STRATUS

FAQs

CODAN
RADIO COMMUNICATIONS

Stratus FAQ

1 Introduction to Stratus and Stratus Technologies

1.1 How do you say Stratus?

Stra-tus
Pronounced [strat-uh s], not [strat-oh s]

1.2 How do you use Stratus in conversation?

Noun, plural as in a network of “Stratus Repeaters”. NOT Strati or Stratuses

1.3 What is LTE? What LTE Bands are available for Stratus?

Long Term Evolution (LTE) is the project name of a high performance air interface for cellular mobile communication systems. It is a 4th generation (4G) technology designed to increase the capacity and speed of mobile telephone networks. Unlike older cellular technology LTE uses technologies such as OFDMA (Orthogonal Frequency Division Multiple Access) and MIMO (Multiple In, Multiple Out) to provide better signal performance and higher data rates. Currently 700 MHz Band 13 LTE, OR 700 MHz Band 17 and AWS Band 4 LTE are available.

1.4 What is FirstNet?

The intent of FirstNet is to provide a US wide broadband data network based on the 4G LTE standard that operates in LTE Band 14. A requirement of FirstNet is to provide 99 percent coverage of the populated areas and the National Highway System.

FirstNet is not intended to replace LMR, instead it is designed to provide mission-critical data and applications to augment the voice capabilities of land mobile radio (LMR) networks.

1.5 What is DFSI?

Digital Fixed Station Interface (DFSI) is a P25 open interface that defines a set of mandatory messages, supporting analog voice, digital voice (clear or encrypted), and data (under development). These messages are in a standard format passed over an IP based interface between a Fixed Station and either an RF Sub-System (RFSS) or a Console Sub-System.

Since DFSI is an IP based interface, DFSI signaling can be easily passed through an LTE network, which is based on IP architecture. All P25 DFSI information can be passed transparently through the LTE (or 3G) network.

1.6 What is VPN?

A Virtual Private Network (VPN) is a network technology that creates a secure network connection over a public network such as the Internet or a private network owned by a service provider, like a public 3G / 4G LTE network provider.

1.7 How does VPN work on a Stratus network?

Stratus systems use VPN to provide a secure encrypted tunnel connection for information passed over the public network owned by a service provider.

1.8 Why is the VPN required?

The VPN uses IPSec to secure the transport of data traffic over the widely available public networks. A firewall between the client and the host server requires the remote user to establish an authenticated connection with the firewall using a unique identification and a password. VPN technology also employs encryption algorithms such as AES-256 to ensure secure data integrity and privacy.

1.9 How secure is the Stratus VPN connection?

The VPN uses IPSec for secure transport. Further, the DFSI supports full P25 AES 256 bit encryption.

With VPN, communications are effectively double-encrypted over the network (VPN encryption and P25 encryption).

2 Stratus Repeater

2.1 How heavy is the Stratus Repeater?

32 lbs (14.5 Kg) with the Sierra Wireless LTE Modem.

2.2 What are the dimensions of the Stratus Repeater?

19.2" (48.8 cm) long, 15.2" (38.6 cm) wide and 7.3" (18.5 cm) deep.

2.3 What is the RF power of the Stratus Repeater?

The RF Power Output is configurable up to 30 Watts. For quick selection there is a Low / High power switch for 15 Watt operation (not available for 700 / 800 MHz).

2.4 What's included with the base Stratus repeater model?

Included in the Stratus repeater is a UIC card for DFSI interface, Codan's well-known collection of low power Class B receiver, Transmitter module, 30W amplifier, swappable mobile duplexer, external AD-DC power converter, operator's headset, folio storage in the case top lid and separate accessory case.

2.5 Does the Sierra Wireless LTE modem and LTE antennae come standard with the Stratus Repeater?

The Sierra Wireless LTE modem and LTE antennas are available as an option to the base model. The Sierra Wireless LTE modem port is vacant in the base model, which allows the end user to:

- Use their own LTE cellular modem,
- Use the repeater as standalone without the modem,
- Hardwire an external DFSI connection to the UIC (such as a portable console).

2.6 Does the Stratus Repeater have an internal battery?

There is no battery internal to the Stratus Unit. The Stratus Repeater is externally powered either by a 12 VDC supply or the supplied 110/220 VAC supply adaptor.

2.7 So, what are the various options of powering the repeaters?

The Stratus can be powered by the Stratus Power Center (with or without the optional Solar Panel), standard 12V DC battery packs, or the supplied 110/220V AC supply adaptor.

2.8 What if there is no LTE coverage where the LMR system needs to be deployed?

When LTE is not available the Sierra Wireless cellular modem falls back to 3G. If a cellular signal is not available the Stratus Repeater can be interconnected with other Codan Transportable radio systems. The Stratus is deployed where there is 3G or LTE cellular coverage and the other transportable repeater is deployed in the area where LMR coverage is desired (but has no cellular). The Stratus repeater is then configured on a frequency pair to communicate with the other transportable repeater.

If your operational requirements for a transportable system regularly lack cellular coverage, then use of another transportable choice such as Codan MRAY or Codan Hivenet repeater is recommended.

2.9 Is the update path available to upgrade a base Stratus repeater unit to the Sierra Wireless LTE Modem later available?

Yes, Sierra Wireless LTE Modem kits (modem and antennae) can be upgraded at a later time by the factory (or by a technician in the field). The Sierra Wireless LTE Modem uses a compact, covert profile LTE diversity antenna mounted inside the Stratus enclosure, which greatly improves signal reception and transmission.

2.10 Why Stratus and not Vizor?

The Stratus P25 repeater provides reliable communications coverage within a building like the Vizor, but adds IP connectivity and the Sierra Wireless LTE modem to provide a reliable and secure bridge to an existing P25 communications network. This ensures the repeater is not isolated from the P25 network. Stratus allows multiple devices to be connected dynamically through the Project 25 (P25) Digital Fixed Station Interface (DFSI) protocol.

2.11 Does the Stratus Repeater have swappable duplexers like the Vizor?

Like the Vizor, the Stratus also has internal "quick change" duplexer mounting capability and easy to use Radio Service Software allows for frequency agile programming and setup of up to 32 channels.

If required for your application the optional Stratus Duplexer Case is available as a compact lightweight case designed to hold up to three additional mobile duplexers, mounted on quick-swap panels.

2.12 Can I upgrade my Vizor to Stratus?

Technically no, but the Vizor uses the same RF module as a Stratus repeater, so the modules could be transferred to a new stratus case.

2.13 Can I use spare MT-4E modules in a Stratus repeater?

Yes, the MT-4E transmitter, Receiver, 30 Watt Amplifier and UIC card are all interchangeable across the Codan LMR product line, with some limitations for modules that have been customized for special applications.

2.14 How tough is the Stratus Repeater?

With an IP65 rating, MIL-STD-810G compliance, and an industry leading compact size and weight, it's easy to transport while being tough, rugged and water resistant. For more information check out our "Smash-a-Stratus" segment on YouTube.

2.15 What is the current draw of the Stratus Repeater?

Standby Current Draw – Fully Loaded: 750 mA

Transmit Current Draw – Fully Loaded: 7.0 A @ 30 W (6.0 A @15 W)

NOTE: Current draw numbers above are based on VHF and UHF systems. The 700 / 800 MHz systems can have a transmit current draw up to 12A.

2.16 Does it come in other colors?

Any customer can have a Stratus case in any color that they want, so long as it is black.

2.17 Is the Stratus Repeater available for VHF or UHF frequency bands?

The Stratus Repeater can be ordered in VHF or UHF configurations. However, if you have both a VHF Stratus Repeater and UHF Stratus Repeater, you will be able to crosspatch via the LTE connection from VHF to UHF networks.

2.18 How does the Stratus Repeater handle encryption?

The Stratus Repeater inherently repeats and transports all P25 encryption (AES-256) both over the network (cellular and WAN/LAN) as well as over the air to P25 subscribers, to ensure your communications are confidential and secure. All encrypted calls are routed transparently.

2.19 Is the Stratus Repeater available in a fixed configuration as well?

Yes, the Stratus Repeater is also available in static 19” rack based system. The 19” rack based version is based on the Codan MT-4E product line. The Stratus Fixed Sites can be fully integrated into an existing Stratus network, allowing DFSI through the 3G / 4G LTE network. A Stratus Fixed Site can also be connected directly to the RF Sub-System (RFSS) / LAN through a direct Ethernet IP interface.

The combination of a fixed configuration of a Stratus Repeater combined with a cellular connection can be used to replace expensive leased lines to remote locations that still have a cellular data connection.

3 Stratus Accessories

3.1 Is the Stratus Power Center and optional Solar Panel compatible with my existing Codan transportable repeaters?

Yes, the power center provides a 12VDC power source to the Stratus repeater or other Codan repeater. The Solar panel is charging capacity Rated for 60 W with a 3.6A output at full sunlight conditions. For a Codan transportable repeater this provides sufficient power to charge the battery pack enabling continuous radio operation at 30 watts with a 5% duty cycle.

3.2 Tell me more about the Stratus Rapid Antenna kit:

The Stratus Rapid Antenna consists of hollow mast made of composite material that transports as a flat coil then rapidly expands into a rigid mast. The specially designed Codan antenna hanger allows the tactical antenna to hang within the hollow mast. Total weight for a Stratus Rapid Antenna kit is 25 lbs and total setup time is approximately two minutes. The tough polycarbonate base cage allows rapid deployment for breaking down/storage.

3.3 What frequency bands is the Stratus Rapid Antenna available for?

The Stratus Rapid Antenna is available for the VHF, 400 MHz and 700 / 800 MHz frequency bands.

3.4 How rigid is the Stratus Rapid Antenna kit once erected?

Three carabineer line supports can be clipped from the top cap to the base for increased lateral support.

3.5 What is the deployable height of the Stratus Rapid Antenna?

The Stratus Rapid Antenna can be deployed at a height of up 3 meters (9’ 10”).

4 Stratus Server

4.1 What is the Stratus Server used for?

The Stratus Server, based on Codan's Digital Link Controller (DLC) technology, act as an arbitrator for the DFSI allowing many point to point connections. The Stratus Server routes digital audio and control signals between multiple Stratus repeaters and DFSI consoles.

4.2 Is the Stratus Tactical/Fixed Server necessary?

Stratus server will be used to tie stratus repeaters to be DFSI consoles and Smart phone application. If a customer only has a single stratus repeater and a single DFSI console, the stratus server is not required.

4.3 What advanced features are available for the Stratus Network via the Stratus Server?

The Stratus Server has a Graphical User Interface (GUI) for remote configuration and monitoring of the Stratus network, using any standard web browser with a secure login. Real-Time Site Monitoring is available through the GUI that displays frequently updated (< 5 seconds) system status.

The Stratus Server also allows dynamic routing based on the use of the P25 Network Access Code (NAC) or Talk Group ID (TGID). Priorities can be set per site, for each NAC or TGID, to allow different users or groups higher or lower routing priority if a signaling conflict occurs.

4.4 Do the log files show the TGID or NAC or other P25 IDs on the Stratus Server?

TGID, NAC or other P25 IDs Log files are saved on the DLC and you can access them by download from the DLC.

4.5 What is the difference between the Stratus Fixed Server and the Stratus Tactical Server?

Since some organizations have a LAN with restrictions that make it difficult or impossible to add external servers or to use for mission-critical communications, the optional Stratus Tactical Server is housed in a rugged transportable case for quick deployment anywhere with a 3G / 4G LTE signal, without the hassle of tying into an existing LAN. The Stratus Tactical Server comes complete with a VPN Server and has the same functionality and capabilities of the Fixed Server, but with a limitation of 10 repeater / console connections.

The fixed server is a 1U 19" rack mounted unit which is IP connected to a Customer's LAN.

5 LTE Network / LAN Connection

5.1 How do I know at the Server GUI, Console and Stratus Repeater level that the network is ready?

If you click on the Stratus Repeater Unit in the Server GUI, the connected state of the Stratus Repeater is visible. An on screen indicator is present for a live connection on the console.

LED Lights on the Stratus Repeater indicate the LTE Connection status, VPN and UIC connection status. The Connect LED indicates the UIC / Stratus unit is connected to the DLC network when illuminated. When the Sierra Wireless LTE Modem Network LED is green, the modem is connected to the network.

5.2 What is the sequence of system activation?

Stratus start up is as such: Stratus comes with four LED operational indicators in a row.

The LEDs on the Sierra Wireless LTE Modem simultaneously cycle red, yellow, and green at startup. Various light patterns continue until the Power LED turns yellow and then green, and the Network LED flashes yellow, changes to a solid yellow, and finally turns green, to indicate an active device. The Connect LED on the Stratus unit illuminates when the UIC is connected to the Stratus Server.

5.3 How fast does the network get established?

1.5 to 2 minutes.

5.4 What is the minimum data throughput requirement?

DFSI requires a 68kbps channel for transport; a very low bandwidth for data.

As an example, at 10% duty cycle operating 12 hours per day this would only be 850 MB of data per month.

In comparison, 1 minute of streamed video can be 15 MB, 1 song could be 16 MB, and 1 web page visit could be 650 MB.

5.5 What size SIM card is required?

The Sierra Wireless LTE modem fits a mini-SIM (2FF). Third-party commercially available SIM card adaptors can be used to adapt micro-SIM (3FF) and nano-SIM (4FF) cards.

5.6 Can the Stratus unit be set up WITHOUT the VPN connection?

Yes it is possible to run the system without VPN, but it requires static IP's on each Stratus Sierra Wireless modem. We recommend against this as carriers charge more for the plans and are somewhat reluctant to give out static IP's.

5.7 How is the Stratus Console Gateway used with the Stratus Network?

The Stratus Console Gateway is a software product that translates DFSI voice traffic and control messages to a proprietary signal used to communicate with multiple disparate endpoint devices over the LAN.

These endpoint devices could include VoIP (SIP-based) telephony devices, legacy tone remote consoles, other radio systems, or even a network of multiple Stratus Consoles.

5.8 What carrier networks will the Sierra Wireless Modem work on?

The Sierra Wireless modem is approved for deployment by Verizon, AT&T, Rogers, Bell, Telus and Telstra. The carrier needs to be identified when ordering the Stratus unit.

5.9 What happens when the 3G or LTE link fails?

When the 3G or LTE cellular connection is unavailable, the Stratus repeater will fall back into a stand-alone repeater (or base station) operation.

5.10 What are the typical delays associated with the Stratus system?

Many of the delays are user-configurable (to ensure throughput by accounting for variations in the networking). There are 'jitter buffers' in both the Stratus Server and the UIC. The latency will be a sum of the delays at the network ends (from each repeater to the Server) and the jitter buffers.

A typical sum of delays would look like this:

P25 Subscriber = 125 ms
Receiver to LTE modem = 50 ms
*LTE modem to Stratus Server = 135 ms
Stratus Server = 180 ms buffer
*Server to LTE modem = 135 ms
UIC jitter buffer = 300 ms (default)
LTE modem to Transmitter = 50 ms
P25 Subscriber = 125 ms

Total delay from speaking to hearing = 1100 ms
Traffic between multiple repeaters will typically experience delays from 0.5 to 2.5 seconds.
*The 3G / LTE delays can vary greatly (up to 500 ms)

On a Stratus Tactical Server, the network latencies would be greater, as much of this time is spent in the LTE link (and there are double the number of LTE path transitions)

It's good to remember that you are leveraging a public network with the Sierra Wireless LTE modem and you are getting coverage where you wouldn't necessarily get RF coverage. It's a trade-off.

5.11 Do I need FCC site licensing for the Sierra Wireless LTE modem?

No. The Sierra Wireless LTE Modem and SIM card are commercial supplied products. FCC licensing has therefore been handled by carriers. This equipment has been tested to, and found to be within, the acceptable limits for a Class A device. This device complies with Part 15 of the Federal Communications Commission (FCC) Rules.

5.12 Is this a secure link ie; encrypted end to end?

The Stratus P25 repeaters support transparent end-to-end encryption across an entire communications network.

5.13 How does the Stratus Console work?

The Stratus Console is for remote operation with command and control and voice traffic over the Stratus network to Stratus Repeaters. The open standard P25 interface of the Stratus Network ensures all DFSI consoles are interoperable with the network.

P25 DFSI consoles can be connected via Ethernet directly to the Stratus Tactical Server, or even directly into a Stratus repeater. A P25 DFSI Console can also be connected into the LTE network with the use of a 3G or LTE cellular aircard.

6 RIC-M

6.1 What is the RIC-M box?

The RIC-M is an external, stand-alone, interface device that converts voice and control messages from a commonly used V.24 serial communications protocol (Motorola) to the P25 open-standard DFSI. P25 digital communications (encrypted and unencrypted) are supported as well as operation with other analog communication equipment.

6.2 Will the Stratus radio network connect with the Motorola Network through the RIC-M?

The existing Motorola radio system must support V.24 in order to interface with the RIC-M module.

The Stratus products with DFSI capability will connect with Motorola's V.24 protocol through the RIC-M interface. This allows for an easy upgrade path away from a proprietary (Motorola) radio system, to an open interface P25 radio network.

6.3 What integration features are supported by the RIC-M interface?

The RIC-M allows the Stratus Radio Network to integrate seamlessly with existing legacy (Motorola) RF equipment, Voting Comparator, or Key Management Facility. An existing Voting Comparator can be used to evaluate the incoming digital or analog radio signals and pick the best quality signal from multiple sites. A Key Management Facility (KMF) is used to transmit, store and manage P25 encryption keys on a P25 radio system, such as OTAR.

7 Stratus Storm Mobile App

7.1 What is the Stratus Storm App?

The Stratus Storm App allows a user to add their own mobile device to a P25 network with all the same features and capabilities (including encryption) as a P25 subscriber radio. The Storm App connects to the Stratus Radio Network through the 3G or 4G LTE cellular network (or Wi-Fi) and connects to the Storm App Gateway Software embedded in the Stratus Server. Each smartphone can be configured to act as a P25 subscriber unit.

The Storm App communicates using the DFSI protocol and recognizes the P25 application in the same way as an actual transmission from a P25 subscriber radio.

7.2 How does the Stratus Storm App work with the Gateway Software?

This Stratus Storm Application allows for maximum flexibility by providing radio communications and interoperability capability to multiple users, allowing the users to “bring your own device” (BYOD). The Gateway Software authenticates the license for each Stratus Storm Application and determines the number of maximum allowable users based on the number of licenses purchased. The Gateway Software also allows the system administrator to enable remote radio features.

7.3 What devices does the Stratus Storm App work with?

The Stratus Strom Application is available for iOS, Windows or Android phones.

8 Miscellaneous

8.1 What is the warranty for the Stratus products?

The Stratus Repeater and Sierra Wireless LTE modem both come with a standard 3 year warranty.

8.2 Is training included in the price?

No, Training is provided separately.

8.3 How is the Stratus supported in the field?

All Codan products are fully supported by the experienced and knowledgeable staff at Codan's facility in Victoria, BC, Canada. Extended warranties and service contracts are also available.

8.4 Is the Stratus Repeater and accessories on the GSA or TACOM contract yet?

The Stratus Repeater is not on the GSA contract yet (awaiting commercial orders). Addition to the TACOM contract will be soon.

8.5 Is customer support included in the price?

Absolutely.