

## Troubleshooting a Terminal on Thor 7



This procedure is intended as a short introduction for TSBC's Service Desk and Customers. It covers remote side troubleshooting, and is thus outside of TSBC's Demarcation Point. Still we need to be familiar with some basic steps of remote troubleshooting.

When a Field Engineer is requesting support from TSBC's Service Desk we expect that he's gone through the steps described on the following pages, and can provide the necessary printouts, screen captures to aid us in evaluating any issues.

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## 1.1 Basic Troubleshooting based on X7 LED Status

### 1. Intepreting the LED status on an X7 modem.

Table 3-2. X7 Router Front Panel LED Descriptions

Label	Signal Color/Type	Definition
<b>POWER</b>		Indicates X7 board power status and any power-related problems; a solid green indicates good power supply status and an unlit LED indicates insufficient power
	Off	No or low power input
	Green	Valid power input detected
	Yellow	Problem with BUC voltage selection
<b>STATUS</b>		IBoot Sequence and Overall Hardware Status: Indicates basic operational state and problems with core hardware; a solid green indicates good operational state and a solid red indicates a problem affecting basic operation
	Off	Powered off or going through initial Power-on Self-test (POST)
	1 second flashing Green	Initial POST failed
	Green	HW operation is normal (all self-tests passed)
	Red	Fault: hardware, software, one or more self-test failures, or configuration error
<b>FAN</b>		Provides fan status
	Green	All fans working
	Red	Failure of one or more fans
<b>TEMP</b>		Operating Temperature Status: Indicates any problems with the current operating temperature; a solid red indicates a problem affecting basic operation
	Off	Router OFF or booting if STATUS LED is not Green
	Green	Normal operating temperature
	Yellow	Operating temperature is nearing the over-temp or under-temp threshold
	Red	Operating temperature has exceeded the over-temp or under-temp threshold

Label	Signal Color/Type	Definition
NET		Modem Network Status: Indicates the state of the satellite network connection
	Off	Router off or in sleep mode if TX LED is yellow (mute ON)
	Yellow	Demodulator is not locked on the primary downstream carrier
	1 second flashing Yellow	Demodulator locked on primary downstream carrier, NCR not yet locked
	2 second flashing Green	Demodulator locked on the primary downstream, NCR locked
	1 second flashing Green	Evolution - Network acquisition in progress iDirect Velocity™ - Network acquisition and authentication in progress
	Green	Evolution - Network acquired; if TX LED is OFF, then router is in Rx (receive) only mode iDirect Velocity™ - Network acquired and authenticated
	Red	Evolution - NA iDirect Velocity™ - Authentication failed
TX		Indicates the state of the transmitter
	Off	Transmitter is off: if STATUS LED is green, then transmission disabled by configuration
	Yellow	Transmitter enabled, mute ON
	Green	Transmitter enabled, mute OFF
RX1 and RX2		Provides downstream receive status, RX2 is reserved for future use
	Off	Evolution - Receiver off or not configured iDirect Velocity™ - Receiver is deactivated
	Yellow	Downstream carrier configured, demodulator not yet locked
	1 second flashing Yellow	Downstream carrier configured, demodulator locked to downstream carrier, Network Clock Reference (NCR) not yet locked  Evolution - This is not applicable when the receiver is configured to receive multicast on second receiver
	Green	Downstream carrier configured, demodulator and NCR locked to downstream carrier  Evolution - This is not applicable when the receiver is configured to receive multicast on second receiver

## 2. No RX lock (Not green on Rx1 or Rx2)

- a. Make sure that your antenna is properly installed and powered on.
- b. Verify that antenna is properly pointed, correct offsets have been applied and you have a valid gyro input.
- c. Verify that your terminal is configured with the correct Terminal Type, that matches your antenna.
- d. Make sure that you have clear view to the satellite.
- e. Verify all cables between ACU and modem are connected (Rx, Tx, IP, BUC I/O, Console)
- f. Connect spectrum and verify that you see signal from Thor 7. If you don't see anything call TSBc Service Desk and they will verify that Outbound is present.
- g. Contact antenna provider, you might have faulty LNB or other issues in your Rx chain preventing modem from getting Rx lock. Could also be a faulty X7 demodulator.

### 3. RX Lock achieved – Downloading OTA beam map

- a. When antenna is properly pointed and you have valid configuration files loaded you should get **RX Green**. Usually Rx1, but in some scenarios terminal can choose Rx2.
- b. At this stage you should prepare to call TSBc so they can activate your terminal at HUB after which you should come online.
- c. RX and TX should become green once terminal is looking towards appropriate beam

### 4. Tx Green, not getting NET stable green.

- a. TX green is only an indication that the modem is transmitting a signal on L-band to the antenna. You could still have issues on your Tx path preventing the signal from being received in the HUB.
- b. If you've been activated but have NET blinking verify that you:
  - i. Have GPS feed to the modem from the ACU
  - ii. Matching serial number between X7 and HUB configuration.
  - iii. That you are not in a blocking zone (Tx would be muted even if clear sight).
- c. Check your RX SNR, do you have a strong Rx signal? If Rx SNR is very low, you might need to resolve RX issue and make sure you are not tracking a side lobe.
- d. Do an **“acq toggle”**(See chapter 1.2.1.2) in Terminal CLI. Look for ACQ! Message, which should contain the TO, FO and PO as seen from HUB. If these messages are shown, the acquisition message is seen in HUB.
  - i. High Timing Offset compared with other terminals, verify GPS.
  - ii. High Frequency Offset. Verify Modem and BUC.
  - iii. High Power Offset, notify TSBc Service Desk. Verify BUC and Modem performance
- e. Make sure proper Terminal Type is configured
- f. Contact TSBc Service Desk to run a CW manually.

5. **NET Green** means terminal is online, but you could still have issues with passing traffic, VoIP etc.

```
CA: C:\WINDOWS\system32\cmd.exe - ping 213.234.64.31 -t
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Users\t725955>ping 213.234.64.31 -t
Pinging 213.234.64.31 with 32 bytes of data:
Reply from 213.234.64.31: bytes=32 time=549ms TTL=45
Reply from 213.234.64.31: bytes=32 time=559ms TTL=45
Reply from 213.234.64.31: bytes=32 time=553ms TTL=45
Reply from 213.234.64.31: bytes=32 time=547ms TTL=45
Reply from 213.234.64.31: bytes=32 time=551ms TTL=45
Reply from 213.234.64.31: bytes=32 time=561ms TTL=45
```

- a. Verify that you are able to pass traffic when connected to External Switch on VLAN 201. Ping 8.8.8.8 or similar. TSBc Service Desk can aid in verifying that we can ping your terminals Public Interface if you don't have a secondary Internet source on site.
- b. To run Speedtest, please make sure that you first disconnect all Internal LAN connections that can consume bandwidth and connect single known laptop directly to X7 on VLAN201 (through a VLAN aware switch).
- c. For VoIP troubleshooting, please do a QoS Status on Terminal CLI to verify that you see increasing numbers on the VoIP traffic rules when you have an ongoing call. If you don't see increasing numbers your VoIP is treated as Best Effort.

## 1.2 Using the CLI of the X7

```
Welcome to the iDirect Core Module [ Approot ] System.
Branch: rc Version: 1.1.1.0 Build: 162 on build server jenkins

iDirectCM login: root
Password:
# telnet 0

Entering character mode
Escape character is '^]'.

Username: admin
Password: *****
[05:51:39:438595]

[X7:6471] admin@telnet:127.0.0.1;55385
>
```

SSH to the terminal on the Admin VLAN or connect using console port, using your terminal password. Default is *root/iDirect* This brings you to the Linux interface. There are a couple of things that can be done from here.

### 1.2.1.1 Linux commands

- Restart falcon (iDirect application) “**service idirect\_falcon restart**”
- Access to Falcon: “**telnet 0**” Username is *admin*, default password is *iDirect*
- Show installed software in different partitions “**pkgstat --list**”
- Show active partition: “**rdev**” Example: */dev/mmcblk0p6* indicates partition 6 is active. By combining this with **pkgstat --list** you can determine active software from Linux.

### 1.2.1.2 Falcon commands

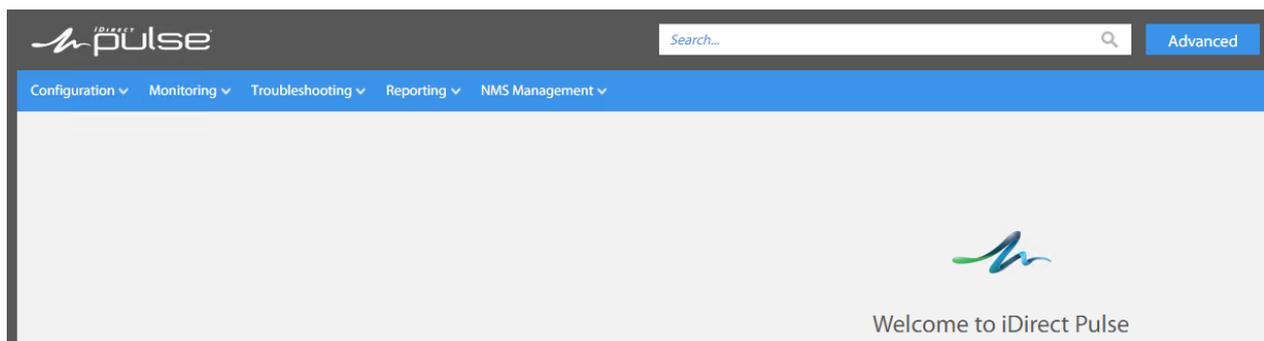
- “**remotestate**” – Gives useful information on the status of the terminal. Indicating whether terminal is online, locked or trying to acquire. Note that Auth/Keyroll must be “Succeeded” in addition to modem state “In Network” for terminal to be online.
- “**rx snr**” / “**rx2 snr**” – Prints SNR value for your demodulators. Make sure to type the command corresponding the active demodulator to get correct SNR value.
- “**rx demod / rx2 demod**” – Prints Outbound Carrier details
- “**inroute power**” – Prints the Tx power required from remote for each IB carrier.
- 
- “**acq toggle**” – Prints ACQ/UCP messages. Useful for troubleshooting a terminal not getting online. Verify Timing Offset, Frequency Offset and Power Offset of ACQ! And UCP! Msgs. Run “**acq toggle**” again to stop ACQ/UCP messages.
- “**partitions\_info**” – Lists the Velocity software versions loaded and which partition is active
- “**qos status**” – Shows the different traffic types assigned to your terminal. Verify VoIP.
- “**bsel cmd pm**” – Prints all beams and carrier details.
- “**bsel com**” – Forces a new BUC Calibration (OTC)
- “**help**” – Show list of commands

### 1.2.1.3 How to put up a CW

In order to put up a CW, you need to access Falcon and write the following commands:

1. **“Bsel cmd deactivate”** – this command prevent modem from changing beams during the CW test
2. **“tx cli enable”** – Brings terminal offline and ready for troubleshooting, start CW, PN etc.
3. **“Tx override on”** – ignore any mute command from ACU
4. **“Tx mute off”** – unmutes the Tx
5. **“tx power”** (e.g. -25)
6. **“tx freq”** You have to use L-Band frequency (eksample “tx freq 1537.3” see chapter 5.1 for further details)
7. **“tx cw on/off”**
8. **“tx keyline on”** (might not be necessary)
9. **“tx cli disable”** – Brings terminal out of debug mode, and back online. Always do a falcon restart after tx cli disable. In Falcon write **“quit”** > Now you are in Linux write **“service idirect\_falcon restart”**

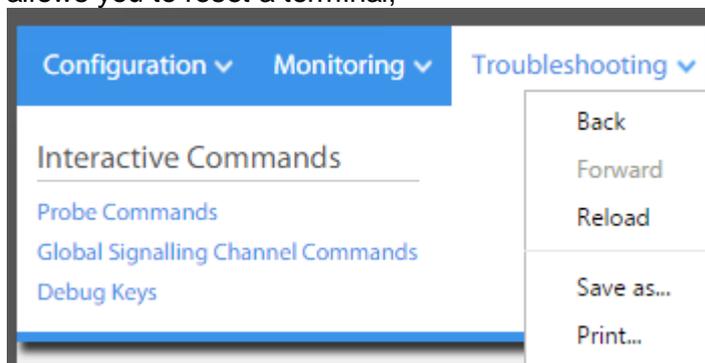
## 1.3 Using Pulse NMS for Monitoring/Troubleshooting



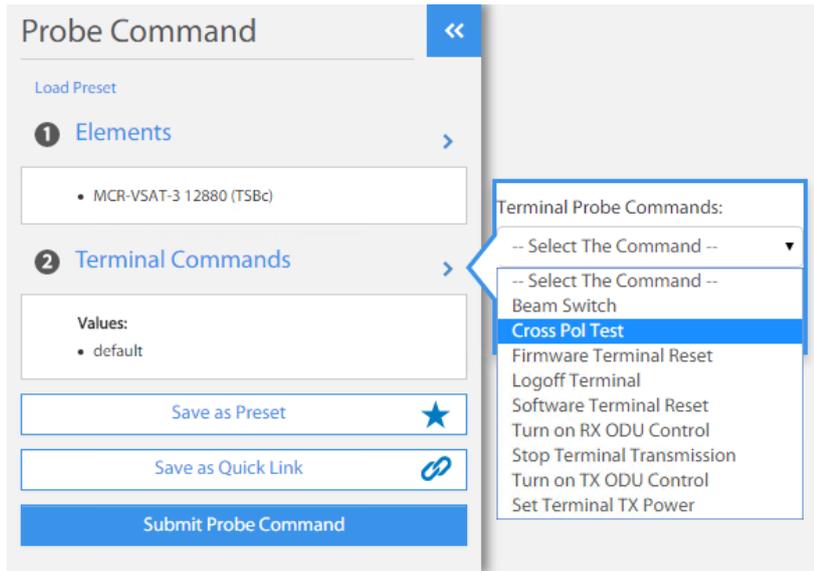
The Pulse NMS has an intuitive horizontal menu which will guide you to the task you are trying to accomplish. This section will focus on Monitoring and Troubleshooting

### 1.3.1 Troubleshooting

In this tab you will find the “Probe” functionality which is similar to the Evolution functionality that allows you to reset a terminal,



When selecting Troubleshooting you should focus on the “Probe commands”. Also note that dependant on your User Account, not all these options will be available to you.



The pull down list will show you the Terminal Commands that can be issued.

1. Stop Terminal Transmission
2. Software Terminal Reset
3. Firmware Terminal Reset
4. *Cross Pol (not possible in current version)*
5. *Beam Switch (not possible in current version)*
6. *Logoff Terminal (not possible in current version)*
7. *Turn on Rx ODU control (not possible in current version)*
8. *Turn on TX ODU Control (not possible in current version)*
9. *Set Terminal TX Power (not possible in current version)*

#### 1.3.1.1 Most used commands:

**Beamswitch** will only work when terminal is in an overlapping area with identical Figure of Merit for two beams.

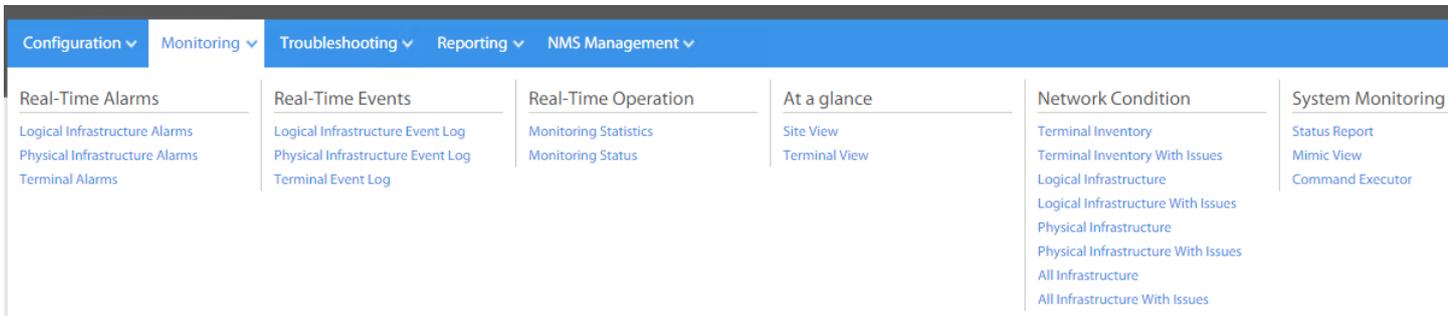
**Cross Pol Test** can be used if OTC and activation doesn't bring terminal online.

**Firmware Terminal Reset** will issue a Linux "reboot" command. 3-5 min outage

**Software Terminal Reset** will issue a reboot of the terminal from Falcon (reset board). 3-5 min outage.

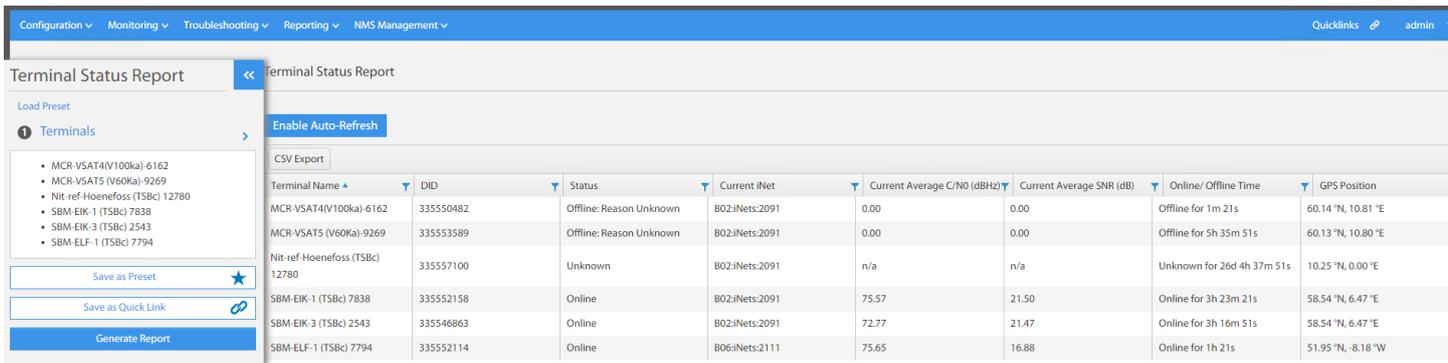
**Set Terminal TX Power** will **temporarily** adjust the transmit power from a remote. Useful if you have trouble with acquisition, and suspect bad Initial Power configuration for your terminal type.

### 1.3.2 Monitoring.



Monitoring in Pulse NMS gives you access to any metric related to the terminals you have access to view.

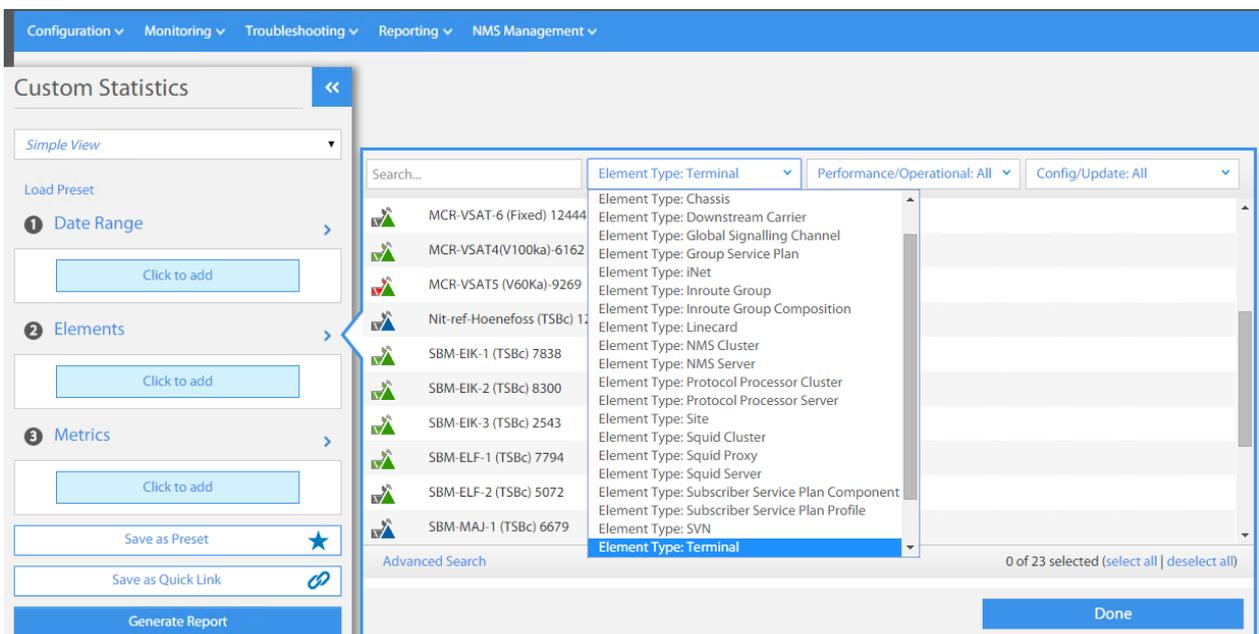
#### 1.3.2.1 At a glance -> Terminal view



Terminal Name	DID	Status	Current iNet	Current Average C/NO (dBHz)	Current Average SNR (dB)	Online/ Offline Time	GPS Position
MCR-VSAT4(V100ka)-6162	335550482	Offline: Reason Unknown	B02i:Nets:2091	0.00	0.00	Offline for 1m 21s	60.14°N, 10.81°E
MCR-VSAT5 (V60Ka)-9269	335553589	Offline: Reason Unknown	B02i:Nets:2091	0.00	0.00	Offline for 5h 35m 51s	60.13°N, 10.80°E
Nit-ref-Hoenefoss (TSBc) 12780	335557100	Unknown	B02i:Nets:2091	n/a	n/a	Unknown for 26d 4h 37m 51s	10.25°N, 0.00°E
SBM-EIK-1 (TSBc) 7838	335552158	Online	B02i:Nets:2091	75.57	21.50	Online for 3h 23m 21s	58.54°N, 6.47°E
SBM-EIK-3 (TSBc) 2543	335546863	Online	B02i:Nets:2091	72.77	21.47	Online for 3h 16m 51s	58.54°N, 6.47°E
SBM-ELF-1 (TSBc) 7794	335552114	Online	B06i:Nets:2111	75.65	16.88	Online for 1h 21s	51.95°N, -8.18°W

This view will give you a quick overview of the state of your terminals, and their most important values. Note that this is a fixed set of parameters that can't be modified in the current release.

#### 1.3.2.2 Real Time Operation -> Monitoring Statistics



## **Date Range**

This is quite self-explanatory. Select the date range of interest, and tick off “Stream” if you want to continue to receive data over time.

Note that longer time intervals gives less data granularity. Highest granularity is 30 seconds, Lowest granularity is 1 day.

## **Elements**

Select the elements you want to retrieve data for. Typically one or more **Terminal** or **Subscriber Service Plan Components**.

There is currently an issue with these fields: To activate the element type selection: Type any letter in search, then delete it, and after that you can select element types. You can always search for specific terminals. Usually you could use the customer name or similar.

## **Metrics**

Select the metrics that you want to monitor for a specific terminal. This can be anything from Current SNR, C/N0, Jitter, Latency, CRC8 and CRC 32 errors etc. Most of the parameters you are familiar with from Evolution will be available in one form or another.

## **Save as Preset**

In order to avoid selecting the metrics and element, every single time it is advisable to save the monitoring setups you use most frequently, either as a Preset or a Quicklink. Dates, elements and metrics can be relative or static.

## **Save as Quick link**

In order to avoid selecting the metrics and element, every single time it is advisable to save the monitoring setups you use most frequently, either as a Preset or a Quicklink. Dates, elements and metrics can be relative or static.

## **Advanced view ( Report Preferences )**

In advanced view you can select how to present the data, the default option is not always the most readable. Play around with this to find your preference for different presets/quick links.

## **Loading a Preset**

On the left hand side of the screen just above Date Range you can opt to Load presets, if you've already created a report that retrieves the parameters of interest.

If there are any questions contact Service Desk at +47 6707 3470 / +47 05002.

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