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Your Gate to The Net

**DW4020: D4**  
**Remote Installation Guide**  
an IBG Release

Version 1.4  
04 August 2003

## Change History

<b>Version</b>	<b>Date</b>	<b>Comments</b>
1.0	12-Aug-02	Bego?a Rascon
1.1	23-Aug-02	Alex Ekonomou
1.2	28-Aug-02	Ammi Midstokke
1.3	11-June-03	Bego?a Rascon (HPEP remove)
1.4	04-Aug-03	Bego?a Rascon (W1 & AB1)

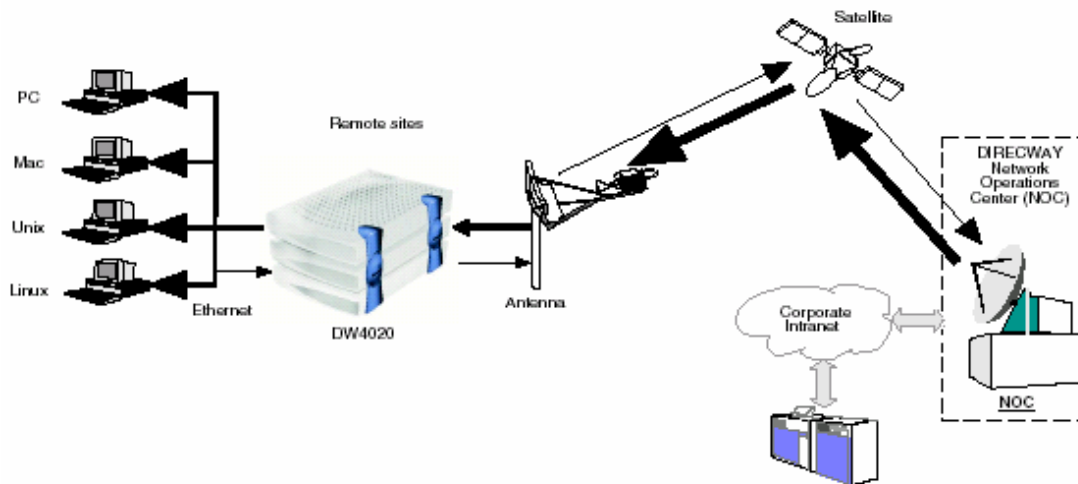
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## D4: REMOTE INSTALLATION GUIDE DW4020

### 1 Remote Site Network diagram

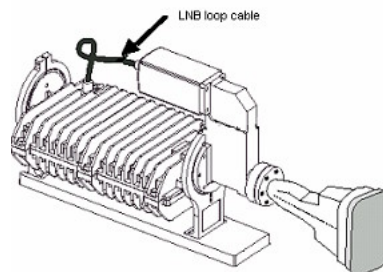


### 2 Equipment Preparation

#### 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 help desk MUST inform the HNSE help desk so your site will be configured in a timely manner.

- The DW4020 is composed of the receive modem (Indoor Receive Unit or IRU), the transmit modem (Indoor Transmit Unit or ITU), and the Gateway Host.
- The Gateway can be used with the DW4000 74cm Two-Way satellite dish, and the included ODU. The Gateway can also be used in conjunction with 89 cm, 98cm and 1.2m dishes, and the Tigris ODU (PN 1025901-X007).
- Power specification of the ODU 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.
- When a Tigris ODU must be used, 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 1025901-1007 *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 satellite modem receiver or Indoor Receive Unit (IRU) is always placed on top of the satellite modem transmitter or Indoor Transmit Unit (ITU) when assembling the two units. This is important for heat dissipation.
- **UNPLUG indoor power** connection before connecting Tx and Rx IF cables to the IRU and ITU.

*NOTE: The DW4020 must use a power supply with the part number P/N: 1031105-0001. The part number is on a sticker on the power supply. Verify that you are using the correct power supply. Do not use anything but the power supply supplied with the Gateway system (1031105-0001). DW4000 power supply will not produce enough power for ITU to transmit.*

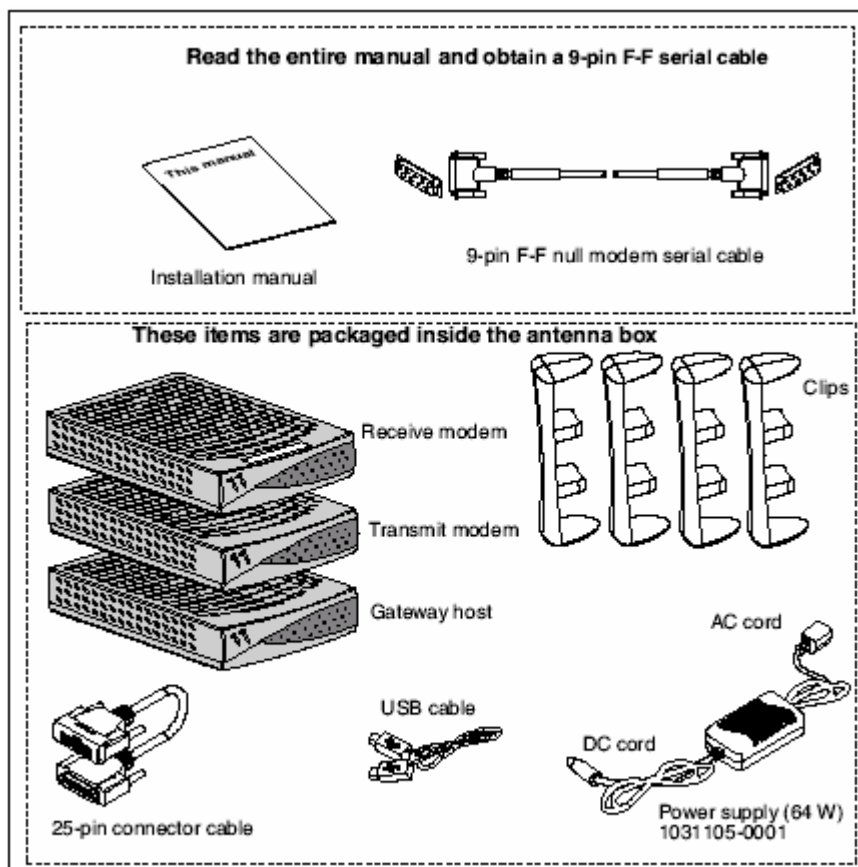
At the end of the install **only one power supply is used**

- The three units must be stacked correctly to ensure proper heat dissipation. The receive modem must be installed on top of the transmit modem, which is in turn installed on top of the Gateway host.
- Remove the rubber “feet” from any of the units (if they are attached).
- Make sure that the 3-way brackets are placed in such a way that the word “HUGHES” is upright and that the bottom of the brackets fit over the rubber “feet” slots of the Gateway module.
- You will need a 9-pin female/female (F/F) null modem serial cable (crossover serial cable) which is not included in the DW4020 box. You need this cable for configuration only – for connecting a PC with a serial port to the Gateway and set parameters.

The basic pin out required is:

pin 2 to pin 3  
pin 3 to pin 2  
pin 5 to pin 5

- **You need a valid RPR form for the site.**
- You will need the following items, included in your DW4020 box:

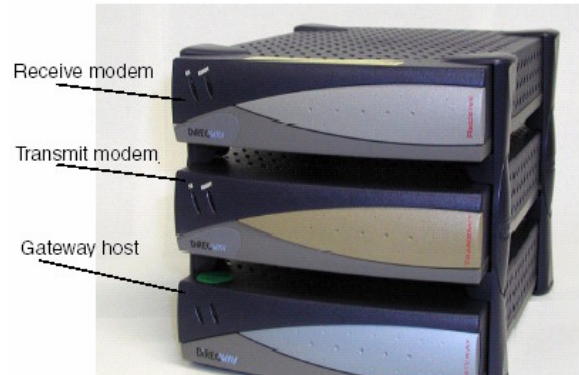


Items required for installation

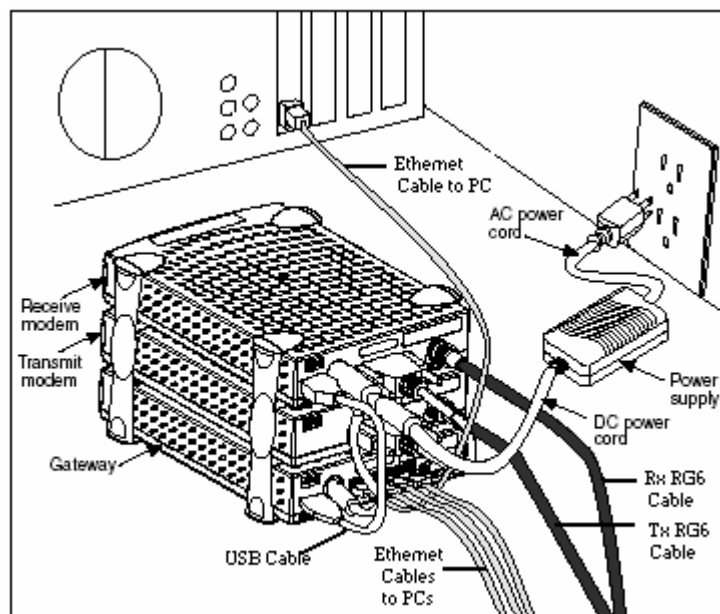
Connect the satellite IRU, ITU and GWH as in the figure:



Attach the clips



The Gateway (DW4020)



DW4020 cabling



Final assembly

### 3 Gateway configuration

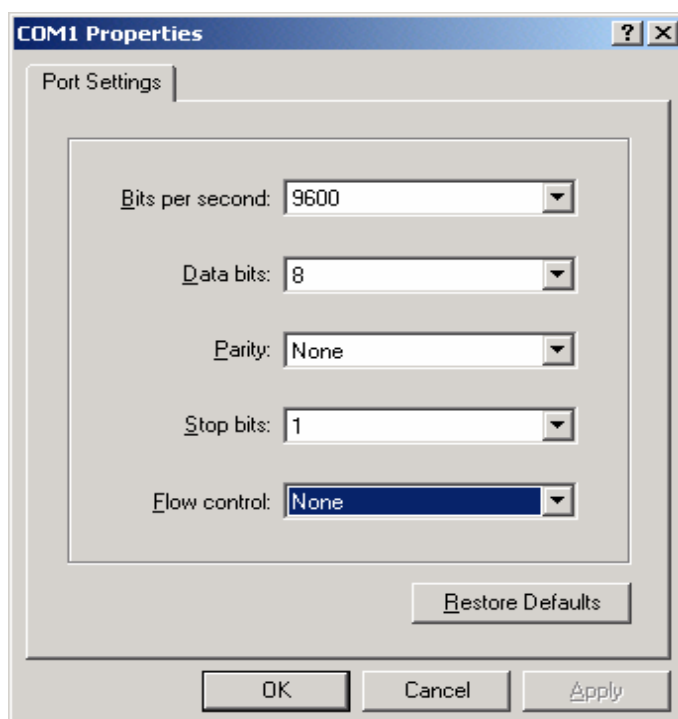
#### 3.1 Connecting Gateway host and PC for configuration of boot parameters

1. Attach one end of a 9-pin F-F (female/female) null modem serial cable to the serial port on your PC.
2. Attach the other end of the cable to the Gateway host serial port at the back.
3. At your PC, run Hyper Terminal to access the Gateway host software, proceed as follow:

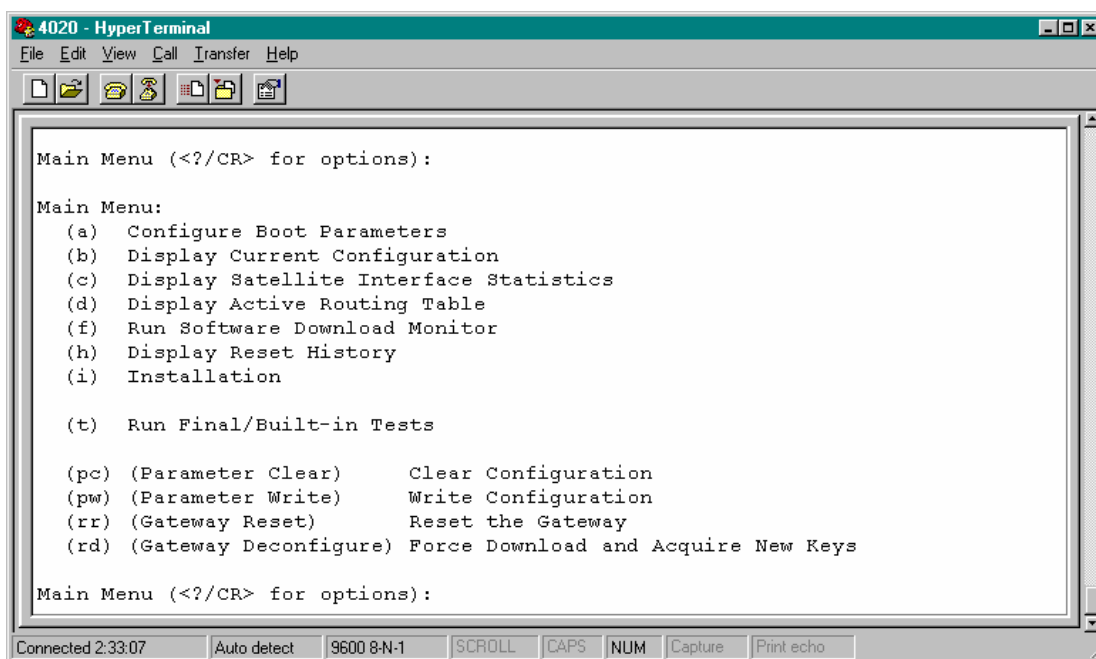
Start Menu → Programs → Accessories → Communications → Hyper Terminal



Configure the Hyper terminal parameters as follows and press OK:



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



### 3.2 Configuring Gateway host.

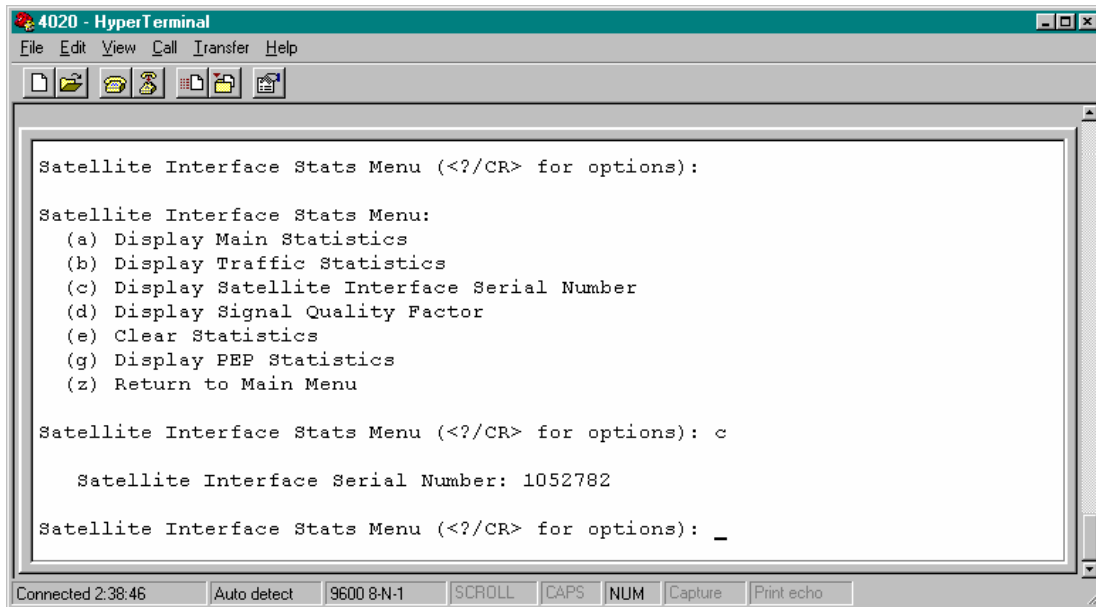
The parameters needed for configuring the DW4020 are as shown below. Several parameters are global and will be the same across all sites, the rest of them will be site specific and you will find them in the RPR form for the specific site. **Note that the values shown in table below as “site specific”, are only examples, please find the site-specific values for your site in your site’s RPR.**

Parameter	AB1 Value	W1 Value	Global/Site specific
VSAT Return Path	Inroute	Inroute	Global
Satellite Longitude degrees	12	10	Global
Satellite Longitude minutes	0	0	Global
Satellite Hemisphere	West	East	Global
VSAT Longitude degrees	0	0	Site specific
VSAT Longitude minutes	46	46	Site specific
VSAT Longitude Hemisphere	West	West	Site specific
VSAT Latitude degrees	52	52	Site specific
VSAT Latitude minutes	0	0	Site specific
VSAT Latitude Hemisphere	North	North	Site specific
Satellite Channel Frequency	13245	15240	Global
Receive Symbol Rate	30000000	30000000	Global
LNB Polarization	Vertical	Vertical	Global
LNB 22KHz Switch	Off	Off	Global
Filter Rolloff	20	20	Global
LAN1 IP Address	172.16.1.49	172.16.1.49	Site specific
LAN1 Subnet Mask	255.255.255.240	255.255.255.240	Site specific
IP Gateway IP Address	195.238.50.5	195.238.50.5	Site specific
SDL Control Channel Multicast IP Address	224.0.1.6	224.0.1.6	Global
VSAT Management IP Address	10.1.128.4	10.1.128.4	Site specific
Default Gateway (for DMV with LAN return path only)	0.0.0.0	0.0.0.0	Global
Number of Static Routes in Routing Table	0	0	Global



1. Check that the IRU s/n matches with that one in your RPR form:

On the Hyper Terminal, you must have the Gateway host Main Menu as shown below, select option **C** at Main Menu and then option **C** again for the Satellite Interface Serial Number:



```
4020 - HyperTerminal
File Edit View Call Transfer Help
[Icons]

Satellite Interface Stats Menu (<?/CR> for options):

Satellite Interface Stats Menu:
(a) Display Main Statistics
(b) Display Traffic Statistics
(c) Display Satellite Interface Serial Number
(d) Display Signal Quality Factor
(e) Clear Statistics
(g) Display PEP Statistics
(z) Return to Main Menu

Satellite Interface Stats Menu (<?/CR> for options): c

Satellite Interface Serial Number: 1052782

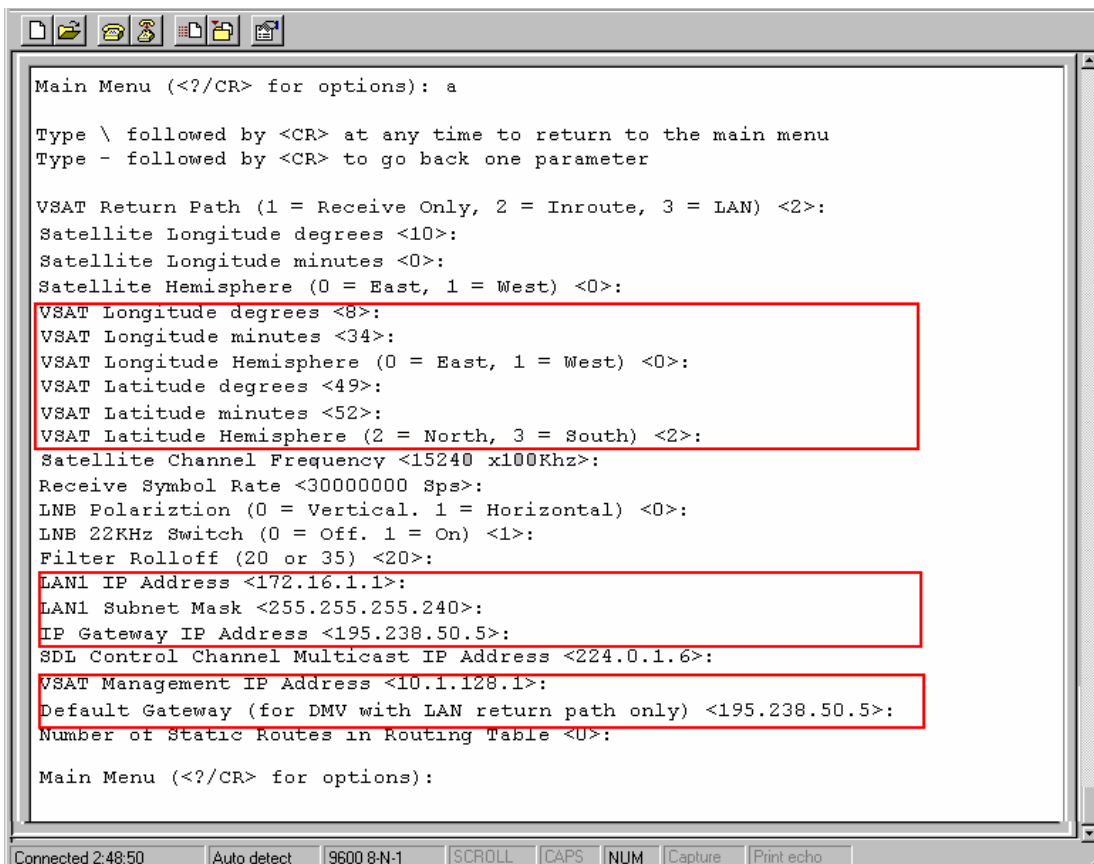
Satellite Interface Stats Menu (<?/CR> for options): _

Connected 2:38:46 Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture Print echo
```

2. 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.*



```
Main Menu (<?/CR> for options): a

Type \ followed by <CR> at any time to return to the main menu
Type - followed by <CR> to go back one parameter

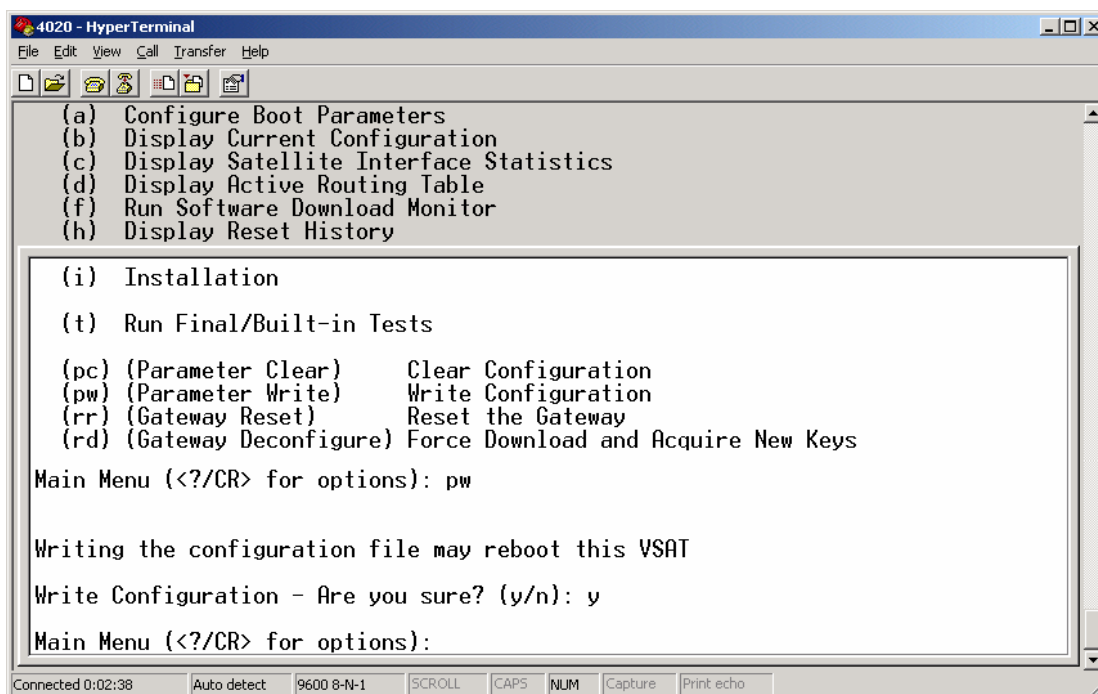
VSAT Return Path (1 = Receive Only, 2 = Inroute, 3 = LAN) <2>:
Satellite Longitude degrees <10>:
Satellite Longitude minutes <0>:
Satellite Hemisphere (0 = East, 1 = West) <0>:
VSAT Longitude degrees <8>:
VSAT Longitude minutes <34>:
VSAT Longitude Hemisphere (0 = East, 1 = West) <0>:
VSAT Latitude degrees <49>:
VSAT Latitude minutes <52>:
VSAT Latitude Hemisphere (2 = North, 3 = South) <2>:
Satellite Channel Frequency <15240 x100Khz>:
Receive Symbol Rate <30000000 Sps>:
LNB Polarization (0 = Vertical. 1 = Horizontal) <0>:
LNB 22KHz Switch (0 = Off. 1 = On) <1>:
Filter Rolloff (20 or 35) <20>:
LAN1 IP Address <172.16.1.1>:
LAN1 Subnet Mask <255.255.255.240>:
IP Gateway IP Address <195.238.50.5>:
SDL Control Channel Multicast IP Address <224.0.1.6>:
VSAT Management IP Address <10.1.128.1>:
Default Gateway (for DMV with LAN return path only) <195.238.50.5>:
Number of Static Routes in Routing Table <0>:

Main Menu (<?/CR> for options):
```

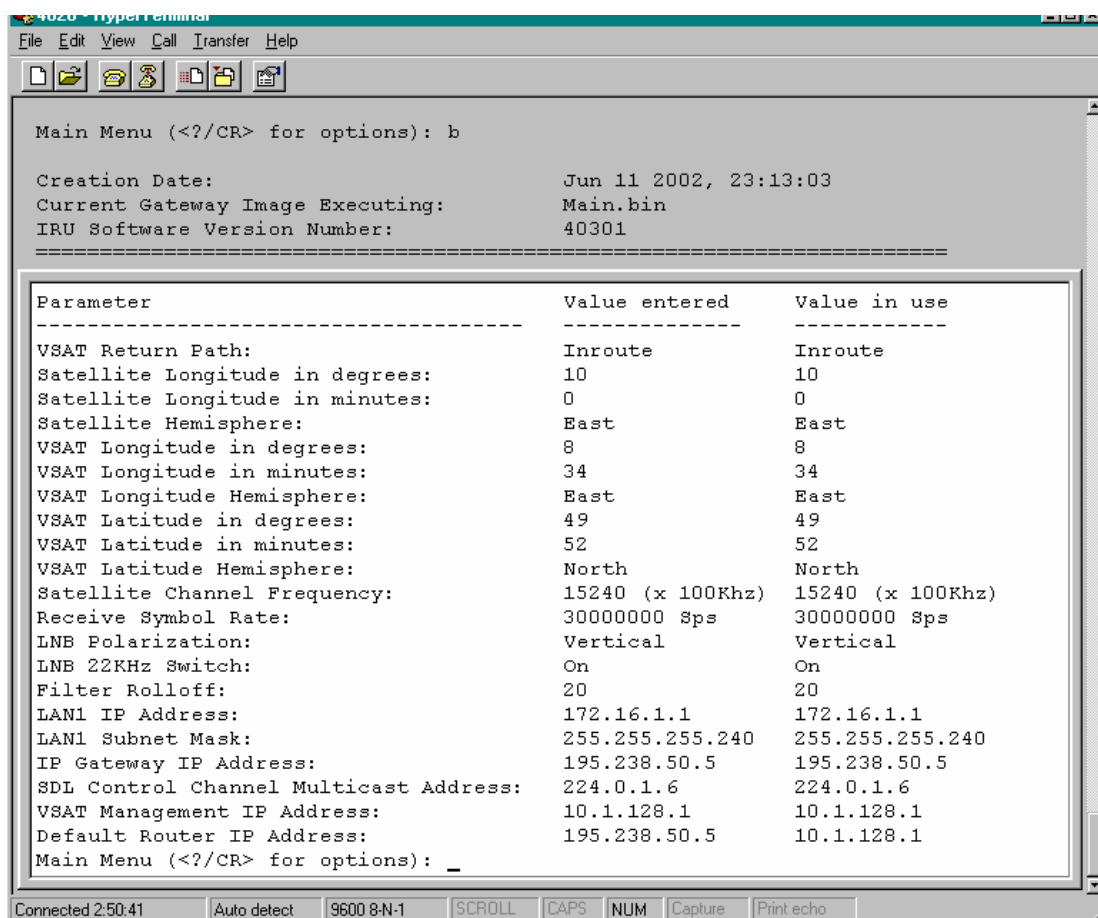


Type - and press **ENTER** at the prompt to go to the previous parameter. You can also skip the remaining parameters by typing \ and pressing **ENTER**.

3. 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.



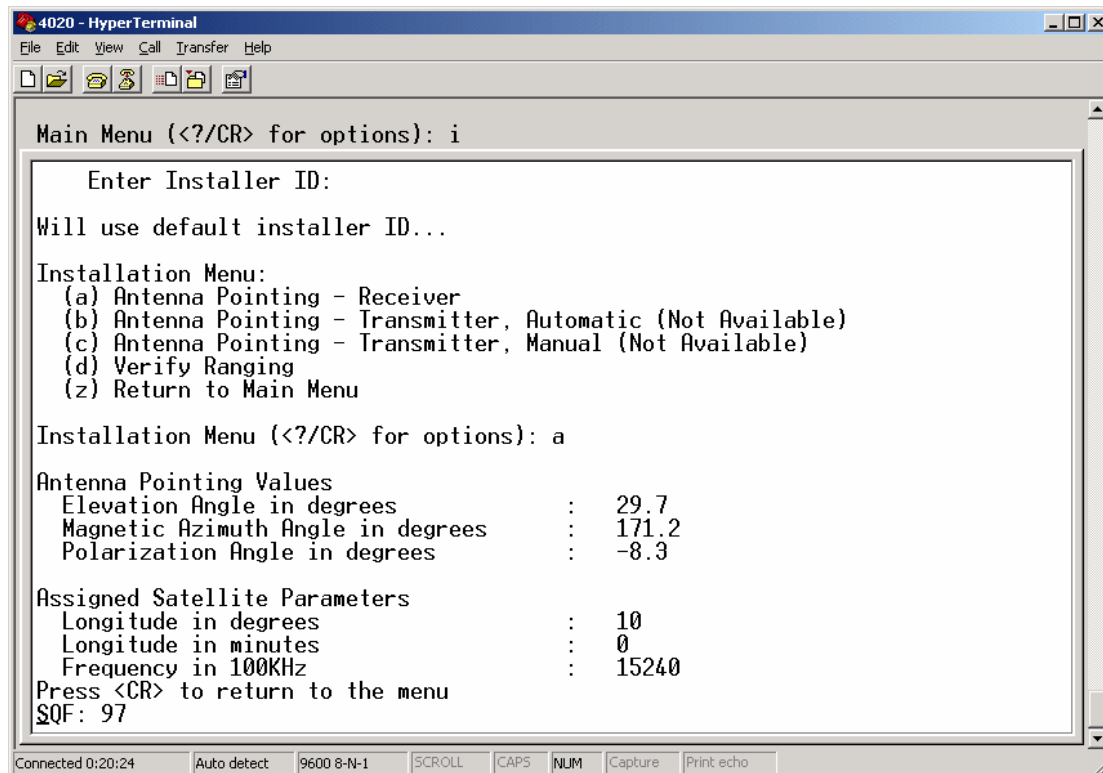
4. At the Main Menu, select **B** option to “display current configuration”. Verify that the parameters entered match those ones in the previous table if they are global, and in your RPR if they are “site specific”.



5. 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:”.

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 is not supported.

If the SQF is less than 55, refine the antenna pointing and/or polarisation to bring the SQF over 55 and to as close to 99 as possible. The SQF message updates automatically. There is a delay of up to 10 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	60
Light cloud	50
Heavy cloud	45
Rain or snow	40

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

- Check for unobstructed view to satellite.
- Refine antenna aiming.
- Check polarisation. (Complete antenna “skew” in the case of the 74 cm antenna)
- Check cables connectivity and length (you may need better quality cable or inline amplifiers).

- e. Replace ODU.
- f. Replace entire Gateway DW4020 unit.
6. 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. Collect 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 DW4020 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).
7. Return to Installation menu by pressing **ENTER**, select now **D** for “Verify Ranging”.

Ranging has succeeded if the Test Result on the screen show “PASS” or “Transmitter available for normal operation”

If you do not see “PASS” 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**.

### **3.3 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.

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, once connected you will see the following messages:

***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 2-5 minutes before the first heartbeat message is received.*

*If you see errors like “V1\_SendTrap: Sendto failed, unable to send trap to manager 192.168.11.180:162 at line 1707 in file /cm\_data/pessd/rem2/snmp/snmp 14.2.1.7/snmpd/unix/trap.c” they can be ignored.*

Upon successful download, the Gateway host automatically resets to reflect the new software. The new configuration takes effect. After reset, the Gateway host 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.**

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.

### 3.4 Verifying correct Gateway operation.

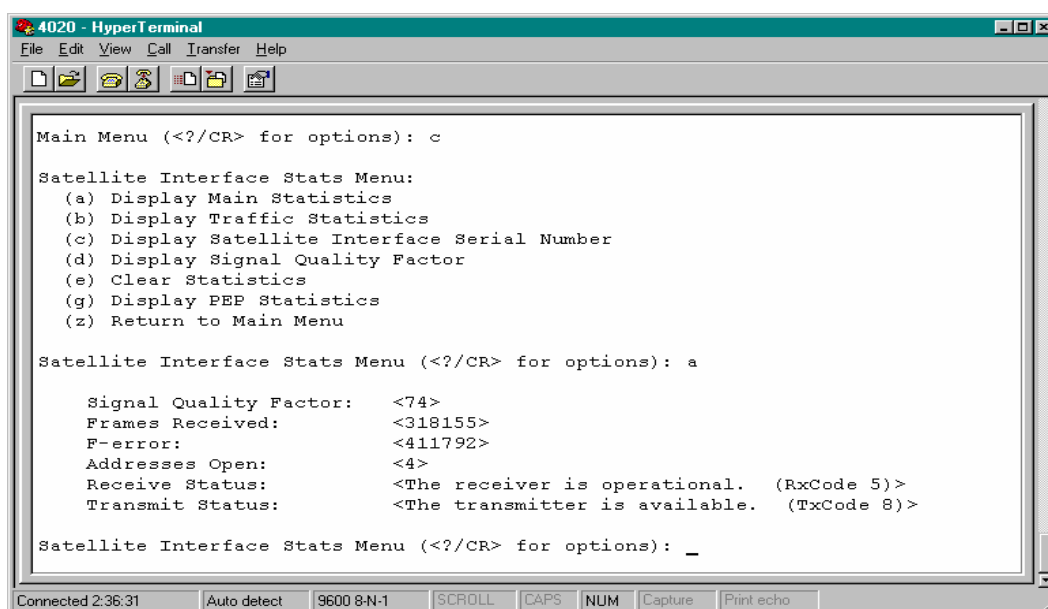
1. At the Main Menu, select **C** again for Satellite Interface Statistics, and select **A** for Main Statistics. You should see:

- Signal quality factor over 60
- 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 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 5 a to f above. Indicate to the VAR HD that you are ready to be re-ranged. The HNSE HD will give new SQF and EbNo figures. This process needs to continue until the site is within correct operational limits.

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



```
4020 - HyperTerminal
File Edit View Call Transfer Help
Main Menu (<?/CR> for options): c
Satellite Interface Stats Menu:
(a) Display Main Statistics
(b) Display Traffic Statistics
(c) Display Satellite Interface Serial Number
(d) Display Signal Quality Factor
(e) Clear Statistics
(g) Display PEP Statistics
(z) Return to Main Menu
Satellite Interface Stats Menu (<?/CR> for options): a
Signal Quality Factor: <74>
Frames Received: <318155>
F-error: <411792>
Addresses Open: <4>
Receive Status: <The receiver is operational. (RxCode 5)>
Transmit Status: <The transmitter is available. (TxCode 8)>
Satellite Interface Stats Menu (<?/CR> for options): _
Connected 2:36:31 Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture Print echo
```

When DW4020 is configured, close the Hyper Terminal window.

## 4 Configuring PC for TCP/IP connectivity

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 Gateway Host (site specific parameter, recorded in RPR)
- **Preferred DNS Server:** 195.238.50.254
- **Alternate DNS Server:** 195.238.62.1

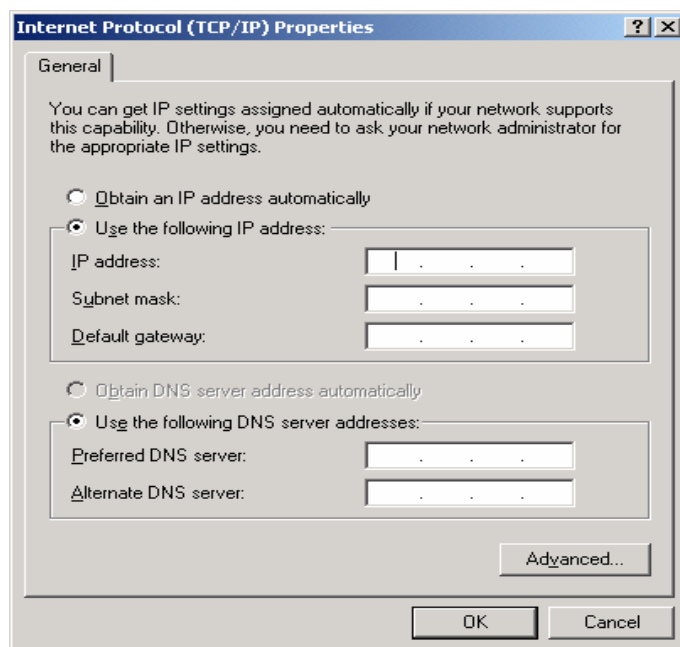
To configure this LAN interface in Windows OS proceed as follows:

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 DW4020 for traffic, click on “Properties”.

On this 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.

## 5 Installing Optimization Software.

NOTE: If this is an upgrade on a site running a DW4000, de-install the DW4000 SW as follow:  
With dw4000 powered on and USB cable connected to PC:

Start Menu → Programs → Direcway → Uninstall

After this is complete disconnect USB cable from PC.

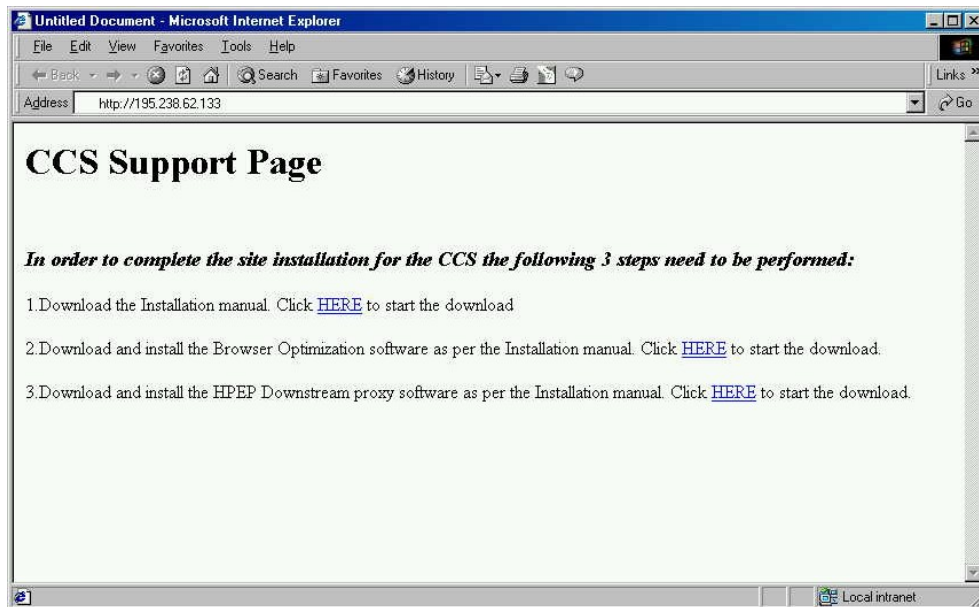
Open Start Menu → Run and type: regedit

Go to HKEY\_local\_machine --> System and delete the directory called DPC, close Registry.

### 5.1 Download the Optimization packages

With PC LAN interface configured and connected to dw4020:

Open in your WEB Browser the CCS Support Page on <http://195.238.62.133> or <http://192.168.40.40>



Download the Browser optimization software by clicking on the corresponding **HERE** link. When asked to either open or save the file select "Open" and the SW will be automatically installed.

## 6 Power cycle reboot.

1. Power down the computer
  - 2.1 Click on **Start**
  - 2.2 Click on **Shut Down**
  - 2.3 Select **Shut down** again (do not select restart)
2. Unplug the power supply to IRU (at least for 30 seconds)
3. Plug the power supply back into the IRU (wait for the **Ready** and **Rx** lights to flash back and forth)
4. **Power ON** the computer
5. Confirm that the **Ready** light on the IRU, ITU, **Ready** and **Status** lights on GWH remain steady, and **RX** light on IRU keeps flashing after the computer boots up completely

## 7 Tests

### 7.1 Test 1.

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

**ping 195.238.48.1 -w 5000** , press the Return button.

The response time should be between 800 and 1500 ms.

### 7.2 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	Premium
First (Satellite dish)	8-10	5-8	2-5
Second (24 small images)	8-10	5-8	2-5
Third (1 large image)	26-35	18-26	11-18
Fourth (12 medium images)	18-28	10-18	5-10

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

### 7.3 Test 3.

Open a "Command prompt" window and type:

**ftp [195.238.48.11](http://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 that 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
PREMIUM	512 Kbps	2.0 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%.

## **8 Communication 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 DW4020 remote is now finished.

## APPENDIX A

### ACRONYMS

<b>GWH:</b>	Gateway Host
<b>IDU:</b>	Indoor Unit
<b>IFL:</b>	Inter Facility Link (cable between IDU and ODU)
<b>IPGW:</b>	IP Gateway
<b>IRU:</b>	Indoor Receive Unit
<b>ITU:</b>	Indoor Transmit Unit
<b>LAN:</b>	Local Area Network
<b>ODU:</b>	Outdoor Unit
<b>SDL:</b>	Software Download
<b>VSAT:</b>	Very Small Aperture Terminal
<b>VAR:</b>	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" Heliac 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