

The STM2-20A is a light seeking tracker control designed for DC motor systems. It has a manual control capability and wind alarm input.

Input voltage range: 10-40VDC  
 Output current: 20 Amps continuous per axis

On initial application of power or reset button push and release, the status leds will light for one second to indicate proper led function—all normal functions halted during led test.

#### STATUS INDICATORS

**PWR:** DC power is on.

**ALARM:** Wind alarm control asserted—move array to elevation up limit. With delay on, this led remains lit during the 60 minute wind alarm recovery delay. Reset button clears wind alarm.

**ALARM (FLASHING):** Output overload—protection circuit shuts off outputs and waits an hour before trying again. Overload can be cleared by cycling mode switch manual-auto or press-release reset button.

**PRK:** Low light park asserted—move array to east and down limits.

**PAUSE:** Dim light due to absence of clear sun, stop movement until light recovers or darkness falls.

**PAUSE (FLASHING):** With delay on, a 4 minute delay is forced after a move is completed. During this delay, the pause led flashes.

**TRACK:** Light level high enough to track.

Abnormal conditions—typically, motor failure or mechanical system jam (from ice build up) or heavy wind load: Tracker will attempt to move the array. If motor overcurrent condition is sensed, tracker will terminate output drive and flash the **ALARM LED** (at a half second rate) for 1 hour before attempting another move.

Notes on initial installation, power up and adjustments.

The remote sensor needs to be attached to the array frame such that the mounting surface of the sensor is parallel with the plane of the array—where on the array is not critical as long as the sensor receives unobstructed sun during the hours when the array is expected to track.

When power is applied, if the ambient light level is above the track threshold and if the mode rocker switch is in **AUTO**, it will then commence tracking immediately unless **S1-1** is in the **DLY** position, in which case there may be a 4 minute delay.

Position trimpots **RT3** and **RT4** settings are to halt movement of the array under conditions of obscured sun where pause is not invoked. **RT3** is for the azimuth (e.g. if the control commands west move with obscured sun, rotate **RT3** counterclockwise until movement stops and vice versa). **RT4** is for the elevation (e.g. if the control commands an up move with obscured sun, rotate **RT4** clockwise until movement stops and vice versa).

Note that the trimpots have a maximum rotation range of approximately 270 degrees. Use a light touch and small screwdriver if adjustment is necessary.

**RT5** is to adjust the light level at which the tracker control changes from track to pause. Adjust clockwise for greater sensitivity (tracks at lower light levels).

**S1-1** on the PCB controls the delay function. The idea here is that, during the initial installation, this is in the **OFF (SETUP)** position. In this state, everything happens within a second—a useful condition when tweaking the track trimpots and setting the *Light Sensitivity*. When **S1-1 switch is in the ON(DLY)** position (*for normal, unattended operation*), the following delays are added to the system operation:

When an autotrack move is completed, a four minute delay must be counted down before the next move on that axis is enabled. This is to reject transient events such as something flying over the sensor and, in cases where the sensor is shaded by moving vegetation during part of the tracking day, to hold off and/or reduce movement during back and forth shading events which aren't representative of true sun position. If this delay is active for either axis, the **PAUSE** led will flash twice per second.

A one hour delay is added to the **PARK** movement. This is for conditions of changing cloud cover (where the sun occasionally pokes through) to keep the tracker from sending the array back and forth between **PARK** and **TRACK** positions. Light conditions must remain below **PARK** threshold for one hour before the controller will allow movement. (There is only a 10 second delay when changing from **PARK** to **TRACK**.) When park delay active, **PARK** led flashes twice per second.

A 60 minute delay is added to the recovery from wind alarm park.

**Sensor induced pause:** When the light intensity on the remote sensor drops below that required to generate a detectable error signal, the tracker may pause without the PAUSE led being illuminated--if the TRACK led is on, assume sensor induced pause during obscured sun conditions.

Separate return terminals are supplied for all limit switches. In installations where wiring permits it, all of the limit switch returns may be tied together and taken to a single limit switch return terminal. The limit switch returns must **NOT** be connected to (-) DC input, as this will damage the PCB and cause failure.

The limit switches can be magnetically actuated reed switches or mechanically actuated type. They are "normally open" and close when drive system nears limit of non-destructive travel. If your actuators have built-in limit switches, the limit switch inputs to the control can be "not connected" and the tracker control will function properly.

The tracker control PCB needs to be housed indoors or in a weatherproof enclosure.

Using a dual axis control with a single axis system will result in large and varying tracking error because a single axis system requires a different light sensor geometry.

**Drive priority:** Only one axis can be active at a time. The azimuth drive has priority over the elevation drive in auto and manual control—this means that whenever the azimuth drive is active, the elevation drive is inhibited. In a wind alarm condition, the azimuth drive is inhibited and the elevation drive is active.

**Wind Alarm:** The wind alarm is factory set at 50 km/hr and is not field adjustable. The anemometer designed for is the type #40R available from [aprsworld.com](http://aprsworld.com). When the wind alarm is active, azimuth movement is inhibited and the control sends the elevation drive to up limit and keeps it there for 1 hour from the last wind alarm event.

WIND ALARM PARK has priority over TRACK, PAUSE, low light PARK and manual control.

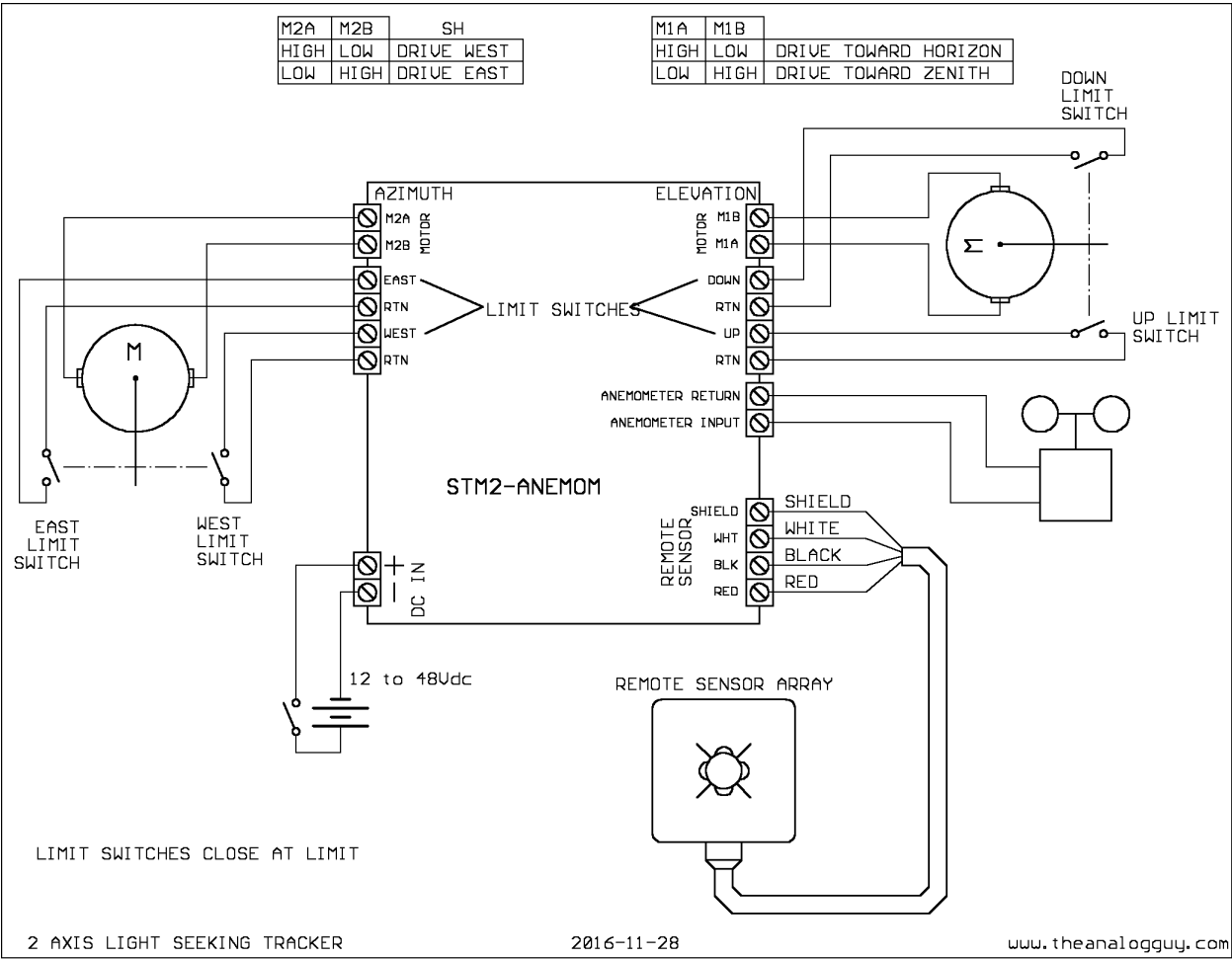
When S1-1 is OFF, the wind alarm recovery delay is only 10 seconds.

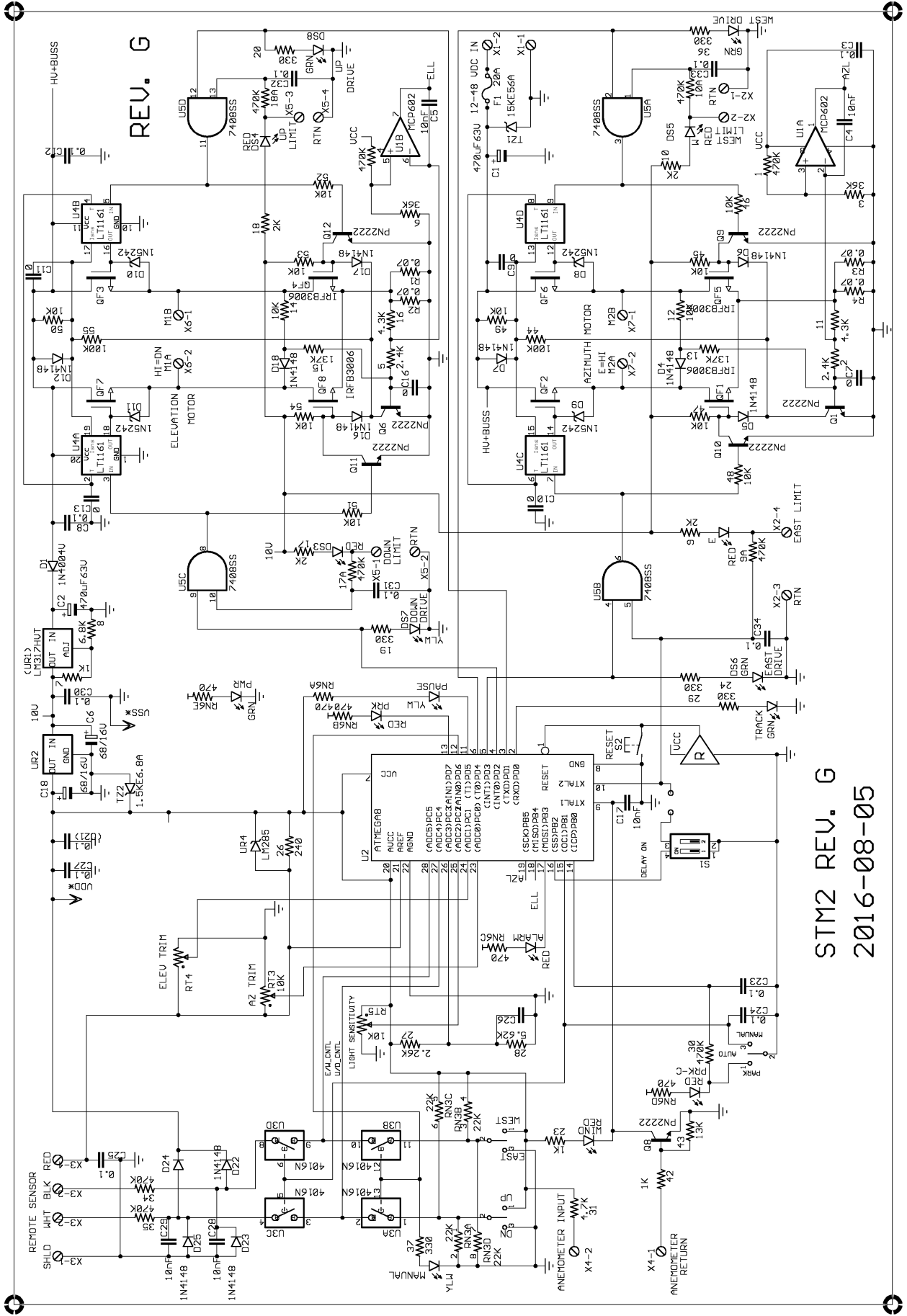
The WIND led flashes as the anemometer turns.

**Undervoltage protect:** The minimum input voltage required to start tracker is 11.4 V. When the input voltage drops below 11.0 V, the control is reset. In battery supplied installations, this can result in a one cycle per second oscillation as the loaded battery drops below 11 V, triggering reset and then recovers to above 11.4 V when the motor load is removed.

**DO NOT** use the light sensor cable strain relief nut to mount the light sensor, as this can compromise the mechanical and hermetic integrity of the unit and cause failure.

The RESET button resets the control chip, clearing all alarm and fault flags. This is a "reboot", similar to removing and reapplying input power.





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