

# *TRBO*net

## TRBOnet Swift Agent A002

### User Manual



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# 1. Introduction

## 1.1. About This Document

This document describes in detail how to connect and set up the TRBOnet Swift Agent Aoo2 hardware to work as a gateway from a radio channel to an IP network, interconnecting a MOTOTRBO professional two-way radio and the TRBOnet Server software over IP.

## 1.2. About TRBOnet Swift

TRBOnet Swift is a family of hardware products designed by Neocom Software Solutions, Ltd. for MOTOTRBO radio networks. The TRBOnet Swift family hardware is presented by radio-over-IP gateways, the ST001 option board, the DT500 data transfer module, and the TR001 GSM tracker.

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

## 1.3. Contacts

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EMEA	+44 203 608 0598	<a href="mailto:info@trbonet.com">info@trbonet.com</a> — general and commercial inquiries
Americas	+1 872 22 28 726	<a href="mailto:support@trbonet.com">support@trbonet.com</a> — technical support
APAC	+61 28 6078325	<a href="http://kb.trbonet.com">http://kb.trbonet.com</a> — online knowledge base

## 2. About Swift Agent A002

TRBOnet Swift Agent is a hardware radio-over-IP gateway designed to interconnect Motorola's MOTOTRBO professional two-way radio and the TRBOnet Server software on the IP network. The connected radio can communicate voice and data with the radio network subscribers and with the connected TRBOnet Servers over IP. The TRBOnet control room personnel can control the connected radio remotely by sending commands on the IP network.

### 2.1. Features

Swift Agent A002 serves as an IP gateway between the connected two-way radio and the TRBOnet radio network, implementing the following functionality:

- Wireless communication with a Motorola MOTOTRBO 3000 and 4000 series professional two-way radio (digital mode, with the option board installed into the radio)
- Wired communication with a non-MOTOTRBO two-way radio (analog mode)
- Voice and data transfer over IP between the connected radio and TRBOnet Server and subscribers in the digital mode
- Voice transfer over IP between the connected radio and TRBOnet Server and subscribers in the analog mode
- Remote control of the connected radio over IP (power on/off, channel and zone selection) in the digital mode
- Monitoring the temperature of the unit and sending an alarm notification to TRBOnet if the threshold value is exceeded
- Support for up to eight TRBOnet Server connections

### 2.2. Restrictions

1. Due to changes introduced by Motorola into recent MOTOTRBO firmware, we do not recommend that you use **Swift IP Gateways A001, A002 and A200** in the wireless (NRF) mode in conjunction with MOTOTRBO radios that have firmware version 2.60 and higher. The latest firmware that can be used in this mode is 2.05.60. The **A200 Gateway** can work with newer firmware in the wired (USB) mode. Please do not update your control radios beyond this version number if you have **A001** or **A002** in the **wireless (NRF)** mode.
2. **Swift IP Gateways A001, A002 and A200** in the **wireless (NRF)** mode do not support revert channels and data repeaters. The **A200 Gateway** in the **wired (USB)** mode must be used instead.
3. We do not recommend to install any Swift IP Gateways in the same subnet as trunked repeaters (applies to Capacity Plus and Linked Capacity Plus).

### 2.3. Design

TRBOnet Swift Agent A002 comes in a black metal case. The front panel of the unit has four LED indicators that display the operational and self-diagnostic information.



Figure 1: The front panel of TRBOnet Swift Agent A002

Table 1: LED indicators (from left to right)


LED #	Descripton
1	Green: The unit is powered on.
2	Green: The connected radio operates in the RX mode. Red: The connected radio operates in the TX mode.
3	Green: TRBOnet Server is connected. Red: The unit receives data/commands from TRBOnet Server.
4	Green: NRF connection is established (digital mode only). The LED indicator is off in the analog mode.

The rear panel of the unit has several interfaces for connecting the radio, the external power supply, and external hardware.



Figure 2: The rear panel of TRBOnet Swift Agent A002

Table 2: TRBOnet Swift Agent connectors

Label	Description
	Earth ground.
ANT	RF antenna input (required for wireless communication between the IP gateway and the option board installed in the MOTOTRBO radio).
LAN	RJ45 connector for linking the device to the LAN.
CTRL1	DB26 female connector for external hardware and/or a radio (analog mode only) and/or power supply.
FAN 1,2	Two 3-pin headers for external fans. External fans are not used when Swift Agent A002 works as a standalone unit (not integrated in Swift Agent A001).
CTRL2	DB9 female connector for connecting external hardware and/or a radio (analog mode only) and/or power supply. This connector is not used when Swift Agent A002 works as a standalone unit (not integrated in Swift Agent A001).
12V	12V power connector.



## 2.4. Connectors

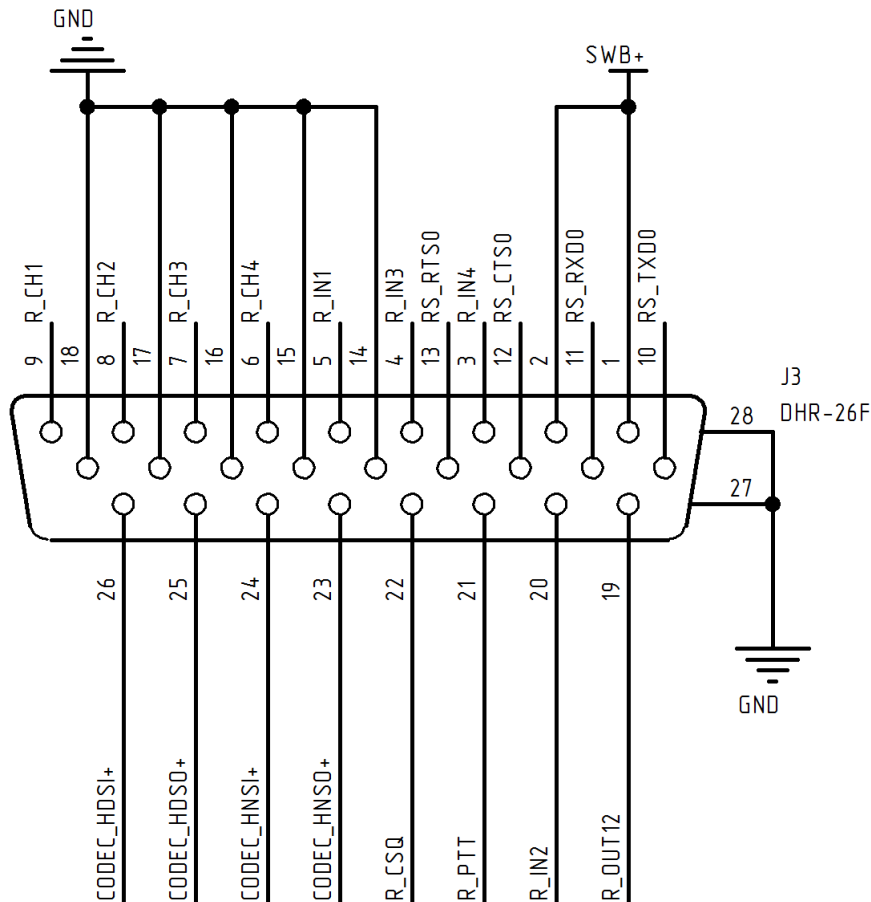


Figure 3: CTRL1 connector pinout

Table 3: CTRL1 connector pins

Pin #	Label	Active level	Type	Function	
				Digital radio	Analog radio
1	SWB+	12 V	Input	Connection to power supply (+) 9-16V	
2	SWB+	12 V	Input	Connection to power supply (+) 9-16V	
3	R_IN4	Ground, 500 mA	Input	Input for an external sensor	
4	R_IN3	12 V	Input	Input for an external sensor	CSQ (PL/DPL/ Group Detect) input; Input for an external sensor

Pin #	Label	Active level	Type	Function	
				Digital radio	Analog radio
5	R_IN1	Ground	Input	Input for an external sensor	
6	R_CH4	Ground, 500 mA	Output	Output for external hardware management	Channel selection on the connected radio
7	R_CH3	Ground, 500 mA	Output	Output for external hardware management	Channel selection on the connected radio
8	R_CH2	Ground, 500 mA	Output	Output for external hardware management	Channel selection on the connected radio
9	R_CH1	Ground, 500 mA	Output	Output for external hardware management	Channel selection on the connected radio
10	RS_TX Do	NA	RS232	TX RS232	TX RS232
11	RS_RX Do	NA	RS232	RX RS232	RX RS232
12	RS_CT So	NA	RS232	CTS RS232	CTS RS232
13	RS_CT So	NA	RS232	RTS RS232	RTS RS232
14	GND	Ground	Input	Ground	Ground
15	GND	Ground	Input	Ground	Ground
16	GND	Ground	Input	Ground	Ground
17	GND	Ground	Input	Ground	Ground
18	GND	Ground	Input	Ground	Ground
19	R_OUT12	Ground, 500 mA	Output	Output for external hardware management	Output for external hardware management
20	R_IN2	12 V	Input	Input for an external sensor	Input for an external sensor

Pin #	Label	Active level	Type	Function	
				Digital radio	Analog radio
21	R_PTT	Ground, 500 mA	Output	Output for external hardware management	PTT output
22	R_CSQ	Ground	Input	Input for an external sensor	CSQ input; Input for an external sensor
23	CODEC_HNSO+		Audio Out	Not used	Audio Out
24	CODEC_HNSI+		Audio In	Not used	Audio In
25	CODEC_HDSO+		Audio Out	Not used	
26	CODEC_HDSI+		Audio In	Not used	
27	GND	Ground	Input	Connection to the external power supply (Ground)	
28	GND	Ground	Input	Connection to the external power supply (Ground)	

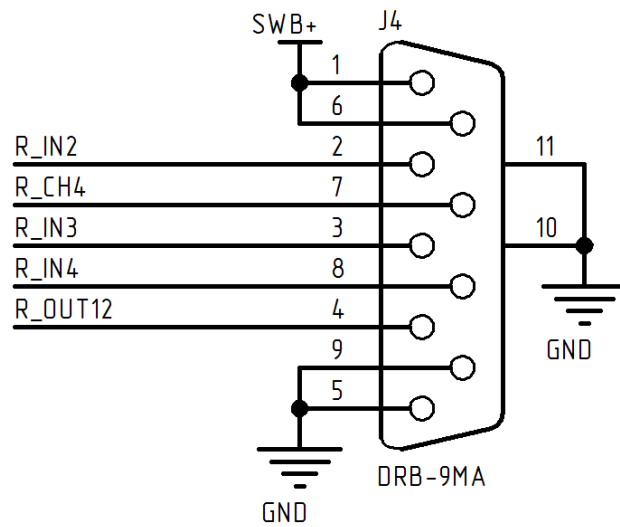


Figure 4: CTRL2 connector pinout

Table 4: CTRL2 connector pins

Pin #	Label	Active level	Type	Function	
				Digital radio	Analog radio
1	SWB+	12 V	Input	Connection to power supply (+) 9-16V	
2	R_IN2	12 V	Input	Input for an external sensor	Input for an external sensor
3	R_IN3	12 V	Input	Input for an external sensor	Input for an external sensor
4	R_OUT12	Ground, 500 mA	Output	Output for external hardware management	Output for external hardware management
5	GND	Ground	Input	Connection to the external power supply (Ground)	
6	SWB+	12 V	Input	Connection to the external power supply (12V)	
7	R_CH4	Ground, 500 mA	Output	Output for external hardware management	Channel selection on the connected radio
8	R_IN4	Ground,	Input	Input for an external sensor	

Pin #	Label	Active level	Type	Function	
				Digital radio	Analog radio
		500 mA			
9	GND	Ground	Input	Connection to the external power supply (Ground)	

## 2.5. Acronyms

Table 5: Acronyms

Acronym	Description
CPS	Customer Programming Software
CSQ	Carrier Squelch
DC	Direct Current
DPL	Digital Private Line
GND	Ground
GPIO	General-Purpose Input/Output
IP	Internet Protocol
ISM	Industrial, Scientific, and Medical (radio band)
LAN	Local Area Network
LED	Light-Emitting Diode
LNA	Low-Noise Amplifier
mA	Milliampere
MAC	Media Access Control
Mbps	Megabits per second
mm	Millimeter
NA	Not Available

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Acronym	Description
NRF	Nordic RF
PL	Private Line (tone)
PTT	Push To Talk
RF	Radio Frequency
RX	Reception
SWB	Switchboard
TCP	Transmission Control Protocol
TX	Transmission
UDP	User Datagram Protocol
USB	Universal Serial Bus
V	Volt

### 3. Connection and Setup

TRBOnet Swift Agent Aoo2 operates in the digital or analog mode. The choice of the operational mode depends on the type of the connected radio.

Table 6: Operational modes supported for different types of radios

Radio	Agent mode	Connection with the radio
Motorola MOTOTRBO radio	Digital	Wireless (through the option board)
Other radio (digital or analog)	Analog	Wired

We recommend that you interconnect a MOTOTRBO radio and Swift Agent Aoo2 wirelessly, through the option board installed into the radio. Swift Agent Aoo2 communicates with the option board in the digital mode.


All non-MOTOTRBO radios, digital and analog, connect Swift Agent Aoo2 using the service cable and communicate with it as analog radios. Swift Agent Aoo2 communicates with the connected radio in the analog (“cable only”) mode.

#### 3.1. Digital Mode (MOTOTRBO Only)

To prepare TRBOnet Swift Agent Aoo2 for operation with a MOTOTRBO professional two-way radio, perform the following steps:

Table 7: High-level steps to prepare TRBOnet Swift Agent Aoo2 for operation in the digital mode

#	Step	Notes
1	Install the option board into the radio.	Refer to section 3.1.1. <i>Installing the Option Board (page 12)</i> .
2	Update the firmware of the option board and configure the radio for wireless communication through the option board.	Refer to section 3.1.2. <i>Configuring the Radio (page 13)</i> .
3	Connect your Swift Agent Aoo2 to the LAN.	
4	Configure the network settings and the NRF connection of your Swift Agent Aoo2.	Refer to section 3.1.3. <i>Configuring Swift Agent Aoo2 (page 16)</i> .

#	Step	Notes
5	Connect the antenna to your Swift Agent Aoo2.	The antenna is supplied in the delivery kit.
6	Connect your Swift Agent Aoo2 to the power supply.	Refer to section 3.3. <i>Power Supply (page 27)</i> .
7	Connect the  (Ground) connector of your Swift Agent Aoo2 to the ground.	The ring terminal for the Ground connector is supplied in the screw kit. Finish the cable and do the connection.
8	Power up the radio.	

### 3.1.1. Installing the Option Board

The Swift Agent Aoo2 delivery kit includes an option board that you need to install into the MOTOTRBO radio.

To install the option board into the radio:

1. Insert the dismantling tool in the groove between the control head and the radio assembly.

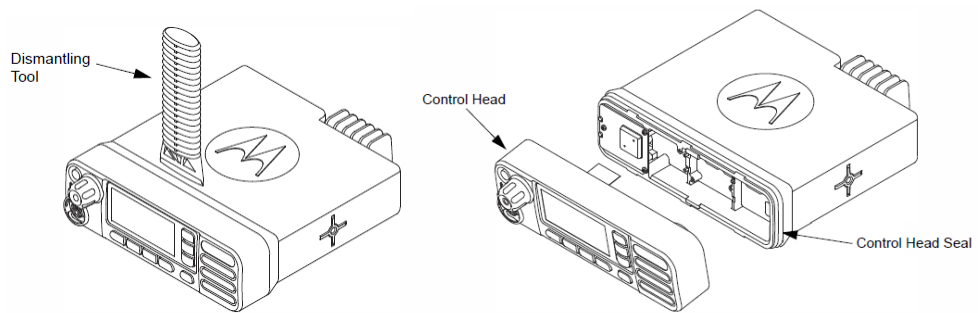


Figure 5: Removing the control head

2. Press the dismantling tool under the control head to release the snap features. Pull the control head away from the radio assembly. Remove the control head seal.
3. Orient the flex cable (supplied in the delivery kit) so that its contacts face the option board. Secure the connector latch to the flex cable.



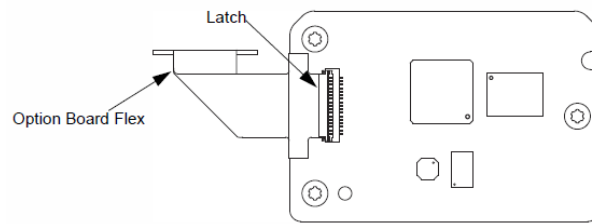


Figure 6: Connecting the flex cable to the option board

4. Connect the flex cable from the option board to the main board connector.

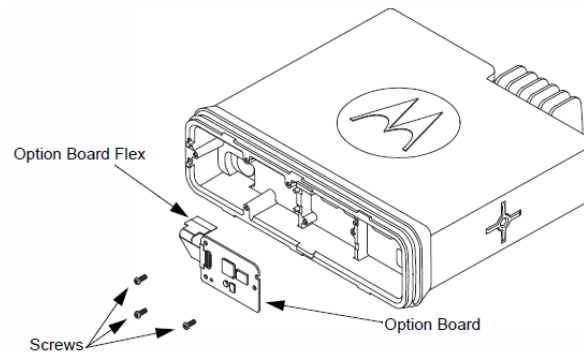


Figure 7: Connecting the option board to the main board of the radio

5. Align the option board to the mounting holes ensuring that the flex tabs are against the chassis alignment posts.
6. Using a T6 TORX™ driver, tighten the three screws to 0.28 N-m (2.5 lbs-in) to secure the option board to the chassis.
7. Assemble the control head seal on the radio. Assemble the control head to the radio chassis by aligning one side of the control head assembly tabs to one side of the radio chassis tabs and then rotate the control head assembly until the other side engages.

Note: Verify that the control head seal is not pinched and not visible. If a pinch is found, disassemble the control head, reset the seal and reassemble the control head.

### 3.1.2. Configuring the Radio

After you have installed the option board into the radio, it is recommended to update the firmware of the option board to the latest version. Then you need to configure the option board for the NRF connection with TRBOnet Swift Agent A002 and to program the radio for communication through the option board on all channels.

To perform these updates, prepare the following:

- A programming cable for connecting the radio to a USB port of the computer.

Note: The programming cable is not supplied in the delivery kit. Use the cable recommended by the manufacturer of the radio.

- The MOTOTRBO CPS software installed on your computer.
- The TRBOnet Swift Manager software installed on your computer. To install the latest version of the software, download the distribution package from [www.trbonet.com](http://www.trbonet.com).

#### To configure the radio:

1. Connect the programming cable to the radio and to a USB port of your computer.
2. Power up the radio.
3. Launch the TRBOnet Swift Manager application.
4. On the menu bar, choose **USB**.
5. Before updating the firmware of the option board, ensure that the **Allow selection of firmware** option on the **Tools** menu is not selected.
6. Click **Update** on the **Device** menu. The latest firmware is loaded to the option board automatically.
7. To open the configuration of the option board, click **Read** on the **Device** menu:

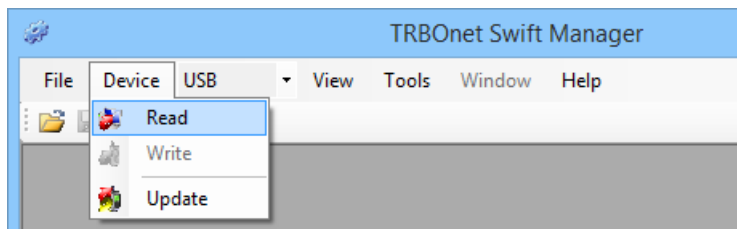


Figure 8: Opening the configuration of the option board

8. In the left pane, click **ISM transceiver settings**. In the right pane, specify the NRF connection settings:
  - **Air data rate**: The data transfer rate for wireless communication. Values: 1 Mbps, 2 Mbps. Default: 1 Mbps.
  - **RF channel**: The channel for wireless communication. Range: 0 to 125. Default: 120.
  - **RF power**: The power of the ISM transceiver. Values: 20, 60, 250, 1000  $\mu$ W. Default: 1000  $\mu$ W.
  - **Receiver LNA gain**: Sensitivity of the receiver. Values: Low, High. Default: Low.

Note: To be able to communicate with the option board wirelessly, TRBOnet Swift Agent must be configured to use the same NRF connection settings.

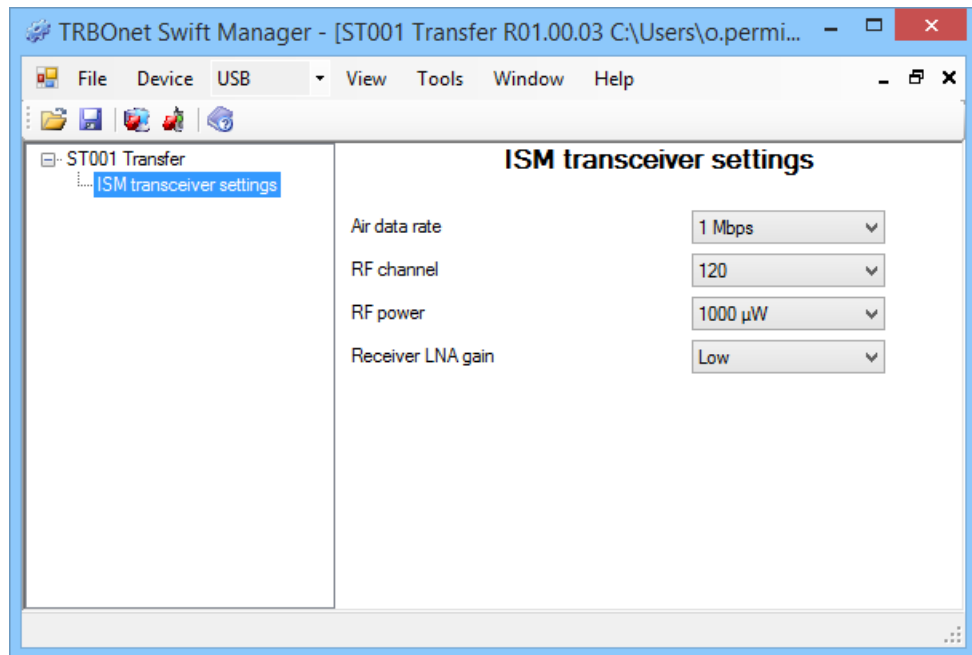


Figure 9: Configuring the option board

9. To save the updated configuration to the option board, click **Write** on the **Device** menu.
10. Close TRBOnet Swift Manager.
11. Launch MOTOTRBO CPS. Click **Read** on the **Device** menu to open the configuration of your radio.
12. In the left pane, expand the **Channels** section.
13. In all zones where the radio needs to work through the option board, click the channels one after another in the left pane. For each channel, select **Option Board** in the right pane.

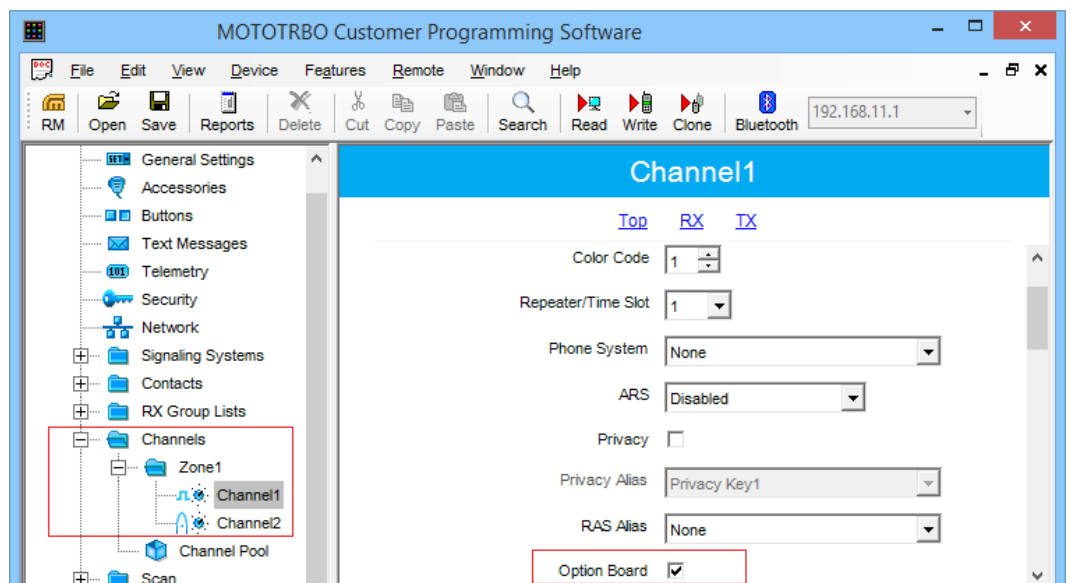


Figure 10: Enabling the use of the option board on the radio channels

14. Click **Write** on the **Device** menu to save the updates to the radio.

15. Close MOTOTRBO CPS and disconnect the radio from the computer.

### 3.1.3. Configuring Swift Agent A002

Configure your TRBOnet Swift Agent A002 for operation in the specified IP network and for wireless communication with the radio.

To configure TRBOnet Swift Agent A002, you need the following:

- A computer connected to the LAN.
- The TRBOnet Swift Manager software installed on the computer. To install the latest version of the software, download the distribution package from [www.trbonet.com](http://www.trbonet.com).

#### To configure TRBOnet Swift Agent A002:

1. Connect your TRBOnet Swift Agent A002 to the power supply and to the LAN. For help, refer to section 3.3. *Power Supply (page 27)*.
2. Launch the TRBOnet Swift Manager software.
3. On the menu bar, select **LAN**. Then click **Read** on the **Device** menu.

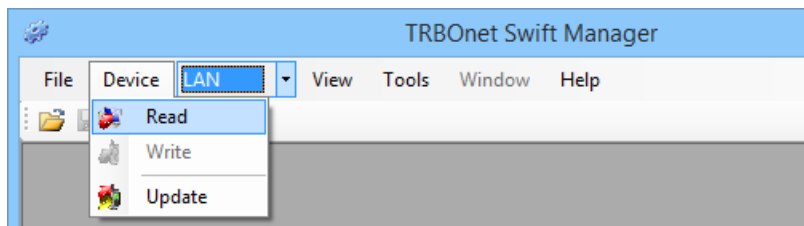


Figure 11: Opening the configuration of TRBOnet Swift Agent

4. In the **Searching the devices...** popup window, point your TRBOnet Swift Agent A002 in the list and click **OK**.

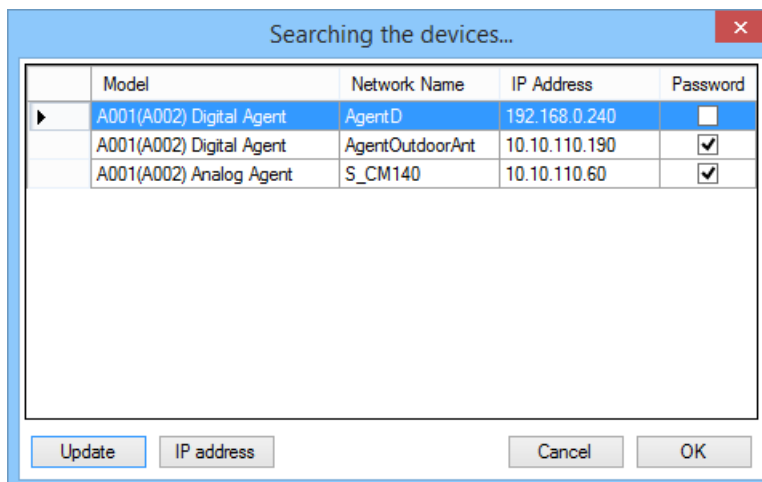


Figure 12: Selecting the device to be configured

The configuration of your TRBOnet Swift Agent A002 appears in the main window of the application.

Note: Your device may not appear in the list, or you may get the “Cannot read the codeplug” error message after you click **OK**. If this happens, modify the IP network settings of your computer to be in the same subnet with the device. Then try to open the configuration of your device once again. For more information, refer to section 3.1.3.1. *Changing TCP/IP Settings (page 18)*.

5. In the left pane, click **Network settings** and update the IP network settings as required.

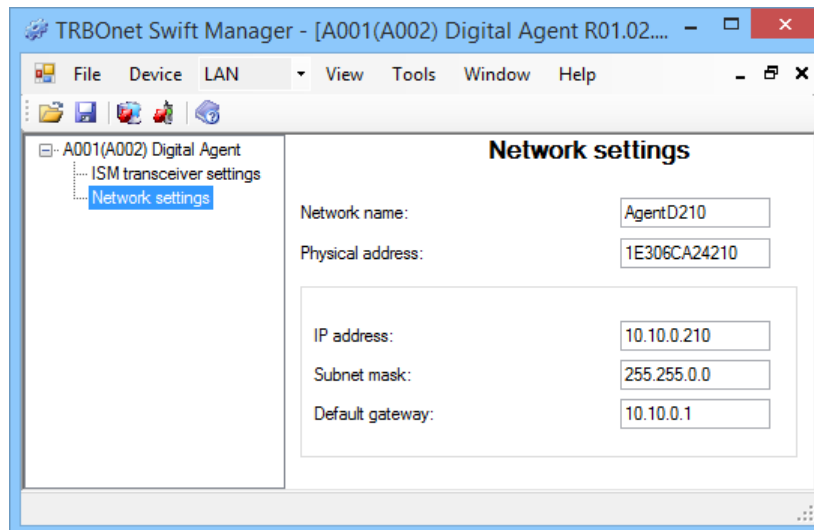


Figure 13: Configuring the network settings

Note: If the specified IP network includes multiple instances of Swift Agent Aoo2, make sure to update the default MAC address in the **Physical address** field.

6. In the left pane, click **ISM transceiver settings** and update the NRF connection settings with values specified in the configuration of the radio.

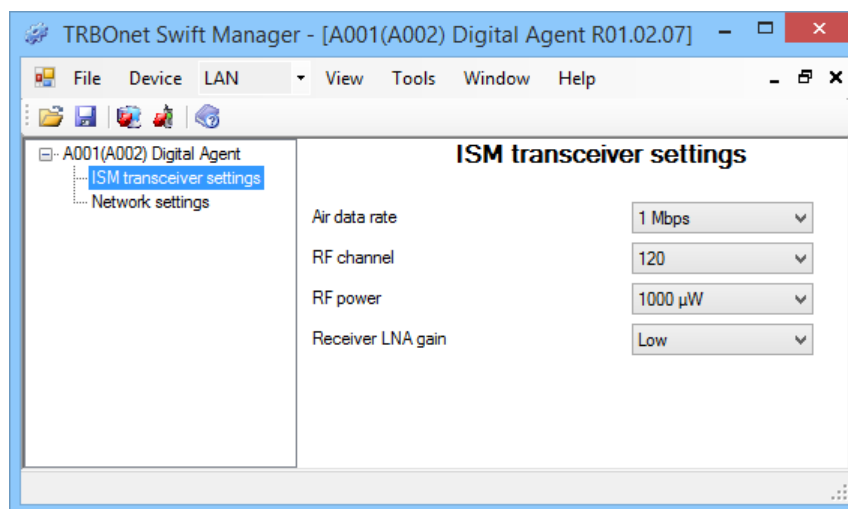


Figure 14: Configuring the NRF connection with the radio

7. (Optional) In the left pane, click **A001(A002) Digital Agent** and protect the configuration with the password. Enter your password in the **Codeplug password** field.
8. On the **Device** menu, click **Write**.
9. Close the application.

### 3.1.3.1. Changing TCP/IP Settings

If TRBOnet Swift Manager cannot find your hardware in the LAN or cannot read the hardware configuration, consider updating the TCP/IP network settings of your computer to be in the same subnetwork with the required hardware.

If TRBOnet Swift Manager is able to detect your hardware in the LAN, you can see the IP address of your hardware in the **Searching the devices...** window:

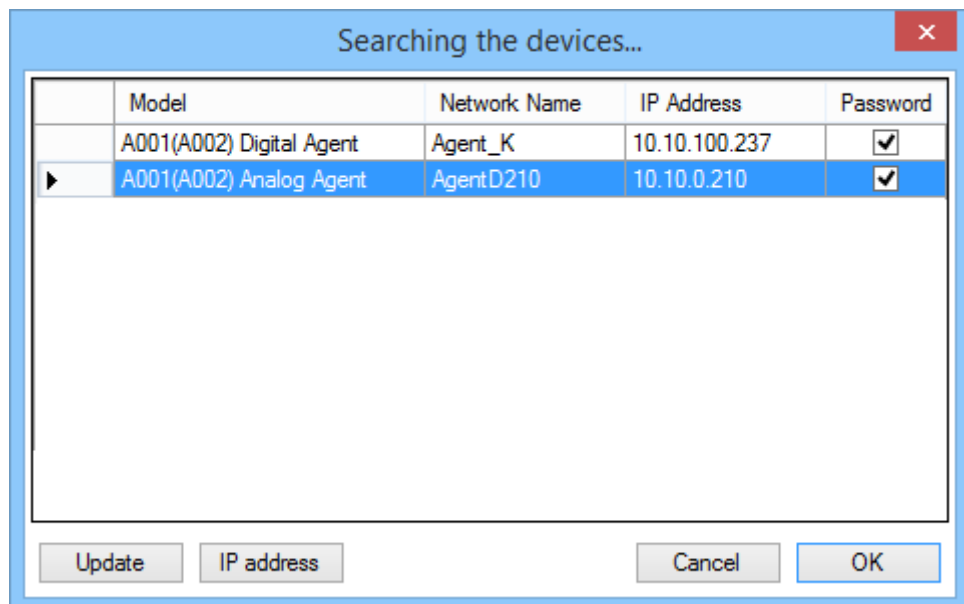


Figure 15: Getting the IP address of Swift Agent Aoo2

A brand new Swift Agent Aoo2 uses the following default network settings:

- IP address: 192.168.0.240
- Subnet mask: 255.255.255.0
- Default gateway: 192.168.0.1

#### To change the TCP/IP settings of your computer:

1. Open the **Start** menu and click **Control Panel**.
2. In the search box, type "adapter". Under **Network and Sharing Center**, click **View network connections**.
3. Right-click the connection that you want to change. Choose **Properties** in the popup menu.

4. In the **Local Area Connection Properties** window, go to the **Networking** tab. Under **This connection uses the following items**, click **Internet Protocol Version 4 (TCP/IPv4)** and then click **Properties**.
5. In the popup window, click **Use the following IP address**. Update the **IP address** and **Subnet mask** settings to locate the computer in one local area subnetwork with your Swift Agent Aoo2.

For example, your Swift Agent Aoo2 uses the IP address **10.10.0.210** and the subnet mask **255.255.255.0**. To locate your computer in the same subnet, you can give it the IP address in the range **10.10.0.[0 to 255]** and the subnet mask **255.255.255.0**.



Note: The IP address assigned to the computer must not be in use by any other device in the network. Contact your network administrator for help.

6. Click **OK**, again **OK**, and **Close**.

### 3.2. Analog Mode

To prepare TRBOnet Swift Agent Aoo2 for operation with a radio in the analog mode, perform the following steps:

Table 8: High-level steps to prepare TRBOnet Swift Agent Aoo2 for operation in the analog mode

#	Step	Note
1	Update the firmware and configuration of your Swift Agent Aoo2.	Refer to section 3.2.1. <i>Configuring Swift Agent Aoo2 (page 20).</i>
2	Assemble the service cable.	Refer to section 3.2.2. <i>Assembling the Service Cable (page 23).</i>
3	Configure the GPIO pins of Swift Agent Aoo2 and of the radio.	Refer to section 3.2.3. <i>Configuring Pin Settings (page 25).</i>
4	Connect Swift Agent Aoo2 to the radio.	Refer to section 3.2.4. <i>Connecting the Service Cable (page 27).</i>
5	Connect Swift Agent Aoo2 to the power supply.	Refer to section 3.3. <i>Power Supply (page 27).</i>
6	Connect the  jack of your Swift Agent Aoo2 to the ground.	The pin for the  jack is supplied in the screw kit. Finish the cable and do the connection.
7	Power up the connected radio.	

#### 3.2.1. Configuring Swift Agent A002

To program your TRBOnet Swift Agent Aoo2, install the TRBOnet Swift Manager software on your computer. Find the distribution package with the latest version of the software at [www.trbonet.com](http://www.trbonet.com).

##### 3.2.1.1. Enabling the Analog Mode

A brand new TRBOnet Swift Agent Aoo2 operates in the digital mode. To use the analog mode, update the firmware of your TRBOnet Swift Agent Aoo2.



### To update the firmware:

1. Power your TRBOnet Swift Agent Aoo2 and connect it to the LAN. For help, refer to section 3.3. *Power Supply (page 27)*.
2. Launch TRBOnet Swift Manager on a computer connected to the LAN.
3. On the menu bar, select **LAN**. Then click **Tools** and select the **Allow selection of Firmware** option.

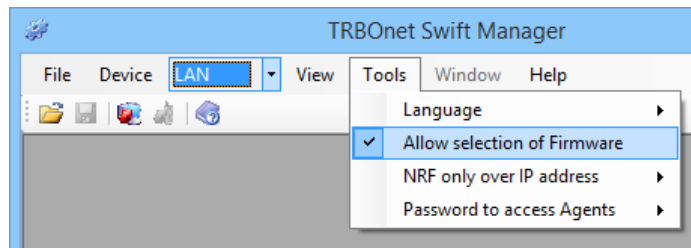


Figure 16: Enabling the firmware update

4. On the **Device** menu, click **Update**.

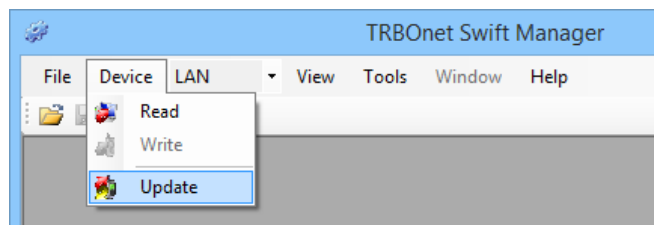


Figure 17: Updating the firmware

5. In the **Searching for devices...** window, point your Swift Agent Aoo2 and click **OK**.

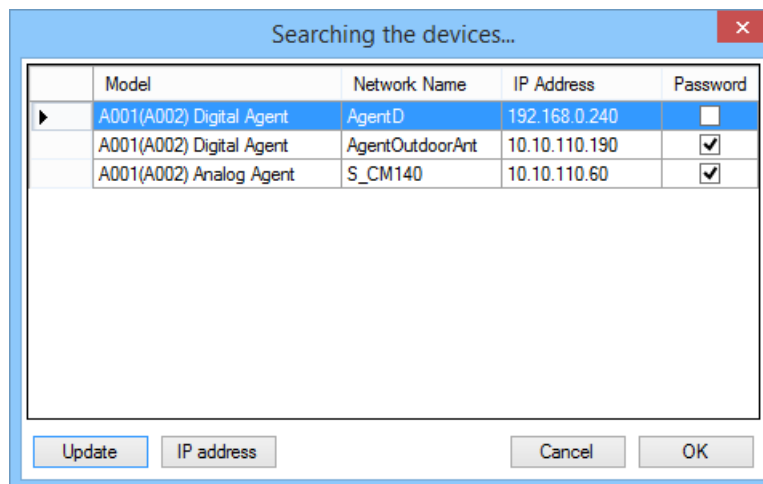


Figure 18: Choosing the device for firmware update

A brand new Swift Agent Aoo2 appears in the window as **A001(A002) Digital Agent** with the IP address of 192.168.0.240.

Note: If you cannot find your Swift Agent Aoo2 in the list, make sure that your computer and the device are both located in the same local area subnetwork. If not,

consider changing the network settings of your computer as described in section 3.1.3.1. *Changing TCP/IP Settings (page 18)*.

6. In the **Select Firmware** popup window, point the **A001(A002) Analog Agent** firmware and click **OK**.

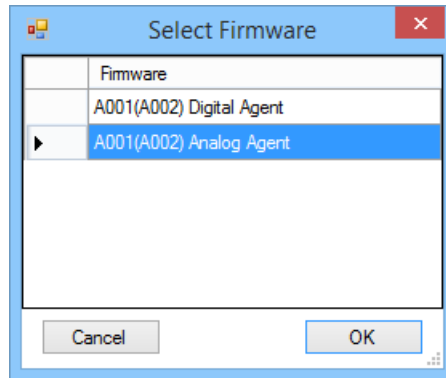


Figure 19: Selecting the firmware

7. Click **OK** to close the “Downloading is complete” message box.

Note: If the firmware update fails with the “error of downloading” message, make sure that your computer and the device are both located in the same local area subnetwork. If not, consider changing the network settings of your computer as described section 3.1.3.1. *Changing TCP/IP Settings (page 18)*.

### 3.2.1.2. *Configuring the Network Settings*

A brand new Swift Agent A002 is configured to use the default IP network settings.

#### **To update the network settings of Swift Agent A002:**

1. Launch TRBOnet Swift Manager on a computer connected to the LAN.
2. On the **Device** menu, click **Read**.
3. In the **Searching the devices...** window, point your Swift Agent A002. Click **OK**.
4. In the left pane, click **Network settings**.

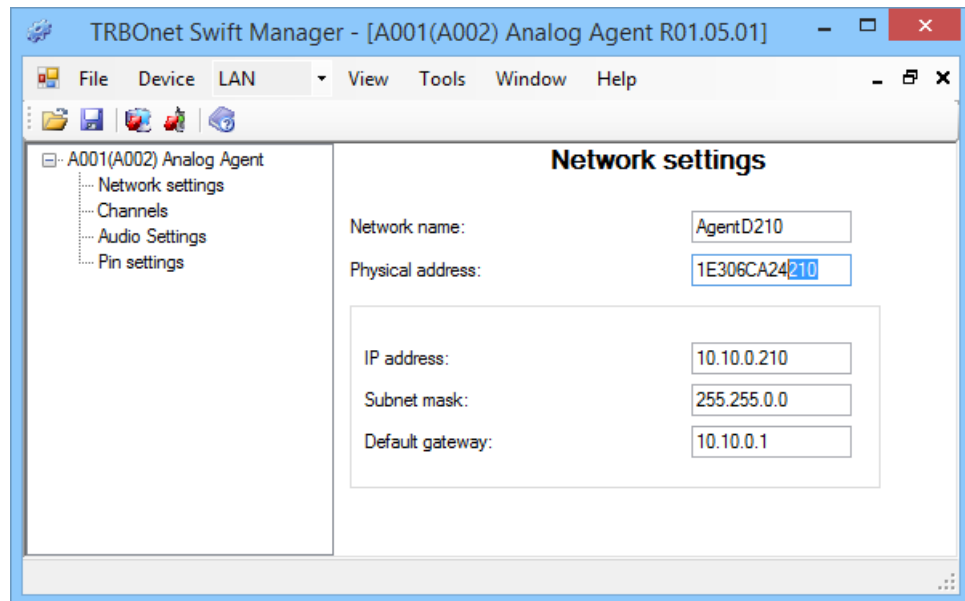


Figure 20: Updating the network settings of Swift Agent A002

- In the right pane, type the required network settings of your Swift Agent A002.

Note: If the specified IP network includes multiple instances of Swift Agent A002, make sure to update the default MAC address in the **Physical address** field.

- On the **Device** menu, click **Write**.

Now your TRBOnet Swift Agent A002 is configured for operation in the analog mode. If you changed the network settings of your computer as described in section 3.1.3.1. *Changing TCP/IP Settings*, roll back the changes.

### 3.2.2. Assembling the Service Cable

In the analog mode, Swift Agent A002 is connected to the radio using the service cable. The delivery kit includes the DB26 male connector and the wire kit. Use these accessories to assemble the service cable that meets your technical requirements.

Note: The radio connector plug is not included in the delivery kit. Contact the manufacturer of your radio or your sales representative to get the plug compatible with the service jack of your radio.

#### To assemble the service cable:

- Link the wires to the DB26 male connector pins. The following table summarizes all required and optional wire links that you can add to the DB26 plug.

Table 9: Required and optional DB26 wire links grouped by purpose

Purpose	DB26 pin number	Function	Required /optional	Notes
Radio connection	24	Audio In	Required	
	23	Audio Out		
	21	PTT Out		
	4 (or 22)	CSQ In		
	18 (or any of 14 to 17)	Ground		
Power supply from the radio	1 (or 2)	+12 V	Optional	
	27 (or 28)	Ground		
Channel selection	6,7,8,9 (any combination or all)		Optional	Applies if your radio supports channel selection.
Input for an external sensor	3, 5, 20 4 or 22 (any not used for CSQ detect)		Optional	
Output for external hardware management	19		Optional	

Note: For more information about CTRL1 connector pins, refer to section 2.3. *Connectors (page 5)*.

2. Link the wires to the radio connector plug. For the description of the radio service jack (pin numbers and functions), refer to the documentation of your radio.

The following example shows how to assemble the service cable for a Motorola CM/GM series mobile radio:

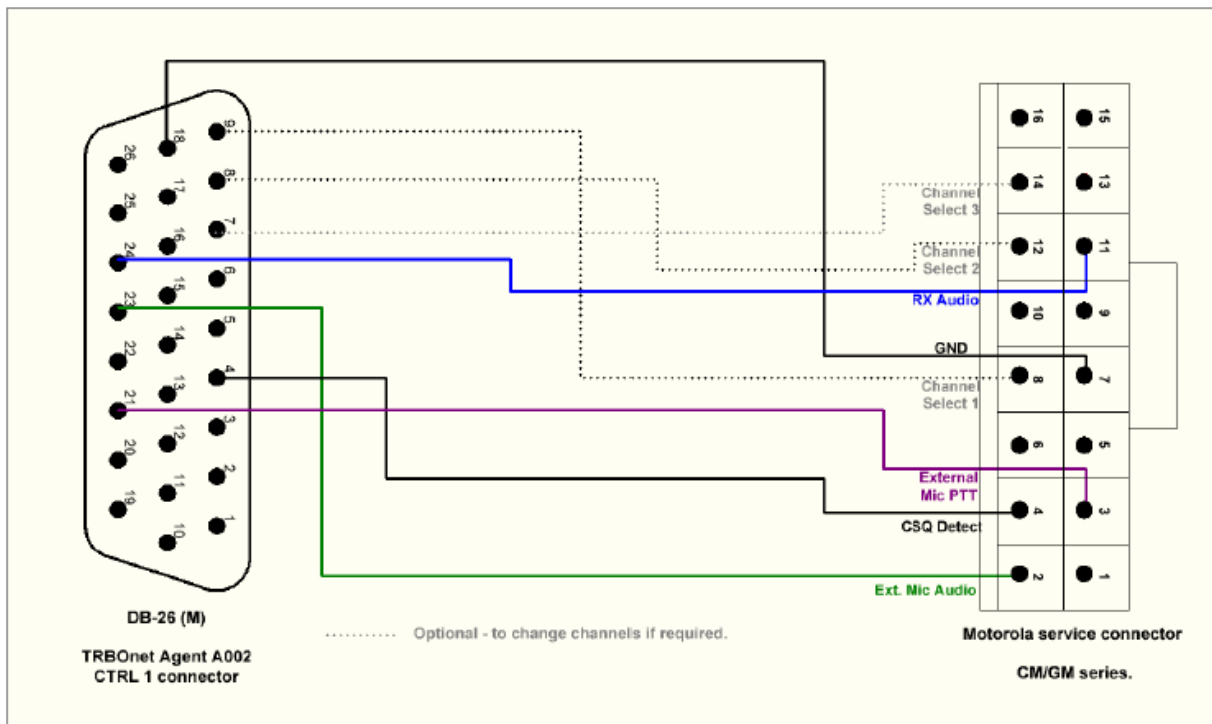


Figure 21: The service cable for a Motorola CM/GM series radio

The solid lines indicate the required wire links: Audio In (pin 24 on DB26), Audio Out (pin 23), PTT (pin 21), CSQ Detect (pin 22), Ground (pin 18). The dotted lines indicate optional wire links.

### 3.2.3. Configuring Pin Settings

When the service cable is assembled, configure the coupled pins on Swift Agent Aoo2 and on the radio.

To configure the CTRL1 connector pins:

1. Launch TRBOnet Swift Manager on a computer connected to the LAN.
2. On the **Device** menu, click **Read**.
3. In the **Searching the devices...** window, point your Swift Agent Aoo2. Click **OK**.
4. In the left pane, click **Pin settings**.
5. In the right pane, specify the following settings:
  - **CSQ detect:** Choose the CTRL1 connector pin (4 or 22) that is used for CSQ input on the service cable. Specify the high or low active level for the selected pin.
  - **PTT:** Specify the high or low active level for CTRL1 connector pin 21 (PTT output).
  - **CSQ debounce duration (ms):** Specify the debounce duration for the input CSQ signal.

6. On the **Device** menu, click **Write**.

To configure the GPIO pins on the radio, install the radio programming software to your computer. For configuring a MOTOTRBO radio, use the MOTOTRBO CPS software.

**To configure the radio connector pins in MOTOTRBO CPS:**

1. Connect the programming cable to the service jack of the radio and to a USB port of your computer.

Note: The programming cable is not supplied in the delivery kit. Use the cable recommended by the manufacturer of the radio.

2. Power up the radio.
3. Launch the MOTOTRBO CPS application.
4. In MOTOTRBO CPS, open the configuration of your radio by clicking **Read** on the **Device** menu.
5. In the navigation (left) pane, click **Accessories**.
6. In the right panel, click the **GPIO Physical Pins** link.
7. In the **GPIO Physical Pins** section, configure all GPIO pins linked by the service cable. To learn the numbers of the linked GPIO pins, refer to the documentation provided for your radio.

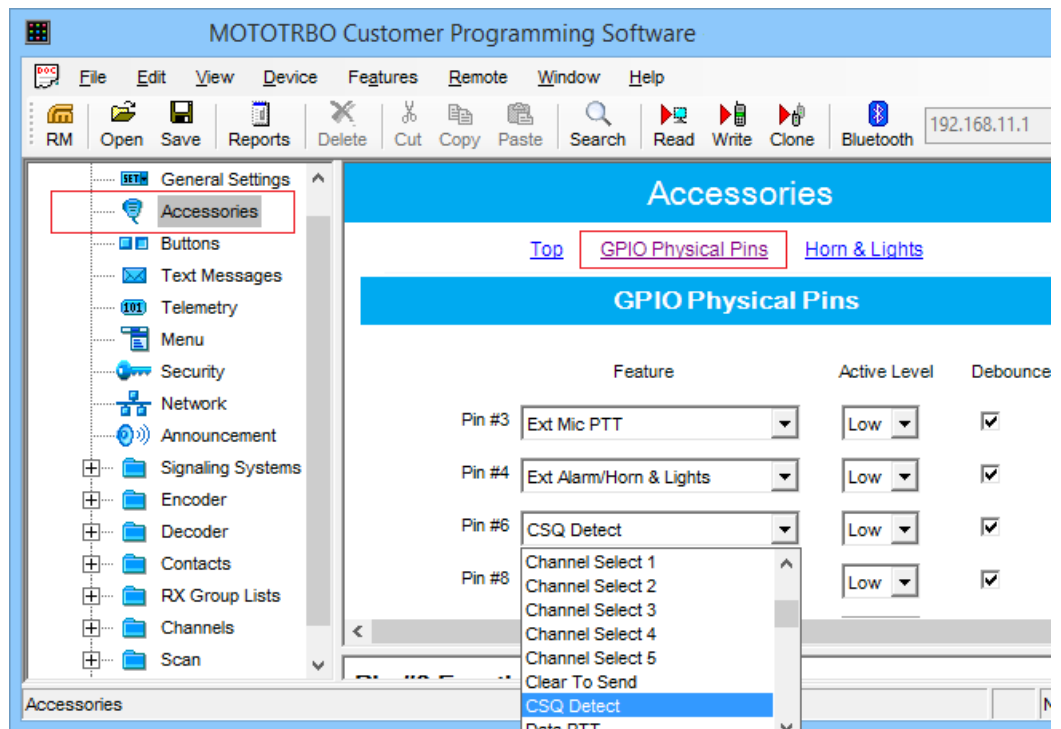


Figure 22: Configuring the GPIO pins of the MOTOTRBO radio

- a. For each pin, choose the function (the **Feature** setting) that matches the function of the coupled CTRL1 connector pin.

Table 10: Matching pin functions

Swift Agent Aoo2 (CTRL1 connector)		MOTOTRBO CPS (Pin function)
Pin 24	Audio In	RX Audio
Pin 23	Audio Out	Ext Mic Audio
Pin 21	PTT Out	Ext Mic PTT
Pin 4 or 22	CSQ In	CSQ Detect
Pin 14 to 18 (any one)	GND	Gnd

- b. Specify the low active level for all pins, except for those whose coupled pins on the CTRL1 connector are configured to use the high level.
8. Save the updated settings to the radio by clicking **Write** on the **Device** menu.
  9. Close the MOTOTRBO CPS application and disconnect the radio from the computer.

### 3.2.4. Connecting the Service Cable

When the service cable is finished and pins are configured on the radio and on Swift Agent Aoo2 accordingly, connect your Swift Agent Aoo2 to the radio and to peripheral devices (if necessary).

*IMPORTANT: Before connecting Swift Agent Aoo2, make sure that the radio is powered off and that Swift Agent Aoo2 and all external hardware (if any to be connected) is disconnected from the power supply.*

#### To connect Swift Agent Aoo2 to the radio and to the external hardware:

1. Connect the DB26 plug of the service cable to the CTRL1 jack on the rear panel of your Swift Agent Aoo2.
2. Connect the other end of the service cable to the service jack of the radio.
3. If necessary, connect the wires of the service cable to the external hardware.

When all connections are done, power up the radio and connect Swift Agent Aoo2 and all connected external hardware to the power supply.

## 3.3. Power Supply

TRBOnet Swift Agent Aoo2 can be powered from an external source of 9-16 V DC or from the connected radio.

Note: We recommend that you power Swift Agent Aoo2 from an external power supply. When Swift Agent Aoo2 is powered from the radio, loss of power on any node of this

chain makes it impossible to diagnose the problem remotely because both nodes do not respond on the IP network.

**To connect Swift Agent Aoo2 to the external power supply:**

1. Connect the DC plug of the power cable to the 12V jack on the rear panel of your Swift Agent Aoo2.
2. Connect the power cable to the power supply.

Note: The power cable is not supplied in the delivery kit. Use any power cable with the 5mm x 2.5 mm X 9 mm barrel plug for connecting Swift Agent Aoo2 and with pins or plug compatible with the external power supply.

**To power Swift Agent Aoo2 from the radio:**

1. Power off the radio. If the service cable is connected, disconnect it from the radio and Swift Agent Aoo2.
2. Link the wires to the service cable as follows:
  - Connect CTRL1 connector pin 1 or 2 and the (12V) pin on the service jack of the radio.
  - Connect CTRL1 connector pin 27 or 28 and the (GND) pin on the service jack of the radio.
3. Connect the service cable to the CTRL1 jack of Swift Agent Aoo2 and to the service jack of the radio.
4. Power up the radio.