

OTTO[®]

Lynq PRO[™]

Model: OTTOVL01

Team Enhanced Navigation

Technical Manual and Instructions for Use



IMPORTANT SAFETY WARNINGS

FCC STATEMENT

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

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Note: 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 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.

INDUSTRY CANADA NOTICE

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

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

1. This device may not cause interference
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

USE AND SAFETY CAUTIONS

- Do not drop, disassemble, open, crush, bend, deform, puncture, shred, microwave, incinerate, paint, or insert foreign objects into the Lynq PRO™. Such actions could result in electric shock.
- Do not expose the device to extremely high or low temperatures or leave in direct sunlight for extended periods of time.
- Do not leave your Lynq PRO™ near open flames such as cooking burners, candles, or fireplaces. Do not dispose in a fire. The battery could explode, causing injury or death.
- Do not block any ventilation openings, which could cause battery hazard.
- Do not attempt to repair, modify, or disassemble your Lynq PRO™; it does not contain any user serviceable components.
- Dispose of the Lynq PRO™ and the battery in accordance with local regulations.



ELECTRIC SHOCK CAUTIONS

- Only charge the battery in temperatures between 32°F - 113°F (0°C - 45°C).
- Do not attempt to disassemble the Lynq PRO™ or force open the built-in battery.
- Do not charge the unit in damp areas.
- Do not attempt to replace your Lynq PRO™ battery; it is built-in and is not changeable.
- Be sure the USB port is dry before plugging in the charging cable.

Maximum SAR Value: 1.30 W/kg reported

Separation Distance: 0 mm for body

Contents

Lynq PRO™ Instructions for Use.....	5
Introduction.....	5
Supplies Equipment and Parts List.....	6
Features of Lynq Pro.....	7
Basic operations.....	8
Lynq PRO™ Icon Definition.....	8
Lynq PRO™ Status Bar Examples.....	8
Lynq PRO™ Button Functions.....	9
Charge device.....	9
Powering On.....	10
Powering Off.....	10
Acquiring GPS Signal.....	10
Calibrate Compass.....	10
Lynq PRO™ Name Entry.....	11
Network Settings.....	12
Network Settings – Pairing.....	14
Device Settings.....	15
Land/Nav.....	16
Settings.....	17
My View.....	18
Team View.....	19
LynQ View.....	21
Markers/Waypoints.....	22
Markers - Edit Name.....	23
Markers - Edit Location.....	23
Markers - Edit Alarm.....	23
Waypoints.....	25
Waypoints - Load.....	26
Messages.....	28
Messages - Send.....	29
Messages - View.....	29
ATAK Connect.....	30
Notes.....	31

LYNQ PRO™ INSTRUCTIONS FOR USE

Introduction

Lynq PRO™ provides GPS in the most austere environments. Connecting team members in denied environments increases battlefield situational awareness allowing for continued mission support and safety.

The integrated screen and 3 button design allow for visual confirmation of team whereabouts quickly and easily. The USB port and external data connections allow for scalability with optional accessories.

An optional Field Deployment Kit is available for large team settings where groups can be quickly created on the fly. This kit can upgrade your Lynq PRO™ device in the field, making it easy to add future features as they come available.

This manual covers the following equipment:

Model	Description	Part Number
Lynq PRO™	Basic	VL-10000
Lynq PRO™ ATAK	Basic w/ATAK compatibility	VL-10100

SUPPLIES EQUIPMENT AND PARTS LIST



A) MENU/SELECT BUTTON

B) UP/DOWN BUTTONS

C) FRONT LIGHT DISPLAY

D) MICRO USB PORT W/COVER

E) ROTATING BELT CLIP

F) CHARGE/DATA PORT (USED WITH FIELD DEPLOYMENT KIT)

G) MICRO USB CABLE (NOT SHOWN)

FEATURES OF LYNQ PRO

- Rapidly Deployable Self-Contained Network
- Provides Position Location Information (PLI) Up to 12 Users
- Route Navigation
- Team movement data
- Networked user data
 - Speed / Elevation / heading
 - GPS location
 - Orientation and distance device to device
- Markers
 - Orientation and distance device to marker
 - GPS location of marker
- Device to Device or Device to Network messaging
- ATAK compatible
 - ATAK Transmit/Receive Capabilities
 - ATAK plug in available

General Specifications

- Dimensions: 4.2 x 2.3 x 1.1 in. [107 x 58 x 28 mm]
- Supply Voltage (main): 2.0 V to 3.3 V
- Supply Voltage (Tx gain): 2.0 V to 4.8 V
- Weight: 0.5 lbs. [0.23 kg]
- Current Consumption, Tx: varies, 600 mA max
- Current Consumption, Rx: 57 mA
- Current Consumption, Disable: 500 nA
- Antenna Pin Impedance: 50 Ω

Radio Specifications

- Modulation: CSS (LoRa)
- Frequency Range: 902-928 MHz
- Channel Spacing: 41.6 kHz, 62.5 kHz, 128 kHz, 250 kHz
- Channel Bandwidth: 20.8 kHz, 31.25 kHz, 62.5 kHz, 125 kHz
- Link Budget: Up to 163 dB
- Receiver Sensitivity: As low as -133 dBm
- Adjacent Channel Selectivity: 90 dB
- Power Output: Up to 1 W
- Frequency Stability: ± 30 ppm or less

Network Stack Specifications

- Maximum Encryption: AES-256
- Network Type: Peer-to-peer broadcast, unicast
- Maximum bitrate: 7.3 kbps
- Maximum payload size: 246 bytes

PHY Layer Specification

- Peripheral: Serial UART
- UART Spect: 8N1
- Baud Rate: 115200 (default)
- Other Baud Rate: TBD
- Timeout (Bad Msg): 44 ms
- Wait after Power On: 1 sec
- Maximum Payload Size: 252 bytes
- Stack API Overhead: 3 bytes

BASIC OPERATIONS

Lynq PRO™ Icon Definition

	Battery level icon – each line represents ~20%
	Unit is plugged into a power source and charging internal battery
	Compass not calibrated – Perform operation noted in Compass Calibration Section *Icon will disappear when unit is calibrated
	Unit does not have a GPS Lock *Icon will disappear when GPS lock is established
	No LoRA communication established
	LoRA communication established
	LoRA in power save mode
	Messages received (icon appears and lines will flash)
	Delete the last character entered
	Save the Name of the Marker

Lynq PRO™ Status Bar Examples

00:00Z	   	Unit is not calibrated, not paired to other devices, and has no GPS lock.
18:17Z	 	Unit is calibrated, is paired to other devices, and has a GPS lock.
18:17Z	  	Unit is calibrated, is paired to other devices, and has a GPS lock. This device also received a message.

Lynq PRO™ Button Functions

Menu/Select Button

- Power on device
- Confirm current selection
- Long press (~3 sec) turns on/off screen front light
- Double tap to go back one (1) screen

Up/Down Arrow Buttons

- Scroll through menu options
- Double tap in select apps to view additional options such as team member list
- Toggle through on-screen data
 - Example: In My View, you can toggle between GPS coordinates and speed which then you can change the units using the Menu/Select button.
- UP arrow to turn on/off screen front light. This option is only available at device start up.

Charge device

To charge the Lynq PRO™, simply plug the included USB cable into the bottom of the device. The other end of the cable can be plugged into another power source, such as a wall power outlet or computer.



As the Lynq PRO™ charges, you'll see a lightning bolt on the battery icon, as shown in above table, either in the status bar (if the device is on) or in the middle of the screen (if the device is off).

Powering On

To power on the Lynq PRO™, press and hold the Menu/Select button on the device for 3 seconds. The Lynq PRO™ will boot and the Lynq PRO™ logo will appear on the screen. Press the Down arrow button to remove the startup screen and display the main menu.

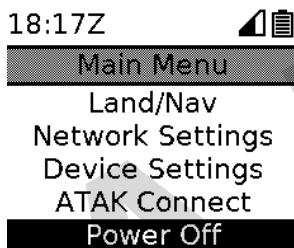
Note: The light on the screen will be off by default. To enable, use one of the following options.

- At the startup screen, press the Up arrow on the device.
- At any other location within the device, press and hold the Menu/Select button for up to 3 seconds

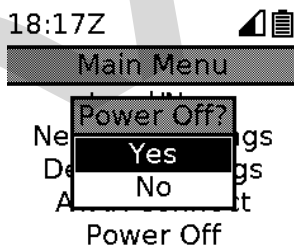
Powering Off

To power down the Lynq PRO™:

1. From the Main Menu select “Power Off”.



2. In the Power Off window, select “Yes”.



Acquiring GPS Signal

Once the Lynq PRO™ is on, it will start acquiring a GPS system lock. For best performance, the Lynq PRO™ should be in an open environment away from any equipment that may impede the signal.

Calibrate Compass

To calibrate the compass on the Lynq PRO™, move the Lynq PRO™ in a figure eight motion. It could take up to 30 seconds to calibrate the compass.

Lynq PRO™ Name Entry

The procedure listed below works for all areas within the device that require names.

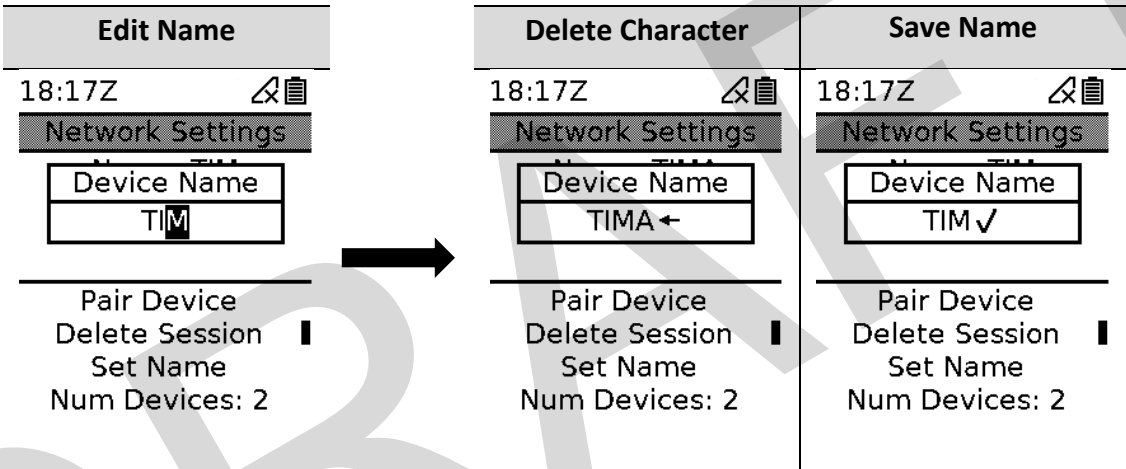
Use the Up and Down arrows on the Lynq PRO™ to scroll through the available alpha-numeric characters. Each name is limited to 6 characters.

To enter more than one (1) character, use the Up or Down arrows to cycle to the character and then press the Menu/Select button to accept and move to the next.

To **delete** the last character entered, use the Up or Down arrows to cycle to the character shaped as an arrow (↵) and then press the Menu/Select button to accept the deletion.

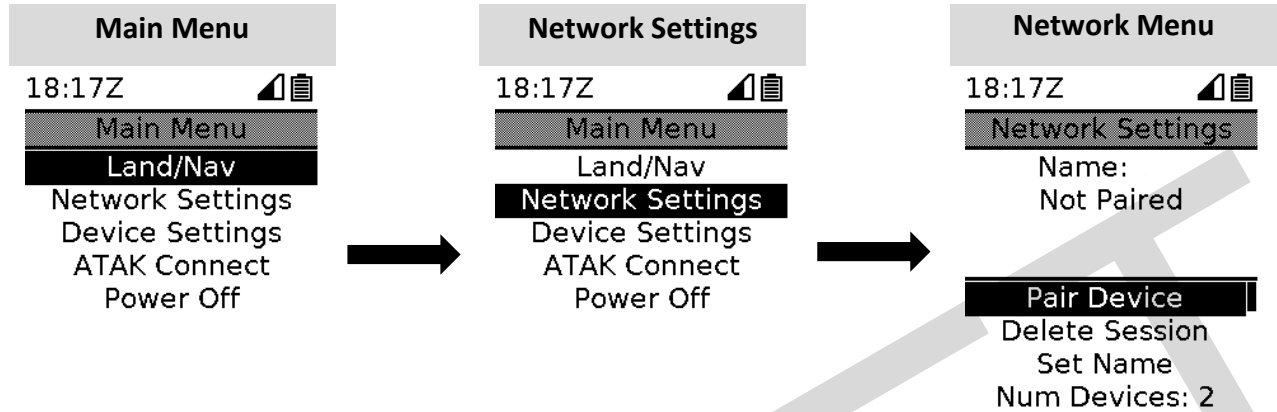
To **save** the name entered, use the Up or Down arrows to cycle to the character shaped as a check mark (✓) and then press the Menu/Select button to save.

Double tap the Menu/Select button to exit this screen and go back to the previous.



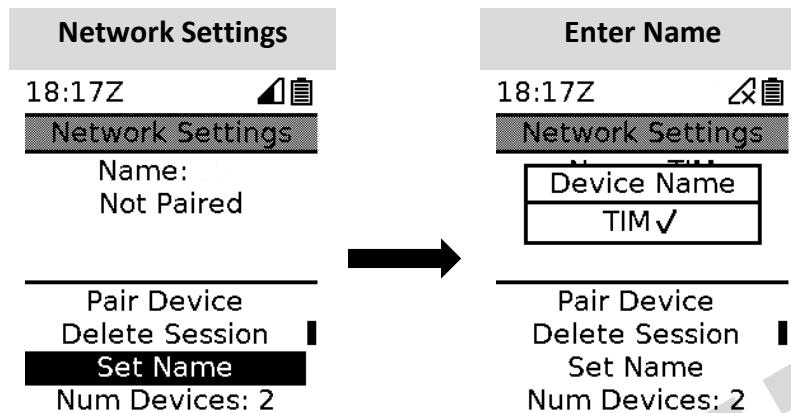
NETWORK SETTINGS

This section sets up the Lynq PRO™ to pair with other Lynq PRO™ in a group. Before you pair the device, you must set the name.

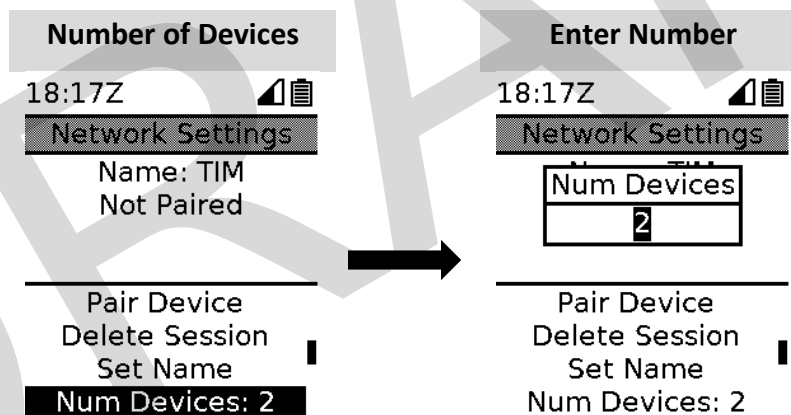


Menu Header	Description
Pair Device	This initiates the device pairing session
Delete Session	This deletes the previous paired session
Set Name	This sets the name of the device. 6 characters is the limit for the name.
Num Devices	This sets the number of devices to be paired in a group. Default is 2
LPD Level	Low Probability of Detection (LPD)
Modem	Sets how data is transmitted

Before any pairing can begin, you must set the name of each device. Please follow the process in the **Lynq PRO™ Name Entry** section for naming this device.



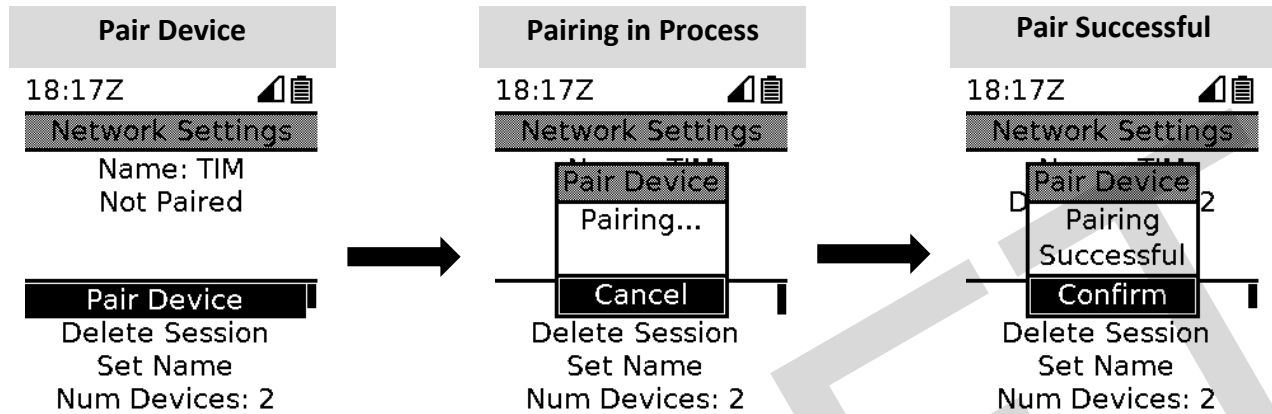
After the name has been set, select the number of devices to be paired. By default, this number is set to 2. Please note, all devices in the group need to have the same number set for "Num Devices". If not, the pairing will fail.



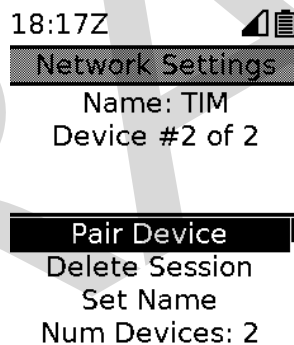
Network Settings – Pairing

With network configured on all Lynq PRO™ devices in this group, you can start the pairing process.

“Pair Device” must be pressed on all devices at the same time. This ensures all devices have enough time to pair into the group.

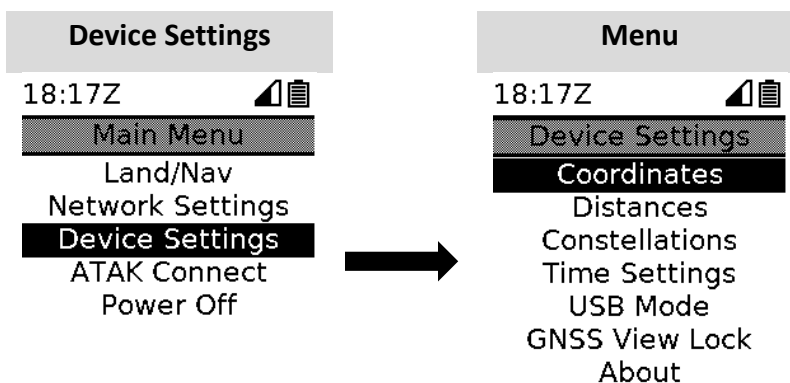


The group has now been created. The screenshot below is now displaying the device name and number in the group.



DEVICE SETTINGS

The Device Settings menu allows the user to configure a number of options on the Lynq PRO™.

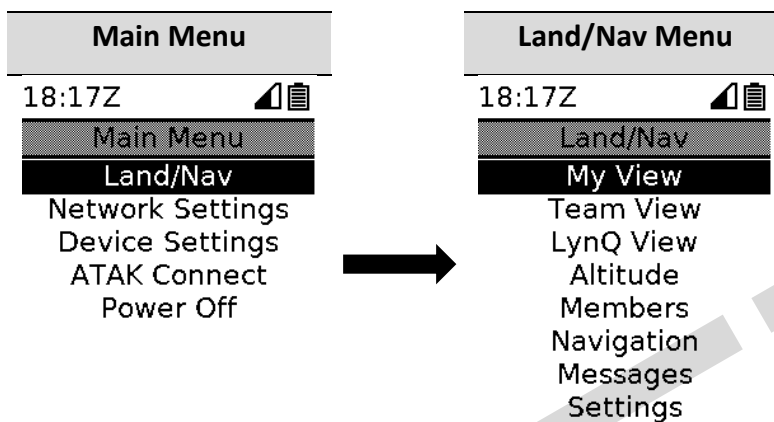


Menu Header	Description
Coordinates	Change the display format between Lat/Long and MGRS
Distance	Change the display format between Imperial and Metric
Temperatures	Change the display format between Celsius and Fahrenheit
Constellations	Change between GPS only or GNSS (Fused system of GPS & GLONASS)
Time Settings	Allows you to manually set the time, date and time zone or use the GNSS system to set these values.
USB Mode	- o Communication: Normal operating mode of the Lynq PRO™ - o Storage: Option to turn the Lynq PRO™ into an external storage device when tethered to another device via USB
GNSS View Lock	This provides the ability to disable the “My View” application. Note: To restore this view requires access to the OTTO Deployment Kit.
About	Lists firmware versions and any regulatory information

LAND/NAV

Personal or group navigation on land.

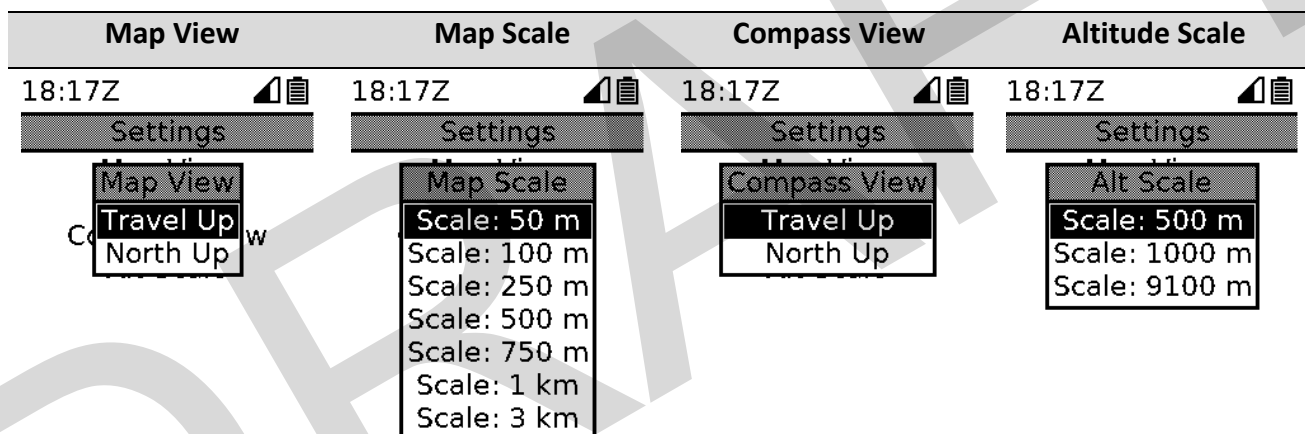
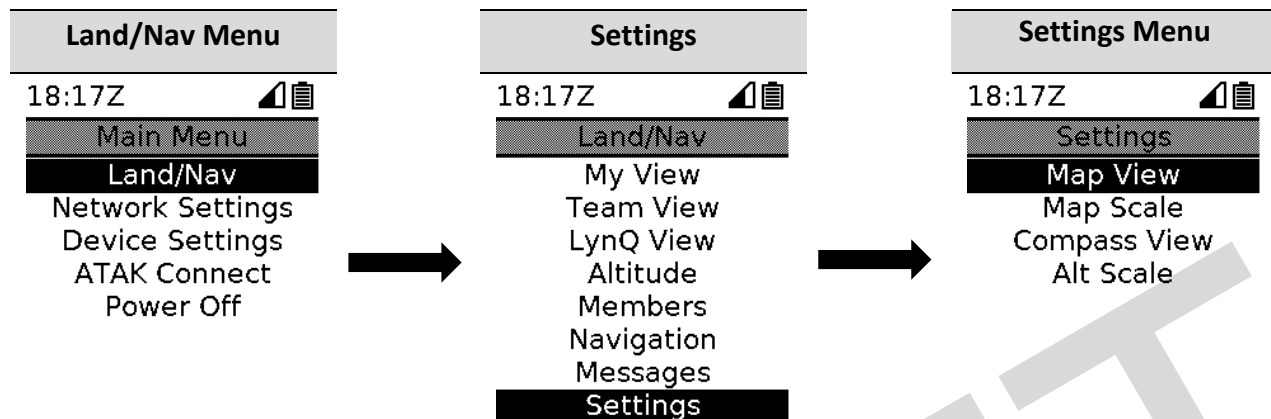
Double tap the Menu/Select button to exit any screen and go back to the previous.



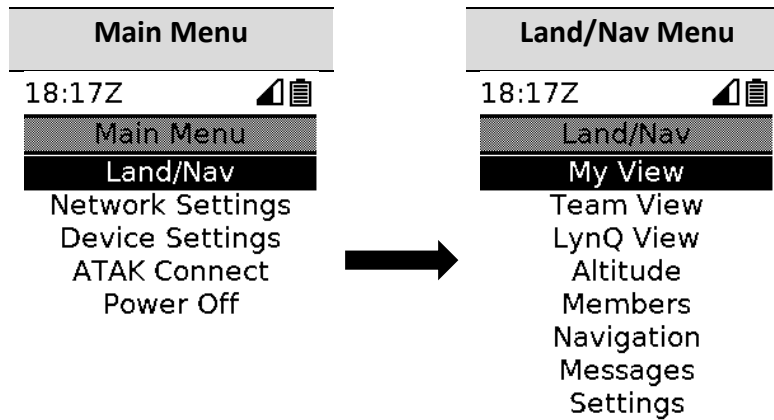
Menu Header	Description
My View	Compass view of personal Lynq PRO™ 2 view options: Horizontal and Vertical
Team View	Compass view of team member approximate locations
LynQ View	Custom LynQ view of specific team member location
Altitude	View displaying your or specific team member altitude and bearing.
Members	Non-Graphical detail view of specific team members
Navigation	Menu showing current Markers and Waypoints
Messages	Send, delete, or view messages
Settings	Change map settings

Settings

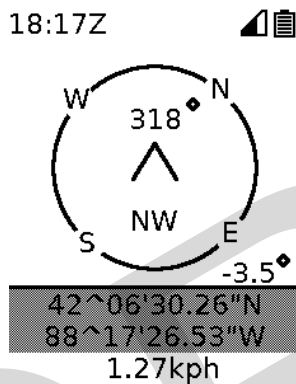
Changing these settings will affect My View and Team View compass views.



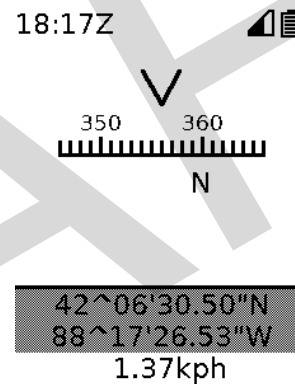
My View



There are 2 map views depending on the orientation of the Lynq PRO™.

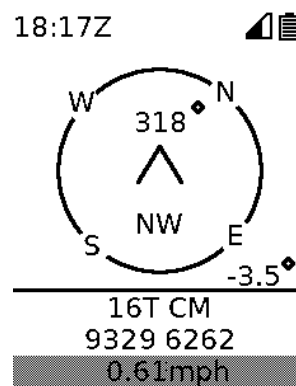
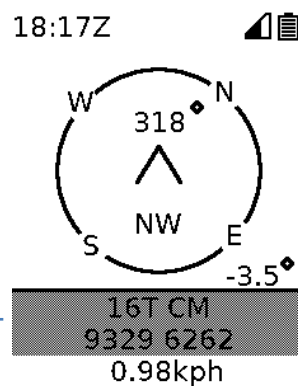


Map View Setting: Travel Up
Lynq PRO™ orientation: horizontal (parallel to ground)



Lynq PRO™ orientation: Vertical
(perpendicular to ground)

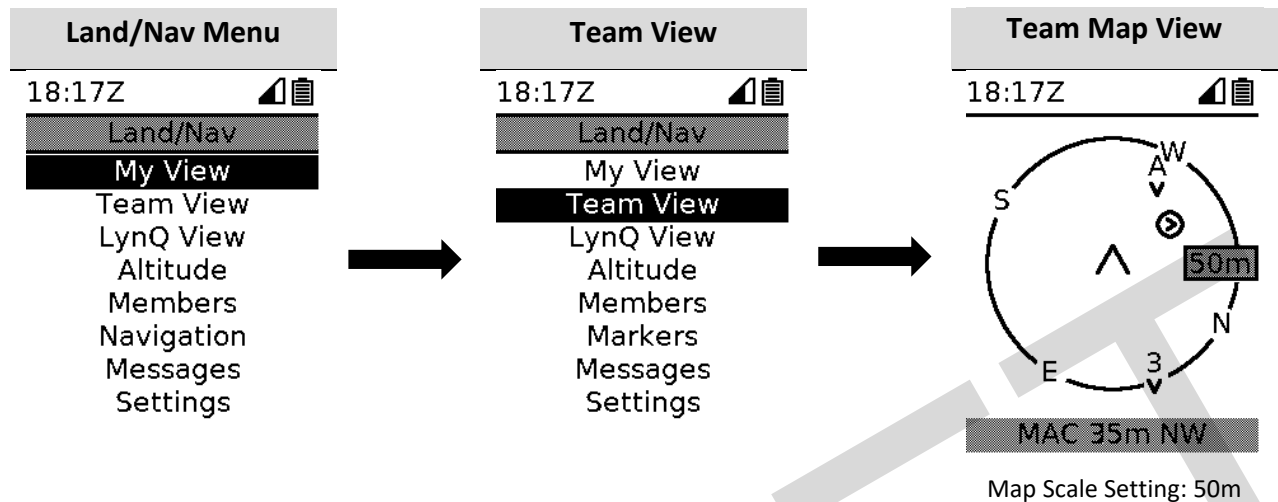
Press the Menu/Select
button to convert Lat/Long
coordinates to MGRS



Press Down button to
highlight speed and then
press the Menu/Select
button to convert.

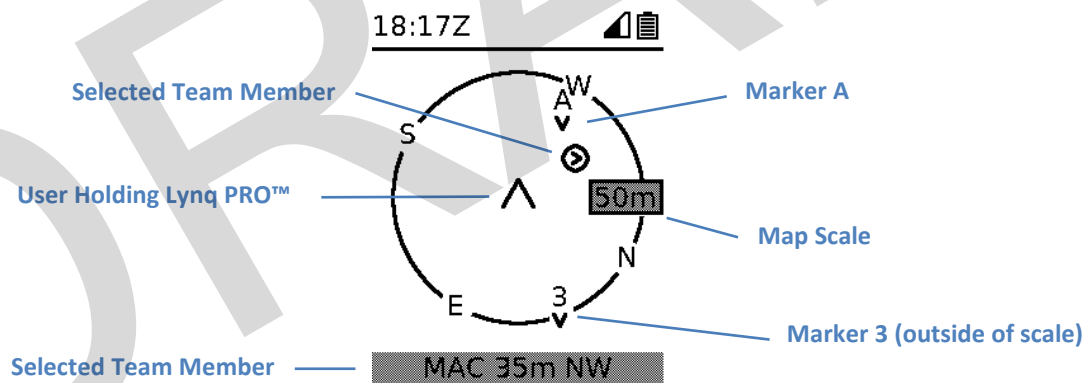
Team View

This option allows for full team view on the compass map.

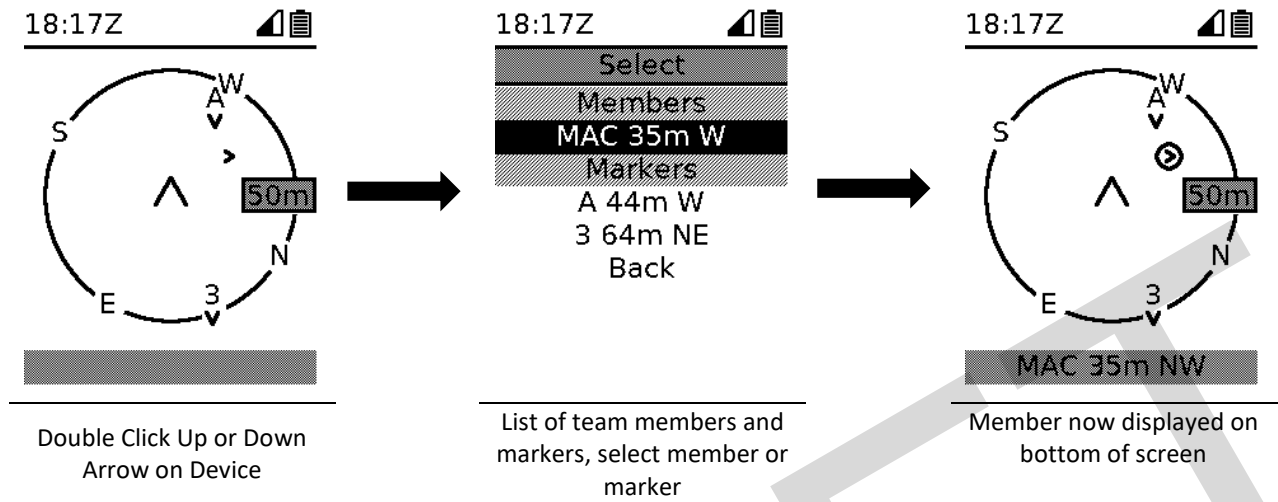


In the Team Map View, the members in your group will show up on the screen. Depending on the map scale, these members will show up either within the circle or outside of it.

In the image below, there are 2 members of this group along with 2 markers which are depicted by the small triangles (small "v"). The centered triangle is the user holding the Lynq PRO™.

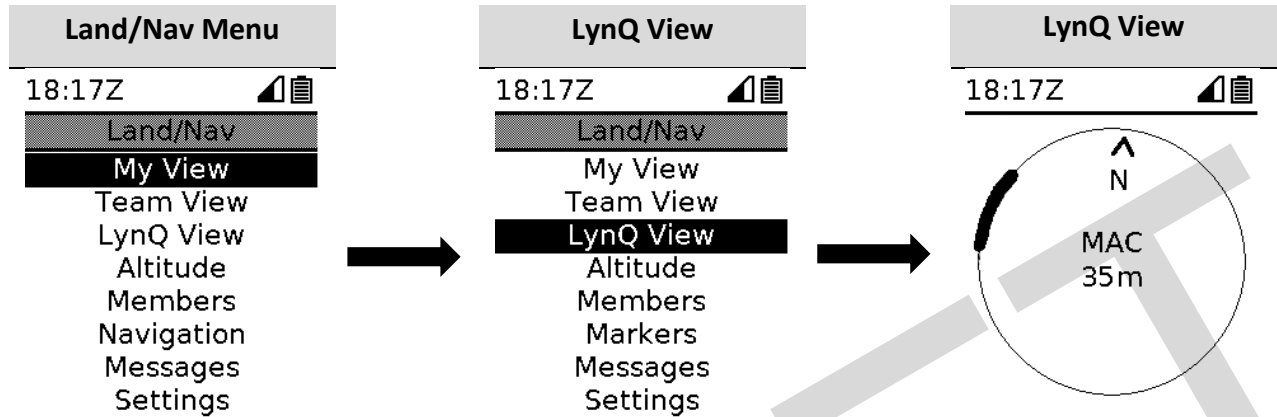


From within the map view, double click on the Up or Down arrow on the device and the Select menu pops up. This window provides the distance the group member(s) and marker(s) are from your location. Selecting the member or marker will add them to the Team Member Map View, allowing you to see up-to-date distances as you move around.

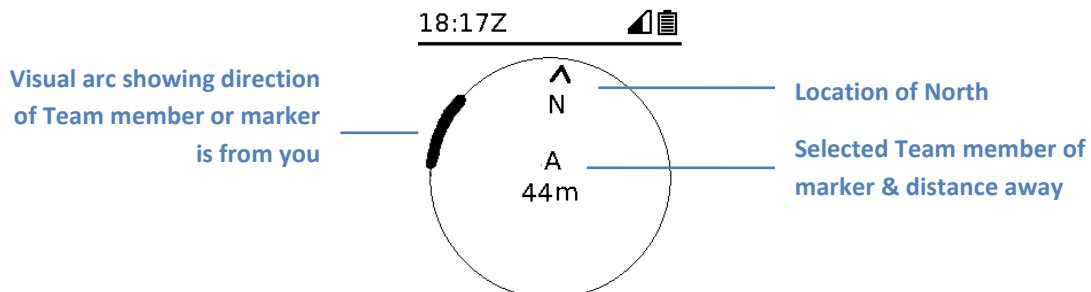
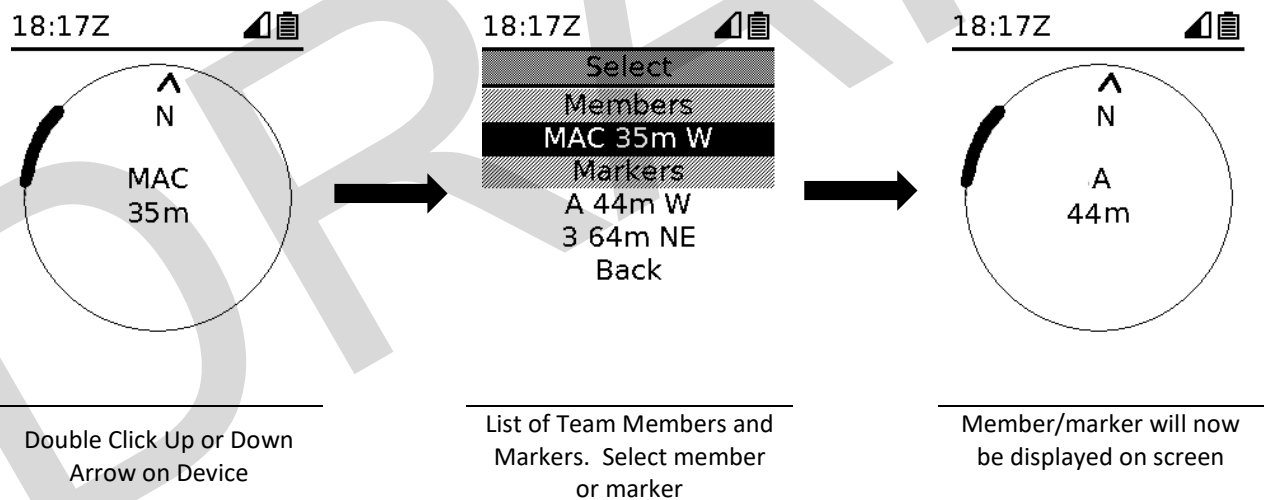


LynQ View

This view option provides another graphical view of your selected team member. The arc on the ring will rotate depending on your orientation from the selected team member. This arc will increase in size as you get closer to that member.



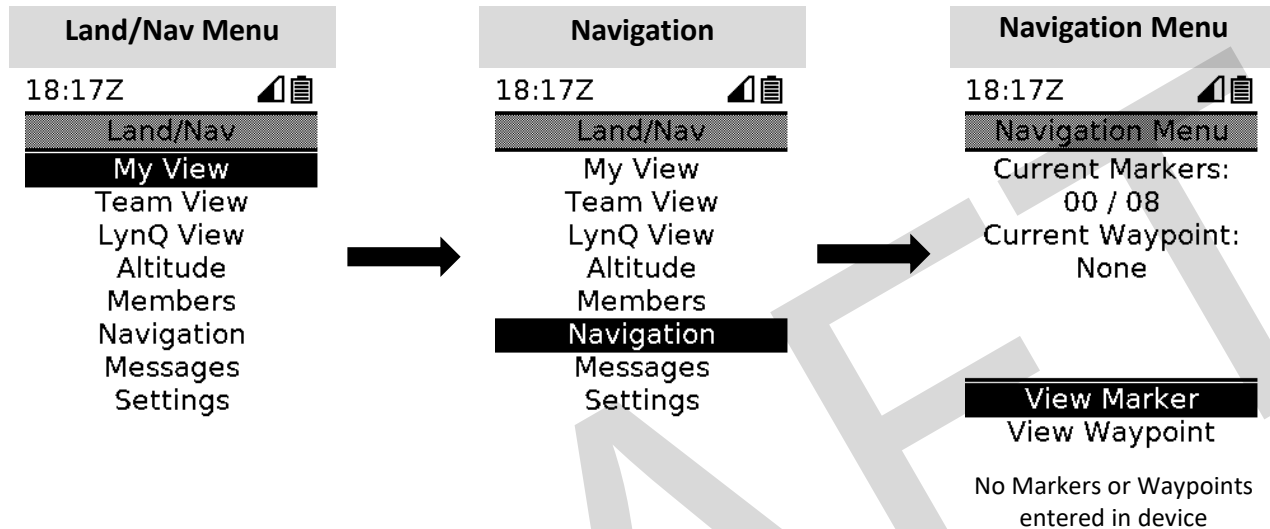
From within the map view, double click on the Up or Down arrow on the device and the Select menu pops up. This window provides the distance the group member(s) and marker(s) are from your location. Selecting the member or marker will add them to the LynQ View, allowing you to see up-to-date distances as you move around.



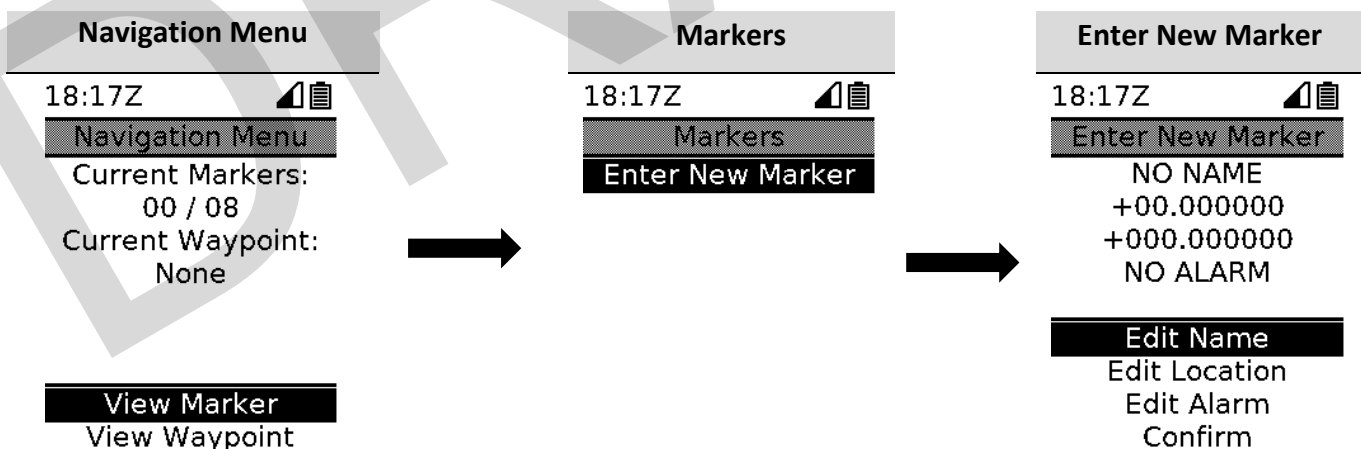
Markers/Waypoints

Markers allow you to add additional locations to your personal device. These locations can be entered based on your current location or manually with a known GPS location. Waypoints are loaded into the Lynq PRO™ using the field deployment kit.

Markers will show up on “My View” automatically and available for view in Team and LynQ Views. Waypoints must be loaded and will be displayed on “Team View” and “LynQ View”.



Select “View Marker” to see a list of all the markers that have been entered into the device. To add a new Marker, select “Enter New Marker”.

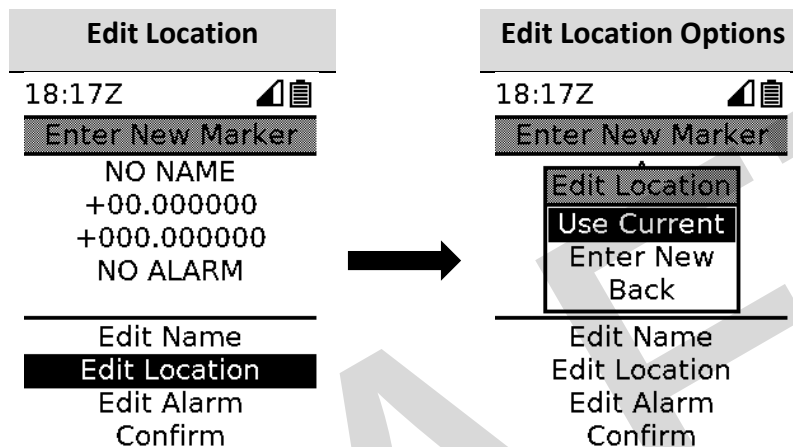


Markers - Edit Name

Please follow the process in the **Lynq PRO™ Name Entry** section for naming this Marker

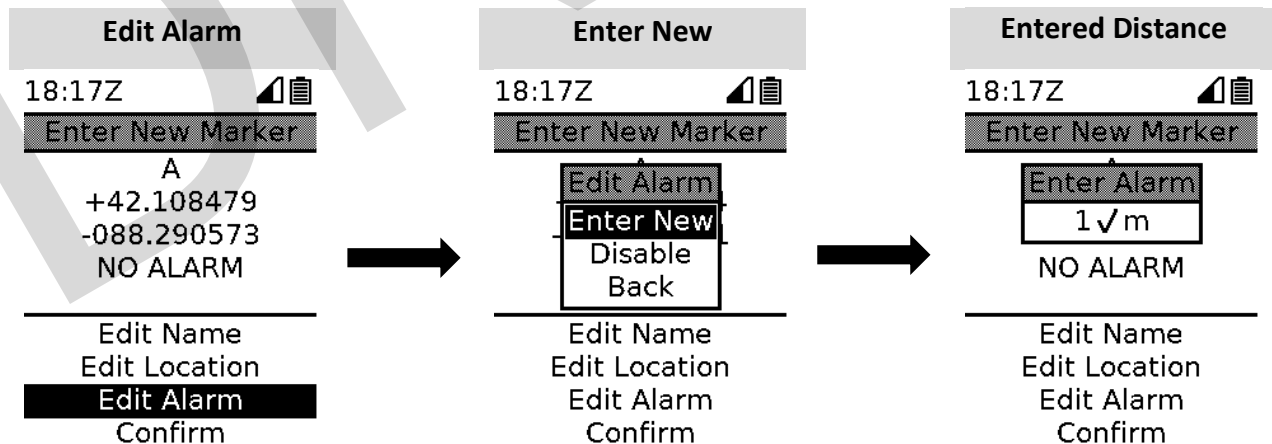
Markers - Edit Location

There are 2 options to entering the location of a Marker. Use the Lynq PRO™ current location or manually enter the location. This location will be entered in decimal format.

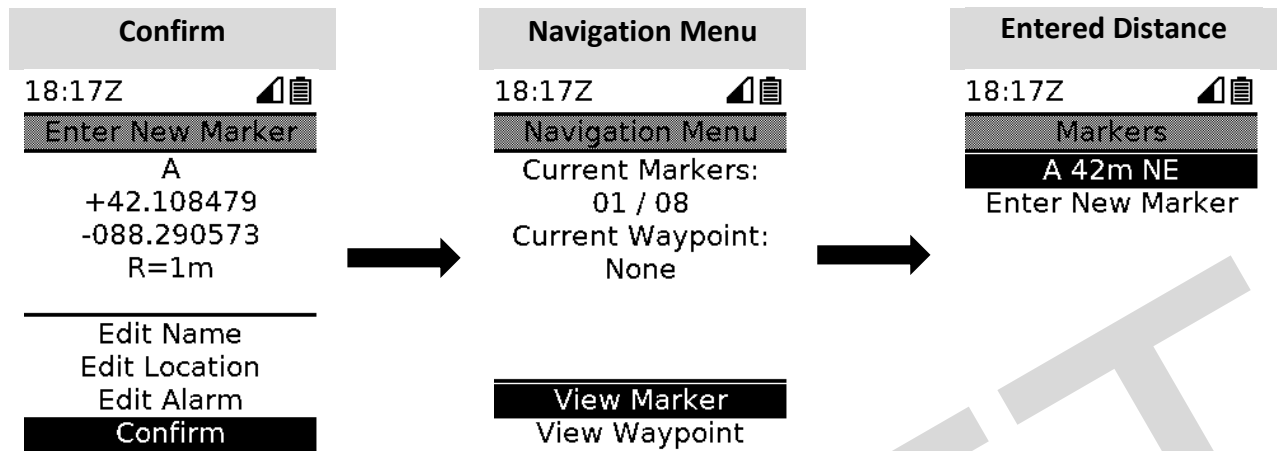


Markers - Edit Alarm

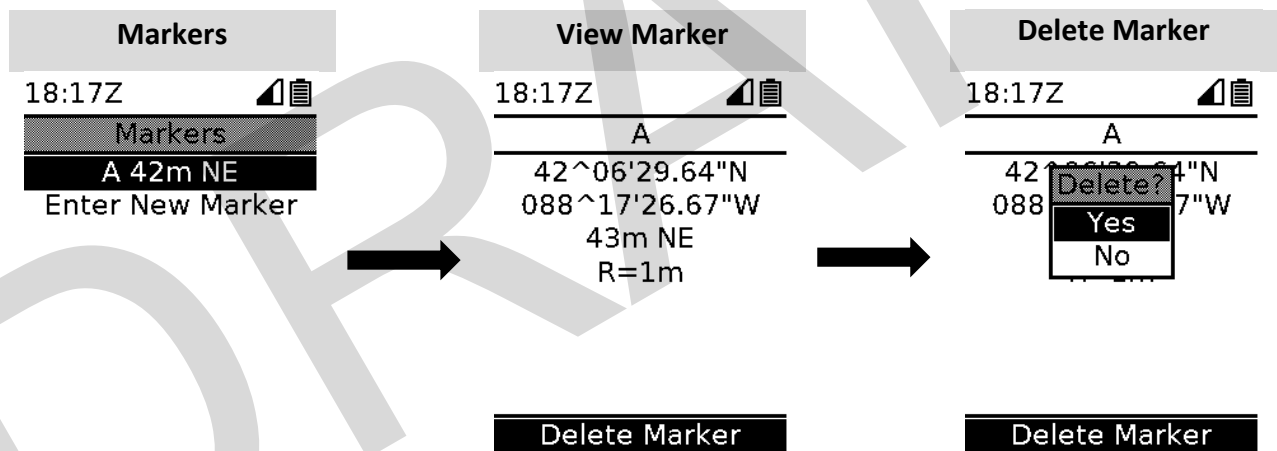
The Alarm option will alert you when you are within a defined range of the Marker. Once within range, the internal motor in the Lynq PRO™ will activate.



Once complete, select "Confirm" and the marker will be saved to the device. Upon saving, you will be sent to the Navigation Menu.



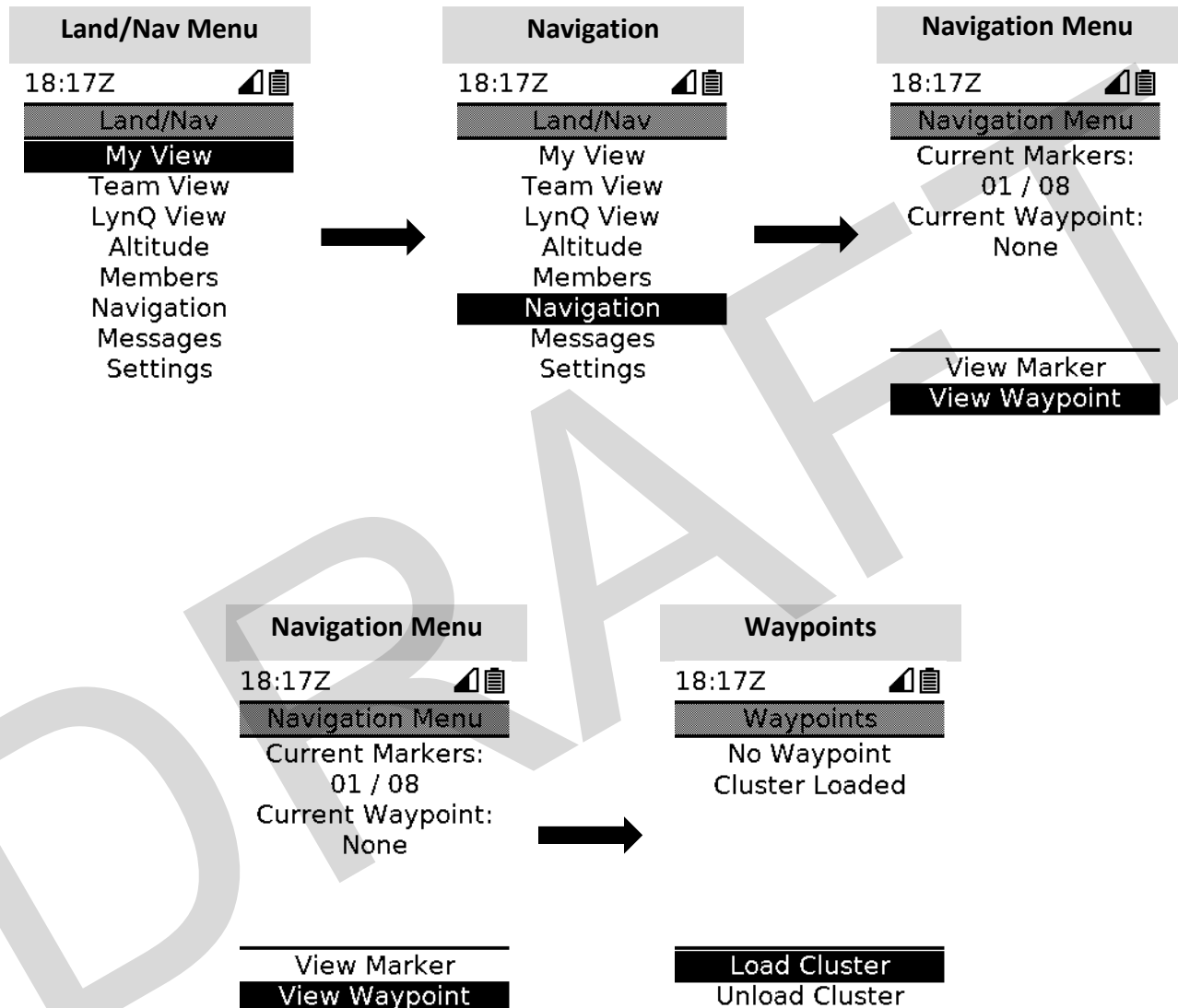
To delete a Marker, go into the Markers list, select the Marker you would like to delete and then select Delete Marker.



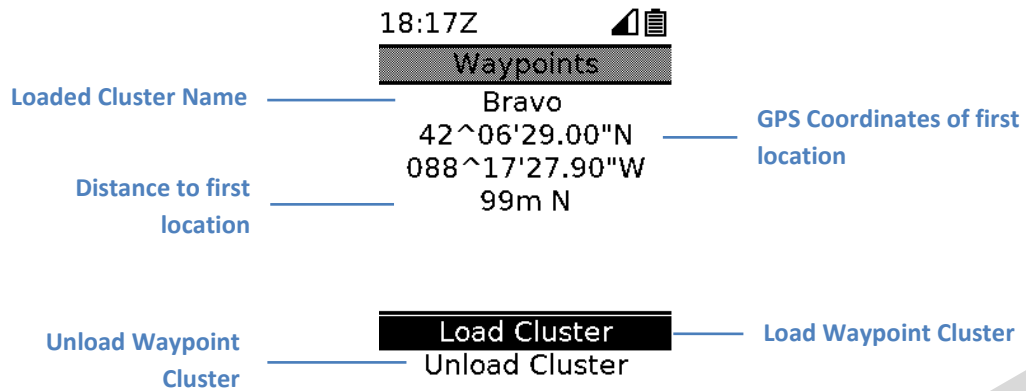
Waypoints

Waypoints are a collection of locations grouped together in a cluster and loaded onto the Lynq PRO™ prior to use. Once loaded onto the device, these Waypoints can be shown on the Team View and LynQ View apps. Waypoints are loaded into the Lynq PRO™ using the field deployment kit.

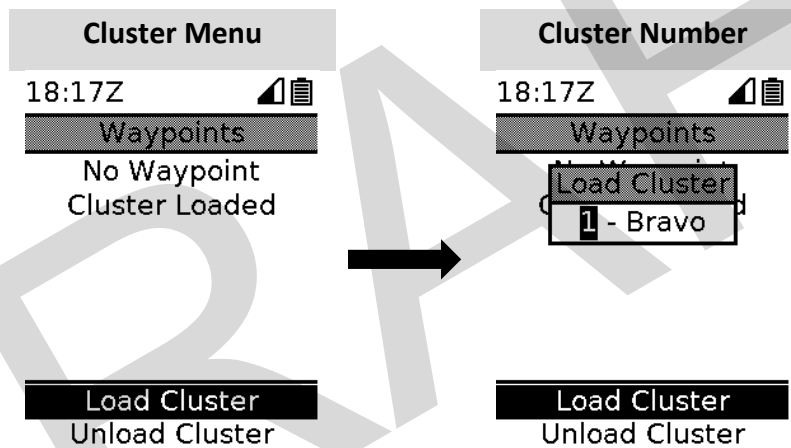
Each device can hold 99 different Waypoint clusters, with each cluster containing up to 10 different GPS locations.



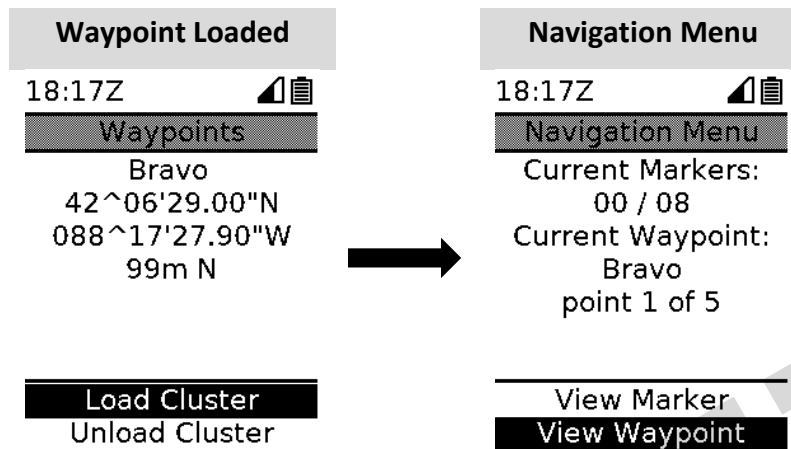
Waypoints - Load



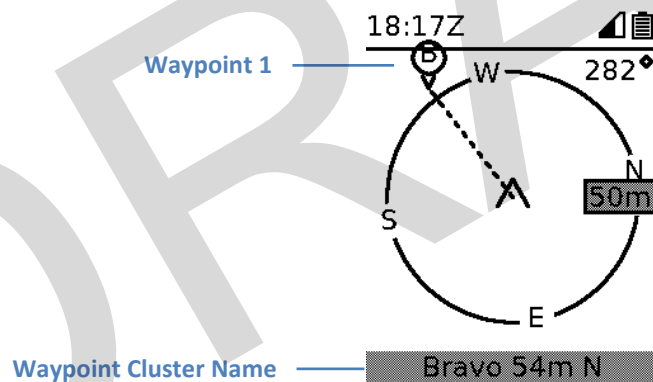
To activate a specific waypoint cluster on the Lynq PRO™, use the Up or Down buttons to toggle to the cluster you want and press the Menu/Select button to load it. The Lynq PRO™ can hold up to 99 waypoint clusters on the device.



Double tap the Menu/Select button to go back to the Navigation Menu and you will now see the loaded waypoints. In the example below, Waypoint "Bravo" was loaded and there are a total of 5 locations within that cluster.



In the Team View app, the first location in the cluster will be displayed on the map. Once you have reached the location, the display will update and guide you to the next point. This will continue until you have reached all the points in the loaded cluster.



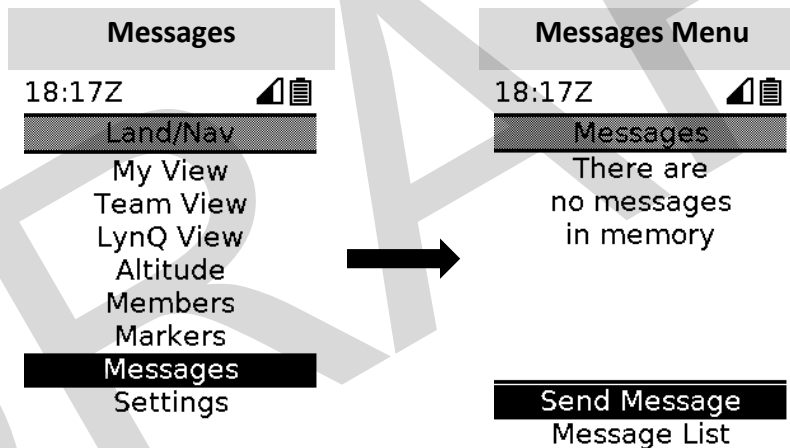
MESSAGES

There is a default set of messages that are available to broadcast to the team. This list can be adjusted with the use of the field deployment kit. There are 10 available slots for messages and 16 available slots for received messages in the Lynq PRO™. The 17th message sent will overwrite the oldest received message.

The default list is as follows:

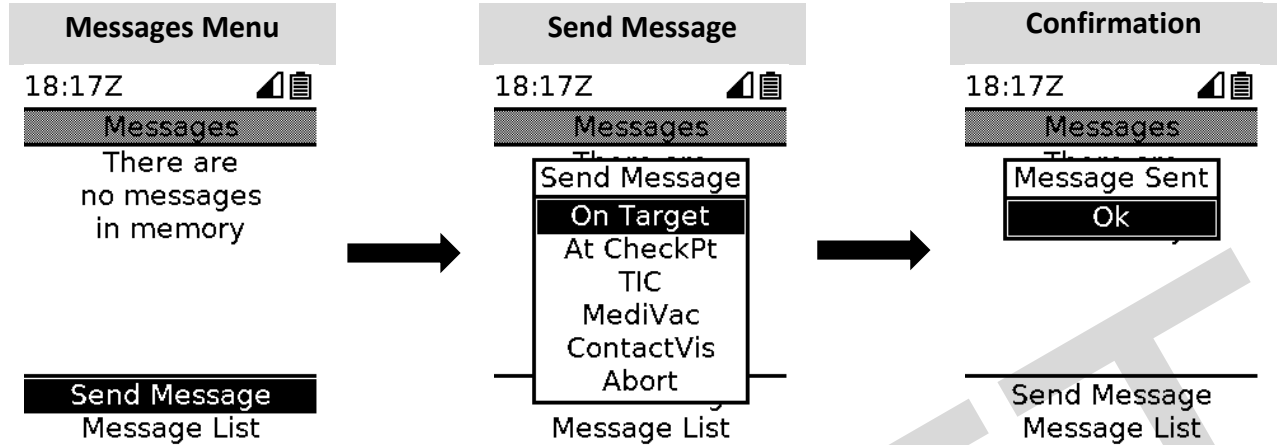
Abbreviated Message	Full Message	Abbreviated Message	Full Message
On Target	On Target	Abort	Abort
At CheckPt	At Check Point	EXFIL	Exfiltration
TIC	Troops in Contact	STBY	Standby
MediVac	MediVac	DSRG	Disregard Last
ContactVis	Contact Visual	RGR	Roger

The messages app is located under the Land/Nav app as shown below.



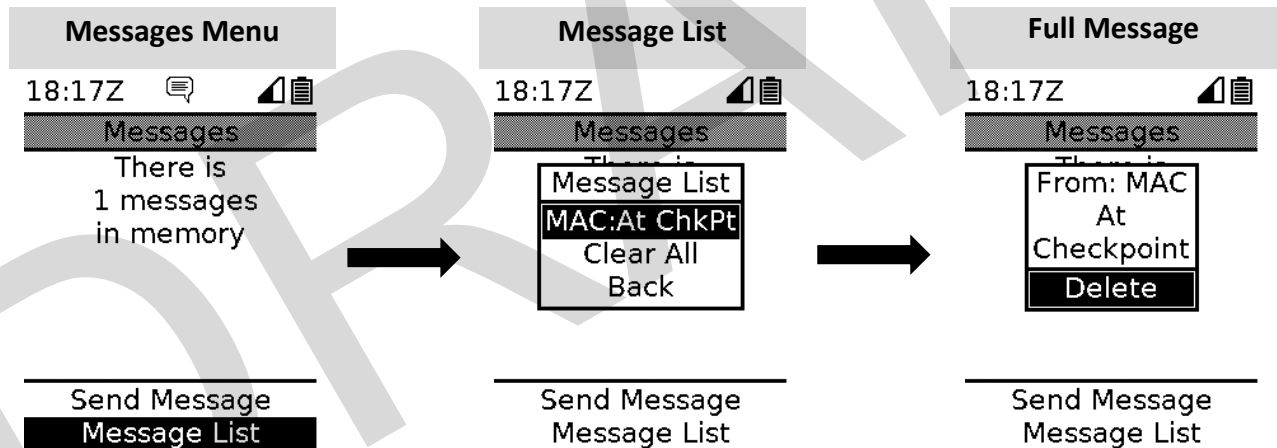
Messages - Send

The messages navigation window allows you to broadcast or view messages. To broadcast a message to the team, select Send Message and select the message.



Messages - View

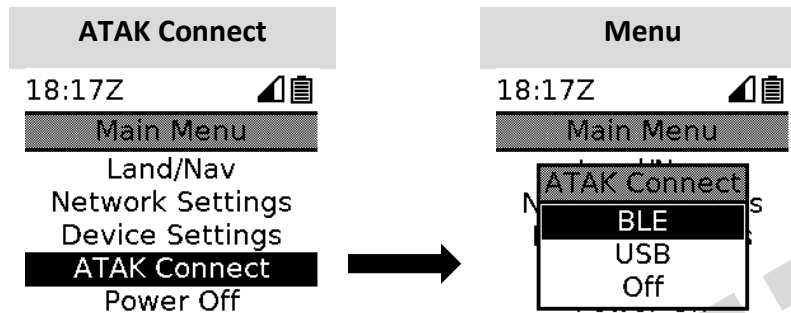
The message icon will flash on the top status bar when messages arrive. To view a message from a team member, select Message List and select the message to view.



Message List will list all messages received from other members. From this list you select the message you want to view in more detail by using the Up or Down arrows on the device to navigate to the message and then use the Menu/Select button to view it.

ATAK CONNECT

The Lynq PRO™ ATAK has the option to link up to an ATAK device using the appropriate plug-in. With the plug-in installed onto the ATAK device, you can now attach the Lynq PRO™ ATAK using either a USB cable or through Bluetooth. From the Main Menu on the Lynq PRO™, select ATAK Connect and then BLE or USB.



Only one (1) Lynq PRO™ ATAK needs to be connected to the ATAK device per group. This device acts as the gateway node and data from all other Lynq devices on the same network will be pushed into ATAK.

DRAFT

DRAFT

REGISTER YOUR PRODUCT

Register to receive email alerts whenever updates or mission critical information regarding your product becomes available. <https://go.otto-comm.com/product-registration>

For questions or more information, please contact:

OTTO[®]

2 E. Main Street
Carpentersville, IL U.S.A. 60110
Toll Free Phone: 888-234-OTTO (6886)
Phone: 847-428-7171
Fax: 847-551-1343
E-mail: info@ottoexcellence.com
www.ottoexcellence.com

804491 Rev.