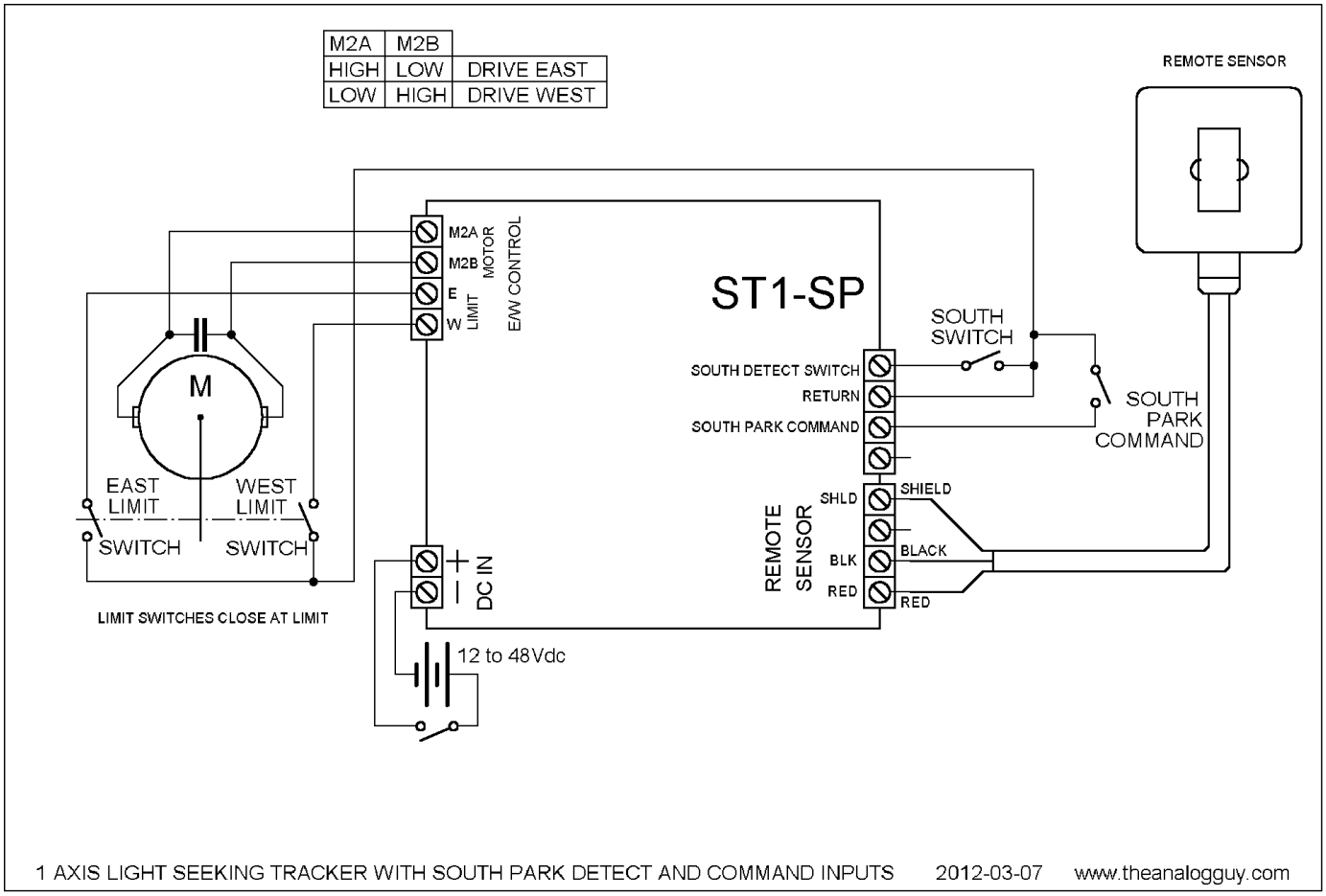


The ST1-SP is a light seeking tracker controls designed for DC motor systems.
Input voltage range: 10-56VDC

After the power up, the ambient light level will determine the operating mode.
The following "normal" operating modes apply:

1) Useable sun—the unit points toward highest illumination, which is usually the sun's disk but may be toward the zenith in bright overcast conditions.
2) Partially obscured sun (e.g. cumulous clouds with breaks)—unit pauses at last "valid" control point to wait for conditions to change.
3) Heavy overcast or night—unit moves to "park" position to await light level recovery.

Overload Protect—typically, motor failure or mechanical system jam (from ice build up) or heavy wind load: Tracker will attempt to move the array for 1 second. If motor overcurrent condition is sensed, tracker will terminate Drive and flash the PAUSE LED (at a half second rate) for 1 hour before attempting another move.
Indicators on the control PCB: PWR, PRK, PAUSE, TRACK, E/W DRIVE, E/W LIMIT, WIND ALARM INPUT, DELAYED RECOVERY, SOUTH DETECT, SOUTH PARK COMMAND.

Notes on initial installation, power up and adjustments.

The remote sensor needs to be attached to the array frame such that the north south axis of the sensor is aligned with the north south axis 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, it will then commence tracking.

TRIMPOTS: RT1 Azimuth trim: If the array moves when the sun is partially obscured, use this control to stop the unwanted motion (e.g. if the array is moving west when sun is obscured, rotate the trimpot counterclockwise).
Track delay: Sets delay interval between track moves when S1-1 is ON. Counterclockwise extreme yields approximately 3 minutes (about 1 degree of sun movement) full clockwise yields 20 minutes (about 5 degrees of sun movement).
Light Sensitivity: To adjust the light level at which the tracker control changes from track to pause. Clockwise for greater sensitivity (tracks at lower light levels).

DIP SWITCHES:
S1-1 controls the delay function. The idea here is that, during the initial installation, this is in the OFF position. In this state, the drive delay is one second—a useful condition for verifying correct direction operation. When the ***S1-1 switch is in the ON position (for normal, unattended operation)***, the following delays are added to the system operation:

An "RT3" delay is added to tracking corrections. During this delay, the PAUSE LED will flash 4 times per second.

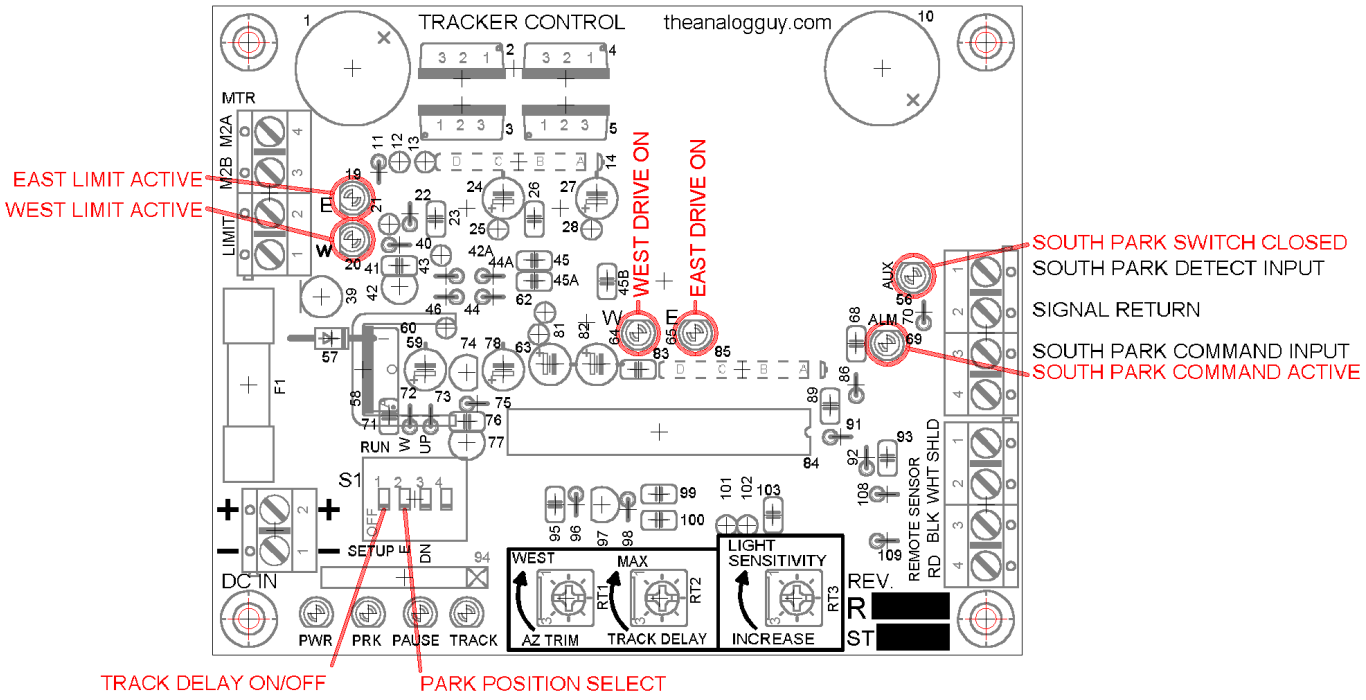
A ten *minute* delay is added to the change from PAUSE to PARK. This is for conditions of changing cloud cover (where the sun occasionally pokes through) to keep the tracker from sending the array back and forth between PARK and TRACK positions. Light conditions must remain below PARK threshold for 10 minutes or more before the controller will allow movement. (There is only a 10 second delay when changing from PARK to TRACK.)

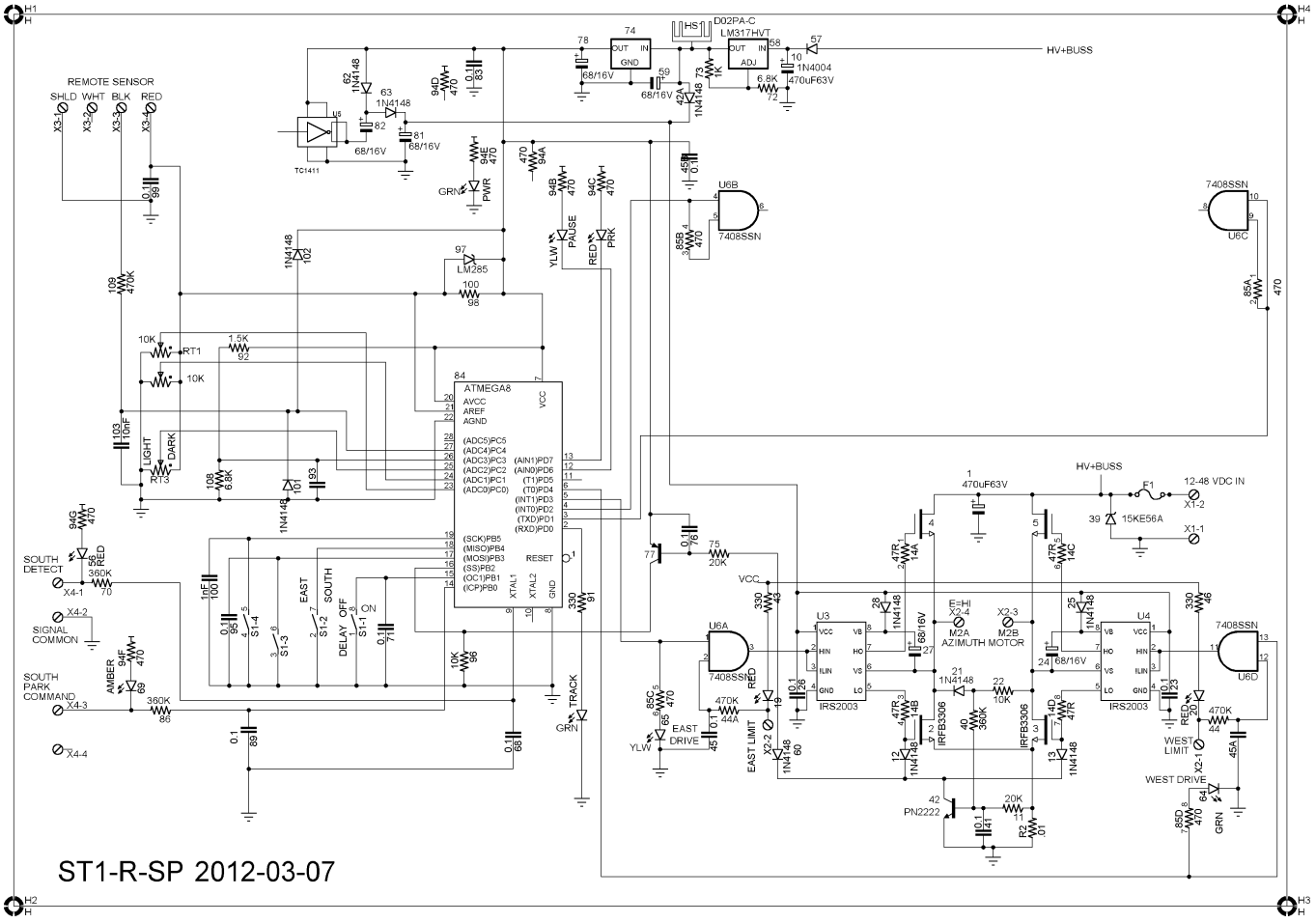
S1-2 OFF: Park at EAST limit. S1-2 ON: Park at SOUTH detect switch.
S1-3: No function.
S1-4 OFF: highest tracking accuracy. S1-4 ON: degraded accuracy to reduce oscillation in systems with fast mechanical drives.

SOUTH PARK considerations:
The south detect switch closes at south and opens either side of south.
First—the control needs to "find" the south detect switch. The way it does this is thus: if the array is moving west when the south detect switch opens, the control assumes the array to be west of south; if the array is moving east when the south detect switch opens, the control assumes that it is east of south. South detect will happen automatically in the course of a normal "tracking" day. If the south detect switch is closed when power is applied, it will have "found" the south detect switch.
After the control "finds" the south detect switch, whenever the south park command switch is closed, the array will return to close the south detect switch and then stop the drive until the south park command switch is opened.
When power is first applied to the control, it assumes that it is EAST of the south detect switch.

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 mechanical actuators have built-in limit switches, the limit switch inputs do not need to be used for normal operation.

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


TRACKER CONTROL
theanalogguy.com
EAST LIMIT ACTIVE
WEST LIMIT ACTIVE
WEST DRIVE ON
EAST DRIVE ON
SOUTH PARK SWITCH CLOSED
SOUTH PARK DETECT INPUT
SIGNAL RETURN
SOUTH PARK COMMAND INPUT
SOUTH PARK COMMAND ACTIVE
TRACK DELAY ON/OFF
PARK POSITION SELECT
DC IN
SETUP
PWR
PRK
PAUSE
TRACK
WEST
MAX
AZ TRIM
TRACK DELAY
LIGHT SENSITIVITY
INCREASE
REV.
REMOTE SENSOR


ST1-R-SP 2012-03-07
HV+BUSS
ATMEGA8
REMOTE SENSOR
SOUTH DETECT
SIGNAL COMMON
SOUTH PARK COMMAND
12-48 VDC IN
M2A AZIMUTH MOTOR
M2B