INVISIO V60

Multi-Com Control Unit

USER MANUAL

Contents

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This User Manual describes the use of the INVISIO System (the "Product") which includes headset, control unit, cables and accessories.

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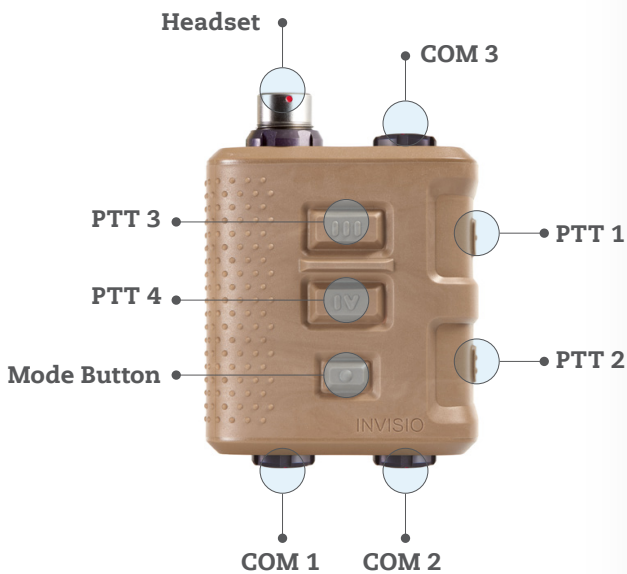
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Headset
COM 3
PTT 3
PTT 4
Mode Button
PTT 1
PTT 2
COM 1   COM 2
INVISIO

INVISIO V60
Communication and Hearing Protection system enabling hearing protection with ambient hear-thru and the ability to control three communication devices simultaneously. Hear-thru volume can be adjusted. The system is designed to meet or exceed military specifications.

Getting Started
1. Connect headset & radio(s)
2. Turn on radio(s) - hear-thru starts automatically
3. Key PTT to transmit on radio

Start-up takes less than 2 seconds and there is an audio tone. When using an INVISIO headset with hear-thru capabilities, hear-thru starts automatically. To turn the hear-thru off, see section on hear-thru control.

Turn Off
To turn off the V60 disconnect the radio cable(s) or turn the radio off.

Caution
• Avoid acoustic feedback by turning the V60 off during headset fitting.

• High sound pressure levels may damage hearing. Ensure radio volume is low at start-up.

Hear-Thru Control

Hear-Thru Adjustment
Hear-thru volume is adjusted by a short press of the Mode Button.
Audio Tone: 1 Beep

Hear-Thru Off
Hear-thru is turned off by a long press of the Mode Button (~1second).
Audio Tone: 2 Beeps

Hear-Thru On
Hear-thru is turned back on by pressing the Mode Button.
Audio Tone: 1 Beep

Long Press
• Turns hear-thru off

Short Press
• Turns hear-thru on or change hear-thru volume steps.

Caution
Avoid acoustic feedback by turning the V60 off during headset fitting.

Hear-Thru Volume Steps

Enhanced Hearing
Enhanced Hearing has a gain of +10 dB.

Natural Hearing
Natural Hearing has a gain of 0 dB.

Comfort Hearing
Comfort Hearing has a gain of -10 dB.

Caution
• Turn the Hear-Thru Off or use Comfort Hearing when in noisy vehicles to reduce noise exposure.

• Using Enhanced Hearing for extended periods may increase noise exposure.

Transmit

Transmit Modes
The V60 has different ways of transmitting depending on the device and cables used. Examples include:
- **Push-To-Talk (PTT)** (e.g. 2-Way Radio)
- **Latching (Mute)** (e.g. Intercom System)
- **Open Mic** (e.g. Intercom System)
- **Call Answering** (e.g. Mobile Phone)
- **Listen Only** (e.g. Minesweeper)

Please consult your representative for more information on your system setup.

PTT Assignment
PTT buttons are dynamically assigned, with a rule of thumb being PTT1 to COM1 and PTT2 to COM2. Keying two PTT's simultaneously is possible. When multi-net radios are connected the following rules apply:
- Every connected device is allocated at least one PTT button.
- Priority is COM1 through to COM3 for button allocation when multi-net radios are connected.

> **Note**
> Different configurations of V60 cables can result in unassigned PTT buttons and different functionality.

PTT Assignment Examples

Example 1

COM Port	PTT Assignment
COM1: Single Net Radio	PTT1: COM1
COM2: Single Net Radio	PTT2: COM2
COM3: Single Net Radio	PTT3: COM3

Example 2

COM Port	PTT Assignment
COM1: Dual Net Radio	PTT1: COM1/Net1
	PTT2: COM1/Net2
COM2: Single Net Radio	PTT3: COM2
COM3: Single Net Radio	PTT4: COM3

> **Note**
> Certain cable and devices when connected will not utilise a PTT button, for example a listen only cable.

How Audio is Received

COM	Default
COM1 / Net1	Left
COM1 / Net2	Right
COM2	Right
COM3	Left

PTT Audio Tones
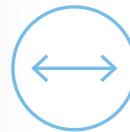Tones are generated to indicate press and release of PTT buttons.

Audio Tone
PTT Keyed: 1 Beep
PTT Released: 2 Beeps

Note
COM1 supports dual net left and right audio. If a dual net left and right audio cable is connected to COM2 or COM3, only one net is audible. While transmitting, depending on the headset, audio can be heard in one or both ears. Refer to headset manual.

Swap Default Audio Left-Right
Default audio routing can be swapped so that COM1 is in right ear and COM2 is in left ear via a key combination.

Key Combo
1. Press and Hold: Mode Button
2. Press and Hold: PTT1
3. Press and Hold: PTT2
4. Release after 5 Seconds: All Buttons

Audio Tone
Swap Audio: 1 Beep
Default Audio: 2 Beeps

COM	Swapped
COM1 / Net1	Right
COM1 / Net2	Left
COM2	Left
COM3	Right

Note
While transmitting in Default or Swapped audio mode, all received audio can be heard in one or both ears. Refer to headset manual.

Received Audio in Both Ears
Received Audio can be swapped between split and dual ear via a key combination.

Key Combo
1. Press and Hold: Mode Button
2. Short Press: PTT2
3. Release: Mode Button

Audio Tone
Both Ears On: 1 Beep
Both Ears Off: 2 Beeps

Received Audio in Both Ears
Received Audio in Both Ears Mode is primarily intended for use in high noise environments, whilst the default split ear audio is primarily intended for use in low noise environments.

INVISIO IntelliCable™
Received audio in both ears mode only works when INVISIO IntelliCable™ settings are programmed to default audio routing.

Note
While transmitting in Default or Swapped audio mode, all received audio can be heard in one or both ears. Refer to headset manual.

Mute All Radios
All radios can be muted (-20 dB) via a key combination.

Key Combo
1. Press and Hold: Mode Button
2. Short Press: PTT1
3. Release: Mode Button

Audio Tone
Mute: 1 Beep
Unmute: 2 Beeps

Exit Mute All Radios
To exit the Mute All Radios Mode, perform any of the following actions:
• Key Combo
• Press any assigned PTT button
• Connect or disconnect any cable.

Note
Some cables do not support Mute All Radios Mode.

Monitor Single Radio
A maximum of one focus can be selected at any given time (mutes other received radio audio by 20 dB) via a key combination.

Key Combo
1. Press and Hold: Mode Button
2. Press and Hold: PTT button
3. Release after 1 Second: All Buttons

Audio Tone
Focus: 1 Beep
De focus: 2 Beeps
Error: 3 Beeps

PTT Button to Use
- COM1: PTT1
- COM2: PTT2
- COM3: PTT3

Exit Monitor Single Radio Mode
To exit the Monitor Single Radio Mode, perform any of the following actions:
- Key Combo
- Press any PTT button assigned to a muted radio
- Connect or disconnect any cable

Note
An error tone is heard when no cable is connected to the COM port being set to Monitor Single Radio Mode.

Alternative State
An alternative duplex state is available on certain cables via a key combination.

Key Combo
1. Press and Hold: Mode Button
2. Short Press: PTT → PTT → PTT → PTT
3. Release: Mode Button

Audio Tone
Alternative State On: 1 Beep
Alternative State Off: 2 Beeps
Incompatible Cable: 3 Beeps

PTT Button to Use
- COM1: PTT1
- COM2: PTT2
- COM3: PTT3

Alternative State
Most radio cables run in Open Mic Mode as the alternative state.

Note
In Open Mic Mode, all receive audio is in the left ear only, as the V60 is always transmitting.

Power Management

Power Source
The V60 can be powered from either a battery pack (PS30) or a Radio.

Getting Started
The V60 automatically starts when connected to a power source.

Incompatible Cables

Warning Tones
A warning tone is heard when an incompatible cable is connected. The audio tone stops when the cable is disconnected.

Audio Tone
COM1 Error: 1 Beep (Repeated Continuously)
COM2 Error: 2 Beeps (Repeated Continuously)
COM3 Error: 3 Beeps (Repeated Continuously)
Headset Error: 4 Beeps (Repeated Continuously)

Causes
• Incorrect INVISIO IntelliCable™ settings
• Faulty cable or connector

Note
If multiple cable failures are detected the priority is: Headset, COM1, COM2, COM3.

System does not power on
• Check headset is connected
• Check radio is connected and powered on

Bad Audio Transmission
• Please see headset's user manual for proper usage of headset. Make sure, if using INVISIO X5 bone conduction microphone is correctly fitted
• Check cable is connected correctly

No Hear-thru
• Press Mode Button
• Press PTT button to check power is on

Note
Contact your representative if the issue is not resolved.

System Reset
System Reset overrides all key combinations and restores the V60 to its original state.

Key Combo
1. Press and Hold: Mode Button
2. Short Press: PTT1 → PTT2 → PTT1 → PTT2
3. Release: Mode Button

Audio Tone
System Reset: 5 Beeps

Note
System reset does not change the V60 firmware version.

Attachment to Equipment

Different Clip
The V60 is supplied with a Molle clip as standard, but different clips are available upon request.
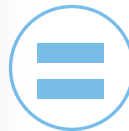
2 mm Hex Key
Use a 2 mm Hex Key to change the clip.

Note
The clip can also be rotated when mounting to allow the V60 to be attached in different directions.

Fitting To Molle Webbing

Place Through Webbing
The Molle clip is threaded through two Molle straps, with the hook grasping the lower Molle strap.

Do Not Stress Connections
Cables should be positioned without hard bends at the connectors.

Caution
Ensure the control unit is securely fastened to your equipment, to avoid personal injury in the case of physical impact.

Cable Management

Fitting Cables to Equipment
Do not thread cables through equipment, such that they are subject to abrasion.

Removing Connectors
Do not attempt to disconnect cables from the V60 by pulling the cable. Remove by pulling on the connector.

Caution
- Ensure cables are securely fastened to avoid entanglement.
- Care should be taken not over-stress cables mounted in equipment.

Storage and Maintenance

Protect from Force
To avoid damaging the V60, store in a protected area without excess weight.

Dry and Ventilated
Store the V60 in a dry and ventilated area with caps removed to avoid moisture build-up in connectors.

Clean in Fresh Water
If the V60 becomes dirty or exposed to salt water, rinse in fresh water.

General Rule for Audio Tones
The general rule for the V60 audio tones is based an on/off rule:
- On: 1 Beep
- Off: 2 Beeps
- Error: 3 Beeps

Hear-thru control
- Hear-thru on (1 Beep) - Hear-thru off (2 Beeps)
- Volume up/down (1 Beep)

Radio control
- PTT press (1 Beep) - PTT release (2 Beeps)
- Connect radio (No Tone) - Disconnect radio (No Tone)
- Latching on (1 Beep) - Latching off (2 Beeps)

System
- Power on (1 Beep)
- Power Off (No Tone)
- Open Mic Mode: On (1 Beep) - Off (2 Beeps)

Note
When using a battery pack (PS30), please refer to its user manual for tones.

BCM
INVISIO Bone Conduction Microphone.
Patented in-ear communication microphone for transmitting.

Hear-Thru
Microphone situated on the headset to monitor audio situational awareness of ambient surroundings.

PTT
Push-to-talk is used when transmitting during a 2-way radio communication. Pressing the PTT button enables transmission. Releasing enables monitoring.

PTT Mode
PTT Mode allows communication in both directions, but not simultaneously. When receiving the user must wait for the signal to end, before begin transmitting.

Open Mic Mode
Open-Mic Mode allows communication in both directions simultaneously. This allows all users to monitor and transmit at the same time.

Latching
Latching is turning and keeping the microphone on.

INVISIO IntelliCable™
Intelligent cable system enabling recognition of attached device.

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