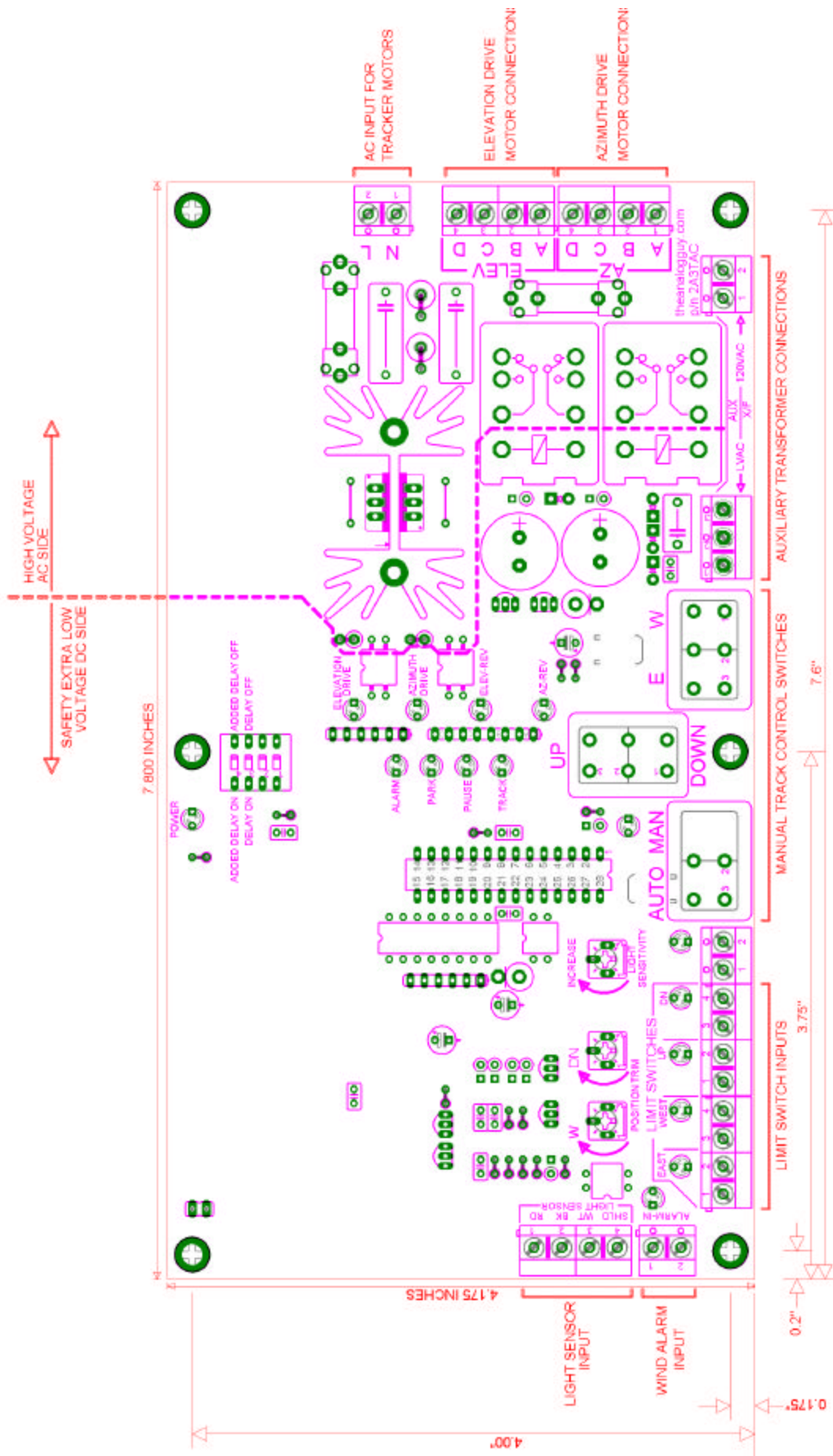


BEFORE WIRING, SEE SAFETY NOTE ON PAGE 3, READ ENTIRE MANUAL!



The ST2-AC is a solar tracker control that performs the function of light seeking solar tracking for drive systems using reversible AC motors.

Safety note: The circuit board is divided into two areas—the safety extra low voltage side which contains the low level electronics and where the voltages present no hazard to humans, and the **high voltage side** which has circuitry carrying line voltage and **presents a potentially lethal hazard** . When the board has AC power applied, no contact with the high voltage side of the board should be made with metal tools or any part of the body. When placed into service, the board must be suitably enclosed to prevent chance contact of hazardous portions of the board by unsuspecting and/or untrained people. The enclosure must carry a warning of hazardous voltages inside.

OVERVIEW OF ADJUSTMENTS, INDICATORS AND OPERATION

Drive priority: Only one drive is enabled at a time. Azimuth control is given priority over elevation control at all times—this means if the azimuth control is active, the elevation control is locked out until the azimuth move is complete. This is of particular note when the control moves to PARK position—in order for the elevation to be enabled, the east "inside" limit switch must close.

Position trimpots RT3 and RT4 are to tweak the tracking position of the array, to allow for trimming out of component variations and slight misalignments of the remote light sensor. RT3 trims the azimuth, RT4 trims the elevation.

Light sensitivity trimpot RT5 sets the light level at which the tracker changes from pause to track mode. Increasing the sensitivity (CW) means that the tracker will start tracking at a lower light level. Decreasing the sensitivity (CCW) means that the tracker will start tracking at a higher light level. If partial obscuring of the solar disk by cloudy conditions causes the array to wander randomly, decrease the sensitivity. If the tracker isn't following the sun when you think it should be, increase the sensitivity.

LED indicators of light level control:

PARK (red)—light level representative of dusk, time to go to park position (East & Down).

PAUSE (yellow)—clearly it's daylight but not enough light to track yet.

TRACK (green)—enough light to track.

ALARM-IN terminals and led: This is the wind alarm input. When contacts close across the ALARM-IN terminals, the ALARM-IN led lights and the tracker sends the collector to UP LIMIT park position where it will remain for 30 minutes after the last wind alarm trigger. During this 30 minute delay, the ALARM LED (near the center of the board) will remain lit. Other park functions will not work while wind alarm park is in play. If, during testing, you need to clear the wind alarm recovery delay, cycle the power off/on.

LIMIT SWITCH terminals and leds: Assuming that your system has two sets of limit switches, "inside" limit switches which are hit first and "outside" limit switches which are hit second, the "inside" switches are connected to these input terminals. The sense of these switches is: open during normal operation, close at limit. Whenever a limit switch closes, the tracking in that direction is stopped. The system could be put together with only the "inside" limit switches required by the tracker control—however, in the event of a "continuous drive" failure, mechanical damage would likely result.

PS (Park Switch) terminal and led: When contacts close across the PS terminals, the PS led lights and the control is commanded to PARK position, overriding TRACK or PAUSE. This will not override wind alarm park.

MANUAL CONTROL ROCKER SWITCHES (near the center of the board): These switches allow for the manual control of the azimuth and elevation motors through the control circuit. A useful tool to insure the correct motor drive direction and useful at other times when manual positioning of the array is desired. When the AUTO/MAN switch is in the MAN position, the MANUAL led is lit and all automatic function is inhibited. The UP/DN switch operates the elevation motor and the E/W switch operates the azimuth motor.

When an UP drive is commanded, the ELEVATION DRIVE led is lit; when a DOWN DRIVE is commanded, the ELEVATION DRIVE and ELEV-REV leds are lit.

When a WEST DRIVE is commanded, the AZIMUTH DRIVE led is lit; when an EAST DRIVE is commanded, the AZIMUTH DRIVE and AZ-REV leds are lit.

When in MANUAL mode, the following are disabled: automatic tracking, park switch control, and wind alarm park.

When dip switch S1-SECTION 3 is ON, the following delays are added to the control:

- 1) A 1 minute delay is added to tracking corrections such that a sensed sun position change must remain consistent for 1 minute to enable movement—this is to reject transient events such as birds flying past the sensor or, in the case of shading of sensor by nearby vegetation, reduce excessive movement of the system.
- 2) A 10 minute delay is added to the start of the PARK movement when dusk falls—this is to preclude seesawing of the array if partly cloudy conditions near sunset produce highly variable light conditions. S1-SECTION 3 can be in the off position for initial set up and adjustment (so that things happen without delay—useful for position tweaking and verifying correct operation), but should be in the ON position for unattended operation.

While the track delay is active, the TRACK led flashes at a $\frac{1}{2}$ second rate, while the park delay is active, the PARK led flashes at a one second rate.

When dip switch S1-Section 4 is ON in addition to S1-Section 3, an additional light level dependent delay is added to the system. At full sun strength, there is only the S1-3 one minute delay. As the light level decreases (when clouds obscure the sun), the delay time between movements increases to a maximum of 20 minutes. This is to reduce the random wandering that occurs on "puffy cumulous" days.

On a "normal" power on, the ALARM, PARK, PAUSE, and TRACK leds all come on for 1 second, then revert to the "correct" status indication.

Input voltage: 120VAC +/- 10%
Input current: 8.1 Arms Maximum
Output current: 8 Arms Maximum

This product part number includes:

- Control PCB
- Remote light sensor with 10 ft cable
- Auxiliary transformer

