

Configuration Guidelines

Configuration Guidelines for Point to Point Setup MDM6000

V1.4



SHAPING THE FUTURE OF SATELLITE COMMUNICATIONS

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1 About this manual

This manual provides a step by step configuration guideline to get a point to point link up and running.

1.1 Cautions and Symbols

The following symbols appear in this manual:



A caution message indicates a hazardous situation that, if not avoided, may result in minor or moderate injury. It may also refer to a procedure or practice that, if not correctly followed, could result in equipment damage or destruction.

A hint message indicates information for the proper operation of your equipment, including helpful hints, shortcuts or important reminders.

| _ | _ | _ | |
|---|---|---|---|
| = | _ | = | |
| _ | _ | - | |
| _ | | 1 | |
| | = | _ | = |

A reference message is used to direct to a location in a document with related document or a web-link.

1.2 Version History and Applicability

| Document version | Date | Comments | | |
|------------------|---------------|--|--|--|
| Version 1.0 | June 2013 | Initial Version | | |
| Version 1.1 | July 2013 | Usability changes + default config | | |
| Version 1.2 | October 2013 | Added Layer 2 support | | |
| Version 1.3 | February 2014 | New GUI view; New Encapsulation protocols (XPE, MPE & ULE). | | |
| Version 1.4 | June 2014 | Maintenance update | | |



1.3 Related Documentation

- The MDM6000 Satellite Modem Reference Manual describes the parameters available in the device;
- The Automated Non Linear Equalink[™] procedure, this document describes the different calibration procedures depending on transponder settings (FGM or ALC);
- Device leaflet (We refer to http://www.newtec.eu);
- The System Integration Guide for MDM6000 describes how to integrate the device into a network management environment;
- The User Manual for the MDM6000 Satellite Modem describes the different user interfaces and the different available features of the device;
- The MDM6000 Quick Start Guide describes how to set the Management IP Address of your device and how to install the sliders and device into the rack.

1.4 Product Range

M-Series

1.5 Software ID

NTC/6437



2 Introduction

The goal of this configuration guideline is to set up a point to point network between two sites equipped with MDM6000 devices. In such a point-to-point setup, the MDM6000 devices can work in Layer 3 IP Router or in Layer 2 Ethernet Bridge.



Please refer to <u>Appendix C: Setup Templates on page 72</u> for a template of the previous drawing.

Layer 3 point-to-point





In the previous network diagrams we assume that the management plane of the setup is up and running. This means that the devices can be configured and managed through a GUI. The configuration guideline focuses on the data traffic that runs over the network.



Please refer to <u>Appendix C: Setup Templates on page 72</u> for a template of the previous drawings.



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3 Log in as Operator

Do the following steps on the hub and remote devices of the satellite link:

- » Open a web browser;
- » Type the MGMT IP address of the device in the address bar of the browser. (The default IP address is 10.0.0.2/24.);
- » Press Enter.

The following graphical user interface is displayed:

| Newtec | Sate Mode | llite Modem № em B | IDM6000 | | | | | | | 👗 Logged-in as guest 🔹 |
|--|-----------------|--|--|---|--|---|------------|--------------------------------|--------------------|--------------------------|
| Tasks | Overview | Tree View | | | | | | | Alarms | >> |
| Logs 👻 | Mont1 | O Device Management | | - | O ACM Controllor | | - | | Filter: Active | * |
| Device Log ACM Client Log ACM Controller Log AUPC Client Log AUPC Client Log | Mgmt2 MgmtFp | Software Version: Date: Time: Uptime: CPU Load: Device Redundancy: | MDM6000_1.3.0.42852 13/01/2014 09:40:28 17 h 48 m 29 s 6% (cpu1: 2% cpu2: 10%) Active | - | Enable: 00 | Enable: 0 On | - | | Description | Count |
| AUPC Level Log • | | Data Interfaces Data Interface: Data Interface: Data | ta1 (non redundant) ta1 | | | | | | | |
| | Data1 | BBF over IP In Enable: | 2 × | | _ | | | | | |
| | Data2 | Total BBF Inputrate: Total BBF Forwarded Total BBF Dropped Fr | 0.000000 Mbps Frames: 0 frames ames: 0 frames | | Modulator Mode: Transponder Operation I Transmit: | S2 Extensions Hode: Multiple Carrier per Transponde | r L-BANDTx | | | |
| | Data1 | Encapsulation Enable: Forwarded Bit Rate: | 0.000000 Mbps | | Transmit State: Transmit State Reason: Actual output Level: Output Frequency: | Configured -15.0 dBm 1200.000000 MHz | IFTx | | | |
| | Data2 | Forwarded Bytes: Forwarded Packets: Dropped Bytes: Dropped Packets: | 0 bytes 0 packets 0 bytes 0 packets | | Symbol Rate: | 72.000000 Mbaud | | | | |
| | Data1 | O Decapsulation | | 2 | O REAL STREET | | | | | |
| | Data2 | Output Bit Rate: 0 Output Bytes: 0 Output Packets: 0 Dropped Bytes: 0 Dropped Packets: 0 | bytes packets bytes packets | • | Enable: Mode: Transponder Operation Mode: | S2 Extensions Multiple Carrier per Transponder | L-BANDRxA | | | |
| | Data1 | BBF over IP Out | 0 × | 1 | Input Frequency: Symbol Rate: Roll Off: Input Selection: | 1200.00000 MHz 72.000000 Mbaud 20% L-BAND Rx B | | | | |
| Toolbox R | Data2 | Output BBF Bit Rate: BBF Out Count: | 0.000000 Mbps 0 frames | | Esflo: | 33.64 dB | 1 | | | - |
| Documentation | | BBF Drop Count: | 0 frames | | | | - | | Details | * |
| 0 | | | | | | | • | Test 🜔 Ethernet 🧧 Data 🚺 TX Or | 🔾 RX Lock 🥥 Cfg si | aved 🔃 Refresh (2 sec) 🔹 |

» Switch User Profile by clicking on, logged in as Guest (top right of the GUI):





» Click Switch User to change the user profile. (The Login window is displayed.)

| Login | | | | | | |
|---|--------------|--|--|--|--|--|
| Please enter your username and password to Login. | | | | | | |
| User Name: | operator | | | | | |
| Password: | ••••• | | | | | |
| | Login Cancel | | | | | |

- The default User Name and password for the operator profile is as follows:
 - User Name: operator
 - Password: operatoroperator



The bottom left row of the banner is editable and can be used to assign a unique identifier to the device. Do this by clicking on the label (in the previous figure, the label is marked: Site B).



4 Configure the Hub Site



This device has preconfigured settings which can be used in a back-to-back setup. For more details, we refer to *Appendix B: Default Device Configuration on page 70*

The configuration of the HUB site can be split up into the following steps:

- Configure Encapsulation;
- Configure the Modulator;
- · Configure the Demodulator;
- Configure Decapsulation.

During the configuration, you can use the following icons:

| lcon | Description |
|------|----------------------------|
| 0 | Edit button |
| | Apply the selected setting |
| × | Cancel button |



Do not use spaces or blanks when entering a name (e.g. when configuring an encapsulation channel).



4.1 Configure the Data Interfaces



Log in as operator, please refer to chapter Log in as Operator. on page 4



» In the Overview tab, click on the top right icon to open the Data Interfaces functional block. Configuration of the Ethernet and IP Connectivity is split up into three parts as shown in the following figure.

| Overview Tree Vi | ew 🗈 Decaps | ulation 🖹 📔 Da | ta Interfaces 🗵 | | | | |
|-------------------------|-------------------|---------------------|------------------|--|--|--|--|
| Dita Interraces | | | | | | | |
| -chemer | | | | | | | |
| 🕼 Link | | | | | | | |
| Interface | Enable | MAC Address | Auto Negotiation | | | | |
| 😥 Data1 | × | 00:06:39:08:15:77 | ~ | | | | |
| 😥 Data2 | × | 00:06:39:08:15: | ~ | | | | |
| | | | | | | | |
| - P | | | | | | | |
| Data Gateway: | | 20.20.20.2 | | | | | |
| 🚱 IP Address | | | | | | | |
| Data Interface | IP Address/Prefix | Virtual IP Address/ | State | | | | |
| 😥 Data | 20.20.20.1/24 | 0.0.0/24 | ~ | | | | |
| | | | | | | | |
| -Data Interface Link Re | dundancy | | | | | | |
| Data Interface: | | 🚱 Data1 (non re | dundant) | | | | |
| Switch Count: | | 0 | | | | | |
| Active Interface: | | Data 1 | | | | | |



4.1.1 Enable the Ethernet Ports

| Ø | ernet Link | | | |
|---|---------------|--------|-------------------|-----------------|
| | Interface | Enable | MAC Address | Link State |
| 0 | Data1 | × | 00:06:39:08:15: | 1000Bt Full Dup |
| 0 | Data2 | × | 00:06:39:08:15:6f | Link Down |

| Parameter | Value | Description | | | | |
|---------------|-------|---|--|--|--|--|
| Ethernet Link | | | | | | |
| Data1 | ✓ | Enable Data1; to make a connection between the Backbone Provider and the MDM6000. | | | | |
| Data2 | × | Disable Data2; in this example it is not foreseen to setup link redundancy between the Backbone provider and the MDM6000. | | | | |

4.1.2 Configure the IP Addresses and its Prefixes

| P Data Gateway: | | 20.20.20.2 | TD Adducer > Editing "Data" | |
|--------------------|-------------------|---------------------|-----------------------------|---|
| 🚱 IP Address | | | TP Address > Editing Data | |
| Data Interface | IP Address/Prefix | Virtual IP Address/ | Data Interface: | Data |
| 🖗 Data | 20.20.20.1/24 | 0.0.0/24 | IP Address/Prefix: | 20.20.20.1/24 |
| -(m) | | _ | Virtual IP Address/Prefix: | 0.0.0/24 |
| - | | - | State: | Image: A set of the set of the |
| | | | | |
| | | | | |
| | | | Update 🔐 Cancel | |
| | | | | |
| | | | - | |



Make sure that the IP Addresses between the different devices belong to the same IP range.



| Parameter | Value | Description |
|--------------|---------------|--|
| IP Address | | |
| Data Gateway | 0.0.0.0 | |
| Data | 20.20.20.1/24 | Configure the IP Address and its prefix (Net Mask) of Data1. |
| | | Data coming from the customer equipment is received on this interface. |

4.1.3 Configure the Data Interface Link Redundancy

| – Data Interface Link Redundancy —— | |
|-------------------------------------|-------------------------|
| Data Interface: | 🕑 Data1 (non redundant) |
| Switch Count: | 0 |
| Active Interface: | Data 1 |

| Parameter | Value | Description |
|-----------------------------------|--------------------------|--|
| Data Interface Link Redundancy | | |
| Data Interface | Data1 (non redundant) | Select Data 1 (non redundant) in this case no bonding (link redundancy) is performed. |
| | | When link redundancy is required, configure the Data2 interface and select a redundant option from the drop down list. |
| Switch Count | | This counter is only active in case data link redundancy is active. |
| | | This indicates the amount of switches between Data1 and Data2. |
| Active Interface | Data1 | Indicates which physical Data Interface is active at the moment. |



4.2 Configure the Modulator

| Modulator | | |
|-----------------------------|----------------------------------|----------|
| Mode: | DVB-S2 | L-BANDTX |
| Transponder Operation Mode: | Multiple Carrier per Transponder | |
| Transmit: | 🙆 x | _ |
| Transmit State: | × | |
| Transmit State Reason: | Configured | IETy |
| Output Level: | 🕑-15.0 dBm | |
| Output Frequency: | 2000.000000 MHz | |
| Symbol Rate: | 10.000000 Mbaud | |

» In the Overview tab, click on the top right icon to open the Modulator functional block.

| Overview Tree View BBF | over IP In 🙁 📑 Modulator 🗷 |
|-----------------------------|----------------------------------|
| Modulator | |
| Mode: | S2 Extensions |
| Transmit: | Ø × |
| Transmit State: | × |
| Transmit State Reason: | Configured |
| Output Frequency: | 1450.000000 MHz |
| Roll Off: | 5% |
| Occupied Bandwidth: | 73.500000 MHz |
| Output Level: | 🧭 -35.0 dBm |
| 10 MHz BUC reference: | 🚱 Off |
| Carrier Modulation: | 🚱 On |
| Symbol Rate: | 70.000000 Mbaud |
| | 00 Reset Counters |
| Measured Packet Count: | 0 packets |
| Measured Bit Rate: | 0.000000 Mbps |
| - Link Optimization | |
| Transponder Operation Mode: | Multiple Carrier per Transponder |
| Maximum Modulation Order: | Unspecified ModCod |
| — Modulation ———— | |
| Physical Layer Efficiency: | 0.00 % |
| Baseband Layer Efficiency: | 0.00 % |



| Parameter | Value | Description | | | |
|-----------------------|---------------|---|--|--|--|
| Modulator | | | | | |
| Mode | S2-Extensions | Select the modulation mode as defined by the system setup requirements. | | | |
| Transmit | × | Activate the transmission over satellite. Wait until the configuration is completed before enabling this parameter. | | | |
| Output Frequency | 1450MHz | Set the output frequency according to the requirements of the system setup. | | | |
| Roll Off | 5% | Select the appropriate roll off factor, according to the requirements of the system setup. | | | |
| Output Level | -35dBm | Enter the value as defined by the link provider. Please contact your link provider to define the output level. | | | |
| Clock Output | × | Enables or disables the transmission of a 10MHz clock signal on the RF output interface. This reference signal can be multiplexed on the L-band output interface. | | | |
| Carrier Modulation | ~ | The modulated RF signal is available on the L-BAND Tx interface. | | | |
| Symbol Rate | 70Mbaud | Enter the available symbol rate. | | | |



Only enable Transmit when the Encapsulation block is configured.!



4.3 Configure Encapsulation

4.3.1 Encapsulation

Before the IP traffic is modulated, the IP traffic is classified, shaped and encapsulated. There are different encapsulation protocols available that can be split up into two main groups, BBF Encapsulation Protocols and TS Encapsulation Protocols.

- The BBF Encapsulation Protocols directly insert IP packets into BBFs. The following protocols GSE or XPE can be used to do this;
- The TS Encapsulation Protocols first maps IP packets to TS packets and then encapsulated into baseband frames.

Depending on the protocol, BBF Encapsulation Protocol or TS Encapsulation Protocol, a different procedure is used.



4.3.1.1 BBF Encapsulation

Configure a BBF Encapsulator (ISI)

| BBF | | | | | | |
|----------------|--------|-----|-----------|------------------------------|----------------------|---------------|
| 🚱 ISIs | | | | | | |
| 🔂 Add | | | | | | |
| Name | Enable | ISI | Frame Typ | Protocol | ISIs > Editing "Enca | apsulator1" |
| Encapsulator 1 | × | 10 | Normal | Default | News | Second Second |
| \odot | | | | | Name: | Encapsulatori |
| _ | | | | | Enable: | |
| | | | | | ISI: | 10 |
| | | | | | Frame Type: | Normal |
| | | | | | Protocol: | Default |
| | | | | | Update | Cancel |
| Channels | | | | | | |



| Parameter | Value | Description | | | | | |
|---------------|---------------|---|---|--|--|--|--|
| Encapsulators | | | | | | | |
| Name | Encapsulator1 | This is the default name for the first BBF encapsulator. The name is fixed and cannot be overruled! | | | | | |
| Enable | ~ | Enable the encapsulator. | | | | | |
| ISI | 10 |) Insert the Input Stream Iden | | | | | |
| | | 0 | Note that this is a decimal value. | | | | |
| Frame Size | Normal | Normal frames = 64800 bits | | | | | |
| | | Short frames = 16200 bits | | | | | |
| | | At data rates under 4Mbps we recommend to use short frames. This to increase the BBF filling level. | | | | | |
| | | 0 | In case of S2-Extensions, normal frames are mandatory and therefore enabled by default. | | | | |
| Protocol | Default | Here you have the possibility to overrule the default protocol that has been selected under the general encapsulation settings. Refer to <i>Configure the General Stream Encapsulation Settings. on page 34</i> | | | | | |



Configure the Channel

| 🚱 Cł | 🕢 Channels | | | | | | | | |
|-----------|------------|----------|---------------|-------|-------------------|------------|---------------|--|--|
| 🖸 Ad | ld | | | | | | | | |
| | Name | Enable | Encapsulator | Label | Nominal S2 Ext Mo | ACM Enable | Terminal Name | | |
| X0 | Channel1 | ~ | Encapsulator1 | | 32 APSK 100/180 | × | [unspecified] | | |
| | | | | | | | | | |

| Parameter | Value | Description |
|--------------------------|--------------------|---|
| Channels | | |
| Name | Channel1 | This is the default name for the first BBF channel. |
| | | Note: The name is fixed and cannot be overruled. |
| Enable | ~ | Activate the channel. |
| Encapsulator | Encapsulator1 | Select the corresponding Encapsulator. |
| Label | - | Not used in this example. |
| | | Use a label when you want to address a specific receiver. |
| Nominal DVB-S2 ModCod | 32 APSK 100/180 | Select the modcod to be used (overruled when ACM is enabled). |
| ACM Enable | × | This configuration guideline does not cover ACM. |
| Terminal Name | - | Note: This selection becomes available when ACM is enabled. |
| | | This configuration guideline does not cover ACM. |



Configure the Traffic Shaping

Traffic shaping is used to do congestion control. Congestion control means defining how much of satellite capacity is distributed amongst the service providers. Furthermore it is possible to configure the quality of service by setting the priority and maximum queue time.

Before configuring the traffic shaping it is strongly advised to make a drawing of the complete shaping tree including traffic classification rules.

The following tree shows an example of different types of incoming IP traffic. In this tree we see that Shaping Node1 and Shaping Node2 directly take in IP traffic from the root node. In Shaping Node1 the data is further distributed over two sub nodes and finally a classification rule captures specific traffic. In Shaping Node2 the traffic is directly captured by a classification rule. Traffic Shaping Node2 will be encapsulated by the TS Encapsulation protocol, refer to following chapter TS Encapsulation. on page 27



» Scroll down to Traffic shaping (Skip the TS configuration block).



Node1

| 🕑 Tr | affic Shaping | | | | | | | | | |
|--------------|---------------|----------|------------------|-------------|-------------|--------|--------------------|-----------|----------------|-------------|
| 🔁 Ad | d | | | | | | | | | |
| | Node Name 🔺 | Enable | Parent Node Name | CIR | PIR | | Channel Name | Priority | Max Queue Time | Shaping Uni |
| X 9 | Node1 | ~ | Root | 30.000000 M | 50.000000 M | 4 | Channel 1 | 50 | 100 msec | bitrate |
| \mathbf{X} | Nodell | ~ | Node 1 | 0.000000 M | 10.000000 | Traffi | c Shaping > Editir | a "Node1" | | • |
| ר | Node 12 | × | Node1 | 0.000000 M | 10.000000 | | | | | |
| ר | Node2 | × | Root | 0.000000 M | 10,000000 | Noc | de Name: | Node1 | | |
| | | | | | | Ena | able: | V | | |
| | | | | | | Par | ent Node Name: | Root | | * |
| | | | | | | CIR | : | 30.000000 | | |
| | | | | | | PIR | : | 50.000000 | | |
| | | | | | | Cha | annel Name: | Channel1 | | ~ |
| | | | | | | Prio | ority: | 50 | | |
| | | | | | | Мах | Queue Time: | 100 | | msec |
| | | | | | | Sha | aping Unit: | bitrate | | ~ |
| | | | | | | | Indate Can | cel | | |

| Parameter | Value | Description | | |
|------------------|-----------------------|---|--|--|
| Node Name | Node1 | Enter the node name. | | |
| | | (By default a unique Node name is proposed) | | |
| Enable | ~ | Enable the first traffic shaping node. | | |
| Parent Node Name | Root | Select one of the available Node names. | | |
| | | For the shaping Node1 this is Root . Indicating the total incoming traffic. | | |
| CIR | 30 Mbps | Enter the Committed Information Rate for this traffic shaping node. | | |
| PIR | 50 Mbps | Enter the Peek Information Rate allowed on this traffic shaping node. | | |
| Channel Name | Channel1 | Select one of the available channels. The available channels correspond with the channels names defined under Channels . | | |
| Priority | Keep default value | Use this setting to prioritize the shaped traffic. Value range: 0-99. | | |
| | | The lower the value that is entered, the higher the priority! | | |



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| Parameter | Value | Description |
|----------------|-----------------------|---|
| Max Queue Time | Keep default value | This buffer provides the possibility to store an amount of data in a shaping node. When the queue time is exceeded, data will be dropped. |
| Shaping Unit | Bitrate | Select the shaping unit. |
| | | Bitrate: This is commonly used as it guarantees the bitrate that can be received by the terminals. The this advantage of this way of working is that optimal pointing is not encouraged and due to that the available bandwidth is not optimally used. |
| | | Symbol rate: This can be used when more than one service provider makes use of the transponder bandwidth. In this case it is possible to divide (shape) the bandwidth amongst the operators as agreed. This way of working encourages the service provider to perform optimal pointing of its terminals. This to obtain an optimal usage of its available bandwidth. |



Node 11

- » Click Add;
- » Complete the Pop-Up window.

| Parameter | Value | Description |
|------------------|-----------------------|---|
| Node Name | Node11 | Enter the node name. |
| | | (By default a unique Node name is proposed, it is recommended to rename this name). |
| Enable | ~ | Enable the shaping node. |
| Parent Node Name | Node1 | Select one of the available Node names. |
| | | For the shaping Node1 this is Root . Indicating the total incoming traffic. |
| CIR | 30 Mbps | Enter the Committed Information Rate for this traffic shaping node. |
| PIR | 50 Mbps | Enter the Peek Information Rate allowed on this traffic shaping node. |
| Channel Name | Channel1 | Select one of the available channels. |
| | | In this case we want to insert the traffic on the TS Encapsulator 1 (BBF Encapsulator) The available channels correspond with the channels names defined under Channels . |
| Priority | Keep default value | Use this setting to prioritize the shaped traffic. Value range: 0-99. |
| | | The lower the value that is entered, the higher the priority! |
| Max Queue Time | Keep default value | This buffer provides the possibility to store an amount of data in a shaping node. When the queue time is exceeded, data will be dropped. |
| Shaping Unit | Bitrate | Select the shaping unit. |
| | | Bitrate: This is commonly used as it guarantees the bitrate that can be received by the terminals. The this advantage of this way of working is that optimal pointing is not encouraged and due to that the available bandwidth is not optimally used. Symbol rate: This can be used when more than |
| | | one service provider makes use of the |



| Parameter | Value | Description |
|-----------|-------|---|
| | | transponder bandwidth. In this case it is possible to divide (shape) the bandwidth amongst the operators as agreed. This way of working encourages the service provider to perform optimal pointing of its terminals. This to obtain an optimal usage of its available bandwidth. |



Node12

- » Click Add;
- » Complete the Pop-Up window.

| Node12 | Enter the node name. |
|-----------------------|--|
| | (By default a unique Node name is proposed, it is recommended to rename this name). |
| ~ | Enable the shaping node. |
| Node1 | Select one of the available Node names. |
| | For the shaping Node1 this is Root . Indicating the total incoming traffic. |
| 30 Mbps | Enter the Committed Information Rate for this traffic shaping node. |
| 50 Mbps | Enter the Peek Information Rate allowed on this traffic shaping node. |
| Channel1 | Select one of the available channels. |
| | In this case we want to insert the traffic on the TS Encapsulator 1 (BBF Encapsulator) The available channels correspond with the channels names defined under Channels . |
| Keep default value | Use this setting to prioritize the shaped traffic. Value range: 0-99. |
| | The lower the value that is entered, the higher the priority! |
| Keep default value | This buffer provides the possibility to store an amount of data in a shaping node. When the queue time is exceeded, data will be dropped. |
| Bitrate | Select the shaping unit. |
| | Bitrate: This is commonly used as it guarantees the bitrate that can be received by the terminals. The this advantage of this way of working is that optimal pointing is not encouraged and due to that the available bandwidth is not optimally used. Symbol rate: This can be used when more than |
| | Node12 Node1 Node1 Node1 So Mbps So Mbps Channel1 Keep default value Keep default value Bitrate |



| Parameter | Value | Description |
|-----------|-------|---|
| | | transponder bandwidth. In this case it is possible to divide (shape) the bandwidth amongst the operators as agreed. This way of working encourages the service provider to perform optimal pointing of its terminals. This to obtain an optimal usage of its available bandwidth. |



Configure the Traffic Classification Rules

Use the traffic classification rules to capture specific traffic.

Please refer to <u>Appendix A - Classification Expressions on page 67</u> to get an overview on the available expressions.





Note that it is not possible to link classification rules to a shaping node that has child nodes. Therefore, when creating child nodes for Shaping Node1, it is needed to either disable or remove the existing Rule1.



Delete Rule1

» Delete Rule1

| 🕖 Tr | affic Classification | | | | |
|------|----------------------|--------|---------------------------|-----------|----------------|
| 🔂 Ad | d | | | | |
| | Classification Name | Enable | Classification Expression | Node Name | Matching Order |
| | Rule1 | ~ | ip4 dst net 0.0.0.0/0 | Node 1 | 50 |
| | elete | | | | |

» Click Delete to confirm.

| Delete Er | itry | | | × |
|-----------|------|----------------|----------------|---------------|
| ? | Are | you sure you v | want to delete | e this entry? |
| | | Delete | Cancel | |
| | | | | |

Create Rule11

» Click Add and fill out the settings in the Pop-Up window.

| 🕑 Tra | affic Classification | | | | | | | | |
|-------|-----------------------|----------|---------------------------|-----------|-------------------------|------------|---------------|---------------|----------|
| 🔁 Ada | ± | | | | | | | | |
| | Classification Name 🔺 | Enable | Classification Expression | | Node Name | Matchi | ng Order | | |
| XQ | Rule11 | ~ | ip4 dst net 10.10.20.0/24 | | Node11 | 50 | | | |
| | Rule12 | ~ | ip4 dst net 10.10.30.0/24 | Traffic (| lassification > E | diting "Ru | ule11" | | |
| ר | Rule2 | ~ | ip4 dst net 20.20.20.0/24 | Classif | ication Name: | | Rule11 | | |
| | | | | Enable | | | | | |
| | | | | Classif | : ication Expression | | in4 dst net 1 | 10 10 20 0/24 | |
| | | | | Nede | Name - | | Nedett | 10.10.20.0,21 | |
| | | | | Node | Name: | | Nodell | | _ |
| | | | | Match | ing Order: | | 50 | | |
| | | | | | | | | | |
| | | | | Upd | ate france | 1 | | | |
| | | | | | | | | | |



| Parameter | Value | Description |
|------------------------------|---|--|
| Traffic Classification | ~ | <u>.</u> |
| Classification Name | Rule11 | Insert a logical Classification Name. |
| Enable | ~ | Activate the classification rule. |
| Classification Expression | ip4 dst net 10.10.20.0/24 (Layer 3 Forwarding Mode) | Enter a detailed classification expression when needed. Make sure that the syntax of the classification expression is correct! We refer to Appendix A - Classification Expressions on page 67 to have an overview on the possible expressions. Other examples are: Filter out all icmp traffic with a rule like this: (ip4 dst net xxx) and (icmp type echo-request) Give priority to same traffic for one specific |
| Shaping Node Name | Node11 | host: ip4 dst host 10.10.20.5 Select one of the available shaping node names. In this case select Node11 to link this rule. (The Node names are defined under Traffic Shaping .) |
| Use Matching Order | Keep default value | This parameter is only changed in case of conflicting rules. The lower the value that is entered, the higher the priority! |



Create Rule12

» Click Add and fill out the settings in the Pop-Up window.

| 🕑 Tr | affic Classification | | | | | |
|------|----------------------|----------|----------------------|------|--------------------------------------|---------------------------|
| 🔂 Ad | d | | | | | |
| | Classification Name | Enable | Classification Expre | Node | Traffic Classification > Editing "Ru | ıle12" |
| ר | Rule11 | ✓ | ip4 dst net 10, 1 | Node | Classification Name: | Rule12 |
| ר | Rule 12 | v | ip4 dst net 10,1 | Node | Enable: | |
| | | | | | Classification Expression: | ip4 dst net 10.10.30.0/24 |
| | | | | | Node Name: | Node12 💌 |
| | | | | | Matching Order: | 50 🔹 |
| | | | | | Update Cancel | |

| Parameter | Value | Description | | |
|------------------------------|--|--|--|--|
| Traffic Classification | - | ^ | | |
| Classification Name | Rule12 | Insert a logical Classification Name. | | |
| Enable | ~ | Activate the classification rule. | | |
| Classification Expression | ip4 dst net 0.0.0.0/0 (Layer 3 Forwarding Mode) all (Layer 2 Forwarding Mode) | Enter a detailed classification expression when needed. Make sure that the syntax of the classification expression is correct! We refer to Appendix A - Classification Expressions on page 67 to have an overview on the possible expressions. Other examples are: Filter out all icmp traffic with a rule like this: (ip4 dst net xxx) and (icmp type echo-request) Give priority to same traffic for one specific host: ip4 dst host 10.10.20.5 | | |
| Shaping Node Name | Node12 | Select one of the available shaping node names. In this case select Node12 to link this rule. (The Node names are defined under Traffic Shaping .) | | |
| Use Matching Order | Keep default value | This parameter is only changed in case of conflicting rules. The lower the value that is entered, the higher the priority! | | |



4.3.1.2 TS Encapsulation

Т

Configure a TS Encapsulator (ISI)

» In the Encapsulation Block scroll to TS Encapsulation.

| ISIs | | | | | | |
|---------------------|--------|-----|------------|---------------------|-------------------|---|
| 🔂 Add | | | | | | |
| Name | Enable | ISI | Frame Type | ISIs > Editing "End | apsulator-TS-1" | |
| 🗙 👰 Encapsulator-TS | -1 💙 | 20 | Normal | | | |
| (^{Im}) | | | | Name: | Encapsulator-TS-1 | |
| 0 | | _ | | Enable: | | |
| | | | | ISI: | 20 | |
| | | | | Frame Type: | Normal | ~ |
| | | | | | | |
| | | | | Update n | Cancel | |
| | | | | (m) | | |

| Parameter | Value | Description |
|---------------|-------------------|---|
| Encapsulators | | |
| Name | Encapsulator-TS-1 | Enter a logical unique name. |
| | | Note: A unique name is proposed by the device. |
| Enable | ~ | Enable the encapsulator. |
| ISI | 20 | Insert the Input Stream Identifier. |
| Frame Size | Normal | Normal frames = 64800 bits |
| | | Short frames = 16200 bits |
| | | At data rates under 4Mbps we recommend to use short frames. This to increase the BBF filling level. |



Configure the PIDs

| 🕖 PI | Ds | | | | | | |
|----------------|-------------------|----------------------------|-----|----|----------------------------|-------------------|---|
| 🔂 Ad | d | | | | | | |
| | Name | Enable | PID | 15 | PIDs > Editing "Service-1" | | |
| 20 | Service-1 | ~ | 30 | Е | Name: | Service-1 | |
| Ċ | 9 | | | | Enable: | | |
| | | | | | PID: | 30 | |
| | | | | | ISI: | Encapsulator-TS-1 | ~ |
| | | | | | Protocol: | Default | ~ |
| | | | | | Nominal S2 Ext Modcod: | 32 APSK 100/180 | ~ |
| 🛞 Ch | annels | | | | ACM Enable: | | |
| 🔂 Ad | d | | | | | | |
| | Name | Enable | PID | Li | | | |
| G <u>click</u> | k here to add a n | ew entry. | | | | | |
| | | | | | Updane Cancel | | |
| | | | | U | | | |

| Parameter | Value | Description | | | | | |
|--------------------------|-------------------|---|--|--|--|--|--|
| PIDs | | | | | | | |
| Name | Service-1 | Enter a logical unique name. | | | | | |
| | | Note: A unique name is proposed by the device. | | | | | |
| Enable | | Enable the creation of PIDs. This adds a Program Identifier to the transport stream packet that is being created. | | | | | |
| | | This is needed by the receiver, to filter out this specific program. | | | | | |
| PID | 30 | Enter the Program Identifier number. This number is added to the header transport stream. It will be used by the decapsulator on the receiver site. | | | | | |
| ISI | Encapsulator-TS-1 | Select one of the available ISI names. The available names are defined under ISIs . | | | | | |
| Protocol | Default | Here you have the possibility to overrule the default protocol that has been selected under the general encapsulation settings. Refer to <u>Configure the</u> <u>General Stream Encapsulation Settings. on page 34</u> | | | | | |
| Nominal DVB-S2 ModCod | 32APSK 100/180 | Select the ModCod to be used (overruled when ACM is enabled).(overruled when ACM is enabled). | | | | | |
| ACM Enable | × | This configuration guideline does not cover ACM. | | | | | |



Configure the Channels

| () (| 🚱 Channels | | | | | | |
|--------------|--------------|--------|-----------|-------------------|---------------|--|--|
| O A | dd | | | | | | |
| | Name | Enable | PID | Label | Terminal Name | | |
| ר | Channel-TS-1 | × | Service-1 | 00:00:00:00:00:00 | [unspecified] | | |
| | | | | | | | |

| Parameter | Value | Description |
|---------------|-----------------------------|---|
| Channels | | |
| Name | Channel-TS-1 | Enter a logical unique name. Note: A unique name is proposed by the device. |
| Enable | ~ | Enable the channel. When enabled the "TS packets" can be transported logical pipe towards the receiver. |
| PID | Service-1 | Select one of the available PID names. The available names are defined under PIDs .Ch |
| Label | 00:00:00:00:00:00 | Use a label when you want to address a specific receiver. For MPE a label is required! |
| Terminal Name | <unspecified></unspecified> | Used when ACM is enabled. This configuration guideline does not cover ACM. |



Configure the Traffic Shaping



lp4 dst net 20.20.20.0/24



| 🕖 Tr | affic Shaping | | | | | | | | | | | |
|------------|---------------|----------|------------------|-------------|-------------|----------|--|---------------------------|--|--------------------|-------------|------|
| 🔂 Ad | ld | | | | | | | | | | | |
| | Node Name 🔺 | Enable | Parent Node Name | CIR | PIR | Chann | Channel Name Priority | | Max Queue Time | | Shaping Uni | t |
| ר | Node 1 | × | Root | 30.000000 M | 50.000000 M | Chann | Channel 1 50 | | 100 msec | | bitrate | |
| ר | Node11 | × | Node 1 | 0.000000 M | 10.000000 M | Channel1 | | 50 | 10 | 100 msec bitrate | | |
| ר | Node 12 | × | Node 1 | 0.000000 M | 10.00000 M | Chann | el 1 | 50 | 10 | 00 msec | bitrate | |
| X Q | Node2 | ~ | Root | 0.000000 M | 10.000000 M | Chann | el-TS-1 | 50 | 10 | 00 msec | bitrate | |
| | | | | | | | Node Nar Enable: Parent No CIR: PIR: Channel I Priority: | ne: ode Name: Name: | Node2 Root 0.00000 10.00000 Channel- 50 | 10 100 -TS-1 | | ~ |
| | | | | | | | Max Quer Shaping U Updater | ue Time: Jnit: Can | 100 bitrate | | | msec |

| Parameter | Value | Description | | |
|------------------|-----------------------|---|--|--|
| Node Name | Node2 | Enter the node name. | | |
| | | (By default a unique Node name is proposed, it is recommended to rename this name). | | |
| Enable | ~ | Enable this traffic shaping node. | | |
| Parent Node Name | Root | Select one of the available Node names. | | |
| | | For the shaping Node2 this is Root , Indicating the total incoming traffic. | | |
| CIR | 0 Mbps | Enter the Committed Information Rate for this traffic shaping node. | | |
| PIR | 50 Mbps | Enter the Peek Information Rate allowed on this traffic shaping node. | | |
| Channel Name | Channel-TS-1 | Select one of the available channels. The available channels correspond with the channels names defined under Channels . | | |
| Priority | Keep default value | Use this setting to prioritize the shaped traffic. Value range: 0-99. | | |
| | | The lower the value that is entered, the higher the priority! | | |
| Max Queue Time | Keep default value | This buffer provides the possibility to store an amount of data in a shaping node. | | |



| | | When the queue time is exceeded, data will be dropped. |
|--------------|---------|---|
| Shaping Unit | Bitrate | Select the shaping unit. |
| | | Bitrate: This is commonly used as it guarantees the bitrate that can be received by the terminals. The this advantage of this way of working is that optimal pointing is not encouraged and due to that the available bandwidth is not optimally used; |
| | | Symbol rate: This can be used when more than one service provider makes use of the transponder bandwidth. In this case it is possible to divide (shape) the bandwidth amongst the operators as agreed. This way of working encourages the service provider to perform optimal pointing of its terminals. This to obtain an optimal usage of its available bandwidth. |


Configure the Traffic Classification Rules

| 🚱 Traffic Classification | | | | | | | | |
|--------------------------|---------------------|----------|---------------------------|----|--------------------------------|------------------------|--|--|
| O Add | | | | | | | | |
| | Classification Name | Enable | Classification Expression | No | January Matchine Order | "Pul-2" | | |
| × 🕖 | Rule11 | × | ip4 dst net 10.10.20.0/24 | Nc | Tranic Classification > Eurong | Kulez | | |
| × 🕖 | Rule12 | × - | ip4 dst net 10.10.30.0/24 | Nc | Classification Name: | Rule2 | | |
| ×Q | Rule2 | ~ | ip4 dst net 20.20.20.0 | Nc | Enable: | | | |
| Ċ |) | | | | Classification Expression: | ip4 dst net 20.20.20.0 | | |
| | | | | | Node Name: | Node2 💌 | | |
| | | | | | Matching Order: | 50 | | |
| - Monitoring Cancel | | | | | | | | |

| Parameter | Value | Description | | | | |
|---------------------------------------|--|--|--|--|--|--|
| Traffic Classification | | | | | | |
| Classification Name | Rule2 | Insert a logical Classification Name. | | | | |
| Enable | ~ | Activate the classification rule. | | | | |
| Classification Expression | ip4 dst net 20.20.20.0/0 (Layer 3 Forwarding Mode) | Enter a detailed classification expression when needed. Make sure that the syntax of the classification expression is correct! We refer to Appendix Classification Rules to have an overview on the possible expressions. Other examples are: Filter out all icmp traffic with a rule like this: (ip4 dst net xxx) and (icmp type echo-request) Give priority to same traffic for one specific host: ip4 dst host 10.10.20.5ip4 dst host 10.10.20.5 | | | | |
| Shaping Node Name | Node2 | Select one of the available shaping node names. (The Node names are defined under Traffic Shaping .) | | | | |
| Use Matching Order Keep default value | | This parameter is only changed in case of conflicting rules. The lower the value that is entered, the higher the priority! | | | | |



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| Data1 | O Encapsulation | F. | |
|-------|---------------------|---------------|--|
| | Enable: | Ø ~ | |
| | Forwarded Bit Rate: | 0.000000 Mbps | |
| | Forwarded Bytes: | 0 bytes | |
| Data2 | Forwarded Packets: | 0 packets | |
| | Dropped Bytes: | 0 bytes | |
| | Dropped Packets: | 0 packets | |

» In the Overview tab, click on the top right icon of the Encapsulation block.

Configuration of the Encapsulation functional block can be split up into the following parts.

- 1. Enable Stream Encapsulation settings, select the forwarding mode (L2, L3), select BBF encapsulation protocol, select TS encapsulation protocol;
- 2. Configure the Carrier Settings;
- 3. Configure the BBF Encapsulation Protocol;
 - Configuration of the ISIs
 - Configuration of the Channels
- 4. Configure the TS Encapsulation Protocol;
 - Configuration of the ISIs
 - Configuration of the PIDs
 - Configuration of the Channels
- 5. Configure the Traffic Shaping;
- 6. Configure the Traffic Classification.

4.3.2 Configure the Stream Encapsulation Settings

| Overview Tree View 🗈 Enca | psulation 🗷 | | | | | |
|--|---------------|--|--|--|--|--|
| Encapsulation | Encapsulation | | | | | |
| - Settings | | | | | | |
| Enable: | Ø 🗸 | | | | | |
| Forwarding Mode: | 🚱 Layer 3 | | | | | |
| Default BBF Encapsulation Protocol: | | | | | | |
| Default TS Encapsulation Protocol: 🚱 MPE | | | | | | |



| Parameter | Value | Description | | | |
|--|----------|---|--|--|--|
| Settings | | | | | |
| Enable | ~ | Activate stream encapsulation | | | |
| Forwarding Mode | Layer 3 | Select the required forwarding mode. Through this selection, the device either acts as Layer 3 IP Router or as Layer 2 Ethernet Bridge. | | | |
| Default BBF Encapsulation Protocol | GSE | This encapsulator inserts IP packets directly into BBFs. This is the most efficient way of encapsulating IP packets. This because it generates the least overhead in comparison with the TS encapsulation protocols. | | | |
| | | There are two possible Encapsulation protocols available: | | | |
| | | GSE (Generic Stream Encapsulation), this is a protocol that is compliant with the DVB-S2 standard. (it generates the least overhead in comparison with XPE); | | | |
| | | XPE (Extended Performance Encapsulation) is a Newtec Proprietary protocol. (Use this protocol between Newtec equipment. It is implemented to be backward compatible with elevation devices such as EL470, EL478, EL978 and other Newtec devices supporting XPE.). | | | |
| Default TS Encapsulation Protocol | MPE | This encapsulator first maps IP packets into TS packets (TS packets are used as containers) and this way it generates a set of TS packets. | | | |
| | | It must be clear that it is not a valid MPEG transport stream that can be used outside of the encapsulation. | | | |
| | | There are two possible Encapsulation protocols available: | | | |
| | | ULE (Unidirectional Lightweight Encapsulation), is more efficient than MPE; | | | |
| | | MPE (Multi-Protocol Encapsulation) is less efficient than ULE because it uses more overhead. Use this in case the receiver only supports this protocol. | | | |



4.3.3 Configure the Carrier Settings

| Carrier Settings | |
|----------------------|------------------|
| Modulation Standard: | S2 Extensions |
| Pilots: | â 🖌 |
| Symbol Rate: | Ø 70.00000 Mbaud |

| Parameter | Value | Description | | |
|---------------------|---------------|--|--|--|
| Carrier Settings | - | | | |
| Modulation Standard | S2 Extensions | Select the modulation standard as defined by the system setup requirements. (DVB-S2 or S2 Extensions) | | |
| Pilots | ~ | Activate the use of pilots. Pilots reduce the influence of phase noise in the system. Use pilots for multi stream; Use pilots to increase the reliability of the receiver synchronization. (Increasing the performance and robustness of the demodulator.) In case of S2-Extensions, pilots are mandatory and therefore enabled by default. | | |
| Symbol Rate | 70 Mbaud | Enter the Symbol Rate according to the system setup requirements. | | |

4.4 Configure the Demodulator Settings

| | Demodulator 1 | L-BANDRXA |
|---|--------------------|---------------------|
| - | Enable: 🕖 👘 | (^I m) - |
| | Input Frequency: 😡 | |
| | Symbol Rate: 🚺 | distant. |
| | Roll Off: | TED |
| | Input Selection: | IFRX |
| - | EsNo: | |

• In the Overview tab, click on the top right icon to open the Demodulator functional block.



| Overview Tree View Demodulator 1 🛞 | | | | |
|-------------------------------------|---|-----------------|--|--|
| Demodulator 1 | | | | |
| Enable: | 0 | ✓ | | |
| Mode: | 0 | DVB-S2 | | |
| Input Frequency: | 0 | 1200.000000 MHz | | |
| Symbol Rate: | 0 | 40.000000 Mbaud | | |
| Roll Off: | 0 | 20% | | |
| Input Selection: | 0 | L-BAND Rx A | | |
| Physical Layer Scrambler Signature: | 0 | 0 | | |
| LNB Power Supply: | 0 | None | | |
| | | | | |

| Parameter | Value | Description | | | | |
|---|-------------|--|--|--|--|--|
| Demodulator | | | | | | |
| Enable | ~ | Activate the demodulator. | | | | |
| Mode DVB-S2 | | Select the modulation mode that is used by the sending site (MDM6000 on the remote site). Note: When the selection does not match, the incoming BBFs are not recognized. | | | | |
| Input Frequency | 1200MHz | Set the input frequency according to the output frequency of the sending site (MDM6000 on the remote site). | | | | |
| Symbol Rate | 40Mbaud | Enter the symbol rate according to the system setup specifications. | | | | |
| Roll Off | 15% | Select the appropriate roll off factor, according to the requirements of the system setup. | | | | |
| Input Selection | L-Band Rx A | Indicates on what Rx interface the RF is received. This is done automatically based on the input frequency. | | | | |
| Physical Layer Scrambler Signature | 0 | | | | | |
| LNB Power Supply | None | When an LNB is used it is possible to select the corresponding power supply | | | | |
| Transponder Automatic Operation Mode | | The multi carrier per transponder configuration is to be used in case the transponder is operated in multiple carriers per traveling wave tube (TWTA) on the satellite; | | | | |



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| Parameter Value | | Description | |
|-----------------|--|---|--|
| | | • The single carrier per transponder configuration in linear mode configuration assumes that the transponder has sufficient backoff to be considered in linear mode with a single carrier and that the operation is clearly within the linear region of the transponder; | |
| | | In the case the satellite channel is operated in a single carrier per transponder mode in the non-linear amplification region of the transponder. | |

4.5 Configure Decapsulation

| Data1 | Decapsulation | | Sat1 |
|-------|-------------------------|---------------|------|
| - | Enable: | 🕲 x | |
| | Output Bit Rate: | 0.000000 Mbps | |
| | Output Bytes: | 0 bytes | |
| Data2 | Output Packets: | 0 packets | Sat2 |
| _ | Dropped Bytes: | 0 bytes | |
| | Dropped Packets: | 0 packets | |

» Click on the top right icon to open the Decapsulation functional block.

4.5.1 Enable Decapsulation and ISI Filtering

| Overview Tree View Decaps | sulation 🗵 |
|-----------------------------------|------------|
| Decapsulation | |
| - Settings | |
| Enable: | 9 🗸 |
| Forwarding Mode: | 🕼 Layer 3 |
| Default BBF Decapsulation Protoco | ol:🕼 GSE |
| Default TS Decapsulation Protocol | : 🕼 MPE |
| ISI Filtering: | Ø 🗸 |

| Parameter | Value | Description |
|--|---------|--|
| Enable | ~ | Enable the decapsulator to start decapsulating the incoming BBF's. |
| Forwarding Mode | Layer 3 | This is the same setting as in the Encapsulator. |
| Default BBF Decapsulation Protocol | GSE | Select the default decapsulation protocol that is mainly used to decapsulate the incoming BBFs.GSEXPE |
| Default TS Decapsulation Protocol | MPE | Select the default decapsulation protocol that is mainly used to decapsulated the incoming "TS packets".MPEULE |
| ISI Filtering | ~ | Enable ISI filtering. When this is not enabled no filtering is performed and the decapsulation cannot take place! |



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4.5.2 Configure the BBF Decapsulator

4.5.2.1 Configure the BBF Decapsulation ISIs



| Parameter | Value | Description | | | | |
|-----------|---------------|---|--|--|--|--|
| ISIs | | | | | | |
| Name | Decapsulator1 | Displays the name of the decapsulator | | | | |
| Enable | ~ | Activate the decapsulation of the ISI. | | | | |
| ISI | 1 | Enter the ISI value that you want to filter out. This must correspond to the ISI value defined on the sending site. (In this case on the remote site). | | | | |
| Protocol | Default | Here you have the possibility to overrule the default protocol that has been selected under the general decapsulation settings. Refer to <i>Enable Decapsulation and ISI Filtering on page 39</i> | | | | |



4.5.2.2 Configure the Decapsulation Channels

| | | | | | | Channels > Editing | "Channel1" | |
|-------|-----------|--------|----------------|---------------------|-----------------|--------------------|------------------|---|
| 🕑 Ch | annels | | | | | Name: | Channel1 | |
| 🖸 Adı | 4 | | | | | Enable: | | |
| | Name | Enable | Decapsulator | Label | Label Filter | Decapsulator: | Decapsulator1 | * |
| ר | Channel 1 | ~ | Decapsulator 1 | 00:00:00:00:00:00/0 | No label filter | Label: | 00:00:00:00:00/0 | |
| | | | | | | Label Filter: | No label filter | * |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | Update | Cancel | |

| Parameter | Value | Description |
|------------------|---------------|---|
| Channels | | |
| Name | Channel1 | Indicate the channel that you want to decapsulate. |
| | | Verify the used channel name on the sending site. |
| Enable | ~ | Activate the decapsulation of the channel. |
| Decapsulato r | Decapsulator1 | Select the decapsulator name. |
| Label | | For more information on the use of the label and label filter please refer to the user manual. The user manual can be |
| Label filter | | found on CD-ROM that is delivered together with the device. |



5 Configure the Remote Site

The configuration of the Remote site can be split up into the following steps.

- · Configure the Data interface;
- Configure the Modulator;
- Configure the Encapsulation;
- · Configure the Demodulator;
- · Configure the Decapsulation;

5.1 Configure the Data Interfaces



Log in as operator, please refer to chapter Log in as Operator. on page 4

| O Data Interfaces | | | |
|-------------------|-----------------------|-------------|--------------------|
| Data Interface: | Data1 (non redundant) | ("") | |
| Active Interface: | Data1 | \subseteq | Open Detailed View |

» In the Overview tab, click on the top right icon to open the Data Interfaces functional block. Configuration of the Ethernet and IP Connectivity is split up into three parts as shown in the following figure.

| Overview Tree | View 📔 Enca | psulatio | n 🗵 🗈 Data | Interfaces 🗵 | |
|----------------------------------|-----------------|-----------|-------------------|--------------|--|
| Data Interfaces | | | | | |
| Ethernet | | | | | |
| 🚱 Link | | | | | |
| Interface Enal | ble MAC Address | | Link State | | |
| 🕑 Data1 🛛 🖌 | 00:06:39:08:15 | 5:6b | 1000Bt Full Duple | ex | |
| 🕑 Data2 🛛 🗙 | 00:06:39:08:15 | 5:6f | Link Down | | |
| | | | | | |
| Data Gateway: | | | | | |
| IP Address | | | | | |
| Data Interface IP Address/Prefix | | Virtual I | IP Address/Prefix | State | |
| 🕑 Data | 10.10.10.1/24 | 0.0.0.0 | /24 | ✓ | |
| | | | | | |
| — Data Interface Link R | edundancy | | | | |
| Data Interface: | | ۷ | Data1 (non red | lundant) | |
| Switch Count: | | | 0 | | |
| Active Interface | | | Data1 | | |



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5.1.1 Enable the Ethernet Ports

| 0 | Link | | | |
|---|-----------|----------|-----------------------|---------------|
| | Interface | Enable | MAC Address Lir | nk State |
| 0 | Data1 | ~ | 00:06:39:08:15: 10 | 00Bt Full Dup |
| 0 | Data2 | × | 00:06:39:08:15:6f Lir | nk Down |

| Parameter | Value | Description |
|---------------|-------|---|
| Ethernet Link | | |
| Data1 | ✓ | Enable Data1; to make a connection between the Backbone Provider and the MDM6000. |
| Data2 | × | Disable Data2; in this example it is not foreseen to setup link redundancy between the Backbone provider and the MDM6000. |

5.1.2 Configure the IP Addresses and its Prefixes

| IP | | | | | | | |
|---------|-------------|-------------------|---------------------------|-------|-----------------------------|--|---|
| Data Ga | ateway: | | 10.10.10.2 | | | | |
| 🕑 IP A | ddress | | | | | | |
| Data | a Interface | IP Address/Prefix | Virtual IP Address/Prefix | State | TD Address > Editing "Data" | | |
| P Data | 3 | 10.10.10.1/24 | 0.0.0/24 | ~ | IP Address > Editility Data | | |
| 0- | | | | | Data Interface: | Data | ~ |
| _ | | | | | IP Address/Prefix: | 10.10.10.1/24 | |
| | | | | | Virtual IP Address/Prefix: | 0.0.0/24 | |
| | | | | | State: | Image: A second s | |
| | | | | | | | |
| | | | | | Upda Cancel | | |
| | | | | | | | |



Make sure that the IP Addresses between the different devices belong to the same IP range.



| Parameter | Value | Description |
|--------------|---------------|--|
| IP Address | | |
| Data Gateway | 10.10.10.2 | |
| Data | 10.10.10.1/24 | Configure the IP Address and its prefix (Net Mask) of Data1. |
| | | Data coming from the customer equipment is received on this interface. |

5.1.3 Configure the Data Interface Link Redundancy

| Data Interface Link Redundancy | |
|--|-------------------------|
| Data Interface: | 🚱 Data1 (non redundant) |
| Switch Count: | 0 |
| Active Interface: | Data 1 |

| Parameter | Value | Description |
|-----------------------------------|--------------------------|--|
| Data Interface Link Redundancy | | |
| Data Interface | Data1 (non redundant) | Select Data 1 (non redundant) in this case no bonding (link redundancy) is performed. |
| | | When link redundancy is required, configure the Data2 interface and select a redundant option from the drop down list. |
| Switch Count | | This counter is only active in case data link redundancy is active. |
| | | This indicates the amount of switches between Data1 and Data2. |
| Active Interface | Data1 | Indicates which physical Data Interface is active at the moment. |

5.2 Configure the Modulator Settings

| Modulator | | |
|-----------------------------|----------------------------------|----------|
| Mode: | DVB-S2 | L-BANDTX |
| Transponder Operation Mode: | Multiple Carrier per Transponder | |
| Transmit: | 🙆 x | _ |
| Transmit State: | × | |
| Transmit State Reason: | Configured | IETy |
| Output Level: | 🕑-15.0 dBm | |
| Output Frequency: | 2000.000000 MHz | |
| Symbol Rate: | 10.000000 Mbaud | |

» In the Overview tab, click on the top right icon to open the Modulator functional block.

| Overview | Tree View | Modulator | × |
|--------------|-------------|------------|-------------------|
| Modulator | | | |
| Mode: | | Ø | DVB-S2 |
| Transmit: | | 0 | × |
| Transmit Sta | ite: | | × |
| Transmit Sta | te Reason: | | Configured |
| Output Freq | uency: | Ø | 1200.000000 MHz |
| Roll Off: | | Ø | 15% |
| Occupied Ba | ndwidth: | | 46.000000 MHz |
| Output Leve | l: | 0 | -35.0 dBm |
| 10 MHz BUC | reference: | () | Off |
| Carrier Modu | lation: | Ø | On |
| Symbol Rate | : | 0 | 40.000000 Mbaud |
| | | | 00 Reset Counters |
| Measured Pa | cket Count: | | 0 packets |
| Measured Bit | t Rate: | | 0.000000 Mbps |
| Measured Bit | t Rate: | | 0.000000 Mbps |



| Parameter | Value | Description | | |
|--------------------|----------|---|--|--|
| Modulator | - | - | | |
| Mode | DVB-S2 | Select the modulation mode as defined by the system setup requirements. | | |
| Transmit | × | Activate the transmission over satellite. Wait until the configuration is completed before enabling this parameter. | | |
| Output Frequency | 1200MHz | Set the output frequency according to the requirements of the system setup. | | |
| Roll Off | 15% | Select the appropriate roll off factor, according to the requirements of the system setup. | | |
| Output Level | -35dBm | Enter the value as defined by the link provider. Please contact your link provider to define the output level. | | |
| Clock Output | × | Enables or disables the transmission of a 10MHz clock signal on the RF output interface. This reference signal can be multiplexed on the L-band output interface. | | |
| Carrier Modulation | ~ | The modulated RF signal is available on the L-BAND Tx interface. | | |
| Symbol Rate | 40Mbaud | Enter the available symbol rate. | | |



Only enable Transmit once encapsulation has been configured!



5.3 Configure Encapsulation

| Detet | O Encapsulation | The cost | |
|-------|-------------------------|---------------|------|
| Datai | Enable: | Ø 🗸 | |
| | Destination IP Address: | 10.0.0.2 | |
| | Destination UDP Port: | 12345 | |
| 1 | Forwarded Bit Rate: | 0.000000 Mbps | |
| Data2 | Forwarded Bytes: | 0 bytes | Sat2 |
| | Forwarded Packets: | 0 packets | |
| | Dropped Bytes: | 0 bytes | |
| | Dropped Packets: | 0 packets | |

» In the Overview tab, click on the top right icon of the Encapsulation block.

Configuration of the Encapsulation functional block can be split up into the following parts.

- 1. Enable Stream Encapsulation settings, select the forwarding mode (L2, L3), select BBF encapsulation protocol, select TS encapsulation protocol;
- 2. Configure the Carrier Settings;
- 3. Configure the BBF Encapsulation Protocol;
 - Configuration of the ISIs
 - Configuration of the Channels
- 4. Configure the TS Encapsulation Protocol;
 - Configuration of the ISIs
 - Configuration of the PIDs
 - Configuration of the Channels
- 5. Configure the Traffic Shaping;
- 6. Configure the Traffic Classification.

5.3.1 Configure the General Stream Encapsulation Settings

| Overview Tree View Encapsul | atio | n 🗷 | |
|---|------|----------|--|
| Encapsulation | | | |
| – Settings – | | | |
| Enable: | Ø | ~ | |
| Forwarding Mode: | 0 | Layer 3 | |
| Default BBF Encapsulation Protocol: 🚱 GSE | | | |
| Default TS Encapsulation Protocol: 🚱 MPE | | | |



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| Parameter | Value | Description | | | |
|--|-----------|--|--|--|--|
| Settings | | | | | |
| Enable | ~ | Activate stream encapsulation | | | |
| Forwarding Mode | • Layer 3 | Select the required forwarding mode. Through this selection, the device either acts as Layer 3 IP Router or as Layer 2 Ethernet Bridge. | | | |
| Default BBF Encapsulation Protocol | • GSE | This encapsulator inserts IP packets directly into BBFs. This is the most efficient way of encapsulating IP packets. Because it generates the least overhead in comparison with the TS encapsulation protocols. | | | |
| | | There are two possible Encapsulation protocols available: | | | |
| | | GSE (Generic Stream Encapsulation), this is a protocol that is compliant with the DVB-S2 standard. (it generates the least overhead); | | | |
| | | XPE (Extended Performance Encapsulation) is a Newtec Proprietary protocol. (Use this protocol between Newtec equipment. It is implemented to be backward compatible with elevation devices such as EL470, EL478, EL978 and). | | | |
| Default TS Encapsulation Protocol | • MPE | This encapsulator first maps IP packets to TS packets (TS packets are used as containers) and this way it generates a set of TS packets. | | | |
| | | It must be clear that it is not a valid MPEG transport stream that can be used outside of the encapsulation. | | | |
| | | There are two possible Encapsulation protocols available: | | | |
| | | ULE (Unidirectional Lightweight Encapsulation), is more efficient than MPE; | | | |
| | | MPE (Multi-Protocol Encapsulation) is less efficient than ULE because it uses more overhead. Use this incase the receiver only supports this protocol. | | | |



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5.3.2 Configure the Carrier Settings

| Carrier Settings | |
|--------------------------------------|-----------------|
| Modulation Standard: | 🕑 DVB-S2 |
| Pilots: | Ø 🗸 |
| Symbol Rate: | 40.000000 Mbaud |

| Parameter | Value | Description | |
|---------------------|----------|--|--|
| Carrier Settings | | | |
| Modulation Standard | DVB-S2 | Select the modulation standard as defined by the system setup requirements. (DVB-S2 or S2 Extensions) | |
| Pilots | ~ | Activate the use of pilots. Pilots reduce the influence of phase noise in the system. Use pilots for multi stream; Use pilots to increase the reliability of the receiver synchronization. (Increasing the performance and robustness of the demodulator.) In case of S2-Extensions, pilots are mandatory and therefore enabled by default. | |
| Symbol Rate | 40 Mbaud | Enter the Symbol Rate according to the system setup requirements. | |



5.3.3 Encapsulation

Before the traffic is modulated, the IP traffic is classified, shaped and encapsulated. There are different encapsulation protocols available that can be split up into two main groups, BBF Encapsulation Protocols and TS Encapsulation Protocols.

The BBF Encapsulation Protocols directly insert IP packets into BBFs. The following protocols GSE or XPE can be used to do this.

The TS Encapsulation Protocols first maps IP packets to TS packets and then encapsulated into baseband frames.

Depending on the protocol, BBF Encapsulation Protocol or TS Encapsulation Protocol, a different procedure is used.

5.3.3.1 BBF Encapsulation

Configure a BBF Encapsulator (ISI)

| Encapsulation ISIs | | | | | | | |
|--------------------|--------|-----|------------|----------|--------------------|---------------------------|---|
| 🖸 Add | | | | | Encapsulation ISIs | > Editing "Encapsulator1" | |
| Name | Enable | ISI | Frame Type | Protocol | | | |
| Encapsulator1 | × | 1 | Normal | Default | Name: | Encapsulator 1 | |
| 0 | | | | | Enable: | | |
| - | | | | | ISI: | 1 | |
| | | | | | Frame Type: | Normal | ~ |
| | | | | | Protocol: | Default | ~ |
| | | | | | Update f | Cancel | |

| Parameter | Value | Description |
|---------------|---------------|---|
| Encapsulators | | |
| Name | Encapsulator1 | This is the default name for the first BBF encapsulator. The name is fixed! |
| Enable | ~ | Enable the encapsulator. |
| ISI | 1 | Insert the Input Stream Identifier. |
| | | Note that this is a decimal value. |



| Parameter | Value | Description |
|------------|---------|--|
| Frame Size | Normal | Normal frames = 64800 bits |
| | | Short frames = 16200 bits |
| | | At data rates under 4Mbps we recommend to use short frames. This to increase the BBF filling level. |
| | | <i>i</i> In case of S2-Extensions, normal frames are mandatory and therefore enabled by default. |
| Protocol | Default | Here you have the possibility to overrule the default protocol that has been selected under the general encapsulation settings. Refer to <u>Configure the General</u> <u>Stream Encapsulation Settings. on page 47</u> |



Configure the Channel

| Encapsulation Channels | | | | | | | |
|------------------------|----------|--------|---------------|-------|-------------------|------------|---------------|
| 🔂 Ad | G Add | | | | | | |
| | Name | Enable | Encapsulator | Label | Nominal S2 Modcod | ACM Enable | Terminal Name |
| X 0 | Channel1 | ~ | Encapsulator1 | | 16 APSK 3/4 | × | [unspecified] |
| | | | | | | | |

| Parameter Value | | Description |
|-------------------|---------------|---|
| Channels | | |
| Name | Channel1 | This is the default name for the first BBF channel. |
| | | Note: The name is fixed and cannot be overruled. |
| Enable | ~ | Activate the channel. |
| Encapsulator | Encapsulator1 | Select the corresponding Encapsulator. |
| Label | | Not used in this example. |
| | | Use a label when you want to address a specific receiver. |
| Nominal S2 ModCod | 16APSK 3/4 | Select the ModCod to be used (overruled when ACM is enabled). |
| ACM Enable | × | This configuration guideline does not cover ACM. |
| Terminal Name | [unspecified] | Used when ACM is enabled. |
| | | This configuration guideline does not cover ACM. |



Configure Traffic Shaping

Traffic shaping is used to do congestion control. Congestion control means defining how much of satellite capacity is distributed amongst the service providers. Furthermore it is possible to configure the quality of service by setting the priority and maximum queue time.

Before configuring the traffic shaping it is strongly advised to make a drawing of the complete shaping tree including traffic classification.

The following tree shows the different types of incoming IP traffic. Shaping Node1 that takes in the traffic.



» Scroll down to Traffic shaping (Skip the TS configuration block).



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Node2

| 🕖 Tr | 🕖 Traffic Shaping | | | | | | | | | | | | | |
|------|-------------------|--------|-----------------------|------------|-----------|---------|--------------|-----|----------------|--------------------|--------------|-----------|--|------|
| 🖸 Ad | d | | | | | | | | | | | | | |
| | Node Name | Enable | Parent Node Name | CIR | PIR | | Channel Name | Pri | ority | Max Queue Time | Shaping Unit | | | |
| N | Node1 | * | Root | 0.000000 M | 10.00000 | 00 M | Channel1 | 50 | | 100 msec | bitrate | | | |
| Ċ |) | | | | | | | 1 | Traff | ic Shaping > Editi | ng "Node1" | | | |
| | | | | | | | | | Noc | de Name: | Node 1 | | | |
| | | | | | | | | | Ena | ble: | V | | | |
| | | | | | | | | | Par | ent Node Name: | Root | | | ~ |
| | | | | | | | | | CIR | : | 25.000000 | 25.000000 | | |
| 💮 Tr | affic Classifi | ation | | | | | | | PIR: 40.000000 | | | | | |
| O Ad | d | | | | | | | | Cha | annel Name: | Channel 1 | | | ~ |
| | Classification | Name | Enable Classification | Expression | Node Name | Matchin | g Order | | Prio | rity: | 50 | | | |
| ר | Rule1 | | 🖌 always | | Node1 | 50 | | | Max | k Queue Time: | 100 | | | msec |
| | | | | | | | | | Sha | ping Unit: | bitrate | | | ~ |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | L | Jpdate n. Car | icel | | | |
| | | | | | | | | | | (m) | | | | |

| Parameter | Value | Description | | |
|------------------|-----------------------|---|--|--|
| Node Name | Node1 | Enter the node name. | | |
| | | (By default a unique Node name is proposed, it is recommended to rename this name). | | |
| Enable | ~ | Enable the first traffic shaping node. | | |
| Parent Node Name | Root | Select one of the available Node names. | | |
| | | For the shaping Node1 this is Root . Indicating the total incoming traffic. | | |
| CIR | 25 Mbps | Enter the Committed Information Rate for this traffic shaping node. | | |
| PIR | 40 Mbps | Enter the Peek Information Rate allowed on this traffic shaping node. | | |
| Channel Name | Channel1 | Select one of the available channels. The available channels correspond with the channels names defined under Channels . | | |
| Priority | Keep default value | Use this setting to prioritize the shaped traffic. Value range: 0-99. | | |
| | | The lower the value that is entered, the higher the priority! | | |



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| Parameter | Value | Description | |
|----------------|-----------------------|---|--|
| Max Queue Time | Keep default value | This buffer provides the possibility to store an amount of data in a shaping node. When the queue time is exceeded, data will be dropped. | |
| Shaping Unit | Bitrate | Select the shaping unit. | |
| | | • Bitrate: This is commonly used as it guarantees the bitrate that can be received by the terminals. The this advantage of this way of working is that optimal pointing is not encouraged and due to that the available bandwidth is not optimally used. | |
| | | Symbol rate: This can be used when more than one service provider makes use of the transponder bandwidth. In this case it is possible to divide (shape) the bandwidth amongst the operators as agreed. This way of working encourages the service provider to perform optimal pointing of its terminals. This to obtain an optimal usage of its available bandwidth. | |



Configure the Traffic Classification Rules

Use the traffic classification rules to capture specific traffic.

Please refer to Appendix A - Classification Expressions on page 67

| 🕖 Tr | 🕖 Traffic Classification | | | | | | | | |
|--------|--------------------------|--------|---------------------------|-----------|--------|----------------------------------|----------|---|---|
| 🖸 Ad | b Add | | | | | | | | |
| | Classification Name | Enable | Classification Expression | Node Name | Matchi | ng Order | | | |
| ⊠¶. | Rule1 | * | always | Node1 | 50 | Traffic Classification > Editing | "Rule1" | | |
| Ċ | | | | | | Classification Name: | Rule 1 | ^ | |
| | | | | | | Enable: | | | _ |
| | | | | | | Classification Expression: | always | = | = |
| | | | | | | Node Name: | Node 1 👻 | | |
| | | | | | | Matching Order: | 50 | - | |
| — Moni | toring | | | | | Undate Cancel | | | |
| | | | | | | (Im) | | |) |

| Parameter | Value | Description | | |
|------------------------------|--------------------------|--|--|--|
| Traffic Classification | | | | |
| Classification Name | Rule1 | Insert a logical Classification Name. | | |
| Enable | ~ | Activate the classification rule. | | |
| Classification Expression | always | Enter a detailed classification expression when needed. Make sure that the syntax of the classification expression is correct! We refer to Appendix A on page to have an overview on the possible expressions. Other examples are: Filter out all icmp traffic with a rule like this: (ip4 dst net xxx) and (icmp type echo-request) Give priority to same traffic for one specific host: ip4 dst host 10.10.20.5ip4 dst host 10.10.20.5 | | |
| Shaping Node Name | Node1 | Select one of the available shaping node names. In this case select Node1 to link this rule. (The Node names are defined under Traffic Shaping .) | | |
| Use Matching Order | Keep default value | This parameter is only changed in case of conflicting rules. The lower the value that is entered, the higher the priority! | | |



5.3.3.2 TS Encapsulation

Configure a TS Encapsulator (ISI)



In this system setup it is **not** foreseen to enter a return channel in the TS encapsulation format. Incase it is needed to create a TS Encapsulation please refer to TS Encapsulation.



5.4 Configure the Demodulator

| | Demodulator 1 | L-BANDRXA |
|---|--------------------|--------------|
| - | Enable: 😥 | (m) - |
| | Input Frequency: 🕼 | BE-1 (0.000- |
| | Symbol Rate: 🚺 | Manage - |
| | Roll Off: | TEDM |
| | Input Selection: | IFRX |
| - | EsNo: | |

• In the Overview tab, click on the top right icon to open the Demodulator functional block.

| Overview | Tree View | Demodulator | 1 🖲 |
|--------------|-----------|-------------|----------------------------------|
| Enable: | | 0 | On |
| Mode: | | 0 | S2 Extensions |
| Input Frequ | ency: | 0 | 1450.000000 MHz |
| Symbol Rate | 2: | 0 | 70.000000 Mbaud |
| Roll Off: | | 0 | 5% |
| Input Select | tion: | 0 | L-BAND Rx A |
| LNB Power S | upply: | 0 | None |
| Operational | Mode: | 0 | Multiple Carrier per Transponder |
| Spectral Inv | ersion: | 0 | Automatic |



| Parameter | Value | Description |
|---------------------------------|-----------------------------------|---|
| Demodulator | - | <u>^</u> |
| Enable | ~ | Activate the demodulator. |
| Mode | S2 Extensions | Select the modulation mode that is used by the sending site (MDM6000 on the remote site). Note: When the selection does not match, the incoming BBFs are not recognized. |
| Input Frequency | 1450MHz | Set the input frequency according to the output frequency of the sending site (MDM6000 on the remote site). |
| Symbol Rate | 70Mbaud | Enter the symbol rate according to the system setup specifications. |
| Roll Off | 5% | Select the appropriate roll off factor, according to the requirements of the system setup. |
| Input Selection L-Band Rx A | | Indicates on what Rx interface the RF is received. This is done automatically based on the input frequency. |
| LNB Power Supply | None | When an LNB is used it is possible to select the corresponding power supply. In this example, this setting is locked as the input frequency is IF. |
| Transponder Operational Mode | Single Carrier per Transponder | Depends if the transponder is used in linear or non-linear area. A non-linearity compensation is applied when 'single carrier per transponder' is selected. |



5.5 Configure Decapsulation

| Data1 | Decapsulation | | Sat1 |
|-------|-------------------------|---------------|------|
| - | Enable: | 🕲 x | |
| | Output Bit Rate: | 0.000000 Mbps | |
| | Output Bytes: | 0 bytes | |
| Data2 | Output Packets: | 0 packets | Sat2 |
| | Dropped Bytes: | 0 bytes | |
| | Dropped Packets: | 0 packets | |

» Click on the top right icon to open the Decapsulation functional block.

5.5.1 Enable Decapsulation and ISI Filtering



| Parameter | Value | Description |
|--|--------------|---|
| Enable | > | Enable the decapsulator to start decapsulating the incoming BBF's. |
| Forwarding Mode | • Layer 3 | This is the same setting as in the Encapsulator on the sending site. |
| Default BBF Decapsulation Protocol | • GSE | Select the default decapsulation protocol that is mainly used to decapsulated the incoming BBFs. |
| Default TS Decapsulation Protocol | • MPE | Select the default decapsulation protocol that is mainly used to decapsulated the incoming "TS packets". |
| ISI Filtering | * | Enable ISI filtering. When this is not enabled no filtering is performed and the decapsulation cannot take place! |



5.5.2 Configure the BBF Decapsulator

5.5.2.1 Configure the Decapsulation ISIs

BBF Decapsulation ISIs 🔂 Add Decapsulation ISIs > Editing "Decapsulator1" Name Enable ISI Protocol Decapsulator 1 🗸 🗸 1 Default Name: Decapsulator1 1 Enable: 10 ISI: Default Protocol: * Update Cancel

| Parameter | Value | Description |
|-----------|---------------|---|
| Name | Decapsulator1 | This is the default name for the first decapsulator. |
| Enable | ~ | Enable the decapsulator. |
| ISI | 10 | Enter the ISI you want to decapsulate. This must correspond with the ISI value that has been configured on the Hub site. Refer to Configure a BBF Encapsulator (ISI). |
| Protocol | Default | Here you have the possibility to overrule the default protocol that has been selected under the general decapsulation settings. Refer to Enable Decapsulation and ISI Filtering. |



5.5.2.2 Configure the Channels

| 🚱 Ch | Channels | | | | | | | | | |
|-----------|----------|----------|-----------------|---------------------|-----------------|---|--------------------|------------------|---|---|
| 🖸 Ad | d | | | | | | | | | |
| | Name | Enable | Decapsulator | Label | Label Filter | | Channels > Editing | "Channel1" | | |
| XQ | Channel1 | ~ | Decapsulator1-1 | 00:00:00:00:00:00/0 | No label filter | | | | | ٦ |
| վո |) | | | | | | Name: | Channel 1 | | |
| \sim | | | | | | | Enable: | | | |
| | | | | | | | Decapsulator: | Decapsulator 1-1 | ~ | |
| | | | | | | 1 | Label: | 00:00:00:00:00/0 | | |
| | | | | | | | Label Filter: | No label filter | ~ | |
| | | | | | | | | | | |
| TS. | | | | | | | Update | Cancel | | |

» Click Add to add a Channel.

| Parameter | Value | Description |
|--------------|----------|--|
| Channels | | |
| Name | Channel1 | Indicate the channel that you want to decapsulate. |
| | | Verify the used channel name on the sending site. |
| Enable | ~ | Activate the decapsulation of the channel. |
| Demod ID | 1 | This is the default ID. |
| Label | | For more information on the use of the label and label filter please refer to the user manual. The user manual can be found on |
| Label filter | | CD-ROM that is delivered together with the device. |



5.5.3 Configure the TS Decapsulator

5.5.3.1 Configure the TS Decapsulation ISIs

| Add | | | Decapsulation | ISIs > Editing "new-entry-6374" |
|-------------------------|--------------|-----|--------------------------|---------------------------------|
| Attr <u>pere to add</u> | a new entry. | 151 | Name: Enable: ISI: | Decapsulator-TS-1 20 |

| Parameter | Value | Description |
|-----------|-------------------|---|
| Name | Decapsulator-TS-1 | Enter a logical name for the first TS decapsulator. |
| Enable | ~ | Enable the decapsulator. |
| ISI | 20 | Enter the ISI you want to decapsulate. This must correspond with the ISI value that has been configured on the Hub site. Refer to <u>Configure a TS Encapsulator (ISI) on page 57</u> |
| Demod ID | 1 | This corresponds with the demod ID of the demodulator of the MDM6000. |



5.5.3.2 Configure the PIDs Decapsulation

| 🕢 PI | Ds | | | | | | | |
|------|--------------------|----------|-----|-------------------|----------|----------------|----------------------|---|
| 🖸 Ad | d | | | | | | | |
| | Name | Enable | PID | ISI | Protocol | PIDs > Editing | "Decapsulator-PID-1" | |
| 20 | Decapsulator-PID-1 | ~ | 30 | Decapsulator-TS-1 | Default | | | |
| - (m |] | | | | | Name: | Decapsulator-PID-1 | |
| _ | | | | | | Enable: | | |
| | | | | | | PID: | 30 | |
| | | | | | | ISI: | Decapsulator-TS-1 | ~ |
| | | | | | | Protocol: | Default | ~ |
| | | | | | | Update | Cancel | |
| @ ch | annole | | | | | | | |

| Parameter | Value | Description |
|-----------|--------------------|--|
| Name | Decapsulator-PID-1 | Enter a logical name for the first PIDs decapsulator. |
| Enable | ~ | Enable the PID decapsulator. |
| PID | 30 | Enter the PID (Program Identifier) you want to decapsulate. This must correspond with the PID value that has been configured on the Hub site. |
| ISI | Decapsulator-TS-1 | Select one of the available ISI decapsulator names. The PID you want to filter out must exist on this decapsulator. |
| Protocol | Default | Here you have the possibility to overrule the default protocol that has been selected under the general decapsulation settings. Refer to <i>Enable Decapsulation and ISI Filtering. on page 60</i> |



5.5.3.3 Configure the Channels

| 0 | Channels | | | | | | |
|-------|--|----------------------|----------------------|-----------------|--------------------|--------------------|-----|
| 0 | Add | | | | | | |
| | Name E | Enable PID | La | bel | Label Filter | | |
| × | Channel-TS-1 | 🖌 🗸 Deca | psulator-PID-1 00 | :00:00:00:00:00 |) Use 6 bytes | | |
| (| | | | | Channels > Editing | "Channel-TS-1" | |
| | - | | | | Name: | Channel-TS-1 | |
| | | | | | Enable: | | |
| | | | | | PID: | Decapsulator-PID-1 | ~ |
| | | | | | Label: | 00:00:00:00:00 | |
| | | | | | Label Filter: | No label filter | × _ |
| BBF M | onitoring | | | | | | |
| | | ate BBE Input Counte | r Nr of Decapsulated | Bytes Nr of I | | | |
| ndex | BBF over IP Input Bit F | ate bor inpor counte | | | | | |
| index | BBF over IP Input Bit F 0.000000 Mbps | 0 packets | 0 bytes | 0 pack | Undate | Cancel | |

» Click Add to add a Channel.

| Parameter | Value | Description |
|--------------|--------------------|---|
| Channels | | |
| Name | Channel1-TS-1 | Indicate the channel that you want to decapsulate. |
| | | Verify the used channel name on the sending site. |
| Enable | ~ | Activate the decapsulation of the channel. |
| PID | Decapsulator-PID-1 | Select one of the available PID decapsulators. This to indicate to what decapsulator this channel must be linked. |
| Label | | For more information on the use of the label and label filter please refer to the user manual. The user manual |
| Label filter | | can be found on CD-ROM that is delivered together with the device. |



6 Finalize the Setup

To check if the setup is working properly, you can use the indicators at the bottom right of the GUI. All these indicators should be marked green:

| | | P. | De | tails | |
|----------|-------|-----|----|----------|------------|
| Ethernet | OData | Отх | On | ORX Lock | OCfg saved |

If some indicators are red or not lit, then check if all settings have been applied correctly.

If the 'Cfg saved' indicator is red, then the configuration has not been saved yet. To save the current configuration, do the following tasks:

- * Navigate to the Tasks Pane (GUI) to check the available configurations;
- * Click Device;
- * Click Configurations;
- * Click Save...

| Please give a name to the config to save. Note that choosing an existing configuration will overwrite it. | | | | |
|--|---|--|--|--|
| Backup_Configuration | ~ | | | |
| | | | | |
| | | | | |
| Save Config Ca | incel | | | |
| I | ne to the config to save. Note that choosing an exist I overwrite it. Backup_Configuration Save Config Ca | | | |

• * Enter a Name or select a configuration using the drop down list.

Saving the current configuration makes it the default configuration. This does not mean that it becomes the boot configuration.



By default, the selected configuration is overwritten upon saving. Enter a name to save the configuration under a new configuration file.



7 Appendix A - Classification Expressions

Filter all incoming packets based on expressions that match any field of an incoming packet

• * IP addresses, TOS byte, protocol, etc.

Expressions can be ANDed (&&), ORed (||), negated (!), brackets can be used to group different expressions.



In later releases a more extended syntax with IPV6/MPLS will become available.



| expression=expression and expression | expression=(expression) |
|--------------------------------------|---------------------------------|
| expression=expression && expression | expression=protocol |
| expression=expression or expression | expression=field value |
| expression=expression expression | expression=protocol field value |
| expression=not expression | expression=always |
| expression=!expression | expression=never |

| ETHERNET | ARP |
|---|---|
| ethernet dst ether <mac> ethernet src ether <mac> ethernet unicast ethernet unicast-this-host ethernet unicast-other-host ethernet multicast ethernet broadcast ethernet broadcast ethernet this-host ethernet protocol <ethertype> ethernet vlan/vlan2/vlan3 <tag> ethernet vlan-priority/vlan-priority2/vlan-priority3 <prio> ethernet vlan-type/vlan-type2/vlan-type3 <ethertype></ethertype></prio></tag></ethertype></mac></mac> | arp operation <operation> arp src ether <mac> arp dst ether <mac> arp dst ether <mac> arp src host <ip4address> arp src net <ip4address>-<ip4address> arp src net <ip4address> mask <ip4netmask> arp src net <ip4address>/<ip4bits> arp dst host <ip4address>-<ip4address> arp dst net <ip4address> mask <ip4netmask> arp dst net <ip4address> mask <ip4netmask> arp dst net <ip4address> mask <ip4netmask> arp dst net <ip4address>/<ip4bits></ip4bits></ip4address></ip4netmask></ip4address></ip4netmask></ip4address></ip4netmask></ip4address></ip4address></ip4address></ip4bits></ip4address></ip4netmask></ip4address></ip4address></ip4address></ip4address></mac></mac></mac></operation> |
| IPv4 ip4 tos <tos> ip4 dscp <dscp> ip4 protocol <protocol> ip4 src host <ip4address> ip4 src net <ip4address> mask <ip4netmask> ip4 src net <ip4address> mask <ip4netmask> ip4 src net <ip4address>/<ip4bits> ip4 dst host <ip4address> ip4 dst net <ip4address> mask <ip4netmask> ip4 dst net <ip4address> mask <ip4netmask> ip4 dst net <ip4address>/<ip4bits> ip4 multicast ip4 broadcast ip4 esp</ip4bits></ip4address></ip4bits></ip4address></ip4bits></ip4address></ip4bits></ip4address></ip4bits></ip4address></ip4bits></ip4address></ip4netmask></ip4address></ip4netmask></ip4address></ip4address></ip4bits></ip4address></ip4netmask></ip4address></ip4netmask></ip4address></ip4address></protocol></dscp></tos> | UDP udp src port <port> udp src port <port>-<port> udp dst port <port>- udp dst port <port>-<port> udp rtp-detection <rtpdetect> TCP tcp src port <port> tcp src port <port>-<port> tcp dst port <port>-<port></port></port></port></port></port></port></port></port></port></port></port></port></port></port></port></rtpdetect></port></port></port></port></port></port> |
| IGMP igmp type <igmptype> igmp host <ip4address> igmp net <ip4address>-<ip4address> igmp net <ip4address> mask <ip4netmask> igmp net <ip4address>/<ip4bits></ip4bits></ip4address></ip4netmask></ip4address></ip4address></ip4address></ip4address></igmptype> | |



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7.1 Example Expressions

| Rule | Expression to be used on the MDM6000 |
|---|--|
| A regular route towards network 192.168.2.0/24. | dst net 192.168.2.0/24 |
| All Ping messages | icmp type echo-request |
| All encrypted Ipsec packets towards 192.168.2.4 | (ip4 esp) and dst host 192.168.2.4 |
| All IPv4 multicast towards udp destination port 6001 | (ip4 multicast) and (udp dst port 6001) |
| Forward Ethernet frames based on vlan tags 300 and 301. | (ethernet vlan 300) and (ethernet vlan 301) |



When working in Layer 2 forwarding mode and using Layer 3 only classification rules (e.g. ip4 dst net 0.0.0.0/0), make sure that ARP packets can still cross the link by adding an appropriate classification rule for ARP as well. Alternatively a static configuration of ARP tables in the switches or routers can be defined.

If no valid ARP configuration is provided by the system, no IP packets will be forwarded by the routers.



8 Appendix B: Default Device Configuration

This device is preconfigured, reflecting the following setup:

| Forward Link | | Return Link | |
|--------------|------------------------------|-------------|------------------------------|
| • | Modulation Standard = DVB-S2 | • | Modulation Standard = DVB-S2 |
| • | Symbol Rate = 10Mbaud | • | Symbol Rate = 10Mbaud |
| • | Output Frequency = 2000MHz | • | Output Frequency = 2000MHz |
| ŀ | Output Level = -15dB | · | Output Level = -15dB |



From the overview menu it is possible to enable the different blocks (do this both for the HUB site and remote site).

- GSE Encapsulation Enable = On
- Modulator Transmit = On
- Demodulator Enable = On
- GSE Decapsulation = On

Correct cabling between two MDM6000 devices results in the following figure:



| Overview | Tree View | | | |
|----------|---|------|-----------------------------|-----------|
| | | | | |
| | Data Interfaces | | | |
| | Data Interface: 😡 Data1 (non redundant) | | | |
| | Active Interface: Data1 | | | |
| | | | | |
| | | | | |
| Data1 | BBF over IP In | | | |
| | Enable: ØOff | | | |
| Data2 | Total BBF Inputrate: 0.000000 Mbps | | | |
| | Total BBF Forwarded Frames: 0 frames | | Modulator | L-BAND Tx |
| | Total BBF Dropped Frames: 0 frames | | Mode: OVB-S2 | |
| | | | Transmit: Off On | |
| Data1 | GSE Encapsulation | | Transmit State: On | IF To |
| | Enable: 😥 On | | Output Level: 15.0 dBm | |
| | Forwarded Bit Rate: 10.008952 Mbps | | Symbol Pate: 10 000000 Mbau | Z |
| Data2 | Forwarded Bytes: 614690898 bytes | | Symbol Rate. 10.000000 Mbau | u |
| Dataz | Propoed Bytes: 22670741044 bytes | | | |
| | Dropped Packets: 14974106 packets | | | |
| | | | | |
| | | | | |
| | CSE Decapsulation | | | |
| Data1 | | | | |
| | Enable: W On Output Bit Pate: 10.004760 Mbps | | | |
| | Output Bytes: 65692032 bytes | Dem | odulator 1 | L-BANDRxA |
| Data2 | Output Packets: 43799 packets | | | < |
| • | Dropped Bytes: 0 bytes | Enab | | |
| | Dropped Packets: 0 packets | Sym | bol Rate: 10.000000 Mbaud | |
| | | Roll | Off: 🚱 20% | TERM |
| Data1 | BBF over IP Out | Inpu | t Selection: 🔒 L-BAND Rx A | |
| | Enable: ØOff | EsNo | : 36.50 dB | |
| Data2 | Output BBF Bit Rate: 0.000000 Mbps | | | |
| | BBF Out Count: 0 frames | | | |



9 Appendix C: Setup Templates

Layer 3 Forwarding Mode



Layer 2 Forwarding Mode





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10 Appendix D - Acronyms

| Acronym | Definition | | |
|---------|---|--|--|
| ACM | Adaptive Coding Modulation | | |
| APSK | Amplitude and Phase Shift Keying | | |
| B2B | Business-to-Business | | |
| B2C | Business-to-Customer | | |
| BUC | Block Up Converter | | |
| CD-ROM | Compact Disc Read Only Memory (in computer systems) | | |
| CIR | Committed Information Rate | | |
| CLI | Command Line Interface | | |
| DC | Direct Current | | |
| DVB-S2 | Digital Video Broadcasting-Second Generation | | |
| Es/N0 | Energy per Symbol to Noise density | | |
| S2 Ext | Extensions | | |
| FIFO | First in First Out | | |
| GSE | Generic Stream Encapsulation | | |
| GUI | Graphical User Interface | | |
| ICMP | Internet Control Message Protocol | | |
| ID | Identifier | | |
| IF | Intermediate Frequency | | |
| IGMP | Internet Group Management Protocol | | |
| IP | Internet Protocol | | |
| ISI | Input Stream Identifier | | |
| ISP | Internet Service Provider | | |
| L3 | Layer 3 | | |
| LNB | Low Noise Block Converter | | |



| MGMT | Management |
|------|-------------------------------|
| PC | Personal Computer |
| PIR | Peak Information Rate |
| QPSK | Quadrature Phase Shift Keying |
| RF | Radio Frequency |
| RX | Receive |
| ТХ | Transmit |



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