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RF-4500 Repeater

Microwave Repeater Systems

Applications

- Low-cost, highly reliable 4.5 GHz microwave through repeater for extending range of or clearing obstructed microwave radio paths.
- Excellent performance with analog, digital, or video microwave radios; channel capacity to 1800 FDM, 1920 PCM(140Mb/s) or multiple video.
- Compatible with any manufacturer's 4-GHz radio terminal.
- Solar power compatible -- economical in thin routes and remote locations.

Features

- RF output power up to +25 dBm analog and FSK, lower power for digital.
- Power consumption only 2.5 amperes at 12 Vdc for duplex operation.
- Solar powered, ac powered, or powered by primary cells.
- Compact and lightweight -- ideally suited for remote sites that do not have access roads or commercial power.
- Environmentally protected aluminum, weathertight, lockable cabinet. No extra environmental shelter required in most installation. Suitable for use at unimproved sites anywhere in the world -- Alaska to Saudi Arabia.
- Duplex frequency diversity, multi- RE channel and three-way or "Y junction" configurations available.
- Only one active element per channel, the internally redundant linear amplifier.
- AGC/ALC provided to correct input fades and reduce overload.
- Amplifiers can be replaced without disrupting service.
- RMAS-I20 Alarm system (optional) to remotely monitor repeater.
- Provided with directional couplers for in-service RE output power measurements.
- No frequency conversion -- received signal is filtered, amplified, and re-radiated.
- Very reliable, greater than 85,000 hours MTBF for duplex.
- Approved for use with 4-GHz radio systems.
- Available as a self-contained RF repeater for use with customer-furnished antenna and power equipment or as a complete package including repeater, antenna, solar electric panels, battery charger and batteries.
- Steel, weatherproof, lockable cabinet. No environmental shelter required in most installations.

RF-4500 Repeater

Technical Summary

General

Frequency Range	4.4 to 5.0 GHz
Maximum Gain	60 dB (0 dB AGC/ALC)
AGC/ALC (Nominal Gain = 45 dB)	15 dB down fade, 5 dB up fade
Noise Figure	7 dB
3rd Order Intercept	+35 dBm

Antenna Connections

Return Loss	26 dB min.
Antenna Ports	CPR-187G, gasket
Waveguide Type	WR-187, EW 44 WC 281, WC 269

Frequency Plan

Channel Bandwidth	40 MHz, 1 dB
T-R Spacing	80 MHz, min.
T-T Spacing (Frequency Diversity, 1+1) on common feeders	80 MHz, min.

Channel Response

Amplitude	± 0.5 dB, $f_0 \pm 20$ MHz
Group Delay	4 nSec/peak to peak, $f_0 \pm 20$ MHz

Power Requirements

Nominal Voltage	+13.5 Vdc, +/- 1 Vdc
Voltage Range	+11 to +16 Vdc
Polarity	Negative Ground

Current:

RF-4000-11 Duplex	2.2A
RF-4500-01 ,-1 1 Duplex	2.5A
RF-4500-02,-12 Duplex, FD 4 Arnpl.	5.0A
RF-4500-15, 2+1	7.5A
RF-4500-16, 3+1	10.0A

RF-4500 Repeater

Environmental Conditions

Ambient Temperature	-40 °C to +60 °C
Relative Humidity	90% (housing internal) 100% (housing external)
Altitude	15000 ft (5000 m)

Reliability (Single channel duplex)

MTBF	85,000 hours
MTRR	30 minutes

Dimensions: Single Housing (-01.02.-11.-12)

Housing	Weather Tight Aluminum
Total Height, including W/G ports	35 in (88.9 cm)
Height, excluding W/G ports	28 in (71.1 cm)
Width, including vent hoods	27.3 in (69.4 cm)
Depth	15.5 in (39.4 cm)
Weight	123 Pounds (56 kg)

NOTE: 2 Housing used for RF-4500-15,16.

RF-4500 Repeater

Gain - Power - Noise Figure Table

FOR FM/FSK/MSK*

OPTION	FREQUENCY CHANNEL	LINEAR GAIN MIN. dB	AGC/ALC ON *		NOISE FIGURE dB
			POWER INPUT dBm (40 dB Gain)	POWER OUTPUT dBm	
RF-4500-01	F1, F2	60.0	-20.0	+25.0	7.0
RF-4500-02	F1, F2	60.0	-20.0	+25.0	7.0
	F3, F4	58.3	-19.1	+24.1	7.9
RF-4500-11	F1, F2	56.8	-19.6	+23.4	8.6
RF-4500-12	F1, F2	56.8	-19.6	+23.4	8.6
	F3, F4	55.5	-19.5	+22.5	9.5
RF-4500-15	F1, F2	56.8	-19.6	+23.4	8.6
	F3, F4	55.0	-19.5	+22.5	9.5
	F5, F6	51.2	-19.0	+21.0	11.4
RF-4500-16	F1, F2	56.8	-19.6	+23.4	8.6
	F3, F4	55.0	-19.5	+22.5	9.5
	F5, F6	51.2	-19.0	+21.0	11.4
	F7, F8	49.5	-18.8	+20.1	12.3

*For Other Modulation, Please Refer to the Following Table:

MODULATION	POWER BACKOFF dB
FM/FSK/MSK	+25 dBm
4PSK	+23 dBm
16QAM	+19 dBm
64QAM	+15 dBm
QPR3/9QPRS	+20 dBm
QPR7/49QPRS	+19 dBm

Peninsula Engineering Solutions, inc. may change performance specifications where necessary to meet industry requirement.