SKYLINK

Remote Monitoring

Global Voice

Data Connection

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Installation Guide

Blue Sky Network

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SkyLink

Installation Guide

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REVISION HISTORY

Date	Ver.	By	Description
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30 April 2021	1.0	MZ	Final Version Release
17 May 2021	1.1	MZ	Updated terminal/antenna mounting sections
24 June 2021	1.2	MZ	Changed mounting renderings; added note about SIM cards
14 July 2021	1.3	MZ	Added aviation antenna information/diagram
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1 Sept 2021	1.6	MZ	Included mention of SkyLink 7100 Install Guide; removed antenna location suggestions table; made corrections based on feedback
9 Sept 2021	1.7	MZ	Added info for antenna location suggestions
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28 Sept 2021	1.9	MZ	Added note to Step 4: Attach Adapters
15 Oct 2021	1.10	MZ	Added SkyLink DC Pigtail info; edited wording in several sections
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2 Feb 2023	2.9	MZ	Added BSN external GPS antenna adapter to list of common adapters

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INTRODUCTION

This Installation Guide demonstrates the process of mounting SkyLink to multiple fixed and non-fixed assets, including a vehicle, ship, and building, among other rigid objects. It also includes information on charging, installing, and using the SkyLink Battery Pack.

About SkyLink

SkyLink by Blue Sky Network is the inaugural Iridium Certus® 100 mid-band solution for land mobile, aviation, IoT, and maritime markets. This small-form, multi-stack hardware is designed for any fixed-mount, portable, or mobile application and offers a range of service configurations for mission-focused versatility and affordability. It is both IP65 Certified and FCC Part 15 & 25 Certified.

Installation Components

Installation components are based on the desired configuration for each unit; the list below describes some of the most common components available in a kit or purchased. All adapter assemblies come with a length of cable that is acceptable for typical installations.

- Dual-Mode Data Gateway
- One of the following Iridium-approved antennas:
    - MARUWA – MHL-1621C
    - High-Profile Maxtena – M1621HCT-HP
    - Sensor Systems – S67-1575-414
    - SCAN – 65020-000
- SkyLink Mounting Bracket
    - Self-assembly kit
    - Pole Mount (optional)
- One of the following power adapters:
    - 12V Cigarette Lighter Adapter
    - SkyLink DC Pigtail Harness
    - POE Injector (self-assembly kit)
    - AC/DC Power Supply (self-assembly kit)
- 1' Pigtail Ethernet Adapter
- 6' Ethernet Cable (longer length options available)

NOTE: If a longer length is needed, you can purchase an extender offered in multiple lengths. Additionally, cable diagrams can be created for specific installations upon request. Please contact us for more information about available accessories, installation kits, and diagrams.

Top Panel Description

The top panel contains a power LED indicator and 2 connectors for an Iridium and cellular antenna. The descriptions below reference the photo above in accordance with the numerical value.

1. **Iridium Antenna Connector**
   - Furthest connector from power LED indicator
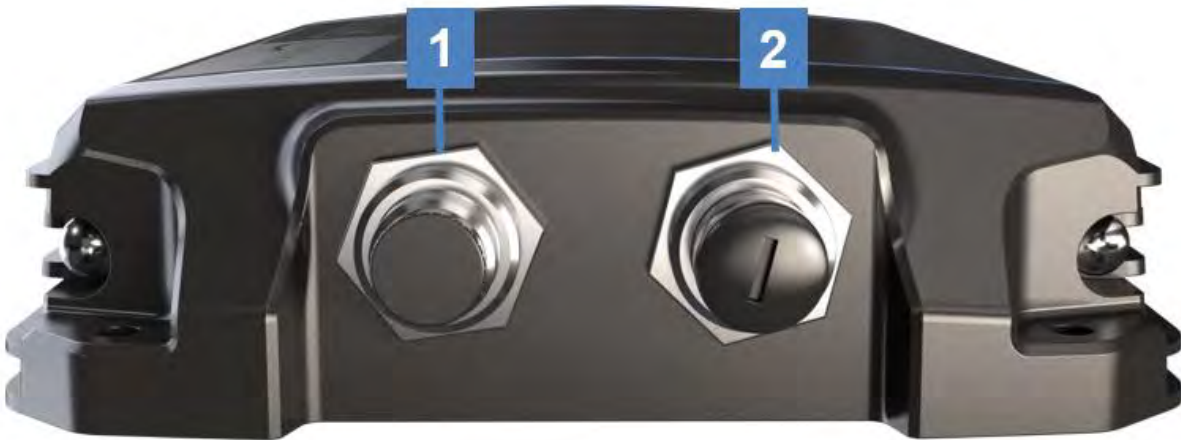   - "IRI" etched into connector recess

2. **Power LED Light**
   - Green = Initial Power On
   - Red = Unit in Bootloader Mode
   - Blue Blink = OS is Booting
   - Blue Steady = Device is Ready
   - Red Blink = Iridium Firmware Upgrade
   - Blue Blink = SkyLink Firmware Upgrade

3. **Cellular Antenna Connector**
   - Closest connector to power LED indicator

Bottom Panel Description

The bottom panel contains a power port and a connectivity port that connects to multiple adapters. The descriptions below reference the photo above in accordance with the numerical value.

1. **Power Port**
   - Connects to the following adapters: 12V Cigarette Lighter, SkyLink DC Pigtail Harness, POE Injector, or AC/DC Power Adapter
   - Remove connector cap before attaching cable

2. **Connectivity Port**
   - Connects to USB and RS232 adapters
   - Remove connector cap before attaching adapter

SkyLink DC Pigtail Harness

This is the cable you receive if you request the currently labeled 'SL100-IS, SkyLink 10' Power Interface Cable with QuickPosition (QPos).' Below are the specs.

OPERATING PARAMETERS
Electrical
- External power:
  - 10-34 VDC (12V nominal power)
  - POE
- Wiring

Function	Color
+Vin	Brown
GND	Green
SOS	White

Back Panel Description

The back panel of the unit contains a label with the following information:

- Model series number
- Part number
- Product serial number
- Iridium IMEI
- WiFi SSID and password
- Required certification notifications
- Power and mechanical specifications
- Scannable QR code to access device WiFi

An extra label with this information can also be found in the device's box.

EQUIPMENT SETUP

Step 1 – Install Cellular & Iridium SIM Cards

NOTE: If you purchased your SkyLink device through Blue Sky Network, the unit will come with cellular and Iridium SIM cards already installed.

To install your cellular and Iridium SIM cards:

1. Carefully remove the entire bottom panel of the unit by unscrewing the Phillips screw on each side of the panel.

2. Insert SIM cards located behind the connectivity port, taking care to ensure wires remain tucked in.

3. Flip the device over to the back panel (where the white label is located) and insert the Iridium SIM card into the slot.

NOTE: A micro SD slot is also present behind the connectivity port. Ensure that the SIM cards are placed into the correct holders and not the micro SD slot. If the device does not work after installing the SIM cards, they may be in the wrong slots.

4. Re-attach bottom panel by re-screwing Phillips screws.

Step 2 – Connect Cellular & Iridium Antennas

CELLULAR ANTENNA

The SkyLink device uses an LTE extender antenna that connects directly to the cellular antenna connector located on the top panel of the unit.

IRIDIUM ANTENNAS

The SkyLink device uses Iridium antennas with both direct and non-direct connection to the unit. The Iridium antenna connector is on the top panel ("IRI" will be etched into the connector's recess).

NOTE: All antennas should be positioned in a location where they have an unobstructed, full view of the sky. Please see Location Requirements for a full list of considerations.

There are multiple Iridium antennas that can be used with your SkyLink device:

Direct Connection – MARUWA

Connect the MARUWA antenna directly to the Iridium connector located on the top panel of the unit.

Non-Direct Connection – High-Profile Maxtena, SCAN, Sensor Systems, & MARUWA

High-Profile Maxtena

- Minimum cable loss: 0.4 dB
- Maximum cable loss: 2.0 dB
- LMR240 cable length: 2' to 12'

SCAN

- Minimum cable loss: 0.4 dB
- Maximum cable loss: 2.0 dB
- LMR240 cable length: 2' to 18'

MARUWA

- Minimum cable loss: 0.4 dB
- Maximum cable loss: 1.0 dB
- LMR240 cable length: 0' to 5'

Sensor Systems

- Minimum cable loss: 0.2 dB
- Maximum cable loss: 0.6 dB
- LMR240 cable length: 2' to 10'

Connect the BSN-provided cable to the respective antenna, then attach the other end to the Iridium antenna connector.

ANTENNA REQUIREMENTS

Listed below are the Iridium antenna requirements for the SkyLink device. Please contact us if you have any questions or need an antenna.

MARUWA Antenna (MHL-1621C)

- Passive antenna
- Frequency: 1621.0 MHz
- Impedance: 50 ohms
- Polarization: RHCP
- Operating temperature: -40°C to +85°C
- SMA male connector
- Maximum acceptable cable loss: 1.0 dB

High-Profile Maxtena (M1621HCT-HP)

- Passive antenna
- Frequency: 1616-1626 MHz
- Impedance: 50 ohms
- Polarization: RHCP
- Operating temperature: -40°C to 85°C
- TNC female connector
- Maximum acceptable cable loss: 2.0 dB

Sensor Systems Antenna (S67-1575-414)

- Passive antenna
- Frequency: 1616-1626.5 MHz
- Impedance: 50 ohms
- Polarization: RHCP
- Operating temperature: -55°C to +70°C
- TNC female connector
- Maximum acceptable cable loss: 0.6 dB

SCAN Antenna (65020-000)

- Passive antenna
- Frequency: 1616-1626.5 MHz
- Impedance: 50 ohms
- Polarization: RHCP
- Operating temperature: -40C° to 70°C
- N-female connector
- Maximum acceptable cable loss: 2.0 dB

Step 3 – Connect Power

Depending on your purchase, your kit will include one of the following power adapters:

- 12V Cigarette Lighter
- SkyLink DC Pigtail Harness
- POE Injector
- AC/DC Power Adapter

NOTE: Some adapters, such as the POE Injector, may require connection to an additional cable that will be included in your kit. Please see the question, *"My kit came with a POE power source. What is it and how do I use it?"* in the FAQ section of the SkyLink User Guide if you need further assistance.

To power on the device, remove the connector cap from the power port located on the bottom panel of the unit. Connect the power cable into the port and the adapter into the appropriate power source (e.g., a wall or vehicle outlet).

Confirm Unit Status

To confirm the status of the unit, use the power LED indicator located on the top panel of the device. It will show green, followed by red, then flashing blue as it boots. A steady blue LED indicates that the unit is ready to use.

Power Off Unit

When you are ready to turn the unit off, simply unplug the power adapter from the power port located on the bottom panel. The power LED indicator will show green and slowly fade. Once the indicator is completely dark (approximately 60 seconds), the unit has turned off.

Step 4 – Connect Adapters

Listed below are the most common adapters that can be connected to your SkyLink device for additional functionality. These will either be included in your kit, depending upon your selection, or can be purchased.

- USB Adapter
  NOTE: An FXS or FXO adapter needs to be plugged into the USB adapter in order to use a POTS phone or phone system. Use an FXS adapter to connect a POTS phone to SkyLink and an FXO adapter to connect a phone system.

- RS232 Adapter
  NOTE: The RS232 cables are proprietary and available only from Blue Sky Network. The SkyLink RS232 cable kit comes with a DB9F connector and conforms to the RS232 standard pinout for a DB9. Please contact sales@blueskynetwork.com or your reseller to purchase.

- Blue Sky Network External GPS Antenna Adapter

To attach the adapter, remove the connector cap from the connectivity port located on the bottom panel of the unit. Connect the cable into the port and the adapter into the appropriate device (e.g., modem or POTS adapter).

Step 5 – Complete Setup

Congratulations on successfully installing your SkyLink device! If you purchased a SkyLink Battery Pack, please see the Battery Pack section below for installation and usage information.

To complete unit setup, including configuring your settings, see the SkyLink User Guide.
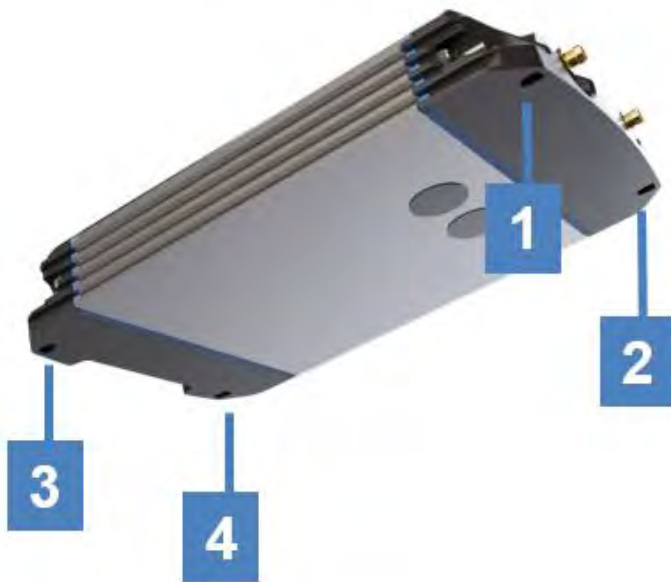
SKYLINK MOUNTING & INSTALLATION

Mounting

The SkyLink device should be securely fastened to a rigid object to ensure optimal functionality. There are three recommended methods for securing the terminal:
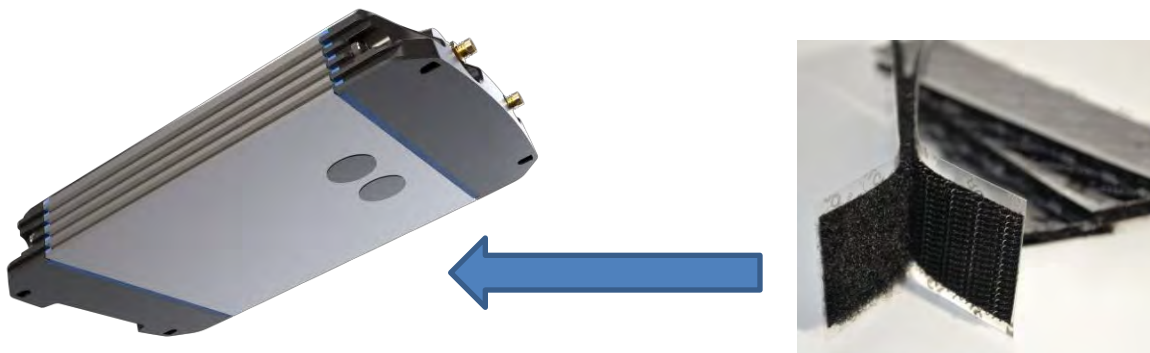
MOUNTING THE UNIT

All four corners of the device contain holes that can be used to affix the unit via straps, ties, or bolts.

MOUNTING WITH ADHESIVE

An adhesive (e.g., Velcro) can be placed on the back panel of the unit and attached to a rigid object.

MOUNTING WITH THE SKYLINK MOUNTING BRACKET

A universal mounting bracket with vibration dampening is included with your purchase of SkyLink, allowing for the unit to be securely anchored to a fixed structure such as a wall. An optional pole mount can also be purchased with the kit.

SkyLink Mounting Bracket

- For installation on wall, panel, boat, or truck.

- Use wall anchors (4) in 2" x 2" pattern.

Optional Pole Mount

- For vertical pole mount installation (shown). Use V-bolts (4) horizontally in 2" x 2" pattern.

- For horizontal pole mount installation (not shown). Use V-bolts (4) vertically in 2" x 2" pattern.

Other Installation Equipment

In addition to the equipment described above, the following may be useful to have during installation:

- Screwdriver & Socket Set

Location Requirements

The following must be observed when installing the SkyLink terminal and antennas:

ANTENNAS

NOTE: Certus-certified antennas for SkyLink are required. See the Antenna Requirements section for a list of approved antennas.

The Iridium Certus Maxtena HP, SCAN, and MARUWA antennas are designed to be ground-plane independent and are certified for use 1m above the ground plane and should be mounted as such. Other antennas such as Sensor Systems is designed to be ground-plane mounted, but its certification is pending the antenna test data approval.

NOTE: To avoid exposure to antenna radiation, personnel should maintain a safe distance of 30 cm. (11.8 in.) minimum from the antenna while the unit is operating.

- The antenna should be mounted in an area that prevents close exposure to its radiation.
- The antennas should be mounted with an unobstructed, clear view of the sky to avoid connection and/or data speed issues.
- When possible, distance antennas from large metallic objects in the field of view.
- Place antennas as far away from other antennas (e.g., radar, magnetic compasses, HF antennas) as possible to avoid interference.

SKYLINK TERMINAL

- The terminal should be securely fastened to the rigid object to ensure proper antenna and device functioning.
- The terminal should not be placed in a location where it may become a hazard to the asset during operation (e.g., placing the unit in a location that prevents free operation of gear selector, steering wheel, or airbags in a vehicle) or in the event of a crash.
- Route cabling and wires through locations where they will not be damaged by operator use of the asset (e.g., routing cables through driver footwell in a vehicle).

Location Suggestions

For the following diagrams, location suggestions for SkyLink are in **RED** and for the antenna in **BLUE**. Each section also includes a brief description of the location suggestions.
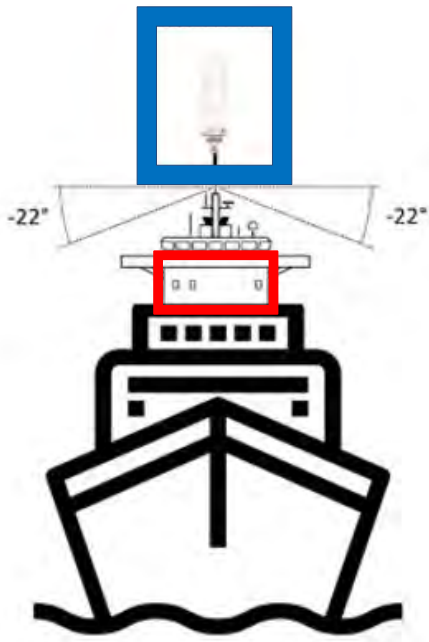
VEHICLE
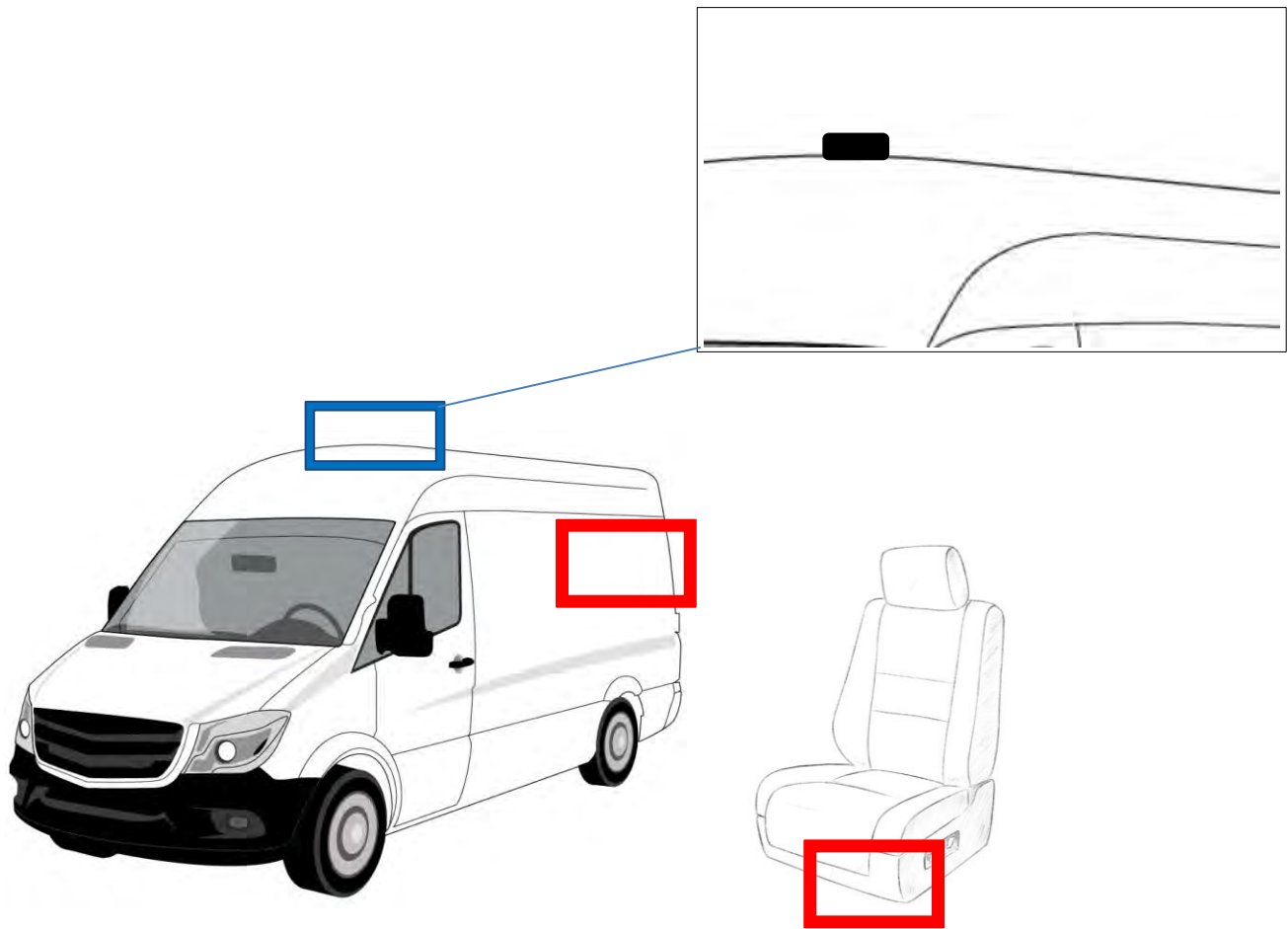
SkyLink
- Under driver or passenger seat
- In trunk of vehicle
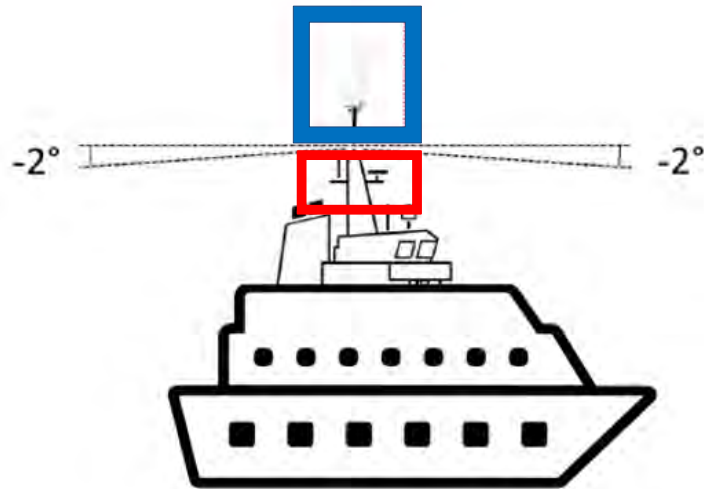
Antenna
- On roof of vehicle

NOTE: No ground plane is required for Maxtena antennas per antenna manufacturer.

SHIP

SkyLink

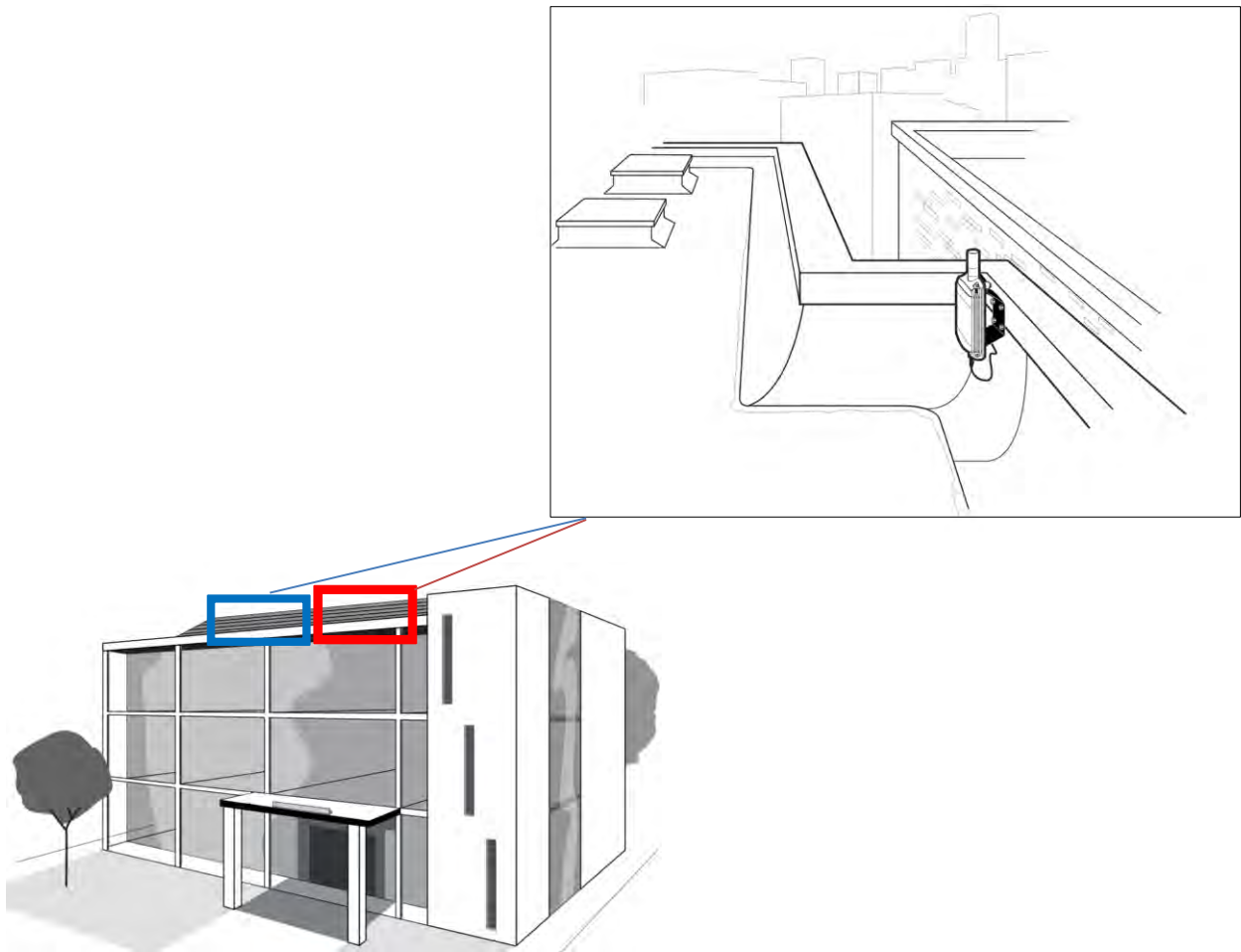- In bridge of ship
- On pole mount attached to mast

Antenna

- On mast

NOTE: The following must be observed when mounting the antenna on a ship:

o Antennas should be placed as far away from other antennas (e.g., radar, magnetic compasses) as possible.

o If mounting to a metal mast, the antenna should be placed above it; otherwise, it should be mounted to a wood or RF transparent fiberglass mast.

o A clear view of +/-22º below the horizontal plan is needed to provide full functionality under extreme roll conditions.

o A clear view of +/-2º below the horizontal plan is needed to provide full functionality under extreme pitch conditions.

BUILDING

SkyLink

- On roof

NOTE: The terminal should not be placed in a room when using the MARUWA antenna while directly connected to the terminal.

- In building (only when using a non-direct connection antenna)

NOTE: Ensure that you have sufficient length of ethernet cat6 cable to connect to the terminal.
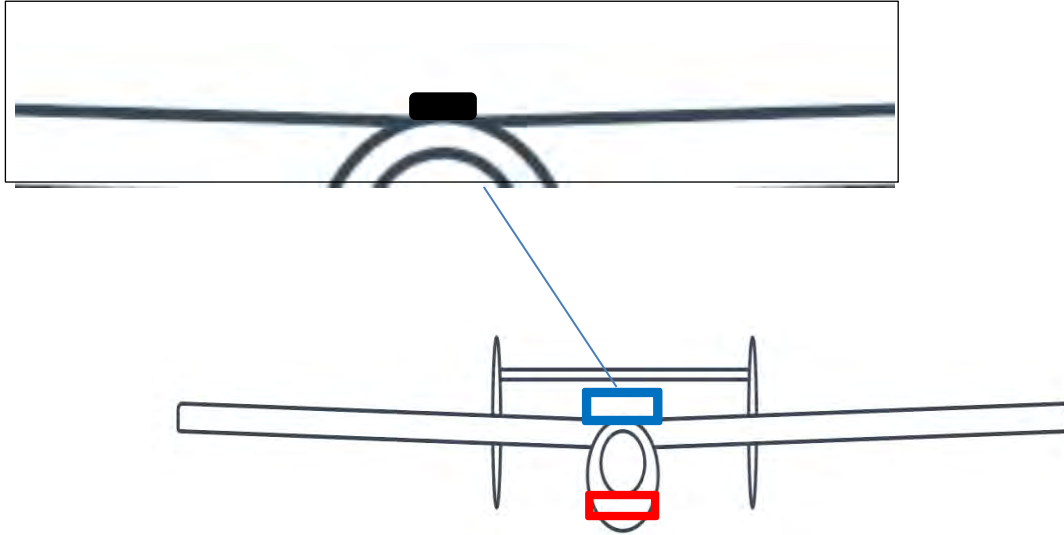
Antenna

- On roof

NOTE: Ensure that the antenna is placed in an unobstructed, full view of the sky to mitigate connectivity and/or data speed issues.

AIRCRAFT/UAV

NOTE: For more detailed information, please see the SkyLink 7100 Installation Guide.

SkyLink
- Installed internally

Antenna
- On fuselage

BATTERY PACK INSTALLATION & USE

The SkyLink Battery Pack is mounted to your Data Gateway for ultimate mobility. Its tiered battery options, SOS capability, and integrated ignition sensing enables long-lasting power and connectivity in remote or mobile environments, even during power outages.

Top Panel Description

The Battery Pack contains 3 LED indicators, a button to power the device, and a button to enable SOS alerts. The descriptions below reference the photo above according to numerical value.

1. Power Button & LED
Press this button to turn the Data Gateway on or off. Below are the LED colors and descriptors.
- Green = Power On
- Yellow Blink (~15 seconds) = Entering Sleep Mode, then Power Off
- Double Yellow Blink = Low Battery
- Rapid Red Blink = Overcurrent is Sensed
- No Illumination = Power Off

2. Battery Status Indicator LED
- Green = Charge Complete
- Red = Fast Charge in Progress
- Yellow Blink = Temperature Out of Range
- Red Blink = Battery Fault Detected
- No Illumination = Power Off

NOTE: The Battery Pack has 2 battery cell packs and only 1 status LED, so status colors may alternate if the cell packs are in different states (e.g., if 1 is charging and the other is done charging, the status LED will alternate red and green).

3. Emergency (SOS) Button & LED
Use this button to activate SOS mode. The LED will flash amber, and if the Data Gateway is off, the power will turn on. Press and hold the button for 1 second to turn off SOS mode; the Data Gateway will remain on. Pressing the Power button in SOS mode will have no effect until SOS is turned off. Please see the Emergency / SOS Function section below for more information.
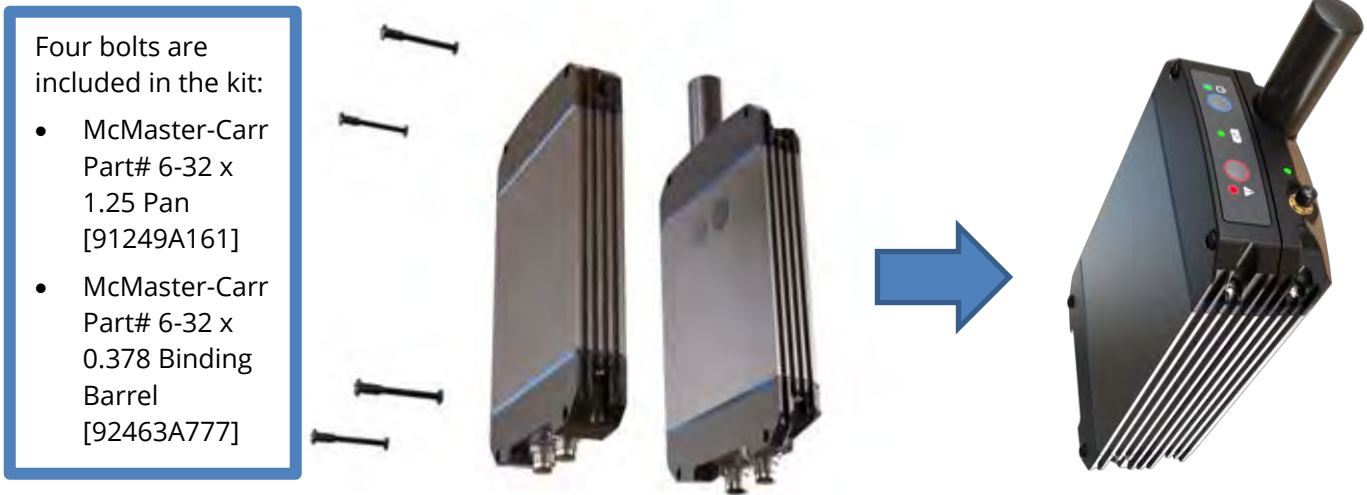
Bottom Panel Description

The Battery Pack is equipped with 2 male M-12 connectors and a provided female cable. A longer cable can be requested to connect a remotely located Battery Pack. The maximum cable run is 50 ft.

The power connector is on the left-hand side when the logo is facing up.

Use the right-hand connector for the external SOS switch.

Installation Steps

STEP 1: ATTACH THE BATTERY

Attach the Battery Pack to the Data Gateway by placing bolts through the chassis holes of the Pack and the Data Gateway (shown below).

Four bolts are included in the kit:

- McMaster-Carr Part# 6-32 x 1.25 Pan [91249A161]
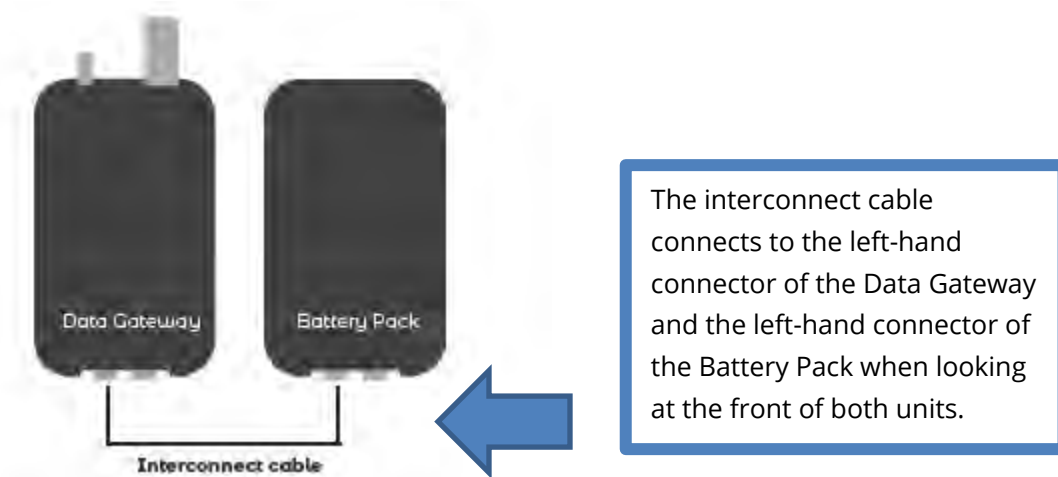- McMaster-Carr Part# 6-32 x 0.378 Binding Barrel [92463A777]

Alternatively, it can be screw or bolt mounted through its own chassis holes. You can also order a remote SOS switch and cable that can be mounted away from the Battery Pack.

STEP 2: ATTACH THE INTERCONNECT CABLE

Connect the interconnect cable between the Battery Pack and the Data Gateway. There is 1 standard interconnect cable and 3 optional cables:

1) Standard 6" interconnect cable, PN 30697-1
2) Optional 72" interconnect cable, PN 300697-2
3) Optional 6" interconnect cable & Ethernet cable, PN 300697E-1
4) Optional 72" interconnect cable & Ethernet cable, PN 300697E-2

> The interconnect cable connects to the left-hand connector of the Data Gateway and the left-hand connector of the Battery Pack when looking at the front of both units.

## STEP 3: ATTACH THE POWER INPUT CABLE

Connect the power input cable to the right-hand connector on the Battery Pack. This is a permanent connection for fixed installations and a temporary connection to charge the battery for mobile use. This standard cable has an AC adapter and there is an optional DC cable:

1) Standard power input cable, PN 300698-AC
2) Optional power input cable, PN 300698-DC

BATTERY STACKING

To stack batteries, use the battery stacking cable, PN 300699, as shown below:
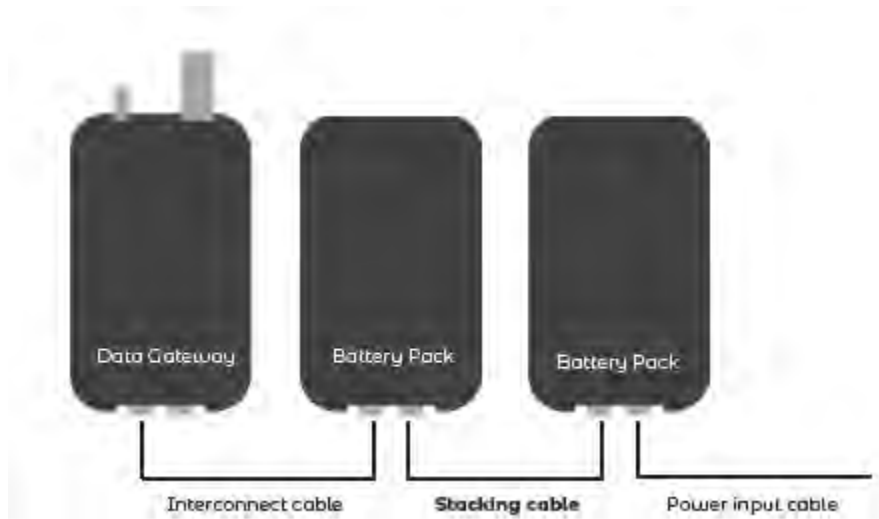
Charging the Battery

Connect the Battery Pack to a 10-35 VDC source (e.g., a cigarette lighter plug from 12VDC in a vehicle or 28V aviation power) to charge. Below are the 3 main configurations to charge the Pack:

1) Hardwire with optional remote-mounted SOS button
2) AC/DC power input cable
3) 12V power cable

An AC/DC power input cable and interconnect cable are included in your kit.

The SkyLink Battery Pack has a run-time of up to 48 hours based on a typical 80/20 (standby/transmitting) duty cycle (specifications subject to change). The Data Gateway can be operated during charging, which will take between 4-6 hours for a fully depleted Battery Pack.

Emergency / SOS Function

When SOS mode is activated, an SOS event with GPS location is sent to SkyRouter. Follow-up emergency events are sent at configurable intervals. See the Accessories screen in the SkyRouter User Guide for more information.

An external SOS button that can be wired and used from a remote location is also available. Simply press the button and an SOS event will be sent to SkyRouter.

External SOS Switch:

Pin info:
Red: Vin+
Black: Vin-
White: SOS

All SOS buttons and remote switches operate together (i.e., pressing either the button or remote switch will trigger an emergency event that gets sent to SkyRouter).

APPENDIX A - TROUBLESHOOTING

If you are unable to activate your SkyLink device, please contact the Blue Sky Network support team and we will be happy to help!

1) Check to ensure the antennas on your device are functioning and attached to the appropriate connectors located on the top panel. The Iridium antenna should be attached to the connector that is furthest from the power LED indicator. It has "IRI" etched into the connector recess.

2) Ensure the SkyLink LED illuminates. If the power LED indicator is stuck on red, this is an indication of a hardware issue. Remove the power cable from the power port and wait approximately 60 seconds, until the power LED indicator fades from green to dark. Once unit has completely shut down, reapply power. If device continues to display red, please contact us for technical support.

The power LED indicator located on the top panel will cycle through multiple colors as it loads. Please see the Top Panel Description section for a description of each color in the cycle.

SUPPORT

Blue Sky Network is committed to providing the highest level of service and support. If you have any questions or concerns, please feel free to contact us by email or phone; contact information is available at the bottom of this page. For self-help, please visit https://blueskynetwork.com/support.

Thank you for choosing Blue Sky Network!

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