LWDA Power Budget

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Introduction

This note outlines the power budget for the LWDA equipment installed in New Mexico. While the values provided below are for the as−installed LWDA components and extrapolation for future LWA components is likely not to be straightforward, especially for the digital components and associated power supplies, these values provide a starting point for estimating future power needs.

There are several factors that might cause the actual power usage at the site to differ from the values presented here.

1. Measurement equipment other than the LWDA rack has been installed in the shelter in New Mexico. This equipment is not included in this budget.
2. The power consumption due to the air−conditioning cannot be evaluated without additional data that is not currently in hand. Our estimates for the AC/heating component of the budget are very uncertain.
3. The power consumption of LWDA electronics can vary with state. In what follows, we have assumed the maximum power consumption (i.e., devices are on, configured, and collecting data).

Measurements have shown that the LWDA station rack typically consumes about 1.1 kW of power (9 amps at 120 V). The maximum system power consumption, including shelter heating/AC is ~ 6 kW. The details below provide a breakdown of the power consumption by system component.

LWDA Rack Power Consumption

The following table provides a power budget for the LWDA equipment rack. Some notes on the power budget.

- Total powers have been rounded to the nearest Watt.
- Computer power is an estimated power. The monitor and keyboard in the rack are not typically in use, and are not included in our estimates.
- Power supply power has been estimated assuming an efficiency of 50%.

Component	***Number***	***Power per Unit (W)***	***Total Power (W)***
Rack Fan	1	100	100
Computer/Monitor/Keyboard	1	250	250
Network UPS	1	200	200
GPS Receiver	1	3	3
Power Supplies (9 & 12V)		6	294
Adder Boards	3	2.2	7
Digital Receivers	16	2.1	34
Balun	16	3.2	50
Gain Stages (ARL)	32	3.8	122
Gain Stage (Minicircuits ZKL−2R7)	32	1.4	45
Level One Enclosure Fans	6	6	36
Total			***1141***

LWDA AC Power Consumption

The LWDA AC/heating system requires approximately 1 kW when in cooling mode, and 5 KW when in heating mode. Since the unit is not in continual operation, it is difficult to currently estimate the actual cost of power. As long term data becomes available, this should be used to replace these estimates.