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Instruction Manual
Digital Signal Generator
Type FS 1 and Type FS 2

Instruction Manual

DIGITAL SIGNAL GENERATOR

Type FS1 and FS2

February 1966

Contents

1. Technical Data

1.1. Frequency range	0...1.2 Mc/s (2 Mc/s)
1.2. Frequency setting	6 decade scales, each with 12 crystal lock-in points (100 Kc/s stage 20 points) and one incremental tuning scale
Smallest crystal lock-in step	1 cps
Incremental tuning dial	120 calibr. points of 0.01 cps increments.

1.3. Frequency accuracy

1.3.1. 1 Mc/s crystal source and 1 cps multiples (crystal lock-in steps)

Stability (ageing).....	better 3 parts in 10^9/day after 8 weeks of operation better 2 part in 10^8/day after 48 hours of operation
Starting accuracy.....	better 1 part in 10^7 after 60 min. of operation at +20°C ambient temperature
Stability as a function of ambient temperature.....	better ... parts in 10^{10}/°C from ... °C up to +40°C
Accuracy when delivered.....	better ± part in 10^7
1 Mc/s frequency E.M.F. at the control socket.....	0.6 to 1 V RMS (internal impedance ≈ 600 Ω)

1.3.2. Vernier oscillator (incremental tuning dial)

Calibration marks	0.01 cps
Dial accuracy (over all)	± 0.003 cps
Resettability	± 0.001 cps
Stability over 1 minute	± 0.00003 cps +)
Stability over 15 minutes	± 0.0001 cps
Stability over 24 hours	± 0.001 cps
Stability as a function of ambient temperature	better 0.0001 cps/°C from +5°C up to +40°C
Calibration against crystal	at dial setting "0" and "10" x 0.1 cps

Remarks: A moving coil instrument indicates the beat between the crystal frequency and the vernier oscillator frequency, thereby a 1 cps beat corresponds to a deviation of 0.00001 cps of the output frequency of the unit against the crystal frequency.

1.4. Output signal

1.4.1. Direct output 0...1.2 Mc/s (2 Mc/s)

Output socket	type 83 UHF
Internal impedance	about 75 Ω
Output voltage (E.M.F.)	> 50 mV RMS (without superimposed D.C. voltage)
Distortion	<1 %

+)
corresponds to a stability of ± 3 parts in 10^9 at 10 Kc/s output frequency
corresponds to a stability of ± 3 parts in 10^{10} at 100 Kc/s output frequency
corresponds to a stability of ± 3 parts in 10^{11} at 1 Mc/s output frequency

1.4.2. Amplifier output 300 cps... 1.2 Mc/s (4 Kc/s... 2 Mc/s)

Output sockets	type 83 UHF and screened 3 pin connector
Internal impedance	can be switched to 0 Ω / 75 Ω / 150 Ω / 600 Ω ± 1 % balanced floating or unbalanced
Output voltage (E. M. F.)	variable from 0 to 2. 5 V RMS for internal impedance + load ≧ 75 Ω
Indication of the output voltage (E. M. F.)	by moving coil instrument calibr. from 0. 5 V to 2. 5 V and from -3 db to 10 db
Accuracy of indication	± 4 % of f. s. d.
Frequency response of the output voltage (E. M. F.) at constant ohmic load	≦ 1 db for imp. + load ≧ 600 Ω
	≦ 2 db for imp. + load ≧ 150 Ω
	≦ 3 db for imp. + load ≧ 75 Ω
	≦ 0. 01 db/Kc for imp. + load ≧ 75 Ω
Common mode rejection (balanced output, int. imp. = 0)	≧ 50 db
Distortion	≦ 1 % for imp. + load ≧ 150 Ω (2 V EMF)
Rejection of unwanted AM	> 80 db (LF-band width 0... 15 Kc/s (2 V EMF)
Rejection of additional hum and noise 0... 15 Kc/s	> 70 db (2 V EMF)
Suppression of spurious side bands (located by analyser with 10 cps filter)	40 cps to 500 cps from carrier ≧ 85 db
	500 cps to 3 Kc/s from carrier ≧ 90 db
	> 3 Kc/s from carrier ≧ 100 db
Suppression of non-harmonic spurious signals	> 80 db (2 V EMF)

1.5. Power supply

Mains voltage	117 V (100 ... 135 V) 220 V (185 ... 250 V)
Mains frequency	50 ... 400 cps
Power requirement	about 20 VA
"STAND BY" operation	keeps the crystal oscillator oven ready for immediate use
Battery operation	available on request with built-in leak proof, rechargeable, hermetically sealed battery
Operation period with one battery charge	about 5 hours for the whole unit about 12 hours for "STAND BY" operation at +20°C ambient temperature
Charging the battery from the mains	occurs during "STAND BY" operation with mains connected to the unit. When the battery is fully charged, charging will be interrupted. In the other modes of operation battery is buffered when mains are connected.
Indication of switched-on mains	by red pilot lamp
Indication of the battery voltage	by moving coil instrument "U_B"

1.6. Case dimensions

approx. 450 x 275 x 355 mm
18 x 11 x 14 in.

adaptor panels for 19 in. racks available

1.7. Weight

approx. 25.8 kg (58 lbs)
including battery 28 kg (62.5 lbs)

2. Brief Technical Description

The equipment is designed on the principle of a beat generator. The output frequency in the range 0...1.2 Mc/s (0...2 Mc/s) is formed in a mixer as a difference of a fixed crystal controlled signal of 21 Mc/s and of a crystal controlled signal, variable in the range 21.0...22.2. Mc/s (21.0...22.2 Mc/s). This difference frequency signal is coupled via a low pass filter to the direct output and also to the wide band low distortion output amplifier. Signals in the range 300 cps to 1.2 Mc/s (4 Kc/s to 2 Mc/s) are amplified up to 2.5 V RMS and coupled over a balun and a switchable resistor, representing the internal impedance, to the two output sockets. Measurement of the EMF takes place at the point between the resistor and the balun; indication is achieved by a moving coil meter on the front panel. One of the two outputs is switchable balanced floating or unbalanced.

The variable crystal controlled 21 to 22.2 Mc/s (21 to 23 Mc/s) signal is generated in the frequency synthesizer stages forming the lower part of the unit. These stages are working on the principle of automatic frequency control by phase locked oscillators. The output frequency of the output oscillator ("x 100 Kc/s" stage) of 21...22.2 Mc/s (21...23 Mc/s) is mixed with a 100 Kc/s spectrum, generated by frequency division of the 1 Mc/s crystal frequency. The resulting first intermediate frequency (22.1...22.2 Mc/s) is heterodyned with the oscillator frequency of the following "x 10 Kc/s"-stage (2.1...2.2 Mc/s to a second intermediate frequency of 20 Mc/s, which signal is compared in phase with a crystal controlled 20 Mc/s signal. The resulting D.C. voltage effects the automatic frequency control of the 21...22.2 Mc/s (21...23 Mc/s) output oscillator and is read by a moving coil meter at the front panel of the stage for indicating sufficient synchronization.

So, this oscillator can be synchronized to crystal controlled 100 Kc/s steps and follows the frequency variation of the "x 10 Kc/s" stage (100 Kc/s variation).

Automatic frequency control of the 2.1...2.2 Mc/s oscillator of the following "x 10 Kc/s" stage occurs in the same way as in the "x 100 Kc/s" stage, the

only difference is that a times ten frequency multiplier is interposed between the oscillator and the mixer for the 100 Kc/s spectrum. In this way the oscillator can be synchronized to crystal controlled 10 Kc/s steps, although being heterodyned with the 100 Kc/s crystal spectrum and to the output frequency of the third stage ("1 Kc/s"-stage) with a frequency variation of 100 Kc/s.

The third and the following stages, except the vernier oscillator stage, are identical with the second stage where, by means of the times ten frequency multiplier, interposed to the phase locking control circuit, the effect of the following stage to the preceding one is reduced to the tenth part.

The seventh stage, the vernier oscillator stage, is a free running 2.1...2.2 Mc/s oscillator, effecting the output frequency of the unit only with 1 part in 10^5 of its frequency variation of 0.1 Mc/s. For crystal accurate setting of the output frequency in smallest crystal lock-in steps of 1 cps the vernier oscillator stage is switched off. Instead of its output frequency a crystal controlled 2.1 Mc/s signal is applied to the "x 1 c/s" stage.

3. Operating Instructions

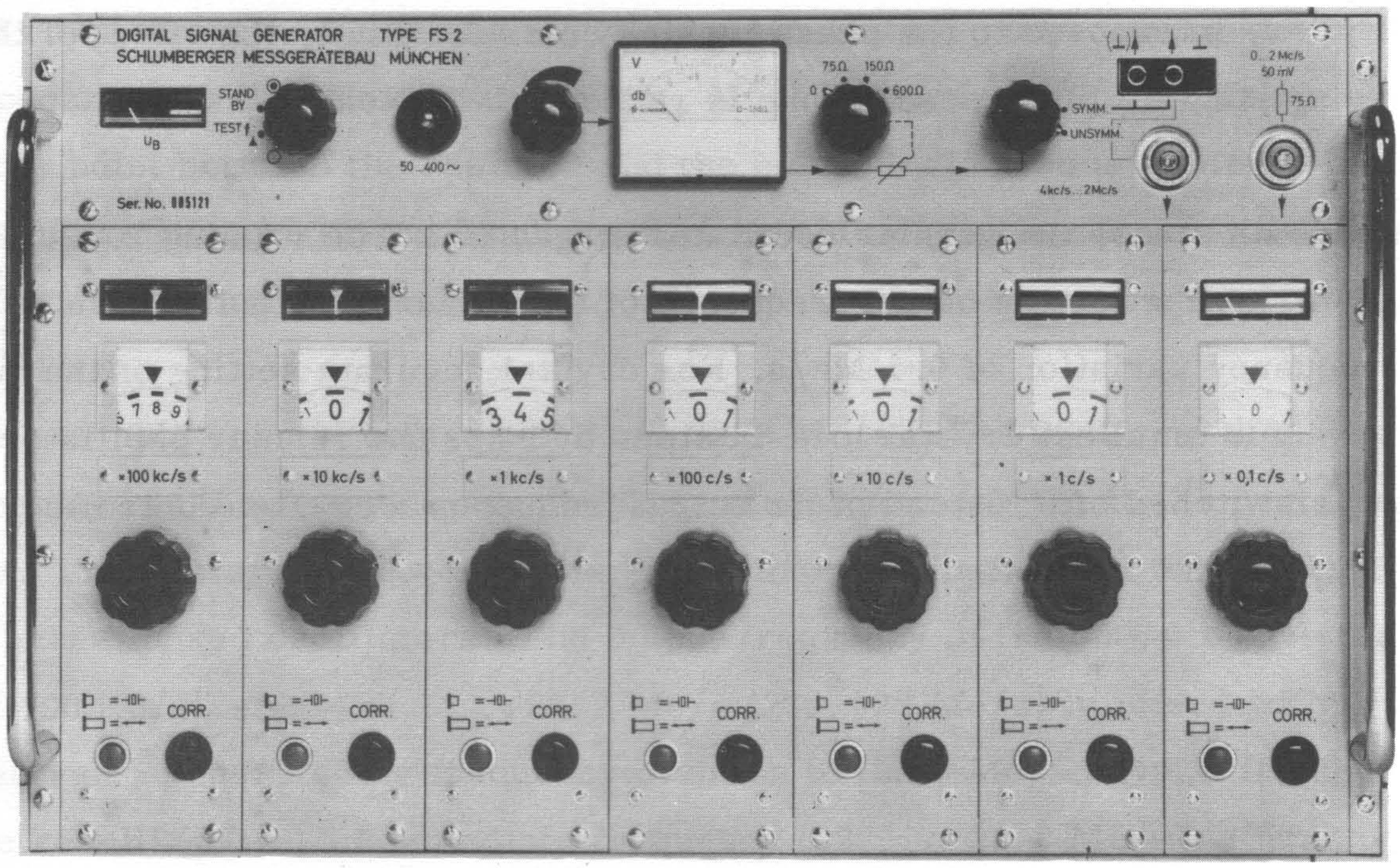


Fig. 1 Controls and Connectors

3.1. Power supply and fuses

The signal generator is connected to the single phase A.C. mains (50...400 cps) by a 3-core cable; when replacing the mains plug by another type, please note that the red coloured cable is the safety grounding (Europe Standard).

For transport the power cable is housed inside of the compartment behind a door at the rear of the case. At the same place 3 fuse sockets with 2 fuses and the output socket for the 1 Mc/s crystal frequency are located. Seen from the rear the left fuse is according to the German DIN Specifications a "Feinsicherung 1 Amp. mittelträge, 5 x 20 mm DIN 41571", the right one is a "Feinsicherung 0.5 Amp. mittelträge, 5 x 20 mm DIN 41571", used simultaneously as a mains voltage selector. With the 0.5 A fuse in the "220 V" socket the unit is to be operated at a 185 to 250 V mains, in the "117 V" socket at a 100 to 135 V mains.

3.2. Setting the mechanical zero of the output meter

This must be done with the equipment switched off or in "STAND BY" operation mode.

3.3. Starting up

The operation mode switch has the four positions "0", TEST f▲", "STAND BY", "◉ ". Selecting the first position the whole unit is switched off; for the second position ("TEST f▲") see 3.4.3.1.

In the "STAND BY" position the crystal oscillator and the oven are in operation and the inclosed battery is charged automatically if necessary; disconnecting the unit from the mains or cutting out of the mains, the crystal oscillator and the oven are automatically supplied by the battery.

In position "◉" the whole unit is under operation and the battery is buffered; in position "TEST f▲" the battery is buffered also. Disconnecting the unit from the mains or in case of cutting out the mains the whole unit is automatically supplied by the battery.

Supplying the unit from the mains, this is indicated by the red pilot lamp and the meter "U_B". (With built-in battery, "U_B" reads the terminal voltage of the battery; the battery is charged enough if the pointer is within the red sector, with the pointer moving into the green sector the battery should be charged. After having stored the unit for more than about four months, the battery should be charged by connecting the unit to the mains in position "STAND BY").

After switching on the unit is ready for use immediately. The built-in 1 Mc/s crystal oscillator, indeed, reaches its starting accuracy (1 part in 10^7 against that frequency at continuous operation) only after 1 hour of operation at $+20^{\circ}C$ ambient temperature.

3.4. Setting Frequency

3.4.1. Locking the oscillators to the crystal lock-in steps

The six scales "x 100 Kc/s", "x 10 Kc/s", "x 1 Kc/s", "x 100 c/s", "x 10 c/s", "x 1 c/s" are attached to six oscillators; these are synchronizable ("⊣□⊢") by pushing the correct button or free running ("⟷") at a repeated push that will release the button again.

For synchronization the dial has to be slowly moved over the wanted locking point (calibration mark) until the pointer of the associated meter follows the knob-movement. In this state the oscillator is locked in on the crystal frequency and no variation of the output frequency takes place. When synchronization has been accomplished at the required calibration mark the scale must be turned again, slowly, until the meter indication is in the mid-position of the scale.

The oscillator locked in this way is synchronized again automatically, if the operation mode switch is set from any possible position to " ◉ " (full operation).

If the oscillator is not locked, the pointer of the indicator is slowly oscillating because the oscillator is wobbulated by a automatic locking circuit with about 5...10 cps.

3.4.2. Fine tuning oscillator ("x 0.1 c/s" dial)

This oscillator is not synchronizable and effects the output frequency only in released position of the button ("⟷"). If the button is pushed ("⊣□⊢"), tuning of the dial is without any effect to the output frequency.

3.4.3. Checking dial calibration

3.4.3.1. Dials of the synchronizable oscillators

are to be checked in the "TEST f ◭ "-position of the operation mode switch. In this position oscillators can only be synchronized on the 11th frequency controlled locking point, marked by an arrow.

For checking the fine tuning oscillator has to be in operation (position "⟷" of the button).

Calibration should be checked by tuning the dial to the arrow and observing the pointer of the meter. Meter indication has to be in mid-position (see 3.4.1.); if there is any deviation, calibration can be corrected by turning the control "CORR".

3.4.3.2. Dial of the fine tuning oscillator

is tuned to "0" and/or to "10". The zero-beat, observed at the meter has to be brought to stand-still by turning the knob "CORR".

Note that a beat frequency of 1 cps corresponds to a deviation of the output frequency against the crystal controlled frequency of 0.01 millicycles per second.

3.4.4. Setting an output frequency

First example: 257.038.42 cps (257.03842 Kc/s)

1.	Fine tuning dial "x 0.1 c/s" set to "0", check calibration and tune to "4.2" (x 0.1 c/s)	
2.	Dial "x 1 c/s"	lock on "8"
3.	Dial "x 10 c/s"	lock on "3"
4.	Dial "x 100 c/s"	lock on "0"
5.	Dial "x 1 Kc/s"	lock on "7"
6.	Dial "x 10 Kc/s"	lock on "5"
7.	Dial "x 100 Kc/s"	lock on "2"

Second example: 257.000.00 cps (257.000 00 Kc/s)

1.	Fine tuning dial "x 0.1 c/s" switch off by pushing button to "⊣□⊢".	
2.	Dial "1 c/s"	lock on "0"
3.	Dial "10 c/s"	lock on "0"
4.	Dial "100 c/s"	lock on "0"
5.	Dial "1 Kc/s"	lock on "7"
6.	Dial "10 Kc/s"	lock on "5"
7.	Dial "100 Kc/s"	lock on "2"

Output frequency of the second example is as accurate as the 1 Mc/s crystal oscillator frequency.

If it is necessary to tune the output frequency continuously to locate a resonance point between 257.0 Kc/s and 257.8 Kc/s for example; the "x 100 c/s" stage has to operate in free running mode by releasing the button ("⟷"). In this case the position of the "x 10 c/s", "x 1 c/s", and "x 0.1 c/s" dials does not effect the output frequency. Any other stage may be operated in free running mode, if necessary.

3.5. Output frequency

is available at three output sockets:

3.5.1 Direct output 0...1.2 Mc/s (0...2 Mc/s)

At this output socket a frequency between 0 and 1.2 Mc/s (0...2 Mc/s) with an E.M.F. of more than 50 mV RMS without any superimposed D.C. is available. This voltage is not variable in amplitude, the internal impedance is about 75 Ω.

3.5.2. Amplifier output 300 c/s...1.2 Mc/s (4 Kc/s...2 Mc/s)

This output can be switched balanced floating (output voltage available at one socket only) or unbalanced (output voltage available at two sockets), the internal impedance for both sockets can be switched to 0 Ω, 75 Ω, 150 Ω or 600 Ω. The E.M.F. is variable from 0 to 2.5 V RMS and is indicated by the output meter; scale of this meter is calibrated from 0.5 V to 2.5 V and from -3 db to +10 db.

3.6. 1 Mc/s crystal oscillator

3.6.1. Frequency check of the 1 Mc/s crystal oscillator

should be made only after some hours of continuous operation. The 1 Mc/s crystal frequency is available at the "1 Mc/s f_Q" socket inside the compartment behind a door at the rear of the case for comparing measurements against an external frequency standard.

If a correction of the crystal frequency should be necessary, the small cover ("1 Mc/s f_Q CORR") at the rear of the case is opened. Rotating the small knob now visible, crystal frequency can be corrected.

3.6.2. Synchronization of the 1 Mc/s crystal oscillator

The built-in crystal oscillator can be synchronized by an external standard frequency via the socket "SYNCH. 1 Mc/s f_Q", located in the compartment at the rear of the case. The maximum input voltage is 1 V RMS, the input impedance is about 2 kΩ. The lock-in range is nearly proportional to the input voltage, at 1 V RMS it is greater than $\pm$ 1 part in 10^7. Before synchronization, a correction of the 1 Mc/s oscillator frequency should be carried out if necessary as described under 3.6.1.

3.7. For later mounting of the battery

the upper side of the case is opened and the power supply (the unit connected with the mains lead) removed upwards out of the frame. Battery is now fixed to the power supply by four screws M3 and connected to it by means of the plug at the end of the battery cable, used now instead of the plug with the shorting bars. Thereafter the whole power supply is mounted to the frame again and the upper side is closed with its cover.

3.8. Changing Oscillator Stages or Altering the Number of Stages

The unit is already operable with the "x 100 Kc"-stage (B-stage) and the fine tuning stage (F-stage). Thereby the B-stage remains on its place, the F-stage fills (mechanically and electrically) the place of the "x10 Kc"-stage and covers the gaps between the 100 Kc/s-lock-in points set on the "x 100 Kc"-stage. The F-stage oscillator works in free-running condition, and can be switched off as described in para. 3.4.2.

Up to five further stages (E-stages) can be interposed between the B-stage and the F-stage, whereby the F-stage oscillator covers the gaps between the lock-in points of the preceding E-stage. Due to the fact that all E-stages are identical (except the removable label) they can be interchanged against one another or replaced by a reserve stage.

Stages are supplied by the DC-voltage and the HF-signals via small identical links from one stage to the following one, beginning with the B-stage.

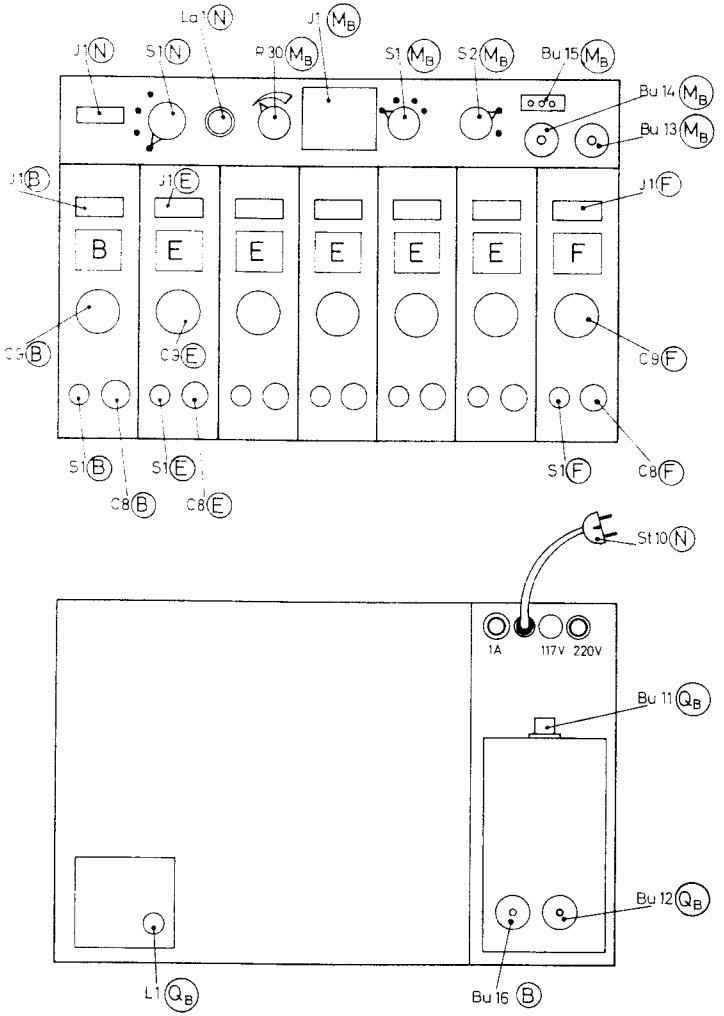
To remove or to insert a stage it is necessary to remove the lid, the buttom and the angle pieces at the upper side of the case. Now the connections on the buttom side and the upper backside of the stages are immediately accessible.

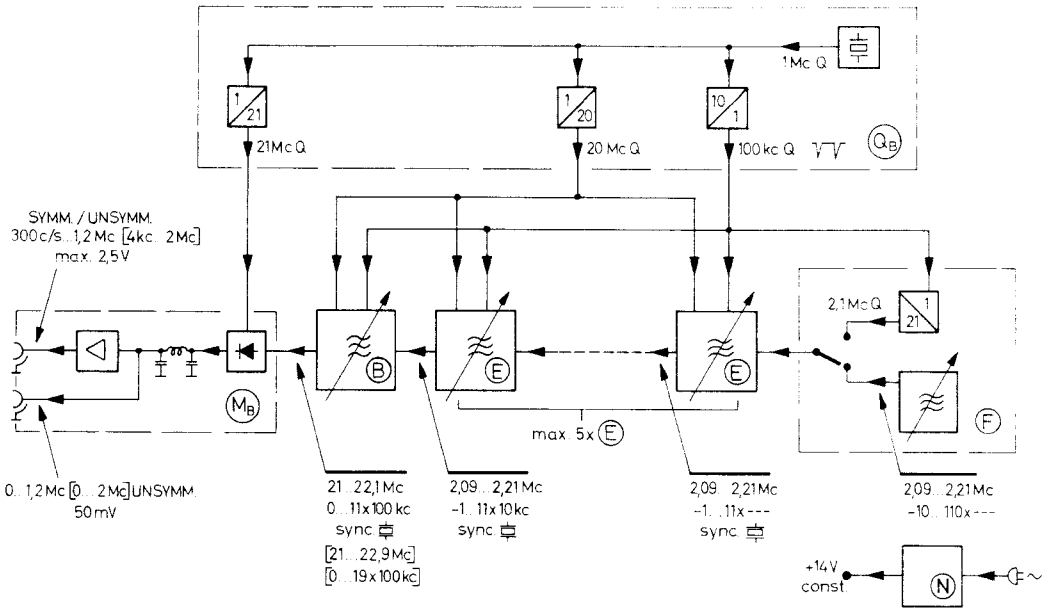
To make the connections at the upper front part better accessible, the power supply should be removed as described in para 3. 7. , and the output amplifier (narrow chassis) should be moved backwards after unscrewing the four screws and the control knob.

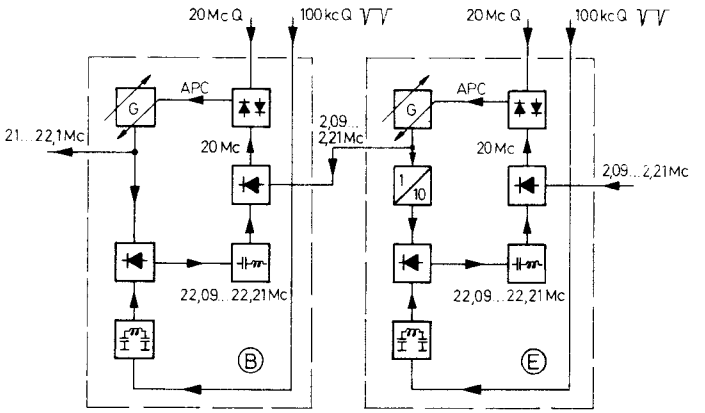
After disconnecting all plugs, the four screws at the front panel of the stage are unscrewed and the stage can be moved out of the frame.

A new stage is inserted accordingly, observe, however, that all stages have the right label, (e.g. the second stage "x 10 Kc", the third stage "x 1 Kc", and so on).

Instead of a removed stage a suitable blank panel can be mounted to the frame.







Block Diagram

				Type
R 1	22	kΩ	1/4 W	4.14
R 2	47	kΩ	"	"
R 3	6,8	kΩ	"	"
R 4	10	Ω	Bv Th. 01	
R 5	10	Ω		
R 6	90	Ω	"	
R 11	3,30	Ω	1/4 W	4.14
R 12	330	Ω	"	"
R 13	10	kΩ	"	"
R 14	22	kΩ	"	"
R 15	6,8	kΩ	"	"
R 16	2,2	kΩ	"	"
R 17	220	Ω	"	"
R 18	100	Ω	"	"
R 19	3,3	kΩ	"	"
R 20	15	kΩ	"	"
R 21	1,5	kΩ	"	"
R 22	68	Ω	"	"
R 23	6,8	kΩ	"	"
R 24	3,3	kΩ	"	"
R 25	68	Ω	"	"
R 26	6,8	kΩ	"	"
R 27	6,8	kΩ	"	"
R 28	68	Ω	"	"
R 31	2,2	kΩ	1/4 W	4.14
R 32	10	kΩ	"	"
R 33	4,7	kΩ	"	"
R 34	10	kΩ	Ker. Pot	7.43
R 35	1	kΩ	1/4 W	4.14
R 36	470	Ω	"	"
R 37	4,7	kΩ	"	"
R 38	1	kΩ	"	"
R 39	15	kΩ	"	"
R 40	2,5	kΩ	Ker. Pot	7.43
R 41	2,2	kΩ	1/4 W	4.14
R 42	680	Ω	"	"
R 43	2,2	kΩ	"	"
R 44	1	kΩ	"	"
R 45	10	Ω	"	"
R 46	470	Ω	"	"
R 47	10	Ω	"	"
R 51	33	Ω	1/4 W	4.14
R 52	1	kΩ	"	"
R 53	4,7	kΩ	"	"
R 54	2,5	kΩ	Ker. Pot	7.43
R 55	1	kΩ	1/4 W	4.14
R 56	470	Ω	"	"
R 57	33	kΩ	"	"
R 58	25	kΩ	Ker. Pot	7.43
R 59	1	kΩ	1/4 W	4.14

				Type
R 60	10	kΩ	1/4 W	4.14
R 61	1	kΩ	"	"
R 62	470	Ω	"	"
R 63	470	Ω	"	"
R 64	3,3	kΩ	"	"
R 65	2,2	kΩ	"	"
R 66	1	kΩ	"	"
R 71	22	kΩ	1/4 W	4.14
R 72	6,8	kΩ	"	"
R 73	1,5	kΩ	"	"
R 74	68	kΩ	"	"
R 75	68	kΩ	"	"
R 81	100	Ω	1/4 W	4.14
R 82	6,8	kΩ	"	"
R 83	22	kΩ	"	"
R 84	2,2	kΩ	"	"
R 85	6,8	kΩ	"	"
R 91	150	Ω	1/4 W	4.14
R 92	47	Ω	"	"
R 93	6,8	kΩ	"	"
R 94	22	kΩ	"	"
R 95	1,5	kΩ	"	"
R 96	10	Ω	"	"
R 97	33	Ω	"	"
R 98	4,7	kΩ	"	"
R 99	100	Ω	"	"
R 106	22	kΩ	1/4 W	4.14
R 107	6,8	kΩ	"	"
R 108	3,3	kΩ	"	"
R 111	68	kΩ	1/4 W	4.14
R 112	68	kΩ	"	"

				Type
C 1	100	pF	Rohr	8.34
C 2	x=27...100	pF	"	"
C 3	270	pF	Glim.	10.11
C 4	270	pF	"	"
C 11	100	µF/15V	Elko	9.41
C 12	100	µF/15V	"	"
C 13	0,1	µF	1% Poly	10.31
C 14	1	µF	"	10.36
C 15	1	µF	"	"
C 16	0,1	µF	Scheibe	9.11
C 17	0,1	µF	1% Poly	10.31
C 18	100	µF/15V	Elko	9.41
C 19	5	µF/15V	"	9.40
C 20	100	µF/15V	"	9.41
C 21	5	µF/15V	"	9.40
C 22	5	µF/15V	"	"
C 23	5	µF/15V	"	"
C 24	0,1	µF	1% Poly	10.31
C 31	0,1	µF	Scheibe	9.11
C 32	1,8	nF	Glim.	10.11
C 33	5	µF/15V	Elko	9.40
C 34	5	nF	Duko	9.32
C 35	270	pF	Glim.	10.11
C 36	0,1	µF	Scheibe	9.11
C 37	0,1	µF	"	"
C 38	1,8	nF	Glim.	10.11
C 39	1	nF	Scheibe	9.7
C 40	1	nF	"	"
C 41	0,1	µF	"	9.11
C 42	5	µF/15V	Elko	9.40
C 43	5	nF	Duko	9.32
C 44	100	µF/15V	Elko	9.41
C 51	0,1	µF	Scheibe	9.11
C 52	15	pF	Rohr	8.30
C 53	100	pF	"	8.34
C 54	0,1	µF	Scheibe	9.11
C 55	100	µF/15V	Elko	9.41
C 56	470	pF	Glim.	10.11
C 57	15	pF	Rohr	8.30
C 58	100	pF	"	8.34
C 59	47	pF	"	"
C 60	0,1	µF	Scheibe	9.11
C 66	2,7	nF	Glim.	10.11
C 67	47	pF	Rohr	8.34
C 68	2,7	nF	Glim.	10.11
C 69	47	pF	Rohr	8.34
C 70	2,7	nF	Glim.	10.11
C 71	0,1	µF	Scheibe	9.11

				Type
C 72	0,5	pF	Scheibe	8.4
C 73	0,1	µF	"	9.11
C 74	150	pF	Rohr	8.34
C 75	220	pF	Scheibe	9.4
C 76	150	pF	Rohr	8.34
C 77	220	pF	Scheibe	9.4
C 81	5	nF	Duko	9.32
C 82	150	pF	Rohr	8.34
C 83	2,2	pF	Scheibe	8.7
C 84	150	pF	Rohr	8.34
C 85	2,2	pF	Scheibe	8.7
C 86	220	pF	Rohr	8.45
C 87	470	pF	Glim.	10.11
C 88	0,1	µF	Scheibe	9.11
C 89	4,7	pF	"	8.7
C 90	100	pF	Rohr	8.34
C 96	0,1	µF	Scheibe	9.11
C 97	5	nF	Duko	9.32
C 98	5	nF	"	"
C 99	0,1	µF	Scheibe	9.11
C 100	0,1	µF	"	"
C 101	5	µF/15V	Elko	9.40
C 102	5	nF	Duko	9.32
C 103	100	pF	Rohr	8.34
C 111	47	pF	Rohr	8.34
C 112	1,8	nF	Glim.	10.11
C 113	22	pF	Rohr	8.33
C 114	1,8	nF	Glim.	10.11
C 115	22	pF	Rohr	8.33
C 116	1,8	nF	Glim.	10.11
C 117	0,1	µF	Scheibe	9.11
C 118	2,2	pF	"	8.7
C 119	150	pF	Rohr	8.34
C 120	0,1	µF	Scheibe	9.11
C 126	220	pF	Scheibe	9.4
C 127	220	pF	"	"
C 128	150	pF	Rohr	8.34
C 129	2,2	pF	Scheibe	8.7
C 130	150	pF	Rohr	8.34
C 131	1,8	nF	Glim.	10.11
(C 146	39	pF	Rohr	8.34)
(C 147	470	pF	Glim.	10.11)

				Type
L 1	Bv	3.06	Schlumberger	
L 2	"	3.07	"	
L 3	"	3.04	"	
L 4	"	3.05	"	
L 5	"	3.05	"	
L 7	"	2.11	"	
L 8	"	2.11	"	
L 9	"	2.11	"	
L 10	"	1.02	"	
L 11	"	2.11	"	
L 12	"	2.11	"	
L 13	"	2.11	"	
L 14	"	2.10	"	
L 15	"	2.10	"	
L 16	"	2.11	"	
L 17	"	2.11	"	
L 18	"	2.11	"	
L 19	"	2.02	"	
L 20	"	2.11	"	
L 21	"	2.11	"	
(L 22	"	1.07	"	)
L 101	Vk 20010/3 B		Volvo	
L 102	"		"	

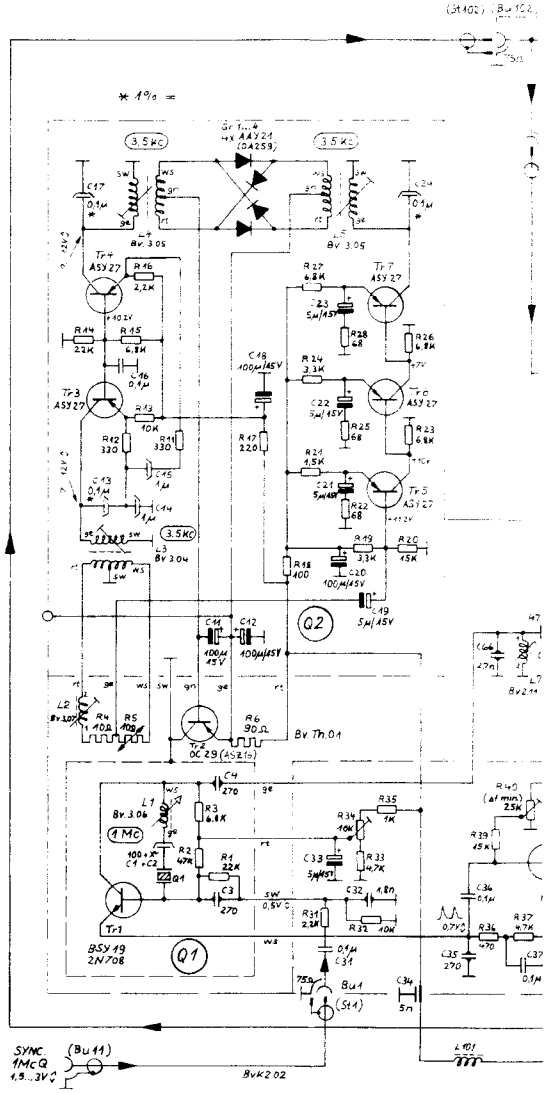
Gr 1	Diode	AAY 21	Volvo	
Gr 2	"	AAY 21	"	
Gr 3	"	AAY 21	"	
Gr 4	"	AAY 21	"	
Gr 5	"	1N 914		
Gr 6	"	1N 914		
Gr 7	"	1N 914		
Gr 8	"	1N 914		
Gr 9	"	1N 914		

Q 1 1 MHz Quarz G7AS
C_{ser} = 110pF / +65°C
The James Knights Co

				Type
Tr 1	Transistor	BSY 19 = 2N 708		
Tr 2	"	(OC 29) ASZ 16	Valvo	
Tr 3	"	ASY 27	"	
Tr 4	"	ASY 27	"	
Tr 5	"	ASY 27	"	
Tr 6	"	ASY 27	"	
Tr 7	"	ASY 27	"	
Tr 8	"	BSY 19 = 2N 708		
Tr 9	"	ASZ 21	Valvo	
Tr 10	"	BSY 19 = 2N 708		
Tr 11	"	BSY 19 = 2N 708		
Tr 12	"	BSY 19 = 2N 708		
Tr 13	"	ASZ 21	Valvo	
Tr 14	"	AF 121		
Tr 15	"	AF 121		
Tr 16	"	AF 121		
Tr 17	"	AF 121		

Bu 1	Buchse	CM 031/70	Haeberlein	
Bu 2	"	CM 031/70	"	
Bu 3	"	CM 031/70	"	
Bu 4	"	CM 031/70	"	
Bu 5	"	CM 031/70	"	
(Bu 7	"	T 2631/1	Tuchel	)
(St 1	Stecker	GM 031/70	Haeberlein	)
(St 2	"	GM 031/70	"	)
(St 3	"	GM 031/70	"	)
(St 4	"	GM 031/70	"	)
(St 5	"	GM 031/70	"	)
St 7	"	T 2630/1	Tuchel	
(Bu 11	Buchse	SO - 239	)	
(Bu 12	"	SO - 239	)	
(Bu 102	"	CM 031/70	Haeberlein	)
(Bu 202	"	CM 031/70	"	)
Bu 302	"	CM 031/70	"	
(St 102	Stecker	GM 031/70	Haeberlein	)
(St 202	"	GM 031/70	"	)
(St 302	"	GM 031/70	"	)

FS - QB



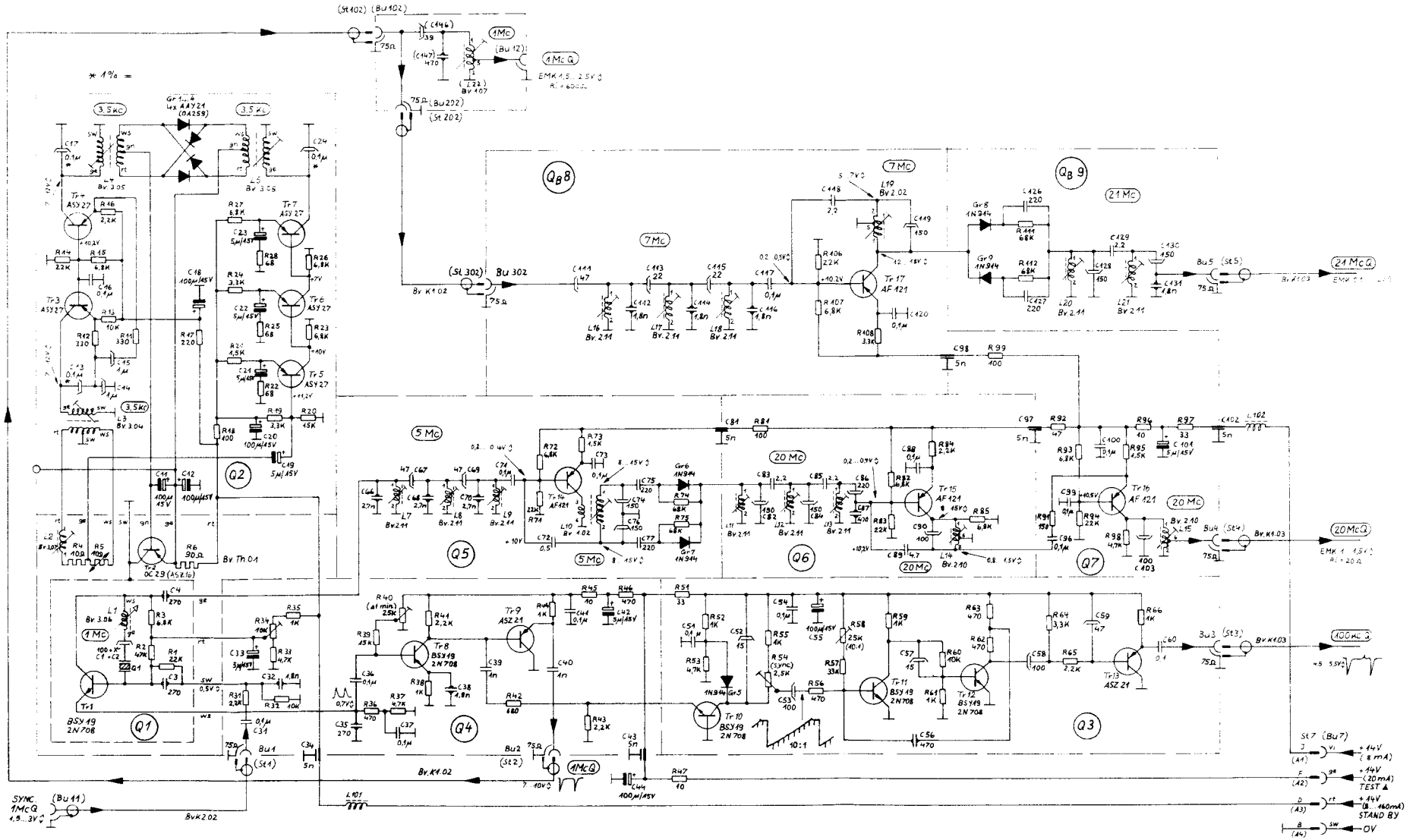
ansistor BSY 19=2N 708
" (OC 29/AS2%) valve
" ASY 27
" ASY 27 "
" ASY 27 "
" ASY 27 "
" ASY 27
" BSY 19=2N 708
" ASZ 21 valve
" BSY 19=2N 708
" BSY 19=2N 708
" BSY 19=2N 708
" ASZ 21 valve
" AF 121
" AF 121
" AF 121
" AF 121

Buchse CM 031/70 Haeberlein
" CM 031/70 "
" CM 031/70 "
" CM 031/70 "
" CM 031/70 "
" T 2631/1 Tuchel)

Stecker GM 031/70 Haeberlein)
" GM 031/70 ")
" GM 031/70 ")
" GM 031/70 ")
" GM 031/70 ")
" T 2630/1 Tuchel

Buchse SO - 239)
" SO - 239)
" CM 031/70 Haeberlein)
" CM 031/70 ")
" CM 031/70 ")
Stecker GM 031/70 Haeberlein)
" GM 031/70 ")
" GM 031/70 ")

- QB



Circuit Q_B

			Type					Type
R 1	100	Ω	1/4 W	4.14	C 1	0,1 µF	Scheibe	9.11
R 2	250	Ω	Ker Pot	743	C 2	0,1 µF	"	"
R 3	3,3	kΩ	1/4 W	4.14	C 3	68 pF	Rohr	8.34
R 4	6,8	kΩ	"	"	C 4	1,8 nF	Glimm.	10.11
R 5	22	kΩ			C 5	1,8 nF	"	"
R 6	100	Ω			C 6	68 pF	Rohr	8.34
R 11	47	Ω	1/4 W	4.14	C 11	5 nF	Duko	9.32
R 12	1	kΩ	"	"	C 12	0,1 µF	Scheibe	9.11
R 13	470	Ω	"	"	C 13	0,1 µF	"	"
R 14	22	kΩ	"		C 14	0,1 µF	"	
R 15	4,7	kΩ	"		C 15	6,8 pF	"	8.13
R 16	10	kΩ	"		C 16	220 pF	"	8.45
R 17	22	kΩ	"		C 17	220 pF	"	"
R 21	68	Ω	1/4 W	4.14	C 21	5 nF	Duko	9.32
R 22	330	Ω	"	"	C 22	220 pF	Scheibe	8.45
R 23	3,3	kΩ	"	"	C 23	220 pF	"	"
R 24	10	kΩ	"	"	C 24	5 µF/15V	Elko	9.40
R 25	47	Ω	"	"	C 25	0,1 µF	Scheibe	9.11
R 26	47	Ω	"	"	C 26	100 µF/15V	Elko	9.41
R 27	1,5	kΩ	"	"	C 27	0,1 µF	Scheibe	9.11
R 28	150	Ω	"	"	C 28	100 µF/15V	Elko	9.41
R 29	3,3	kΩ	"	"	C 29	0,1 µF	Scheibe	9.11
R 30	10	kΩ	Pot	74	C 30	270 pF	Rohr	8.45
R 31	10	kΩ	1/4 W	4.14	C 31	5 µF/15V	Elko	9.40
R 32	3,3	kΩ	"	"	C 32	0,1 µF	Scheibe	9.11
R 33	680	Ω	"	"	C 33	0,1 µF	"	"
R 34	150	Ω	"	"	C 34	5 µF/15V	Elko	9.40
R 35	1,2	kΩ	"	"	C 35	100 µF/15V	"	9.41
R 36	3,3	kΩ	"	"	C 36	0,1 µF	Scheibe	9.11
R 37	250	Ω	Ker. Pot	743	C 37	42pF...33pF	Rohr	(8.30)
R 38	10	kΩ	1/4 W	4.14	C 38	0,1 µF	Scheibe	9.11
R 39	680	Ω	"	"	C 39	5 µF/15V	Elko	9.40
R 40	150	Ω	"	"	C 40	100 µF/15V	"	9.41
R 41	1,5	kΩ	"	"	C 41	0,1 µF	Scheibe	9.11
R 42	2,2	kΩ	"	"	C 42	100 µF/15V	Elko	9.41
R 43	100	Ω	"	"	C 43	0,1 µF	Scheibe	9.11
R 44	2,2	kΩ	"	"	C 44	0,1 µF	"	"
R 45	100	Ω	"	"	C 45	100 µF/15V	Elko	9.41
R 46	220	Ω	"	"	C 46	0,1 µF	Scheibe	9.11
R 47	220	Ω	"	"	C 47	100 µF/15V	Elko	9.41
R 48	15	kΩ	"	"	C 48	15 pF	Rohr	8.30
R 49	2,2	kΩ	"	"	C 49	25 pF	Trim.	11.41
R 50	15	kΩ	"	"	C 50	0,1 µF	Poly	10.31
R 51	470	Ω	"	"	C 51	0,1 µF	"	"
R 52	225	Ω	1/10 W	4.2	C 52	470 pF	Scheibe	9.4
R 53	37,5	Ω	"	"				
R 54	37,5	Ω	"	"				
R 55	225	Ω	"	"				
R 56	37,5	Ω	"	"				
R 57	37,5	Ω	"	"	(R 61	25 kΩ	Ker. Pot.	743)

L 1	Bv 2.06		Schlumberger
L 2	Bv. 2.17		"
L 3	Bv 2.18		"
L 4	Bv 3.01		"
L 5	Bv 3.01		"
L 6	Bv. 3.08 [Bv 3.10]		"
L 101	VK 200 10/3B		Valvo

Gr 1	Diode	AAY 21	Valvo
Gr 2	"	AAY 21	"
Gr 3	"	AAY 21	"
Gr 4	"	AAY 21	"
Gr 5	"	AAY 21	"
Gr 6	"	AAY 21	"
Gr 7	"	AAY 21	"
Gr 8	"	AAY 21	"

Tr 1	Transistor	AF 124
Tr 2	"	AF 124
Tr 3	"	AF 124
Tr 4	"	AF 124
Tr 5	"	AF 124
Tr 6	"	AF 124
Tr 7	"	AF 124
Tr 8	"	AF 124
Tr 9	"	AFY 19 Valvo
Tr 10	"	AFY 19 "

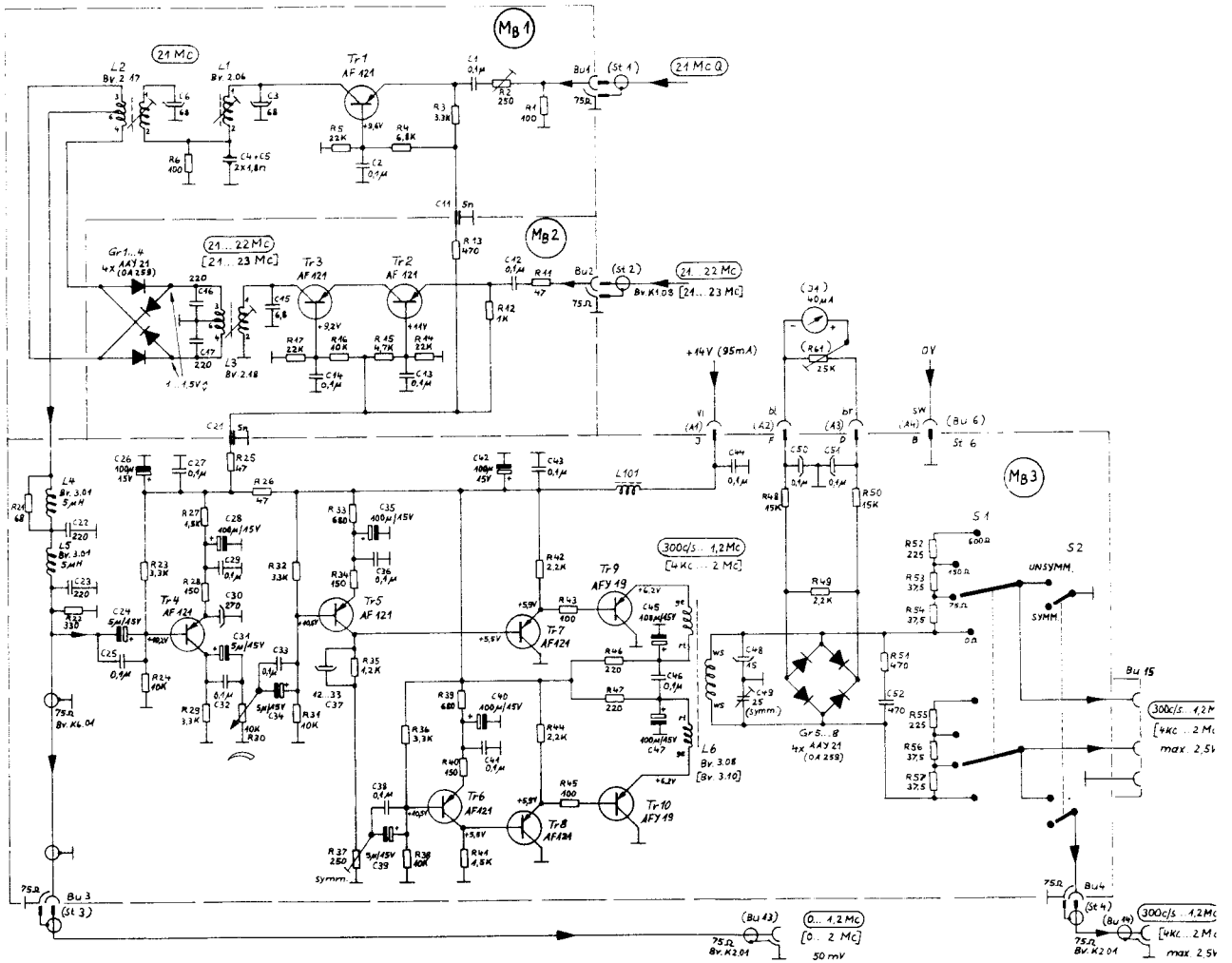
Bu 1	Buchse	CM 031/70	Haeberlein	
Bu 2	"	CM 031/70	"	
Bu 3	"	CM 031/70	"	
Bu 4	"	CM 031/70	"	
Bu 15	"	9 Rel kli 6a	Siemens	
(St 1	Stecker	GM 031/70	Haeberlein)	
(St 2	"	GM 031/70	")	
(St 3	"	GM 031/70	")	
(St 4	"	GM 031/70	")	
(Bu 13	Buchse	50 - 239)		
(Bu 14	"	50 - 239)		

St 6	Stecker	T 2630/1	Tuchel
(Bu 6	Buchse	T 2634/1	")

(J1 Instrument J Bv D/2192 Neuberger)

S 1	Schalter	H 324	Mayr
S 2	"	H 342	"

FS - MB



[...] = TYPE FS 2

Circuit M

			Type
R 1	47	Ω 1/4W	4.14
R 2	25	kΩ Ker.Pot.	7.43
R 3	10	kΩ Dr.-Pot.	6.42
R 4	10	kΩ Ker.Pot.	7.43
R 5	33	kΩ 1/4W	4.14
R 6	6,8	kΩ "	"
R 7	6,8	kΩ "	"
R 8	1,5	kΩ "	"
R 9	33	kΩ "	"
R 10	25	kΩ Ker.Pot.	7.43
R 11	15	kΩ 1/4W	4.14
R 12	1	kΩ "	"
R 13	1,5	kΩ "	"
R 14	1	kΩ "	"
R 15	10	kΩ Ker.Pot.	7.43
R 16	100	Ω 1/4W	4.14
R 17	330	Ω "	"
R 18	100	Ω "	"
R 19	33	kΩ "	"
R 20	6,8	kΩ "	"
R 21	22	kΩ "	"
R 22	100	Ω "	"
R 23	220	Ω "	"
R 24	100	Ω "	"
R 25	1,5 kΩ	[2,2 kΩ] "	"
R 26	100	Ω "	"
R 27	470	Ω "	"
R 28	2,2	kΩ "	"
R 29	4,7	kΩ "	"
R 30	22	kΩ "	"
R 31	100	Ω "	"
R 38	10	kΩ 1/4W	4.14
R 39	22	kΩ "	"
R 40	2,2	kΩ "	"
R 41	47	Ω "	"
R 42	220	Ω "	"
R 43	47	kΩ "	"
R 44	1	kΩ "	"
R 45	100	Ω "	"
R 46	100	Ω "	"
R 51	22	kΩ 1/4W	4.14
R 52	6,8	kΩ "	"
R 53	4,7	kΩ "	"
R 54	6,8	kΩ "	"
R 55	22	kΩ "	"
R 56	47	Ω "	"
R 57	2,2	kΩ "	"
R 58	33	kΩ "	"
R 59	22	kΩ "	"
R 60	10	kΩ "	"
R 61	470	Ω "	"
R 62	10	kΩ "	"

			Type
R 63	4,7	kΩ 1/4W	4.14
R 64	33	kΩ "	"
R 65	33	kΩ "	"
R 66	3,3	kΩ "	"
R 67	6,8	kΩ "	"
R 71	100	Ω 1/4W	4.14
R 72	2,2	kΩ "	"
R 73	6,8	kΩ "	"
R 74	22	kΩ "	"
R 75	470	Ω "	"
R 76	10	kΩ "	"
R 77	68	kΩ "	"
R 78	68	kΩ "	"
R 79	22	kΩ "	"
R 80	22	kΩ "	"
R 81	10	Ω "	"
R 82	10	kΩ "	"
(R 88	100	Ω 1/4W	4.14)
(R 89	150	Ω "	")

				Type
C 1	100 µF/15V	Elko		9.41
C 2	5	nF	Duko	9.32
C 3	5	nF	"	"
C 4	5	nF	"	"
C 5	0,1	µF	Scheibe	9.11
C 6	0,1	µF	"	"
C 7	25	pF	Trim.	11.41
C 8	4	pF	"	11.44
C 9	40	pF	Drehko	11.34
C 10	47	nF	Poly	10.21
C 11	1	µF	"	10.36
C 12	5 µF/15V	Elko		9.40
C 13	0,1	µF	Poly	10.31
C 14	10	nF	"	10.21
C 15	470	pF	Glim.	10.11
C 16	120	pF	Rohr	8.34
C 17	10	nF	Poly	10.21
C 18	10	nF	"	"
	[100	pF	Rohr	8.34]
C 19	120	pF	"	"
	[0	pF]		
C 20	22	pF	Rohr	8.33
C 21	0,1	µF	Scheibe	9.11

[...] = Type FS 2

				Type
C 33	5	nF	Duko	9.32
C 34	0,1	µF	Scheibe	9.11
C 35	33	pF	Rohr	8.34
C 36	5	nF	Duko	9.32
C 37	100 µF/15V		Elko	9.41
C 38	470	pF	Scheibe	9.4
C 39	470	pF	"	"
C 40	0,1	µF	"	9.11
C 41	470	pF	"	9.4
C 42	0,1	µF	"	9.11
C 43	470	pF	"	9.4
C 44	470	pF	"	"
C 45	56	pF	Rohr	8.34
C 46	0,5	pF	Scheibe	8.4
C 51	5	nF	Duko	9.32
C 52	56	pF	Rohr	8.34
C 53	0,5	pF	Scheibe	8.4
C 54	56	pF	Rohr	8.34
C 55	1	pF	Scheibe	8.4
C 56	68	pF	Rohr	8.34
C 57	330	pF	"	8.47
C 58	470	pF	Scheibe	9.4
C 59	4,7	nF	"	9.7
C 60	0,1	µF	"	9.11
C 61	68	pF	Rohr	8.34
C 62	330	pF	"	8.47
C 63	0,5	pF	Scheibe	8.4
C 64	120	pF	Rohr	8.34
C 65	120	pF	"	"
C 66	0,1	µF	Scheibe	9.11
C 67	5 µF/15V		Elko	9.40
C 68	5	nF	Duko	9.32
C 69	5 µF/15V		Elko	9.40
C 70	0,47	µF	Poly	10.35
C 71	5 µF/15V		Elko	9.40
C 72	5 µF/15V		"	"
C 81	5	nF	Duko	9.32
C 82	0,1	µF	Scheibe	9.11
C 83	1	nF	"	9.7
C 84	5	nF	Duko	9.32
C 85	0,1	µF	Scheibe	9.11
C 86	68	pF	Rohr	8.34
C 87	5	nF	Duko	9.32
C 88	5	nF	"	"
C 89	5	nF	"	"
C 90	47	nF	Poly	10.21
C 91	47	pF	Rohr	8.34
C 92	47	pF	"	"

				Type
L 1	Bv. 2.19		Schlumberger	
L 2	" 3.09		"	
L 7	" 2.04		"	
L 8	" 1.03		"	
L 9	" 2.05		"	
L 10	" 2.06		"	
L 11	" 2.06		"	
L 12	" 2.06		"	
L 13	" 3.01		"	
L 14	" 2.06		"	
L 15	" 2.07		"	
L 16	" 2.08		"	
L 101	VK 20010/3 B		Valvo	
L 102	"		"	
L 103	"		"	

Gr 1	Diode	OA95	Valvo
Gr 2	"	OA95	"
Gr 3	"	BA102 II	"
Gr 4	"	BA102 II	"
Gr 9	"	OA95	Valvo
Gr 10	"	OA95	"

Tr 1	Transistor	AF 121	
Tr 2	"	AF 121	
Tr 3	"	AF 121	
Tr 4	"	AF 121	
Tr 5	"	AF 121	
Tr 6	"	AF 121	
Tr 7	"	AF 121	
Tr 8	"	ASY 27	Valvo
Tr 9	"	ASY 27	"
Tr 10	"	AF 121	

(Bu 1	Buchse	T 2
Bu 2	"	T
Bu 3	"	CM
Bu 4	"	CM
Bu 5	"	CM
Bu 6	"	CM
Bu 7	"	CM
Bu 8	"	CM
St 1	Stecker	T 2
(St 2	"	T
(St 3	"	GM
(St 4	"	GM
(St 5	"	GM
(St 6	"	GM
(St 7	"	GM
(St 8	"	GM
(Bu 106	Buchse	CM
(Bu 206	"	CM
(St 106	Stecker	GM
(St 206	"	GM
(Bu 16	Buchse	SC
J 1	Instrumen	
S 1	Tastenschal	

10051 - rt -
herausrager
länge 40m

FS - Ⓑ

		Type	
	47 Ω	1/4 W	4.14
	25 kΩ	Ker Pot	7.43
	10 kΩ	Dr. Pot	6.42
	10 kΩ	Ker Pot	7.43
	33 kΩ	1/4 W	4.14
	6.8 kΩ	"	
	6.8 kΩ	"	
	1.5 kΩ	"	
	33 kΩ	"	
	25 kΩ	Ker Pot	7.43
	15 kΩ	1/4 W	4.14
	1 kΩ	"	
	1.5 kΩ	"	
	1 kΩ	"	
	10 kΩ	Ker Pot	7.43
100	Ω	1/4 W	4.14
330	Ω	"	"
100	Ω	"	"
33	kΩ	"	"
68	kΩ	"	"
22	kΩ	"	"
400	Ω	"	"
220	Ω	"	"
100	Ω	"	"
1,5 kΩ	[2,2 kΩ]	"	"
100	Ω	"	"
470	Ω	"	"
2,2	kΩ	"	"
4,7	kΩ	"	"
22	kΩ	"	"
100	Ω	"	"
10	kΩ	1/4 W	4.14
22	kΩ	"	"
2.2	kΩ	"	"
47	Ω	"	"
220	Ω	"	"
47	kΩ	"	"
1	kΩ	"	"
100	Ω	"	"
100	Ω	"	"
22	kΩ	1/4 W	4.14
6.8	kΩ	"	"
4.7	kΩ	"	"
6.8	kΩ	"	"
22	kΩ	"	"
47	Ω	"	"
2.2	kΩ	"	"
33	kΩ	"	"
22	kΩ	"	"
10	kΩ	"	"
470	Ω	"	"
10	kΩ	"	"

		Type	
R 63	4.7	kΩ	4W 4.14
R 64	33	kΩ	"
R 65	33	kΩ	"
R 66	3.3	kΩ	"
R 67	6.8	kΩ	"
R 71	100	Ω	1/4W 4.14
R 72	2.2	kΩ	" "
R 73	6.8	kΩ	" "
R 74	22	kΩ	" "
R 75	470	Ω	" "
R 76	10	kΩ	" "
R 77	68	kΩ	" "
R 78	68	kΩ	" "
R 79	22	kΩ	" "
R 80	22	kΩ	" "
R 81	10	Ω	" "
R 82	10	kΩ	" "
(R 88	100	Ω	1/4W 4.14)
(R 89	150	Ω	")

C 1	100 µF/15V	Elko	9.41	
C 2	5	nF	Duko	9.32
C 3	5	nF	"	"
C 4	5	nF	"	"
C 5	0,1	µF	Scheibe	9.11
C 6	0,1	µF	"	"
C 7	25	pF	Trim.	11.41
C 8	4	pF	"	11.44
C 9	40	pF	Drehko	11.34
C 10	47	nF	Poly	10.21
C 11	1	µF	"	10.36
C 12	5 µF/15V		Elko	9.40
C 13	0,1	µF	Poly	10.31
C 14	10	nF	"	10.21
C 15	470	pF	Glim.	10.11
C 16	120	pF	Rohr	8.34
C 17	10	nF	Poly	10.21
C 18	10	nF	"	"
	[100	pF	Rohr	8.34]
C 19	120	pF	"	"
	[0	pF]		
C 20	22	pF	Rohr	8.33
C 21	0,1	µF	Scheibe	9.11

[...] = Type FS 2

C 33	5	nF	Duko	9.32
C 34	0,1	µF	Scheibe	9.11
C 35	33	pF	Rohr	8.34
C 36	5	nF	Duko	9.32
C 37	100 µF/15V		Elko	9.41
C 38	470	pF	Scheibe	9.4
C 39	470	pF	"	"
C 40	0,1	µF	"	9.11
C 41	470	pF	"	9.4
C 42	0,1	µF	"	9.11
C 43	470	pF	"	9.4
C 44	470	pF	"	"
C 45	56	pF	Rohr	8.34
C 46	0,5	pF	Scheibe	8.4
C 51	5	nF	Duko	9.32
C 52	56	pF	Rohr	8.34
C 53	0,5	pF	Scheibe	8.4
C 54	56	pF	Rohr	8.34
C 55	1	pF	Scheibe	8.4
C 56	68	pF	Rohr	8.34
C 57	330	pF	"	8.47
C 58	470	pF	Scheibe	9.4
C 59	4,7	nF	"	9.7
C 60	0,1	µF	"	9.11
C 61	68	pF	Rohr	8.34
C 62	330	pF	"	8.47
C 63	0,5	pF	Scheibe	8.4
C 64	120	pF	Rohr	8.34
C 65	120	pF	"	"
C 66	0,1	µF	Scheibe	9.11
C 67	5 µF/15V		Elko	9.40
C 68	5	nF	Duko	9.32
C 69	5 µF/15V		Elko	9.40
C 70	0,47	µF	Poly	10.35
C 71	5 µF/15V		Elko	9.40
C 72	5 µF/15V	"	"	
C 81	5	nF	Duko	9.32
C 82	0,1	µF	Scheibe	9.11
C 83	1	nF	"	9.7
C 84	5	nF	Duko	9.32
C 85	0,1	µF	Scheibe	9.11
C 86	68	pF	Rohr	8.34
C 87	5	nF	Duko	9.32
C 88	5	nF	"	"
C 89	5	nF	"	"
C 90	47	nF	Poly	10.21
C 91	47	pF	Rohr	8.34
C 92	47	pF	"	"

L 1	Bv 2.19		Schlumberger
L 2	" 3.09		"
L 7	" 2.04		"
L 8	" 1.03		"
L 9	" 2.05		"
L 10	" 2.06		"
L 11	" 2.06		"
L 12	" 2.06		"
L 13	" 3.01		"
L 14	" 2.06		"
L 15	" 2.07		"
L 16	" 2.08		"
L 101	1/K 20010/3 B		Valvo
L 102	"		"
L 103	"		"
Gr 1	Diode	OA 95	Valvo
Gr 2	"	OA 95	"
Gr 3	"	BA 102 II	"
Gr 4	"	BA 102 II	"
Gr 9	"	OA 95	Valvo
Gr 10	"	OA 95	"
Tr 1	Transistor	AF 121	
Tr 2	"	AF 121	
Tr 3	"	AF 121	
Tr 4	"	AF 121	
Tr 5	"	AF 121	
Tr 6	"	AF 121	
Tr 7	"	AF 121	
Tr 8	"	ASY 27	Valvo
Tr 9	"	ASY 27	"
Tr 10	"	AF 121	

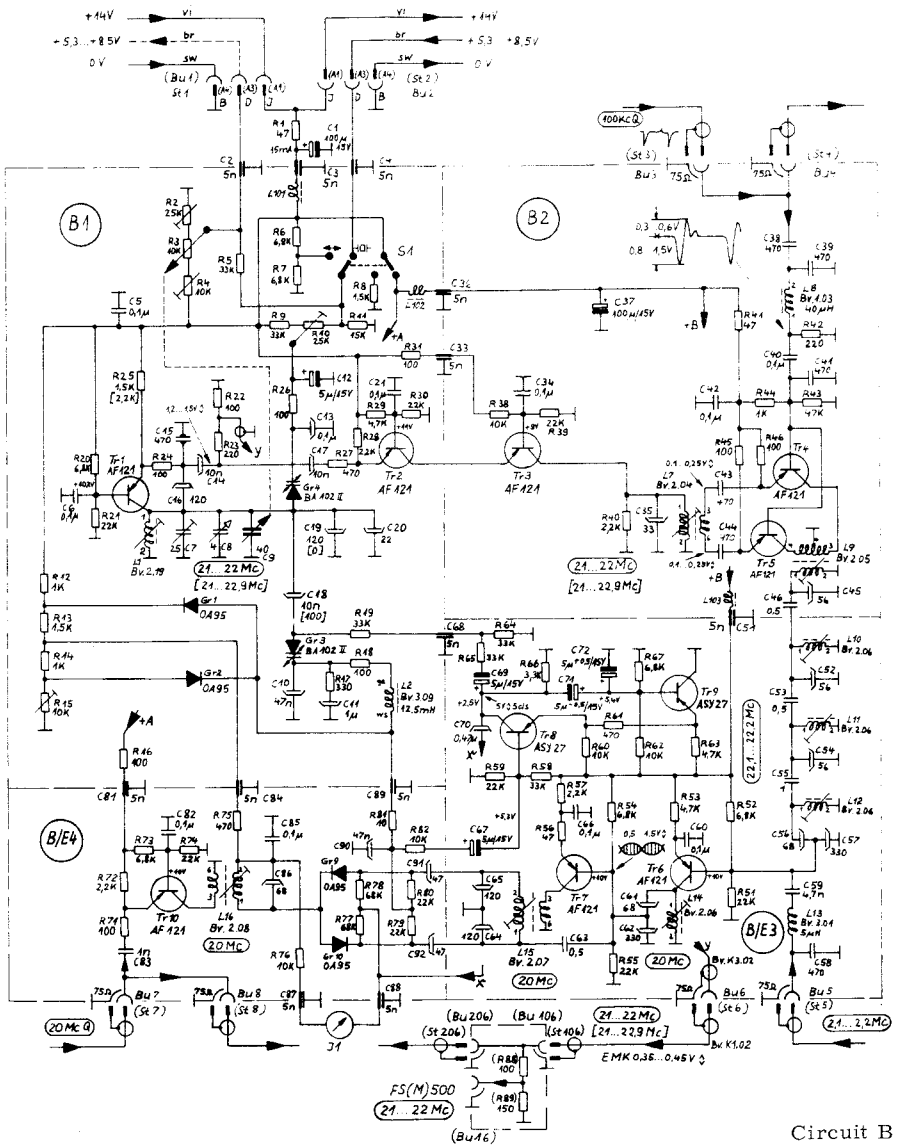
(Bu 1	Buchse	T 2634/1	Tuchel)
Bu 2	"	T 2634/1	"
Bu 3	"	CM 031/70	Haeberlein
Bu 4	"	CM 031/70	"
Bu 5	"	CM 031/70	"
Bu 6	"	CM 031/70	"
Bu 7	"	CM 031/70	"
Bu 8	"	CM 031/70	"
St 1	Stecker	T 2630/1	Tuchel
(St 2	"	T 2630/1	")
(St 3	"	GM 031/70	Haeberlein)
(St 4	"	GM 031/70	")
(St 5	"	GM 031/70	")
(St 6	"	GM 031/70	")
(St 7	"	GM 031/70	")
(St 8	"	GM 031/70	")
(Bu 106	Buchse	CM 031/70	Haeberlein)
(Bu 206	"	CM 031/70	")
(St 106	Stecker	GM 031/70	")
(St 206	"	GM 031/70	")

(Bu 16 Buchse SO - 2.39)

J 1 Instrument Type 663 Bertram

S 1 Tastenschalter
10051 - rt - F 12 (-) 21
herausragende Knopf-
länge 40mm Sasse

FS - Ⓑ



Circuit B

			Type
R 1	47	Ω	1/4 W 4.14
R 2	25	kΩ	Ker.Pot. 7.43
R 3	10	kΩ	Dr.-Pot. 6.42
R 4	10	kΩ	Ker.Pot. 7.43
R 5	33	kΩ	1/4W 4.14
R 6	6,8	kΩ	" "
R 7	6,8	kΩ	" "
R 8	1,5	kΩ	" "
R 9	33	kΩ	" "
R 10	25	kΩ	Ker.Pot. 7.43
R 11	15	kΩ	1/4W 4.14
R 12	1	kΩ	" "
R 13	1,5	kΩ	" "
R 14	1	kΩ	" "
R 15	10	kΩ	Ker.Pot. 7.43
R 16	100	Ω	1/4W 4.14
R 17	330	Ω	" "
R 18	100	Ω	" "
R 19	33	kΩ	" "
R 20	6,8	kΩ	" "
R 21	22	kΩ	" "
R 22	100	Ω	" "
R 23	330	Ω	" "
R 24	330	Ω	" "
R 25	4,7	kΩ	" "
R 26	100	Ω	" "
R 27	100	kΩ	" "
R 28	100	kΩ	" "
R 36	6,8	kΩ	1/4W 4.14
R 37	22	kΩ	" "
R 38	2,2	kΩ	" "
R 39	68	kΩ	" "
R 40	68	kΩ	" "
R 41	47	Ω	" "
R 42	220	Ω	" "
R 43	47	kΩ	" "
R 44	1	kΩ	" "
R 45	100	Ω	" "
R 46	100	Ω	" "
R 51	22	kΩ	1/4 W 4.14
R 52	6,8	kΩ	" "
R 53	4,7	kΩ	" "
R 54	6,8	kΩ	" "
R 55	22	kΩ	" "
R 56	47	Ω	" "
R 57	2,2	kΩ	" "
R 58	33	kΩ	" "
R 59	22	kΩ	" "
R 60	10	kΩ	" "
R 61	470	Ω	" "
R 62	10	kΩ	" "

			Type
R 63	4,7	kΩ	1/4W 4.14
R 64	33	kΩ	" "
R 65	33	kΩ	" "
R 66	3,3	kΩ	" "
R 67	6,8	kΩ	" "
R 71	100	Ω	1/4W 4.14
R 72	2,2	kΩ	" "
R 73	6,8	kΩ	" "
R 74	22	kΩ	" "
R 75	470	Ω	" "
R 76	10	kΩ	" "
R 77	68	kΩ	" "
R 78	68	kΩ	" "
R 79	22	kΩ	" "
R 80	22	kΩ	" "
R 81	10	Ω	" "
R 82	10	kΩ	" "

				Type
C 1	100µF/15V	Elko		9.41
C 2	5	nF	Duko	9.32
C 3	5	nF	"	"
C 4	5	nF	"	"
C 5	0,1	µF	Scheibe	9.11
C 6	0,1	µF	"	"
C 7	25	pF	Trim.	11.41
C 8	4	pF	"	11.44
C 9	40	pF	Drehko	11.34
C 10	47	nF	Poly	10.21
C 11	1	µF	"	10.36
C 12	5µF/15V	Elko		9.40
C 13	0,1	µF	Poly	10.31
C 14	10	nF	"	10.21
C 15	2,7	nF	Glim.	10.11
C 16	120	pF	Rohr	8.34
C 17	150	pF	"	8.34
C 18	10	nF	Poly	10.21
C 19	220	pF	Scheibe	9.4
C 20	220	pF	"	"
C 21	56	pF	Rohr	8.34
C 22	4,7	pF	Scheibe	8.7
C 23	56	pF	Rohr	8.34
C 25	3,3	pF	Scheibe	8.7
C 26	0,1	µF	"	9.11
C 27	0,1	µF	"	"
C 28	0,5	pF	"	8.4

				Type
C 29	27	pF	Rohr	8.34
C 30	220	pF	Scheibe	9.4
C 31	27	pF	Rohr	8.34
C 32	220	pF	Scheibe	9.4
C 33	33	pF	Rohr	8.34
C 34	2,7	pF	Scheibe	8.7
C 35	33	pF	Rohr	8.34
C 36	5	nF	Duko	9.32
C 37	100µF/15V	Elko		9.41
C 38	470	pF	Scheibe	9.4
C 39	470	pF	"	"
C 40	0,1	µF	"	9.11
C 41	470	pF	"	9.4
C 42	0,1	µF	"	9.11
C 43	470	pF	"	9.4
C 44	470	pF	"	"
C 45	56	pF	Rohr	8.34
C 46	0,5	pF	Scheibe	8.4
C 51	5	nF	Duko	9.32
C 52	56	pF	Rohr	8.34
C 53	0,5	pF	Scheibe	8.4
C 54	56	pF	Rohr	8.34
C 55	1	pF	Scheibe	8.4
C 56	68	pF	Rohr	8.34
C 57	330	pF	"	8.47
C 58	470	pF	Scheibe	9.4
C 59	4,7	nF	"	9.7
C 60	0,1	µF	"	9.11
C 61	68	pF	Rohr	8.34
C 62	330	pF	"	8.47
C 63	0,5	pF	Scheibe	8.4
C 64	120	pF	Rohr	8.34
C 65	120	pF	"	"
C 66	0,1	µF	Scheibe	9.11
C 67	5µF/15V	Elko		9.40
C 68	5	nF	Duko	9.32
C 69	5µF/15V	Elko		9.40
C 70	0,47µF	Poly		10.35
C 71	5µF/15V	Elko		9.40
C 72	5µF/15V	"		"
C 81	5	nF	Duko	9.32
C 82	0,1	µF	Scheibe	9.11
C 83	1	nF	"	9.7
C 84	5	nF	Duko	9.32
C 85	0,1	µF	Scheibe	9.11
C 86	68	pF	Rohr	8.34
C 87	5	nF	Duko	9.32
C 88	5	nF	"	"
C 89	5	nF	"	"
C 90	47	nF	Poly	10.21
C 91	47	pF	Rohr	8.34
C 92	47	pF	"	"

L 1	Bv. 1.06	Schlumberger	
L 2	" 3.09	"	
L 3	" 2.01	"	
L 4	" 2.02	"	
L 5	" 1.02	"	
L 6	" 2.03	"	
L 7	" 2.04	"	
L 8	" 1.03	"	
L 9	" 2.05	"	
L 10	" 2.06	"	
L 11	" 2.06	"	
L 12	" 2.06	"	
L 13	" 3.01	"	
L 14	" 2.06	"	
L 15	" 2.07	"	
L 16	" 2.08	"	
L 101	Vk 20010/3B	Valvo	
L 102	"	"	
L 103	"	"	

Gr 1	Diode	OA 95	Valvo
Gr 2	"	OA 95	"
Gr 3	"	BA 102 II	"
Gr 4	"	BA 102 II	"
Gr 5	"	1N 914	
Gr 6	"	1N 914	
Gr 7	"	OA 95	Valvo
Gr 8	"	OA 95	"
Gr 9	"	OA 95	"
Gr 10	"	OA 95	"

Tr 1 Transistor AF 121

Tr 3	"	AF 121	
Tr 4	"	AF 121	
Tr 5	"	AF 121	
Tr 6	"	AF 121	
Tr 7	"	AF 121	
Tr 8	"	ASY 27	Valvo
Tr 9	"	ASY 27	"
Tr 10	"	AF 121	

(Bu 1 Buchse
Bu 2 "
Bu 3 "
Bu 4 "
Bu 5 "
Bu 6 "
Bu 7 "
Bu 8 "
St 1 Stecker
(St 2 "
(St 3 "
(St 4 "
(St 5 "
(St 6 "
(St 7 "
(St 8 "

J 1 Instrum

S 1 Tastens
10051 -
heraus
länge

FS - (B

				Type
1	47	Ω	1/4 W	4.14
2	25	kΩ	Ker Pot	7.43
3	10	kΩ	Dr Pot	6.42
4	10	kΩ	Ker Pot	7.43
5	33	kΩ	1/4 W	4.14
6	6.8	kΩ	"	
7	6.8	kΩ	"	
8	1.5	kΩ	"	"
9	33	kΩ	"	"
0	25	kΩ	Ker Pot	7.43
1	15	kΩ	1/4 W	4.14
2	1	kΩ	"	"
3	1.5	kΩ	"	"
4	1	kΩ	"	"
5	10	kΩ	Ker Pot	7.43
6	100	Ω	1/4 W	4.14
7	330	Ω	"	"
8	100	Ω	"	"
9	33	kΩ	"	"
0	6.8	kΩ	"	"
1	22	kΩ	"	"
2	100	Ω	"	"
3	330	Ω	"	"
4	330	Ω	"	"
5	47	kΩ	"	"
6	100	Ω	"	"
7	100	kΩ	"	"
8	100	kΩ	"	"
6	6.8	kΩ	1/4 W	4.14
7	22	kΩ	"	"
8	2.2	kΩ	"	"
9	68	kΩ	"	"
0	68	kΩ	"	"
1	47	Ω	"	"
2	220	Ω	"	"
3	47	kΩ	"	"
4	1	kΩ	"	"
5	100	Ω	"	"
6	100	Ω	"	"
1	22	kΩ	1/4 W	4.14
2	6,8	kΩ	"	"
3	4.7	kΩ	"	"
4	6,8	kΩ	"	"
5	22	kΩ	"	"
6	47	Ω	"	"
7	2,2	kΩ	"	"
8	33	kΩ	"	"
9	22	kΩ	"	"
0	10	kΩ	"	"
1	470	Ω	"	"
2	10	kΩ	"	"

				Type
R 63	47	kΩ	1/4 W	4.14
R 64	33	kΩ	"	
R 65	33	kΩ	"	
R 66	33	kΩ	"	
R 67	6.8	kΩ	"	
R 71	100	Ω	1/4 W	4.14
R 72	2.2	kΩ	"	"
R 73	6.8	kΩ	"	"
R 74	22	kΩ	"	"
R 75	470	Ω	"	"
R 76	10	kΩ	"	"
R 77	68	kΩ	"	"
R 78	68	kΩ	"	"
R 79	22	kΩ	"	"
R 80	22	kΩ	"	"
R 81	10	Ω	"	"
R 82	10	kΩ	"	"
C 1	100µF/15V	Elko		9.41
C 2	5	nF	Duko	9.32
C 3	5	nF	"	"
C 4	5	nF	"	"
C 5	0.1	µF	Scheibe	9.11
C 6	0,1	µF	"	"
C 7	25	pF	Trim.	11.41
C 8	4	pF	"	11.44
C 9	40	pF	Drehko	11.34
C 10	47	nF	Poly	10.21
C 11	1	µF	"	10.36
C 12	5µF/15V	Elko		9.40
C 13	0,1	µF	Poly	10.31
C 14	10	nF	"	10.21
C 15	2,7	nF	Glim.	10.11
C 16	120	pF	Rohr	8.34
C 17	150	pF	"	8.34
C 18	10	nF	Poly	10.21
C 19	220	pF	Scheibe	9.4
C 20	220	pF	"	"
C 21	56	pF	Rohr	8.34
C 22	4,7	pF	Scheibe	8.7
C 23	56	pF	Rohr	8.34
C 25	3.3	pF	Scheibe	8.7
C 26	0,1	µF	"	9.11
C 27	0,1	µF	"	"
C 28	0,5	pF	"	8.4

				Type
C 29	27	pF	Rohr	8.34
C 30	220	pF	Scheibe	9.4
C 31	27	pF	Rohr	8.34
C 32	220	pF	Scheibe	9.4
C 33	33	pF	Rohr	8.34
C 34	2,7	pF	Scheibe	8.7
C 35	33	pF	Rohr	8.34
C 36	5	nF	Duko	9.32
C 37	100µF/15V	Elko		9.41
C 38	470	pF	Scheibe	9.4
C 39	470	pF	"	"
C 40	0,1	µF	"	9.11
C 41	470	pF	"	9.4
C 42	0,1	µF	"	9.11
C 43	470	pF	"	9.4
C 44	470	pF	"	"
C 45	56	pF	Rohr	8.34
C 46	0,5	pF	Scheibe	8.4
C 51	5	nF	Duko	9.32
C 52	56	pF	Rohr	8.34
C 53	0,5	pF	Scheibe	8.4
C 54	56	pF	Rohr	8.34
C 55	1	pF	Scheibe	8.4
C 56	68	pF	Rohr	8.34
C 57	330	pF	"	8.47
C 58	470	pF	Scheibe	9.4
C 59	4,7	nF	"	9.7
C 60	0,1	µF	"	9.11
C 61	68	pF	Rohr	8.34
C 62	330	pF	"	8.47
C 63	0,5	pF	Scheibe	8.4
C 64	120	pF	Rohr	8.34
C 65	120	pF	"	"
C 66	0,1	µF	Scheibe	9.11
C 67	5µF/15V	Elko		9.40
C 68	5	nF	Duko	9.32
C 69	5µF/15V	Elko		9.40
C 70	0,47µF	Poly		10.35
C 71	5µF/15V	Elko		9.40
C 72	5µF/15V	"		"
C 81	5	nF	Duko	9.32
C 82	0,1	µF	Scheibe	9.11
C 83	1	nF	"	9.7
C 84	5	nF	Duko	9.32
C 85	0,1	µF	Scheibe	9.11
C 86	68	pF	Rohr	8.34
C 87	5	nF	Duko	9.32
C 88	5	nF	"	"
C 89	5	nF	"	"
C 90	47	nF	Poly	10.21
C 91	47	pF	Rohr	8.34
C 92	47	pF	"	"

L 1	Bv 1.06	Schlumberger	
L 2	" 3.09	"	
L 3	" 2.01	"	
L 4	" 2.02	"	
L 5	" 1.02	"	
L 6	" 2.03	"	
L 7	" 2.04	"	
L 8	" 1.03	"	
L 9	" 2.05	"	
L 10	" 2.06	"	
L 11	" 2.06	"	
L 12	" 2.06	"	
L 13	" 3.01	"	
L 14	" 2.06	"	
L 15	" 2.07	"	
L 16	" 2.08	"	
L 101	VK 20040/38	Valvo	
L 102	"	"	
L 103	"	"	

Gr 1	Diode	OA 95	Valvo
Gr 2	"	OA 95	"
Gr 3	"	BA 102 II	"
Gr 4	"	BA 102 II	"
Gr 5	"	1N 914	
Gr 6	"	1N 914	
Gr 7	"	OA 95	Valvo
Gr 8	"	OA 95	"
Gr 9	"	OA 95	"
Gr 10	"	OA 95	"

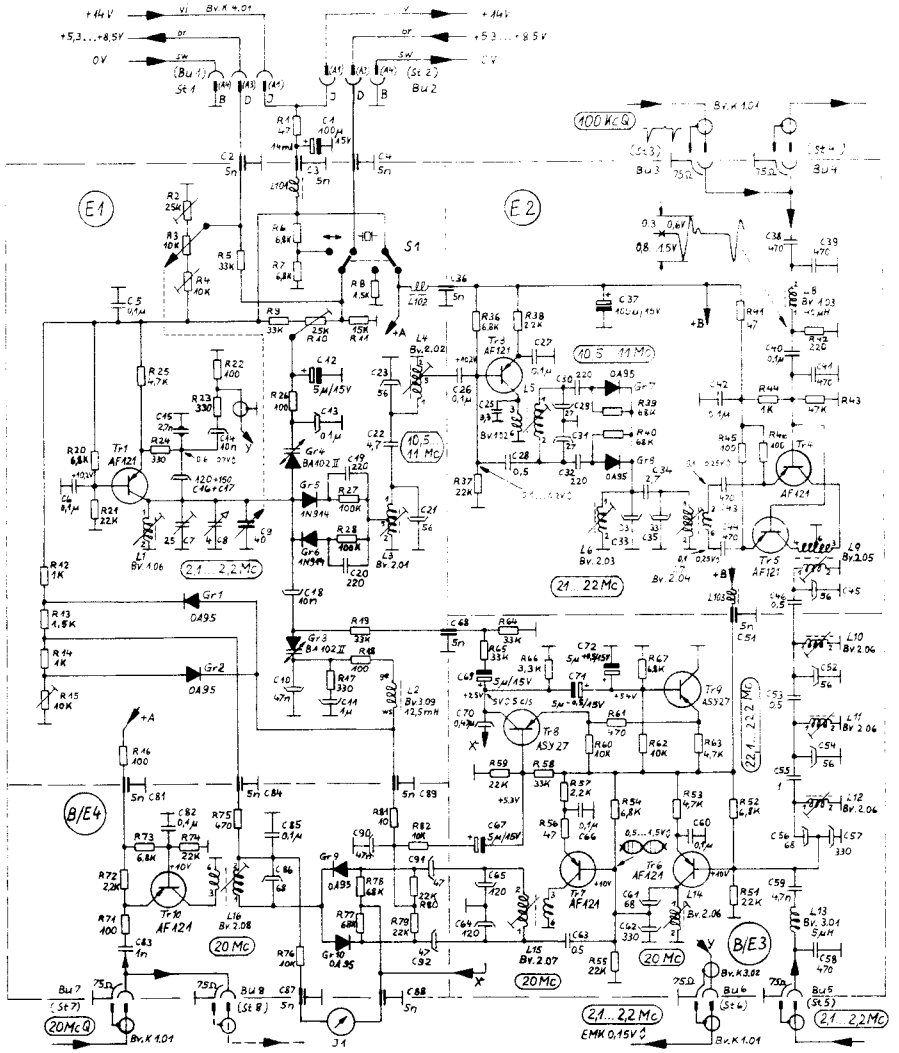
Tr 1	Transistor	AF 121	
Tr 3	"	AF 121	
Tr 4	"	AF 121	
Tr 5	"	AF 121	
Tr 6	"	AF 121	
Tr 7	"	AF 121	
Tr 8	"	ASY 27	Valvo
Tr 9	"	ASY 27	"
Tr 10	"	AF 121	

(Bu 1	Buchse	T 2631/1	Tuchel	)
Bu 2	"	T 2634/1	"	
Bu 3	"	CM 031/70	Haeberlein	
Bu 4	"	CM 031/70	"	
Bu 5	"	CM 031/70	"	
Bu 6	"	CM 031/70	"	
Bu 7	"	CM 031/70	"	
Bu 8	"	CM 031/70	"	
St 1	Stecker	T 2630/1	Tuchel	
(St 2	"	T 2630/1	"	)
(St 3	"	GM 031/70	Haeberlein	
(St 4	"	GM 031/70	"	)
(St 5	"	GM 031/70	"	)
(St 6	"	GM 031/70	"	)
(St 7	"	GM 031/70	"	)
(St 8	"	GM 031/70	"	)

J 1 Instrument Type 663 Bertram

S 1 Tastenschalter
10051 - rt - F 12 (-) 21
herausragende Knopf-
länge 40 mm Sasse

FS-(E)



Circuit E

			Type
R 1	10 kΩ	Ker. Pot.	7.43
R 2	10 kΩ	Dr. Pot.	6.42
R 3	25 kΩ	Ker. Pot	7.43
R 4	10 kΩ	1/4 W	4.44
R 5	10 kΩ	"	"
R 6	6,8 kΩ	"	"
R 7	22 kΩ	"	"
R 8	6,8 kΩ	"	"
R 9	470 Ω	"	"
R 10	470 Ω	"	"
R 11	150 Ω	"	"
R 12	470 Ω	"	"
R 13	2,2 kΩ	"	"
R 14	4,7 kΩ	"	"
R 15	22 kΩ	"	"
R 16	100 Ω	"	"

				Type
C 1	5 nF	Duko		9.32
C 2	5 nF	"		"
C 3	0,1 µF	Scheibe		9.11
C 4	0,1 µF	"		"
C 5	150 pF	Rohr		8.34
C 6	180 pF	"		"
C 7	25 pF	Trimm.		11.41
C 8	4 pF	"		11.44
C 9	40 pF	Drehko		11.34
C 10	2,7 nF	Glim.		10.11
C 11	10 nF	Poly		10.21
C 12	10 nF	"		"
C 13	0,1 µF	Scheibe		9.11

L 1	Bv 1.06	Schlumberger		
L 2	Bv 1.04	"		
L 3	Bv 1.04	"		
L 4	Bv 1.05	"		
L 101	VK 20040/3B	VALVO		
L 102	"	"		
L 103	"	"		
L 104	"	"		
Gr 1	Diode	1N944		
Gr 2	"	OA95	VALVO	
Gr 3	"	OA95	"	
Gr 4	"	OA95	"	
Gr 5	"	OA95	"	

R 21	10 kΩ	1/4 W	4.44
R 22	100 Ω	"	"
R 23	2,2 kΩ	"	"
R 24	220 Ω	"	"
R 25	22 kΩ	"	"
R 26	4,7 kΩ	"	"
R 27	10 kΩ	"	"
R 28	22 kΩ	"	"
R 29	3,3 kΩ	"	"
R 30	22 kΩ	"	"
R 31	10 kΩ	"	"
R 32	1 MΩ	"	"
R 33	22 kΩ	"	"
R 34	4,7 kΩ	"	"
R 35	10 kΩ	"	"
R 36	10 kΩ	"	"

				Type
C 21	5 nF	Duko		9.32
C 22	220 pF	Scheibe		9.4
C 23	180 pF	Rohr		8.34
C 24	0,1 µF	Scheibe		9.11
C 25	0,1 µF	"		"
C 26	0,1 µF	"		"
C 27	0,1 µF	"		"
C 28	470 pF	"		9.4
C 29	0,1 µF	"		9.11
C 30	0,1 µF	"		"
C 31	100 µF/15V	Elko		9.41
C 32	0,1 µF	Scheibe		9.11

Tr 1	Transistor	AF 121
Tr 2	"	AF 121
Tr 3	"	AF 121
Tr 4	"	AF 121
Tr 5	"	AF 121
Tr 6	"	ASY 27 VALVO
Tr 7	"	AF 121

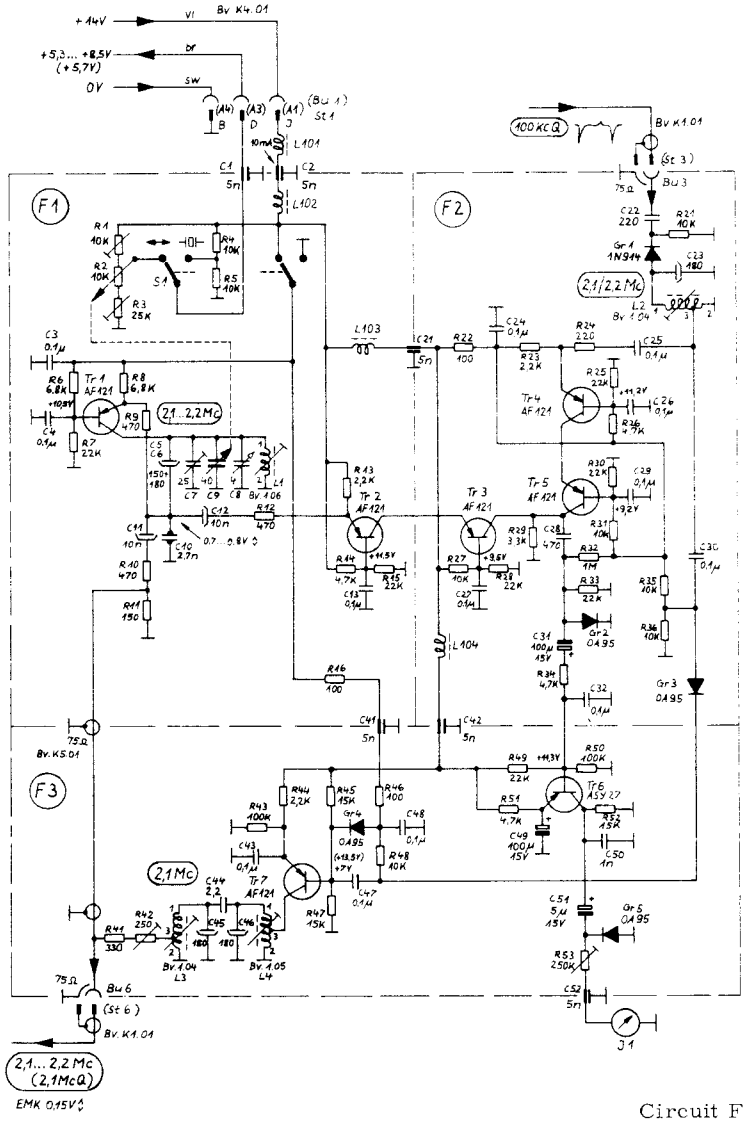
R 41	330 Ω	1/4 W	4.44
R 42	250 Ω	Ker. Pot.	7.43
R 43	100 kΩ	1/4 W	4.44
R 44	2,2 kΩ	"	"
R 45	15 kΩ	"	"
R 46	100 Ω	"	"
R 47	15 kΩ	"	"
R 48	10 kΩ	"	"
R 49	22 kΩ	"	"
R 50	100 kΩ	"	"
R 51	4,7 kΩ	"	"
R 52	15 kΩ	"	"
R 53	250 kΩ	Ker. Pot	7.43

				Type
C 41	5 nF	Duko		9.32
C 42	5 nF	"		"
C 43	0,1 µF	Scheibe		9.11
C 44	2,2 pF	"		8.7
C 45	180 pF	Rohr		8.34
C 46	180 pF	"		"
C 47	0,1 µF	Scheibe		9.11
C 48	0,1 µF	"		"
C 49	100 µF/15V	Elko		9.41
C 50	1 nF	Scheibe		9.7
C 51	5 µF/15V	Elko		9.40
C 52	5 nF	Duko		9.32

Bu 3	Buchse	GM031/70	Haeberlein
Bu 6	"	GM031/70	"
(St 3	Stecker	GM031/70	")
(St 6	"	GM031/70	")
St 1	Stecker	T2630/1	Tuchel
(Bu 1	Buchse	T2631/1	")
J 1	Instrument	Type 664	Bertram

S 1 Tastenschalter
10051 - rt - F42 (-) 21
herausragende Knopflänge 40 mm. Sasse

FS-Ⓕ



Circuit F

			Type
R 1	100 kΩ	1/4 W	4.14
R 2	2,2 kΩ	"	"
R 3	10 Ω	8 W	6.21
R 4	560 Ω	1/2 W	5.4
R 5	33 kΩ	1/4 W	4.14
R 6	10 kΩ	"	"
R 7	100 Ω	"	"
R 8	4,7 kΩ	"	"
R 9	10 kΩ	"	"
R 10	2,5 kΩ	Ker. Pot.	7.43
R 11	2,2 kΩ	1/4 W	4.14
R 12	5 Ω	8 W	6.21
R 13	180 Ω	1/2 W	5.4
R 14	2,2 kΩ	1/4 W	4.14
R 15	68 Ω	"	"
R 16	25 kΩ	Ker. Pot.	7.43
R 17	33 kΩ	1/4 W	4.14
R 18	1 kΩ	"	"
R 19	33 kΩ	"	"
R 20	6,8 kΩ	"	"
R 21	4,7 kΩ	"	"
R 22	6,8 kΩ	"	"
R 23	2,5 kΩ	Ker. Pot.	7.43
R 24	12 kΩ	1/4 W	4.14
R 25	0,05 Ω	Schlumberger	
R 26	3,3 kΩ	1/4 W	4.14
R 27	3,3 kΩ	"	"
R 28	(3,3 kΩ)	"	"

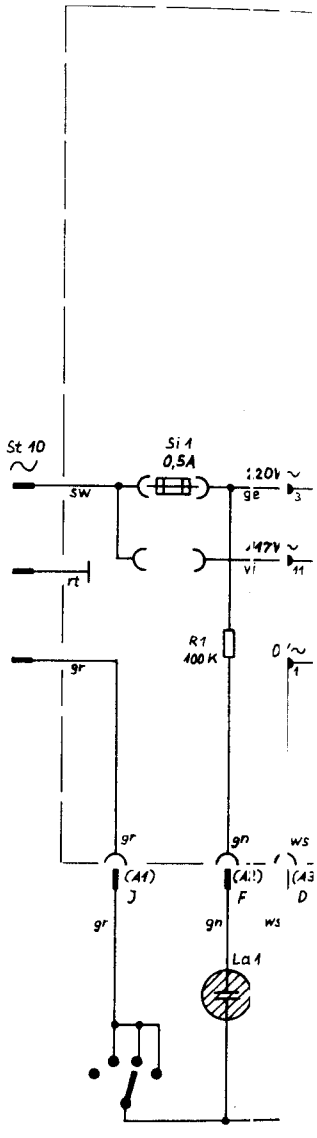
			Type
C 1	500 µF/70V	Elko	9.44
C 2	0,47 µF	Poly	10.35
C 3	100 µF/15V	Elko	9.41
C 4	100 µF/15V	Elko	"

				Type
Gr 1	Gleichr.	SiG 1/100		SEL
Gr 2	"	"		"
Gr 3	"	"		"
Gr 4	"	"		"
Gr 5	Diode	ZF 3,3		Intermetall
Gr 6	"	ZF 5,6		"
Gr 7	"	ZF 3,3		"
Gr 8	"	ZF 5,6		"

				Type
Tr 1	Transistor	(OC 29)	ASZ16	Valvo
Tr 2	"		ASY 77	"
Tr 3	"		ASY 27	"
Tr 4	"		(OC 29)	ASZ16 "
Tr 5	"		ASY 77	"
Tr 6	"		BCY 33	"
Tr 7	"		BCY 33	"
Tr 8	"		BCY 33	"
Tr 9	"		BCY 33	"

			Type
R 41	5 Ω	8 W	6.21
R 42	82 Ω	1/2 W	5.4
R 43	5 Ω	8 W	6.21
R 44	390 Ω	1/2 W	5.4
R 45	33 kΩ	1/4 W	4.14
R 46	10 kΩ	"	"
R 47	1 kΩ	Ker. Pot.	7.43
R 48	470 Ω	1/4 W	4.14
R 49	10 kΩ	"	"
R 50	100 Ω	"	"
R 51	100 Ω	"	"
R 52	4,7 kΩ	"	"
R 53	10 kΩ	"	"
R 54	2,5 kΩ	Ker. Pot.	7.43
R 55	2,2 kΩ	1/4 W	4.14
R 56	25 kΩ	Ker. Pot.	7.43
R 57	2,2 kΩ	1/4 W	4.14
R 58	4,7 kΩ	"	"
R 59	2,5 kΩ	Ker. Pot.	7.43
R 60	6,8 kΩ	1/4 W	4.14
R 61	3,3 kΩ	"	"
R 62	330 Ω	"	"
R 63	390 Ω	1/2 W	5.4
R 64	560 Ω	"	"

C 6	100 µF/15V	Elko		9.41
Gr 11	Diode	ZF 5,6		Intermetall
Gr 12	Gleichr.	SiG 1/100		SEL
Gr 13	"	"		"
Tr 11	Transistor	(OC 29)	ASZ16	Valvo
Tr 12	"		ASY 77	"
Tr 13	"		ASY 27	"
Tr 14	"		ASY 27	"
Tr 15	"		ASY 77	"



Bu 1	Buchse	T 2631/1	Tuchel
St 2	Stecker	T 2630/1	Tuchel
St 10	Schuko - Stecker		
Si 1	0,5 A/ 250V	DIN 41571	5x20 mm
Si 2	1 A/ 250V		"
T 1	Bv. FS-T1		Schlumberger

Bu 2	Buchse	T 2631/1	Tuchel
(Bu 2a	"	"	")

Rls 1	Relais	Trls 154c;	TBv65419/93d Siemens
Rls 2	"	"	" "

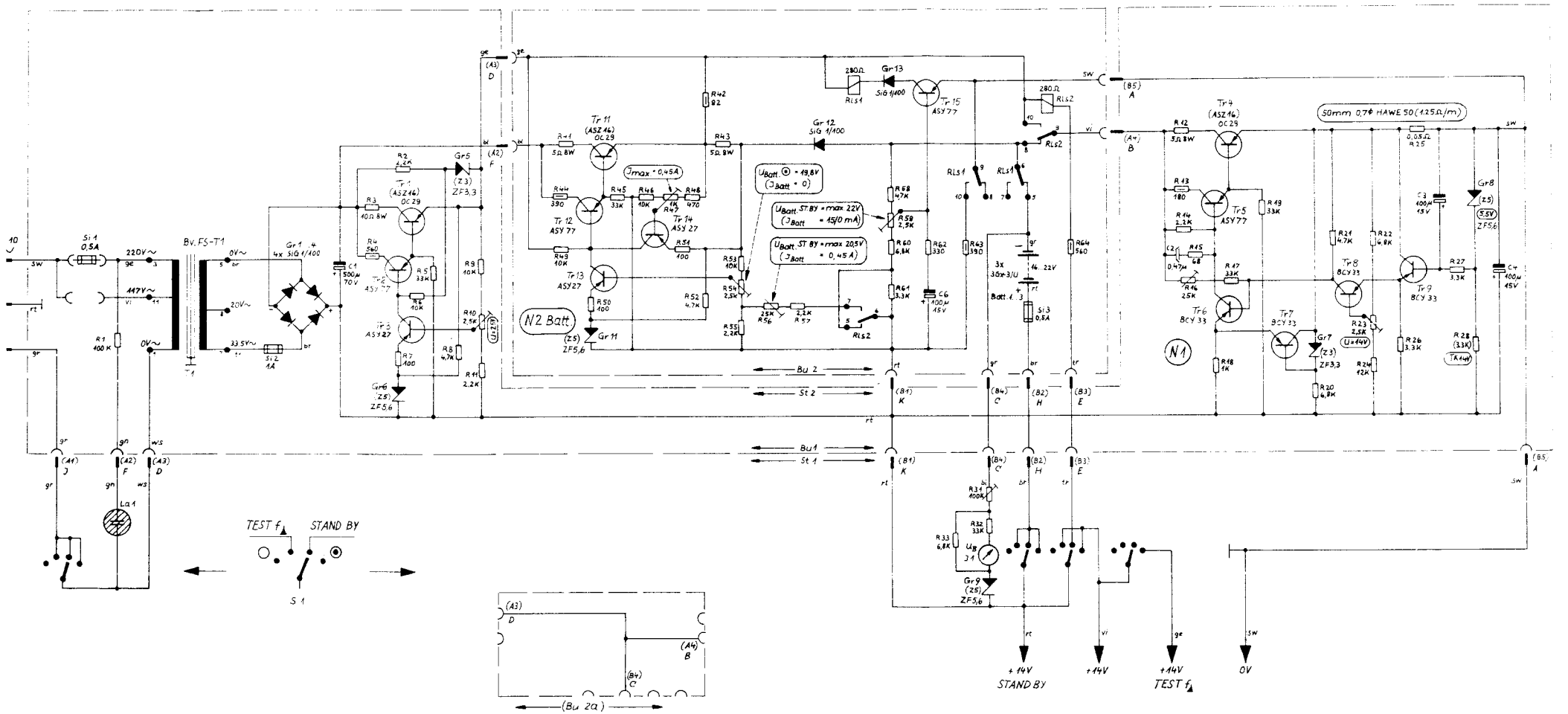
Si 3	0,5 A/250V	DIN 41571	5 x 20 mm

Batt. 1	Dryfit-Batt.	3Gr 3/U	Sonnenschein
Batt. 2	"	"	"
Batt. 3	"	"	"

R 31	100 kΩ	Ker. Pot.	7.43
R 32	33 kΩ	1/4 W	4.14
R 33	6,8 kΩ	"	"

Gr 9	Diode	ZF 5,6	Intermetall
St 1	Stecker	T 2630/1	Tuchel
J 1	Instrument	Type 664	Bertram
S 1	Drehschalter	H 344	Mayr
La 1	Glimmlampe	MRZ 13-03, E10	Vakuumtechnik

FS- (N)



Circuit N
INVALID

Type			
2.44	Schichtwiderstand	AP 1/4 ± 1% „N" axial	Electronic
4.2	"	Rmx 1 Kl. 0,5 ± 1% 0,1 W	Resista
4.14	"	Rsx 3 Kl. 2 ± 2% Nr. 033-0300 SCD 0,5 Kl. 2 ± 2% LCA 0,25 Kl. 2 ± 2%	Resista Rosenthal "
5.4	"	SCD 1 Kl. 2 ± 2%	Rosenthal
6.21	Drahtwiderstand	GWD 8 ± 5%	"
6.42	Draht - Potentiometer	Multiohm 2,5 lin. Nr. 2-3446	Preh
7.4	Schicht - Potentiometer	63 L lin. Nr. 230-3	Dralowid
7.43	Trimm - Potentiometer, keramisch	59 Tr - K lin. Nr. 285	"
8.4	Keramischer Scheiben-Kondensator	P100/IB Sb 500V- ± 0,1 pF	Stettner
8.7	" " "	N033/IB " " "	"
8.13	" " "	" " " ± 0,25 pF	"
8.18	" " "	NP0/IB CEP 2A 10 x 10 ± 5%	Dralowid
8.30	" Rohr - Kondensator	N033/IB Rd 500V- ± 5%	Rosenthal
8.33	" " "	" " " ± 2,5 %	"
8.34	" " "	" " " ± 2 %	"
8.45	" " "	N470/IB " "	"
8.47	" " "	N750/IB " "	"
9.4	" Scheiben - Kondensator	R 2000 Sa/U " ± 10 %	"
9.7	" " "	R 4000 " " -20 + 50 %	"
9.11	" " "	GSY 715 30V-	Resista
9.28	" Durchführungs-Kondensator	N750 Dgd 500V- ± 5%	Rosenthal
9.32	" " "	B 3748 - A 5502 - R 000	Siemens
9.35	UKW Durchführungsfilter	B 85313 - A - C1	"
9.40	Elektrolyt - Kondensator	B 41951 - A 4505 - S	"
9.41	" "	B 41931 - A 4107 - S	"
9.44	" "	B 41711 - B 8507 - S EHL 500/70	Siemens Roederstein
10.11	Glimmer - Kondensator	Mica - Dur 48.1 250V- ± 2%	Jahre
10.21	Polyester - Kondensator	C 296 AC/A	Valvo
10.31	" "	C 296 AA/A	"
10.35	" "	Eromet 85 Hw 447/2	Roederstein
10.36	" "	" Hw 510/2	"
11.34	Regelkondensator	C 001 EA/40 E	Valvo
11.36	"	" EA/16 E	"
11.41	Lufttrimmer	C 005 BA/25 E	"
11.44	Korrektions - Kondensator	C 003 DA/4 E	"

Keramischer - Scheiben - Kondensator / ceramic - disc - capacitor

Ferritperle / ferrit core — K 24/3Ø x 1Ø x 5/20505 Stemag

12 pF ... 390 pF Keramischer - Rohr - Kondensator / ceramic - tubular - capacitor

10 nF ... 1 µF Polyester - Kondensator / polyester - capacitor

Glimmer - Kondensator / mica - capacitor

DIN	MIL - R	
1/4 Watt	1/2 Watt	Widerstand / resistor
1/2 Watt	1 Watt	"