InternetVSAT.Com
Your Gate to The Net

Star 6000 Installation Manual

Version 1.1
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Change History

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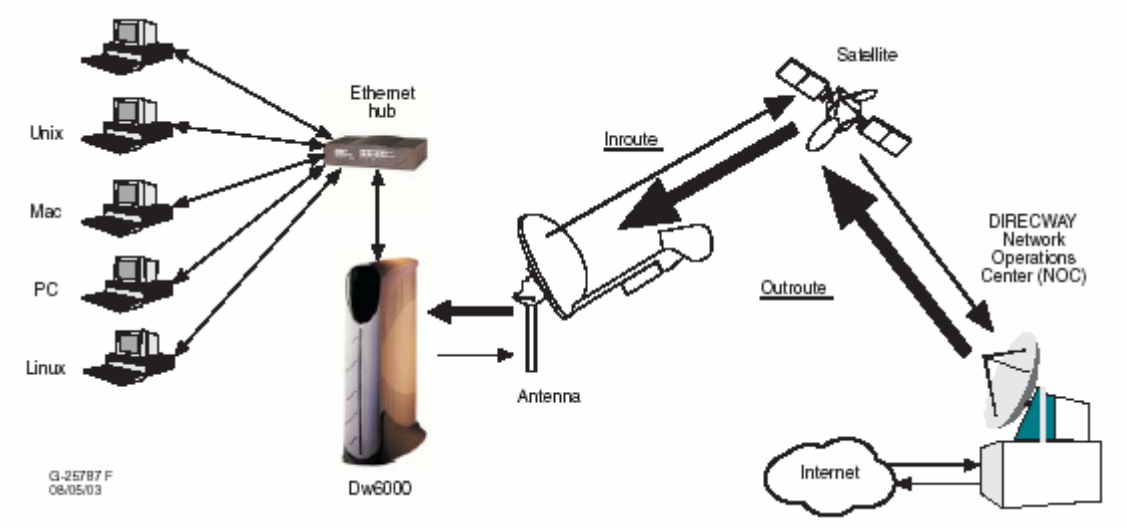
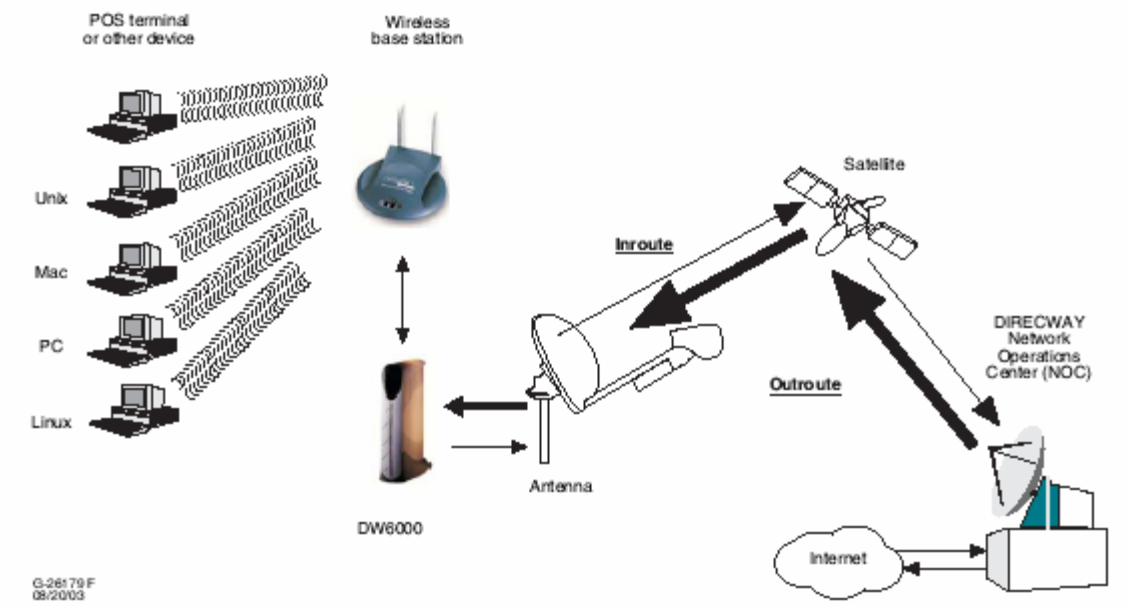
D4: REMOTE INSTALLATION GUIDE DW6000

Remote Site Network diagram



Remote Site Network diagram with wireless interface (WiFi)



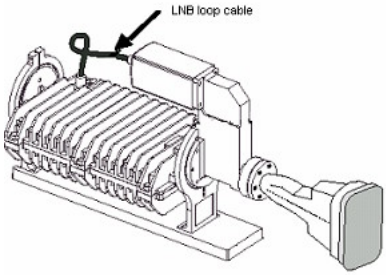
1. Equipment Preparation

IMPORTANT TIME SAVING STEP

Prior to doing anything on the site, look in your RPR form. If the IRU serial number is NOT on the form for the site you are installing you MUST GIVE YOUR HELP DESK THE SERIAL NUMBER AND SITE ID. The VAR help desk MUST inform the HNSE help desk so your site will be configured in a timely manner.

- The DW6000 is an integrated receive and transmit modem with a single LAN interface
- The DW6000 can be used with the 74cm Two-Way satellite dish, and the included ODU. The DW6000 can also be used in conjunction with 89 cm, 98cm and 1.2m dishes, and the Tigris ODU (PN 1025901-X007) or the Isis ODU (PN 1032552-0018).
- Power specification of these ODU's is 1 watt.

- IF cables: RG6 type for transmission and reception, two separate cables are required. It is important that the right quality cable is used in order to achieve the right signal levels depending on the cable length. Please review the table attached in Appendix B at the back of this document.
- When a Tigris ODU must be used (shown below), the LNB loop cable that connects Outdoor Transmit Unit and LNB (see figure below) must be unscrewed and removed before connecting the RX RG6 cable to the F connector in the LNB and before connecting the TX RG6 cable to the N/F connector at the back of the Outdoor Transmit Unit.



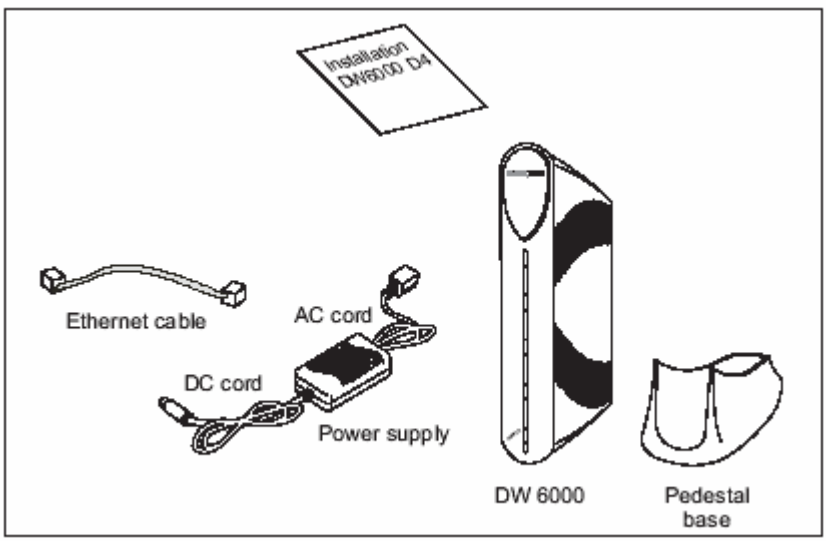
- When using Tigris ODU with part number 1025901-0007 one **F to N connector** will be required for the connection between the TX RG6 cable and the N connector at the back of the Outdoor Transmit Unit.
- When using Tigris ODU with part number 1025901-1/2007 *no **F to N connector** is required between the TX RG6 cable and the F connector at the back of the Outdoor Transmit Unit*, this ODU always comes with F connector.

- The DW6000 is supplied with a stand; ensure that this is fitted to the unit. This is important for heat dissipation.

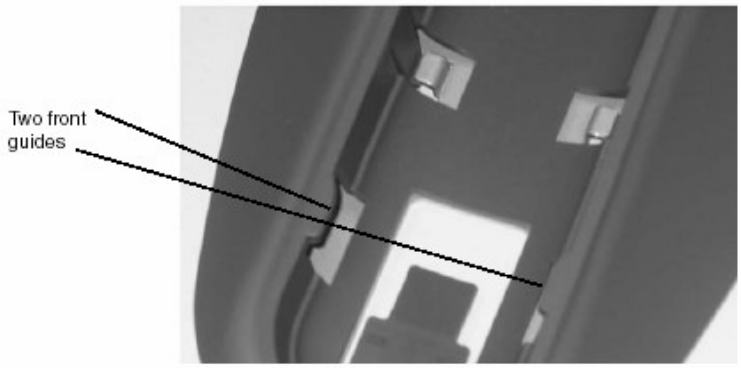
- You will need a Cat5 patch cable (included with the DW6000) to configure the unit.

- **You need a valid RPR form for the site for the site to be commissioned. This must be requested at least 3 days inadvance of installation.**

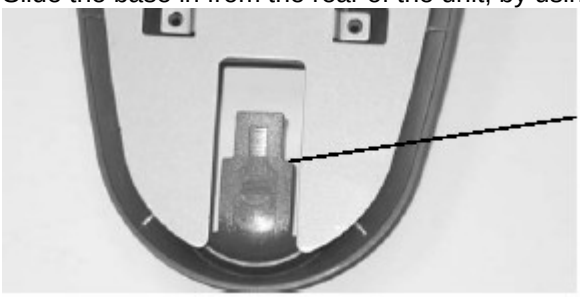
- You will need the following items, included in your DW6000 box (The DW6000 D4 (this document) is not included, this must always be carried by HNS qualified installers).



Connect the base to the DW6000 as shown below:



Slide the base in from the rear of the unit, by using the locating guides.



Ensure the clip is locked in position; the clip can also be de-pressed to removed the base.

DW6000 configuration

2. Connecting DW6000 and PC for configuration of boot parameters

a) Attach the CAT5 cable between your PC and the DW6000.

Note: **The DW6000 auto detects the type of cable your have (X or Straight Cat5).**

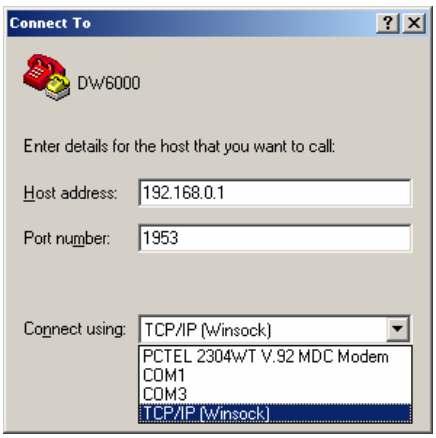
The DW6000's ip address is preset to 192.168.0.1. If your PC's network card to set for DHCP, the DW6000 will automatically allocate you the ip address of 192.168.0.2 (DHCP is not enabled for normal operation on a commissioned system at this time)

b) At your PC, run Hyper Terminal to access the Gateway host software, proceed as follow:

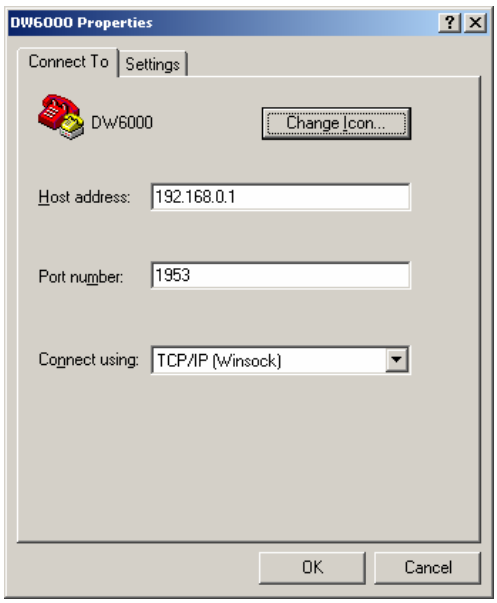
Start Menu → Programs → Accessories → Communications → Hyper Terminal

Configure the Hyper terminal parameters as follows:

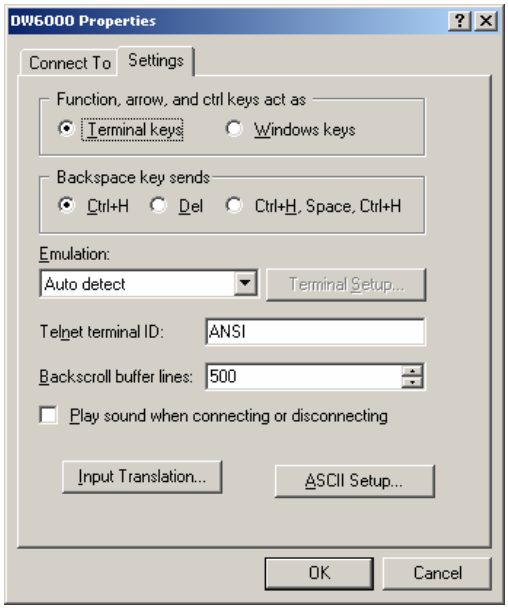
Start Hyper terminal session



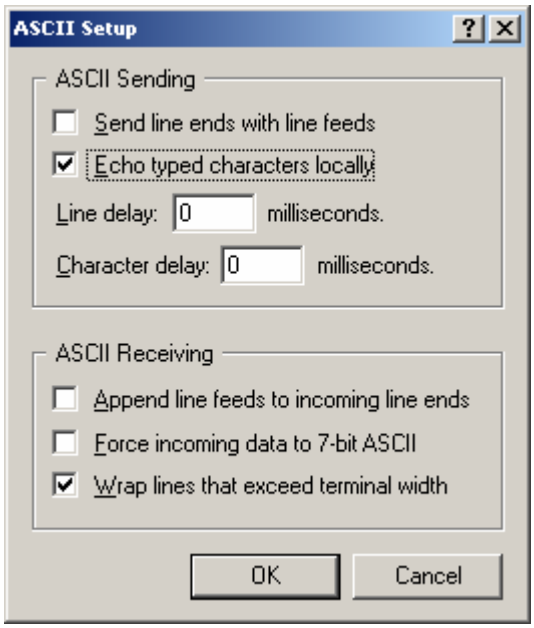
Select *connect using* TCP/IP, and enter 192.168.0.1, port 1953



Select the *settings* tab

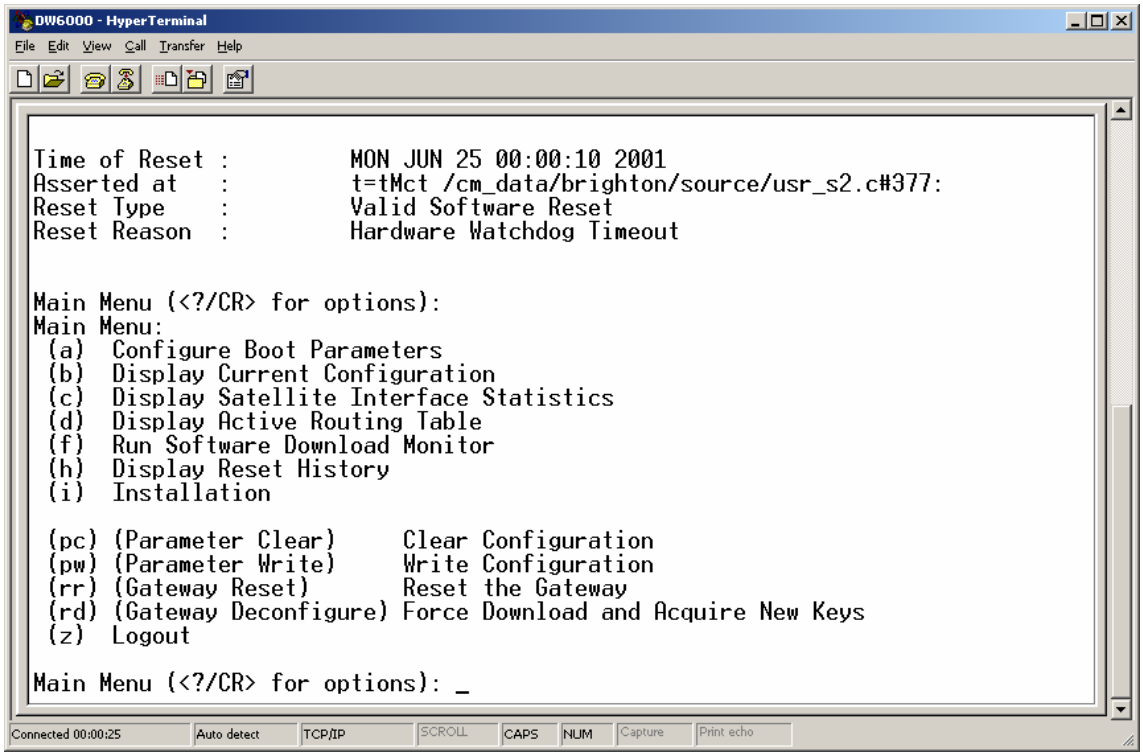


Ensure the setting are as shown above, then select ASCII setup



Ensure your ASCII settings are the same as shown here, then *click* OK.

3. Press **ENTER** at the program prompt to display the Gateway Host Main Menu:

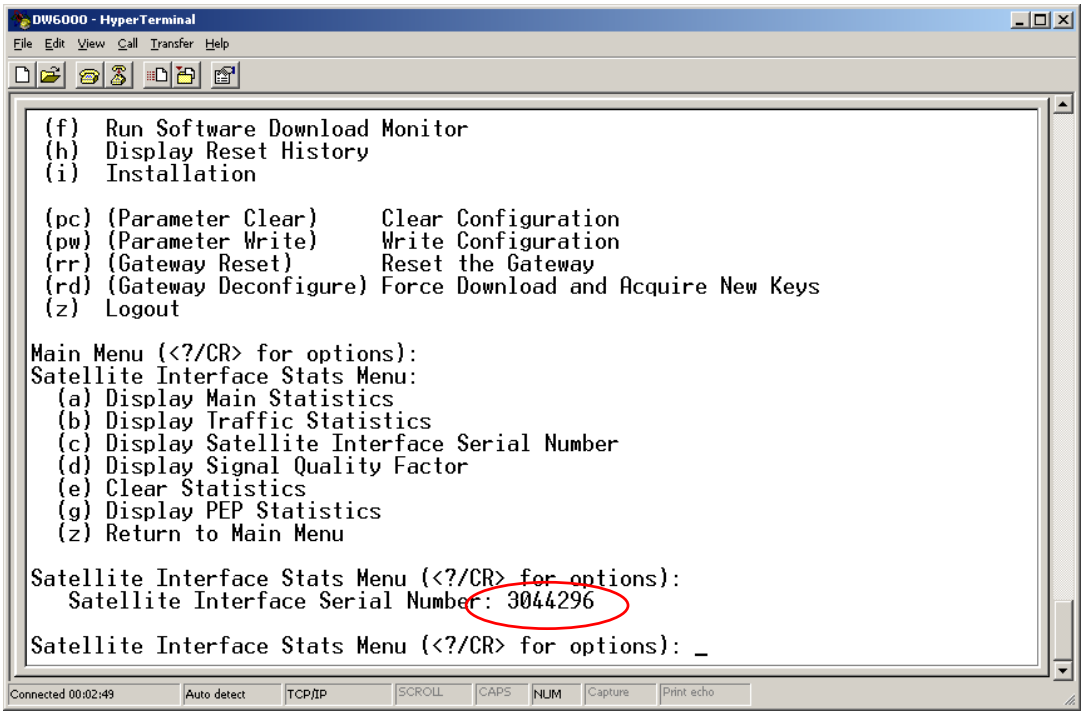


3.1 The parameters needed for configuring the DW6000 are as shown below. Several parameters are Global and will be the same across all sites, the rest of them will be site specific and you will find them in the RPR form for the specific site. **Note that the values shown in table below as "site specific", are only examples, please find the site-specific values for your site in your site's RPR**.

Parameter	Value	Global/Site specific
VSAT Return Path	Inroute	Global
Satellite Longitude degrees	10	Global
Satellite Longitude minutes	0	Global
Satellite Hemisphere	East	Global
VSAT Longitude degrees	0	Site specific
VSAT Longitude minutes	45	Site specific
VSAT Longitude Hemisphere	West	Site specific
VSAT Latitude degrees	52	Site specific
VSAT Latitude minutes	0	Site specific
VSAT Latitude Hemisphere	North	Site specific
Satellite Channel Frequency	16156	Site specific
Receive Symbol Rate	30000000	Global
Viterbi rate	5	Global
LNB Polarization	Vertical	Global
Tx Polarization	Horizontal	Global
LNB 22kHz Switch	Off	Global
DVB Program Num for user data	20500	Global
DVB Program Num for DNCC data	0	Global
LAN1 IP Address	172.16.1.49	Site specific
LAN1 Subnet Mask	255.255.255.240	Site specific
Number of Static Routes in Routing Table	0	Global
IP Gateway IP Address	62.128.190.179	Site specific
SDL Control Multicast IP Address	224.0.1.6	Global
VSAT Management IP Address	10.1.128.68	Site specific
Satellite Hemisphere	East	Global
Default Gateway (meaningful for LAN)	10.0.0.10	Global

3.2 Check that the DW6000 s/n matches with that one in your RPR form:

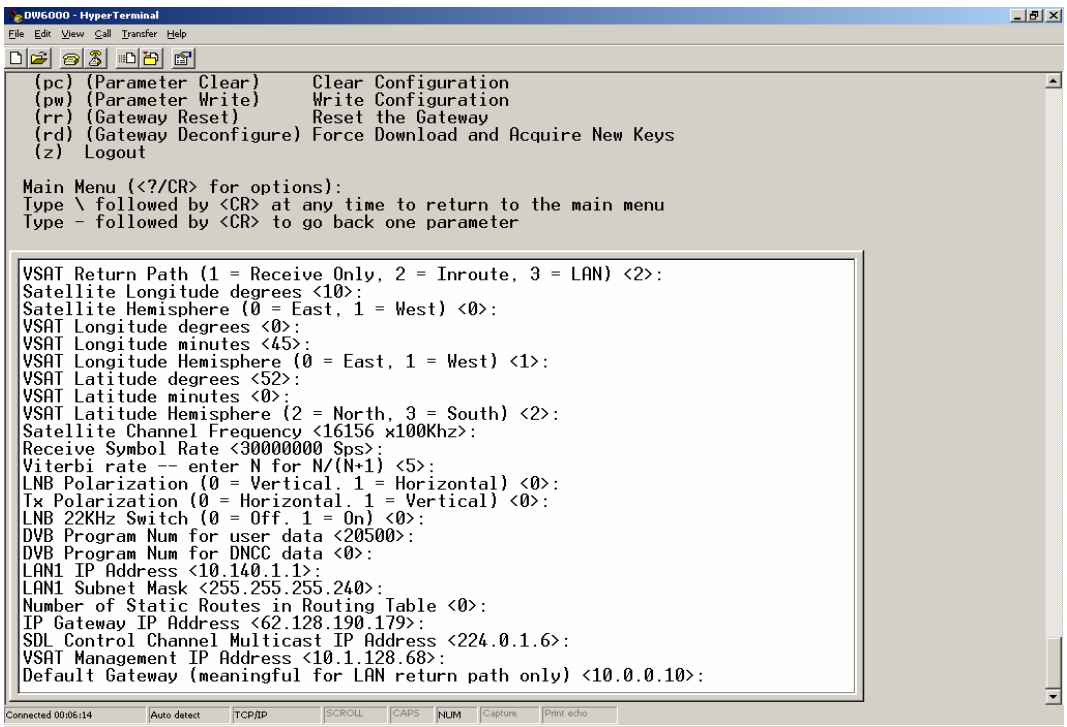
In the Hyper Terminal session, you must have the DW6000 Main Menu as shown below, select option ***c*** at Main Menu and then option ***c*** again for the Satellite Interface Serial Number:



3.3 Return to Main Menu by typing **z**. On Main Menu select option ***a*** for "Configure Boot Parameters".

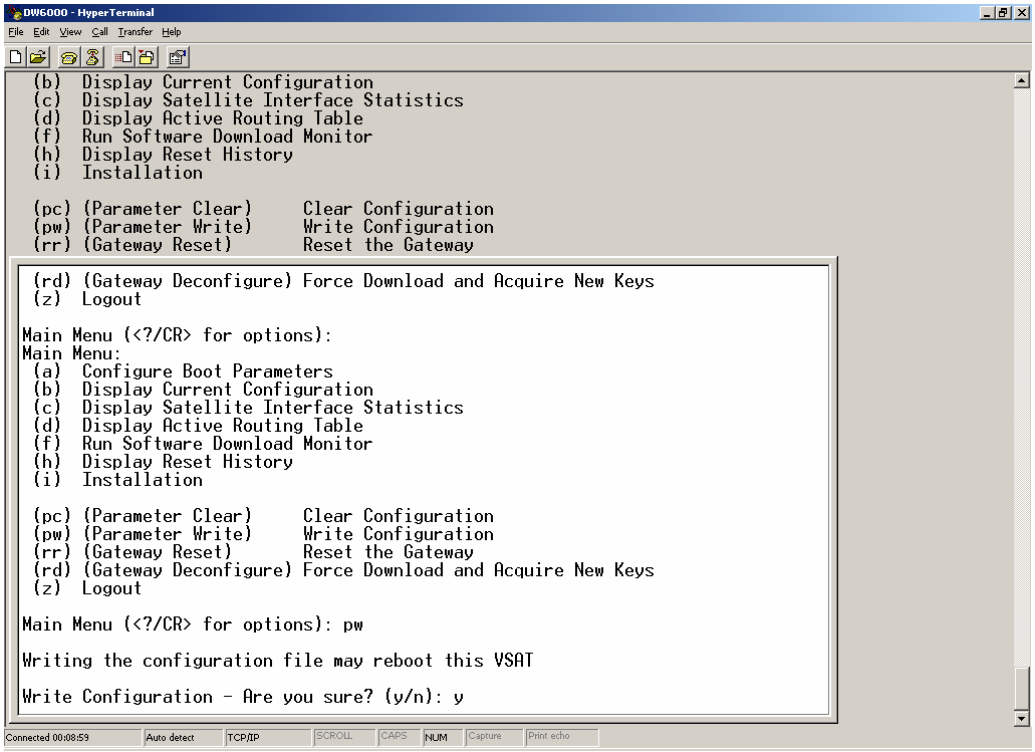
As each one-line parameter appears, type the value as defined in the previous table for "global" parameters and as defined in your site's RPR for the "site specific" parameters. Pressing <***enter***> will bring you to the next parameter.

Note *that the values for "site specific" parameters in the previous table are* ***only*** *examples and that you must get those "site specific" parameters from* ***your*** *RPR form.*

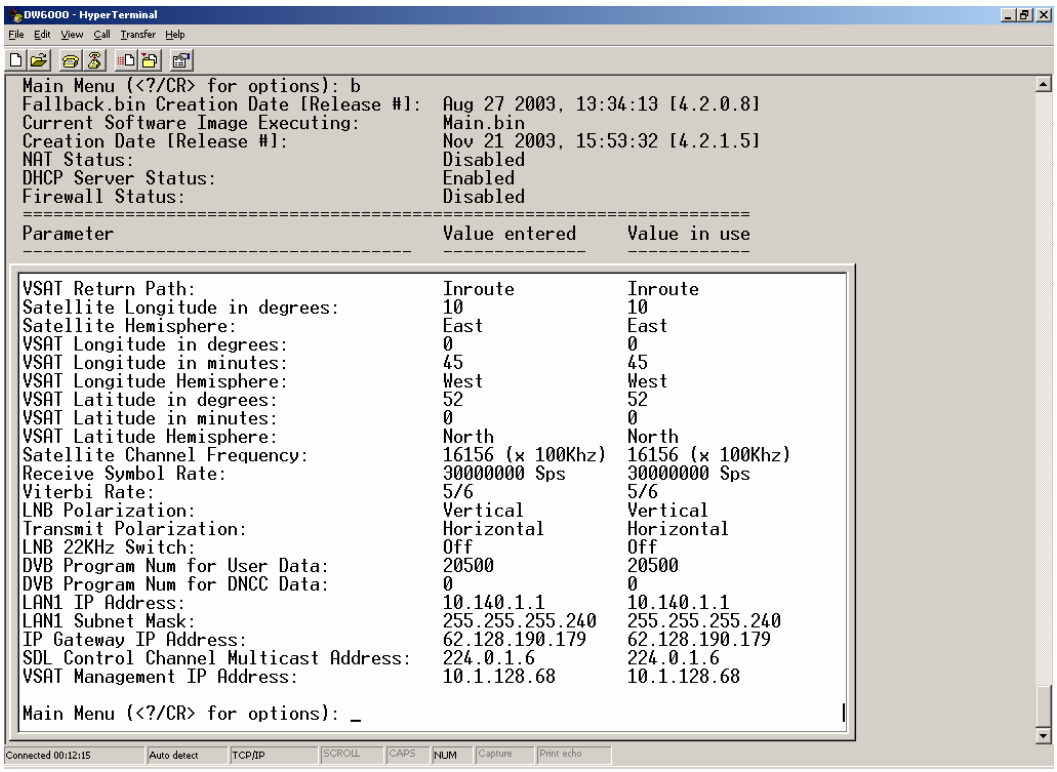


Hint: Type **–** (*minus sign*) and press ***<enter>*** at the prompt to go to the previous parameter. You can also skip the remaining parameters by typing **** and pressing ***<enter>.***

3.4 When you have entered all parameters, return to the Main Menu and type ***pw***. This saves the configuration parameters to the flash memory. At this point, depending on the parameters that were modified, the Gateway host may reset.



3.5 At the Main Menu, select ***b*** option to “display current configuration”. Verify that the parameters entered match those ones in the previous table if they are global, and in your RPR if they are “site specific”.

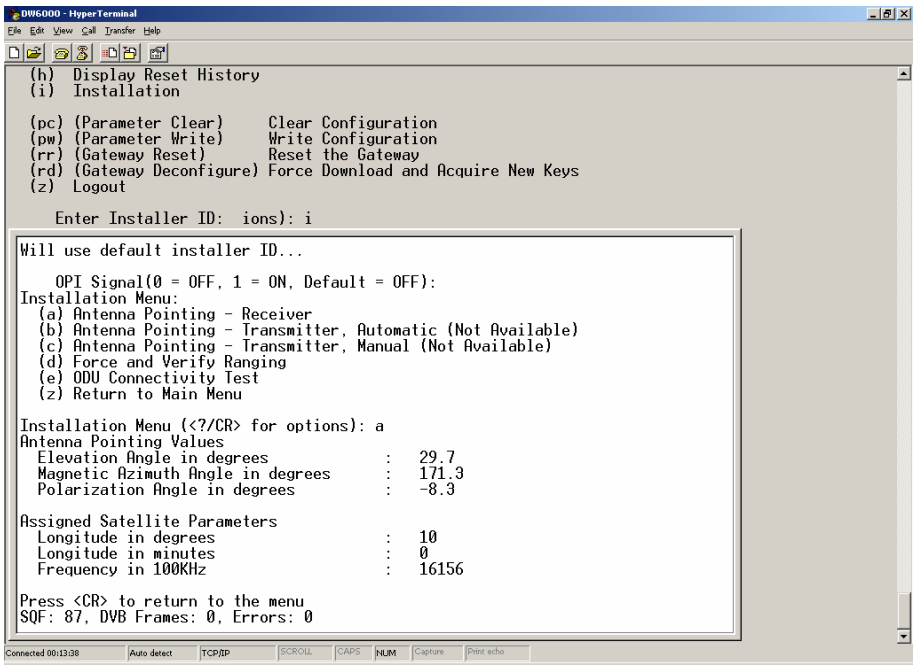


3.6 After you have entered and verified the boot parameters, return to the Main Menu and select option **i** for Installation.

Hit ***<enter>*** when prompted with “Installer ID:”.

Also leave OPI Signal as default off then hit ***<enter>***

At the Installation Menu prompt, enter ***a*** to obtain antenna pointing values and assigned satellite parameters.



Fine tune the antenna with the values for Elevation, Azimuth and Polarization angles displayed on your screen.

The Signal Quality Factor (SQF) at the bottom of the screen, represents the strength of the received signal relative to noise. SQF is an integer value between 0 and 99. The SQF value is interpreted as follows:

- 0~29. The Gateway is **not** locked onto the desired signal.
- 31~99. The Gateway is locked onto the desired satellite signal.

Note: The SQF value of 30 indicates you maybe pointed to the incorrect satellite, the wrong polarity is selected at the RFU/ODU or the incorrect frequency has been entered.

The SQF must be as high as possible, refine the antenna pointing and/or polarisation to bring the SQF to its maximum. The SQF message updates automatically. There is a delay of up to 5 seconds between the displayed SQF value and the current SQF value.

Refine your antenna pointing until you get an SQF higher than what is shown in the table below:

Weather conditions (remote)	SQF
Clear sky	70 minimum Upto 99
Light cloud	60 minimum
Heavy cloud	55 minimum
Rain or snow	50 minimum

If you cannot achieve a satisfactory SQF take the following steps until the situation is corrected.

a. Check for unobstructed view to satellite.
b. Refine antenna aiming.

c. Check polarisation. (Complete antenna “skew” in the case of the 74 cm antenna, & RFU skew in antenna 89cm’s and above)
d. Check cables connectivity and length (you may need better quality cable or inline amplifiers).
e. Replace ODU.
f. Replace the entire DW6000 unit.

3.7 At this point you are ready to have the Transmitter enabled. In order to do so you need to collect the following information and then call **your VAR Help Desk**. For tracking and procedural reasons the following steps must be followed:

a. The following information:

- CUSTOMER site ID
- IRU Serial Number
- Site ID
- IP Address
- Gateway IP address
- Service Plan
- Weather conditions (clear sky, light cloud, heavy cloud, rain)
- SQF

b. Call the VAR Help Desk and inform them that this is a DW6000 installation and give them the information listed above.
c. Wait until the VAR Help Desk communicates back to you that you are now Transmit enabled and within tolerance in your SQF (Receive signal Quality as shown in the statistics discussed above) and Eb/No (Signal quality of your transmission as received at the hub).
d. If your site is now enabled and has ranged in successfully continue to stage 4, if your transmitter is enabled but failed to range continue to stage 3.8.

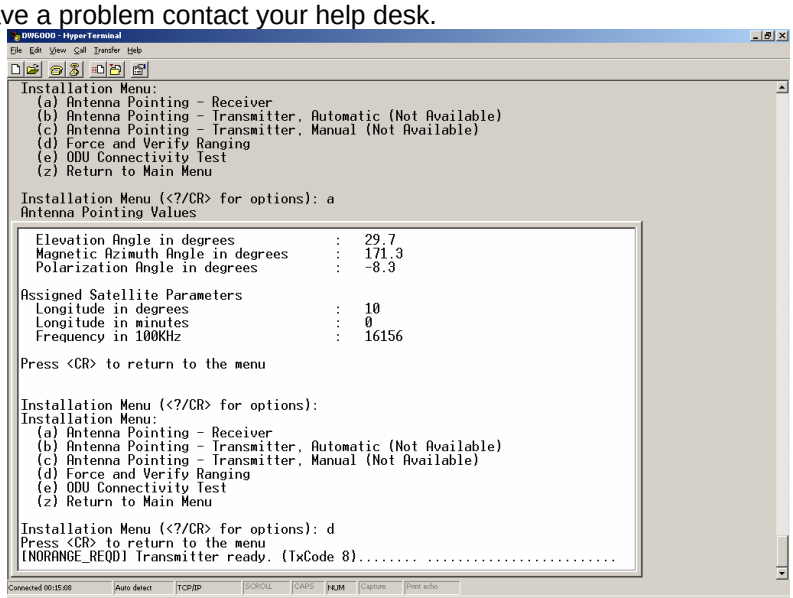
3.8 Return to Installation menu by pressing ***<enter>***, select now **d** for “Verify Ranging”.

Ranging has succeeded if the Test Result on the screen show “NORANGE REQD Transmitter ready”. Ranging has not been successful if “NO RANGE” appears.

If you do not see “ “NORANGE REQD Transmitter ready”. repeat the “Verify Ranging” step 3 times in 5 minute intervals.

If NO RANGE appears re-check your Latitude and Longitude entries, change them to more accurate values and go through the Parameter Write step. Power cycle the unit as described in the attached procedure.

If you still have a problem contact your help desk.



Return to Main Menu by pressing ***<enter>***.

4.0 *Verifying software download.*

If the Gateway is configured correctly for outroute reception and SQF is acceptable, it will acquire the outroute. As soon as the Gateway acquires the outroute, it tries to perform software download.

4.1 At the Main Menu, select ***f*** for *Software Download Monitor*.
The following message is displayed at the bottom of the screen:

SDL Initialization complete. Awaiting first heartbeat msg.

This message is dynamically updated. It indicates that SDL (Software Download process) has started and is waiting to connect with the HUB server.

4.2 At Main Menu, select option ***rd*** to force download and acquire new keys. DW6000 resets after this command. Wait until Main Menu appears again, select ***f*** for monitoring the SDL.

You should see on the screen:

SDL Initialization complete. Awaiting first heartbeat msg.

Received first heartbeat message.

Received File/Group message. Reconciling files...

MM loading...

Transferring MM to flash!

All files downloaded. Notifying CFM.

Note: It may be 20 minutes before the first heartbeat message is received, other messages may also appear i.e. IP delivered, WC delivered etc.

Upon successful download, the DW6000 automatically resets to reflect the new software. The new configuration takes effect. After reset, the DW6000 goes through the boot-up sequence again. Press ***<enter>*** for the Main Menu to appear and select option ***f*** again, you should see on the screen:

SDL Initialization complete. Awaiting first heartbeat msg.
All files downloaded. No pending changes.

The DW6000 power Led will also stop flashing when the software download is complete (a flashing power Led indicates the unit is operating on is factory fallback software)

If SDL does not progress, at Main Menu select ***b*** for Display Current Configuration and check the following:

- SDL Control Channel Multicast Address, value entered and used are: 224.0.1.6
- IP Gateway IP Address, value entered and used are the one in your RPR for this “site specific” parameter.

5. Verifying correct Gateway operation.

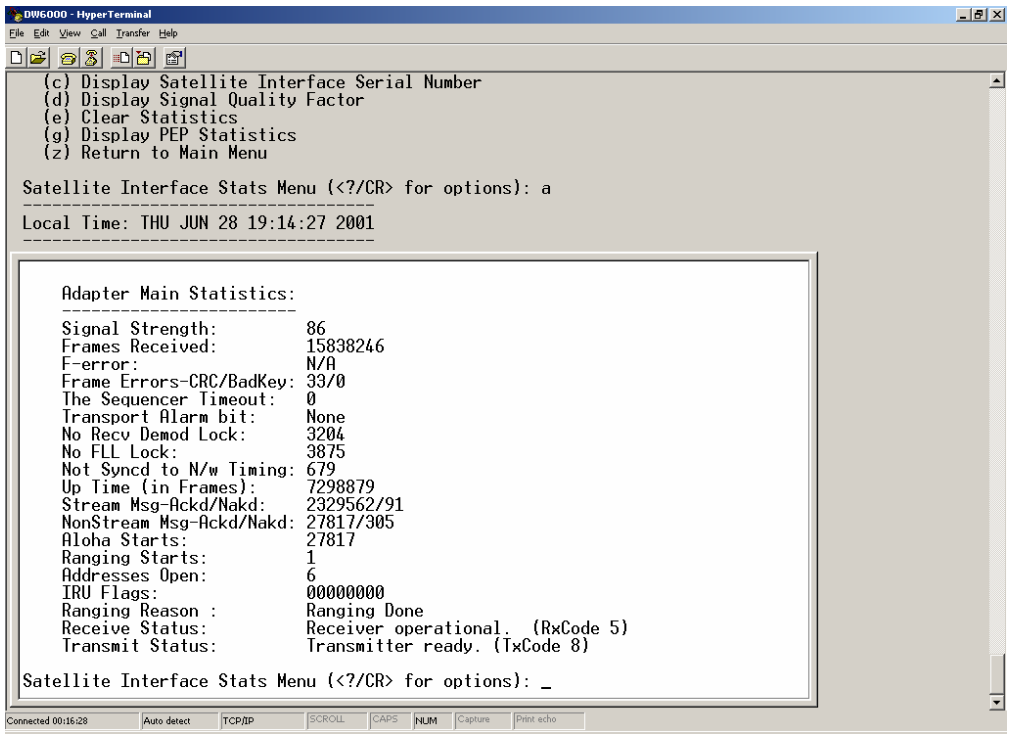
5.1 At the Main Menu, select **c** again for Satellite Interface Statistics, and select **a** for Main Statistics. You should see:

- Signal quality factor
- Frames received
- Receive Status operational
- Transmit Status available

At this point, your help desk (VAR Help Desk) needs to approve the installation. The VAR HD approves the installation based on possibly a wide number of criteria. As far as the satellite equipment installation is concerned HNSE must verify two basic parameters: The SQF and the Eb/No. Of these only the SQF is visible to the installer on site. The Eb/No is only visible at the NOC. The HNSE HD will communicate these parameters to the VAR HD and will also communicate if the values are acceptable. The VAR HD will then be able to accept the installation.

If the values are not acceptable then the installer will have to take steps to improve the site's performance. Follow the same steps as described in 3.6 a to f. Indicate to the VAR HD that you are ready to be re-ranged. The HNSE Helpdesk will give new SQF and EbNo figures. This process needs to continue until the site is within correct operational limits.

The VAR Helpdesk may issue to the installer a Commissioning Number for tracking purposes.



When DW6000 is configured, type ***z*** to log out and close the Hyper Terminal session.

6. Configuring PC for TCP/IP connectivity

For the PC interface to be connected to the Gateway Host must be configured with the following parameters:

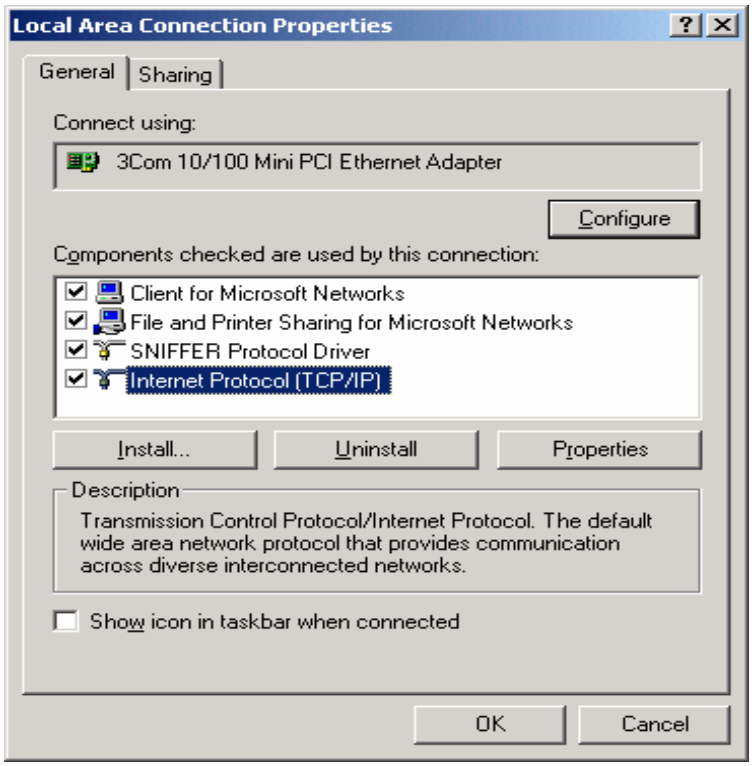
- **IP Address**: one IP Address from the Host IP range in RPR (site specific parameter, recorded in RPR)
- **Subnet Mask**: LAN1 Subnet Mask configured in Gateway Host (site specific parameter, recorded in RPR)
- **Default Gateway IP Address**: LAN1 IP Address configured in DW6000 (site specific parameter, recorded in RPR)
- **Preferred DNS Server**: 195.238.40.45
- **Alternate DNS Server**: 195.238.50.254

To configure this LAN interface in Windows OS proceed as follows:

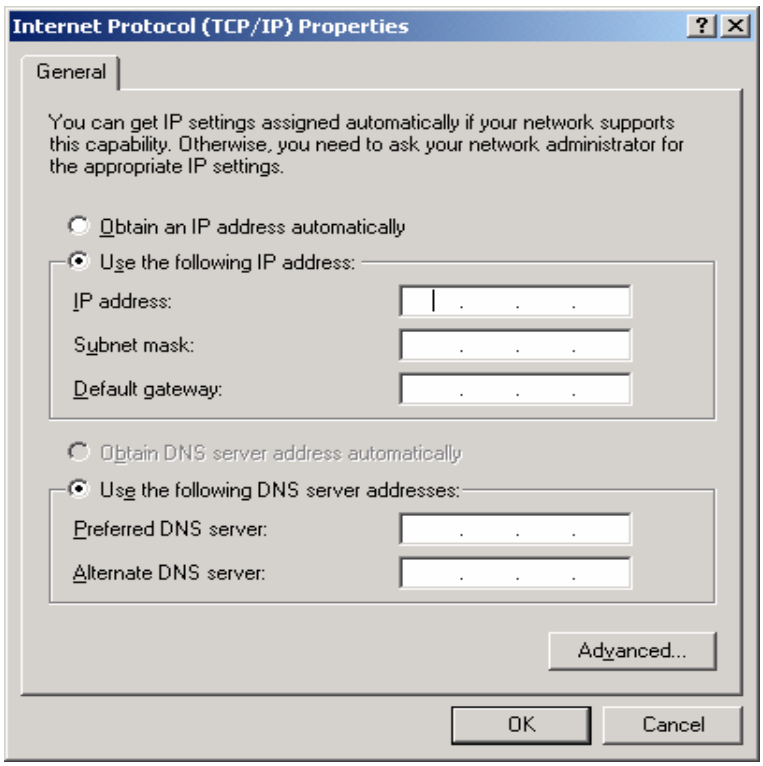
Start Menu→ Settings → Network Connections (If not direct access from here, go to Control Panel → Network Connections)

Right click on the icon for the Local Area Connection interface that you will connect to the DW6000 for traffic, click on “Properties”.

On the Properties window, click on “Internet Protocol (TCP/IP)” and then click on Properties button:



Fill in the previous parameters and click OK on this screen and in the previous one still open:



Reboot the PC after LAN interface is configured.

7. Installing Optimization Software.

Download the Optimization package (Windows O/S with Internet Explorer only)

Open your WEB Browser to ftp://195.238.48.11/pub/
And download and install ***IE_5x_Opt_15.exe***

When asked to either open or save the file, select "Open" and the software will be automatically installed.

8. Power cycle reboot.

a) Power down the computer, Click on **Start** & Click on **Shut Down**
Select **Shut down** again (do not select restart)
b) Unplug the power supply to the DW6000 (at least for 30 seconds)
c) Plug the power supply back into the DW6000 (wait for the **Ready** and **Rx** lights to flash back and forth)
d) **Power ON** the computer
e) Confirm that the **status** lights on DW6000 remain steady, and **LAN led** flashes after the computer boots up completely (you will see the LAN led flash when your are passing traffic)

9. Tests

a) Test 1.

Open a "Command prompt" window (Start→Run→command) and type:

ping *<ip gateway address from RPR form>* –w 5000, press the ***<enter>*** button.

The response time should be between 800 and 1400 ms.

b) Test 2.

Open your Internet browser and enter into the URL line ("Address" field), the IP address:
195.238.48.11

The first page you get is just a blue Hughes Network Systems Europe page that will go directly to the *index* page, a large satellite dish; write down the shown time to download this page.
Press "Continue" and it will download the *van.html* page, that consists of 24 small pictures of Vancouver as objects; write down the shown time to download this page.

Press "Continue" and it will download the *demo.html* page that is a large image. Write down the shown time to download this page.

Press "Continue" and it will download the *vancouver.html* page, that consists of 12 medium size images of Vancouver as objects. Write down the shown time to download this page.
Depending on your Grade Of Service the pages should come in the following times:

Page	Standard	Plus
First (Satellite dish)	8-10	5-8
Second (24 small images	8-10	5-8
Third (1 large image)	26-35	18-26
Fourth (12 medium images)	18-28	10-18

Times in seconds

Note1: In some cases the reported times are negative. Add 60 to the reported time to get the actual time. Example: Reported time –47 sec 112 msec. The actual time is –47+60=13 sec (actually 12.888 sec)

In some instances the reported time might be higher than 60. Please use your judgement (and a stopwatch!) If the time is clearly not as long as reported then subtract 60 from the reported time. If the time is indeed higher than 60 sec (using a stopwatch) then there is something wrong with your system. Please call your help desk.

Note 2: If the "Continue" soft key cannot be depressed make sure you maximise your browser window.

The table below shows the performance of the same 4 sites on a directly connected dedicated (Leased) line. This table is for demonstration purposes only.

Page	128 Kbps	256 Kbps	512Kbps
First (Satellite dish)	12	6	3
Second (24 small images	12	6	3
Third (1 large image)	79	39	20
Fourth (12 medium images)	40	24	12

Times in seconds

c)Test 3.

Open a "Command prompt" window and type:

ftp 195.238.48.11

When prompted for "username", type:

anonymous

Press return key when prompted for "Password"

Download the test file, type:

get 2mb.pak

Depending on your Grade of Service, you should see download speeds in the following ranges. Note the speed is reported in Kilobytes per second. Please multiply by 8 to convert to Kilobits per second.

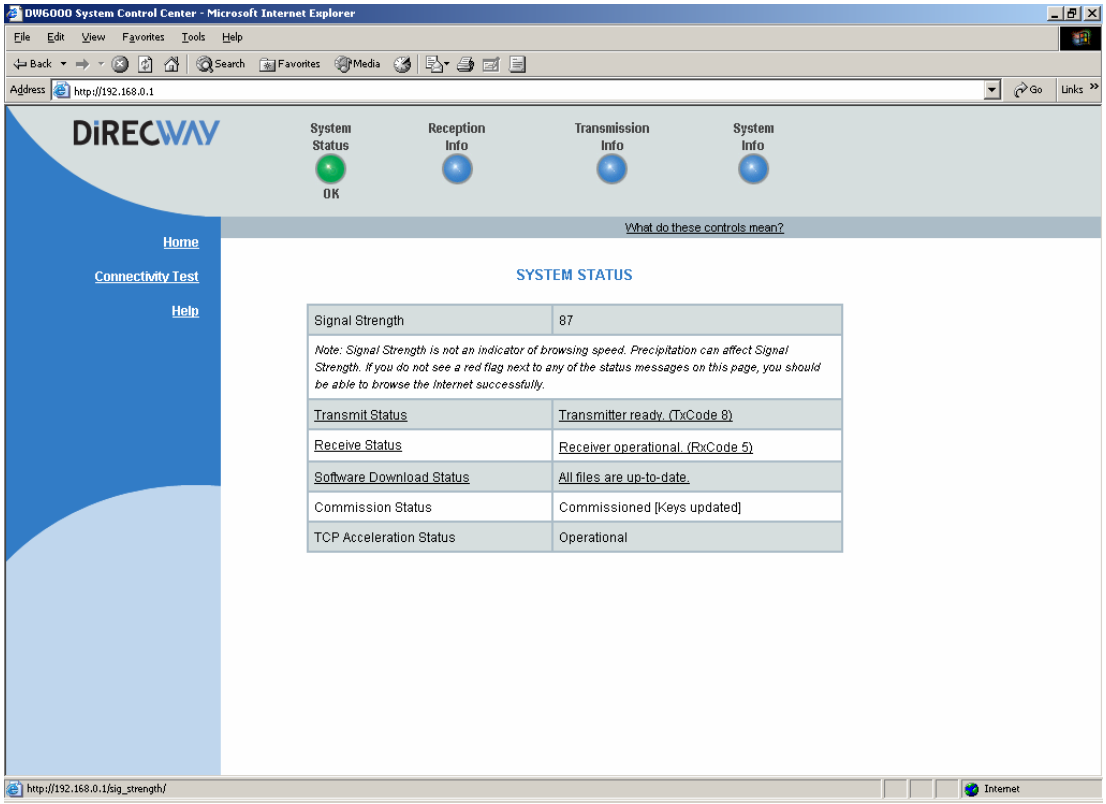
GOS	MIN	MAX
STANDARD	128 Kbps	512 Kbps
PLUS	256 Kbps	1.0 Mbps

Bps: bits per second

Note: The variation is due to peak and off peak system performance. MIN and MAX figures indicated can vary by as much as 30%.

A useful feature of the DW6000 is the ability to browse to its internal web front-end, this has trouble shooting and system status information for the end user (including a connectivity test).

This is accessed by browsing to http://192.168.0.1 (the default ip address even if commissioned) or the Lan1 ip address.



10. At the end of Commissioning

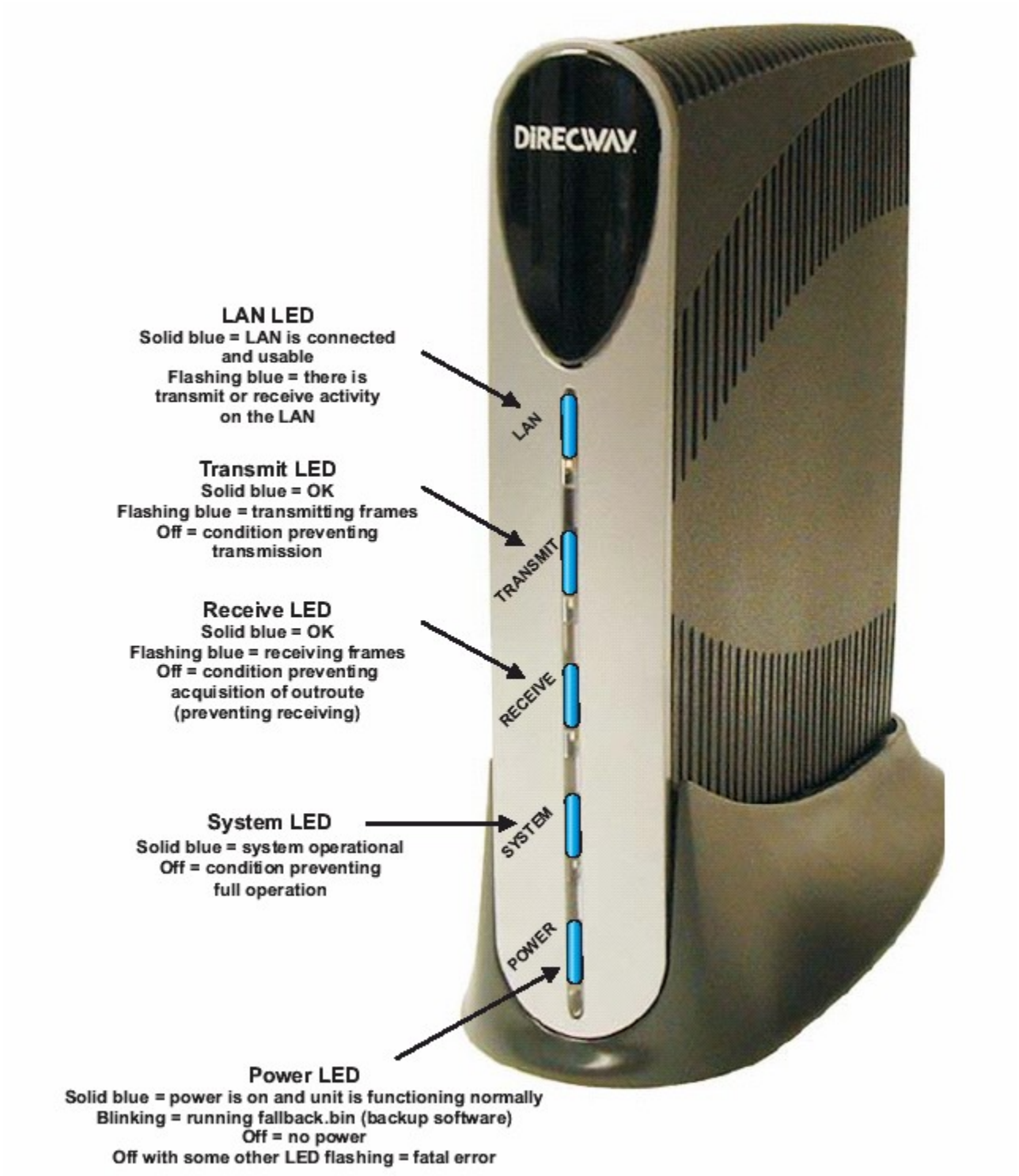
Call your VAR Helpdesk and give them the results of your tests

Deliver to the end user representative the second page of the RPR form with all the relevant site parameters.

Customer's Installer having test problems calls VAR HD.

The installation and commissioning of the DW6000 remote is now finished.

11. DW6000 Status LED's



APPENDIX A

ACRONYMS

GWH: Gateway Host
IDU: Indoor Unit
IFL: Inter Facility Link (cable between IDU and ODU)
IPGW: IP Gateway
IRU: Indoor Receive Unit
ITU: Indoor Transmit Unit
LAN: Local Area Network
ODU: Outdoor Unit
RFU: Radio Frequency unit (same as ODU)
SDL: Software Download
VSAT: Very Small Aperture Terminal
VAR: Value Added Reseller

APPENDIX B

SAMPLE RG6 CABLE LENGTHS

Vendor Part Number	Description	DC Conductor Resistance	DC Shield Resistance	DC Limit (meters)	Tx Limit (meters)	Rx Limit (meters)	Overall (meters)
5729	RG6 w/ Solid Copper Center Conductor	6.40	10.50	92	112	145	92.00
5730	RG6 w/ Plated Steel Center Conductor	32.00	10.50	36	113	145	121.41
5781	RG6 w/ Solid Copper Center Conductor & Quad Shield	6.50	5.30	133	111	134	111
5916	RG11 w/ Plated Steel Center Conductor	14.29	4.80	82	180	189	82
Special	RG11 w/ Solid Copper Center Conductor	3.00	3.70	234	180	189	180
LDF4-75A	1/2" Heliax Cable	1.15	0.58	908	370	417	370
2229V	RG6 w/ Solid Copper Center Conductor & Quad Shield	6.50	5.30	133	89	118	89