Listen **NAVILUTION**   USER MANUAL

ENGLISH

Delivering
Exceptional
Passenger
Experiences

LISTEN
TECHNOLOGIES

www.listentech.com

Dear Valued Customer,

Thank you for choosing Listen! We provide you with the highest quality products available and take pride in delivering outstanding performance to ensure you are completely satisfied. We independently certify each of our products to the highest standards and back them with a limited lifetime guarantee. We are available to answer any questions you might have during installation or in the operation of our products. At Listen, it's all about you, should you have any comments or suggestions we're here to listen.

Here's how to reach us:

+1.801.233.8992

+1.800.330.0891 North America

+1.801.233.8995 fax

support@listentech.com

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Thank you and enjoy your listening experience!

Best regards,
The Listen Team

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TECHNOLOGIES

LISTEN NAVILUTION TABLE OF CONTENTS

INTRODUCTION

Navilution is designed for successful tour operators requiring high-quality and reliable solutions to deliver multi-language, multi-topical stories, audio and video, fast and effortlessly. Navilution provides a solution for audio over the PA (PA Delivery), audio to a passenger's own Wi-Fi enabled device (BYOD+) or hardwired to individual controllers (Seatback+).

With Listen Technologies, you'll increase ridership faster with more predictability, gain higher customer satisfaction ratings and remove operational barriers. Send clear engaging stories consistently without wasting valuable resources on hiring and managing story tellers. Experience the solution that will give you an edge in the market and fill empty seats on your bus, vessel, train, or tram.

SAFETY CAUTIONS

Hearing Safety

This product is designed to amplify audio to a high-volume level which could potentially cause hearing damage if used improperly. To protect your hearing make sure the volume is turned down before putting on the headset. Then adjust the volume up to the minimum setting required to hear clearly. Do not allow children or other unauthorized individuals to have access to this product without supervision.

Medical Device Safety

Before using this Listen product with an implantable or other medical device, consult your physician or manufacturer of your implantable or other medical device. Always make sure you are using this product in accordance with the safety guidelines established by your physician or the implantable device manufacturer.

Distracted Driving

The primary responsibility of the driver is to operate a motor vehicle safely. The task of driving requires full attention and focus. Drivers should resist engaging in any activity that takes their eyes and attention off the road.

NAVILUTION SEATBACK+

NAVILUTION SEATBACK+ SOLUTION

Navilution SEATBACK+ delivers GPS-triggered multi-language, multi-topical audio stories to hardwired digital seatback controllers.

Installed Systems

LNS-100E

This system is installed in your AV rack or other storage solution.

NAVILUTION SEATBACK+ COMPONENTS

Navilution EVO Server

LN-100E

Display Control Panel (DCP)

LN-075-DCP

GPS

LN-050-GPSR

Navilution Seatback Controller (SBC)

LN-100E-SBC

NAVILUTION SEATBACK+ ACCESSORIES

Navilution Seatback+ Jumper

LNA-100E-C5J

Navilution Seatback+ Loopback

LNA-100E-C5L

Navilution SBC Mounting Plate, Qty: 10

LNA-100E-SBCM10

Navilution SBC Installation Hex Key – 7/64", Qty: 4

LNA-046-7HK

Navilution Seatback Controller Mounting Template

LNA-100E-SBCT

Navilution USB 16GB Flash Drive
LNA-052-USB

Stereo Headphones
LA-165

Cables and Connectors

SEATBACK+ Server power AC	LA-211-01
SEATBACK+ Server power DC	LNA-040-PC
Navilution Wi-Fi Antenna SMA-Male	LNA-041-WFA
Navilution SEATBACK+ Loopback	LNA-100E-C5L
Navilution SEATBACK+ Jumper	LNA-100E-C5J

EVO SERVER QUICK REFERENCE

Description
The EVO Server is the component that runs the Navilution SEATBACK+ solution.

Purpose
The EVO Server processes location data derived from the GPS receiver and automatically activates audio at predetermined zones. The audio and Trigger Zones are designed in Cortex* and uploaded to the EVO Server.

*Navilution Cortex is the cloud-based software for route-building and content management. A separate Cortex manual is available and software training is recommended.

Placement and Fastening
The EVO Server must be in a secure, dry location that will be free of water, condensation, splashing, moving objects and other environmental hazards. It has a mounting bracket so it can be secured to a shelf that fits in a standard 19" AV rack or it can be mounted on a secure surface.

Allow at least 3cm or 1 inch of clearance on all sides to allow for airflow. Avoid mounting the electronics in exceptionally hot locations.

EVO Server Connections (Front)

AUDIO IN
4 mono analog RCA audio inputs (Audio In) are provided. These are for connections from external audio sources.

MIC A & MIC B
2 XLR microphone inputs. When microphones are enabled the microphone inputs deliver audio to the Seatback Controller and the PA OUT.

12V2A POWER OUT
2 Pin port for the Navilution DCP V2.0 POE Power cable that powers the DCP. Power output is 12V 2Amp

PA OUT
2 mono analog RCA audio outputs. The line level outputs may be selected to output to a monaural PA system.

IMP

The impedance switch only applies to the upper white RCA mono output ("PA Out"). The impedance switch compensates for when no Auxiliary Audio Input is on your PA hardware, allowing you to plug directly into a Microphone Input (works on most systems).

EVO Server Connections (Back)

PWR
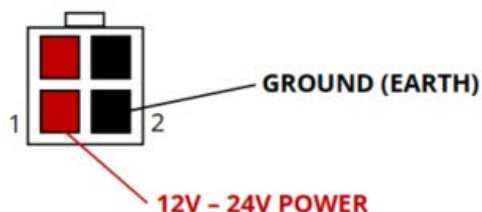
The EVO Server can accept power voltages between 12-24VDC. Normal vehicle systems will run at 12v (14.4V with alternator running) and 24V (26V-28V with alternator running). Any power outside of this range could cause errors or damage to the system.

GPS

RJ12 port. The GPS receiver has been programmed and pinned to an RJ12 connector by Listen Technologies. Contact Listen Technologies if you need replacements or if you need technical assistance.

HDMI

HDMI (High-Definition Multimedia Interface) output. The HDMI connects to an HDMI enabled monitor or television for displaying video segments. The output content is determined in Cortex. (EVO Server supports video files in mp4 format with the H.264 Codec)
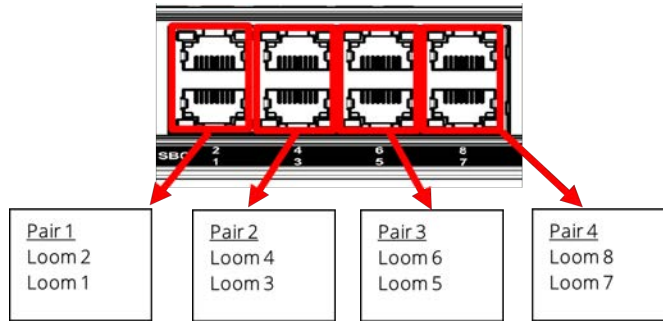
USB

The USB 2.0 port is utilized for uploading tours, downloading analytics, and updating the system.
We recommend you use the Navilution USB 16GB Flash Drive LNA-052-USB.

DCP

RJ45 port for the Navilution DCP V2.0 POE Power cable that allows for two-way communication between the EVO Server and the DCP.

SBC Loom Ports (8)

ANT

SMA female connector for the Wi-Fi antenna. NOTE: This Wi-Fi signal is used to connect wirelessly to an iOS or Android device acting as a DCP.

CTRL

Control port for Track Advance Switch connection.

LED Indicator Green

The normal working status is solid green lit (on). A flashing on and off green light indicates tours are uploading or updates are being applied using a USB memory stick.

SEATBACK CONTROLLER QUICK REFERENCE

Seatback Controller Description

The SBC is the passenger user interface for the SEATBACK+ solution. It is connected by network cables from SBC to SBC. A group of SBC all connected together is called a loom and that loom is plugged into a Loom Port on the EVO Server.

Seatback Controller Purpose

The SBC is the passenger user interface to plug headphones into listen to audio stories that are stored on the Navilution EVO Server. It allows passenger users to select channels, adjust volume, and an option for selecting more info. It has a display that indicates the channel number they are listening to. There is braille on the SBC to describe the functionality of the volume, channel, and more info buttons.

Placement

The SBC can be placed on seat backs or on the side wall of a vehicle. The proximity to the passenger is limited by the length of the headphone cables being used. The SBC should be mounted on a flat firm surface that can accept screw fasteners. The SBC is suitable for open top vehicles and can be subjected to normal sun and rain. Do not direct water to the SBC from spray hoses, pressure washers, or vehicle drive through washers.

Fastening

The SBC is made up of the SBC and a SBC Mounting Plate (included with the SBC). You can use the SBC Mounting Template to mark the location of the four screws that secure the mounting plate to mounting surface.

• Use 4 x #6 or M3.5 screw with the thread type for the material you are fastening to and the length that will not penetrate items behind the mounting surface.

• The head of the screw should be a panhead with a flat base.

• Fastening on an uneven surface will not allow for a tight fit when the SBC is connected to the mounting plate.

- If mounting the SBC side by side use the template to mark the holes for mounting plate placement. The mounting plates should be approximately 5mm apart. When installing the mounting plate, SBC that are immediately beside each other need to have 5mm between the mounting plates. For all mounting plate installations leave 15mm on the top and 3mm on each side. If you use the Single or the Side by Side mounting template, they are designed taking these measurements into consideration.

- Do not place the mounting plate flush to the top or side because the body of the SBC flares out slightly. Leave 15mm on the top and 3mm on the sides of the mounting plate. The mounting templates are designed taking these measurements into consideration.

- Leave room at the bottom for the use of the 3.5mm headphone jack and securing set screw.

LN-100E-SBC

Screw holes for mounting

Allen screw for securing

Cat 5 cable route location

LNA-100E-SBC   LNA-100E-SBCM

Seatback Controller Mounting Template

Single   Side by Side

The SBC is connected to the mounting bracket from the top and then secured with a 7/64 hex key set screw on the bottom of the SBC.

SBC Wiring Topology

Planning the SBC wiring topology is an important step at the beginning of the installation process.

Important steps based on the power supply are:

1. Number of SBC per loom pair.

2. Number of SBC per EVO Server.

| Source Voltage	Max Per Loom Pair	Max Per EVO Server
12VDC	34	100
24VDC	40	150
AC Power Supply	40	90

Important steps when connecting the cables:

1. The SBC are connected in a daisy chain fashion, one after the other.

2. The last controller in a loom must have the cable plugged into the RJ45 port behind the More Info button. When looking at the back of the SBC that would be the port on the left.

3. Use a Loopback if you need to skip a loom port.

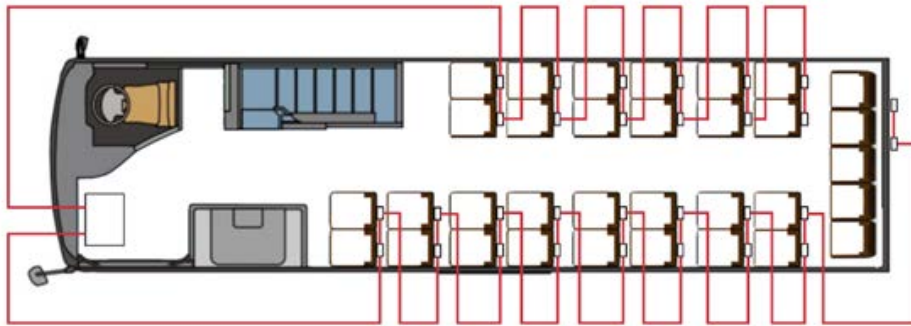4. Use a Jumper from the last open loom port to loom port 8.

Loom cables should be Cat5e with no strain relief or boots covering the RJ45 connector. This is only because of the limited space behind the SBC and the Mounting Plate.

Use Cat5e cables, no boots, no strain relief.
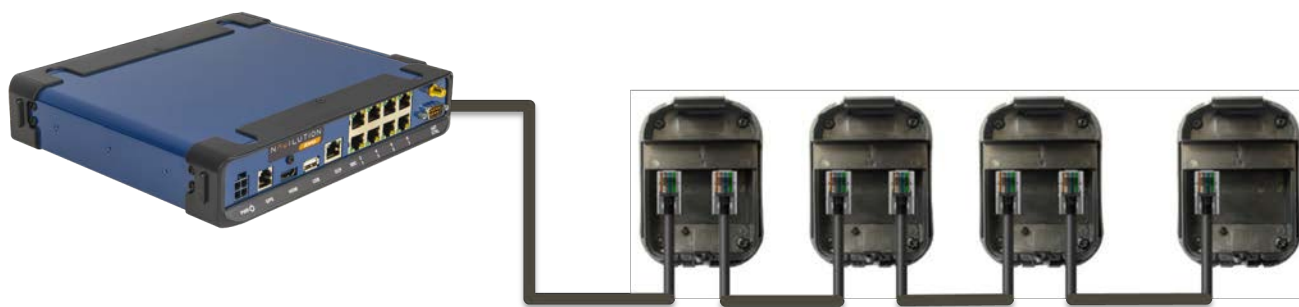
SBC connected in a daisy chain with last cable plugged into the port behind the More Info button.

Example of 2 looms of SBC

Cable Routing at the SBC Mounting Plate

The loom cable can be routed behind the surface you are mounting the SBC to or it can be routed in front of the surface you are mounting the SBC to.

1. If you are routing behind the mounting surface, you need to pre-drill a 7/8" (22mm) hole in the mounting surface. This is indicated on the Mounting Template.

2. If you are routing the cable in front of the mounting surface, you need to use plastic or metal raceway. The Mounting Bracket has breakout tabs on the left, right and bottom to facilitate the routing of the loom cable.
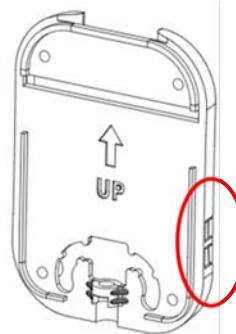
LOOPBACK AND JUMPER

Loopback Description

The Loopback is a single RJ45 connector that has a proprietary wiring topology.

Loopback Purpose

The Loopback is required to tell the EVO server that there is a loom port being skipped in the connecting of SBC.

Placement

Insert the Loopback where no SBC are going to be connected in a loom port. You only use the loopback when there is going to be SBC connected in the following loom port(s).

Jumper Description

The Jumper has 2 RJ45 connectors and a short piece of Cat5e cable between them. There is a proprietary wiring topology in this connector.

Jumper Purpose

The Jumper is required to complete the SBC connection for the 4 Loom pairs.

Jumper Placement

The Jumper is placed in the loom port after the last loom port being used and the other end is placed in loom port 8.

EVO SERVER PROGRAMMING

Software updates, tour uploads, and analytics downloads all use the USB port located on the rear of the server.

Server Updates

When an EVO server update is available, the update file should be placed on a USB flash drive and inserted into the USB port while the system is off. Ensure there is only one file on the USB flash drive. When the system is turned on, the system update will begin. A green LED indicator will flash on and off while the update is taking place. When the update has completed the system will resume booting up, and the green LED indicator will be ON. Once complete, remove the USB from the EVO Server.

Loading Tours

When new tour information has been exported from Navilution Cortex* to a USB, the update file should be inserted into the USB port while the server is off. Ensure there is only one file on the USB flash drive. When the server is turned on, the tour update will begin. A green LED indicator will flash on and off while the update is taking place. When the update has completed the system will resume booting up, and the green LED indicator will be ON. Once complete the USB may be removed from the EVO Server.

*Navilution Cortex is the cloud-based software for route-building and content management. A separate Cortex manual is available and software training is recommended.

CONNECTING THE HARDWARE

1. Connect the GPS to the GPS port on the back of the EVO Server.

2. Connect the DCP using the provided Y-Cable LNA-048-POE.

   a. The male RJ45 connector goes to the DCP port on the back of the EVO Server.

   b. The 2-pin power connector goes to the 12V2A POWER OUT on the front of the EVO Server.

   c. Connect the Cat5e cable from the female RJ45 port to the DCP.

3. Connect all the loom cables, loopback, and jumpers required.

4. Connect Power to the PWR 4 pin port on the back of Navilution EVO Server.

   a. DC Power Source

   i. use the LNA-040-PC cable.

   ii. IGNITION power: This allows for very easy use; however, the vehicle key must be in the IGNITION position for the SEATBACK+ solution to be powered on.

   iii. CONTINUOUS power: This allows for very easy use; however, you need to install an in-line on/off switch to ensure you do not drain the battery. This method allows you to turn the SEATBACK+ solution on regardless of the vehicle running.

   b. AC Power Source

   i. If there is AC 120 - 240VAC, 50/60Hz power available use the LA-211-0x power supply.
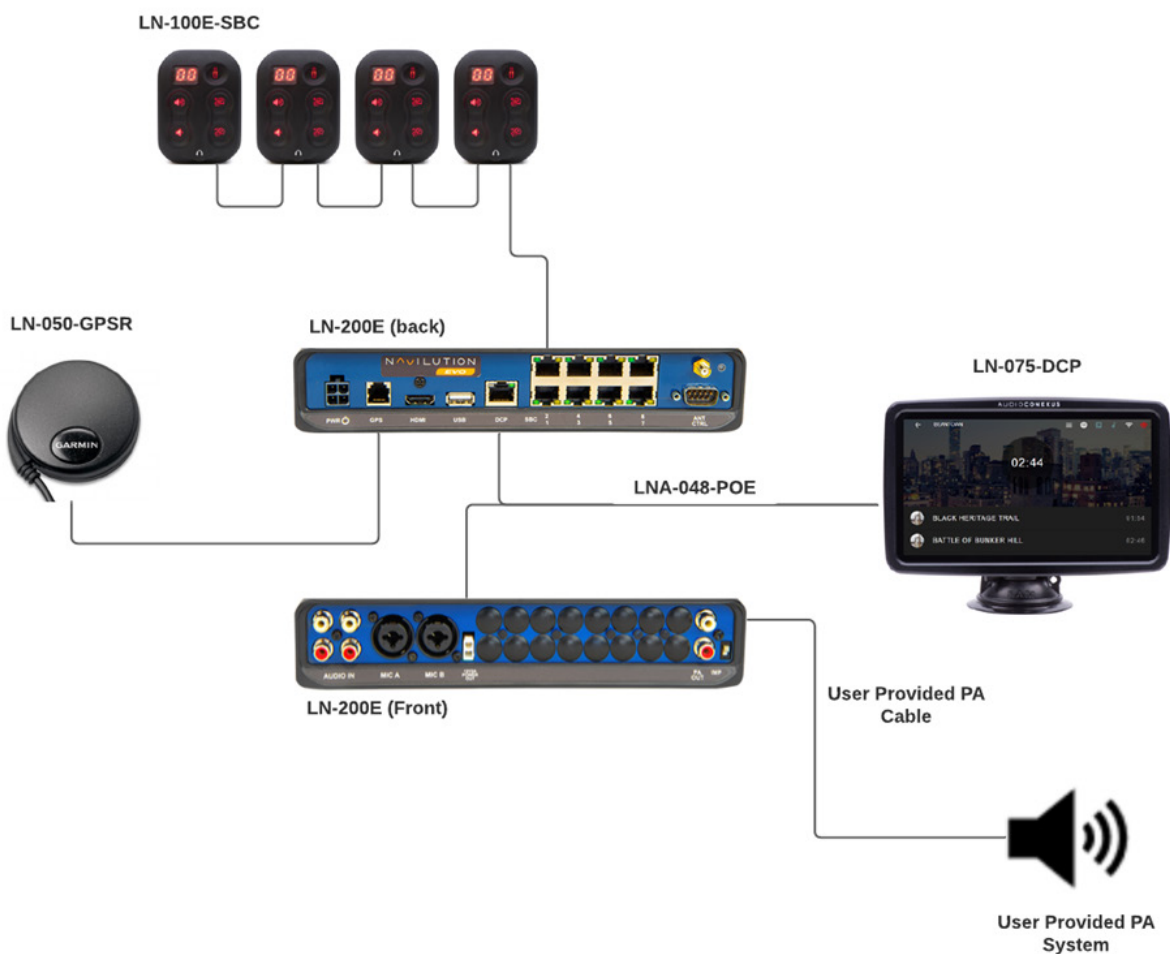
SPECIFICATIONS NAVILUTION SEATBACK+ (LN-100E)

Physical

Dimensions (H x W x D)	Metric - 44.14 mm x 236.89 mm x 207.27 mm Imperial - 1.74 in. x 9.33 in. x 8.16 in.
Unit Weight	Metric - 1.72 kg Imperial - 3.8 lbs
Shipping Weight	Metric - 2.72 kg Imperial - 6 lbs

Controls

IMP Switch	PA Out Mic/line switch. Up- Line, nominal -13dBu / Down-Mic, nominal -59dBu

Indicators

Power / Status LED	Solid Green under normal operation. Flashes Green when uploading tours or firmware updates
DCP Port Green LED	Solid Green, physical link established. Flashing Green, data transfer
SBC Port 1-8 Amber LED	Flashing Amber, data transfer
SBC Port 1-8 Green LED	Solid Green, physical link established

Interconnections

Rear Panel	
Power In	Molex CONN HEADER R/A 4POS 5.7MM, 24VDC at 16 amps under max load, 12-24Vdc at 13 amps under max load
GPS	RJ-11, Dedicated connection to LN-050-GPSR GPS receiver
HDMI	(High Definition Multimedia Interface) Connects to HDMI enabled monitor for displaying video segments
USB	Type A 2.0 female
DCP	RJ-45, Dedicated port for LN-075-DCP Display Control Panel connection
SBC	RJ-45, Dedicated power and data ports for SBC loom connection
ANT	SMA Antenna, Female for Wi-Fi Control
CTRL	DB-9 Male D-Sub Connector. Control port for Track Advance Switch connection
Front Panel Audio Inputs	
Nominal Level	-10dBu
Max Level	+13dBu
Noise Floor	-75dBu
Dynamic Range	88dB
Impedance	3K Ohms
Frequency Response	+/-1dB from 20Hz to 20KHz

Signal-to-Noise Ratio	65dB
Total Harmonic Distortion	< 0.05 @ 1KHz
Mic A & B	**Female XLR, 1/4" Phone combo jack, unbalanced**
Nominal Level	-45dBu to -35dBu
Max Level	-19dBu
Impedance	100K Ohms
Frequency Response	+/-1dB from 20Hz to 20KHz
Total Harmonic Distortion	0.04% @ 1KHz
12V2A Power Out	**2 Pin Molex, 12VDC 2A Out**
PA Outputs	**RCA: 2 analog, mono, unbalanced outputs**
Nominal Level	-22dBu
Max Level	-10dBu
Noise Floor	-69dBu
Dynamic Range	59dB
Frequency Response	+/-4dB from 20Hz to 15KHz
Total Harmonic Distortion	< 0.2% @ 1KHz

Power Supply

AC Power Supply	**LA-211-0X**
AC Power Supply Input	120 - 240VAC, 50/60Hz, 2.5A
AC Power Supply Output	24Vdc, 10A
Connector	Molex CONN RCPT HSG 4POS 5.70MM
Fuse	20A Blade Fuse, ATO (Regular).
Compliance	FCC, CE
DC Power Cable	**LNA-040-PC**
Connector	Molex CONN RCPT HSG 4POS 5.70MM ending in bare wire to connect to source
Fuse	20A Blade Fuse, ATO (Regular)
Cable Length	183 cm or 72 inches

Server

Programming	Via Cloud Software: Navilution Cortex software for route building and content management
Max Channels	63
Max SBCs (24VDC power)	40 max per loom pair, 150 max per server
Max SBCs (12VDC power)	34 max per loom pair, 100 max per server
Max SBCs (AC Supply)	40 max per loom pair, 90 max per server
Audio Media File Format	MP3, 128kbps, mono
Audio Bit Depth	16 Bit
Audio Sampling Rate	44.1KHz
Video Media File Format	MP4
Max Trigger points	120 per route
Wifi Control	2.4GHz HTTP

Environmental

Temperature - Operating	0 C to +40 C 32 F to +104F
Temperature - Storage	-20 C to +50 C -4 F to +122 F
Relative Humidity	0 - 95%, Non condensing

Compliance

Standards	FCC, IC, RoHS, CE, IEC 62368-1

Warranty

Server	2 Year

NAVILUTION PA DELIVERY

NAVILUTION PA DELIVERY SOLUTION

Navilution PA DELIVERY delivers a single channel to your public address (PA) system. You still have the GPS-triggered functionality and you can choose from whatever channels you have stored on your NEXT server as well as continued use of the HDMI connector for supporting video.

Installed Systems

LNS-200N

This system is installed in your AV rack or other storage solution you are using.

Portable Systems

LNS-300N

This system is portable and can be moved between vehicles or vessels.

NAVILUTION PA DELIVERY COMPONENTS

Navilution NEXT Server

LN-200N

Display Control Panel (DCP)

LN-075-DCP

GPS

LN-050-GPSR

Navilution Portable Carrying Case

LN-300N-CASE

Cables and Connectors

Navilution USB 16GB Flash Drive   LNA-052-USB

PA DELIVERY Server power AC   LA-211-01

PA DELIVERY Server power DC   LNA-040-PC

Navilution Wi-Fi Antenna SMA-Male   LNA-041-WFA

NEXT SERVER QUICK REFERENCE

Description

The NEXT Server is the component that runs the Navilution PA DELIVERY Solution.

Purpose

The NEXT Server processes location data derived from the GPS receiver and automatically activates audio at predetermined zones. The audio and Trigger Zones are designed in Cortex* and uploaded to the NEXT Server.

*Navilution Cortex is the cloud-based software for route-building and content management. A separate Cortex manual is available and software training is recommended.

Placement and Fastening

The NEXT Server must be in a secure, dry location that will be free of water, condensation, splashing, moving objects and other environmental hazards. It has a mounting bracket so it can be secured to a shelf that fits in a standard 19" AV rack or it can be mounted on a secure surface.

Allow at least 3cm or 1 inch of clearance on all sides to allow for airflow. Avoid mounting the electronics in exceptionally hot locations.

NEXT Server Connections (Front)

AUDIO IN

4 mono analog RCA audio inputs (Audio In) are provided. These are for connections from external audio sources.

MIC A & MIC B

2 XLR microphone inputs. When microphones are enabled the Microphone inputs can deliver audio to the PA Delivery available AUDIO OUT or to the PA OUT

12V2A POWER OUT

2 Pin port for the Navilution DCP V2.0 POE Power cable that powers the DCP. Power output is 12V 2Amp

AUDIO OUT

16 mono analog RCA audio outputs. These outputs associate directly with the channels as designed in Cortex. Any open AUDIO OUT will use the AUDIO IN as source then MIC A and MIC B as source.

PA OUT

2 mono analog RCA audio outputs. The line level outputs may be selected to output to a monaural PA system.

IMP

The impedance switch only applies to the upper white RCA mono output ("PA Out"). The impedance switch compensates for when no auxiliary audio input is on your PA hardware, allowing you to plug directly into a microphone input (works on most systems).

NEXT Server Connections (Back)

PWR
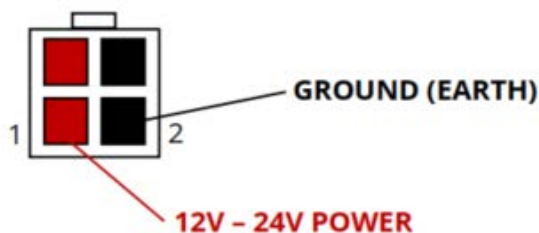
The NEXT Server can accept power voltages from 12-24VDC. Normal vehicle systems will run at 12v (14.4V with alternator running) and 24V (26V-28V with alternator running). Any power outside of this range could cause errors or damage to the system.

GPS

RJ12 port. The GPS receiver has been programmed and pinned to an RJ12 connector by Listen Technologies. Contact Listen Technologies if you need replacements or if you need technical assistance.

HDMI

HDMI (High-Definition Multimedia Interface) output. The HDMI connects to an HDMI enabled monitor or television for displaying video segments. The output content is determined in Cortex. (PA DELIVERY Server supports video files in mp4 format with the H.264 Codec)

USB

The USB 2.0 port is utilized for uploading tours, downloading analytics, and updating the system. We recommend you use the Navilution USB 16GB Flash Drive LNA-052-USB.

DCP

RJ45 port for the Navilution DCP V2.0 POE power cable that allows for two-way communication between the PA DELIVERY Server and the DCP.

ANT

SMA female connector for the Wi-Fi antenna. NOTE: This Wi-Fi signal is used to connect wirelessly to an iOS or Android device acting as a DCP.

LED Indicator Green

The normal working status is solid green lit (on). A flashing on and off green light indicates tours are uploading or updates are being applied using a USB memory stick.

NEXT SERVER PROGRAMMING

Software updates, and tour uploads use the USB port located on the back of the NEXT server.

Server Updates

When a NEXT server update is available, the update file should be placed on a USB flash drive and inserted into the USB port while the system is off. Ensure there is only one file on the USB flash drive. When the NEXT server is turned on, the update will begin. A green LED indicator will flash on and off while the update is taking place. When the update has completed the system will resume booting up, and the green LED indicator will be ON. Once complete, remove the USB from the NEXT server.

Loading Tours

When new tour information has been exported from Navilution Cortex* to a USB, the update file should be inserted into the USB port while the server is off. Ensure there is only one file on the USB flash drive. When the NEXT server is turned on, the tour update will begin. A green LED indicator will flash on and off while the update is taking place. When the update has completed, the system will resume booting up, and the green LED indicator will be ON. Once complete the USB may be removed from the NEXT server.

*Navilution Cortex is the cloud-based software for route-building and content management. A separate Cortex manual is available and software training is recommended.

CONNECTING THE HARDWARE

1. Connect the GPS to the GPS port on the back of the NEXT Server.

2. Connect the DCP using the provided Y-Cable LNA-048-POE.

   a. The male RJ45 connector goes to the DCP port on the back of the PA DELIVERY Server.

   b. The 2-pin power connector goes to the 12V2A POWER OUT on the front of the PA DELIVERY Server.

   c. Connect the Cat5e cable from the female RJ45 port to the DCP.

3. Connect the RCA Cables to the Audio Out to your distribution system and the PA Out to your PA system.

4. Connect Power to the PWR 4 pin port on the back of Navilution PA DELIVERY Server.

   a. DC Power Source

     i. use the LNA-040-PC cable.

     ii. IGNITION power: This allows for very easy use; however, the vehicle key must be in the IGNITION position for the Navilution PA Delivery system to be powered on.

     iii. CONTINUOUS power: This allows for very easy use; however, you need to install an in-line on/off switch to ensure you do not drain the battery. This method allows you to turn the PA DELIVERY system on regardless of the vehicle running.

   b. AC Power Source

     i. If there is AC 120 - 240VAC, 50/60Hz power available use the LA-211-01 power supply.
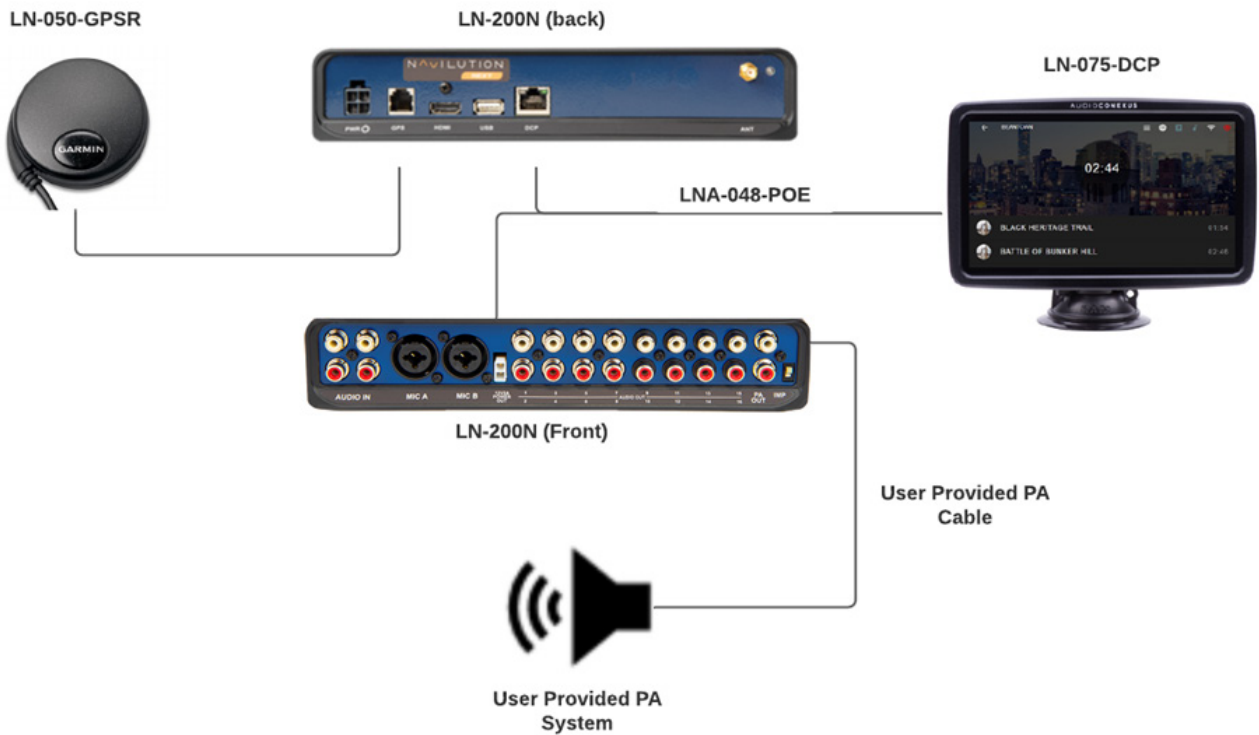
SPECIFICATIONS NEXT SERVER (LN-200N)

Physical

Dimensions (H x W x D)	Metric - 44.14 mm x 236.89 mm x 207.27 mm Imperial - 1.74 in. x 9.33 in. x 8.16 in.
Unit Weight	Metric - 1.54 kg Imperial - 3.4 lbs
Shipping Weight	Metric - 2.27 kg Imperial - 5 lbs

Controls

IMP Switch	PA Out Mic/line switch. Up- Line, nominal -13dBu / Down-Mic, nominal -59dBu

Indicators

Power / Status LED	Solid Green under normal operation. Flashes Green when uploading tours or firmware updates
DCP Port Green LED	Solid Green, physical link established. Flashing Green, data transfer

Interconnections

Rear Panel	
Power In	Molex CONN HEADER R/A 4POS 5.7MM, 12-24Vdc at 1 amp under max load
GPS	RJ-11, Dedicated connection to LN-050-GPSR GPS receiver
HDMI	(High Definition Multimedia Interface) Connects to HDMI enabled monitor for displaying video segments
USB	Type A 2.0 female
DCP	RJ-45, Dedicated port for LN-075-DCP Display Control Panel connection
ANT	SMA Antenna, Female for Wi-Fi Control
CTRL	DB-9 Male D-Sub Connector. Control port for Track Advance Switch connection
Front Panel Audio Inputs	**RCA: 4 analog mono, unbalanced inputs**
Nominal Level	-10dBu
Max Level	+13dBu
Noise Floor	-75dBu
Dynamic Range	88dB
Impedance	3K Ohms
Frequency Response	+/-1dB from 20Hz to 20KHz
Signal-to-Noise Ratio	65dB
Total Harmonic Distortion	< 0.05 @ 1KHz
Mic A & B	
Nominal Level	-45dBu to -35dBu
Max Level	-19dBu
Impedance	100K Ohms
Frequency Response	+/-1dB from 20Hz to 20KHz
Total Harmonic Distortion	0.04% @ 1KHz
12V2A Power Out	2 Pin Molex, Dedicated port for LN-075-DCP power
Audio Outputs (1-16)	
Nominal Level	-15dBu
Max Level	-3dBu
Noise Floor	-75dBu

Dynamic Range	72dB
Frequency Response	+/-1dB from 20Hz to 20KHz
Total Harmonic Distortion	< 0.1 % @ 1KHz
PA Outputs	
Nominal Level	-22dBu
Max Level	-10dBu
Noise Floor	-69dBu
Dynamic Range	59dB
Frequency Response	+/-4dB from 20Hz to 15KHz
Total Harmonic Distortion	< 0.2% @ 1KHz

Power Supply

AC Power Supply	**LA-211-0X**
AC Power Supply Input	120 - 240VAC, 50/60Hz, 2.5A
AC Power Supply Output	24Vdc, 10A
Connector	Molex CONN RCPT HSG 4POS 5.70MM
Fuse	20A Blade Fuse, ATO (Regular)
Compliance	FCC, CE
DC Power Cable	**LNA-040-PC**
Connector	Molex CONN RCPT HSG 4POS 5.70MM ending in bare wire to connect to source
Fuse	20A Blade Fuse, ATO (Regular)
Cable Length	183 cm or 72 inches

Server

Programming	Via Cloud Software: Navilution Cortex software for route building and content management
Max Channels	16
Audio Media File Format	mp3, 128kbps, mono
Audio Bit Depth	16 Bit
Audio Sampling Rate	44.1KHz
Video Media File Format	MP4
Max Trigger points	120 per route
Wi-Fi Control	2.4Ghz HTTP
Warranty	2 years

Environmental

Temperature - Operating	0 C to +40 C 32 F to +104F
Temperature - Storage	-20 C to +50 C -4 F to +122 F
Relative Humidity	0 - 95%, Non condensing

Compliance

Standards	FCC, IC, RoHS, CE, IEC 62368-1

Warranty

Server	2 Year

NAVILUTION BYOD+

NAVILUTION BYOD+ SOLUTION

Navilution BYOD+ solution combines the technology of Navilution PA Delivery and Listen EVERYWHERE to deliver GPS-triggered tour audio via Wi-Fi to your passenger's own smart devices.

Installed Systems

LNS-204N, LNS-208N, LNS-216N

This system is installed in your AV rack or other storage solution you are using.

Portable Systems

LNS-304N, LNS-308N, LNS-316N

This system is portable and can be moved between vehicles or vessels that have a Wi-Fi infrastructure.

NAVILUTION BYOD+ SOLUTION COMPONENTS

Navilution NEXT Server

LN-200N
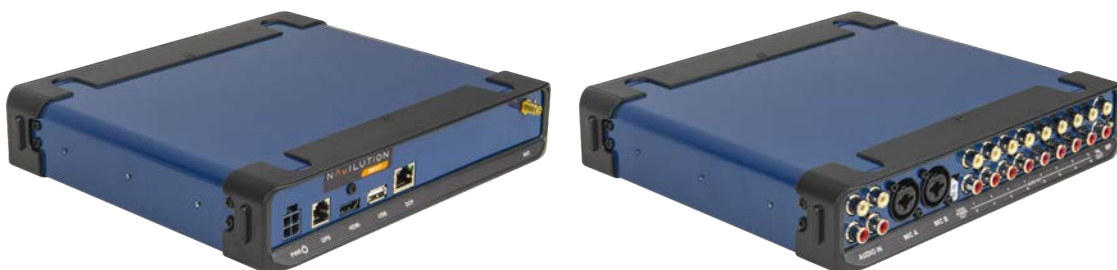
Listen EVERYWHERE Server

LW-200P-04, LW-200P-08, LW-200P-16

Display Control Panel (DCP)

LN-075-DCP

GPS

LN-050-GPSR

Navilution Portable Carrying Case

LN-300N-CASE

Cables and Connectors

RCA Mono to Terminal block	LA-508
Navilution USB 16GB Flash Drive	LNA-052-USB
PA DELIVERY Server power AC	LA-211-01
PA DELIVERY Server power DC	LNA-040-PC
Listen EVERYWHERE AC power	LA-504
Listen EVERYWHERE DC-to-DC Power Supply	LNA-049-WPC
Navilution Wi-Fi Antenna SMA-Male	LNA-041-WFA

NEXT SERVER QUICK REFERENCE

Description

The NEXT Server is the component that runs the Navilution BYOD+ Solution.

Purpose

The NEXT Server processes location data derived from the GPS receiver and automatically activates audio at predetermined zones. The audio and Trigger Zones are designed in Cortex* and uploaded to the NEXT Server.

*Navilution Cortex is the cloud-based software for route-building and content management. A separate Cortex manual is available and software training is recommended.

Placement and Fastening

The NEXT Server must be in a secure, dry location that will be free of water, condensation, splashing, moving objects, and other environmental hazards. It has a mounting bracket so it can be secured to a shelf that fits in a standard 19" AV rack or it can be mounted on a secure surface.

Allow at least 3cm or 1 inch of clearance on all sides to allow for airflow. Avoid mounting the electronics in exceptionally hot locations.

FOR FURTHER NEXT SERVER DESCRIPTIONS SEE THE PA DELIVERY CHAPTER.

LISTEN EVERYWHERE QUICK REFERENCE

For a DC power installation, the Listen EVERYWHERE server comes with a DC-DC converter (LNA-049-WPC). This converter connects to vehicle DC power 12-24VDC and changes it to the 5V that the Listen EVERYWHERE server uses. The converter has bare wire termination on the input and a barrel connector on the output to the Listen EVERYWHERE server.

There is also an AC power supply provided with the Listen EVERYWHERE server so that you can complete the cloud server set up where you have a network internet connection.

WI-FI REQUIREMENTS (NOT INCLUDED)

NETWORK CONNECTION

Connect the Listen EVERYWHERE server to your local area network (LAN) via the ethernet port on the server rear panel, then plug in the power cable. The enclosed CAT6 cable may be used to connect the Listen EVERYWHERE server to the network router or network switch. The Listen EVERYWHERE server and smartphones must be on the same public network.

Quick Tip: 2.4 GHz bands tend to have higher traffic; 5 GHz or dual-band access points are recommended in high-traffic areas.

NETWORK CONFIGURATION

Listen EVERYWHERE (LE) was designed to be used on pre-existing wireless networks as a plug-and-play system, however it might be necessary to have an IT/Network Administrator assist with the initial setup to ensure proper functionality. This guide will provide you instructions for configuring the network where the LE system will be deployed.

How it works

LE streams audio over Wi-Fi to connected Android and iOS smart-devices. This process has two phases: Discovery and Streaming, in the discovery phase the LE app on the smart-device seeks out the LE Server on the Wi-Fi network via mDNS. It then moves to the streaming phase, where audio is streamed unicast (UDP) from the LE server to the LE app on the connected smart-device.

• Enterprise Grade Router. Consumer Grade routers do not always have the required features or configuration options. Contact Listen for more info on compatible routers.

• Enterprise Grade Access Point(s), 802.11n or better (802.11ac is recommended).

• Multicast UDP (mDNS/Bonjour/Avahi) is enabled (see Enabling Multicast UDP).

• The data load is approximately 140 kbps per connected user. It is recommended that Listen Everywhere traffic only account for 20% of the total available bandwidth.

• Internet connectivity to the LE server is required for initial setup and for some features to be available (See Internet Connectivity).

Suggested Settings

Though not required for the LE system to function, there are several optimizations that can improve performance:

• No Wi-Fi Encryption is used. Using encryption will lower the number of users that can connect to the Access Point and add latency to the LE system. If encryption is used, WPA2-AES is preferred. TKIP encryption should not be used.

• Enable Quality of Service (QoS) on the network (see Enabling QoS).

• Do not use range extenders, mesh networks, or multi-hop networks. Doing so may add latency, noise, or cause dropouts.

• Set the BSS Minrate to 12,000 (12 Mbps). This will disconnect clients from the network if their signal strength is too low, reducing strain on the AP.

• Assign the Listen EVERYWHERE server a static IP through the LAN Manager.

• Set access points to static channels (see AP Channel Optimization).

Cloud Server Setup

The Cloud Server offers in-app marketing features including banner ads & promotional videos, web-based remote setup & maintenance, and advanced customization. Create an account with the Cloud Server by sending an email to support@listentech.com with the following information:

    User Setup

    last name, first name, phone number, & email

    Company Setup

    company name, phone number, venue type

    address, & LE Server serial number (looks like: AEL6-2345-43RF-TEW9)

You will receive an email with login credentials to: services.listeneverywhere.com

Internet Connectivity

Note, an internet connection is not required for the LE system to function. However, the LE server must be able to reach the Cloud Manager (see Ports and Services) for the initial setup and for some features to function.

The following features are available without a persistent connection to the cloud manager:

• Audio Streaming

• Theme Settings (title, colors, images)*

• Channel Settings (names, images, gain, delay)*

• Welcome ad (image or video)*

*Initial setup requires an internet connection and will then function without

The following features require a persistent connection to the Cloud Manager:

• Banner Ads

• Offers

• Documents

• Analytic Reports

• Firmware updates

• Downloading log files

Listen EVERYWHERE support is available on the internet:

https://www.listentech.com/listen-everywhere-support/

You will find support for documentation, cloud services, access to QR codes to join Wi-Fi networks, App download and a dynamic link.

CONNECTING THE NEXT SERVER AND LISTEN EVERYWHERE SERVER

The NEXT Server and the Listen EVERYWHERE Server are connected using the RCA Mono to Terminal block (LA-508) cable. Connect port 1 on the NEXT server to port 1 on the Listen EVERYWHERE server, and so on.
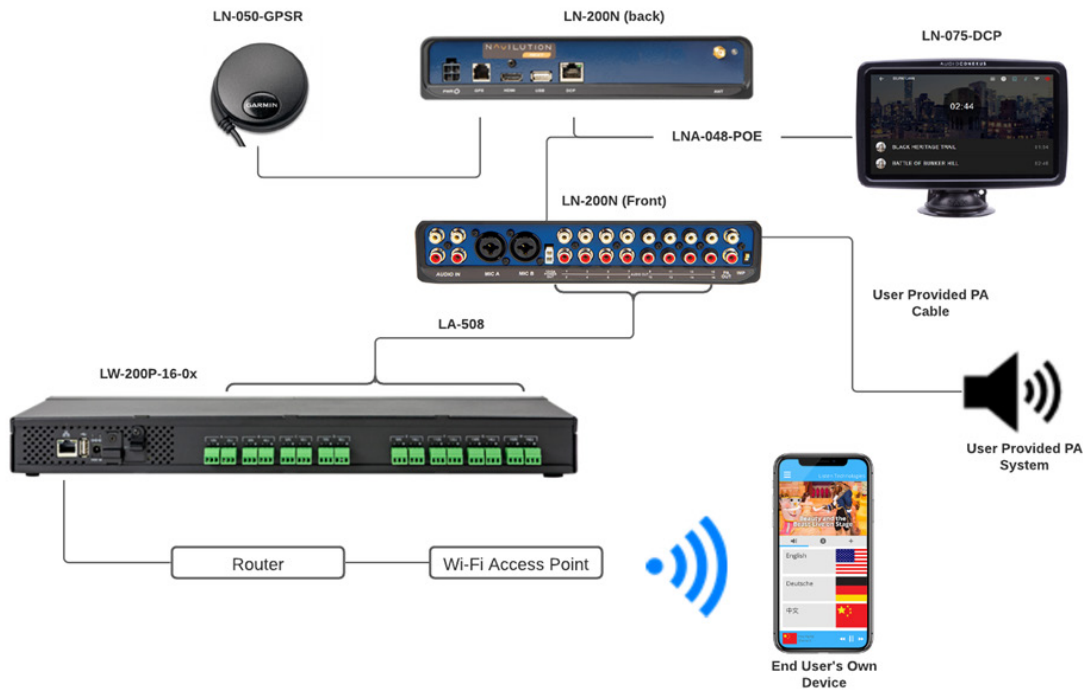
NAVILUTION DISPLAY CONTROL PANEL

NAVILUTION DISPLAY CONTROL PANEL (DCP) COMPONENT

LN-075-DCP

DCP QUICK REFERENCE

Description

The DCP (LN-075-DCP) is a 7" Display, (800x480) RGB color LCD with wide viewing angles. Included is the RAM mount with a 5.25" inch arm and the y-cable that connects the DCP to the Navilution Server for power and data.

Mobile Device DCP (not included) is when you use your iOS or Android device as a DCP. This is done by connecting your mobile device to the Navilution Server Wi-Fi network.

DCP Purpose

The DCP provides a user interface for running the Navilution System. This includes tour and route selection, filler and safety message selection, manual play and pause of stories, selecting language over a PA system, music, microphones, and more.

Placement

The DCP must be in a secure, dry location that will be free of water, condensation, splashing, moving objects and other environmental hazards. The DCP placement needs to be in a place that is easy for the driver or tour guide to interact with. Normally this includes dashboard areas and occasionally overhead areas.

Fastening

The DCP comes with a RAM mount base that can be fastened to any surface. The RAM mount consists of a 5.25" long length B size 1" double socket arm and a 2.5" diameter round plate and a diamond mini plate. The mount is designed with a patented rubber ball and socket system that dampens shock and vibration and allows for almost infinite adjustment to achieve the perfect viewing angle.

CONNECTIONS AND CONTROLS

1. On/Off power button when powered through the DCP V2.0 POE Power cable. (back)

2. RJ45 connection on the rear for connecting to the Navilution Server by using the Navilution DCP V2.0 POE Power cable. (right side)

3. 2 x USB 2.0 ports. Do not use these. (right side)

4. 1 x Micro-USB port for alternative power source (5.25V 2.4A). Not required when using POE from the Navilution Server. (bottom)

TOUR SELECTION SCREEN

Menu Icon

Tour Selection

GPS Signal Status

Wi-Fi Signal Indicator

When the system begins, you will see a splash screen with the Listen Technologies logo, rapidly followed by a list of available tours listed on the touch panel. Select the desired tour by pressing the tour name.

ROUTE SELECTION SCREEN

Back Arrow

Tour Selection
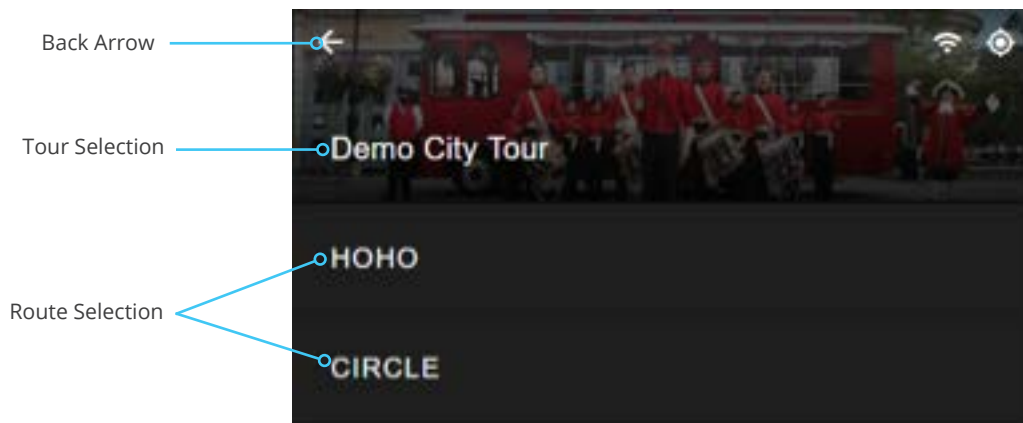
Route Selection

Once the tour is selected the available routes will appear. Again, make the selection by pressing the desired route.

TOUR SCREEN

Filler & Safety Menu

PA Language Selection

Story playing indicator

Music playing between Stories

Back Arrow Current Story

Wi-Fi Indicator

Story Timer

GPS Signal Status

BEANTOWN

02:44

BLACK HERITAGE TRAIL 01:54

BATTLE OF BUNKER HILL 02:46

The next story and the duration
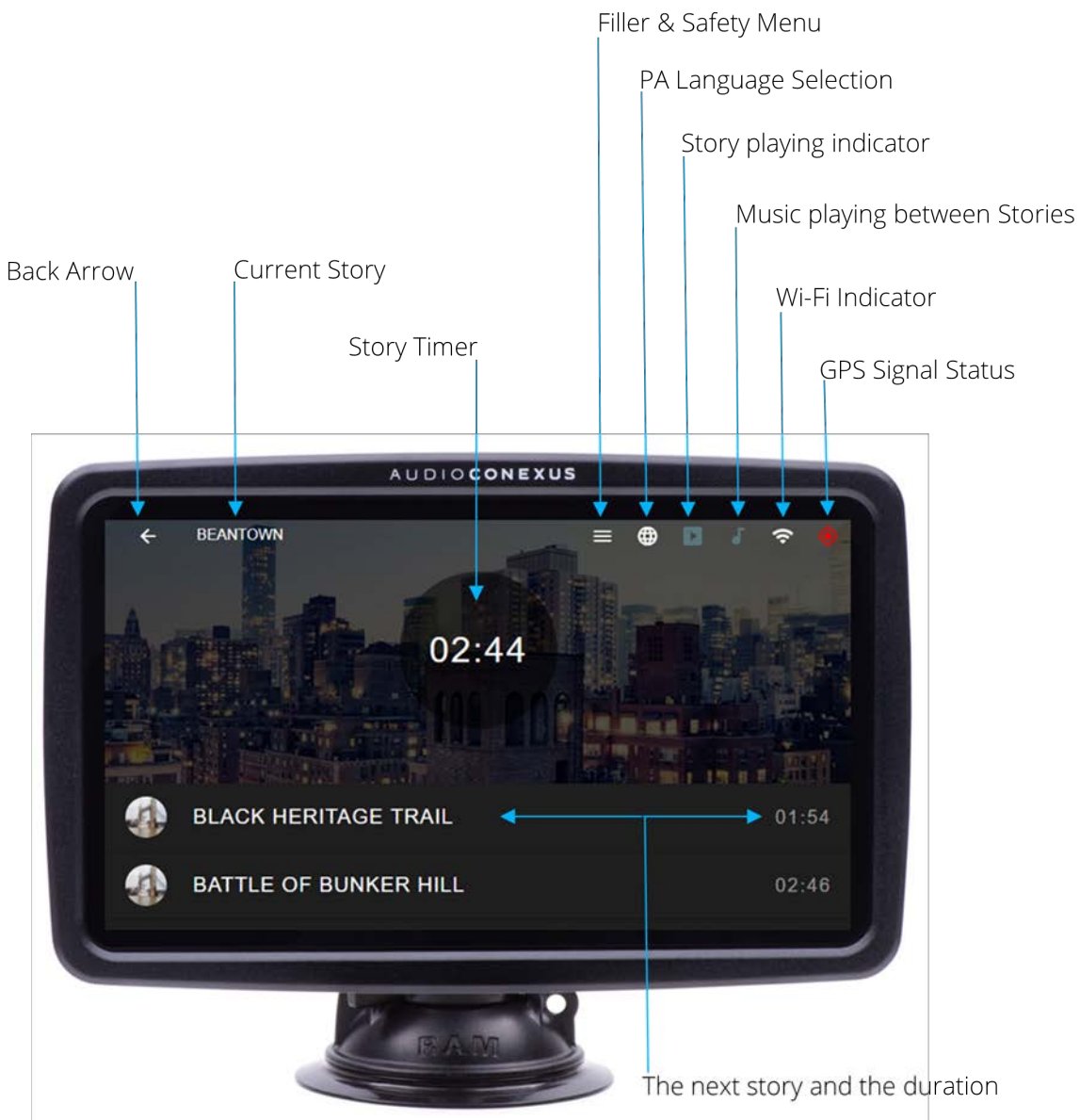
Non-Active Icon	Active Icon	Description
	←	Back Arrow, Exiting from Tour or Route
	BEANTOWN	Current Topic Playing
☰	☰	Menu for Safety & Filler Messages, Pause, Play Stop, Mic
🌐	🌐	Set Language over Paging Audio (PA) System
▶	▶	Topic Commentary is Playing on Seatback Controllers (SBC)
♪	♪	Music Playing Status
📶	📶	Wi-Fi Signal
◎	◉	Red – GPS Connected – No Signal
	◉	Yellow – GPS Connected – Weak Signal
	◉	Green – GPS Connected – Strong Signal
02:44	02:03	Story Timer: Current story length and in progress story countdown with progress bar. Select to manually play or pause.

DCP Icon Bar

Visual Story Timer

In the middle of the screen is the innovative Visual Story Timer. This serves two purposes. First, it indicates the time remaining, both in a numerical countdown, and by a blue progress bar which encircles the numerical count down. This allows the user to see briefly the progress and remaining time of the current audio file. Secondly, by pressing the indicator, the audio will pause, and the user can navigate to the User Option screen, where the user is able to select safety messages, filler material, or enable a microphone to address all channels for an announcement.
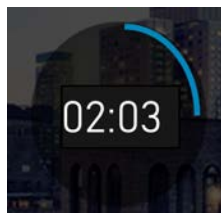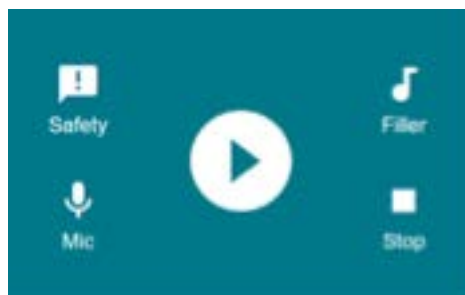

Story timer countdown with visual blue progress bar
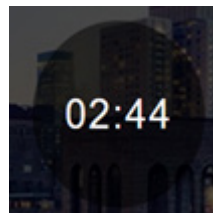

Duration of the Story

USER OPTION PAGE

This page may be accessed by pressing the Visual Story Timer while commentary is playing, or by pressing the Filler & Safety Menu Icon when no commentary is playing.

SAFETY

 When Safety is selected, a menu appears allowing a safety message to be selected from the Safety section of the tours library to be played. Because the safety messages are recorded in every language, the safety message will play for each passenger in their chosen language.
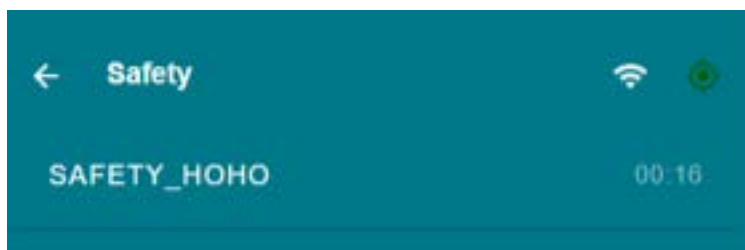

FILLER

When the Filler menu is selected, the menu lists all filler audio files along with their times. The user can then select which filler files to play. Once selected, the files will be displayed and can be selected to add to the normal playlist. Each file will be manually triggered. Receiving any GPS trigger will return to the normal route.

MIC

 Selecting the Mic option will cause the Microphone inserted into Mic B port to play over all channels.
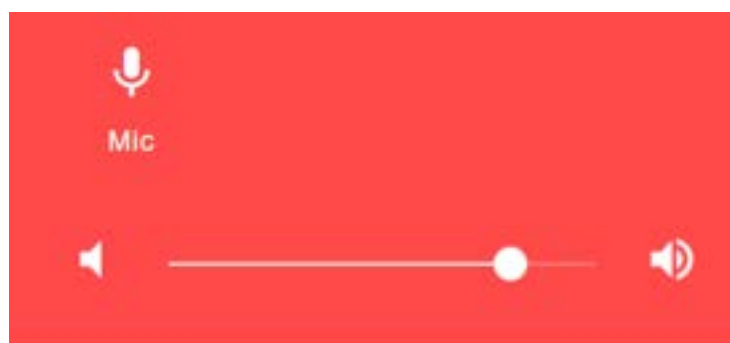
STOP

☐ Selecting stop will prompt a warning menu, from where you can stop the active route. If route is ended, a new route can be selected from the home screen of the DCP.

Stop Route?

NO   YES

LANGUAGE OVER THE PA

🌐 The PA language screen may be accessed by pressing the language icon from the DCP Icon bar. When pressed, all available languages will be presented on the DCP screen. To select, press the PA button on the far right and enable the feature. This causes the desired language to play from the line level out, which will play over a connected PA system. If no language is selected then nothing will play over the PA system.
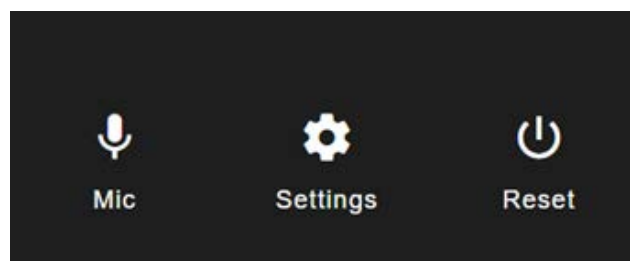
SETTINGS SCREEN AND SETTINGS MENU

From the Tour selection screen you can press the Menu icon to get to the Settings Menu.
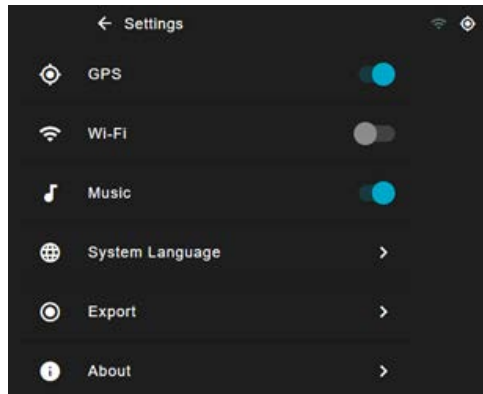
Menu Icon ——————

Demo City Tour
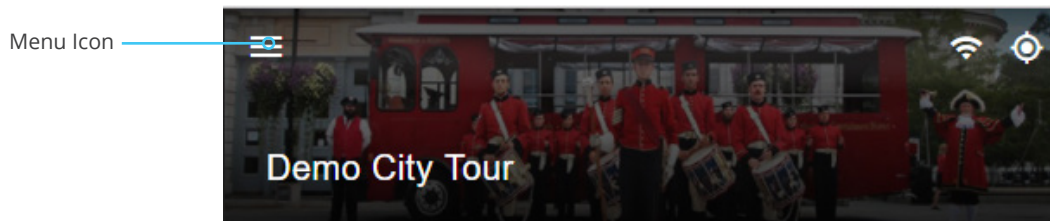
In this screen:

    • Mic can be selected. This is identical to the Mic function during a route.

    • Settings page can be selected. (read below)

    • Reset can be selected. This will reset the DCP connection.

Mic   Settings   Reset

SETTINGS

GPS

This can be used to disable the GPS when all triggering is to be done manually.

WI-FI

This feature will enable / disable the Wi-Fi connectivity of the server.

MUSIC

This setting will enable music (where available on the program) to be played over headsets when recorded commentary is not playing.

SYSTEM LANGUAGE

This setting allows you to choose the default language of the DCP display.

EXPORT

This setting updates the system time and prepares a file to be exported to the USB which will be uploaded into Cortex* for analytics where applicable.

*Navilution Cortex is the cloud-based software for route-building and content management. A separate Cortex manual is available and software training is recommended.

ABOUT

Displays information and version of software and firmware.

DCP INSTALLATION INSTRUCTIONS

1. Choose a mounting location for the DCP which has the optimum position for ease of use and is ideal for routing the network cable to the Navilution server.

2. Drill the necessary holes to route the network cable from the DCP to the Navilution Server.

3. Route the CAT5e cable through a ½ inch hole, and onward until reaching the Server. Use Fish tape, if necessary, to pull cable through the hole.

4. Secure the RAM Mount by drilling pilot holes and using ½ inch self-tapping screws.

5. Install DCP to RAM mount and make all cable connections. Be sure to cover most of the hole with the base of the RAM mount.

7. Use zip ties and mounting tabs where needed to secure cable along cable routes.

8. Position DCP for optimal viewing angle.

SPECIFICATIONS NAVILUTION DCP (LN-075-DCP)

Physical

Dimensions (H x W x D)	Metric - 132.60 mm x 212.41 mm x 58.35 mm Imperial - 5.22 in. x 8.36 in. x 2.30 in.
Unit Weight	Metric – 0.363 kg Imperial – 0.8 lbs
Shipping Weight	Metric – 1.36 kg Imperial – 3.0 lbs

Controls

Touch Screen	7" (177.80mm), 800 x 480, TFT, 10 finger capacitive touch display
Power Switch	Switch, push button SPST, DCP Power

Indicators

Ethernet Port Green LED	Solid Green, physical link established. Flashing Green, data transfer.

Interconnections

Rear Panel	
Ethernet Jack	RJ-45, Dedicated port for connection to the Navilution Server, Includes DCP power when used in conjunction with POE power cable LNA-048-POE.
Micro USB	Micro USB, Type B. DCP power alternative when used with a 5V USB power adapter.
USB x 4	For internal use only.

Environmental

Temperature - Operating	0 C to +40 C	32 F to +104F
Temperature - Storage	-20 C to +50 C	-4 F to +122 F
Relative Humidity	0 - 95%, Non condensing	

Warranty

DCP	2 Year

NAVILUTION GPS RECEIVER

LN-050-GPSR

NAVILUTION GPS COMPONENT

GPS

LN-050-GPSR

GPS RECEIVER QUICK REFERENCE

GPS Purpose

To receive Global Positioning Satellite (GPS) signals for location based automatic triggering of audio commentary tracks and videos.

GPS Placement

Placement of the GPS Receiver should be:

• The GPS is waterproof to IEC 60529 IPX7 and can be mounted on the exterior of the vehicle where it has an unobstructed view of the sky.

• On level plane.

• In an area that will not be hit by obstacles while vehicle is in motion.

• Not located PA Delivery to RF transmitting antennas because it can deteriorate the performance of the GPS.

Optimally the placement of the GPS receiver should be on the forward driver side of the vehicle.

GPS Fastening

To have the GPS receiver inside a vehicle it can be mounted to an included suction cup window mount LNA-050-GPM or if it is mounted outside the vehicle the GPS receiver has a built-in magnetic base. To further secure the GPS receiver on the outside of the vehicle it is recommend using a silicone adhesive rated for exterior use.

GPS Connections

The GPS Receiver has a built-in GPS cable. The cable end is a RJ12 connector that connects to the Navilution server.

The GPS RJ12 wiring is not standard aftermarket GPS wiring. If you need to replace the RJ12 connector contact support@listentech.com and they can provide you with the correct pinout.

CONNECTING THE HARDWARE

Connect the GPS to the GPS port on the back of the Navilution Server.
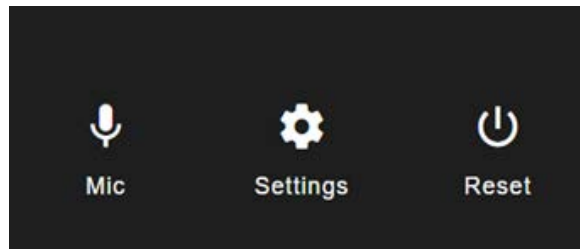
SETTINGS SCREEN AND SETTINGS MENU

With the tour stopped, and from the tour select menu, pressing the Settings icon (now in the upper left corner) takes you to the settings screen, as shown below.
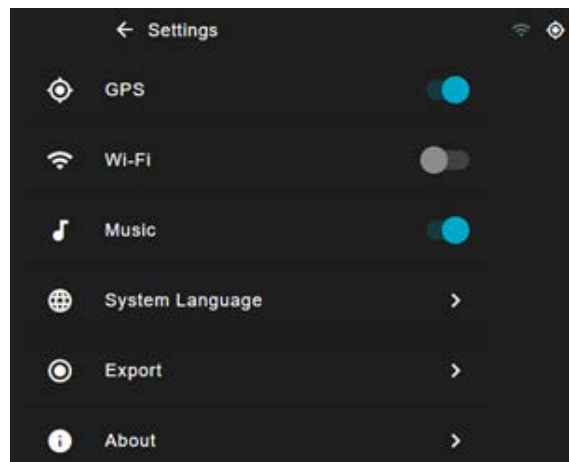
Menu Icon ——————

In this screen

      • Settings page can be selected.

Settings

GPS

This can be used to disable the GPS when all triggering is to be done manually.

GPS SIGNAL STATUS INDICATOR

From the DCP look for the GPS signal status indicator.

⊙	Red – GPS Connected – No Signal
⊙	Yellow – GPS Connected – Weak Signal
⊙	Green – GPS Connected – Strong Signal
⊙	Gray – GPS turned off

SPECIFICATIONS NAVILUTION GPS RECEIVER (LN-050-GPSR)

Physical

Dimensions (H x Diam)	Metric – 19.5 mm x 61.0 mm Imperial – 0.77 in x 2.4 in
Unit Weight	Metric – 0.09 kg Imperial – 0.2 lbs
Shipping Weight	Metric – 0.45 kg Imperial – 1.0 lbs
Enclosure Material	Polycarbonate thermoplastic
Cable Length	Metric - 4.94 m Imperial – 16.21 ft
Mounting Hardware	Garmin GPS18 Suction Cup Mount (included)

Indicators

Performance indicator on the DCP (LN-075-DCP) screen during operation.	
Grayed out Icon	GPS turned off or not connected
Red Icon	GPS Connected – No Signal
Yellow Icon	GPS Connected – Weak Signal
Green Icon	GPS Connected – Strong Signal

Interconnections

Dimensions (H x Diam)	Metric – 19.5 mm x 61.0 mm Imperial – 0.77 in x 2.4 in

Receiver / Antenna

Receiver / Antenna	Differential DGPS capability using real-time WAAS correction yielding position accuracy of less than 3 meters
Receiver Sensitivity	-185 dBW minimum
Accuracy	<3 Meter, 95% typical

Environmental

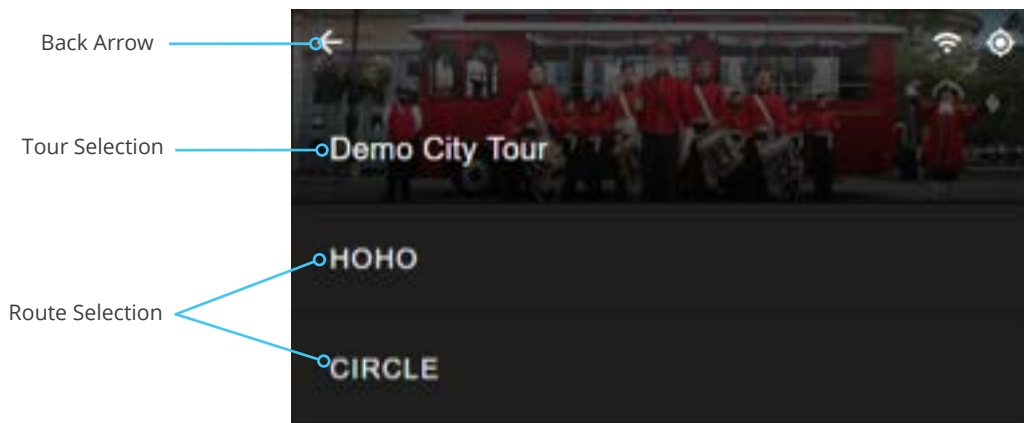| Temperature - Operating	-30 C to +80 C -22 F to +176F
Temperature - Storage	-40 C to +90 C -40 F to +194 F
Weather Resistance	Waterproof to IEC 60529 IPX7

Warranty

Standard	2 Year

RUNNING A TOUR

1. Turn the system on and wait for the DCP to open to the tour selection screen and select a tour.

Menu Icon

GPS Signal Status

Tour Selection

Wi-Fi Signal Indicator

Demo City Tour

2. Select the Route you are going to follow.

Back Arrow

Tour Selection

Demo City Tour

HOHO

Route Selection

CIRCLE

3. The DCP will show the Story Timer.

4. GPS triggered - story will be triggered when you meet the Trigger Zone settings. When the story ends, the server will play the next story as Trigger Zone parameters are met.

5. Manually triggered - Swipe (scroll) through the stories that are available and select the one you want to play. The DCP will show the current story name in the top left corner of the DCP and the Story Timer will show the duration of the story. Press the Story Timer to start the story. When the story is complete the DCP will show the next story that is ready to play in the top left of the DCP screen and the Story Timer will show the length of the story. Repeat this step.

If you have selected the music option in the settings and you have music files they will play between the triggered stories.

REGULATORY INFORMATION

FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) These devices may not cause harmful interference, and (2) these devices must accept any interference received, including interference that may cause undesirable operation.

No user serviceable parts inside. Any changes or modifications not expressly approved by Listen Technologies could void the user's authority to operate this equipment.

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help

ICES Statement

This device complies with ICES-003 class B.

This device complies with Industry Canada's license-exempt RSS Standards. Operation is subject to the following two conditions:

(1) This device may not cause interference; and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme à la classe B de l'ICES-003

Cet appareil est conforme avec Industrie Canada RSS standard exempts de licence (s). Son utilisation est soumise aux deux conditions suivantes:

(1) cet appareil ne peut pas provoquer d'interférences et

(2) cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.

CAN ICES-3 (B)/NMB-3(B)

EU Member States Notice

The Navilution products and associated components will be marketed in all Member States of the EU

WARRANTY

Please visit www.listentech.com/support/warranty/ for warranty and service information.

GPS Caution

The GPS system is operated by the government of the United States, which is solely responsible for its accuracy and maintenance. Although the GPS 18x is a precision electronic NAVigation AID (NAVAID), any NAVAID can be misused or misinterpreted, and therefore become unsafe. Use these products at your own risk. To reduce the risk, carefully review and understand all aspects of these Technical Specifications before using the GPS 18x. When in actual use, carefully compare indications from the GPS to all available navigation sources including the information from other NAVAIDs, visual sightings, charts, etc. For safety, always resolve any discrepancies before continuing navigation.

This product does not contain user-serviceable parts. Repairs should only be made by an authorized Garmin service center. Unauthorized repairs or modifications could result in permanent damage to the equipment and void your warranty and your authority to operate this device under Part 15 regulations.

CONTACT INFORMATION

LISTEN TECHNOLOGIES 14912 Heritage Crest Way, Bluffdale, Utah 84065-4818 USA

Phone: +1.801.233.8992 Toll-Free: 1.800.330.0891 www.listentech.com