



# **EFJohnson Interface for IP-224**



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#### WARNING

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Do not open the unit. No user serviceable parts are contained within. Bosch cannot be responsible for damage. If the unit is opened, the warranty can be voided.

#### **OPENSSL PROJECT**

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/). This product includes cryptographic software written by Eric Young (eay@cryptosoft.com). This product includes cryptographic software written by Tim Hudson (tjh@cryptsoft.com).

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# 1.0 Introduction

The EFJohnson radio interface is designed as an add-on option in the Telex Radio Dispatch system. This application guide describes the Telex Radio Dispatch EFJohnson feature set and how to configure the interface for the IP-224 and C-Soft.

**NOTE:** For more information, see the IP-224 Technical Manual (P/N F.01U.218.562), the C-Soft Software Manual (P/N F.01U.218.561), and the Radio Manufacturer's technical documentation.

# 2.0 Hardware Requirements

- IP-224 Ethernet Adapter Panel (P/N F.01U.306.547).
- IP-224 EFJ 5300 ES, 53SL, VMx00 Radio Interface (P/N F.01U.165.548).
- EFJohnson 5300 ES, 53SL ES, or Viking VMx00 mobile radio.
- EFJohnson Pigtail Connector Assembly (EFJohnson P/N 597-5357-746 Rev D or higher) is required for EFJohnson 5300 ES and EFJohnson 53SL ES radios.

NOTE: No modification to this accessory cable is required.

• EFJohnson Pigtail Connector Assembly (EFJohnson P/N 597-5357-707) is required for EFJohnson Viking VMx00 radios. Currently the Telex supplied interface cable will not directly connect to this accessory cable and needs to be modified. For more information, see Section 5.0 Cable Diagram for details.

# 3.0 Software Requirements

- C-Soft version 6.500 or later
- IP-224 version 2.300 or later
- IP-224 Advanced Interface Option (Export) or Advanced Interface Option (North American) Access Key
- Telex System Manager (TSM) 2.300 or later
- Windows 7 (32-bit or 64-bit)
- Windows 8.1
- EFJohnson Viking VMx00 Third Party Interface additional software license purchased from EFJohnson.
- The EFJohnson radio firmware version must be version 4.14.5 or higher for the RS-5300, version 6.16.18 or higher for the 5300 ES or the 53SL ES, and version 8.12.17 or higher for the Viking VMx00 radios.

4.(	0	Su	эрс	orted	Fea	tures
-----	---	----	-----	-------	-----	-------

	EFJohnson Radio Supported Features				
Feature	Analog Support	Digital Support	Feature	Analog Support	Digital Support
Channel/Talkgroup Change	Yes	Yes	Emergency Acknowledgement	No	No
Zone Change	No	No	Encryption On/Off	Yes	Yes
			GPS Read	No	No
Group Call	No	No	GPS Trigger On/Off	No	No
Private Call	No	No	Monitor On/Off	Yes	Yes
			Radio Call Alert	No	No
ANI Decode	Yes	Yes	Radio Check	No	No
Emergency Decode	Yes	Yes	Radio Enable/Disable	No	No
Status Message Decode	No	No	Radio Select Call	No	No
Text Message Decode	No	No	Radio Remote Monitor	No	No
			Radio Send Text Message	No	No
Query Encryption	Yes	Yes	Radio Status (Send Status Message)	No	No
Query Monitor	Yes	Yes	Radio Status Request	No	No
Query Scan	Yes	Yes	Scan Add/Delete	No	No
Query Talk Around	Yes	Yes	Scan On/Off	Yes	Yes
			Talk Around On/Off	Yes	Yes

# 5.0 Cable Diagram

The IP-224 to EFJ 5300 ES, 53SL ES, VMx00 Radio Interface Cable allows the IP-224 to serially control an EFJohnson 5300 ES, 53SL ES, or Viking VMx00 radio.



FIGURE 1. IP-224 EFJ 5300 ES, 53SL ES, VMx00 Radio Interface Cable

Cable diagram for EFJohnson Radio and IP-224 Interface			
Function	EFJohnson Radio	IP-224	
TX+ Audio	PIN 7	PIN 1	
TX- Audio	PIN 8	PIN 2	
RX+ Audio	PIN 11	PIN 20	
RX- Audio	PIN 12	PIN 21	
PTT Relay N.O. Contact	PIN 9	PIN 24	
Ground	PIN 25	PIN 29	
RS-485 D+	PIN 13	PIN 16	
RS-485 D-	PIN 20	PIN 35	
RS-485 Busy	PIN 10	PIN 34	

**NOTE:** Currently, the Telex supplied interface cable needs modification in order to connect to the EFJohnson Viking VMx00 Pigtail Connector Assembly (EFJohnson P/N 597-5357-707). The DB-25M connector on the Telex-supplied interface cable needs to be disconnected and replaced with a DB-15M connector. Unsolder the wires from the DB-25M connector and resolder them to the DB-15M connector.

Telex Cable Modification for EFJohnson Viking VMx00 Series			
DB-15M	WIRE	DB-25M	
PIN 1	Blue	PIN 7	
PIN 2	Purple	PIN 8	
PIN 3	Yellow	PIN 9	
PIN 4	Orange	PIN 10	
PIN 5	White	PIN 11	
PIN 6	Red	PIN 12	
PIN 7	Black	PIN 13	
PIN 8	Brown	PIN 20	
PIN 14	Green	PIN 25	

# 6.0 Radio Programming Application Setup

## 6.1 EFJohnson 5300 ES and 53SL ES Radio Configuration

The PCConfigure Radio Configuration Software is used to configure the EFJohnson 5300 ES or EFJohnson 53SL ES radio to interface properly with the IP-224.

## 6.1.1 Radio Buttons Setup

To configure the Radio Buttons, do the following:

- 1. Open the PCConfigure Radio Configuration Software.
- 2. Click the **Radio Wide tab**. *The Radio Wide page appears*.
- 3. Under System Specific, select the **desired system**. *The corresponding system page appears*.

PCConfigure 2.18.2
<u>File R</u> adio Iransfer T <u>o</u> ols <u>H</u> elp
🗅 🚈 – 🖬 🔤 🥙 🏥 单 🗌 🔗
Global Radio Wide Per System Zone
Radio Wide Scan List
) E dit <u>S</u> can Lists
-System Specific
Conventional SmartNet/ SmartZone
P25 Trunking
Menu Items
🗟 Assign Items
s Assign Aliases
Function Buttons
dessign CH Buttons
📑 Assign Mic Buttons

4. Under Function Buttons, click <u>Assign CH Buttons</u>. *The Radio Wide Function Buttons window appears.* 



5. Click the **F3 button**.

A drop-down menu appears.

- 6. From the F3 drop-down menu, select **Repeater TA**.
- 7. Click the **F4 button**.
  - A drop-down menu appears.
- 8. From the F4 drop-down menu, select **Clear/Secure**.
- 9. Click the **F5 button**. *A drop-down menu appears*.
- 10. From the F5 drop-down menu, select Scan.
- 11. Click the **F6 button**.
  - A drop-down menu appears.
- 12. From the F6 drop-down menu, select Monitor.
- 13. Click the **OK button**.
- 14. Repeat steps 2-13 to configure additional systems.

## 6.1.2 ANI and Emergency Setup

**NOTE:** Only perform the ANI and Emergency Setup if the radio firmware version is prior to 4.14.5.

To configure ANI and Emergency, do the following:

- 1. Open the PCConfigure Radio Configuration Software.
- 2. Click the **Radio Wide tab**. *The Radio Wide page appears*.
- 3. Under System Specific, select the **desired system**. *The corresponding system page appears*.
- 4. Under Display, select the **PTT ID on RX** and **Inf. check boxes**.
- 5. Repeat **steps 2-4** to configure additional systems.

PCConfigure 2.18.2	100-6-1	
<u>File Radio Transfer Tools H</u> elp		
Image: Provide the second state of	entional nes Clear Alert Tone Clear Mode Alert on Secure Rx Priority Call Alert	Display Show MON icon when in Normal Mode Call History PTT ID on Rx PTT ID Disp. Time: 1 (s) P25 TG on Rx TG Disp. Time: 1 (s) User Group ID
-Mei	nu Items  Assign Items  Assign Aliases  nction Buttons  Assign CH Buttons  Assign Mic Buttons	ID Disp. Time:       1       ∞       (s)         Received Key ID       Key ID Disp. Time:       1       ∞       (s)         P25 TG on Tx       1       ∞       (s)       □         P25 TG on Tx       1       ∞       (s)       □         P3 TG Disp. Time:       1       ∞       (s)       □         Range Indicators       1       ∞       (s)       □         RSSI Thresholds       Out Of Range       ·120       Inactivity D         Fair       ·60       0       □       Excellent       127         Defaults       □       □       □       □       □

## 6.2 EFJohnson Viking VMx00 Radio Configuration

The Armada Fleet Management Software is used to configure the EFJohnson Viking VMx00 radio to interface properly with the IP-224.

## 6.2.1 Serial Communication

To verify Serial Communications are enabled, do the following:

- 1. Open the Armada Fleet Management Software.
- 2. Click the **Codeplugs tab**. *The Codeplugs page appears.*



3. Right click the **Codeplug icon**. *A drop-down menu appears*.

4. In the Codeplugs drop-down menu, select **Properties**. *The Radio Information window appears*.

Radio Information	
Dptions	Version
Channel Options	Softw
48 Channels	SEM
128 Channels	DEPT V
256 Channels	File F
512 Channels	Identifi
🛷 1024 Channels	ECNI
1536 Channels	LOIV.
2048 Channels	Alias:
Encryption	MAC
OTAR P25 Conventional	
OTAR P25 Trunking	Hardwa
P25 AES OFB	Type:
✓ P25 DES OFB	Band:
ARC4 Software Encryption	
Feature Disable Options     Multi Koy Disable	Кеура
Wideband Disable	Logic
Feature Options	Logic
Keypad Programming =	DED
Fire Ground Commander	RF D6
Fire Ground First Responder	RF De
MDC 1200/GEStar	PA Pa
P25 Conv and Trunking OTAP	DAG
Internal GPS	PASE
Topaz	Battery
🖌 Third Party Interface	Mobile
Automatic Volume Control	
OTIP	
4 P25	
P25 Conventional Packet Data	
P25 Trunking Packet Data	
Digital Conventional	
P25 Phase 2	
P25 Authentication	
Trunking Options	
P25 Trunking	
SMARTNET Trunking	
SmartZone Trunking	

5. Under Feature Options, verify there is a check mark next to **Third Party Interface**.

If yes, continue. OR If no, please contact an **EFJohnson representative** for instructions. 6.2.2 Radio Buttons Setup (Standard Control Head)

To configure the Radio Buttons for a Standard Control Head, do the following:

- 1. Open the Armada Fleet Management Software.
- 2. Click the **Button/Menu tab**. *The Button/Menu page appears*.
- 3. From Systems Types, select the **desired system**.
- 4. From Interface Types, select Std. CH.
- 5. Click the **Buttons tab**.

The Buttons page appears.



#### **Under Button Assignments**

- 6. From the F3 drop-down menu, select Repeater TA.
- 7. From the F4 drop-down menu, select Clear/Secure.
- 8. From the F5 drop-down menu, select Scan.
- 9. From the F6 drop-down menu, select Monitor.
- 10. Repeat steps 2-9 to configure additional systems.

## 6.2.3 Radio Buttons Setup (Lightning Control Head)

To configure the Radio Buttons for a Lightning Control Head, do the following:

- 1. Open the Armada Fleet Management Software.
- 2. Click the **Button/Menu tab**. *The Button/Menu page appears*.
- 3. From Systems Types, select the **desired system**.
- 4. From Interfaces Types, select Lightning CH.
- 5. Click the **Buttons tab**.

The Buttons page appears.



## **Under Front Button Assignments**

- 6. From the F3 drop-down menu, select **Repeater TA**.
- 7. From the F4 drop-down menu, select **Clear/Secure**.
- 8. From the F5 drop-down menu, select Scan.
- 9. From the F6 drop-down menu, select Monitor.
- 10. Repeat **steps 2-9** to configure additional systems.

# 7.0 IP-224 Access Key Installation

The EFJohnson radio interface requires an additional Advanced Interface Option (Export) or Advanced Interface Option (North American) on the IP-224.

## NOTE:

- The Advanced Interface Option (Export) or Advanced Interface Option (North American) Access Key must be purchased before you can activate the EFJ 5300/VMx00 Serial Type. The Advanced Interface Option (Export) or Advanced Interface Option (North American) requires an access key to be generated specifically for each IP-224.
- If the Advanced Interface Option (Export) or Advanced Interface Option (North American) Access Key was purchased as a factory installation [(F.01U.347.906) IP-224 Radio Gateway Advanced Options Export or (F.01U.347.907) IP-224 Radio Gateway Advanced Options NA (factory installed)], the access key was activated by the factory prior to shipping.
- Activating the Advanced Interface Option (Export) or Advanced Interface Option (North American) via the IP-224 web interface is only required if this is a field installation [(F.01U.343.868) IP-224 Field Code Advanced Options Export or (F.01U.343.869) IP-224 Field Code Advanced Options NA (customer purchased option)].

To activate the Advanced Interface Option (Export) or Advanced Interface Option (North American) Access Key, do the following:

- 1. Open the **IP-224 webpage**.
- 2. From the left navigation, select **Additional Features**. *The Additional Features page appears*.

Home	SUCCESS	. Peacures are now available. Save Parameters step s	chi requireu.
Ethernet Setup	ACCESS ADD	ITIONAL FEATURES	
Multicast Setup		· · · · · · · · · · · · · · · · · · ·	1-110
Hardware Setup	Access Key:		Submit
Gain Setup	3 e	Feature Name	<u>State</u>
Per Line Setup		Advanced Interface Option (North American)	Enabled
Crosspatch Setup		Serial Type	Available
Account Management		EFJ 5300/VMx00	Yes
Backup & Pertore		Hytera MD782	Yes
P backup a Restore		Hytera MT680	Yes
Firmware Upgrade		ICOM IDEN	Yes
Additional Features		Kenwood 5x10	Yes
Cours Desembles		Kenwood NEXEDGE	Yes
Save Parameters		Kenwood NX-5x00	Yes
System Status		Kenwood x150	Yes
		Kenwood x180	Yes
		Kenwood x80	Yes
		Kenwood x90	Yes
		MOTOTRBO Interface*	Yes
		MTRBi	Yes
		PowerTrunk	Yes
		Sepura	Yes
		Serial Over IP	Yes
		Sprint Direct Connect	Yes
		Tait TM91xx/TM94xx	Yes
		Tait TM93xx	Yes
		Telex Generic	Yes

- 3. In the Access Key field, enter the **32-character access key**.
- 4. Click the **Submit button**. *The changes are sent to the IP-224 in temporary storage.*
- 5. From the left navigation, select **Save Parameters**. *The Save Parameters page appears*.
- 6. Click the **Save Parameters button**. *Changes are now permanently saved to the IP-224 console.*

# 8.0 IP-224 Setup

To configure the IP-224, do the following:

- 1. Open the **IP-224 web application**. *The IP-224 window appears*.
- 2. From the left navigation, select Multicast Setup.

Name: Telex IP-224 MAC: 00:08:7C:70:03:A2 HW: 1.010 FW: 2.101 SN: 224010802 Checksu	ım: A4CD3A3	F				T	El	Radio	Dispatcl		
TELEX IP-224					Submit		Auto	o Configur	ation: 🛽		
Home											
Ethernet Setup	LINE SET	TUP									
<ul> <li>Multicast Setup</li> </ul>	Line:	Line Enable:	Line Nan	ne:	Line Type:	Seria	I Type:	Vocod	er Type:		
Line Setup	1	V.	EFJ 1		Local Mode	EFJ 5300/VN	tx00	<ul> <li>TELED</li> </ul>	TELEX 32K 💌		
IP Recorder Setup	2	V	EFJ 2		Local Mode	EFJ 5300/VN	tx00	▼ TELE	( 32K 👻		
Hardware Setup	Line:	Mcast Enable:	RX Mcast:	RX Port	TX Mcast	TX Port:	TX Group Port A:	TX Group Port B:	, ш.		
Gain Setup	1	1	225.8.11.81	1054	225.8.11.81	1254	0	0	6		
Per Line Setup	2	V	225.8.11.81	1055	225.8.11.81	1255	0	0	6		
Crosspatch Setup											
Account Management	IP RECO	RDER SET	UP								
Additional Features	Line:	Mcast Enable	Line Na	ame:	Vocoder Type	: Mcast Add	ress: Ou	itgoing Port:	TIL:		
Save Parameters	1		Recorder 1		TELEX 32K 🔻	225.8.11.101	22	250	6		
System Status	2		Recorder 2		TELEX 32K 🔻	225.8.11.101	22	251	6		
					Submit						

3. Select the Auto Configuration check box.

## **Under LINE SETUP**

- 4. From the Serial Type drop-down menu, select EFJ 5300/VMx00.
- 5. In the RX Mcast field, enter Receive Multicast IP Address.
- 6. In the RX Port field, enter the **Receive Multicast Port number**.
- 7. In the TX Mcast field, enter the Transmit Multicast IP Address.
- 8. In the TX Port field, enter the Transmit Multicast Port number.
- 9. Click the **Submit button**. *The changes are sent to the IP-224 in temporary storage.*

10. From the left navigation, select **Per Line Setup**. *The Per Line Setup window appears.* 

FUNCTIO	ON TONE SE	TUP							
Jump t	o Entry:	<< <	1 to 10	▼ > (	>>				
Boot U	p Frequen	cy: 1 🔻							
Entry	Enable	Relay	Relay Group	Relay Time (ms)	Digital Output	CTCSS Freq	CTCSS Default	Zone	Chan
1	<b>V</b>	•	1 🔻	0	0	0		1	1
2	$\checkmark$	•	1 🔻	0	0	0		1	2
3	<b>V</b>	•	1 🔻	0	0	0		1	3
4	<b>V</b>	•	1 🔻	0	0	0		1	4
5	<b>V</b>	-	1 🔻	0	0	0		1	5
6	<b>v</b>	-	1 🔻	0	0	0		1	6
7	<b>v</b>	-	1 🔻	0	0	0		1	7
8	<b>v</b>	-	1 🔻	0	0	0		1	8
9	<b>v</b>	-	1 🔻	0	0	0		2	1
10	<b>v</b>	-	1 🔻	0	0	0		2	2

#### **Under Function Tone Setup**

- 11. In the Zone Column field, enter the **desired radio zone**.
- 12. In the Chan Column field, enter the **desired radio channel**.
- 13. Click the **Submit button**.

The changes are sent to the IP-224 in temporary storage.

- 14. In the left navigation, select **Save Parameters**. *The Save Parameters page appears*.
- 15. Click the **Save Parameters button**. Changes are now saved permanently to the IP-224 console.

# 9.0 C-Soft Designer Setup

The Per Line Parameters window is used to configure C-Soft to IP-224 communications.

To configure Per Line Parameters, do the following:

- 1. Open C-Soft Designer.
- 2. From the Edit menu, select **Setup Per Line Parameters**. *The Per Line Parameters window appears.*

Line Number Line Type Line Name		Rx Multicast Address	Rx Port	Tx Multicast Address			Tx Port	Base Radio IP:			TTL	Packet Delay		Close								
1 Te	Telex	•	Fire Department	225. 8 . 11 . 81	1054	225	. 8	. 1	1.	81	1254	0	. 0	. 0	. 0	2	10	Ontions	Ereces	Signal	CID	1
		Ecł	ho Packets Enable: 📰	0.0.0.0	1054	0	. 0	. (	0	0	1254							opaons	inces	Setup		
2 Telex	Telex	•	Sidney Police	225. 8 . 11 . 81	1055	225	. 8	1.1	1.	81	1255	0	. 0	. 0	, 0	2	10	Ontione	Frede	Signal	CID	1
		Echo Packets Enable: 📃		0.0.0.0	1055	0	. 0	. (	0	0	1255							opuons	rieds	Setup	SIF	
3	Telex	•	Newport Police	225. 8 . 11 . 81	1056	225	. 8	. 1	1.	81	1256	0	. 0	. 0	, 0	2	10	Options	Frens	Signal	SIP	
		Ech	ho Packets Enable: 📃	0.0.0.0	1056	0	. 0	) . (	) .	0	1256								linde	Setup		ł
4	Telex	•	iDen Line	225. 8 . 11 . 81	1057	225	. 8	1.1	1.	81	1257	0	. 0	. 0	. 0	2	10	Options	Freqs	Signal	SIP	1
		Eck	ho Packets Enable: 📰	0.0.0.0	1057	0	. 0	. (	) .	0	1257									Setup	-	I
5	Telex	•	16kb Vocoder	225. 8 . 11 . 81	1058	225	. 8	. 1	1.	81	1258	0	. 0	. 0	. 0	2	10	Options	Fregs	Signal	SIP	1
		Ech	ho Packets Enable: 📰	0.0.0.0	1058	0	. 0	. (	0 .	0	1258									Setup		ł
6	Telex	•	Supervisor Line	225. 8 . 11 . 81	1059	225	. 8	- 1	1.	81	1259	0	. 0	. 0	. 0	2	10	Options	Freas	Signal	SIP	
		Ecł	ho Packets Enable: 🕅	0.0.0.0	1059	0	. 0	1.1	0	0	1259									Seiup		J
7	Disabled	•	Line 7	225. 8 . 11 . 81	1060	225	. 8	. 1	1.,	81	1260	0	. 0	, 0	0	6	10	Options	Freqs	Signal	SIP	
		Eck	ho Packets Enable: 📋	0.0.0.0	1060	0	. 0	(	3	0	1260									Setup		J
8	Disabled	•	Line 8	225, 8, 11, 81	1061	225	. 8	1.1	1.	81	1261	0	. 0	. 0	. 0	6	10	Options	Freqs	Signal	SIP	
		Ecł	ho Packets Enable: 📋	0.0.0.0	1061	0	. 0	1. (	0	0	1261									Setup		I
9	Disabled	•	Line 9	225. 8 . 11 . 81	1062	225	. 8	1.1	1.	81	1262	0	. 0	. 0	. 0	6	10	Options	Freds	Signal	SIP	
		Ech	ho Packets Enable:	0.0.0.0	1062	0	. 0	. (	0.	0	1262							(	( todo	setup		1
10 Disable	Disabled	+	Line 10	225. 8 . 11 . 81	1063	225	8	1.1	1.	81	1263	0	. 0	, 0	, 0	6	10	Options	Freqs	Signal	SIP	1
		Ech	ho Packets Enable: 🔲	0.0.0.0	1063	0	. 0	. (	) .	0	1263									Selup	_	J

- 3. In the Rx Multicast Address field, enter the **Receive Multicast IP Address** of the connected IP-224.
- 4. In the Rx Port field, enter the Receive Multicast Port number of the connected IP-224.
- 5. In the Tx Multicast Address field, enter the **Transmit Multicast IP Address** of the connected IP-224.
- 6. In the Tx Port field, enter the Transmit Multicast Port number of the connected IP-224.
- 7. In the Base Radio IP field, enter the IP address of the connected IP-224.
- 8. Click the **Close button**.
- **NOTE:** The Multicast settings of IP-224 and C-Soft must match for the interface to function properly. Verify the RX and TX Multicast Addresses match, as well as RX and TX Ports.

Notes:

## Suggestions or comments:

Contact technical support with suggestions or comments concerning this application guide.

## Technical Support:

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