Do It Yourself
C-Band Dish Installation
For Pole Mounted Dishes

Site Survey

Surveying the site is the first step in a good installation. The purpose of the site survey is to assure that several conditions are met that will ensure the proper operation of the C-Band satellite system. The conditions you are examining are:

1. Is there an unobstructed view to the satellite position? Check using the satellite positions and compass settings guides on at the end of this guide. Choose the nearest major city to you and use the compass setting and the elevation (up and down angle) to check if you can 'see' the satellite from your site.
2. Will seasonal foliage cause problems?
3. Is the area that the dish is to be anchored into solid?

If you are installing a movable 'polar axis mount' dish, that is one that will swing from side to side, then please use our '**DIY Installation Guide for C Band Polar Mounted Dish**'. This is located on our website www.hooktech.co.nz

Mounting the Dish – Construction Specifications

This specification sheet is for constructing a well-anchored solid base for both mesh and solid petal satellite dish construction.

While the mesh dishes allow more air flow through the petals at low wind speeds and so are not subjected to wind loading to the extent of that the solid petal dishes are, at high wind speeds (when damage occurs) the mesh acts much the same as a solid petal. Therefore the specifications for these dishes are the same for mesh and solid petal.

Calculation Formula:

The calculations used to determine the amount of concrete needed in the base for the two dish types are as follows:

- **Mesh and Solid Petal satellite dishes** – Use 0.1m3 of concrete per metre of dish size.
- For example a 2.4m dish would require a minimum of 0.24m3 of concrete in the base. (2.4 x 0.1 = 0.24m3)
  An example hole for this would be 450mm x 450mm x 1200mm
- For example a 3m dish would require a minimum of 0.3m3 of concrete in the base. (3 x 0.1 = 0.3m3)
  An example hole for this would be 500mm x 500mm x 1200mm

Further specifications:

- It is recommended that these size dishes have the galvanized mounting pole a minimum of 1200mm into the concrete. Keep the end of the galvanized pole up off the ground so the concrete is surrounding it. This helps prevent rusting of the pole from the bottom up.
- The galvanized mounting pole must have a wall thickness of no less than 4mm.
- To further prevent the mounting pole from spinning in the concrete in high winds, a 12mm x 200mm galvanized bolt should be bolted through the mounting pole 900mm up from the bottom end. Once the pole is set into the concrete, the bolt will be 300mm below the surface.
- The concrete must be allowed to harden for no less than 24 hours before work is performed on the mounting pole and no less than 48 hours before the dish is mounted on the pole. Alternatively QuickSet concrete can

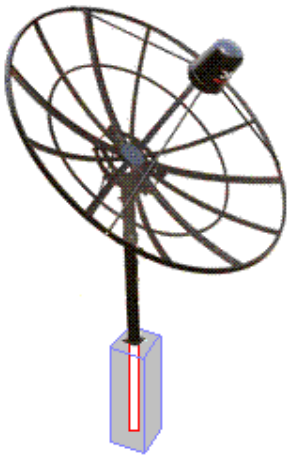
be used. Follow the instructions provided for such concrete.

- There must not be more than 1500mm between the lower edge of the dish (when the dish is at 0 deg Horizontal) and a brace. The concrete base is considered to be a brace. If the height from the lower edge of the dish to the top of the concrete is more than 1500mm, the pole must have a minimum of two galvanized steel braces bolted to the mounting pole with 12mm galvanized bolts and set into the ground with concrete 200mm diameter x 900mm deep.

  The braces should be at 90deg to each other and at 45deg to the ground. The fixing into the concrete should be with galvanized flat steel 4mm x 50mm set into the concrete 500mm. The section of flat steel protruding from the top of the concrete block will need a hole for the 12mm bolts attaching the braces. (see diagram below)

  Galvanized steel braces of 50mm x 4mm angle iron are acceptable.

Note: The one-piece pole runs right down into the concrete base. The part in the concrete is marked in red.



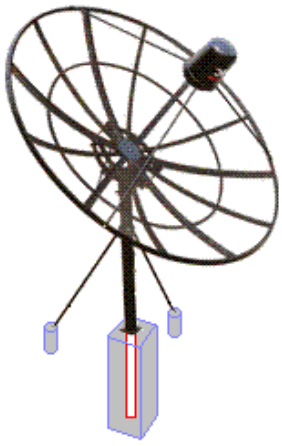
There must not be more than 1500mm between the lower edge of the dish (when the dish is at 0 deg Horizontal) and a brace. The concrete base is considered to be a brace.

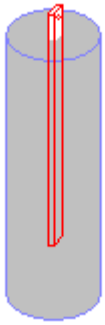
The dish pictured is set at 45deg.

If the height from the lower edge of the dish to the top of the concrete is more than 1500mm, the pole must have a minimum of two galvanized steel braces bolted to the mounting pole with 12mm galvanized bolts and set into the ground with concrete 200mm diameter x 900mm deep.

The braces should be at 90deg to each other and at 45deg to the ground.

Galvanized steel braces of 50mm x 4mm angle iron are acceptable.





The fixing for the braces into the concrete should be with galvanized flat steel 4mm x 50mm set into the concrete 500mm. The section of flat steel protruding from the top of the concrete block will need a hole for the 12mm bolts attaching the braces.

For more information please visit www.hooktech.co.nz

Dish Assembly and Mounting

Every dish sold comes with directions for assembly. Make sure you read the instructions before attempting to assemble the dish! Some important things to remember:

- Assemble the dish face down on a flat surface. A concrete drive or garage floor covered with a sheet, carpet or plastic cover (so the dish is not scratched) will be best. If you can not assemble it on these places you can use a flat lawn surface.
- The dish needs to be perfectly shaped. Once assembled, use a measuring tape and measure across the diameter of the dish (across the face of it once you flip it over after assembly) in three directions. All measurements should be identical.
- Tie a piece of string across the diameter of the dish in two directions. The strings should just barely touch at the centre of the dish. If the strings are pushed hard against each other or fail to touch, then the dish is not properly assembled. You can make adjustments by loosening some of the bolts and moving the dish pieces slightly. The assembly on a flat surface is very important as this will keep the dish quite accurate.
- Don't over tighten the dish-mounting hardware. You do not want the ribs to be deformed by pressure, as this will prevent proper alignment. Allow the lock washers to perform the job of securing the bolts. If you have access to lock-tight or a similar product, it is a good idea to put this on the bolts to stop them loosening in the future. Only do this once you have finished the assembly and testing.

Mounting the LNB

The dish is basically just a reflector that focuses the energy into a small tube called the LNB. Inside the LNB is two small antenna, one mounted vertical and the other horizontal. Knowing this will allow you to see how important it is to properly mount the LNB.

Do not assume that because all the supports holding the scalar ring are the same length that centering is automatic. Make sure that all the supports are the same distance from the edge of the dish to the scalar ring. Each measurement should be within 1mm of each other. You need to be sure that the scalar ring (the supporting ring for the LNB, it comes with the LNB) is parallel to the bottom of the dish and that it is perfectly centered in the dish. If all this isn't done, then you will have imperfect reception. Having the focal point off by as little as 13mm can cause a fifty percent loss in signal strength!

You can measure down from the scalar ring to the centre of the dish on three points around the scalar ring to check if it is parallel to the dish surface.

Focal Depth (f/D)

Focal Depth (f/D) (for the more technical DIY)

The f/D ratio is the focal distance of the dish (f), divided by the diameter (D). When dealing with most prime focus antennas, the number should come out between .28 and .42. If you notice, most of those numbers are also on scale on the side of the LNB. You simply set the top edge of the scalar ring even with the line that corresponds to your correct f/D setting. What this adjustment actually does is determines how wide of an angle the LNB can "see".
To calculate the focal distance, you need to measure the diameter (D) and the depth (d) of the dish. Measurements should be in like units (you can't use feet for the diameter and inches for depth). For this example, let's say we have a dish that is 120 inches in diameter (D) and 18 inches deep (d). Focal distance (f) equals the diameter squared (D x D) divided by 16 times the depth (16 x d) or:

D x D = 120 x 120 = 14400
16 x d = 16 x 18 = 288
D x D/16 x d = 14400/288 = 50
Therefore focal distance f = 50 inches
After you have calculated the focal distance (f), you can use that figure to calculate the f/D ratio of your dish. In this case, using the same diameter of (D) = 120; and the calculated focal distance (f) = 50

f / D = 50 / 120 = .416
f /D = .416
And round up to give a setting of .42.

Focal Depth (f/D) the easy way

Our 2.4m and 1.8m solid petal dishes have a focal depth that need the LNB to be mounted at 38 (markings on the side of the LNB). Fine tune the LNB position in and out after everything is running. Some LNBs do not have these markings. We have shown how to configure this in the sections below. These are good settings to start at if you do not know the focal depth of your dish.

This C Band LNB has the f/D markings on the side. The red arrow points to 38.
The measurement of the f/D is taken on the topside of the scalar ring against the LNB marking.
The scalar ring is the ring that the LNB mounts in.

If you are using the Dual Local Oscillator C Band LNB then the correct setting is shown below.

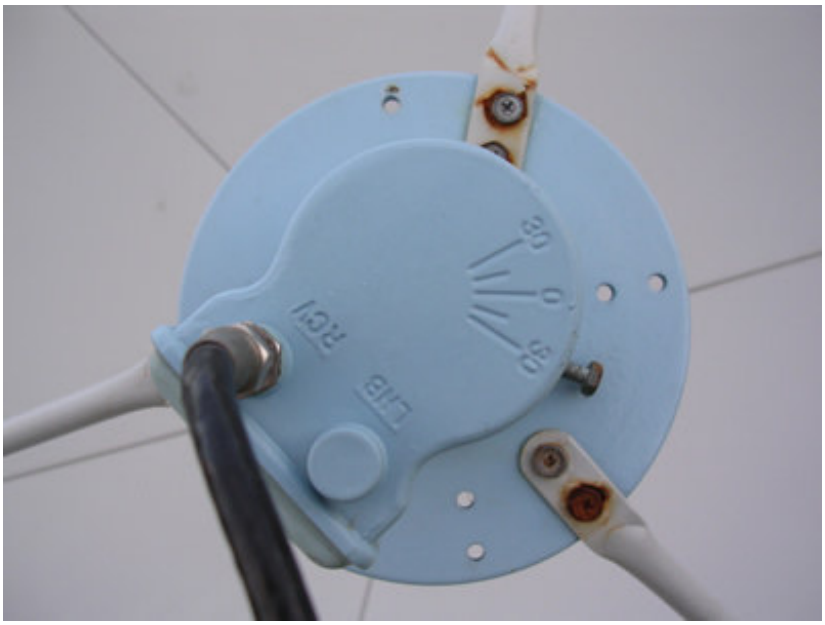
Note: The measurement from the front of the LNB to the back of the scalar ring is 45mm.
This corresponds to 38 on an LNB with markings.

If you are using the C/Ku Band LNB then the correct setting is shown below.

Again the measurement is from the front of the LNB to the back of the scalar ring.
50mm is the measurement for this LNB. Note that the C Band output of the C/Ku Band LNB, is the lower connection.

Zeroing the Polarity (skew) Setting:

As with the f/D setting, the skew setting is fine tuned later. However you need an approximate starting point. First you start at ‘zero’ and then adjust it for your longitude and latitude. The pictures below give you the ‘zero’ point.



This is a standard C Band LNB with skew markings.
This is what you would see if you were looking into the front of the dish. The 'zero' mark should start at horizontal. Mount the LNB into the scalar ring with the 'zero' mark horizontal and facing the right like it is in the picture.

This is the Dual Local Oscillator C Band LNB. This LNB has no markings to indicate skew. Use this picture to help you identify the 'zero' mark. Start with your LNB at this point.

This is the C/Ku Band LNB. Once again there is no mark to indicate skew.
Use this picture to set your LNB to 'zero'. You will be adjusting it to the correct setting and then fine tuning it shortly so do not waste time trying to find the perfect 'zero'. It isn't that critical.

Adjusting the Polarity (skew) Setting:

You have just set the ‘zero’ for the skew setting. Now this is just the initial setting. To know where to adjust the LNB to from here you need to download and read our ‘**satellite positions and compass settings**’ tables at the very end of this guide. They make up the last four pages of the guide. Choose the nearest major city to you and use this for your adjustments. This will let you receive the satellite and then you can adjust it further from there.

On the guide you will see the calculations for Polarity (skew) adjustments. Use the calculations in the orange called HPT CW. Turn the LNB the appropriate amount of degrees. This will be very small in some instances.

A slightly more technical version:

Adjusting the skew like this will put the antenna inside the LNB in the correct position to receive from that satellite. You do not need to worry about choosing between the vertical or horizontal adjustments as the antenna in the LNB are exactly 90deg apart, which means if you align the vertical adjustment (for example) then the horizontal adjust is automatically correct. And vice versa. You only need to do one adjustment and the zero mark should point to the calculated degree.

An example: Suppose you live in Christchurch and you wish to receive from the satellite Panamsat 8 (PAS 8). For Christchurch the adjustment you need to make for polarity is this: **Turn the LNB clockwise 6.71 deg**. Now obviously you can't get it exact but try to guess about 6.5 deg.

Using the C Band LNB with the skew markings on it, you know ‘zero’ degrees is with the ‘zero’ mark horizontal and to the right. Therefore 90deg is with the 'zero' straight down, 45deg is half way between that - do some division and you should get it close.

For polarity/skew an educated guess is usually a good enough start. Then after you get the satellite you can adjust it to peak the signal levels.

Running the Coax Cable

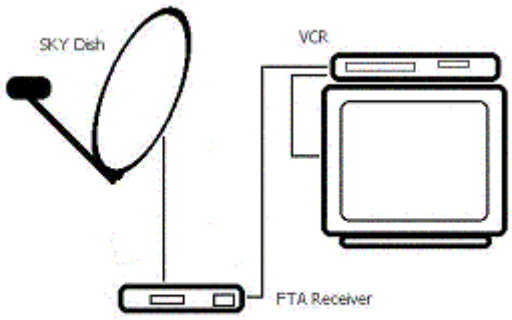
There is nothing problematic about running the coax cable. Just keep these following points in mind.

- Never use metal clips or staples to hold the coax cable. Use proper plastic coax cable clips from an electrical supplies store or use plastic cable ties to fix it to the back of downpipes. Be careful not to pull the cable ties too tight. Don't distort the shape of the cable by squashing it.
- Never bend the cable in a tighter curve than 100mm in diameter.
- Think carefully about where to have drip loops. These are loops that turn and go up at points where water may run on the cable and you need to make it drip off be fore the cable runs into the house.
- Don't leave any cable hanging loosely where it could be blown in the wind (on the roof) or chewed by a dog (under the house).
- Always use satellite quality coax cable as ordinary TV aerial cable is not designed to used with higher frequencies. The signal will be lost over the coax. RG6 is the common satellite coax cable but if you are doing runs longer than 50m, definitely consider upgrading to RG11.

Setting up the Receiver

Make sure the receiver is **unplugged** from the power point. The receiver has two threaded connections on the rear panel. The top connection is labeled ‘LNB IN’, gently screw the 'F' connector from the end of your coax cable to this socket.

Connect a TV lead, from the "RF out" plug on the rear of the receiver to the "aerial in" socket on the rear of your TV or VCR. If you also have an ordinary aerial, plug that into the RF in at the rear of the receiver.



Plug the receiver into the power, turn power on and wait for 10 seconds. Make sure the light on the front panel is green. Press 'on/off' on remote if necessary. Press 'menu' once on the remote.

Tune your TV or VCR into the desired channel so you can view the receiver menu on the TV.
Note: Receiver output is in UHF frequency.

The receiver can also be connected via A/V inputs with the correct cable (connect A/V out from the receiver to the A/V in on your TV). This does not require tuning of the TV.

Aligning the Dish

Once you have mounted the dish, set up the LNB and the satellite receiver, you can now align the dish properly. Two adjustments are required to ensure good reception: Azimuth (north/south heading also known as compass setting), and elevation (up and down).

Azimuth: A hand-held compass is the most effective type for lining up the dish. Use the '**satellite positions and compass settings**' list at the end of this guide for details. Choose the city closest to you. Stand behind the dish, a little away from it so that the metal does not affect the compass, and align the dish to the correct setting. You will fine tune this later, but try to get it accurate.

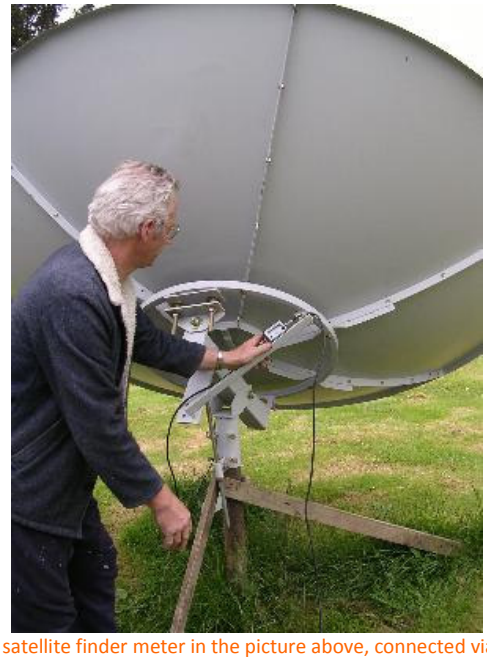
Elevation: Again use the '**satellite positions and compass settings**' list at the end of this guide for details. Set the elevation using a cheap inclinometer bought from Bunnings or a building supplies. Or use a protractor and a level. You need to use this from a place perpendicular (at right angles) to the LNB and scalar ring. The position shown in the picture below is a good one.

Measure your elevation from the large steel box section ring at the back of the dish.
Another alternative is to put a straight piece of timber or steel across the face of the dish and measure off that.

Once you have the dish setup to the angle for your satellite, you will need a satellite meter to do the fine tuning. If you have a professional meter, such as the SF3000, follow the instructions that came with it.

Aligning the dish with the SF95 DIY satellite meter

Make sure the receiver is **turned off** and go to the dish and connect the SF95 meter to the LNB via a 2m coax cable so that the SF95 meter is kept behind the dish at all times. If the meter is in front of a C Band dish it will give a false reading. Make sure you connect the meter to the dish cable using the socket labeled LNB or DISH (depending on the meter you have). Then connect your main coax cable that runs down to your receiver to the other socket on the meter, this one is marked REC.
The meter must be kept well behind the dish at all times to stop interference problems.



You can see the SF95 satellite finder meter in the picture above, connected via 2m black coax cable.

Now you are ready to begin alignment with the SF95 DIY satellite meter:

1] Turn on the receiver. The green light should be glowing on the front panel. Select a channel from the satellite you wish to receive. **You must do this. You must select a channel from the satellite you wish to receive or you will not be able to use the SF95 meter to align the dish.**

2] Go back outside and use the gain control on the front of the SF95 meter to adjust the meter to read about halfway on the scale. The scale means very little and is only used to 'peak' the signal - that is to find the highest signal once you locate the satellite.

3] Whilst staying behind or to one side of the dish, gently and slowly move it from side to side until you find maximum signal on your meter. If you have carefully followed the instructions above using the compass and inclinometer to align your dish you will not have to move the dish much at all. In fact you may already be on the satellite. However it is easy to make a small mistake so this may take some experimenting to find the satellite, but persist and you will find it. Don't move to far at a time. Move a little one way and then a little another way. If you can't find anything, use your compass and inclinometer to start again from the correct spot.

4] Once you have a signal (you will see the needle come up on the signal meter), stop, and before continuing with the adjustments, go check the receiver to be sure you have the correct satellite. You should be able to see some picture if you select the different channels. Also you can press the 'INFO' button on the remote (this is for the Topfield receivers, for a Fortecstar receiver press 'Signal' on the remote) and the satellite name will be displayed. With the 'INFO' box on the screen you will be able to see in the bottom right hand corner two bar graphs. The green one shows you that the cable and LNB are good. The yellow one shows the signal quality – if you have the correct satellite you will have the yellow bar. Even if it is low you should be able to see some channels. The dish can now be fine tuned to get the best signal quality, follow step 5.

If you have no signal or somehow manage to have the wrong satellite, recheck your elevation (details in Dish Setup back up the top of this page) and then start at step one of this section again. If you continue to have trouble, try slowly adjusting the elevation (up and down) of the dish once you have the correct compass point. It is easy to accidentally align your dish to one of the other satellites in the area so you may need to try a few times before you get it right. You will find peaks of signal from other satellites, but you will know if you have the correct one when the quality bar (yellow bar) on the 'INFO' box lights up. For each peak you find, have someone check the TV screen to see if you have any quality.

5] Now that you have found the satellite you may need to use the gain control knob on the front of the SF95 meter to adjust the meter to read halfway on the scale again. The trick is not to get the meter to read full scale (as the measurements on the meter mean very little) but rather to find the peak, the highest signal strength. This will mean you have correctly aligned and fine tuned the dish.

To find the peak, you will need to gently pull on one edge of the dish while you push on the other edge. Do this from behind or from one side. If when you move it to the right the signal goes down, and when you move it to the left it goes up, adjust the dish to the left a little. Keep adjusting it until the signal goes down when you move the dish to the right or to the left. This means you have found the peak, the centre of highest signal.

Now do the same thing up and down. Even though you set the elevation during dish setup it will very rarely be perfect. So adjust it a little until it is in the peak spot, using the same technique as outlined above.

Then check the side to side peak again to make sure it didn't move.

Now tighten up all the bolts tight. It is important these are tight as the dish will move in the wind if they are not tight enough. They are designed to be tightened, just be careful not to swing on the dish as you do it or it will move and your alignment will be lost. If you have any lock-tight or similar product now is the time to apply it to all the bolts so they do not come undone.

6] Just before you leave and relax to watch your new FTA satellite TV and Radio system - you need to do a few more fine adjustments:

Loosen the LNB fitting a little and adjust the 'focus' by sliding the LNB in or out for maximum signal strength. This will take some experimenting also as you are in front of the dish when you do it. You will need to move to the back of the dish to read the meter level before going back to make another adjustment.

Also check the 'polarity' (skew) of the LNB by rotating the LNB for maximum signal strength. This adjustment will often be very small or nothing at all because you set it up correctly at the start.

Now lock the LNB in place by tightening the screws or bolts. Do not tighten these too much as the LNB will be crushed and the wind will have little effect on the LNB anyway. Apply lock-tight to these bolts too.

If your satellite dish angle is quite high, like about 45deg, it will be difficult to get up to the LNB. Please be very careful and do not do anything dangerous. If it is very difficult to reach the LNB but the signal you have is fine, then just leave it. If you have good signal don't bother to do these fine adjustments. Just enjoy it.

Oh but before you go inside…. You will need to unscrew the satellite meter and take it out of the weather. Again if you find it dangerous to reach the LNB just use a 'F' connector joiner to join the extension cable to the main cable, instead of removing the 2m extension.

The Team at ***Hook Technologies Ltd***

Hook Technologies
www.hooktech.co.nz

Satellite Positions and Compass Settings from Auckland, NZ

Table Key:

Compass	Use compass to point dish in this direction
Elevation	The up and down angle to set the dish. Use an inclinometer or markings on dish.
VPT CW	Degrees of **V**ertical **P**olarisation **T**ilt in **C**lock **W**ise direction
VPT CCW	Degrees of **V**ertical **P**olarisation **T**ilt in **C**ounter **C**lock **W**ise direction
HPT CW	Degrees of **H**orizontal **P**olarisation **T**ilt in **C**lock **W**ise direction – see DIY Guide
HPT CCW	Degrees of **H**orizontal **P**olarisation **T**ilt in **C**ounter **C**lock **W**ise direction
	If Polarity degree is shown as negative, turn anti clockwise

Satellite Name		**Compass**	**Elevation**	**VPT CW**	**VPT CCW**	**HPT CW**	**HPT CCW**
NSS5	177W	354.2	46.7	78.66	-101.34	-11.34	168.66
IntelSat 701	180E	349.3	47.2	82.57	-97.43	-7.43	172.57
GE23 or AMC23	174E	339.2	47.6	90.62	-89.38	0.62	-179.38
Intelsat5 (was PAS2)	169E	330.9	47.2	97.32	-82.68	7.32	-172.68
Intelsat8 (was PAS8)	166E	326.0	46.7	101.24	-78.76	11.24	-168.76
OptusD1	160E	316.6	45.0	108.64	-71.36	18.64	-161.36
OptusC1	156E	310.7	43.4	113.16	-66.84	23.16	-156.84
JCSat 2	154E	307.9	42.4	115.28	-64.72	25.28	-154.72
OptusD2	152E	305.2	41.5	117.30	-62.70	27.30	-152.70
Measat 2	148E	300.1	39.3	121.05	-58.95	31.05	-148.95
Telstar18 or Apstar5	138E	288.8	33.0	128.76	-51.24	38.76	-141.24
Apstar 6	134E	284.9	30.2	131.24	-48.76	41.24	-138.76
AsiaSat 4	122E	274.6	21.2	136.97	-43.03	46.97	-133.03
Palapa C2	113E	267.9	14.1	139.88	-40.12	49.88	-130.12
AsiaSat 3S	105.5E	262.9	8.2	141.58	-38.42	51.58	-128.42
AsiaSat 2	100.5E	259.7	4.2	142.40	-37.60	52.40	-127.60
NSS6	95.0E	Below the horizon					

Calculated from Auckland 36.51S Lat 174.46E Long

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Satellite Positions and Compass Settings from Hamilton, NZ

Table Key:

Compass	Use compass to point dish in this direction
Elevation	The up and down angle to set the dish. Use an inclinometer or markings on dish.
VPT CW	Degrees of **V**ertical **P**olarisation **T**ilt in **C**lock **W**ise direction
VPT CCW	Degrees of **V**ertical **P**olarisation **T**ilt in **C**ounter **C**lock **W**ise direction
HPT CW	Degrees of **H**orizontal **P**olarisation **T**ilt in **C**lock **W**ise direction – see DIY Guide
HPT CCW	Degrees of **H**orizontal **P**olarisation **T**ilt in **C**ounter **C**lock **W**ise direction
	If Polarity degree is shown as negative, turn anti clockwise

Satellite Name		**Compass**	**Elevation**	**VPT CW**	**VPT CCW**	**HPT CW**	**HPT CCW**
NSS5	177W	352.5	45.5	80.19	-99.81	-9.81	170.19
IntelSat 701	180E	347.7	45.9	83.96	-96.04	-6.04	173.96
GE23 or AMC23	174E	337.9	46.2	91.68	-88.32	1.68	-178.32
Intelsat5 (was PAS2)	169E	329.9	45.7	98.06	-81.94	8.06	-171.94
Intelsat8 (was PAS8)	166E	325.1	45.1	101.78	-78.22	11.78	-168.22
OptusD1	160E	316.0	43.4	108.81	-71.19	18.81	-161.19
OptusC1	156E	310.3	41.8	113.10	-66.90	23.10	-156.90
JCSat 2	154E	307.6	40.9	115.12	-64.88	25.12	-154.88
OptusD2	152E	305.8	40.8	117.04	-62.96	27.04	-152.96
Measat 2	148E	300.0	37.8	120.62	-59.38	30.62	-149.38
Telstar18 or Apstar5	138E	288.8	31.6	128.03	-51.97	38.03	-141.97
Apstar 6	134E	284.9	28.8	130.42	-49.58	40.42	-139.58
AsiaSat 4	122E	274.5	20.0	135.98	-44.02	45.98	-134.02
Palapa C2	113E	267.8	13.2	138.81	-41.19	48.81	-131.19
AsiaSat 3S	105.5E	262.8	7.3	140.46	-39.54	50.46	-129.54
AsiaSat 2	100.5E	259.4	3.28	141.24	-38.76	51.24	-128.76
NSS6	95.0E	Below the horizon					

Calculated from Hamilton 37.77S Lat 175.3E Long

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Satellite Positions and Compass Settings from Wellington, NZ

Table Key:

Compass	Use compass to point dish in this direction
Elevation	The up and down angle to set the dish. Use an inclinometer or markings on dish.
VPT CW	Degrees of **V**ertical **P**olarisation **T**ilt in **C**lock **W**ise direction
VPT CCW	Degrees of **V**ertical **P**olarisation **T**ilt in **C**ounter **C**lock **W**ise direction
HPT CW	Degrees of **H**orizontal **P**olarisation **T**ilt in **C**lock **W**ise direction – see DIY Guide
HPT CCW	Degrees of **H**orizontal **P**olarisation **T**ilt in **C**ounter **C**lock **W**ise direction
	If Polarity degree is shown as negative, turn anti clockwise

Satellite Name		**Compass**	**Elevation**	**VPT CW**	**VPT CCW**	**HPT CW**	**HPT CCW**
NSS5	177W	350.5	41.62	80.36	-99.64	-9.64	170.36
IntelSat 701	180E	348.4	42.1	83.70	-96.30	-6.30	173.70
GE23 or AMC23	174E	339.3	42.4	90.53	-89.47	0.53	-179.47
Intelsat5 (was PAS2)	169E	331.7	42.1	96.21	-83.79	6.21	-173.79
Intelsat8 (was PAS8)	166E	327.3	41.6	99.55	-80.45	9.55	-170.45
OptusD1	160E	318.6	40.2	105.94	-74.06	15.94	-164.06
OptusC1	156E	313.1	38.8	109.90	-70.10	19.90	-160.10
JCSat 2	154E	310.5	38.0	111.79	-68.21	21.79	-158.21
OptusD2	152E	307.9	37.2	113.60	-66.40	23.60	-156.40
Measat 2	148E	302.9	35.3	117.00	-63.00	27.00	-153.00
Telstar18 or Apstar5	138E	291.7	29.7	124.20	-55.80	34.20	-145.80
Apstar 6	134E	287.7	27.2	126.58	-53.42	36.58	-143.42
AsiaSat 4	122E	276.8	19.1	132.20	-47.80	42.20	-137.80
Palapa C2	113E	269.7	12.6	135.13	-44.87	45.13	-134.87
AsiaSat 3S	105.5E	264.2	7.05	136.86	-43.14	46.86	-133.14
AsiaSat 2	100.5E	260.7	3.33	137.70	-42.30	47.70	-132.30
NSS6	95.0E	Below the horizon					

Calculated from Wellington 41.17S Lat 174.46E Long

Hook Technologies
www.hooktech.co.nz

Satellite Positions and Compass Settings from Christchurch, NZ

Table Key:

Compass	Use compass to point dish in this direction
Elevation	The up and down angle to set the dish. Use an inclinometer or markings on dish.
VPT CW	Degrees of **V**ertical **P**olarisation **T**ilt in **C**lock **W**ise direction
VPT CCW	Degrees of **V**ertical **P**olarisation **T**ilt in **C**ounter **C**lock **W**ise direction
HPT CW	Degrees of **H**orizontal **P**olarisation **T**ilt in **C**lock **W**ise direction – see DIY Guide
HPT CCW	Degrees of **H**orizontal **P**olarisation **T**ilt in **C**ounter **C**lock **W**ise direction
	If Polarity degree is shown as negative, turn anti clockwise

Satellite Name		**Compass**	**Elevation**	**VPT CW**	**VPT CCW**	**HPT CW**	**HPT CCW**
NSS5	177W	354.8	38.9	78.93	-101.07	-11.07	168.93
IntelSat 701	180E	351.0	39.4	81.99	-98.01	-8.01	171.99
GE23 or AMC23	174E	342.4	40.0	88.27	-91.73	-1.73	178.27
Intelsat5 (was PAS2)	169E	335.1	39.9	93.57	-86.43	3.57	-176.43
Intelsat8 (was PAS8)	166E	330.8	39.6	96.71	-83.29	6.71	-173.29
OptusD1	160E	322.3	38.5	102.80	-77.20	12.80	-167.20
OptusC1	156E	316.8	37.4	106.64	-73.36	16.64	-163.36
JCSat 2	154E	314.2	36.7	108.46	-71.52	18.48	-161.52
OptusD2	152E	311.6	36.0	110.26	-69.74	20.26	-159.74
Measat 2	148E	306.6	34.3	113.63	-66.37	23.63	-156.37
Telstar18 or Apstar5	138E	295.1	29.3	120.91	-59.09	30.91	-149.09
Apstar 6	134E	290.9	27.0	123.35	-56.65	33.35	-146.65
AsiaSat 4	122E	279.6	19.4	129.24	-50.76	39.24	-140.76
Palapa C2	113E	272.1	13.3	132.38	-47.62	42.38	-137.62
AsiaSat 3S	105.5E	266.3	8.00	134.28	-45.72	44.28	-135.72
AsiaSat 2	100.5E	262.7	4.42	135.22	-44.78	45.22	-134.78
NSS6	95.0E	258.7	0.46	135.98	-44.02	45.98	-134.02

Calculated from Christchurch 43.32S Lat 172.37E Long