X10DR2 Test Instructions using XATB2 Test Box

Name: Test Instructions for X10DR using XATB2 Test Box

Purpose: To provide Test instructions to enable the X10DR to be tested and aligned using the XATB2 Test Box.

Audience: Manufacturing, Service and QA personnel

Applicable to: X10DR general product (includes Handset and Gateway)

Referenced Docs: none

Background:
The XATB2 Test Box allows all I/O lines of the Gateway RJ45 connector to be exercised and tested, and provides audio facilities to allow the Handset functions and audio paths to be tested without connection to a host radio.

NOTES :

- A Switch is “active” (ON) when it is in the DOWN position, and “inactive” (OFF) when it is in the UP position.
- A LED is “active” (ON) when it is illuminated, and “inactive” (OFF) when it is dark.
- The descriptions in this document assume the X10DR Handset and Gateway are configured with the default parameter settings as defined at the end of this document.

Test Box Connectors :

12VDC POWER : 2.5/5.5mm DC Power Connector
Connect to Power Supply which should be typically set to 12Vdc (+/-0.5V).

Notes:
1. The “SYSTEM POWER” LED will be ON when power is present.
2. +12V will be present on the GW_B+ line (RJ45, pin 1) when power is present.

MONITOR SPEAKER : 2-pole 3.5mm Phono Connector
Connect to Monitor Loudspeaker (8 ohm, min 500mW)
Volume can be adjusted via the “MONITOR” VOLUME” control.
Source is selected via the “RADIO AUDIO / TA AUDIO” switch.

RADIO AUDIO OUT : BNC Connector*[1]
If desired, connect to Oscilloscope to observe the GW_AUDIO_OUT signal (RJ45, pin 4).
This audio is what would normally be sent from the X10DR Gateway to the host Radio

This line will have a 47k pull-up resistor (to +5V) when the “RADIO-ON” Switch is ON.

RADIO AUDIO IN : BNC Connector*[1]
If desired, connect to a Signal Generator to inject a signal into the GW_AUDIO_IN line (RJ45, pin 3).

Note : When the “RADIO TONE” switch is ON, the generated tone (from the Test Box) will appear on this line.

T/A AUDIO : BNC Connector*[1]
If desired. connect to Oscilloscope to observe the TA_AUDIO line (RJ45, pin 8).

Notes :
1. When there is no audio signal on this line, it will sit at approximately 3.0 to 3.2Vdc.
2. When an audio signal is present on this line, it will sit at approximately 2.3Vdc.
3. This line is grounded when the “REMOTE-PTT” switch is ON.
4. This line will have approximately 2.3Vdc on it when the “TA PTT” switch is ON.
5. This line will have the generated tone on it when the “TA-TONE” switch is ON.

X10DR : RJ45 Connector
Connect to Gateway via a shielded RJ45 cable (eg. XIC-0.5)

*1 The RADIO-AUDIO-IN, RADIO-AUDIO-OUT and T/A-AUDIO connectors do not need to be connected for “normal” X10DR testing. Theses lines are provided for additional debugging / monitoring – if required.

Test Box Switches and LEDs :

SYSTEM POWER LED:
This LED will be ON when power is connected to the 12VDC POWER connector.

RADIO-ON Switch:
Simulates the Radio switching ON/OFF and is used to switch the Gateway ON/OFF.

ON switches +5V (via a 47k resistor) onto the GW_AUDIO_OUT line (RJ45 pin 4).
OFF opens the switch.

COR Switch:
This generates a COR signal (Active LOW on RJ45, pin6). The Handset will unmute its speaker when this switch is activated.
A low level "hiss" should be heard in the Handset speaker.
Any audio on the GW_AUDIO_IN line (RJ45, pin 3) should be heard in the Handset speaker.

RADIO-PTT LED:
The LED lights when the Handset Side-PTT button is pressed.

TA-PTT Switch:
The switch simulates a Talk-Around PTT by a parallel-connected Gateway.
When this switch is ON, it places approximately 2.3Vdc on the TA_AUDIO line (RJ45, pin 8).
A low level "hiss" should be heard in the Handset speaker.
Any audio on the TA_AUDIO line (RJ45, pin 8) should be heard in the Handset speaker.
The "TA PTT" LED will light when this switch is ON.

TA-PTT LED:
The LED lights when
1. the Handset TA-PTT button (Grey button) is pressed.
2. the "TA PTT" switch on the Test Box is switched ON.

RADIO EMERG LED:
The LED lights when the Handset Emergency button (Orange button) is pressed.
This is in response to the Gateway Emergency Line (RJ45 pin 2) going LOW.

REMOTE-PTT Switch:
ON switches 0V onto the TA-AUDIO line (RJ45 pin 8) and disables the **TA-PTT** and **TA-TONE** switches

When this switch is ON, the Handset Microphone is enabled (just as if the Handset side-PTT button were pressed). The Handset LED should show RED.

RADIO-TONE Switch:
ON switches a 400mVrms, ~1kHz tone onto the GW_AUDIO_IN line (RJ45 pin 3.
This will typically trigger the VOX circuit in the Gateway and the tone will be heard in the Handset Speaker.

TA-TONE Switch:
ON switches a 400mVrms, ~1kHz tone onto the TA-AUDIO line (RJ45 pin 8).
This will not be automatically heard at the Handset Speaker.
The TA-PTT switch should be ON in order for this signal to appear at the Handset Speaker.

RADIO AUDIO LEDs
Three LEDs provide an indicative indication of signal level on the GW_AUDIO_OUT line (RJ45, pin 4)

FUNC 5 and 6 LEDs:
These LEDs give an indication of the applied DC bias on the GW_AUDIO_IN line (RJ45, pin 3).

FUNC 5 LED illuminates when FNC5 is active
Eg. Handset is in Handsfree mode.

FUNC 6 LED illuminates when FNC6 is active.
Eg. Handset is in the Gateway Cradle.

Note : FUNC 5 LED will always be ON if FUNC 6 LED is ON. This is a characteristic of the detection circuit.

RADIO / TA AUDIO switch and MONITOR-VOLUME control:
The MONITOR SPEAKER volume and source is selected by these controls.

When the switch is set to RADIO AUDIO, then the signal on the GW_AUDIO_OUT line (RJ45, pin 4) is routed via an audio amplifier to the speaker.

When the switch is set to TA AUDIO, then the signal on the GW_TA_AUDIO line (RJ45, pin 8) is routed via an audio amplifier to the speaker.

Suggested Test Procedure :

The following procedure is a guide only that may be used to test a Gateway and Handset is working correctly. The order of the steps is generally not important, and can be varied to suit specific testing or diagnosis requirements as the user becomes familiar with the Test Box functions.

1. Connect +12VDC and a MONITOR-SPEAKER to the XATB2 Test Box.

2. Set all switches on Test Box to OFF or UP position
   (Check SYSTEM –POWER LED is ON)

3. Connect a Gateway to the "X10DR" connector.
   Observe that the LED on the Gateway remains OFF (or has a dull RED glow).

4. Place an unpaired[NOTE-2], OFF Handset in the Gateway Cradle.
   Observe that the Handset turns ON and its LED is a steady BLUE.
   …and observe that FUNC 6 LED is OFF[NOTE-3].

5. Remove the Handset from the Cradle.
   Observe that the Handset LED starts flashing BLUE.

6. Press the Handset Volume-UP button ~7 times and hear beep volume increase.
   Press the Volume-DOWN button 4 times and hear beep volume decrease.

7. Turn the RADIO-ON switch to ON.
   Observe that the Gateway LED flashes BLUE.

8. Place the Handset into Pairing-Mode[NOTE-4] and place the Handset into the Gateway cup.
   Observe the Gateway LED start flashing faster. Also note that the FUNC 5 & 6 LEDs are also flashing.
   The pairing process should complete after ~10 seconds with HS and GW LEDs showing steady BLUE ON.
   …and observe that FUNC 6 LED is ON[NOTE-2] (indicating HS is in Cradle).

9. Remove the Handset from the Gateway cup.
   Observe that both Handset and Gateway LEDs show a steady BLUE
   …and observe that FUNC 6 LED is OFF.

10. Ensure MONITOR SPEAKER is switched to RADIO-AUDIO and VOLUME is at ~2:00 o'clock.
    Press Handset Side PTT button.
    Observe RADIO-PTT LED lights and Mic audio is heard in MONITOR SPEAKER.
    Also observe that the TA-PTT LED is lit.
    Release PTT button.
    Note: There will also be audio if the MONITOR SPEAKER source is switched to TA-AUDIO

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[2] Note: Erase pairing data in Handset by Powering ON whilst holding the PTT and Volume-Up button. Hear a triple-bip tone from the Handset.

[3] Note: FUNC 5 LED will also be ON when FUNC 6 LED is ON.

[4] Note: Press + hold the Handset Volume UP and DOWN buttons for ~10 seconds until a repeated beeping sound is heard.

11. Switch the REMOTE-PTT switch to ON.
    Observe RADIO-PTT LED lights and Handset Mic audio is heard in the MONITOR SPEAKER.
    Observe that the Handset LED shows RED
    (The TA-PTT LED will not be lit, and there will be no audio on the TA-AUDIO line.)
    Set REMOTE-PTT switch to OFF again.

12. Press Handset EMERGENCY (top ORANGE) button.
    Observe RADIO-EMERG and TA-PTT LEDs light and Mic audio is heard in MONITOR SPEAKER.
    Release EMERGENCY button.
    Note: There will also be audio if the MONITOR SPEAKER source is switched to TA-AUDIO

13. Switch the MONITOR SPEAKER source to TA-AUDIO.
    Press Handset TA-PTT (top GREY) button.
    Observe TA-PTT LED lights and Mic audio is heard in MONITOR SPEAKER.
    (The RADIO-PTT LED will NOT be lit, and there will be no audio on the RADIO-AUDIO line.)
    Release the TA-PTT button.
    Switch the MONITOR SPEAKER source back to RADIO-AUDIO

14. Turn the COR switch to ON (on Test Box).
    Listen to the Handset speaker and hear a background “hiss”.

    Turn the RADIO-TONE switch to ON.
    Hear a tone sound from the Handset Speaker.
    Turn the RADIO-PTT switch to OFF, then turn the RADIO-TONE switch to OFF.
    Observe that the tone only stops after the RADIO-TONE is switched OFF.

15. Turn the TA-PTT switch to ON.
    Listen to the Handset speaker and hear a background “hiss”.

    Turn the TA-TONE switch to ON.
    Hear a tone sound from the Handset Speaker.
    Turn the TA-PTT switch to OFF.
    Observe that the tone stops.
    Turn the TA-TONE switch to OFF

16. END of testing.

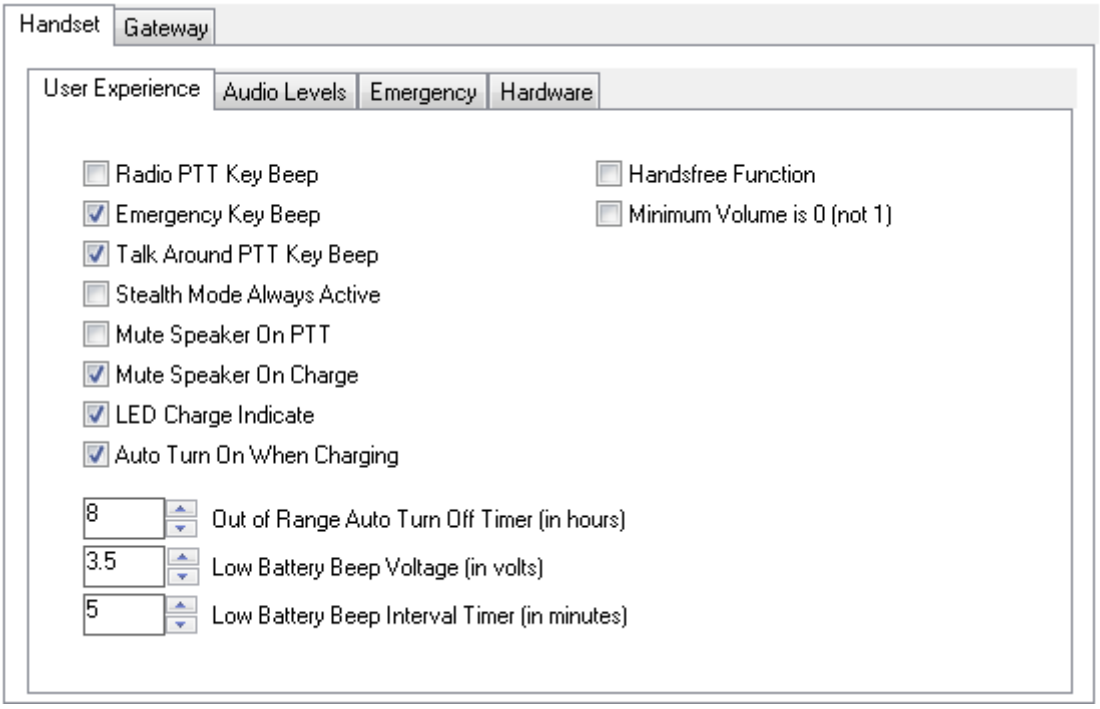
EXTRA TESTS

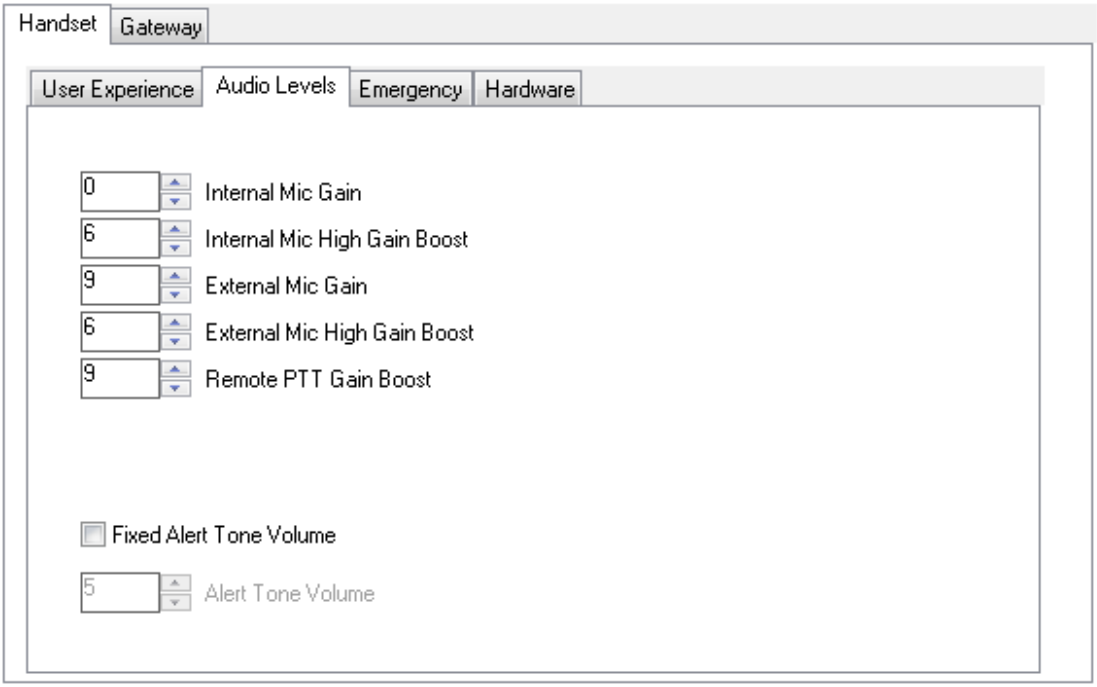
17. If Handset has HANDSFREE enabled and programmed, then double-press the Handset TA-PTT (top grey) button and observe that the TA-PTT LED and the FUNC 5 LED illuminates (indicating the Handset is in Handsfree-Mode), and that Mic audio appears in Monitor-Speaker.
    Single-press the TA-PTT button to exit Handsfree-Mode, and observe FUNC 5 LED turns OFF.

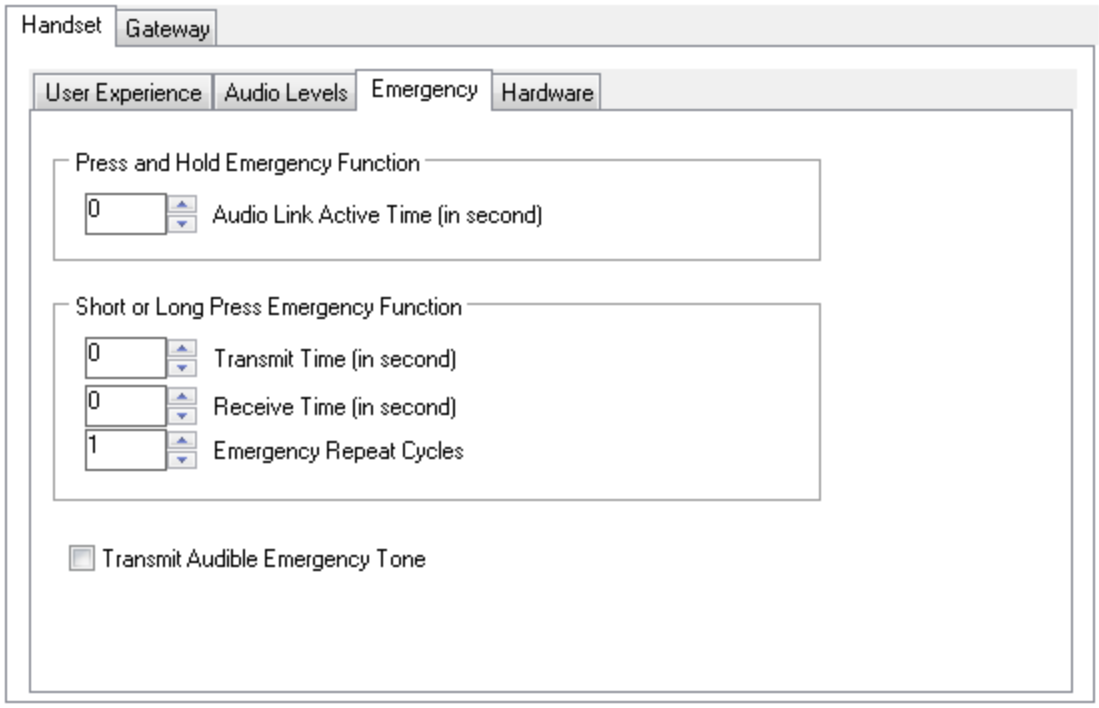
18. For “Elite” Gateways, unplug the MONITOR-SPEAKER from the Test-Box and plug it into the connector on the base of the Gateway.
    Press the TA-PTT button and hear audio from the MONITOR-SPEAKER. The Volume UP/DOWN buttons (on base of Gateway) adjust the level.

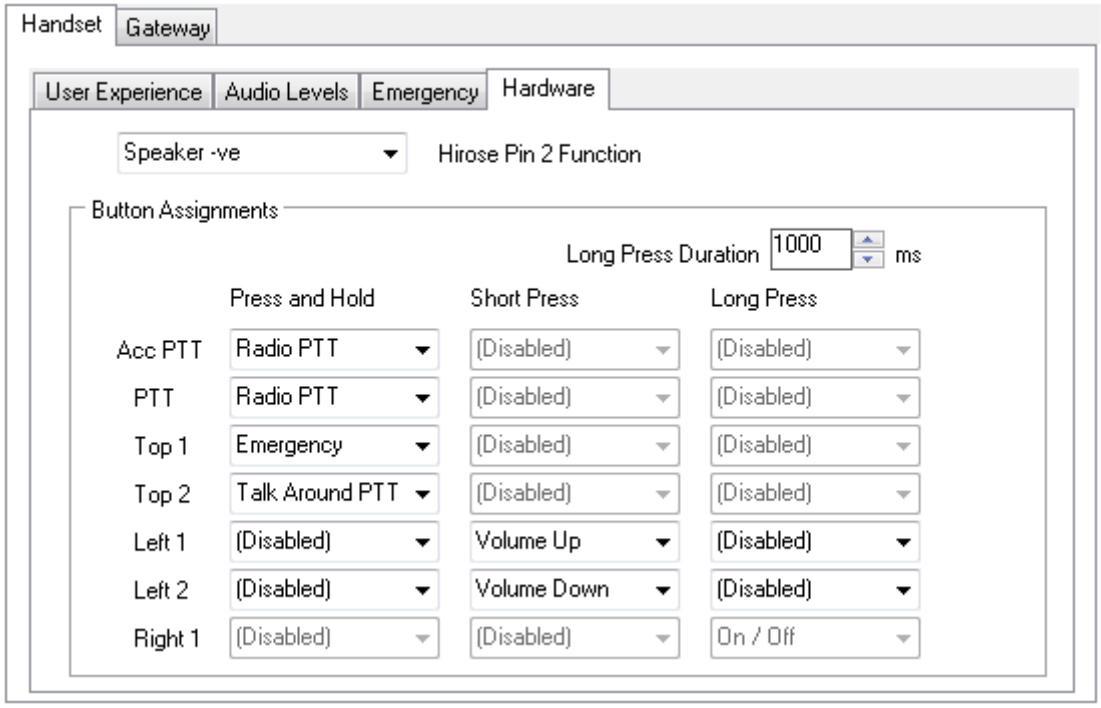
DEFAULT HANDSET AND GATEWAY CONFIGURATION PARAMETERS

HANDSET:

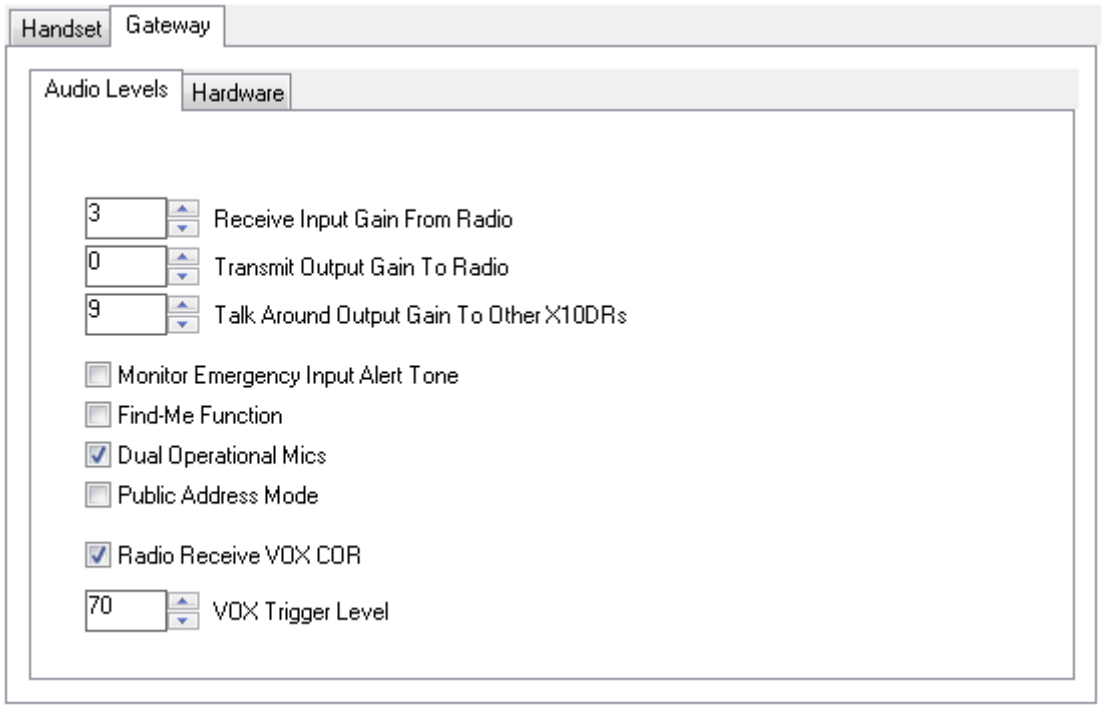


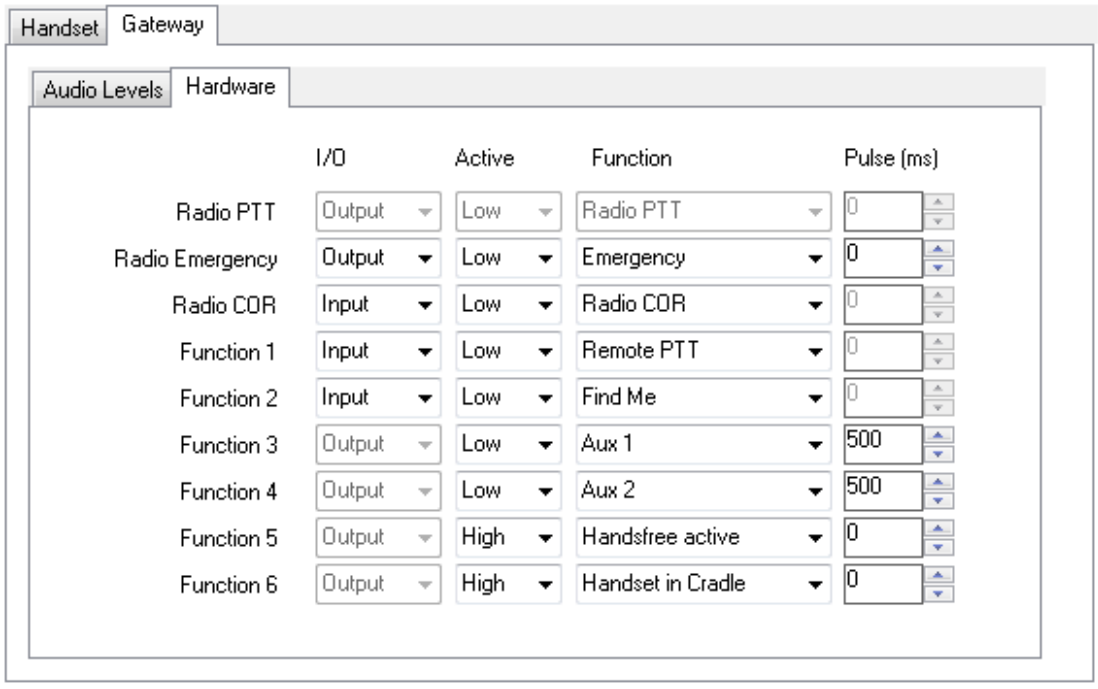



Handset
Gateway
User Experience
Audio Levels
Emergency
Hardware
Press and Hold Emergency Function
0
Audio Link Active Time (in second)
Short or Long Press Emergency Function
0
Transmit Time (in second)
0
Receive Time (in second)
1
Emergency Repeat Cycles
Transmit Audible Emergency Tone


Handset
Gateway
User Experience
Audio Levels
Emergency
Hardware
Speaker -ve
Hirose Pin 2 Function
Button Assignments
Long Press Duration
1000
ms
Press and Hold
Short Press
Long Press
Acc PTT
Radio PTT
(Disabled)
(Disabled)
PTT
Radio PTT
(Disabled)
(Disabled)
Top 1
Emergency
(Disabled)
(Disabled)
Top 2
Talk Around PTT
(Disabled)
(Disabled)
Left 1
(Disabled)
Volume Up
(Disabled)
Left 2
(Disabled)
Volume Down
(Disabled)
Right 1
(Disabled)
(Disabled)
On / Off

GATEWAY


Handset
Gateway
Audio Levels
Hardware
3
Receive Input Gain From Radio
0
Transmit Output Gain To Radio
9
Talk Around Output Gain To Other X10DRs
Monitor Emergency Input Alert Tone
Find-Me Function
Dual Operational Mics
Public Address Mode
Radio Receive VOX COR
70
VOX Trigger Level


Handset
Gateway
Audio Levels
Hardware
I/O
Active
Function
Pulse (ms)
Radio PTT
Output
Low
Radio PTT
0
Radio Emergency
Output
Low
Emergency
0
Radio COR
Input
Low
Radio COR
0
Function 1
Input
Low
Remote PTT
0
Function 2
Input
Low
Find Me
0
Function 3
Output
Low
Aux 1
500
Function 4
Output
Low
Aux 2
500
Function 5
Output
High
Handsfree active
0
Function 6
Output
High
Handset in Cradle
0