ICOM

IDAS™ Technical Tips

"Action of the TX / RX LED"

IC-F3160/F3260 Series Handheld Radio
and
IC-F5060 Series Mobile Radio

Icom Inc.

Foreword

The subscriber radio for the NXDN™ IDAS™ multisite trunked system works slightly different than the radio for a conventional system.   For example, it sometimes transmits a signal even if you do not press [PTT]. Or sometimes it does not transmit even if you press [PTT] for a long time.   However this is the correct operation of a trunked system subscriber radio and not an error or irregular action.

This document explains how an IDAS™ multisite trunked radio operates, by showing visible examples of the radio's behavior, like the LED indicators or the LCD backlight.   It is possible to get a basic knowledge of how an IDAS™ multisite trunked radio works, by studying the LED blinking and/or the LCD backlight status.

This knowledge is very basic and simple, but necessary, important, and useful, especially for troubleshooting and to judge whether the system or subscriber settings are appropriate or not.   Or if there are any other issues you have to solve other than the IDAS™ equipment, to maintain good service to your customer.

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Note:

This document was prepared based on the following software revisions:

Hardware		Firmware type	Revision
IC-F3160 / F3260 / F4160 / F4260series	Handheld radio	Main	4.8
		DSP	3.1
IC-F5060 / IC-F6060 series	Mobile radio	Main	4.8
		DSP	3.1
IC-FR5000 / IC-F6000 series	Repeater	Main	2.4
		DSP	2.6
UC-FR5000	Network adaptor	MCU	3.6
		SCU	3.4

Programming Software	Revision
CS-F3160/F5060	4.7
CS-FR5000	1.8

1 Introduction

Every IDAS™ transceiver has TX / RX LED indicators showing the radio status to the operator. This is common with ICOM's traditional analog FM radio or IDAS™ radios configured for conventional or trunked systems. The basic indications are described in the following table.

TX/RX LED

| Color	Radio condition
(Lights red)	The radio is transmitting.
(Lights green)	While the subscriber radio receives a signal, the LED lights green. However it does not mean that the radio is receiving an incoming call from another operator.
(turn OFF)	The radio is in the standby mode.

Location of the TX/RX LED: see red circle

The following are typical operations of IDAS™ multi site trunk radios. More detailed descriptions are explained in subsequent sections.

- Registration
- Standing by
- Receiving a call
- Repeater busy
- Call initiation
- Call retry

2　Registering the radio

The following timing chart and text explains the working theory of registration after you have turned ON the radio.　It takes approximately 10 seconds after you turn ON the radio to complete the registration process, if there are no other radios trying to register to the same [Collect repeater] at the same time.

Action of the TX/RX LED
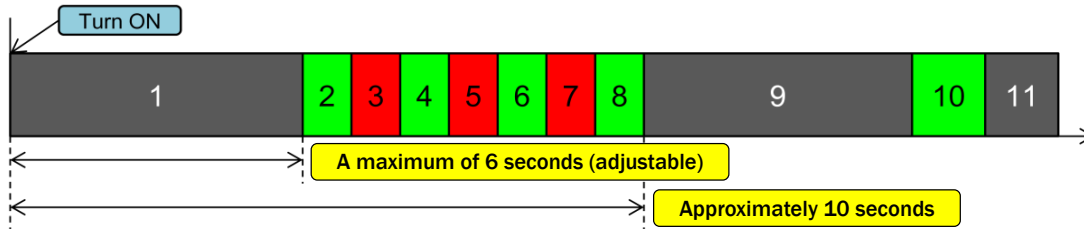
1. After turning ON the radio, it stays on the [Collect repeater] frequency for a maximum of 6 seconds. (This time duration is adjustable.　Refer to items in "related settings" for details.)

2. Receives a [Site ID] signal is sent from the [Collect repeater].

3. The radio sends a [Call request] message to the [Collect repeater].

4. The [Collect repeater] sends back a [Call Response] message to the radio.

5. The radio sends a [Registration request] message to the [Collect repeater].

6. The [Collect repeater] sends back a [Registration response] message to the radio.

7. The radio sends an [End of transmission] message to the [Collect repeater].

8. The [Collect repeater] sends back an [End of transmission] message to the radio.

9. The radio moves to the [Home repeater] and begins standing by.

10. The radio receives a [Site ID] signal sent from the [Home repeater].

11. The radio stands by on the [Home repeater] channel.

Related settings;

■Roaming Wait Timer (CS-F3160/F5060)

Default Value: 6 seconds
Selectable range: 0.1 to 25.5 seconds

This item sets the time duration that the radio stays on the [Collect repeater] channel to find a [Site ID] signal, after being turned ON.

This item should be set to 1 second longer than the Site ID TX cycle.　If it is set shorter than the Site ID TX cycle, the radio may fail to find a [Site ID] signal which is a trigger for the radio to start the registration process.

2 Registering the radio (continued)

■Site ID TX cycle (UC-FR5000)

Default Value: 5 seconds
Selectable range: 3 to 10 seconds

Set the time interval to transmit the [Site ID] from the [Collect repeater] and the [Home repeater] of a Multi-site Trunked mode site.

Use the default value under normal operation. If you adjust this value, be sure it is longer than the radio's "Roaming Wait Timer".

Site Settings - Site Management

Site Management Settings

Site Code   (1-250)

Site Type   ● Small Zone   ○ Medium Zone   ○ Large Zone

Adjacent Site Code

Site ID Tx Cycle[sec]   5   (3.0 - 10.0)

Number of Site ID Tx Frame for Home Repeater   4   (4 - 30)

Number of Site ID Tx Frame for Collect Repeater   6   (6 - 30)

■Ack RX Wait (CS-F3160/F5060)

Default Value: 0.8 seconds
Value range: 0.001 to 60.000 seconds

Set the time period for the radio to wait for an acknowledgment from a repeater station, after sending a [Call request].

If no acknowledgment is received within this set time period, the radio repeats the call up to the number of times, set in "Attempt No".

Digital - Option

Config

Unit ID	MR CH Individual
Global ID(Edit)	1
Global ID(Auto)	0
Ack TX Delay(Sec)	0.100
Ack RX Wait(Sec)	0.800
Attempt No.	5
Ringer Repeat(Sec)	10.000
Call Type	Talkgroup
Call Type Reset	ON
Reset Timer(Sec)	10.000
Data Decode Comparison	OFF
Digital/Individual/Talkgroup Key	Normal(Application

■Opening Text (CS-F3160/F5060)

Default Value: (No text)
Value range: Maximum 12 or 24 characters

TIPS: When turning ON the power, your programmed text is displayed for 2 seconds, before starting the registration procedure. Set this item to "No text" if you want the radio to start the registration faster.

Key & Display Assign

Display

Opening Text

Opening Beep   OFF

3   Standing by

After the radio has successfully finished registering, it moves to a repeater assigned as the [Home repeater] and enters the standby mode.   Preprogrammed channel text is displayed on the radio's LCD. The LED blinks green every several seconds.   The LED blinking default interval is 5 seconds, but you can adjust this to a longer or shorter interval.

Action of the TX/RX LED

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

400 milliseconds (adjustable)

5 seconds (adjustable)
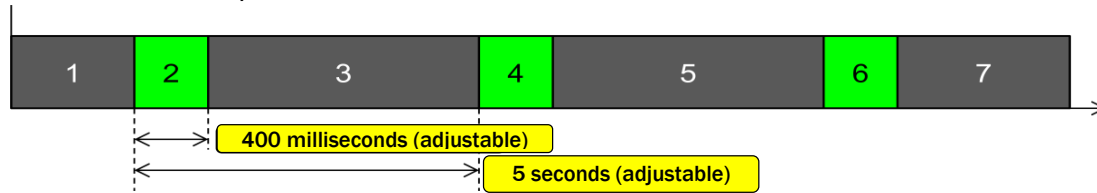
1, 3, 5, 7.   The radio stays on the [Home repeater] in the standby mode.

2, 4, 6.   Receives a [Site ID] signal sent from the [Home repeater].

Site ID TX cycle (total duration time of the above chart 2+3) is adjustable.
Refer to items in "related settings" for details.

Related settings;
■Roaming Wait Timer (CS-F3160/F5060)

Default Value: 6 seconds
Value range: 0.1 to 25.5 seconds

This item sets the time duration that the radio stays on the [Collect repeater] to find a [Site ID] signal, after the radio is turned ON.

Set the timer 1 second longer than the Site ID TX cycle.
If it is set shorter than the Site ID TX cycle, the radio may fail to find a [Site ID] signal which is a trigger for the radio to start the registration process.

■Site ID TX cycle (UC-FR5000)

Default Value: 5 seconds
Selectable range: 3 to 10 seconds

Set the time interval to transmit the [Site ID] from the [Collect repeater] and the [Home repeater] at a Multi-site Trunked mode site.

Use the default value under normal operation.   If you adjust this value, be sure it is longer than the radio's "Roaming Wait Timer".

4   Receiving a call

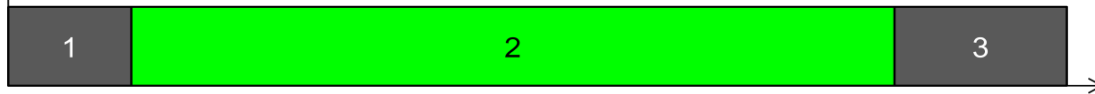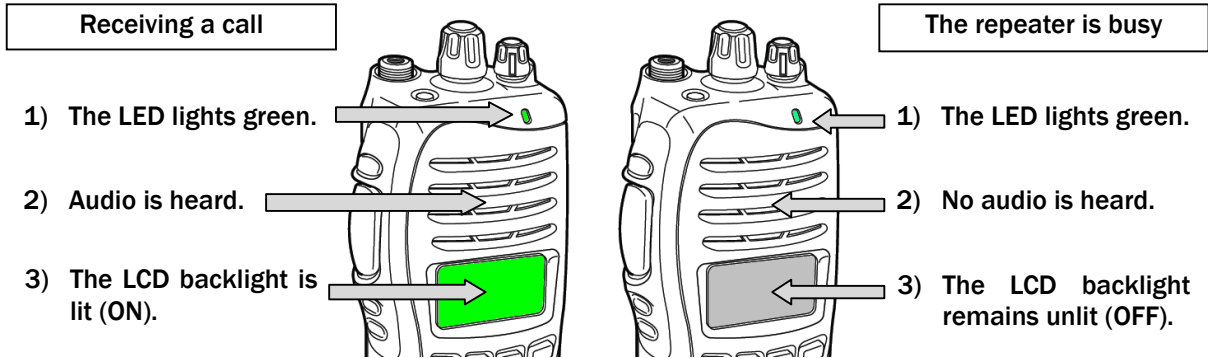When the radio receives an incoming call from another radio in the same Talkgroup, the LED lights green and audio is heard from speaker.   Depending on preprogrammed settings, the LCD backlight is turned ON, beeps are heard from the speaker along with the incoming call, and the Caller ID or corresponding name is displayed.

Action of the TX/RX LED

1	2	3

1. The radio stays on the [Home repeater] in the standby mode.

2. Receives incoming calls sent from a radio belonging to the same Talkgroup.   You can hear audio.

3. After the signal disappears, the TX/RX LED turns OFF.

Note: The difference between "receiving a call" and a "busy" status

Receiving a call		The repeater is busy

1) The LED lights green.

2) Audio is heard.

3) The LCD backlight is lit (ON).

1) The LED lights green.

2) No audio is heard.

3) The LCD backlight remains unlit (OFF).

Related settings;

■Set Mode - Backlight (CS-F3160/F5060)

Default: Dim Auto
Selectable option:

OFF: The backlight is always OFF.

OFF Auto: Lights for 5 seconds when any key except when [PTT] is pushed, or when you have an incoming call.

Dim Auto: Lights dim if you select this option on a mobile radio and apply a signal to an external DIM terminal.   The backlight turns ON when no signal is applied to an external DIM terminal.   Valid for only a mobile radio.   If you select this option on a handheld, it works the same as "ON".

Dim: Lights only dimly.   Valid for only a mobile radio. If you select this value on a handheld, it works same as "ON".

ON: Lights continuously.

	Value	Enable /Inhibit
Backlight	Dim Auto	Enable
LCD Contrast	50	Enable
Beep	ON	Enable
Beep Level	3	Enable
Ringer Level	3	Enable
SQL Level	2	Enable
AF Min Level	0	Enable
Mic Gain	3	Enable
VOX Gain	3	Enable
VOX Delay(Sec)	0.5	Enable
Horn	ON	Enable
Battery Voltage	OFF	Enable
Signal Moni	ON	Enable
Lone Worker	OFF	Enable
System Info	----	Inhibit

Selecting "OFF Auto" turns ON the LCD backlight for 5 seconds when receiving an incoming call. Select the backlight setting from above table.

4   Receiving a call (continued)

■Ringer on Receive (CS-F3160/F5060)

TIPS: Select an option other than "OFF" if you want to hear beeps when receiving an incoming call. Select the desired ringer type when the digital squelch opens.

Default: OFF
Selectable options:

Null: Ringer sound (or non sound) is retained even when the digital squelch opens.

OFF: Ringer sound is turned OFF.

Pi: 1 high ring sounds once.

PiPi: 2 high rings sound once.

PiRo: 1 high ring and 1 low ring sound 3 times.

Pi/R: 1 high ring is repeated at the selected time interval.

PiPi/R: 2 high rings are repeated at the selected time interval.

PiRo/R: 1 high ring and 1 low ring sound 3 times, repeated at the selected time interval.

■Talkgroup Display on Receive (CS-F3160/F5060)
This setting is to display the caller Talkgroup ID or not when receiving an incoming call.

Default: OFF
Selectable options:

ON: The caller Talkgroup ID or corresponding name is displayed.

OFF: The caller Talkgroup ID or corresponding name is not displayed.

■Unit ID Display on Receive (CS-F3160/F5060)
This setting is to display a caller unit ID or not when receiving an incoming call.

Default: OFF
Selectable options:

ON: The caller Unit ID or corresponding name is displayed.

OFF: The caller Unit ID or corresponding name is not displayed.
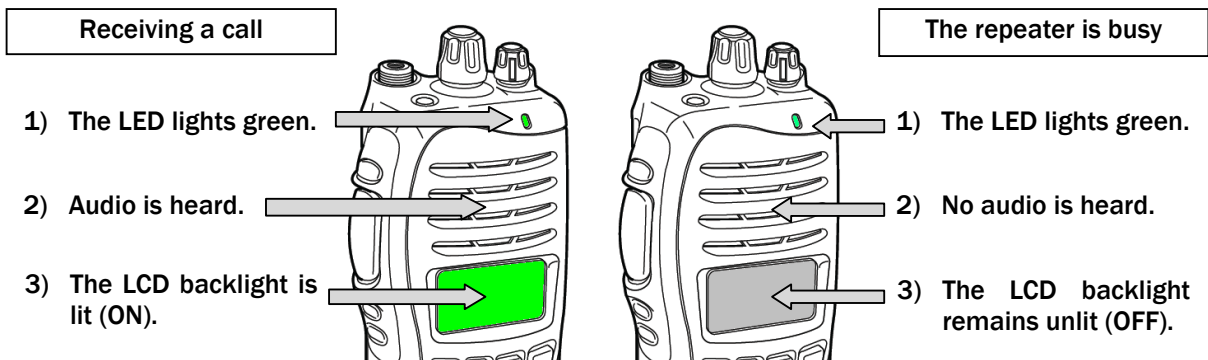
5 Home repeater busy

If the repeater assigned as the [Home repeater] is occupied by another subscriber radio or other Talkgroup than the one you belong to, the TX/RX LED also lights green. However no sound is heard from the speaker, the LCD backlights are not turned ON, and the caller ID or name is not displayed.

Action of the TX/RX LED
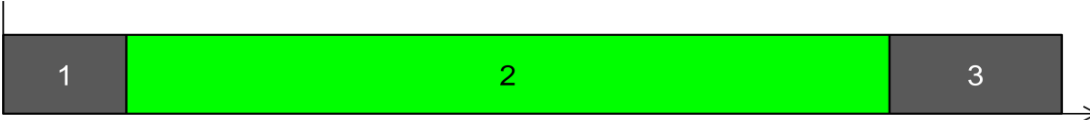
1. The radio stays on the [Home repeater] in the standby mode.

2. Someone (other than your Talkgroup) starts a conversation. The LED indicator lights green, but no voice is heard from the speaker.

3. After the signal disappears, the TX/RX LED is turned OFF.

Note: The difference between a "receiving a call" and a "busy" status

Receiving a call		The repeater is busy
1) The LED lights green.		1) The LED lights green.
2) Audio is heard.		2) No audio is heard.
3) The LCD backlight is lit (ON).		3) The LCD backlight remains unlit (OFF).

6 Initiating a call

After the radio successfully finishes the registration, hold down the [PTT] to initiate a call. It takes approximately 320 milliseconds to establish a handshake to talk, if the radio is within the service area and there is no retry.
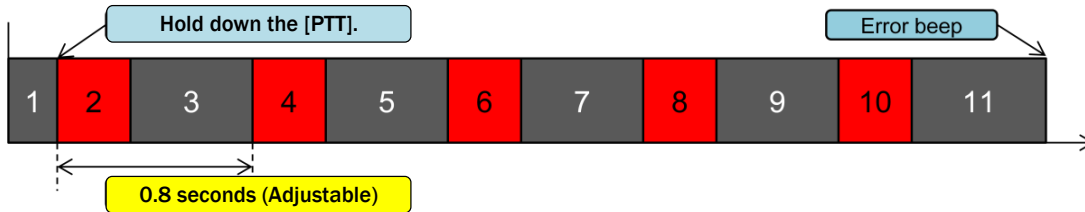
Action of the TX/RX LED
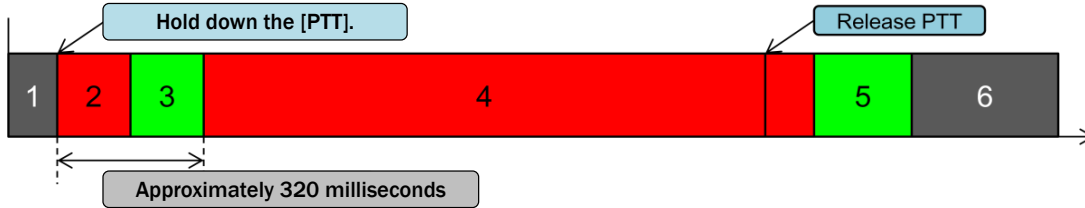
1. The radio stays on the [Home repeater] in the standby mode.

2. The operator pushes the radio's [PTT], and it sends a [Call request] message to the [Home repeater].

3. The [Home repeater] sends back the [Call connection response] message and allows the radio to continue to transmit, if the repeater is not busy.

4. The radio starts transmitting and the operator talks at a normal voice level. When the conversation is finished, the operator releases [PTT] to stop transmission. When the operator releases [PTT], the [End of transmission] message is sent at the end of the transmission.

5. The [Home repeater] sends back the [End of transmission] message.

6. The radio returns to the standby mode.

7 Call retry

After holding down the [PTT] to initiate a call, if there is no acknowledgement from the repeater, the radio sends the [Call request] again. If the retry count exceeds the number of attempted retries, the radio stops sending a [Call request]. At the same time, an error sounds.

Action of the TX/RX LED

1.   The radio stays on the [Home repeater] in the standby mode.

2.   The operator pushes the radio's [PTT], to send a [Call request] to the [Home repeater].

3 to 10.   If no acknowledgement is received within the Ack RX wait timer set time, the radio sends the [Call request] again.

11.   If no acknowledgement is received, and the retry count exceeds the attempt number setting, the radio sounds a beep, to alert the radio operator.

Related settings;
■Ack RX Wait (CS-F3160/F5060)

Default Value: 0.8 seconds
Value range: 0.001 to 60.000 seconds

Set the time period for the radio to wait for an acknowledgment from the repeater, after sending a [Call request].

If no acknowledgment is received within this set time period, the radio repeats the call up to the number of times set in "Attempt No".

■Attempt No. (CS-F3160/F5060)

Default Value: 5
Value range: 1 to 15

Set the maximum number of times the radio transmits a call when no acknowledgement is received within the period set in "Ack RX Wait".

Count on us!

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