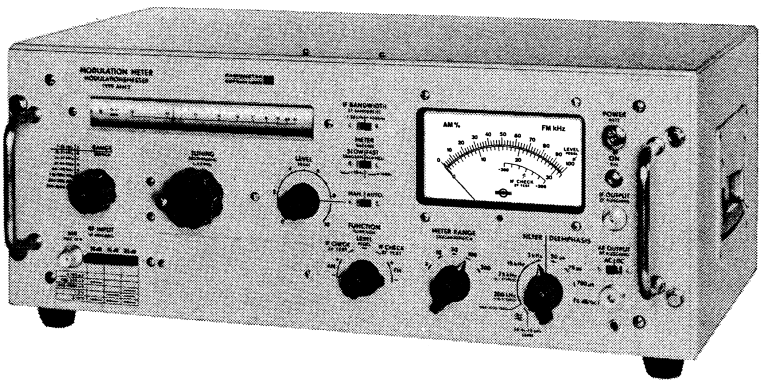
AFM2b
MODULATION
METER

OPERATING INSTRUCTIONS

RADIOMETER
COPENHAGEN

AFM2
MODULATION
METER



OPERATING INSTRUCTIONS

RADIOMETER
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This instruction manual is valid for the Modulation Meter, type AFM2, but applies also for the type AFM2S6 when the following specification changes and additions are borne in mind:

1) On page B5 read for AFM2S6

AM distortion:

Carrier frequencies within the range 5 - 300 MHz:	0.3% distortion at 30% AM and at modulation frequencies within 20 Hz - 15 kHz. 1.5% distortion at 90% AM and at modulation frequencies within 10 Hz - 50 kHz.
Carrier frequencies within the range 300 - 1002 MHz:	1.5% distortion at 30% AM and at modulation frequencies within 10 Hz - 50 kHz.

2) Signal-to-noise ratio for each stereo channel measured with a psophometer: Typically 66 dB at ±40 kHz frequency deviation and RF < 200 MHz. These data apply only when the level of the RF signal is in the 30 - 100 mV range.

Furthermore, it applies to the Modulation Meter, type AFM2S4S5, when the following corrections are made on pages B6, B7, D6, E2, and E4:

1) AF Output	Nominally 0 dBm (0.775 V rms into 600Ω) when meter reads 3/4 of full-scale deflection, e.g., at ±75 kHz deviation in the ±100 kHz deviation range.
2) AF Output Terminals	3-pole standard, type ZNA 333874/1

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Modulation Meter
Type AFM2

Section A. Introduction

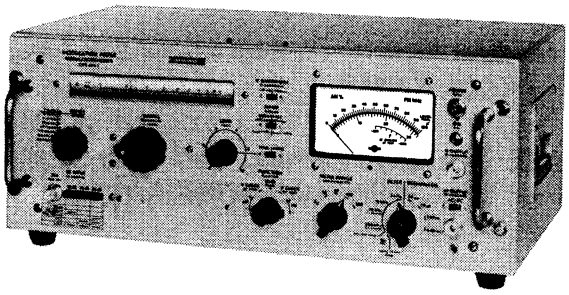


Fig.A1. The Modulation Meter, type AFM2.

The Modulation Meter, type AFM2, is a solid-state, line- or battery-operated precision measuring instrument for accurate measurement of the modulation depth of AM signals and the peak deviation of FM signals in the carrier frequency range from 5 to 1002 MHz. The Modulation Meter is designed for accepting telemetric signals with a modulation frequency up to 200 kHz, and stereo signals for which it features an L/R-separation of 46 dB.

The indicating meter has full-scale deflection for 3, 10, 30, and 100% AM, and ±3, ±10, ±30, ±100, and ±300 kHz FM, peak value. Due to the very small amount of residual modulation generated in the Modulation Meter proper, it is possible to measure residual FM and AM in oscillators, spurious AM on FM signals, and vice versa. Accurate measurements on distorted signals are rendered easy by a switch that enables the positive and the negative peak value to be measured separately. If increased resolution is desired, an external indicator, such as a voltmeter, can be employed to extend the measuring ranges downwards.

The input signal level necessary for full accuracy is 3 mV in the carrier frequency range 5 to 200 MHz, 20 mV in the range 200 to 600 MHz, and 30 mV in the range 600 to 1002 MHz. The maximum operating input voltage is 10 V. Besides a manual level control, the Modulation Meter features an automatic level control with a regulating range of 40 dB.

To increase the versatility of the Modulation Meter for measurements on narrow-band equipment, it is provided with two IF bandwidths of ±20 and ±400 kHz, just as three standard deemphasis networks of 50, 75, and 750 µs, one non-standard of 6 dB/octave (ref.1 kHz), four low-pass filters with frequencies of 3, 15, 75, and 200 kHz, and one band-pass filter with 3 dB points at 50 Hz and 15 kHz, ensure optimal measuring conditions for a wide range of applications.

A plug-in Crystal Oscillator Unit, code 900-252, and a plug-in External-Oscillator Amplifier, code 900-253, are available. See SECTION C.

Section B. Specifications

FREQUENCY RANGE OF INPUT SIGNAL	5 - 1002 MHz
FREQUENCY RANGE OF VARIABLE OSCILLATOR	7 - 1000 MHz
Fundamental ranges:	7-12, 12-21, 21-37, 37-65, 65-110, and 110-200 MHz
Harmonic ranges:	200-330, 330-600, and 600-1000 MHz
CALIBRATION ACCURACY	3%
CRYSTAL OPERATION	An optional Crystal Oscillator Unit, code 900-252, that accepts up to four switch-selected crystals, ensures low residual FM. Specification changes due to crystal operation: See SECTION C - ACCESSORIES.
INPUT LEVEL	One input socket in connection with a 3-step input attenuator (10 + 10 + 20 dB) adapts the AFM2 to input levels from 3 mV to 10 V.

Carrier frequency ranges:	5-200 MHz	200-600 MHz	600-1000 MHz
Attenuation 0 dB[+]:	3-100 mV	20-100 mV	30-100 mV
Attenuation 10 dB:	(10)[++]-100-300 mV	(60)-100-300 mV	100-300 mV
Attenuation 20 dB:	(30)-300-1000 mV	(200)-300-1000 mV	300-1000 mV
Attenuation 30 dB:	(0.1)-1-3 V	(0.6)-1-3 V	1-3 V
Attenuation 40 dB:	(0.3)-3-10 V	(2)-3-10 V	3-10 V

[+] Basic sensitivity range, BSR

[++] Values in parentheses are derived from minimum level of BSR and from lower limit of overlapping ranges.

Max. safe input level: 10 V

Input level for residual FM and AM measurements:

Min. input level	RF attenuation inserted (dB)
10 mV	0
30 mV	10
100 mV	20
300 mV	30
1 V	40

INPUT IMPEDANCE

50 Ω nominal

LEVEL SETTING

Manual level setting:

Continuous within a range of min. 40 dB.

Automatic level setting:

The AGC system keeps the level setting within 0.5% for input level variations within the specified input level ranges, inclusive of the overlapping ranges.

Fine adjustment of the automatic level setting is possible.

FREQUENCY MODULATION

Deviation ranges:

±3, ±10, ±30, ±100, and ±300 kHz f.s.d. (peak deviation).

Positive and negative deviation peaks can be measured separately.

Accuracy:

±75 kHz deviation:

2% of reading + 1% of full scale at modulation frequencies within 20 Hz - 53 kHz

4% of reading + 1% of full scale at modulation frequencies within 10 Hz - 75 kHz.

±300 kHz deviation:

2% of reading + 1% of full scale at modulation frequencies within 20 Hz - 15 kHz.

7% of reading + 1% of full scale at modulation frequencies within 10 Hz - 125 kHz.

15% of reading +1% of full scale at modulation frequencies within 125 kHz - 200 kHz.

Notes:

1. To obtain specified accuracy, the upper frequency limit of the built-in low-pass filter should be switched as follows:

Deviation range	upper frequency limit
±3 kHz	3 kHz
±10 kHz	15 kHz
±30 kHz	15 kHz
±100 kHz	75 kHz
±300 kHz	200 kHz

(see Bandwidths)

2. The specified accuracies are valid only with the METER switch set to SLOW. In position FAST, the lower frequency limit is 160 Hz.

Distortion

±75 kHz deviation:

0.1% distortion at modulation frequencies within 10 Hz - 15 kHz.

0.2% distortion at modulation frequencies within 20 Hz - 53 kHz.

0.3% distortion at modulation frequencies within 10 Hz - 75 kHz.

±300 kHz deviation:

0.5% distortion at modulation frequencies within 20 Hz - 15 kHz.

1.5% distortion at modulation frequencies within 10 Hz - 50 kHz.

3% distortion at modulation frequencies within 10 Hz - 125 kHz.

5% distortion at modulation frequencies within 125 kHz - 200 kHz.

LR-separation of FM stereo signals: For an ideal FM stereo signal (FCC and EBU-standard), the LR-separation at modulation frequencies within 40 Hz - 15 kHz is greater than 46 dB.

AF output and meter response (FM):

AF output:

Within 40 Hz - 15 kHz, the LR-separation is greater than 46 dB (see above). This corresponds to a departure from a linear phase response of less than 0.5° and a frequency response within +0.25% and -1.5% (40 Hz - 53 kHz).

Note: The built-in 200 kHz low-pass filter is to be used.

Meter response:

Within 40 Hz - 53 kHz, the frequency response of the meter is within +0.25% and -1.5%.

Notes:

1. The built-in 200 kHz low-pass filter is to be used.

2. The specified response is valid only with the METER switch set to SLOW. In position FAST, the lower frequency limit is 160 Hz.

Residual FM:

On condition of a quiet test room (noise level < 60 dB rel. 2×10^{-4} µbar.):
Less than 25 Hz FM (r.m.s.) within the frequency range 5-250 MHz; typically 15 Hz (r.m.s.).

Less than 100 Hz FM (r.m.s.) up to 1002 MHz, typically 50 Hz FM (r.m.s.).

Notes:

1. 0.1% of full deviation range is to be added.

2. Minimum RF input level: See Input Level.

3. The built-in band-pass filter (50 Hz - 15 kHz) or one of the deemphases (50 µs or 75 µs) is to be used.

FM due to AM: Additional residual FM error due to AM is typically less than 50 Hz (r.m.s.) at 50% AM, when the band-pass filter (50 Hz - 15 kHz) is used.

Deemphases:

Standard deemphases: 50, 75, and 750 µs, switchable.

Deemphasis: 6dB/oct. (ref. 1 kHz). For frequency response of filter, see Fig. B1.
The deemphasis can be switched off.

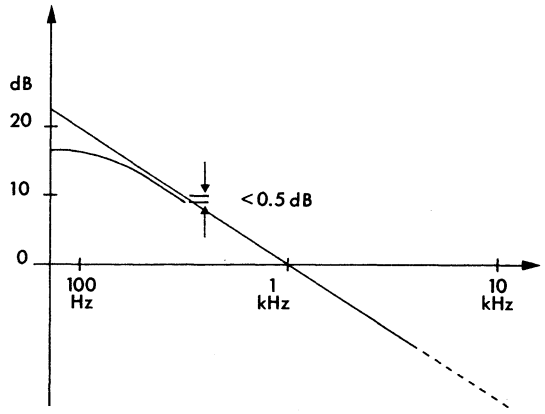


Fig.B1. Frequency response of the 6 dB/oct. filter.

AMPLITUDE MODULATION

Modulation depth range: 3, 10, 30, and 100% AM f.s.d.

Positive and negative modulation peaks can be measured separately.

Accuracy:

Manual level setting: 2% of reading + 1% of full scale at modulation frequencies within 20 Hz - 15 kHz.

5% of reading + 1% of full scale at modulation frequencies within 10 Hz - 50 kHz.

Notes:

1. To obtain specified accuracy, the upper frequency limit of the built-in low-pass filter should be switched as follows:

modulation range	upper frequency range
3%+	3 kHz
10%	15 kHz
30%	75 kHz
100%	200 kHz

+By a 10 dB increase in minimum input level, the upper frequency limit can be extended to 15 kHz.

2. The above accuracies are valid for modulation depths up to 90% AM within the carrier frequency range 15-300 MHz, and up to 30% AM within the carrier frequency range 300-1002 MHz.

Automatic level setting:

The following typical values are to be added to the above accuracies:

At a modulation frequency of 20 Hz: 6% of reading.

At a modulation frequency of 50 Hz: 1% of reading.

At modulation frequencies above 100 Hz, the additional error is negligible.

Note: The specified accuracies (manual and automatic level settings) are valid only with the METER switch set to SLOW. In position FAST, the lower frequency limit is 160 Hz.

AM distortion:

Carrier frequencies within the range 5 - 300 MHz:

0.2% distortion at 30% AM and at modulation frequencies within 20 Hz - 15 kHz.

1% distortion at 90% AM and at modulation frequencies within 10 Hz - 50 kHz.

Carrier frequencies within the range 300 - 1002 MHz:

1% distortion at 30% AM and at modulation frequencies within 10 Hz - 50 kHz

Residual AM at CW:

Less than 0.03% AM (r.m.s.) at carrier frequencies up to 200 MHz.

Less than 0.1% AM (r.m.s.) at carrier frequencies up to 500 MHz.

Less than 0.3% AM (r.m.s.) at carrier frequencies up to 1002 MHz.

Notes:

1. 0.1% of full AM range to be added.

2. Minimum RF input level: See Input Level.

3. The built-in band-pass filter (50 Hz - 15 kHz) is to be used.

AM due to FM: Additional error is less than 0.6% AM (r.m.s.) at ±50 kHz deviation.

AF output (AM)

Manual level settings: The frequency response is within ±0.5% in the range 20 Hz - 15 kHz.

Automatic level setting: The following typical error contributions are to be added to the above frequency response:

At a modulation frequency of 20 Hz: 6%

At a modulation frequency of 50 Hz: 1%

At modulation frequencies above 100 Hz, the error contribution is negligible.

INTERMEDIATE FREQUENCY CHANNEL

Frequency: 2 MHz

Bandwidths: approx. ±400 kHz/3 dB and ±25 kHz/3 dB, switch-selected.

IF check: The meter has a separate scale to facilitate correct tuning (IF = 2 MHz).

IF output: 2 MHz IF signal of 0.2 V EMF from 50 Ω source at correct frequency tuning and full scale deflection on meter.

AUDIO FREQUENCY CHANNEL

Bandwidths: four switchable low-pass filters, 3 kHz, 15 kHz, 75 kHz, and 200 kHz, to be used when measuring FM deviation and AM modulation.

3 kHz filter: for mod. freq. up to 3 kHz

15 kHz filter: for mod. freq. up to 15 kHz.

75 kHz filter: for mod. freq. up to 75 kHz and for measurements of FM stereo deviation.

200 kHz filter: for mod. freq. up to 200 kHz and for measurements of stereo L/R separation.

(bandwidth: 10 Hz (0.1 dB) - 350 kHz (3 dB))

50 Hz - 15 kHz filter: Band-pass filter, 50 Hz (3 dB) - 15 kHz (3 dB), to be used when measuring residual FM and AM.

AF output: AF signal of 1 V EMF (peak value) at full scale deflection.

Bandwidth as specified above. A switch provides for ac- or dc-coupling.

ac-coupling: Output impedance: 600 Ω in series with 10 µF.

dc-coupling: Output impedance: 600 Ω.

dc OUTPUTS

IF level:	dc-voltage of 1 V EMF from 600 Ω source at meter deflection to set level mark.
IF frequency:	dc-voltage of 1 V EMF from 600 Ω source at meter deflection to IF CHECK mark (50 mV/100 kHz).
Modulation:	dc-voltage of 1 V EMF from 600 Ω source at full scale deflection.

POWER SUPPLY

Power line:

Voltages:	110 V and 220 V, ±10%.
Frequencies:	48 - 65 Hz.
Consumption:	about 25 VA.
	The power cord is fixed and provided with a mains plug of the Schuko type.

External dc supply:

dc sources:	0 to +(18 to 25 V) and 0 to -(18 to 25 V).
Current drain:	approx. 400 mA from each source.

TERMINALS

RF input and IF output:	BNC
AF output:	UHF
dc output (AF):	Banana jacks
External dc supply:	Belling Lee L1436/S
Operating ambient temperature range:	0 - 50°C

DIMENSIONS AND WEIGHT

Height:	197 mm (7 3/4 in.)
Width:	485 mm (19 1/8 in.)
Depth:	245 mm (9 5/8 in.)
Weight:	13 kg (28.6 lbs)
MOUNTING AND FINISH	Steel cabinet finished in grey enamel lacquer.
ACCESSORIES SUPPLIED	1 coaxial cable (50 Ω), code 617-004, with type UG-88/U BNC plugs.
	1 battery plug, Belling & Lee, L1436/P, code 805-429.
ACCESSORIES AVAILABLE	Crystal Oscillator, code 900-252.
	External-Oscillator Amplifier, code 900-253
	1 set of dust covers (top plate and bottom plate) for rack mounting, code 884-002

Section C. Accessories

PLUG-IN CRYSTAL OSCILLATOR UNIT, CODE 900-252

General

The Plug-in Crystal Oscillator Unit, code 900-252, is preferably used within the frequency range 80 - 1000 MHz to achieve low residual FM. It is supplied without crystals.

The Crystal Oscillator Unit contains a crystal-controlled oscillator followed by a doubler stage, and it has room for up to four switch-selected crystals. The crystals are mounted inside the unit and can easily be exchanged. Initial adjustment is made by means of individual screw-driver adjustments on the front panel.

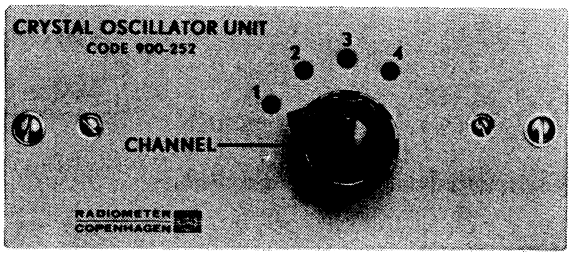


Fig. C1. The Crystal Oscillator Unit, code 900-252.

The trimmers directly cover a tuning range of 360 - 1000 MHz. In the ranges 80 - 120 MHz and 250 - 360 MHz, a fixed capacitor must be added in parallel with the trimmer.

Specifications

Number of crystals: Sockets for up to 4 crystals.

Frequency of crystals: In order to achieve the highest possible sensitivity of the modulation meter, the frequency of the crystals must be as high as possible. Overtone crystals having frequencies within the range 40 - 100 MHz are recommended. The crystal frequency f_{cr} is determined by

$$f_{cr} = \frac{f_s - 2}{2n} \text{ MHz}$$

where f_s indicates the carrier frequency and n the odd harmonic of the crystal overtone-frequency.

Initial conditions: The sensitivity specifications, item INPUT LEVEL, are based on the following combinations of carrier frequency, order of harmonic, and range of crystal frequencies.

Carrier frequency f_s	Order of harmonic n	Range of crystal frequencies f_{cr}
250 - 600 MHz	3	40 - 100 MHz
600 - 1000 MHz	5	60 - 100 MHz

Characteristics of the crystals:

Type: HC-25/U

Frequency: See above.

Frequency tolerance: 10×10^{-6} at reference temperature 25°C

Frequency tolerance over operating temperature range: 10×10^{-6}, within 0-50°C

Condition of resonance: Series

Mode of operation: 5. overtone

Max. drive level: 2 mW

Max. equivalent series resistance: 60 Ω

CHANGE IN SPECIFICATIONS OF AFM2 CAUSED BY THE CRYSTAL OSCILLATOR

Input level:

Frequency ranges:	250 - 600 MHz	600 - 1000 MHz
Attenuation 0 dB[+]:	20 - 100 mV	30 - 100 mV
Attenuation 10 dB:	(60)[++] - 100 - 300 mV	100 - 300 mV
Attenuation 20 dB	(200) - 300 - 1000 mV	300 - 1000 mV
Attenuation 30 dB:	(0.6) - 1 - 3 V	1 - 3 V
Attenuation 40 dB:	(2) - 3 - 10 V	3 - 10 V

[+]Basic sensitivity range, BSR

[++]Values in parentheses are derived from minimum level of BSR and from lower limit of overlapping ranges.

Max. safe input level:

10 V

Input level for FM and AM measurements:

250 - 600 MHz:

Min. input level	RF attenuation inserted (dB)
20 mV	0
60 mV	10
200 mV	20
600 mV	30
2 V	40

600 - 1000 MHz:

Min. input level	RF attenuation inserted (dB)
30 mV	0
90 mV	10
300 mV	20
900 mV	30
3 V	40

Residual FM: Less than 20 Hz FM (r.m.s.) at carrier frequencies up to 1002 MHz; typically 15 Hz (r.m.s.).

Notes:

1. 0.1% of full deviation range is to be added.
2. Minimum RF input level: See Input Level.
3. The built-in band-pass filter (50 Hz - 15 kHz) or one of the deemphases (50 µs or 75 µs) is to be used.

Residual AM at CW:	Less than 0.15% (r.m.s.) at carrier frequencies up to 1000 MHz.

Notes:

1. 0.1% of full AM range must be added.
2. Minimum RF input level: See Input Level.
3. The built-in band-pass filter (50 Hz - 15 kHz) is to be used.

EXTERNAL-OSCILLATOR AMPLIFIER, CODE 900-253

General

The Modulation Meter, type AFM2, is so designed that an optional plug-in External-Oscillator Amplifier, code 900-253, can be used if driving by means of an external oscillator, for example a synthesizer, is required. It will adapt the output of the external oscillator to the level required by the mixer of the AFM2.

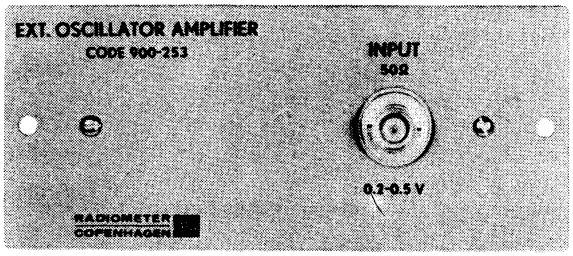


Fig.C2. The External-Oscillator Amplifier, code 900-253.

Specifications

Input Level:	0.3 to 0.5 V depending on the frequency range.
Frequency Range:	90 to 200 MHz. Up to 1 GHz on harmonics.
Input Impedance:	50 Ω (BNC connector).

Section D. General Description

DESCRIPTION

As can be seen on the simplified block-diagram shown in Fig.D1, the RF input signals to the 50 Ω coaxial connector are fed to a diode mixer via an input attenuator providing for 10, 20, 30, and 40 dB attenuation and thus accommodating RF signals from 3 mV to 10 V r.m.s. The mixer, which is balanced and highly linear, so that distortion of amplitude-modulated signals is avoided, is coupled to the local tuning oscillator. For RF input signals in the range from 5 to 200 MHz, mixing is realized with the fundamental frequency of the local oscillator, whilst it takes place with the third and fifth harmonics in the range from 200 to 1002 MHz. This results in an IF signal of 2 MHz. The mixer can also be coupled to an optional Crystal Oscillator Unit, code 900-252, which can accommodate four crystals, thereby enabling measurements at four predetermined, fixed frequencies.

The signal from the mixer is passed through an IF filter, which is a phase-linear band-pass filter with a bandwidth of ±400 kHz, a high degree of phase-linearity being necessary in order to pass a multiplex stereo signal with minimum distortion.

From the IF filter, the IF signal is fed to an IF preamplifier which acts as a buffer. At the same time, the IF preamplifier provides for amplification of the IF signal. This amplification, together with ideal coupling to the IF filter, keeps the noise level down to a minimum at all input levels.

The IF preamplifier is followed by a diode attenuator whose biasing current can be controlled by the potentiometer LEVEL, accessible on the front panel of the Modulation Meter. Level control can be performed within a range of 40 dB. Alternatively, the IF attenuator can be driven by a voltage proportional to the IF level amplified in an AGC amplifier. This provides for automatic level control within 40 dB. Fine adjustment is nevertheless also possible by means of the potentiometer LEVEL.

The IF signal from the IF attenuator is then fed to an IF amplifier which consists of two wideband amplifier stages. The IF amplifier brings the IF signal to the level required by the AM detector.

The amplified IF signal is then passed either through a band-pass filter or through a phase-compensator, according to the position of the IF BANDWIDTH control. The band-pass filter has a bandwidth of ±25 kHz and is phase-linear just as the IF filter. It is intended for use when measuring on weak signals from narrow-band equipment. The phase compensator leaves the initial bandwidth unchanged.

A buffer amplifier separates filters, AM detector and IF output amplifier. It consists of a unity-gain amplifier with low output impedance and serves to suppress any influence from the IF output which is available for external monitoring from a coaxial connector on the front panel.

The IF signal from the buffer amplifier is fed both to the AM detector and to the IF output amplifier. The AM detector is an amplifier with a mean-value detector in the feedback loop which also provides for the large amount of linearity required. The AM detector has a dc and an ac output. The first of these is coupled to the meter of the instrument via the FUNCTION selector.

In the corresponding position of the FUNCTION selector, the meter indicates the value of the AM detector's dc current - in other words: the IF level. The second output of the AM detector is coupled to the AF section (described below) via the selector FUNCTION.

As stated above, the IF signal from the buffer amplifier is also fed to the IF output amplifier which provides for amplification so that the level required for driving a following limiter is obtained.

The limiter transforms the IF signal into a square wave, the zero crossing of which is controlled by variations in the peak-to-peak value being compared with variations in the mean value. Subsequent limiting action takes place in the following limiter section. The resulting signal is fed via a buffer amplifier to the FM detector section which consists of a monostable multivibrator and an output amplifier.

The signal from the last limiter section is used to trigger a monostable multivibrator which provides for pulses of constant width. The pulses from the multivibrator are amplified in an output amplifier. The output amplifier is provided with a regulating loop consisting of a peak detector and an amplifier. This regulating loop keeps the value of the peak-to-peak voltage of the output amplifier constant. Hence, as the amplitude and the width of the pulses are constant, the mean value of the signal will vary according to the number of pulses per second. The mean value is utilized when the FUNCTION selector is in position IF CHECK for reading the value of the intermediate frequency. To ensure a high degree of accuracy and an extremely low hum level, both the multivibrator and the output amplifier are furnished with their own regulated power supply.

From the AM or FM detector, the signal is fed to a low-pass filter via a relay controlled by the FUNCTION selector. The low-pass filter features the high degree of phase-linearity required for passing stereo information without any disturbing influence on L/R separation.

The low-pass filter is followed by a two-section, 4 x 10 dB precision attenuator which determines the metering ranges. It is followed by an amplifier providing for amplification of the AF signal to the level required by the next stages.

The AF amplifier is followed by deemphasis networks providing for the standard deemphases of 50, 75, and 750 µs, and the non-standard deemphasis of 6 dB/oct. The amplified AF signal can also be passed through one of four low-pass filters with frequencies of 3, 15, 75 and 200 kHz, or through a band-pass filter with 3 dB points at 50 Hz and 15 kHz, ensuring a wide range of applications.

These networks and filters are followed by an AF amplifier. The output signal from this amplifier is available on the front panel via the AF OUTPUT connector for distortion measurements or external monitoring. Loading of the AF OUTPUT does not interfere with the meter indication. The output voltage from the first AF amplifier is also fed to another AF amplifier providing for the voltage necessary for the AF detector. The signal from the AF OUTPUT can either be dc-coupled or ac-coupled to

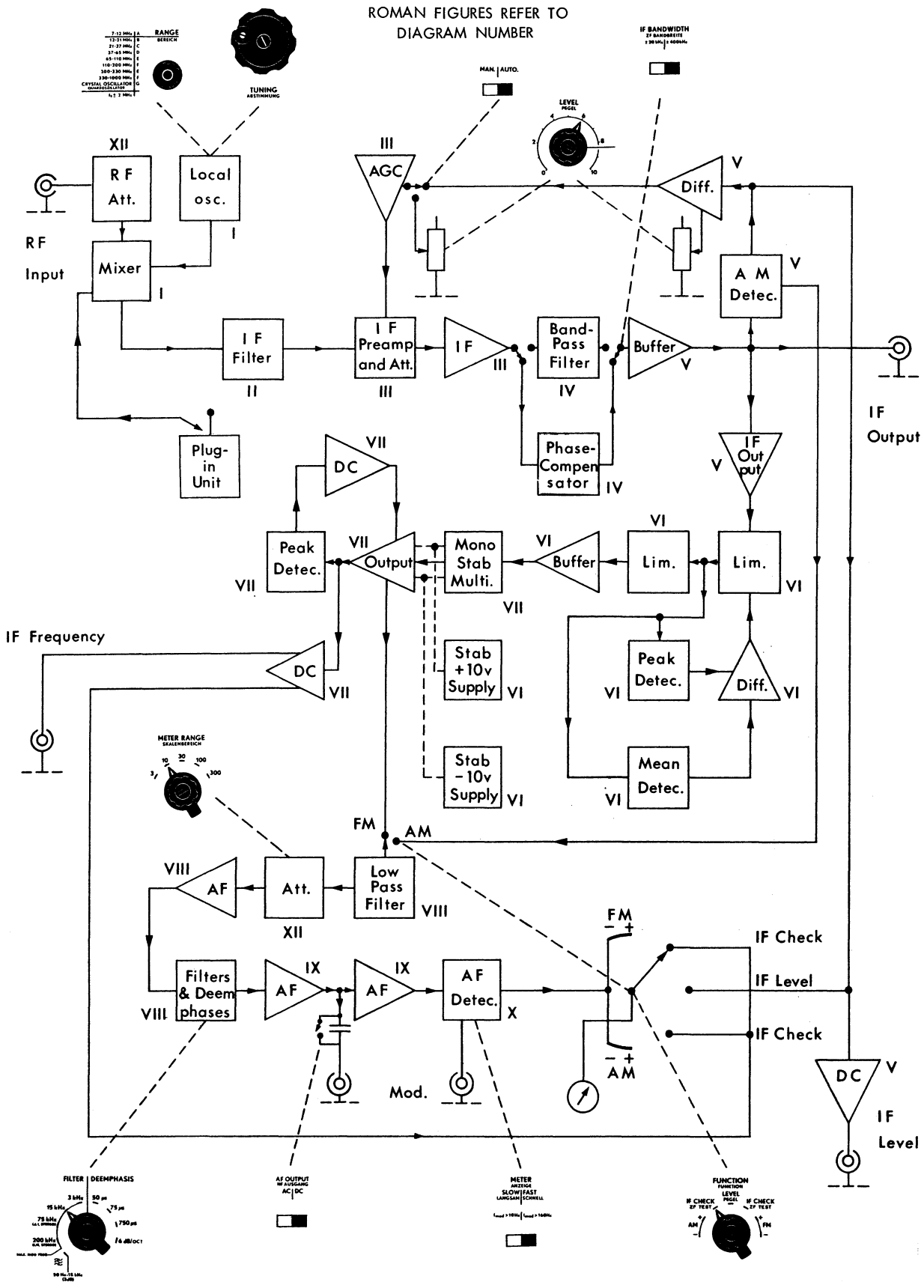


Fig. D1. Block-diagram of the Modulation Meter, type AFM2.

the AF OUTPUT connector by sliding the switch.

The AF detector gives the true peak value of any AF signal. Depending on the position of the FUNCTION selector, the positive or the negative modulation peak can be measured. The AF detector has two time constants, thereby furnishing two meter responses.

The AF detector is followed by an impedance-matching network providing for low output impedance to the meter.

CONTROLS, METER, AND TERMINALS

General

As can be seen in Fig. D2 and D4, the Modulation Meter, type AFM2, is provided with the following controls, meter, and terminals:

Controls, Meter, and Front Plate Terminals (see Fig. D2)

Power Lamp and ON switch (1)

The power switch ON is a toggle switch monitored by the lamp POWER.

RANGE Selector and Drum Scale (2)

The selector RANGE is an eight-position rotary switch. In the first six positions, the RANGE selector provides for selection of the frequency ranges according to the table printed on the front plate of the instrument. (Note that the ranges E and F each cover two frequency bands.) The next position is a rest position. In the last position, the plug-in Crystal Oscillator Unit (if any) is connected. The selector RANGE is monitored by the drum scale immediately above.

TUNING Knob (3)

The knob TUNING provides for adjustment of the local oscillator frequency at 2 MHz from the signal frequency. It is monitored by a cursor on the drum scale.

LEVEL Potentiometer (4) and MAN.-AUTO. Switch (5)

The potentiometer LEVEL has two functions according to the position of the switch MAN.-AUTO.

When the switch MAN.-AUTO. is in position MAN., the LEVEL potentiometer is used to vary the sensitivity of the instrument manually within a range of min. 40 dB.

When the switch MAN.-AUTO. is in position AUTO., the LEVEL potentiometer is used for fine-adjustment of the automatically adjusted sensitivity of the instrument.

FUNCTION Selector (6)

The selector FUNCTION is a seven-position rotary switch. The position LEVEL is used when searching the signal (i.e., tuning) and monitoring the IF level. When measuring, the positions IF CHECK are used to tune the instrument to the exact carrier frequency. (See under "Meter" below) The percentage of amplitude modulation of AM signals can be measured by placing the selector in position AM + or AM - according to the sign of the modulation peak to be measured. The frequency deviation of FM signals can be measured by placing the selector in position FM + or FM - according to the sign of the modulation peak to be measured.

METER RANGE Selector (7)

The selector METER RANGE is a five-position rotary switch. Each position corresponds to the full-scale range of the meter, viz: AM 3 - 10 - 30 - 100%, FM 3 - 10 - 30 - 100 - 300 kHz.

METER Switch (8)

The switch METER is a sliding switch. In position SLOW f_{mod} >10 Hz, the meter response is slow. This position should not be used when measuring on signals with modulating frequencies higher than 160 Hz. In position FAST f_{mod} >160 Hz, the meter response is fast.

IF BANDWIDTH (9)

The switch IF BANDWIDTH is a sliding

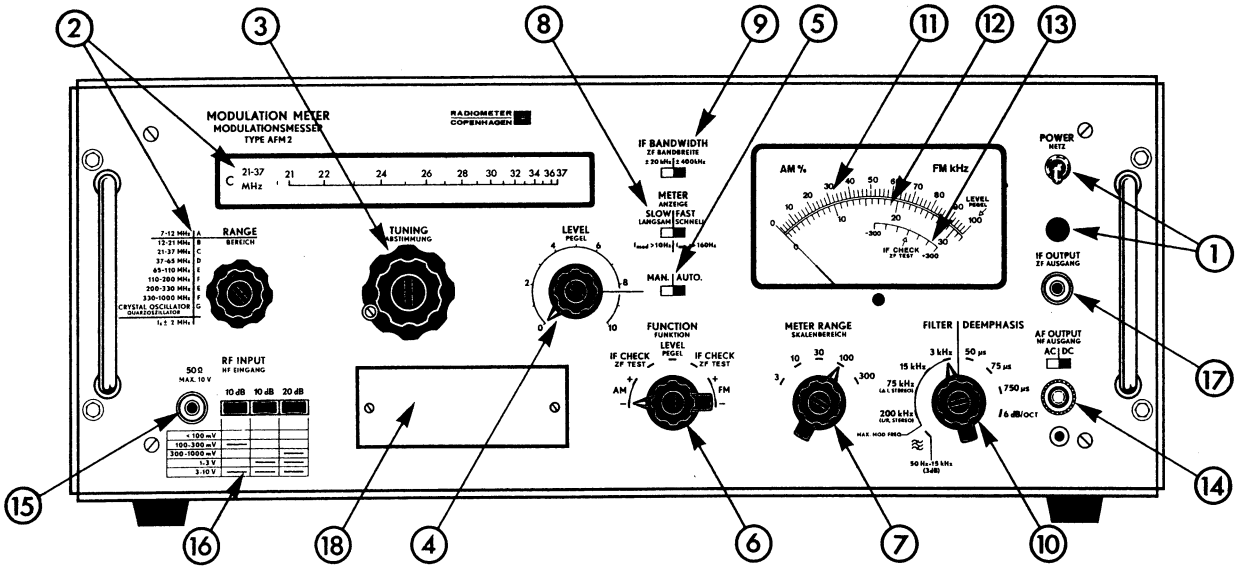


Fig.D2. Front plate of the Modulation Meter, type AFM2.

switch. It provides for switching from the band-pass filter to the phase-comparator and vice versa, i.e., from a bandwidth of ±25 kHz to one of ±400 kHz.

AF FILTER/DEEMPHASIS Selector (10)

The selector AF FILTER/DEEMPHASIS is a nine-position rotary switch. In the first position - 50 Hz—15 kHz (3 dB) - a band-pass filter is switched in. It is used when measuring residual AM and FM. In the next four positions - 200 kHz (L/R STEREO), 75 kHz (Δf, STEREO), 15 kHz, and 3 kHz - four low-pass filters are switched in. They are used when measuring FM deviation or AM modulation. The 3 kHz and 15 kHz filters are used for modulation frequencies up to 3 kHz and 15 kHz, respectively.

The 75 kHz filter is used for modulation frequencies up to 75 kHz and for measurements of FM stereo deviation. The last filter - 200 kHz - is used for modulation frequencies up to 200 kHz and for measurements of stereo L/R separation (bandwidth: 10 Hz (0.1 dB) - 350 kHz (3 dB)).

The last four positions of the AF FILTER/DEEMPHASIS selector introduce four deemphases of 50 µs, 75µs (European and American standard for stereo work), 750 µs (narrow-band equipment) and a 6 dB/oct (non-standard).

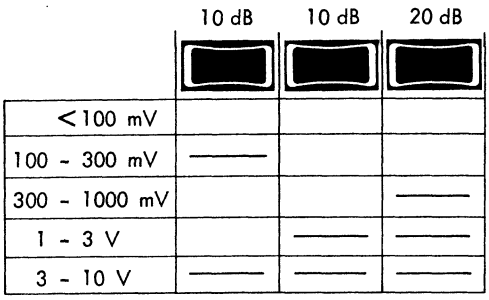
Meter

The meter of the Modulation Meter, type AFM2, is of the taut-band suspension type. It is provided with three scales.

The upper scale (11) provides for reading in the AM ranges from 0 to 10% or 0 to 100%, and in the FM ranges from 0 to 10 kHz or 0 to 100 kHz deviation, according to the positions of the FUNCTION selector and the METER RANGE selector. It is also provided with a LEVEL mark to permit setting of the IF level.

The middle scale (12) provides for reading in the AM ranges from 0 to 3% or 0 to 30%, and in the FM ranges from 0 to 3 kHz, 0 to 30 kHz, or 0 to 300 kHz deviation, according to the position of the FUNCTION and METER RANGE selectors.

The lower scale (13) is utilized when checking the frequency of the converted signal. It is graduated for ±300 kHz deviation around the 2 MHz intermediate frequency. An IF CHECK mark provides for exact tuning to the intermediate frequency.



ATTENUATION	FREQUENCY RANGE		
	15 - 200 MHz	200 - 600 MHz	600 - 1000 MHz
0 dB	3 - 100 mV	20 - 100 mV	30 - 100 mV
10 dB	100 - 300 mV	100 - 300 mV	100 - 300 mV
20 dB	300 - 1000 mV	300 - 1000 mV	300 - 1000 mV
30 dB	1 - 3 V	1 - 3 V	1 - 3 V
40 dB	3 - 10 V	3 - 10 V	3 - 10 V

Fig.D3. Attenuation and sensitivity ranges.

AF OUTPUT Switch and AF OUTPUT Connector (14)

The AF OUTPUT switch is a sliding switch used for selection of the mode of coupling of the AF signal. With the switch in the left-hand position, the AF signal is ac-coupled (600 Ω in series with 10 μF). With the switch in the right-hand position, the AF signal is dc-coupled (600 Ω). The AF signal of 1 V EMF (peak value) at full-scale deflection is delivered via a UHF connector.

RF INPUT Connector (15)

The BNC connector RF INPUT provides for connection of the RF signal to be measured on.

Input Attenuator (16)

The input attenuator is a three-step attenuator (10 + 10 + 20 dB). It is used to adapt the Modulation Meter, type AFM2, to input levels from 3 mV to 10 V. As can be seen in Fig. D3, the degree of attenuation to be selected depends on the input voltage range, and the sensitivity of the instrument on the frequency range.

IF OUTPUT (17)

The UHF connector IF OUTPUT provides for connection of the 2 MHz IF signal to, for example, external monitors. It delivers a 2 MHz IF signal of 0.2 V EMF from a 50 ohms source at correct frequency tuning and full deflection on the meter.

Plug-in Unit Receptacle (18)

The Modulation Meter, type AFM2, is so designed that two optional plug-in units, i.e., Crystal Oscillator Unit, code 900-252, and External-Oscillator Amplifier, code 900-253, can be easily plugged in. (See SECTION C - ACCESSORIES.)

Rear Terminals (see Fig.D4)

IF LEVEL (DC) (1)

The terminal IF LEVEL consists of two banana jacks (600 Ω) and delivers a dc output voltage of 1 V EMF at meter deflection to SET LEVEL mark.

IF FREQ. (DC) (2)

The terminal IF FREQ. consists of two banana jacks (600 Ω) and delivers a dc output voltage of 1 V EMF at meter deflection to IF CHECK mark.

MOD. LEVEL (DC) (3)

The terminal MOD. LEVEL (DC) consists of two banana jacks (600 Ω) and delivers a dc output voltage (meter current) of 1 V EMF at full-scale deflection.

Line Voltage Indicator (4)

The line voltage indicator shows the line voltage to which the instrument is switched: either 110 V or 220 V - 48 to 65 Hz. When the two screws (5) and (6) are loosened, the voltage indicator can be turned to the appropriate position. (For further details see SECTION E - OPERATING INSTRUCTIONS.)

Battery (7)

The terminals BATTERY are of the Belling & Lee L1436/5 type and provide for connection of the instrument to an external dc supply be means of a Belling & Lee L1436P Plug supplied with the instrument.

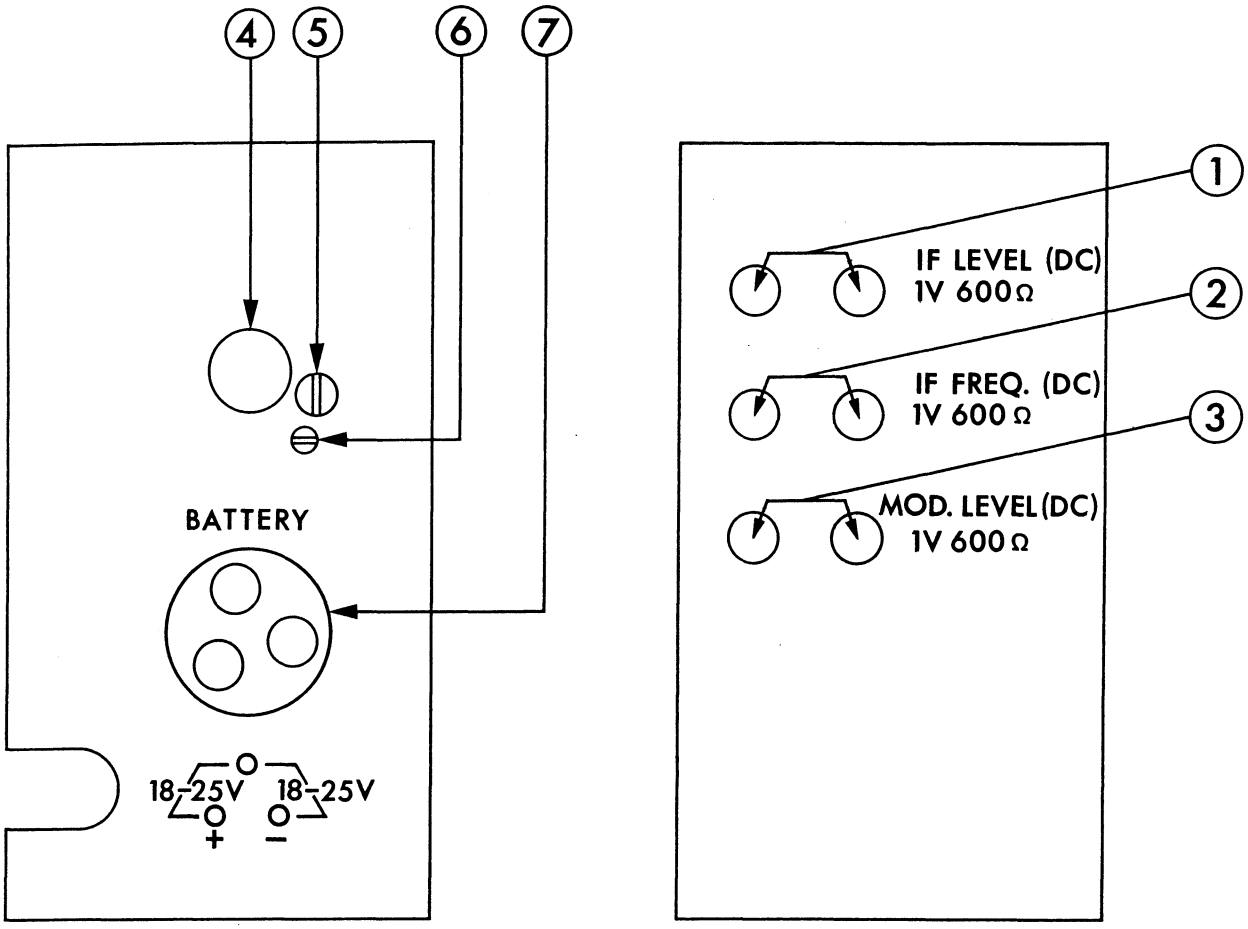


Fig. D4. Rear terminals of the Modulation Meter, type AFM2.

Section E. Operating Instructions

CONNECTING THE INSTRUMENT

Before connecting the instrument to the power line, make sure that the supply transformer and the line voltage indicator are set to the voltage of the power line.

To prepare the instrument for 110 V or 220 V line voltage operation, refer to diagram XI and proceed as follows:

1) If the instrument must be used at a line voltage of 110 V, interconnect lugs 3 and 5 and lugs 4 and 6 on the supply transformer.

2) If the instrument must be used at a line voltage of 220 V, interconnect lugs 4 and 5 on the supply transformer.

Then loosen the screws on the voltage indicator and set the indicator to the desired voltage.

MEASURING AMPLITUDE MODULATION PERCENTAGE

Modulation Percentage of AM Signals

1) Feed the signal to be measured to the RF INPUT connector. Bear in mind that the max. applicable signal is 10 V r.m.s., and that the input impedance is 50 Ω.

2) Use the RF input attenuator according to the instructions printed on the front panel, or refer to Fig.D3 in SECTION D - GENERAL DESCRIPTION.

3) Set the switch BANDWIDTH to ±400 kHz when measuring on broad-band equipment, or to ±25 kHz when measuring on narrow-band equipment.

4) Set the switch METER to SLOW if the modulation frequency of the signal is less than 160 Hz; otherwise set it to FAST.

5) Set the switch MAN.-AUTO. to MAN.

6) Set the drum scale to the desired frequency range by using the RANGE selector.

7) Set the selector FUNCTION to LEVEL.

8) Set the tuning knob so that the cursor on the drum scale indicates the signal frequency ±2 MHz, and then tune so as to obtain maximum meter deflection.

9) Turn the selector FUNCTION to IF CHECK.

10) Make a fine adjustment with the TUNING knob so that the meter reads IF CHECK.

11) Set FUNCTION to LEVEL. When using MAN.-AUTO. in position MAN. readjust to the LEVEL mark, if necessary by means of the LEVEL potentiometer. When using MAN.-AUTO. in position AUTO., fine level-adjustment can

be accomplished by means of LEVEL. It is recommended to use the MAN.-AUTO. switch in position AUTO. when performing AM measurements, as the inevitable level variations of the signal then are equalized.

12) In order to obtain the best accuracy, select the low-pass filter corresponding to the modulation frequency of the signal under test. See Fig. E1, and refer to SECTION B - SPECIFICATIONS under "AM MODULATION Accuracy".

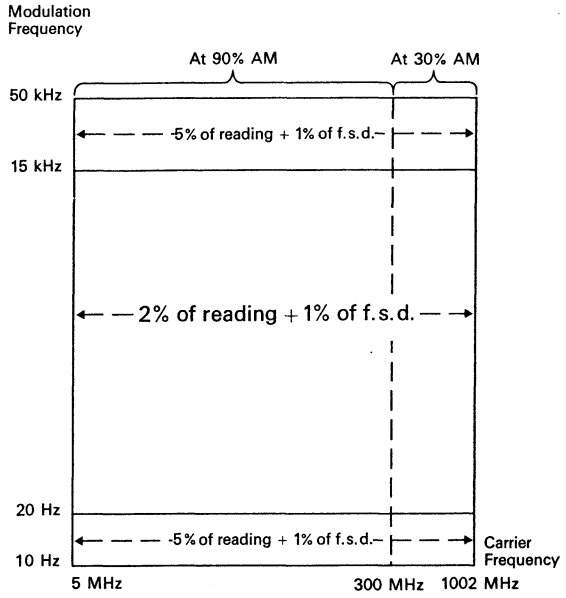


Fig. E1. Accuracy of modulation percentage measurements.

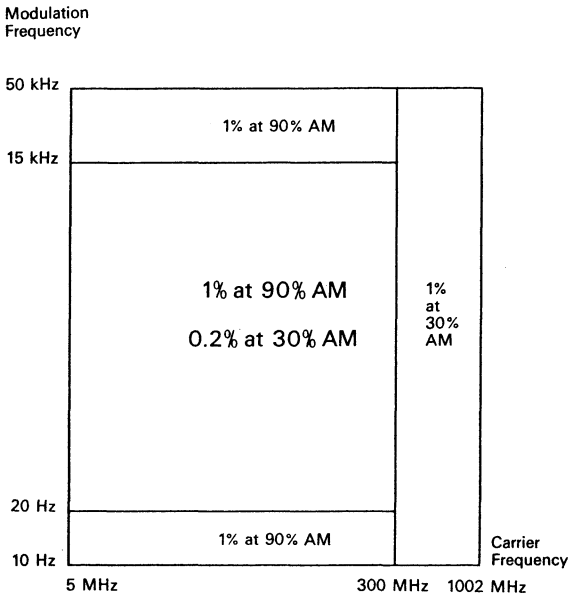


Fig. E2. Distortion for modulation percentage measurements.

13) Turn FUNCTION to AM + or AM - , depending on which peak of modulation is to be measured.

14) Rotate the selector METER RANGE until a proper deflection is obtained.

15) Read the modulation percentage. Check if the reading is the same for both peaks of modulation: a difference indicates distortion of the modulation envelope. See Fig. E2, and refer to SECTION B - SPECIFICATIONS under "AM MODULATION Distortion".

Residual AM on FM Signals

Proceed as described above. If resolution somewhat higher than that corresponding to the 3% AM range is wanted, an external meter, e.g., an electronic voltmeter, may be connected to the AF OUTPUT connector. The external meter will read 1 volt for full deflection of the internal meter, i.e., with the METER RANGE selector set to 3, the modulation percentage read on the voltmeter is 0.003% per mV.

The minimum residual AM reading for a given deviation caused by the instrument itself can be estimated as follows:

1) Apply a CW signal and set FUNCTION to LEVEL.

2) Rotate the TUNING knob back and forth so that the intermediate frequency is changed over the range 2 MHz - Δ f to 2 MHz + Δf, where Δf is the deviation of the frequency-modulated signal whose residual AM is to be measured. (Check the frequency change with the IF CHECK scale.)

3) Read the peak-to-peak value of the change in the LEVEL reading. The minimum residual AM is approx. half of this percentage change.

MEASURING FREQUENCY DEVIATION (FM kHz)

Frequency Deviation of FM signals

1) Feed the signal to be measured to the RF INPUT connector. Bear in mind that the max. applicable signal is 10 V and that the input impedance is 50 Ω.

2) Use the RF input attenuator according to the instructions printed on the front panel, or refer to Fig. D3 in SECTION D - GENERAL DESCRIPTION.

3) Set the switch IF BANDWIDTH to ±400 kHz when measuring on broadband equipment, or to ±25 kHz when measuring on narrow-band equipment.

4) Set the switch METER to SLOW if the modulation frequency of the signal is less than 160 Hz; otherwise set it to FAST.

5) Set the switch MAN.-AUTO. to MAN.

6) Set the drum scale to the desired frequency range by using the RANGE selector.

7) Set the selector FUNCTION to LEVEL.

8) Set the TUNING knob so that the cursor on the drum scale indicates the signal frequency ±2 MHz, and then tune so as to obtain maximum meter deflection.

9) Turn the selector FUNCTION to IF CHECK.

10) Make a fine adjustment with the TUNING knob so that the meter reads IF CHECK.

11) Set the selector FUNCTION to LEVEL. When using MAN.-AUTO. in position MAN., readjust to the LEVEL mark. When using MAN.-AUTO. in position AUTO., fine level-adjustment can be accomplished by means of LEVEL.

12) In order to obtain the best accuracy, select the low-pass filter corresponding to the modulation frequency of the signal under test. See Fig. E3, and refer to SECTION B - SPECIFICATIONS under "FM MODULATION - Accuracy".

13) Turn FUNCTION to FM + or FM -, depending on which peak of modulation is to be measured.

14) Rotate the selector METER RANGE until a proper deflection is obtained.

15) Read the modulation deviation. Check if the reading is the same for

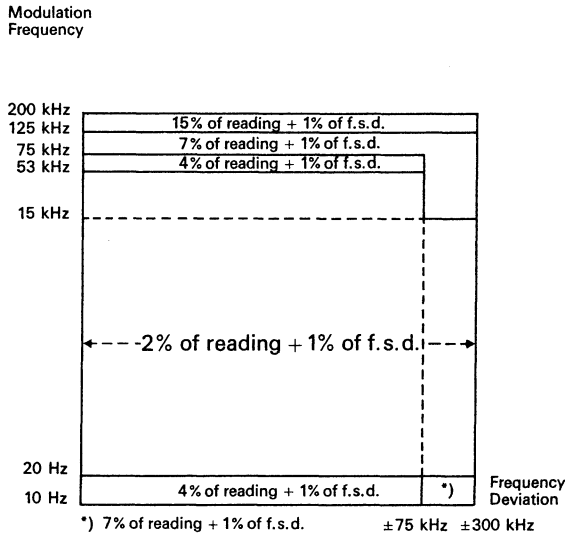


Fig. E3. Accuracy of frequency deviation measurements.

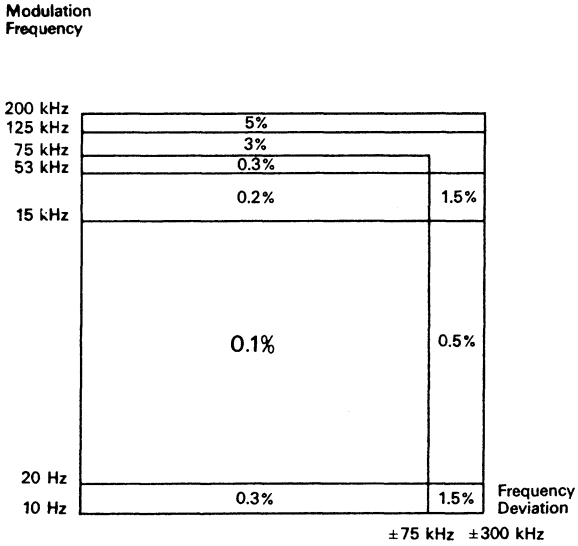


Fig. E4. Distortion for frequency deviation measurements.

both peaks of modulation: a difference indicates distortion of the modulating envelope. See Fig. E4, and refer to SECTION B - SPECIFICATIONS under "FM MODULATION - Distortion".

Residual FM on CW and AM signals

Proceed as described immediately above. Because of the very effective limiter stages in the FM detector, the residual FM caused by amplitude modulation is quite low, viz. 50 Hz (r.m.s.) at 50% AM when the band-pass filter (50 Hz - 15 kHz) is used. The residual FM at a carrier frequency within 15 - 250 MHz is less than 25 Hz FM (r.m.s.), and less than 100 Hz FM (r.m.s.) up to 1002 MHz, when measurements are performed in a room with an acoustical noise level lower than 60 dB (rel. 2 10^{-4} µbar) and the band-pass filter (50 Hz - 15 kHz) or one of the de-emphases (50 µs or 75 µs) is used. (See SECTION B - SPECIFICATIONS.)

If a resolution somewhat higher than that corresponding to the 3 kHz deviation range is wanted, an electronic voltmeter can be connected to the AF OUTPUT terminals. The external meter will read 1 volt for full deflection of the internal meter, i.e., with the METER switch set to 3, the deviation read on the electronic voltmeter will be 3 Hz per mV.

USING A CRYSTAL OSCILLATOR PLUG-IN UNIT, CODE 900-252

1) Remove the two screws and the plate covering the receptacle in which the Crystal Oscillator Unit is to be placed (see Fig. E5).

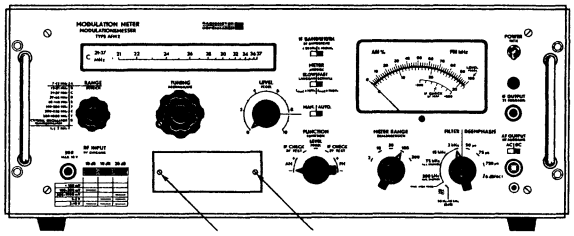


Fig. E5. The arrows show screws and plate to be removed when a plug-in unit is to be used.

2) Supply the Crystal Oscillator Unit with Crystals. Bear in mind that the crystals must have the frequency f_{cr} defined below:

$$f_{cr} = \frac{f_s - 2}{2n} \text{ MHz}$$

where f_s indicates the carrier frequency and n the odd harmonic of the crystal overtone frequency. The sensitivity specifications (see item INPUT LEVEL in SECTION C-ACCESSORIES or Fig. E6) are based on the combinations shown below of carrier frequency, order of harmonic, and range of crystal frequencies.

3) Position the Crystal Oscillator Unit in the Modulation Meter and fasten the two screws.

4) Switch the RANGE selector to position G - "CRYSTAL OSCILLATOR".

Carrier frequency	Order of harmonic	Range of crystal frequencies
f_s	n	f_{cr}
250 - 600 MHz	3	40 - 100 MHz
600 - 1000 MHz	5	60 - 100 MHz

5) Tune the Modulation Meter to the desired carrier frequency.

6) Switch the function selector to IF CHECK.

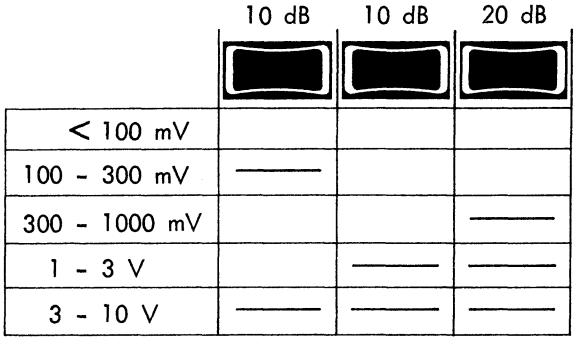
7) Switch the Crystal Oscillator Unit to the desired channel by means of the four-position selector.

8) Insert a screwdriver in the hole corresponding to the selected channel, and adjust the corresponding trimmer until the meter indicates IF CHECK.

9) If necessary, repeat steps 6 to 9 until all four channels are trimmed.

10) The Crystal Oscillator Unit, code 900-252, is now ready for use.

Proceed as described above for AM or FM measurements, but keep in mind that certain specifications of the Modulation Meter proper cannot apply, and refer to SECTION C under "Change in Specifications of AFM2 Caused by the Crystal Oscillator Unit", and see Fig. E6.



ATTENUATION	FREQUENCY RANGE	
	250 - 600 MHz	600 - 1000 MHz
0 dB	20 - 100 mV	30 - 100 mV
10 dB	100 - 300 mV	100 - 300 mV
20 dB	300 - 1000 mV	300 - 1000 mV
30 dB	1 - 3 V	1 - 3 V
40 dB	3 - 10 V	3 - 10 V

Fig. E6. Attenuation and sensitivity ranges when the Crystal Oscillator Unit, code 900-252, is in use.

USING AN EXTERNAL-OSCILLATOR AMPLIFIER, CODE 900-253

1) Remove the two screws and the plate covering the receptacle in which the External-Oscillator Amplifier is to be placed (see Fig. E5).

2) Position the External-Oscillator Amplifier in the Modulation Meter, and fasten the two screws.

3) Switch the RANGE selector to G - "CRYSTAL OSCILLATOR".

4) Feed the signal to be measured to the RF INPUT connector.

5) Feed the signal from the external oscillator to the INPUT connector.

6) Proceed as described above for AM or FM measurements.

Section F. Technical Description

RF INPUT CIRCUIT

The RF input signal is fed to the BNC connector on the front plate of the instrument, then passed through a resistive attenuator (providing for 10 dB, 20 dB, 30 dB or 40 dB attenuation) which is inserted to avoid overloading of the mixer and to adapt the Modulation Meter to RF signals in the range 3 mV to 10 V r.m.s.

All components of the RF attenuator are numbered between 1300 and 1399.

TUNER (See diagram No.1)

The local oscillator consists of Q103 in a common-base Hartley coupling. The same circuit configuration is used in all ranges. Only the tank circuit (C_C, C_B, and L_A) and the emitter capacitor C_A are exchanged to obtain the different fundamental ranges from 7 to 200 MHz. Up to 200 MHz, the mixing takes place with the fundamental frequency of the local oscillator. Mixing with input signals which have a frequency higher than 200 MHz is accomplished with the 3rd or 5th harmonics of the local oscillator.

The intermediate frequency is chosen to be 2 MHz, and both sidebands can be used; however, only the lower sideband can be used at 5 MHz RF input signal because the lower frequency limit of the local oscillator is 7 MHz.

With the selector RANGE in position CRYSTAL OSCILLATOR, the local oscillator is disconnected, and an oscillator providing for operation at a fixed frequency, such as the Crystal Oscillator Unit, code 900-252, may be used.

The signal from the RF attenuator and that from the local oscillator or the Crystal Oscillator Unit are fed to the diodes CR101 to CR104 which form a balanced mixer and provide for good insulation between the input terminals and the local oscillator or the Crystal Oscillator Unit, and thereby reduce the influence of stray radiation. The resulting 2 MHz signal is fed to the IF filter via T102.

The tuner has its own current limiters, i.e., Q101 for +12 V, and Q102 for -12 V.

All components of the tuner are numbered between 100 and 199.

IF FILTER (See diagram No.11)

The output impedance of the mixer is matched capacitively to that of the IF filter. In this fashion, variations of the output impedance of the mixer become uncritical. From T102, the intermediate frequency signal of 2 MHz passes through a band-pass filter which rejects unwanted mixing products. It is of the phase-linear type, and it has a bandwidth of ±400

kHz around the intermediate frequency. A high degree of phase-linearity is necessary to achieve measurements on FM signals with minimum distortion, especially when the modulation frequency is high.

All components of the IF filter are numbered between 200 and 299.

IF PREAMPLIFIER AND IF ATTENUATOR (See diagram No.III)

The three-stage IF preamplifier consists of Q301, Q302, and Q303. It protects the IF filter against load impedance variations from the IF attenuator. At the same time, it provides for amplification before the signal is fed to the IF attenuator. Amplification alongside with an almost ideal connection to the IF filter results in a minimum amount of noise at all input levels. The ohmic part of the IF amplifier input is matched by means of R304, and the reactive part by means of C306. The amplified IF signal is then fed to the IF attenuator via C308.

The IF attenuator (see Fig.F1) consists of R311 and the four diodes CR310 to CR304. R311 and the four diodes form a voltage divider with one fixed resistance and the variable resistance resulting from the combination CR301 - CR302 // CR303 - CR304. Combining these four diodes ensures linear characteristic and thereby minimum distortion. The resistance value resulting from the above combination depends on the biasing current of the four diodes. This biasing current is drawn from the collector of the current generator Q310. In position MAN. of the MAN.-AUTO switch, the base of Q310 is at a potential determined by the reference voltage source Q311. The emitter current of Q310, and thereby its collector current, is controlled by means of the potentiometer R1A (LEVEL) accessible from the front of the instrument. This results in regulation of the biasing current of the diode complex CR301 to CR304, and, therefore, in regulation of the IF level. Finally, the sensitivity of the IF attenuator at a given RF input voltage can be adjusted by means of R345.

When the switch MAN.-AUTO. is in position AUTO., the base of Q310 is at a voltage delivered by the AGC amplifier. The AGC amplifier consists of a differential amplifier Q512 and Q513 followed by a unity-gain amplifier Q308 and Q309. The base of Q513 is at a potential determined by the divider consisting of R1B (LEVEL), R552, R553, and R554. The base of Q512 receives a signal proportional to the IF level from the AM detector. The difference signal (if any) is then fed to the input (base of Q308) of the unity-gain amplifier driving the exponential amplifier Q310. The emitter of Q310 is at a voltage provided by the voltage reference source Q311. The emitter basis voltage of Q310, and thereby the biasing current of the diodes CR310 to CR304, is in this case controlled by the potentiometer R1B (LEVEL) and by the AGC amplifier.

All components of the IF preamplifier and IF attenuator are numbered between 300 and 399.

IF AMPLIFIER (See diagram No.III)

The signal from the IF attenuator is then fed to the IF amplifier which consists of the two wideband amplifier stages Q304, Q305 and Q306, Q307. The IF amplifier brings the IF signal to a voltage level higher than that required by the AM detector and thus provides for compensation of the attenuation in the following band-pass filter or phase-compensator.

All components of the IF amplifier are numbered between 300 and 399.

PHASE-COMPENSATOR AND BAND-PASS FILTER (See diagram No.IV)

The amplified IF signal is then fed to a phase-compensator or to a band-pass filter, according to the position of the IF BANDWIDTH switch. When the IF BANDWIDTH is in position ±400 kHz, the phase-compensator is switched in. It provides for compensation of the phase-error that arises in the IF filter. This phase error is due to the theoretical

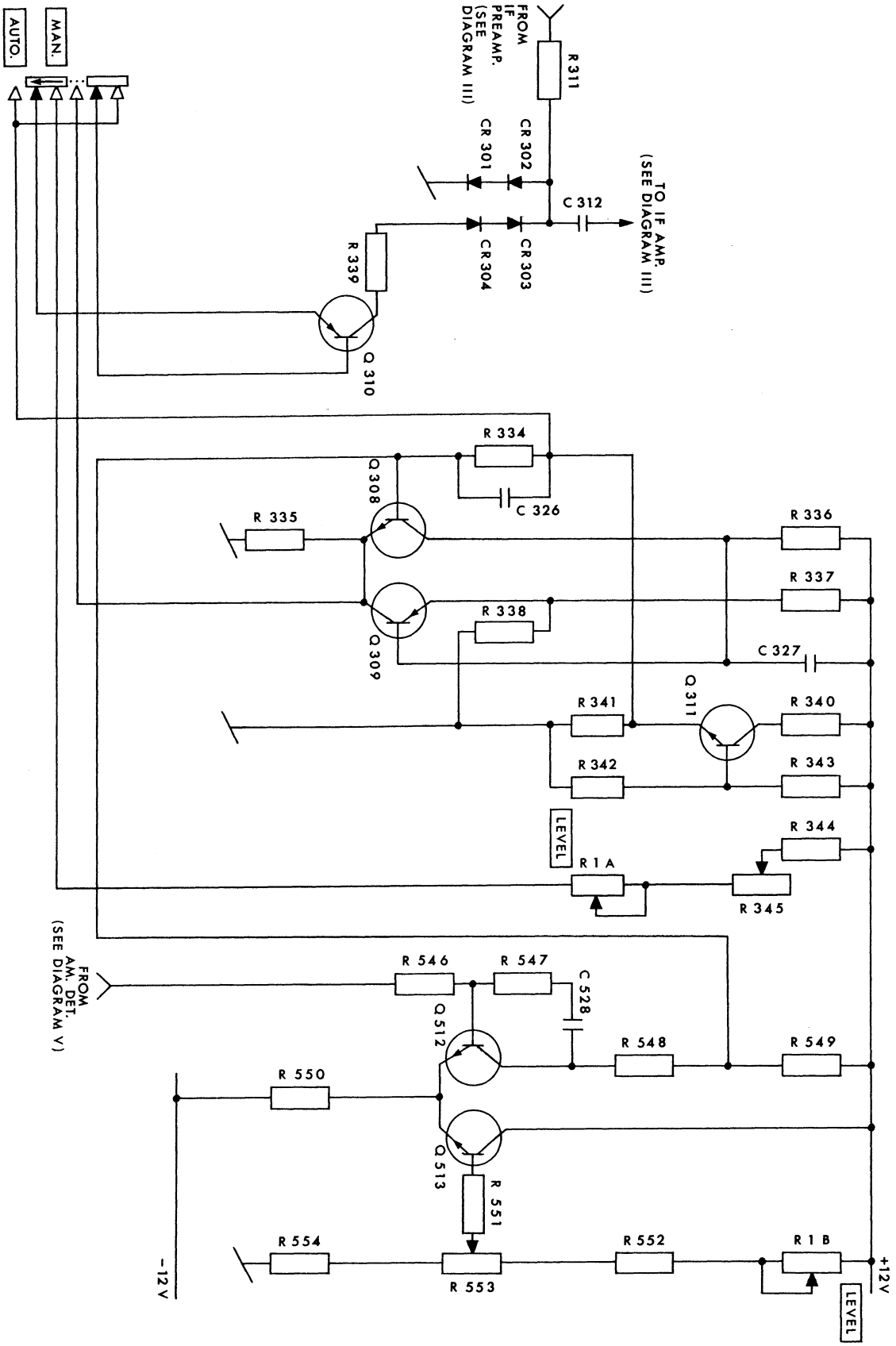


Fig. F1. IF attenuator and AGC amplifier.

asymmetry of the IF filter characteristic around the intermediate frequency. In the position ±25 kHz of the IF BANDWIDTH switch, the band-pass filter is switched on. It is of the same type as the IF filter concerning phase-linearity, but has a bandwidth of ±25 kHz, and is intended for use when measuring on signals from narrow-band equipment.

BUFFER AMPLIFIER (See diagram No.V)

The signal from the phase-compensator or the band-pass filter is fed to a buffer amplifier which separates filter, AM detector, and output amplifier. It consists of a two-stage unity-gain amplifier (Q501 and Q502) and serves to suppress any influence from the IF output. The signal from the buffer amplifier is fed both to the AM detector and to the IF output amplifier.

All components of the Buffer amplifier are numbered between 500 and 599.

AM DETECTOR (See diagram No.V)

The signal from the buffer amplifier is fed to the AM detector. It consists of a three-stage amplifier Q507, Q508, and Q509 with a mean-value detector CR505 and CR506 in the feedback loop. The feedback ensures a good linearity. A pair of output transistors, Q510 and Q511, provides for two outputs. The signal on the collector of Q511 is proportional to the IF level. This signal is fed via R546 to the differential amplifier which is part of the automatic level setting circuitry (described above), and, via R543 and R555, to a pair of complementary emitter-followers, Q514 and Q515, forming a dc output amplifier delivering voltage to the IF LEVEL (DC) output. The signal from the collector of Q511 is also fed via R544 to the indicating meter which provides for checking of the IF level.

The signal on the collector Q510 is the detected signal which is fed through a first low-pass filter section (L701, L702, C710 and C711 on diagram VII), via the network consisting of R537, R538, R539, and C530. R539 is used to calibrate the AM detector.

Note: The low-pass filter and the following AF section are described below.

All the components of the AM detector are numbered from 500 to 599.

IF OUTPUT AMPLIFIER (See diagram No.V)

The signal from the buffer amplifier is also fed to the IF output amplifier which consists of the four stages Q503, Q504, Q505, and Q506, and which provides for amplification of the IF signal to the level required by the following limiter stages. The two diodes CR502 and CR503 are used to protect the limiter input stage against too high a voltage.

All components of the IF output amplifier are numbered between 500 and 599.

LIMITER STAGES (See diagram No.VI)

General

The amplified IF signal is fed to a series of three limiters.

All components of the limiter stages are numbered from 600 to 699.

First limiter stage.

The first limiter stage consists of two emitter-coupled transistors, Q601 and Q602. Their working point is determined by the current delivered by the constant dc current generator Q607. The amplified IF signal from the IF output amplifier is fed to the base of Q601, whilst the base of Q602 is connected to ground. When a sufficient IF level is reached, Q601 and Q602 are cut-off, and the output voltage of the first limiter (at C605) is a square-wave. The peak-to-peak value of this square-wave is fixed by the constant current generator Q607. The first limiter is provided with a regulation circuit which holds the zero-crossing of the square-wave output voltage. The regulation circuit consists of a peak-dif-

ference detector, CR601 and CR602, and a differential amplifier, Q603 and Q604, where any signal from the peak-difference detector is compared with the dc component of the square-wave. The output signal of the differential amplifier (if any) is fed to the bases of Q601 and Q602 via the two emitter-followers Q605 and Q606.

Subsequent limiter stages

From C605, the square-wave signal is fed to two subsequent limiter stages Q608-Q609 and Q610-Q611 where it is again limited. The resulting signal is then fed to the FM detector via Q612.

FM DETECTOR (See diagram No. VII)

The FM detector consists of a monostable multivibrator and an output stage.

The multivibrator consists of Q701 and Q702. It is triggered by the train of positive pulses from the last limiter stage. This train of pulses is fed to the base of Q701 via C701. Transistor Q701 is cut-off when no IF signal is applied to its base whilst transistor Q702 conducts, and conversely.

The multivibrator has a time-constant determined by R707, R708 and C703, and it delivers a square-wave signal across R702. The positive pulses drive the output stage which consists of Q703 and Q704. The working points of the two transistors of the output stage are determined by the constant dc current generator Q708. The peak value of the square-wave is detected by CR704 and amplified in Q705 and Q706, which in turn drive the constant-current generator Q708 via Q707, thereby regulating amplitude variations. As the width of the pulses and their amplitude are constant, the mean value of the output voltage of the output stage will vary according to the number of pulses per second of the square-wave, i.e., according to the modulating frequency. Frequency-modulation of the IF signal will cause a variation of the output voltage of the output stage. This signal is then passed, via a low-pass filter consisting of L701, L702, C710 and C711, to the AF section described below.

A positive voltage, varying proportionally to the modulating frequency, is drawn from the collector of Q704 and, via R726 and R727, fed to a unity-gain amplifier stage consisting of the double transistor Q709 and Q710 and Q711. The amplifier signal present on the emitter of Q711 is fed via R734 to the IF FREQ. (DC) output, whilst the other part is fed via R736 to the meter when the selector FUNCTION is in IF CHECK position. R737 and R739 provide for fine adjustment of IF CHECK position and gain.

The monostable multivibrator and the output stage are provided with their own +10 V and -10 V regulated power supplies. They consist of Q613, Q614, Q615 and Q616 for +10 V, and Q617, Q618, Q619 and Q620 for -10 V. (See diagram VI)

All components of the FM detector are numbered between 700 and 799.

AF AMPLIFIERS I AND II
(See diagram VIII)

The signal from the AM detector is fed to the second low-pass filter, consisting of L801, L802, L803, L804, L805, C801, C802, C803 and C804, when the selector FUNCTION is in one of the positions AM. The signal from the FM detector is fed to the second low-pass filter when the selector FUNCTION is in one of the positions FM. The low-pass filter is characterized by its good phase-linearity and its almost flat frequency response, which are both required for passing a stereo signal with minimum distortion.

The filtered signal is then passed through the first section of a two-section resistive AF attenuator (see diagram XII) and fed to the first AF AMPLIFIER, which consists of Q801, Q802, and Q803.

The amplified signal at the collector of Q803 is passed via the second section of the AF attenuator (see diagram XII) and fed to the second AF AMPLIFIER, which consists of Q804, Q805 and Q806. It provides for the necessary amplification and for the low output impedance required for coupling to the subsequent low-pass filter.

All components of the AF AMPLIFIERS I and II are numbered from 800 to 899.

AF AMPLIFIERS III - V (See diagram IX)

The amplified signal from amplifier II is fed to the low-pass filter, which consists of L901, L902, L903, C901, and C902, and which provides for limitation of the noise bandwidth in the AF section of the instrument without deterioration of the phase-linearity and frequency-response.

The filtered signal is then passed through the third AF amplifier. It is a unity-gain amplifier, consisting of Q901 and Q902, which is part of the active filter switched in when the FILTER/DEEMPHASIS selector is in position 3 kHz, 15 kHz and 50 Hz - 15 kHz (3 dB). It acts as a buffer in the other positions of the FILTER/DEEMPHASIS selector. For filter characteristics, see SECTION B - SPECIFICATIONS. The de-emphasis networks and the 6 dB/oct filter are regular RC networks.

The following AF amplifiers IV and V, consist respectively of Q903, Q904, Q905, Q906, Q907, and Q908, Q910, Q911 and Q912. They bring the signal up to the level required by the AF detector.

The AF OUTPUT signal is drawn from the emitter of Q907 via R920 when the AF OUTPUT switch is in position DC, and via R920 and C911 when the AF OUTPUT switch is in position AC.

All the components of the AF amplifiers III - V are numbered from 900 to 999.

AF DETECTOR (See diagram X)

The signal from the emitter of Q912 is fed to the AF detector which consists of diodes CR1001 and CR1002. Diode CR1002 is used for detection of the negative peaks of modulation, whilst diode CR1001 is used for detection of the positive modulation peaks. Selection of the peak of modulation (positive or negative) is done by means of the FUNCTION selector in the positions AM or FM.

The detected signal is then fed to an impedance converter so that it can be fed to the MOD.LEVEL (DC) output and to the meter.

All the components of the AF detector are numbered from 1000 to 1099.

POWER SUPPLY (See diagram XI)

The power supply provides for the regulated dc voltages (-12 V, 0 V, +12 V) required by the different sections of the instrument. (For -10 V and +10 V supply, see FM DETECTOR.)

All the components of the power supply are numbered from 1100 to 1199.

Section G. Maintenance

The following maintenance procedure is based on the assumption that any printed circuit found defective is replaced by a new one delivered by Radiometer and prealigned at the factory. This procedure reduces adjustments in the field to a minimum. However, the test instruments necessary to make these field adjustments must be of high quality to achieve the required standard of performance of the AFM2.

TEST INSTRUMENTS REQUIRED

The following is a list of preferred instruments. Any alternatives must have equivalent specifications and should possess the same degree of accuracy.

Instruments:

Signal generators (referred to in the text as Sig.Gen.) to cover 5 - 1000 MHz, 50 Ω impedance, as follows:

1 Hewlett Packard 606B (50 kHz-65 MHz)
1 Hewlett Packard 608E (10 MHz-480 MHz)
1 Hewlett Packard 612A (450 MHz-1230 MHz)

1 AF Oscillator, Radford LDO, distortion $< 0.01\%$ (referred to in the text as AF Osc.)
1 Oscilloscope, for example, Philips PM3231
1 DC DVM (digital voltmeter), Hewlett Packard 3403A
1 AC DVM, Hewlett Packard 3430A
1 AC VTVM, Hewlett Packard 400E or equivalent (1%, with scales calibrated in rms)

Miscellaneous

1 Resistor, 500 Ω ±0.1%, 0.25 W, precision carbon film
2 Resistors, 10 kΩ ±0.1%, 0.25 W, precision carbon film
2 Resistors, 1 MΩ ±0.1%, 0.25 W, precision carbon film
1 Capacitor, 0.47 µF (30 V wkg. is suitable)
1 Hexagonal Key, 2.5 mm (at least 75 mm in length)

DISMANTLING

To remove the AFM3 from its case proceed as follows:

a) Stand the instrument on its rear panel.
b) Remove the four hexagonal bolts located beside the carrying handles on the front panel.
c) Carefully lift the instrument out of the case.

PRELIMINARY

Prepare the following items:

a) Refer to Fig.G1 and connect two 1 MΩ ±0.1% resistors in series. Connect a 500 Ω ±0.1% resistor in parallel and connect the 0.47 µF capacitor as shown.

b) Prepare an attenuator as shown in Fig.G2 from two 10 kΩ ±0.1% resistors.

REPLACEMENT AND REALIGNMENT PROCEDURE OF THE PRINTED CIRCUIT BOARDS

TUNER printed circuit board

1) Fig.G4 shows the location of the TUNER and Fig.G5 shows a top view of the TUNER assembly.

2) To remove the TUNER printed circuit rotor, first remove the cover plate of the TUNER (pry up).

3) Remove the 7 screws retaining the circular printed rotor. Carefully pull the rotor out of the fixed contacts and then lift out. Replace the new rotor in the opposite sequence. Check the orientation of the rotor and take extreme care not to damage the contacts on the fixed printed circuit board. Before securing the 7 retaining screws, check that the rotor does not foul the fixed printed circuit board. Check that it is properly centred and that the contacts mesh correctly (no overlapping of the contacts).
To remove the fixed TUNER printed circuit board, proceed as follows:

4) Remove the TUNER printed circuit rotor as described in 3) above.

5) Turn the TUNING knob fully counterclockwise.

6) Insert a 2.5 mm hexagonal key through the hole in the bottom chassis support plate and loosen the set screw in the coupling of the variable capacitor.

7) Unsolder the 10 leads and cables soldered to the printed circuit board, taking care not to damage the leads or the cable insulation. Do not use excessive heat when unsoldering these connections.

8) Remove the three screws securing the printed circuit board.

9) Using the blade of a screwdriver inserted through the hole in the bottom chassis support, hold the coupling in place and carefully pull out the printed circuit board.

10) To replace the printed circuit board, proceed as follows:

11) Again using the blade of a screwdriver inserted through the hole in the bottom chassis support, guide the coupling into position over the variable capacitor shaft and mount the printed circuit board into place.

12) Insert the three retaining screws, but do not tighten them at this point.

13) Mount the printed circuit rotor as described above in 3).

14) Secure the three retaining screws when both the rotor and fixed printed circuit boards are orientated correctly.

15) Rotate the variable capacitor until fully meshed.

16) Tighten the screw in the coupling, using the 2.5 mm hexagonal key.

17) Proceed to the electrical adjustments as follows:

18) Set the following controls:

RANGE switch to A
TUNING to 7 MHz
IF BANDWIDTH to ±400 kHz
MAN./AUTO switch to MAN.
FUNCTION switch to LEVEL
LEVEL potentiometer fully clockwise.

19) Connect the Sig. Gen. (HP606B) to the RF INPUT connector of the AFM2

20) Set the Sig. Gen. to 9 MHz.

21) Adjust the Sig. Gen. output until a suitable indication on the METER of the AFM2 is obtained.

22) Using a trimming tool, adjust the oscillator coil for RANGE A (marked on the circular printed circuit rotor) for a maximum deflection on the METER. If the METER overshoots, turn the LEVEL knob anticlockwise until a suitable deflection is obtained.

23) Reset the Sig. Gen. to 10 MHz.

24) Reset the TUNING to 12 MHz.

25) Using a trimming tool, adjust the oscillator trimming capacitor to RANGE A (located next to the oscillator coil for RANGE A) for a maximum deflection on the METER.

26) Because of interaction between these adjustments, it will be necessary to repeat 22) to 25) inclusive several times until the maximum deflection occurs at the respective TUNING settings without readjustment.

27) Repeat 17) to 26) on the remaining ranges B, C, D, E and F at the appropriate range frequencies, choosing the Sig. Gen. necessary to cover the range in question.

IF FILTER (WIDE) and IF AMPLIFIER/IF ATTENUATOR printed circuit boards

These two printed circuit boards are matched at the factory and must be replaced as a matched pair. No realignment adjustments are necessary.

28) To replace the IF FILTER (WIDE) proceed as follows:

29) Remove the cover plate by unscrewing the four screws A (two shown in Fig. G7).

30) Unsolder the input and output cables to the printed circuit board, taking extreme care not to damage the cables or the nearby components by overheating.

31) Using a fine-bladed angle screwdriver, unscrew the four screws securing the printed circuit board to the housing.

32) Lift the printed circuit board out.

33) Replace in the opposite sequence, again taking extreme care when soldering the input and output cables.

34) When IF FILTER (WIDE) is replaced, the IF AMP/ATTENUATOR printed circuit board must also be changed out (or vice versa), as these two boards are matched at the factory in pairs.

35) To change out the IF AMP/ATTENUATOR board, first remove the retaining bar C by loosening the two screws D shown in Fig. G7 and sliding the bar until it can be lifted over the screws.

36) The printed circuit board may then be withdrawn. Some resistance will be felt when disengaging the multiconnector.

37) When replacing the board, first make sure that it is located in the correct position and then slide it into the guides. Some resistance will be felt when engaging the multiconnector. Make sure that the board is pressed fully in.

IF FILTER (NARROW) printed circuit board

38) No realignment adjustments are necessary when replacing this printed circuit board.

AM DETECTOR + IF AMPLIFIER printed circuit board

39) Connect the DC DVM to the IF LEVEL (DC) jacks.

40) Turn the LEVEL potentiometer counterclockwise.

41) Adjust potentiometer R558 (see Fig.G6) until the DC DVM indicates 0 V ±2 mV.

42) Disconnect the DC DVM.

43) Set the FUNCTION switch to LEVEL.

44) Set the METER RANGE switch to 3 and the IF BANDWIDTH to ±400 kHz.

45) Set the FILTER/DEEMPHASIS switch to 50 Hz-15 kHz.

46) Check that the MAN./AUTO switch is still set to MAN.

47) Remove the cover of the TUNER (pry up) and unsolder the cable W2, shown in Fig.G5.

48) Connect the output of the Sig. Gen. to the cable.

49) Set the Sig. Gen. to 2 MHz ±1 kHz and adjust the output until the METER on the AFM2 deflects to the LEVEL mark.

50) Note the output level on the Sig. Gen. and then reduce this output by 10 times (20 dB).

51) Set the MAN./AUTO switch to AUTO.

52) Set the LEVEL potentiometer to 5.

53) Adjust the potentiometer R553, shown in Fig.G6. until the METER again deflects to the LEVEL mark.

54) Disconnect the Sig. Gen. and reconnect the cable W2. Replace the TUNER cover plate.

55) Set the MAN./AUTO switch to MAN. and the IF BANDWIDTH to 20 kHz.

56) Connect an oscilloscope to terminals J500/5 and J500/6 (0 V).

57) Connect the Sig. Gen. to the RF INPUT socket and set the frequency to 2 MHz.

58) Set the RANGE to scale A.

59) Set the LEVEL potentiometer to about half way.

60) Adjust the output of the Sig. Gen. until the METER on the AFM2 deflects to the LEVEL mark.

61) Adjust the oscilloscope and check that the display shows a sine waveform.

62) Turn the LEVEL potentiometer clockwise until the display just shows the commencement of "flats" on the peaks of the display.

63) Adjust potentiometer R514, shown in Fig. G6, until the "flats" on the sine waveform are symmetrical with respect to the x-axis.

64) Set IF BANDWIDTH to ±400 kHz.

65) Set Sig. Gen. to 12 MHz with an AM modulation of 1 kHz at about 30%. The output level should be about 30 mV.

66) Carefully unsolder the cable W16 from terminal J800/16. (AF AMPLIFIER I-II.)

67) Connect the prepared assembly shown in Fig.G1 as follows:

Connect point A to tag 8 on J700
Connect point B to tag 16 on J800.
Connect point C to the centre conductor of cable W16.

68) Withdraw the AF AMPLIFIER I-II printed circuit board and connect a temporary short circuit across the capacitor C805. (See Fig.H8 for location.) Replace the board back into the AFM2.

69) Withdraw the AM DET. printed circuit board and refer to Figs.G3 and H5. Proceed as follows:

Temporarily disconnect strap A on tag block TB501.
Temporarily connect straps C and D.
Replace the board back into circuit.

70) Set FILTER/DEEMPHASIS to 3 kHz.

71) Set METER RANGE switch to 100.

72) Set MAN./AUTO switch to AUTO.

73) Connect the DC DVM between the points A and B, shown in Fig.G1.

74) Set the FUNCTION switch to LEVEL and adjust the LEVEL potentiometer until the METER on the AFM2 deflects to the LEVEL mark.

75) Set the FUNCTION switch to IF CHECK and adjust the TUNING knob until the METER on the AFM2 deflects to the IF CHECK mark.

76) Set the FUNCTION switch to +AM and adjust the trimmer potentiometer R539, shown in Fig.G6,until the DC DVM indicates 93.9 mV. This value will be referred to as U1.

77) Connect the AC VTVM to the AF OUTPUT connector and note the value obtained.

78) Now connect the attenuator shown in Fig.G2 to the AF OUTPUT connector, connecting point D to the centre conductor and point F to the outer screen.

79) Connect the AC VTVM between points E and F.

80) Set the MAN./AUTO switch to MAN and adjust the LEVEL potentiometer until the AC VTVM indicates the same value as was noted in 77) above.

81) Now note the voltage indicated on the DC DVM. This value will be referred to as U2.

82) Check that U2-U1 = 94.9 mV.

83) If U2-U1 is greater than 94.9 by a value x (i.e. U2-U1 = 94.9 + x), readjust R539 until the value indicated by the DC DVM = 93.9 mV - x.

84) Repeat 83) until U2-U1 = 94.9 mV.

85) Disconnect the DC DVM and the AC VTVM. Remove the attenuator from the AF OUTPUT socket. Unsolder the assembly from J700/8-J800/16 and resolder the cable W16 to tag 16 on J800.

86) Replace the strap A and disconnect the straps C and D (shown in Fig.G3) on the AM DETECTOR printed circuit board.

87) Disconnect the short circuit across C805 on the AF AMPLIFIER printed circuit board.

LIMITER printed circuit board

88) Connect the DC DVM between tags 15 (0 V) and 16 on J600 (LIMITER).

89) Using a trimming tool, adjust potentiometer R660, shown in Fig.G7, until the DC DVM indicates +10 V dc ±0.5%.

90) Disconnect the DC DVM.

FM DETECTOR printed circuit board

91) Set the FUNCTION switch to LEVEL.

92) Set the METER RANGE switch to 3.

93) Set the IF BANDWIDTH to ±400 kHz and the MAN./AUTO switch to MAN.

94) Set the FILTER/DEEMPHASIS switch to 50 Hz - 15 kHz and the RANGE to A.

95) Locate the FM Detector printed circuit board and unsolder the centre conductor of cable W9 at tag 5 on J700.

96) Solder the assembly shown in Fig.G1, as follows: Point A to tag 5 of J700 and point B to tag 8 of J700. Point C on the assembly is not used in this check.

97) Connect the DC DVM between tag 8 of J700 and point H of the assembly.

98) Connect the Sig. Gen. to the RF INPUT and set the frequency to 10 MHz.

99) Set FUNCTION to IF CHECK and tune the AFM2 (about 8 MHz) until the METER indicates the IF CHECK mark. Reset FUNCTION to LEVEL and adjust the LEVEL pot. until the METER indicates the level mark.

100) Reset the FUNCTION to -FM.

101) Using a trimming tool, adjust the potentiometer R708, shown in Fig.G6, until the DC DVM indicates 955 mV.

102) Disconnect the DC DVM and resistance assembly. Reconnect the inner conductor of cable W9.

IF CHECK realignment adjustments

103) Set the Sig. Gen. to 2 MHz.

104) Set the LEVEL potentiometer to position 10.

105) Set the FUNCTION switch to LEVEL.

106) Adjust the output level of the Sig. Gen. until the METER deflects to the LEVEL mark on the scale.

107) Reset the FUNCTION switch to IF CHECK.

108) Using a trimming tool, adjust the potentiometer R737, shown in Fig.G7, until the METER deflects to the IF CHECK mark.

109) Vary the 2 MHz setting of the Sig. Gen. by + and - 200 kHz and check that the deflection on the METER corresponds to + and - 200 kHz from the IF CHECK mark, ±10 kHz.

110) Disconnect the Sig. Gen.

AF AMPLIFIER I-II printed circuit board

111) Withdraw the AF AMPLIFIER III-V printed circuit board.

112) Unsolder the centre conductor of cable W15 from tag 15 of J800.

113) Set the FILTER/DEEMPHASIS to 6 dB/oct.

114) Set the METER RANGE to 3.

115) Connect the DC DVM between the tags 2 and 3 (0 V) of J800.

116) Using a trimming tool, adjust the potentiometer R803, shown in Fig.G6, until the DC DVM indicates 0 V ±10 mV.

117) Replace the AF AMPLIFIER III-V printed circuit board.

118) Adjust the AF AMPLIFIER III-V printed circuit board as set out in 120) to 131) below.

119) Adjust the AF DETECTOR printed circuit board as set out in 132) to 134) below.

AF AMPLIFIER III-V printed circuit board

120) Set FUNCTION to +AM.

121) Set METER RANGE to 100.

122) Using a trimming tool, adjust potentiometer R929, shown in Fig.G6, until the METER on the AFM2 indicates zero.

123) Set the METER RANGE to 30.

124) Set the FILTER/DEEMPHASIS switch to 200 kHz.

125) Connect the AF Osc. between tags 4 and 6 (0 V) on J700 (FM DET.) and set the frequency to 1 kHz.

126) Connect the AC DVM between tags 15 and 18 (0 V) on J800 (AF AM I-II).

127) Adjust the output of the AF Osc. until the AC DVM indicates 20 mV rms.

128) Disconnect the AC DVM and reconnect it to the AF OUTPUT connector.

129) Using a trimming tool, adjust potentiometer R909, shown in Fig.G4, until the AC DVM indicates 0.672 V (rms value).

130) Using a trimming tool, adjust the potentiometer R923, shown in Fig.G4, until the METER on the AFM2 indicates 30.

131) Disconnect the AF Osc. and the AC DVM.

AF DETECTOR printed circuit board

132) Set the FUNCTION switch to -AM.

133) Set the METER RANGE to 100.

134) Using a trimming tool, adjust potentiometer R1002, shown in Fig.G7, until the METER on the AFM2 indicates zero.

POWER SUPPLY printed circuit board

135) No realignment is necessary after replacing the POWER SUPPLY printed circuit board.

RF ATTENUATOR printed circuit board

136) No realignment is necessary after replacing the RF ATTENUATOR printed circuit board.

137) To replace the RF ATTENUATOR printed circuit board, proceed as follows:

138) Remove the TUNER cover plate (pry up).

139) Remove the cover of the attenuator by unscrewing the two securing screws.

140) Unsolder the input cable at the RF INPUT connector and loosen the nut securing the connector. (To give further access to the attenuator and the RF INPUT connector, it is recommended that the left-hand side frame of the chassis be removed by unscrewing its 6 mounting screws, 2 on the front panel and 4 on the side frame.)

141) Unsolder the cable from the attenuator inside the TUNER and withdraw it from the screening tube between the TUNER and the attenuator.

142) Remove the screw located to the right-hand side of the attenuator pushbuttons and lift the attenuator assembly out of the chassis.

Note: When replacing the attenuator assembly, secure the screws carefully and check that the pushbuttons do not foul the front panel.

METER

143) If the meter has been changed out, it will be necessary to realign the following printed circuits in models with serial numbers up to 173610:

AF AMPLIFIER I-II
AF AMPLIFIER III-V
AF DETECTOR

144) With models of serial numbers above this, no realignment adjustment is necessary after replacement of the meter.

REPLACEMENT OF THE SCALE CORDS

Refer to Figs. G8 and G9.

Two cords are used, a long and a short. The long cord couples the cursor to the drive wheel. The short cord couples the TUNING knob shaft to the drive wheel.

To facilitate replacement, remove first the scale drum. This is done by unscrewing the screws at each side of the scale window. Take care not to scratch the window, which is retained in place by the screws securing the scale drum. After replacement of the

cords, remount the scale drum and window, taking care not to scratch the window. Check that the scale exposed in the window corresponds to the RANGE setting.

Using a hexagonal key, loosen the two screws securing the drive wheel to the shaft. Turn the TUNING knob until the cursor is in its extreme left-hand position. Check that the capacitor in the TUNER is fully meshed. Set the reference line on the cursor over the little trimming mark to the left of the scale and tighten the screws securing the drive wheel.

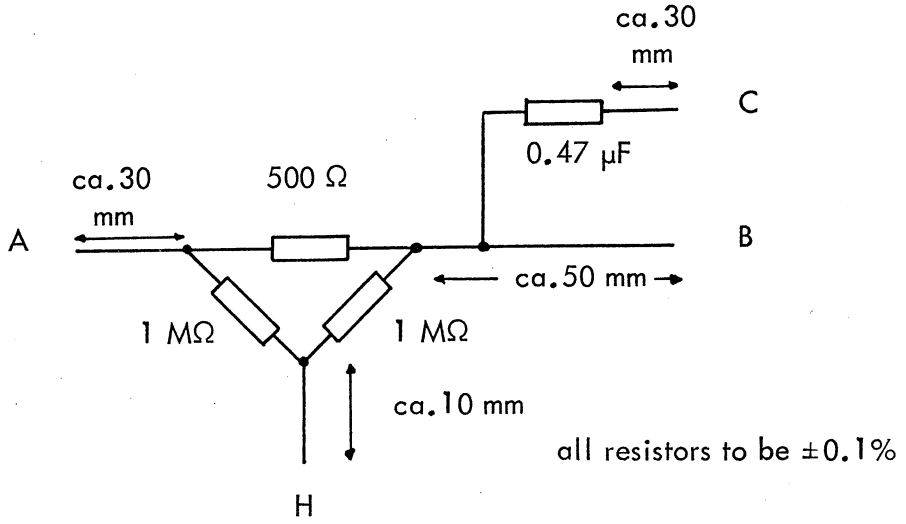


Fig.G1.

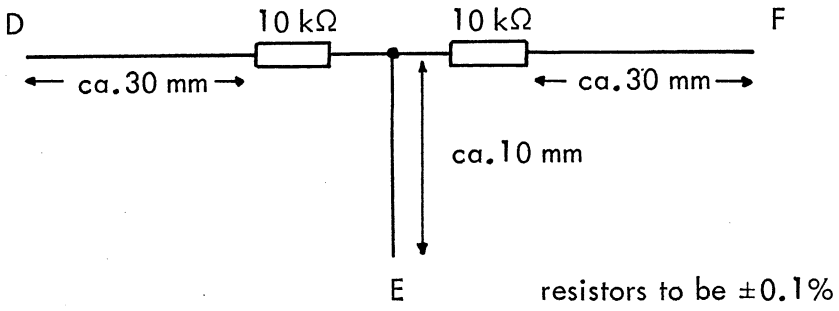


Fig.G2.

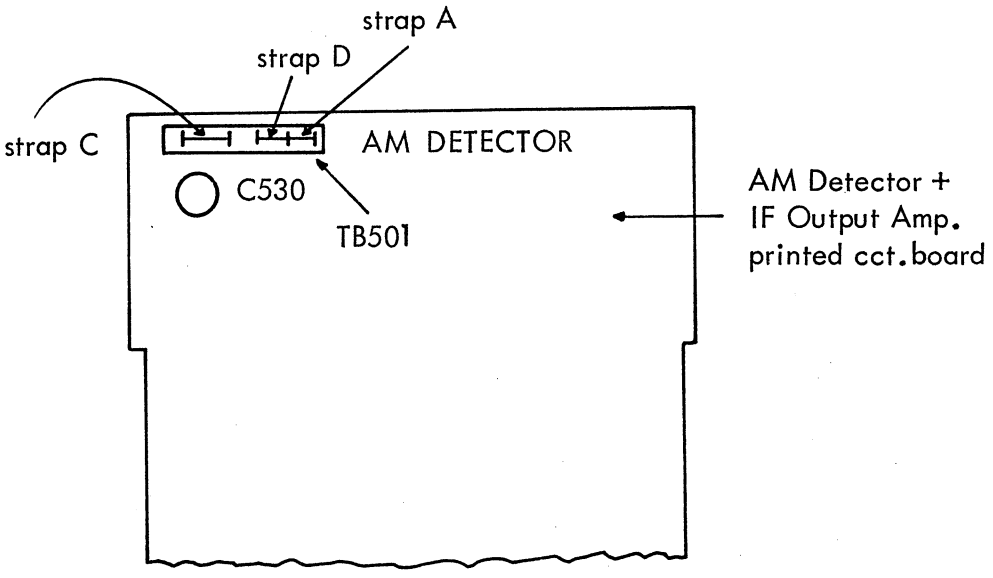


Fig.G3.

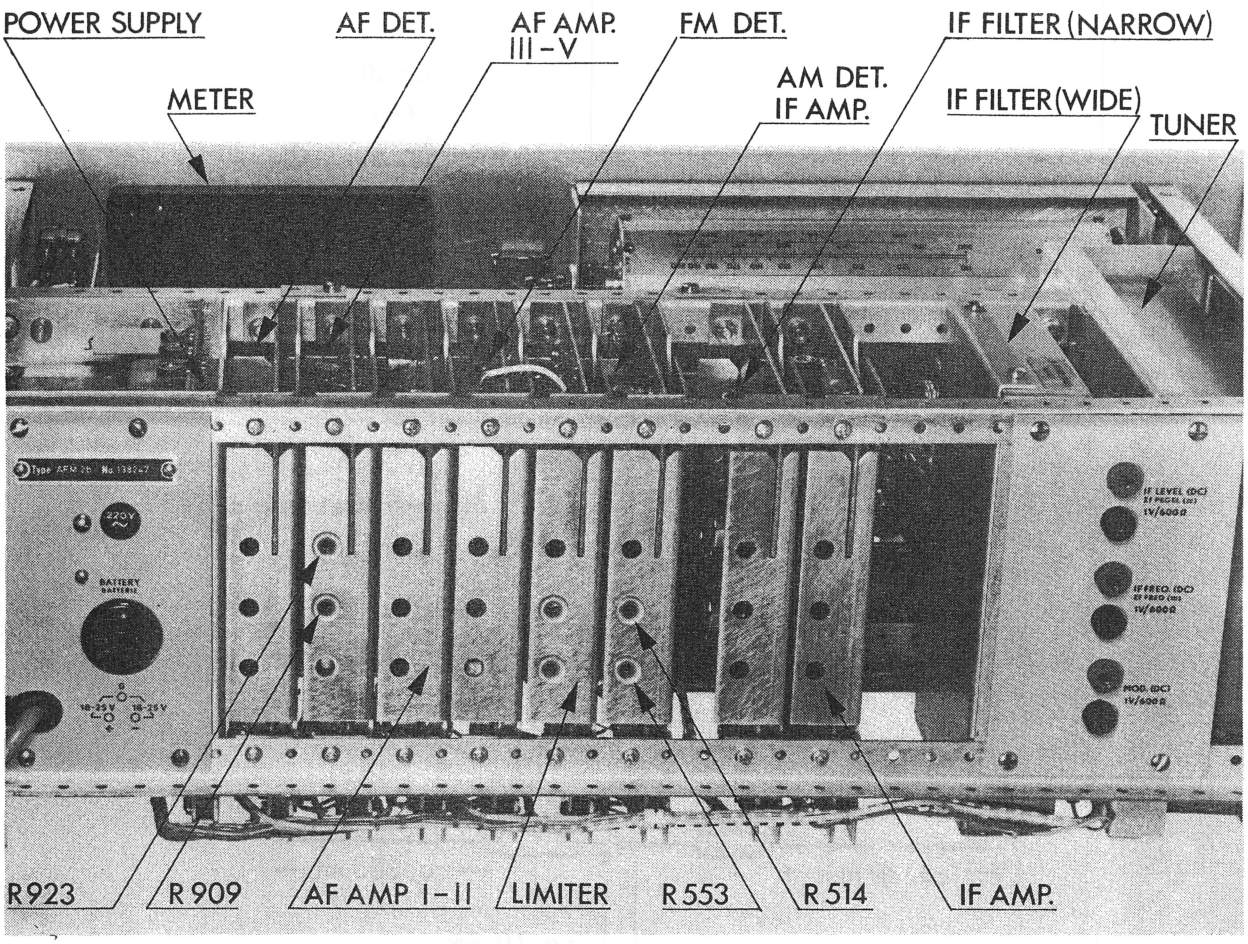

POWER SUPPLY
METER
AF DET.
AF AMP. III-V
FM DET.
AM DET. IF AMP.
IF FILTER (NARROW)
IF FILTER (WIDE)
TUNER
R923
R 909
AF AMP I-II
LIMITER
R 553
R 514
IF AMP.

Fig. G4.

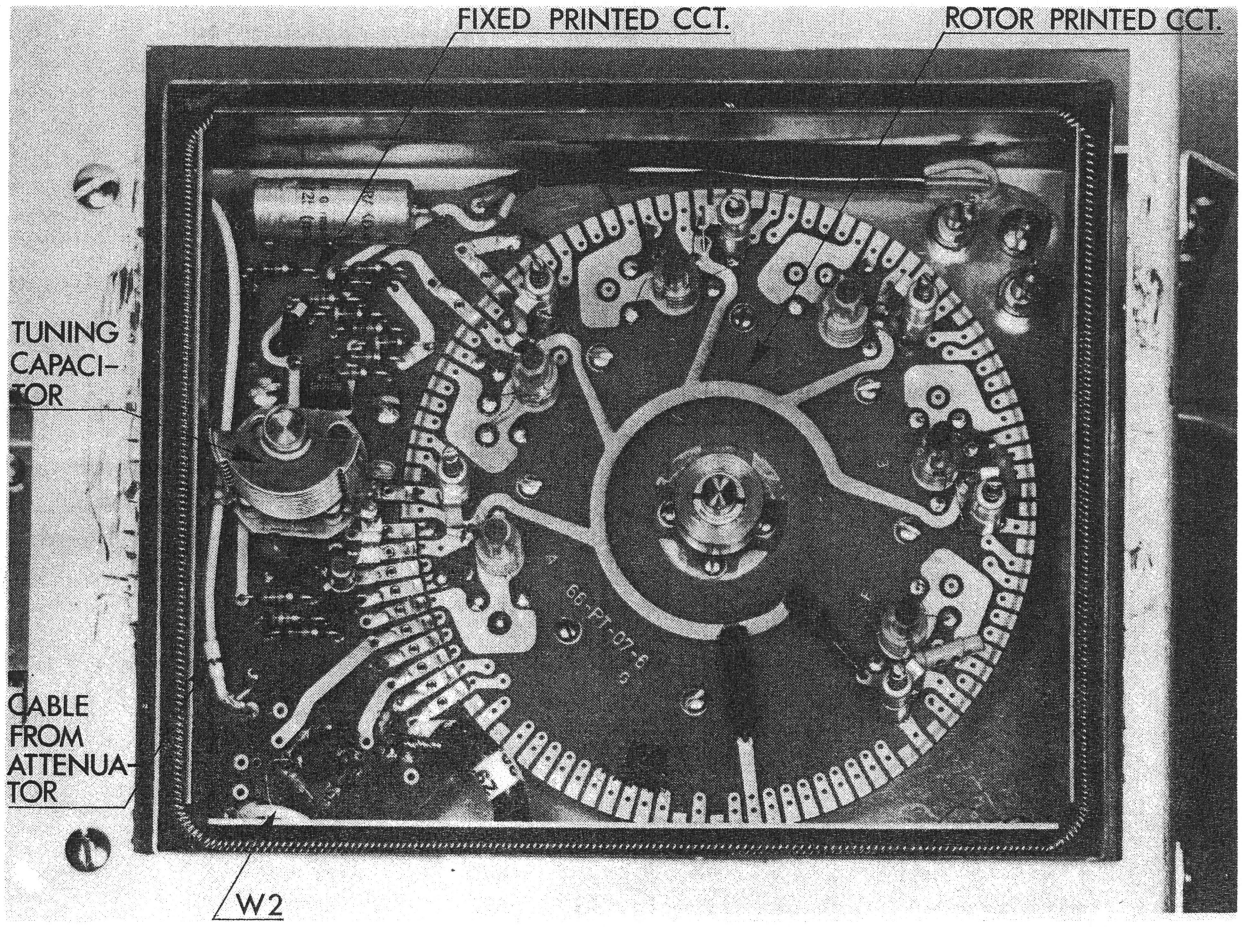

FIXED PRINTED CCT.
ROTOR PRINTED CCT.
TUNING CAPACI-TOR
CABLE FROM ATTENUA-TOR
W2

Fig. G5.

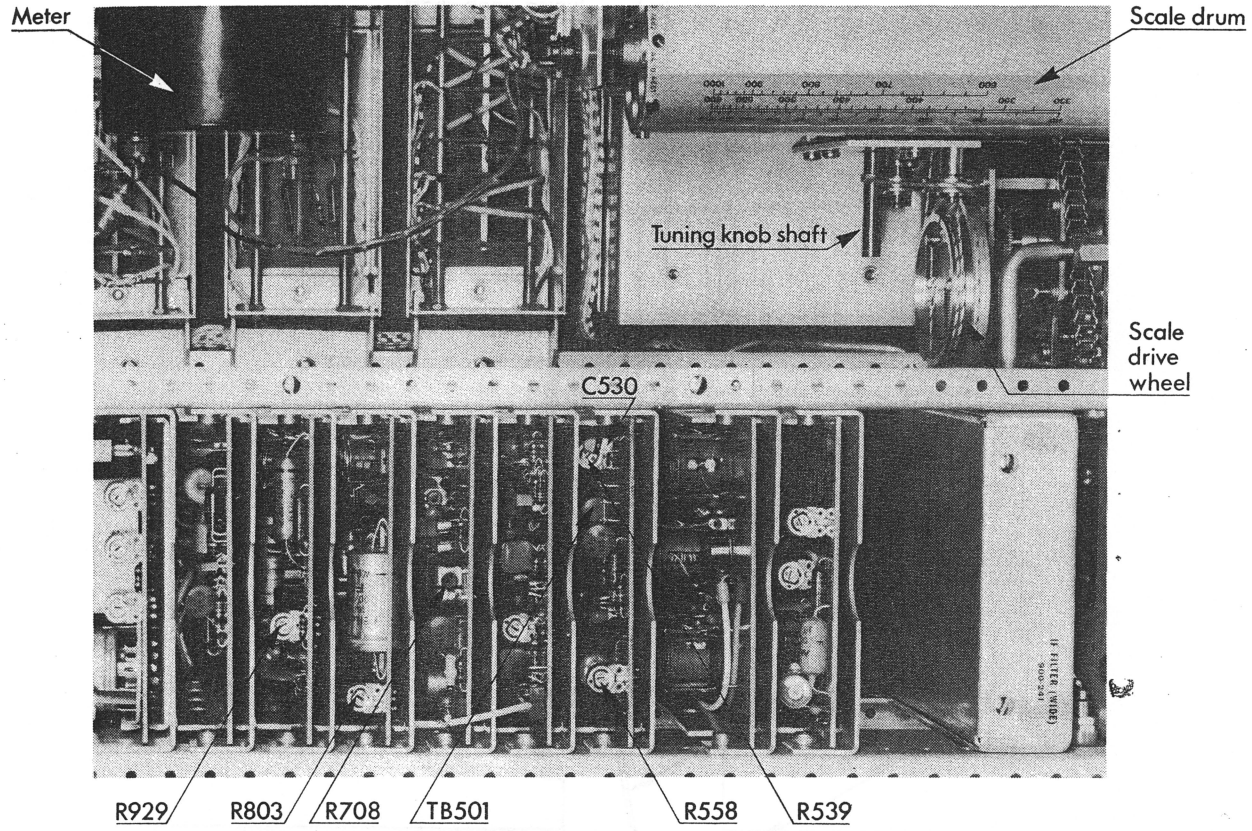

Meter
Scale drum
Tuning knob shaft
Scale drive wheel
C530
R929
R803
R708
TB501
R558
R539

Fig. G6.

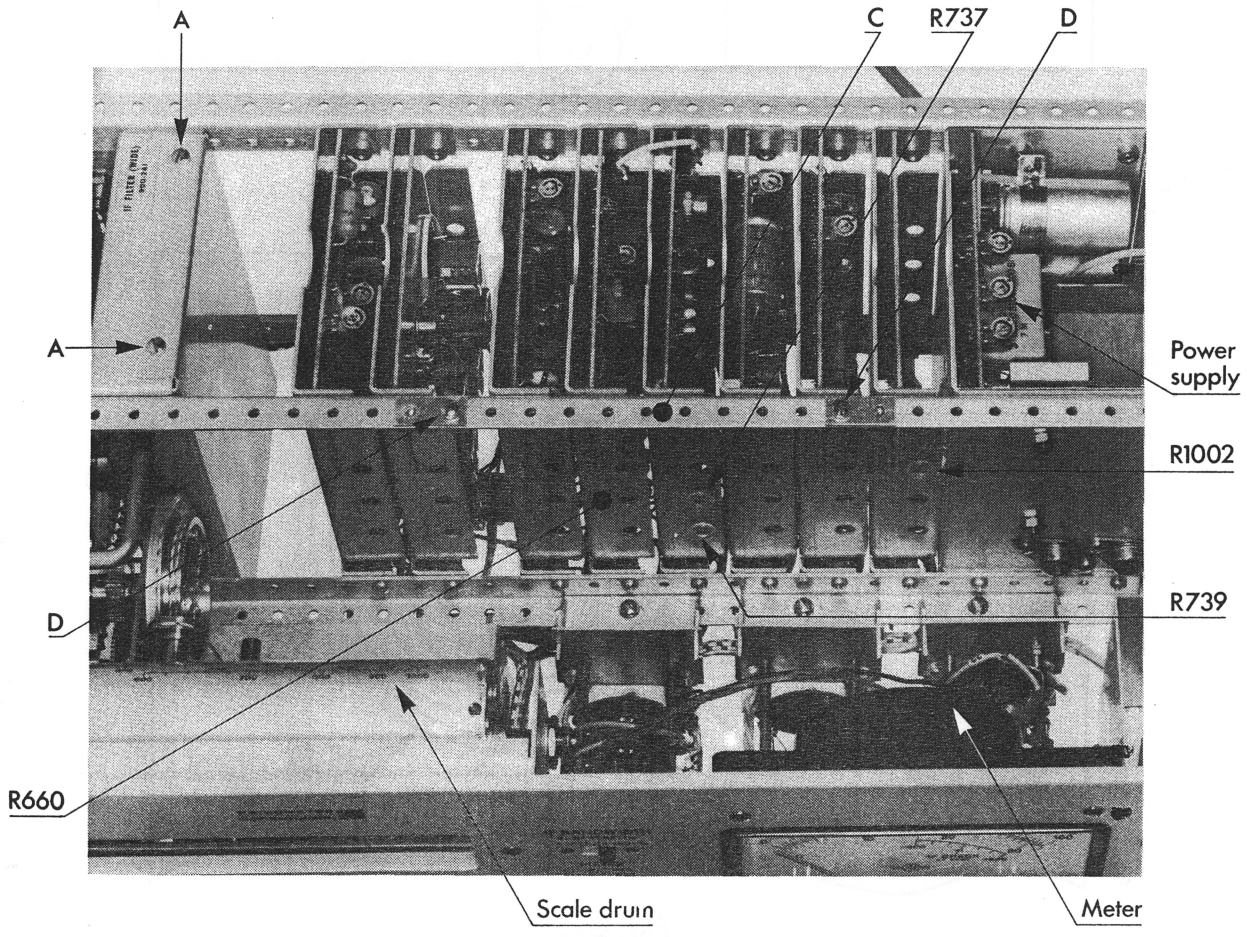

A
C
R737
D
A
Power supply
R1002
D
R739
R660
Scale drum
Meter

Fig. G7.

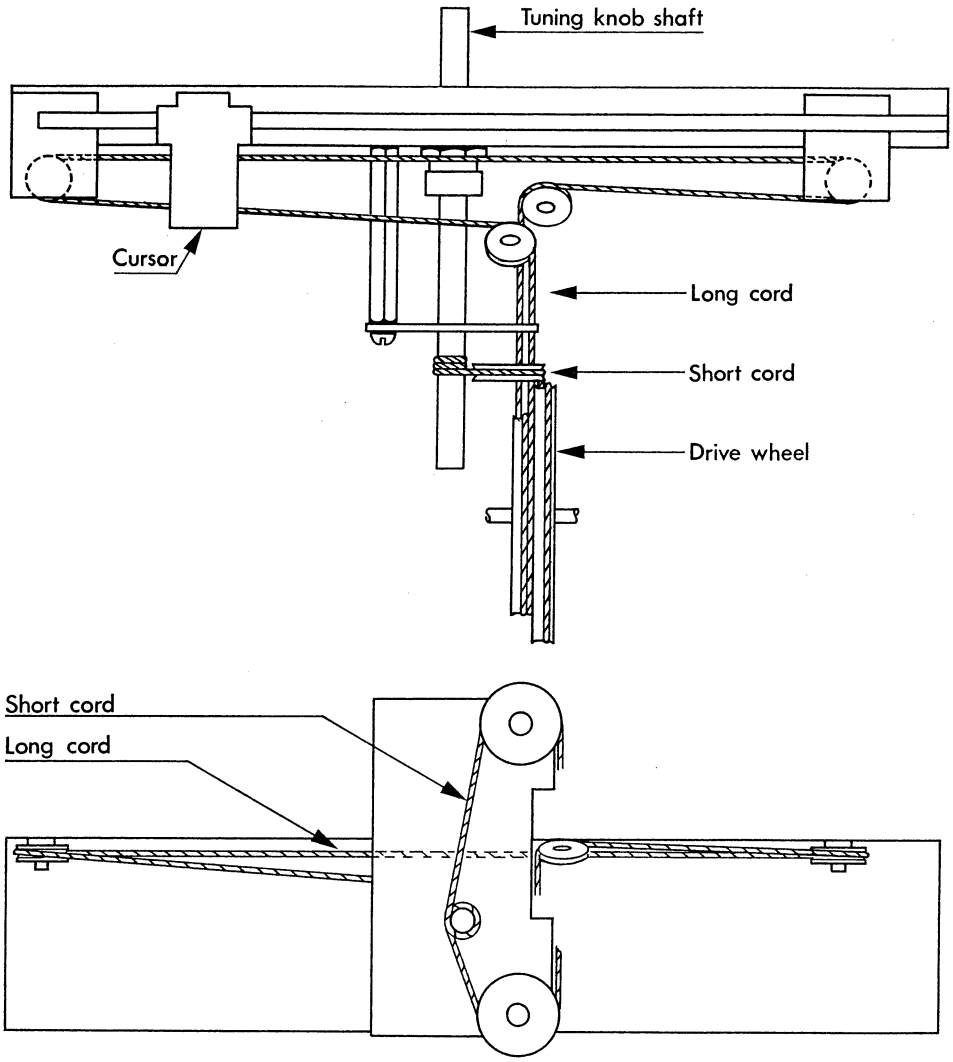

Tuning knob shaft
Cursor
Long cord
Short cord
Drive wheel
Short cord
Long cord

Fig. G8.

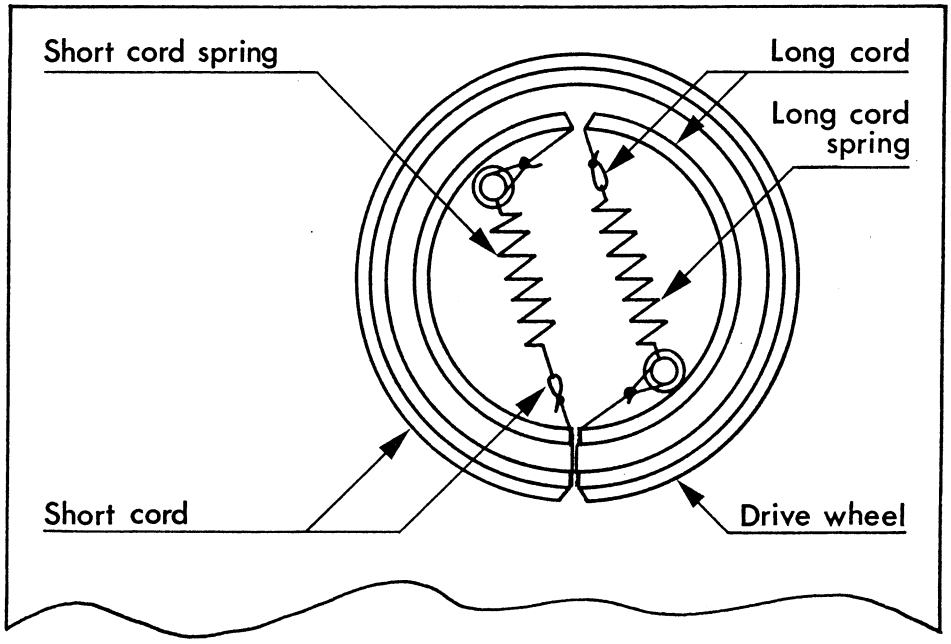

Short cord spring
Long cord
Long cord spring
Short cord
Drive wheel

Fig. G9.

Section H. Parts List

In the following parts list a group code prefix number is used. To facilitate the use of this code, a list of the different types of parts and their corresponding group code prefix is listed below:

Standard resistors	100- to 139-
Precision resistors	140- to 152-
Non-linear resistors	160-
UHF resistors	170- to 172-
Carbon potentiometers	180- to 185-
Wire-wound potentiometers	190- to 195-
Mica capacitors	200- to 108-
Ceramic capacitors	210- to 214-
Paper capacitors	220- to 222-
Metal-paper capacitors	224- to 229-
Plastic capacitors	240- to 245-
Electrolytic capacitors	260- to 267-
Variable capacitors	280- to 286-
Special tubes	310-
Rectifiers	340- to 341-
Diodes	350-
Transistors	360-
Integrated circuits	364-
Lamps, batteries, fuses	400- to 486-
Switches	500- to 580-
Coils, coil material and transformers	700- to 785-

As we are continually improving our instruments, it is important, when ordering spare parts, that you include the following information:

The code number and description of the part
The circuit reference from the wiring diagram
The complete type designation of your instrument
The serial number of your instrument.

Please note that the position of any part can easily be found by referring to the last column of the parts list. This indicates on which figure the part can be located.

MAIN PARTS LIST

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.
C1	electrolytic	2.2 µF	100 V	241-007
C2	polystyrene	50 nF	1% 63 V	243-019
C3	polystyrene	1 nF	2% 63 V	243-014
C4	polystyrene	407 pF	1% 63 V	243-116
C5	polystyrene	3 nF	2% 63 V	243-107

LAMPS

Designation	Type	Code No.
I1	neon lamp, yellow, 110 V	400-703

TERMINALS

Designation	Type	Code No.
J1	coaxial bushing UG-657/U	800-108
J3	coaxial bushing UG-657/U	800-108
J4	coaxial bushing UHF-83GB-73	800-009
J5	phone jack, non-insulated	803-241
J6	phone jack, red	803-206
J7	phone jack, black	803-205
J8	phone jack, red	803-206
J9	phone jack, black	803-205
J10	phone jack, red	803-206
J11	phone jack, black	803-205
J12	3-pole socket	805-430
J300	terminal strip, 20 pole	805-612
J400	terminal strip, 15-pole	805-613
J500	terminal strip, 20-pole	805-612
J600	terminal strip, 10-pole	805-614

J700	terminal strip, 15-pole	805-613
J800A	terminal strip, 10-pole	805-614
J800B	terminal strip, 5-pole	805-666
J900	terminal strip, 20-pole	805-612
J1000	terminal strip, 15-pole	805-613
J1200	terminal strip, 13-pole	805-639

INDUCTORS

Designation	Type	Code No.
L1	ferroxcube tube, 15 mm	704-301
L2	ferroxcube tube, 15 mm	704-301
L3	ferroxcube tube, 15 mm	704-301
L4	ferroxcube tube, 15 mm	704-301
L5	ferroxcube tube, 15 mm	704-301
L6	ferroxcube tube, 15 mm	704-301
L7	ferroxcube tube, 15 mm	704-301
L8	ferroxcube tube, 15 mm	704-301

METERS

Designation	Type	Code No.
meter with scale, 450 μA		482-154

RESISTORS

Designation	Type	Value	Code No.
R1	tandem potm.	A: 250 kΩ pos. exp. 10% B: 500 Ω lin.	180-203
R2	wire-wound	110 Ω 2% at 25°C	152-051
R3	metal film	4.95 kΩ 0.2% 1/4 W	140-393
R4	metal film	550Ω 0.2% 1/4 W	140-390
R5	metal film	1 kΩ 0.2% 1/4 W	140-391
R6	metal film	3.16 kΩ 0.2% 1/4 W	140-392

R7	metal film	10 kΩ 0.2% 1/4 W	140-394
R8	carbon film	1.5 kΩ 5% 0.3 W	106-415
R9	carbon film	1.2 kΩ 5% 0.3 W	106-412
R10	metal film	3.5 kΩ 2% 1/4 W	140-384
R11	metal film	10 kΩ 1% 1/4 W	140-340
R12	metal film	750 Ω 2% 1/4 W	140-381
R13	metal film	1.25 kΩ 2% 1/4 W	140-382
R14	metal film	14.75 kΩ 2% 1/4 W	140-385
R15	metal film	2.91 kΩ 2% 1/4 W	140-383
R16	metal film	2.49 kΩ 1% 1/4 W	140-464
R17	metal film	3.39 kΩ 1% 1/4 W	140-466
R18	metal film	18 kΩ 1% 1/4 W	140-118
R19	metal film	227 Ω 1% 1/4 W	140-465
R20	metal film	1.01 kΩ 1% 1/4 W	140-467
R21	metal film	5.05 kΩ 1% 1/4 W	140-463

SWITCHES

Designation	Type	Code No.
S1	slide switch	510-204
S2	slide switch	510-204
S3	slide switch	510-204
S4	slide switch	510-204
xS5	switch, "RANGE"	550-985
xS6	switch, "FUNCTION"	550-986
xS7	switch, "DEEMPHASIS"	550-987
S8	POWER switch, 2-pole	500-102
xS1300	switch, "RF INPUT Attenuator"	550-992

x indicates special parts manufactured by Radiometer.

CABLES

Designation	Type	Code No.
W1	coaxial cable, 50 Ω, RG196/U, 0.21 m	600-008
W2	coaxial cable, 50 Ω, RG196/U, 0.17 m	600-008
W3	coaxial cable, 50 Ω, RG196/U, 0.13 m	600-008
W4	coaxial cable, 50 Ω, RG196/U, 0.035 m	600-008
W5	coaxial cable, 50 Ω, RG196/U, 0.045 m	600-008
W6	coaxial cable, 50 Ω, RG196/U, 0.050 m	600-008
W7	coaxial cable, 50 Ω, RG196/U, 0.43 m	600-008
W8	coaxial cable, 50 Ω, RG196/U, 0.18 m	600-008
W9	coaxial cable, 50 Ω, RG196/U, 0.075 m	600-008
W10	coaxial cable, 50 Ω, RG196/U, 0.165 m	600-008
W11	coaxial cable, 50 Ω, RG196/U, 0.335 m	600-008
W12	coaxial cable, 50 Ω, RG196/U, 0.335 m	600-008
W13	coaxial cable, 50 Ω, RG196/U, 0.075 m	600-008
W14	coaxial cable, 50 Ω, RG196/U, 0.17 m	600-008
W15	coaxial cable, 50 Ω, RG196/U, 0.27 m	600-008
W16	coaxial cable, 50 Ω, RG196/U, 0.21 m	600-008
W17	coaxial cable, 50 Ω RG196/U, 0.06 m	600-008
W18	coaxial cable, 50 Ω, RG196/U, 0.345 m	600-008
W19	coaxial cable, 50 Ω, RG196/U, 0.335 m	600-008
W20	coaxial cable, 50 Ω, RG196/U, 0.195 m	600-008
W21	coaxial cable, 50 Ω, RG196/U, 0.21 m	600-008
W22	coaxial cable, 50 Ω, RG196/U, 0.20 m	600-008
W23	coaxial cable, 50 Ω, RG196/U, 0.18 m	600-008
W24	coaxial cable, 50 Ω, RG196/U, 0.195 m	600-008
W25	coaxial cable, 50 Ω, RG196/U, 0.42 m	600-008
W26	coaxial cable, 50 Ω, RG196/U, 0.135 m	600-008
W27	coaxial cable, 50 Ω, RG196/U, 0.147 m	600-008
W29	coaxial cable, 110 Ω, T3283, 0.30 m	600-001
W30	coaxial cable, 50 Ω, RG196/U, 0.028 m	600-008
W31	coaxial cable, 50 Ω, RG196/U, 0.22 m	600-008
W32	coaxial cable, 50 Ω, RG196/U, 0.25 m	600-008

MISCELLANEOUS

Designation	Type	Code No.
	pointer knob N20	850-121
	pointer knob with wing	850-122
	x knob N30	850-230
	x knob N40, with crank knob	850-241
	x cap for knob N14/2A	851-101
	x cap for knob N14/2B	851-102
	x cap for knob N16/2A	851-201
	x rubber foot	855-002
	x scale A	861-220
	x scale B	861-214
	x scale C	861-215
	x scale D	861-216
	x scale E	861-217
	x scale F	861-218
	x scale G	861-221
	x sprocket drive chain	4975-A4
	x sprocket wheel	867-628
	x sprocket wheel	867-629
	x sprocket wheel	867-630
	x scale cords	3101/3102-A5
	x pinion	870-124
	x pinion	870-300
	x pinion	870-301
	x pinion	870-302
	x pawl pinion	872-119
	x pawl pinion	872-120
	x bevel pinion	872-233

x indicates special parts manufactured by Radiometer.

PRINT BOARD I - TUNER, CODE 970-149/970-151
RF ATTENUATOR, CODE 970-188

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C101	electrolytic	250 µF	25 V	260-042	
C102	tantalum	10 µF	15 V	267-000	
C103	ceramic	47 pF	±20% 25 V	213-019	
C104	ceramic	22 nF	-20/+80% 40 V	213-011	
C105	ceramic	22 nF	-20/+80% 40 V	213-011	
xC106	variable			285-513	
C107	ceramic	2.2 nF	-20/+80% 25 V	213-012	
C108	trimmer	0.5 - 3 pF		286-206	
C109	ceramic	1 nF	-20/+80% 25 V	213-013	
C110	trimmer	0.5 - 3 pF		286-206	
C111	ceramic	1 nF	-20/+80% 25 V	213-013	
C112	trimmer	0.5 - 3 pF		286-206	
C113	ceramic	470 pF	-20/+80% 25 V	213-014	
C114	trimmer	0.5 - 3 pF		286-206	
C115	ceramic	220 pF	-20/+80% 25 V	213-018	
C116	trimmer	0.5 - 3 pF		286-206	
C117	ceramic	47 pF	±5%	210-247	
C118	trimmer	0.5 - 3 pF		286-206	
C119	ceramic	47 pF	±20% 25 V	213-019	
C121	ceramic	2.2 pF	±0.5 pF NPO	210-122	
C122	ceramic	1.5 pF	±0.25 pF NPO	210-115	
C1300	ceramic	2.2 pF	±0.5 pF	210-122	H1
C1301	ceramic	2.2 pF	±0.5 pF	210-122	H1
C1302	ceramic	2.2 pF	±0.5 pF	210-122	H1

DIODES

Designation	Type	Code No.
CR101	diode HP5082-2812 (matched)	350-802
CR102	diode HP5082-2812 (matched)	350-802

x indicates special parts manufactured by Radiometer.

CR103	diode 5082-2812 (matched)	350-802
CR104	diode 5082-2812 (matched)	350-802

FILTERS

Designation	Type	Code No.
FL101	filter B 8513-A-C1	910-032
FL102	filter B 8513-A-C1	910-032

INDUCTORS

Designation	Type	Code No.
L101	choke, 47 µH	703-008
L102	choke, 47 µH	703-008
xL103	oscillator coil	4993-A4
xL104	oscillator coil	4994-A4
xL105	oscillator coil	4995-A4
xL106	oscillator coil	4996-A4
xL107	oscillator coil	4997-A4
xL108	oscillator coil	4998-A4
L109	ferrite tube, 15 mm	704-301
L110	ferrite tube, 1.2/3.5 x 3.2	704-305
L113	ferrite tube, 1.2/3.5 x 3.2	704-305
L114	ferrite tube, 1.2/3.5 x 3.2	704-305
L115	choke, 47 µH	703-008
L116	ferrite tube, 7 mm	704-300
L118	ferrite tube, 1.2/3.5 x 3.2	704-305
L119	ferrite tube, 1.2/3.5 x 3.2	704-305

TRANSISTORS

Designation	Type	Code No.
Q101	transistor 2N3906	360-062
Q102	transistor BC149	360-072
Q103	transistor BF274	360-123
Q104	transistor BC147	360-074

x indicates special parts manufactured by Radiometer.

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R101	carbon film	100 Ω 5% 0.3 W	106-310	
R102	carbon film	47 Ω 5% 0.3 W	106-247	
R103	carbon film	1 kΩ 5% 0.3 W	106-410	
R104	carbon film	5.6 kΩ 5% 0.3 W	106-456	
R105	carbon film	100 Ω 5% 0.3 W	106-310	
R106	carbon film	47 Ω 5% 0.3 W	106-247	
R107	carbon film	1 kΩ 5% 0.3 W	106-410	
R108	carbon film	6.8 kΩ 5% 0.3 W	106-468	
R109	carbon film	3.3 kΩ 5% 0.3 W	106-433	
R110	carbon film	100 Ω 5% 0.3 W	106-310	
R111	carbon film	1 kΩ 5% 0.3 W	106-410	
R112	metal film	50 Ω 1% 1/2 W	140-355	
R113	metal film	50 Ω 1% 1/2 W	140-355	
R114	carbon film	2.2 kΩ 5% 0.5 W	106-422	
R115	carbon film	10 kΩ 5% 0.3 W	106-510	
R1300	metal film	95.3 Ω 1% 1/2 W	140-428	H-1
R1301	metal film	71.5 Ω 1% 1/2 W	140-429	H-1
R1302	metal film	95.3 Ω 1% 1/2 W	140-428	H-1
R1303	metal film	95.3 Ω 1% 1/2 W	140-428	H-1
R1304	metal film	71.5 Ω 1% 1/2 W	140-429	H-1
R1305	metal film	95.3 Ω 1% 1/2 W	140-428	H-1
R1306	metal film	95.3 Ω 1% 1/2 W	140-428	H-1
R1307	metal film	71.5 Ω 1% 1/2 W	140-429	H-1
R1308	metal film	48.7 Ω 1% 1/2 W	140-430	H-1
R1309	metal film	71.5 Ω 1% 1/2 W	140-429	H-1
R1310	metal film	95.3 Ω 1% 1/2 W	140-428	H-1

TRANSFORMERS

Designation	Type	Code No.
xT101	transformer	5029-A4
xT102	transformer	5165-A4

x indicates special parts manufactured by Radiometer.

PRINT BOARD II - IF FILTER (WIDE), CODE 900-241

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C201	polystyrene	13830 pF	1% 63 V	243-105	H2
C202	polystyrene	10550 pF	1% 63 V	243-104	H2
C203	polystyrene	182 pF	1% 63 V	243-113	H2
C204	polystyrene	437 pF	1% 63 V	243-118	H2
C205	polystyrene	1106 pF	1% 63 V	243-099	H2
C206	polystyrene	1326 pF	1% 63 V	243-101	H2
C207	polystyrene	562 pF	1% 63 V	243-121	H2
C208	polystyrene	174 pF	1% 63 V	243-112	H2
C209	polystyrene	1715 pF	1% 63 V	243-102	H2
C210	polystyrene	1295 pF	1% 63 V	243-100	H2
C211	polystyrene	1856 pF	1% 63 V	243-103	H2
C212	polystyrene	189 pF	1% 63 V	243-114	H2
C213	polystyrene	407 pF	1% 63 V	243-116	H2

INDUCTORS

Designation	Type	Code No.	Shown in Fig.
x L201	choke, 1.05 µH	4568-A4	H2
x L202	choke, 10.15 µH	4569-A4	H2
x L203	choke, 3.86 µH	4570-A4	H2
x L204	choke, 6.69 µH	4571-A4	H2
x L205	choke, 3.86 µH	4570-A4	H2
x L206	choke, 3.09 µH	4573-A4	H2
x L207	choke, 15.12 µH	4574-A4	H2

CABLES

Designation	Type	Code No.	Shown in Fig.
W2010	coaxial cable, 50 Ω, RG196/U	600-014	H2

x indicates special parts manufactured by Radiometer.

PRINT BOARD III - IF AMP + ATTENUATOR, CODE 900-242

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C301	polyester	27 nF	10% 400 V	240-527	H3
C302	ceramic	47 pF	5%	210-247	H3
C303	ceramic	1 pF	±0.25 pF	210-110	H3
C304	ceramic	22 nF	-20/+80% 40 V	213-011	H3
C305	ceramic	22 nF	-20/+80% 40 V	213-011	H3
C306	trimmer	10-60 pF		286-006	H3
C307	ceramic	22 nF	-20/+80% 40 V	213-011	H3
C308	ceramic	4.7 nF	-20/+50% 40 V	213-010	H3
C309	ceramic	22 nF	-20/+80% 40 V	213-011	H3
C311	ceramic	0.1 µF	-20/+80% 12 V	213-017	H3
C312	ceramic	4.7 nF	-20/+50% 40 V	213-010	H3
C313	ceramic	22 nF	-20/+80% 40 V	213-011	H3
C314	ceramic	3.3 pF	±0.5 pF	210-133	H3
C315	ceramic	22 nF	-20/+80% 40 V	213-011	H3
C316	ceramic	0.1 µF	-20/+80% 12 V	213-017	H3
C317	ceramic	10 pF	±5%	210-210	H3
C318	ceramic	22 nF	-20/+80% 40 V	213-011	H3
C319	ceramic	4.7 nF	-20/+50% 40 V	231-010	H3
C320	ceramic	22 nF	-20/+80% 40 V	213-011	H3
C321	ceramic	22 nF	-20/+80% 40 V	213-011	H3
C322	ceramic	0.1 µF	-20/+80% 12 V	213-017	H3
C323	ceramic	10 pF	5%	210-210	H3
C324	ceramic	47 nF	-20/+80% 30 V	213-016	H3
C325	ceramic	0.1 µF	-20/+80% 12 V	213-017	H3
C326	polyester	1.5 µF	10% 160 V	241-029	H3
C327	ceramic	4.7 nF	-20/+80% 40 V	213-010	H3
C328	ceramic	68 pF	5% selected	211-268	H3

DIODES

Designation	Type	Code No.	Shown in Fig.
CR301	diode BAY74	350-413	H3
CR302	diode BAY74	350-413	H3
CR303	diode BAY74	350-413	H3
CR304	diode BAY74	350-413	H3

TERMINALS

Designation	Type	Code No.	Shown in Fig.
P300	terminal strip, 20 pole	805-612	H3

TRANSISTORS

Designation	Type	Code No.	Shown in Fig.
Q301	transistor BFY90	360-071	H3
Q302	transistor 2N3904	360-064	H3
Q303	transistor 2N3906	360-062	H3
Q304	transistor BFY90	360-071	H3
Q305	transistor 2N3906	360-062	H3
Q306	transistor 2N3904	360-064	H3
Q307	transistor 2N3906	360-062	H3
Q308	transistor BC149	360-072	H3
Q309	transistor 2N3906	360-062	H3
Q310	transistor 2N3906	360-062	H3
Q311	transistor BC149	360-072	H3

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R300	carbon film, factory-selected		106-	H3
R301	metal film	45.7Ω 0.5% 1/4 W	140-375	H3
R302	carbon film	47 Ω 5% 0.3 W	106-247	H3
R303	carbon film	390 Ω 5% 0.3 W	106-339	H3
R304	carbon potm	1 kΩ, lin.	182-030	H3
R305	carbon film	680 Ω 5% 0.3 W	106-368	H3
R306	carbon film	100 Ω 5% 0.3 W	106-310	H3
R307	carbon film	12 Ω 5% 0.3 W	106-212	H3
R308	carbon film	2.2 kΩ 5% 0.3 W	106-422	H3
R309	carbon film	4.7 kΩ 5% 0.3 W	106-447	H3
R310	carbon film	8.2 kΩ 5% 0.3 W	106-482	H3
R311	carbon film	1.2 kΩ 5% 0.3 W	106-412	H3
R312	carbon film	1.2 kΩ 5% 0.3 W	106-412	H3
R313	carbon film	39 Ω 5% 0.3 W	106-239	H3
R314	carbon film	8.2 kΩ 5% 0.3 W	106-482	H3
R315	carbon film	3.3 kΩ 5% 0.3 W	106-433	H3
R316	carbon film	1.5 kΩ 5% 0.3 W	106-415	H3
R317	carbon film	3.9 kΩ 5% 0.3 W	106-439	H3
R318	carbon film	22 Ω 5% 0.3 W	106-222	H3
R319	carbon film	270 Ω 5% 0.3 W	106-327	H3
R320	carbon film	150 Ω 5% 0.3 W	106-315	H3
R321	carbon film	82 Ω 5% 0.3 W	106-282	H3
R322	carbon film	2.2 kΩ 5% 0.3 W	106-422	H3
R323	carbon film	100 Ω 5% 0.3 W	106-310	H3
R324	carbon film	3.3 kΩ 5% 0.3 W	106-433	H3
R325	carbon film	8.2 kΩ 5% 0.3 W	106-482	H3
R326	carbon film	100 Ω 5% 0.3 W	106-310	H3
R327	carbon film	100 Ω 5% 0.3 W	106-310	H3
R328	carbon film	2.2 kΩ 5% 0.3 W	106-422	H3

R329	carbon film	15 Ω 5% 0.3 W	106-215	H3
R330	carbon film	330 Ω 5% 0.3 W	106-333	H3
R331	carbon film	220 Ω 5% 0.3 W	106-322	H3
R332	carbon film	82 Ω 5% 0.3 W	106-282	H3
R333	carbon film	220 Ω 5% 0.3 W	106-322	H3
R334	carbon film	27 kΩ 5% 0.3 W	106-527	H3
R335	carbon film	3.3 kΩ 5% 0.3 W	106-433	H3
R336	carbon film	15 kΩ 5% 0.3 W	106-515	H3
R337	carbon film	330 Ω 5% 0.3 W	106-333	H3
R338	carbon film	1.8 kΩ 5% 0.3 W	106-418	H3
R339	carbon film	68 Ω 5% 0.3 W	106-268	H3
R340	carbon film	100 Ω 5% 0.3 W	106-310	H3
R341	carbon film	1.5 kΩ 5% 0.3 W	106-415	H3
R342	carbon film	3.3 kΩ 5% 0.3 W	106-433	H3
R343	carbon film	1.5 kΩ 5% 0.3 W	106-415	H3
R344	carbon film	68 Ω 5% 0.3 W	106-268	H3
R345	carbon potm.	470 Ω, lin.	182-038	H3

CABLES

Designation	Type	Code No.	Shown in Fig.
W300	coaxial cable, 50 Ω, RG196/U, 0.14 m	600-008	H3

PRINT BOARD IV - IF FILTER (NARROW), CODE 900-243

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C401	polystyrene	695 pF	1% 63 V	243-098	H4
C402	polystyrene	582 pF	1% 63 V	243-122	H4
C403	polystyrene	166 pF	1% 63 V	243-111	H4
C404	polystyrene	739 pF	1% 63 V	243-123	H4
C405	ceramic	4.7 nF	-20/+80% 40 V	213-010	H4
C406	polystyrene	483 pF	1% 63 V	243-120	H4
C407	polystyrene	442 pF	1% 63 V	243-119	H4
C408	polystyrene	244 pF	1% 63 V	243-115	H4
C409	polystyrene	432 pF	1% 63 V	243-117	H4
C410	polystyrene	900 pF	1% 63 V	243-154	H4
C412	polystyrene	412 pF	1% 63 V	243-124	H4
C413	ceramic	4.7 nF	-20/+80% 40 V	213-010	H4
C414	ceramic	4.7 nF	-20/+80% 40 V	213-010	H4

DIODES

Designation	Type	Code No.	Shown in Fig.
CR401	diode BAX16	350-023	H4

INDUCTORS

Designation	Type	Code No.	Shown in Fig.
x L401	inductor, 5.82 µH	4575-A4	H4
x L402	inductor, 6.95 µH	4576-A4	H4
x L403	inductor, 0.53 µH	4577-A4	H4
x L404	inductor, 0.53 µH	4577-A4	H4
x L405	inductor, 0.53 µH	4577-A4	H4
x L406	inductor, 1.22 µH	4578-A4	H4

x indicates special parts manufactured by Radiometer.

TERMINALS

Designation	Type	Code No.	Shown in Fig.
P400	terminal strip, 15 pole	805-613	H4

TRANSISTORS

Designation	Type	Code No.	Shown in Fig.
Q401	transistor 2N1711	360-091	H4
Q402	transistor 2N3904	360-064	H4
Q403	transistor 2N3904	360-064	H4

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R401	metal film	226 Ω 1% 1/16 W	140-528	H4
R402	metal film	97.4 Ω 1% 1/4 W	140-377	H4
R403	metal film	100 Ω 0.5 % 1/4 W	140-169	H4
R404	carbon film	5.6 kΩ 5% 0.3 W	106-456	H4
R405	carbon film	68 kΩ 5% 0.3 W	106-568	H4
R406	carbon film	82 kΩ 5% 0.3 W	106-582	H4
R407	carbon film	82 kΩ 5% 0.3 W	106-582	H4
R408	carbon film	4.7 kΩ 5% 0.3 W	106-447	H4
R409	carbon film	82 kΩ 5% 0.3 W	106-582	H4
R410	carbon film	4.7 kΩ 5% 0.3 W	106-447	H4
R411	carbon film	6.8 kΩ 5% 0.3 W	106-468	H4
R412	carbon film	56 Ω 5% 0.3 W	106-256	H4
R413	metal film	143 Ω 1% 1/20 W	140-527	H4

CABLES

Designation	Type		Code No.	Shown in Fig.
W400	coaxial cable	50 Ω, RG196/U	600-008	H4

PRINT BOARD V - AM DETECTOR + IF OUTPUT AMP,CODE 900-244

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C501	polystyrene	100 pF	5% 125 V	243-037	H5
C502	ceramic	22 nF	-20/+80% 40 V	213-011	H5
C503	polystyrene	100 pF	5% 125 V	243-037	H5
C504	ceramic	0.1 µF	-20/+80% 12 V	213-017	H5
C505	ceramic	22 nF	-20/+80% 40 V	213-011	H5
C506	polystyrene	150 pF	5% 125 V	243-030	H5
C507	ceramic	47 pF	5%	210-247	H5
C508	ceramic	22 nF	-20/+80% 40 V	213-011	H5
C510	tantalum	10 µF	15 V	267-000	H5
C511	ceramic	3.3 pF	±0.5 pF	210-133	H5
C512	ceramic	47 nF	-20/+80% 30 V	213-016	H5
C513	ceramic	47 nF	-20/+80% 30 V	213-016	H5
C514	ceramic	22 nF	-20/+80% 40 V	213-011	H5
C515	tantalum	10 µF	15 V	267-000	H5
C516	tantalum	10 µF	15 V	267-000	H5
C517	polystyrene	100 pF	5% 125 V	243-037	H5
C518	ceramic	4.7 nF	-20/+50% 40 V	213-010	H5
C519	ceramic	82 pF	5%	210-282	H5
C520	ceramic	22 nF	-20/+80% 40 V	213-011	H5
C521	ceramic	22 nF	-20/+80% 40 V	213-011	H5
C522	ceramic	0.1 µF	-20/+80% 12 V	213-017	H5
C523	ceramic	2.2 nF	-20/+80% 25 V	213-012	H5
C524	polystyrene	300 pF	10% 63 V	243-108	H5
C525	ceramic	0.1 µF	-20/+80% 12 V	213-017	H5
C526	ceramic	0.1 µF	-20/+80% 12 V	213-017	H5
C527	polystyrene	300 pF	10% 63 V	243-108	H5

C528	polyester	10 µF	10% 63 V	241-028	H5
C529	tantalum	20 µF	6 V	267-001	H5
C530	tantalum	68 µF	16 V	267-015	H5

DIODES

Designation	Type	Code No.	Shown in Fig.
CR501	zener diode BZY88C9V1	350-606	H5
CR502	diode 1N916	350-019	H5
CR503	diode 1N916	350-019	H5
CR504	zener diode BZY88C7V5	350-621	H5
CR505	diode HD5004	350-017	H5
CR506	diode HD5004	350-017	H5

INDUCTORS

Designation	Type	Code No.	Shown in Fig.
L501	choke, 47 µH	703-008	H5
L502	choke, 47 µH	703-008	H5

TERMINALS

Designation	Type	Code No.	Shown in Fig.
P500	terminal strip, 20-pole	805-612	H5

TRANSISTORS

Designation	Type	Code No.	Shown in Fig.
Q501	transistor 2N3904	360-064	H5
Q502	transistor 2N3906	360-062	H5
Q503	transistor 2N3904	360-064	H5

Q504	transistor 2N3904	360-064	H5
Q505	transistor 2N3904	360-064	H5
Q506	transistor 2N3906	360-062	H5
Q507	transistor 2N3904	360-064	H5
Q508	transistor 2N3906	360-062	H5
Q509	transistor 2N3906	360-062	H5
Q510	transistor 2N3904	360-064	H5
Q511	transistor 2N3906	360-062	H5
Q512	transistor TD121	360-077	H5
Q514	transistor 2N5087	360-087	H5
Q515	transistor BC149	360-072	H5

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R501	carbon film	10 kΩ 5% 0.3 W	106-510	H5
R502	carbon film	4.7 kΩ 5% 0.3 W	106-447	H5
R503	carbon film	27 Ω 5% 0.3 W	106-227	H5
R504	carbon film	560 Ω 5% 0.3 W	106-356	H5
R505	carbon film	120 Ω 5% 0.3 W	106-312	H5
R506	carbon film	47 Ω 5% 0.3 W	106-247	H5
R507	carbon film	330 Ω 5% 0.3 W	106-333	H5
R508	carbon film	22 Ω 5% 0.3 W	106-222	H5
R509	carbon film	47 Ω 5% 0.3 W	106-247	H5
R510	carbon film	2.7 kΩ 5% 0.3 W	106-427	H5
R511	carbon film	5.6 kΩ 5% 0.3 W	106-456	H5
R512	carbon film	220 Ω 5% 0.3 W	106-322	H5
R513	carbon film	5.6 kΩ 5% 0.3 W	106-456	H5
R514	carbon pot.	2.5 kΩ, lin.	182-031	H5
R515	carbon film	560 Ω 5% 0.3 W	106-356	H5
R516	carbon film	2.7 kΩ 5% 0.3 W	106-427	H5
R517	carbon film	390 Ω 5% 0.3 W	106-339	H5

R518	carbon film	47 Ω 5% 0.3 W	106-247	H5
R519	carbon film	1 kΩ 5% 0.3 W	106-410	H5
R520	carbon film	2.2 kΩ 5% 0.3 W	106-422	H5
R521	carbon film	100 Ω 5% 0.3 W	106-310	H5
R522	carbon film	22 Ω 5% 0.3 W	106-222	H5
R523	carbon film	3.9 kΩ 5% 0.3 W	106-439	H5
R524	carbon film	27 kΩ 5% 0.3 W	106-527	H5
R525	carbon film	10 kΩ 5% 0.3 W	106-510	H5
R526	carbon film	220 Ω 5% 0.3 W	106-322	H5
R527	carbon film	3.3 kΩ 5% 0.3 W	106-433	H5
R528	carbon film	27 Ω 5% 0.3 W	106-227	H5
R529	carbon film	220 Ω 5% 0.3 W	106-322	H5
R530	carbon film	100 Ω 5% 0.3 W	106-310	H5
R531	carbon film	1.5 kΩ 5% 0,3 W	106-415	H5
R532	carbon film	4.7 kΩ 5% 0.3 W	106-447	H5
R533	carbon film	10 kΩ 5% 0.3 W	106-510	H5
R534	carbon film	680 Ω 5% 0.3 W	106-368	H5
R535	carbon film	22 Ω 5% 0.3 W	106-222	H5
R536	carbon film	1.5 kΩ 5% 0.3 W	106-415	H5
R537	carbon film	1 kΩ 5% 0.3 W	106-410	H5
R538	metal film	444 Ω 1% 1/4 W	140-396	H5
R539	carbon potm.	10 kΩ, lin.	182-033	H5
R540	carbon film	5.6 kΩ 5% 0.3 W	106-456	H5
R541	carbon film	1.2 kΩ 5% 0.3 W	106-412	H5
R542	carbon film	5.6 kΩ 5% 0.3 W	106-456	H5
R543	carbon film	1.8 kΩ 5% 0.3 W	106-418	H5
R544	carbon film	2.07 kΩ 5% 1/10 W	143-038	H5
R545	carbon film	1.8 kΩ 5% 0.3 W	106-418	H5
R546	carbon film	56 kΩ 5% 0.3 W	106-556	H5
R547	carbon film	1.2 kΩ 5% 0.3 W	106-412	H5
R548	carbon film	82 kΩ 5% 0.3 W	106-582	H5
R549	carbon film	150 kΩ 5% 0.3 W	106-615	H5

R550	carbon film	100 kΩ 5% 0.3 W	106-610	H5
R551	carbon film	3.3 kΩ 5% 0.3 W	106-433	H5
R552	carbon film	12 kΩ 5% 0.3 W	106-512	H5
R553	carbon potm.	1 kΩ, lin.	182-030	H5
R554	carbon film	1.8 kΩ 5% 0.3 W	106-418	H5
R555	carbon film	8.2 kΩ 5% 0.3 W	106-482	H5
R556	carbon film	82 kΩ 5% 0.3 W	106-582	H5
R557	carbon film	4.7 kΩ 5% 0.3 W	106-447	H5
R558	carbon potm.	25 kΩ, lin.	182-034	H5
R559	metal film	600 Ω 1% 1/4 W	140-378	H5
R560	carbon film	27 kΩ 5% 0.3 W	106-527	H5
R561	metal film	160 kΩ 1% 1/2 W	140-094	H5
R562	metal film	100 kΩ 1% 1/10 W	140-474	H5
R565	carbon film	68 Ω 5% 0.3 W	106-268	H5

TAG STRIPS

Designation	Type	Code No.	Shown in Fig.
TB501	tag strip, 5-pole	821-105	H5

PRINT BOARD VI - LIMITER, CODE 900-245

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C601	ceramic	1 nF	-20/+80% 25 V	213-013	H6
C602	polystyrene	100 pF	5% 125 V	243-037	H6
C603	tantalum	10 µF	15 V	267-000	H6
C604	tantalum	10 µF	15 V	267-000	H6
C605	ceramic	22 nF	40 V	213-011	H6
C606	ceramic	1 nF	-20/+80% 25 V	213-013	H6
C607	ceramic	4.7 nF	-20/+50% 40 V	213-010	H6
C608	tantalum	10 µF	15 V	267-000	H6
C609	polystyrene	100 pF	5% 125 V	243-037	H6
C610	polystyrene	100 pF	5% 125 V	243-037	H6
C611	ceramic	1 nF	-20/+80% 25 V	213-013	H6
C612	ceramic	47 nF	-20/+80% 30 V	213-016	H6
C613	ceramic	1 nF	-20/+80% 25 V	213-013	H6
C614	ceramic	33 pF	5%	210-233	H6
C615	ceramic	22 nF	-20/+80% 40 V	213-011	H6
C616	ceramic	22 nF	-20/+80% 40 V	213-011	H6
C617	ceramic	33 pF	5%	210-233	H6
C618	ceramic	22 nF	-20/+80% 40 V	213-011	H6
C619	ceramic	22 pF	5%	210-222	H6
C620	ceramic	22 nF	-20/+80% 40 V	213-011	H6
C621	tantalum	10 µF	15 V	267-000	H6
C622	ceramic	470 pF	-20/+80% 25 V	213-014	H6
C623	tantalum	10 µF	15 V	267-000	H6
C624	ceramic	47 nF	-20/+80% 30 V	213-016	H6
C625	tantalum	10 µF	15 V	267-000	H6
C626	ceramic	22 nF	-20/+80% 40 V	213-011	H6

C627	tantalum	10 µF	15 V	267-000	H6
C628	tantalum	10 µF	15 V	267-000	H6
C629	tantalum	10 µF	15 V	267-000	H6
C630	ceramic	2.2 nF	-20/+80% 25 V	213-012	H6
C631	tantalum	10 µF	15 V	267-000	H6

DIODES

Designation	Type	Code No.	Shown in Fig.
CR601	diode BAV10	350-022	H6
CR602	diode BAV10	350-022	H6
CR603	diode BAX16	350-023	H6
CR604	diode BAX16	350-023	H6
CR605	diode BAV10	350-022	H6
CR606	diode BAV10	350-022	H6
CR607	zener diode 1N3497	350-637	H6

TERMINALS

Designation	Type	Code No.	Shown in Fig.
P600	terminal strip, 10 pole	805-614	H6

TRANSISTORS

Designation	Type	Code No.	Shown in Fig.
Q601	transistor 2N3906	360-062	H6
Q602	transistor 2N3906	360-062	H6
Q603	transistor BC149	360-072	H6
Q604	transistor BC149	360-072	H6
Q605	transistor BC149	360-072	H6
Q606	transistor BC149	360-072	H6
Q607	transistor 2N3906	360-062	H6
Q608	transistor 2N3906	360-062	H6

Q609	transistor 2N3906	360-062	H6
Q610	transistor 2N3906	360-062	H6
Q611	transistor 2N3906	360-062	H6
Q612	transistor 2N3906	360-062	H6
Q613	transistor 2N3906	360-062	H6
Q614	transistor 2N3904	360-064	H6
Q615	transistor BC149	360-072	H6
Q616	transistor TD100	360-105	H6
Q617	transistor BC149	360-072	H6
Q618	transistor 2N3906	360-062	H6
Q619	transistor 2N3906	360-062	H6
Q620	transistor 2N3906	360-062	H6

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R601	carbon film	330 Ω 5% 0.3 W	106-333	H6
R602	carbon film	470 Ω 5% 0.3 W	106-347	H6
R603	carbon film	330 Ω 5% 0.3 W	106-333	H6
R604	carbon film	150 Ω 5% 0.3 W	106-315	H6
R605	carbon film	3.9 kΩ 5% 0.3 W	106-439	H6
R606	carbon film	1.8 kΩ 5% 0.3 W	106-418	H6
R607	carbon film	180 Ω 5% 0.3 W	106-318	H6
R608	carbon film	18 Ω 5% 0.3 W	106-218	H6
R609	carbon film	33 kΩ 5% 0.3 W	106-533	H6
R610	carbon film	56 kΩ 5% 0.3 W	106-556	H6
R611	carbon film	56 kΩ 5% 0.3 W	106-556	H6
R612	carbon potm.	10 kΩ, lin.	182-033	H6
R613	carbon film	8.2 kΩ 5% 0.3 W	106-482	H6
R614	carbon film	3.3 kΩ 5% 0.3 W	106-433	H6
R615	carbon film	27 kΩ	106-527	H6
R616	carbon film	5.6 kΩ	106-456	H6
R617	carbon film	68 kΩ	106-568	H6

R618	carbon film	68 kΩ 5% 0.3 W	106-568	H6
R619	carbon film	10 kΩ 5% 0.3 W	106-510	H6
R620	carbon film	10 kΩ 5% 0.3 W	106-510	H6
R621	carbon film	1 kΩ 5% 0.3 W	106-410	H6
R622	carbon film	1 kΩ 5% 0.3 W	106-410	H6
R623	carbon film	6.8 kΩ 5% 0.3 W	106-468	H6
R624	carbon potm.	1 kΩ, lin.	182-030	H6
R625	carbon film	560 Ω 5% 0.3 W	106-556	H6
R626	carbon film	2.2 kΩ 5% 0.3 W	106-422	H6
R627	carbon film	1.5 kΩ 5% 0.3 W	106-415	H6
R628	carbon film	390 Ω 5% 0.3 W	106-339	H6
R629	carbon film	47 Ω 5% 0.3 W	106-247	H6
R630	carbon film	1 kΩ 5% 0.3 W	106-410	H6
R631	carbon film	1.8 kΩ 5% 0.3 W	106-418	H6
R632	carbon film	560 Ω 5% 0.3 W	106-356	H6
R633	carbon potm.	1 kΩ, lin.	182-030	H6
R634	carbon film	6.8 kΩ 5% 0.3 W	106-468	H6
R635	carbon film	2.2 kΩ 5% 0.3 W	106-422	H6
R636	carbon film	1.5 kΩ 5% 0.3 W	106-415	H6
R637	carbon film	390 Ω 5% 0.3 W	106-339	H6
R638	carbon film	47 Ω 5% 0.3 W	106-247	H6
R639	carbon film	1 kΩ 5% 0.3 W	106-410	H6
R640	carbon film	1.8 kΩ 5% 0.3 W	106-418	H6
R641	carbon film	12 kΩ 5% 0.3 W	106-512	H6
R642	carbon film	1 kΩ 5% 0.3 W	106-410	H6
R643	carbon film	47 Ω 5% 0.3 W	106-247	H6
R644	carbon film	1 kΩ 5% 0.3 W	106-410	H6
R645	carbon film	68 Ω 5% 0.3 W	106-268	H6
R646	carbon film	10 kΩ 5% 0.3 W	106-510	H6
R647	carbon film	10 Ω 5% 0.3 W	106-210	H6
R648	carbon film	10 Ω 5% 0.3 W	106-210	H6
R649	carbon film	6.8 kΩ 5% 0.3 W	106-468	H6
R650	carbon film	6.8 kΩ 5% 0.3 W	106-468	H6

R651	carbon film	6.8 kΩ 5% 0.3 W	106-468	H6
R652	carbon film	100 kΩ 5% 0.3 W	106-610	H6
R653	carbon film	4.7 kΩ 5% 0.3 W	106-447	H6
R654	carbon film	1.5 kΩ 5% 0.3 W	106-415	H6
R655	carbon film	680 Ω 5% 0.3 W	106-368	H6
R656	carbon film	1.8 kΩ 5% 0.3 W	106-418	H6
R657	carbon film	27 kΩ 5% 0.3 W	106-527	H6
R658	carbon film	18 kΩ 5% 0.3 W	106-518	H6
xR659	wire-wound	4.18 kΩ 1%	152-031	H6
R660	trimmer	500 Ω 10%	193-000	H6
xR661	wire-wound	2.46 kΩ 1%	152-029	H6
R662	carbon film	6.8 kΩ 5% 0.3 W	106-468	H6
R663	carbon film	100 kΩ 5% 0.3 W	106-610	H6
R664	carbon film	4.7 kΩ 5% 0.3 W	106-447	H6
R665	carbon film	47 kΩ 5% 0.3 W	106-547	H6
xR666	wire-wound	10 kΩ 0.1%	152-032	H6
xR667	wire-wound	10 kΩ 0.1%	152-032	H6
R668	carbon pot.	10 kΩ, lin.	186-033	H6
R669	metal film	221 kΩ 1% 0.1 W	140-605	H6

CABLES

Designation	Type	Code No.	Shown in Fig.
W600	coaxial cable, 50 Ω, R196/U, 0.14 m	600-008	H6

x indicates special parts manufactured by Radiometer.

PRINT BOARD VII - FM DETECTOR, CODE 900-246

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C701	ceramic	39 pF	5%	211-239	H7
C702	ceramic	47 nF	-20/+80% 30 V	213-016	H7
C703	ceramic	68 pF	5%	211-268	H7
C704	ceramic	47 nF	-20/+80% 30 V	213-016	H7
C705	ceramic	47 nF	-20/+80% 30 V	213-016	H7
C706	tantalum	10 µF	15 V	267-000	H7
C707	tantalum	10 µF	15 V	267-000	H7
C708	ceramic	1 nF	-20/+80% 25 V	213-013	H7
C709	tantalum	10 µF	15 V	267-000	H7
C710	polystyrene	2 nF	1% 63 V	243-106	H7
C711	polystyrene	2 nF	1% 63 V	243-106	H7
C712	ceramic	47 nF	-20/+80% 30 V	213-016	H7
C713	polyester	1µF	10% 63 V	241-027	H7
C714	polyester	0.47 µF	10% 160 V	241-003	H7
C715	polystyrene	4.7 nF	5% 63 V	243-021	H7

DIODES

Designation	Type	Code No.	Shown in Fig.
CR701	zener diode BZY88C3V3	350-625	H7
CR702	zener diode BZY88C3V6	350-626	H7
CR703	diode ITT 700	350-028	H7
CR704	diode ITT 700	350-028	H7
CR705	diode ITT 700	350-028	H7
CR706	diode BAX16	350-023	H7

RELAYS

Designation	Type	Code No.	Shown in Fig.
K700	gas relay	570-033	H7

INDUCTORS

Designation	Type	Code No.	Shown in Fig.
xL701	choke, 203 µH	4579-A4	H7
xL702	choke, 394 µH	4580-A4	H7
L703	choke, 47 µH	703-008	H7

TERMINALS

Designation	Type	Code No.	Shown in Fig.
P700	terminal strip, 15 pole	805-613	H7

TRANSISTORS

Designation	Type	Code No.	Shown in Fig.
Q701	transistor 2N3904	360-064	H7
Q702	transistor 2N3904	360-064	H7
Q703	transistor 2N3904	360-064	H7
Q704	transistor 2N3904	360-064	H7
Q705	transistor 2N3251	360-052	H7
Q706	transistor 2N3251	360-052	H7
Q707	transistor 2N3906	360-062	H7
Q708	transistor BC149	360-072	H7
Q709	transistor TD100	360-105	H7
Q710	transistor 2N3906	360-062	H7
Q711	transistor BC149	360-072	H7

x indicates special parts manufactured by Radiometer.

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R701	carbon film	100 Ω 5% 0.3 W	106-310	H7
R702	carbon film	270 Ω 5% 0.3 W	106-327	H7
R703	metal film	390 Ω 1% 1/8 W	140-409	H7
R704	carbon film	10 Ω 5% 0.3 W	106-210	H7
R705	metal film	910 Ω 1% 1/8 W	140-410	H7
R706	carbon film	10 Ω 5% 0.3 W	106-210	H7
R707	metal film	7.5 kΩ 1% 1/4 W	140-299	H7
R708	trimmer potm. wire-wound	2 kΩ 10%	193-001	H7
R709	carbon film	470 Ω 5% 0.3 W	106-347	H7
R710	carbon film	10 Ω 5% 0.3 W	106-210	H7
R711	carbon film	820 Ω 5% 0.3 W	106-382	H7
R712	carbon film	3.3 kΩ 5% 0.3 W	106-433	H7
R713	metal film	100 Ω 0.2%	140-389	H7
R714	carbon film	240 Ω 5% 0.5 W	100-324	H7
R715	carbon film	220 Ω 5% 0.3 W	106-322	H7
R716	carbon film	68 Ω 5% 0.3 W	106-268	H7
R717	metal film	500 Ω 1% 1/4 W	140-397	H7
R718	metal film	500 Ω 1% 1/4 W	140-397	H7
R719	carbon film	15 kΩ 5% 0.3 W	106-515	H7
R720	carbon film	33 kΩ 5% 0.3 W	106-533	H7
R721	carbon film	10 MΩ 5% 1/2 W	100-810	H7
R722	carbon film	39 kΩ 5% 0.3 W	106-539	H7
R723	carbon film	39 kΩ 5% 0.3 W	106-539	H7
R724	carbon film	33 kΩ 5% 0.3 W	106-533	H7
R725	carbon film	3.3 MΩ 5% 1/2 W	100-733	H7
R726	carbon film	27 kΩ 5% 0.3 W	106-527	H7
R727	carbon film	56 kΩ 5% 0.3 W	106-556	H7
R728	carbon film	180 kΩ 5% 0.3 W	106-618	H7
R729	carbon film	270 kΩ 5% 0.3 W	106-627	H7

R730	carbon film	82 kΩ 5% 0.3 W	106-582	H7
R731	carbon film	1.8 kΩ 5% 0.3 W	106-418	H7
R732	carbon film	3.3 kΩ 5% 0.3 W	106-433	H7
R733	carbon film	68 kΩ 5% 0.3 W	106-568	H7
R734	metal film	2.25 kΩ 1% 1/4 W	140-380	H7
R735	metal film	822 Ω 1% 1/4 W	140-379	H7
R736	metal film	7.5 kΩ 1% 1/4 W	140-299	H7
R737	cermet potm.	1 kΩ	182-030	H7
R738	carbon film	2.7 kΩ 5% 0.3 W	106-427	H7
R739	cermet potm.	2.2 kΩ	182-034	H7
R740	metal film	57.6 kΩ, 1% 1/8 W	140-581	H7

CABLES

Designation	Type	Code No.	Shown in Fig.
W701	coaxial cable, 50 Ω, RG196/U, 0.04 m	600-008	H7

PRINT BOARD VIII - AF AMPLIFIER I + II, CODE 900-247

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C801	polystyrene	2 nF	1% 63 V	243-106	H8
C802	polystyrene	2 nF	1% 63 V	243-106	H8
C803	polystyrene	2 nF	1% 63 V	243-106	H8
C804	polystyrene	2 nF	1% 63 V	243-106	H8
C805	electrolytic	1000 µF	15/18 V	260-044	H8
C806	polystyrene	130 pF	5% 125 V	243-039	H8
C807	ceramic	15 pF	5%	210-215	H8
C808	polystyrene	600 pF	5% 125 V	243-027	H8
C809	ceramic	1 nF	-20/+80% 25 V	213-013	H8
C810	tantalum	10 µF	15 V	267-000	H8
C811	ceramic	47 nF	-20/+80% 30 V	213-016	H8
C812	polystyrene	54.5 nF	1% 63 V	243-158	H8
C813	ceramic	82 pF	5%	210-282	H8

DIODES

Designation	Type	Code No.	Shown in Fig.
CR801	diode BAV10	350-022	H8
CR802	zener diode BZY88C6V8	350-627	H8
CR803	zener diode BZY88C6V8	350-627	H8

INDUCTORS

Designation	Type	Code No.	Shown in Fig.
xL801	choke, 400 µH	4581-A4	H8
xL802	choke, 400 µH	4581-A4	H8
xL803	choke, 400 µH	4581-A4	H8

x indicates special parts manufactured by Radiometer.

xL804	choke, 400 µH	4581-A4	H8
xL805	choke, 110 µH	4582-A4	H8

TERMINALS

Designation	Type	Code No.	Shown in Fig.
P800	terminal strip, 20-pole	805-612	H8

TRANSISTORS

Designation	Type	Code No.	Shown in Fig.
Q801	transistor TD121	360-077	H8
Q802	transistor BC149	360-072	H8
Q803	transistor 2N3906	360-062	H8
Q804	transistor TD121	360-077	H8
Q805	transistor BC149	360-072	H8
Q806	transistor BC149	360-072	H8

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R801	metal film	550 Ω 0.2% 1/8 W	140-390	H8
R802	carbon film	680 Ω 5% 0.3 W	106-368	H8
R803	carbon potm.	100 kΩ, lin.	182-035	H8
R804	carbon film	3.9 MΩ 5% 1/2 W	100-739	H8
R805	metal film	3.16 kΩ 1% 1/4 W	140-408	H8
R806	carbon film	47 kΩ 5% 0.3 W	106-547	H8
R807	carbon film	22 kΩ 5% 0.3 W	106-522	H8
R808	carbon film	330 Ω 5% 0.3 W	106-333	H8
R809	carbon film	1 kΩ 5% 0.3 W	106-410	H8
R810	carbon film	1 kΩ 5% 0.3 W	106-410	H8
R811	carbon film	4.7 kΩ 5% 0.3 W	106-447	H8

x indicates special parts manufactured by Radiometer.

R812	carbon film	180 Ω 5% 0.3 W	106-318	H8
R813	carbon film	82 Ω 5% 0.3 W	106-282	H8
R814	carbon film	2.2 kΩ 5% 0.3 W	106-422	H8
R815	carbon film	560 Ω 5% 0.3 W	106-356	H8
R816	carbon film	1 kΩ 5% 0.3 W	106-410	H8
R817	carbon film	39 kΩ 5% 0.3 W	106-539	H8
R818	carbon film	56 kΩ 5% 0.3 W	106-556	H8
R819	carbon film	6.8 kΩ 5% 0.3 W	106-468	H8
R820	carbon film	12 kΩ 5% 0.3 W	106-512	H8
R821	carbon film	470 Ω 5% 0.3 W	106-347	H8
R822	carbon film	6.8 kΩ 5% 0.3 W	106-468	H8
R823	metal film	500 Ω 1% 1/4 W	140-397	H8
R824	carbon film	5.6 kΩ 5% 0.3 W	106-456	H8
R825	metal film	12.6 kΩ 0.5% 1/4 W	140-395	H8
R826	metal strap	ca. 0 Ω		H8

PRINT BOARD IX - AF AMPLIFIER III - V, CODE 900-248

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C901	polystyrene	2 nF	1% 63 V	243-106	H9
C902	polystyrene	2 nF	1% 63 V	243-106	H9
C903	polystyrene selected	100 pF	5% 160 V	243-037	H9
C905	tantalum	1.2 µF	10% 35/46 V	266-023	H9
C906	electrolytic	1000 µF	6 V	260-043	H9
C907	ceramic	47 pF	5%	210-247	H9
C908	polystyrene	700 pF	5% 125 V	243-033	H9
C909	tantalum	10 µF	15 V	267-000	H9
C910	tantalum	10 µF	15 V	267-000	H9
C911	polyester	10µF	10 % 63 V	241-028	H9
C912	polyester	2.2 µF	10% 100 V	241-007	H9
C913	ceramic	68 pF	5%	211-268	H9
C914	ceramic	2.2 pF	±0.5 pF	210-122	H9
C915	ceramic	0.1 µF	-20/+80% 12 V	213-017	H9
C916	tantalum	10 µF	15 V	267-000	H9
C917	tantalum	10 µF	15 V	267-000	H9

DIODES

Designation	Type	Code No.	Shown in Fig.
CR901	diode BAX16	350-023	H9
CR902	zener diode BZY88C6V2	350-604	H9
CR903	diode 1N916	350-019	H9
CR904	diode 1N916	350-019	H9

INDUCTORS

Designation	Type	Code No.	Shown in Fig.
xL901	choke, 197 µH	4583-A4	H9
xL902	choke, 394 µH	4580-A4	H9
xL903	choke, 203 µH	4579-A4	H9

TERMINALS

Designation	Type	Code No.	Shown in Fig.
P900	terminal strip, 20 pole	805-612	H9

TRANSISTORS

Designation	Type	Code No.	Shown in Fig.
Q901	transistor BC149	360-072	H9
Q902	transistor 2N3906	360-062	H9
Q903	transistor BC149	360-072	H9
Q904	transistor BC149	360-072	H9
Q905	transistor BC149	360-072	H9
Q906	transistor 2N3906	360-062	H9
Q907	transistor BC149	360-072	H9
Q908	transistor BC149	360-072	H9
Q909	transistor BC149	360-072	H9
Q910	transistor BC149	360-072	H9
Q911	transistor 2N3906	360-062	H9
Q912	transistor BC149	360-072	H9

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R901	metal film	500 Ω 1% 1/4 W	140-397	H9

× indicates special parts manufactured by Radiometer.

R902	carbon film	150 Ω 5% 0.3 W	106-315	H9
R903	carbon film	2.7 kΩ 5% 0.3 W	106-427	H9
R904	carbon film	1.5 kΩ 5% 0.3 W	106-415	H9
R905	carbon film	56 Ω 5% 0.3 W	106-256	H9
R906	carbon film	150 Ω 5% 0.3 W	106-315	H9
R907	carbon film	56 kΩ 5% 0.3 W	106-556	H9
R908	metal film	2410 Ω 1% 1/4 W	140-401	H9
R909	carbon potm.	500 Ω, lin.	182-038	H9
R910	carbon film	27 kΩ 5% 0.3 W	106-527	H9
R911	carbon film	12 kΩ 5% 0.3 W	106-512	H9
R912	carbon film	330 Ω 5% 0.3 W	106-333	H9
R913	carbon film	3.3 kΩ 5% 0.3 W	106-433	H9
R914	carbon film	560 Ω 5% 0.3 W	106-356	H9
R915	carbon film	100 Ω 5% 0.3 W	106-310	H9
R916	carbon film	10 kΩ 5% 0.3 W	106-510	H9
R917	carbon film	1 kΩ 5% 0.3 W	106-410	H9
R918	carbon film	100 Ω 5% 0.3 W	106-310	H9
R919	metal film	36.1 kΩ 1% 1/4 W	140-404	H9
R920	metal film	850 Ω 1% 1/4 W	140-399	H9
R921	metal film	2.04 kΩ 1% 1/4 W	140-400	H9
R922	carbon film	1 MΩ 5% 0.3 W	106-710	H9
R923	carbon potm.	10 kΩ, lin.	182-033	H9
R924	metal film	50 kΩ 1% 1/4 W	140-405	H9
R925	carbon film, selected	approx. 5.6 kΩ 0.3 W	106-456	H9
R926	carbon film	470 kΩ 5% 0.3 W	106-647	H9
R927	carbon film	120 kΩ 5% 0.3 W	106-612	H9
R928	carbon film	5.6 MΩ 5% 1/2 W	100-756	H9
R929	carbon potm.	0.5 MΩ, lin.	182-036	H9
R930	carbon film	680 Ω 5% 0.3 W	106-368	H9
R931	carbon film	530 Ω 5% 0.3 W	106-333	H9
R932	carbon film	39 kΩ 5% 0.3 W	106-539	H9
R933	carbon film	1 kΩ 5% 0.3 W	106-410	H9
R934	carbon film	12 kΩ 5% 0.3 W	106-512	H9

R935	carbon film	1.2 kΩ 5% 0.3 W	106-412	H9
R936	carbon film	100 Ω 5% 0.3 W	106-310	H9
R937	metal film	270 kΩ 1% 1/4 W	140-406	H9
R938	carbon film	100 Ω 5% 0.3 W	106-310	H9

PRINT BOARD X - AF DETECTOR, CODE 900-249

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C1001	polyester	68 nF	10% 400 V	240-568	H10
C1002	polyester	68 nF	10% 400 V	240-568	H10
C1003	polyester	0.47 µF	10% 125 V	240-001	H10
C1004	polyester	0.47 µF	10% 125 V	240-001	H10
C1005	ceramic	1 nF	±20%	212-410	H10
C1006	ceramic	0.1 µF	-20+80% 12 V	213-017	H10

DIODES

Designation	Type	Code No.	Shown in Fig.
CR1001	diode 1N5220	350-028	H10
CR1002	diode 1N5220	350-028	H10
CR1003	diode ER1	350-414	H10
CR1004	diode ER1	350-414	H10
CR1005	zener diode BZY88C5V6	350-629	H10

TERMINALS

Designation	Type	Code No.	Shown in Fig.
P1000	terminal strip, 15 pole	805-613	H10

TRANSISTORS

Designation	Type	Code No.	Shown in Fig.
Q1001	transistor 2N930	360-038	H10
Q1002	transistor 2N3906	360-062	H10
Q1003	transistor BC149	360-072	H10

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R1001	carbon film	18 MΩ 5% 1/2 W	100-818	H10
R1002	carbon potm.	0.5 MΩ, lin.	182-036	H10
R1003	carbon film	5.6 MΩ 5% 1/2 W	100-756	H10
R1004	carbon film	470 kΩ 5% 0.3 W	100-647	H10
R1005	carbon film	180 kΩ 5% 0.3 W	106-618	H10
R1006	carbon film	approx. 12 kΩ 0.3 W, selected	106-	H10
R1007	carbon film	approx. 560 Ω 0.3 W, selected	106-	H10
R1008	carbon film	1.2 kΩ 5% 0.3 W	106-412	H10
R1009	carbon film	120 kΩ 5% 0.3 W	106-612	H10
R1010	carbon film	1.8 kΩ 5% 0.3 W	106-418	H10
R1011	carbon film	10 kΩ 5% 0.3 W	106-510	H10
R1012	carbon film	1.5 kΩ 5% 0.3 W	106-415	H10
R1013	metal film	700 Ω 1% 1/4 W	140-398	H10
R1014	metal film	4.2 kΩ 1% 1/4 W	140-402	H10
R1015	metal film	14.7 kΩ 1% 0.1 W	140-603	H10
R1016	carbon film	2.2 kΩ 5% 0.3 W	106-422	H10

PRINT BOARD XI - POWER SUPPLY, CODE 900-250

CAPACITORS

Designation	Type	Value	Accuracy and max. voltage	Code No.	Shown in Fig.
C1101	electrolytic	1000 µF	25 V	261-029	H11
C1102	ceramic	0.1 µF	30 V	213-009	H11
C1103	ceramic	15 pF	±5%	210-215	H11
C1104	polyester	1 µF	10% 160 V	241-004	H11
C1105	polyester	33 nF	10% 400 V	240-533	H11
C1106	polyester	0.22 µF	10% 160 V	241-002	H11
C1107	electrolytic	1000 µF	25 V	261-029	H11
C1108	ceramic	33 pF	±5%	210-233	H11
C1109	polyester	2.2 nF	10% 400 V	240-422	H11
C1110	polyester	0.22 µF	10% 160 V	241-002	H11

DIODES AND RECTIFIERS

Designation	Type	Code No.	Shown in Fig.
CR1101	diode ER1	350-414	H11
CR1102	diode ER1	350-414	H11
CR1103	rectifier B80C2000	340-204	H11
CR1104	zener diode BZY88C5V6	350-629	H11
CR1105	zener diode BZY88C6V8	350-627	H11
CR1106	diode ER1	350-414	H11
CR1107	diode BAX16	350-023	H11

TERMINALS

Designation	Type	Code No.	Shown in Fig.
J1100	terminal strip, 20 contacts	805-612	H-11
P1100	terminal strip, 20 contacts	805-612	H-11

TRANSISTORS

Designation	Type	Code No.	Shown in Fig.
Q1100	transistor 2N2905A	360-073	H11
Q1101	transistor BC149	360-072	H11
Q1102	transistor BC149	360-072	H11
Q1103	transistor 2N3906	360-062	H11
Q1104	transistor 2N2905A	360-073	H11
Q1105	transistor BD121 with insulated mounting	360-090	H11
Q1106	transistor BD121 with insulated mounting	360-090	H11

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R1101	carbon potm.	1 MΩ, lin.	182-037	H11
R1102	carbon film	1 MΩ 5% 0.3 W	106-710	H11
xR1103	wire-wound	6.8 Ω 5% 2.5 W	133-045	H11
R1104	carbon film	12 Ω 5% 0.3 W	106-212	H11
R1105	carbon film	68 Ω 5% 0.3 W	106-268	H11
R1106	carbon film	2.7 kΩ 5% 0.3 W	106-427	H11
R1107	carbon film	82 Ω 5% 0.3 W	106-282	H11
R1108	carbon film	2.7 kΩ 5% 0.3 W	106-427	H11
R1109	wire-wound	2 Ω 2% 1/2 W	135-000	H11
R1110	carbon film	1.2 kΩ 5% 0.3 W	106-412	H11
R1111	carbon film	150 Ω 5% 0.3 W	106-315	H11
R1112	carbon film	2.7 kΩ 5% 0.3 W	106-427	H11
R1113	carbon film	5.6 kΩ 5% 0.3 W	106-456	H11
R1114	carbon film	2.2 kΩ 5% 0.3 W	106-422	H11
R1115	carbon potm.	1 kΩ, lin.	182-030	H11
R1116	carbon film	2.7 kΩ 5% 0.3 W	106-427	H11

x indicates special parts manufactured by Radiometer.

R1117	carbon film	1.2 kΩ 5% 1/2 W	100-412	H11
R1118	carbon film	1.2 kΩ 5% 0.3 W	106-412	H11
xR1119	wire-wound	8.2 Ω 5% 2.5 W	133-044	H11
R1120	carbon film	330 Ω 5% 0.3 W	106-333	H11
R1121	carbon potm.	1 MΩ, lin.	182-037	H11
R1122	carbon film	2.7 MΩ 5% 1/2 W	100-727	H11
R1123	carbon film	100 Ω 5% 0.3 W	106-310	H11
R1124	carbon film	4.7 kΩ 5% 0.3 W	106-447	H11
R1125	metal film	4.4 kΩ 0.5% 1/4 W	140-407	H11
R1126	metal film	4.4 kΩ 0.5% 1/4 W	140-407	H11
R1127	carbon film	2.2 kΩ 5% 0.3 W	106-422	H11
R1128	carbon film	4.7 kΩ 5% 0.3 W	106-447	H11

CABLES

Designation	Type	Code No.	Shown in Fig.
W1101	power line with plug, 1.7 m	615-005	H11
W1102	shielded cable, 0.5 m	611-008	H11

TRANSFORMER

Designation	Type	Code No.
T1101	transformer TBS593	770-593

x indicates special parts manufactured by Radiometer.

CRYSTAL OSCILLATOR UNIT, CODE 900-252

CAPACITORS

Designation	Type	Value	Code No.	
C1201	trimmer	18 pF	285-601	H12
C1202	trimmer	18 pF	285-601	H12
C1203	trimmer	18 pF	285-601	H12
C1204	trimmer	18 pF	285-601	H12
C1205	ceramic	4.7 nF -20/+50% 40 V	213-010	H12
C1206	ceramic	4.7 nF -20/+50% 40 V	213-010	H12
C1211	ceramic	3.3 pF 10%	211-133	H12
C1212	ceramic	1 nF -20+80% 25 V	213-013	H12
C1213	ceramic	1 nF -20+80% 25 V	213-013	H12
C1214	ceramic	1 nF -20+80% 25 V	213-013	H12
C1215	ceramic	470 pF -20+80% 25 V	213-014	H12
C1216	ceramic	470 pF -20+80% 25 V	213-014	H12

INDUCTORS

Designation	Type	Code No.	Shown in Fig.
xL1201	coil	5076-A4	H12
L1202	ferrite tube, 15 mm	704-301	H12
L1203	ferrite tube, 15 mm	704-301	H12
L1204	ferrite tube, 7 mm	704-300	H12

× indicates special parts manufactured by Radiometer.

TERMINALS

Designation	Type	Code No.	
P1200	terminal strip, 13 pole	805-639	H12

TRANSISTORS

Designation	Type	Code No.	Shown in Fig.
Q1201	transistor BF173	360-095	H12
Q1202	transistor BFW30	360-093	H12
Q1203	transistor BFW30	360-093	H12

RESISTORS

Designation	Type	Value	Code No.	Shown in Fig.
R1201	carbon film	1 kΩ 5% 0.3 W	106-410	H12
R1202	carbon film	1.2 kΩ 5% 0.3 W	106-412	H12
R1208	carbon film	56 Ω 5% 0.2 W	106-256	H12
R1209	carbon film	680 Ω 5% 0.2 W	106-368	H12
R1210	carbon film	470 Ω 5% 0.2 W	106-347	H12
R1211	carbon film	150 Ω 5% 0.2 W	106-315	H12
R1212	carbon film	150 Ω 5% 0.2 W	106-315	H12
R1214	carbon film	120 Ω 5% 0.2 W	106-312	H12
R1215	carbon film	56 Ω 5% 0.2 W	106-256	H12
R1216	cermet potm.	100 Ω 0.1 W	182-040	H12

SWITCHES

Designation	Type	Code No.	Shown in Fig.
S1201	switch "CHANNEL"	551-011	H 12

CABLES

Designation	Type	Code No.
W1201	coaxial cable, 110 Ω	600-001

MISCELLANEOUS

Designation	Type	Code No.
	crystal holder (HC 25/U)	816-201
	x pointer knob	852-111

x indicates special parts manufactured by Radiometer.

MODIFICATIONS FOR MODULATION METER, TYPE AFM2S3

The coaxial bushing J1, code 800-108, of the Modulation Meter, type AFM2, is replaced by the coaxial bushing J1, code 800-203, in the Modulation Meter, type AFM2S3.

MODIFICATIONS FOR MODULATION METER, TYPE AFM2S5

The following components are removed from the regular Modulation Meter, type AFM2, and replaced as follows in the Modulation Meter, type AFM2S5.

(AFM2)

Designation	Type	Value	Code No.	Shown in Fig.
C908	polystyrene	700 pF	243-033	H9
R912	carbon film	330 Ω 5% 0.3 W	106-133	H9
R917	carbon film	1 kΩ 5% 0.3 W	106-410	H9
R919	metal film	36.1 kΩ 1% 1/4 W	140-404	H9
R920	metal film	850 Ω 1% 1/4 W	140-399	H9
R921	metal film	2.04 kΩ 1% 1/4 W	140-400	H9
R922	carbon potm.	10 kΩ, lin.	182-033	H9
R923	carbon potm.	10 kΩ, lin.	182-033	H9
R924	metal film	50 kΩ 1% 1/4 W	140-405	H9

(AFM2S5)

Designation	Type	Value	Code No.	
C908	polystyrene	150 pF 5% 125 V	243-030	H9
C918	ceramic	0.5 pF 5%	210-050	H9
R912	carbon film	1.2 kΩ 5% 0.3 W	106-412	H9
R917	carbon film	680 Ω 0.5 W 5%	106-368	H9
R919	metal film	75 kΩ 1% 0.2 W	140-554	H9
R920	metal film	600 Ω 1% 0.2 W	140-378	H9
R923	carbon potm.	25 kΩ lin.	182-034	H9
R924	metal film	100 kΩ 1%	140-555	H9
R939	carbon film	330 kΩ 5% 0.2 W	106-633	H9

MODIFICATIONS FOR MODULATION METER, TYPE AFM2S6

The following components are removed from the regular Modulation Meter, type AFM2, and replaced as follows in the Modulation Meter, type AFM2S6.

(AFM2)

Designation	Type	Value	Code No.	Shown in Fig.
C317	ceramic	10 pF 5%	210-210	H3
R320	carbon film	150 Ω 5% 0.3 W	106-315	H3

(AFM2S6)

Designation	Type	Value	Code No.	
C317	ceramic	22 pF 5%	211-222	H3
R320	carbon film	56 Ω 5% 0.2 W	106-256	H3

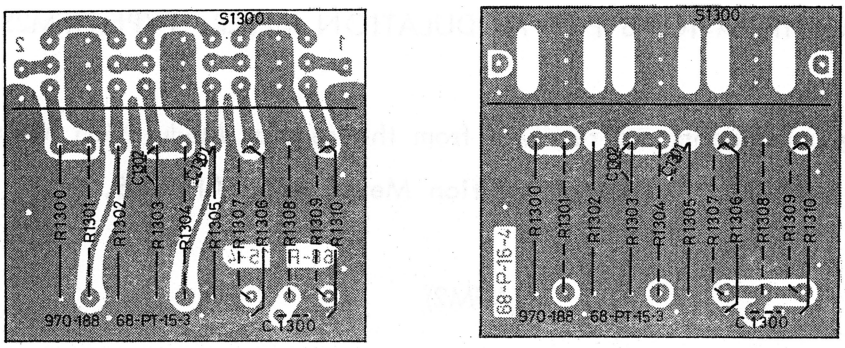


Fig. H1.

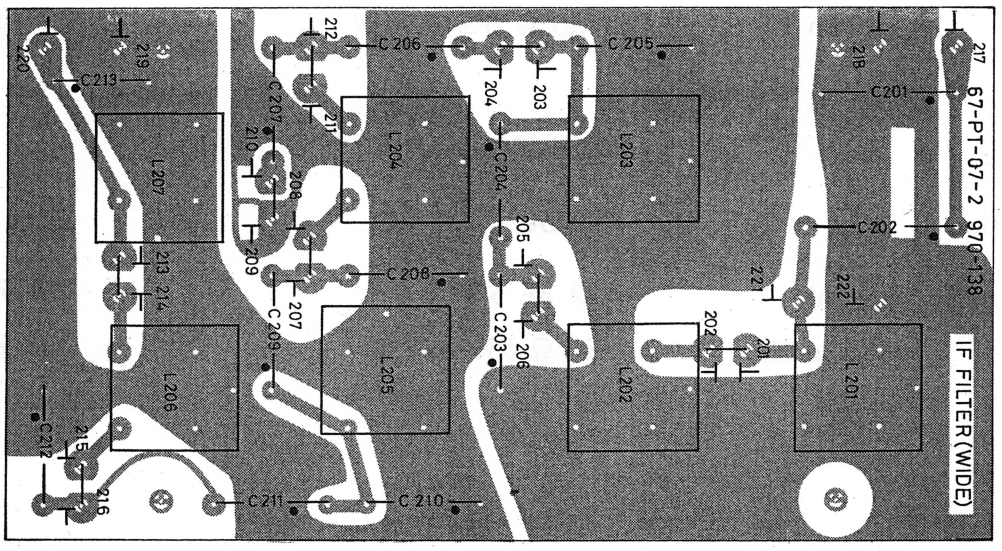


Fig. H2.

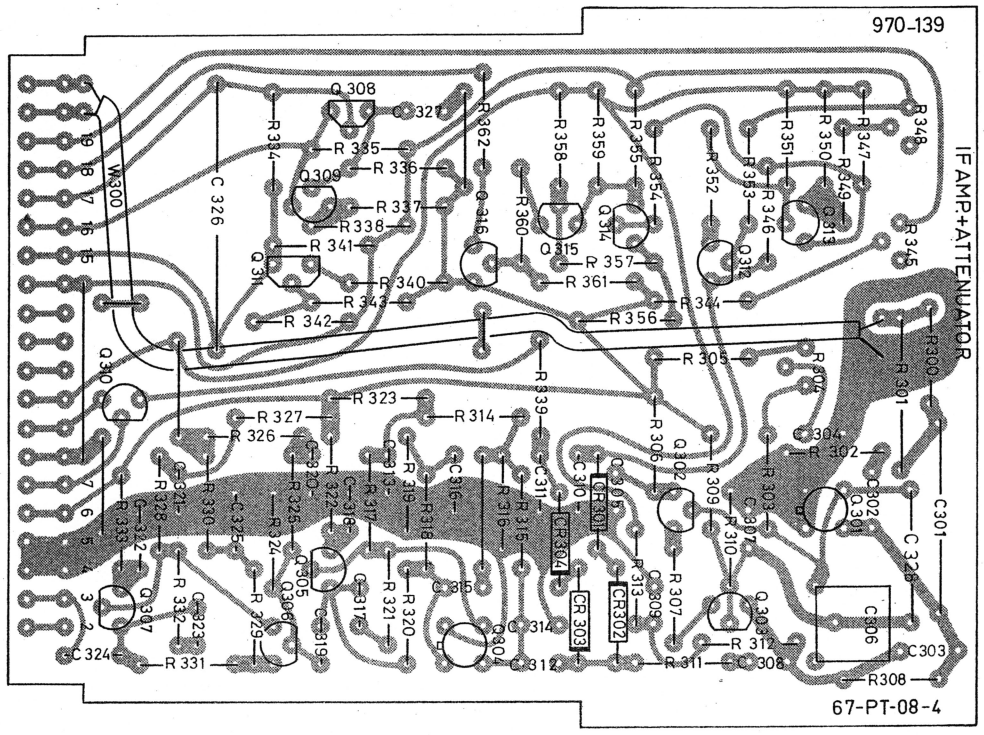


Fig. H3.

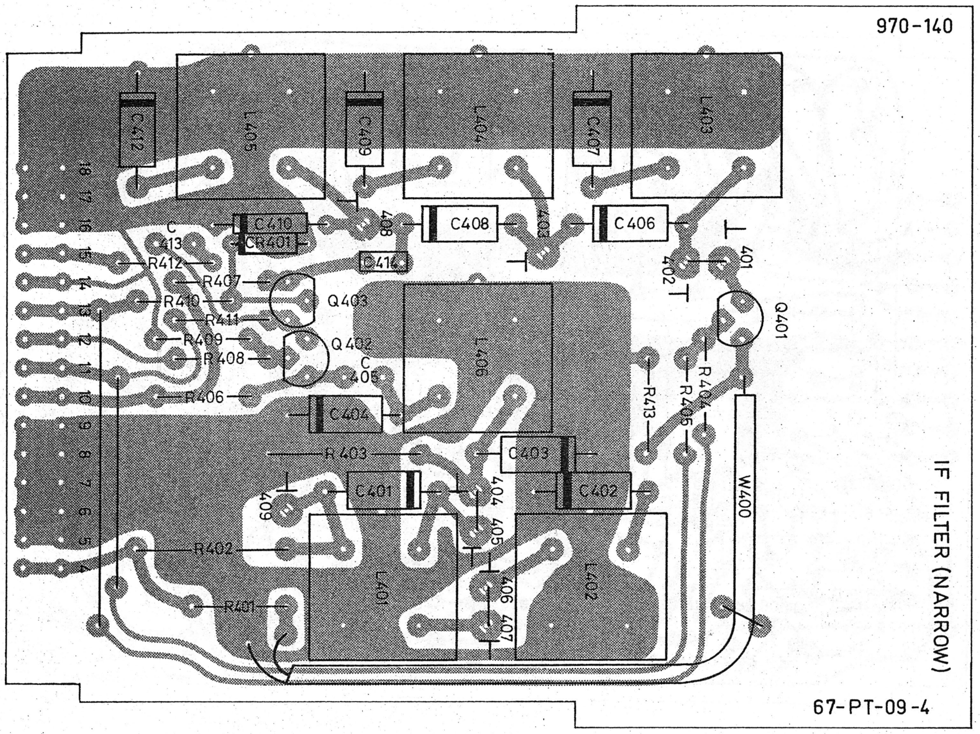

970-140
IF FILTER (NARROW)
67-PT-09-4

Fig. H4.

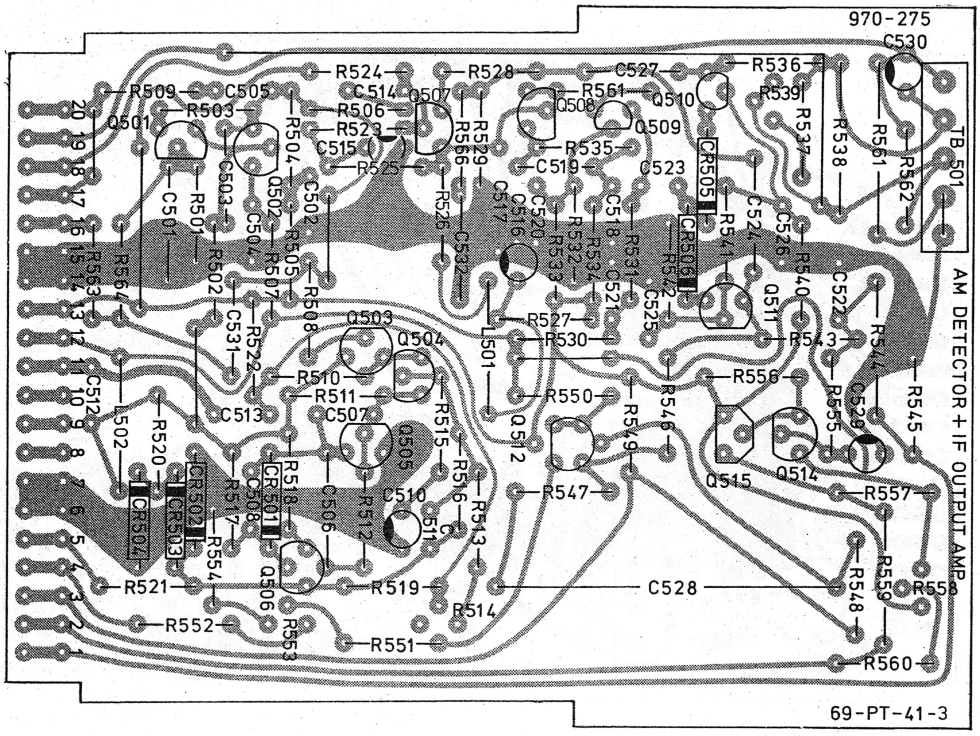

970-275
AM DETECTOR + IF OUTPUT AMP.
69-PT-41-3

Fig. H5.

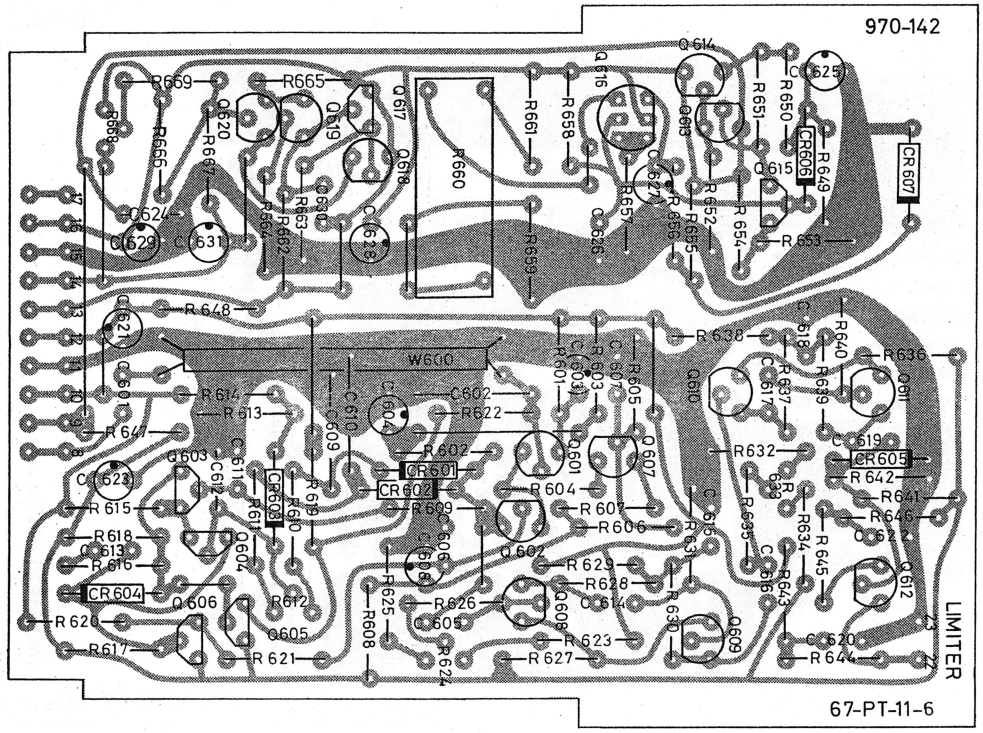


Fig. H6.

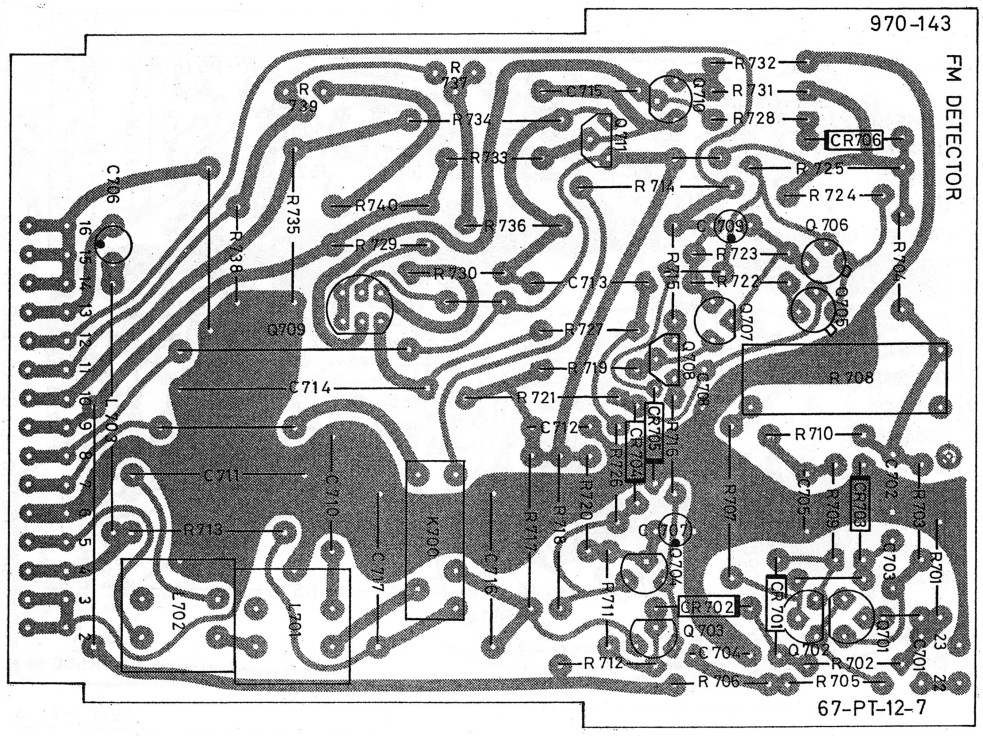
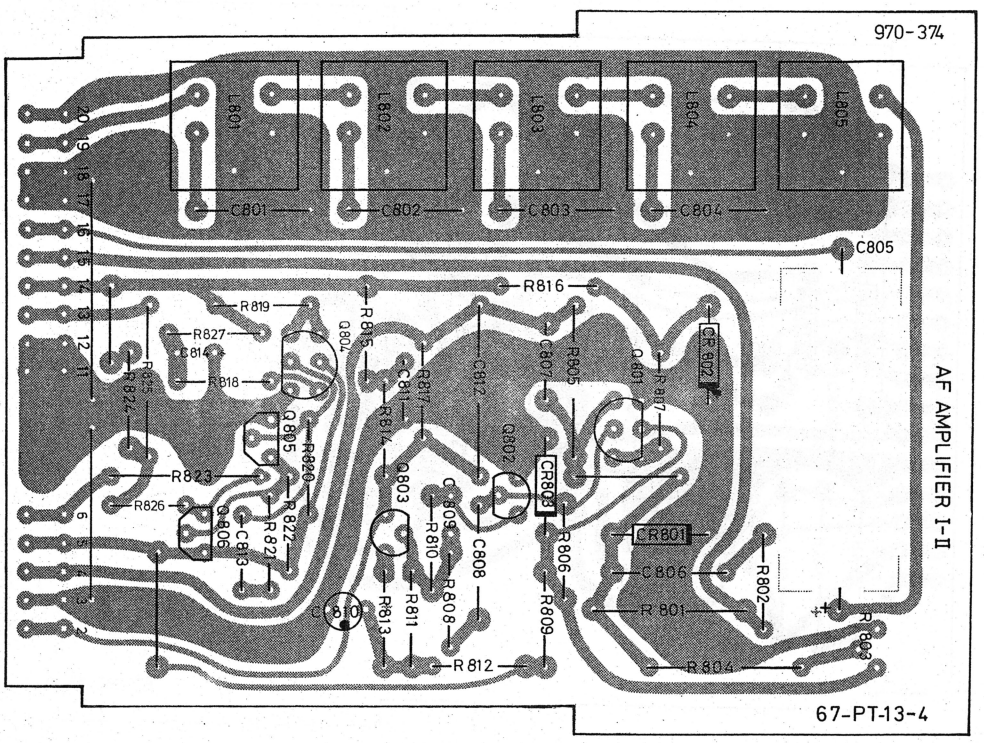


Fig. H7.


970-374
AF AMPLIFIER I-II
67-PT-13-4
L801
L802
L803
L804
L805
C801
C802
C803
C804
C805
R816
R819
R827
C814
R818
R824
R825
Q804
Q805
R820
R823
R826
Q806
C813
R822
C811
R817
R814
C812
C807
R805
Q801
R807
CR802
Q802
CR803
CR801
C806
R802
R801
R803
R804
C809
R810
C808
R806
R809
C810
R813
R811
R808
R812
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19
18
17
16
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3
2

Fig. H8.

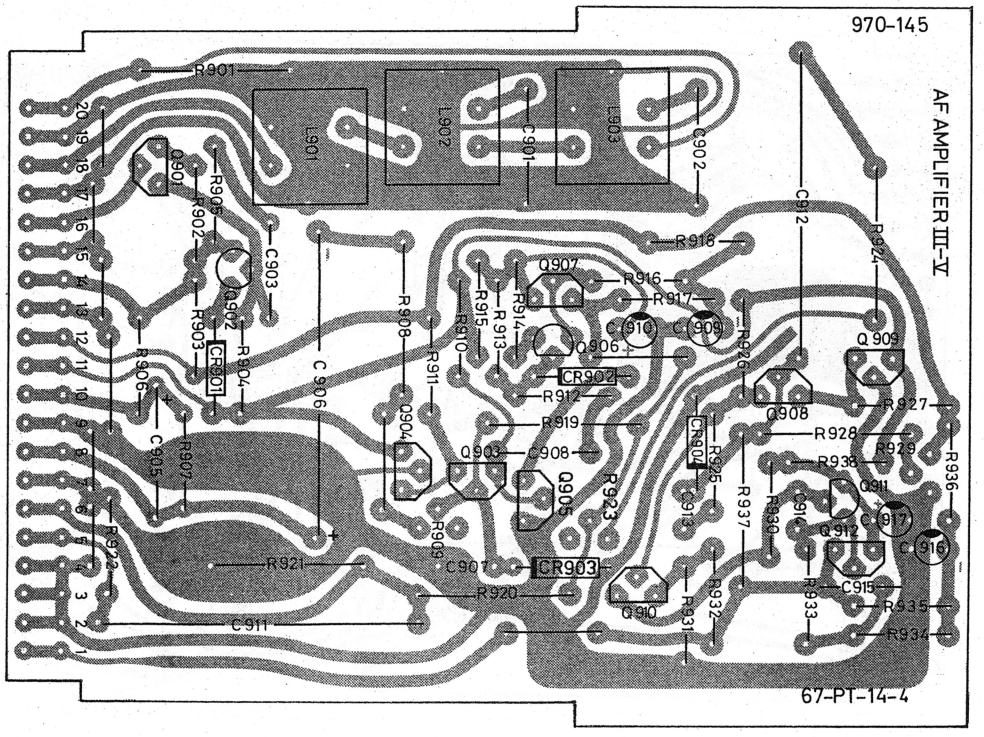
970-145
AF AMPLIFIER III-V
67-PT-14-4
L901
L902
L903
C901
C902
R901
Q901
R905
R902
C903
Q902
R903
CR901
R904
R906
C905
R907
R922
R921
C911
R908
C906
Q904
R909
C907
CR903
R920
Q910
R931
R932
R918
Q907
R916
R917
R914
R915
R913
R910
C910
C909
Q906
CR902
R912
R919
Q903
C908
Q905
R923
R911
R926
Q908
Q909
R927
R928
R929
R933
R936
Q911
C917
C916
Q912
C915
R935
R934
R937
R938
C914
R933
C912
R924
C913
R925
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Fig. H9.

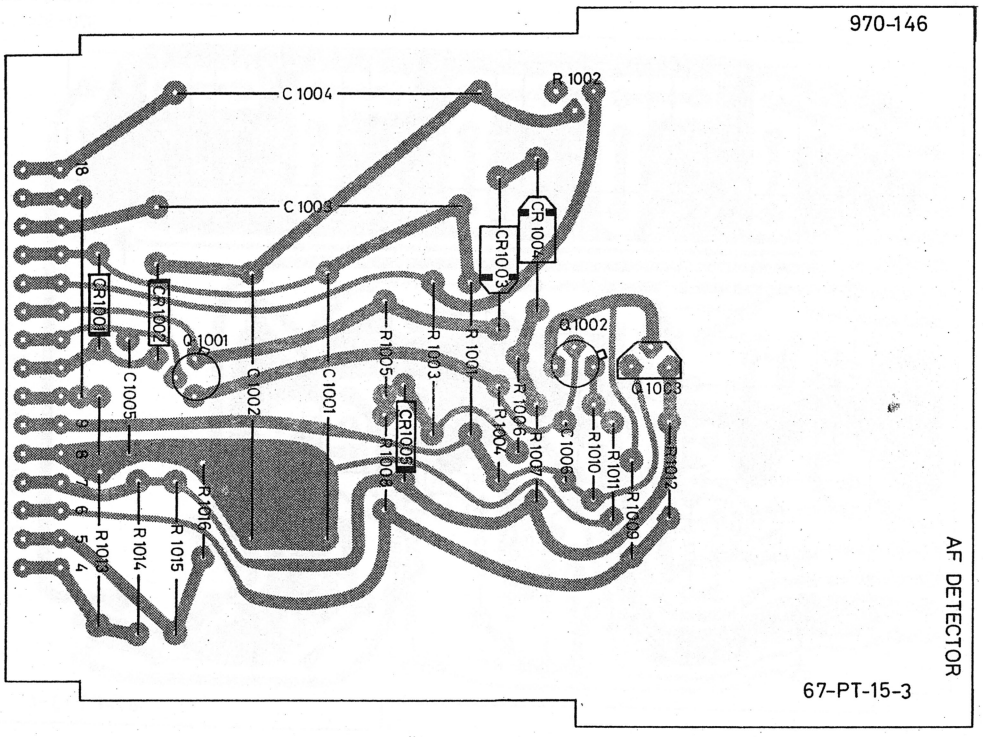


Fig. H10.

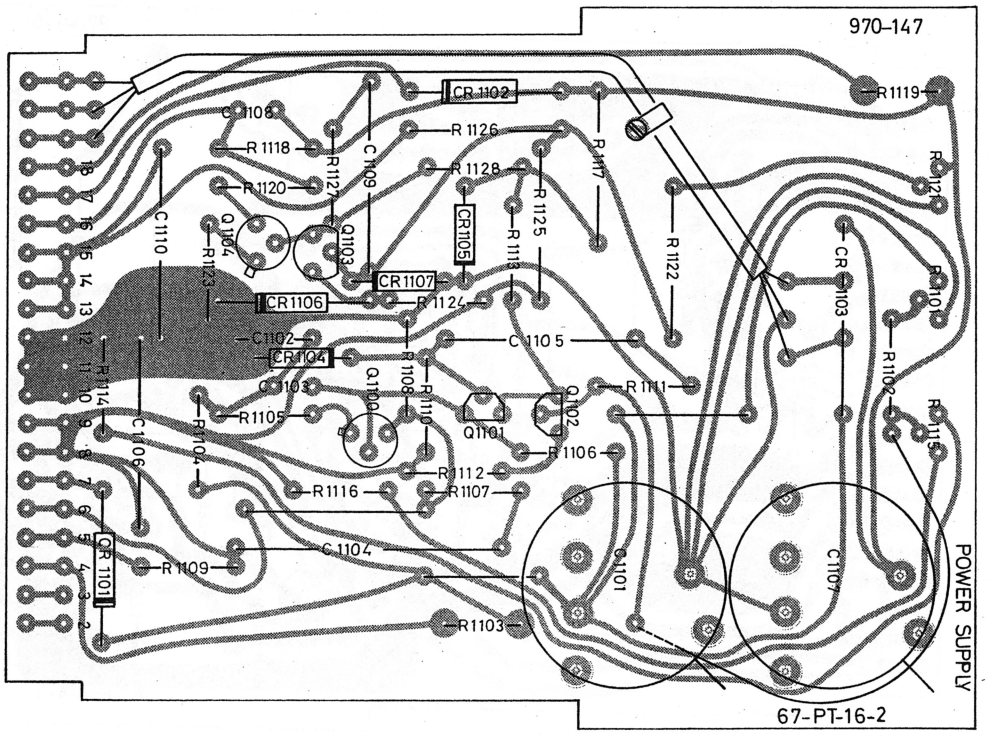


Fig. H11.

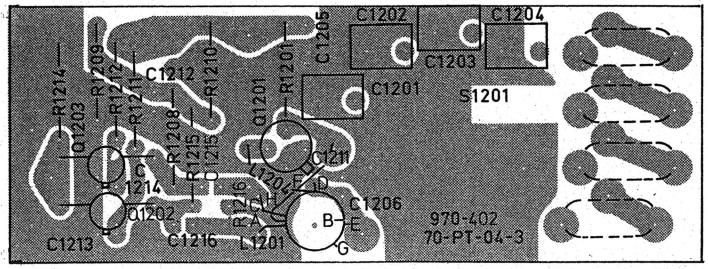
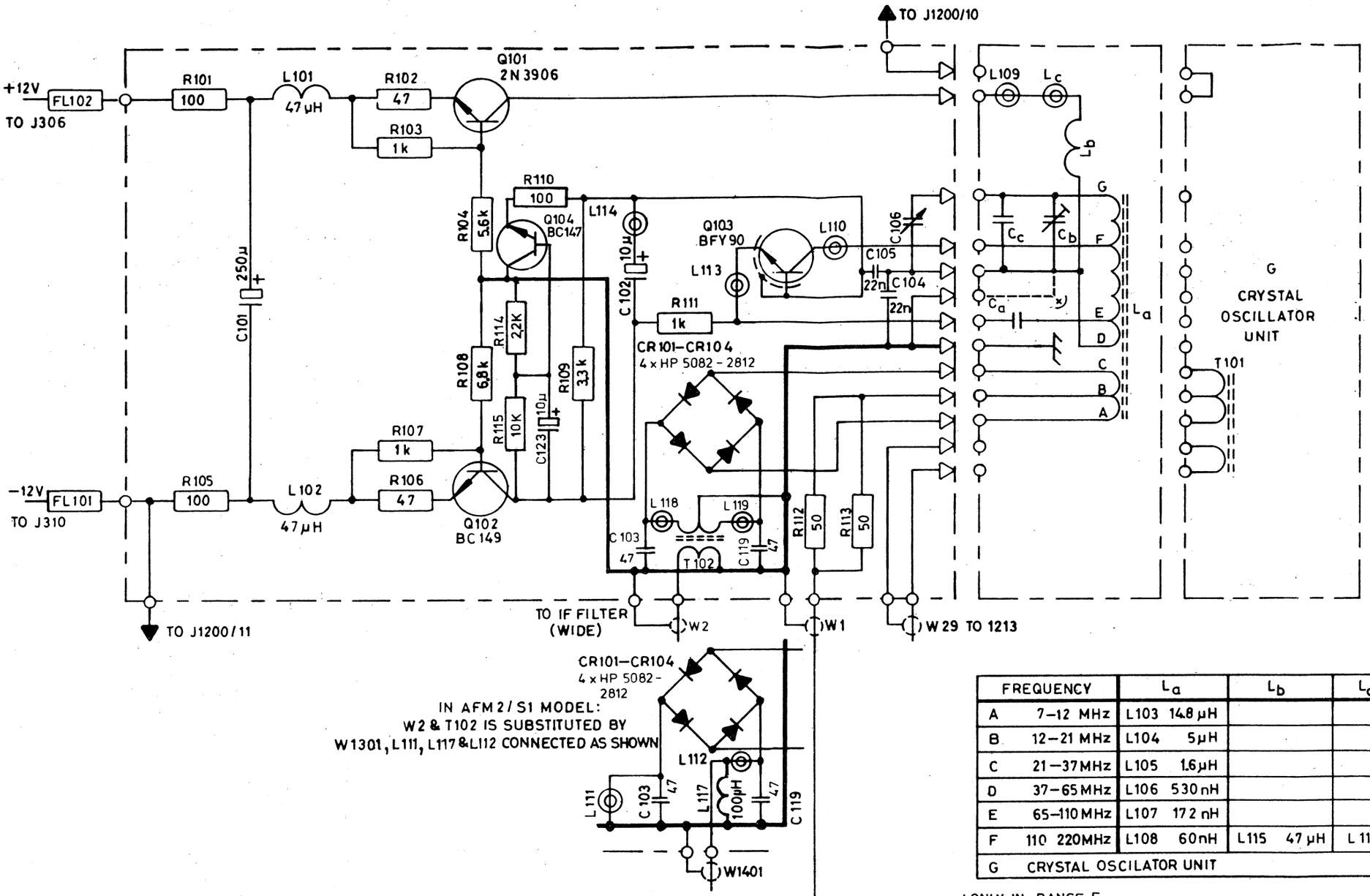
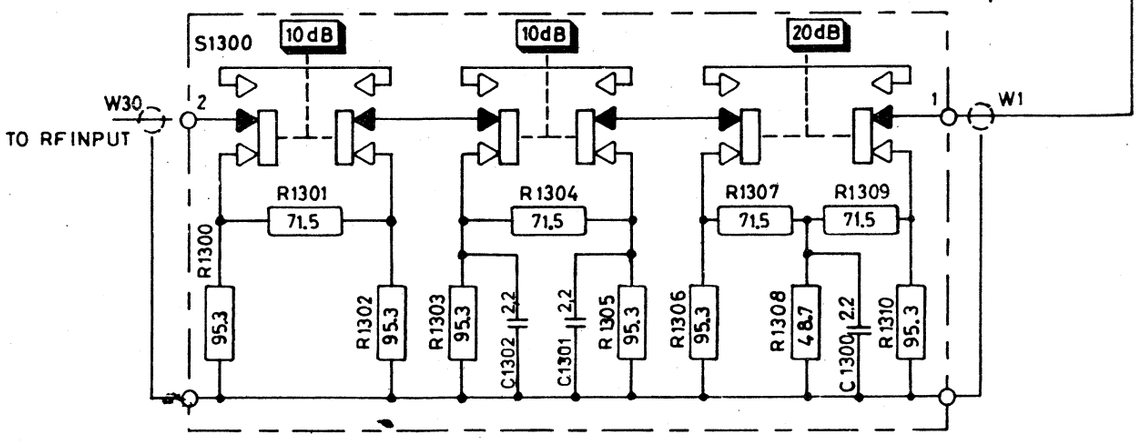

C1202
C1204
C1205
C1203
C1201
S1201
R1214
R1209
R1212
R1211
C1212
R1210
R1201
Q1201
R1208
R1215
C1211
C1214
Q1202
R1216
C1206
970-402
70-PT-04-3
C1213
C1216
L1201
B
E
C

Fig. H12





FREQUENCY		L_a	L_b	L_c	C_a	C_b	C_c
A	7–12 MHz	L103 14.8 µH			C107 2.2 n	C108 3	
B	12–21 MHz	L104 5 µH			C109 1 n	C110 3	
C	21–37 MHz	L105 1.6 µH			C111 1 n	C112 3	
D	37–65 MHz	L106 530 nH			C113 470	C114 3	C122 1.5
E	65–110 MHz	L107 172 nH			C115 220	C116 3	C121 2,2
F	110 220MHz	L108 60nH	L115 47 µH	L 116	C117 47	C118 3	
G	CRYSTAL OSCILATOR UNIT						

x) ONLY IN RANGE F_1
VALUES IN Ω OR pF IF NOT
OTHERWISE SPECIFIED.
1 ○ PRINT TERMINAL.

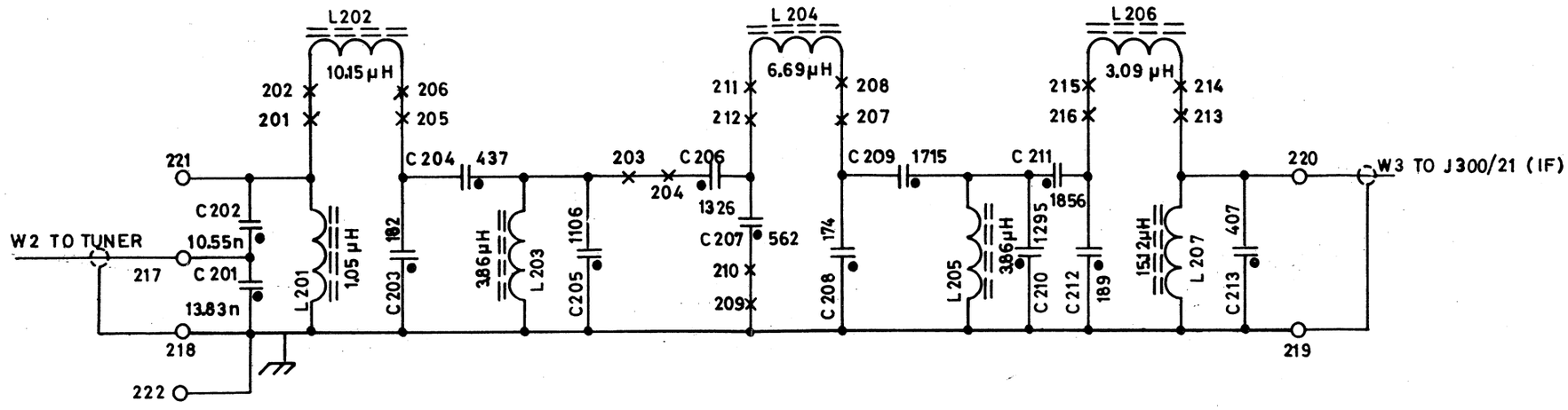
Rt.Nr	Fr. Fac. Nr.	Dato	Rt. af	Kont.	Norm.
6	171216	3.8.70	SHM	sa	PK
5	155625	28.1.70	OH	AIH	PK
4	152230	26.8.69	SHM		
8	155575	4.11.70	OH	AIH	PK
7	171265	13.8.70	SHM		

RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

Målestok		Tegn.	A.T.	27.6.68
		Kont.	sa	27.6.68
		Norm.	PK	27.6.68

MODULATION METER
TYPE: AFM2b
TUNER DIAGRAM
From no. to no.

Erstatter
1814-A2
Erstattes af



O PRINT TERMINAL

OUTSIDE ELECTRODE

TEST POINT

VALUES IN Ω OR pF
NOT OTHERWISE SPECIFIED

Rt.Nr.	Fra Fab. Nr.	Dato	Rt. af	Konf.	Norm.
1	173611	11.11.70	BG	OH	

RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

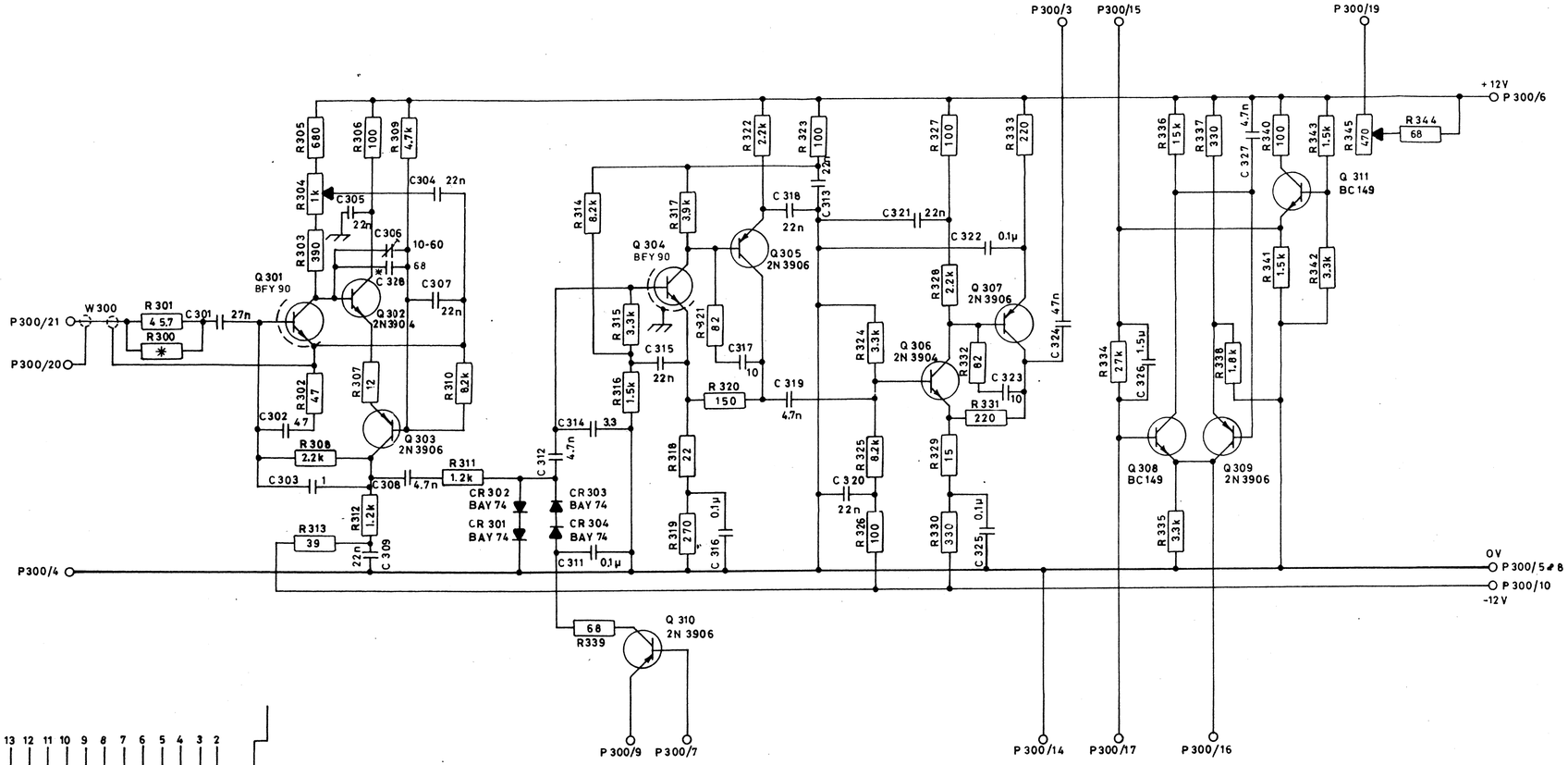
IF FILTER (WIDE)
900-241

From no. to no.

Maalestok /

Tegn.	J.H.	27.8.68
Konf.		
Norm.	PH	3.10.68

Erstatter
1818-A2
Erstattes af



P300
COMPONENT SIDE

21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
W3 TO IF FILTER WIDE	COMMON IF	TO R1A (LEVEL)		TO J500/3	TO S1 (AUTO/MAN)	TO S1 (AUTO/MAN)					- 12V	TO S1 (AUTO/MAN)		TO S1 (AUTO/MAN)	+12V	COMMON IF		W4 TO J400/4	

*FINAL VALUE FACTORY ADJUSTED
VALUES IN Ω OR pF IF NOT
OTHERWISE SPECIFIED

Rt.Nr.	Ers./Lab Nr.	Date	Rt. af	Kont.	Norm.
6	17361	11.11.70	BG.	OH	
5	155575	4.9.70	OH		PK
4	149450	21.4.70	OH		PK
3	155625	23.2.70	OH	stä	
7	191981	15.3.72	SHM	AH	PL

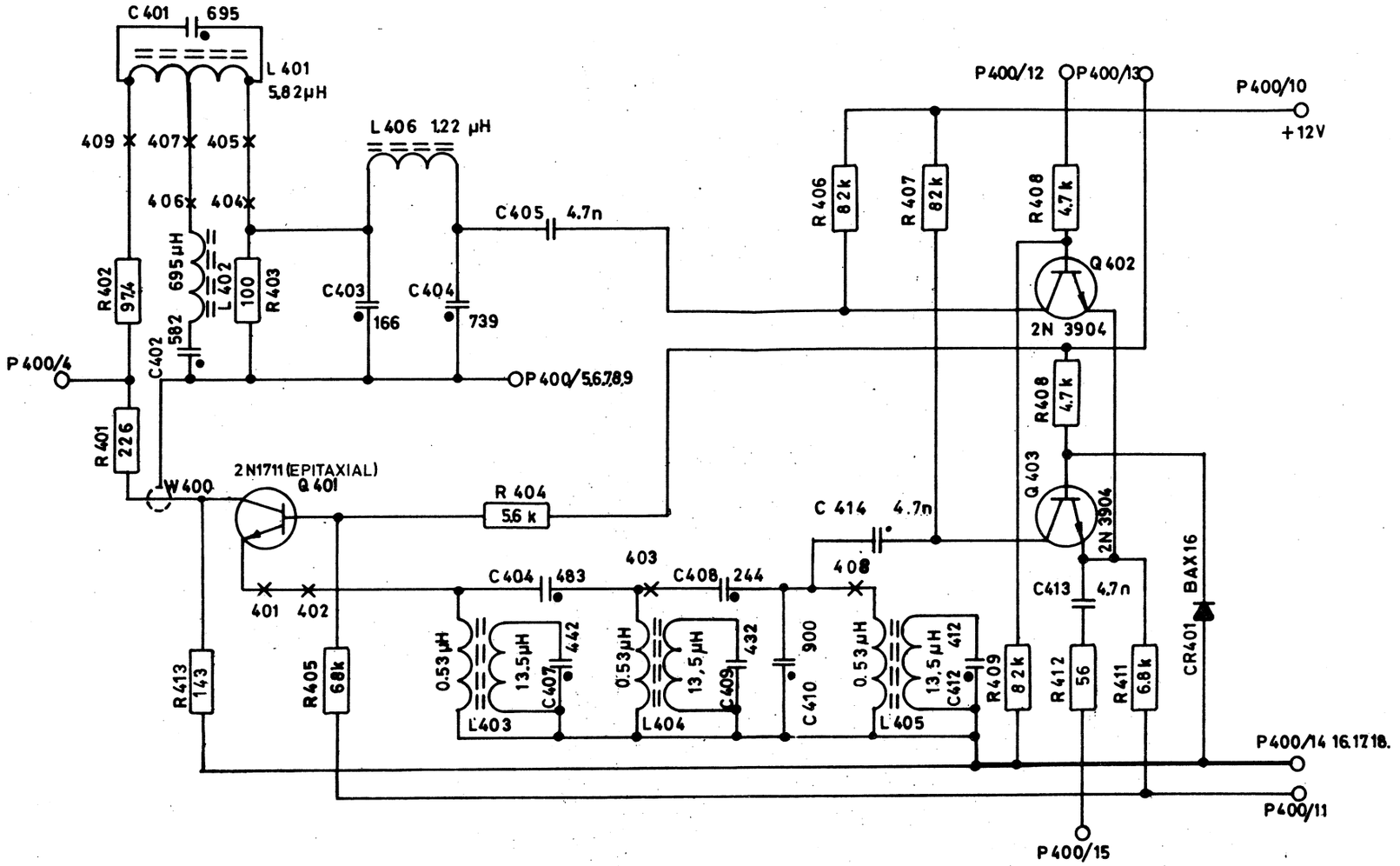
RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

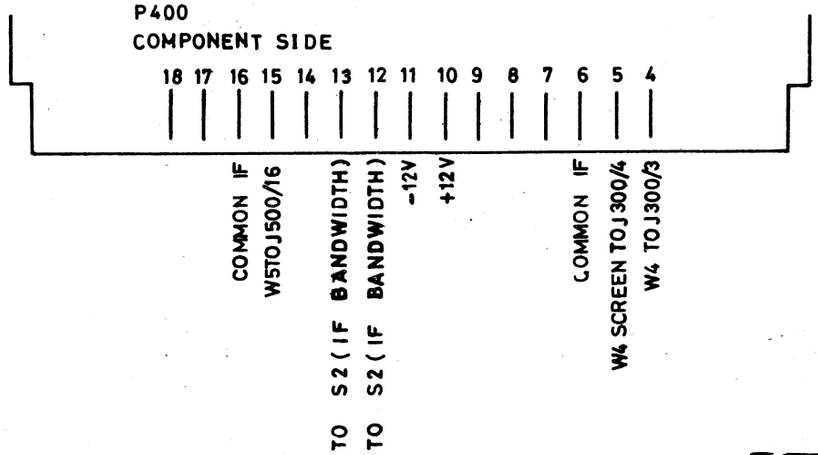
IF AMP. ATTENUATOR
900-242
From no. to no.

Malestok /
Tegn. OH 29.6.68
Kont.
Norm. PK 3.10.68

Erstatter
1193 - A1
Erstattes af

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F G





OUTSIDE ELECTRODE

TEST POINT

VALUES IN Ω OR pF IF NOT OTHERWISE SPECIFIED

Rt.Nr.	Fra Fab. Nr.	Dato	Rt. af	Konf.	Norm.
3	175311	11.11. 70	B.G.	OH	
2	155625	5.2. 70	OH		PK
1		20.9.68	SHM	HA	

RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

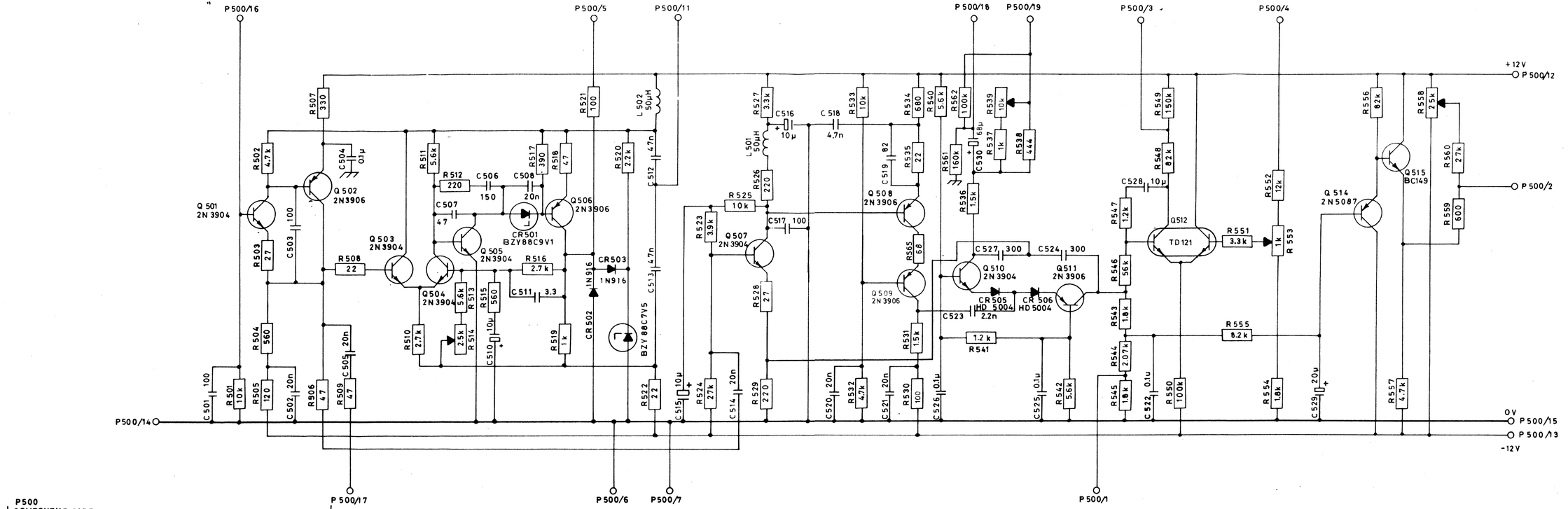
Målestok /

Tegn. OH 28.8.68
Konf.
Norm. PK 3.10.68

IF FILTER (NARROV)
900-243

From no. to no.

Erstatter
1817-A2
Erstattes af



VALUES IN Ω OR pF IF NOT OTHERWISE SPECIFIED

Rt.Nr.	Frg Fab Nr.	Dato	Rt. af	Kont.	Norm.
6	173611	11.11.70	B.G.	OH	
5	166251	21.4.70	OH		PH
4	155625	15.12.69	OH		PL
3	193815	19/2-69	Je.		
8	191981	14.3.72	SHM	AIH	PL
7	173611	2.2.72	OH	AIH	PL

RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

Målestok / Tegn. 7/5.9.68 Kont. Norm. 28.10.68

AF DETECTOR+IF OUTPUT AMP
900-244
From no. to no.

Erstatter 1194 -A1
Erstatter af

P800/16
P800/15
P800/2
P800/13
P800/5
+12V
C805 1000µ
L805 110µH
L804
C804 2n
400µH
L803
C803 2n
400µH
L802
C802 2n
400µH
L801
C801 2n
400µH
R803 100k
R809 1k
R806 47k
R804 3.9M
CR803 BZY88C6V8
R812 180
R811 4.7k
R813 82
C810 10µ
R801 550
R802 680
C806 130
R808 330
C808 600
C809 1n
R810 1k
Q803 2N3906
Q802 BC149
Q801 TD121
CR801 BAV10
C807 15
R805 3.16k
R807 22k
CR802 BZY88C6V8
C811 47n
R814 2.2k
R815 560
R817 39k
C812 54.5n
1k R816
R820 12k
R822 6.8k
C813 82
R821 470
Q806 BC149
Q805 BC149
R823 500
P800/6
Q804 TD121
R825 12.6k
R818 56k
R819 6.8k
R824 5.6k
P800/3
0V
P800/12
P800/14
-12V
P800/19
P800/17
P800/18
P800/20
P800/4

P800
COMPONENT SIDE

20	19	18	17	16	15	14	13	12	11	6	5	4	3	2
W9 SCREEN	W9 TO J700/5	W16 SCREEN	W15 SCREEN	W16 TO S5-1-23 (RANGE)	W15 TO S7-1-24 (FILTER/DEEMPHASIS)	TO J1100/13	W14 TO S5-2-18 (RANGE)	COMMON AF	W13+W14 SCREEN	W13 TO 900/18	TO J1100/9	W12 TO S7-2-24 (FILTER/DEEMPHASIS)	W11+W12 SCREEN	W11 TO S5-2-13 (RANGE)

VALUES IN Ω OR pF IF NOT OTHERWISE SPECIFIED

Rt.Nr.	Fra Fab. Nr.	Dato	Rt. af	Konf.	Norm.
3	173611	11.11.70	B.G.	OH	
2	155625	26.1.70	OH		
1.	133815	20/2-69	Je.		

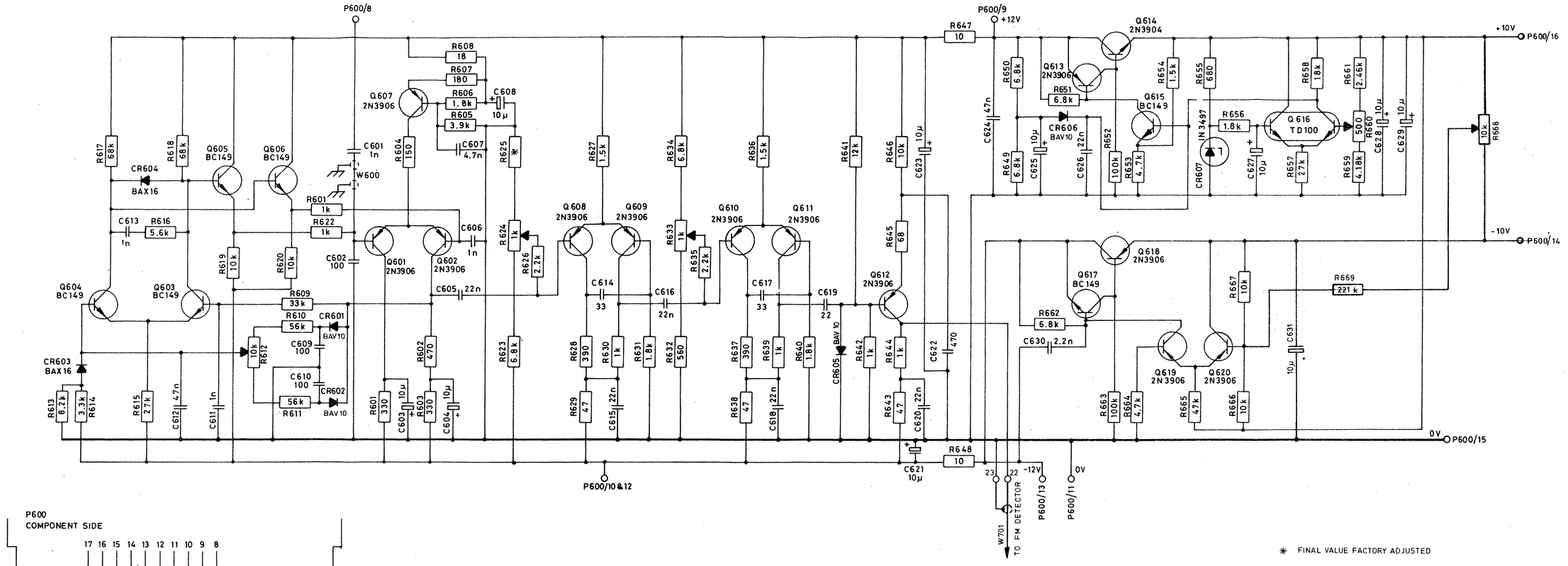
RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

Målestok /
Tegn. 29.8.66
Konf.
Norm.

AF AMPLIFIER I-II
900-247

From no. to no.

Erstatter
1815-A2
Erstattes af



* FINAL VALUE FACTORY ADJUSTED

VALUES IN Ω OR pF IF NOT OTHERWISE SPECIFIED.

No.					
6	155625	26.1.70	OH	JGa	PK
5	152230	26.8.69	SHM	JGa	
9	171216	13.1.71	SHM	JGa	
8	175936	10.11.70	B.G.	OH	
7	171265	13.8.70	SHM	JGa	

RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

Målestok /

Tegn. EJ 3.9.68
Kontr.
Norm. PK 3.1.69

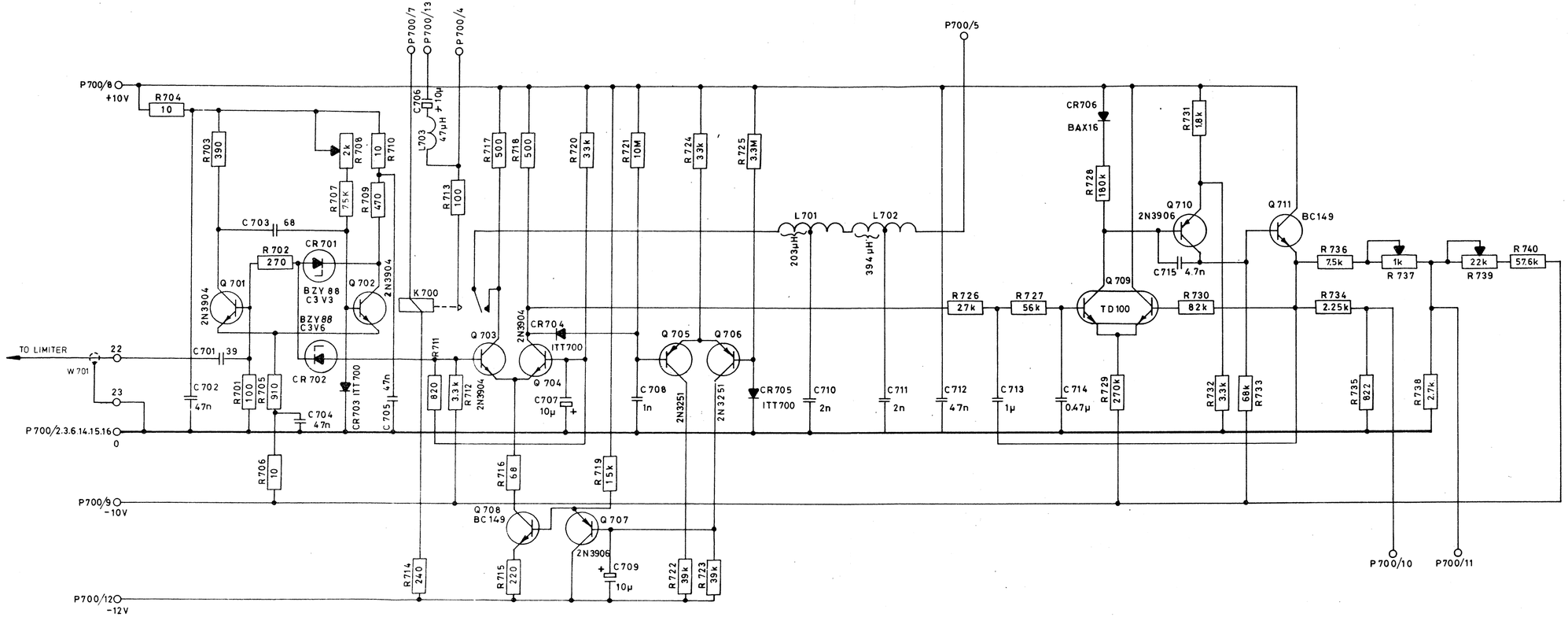
VI

LIMITER
900-245

From no. to no.

Erstatter
1197-A1

Erstattes af



P700
COMPONENT SIDE

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
TO S6-6-13 (FUNCTION)	W10 SCREEN	W10 TO S6-6-18 (FUNCTION)	TO J1100/13	TO S6-2-16 (FUNCTION)			TO J600/14	TO J600/16	[illegible]	COMMON AF	W9 TO J800/19	W8 TO J500/18	W9 SCREEN	W8 SCREEN

VALUES IN Ω OR pF IF
NOT OTHERWISE SPECIFIED

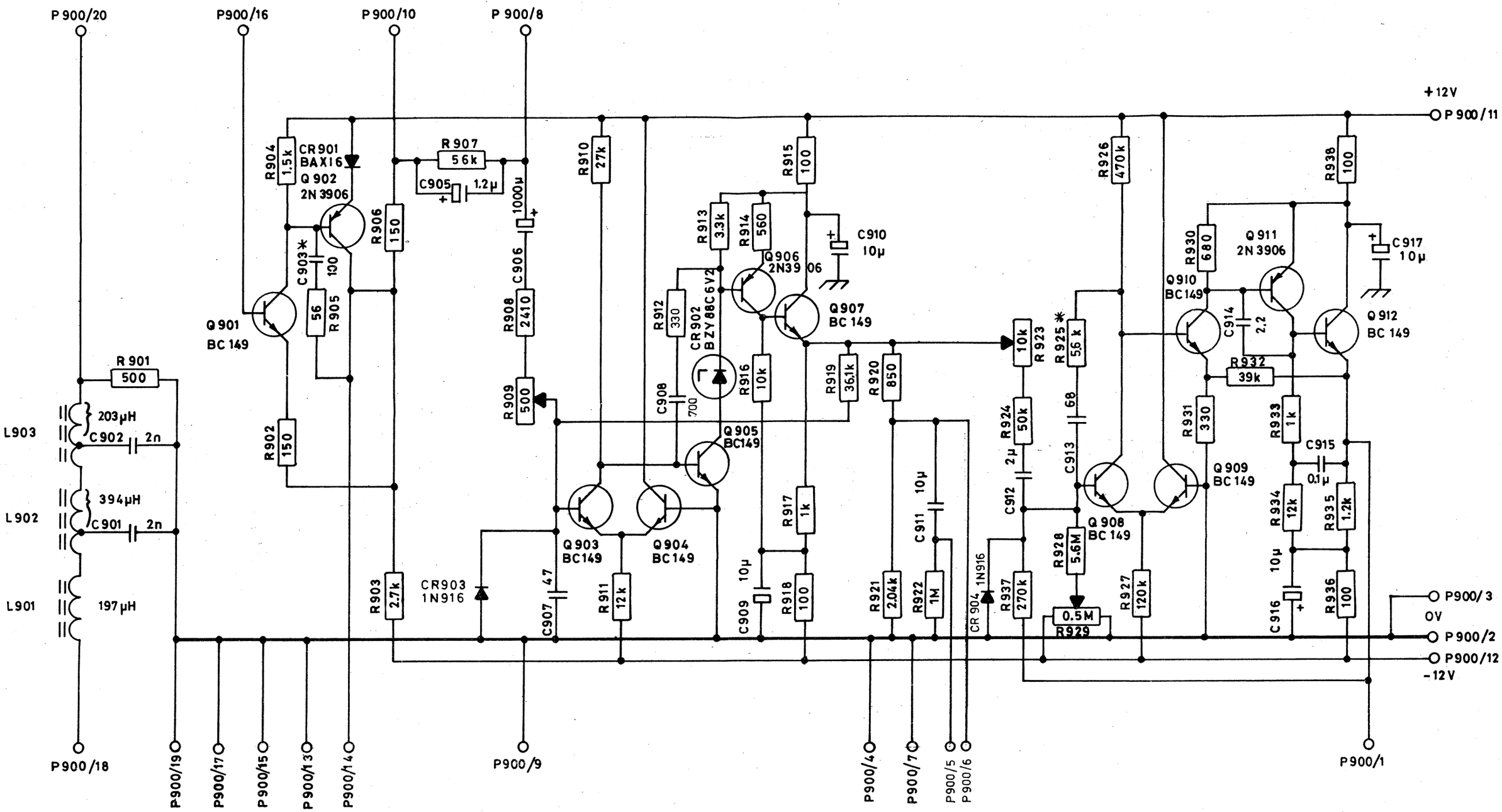
Rt.Nr	Erstellt Nr.	Datum	Rt. af	Kont.	Norm.
6	173611	11.11.70	B.G	OH	
5	155625	28.10.69	OH		
4	152230	26.8.69	SHM		
3	149450	10.6.69	SHM		
7	191981	14.3.72	SHM	AH	PR

RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

FM DETECTOR
900-246
From no. to no.

Malestok /
Tegn. OH 19.6.69
Konf.
Norm. PR 3.10.68

Erstatter
1195 -A1
Erstattes af



P900
COMPONENT SIDE

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
W24TOS7-3-24(FILTER/DEEMPHASIS)	W24 SCREEN	W13TOJ800/6	W13 SCREEN	W23TOS7-5-24(FILTER/DEEMPHASIS)	W22+W23 SCREEN	W22TOS7-4-24(FILTER/DEEMPHASIS)	AF COMMON	TOJ1100/14	TOJ1100/9	W21TOS7-6-24(FILTER/DEEMPHASIS)	W20+W21 SCREEN	W20TOS7-6-13(FILTER DEEMPHASIS)	W19 SCREEN	W19TOS4(AC-DC)	W18TOS4(AC-DC)	W18 SCREEN		W17SCREEN	W17TOJ1000/11

VALUES IN Ω OR pF IF NOT OTHERWISE SPECFIED

* FINAL VALUE FACTORY SELECTED

Rt.Nr.	Fra Fab. Nr.	Dato	Rt af	Kont.	Norm.
5	173611	11.11.70	BG.	OH	
4	152230	22.9.70	SHM	OJL	
3	166201	4/11-69	D.D.	Jla	
2	133815	19/2-69	Je.	Jla	Ph
1	129861.	11. 10. 68.	Je.	Jla	Ph

RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

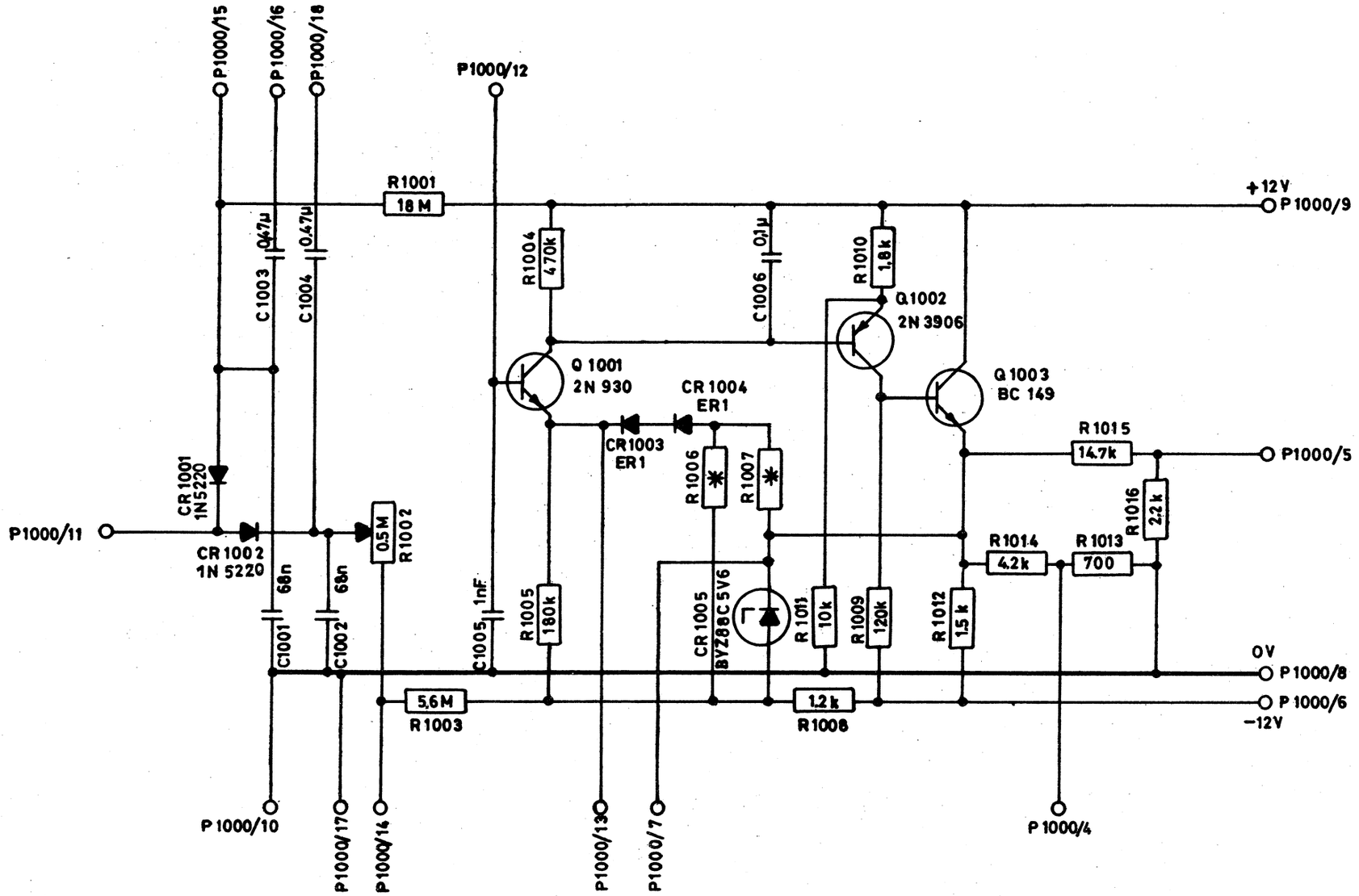
Målestok / Tegn. JH 30.8.68
Konf.
Norm. Ph 3.1.69

AF AMPLIFIER III-V
900-248

From no. to no.

Erstatter
1813-A 2

Erstatter af



P1000
COMPONENT SIDE

18	17	16	15	14	13	12	11	10	9	8	7	6	5	4
TOS3(METER:SLOW-FAST)	TOS3(METER:SLOW-FAST)	TOS3(METER:SLOW-FAST)	TOS6-4-19(FUNCTION)	TOS6-4-24(FUNCTION)	TOS6-5-13(FUNCTION)	TOS6-4-13(FUNCTION)	W17 TO J900/1	W25 SCREEN.TOS6-1-2-4(FUNCTION)	TO J1100/8	AF COMMON+J1100/11	TO S6-5-19(FUNCTION)	TOJ1100/13	TOS6-2-24(FUNCTION)	W25 TOJ10 MOD. LEVEL (DC)

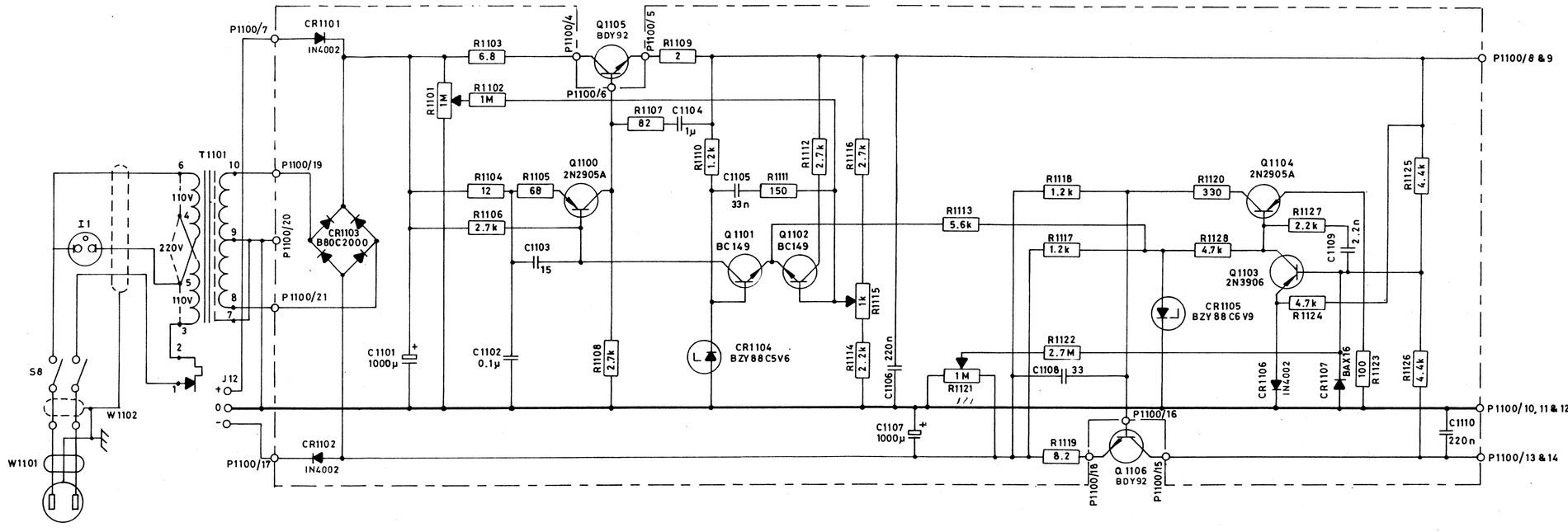
*FINAL VALUE FACTORY ADJUSTED
VALUES IN Ω OR pF IF NOT OTHERWISE SPECIFIED

Rt.Nr.	Fra Fab. Nr.	Dato	Rt. af	Kont.	Norm.
3	175936	10.11.70	B.G.	OH	
2	171216	3.8.70	SHM	Hø	
1	1298 36	31.10.68.	Je.	AIH	PK

RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

X
AF DETECTOR
900-249
From no. to no.

Erstatter
1816-A2
Erstattes af



P1100
COMPONENT SIDE

21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
TO T1101/8	TO T1101/9	TO T1101/10	Q1106 EMITTER	TO J12 (BATTERY-)	Q1106 BASE	Q1106 COLLECTOR	-12V	-12V	0V	0V	0V	+12V	+12V	TO J12 (BATTERY+)	Q1105 BASE	Q1105 EMITTER	Q1105 COLLECTOR		

VALUES IN Ω OR pF IF
NOT OTHERWISE SPECIFIED.

Ved rettelse, se også tegn. nr. 1444-A1

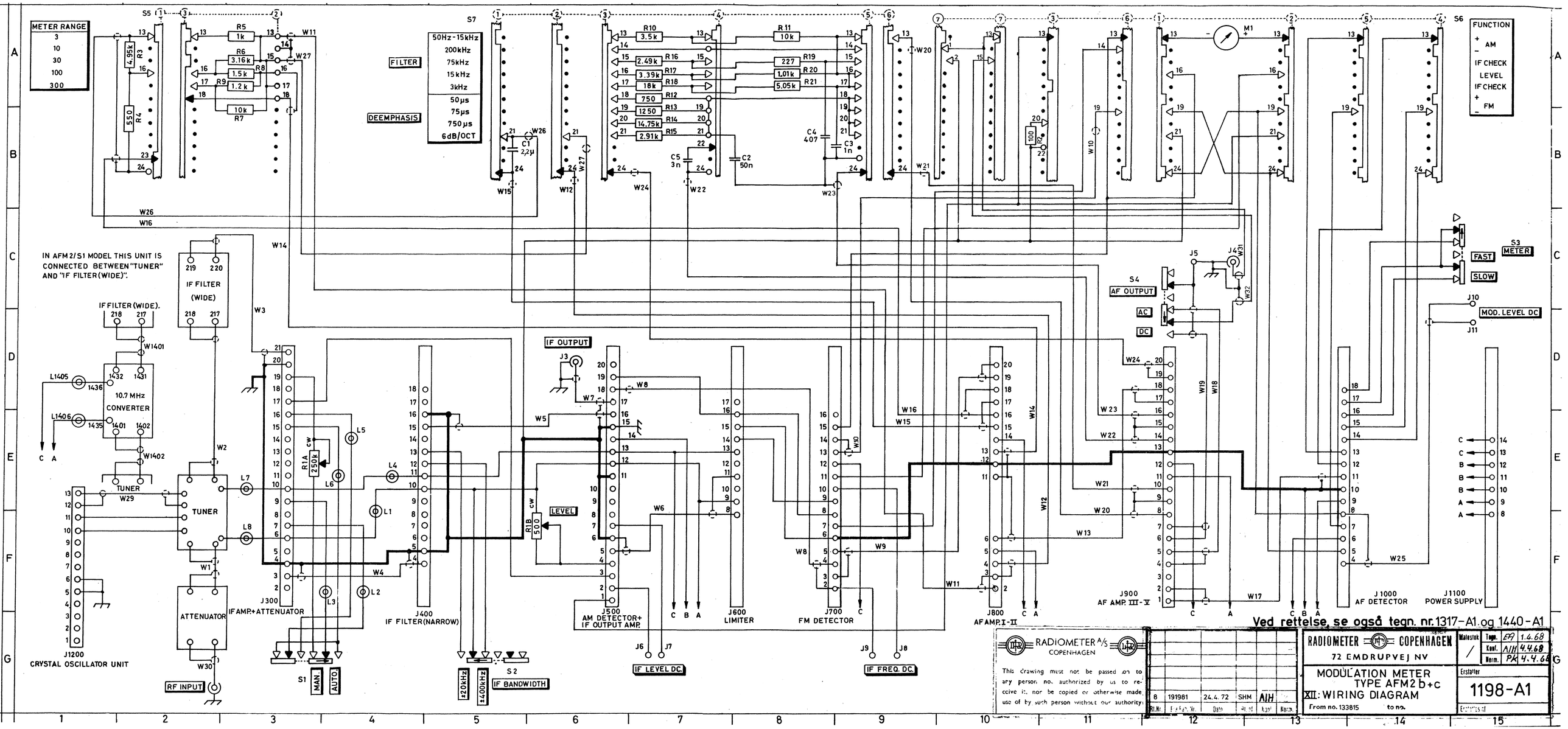
Rl.Nr.	Projekt Nr.	Dato	Rett af	Kontr.	Norm.
6	208892	15.3.73	OH	AIH	
5	197442	18.9.72	B.G.	AIH	
4	175936	10.11.70	B.G.	OH	
3	144435	6.6.69	N.H.	AIH	PK
2	133865	25.9.68	N.H.		PK
1		5.7.68	SHM	AIH	PK

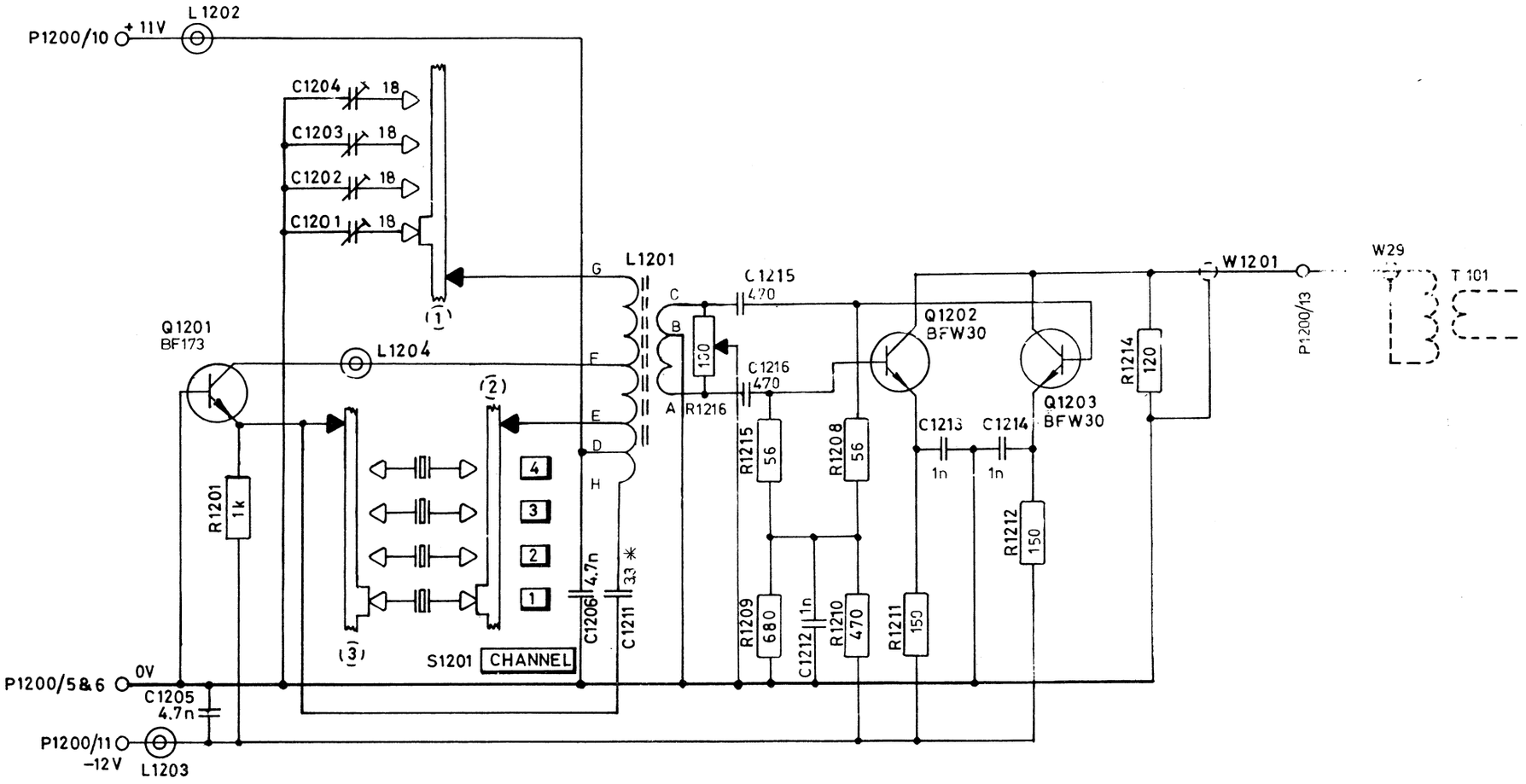
RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

Målestok: /
Tegn. EP 5.9.68
Kontr.
Norm. PK 3/10-68

XI
POWER SUPPLY
900-250
From no. to no.

Erstatter
1196-A1
Erstattes af


METER RANGE
3
10
30
100
300
FILTER
50Hz-15kHz
200kHz
75kHz
15kHz
3kHz
DEEMPHASIS
50µs
75µs
750µs
6dB/OCT
FUNCTION
+ AM −
IF CHECK LEVEL
IF CHECK + FM −
IN AFM2/S1 MODEL THIS UNIT IS CONNECTED BETWEEN "TUNER" AND "IF FILTER(WIDE)".
IF FILTER (WIDE).
IF FILTER (WIDE)
10.7 MHz CONVERTER
TUNER
ATTENUATOR
J1200 CRYSTAL OSCILLATOR UNIT
RF INPUT
J300 IF AMP+ATTENUATOR
J400 IF FILTER(NARROW)
J500 AM DETECTOR+ IF OUTPUT AMP
J600 LIMITER
J700 FM DETECTOR
J800 AF AMP. I-II
J900 AF AMP. III-V
J1000 AF DETECTOR
J1100 POWER SUPPLY
IF OUTPUT
LEVEL
IF LEVEL DC.
IF FREQ. DC.
IF BANDWIDTH
±20kHz
±400kHz
MAN.
AUTO.
AF OUTPUT
AC
DC
FAST
SLOW
METER
MOD. LEVEL DC
Ved rettelse, se også tegn. nr. 1317-A1 og 1440-A1
RADIOMETER A/S COPENHAGEN
This drawing must not be passed on to any person not authorized by us to receive it, nor be copied or otherwise made use of by such person without our authority.
RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV
MODULATION METER TYPE AFM2 b+c
XII: WIRING DIAGRAM
From no. 133815 to no.
Erstatter 1198-A1
Erstattes af
Tegn. EA 1.4.68
Kontr. AH 4.4.68
Norm. PA 4.4.68
8 191981 24.4.72 SHM AH



P1200
COMPONENT SIDE

13	12	11	10	9	8	7	6	5	4	3	2	1
W29 TO TUNER	W29 SCREEN	TO TUNER	TO TUNER				CHASSIS	CHASSIS				

VALUES IN Ω OR pF IF NOT OTHERWISE SPECIFIED.

cw: CLOCKWISE POSITION.

*: FINAL VALUE FACTORY ADJUSTED.

Rt.Nr.	Fra Fab. Nr.	Dato	Rt. af	Kont.	Norm.
5		7.4.72.	BG.	AIH	PL
4		20.4.71.	BG.	AIH	PK
3		12.11.70	SHM	AIH	PK
2		8.8.69	OH	JIa	
1		26.3.69	SHM	JIa	

RADIOMETER COPENHAGEN
72 EMDRUPVEJ NV

CRYSTAL OSCILLATOR UNIT
TYPE 900-252
From no. to no.

Malestok			
/	Tegn.	EA	20.6.68
	Kont.	JIa	21.6.68
	Norm.	PK	21.6.68

Erstatter
1831-A2
Erstattes af