Linkstar
Installation Manual

Offered By

Network Satellite Technology Trading
Installing and commissioning an RCST

Introduction

This document is intended for providing instructions on installing, operating, and field servicing of the Linkstar terminal system.

A typical Star2 Net remote terminal system consists of the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Part No.</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Antenna</td>
<td>Location dependant must be approved by NSTT</td>
<td>1</td>
</tr>
<tr>
<td>2. RCST</td>
<td>Linkstar terminal</td>
<td>1</td>
</tr>
<tr>
<td>3. BUC</td>
<td>NJT5037F</td>
<td>1</td>
</tr>
<tr>
<td>4. LNB:</td>
<td>NJR 2184F</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>DRO 10.95 – 11.7 GHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L.O. 10 GHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NJR2183F</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DRO 11.20 – 11.7 GHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L.O. 10.25 GHz</td>
<td></td>
</tr>
</tbody>
</table>
Below illustrates a Linkstar remote system.

Ku-band Antenna and Antenna Feed Assembly

Important note at any timework is carried out on the TX or RX unit the power to the indoor unit must be turned OFF.

Antenna and Feed Assembly

Incoming signals from the satellite are intercepted by the antenna reflector ("dish") and focused into the feed assembly. The feed assembly collects receive signals and passes them to the LNB.

The antenna geometry is termed an Offset Feed Parabola, with the beam (satellite direction) typically oriented 22.6° above a line perpendicular to the antenna face, as shown above. The antenna mount allows the antenna to be pointed toward the satellite by pivoting around the mounting mast (azimuth) and by tilting about the mounting head (elevation). The entire Antenna Assembly can be rotated about the feed axis to set polarization.

Note that it is not a rule that an antenna offset is 22.6°. Refer to the documentation that accompanies the antenna for the actual offset specification.

LNB

The LNB provides the low noise amplification and down conversion from Ku-band or C-band to L-Band. The down converted signals are then routed to the RCST via coaxial cable. Based on the satellite downlink frequency bands, the LNB is available to receive the frequencies as specified.
**BUC**

The BUC (Block up converter) accepts transmit signals from the RCST and provides up conversion to the satellite uplink frequency and transmits them to the satellite.

For the Linkstar ODU, the BUC includes a Solid State Power Amplifier available as Ku-Band transceivers for .5-, 1-, 2-, or 4-Watt operation. The RCST provides a 24VDC source to power these units.

<table>
<thead>
<tr>
<th>IFL Length</th>
<th>Cable</th>
<th>Connector</th>
<th>External Power Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 30m</td>
<td>RG-6 type</td>
<td>F Type</td>
<td>No</td>
</tr>
<tr>
<td>30-50m</td>
<td>RG-11 type</td>
<td>F Type</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 1: Cabling Specifications for 1W/2W KU-band BUC

**Return Channel Satellite Terminal (RCST)**

The Linkstar RCST combines a DVB receiver, a burst MF-TDMA modulator, and a terrestrial traffic interface on a single integrated circuit board.

The RCST terrestrial interface is a standard 10/100BaseT. The TCP Acceleration processing engine is built into the RCST software. The maximum aggregate TCP data transmission rate for each RCST is 10Mbps.

The RCST comes with L-Band IF interfaces and can be rack-mounted. Depending upon the satellite link requirements, the Linkstar RCST is deployable in VSATs ranging from sub-meter 0.96m/1-Watt Ku-band units to 2.4m/.5-Watt C-
Recommended Tools and Test Equipment

Below lists all recommended tools and test equipment for completing a Linkstar terminal system installation.

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
</table>
| • Electronic Installer’s Tool Kit  
  Multi meter |
| • Magnetic Compass |
| • Inclinometer |
| • Socket Set, 3/8" drive, to 3/4", with 3" extension |
| • Set, Allen Keys |
| • Test Equipment:  
  Satellite meter maximizing BER & 10Mhz span Adapters  
  Type F female to N male  
  GPS for LAT/LONG |
| • Laptop PC for use in terminal configuration or troubleshooting, running telnet sessions.  
  Minimum PC requirements: 10/100 Ethernet Card  
  Win98 or higher  
  Pentium processor |
| • Standard LAN crossover cable |
| • Standard straight LAN cable |

A rack mounted RCST must occupy 3U space where the top 2U space is left empty as to ensure adequate cooling. Less space can cause overheating and failure of the terminal.

Similarly, a tabletop mounted RCST requires the placement to be cool and well ventilated. No other items may be resting on top of the unit to ensure adequate cooling.
IFL installation

Cautions:
1. Ensure installation meets all applicable cable codes, including National Electrical Code (NEC) and local requirements.
2. Do not pull IFL cables using center conductor of the coax. Cable insulation is foam; pulling by center conductor will damage electrical performance. Use full grip only.

Antenna Pointing

Record the following site parameters as determined with GPS:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude</td>
<td></td>
</tr>
<tr>
<td>Longitude</td>
<td></td>
</tr>
<tr>
<td>Satellite Longitude</td>
<td></td>
</tr>
<tr>
<td>Elevation</td>
<td></td>
</tr>
<tr>
<td>Azimuth</td>
<td></td>
</tr>
<tr>
<td>Polarization</td>
<td></td>
</tr>
</tbody>
</table>

Perform standard antenna pointing procedure based on the above look angles.

www.Lyngsat.com has a complete frequency plan, which can help in identifying satellites

Linkstar IDU Installation

Before a terminal can be operational NSTT must be informed of certain parameters and your GPS position then NSTT can enable your terminal. You must email NSTT with the correct activation form 2 working days before installation of terminal to enable NSTT to program your system and respond with your Network IP address.
Computer specification and telnet window operation

1) IP Address Calculations

To calculate the IP address from the Ethernet address uses the Microsoft default calculator. Select view/scientific.

Convert the last two octets of the MAC address (labeled Eth Addr) on the reverse of the unit and convert from HEX to DEC. For example 00.9C.D0 converts to 10.0.156.208. (10.0 will always complete the first 2 parts of the default IP address).

For the new generation of Linkstar modems the MAC address ends with 01.xx.xx. For example 01.9C.D0 converts to 10.1.156.208. (10.1 will always complete the first 2 parts of the default IP address).

2) PC Configuration

Windows 2000 or XP
- Open the LAN properties
- Highlight TCP/IP protocol
- Left click on Properties
- Left click on Specify an IP address for pc
- Click on Advanced, then on the IP Address click on Add
- Add any IP from the subnet that you calculated in Step 1. For example: 00-9C-D0: the calculated IP is 10.0.156.208 that means you can add 10.0.156.x (x should not be the same as the calculated that means any no from 1 – 255 except 208). So:
  IP – 10.0.156.1
  Subnet Mask -255.255.255.0
3) Linkstar Network Test

Connect PC to the Star Pro with cross over Ethernet cable, or with straight cable through hub, router, etc.
Test connection by going to Command line and typing
Ping 10.0.xx.xx or 10.1.xx.xx *(Where xx is your converted IP from step 1)*
If you are connected you should have a roundtrip time of around 10ms to Linkstar & back.

**Troubleshooting:**
If you are unable to ping your box, then check that the default IP address you converted is correct, and that you have configured your network card correctly.

3) Linkstar Configuration

Telnet to terminal via LAN cable

To telnet go to Start
Go to Run
Type cmd or command
Type telnet 10.0.xx.xx *(Where xx is your converted IP from step 1)*
Press enter, and you will be prompted for a password. This is blank, so only press enter.
A telnet window should come up with a title Telnet 10.0.xx.xx *(Where xx is your converted IP from step 1)*
Enter following parameters

**For the W1 Network**

```
savebootparms -f 1606630 -s 27500000 -c 0x1ffe -pop 0x01310045 -o 1 -t -26 -pcr 0x365
```

**For NSS-6 Network**

```
savebootparms -f 1682000 -s 17771000 -c 0x1029 -pop 0x011e0001 -o 1 -t -24 -pcr 0x365
```
One you have typed these in, press enter. Then follow this with an `hw` command to reset the terminal.

### 5) Parameter Confirmation
To confirm the parameters, re-telnet into the box and type `pconf`. A display as follows should appear with the parameters which you received from NSTT.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-t</td>
<td>Transmit Power Level (Power)</td>
<td></td>
</tr>
<tr>
<td>-f</td>
<td>Outbound TDM Carrier to tune to (Freq)</td>
<td></td>
</tr>
<tr>
<td>-pop</td>
<td>Population ID (POP)</td>
<td></td>
</tr>
<tr>
<td>-s</td>
<td>Symbol rate of TDM Carrier (Symbol Rate)</td>
<td></td>
</tr>
<tr>
<td>-o</td>
<td>ODU status (0-none, 1-internal, 2-external power)</td>
<td></td>
</tr>
</tbody>
</table>

N.B. You do not have to enter Lat & Long coordinates but the NMS must know them to within 2Km to ensure network efficiency and in decimal after degree not minutes and seconds.

### Troubleshooting:
If any of the parameters in the `pconf` command do not match up to what you have entered into the box, then re-enter the boot parameters.
6) Alignment Confirmation
To check the receiver has locked to the correct carrier type in tcpm and confirm the following. Also ensure that you have a minimum of 0.0001 QPSKBER reading. If not, please adjust your dish until you reach at least this figure. Note that the more zeros after the decimal point, the better your RX and TX signals will be.

**Troubleshooting:**

If the Carrier Phase is reading (!) LOCKED and the RSVIT is (!) LOCKED, and then check your dish pointing, and also your boot parameter configuration using the pconf command mentioned above. Ensure also you have the correct polarity set, which is Horizontal RX.
If you are sure that the dish is pointed correctly, then check your cables are securely connected at both ends, and no water etc has got into the cables.