TRULINK® USER'S MANUAL

CF0061 ADDENDUM

WIRELESS INTERCOM SYSTEM

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CF0061 ADDENDUM

WIRELESS INTERCOM SYSTEM

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REVISION HISTORY SHEET

REVISION	DESCRIPTION	APPROVAL DATE

FCC COMPLIANCE

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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CHAPTER 1
GENERAL

1. INTRODUCTION

This document is intended to be used specifically with the CF0061 configuration. See the TruLink Users guide for overall information on the TruLink wireless communications System. This document will provide specific information for the set up, and operation of the CF0061 configured equipment.

1.1 DEFINITIONS AND ABBREVIATIONS

1.1.1 Definitions of terms used in this document:

- Channel — A collection of specific frequencies that define the RF link.
- Network — A collection of slaves and one master that form the communication group.
- Sidetone — User's own audio heard in the user's ear.
- Other Vehicles — Refers to other platforms without a TruLink TAP

1.1.2 Abbreviations and acronyms used in this document:

- NiMH — Nickel Metal Hydride
- PTT — Push To Talk button on the SPT
- SYNVOICE — Synthetic Voice (recorded voice message)
- TAP — TruLink Access Point Transceiver
- SPT — Submersible Portable Transceiver
- VOX — Voice Operated Keying

1.2 TRULINK WIRELESS SYSTEM DESCRIPTION

1.2.1 TRULINK Overview

The TruLink system is a full-duplex system that permits multiple crewmembers to speak simultaneously. Unlike conventional walkie-talkies, TruLink users can converse among themselves without pressing a Push-to-Talk Button or waiting for another user to finish their transmission.

TAP Equipped Vehicles support 50 channels (0-49). Up to 31 crewmembers can be logged on to a channel with up to three speaking simultaneously on any channel. In addition, the TAP adds the capability to transmit and receive over VHF & UHF Radios

The Other Vehicles system (without a TAP) supports 50 channels (0-49). Up to 31 crewmembers can be logged on to a channel with up to six speaking simultaneously on any channel.

Each channel requires one TruLink Transceiver be set as a "Master"

1.2.2 TRULINK TAP Overview

The TruLink TAP allows crewmembers to transmit and receive over VHF & UHF Radios. The TAP is always master and the SPT's are slaves to the master. The crewmembers may gain access to the TAP via their TruLink SPT. If no TAP is present, one SPT will be elected master. The remaining SPT's will be slaves.

1.2.3 TRULINK SPT Overview

The Submersible Portable Transceiver (SPT) is the portable hand held unit in the TruLink Wireless Communication System. The operator wears the SPT along with a headset that includes headphones and a microphone to communicate with other wireless users. The SPT is usually set up as a slave in this configuration and is used in conjunction with a TAP.

1.3 EQUIPMENT LIST

The following list shows the major components that are supported by this configuration. For a complete list of all the elements needed for a TruLink system, please contact Telephonics Product Support.

Table 1.3-1
TruLink Equipment List

Name	Part Number
TruLink Access Point (TAP)	780-2000-002-CF0061-M1
Submersible Portable Transceiver (SPT)	ME6864-M1-CF0061-M2
Submersible Headset	SOR1312P-S104
David Clark Radio Interface Adapter (TAP equipped Vehicles)	780-4050-001
Tactical VHF Radio Interface Cable (TAP equipped Vehicles)	780-4060-001
TAP Power Cable (TAP equipped Vehicles)	780-4070-001

CHAPTER 2

2. SUBMERSIBLE PORTABLE TRANSCEIVER (SPT)

2.1 HEADSET SETTINGS

Table 2.1-1.
Headset Parameters

Parameter	Setting
Mic Type	Dynamic
Mic Feed Voltage	No mic Voltage
Mic Feed Impedance	No Impedance Enabled
Mic Sensitivity	-53.0
Mic Distortion Level	130.0
Headset Level Correction	0.0
Headset Limiter	Peltor MT7H10F xx-T5141
Side tone Gain	0.0 dB

2.2 MENU OPTIONS

Prerecorded messages (synvoice) will prompt you through the menu options (press M to scroll through menu options). Once a specific menu is selected, Press the Asterisk Button (Ý) until the desired mode is announced and then immediately the Push-to-Talk Button (PTT) to set the mode:

CHANNEL

- Selects the Channel that the TPT will operate on
- Available channels are 0-49
- Must match the other crewmembers

MASTER OR SLAVE

- The 780-2000-002 (TAP) is always master when installed in system.
- All ME6864-M1-CF0061-M2 (SPT's) should be slave when used with TAP.
- Only one Master per channel
- One master will need to be set for other Vehicles.

RADIO MODE

- No Radios Vehicles Conference / wireless intercom (mode used on any type of Vehicles)
- Tactical VHF (available on TAP equipped Vehicles)
- Marine VHF (available on TAP equipped Vehicles)
- Tactical UHF (available on TAP equipped Vehicles)

VOX

- Voice Activated transmit
- VOX ON for hands-free operation
- VOX OFF requires the crew to press PTT to transmit

LED

- Use NORMAL setting for daylight operations
- Use NVG setting for operation with Night Vision Goggles
- Use HIGH setting for intense sunshine

BATTERY

- Battery Charging (NiMH Batteries only) NiMH battery capacity is set to 2300mAh. The Battery Warning time is set to 30 / 10 (Battery Low / Empty in minutes)
- Batteries Not Charging (Alkaline Batteries only)

2.3 TRULINK SYSTEM STARTUP

Start up of TruLink consists of:

- Setting a Master for **Other Vehicles** only
- Setting the SPT channel
- Setting the TAP Channel (should be set once during TAP installation)
- Creating a Network
- Setting a Mode of Operation

2.4 SETTING A MASTER SPT (OTHER VEHICLES)

Note

☞ If a SPT is turned on and no other master is present, it will automatically become a master.

- Turn the SPT on by pressing both the Up (^) and Down (v) Volume Buttons simultaneously until the LED remains on and then release the buttons. The User will hear “Channel status, Master”

2.5 SETTING THE SPT CHANNEL

- Available channels are 0-49
- All Crew Members must be set to the same channel as “Master” TAP.
- All Crew Members must be set to the same channel as “Master” SPT when used on other Vehicles types

Note

☞ These steps must be accomplished upon initial setup of the TruLink System. The SPT will automatically default to the last set channel it was set to prior to securing power. *Subsequently, these steps should only be repeated if a channel change for this SPT is required*.

- Turn the SPT on by pressing both the Up (^) and Down (v) Volume Buttons simultaneously until the LED remains on and then release the buttons. The User will hear “Channel status, Slave”
- Press the Menu Button (**M**) once, “Channel status” will be announced. Press the Asterisk Button (*) until the desired channel is announced and then immediately the Push-to-Talk Button (**PTT**) to set the channel.
- Hold * for 2sec and channel will change in increments of 10 at a time (listen for tone)
- Wait for “Logon OK” announcement.

This SPT is now set to the selected channel.

2.6 SPT OPERATION

When connecting the TruLink system to a TAP, there are four modes of operations for this configuration.

Based on the mode of operation selected for that particular SPT, audio is routed to different destinations. This permits TruLink users to have different radio access depending on the radio mode set for that particular SPT.

Operators can toggle between Radio Mode Types by:

1. By pressing the ‘M’ key until “ Radio <status>” is heard
2. Toggle User Types by pressing ‘*’ key until the desired Radio Mode is announced
3. Pressing the PTT key to lock in the selection.

2.6.1 NO RADIO MODE

No Radio Mode is used on other Vehicles without a TAP.

No Radio Mode is used on TAP equipped Vehicles when crewmembers do not want access to VHF or UHF audio.

- VOX initiated audio from the SPT is heard by all TruLink wireless radio modes.
- PTT initiated audio from the SPT is heard by all TruLink wireless radio modes.

2.6.2 Tactical VHF Radio Mode

Tactical VHF Mode is only available when a TAP is within range of a SPT.

- VOX imitated audio from the SPT is heard by all TruLink wireless radio modes
- PTT initiated audio is heard by Tactical VHF Radio users and all TruLink wireless Tactical VHF radio mode users.

2.6.3 Marine VHF Radio Mode

Marine VHF Mode is only available when a TAP is within range of a SPT.

- VOX imitated audio from the SPT is heard by all TruLink wireless radio modes
- PTT initiated audio is heard by Marine VHF Radio users and all TruLink wireless Marine VHF radio mode users.

2.6.4 Tactical UHF Radio Mode

Tactical UHF Mode is only available when a TAP is within range of a SPT.

- VOX imitated audio from the SPT is heard by all TruLink wireless radio modes
- PTT initiated audio is heard by Tactical UHF Radio users and all TruLink wireless Tactical UHF radio mode users.

CHAPTER 3

3. TRULINK ACCESS POINT (TAP)

3.1 OVERVIEW

The TAP is used for fixed installations. It is used as the interface to the wired system. The TAP offers three audio ports and one data port (for configuration). The TAP is always used as the MASTER. Any one or all the audio ports can be used to interface to VHF or UHF Radios.

Trulink Access Point (TAP): The TAP acts as the system's base station. The TAP is always designated the network "master." The TAP is permanently installed on the TAP equipped Vehicles and can draw power from a 9VDC to 33VDC source. Up to three VHF or UHF radios can be integrated into the TAP, allowing crewmembers the ability to monitor and transmit over the selected radio through their wireless SPT and headset.

3.2 AUDIO CONNECTORS

There are three audio connectors on the TAP.

J1-external 1 - Designated "Tactical VHF"

J3-external 2 – Designated "Marine VHF"

J5-external 3 – Designated "Tactical UHF"

All audio ports are active in this configuration.

Refer to Appendix A

All ports are set for Half-duplex communication

3.3 TACTICAL VHF

Upon initial fielding on TAP equipped Vehicles, the TruLink system includes all necessary interfaces for Tactical VHF. The Tactical VHF interface enables all SPT users to communicate over Tactical VHF via the TAP. The Interface provides a physical connection between the TAP and the Tactical VHF Radio control head. With that, all SPT users can communicate over Tactical VHF radio (by pressing PTT) when SPT's are logged onto the TAP in Tactical VHF Mode.

3.4 MARINE VHF

Refer to marine VHF addendum when deployed.

3.5 TACTICAL UHF

Refer to tactical UHF addendum when deployed.

3.6 TAP OPERATION

A TAP is always operated as a MASTER. However, it requires a SPT SLAVE unit to change the channel.

Refer to Users Manual for TAP Details.

CHAPTER 4

4. TRULINK SUBMERSIBLE HEADSET

4.1 TALK-THROUGH HEADSET

CF 0061 has been specifically configured to accommodate submersible Talk-Through Headsets (part number: SOR1312P-S104).

In addition, the headsets may be subjected to wind up to 50 MPH, the headset may be equipped with weatherproof windsocks (P/N: 2678/80 from Television Equipment Associates, INC PH:845-278-0960). This will prevent the VOX circuit from activating in a windy environment.

The Talk-Through headset employs a microphone mounted in each ear cup (left/right) to monitor ambient sound. The audio from these microphones is amplified and sent to a dedicated ambient sound speaker in each ear cup. This speaker is separate from the speaker employed to listen to the TruLink audio.

At the highest volume setting, the microphone amplifier can amplify ambient sound up to 12 dB. For safety, the maximum sound pressure heard by the user is limited to 82dB(a)

Three control buttons are provided on one of the ear cups. There are two triangular shaped buttons for volume up/down. A square button is located between the two volume buttons that is used to turn the Talk-Through circuit on/off. Volume can be adjusted in five steps and the headset returns to the last volume setting when switched on.

Two AAA batteries installed in the headset power the Talk -Through amplifier. The batteries are completely enclosed to prevent moisture or dirt intrusion. To extend battery life, the Talk-Through circuit automatically shuts off when no button is pressed for 4 hours. A warning tone is sent about two minutes prior to shut down. Pressing any button delays the shut down for a further four hours.

Note

☞ Rechargeable NiMH or NiCad batteries should not be used in this headset.

Figure 4.1-1. Talk Through Headset Buttons

4.2 HEADSET/EXTERNAL AUDIO/DATA INTERFACE

4.2.1 Connector Type

The connector is a female 16-pole FISCHER DBPU104A086-140 type jack. The recommended mating plug is a FISCHER SFU104A086-140.

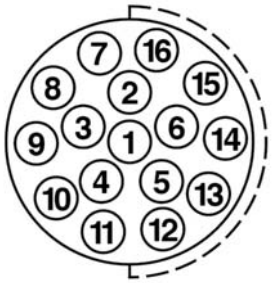

Figure 4.2.1-1. Connector Outside View

4.2.2 Connector Pin-out

The pin-out of the connector is defined as:

Pin nr	Signal name	Comment
11	MIC+	
10	MIC-	
4	Earphone Left +	Amplified by a power amplifier.
9	Earphone Left -	Amplified by a power amplifier.
3	Earphone Right +	Amplified by a power amplifier.
8	Earphone Right -	Amplified by a power amplifier.
12	Control input	Used for detection input.
6	Audio IN +	
2	CTRL_DATA2_IN	
15	Audio OUT +	
14	CTRL_DATA1_OUT	
5	DATA_IN_EXT	RS232
13	DATA_OUT_EXT	RS232
7	Power IN+	11 – 15 V DC
16	RET (GND)	Connected to GND via common mode filter L13.
1	GND	

APPENDIX A

TAP CONNECTOR DATA

APPENDIX A

APPENDIX A TAP CONNECTOR DATA

LRU ID: TruLink Access Point (TAP)	
LRU CONNECTOR: **J1** Audio Interface	**Protective Cap PN: 8LTE02B13**
CONNECTOR STD: MIL-C 38999 MS27468T13B35SN	MATING CONN. MS27467T13B35PN
CONNECTOR MFG'R: SOURIAU	MATING CONNECTOR MFG'R: SOURIAU
CONNECTOR P/N: 8LT7C13B35SN	MATING CONNECTOR P/N: 8LT5C13B35PN

Signal Name	Signal Level	Signal Freq	Pin Number	Input/ Output	Technical Specs	Signal Description
AUDIO_IN- (Note 1)	0 dBm	300 To 3400 Hz	21	Input	Nominal: 0 dBm. Input line impedance (Audio1_IN): 600 Ohm. For reference only.	(RX-path) Placing different impedance nets in the connector changes the impedance. The signal is transformer isolated.
AUDIO_IN+			14			
AUDIO_OUT- (Note 1)	0 dBm	300 To 3400 Hz	16	Output	Nominal: +10 dBm Output line impedance (Audio1_Out): 600 Ohm For reference only.	(TX-path) Placing different impedance nets in the connector changes the impedance. The signal is amplified with a dual operational amplifier. The signal is transformer isolated
AUDIO_OUT+			2			
CTR_DATA_1_OUT-			11	Output	Closed: Max current: 0.14 A Max resistance: 15 Ohm Open: Max voltage: 30 V Max leak current: 0.1 mA	Discrete signal. The signal is isolated by an optocoupler.
CTR_DATA_1_OUT+			12			
CTR_DATA_1_IN-			4	Input	Non detect: Max current: 0.18 mA Max voltage: 0.95 V Detect: Min Current: 0.3 mA Min voltage: 2.2 V	Discrete signal. The signal is isolated by an optocoupler.
CTR_DATA_1_IN+			3			
Note 1: Signal levels are factory programmable.						

LRU ID: TruLink Access Point (TAP)	
LRU CONNECTOR: **J2** Data Interface	**Protective Cap P/N: 8LTE02B09**
CONNECTOR STD: MIL-C 38999 MS27468T09B35SN	MATING CONN. MS27467T09B35PN
CONNECTOR MFG'R: SOURIAU	MATING CONNECTOR MFG'R: SOURIAU
CONNECTOR P/N: 8LT7C09B35SN	MATING CONNECTOR P/N: 8LT5C09B35PN

Signal Name	Signal Level	Signal Freq	Pin Number	Input/ Output	Technical Specs	Signal Description
RX	RS232	Max 115.2 kbit/s	4	Input/ Output	VT100 or ANSI compatible. ASCII transfer protocol. 8 bit data, 1 stop bit, No parity, 38400 baud.	Asynchronous data interface. This interface consists of two RS232 lines. The RS232 transceiver is a SP3232EEA from SIPEX.
TX			6			
GND			1			

LRU ID: TruLink Access Point (TAP)	
LRU CONNECTOR: **J3** Audio Interface	
CONNECTOR STD: MIL- MIL-C 38999 MS27468T13B35SA	MATING CONN. MS27467T13B35PA
CONNECTOR MFG'R: SOURIAU	MATING CONNECTOR MFG'R: SOURIAU
CONNECTOR P/N: 8LT7C13B35SA	MATING CONNECTOR P/N: 8LT5C13B35PA

Signal Name	Signal Level	Signal Freq	Pin Number	Input/ Output	Technical Specs	Signal Description
AUDIO_IN- (Note 1)	0 dBm	300 To 3400 Hz	21	Input	Nominal 0 dBm. Input line impedance (Audio1_IN): 600 Ohm. For reference only.	(RX-path) Placing different impedance nets in the connector changes the impedance. The signal is transformer isolated.
AUDIO_IN+			14			
AUDIO_OUT- (Note 1)	0 dBm	300 To 3400 Hz	16	Output	Nominal 0 dBm. Output line impedance (Audio1_Out): 600 Ohm. For reference only.	(TX-path) Placing different impedance nets in the connector changes the impedance. The signal is amplified with a dual operational amplifier. The signal is transformer isolated
AUDIO_OUT+			2			
CTR_DATA_1_OUT-			11	Output	Closed: Max current: 0.14 A Max resistance: 15 Ohm Open: Max voltage: 30 V Max leak current: 0.1 mA.	Discrete signal. The signal is isolated by an optocoupler.
CTR_DATA_1_OUT +			12			
CTR_DATA_1_IN-			4	Input	Non detect: Max current: 0.18 mA Max voltage: 0.95 V Detect: Min Current: 0.3 mA Min voltage: 2.2 V	Discrete signal. The signal is isolated by an optocoupler.
CTR_DATA_1_IN+			3			
Note 1: Signal levels are factory programmable.						

LRU ID: TruLink Access Point (TAP)	
LRU CONNECTOR: **J5** Audio Interface	**Protective Cap PN: 8LTE02B13**
CONNECTOR STD: MIL--C 38999 MS27468T13B35SB	MATING CONN. MS27467T13B35PB
CONNECTOR MFG'R: SOURIAU	MATING CONNECTOR MFG'R: SOURIAU
CONNECTOR P/N: 8LT7C13B35SB	MATING CONNECTOR P/N: 8LT5C13B35PB

Signal Name	Signal Level	Signal Freq	Pin Number	Input/ Output	Technical Specs	Signal Description
AUDIO_IN- (Note 1)	0 dBm	300 To 3400 Hz	21	Input	Nominal 0 dBm. Input line impedance (Audio1_IN): 600 Ohm. For reference only.	(RX-path) Placing different impedance nets in the connector changes the impedance. The signal is transformer isolated.
AUDIO_IN+			14			
AUDIO_OUT- (Note 1)	0 dBm	300 To 3400 Hz	16	Output	Nominal -10 dBm. Output line impedance (Audio1_Out): 600 Ohm For reference only.	(TX-path) Placing different impedance nets in the connector changes the impedance. The signal is amplified with a dual operational amplifier. The signal is transformer isolated
AUDIO_OUT+			2			
CTR_DATA_1_OUT-			11	Output	Closed: Max current: 0.14 A Max resistance: 15 Ohm Open: Max voltage: 30 V Max leak current: 0.1 mA.	Discrete signal. The signal is isolated by an optocoupler.
CTR_DATA_1_OUT+			12			
CTR_DATA_1_IN-			4	Input	Non detect: Max current: 0.18 mA Max voltage: 0.95 V Detect: Min Current: 0.3 mA Min voltage: 2.2 V	Discrete signal. The signal is isolated by an optocoupler.
CTR_DATA_1_IN+			3			
Note 1: Signal levels are factory programmable.						

LRU ID: TruLink Access Point (TAP)	
LRU CONNECTOR: **Power**	
CONNECTOR STD: MIL-C 26482	MATING CONN. MS3116E14-5S
CONNECTOR MFG'R: CANNON	MATING CONNECTOR MFG'R: CANNON
CONNECTOR P/N: KPT02E-14-5P	MATING CONNECTOR P/N: KPT06E14-5S

Signal Name	Signal Level	Signal Freq	Pin Number	Input/ Output	Technical Specs	Signal Description
+28VDC	DC	DC	A, B	Input	Fused protected 60V, 650mA. Current consumption, 12V, without load: 4.8 mA. PTC-resistor: 650 mA Tranzorb: 39V	Supply voltage: 9 to 33 VDC. User must protect with 1A circuit breaker.
+28VRTN	DC	DC	C, D, E			

ANTENNA

LRU ID: TruLink Access Point (TAP)	
LRU CONNECTOR: **ANT**	
CONNECTOR TNC FEMALE-	MATING CONN.
CONNECTOR MFG'R: TBD	MATING CONNECTOR MFG'R: TBD
CONNECTOR P/N: TBD (TNC FEMALE)	MATING CONNECTOR P/N: TBD (TNC MALE)

Signal Name	Signal Type	Pin Number	Input/ Output	Technical Specs	Signal Description
Antenna	RF Antenna	1	**Input/Output**	Frequency Range: 2,400 MHz to 2,484 MHz	RF transmit / receive signal. Connection to a 50 Ohm antenna