## IRRIGATION CONTROL SYSTEM Stan Hicks and Robert Lascano Texas Agricultural Experiment Station Texas A&M Research and Extension Center Lubbock, TX

## **Abstract**

An irrigation control system was developed to calculate potential evapotranspiration (PET), a cotton crop coefficient (K<sub>c</sub>), evapotranspiration (ET), and to control irrigation application using a surface drip system. Irrigation treatments consisted of alternate and every row applications and irrigation application amounts of 0.1, 0.2, and 0.3" per day applied on a 3 day interval. Irrigation applications could not exceed the calculated crop ET minus rain on a 3 day period. The application amounts represent the range of well pumping capacities typical on the Texas Southern High Plains. The experimental design was 12 plots on 4 acres. Water flow to each plot was controlled by a solenoid valve and measured by a flow meter that produced a switch closure pulse for every gallon of water applied. The irrigation control system was a Campbell Scientific CR 10 datalogger with an SDM-CD16AC digital control expansion device and two SDM-SW8A expansion pulse counters. The CR10 recorded air temperature, relative humidity, windspeed and net radiation. PET was calculated by the CR10 based on a Penman-Monteith grass reference standard equation with the exception that net radiation was measured and not estimated. The CR 10 calculated cumulative heat units (HU), the crop coefficient ( $K_c$ ), cumulative crop ET minus rain, and water application amount. Every three days the system automatically applied the irrigation amounts for the three irrigation treatments. The CR10 was connected to a remote PC via a cellular phone. Irrigation application could be monitored and controlled by the remote PC computer. This control system is generic and can be adapted to a wide variety of irrigation systems.