



Norsat GLOBETrekker™ SNG Standard

User Guide



Norsat
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Preface

Preface

Purpose and Scope of the User Guide

The user guide explains how best to assemble, operate, transport and care for the Norsat GLOBETrekker SNG Standard™ satellite terminal. It also provides guidance on how to interact efficiently with a satellite hub operator.

This user guide is specifically written for the GLOBETrekker SNG Standard™ Ku-Band Satellite Terminal (model number 5200-40W-STD) that comes equipped with an MPEG-2 encoder / DVB-S modulator.

Audience

The guide will be of interest to the following personnel:

- field users
- systems administrators (or IT; Lifecycle/Sustainment Managers)

Revision History

Date	Nature of Revision	Revision
March 2008	Release	1.0
April 2008	Additional appendices	2.0
October 2008	Minor revisions	2.1

**READ THE MANUAL BEFORE YOU INSTALL OR OPERATE THE
GLOBETREKKER SNG Standard™**

1 **Safety Basics**

Safety Basics

**YOU MUST READ THIS CHAPTER BEFORE OPERATING THE
GLOBETREKKER SNG Standard™**

Observe Electrical Codes

Caution



Grounding the GLOBETrekker SNG Standard™

In urban areas, ground the GLOBETrekker SNG Standard™ with a grounding conductor according to national and local electrical codes.

Avoid Hazards Leading to Serious Injury or Possible Death

Danger



FCC Radio Frequency Exposure Information for Mobile Transmitting Devices

When the power is on, maintain an off axis clearance distance of 2.9m, (where 'off axis' means 1m from the center of the beam) and an on axis clearance distance of 29m (where 'on axis' means within 1m of the center of the beam).

Refer also to "Understanding clearance distance" on later in this chapter.

Hazards of Microwave Radiation in Electromagnetic Fields

When the power is on, the area directly in front of the antenna is an Area of Restricted Occupancy. Observe the safety precautions which follow:

1. Limit human exposure time to the area directly in front of the main antenna assembly.
2. Never place any part of your body between the antenna and the feed horn assembly.
3. Never place any part of your body in line with the direction of the antenna transmission path. The LinkControl application provides a screen which helps users estimate the minimum clearance distance. Please refer to "Understanding clearance distance" on pages 13 and 14.
4. Locate the terminal as far as possible from ungrounded metal.

Safety Basics

Avoid Hazards Leading to Serious Injury or Possible Death - continued

Dielectric Heating

Dielectric heating is the heating of an insulating material caused by placing it in a high frequency electric field. When a human enters a Radio Frequency (RF) field the body acts as the dielectric. If the power in the RF field exceeds 10 milliwatts per centimeter, the individual will have a noticeable rise in body temperature.

The severity of burns may vary from minor to major. Burns or other damage may result in long term injury, or even death.

The vital organs of the body are highly susceptible to dielectric heating.

The eyes are also highly susceptible to dielectric heating. Do not look directly into devices radiating RF energy.

You must not stand directly in the path of RF radiating devices.

Electrical Hazards in Wet and Windy Conditions

During windy and wet weather conditions, observe the following safety precautions:

1. Check cable connectors and power cords.
2. If the GLOBETrekker SNG Standard™ is in contact with water, check for signs of electrical dangers.
3. Disconnect the GLOBETrekker SNG Standard™ from its power source before you move it.
4. Disconnect the GLOBETrekker SNG Standard™ from its power source if you suspect a power malfunction.
5. Shelter the baseband unit and its components from water.

Safety Basics

Operating Regulations

Warning



Unintentional Radio Interference

This equipment generates, uses, and radiates radio frequency energy. If you install and use the device according to the instruction manual, the device will not cause harmful interference to radio communications.

If you operate the device in a residential area, it is likely to cause harmful interference to radio communications; you will correct the interference at your own expense.

Frequency Coordination

Users must ensure they co-ordinate proposed frequency and power usage with other terrestrial and satellite users prior to transmission.

Understanding Clearance Distance

There is a Clearance Distance indicator screen within the LinkControl application that can help the user estimate the minimum clearance required in front of the antenna.

It is recommended the user read this entire user guide before attempting system assembly; powering up the system and laptop; or trying to access the LinkControl software.

Safety Basics

Operating Regulations - continued

Understanding Clearance Distance - continued

To access the Clearance Distance indicator screen in LinkControl:

1. Launch the LinkControl software.
2. Enter Administrator mode (this mode of operation is password-protected and is accessible to users with "administrator" level rights in LinkControl).
3. To enter Admin mode, on the Menu bar click Settings -> Enter Admin Mode.
4. Type in the Administrator password; the factory default password is "Administrator". This password is set at the factory and meant to be changed at first use. It is recommended this password be changed and documented as soon as possible by the System Administrator.

NOTE: Passwords are case-sensitive.

To exit Administrator mode and to enter Field mode:

1. Field mode is an end-user mode that operates without elevated rights and is only used for Auto-Acquire method of access.
2. To exit Administrator mode and enter Field mode, on the Menu bar click Settings -> Exit Admin Mode.

To view the Clearance Distance indicator screen go to Alignment tab and click the down arrow beside Clearance Distance on the right-hand side of the window. The Clearance Distance screen opens as shown in **Figure 1**.

The Clearance Distance screen shows the distance that different types of obstacles must be 'away' from the terminal when the antenna is positioned at a given elevation.

Refer to **Table 1** and **Figure 1** in this chapter for more information on LinkControl Clearance Distance screen and sample calculations.

Changes or Modifications to Equipment

Caution: Changes or modifications to this equipment, not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Safety Basics

Figure 1. Clearance Distance Screen



Table 1. Sample Clearance Distance Calculations

Types of Obstacles	Clearance Distances
Antenna Elevation = 33°	
Clearance for every 3.3 meters (10 feet) vertical	5 meters (17 feet)
Clearance for one storey building	8 meters (25 feet)
Clearance for three storey building	20 meters (65 feet)
Human	4 meters (13 feet)

2 Getting Started

Getting Started

This chapter describes what you should do when you first receive your shipment from Norsat.

Boxes Delivered

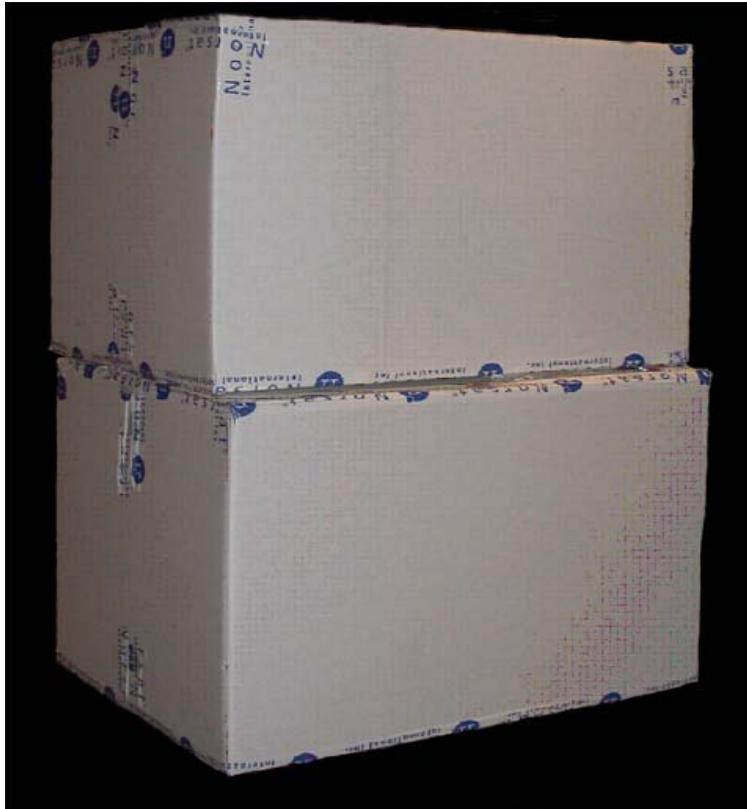
When your Norsat GLOBETrekker SNG Standard™ shipment arrives, it will come shipped in four boxes:

Box Number:	Contents:	Size:
Box 1, Box 2, Box 3	Contain the GLOBETrekker SNG Standard™ System transit cases	79cm x 56cm x 51cm (31" x 22" x 20")
Box 4	Contains the GLOBETrekker SNG Standard™ accessories case	61cm x 56cm x 23cm (24" x 22" x 9")

Figure 2. GLOBETrekker SNG Standard™ Shipping Boxes

The shipment should be checked for any visible damage to the boxes that may have occurred during shipping.

You should use a short, sharp object (knife or scissors) to carefully unseal the boxes.



Getting Started

After opening the four boxes, note that the GLOBETrekker SNG Standard™ is held by foam spacers. The spacers are used to ensure the GLOBETrekker SNG Standard™ system is not damaged during shipping.

Note: It is recommended that the spacers and original boxes be stored and saved should you need to re-ship the GLOBETrekker SNG Standard™.

What is Inside?

Once the boxes are unpacked, you will find three black transit cases (A, B, C) and an accessories case.

Figure 3. GLOBETrekker SNG Standard™ Transit Cases

Transit Case A – Main Antenna Unit/RF
27.5" x 19.5" x 15.5"
(698.5 x 495.3 x 393.7 mm)

Transit Case B – Antenna Segments/Baseband
27.5" x 19.5" x 15.5"
(698.5 x 495.3 x 393.7 mm)

Transit Case C –
Audio/Data Kit & Power Supply
27.5" x 19.5" x 15.5"
(698.5 x 495.3 x 393.7 mm)

Accessories Case
20.6" x 17.2" x 8.6"
(523.2 x 436.9 x 218.4 mm)



Getting Started

Contents by Transit Case

Refer to **Table 2** in this chapter to ensure that your shipment is complete and is not missing any parts or assemblies. Contact the factory at Norsat immediately if there are any missing parts.

Transit Case A – Main Antenna Unit/RF

Top:

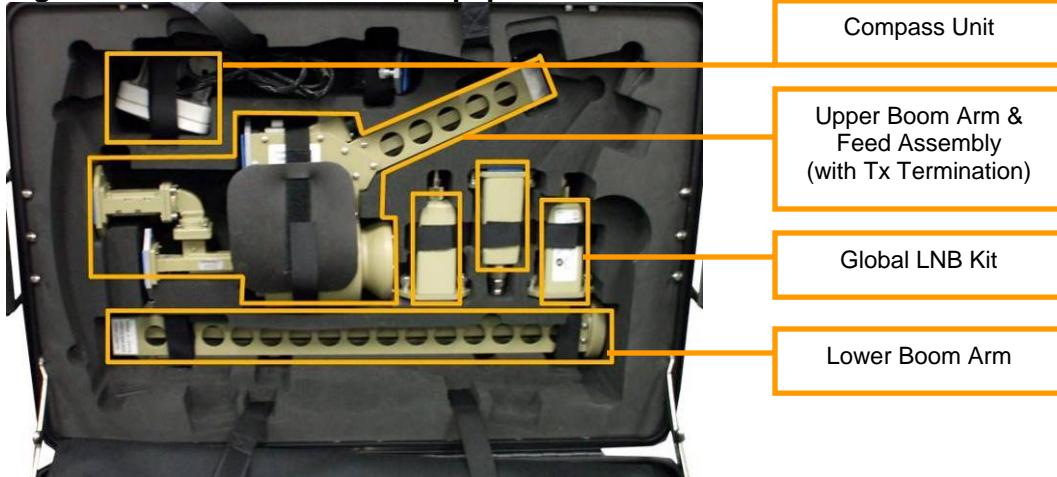
<input type="checkbox"/> Antenna segments 4 and 6	(Figure 4)
<input type="checkbox"/> Upper boom arm and feed assembly	(Figure 5)
<input type="checkbox"/> Lower boom arm	(Figure 5)
<input type="checkbox"/> Compass	(Figure 5)
<input type="checkbox"/> Tx Termination (optional)	(Figure 5)

Figure 4. Transit Case A – Antenna Segments 4 & 6



Getting Started

Figure 5. Transit Case A – RF Equipment & Accessories



Bottom:

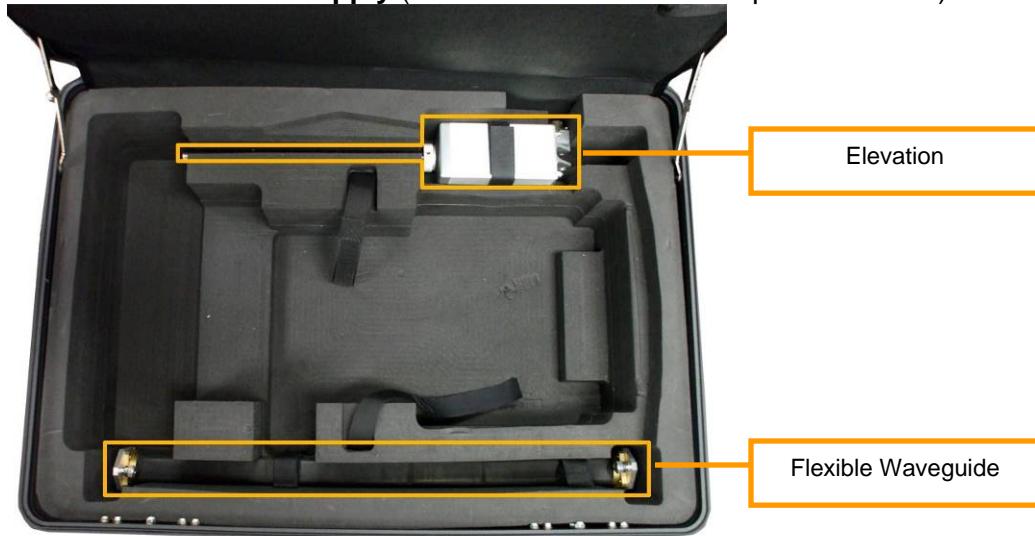
- Main Antenna Unit with Backplate-Mounted SSPA [\(Figure 6\)](#)
- Audio/Data Kit Power Supply [\(Figure 7\)](#)
- Flexible Waveguide [\(Figure 7\)](#)
- Elevation Assembly [\(Figure 7\)](#)

Figure 6. Transit Case A – Main Antenna Unit with Backplate-Mounted SSPA



Getting Started

Figure 7. Transit Case A – Flexible Waveguide, Elevation Assembly, & Audio/Data Kit Power Supply (Main Antenna Unit & Backplate removed)



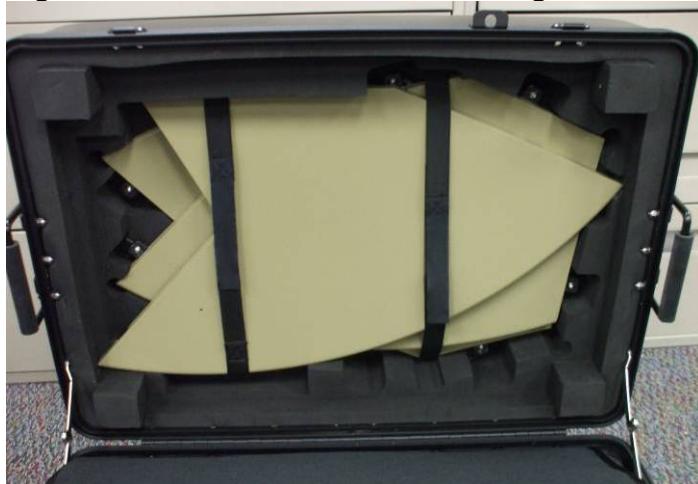
Transit Case B – Antenna Segments 2, 3, & 5 and Baseband Unit

Top:

- Antenna segments 2, 3, & 5

([Figure 8](#))

Figure 8. Transit Case B - Antenna Segments 2, 3, & 5



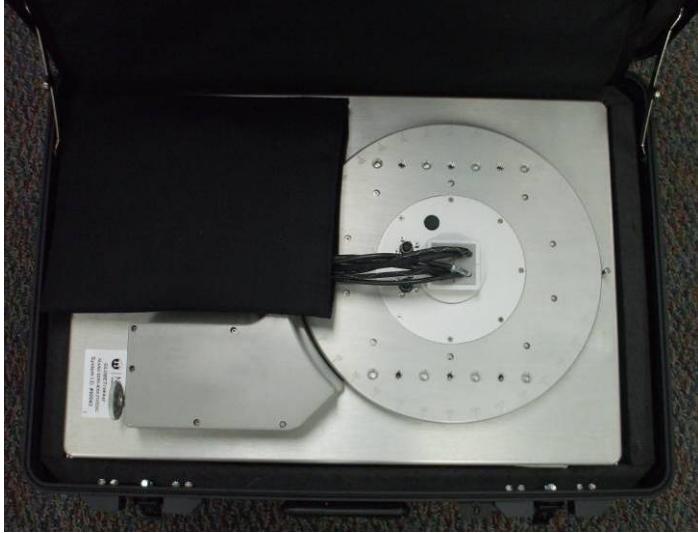
Bottom:

- Baseband unit and cables (in black case)

([Figure 9](#))

Getting Started

Figure 9. Transit Case B – Baseband Unit



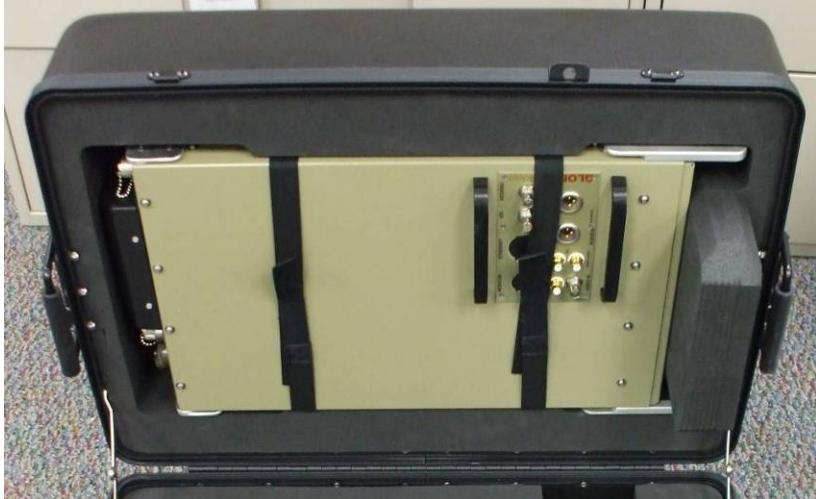
Transit Case C – Audio/Data Kit and Power Supply

Top:

- Audio/data kit

([Figure 10](#))

Figure 10. Transit Case C (Top) - Audio/Data Kit

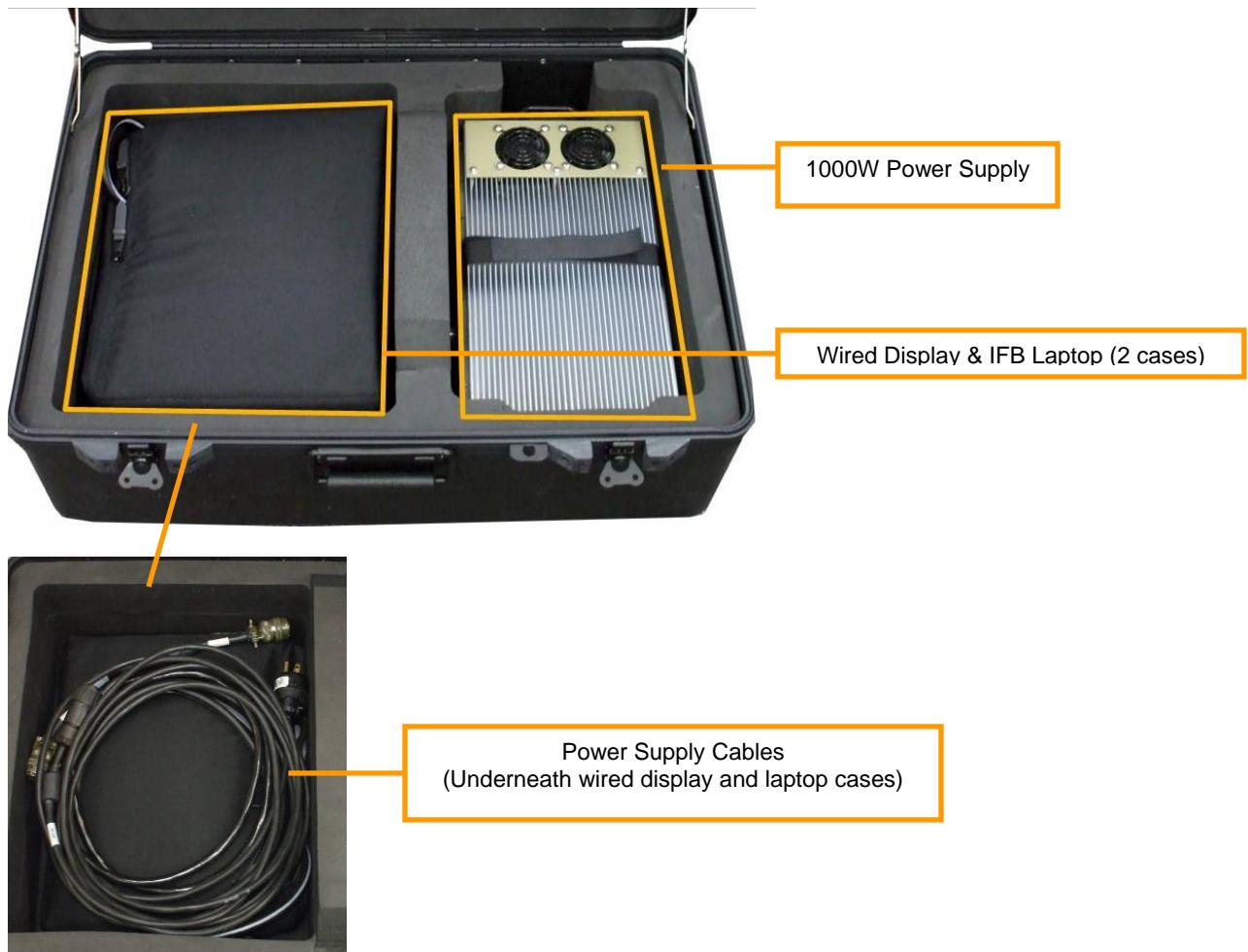


Getting Started

Bottom:

- Wired display [\(Figure 11\)](#)
- 1000W power supply [\(Figure 11\)](#)
- AC and DC power supply cables [\(Figure 11\)](#)

Figure 11. Transit Case C (Bottom) - Wired Display, Laptop, Power Supply, Cables



Getting Started

Accessories Case

<input type="checkbox"/> 30m IFL cable (largest cable)	(Figure 12)
<input type="checkbox"/> 50 ft 12 AWG extension cable (yellow)	(Figure 12)
<input type="checkbox"/> 10 ft Ethernet crossover cable (purple)	(Figure 12)
<input type="checkbox"/> 10 ft Ethernet patch cable (white)	(Figure 12)
<input type="checkbox"/> 2 speakers	(Figure 12)
<input type="checkbox"/> 2 speaker extension cables (corners)	(Figure 12)
<input type="checkbox"/> 25 ft Dual RCA to 1/8" stereo (corner)	(Figure 12)
<input type="checkbox"/> XLR Microphone cable (on top of speakers)	(Figure 12)
<input type="checkbox"/> Power bar	(Figure 12)
<input type="checkbox"/> 3 channel RCA cables (3; red/yellow/white connectors)	(Figure 12)
<input type="checkbox"/> XLR F-F adapter cables (2)	(Figure 12)
<input type="checkbox"/> Adapters (in plastic bags)	(Figure 12)
• Mono to RCA (2)	
• RCA to RCA (3)	
• RCA to XLR (2)	
• Stereo to Stereo (3)	
<input type="checkbox"/> Ear buds (2)	(Not shown in photo)
<input type="checkbox"/> Disposal replacement ear tips (25)	(Not shown in photo)
<input type="checkbox"/> Ear tubes (2)	(Not shown in photo)
<input type="checkbox"/> Ear bud extension cables	(Not shown in photo)

Figure 12. Accessories Case



Getting Started

Parts and Assemblies Checklist

Table 2. Parts/Assemblies Checklist

Part Name	Transit Case
<input type="checkbox"/> Main Antenna Segment with Backplate & SSPA	A (Bottom)
<input type="checkbox"/> Antenna Segments 2, 3, and 5	B (Top)
<input type="checkbox"/> Antenna Segment 4 and 6	A (Top)
<input type="checkbox"/> Lower Boom Arm	A (Top)
<input type="checkbox"/> Upper Boom Arm and Feed Assembly	A (Top)
<input type="checkbox"/> LNB 1000HA	A (Top)
<input type="checkbox"/> LNB 1000HB	A (Top)
<input type="checkbox"/> LNB 1000HC	A (Top)
<input type="checkbox"/> Compass	A (Top)
<input type="checkbox"/> Tx Termination (optional)	A (Top)
<input type="checkbox"/> Flexible Waveguide	A (Bottom)
<input type="checkbox"/> Elevation Assembly	A (Bottom)
<input type="checkbox"/> Baseband Unit and Cables (with protective case)	B (Bottom)
<input type="checkbox"/> AC-DC Power Supply	C (Bottom)
<input type="checkbox"/> AC & DC Power Supply Cables	C (Bottom)
<input type="checkbox"/> Wired Display	C (Bottom)
<input type="checkbox"/> Audio/Data Kit	C (Top)
<input type="checkbox"/> Audio/Data Kit Power Supply	A (Bottom)
<input type="checkbox"/> 30m IFL cable	Accessories

Getting Started

<input type="checkbox"/> 50 ft 12 AWG extension cable (yellow)	Accessories
<input type="checkbox"/> 10 ft Ethernet crossover cable (purple)	Accessories
<input type="checkbox"/> 10 ft Ethernet patch cable (white)	Accessories
<input type="checkbox"/> 2 speakers	Accessories
<input type="checkbox"/> 2 speaker extension cables	Accessories
<input type="checkbox"/> 25 ft Dual RCA to 1/8" stereo	Accessories
<input type="checkbox"/> XLR Microphone cable	Accessories
<input type="checkbox"/> XLR Adapter cables (2)	Accessories
<input type="checkbox"/> Power bar	Accessories
<input type="checkbox"/> 3 channel RCA cables (2 x 20 ft, 1 x 50 ft)	Accessories
<input type="checkbox"/> Adapters (in plastic bags): <ul style="list-style-type: none">• Mono to RCA (2)• RCA to RCA (3)• RCA to XLR (2)• Stereo to Stereo (3)	Accessories
<input type="checkbox"/> Ear buds (2)	Accessories
<input type="checkbox"/> Disposal replacement ear tips (25)	Accessories
<input type="checkbox"/> Ear tubes (2)	Accessories
<input type="checkbox"/> Ear bud extension cables (2)	Accessories

NOTE: If you ordered additional spares, they will not appear on the list above.

3 **GLOBETrekker SNG** **Standard™ Basics**

GLOBETrekker SNG Standard™ Basics

What is the GLOBETrekker SNG Standard™?

The Norsat® GLOBETrekker SNG Standard™ represents the next generation of portable satellite news gathering (SNG) systems. It is fully automated with both non-technical and 'power users' in mind, and is the industry's only comprehensive SNG system.

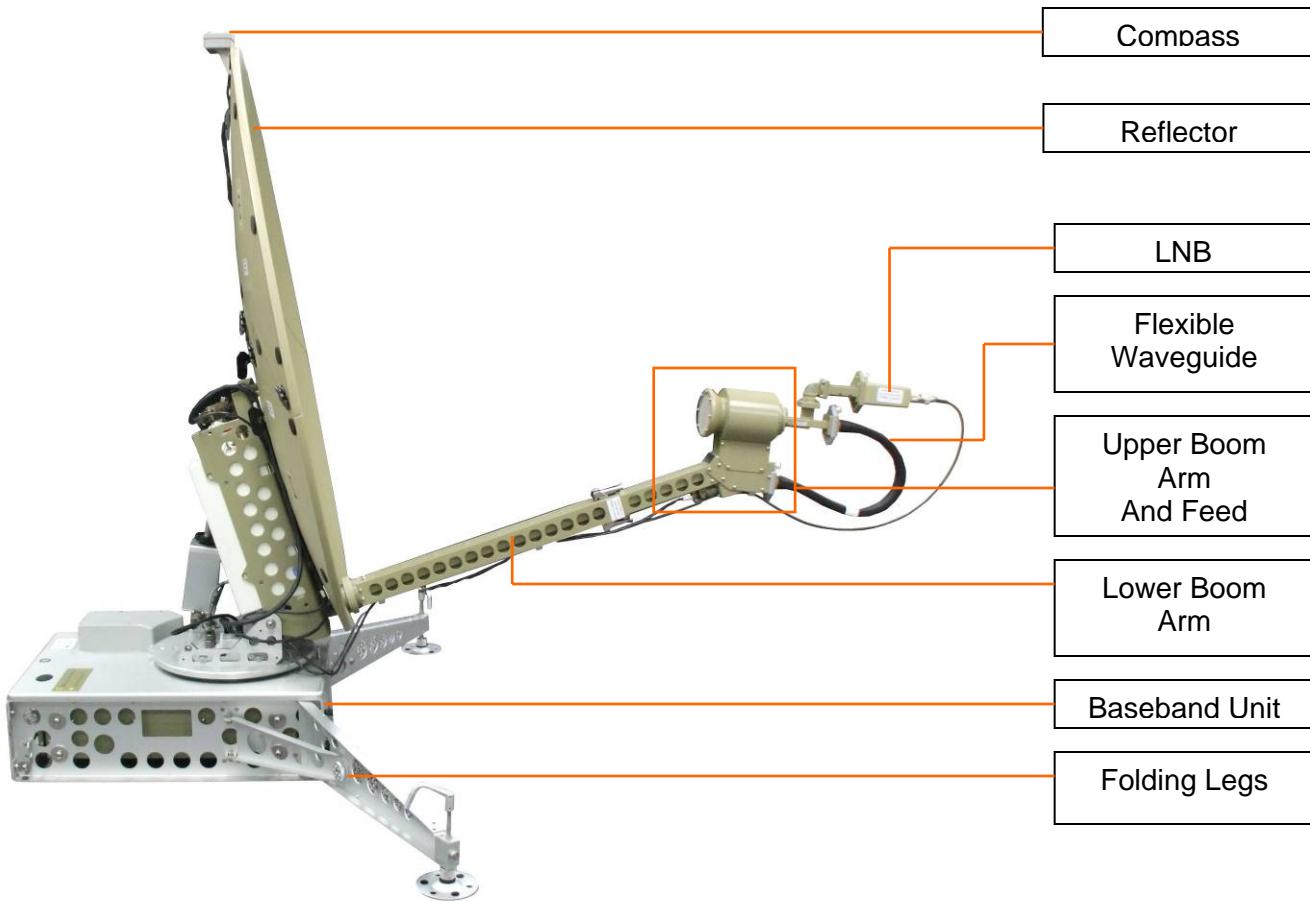
The Norsat® GLOBETrekker SNG Standard™ is the intelligent choice. Unlike other packages, it is a highly integrated, complete system which includes a segmented carbon fiber antenna; motorized feed assembly; LNB; 40W SSPA with an intergrated BUC; motorized azimuth/elevation superstructure; motorized polarization; built-in inclinometer; compass; GPS; baseband unit with a single-board computer, up-converter, spectrum analyzer, DVB-S receiver, Ethernet switch, DC-DC converter, and shock-protected chassis; audio/data kit with a MPEG-2 encoder, modulator, modem; and a system controller including a wired display with software and a graphical user interface (GUI). Sleekly packaged in three rugged, self-contained and wheelable cases. The GLOBETrekker SNG Standard™ has also been extensively tested to withstand vibrations and shocks. It is specifically designed to operate in harsh and hostile conditions.

The GLOBETrekker SNG Standard™ comes equipped with a software application called LinkControl. LinkControl enables a user to configure and operate the terminal through an innovative user interface. The LinkControl software application has been designed such that the more advanced functions, such as commissioning; are performed by a Systems Administrator (such as an IT Manager or Life Cycle/Sustainment Manager). The regular functions of the GLOBETrekker SNG Standard™ terminal, on the other hand, are accessible to all users in field mode.

GLOBETrekker SNG Standard™ Basics

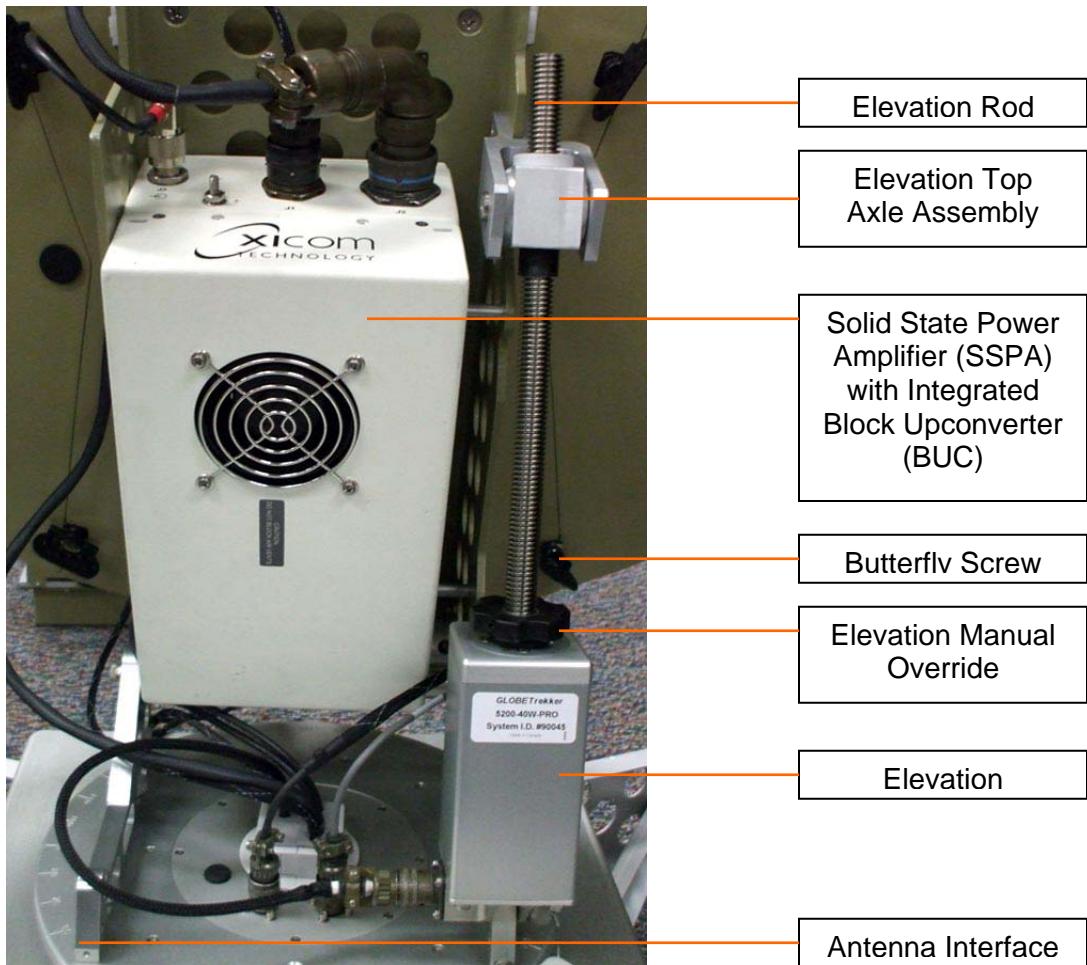
Identifying Basic Elements of the GLOBETrekker SNG Standard™

Figure 13. Side View of Assembled GLOBETrekker SNG Standard™



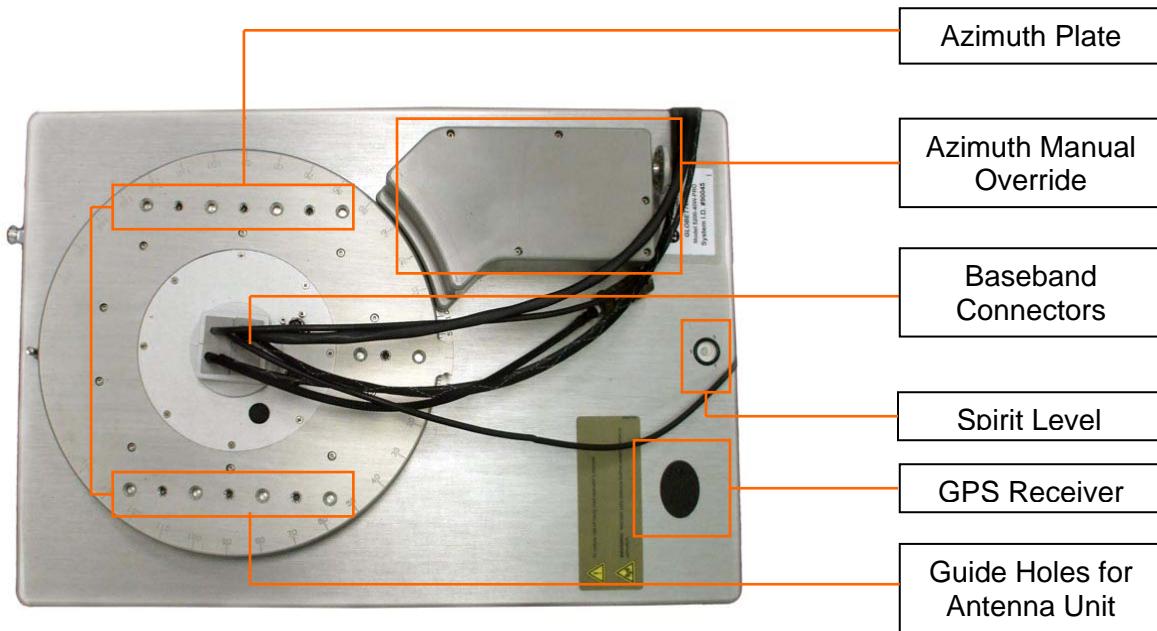
GLOBETrekker SNG Standard™ Basics

Figure 14. Rear View of Assembled GLOBETrekker SNG Standard™ Backplate



GLOBETrekker SNG Standard™ Basics

Figure 15. Top View of GLOBETrekker SNG Standard™ Baseband Unit



GLOBETrekker SNG Standard™ Basics

How Does the GLOBETrekker SNG Standard™ Work?

The GLOBETrekker SNG Standard™ system diagram can be reviewed in **Figure 16**. The GLOBETrekker SNG Standard™ consists of the Baseband Assembly, Motorized Azimuth/Elevation Assembly, Antenna/RF Assembly, and an AC-DC power supply. Subcomponents of these assemblies are identified below. Details of each of these subcomponents have been included in this chapter under relevant subsections.

Baseband Assembly

The Baseband Assembly combines the following:

- Baseband unit with:
 - Single Board Computer¹ (900MHz) with Microsoft ® XP Embedded Operating System and Norsat LinkControl application software
 - 70 MHz-L-Band Upconverter
 - 5-port Ethernet Switch
 - DVB-S Receiver
 - Spectrum Analyzer
 - DC-DC Converter

Audio/Data Kit

The Audio/Data Kit includes the following components:

- Paradise Evolution L-Band modem
- MPEG-2/DVB-S Encoder/Modulator
- Tiny router
- Ethernet switch
- Mixer board

¹ A single-board computer is a complete computer built on a single circuit board. The design is always centered around a microprocessor.

GLOBETrekker SNG Standard™ Basics

Motorized Azimuth/Elevation Assembly

The Azimuth/Elevation (Az/EI) assembly houses the following components:

- Custom Frame with Foldable Legs
- Elevation Drive Unit
- Azimuth Main and Rotational Plate with Feedback Components
- Motor Control Board (inside)
- Azimuth Motor (including gear box)
- Azimuth Motor Manual Override
- GPS Receiver (located under baseplate)

Antenna/RF Unit

The RF/Antenna unit includes the following components:

- 1m segmented (6) carbon fiber antenna reflector
- BUC/SSPA assembly
- Inclinometer
- Lower boom arm segment (with transmit fixed waveguide and Harmonic filter)
- Upper boom arm and feed assembly (includes Transmit fixed waveguide and Receive Reject filter, and motorized cross-pol compensated feed/OMT/Transmit Reject filter assembly)
- LNB quick-connect assembly set (3)
- Transmit flexible waveguide
- Compass

GLOBETrekker SNG Standard™ Basics

Transmit Path

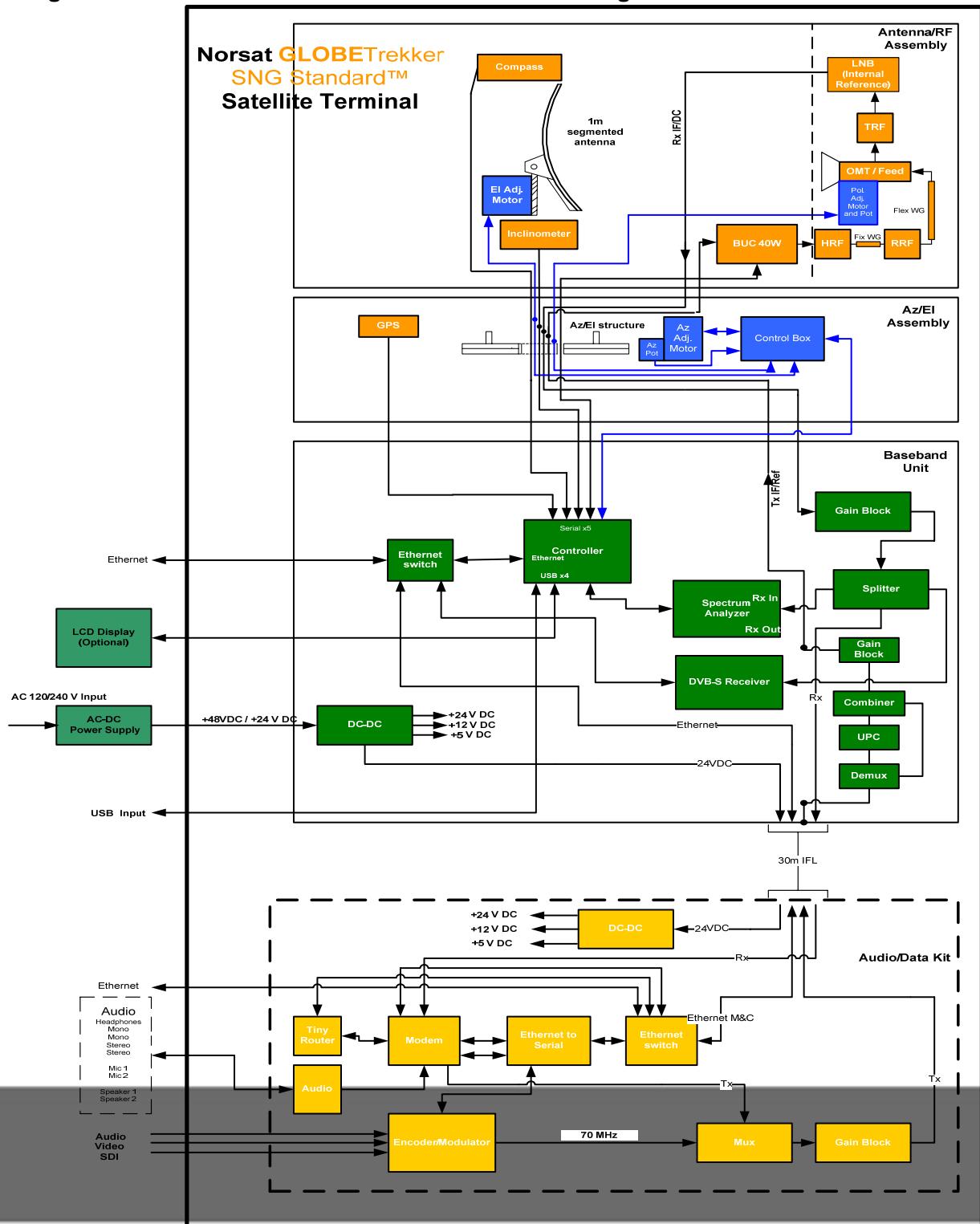
The transmit side of the uplink chain starts at the baseband unit where the audio and video signals pass through the MPEG-2 encoder and the DVB-S modulator and is outputted as a 70 MHz signal. This baseband output frequency is controlled by the upconverter (UPC) which converts the 70 MHz signal from the modulator to intermediate frequency (IF) in the L-band range of 950 – 1700 MHz. From here, the signal passes through an interfacility link (IFL) cable to the integrated block upconverter (BUC) / solid state power amplifier (SSPA), which upconverts the signal again to the extended Ku-Band (13.75 – 14.50 GHz) and amplifies it for transmission.

Note: The BUC is integrated into the Solid State Power Amplifier (SSPA). This system comes with a 40W BUC/SSPA that is mounted to the back of the main antenna unit.

The output of the BUC/SSPA is fed to the Harmonic (HRF) and Receive Reject Filter (RRF) filter. The RRF is essentially a high pass filter. Harmonic reject filters attenuate all harmonics produced in the BUC/SSPA due to its nonlinearities. Similarly, the RRF filter provides attenuation within the receive band; specifically receive frequency range from 10.95 GHz to 12.75 GHz, preventing Receive performance degradation due to the injection of noise from the transmit to receive path. Finally, through a flexible waveguide the transmitter signal is applied to the antenna feed through an Orthogonal Mode Transducer (OMT) which isolates the outbound signal from the receive signal. The feed horn feeds energy into the antenna. The directivity of the feed horn is added to that of the antenna resulting in a pattern that is a narrow and concentrated beam.

GLOBETrekker SNG Standard™ Basics

Figure 16. GLOBETrekker SNG Standard™ Block Diagram



GLOBETrekker SNG Standard™ Basics

Antenna Parameters

Table 3. Antenna Parameters

RF/Antenna	Ku-band
Transmit Frequency	13.75 GHz – 14.50 GHz
Receive Frequency	10.95 GHz – 11.70 GHz 11.70 GHz – 12.20 GHz 12.25 GHz – 12.75 GHz
RF Power (SSPA Output)	12 W 25W 40W
EIRP (at 1dB compression point)	51.3 dBW (12W) 54.5 dBW (25W) 56.5 dBW (40W)
G/T	19.4 dB/K (20° elevation, antenna temperature 40° K)
LNB Noise Figure	0.8 dB
Antenna	1m carbon fiber, segmented (6)
Antenna Tx Gain at 14.125GHz	41.9 dBi
Antenna Rx Gain at 10.95 GHz	39.5 dBi (at 10.95 GHz; worst-case scenario)
Antenna Platform	Motorized El over Az Mounted on support frame
Polarization Configuration ²	Linear Cross-pol, -90° to +135° Motorized, resolution <0.25°
Elevation Adjustment	10-85°, Motorized, resolution < 0.1°
Azimuth Adjustment	+/- 175°, Motorized, resolution < 0.1°

² The antenna is linearly polarized where the polarization selection can either be Vertical/Horizontal (V/H) or Horizontal/Vertical (H/V) on the transmit and receive sides.

GLOBETrekker SNG Standard™ Basics

Receive Path

The isolation between the transmit and receive side is achieved through the use of the OMT (Ortho Mode Transducer) and the TRF (Transmit Reject Filter).

The TRF serves to further attenuate any signals within the transmit band that leaks out the Rx side.

The Ku-band receive signal, at the output of the transmit reject filer and the input of the low-noise block downconverter (LNB), is at the standard Ku-band frequency (10.95 GHz to 12.75 GHz). A block down-converter translates the RF frequency into an L-band output (950 MHz to 1700 MHz) required by the modem. The output of the LNB is also fed to the spectrum analyzer to assist with pointing the antenna and to facilitate system monitoring.

Note: Three LNBs are provided with this system; only one is required for system operation. The user should select the LNB appropriate to the geographic location. (Refer to the following Assembly chapter to select the correct LNB.)

Table 4 shows the details for Baseband unit.

GLOBETrekker SNG Standard™ Basics

Baseband Parameters

Table 4. Baseband Parameters

Baseband	Ku-Band
<i>RF Interfaces</i>	
Tx Out	950 -1750 MHz
Rx In	950 - 1700 MHz
Encoder/Modulator Type	MPEG-2 per ISO/IEC 13818 DVB-S per EN 300 421
Network Topology	SCPC
Modulation	QPSK
Data Rates	1500 kbps-10 Mbps
Error Control	Viterbi FEC Rates 1/2, 2/3, 3/4, 5/6, 7/8, concatenated Reed Solomon

Note: See Appendix B and C for Encoder/Modulator and Modem parameters.

GLOBETrekker SNG Standard™ Basics

Power Configuration Options for the Assemblies

The GLOBETrekker SNG Standard™ is supplied with a 1000W dual voltage AC-DC power supply. This power supply supplies 24V to the baseband equipment and 48V to the SSPA/BUC. The power supply has universal, auto-sensing, AC input allowing operation with 92-132V AC and 184-264V AC.

The input frequency into the AC/DC power has a range of 50-60 Hz.

A DC-to-DC converter inside the GLOBETrekker SNG Standard™ translates the 24V DC to the internal voltages required for different parts of the electronics.

Baseband Connections: Baseband – Antenna/RF Interface

There are seven connections originating at the baseband unit between the baseband and Antenna/RF. These connections provide the user control over the operation of both receive and transmit functions as well as control of the SSPA and access to the alignment tools via the LinkControl software interface.

Receive IF (Rx) Cable

The Receive IF (Rx) cable is a 50 ohm coaxial cable with a N-type male connector. This connector has been color coded **green**.

The signals supplied on this interface are:

- Receive IF (950 – 1700 MHz): the received signal amplified and downconverted by the LNB and supplied to the baseband unit
- 24V DC: supplied to the LNB

This interface does not supply a 10 MHz signal.

Note: Connections between the baseband unit and antenna/RF are very different for the 12W BUC/SSPA system option.

GLOBETrekker SNG Standard™ Basics

Transmit IF (Tx) Cable

The Transmit IF (Tx) cable is a 50 ohm coaxial cable with a N-type male connector. This connector has been color coded **red**.

The signals supplied on this interface are:

- Transmit IF (950 to 1700 MHz) signal to be upconverted, amplified and transmitted to the satellite. This signal may either be a continuous wave (CW) or modulated signal.
- 10 MHz reference: provides a reference signal for the BUC (Block Upconverter)/ SSPA (Solid State Power Amplifier)

The transmitter, or BUC/SSPA, that is located at the base of the antenna, needs the 10MHz signal in order to be enabled and operational.

Note: There is no DC on this connector.

SSPA Monitoring and Control (M&C) Cable

The SSPA M&C cable consists of a multi-wire cable with a multi-pin amphenol female connector. It allows the GLOBETrekker SNG Standard™'s onboard computer to interface with the SSPA's M&C Subsystem using RS-232.

The signals supplied on this interface are:

- SSPA Temperature Sensor Reading: provides an indication of the SSPA temperature. This measurement is displayed in LinkControl Status screen and is used in the power control algorithms.
- SSPA Power Detector Reading: provides an indication of the SSPA transmitted power. This measurement is displayed in LinkControl Status screen and is used in the power control algorithms.
- Fan Operation: provides an indication whether the fan is turning.
- SSPA Mute Control: allows the SSPA to be turned OFF/ON via LinkControl.
- SSPA Connection Status: provides an indication of whether the SSPA is connected properly and if LinkControl can communicate with it.
- Transmitter ON and OFF: allows the transmitter (BUC/SSPA and modem) to be turned ON/OFF via LinkControl

GLOBETrekker SNG Standard™ Basics

DC Power Cable

The DC power cable consists of a large 8-pin amphenol-style connector, and supplies 48V DC to the SSPA/BUC. This power is switched on by the power supply switch.

Note: This applies only to the 40W BUC/SSPA power option, not the 12W option.

Alignment Tool Cables

The Alignment Tools connectors originating from the baseband unit include the elevation motor control, polarization motor control, inclinometer, and compass.

The signals supplied through these interfaces are:

Elevation (El) motor control:	Provides power control to the elevation motor used in antenna alignment and auto-acquire functions.
Polarization motor control:	Provides power control to the polarization motor on the feed assembly and polarization (Pl) angular position feedback to the Baseband unit. The polarization motor is used in polarization alignment and auto-acquire functions.
Inclinometer:	Provides Elevation angular position feedback and used in antenna alignment and auto-acquire functions.
Compass:	Provides Azimuth heading and is used in antenna alignment and auto-acquire functions.

Note 1: The GPS is built into Azimuth base plate assembly. There is no external connector outside the frame.

Note 2: The Azimuth (Az) motor control is inside the Az base plate assembly. There is no external connector.

4

Assembling the GLOBETrekker SNG Standard™

Assembling the GLOBETrekker SNG Standard™

The chapter explains how to assemble the GLOBETrekker SNG Standard™ satellite terminal.

Opening the Transit Cases

1. To prepare for assembly, lay down each transit case to safely open the five main latches.
2. To open each latch, flip up the latch release and turn it until the latch unlocks.



Assembling the GLOBETrekker SNG Standard™

Deploying the Baseband Unit

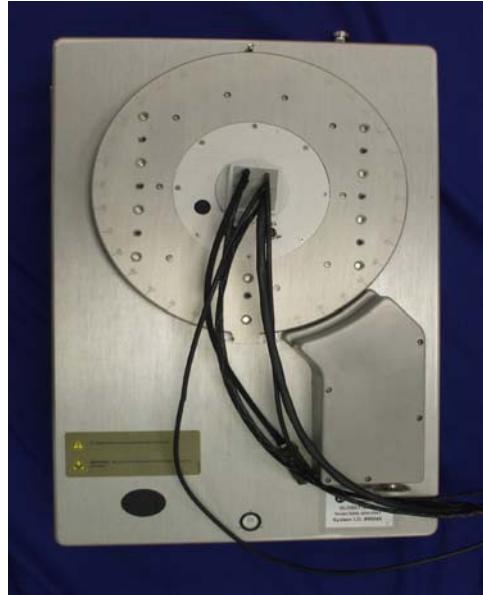
3. Remove the baseband unit from the bottom of Transit Case B.



4. Carefully remove the cables from the small, black padded bag. Position the baseband unit in the general direction of the satellite.

Note: The photo to the right shows the unit in a top (front) to bottom (back) page view where the top of the page would face south.

Example: If your position is north of the equator, place the unit with the top towards the South.



Assembling the GLOBETrekker SNG Standard™

5. To release a leg from the baseband unit, press the button located at the end of the leg. Once released, swing the leg out to unfold it.

Release button
(On side of
baseband unit)



6. Unscrew one the foot located next to the hinge of the released leg to remove it from the baseband unit.

Note: There are two feet (one by each leg), one per side.



7. Screw the foot onto the end of the leg with the flat side towards the ground.



Assembling the GLOBETrekker SNG Standard™

8. Unfold the supporting arm on the side of the released leg by unscrewing it. Slide the supporting arm handle into the hole on the leg. Then, tighten the thumb screw.



9. Repeat steps 7-10 for the other baseband leg.



10. For rapid foot height adjustments, push the locking button in, (located at the end of the leg), and make your adjustment.



Assembling the GLOBETrekker SNG Standard™

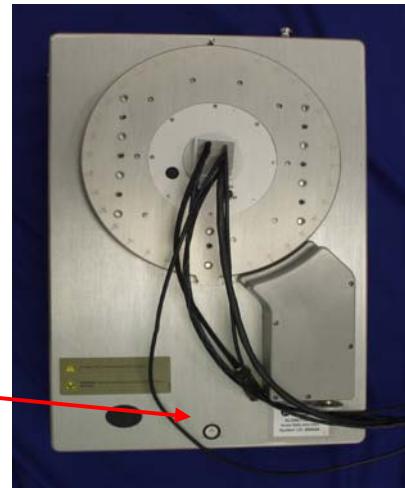
11. For fine adjustments in leveling the unit, turn the handle.



Level the Baseband Unit

12. Look at the Spirit Level (on top of baseband towards the back) to ensure the unit is leveled.

Spirit Level



Assembling the GLOBETrekker SNG Standard™

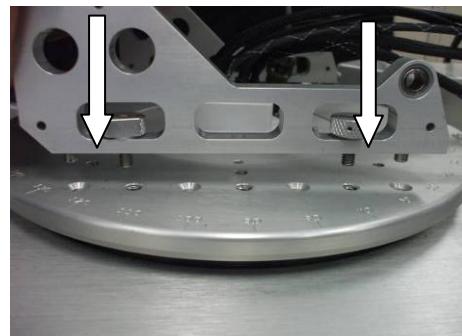
Assembling the Main Antenna Unit

13. Remove the main antenna unit and backplate (with mounted SSPA) from the bottom of Transit Case A.
14. Flip the supporting legs, at both ends of the main antenna unit, down and insert the right and left legs of the back plate guide pins into the corresponding holes on the azimuth plate on the baseband unit.



15. Ensuring that the supporting legs are square and straight, guide pins should fit into guide holes on the azimuth plate.

Hint: If you are having difficulty fitting the guide pins, gently maneuver the main antenna unit from side to side for easy fit.



16. Secure the left and right back plate supports using the thumb screws.



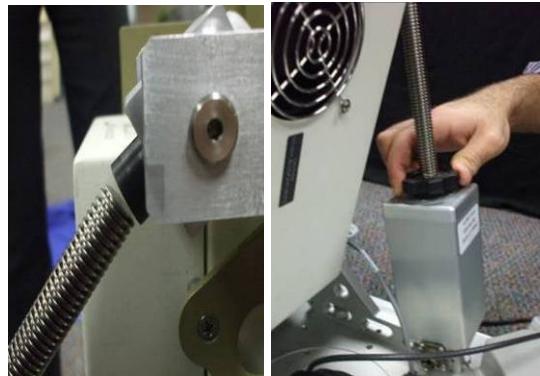
Assembling the GLOBETrekker SNG Standard™

17. Remove the elevation assembly from the bottom of Transit Case A.
18. Thread the elevation rod (clockwise) into the elevation top axle assembly.

Hint: You can thread using either the rod or the black plastic manual adjust wheel at the base of the elevation rod.

Note: One inches should be exposed from the top of the elevation top axle assembly.

19. Insert the elevation assembly unit into the azimuth plate. Secure with thumb screws.



Assembling the GLOBETrekker SNG Standard™

Assembling the Main Antenna Segments

The next section outlines the assembly of the remaining five main antenna segments to the main antenna unit. The antenna segments can be found in the backpacks labeled and numbered in the order they are meant to be attached.

Segments are numbered in the sequence in which they should be assembled as follows:

- Segment 2: attaches to the **bottom left** of the main antenna unit
- Segment 3: attaches to the **bottom right** of the main antenna unit
- Segment 4: attaches to the **top center** of the main antenna unit
- Segment 5: attaches to the **top left** of the main antenna unit
- Segment 6: attaches to the **top right** of the main antenna unit

Illustrations and instructions on how to attach each of the five main antenna segments are described on the following pages.

Hint: The segments should be loosely attached at first so that all segments can be fitted. Once all fitted, all the segment's butterfly screws can be tightened (but not over tightened).

Assembling the GLOBETrekker SNG Standard™

20. To prepare for assembly, remove all the antenna segments from the tops of Transit Case A and B.

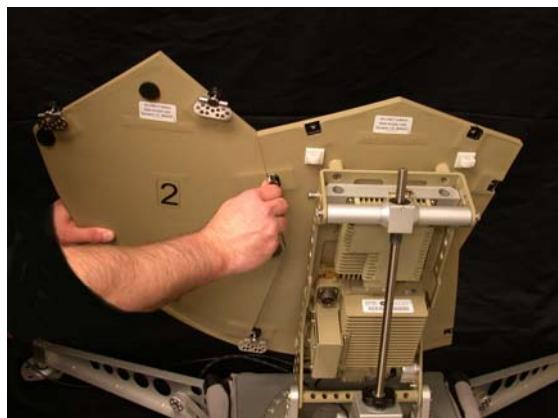


Note: The following photos illustrate the reflector assembly for all GLOBETrekker™ product variants. As such, the 40W SSPA for the SNG Standard™ system is not shown.

Attaching Antenna Segment 2

21. Using the butterfly latches, loosely attach Segment 2 to the bottom left of the main antenna unit.

Note: Center the butterfly latch and then screw it in.



Assembling the GLOBETrekker SNG Standard™

Antenna Segment 3

22. Loosely attach Segment 3 to the bottom right of the main antenna unit.



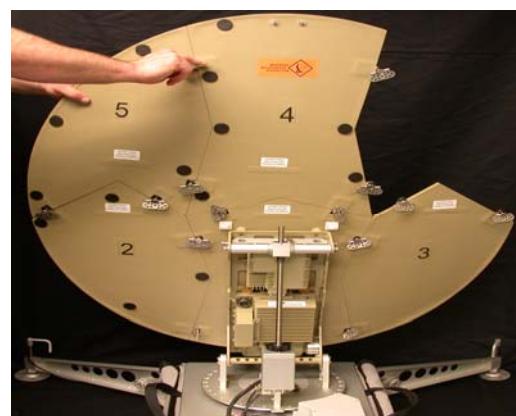
Antenna Segment 4

23. Loosely attach Segment 4 to the top center.



Antenna Segment 5

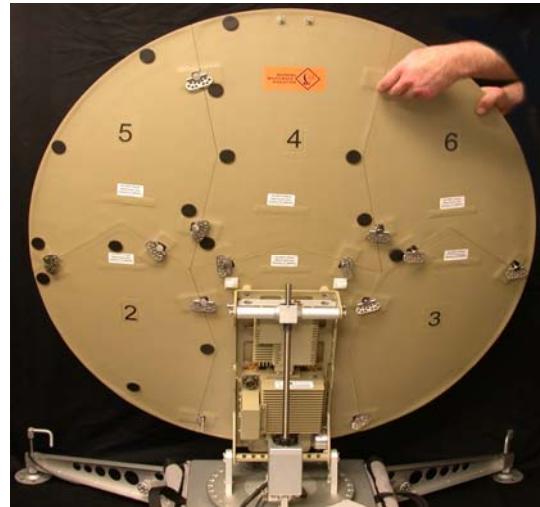
24. Loosely attach Segment 5 to the top left.



Assembling the GLOBETrekker SNG Standard™

Antenna Segment 6

25. Loosely attach Segment 6 to the top right.



26. Tighten all the latches on each of the segments.

Caution: DO NOT over tighten the butterfly latches as it may damage the antenna.

Assembling the Boom Arm and Feed Assembly

27. Remove the upper boom and feed assembly, as well as the lower boom arm, from the top of Transit Case A.

28. Insert the lower boom arm into the main antenna assembly.

Hint: Use the pin-guide at the base of the lower boom arm to align it to the front of the antenna assembly.

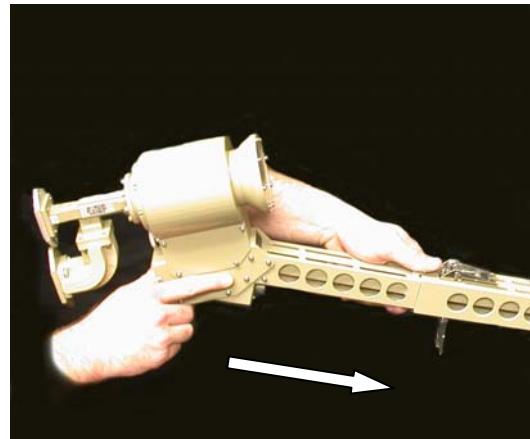


Assembling the GLOBETrekker SNG Standard™

29. Secure the boom arm by tightening ring.

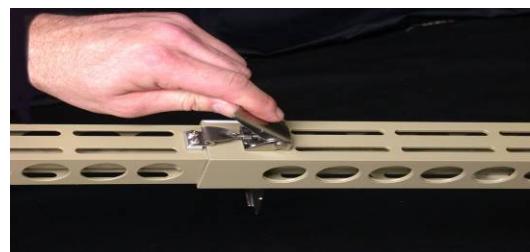
Note: The plastic cable clips on the underside of the boom arm should be facing the ground.

30. Insert the upper boom arm which includes the feed assembly.



31. Secure the boom arm using quick release latches.

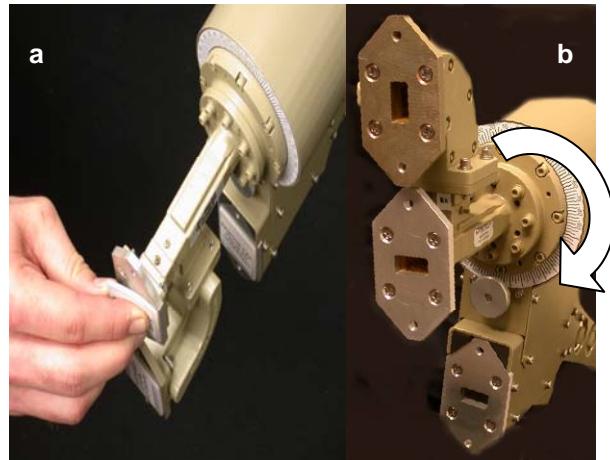
Hint: Engage both latches loosely and apply tension to both latches at the same time.



32. Remove the protective plastic covers from the feed assembly (a).

33. Rotate the polarization assembly so that it is pointing directly up (b). You will need to rotate it 180° from the stowed position.

Note: Store the protective covers in the backpack. They will need to be reapplied upon disassembly.

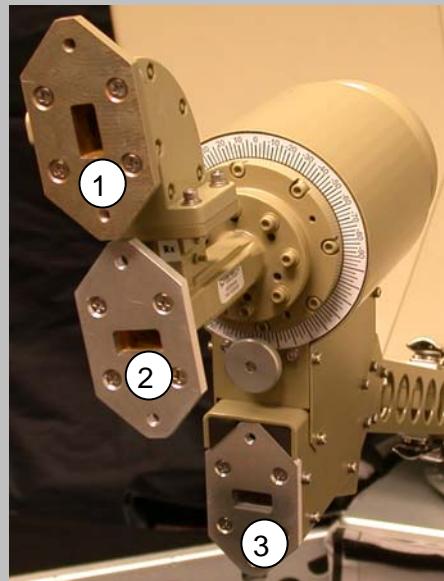


Assembling the GLOBETrekker SNG Standard™

Understanding the Feed Assembly

Figure 17. Front View of the Feed Assembly without Protective Covers

Additional components can be attached to the feed assembly at three interfaces:



INTERFACE 1: Receive (Rx) Output

- Connects to the Low Noise Block (LNB).
- Refer to the section titled “Attaching the Low Noise Block to the Feed Assembly” on page 62.

INTERFACE 2: Transmit (Tx) Input

- Connects to an end of the flexible waveguide.
- Refer to the section titled “Connecting the Waveguide to the Feed Assembly” on page 63.

INTERFACE 3: Transmit (Tx) Output

- Connects to the other end of the flexible waveguide.
- Refer to the section titled “Connecting the Waveguide to the Feed Assembly” on page 63.
- RF Terminator is also connected here during system testing and troubleshooting.

Attaching the Low Noise Block to the Feed Assembly

34. Select the LNB that is appropriate for the region of deployment from the top of Transit Case A:

North America = 1000HA

Europe = 1000HB

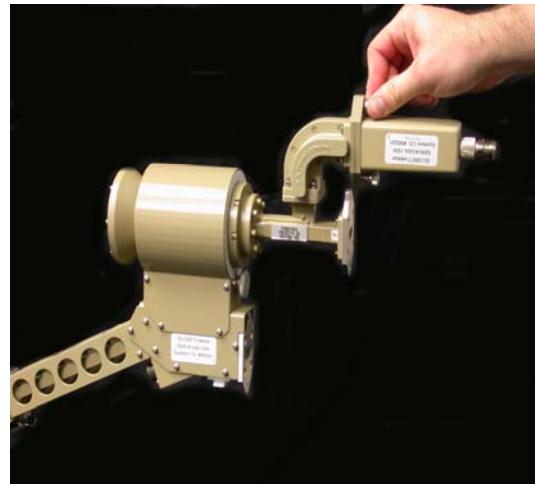
Asia = 1000HC

35. Remove the protective cover from the LNB.
Note: Store the protective plastic covers in the backpack. They will need to be reapplied upon disassembly.



Assembling the GLOBETrekker SNG Standard™

36. Attach the LNB to the top waveguide interface of the feed assembly using the thumb screws.

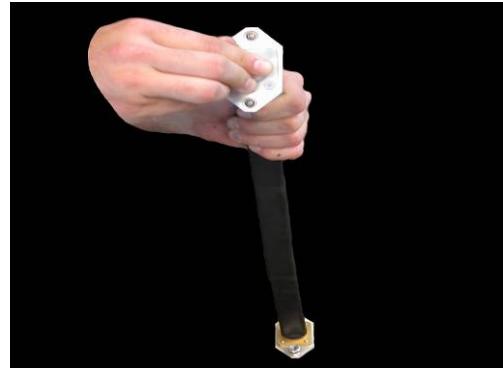


For more information on the feed assembly, refer to Figure 17.

Connecting the Waveguide to the Feed Assembly

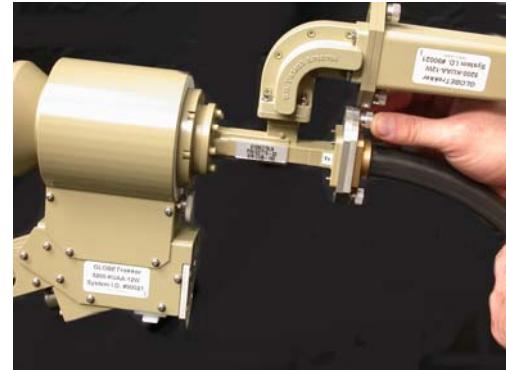
37. Remove the flexible waveguide from bottom of Transit Case A.
38. Remove the protective covers from each flange (or end) of the flexible waveguide.

Note: Store the protective covers in the backpack. They will need to be reapplied upon disassembly.



Assembling the GLOBETrekker SNG Standard™

39. Attach one end; does not matter which end you use; of the waveguide to the middle waveguide interface of the feed assembly using the thumb screws.



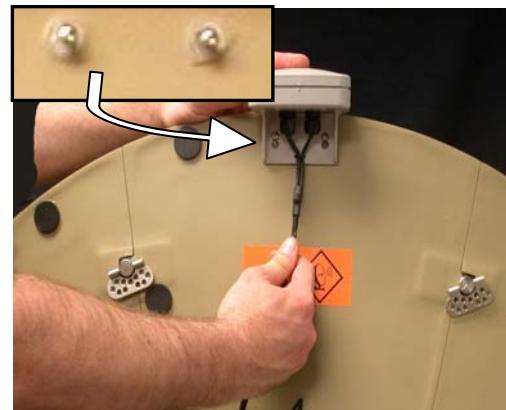
40. Attach the other end of the flexible waveguide to the waveguide interface of the feed assembly using the thumb screws.



Attaching the Compass Unit

41. Remove the compass unit from the top of Transit Case A.
42. Attach the compass unit to the mounting hardware on the top of antenna segment 4 (top middle).

Note: Mounting hardware is shown in inlaid picture.



Assembling the GLOBETrekker SNG Standard™

43. Select the attached cable with the 4 pin male amphenol connector.



44. Connect cable to baseband unit.

Hint: Align the notch on the larger amphenol connector when connecting it to the baseband unit.



Connecting the Baseband Cables to the Feed Assembly

45. Locate the two cables from the baseband unit that connect to the feed assembly.



Assembling the GLOBETrekker SNG Standard™

46. Select the green color-coded cable with the male N connector as shown.



47. Attach the green color-coded cable with the male N connector to the female N output connector on the LNB.



48. Select the next cable towards the front of the baseband, with the size 12, 8-pin amphenol connector as shown.



Assembling the GLOBETrekker SNG Standard™

49. Attach the cable with the 8 pin amphenol connector to under-side of the base of the feed assembly.



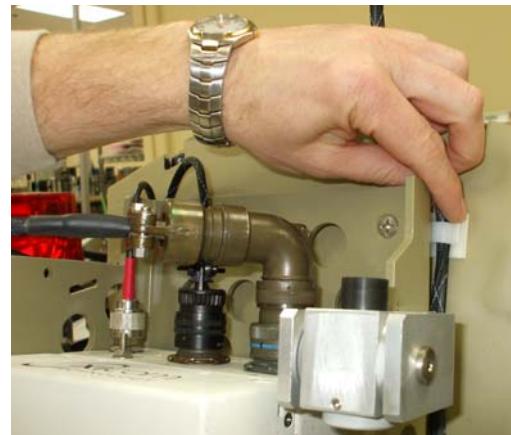
50. Stretch the cables from the feed assembly on the underside of the boom arm towards the main antenna assembly. Leave enough slack in the LNB cable to enable the LNB and feed to rotate freely.

51. Clip the cables into place along the boom arm (underside) in two places.



Assembling the GLOBETrekker SNG Standard™

52. Clip the Compass cable to back of main antenna segment.



Connecting the Baseband Cables to the Main Antenna Assembly

53. Select the 6 pin female amphenol connector of the elevation drive cable.



54. Connect the 6 pin female amphenol connector to the elevation assembly.

Hint: Align the larger notch on the amphenol cable when making the connection to the elevation assembly.



Assembling the GLOBETrekker SNG Standard™

55. Select the 3 pin male amphenol connector (inclinometer cable).



56. Connect the 3 pin male amphenol connector to the baseband unit.

Hint: Align the larger notch on the amphenol cable when connecting it to the baseband unit.



Connecting the Baseband Cables to the SSPA

57. Locate the three baseband cables that attach to the SSPA.



Assembling the GLOBETrekker SNG Standard™

58. Note the 3 ports on the SSPA mounted on the back plate of the main antenna assembly.



59. Select the 90° color-coded red male N connector.



60. Connect it to the 'RF IN' port on the SSPA.



Assembling the GLOBETrekker SNG Standard™

61. Select the 8-pin DC connector.



62. Connect the 8-pin DC connector to the 'DC IN' port on the SSPA.



63. Select the 18-pin Monitor & Control amphenol connector.



Assembling the GLOBETrekker SNG Standard™

64. Connect the 18-pin amphenol connector to the 'MONITOR AND CONTROL' port on the SSPA.
65. Bundle the cables together and secure one to cable clip on back of the reflector (on the left of SSPA).



5 Attaching the Audio/Data Kit & Peripheral Equipment

Attaching The Audio/Data Kit & Peripheral Equipment

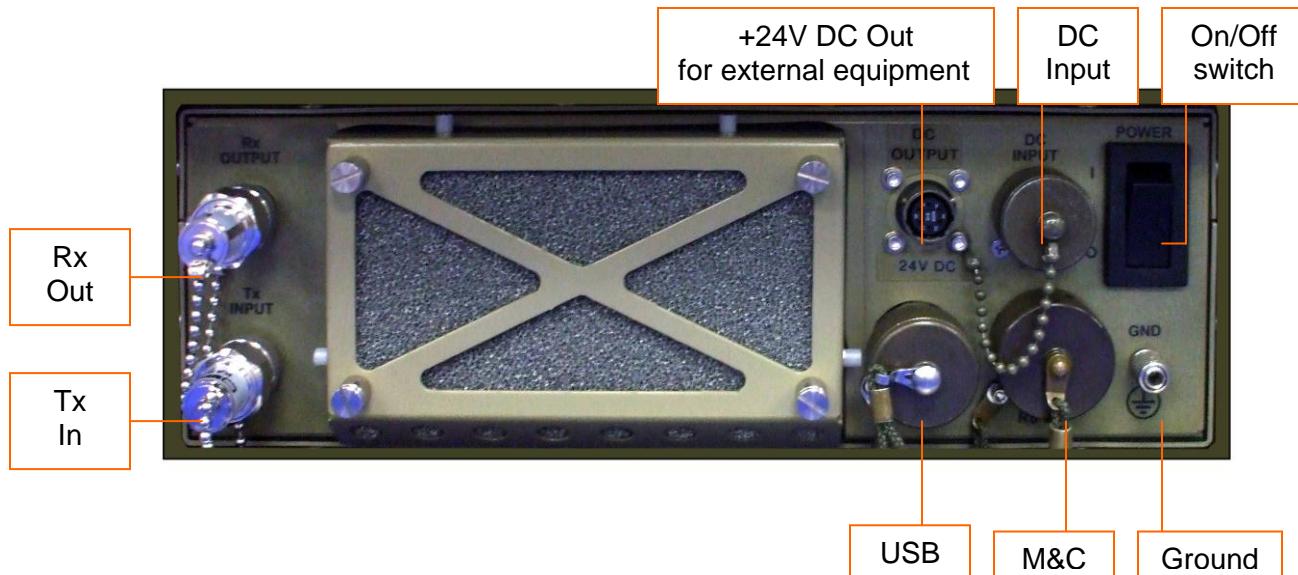
This chapter describes the baseband unit and audio/data kit connections, as well as how peripheral equipment may be attached to the GLOBETrekker SNG Standard™ terminal.

For ultimate flexibility the GLOBETrekker SNG Standard™ is equipped with several connectors on both the baseband unit and the audio/data kit.

To correctly attach a laptop to this system, refer to *Appendix A: Attaching a Laptop to the GLOBETrekker SNG Standard™*.

Baseband Connections

Figure 18. Baseband Connections (Front Panel)



The **+24V DC OUTPUT** is a multi-pin amphenol female connector. It gives the +24V power supply to the baseband unit, which in turns supplies the Antenna/RF equipment.

The **DC INPUT** supplies power from the power supply to the baseband unit.

The **POWER** switch controls the AC power to the interior of the baseband unit.

Attaching The Audio/Data Kit & Peripheral Equipment

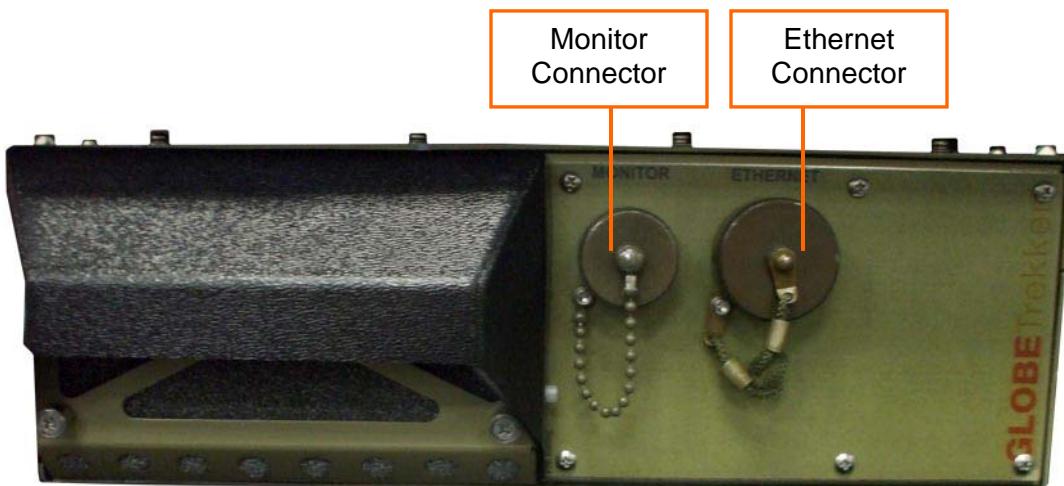
The **USB** connector can be used to connect USB compatible speakers, a mouse, a keyboard, a memory stick or a USB hub.

The **M&C** connector is used for factory testing only, i.e. does not require user interaction.

The **Ground** stud provides a means to ground the chassis of the baseband unit to the earth ground.

Note: The ground of the AC input is connected to this ground stud.

Figure 19. Baseband Connections (Rear Panel)



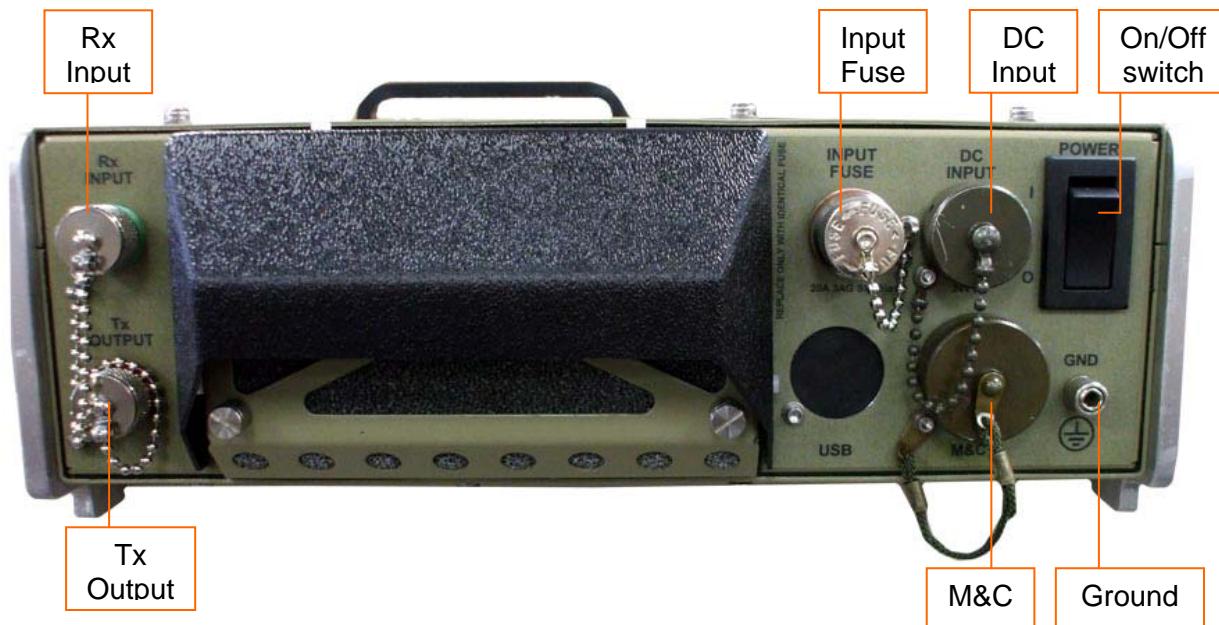
The **MONITOR** connector is used to connect the wired display to control the GLOBETrekker SNG Standard™ system.

The **ETHERNET** connectors can be used to connect a wireless router, laptop, camera, or similar peripheral equipment.

Attaching The Audio/Data Kit & Peripheral Equipment

Audio/Data Kit Peripheral Connections

Figure 20. Audio/Data Kit Connections (Rear Panel)



The **INPUT FUSE** protects the DC input to the audio/data kit. The fuse will blow and the fans will subsequently turn off in the event of DC input problems.

Note: Some audio/data kits may have a DC Output connector in place of the Input Fuse.

The **POWER** switch controls the AC power to the interior of the baseband unit.

The **DC INPUT** supplies power from the power supply to the baseband unit.

The **M&C** connector controls the parameters of the audio/data kit and modem.

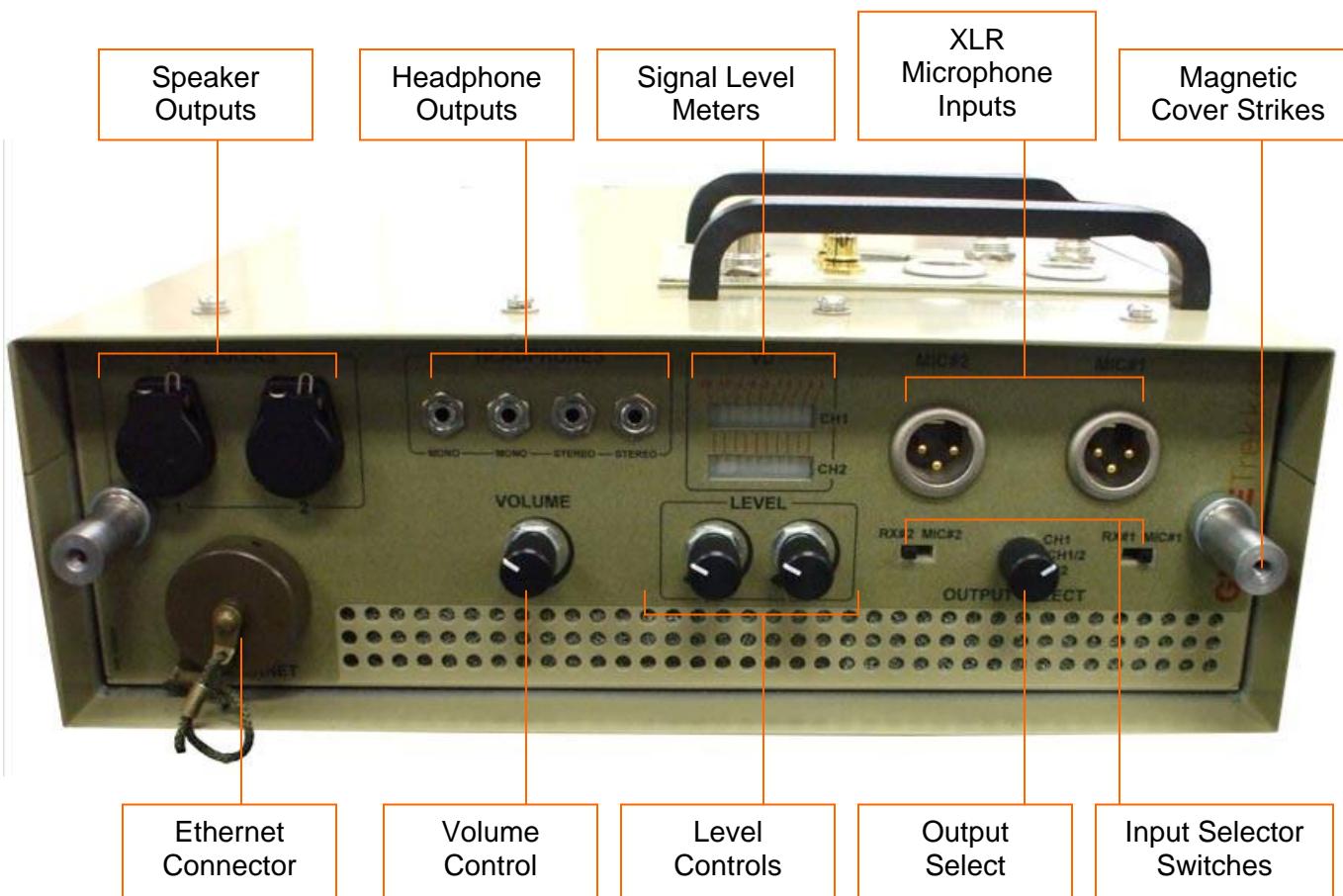
The **Ground** stud provides a means to ground the chassis of the baseband unit to the earth ground. (Note: The ground of the AC input is connected to this ground stud.)

The **Rx Input** accepts L-Band receive (Rx) signal from the LNB via the IFL and baseband unit.

The **Tx Output** provides the L-Band output of the Paradise Evolution modem and the 70MHz output of the DVB-S modulator to the baseband unit via the IFL.

Attaching The Audio/Data Kit & Peripheral Equipment

Figure 21. Audio/Data Kit Connections (Front Panel)



The **Speaker Outputs** allow audio speakers to be attached to the audio/data kit for audio output.

The **Headphone Outputs** allow the user to listen to the audio output via headphones. There are two mono outputs and two stereo outputs (left – Channel 1; right – Channel 2).

The **Signal Level Meters** will display the VU level of the selected channel(s).

The **Level Controls** allow the user to adjust the input volume for Channel 1 (left) and Channel 2 (right).

The **XLR Microphone Outputs** allow the user to attach microphones to input audio.

Attaching The Audio/Data Kit & Peripheral Equipment

The **Magnetic Cover Strikes** allow the audio/data kit cover to be attached magnetically.

The **Ethernet Connector** can be used to connect a wireless router, laptop (directly or via remote desktop connection), camera, or similar peripheral equipment. This connection is typically used for data file transfers.

The **Volume Control** allows the user to adjust the output volume for the speakers and headphones.

The **Output Select** switch allows the user to select which channel is outputted to which speaker/headphone.

CH1: Both speakers/headphones will output audio from Channel 1

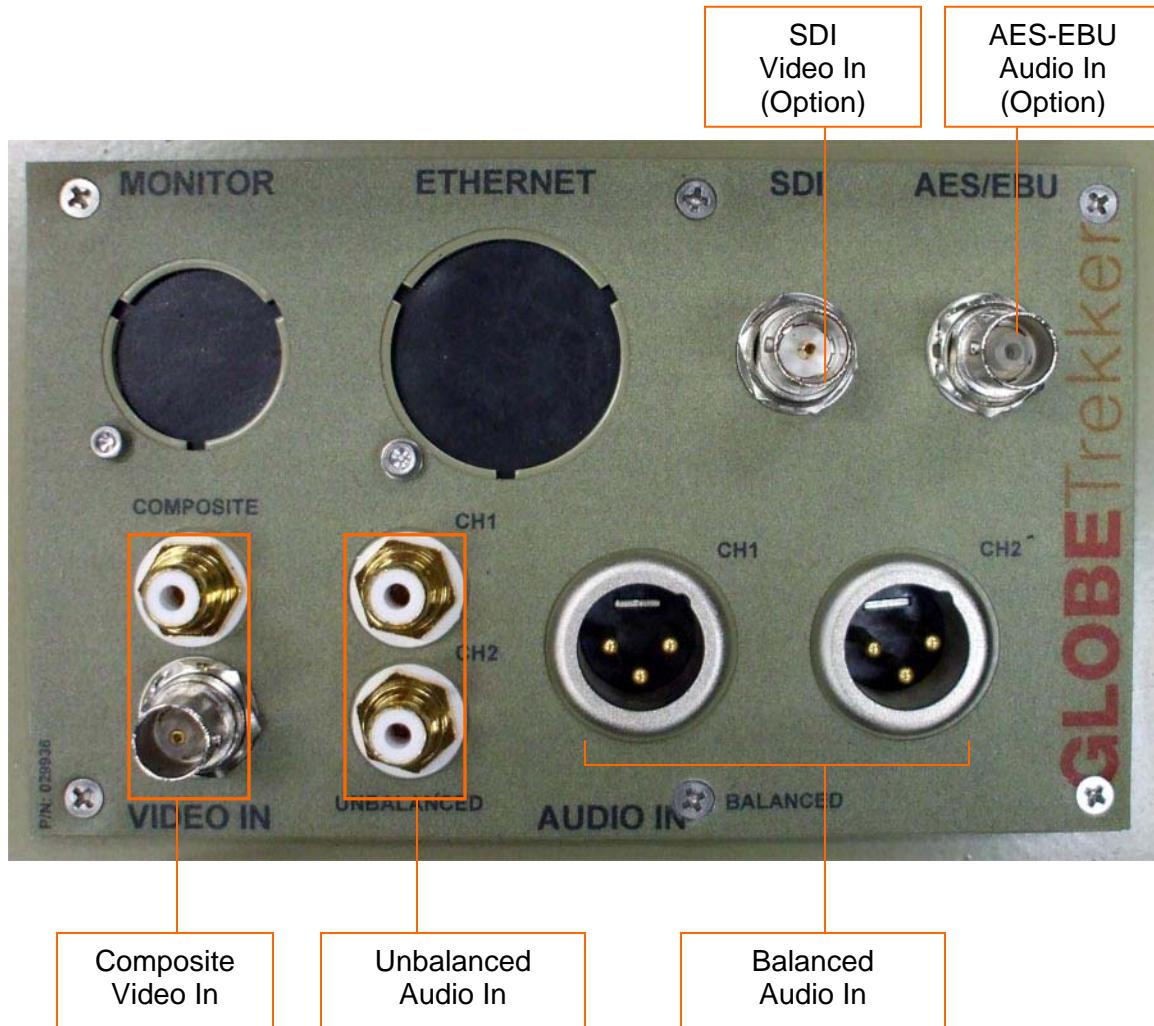
CH1/2: The left speaker/headphone will hear Channel 1

The right speaker/headphone will hear Channel 2

CH2: Both speakers/headphones will output audio from Channel 2

Attaching The Audio/Data Kit & Peripheral Equipment

Figure 22. Audio/Data Kit Connections (Top Panel)



The **SDI VIDEO INPUT** is a 75 ohm BNC connector (Optional).

The **COMPOSITE VIDEO INPUT** is a 75 ohm BNC female and an RCA female socket.
Note: Only one of SDI or Composite video input can be used at a time.

Attaching The Audio/Data Kit & Peripheral Equipment

The **AES-EBU AUDIO INPUT** (AES3) carries digital audio signals between devices (Optional).

The **UNBALANCED AUDIO INPUTS** are RCA female connectors. The audio input can be set to dual mono and stereo. The audio channel is mapped as a stereo MPEG audio program.

The **BALANCED AUDIO INPUTS** are 3-pin XLR male connectors because they are waterproof. The audio input can be set to dual mono and stereo. The audio channel is mapped as a stereo MPEG audio program.

Note: For the balanced audio inputs, you will need to use the XLR adapter cable to female/female.

Note: Any single channel can use either the balanced or the unbalance input, but not both simultaneously.

Attaching The Audio/Data Kit & Peripheral Equipment

Connecting the Baseband Unit to the Audio/Data Kit (Rear Panel)

The following steps outline the process for connecting the baseband unit to the audio/data kit:

1. Remove the 30m IFL cable from the Accessories case. Note the four connectors and long cable hook.



2. On the end of the IFL cable with the cable hook, select the M&C cable.

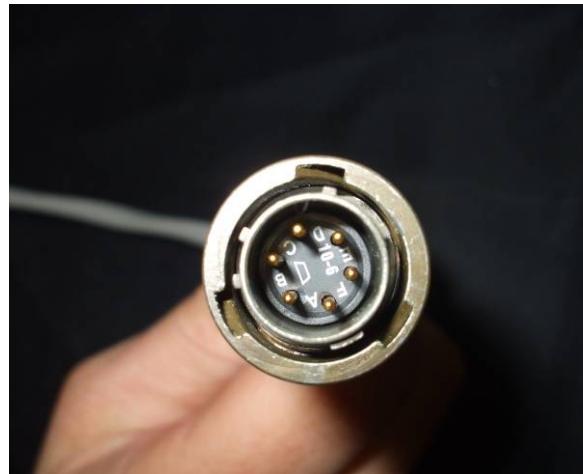


Attaching The Audio/Data Kit & Peripheral Equipment

3. Connect it to the M&C connector on the front panel of the baseband unit.



4. Select the 6-pin amphenol connector from the same end of the IFL cable.



5. Connect it to the **DC Input** connector on the front panel of the baseband unit.

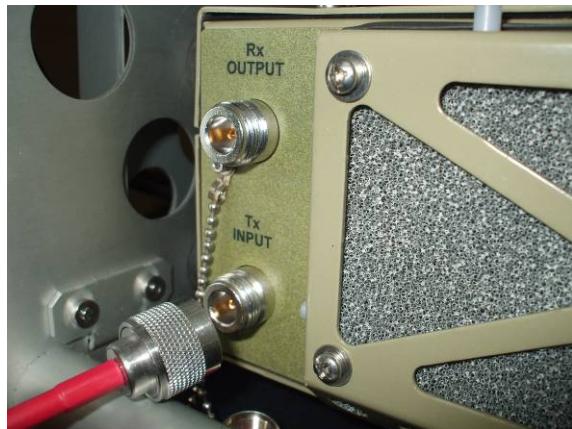


Attaching The Audio/Data Kit & Peripheral Equipment

6. Select the red color-coded male N connector.



7. Connect it to the **Tx Input** connector on the front panel of the baseband unit.



8. Select the green color-coded cable with the male N connector.

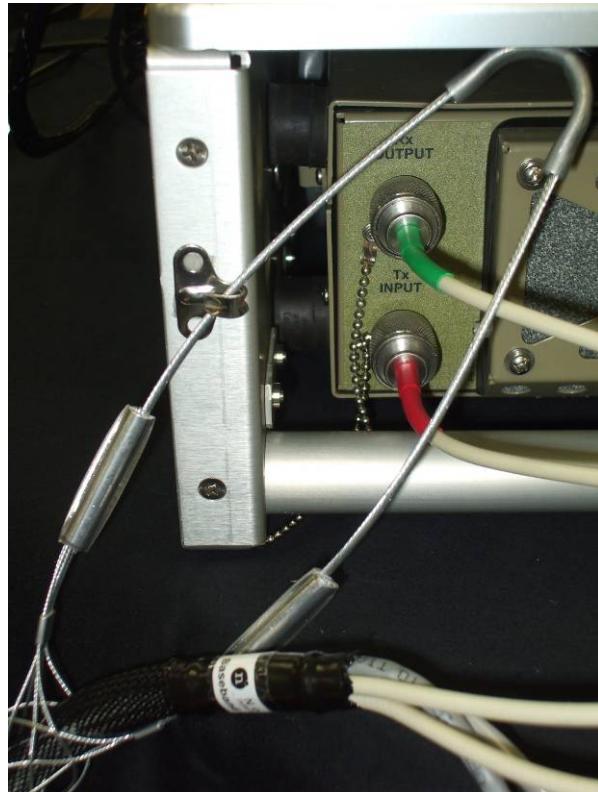


Attaching The Audio/Data Kit & Peripheral Equipment

9. Connect it to the **Rx Output** cable on the front panel of the baseband unit.



10. Confirm that the four IFL cable connections to the front panel baseband connections are secure. Attach the cable hook to the baseband chassis hook on the left side of the front panel to relieve the tension from the IFL connectors.



Attaching The Audio/Data Kit & Peripheral Equipment

11. Connect the connectors on the opposite end of the IFL cable to the rear panel of the audio/data kit (as shown in the following order: **M&C**, **DC Input**, **Tx Output**, **Rx Input**).



Attaching The Audio/Data Kit & Peripheral Equipment

Connecting Peripheral Equipment to the Audio/Data Kit

The following steps outline the process of connecting peripheral equipment to the rear panel and top panel of the audio data kit.

Connecting the Speakers

1. Remove the two speakers from the Accessories Case.



2. Connect the speakers to the **Speakers** connectors on the rear panel of the audio/data kit.



Attaching The Audio/Data Kit & Peripheral Equipment

Connecting the Microphone(s)

3. Remove the XLR Microphone cable from the Accessories Case.

4. Remove the XLR F-F adapter cable from the Accessories case.

5. Connect the male (with pins) connector of the XLR Microphone cable to one end of the XLR F-F adapter cable.

6. Connect the other end of the XLR F-F adapter cable to one of the **MIC #** cables on the rear panel of the audio/data kit.

7. Connect the other (female) end of the XLR Microphone cable to the male (with pins) connector of your microphone (user supplied).



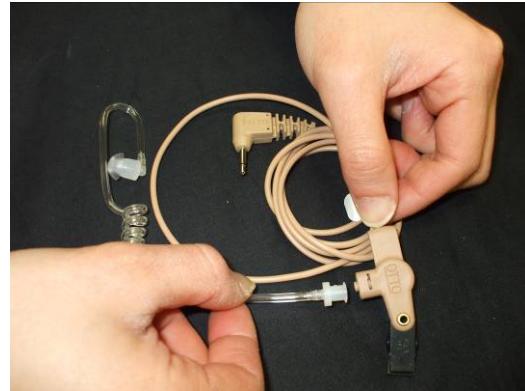
Attaching The Audio/Data Kit & Peripheral Equipment

Connecting the Headphone Equipment

8. Remove the headphone equipment (ear tubes, ear buds, and ear bud extension cables) from the Accessories Case.



9. Connect the ear tube to the ear bud, as shown. Turn the ear tube to secure inside the ear bud.



10. Attach either the ear bud directly into the **Headphones** connectors (rear panel of audio data kit) or via the black ear bud extension cable.



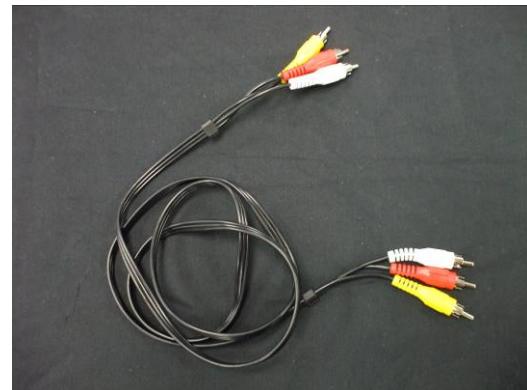
Attaching The Audio/Data Kit & Peripheral Equipment

11. When you are ready, simply place the ear tube in your ear to listen to the audio output.



Connecting the Audio/Video cable

12. Remove the 3-channel RCA cable from the Accessories Case.



13. Attach one end (3 connectors) to appropriate **VIDEO IN** and **AUDIO IN** connectors on the top panel of the audio/data kit, as shown.

Note: The yellow cable is for video input and the red and white cables are for unbalanced audio input. If you prefer to use balanced audio input, disconnect the red and white (unbalanced audio) RCA cables. Then, connect balanced audio cables (user supplied) to the **BALANCED (CH1** and **CH2) AUDIO IN** connectors via the second XLR F-F adapter cable.

