LEIT ET WWS
Operational Description

The following document is a brief description of the circuit functions of the LEIT ET Wireless Weather Station.

The LEIT ETWWS is a solar powered, radio transmitting weather station for irrigation controllers. Its job is to accrue sensor information in regards to light levels, temperature, humidity, rain levels, and wind speed to calculate an "evapotranspiration" number to send to irrigation controllers. All power comes from the sun. The energy collected by the PVM (photo voltaic module – the solar cell) is stored in super capacitors. The weather station only transmits and works as a beacon to give information to nearby irrigation controllers. All the functions have been already set for it.

RF modulation is FSK, modulated in position/phase, intended for data transmission.

The following is a breakdown of the circuits. Please refer to the LEIT ET WWS schematics for reference.

Microcontroller schematic:
The MSP430F1232 microcontroller is used to control the device. All logic function takes place here. Some of the functions of the microcontroller: monitor available power, attain various sensor information, calculate ET values, and interfaces with the radio.

Charging schematic:
All power is stored in super capacitors. This provides a constant source of power from the fluctuating power of the PVM. The capacitors are placed in series.

Sensors schematic:
The system runs at 2.5V. The humidity sensor though, requires a separate 3.5 V supply to send a varying frequency to the microcontroller. The two different reed switches are for the wind sensor and the rain gauge. The actual reed switch for the wind sensor is on a separate PCB though.

Radio schematic:
The Chipcon CC1100 chipset is used for the radio. A few external components are needed (decoupling caps, and balancing). The microcontroller sets up the radio to work at the desired frequency and power, and enables/disables communication.