 1/8W	R49	80.5269	22 k Ω 5% carbon film 1/8W
R25	80.5283	680 k Ω 5% carbon film 1/8W	R50	80.5265	22 k Ω 5% carbon film 1/8W
R26	80.5265	22 k Ω 5% carbon film 1/8W	E10	99.5123	Diode AA117
R27	80.5265	22 k Ω 5% carbon film 1/8W	E11	99.5123	Diode AA117
R29	80.5267	33 k Ω 5% carbon film 1/8W	E12-17	99.5028	Diode 1N914
R30	80.5270	56 k Ω 5% carbon film 1/8W	E18	99.5123	Diode AA117
R31	80.5269	47 k Ω 5% carbon film 1/8W	E19	99.5123	Diode AA117
R32	80.5265	22 k Ω 5% carbon film 1/8W	E20	99.5028	Diode 1N914
R33	80.5262	12 k Ω 5% carbon film 1/8W	E21	99.5028	Diode 1N914
R34	80.5258	5.6 k Ω 5% carbon film 1/8W	E22	99.5114	Zenerdiode 5.6V 5% 0.25W
R35	80.5283	680 k Ω 5% carbon film 1/8W	Q5-12	99.5144	Transistor BC214L
R36	80.5265	22 k Ω 5% carbon film 1/8W	R19	} Adjustment resistors, optimum value selected at factory. Justeringsmodstande isættes ved afprøvningen.	
R37	80.5265	22 k Ω 5% carbon film 1/8W	R28		
			R41		

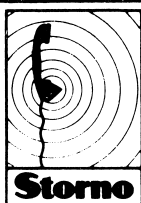
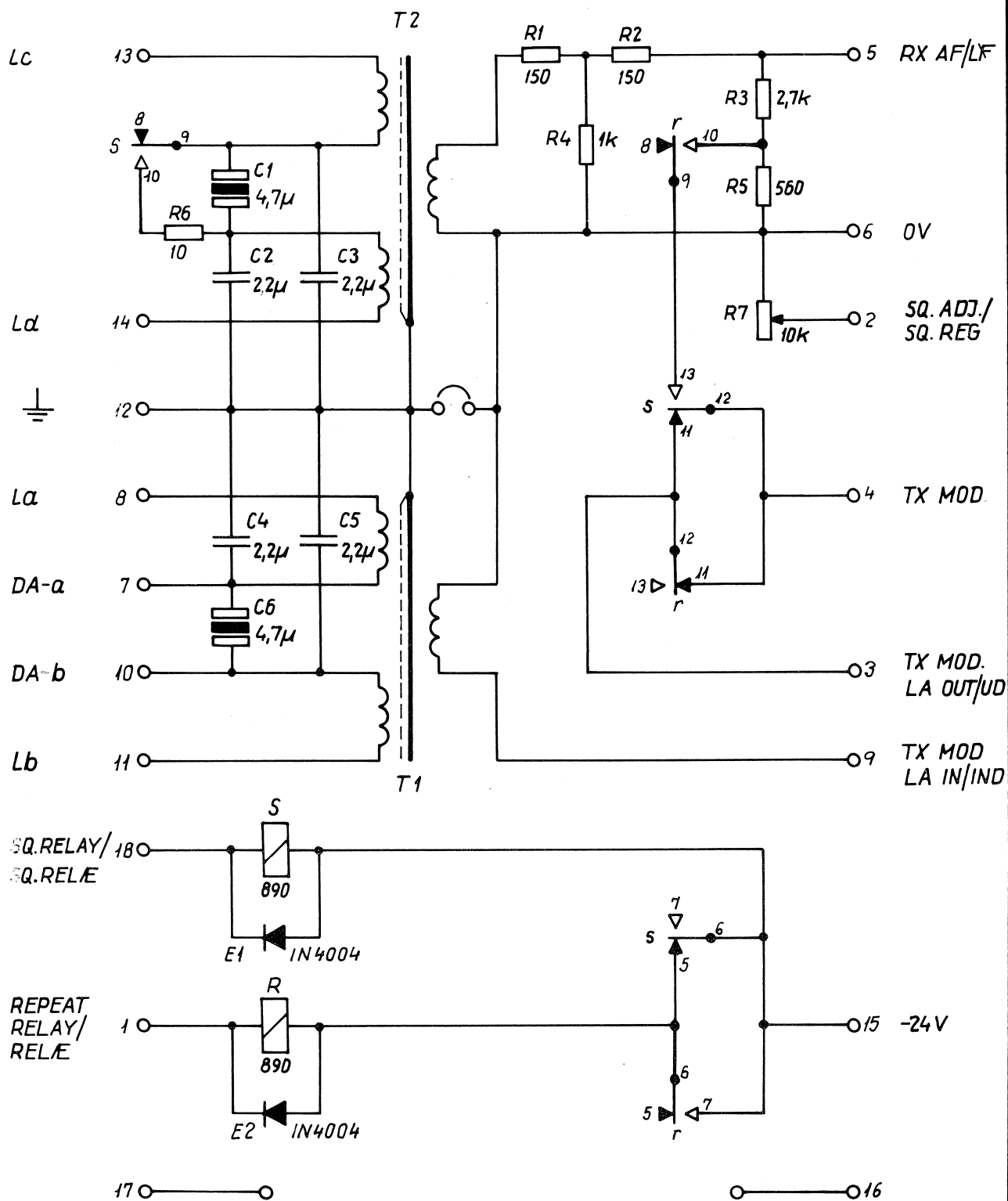


KHB/HNE
 9.10.70
 Kontrol af
 KHB
 Tilk. diag.
 D112857

PARTS LIST
STYKLISTE

DA680-6232/02

X113141
 Side no 1 of 1



konstr./tegn.
06 / 80
22.10.69
godk.
06
komp.liste
X113731

LINE PANEL/LINIE PANEL
RP680-2003/04

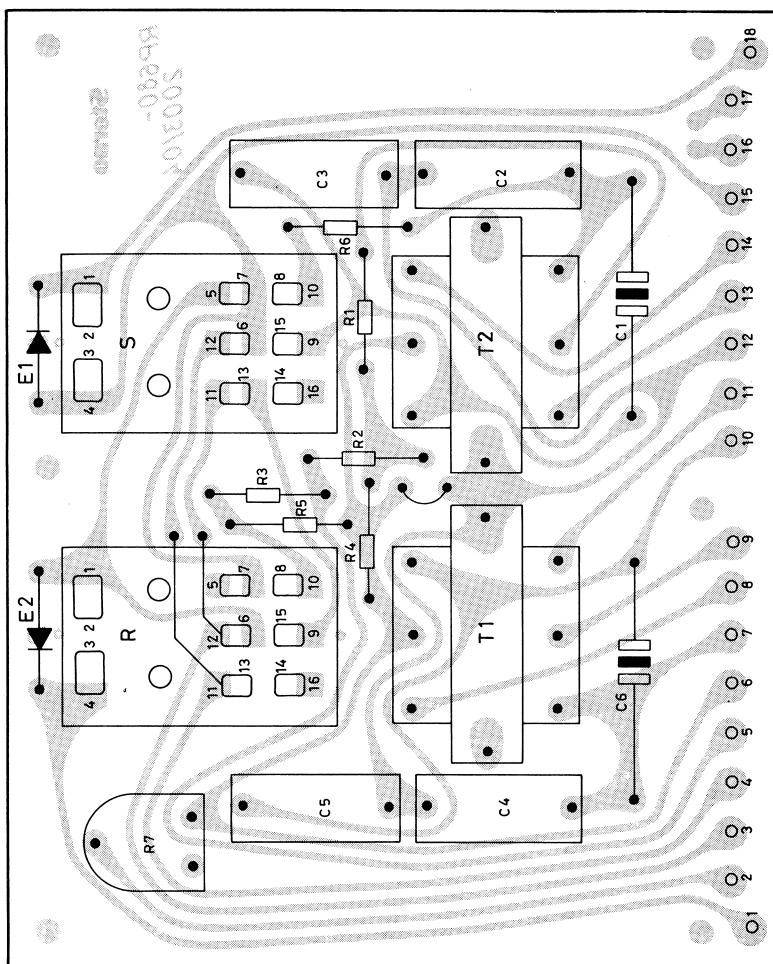
KODE


TEGN. NR.

D 113702

A 4

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN




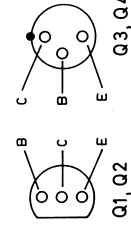
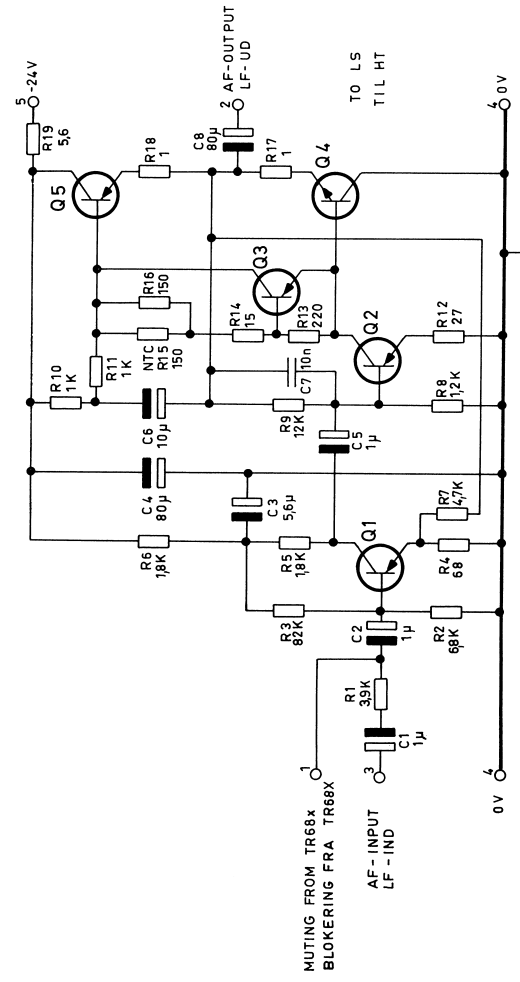
	KOMP. LISTE 06/ANM 3.H. 69.	
	06	06
KOMP. LISTE D/13707 X/13731		06

LINE PANEL / LINEPANEL RP680-2003/04

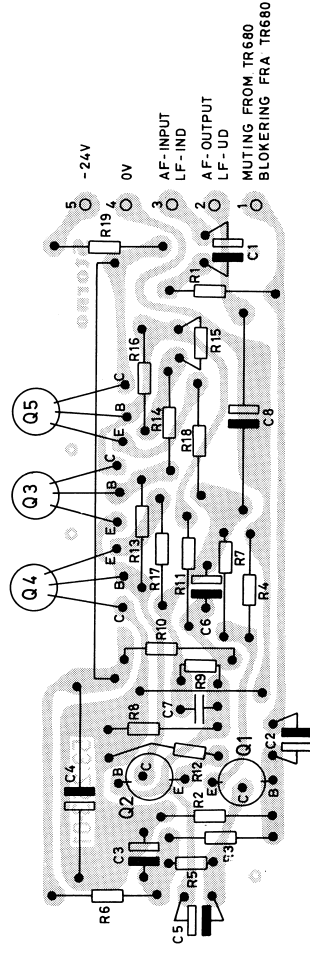
D/13754

no	code	data	no	code	data
C1	73.5007	4,7 μ F -10+100% elko 100V (Bip.)			
C2	76.5081	2,2 μ F 5% polyest.FL63V			
C3	76.5081	- - - - -			
C4	76.5081	- - - - -			
C5	76.5081	- - - - -			
C6	73.5007	4,7 μ F -10+100% elko 100V (Bip.)			
R1	80.5239	150 Ω 5% carb.film 1/8W			
R2	80.5239	150 Ω - - -			
R3	80.5254	2,7k Ω - - -			
R4	80.5249	1k Ω - - -			
R5	80.5246	560 Ω - - -			
R6	80.5225	10 Ω - - -			
R7	86.5039	10k Ω 20% adjust carb.film 0,1W lin.			
E1	99.5028	Diode 1N4004			
E2	99.5028	Diode 1N4004			
ReR	58.5055	Relay 24V 890 Ω 21-21, 21-21			
ReS	58.5055	- - - - -			
T1	60.5097	Transformer AF/ LF, 150/150/600 Ω			
T2	60.5097	- - - - -			

	udob. of	PARTS LIST STYKLISTE RP680-2003/04	X113731 b od o of
	OG/BH/An		
	kontrol of		
	06		
D113702			



BOTTOM VIEW
SET FRA BUNDEN

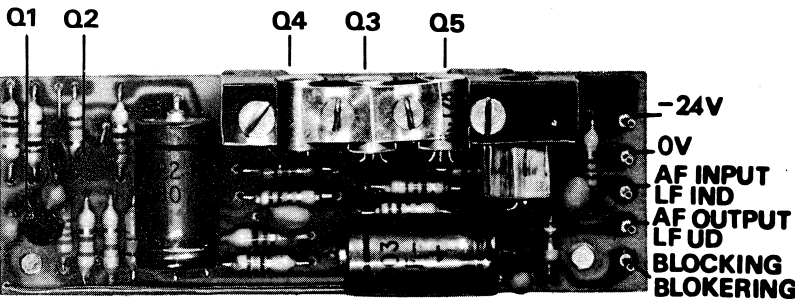


AF-AMPLIFIER
LF-FORSTÆRKER

AA602c

D400.836/3

Audio Output Amplifier AA602



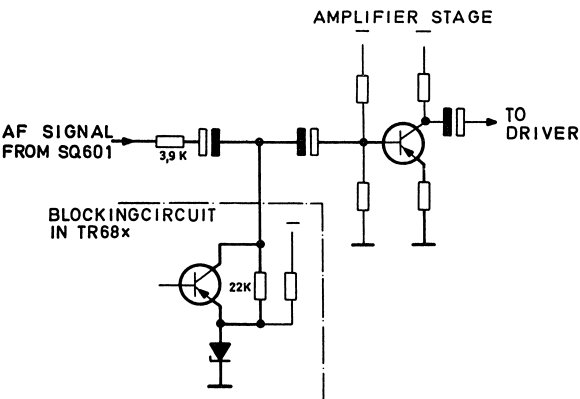
The audio output amplifier is built on a wiring board. It consists of these stages:

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

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

Mode of Operation

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



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

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

Reducing the Input Sensitivity

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

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

Technical Specifications**Supply Voltage**

24 V $\pm 5\%$.

Resistance in Power Supply Cable

R_{cable} : max. 14 ohms.

Current Drain

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

Power Output

Max. 2 watts.

Loudspeaker Impedance

15 ohms.

Input Impedance

6.5 k ohms.

Input Sensitivity

For 2 watts into 15 ohms and $R_{\text{cable}} = 0$ ohms.
Better than -9 dBm.

Frequency Response

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

Distortion

Less than 5%.

Hum and Noise

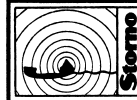
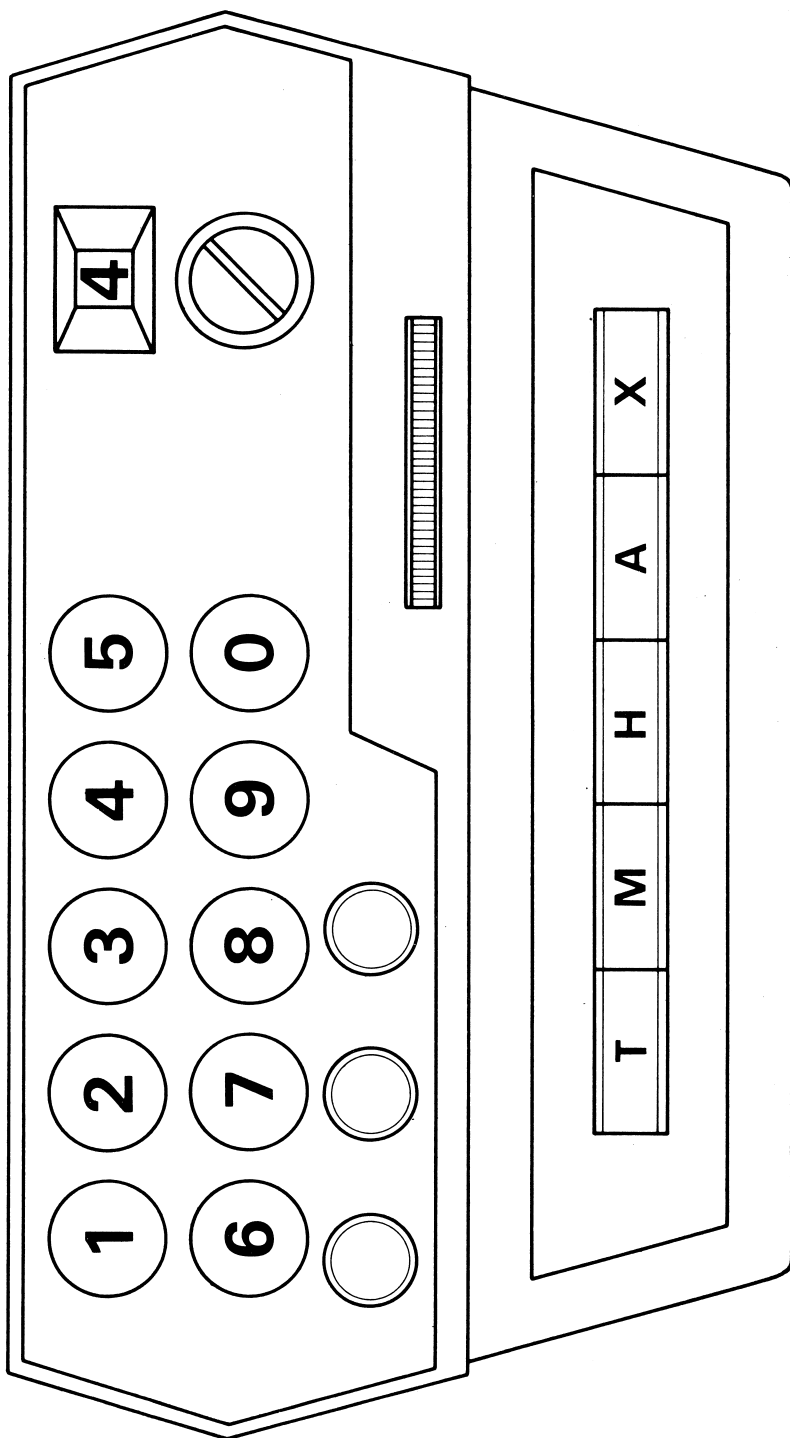
Attenuated 60 dB.

Blocking

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

Dimensions

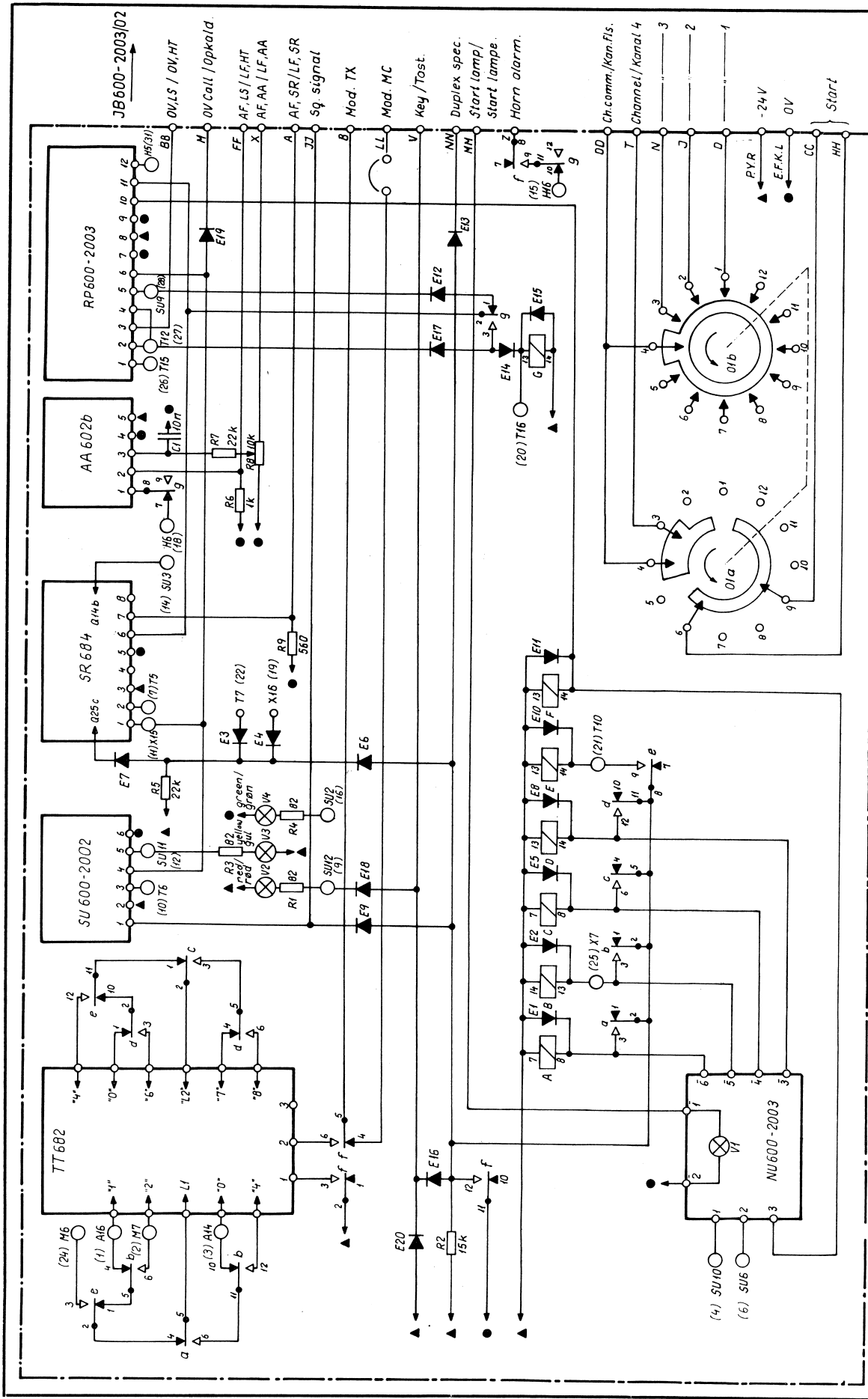
28 x 80 mm.




konstr. lekki:
06 / 314
9 4 62
godk. 06
komp. lista

MOBILE CONTROL BOX FOR RADIO TELEPHONE
SYSTEM WITH 2-WAY AUTOMATIC DIALING.
MOBIL MANÖVREBOKS FÖR RADIOTELEFONSYSTEM
MED 2-VEJS AUTOMATVALG. CB601-2003 I
CAF 600-2003

TEGN. NR.
D112873
A3





konstr. tegn
SPN/JAM
13.11.69
godk. C/G
komp. liste

TOP SECTION OF CONTROL BOX

CB 601-2003 / 01

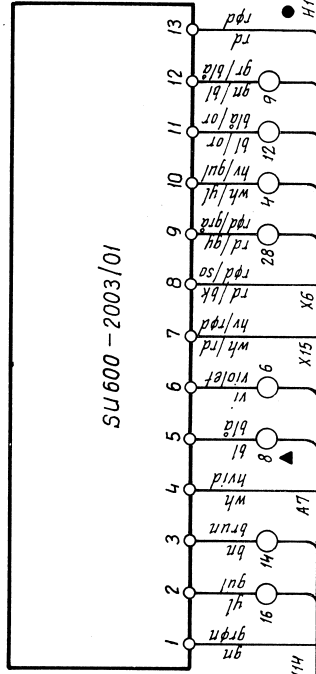
OVERSEKSEK AF MANØVREBOKS

TEGN. NR.
D143820

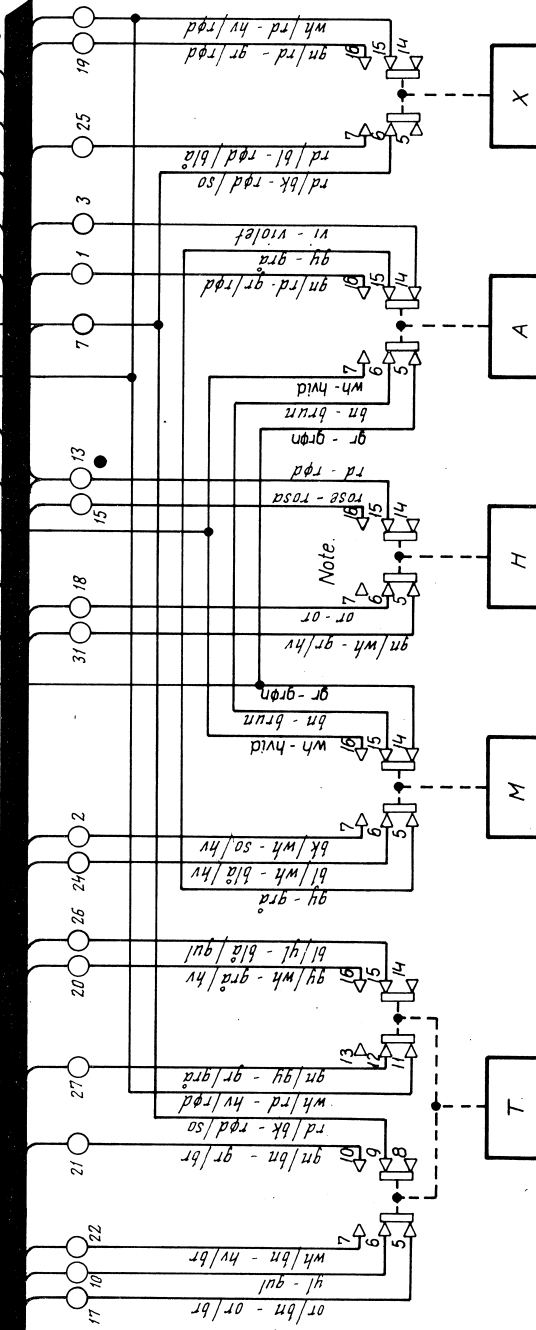
KODE

RP 600 - 2003/01

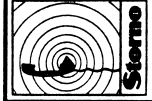
Print unit in upper section
of CB601-2003/01 (D113.820)
Printpladeenhed i øverste sektion
af CB601-2003/01 (D113.820)



Wire no. accord. to K304.306 /
Ledningsnumre iflg. K304.306



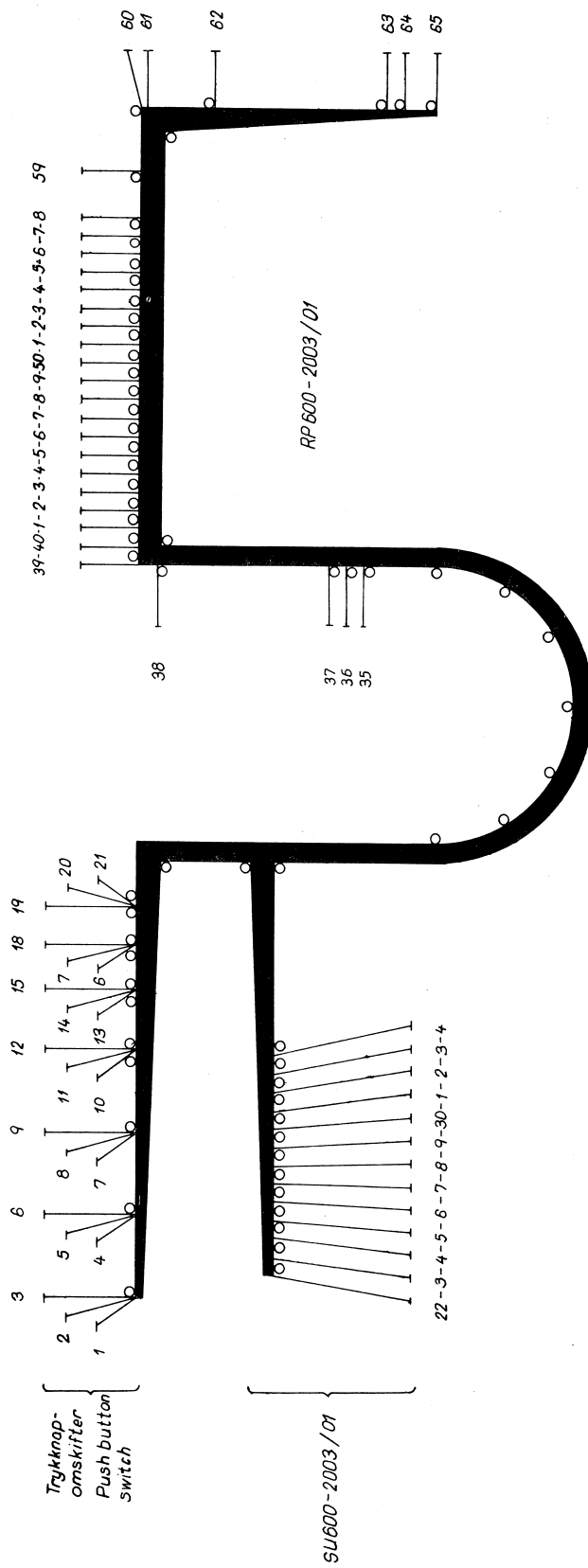
Note.
Ønskes opkaldstone samtidig med hornalarm (H-knap indtrykket)
kørlsluttes term. 5 og 6 på omskifter H.
SU600-2003/01 og trykknapskifter er monteret i CA681.
If attention tone is desired together with horn alarm (H-push button
activated) term. 5 and 6 on push button switch H must be strapped.
SU600-2003/01 and push button switches are mounted in CA681.





KOMPLETTE
SPN/TEBH
12.11.69
godk. 06
komplette

BOTTOM SECTION OF CONTROL BOX
UNDERSEKTIØN AF MANØVREBOKS
CB601 - 2003/01
KODE

TEGN. NR.
D113824



See cableform C304305
 Se kablingsliste C304305

		konstr./regn. SPN/SL 28.11.69	godk. 	kompl./liste	KODE CABLE FORM KABLINGSTEGNING RP600-2003/01 CB601-2003/01	TEGN.NR. K304305
--	--	-------------------------------------	--	--------------	--	---------------------

Wire Type Ledningstype	Colour ledningsfarve	From no: fra nr:	To no: til nr:	Remarks Bemærkninger
0,125 mm ² P.V.C. flexibel	rød-grå	1	53	
"	rød-hvid	28	2	
"	rød-hvid	2	18	
"	rød-hvid	18	45	
"	rød-blå	4	59	
"	rød-sort	27	5	
"	rød-sort	5	20	
"	rød-sort	20	41	
"	rød-grøn	4	35	
"	grå	5	15	
"	violet	6	37	
"	hvid	7	10	
"	hvid	10	31	
"	brun	8	11	
"	grøn	9	12	
"	grøn	12	34	
"	rosa	7	49	
"	rød	22	8	
"	rød	8	47	
"	orange	11	52	
"	grøn-hvid	12	65	
"	sort-hvid	13	36	
"	blå-hvid	14	58	
"	grå-hvid	16	54	
"	blå-gul	17	60	
"	grøn-grå	17	61	
"	grøn-brun	21	55	
"	hvid-brun	21	56	
"	gul	20	44	
"	orange-brun	19	51	
"	blå-grøn	23	43	
"	blå-orange	24	46	
"	hvid-gul	25	38	
"	rød-grå	26	62	
"	violet	29	40	
"	blå	30	42	
"	brun	32	48	



SPV/SL
28.11.89
06
Comp. Mabo

Cableform no:
Kabling nr:

Type RP600-2003/01

C304305
Side 42

Wire Type Ledningstype	Colour ledningsfarve	From no: fra nr:	To no: til nr:	Remarks Bemærkninger
0 125 mm ² P.V.C. flexibel	gul	33	50	
"	orange	39	63	
"	rosa	57	64	
Se kablingstegn. K304306				



Version / Rev.
 SPN/SL
 28.11.69
 godk.
 06
 Komp. dato

Cableform no:
 Kabling nr:

Type RP600-2003/01

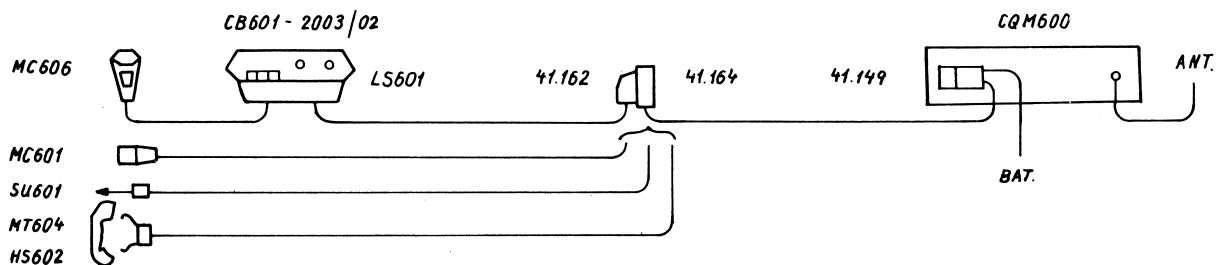
C304305
 Side 2/2

Control Box CB601-2003/02 (D113972).

General.

The control box type CB601-2003/02 is intended for remote control of the radio equipment CQM600 employed in the system solutions CAF680-2002 and -2003. The box is equipped with the loudspeaker unit LS601 mounted under the control unit itself.

The box unit is mounted under the panel of a vehicle in the same way as stated in the CQM manuals. From the box runs a 1,5m 26 conductor cable which ends in a connector (41.162) intended for connection to a fixed, mounted "wall box" (41.164). The installation cable from the transmitter/receiver cabinet is connected to the wall box as shown on the standard installation cable diagram D400.745. As stated on the unit box diagram, the blue wire is connected to the terminal Y and the black one to P.



Connection of the external control units may be effected direct to the control box or to the terminals in the wall box. To obtain the best possible service, it is recommended to connect a hand-held microphone (MC606) to the box; whereas all other units such as fixed microphones (MC601), steering wheel switch (SU602) or handset with hang-up bracket (MT601 or MT604 m. MT602) should be connected to the wall box.

To a great extent the control box can be used as a mobile control unit in other radio systems, there being a possibility of making a special type of internal cabling between the button switches, the selector with 2 x 12 positions, the connection to the units and the tone units.

In this way the box may, according to requirements, be equipped with special cabling for tone call combinations.

Moreover, space has been reserved on the print plate for the mounting of an extra relay.

Originally the box was made for application in the system 2003. By using the box in a 2002 system where the possibility of calling a maximum of 10 subscribers (sub. 1-10) and of making repeater calls to the same 10 mobile groups is desired, the cabling for CAF680/600-2002 shown on the diagram D113972 is inserted between the tone transmitter, the button switches and the subscriber selector. If the design of the control box includes the sequential tone receiver SR684 for an individual call or for a group call, the control box is termed CB601-2003/02a. If both call possibilities are desired in connection with the application of SR6841, the control box is termed CB601-2003/02b.

System application.

Mobile stations equipped with CB601-2003/02 are called individually from the base station by a 4-tone sequential tone signal. The 3rd and the 4th tones represent the 2-digit call number of the mobile stations, whereas the 1st and the 2nd tones represent tone combinations permanently set. In CAF600-2003, the 1st tone is - to the system - an arbitrarily selected, common tone (not tone "1", however), whereas the 2nd tone must always be tone "1".

In CAF600-2002 the 1st and the 2nd tones are used to indicate which mobile group the mobile stations concerned belong to.

After reception of a call, the green call lamp (V3) is lit and a tone signal of approx. one second (from RP600-2003) is heard in the simultaneously switched on loudspeaker. At the same time as the attention tone signal is heard in the loudspeaker, the transmitter is keyed (the red key lamp flashes), and a reply tone signal (tones "1" and "0") is transmitted back to the base station. The loudspeaker is disconnected and the call lamp is put out at the cessation of the carrier wave from the base station.

Selective tone calls to the base station can only be made if the yellow engaged lamp does not give out light. Tone signalling is composed of 2 of the 7 simultaneously transmitted tone frequencies.

2002: The double tone combinations used for the system 2002 are shown diagrammatically on the drawing D113649. Call to a SBS subscriber is made by setting the subscriber number by means of the selector (01) and then activating the push button marked D. As long as the button is operated, the telephone of the subscriber will ring. Mobile-to-mobile calls are made by activating the T button (for approx. 1 second). The D button is activated

also for one second. When the D button is released, a selective group call is transmitted from the base station to the mobile group set by means of the selector 01. The X button may be employed as a special tone key or as a HT-OUT button (depending upon strapping in CB).

2003: When using CB601-2003/02 in the system 2003, the selector 01 is used for the setting of double tone combinations for automatic number selection of a maximum of 10 pre-selected subscribers who - via an automatic telephone exchange - are connected to the base station of the radio system. The same tone combinations are also employed to transmit - by individual number selection from mobile stations - one digit at a time.

The 3 push buttons of the control box T, D, and X have the following functions:

1. T is pushed when automatic number selection call is desired. The tones "1" and "4" are transmitted. This signal corresponds to the lifting of handsets by normal telephoning, and dialling tone is therefore received from the exchange after the tone call.
2. On activation of the D button, the tone combination set by the selector 01 is transmitted. The 10 positions of the selector correspond to the following tone combinations: 1 - "2" and "8", 2 - "1" and "8", 3 - "4" and "7", 4 - "0" and "7", 5 - "2" and "7", 6 - "1" and "7", 7 - "4" and "6", 8 - "0" and "6", 9 - "2" and "6" and 10(0) - "1" and "6".

When the D button is released after having been operated for approx. one second, a subscriber number selection will automatically be transmitted in the terminal unit of the base station corresponding to the number of the preselected subscriber dialled on the normal telephone dial. On activating the D button after individual number selection call (1 digit at a time as well as in connection with mobile-to-mobile number selection, the selector setting indicates the shown digit.

3. The connection with the base station can be cancelled ("replacing") by pressing the X button. The tones "0" and "2" are then transmitted.
4. Calling ("lifting") in connection with individual number selection (direct dialling) can be made by simultaneous activation of the T and D buttons which causes the tones "0" and "4" to be transmitted. After reception of the dialling tone from the exchange, one digit at a time may be transmitted by activating the D button. Prior to the transmis-

sion of the subsequent digit, this is being set by means of the digit selector. The D button may only be activated again when a "digit reception signal" (in form of a 3-tone sequential signal) for the preceding digit has been received.

5. Calls to other mobile stations in the 2003 system are made by activating the D and X buttons at the same time (tones "2" and "4"). When the dialling tone is heard, digit transmission for the 2-digit mobile call number is made.

Directions for use for CB601-2003/02 are printed in A3 folders in Danish, English and German. The Danish folder is termed "Operating instructions for the fully automatic VHF/UHF radio telephone system with two-way number selection".

Storno

Storno

TYPE	NO.	CODE	DATA
	C1	73.5089	0, 1 μ F 20% tantal
	C2	73.5089	0, 1 μ F 20% "
	C3	73.5089	0, 1 μ F 20% "
	C4	73.5109	10 μ F 20% "
	C5	73.5109	10 μ F 20% "
	C7	76.5068	0, 1 μ F 1% polystyr. TB
	C8	76.5072	47 nF 10% polyester. FL
	C9	73.5102	2, 2 μ F 20% tantal
	C10	73.5114	1 μ F 20% "
	C11	73.5118	0, 22 μ F 20% "
	C12	76.5059	2, 2 nF 10% polyester. FL
	C13	76.5072	47 nF 10% polyester. FL
	C14	73.5114	1 μ F 20%
	C15	73.5110	80 μ F -10/+50% elco
	C16	73.5106	68 μ F 20% tantal
	C17	76.5071	22 nF 10% polyester. FL
	C18	76.5071	22 nF 10% FL
	C19	76.5071	22 nF 10% FL
	C20	76.5071	22 nF 10% FL
	C21	76.5071	22 nF 10% FL
	C22	76.5071	22 nF 10% FL
	C23	76.5070	10 nF 10% FL
	C24	73.5114	1 μ F 20% tantal
	C25	73.5102	2, 2 μ F 20%
	C26	73.5105	15 μ F 20% "
	C27	73.5105	15 μ F 20% "
	R1	80.5268	39 k Ω 5% carbon film
	R2	80.5261	10 k Ω 5% "
	R3	80.5233	47 Ω 5% "
	R4	80.5265	22 k Ω 5% "
	R5	80.5258	5, 6 k Ω 5% "
	R6	80.5253	2, 2 k Ω 5% "
	R9	80.5256	3, 9 k Ω 5% "
	R10	80.5249	1 k Ω 5% "
	R11	80.5230	27 Ω 5% "
	R12	80.5265	22 k Ω 5% "
	R13	80.5265	22 k Ω 5% "
	R14	80.5237	100 Ω 5% "
	R15	80.5249	1 k Ω 5% "
	R16	80.5281	0, 47 M Ω 5% "
	R17	80.5281	0, 47 M Ω 5% "
	R18	80.5261	10 k Ω 5% "
	R19	80.5490	2, 7 M Ω 10% "
	R20	80.5264	18 k Ω 5% "
	R21	80.5265	22 k Ω 5% "
	R22	80.5241	220 Ω 5% "
	R23	80.5246	560 Ω 5% "

TYPE	NO.	CODE	DATA
	R24	80.52xx	Adjusted/tilpasset
	R25	80.5269	47 k Ω 5% carbon film
	R26	80.5268	" "
	R27	80.5265	" "
	R28	80.5260	8, 2 k Ω 5% "
	R29	80.5269	47 k Ω 5% "
	R30	80.5255	3, 3 k Ω 5% "
	R31	80.5253	2, 2 k Ω 5% "
	R32	80.5277	0, 22 M Ω 5% "
	R33	80.5258	5, 6 k Ω 5% "
	R34	80.5258	5, 6 k Ω 5% "
	R35	80.5257	4, 7 k Ω 5% "
	R36	80.5249	1 k Ω 5% "
	R37	80.5249	1 k Ω 5% "
	R38	80.5262	12 k Ω 5% "
	R39	80.5265	22 k Ω 5% "
	R40	80.5253	2, 2 k Ω 5% "
	R41	80.5254	2, 7 k Ω 5% "
	R42	80.5265	22 k Ω 5% "
	R43	80.5237	100 Ω 5% "
	R44	80.5256	3, 9 k Ω 5% "
	R45	80.5263	15 k Ω 5% "
	R46	80.5263	15 k Ω 5% "
	R47	80.5263	15 k Ω 5% "
	R48	80.5263	15 k Ω 5% "
	R49	80.5260	8, 2 k Ω 5% "
	R50	80.5273	0, 1 M Ω 5% "
	R51	80.5267	33 k Ω 5% "
	R52	80.5267	33 k Ω 5% "
	R53	80.5257	4, 7 k Ω 5% "
	R54	80.5265	22 k Ω 5% "
	R55	80.5265	22 k Ω 5% "
	R56	80.5257	4, 7 k Ω 5% "
	R57	80.5265	22 k Ω 5% "
	R58	80.5273	0, 1 M Ω 5% "
	R59	80.5273	0, 1 M Ω 5% "
	R60	80.5267	33 k Ω 5% "
	R61	80.5267	33 k Ω 5% "
	R62	80.5257	4, 7 k Ω 5% "
	R63	80.5265	22 k Ω 5% "
	R64	80.5265	22 k Ω 5% "
	R65	80.5257	4, 7 k Ω 5% "

STONE SEQUENCE RECEIVER
SEKVENSTONEMODTAGER

SR684

X400.975/4

Storno

Storno

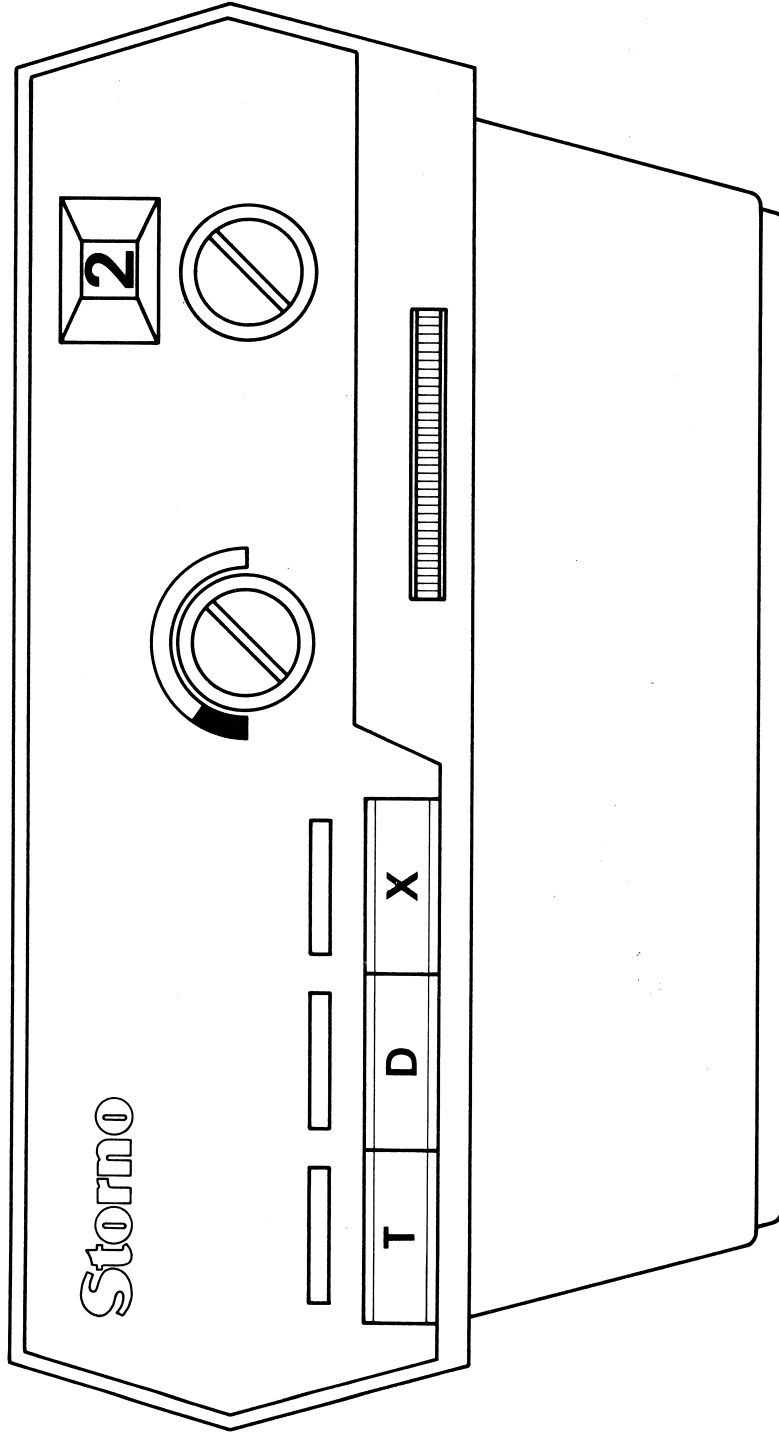
TYPE	NO.	CODE	DATA	
	R66	80.5265	22 k Ω 5%	1/8W
	R67	80.5273	0, 1 M Ω 5%	1/8W
	R68	80.5273	" "	1/8W
	R69	80.5265	" "	1/8W
	R70	80.5257	22 k Ω 5%	1/8W
	R71	80.5265	4. 7 k Ω 5%	1/8W
	R72	80.5265	22 k Ω 5%	1/8W
	R73	80.5257	" "	1/8W
	R74	80.5267	4. 7 k Ω 5%	1/8W
	R75	80.5267	33 k Ω 5%	1/8W
	R76	80.5273	33 k Ω 5%	1/8W
	R77	80.5273	0, 1 M Ω 5%	1/8W
	R78	80.5269	0, 1 M Ω 5%	1/8W
	R79	80.5255	47 k Ω 5%	1/8W
	R80	80.5253	3. 3 k Ω 5%	1/8W
	R81	80.5255	2. 2 k Ω 5%	1/8W
	R82	80.5255	3. 3 k Ω 5%	1/8W
	R83	80.5274	3. 3 k Ω 5%	1/8W
	R84	80.5261	0, 12 M Ω 5%	1/8W
	R85	80.5261	10 k Ω 5%	1/8W
	R86	80.5266	27 k Ω 5%	1/8W
	R87	80.5245	470 Ω 5%	1/8W
	R88	80.5269	" "	1/8W
	R89	80.5261	47 Ω 5%	1/8W
	R90	80.5259	10 k Ω 5%	1/8W
	R91	80.5259	6. 8 k Ω 5%	1/8W
	R92	80.5257	4. 7 k Ω 5%	1/8W
	R93	80.5278	" "	1/8W
	R94	80.5245	0. 27 k Ω 5%	1/8W
	R95	80.5245	470 Ω 5%	1/8W
	L1	61. 1051	Coil/spole	
	E1	99. 5136	AA119 Diode	
	E2	99. 5136	AA119 Diode	
	E3	99. 5028	1N914 Diode	
	E4	99. 5028	1N914 Diode	
	E5	99. 5042	Zenerdiode 9. 1V 5%	1/4W
	E6	99. 5020	1N4004 Diode	
	E7	99. 5020	1N4004 Diode	
	E8	99. 5075	Zenerdiode 7. 6V 5%	0. 275W
	E9-E28	99. 5028	1N914 Diode	
	E29	99. 5146	Zenerdiode 6. 9V 5%	0. 275W
	E30	99. 5020	1N4004 Diode	
	E31	99. 5028	1N914 Diode	
	Q1	99. 5144	BC214L Transistor	
	Q2	99. 5143	BC108 Transistor	
	Q3	99. 5144	BC214L Transistor	
	Q4	99. 5121	BC107 Transistor	

TYPE	NO.	CODE	DATA
	Q5	99. 5144	BC214L Transistor
	Q6	99. 5144	BC214L Transistor
	Q7	99. 5143	BC108 Transistor
	Q8	99. 5143	BC108 Transistor
	Q9	99. 5121	BC107 Transistor
	Q10	99. 5144	BC214L Transistor
	Q11	99. 5142	AC128 Transistor
	Q12-Q26	99. 5144	BC214L Transistor

STONE SEQUENCE RECEIVER
SEKVENSTONEMODTAGER

SR684

X400. 975/4

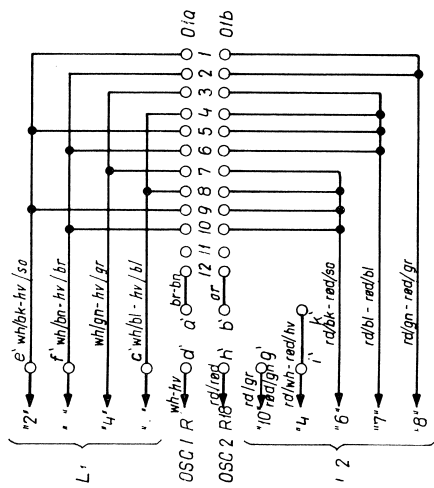


Kvalitet / Quality
 100% / 100%
 Godt / Good
 100% / 100%

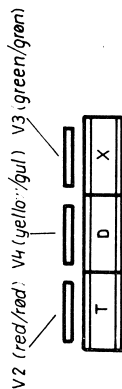
MOBIL MANØVREBOX
 FOR RADIOTELEFONSYSTEM MED
 2-VEJRS AUTOMATVALG
 MOBILE CONTROL BOX
 FOR RADIO TELEPHONE SYSTEM WITH
 2-WAY AUTOMATIC DIALLING

CB 601-2003/02
 CAF 600-2003 (2002)
 CB 601-2003/02
 CAF 600-2003 (2002)

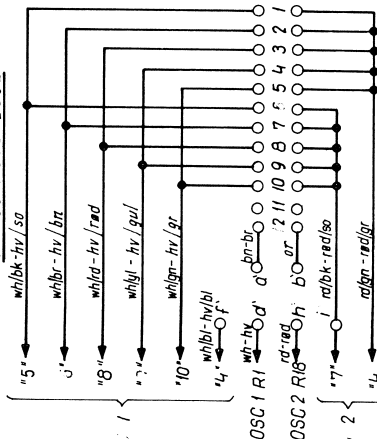
TEGN. NR.
 0112889
 A 3



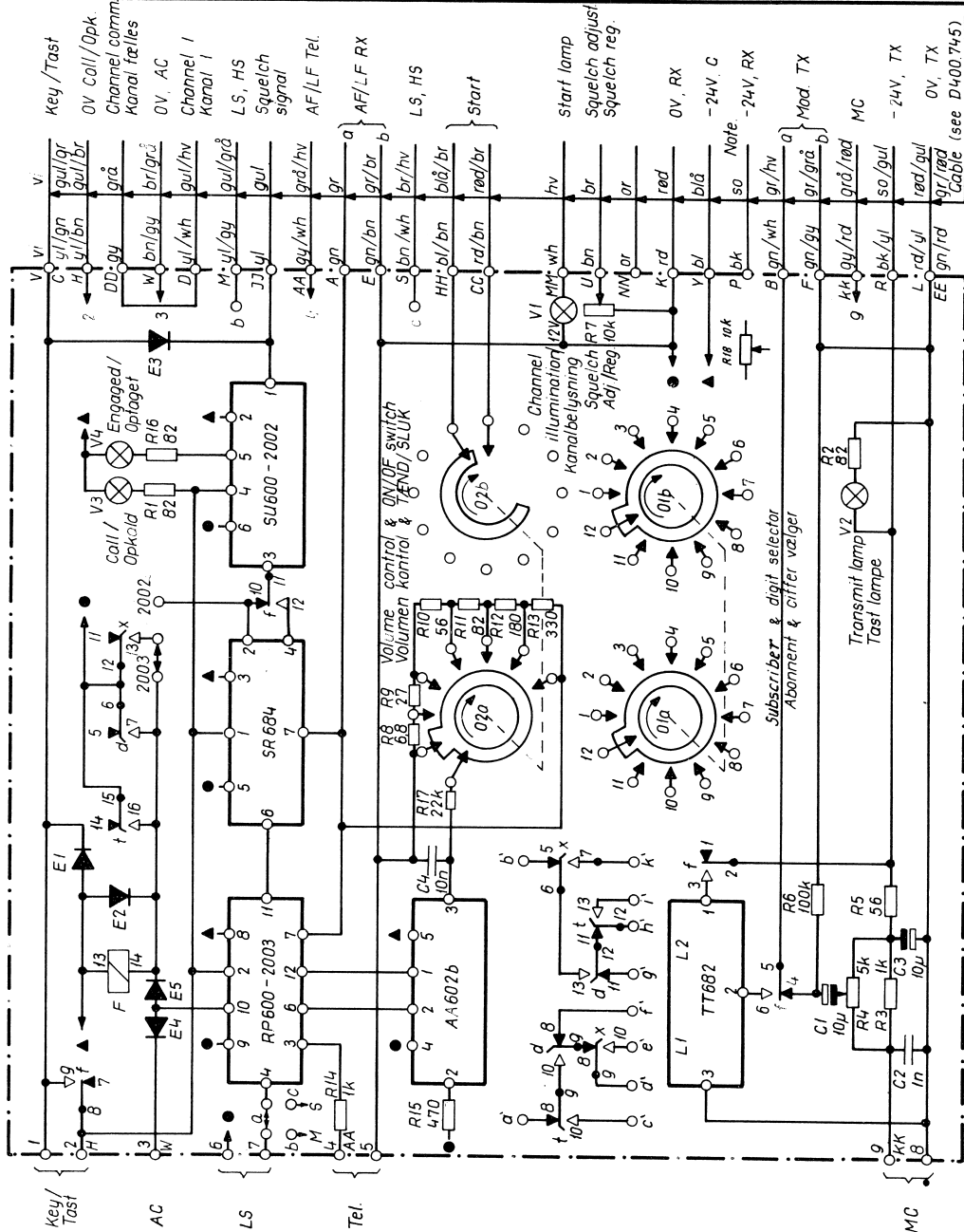
CAF 680/600-2003



CAF 680/600-2002

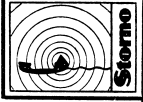


D n viste kabling for CAF 680/600-2002 (SBS-system) er beregnet for opkald til abonnente i 10. samt for repeater-opkald (T-knap). Manøvreboxen benyttes da CB 601-2003/02a. Med mulighed for individuelt - samt en oppeopkald (ved anvendelse af SR 684) benyttes boksen CB 601-2003/02b. X-knappen kan anvendes til HT-UD ved at tilføje strøpling 2003 ↔ X. I X ↔ 2002. Ønskes ikke out. sive tonesignal efter modtaget opkald, fjernes dioden E5.



The shown cabling for CAF 680-2002 (SBS-system) is intended for calls to the subscriber 1-10 and for repeater calls (push button T). In this case the control box is designated CB 601 2003/02a. With the added possibility of individual selective calls as well as group calls by the use of SR 684 in stead of SR 684, the box is designated CB 601 2003/02b. The push button X may be used for LS-out by changing the strap: Terminal 13 on push b.X ↔ terminal "2003" to terminal 13 on push b.X ↔ terminal "2002". If no automatic

Note: Connect the blue wire to Y and the black to P. Forth. bla ledn. til Y og sort til P.

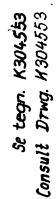


Version: 12.12.89
godk. 06
komplete

CONTROL BOX
MANØVREBOXES
CB 601-2003/02

KODE

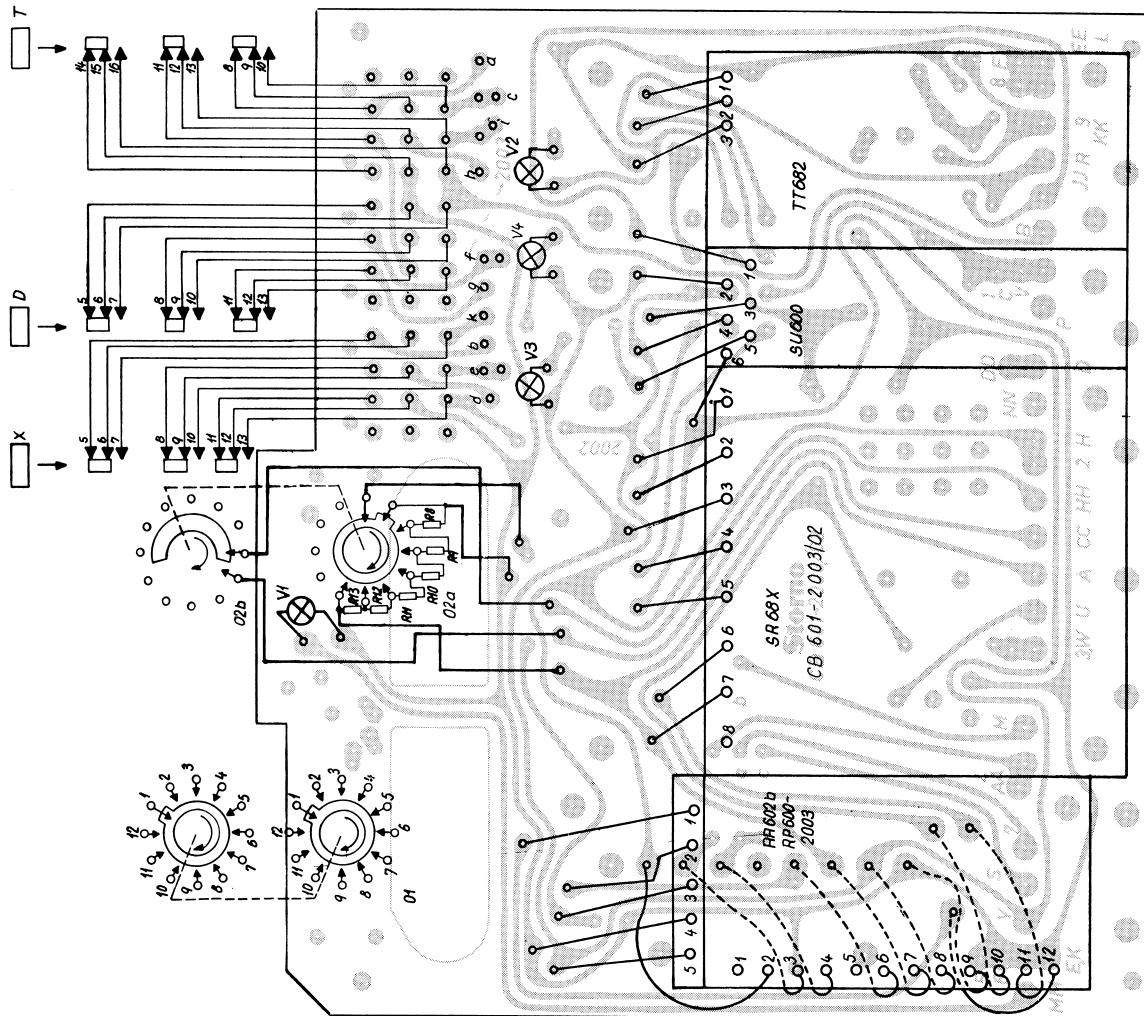
TEGN NR. D113972
A3



konst. fiedr Hou/SL 26.4.70	godk 06	komp insto
-----------------------------------	------------	------------

COMPONENT LAY-OUT
KOMPONENT PLACERING
CB 601 - 2003/02

DD 114134



Note : RP 600-2003 monterees oven p3 RP 602b.
RP 600-2003 mounted on top of AA 602b.



Storno
RP 600-2003
06

LAY-OUT
MONTERINGSOVERSIGT
CB 601-2003/02

0114135

no	code	data	no	code	data
C1	73 5100 1	10 μ F -10+100% elco TB35V	ReF		ITT relay 850 Ω 4 shift PZ4/A2615
C2	76 5069	1nF 10% FL50V polyester	V1	92.5004	Lamp 12V 50mA BA7
C3	73.5100	10 μ F -10+100% elco TB35V	V2	92.5003	Lamp 24V 25mA BA7
C4	76.5070	10nF 10% FL50V polyester	V3	92.5003	Lamp 24V 25mA BA7
			V4	92.5003	Lamp 24V 25mA BA7
R1	80.5236	82 Ω 5% carb. film 1/8W	O1	47.530	Switch-over (tone)
R2	80.5236	82 Ω 5% carb. film 1/8W	O2	47.372	Switch-over (volumen)
R3	80.5249	1k Ω 5% carb. film 1/8W	O3	47.531	Push-button-row
R4	86.5050	5k Ω 20% trim. Var. lin. 0,1 W			
R5	80.5234	56 Ω 5% carb. film 1/8W			
R6	80.5273	100k Ω 5% carb. film 1/8W			
R7	86.5039	10k Ω 20% trim var. lin. 0,15W			
R8	80.5223	6,8 Ω 5% carb. film 1/8W			
R9	80.5230	27 Ω 5% carb. film 1/8W			
R10	80.5234	56 Ω 5% carb. film 1/8W			
R11	80.5236	82 Ω 5% carb. film 1/8W			
R12	80.5240	180 Ω 5% carb. film 1/8W			
R13	80.5243	330 Ω 5% carb. film 1/8W			
R14	80.5249	1k Ω 5% carb. film 1/8W			
R15	80.5245	470 Ω 5% carb. film 1/8W			
R16	80.5236	82 Ω 5% carb. film 1/8W			
R17	80.5265	22k Ω 5% carb. film 1/8W			
R18	86. 004	10k Ω var. lin carb. film w/ tast 0,1W			
E1-	99.5020	Diode 1N4004			
E2	99.5020	Diode 1N4004			
E3	99.5028	Diode 1N914			
E4	99.5028	Diode 1N914			
E5	99.5028	Diode 1N914			

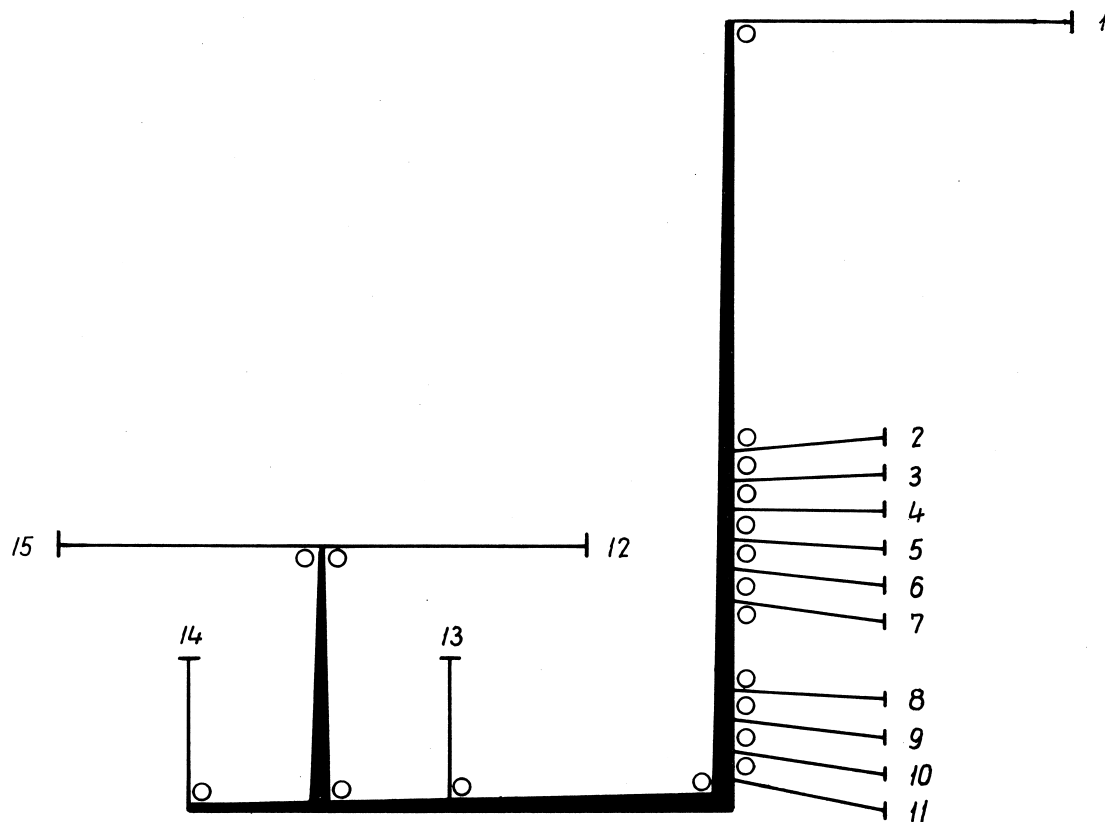


CG/LF
30.11.70
kontrol of
tish diag

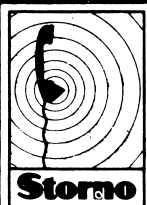
Parts list
Stykliste

CB601-2003/02

Comp list
X114092
blad no 1 of 1



Se kablingsliste C304550 eller C304551
 See cable form C304550 or C304551



konstr./tegn.
 Hou/EBH
 20. 1. 70.
 godk.
 06
 komp.liste

CABLE FORM FOR CONTROL BOX
 KABLINGSTEGNING
 TIL BETJENINGSBOKS CB601-2003/02
 CAF 680/600-2003 OG 2002
 KODE

TEGN. NR.
 K304549
 A 4

Wire Type Ledningstype	Colour ledningsfarve	From no: fra nr:	To no: til nr:	Remarks Bemærkninger
0, 125mm PVC flexibel	white/black hvid/sort	1	3	
-	white/black hvid/sort	3	15	
-	white/brown hvid/brun	1	7	
-	white/brown hvid/brun	7	15	
-	white/green hvid/grøn	1	15	
-	white/blue hvid/blå	1	10	
-	white/blue hvid/blå	10	15	
-	white hvid	2	14	
-	red rød	8	13	
-	red/grey rød/grå	6	12	
-	red/white rød/hvid	5	9	
-	red/white rød/hvid	9	12	
-	red/black rød/sort	1	12	
-	red/blue rød/blå	1	12	
-	red/green rød/grøn	1	12	
-	brown brun	1	11	
-	orange	1	4	
Se kablingstegn. K 304549				



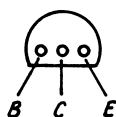
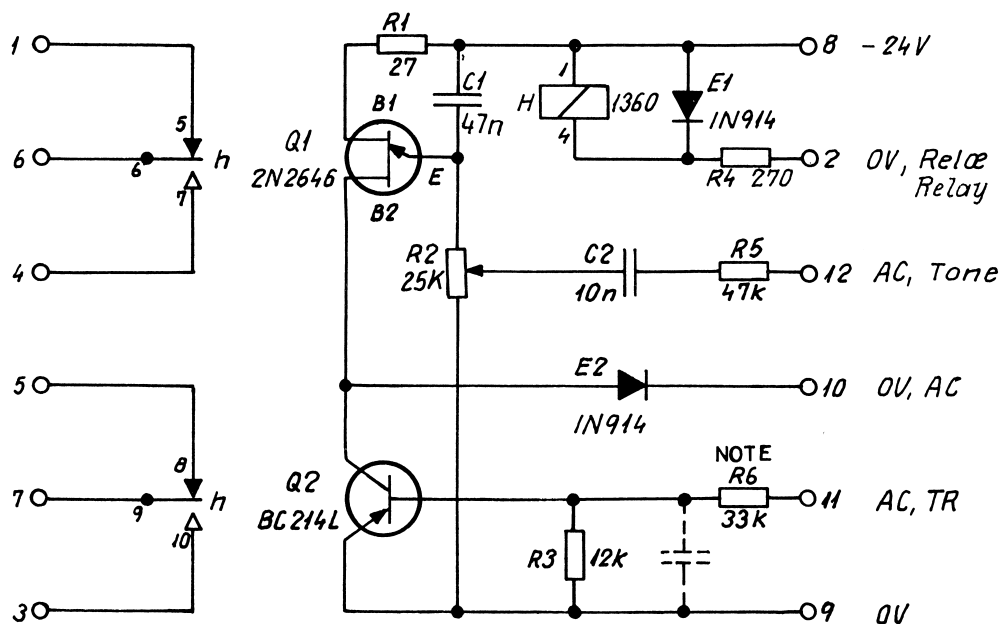
konstr./tegn.
 Hou/EBH
 20.1.0
 06
 komp./dato
 D114075

Cableform no:
 Kabling nr:

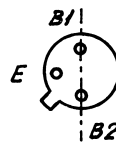
Type

CB601-2003/02
 CAF680/600-
 2003

C 304550

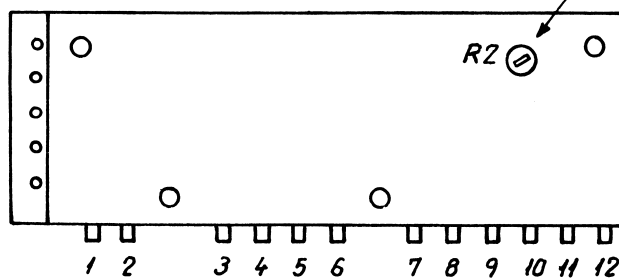


BC214L



2N2646

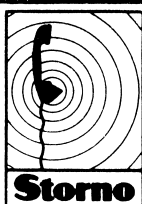
Signal level adjustment
Justering af signalstyrke



Viewed from printed circuit side, mounted on top of AA602a
Set fra printside, monteret overpå AA602b

NOTE : I FORBINDELSE MED SR 6841 ÆNDRES R6 TIL 18K Ω
THE VALUE OF R6 IS CHANGED TO 18 K Ω , WHEN USED
WITH SR6841.

Ref. 23.11.71



konstr./tegn.
OG/KG
28-10-71
godk.
OG
komp.liste
X 113245

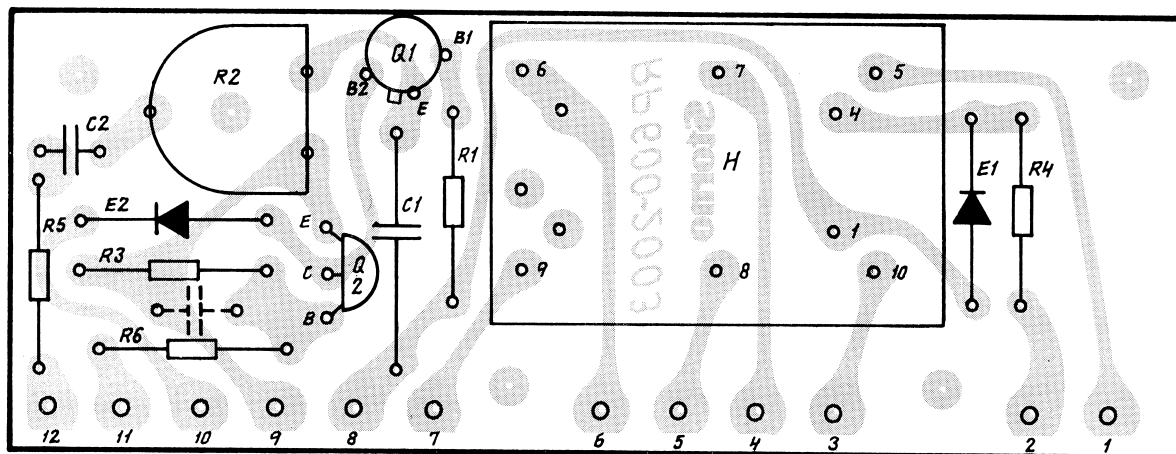
TONE GENERATOR FOR ACCOUSTIC
CALL SIGNAL CB601 (AA602b)
TONEGENERATOR FOR AKUSTISK
OPKALDSSIGNAL CB601 (AA602b)
RP 600-2003

KODE

TEGN. NR.

D112687/01
A4

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr./tegn.
OG / JWA
10 9 69
godk.
OG
komp.liste
X113245
D112687

TONE GENERATOR FOR ACCUSTIC
CALL SIGNAL CB601 (AA602b)
TONEGENERATOR FOR AKUSTISK
OPKALDSSIGNAL CB602 (AA602b)
RP600-2003
KODE

TEGN. NR.

D113419

A 4

Ret. den 28/10-71

no	code	data	no	code	data
C1	76.5072	47n 10% polyest. FL50V			
C2	76.5070	10nF 10% polyest. FL50V			
R1	80.5230	27 Ω 5% carbon film 1/8W			
R2	86.5044	25 k Ω 20% trim. carbon film 0,1W lin.			
R3	80.5262	12k Ω 5% carbon film 1/8W			
R4	80.5242	270 Ω 5% carbon film 1/8W			
R5	80.5269	47k Ω 5% carbon film 1/8W			
R6	80.5267	33k Ω 5% carbon film 1/8W			
E1	99.5028	diode 1N914			
E2	99.5028	diode 1N914			
Q1	99.5194	transistor 2N2646 (UNJ)			
Q2	99.5144	transistor BC214L			
ReH	58.5069	Relay 24V 1260 Ω 21-21			



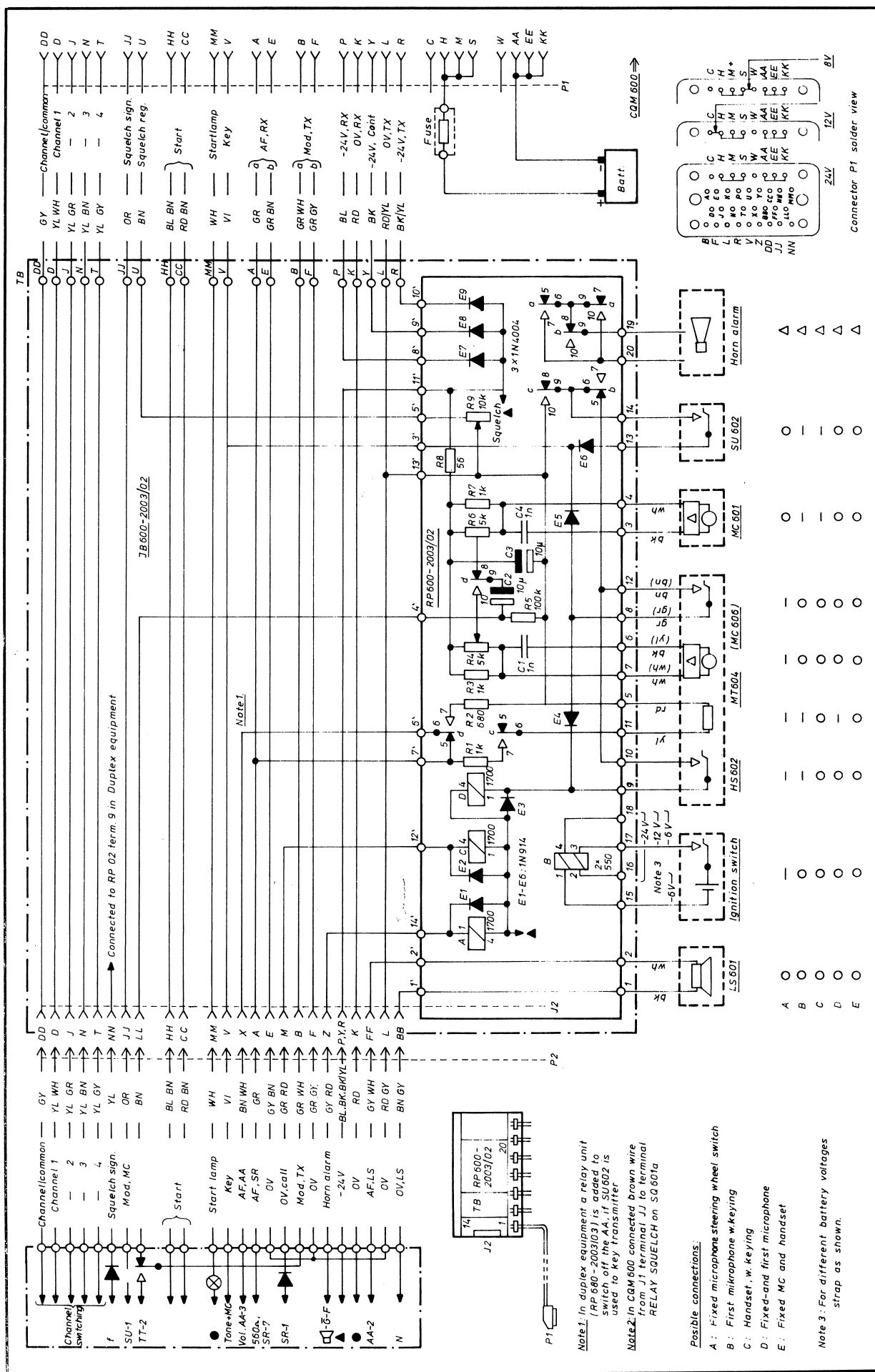
FB/LF
12.10.70
kontrol af
tilh. diag.

PARTS LIST
Stykliste

RP600-2003

comp. liste
X113245

blad no 1 af 1



JUNCTION BOX
FUNCTION: LAY-OUT- AND WIRING DRAWING
RELAY PANEL

Konstr. Zeich. 08 / JWA
V1. 3. 84
gock. 06
Kamp. liste X 113235

RP600-2003/02

TEGN. NR. D113056E
A3

CODE JB 600-2003/02

Signature:

○ Unit connected

△ Unit eventually connected

— No connected

Possible connections:

A : Fixed microphone steering wheel switch

B : First microphone w/keying

C : Handset, w. keying

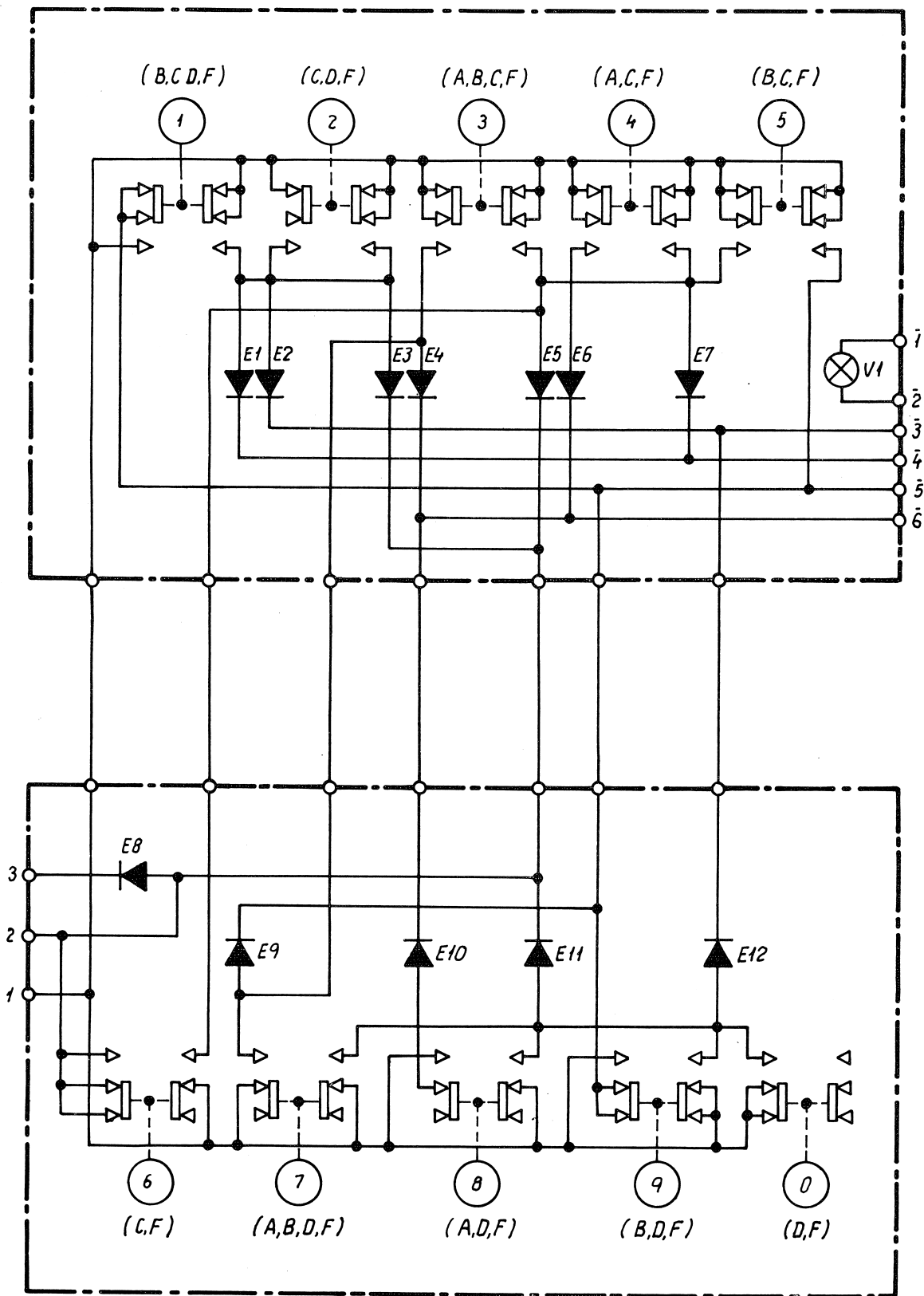
D : Fixed and first microphone

E : Fixed MC and handset

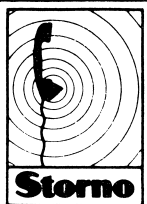
Note 1: In duplex equipment a relay unit (RP 680-2003/03) is added to switch off the AA, if SU602 is used to Key transmitter

Note 2: In CAM 600 connected brown wire from J1 terminal JJ to terminal RELAY SQUELCH on SQ601a

Note 3: For different battery voltages strap as shown.



Bogstaver i parentes angiver hvilke relæer der aktiveres i RP600-2003/01
 Letters in paranthesis indicate which relays are activated in RP600-2003/01



konstr./tegn.
SPN/AMM
17. 11. 69
godk.
06
komp.liste
X113737

NUMBER UNIT / NUMMERENHED

PUSH-BOTTON DIAL / CIFFERTASTATUR

FOR CB601 - 2003/01

NU600-2003

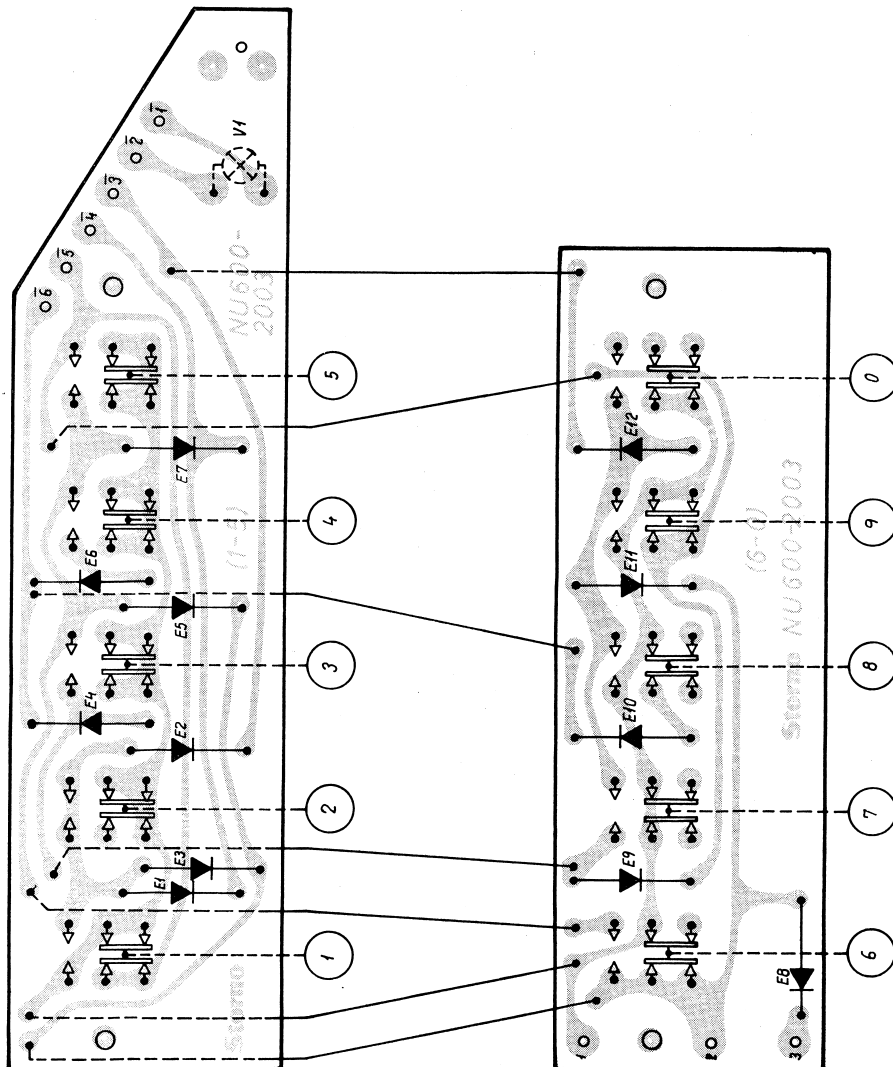
KODE

TEGN. NR.

D113736

A 4

PRINTED CIRCUIT SEEN FROM PRINT SIDE
TRYKT KREDSLØB SET FRA PRINTSIDEN.



Konst. Nødv.
09/AMM
29.10.69

06

Konst. Nødv.
X 113737

NUMBER UNIT / NUMMERENHED
NU600-2003

PUSH-BUTTON DIAL / CIFFERTASTATUR

FOR CB601-2003/01

KODE

TEGN NR
D113733

no	code	data	no	code	data
E1	99.5028	Diode 1N914			
E2	99.5028	Diode 1N914			
E3	99.5028	Diode 1N914			
E4	99.5028	Diode 1N914			
E5	99.5028	Diode 1N914			
E6	99.5028	Diode 1N914			
E7	99.5028	Diode 1N914			
E8	99.5028	Diode 1N914			
E9	99.5028	Diode 1N914			
E10	99.5028	Diode 1N914			
E11	99.5028	Diode 1N914			
E12	99.5028	Diode 1N914			
O1		Trykknoprække. Isostat 5 x 2 LB MODUL 15			
O2		Trykknoprække. Isostat 5 x 2 LB MODUL 15			
V1		RAFI			



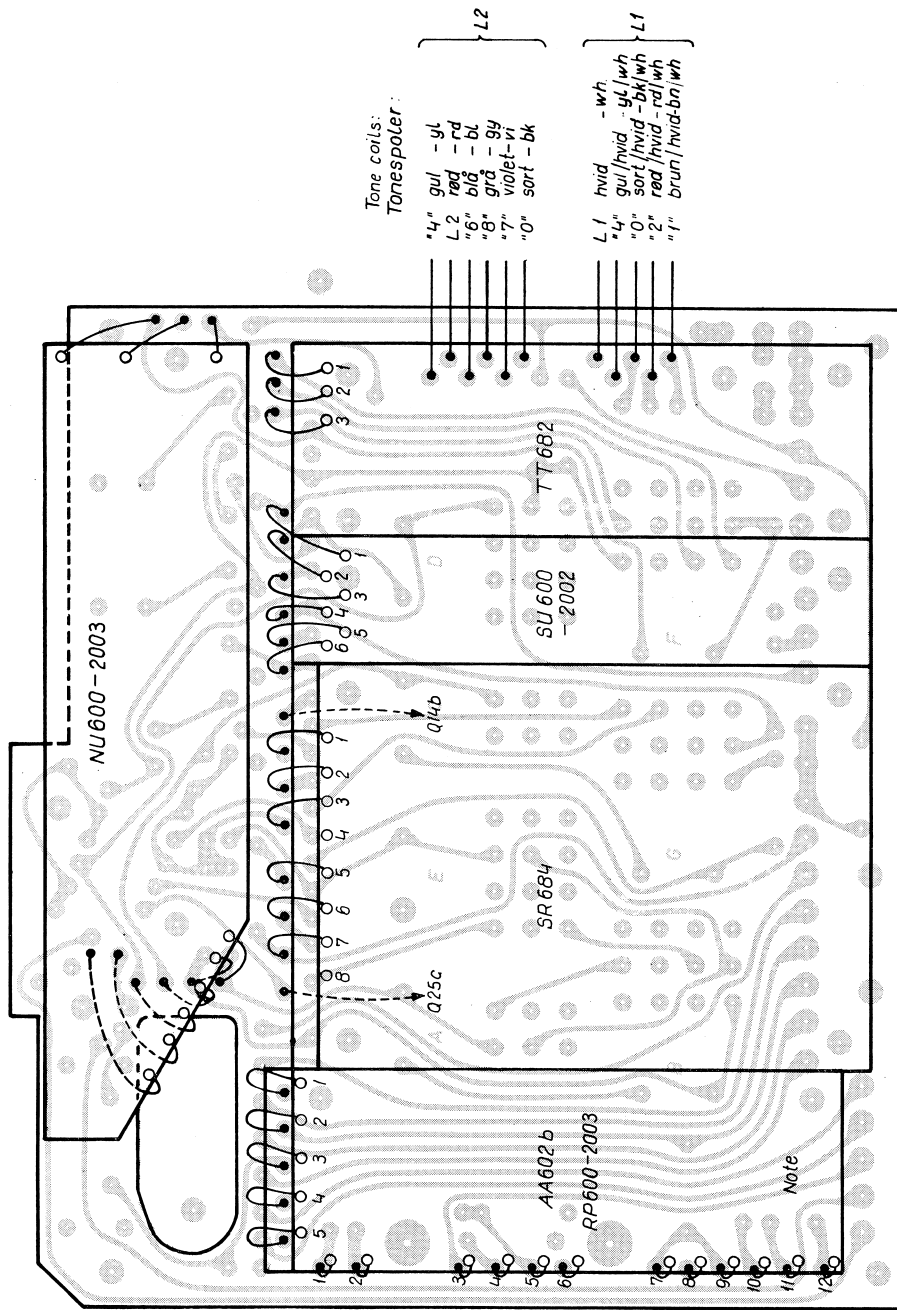
SPV/HNI
22/1-70
Kontrol af
06
11th. 10/10

PARTS LIST
STYKLISTE

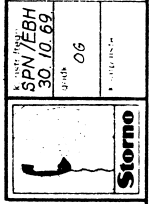
NU600-2003

X113737

Blad No 1 af 1



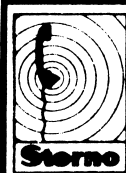
Note RP 600 - 2003 monteres oven pÅ AA 602 b.
RP 600 - 2003 is mounted on top of AA 602 b.



MOUNTING OF UNITS
PLACERING AF ENHEDER

D113825

no	code	data	no	code	data
C1	76.5070	10 nF 10% Polyester	Re A		Relæ 2 skifte 850Ω
R1	80.5236	82Ω 5%carbonfilm 1/8W			ITT PZ2/A2425
R2	80.5263	15KΩ 5%carbonfilm 1/8W	Re B		Relæ 4 skifte 850Ω
R3	80.5236	82Ω 5%carbonfilm 1/8W			ITT PZ4/A2615
R4	80.5236	82Ω 5%carbonfilm 1/8W			
R5	80.5265	22KΩ 5%carbonfilm 1/8W	Re C		Relæ 2 skifte 850Ω
R6	80.5249	1KΩ 5%carbonfilm 1/8W			ITT PZ2/A2425
R7	80.5265	22KΩ 5%carbonfilm 1/8W			
R8	86.004	10KΩ rariabel lin.01W	Re D		Relæ 4 skifte 850Ω
E1	99.5020	Diode 1N 4004			ITT PZ4/A2615
E2	99.5020	Diode 1N 4004	Re E		Relæ 4 skifte 850Ω
E3	99.5028	Diode 1N 914			ITT PZ4/A2615
E4	99.5028	Diode 1N 914			
E5	99.5020	Diode 1N 4004	Re F		Relæ 4 skifte 850Ω
E6	99.5028	Diode 1N 914			ITT PZ4/A2615
E7	99.5028	Diode 1N 914			
E8	99.5020	Diode 1N 4004	Re G		Relæ 4 skifte 850Ω
E9	99.5028	Diode 1N 914			ITT PZ4/A2615
E10	99.5020	Diode 1N 4004			
E11	99.5020	Diode 1N 4004			
E12	99.5028	Diode 1N 914			
E13	99.5028	Diode 1N 914			
E14	99.5028	Diode 1N 914			
E15	99.5020	Diode 1N 4004			
E16	99.5028	Diode 1N 914			
E17	99.5028	Diode 1N 914			
E18	99.5028	Diode 1N 914			
E19	99.5028	Diode 1N 914			
E20	99.5020	Diode 1N 4004			
V1		Lampe 12V 20mA			
V2	92.5003	Lampe 24V 25mA BA 7			
V3	92.5003	Lampe 24V 25mA BA 7			
V4	92.5003	Lampe 24V 25mA BA 7			

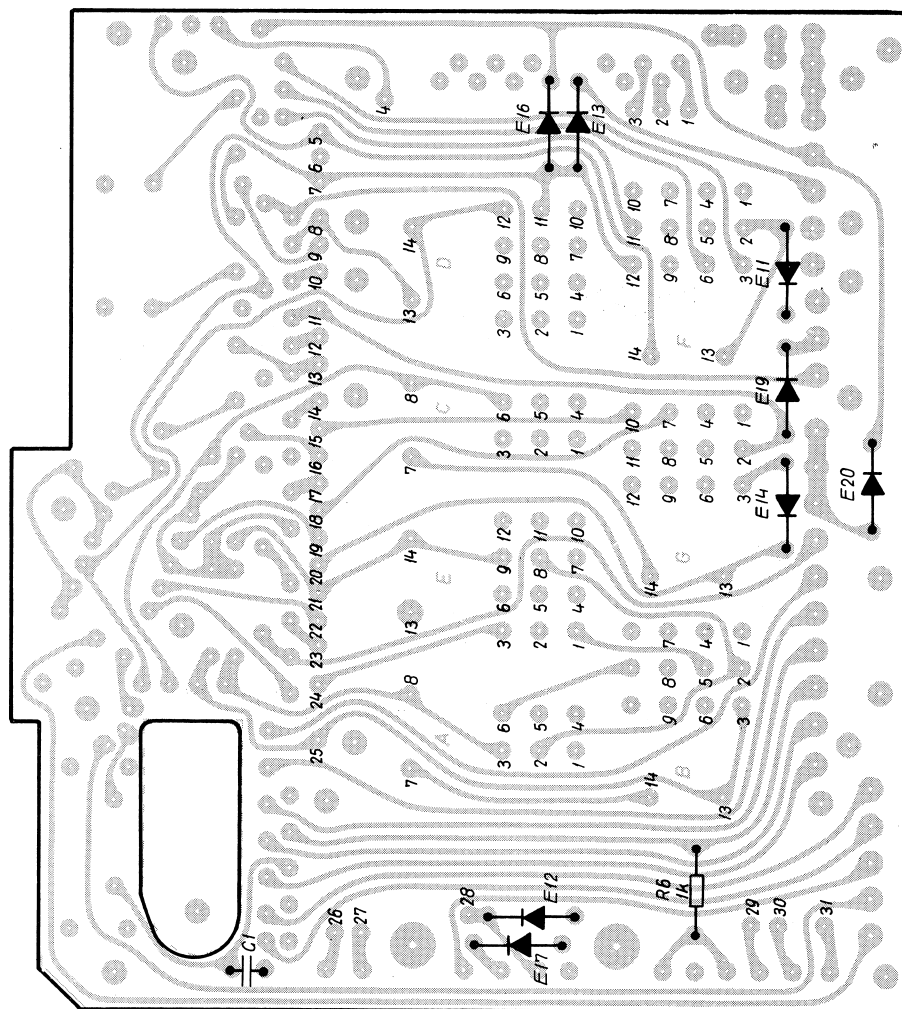


udarb af
SPN/
GHa
kontrol af
tilh. diagr

PARTS LIST
STYKLISTE

RP600-2003/01

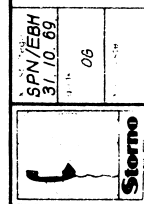
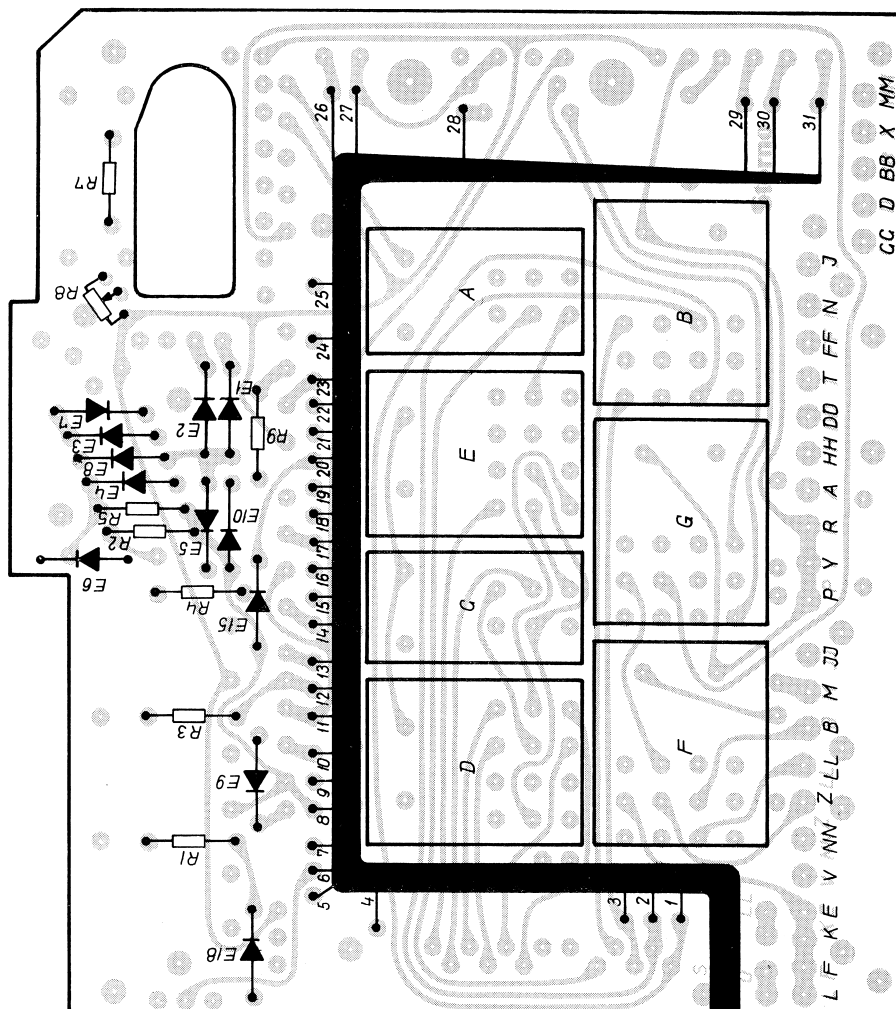
comp list
X114391
blad no 2 af 1



SPN/EBH
31.10.99
główny
06
komput. inż.

LAY-OUT TOP SIDE
KOMP. PLACERING OVERSIDE RP600-2003 03

D/13826

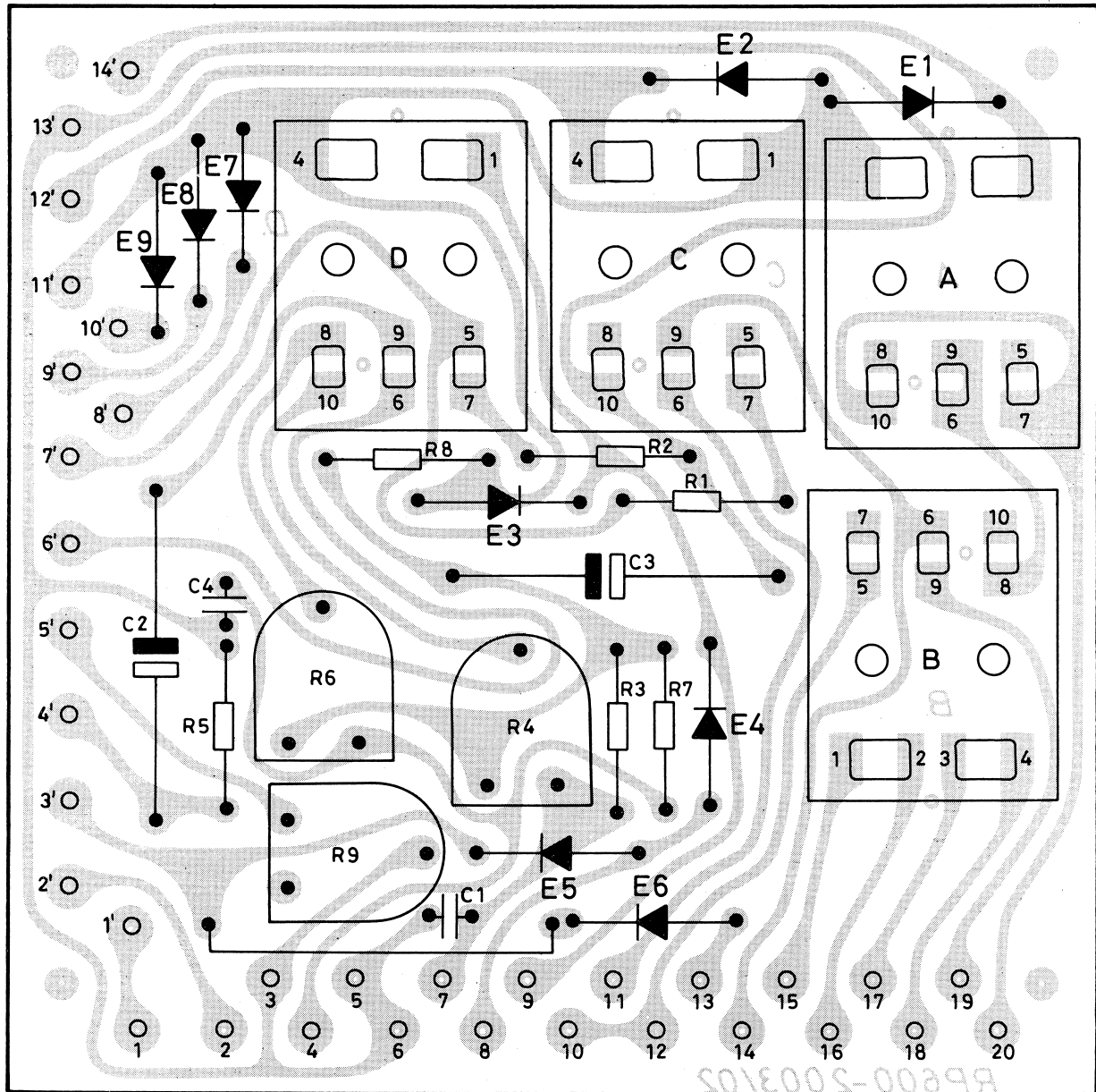


LAY-OUT BOTTOM SIDE
KOMP. PLACERING UNDERSIDE

RP 600 - 2003/01

D 113827

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr. Regn.
OG/AMM
3.9.69,
godk.
OG
komp. liste
D113056
X113235

RELAY PANEL , RELÆPANEL
RP600-2003/02

KODE

TEGN. NR.
D113420
A4

no	code	data	no	code	data
C1	74 5155	1nF -20+80% Ceram. II PL 63V			
C2	73. 100	10 μ F 10+100% elco TB35V			
C3	73.5100	10 μ F -10+100% elco TB 35V			
C4	74.5155	1nF -20+50% Ceram. II PL63V			
R1	80.5249	1k Ω 5% carb. film 1/8W			
R2	80.5247	680 Ω 5% carb. film 1/8W			
R3	80.5249	1k Ω 5% carb. film 1/8W			
R4	86.5050	5k Ω 20% trim. carb. film 1/8W lin.			
R5	80.5273	100k 5% carb. film 1/8W			
R6	86.5050	5k Ω 20% trim. carb. film 0,1W lin.			
R7	80.5249	1k Ω 5% carb. film 1/8W			
R8	80.5234	56 Ω 5% carb. film 1/8W			
R9	80.5039	10k Ω 20% trim. carb. film 0,1W lin.			
E1 E6-	99.5028	Diode 1N914			
E7 E9-	99.5020	Diode 1N4004			
ReA	58.5062	Relay 24V 1700 Ω 21-21			
ReB	58.5060	Relay 24V 2 x 550 Ω 21-21			
ReC	58.5062	Relay 24V 1700 Ω 21-21			
ReD	58.5062	Relay 24V 2700 Ω 21-21			



udarb. of
OG/LF
30.11.70
kontrol at
1/1h diag
D/13056

Parts list
Stykliste

RP600-2003/02

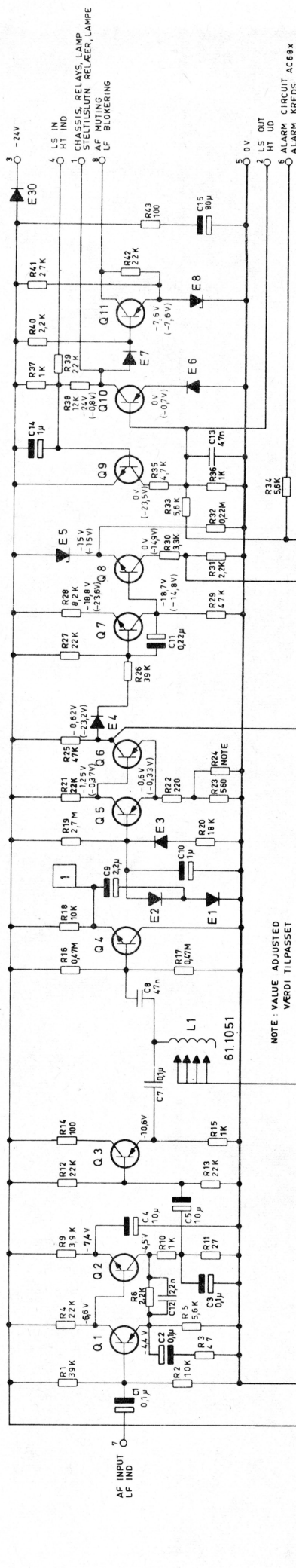
comp list
X113235

blad no

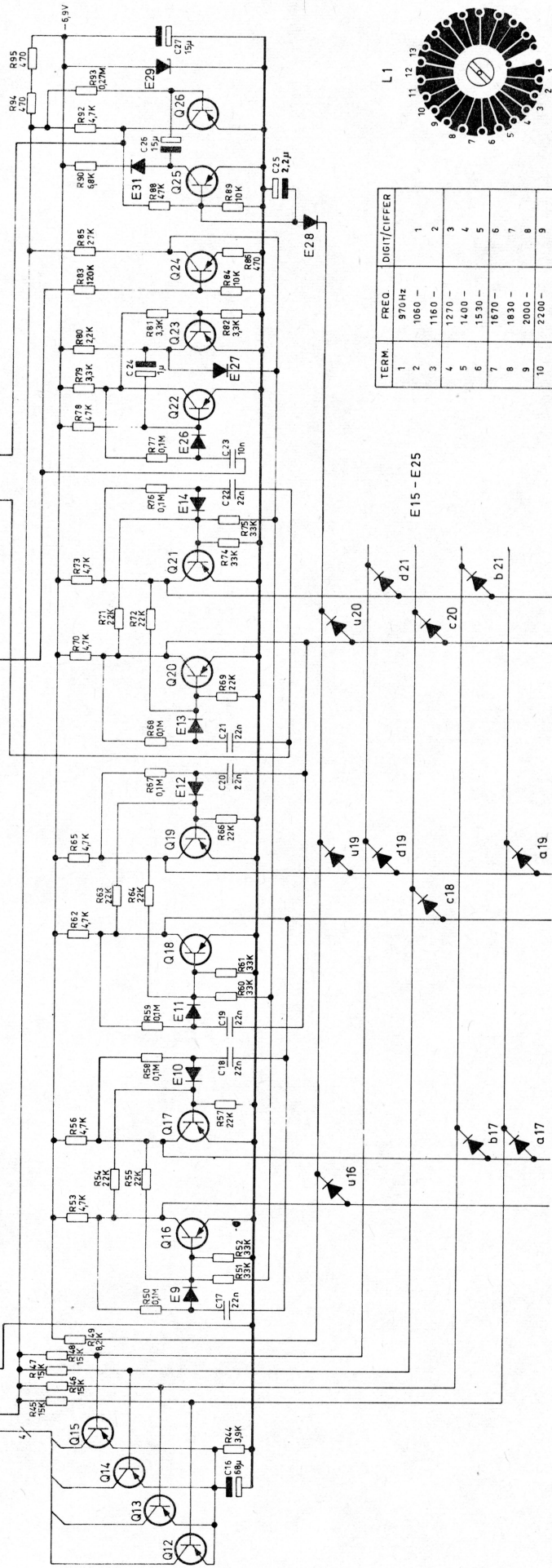
Directions for Test

RP/600-2003/02.

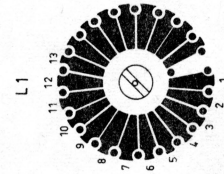
1. Only relay functions are tested.
2. Establish connection between the terminals 16 and 18, mount lamp from -24 volts to terminal 19, apply 0 volt to the terminals 13', 15 and 20. Apply -24 volts to terminal 8'.
3. Measure -24 volts from terminal 11'. Also measure with -24 volts applied to the terminals 9' and 10' (alone).
4. Apply 0 volt to terminal 14'. A operates and V1 emits light.
5. Apply -24 volts to terminal 17. B operates and V1 goes out.
6. Connect V1 to terminal 7' and 0 volt to terminal 6'. V1 emits light.
7. Apply 0 volt to terminal 12'. The C relay operates.
8. Remove 0 volt from terminal 15. The B relay is released.
9. Establish connection between the terminals 9 and 10. The D relay operates and V1 goes out. Connect a lamp, V2, from -24 volts to terminal 3'.
10. Remove connection between 9 and 10 and establish connection between the terminals 8 and 12. V1 goes out and V2 emits light.
11. Apply 0 volt to terminal 15. V2 goes out.
12. Instead establish connection between the terminals 13 and 14. V1 and V2 emit light.



NOTE: VALUE ADJUSTED
VÆRDI TILPASSET

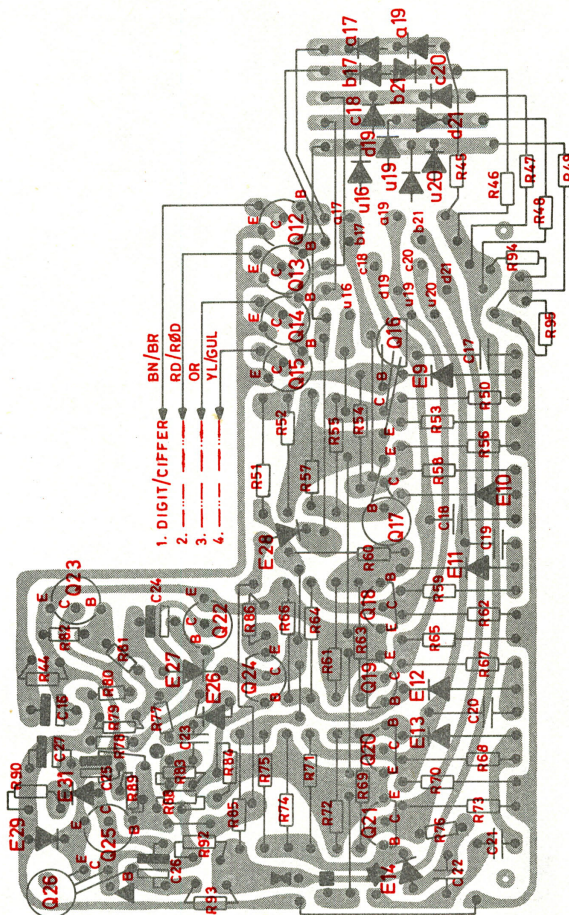
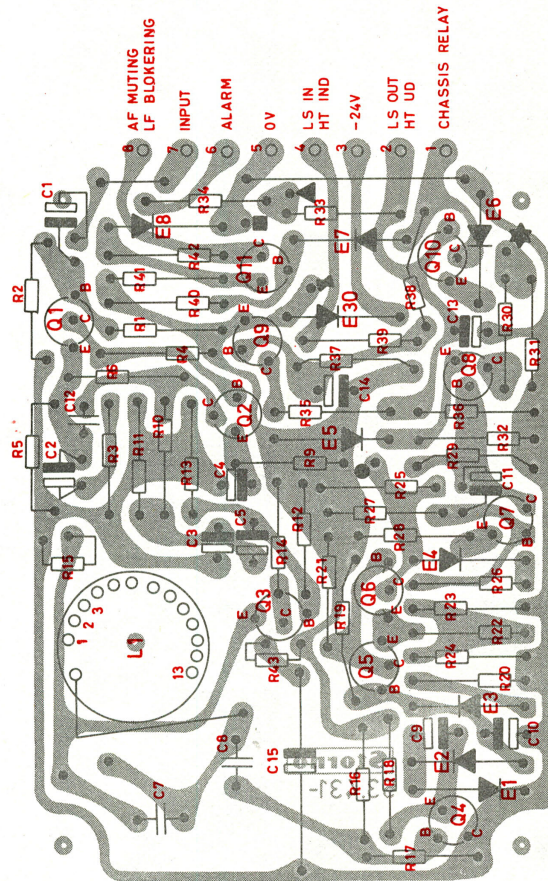


TERM.	FREQ.	DIGIT/CIPHER
1	970 Hz	1
2	1060	2
3	1160	3
4	1270	4
5	1400	5
6	1530	6
7	1670	7
8	1830	8
9	2000	9
10	2200	0
11	2400	REPEAT
12	2600	ALARM
13	2800	





PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



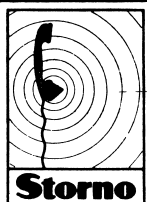
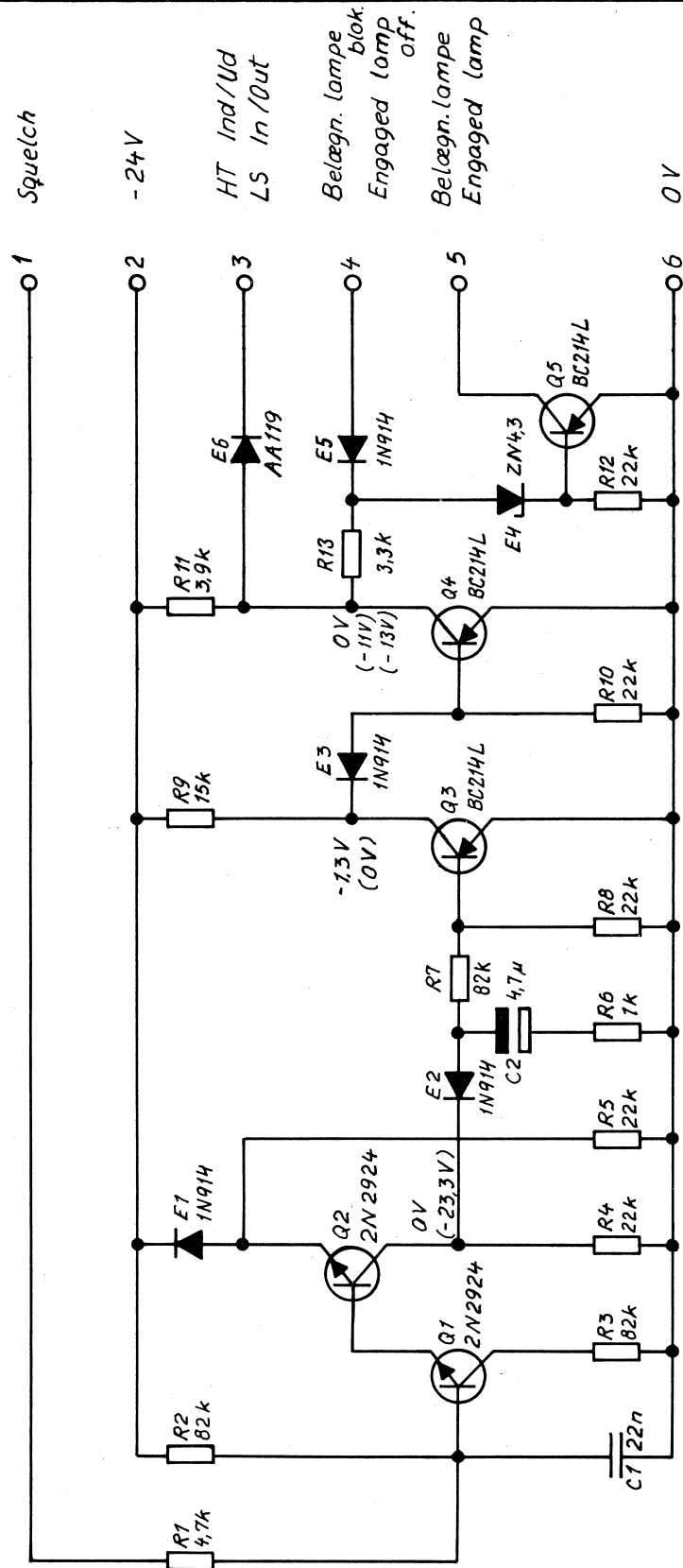
- ⌵ BLACK WIRE / SORT LEDNING
- ★ GREEN WIRE / GRØN LEDNING
- YELLOW WIRE / GUL LEDNING
- RED WIRE / RØD LEDNING
- ▲ WHITE WIRE / HVID LEDNING



STONE SEQUENCE RECEIVER SEKVENSTONEMODTAGER

SR684

D400.989/2



konstr./tegn.
06 / JAS
23.10.67
godk.
JB
komp.liste
X 110181

OMSKIFTERENHED FOR SAMTALEHEMMELIGHED
SU 600 - 2002
SWITCHING UNIT FOR SECRECY

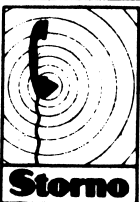
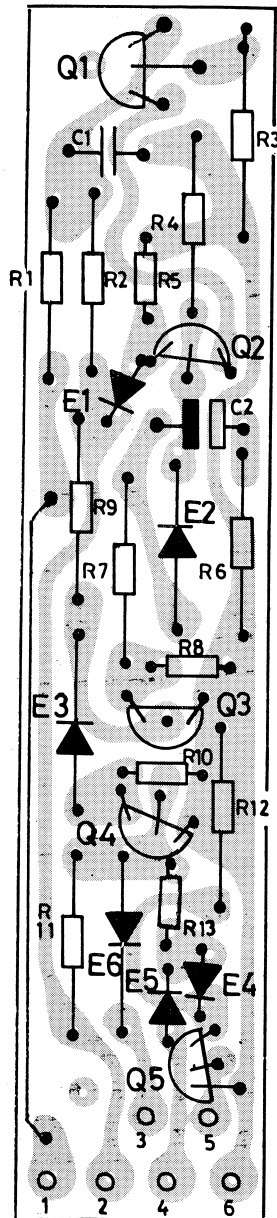
KODE

TEGN. NR.

D110180

A4

PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
 TRYKT KREDSLØB SET FRA KOMPONENTSIDE



konstr./tegn.
 OG/EBH
 26. 10. 70.
 godk.
 M
 komp. liste
 0110180
 X110181

SWITCHING UNIT FOR SECRECY
 OMSKIFTERENHED FOR SAMTALEHEMMELIGHED
 SU600-2002

KODE

TEGN. NR.

0113579

A4

no	code	data	no	code	data
C1	76.5071	22nF 10% polyest. 50V			
C2	73.5126	4,7μF 20% tantal 35V			
R1	80.5257	4,7KΩ 5% 1/8W			
R2	80.5272	82KΩ 5% 1/8W			
R3	80.5272	82KΩ 5% 1/8W			
R4	80.5265	22KΩ 5% 1/8W			
R5	80.5265	22KΩ 5% 1/8W			
R6	80.5249	1KΩ 5% 1/8W			
R7	80.5272	82KΩ 5% 1/8W			
R8	80.5265	22KΩ 5% 1/8W			
R9	80.5263	15KΩ 5% 1/8W			
R10	80.5265	22KΩ 5% 1/8W			
R11	80.5256	3,9KΩ 5% 1/8W			
R12	80.5265	22KΩ 5% 1/8W			
R13	80.5255	3,3kΩ 5% 1/8W			
E1	99.5028	Diode 1N914			
E2	99.5028	Diode 1N914			
E3	99.5028	Diode 1N914			
E4	99.5116	Zenerdiode ZN4,3			
E5	99.5028	Diode 1N914			
E6	99.5074	Diode AA119			
Q1	99.5117	Transistor 2N2924			
Q2	99.5117	Transistor 2N2924			
Q3	99.5144	Transistor BC214L			
Q4	99.5144	Transistor BC214L			
Q5	99.5144	Transistor BC214L			



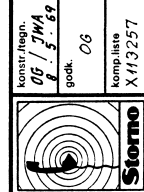
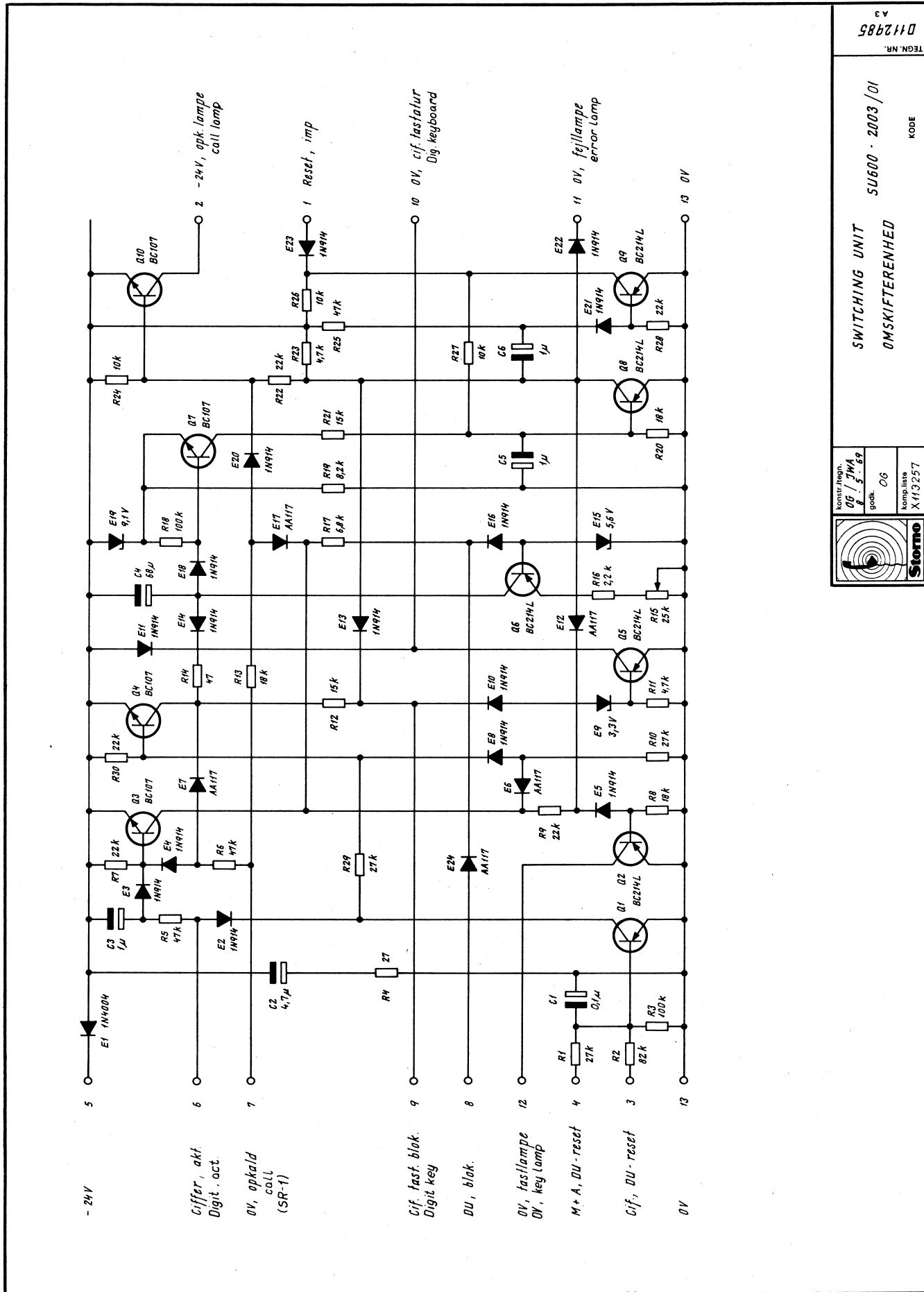
OG/HNi
26.10.67
kontrol
D11/80

PARTS LIST
STYKLISTE

SU600-2002

comp list
X110181

blad no 1 of 1

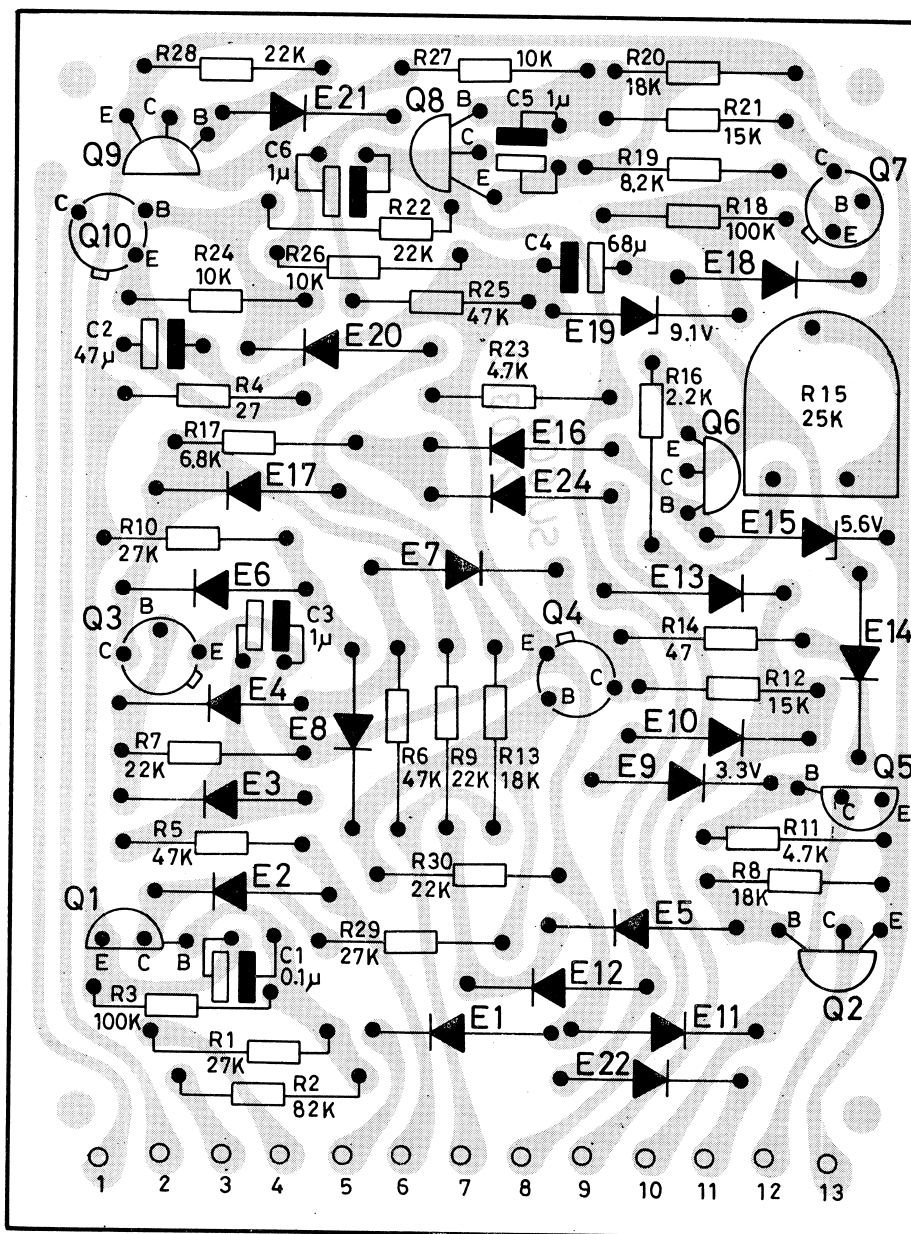


SWITCHING UNIT
 OMSKIFTERENHED
 SU600 - 2003 / 01

TEGN. NR.
 D112985
 A3

KODE

PRINTED CIRCUIT SEEN FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN



konstr. Regn.
OG / JWA
1.9.69
godk.
OG
komp. liste
X113257
0112985

SWITCHING UNIT
OMSKIFTERENHED
SU600 - 2003 / 01

KODE

TEGN. NR.

0113417

A4

no	code	data	no	code	data
C1	73.5089	0,1 μ F 20% tantal 35V	E13	99.5028	Diode 1N914
C2	73.5126	4,7 μ F 20% tantal 35V	E14	99.5028	- - - -
C3	73.5114	1 μ F 20% tantal 35V	E15	99.5114	Zenerdiode 5,6V 5%
C4	73.5106	68 μ F 20% tantal 15V			0,25W
C5	73.5114	1 μ F 20% tantal 35V	E16	99.5028	Diode 1N914
C6	73.5114	- - - - -	E17	99.5123	Diode AA117
			E18	99.5028	Diode 1N914
R1	80.5266	27k Ω 5% carb. film 1/8W	E19	99.5042	Zenerdiode 9,1V 5%
R2	80.5272	82k Ω - - - -			0,250W
R3	80.5273	100k Ω - - - -	E20	90.5028	Diode 1N914
R4	80.5230	27 Ω - - - -	E21	99.5028	- - - -
R5	80.5269	47k Ω - - - -	E22	99.5028	- - - -
R6	80.5269	47k Ω - - - -	E23	99.5028	- - - -
R7	80.5265	22k Ω - - - -	E24	99.5123	AA117 Diode
R8	80.5264	18k Ω - - - -			
R9	80.5265	22k Ω - - - -	Q1	99.5144	Transistor BC214L
R10	80.5266	27k Ω - - - -	Q2	99.5144	- - - -
R11	80.5257	4,7k Ω - - - -	Q3	99.5121	Transistor BC107
R12	80.5263	15k Ω - - - -	Q4	99.5121	- - - -
R13	80.5264	18k Ω - - - -	Q5	99.5144	Transistor BC214L
R14	80.5233	47 Ω - - - -	Q6	99.5144	- - - -
R15	86.5044	25k Ω 20% trim. kull. 0.1W lin.	Q7	99.5121	Transistor BC107
R16	80.5253	2,2k Ω 5% kull. 1/8W	Q8	99.5144	Transistor BC214L
R17	80.5259	6,8k Ω - - - -	Q9	99.5144	- - - -
R18	80.5273	100k Ω - - - -	Q10	99.5121	Transistor BC107
R19	80.5260	8,2k Ω - - - -			
R20	80.5264	18k Ω - - - -	R29	80.5266	27k Ω 5% carb. film 1/8W
R21	80.5263	15k Ω - - - -			
R22	80.5265	22k Ω - - - -	R30	80.5265	22k Ω - -
R23	80.5257	4,7k Ω - - - -			
R24	80.5261	10k Ω - - - -			
R25	80.5269	47k Ω - - - -			
R26	80.5261	10k Ω - - - -			
R27	80.5261	- - - - -			
R28	80.5265	- - - - -			
E1	99.5020	Diode 1N4004			
E2	99.5028	Diode 1N914			
E3	99.5028	- - - -			
E4	99.5028	- - - -			
E5	99.5028	- - - -			
E6	99.5123	Diode AA117			
E7	99.5123	- - - -			
E8	99.5028	Diode 1N914			
E9	99.5210	Zenerdiode 3,3V 5%			
		0,250W			
E10	99.5028	Diode 1N914			
E11	99.5028	- - - -			
E12	99.5123	Diode AA117			

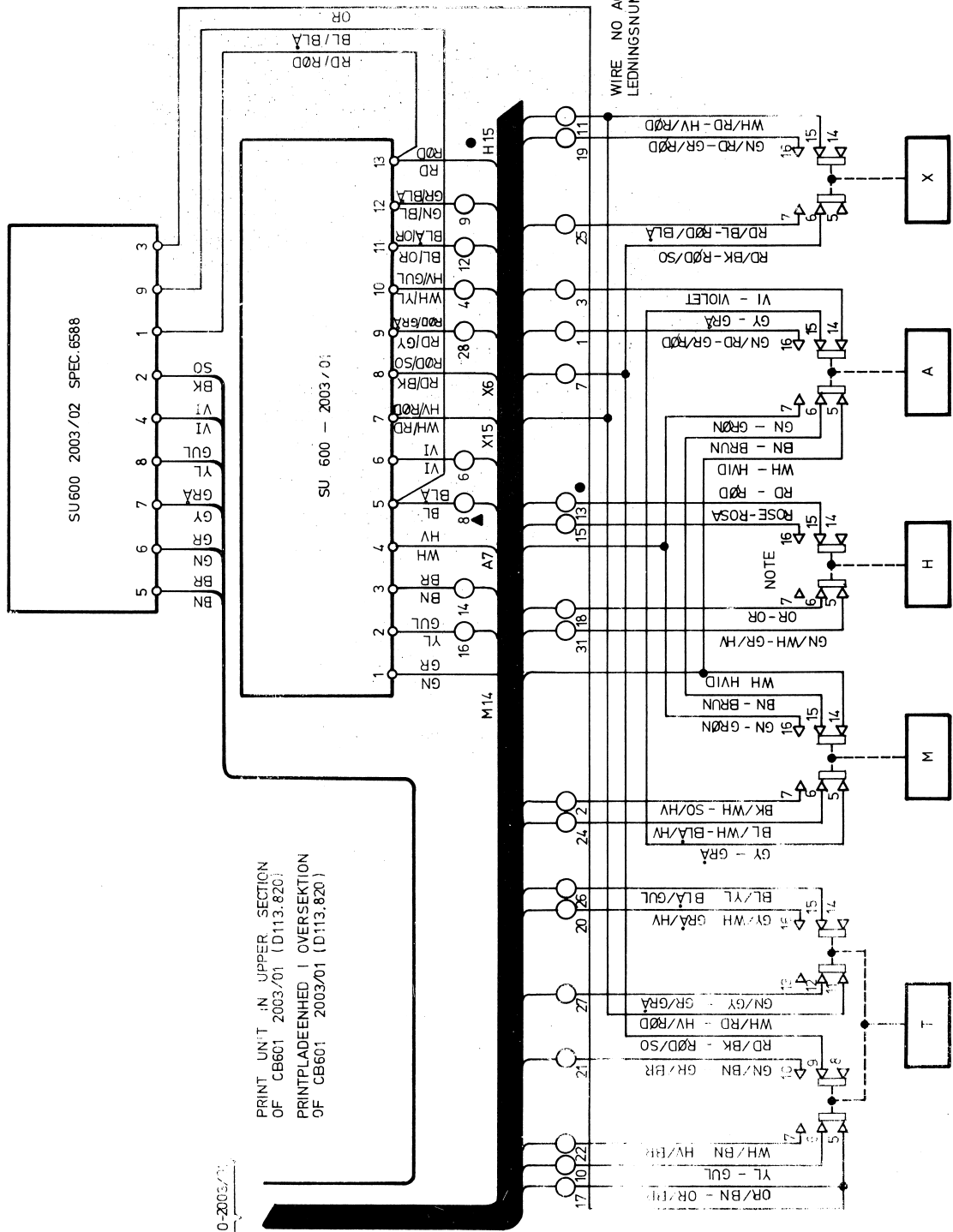


12.8.69
 kontrol af
 06
 tilh. diag.
 0112985

PARTS LIST
 STYKLISTE

SU600-2003/01

113257
 1 af 1



PRINT UNIT IN UPPER SECTION
OF CB601 2003/01 (D113.820)
PRINTPLADENHED I OVERSEKSTION
OF CB601 2003/01 (D113.820)

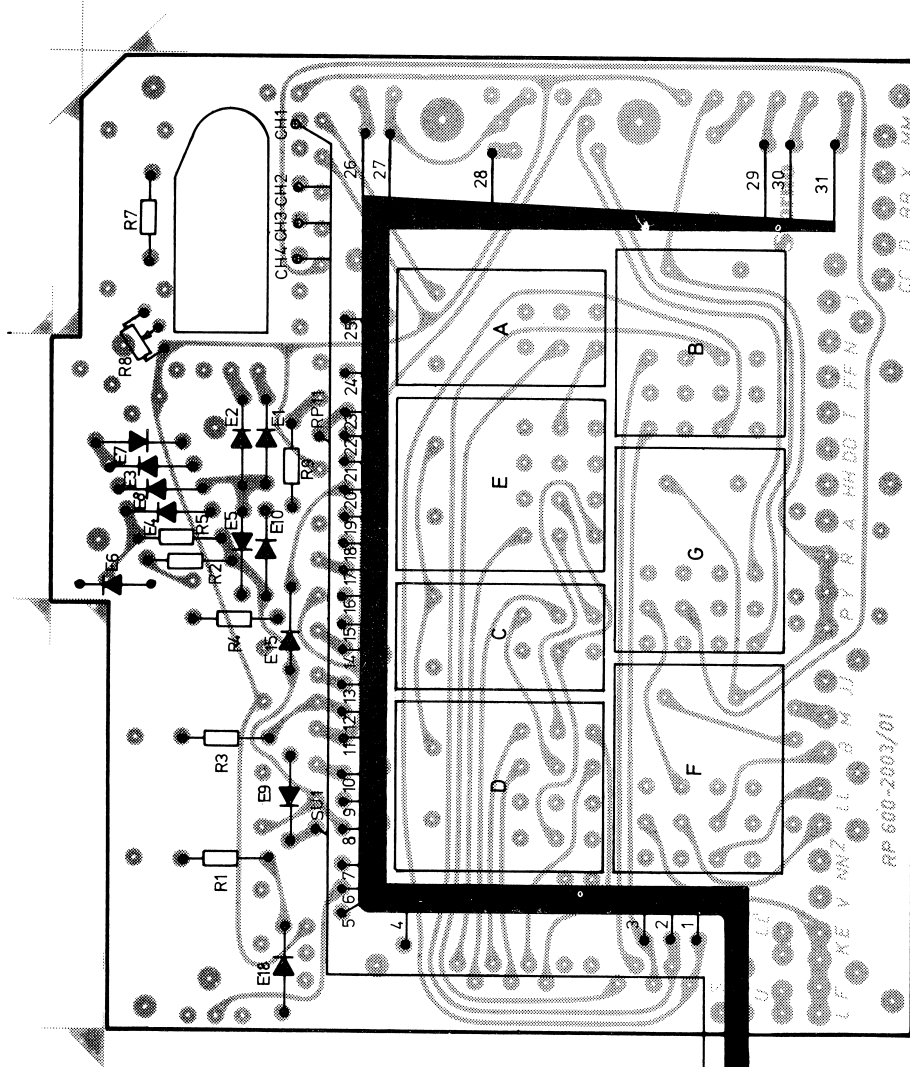
RP 600-2003/1

NOTE : ØNSKES OPKALDSTONE SAMTIDIG MED HORNALARM (H-KNAP INDTRYKKET)
KORTSLUTTES TERM. 5 OG 6 PÅ OMSKIFTER H
SU600-2003/01 OG TRYKKNAPOMSKIFTER ER MONTERET I CA681

IF ATTENTION TONE IS DESIRED TOGETHER WITH HORN ALARM (H PUSH
BUTTON ACTIVATED) TERM 5 AND 6 ON PUSH BUTTON SWITCH H MUST
BE STRAPPED.
SU600-2003/01 AND PUSH BUTTON SWITCHES ARE MOUNTED IN CA681

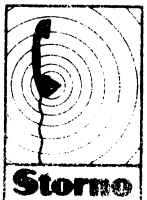
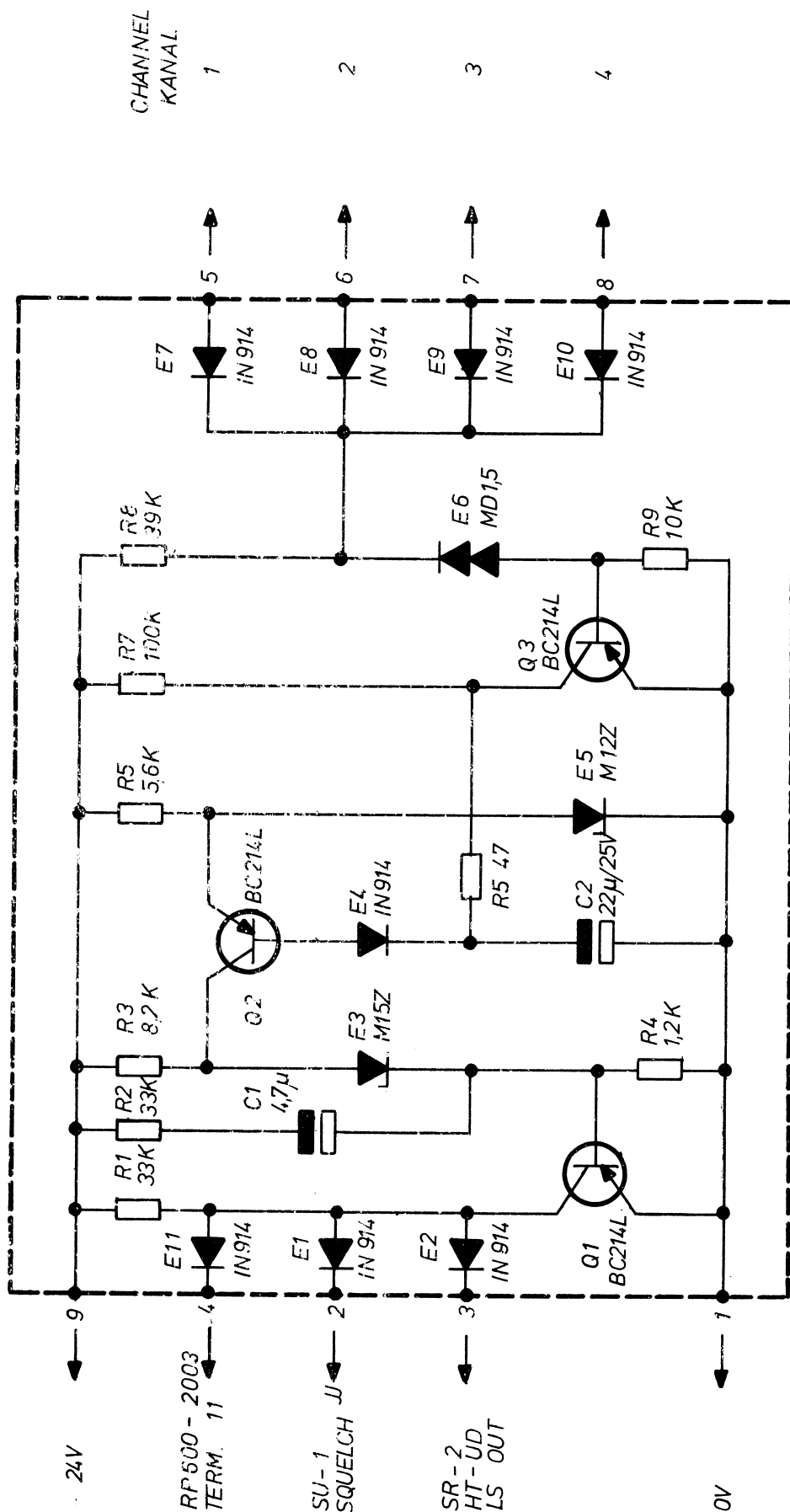
BOTTOM SECTION OF CONTROL
UNDERSEKSTION AF MANØVREBOX BOX CA 681

		konstr./tegn. BLU ADL 4 9 72 godk. kende linie I120204	MOUNTING OF SECRETY UNIT MONTERING AF HEMMELIGHOLDELSKREDS SU600-2003/2 SPEC 6588 IN CB601 - 2003/01 KODE	D120203 TEGN NR
--	--	---	--	--------------------



BOTTOM SIDE RP600-2003/01
 KOMP. PLACERING UNDERSIDE RP600-2003/01

		SU600-2003 SPEC. 6588 IN CB600-2003/01 MOUNTING OF SECRECY UNIT KODE	1 120204 TROM. NR.
Skapad / Rev. 20 1. 73	Godkänd / Rev. 20 1. 73	Databas D120203	1 120204 TROM. NR.



BLu./ADL
4. 9. 72.
godk.
Blu
komp.liste
I 120201
X 120202

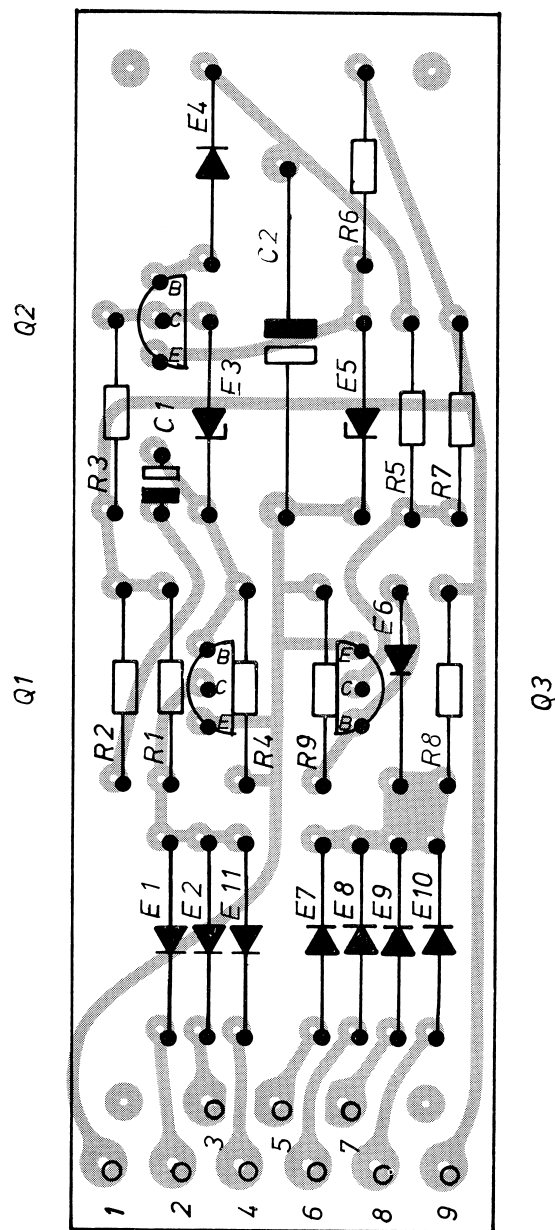
HEMMELIGHOLDELSESKREDS
SECURITY UNIT
SU 600 - 2003/02 SPEC. 6588

KODE

TEGN. NR.

D 120200

24



VIEDED FROM COMPONENT SIDE !
SET FRA KOMPONENTSIDEN.



konstr./tegn.
KDM ADL
5. 9. 72.
godk.
Blum
komp.liste
D120200

LAY OUT
PLACERINGSTEGNING
SU600 - 2003/02 SPEC 6588

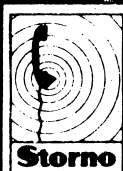
KODE

TEGN. NR.

I 120201

A 4

no	code	data	no	code	data
C1	73.5126-00	4,7 μ F tantal			
C2	73.5120-00	22 μ F tantal / 25V			
R1	80.5267-00	33K 5% carb.film 1/8W			
R2	80.5267-00	33K 5% carb.film 1/8W			
R3	80.5260-00	8,2K 5% carb.film 1/8W			
R4	80.5250-00	1,2K 5% carb.film 1/8W			
R5	80.5233-00	47 5% carb.film 1/8W			
R6	80.5258-00	5,6K 5% carb.film 1/8W			
R7	80.5273-00	100K 5% carb.film 1/8W			
R8	80.5268-00	39K 5% carb.film 1/8W			
R9	80.5261-00	10K 5% carb.film 1/8W			
E1	99.5028-00	diode 1N914			
E2	99.5028-00	diode 1N914			
E3	99.5205-00	diode M15Z			
E4	99.5028-00	diode 1N914			
E5	99.5223-00	diode M12Z			
E6	99.5209-00	diode MD1.5			
E7	99.5028-00	diode 1N914			
E8	99.5028-00	diode 1N914			
E9	99.5028-00	diode 1N914			
E10	99.5028-00	diode 1N914			
E11	99.5028-00	diode 1N914			
Q1	99.5144-00	trans BC214L			
Q2	99.5144-00	trans BC214L			
Q3	99.5144-00	trans BC214L			



udarb at
Blu/LAP
7.9.72
kontrol at
Blu
třih diagr
D102 200

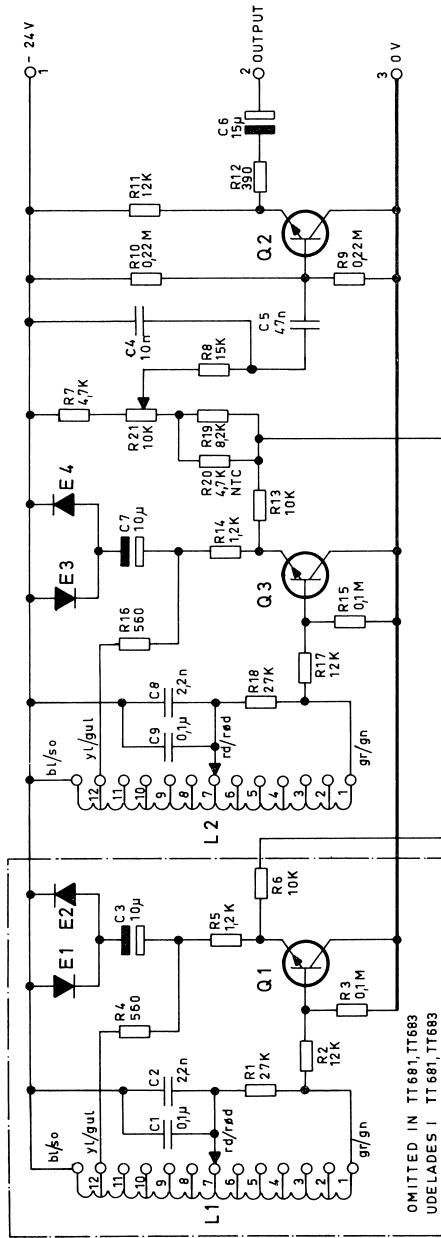
Partslist
Stykliste

SU600-2003 spec.6588

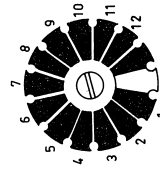
comp list

X120202

blad no 1 ar 1

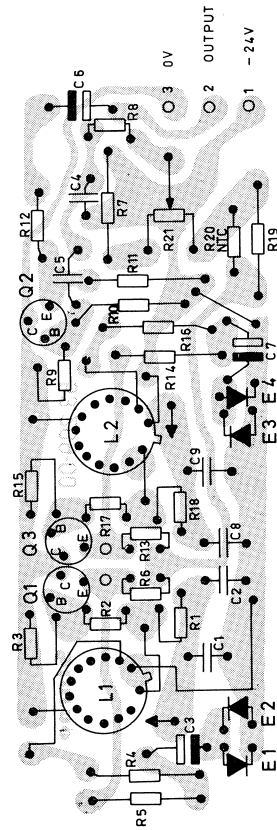


OMITTED IN TT681, TT683
UDELADES I TT681, TT683



L1, L2

TOP VIEW
SET FRA OVEN

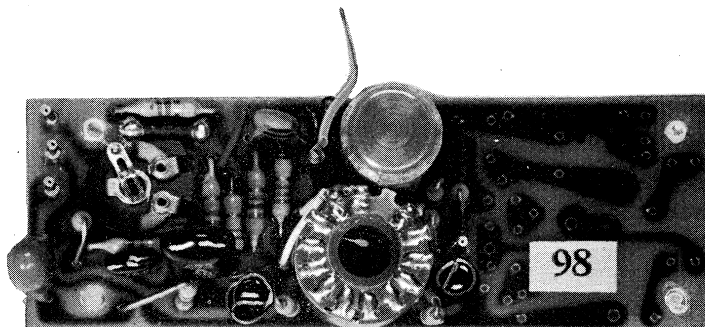


PRINTED CIRCUIT VIEWED FROM COMPONENT SIDE
TRYKT KREDSLØB SET FRA KOMPONENTSIDEN

TERM.	TT681, TT682	TT683
1	FREQ.	FREQ.
2	1060 Hz	825 Hz
3	1160 Hz	1010 Hz
4	1270 Hz	1240 Hz
5	1400 Hz	1435 Hz
6	1530 Hz	1520 Hz
7	1670 Hz	1750 Hz
8	1830 Hz	1860 Hz
9	2000 Hz	1980 Hz
10	2200 Hz	2000 Hz
11	2400 Hz	2135 Hz
12	2600 Hz	2280 Hz
	2900 Hz	2450 Hz

TT681, TT682, TT683 TONE TRANSMITTER TONE SENDER

TT681 and TT683 Tone Transmitters



This type of tone transmitter is built on a printed wiring board. It consists of these circuits:

- Tone oscillator
- De-emphasis network
- Amplifier

The TT681 and TT683 are single-tone transmitters for use in tone call systems.

The two types are constructionally identical. The difference lies in their tone sequences, different tone coils being provided in the two units (see under technical specifications).

The frequency of the tone transmitter can easily be altered: the oscillator coil has taps for 12 different frequencies so that the change from one frequency to another merely requires rewiring of one lead (see circuit diagram).

Mode of Operation

Tone Oscillator

The tone oscillator is a Hartley oscillator with an amplitude limiter consisting of two diodes inserted in the emitter circuit of the transistor.

The oscillator may - as mentioned above - be wired for 12 different frequencies.

De-emphasis Network

The oscillator is followed by a potentiometer for output level adjustment, and a de-emphasis network.

De-emphasis is performed in order to obtain constant frequency swing in tone transmissions regardless of the tone frequency in use.

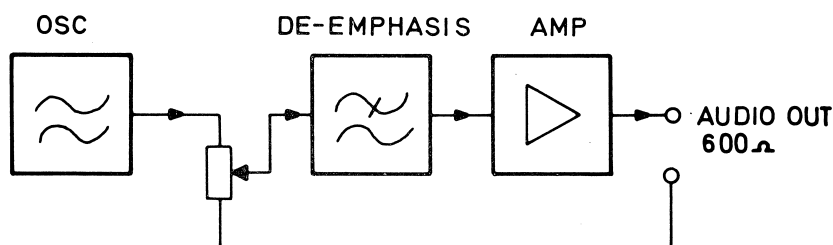
Amplifier

The tone generator output stage is an emitter follower.

This stage provides an impedance match between the tone oscillator and the transmitter modulation input.

Adjustment

The frequencies of the tone transmitter are factory preset and require no readjustment.



With the tone transmitter strapped for the 1060 Hz tone frequency (for the TT681) or for 1010 Hz (for the TT683), adjust the alignment potentiometer for an output voltage of 110 mV, corresponding to a measuring level of -17 dB.

Data

Output Impedance

600 ohms

Output Level

At 1060 Hz, TT681) 110 mV
At 1010 Hz, TT683)

Frequency Range

12 tones inside the frequency range

1060 - 2900 Hz (for TT681)

825 - 2450 Hz (for TT683)

Tone Sequence for TT681

1060 Hz, 1160 Hz, 1270 Hz, 1400 Hz, 1530 Hz,
1670 Hz, 1830 Hz, 2000 Hz, 2200 Hz, 2400 Hz,
2600 Hz, and 2900 Hz.

Tone Sequence for TT683

825 Hz, 1010 Hz, 1240 Hz, 1435 Hz, 1520 Hz,
1750 Hz, 1860 Hz, 1980 Hz, 2000 Hz, 2135 Hz,
2280 Hz, and 2450 Hz.

Frequency Accuracy

Deviation from remaining tone frequencies of the standard sequence with unit adjusted at 1060 Hz (TT681) or 1010 Hz (TT683): Better than 0.5%.

Frequency Stability

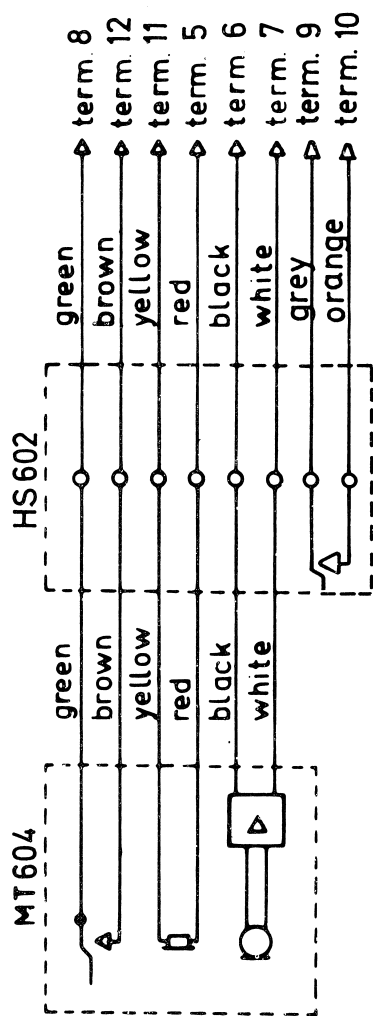
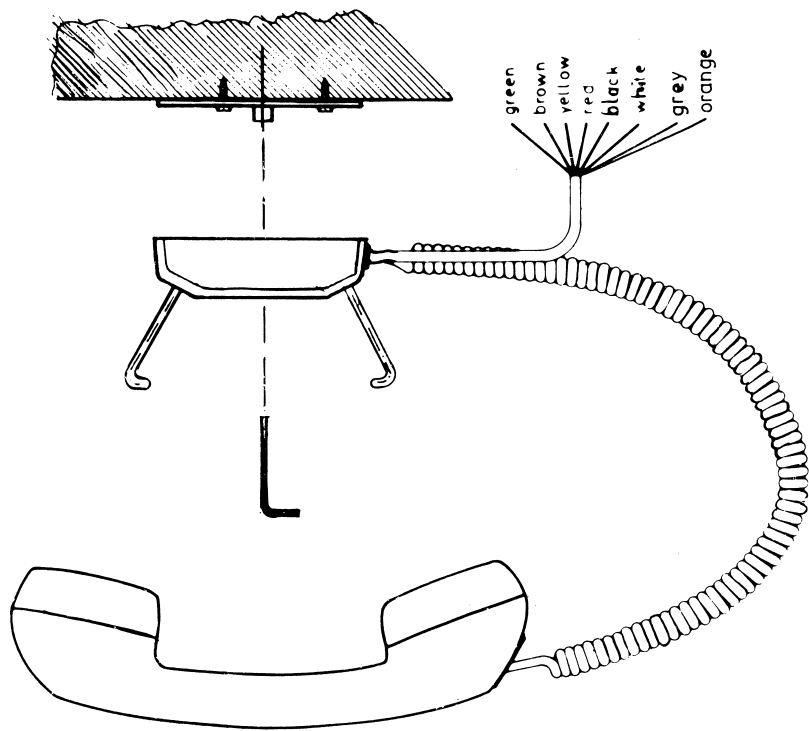
Better than 1%.

Distortion

Less than 3%.

Current Drain

2.5 mA.



Direct mounting

MT 601 - 2003

Storno
COPENHAGEN
DENMARK

D 119044

Blue