



ROHDE & SCHWARZ

SERVICE INSTRUCTIONS

Attenuation Set Module

802.4223.02

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Caution: The module must not be opened. The guarantee is otherwise void and the instrument must be recalibrated.

5.1 Function Description

The switches on the attenuator pads are driven by D1, a shift register (serial in/parallel out), via the power drivers D10, D11, D12, D13. The power attenuator pad (L) is driven via D3 and V8 because it is necessary to switch the pad from the RF overvoltage protection (limiter diodes Z9) in addition to via the controller interface. The signal path in this case is: Z9 → Z11/Z12 → comparators N1 → D3 (pin 6) → V8 → power attenuator pad. Once the limiter diodes have responded, the circuit V50 and V60 effects the diodes so, that they are fully driven in the forward direction for approx. 10 ms thus the RF power, which may be up to 50 W, is short-circuited until the power attenuator pad Z10 is switched on. If the function of the limiter diodes is no longer required, they can be switched in the reverse direction using V9, V10 and V11 so that they do not produce intermodulation. The components V15/R2 and V1/R27 determine the operating point of the limiter diodes.

The attenuation set is connected between the output stage of the RF synthesizer and the input/output of the instrument. The function of the attenuation set during the receiver test is to attenuate the level of the RF synthesizer. Two 40-dB attenuator pads, two 20-dB attenuator pads (one as part of the 12-dB power divider), one 10-dB attenuator pad and one 5-dB attenuator pad are used to this end. The smallest possible resolution is therefore 5 dB. The intermediate values are produced electronically by the output stage (802.7616.02).

A differentiation is made between two cases in the transmitter test: on the one hand, the signal passes directly via the power divider. If the power divider is bypassed, the signal on the RF overvoltage protection switches the divider on. The power is divided amongst 3 paths in this second case: to the rear (RF -30 dB) for further external processing, to the power meter and to the demodulators.

The signal of the power test point of Z10 is applied via Z13 and Z14 to the subtracting amplifier N5 whose output X41.16 is connected to the A/D converter. Once this analog signal has been digitized using the comparator, a power above a threshold of approx. 1 W indicates to the controller via D3 using an interrupt that a power is present. The power measuring diodes can also be biased in the reverse direction via N5 (pins 1, 2, 3) in order to prevent intermodulation whilst relinquishing the power measuring function.

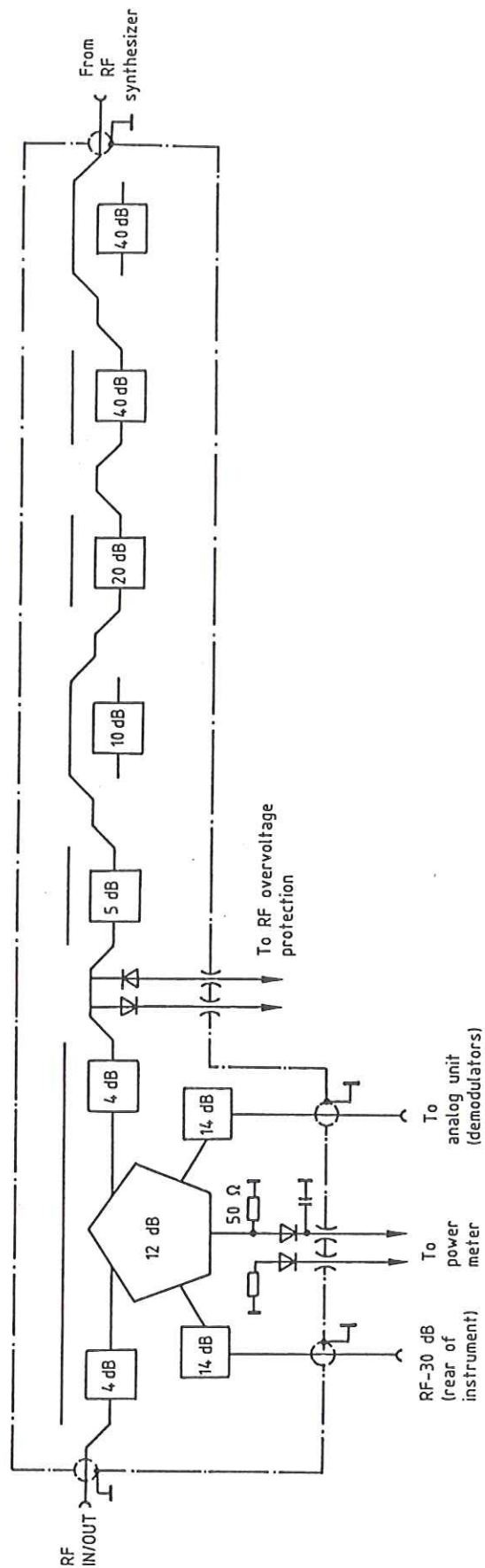


Fig. 5-1 Block diagram of the RF attenuation set

5.2 Testing and Adjustment

Potentiometer R34 is used to adjust the response threshold of the RF overvoltage protection. The adjustment is carried out in the complete instrument (see Section 4).

5.3 Interfaces

Connector	Input Output	Designation	Value
W1	I/O	RF IN/OUT	I: 5 mW to 50 W O: 1 V
W2	I	RF IN	1 V
Z13	O	Input voltage	$V_{PK\ RF} - 16\ dB$
Z14	O	Reference voltage	$-0.25\ V \pm 0.1\ V$
Z11	I/O	Positive	+3 V
Z12	I/O	overvoltage protect. negative	-3 V
			*)
X41.16	O	Power: DC	$V_{PK\ RF} - 16\ dB$
X41.13	O	Power: Trigger	TTL **)
X41.11	I	Data	CMOS 5 V
X41.12	I	Clock	CMOS 5 V
X41.15	I	Strobe	CMOS 5 V
X41.3	O	Interrupt: Power	CMOS 5 V
X41.14	O	Interrupt: Thermo	CMOS 5 V
X41.8	I	+24 V	<10 mA
X41.7	I	+15 V	<40 mA
X41.10	I	-15 V	<10 mA
X41.5	I	+ 5 V	<10 mA

*) Dependent on R34 in unloaded status

**) Threshold with $V_{RF} = \text{approx. } 1\ V$

