

HOW TO GUIDE: Network RTK

Description

This document describes the setup and usage of the Network RTK feature of the mojoRTK console. Its intended audience is Leica approved Value Added Resellers and end users of the mojoRTK system.

Benefits

The mojoRTK console typically receives RTK corrections from a mojoRTK base or other compatible base station. The Network RTK feature allows the mojoRTK console to be operated without the need for a local base station. The RTK corrections are instead received from a network provider over the internet using the console's internal modem.

The Network RTK feature replaces the local base station with a network of permanent base stations operated by a network provider. By using Network RTK, there is no need to purchase a base station.

Network RTK offers very quick convergence times (similar to using the mojoRTK base) compared to other correction sources available.

The Network RTK base stations are survey quality and mounted in fixed positions, offering repeatability from year to year.

Limitations

Network RTK can only be used when a good connection to the internet is present. Internet connections are only supported through the mojoRTK console's internal modem and so cellular coverage is required in all areas you intend to operate guidance.

In order to use Network RTK, it is necessary to be within the bounds of the network being used. Only correction streams providing CMR, CMR+ or RTCM 3 format corrections are supported. GLONASS is only supported with the RTCM 3 format.

Required Items

- Network Upgrade unlock code
- Network Data Plan unlock code
- Cell data plan (contact Leica Geosystems before arranging a data plan)
- Subscription to local Network RTK provider

The unlock codes can only be generated by Leica Geosystems if the console serial number has been provided. Value added resellers can then obtain the unlock code directly from Leica or by logging onto www.mojoRTK.com and viewing the information for the particular console which is uniquely identified by its serial number.

Configuration

Installing the unlock codes manually on the mojoRTK console

1. Start the mojoRTK console
2. Press the OK button to enter the Menu
3. Using the Main Dial, select Settings -> Extended Features -> Enter New Code
4. Enter the 16 digit code by using the Main Dial to select the value for a digit and pressing OK or Escape to move backwards and forwards between digits
5. Once all 16 characters are entered and checked press OK
6. After the code has been accepted the Console will restart

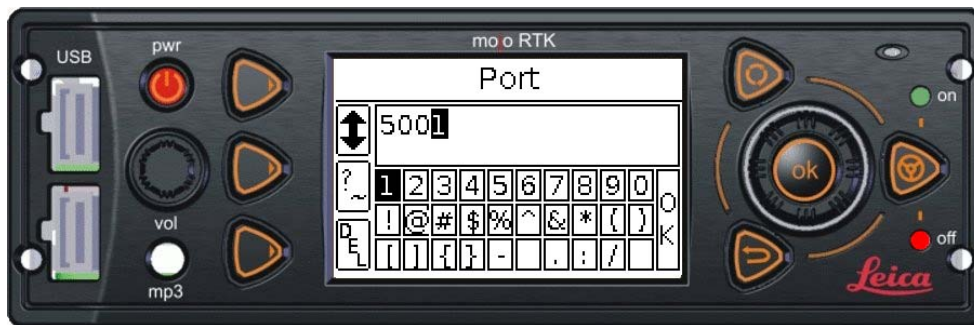
Installing the unlock codes using Virtual Wrench on the mojoRTK Console

1. Start the mojoRTK console
2. Press softkey 3 twice to bring up the Virtual Wrench connection screen
3. Select Yes using the Main Dial and press the OK button to connect to Virtual Wrench
4. Once connected the new unlock codes will be automatically downloaded and installed
5. A message will then appear stating which unlock codes have been installed, press OK and the console will restart

Using the On Screen Keyboard (OSK)

- The OSK has 2 components
- The text field where the current value is displayed
- The keyboard which is used to add letters to the current value
- Softkey 1 switches between the keyboard and the text field
- Softkey 2 switches between the different keyboard modes (lower case, upper case, numbers and symbols)

- Softkey 3 works as a backspace key and will delete the letter before the cursor
- The Escape button cancels any changes and goes back to the previous screen
- The OK button only works when in keyboard mode and will insert a letter at the cursor location
- The main dial will:
 - Scroll between the letters (and the OK key) when in keyboard mode. The current letter to insert will be shown and highlighted in the text field
 - Change the cursor position when in text field mode



Setting up Network RTK

1. Switch on the mojoRTK console and wait for a basic GPS fix to be achieved (satellite icon shows one or more bars)
2. The console needs to have good internal modem signal strength (1 or more bars)
3. If you are not on the navigation screen then press the Esc button until it comes up.
4. Press the OK button to enter the main menu
5. Use the main dial to scroll down to Base Channel
6. Press the OK button to enter the Base Channel Wizard
7. Use the main dial to scroll through the different options. Select Network RTK and then press the OK button
8. You will be prompted to enter the following details (using the On Screen Keyboard). They will be supplied by your Network RTK provider when you create an account with them.
 - Host/Server IP address
 - Host/Server port
 - Username
 - Password
9. After entering the above details the mojoRTK console will attempt to connect to the selected source. If any problems occur an appropriate message will be displayed.



10. Once the console successfully contacts the Network RTK server you will be prompted to select a stream to use.
11. A stream represents a combination of correction format and base location. Select the closest stream with a compatible reference format.
 - Only CMR, CMR+ and RTCM 3 formats are supported
 - GLONASS is only supported with RTCM 3
12. After selecting a stream press the OK button to confirm the selection. The mojoRTK console will attempt to connect to the stream and will report if any problems occur.
13. After successfully connecting to the stream the console may need to restart before a good fix can be achieved.
14. The mojoRTK console will remember these settings and will reconnect automatically when it connects.

Region Specific Information

Note that while every effort was undertaken to ensure the following information is correct at the time of publication, the operation and configuration of these networks is not performed by Leica Geosystems and may change without notice at any time. The material is provided for informational purposes only and is in no way guaranteed. Please contact the organisations directly for the most up-to-date information.

USA

Alabama

The Alabama CORS network is run by the Alabama Department of Transportation (ALDOT). Information on the network can be found at the following web sites:

<http://aldotcors.dot.state.al.us/SpiderWeb/frmlIndex.aspx>

http://www.dot.state.al.us/Docs/Bureaus/Design/Location/CORS_Opening_Page.htm

Please contact ALDOT to obtain and username and password.

IP address: 205.172.52.26

Port: 10011

Recommended stream: Near_RTCMv3_GG



Iowa

The Iowa network is called IaRTN and is run by the Iowa Department of Transportation. Information on the network can be found at: <http://www.iowadot.gov/rtn/>

Please contact IaRTN for information on how to register to use the network and for the IP address, port, username and password.

Michigan

The Michigan CORS network run by the Michigan Department of Transportation (MDOT). Information on the network can be found at: <http://www.mdotcors.org/>

To register for access to the network and to get the IP address, port, username and password, fill out this form: http://www.mdotcors.org/data_out/log_files/MDOT_RTK_ACCESS.pdf

Minnesota

The Minnesota CORS network is run by the Minnesota Department of Transportation (Mn/DOT). Information on the network can be found at: <http://www.olmweb.dot.state.mn.us/CORS.GPS/cors.html>

To get access to the network, request a username and password by e-mail from the Office of Land Management. Please contact either

Bud Jorgenson Bud.Jorgenson@dot.state.mn.us or
Don Seitz Don.Seitz@dot.state.mn.us.

With your request include your name, company name, phone number, and an e-mail address. They will send you the necessary login information, which includes a username and password along with the IP address and port number to use to connect to the network.



New York

The New York CORS network is run by the New York State Department of Transportation (NYSDOT). Information on the network can be found at the following websites:

<https://www.nysdot.gov/divisions/engineering/applications/geodetic-control-viewer>

<https://www.nysdot.gov/divisions/engineering/design/design-services/land-survey/cors>

To request access to the network, complete this form:

<https://www.nysdot.gov/portal/page/portal/divisions/engineering/design/design-services/land-survey/repository/nysnet-access-form.rtf>

and return it to cors@dot.state.ny.us

IP address: 170.3.245.18

Port: 8080

Recommended stream: NetCell_iMAX_RTCMv3

Wisconsin

The Wisconsin CORS network is run by the Wisconsin Department of Transportation (WisDOT). Information on the network can be found at:

<https://wiscors.wi.gov/>

Please contact WisDOT for information on how to register to use the network and for the IP address, port, username and password.



United Kingdom and Ireland

Across the United Kingdom and Ireland, network RTK is available from Leica Geosystems' SmartNet. Information on the network can be found at:

<http://smartnet.leica-geosystems.co.uk/SpiderWeb/frmlIndex.aspx>

Please contact SmartNet to obtain a username and password.

United Kingdom

IP address: 217.146.121.50

Port: 7801

Ireland

IP address: 217.146.121.30

Port: 7808

Europe

Germany

Germany's CORS network is ascos, which is operated by AXIO NET GmbH. ascos uses both GPS and GLONASS satellites and offers a range of products with different levels of accuracy. ascos PED (Präzisen Echtzeitdienst) offers accuracies in the centimetre range. Information on the network can be found at:

<http://www.ascos.de/>

Please contact ascos to obtain a username and password.

IP address: 62.180.42.56

Port: 2101

Recommended stream: ascos-PED-31-GG



Australia

Victoria

In Victoria, the available CORS network is called GPSnet and it is managed by the Victorian Spatial Information Infrastructure of the Department of Sustainability and Environment. Information on the network can be found at: <http://www.land.vic.gov.au/gpsnet>

Please contact Leica Geosystems about subscriptions to this network.

IP address: 61.88.99.46

Port: 8080



Glossary

Base A source of the correction signals for the RTK solution. May also be referred to as: base station, reference station and network reference station.

Console The mobile receiver installed in the vehicle.

CMR Compact Measurement Record. An RTK correction protocol.

CORS Continuously Operating Reference Station

OSK On Screen Keyboard, a feature used by the mojoRTK console to allow the input of the Network RTK server information

NTrip Networked Transport of RTCM via Internet Protocol

RTCM Radio Technical Commission for Maritime Services. RTCM3 is an RTK correction protocol.

RTK Real Time Kinematics

VRS Virtual Reference Station