Calibrating the Tracking System Using 1 of 2 Methods

Method 2 Bore Sight Calibration After Initial Calibration

Method 1 involves using nothing more than calibrating the Quadrature Encoder Boards with Built in Encoder S1-200.

This is an example only and will certainly vary to your system, but it is really all I ever use to calibrate the Boards and thus far have seen no difference, except simplicity between method 1 & method 2.

1/ Using an S1-200 from US Digital as My Display Adjust. My AZ Encoder

2/ My AZ Encoder Wheel has 153 X 3/8" Chain Links around the parameter of the wheel with an Encoder Drive Sprocket with 10 Teeth on it.

3/ My AZ Ratio using an H3-2000 are 15.3:1 or 30,600 quadrature counts in 360Deg.

3/ by using the built in Encoder with 200 Quadrature counts per turn I simply use this procedure to calibrate the Touch Memory.

4/ 30,600 / 200 = 153 turns of the S1-200 to produce the exact same numbers as Rotating the Dish or Array and depressing the "FULL" PB Switch.

5/ Hold the AZ Spring Loaded Return Switch Down. Depress the ZERO PB Switch on the Encoder Board, then the RESET PB, now Rotate the S1-200 153 Time then depress the FULL SPAN PB on the Encoder Board. Now Depress the RESET PB once more. You MUST now see a Display Reading of 359.99 (360Deg.), on the LCD Display, and/or Computer Tracking System Display Software

6/ To make it a bit easier, or use fewer rotation, of the S1-200 take the 153 and divide it by 2 = 76.5 Rotations of S1-200 and Press the "HALF" PB Switch, then the RESET PB you MUST see (180Deg.), On the LCD & Computer Software. Remember to Depress the RESET PB if necessary.

7/ since the total Quadrature counts are 30,600 for 360Deg. Rotation of the Dish/Array and 65,534 (actually 65,535-1), are allowed for 16Bit wide Data, set the Jumper at the LS-7184 to X 2 for a MPU (Micro Processer Unit), Count of 61200 in 360Deg. and 0.001Deg. Tracking Resolution.

8/ Use exactly the same procedure for EL Calibration of the T6S-2500-DD Inclinometer at a Ration of 1:1 for 360Deg (remember only 90Deg of this is actually used for EL), 2500/200 = 12.5 Rotations of the S1-200 Encoder with the EL Switch Held Down. In this case set the LS7184 for an X 4 Multiplication on the EL Encoder Board for 10,000 Quadrature Counts in 360Deg. and a Tracking Resolution of 0.04Deg.

Method 2

1/ PLEASE READ COMPLETELY BEFORE START OF CALIBRATION

CALIBRATION ONLY NEEDS TO BE PERFORMED ONCE IN THE LIFE TIME OF THE iBUTTON Cell (approx. 8 to 10 Years), or until something is changed in the field that will alter the ratios

Calibration

2/ Rotate Dish, or Array, to a "0" (zero), degree position. This position can be any position that is convenient for you.....near your moon rise location for example. At this point of calibration it does not matter

3/ Depress the "ZERO", normally open push button, as on schematic. Now depress the MPU reset (RESET), as on schematic. This operation clears the MPU registers and clears "touch memory" to zero.

4/ Using a very accurate compass (I borrow a surveyors compass), rotate the Dish exactly 360 degrees from the "zero" position.

5/ when 360-degree position is located depress the "full-span" (FULL), normally open push button, on schematic. Again depress the MPU RESET, RESET push button. This forces the MPU data registry to the "touch memory".

You should now be calibrated "exactly" 0 to 360 degrees. Do NOT depress any more switches.

6/ Make sure your computer clock is accurate to time and date before continuing. Computer clock should be within one second of correct time.

7/ Bore Sight the Dish (array), on the moon, using echoes, or peak on sun-noise. Write down the exact position of the moon on the piece of paper. Disregard the dish position indication at this time.

8/ Without moving the Dish, or Array, depress the AZ/EL switch on the front of the control box and rotate Display knob until indicated position matches exactly the position noted above.

THE SYSTEM IS NOW CALIBRATE TO AZ & EL POSITIONS

There are other methods, or techniques, for doing the same thing as described above and you may chose your own method.

For example: I used the SUN using peak sun noise on 23cm. This is very, very sharp with a 25' Dish.

I have NEVER recalibrated my system since the initial calibration over four years ago. Just be sure of your angles when setting the 0 to 180 degrees or 0 to 360 degrees is very Accurate. Within 0.05 degrees if possible.

You may remove power (VCC), voltage from the complete system it will remember where it was when you re-establish supply voltage.
Just remember if you MOVE the Dish, or array, without VCC applied to the system you will have to "BORE SIGHT" the system again. NOT RECALIBRATE.

I have a relay in my VCC supply that will not allow me to move the Dish unless VCC is applied. I also have an over-ride switch that will allow me to move without VCC, but that switch is hidden inside the control box with SW-1, 2, and 3,

EL CALIBRATION

Elevation calibration is performed nearly the same way as AZ calibration.

Locate the Inclinometer so it may be rotated EXACTLY 360 degrees. Depress the “zero” switch and next the “reset” switch.
Rotate the Inclinometer exactly 360 degrees and depress the full span switch. Now install on the system.
Remember that in TRACKING SETUP you must be operating in the BIN mode and 0degrees offset until calibration is completed.

After calibration is completed you can set your offsets and then using the EL, or AZ switch on the front panel reposition the display to indicate the true settings.

To make certain I derive higher counts and 0.001 Deg. Resolution I set the LS-7184 to multiply by 2, therefore in the case of 30,600 I actually produces 61,200 counts in 360Deg.

1111111111111111 = 16 Bit Binary, or 65535 Decibel

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