

TRBOnet Swift DT500

User Guide



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1 Introduction

1.1 About This Guide

This document is intended for engineers responsible for building MOTOTRBO radio networks and programming two-way radios for end users.

1.2 About TRBOnet Swift

TRBOnet Swift is a family of hardware products by Neocom Software, Ltd designed for use in MOTOTRBO radio networks. The TRBOnet Swift family hardware is presented by RoIP gateways A001/002 and A200, option boards ST001 and ST002, the DT500 data transfer module.

For more information on the TRBOnet Swift family products, refer to our website.

1.3 Contacts

| Region | Phone | Email & Support |
|----------|------------------|---|
| EMEA | +44 203 608 0598 | info@trbonet.com — general and commercial inquiries |
| Americas | +1 872 222 8726 | support@trbonet.com — technical support |
| APAC | +61 28 607 8325 | http://kb.trbonet.com — online knowledge base |

2 About Swift DT500

TRBOnet Swift DT500 is an external programmable controller connectable to a MOTOTRBO digital two-way radio.

2.1 Advantages

- Small size and weight
- High-performance processor
- Built-in memory (8 Mb)
- Interfaces that allow various connections:
 - 7 VIO contacts (active level GND, up to 200 mA per contact)
 - Serial ports RS232 and RS485
 - USB port for a MOTOTRBO radio or a computer
- Support for MOTOTRBO 3000/4000 series digital two-way mobile radios
- Quick and easy connection and setup
- Programmable via USB (RJ45)
- Configurable Swift Event Logic on board

2.2 Functionality

Swift DT500 supports the following operations:

- Receives events and data from external devices
 - Receives GNSS coordinates from the radio's built-in navigation tracker.
 - Handles region events (region entered, left, region border crossed) from the radio's built-in navigation tracker.
- Controls a connected MOTOTRBO radio
 - Sends a MOTOTRBO alarm (with the indicated event).
 - Sets a different zone and a channel on the radio.
 - Manages the volume of the tone played back on the radio
 - Plays back the tones on the radio.
 - Plays back voice messages on the radio (messages are preconfigured in MOTOTRBO CPS).
 - Sends text messages to other radios and talk groups.
 - Shows predefined text on the radio's display.
- Controls internal functions
 - Stores GNSS and other data in memory.
 - Creates and sends GNSS and other reports on the radio channel.
 - At runtime, sets parameters for creating and sending reports.
 - Controls the VIO contacts located on the rear panel.
- Receives internal events
 - Registers an event when powered on/off and at change of a VIO contact state.
 - Receives and transmits data on the RS-232 and RS-485 ports.

Note: The availability of a particular feature depends on the loaded firmware and configuration, activated features, connected hardware, and the model of a connected MOTOTRBO radio.

2.3 Licensing

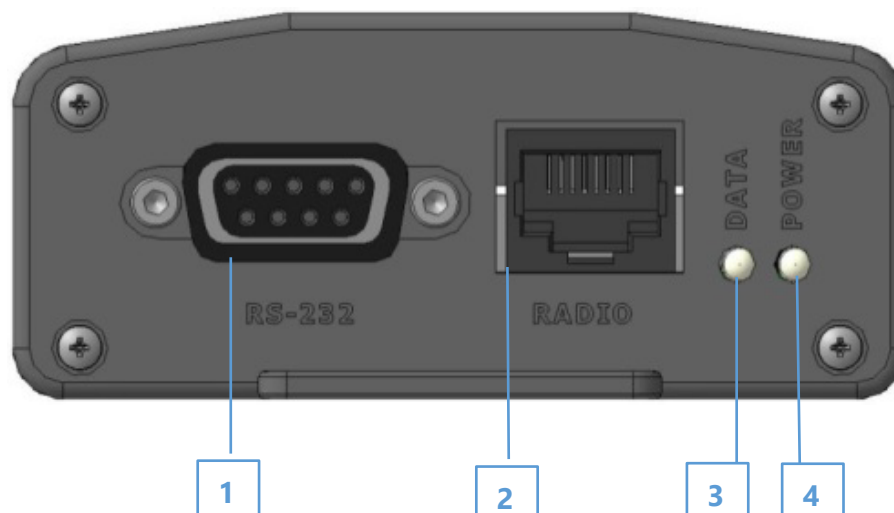
Swift Event Logic features are provided on terms of commercial licensing. The following licenses are available for purchase for Swift DT500:

Table 1: Licenses available for Swift DT500

| License | Description | Licensed features |
|----------|---|--|
| Tracker | This license enables getting GNSS data from the radio. | <ul style="list-style-type: none">▪ GNSS reports▪ Speed Limit |
| GeoZones | This license enables monitoring of the radio's location in the predefined geographical regions. | <ul style="list-style-type: none">▪ GeoRoaming▪ GeoFencing |
| DataPort | This license enables data transfer on the RS-232 port. | Communication with external devices over the RS-232 interface |

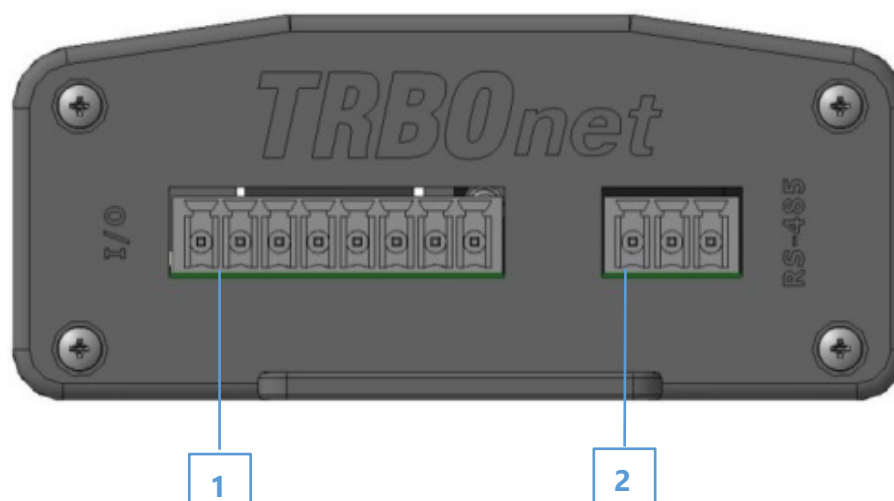
2.4 Panels

FRONT PANEL



1. RS-232: The DB9 connector for connecting external hardware.
2. RADIO: The RJ45 connector for connecting a radio or a computer.
3. DATA: The data receive/transmit indication.
4. POWER: The power indication.

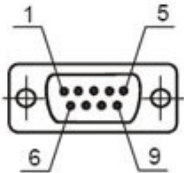
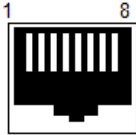


REAR PANEL



1. I/O: The contact group connector for VIO input/output.
2. RS-485: The contact group connector for connecting external hardware.

2.5 Connectors

Table 2: Connector pinouts

| RS-232 connector | RADIO connector |
|--|---|
|  |  Front View |
| <div>1. Not used</div> <div>2. Received Data (RXD)</div> <div>3. Transmit Data (TXD)</div> <div>4. Not used</div> <div>5. Ground (GND)</div> <div>6. Not used</div> <div>7. Request To Send (RTS)</div> <div>8. Clear To Send (CTS)</div> <div>9. Not used</div> | <div>1. Ground (GND)</div> <div>2. USB OTG</div> <div>3. Ground (GND)</div> <div>4. USB Data +</div> <div>5. USB Data -</div> <div>6. USB VBUS</div> <div>7. Not used</div> <div>8. PWR IN – Input power (12 V)</div> |
| I/O connector | RS-485 connector |
|  1 2 3 4 5 6 7 8 |  1 2 3 |
| <div>1. VIO 1</div> <div>2. VIO 2</div> <div>3. VIO 3</div> <div>4. VIO 4</div> <div>5. VIO 5</div> <div>6. VIO 6</div> <div>7. VIO 7</div> <div>8. Ground (GND)</div> | <div>1. RS485 A</div> <div>2. Ground (GND)</div> <div>3. RS485 B</div> |

2.6 Glossary

Table 3: Terms and abbreviations

| Term | Description |
|-------------------|--|
| CAN | Controller Area Network |
| CPS | Customer Programming Software |
| DT | Data Transfer |
| GeoFencing | A radio network feature that enables tracing of the radio's staying within or crossing the border of certain geographical regions, with a subsequent execution of tasks defined by the user. |
| GeoRoaming | A radio network feature that enables automatic switching of the radio between the programmed channels and zones when entering or leaving a particular region. |
| GND | Ground |
| GNSS | Global Navigation Satellite System |
| GPS | Global Positioning System |
| I/O | Input/output |
| IP | Internet Protocol |
| Report | A dataset that Swift DT500 creates and sends to TRBOnet Server on the radio channel. A report typically includes GNSS data from the radio and/or data from VIO contacts. |
| Swift Event Logic | A unified programmable environment that enables flexible configuration of logic on TRBOnet Swift family products and MOTOTRBO GOB connectable to MOTOTRBO digital two-way radios. A configured device turns into a full-featured controller that can manage events and connected hardware. |
| USB | Universal Serial Bus |

3 Connections

This section describes how to connect Swift DT500 to external devices.

3.1 Precautions

IMPORTANT: To connect Swift DT500 to a radio or a computer, use the cables specially designed for Swift DT500 by Neocom Software, Ltd. Use of any other cables not intended for Swift DT500 may cause damage to Swift DT500 and to the hardware connected using a non-compliant cable.

IMPORTANT: Connect Swift DT500 to a MOTOTRBO digital radio only when the radio is powered OFF. When the radio is powered on, connecting or disconnecting the cable presents a high risk of the USB interface damage on the radio.

3.2 Connecting a Computer

Use the programming cable by Neocom Software, Ltd to connect the radio slot of your Swift DT500 to a USB slot of a computer.

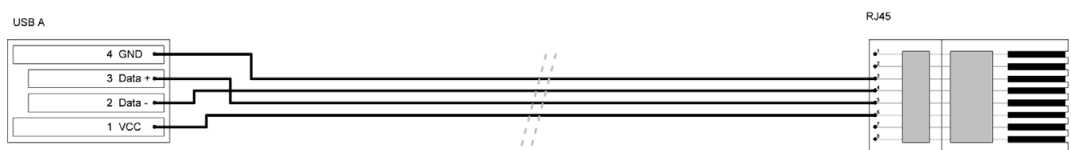


Figure 1: Pinout diagram of the programming cable

3.3 Connecting External Hardware

Swift DT500 provides interfaces for serial communication with external hardware and VIO contacts that can be connected each to an external device for data input or output. For instance, input VIO contacts can be used for monitoring states of connected sensors, and output VIO contacts can be used for controlling external hardware.

3.3.1 Connecting Swift DT500 for Serial Communication

To connect external hardware to serial ports RS-232/RS-485 of Swift DT500, use a cable recommended by the hardware manufacturer. Connect external hardware only when Swift DT500 is disconnected from the radio.

3.3.2 Connecting VIO Contacts for Input

An input VIO contact shall be connected to the ground (GND) to register ground potential.

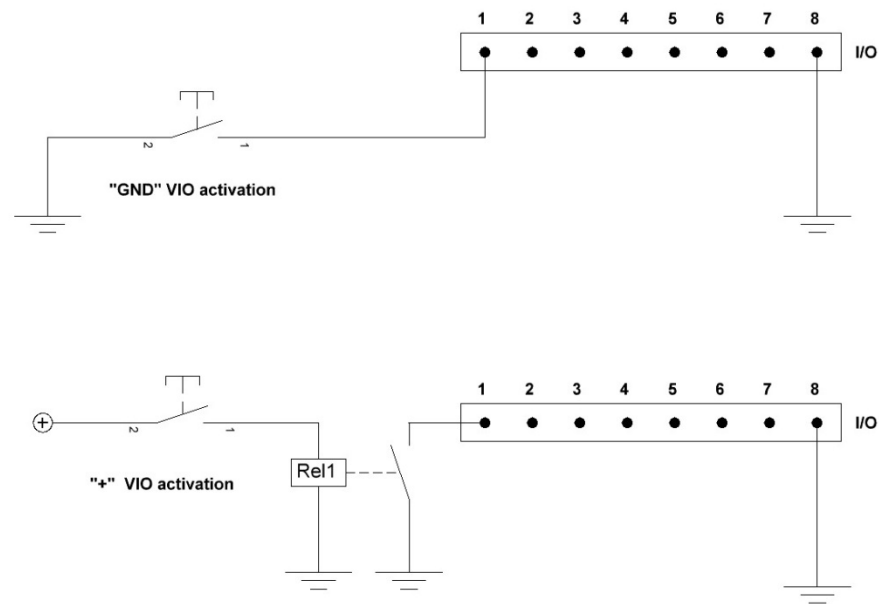


Figure 2: Connecting a VIO contact for input

For an input VIO contact to register positive potential, an additional relay shall be used.

3.3.3 Connecting VIO Contacts for Output

An output VIO contact shall be connected to the ground (GND).

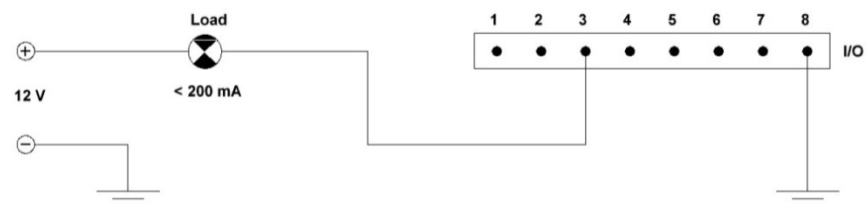


Figure 3: Connecting a VIO contact for output

To handle the load of greater than 200 mA, an additional relay with consumption of not greater than 200 mA shall be used.

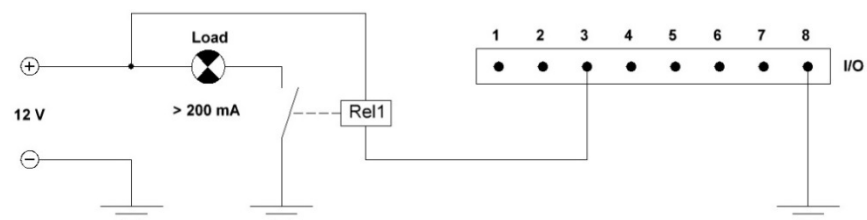


Figure 4: Connecting an output VIO contact for handling the load of greater than 200 mA

To handle the load voltage greater than 12V, additional relays connected to the source of 12V shall be used.

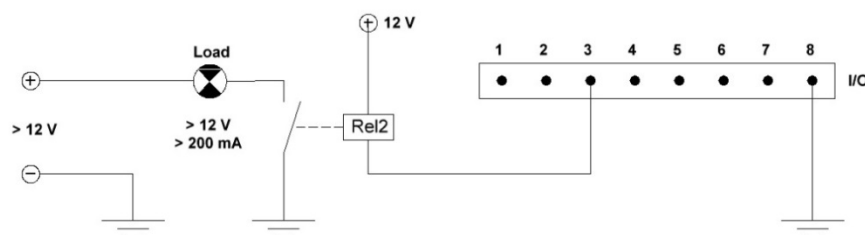


Figure 5: Connecting an output VIO contact for handling the load voltage of greater than 12V

3.4 Connecting a Radio

You can connect Swift DT500 to a MOTOTRBO digital two-way mobile radio for IP or non-IP communication.

Non-IP communication with a peripheral device requires preliminary setup on the radio.

To setup the radio for non-IP communication with a peripheral device:

1. Disconnect peripherals from the radio.
2. Connect the radio to a computer and run the MOTOTRBO CPS software.
3. Read the radio settings.
4. Go to the **Accessories** section and set **Cable Type** to **Rear Data Accessory**.
5. Write the new settings to the radio.

Note: If the radio has a display and changing the cable type through the radio menu is allowed, you can make the same changes without using the MOTOTRBO CPS software.

To connect Swift DT500 to a MOTOTRBO radio:

1. Power off the radio.
2. Connect Swift DT500 to external hardware (if required).
3. Use the service cable by Neocom Software, Ltd to connect the radio port of your Swift DT500 to the service port of the radio. The service cable is supplied with Swift DT500 in the delivery kit.

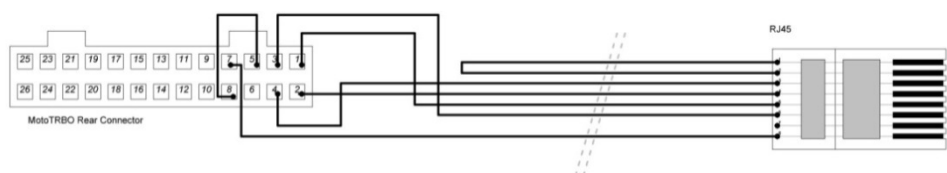


Figure 6: Pinout diagram of the radio cable for non-IP communication

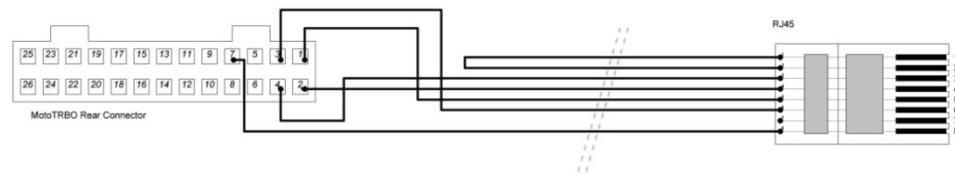


Figure 7: Pinout diagram of the radio cable for IP communication

Note: Connection to a radio for IP communication may require special firmware loaded to Swift DT500 and a service cable without the jumper between contacts 5 and 8.

4. Power on the radio.

4 Setup

To prepare Swift DT500 for operation, perform the following steps.

Table 4: High-level steps to prepare Swift DT500 for operation

| # | Step | Note |
|----|--|---|
| 1 | Install the required software on your computer. | Find the details in Installing Software . |
| 2 | (Optional) Install a USB driver on your computer. | Find instructions in Installing a Driver . |
| 3 | Connect Swift DT500 to your computer. | Find instructions in Connecting a Computer . |
| 4 | (Optional) Update the firmware version on Swift DT500. | Find instructions in Updating Firmware . |
| 5 | Activate purchased features on Swift DT500. | Find instructions in Activating Features . |
| 6 | Load an Event Logic configuration on Swift DT500. | Find instructions in Loading Configuration . |
| 7 | Disconnect Swift DT500 from your computer. | |
| 8 | Connect all peripherals to Swift DT500. | Find instructions in Connecting External Hardware . |
| 9 | Connect Swift DT500 to a MOTOTRBO radio. | Find instructions in Connecting a Radio . |
| 10 | Power on the radio. | |

4.1 Installing Software

To load a configuration and activate the licensed features on your Swift DT500, install the following software on your computer:

- TRBOnet Swift CPS
- TRBOnet Swift License Manager

The distribution packages of the required software are available for download at www.trbonet.com.

4.2 Installing a Driver

To detect Swift DT500 connected to a USB port, your computer needs a hardware driver. Windows 10 includes a generic driver for USB connected devices. For an earlier version of Windows, install the driver that comes with the TRBOnet Swift CPS software.

Note: TRBOnet Swift CPS needs to be installed on your computer prior to installing the driver. Refer to [Installing Software](#) for details.

To install the driver:

1. If you are running a 64-bit version of Windows, disable the driver signature enforcement in any preferred way. This is necessary because the provided driver is not signed.

For instance, you can restart Windows with the SHIFT key pressed. At the boot prompt, select the **Disable driver signature enforcement** option or keep F7 pressed.

3. Go to the Swift CPS installation folder and open the **Driver** folder located inside. Right-click the **swift-vcom.inf** file and select **Install** from the context menu.
4. (Optional) If the warning window is displayed, select to install the driver anyway and complete the installation.

4.3 Updating Firmware

The firmware version loaded to your Swift DT500 may require an update. The Swift CPS software provides the latest firmware version for Swift DT500.

Note: Firmware update clears configuration from device memory. We recommend that you save the current configuration to a file before updating firmware on your device. Information about activated features is not affected by firmware update.

To load the latest firmware on Swift DT500:

1. Connect Swift DT500 to a computer.
2. Launch the Swift CPS application. If you need to install this software, refer to [Installing Software](#) for details.

Swift CPS automatically detects the connected device and shows the information about detected connections in the status bar.

Note: If Swift CPS fails to detect a connected DT500, make sure that you have installed the USB driver as described in [Installing a Driver](#).

3. Select **Update** in the **Device** menu.

The **Firmware Update** window displays the actual firmware version for each connected device in section **Info about device**. The latest available firmware version appears in the **Firmware** section.

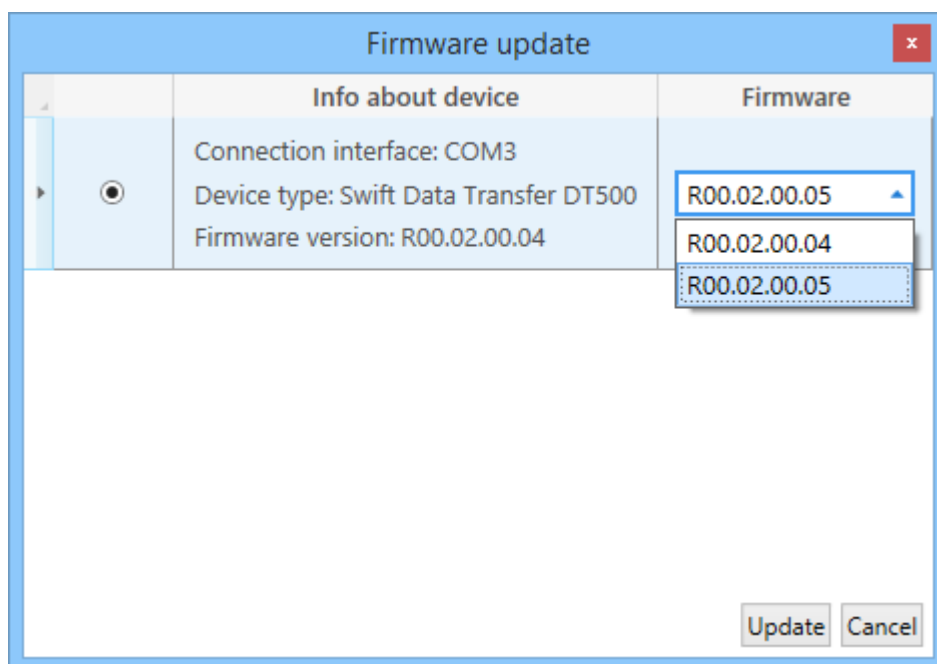


Figure 8: Updating the firmware version on Swift DT500

- If firmware update is necessary, select your device and the latest firmware version. Click **Update** to load the latest firmware version.

4.4 Activating Features

To enable Swift Event Logic features on a device, you need to purchase a license. Then you need to activate the purchased features on your device using the license key.

Note: If configuration loaded to a device includes purchased but not activated features, such features do not work on the device at runtime.

To activate purchased features:

- Connect Swift DT500 to a USB port of a computer. The computer must have access to the Internet during the activation of features.
- Launch the Swift License Manager application on your computer. If you need to install this software, refer to [Installing Software](#) for details.
- Select the **Activate products** option and enter the license key in the edit box. Click **Next** and again **Next**.
- On the **Connection to Device** page, click **Swift DT500**, then click the tab with the device information. The **Next** button becomes available. Click **Next**.

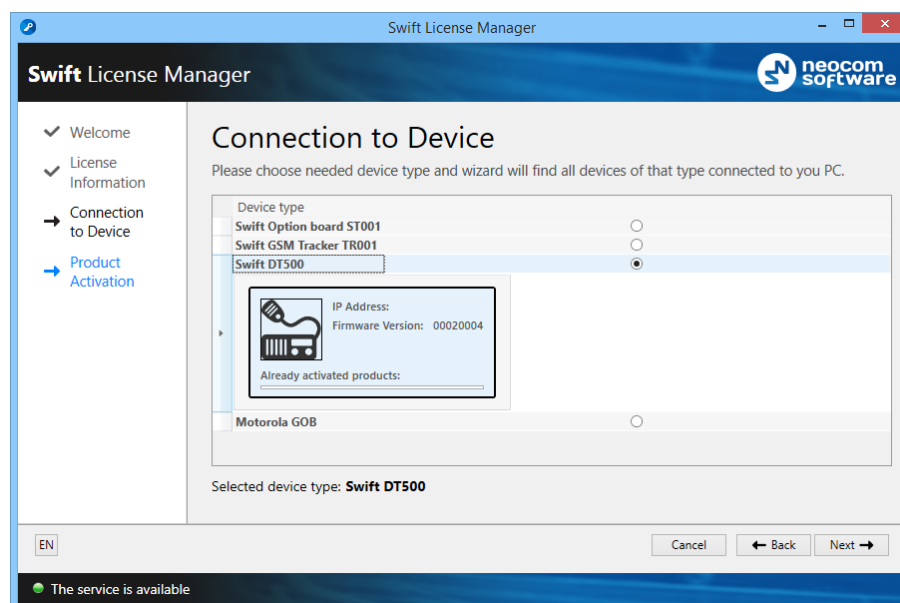


Figure 9: Selecting a connected device

5. On the **Products Activation** page, select the purchased features that you want to activate on your Swift DT500. Click **Activate Products**.

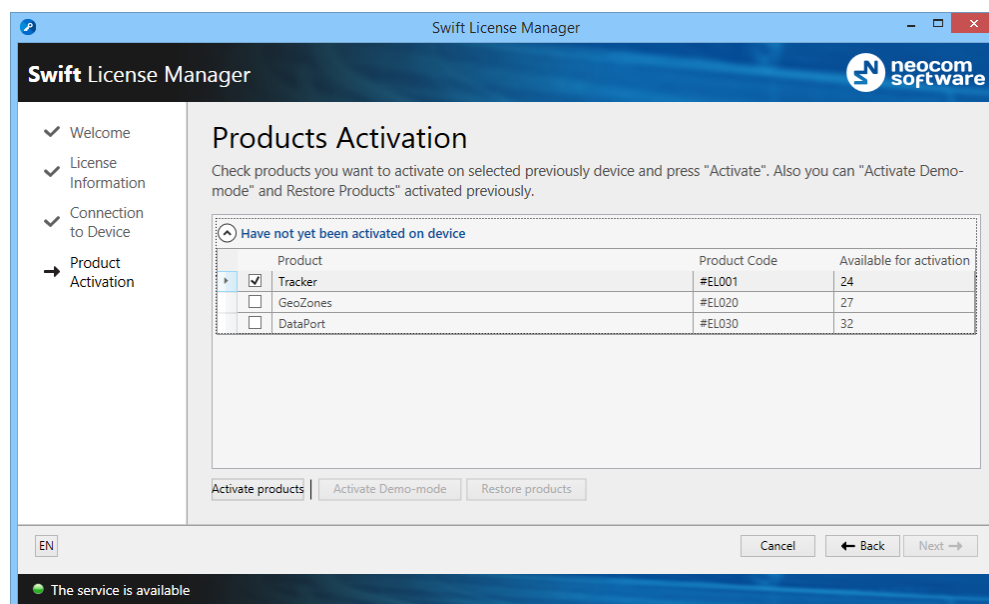


Figure 10: Activating licensed features on Swift DT500

6. Close the wizard.

To verify the activated features, do any of the following:

- In the Swift License Manager application, select the Look products on a device option and click Next. Click Swift DT500 and view the activated features in the tab with the device information.
- Launch the Swift CPS application and read configuration of your Swift DT500. The License Information section in the opened tab displays all activated features as Purchased.

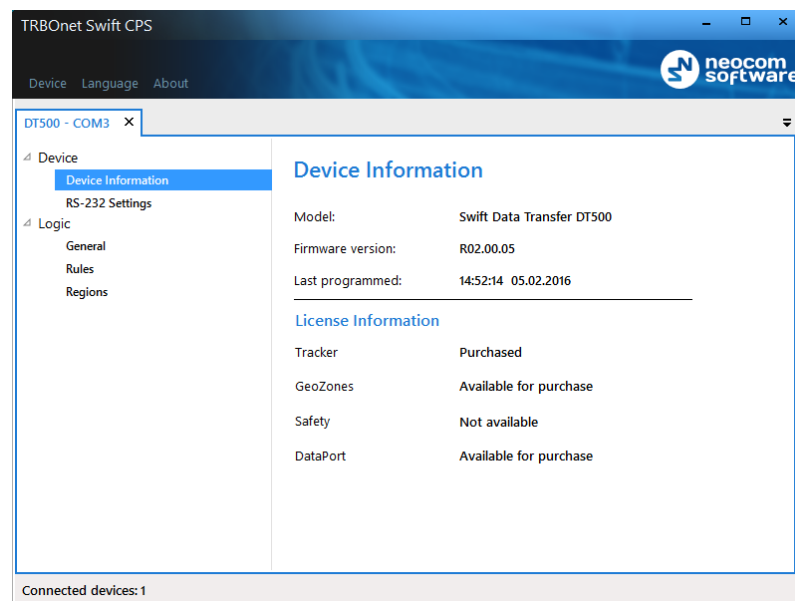


Figure 11: Verifying the license information on Swift DT500

4.5 Loading Configuration

To use Swift Event Logic, a brand new Swift DT500 needs to be configured. A configuration defines all events monitored on a device, conditions evaluated for a triggered event, and actions executed for a triggered event.

To obtain a configuration that meets your business case, you have options as follows:

- Create your configuration in the Swift CPS software.

The user guide for the TRBOnet Swift CPS software describes step by step how to create a configuration for any type of hardware. This document is available for download on www.trbonet.com.

- Order your configuration from the manufacturer of your device.

The manufacturer can provide a configuration that uses standard Event Logic features, or a configuration with extended capabilities. To order a configuration, contact our support. Find the contact details for your region in the [Contacts](#) section of this document.

When you have the required configuration, load it to your Swift DT500.

4.5.1 Loading a Configuration with Standard Features

To load a configuration with standard features to Swift DT500:

1. Connect Swift DT500 to the USB port of your computer.
2. Launch the Swift CPS application.

The application automatically detects the connected Swift DT500 and shows the information about all detected connections in the status bar.

3. Open the desired configuration in Swift CPS:

- To open the configuration file, select **Open File** in the **Device** menu. Select the file and confirm the choice.

- To open the configuration from another device connected to your computer, select **Read** in the **Device** menu. Select the configured device and confirm the choice.

The configuration appears in a separate tab.

4. Select **Write** in the **Device** menu. If multiple devices are connected to your computer, select your Swift DT500 and confirm the choice.

The configuration from the opened tab is loaded to your Swift DT500.

5. To verify the result, select **Read** in the **Device** menu. If necessary, select the just configured Swift DT500 and confirm the choice.

The current configuration of your Swift DT500 appears in the **DT500 - COM3** tab.

4.5.2 Loading an Extended Configuration

An extended configuration includes configuration settings not supported by the Swift CPS software. For this reason, you cannot open an extended configuration in Swift CPS using commands **Open File** and **Read**.

To load an extended configuration to Swift DT500:

1. Connect Swift DT500 to the USB port of your computer.
2. Launch the Swift CPS application.
3. Select **Write logic to device** in the **Device** menu. Select the configuration file provided by the manufacturer of your device and confirm the choice.

5 Demo Mode

The demo mode enables you to test all Event Logic features on your device without purchasing a license.

If you did not activate any features on your device, it enters the demo mode automatically when you power on the connected radio. To indicate the demo mode on a connected device, the radio plays back the tone. If the radio has a display, a demo mode notification appears.

The demo mode lasts for two hours. After that, the radio displays a warning message and continues to play back the tone until powered off.

- To continue testing, power on the radio and use the demo mode for the next two hours.
- To use your device in the normal mode, purchase the required features and activate them on your device. Find the instructions in [Activating Features](#).

5.1 Using Demo Mode with Activated Features

If you have activated features on your Swift DT500, you can use the demo mode whenever necessary.

To activate the demo mode on Swift DT500:

1. Connect your Swift DT500 to a computer.
2. Launch the Swift License Manager software.
3. Select the **Activate products** option and enter the license key in the edit box. Click **Next** and again **Next**.
4. On the **Connection to Device** page, click **Swift DT500**, then click the tab with the device information. The **Next** button becomes available. Click **Next**.
5. On the **Product Activation** page, click **Activate Demo-mode**.

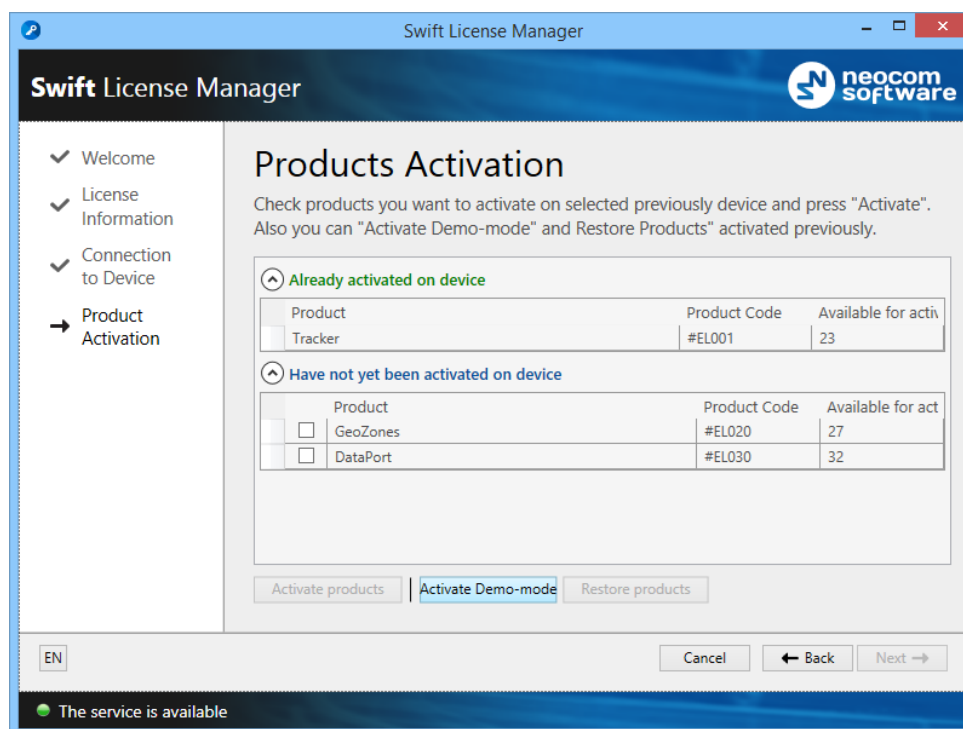


Figure 12: Forcing the demo mode on a device with activated features

The wizard displays a message about the demo mode successfully activated.

6. Close the wizard window.

If you now connect your Swift DT500 to the powered off radio and then power the radio, your device enters the demo mode.

When forced to use the demo mode, a device preserves the information about all activated features in memory. When necessary, you can restore the activated features without incrementing the license count and continue to use your device in the normal mode.

To restore the activated features:

1. Power off the radio.
2. Reconnect your Swift DT500 to a computer.
3. Launch Swift License Manager software.
4. Select the **Activate products** option and enter the license key in the edit box. Click **Next** and again **Next**.
5. On the **Connection to Device** page, click **Swift DT500**, then click the tab with the device information. The **Next** button becomes available. Click **Next**.
6. On the **Product Activation** page, select the previously activated features in the list. Click **Restore products**.

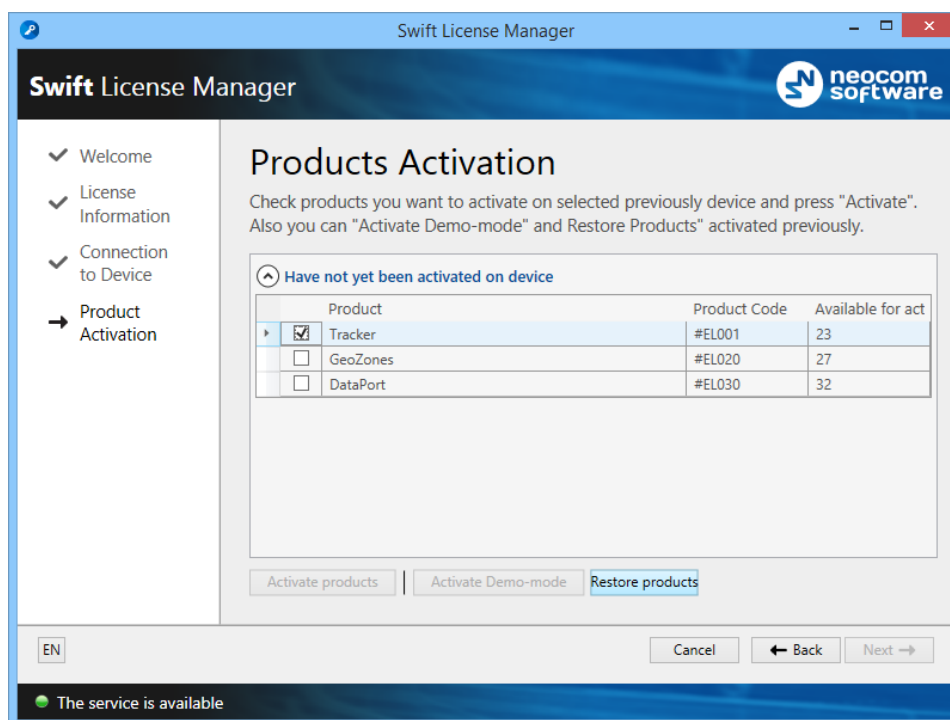


Figure 13: Restoring activated features on a device

The wizard displays a message about the activated features successfully recovered.

7. Close the wizard.

If you now connect your Swift DT500 to the powered off radio and then power on the radio, your device will enter the normal mode.