

# RF Receiver

FREQUENCY RANGE: 2-18 GHz

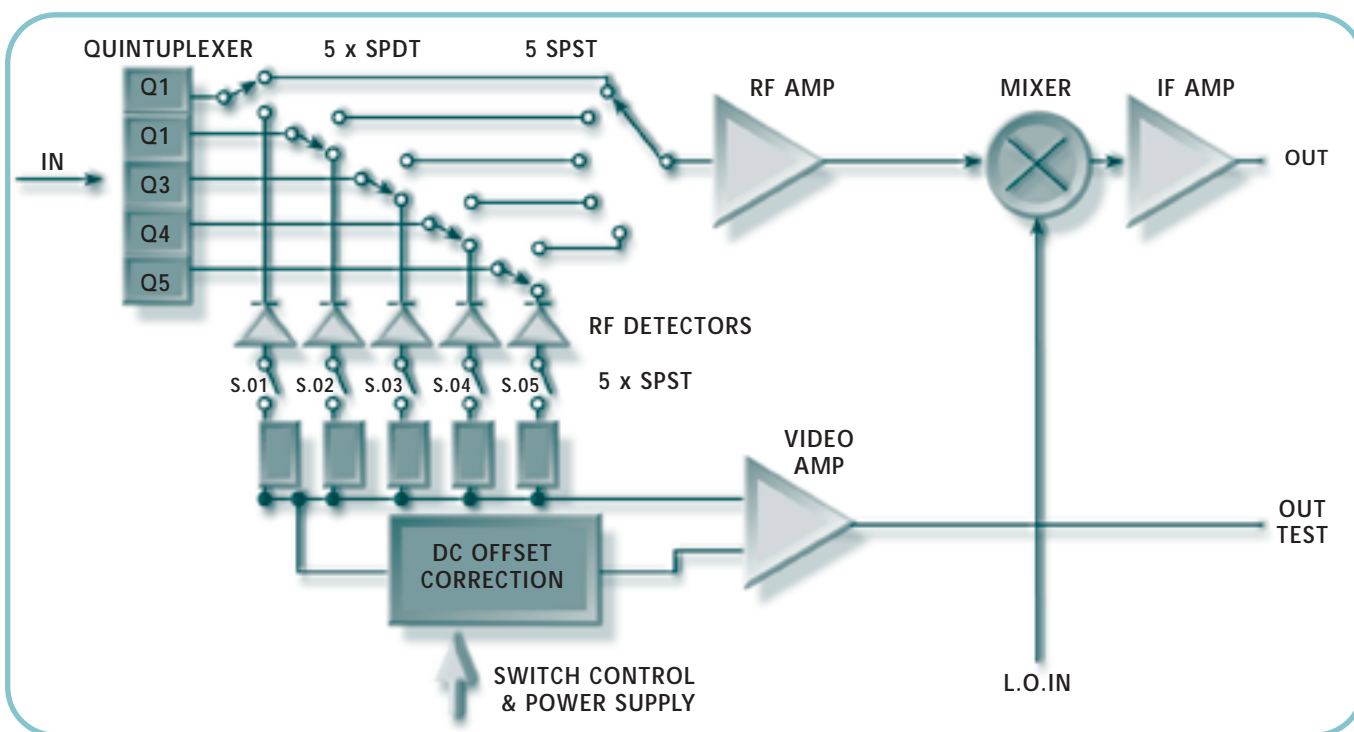
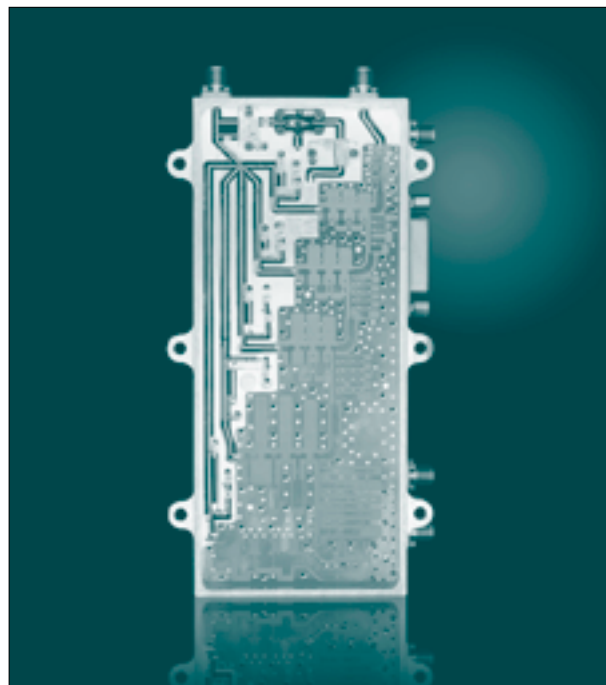
- ▶ RF to IF Output
- ▶ RF to Video Output
- ▶ High Dynamic Range RF to IF Converter

## APPLICATION

- ▶ EW Systems

## TECHNOLOGY

- ▶ Microstrip
- ▶ MMIC
- ▶ Suspended Quintuplexer
- ▶ PIN Diode Switches
- ▶ Hermetically Sealed (Laser)



## RF RECEIVER (continued)

### GENERAL INFORMATION

The RF Receiver (RFREC) is an integrated unit consisting of the following components:

- Quintuplexer (Q)
- 5 x SPDT Switch
- Single Pole 5 Throw Switch (SP5T)
- Five Broadband RF Detectors (RFD)
- 5 Video Switches (5 x SPST)
- Video Amplifier (VA)
- RF Amplifier
- RF Mixer
- IF Amplifier (IFA)

The unit has two outputs:

- 1 of 5 selected RF bands
- Switchable RF detected signals

The incoming signal is fed to the Quintuplexer (Q).

The Quintuplexer consist of five sub band filters (Q1, Q2, Q3, Q4, Q5).

The output of the Quintuplexer is fed to SP5T non reflective switch.

The Output of the SP5T Switch is fed to an isolation amplifier and series attenuation to the RF mixer, the IF output is amplified by the IF amplifier.

The outputs of the quintuplexer, which are not selected by the SP5T, are fed to 5 RF Detectors (RFD) which are located instead of the termination resistors of the SP5T switch. After every detector there is an analog switch, and the output of the switches are summed to the Video Amplifier. The DC correction circuit is incorporated into the Video Amplifier. The control of the analog switch is activated through a decoder

### ELECTRICAL SPECIFICATIONS

-15 VDC; I = 100 mA max.

+15 VDC; I = 300 mA max.

+5 VDC; I = 280 mA max.

-5.2 VDC; I = N.A.

### CHARACTERISTICS

#### Input Frequency Range

2 – 18 GHz min.

The frequency range is divided to five sub bands Q1- Q5 (band edge cross-over frequency).

The accuracy of cross-over frequencies is  $\pm 0.5\%$

#### Noise Figure

Frequency Range: 50 – 700 MHz including insertion loss in the passband of every sub band. (Passband the range of frequency in the sub band with insertion loss less than 1.5 dB). For sub bands Q3, Q4, Q5 the noise figure is calculated for the third harmonic of the mixer (20 dB conversion loss)

#### N.F. Max. dB

Band/F (Mhz)	50	300–600	700
Q1	20.5	19.5	20
Q2	20.5	19.5	20
Q3A	21	20	20.5
Q3B	31	30	30.5
Q4	31	30	30.5
Q5	32.5	31.5	32

F=Frequency in MHz

#### Gain As a Function of Input Frequency in Every Sub-Bands Q1, Q2, Q3, Q4, Q5

The IF frequency range 50 to 700 MHz.

#### Gain/Frequency Sub-Bands Q1 – Q5

Subband Filter	Passband Gain (dB)	
	Min.	Max.
Q1	+1	+5
Q2	+1	+5
Q3	-1	+3
Q4	-10	-5
Q5	-12	-6

### VSWR In/Out

Input to the RF Receiver

2 : 1 max 85% of the bandwidth  
2 – 18 GHz

2.5 : 1 max 15% of the bandwidth  
2 – 18 GHz

Local Oscillator Input

2.5 : 1 max

Output of the RF Receiver (OUT)

1.8 : 1 max

### Recovery Time

The time that takes the unit to get out of any saturated state due to excess input power to full performance as described in the specification

100nsec max.

### Incident Power Level

-65 dBm to +14 dBm

### Power Input Compression Point

RF Band	1dB Compression Point
Q1	+7 dBm min
Q2	+7 dBm min
Q3	+8 dBm min
Q4	+8 dBm min
Q5	+9 dBm min

### Power Output at 1 dB GCP

(The measurement shall be done at the component level)

(dB) Compression Point	(dBm min) Power Output
+0.25	+11
+0.5	+12.5
+1	+14

### Power Handling Capability

+24 dBm max

### Switching Speed (of the SP5T Switch)

The time required for the unit to attain 90% of the final RF signal reference to the 50% level of the command signal

1µsec max

### Third Order Intercept Point

For fundamental mode of the mixer

+18 dBm min

For third harmonic of the mixer

+8 dBm min

### Second Order Intercept Point

For fundamental mode of the mixer

+21 dBm min

For third harmonic of the mixer

+11 dBm min

The RF and LO frequencies have to be chosen such that the intermodulation frequency will be between 50 – 600 MHz

### Setting Time to 0.1%:

50 nsec max.

Pulse settling time is defined as the time for the pulse to rise from 10% RF and settle to within  $\pm 0.5$  dB of final value for pulse dynamic range of 35 dB

### Output Impedance:

$51\Omega \pm 0.5\Omega$  max.

The load of the output test is  $100\Omega$

### Analog Switch Switching Time:

1 µsec max.

The time required for the switch to attain 99% of the final voltage at the test output. (From "OFF" to "ON" and from "ON" to "OFF")

### ON to OFF Isolation Rejection Ratio at Frequency of 40 MHz:

50 dB min.

### Cross Coupling Rejection Ratio at Frequency of 10 MHz:

80 dB typ

Is the leakage between each channel to the other channels

### Isolation of the SPDT Switch:

45 dB min.

### LO Power:

13 – 20 dBm