

Case Study: Solar Powered Car Power of One traverses the continent with performance data communicated via *DATA-LINC's* 802.11b modems



Since 2004, *DATA-LINC* has been an enthusiastic supporter of the Power of One, Marcelo da Luz's independent, environmentally-focused, solar car project. The development, testing and on-the-road monitoring requires that critical performance data be collected from the solar car and its support vehicles — temperature, power status, energy consumption, and the like. *DATA-LINC* has continued to be selected to provide the data communication component of the project because of its proven record of superior performance, even in harsh environments.

The FLC810E+ provides high-speed, secure wireless communications using 2.4 GHz direct sequence technology. It offers higher RF power (300mW) than commercial 802.11b products, the ability to connect multiple Ethernet devices in station adaptor mode and a built-in router.

Rated at up to 6 miles (10 km) with unobstructed line-of-sight (farther using Repeaters), the FLC810E+ is ideal for wireless Ethernet communications in challenging environments.

The FLC810E+ is housed in a sturdy steel enclosure with an optional DIN rail clip for mounting. It is designed for harsh environments and has an extended operating temperature of -40° to 150°F (-40 to +65°C).



Power of One and the FLC810E+ meet the challenges of broad temperature ranges, operating in bitter cold to desert heat.

The FLC810E+ is easy to configure and trouble shoot using a web browser to access an internal web server. A software configuration utility is also included.

In 2007, the Power of One participated in the world distance tour covering 10,000 miles (16,440 km) in 42 days— approximately 243.23 miles (391.4km) per day. While crossing the country, the solar car covered 33 states and stopped in or passed by over 300 towns— an ambassador promoting the use of clean and sustainable energy. Visit www.xof1.com for more information about the solar car project.



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POWER OF ONE SPECIFICATIONS



Vehicle mass	~ 300 kg (with driver)
Occupants	1 (driver)
Car Length	5.0m
Car Width	1.8m
Car Height	0.90m
Ground clearance	0.40m
Weight distribution	65% front, 35% rear
Wheel track	1.2m
Wheelbase	2.0m
Wheel configuration	3 (two front, one rear)
Wheel design & mfr, material	XOF1 custom, aluminium
Tire model, inflation pressure	SLR93, 90PSI, IRC (rolling resistance ~ 2.5kg per 1,000kg)
Chassis construction	Polyurethane foam covered in Fibreglas and reinforced with carbon fiber
Body construction (upper shell)	Light foam covered in Fibreglas
Front suspension	Double A arm - fully adjustable
Rear suspension	Double A arm
Steering	XOF1 custom (Tank steer style)
Power control - dead man switch	Active power control (no cruise control for safety)

Mechanical brake (front)	Hydraulic disc brakes
Electrical brake (rear)	Regenerative braking (motor)
Battery mfr, chemistry, capacity	EP Kokam, Li-Ion Polymer, each cell 3.7V-40Ah (27 cells) = 3.996Kwh
Battery Pack Voltage	96V
Battery monitoring system (BMS)	XOF1 custom
Motor type, operating voltage, weight, mfr	Brushless DC, 84-108V, 20kg, NGM Corporation
Solar cell type, efficiency, number of cells, mfr	Mono-crystalline, 15%, 893, Shell solar
Solar placement, material, mfr	Double sided HVP foam tape, Specialty Tapes
Encapsulation method	Conformal
Total array area (cell surface)	7.144sq m
Maximum array output	~900 Watts
Number of power trackers, type	4, booster
Rear view	Micro camera, image displayed to driver via portable viewer
Max speed	120 kmh
Frontal Area	0.723m ²



FLC810E+ SPECIFICATIONS

Operating Frequency

License-free, 2.412-2.462 GHz

Transmitter

Range. Up to 6 miles, LOS (line-of-sight) using 14 dBi* antennas

Output Power. 300 mW (+24.7 dB)

Modulation. CCK, DQPSK or DBPSK

Spreading Code. Direct sequence

Channels. 11 (3 non-overlapping)

Occupied bandwidth. 22 MHz

Receiver

Sensitivity. 11 Mbps -89 dBm;

5.5 Mbps -91 dBm; 2 Mbps -93 dBm;

1 Mbps -94 dBm

RF Data Transmission

Data Encryption. WEP+ (64 or 128 bit)

RF Data Rate. 1, 2, 5.5 or 11 Mbps

Operating Modes

Wireless Bridge, Wireless Bridge and Repeater, Access Point, Station Adapter, Router, DHCP Client, DHCP server

Data Interface

Interface. 10BaseT or 100BaseT (auto select)

Data Throughput. 800 Kbps to 6 Mbps (dependent upon RF link quality)

Diagnostics

Web (HTML) RF statistics; SNMP MIB support; 7 indicators (Top: Power, Access Point activity, W-LAN Link, Data and Link; Side: Ethernet link, 10/100 BaseT)

Antenna

Connectors. reverse-polarity SMA

Power

Power requirements. 12 VDC (115 VAC to 12 VDC wall mounted transformer included)

Operating Environment

Standard Temperature. -40° to 150°F (-40° to 65 C)

Humidity. 0 to 95% non-condensing humidity

Enclosure

Standard. NEMA 1; 18-gauge steel; 4.25" x 1.7 in. x 7.2 in. - including mounting feet (10.8 x 4.3 x 18.3 cm)

Mounting. Base bracket for horizontal or vertical mounting; Optional DIN rail clip

Weight 2.0 lb (.91 kg)

*Some dB restrictions apply; specifications subject to change without notice.
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