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SATELLITES

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Installation instructions for SG2100



Installing a motorized satellite system

Most people that install a motorized satellite system do so because they wish to access more than one satellite. With a motor such as the SG2100 it is possible to access IS8 @166east, Optus D1 @160 east, Optus C1@156 east, Optus D2 @152east

Installing a motorized system is a challenge but well worth the time spent. It is assumed that the dish is mounted on a correctly aligned roof mount. Following these instructions you should be able to have a fully working system within 3-4 hours.

These installation instructions are for installing a **SG2100** onto a Ku band satellite dish. The **SG2100** can be used with **65cm, 75cm, 90cm, 1m and 1.2m** dishes.

Manual Button: On the left hand under side of the motor is the manual button. This is of great assistance when setting up the tracking out side. I used a spectrum analyzer but there is no reason why a signal meter or monitor and a STB could not be used to sweep the satellite orbit belt to locate and fine tune the tracking between satellites. The LNBF

polarization adjustment was set so that a compromise was made between Optus and non Optus polarities.

- 1: West movement: press once and keep pressing.
- 2: East movement: press twice with in half a second and keep pressing.
- 3: West fine tune: press twice and release the button for one step.
- 4: East fine tune: press once and release the button for one step.

Indication Light: This is positioned on the underneath right hand side of the motor.

Green Colour: Power on in stand by mode.

Orange Colour Blinking: receiving DiSEqC 1.2 commands.

Orange Colour ON: error, over current or reached hardware limits.

DiSEqC 1.2 operation.

The SG2100 is designed for use with a satellite receiver with DiSEqC 1.2 capabilities.

The satellite receiver will have all the relevant information to enable the integration and use of the SG2100. In my case the test receiver was a Globo 4100C.

I found no problem aligning each satellite using the receivers on board Signal and Quality indicators to locate and store the following satellites .I started with Optus D1 @160 east and then moved to Optus C1 @156 east. I then moved back and found another two signals which were IS8 @169 east and Ge23 @177east. Moving down passing all the located and stored satellites the last one was Optus D2@152east. The

1: IS 8@166east:12491 V 4400 Arirang or 12502 V 3074 Mac TV.

2: Optus D1 @160east:12456 /22500 12483 /22500 12646 /12600 SBS 1& 23:

3: Optus C1 @ 156 east: 12407 /30000 Seven Network, SBS

4: Optus D2 @ 152 east Globe cast and UBI services.

Installing the Motor

1: Check the pole - **ensure that the mounting pole is perfectly straight** with a level or inclinometer. If the pole is not level, your dish will not properly track the arc of satellites.

Aligning the motor – to ‘True North’

This method relies on aligning the motor to true north using a compass to make sure the motor is aiming roughly north. This is not as critical as the text books make out, I set our test unit very roughly north and it had no impact upon the motors ability to track

2: Attach the DiSEqC motor to the pole - tighten the motor fittings.

3. Set the elevation angle on the motor - the elevation angle on the motor will be based on the latitude of your location. The manual for the motor will tell you how to set this angle to or alternatively, you can use the following table: Motor elevation & declination angles

Site Latitude	Elev / Decl Ang /	Brack Ang
34	56 / 5.5 /	24.5
35	55 / 5.6 /	24.4
36	54 / 5.8 /	24.2
37	53 / 5.9 /	24.1
38	52 / 6.0 /	24.0
39	51 / 6.1 /	23.9
40	50 / 6.3 /	23.7
41	49 / 6.4 /	23.6
42	48 / 6.5 /	23.2
43	47 / 6.6 /	23.4
44	46 / 6.7 /	23.3
45	45 / 6.8 /	23.2
46	44 / 6.8 /	23.2
47	43 / 7.0 /	23.0
48	42 / 7.1 /	22.9

For example Auckland which has latitude of -36.86 degrees, will require an elevation angle of 53.14 degrees with a declination of 5.88 degrees. The angle can be set according to the markings on the side of the motor. Some motors even include the latitude markings as an additional aid.

Setting the elevation angle



4. Attach the dish to the motor shaft - make sure the dish is at right angles to the motor and pole. The center line on the tube of the motor will assist you to mount the dish on center. Set up the declination angle using the attached table or the table in the motors instruction and installation book.

5. Set the adjusted declination angle on the dish - Your latitude will also determine the declination angle - see above. Most DiSEqC motors use a special **adjusted declination angle** formula (based on the tilt of the rotating motor shaft) which will again be specified in your manual. For example Auckland with latitude of -36.86 degrees, will require a declination angle of approximately 5.88 degrees.

Our SG-2100, a very common DiSEqC motor, uses the formula $30 - \text{declination angle}$. So for Auckland the **adjusted declination angle** is 24.1 degrees (i.e. $30 - 5.88$) this angle can be set according to the markings on the side of the dish. **Note:** If you have a different model of motor, it will use a different formula for the **adjusted declination angle**.

Setting the adjusted declination angle



Slightly loosen the motor fittings - this will enable you to just rotate the motor about the pole. Don't loosen the fittings too much finger tight is more than enough.

Connect: The cable from the LNBF to the receiver connect a satellite meter or alternatively tune the receiver - make sure to tune to an active transponder –

The satellites I feel are worth tuning in too are:

- 1: IS 8@166east:12491 V 4400 Arirang or 12502 V 3074 Mac TV.
- 2: Optus D1 @160east:12456 /22500 12483 /22500 12646 /12600 SBS 1& 23:
- 3: Optus C1 @ 156 east: 12407 /30000 Seven Network, SBS
- 4: Optus D2 @ 152 east Globe cast and UBI services.

Input your Longitude and Latitude of the receiver's location and input Optus D1 @160 east .The receivers will calculate and drive the dish to the right angle automatically.



Rotate the dish and motor until you see activity on the signal meter or the receivers signal strength indicator rotate **slowly** both the motor mounted dish until the signal meter is at a maximum.

Refer to the manual receiver for specific DiSEqC 1.2 satellite finding operations

As long as specific satellite transponders are stored it is a very simple operation to move the dish from satellite to satellite using the on board signal and quality meter. Infact this operation was repeated dozens of times and once the locations saved the dish moved faultlessly upon channel selection.



Tighten the fittings - once the satellite has been found and the signal is at a maximum, tighten the motor fittings to the pole to ensure everything is firmly locked in position.

Aligning the motor - the USALS approach

USALS Goto X or DiSEqC 1.3) allows you to quickly and accurately align your dish. As most receivers are now USALS compatible, this method provides much better tracking of the Clarke Belt than the 'True North' approach. This is due to the fact that it is more precise to align your dish at the eastern or western extremes of the arc than at the top of the arc (i.e. near true North).

1. Enter you latitude and longitude into the receiver - enter your location coordinates into the the USALS menu of your receiver.

Typical USALS menu



Set the LNBF polarity offset to 10 deg clockwise. This will need to be adjusted later if other satellites than Optus are to be received. There is a compromise position which can be found by using the "signal quality" indicator on your receiver. It may be best to optimize for the channel that you want that is hardest to receive.

Now you can setup the USALS in the receiver, you will need to enter in your site location. **Enter the** Longitude and Latitude for your specific location: Example (Auckland) 174.30degrees East -36.86South. Now you can move the receiver to a known satellite, it is best to use the Optus D1 (160 deg east) satellite as it provides the strongest signal.

Once the SG2100 dish mover has moved to the Optus D1 position then using a satellite meter adjust or the signal strength and quality indication on your receiver adjust the Azimuth by moving the motor and dish together. Elevation fine tuning is done by changing the dish elevation for max signal.

Once you have finished tighten all the bolts. You can now change to other satellites and scan for channels etc. You can now fine tune the skew if needed using the signal quality feature of your receiver if you think it is necessary.

2. Drive the motor to a satellite towards the east or west - select a satellite in the USALS menu and drive or GOTO that satellite. Again use Optus D1@160E as it has the strongest signal over New Zealand.

3. Rotate the dish and motor until you see activity on the signal meter - loosen the pole fittings slightly and rotate **slowly** both the dish and motor on the pole until the signal meter is at a maximum. If you don't have a signal meter, then watch the quality meter on the satellite receiver which has been tuned to an active transponder. For Optus D1 12456/ 22500 is more than acceptable.

4. Tighten the fittings - once the satellite has been found and the signal is at a maximum, tighten the motor fittings to the pole to ensure everything is firmly locked in position. Repeat the procedure for the other satellites you wish to locate save and you are good to go.