



Radio-over-IP Gateway **TRBOnet Swift A200**

User Manual



World HQ Neocom Software 8th Line 29, Vasilyevsky Island St. Petersburg, 199004, Russia US Office Neocom Software

15200 Jog Road, Suite 202 Delray Beach, FL 33446, USA

Email: info@trbonet.com WWW.TRBONET.COM

Internet

Telephone EMEA: +44 203 608 0598 Americas: +1 872 222 8726 APAC: +61 28 6078325



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Contents

1	Introd	duction	3
	1.1	About This Document	3
	1.2	About TRBOnet Swift	3
	1.3	Contacts	3
2	Abou	t TRBOnet Swift A200	4
	2.1	Features	4
	2.2	Capabilities	4
	2.3	Restrictions	5
	2.4	Package Contents	5
	2.5	Specification	6
	2.6	Design	7
	2.7	Connectors	8
	2.8	OLED Indication	9
3	Setup	and Connection	10
	3.1	MOTOTRBO Mode	10
	3.2	Non-MOTOTRBO Mode	18
	3.3	Power Supply	22
4	TRBO	net Configuration	23
	4.1	TRBOnet Enterprise/PLUS Configuration	23
	4.2	TRBOnet Watch Configuration	27
5	Maint	tenance	29
	5.1	Built-in Clock Battery Replacement	29
	5.2	Memory Card Replacement	30
6	Impo	rtant Note	30
Ар	oendix	A: Service Cable Examples	31
	A.1	Motorola CM 140 Two-Way Radio	31
	A.2	Motorola SLR 5500 Repeater	32
	A.3	Tetra MTM5400/5500 Control Radio	33



1 Introduction

1.1 About This Document

The information in this document is intended for engineers responsible for building MOTOTRBO radio networks and programming two-way radios for end users.

The document describes in detail how to connect, set up, and maintain the TRBOnet Swift A200 hardware radio-over-IP gateway.

1.2 About TRBOnet Swift

TRBOnet Swift is a family of hardware products designed by Neocom Software Solutions, Ltd for MOTOTRBO radio networks. The Swift family hardware is presented by the RoIP gateways A100 and A200, and the option board ST002.

For more information about 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
АРАС	+61 28 607 8325	https://trbonet.com/kb/ — online knowledge base



2 About TRBOnet Swift A200

TRBOnet Swift A200 (also referred to as the "A200 gateway") is a hardware radio-over-IP gateway designed to interface your TRBOnet Server to a MOTOTRBO or non-MOTOTRBO control (donor) radio, or a MOTOTRBO repeater in the analog or digital mode.

2.1 Features

- Compact size and light weight
- Wired and wireless connection with control radios
- Support for 10 connections with TRBOnet Servers
- Interfaces:
 - 7 I/O contacts for external hardware (SCADA, sensors, and other)
 - USB interface for wired communication with MOTOTRBO control radios and repeaters
 - NRF interface for wireless communication with a MOTOTRBO radio
 - Audio interface for wired communication with non-MOTOTRBO control radios
 - LAN interface for the wired IP connection (Ethernet 10/100Base-T, 10/100 Mbit/s)
 - Micro-USB port for programming
- 12V DC power supply
- OLED display
- Support for flash cards with capacities up to 32 Gb
- Quick and easy connection and setup
- Unattended operation that does not require regular maintenance

2.2 Capabilities

• A gateway between a radio channel and an IP network

A radio connected to the A200 gateway can transfer voice and data to all connected TRBOnet Servers over IP. The A200 gateway performs no encryption of the transferred voice and data traffic.

In addition, the VOX (voice operated transmission) mode is supported on a control radio connected via the A200 gateway.

Remote control

TRBOnet control room operators can control a connected radio remotely by sending commands (power on/off, channel and zone selection) over IP.

Self-check and alarm notification

The A200 gateway performs continuous monitoring of all connections and physical parameters (interior temperature, battery status). When an error is detected, the device shows the corresponding information on the display and sends an alarm notification to all connected TRBOnet Servers. The notification is displayed on the screens of TRBOnet control room operators.



2.3 **Restrictions**

- Due to changes introduced by Motorola into recent MOTOTRBO firmware, we do not recommend that you use the **A200 gateway** 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.
- 2. The **A200 gateway** in the **wireless (NRF)** mode does 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).

2.4 Package Contents

Item	Description	Quantity
TRBOnet Swift A200	A radio-over-IP gateway unit with a factory-installed MicroSD card (4 Gb or more) and a CR1220 battery.	1
TRBOnet Swift Transfer ST002	An option board for a MOTOTRBO radio. A flex cable for connecting the option board to the main board of a MOTOTRBO radio.	1
Micro-USB <> USB cable	A programming cable.	1
USB <> RADIO cable	A service cable for connecting a MOTOTRBO radio to the A200 gateway.	1
Audio cable	An audio cable (in and out) for connecting a non- MOTOTRBO two-way radio to the A200 gateway.	1
Micro-Fit connector system	A Micro-Fit plug and a wire kit for connecting the A200 gateway to a non-MOTOTRBO two-way radio, a 12V DC power supply, and external hardware.	1
Screw kit		1
Passport	Technical documentation for TRBOnet Swift Agent A200.	1

The package contents of TRBOnet Swift A200 include the following items:



2.5 Specification

General			
Dimensions	82 x 34.5 x 102 mm		
Weight	200 g		
Operational temperature	-20 °C to +60 °C		
Storage temperature	-40 °C to +85 °C		
Ingress protection rating	IP30		
Relative humidity, max	85% at +40 °C		
Power supply			
Nominal supply voltage	12 V DC		
Current consumption, max	0.5 A		
Display	OLED, mono color, 128 x 32 pix, 0.91 inch		
Memory card	MicroSD, 4 – 32 Gb		
Built-in clock battery	3 V, CR1220		
Interfaces	7 I/O, micro-USB, USB, LAN, UART, Audio In/Out		
LAN	i		
Parameters	RJ45, Ethernet 10/100Base-T, 10/100 Mbit/s		
Bandwidth	128 kbps for one voice connection 15 kbps for one control connection		
Latency*, max	1800 ms		
Jitter*, max	400 ms		
Device programming	USB type B		
Radio connection interfaces			
MOTOTRBO	USB (wired), NRF (wireless)		
Non-MOTOTRBO	Audio (wired)		
Inputs/outputs			
Output type	Open collector		
Output current, max 100 mA			
Input voltage, max	12 V		

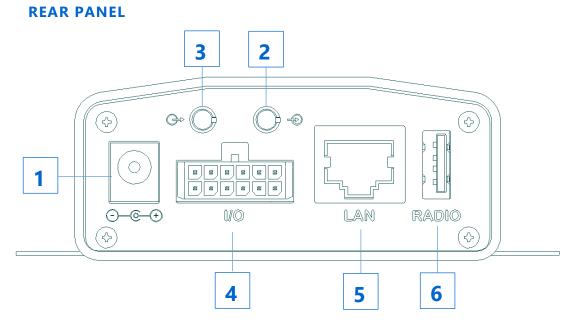
* TRBOnet Enterprise/PLUS of version 5.2.5 and higher is required.



2.6 Design FRONT PANEL



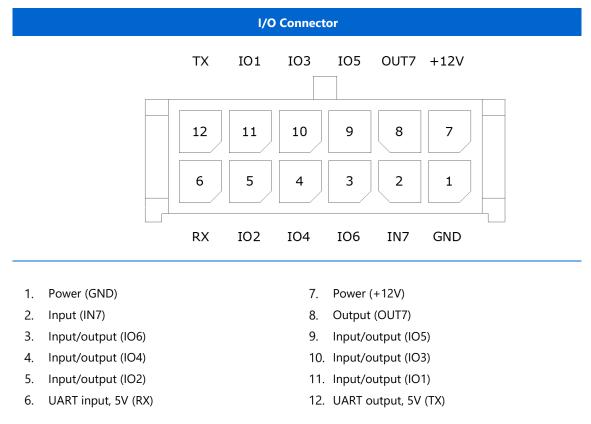
- 1. OLED display that shows the connection status and self-check information.
- 2. Micro-USB port to connect the device to a computer using the programming cable.



- 1. DC power inlet.
- 2. Audio Input to connect a non-MOTOTRBO two-way radio.
- 3. Audio Output to connect a non-MOTOTRBO two-way radio.
- 4. Micro-Fit 3mm pitch connector to connect a non-MOTOTRBO radio, a 12V DC power supply, and external hardware.
- 5. LAN port.
- 6. USB port to connect a MOTOTRBO radio.



2.7 Connectors





2.8 **OLED Indication**

lcon	State
Ψ	Radio connection
	Flashing icon: The radio is not connected or powered off.
•→ •==	Radio TX
¶.atil (===)	Radio RX
Ę	IP connection
	Digits near the icon: The number of connected TRBOnet servers.
	Flashing icon: the A200 gateway is not connected to an IP network.
ŧ	Activity on the IP connection
ണ	Wireless connection to the radio
æi	USB connection to the radio
2001	Memory card
250	Flashing icon: The memory card is not detected.
P	Low battery charge
	Flashing icon: Battery replacement is required.
Θ	Built-in clock not set Flashing icon: The built-in clock is not set. Update of the device configuration or battery replacement is required.



3 Setup and Connection

TRBOnet Swift A200 operates in the MOTOTRBO mode or in the non-MOTOTRBO mode. The choice of the operation mode depends on the type of the connected radio.

Radio	Operation mode	Connection with the radio
Motorola MOTOTRBO MOTOTRBO		Wireless (NRF), requires a radio with the firmware version 2.05.60 or earlier
		Wired (USB) - recommended
Non-MOTOTRBO	Non-MOTOTRBO	Wired (audio)

To configure your A200 gateway, download the Swift Utilities Pack (version 1.6 and higher) from the <u>www.trbonet.com</u> website and install the TRBOnet Swift CPS software tool on your computer.

Then set up and connect your A200 gateway for operation in the preferred mode. Find the details in the following sections:

- <u>3.1 MOTOTRBO Mode</u> (page 10)
- <u>3.2 Non-MOTOTRBO Mode</u> (page 18)
- <u>3.3 Power Supply</u> (page 22)

3.1 MOTOTRBO Mode

To prepare TRBOnet Swift A200 for operation in the MOTOTRBO mode, follow the steps in the table below.

#	Step	Refer to:
1	Update the firmware and configure your A200 gateway.	<u>3.1.1 Configuring the A200</u> (page 10)
2	Install the option board into the MOTOTRBO radio.	3.1.2 Installing the Option Board (page 13)
3	Update the configuration settings of the radio.	<u>3.1.3 Configuring the Radio</u> (page 15)
4	Update the firmware and configuration settings of the option board.	<u>3.1.4 Configuring the Option Board</u> (page 16)
5	Connect your A200 gateway to the radio and to the LAN.	<u>3.1.5 Connecting the A200 Gateway to the</u> <u>Radio</u> (page 16)
6	Connect your A200 gateway to the power supply.	<u>3.3 Power Supply</u> (page 22)
7	Power up the connected radio.	

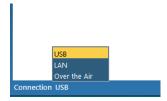
3.1.1 Configuring the A200 Gateway

To configure the A200 gateway:

1. Launch TRBOnet Swift CPS. In the main window, select **USB** as an interface for device programming at the bottom left of the window. Connect the



programming cable to the micro-USB port of the A200 gateway and to a USB port of your computer.



If you prefer to program your A200 gateway using the LAN connection, select LAN as the programming interface and connect the A200 gateway to the LAN and to the power supply.

- 2. (Recommended) Update firmware of your A200 gateway:
 - a. Click **Options** on the **Tools** menu. In the right pane, make sure that the **Allow changing firmware type** option is switched on (see the picture below).

File	Device	Tools	{? Help	Read Write	
Optio	ns ×				
⊖ Op	otions General			General	
	Connections			Allow changing device firmware type off 🚺 on	
				Language English •	

- b. On the **Device** menu, click **Update Firmware**. If you use the LAN connection for programming, specify the IP address of your A200 gateway and click **Connect**.
- c. In the **Firmware update** window, select your A200 gateway. Open the **Mode** menu and click the preferred mode "NRF RoIP Gateway" (for the wireless connection to the radio) or "USB RoIP Gateway" (for the USB connection to the radio).
- d. On the **Update to** menu, select the latest firmware version. Click **Update**.

Firm	Firmware update ×				
	Device	Interface	Firmware	Mode	Update to
•	Swift A200	USB	03.04.00	USB RoIP Gateway	03.04.00 🔻
				Analog RoIP Gateway USB RoIP Gateway NRF RoIP Gateway	
					Update Cancel

3. To open the configuration of your A200 gateway, click the **Read** button, or open the **Device** menu and click **Read**.



- If you use the LAN connection, the **Read LAN** window appears. Specify the IP address of your A200 gateway and click **Read**.
- If you use the USB connection and the Select device window appears, point your device.

The configuration settings appear in a separate tab.

4. Click **Network Settings** in the left panel.

TRBOnet Swift CPS	
File Device Tools Help	Read Write
Swift A200 (NRF RoIP Gateway) - USB	<
 Device Device Information I/O Settings 	Network Settings Configure connection to the IP network
NRF Settings Network Settings	IP Address: 192 . 168 . 0 . 244
	Subnet Mask: 255 . 255 . 255 . 0
	Default Gateway: 192 . 168 . 0 . 1
	MAC Address: 5E:31:7D:C8:E3:57

In the right panel, specify the following settings:

- IP Address: The IP address assigned to your A200 gateway.
- Subnet Mask: The mask of the subnet to which the A200 gateway belongs.
- **Default Gateway**: The default gateway of the IP network.
- MAC Address: The default network address of the A200 gateway. Modify it for each A200 gateway to use a unique MAC address on the IP network.
- 5. (Optional) If the wireless connection to the radio is required, click **NRF Settings** in the left panel. In the right panel, specify the following NRF connection settings:
 - **Data transfer rate**: The data transfer rate for wireless communication. Values: 1 Mbps (default), 2 Mbps.
 - **Channel**: The radio channel for wireless communication. Range: 0 to 125. If multiple A200 gateways use NRF on the same spot, it is recommended that their radio channel numbers differ by 5 or more.
 - Power: The power of the ISM transceiver. Values: 20, 60, 250, 1000 μW.
 - Address: The group call ID on the NRF network. Only devices programmed with the same value can communicate on the NRF network. Default: E7:E7:E7:E7:E7:E7.
 - Width address: The number of sections in the NRF address (above) to be considered. Values: 3, 4, 5. Default: 3.
- Note: It is important to specify the same NRF connection settings in the configuration of the option board installed inside the radio.



6. (Optional) If you need to display the states of I/O pins in the TRBOnet software tools, click **I/O Settings** in the left panel.

TRBOnet Swift CPS		- 🗆 ×
File Device Tools Help	Read Write	neocom software
Swift A200 (USB RoIP Gateway) - USB Hid	×	÷
 Logic Device Information 	I/O Settings	•
I/O Settings Network Settings	Pin 1 Input 1 Active level Low Pullup Off Logic level 12 V	Debounce 300 ms
Network Settings		Debounce off
	Pin 2 Output 1 Active level Low Pullup +5 V Default level Low	Debounce 100 ms Debounce 200 ms
		Debounce 300 ms
	Pin 3 Unassigned 🔹	Debounce 500 ms
	Information	Debounce 700 ms Debounce 900 ms
	UART TX Fin 1 Fin 3 Fin 7 +12v UART TX Fin 1 Fin 3 Fin 7 +12v UART FX Fin 2 Fin 4 Fin 6 Fin 8 GM	
Connection: USB		

In the right panel, configure the I/O pins of the A200 gateway that are connected to external hardware. For each connected I/O pin, expand the menu, and select the logical pin in TRBOnet:

- For input pins, choose "Input" with the index 1 through 4.
- For output pins, choose "Output" with the index 5 through 10.

Specify the active level of the signal and other I/O pin settings.

Note: For TRBOnet software to display the states of the A200 gateway pins, configure TRBOnet software as described in section <u>4 TRBOnet Configuration</u> (page 23).

If a physical pin is not connected, leave it unassigned.

7. To save the configuration on your A200 gateway, click the **Write** button or open the **Device** menu and click **Write**.

3.1.2 Installing the Option Board

The delivery kit includes an option board that you need to install into a 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.



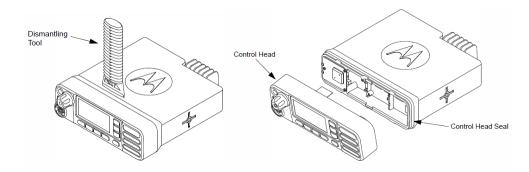


Figure 1: Removing the control head

- 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 it contacts face the option board. Secure the connector latch to the flex cable.

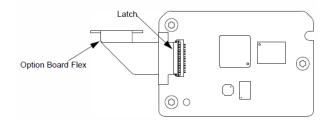


Figure 2: Connecting the flex cable to the option board

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

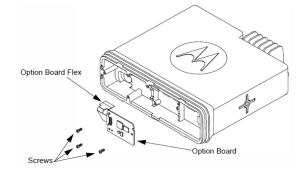


Figure 3: Connecting the option board to the main board of the radio

- 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, reseat the seal, and reassemble the control head.

3.1.3 Configuring the Radio

After you have installed the option board into your MOTOTRBO radio, configure the radio using the MOTOTRBO CPS software.

To configure the radio:

- 1. Power off the radio. Connect the programming cable to the radio and to a USB port of your computer. Power up the radio.
- 2. Launch the MOTOTRBO CPS software on your computer.
- 3. Open the configuration settings of your radio by clicking **Read** on the **Device** menu.
- In the Set Categories pane, select General > Accessories.
 In the right pane, from the Cable Type drop-down list, select Motorola Solutions.

File Device Licenses Tools Help) H H HH → H → H → H Write Cover Clove Equence Updelte Regulare Activate	×
Set Categories	General Bluetooth GPIC Physical Pins	
General Welcome Bitmap Language Packs General Settings Accessories Accessories Converse Buttons	Volume Control 2 Analog Accessory Mc Gan (8) 7 Digital Accessory Mc Gan (8) 8 Debource Duration (m) 8 0	
Control Buttons Text Messages Telemetry Menu	Cable Type Motorula Solutions Cable Type Motorula Solutions Analog Mic Gain (dB) -10 Digital Mic Gain (dB) -4	
Validation Results Warning Messages Sear Ready	ch Results Help	Serial Number: 87115HF956

In the Set Categories pane, select General > Network.
 In the right pane, from the Forward to PC drop-down list, select Via USB.

File Device Licenses Tools Help		_	
Dpen Save Read Writ			
DP4801e + Network		-	×
Set Categories #	General Radio Network Services Control Station IP	Site Connect Bluetooth	
Configuration	Bluetooth Serial Port Profile Data Routing USB HID Data Routi	ing WAVE 5000 WAVE OnCloud	
☑ Device Information ▼			*
🗋 Welcome Bitmap	CAI Network 12		
Language Packs	CAI Group Network 225	5	
General Settings Accessories	Protected Mode Control Station		
Control Buttons	Max TX PDU Size (bytes) 750		
Text Messages	Telemetry UDP Port 4008		
Telemetry	Forward to PC Via USB		
Menu Security	⊙ Services		
Network 🕸	ARS Radio ID 64250		-
Wi-Fi Network	ARS IP 13.0.250.250		
<	ARS UDP Port 4005	2	¥
Validation Results Warning Messages Search Result	Help		
Ready		Serial Number: 871TSF	1F956

 In the left pane, expand the Channels section.
 For all channels on which the radio should work with the A200 gateway via the ST002 option board, select Option Board in the right pane.



File Device Licenses Tools Help		
Copen Save Read Write	료료 —=ਜ਼ਜ਼ # 수료 ☆ Clone Express Update Register	★ ਜ਼ Activate
DP4801e + Zone + Zone1 + Zone Items + Chann	el1*	×
Set Categories 🔍	General R	(/TX
Configuration* Configuration* Concent Concent Systems Concert Decoder Concets Concets	Enhanced Okl55 Window Joe 8 Prinary / III Prinary / IIII Prinary / III Prinary / IIII Prinary / IIIII Prinary / IIIIII Prinary / IIIII Prinary / III	n
	Per-Site RSSI Threshold (dBm) -108	*
Validation Results Warning Messages Search Results He	+lo	
		6 1 1 N 1 674701/0000

- 7. Save the updated settings to the radio by clicking **Write** on the **Device** menu.
- 8. Close the application and disconnect the radio from the computer.

3.1.4 Configuring the Option Board

After you have installed the option board into a MOTOTRBO radio, update the firmware of the option board to the latest version. If the wireless connection between the A200 gateway and the radio is required, configure the NRF settings of the option board.

To configure the option board:

- 1. Power off the radio. Connect the programming cable to the radio and to a USB port of your computer. Power up the radio.
- 2. Launch TRBOnet Swift CPS on your computer. In the main window, select **USB** as the programming interface (at the bottom left of the window).
- 3. On the **Device** menu, click **Update Firmware**.
- 4. In the **Update Firmware** window, point the option board connected through USB. Expand the **Update to** drop-down menu and select the latest firmware version. Click **Update**.
- (Optional) If the wireless connection with the A200 gateway is used, click NRF Settings in the left panel. Specify the NRF connection settings of the option board exactly as programmed in the configuration of the A200 gateway. For details, refer to section <u>3.1.1 Configuring the A200</u> (page 10).

3.1.5 Connecting the A200 Gateway to the Radio

When all configuration settings are made, connect your A200 gateway to the radio and to the local IP network. The LAN port is located on the rear panel of the A200 gateway.

Wireless (NRF) connection with the radio

If the radio and the A200 gateway have identical NRF settings (data transfer rate and channel), the wireless connection is established automatically as soon as both devices are powered up.

Wired (USB) connection with the radio

For the wired connection between the radio and A200 gateway, use the USB cable supplied with the A200 gateway.



Note: Before connecting the A200 gateway to a MOTOTRBO two-way radio with the USB cable, power off the radio and make sure that the A200 gateway is disconnected from the power supply.



Connect the cable to the USB connector on the rear panel of the A200 gateway and to the rear accessory connector of the radio.

Note: Once you have reconfigured the radio and/or option board, disconnect the programming cable from the radio and reboot by powering off and on both the A200 gateway and the radio.



To prepare TRBOnet Swift A200 for operation in the non-MOTOTRBO mode, follow the steps in the table below.

#	Step	Refer to:
1	Assemble the service cable.	<u>3.2.1 Assembling the Service Cable</u> (page 18)
2	Update the firmware and configure your A200 gateway.	3.2.2 Configuring the A200 (page 19)
3	Update the configuration settings of the radio.	3.2.3 Configuring the Radio (page 21)
4	Connect your A200 gateway to the radio and to the LAN.	<u>3.2.4 Connecting the Radio</u> (page 21)
5	Connect your A200 gateway to the power supply.	<u>3.3 Power Supply</u> (page 22)
6	Power up the connected radio.	

3.2.1 Assembling the Service Cable

The A200 gateway and a non-MOTOTRBO radio are connected using the service cable and the audio cable. To assemble the service cable, use a Micro-Fit connector plug, a wire kit, and a radio connector plug.

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

To assemble the service cable:

1. Connect the wires to the Micro-Fit plug and to the radio connector plug to implement the following required links:

Function	Micro-Fit plug	Radio connector plug
PTT	Any input pin (Pin 1 – Pin 7)	Use pins as advised in the
CSQ Detect	Any output pin (Pin 1 – Pin 6, Pin 8)	documentation of the radio.
Ground	GND pin (black wire)	

Note: The Micro-Fit connector pins are described in section 2.7 Connectors (page 8).

2. Connect the wires of the audio cable (provided in the delivery kit) to the radio connector plug. Implement the following required links:

Audio cable (wires)	Radio connector pin (function)
Audio In	RX AUDIO
Audio Out	EXT MIC AUDIO (TX AUDIO)
Ground	AUDIO GND



- 3. (Optional) Add wires between the Micro-Fit plug and the radio connector plug to implement additional features. Consult the documentation of your radio to learn about supported GPIO pin functions.
- 4. (Optional) Connect external hardware (sensors, controllers) to the I/O pins of the Micro-Fit plug.

For examples, see Appendix A: Service Cable Examples.

3.2.2 Configuring the A200 Gateway

To configure the A200 gateway:

1. Launch TRBOnet Swift CPS. In the main window, select **USB** as an interface for device programming at the bottom left of the window. Connect the programming cable to the micro-USB port of Swift A200 and to a USB port of your computer.

If you prefer to program your A200 gateway using the LAN connection, select LAN as the programming interface and connect the A200 gateway to the LAN and to the power supply.

- 2. (Recommended) Update the firmware of your A200 gateway:
 - a. Click **Options** on the **Tools** menu. In the right pane, make sure that the **Allow changing device firmware type** option is switched on.

Firm	ware update USB				×
	Device	Interface	Firmware	Mode	Update to
•	Swift A200	USB Hid	03.04.00	Analog RolP Gateway A Analog RolP Gateway NRF RolP Gateway USB RolP Gateway	03.04.00 -
					Update Cancel

- b. On the **Device** menu, click **Update Firmware**. If you use the LAN connection for programming, specify the IP address of your A200 gateway and click **Connect**.
- c. In the **Firmware update** window, select your A200 gateway. Open the **Mode** menu and click "Analog RoIP Gateway".
- d. On the **Update to** menu, select the latest firmware version. Click **Update**.
- 3. To open the configuration of your A200 gateway, click the **Read** button, or open the **Device** menu and click **Read**.
 - If you use the LAN connection, the **Read LAN** window appears. Specify the IP address of your A200 gateway and click **Read**.
 - If you use the USB connection and the Select device window appears, point your device.

The configuration settings appear on a separate tab.

4. Click **Network Settings** in the left panel. Specify the following settings:



- IP Address: The IP address assigned to your A200 gateway.
- Subnet Mask: The mask of the subnet to which the A200 gateway belongs.
- **Default Gateway**: The default gateway of the IP network.
- MAC Address: The MAC address of your A200 gateway.
- 5. Click **I/O Settings** in the left panel. In the right panel, configure the I/O connector pins:
 - For I/O pins connected to the service cable, specify the function (PTT Output, CSQ Input, other), the active level, and other I/O pin settings.
- Note: The coupled pins of the radio connector must be configured to use the matching function and active level. For details, refer to section <u>3.2.3</u> <u>Configuring the Radio</u> (page 21).
 - If any I/O pins are connected by external hardware, configure the A200 gateway to send the states of these pins to TRBOnet software. For each I/O pin connected by external hardware, expand the menu and select the logical pin in TRBOnet:
 - For input pins, choose "Input" with the index 1 through 4.
 - For output pins, choose "Output" with the index 5 through 10.

Specify the active level of the signal and other I/O pin settings.

Notes: For TRBOnet software to display the pin states received from the A200 gateway, configure TRBOnet software as described in section <u>4 TRBOnet Configuration</u> (page 23).

RBOnet Swift CPS		Read Write		neocom softwar
Swift A200 (Analog RoIP Gateway) - USE	B Hid ×			
 Logic Device Information Audio Settings 	Pin 5	Output PTT Active level Lo	w Pullup +5 V	•
I/O Settings Network Settings	Pin 6	Input CSQ Active level Lo	v • Pullup +5 V	▼ Debounce 300 ms ▼
	Pin 7	Output Radio Stat 🔻 Active level Hi	gh 🔻 Pullup Off	▼ Default level High ▼
	Pin 8	Input Radio State 🔻 Active level Hi	gh 🔹 Logic level 12 V	▼ Debounce 300 ms ▼
	Informa	ition		

Note: For the VOX (voice operated transmission) mode to work, the **Input CSQ** value must not be selected for any pin.

- 6. Click **Audio Settings** in the left panel. In the right panel, do the following:
 - Use the sliders to adjust the level of the input (incoming to A200 gateway) and output (outgoing from A200 gateway) audio signals in the range of -42Db to 20 Db.
 - To raise the level of the input audio signal, adjust the amplifier by selecting the appropriate gain factor from the drop-down list (6, 12, 24).



 To lower the level of the input signal from a non-MOTOTRBO radio, consider setting Input for Audio to IN2.

File	Device	Tools	{ ? Help	Read Write		neocom software
Samp	e_A200 (Anal	og RoIP (Gateway) ×			=
⊖ De	vice Device infor	mation		Audio settings		
	Audio settin	-		Level of the input audio signal	•	U Db
	I/O Settings Network set Service			Level of the output audio signal Level of amplification of the input audio signal Input for Audio		

7. To save the configuration to your A200 gateway, click the **Write** button, or open the **Device** menu and click **Write**.

3.2.3 Configuring the Radio

After you have assembled the service cable, configure your radio to use the radio connector pins that are coupled with the pins of the A200 gateway. Use the radio programming software provided by the manufacturer of the radio.

Program the GPIO pins of your radio as described in the documentation supplied by the manufacturer of the radio.

3.2.4 Connecting the Radio

When the service cable is finished and pins are configured on the radio and on the A200 gateway accordingly, connect your A200 gateway to the radio and to external hardware (if necessary).

Note: Before connecting the A200 gateway, make sure that the radio is powered off and that the A200 gateway and all external hardware (if any to be connected) is disconnected from the power supply.

To connect the A200 gateway to the radio and to external hardware:

- 1. Connect the Micro-Fit plug of the service cable to the Micro-Fit connector on the rear panel of the A200 gateway.
- 2. Connect the audio cable to the audio input and audio output on the rear panel of the A200 gateway.
- 3. Connect the other end of the service cable to the service jack of the radio.
- 4. If required, connect the wires of the service cable to external hardware.



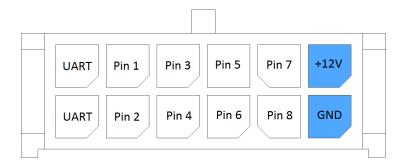
When all connections are done, connect the A200 gateway and external hardware to the power supply. Then power up the radio.

3.3 Power Supply

This section describes how to connect the A200 gateway to the source of +12V DC (recommended) or to an AC power supply.

3.3.1 DC Power Supply

To power the A200 gateway from a DC power source, use the Micro-Fit connector supplied in the delivery kit. The Micro-Fit plug and the wires are connected as follows: the red wire links contact 2 (+12V) and the black wire links contact 1 (GND).



To connect your A200 gateway to a DC power source:

- 1. Insert the Micro-Fit plug into the I/O jack on the rear panel of the A200 gateway.
- 2. Connect the other end of the red wire to terminal (+) and the black wire to terminal (-) of a DC power unit.

3.3.2 AC Power Supply

The AC power cable is not supplied with the A200 gateway. To power the A200 gateway from an external AC power source, use any power cable with the 5.5mm x 2.1 mm DC plug and the AC/DC adaptor with the DC output of +12V (positive polarity) and the input AC voltage recommended for your region. Find all information on the label of the power adaptor.

Note: Before connecting the A200 gateway to an AC power supply, test the power adaptor to make sure it has the proper voltage and polarity. The use of a power adapter with reverse polarity or higher voltage may cause damage to the A200 gateway.

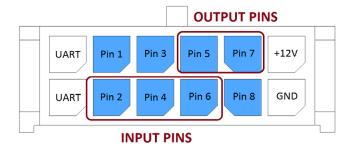
To connect your A200 gateway to an AC power source:

- 1. Connect the power cable through the AC/DC adaptor to the AC power inlet located on the rear panel of your A200 gateway.
- 2. Plug the power cable into an AC power source.



4 TRBOnet Configuration

This section describes how to configure TRBOnet software so that the operator could see and manage the physical I/O pins of the A200 gateway. In the example below, the A200 gateway is connected to a MOTOTRBO radio through USB and has three input pins and two output pins connected to external hardware (see the picture below).



In the A200 gateway configuration, the physical I/O pins are mapped to the logical pins of TRBOnet (see the screenshot below).

TRBOnet Swift CPS					-	- 🗆 ×
File Device Tools Help	R	tead Write			8	neocom software
Swift A200 (USB RoIP Gateway) - LAN (1	0.10.110.191) ×					=
 Logic Device Information 	I/O Settin	ıgs				A
I/O Settings Network Settings	Pin 1	Unassigned 🔹				
	Pin 2	Input 2 🔹	Active level Low	▼ Pullup +5 V	▼ Debounce 300 ms	•
	Pin 3	Unassigned 🔹				
	Pin 4	Input 1 🔹	Active level Low	▼ Pullup +5 V	▼ Debounce 300 ms	•
	Pin 5	Output 5 🔹	Active level Low	▼ Pullup Off	 Default level High 	•
	Pin 6	Input 3 🔹	Active level Low	▼ Pullup +5 V	▼ Debounce 300 ms	•
	Pin 7	Output 6 🔹	Active level Low	▼ Pullup Off	▼ Default level High	•
	Pin 8	Unassigned 🔻				\$
Connection: LAN	****************					

To complete the I/O pin configuration in TRBOnet, read the following sections:

- <u>4.1 TRBOnet Enterprise/PLUS Configuration</u> (page 23)
- <u>4.2 TRBOnet Watch Configuration</u> (page 27)

4.1 TRBOnet Enterprise/PLUS Configuration

I/O pins of the A200 gateway are supported in TRBOnet Enterprise (PLUS) 4.8.1.1008 and later versions. In this example, the A200 gateway is registered as a radio system in the TRBOnet Enterprise (PLUS) Server configuration (see the screenshot below).



Configuration	Swift A200 (digital)				
💣 Service					
🕤 Network	Name:	Swift A200 (digital)			
🛊 Redundancy	Radio ID:	64250	÷		
Database	IP Address:	10, 10, 110, 191	-		
Reports	IP Address:		-		
Service Management	Port:	8002	÷	Test	
X Advanced Settings	TRBOnet Local Port:	0	÷		
Geocoding Servers	Mode:	Single Control Stati	ion		
🔚 Radio Systems	moue:	Single Control Stat			
Services	System Identifier:				
Swift A200 (digital)	Use the radio for P)	Data only (GPS Rever	rt or Dat	ta Devert)	
			COI DOI	ancevery	
🗰 🕏 Redundancy	VoIP port:	4000	÷		
🖵 PTT over Cellular	Audio Format:	PCM 8 kHz 16 bit			*
🔂 Remote Agents					
Friendly Servers					
🔞 Telephony					
🖞 Data Sources					
🔀 Email					
SMS Notifications					
Push Notifications					
📮 License					
Set Defaults		Apply		ОК	Cancel

Launch the TRBOnet Dispatch Console and click **Voice Dispatch** in the left pane. If registered correctly, your A200 gateway appears on the **Radio Interface** tab with the green ("connected") icon (see the screenshot below).

<u>F</u> ile <u>V</u> iew <u>M</u> ap <u>T</u> ools <u>H</u> elp		
Voice Dispatch	Radio Interface	
🕼 🗄 🗽 🗞 🛛 🏹 💱	Radio Interface Recent Calls/Events	
 Online Dispatchers (1) 	Intercom	🛛 🧁 Swift A200 (digital) 🛛 🗐 🕷 🙆
Administrator	PTT All Call	PTT Channel 1 All Call 🔹
	Session:	Session:
	Free channel	Free channel
Voice Dispatch	Sender:	Sender:
Location Tracking	RX / TX	
🚰 Job Ticketing		

To configure pins:

- 1. In the TRBOnet Dispatch console, click **Administration** and **Radio Systems** in the left pane (see screenshot below, step 1 and 2).
- 2. In the right pane, the list of the registered radio systems appears. Double-click the radio system associated with your A200 gateway (see screenshot below, step 3).
- 3. In the popup window, click the **Channels** tab. Double-click the channel (see screenshot below, step 4), or select it and click **Properties**. Another popup window appears.
- 4. In the second popup window, click the **Master Control** tab and configure pins.



Administration		Radio Systems							
Server	^		•0		Swift A200 (digita	l) 🜒	•0		
		Properties							
Radio Systems		System type	System	ID	Caption				
🐺 Tasks		Intercom			Intercom			_ 2	
Virtual Modbus Devices		Single Control Station			Swift A200 (digital)		J	
Event/Alarm Management									
Swift Event Profiles	¥	S	wift A20)0 (d	igital)		×		
< >	_	Description Channels	-		Swi	ft A200	(digita	al)	×
Voice Dispatch		😭 Properties 🏟 Co	Desc	cription	n Radio channel	s Talk gr	oups M	aster Control	Volume
Location Tracking		Name	C	ontrol	states:				
		Swift A200 (digital)	P	IN	Name	Value		Status	
🙀 Job Ticketing				0	PINO	ON	ON	C Alarm	
300 licketing						OFF	OFF	Alarm	
1				1	Low oil pressure	ON	ON	Alarm	
Route Management						OFF	OFF	Alarm	_
N				2	Low tire pressure		OFF	Alarm	
RFID Tracker				_		ON	ON	Alarm	
				3	Low fuel	OFF	OFF	Alarm	
Text Messages				omman	nds:				
Voice Recording				IN	Name	Value ON		Value OFF	
		Channel for private and			Heating	ON		OFF	
Reports				6	Block engine	ON		OFF	
D Keports				7	PIN7	ON		OFF	
Event Viewer				8	PIN8	ON		OFF	-
Badio Allocation								ОК	Cancel
Administration 1		H4 44 4 Record 2 of 2 > >> >>	н а						

- Under Control states, select the logical input pins that you have mapped in the configuration of your A200 gateway. Do not select pin 0. For each selected pin:
 - Double-click the value in the **Name** field and enter a descriptive pin name.
 - In the Value field, you see the pin states (ON and OFF) and their displayed values (also ON and OFF by default). If necessary, double-click the value in the second column and enter a custom name of the pin state.
 - In the Status field, select Alarm for the TRBOnet Dispatch Console operator to see an alarm box when the given pin state is detected.
- Under **Commands**, select the logical output pins that you mapped to the physical pins of your A200 gateway. For each selected pin, specify a descriptive name. In the **Value ON** and **Value OFF** fields, double-click the value and enter a custom name of the command.
- 5. Click **OK** and again **OK**.

To see the configured pins, click **Voice Dispatch** in the left pane. Click the green icon in the PTT box of your A200 gateway (see the screenshot below).



Radio Interfac	e
Radio Interface	Recent Calls/Events
2 Swift A	200 (digital) 💿 📧 🖉
	Channel 1
PTT	All Call 🔻
	Session: Free channel
	Sender:
RX/TX -]
	Radio Interface

The pin states appear in a popup window:

Со	ntrol IO State		×
0 (digital)		
43 ℃			
No data			
No data			
OFF			
OFF			
OFF			
<u>ON</u>	<u>OFF</u>		
<u>ON</u>	<u>OFF</u>		
		Close	
	0 (digital 43 °C No data No data OFF OFF OFF OFF	0 (digital) 43 °C No data No data OFF OFF OFF OFF OFF OFF	0 (digital) 43 °C No data No data OFF OFF OFF OFF ON OFF ON OFF

The temperature is measured inside the unit and transmitted to TRBOnet by default, no additional configuration is required. The coolers are missing ("No data").

Input and output pins appear with their custom names. The input pin states are readonly. The operator can change the output pin states by clicking a respective command next to the pin name (**ON** and **OFF** under **Outputs** in the screenshot above). Or, the operator can right-click the green icon in the PTT box of the A200 gateway and change the output pin states from the popup menu (see the screenshot below).



Voice Dispatch	Radio Interface
🗟: 🗄 🗄 🖧 🏹 💱 🖌	Radio Interface Recent Calls/Events
Administrator	
	Block engine ON
Voice Dispatch	All Call OFF
Location Tracking	Session: Free channel
🔡 Job Ticketing	Sender:
💓 Route Management	
RFID Tracker	RX / TX

4.2 TRBOnet Watch Configuration

I/O pins of the A200 gateway are supported in TRBOnet Watch 2.5 and later versions. In this example, the A200 gateway is registered as a radio system in the TRBOnet Watch server configuration (see the screenshot below).

Configuration	TRBOnet Swift Agent A200	(digital)	Version: 3.2.0.747
Service Database Maintenance Network Advanced settings MOTOTRBO	System Name: IP Address: Port:	TRBOnet Swift Agent A20 10.10.110.191 \$ 8002	0 (digital) Test
TRBOnet Swift Agent A200 (digital) TRBOnet Plus/Enterprise Strange Strange	VoIP port:	4000 ‡	Pin value:
	 PIN 0: PIN 1: PIN 2: 	PIN0 Low oil pressure Low tire pressure	Low Level Low Level Low Level
	🔽 PIN 3:	Low fuel PIN4	Low Level
Set Defaults		Apply	OK Cancel

Enable the Input Pins feature and configure pins as follows:

- Select the logical input pins (PIN 1 through PIN 4) that you have mapped in the configuration of your A200 gateway. Leave PIN 0 not selected.
- If needed, enter a descriptive name for each input pin. Otherwise, the console will display the default pin names (PIN1, PIN2, and so on).
- For each pin, expand the **Pin value** menu and select the active level exactly as specified in the A200 gateway configuration.



After you apply the changes, launch the TRBOnet Watch console and click **Live Monitor** in the left pane. You can see the states of the connected A200 gateway pins on the **Diagnostics** tab and on the **Physical GPIO Pins** tab.

	Topology	Chan	nels 👰	Diagnostic	s 🛄	Physica	GPIO Pins							
Ro	(P Gateway	/S												
Selec	t an item for det	ailed in	formation											
	IP Address	Port	Name			Mode	Link to Radio	Radio Status	Radio ID	Model Number	Channel	Channel Type	Zone	Temperature °C
	10.10.110.191	8002	TRBOnet	Swift A200	(digital)	Digital	Option Board	Connected	64250	M28JNN9JA2AN	1	Digital	2	47
0	192.168.0.100	8002	TRBOnet	Swift A001	(digital)	N/A	None	Not connected	0		0	N/A	0	
<														
Cat	teway: TRE	0000	t Cwift	A 200 (d	ligital)	(643	50)							
	5how Channels	One	Switt	H200 (0	ilgital)	(042	.50)							
	Show Channels													
R	emote Contr	ol	5	State										
cł	annel:		-	 Inpu 	ıt Pin 0	• Inp	ut Pin 1 🔍 In	put Pin 2 🔍 I	nput Pin 3	Output Pin	5 Out	put Pin 6		
ъ	Power:		-			T								
St	ate:		-											
	Reset	W	Irite	[Input F	Pin 1 OFF] Diagn	ostics: Low oil	pressure						

The **State** panel shows all pins (input and output) that are connected to external hardware.

- The green icon indicates the active level on the pin.
- The red icon indicates an inactive pin.

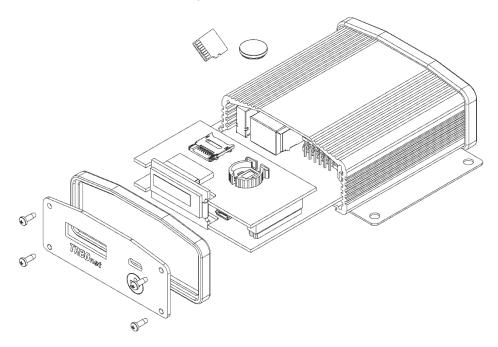
Point the mouse cursor at the pin in the **State** panel to see the detailed information about the pin (see the screenshot above).



5 Maintenance

5.1 Built-in Clock Battery Replacement

If the flashing **Low battery charge** icon appears on the display of the unit, you need to replace the built-in clock battery.



To replace the battery:

- 1. Disconnect the unit from the power supply. Disconnect all connectors on the rear panel.
- 2. Remove the screws and pull the front panel from the unit. Remove the seal.
- 3. Press the jacks on the rear panel to pull the board out of the unit.
- 4. Remove the old battery from the battery slot (Dispose of it according to local laws).
- 5. Insert a new CR1220 3V lithium coin battery so it matches the polarity: (+) to (+) and (-) to (-).
- 6. Insert the board inside the unit, assemble the seal and the front panel on the unit. Tighten the screws to secure the front panel to the unit.
- Note: Use the recommended battery type. Batteries that look similar may differ in voltage.



5.2 Memory Card Replacement

The A200 gateway is equipped with a 4 Gb microSD memory card. If necessary, you can replace the memory card as described below.

To replace the memory card:

- 1. Disconnect the unit from the power supply. Disconnect all connectors on the rear panel.
- 2. Remove the screws and pull the front panel from the unit. Remove the seal.
- 3. Press the jacks on the rear panel to pull the board out of the unit.
- 4. Unlock the microSD card holder by pulling it in the front panel's direction.
- 5. Lift the card holder and remove the microSD card.
- 6. Insert a replacement microSD card. Ensure that the golden contacts of the memory card face the contacts of the microSD card holder.
- 7. Put down and lock the card holder, pulling it in the rear panel's direction.
- 8. Insert the board inside the unit, assemble the seal and the front panel. Tighten the screws to secure the front panel to the unit.

Note: The maximum supported memory size of a microSD card is 32 Gb.

6 Important Note

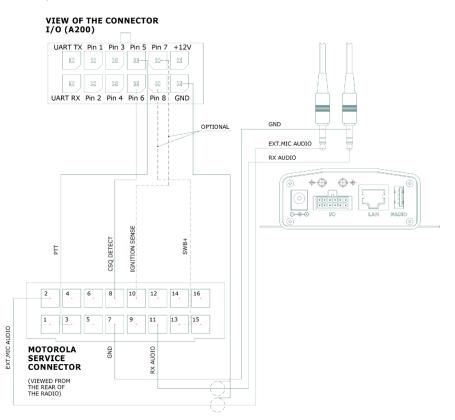
The manufacturer reserves the right to make changes and/or improvements in designs and dimensions without notice and without incurring obligation.



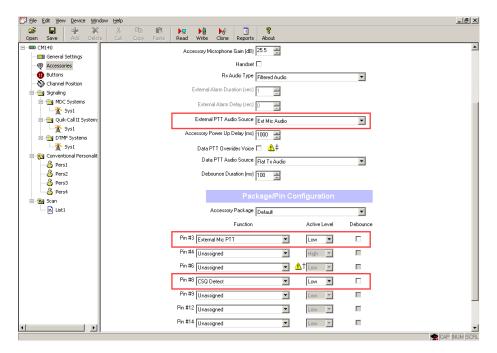
Appendix A: Service Cable Examples

A.1 Motorola CM 140 Two-Way Radio

The following diagram shows how to assemble the service cable for a Motorola CM140 two-way radio.



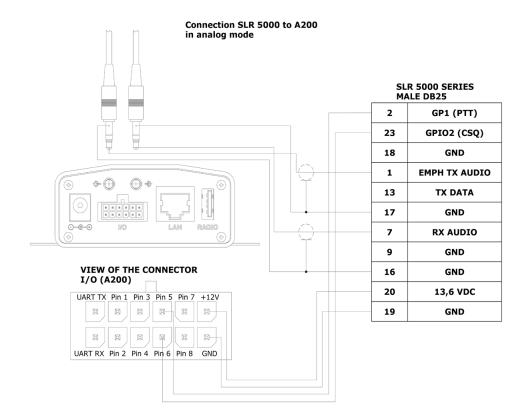
The following screenshot shows how to appropriately configure an CM140 radio in MOTOTRBO CPS:





A.2 Motorola SLR 5500 Repeater

The following diagram shows how to assemble the service cable for a Motorola SLR 5500 repeater:



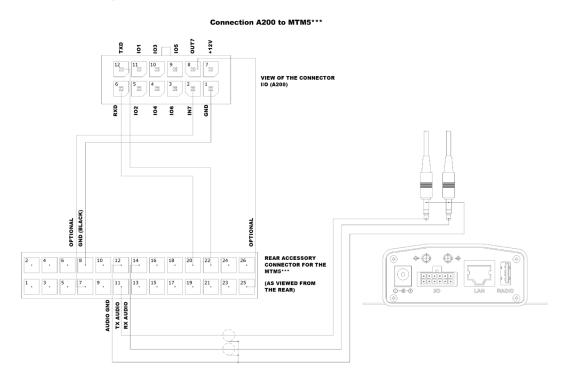
The following screenshot shows how to appropriately configure an SLR 5500 repeater in MOTOTRBO CPS:

ite Clone		ixpress Update			vate		
			General	GPIO Physical	Pins		
🕟 General							
		Analog Accessor	y Emphasis	De & Pre		•	
			Audio Type	Filtered Squ	elch		
		TX Au	dio Priority	0			
		Repeater Au	dio Priority	0			
		Disable F	lepeat Path				
		Debounce Du	ration (ms)	100			
GPIO Phy	sical Pins						
		Feature	Acti	ve Level	Debounce		
l [GPIO1	External PTT	Low		✓		
	GPIO2	Unassigned 🔽	Low				
	GPIO3	Unassigned	Low				
<u>ا</u> ا	GPIO4	CSQ Detect	Low				
· ·	GPIO5	Unassigned	Low				
	GPIO6	Unassigned	Low				
	GPIO7	Unassigned 🔽	Low				
	GPIO8	Unassigned	Low				
	⊙ General	General GPIO Physical Pins GPIO1 GPIO2 GPIO3 GPIO4 GPIO5 GPIO6 GPIO7	 ♦ General Analog Accessor TX Au Repeater Au Disable R Debounce Du ♦ GPIO Physical Pins Feature GPIO1 External PTT GPIO2 Unassigned GPIO4 CSQ Detect GPIO5 Unassigned GPIO6 Unassigned GPIO7 Unassigned 	General General Analog Accessory Emphasis Audio Type TX Audio Priority Repeater Audio Priority Disable Repeat Path Debounce Duration (ms) GPIO Physical Pins Feature Acti GPIO1 External PTT Low GPIO2 Unassigned Low GPIO3 Unassigned Low GPIO5 Unassigned Low GPIO6 Unassigned Low GPIO7 Unassign	General General Analog Accessory Emphasis De & Pre Audio Type Audio Type Filtered Squ TX Audio Priority TX Audio Priority 0 Repeater Audio Priority 0 Disable Repeat Path 0 Debounce Duration (ms) 100 Image: Second Stress 100 GPIO Physical Pins Eesture Active Level GPIO1 External PTT Low GPIO2 Unassigned Unassigned Low GPIO3 Unassigned GPIO4 CSQ Detect GPIO5 Unassigned GPIO7 Unassigned GPIO7 Low	General GPIO Physical Pins 	General GPIO Physical Pins General Analog Accessory Emphasis De & Pre Audio Type Filtered Squelch TX Audio Priority Debounce Duration (ms) 100 GPIO Physical Pins Feature Active Level Debounce GPIO2 Unassigned Low GPIO4 CSQ Detect Low GPIO5 Unassigned Low GPIO6 Unassigned Low GPIO7 G



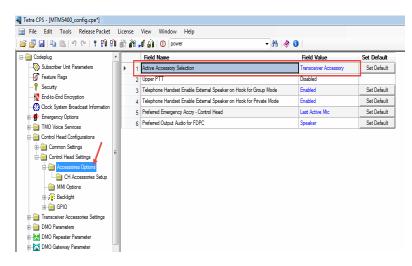
A.3 Tetra MTM5400/5500 Control Radio

The following diagram shows how to assemble the service cable for a Tetra MTM5400/5500 control radio:



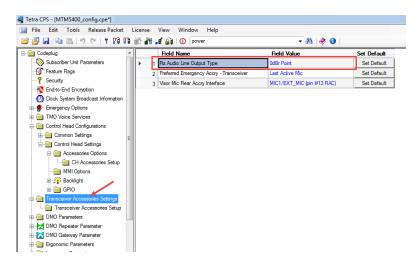
The following screenshots show how to appropriately configure an MTM5400/5500 control radio in Tetra CPS:

Control Head Configurations>Control Head Settings>Accessories Options

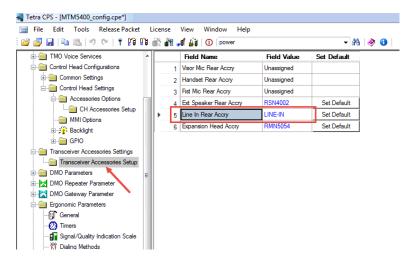




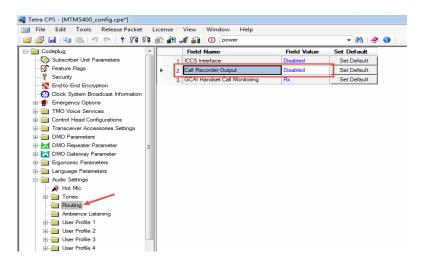
Transceiver Accessories Settings



Transceiver Accessories Settings > Transceiver Accessories Setup



Audio Settings > Routing





Ergonomic Parameters > Default Setting

File Edit Tools Release Packer	t L	icens	e	View Window Help		
। 🤊 🔛 🗈 🛍 🖉 🖓 🕈		1) 1	18	🦸 🔓 🕕 power		- 🏦 🛷 🚯
CH Accessories Setup	^		_	Field Name	Field Value	Set Default
MMI Options		•	1	Periodic Alerting		
			2	Periodic Alerting Period	5 min	Set Defaul
🗄 🛅 GPIO			3	Keypad Auto Lock		
Transceiver Accessories Settings			4	Keypad Lock on Start-Up		
Transceiver Accessories Setup			5	Keypad Tone		
iai DMO Parameters Iai≫ DMO Repeater Parameter			6	Keypad Autolock Time, sec	300	Set Defaul
DMO Gateway Parameter			7	Clear to Send Tone		
Ergonomic Parameters			8	All Tones		
General			9	Covert Mode		
- 😥 Timers			10	Talk Permit Tone		
Signal/Quality Indication Scale			11	TXI Activated		
Dialing Methods			12	Default TG	Group 10:NeoGroups:10:	Any Set Defaul
🖮 💼 Default Setting	=		13	Audio Profile	User Profile 1:General 1	Set Defaul
Image: Weight of the setting setti						
Display						
Screen Saver						
🛅 GPS						
BSI Security						