

OPERATING INSTRUCTIONS

Bridge

IOP904

© ATS Elektronik GmbH Manual Version 1.00 All information in this manual has been compiled after careful investigation, but cannot be considered to be assured as product property. ATS Elektronik GmbH is only liable in the scope defined in the sales and delivery terms. We appreciate any completion or suggestion.

ATS Elektronik GmbH is not liable for missed profits and customer's property disadvantages arising f.e. from failure of the product, from incorrect program function or data loss, either in case that the system combination chosen by the customer does not answer his requirements, or if intended results may not be achieved, provided that compelling legal regulations regarding liability in case of intention resp. coarse negligence do not counteract these liability limits.

We appreciate any completion or suggestion.

You are only allowed to pass on or copy this manual and to make use of its contents as well as of the software belonging to this product with written permission of ATS Elektronik GmbH. We reserve the right to make modifications serving for any technical improvement.

Copyright © 2014 ATS Elektronik GmbH, Wunstorf (Germany)

Operating instructions version 1.00 of December 1, 2014 Wunstorf, December 2014



ATS Elektronik GmbH Albert-Einstein-Straße 3 D-31515 Wunstorf, Germany Tel: +49 (0) 50 31 / 95 48 - 0 Info@ATSonline.de www.ATSonline.de

DIN EN ISO 9001 TÜV Nord CERT Reg.- Nr: 08/100/971872.

3

Contents

1 A	About these instructions	. 4		
1.1	Scope of delivery	. 4		
1.2	Intended use	. 5		
1.3	Warranty provisions	. 5		
1.4	Disposal	. 6		
2 IOP9047				
3 I	nstallation	10		
3.1	Programming of radio devices	10		
3.1.1 TETRA				
3.1.2	2 DMR	14		
3.2	Installing the radio devices	17		
3.3	IOP904 connections	17		
3.4	Layout	18		
4 Technical Specification 19				

NOTE

1 About these instructions

This manual describes the IOP904 bridge.

One distinctive feature of ATS products is their continued further development. Therefore, it might be possible that print documentation does not always reflect the most recent state.

Before you use the product, please read the manual carefully. Keep this manual for the entire useful life of the product for reference purposes.

NOTE This manual addresses trained service technicians and specialized radio traders. It is, therefore, assumed that programming skills and knowledge about how to install radio technology and its functions are given.

1.1 Scope of delivery

Scope of de-Before you start with the installation please make sure that yourliverydelivery is complete and free from damage:

- IOP904
- MOTOTRBO, TETRA DIN drawer release lock bracket
- this manual

ATS Elektronik GmbH reserves the right to change the scope of delivery without prior notice.

RequiredTo operate the device you require the following componentscomponentswhich are not included in the scope of delivery:

- TETRA mobile radio set MTM5400 R27.000.8536
- DMR mobile radio set DM4601 R02.30.01
- aerials suitable for the radio sets

1.2 Intended use

The IOP904 serves as a bridge between Motorola DMR and Motorola TETRA radio sets. The IOP904 is designed for indoor use only. The IOP904 is not suitable for use in the open air as well as in spaces with permanently high humidity, and underwater.

The IOP904 enables cross-network group paging. Individual calls are not possible.

1.3 Warranty provisions

If you purchased the device from ATS Elektronik GmbH directly, the statutory warranty provisions shall apply as well as the General Terms and Conditions of ATS Elektronik GmbH. The delivery date of ATS Elektronik GmbH shall govern the commencement of the warranty period. Any warranty claims shall lapse in case of

- operating or programming errors,
- defects caused by the customer,
- wilful damages,
- improper installation/removal.

If a warranty case occurs, please return the defective device together with a copy of the delivery note or invoice to ATS Elektronik. We will check whether a warranty claim is justified for the device. If your claim is rejected you will receive a cost estimate for repair or exchange. ATS Elektronik GmbH shall refrain from covering any costs arising from the failure to adhere to the warranty provisions. If you did not directly purchase the radio from ATS Elektronik, the respective warranty terms of your supplier shall apply.

1.4 Disposal



European Union (EU) Waste Electrical and Electronic Equipment Directive (WEEE):

Any product that is brought onto the market in EU member states must be marked with a crossed-out waste bin symbol (in individual cases the packaging may be marked). The WEEE Directive specifies that customers and end users in member states of the European Union (EU) may not dispose of electronic or electrical equipment and electronic or electrical accessories in the household waste. Within the EU, please contact your local representative or the customer service department of your supplier. They can give you information on the disposal or collection of waste equipment.

2 **IOP904**

ments

The IOP904 is a bridge which connects a TETRA radio set and a DMR radio set enabling voice communication (group paging) across the networks.



Fig. 2-1 IOP904 system sketch

A TETRA and DMR radio set each are installed in the IOP904. Each radio set receives an own aerial.

Display ele-At the front of the IOP904 there are two LEDs and a push button.



Fig. 2-2 Front view with display elements

- Green LED at the top: blinking: system is booting / lights up = operative / off = inoperative
- Red LED in the middle: lights up = error, e.g. due to a switched off radio set, an error of internal PC or a radio is not in service / off = system in operation.
- Blue push button: blinking = bridge active at the moment / lights up = bridge function activated / off = bridge function deactivated

At the back there are two LEDs each for the power supplies, the left-hand LEDs belong to the power supply of the TETRA radio set, the right-hand LEDs belong to the power supply of the DMR radio set.



Fig. 2-3 Back view with display elements

- **Green LED**: on = mains supply / off = no mains supply
- **Red LED**: on = system uses the optional external battery / off = no external battery

IOP904 opera-
tionPre-condition: The relevant radio set installed in the IOP904 is in
the same group as the end devices.

WARNING Connect first the power supply of the DMR radio device and thereafter the power supply of the TETRA radio device, or connect both power supplies simultaneously.

> If the radio sets do not switch on automatically when connecting to power supply, they have to be switched on manually. After complete start-up of the system, the transfer function is ready for use (blue push button lights up).

	 Now all group calls received by the group set up in the IOP904 radio will automatically be sent via the group set up in the other IOP904 radio. To exit the bridge function press the blue push button again (the blue push button is off). Activate the bridge function with the blue push button (the blue push button illuminates).
Operation via	The IOP904 can be controlled by SDS from TETRA end devices.
TETRA	 To query the status of the bridge function, send the SDS text BRIDGE? to the IOP904 TETRA radio. The TETRA radio returns an SDS with the status infor- mation:
	Bridge active yes/no; Tetra talkgroup;
	 2. To activate the bridge function send the SDS text Bridge active yes to the IOP904 TETRA radio. The TETRA radio returns an SDS with the status information:
	Bridge active; Tetra talkgroup;
	MOTOTRBO channel 3. To deactivate the bridge function, send the SDS text
	Bridge active no to the IOP904 TETRA radio. The TETRA radio returns an SDS with the status infor- mation:
	Bridge not active; Tetra talkgroup; MOTOTRBO channel

NOTE

Installation 3

When programming the radio sets to be used with the IOP904 some issues need to be considered. The radio devices must be programmed before their installation.

Programming of radio devices 3.1

Special programming parameters need to be set before installing

This manual addresses trained service technicians and specialized radio traders. It is, therefore, assumed that programming skills and knowledge about how to install radio technology and its functions are given.

Unless otherwise provided for in the following, please program the basic data such as output, channel, etc. in the usual way.

the radio devices in the bridge.

3.1.1 TETRA

When programming the TETRA radio device please set the following parameters:

- Under Data Services SDS Remote Control AT commands activate the options:
 - ETSI Group Setup Format
 - ETSI AT SDS/Status Format
 - Extended ETSI Addressing



Fig. 3-1 TETRA – AT Commands



• In the Transceiver Accessories Settings menu set the RX Audio Line Output Type to +14dBr Point.

Fig. 3-2 TETRA – Transceiver Accessories Settings

 In the Transceiver Accessories Settings – Transceiver Accessories Setup menu set the Line In Rear Accry option to LINE-IN.

File Edit Tools Release Packet View Window Help Codepuig Codepuig Codepuig Codepuig Feature Rags Code System Broadcast Information Endet Send Encryption Feature Rage Codex System Broadcast Information Endet Configurations Torscover Accessories Settings Torscover Accessories Settings Torscover Accessories Settings Endet Organities Milo Reparaters Southy Parameters Control Head Configurations Torscover Accessories Settings To
Image: Subscriber Unit Parameters Image: Subscriber Value Value Subscriber Value Subscriber Value Val
Image: Codepuig Field Name Field Value Set Default Image: Subscriber Unit Parameters Image: Next Microson Unassigned Image: Next Microson Unassigned Image: Next Microson Unassigned Image: Subscriber Unit Parameters Image: Next Microson Unassigned Image: Subscriber Unit Parameters Image: Next Microson Units Image: Next Microson Units Set Default Image: Next Microson Units
Subscriber Unit Parameters Image: Parameters Peature Rags 2 Security 3 Ref the Rags 3 Ref the Rear Accry Unassigned Remote Programming 3 Cock System Broadcast Information Ext Soeaker Rear Accry UNassigned Ext Soeaker Rear Accry Unassigned Image: Parameters Point Programming Ext Soeaker Rear Accry RSN4002 Set Default 5 Ext Soeaker Rear Accry RSN4002 Set Default 5 Ext Soeaker Rear Accry RSN4002 Set Default 5 Ext Soeaker Rear Accry Intel No Soft Set Default 5 Ext Soeaker Rear Accry Intel No Soft Point No Voice Services Ext Soeaker Rear Accry Intel No Soft Set Default Finance/ver Accessories Settings
Image: Control Head Configurations 2 Handset Rear Accry Unassigned Image: Control Head Configurations 3 Rit Mic Rear Accry Unassigned Image: Control Head Configurations 5 Expansion Mic RINNS054 Set Default Image: Control Head Configurations 1 Image: Configurations Image: Configurations Image: Configurations Image: Control Head Configurations 1 Image: Configurations Image: Configurations Image: Configurations Image: Control Head Configurations 1 Image: Configurations Image: Configurations Image: Configurations Image: Control Head Configurations 1 Image: Configurations Image: Configurations Image: Configurations Image: Control Head Configurations 1 Image: Configurations Image: Configurations Image: Configurations Image: Control Head Configurations 1 Image: Configurations Image: Configurations Image: Configurations Image: Configurations Image: Configurations Image: Control Book 1 Image: Configurations
Provide Security Provide 3 Pet Mic Rear Accry Unassigned Pet Mic Rear Accry Set Default Pet Soeaker Rear Accry RNN002 Pet Soeaker Rear Accry Set Default Pet Soeaker Rear Accry LINE-IN Pet Soeaker Rear Accry LINE-IN Pet More Services Expansion Mic RMN15054 Set Default Pet More Services Expansion Mic Pet More Services Expansion Mic Pet More Rear Accry LINE-IN Pet More Services Expansion Mic Pet More Services Set Default Pet More Rear Accry LINE-IN Pet More Services Set Default Pet More Rear Accry LINE-IN Pet Soeaker Rear Accry LINE-IN Pet More Rear Accry LINE-IN Pet Soeaker Rear Accry LINE-IN Pet Soeaker Rear Accry LINE-IN Pet More Rear Accry Remover Accessories Seture Pet More Rear Accry LINE-IN Pet More
Image: Provide Services Image: Provide Services
Image: Parameters Image: Parameters <t< td=""></t<>
Cock System Broadcast montation 6 Expansion Mic RMN5054 Set Default B→ B Emergency Options Image: Control Head Configurations Image: Control Head Configurations Image: Control Head Configurations Image: Control Head Configurations B→ B Transceiver Accessories Settings Image: Control Head Configurations Image: Control Head Configurations Image: Control Head Configurations B→ B DMO Parameters Image: Control Head Configurations Image: Control Head Configurations Image: Control Head Configurations B→ D DMO Repeater Parameters Image: Control Head Configurations Image: Control Head Configurations Image: Control Head Configurations B→ D DMO Repeater Parameters Image: Control Head Configurations Image: Control Head Configurations Image: Control Head Configurations B→ Contact Book Image:
□ □
Bit Source Control Head Configurations Control Head Configurations Image: Source Image: Transceiver Accessories Setup Image: Sou
Image: Seturgs Image: Seturgs Image: Transceiver Accessories Seturgs Image: Seturgs Image: DMO Parameters Image: Seturgs Image: Seturgs Image: Seturgs Image: S
Imanuceiver Accessories Setup Imanuely in an intervent accessories Setup Imanuely in an intervent accessories Setup Imanuely intervent accessories Setup Imanuely intervent accessories Setup
B → DMO Parameters B → MO Parameters B → MO Repeater Parameter B → D MO Repeater Parameter B → Ergonomic Parameters B → Audio Settings B → Mole Settings B →
B - 2 MO Repeater Parameter B - 2 MOO Gateway Parameter B - 2 Engonomic Parameters B - 2 Language
Image: The Second Section Second
B · · · · · · · · · · · · · · · · · · ·
ter → Language reanteers ter → Language reanteers ter → Audio Settings ter → Audio S
B: SQ Display Parameters B: GQ Contact Book B: GQ Contact Book B: GQ My Favorites B: GQ Data Services
⊕ TalkGroups ⊕ ✓
⊕ Ø Contact Book ⊕ ∰ My Favorites ⊕ ⊡ Data Services
⊕
B) 🚔 Data Services
B- C Mobility and System Parameters
er-∞ GPS
Green Contraction
Heb Touglid Marrian End Result
Transceiver Accessories Setup
This node contains fields that are used to define accessories connected to the Bear Accessory
Connector.
US82
v 7

Fig. 3-3 TETRA – Transceiver Accessories Setup

3.1.2 DMR

When programming the MOTOTRBO radio device please use the following parameters:

- Under General Settings deactivate all AGCs:
 - Deactivate Analog Mic AGC
 - Deactivate Digital Mic AGC



Fig. 3-4 MOTOTRBO – General Settings

- In Accessories set all gain values to default:
 - Analog Front Mic Gain (dB): -2
 - Digital Front Mic Gain (dB): 2
 - Analog Rear Mic Gain (dB): -2
 - Digital Rear Mic Gain (dB): 2
- Set the Cable Type to Rear PC & Audio



Fig. 3-5 MOTOTRBO – Accessories

- In Network allocate the 192.168.10.1 Radio-IP (stand-• ard) to the radio set.
- Set the Forward to PC option to Via USB. •



Fig. 3-6 MOTOTRBO – Network

3.2 Installing the radio devices

In the IOP904 the necessary connection cables are ready for use for both radio sets.



Fig. 3-7 IOP904 front

- 1. For audio transmission connect the TETRA or DMR connection cables.
- 2. Plug in the aerial cable. Please ensure to use the proper side.
- 3. Plug in the power supply cables. Please ensure to use the proper side.
- 4. Insert the radio sets into the drawers.
- 5. When you take the radio sets out, please pay attention to the cable lengths.

3.3 IOP904 connections

After the installation of the radio sets, the power supply and aerials have to be connected at the back.

WARNING

Connect first the power supply of the DMR radio device and thereafter the power supply of the TETRA radio device, or connect both power supplies simultaneously.

When the device is connected to the power supply, the green power supply LED illuminates.



Fig. 3-8 IOP904 back

3.4 Layout

WARNING

Only trained service technicians are allowed to open the IOP904. The power supply must be separated from mains supply.



Fig. 3-9 Layout IOP904

4 Technical Specification

Description	Value
Power supply	2 Switched-mode power supply, range 98 to 254 V AC
Power input	max . 68 W idle 35 W
Environmental specifica-	Operation
tions	0 °C to +40°C temperature range, avoid condensing humidity Storage
	-40°C to +60°C temperature range, avoid condens- ing humidity Avoid direct insolation
Dimensions:	580 mm x 483 mm x 133 mm (L x W x H) (19" rack)
Weight	about 17,5 kg including 2 radio sets
Packaging	powder coated steel plate
Mounting method	19" rack mount
Connections	2 BNC connectors (aerials)
Cable ports	2 grounded mains connections
Display elements	3 LEDs in the front; 4 LEDs in the back
Transmit power	max. DMR 30 W (DM4601) max. TETRA 10 W (MTM5400)
Frequency range	Dependent on the radio sets used

Tab. 4-1 Technical Specification

