RE 108 Synthesized Signal Generator

Manual Code Number 983-255

RE TECHNOLOGY

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

S E C T I O N A GENERAL INFORMATION

AI - INTRODUCTION

All functions of the RE108 SYNTHESIZED SIGNAL GENERATOR are programmable and the instrument can be remotely controlled via optional interface units. Three different units are available:

1. BCD CONTROL INTERFACE
2. IEEE/IEC BUS INTERFACE
3. MEMORY UNIT

The RE108 is particularly dedicated to measurements on FM and AM broadcast receivers and tuners, and covers the frequency range 0.1 to 1.69999 MHz in 10 Hz increments and 1.7 to 129.999 MHz in 1 kHz increments. A crystal controlled oscillator ensures the accuracy and stability of the instrument.

The RE108 has very low AM and FM distortion when modulated from the internal or an external low distortion source. When the RE108 is stereo modulated from an external stereo generator, e.g. the RE501 Programmable Stereo Generator, an L/R separation of more than 60 dB is obtainable.

The RE108 has facilities for AM stereo modulation according to the Magnavox stereo system. The RE502 stereo generator supplies the stereo modulation signals for FM stereo as well as AM stereo modulation.

The RE108 incorporates a sweep generator for sweeping of the RF frequency. You may choose between three different presettable sweep widths and between a triangular or a saw tooth sweep signal. Also the repetition rate is presettable.

The RE108 is provided with a crystal oscillator (SPOT FREQ.) for measurement of very high FM signal to noise ratio. The crystal oscillator can be furnished with crystals specified by the customer for a frequency within the range 75-108 MHz. The crystal oscillator can be phase modulated by a 19 kHz pilot signal (supplied e.g. from an RE501 or an RE502) for stereophonic S/N measurements.

S E C T I O N A _____ GENERAL INFORMATION

The RF output EMF can be varied from 0.55 uV to 6.3 V in 0,1 dB steps by means of a built-in attenuator.

AII - EQUIPMENT AND ACCESSORIES

CODE NO.	TYPE	DESCRIPTION
391-021	RE108,220V	Synthesized Signal Generator, RF REAR
391-025	RE108,220V	Synthesized Signal Generator, RF FRONT
615-303	220 V	line cord
615-403	115 V	line cord
450-017	220 V, 500 mA	spare fuse
450-120	115 V, 1 A	spare fuse
906-005		RF ANNUNCIATOR KIT
983-255		Instruction Manual

Options available

901-013		BCD Interface Unit
901-686		IEEE 488 Interface Unit
900-997		Memory Interface Unit
906-003	RE901	Keyboard

Accessories available

617-025	Cable for interconnecting the RE108 and the RE501, length 0.35 m, connecting BNC male to BNC male
617-763	Multicable for interconnecting the RE108 and the RE501, Memory Units, length 0.70 m
617-761	Multicable for interconnecting Memory Unit and Keyboard, length 2.5 m
617-762	Multicable for interconnecting RE108 and RE501 Memory Units, length 0.35 m
906-004	19" Rack mounting kit
770-662	Balancing Transformer for 75 ohms unbalanced to 300 ohms balanced. Impedance ratio: 1:4

AIII - SPECIFICATIONS

Frequency characteristics

Frequency range:	0.1 to 129.999 MHz
Frequency accuracy:	20 x 10^{-6}
Frequency resolution:	(0.1 to 1.69999 MHz) 10 Hz (1.7 to 129.999 MHz) 1 kHz 10 to 11.999 MHz, 100 Hz or 1 kHz selectable
Frequency settling time (for frequency steps 1 MHz or less):	within 1 kHz typical 50 ms
Short time stability:	better than 0.15 x 10^{-6}/15 min

RF Output Level Characteristics

Source EMF:	0.55 uV to 4 V RMS (to 6.3 V for AM less than 30%) variable in 0,1 dB steps

S E C T I O N A GENERAL INFORMATION

Accuracy:	
RF level frequency response:	±0.5 dB
Attenuator accuracy:	±1 dB, 2.7 mV to 4 V ±2 dB, 0.55 uV to 2.4 mV
Display:	4 digits - by means of an internal switch the level can be displayed in one of the following units: dBm - dBpw - dBfw - dB(uV) across matched load or dB(uV) EMF
Source impedance:	50 ohms
Output Connector:	BNC
VSWR:	<1.2
Leakage:	<1 uV EMF in a 2-turn loop 25 mm diameter at a distance of 25 mm from the generator
Switching time:	10 ms

Signal Purity

Harmonic distortion:	<-30 dB relative to carrier
Spurious frequencies:	-80 dB relative to carrier
ssb noise 30 - 130 MHz:	<-130 dB in 1Hz bandwidth 200 kHz from carrier
ssb noise 1.7 - 30 MHz:	<-105 dB in 1Hz bandwidth 10 kHz from carrier
ssb noise 0.1 - 1.7 MHz:	<-120 dB in 1Hz bandwidth 10 kHz from carrier

Modulation Characteristics

Modulation modes:	FM, AM, AM stereo and sweep, simultaneously 30% AM (f mod = 1 kHz) and FM (internal or external)

Modulation sources:	400 Hz and 1 kHz internal and 6 external modulation inputs selected from front panel or from programming interface unit
Modulation display:	00.0 to 99.5% AM or 00.0 to 99.5 kHz FM (peak value) (0.00 to 9.95 kHz for f <1.7 MHz)

- calibrated when 400 Hz and 1 kHz int. modulation are selected
- calibrated when Ext. MOD. 4-6 is selected and ext. mod level is 1 Vp
- UNCAL. annunciator switched on when ext. mod. level (Ext. 4-6) is ±1% besides the 1 Vp nominal value
- OFF when Ext. MOD. 1-3 is selected

- Ext. MOD. 2-3 on the rear are calibrated: 10 mVp for 1% AM
  10 mVp for ±1 kHz FM (1.7 to 129.999 MHz)
  1000 mVp for ±2 kHz FM (0.1 to 1.6999 MHz)

Frequency Modulation

a. 1.7 to 129.999 MHz

Programming steps:	0.5 kHz
Max. deviation:	99.5 kHz
Deviation accuracy:	±2% of preset value
Input impedance:	10 kohms
Mod. freq. response:	5 Hz to 100 kHz within 1%
Distortion at ±99.5 kHz: (Carrier frequency: 60 to 129.999 MHz and 1.7 to 29.999 MHz)	<0.02% at f mod = 1 kHz
FM stereo: L/R stereo separation:	60 dB at 1 kHz 50 dB 300 Hz to 5 kHz 40 dB 40 Hz to 15 kHz

S/N ratio relative to ±75 kHz deviation:	>74 dB (15 kHz bandwidth) (>90 dB for 10 MHz <f<12 MHz with 100 Hz resolution)
Incidental FM on AM:	<±60 Hz peak at 30% AM, 1 kHz mod. frequency (<±6 Hz peak for 10 MHz <f<12 MHz with 100 Hz resolution)

b. 10 to 11.9999 MHz (100 Hz resolution)

S/N ratio relative to ±75 kHz deviation:	>90 dB (15 kHz bandwidth)
FM distortion:	<0.2% at ±75 kHz deviation
L/R stereo separation:	40 dB 300 Hz to 5 kHz

c. 0.1 to 1.69999 MHz

Programming steps:	±50 Hz
Max deviation:	±9.95 kHz
Deviation accuracy:	±2% of preset value
Input impedance:	10 k ohms
Mod. freq. response:	5 Hz to 100 kHz within 1%
Residual FM: (20 Hz to 4 kHz bandwidth)	<2 Hz RMS
Incidental FM on AM:	<±3 Hz peak at 30% AM (1 kHz mod. freq.)

Amplitude Modulation

a. 1.7 to 129.999 MHz

Programming steps:	0.5%
Max. modulation depth:	90% for RF EMF <4 V 30% for RF EMF >4 V

Modulation accuracy	±5% of preset value
Input impedance:	10 kohms
Mod. freq. response	40 Hz to 5 kHz ±3 dB
Distortion at 30% AM:	<0.3% at 1 kHz (1.7 - 29.999 MHz)
Distortion at 80% AM:	<1% at 1 kHz (1.7 - 29.999 MHz)
Residual AM (RMS value):	0.03% (5 kHz bandwidth)
Incidental AM on FM (±100 kHz dev. 1 kHz mod.freq.):	<0.2%

b. 0.1 to 1.69999 MHz

Programming steps:	0.5% AM
Max. modulation depth:	99.5% for RF EMF ≤4 V
Modulation accuracy: (output level vernier OFF)	±2% of preset value ±1% in AM stereo mode
Input impedance:	10 k ohms
Mod. freq. response:	1 Hz to 500 kHz ±3 dB
Distortion at 30% AM:	<0.1%
Distortion at 80% AM: 95% AM:	<0.2% <1%
Residual AM:	<0.015% RMS (BW 5 kHz) 1MHz
Incidental AM on FM: (±10 kHz deviation, 1 kHz mod.freq.)	<0.1%

AM stereo modulation (Magnavox system)

Valid for frequency range 0.4 to 1.69999 MHz only.

L+R input (AM):	1 V peak for 100% AM

Max. modulation depth:	100%
L-R input (PM):	1 V peak for ±1 radian
Max. modulation depth:	±2 rad. at 10 kHz mod.freq. ±20 rad. at 1 kHz mod.freq.

The 5 Hz stereo identification signal is applied to the L-R input terminal. 4 volts peak required for (4 rad) deviation.

The RE502 Programmable Stereo Coder delivers all signals necessary for AM stereo modulation.

The AM stereo signal from the combination RE502-RE108 has an L/R separation of at least 40 dB at 1 kHz.

Incidental PM at 80% AM:	typical 50 dB below 0.8 radian (f.mod. = 1 kHz)
Residual PM (20 Hz to 20 kHz):	$<2 \times 10^{-3}$ radian
Residual PM (200 Hz to 20 kHz):	$<0{,}3 \times 10^{-3}$ radian
Incidental AM on PM: (±1 rad. at 1 kHz mod.freq.)	<0.01%
Residual AM: (20 Hz to 20 kHz)	<0.015% RMS

MODULATION IN/OUT connectors

Pilot		19 kHz pilot 775 mV RMS for 6.75 kHz FM dev. (spot freq. or normal mode)
Ext. 2	Direct	AM 1 Vp/100%
		FM 1 Vp/±100 kHz for f ≥1.7 MHz
Ext. 3		FM 1 Vp/±2 kHz for f <1.7 MHz
Ext. 4	Via D/A Converter	Calibrated for 1 V peak
		AM 0 to ±99.5% in 0.5% steps
Ext. 5		FM 0 to ±99.5 kHz in 0.5 kHz steps (f≥1.7 MHz)
Ext. 6		FM 0 to ±9.95 kHz in 0.05 kHz steps (f<1.7 MHz)
L+R	AM STEREO	AM 1 Vp/100% AM
L-R		PM 1 Vp/radian (5 Hz pilot: 4 Vp for 20 Hz dev.)

400 Hz	Mod. osc. out 1 Vp
1 kHz	Mod. osc. out 1 Vp
SWEEP OUT	±5 Vp

SPOT FREQUENCY

Frequency:	within the range 75 to 108 MHz
S/N mono:	>90 dB (bandwidth 20 Hz to 15 kHz)
S/N stereo:	>80 dB (bandwidth 20 Hz to 15 kHz)
Pilot modulation:	9% 19 kHz for stereo S/N measurements 19 kHz signal delivered from stereo generator 775 mV RMS
Standard frequency:	98 MHz other frequencies on request

Frequency Sweep (internal)

Sweep "NARROW":

Width:	presettable between ±1 kHz and ±10 kHz
Rep. frequency:	presettable between 5 Hz and 50 Hz

Sweep "MEDIUM": Not valid for f <1.7 MHz

Width:	presettable between ±50 kHz and ±0.5 MHz
Rep. frequency:	presettable between 5 Hz and 50 Hz

Sweep "WIDE": Not valid for f <1.7 MHz

Width:	presettable between ±0.5 MHz and ±5 MHz (divided by 2 for 30≤f<60 MHz)
Rep. frequency:	presettable between 25 Hz and 50 Hz

Sweep OUT

Sweep output signal:	±5 V triangular or saw tooth (selectable by internal switch)
Output impedance:	<1 ohm (max. load 5 mA)
Sweep marker:	bright spot/line on oscilloscope corresponds to programmed centre frequency

POWER REQUIREMENTS

Line voltage:	115 V ac (95 - 130 V ac) or 220 V ac (190 - 260 V ac)
Line frequency:	47.5 - 63 Hz
Consumption:	100 VA

ENVIRONMENTAL REQUIREMENTS

Ambient temperature:	+5°C to +40°C
Storage temperature:	-40°C to +70°C
Relative humidity:	20% to 80%

DIMENSIONS AND WEIGHT

W x H x D:	440 x 133 x 290 mm
Weight:	14 kg, inclusive of IEEE bus

S E C T I O N B _____ INSTALLATION AND OPERATION

BI - PRELIMINARY INSTRUCTIONS

INITIAL INSPECTION

When unpacking the instrument, the accessories and the packing material should be visually inspected for physical damage. If the instrument is damaged, notify the carrier and your local RE INSTRUMENTS representative or the factory. The packing material should be retained for inspection by the carrier in the case of complaint.

ELECTRICAL INSTALLATION

The RE108 SYNTHESIZED SIGNAL GENERATOR will operate on either 115 V ac or 220 V ac line supplies. The required line voltage is selected by a slide switch on the rear panel.

CAUTION: To prevent damage to the instrument check that the line voltage selector is set to the correct line voltage and that the line fuse has the correct value.

To change the line voltage, remove the locking-plate by unscrewing the two securing screws. Switch the slide switch to the required line voltage and replace the locking-plate. When changing the line voltage the line supply fuse must also be changed. The correct fuse values are printed above the fuse holder.

In accordance with international safety standards, the RE108 is supplied with a 3-wire line cord which, when connected to an appropriate ac power outlet, grounds the instrument cabinet. If the RE108 is to

be connected to an ac power outlet without a ground connection, the ground jack on the rear panel can be used to ground the instrument.

ENVIRONMENTAL REQUIREMENTS

The RE108 will comply with the specifications given where the operating environment is within the following limitations:

Ambient temperature: between +5°C and +40°C
Relative humidity: between 20% and 80%

The RE108 should be stored in an environment with a temperature between -40°C and +70°C, and a relative humidity of less than 80%.

BII - DESCRIPTION OF FRONT AND REAR PANELS

FRONT PANEL

The front panel of the RE108 SYNTHESIZED SIGNAL GENERATOR is shown in Fig. B1.

(1) FREQUENCY display
Displays the RF output frequency selected by (2) in the LOCAL mode or programmed in the REMOTE mode of operation.

(2) FREQUENCY - INCREASE/DECREASE
The individual digits of the RF frequency can be stepped up or down by the appropriate buttons.

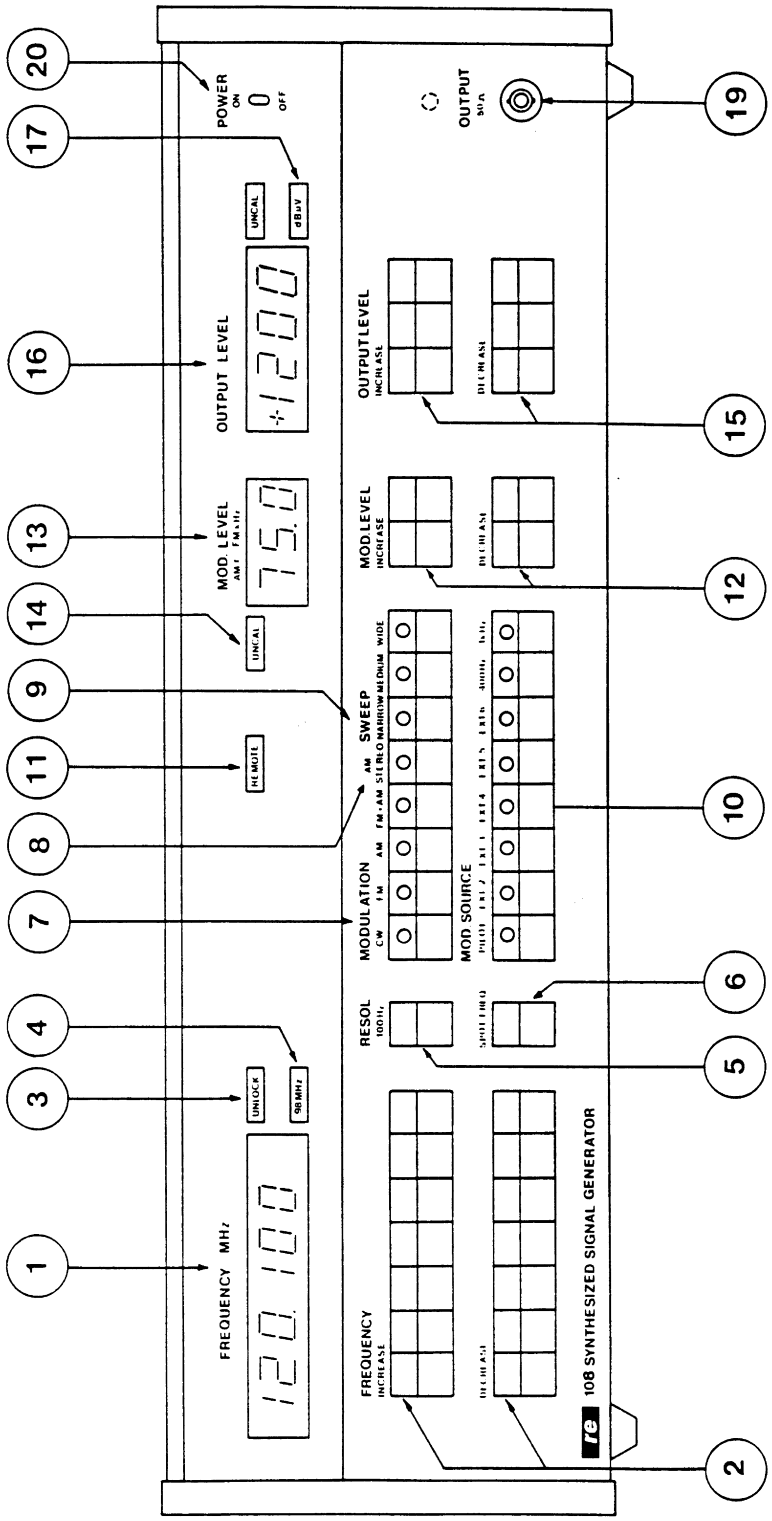


Fig. B1 - FRONT PANEL CONTROLS

(3) UNLOCK annunciator
Switched on for approx. 30 secs when the instrument is initially turned on. Indicates that one phase-locked loop is unlocked.

(4) xx MHx annunciator
Indicates SPOT FREQ. activated by 6

(5) RESOL 100 Hz
Activates 100 Hz resolution in the frequency range 10 to 11.999 MHz

(6) SPOT FREQ.
Activates a built-in crystal controlled oscillator. The frequency displayed by (4)

(7) MODULATION mode switch
CW: Unmodulated carrier
FM: Frequency Modulation. Modulation source selected by (10)
AM: Amplitude Modulation. Modulation source selected by (10)
FM + AM: 30% AM, f mod = 1 kHz
FM mod. source selected by (10) and deviation set by (12).

(8) AM STEREO
Selects AM stereo mode
(Mod. Source selector (10) is invalid

(9) SWEEP
Three different sweep modes can be selected. Sweep width and repetition rate are internally adjustable. Triangular or saw tooth sweep waveform is internally selected.

(10) MOD. SOURCE
Up to eight different modulation sources can be selected

(11) REMOTE
Indicates when the instrument is in the REMOTE mode of operation, controlled from the programming connector. In the REMOTE mode of operation all front panel buttons (except the power switch) are disabled.

(12) MOD. LEVEL - INCREASE/DECREASE
When either MOD. SOURCE 4-6, 400 Hz or 1 kHz is selected by (10) the modulation level can be set by means of (12).

(13) MOD. LEVEL
Displays the modulation level set by (12)

(14) UNCAL.
Indicates uncalibrated mod. level display, e.g. if the level from an external modulation source is beyond the specified value.

(15) OUTPUT LEVEL - INCREASE/DECREASE
The output level can be stepped up or down in 0,1 or 10 dB steps by using the appropriate buttons.

(16) OUTPUT LEVEL display
Indicates the RF output level chosen by (15).

(17) dBxx
Indicates the units of the displayed output RF level.

(19) OUTPUT
RF output connector. Impedance level 50 ohms.

(20) POWER
Power ON/OFF switch.

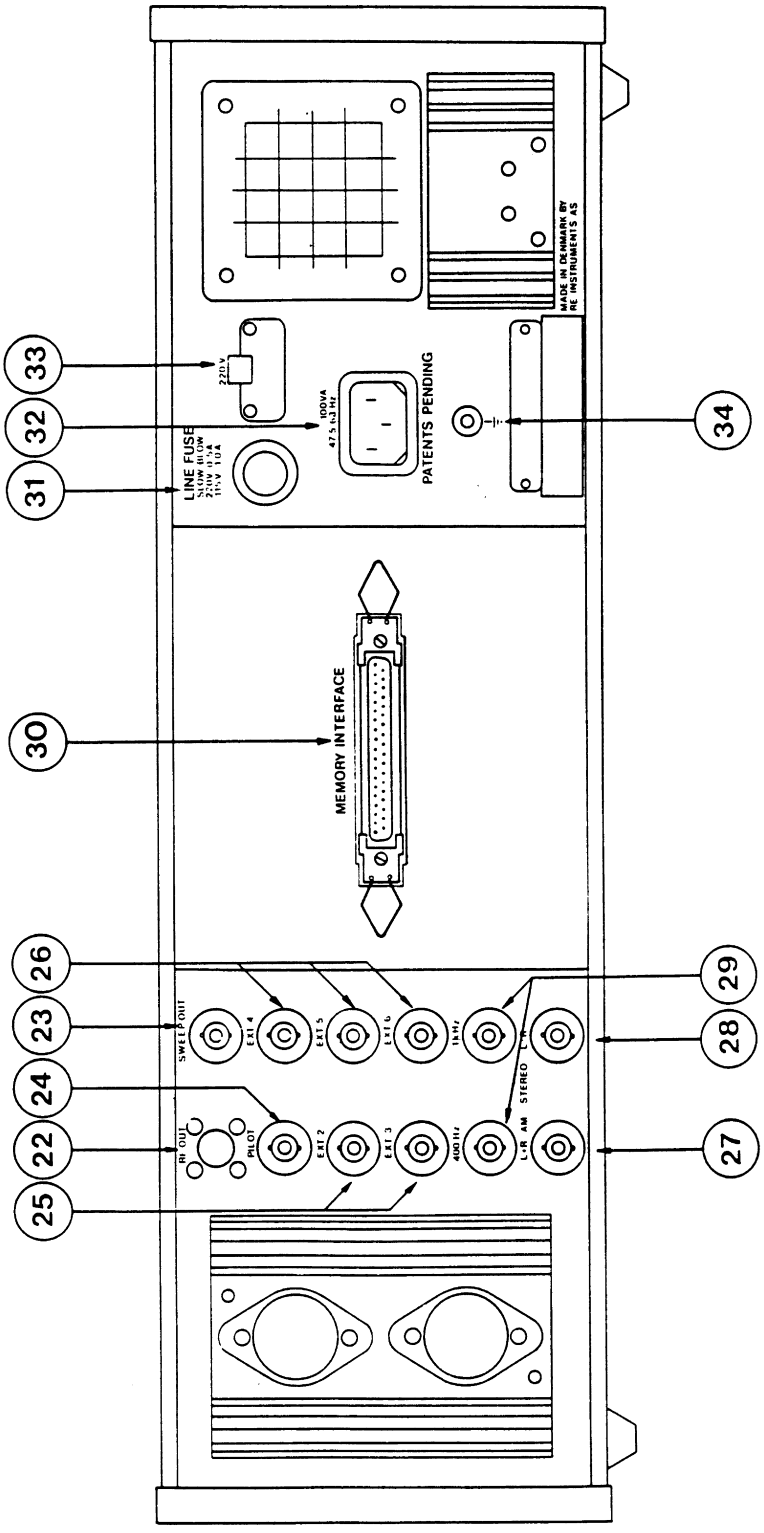


Fig. B2 - REAR PANEL

REAR PANEL

The rear panel of the RE108 SYNTHESIZED SIGNAL GENERATOR is shown in Fig. B2.

(22) Optional RF output connector

(23) Sweep signal output
Level ±5 Vp

(24) PILOT input 775 mV RMS 19 kHz for 9% FM modulation, primarily for the spot frequency oscillator

(25) Ext. 2-3
External AM or FM. 1% AM or ±1 kHz FM deviation for 10 mVp (2 kHz deviation for 1 Vp for f <1.7 MHz). When the RE108 is used with an FM stereo generator RE501 or RE502, the COMPOSITE signal should be fed to one of these terminals.

(26) Ext. 4-6
Input 1 Vp for calibrated modulation display.

(27) L+R signal from AM stereo generator
(AM input 1 Vp for 100% AM)

(28) L-R signal + pilot from AM stereo generator
(PM input 1 Vp for 1 radian)

(29) Internal Mod. oscillator outputs

(30) REMOTE control connector for interface unit

(31) Line supply fuse

(32) Line cord receptacle

(33) Line voltage selector

(34) Ground socket
Used for grounding of the instrument if it is not grounded via the power cord

S E C T I O N B _____ INSTALLATION AND OPERATION

BIII - OPERATING INSTRUCTIONS

INTRODUCTION

The front panel is shown in Fig. B1. All functions (except the POWER switch) can be locally or remotely controlled. The displays and indicators are active in both local and remote modes of operation.

The RF frequency, modulation level and RF level can be stepped up or down by means of the pushbuttons. Modulation mode or modulation source can be chosen.

ON-OFF control of an external level vernier potentiometer is provided. By means of the vernier potentiometer the output level can be varied 0 to 12 dB below the level shown on the display.

FREQUENCY

By pressing an INCREASE or DECREASE button the appropriate frequency digit will be stepped up or down at a rate of approx. 3 steps per second. Carry and borrow will be transferred to succeeding digits.

The UNLOCK annunciator (3) is activated when a significant part of the circuitry is not properly working. This occurs during the first minute after power turn-on of the instruments. When the UNLOCK annunciator is switched on, the RF output is invalid.

In the frequency range 10 to 11.9999 MHz the frequency resolution can be increased to 100 Hz by pressing the button "RESOL". This button is inhibited when the frequency is outside the range 10 to 11.9999 MHz. In addition to the higher frequency resolution, the FM noise is reduced 20 dB in this mode. The FM distortion and the L/R stereo cross-talk are somewhat derated in the 100 Hz resolution mode.

When the SPOT FREQ. is activated, the normal frequency display is blanked and the value of the spot freq. is shown by the annunciator (4).

MODULATION

The CW, FM, AM, FM & AM simultaneously AM STEREO or the NARROW, MEDIUM or WIDE sweep can be selected.

MOD. SOURCE

Selects one of a total of eight internal or external modulation sources. When using the internal modulation sources and Ext. 4 to Ext. 6 the modulation signal is always routed through the modulation attenuator and the modulation level is displayed. When using the external modulation inputs PILOT, Ext. 2 or Ext. 3 the signal is routed directly to the modulation summing amplifiers. In this case, the MOD. LEVEL display is switched off.

The inputs Ext. 2 or Ext. 3 should always be used when the RE108 is modulated from an RE501 or RE502 stereo generator.

The external PILOT modulation signal is intended for S/N measurements on receivers in stereo mode.

Via the PILOT input terminal a 19 kHz signal (775 mV RMS) delivered from a stereo generator produces a ±6.75 kHz FM deviation if Mod. Source "PILOT" and Modulation Mode "FM" are activated.

If the SPOT FREQ. is activated, the signal is phase modulated by the 19 kHz signal producing a frequency deviation of ±6.75 kHz (or 9%).

SWEEP

Three sweep widths are provided, NARROW, MEDIUM and WIDE. The sweep widths and sweep frequency can be adjusted individually as shown in Fig. B3. Triangular or saw tooth sweep signal can be chosen by placing a jumper as shown in Fig. B3.

MOD. LEVEL

The modulation level is stepped up or down in steps of 0.5 (kHz deviation (50 Hz for f <1,7 MHz) or %AM) in a similar way as the RF frequency.

In the AM & FM mode the AM percentage is fixed at 30% and the modulation frequency is 1 kHz. The FM deviation is set by (12) and the mod. source chosen by (10). The NARROW, MEDIUM and WIDE sweep widths and repetition frequency can be set by internal potentiometers placed on the Modulation Unit PCB, see Fig. B3.

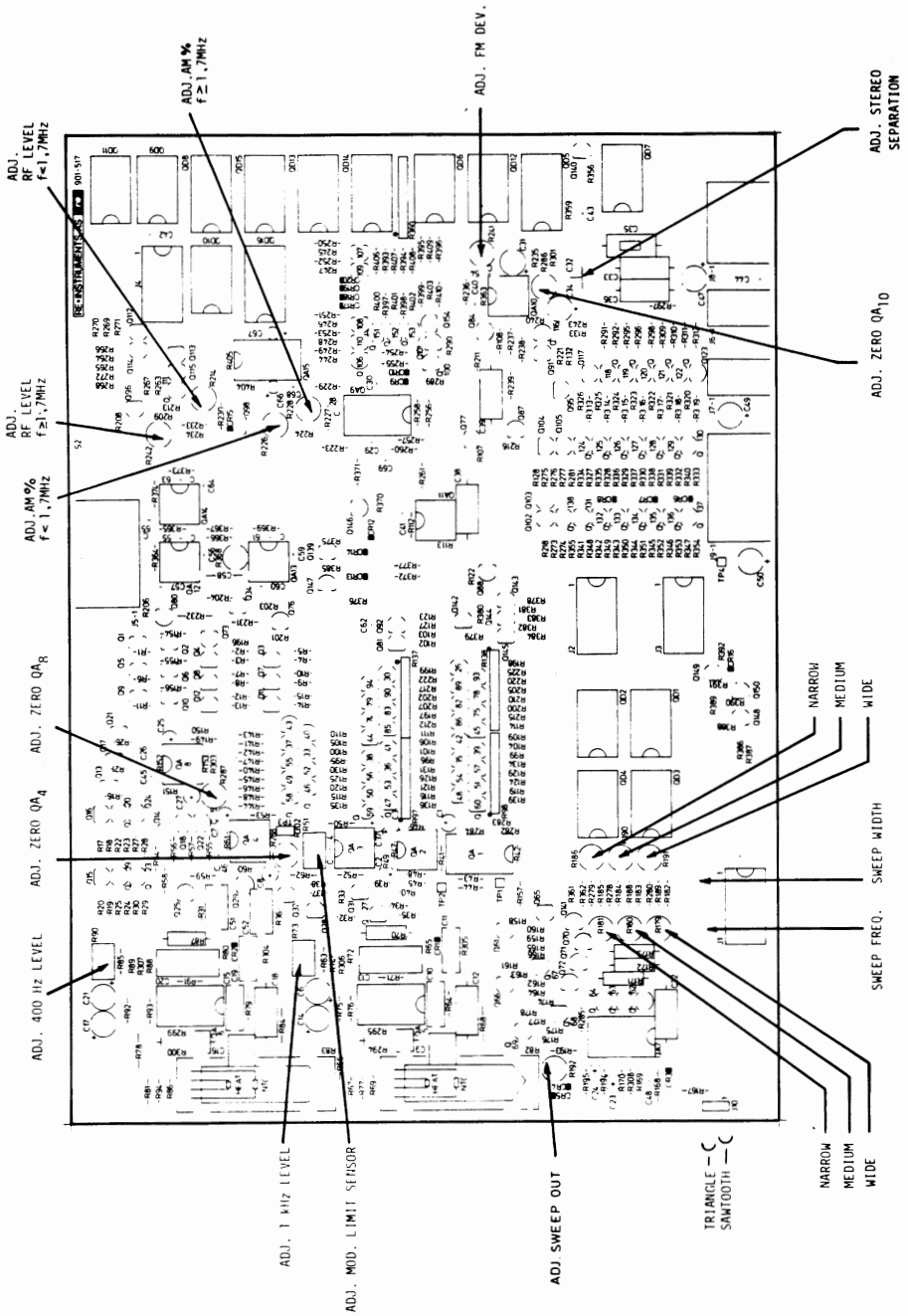


Fig. B3 - MODULATION AND SWEEP ADJUSTMENTS

OUTPUT LEVEL

The RF output level can be stepped up or down in 0,1 dB steps and can be displayed in different units. The operator can change the display unit by setting of a "DIL-switch" located behind the red perspex window on the front panel. The settings are shown in table B1. The appropriate unit annunciator window (17) has to be inserted.

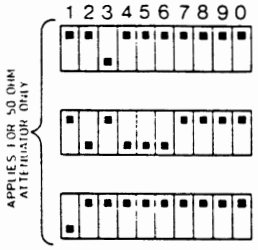
Setting of DIL switch S40		Minimum reading	Maximum reading
	dBm (dB above 1 milliwatt)	-119.0	22.9
	dBpw (dB above 1 picowatt)	-29.0	112.9
	dBfw (db above 1 femtowatt)	1.0	142.9
	dBuV (dB above 1 uV EMF)	-6.0	135.9
	dBuV (dB above 1 uV across matched load)	-12.0	129.9

Table B1 - RF Level

PROGRAMMING

The functions of the RE108 can be externally controlled via an optional interface unit. When the RE108 is in the remote mode of operation, indicated by the REMOTE annunciator, all the front panel controls (except the power switch) are disabled. The REMOTE/LOCAL state is set by applying logical "0" or "1" to a terminal on the interface unit.

For further information, please refer to the instruction manual for the Interface Unit in use.

The function set-ups are transferred via (or from) the interface unit in serial form by a 4-bit data bus and a 4-bit address bus, and is stored in latches by applying a load pulse. The address and data codes are shown in Table B2.

BCD INTERFACE OPTION

Direct access to store data in the latches of the RE108 is obtained when using the BCD INTERFACE OPTION (901-013).

The address and data code shown in Table B1 must be used. When the address and data are set up a load pulse with a length of at least 2 usecs must be generated for clocking the data into the selected latch. The load pulse should be delayed at least 2 usecs in relation to the set-up of data and address.

A signal indicating that one or more of the UNCAL. annunciators are active, is available at the connector of the option.

For further information, see instruction manual for the BCD INTERFACE OPTION.

MEMORY INTERFACE OPTION AND KEYBOARD

When using the MEMORY INTERFACE OPTION (900-997), which contains a programmable memory, an entire function set-up can be stored and recalled.

x = state is immaterial

FUNCTION	ADRESS HEX	ADRESS BINARY D	C	B	A	DATA D	C	B	A
RF FREQ. 100/10 MHz digit	0	0	0	0	0	HEX code 0 to C			
RF FREQ. 1 MHz digit	1	0	0	0	1	BCD code 0 to 9			
RF FREQ. 100 kHz digit	2	0	0	1	0	BCD code 0 to 9			
RF FREQ. 10 kHz digit	3	0	0	1	1	BCD code 0 to 9			
RF FREQ. 1 kHz digit	4	0	1	0	0	BCD code 0 to 9			
RF FREQ. 100 kHz digit	5	0	1	0	1	BCD code 0 to 9			
RF FREQ. 10 Hz digit	6	0	1	1	0	BCD code 0 to 9			
MODULATION CW	7	0	1	1	1	x	0	0	0
MODULATION FM	7	0	1	1	1	x	0	0	1
MODULATION AM	7	0	1	1	1	x	0	1	0
MODULATION FM & AM	7	0	1	1	1	x	0	1	1
MODULATION AM STEREO	7	0	1	1	1	x	1	0	0
SWEEP Narrow	7	0	1	1	1	x	1	0	1
SWEEP Medium	7	0	1	1	1	x	1	1	0
SWEEP Wide	7	0	1	1	1	x	1	1	1
MOD. SOURCE 19 kHz pilot	8	1	0	0	0	x	0	0	0
MOD. SOURCE Ext. 2	8	1	0	0	0	x	0	0	1
MOD. SOURCE Ext. 3	8	1	0	0	0	x	0	1	0
MOD. SOURCE Ext. 4	8	1	0	0	0	x	0	1	1
MOD. SOURCE Ext. 5	8	1	0	0	0	x	1	0	0
MOD. SOURCE Ext. 6	8	1	0	0	0	x	1	0	1
MOD. SOURCE Int. 400 Hz	8	1	0	0	0	x	1	1	0
MOD. SOURCE Int. 1 kHz	8	1	0	0	0	x	1	1	1
MOD. LEVEL x 10 (% or kHz*)	9	1	0	0	1	BCD code 0 to 9			
MOD. LEVEL x 1 (% or kHz*)	A	1	0	1	0	BCD code 0 to 9			
MOD. LEVEL +0.5 (% or kHz*)	B	1	0	1	1	x	x	x	1
MOD. LEVEL +0.0 (% or kHz*)	B	1	0	1	1	x	x	x	0
RF LEVEL 100/10 dB digit	C	1	1	0	0	HEX code 0 to E**			
RF LEVEL 1 dB digit	D	1	1	0	1	BCD code 0 to 9**			
RF LEVEL 0.1 dB digit	E	1	1	1	0	BCD code 0 to 9**			
SPOT FREQ. OFF	F	1	1	1	1	x	x	0	x
SPOT FREQ. ON	F	1	1	1	1	x	x	1	x
100 Hz res. 10-12 MHz OFF	F	1	1	1	1	x	0	x	x
100 Hz res. 10-12 MHz ON	F	1	1	1	1	x	1	x	x

* For carrier freq. <1.7 MHz address 9 sets 1 kHz, adress A sets 100 Hz and address B sets 50 Hz step in FM mode

** Set RF level code to wanted EMF in dB μ V +6 dB

Table B2. - BCD Data and Address Bus RE108

In the local mode the data set up by means of the front panel controls of the RE108 can be stored in the Memory Interface.

In the remote mode the data can be transferred from the Memory Interface to the latches in the RE108.

The data transmission from the RE108 to the Memory Interface and vice versa is controlled by the RE901 KEYBOARD. By means of the keyboard the test number is set up selecting the area of the programmable memory in which the data are to be stored.

Storing of up to 64 set-ups is possible.

The RE901 Keyboard contains an out-of-range indication which is switched on when one of the UNCAL. indicators of the RE104 is active.

The data transmission from the RE108 to the Memory Interface and vice versa can also be controlled by a computer.

For further information, see instruction manual for MEMORY INTERFACE OPTION and RE901 KEYBOARD.

IEEE 488 INTERFACE OPTION

The RE108 can be controlled by the IEEE bus when using the IEEE 488 INTERFACE OPTION 901-686.

By means of a microprocessor the Interface Option converts the information on the IEEE bus to the 4-bit address and 4-bit data bus used in the RE108.

For further information, see instruction manual for IEEE BUS INTERFACE OPTION for RE108.

S E C T I O N C TECHNICAL DESCRIPTION

CI - PRINCIPLE OF OPERATION

The purpose of the following information is to make it easier for the operator to understand the overall concept of the RE108 Synthesized Signal Generator.

Detailed descriptions of the individual circuits are given on the pages C7 to C28.

ORGANIZATION OF THE RE108 SYNTHESIZED SIGNAL GENERATOR

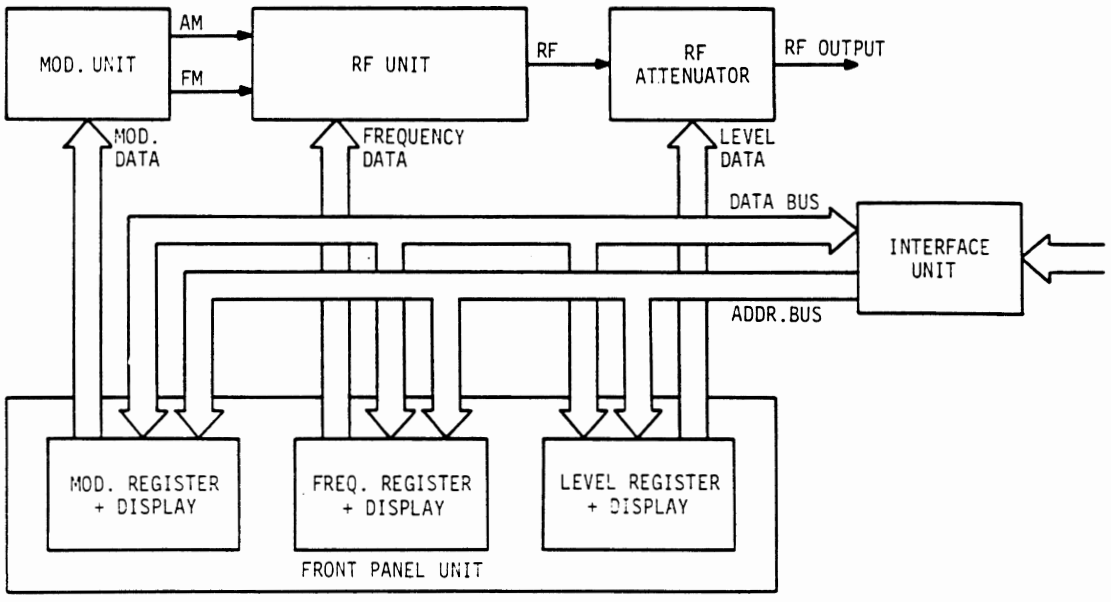


Fig. C1

S E C T I O N C TECHNICAL DESCRIPTION

As shown in Fig. C1 the RE108 comprises the following main units:

1. The Front Panel Unit
   with data registers and displays for modulation, RF frequency and RF level, and buttons for local control of the data in the registers. The front panel unit also contains a bidirectional data bus and a unidirectional address bus.
   The data stored in the registers are always shown on the displays and fed to the RF synthesizer, modulation unit and attenuator.

2. The Interface Unit
   controls the data flow via the data bus by means of the address bus. In the LOCAL mode of operation data from the registers in the RE108 are available to the outside world.
   In the REMOTE mode of operation external data can be loaded into the registers of the RE108.
   For further information, please refer to the instruction manual for the relevant Interface Unit.

3. The RF Unit
   produces the RF frequency given by the BCD data coming from the Front Panel Unit, with or without modulation.

4. The Modulation Unit
   routes internally generated or external modulation signals to the AM or FM modulator contained in the RF Unit.

5. The RF attenuator
   controls the RF output EMF in 0,1 dB steps from 0.55 μV_{RMS} to 4 V_{RMS}.

The following text applies to the simplified block digram, Fig. C2:

Front Panel Section

The registers for RF frequency, RF level and modulation level consist of presettable up/down decade counters.

For RF frequency six decade and one binary counters are casaded.

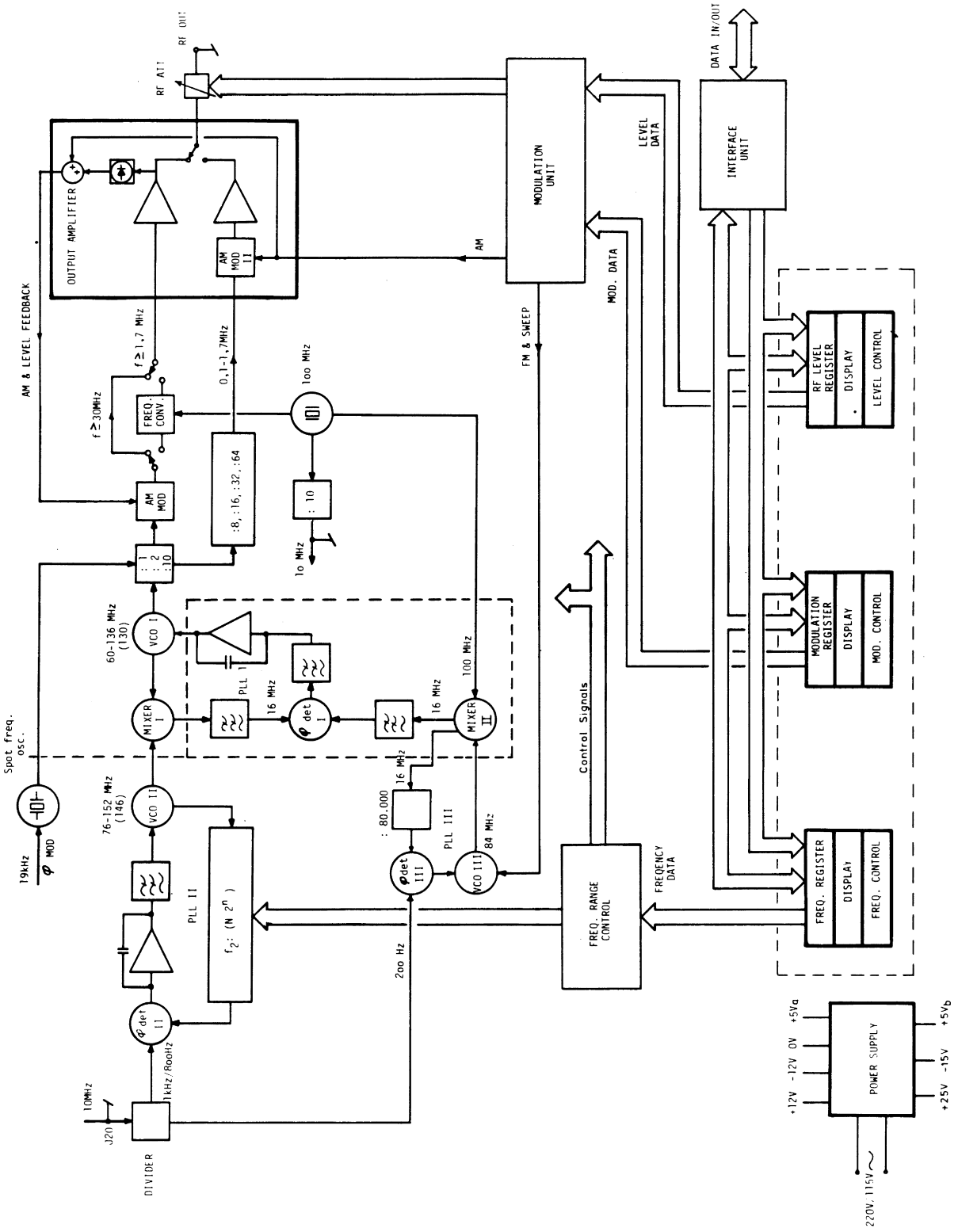


Fig. C2 - Simplified Block Diagram of the RE108 SYNTHESIZED SIGNAL GENERATOR

By de-pressing an INCREASE or a DECREASE button, the corresponding IC ~~coun~~ counter will start counting up or down at a rate of approx. 3 counts per second. When the counter overflows or underflows, a carry or borrow pulse will be transferred to the succeeding counter IC.

Similar principles are used for the RF Level and the Mod. Level.

The counter outputs are routed to the displays and as parallel BCD data to the Modulation Unit, RF Unit and the attenuator driver. By means of tri-state buffers the BCD data can be fed to the optional Interface Unit. The data are transferred in serial form controlled from the Interface Unit via the address bus.

When data are routed from the interface unit to the decade counters (now working as storage registers) the same data and address bus are used, and the data are loaded into the appropriate decade counter IC by applying a pulse to the parallel load terminal.

Modulation mode and modulation source are chosen by applying a signal from the front panel button to an 8-input priority encoder.

Frequency Range Control

This circuit has the function of preconditioning the RF frequency data from the Front Panel Unit before they are fed to the RF Unit, and to deliver proper RF switching signals for the RF circuits.

RF Unit (Synthesized Section and Output Section)

Basically the Synthesized Section consists of three Phase Locked Loops (PLL):

1. The frequency programming loop (PLL II)
2. The frequency modulation loop (PLL III)
3. The output loop (PLL I)

The Output Section contains:

1. Two frequency dividers
2. AM modulator
3. Frequency converter
4. Output amplifier
5. RF attenuator
6. Crystal oscillator
7. :10 Prescaler

The Frequency Programming Loop (PLL II)

consists of a Voltage Controlled Oscillator (VCO II), a programmable frequency divider (divide by N), a phase detector and a loop filter. The VCO covers the frequency range from 76 MHz to 145.999 MHz (f_2). After division by N in the programmable frequency divider, the signal (f_2:N) is compared to a reference signal of 1 kHz in the phase detector (φ det II). When the loop is in lock, the frequency f_2 is given by:

$f_2 = N \times f_{ref} = N \times 1$ kHz.

The division ratio N can be set to any integer in the range from 76000 to 145999, which means that the frequency f_2 can be set in 1 kHz increments from 76000 kHz to 145999 kHz. The loop filter removes 1 kHz feedthrough from the phase detector, and is optimized with respect to fast frequency shift time.

The Frequency Modulation Loop (PLL III)

The VCOIII is oscillating on a mean frequency of 84 MHz. The 84 MHz signal is mixed by a 100 MHz signal in mixer II. The difference frequency (16 MHz) from mixer II is divided by 80,000 and fed to a phase detector, φ det III. The reference signal is a 200 Hz square signal delivered from φ det II.

The output from φ det III is fed to the varicap diodes via a loop filter in VCOIII.

The AF signal used for frequency modulation is applied to the anodes of the varicap diodes in VCOIII. To avoid affecting the modulation by the feedback signal from the phase detector, the time constant of the loop filter is made large. This ensures a very low loop gain in the specified modulation frequency range.

An oscillator having the same accuracy as the crystal oscillator and offering the possibility of frequency modulation is established in this way.

S E C T I O N C TECHNICAL DESCRIPTION

The Output Loop (PLL I)

The loop generates an output frequency covering 60.000 MHz to 129.999 MHz.

The output loop consists of VCO I which oscillates directly on the output frequency (in the range 60.000 to 129.999 MHz). The output from VCO I (f_1) is mixed with the output from VCO II (f_2). The difference frequency f_2-f_1 is routed via a lowpass filter with a center frequency of 16 MHz to a phase detector (φ det I) using the output from mixer II (f_3) as a reference signal. When PLL I is locked the difference frequency f_2-f_1 is equal to f_3. The output frequency f_1 is then given by: $f_1 = f_2-f_3 = f_2-16$ MHz.

The bandwidth of PLL I is approx. 1.5 MHz. Hereby frequency modulation superposed the f_3 signal is reproduced at the f_1 output with modulation frequency response up to approx. 1.5 MHz.

The AM Modulator Output Amplifier and Frequency Dividers

For frequencies from 60.000 MHz to 129.999 MHz the output frequency from VCO I is applied to the amplitude modulation stage, the output of which is routed directly to the output amplifier.

For frequencies from 30.000 MHz to 59.999 MHz the output from VCO I is divided by two (in Frequency Divider I) before it is applied to the AM Modulator. An RF detector is connected to the output of the Output Amplifier.

The output from the RF detector is compared to a dc voltage in a differential amplifier and the output is used for automatic level control in the AM stage. Amplitude modulation is produced by applying the modulation signal to the differential amplifier.

The frequency range 0.1 to 1.69999 MHz is obtained by frequency division in order to keep the phase noise at a minimum. This is very important for AM stereo. In addition, the frequency resolution is increased to 100 Hz in this frequency range.

The signal from VCO I is divided by 80, 160, 320 or 640 in the frequency dividers I and II, the division ratio being controlled from the front panel setting via the Frequency Control Unit.

At the same time the division ratio in the programmable divider (in PLL II) is properly corrected, and the reference frequency is changed from 1 kHz to 800 Hz.

To achieve low AM envelope distortion, a separate AM modulator QA3 and a separate output amplifier, Q7 to Q12, is used in this frequency range.

Frequency Converter

The frequency range 1.700 to 29.999 MHz is generated in the frequency converter. The frequency from VCO I is in this range limited to cover 101.700 to 129.999 MHz. By mixing this signal with a 100 MHz crystal controlled oscillator and filtering out the difference frequency, the frequency range from 1.700 to 29.999 MHz is generated. The frequency converter is inserted between the amplitude modulator and the output amplifier.

Reference Oscillator

The overall frequency accuracy and stability of the RE108 is determined by the 100 MHz crystal controlled oscillator, as the 1 kHz reference frequency for the phase locked loops is derived from the 100 MHz crystal oscillator by a 10^5 dividing circuit.

Spot Frequency Oscillator

The Spot Frequency Oscillator provides a vey low noise signal for S/N measurements.

A phase modulator is incorporated which allows for phase modulation from a 19 kHz pilot signal for stereo S/N measurements.

The Modulation Unit

Two internal modulation oscillators with frequencies of 400 Hz and 1 kHz are provided as standard. The oscillators have a highly stabilized output level which is applied to the modulation attenuator via the modulation source switch. Three external mod. input signals (Ext. 4 to Ext. 6) are applied to the modulation attenuator while three other external modulation inputs are directly applied to the FM or AM modulation summing amplifiers.

S E C T I O N C TECHNICAL DESCRIPTION

Sweep Generator

The sweep generator delivers a triangular or sawtooth wave, according to the choice of the operator, see Fig. B3, page B11. Three different sweeps are provided. The sweep width and the sweep repetition frequency can be set by internal potentiometers, see Fig. B3. The sweep signals contain a "plateau" at the zero crossing. This gives a marker spot on an oscilloscope, when its horizontal input is connected to the SWEEP OUT terminal on the rear panel of the RE108.

RF Attenuator

The RF attenuator covers the attenuation range 0 to 127 dB (5 dBµV to 132 dBµV EMF) in 1 dB steps. It is controlled by the Attenuator Driver circuit which converts the BCD inputs from the Front Panel section into a binary code with the level required to drive the attenuator.

For RF levels above 132 dBµV and levels below 5dBµV and for 0,1 dB steps proper voltages are injected into the AGC loop.

CII - MECHANICAL CONSTRUCTION

The mechanical construction of the RE108 Synthesized Signal Generator is dominated by the three shielded boxes containing the RF circuits. The boxes are milled from solid aluminum which ensures a stable construction and insensitivity to microphony. EMI/RFI gaskets are inserted in slots in the boxes to give an extremely low RF leakage.

The complete front panel section can be removed from the signal generator.

CIII - CIRCUIT DESCRIPTION

A detailed description of the circuits of the RE108 Synthesized Signal Generator is given in this section and reference is made to the following schematic diagrams at the end of the manual:

S E C T I O N C TECHNICAL DESCRIPTION

drawing no. 985-114: SYNTHESIZER SECTION
drawing no. 985-115: OUTPUT SECTION
drawing no. 985-128: FREQUENCY RANGE CONTROL
drawing no. 985-123: FRONT PANEL UNIT
drawing no. 985-127: MODULATION UNIT
drawing no. 985-116: POWER SUPPLY

Fig. C2 gives an overall view of the operation of the instruments.

The circuit description is divided into the following main sections:

RF UNIT

(see drawings nos. 985-114 and 985-115)

Frequency Programming Loop PLL II

consisting of: VCO II 901-166
Programmable Frequency Divider 901-171
and Phase Detector II 901-169

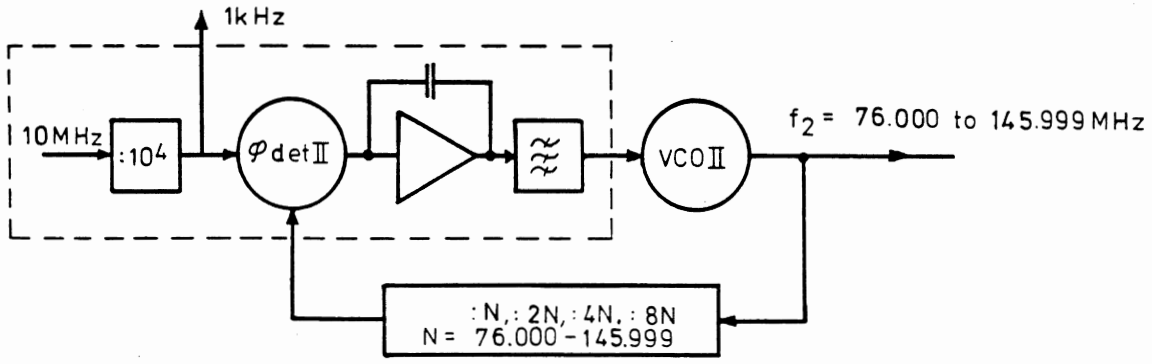


Fig. C3 - Frequency Programming Loop

The Voltage Controlled Oscillator VCO II consists of two oscillators, A and B covering the frequency range 76 MHz to 145.999 MHz.

A push-pull configuration is used to ensure low harmonic distortion. The active elements consist of two matched low-noise FET transistors, Q_1A - Q_1B (Q_2A - Q_2B).

The oscillator tank circuit contains four matched variable capacitance diodes, CR_1 to CR_4. The RF signal is fed through a buffer amplifier, Q_7 and Q_8. The output level of the buffer amplifier is rectified by CR_9, and the DC voltage obtained is applied to the automatic level control loop, Q_5 or Q_6, and Q_9, Q_{10} to keep the RF level constant. The level is set by the potentiometer R_{31}.

Switching between section A and B is controlled from terminal J_{1-1} via transistors Q_3, Q_4.

The RF output from the VCO II is fed to the programmable frequency divider (:N) which consists of six CMOS programmable BCD down-counters combined with a very fast ECL frequency divider. The frequency divider can be preset for division of any integer between 76000 and 145999. A principle known as the pulse swallowing technique is used to obtain this.

The frequency control data words from the front panel latches are fed via the Frequency Range Control to the programming inputs of the programmable frequency divider.

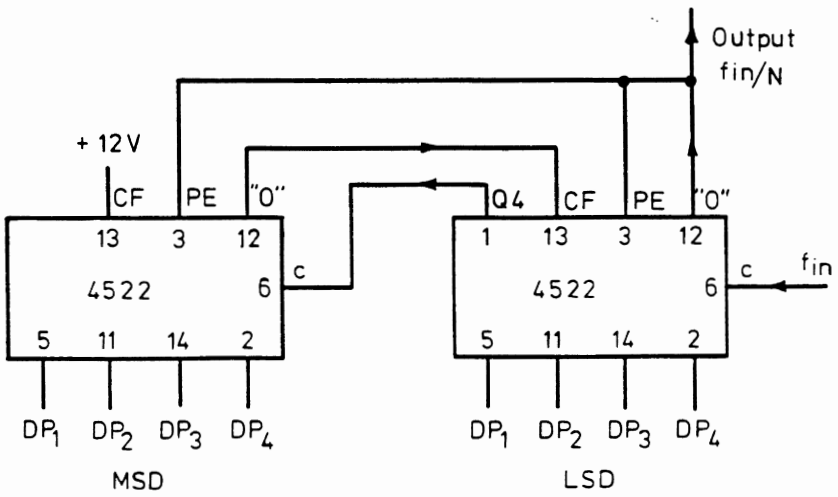


Fig. C4 - Two-stage Programmable Frequency Divider

Fig. C4 shows a two-stage programmable frequency divider consisting of two cascaded BCD programmable down-counters.

The division ratio is set by the programming data applied to the DP_1 to DP_4 programming inputs of each stage.

At the start of a division cycle the counters have just been preset to the data applied to the programming inputs by a positive going Preset Enable pulse applied to the PE terminals. If, e.g. a division ratio of 53 is wanted, the two digits are set to 5 and 3, respectively. After three input pulses (f_{in}) the LSD is counted down to zero and delivers a borrow pulse to the MSD, decrementing the MSD to 4. The LSD now has a division ratio of ten for the rest of the division cycle. When a total of 43 input pulses (f_{in}) is received, the MSD is counted down to zero. The "0" output goes high and delivers a positive going Carrier Feedback signal to the CF terminal of the less significant digit. A high level on the CF terminal will cause the "0" output to go high next time the less significant digit is counted down to zero. (After 10 more input pulses (f_{in}) this gives a total of 53 input pulses.

The "0" output from the least significant digit is connected to the PE inputs of both stages, and when this "0" goes high the dividers are preset again, and the division cycle is concluded.

The PE signal is synchroneous with the input signal f_{in}.

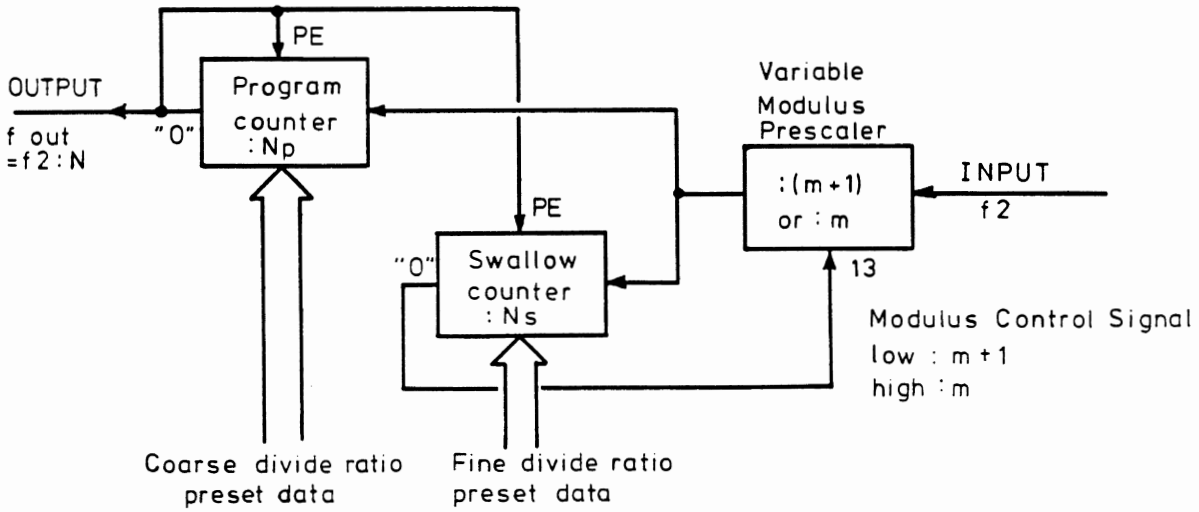


Fig. C5 - Pulse-Swallowing Frequency Divider

Fig. C5 shows the operating principle of the variable ratio pulse-swallowing frequency divider.

The high-frequency variable modulus prescaler divides the input signal f2 by m+1 or by m. The division ratio is controlled by the output signal from the "0" output of the swallow counter (the modulus control signal. The swallow and program counters are initially preset to Ns and Np, respectively, by data derived from the frequency control data words.

Initially, the modulus control signal is low and the prescaler divides by m+1. The two counters count down to zero form the preset numbers Ns and Np for the swallow counter and the program counter, respectively.

When the swallow counter reaches zero, the "0" output goes high and changes the prescaler division ratio into m. The program counter continues counting down to zero. When this is reached an output pulse is generated. This output pulse reloads the swallow and program counters with Ns and Np, respectively, and the cycle is completed. Per definition the division ratio of the pulse-swallowing frequency divider is equal to the number of input pulses required at the INPUT to get one output pulse at the OUTPUT. A complete cycle can be summarized as follows:

Count down of the swallow counter requires $(m+1) \times Ns$ input pulses at the INPUT.

When the swallow counter reaches zero, the program counter state is counted down by Ns pulses to Np-Ns.

During the remaining part of the counting cycle the prescaler divides the INPUT by m.

The program counter will reach zero after $m \times (Np-Ns)$ pulses at the INPUT terminal in addition to the $(m+1) \times Ns$ INPUT pulses from the first part of the division cycle, i.e.

$$m \times (Np-Ns) + (m+1) \times Ns = m \times Np + Ns \text{ INPUT pulses}$$

are required for each OUTPUT pulse. In other words, the division ratio is given by:

$$N = \frac{f_2}{f_{out}} = m \times Np + Ns$$

By choosing m = 100 (m+1 = 101), letting the swallow counter cover 2 BCD digits (Ns = 0 to 99) and the program counter 3½ digits (Np = 760 to 1459), the required division ratio from 76000 to 145999 is obtained in increments of one.

The :100/:101 prescaler QD_1 (see drawing 2139-A1) has a modulus control input terminal, pin 13. When the control input is low, QD_1 divides by 101, and when the input is high it divides by 100. As the prescaler QD_1 is an ECL device, the control signals are converted from CMOS levels (12 V) into ECL level by resistors R_{14}, R_{15}.

If the two last digits of the frequency control data word are zero, the swallow counter is told to divide by 0. As a counter cannot divide by 0, a gate QD_4 is inserted which senses the input lines for the last two digits and via the CR2 forces the modulus control signal high, letting the prescaler divide by 100 all the time as required in this special case.

A buffer/amplifier, Q_1, Q_2 and Q_3, drives the QD_1 prescaler.

The output from the programmable frequency divider is fed to phase detector II.

The phase detector II PCB contains a frequency divider which provides the 1 kHz reference frequency by dividing an incoming 10MHz signal by 10,000. This PCB also incorporates a digital phase-frequency comparator, a loop integrator and an LC lowpass filter.

The 10 MHz signal is divided by 25 in QD_1 and QD_3, and in addition by 400 (or 500) in the combined programmable frequency divider and phase-frequency comparator, QD_2. The resulting 1 kHz reference frequency (f_{ref}) is fed to one of the inputs of the phase-frequency comparator. The signal from the "divide by N" counter (f_2/N) is fed to the second input (terminal 14).

The phase-frequency comparator is a positive edge-controlled logic circuit. Duty cycles of the input signals are unimportant as the detector responds to leading edges only.

If the signal to terminal 14 (f_2/N) is leading in phase or higher in frequency, relative to the reference frequency, the output of the detector (terminal 13) will vary between a high voltage and some intermediate voltage. If f_2/N is lagging in phase or lower in frequency relative to the reference frequency, the output voltage will vary between zero and some intermediate value.

The output from the detector (pin 13) drives the switches Q_3, Q_5 or Q_4, Q_6 which pump charges into the integrator capacitor C_4. The output from the integrator is fed to the Voltage Controlled Oscillator VCO II via an LC filter, and will adjust the oscillator frequency until the frequency and phase differences between the divided frequency (f_2/N) and the 1 kHz reference frequency are zero.

The LC filter L_2, C_8, C_9 and C_{10} rejects 1 kHz and harmonics of 1 kHz from the phase detector.

The coil L_2 is very susceptible to hum pick-up and it is therefore contained in a mumetal shield.

In the frequency range 0.1 to 1.6999 MHz the programmable divider divides by N, 2N, 4N or 8N (in QD_1 and QD_9) depending on the actual frequency setting, and the reference frequency is changed from 1 kHz to 800 Hz. This will be described later on.

Frequency Modulation Phase-Locked Loop (PLL III)

consisting of:
VCO III 901-167
Mixer II 901-532
Filter II 901-647
and Phase Detector III 901-170

In order to produce FM with very low modulation distortion the oscillator frequency has to be relatively high. The relatively low output frequency of PLL III (16 MHz) is obtained by down-converting in mixer II (see Fig. C6).

The frequency divider in the feedback path has a fixed division ratio of 80,000. The integrator time constant has been made very large (R_{21} x C_8 = 15 megohms x 10 microfarads = 150 seconds) to prevent the feedback loop from affecting the frequency modulation. The mean value of f_3 will always be 16 MHz and the accuracy given by the crystal derived 200 Hz reference frequency.

The 16 MHz signal is divided by ten in QD_2 and by sixteen in QD_3. The programmable frequency divider incorporated in QD_4 is set to a division ratio of 500. The integrator offset voltage must be low and is adjusted by the potentiometer R_{55}. CR_5 and CR_6 prevent the integrator from latch up. An active filter Q_{10}, Q_{11} follows the integrator.

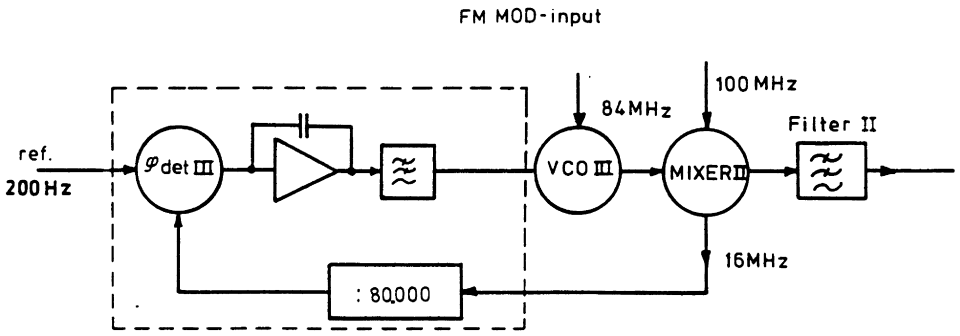


Fig. C6 - Frequency Modulation Loop

Pin 12 on QD_4 provides negative going output pulses when the phase-lock is out of lock. The pulses are filtered and via Q_{12}, Q_13 and Q_{14} fed to the OUT OF LOCK indicator on the front panel.

Output Loop PLL I

consisting of: VCO I 901-165
Mixer I 901-174
Filter I 901-172
and Phase Detector I 901-168

The VCO I has the same configuration as the VCO II. The signal f_1 is fed to the mixer stage where it passes through a grounded base buffer stage Q_2 to a double balanced mixer. The output from PLL II (f_2) is amplified in Q_1 and used as L.O. signal in the double balanced mixer. The output difference frequency f_2-f_1 from the mixer is fed via a 16 MHz lowpass filter to the phase detector (det I). The lowpass filter has the purpose of rejecting spurious mixing products. In the phase detector PCB the signal is fed to the input of the phase detector QA_2 pin 7 via a preamplifier, Q_1, Q_2 and Q_3. The reference signal f_3 (from the frequency modulation loop) is fed to the second input of QA_2 (pin 13) via preamplifier Q_{15}, Q_{13}. The output from the phase detector is fed to the integrator Q_7, Q_8, Q_9 and Q_{10} via a lowpass filter L_2, L_3. The integrator output controls the frequency of VCO I which produces the output frequency f_1. When this phase

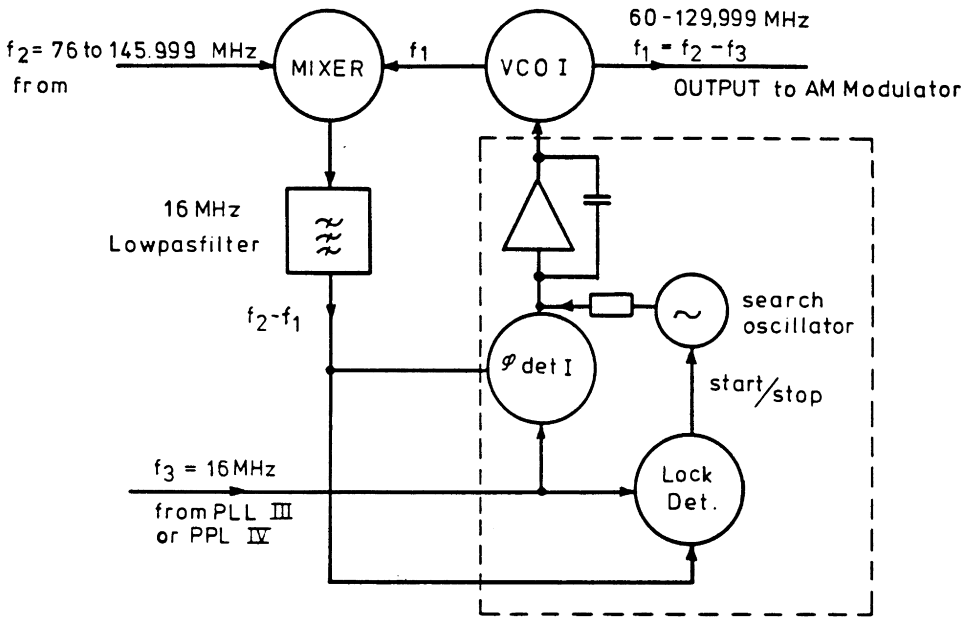


Fig. C7 - Output Loop PLL I

lock loop is locked the following equation applies:

$f_2 - f_1 = f_3$

i.e. $f_1 = f_2 - f_3 = f_2 - 16$ MHz.

If PLL I is out of lock, e.g. after power turn-on, the difference frequency, $f_2 - f_1$, after the mixer can be beyond the passband of the 16 MHz lowpass filter. In this case, the phase detector has no input signal and is unable to lock. The lock detector, QA_1, senses the signal from the lowpass filter as well as the f_3 signal. If one of the signals is not present or if the frequencies are different, the lock detector starts a search oscillator, QA_3, (a Wien bridge configuration) which via the integrator sweeps the VCO I frequency until lock takes place. When PLL I locks, the search oscillator is inhibited by the lock detector. When making troubleshooting the search oscillator can be inhibited by placing a jumper at TP.

Frequency Divider I, 901-178

In Frequency Divider I the input frequency can be divided by 2 or 10.

Switching diodes select whether the signal should pass through the divider or directly to the AM Modulator.

When the output frequency is set in the range 30 to 59.999 MHz, the frequency from VCO I is divided by two.

In the range 10 to 11.999(9) MHz the frequency resolution can be increased to 100 Hz by pushing a button.

In this mode of operation the frequency from VCO I is set to ten times the programmed frequency - 1 kHz resolution - (controlled from the Frequency Range Control), and after division by 10 the programmed frequency is obtained with 100 Hz resolution.

In frequency range 0.1 to 1.69999 MHz the signal from VCO I is divided by ten in Divider I and fed to Frequency Divider II for further division (8, 16, 32 or 64).

Frequency Divider II, 901-258

The frequency range 0.1 to 1.69999 MHz is divided into four one octave bands.

The input signal (from Frequency Divider II) 6.5 to 12.8 MHz (13.6 MHz) is divided by 64, 32, 16 or 8 in order to obtain the ranges: 0.1 to 0.19999 MHz, 0.2 to 0.39999 MHz, 0.4 to 0.79999 MHz and 0.8 to 1.69999 MHz. The division ratio is set by the programmable divider QD_2. The square wave output from the dividers is filtered in the four lowpass filters.

AM Modulator 901-179 and Level and AM Feedback Loop

The AM modulator circuit is used for amplitude modulation and automatic level stabilization.

The amplitude modulation is performed by controlling the dynamic resistance ratio of the two PIN-diodes, CR1 and CR2, by means of the bias current through the diodes. The automatic level stabilization is obtained by controlling the dynamic resistance of the PIN-diode CR3.

The RF amplifier Q1 and Q2 serves two purposes; it compensates the loss in the PIN-diodes, and it provides a low impedance for the amplitude modulation diodes, reducing the incidental FM.

The switching diodes CR4 and CR5 select whether the signal should pass through the Frequency Converter or directly to the Output Amplifier. The switching diodes are controlled from the Frequency Range Control.

The level and AM feedback loop is designed to achieve a good envelope distortion figure, and to maintain a constant modulation depth and constant RF level, with a varying carrier frequency.

The feedback is taken via a summing amplifier from the RF detector which is connected to the output terminal of the Output Amplifier, QA1. The summing amplifier (QA2) and the RF detector (CR11, CR12) are located on the Output Amplifier PC-board.

From the summing amplifier the feedback signal passes through a low-pass filter composed of the feedthrough capacitors C1 and L1 to the AM modulator stage.

CR9 and CR8 compensate for temperature drift of CR11 and CR12, and thus ensures that the RF output level is independent of temperature variations.

Frequency Converter 901-256

The Frequency Converter PC-board contains four parts: the mixer QA1, the 100 MHz crystal controlled oscillator, a lowpass filter, and an amplifer (Q2, Q3, Q4) which compensates for the losses in the mixer.

The input signal to the Frequency Converter, ranging from 101.700 MHz to 130 MHz, is balanced in the transformer L2 and is applied to the mixer, where it is mixed with the 100 MHz crystal controlled signal giving a difference frequency of 1.7 MHz to 30 MHz after filtering.

The 100 MHz local oscillator signal is balanced by means of the resistors R8 and R9. The mixer is of the transistor multiplier type, which gives excellent spurious rejection when driven by properly chosen input signal levels. The mixer is followed by a non-symmetrical lowpass filter having a cut off frequency of 30 MHz. Additional filtering is provided in a similar filter placed on the output amplifier PC-board. The amplifier has a grounded base transistor (Q2) in the input stage to assure a good termination of the lowpass filter.

The ON/OFF position of the Frequency Converter is controlled by the PIN-diode switches (CR_4, CR_5 on the AM modulator PC-board and CR_1, CR_2 and CR_3 located on the Output Amplifier PC-board). The switches are controlled from the Frequency Range Control circuit. In the ON position, the PIN-diodes act as linear low-ohmic resistors and introduce no distortion as long as the frequency is high. All PIN-diodes, except one (CR_1 on the output amplifier PC-board), are working at high frequencies. To prevent distortion from CR_1 at low frequencies, this diode is current driven form the output transistor Q4. The dc current to Q4 is supplied partly via CR_1. The crystal controlled oscillator has two additional outputs, one which offers frequency division in a divide-by-ten prescaler, and is used as a reference frequency for the Frequency Synthesizer, and another which is fed to Mixer II.

Output Amplifier 901-180

(see drawing no. 985-115)

The PCB contains two independent output amplifiers.

The output amplifier for the frequency range 1.7 to 129.9999 MHz consists of a preamplifier Q1, Q2, Q3 and Q4 and a hybrid amplifier QA1 which delivers 4 V RMS with up to 90% AM to the RF attenuator.

Filter and switching diodes CR1, CR2 and CR3 for the Frequency Converter are incorporated.

The rectified signal from the RF detector CR11, CR12 is compared to the input signal from connector J_1-7 in the differential amplifier QA2. The output from QA2 is fed back to the AM Modulator for RF level stabilization and amplitude modulation. The input to terminal J_1-7 is a DC signal which sets the RF output level (normally to 4 V RMS) and when AM is ON, the modulation signal is superposed the DC signal.

In the frequency range 0.1 to 1.69999 MHz the RF signal - now coming from Frequency Divider II - passes through an analog multiplier QA3, which works as AM modulator, to the second output amplifier Q7 to Q12.

The RF level defining DC voltage and the AM modulation signal are also here applied via terminal J_1-7.

Switching between the two output amplifiers is performed by a relay (K1).

Spot Frequency Crystal Oscillator 901-194

(see schematic diagram 985-115)

The crystal oscillator consists of Q1, Y1 and associated circuits.

The tank resonant circuit L1, C_3, C_4 and C_14 is tuned to the crystal resonant frequency by means of the core in L_1.

C_14 is zero for frequencies above 90 MHz.j

The output from the oscillator stage is split into two. One is fed to a highpass filter C_5, C_6 and L_2, and the other to a lowpass filter C_7, C_8 and L_3.

The output from the lowpass filter is lagging 90 degrees behind the output from the highpass filter.

The output from the lowpass filter is fed to a double balanced mixer working as an AM modulator with suppressed carrier.

When a 19 kHz modulation signal is applied to the mixer via R6, two sidebands separated by ±19 kHz from the crystal frequency will be present at the output from the mixer.

When this signal is added to the output from the highpass filter via resistors R_8, R_9, a signal equivalent to a phase modulated signal will be obtained at the output of amplifier Q_2, Q_3.

Prescaler 901-257

The prescaler divides the 100 MHz signal from the crystal controlled oscillator by ten. It consists of a buffer/preamplifier followed by an ECL frequency divider.

FRONT PANEL SECTION 901-513, 901-514, 901-515

(see drawing no. 985-123)

The front panel consists of a sandwich of three PCB's which are interconnected by flex strips. One PCB contains the pushbuttons for setting of the RF frequency, modulation and RF level. Another contains the numerical displays, switch drivers and annunciators, and the third PCB contains the remaining part of the logical circuits, up/down counters for RF frequency, modulation level, RF level and modulation selector circuits.

Fig. C8 shows part of the frequency register and display. The keys for stepping up/down are shown in the bottom of the figure. Anti-bouncing flip-flops are inserted between the keys and the logical circuits. If the key 1 kHz Up is pressed, a positive level on the output of flip-flop QD5, pin 9 starts a clock generator (QD25 and associated circuit). Through gate QD17 the signal is then clocked into the count-up terminal on the presettable up/down BCD counter QD20 at a rate of approx. 3 Hz. When the counter overflows, a carry pulse clocks up the following digit by one. When stepping down, borrow pulses clock down the following digit in a similar way. The counter outputs Q_0 to Q_3 are fed to the seven segment decoder/driver QD37 and to the tri-state buffer array QD26. Furthermore, the outputs are fed to the Frequency Range Control and furthermore to the RF unit to control the RF frequency.

The data stored in the up/down counters can be read out to an interface unit via the data bus by applying read pulses to the tri-state buffers. Data from the interface unit can be read into the up/down counters via the data bus by applying load pulses to the load terminals on the up/down counters. The read and load pulses are routed to the appropriate up/down counter addressed from the address decoders QD44 and QD35 (see diagram no. 985-123).

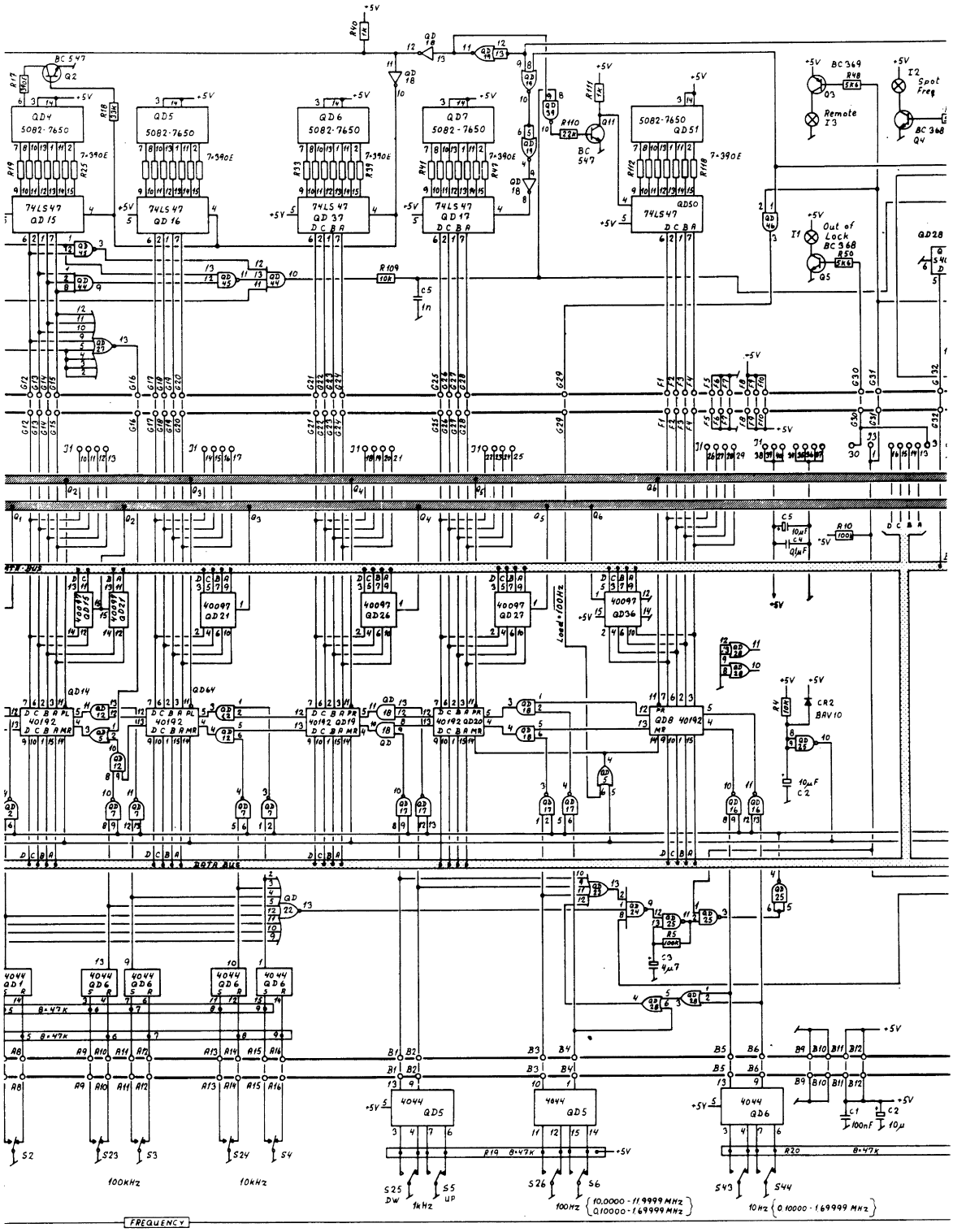


Fig. C8 - Part of Frequency Register and Display (Front Panel Unit)

The digital circuitry for modulation level and RF level works in the same way as the frequency control.

Modulation mode and modulation source are selected by pressing the appropriate keys. The data word is then set up by the encoders QD1 and QD2 and routed via tri-state gates to the latches QD30 and QD38 where the data word is stored. The decoders QD33 and QD34 drive the LED's.

In the remote mode the data words are routed via tri-state latches to QD30 and QD38 by the load pulse.

The RF level up/down counters, QD58, QD62 and QD50, can be stepped from zero to 141.9. The data output from the up/down counters are fed to the modulation unit PCB. Signals stops counting up or down when the maximum or minimum signal level is reached. When the counter outputs are 0, the attenuator is set to maximum attenuation (127 dB).

By means of a BCD subtractor circuit inserted between the counter outputs and the level display drivers, the level will be displayed in units given by the setting of switch S1 (see table B1, page B12).

Power Upstart

When the power for the RE107 is switched on, an upstart pulse from C_2, R_4 presets all counters and latches on the front panel unit.

FREQUENCY RANGE CONTROL 901-516

(see drawing no. 985-128)

The purpose of the Frequency Range Control is to decode the signals related to RF frequency which is received from the Front Panel Unit, and after decoding of the set frequency to deliver proper signals for the following tasks:

1. Control whether the A- or the B-section of VCO I and VCO II should be ON

2. Control of the ON/OFF switches and the division ratios of the two frequency dividers

3. To set the converter ON when the frequency is set between 1.7 and 29.999 MHz

4. To switch in the correct Output Amplifier

5. To route the RF data from the Front Panel to the correct position in the Programmable Frequency Divider after proper preconditioning, e.g. in the frequency range 60 to 129.999 MHz, 16 MHz have to be added to the frequency data because f_2 has to be 16 MHz above the programmed output frequency.

6. To correct FM modulation signal level (and sweep signal level) to compensate for variation in frequency division in Frequency Dividers I and II, when used

7. To deliver ON/OFF switching signals for Spot Frequency Oscillator.

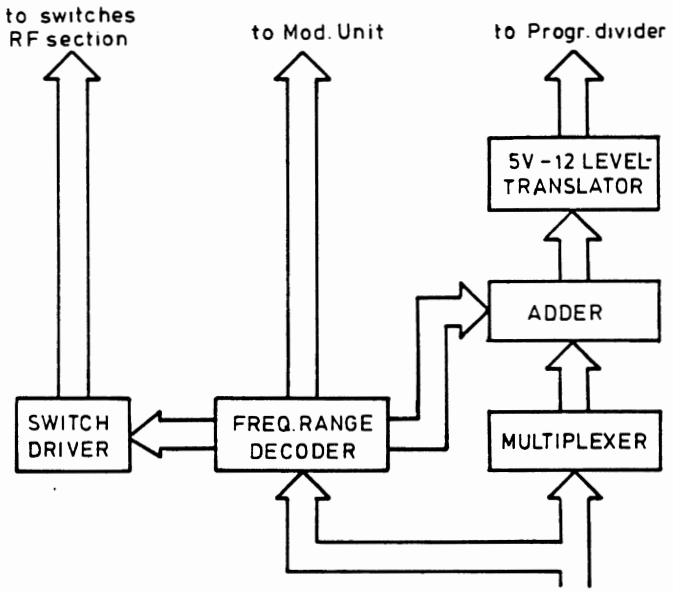


Fig. C9 - Block diagram - Frequency Range Control

The input data from the Front Panel Unit via J_2 and J_3 is fed via multiplexers QD10 to QD19 (see drawing no. 985-128) to the NBCD adders QD7, QD8 and QD9, where proper values are added to the data according to the frequency range decoding. Level translators QD1 to QD6 changes the data levels from 5 Volts to 12 Volts which are fed to the programmable frequency divider in PLL II.

In the frequency range 1.7 MHz to 129.999 MHz and when the 100 Hz resolution is in OFF position, the 1 kHz data is fed to the 1 kHz input of the programmable divider, the 10 kHz to the 10 kHz input, etc.

When the 100 Hz resolution is activated (10 - 11.9999 MHz only), the input data from the 100 Hz digit is fed to the 1 kHz input of the programmable divider, the 1 kHz digit data is fed to the 10 kHz input, etc.

In this situation the synthesizer is generating a frequency which is ten times the frequency set on the Front Panel. After division by ten in Frequency Divider I, the correct frequency is obtained.

When the frequency is set below 1.7 MHz, the input data from the 10 Hz digit is fed to the 1 kHz input of the Programmable Frequency Divider and the data from the 100 Hz digit is fed to the 10 kHz input, etc.

In the range from 0.8 to 1.69999 MHz the division ratio in the Programmable Frequency Divider will then correspond to 100 times the set frequency. In the Frequency Dividers I + II the frequency in this range is divided by 80. To give a correct output frequency, the reference frequency for PLL II is changed from 1 kHz to 0.8 kHz.

When the output frequency is set in the range 0.4 to 0.79999 MHz the Frequency Dividers I + II divide by 160, and the Programmable Divider is set to divide by 2 x N.

The output frequency of PLL II always has to be 16 MHz higher than the output frequency of PLL I.

When the output frequency is less than 1.7 MHz, the reference frequencies in PLL II are changed from 1 kHz to 0.8 kHz and the division ratio in the Programmable Frequency Divider is rised by a factor 2^n (n = 0, 1, 2, J), and the value added to the frequency data before these are applied to the Programmable Divider has to be corrected for this as shown in the table below.

	frequency range (MHz)	VCO section	adder	reference frequency	frequency division
	0.1 - 0.13999	B	2.5 M	800 Hz	640
	0.14 - 0.19999	A	2.5 M	800 Hz	640
	0.2 - 0.27999	B	5 M	800 Hz	320
	0.28 - 0.39999	A	5 M	800 Hz	320
	0.4 - 0.55999	B	10 M	800 Hz	160
	0.56 - 0.79999	A	10 M	800 Hz	160
	0.8 - 1.09999	B	20 M	800 Hz	80
	1.1 - 1.69999	A	20 M	800 Hz	80
	1.7 - 29.9999	A	16 M	1 kHz	
(:10)	10 - 11.999	A	16 M	1 kHz	10
	30 - 44.999	B	8 M	1 kHz	2
	45 - 59.999	A	8 M	1 kHz	2
	60 - 85.999	B	16 M	1 kHz	
	86 - 129.999	A	16 M	1 kHz	

RF Level

The RF attenuator is a seven bit binary controlled attenuator. It contains sections of 0, 1, 2, 4, 8, 16, 32 and 64 dB attenuation, giving a range from 0 to 127 dB in 1 dB steps (from +5 dBµV to +132 dbµV EMF). The Rf level range is extended up to 136 dBµV and down to -5 dBµV by injecting voltage into the AGC loop.
The AGC loop is also used for 0,1 dB resolution.

The circuitry for this, as well as the attenuator drive circuit, is placed on the Modulation Unit PCB.

MODULATION UNIT

(see drawing no. 985-127)

FET switches (Q1 to Q32) select one of the eight modulation sources. The modulation signal is routed via the D/A converter, or directly, to the FM or AM modulation summing amplifier. AM stereo (Magnavox system) is switched ON by Q77, Q34 and associated circuit.

The modulation mode selector controls the FET switches connected to the inputs of the modulation summing amplifiers as shown in the table below:

switch transistors	mod. source	location
Q73 - Q75	external direct	AM summing amplifier
Q76 - Q79	external or internal oscillator via D/A converter	AM summing amplifier
Q80 - Q83	1 kHz internal oscillator	AM summing amplifier (30% AM)
Q84 - Q86 + Q114	external direct	FM summing amplifier
Q87 - Q90	external or internal oscillator via D/A converter	FM summing amplifier
Q91 - Q94	sweep generator	FM summing amplifier
Q88 - Q92	19 kHz pilot	Spot freq. oscillator
Q34 and Q77	AM stereo coder	FM and AM summing amplifier

The modulation level attenuator is a multiplying D/A converter. By FET switches Q33 to Q60 and series resistors R140 to R148 the signal to the summing amplifier QA8 is controlled in 0.5% steps from 0 to 99.5%.

The input to the D/A converter is sensed by a limit sensor, QA1, QA2 and QA3. The UNCAL annunciator on the front panel indicates when external modulation signal level is outside the specified limits, 1 Vpeak $\pm$1%.

Two internal modulation oscillators are provided, 400 Hz and 1 kHz. The oscillators are of the Wien bridge type. The output level is highly stabilized by an ALC loop consisting of an active peak detector and an indirectly heated thermistor. The level is fine adjusted by a potentiometer.

The sweep generator produces a triangular or sawtooth wave selected by S1.

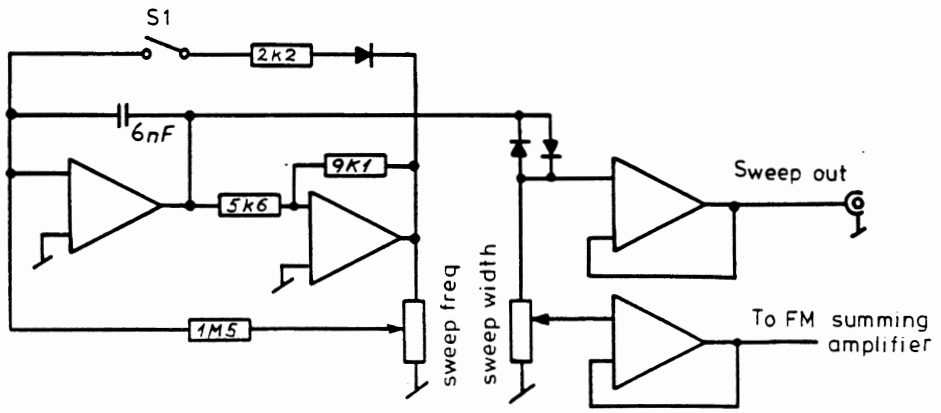


Fig. C10 - Principle of Sweep Generator

The RF level from the Output Amplifier is controlled by the Quad operational amplifier QA2 and associated circuits. The RF output level is directly proportional to the DC voltage at the output of QA4 which is - via terminal J_9-2 on the mod. unit - fed to terminal J_1-7 on the Output Amplifier PCB.

Amplitude Modulation is produced by superposing an AC signal on the DC voltage.

The normal RF level from the Output Amplifier is 132 dBµV EMF. By setting ON one of the FET switches Q110, Q109, Q108 or Q107, the RF level range 132 to 135 dBµV is covered. At the maximum attenuation of the attenuator (127 dB) the RF output level is +5 dBµV. To achieve levels down to -5 dBµV the FET Q106 is set OFF in the range +4 to -5 dB µV producing a 10 dB lower output level from the Output Amplifier. The correct setting of the RF attenuation is in this range obtained by adding nine to the input data from the Front Panel Unit.

The FET switches Q151 to Q154 are used to obtain the 0,1 dB resolution on output level.

Attenuator driver circuit converts the BCD data from the Front Panel Unit into binary data which is fed via open-collector buffers QD7 to the attenuator relay coils.

The FM modulation signal from the FM summing amplifier QA10 is fed to the FM input in the synthesizer section via a voltage divider. The voltage division ratio is controlled by setting ON one of the FET switches Q117 to Q123. In this way the frequency division in Frequency Dividers I and II is compensated for.

In the AM stereo mode (Magnavox system) the L-R input signal is pre-emphasized by QA11 and associated circuit.

S E C T I O N D MAINTENANCE

DI - RECOMMENDED TEST EQUIPMENT

Instrument	Critical Specifications	Recommended Model
Digital Voltmeter	4 1/2 digit AC/DC resolution 0.1 mV or less max. voltage at least 100 V	Data Precision Model 1450
Power Meter	Impedance 50 ohm Frequency range 0.1 to 130 MHz	Hewlett Packard type 434A, with probe type 8482A
FM/AM Modulation Meter	Frequency range: at least 10 MHz to 130 MHz	RE AFM2 Modulation Meter
Oscilloscope	Dual Mode DC to 20 MHz	Advance type OS1000
RF Spectrum Analyzer	Frequency range: 0.1 MHz to 350 MHz	Hewlett Packard type 8557A or 8558B
LF Oscillator	Frequency range: 10 Hz to 100 kHz Distortion: <0.01%	RE BKF10 Distortion Analyzer
Distortion Meter	Capable of measuring distortion down to 0.01%	
Test Loop	2 turns diameter: 25 mm	
Frequency Counter		Data Precision Model 5740

DII - PERFORMANCE TESTS

The procedures in this section test the electricial performance of the RE108 - using the specifications in section AIII as the performance standards. All tests can be performed without access to the interior of the instrument. The performance tests given in this section are suitable for incoming inspection, troubleshooting or preventative maintenance.

Equipment required for the performance tests is listed on page D1.

Before any tests are performed the instrument should warm up for one hour.

RF OUTPUT FREQUENCY

Recommended equipment.

Frequency counter.

Set the RE108 controls as follows:

RF frequency:	100.000 MHz
RF voltage:	100 dBuV
Modulation mode:	CW

Connect the frequency counter to the RF OUT connector of the RE108.

The measured frequency should be 100.000 MHz $\pm$2 kHz

To ensure proper function of the instrument, the frequency should be checked at the following dispaly settings:

0.10000 MHz	10.000 MHz	: 10 function OFF
0.19999 MHz	10.0002 MHz	: 10 function ON
0.20000 MHz	11.9999 MHz	: 10 function ON
0.39999 MHz	29.999 MHz	
0.40000 MHz	30.000 MHz	
0.79999 MHz	59.999 MHz	
0.80000 MHz	60.000 MHz	
1.69999 MHz	85.999 MHz	
1.700 MHz	86.000 MHz	
	129.999 MHz	

RF OUTPUT LEVEL TEST

Recommended equipment: Power Meter: HP 434A
Probe: HP 8482A

Set the RE108 controls as follows:

RF frequency: 100 MHz
RF VOLTAGE: 113 dBuV EMF or 107 dBuV across 50 ohms

Modulation mode: CW

Connect the power meter to the RF OUT connector on the RE108.

The output level should be 0 dBm ±1 dB read on the power meter.

Check the output level at the following frequencies:

0.10000 MHz	10.000 MHz	: 10 function OFF
0.19999 MHz	10.0002 MHz	: 10 function ON
0.20000 MHz	11.9999 MHz	: 10 function ON
0.39999 MHz	29.999 MHz	
0.40000 MHz	30.000 MHz	
0.79999 MHz	59.999 MHz	
0.80000 MHz	60.000 MHz	
1.69999 MHz	85.999 MHz	
1.700 MHz	86.000 MHz	
	129.999 MHz	
	SPOT. FREQ.	

Permissible error: ±0.5 dB

If the above RF level checks prove satisfactory, further measurements at other levels (1 V EMF to 1 uV EMF) will normally be superfluous.

RF LEAKAGE TEST

Recommended equipment: Spectrum Analyzer: HP 8557A or HP 8558B
Test Loop: Two turns, 25 mm diameter

Set the RE108 controls as follows:

FREQUENCY: 100 MHz
RF VOLTAGE EMF: ≤1 mV

Connect the Test Loop to the Spectrum Analyzer.

Permissible Leakage

<1 uV EMF at a distance of 25 mm from the Signal Generator cabinet.

RF HARMONICS TEST

Recommended equipment: Spectrum Analyzer: HP 8557A or HP 8558B

The harmonics of the RF frequency are measured by means of the spectrum analyzer connected to the RF OUT connector on the front panel of the RE108.

Permissible Level

Each of the harmonics should be at least 30 dB below the carrier level when the carrier frequency is within the specified frequency ranges.

NON-HARMONICS SPURIOUS FREQUENCY TEST

Non-harmonically related spurious frequencies can be generated in the Frequency Synthesizer or in the Frequency Converter.

Recommended equipment: Spectrum Analyzer: HP 8557A

Connect the Spectrum Analyzer to the RF OUT connector on the RE108.

The non-harmonic spurious frequencies are measured by slowly stepping the RE108 through the frequency ranges.

Permissisble Levels

The level of any non-harmonic spurious signals should be at least 80 dB below the carrier level.

MODULATION OSCILLATOR TEST

Recommended equipment:	Frequency Counter:	Data Precision Model 5741
	Distortion Analyzer:	RE BKF10

Modulation Frequency

Connect the counter to the 1 kHz connector on the rear panel of the RE108.

Counter reading: 1 kHz ±2%

Connect the counter to the 400 Hz connector on the rear panel of the RE108.

Counter reading: 400 Hz ±2%

Distortion

Connect the INPUT connector of the BKF10 to the modulation output connectors of the RE108.

Read the distortion factor of the 400 Hz and the 1 kHz modulation frequency on the Distortion Meter.

Distortion factor: max. 0.01%

MODULATION MODE TEST

Recommended equipment:	Modulation Meter:	RE AFM2
	Oscilloscope:	Advance, type OS1000
	DVM:	Data Precision, Model 1450
	LF Oscillator:	RE BKF10
	Distortion Analyzer:	RE BKF10

The AM and FM modulation depths are detected and measured using the AFM2 Modulation Meter.

Connect the RF INPUT connector of the AFM2 to the RF OUT connector of the RE108.

AMPLITUDE MODULATION

Initial settings of the RE108.

The following measurements are performed at MOD. FREQ. 1 kHz and carrier frequency 10 MHz unless otherwise stated.

1. INT. 30% AM

   Permissible error: max. reading 33%
   min. reading 27%

2. INT. 80% AM

   Permissible error: max. reading 84%
   min. reading 76%

3. EXT. AM

   Connect the LF Generator to the EXT. MOD 4-connector on the rear panel of the RE108. Test the modulation frequency response at 30% AM and 80% AM (EXT. MOD. input level: 707 mV RMS).

Permissible error: 30% AM: ±3 dB at mod./freq. 40 Hz to 5 kHz for carrier frequencies >400 kHz

80% AM: ±3 dB at mod./freq. 40 Hz to 3 kHz for carrier frequencies >400 kHz

4. AM distortion at 30% AM and 80% AM (internal)

Connect the BKF10 Distortion Analyzer to the AF OUTPUT connector on the AFM2.

Permissible error: 30% AM: <0.3% for carrier frequencies <30 MHz
80% AM: <1% for carrier frequencies <30 MHz

5. EXT. AM sensitivity

212 mV RMS applied to EXT. MOD 2 should provide 30% AM.

Permissible error: max. value: 31.5% AM
min. value: 28.5% AM

6. Residual AM

AFM2 setting: FILTER at 50 Hz to 15 kHz (3 dB)
METER RANGE: 3%

RE108 setting: Carrier freq.: 10 MHz
Modulation mode at CW

Connect a DVM to the AF OUTPUT connector on the AFM2.

Permissible error: Residual AM: 0.02% RMS
(~ 6 mV RMS on the DVM)

7. Incidental FM for 30% AM (at 1 kHz mod.freq.)

Permissible error: <±60 Hz peak

8. Incidental FM for 80% AM (at 1 kHz mod.freq.)

Permissible error: <±300 Hz peak

FREQUENCY MODULATION

The following measurements are performed at 100 MHz carrier frequency and 1 kHz modulation frequency.

1. EXT. 2

   Connect an LF generator to the EXT. MOD. 2 connector. An AF level of 565.7 mV RMS should provide ±80 kHz FM.

   Permissible error: Max. reading: ±81.6 kHz
   Min. reading: ±78.4 kHz

   EXT. 3 should be tested in a similar way.

2. EXT. 4

   Connect the LF generator to the EXT. MOD. 4 connector. The AF level should be 707 mV RMS. Set MOD. LEVEL to ±80 kHz FM.

   Permissible error: Max. reading: ±81.6 kHz
   Min. reading: ±78.4 kHz

3. EXT. 5 and EXT. 6

   Should be tested in a similar way.

4. 400 Hz

   Set MOD. LEVEL to ±80 kHz FM.

   Permissible error: Max. reading: ±81.6 kHz
   Min. reading: ±78.4 kHz

5. 1 kHz

   Set MOD. LEVEL to ±80 kHz FM.

   Permissible error: Max. reading: ±81.6 kHz
   Min. reading: ±78.4 kHz

6. FM distortion

This check is a little difficult to perform with the recommended test instruments. At the factory special instruments are used. The results of the distortion measurements are dependent upon the intrinsic distortion of the AFM2 as well as that of the RE108 under test. Connect the BKF10 Distortion Meter to the AF OUTPUT connector on the AFM2, deivation ±100 kHz, MOD. FREQ. 1 kHz.

Measure at carrier frequency 100 MHz.

Permissible error: 0.02%

7. EXT. AM and simultaneously FM

Check the function.

8. Residual FM

Connect an AC DVM to the AFM2 AF OUTPUT connector.

AFM2 setting:	FILTER at 50 Hz to 15 kHz (3 dB) METER RANGE: ±3 kHz
RE108 setting:	Modulation Mode: CW
Permissible error:	
Residual FM:	<10 Hz (RMS value) 2.2 mV RMS on the DVM corresponding to 74 dB S/N ratio

9. Incidental AM

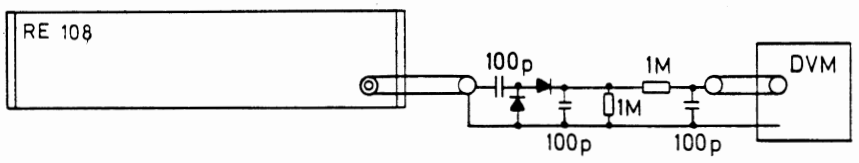


Fig. D1 - Measurement of incidental AM

Proceed as follows:

a) Set the OUTPUT LEVEL to max.

b) Modulation level: INT. AM, 10%

c) Read the AF voltage = x mV
i.e., $\frac{x}{10}$ mV equals 1% AM

d) Set the Modulation Mode switch to position INT. FM and deviation to ±100 kHz
MOD. FREQ. at 1 kHz

e) Read the AF voltage = y mV

f) Calculate the incidental AM% = $\frac{y}{x} \cdot 10\%$

Permissible error:

Incidental AM <0.2%

MEASUREMENT OF L/R STEREO SEPARATION

Recommended equipment:	Stereo Coder:	RE501 (or SMG40)
	Oscilloscope:	ADVANCE OS1000
	Modulation Meter:	RE AFM2

1. Connect the COMP connector on the RE501 to the EXT. MOD. 2 on the RE108.

2. Connect EXT. SYNC. of the oscilloscope to the MOD. SOURCE on the RE501.

3. Connect the RF OUT of the RE108 to the RF IN of the AFM2.

4. Connect the AF output of the AFM2 to the Y input of the oscilloscope.

5. RE108 settings:

RF FREQUENCY:	e.g. 100 MHz
RF LEVEL	105 dBuV across 50 ohms (or 111 dBuV EMF)
Mod. Source:	EXT. 2

6. RE501 (or SMG40) settings:

MOD. FREQ.	1 kHz

L signal
PILOT OFF
PREEMPHASIS OFF
MODULATION LEVEL set to ±60 kHz deviation measured on AFM2 (in METER RANGE 100)

7. AFM2 settings:

INPUT ATT.:	10 dB
IF BANDWIDTH:	±400 kHz
FUNCTION:	FM
METER RANGE:	30 (overloaded)
FILTER:	75 kHz (f, STEREO)
AF OUTPUT:	DC

8. OS1000A settings:

Ext. trigger (trigger signal from stereo generator mod. source).

Time/cm:	0.2 ms/cm
DC MODE	
Volts/cm:	a. 1 V/cm should give 4 Vpp b. 10 mV/cm read stereo separation. 4 mV pp is equivalent to 60 dB separation.

The set-up can be checked by means of an RE101 Signal Generator.

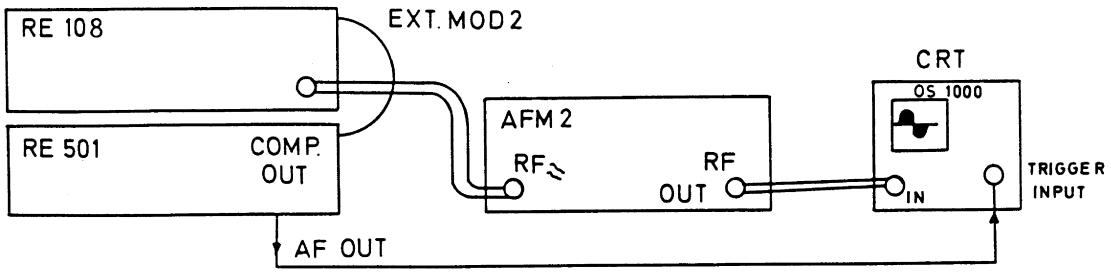


Fig. D2 - Stereo Separation Measurement

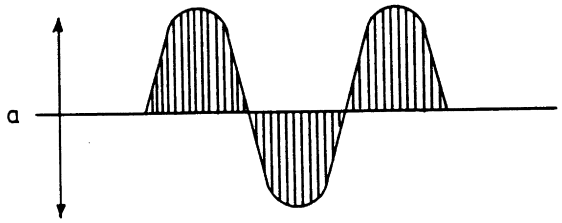


Fig. D3 - Oscilloscope trace at 1 V/cm

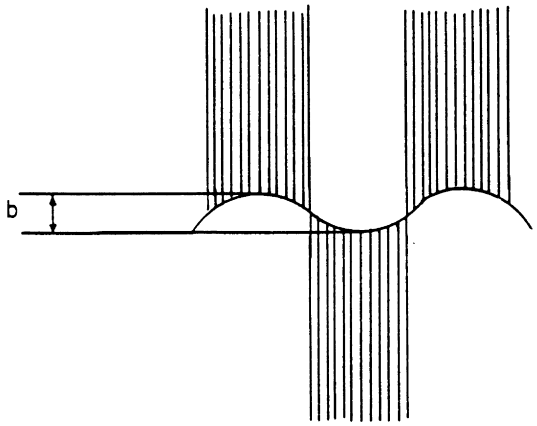


Fig. D4 - Oscilloscope trace at 10 mV/cm

stereo separation: $20 \log \frac{a}{b}$

SPOT FREQUENCY OSCILLATOR

Recommended equipment	Modulation Meter:	RE AFM2
	Stereo Coder:	RE501

1. RE108 settings:

   SPOT FREQ. Mode

MODULATION:	FM
MOD. SOURCE:	PILOT

2. AFM2 settings:

FUNCTION:	FM
METER RANGE:	±10 kHz
FILTER:	MAX. MOD FREQ. 15 kHz

3. The pilot signal from RE501 (19 kHz) 775 mV RMS) is applied to the PILOT input on the RE108.

4. The FM deviation read on the AFM2 should be ±6.75 kHz corresponding to 9% pilot. Max. value: ±7.25 kHz. Min. value: ±6.25 kHz.

5. With FREQUENCY in normal mode the FM deviation should also be ±6.75 kHz measured under the conditions above.

DIII - ADJUSTMENTS

Power Supply

The +12 V supply is adjusted by potentiometer R_{14}, see Fig. E8. The -12 V supply automatically follows the +12 V supply. The +12 V (red lead) should be +12 V within ±10 mV. The -12 V (blue lead) should be -12 V within ±200 mV.

The +28 V supply is adjusted to 28 V ±100 mV by potentiometer R_7, see Fig. E7.

The -18 V supply is adjusted to -18 V ± 100 mV by potentiometer R_5, see Fig. E7.

Adjustments in the RF Unit: see Figs. E1 and E2 for component locations and Fig. D5 for connector locations.

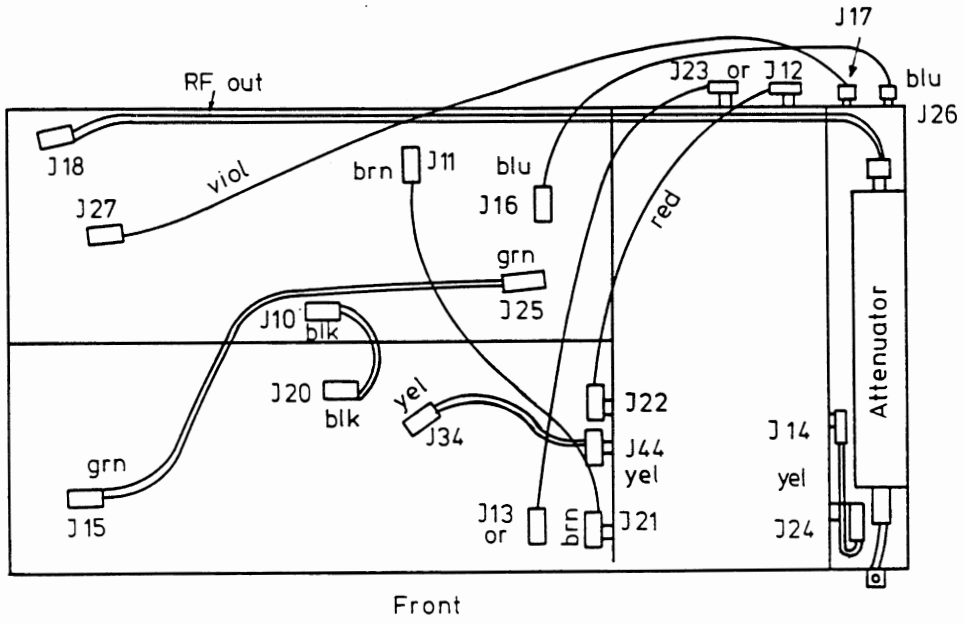


Fig. D5 - Connector Locations

Recommended equipment: DC Voltmeter
50 ohm Power Meter

PLL III (16 MHz loop)

Phase detector III zero adjustment

Connect a DC Voltmeter to the gate of Q7A (teflon stand off).

Adjust potentiometer R_{55} for zero reading on the voltmeter ($\pm$5 mV).

RF level adjustment

Connect the Power Meter to J_{14} on top of the RF box (see Fig. D5)

Adjust potentiometer R_8 on VCO III to -6 dBm reading on the Power Meter.

PLL II (programming loop)

RF level adjustment

FREQUENCY setting 100 MHz.

Connect the Power Meter to J_{13} on top of the RF box.

Adjust potentiometer R_{31} on VCO II to -5 dBm reading on the Power Meter.

PLL I (output loop)

RF level from VCO I at 100 MHz.

Connect the Power Meter to the coaxial cable which feeds the signal from VCO I to the Frequency Divider I.

Adjust potentiometer R_{31} on VCO I to -3 dBm reading on the Power Meter.

Phase Detector I zero adjustment (located in the small RF box)

Required equipment: Spectrum Analyzer

1. Connect a shorting jumper to TP terminals. This will prevent the search oscillator from sweeping.

2. Connect the Spectrum Analyzer to the RF output connector on the front panel.
Spectrum Analyzer center frequency 100 MHz, and 10 MHz/division.

3. Disconnect the connection between the 16 MHz lowpass filter (W_2), and det I. The output loop is now open and the signal (seen on the Spectrum Analyzer) will move up or down in frequency.

4. Adjust potentiometer R_{33} on φ det I until the frequency moves very slowly across the Spectrum Analyzer display (1 to 3 seconds to move from the center frequency and 20 MHz up or down in frequency.

5. Remove the shorting jumper from the TP. The frequency should now be swept by the search oscillator approx. $\pm$20 MHz around the 100 MHz center frequency on the Spectrum Analyzer.

6. Connect W_2 to the 16 MHz lowpass filter. The loop should now be locked to the set frequency of 100 MHz.

Modulation Unit

(see Fig. B3 (page B11)).

Required equipment:
Power Meter
AC/DC Digital Voltmeter
Modulation Meter

RF output level

1. Set the RF frequency to 100 MHz.

2. Set RF level display to 113 dBuV EMF or 107 dBuV across 50 ohms.

3. Connect the Power Meter to the RF output connector.

4. Adjust R_{242} on the Modulation Unit PCB to 0 dBm reading on the Power Meter.

5. Set the RF frequency to 1 MHz.

6. Adjust R_{214} on the Modulation Unit PCB to 0 dB reading on the Power Meter.

   NOTE: When the RF output level has been adjusted, it is always necessary to readjust the AM modulation depth as described in the following section.

7. Offset adjustment QA4

   Adjust R_{288} for zero voltage $\pm$1 mV measured on pin 2 on QA4.

8. Offset adjustment QA8

   Adjust R_{287} for zero voltage $\pm$1 mV measured on pin 2 on QA8.

9. Offset adjustment QA10

   Adjust R_{286} for zero voltage $\pm$1 mV measured on pin 2 on QA10.

10. 1 kHz oscillator level

    Connect an AC Digital Voltmeter to QA5, pin 6.

    Adjust R_{73} to .707 V RMS $\pm$0.2% read on the DVM.

11. 400 Hz oscillator level

    Connect the AC Digital Voltmeter to QA6, pin 6.

    Adjust R_{90} to .707 V RMS $\pm$0.2% read on the DVM

12. Mod. level limit sensor

Connect a DC DVM to TP_1 and measure the voltage.

Add 120 mV to the measured voltage.

Set: Mod. Mode: FM
Mod. Source: 1 kHz

Connect the DC DVM to TP_2.

Adjust potentiometer R_{51} until the DVM reads the value calculated above ±10 mV.

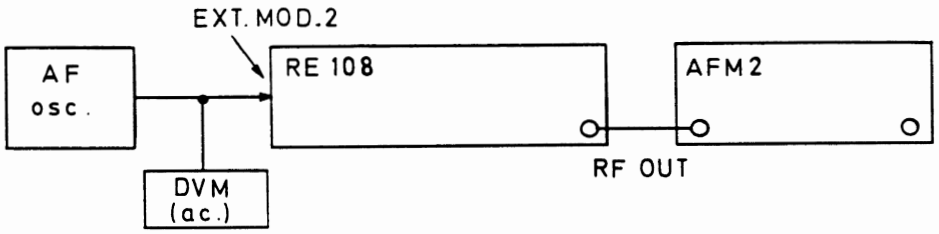


Fig. D6 - Modulation Adjustment

13. ADJUST AM% at 10 MHz

RF frequency: 10 MHz

Modulation: AM

Modulation Source: Ext. 2

Connect an AF oscillator to terminal EXT. MOD. 2 on the rear panel of the RE108.

AF frequency: 1 kHz

AF level: 0.3 V peak = 212 mV RMS ±0.5%

Adjust potentiometer R_{228} to 30% AM reading on the AFM2.

14. Adjustment of AM% at 1 MHz

Required equipment: AF oscillator
AC DVM
Oscilloscope: ADVANCE OS1000

1. Connect the RF output from the RE108 to the Y-input of the oscilloscope.

2. RE108 settings:

   FREQUENCY: 1 MHz
   AF LEVEL: 105 dBuV EMF
   MOD. MODE: AM STEREO

3. Moulation Generator:

   Frequency: 1 kHz
   LEVEL: 707 mV RMS

   Connected to the L+R input terminal on RE108.

4. Oscilloscope settings:

   Ext. trigger (triggered from LF oscillator):

   Time/cm: 0.2 ms/cm
   Volts/cm: 0.1 V/cm

   Variable: set for 5 cm peak to peak on CRT screen

5. Set the volts/cm switch to 5 mV/cm.

   Adjust potentiometer R_{226} on MOD. UNIT to obtain zero voltage in the negative modulation peaks as shown in Fig. D8.

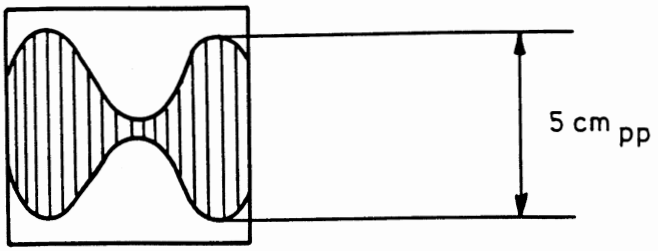


Fig. D7 - Oscilloscope trace ~ 0.1 V/cm

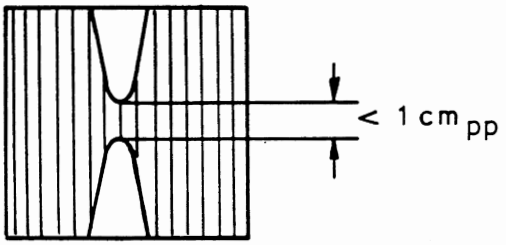


Fig. D8 - Oscilloscope trace ~ 5 mV/cm

NOTE:
The CRT is heavily overloaded under this measurement. If another CRT than the recommended type is used, be sure that overloading does not disturb the measurement. Changing the position of the V/cm switch and oberserving the signal will give an indication of whether the measurement is correct or not.

15. Adjustment of FM (PM - Crosby Method)

Required equipment:
- Spectrum Analyzer
- AF Oscillator
- AC Voltmeter

Set the RF frequency to 1 MHz.

Modulation mode: CW.

RF level 113 dBuV EMF.

Connect the spectrum analyzer to RE108.

Set the spectrum analyzer to minimum bandwidth and minimum sweep width.

Place the 1 MHz signal at the center of the spectrum analyzer screen.

Set the RE108 to AM stereo mode.

Connec the AF oscillator to terminal L-R.

Oscillator frequency: 1 kHz.

Oscillator level: 1.7005 V RMS.

Several sidebands separated by 1 kHz will now be present on the spectrum analyzer screen.

By means of potentiometer R_{241} on Modulation Unit PCB the carrier frequency component shown on the spectrum analyzer is now adjusted to minimum.

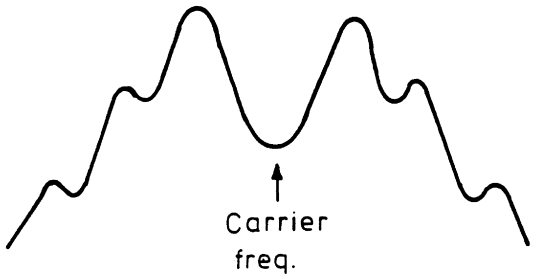


Fig. D9 - FM adjustment (PM), L-R input

16. Stereo separation adjustment

Recommended equipment: Stereo Coder: RE501 (or SMG40)
Oscilloscope: ADVANCE OS1000
Modulation Meter: RE AFM2

Measurement: see page D10 to D12.

Adjust trimemr C_{32} for max. stereo separation.

17. Sweep width adjustment

Recommended equipment: Modulation Meter: RE AFM2
Oscilloscope: ADVANCE OS1000

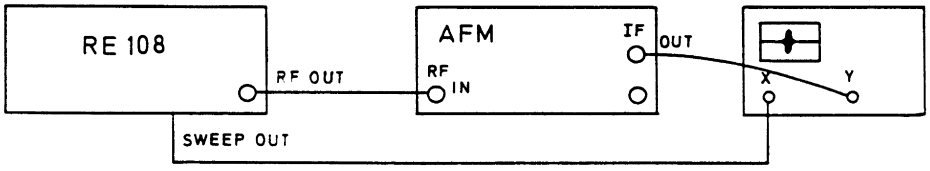


Fig. D10 - Sweep width measurement set-up

1. Connect the RF OUTPUT of the RE108 to the RF INPUT of the AFM2.

2. Connect the SWEEP OUT signal from the RE104 to the X input of the oscilloscope.

3. Connect the IF OUTPUT from the AFM2 to the Y input of the oscilloscope.

4. RE108 settings:
RF FREQUENCY: e.g. 100 MHz
RF LEVEL: 105 dBuV across 50 ohm
SWEEP: NARROW, MEDIUM or WIDE

5. AFM2 settings:
   IF BANDWIDTH: ±20 kHz

6. OS1000A settings:
   X-Y operation.
   X input: 1 V/cm (DC coupled)
   Y input: 0.5 V/cm

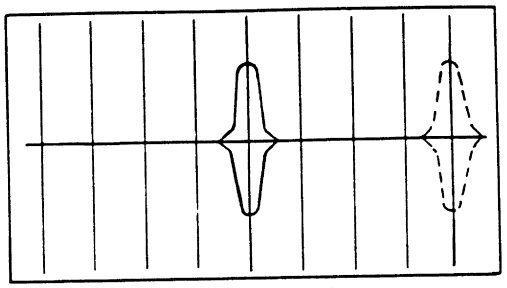


Fig. D11 - Sweep width adjustment

Fine adjust the AFM2 frequency until the IF signal is placed in the center of the oscilloscope as shown in Fig. D11. If, e.g. a sweep of 100 kHz/cm is required, proceed as follows:

1. Step the center frequency of the RE108 4 x 100 kHz = 400 kHz up in frequency. The IF signal will now move to the right as shown by the dotted curve in Fig. D11.

2. Adjust the sweep width potentiometer R_{180} (see Fig. B3, page B11) until the IF trace is placed 4 cm to the right of the center line.

   The sweep is now calibrated to 400 kHz/4 cm = 100 kHz/cm, and the total sweep width is ±500 kHz.

Instead of the modulation meter a receiver can be used for sweep width adjustment.

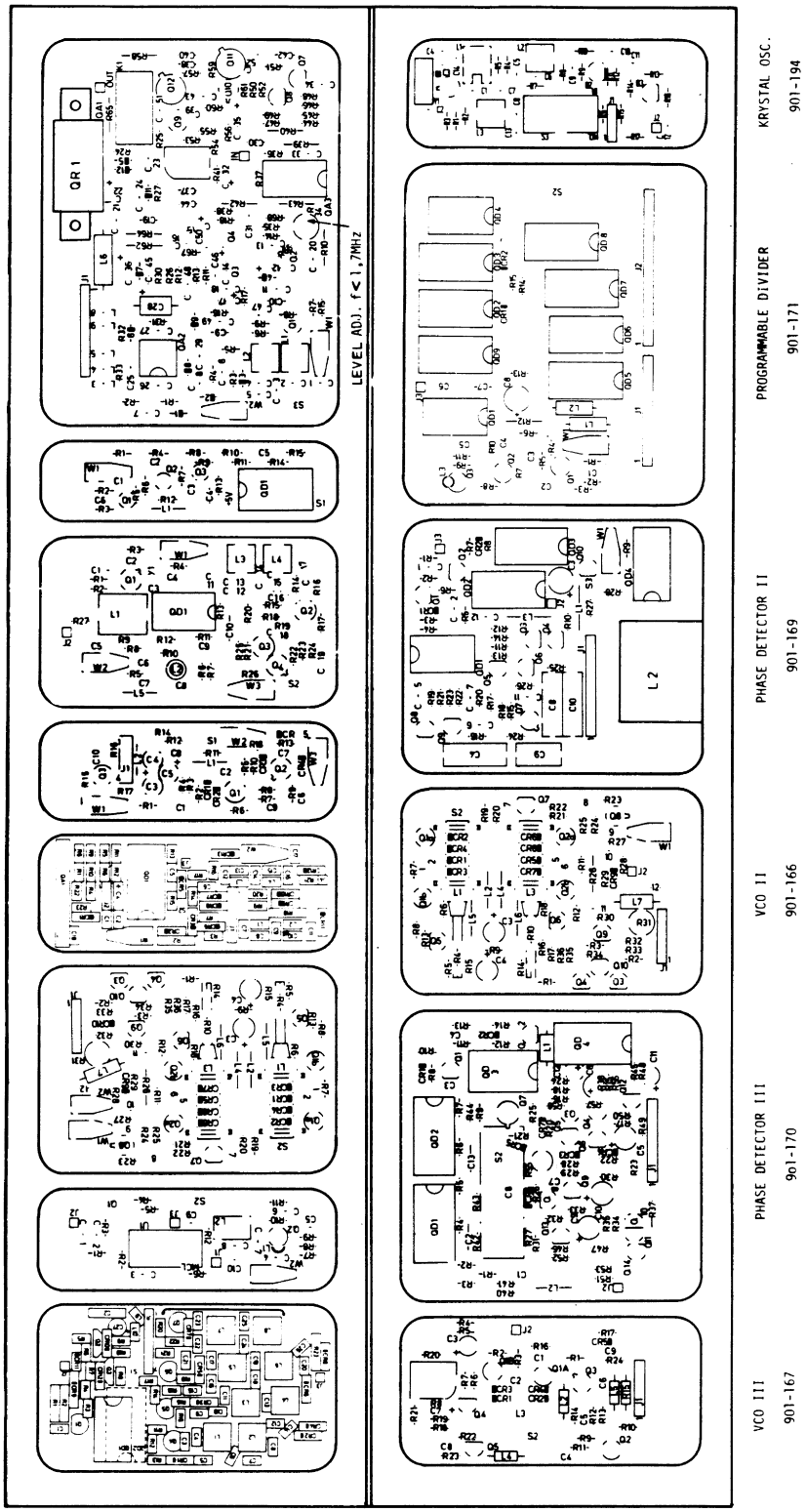


Fig. E1- RE108 RF Unit Component Location

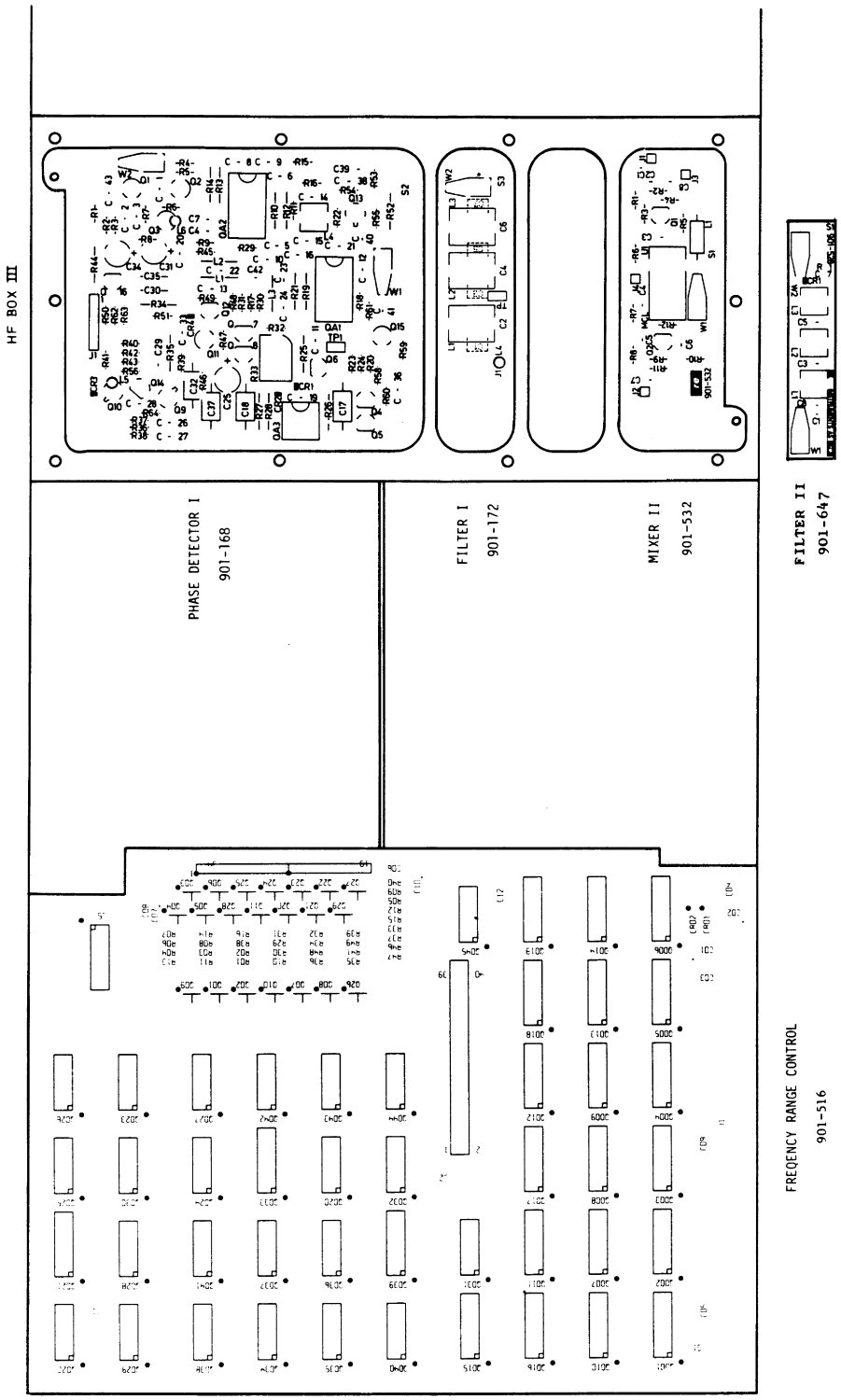


Fig.E2- RE108 RF Unit-Component Location

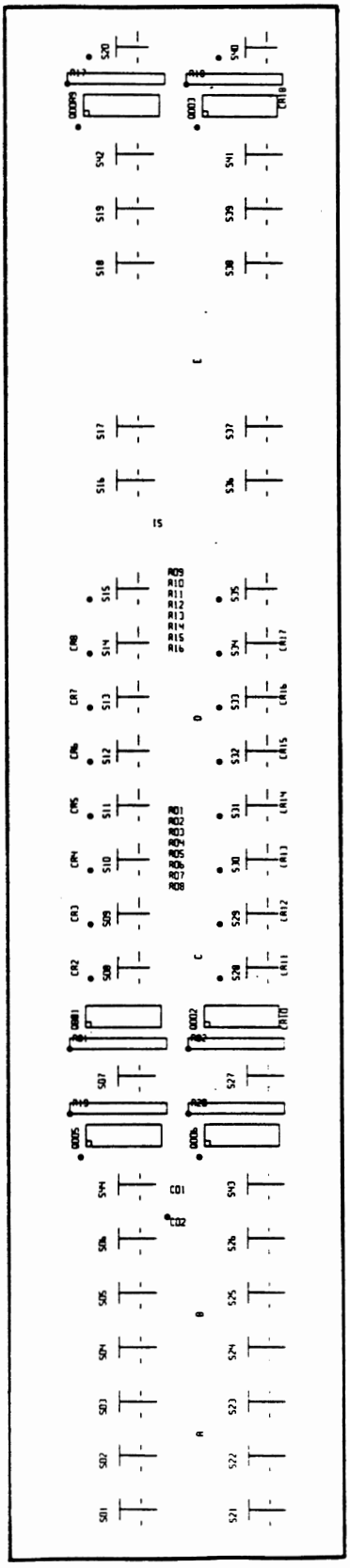


Fig.E3- Front Panel I -Component Location

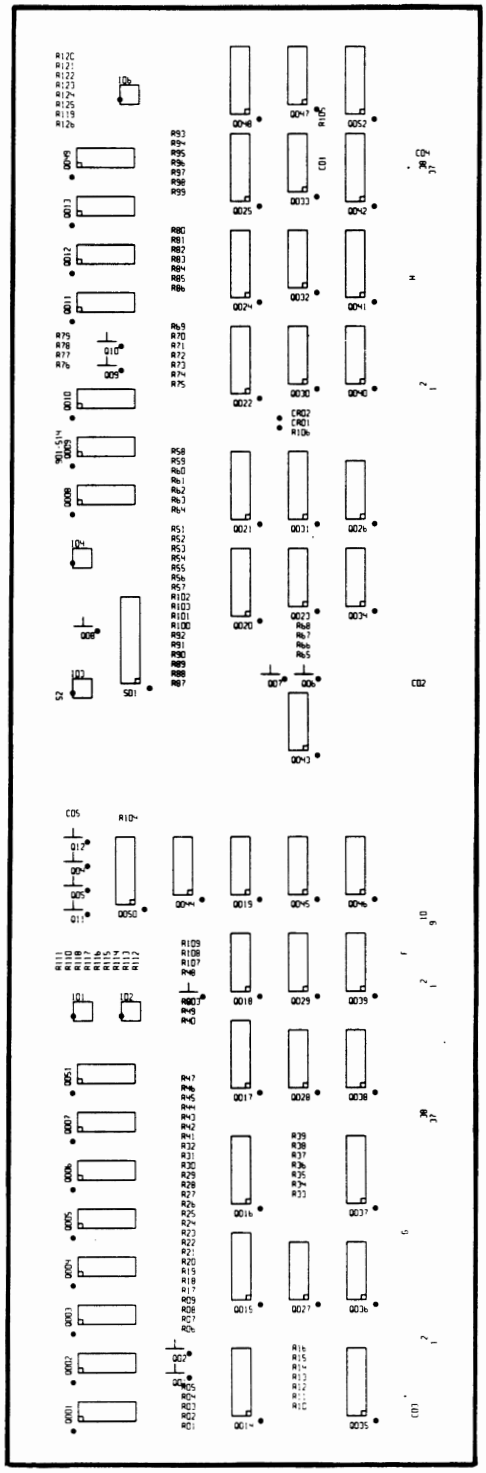


Fig.E4- RE108- Front Panel II - Component Location

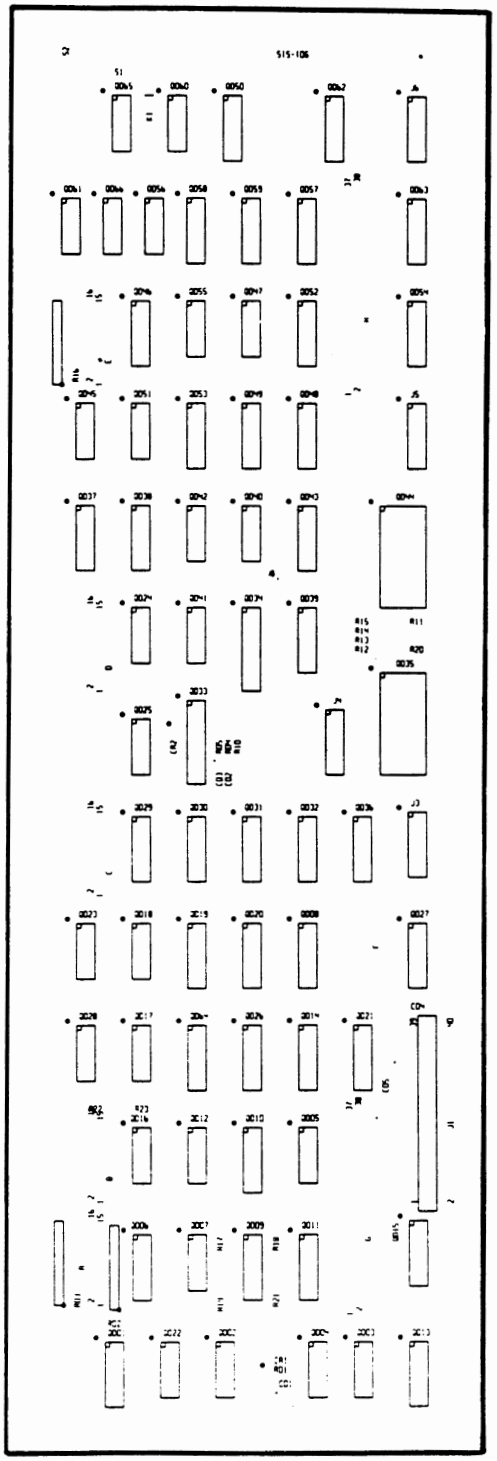


Fig.E5- RE108- Front Panel III - Component Location

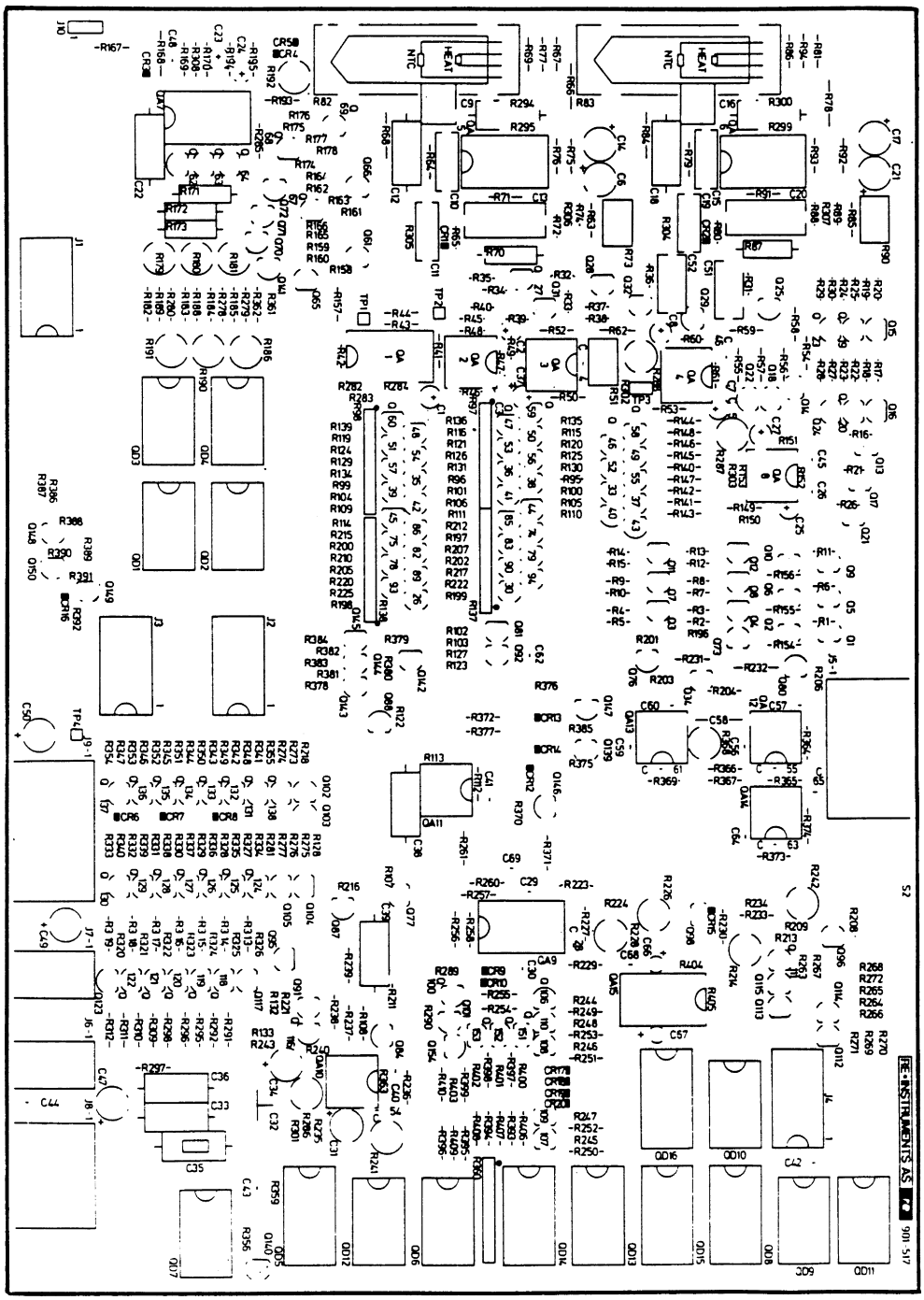


Fig.E6 - RE108- Modulation Unit- Component Location (901-517)

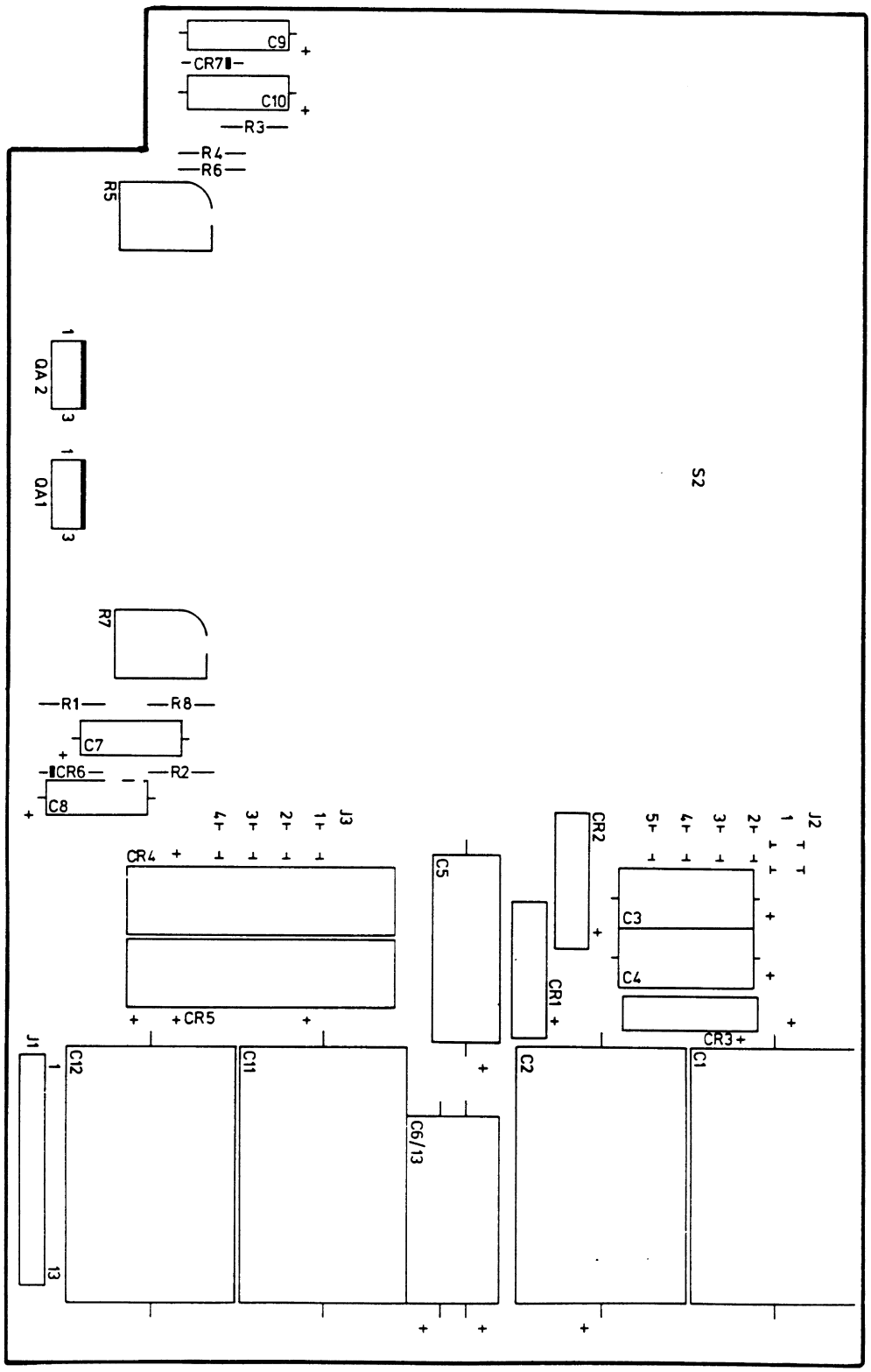


Fig.E7- RE108 - Power Supply I- Component Location

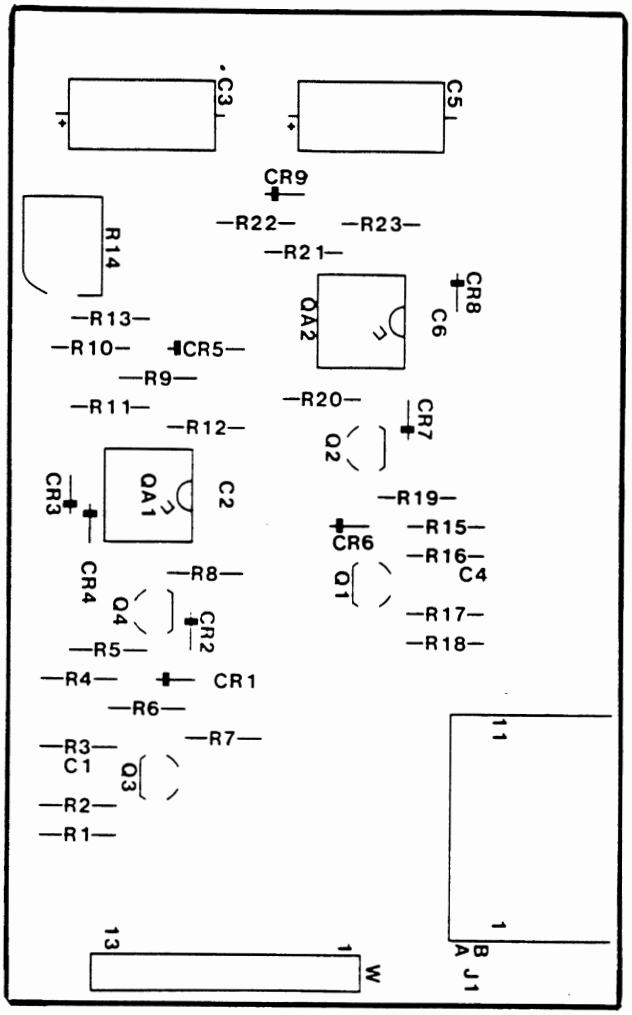


Fig.E8- RE108- Power Supply II- Component Location

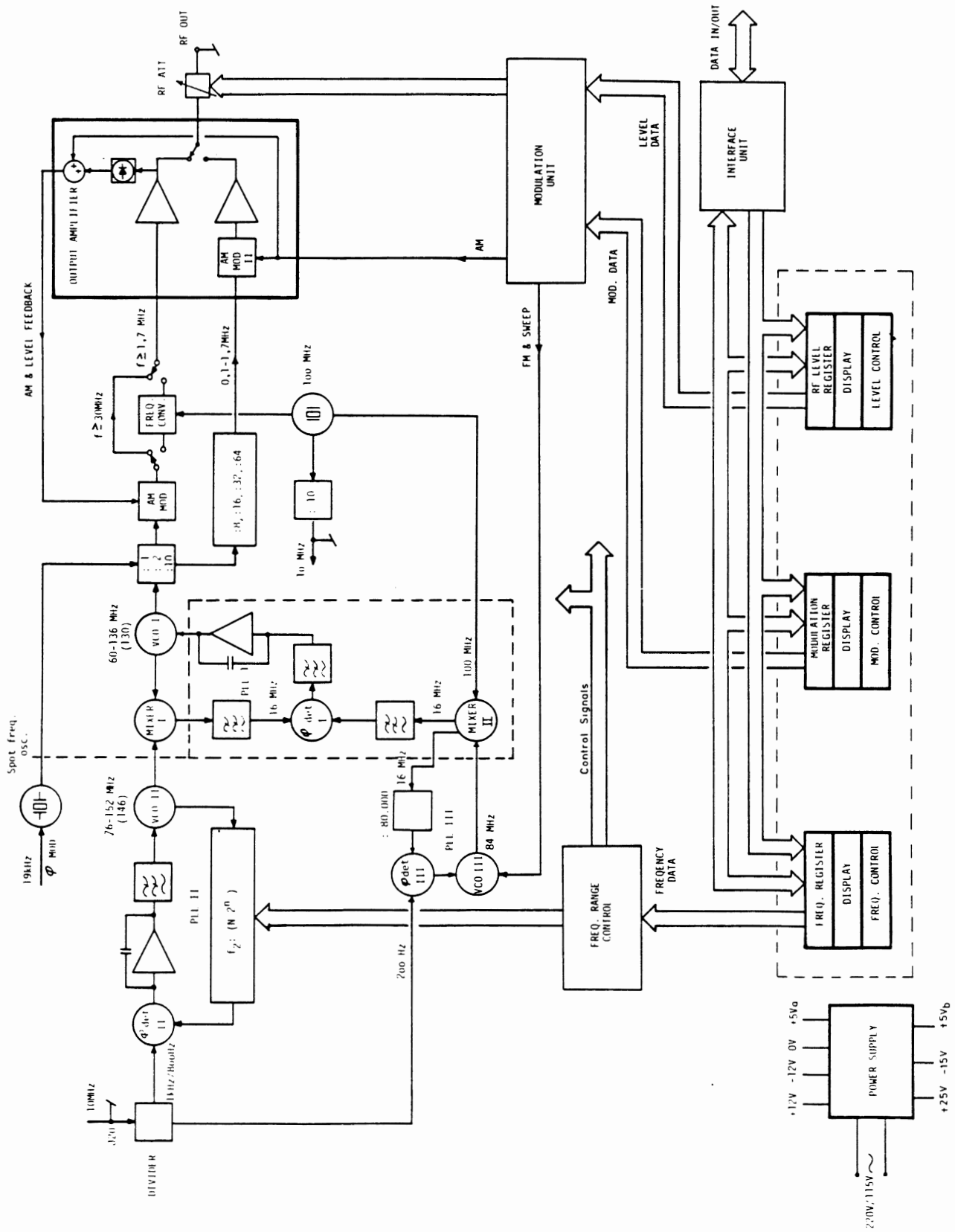


Fig.E9 - RE108 Synthesized Signal Generator

All electronic components are included in the parts list. Parts marked with a * are manufactured by RE INSTRUMENTS.

When ordering spare parts it is important, that the following information is included:

1. The code No. and description of the part
2. The circuit reference from the schematic diagram
3. The complete type designation of your instrument
4. The serial No. of your instrument.

MOUNTED UNITS

Unit	Code No.
VCO I	901-165
VCO II	901-166
VCO III	901-167
Phase Detector I	901-168
Phase Detector III	901-170
Programmable Frequency Divider	901-171
Filter I	901-172
Mixer I	901-174
Frequency Divider I	901-178
AM-Modulator	901-179
Power Supply I	901-193
Crystal Oscillator	901-194
Power Supply II	901-243
Frequency Converter	901-256

Prescaler	901-257
Frequency Divider II	901-258
Frontpanel I	901-513
Frontpanel II	901-514
Frontpanel III	901-515
Frequency Range Control	901-516
Modulations Unit	901-517
Output Amplifier	901-180
Filter II	901-647
Mixer II	901-532
Phase Detector II	901-549

VCO I (901-165)

CAPACITORS

C 1	C Ceramic 3p30 p25 100V P100	213-202
C 2	C Ceramic 3p30 p25 100V P100	213-202
C 3	C Tantalum 10u 20% 16V	267-000
C 4	C Polyester 33n 10% 63V	241-059
C 5	C Ceramic 3p30 p25 100V P100	213-202
C 6	C Ceramic 3p30 p25 100V P100	213-202
C 7	C Ceramic 1n00 -20+80% 63V	213-013
C 8	C Ceramic 1n00 -20+80% 63V	213-013
C 9	C Ceramic 1n00 -20+80% 63V	213-013
C 10	C Ceramic 27p0 2% 100V NP0	213-207
C 12	C Ceramic 10n -20+80% 63V	213-027
C 13	C Ceramic 10n -20+80% 63V	213-027

DIODES

CR 1	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 2	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 3	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 4	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 5	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 6	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 7	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 8	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 9	Diode Hot Carrier 5082-2811 S 8V DO35	350-032
CR 10	Diode BAV10 Si Vr-60V If-600mA	350-022

CHOKES

L 1	Coil L1	740-064
L 2	Choke HF Mini 2U2 10% 1A 0.25 Ohm	703-051
L 3	Coil L3	740-065
L 4	Choke HF Mini 2U2 10% 1A 0.25 Ohm	703-051
L 5	Choke HF Mini 2U2 10% 1A 0.25 Ohm	703-051
L 6	Choke HF Mini 2U2 10% 1A 0.25 Ohm	703-051
L 7	Choke HF Mini 100U/10% 192MA	703-009
L 8	Ferrite Tube Diam. 1.2/3.7X3.2	704-305

TRANSISTORS

Q 1	Transistor 2XU1994N 30V 300mW TO-106	360-152
Q 2	Transistor 2XU1994N 30V 300mW TO-106	360-152
Q 3	Transistor BC557B pnp	360-160
Q 4	Transistor BC557B pnp	360-160
Q 5	Transistor BC547B npn	360-159
Q 6	Transistor BC547B npn	360-159
Q 7	Transistor BF959 npn	360-123
Q 8	Transistor BFW30 SI NPN 10V 50mA 250mW TO72	360-093
Q 9	Transistor BC547B npn	360-159
Q 10	Transistor BC557B pnp	360-160

RESISTORS

R 1	R Metal film 150K 5% 0.2W TC250	107-615
R 2	R Metal film 33K0 5% 0.2W TC250	107-533
R 3	R Metal film 1K80 5% 0.2W TC250	107-418
R 4	R Metal film 1K00 5% 0.2W TC250	107-410
R 5	R Metal film 220E 5% 0.2W TC250	107-322
R 6	R Metal film 4K70 5% 0.2W TC250	107-447
R 7	R Metal film 82K0 5% 0.2W TC250	107-582
R 8	R Metal film 82K0 5% 0.2W TC250	107-582
R 9	R Metal film 100E 5% 0.2W TC250	107-310
R 10	R Metal film 100E 5% 0.2W TC250	107-310
R 11	R Metal film 82K0 5% 0.2W TC250	107-582
R 12	R Metal film 82K0 5% 0.2W TC250	107-582
R 13	R Metal film 5K60 5% 0.2W TC250	107-456
R 14	R Metal film 3K90 5% 0.2W TC250	107-439
R 15	R Metal film 8K20 5% 0.2W TC250	107-482
R 16	R Metal film 1K00 5% 0.2W TC250	107-410
R 17	R Metal film 220E 5% 0.2W TC250	107-322
R 18	R Metal film 1K00 5% 0.2W TC250	107-410
R 19	R Metal film 100E 5% 0.2W TC250	107-310
R 20	R Metal film 150E 5% 0.2W TC250	107-315
R 21	R Metal film 1K80 5% 0.2W TC250	107-418
R 22	R Metal film 47E0 5% 0.2W TC250	107-247
R 23	R Metal film 560E 5% 0.2W TC250	107-356
R 24	R Metal film 3K90 5% 0.2W TC250	107-439
R 25	R Metal film 220E 5% 0.2W TC250	107-322
R 26	R Carbon 150E 5% 0.2W	106-315
R 27	R Metal film 120E 5% 0.2W TC250	107-312
R 28	R Metal film 33E0 5% 0.2W TC250	107-233
R 29	R Metal film 10K0 5% 0.2W TC250	107-510
R 30	R Metal film 1M00 5% 0.2W TC250	107-710
R 31	R Cermet Trimpot 22K 20% 0.3W TC70	182-303
R 32	R Metal film 1M00 5% 0.2W TC250	107-710
R 33	R Metal film 1M00 5% 0.2W TC250	107-710
R 34	R Metal film 15K0 5% 0.2W TC250	107-515
R 35	R Metal film 33E0 5% 0.2W TC250	107-233
R 36	R Metal film 39K0 5% 0.2W TC250	107-539

CABLES

W 1	Coax Cable W1	616-132
W 2	Coax Cable W2	616-133

MISCELLANEOUS

Solder sleeve	062-625
Coax Cable 50E	616-065
Enamelled Copper Wire Diam. 0.70	650-070
HF-Coilform Ceramic with Tuning Slug	700-105
Wire Wrap Terminal	805-727
PCB VCO I Issue 2	971-018

VCO II (901-166)

CAPACITORS

C 1	C Ceramic 4p7 +-P25 100V P100	213-109
C 2	C Ceramic 4p7 +-P25 100V P100	213-109
C 3	C Tantalum 10u 20% 16V	267-000
C 4	C Tantalum 47u 20% 6,3V	267-012
C 5	C Ceramic 4p7 +-P25 100V P100	213-109
C 6	C Ceramic 4p7 +-P25 100V P100	213-109
C 7	C Ceramic 1n00 -20+80% 63V	213-013
C 8	C Ceramic 1n00 -20+80% 63V	213-013
C 9	C Ceramic 1n00 -20+80% 63V	213-013
C 10	C Ceramic 27p0 2% 100V NP0	213-207
C 11	C Ceramic 1n00 -20+80% 63V	213-013
C 12	C Ceramic 10n -20+80% 63V	213-027

DIODES

CR 1	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 2	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 3	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 4	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 5	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 6	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 7	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 8	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 9	Diode Hot Carrier 5082-2811 S 8V DO35	350-032

CHOKES

L 1	Coil L1	740-062
L 2	Choke HF Mini 15u 10% 0.6A	703-082
L 3	Coil L3	740-063
L 4	Choke HF Mini 15u 10% 0.6A	703-082
L 5	Choke HF Mini 15u 10% 0.6A	703-082
L 6	Choke HF Mini 15u 10% 0.6A	703-082
L 7	Choke HF Mini 100U/10% 192MA	703-009
L 8	Ferrite Tube Diam. 1.2/3.7X3.2	704-305

TRANSISTORS

Q 1	Transistor 2XU1994N 30V 300mW TO-106	360-152
Q 2	Transistor 2XU1994N 30V 300mW TO-106	360-152
Q 3	Transistor BC557B pnp	360-160
Q 4	Transistor BC557B pnp	360-160
Q 5	Transistor BC547B npn	360-159
Q 6	Transistor BC547B npn	360-159
Q 7	Transistor BF959 npn	360-123
Q 8	Transistor BFW30 SI NPN 10V 50mA 250mW TO72	360-093
Q 9	Transistor BC547B npn	360-159
Q 10	Transistor BC557B pnp	360-160

RESISTORS

R 1	R Metal film 150K 5% 0.2W TC250	107-615
R 2	R Metal film 33K0 5% 0.2W TC250	107-533
R 3	R Metal film 1K80 5% 0.2W TC250	107-418
R 4	R Metal film 1K00 5% 0.2W TC250	107-410
R 5	R Metal film 470E 5% 0.2W TC250	107-347
R 6	R Metal film 1K00 5% 0.2W TC250	107-410
R 7	R Metal film 8K20 5% 0.2W TC250	107-482
R 8	R Metal film 8K20 5% 0.2W TC250	107-482
R 9	R Metal film 100E 5% 0.2W TC250	107-310
R 10	R Metal film 100E 5% 0.2W TC250	107-310
R 11	R Metal film 8K20 5% 0.2W TC250	107-482
R 12	R Metal film 8K20 5% 0.2W TC250	107-482
R 13	R Metal film 5K60 5% 0.2W TC250	107-456
R 14	R Metal film 3K90 5% 0.2W TC250	107-439
R 15	R Metal film 8K20 5% 0.2W TC250	107-482
R 16	R Metal film 1K00 5% 0.2W TC250	107-410
R 17	R Metal film 220E 5% 0.2W TC250	107-322
R 18	R Metal film 1K00 5% 0.2W TC250	107-410
R 19	R Metal film 100E 5% 0.2W TC250	107-310
R 20	R Metal film 100E 5% 0.2W TC250	107-310
R 21	R Metal film 1K80 5% 0.2W TC250	107-418
R 22	R Metal film 47E0 5% 0.2W TC250	107-247
R 23	R Metal film 560E 5% 0.2W TC250	107-356
R 24	R Metal film 3K90 5% 0.2W TC250	107-439
R 25	R Metal film 220E 5% 0.2W TC250	107-322
R 26	R Carbon 150E 5% 0.2W	106-315
R 27	R Metal film 47E0 5% 0.2W TC250	107-247
R 28	R Metal film 47E0 5% 0.2W TC250	107-247
R 29	R Metal film 10K0 5% 0.2W TC250	107-510
R 30	R Metal film 1M00 5% 0.2W TC250	107-710
R 31	R Cermet Trimpot 22K 20% 0.3W TC70	182-303
R 32	R Metal film 1M00 5% 0.2W TC250	107-710
R 33	R Metal film 1M00 5% 0.2W TC250	107-710
R 34	R Metal film 18K0 5% 0.2W TC250	107-518
R 35	R Metal film 33E0 5% 0.2W TC250	107-233
R 36	R Metal film 8K20 5% 0.2W TC250	107-482

CABLES

W 1	Coax Cable W1	616-131

MISCELLANEOUS

Solder sleeve	062-625
Coax Cable 50E	616-065
Enamelled Copper Wire Diam. 0.70	650-070
HF-Coilform Ceramic with Tuning Slug	700-105
Wire Wrap Terminal	805-727

VCO III (901-167)

CAPACITORS

C 1	C Ceramic 3p3 +-P25 100V P100	213-107
C 2	C Ceramic 3p3 +-P25 100V P100	213-107
C 3	C Tantalum 10u 20% 16V	267-000
C 4	C Ceramic 1n -20+80% 63V	213-024
C 5	C Ceramic 1n -20+80% 63V	213-024
C 6	C Ceramic 1n -20+80% 63V	213-024
C 7	C Tantalum 100u 20% 3V	267-011
C 8	C Ceramic 1n -20+80% 63V	213-024
C 9	C Ceramic 27p 2% 100V NP0	213-118

DIODES

CR 1	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 2	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 3	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 4	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 5	Diode Hot Carrier 5082-2811 S 8V DO35	350-032

CHOKES

L 2	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020
L 3	Coil T300	740-061
L 4	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020
L 5	Choke HF Mini 100U/10% 192MA	703-009

TRANSISTORS

Q 1	Transistor 2XU1994N 30V 300mW TO-106	360-152
Q 2	Transistor BF959 npn	360-123
Q 3	Transistor BFW30 SI NPN 10V 50mA 250mW TO72	360-093
Q 4	Transistor BC547B npn	360-159
Q 5	Transistor BC557B pnp	360-160

RESISTORS

R 1	R Metal film 330E 5% 0.2W TC250	107-333
R 2	R Metal film 82K0 5% 0.2W TC250	107-582
R 3	R Metal film 82K0 5% 0.2W TC250	107-582
R 4	R Metal film 3K90 5% 0.2W TC250	107-439
R 5	R Metal film 5K60 5% 0.2W TC250	107-456
R 6	R Metal film 2K20 5% 0.2W TC250	107-422
R 7	R Metal film 100K 5% 0.2W TC250	107-610
R 8	R Cermet Trimpot 47K 20% 0.5W TC150	182-010
R 9	R Metal film 100E 5% 0.2W TC250	107-310
R 10	R Metal film 1K80 5% 0.2W TC250	107-418
R 11	R Metal film 47E0 5% 0.2W TC250	107-247
R 12	R Metal film 330E 5% 0.2W TC250	107-333
R 13	R Metal film 3K90 5% 0.2W TC250	107-439
R 14	R Metal film 560E 5% 0.2W TC250	107-356
R 15	R Carbon Film 180E 5% 0.2W	106-318

R 16	R Metal film 47E0 5% 0.2W TC250	107-247
R 17	R Metal film 1M00 5% 0.2W TC250	107-710
R 18	R Metal film 100E 5% 0.2W TC250	107-310
R 19	R Metal film 56K0 5% 0.2W TC250	107-556
R 20	R Metal film 56K0 5% 0.2W TC250	107-556
R 21	R Metal film 3K30 5% 0.2W TC250	107-433
R 22	R Metal film 220K 5% 0.2W TC250	107-622
R 23	R Metal film 1M00 5% 0.2W TC250	107-710
R 24	R Metal film 10K0 5% 0.2W TC250	107-510

MISCELLANEOUS

Wire Wrap Terminal	805-727
PCB VCO III Issue 3	971-020

PHASE DETECTOR I (901-168)

CAPACITORS

C 1	C Ceramic 1n00 -20+80% 63V	213-013
C 2	C Ceramic 2n20 -20+80% 63V	213-012
C 3	C Ceramic 2p70 p25 100V NPO	213-201
C 4	C Ceramic 1n00 -20+80% 63V	213-013
C 5	C Ceramic 1n00 -20+80% 63V	213-013
C 6	C Ceramic 1n00 -20+80% 63V	213-013
C 7	C Ceramic 5p60 p25 100V NPO	213-226
C 8	C Ceramic 10n0 -20+80% 63V	213-020
C 9	C Ceramic 1n00 -20+80% 63V	213-013
C 10	C Ceramic 1n00 -20+80% 63V	213-013
C 11	C Ceramic 1n00 -20+80% 63V	213-013
C 12	C Ceramic 1n00 -20+80% 63V	213-013
C 13	C Ceramic 5p60 p25 100V NPO	213-226
C 14	C Ceramic 68p0 2% 100V NP0	213-215
C 15	C Ceramic 68p0 2% 100V NP0	213-215
C 16	C Ceramic 470p 20% 100V	213-014
C 17	C Polystyrol 6n 2% 63V	243-016
C 18	C Polystyrol 6n 2% 63V	243-016
C 19	C Ceramic 10p0 2% 100V NP0	213-205
C 20	C Ceramic 39p0 2% 100V NP0	213-232
C 21	C Ceramic 1n00 -20+80% 63V	213-013
C 22	C Ceramic 3p90 p25 100V NP0	213-223
C 23	C Ceramic 39p0 2% 100V NP0	213-232
C 24	C Ceramic 22p0 2% 100V NP0	213-206
C 25	C Tantal 15u 20% 35V	267-008
C 26	C Ceramic 12p0 p25 100V NPO	213-227
C 27	C Ceramic 470p 20% 100V	213-014
C 28	C Ceramic 1n00 -20+80% 63V	213-013
C 29	C Ceramic 22n0 -20+80% 63V	213-011
C 30	C Caramic 47n -20+80% 30V	213-016
C 31	C Tantal 15u 20% 35V	267-008
C 32	C Polyst 2n00 1% 63V	243-106
C 33	C Ceramic 15p0 2% 100V NP0	213-216
C 34	C Tantal 15u 20% 35V	267-008
C 35	C Caramic 47n -20+80% 30V	213-016
C 36	C Ceramic 2n20 -20+80% 63V	213-012
C 37	C Polystyrol 695p 1% 63V	243-098
C 38	C Ceramic 1n00 -20+80% 63V	213-013
C 39	C Ceramic 1n00 -20+80% 63V	213-013
C 40	C Ceramic 1n00 -20+80% 63V	213-013
C 41	C Ceramic 1n00 -20+80% 63V	213-013
C 42	C Ceramic 1p5 +-P25 100V P100	213-221
C 43	C Ceramic 1n00 -20+80% 63V	213-013

DIODES

CR 1	Diode zener BZX79-C9V1 0.4W	350-606
CR 2	Diode zener BZX79-C9V1 0.4W	350-606
CR 3	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 4	Diode zener BZX79-C3V3 0.4W	350-625
CR 5	Diode zener BZX79-C6V8 0.4W	350-627
CR 6	Diode BAV10 Si Vr-60V If-600mA	350-022

CHOKES

L 1	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020
L 2	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020
L 3	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020
L 5	Ferrite Tube Diam. 1.2/3.7X3.2	704-305
L 6	Ferrite Tube Diam. 1.2/3.7X3.2	704-305

TRANSISTORS

Q 1	Transistor BF959 npn	360-123
Q 2	Transistor BF959 npn	360-123
Q 3	Transistor BF959 npn	360-123
Q 4	Transistor BC557B pnp	360-160
Q 5	Transistor BC557B pnp	360-160
Q 6	Transistor BC547B npn	360-159
Q 7	Transistor BC547B npn	360-159
Q 8	Transistor BC547B npn	360-159
Q 9	Transistor BFR99 SI PNP 25V 50mA 225mW TO72	360-189
Q 10	Transistor BFY90 SI NPN 15V 25mA 200mW TO72	360-071
Q 11	Transistor PN4416 Jfet UHF	360-108
Q 12	Transistor BC547B npn	360-159
Q 13	Transistor BFW30 SI NPN 10V 50mA 250mW TO72	360-093
Q 14	Transistor BC547B npn	360-159
Q 15	Transistor BF959 npn	360-123
Q 16	Transistor BC557B pnp	360-160

INTEGRATED ANALOG CIRCUITS

QA 1	IC S042P Mixer	364-152
QA 2	IC S042P Mixer	364-152
QA 3	IC LM301AH OP-AMP	364-016

RESISTORS

R 1	R Metal film 56E0 5% 0.2W TC250	107-256
R 2	R Metal film 22E0 5% 0.2W TC250	107-222
R 3	R Metal film 8K20 5% 0.2W TC250	107-482
R 4	R Metal film 56E0 5% 0.2W TC250	107-256
R 5	R Metal film 2K70 5% 0.2W TC250	107-427
R 6	R Metal film 3K30 5% 0.2W TC250	107-433
R 7	R Metal film 270E 5% 0.2W TC250	107-327
R 8	R Metal film 150E 5% 0.2W TC250	107-315
R 9	R Metal film 100E 5% 0.2W TC250	107-310
R 11	R Metal film 10E0 5% 0.2W TC250	107-210

R 13	R Metal Film 10K0 1% 0.5W TC50	115-100
R 14	R Metal Film 7K32 1% 0.5W TC50	114-732
R 15	R Metal film 100E 5% 0.2W TC250	107-310
R 16	R Metal film 100E 5% 0.2W TC250	107-310
R 17	R Metal film 10K0 5% 0.2W TC250	107-510
R 18	R Metal film 330E 5% 0.2W TC250	107-333
R 19	R Metal Film 10K0 1% 0.5W TC50	115-100
R 20	R Metal film 12K0 5% 0.2W TC250	107-512
R 21	R Metal Film 12K1 1% 0.5W TC50	115-121
R 22	R Metal film 100E 5% 0.2W TC250	107-310
R 23	R Metal film 5K60 5% 0.2W TC250	107-456
R 24	R Metal film 10K0 5% 0.2W TC250	107-510
R 25	R Metal Film 15K0 1% 0.5W TC50	115-150
R 26	R Metal Film 27K 0.5% 1/8W TC50	140-451
R 27	R Metal Film 27K 0.5% 1/8W TC50	140-451
R 28	R Metal Film 32K4 0.5% 0.5W TC50	140-856
R 29	R Metal film 39K0 5% 0.2W TC250	107-539
R 30	R Metal film 680E 5% 0.2W TC250	107-368
R 31	R Metal film 8K20 5% 0.2W TC250	107-482
R 32	R Metal film 100K 5% 0.2W TC250	107-610
R 33	R Cermet Trimpot 47K 20% 0.5W TC150	182-010
R 34	R Carbon Film 22E 5% 0.2W	106-222
R 35	R Carbon Film 2K7 5% 0.2W	106-427
R 36	R Metal film 56E0 5% 0.2W TC250	107-256
R 37	R Metal film 10K0 5% 0.2W TC250	107-510
R 38	R Metal film 150E 5% 0.2W TC250	107-315
R 39	R Metal film 560E 5% 0.2W TC250	107-356
R 40	R Metal film 22K0 5% 0.2W TC250	107-522
R 41	R Metal film 100E 5% 0.2W TC250	107-310
R 42	R Metal film 82E0 5% 0.2W TC250	107-282
R 43	R Metal film 1K50 5% 0.2W TC250	107-415
R 44	R Carbon Film 22E 5% 0.2W	106-222
R 45	R Metal film 100E 5% 0.2W TC250	107-310
R 46	R Metal film 1K20 5% 0.2W TC250	107-412
R 47	R Metal film 1M00 5% 0.2W TC250	107-710
R 48	R Metal film 1M00 5% 0.2W TC250	107-710
R 49	R Metal film 22K0 5% 0.2W TC250	107-522
R 50	R Metal film 470K 5% 0.2W TC250	107-647
R 51	R Metal film 220K 5% 0.2W TC250	107-622
R 52	R Carbon Film 220E 5% 0.2W	106-322
R 53	R Metal film 390E 5% 0.2W TC250	107-339
R 54	R Metal film 5K60 5% 0.2W TC250	107-456
R 55	R Metal film 1K00 5% 0.2W TC250	107-410
R 56	R Metal film 2K20 5% 0.2W TC250	107-422
R 58	R Metal film 22E0 5% 0.2W TC250	107-222
R 59	R Metal film 2K20 5% 0.2W TC250	107-422
R 60	R Metal film 5K60 5% 0.2W TC250	107-456
R 61	R Metal film 56E0 5% 0.2W TC250	107-256
R 62	R Metal film 100K 5% 0.2W TC250	107-610
R 63	R Metal film 22K0 5% 0.2W TC250	107-522
R 64	R Metal film 22K0 5% 0.2W TC250	107-522
R 65	R Metal film 120K 5% 0.2W TC250	107-612

MISCELLANEOUS

	Solder sleeve	062-625
	Coax Cable 50E	616-064
	Enamelled Copper Wire Diam. 0.20	650-020
	Filter Kit, Complete	720-038
	Wire Wrap Terminal	805-727
	PCB Phase Detector I Issue 2	971-021
L 4*	Coil L4	740-060
W 1*	Coax Cable W1	616-129
W 2*	Coax Cable W2	616-130

PHASE DETECTOR III (901-170)

CAPACITORS

C 1	C Ceramic 1n -20+80% 63V	213-024
C 2	C Ceramic u1 -20+80% 30V	213-009
C 3	C Ceramic 22n -20+80% 63V	213-028
C 4	C Ceramic 4n7 -20+80% 63V	213-026
C 5	C Tantalum 10u 20% 16V	267-000
C 6	C Tantalum 10u 20% 16V	267-000
C 7	C Ceramic 4n7 -20+80% 63V	213-026
C 8	C Polycarbonate 10u 5% 63V 150PPM	242-005
C 9	C Tantalum 10u 20% 16V	267-000
C 10	C Tantalum 10u 20% 16V	267-000
C 11	C Tantalum 22u 20% 16V	267-019
C 12	C Tantalum 10u 20% 16V	267-000
C 13	C Ceramic u1 -20+80% 30V	213-009

DIODES

CR 1	Diode Hot Carrier 5082-2811 S 8V DO35	350-032
CR 2	Diode Hot Carrier 5082-2811 S 8V DO35	350-032
CR 3	Diode Hot Carrier 5082-2811 S 8V DO35	350-032
CR 4	Diode Hot Carrier 5082-2811 S 8V DO35	350-032
CR 5	Diode BAV45 Si Vr-20V If-50mA	350-432
CR 6	Diode zener BZX79-C7V5 0.4W	350-621
CR 7	Diode zener BZX79-C6V2 0.4W	350-604

CHOKES

L 1	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020
L 2	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020
L 3	Choke HF Mini 2u2 10% 1A 0. 25ohm	703-011

TRANSISTORS

Q 1	Transistor BC547B npn	360-159
Q 2	Transistor BC547B npn	360-159
Q 3	Transistor BC547B npn	360-159
Q 4	Transistor BC557B pnp	360-160
Q 5	Transistor BC557B pnp	360-160
Q 6	Transistor BC547B npn	360-159
Q 7	Transistor 2N5524N 40V 375mW TO71	360-202
Q 8	Transistor BC557B pnp	360-160
Q 9	Transistor BC547B npn	360-159
Q 10	Transistor BC547B npn	360-159
Q 11	Transistor BC557B pnp	360-160
Q 12	Transistor BC557B pnp	360-160
Q 13	Transistor BC547B npn	360-159
Q 14	Transistor BC547B npn	360-159

INTEGRATED DIGITAL CIRCUITS

QD 1	IC 10116 tripl line rec.	364-331
QD 2	IC 10138 dec counter	364-324
QD 3	IC 74LS93 bin counter	364-220
QD 4	IC MC14568 Phase com. and prog. Counter	364-327

RESISTORS

R 1	R Metal film 100E 5% 0.2W TC250	107-310
R 2	R Metal film 100E 5% 0.2W TC250	107-310
R 3	R Metal film 100E 5% 0.2W TC250	107-310
R 4	R Metal film 220E 5% 0.2W TC250	107-322
R 5	R Metal film 220E 5% 0.2W TC250	107-322
R 6	R Metal film 2K70 5% 0.2W TC250	107-427
R 7	R Metal film 100E 5% 0.2W TC250	107-310
R 8	R Metal film 15K0 5% 0.2W TC250	107-515
R 9	R Metal film 6K80 5% 0.2W TC250	107-468
R 10	R Metal film 470E 5% 0.2W TC250	107-347
R 11	R Metal film 220E 5% 0.2W TC250	107-322
R 12	R Metal film 33K0 5% 0.2W TC250	107-533
R 13	R Metal film 5K60 5% 0.2W TC250	107-456
R 14	R Metal film 2K20 5% 0.2W TC250	107-422
R 15	R Metal film 22K0 5% 0.2W TC250	107-522
R 16	R Metal film 6K80 5% 0.2W TC250	107-468
R 17	R Metal film 6K80 5% 0.2W TC250	107-468
R 18	R Metal film 5K60 5% 0.2W TC250	107-456
R 20	R Metal film 1K00 5% 0.2W TC250	107-410
R 21	R Carbon Film 15M 10% 1/8W 140PPM	109-016
R 22	R Metal film 1K00 5% 0.2W TC250	107-410
R 23	R Metal film 33E0 5% 0.2W TC250	107-233
R 24	R Metal film 33E0 5% 0.2W TC250	107-233
R 25	R Metal film 2K70 5% 0.2W TC250	107-427
R 26	R Metal film 270E 5% 0.2W TC250	107-327
R 27	R Metal film 82K0 5% 0.2W TC250	107-582
R 28	R Metal film 18K0 5% 0.2W TC250	107-518
R 29	R Metal film 2K70 5% 0.2W TC250	107-427
R 30	R Metal film 220E 5% 0.2W TC250	107-322
R 31	R Metal film 2K70 5% 0.2W TC250	107-427
R 32	R Metal film 5K60 5% 0.2W TC250	107-456
R 33	R Metal film 5K60 5% 0.2W TC250	107-456
R 34	R Metal film 5K60 5% 0.2W TC250	107-456
R 35	R Metal film 12K0 5% 0.2W TC250	107-512
R 37	R Metal film 180E 5% 0.2W TC250	107-318
R 38	R Metal film 22K0 5% 0.2W TC250	107-522
R 40	R Metal film 2K70 5% 0.2W TC250	107-427
R 41	R Metal film 2K70 5% 0.2W TC250	107-427
R 42	R Metal film 2K70 5% 0.2W TC250	107-427
R 43	R Metal film 2K70 5% 0.2W TC250	107-427
R 44	R Metal film 2K70 5% 0.2W TC250	107-427
R 45	R Metal film 10K0 5% 0.2W TC250	107-510
R 46	R Metal film 10K0 5% 0.2W TC250	107-510
R 47	R Metal film 1M00 5% 0.2W TC250	107-710
R 48	R Metal film 10K0 5% 0.2W TC250	107-510

R 49	R Metal film 39K0 5% 0.2W TC250	107-539
R 50	R Metal film 56K0 5% 0.2W TC250	107-556
R 51	R Metal film 330K 5% 0.2W TC250	107-633
R 52	R Metal film 4K70 5% 0.2W TC250	107-447
R 53	R Metal film 3K90 5% 0.2W TC250	107-439
R 55	R Cermet Trimpot 22K 20% 0.3W TC70	182-303
R 56	R Metal film 15K0 5% 0.2W TC250	107-515
R 57	R Metal film 22K0 5% 0.2W TC250	107-522
R 58	R Metal film 10K0 5% 0.2W TC250	107-510

MISCELLANEOUS

Wire Wrap Terminal	805-727
Teflon Insulator (Diam. 4.4)	823-904
PCB Phase Detector III Issue 3	971-023

PROGRAMMABLE FREQUENCY DIVIDER (901-171)

CAPACITORS

C 1	C Ceramic 1n -20+80% 63V	213-024
C 2	C Ceramic 1n -20+80% 63V	213-024
C 3	C Ceramic 1n -20+80% 63V	213-024
C 4	C Ceramic 22n -20+80% 63V	213-028
C 5	C Ceramic 1n -20+80% 63V	213-024
C 6	C Ceramic 1n -20+80% 63V	213-024
C 7	C Ceramic u1 -20%+80% 12V	213-017
C 8	C Tantal 68u 20% 16V	267-015

DIODES

CR 1	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 2	Diode BAV10 Si Vr-60V If-600mA	350-022

CHOKES

L 1	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020
L 2	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020

TRANSISTORS

Q 1	Transistor BF959 npn	360-123
Q 2	Transistor BF959 npn	360-123
Q 3	Transistor BF959 npn	360-123

INTEGRATED DIGITAL CIRCUITS

QD 1	IC S89 Programmable Divider	364-457
QD 2	IC HEF4522BP Programmable 4-bit BCD down counter	364-325
QD 3	IC HEF4522BP Programmable 4-bit BCD down counter	364-325
QD 4	IC 4078 8-input NOR gate	364-268
QD 5	IC HEF4522BP Programmable 4-bit BCD down counter	364-325
QD 6	IC HEF4522BP Programmable 4-bit BCD down counter	364-325
QD 7	IC HEF4522BP Programmable 4-bit BCD down counter	364-325
QD 8	IC HEF4522BP Programmable 4-bit BCD down counter	364-325
QD 9	IC HEF4522BP Programmable 4-bit BCD down counter	364-325

RESISTORS

R 1	R Metal film 47E0 5% 0.2W TC250	107-247
R 2	R Metal film 470E 5% 0.2W TC250	107-347
R 3	R Metal film 1K80 5% 0.2W TC250	107-418
R 4	R Metal film 47E0 5% 0.2W TC250	107-247
R 5	R Metal film 1K20 5% 0.2W TC250	107-412
R 6	R Metal film 680E 5% 0.2W TC250	107-368
R 7	R Metal film 180E 5% 0.2W TC250	107-318
R 8	R Metal film 470E 5% 0.2W TC250	107-347
R 9	R Metal film 470E 5% 0.2W TC250	107-347
R 10	R Metal film 560E 5% 0.2W TC250	107-356
R 11	R Metal film 47E0 5% 0.2W TC250	107-247

R 12	R Carbon Film 22E 5% 0.2W	106-222
R 13	R Metal film 2K70 5% 0.2W TC250	107-427
R 14	R Metal film 3K30 5% 0.2W TC250	107-433
R 15	R Metal film 5K60 5% 0.2W TC250	107-456
R 16	R Metal film 12K0 5% 0.2W TC250	107-512

MISCELLANEOUS

	Solder sleeve	062-625
	Coax Cable 50E	616-064
	Ferrite Tube Diam. 1.2/3.7X3.2	704-305
	Wire Wrap Terminal	805-727
	PCB Program. Freq. Div. Issue 2	971-024
W 1*	Coax Cable W1	616-143

FILTER I (901-172)

CAPACITORS

C 1	C Ceramic Chip 180p 10% 25V NPO	213-608
C 2	C Ceramic 8p2 +-P25 100V NPO	213-112
C 3	C Ceramic Chip 270p 10% 25V NPO	213-609
C 4	C Ceramic 27p 2% 100V NP0	213-118
C 5	C Ceramic Chip 270p 10% 25V NPO	213-609
C 6	C Ceramic 47p 2% 100V NP0	213-121
C 7	C Ceramic Chip 150p 10% 25V NPO	213-607

CHOKES

L 4	Ferrite Tube Diam. 1.2/3.7X3.2	704-305

MISCELLANEOUS

	Solder sleeve	062-625
	Coax Cable 50E	616-065
	Enamelled Copper Wire Diam. 0.20	650-020
	Coil Form	700-107
	Coil Screen Cup	700-108
	Trimcore	704-153
	Wire Wrap Terminal	805-727
	EPDM rubber black 02x1,5	840-027
	PCB Band Pass Filter I Issue 3	971-025
L 1*	Coil L1	740-057
L 2*	Coil L2	740-058
L 3*	Coil L3	740-059
W 2*	Coax Cable W2	616-127

MIXER I (901-174)

CAPACITORS

C 1	C Ceramic 1n00 -20+80% 63V	213-013
C 2	C Ceramic 1n00 -20+80% 63V	213-013
C 3	C Ceramic 1n00 -20+80% 63V	213-013
C 4	C Ceramic 1n00 -20+80% 63V	213-013
C 5	C Ceramic 1n00 -20+80% 63V	213-013
C 6	C Ceramic 1n00 -20+80% 63V	213-013
C 7	C Ceramic 27p0 2% 100V NP0	213-207
C 8	C Ceramic 27p0 2% 100V NP0	213-207
C 9	C Ceramic 18p0 2% 100V NP0	213-222
C 10	C Ceramic 1n00 -20+80% 63V	213-013

CHOKES

L 1	Ferrite Tube diam. 1.2/3.7x3.2	740-305

TRANSISTORS

Q 1	Transistor BFR90 npn	360-147
Q 2	Transistor BF959 npn	360-123

RESISTORS

R 1	R Metal film 56E0 5% 0.2W TC250	107-256
R 2	R Metal film 270E 5% 0.2W TC250	107-327
R 3	R Metal film 1K80 5% 0.2W TC250	107-418
R 4	R Metal film 470E 5% 0.2W TC250	107-347
R 5	R Metal film 56E0 5% 0.2W TC250	107-256
R 6	R Metal film 220E 5% 0.2W TC250	107-322
R 7	R Metal film 56E0 5% 0.2W TC250	107-256
R 8	R Metal film 56E0 5% 0.2W TC250	107-256
R 9	R Metal film 1K20 5% 0.2W TC250	107-412
R 10	R Metal film 5K60 5% 0.2W TC250	107-456
R 11	R Metal film 5K60 5% 0.2W TC250	107-456
R 12	R Metal film 100E 5% 0.2W TC250	107-310

MIXERS

U 1	Double Balanced Mixer 1-500MHZ SBL-1	910-120

MISCELLANEOUS

	Solder sleeve	062-625
	Coax Cable 50E	616-064
	Enamelled Copper Wire diam. 0.50	650-050
	Wire Wrap Terminal	805-727
	PCB Mixer I Issue 2	971-027
L 2*	Coil L2	740-053
W 2*	Coax Cable W2	616-053

FREQUENCY DIVIDER I (901-178)

CAPACITORS

C 1	C Ceramic 1n00 -20+80% 63V	213-013
C 2	C Ceramic 1n00 -20+80% 63V	213-013
C 4	C Tantalum 47u 20% 6,3V	267-012
C 5	C Ceramic 1n00 -20+80% 63V	213-013
C 6	C Ceramic 1n00 -20+80% 63V	213-013
C 7	C Ceramic 68p0 2% 100V NP0	213-215
C 8	C Ceramic 12p0 p25 100V NPO	213-227
C 9	C Ceramic 82p0 2% 100V NPO	213-229
C 10	C Ceramic 47p0 2% 100V NP0	213-209
C 11	C Ceramic 33p0 2% 100V NP0	213-208
C 12	C Ceramic 120p 2% 100V NPO	213-230
C 13	C Ceramic 39p0 2% 100V NP0	213-232
C 14	C Ceramic 270p 2% 100V N750	213-213
C 15	C Ceramic 39p0 2% 100V NP0	213-232
C 16	C Ceramic 120p 2% 100V NPO	213-230
C 17	C Ceramic 1n00 -20+80% 63V	213-013
C 18	C Ceramic 10p0 2% 100V NP0	213-205

DIODES

CR 1	Diode BA389 pin Vr-30 If-20mA	350-038
CR 2	Diode BA482 Si Vr-35V If-100mA	350-054
CR 3	Diode BA389 pin Vr-30 If-20mA	350-038
CR 5	Diode BA389 pin Vr-30 If-20mA	350-038
CR 6	Diode BA389 pin Vr-30 If-20mA	350-038
CR 7	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 8	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 9	Diode BA389 pin Vr-30 If-20mA	350-038
CR 10	Diode BA389 pin Vr-30 If-20mA	350-038
CR 11	Diode BA482 Si Vr-35V If-100mA	350-054
CR 12	Diode BA389 pin Vr-30 If-20mA	350-038
CR 13	Diode BA389 pin Vr-30 If-20mA	350-038

CHOKES

L 1	Choke HF mini u15 20% 1A 0,1 ohm	703-033
L 2	Choke HF Mini U1 20% 1.1A 0.11 Ohm	703-032
L 3	Choke HF Mini 1U 630mA 0.25 Ohm	703-030
L 4	Choke HF Mini 1U 630mA 0.25 Ohm	703-030

INTEGRATED ANALOG CIRCUITS

QA 1	IC OM335 Hybrid VHF/UHF Amplifier	364-476

INTEGRATED DIGITAL CIRCUITS

QD 1	IC 10138 dec counter	364-324

RESISTORS

R 1	R Metal film 1K80 5% 0.2W TC250	107-418
R 2	R Metal film 560E 5% 0.2W TC250	107-356
R 3	R Metal film 560E 5% 0.2W TC250	107-356
R 4	R Metal film 1K00 5% 0.2W TC250	107-410
R 5	R Metal film 560E 5% 0.2W TC250	107-356
R 6	R Metal film 150E 5% 0.2W TC250	107-315
R 7	R Metal film 68E0 5% 0.2W TC250	107-268
R 8	R Metal film 22K0 5% 0.2W TC250	107-522
R 9	R Metal film 27K0 5% 0.2W TC250	107-527
R 10	R Metal film 3K30 5% 0.2W TC250	107-433
R 11	R Metal film 10K0 5% 0.2W TC250	107-510
R 12	R Metal film 2K20 5% 0.2W TC250	107-422
R 13	R Metal film 2K70 5% 0.2W TC250	107-427
R 14	R Metal film 47K0 5% 0.2W TC250	107-547
R 15	R Metal film 39E0 5% 0.2W TC250	107-239
R 16	R Metal film 100E 5% 0.2W TC250	107-310
R 17	R Metal film 3K30 5% 0.2W TC250	107-433
R 18	R Metal film 270E 5% 0.2W TC250	107-327
R 19	R Metal film 1K50 5% 0.2W TC250	107-415
R 20	R Metal film 1K50 5% 0.2W TC250	107-415
R 21	R Metal film 100K 5% 0.2W TC250	107-610
R 22	R Carbon Film 120E 5% 0.2W	106-312
R 23	R Metal film 68E0 5% 0.2W TC250	107-268

MISCELLANEOUS

	Soldering lug 3,2x12	061-132
	Solder sleeve	062-625
	Coax Cable 50E	616-064
	Coax Cable 50E	616-065
	Wire Wrap Terminal	805-727
	PCB Frequency Divider I Issue 2	971-031
W 1*	Coax Cable W1	616-121
W 2*	Coax Cable W2	616-122

AM-MODULATOR (901-179)

CAPACITORS

C 1	C Ceramic 1n -20+80% 63V	213-024
C 2	C Ceramic 1n -20+80% 63V	213-024
C 3	C Tantalum 4u7 20% 25V	267-004
C 4	C Tantalum 4u7 20% 25V	267-004
C 5	C Tantalum 22u 20% 16V	267-019
C 6	C Ceramic 1n -20+80% 63V	213-024
C 7	C Ceramic 1n -20+80% 63V	213-024
C 8	C Ceramic 4n7 -20+80% 63V	213-026
C 9	C Ceramic 1p5 +-P25 100V P100	213-103
C 10	C Ceramic 1n -20+80% 63V	213-024

DIODES

CR 1	Diode BA389 pin Vr-30 If-20mA	350-038
CR 2	Diode BA389 pin Vr-30 If-20mA	350-038
CR 3	Diode BA389 pin Vr-30 If-20mA	350-038
CR 4	Diode BA389 pin Vr-30 If-20mA	350-038
CR 5	Diode BA389 pin Vr-30 If-20mA	350-038

CHOKES

L 1	Choke HF Mini 100U/10% 192MA	703-009
L 2	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020

TRANSISTORS

Q 1	Transistor BF959 npn	360-123
Q 2	Transistor BFW30 SI NPN 10V 50mA 250mW TO72	360-093
Q 3	Transistor BF959 npn	360-123

RESISTORS

R 1	R Metal film 100E 5% 0.2W TC250	107-310
R 2	R Metal film 22K0 5% 0.2W TC250	107-522
R 3	R Metal film 8K20 5% 0.2W TC250	107-482
R 4	R Metal film 39K0 5% 0.2W TC250	107-539
R 5	R Metal film 1K80 5% 0.2W TC250	107-418
R 6	R Metal film 150E 5% 0.2W TC250	107-315
R 7	R Metal film 470E 5% 0.2W TC250	107-347
R 8	R Metal film 3K90 5% 0.2W TC250	107-439
R 9	R Metal film 560E 5% 0.2W TC250	107-356
R 10	R Metal film 180E 5% 0.2W TC250	107-318
R 11	R Metal film 1K80 5% 0.2W TC250	107-418
R 12	R Metal film 2K70 5% 0.2W TC250	107-427
R 13	R Metal film 680E 5% 0.2W TC250	107-368
R 14	R Metal film 560E 5% 0.2W TC250	107-356
R 15	R Metal film 47E0 5% 0.2W TC250	107-247
R 16	R Metal film 1K80 5% 0.2W TC250	107-418
R 17	R Metal film 1K00 5% 0.2W TC250	107-410
R 18	R Metal film 56K0 5% 0.2W TC250	107-556

MISCELLANEOUS

	Solder sleeve	062-625
	Coax Cable 50E	616-064
	Coax Cable 50E	616-065
	Wire Wrap Terminal	805-727
	EPDM rubber black 02x1,5	840-027
	PCB AM-Modulator Issue 1	971-032
W 1*	Coax Cable W1	616-118
W 2*	Coax Cable W2	616-119
W 3*	Coax Cable W3	616-120

POWER SUPPLY I (901-193)

CAPACITORS

C 1	C Electrolytic 2200u 40V	260-053
C 2	C Electrolytic 2200u 40V	260-053
C 3	C Electrolytic 220u 63V	260-017
C 4	C Electrolytic 220u 63V	260-017
C 5	C Electrolytic 220u 63V	260-017
C 6	C Electrolytic 220u 63V	260-017
C 7	C Electrolytic 10u 40V	260-012
C 8	C Electrolytic 10u 40V	260-012
C 9	C Electrolytic 10u 40V	260-012
C 10	C Electrolytic 10u 40V	260-012
C 11	C Electrolytic 10000u 16V	260-064
C 12	C Electrolytic 4700u 16V	260-055
C 13	C Electrolytic 220u 63V	260-017

DIODES

CR 1	Bridge Rectifier 2KBB20R	340-208
CR 2	Bridge Rectifier 2KBB20R	340-208
CR 3	Bridge Rectifier 2KBB20R	340-208
CR 4	Bridge Rectifier B40C5000/3300	340-209
CR 5	Bridge Rectifier B40C5000/3300	340-209
CR 6	Diode 1N4002 Si Vr-100V If-1A	350-409
CR 7	Diode 1N4002 Si Vr-100V If-1A	350-409

RESISTORS

R 1	R Metal Film 221E 1% 0.5W TC50	113-221
R 2	R Metal Film 4K99 1% 0.5W TC50	114-499
R 3	R Metal Film 3K16 1% 0.5W TC50	114-316
R 4	R Metal Film 226E 1% 0.5W TC50	113-226
R 5	R var 4K7 20% 0.5w	182-002
R 6	R Metal Film 30K1 1% 0.5W TC50	115-301
R 7	R var 4K7 20% 0.5w	182-002
R 8	R Metal Film 46K4 1% 0.5W TC50	115-464

MISCELLANEOUS

Screw pozidriv panhead M3x6	008-306
Nut hexagon M3	031-302
Threaded socket M3x40	037-340
Wire Wrap Terminal	805-727
Terminal Strip 10P AMP	805-907
TY-Wrap 150X3.6mm	832-200
Attachment for TY-Wrap	832-204
PCB Power Supply Issue 5	971-044

CRYSTAL OSCILLATOR (901-194)

CAPACITORS

C 1	C Ceramic 1n00 -20+80% 63V	213-013
C 2	C Ceramic 22p0 2% 100V NP0	213-206
C 3	C Ceramic 18p0 2% 100V NP0	213-222
C 4	C Ceramic 68p0 2% 100V NP0	213-215
C 5	C Ceramic 82p0 2% 100V NPO	213-229
C 6	C Ceramic 82p0 2% 100V NPO	213-229
C 7	C Ceramic 12p0 p25 100V NPO	213-227
C 8	C Ceramic 12p0 p25 100V NPO	213-227
C 9	C Ceramic 1n00 -20+80% 63V	213-013
C 10	C Ceramic 1n00 -20+80% 63V	213-013
C 11	C Ceramic 1n00 -20+80% 63V	213-013
C 12	C Ceramic 1n00 -20+80% 63V	213-013
C 13	C Ceramic 1n00 -20+80% 63V	213-013

TRANSISTORS

Q 1	Transistor BF272 SI NPN 20V 100mA 500mW	360-145
Q 2	Transistor BF959 npn	360-123
Q 3	Transistor BF959 npn	360-123

RESISTORS

R 1	R Metal film 5K60 5% 0.2W TC250	107-456
R 2	R Metal film 10K0 5% 0.2W TC250	107-510
R 3	R Metal film 2K70 5% 0.2W TC250	107-427
R 4	R Metal film 56E0 5% 0.2W TC250	107-256
R 5	R Metal film 56E0 5% 0.2W TC250	107-256
R 6	R Metal film 2K20 5% 0.2W TC250	107-422
R 7	R Metal film 68E0 5% 0.2W TC250	107-268
R 8	R Metal film 180E 5% 0.2W TC250	107-318
R 9	R Metal film 56E0 5% 0.2W TC250	107-256
R 10	R Metal film 3K30 5% 0.2W TC250	107-433
R 11	R Metal film 12K0 5% 0.2W TC250	107-512
R 12	R Metal film 560E 5% 0.2W TC250	107-356
R 13	R Metal film 680E 5% 0.2W TC250	107-368
R 14	R Metal film 5K60 5% 0.2W TC250	107-456
R 15	R Metal film 470E 5% 0.2W TC250	107-347
R 16	R Metal film 47E0 5% 0.2W TC250	107-247
R 17	R Metal film 1K20 5% 0.2W TC250	107-412

MIXERS

U 1	Double Balanced Mixer 1-500MHZ SBL-1	910-120

CRYSTALS

Y 1	Quarts Crystal 98 MHz	910-140

MISCELLANEOUS

	Enamelled Copper Wire Diam. 0.30	650-030
	HF-Coilform, Polyamid	700-106
	Trimcore	704-153
	Filter Kit, Complete	720-038
	Wire Wrap Terminal	805-727
	Mini Socket 1-Pin	816-238
	PCB Krystal Oscillator Issue 3	971-045
L 1*	Coil L1	740-067
L 2*	Coil L2	740-068
L 3*	Coil L3	740-069

POWER SUPPLY II (901-243)

CAPACITORS

C 1	C Ceramic 10n -20+80% 63V	213-027
C 2	C Ceramic 33p 2% 100V NP0	213-119
C 3	C Electrolytic 220u 25V	260-042
C 4	C Ceramic 10n -20+80% 63V	213-027
C 5	C Electrolytic 220u 25V	260-042
C 6	C Ceramic 33p 2% 100V NP0	213-119

DIODES

CR 1	Diode zener BZX79-C9V1 0.4W	350-606
CR 2	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 3	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 4	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 5	Diode zener 1N825 C6V2 0.4W	350-637
CR 6	Diode zener BZX79-C9V1 0.4W	350-606
CR 7	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 8	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 9	Diode BAV20 Si Vr-150V If-250mA	350-023

TRANSISTORS

Q 1	Transistor BC547B npn	360-159
Q 2	Transistor BC557B pnp	360-160
Q 3	Transistor BC557B pnp	360-160
Q 4	Transistor BC547B npn	360-159

INTEGRATED ANALOG CIRCUITS

QA 1	IC LM301AH OP-AMP	364-016
QA 2	IC LM301AH OP-AMP	364-016

RESISTORS

R 1	R Carbon Film 1E2 5% 0.2W	106-112
R 2	R Carbon Film 47E 5% 0.2W	106-247
R 3	R Carbon Film 1K 5% 0.2W	106-410
R 4	R Carbon Film 1K8 5% 0.2W	106-418
R 5	R Carbon Film 470E 5% 0.2W	106-347
R 6	R Carbon 10K 5% 0.2w	106-510
R 7	R Carbon 10K 5% 0.2w	106-510
R 8	R Carbon Film 470E 5% 0.2W	106-347
R 9	R Carbon Film 4K7 5% 0.2W	106-447
R 10	R Metal Film 750E 0.5% 1/8W TC50	140-765
R 11	R Metal Film 9K31 1% 0.5W TC50	114-931
R 12	R Metal Film 10K0 1% 0.5W TC50	115-100
R 13	R Carbon Film 68K 5% 0.2W	106-568
R 14	R var 10K 20% 0.5w	182-008
R 15	R Carbon Film 1K8 5% 0.2W	106-418
R 16	R Carbon Film 1K 5% 0.2W	106-410
R 17	R Carbon Film 47E 5% 0.2W	106-247

R 18	R Carbon Film 1E2 5% 0.2W	106-112
R 19	R Carbon Film 470E 5% 0.2W	106-347
R 20	R Carbon Film 1K 5% 0.2W	106-410
R 21	R Carbon Film 4K7 5% 0.2W	106-447
R 22	R Metal Film 10K0 1% 0.5W TC50	115-100
R 23	R Metal Film 10K0 1% 0.5W TC50	115-100
R 24	R Carbon Film 1E2 5% 0.2W	106-112

MISCELLANEOUS

Terminal 2x11 Pol. Vinkel Mod II	805-857
PCB Power Supply II Issue-5	971-067

FREQUENCY CONVERTER (901-256)

CAPACITORS

C 1	C Ceramic 1n00 -20+80% 63V	213-013
C 2	C Ceramic 22p 2% 100V NPO	213-117
C 3	C Ceramic 18p 2% 100V NPO	213-116
C 4	C Ceramic 68p0 2% 100V NP0	213-123
C 5	C Ceramic 1n -20+80% 63V	213-024
C 6	C Ceramic 1n -20+80% 63V	213-024
C 7	C Ceramic 1n -20+80% 63V	213-024
C 8	C Ceramic 1n -20+80% 63V	213-024
C 9	C Ceramic 1n -20+80% 63V	213-024
C 10	C Caramic 47n -20+80% 30V	213-016
C 11	C Ceramic 2n20 -20+80% 63V	213-012
C 12	C Ceramic 56p 2% 100V NPO	213-122
C 13	C Ceramic 27p 2% 100V NP0	213-118
C 14	C Ceramic 68p0 2% 100V NP0	213-123
C 15	C Ceramic 12p 2% 100V NPO	213-114
C 16	C Ceramic 33p 2% 100V NP0	213-119
C 17	C Ceramic 22n -20+80% 63V	213-028
C 18	C Ceramic 4n7 -20+80% 63V	213-026
C 19	C Ceramic 22n -20+80% 63V	213-028

CHOKES

L 5	Choke HF Mini 47U 5% 450mA 1.1 Ohm	703-008
L 6	Ferrite Tube Diam. 1.2/3.7X3.2	704-305

TRANSISTORS

Q 1	Transistor BF272 SI NPN 20V 100mA 500mW	360-145
Q 2	Transistor BF959 npn	360-123
Q 3	Transistor BF959 npn	360-123
Q 4	Transistor BFY90 SI NPN 15V 25mA 200mW TO72	360-071

INTEGRATED DIGITAL CIRCUITS

QD 1	IC S042P Mixer	364-152

RESISTORS

R 1	R Metal film 5K60 5% 0.2W TC250	107-456
R 2	R Metal film 10K0 5% 0.2W TC250	107-510
R 3	R Metal film 8K20 5% 0.2W TC250	107-482
R 4	R Metal film 47E0 5% 0.2W TC250	107-247
R 5	R Metal film 100E 5% 0.2W TC250	107-310
R 6	R Metal film 56E0 5% 0.2W TC250	107-256
R 7	R Metal film 56E0 5% 0.2W TC250	107-256
R 8	R Metal film 56E0 5% 0.2W TC250	107-256
R 9	R Metal film 56E0 5% 0.2W TC250	107-256
R 10	R Metal film 270E 5% 0.2W TC250	107-327
R 11	R Metal film 390E 5% 0.2W TC250	107-339
R 12	R Metal film 390E 5% 0.2W TC250	107-339

R 13	R Metal film 2K20 5% 0.2W TC250	107-422
R 14	R Metal film 100E 5% 0.2W TC250	107-310
R 15	R Metal film 1K50 5% 0.2W TC250	107-415
R 16	R Metal film 3K30 5% 0.2W TC250	107-433
R 17	R Metal film 6K80 5% 0.2W TC250	107-468
R 18	R Metal film 1K00 5% 0.2W TC250	107-410
R 19	R Metal film 100E 5% 0.2W TC250	107-310
R 20	R Metal film 390E 5% 0.2W TC250	107-339
R 21	R Metal film 6K80 5% 0.2W TC250	107-468
R 22	R Metal film 1K00 5% 0.2W TC250	107-410
R 23	R Metal film 220E 5% 0.2W TC250	107-322
R 24	R Metal film 100E 5% 0.2W TC250	107-310
R 25	R Metal film 1K80 5% 0.2W TC250	107-418
R 26	R Metal film 56E0 5% 0.2W TC250	107-256
R 27	R Metal film 47E0 5% 0.2W TC250	107-247

CRYSTALS

Y 1	Quarts Crystal 100 MHz	910-112

MISCELLANEOUS

	Solder sleeve	062-625
	Coax Cable 50E	616-064
	Coax Cable 50E	616-065
	Enamelled Copper Wire Diam. 0.20	650-020
	Enamelled Copper Wire Diam. 0,25	650-025
	HF-Wire Soldeable 3 x 0.07	652-001
	HF-Coilform, Polyamid	700-106
	Trimcore	704-153
	Filter Kit, Complete	720-038
	Toroidcore Diam. 4.2/2.1X1	731-013
	Wire Wrap Terminal	805-727
	EPDM rubber black 02x1,5	840-027
	PCB Frequency Converter Issue 3	971-073
L 1*	Coil L1	740-049
L 2*	Coil L2	740-050
L 3*	Coil	740-051
L 4*	Coil	740-051
W 1*	Coax Cable W1	616-113
W 2*	Coax Cable W2	616-114
W 3*	Coax Cable W3	616-115

PRESCALER (901-257)

CAPACITORS

C 1	C Ceramic 1n -20+80% 63V	213-024
C 2	C Ceramic 1n -20+80% 63V	213-024
C 3	C Ceramic 22n -20+80% 63V	213-028
C 4	C Ceramic u1 -20%+80% 12V	213-017
C 5	C Ceramic 1n -20+80% 63V	213-024
C 6	C Ceramic 1n -20+80% 63V	213-024

CHOKES

L 1	Choke HF Mini 2u2 10% 1A 0. 25ohm	703-011
L 2	Ferrite Tube Diam. 1.2/3.7X3.2	704-305

TRANSISTORS

Q 1	Transistor BF959 npn	360-123
Q 2	Transistor BF959 npn	360-123
Q 3	Transistor BF959 npn	360-123

INTEGRATED DIGITAL CIRCUITS

QD 1	IC SP8647B High Speed Divider	364-105

RESISTORS

R 1	R Metal film 1K80 5% 0.2W TC250	107-418
R 2	R Metal film 47E0 5% 0.2W TC250	107-247
R 3	R Metal film 470E 5% 0.2W TC250	107-347
R 4	R Metal film 1K20 5% 0.2W TC250	107-412
R 5	R Metal film 47E0 5% 0.2W TC250	107-247
R 6	R Metal film 680E 5% 0.2W TC250	107-368
R 7	R Metal film 560E 5% 0.2W TC250	107-356
R 8	R Metal film 470E 5% 0.2W TC250	107-347
R 9	R Metal film 470E 5% 0.2W TC250	107-347
R 10	R Metal film 47E0 5% 0.2W TC250	107-247
R 11	R Metal film 560E 5% 0.2W TC250	107-356
R 12	R Metal film 180E 5% 0.2W TC250	107-318
R 13	R Metal film 150E 5% 0.2W TC250	107-315
R 14	R Metal film 1K00 5% 0.2W TC250	107-410
R 15	R Metal film 47E0 5% 0.2W TC250	107-247

MISCELLANEOUS

	Screw pozidriv panhead M2x8	008-108
	Solder sleeve	062-625
	Coax Cable 50E	616-064
	Wire Wrap Terminal	805-727
	Heat Sink 10X10,5X35 .	816-169
	Insulating Plate 7X22	886-100
	PCB Prescaler Issue 1	971-074
W 1*	Coax Cable W1	616-112

FREQUENCY DIVIDER II (901-258)

CAPACITORS

C 1	C Ceramic 1n00 -20+80% 63V	213-013
C 2	C Ceramic u1 -20%+80% 12V	213-017
C 3	C Ceramic 22n0 -20+80% 63V	213-011
C 4	C Ceramic 270p 2% 100V N750	213-213
C 5	C Ceramic 56p0 2% 100V NP0	213-210
C 6	C Polystyrol 442p 1% 63V	243-119
C 7	C Ceramic 150p 2% 100V N750	213-212
C 8	C Ceramic 180p 2% 100V N750	213-228
C 9	C Ceramic 22n0 -20+80% 63V	213-011
C 10	C Polystyrol 582p 1% 63V	243-122
C 11	C Ceramic 120p 2% 100V NPO	213-230
C 12	C Polyst 1n00 2% 63V	243-014
C 13	C Ceramic 330p 2% 100V N750	213-214
C 14	C Polystyrol 412p 1% 63V	243-124
C 15	C Ceramic 22n0 -20+80% 63V	213-011
C 16	C Polystyrol 1n2 1% 63V	243-191
C 17	C Ceramic 220p 2% 100V N750	213-218
C 18	C Polystyrol 1n9 1% 63V	243-192
C 19	C Polystyrol 643p 1% 63V	243-143
C 20	C Polyst 900p 1% 63V	243-154
C 21	C Ceramic 22n0 -20+80% 63V	213-011
C 22	C Polystyrol 2n433 1% 63V	243-162
C 23	C Polystyrol 442p 1% 63V	243-119
C 24	C Polystyrol 4n 1% 63V	243-193
C 25	C Polystyrol 1n326 1% 63V	243-101
C 26	C Polystyrol 1n9 1% 63V	243-192
C 27	C Tantalum 10u 20% 16V	267-000

DIODES

CR 1	Diode BA389 pin Vr-30 If-20mA	350-038
CR 2	Diode BA389 pin Vr-30 If-20mA	350-038
CR 3	Diode BA389 pin Vr-30 If-20mA	350-038
CR 4	Diode BA389 pin Vr-30 If-20mA	350-038
CR 5	Diode BA389 pin Vr-30 If-20mA	350-038
CR 6	Diode BA389 pin Vr-30 If-20mA	350-038
CR 7	Diode BA389 pin Vr-30 If-20mA	350-038
CR 8	Diode BA389 pin Vr-30 If-20mA	350-038
CR 9	Diode Hot Carrier 5082-2811 S 8V DO35	350-032
CR 10	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 11	Diode Zener C2V1-0.4W DO7	350-654
CR 12	Diode BAV10 Si Vr-60V If-600mA	350-022

CHOKES

L 9	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020
L 10	Choke HF Mini 470uH 10% 124MA	703-014

TRANSISTORS

Q 1	Transistor BC547B npn	360-159
Q 2	Transistor 2N3904 pnp	360-064
Q 3	Transistor 2N3906 pnp	360-062
Q 4	Transistor BC547B npn	360-159
Q 5	Transistor BC547B npn	360-159
Q 6	Transistor BC547B npn	360-159
Q 7	Transistor BC547B npn	360-159

INTEGRATED DIGITAL CIRCUITS

QD 1	IC 74LS93 bin counter	364-220
QD 2	IC 74LS190 Synchronous Up/Down Counter	364-472

RESISTORS

R 1	R Metal film 47E0 5% 0.2W TC250	107-247
R 2	R Metal film 6K80 5% 0.2W TC250	107-468
R 3	R Metal film 15K0 5% 0.2W TC250	107-515
R 4	R Metal film 470E 5% 0.2W TC250	107-347
R 5	R Metal film 2K70 5% 0.2W TC250	107-427
R 6	R Metal film 2K70 5% 0.2W TC250	107-427
R 7	R Metal film 1K80 5% 0.2W TC250	107-418
R 8	R Metal film 2K70 5% 0.2W TC250	107-427
R 9	R Metal film 390E 5% 0.2W TC250	107-339
R 10	R Metal film 390E 5% 0.2W TC250	107-339
R 11	R Metal film 22K0 5% 0.2W TC250	107-522
R 12	R Metal film 10K0 5% 0.2W TC250	107-510
R 13	R Metal film 1K50 5% 0.2W TC250	107-415
R 14	R Metal film 22K0 5% 0.2W TC250	107-522
R 15	R Metal film 10K0 5% 0.2W TC250	107-510
R 16	R Metal film 1K50 5% 0.2W TC250	107-415
R 17	R Metal film 22K0 5% 0.2W TC250	107-522
R 18	R Metal film 10K0 5% 0.2W TC250	107-510
R 19	R Metal film 1K50 5% 0.2W TC250	107-415
R 20	R Metal film 22K0 5% 0.2W TC250	107-522
R 21	R Metal film 10K0 5% 0.2W TC250	107-510
R 22	R Metal film 1K50 5% 0.2W TC250	107-415
R 23	R Metal film 680E 5% 0.2W TC250	107-368

MISCELLANEOUS

	Wire Electrical 0.055MM2 Red	643-009
	Enamelled Copper Wire Diam. 0.10	650-010
	HF-Wire Soldeable 3 x 0.07	652-001
	Filter Kit Complete	720-039
	Wire Wrap Terminal	805-727
	Socket for 10-pin DIL	816-240
	PCB Frequency Divider II Issue 2	971-075
L 1*	Coil L1	740-041
L 2*	Coil L2	740-042
L 3*	Coil L3	740-043
L 4*	Coil L4	740-044

L 5*	Coil L5	740-045
L 6*	Coil L6	740-046
L 7*	Coil L7	740-047
L 8*	Coil L8	740-048

FRONTPANEL I (901-513)

CAPACITORS

C 1	C Ceramic 100n 20% 50V	213-400
C 2	C Tantalum 10u 20% 16V	267-000

INTEGRATED DIGITAL CIRCUITS

QD 1	IC HEF4532BP 8-input priority encoder	364-354
QD 2	IC HEF4532BP 8-input priority encoder	364-354
QD 3	IC HEF4044BP Quad R/S latch with 3 state outputs	364-353
QD 4	IC HEF4044BP Quad R/S latch with 3 state outputs	364-353
QD 5	IC HEF4044BP Quad R/S latch with 3 state outputs	364-353
QD 6	IC HEF4044BP Quad R/S latch with 3 state outputs	364-353

RESISTORS

R 1	R Metal film 220E 5% 0.2W TC250	107-322
R 2	R Metal film 220E 5% 0.2W TC250	107-322
R 3	R Metal film 220E 5% 0.2W TC250	107-322
R 4	R Metal film 220E 5% 0.2W TC250	107-322
R 5	R Metal film 220E 5% 0.2W TC250	107-322
R 6	R Metal film 220E 5% 0.2W TC250	107-322
R 7	R Metal film 220E 5% 0.2W TC250	107-322
R 8	R Metal film 220E 5% 0.2W TC250	107-322
R 9	R Metal film 220E 5% 0.2W TC250	107-322
R 10	R Metal film 220E 5% 0.2W TC250	107-322
R 11	R Metal film 220E 5% 0.2W TC250	107-322
R 12	R Metal film 220E 5% 0.2W TC250	107-322
R 13	R Metal film 220E 5% 0.2W TC250	107-322
R 14	R Metal film 220E 5% 0.2W TC250	107-322
R 15	R Metal film 220E 5% 0.2W TC250	107-322
R 16	R Metal film 220E 5% 0.2W TC250	107-322
R 17	R thick film Sil 8x47K	146-005
R 18	R thick film Sil 8x47K	146-005
R 19	R thick film Sil 8x47K	146-005
R 20	R thick film Sil 8x47K	146-005
R 21	R thick film Sil 8x47K	146-005
R 22	R thick film Sil 8x47K	146-005

SWITCHES

S 1	Keyboard Switch	551-141
S 2	Keyboard Switch	551-141
S 3	Keyboard Switch	551-141
S 4	Keyboard Switch	551-141
S 5	Keyboard Switch	551-141
S 6	Keyboard Switch	551-141
S 7	Keyboard Switch	551-141
S 8	Keyboard Switch With Red Led	551-163
S 9	Keyboard Switch With Red Led	551-163
S 10	Keyboard Switch With Red Led	551-163
S 11	Keyboard Switch With Red Led	551-163

S 12	Keyboard Switch With Red Led	551-163
S 13	Keyboard Switch With Red Led	551-163
S 14	Keyboard Switch With Red Led	551-163
S 15	Keyboard Switch With Red Led	551-163
S 16	Keyboard Switch	551-141
S 17	Keyboard Switch	551-141
S 18	Keyboard Switch	551-141
S 19	Keyboard Switch	551-141
S 21	Keyboard Switch	551-141
S 22	Keyboard Switch	551-141
S 23	Keyboard Switch	551-141
S 24	Keyboard Switch	551-141
S 25	Keyboard Switch	551-141
S 26	Keyboard Switch	551-141
S 27	Keyboard Switch	551-141
S 28	Keyboard Switch With Red Led	551-163
S 29	Keyboard Switch With Red Led	551-163
S 30	Keyboard Switch With Red Led	551-163
S 31	Keyboard Switch With Red Led	551-163
S 32	Keyboard Switch With Red Led	551-163
S 33	Keyboard Switch With Red Led	551-163
S 34	Keyboard Switch With Red Led	551-163
S 35	Keyboard Switch With Red Led	551-163
S 36	Keyboard Switch	551-141
S 37	Keyboard Switch	551-141
S 38	Keyboard Switch	551-141
S 39	Keyboard Switch	551-141
S 41	Keyboard Switch	551-141
S 42	Keyboard Switch	551-141
S 43	Keyboard Switch	551-141
S 44	Keyboard Switch	551-141

MISCELLANEOUS

Threaded Nipple GT M3/5-1.25	065-433
Threaded Nipple GT M3/9-1,5	065-448
PCB Frontpanel I RE107	971-207

FRONTPANEL II (901-514)

CAPACITORS

C 1	C Ceramic 10n -20+80% 63V	213-027
C 2	C Ceramic u1 -20%+80% 12V	213-017
C 3	C Tantalum 10u 20% 16V	267-000
C 4	C Tantalum 10u 20% 16V	267-000
C 5	C Ceramic 1n00 -20+80% 63V	213-013

DIODES

CR 1	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 2	Diode BAV10 Si Vr-60V If-600mA	350-022

LAMPS

I 1	Lamp 5V 0..06A	401-002
I 2	Lamp 5V 0..06A	401-002
I 3	Lamp 5V 0..06A	401-002
I 4	Lamp 5V 0..06A	401-002
I 6	Lamp 5V 0..06A	401-002

TRANSISTORS

Q 1	Transistor BC547B npn	360-159
Q 2	Transistor BC547B npn	360-159
Q 3	Transistor BC369 SI PNP 20V 2A 1W	360-206
Q 4	Transistor BC368 SI NPN 20V 2A 1W	360-205
Q 5	Transistor BC368 SI NPN 20V 2A 1W	360-205
Q 6	Transistor BC547B npn	360-159
Q 7	Transistor BC547B npn	360-159
Q 8	Transistor BC368 SI NPN 20V 2A 1W	360-205
Q 9	Transistor BC557B pnp	360-160
Q 10	Transistor BC547B npn	360-159
Q 11	Transistor BC547B npn	360-159
Q 12	Transistor BC547B npn	360-159

INTEGRATED DIGITAL CIRCUITS

QD 1	IC 5082-7650 Display 7 Segment	364-231
QD 2	IC 5082-7650 Display 7 Segment	364-231
QD 3	IC 5082-7650 Display 7 Segment	364-231
QD 4	IC 5082-7650 Display 7 Segment	364-231
QD 5	IC 5082-7650 Display 7 Segment	364-231
QD 6	IC 5082-7650 Display 7 Segment	364-231
QD 7	IC 5082-7650 Display 7 Segment	364-231
QD 8	IC 5082-7650 Display 7 Segment	364-231
QD 9	IC 5082-7650 Display 7 Segment	364-231
QD 10	IC 5082-7650 Display 7 Segment	364-231
QD 11	IC 5082-7656 Display +,-1red	364-429
QD 12	IC 5082-7650 Display 7 Segment	364-231
QD 13	IC 5082-7650 Display 7 Segment	364-231
QD 14	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183

QD 15	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 16	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 17	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 18	IC SN74LS05N HEX inverters (open collector)	364-214
QD 19	IC 4001 quad NOR gate	364-248
QD 20	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 21	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 22	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 23	IC MC14561BP 9's complementer	364-356
QD 24	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 25	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 26	IC HEF4013BP Dual D-type Flip-Flop	364-222
QD 27	IC 4078 8-input NOR gate	364-268
QD 28	IC HEF4013BP Dual D-type Flip-Flop	364-222
QD 29	IC HEF4013BP Dual D-type Flip-Flop	364-222
QD 30	IC 4001 quad NOR gate	364-248
QD 31	IC MC14560BP NBCD Adder	364-326
QD 32	IC MC14561BP 9's complementer	364-356
QD 33	IC MC14561BP 9's complementer	364-356
QD 34	IC 4011 quad NAND gate	364-221
QD 35	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 36	IC 4002 Dual 4-input NOR gate	364-360
QD 37	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 38	IC 4011 quad NAND gate	364-221
QD 39	IC 4011 quad NAND gate	364-221
QD 40	IC HEF4081BP Quad 2-input AND gate	364-228
QD 41	IC MC14560BP NBCD Adder	364-326
QD 42	IC MC14560BP NBCD Adder	364-326
QD 43	IC HEF4075BP Tripple 3-input OR gate	364-362
QD 44	IC HEF4073BP Tripple 3-input AND gate	364-385
QD 45	IC 4011 quad NAND gate	364-221
QD 46	IC HEF4081BP Quad 2-input AND gate	364-228
QD 47	IC MC14561BP 9's complementer	364-356
QD 48	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 49	IC 5082-7650 Display 7 Segment	364-231
QD 50	IC SN74LS47N BCD-TO-Seven-Segment Decoders	364-183
QD 51	IC 5082-7650 Display 7 Segment	364-231
QD 52	IC MC14560BP NBCD Adder	364-326

RESISTORS

R 1	R Metal film 180E 5% 0.2W TC250	107-318
R 2	R Metal film 22K0 5% 0.2W TC250	107-522
R 3	R Metal film 390E 5% 0.2W TC250	107-339
R 4	R Metal film 390E 5% 0.2W TC250	107-339
R 5	R Metal film 390E 5% 0.2W TC250	107-339
R 6	R Metal film 390E 5% 0.2W TC250	107-339
R 7	R Metal film 390E 5% 0.2W TC250	107-339
R 8	R Metal film 390E 5% 0.2W TC250	107-339
R 9	R Metal film 390E 5% 0.2W TC250	107-339
R 10	R Metal film 390E 5% 0.2W TC250	107-339
R 11	R Metal film 390E 5% 0.2W TC250	107-339
R 12	R Metal film 390E 5% 0.2W TC250	107-339
R 13	R Metal film 390E 5% 0.2W TC250	107-339

R 14	R Metal film 390E 5% 0.2W TC250	107-339
R 15	R Metal film 390E 5% 0.2W TC250	107-339
R 16	R Metal film 390E 5% 0.2W TC250	107-339
R 17	R Metal film 390E 5% 0.2W TC250	107-339
R 18	R Metal film 33K0 5% 0.2W TC250	107-533
R 19	R Metal film 390E 5% 0.2W TC250	107-339
R 20	R Metal film 390E 5% 0.2W TC250	107-339
R 21	R Metal film 390E 5% 0.2W TC250	107-339
R 22	R Metal film 390E 5% 0.2W TC250	107-339
R 23	R Metal film 390E 5% 0.2W TC250	107-339
R 24	R Metal film 390E 5% 0.2W TC250	107-339
R 25	R Metal film 390E 5% 0.2W TC250	107-339
R 26	R Metal film 390E 5% 0.2W TC250	107-339
R 27	R Metal film 390E 5% 0.2W TC250	107-339
R 28	R Metal film 390E 5% 0.2W TC250	107-339
R 29	R Metal film 390E 5% 0.2W TC250	107-339
R 30	R Metal film 390E 5% 0.2W TC250	107-339
R 31	R Metal film 390E 5% 0.2W TC250	107-339
R 32	R Metal film 390E 5% 0.2W TC250	107-339
R 33	R Metal film 390E 5% 0.2W TC250	107-339
R 34	R Metal film 390E 5% 0.2W TC250	107-339
R 35	R Metal film 390E 5% 0.2W TC250	107-339
R 36	R Metal film 390E 5% 0.2W TC250	107-339
R 37	R Metal film 390E 5% 0.2W TC250	107-339
R 38	R Metal film 390E 5% 0.2W TC250	107-339
R 39	R Metal film 390E 5% 0.2W TC250	107-339
R 40	R Metal film 1K00 5% 0.2W TC250	107-410
R 41	R Metal film 390E 5% 0.2W TC250	107-339
R 42	R Metal film 390E 5% 0.2W TC250	107-339
R 43	R Metal film 390E 5% 0.2W TC250	107-339
R 44	R Metal film 390E 5% 0.2W TC250	107-339
R 45	R Metal film 390E 5% 0.2W TC250	107-339
R 46	R Metal film 390E 5% 0.2W TC250	107-339
R 47	R Metal film 390E 5% 0.2W TC250	107-339
R 48	R Metal film 5K60 5% 0.2W TC250	107-456
R 49	R Metal film 5K60 5% 0.2W TC250	107-456
R 50	R Metal film 5K60 5% 0.2W TC250	107-456
R 51	R Metal film 390E 5% 0.2W TC250	107-339
R 52	R Metal film 390E 5% 0.2W TC250	107-339
R 53	R Metal film 390E 5% 0.2W TC250	107-339
R 54	R Metal film 390E 5% 0.2W TC250	107-339
R 55	R Metal film 390E 5% 0.2W TC250	107-339
R 56	R Metal film 390E 5% 0.2W TC250	107-339
R 57	R Metal film 390E 5% 0.2W TC250	107-339
R 58	R Metal film 390E 5% 0.2W TC250	107-339
R 59	R Metal film 390E 5% 0.2W TC250	107-339
R 60	R Metal film 390E 5% 0.2W TC250	107-339
R 61	R Metal film 390E 5% 0.2W TC250	107-339
R 62	R Metal film 390E 5% 0.2W TC250	107-339
R 63	R Metal film 390E 5% 0.2W TC250	107-339
R 64	R Metal film 390E 5% 0.2W TC250	107-339
R 65	R Metal film 22K0 5% 0.2W TC250	107-522
R 66	R Metal film 5K60 5% 0.2W TC250	107-456
R 67	R Metal film 33K0 5% 0.2W TC250	107-533

R 68	R Metal film 390E 5% 0.2W TC250	107-339
R 69	R Metal film 390E 5% 0.2W TC250	107-339
R 70	R Metal film 390E 5% 0.2W TC250	107-339
R 71	R Metal film 390E 5% 0.2W TC250	107-339
R 72	R Metal film 390E 5% 0.2W TC250	107-339
R 73	R Metal film 390E 5% 0.2W TC250	107-339
R 74	R Metal film 390E 5% 0.2W TC250	107-339
R 75	R Metal film 390E 5% 0.2W TC250	107-339
R 76	R Metal film 22K0 5% 0.2W TC250	107-522
R 77	R Metal film 120E 5% 0.2W TC250	107-312
R 78	R Metal film 120E 5% 0.2W TC250	107-312
R 79	R Metal film 22K0 5% 0.2W TC250	107-522
R 80	R Metal film 390E 5% 0.2W TC250	107-339
R 81	R Metal film 390E 5% 0.2W TC250	107-339
R 82	R Metal film 390E 5% 0.2W TC250	107-339
R 83	R Metal film 390E 5% 0.2W TC250	107-339
R 84	R Metal film 390E 5% 0.2W TC250	107-339
R 85	R Metal film 390E 5% 0.2W TC250	107-339
R 86	R Metal film 390E 5% 0.2W TC250	107-339
R 87	R Metal film 100K 5% 0.2W TC250	107-610
R 88	R Metal film 100K 5% 0.2W TC250	107-610
R 89	R Metal film 100K 5% 0.2W TC250	107-610
R 90	R Metal film 100K 5% 0.2W TC250	107-610
R 91	R Metal film 100K 5% 0.2W TC250	107-610
R 92	R Metal film 100K 5% 0.2W TC250	107-610
R 93	R Metal film 390E 5% 0.2W TC250	107-339
R 94	R Metal film 390E 5% 0.2W TC250	107-339
R 95	R Metal film 390E 5% 0.2W TC250	107-339
R 96	R Metal film 390E 5% 0.2W TC250	107-339
R 97	R Metal film 390E 5% 0.2W TC250	107-339
R 98	R Metal film 390E 5% 0.2W TC250	107-339
R 99	R Metal film 390E 5% 0.2W TC250	107-339
R 100	R Metal film 100K 5% 0.2W TC250	107-610
R 101	R Metal film 100K 5% 0.2W TC250	107-610
R 102	R Metal film 100K 5% 0.2W TC250	107-610
R 103	R Metal film 100K 5% 0.2W TC250	107-610
R 104	R Metal film 5K60 5% 0.2W TC250	107-456
R 105	R Metal film 10K0 5% 0.2W TC250	107-510
R 106	R Metal film 100K 5% 0.2W TC250	107-610
R 107	R Metal film 33K0 5% 0.2W TC250	107-533
R 108	R Metal film 390E 5% 0.2W TC250	107-339
R 109	R Metal film 10K0 5% 0.2W TC250	107-510
R 110	R Metal film 22K0 5% 0.2W TC250	107-522
R 111	R Metal film 1K00 5% 0.2W TC250	107-410
R 112	R Metal film 390E 5% 0.2W TC250	107-339
R 113	R Metal film 390E 5% 0.2W TC250	107-339
R 114	R Metal film 390E 5% 0.2W TC250	107-339
R 115	R Metal film 390E 5% 0.2W TC250	107-339
R 116	R Metal film 390E 5% 0.2W TC250	107-339
R 117	R Metal film 390E 5% 0.2W TC250	107-339
R 118	R Metal film 390E 5% 0.2W TC250	107-339
R 119	R Metal film 390E 5% 0.2W TC250	107-339
R 120	R Metal film 390E 5% 0.2W TC250	107-339
R 121	R Metal film 390E 5% 0.2W TC250	107-339

R 122	R Metal film 390E 5% 0.2W TC250	107-339
R 123	R Metal film 390E 5% 0.2W TC250	107-339
R 124	R Metal film 390E 5% 0.2W TC250	107-339
R 125	R Metal film 390E 5% 0.2W TC250	107-339

SWITCHES

S 1	Dil Switch 10-Pol	547-000

MISCELLANEOUS

Insulation Bushing 01.7/3.3/4.3X5	066-311
14 Pin Dil Socket	816-131
Case for lamp indicator 7,5x17x10,75	922-413
PCB Front Panel II RE107	971-208
Serigraphed Rude Unlock	977-064
Serigraphed window| REMOTE	977-065
Serigraphed window: UNCAL	977-066
Serigraphed Rude DBUV	977-067
Serigraphed Rude 98 mHz	977-085

FRONTPANEL III (901-515)

CAPACITORS

C 1	C Tantal 2u2 20% 35V	267-007
C 2	C Tantalum 10u 20% 16V	267-000
C 3	C Tantalum 4u7 20% 25V	267-004
C 4	C Ceramic u1 -20%+80% 12V	213-017
C 5	C Tantalum 10u 20% 16V	267-000

DIODES

CR 1	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 2	Diode BAV10 Si Vr-60V If-600mA	350-022

INTEGRATED DIGITAL CIRCUITS

QD 1	IC HEF4044BP Quad R/S latch with 3 state outputs	364-353
QD 2	IC 4011 quad NAND gate	364-221
QD 3	IC 4011 quad NAND gate	364-221
QD 4	IC HEF4081BP Quad 2-input AND gate	364-228
QD 5	IC HEF4071BP Quad 2-input OR gate	364-263
QD 6	IC HEF4044BP Quad R/S latch with 3 state outputs	364-353
QD 7	IC 4011 quad NAND gate	364-221
QD 8	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 9	IC HEF40193BP 4-bit binary counter	364-564
QD 10	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 11	IC HEF4008BP 4-bit binary full adder	364-411
QD 12	IC HEF4081BP Quad 2-input AND gate	364-228
QD 13	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 14	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 15	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 16	IC 4011 quad NAND gate	364-221
QD 17	IC 4011 quad NAND gate	364-221
QD 18	IC HEF4081BP Quad 2-input AND gate	364-228
QD 19	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 20	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 21	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 22	IC 4078 8-input NOR gate	364-268
QD 23	IC 4002 Dual 4-input NOR gate	364-360
QD 24	IC HEF4023BP Triple 3-input Nand gate	364-223
QD 25	IC 4093 quad NAND gate	364-238
QD 26	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 27	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 28	IC HEF4071BP Quad 2-input OR gate	364-263
QD 29	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 30	IC HEF40175BP Quad d-type flip-flop	364-359
QD 31	IC HEF4028BP 1-of-10 decoder	364-234
QD 32	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 33	IC 74LS244 oct buffer	364-321
QD 34	IC 74LS244 oct buffer	364-321
QD 35	IC HEF4515BP 1 of 16 decoder with input latches	364-352
QD 36	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 37	IC HEF4519BP Quad 2-input multiplexer	364-365

QD 38	IC HEF40175BP Quad d-type flip-flop	364-359
QD 39	IC HEF4028BP 1-of-10 decoder	364-234
QD 40	IC HEF4025BP Tripple 3-input Nor gate	364-355
QD 41	IC HEF4071BP Quad 2-input OR gate	364-263
QD 42	IC 4011 quad NAND gate	364-221
QD 43	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 44	IC HEF4515BP 1 of 16 decoder with input latches	364-352
QD 45	IC 4078 8-input NOR gate	364-268
QD 46	IC HEF4044BP Quad R/S latch with 3 state outputs	364-353
QD 47	IC HEF4081BP Quad 2-input AND gate	364-228
QD 48	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 49	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 50	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 51	IC 4011 quad NAND gate	364-221
QD 52	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 53	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 54	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 55	IC 4011 quad NAND gate	364-221
QD 56	IC 4011 quad NAND gate	364-221
QD 57	IC HEF4008BP 4-bit binary full adder	364-411
QD 58	IC HEF40193BP 4-bit binary counter	364-564
QD 59	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 60	IC 4011 quad NAND gate	364-221
QD 61	IC 4011 quad NAND gate	364-221
QD 62	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 63	IC HEF40097BP 3-state HEX non-inverting buffers	364-264
QD 64	IC HEF40192BP 4-bit up/down decade counter	364-358
QD 65	IC 4011 quad NAND gate	364-221
QD 66	IC HEF4071BP Quad 2-input OR gate	364-263

RESISTORS

R 1	R Metal film 10K0 5% 0.2W TC250	107-510
R 2	R thick film Sil 8x47K	146-005
R 3	R thick film Sil 8x47K	146-005
R 4	R Metal film 10K0 5% 0.2W TC250	107-510
R 5	R Metal film 100K 5% 0.2W TC250	107-610
R 10	R Metal film 10K0 5% 0.2W TC250	107-510
R 11	R Metal film 100K 5% 0.2W TC250	107-610
R 12	R Metal film 100K 5% 0.2W TC250	107-610
R 13	R Metal film 100K 5% 0.2W TC250	107-610
R 14	R Metal film 100K 5% 0.2W TC250	107-610
R 15	R Metal film 100K 5% 0.2W TC250	107-610
R 16	R thick film Sil 8x47K	146-005
R 17	R Metal film 47K0 5% 0.2W TC250	107-547
R 18	R Metal film 47K0 5% 0.2W TC250	107-547
R 19	R Metal film 47K0 5% 0.2W TC250	107-547
R 20	R Metal film 100K 5% 0.2W TC250	107-610
R 21	R Metal film 47K0 5% 0.2W TC250	107-547
R 22	R Metal film 47K0 5% 0.2W TC250	107-547
R 23	R Metal film 47K0 5% 0.2W TC250	107-547

MISCELLANEOUS

Spacing Nipple Ø3,5/9,5-1,5	065-673
Wire Wrap Terminal	805-727
Connector Socket for 16-Pin	816-217
PCB Frontpanel III RE107 Issue-4	971-209

FREQUENCY RANGE CONTROL (901-516)

CAPACITORS

C 1	C Tantal 15u 20% 35V	267-008
C 2	C Tantal 15u 20% 35V	267-008
C 3	C Ceramic 100n 20% 50V	213-400
C 4	C Ceramic 100n 20% 50V	213-400
C 5	C Ceramic 100n 20% 50V	213-400
C 6	C Ceramic 100n 20% 50V	213-400
C 7	C Tantal 15u 20% 35V	267-008
C 8	C Ceramic 100n 20% 50V	213-400
C 9	C Ceramic 100n 20% 50V	213-400
C 10	C Tantal 15u 20% 35V	267-008
C 11	C Ceramic 100n 20% 50V	213-400
C 12	C Ceramic 100n 20% 50V	213-400

DIODES

CR 1	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 2	Diode BAV20 Si Vr-150V If-250mA	350-023

CONNECTORS

J 1	Print Connector 32 Pol Male DIN 41612B	805-848

TRANSISTORS

Q 1	Transistor BC547B npn	360-159
Q 2	Transistor BC557B pnp	360-160
Q 3	Transistor BC557B pnp	360-160
Q 4	Transistor BC547B npn	360-159
Q 5	Transistor BC557B pnp	360-160
Q 6	Transistor BC547B npn	360-159
Q 7	Transistor BC557B pnp	360-160
Q 8	Transistor BC547B npn	360-159
Q 9	Transistor BC557B pnp	360-160
Q 10	Transistor BC547B npn	360-159
Q 11	Transistor BC368 SI NPN 20V 2A 1W	360-205
Q 20	Transistor BC547B npn	360-159
Q 21	Transistor BC557B pnp	360-160
Q 22	Transistor BC557B pnp	360-160
Q 23	Transistor BC547B npn	360-159
Q 24	Transistor BC557B pnp	360-160
Q 25	Transistor BC547B npn	360-159
Q 26	Transistor BC547B npn	360-159
Q 27	Transistor BC557B pnp	360-160
Q 28	Transistor BC547B npn	360-159
Q 29	Transistor BC557B pnp	360-160

INTEGRATED DIGITAL CIRCUITS

QD 1	IC HEF4104BP Quad low to high voltage translator	364-357
QD 2	IC HEF4104BP Quad low to high voltage translator	364-357
QD 3	IC HEF4104BP Quad low to high voltage translator	364-357
QD 4	IC HEF4104BP Quad low to high voltage translator	364-357
QD 5	IC HEF4104BP Quad low to high voltage translator	364-357
QD 6	IC HEF4104BP Quad low to high voltage translator	364-357
QD 7	IC MC14560BP NBCD Adder	364-326
QD 8	IC MC14560BP NBCD Adder	364-326
QD 9	IC MC14560BP NBCD Adder	364-326
QD 10	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 11	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 12	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 13	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 14	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 15	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 16	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 17	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 18	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 19	IC HEF4519BP Quad 2-input multiplexer	364-365
QD 20	IC HEF4071BP Quad 2-input OR gate	364-263
QD 21	IC 4049 hex inv buffer	364-224
QD 22	IC CD4072BE Dual 4-input OR gate	364-440
QD 23	IC HEF4025BP Tripple 3-input Nor gate	364-355
QD 24	IC HEF4075BP Tripple 3-input OR gate	364-362
QD 25	IC HEF4025BP Tripple 3-input Nor gate	364-355
QD 26	IC HEF4071BP Quad 2-input OR gate	364-263
QD 27	IC CD4072BE Dual 4-input OR gate	364-440
QD 28	IC 4001 quad NOR gate	364-248
QD 29	IC HEF4075BP Tripple 3-input OR gate	364-362
QD 30	IC HEF4025BP Tripple 3-input Nor gate	364-355
QD 31	IC 4078 8-input NOR gate	364-268
QD 32	IC HEF4081BP Quad 2-input AND gate	364-228
QD 33	IC 4049 hex inv buffer	364-224
QD 34	IC 4001 quad NOR gate	364-248
QD 35	IC 4001 quad NOR gate	364-248
QD 36	IC HEF4025BP Tripple 3-input Nor gate	364-355
QD 37	IC CD4072BE Dual 4-input OR gate	364-440
QD 38	IC 4002 Dual 4-input NOR gate	364-360
QD 39	IC 4049 hex inv buffer	364-224
QD 40	IC HEF4071BP Quad 2-input OR gate	364-263
QD 41	IC HEF4075BP Tripple 3-input OR gate	364-362
QD 42	IC HEF4025BP Tripple 3-input Nor gate	364-355
QD 43	IC HEF4071BP Quad 2-input OR gate	364-263
QD 44	IC HEF4071BP Quad 2-input OR gate	364-263
QD 45	IC HEF4075BP Tripple 3-input OR gate	364-362

RESISTORS

R 1	R Metal film 22K0 5% 0.2W TC250	107-522
R 2	R Metal film 120K 5% 0.2W TC250	107-612
R 3	R Metal film 12K0 5% 0.2W TC250	107-512
R 4	R Metal film 12K0 5% 0.2W TC250	107-512
R 5	R Metal film 2K20 5% 0.2W TC250	107-422
R 6	R Metal film 2K20 5% 0.2W TC250	107-422
R 7	R Metal film 22K0 5% 0.2W TC250	107-522
R 8	R Metal film 10K0 5% 0.2W TC250	107-510
R 9	R Metal film 10K0 5% 0.2W TC250	107-510
R 10	R Metal film 22K0 5% 0.2W TC250	107-522
R 11	R Metal film 10K0 5% 0.2W TC250	107-510
R 12	R Metal film 10K0 5% 0.2W TC250	107-510
R 13	R Metal film 22K0 5% 0.2W TC250	107-522
R 14	R Metal film 22K0 5% 0.2W TC250	107-522
R 15	R Metal film 10K0 5% 0.2W TC250	107-510
R 16	R Metal film 2K20 5% 0.2W TC250	107-422
R 29	R Metal film 22K0 5% 0.2W TC250	107-522
R 30	R Metal film 120K 5% 0.2W TC250	107-612
R 31	R Metal film 12K0 5% 0.2W TC250	107-512
R 32	R Metal film 12K0 5% 0.2W TC250	107-512
R 33	R Metal film 2K20 5% 0.2W TC250	107-422
R 34	R Metal film 2K20 5% 0.2W TC250	107-422
R 35	R Metal film 39K0 5% 0.2W TC250	107-539
R 36	R Metal film 39K0 5% 0.2W TC250	107-539
R 37	R Metal film 2K20 5% 0.2W TC250	107-422
R 38	R Metal film 2K20 5% 0.2W TC250	107-422
R 39	R Metal film 47K0 5% 0.2W TC250	107-547
R 40	R Metal film 2K20 5% 0.2W TC250	107-422
R 41	R Metal film 1K20 5% 0.2W TC250	107-412
R 46	R Metal film 10K0 5% 0.2W TC250	107-510
R 47	R Metal film 47K0 5% 0.2W TC250	107-547
R 48	R Metal film 22K0 5% 0.2W TC250	107-522
R 49	R Metal film 100K 5% 0.2W TC250	107-610

MISCELLANEOUS

Screw pozidriv panhead M2.5x12	008-212
Nut hexagon M2,5	031-250
Wire Wrap Terminal	805-727
Connector Socket for 16-Pin	816-217
PCB Freq Range Control RE107	971-210

MODULATIONS UNIT (901-517)

CAPACITORS

C 1	C Tantalum 22u 20% 16V	267-019
C 2	C Tantalum 22u 20% 16V	267-019
C 3	C Tantalum 22u 20% 16V	267-019
C 4	C Ceramic 33p0 2% 100V NP0	213-208
C 5	C Tantalum 22u 20% 16V	267-019
C 6	C Tantalum 22u 20% 16V	267-019
C 7	C Ceramic 10p0 2% 100V NP0	213-205
C 8	C Tantalum 22u 20% 16V	267-019
C 9	C Polystyrol 13n83 1% 63V	243-105
C 10	C Polyst 220n 10% 63V	241-032
C 11	C Polyst 100n 10% 100V	241-025
C 12	C Polystyrol 13n83 1% 63V	243-105
C 13	C Polyst 2u20 63V	241-031
C 14	C Tantalum 22u 20% 16V	267-019
C 15	C Polyst 220n 10% 63V	241-032
C 16	C Polystyrol 13n83 1% 63V	243-105
C 17	C Tantalum 22u 20% 16V	267-019
C 18	C Polystyrol 13n83 1% 63V	243-105
C 19	C Polyst 100n 10% 100V	241-025
C 20	C Polyst 2u20 63V	241-031
C 21	C Tantalum 22u 20% 16V	267-019
C 22	C Polystyrol 6n 2% 63V	243-016
C 23	C Tantalum 22u 20% 16V	267-019
C 24	C Tantalum 22u 20% 16V	267-019
C 25	C Tantalum 22u 20% 16V	267-019
C 26	C Ceramic 10p0 2% 100V NP0	213-205
C 27	C Tantalum 22u 20% 16V	267-019
C 28	C Ceramic 33p0 2% 100V NP0	213-208
C 29	C Ceramic 100n 20% 50V	213-401
C 30	C Ceramic 100n 20% 50V	213-401
C 31	C Tantalum 22u 20% 16V	267-019
C 32	C Var. 10-60p hor	286-007
C 33	C Polyst 2n00 1% 63V	243-106
C 34	C Tantalum 22u 20% 16V	267-019
C 35	C Ceramic 220p 2% 100V N750	213-218
C 36	C Polystyrol 5n5 1% 63V	243-195
C 37	C Tantalum 22u 20% 16V	267-019
C 38	C Polystyrol 7n9 1% 63V	243-199
C 39	C Polystyrol 7n9 1% 63V	243-199
C 40	C Ceramic 8p20 p25 100V NP0	213-224
C 41	C Ceramic 82p0 2% 100V NPO	213-229
C 42	C Ceramic 100n 20% 50V	213-401
C 43	C Ceramic 100n 20% 50V	213-401
C 44	C Ceramic 100n 20% 50V	213-401
C 45	C Ceramic 8p20 p25 100V NP0	213-224
C 46	C Ceramic 8p20 p25 100V NP0	213-224
C 47	C Tantal 68u 20% 16V	267-015
C 48	C Ceramic 220p 2% 100V N750	213-218
C 49	C Tantal 68u 20% 16V	267-015
C 50	C Tantal 68u 20% 16V	267-015

C 51	C Polyester u47 10% 63V	241-038
C 52	C Polyester u47 10% 63V	241-038
C 54	C Ceramic 22n0 -20+80% 63V	213-011
C 55	C Ceramic 10p0 2% 100V NP0	213-205
C 56	C Ceramic 100n 20% 50V	213-401
C 57	C Ceramic 100n 20% 50V	213-401
C 58	C Ceramic 120p 2% 100V NPO	213-230
C 59	C Ceramic 100n 20% 50V	213-401
C 60	C Ceramic 100n 20% 50V	213-401
C 61	C Ceramic 3p30 p25 100V P100	213-202
C 62	C Ceramic 22n0 -20+80% 63V	213-011
C 63	C Ceramic 10p0 2% 100V NP0	213-205
C 64	C Ceramic 100n 20% 50V	213-401
C 65	C Ceramic 100n 20% 50V	213-401
C 66	C Tantalum 10u 20% 16V	267-000
C 67	C Tantalum 10u 20% 16V	267-000
C 68	C Ceramic 22n0 -20+80% 63V	213-011
C 69	C Ceramic 22p0 2% 100V NP0	213-206
C 71	C Bipolar 10u 40V	261-302

DIODES

CR 1	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 2	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 3	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 4	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 5	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 6	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 7	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 8	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 9	Diode zener BZX79-C6V2 0.4W	350-604
CR 10	Diode zener BZX79-C6V2 0.4W	350-604
CR 12	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 13	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 14	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 15	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 16	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 17	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 18	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 19	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 20	Diode BAV10 Si Vr-60V If-600mA	350-022

CONNECTORS

J 1	Connector Socket for 16-Pin	816-217
J 2	Connector Socket for 16-Pin	816-217
J 3	Connector Socket for 16-Pin	816-217
J 4	Connector Socket for 16-Pin	816-217
J 5	Terminal 12-Pol. Vinkel MOD II	805-878
J 6	Terminal Strip 4-Pol. Vinkel M0D II	805-850
J 7	Terminal Strip 4-Pol. Vinkel M0D II	805-850
J 8	Terminal strip 9-pol, vinkel	805-852
J 9	Terminal 12-Pol. Vinkel MOD II	805-878
J 10	Wire Wrap Terminal	805-727

TRANSISTORS

Q 1	Transistor PN4092 N jfet	360-114
Q 2	Transistor PN4092 N jfet	360-114
Q 3	Transistor BC557B pnp	360-160
Q 4	Transistor BC547B npn	360-159
Q 5	Transistor PN4092 N jfet	360-114
Q 6	Transistor PN4092 N jfet	360-114
Q 7	Transistor BC557B pnp	360-160
Q 8	Transistor BC547B npn	360-159
Q 9	Transistor PN4092 N jfet	360-114
Q 10	Transistor PN4092 N jfet	360-114
Q 11	Transistor BC557B pnp	360-160
Q 11	Transistor BC557B pnp	360-160
Q 12	Transistor BC547B npn	360-159
Q 13	Transistor PN4092 N jfet	360-114
Q 14	Transistor PN4092 N jfet	360-114
Q 15	Transistor BC557B pnp	360-160
Q 16	Transistor BC547B npn	360-159
Q 17	Transistor PN4092 N jfet	360-114
Q 18	Transistor PN4092 N jfet	360-114
Q 19	Transistor BC557B pnp	360-160
Q 20	Transistor BC547B npn	360-159
Q 21	Transistor PN4092 N jfet	360-114
Q 22	Transistor PN4092 N jfet	360-114
Q 23	Transistor BC557B pnp	360-160
Q 24	Transistor BC547B npn	360-159
Q 25	Transistor PN4092 N jfet	360-114
Q 26	Transistor BC557B pnp	360-160
Q 27	Transistor BC557B pnp	360-160
Q 28	Transistor BC547B npn	360-159
Q 29	Transistor PN4092 N jfet	360-114
Q 30	Transistor BC547B npn	360-159
Q 31	Transistor BC557B pnp	360-160
Q 32	Transistor BC547B npn	360-159
Q 33	Transistor J109-18 n Fet	360-188
Q 34	Transistor PN4092 N jfet	360-114
Q 35	Transistor BC557B pnp	360-160
Q 36	Transistor BC547B npn	360-159
Q 37	Transistor PN4092 N jfet	360-114
Q 38	Transistor BC547B npn	360-159
Q 39	Transistor BC557B pnp	360-160
Q 40	Transistor PN4092 N jfet	360-114
Q 41	Transistor BC547B npn	360-159
Q 42	Transistor BC557B pnp	360-160
Q 43	Transistor PN4092 N jfet	360-114
Q 44	Transistor BC547B npn	360-159
Q 45	Transistor BC557B pnp	360-160
Q 46	Transistor PN4092 N jfet	360-114
Q 47	Transistor BC547B npn	360-159
Q 48	Transistor BC557B pnp	360-160
Q 49	Transistor PN4092 N jfet	360-114
Q 50	Transistor BC547B npn	360-159
Q 51	Transistor BC557B pnp	360-160

Q 52	Transistor PN4092 N jfet	360-114
Q 53	Transistor BC547B npn	360-159
Q 54	Transistor BC557B pnp	360-160
Q 55	Transistor PN4092 N jfet	360-114
Q 56	Transistor BC547B npn	360-159
Q 57	Transistor BC557B pnp	360-160
Q 58	Transistor PN4092 N jfet	360-114
Q 59	Transistor BC547B npn	360-159
Q 60	Transistor BC557B pnp	360-160
Q 61	Transistor BC557B pnp	360-160
Q 62	Transistor U1899N JFET 40V 300mW TO106	360-102
Q 63	Transistor U1899N JFET 40V 300mW TO106	360-102
Q 64	Transistor U1899N JFET 40V 300mW TO106	360-102
Q 65	Transistor BC547B npn	360-159
Q 66	Transistor BC557B pnp	360-160
Q 67	Transistor BC547B npn	360-159
Q 68	Transistor BC547B npn	360-159
Q 69	Transistor BC557B pnp	360-160
Q 70	Transistor U1899N JFET 40V 300mW TO106	360-102
Q 71	Transistor U1899N JFET 40V 300mW TO106	360-102
Q 72	Transistor U1899N JFET 40V 300mW TO106	360-102
Q 73	Transistor PN4092 N jfet	360-114
Q 74	Transistor BC547B npn	360-159
Q 75	Transistor BC557B pnp	360-160
Q 76	Transistor PN4092 N jfet	360-114
Q 77	Transistor PN4092 N jfet	360-114
Q 78	Transistor BC557B pnp	360-160
Q 79	Transistor BC547B npn	360-159
Q 80	Transistor PN4092 N jfet	360-114
Q 81	Transistor BC547B npn	360-159
Q 82	Transistor BC557B pnp	360-160
Q 83	Transistor BC547B npn	360-159
Q 84	Transistor PN4092 N jfet	360-114
Q 85	Transistor BC547B npn	360-159
Q 86	Transistor BC557B pnp	360-160
Q 87	Transistor PN4092 N jfet	360-114
Q 88	Transistor PN4092 N jfet	360-114
Q 89	Transistor BC557B pnp	360-160
Q 90	Transistor BC547B npn	360-159
Q 91	Transistor PN4092 N jfet	360-114
Q 92	Transistor BC547B npn	360-159
Q 93	Transistor BC557B pnp	360-160
Q 94	Transistor BC547B npn	360-159
Q 95	Transistor BC557B pnp	360-160
Q 96	Transistor BC557B pnp	360-160
Q 98	Transistor PN4092 N jfet	360-114
Q 100	Transistor PN4092 N jfet	360-114
Q 101	Transistor PN4092 N jfet	360-114
Q 102	Transistor BC557B pnp	360-160
Q 103	Transistor BC557B pnp	360-160
Q 104	Transistor BC547B npn	360-159
Q 105	Transistor BC547B npn	360-159
Q 106	Transistor PN4092 N jfet	360-114
Q 107	Transistor PN4092 N jfet	360-114

Q 108	Transistor PN4092 N jfet	360-114
Q 109	Transistor PN4092 N jfet	360-114
Q 110	Transistor PN4092 N jfet	360-114
Q 111	Transistor BC557B pnp	360-160
Q 112	Transistor BC557B pnp	360-160
Q 113	Transistor BC557B pnp	360-160
Q 114	Transistor BC557B pnp	360-160
Q 115	Transistor BC557B pnp	360-160
Q 116	Transistor PN4092 N jfet	360-114
Q 117	Transistor PN4092 N jfet	360-114
Q 118	Transistor PN4092 N jfet	360-114
Q 119	Transistor PN4092 N jfet	360-114
Q 120	Transistor PN4092 N jfet	360-114
Q 121	Transistor PN4092 N jfet	360-114
Q 122	Transistor PN4092 N jfet	360-114
Q 123	Transistor PN4092 N jfet	360-114
Q 124	Transistor BC547B npn	360-159
Q 125	Transistor BC547B npn	360-159
Q 126	Transistor BC547B npn	360-159
Q 127	Transistor BC547B npn	360-159
Q 128	Transistor BC547B npn	360-159
Q 129	Transistor BC547B npn	360-159
Q 130	Transistor BC547B npn	360-159
Q 132	Transistor BC557B pnp	360-160
Q 133	Transistor BC557B pnp	360-160
Q 134	Transistor BC557B pnp	360-160
Q 135	Transistor BC557B pnp	360-160
Q 136	Transistor BC557B pnp	360-160
Q 137	Transistor BC557B pnp	360-160
Q 138	Transistor BC557B pnp	360-160
Q 139	Transistor PN4092 N jfet	360-114
Q 140	Transistor BSR50 npn	360-201
Q 141	Transistor U1899N JFET 40V 300mW TO106	360-102
Q 142	Transistor BC547B npn	360-159
Q 143	Transistor BC557B pnp	360-160
Q 144	Transistor BC557B pnp	360-160
Q 145	Transistor BC557B pnp	360-160
Q 146	Transistor PN4092 N jfet	360-114
Q 147	Transistor PN4092 N jfet	360-114
Q 148	Transistor BC557B pnp	360-160
Q 149	Transistor BC547B npn	360-159
Q 150	Transistor BC547B npn	360-159
Q 151	Transistor PN4092 N jfet	360-114
Q 152	Transistor PN4092 N jfet	360-114
Q 153	Transistor PN4092 N jfet	360-114
Q 154	Transistor PN4092 N jfet	360-114

INTEGRATED ANALOG CIRCUITS

QA 1	IC LM3302 Quad Comparator	364-171
QA 2	IC LM311N comparator	364-024
QA 3	IC LM301AH OP-AMP	364-016
QA 4	IC LM318N OP-Amp	364-216
QA 5	IC TL084 quad op amp	364-276

QA 6	IC TL084 quad op amp	364-276
QA 7	IC TL084 quad op amp	364-276
QA 8	IC LM318N OP-Amp	364-216
QA 9	IC TL084 quad op amp	364-276
QA 10	IC LM318N OP-Amp	364-216
QA 11	IC LM318N OP-Amp	364-216
QA 12	IC LM318N OP-Amp	364-216
QA 13	IC LM318N OP-Amp	364-216
QA 14	IC LM318N OP-Amp	364-216
QA 15	IC LM324N Quad OP-Amp	364-176

INTEGRATED DIGITAL CIRCUITS

QD 1	IC HEF4081BP Quad 2-input AND gate	364-228
QD 2	IC HEF4075BP Tripple 3-input OR gate	364-362
QD 3	IC 4078 8-input NOR gate	364-268
QD 4	IC 4011 quad NAND gate	364-221
QD 5	IC MC14560BP NBCD Adder	364-326
QD 6	IC 74LS32 quad OR gate	364-301
QD 7	IC SN7407N HEX inverter/driver,open collector	364-315
QD 8	IC MC14560BP NBCD Adder	364-326
QD 9	IC HEF4081BP Quad 2-input AND gate	364-228
QD 10	IC HEF4081BP Quad 2-input AND gate	364-228
QD 11	IC 4011 quad NAND gate	364-221
QD 12	IC 4011 quad NAND gate	364-221
QD 13	RE107 Prog Prom 901-517 QD13 QD14 V1.0	368-519
QD 14	RE107 Prog Prom 901-517 QD13 QD14 V1.0	368-519
QD 15	IC 4050 hex buffer	364-240
QD 16	IC 4050 hex buffer	364-240

RESISTORS

R 1	R Metal film 1M00 5% 0.2W TC250	107-710
R 2	R Metal film 100K 5% 0.2W TC250	107-610
R 3	R Metal film 22K0 5% 0.2W TC250	107-522
R 4	R Metal film 100K 5% 0.2W TC250	107-610
R 5	R Metal film 22K0 5% 0.2W TC250	107-522
R 6	R Metal film 1M00 5% 0.2W TC250	107-710
R 7	R Metal film 100K 5% 0.2W TC250	107-610
R 8	R Metal film 22K0 5% 0.2W TC250	107-522
R 9	R Metal film 100K 5% 0.2W TC250	107-610
R 10	R Metal film 22K0 5% 0.2W TC250	107-522
R 11	R Metal film 1M00 5% 0.2W TC250	107-710
R 12	R Metal film 100K 5% 0.2W TC250	107-610
R 13	R Metal film 22K0 5% 0.2W TC250	107-522
R 14	R Metal film 100K 5% 0.2W TC250	107-610
R 15	R Metal film 22K0 5% 0.2W TC250	107-522
R 16	R Metal film 1M00 5% 0.2W TC250	107-710
R 17	R Metal film 100K 5% 0.2W TC250	107-610
R 18	R Metal film 22K0 5% 0.2W TC250	107-522
R 19	R Metal film 100K 5% 0.2W TC250	107-610
R 20	R Metal film 22K0 5% 0.2W TC250	107-522
R 21	R Metal film 1M00 5% 0.2W TC250	107-710
R 22	R Metal film 100K 5% 0.2W TC250	107-610

R 23	R Metal film 22K0 5% 0.2W TC250	107-522
R 24	R Metal film 100K 5% 0.2W TC250	107-610
R 25	R Metal film 22K0 5% 0.2W TC250	107-522
R 26	R Metal film 1M00 5% 0.2W TC250	107-710
R 27	R Metal film 100K 5% 0.2W TC250	107-610
R 28	R Metal film 22K0 5% 0.2W TC250	107-522
R 29	R Metal film 100K 5% 0.2W TC250	107-610
R 30	R Metal film 22K0 5% 0.2W TC250	107-522
R 31	R Metal film 100K 5% 0.2W TC250	107-610
R 32	R Metal film 100K 5% 0.2W TC250	107-610
R 33	R Metal film 22K0 5% 0.2W TC250	107-522
R 34	R Metal film 100K 5% 0.2W TC250	107-610
R 35	R Metal film 22K0 5% 0.2W TC250	107-522
R 36	R Metal film 100K 5% 0.2W TC250	107-610
R 37	R Metal film 100K 5% 0.2W TC250	107-610
R 38	R Metal film 22K0 5% 0.2W TC250	107-522
R 39	R Metal film 100K 5% 0.2W TC250	107-610
R 40	R Metal film 22K0 5% 0.2W TC250	107-522
R 41	R Metal Film 2K74 1% 0.5W TC50	114-274
R 42	R Metal film 10K0 5% 0.2W TC250	107-510
R 43	R Metal Film 110E 1% 0.5W TC50	113-110
R 44	R Metal Film 2K74 1% 0.5W TC50	114-274
R 45	R Metal film 10K0 5% 0.2W TC250	107-510
R 46	R Metal film 100E 5% 0.2W TC250	107-310
R 47	R Metal film 2K20 5% 0.2W TC250	107-422
R 48	R Metal film 680K 5% 0.2W TC250	107-668
R 49	R Metal film 10K0 5% 0.2W TC250	107-510
R 50	R Metal Film 20K0 1% 0.5W TC50	115-200
R 51	R Cermet Trimpot 10K 10% 0.5W TC100	182-407
R 52	R Metal Film 4K99 1% 0.5W TC50	114-499
R 53	R Carbon Film 100E 5% 0.2W	106-310
R 54	R Metal Film 10K 0.25% 1/8W TC50	140-394
R 55	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 56	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 57	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 58	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 59	R Metal Film 10K 0.25% 1/8W TC50	140-394
R 60	R Metal film 2K20 5% 0.2W TC250	107-422
R 61	R Metal film 4K70 5% 0.2W TC250	107-447
R 62	R Carbon Film 100E 5% 0.2W	106-310
R 63	R Carbon Film 100E 5% 0.2W	106-310
R 64	R Carbon Film 22K 5% 0.2W	106-522
R 65	R Metal film 10K0 5% 0.2W TC250	107-510
R 66	R Metal Film 11K5 1% 0.5W TC50	115-115
R 67	R Carbon Film 1K 5% 0.2W	106-410
R 68	R Metal Film 11K5 1% 0.5W TC50	115-115
R 69	R Carbon Film 1K5 5% 0.2W	106-415
R 70	R Carbon Film 1M5 5% 0.5W	100-715
R 71	R Carbon Film 120K 5% 0.2W	106-612
R 72	R Metal film 10K0 5% 0.2W TC250	107-510
R 73	R Cermet Trimpot 10K 10% 0.5W TC100	182-407
R 74	R Metal film 39K0 5% 0.2W TC250	107-539
R 75	R Carbon Film 100E 5% 0.2W	106-310
R 76	R Carbon Film 1K5 5% 0.2W	106-415

R 77	R Carbon Film 1K5 5% 0.2W	106-415
R 78	R Metal Film 28K8 1% 0.5W TC50	140-367
R 79	R Carbon Film 22K 5% 0.2W	106-522
R 80	R Metal film 10K0 5% 0.2W TC250	107-510
R 81	R Carbon Film 1K 5% 0.2W	106-410
R 82	R Thermistor NTC R25=16K2+-20%	160-019
R 83	R Thermistor NTC R25=16K2+-20%	160-019
R 84	R Metal Film 28K8 1% 0.5W TC50	140-367
R 85	R Carbon Film 100E 5% 0.2W	106-310
R 86	R Carbon Film 1K5 5% 0.2W	106-415
R 87	R Carbon Film 1M5 5% 0.5W	100-715
R 88	R Metal film 10K0 5% 0.2W TC250	107-510
R 89	R Metal film 39K0 5% 0.2W TC250	107-539
R 90	R Cermet Trimpot 10K 10% 0.5W TC100	182-407
R 91	R Carbon Film 120K 5% 0.2W	106-612
R 92	R Carbon Film 100E 5% 0.2W	106-310
R 93	R Carbon Film 1K5 5% 0.2W	106-415
R 94	R Carbon Film 1K5 5% 0.2W	106-415
R 95	R Metal film 100K 5% 0.2W TC250	107-610
R 96	R Metal film 47K0 5% 0.2W TC250	107-547
R 97	R thick film Sil 8x10K	146-003
R 98	R thick film Sil 8x47K	146-005
R 99	R Metal film 10K0 5% 0.2W TC250	107-510
R 100	R Metal film 100K 5% 0.2W TC250	107-610
R 101	R Metal film 47K0 5% 0.2W TC250	107-547
R 102	R Metal film 100K 5% 0.2W TC250	107-610
R 103	R Metal film 22K0 5% 0.2W TC250	107-522
R 104	R Metal film 10K0 5% 0.2W TC250	107-510
R 105	R Metal film 100K 5% 0.2W TC250	107-610
R 106	R Metal film 47K0 5% 0.2W TC250	107-547
R 107	R Metal film 100K 5% 0.2W TC250	107-610
R 108	R Metal Film 2K 0.5% 0.25W TC50	140-262
R 109	R Metal film 10K0 5% 0.2W TC250	107-510
R 110	R Metal film 100K 5% 0.2W TC250	107-610
R 111	R Metal film 47K0 5% 0.2W TC250	107-547
R 112	R Metal Film 2K 0.5% 0.25W TC50	140-262
R 113	R Metal film 39E0 5% 0.2W TC250	107-239
R 114	R Metal film 10K0 5% 0.2W TC250	107-510
R 115	R Metal film 100K 5% 0.2W TC250	107-610
R 116	R Metal film 47K0 5% 0.2W TC250	107-547
R 119	R Metal film 10K0 5% 0.2W TC250	107-510
R 120	R Metal film 100K 5% 0.2W TC250	107-610
R 121	R Metal film 47K0 5% 0.2W TC250	107-547
R 122	R Metal film 100K 5% 0.2W TC250	107-610
R 123	R Metal film 22K0 5% 0.2W TC250	107-522
R 124	R Metal film 10K0 5% 0.2W TC250	107-510
R 125	R Metal film 100K 5% 0.2W TC250	107-610
R 126	R Metal film 47K0 5% 0.2W TC250	107-547
R 127	R Metal film 100K 5% 0.2W TC250	107-610
R 128	R Metal film 22K0 5% 0.2W TC250	107-522
R 129	R Metal film 10K0 5% 0.2W TC250	107-510
R 130	R Metal film 100K 5% 0.2W TC250	107-610
R 131	R Metal film 47K0 5% 0.2W TC250	107-547
R 132	R Metal film 3K30 5% 0.2W TC250	107-433

R 133	R Metal film 100K 5% 0.2W TC250	107-610
R 134	R Metal film 10K0 5% 0.2W TC250	107-510
R 135	R Metal film 100K 5% 0.2W TC250	107-610
R 136	R Metal film 47K0 5% 0.2W TC250	107-547
R 137	R thick film Sil 8x10K	146-003
R 138	R thick film Sil 8x47K	146-005
R 139	R Metal film 10K0 5% 0.2W TC250	107-510
R 140	R Metal Film 2K49 1% 0.5W TC50	114-249
R 141	R Metal Film 4K99 1% 0.5W TC50	114-499
R 142	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 143	R Metal Film 20K0 1% 0.5W TC50	115-200
R 144	R Metal Film 24K9 0.5% 0.4W TC50	140-697
R 145	R Metal Film 49K9 1% 0.5W TC50	115-499
R 146	R Metal Film 100K 1% 0.5W TC50	116-100
R 147	R Metal Film 200K 1% 0.5W TC50	116-200
R 148	R Metal Film 402K 1% 0.5W TC50	116-402
R 149	R Metal Film 2K 0.5% 0.25W TC50	140-262
R 150	R Metal film 100E 5% 0.2W TC250	107-310
R 151	R Metal film 2K20 5% 0.2W TC250	107-422
R 152	R Metal film 4K70 5% 0.2W TC250	107-447
R 153	R Metal film 100E 5% 0.2W TC250	107-310
R 154	R Metal Film 158K 1% 0.5W TC50	116-158
R 155	R Metal Film 10K 0.25% 1/8W TC50	140-394
R 156	R Metal Film 10K 0.25% 1/8W TC50	140-394
R 157	R Carbon Film 22K 5% 0.2W	106-522
R 158	R Metal film 100K 5% 0.2W TC250	107-610
R 159	R Metal film 22K0 5% 0.2W TC250	107-522
R 160	R Metal film 100K 5% 0.2W TC250	107-610
R 161	R Metal film 22K0 5% 0.2W TC250	107-522
R 162	R Metal film 100K 5% 0.2W TC250	107-610
R 163	R Metal film 100K 5% 0.2W TC250	107-610
R 164	R Metal film 22K0 5% 0.2W TC250	107-522
R 165	R Metal film 100K 5% 0.2W TC250	107-610
R 166	R Metal film 100K 5% 0.2W TC250	107-610
R 167	R Carbon 10K 5% 0.2w	106-510
R 168	R Metal Film 9K10 1% 0.5W TC50	114-910
R 169	R Carbon Film 5K6 5% 0.2W	106-456
R 170	R Carbon Film 100E 5% 0.2W	106-310
R 171	R Carbon Film 1M5 5% 0.5W	100-715
R 172	R Carbon Film 1M5 5% 0.5W	100-715
R 173	R Carbon Film 1M5 5% 0.5W	100-715
R 174	R Metal film 100K 5% 0.2W TC250	107-610
R 175	R Metal film 100K 5% 0.2W TC250	107-610
R 176	R Metal film 22K0 5% 0.2W TC250	107-522
R 177	R Metal film 100K 5% 0.2W TC250	107-610
R 178	R Metal film 22K0 5% 0.2W TC250	107-522
R 179	R Cermet Trimpot 47K 20% 0.5W TC70	182-314
R 180	R Cermet Trimpot 47K 20% 0.5W TC70	182-314
R 181	R Cermet Trimpot 47K 20% 0.5W TC70	182-314
R 182	R Carbon Film 2K7 5% 0.2W	106-427
R 183	R Carbon Film 2K7 5% 0.2W.	106-427
R 184	R Carbon Film 2K2 5% 0.2W	106-422
R 185	R Carbon Film 47E 5% 0.2W	106-247
R 186	R Cermet Trimpot 10K 20% 0.5W TC70	182-301

R 188	R Carbon Film 470E 5% 0.2W	106-347
R 189	R Carbon Film 1K 5% 0.2W	106-410
R 190	R Cermet Trimpot 10K 20% 0.5W TC70	182-301
R 191	R Cermet Trimpot 10K 20% 0.5W TC70	182-301
R 192	R Cermet Trimpot 1K 10% 0.5W TC70	182-310
R 193	R Carbon 10K 5% 0.2w	106-510
R 194	R Carbon Film 100E 5% 0.2W	106-310
R 195	R Carbon Film 560E 5% 0.2W	106-356
R 196	R Metal film 100K 5% 0.2W TC250	107-610
R 197	R Metal film 47K0 5% 0.2W TC250	107-547
R 198	R Metal film 10K0 5% 0.2W TC250	107-510
R 199	R Metal film 47K0 5% 0.2W TC250	107-547
R 200	R Metal film 10K0 5% 0.2W TC250	107-510
R 201	R Metal film 100K 5% 0.2W TC250	107-610
R 202	R Metal film 47K0 5% 0.2W TC250	107-547
R 203	R Metal film 100K 5% 0.2W TC250	107-610
R 204	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 205	R Metal film 10K0 5% 0.2W TC250	107-510
R 206	R Metal film 100K 5% 0.2W TC250	107-610
R 207	R Metal film 47K0 5% 0.2W TC250	107-547
R 208	R Metal film 22K0 5% 0.2W TC250	107-522
R 209	R Metal film 3K30 5% 0.2W TC250	107-433
R 210	R Metal film 10K0 5% 0.2W TC250	107-510
R 211	R Metal film 100K 5% 0.2W TC250	107-610
R 212	R Metal film 47K0 5% 0.2W TC250	107-547
R 213	R Metal film 100K 5% 0.2W TC250	107-610
R 214	R Cermet Trimpot 22K 20% 0.3W TC70	182-303
R 215	R Metal film 10K0 5% 0.2W TC250	107-510
R 216	R Metal film 100K 5% 0.2W TC250	107-610
R 217	R Metal film 47K0 5% 0.2W TC250	107-547
R 218	R Metal film 47K0 5% 0.2W TC250	107-547
R 220	R Metal film 10K0 5% 0.2W TC250	107-510
R 221	R Metal film 100K 5% 0.2W TC250	107-610
R 222	R Metal film 47K0 5% 0.2W TC250	107-547
R 223	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 224	R Metal film 47K0 5% 0.2W TC250	107-547
R 225	R Metal film 10K0 5% 0.2W TC250	107-510
R 226	R Cermet Trimpot 220K 10% 0.1W TC70	182-308
R 227	R Metal Film 9K53 1% 0.5W TC50	114-953
R 228	R var 2K2 20% 0.5W	182-313
R 229	R Metal Film 665K 1% 0.5W TC50	116-665
R 230	R Carbon Film 390K 5% 0.2W	106-639
R 231	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 232	R Metal Film 34K0 1% 0.5W TC50	115-340
R 233	R Metal Film 162K 1% 0.5W TC50	116-162
R 234	R Metal film 220K 5% 0.2W TC250	107-622
R 235	R Metal film 100E 5% 0.2W TC250	107-310
R 236	R Metal Film 8K87 1% 0.5W TC50	114-887
R 237	R Metal Film 8K06 0.5% 0.1W TC50	141-025
R 238	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 239	R Metal Film 1K93 0.5% 0.1W TC50	141-027
R 240	R Metal film 4K70 5% 0.2W TC250	107-447
R 241	R var 2K2 20% 0.5W	182-313
R 242	R Cermet Trimpot 22K 20% 0.3W TC70	182-303

R 243	R Metal film 100E 5% 0.2W TC250	107-310
R 244	R Metal film 100K 5% 0.2W TC250	107-610
R 245	R Metal film 100K 5% 0.2W TC250	107-610
R 246	R Metal film 100K 5% 0.2W TC250	107-610
R 247	R Metal film 100K 5% 0.2W TC250	107-610
R 248	R Metal film 100K 5% 0.2W TC250	107-610
R 249	R Metal Film 6K81 1% 0.5W TC50	114-681
R 250	R Metal Film 54K9 1% 0.5W TC50	115-549
R 251	R Metal Film 68K0 1% 0.5W TC50	115-680
R 252	R Metal Film 97K6 1% 0.5W TC50	115-976
R 253	R Metal Film 182K 1% 0.5W TC50	116-182
R 254	R Metal Film 21K0 1% 0.5W TC50	115-210
R 255	R Metal Film 6K34 1% 0.5W TC50	114-634
R 256	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 257	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 258	R Metal Film 100E 1% 0.5W TC50	113-100
R 260	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 261	R Carbon Film 100E 5% 0.2W	106-310
R 263	R Metal film 100K 5% 0.2W TC250	107-610
R 264	R Metal film 100K 5% 0.2W TC250	107-610
R 265	R Metal film 100K 5% 0.2W TC250	107-610
R 266	R Metal film 100K 5% 0.2W TC250	107-610
R 267	R Metal film 100K 5% 0.2W TC250	107-610
R 268	R Metal film 22K0 5% 0.2W TC250	107-522
R 269	R Metal film 22K0 5% 0.2W TC250	107-522
R 270	R Metal film 22K0 5% 0.2W TC250	107-522
R 271	R Metal film 22K0 5% 0.2W TC250	107-522
R 272	R Metal film 22K0 5% 0.2W TC250	107-522
R 273	R Metal film 22K0 5% 0.2W TC250	107-522
R 274	R Metal film 100K 5% 0.2W TC250	107-610
R 275	R Metal film 100K 5% 0.2W TC250	107-610
R 276	R Metal film 22K0 5% 0.2W TC250	107-522
R 277	R Metal film 100K 5% 0.2W TC250	107-610
R 278	R Carbon 10K 5% 0.2w	106-510
R 279	R Metal Film 10K 0.5% 0.4W TC50	140-450
R 280	R Carbon 10K 5% 0.2w	106-510
R 281	R Metal film 22K0 5% 0.2W TC250	107-522
R 282	R Metal film 10K0 5% 0.2W TC250	107-510
R 283	R Metal film 10K0 5% 0.2W TC250	107-510
R 284	R Metal film 10K0 5% 0.2W TC250	107-510
R 285	R Carbon 10K 5% 0.2w	106-510
R 286	R Cermet Trimpot 220K 10% 0.1W TC70	182-308
R 287	R Cermet Trimpot 220K 10% 0.1W TC70	182-308
R 288	R Cermet Trimpot 220K 10% 0.1W TC70	182-308
R 289	R Metal film 1M00 5% 0.2W TC250	107-710
R 290	R Metal film 1M00 5% 0.2W TC250	107-710
R 291	R Metal Film 3K32 1% 0.5W TC50	114-332
R 292	R Metal Film 953E 1% 0.5W TC50	113-953
R 293	R Metal film 10K0 5% 0.2W TC250	107-510
R 294	R Metal film 10K0 5% 0.2W TC250	107-510
R 295	R Metal Film 475E 1% 0.5W TC50	113-475
R 296	R Metal Film 237E 0.25% 0.1W TC50	141-023
R 297	R Metal Film 237E 0.25% 0.1W TC50	141-023
R 298	R Metal Film 143E 1% 0.5W TC50	113-143

R 299	R Metal film 10K0 5% 0.2W TC250	107-510
R 300	R Metal film 10K0 5% 0.2W TC250	107-510
R 301	R Metal film 220K 5% 0.2W TC250	107-622
R 302	R Metal film 220K 5% 0.2W TC250	107-622
R 303	R Metal film 220K 5% 0.2W TC250	107-622
R 304	R Metal film 1M00 5% 0.2W TC250	107-710
R 305	R Metal film 1M00 5% 0.2W TC250	107-710
R 306	R Metal film 1K80 5% 0.2W TC250	107-418
R 307	R Metal film 1K80 5% 0.2W TC250	107-418
R 308	R Carbon Film 270K 5% 0.2W	106-627
R 309	R Metal Film 3K57 1% 0.5W TC50	114-357
R 310	R Metal Film 1K18 1% 0.5W TC50	114-118
R 311	R Metal Film 147E 1% 0.5W TC50	113-147
R 312	R Metal Film 147E 1% 0.5W TC50	113-147
R 313	R Metal Film 38K3 1% 0.5W TC50	115-383
R 314	R Metal Film 18K7 1% 0.5W TC50	115-187
R 315	R Metal Film 9K53 1% 0.5W TC50	114-953
R 316	R Metal Film 4K75 1% 0.5W TC50	114-475
R 317	R Metal Film 29K4 1% 0.5W TC50	115-294
R 318	R Metal Film 5K90 1% 0.5W TC50	114-590
R 319	R Metal Film 2K94 1% 0.5W TC50	114-294
R 320	R Metal film 100K 5% 0.2W TC250	107-610
R 321	R Metal film 100K 5% 0.2W TC250	107-610
R 322	R Metal film 100K 5% 0.2W TC250	107-610
R 323	R Metal film 100K 5% 0.2W TC250	107-610
R 324	R Metal film 100K 5% 0.2W TC250	107-610
R 325	R Metal film 100K 5% 0.2W TC250	107-610
R 326	R Metal film 100K 5% 0.2W TC250	107-610
R 327	R Metal film 22K0 5% 0.2W TC250	107-522
R 328	R Metal film 22K0 5% 0.2W TC250	107-522
R 329	R Metal film 22K0 5% 0.2W TC250	107-522
R 330	R Metal film 22K0 5% 0.2W TC250	107-522
R 331	R Metal film 22K0 5% 0.2W TC250	107-522
R 332	R Metal film 22K0 5% 0.2W TC250	107-522
R 333	R Metal film 22K0 5% 0.2W TC250	107-522
R 334	R Metal film 100K 5% 0.2W TC250	107-610
R 335	R Metal film 100K 5% 0.2W TC250	107-610
R 336	R Metal film 100K 5% 0.2W TC250	107-610
R 337	R Metal film 100K 5% 0.2W TC250	107-610
R 338	R Metal film 100K 5% 0.2W TC250	107-610
R 339	R Metal film 100K 5% 0.2W TC250	107-610
R 340	R Metal film 100K 5% 0.2W TC250	107-610
R 341	R Metal film 100K 5% 0.2W TC250	107-610
R 342	R Metal film 100K 5% 0.2W TC250	107-610
R 343	R Metal film 100K 5% 0.2W TC250	107-610
R 344	R Metal film 100K 5% 0.2W TC250	107-610
R 345	R Metal film 100K 5% 0.2W TC250	107-610
R 346	R Metal film 100K 5% 0.2W TC250	107-610
R 347	R Metal film 100K 5% 0.2W TC250	107-610
R 348	R Metal film 22K0 5% 0.2W TC250	107-522
R 349	R Metal film 22K0 5% 0.2W TC250	107-522
R 350	R Metal film 22K0 5% 0.2W TC250	107-522
R 351	R Metal film 22K0 5% 0.2W TC250	107-522
R 352	R Metal film 22K0 5% 0.2W TC250	107-522

R 353	R Metal film 22K0 5% 0.2W TC250	107-522
R 354	R Metal film 22K0 5% 0.2W TC250	107-522
R 355	R Metal film 10K0 5% 0.2W TC250	107-510
R 356	R Metal film 22K0 5% 0.2W TC250	107-522
R 359	R Metal film 10K0 5% 0.2W TC250	107-510
R 360	R thick film Sil 8x10K	146-003
R 361	R Metal film 100K 5% 0.2W TC250	107-610
R 362	R Metal Film 499K 1% 0.5W TC50	116-499
R 363	R Metal film 3K30 5% 0.2W TC250	107-433
R 364	R Metal Film 10K0 1% 0.5W TC50	115-100
R 365	R Carbon Film 5K6 5% 0.2W	106-456
R 366	R Carbon Film 100E 5% 0.2W	106-310
R 367	R Metal Film 10K0 1% 0.5W TC50	115-100
R 368	R var 2K2 20% 0.5W	182-313
R 369	R Metal Film 10K0 1% 0.5W TC50	115-100
R 370	R Metal film 100K 5% 0.2W TC250	107-610
R 371	R Metal Film 10K0 1% 0.5W TC50	115-100
R 372	R Carbon Film 22K 5% 0.2W	106-522
R 373	R Carbon Film 5K6 5% 0.2W	106-456
R 374	R Metal Film 10K0 1% 0.5W TC50	115-100
R 375	R Metal film 100K 5% 0.2W TC250	107-610
R 376	R Metal film 47K0 5% 0.2W TC250	107-547
R 377	R Carbon Film 22K 5% 0.2W	106-522
R 378	R Metal film 4K70 5% 0.2W TC250	107-447
R 379	R Metal film 47K0 5% 0.2W TC250	107-547
R 380	R Metal film 22K0 5% 0.2W TC250	107-522
R 381	R Metal film 100K 5% 0.2W TC250	107-610
R 382	R Metal film 100K 5% 0.2W TC250	107-610
R 383	R Metal film 22K0 5% 0.2W TC250	107-522
R 384	R Metal film 22K0 5% 0.2W TC250	107-522
R 385	R Metal film 100K 5% 0.2W TC250	107-610
R 386	R Metal film 22K0 5% 0.2W TC250	107-522
R 387	R Metal film 22K0 5% 0.2W TC250	107-522
R 388	R Metal film 100K 5% 0.2W TC250	107-610
R 389	R Metal film 47K0 5% 0.2W TC250	107-547
R 390	R Metal film 22K0 5% 0.2W TC250	107-522
R 391	R Metal film 22K0 5% 0.2W TC250	107-522
R 392	R Metal film 100E 5% 0.2W TC250	107-310
R 393	R Metal Film 10K5 1% 0.5W TC50	115-105
R 394	R Metal Film 10K5 1% 0.5W TC50	115-105
R 395	R Metal Film 5K90 1% 0.5W TC50	114-590
R 396	R Metal Film 5K90 1% 0.5W TC50	114-590
R 397	R Metal Film 9K76 1% 0.5W TC50	114-976
R 398	R Metal Film 27K4 1% 0.5W TC50	115-274
R 399	R Metal Film 41K2 1% 0.5W TC50	115-412
R 400	R Metal film 100K 5% 0.2W TC250	107-610
R 401	R Metal film 100K 5% 0.2W TC250	107-610
R 402	R Metal film 100K 5% 0.2W TC250	107-610
R 403	R Metal film 100K 5% 0.2W TC250	107-610
R 404	R Metal film 18K0 5% 0.2W TC250	107-518
R 405	R Metal film 4K70 5% 0.2W TC250	107-447
R 406	R Metal Film 21K0 1% 0.5W TC50	115-210
R 407	R Metal Film 21K0 1% 0.5W TC50	115-210
R 408	R Metal Film 21K0 1% 0.5W TC50	115-210

R 409	R Metal Film 21K0 1% 0.5W TC50	115-210
R 410	R Metal Film 88K7 1% 0.5W TC50	115-887
R 412	R Cermet Trimpot 1K 10% 0.5W TC70	182-310

MISCELLANEOUS

Screw pozidriv panhead M3x8	008-308
Nut hexagon M3	031-302
Locking nut w. 3 w. lock	035-503
Cabel Clamp O10	064-510
Female Plug	805-718
Wire Wrap Terminal	805-727
Housing for NTC	857-034
Hinge Plate	932-144
PCB Modulation Unit RE107 Issue-4	971-211

OUTPUT AMPLIFIER (901-180)

CAPACITORS

C 1	C Ceramic 56p0 2% 100V NP0	213-210
C 1	C Ceramic 5p60 p25 100V NPO	213-226
C 2	C Ceramic 27p0 2% 100V NP0	213-207
C 2	C Ceramic 1p +-P25 100V P100	213-220
C 3	C Ceramic 68p0 2% 100V NP0	213-215
C 4	C Ceramic 12p0 p25 100V NPO	213-227
C 5	C Ceramic 33p0 2% 100V NP0	213-208
C 6	C Ceramic 4n70 -20+80% 63V	213-010
C 7	C Ceramic 4n70 -20+80% 63V	213-010
C 8	C Ceramic 4n70 -20+80% 63V	213-010
C 9	C Caramic 47n -20+80% 30V	213-016
C 10	C Caramic 47n -20+80% 30V	213-016
C 11	C Ceramic 10n0 -20+80% 63V	213-020
C 12	C Tantalum 1u 20% 35V	267-006
C 13	C Ceramic 1p +-P25 100V P100	213-220
C 14	C Tantal 2u2 20% 35V	267-007
C 15	C Tantal 2u2 20% 35V	267-007
C 16	C Ceramic 1n00 -20+80% 63V	213-013
C 17	C Tantal 2u2 20% 35V	267-007
C 18	C Ceramic 1n00 -20+80% 63V	213-013
C 19	C Caramic 47n -20+80% 30V	213-016
C 20	C Ceramic 22n0 -20+80% 63V	213-011
C 21	C Ceramic 22n0 -20+80% 63V	213-011
C 22	C Tantal 2u2 20% 35V	267-007
C 23	C Ceramic 68p0 2% 100V NP0	213-215
C 24	C Ceramic 100p 2% 100V NP0	213-211
C 25	C Ceramic 10n0 -20+80% 63V	213-020
C 26	C Ceramic 12p0 p25 100V NPO	213-227
C 27	C Ceramic 10n0 -20+80% 63V	213-020
C 28	C Polystyrol 1n715 1% 63V	243-102
C 29	C Ceramic 1n00 -20+80% 63V	213-013
C 30	C Ceramic u1 -20%+80% 12V	213-017
C 31	C Ceramic 33p0 2% 100V NP0	213-208
C 32	C Tantal 15u 20% 35V	267-008
C 33	C Ceramic 10p0 2% 100V NP0	213-205
C 34	C Ceramic 10N -20+80% 63V	213-029
C 35	C Tantalum 22u 20% 16V	267-019
C 36	C Tantalum 10u 20% 16V	267-000
C 37	C Caramic 47n -20+80% 30V	213-016
C 38	C Caramic 47n -20+80% 30V	213-016
C 39	C Ceramic 22n0 -20+80% 63V	213-011
C 40	C Ceramic u1 -20+80% 30V	213-009
C 42	C Ceramic u1 -20+80% 30V	213-009
C 43	C Ceramic 10p0 2% 100V NP0	213-205
C 44	C Caramic 47n -20+80% 30V	213-016
C 45	C Tantal 15u 20% 35V	267-008
C 46	C Ceramic 10n0 -20+80% 63V	213-020
C 47	C Ceramic 1n00 -20+80% 63V	213-013
C 48	C Ceramic 1n00 -20+80% 63V	213-013
C 49	C Ceramic 1n00 -20+80% 63V	213-013

C 50	C Ceramic 10p0 2% 100V NP0	213-205
C 51	C Ceramic 2n20 -20+80% 63V	213-012
C 52	C Ceramic 2n20 -20+80% 63V	213-012

DIODES

CR 1	Diode BA389 pin Vr-30 If-20mA	350-038
CR 2	Diode BA389 pin Vr-30 If-20mA	350-038
CR 3	Diode BA389 pin Vr-30 If-20mA	350-038
CR 4	Diode zener BZX79-C12V 0.4W	350-605
CR 5	Diode BAV20 Si Vr-150V If-250mA	350-023
CR 6	Diode zener BZX79-C10V 0.4W	350-657
CR 7	Diode zener BZX79-C6V2 0.4W	350-604
CR 8	Diode Hot Carrier 5082-2811 S 8V DO35	350-032
CR 9	Diode Hot Carrier 5082-2811 S 8V DO35	350-032
CR 11	Diode Hot Carrier 5082-2811 S 8V DO35	350-032
CR 12	Diode Hot Carrier 5082-2811 S 8V DO35	350-032

RELAYS & JUMPERS

K 1	Relay, Double Throw 12V	570-083

CHOKES

L 3	Choke HF Mini 100U/10% 192MA	703-009
L 4	Choke HF Mini 100U/10% 192MA	703-009
L 5	Choke HF Mini 100U/10% 192MA	703-009
L 6	Choke HF Mini 22U/10% 0.75A	703-013
L 8	Choke HF Mini 47U 5% 450mA 1.1 Ohm	703-008
L 9	Choke HF Mini 47U 5% 450mA 1.1 Ohm	703-008

TRANSISTORS

Q 1	Transistor BF959 npn	360-123
Q 2	Transistor BFR96 npn	360-199
Q 3	Transistor BFR96 npn	360-199
Q 4	Transistor BFQ32 pnp	360-198
Q 7	Transistor 2N3906 pnp	360-062
Q 8	Transistor 2N3906 pnp	360-062
Q 9	Transistor BC547B npn	360-159
Q 10	Transistor BFY90 SI NPN 15V 25mA 200mW TO72	360-071
Q 11	Transistor 2N2905A SI PNP 60V 600mA 600mW TO39	360-073
Q 12	Transistor 2N3725 SI NPN 50V 1A 1W TO-39	360-211

INTEGRATED ANALOG CIRCUITS

QA 1	IC CA2818 Hybrid Amplifier	364-460
QA 2	IC LM301AH OP-AMP	364-016
QA 3	IC MC1495L Multiplier	364-459

RESISTORS

R 1	R Metal film 390E 5% 0.2W TC250	107-339
R 2	R Metal film 220E 5% 0.2W TC250	107-322
R 2	R Metal film 2K70 5% 0.2W TC250	107-427
R 3	R Metal film 680E 5% 0.2W TC250	107-368
R 3	R Metal film 2K70 5% 0.2W TC250	107-427
R 4	R Metal film 390E 5% 0.2W TC250	107-339
R 5	R Metal film 33E0 5% 0.2W TC250	107-233
R 6	R Metal film 47E0 5% 0.2W TC250	107-247
R 7	R Metal film 2K70 5% 0.2W TC250	107-427
R 8	R Metal film 47E0 5% 0.2W TC250	107-247
R 9	R Metal film 1K00 5% 0.2W TC250	107-410
R 10	R Carbon Film 560E 5% 0.2W	106-356
R 11	R Metal film 270E 5% 0.2W TC250	107-327
R 12	R Metal film 1K00 5% 0.2W TC250	107-410
R 13	R Metal film 680E 5% 0.2W TC250	107-368
R 14	R Metal film 1K00 5% 0.2W TC250	107-410
R 15	R Metal film 1K50 5% 0.2W TC250	107-415
R 16	R Metal film 680E 5% 0.2W TC250	107-368
R 17	R Metal film 1K80 5% 0.2W TC250	107-418
R 18	R Metal film 47E0 5% 0.2W TC250	107-247
R 24	R Metal Film 442E 1% 0.5W TC50	113-442
R 25	R Metal film 330E 5% 0.2W TC250	107-333
R 26	R Metal film 1M00 5% 0.2W TC250	107-710
R 27	R Metal film 39K0 5% 0.2W TC250	107-539
R 30	R Carbon Film 15M 10% 1/8W 140PPM	109-016
R 31	R Metal film 3K90 5% 0.2W TC250	107-439
R 32	R Metal film 470E 5% 0.2W TC250	107-347
R 33	R Metal film 3K30 5% 0.2W TC250	107-433
R 34	R Cermet Trimpot 22K 20% 0.3W TC70	182-303
R 35	R Metal film 56K0 5% 0.2W TC250	107-556
R 36	R Metal film 560E 5% 0.2W TC250	107-356
R 37	R Metal film 100E 5% 0.2W TC250	107-310
R 38	R Metal film 8K20 5% 0.2W TC250	107-482
R 39	R Metal Film 1K00 1% 0.5W TC50	114-100
R 40	R Metal Film 10K5 1% 0.5W TC50	115-105
R 41	R Metal film 100E 5% 0.2W TC250	107-310
R 42	R Metal Film 2K00 1% 0.5W TC50	114-200
R 43	R Metal Film 10K5 1% 0.5W TC50	115-105
R 44	R Metal film 1K50 5% 0.2W TC250	107-415
R 45	R Metal film 1K00 5% 0.2W TC250	107-410
R 46	R Metal film 1K50 5% 0.2W TC250	107-415
R 47	R Metal film 100E 5% 0.2W TC250	107-310
R 48	R Metal film 5K60 5% 0.2W TC250	107-456
R 49	R Metal film 1K50 5% 0.2W TC250	107-415
R 50	R Metal film 18K0 5% 0.2W TC250	107-518
R 51	R Metal film 270E 5% 0.2W TC250	107-327
R 52	R Metal film 5K60 5% 0.2W TC250	107-456
R 53	R Metal film 560E 5% 0.2W TC250	107-356
R 54	R Cermet Trimpot 1K 20% 0.5W TC150	182-001
R 55	R Metal film 820E 5% 0.2W TC250	107-382
R 56	R Metal film 1K50 5% 0.2W TC250	107-415
R 57	R Metal film 10E0 5% 0.2W TC250	107-210

R 58	R Metal Film 49E9 1% 0.5W TC50	112-499
R 59	R Metal film 10E0 5% 0.2W TC250	107-210
R 60	R Metal film 330E 5% 0.2W TC250	107-333
R 61	R Metal film 220E 5% 0.2W TC250	107-322
R 62	R Carbon Film 1E0 5% 0.2W	106-110
R 63	R Metal Film 49E9 1% 0.5W TC50	112-499
R 64	R Carbon Film 10E 5% 0,2W	106-210
R 66	R Metal film 33E0 5% 0.2W TC250	107-233
R 67	R Metal film 27E0 5% 0.2W TC250	107-227
R 68	R Metal film 1K50 5% 0.2W TC250	107-415

MISCELLANEOUS

	Solder sleeve	062-625
	Coax Cable 50E	616-064
	Wire Electrical Tinned 0.5mm	648-050
	Enamelled Copper Wire Diam. 0.70	650-070
	HF-Wire Soldeable 3 x 0.07	652-001
	Filter Kit, Complete	720-038
	Wire Wrap Terminal	805-727
	Spacer Transistor Pads TO-5	816-106
	PCB Output Amplifier Issue 4	971-033
	PCB Issue 1	971-136
L 1*	Coil	740-052
L 2*	Coil	740-052
W 1*	Coax Cable W1	616-116
W 2*	Coax Cable W2	616-117

FILTER II (901-647)

CAPACITORS

C 1	C Ceramic 180p 2% 100V N750	213-228
C 2	C Ceramic 8p20 p25 100V NP0	213-224
C 3	C Ceramic 270p 2% 100V N750	213-213
C 4	C Ceramic 27p0 2% 100V NP0	213-207
C 5	C Ceramic 270p 2% 100V N750	213-213
C 6	C Ceramic 47p0 2% 100V NP0	213-209
C 7	C Ceramic 150p 2% 100V N750	213-212
C 8	C Ceramic 2n20 -20+80% 63V	213-012

RESISTORS

R 1	R Metal film 560E 5% 0.2W TC250	107-356

MISCELLANEOUS

	Coax Cable 50E RG 196/U	600-014
	Coax Cable 50E	616-065
	Wire Electrical Tinned 0.5mm	648-050
	HF-Wire Soldeable 10X0.05	652-008
	Filter Kit, Complete	720-038
	Insulation Sheet 0. 25X6. 5X11	932-878
	PCB Filter II Issue-3	971-218
L 1*	Coil L1 For 901-528	740-180
L 2*	Coil L2 For 901-528	740-181
L 3*	Coil L3 For 901-528	740-182
W 1*	Coax Cable W1	616-168
W 2*	Coax Cable W2	616-169

MIXER II (901-532)

CAPACITORS

C 1	C Ceramic 1n00 -20+80% 63V	213-013
C 2	C Ceramic 1n00 -20+80% 63V	213-013
C 3	C Ceramic 1n00 -20+80% 63V	213-013
C 4	C Ceramic 1n00 -20+80% 63V	213-013
C 5	C Ceramic 1n00 -20+80% 63V	213-013
C 6	C Ceramic 12p0 p25 100V NPO	213-227
C 7	C Ceramic 1n00 -20+80% 63V	213-013
C 8	C Ceramic 12p0 p25 100V NPO	213-227

CHOKES

L 1	Choke HF Mini 2u2 10% 1A 0. 25ohm	703-011

TRANSISTORS

Q 1	Transistor BF959 npn	360-123
Q 2	Transistor BF959 npn	360-123

RESISTORS

R 1	R Metal film 56E0 5% 0.2W TC250	107-256
R 2	R Metal film 1K80 5% 0.2W TC250	107-418
R 3	R Metal film 270E 5% 0.2W TC250	107-327
R 4	R Metal film 470E 5% 0.2W TC250	107-347
R 5	R Metal film 56E0 5% 0.2W TC250	107-256
R 6	R Metal film 150E 5% 0.2W TC250	107-315
R 7	R Metal film 5K60 5% 0.2W TC250	107-456
R 8	R Metal film 5K60 5% 0.2W TC250	107-456
R 9	R Metal film 56E0 5% 0.2W TC250	107-256
R 10	R Metal film 1K20 5% 0.2W TC250	107-412
R 11	R Metal film 82E0 5% 0.2W TC250	107-282
R 12	R Metal film 56E0 5% 0.2W TC250	107-256

MIXERS

U 1	Double Balanced Mixer 1-500MHZ SBL-1	910-120

MISCELLANEOUS

	Wire Wrap Terminal	805-727
	PCB Mixer II Issue-3	971-223

PHASE DETECTOR II (901-549)

CAPACITORS

C 1	C Ceramic 1n00 -20+80% 63V	213-013
C 2	C Ceramic 4n70 -20+80% 63V	213-010
C 3	C Tantalum 10u 20% 16V	267-000
C 4	C Polyst 1u00 10% 63V	241-027
C 5	C Ceramic 4n70 -20+80% 63V	213-010
C 6	C Ceramic 1n00 -20+80% 63V	213-013
C 7	C Ceramic 1n00 -20+80% 63V	213-013
C 8	C Polyester u33 10% 100V	241-024
C 9	C Polyst 33n0 10% 250V	241-021
C 10	C Polyester u68 10% 63V	241-030
C 11	C Ceramic 1n00 -20+80% 63V	213-013
C 12	C Ceramic 10n0 -20+80% 63V	213-020

DIODES

CR 1	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 2	Diode BAV10 Si Vr-60V If-600mA	350-022

CHOKES

L 1	Choke HF Mini 150 10% 0.6A 0.6 Ohm	703-020
L 3	Choke HF Mini 100U 10% 90MA	703-037

TRANSISTORS

Q 1	Transistor BC547B npn	360-159
Q 2	Transistor BC547B npn	360-159
Q 3	Transistor BC547B npn	360-159
Q 4	Transistor BC557B pnp	360-160
Q 5	Transistor BC557B pnp	360-160
Q 6	Transistor BC547B npn	360-159
Q 7	Transistor JFET 2N4867N 40V 10mA 310mW TO92	360-197
Q 8	Transistor BC557B pnp	360-160
Q 9	Transistor BC547B npn	360-159
Q 10	Transistor BC547B npn	360-159

INTEGRATED DIGITAL CIRCUITS

QD 1	IC SN74LS90N Decade counter	364-187
QD 2	IC MC14568 Phase com. and prog. Counter	364-327
QD 3	IC HEF4522BP Programmable 4-bit BCD down counter	364-325
QD 4	IC HEF4518P Dual BCD counter	364-226

RESISTORS

R 1	R Metal film 47E0 5% 0.2W TC250	107-247
R 2	R Metal film 6K80 5% 0.2W TC250	107-468
R 3	R Metal film 15K0 5% 0.2W TC250	107-515
R 4	R Metal film 470E 5% 0.2W TC250	107-347
R 5	R Metal film 270E 5% 0.2W TC250	107-327

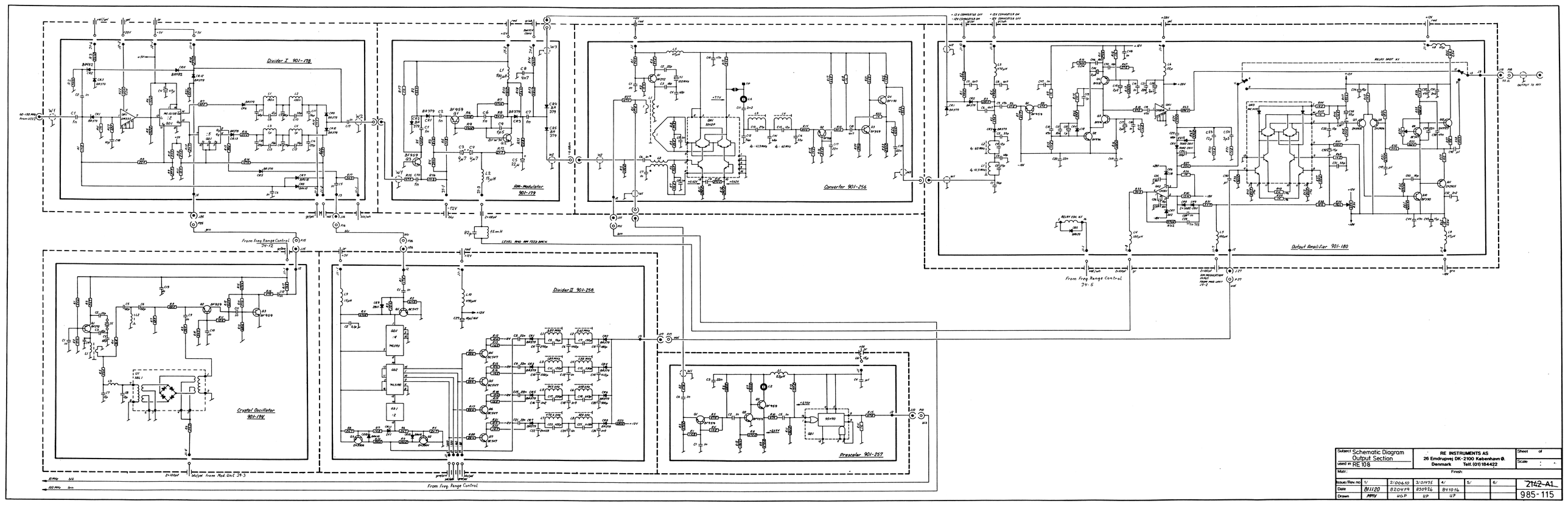
R 6	R Metal film 5K60 5% 0.2W TC250	107-456
R 7	R Metal film 39K0 5% 0.2W TC250	107-539
R 8	R Metal film 2K20 5% 0.2W TC250	107-422
R 9	R Metal film 10K0 5% 0.2W TC250	107-510
R 10	R Metal film 39K0 5% 0.2W TC250	107-539
R 11	R Metal film 6K80 5% 0.2W TC250	107-468
R 12	R Metal film 6K80 5% 0.2W TC250	107-468
R 13	R Metal film 6K80 5% 0.2W TC250	107-468
R 14	R Metal film 6K80 5% 0.2W TC250	107-468
R 15	R Metal film 10K0 5% 0.2W TC250	107-510
R 16	R Metal film 10K0 5% 0.2W TC250	107-510
R 17	R Metal film 2K70 5% 0.2W TC250	107-427
R 18	R Metal film 2K70 5% 0.2W TC250	107-427
R 19	R Metal film 100E 5% 0.2W TC250	107-310
R 20	R Metal film 3K90 5% 0.2W TC250	107-439
R 21	R Metal film 2K20 5% 0.2W TC250	107-422
R 22	R Metal film 2K70 5% 0.2W TC250	107-427
R 23	R Metal film 82E0 5% 0.2W TC250	107-282
R 24	R Metal film 1K00 5% 0.2W TC250	107-410
R 25	R Metal film 10K0 5% 0.2W TC250	107-510
R 26	R Metal film 3K90 5% 0.2W TC250	107-439
R 27	R Metal film 22K0 5% 0.2W TC250	107-522
R 28	R Metal film 22K0 5% 0.2W TC250	107-522
R 29	R High Ohmic 1G 10% 0.25W	145-010
R 30	R Metal film 10K0 5% 0.2W TC250	107-510
R 31	R Metal film 1K00 5% 0.2W TC250	107-410
R 32	R Metal film 4K70 5% 0.2W TC250	107-447

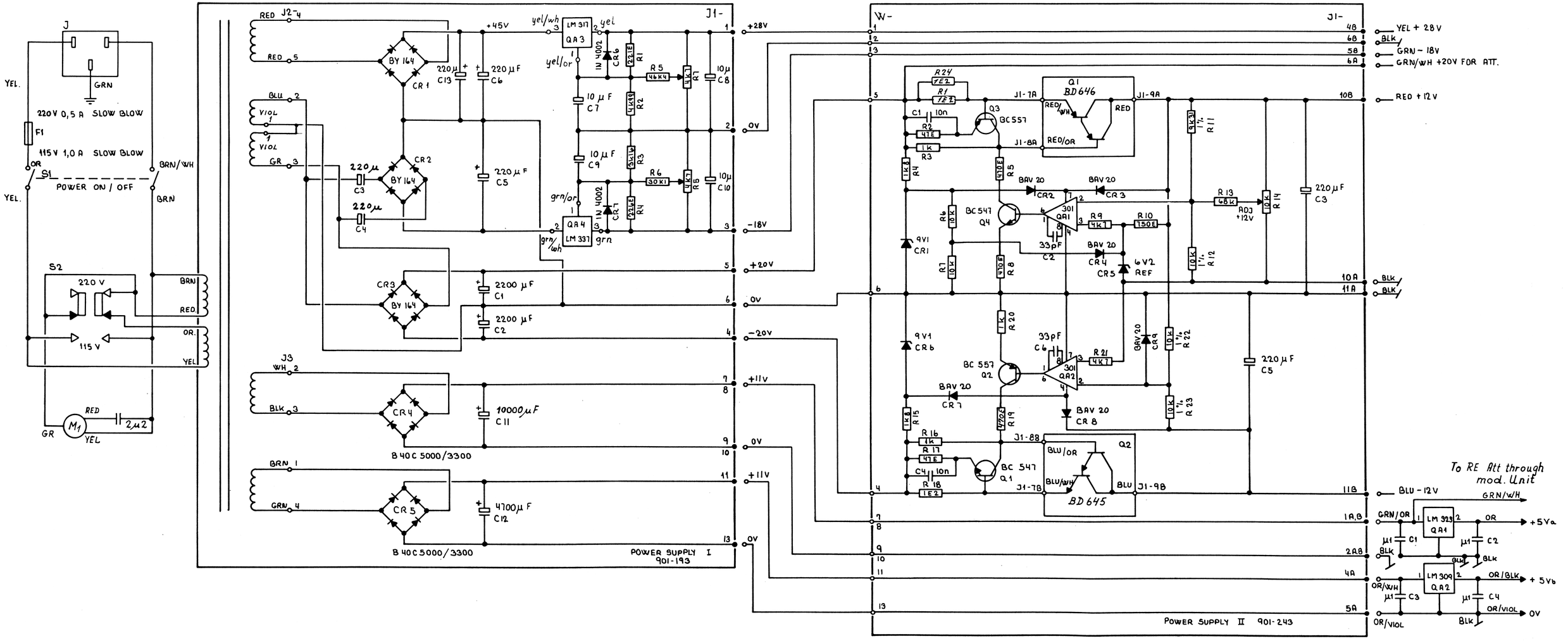
MISCELLANEOUS

	Solder sleeve	062-625
	Coax Cable 50E RG 196/U	600-014
	Wire Electrical Black AWG 24	634-000
	Wire Electrical Brown AWG 24	634-001
	Heat shrinkable Sleving 03,2x10 Black	692-815
	Wire Wrap Terminal	805-727
	Housing for Multiplug 3-Polet	805-811
	Crimpsocket Mod. IV	805-820
	Codepin Mod IV	805-821
	EPDM rubber black 02x1,5	840-027
	PCB Phase Detector II RE107	971-237
W 1*	Coax Cable W1	616-128

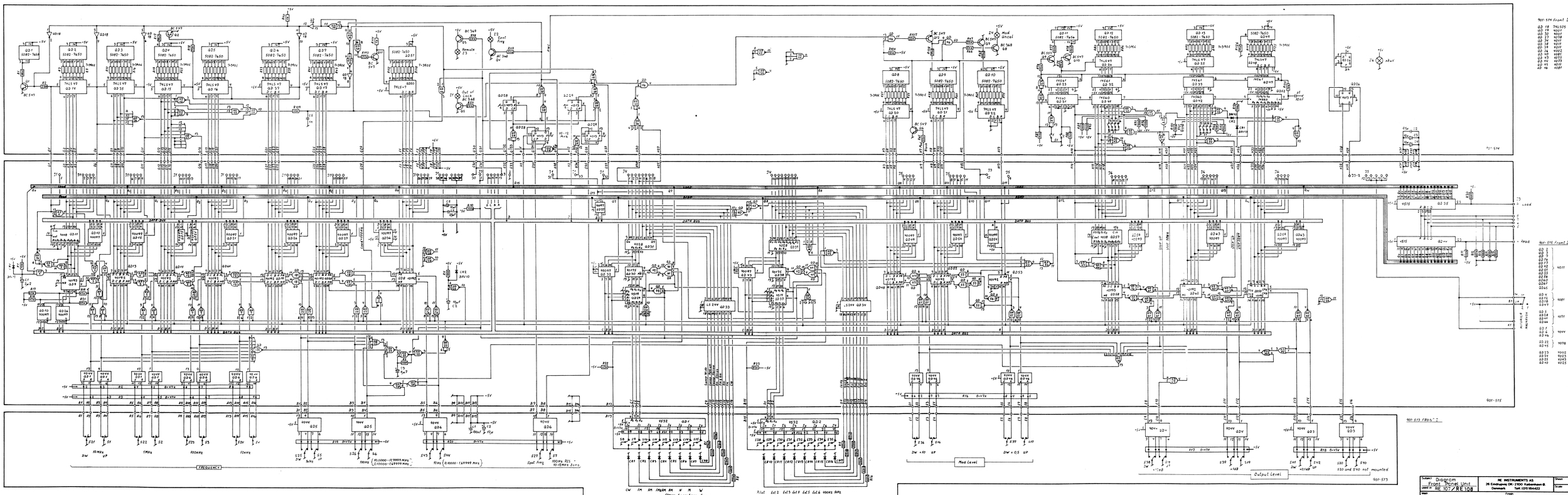
Subject	Schematic Diagram Synthesizer Section	RE INSTRUMENTS AS 26 Emdrupvej DK-2100 København Ø. Denmark, Telf. (01) 184422	Sheet of
used in	RE 108		Scale :
Matr.:		Finish:	

Issue/Rev. no	1/	2. 00610	3/ 01475	4/	5/	6/	~~2139-A1~~
Date	811113	820419	830926	841016			985-114
Drawn	SM/UGP	UGP	UP	UP			


Divider I 901-178
RM-Modulator 901-179
Converter 901-256
Output Amplifier 901-180
Crystal Oscillator 901-194
Divider II 901-258
Prescaler 901-257
From Freq Range Control 34-5
From Freq Range Control
LEVEL RMO RM FEED BACK
RELAY SHUT XI
RELAY COIL K1
+12V CONVERTER OFF
-12V CONVERTER ON
+12V CONVERTER ON
-12V CONVERTER OFF
50-150 MHz from VCO
OUTPUT TO ANT.
Subject Schematic Diagram
Output Section
used in RE 108
RE INSTRUMENTS AS
26 Emdrupvej DK-2100 København Ø.
Denmark Telf. (01) 184422
Matr.:
Finish:
Sheet of
Scale
Issue/Rev. no. 1/ 2/ 00610 3/ 01975 4/ 5/ 6/
Date 811120 820419 830926 841016
Drawn MMV GGP UP UP
2142-A1
985-115



Subject: Schematic diagram Power supply	RE INSTRUMENTS AS 26 Emdrupvej DK-2100 København Ø. Denmark Telf. (01) 184422					Sheet	of
used in: RE 107/108						Scale	:
Matr.	Finish:						
Issue/Rev. no.	1	2 00106	3 01475	4	5 02538	6 4020	2143-A1
Date	811119	820419	830926	841016	850215	89 02 09	985-116
Drawn	SM/EMP	UGP	UP	UP	UP	MG	

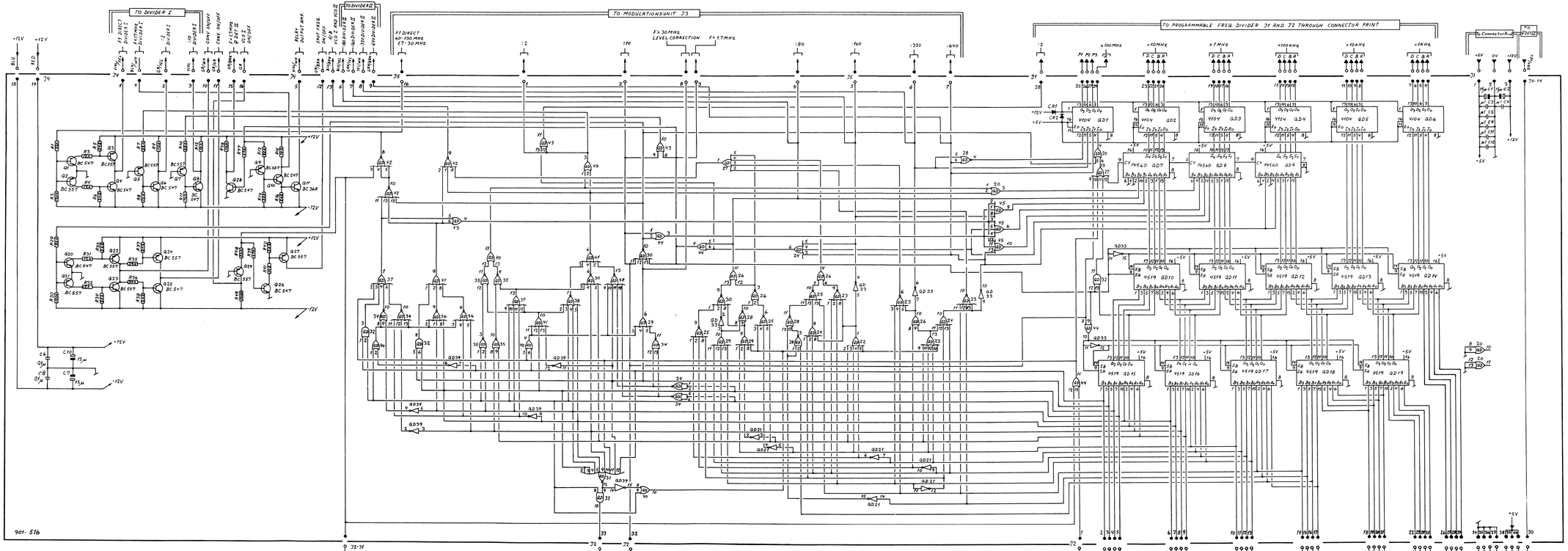


Subject: Diagram Front Panel Unit used in: RE 107 / RE 108	RE INSTRUMENTS AS 26 Emdrupvej DK-2100 Kobenhavn Ø Denmark Telf. (01) 184422
Sheet: of	Scale: -
Issue:	Finish:
Issue/Rev.no.	1 2 3 4 5 6
Date: 85/10/4	86/01/6
Drawn: U.P.	U.P.

-A

985-123

Subject	Schematic Diagram Modulation Unit		RE INSTRUMENTS AS 26 Emdrupvej DK-2100 København Ø. Denmark Telf. (01) 184422				Sheet of
used in	RE 107/RE 108						Scale :
Matr.:			Finish:				
Issue/Rev. no	1/	2/	3/02538	4/ 4019	5/	6/	
Date	831106	841016	850215	890208			985-127
Drawn	UGP/	UP	UP	MG			



Subject: Schematic Diagram Freq. Range Control	RE INSTRUMENTS AS 26 Emdrupvej DK-2100 København Ø. Denmark Telf. (01) 184422					Sheet of	
Used in: RE 107/RE 108						Scale:	-
Matr	Finish						
Issue/Rev. no.	1	2	3 02538	4	5	6	-A1
Date	831106	841016	850215				985-128
Drawn	UP	UP	UP				