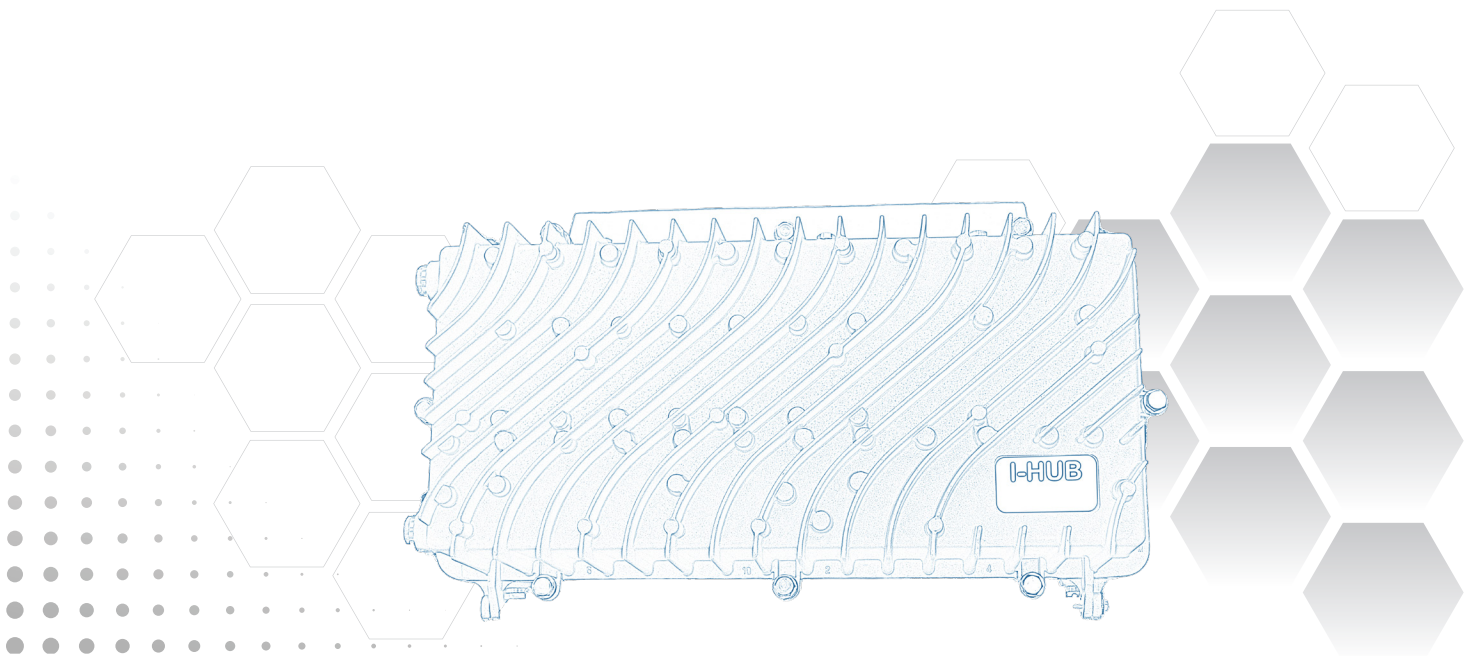




I-HUB

I-HUB Chassis

Operation Manual



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SCOPE

1. Scope

This document describes the user interfaces for I-HUB family chassis. The user interfaces include front panel LED, button operations, LCD display, Craft Line Interfaces and monitoring through SNMP.

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LED DISPLAY

2. LED Display

The I-HUB LED display is module dependent; there is one LED on controller module and various numbers of LED on each module. Upon powering up, all modules perform a brief LED test that cycle through all possible color changes of LEDs.

2.1 LED Color Codes

There are 4 possible state represented by each LEDs. They are observed during the following conditions.

Off: Indicates the monitored function is unavailable or disabled. This is also observed temporarily during power on LED test.

Green: Indicates the monitored signal is healthy. This is also temporarily observed during power on LED test.

Amber: Indicates the monitored signal is in minor alarm condition. This is also temporarily observed during power on LED test.

Red: Indicates the monitored function is in major alarm condition. This is also temporarily observed during power on LED test.

High High	Red
High Low	Amber
Nominal	Green
Low High	Amber
Low Low	Red

Figure 1: Generic Alarm & LED Color

The Figure 1 shows a typical analog signal alarm color band. The major alarms in red zones include major-high-high which is declared when signal level rises above the factory high-high threshold and major-low-low which is declared when signal level falls below the factory low-low threshold. The minor alarms in amber zones include minor-high which is declared when signal level rises above the factory high threshold and minor-low which is declared when signal level falls below the factory low threshold.

In the case of non-analog alarms, the LED color turns Amber when alarm condition reaches minor and turns Red when alarm condition reaches major.

2.2 Controller

The I-HUB controller module detects the alarms and reflects them on the front panel LEDs based on the following schema.

LED Location	Trigger Events
Top	Module temperature Power supply SFP (optional)

The SPF alarm is only valid when the remote management goes through Proxy agent (e.g. the remote management channel is bi-directional). Example #1: The module temperature is normal. The top LED associated with the module shall be observed as “green”.

2.3 Plug-in LED Definitions

2.3.1 EDFA & AGC-EDFA

The EDFA and AGC-EDFA detect the alarms and reflects them on the front panel LEDs based on the following schema.

LED Location	Trigger Events
Top	Optical input power Module temperature
Bottom	Optical output power (EDFA) Gain status (AGC-EDFA)

Example #1: The module temperature is normal and optical input power is major-low-low (for example: optical input power cable is removed). The top LED associated with the module shall be observed as “red” to reflect the major alarm condition.

2.3.2 Opto-Stacker

The Opto-stacker detects the alarms and reflects them on the front panel LED based on the following schema.

Table 1 LED definition for hardware revision 1

LED Location	Trigger Events
Status	Module temperature Optical output power All optical input powers All synthesizer locks

Example #1: The module temperature, all synthesizer locks and optical output power are normal, but one of the optical input power level is too low and triggers the major-low-low alarm (for example: one of the optical input power cable is removed). The top LED associated with the module shall be observed as “red”.

Table 2 LED definition for hardware revision 2 and later

LED Location	Trigger Events
Status	Module temperature Optical output power
1	Optical input power 1
2	Optical input power 2
3	Optical input power 3
4	Optical input power 4

Example #1: The optical input power level 1 is too low and triggers the major-low-low alarm (for example: the optical input power cable is removed). The #1 shall be observed as “red”.

2.3.3 Optical Switch

The Optical Switch detects the alarms and reflects them on the front panel LEDs based on the following schema.

LED Location	Trigger Events
STAT	Module temperature Switch alarm
PRI	Primary optical input power Primary optical input power below threshold
SEC	Secondary optical input power Secondary optical input power below threshold

Auto	Auto switch
PRI	Manual primary switch
SEC	Manual secondary switch

Front panel toggle switch: There is a tri-position toggle switch on the front panel.

Left: Manually force the switch to primary optical input.

Right: Manually force the switch to secondary optical input.

Middle: Auto switch to primary or secondary based on threshold detection and switching criteria.

Example #1: The front panel toggle switch is in the middle position; primary optical input signal is below the set threshold while secondary optical input is healthy. The user shall observe the red on PRI LED, green on Auto LED, and yellow on STAT LED.

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DISPLAY MODULE

3. Display Module

An optional Display Module allows the operator to monitor and control the chassis locally through a special DB15 cable (referred as “Display Module” in this manual). All readable and writable attributes can be monitored and changeable locally via Display Module. When the Display Module is detected, I-HUB Controller disables all remote supervisory communication. The remote supervisory communication includes monitoring of Status and Alarm attributes.

The Display Module consists of a LCD display and 5 push buttons, their operation are detailed in this chapter.

3.1 Connecting the Display Module

Connect the Display Cable to the female DB15 connector on the face of I-HUB Controller and to the female DB15 connector on the Display Module as shown in Figure 2 and Figure 3. The I-HUB Controller performs a quick reboot when the Display Module is connected to the I-HUB Controller. There is no impact on the analog signals during this reboot. Operator shall observe the I-HUB chassis greeting message when the reboot completes.

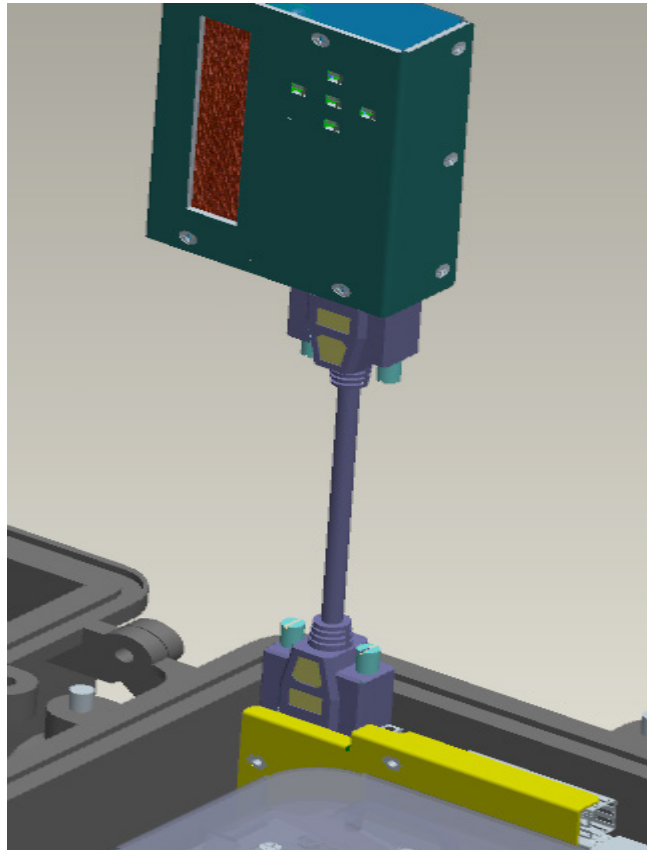


Figure 2: I-HUB Controller, Display Module & Display Cable Connection

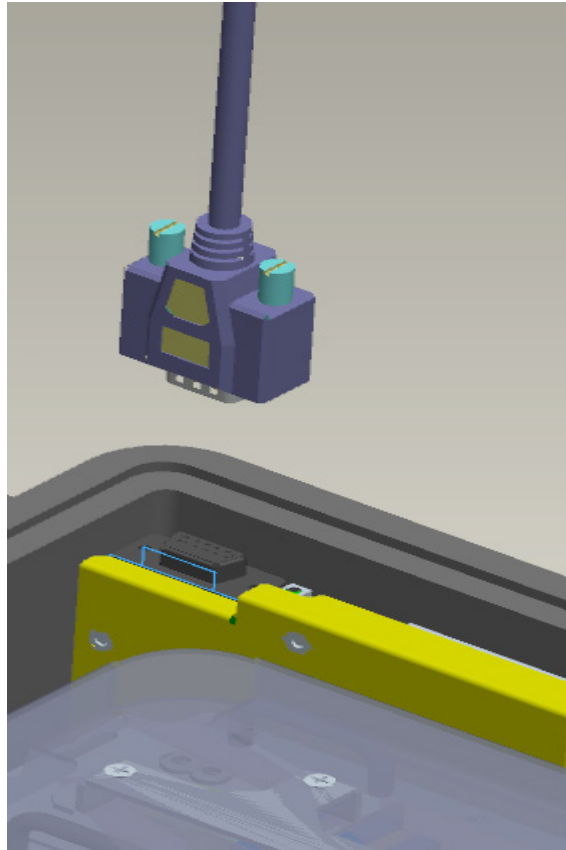
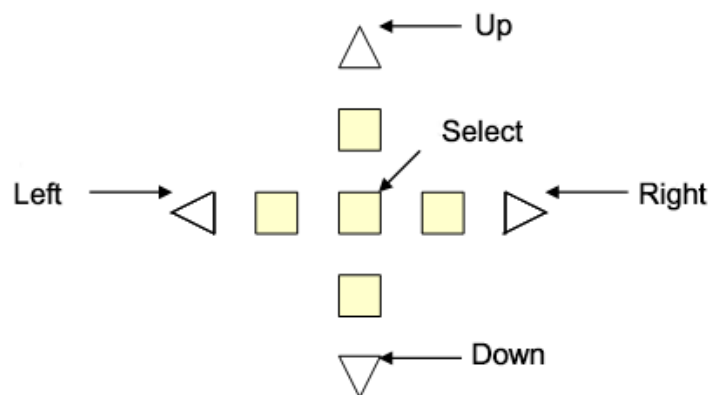


Figure 3: Female Connector on I-HUB Controller & Display Cable

3.2 Pushbutton Operations

There are five pushbuttons located on the Display Module. They are designated as “Up” with an upper arrow indicator, “Right” with a right arrow indicator, “Left” with a left arrow indicator, “Down” with a down arrow indicator and “Select” as the center button.



3.2.1 Philosophy of Button Operations

The button operations are similar to those of other systems designed and manufactured by ATX Networks.

3.2.2 Individual Button Operations

Up: The cursor moves up one line

Down: The cursor moves down one line

Right: Cycle through the available options for the line where cursor is located.

If the menu is for read-only attribute, the display shows the next available interface.

Example #1:

If the current display is “#1 Optical Power”, the “#2 Optical Power” shall be displayed after “Right” button is pressed.

Example #2:

If the menu is for the quantitative write attributes, the “Right” button increases the value.

In the “Gain Setting Menu”, the cursor displays Gain (steps): 1, the Gain (steps): 2 shall be displayed after the “Right” button is pressed once.

Left: Cycle through the available options for the line where cursor is located.

If the menu is for read-only attribute, the display shows the next available interface.

Example #1: If the current display is “#2 Optical Power”, the “#1 Optical Power” shall be displayed after “Left” button is pressed.

Example #2:

If the menu is for the quantitative write attributes, the left button decreases the value.

In the “Gain Setting Menu”, the cursor displays Gain (steps): 3, the Gain (steps): 2 shall be displayed after “Left” button is pressed.

Select: There are multiple meanings to the select button.

- Select to execute the action where the cursor is located

Example #1:

If the cursor is located at the “Prev menu” line, the display shall change to the NEXT higher menu after the “Select” button is pressed once.

- Select to commit the option

Example #1:

In the “Gain Setting Menu”, if the cursor is located on the “Sel Ch: 1” line, the channel #1 shall be used for gain adjustment after “Select” button is pressed.



NOTE: Only after pressing the Select button, the gain settings option is operated on the selected channel.

- Select to commit the setting to NVRAM

Example #1:

In the “Gain Setting Menu”, if cursor is on “Save: No (17)”, user must toggle the right or left button to change the option to “Yes”. Then press “Select” to commit the value, 17, in the bracket into the NVRAM.



NOTE: Only if the value is committed into NVRAM, the chassis will use the selected gain level next time the chassis recovers from power cycle.

3.2.3 Combination Button Operations

The combination button operations are unique to I-HUB chassis. Each combination operation is defined strictly for their specific usage as the following definition.

Up+Down: When pressing and holding the Up+Down button simultaneously when traversing the local slot menu, the front panel displays current local slot number. The LCD display will restore back to the previous display once the buttons are released.

Example #1:

User is within the “Status Menu” of slot #1. By pressing and holding the Up and Down buttons, the front panel displays the current slot as 1. The “Status Menu” returns after releasing the Up + Down button combination.

3.3 LCD Display

3.3.1 Menu Tree Structure

The I-HUB chassis LCD menu is structured into bi-level trees. The top level is system related information and the second level is plug-in related information. The top level contains the menu for second level, but each has its own menu structure.

Level 1	Level 2	Level 3
Greeting	Slot	
	Chassis	Temperature
		Model
		Hardware Version
		Software Version
		Serial Number
		Prev Menu
	Status	Hub ID
		Proxy Comm(Way)
		Prev Menu
	Alarm	Power Supply
		Module Temp
		SFP
		Prev Menu
Prev Menu		

Table 3: I-HUB Display Module System Menu Overview

3.3.2 System Menu Trees

I-HUB chassis displays the greeting message upon chassis power up.

Greeting:



InnoTrans Communications
IHUB

Press “Select” button to go into the system menus. The entries in system menus are described as follows:

Slot:

This displays the detected plug-in module’s type, or “Empty” if none is detected. Press “Right” or “Left” button to cycle through available slots. The displayed slot number corresponds to the silkscreen of backplane. Press “Select” to access the module menu or show the slot communication status. If the communication with slot establishes successfully, the display will go into the plug-in module’s menu.

Conventionally the display shows the identical card type for multi-slot modules, but users can only access the module’s display menu via the lowest occupied slot. For example, a dual width module is detected in slot 1, both slot 1 and 2 show occupied by this module, but user can only access the module menu through slot 1.

Slot Status:

Module Greeting: Communication is established with plug-in.

Empty: No module is detected in the slot.

Failed to Switch: Cannot establish communication with module. The module is unknown to controller.

Multi-slot unit; Display avail on slot #: This is the virtual slot on a multiple slot unit. User can access the module's display menu via the lowest slot of the multi slot unit. The slot # is shown.

Chassis:

Displays all system related information.

Temp(C): Displays the module's temperature reading in Centigrade.

Model: Displays the chassis' model name.

HW Ver: Displays the hardware version information of TranScend chassis.

SW Ver: Displays the software version information of TranScend chassis.

Ser #: Displays the serial number of TranScend chassis.

Status:

Display all system related status.

HUB ID: Displays the HUB identification. This HUB ID is determined via the front number 4-position dial. The dial position and HUB ID relationship is shown in the following table.

Dial Configuration	HUB ID Readout	Comments
0	1	1-Way Proxy Communication: Required. 2-way Proxy Communication: Required.
1	2	1-Way Proxy Communication: Must not be set. 2-way Proxy Communication: Set for the I-HUB in the second position of daisy chain topology.
2	3	1-Way Proxy Communication: Must not be set. 2-way Proxy Communication: Set for the I-HUB in the third position of daisy chain topology.
3	4	1-Way Proxy Communication: Must not be set. 2-way Proxy Communication: Set for the I-HUB in the last position of daisy chain topology.

Table 4: I-HUB ID Dial Configuration

Proxy Comm(Way): Displays the communication protocol to the remote Proxy agent. 1 is 1-way communication, 2 is 2-way communication.



NOTE: The communication protocol is determined during Controller's reboot. User can plug or remove the SFP anytime, but the change is only applied during the next reboot.

Alarm: Display all system related alarm status.

Pwr Sply: Displays the health of chassis power supplies.

Module Temp: Displays the health of the chassis temperature.

SFP: Displays the health of SFP. This alarm is only available if communication to Proxy is 2-way.

Prev Menu: Press "Select" will bring the Greeting Message screen back.



NOTE: "Prev Menu" exists in all menu trees as the last option. Place the cursor on this line and press the "Select" button will go back to the previous menu.

3.3.2.1 SFP Operation

There are two SFP slots available on the I-HUB Controller, the top SFP is for upstream remote monitoring purpose and the bottom one is for daisy chaining downstream I-HUBs.

The communication to Proxy is determined upon the detection of upstream remote monitoring SFP's presence. The 2-way communication protocol is enabled when the upstream remote monitoring SFP is present; while the 1-way communication protocol is engaged if not. The communication protocol is only determined during Controller's reboot. The change shall only take effect after the Controller's next reboot. User can read the current communication protocol via I-HUB's Status menu.

3.3.3 Plug-in Menu Tree

The plug-in menu display is driven by the module's card type. Each model provides its own display structure. In any sub menu, press "Select" on the **Prev Menu** line to return to the previous menu one level up.

3.3.3.1 AGC-EDFA

Level 1	Level 2	Level 3	Level 4
Greeting	Status	OPT In (dBm)	
		OPT Out (dBm)	
		Gain (dB)	
		Prev Menu	
	Alarm	OP In Pwr	
		OP Out Pwr	
		Module Temperature	
		Prev Menu	
	Chassis	Temperature(C)	
		Model	
		Hardware Version	
		Software Version	
		Serial Number	
	Prev Menu		
	Prev Menu		

Table 5: I-HUB AGC EDFA Front Panel Display Menu Overview

Greeting:

Greeting Message



InnoTrans Communications
AGC-EDFA

Press "Select" button to go into the plug-in menu.

Prev Menu:

Press "Select" will bring back to the System menu.

The entries in plug-in menu are described as follows:

Status Menu:

OPT In (dBm): Displays the reading of optical input power in dBm.

OPT Out (dBm): Displays the reading of optical output power in dBm.

Gain (dB): Displays the gain of optical output in respect to input power in dB.

Alarm Menu:

OP In Pwr: Displays the alarm status of the optical input power.

OP Out Pwr: Displays the alarm status of the optical output power.

Module Temp: Displays the alarm status of module temperature.

Chassis Menu:

Temp(C): Displays the module's temperature reading in Centigrade.

Model: Displays the model name of plug-in module.

HW Ver: Displays the hardware version information of plug-in module.

SW Ver: Displays the software version information of plug-in module.

Ser #: Displays the serial number of plug-in module.

Prev Menu:

Press "Select" will bring the plug-in's greeting message screen back.

3.3.3.2 EDFA

Level 1	Level 2	Level 3	Level 4	
Greeting	Status	OPT In (dBm)		
		OPT Out (dBm)		
		Prev Menu		
	Alarm	OP In Pwr		
		OP Out Pwr		
		Module Temperature		
		Prev Menu		
	Chassis	Temperature(C)		
		Model		
		Hardware Version		
		Software Version		
		Serial Number		
	Prev Menu			
	Prev Menu			

Table 6: I-HUB EDFA Front Panel Display Menu Overview

Greeting:**Greeting Message**

InnoTrans Communications
EDFA

Press “Select” button to go into the plug-in menu.

Prev Menu:

Press “Select” will bring back to the System menu.

The entries in plug-in menu are described as follows:

Status Menu:

OPT In (dBm): Displays the reading of optical input power in dBm.

OPT Out (dBm): Displays the reading of optical output power in dBm.

Alarm Menu:

OP In Pwr: Displays the alarm status of the optical input power.

OP Out Pwr: Displays the alarm status of the optical output power.

Module Temp: Displays the alarm status of module temperature.

Chassis Menu:

Temp(C): Displays the module’s temperature reading in Centigrade.

Model: Displays the model name of plug-in module.

HW Ver: Displays the hardware version information of plug-in module.

SW Ver: Displays the software version information of plug-in module.

Ser #: Displays the serial number of plug-in module.

Prev Menu:

Press “Select” will bring the plug-in’s greeting message screen back.

3.3.3.3 Opto-Stacker

Level 1	Level 2	Level 3	Level 4	
Greeting	Setup	Sel Chnl		
		Mode Setting Menu	Mode	
			Save	
			Prev Menu	
		Attn Setting Menu	RF (dB)	
			Attn (dB)	
			Save	
			Prev Menu	
			Prev Menu	
		Alarm	OptPower	
	Syn Lock			
	Laser Temp			
	OPT Out Pwr			
	Module Temperature			
	Prev Menu			
	Status	OptPwr(dBm)		
		Attn (dB)		
		Laser Temp (C)		
		OPT Out (dBm)		
		Gain Resv (dB)		
		Mode		
		Prev Menu		
	Chassis	Temperature(C)		
Model				
Hardware Version				
Software Version				
Serial Number				
Prev Menu				
	Prev Menu			
Prev Menu				

Table 7: I-HUB Opto-Stacker Front Panel Display Menu Overview

Greeting:**Greeting Message**


InnoTrans Communications
Opto Stacker

Press “Select” button to go into the plug-in menu.

Prev Menu:

Press “Select” will bring back to the System menu.

The entries in plug-in menu are described as follows:

Setup Menu:

Sel Ch: Press “Select” to select the channel / interface for adjustment. Press “Right” or “Left” button to cycle through available channels.

Mode Setting Menu:

Mode: Press “Right” or “Left” button to toggle among available mode selections. Press “Select” to select the displayed mode.

Save: Press “Right” or “Left” button to toggle between “Yes” or “No”. Press “Select” to commit the value in bracket into NVRAM if “Yes” is selected. The value in bracket reflects the current NVRAM storage reading. If user presses “Select” when display is “No”, no NVRAM change takes place.

Attn Setting Menu:

RF (dB): Displays the RF reading of composite input to laser in dB.

Attn (dB): Press “Select” to set the attenuation level. Press “Right” to increase or “Left” button to decrease the attenuation level.



NOTE: After the attenuation level adjustment, user must press “Select” to commit the attenuation level in order for the plug-in to operate at such level and for NVRAM storage. Fail to do so, the attenuation might revert back to previous level.

Save: Press “Right” or “Left” button to select between “Yes” or “No”. Press “Select” to commit the value in bracket into NVRAM if “Yes” is selected. The value in bracket reflects the current NVRAM storage reading. If user presses “Select” when display is “No”, no NVRAM change takes place.

Status Menu:

OptPwr (dBm): Displays the optical receiver power reading in dBm.

Attn (dB): Displays the attenuation reading in dB.

Gain Resv (dB): Displays the gain reserve reading of laser driver in dB.

Laser Temp(C): Displays the laser temperature reading in Centigrade.

OPT Out (dBm): Displays the optical output power reading in dBm.

Mode: Displays the current gain mode, AGC or MGC.

Alarm Menu:

OptPower: Displays the alarm status of optical input power.

Syn Lock: Displays the alarm state of synthesizer lock status.

Press “Right” or “Left” button to cycle through available channels.

Laser Temp: Displays the alarm status of laser temperature.

OPT Out Pwr: Displays the alarm status of optical output power.

Module Temp: Displays the alarm status of module temperature.

Chassis Menu:

Temp(C): Displays the module's temperature reading in Centigrade.

Model: Displays the model name of plug-in module.

HW Ver: Displays the hardware version information of plug-in module.

SW Ver: Displays the software version information of plug-in module.

Ser #: Displays the serial number of plug-in module.

Prev Menu:

Press "Select" will bring the plug-in's greeting message screen back.

3.3.3.4 Optical Switch

Level 1	Level 2	Level 3
Greeting	Status Menu	OPin Pwr(dBm)
		Threshold(dBm)
		Switch
		Mode
		Prev Menu
	Alarm Menu	OPin Pwr
		Module Temperature
		Switch
		Prev Menu
	Chassis Menu	Temperature(C)
		Model
		Hardware Version
		Software Version
		Serial Number
	Prev Menu	Prev Menu
Prev Menu		

Table 8: TranScend Optical Switch Front Panel Display Menu Overview

Greeting:

Greeting Message



InnoTrans Communications
Optical Switch

Press "Select" button to go into the plug-in menu.

Prev Menu:

Press "Select" will bring back to the System menu.

The entries in plug-in menu are described as follows:

Status Menu:

OPin Pwr (dBm): Displays the optical input power reading in dBm. Press “Right” or “Left” button to cycle through available channels.



NOTE: *The primary input is marked as #1 and secondary is #2.*

Threshold (dBm): Displays the switching threshold settings. It reads the user settable front panel’s turn dial setting.

Switch: Displays the optical switch position, “Primary”, “Secondary” or “Faulty”.

Mode: Displays the user settable switch control mode. It reads the user settable front panel’s turn dial setting, “Primary”, “Secondary”, “Auto” or “Faulty”.

Alarm Menu:

OPin Pwr: Displays the alarm state of optical input power.

Press “Right” or “Left” button to cycle through available channels.

Module Temp: Displays the alarm status of module temperature.

Switch: Displays the alarm status of optical switch. The alarm is raised when optical switch is in faulty state or switch position on secondary input.

Chassis Menu:

Temp(C): Displays the module’s temperature reading in Centigrade.

Model: Displays the model name of plug-in module.

HW Ver: Displays the hardware version information of plug-in module.

SW Ver: Displays the software version information of plug-in module.

Ser #: Displays the serial number of plug-in module.

Prev Menu:

Press “Select” will bring the plug-in’s greeting message screen back.

3.3.3.4.1 Optical Switch Switching Criteria

The switching decision is based on the front panel tri-position toggle switch. User can enforce manual switching by engaging the toggle switch to either “PRI” and “SEC” position.

Toggle switch on “PRI” position

The optical switch shall stay on primary input regardless of the health of primary and secondary signals. The PRI green LED shall light.

Toggle switch on “SEC” position

The optical switch shall stay on secondary input regardless of the health of primary and secondary signals. The “SEC” green LED shall light.

Toggle switch on “Auto” position

The optical switch shall monitor the health of primary and secondary signals for switching decision. The “AUTO” green LED shall light. The user shall expect the switch position based on the following description.

Forward Switch - Switch from primary to secondary

When the primary optical power drops below the user defined threshold and the secondary optical power is above the user defined threshold, the optical switch position moves over to the secondary optical power immediately.

Recovery Switch - Recover from secondary to primary

When the primary optical power is above the user defined threshold for at least one second, the optical switch recovers back to primary position.

Switch alarm

Normal – Green: when the optical switch is on primary

Minor – Yellow: when the optical switch is on secondary

Major – Red: when the switch is faulty or when the Forward Switch failed due the unhealthy secondary input.

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CRAFT LINE INTERFACE (CLI)

4. Craft Line Interface (CLI)

4.1 Command Structure

Upon power up, the CLI attaches to the front panel DB9 console port by default. The following is a sample greeting screen:

```
*****
InnoTrans Craft Line Interface
*****
Transcend [slot-1] >
```

The slot number in square bracket indicates the plug-in that CLI is currently in communication with. The above example selects the slot number 1.

The I-HUB user interface adopts the same design philosophy as the one of TranScend. Similar to the LCD menu, the I-HUB chassis Craft Line Interface (CLI) is structured into bi-level trees. The top level is system related information and the second level is plug-in related information. The top level contains the commands for second level, but each has its own command structure.

The I-HUB CLI and SNMP attributes are constructed dynamically upon detection of I-HUB agent. Prior to the presence of the I-HUB agent, user cannot retrieve I-HUB related information. To access the I-HUB menu, user must first traverse down to the slot with I-HUB agent capability. Following is an example of accessing an I-HUB module menu.

In this example, a DeStacker-Proxy agent is detected on slot 2.

```
Transcend[slot-1] >slot
Slot 1 - Empty
Slot 2 - DeStacker-Proxy
Slot 3 - Empty
Slot 4 - Empty
```

To access the I-HUB menu, user first needs to traverse down to the proxy agent capable slot.

```
Transcend[slot-1] >slot 2
Slot 2 (DeStacker-Proxy) selected
Transcend[slot-2] >
```

The I-Hub system menu items appear as part of the slot 2 Help, in the section named “Addon Commands”. These commands only would appear if user activates the associated proxy agent capable slot.

```
Transcend[slot-2] >help
Following commands are supported.
System Commands:
help      uptime      info      logout     status

alarm     DownloadStatus  slot      ModuleSupport
SwVer     HwVer         ModelName  SerialNum  Network
```

```

Download      Reboot      Date      Hostname      Community
TrapAddr     sysContact  sysLocation  PowerAlarm   FanAlarm

```

Module Commands:

```

ModuleTemp      ModuleTempAlarm  OpticalPowerDbm  GainReserve   Attenuation
OpticalPowerAlarm  LockAlarm

```

Addon Commands:

```

Help  slot      iHub      exit      ModuleSupport  info
status      alarm

```

Through the I-HUB commands, the I-HUB #2 is shown under this slot.



NOTE: The I-HUB # shown here may not be identical to the I-HUB ID which is set via the dial of I-HUB Controller. In the case of 1-way communication protocol, this I-HUB # follows the TranScend slot number. In the case of 2-way communication protocol, this I-HUB # follows the dial I-HUB Controller.

```

Transcend[slot-2] >ihub
Hub 2 - iHUB
Transcend[slot-2] >ihub 2
iHubs 2 (iHUB) selected
Transcend[slot-2] >[ihub-2 slot-1] >

```

Similar to the TranScend system menu, “slot” command displays the detected cards in the I-HUB #2.

```

Transcend[slot-2] >[ihub-2 slot-1] >slot
Slot 1 - OptoStacker
Slot 2 - OptoStacker
Slot 3 - Empty
Slot 4 - Empty
Slot 5 - Empty
Slot 6 - Empty
Slot 7 - Empty
Slot 8 - OptoStacker
Slot 9 - OptoStacker
Slot 10 - Empty

```

By selecting the slot, the I-HUB module menu becomes accessible. In this example, the OptoStacker is detected in I-HUB #2 slot #1, the OptoStacker menu items are accessible to users under “ihub-2 slot-1”.

```

Transcend[slot-2] >[ihub-2 slot-1] >help

```

System Commands:

```

help      slot      iHub      exit      ModuleSupport
info      status    alarm
SwVer     HwVer     ModelName  SerialNum  Network

```

```

Download      Reboot      Date      Hostname      Community
TrapAddr     sysContact  sysLocation  ModuleTemp    ModuleTempAlarm
SfpAlarm     PowerAlarm

```

Module Commands:

```

ModuleTemp    LaserTemp    OPoutPower    OpticalPowerDbm  GainReserve
Mode          LaserTempAlarm  OpticalPowerAlarm  OPoutPowerAlarm  ModuleTempAlarm

```

To traverse back up to TranScend menu, type “exit” in any I-HUB slot menu.

```

Transcend[slot-2] >[ihub-2 slot-1] >exit
Transcend[slot-2] >

```

4.1.1 System Commands

The commands in this section are system related.

Help: Displays all available commands or help on individual command.

Example #1: Displays all available commands.

```

Transcend [slot-1] >help
System Commands:
help      slot      iHub      exit      ModuleSupport
info      status    alarm
SwVer     HwVer     ModelName  SerialNum  Network

Download  Reboot    Date      Hostname    Community
TrapAddr  sysContact  sysLocation  ModuleTemp  ModuleTempAlarm
SfpAlarm  PowerAlarm

```

Example #2: Display individual help description.

```

Transcend [slot-1] >help network
Network:
Set/Get network configuration.
Syntax: Network <ip netmask gateway >
No argument: Display network configuration.
With all 3 arguments: Configure network.

```

info: Displays the system and selected plug-in factory information.

Example #1: The first part is System factory information and followed by the factory information of I-HUB #2 plug-in in slot 1.

```

Transcend[slot-2] >[ihub-2 slot-1] >info
iHub 2
SwVer:
  1.2
HwVer:
  3

```

```

ModelName:
  IHUB-CTRL
SerialNum:
  01420070901234

```

iHub 2 Slot 1 (OptoStacker)

```

SwVer:
  1.8
HwVer:
  1
ModelName:
  IHUB-OSTCKR
SerialNum:
  01420070901234

```

iHub: Display the selected I-HUB or list of all available I-Hubs in this slot.

```

Transcend[slot-2] >ihub
Hub 2 - iHUB

```

status: Displays the status on the system and selected plug-in.

Example #1: In this example, it displays the status of the I-HUB #2 and selected plug-in, OptoStacker.

```

Transcend[slot-2] >[ihub-2 slot-1] >status
iHub 2
ModuleTemp (deg C):
  +26.1

iHub 2 Slot 1 (OptoStacker)
ModuleTemp (deg C):
  +35.7
LaserTemp (deg. C):
  +25.0
OPoutPower (dBm):
  +20.2
OpticalPowerDbm (dBm):
  [1] -55.4 [2] -55.6 [3] -55.5 [4] -55.6
GainReserve (dB):
  +19.7
Mode:
  [1] MGC [2] MGC [3] MGC [4] MGC

```

alarm: Displays the alarm status on the system and selected plug-in.

Example #1: In this example, displays the alarms of the selected I-HUB #2slot 1 plug-in, OptoStacker.

```

Transcend[slot-2] >[ihub-2 slot-1] >alarm
iHub 2

```

```

ModuleTempAlarm:
  Normal
SfpAlarm:
  NA
PowerAlarm:
  Major

```

```

iHub 2 Slot 1 (OptoStacker)
LaserTempAlarm:
  Normal
OpticalPowerAlarm:
  [1] MajorLoLo [2] MajorLoLo [3] MajorLoLo [4] MajorLoLo
OPoutPowerAlarm:
  Normal
ModuleTempAlarm:
  Normal

```

exit: Traverses back to TranScend menu.

slot: Displays the detected plug-in in each slot.

Example #1: This example shows that the chassis contains an High Sensitivity Quad Return Receiver in slot 1 and slot 2, 3 and 4 are empty.

```

TranScend[slot-1] >slot
Slot 1 - HS-QRRX
Slot 2 - Empty
Slot 3 - Empty
Slot 4 - Empty

```

ModuleSupport: Displays the list of supported modules. *User shall use this command to determine the compatibility of the chassis and plug in modules. A microprocessor with older version of software may require a software upgrade to support the newer plug in module for remote monitoring and snmp support.*

Example #1: This example shows the list of supported module.

```

TranScend[slot-2] >[ihub-2 slot-1] >ModuleSupport
EDFA
AGC-EDFA
Optical-Switch
OptoStacker
iHUB

```

ModelName: Displays the model name information of the system.

SerialNum: Displays the model name information of the system.

Network: Displays or set the chassis network configuration.

Example #1: In this example, the system contains the configuration with an IP address: 192.168.1.202, network address mask: 255.255.255.0 and gateways address: 192.168.1.1.

```

TranScend [slot-1] >network

```

```
IpAddr: 192.168.1.202   Mask: 255.255.255.0   Gateway: 192.168.1.1
BdCast: 192.168.1.255   Mac: 00:50:c2:88:10:02
```

Example #2: In this example, the system is configured with an IP address: 192.168.1.202, network address mask: 255.255.255.0 and gateways address: 192.168.1.1. And the system indicates the command execution as “Successful”. Only these network parameters are settable by user.

```
Transcend [slot-1] >network 192.168.1.202 255.255.255.0 192.168.1.1
Successful
```

Download: Initiate a remote system software upgrade.

Example #1: In this example, the user “inno” with password “inno” initiated the download request. The download file name is “vmlinux-initrd.img” which is hosted under /tftpboot on the download server at 192.168.1.137. Note: the ftp server must be set up prior to a successful download. There is no response returned for this command. To see the download status, user shall use “downloadstatus” command instead.

```
Transcend [slot-1] >download inno inno 192.168.1.137 /tftpboot/vmlinux-initrd.img
```

Reboot: Displays the current reboot state or initiates a system reboot.

Example #1: This example demonstrates a system reboot. The reboot process may a few minutes to complete.

```
Transcend [slot-1] >reboot now
```

Date: Displays the current system time.



NOTE: *TransCend chassis is configured to factory time prior to shipment. It does not make local time adjustment (e.g. daylight saving time) automatically.*

Hostname: Displays or configure the system hostname.

Example #1: In this example, user requested to configure the hostname “InnoTrans”. And the system indicates the command execution as “Successful”.

```
Transcend[slot-1] >hostname InnoTrans
Successful
```

Community: Displays or configures the SNMP community string. Up to 3 community strings are supported. The system default community string is “public” with read only permission.

Example #1: In this example, user requested to add a community string “inno” with read-write permission. And the system indicates the command execution as “Successful”.

```
Transcend [slot-1] >community add inno rw
Successful
```

Example #2: In this example, user requested to add a community string name “inno” with read-only permission. And the system indicates the command execution as “Successful”

```
Transcend [slot-1] >community add inno
```

Successful

TrapAddr: Displays or configures the SNMP trap destination IP addresses. Up to 2 trap addresses are supported.

Example #1: In this example, user requested to add a trap destination, 192.168.1.137. And the system indicates the command execution as “Successful”.

```
Transcend [slot-1] >trapaddr add 192.168.1.137
Successful
```

sysContact: Displays or configures the SNMP system contact information.

Example #1: In this example, user configures the SNMP system contact information as “snmp@inno-trans.com”. And the system indicates the command execution as “Successful”.

```
Transcend [slot-1] >sysContact snmp@inno-trans.com
Successful
```

SysLocation: Displays or configures the SNMP system location information.

Example #1: In this example, user configures the SNMP system location information as “Bldg 10, San Jose, CA”. And the system indicates the command execution as “Successful”.

```
Transcend [slot-1] >sysLocation bldg 10, San Jose, CA
Successful
```

ModuleTemp: Displays the chassis temperature alarm status.

ModuleTempAlarm: Displays the chassis temperature alarm status.

SfpTemp: Displays the I-HUB N-Controller’s SFP alarm status.

PowerAlarm: Displays the I-HUB power supply alarm status.

4.1.2 Plug-in Commands

The plug-in commands are grouped into two types, commands that are common to all types of plug-in and that are type specific.

4.1.2.1 Common Commands

The commands in this section are common to all types of module.

SwVer: Displays the software version information of the selected plug-in.

HwVer: Displays the hardware version information of the selected plug-in.

4.1.2.2 EDFA & AGC-EDFA

The commands in this section are EDFA and AGC-EDFA specific.

ModuleTemp: Displays the module temperature reading in Centigrade.

Example #1: In this example, the module in iHUB #2 slot 1 reports its module temperature reading as 21.4 Centigrade.

```
Transcend [slot-1] > [ihub-2 slot-1] >ModuleTempAlarm
+21.4 (deg C)
```

OPinPower: Displays the optical input power reading in dBm.

Example #1: In this example, the module in iHub #2 slot 1 reports its optical input power reading.

```
Transcend[slot-2] >[ihub-2 slot-1] >OPinPower
OPinPower (dBm):
+20.2
```

OPoutPower: Displays the optical output power reading in dBm.

Example #1: In this example, the module in iHub #2 slot 1 reports its optical output power reading.

```
Transcend[slot-2] >[ihub-2 slot-1] >OPoutPower
OPoutPower (dBm):
+20.2
```

Gain: Displays the gain reading in dB. This menu is only available for AGC-EDFA.

Example #1: In this example, the module in iHub #2 slot 1 reports its gain reading.

```
Transcend[slot-2] >[ihub-2 slot-1] >gain
Gain (dB):
-99.0
```

OPinPowerAlarm: Displays the alarm status of optical input power.

Example #1: In this example, the module in iHub #2 slot 1 reports the alarm status of optical input power as "Normal".

```
Transcend[slot-2] >[ihub-2 slot-1] >OPinPowerAlarm
OPinPowerAlarm:
Normal
```

OPoutPowerAlarm: Displays the alarm status of optical output power.

Example #1: In this example, the module in iHub #2 slot 1 reports the alarm status of optical output power as "Normal".

```
Transcend[slot-2] >[ihub-2 slot-1] >OPoutPowerAlarm
OPoutPowerAlarm:
Normal
```

ModuleTempAlarm: Displays the alarm status of module temperature.

Example #1: In this example, the module in iHub #2 slot 1 reports the alarm status of module temperature as Normal.

```
Transcend[slot-2] >[ihub-2 slot-1] >ModuleTempAlarm
ModuleTempAlarm:
```


Normal

4.1.2.3 Opto-Stacker

The commands in this section are Opto-stacker specific.

ModuleTemp: Displays the module temperature reading in Centigrade.

Example #1: In this example, the module in iHub #2 slot 1 reports its module temperature reading as 21.4 Centigrade.

```
Transcend [slot-1] > [ihub-2 slot-1] >ModuleTempAlarm
+21.4 (deg C)
```

LaserTemp: Displays the laser temperature reading in Centigrade.

Example #1: In this example, the module in iHub #2 slot 1 reports its laser temperature reading.

```
Transcend [slot-1] > [ihub-2 slot-1] > LaserTemp
+23.0 (deg C)
```

OPoutPower: Displays the optical output power reading in dBm.

Example #1: In this example, the module in iHub #2 slot 1 reports its optical output power reading.

```
Transcend[slot-2] >[ihub-2 slot-1] >OPoutPower
OPoutPower (dBm):
+20.2
```

OpticalPowerDbm: Displays the optical output power reading in dBm.

Example #1: In this example, the module in iHub #2 slot 1 reports its optical input power #1 reading.

```
Transcend[slot-2] >[ihub-2 slot-1] >OpticalPowerDbm 1
OpticalPowerDbm (dBm):
[1] -55.4
```

GainReserve: Displays the gain reserve in laser driver reading in dB.

Example #1: In this example, the module in iHub #2 slot 1 reports its gain reserve in laser driver reading.

```
Transcend[slot-2] >[ihub-2 slot-1] >GainReserve
GainReserve (dB):
+19.6
```

Mode: Displays the interface gain mode.

Example #1: In this example, the module in iHub #2 slot 1 reports its gain mode as MGC.

```
Transcend[slot-2] >[ihub-2 slot-1] >Mode 1
Mode:
```

[1] MGC

LaserTempAlarm: Displays the alarm status of laser temperature.

Example #1: In this example, the module in iHub #2 slot 1 reports the alarm status of laser temperature on channel 1 as "Normal".

```
Transcend[slot-2] >[ihub-2 slot-1] >LaserTempAlarm
LaserTempAlarm:
Normal
```

OpticalPowerAlarm: Displays the alarm status of optical input power.

Example #1: In this example, the module in iHub #2 slot 1 reports the alarm status of optical input power as "MajorLoLo" (e.g. Major alarm with power reading below the low low threshold).

```
Transcend[slot-2] >[ihub-2 slot-1] >OpticalPowerAlarm 1
OpticalPowerAlarm:
[1] MajorLoLo
```

OPoutPowerAlarm: Displays the alarm status of optical output power.

Example #1: In this example, the module in iHub #2 slot 1 reports the alarm status of optical output power as "Normal".

```
Transcend[slot-2] >[ihub-2 slot-1] >OPoutPowerAlarm
OPoutPowerAlarm:
Normal
```

ModuleTempAlarm: Displays the alarm status of module temperature.

Example #1: In this example, the module in iHub #2 slot 1 reports the alarm status of module temperature as Normal.

```
Transcend[slot-2] >[ihub-2 slot-1] >ModuleTempAlarm
ModuleTempAlarm:
Normal
```

4.1.2.4 Optical Switch

The commands in this section are Optical Switch specific.

ModuleTemp: Displays the module temperature reading in Centigrade.

Example #1: In this example, the module in iHub #2 slot 4 reports its module temperature reading as 21.4 Centigrade.

```
Transcend [slot-1] > [ihub-2 slot-4] >ModuleTempAlarm
+21.4 (deg C)
```

OPinPower: Displays the optical input power reading in dBm.

Example #1: In this example, the module in iHub #2 slot 4 reports its optical input power reading on input #1 (p.s. primary optical input).

```
Transcend[slot-2] >[ihub-2 slot-4] >opinpower 1
OPinPower (dBm):
[1] -20.0
```

Switch: Displays the optical switch position.

Example #1: In this example, the module in iHub #2 slot 4 reports its optical switch position as on primary input.

```
Transcend[slot-2] >[ihub-2 slot-4] >switch
Switch:
Primary
```

ThresholddBm: Displays the optical input power threshold reading in dBm.

Example #1: In this example, the module in iHub #2 slot 4 reports its optical threshold reading in dBm.

```
Transcend[slot-2] >[ihub-2 slot-4] >ThresholddBm
ThresholddBm (dBm):
-2.3
```

Mode: Displays the I-Hub Optical Switch front panel tri-position toggle switch setting.

Example #1: In this example, the module in iHub #2 slot 4 reports its optical switch tri-position toggle switch setting on Auto.

```
Transcend[slot-2] >[ihub-2 slot-4] >Mode
Mode:
Auto
```

OPinPowerAlarm: Displays the alarm status of optical input power.

Example #1: In this example, the module in iHub #2 slot 4 reports the alarm status of optical input #1 power as “MajorLoLo” (e.g. Major alarm with power reading below the low low threshold).

```
Transcend[slot-2] >[ihub-2 slot-4] >OPinPowerAlarm 1
OPinPowerAlarm:
[1] MajorLoLo
```

SwitchAlarm: Displays the alarm status of optical switch. This alarm is raised if switch is in faulty state.

Example #1: In this example, the module in iHub #2 slot 4 reports the alarm status of optical switch as “Normal”

```
Transcend[slot-2] >[ihub-2 slot-4] >SwitchAlarm
SwitchAlarm:
Normal
```

ModuleTempAlarm: Displays the alarm status of module temperature.

Example #1: In this example, the module in iHub #2 slot 1 reports the alarm status of module temperature as Normal.

```
Transcend[slot-2] >[ihub-2 slot-1] >ModuleTempAlarm
ModuleTempAlarm:
    Normal
```

APPENDIX A SNMP ENTERPRISE MIB ATTRIBUTES

5. Appendix A SNMP Enterprise MIB Attributes

The following is a list of the SNMP Enterprise MIB attributes for I-HUB chassis.

```

INNO-TRANS-IHUB-MIB DEFINITIONS ::= BEGIN

--
-- InnoTrans Communications IHUB Enterprise MIB
-- Copyright InnoTrans 2013
--

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, Integer32,
    NOTIFICATION-TYPE, enterprises          FROM SNMPv2-SMI
    MODULE-COMPLIANCE, OBJECT-GROUP,
    NOTIFICATION-GROUP                     FROM SNMPv2-CONF
    DisplayString, TEXTUAL-CONVENTION      FROM SNMPv2-TC
    HeTenthdBm, HeTenthCentigrade, HeTenthdB, HeTenthVolt, HeTenthdBmV
                                           FROM SCTE-HMS-HEADENDIDENT-MIB
;

innoTransIHUB MODULE-IDENTITY
    LAST-UPDATED "201305060000Z" -- May 06, 2013
    ORGANIZATION "InnoTrans Communications"
    CONTACT-INFO
        "    InnoTrans SNMP Group
         mailto:snmp@inno-trans.com
        "
    DESCRIPTION
        "InnoTrans enterprise attributes.."
    REVISION
        "201305060000Z"
    DESCRIPTION
        "Initial release build."

    ::= { innoTrans 11003 }

--
-- top level structure
--

innoTrans          OBJECT IDENTIFIER ::= { enterprises 30294 }

innoTransIHUBSystem    OBJECT IDENTIFIER ::= { innoTransIHUB 1 }
innoTransIHUBEquip     OBJECT IDENTIFIER ::= { innoTransIHUB 2 }

```

```

---
--- These values are returned when the objects return the following
--- conditions - These values apply to all innoTransIHUB objects.
---
--- Retrieving objects on slots that contain no module
--- Retrieving objects beyond installed laserIndex (e.g. 3rd optics on a 2
channel module)
--- Encountering internal errors such as time out.
---
--- Values:
--- DisplayString: NA
--- Unsigned32: 999999
--- Integer32: -999
--- HeTenthCentigrade: -999
--- HeTenthdBm: -999
--- HeTenthdBmV: -999
--- HeTenthdB: -999
--- HeTenthVolt: -999
---
--
-- IHUB system
--

```

```

innoTransIHUBChassisTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF InnoTransIHUBChassisEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION     "IHUB system table"
    ::= { innoTransIHUBSystem 1 }

```

```

innoTransIHUBChassisEntry OBJECT-TYPE
    SYNTAX          InnoTransIHUBChassisEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION     "Entry in Parent table"
    INDEX          { innoTransIHUBChassisIndex }
    ::= { innoTransIHUBChassisTable 1 }

```

```

InnoTransIHUBChassisEntry ::= SEQUENCE {
    innoTransIHUBChassisIndex      Integer32,
    innoTransIHUBChassisState      INTEGER,
    innoTransIHUBChassisSwVer      DisplayString,
    innoTransIHUBChassisModel      DisplayString,
    innoTransIHUBChassisSerial     DisplayString,
    innoTransIHUBChassisTemp       HeTenthCentigrade,
    innoTransIHUBChassisHwVer      DisplayString
}

```

```

innoTransIHUBChassisIndex OBJECT-TYPE
    SYNTAX          Integer32 (1..4)

```

```

MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
  "The system index. The index of the first system is 1."
 ::= { innoTransIHUBChassisEntry 1 }

--
-- System Attributes :
--
-- system state, s/w Ver, h/w Ver, Model Name, Serial Num
--

innoTransIHUBChassisState OBJECT-TYPE
    SYNTAX INTEGER {
        equipped(1),
        unequipped(2)
    }
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "This object indicates the state of a slot. When a module is
        plugged in a slot, it becomes equipped. When a module is
        removed from a slot, it becomes unequipped."
    ::= { innoTransIHUBChassisEntry 2 }

innoTransIHUBChassisSwVer OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The Software Version."
    ::= { innoTransIHUBChassisEntry 3 }

innoTransIHUBChassisModel OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The model name for the device."
    ::= { innoTransIHUBChassisEntry 4 }

innoTransIHUBChassisSerial OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The serial number for the device."
    ::= { innoTransIHUBChassisEntry 5 }

innoTransIHUBChassisTemp OBJECT-TYPE
    SYNTAX HeTenthCentigrade

```

```

MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
  "The module temperature."
 ::= { innoTransIHUBChassisEntry 6 }

innoTransIHUBChassisHwVer OBJECT-TYPE
SYNTAX        DisplayString
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
  "The Hardware Version (includes versions for microprocessor and
  microcontroller)."
```

```
 ::= { innoTransIHUBChassisEntry 7 }
```

```
--
-- Equipment Attributes
--
-- ModuleTemp
-- Tx - Opt Power - dBm
--   - RF Level dB
--   - mode : MDC/AGC
-- Amp - PumpLaserPower
--   - Laser Output Power

--
-- Module
--
innoTransIHUBModuleTable OBJECT-TYPE
SYNTAX        SEQUENCE OF InnoTransIHUBModuleEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION   "IHUB module table"
 ::= { innoTransIHUBEquip 1 }
```

```

innoTransIHUBModuleEntry OBJECT-TYPE
SYNTAX        InnoTransIHUBModuleEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION   "Entry in Parent table"
INDEX         { innoTransIHUBModuleIndex }
 ::= { innoTransIHUBModuleTable 1 }
```

```

InnoTransIHUBModuleEntry ::= SEQUENCE {
  innoTransIHUBModuleIndex      Integer32,
  innoTransIHUBSlotState        INTEGER,
  innoTransIHUBModuleSwVer      DisplayString,
  innoTransIHUBModuleModel      DisplayString,
  innoTransIHUBModuleSerial     DisplayString,
  innoTransIHUBModuleTemp       HeTenthCentigrade,
```



```

    innoTransIHUBModuleHwVer          DisplayString
    }

innoTransIHUBModuleIndex OBJECT-TYPE
    SYNTAX          Integer32 (1..10)
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "The module index. The index of the first module is 1."
    ::= { innoTransIHUBModuleEntry 1 }

innoTransIHUBSlotState OBJECT-TYPE
    SYNTAX          INTEGER {
        equipped(1),
        unequipped(2)
    }
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "This object indicates the state of a slot. When a module is
        plugged in a slot, it becomes equipped. When a module is
        removed from a slot, it becomes unequipped."
    ::= { innoTransIHUBModuleEntry 2 }

innoTransIHUBModuleSwVer OBJECT-TYPE
    SYNTAX          DisplayString
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "The Software Version of this module."
    ::= { innoTransIHUBModuleEntry 3 }

innoTransIHUBModuleModel OBJECT-TYPE
    SYNTAX          DisplayString
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "The model name for the module."
    ::= { innoTransIHUBModuleEntry 4 }

innoTransIHUBModuleSerial OBJECT-TYPE
    SYNTAX          DisplayString
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "The serial number for the module."
    ::= { innoTransIHUBModuleEntry 5 }

innoTransIHUBModuleTemp OBJECT-TYPE
    SYNTAX          HeTenthCentigrade
    MAX-ACCESS      read-only

```

```

STATUS      current
DESCRIPTION
  "The module temperature."
 ::= { innoTransIHUBModuleEntry 6 }

innoTransIHUBModuleHwVer OBJECT-TYPE
SYNTAX      DisplayString
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "The Hardware Version (includes versions for microprocessor and
  microcontroller)."
```

```

 ::= { innoTransIHUBModuleEntry 7 }

--
-- Module Laser Table: contains lasers.
--

innoTransIHUBModuleLaserTable OBJECT-TYPE
SYNTAX      SEQUENCE OF InnoTransIHUBModuleLaserEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "This table contains a set of data for Laser elements in the module."
 ::= { innoTransIHUBEquip 2 }

innoTransIHUBModuleLaserEntry OBJECT-TYPE
SYNTAX      InnoTransIHUBModuleLaserEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "A row describing one of the lasers. To access to one of the
  entry, it requires the module index and laser index. All the
  lasers of all modules are in the same table."
INDEX      { innoTransIHUBModuleIndex, itModuleLaserIndex }
 ::= { innoTransIHUBModuleLaserTable 1 }

InnoTransIHUBModuleLaserEntry ::= SEQUENCE {
  itModuleLaserIndex      Integer32,
  itModuleLaserRFdB       HeTenthdB,
  itModuleLaserTemp       HeTenthCentigrade,
  itModuleLaserPowerWt    Integer32,
  itModuleLaserPowerdBm   HeTenthdBm,
  itModuleLaserWavelength DisplayString,
  itModuleLaserGainOffset Integer32,
  itModuleLaserGainControl DisplayString,
  itModuleAmpPumpPower    HeTenthdB,
  itModuleAmpOutputPower  HeTenthdB,
  itModuleOPinPower       HeTenthdB,
  itModuleOPoutPower      HeTenthdB,
  itModuleLaserBiasCurrent Integer32,
  itModuleRFPower         HeTenthdBmV,

```

```

itModuleOpticalPowerdBm      HeTenthdBm,
itModule3V3Power             HeTenthVolt,
itModuleOpticalModulationIndex Integer32,
itModuleGainReserve          HeTenthdB,
itModuleAttenuation          HeTenthdB,
itModuleSwitch               DisplayString,
itModuleMode                 DisplayString,
itModuleThresholddBm        HeTenthdBm,
itModuleThresholddBmV       HeTenthdBmV,
itModuleGaindB               HeTenthdB
}

itModuleLaserIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..4)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The laser index referring to each laser in the module. The first
         laser has index of 1."
    ::= { innoTransIHUBModuleLaserEntry 1 }

itModuleLaserRFDdB OBJECT-TYPE
    SYNTAX      HeTenthdB
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "RF level for the laser in tenth of dB."
    ::= { innoTransIHUBModuleLaserEntry 2 }

itModuleLaserTemp OBJECT-TYPE
    SYNTAX      HeTenthCentigrade
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Laser temperature in tenth of Centigrade."
    ::= { innoTransIHUBModuleLaserEntry 3 }

itModuleLaserPowerWt OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Laser Power in tenth of milliWatt."
    ::= { innoTransIHUBModuleLaserEntry 4 }

itModuleLaserPowerdBm OBJECT-TYPE
    SYNTAX      HeTenthdBm
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Laser power in tenth of dBm."

```

```
 ::= { innoTransIHUBModuleLaserEntry 5 }

itModuleLaserWavelength OBJECT-TYPE
    SYNTAX      DisplayString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Laser wavelength."
    ::= { innoTransIHUBModuleLaserEntry 6 }

itModuleLaserGainOffset OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Gain offset in steps."
    ::= { innoTransIHUBModuleLaserEntry 7 }

itModuleLaserGainControl OBJECT-TYPE
    SYNTAX      DisplayString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Laser gain control mode."
    ::= { innoTransIHUBModuleLaserEntry 8 }

itModuleAmpPumpPower OBJECT-TYPE
    SYNTAX      HeTenthdB
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Amplifier pump power in tenth of dBm."
    ::= { innoTransIHUBModuleLaserEntry 9 }

itModuleAmpOutputPower OBJECT-TYPE
    SYNTAX      HeTenthdB
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Amplifier output power in tenth of dBm."
    ::= { innoTransIHUBModuleLaserEntry 10 }

itModuleOPinPower OBJECT-TYPE
    SYNTAX      HeTenthdB
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Optical input power in tenth of dBm."
    ::= { innoTransIHUBModuleLaserEntry 11 }

itModuleOPoutPower OBJECT-TYPE
    SYNTAX      HeTenthdB
```

```

MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "Optical output power in tenth of dBm."
 ::= { innoTransIHUBModuleLaserEntry 12 }

```

```

itModuleLaserBiasCurrent OBJECT-TYPE
  SYNTAX      Integer32
  UNITS       "milli Amperes"
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Laser bias current in mA."
  ::= { innoTransIHUBModuleLaserEntry 13 }

```

```

itModuleRFPower OBJECT-TYPE
  SYNTAX      HeTenthdBmV
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "RF power in dBmV."
  ::= { innoTransIHUBModuleLaserEntry 14 }

```

```

itModuleOpticalPowerdBm OBJECT-TYPE
  SYNTAX      HeTenthdBm
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Optical power in tenth of dBm."
  ::= { innoTransIHUBModuleLaserEntry 15 }

```

```

itModule3V3Power OBJECT-TYPE
  SYNTAX      HeTenthVolt
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "3.3 v power reading in tenth of volt."
  ::= { innoTransIHUBModuleLaserEntry 16 }

```

```

itModuleOpticalModulationIndex OBJECT-TYPE
  SYNTAX      Integer32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Optical modulation index."
  ::= { innoTransIHUBModuleLaserEntry 17 }

```

```

itModuleGainReserve OBJECT-TYPE
  SYNTAX      HeTenthdB
  MAX-ACCESS  read-only

```

```
STATUS      current
DESCRIPTION
  "Gain reserve in tenth of dB."
 ::= { innoTransIHUBModuleLaserEntry 18 }
```

```
itModuleAttenuation OBJECT-TYPE
SYNTAX      HeTenthdB
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "Attenuation settings in tenth of dB."
 ::= { innoTransIHUBModuleLaserEntry 19 }
```

```
itModuleSwitch OBJECT-TYPE
SYNTAX      DisplayString
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "Switch position."
 ::= { innoTransIHUBModuleLaserEntry 20 }
```

```
itModuleMode OBJECT-TYPE
SYNTAX      DisplayString
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "Module mode - switch control mode."
 ::= { innoTransIHUBModuleLaserEntry 21 }
```

```
itModuleThresholddBm OBJECT-TYPE
SYNTAX      HeTenthdBm
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "Threshold in tenth of dBm."
 ::= { innoTransIHUBModuleLaserEntry 22 }
```

```
itModuleThresholddBmV OBJECT-TYPE
SYNTAX      HeTenthdBmV
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "Threshold in tenth of dBmV."
 ::= { innoTransIHUBModuleLaserEntry 23 }
```

```
itModuleGaindB OBJECT-TYPE
SYNTAX      HeTenthdB
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "Gain in tenth of dB."
```

```

 ::= { innoTransIHUBModuleLaserEntry 24 }

---
--- TRAPS
---

iTIHUBNotifications      OBJECT IDENTIFIER ::= { innoTransIHUB 3 }
iTIHUBNotification      OBJECT IDENTIFIER ::= { iTIHUBNotifications 0 }
iTIHUBNotificationObjects OBJECT IDENTIFIER ::= { iTIHUBNotifications 1 }

--
-- Notification objects
--
notifyObjectIndex OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "The integer object reports the laser index number from 1 to 4."
 ::= { iTIHUBNotificationObjects 1 }

notifyObjectValue OBJECT-TYPE
    SYNTAX      DisplayString
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "The value of the notification object."
 ::= { iTIHUBNotificationObjects 2 }

HeCommonLogState ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "The new alarm state of the object which caused the event
        to be recorded into the log."
    SYNTAX      INTEGER {
        heCommonNominal(1),
        heCommonHIHI(2),
        heCommonHI(3),
        heCommonLO(4),
        heCommonLOLO(5),
        heCommonDiscreteMajor(6),
        heCommonDiscreteMinor(7)
    }

notifyAlarmState OBJECT-TYPE
    SYNTAX      HeCommonLogState
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "The integer object reports the alarm severity of a notification."
 ::= { iTIHUBNotificationObjects 3 }

```

```
notifyModuleIndex OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "The integer object reports the module index number.
        For a non-chassis system, it is always 0. For a chassis system
        with modules, it starts from 1."
 ::= { iTIHUBNotificationObjects 4 }

notifyChassisIndex OBJECT-TYPE
    SYNTAX      Integer32      This page intentionally left blank.
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "The integer object reports the chassis index number.
        For a chassis system with modules, it starts from 1."
 ::= { iTIHUBNotificationObjects 5 }

--
-- Notification: System
--
notifSystemTemp NOTIFICATION-TYPE
    OBJECTS { notifyObjectValue, notifyAlarmState }
    STATUS      current
    DESCRIPTION
        "The notification of system temperature alarm"
 ::= { iTIHUBNotification 30 }

notifPower NOTIFICATION-TYPE
    OBJECTS { notifyObjectValue, notifyAlarmState }
    STATUS      current
    DESCRIPTION
        "The notification of system power alarm"
 ::= { iTIHUBNotification 31 }

notifFan NOTIFICATION-TYPE
    OBJECTS { notifyObjectValue, notifyAlarmState }
    STATUS      current
    DESCRIPTION
        "The notification of fan alarm"
 ::= { iTIHUBNotification 32 }

notifModulePresence NOTIFICATION-TYPE
    OBJECTS { notifyObjectValue, notifyAlarmState }
    STATUS      current
    DESCRIPTION
        "The notification of module presence status alarm"
 ::= { iTIHUBNotification 33 }
```



```

--
-- Notification: Module
--
notifLaserTemp NOTIFICATION-TYPE
    OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,
notifModuleIndex }
    STATUS      current
    DESCRIPTION
        "The notification of laser temperature alarm. There are 4 lasers in the
system. The notifyObjectIndex is
        used to identify which one. The notifyAlarmState indicates the alarm
state."
 ::= { iTIHUBNotification 10 }

notifLaserPower NOTIFICATION-TYPE
    OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,
notifModuleIndex }
    STATUS      current
    DESCRIPTION
        "The notification of laser output power alarm"
 ::= { iTIHUBNotification 11 }

notifLaserRf NOTIFICATION-TYPE
    OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,
notifModuleIndex }
    STATUS      current
    DESCRIPTION
        "The notification of laser RF alarm. There are 4 lasers in the system.
The notifyObjectIndex is
        used to identify which one. The notifyAlarmState indicates the alarm
state."
 ::= { iTIHUBNotification 12 }

notifPumpPower NOTIFICATION-TYPE
    OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,
notifModuleIndex }
    STATUS      current
    DESCRIPTION
        "The notification of pump output power alarm. There are 1 pump in the
system. The notifyObjectIndex is
        1. The notifyAlarmState indicates the alarm state."
 ::= { iTIHUBNotification 13 }

notifOpticalOutputPower NOTIFICATION-TYPE
    OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,
notifModuleIndex }
    STATUS      current
    DESCRIPTION
        "The notification of laser optical output power alarm. There are 4 lasers
in the system. The notifyObjectIndex is

```

used to identify which one. The notifyAlarmState indicates the alarm state.”

```
::= { iTIHUBNotification 14 }
```

```
notifOPinPower NOTIFICATION-TYPE
```

```
  OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,  
  notifyModuleIndex }
```

```
  STATUS      current
```

```
  DESCRIPTION
```

```
    “The notification of optical input power alarm. The notifyAlarmState  
    indicates the alarm state.”
```

```
::= { iTIHUBNotification 15 }
```

```
notifOPoutPower NOTIFICATION-TYPE
```

```
  OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,  
  notifyModuleIndex }
```

```
  STATUS      current
```

```
  DESCRIPTION
```

```
    “The notification of optical output power alarm. The notifyAlarmState  
    indicates the alarm state.”
```

```
::= { iTIHUBNotification 16 }
```

```
notifShutoff NOTIFICATION-TYPE
```

```
  OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,  
  notifyModuleIndex }
```

```
  STATUS      current
```

```
  DESCRIPTION
```

```
    “The notification of pump shutoff alarm”
```

```
::= { iTIHUBNotification 17 }
```

```
notifGain NOTIFICATION-TYPE
```

```
  OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,  
  notifyModuleIndex }
```

```
  STATUS      current
```

```
  DESCRIPTION
```

```
    “The notification of gain related alarm”
```

```
::= { iTIHUBNotification 18 }
```

```
notifOpticalPower NOTIFICATION-TYPE
```

```
  OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,  
  notifyModuleIndex }
```

```
  STATUS      current
```

```
  DESCRIPTION
```

```
    “The notification of optical power alarm”
```

```
::= { iTIHUBNotification 19 }
```

```
notifLock NOTIFICATION-TYPE
```

```
  OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,  
  notifyModuleIndex }
```

```
  STATUS      current
```

```
  DESCRIPTION
```

```

        "The notification of synthesizer lock alarm"
 ::= { iTIHUBNotification 20 }

notifSwitch NOTIFICATION-TYPE
    OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,
notifyModuleIndex }
    STATUS      current
    DESCRIPTION
        "The notification of switch status alarm"
 ::= { iTIHUBNotification 21 }

notifRfPower NOTIFICATION-TYPE
    OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,
notifyModuleIndex }
    STATUS      current
    DESCRIPTION
        "The notification of RF power alarm"
 ::= { iTIHUBNotification 22 }

notifSFP NOTIFICATION-TYPE
    OBJECTS { notifyObjectIndex, notifyObjectValue, notifyAlarmState,
notifyModuleIndex }
    STATUS      current
    DESCRIPTION
        "The notification of SFP status alarm"
 ::= { iTIHUBNotification 23 }

--
-- 30 and above are system notifications
--

--
-- Conformance Information
--
innoTransIHUBMibConformance OBJECT IDENTIFIER ::= { innoTransIHUB 4 }

innoTransIHUBMibGroups OBJECT IDENTIFIER
    ::= { innoTransIHUBMibConformance 1 }

innoTransIHUBMibCompliances OBJECT IDENTIFIER
    ::= { innoTransIHUBMibConformance 2 }

--
-- Compliance Statements
--
innoTransIHUBMibCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION "The compliance statement for SNMP entities
        for InnoTrans IHUB products."
    MODULE -- this module
        MANDATORY-GROUPS { innoTransIHUBChassisGroup,
            innoTransIHUBModuleGroup,

```

```

        innoTransIHUBModuleLaserGroup,
        innoTransIHUBNotificationObjectGroup,
        innoTransIHUBNotificationGroup
    }
 ::= { innoTransIHUBMibCompliances 1 }

--
-- Units of Conformance
--
innoTransIHUBChassisGroup OBJECT-GROUP
    OBJECTS {
        innoTransIHUBChassisState,
        innoTransIHUBChassisSwVer,
        innoTransIHUBChassisModel,
        innoTransIHUBChassisSerial,
        innoTransIHUBChassisTemp,
        innoTransIHUBChassisHwVer
    }
    STATUS current
    DESCRIPTION "This group consists of objects in InnoTrans IHUB
                system group."
 ::= { innoTransIHUBMibGroups 1 }

innoTransIHUBNotificationObjectGroup OBJECT-GROUP
    OBJECTS {
        notifyObjectIndex,
        notifyObjectValue,
        notifyAlarmState,
        notifyModuleIndex,
        notifyChassisIndex
    }
    STATUS current
    DESCRIPTION "This group consists of objects in InnoTrans IHUB
                notification objects group."
 ::= { innoTransIHUBMibGroups 3 }

innoTransIHUBNotificationGroup NOTIFICATION-GROUP
    NOTIFICATIONS {
        notifSystemTemp,
        notifPower,
        notifFan,
        notifModulePresence,
        notifLaserTemp,
        notifLaserPower,
        notifLaserRf,
        notifPumpPower,
        notifOpticalOutputPower,
        notifOPinPower,
        notifOPoutPower,
        notifShutoff,
        notifGain,
        notifOpticalPower,
        notifLock,

```

```

        notifSwitch,
        notifRfPower,
        notifSFP
    }
    STATUS current
    DESCRIPTION          "This group consists of objects in InnoTrans IHUB
                          equipment group."
 ::= { innoTransIHUBMibGroups 4 }

innoTransIHUBModuleGroup OBJECT-GROUP
    OBJECTS {
        innoTransIHUBSlotState,
        innoTransIHUBModuleSwVer,
        innoTransIHUBModuleModel,
        innoTransIHUBModuleSerial,
        innoTransIHUBModuleTemp,
        innoTransIHUBModuleHwVer
    }
    STATUS current
    DESCRIPTION          "This group consists of objects in InnoTrans IHUB
                          module group."
 ::= { innoTransIHUBMibGroups 5 }

innoTransIHUBModuleLaserGroup OBJECT-GROUP
    OBJECTS {
        itModuleLaserRFdB,
        itModuleLaserTemp,
        itModuleLaserPowerWt,
        itModuleLaserPowerdBm,
        itModuleLaserWavelength,
        itModuleLaserGainOffset,
        itModuleLaserGainControl,
        itModuleAmpPumpPower,
        itModuleAmpOutputPower,
        itModuleOPinPower,
        itModuleOPoutPower,
        itModuleLaserBiasCurrent,
        itModuleRFPower,
        itModuleOpticalPowerdBm,
        itModule3V3Power,
        itModuleOpticalModulationIndex,
        itModuleGainReserve,
        itModuleAttenuation,
        itModuleSwitch,
        itModuleMode,
        itModuleThresholddBm,
        itModuleThresholddBmV,
        itModuleGaindB
    }
    STATUS current
    DESCRIPTION          "This group consists of objects in InnoTrans IHUB
                          module laser group."

```

```
::= { innoTransIHUBMibGroups 6 }
```

END

SERVICE & SUPPORT

6. Service & Support

6.1 Contact ATX Networks

Please contact ATX Technical Support for assistance with any ATX products.

Optical Transport

(ChromaFlex, I-HUB, Chromadigm, TranScend, COMPASS, ART)

TECHNICAL SUPPORT

Tel: (408) 227-3400 – press 4
Fax: (408) 227-3403
Email: opticalsupport@atxnetworks.com

CUSTOMER SERVICE

ATX Networks
5850 Hellyer Avenue
San Jose, CA 95138 USA

Tel: (408) 227-3400 – press 4
Fax: (408) 227-3403
Email: opticalsales@atxnetworks.com
Web: www.atxnetworks.com

6.2 Warranty Information

All of ATX Networks' products have a 1-year warranty that covers manufacturer's defects or failures.



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