

World Headquarters

39 Grand Canyon Lane
San Ramon,
California 94582 USA

Telephone

+1 925 901 0103

Facsimile

+1 925 901 0403

Peninsula Engineering
Solutions, inc. may
change specifications as
necessary to meet
industry requirements.

RF-2000E Repeater

Microwave RF Repeater Systems

Applications

- Low-cost, highly reliable 2-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 1200 FDM, 672 PCM (1xDS3 or 45 Mb/s), 480 PCM (16xE1 or 34 Mb/s), Internet Protocol (50 Mb/s), or mixed traffic.
- Compatible with any manufacturer's 2-GHz radio terminal.
- Solar and wind power compatible -- economical in thin routes and remote locations.

Features

- Power Amplifier RF output power up to +30 dBm, 1.0 Watt.
- Two RF power levels available, Standard and Higher Power.
- Power consumption only 23 Watts, solar rated, at +12 VDC for, standard-power level, 1+0 duplex operation.
- Solar powered, hybrid solar and wind powered, ac powered, or other alternative energy electrical power sources.
- 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 installations. Suitable for use at unimproved sites anywhere in the world -- Alaska to Saudi Arabia.
- Internally protected duplex (FDD), frequency diversity, space diversity and three-way or "Y junction" system configurations are available.
- Only one active element per channel, the internally redundant linear amplifier.
- AGC/ALC provided to correct input fades, regulate output power and reduce overload.
- Adaptable to new radio modulations and capacities as technology advances.
- RMAS-120 Alarm system (optional) can remotely monitor repeater.
- Equipped with directional couplers for in-service RF output power measurements.
- No frequency conversion -- received signal is filtered, amplified, and re-radiated.
- Very reliable, greater than 85,000 hours MTBF for 1+0 duplex.
- Available as a self-contained RF repeater for use with customer-furnished antenna and power equipment or as a complete package including repeater, antenna, photovoltaic modules, battery charger and batteries.



Figure 1 RF-2000E Solar Powered Repeater

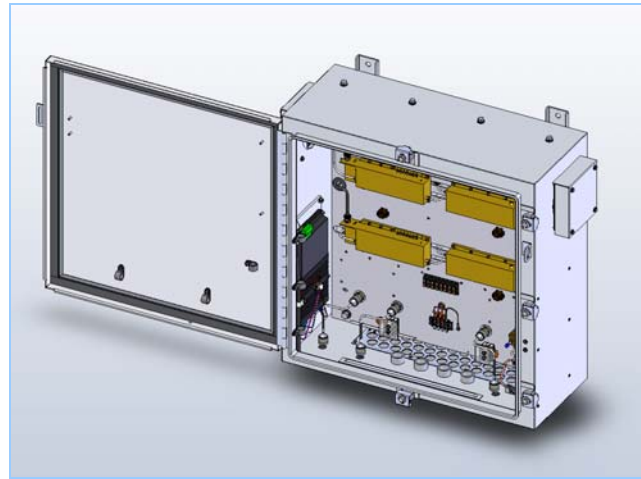


Figure 2 RF-2000E, 24V with Weathertight Enclosure



Figure 3 RF-2000E Y-Junction Repeater, 3-Hops

An RF-2000-99 repeater is used to provide links to two end terminals located in a mountainous region. The repeater site's high elevation provides a vantage point where clear, line-of-sight paths to each microwave terminal exist. A photovoltaic and wind turbine power system operates the repeater at this remote location. Site access is by four wheel drive vehicle.

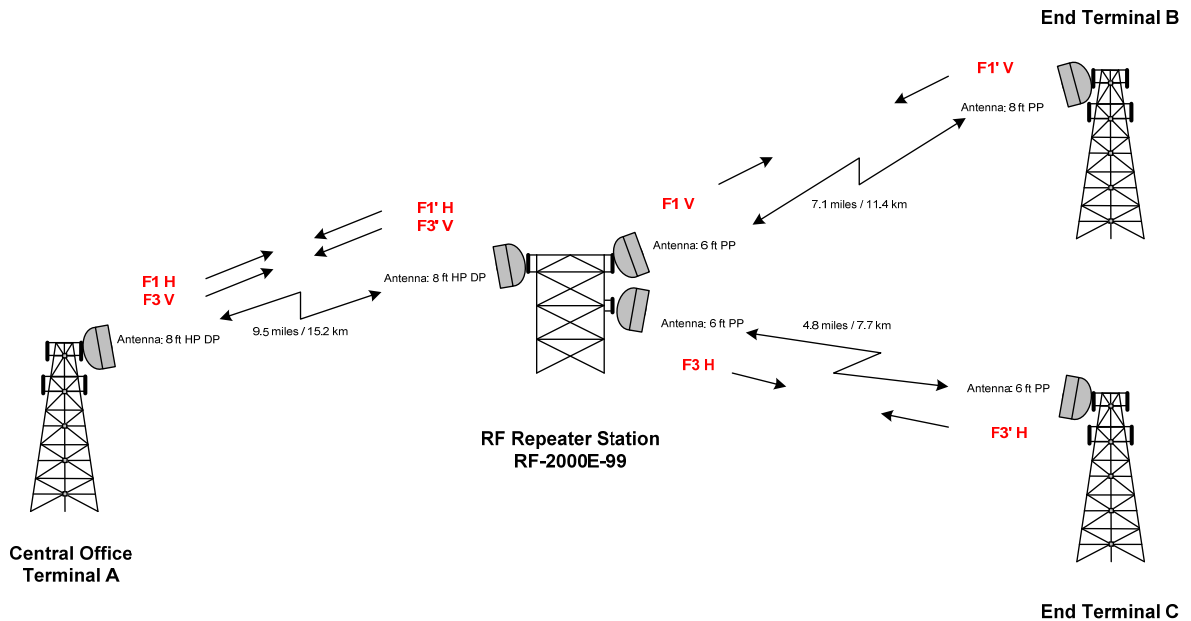


Figure 4 Y-Junction Repeater Network



Figure 5 RF-2000E Clearing an Obstructed Path, 2-Hops

The path between Raspberry and Pillar Mtn is obstructed by mountainous terrain. An RF-2000 repeater is located on Sharatin Mountain where line-of-sight paths to both terminals exist. The repeater site is isolated, requiring four wheel drive vehicles for access. Photovoltaic system provides operating power for the repeater. The site is shown in the figure below.



Figure 6 RF-2000E Repeater Installation with Solar Power

Repeater is installed on Kodiak Island, Alaska and used by US-Coast Guard. Low winter sunlight and cold conditions require the large photovoltaic array and battery plant.

RF-2000E Microwave RF Repeater

General

Frequency Range	1.7 ~ 2.3 GHz
Linear Amplifier Gain ¹	66 dB typ., 64 dB min.
AGC/ALC	15 MHz down fade 5 MHz up fade min.
Noise Figure ¹	3.5 dB at max gain
Antenna Ports	Type N Coaxial
Return Loss	≥ 20 dB

Channel Response

Amplitude	± 1.0 dB, $f_0 \pm 7$ MHz
Group Delay	30 nsec P-P, $f_0 \pm 7$ MHz

Power Requirements: Duplex, 2 Amplifiers

Nominal Voltage	+12 VDC ³
Voltage Range	+11 ~ +16.5 VDC
Power Consumption, Level 1	23 W, Solar Rated
Power Consumption, Level 2	35 W, Solar Rated
Polarity	Negative Ground

Nominal Transmit Power^{1,2}

Modulation	Level 1	Level 2
FM/FSK/MSK	26.0 dBm	30.0 dBm
4QAM/QPSK/OQPSK	24.0	28.0
16QAM	20.0	24.0
32QAM	18.0	22.0
64QAM/64TCM	16.0	20.0
128QAM/128TCM	14.0	18.0
256QAM	13.0	17.0
32TCM	17.0	21.0
256TCM	12.0	16.0

Dimensions: 1+0, 1+1 and 2+0 Configurations

Height	26.5 in, 673 mm
Width, with vent hoods	27.5 in, 699 mm
Depth	11.4 in, 290 mm
Weight	2 Amplifiers 40 lb, 18 kg – 1+0 4 Amplifiers 50 lb, 23 kg – 1+1, 2+0

Reliability

MTBF	85,000 hours
MTTR	30 minutes, on-site

Frequency Plan

Channel Passband	20 MHz, 1 dB
Typical Channel Plan BW	0.8, 1.6, 3.5, 5, 7, 10, 14 MHz
T-R Spacing	50 MHz, min.
T-T Spacing*	28 MHz, min

* on common feeders

¹: Not including branching losses, see Operations Manual.

²: See Operations Manual for more details. Modulations listed are a sample only, contact PESi for more.

Environmental

Ambient Temperature	-40° C ~ +60° C
Relative Humidity	90% - Housing Internal 100% - Housing External
Altitude	15,000 feet, 4600 meters
Enclosure Housing	Weathertight Aluminum

³: +24V optional, contact PESi for details.

US FCC ID: EK2A101

World Headquarters
39 Grand Canyon Lane
San Ramon,
California 94582 USA

Telephone
+1 925 901 0103

Facsimile
+1 925 901 0403

Peninsula Engineering
Solutions, inc. may
change specifications as
necessary to meet
industry requirements.

