IC-F9511
RadioG uide

November 2009

Your Smart P25 Choice

▲ 110WH ighPo weredF 9511HTV ersionSho wn

P25T runking
P25Con ventional
AnalogCon ventional
ALLINONE

Icom America Inc.

FOREWORD and DISCLAIMER

Foreword

This handbook provides detailed information about the IC-F9510 series VHF and UHF MOBILE TRANSCEIVERS based on the latest firmware Rev.1.50.

Disclaimer

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Table Of Contents

Table Of Contents

1 Introduction
1-1 Company Profile

Company Profile

Icom, the wireless communication experts

Icom Inc. is a company located in Osaka, Japan, and is a manufacturer of wireless communication products. Since Icom's establishment in 1954, we have had a long record as a trusted manufacturer of land mobile radio, amateur radio, marine radio, navigation products, aviation radio and communications receivers.

Quality & Reliability

Icom quality and Icom reliability

Over 50 years of engineering and production excellence is a part of every Icom product. Using the latest equipment, Icom radios are tested to pass rigorous in-house tests as well as environmental tests to the US Military standard 810 specifications. Icom Inc holds ISO9001:2008 certification.

Production

Made in Japan quality

Icom is a rare example of an electronics manufacturer that has not shifted production to lower cost countries, but kept its production base 100% in Japan. The Wakayama Icom plant has an advanced production system to produce small volume/multi-model wireless communication products.

Icom brand

Icom, world brand name

Icom is today recognized as a reliable 2-way radio brand name around the world. Our land mobile radios are used by many professional organizations all over the world, like the United States Department of Defense and the U.S. Marine Corps. who chose Icom as the first Japanese company to supply radios to them.

Network

Icom's worldwide network

Icom's products are sold in over 80 countries in the World. Icom has an international sales and service network around the world, including sales subsidiaries in the US, Australia, Germany, Spain and liaison offices in France and China. Icom is here to support and service our products and your communication needs.

2 Overview
2-1 Product Line Up

VHF P25 Trunking Mobile Transceivers

IC-F9511S *(USA Version)*
IC-F9511T *(USA Version)*
IC-F9511HT *(USA Version)*

IC-F9511T / **IC-F9521T** / **IC-F9523T** includes supplied Hand Microphone HM-148G and External Speaker SP-22

UHF P25 Trunking Mobile Transceivers

IC-F9521S *(USA Version)*
IC-F9521T *(USA Version)*
IC-F9523S *(EXP Version)*
IC-F9523T *(EXP Version)*

IC-F9511HT includes supplied Hand Microphone HM-148G and Optional External Speaker SP-30 (Photo : Double remote head option)

IC-F9511S / **IC-F9521S** / **IC-F9523S** includes supplied Hand Microphone HM-148G.

NOTE : In this sales handbook, the IC-F9511/S/T/HT/F9521/F9523/S/T are all referred to as "**IC-F9510 series**". When the products are described as "**IC-F9511S/F9511T**", this includes IC-F9521S/F9521T/F9523S/F9523T.

APCO P25 DIGITAL RADIO SYSTEM – *Conventional and Trunking in one radio !*

APCO Project P25 Digital migration is now an inevitable trend for Federal, State and Local government users of 2-way radios. The IC-F9510 series, much more evolved from the IC-F1700 series, are not simply enabling migration from analog to digital but also covers wide range of features. The standard trunking capability of the IC-F9510 series is outstanding, ensuring smooth communication, despite busy signal traffic. Furthermore the IC-F9510 series has the advanced DVSI AMBE+2™ enhanced vocoder resulting in clear speech audio.

APCO 25 [P25] Digital Features

❑P25 Conventional and Trunking
The IC-F9510 series includes P25 VHF conventional and trunking capabilities as standard. You can assign individual channels to conventional analog, conventional P25 or P25 trunking, all within one radio.

❑Interoperability
The IC-F9510 series have passed CAP (Compatibility Assessment Program) and proved to provide interoperability with other brand P25 trunked infrastructure for public safety applications. The IC-F9510 series conforms to the standard specifications for TIA-102, CAAB-B, Digital C4FM Transceiver Performance recommendations.

❑Digital/Analog - Mixed mode operation
The IC-F9510 series have the mixed mode operation which allows you to detect and receive both analog FM and P25 digital modes and to transmit either mode depending on programming.

❑Individual ID and talkgroup ID
The IC-F9510 series has 100 individual ID and 250 talkgroup ID memories. Use the display to visually select the person or group you're going to call.

❑Optional AES/DES encryption
The IC-F9510 series provides AES and/or DES encryption for secure conversation with the optional UT-125 AES/DES encryption unit or UT-128 DES encryption unit. Versions certified to FIPS 140-2 Level 1 for AES encryption are planned for future release.

❑Enhanced vocoder ready
Using the DVSI's AMBE+2™ vocoder, the IC-F9510 series is enhanced vocoder ready.

❑OTAR (Over-the-Air-Rekeying)
The IC-F9510 series supports P25 OTAR function. for changing encryption keys over the air.

❑Detachable controller (front panel)
With the optional remote control kit, RMK-2 and separation cable, the front panel controller of the radio can be detached from the main unit. It allows flexible installation in limited vehicle space. Separation cable length is selectable from 1.9m (6.2ft), 3m (9.8ft) and 8m (26.2ft).

❑Dot matrix, multi-function LCD
With a high-contrast dot matrix display, upper and lower case characters can be easily distinguished. The display shows 12 characters by 2 lines. LCD backlight is standard.

Illuminated display and keys
(Internal clock setting example)

❑IP54 dust-protection and splash resistance (Controller only)
The rugged front controller panel is resistant to shock and vibration. When used with the optional separation kit, RMK-2, the controller head has dust-protection and splash resistance, equivalent to IP54.
See 2-3 IP Classification Code for the meaning of this criteria.

IP54

❑Built-in CTCSS and DTCS signaling
Use the built-in CTCSS and DTCS encoder and decoder capabilities* to set up your own talk groups, and have your radio stand by quietly when other groups are talking. You can also set up selective calls to individuals or control a repeater.
*Analog mode only.

❑512 memory channels, 128 zones
Up to 512 memory channels can be divided into 128 memory zones, allowing you flexible channel and communication group management.

Common Features

❑Tactical group function
The tactical group function allows you to copy memory channels to the tactical zone and temporarily regroup memory channels. Using the optional zone copy cable, memory channels in the tactical zone can be transferred from a master radio to other radios.

❑Abundant scanning functions
The dual priority scan monitors two primary channels alternately, while scanning other channels. The mode-dependent scan function automatically changes the scan list according to the operating channel setting. The talk-back function with timer beep, TX channel and cancel channel settings allow you to preset the transmission channel when you push the PTT button during a scanning operation or cancel scanning.

❑22W amp for Public address (PA) and RX speaker functions
The IC-F9510 series has a built-in 22W BTL audio amplifier. When an external speaker is connected to the radio, you can speak through the radio's microphone. The RX speaker function allows you to relay the received audio over the speaker.

❑Programmable accessory connector
The IC-F9510 series has a D-SUB 25-pin ACC connector for connecting external devices. It has reserved pins for programming to input operating channels, turn on/off functions and output received audio or honk a horn, etc. In addition, an ignition sensing line allows you to control the radio power from the engine ignition switch.

❑Radio stun/kill and Power-on password function
The radio stun/kill function* disables a lost or stolen radio over the air, eliminating security threats from undesired listeners. The power-on password prevents unauthorized people from turning on the radio. P25 digital mode only.

❑Self-grounding Mic, HM-148G*
The supplied HM-148G self-grounding microphone has a mechanism for self grounding where a grounding wire is no longer required.
*Supplied depending on version.
(See 3-6 Self-grounding Microphones HM-148G/HM-148T for details).


HM-148G

Unique Features of IC-F9511HT

❑110W of powerful RF
A full 110W of output power is available for reliable long distance communication. A large heat sink provides effective cooling mechanism allowing reliable operation (20% duty cycle transmission).

❑Compact "letter size" RF unit
While the IC-F9511HT provides 110W of RF output, the RF unit dimensions are only 175 (W) × 279 (D) × 60 (H) mm, so the IC-F9511HT can be fit into the "letter size" console box. The controller and speaker are separated from the main (RF) unit for flexible installation.

❑Optional external speaker SP-30
Newly designed external speaker, SP-30 offers 15W* typ. of higher level audio with the IC-F9511HT for improved operation in noisy environment.
*Rated input of the SP-30 is 20W.


SP-30

❑9-pin external speaker connector
The IC-F9511HT has a 9-pin speaker connector with 15W (typ.) BTL audio amplifier for connecting SP-30 external speaker, horn honk and ignition sensing line, etc,.

❑Separate Controller
The controller and speaker are separated from the RF unit for flexible installation. A 5m (16.4ft) separation cable is attached to the controller and optional separation cable length is selectable from 1.9m (6.2ft), 3m (9.8ft) and 8m (26.2ft).

❑ Other features (IC-F9510 Series)

- Wide frequency coverage (VHF 136–174MHz / UHF 400-470MHz, 450- 520MHz)
- FM wide/narrow channel spacing*1
- Built-in audio compander*1
- Built-in inversion type voice scrambler*1
- Heavy duty microphone, HM-148
- NTIA VHF specification compliant
- Talk-around function
- DTMF autodial*1
- Microphone hanger action (On hook scan and off hook monitor)
- 2-Tone encoder and decoder*1 and MDC 1200 compatible*1 (Available in the future)

*1 Analog mode only

❑ Meets MIL STANDARD

The **MIL-STD-810** series of standards are issued by the United States Army's Developmental Test Command, to specify various environmental tests to prove that equipment qualified to the standard will survive in the field

Icom makes rugged products that have been tested to and passed the following MIL-STD requirements and strict environmental standards.

Applicable U.S. Military Specifications & IP Rating

Standard	MIL 810 F	
	Method	Procedure
Low Pressure	500.4	I, II
High Temperature	501.4	I, II
Low Temperature	502.4	I, II
Temperature Shock	503.4	I
Solar Radiation	505.4	I
Humidity	507.4	–
Salt Fog	509.4	–
Dust	510.4	I
Vibration	514.5	I
Shock	516.5	I, IV

Also meets equivalent MIL-STD-810-C, -D and -E.

Ingress Protection Standard	
Dust & Water	IP54* (Dust-protection and water resistant)

* IP54 tests were performed on the controller and RMK-2 only.

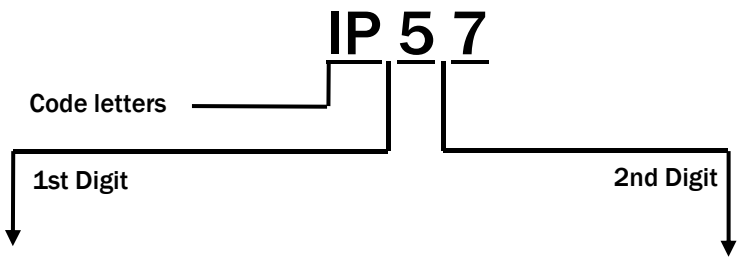
▒ Also meets equivalent MIL-STD-810-C, -D and -E.

2-3 IP Classification Codes

Ingress Protection (IP) ratings are developed by the European Committee for Electro Technical Standardization.

International Standard IEC 60529 outlines an international classification system that describes the sealing characteristics of electrical equipment. The classification system defines the level of protection provided by enclosures to prevent the ingress of foreign objects and moisture into the electrical equipment.

The classification system uses the "IP" code, or "Ingress Protection" code, to define the level of seal. An IP number contains two numbers (i.e. IP57) in most instances which relate to the level of protection provided by an enclosure or housing. Either number may be shown as "X" (i.e. IPX6 / IP7X) to indicate the "X" part is not tested.



Degrees of Protection (Foreign Bodies) – 1st Digit		
IP Level	Description of Protection Level	
0	Not protected	
1	Protected against foreign solid objects of 50 mm diameter and greater (Protects against a large surface of the body, such as the back of a hand)	
2	Protected against foreign solid objects of 12.5 mm diameter and greater (Protects against fingers or similar objects)	
3	Protected against foreign solid objects of 2.5 mm diameter and greater (Protects against tools, thick wires, etc.)	
4	Protected against foreign solid objects of 1.0 mm diameter and greater (Protects against most wires, screws, etc.)	
5	Protected from the amount of dust that would interfere with normal operation	
6	Dust tight (No ingress of dust; complete protection against contact)	

Degrees of Protection (Moisture) – 2nd Digit		
IP Level	Description of Protection Level	
0	Not protected	
1	Protected against vertically falling water drops	
2	Protected against vertically falling water drops when enclosure is tilted up to 15°	
3	Protected against water sprayed at an angle up to 60° on either side of the vertical	
4	Protected against water splashed against the component from any direction	
5	Protected against water projected in jets from any direction	
6	Protected against water projected in powerful jets from any direction	
7	Protected against temporary immersion in water between 15cm and 1m for 30min.	
8	Protected against continuous immersion in water beyond 1m.	

2-4 Project 25

What is Project 25?

Project 25 (P25) is a standard for the manufacturing of interoperable digital 2-way wireless communications products. Developed in North America under state, local and federal representatives and Telecommunications Industry Association (TIA) governance, P25 is gaining worldwide acceptance for public safety, security, public service, and commercial applications.

The published P25 standards suite is administered by the Telecommunications Industry Association (TIA Mobile and Personal Private Radio Standards Committee TR-8). Radio equipment that demonstrates compliance with P25 is able to meet a set of minimum requirements to fit the needs of public safety. These include the ability to interoperate with other P25 equipment, so that users on different systems can talk via direct radio contact. The P25 standard was created by and for public safety professionals.

What Are the Benefits of P25?

From the beginning, P25 has targeted four primary objectives:

- *Allow effective, efficient, and reliable intra-agency and inter-agency communications*

  ... so organizations can easily implement interoperable and seamless joint communication in both routine and emergency circumstances.

- *Ensure competition in system life cycle procurements*

  ... so agencies can choose from multiple vendors and products, ultimately saving money and gaining the freedom to select from the widest range of equipment and features.

- *Provide user-friendly equipment*

  ... so users can take full advantage of their radios' lifesaving capabilities on the job – even under adverse conditions – with minimal training.

- *Improve radio spectrum efficiency*

  ... so networks will have enough capacity to handle calls and allow room for growth, even in areas where the spectrum is crowded and it's difficult for agencies to obtain licenses for additional radio frequencies.

What is the Status of P25 Today?

P25 systems are available today and being deployed globally. Many organizations have mandated that new land mobile radio system purchases follow P25 standards. P25 is ongoing – the standard continues to evolve as the needs of users and the capabilities of new technology advance. Both users and manufacturers have an important role to play in shaping P25.

What is Required for P25 Compliance?

At a minimum, a P25 radio system must provide interoperability with these mandatory P25 Standard components:

- *The Common Air Interface (CAI) specifies how information is coded, transmitted and received over the air.* It enables users to interoperate and communicate digitally across networks, agencies, and vendors.

- *The Improved Multi-Band Excitation (IMBE) vocoder converts speech into a digital bit stream.* Test panels judged IMBE as the coding scheme most successful at making male and female voices audible against background noises such as moving vehicles, sirens, gunshots, and traffic noise – the conditions of public safety use. DVSI has introduced a new low data rate AMBE+2™ Vocoder that sets a new standard for high-quality, high-performance speech quality at data rates from 2.0 to 9.6 kbps and Icom IC-F9510 series include this AMBE+2™ enhanced vocoder.

P25 has also defined standard modes of operation to enable multi-vendor interoperability for additional system functions: trunking, encryption, and over-the-air rekeying, to name a few.

A set of defined system interfaces allow the P25 system elements to communicate with host computers, data terminals and the public switched telephone network (PSTN).

Looking to the Future

There are two phases of P25 development:

- Phase 1 is completed.
  It specifies a 12.5 kHz bandwidth.

- Phase 2 is in development.
  It will use a 6.25 kHz equivalent bandwidth to allow better spectrum efficiency and benefit a greater number of users

2-5 Function and Specifications Comparison

Model No.			IC-F9511HT	IC-F9511S	IC-F9511T	IC-F9521S	IC-F9521S	IC-F9521T	IC-F9521T
Version			#01	#01	#05	#01	#11	#05	#15
Destinations			USA-01	USA-01	USA-01	USA-01	USA-01	USA-01	USA-01
Keypad or Speaker			10 keypad	Speaker	10 keypad	Speaker	Speaker	10 keypad	10 keypad
Type Approval			FCC	FCC	FCC	FCC	FCC	FCC	FCC
FIPS 140-2 Certified *1 *2			-	-	-	-	-	-	-
Function Comparison									
CTCSS			✔	✔	✔	✔	✔	✔	✔
DTCS			✔	✔	✔	✔	✔	✔	✔
2-Tone *1			-	-	-	-	-	-	-
5-Tone			-	-	-	-	-	-	-
DTMF Autodial			✔	✔	✔	✔	✔	✔	✔
DTMF Decoder			-	-	-	-	-	-	-
Voice Scrambler		Inversion	✔	✔	✔	✔	✔	✔	✔
		Non rolling	-	-	-	-	-	-	-
		Rolling	-	-	-	-	-	-	-
MDC 1200 *1 *2			-	-	-	-	-	-	-
Conventional P25 digital*3			✔	✔	✔	✔	✔	✔	✔
P25 digital Trunking			✔	✔	✔	✔	✔	✔	✔
AES Encryption			UT-125	UT-125	UT-125	UT-125	UT-125	UT-125	UT-125
DES Encryption			UT-125 or UT-128	UT-125 or UT-128	UT-125 or UT-128	UT-125 or UT-128	UT-125 or UT-128	UT-125 or UT-128	UT-125 or UT-128
OTAR *3			✔	✔	✔	✔	✔	✔	✔
Number of Option Slot			1	1	1	1	1	1	1
SPECIFICATIONS - Measurements made in accordance with TIA-102(Digital), TIA/EIA-603 (Wide/Narrow).									
GENERAL	Frequency Range (MHz)		136-174			400~470	450~520	400~470	450~520
	Number of Channels		512 ch / 128 zones						
	Channel Spacing (kHz)		12.5 (digital), 15/30 (analog)			12.5 (digital), 12.5/25 (analog)			
	PLL Channel Step (kHz)		2.5 / 3.125						
	Current Drain	Tx High	22A	11A					
		Rx Stand-by	400mA	350mA					
		Rx Max. audio	3.0A	1000mA					
	Dimensions (W × H × D) (projections not included)		175 × 60 × 279mm $6\frac{7}{8} \times 2\frac{3}{8} \times 10\frac{31}{32}$ in	175 × 45 × 170 mm $6\frac{7}{8} \times 1\frac{25}{32} \times 6\frac{11}{16}$ inch					
	Weight (approx.)		4.7kg,10.4lb w/controller	1.5kg; 3.3lb					
TX	RF Output Power (High)		110W	50W					
	Spurious Emissions		70dB(typ.)	70dB (min.)					
	Adjacent Channel Power (W/N)			70/60dB (min.,analog), 67dB (min.,digital)					
RX	Sensitivity (12dB SINAD)		0.25uV (typ.,analog) 0.30uV (typ.,digital)	0.25uV(typ.,analog) / 0.25uV(typ.,digital)					
	Adjacent Channel Selectivity (W/N)FM(analog),P25(digital)		FM81/56dB (typ.) P25 63dB (typ.)						
	Spurious Response Rejection		85dB (min.)						
	Inter-modulation Rejection		78dB (typ.)						
	AF Output Power (At 10% Distortion with a 4Ω load)		15W (3% Dist.,External audio)	4W (typ.),22W (typ., External audio)					

*1. Planned to be available in the future *2. Depending on versions. *3. OTAR function became available from the firmware Rev.1.40 on. All specifications are subject to change without prior notice or obligation.

2-5 Function and Specifications Comparison

Model No.			IC-F9523S	IC-F9523S	IC-F9523T	IC-F9523T
Version			#02	#12	#06	#16
Destinations			EXP-01	EXP-01	EXP-01	EXP-01
Keypad or Speaker			Speaker	Speaker	10 keypad	10 keypad
Type Approval			-	-	-	-
FIPS 140-2 Certified *1 *2			-	-	-	-
Function Comparison						
CTCSS			✔	✔	✔	✔
DTCS			✔	✔	✔	✔
2-Tone *1			-	-	-	-
5-Tone			-	-	-	-
DTMF Autodial			✔	✔	✔	✔
DTMF Decoder			-	-	-	-
Voice Scrambler		Inversion	✔	✔	✔	✔
		Non rolling	-	-	-	-
		Rolling	-	-	-	-
MDC 1200 *1 *2			-	-	-	-
Conventional P25 digital*3			✔	✔	✔	✔
P25 digital Trunking			✔	✔	✔	✔
AES Encryption			UT-125	UT-125	UT-125	UT-125
DES Encryption			UT-125 or UT-128	UT-125 or UT-128	UT-125 or UT-128	UT-125 or UT-128
OTAR *3			✔	✔	✔	✔
Number of Option Slot			1	1	1	1
SPECIFICATIONS - Measurements made in accordance with TIA-102(Digital), TIA/EIA-603 B (Wide/Narrow).						
GENERAL	Frequency Range (MHz)		400~470	450~520	400~470	450~520
	Number of Channels		512 ch / 128 zones			
	Channel Spacing (kHz)		12.5 (digital), 12.5/25 (analog)			
	PLL Channel Step (kHz)		2.5 / 3.125			
	Current Drain	Tx High	11A			
		Rx Stand-by	350mA			
		Rx Max. audio	1000mA			
	Dimensions (W × H × D) (projections not included)		175 × 45 × 170 mm $6\frac{7}{8} \times 1\frac{25}{32} \times 6\frac{11}{16}$ inch			
	Weight (approx.)		1.5kg; 3.3lb			
TX	RF Output Power (High)		50W			
	Spurious Emissions		70dB (min.)			
	Adjacent Channel Power (W/N)		70/60dB (min.,analog), 67dB (min.,digital)			
RX	Sensitivity (12dB SINAD)		0.25uV(typ.,analog) / 0.25uV(typ.,digital)			
	Adjacent Channel Selectivity (W/N)FM(analog),P25(digital)		FM81/56dB (typ.) P25 63dB (typ.)			
	Spurious Response Rejection		85dB (min.)			
	Inter-modulation Rejection		78dB (typ.)			
	AF Output Power (At 10% Distortion with a 4Ω load)		4W (typ.),22W (typ., External audio)			

*1. Planned to be available in the future *2. Depending on versions. *3. OTAR function became available from the firmware Rev.1.40 on. All specifications are subject to change without prior notice or obligation.

3 Accessories
3-1 Supplied Accessories Connection
3-1-1 IC-F9511S, IC-F9511T

■ IC-F9511S

■ IC-F9511T

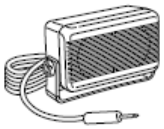
NOTE : For **IC-F9521/F9523/S/T**, please refer to this instruction and connect the accessories the same way.

■ Supplied Accessories

Microphone

Microphone hanger and screw set

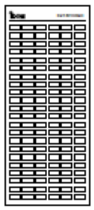
Speaker *1



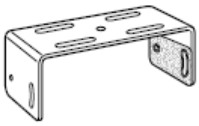
DC power cable

Key caps

Function name stickers *2



Mounting bracket



Flat washers

Spring washers

Nuts

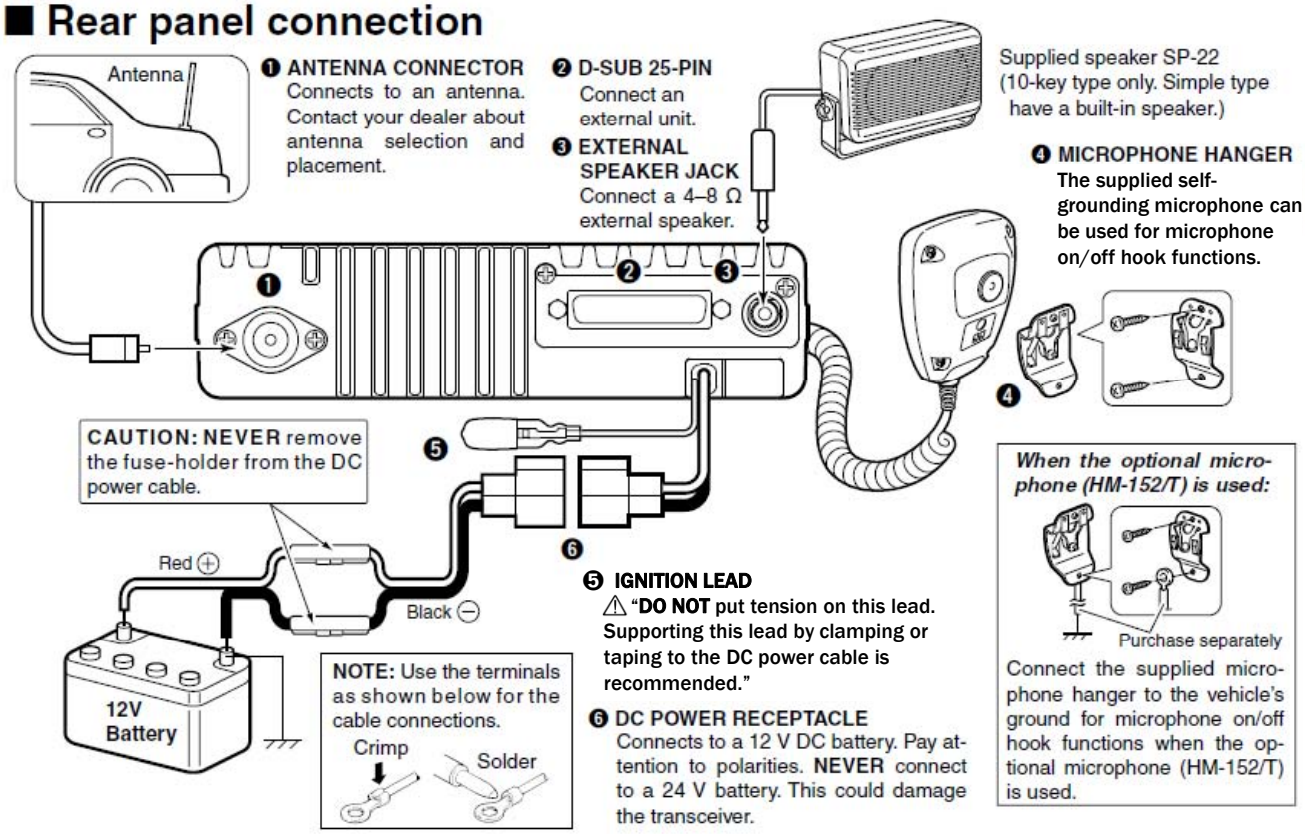
Bracket bolts

Mounting screws (M5 x 12)

Self-tapping screws (M5 x 16)

*1 10-key type only
*2 Used for labeling the programmable function keys according to their assigned functions.

■ Rear panel connection

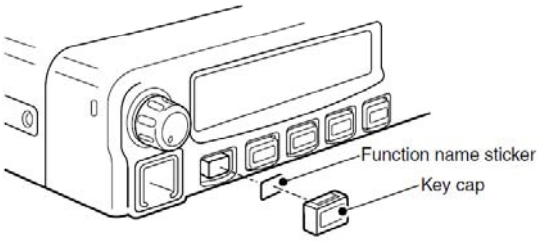


■Function name stickers

There are no names on the programmable function keys since the functions can be freely assigned to these keys.

① Attach the supplied function name stickers as below to the appropriate keys for easy recognition of that key's assigned function.

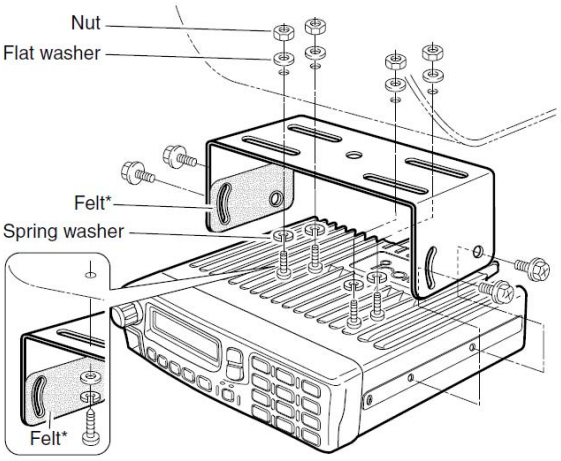
② Then, protect the attached stickers from detaching with the supplied key cap as below.



■Mounting the transceiver

The universal mounting bracket supplied with your transceiver allows overhead mounting.

• Mount the transceiver securely with the 4 supplied screws to a thick surface which can support more than 1.5 kg.



When using self-tapping screws

*Felts reduce the vibration effects.

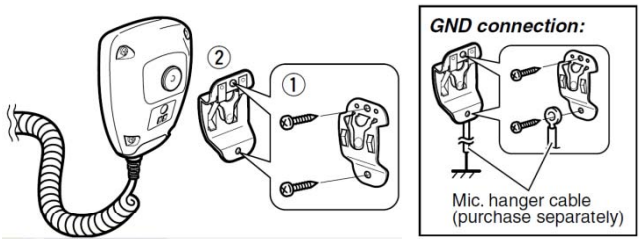
■Antenna

A key element in the performance of any communication system is an antenna. Contact your dealer about antennas and the best places to mount them.

■Hand Microphone

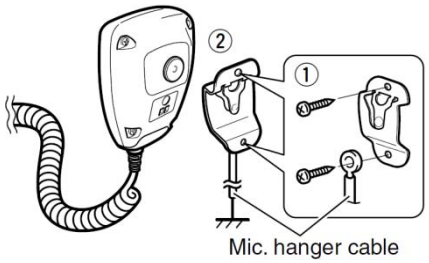
When using with the self ground type microphone hanger:

① Attach the microphone hanger with screws.
② Put on (on-hook) or take off (off-hook) the microphone.



When using with the non-self ground type microphone hanger:

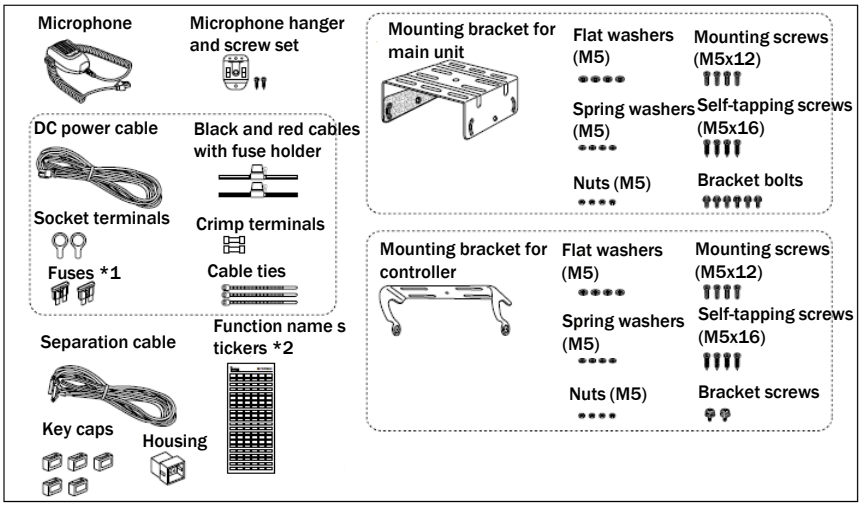
① Attach the microphone hanger and the microphone hanger cable (supplied with the transceiver) with screws to the ground line.
② Put on (on-hook) or take off (off-hook) the microphone.



■ IC-F9511HT

▼Two front panels for one box available

■ Supplied Accessories



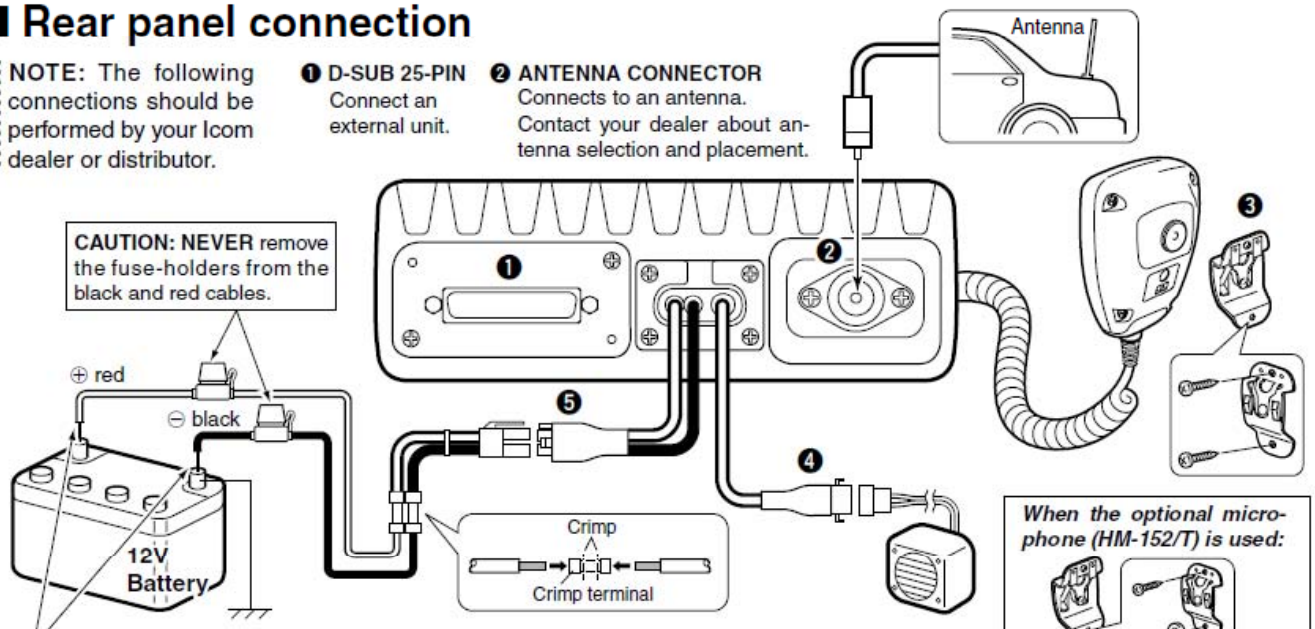
*1 Fuses should be installed in the fuse holder of the black and red cables, respectively.
*2 Used for labeling the programmable function keys according to their assigned functions.

■ Rear panel connection

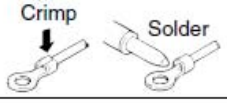
NOTE: The following connections should be performed by your Icom dealer or distributor.

❶ D-SUB 25-PIN
Connect an external unit.

❷ ANTENNA CONNECTOR
Connects to an antenna. Contact your dealer about antenna selection and placement.



NOTE: Use the terminals as shown below for the cable connections.

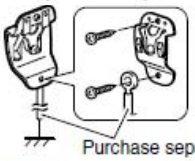


❺ DC POWER RECEPTACLE
Connects to a 12 V DC battery. Pay attention to polarities. **NEVER** connect to a 24 V battery. This could damage the transceiver.

❸ MICROPHONE HANGER
The supplied self-grounding microphone can be used for microphone on/off hook functions.

❹ EXTERNAL SPEAKER CONNECTOR
Connect a 4–8 Ω external speaker.

When the optional microphone (HM-152/T) is used:



Purchase separately

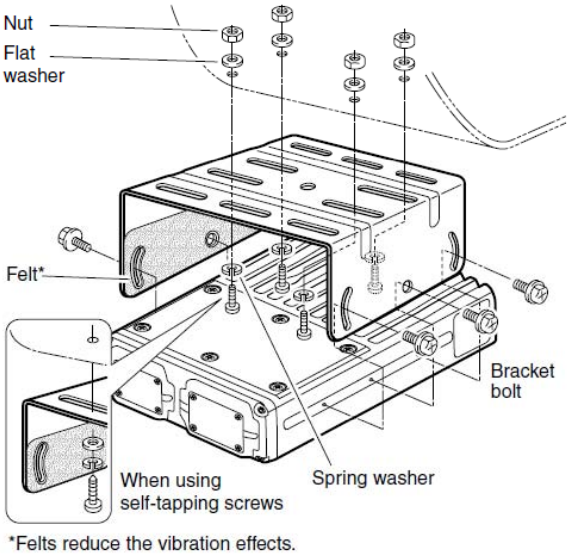
Connect the supplied microphone hanger to the vehicle's ground for microphone on/off hook functions when the optional microphone (HM-152/T) is used.

■ Mounting the transceiver

Main unit

The universal mounting bracket supplied with your transceiver allows overhead mounting.

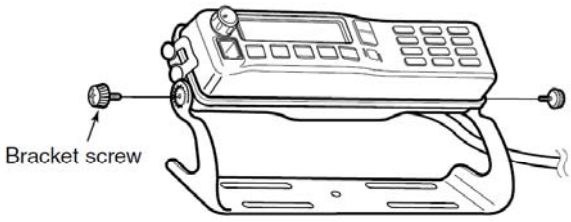
• Mount the main unit securely with the 4 supplied screws to a thick surface which can support more than 8 kg (17.63 lb).



*Felts reduce the vibration effects.

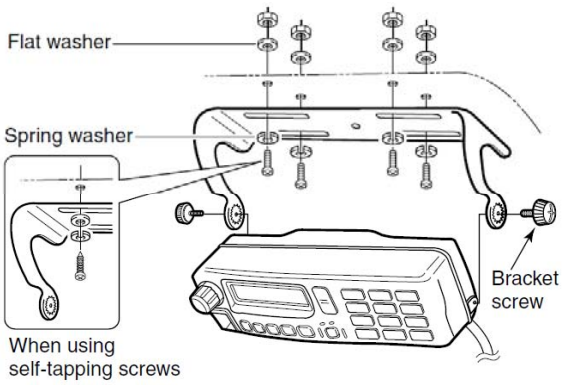
Controller

2 types of mounting styles are available— one is overhead mounting, and other one is on-board mounting.



Overhead mounting

• Mount the controller securely with the 4 supplied screws to a thick surface which can support more than 2 kg (4.40 lb). (Overhead mounting)



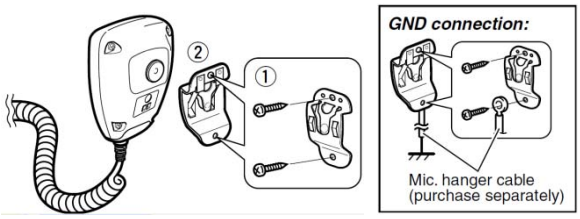
■Antenna

A key element in the performance of any communication system is an antenna. Contact your dealer about antennas and the best places to mount them.

■Hand Microphone

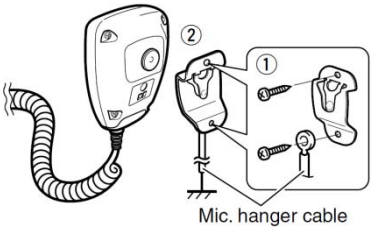
When using with the self ground type microphone hanger:

① Attach the microphone hanger with screws.
② Put on (on-hook) or take off (off-hook) the microphone.

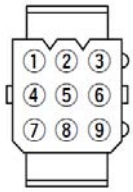


When using with the non-self ground type microphone hanger:

① Attach the microphone hanger and the microphone hanger cable (supplied with the transceiver) with screws to the ground line.
② Put on (on-hook) or take off (off-hook) the microphone.



■ Speaker connector information



Connector's front view

When the horn function is activated, HORN1 and HORN2 are shorted.

Pin No.	Name	Description	Specifications
①	IGN	IGSW cont. In	0 -Vcc
②	RXSP1	RX AF Out (BTL)	Output power : Max.20W Impedance : 4Ω
③	NC	-	-
④	HORN1	Horn drive cont.Out	0-VCC
⑤	HORN2	Horn drive cont.Out	0 -Vcc
⑥	RXSP2	RX AF Out (BTL)	Output power : Max.20W Impedance : 4Ω
⑦	PS1	AF Out to PA (BTL)	Output power : Max.20W Impedance : 4Ω
⑧	PS2	AF Out to PA (BTL)	Output power : Max.20W Impedance : 4Ω
⑨	GND	Connects to ground.	-

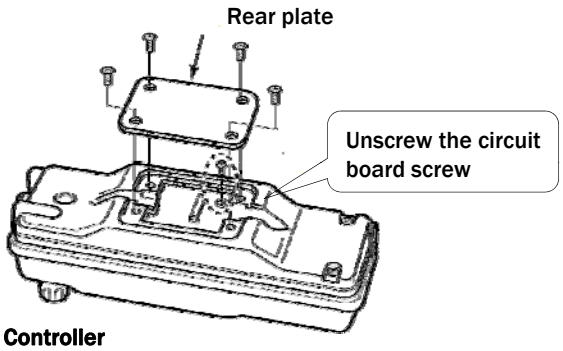
■Separation cable connection

CAUTION: To avoid damage to the transceiver, disconnect the DC power cable from the transceiver before connecting the separation cable.

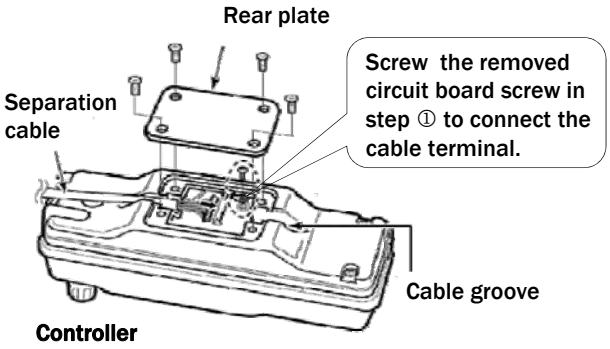
NOTE: The following connections should be performed by your Icom dealer or distributor.
The supplied or optional separation cable is required for the controller and the main unit connection.
For the details on the separation cables, see 3-5 Optional Accessories.

◇Controller

①Unscrew the 4 screws, then remove the rear plate from the controller.



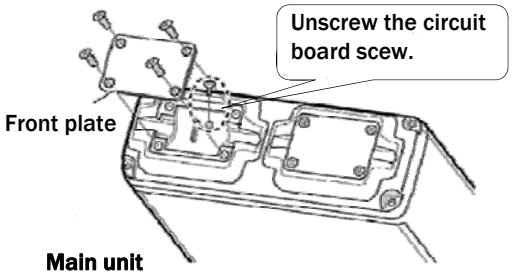
②Connect the separation cable to the controller as shown below.
- The cable can be inserted into either the left or right grooves as desired.



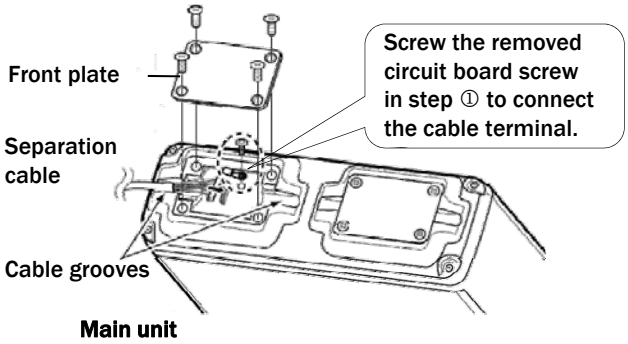
③After the cable connection, replace the removed rear plate and the 4 screws, then connect the opposite side of the separation cable to the main unit.

◇Main unit

①Unscrew the 4 screws of the front plate (either the left or right), then remove the front plate from the main unit.



②Connect the opposite side of the separation cable that is connected to the controller described on the previous page as shown below.
- The cable can be inserted into either the left or right grooves as desired.



③After the cable connection, replace the removed front plate and the 4 screws, then connect the DC power cable.

3-2 Mobile Radio Installation

➢ PREPARATION

Check points	The locations to obtain
Check if there are installation instructions available for your car.	Vehicle manufacturer or agent.
Check that radio is suitable and approved for mobile installation	Radio manufacturer or agent.
Read the installation instructions for the radio.	

➢ POSITION

Checklist of points to decide before starting:

1) Is there a suitable position to mount the radio?
2) Will you use a hand mic or a "hands-free" installation?
3) Can you route all cables so that they will not interfere with any controls of the vehicle? Hand mic cables are especially important here.
4) Make sure that it is possible to securely mount the radio.
5) Will the position of the radio be safe for you and your passengers?
6) Will the position of the radio obstruct any safety device of the vehicle?
7) Don't forget that transceivers can become hot in transmit mode and ventilation should not be obstructed.
8) Don't mount the transceiver, antenna or accessories where they can obstruct the driver's view.

➢ VEHICLE

Some vehicles require special attention.
These notes are written for petrol/diesel engined cars, vans etc. with 12 volt battery supplies.
Other types of vehicles may be subject to special regulations.
If in doubt, please contact either the vehicle or radio distributor for further information.
Be sure that the installation can be made safely, such as no petrol leaks etc.

Modern vehicles are using more and more non-metallic materials in their construction. Some panels (interior and exterior) may be made from plastic or reinforced resin etc. Such panels do not have the same shielding properties as metal and this may cause unexpected effects with RF such as high VSWR or RF exposure. A qualified radio installation engineer should be able to give you advice on suitable products that can be used to "screen" such non-metallic panels if required

➢ ANTENNA

Many types and sizes of antennas are available, whatever you choose you need to consider some basic points :

Check points	Potential action
Reduce any RF interference to the vehicle electronic circuits.	Position the antenna away from any sensitive circuits.
If the transceiver is a "high power" model, reduce RF risk to pedestrians etc.	Position the antenna where pedestrians will not easily touch it or stand too close.
Avoid mounting the antenna where it could be dangerous for pedestrian or other road users.	Position the antenna away from the edges of the vehicle, as high as possible. Avoid having the antenna tip at "eye level."

Don't forget that the antenna must also be securely mounted to the vehicle and should be a sensible size.
If you choose a magnetic mount type, be sure that it is rated for the antenna type.

➢ CABLING

Mobile transceivers generally need a direct connection to the vehicle battery.
You need to check where you can route the DC supply cable and RF coaxial cables.
If there are no specific instructions for your vehicle and/or radio then the following points should be adhered to :

1) Keep the radio cables away from fuel or gas pipes.
2) Keep the radio cables away from any part that will become hot.
3) Keep the radio cables clear of moving parts (steering, suspension, throttle control, etc.)
4) Route the cables where they can be securely held in position.
5) Check if you need to drill some holes for passing radio cables. (Before drilling holes, check for hidden radio or power wiring.)
6) Only attach cables to non-moving parts of the vehicle.

Mobile Radio Installation

➢ **INSTALLATION**

Start the installation with any mechanical work that is required for fitting the radio mount, cables, etc.
Before drilling any hole in a vehicle check exactly what is behind the panel that you are drilling. When drilling a hole always use a drill with a "stop" so that it is impossible for the drill to go too far. Take extra care to avoid petrol tanks and pipes, brake lines, other wiring, etc. If you have to drill any hole to pass a cable then the hole must be sealed with a rubber grommet and when the cable has been passed through you should re-seal the cable and grommet with a suitable sealant.
If you drill holes for mounting screws, be sure to check that the screw is a suitable type and length.
Locking type screws, nuts or washers are preferred.

Pay attention to cables inside the passenger compartment. They should be secured or routed under carpets etc. There should be no possibility that they could move and interfere with any control or pedal.

➢ **BATTERY CONNECTION**

Mobile transceivers are usually intended for direct connection to the battery. Before disconnecting the battery you need to be aware of some possible problems:

1) Is the vehicle fitted with an alarm that may not operate after re-connection?
2) Is the vehicle fitted with any electronic circuit that may malfunction after re-connection? (engine management, traction control, braking control, etc.)
3) If in doubt do not disconnect the battery. Take the vehicle to an authorized service agent and ask them to connect the transceiver power cables for you.

If the DC cables are not long enough they should only be extended using an equivalent size and type of cable and must be capable of handling the specified current and be well insulated. Always try and route cables so that the total length is as short as possible.
Connections should be made to the battery terminal connectors and nowhere else in the vehicle wiring.

➢If the vehicle uses a different battery voltage (24 volts, etc.) then a DC-DC convertor must be used. Never try and connect to an intermediate point on the battery, etc., that appears to measure 12 volts.

➢ **TESTING**

Switch on transceiver and check that it functions OK.
Check the antenna matching with a VSWR meter, if possible, adjust the antenna for a minimum value.
(Don't forget that doors etc may have an effect on the measured value!)

Switch on ignition (but not engine) and check that all instruments, warning lights etc are displaying "normal" readings. Now transmit and verify that nothing changes and that no instrument is disturbed. If the transceiver is multi-mode, then repeat the test with all modes. If the transceiver is multi-band, then repeat the test in all operating bands. In each case use the maximum RF power. If there is ANY disturbance of the vehicle instrumentation then stop and identify the source of the problem before continuing.

If the above tests have been completed without any problems, you can proceed to the STATIC operational checks.

➢ **STATIC OPERATIONALCHECKS**

Start the engine of the vehicle and repeat ALL the tests described in 'TESTING'. Check that there is no disturbance of the engine control or engine speed.
With the help of an assistant, switch on the vehicle lights, indicators, etc. while transmitting. Check that no unintended flashing or indication occurs.

Stop the engine. If the above checks have been completed without any problems you can proceed to the mobile operational checks.

➢ **MOBILE OPERATIONALCHECKS**

DO NOT PERFORM THESE CHECKS IN CITY TRAFFIC!

Find a quiet road, start the vehicle and while moving slowly operate the transmitter. Check that brakes, etc. all operate as normal. Repeat using all bands, modes, etc. as applicable to your transceiver. If all is OK, then increase to normal driving speed and repeat the tests. If there is any unexpected reaction from the vehicle (accelerator, transmission, steering or other in-car electronic device) then stop immediately and seek assistance from a qualified installation engineer before operating the transceiver. If all is OK, perform a final braking test at normal speed while transmitting.

Finally stop the vehicle, switch OFF the transceiver and recheck your installation :

- Nothing has come loose?
- No equipment or cable was inconveniently placed for your driving or your passenger's safety?
- Vehicle alarm/immobilizer functions correctly?
- All vehicle instruments read normally?

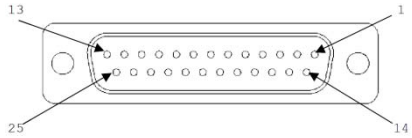
WARNING !

If the vehicle and transceiver installation does not pass every check without problem you should seek expert assistance.

3-3 D-Sub 25 Pin Configuration

D-sub accessory connector

The IC-F9511 series has a D-SUB 25 pin ACC connector for connecting various external devices.

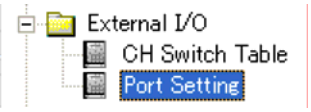


D-SUB 25 Pin Configuration

Pin No.	Pin Name	Description
1	H_OUT2	22W Hi Power AMP BTL Output
2	TXD	Serial Data Output *Built-in RS-232C Interface
3	RXD	Serial Data Input *Built-in RS-232C Interface
4	RTS	Request To Send Input for Internal RS-232C Interface
5	CTS	Clear To Send Input for Internal RS-232C Interface
6	DSR	Connected to Pin20
7	GND	Ground
8	EXMOD	Modulation Input
9	DISC OUT	Demodulation Signal Output
10	HORN	Horn Selection Signal Output
11	VCC	DC Voltage Output
12	PI01	Port setting (MIC Mute Input)
13	H_OUT1	22W Hi Power AMP BTL Output
14	GND	Ground
15	PI02	Port setting
16	NC	No connection
17	PI03	Port setting
18	PI04	Port setting
19	PI05	Port setting (EPTT Input)
20	DTR	Connected to Pin6
21	PI06	Port setting (Analog Audible Output)
22	PA	AF Amp Signal Input
23	PI07	Port setting
24	DIMO	DIMMER Control Input
25	PI08	Port setting

The pins (No. **12, 15, 17, 18, 19, 21, 23** and **25**) can be customized to your required function in cloning software.

Please set up the cloning software and proceed to Port Setting of the External I/O and you can see the following Port Setting Window.



Port Setting

D-Sub 25pin

Port	In/Out	Function	Active Logic
Ext.I/O 10	Output	Horn	Low
Ext.I/O 12	Input	Mic Mute	Low
Ext.I/O 15	Input	Null	Low
Ext.I/O 17	Input	Null	Low
Ext.I/O 18	Input	Null	Low
Ext.I/O 19	Input	EPTT	Low
Ext.I/O 21	Output	Analog Audible	Low
Ext.I/O 23	Input	Null	Low
Ext.I/O 24	Input	Dimmer	High
Ext.I/O 25	Input	Null	Low

There are 8 pins that can be assigned the function you need. These are the default setting of 8 pins.

Port No.	Port set No.	In/Out	Function
10	-	Output	Horn
12	PIN01	Input	Mic Mute
15	PIN02	Input	-
17	PIN03	Output	Busy
18	PIN04	Output	Digital Audible
19	PIN05	Input	EPTT
21	PIN06	Output	Analog Audible
23	PIN07	Output	Mic Mute
24	-	Input	Dimmer
25	PIN08	Output	Hanger

These default settings can be changed to the function you want. ① Select Input or Output at In/Out.
② Select the function you need.

Input

Function
Null
MCH Select : 1
MCH Select : 2
MCH Select : 3
MCH Select : 4
MCH Select : 5
Mic Mute
EPTT
Dimer
Ext.Key

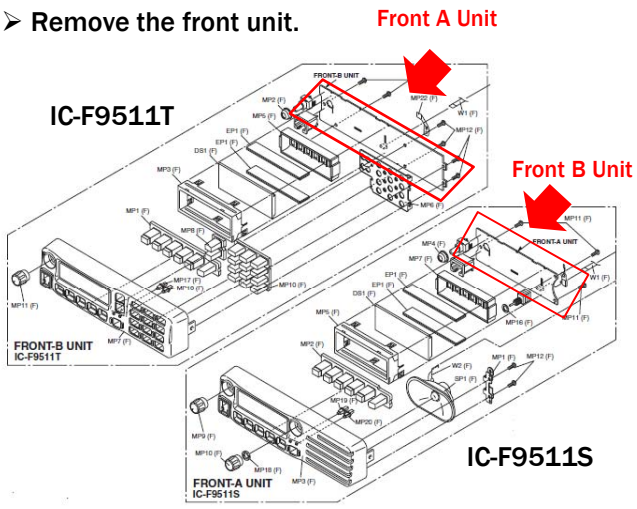
Output

Function	
Null	P2 Monitor
Busy	P3 Monitor
Analog Audible	P4 Monitor
Digital Audible	Ext.CH Mode
Mic Mute	
Hanger	
TX	
Horn	
P0 Monitor	
P1 Monitor	

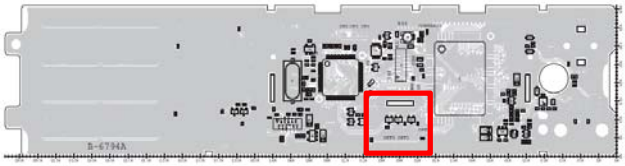
Additional Function Keys

- Three programmable function keys can be installed externally. – OPF0 / OPF1 / OPF2
- To activate the assigned functions in these buttons, soldering is required.

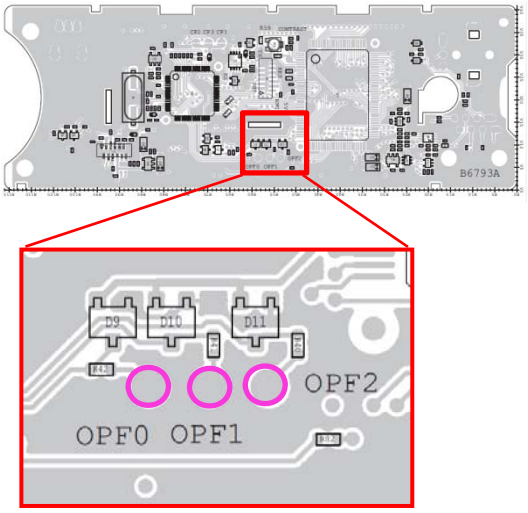
➢ Remove the front unit.



Front A Unit (IC-F9511T)

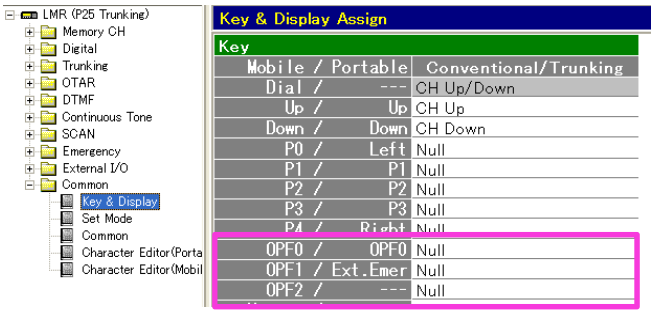


Front B Unit (IC-F9511S)



➢ Solder the circulation of OPF0, OPF1, and OPF2 shown above to activate the function.

➢ Program a desired function with the cloning software as shown below.



Assign one of these functions to each programmable key for the Conventional operation.

Null
CH Up / CH Down
Zone
Scan A Start/Stop, Scan B Start/Stop
Scan Add/Del (Tag)
Prio A, Prio A (Rewrite), Prio B, Prio B (Rewrite)
MR-CH 1/MR-CH 2/MR-CH 3/MR-CH 4
Moni
Public Address
RX Speaker
Light
Lock
Lone Worker
High/Low
Talk-around
DTMF Autodial
Re-dial
Emergency/Surveillance/Scrambler/Encryption
Scrambler/Encryption
Compander
Hook Scan
User Set Mode
OPT1 Out/OPT2 Out/OPT3 Out
OPT 1 Momentary/OPT2 Momentary/OPT 3 Momentary
Ext.CH Sel Mode
Digital Button/Digital Page
Digital Status/Digital Message
Phone
Individual/Talk-group
Zeroize
Rekey/Keyset
Sp. Func 1/SP.Func 2/Site Lock/Site Select
Clock
Home

3-5 Optional Accessories

Current options available are shown below. (Some options are not available for all countries.)

MICROPHONES

HM-152
Regular hand microphone

HM-152T
DTMF microphone

HM-148G
Heavy duty microphone (Self-ground)

HM-148T
Heavy duty microphone With DTMF keypad (Self-ground)

SM-25
Convenient for dispatching, equipped with monitor switch, Desk top.

ENCRYTION UNITS

UT-125
AES/DES Encryption Unit

UT-128
DES Encryption Unit

EXTERNAL SPEAKERS

SP-22
Compact and easy-to-install. Same as supplied with IC-F9511T

SP-10
Compact mobile speaker.

SP-30
External speaker for IC-F9511HT

ZONE COPY CABLE

OPC-1532
Mobile to mobile zone copy cable

OPC-1871
Mobile to handheld zone copy cable

KEYLOADER CABLE

OPC-1534
Keyloader Cable (to KVL 3000 Plus by Motorola)

SEPARAION KIT

RMK-2
For front panel detachment installation.

SEPARAION CABLES

OPC-609
(1.9m; 6.2ft)

OPC-607
(3m; 9.8ft)

OPC-726
(5m; 16.4ft)

OPC-608
(8m; 26.2ft)

CLONING SOFTWARE

CS-F9511 #01 EXP :
For programming all versions of the IC-F9510 series.
Cloning cables :
OPC-1122U (packed with OPC-1637 USB cable and USB driver CD)

USB driver

OPC-1122U OPC-1637

3-6 Self-grounding Microphones HM-148G / HM-148T

The **HM-148G** and **HM-148T,** Heavy duty **self-grounding microphones** are designed to do without connecting wires to the vehicle's ground. The self-grounding is enabled by a newly designed microphone hanger.

HM-148G (Plain type) **HM-148T** (DTMF type)

■ Features

1. Self-Grounding

"Hanger Action" functions can be used without connecting the microphone hanger to the vehicle's ground, which makes the installation work easier.

When the HM-148G/T is put on the new self-grounding hanger, the microphone's metal parts, having no conduction between them in normal condition, short-circuits. Thus, no ground wiring is required. The radio detects it also as "**Hanger Action**".

2. "Hot DTMF" for HM-148T

The DTMF code will be sent out when pressing a key without a PTT operation.
*This function can be de-activated too.

■Hanger Action (On Hook / Off Hook)

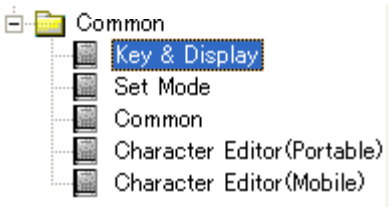
There are two "Hanger Action" functions available. It can be pre-set ON or OFF in the cloning software.

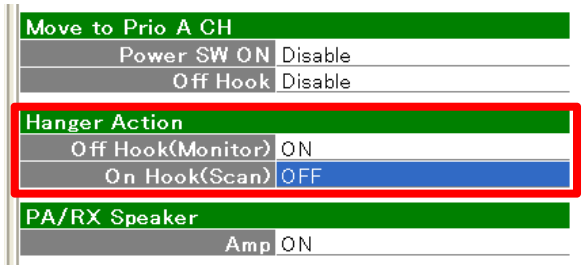
1. Off Hook Monitor function

When you pick up the microphone out of the hanger, the radio automatically turns to the monitor mode.

2. On Hook Scan function

When you put the microphone on the hanger and the radio automatically starts scanning.(The radio continues to be on the scan mode except when you talk on the radio.)





■Availability of Hanger Actions

The available On-hook/Off-hook hanger actions are shown below. (✓: Available N/A : Not available)

Hanger Type	Image	GND connection	HM-148 G/T	HM-148 HM-152 HM-152T
Self grounding supplied with the HM-148G/T		Connected	✓	✓
		Not Connected	✓*	N/A
Non-self grounding supplied with the transceiver		Connected	✓	✓
		Not Connected	N/A	N/A

* Self-ground

NOTE

- **HM-148G #18 EXP** / **HM-148 #19 EXP** includes **a self-grounding mic hanger.** (The former versions do not include the mic hanger, so it's necessary to order it separately.)
- When you use other microphones than HM-148G /HM-148T with the new microphone hanger, the hanger must be connected to the vehicle's ground for using hanger action functions.
- When you use the HM-148G/HM-148T with an old, regular type microphone hanger, ground wiring is still required.

3-7 Optional Internal Unit Installation

This is the instruction on how to install the UT-125, UT-128 encryption unit to the transceiver.

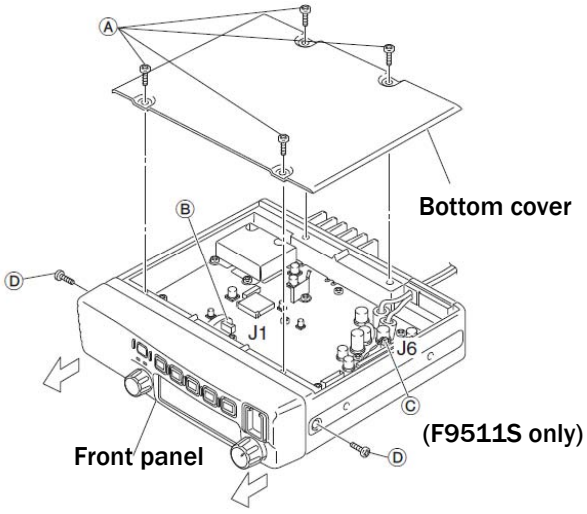
UT-125	UT-128
AES/DES Encryption Unit	DES Encryption Unit

CAUTION! Optional unit installation should be done at an authorized Icom service center only.

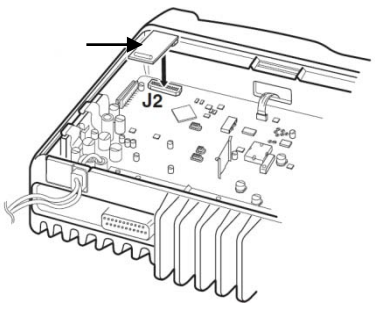
■ENCRYPTION UNIT INSTALLATION

➢ IC-F9511S, IC-F9511T

①Unscrew 4 screws, A, then remove the bottom cover.
②Unplug J1(B) and J6 (C; F9511S only).
③Unscrew 2 screws, D.
④Remove the front panel in the direction of the arrows.



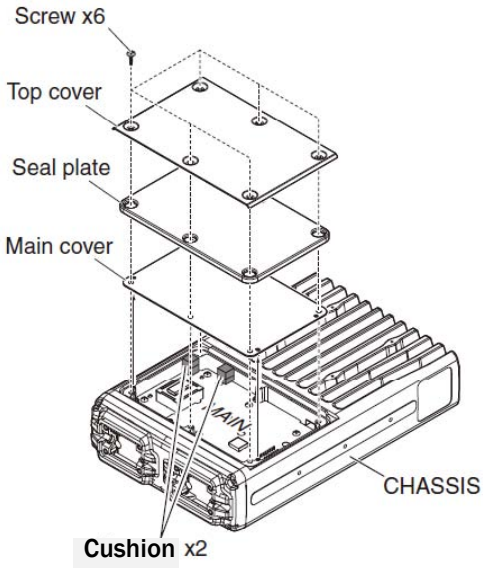
⑤Attach the unit to "J2" as below.



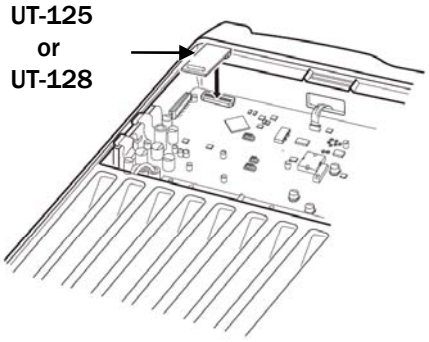
⑥Recover the transceiver, and set or modify the setting using optional cloning software.

➢IC-F9511HT

①Unscrew 6 screws from the top cover, and remove the top cover, seal plate and main cover.
②Remove 2 cushions from the MAIN UNIT.



③Attach the unit as illustrated below.



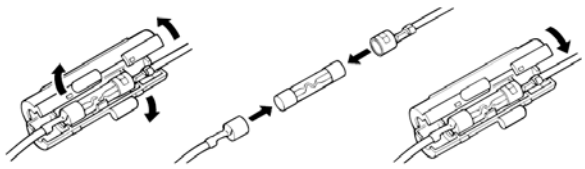
④Recover the transceiver, and set or modify the setting using optional cloning software.

These instructions on how to install the units can be referred to in the service manual .

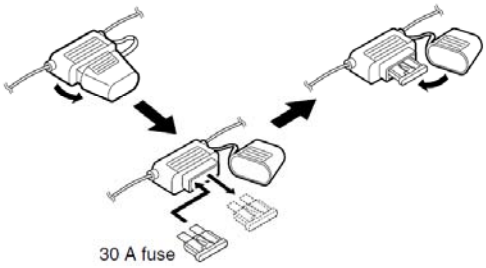
■Fuse Replacement

Fuses should be installed in the fuse holder of the black and red power cables, respectively. If a fuse blows or the transceiver stops functioning, track down the source of the problem if possible, and replace the damaged fuse with a new one of the same rating.

❑Fuse rating: 20 A **USE a 20 A fuse only.**
for IC-F9511S, IC-F9511T



❑Fuse rating: 30 A **USE a 30 A fuse only.**
for IC-F9511HT



■Cleaning

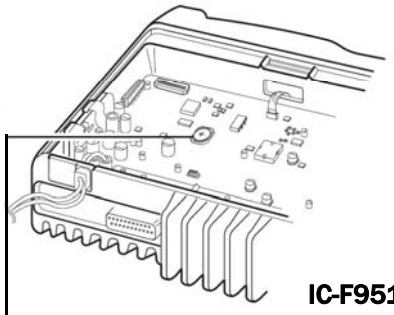
If the transceiver becomes dusty or dirty, wipe it clean with a soft, dry cloth.

AVOID the use of solvents such as benzene or alcohol, as they may damage the transceiver surfaces.

■Clock Backup Battery Replacement

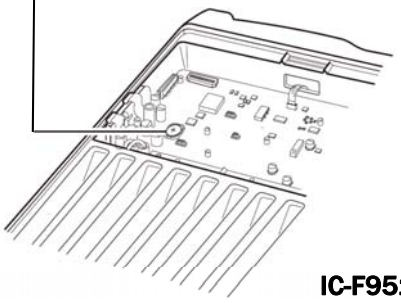
When the backup battery is discharged, the transceiver transmits and receives normally but cannot retain the current time.

①Remove the bottom cover to expose MAIN UNIT (Refer to 3-7 Optional Internal Unit Installation)
②Replace the clock backup battery, located on the MAIN UNIT as below. (Make sure the battery polarity is correct.)
③Recover the transceiver, and re-set the date and time in set mode. (Refer to 4-1-8 Basic Operation, Clock function.)

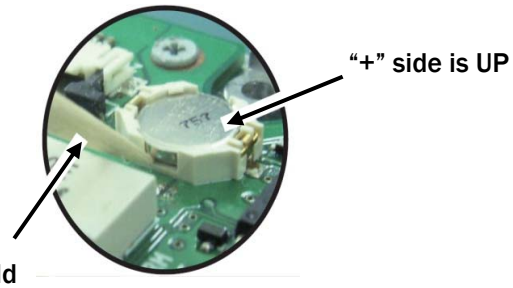


IC-F9511S/T

CLOCK BACKUP BATTERY		
MAIN UNIT	:	"BT601"
Part No.	:	3020000340
Part Name	:	ML-614S/ZT



IC-F9511HT

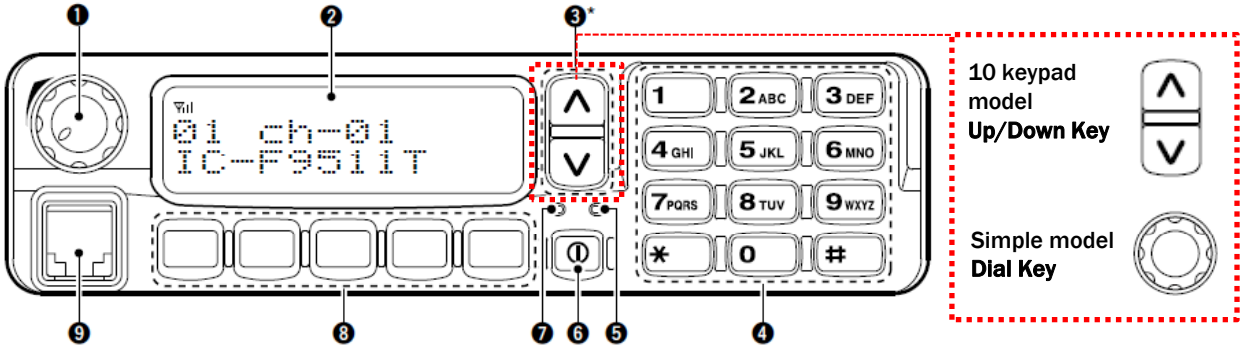


Remove old battery using a non-conductive flat object

Battery removal

4-1 Operation and Function
4-1-1 Operation and Function IC-F9511S, IC-F9511T

NOTE : Operation of the **IC-F9521/F9523/S/T** is also based on this instruction.



❶ AF VOLUME CONTROL KNOB
Rotate the knob to adjust the audio output level.
- Minimum audio level is pre-programmed.

❷FUNCTION DISPLAY
Displays a variety of information, such as an operating channel number/name, DTMF numbers and audible condition, etc.

❸UP/DOWN or DIAL KEYS
- 10-key model: **UP/DOWN Keys**
  Push to select an operating channel, etc.
- Simple model: **DIAL**
  Rotate to select an operating channel, etc.
  *The desired function can be assigned by your dealer.

❹10-KEYPAD (10-key model only)
The keypad allows you to enter digits to:
- Select memory channels, tone channels and DTMF codes (when in the DTMF code channel selection mode)
- Start up with a password
- Input the Individual ID code for digital operation. (Depending on the pre-set value)

❺BUSY INDICATOR
Lights green while receiving a signal, or when the squelch is open.

❻POWER SWITCH [POWER]
Push to turn the power ON and OFF.
- The following functions are available at power ON as options:

➢ Automatic scan start
➢ Password prompt
➢ Set mode

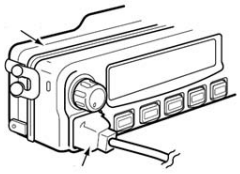
❼TRANSMIT INDICATOR
Lights red while transmitting.
* P25 operation only

❽DEALER-PROGRAMMABLE KEYS
Desired functions can be programmed independently by your dealer. In this instruction manual, these keys are from the left, called [P0]/[P1]/[P2]/[P3]/[P4].

❾MICROPHONE CONNECTOR
Connect the supplied or optional microphone.
- When you connect a microphone, be sure to fit the connector cover of the microphone into the connector to maintain the front panel's dust protection and splash resistance*.

*Only when the optional RMK-2 is attached.

RMK-2



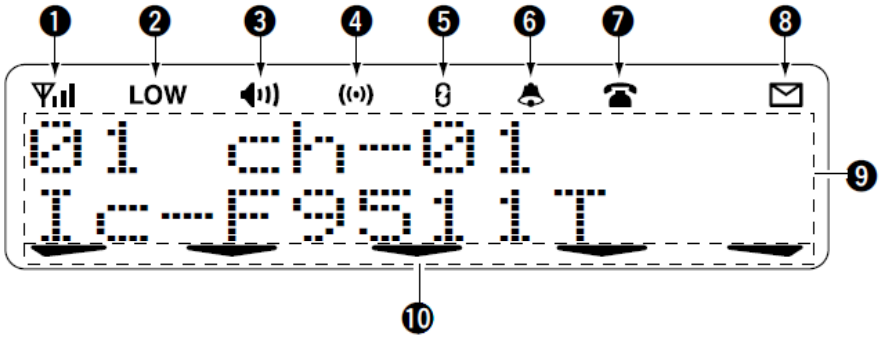
Connector cover

NEVER connect non-specified microphones. The pin assignments may be different and the transceiver may be damaged.

◇MICROPHONE
The supplied microphone has a PTT switch and a hanger hook.
- The following functions are available when the microphone is on or off hook (depending on the setting):

➢ Automatic scan starts when it is on hook.
➢ Scan is cancelled when it is off hook.
➢ Scan is paused when it is off hook.
➢ Automatic priority channel selection is available when it is off hook.
➢ Sets to 'Inaudible' condition (mute condition) when it is on hook.
➢ Sets to 'Audible' condition (unmute condition) when it is off hook.

4-1-2 Function Display
IC-F9511S/T,F9521S/T, F9523S/T



❶RECEIVED SIGNAL STRENGTH INDICATOR
Indicates relative signal strength level.

Weak ⇐ Receive Signal level ⇒ Strong

❷LOW POWER INDICATOR
Appears when low output power is selected.
* When high output power is selected, no indicator appears.

❸AUDIBLE INDICATOR
Appears when the channel is in the 'audible' (unmute) condition.

❹COMPANDER INDICATOR
Appears when the compander function* is activated.
* Analog mode operation only

❺SCRAMBLER INDICATOR
Appears when the voice scrambler or encryption function is activated.

❻BELL INDICATOR
Appears/blinks when the specific page call* is received, depending on how the transceiver has been pre-programmed.
* P25 operation only

❼TELEPHONE INDICATOR
Appears when a phone call* is received.
* P25 operation only

❽SHORT MESSAGE INDICATOR
Appears when a Status message or Short message is received.
* P25 operation only

❾ALPHANUMERIC DISPLAY
Displays an operating channel number, channel name, Set mode contents, DTMF code, etc.

❿ACTIVATED KEY INDICATOR
Appears above the key assigned as [Scan Add/Del (Tag)] key when that key has been activated.

See the operating guide for details of Analog and P25 Trunking/Conventional system operations. Consult your Icom dealer or system operator for details concerning your transceiver's programming.

4-1-3 Programmable Function Keys IC-F9511S/T,F9521S/T,F9523S/T

■Programmable function keys

The following functions can be assigned to [DIAL]*, [UP], [DOWN], [P0], [P1], [P2], [P3] and [P4] programmable function keys. Consult your Icom dealer or system operator for details concerning your transceivers programming.

If the programmable function names are bracketed in the following explanations, the specific key is used to activate the function depends on the programming.

* The functions you can assign to [DIAL] are limited.(Only functions marked with ☆ can be assigned.)

☆ ***CH UP AND DOWN KEYS***

➥ Push (or Rotate)* to select an operating channel.

➥ Push (or Rotate)* to select a scan group after pushing and holding [Scan A Start/Stop]/[Scan B Start/Stop].

* Rotate when this function is assigned to [DIAL].

☆ ***ZONE UP AND DOWN KEY***

(This function is for [DIAL] only) Rotate to select the desired zone.

ZONE KEY

Push this key, then push [CH Up] or [CH Down] or rotate [CH Up/Down]* to select the desired zone.

What is "zone"?—The desired channels are assigned into a zone according to the intended use for grouping. For example, 'Staff A' and 'Staff B' are assigned into a "Business" zone, and 'John' and 'Cindy' are assigned into a "Private" zone.

SCAN A START/STOP KEY

➥ Push to start and cancel scanning operation.

• When Power ON Scan function is activated, push to pause the scanning operation. And the paused scan resumes after the specified time period has passed.

➥ Push and hold this key for 1 sec to indicate the scan list, then push [CH Up] or [CH Down] or rotate [CH Up/Down]* to select the desired list. (Available depending on the presetting.)

SCAN B START/STOP KEY

➥ Push to start and cancel scanning operation. The scan restarts after the specified time period has passed when the scan (started with this key) is cancelled by this key operation.

➥ Push and hold this key for 1 sec to indicate the scan list, then push [CH Up] or [CH Down] or rotate [CH Up/Down]* to select the desired list.

SCAN ADD/DEL (TAG) KEY

Push to add or delete the selected channel to/from the scan list.

① Push to indicate the scan list, then push [CH Up] or [CH Down] or rotate [CH Up/Down] * to select the desired list.

② Push to add or delete the channel to/from the selected scan list.

③ Push and hold for 1 sec to exit the scan list selection mode.

PRIO A/B KEYS

➥ Push to select Priority A or Priority B channel.

➥ Push and hold [Prio A (Rewrite)] or [Prio B (Rewrite)] for 1 sec to rewrite the operating channel as the Priority A or Priority B channel.

MR-CH 1/2/3/4 KEYS

Push to select the memory channel 1 to 4 directly.

MONI KEY

➥ Mute and release the CTCSS (DTCS), NAC or Talkgroup ID squelch mute. Open any squelch/deactivate any mute while pushing this key.

➥ Depending on the pre-set value, pushing and holding this key for 1 sec cancels the scan. For the IC-F9511S/T, this function is not available in transceivers with a revision number of 1.2 or lower.

TALK AROUND KEY

(Conventional operation only)

Turn the talk-around function ON and OFF.

• The talk around function equalizes the transmit frequency to the receive frequency for transceiver-to-transceiver communication.

Programmable Function Keys
IC-F9511S, IC-F9511T

PUBLIC ADDRESS KEY
Push to activate the Public Address (PA) function for voice amplification. When the PA function is activated, the audio output can be controlled from the transceiver separately with [CH Up] or [CH Down] or rotate [CH Up/Down]*.
- This function is available when the external unit, such as a audio amplifier, speaker, etc. is additionally connected.
- Push this key, then speak into the microphone while pushing and holding [PTT].

RX SPEAKER KEY
Push to turn the RX speaker function ON or OFF. When the RX speaker function is turned ON, the received audio can be heard via the external speaker that is connected to the D-Sub 25-pin.
- This function is available when the external speaker is additionally connected.
- This function is useful when you are out of the vehicle.
- The audio output level is linked to the transceiver's volume control.

LOCK KEY
Push and hold to electronically lock all programmable keys except the following: [Moni], [Light], [Lock], [Emergency Single], [Emergency Repeat], [Surveillance] and [OPT 1/2/3].

LIGHT KEY
Push to turn the transceiver's backlight ON for about 5 sec when the backlight function is turned OFF in user set mode.

HIGH/LOW KEY
Push to select the transmit output power temporarily or permanently, depending on the pre-set value.
- Ask your dealer for the output power level for each selection.

SURVEILLANCE KEY
Push to turn the surveillance function ON or OFF. When this function is turned ON, the beep is not emitted and the LCD backlight does not light when a signal is received or a key is pushed, etc.

HOOK SCAN KEY
When the on-hook scan function is activated, push this key to stop scanning temporarily. Push this key again to re-start scanning.

USER SET MODE KEY
➥ Push and hold to enter user set mode.
- During user set mode, push this key to select an item that is enabled by your dealer, and change the value or condition by pushing [CH Up] or [CH Down] or rotating [CH Up/Down]*.

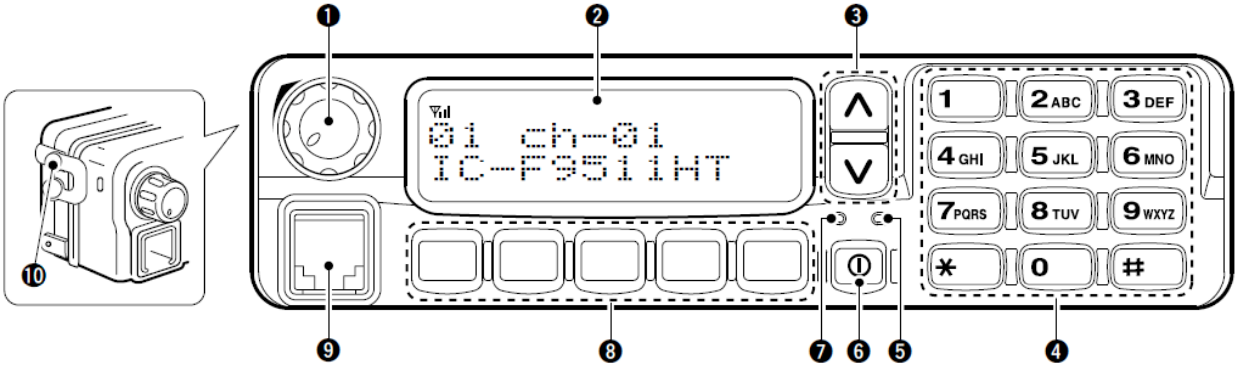
➥ Push and hold this key again to exit user set mode. User set mode is also available via the 'Power ON function.'

OPT 1/2/3 KEYS
Push to control the output signal level from the optional unit connector.

CLOCK KEY
➥ Push to indicate the current time on the LCD.
- While the current time is indicated, push and hold this key for 1 sec to enter the time data edit mode.

➥ Push and hold for 1 sec to enter the clock set mode.
- During clock set mode, push this key to select an item, and change the value or condition by pushing [CH Up] or [CH Down] or rotating [CH Up/Down]*.

*Simple model only



❶AF VOLUME CONTROL KNOB
Rotate the knob to adjust the audio output level.
- Minimum audio level is pre-programmed.

❷FUNCTION DISPLAY
Displays a variety of information, such as an operating channel number/name, DTMF codes and operating conditions, etc.

❸UP/DOWN KEYS
Push to select an operating channel, etc.
*The desired function can be assigned by your dealer.

❹10-KEYPAD
The keypad allows you to enter digits to:
- Select memory channels, tone channels and DTMF codes (when in the DTMF code channel selection mode)
- Start up with a password
- Input the Individual ID code during P25 mode operation. (Depending on the pre-set value.)

❺BUSY INDICATOR
Lights green while receiving a signal, or when the squelch is open.

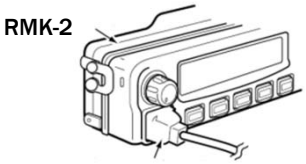
❻POWER SWITCH [POWER]
Push to turn the power ON and OFF.
- The following functions are available at power ON as options:

➢ Automatic scan start
➢ Password prompt
➢ Set mode

❼TRANSMIT INDICATOR
Lights red while transmitting.

❽DEALER-PROGRAMMABLE KEYS
Desired functions can be programmed independently by your dealer. In this instruction manual, these keys are from the left, called [P0]/[P1]/[P2]/[P3]/[P4].

❾MICROPHONE CONNECTOR
Connect the supplied or optional microphone.
- When you connect a microphone, be sure to fit the connector cover of the microphone into the connector to maintain the controller's dust protection and splash resistance.



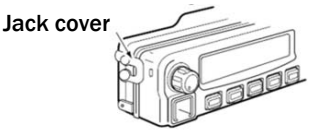
Connector cover

NEVER connect non-specified microphones. The pin assignments may be different and the transceiver may be damaged.

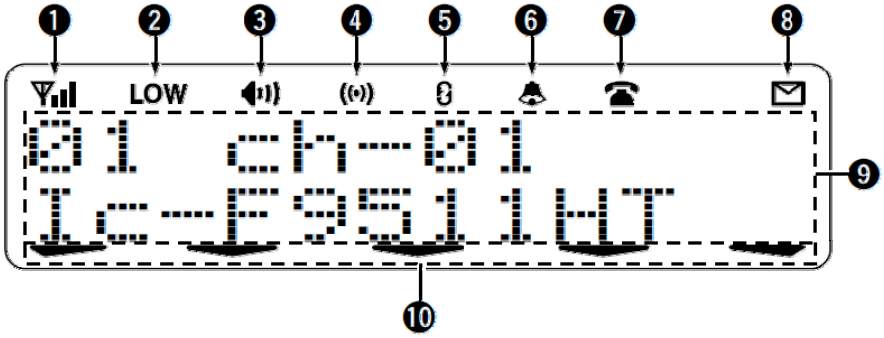
◇MICROPHONE
The supplied microphone has a PTT switch and a hanger hook.
- The following functions are available when the microphone is on or off hook (depending on the setting):

➢ Automatic scan starts when it is on hook.
➢ Scan is cancelled when it is off hook.
➢ Scan is paused when it is off hook.
➢ Automatic priority channel selection is available when it is off hook.
➢ Sets to 'Inaudible' condition (mute condition) when it is on hook.
➢ Sets to 'Audible' condition (unmute condition) when it is off hook.

❿SPEAKER JACK
Connect a 4–8 Ω external speaker.
- Max. input power: 7 W
- Attach the jack cover when no external speaker is connected.



4-1-5 Function Display IC-F9511HT



❶RECEIVED SIGNAL STRENGTH INDICATOR
Indicates relative signal strength level.

Weak ⇐ Receive Signal level ⇒ Strong

❷LOW POWER INDICATOR
Appears when low output power is selected.
* When high output power is selected, no indicator appears.

❸AUDIBLE INDICATOR
Appears when the channel is in the 'audible' (unmute) condition.

❹COMPANDER INDICATOR
Appears when the compander function* is activated.
* Analog mode operation only

❺SCRAMBLER INDICATOR
Appears when the voice scrambler or encryption function is activated.

❻BELL INDICATOR
Appears/blinks when the specific page call* is received, depending on how the transceiver has been pre-programmed.
* P25 operation only

❼TELEPHONE INDICATOR
Appears when a phone call* is received.
* P25 operation only

❽SHORT MESSAGE INDICATOR
Appears when a Status message or Short message is received.
* P25 operation only

❾ALPHANUMERIC DISPLAY
Displays an operating channel number, channel name, Set mode contents, DTMF code, etc.

❿ACTIVATED KEY INDICATOR
Appears above the key assigned as [Scan Add/Del (Tag)] key when that key has been activated.

See the operating guide for details of Analog and P25 Trunking/Conventional system operations. Consult your Icom dealer or system operator for details concerning your transceiver's programming.

■Programmable function keys

The following functions can be assigned to [UP], [DOWN], [P0], [P1], [P2], [P3] and [P4] programmable function keys. Consult your Icom dealer or system operator for details concerning your transceivers programming.
If the programmable function names are bracketed in the following explanations, the specific key is used to activate the function depends on the programming.

CH UP AND DOWN KEYS
➥ Push to select an operating channel.
➥ Push to select a scan group after pushing and holding [Scan A Start/Stop]/[Scan B Start/Stop].

ZONE KEY
Push this key, then push [CH Up] or [CH Down] to select the desired zone.

What is "zone"?—The desired channels are assigned to a zone according to the intended use for grouping. For example, 'Staff A' and 'Staff B' are assigned into a "Business" zone, and 'John' and 'Cindy' are assigned to a "Private" zone.

SCAN A START/STOP KEY
➥ Push to start and cancel scanning operation.
• When Power ON Scan function is activated, push to pause the scanning operation. And the paused scan resumes after the specified time period has passed.
➥ Push and hold this key for 1 sec to indicate the scan list, then push [CH Up] or [CH Down] to select the desired list. (Available depending on the pre-set value.)

SCAN B START/STOP KEY
➥ Push to start and cancel scanning operation. The scan restarts after the specified time period has passed when the scan (started with this key) is cancelled by except for this key operation.
➥ Push and hold this key for 1 sec to display the scan list, then push [CH Up] or [CH Down] to select the desired list.

SCAN ADD/DEL (TAG) KEY
Push to add or delete the selected channel to/from the scan list.
① Push to display the scan list, then push [CH Up] or [CH Down] to select the desired list.
② Push to add or delete the channel to/from the selected scan list.
③ Push and hold for 1 sec to exit the scan list selection mode.

PRIO A/B KEYS
➥ Push to select Priority A or Priority B channel.
➥ Push and hold [Prio A (Rewrite)] or [Prio B (Rewrite)] for 1 sec to rewrite the operating channel as the Priority A or Priority B channel.

MR-CH 1/2/3/4 KEYS
Push to select the memory channel 1 to 4 directly.

MONI KEY
Mute and release the CTCSS (DTCS), NAC or Talkgroup ID squelch mute. Open any squelch/deactivate any mute while pushing this key.

TALK AROUND KEY (Conventional operation only)
Turn the talk around function ON and OFF.
• The talk around function equalizes the transmit frequency to the receive frequency for transceiver-to-transceiver communication.

PUBLIC ADDRESS KEY
Push to activate the Public Address (PA) function for voice amplification. When the PA function is activated, the audio output can be controlled from the transceiver separately with [CH Up] or [CH Down].
• This function is available when the external unit, such as a audio amplifier, speaker, etc. is additionally connected.
• Push this key, then speak into the microphone while pushing and holding [PTT].

NOTE: "PA/RX Speaker" setting should be turned OFF by your dealer with the CS-F9010/F9510 cloning software to activate the PA function.

RX SPEAKER KEY
Push to turn the RX speaker function ON or OFF. When the RX speaker function is turned ON, the received audio can be heard via the external speaker.
- This function is available when the external speaker is additionally connected.
- This function is useful when you are out of the vehicle.
- The audio output level is linked to the transceiver's volume control.

DO NOT operate this key with this transceiver. Otherwise no audio may be emitted.

LOCK KEY
Push and hold to electronically lock all programmable keys except the following: [Moni], [Light], [Lock], [Emergency Single], [Emergency Repeat], [Surveillance] and [OPT 1/2/3].

LIGHT KEY
Push to turn the transceiver's backlight ON for about 5 sec when the backlight function is turned OFF in user set mode.

HIGH/LOW KEY
Push to select the transmit output power temporarily or permanently, depending on the pre-set value.
- Ask your dealer for the output power level for each selection.

SURVEILLANCE KEY
Push to turn the surveillance function ON or OFF. When this function is turned ON, the beep is not emitted and the LCD backlight does not light when a signal is received or a key is pushed, etc.

HOOK SCAN KEY
When the on-hook scan function is activated, push this key to stop scanning temporarily. Push this key again to re-start scanning.

USER SET MODE KEY
➥ Push and hold to enter user set mode.
- During user set mode, push this key to select an item that is enabled by your dealer, and change the value or condition by pushing [CH Up] or [CH Down].

➥ Push and hold this key again to exit user set mode. User set mode is also available via the 'Power ON function.'

OPT 1/2/3 KEYS
Push to control the output signal level from the optional unit connector.

CLOCK KEY
➥ Push to indicate the current time on the LCD.
- While the current time is indicated, push and hold this key for 1 sec to enter the time data edit mode.

➥Push and hold for 1 sec to enter the clock set mode.
- During clock set mode, push this key to select an item, and change the value or condition by pushing [CH Up] or [CH Down].

HOME KEY
Push to return to normal operation.

4-1-7 Preparation for Operation (IC-F9510 series)

■Programmable key functions

The programmable key functions can be assigned to the following keys and switches;

Mobile transceivers:
[UP]*, [DOWN]*, [P0], [P1], [P2], [P3] and [P4].

*Available on 10-key models only

Consult your Icom dealer or system operator for details concerning your transceiver's PC programming.

◇Programmable key functions availability

Following chart shows the availability of the programmable key functions in analog and P25 digital mode.

▒ N/A : Not Available

Programmable key functions	Analog	Apco P25
CH Up/Down	✓	✓
Zone Up/Down	✓	✓
Zone	✓	✓
Scan A Start/Stop, Scan B Start/Stop	✓	✓
Scan Add/Del (Tag)	✓	✓
Prio A, Prio B	✓	✓
Prio A (Rewrite), Prio B (Rewrite)	✓	✓
MR-CH 1,2,3,4	✓	✓
Moni	✓	✓
Public Address	✓	✓
RX Speaker	✓	✓
Light	✓	✓
Lock	✓	✓
Talk Around	✓	✓
High/Low	✓	✓
Surveillance	✓	✓
Hook Scan	✓	✓
OPT1 Out, OPT2 Out, OPT3 Out	✓	✓
OPT1 Momentary OPT2 Momentary OPT3 Momentary	✓	✓
User Set Mode	✓	✓
Clock	✓	✓
Menu <,Menu >	N/A	N/A
Re-dial	✓	N/A
DTMF Autodial	✓	N/A
Scrambler	✓	N/A
Compander	✓	N/A
Lone Worker	✓	✓
Emergency	✓	✓
Ext.CH Sel Mode	✓	✓
Home	✓	✓
Scrambler/Encryption	✓	✓
Zeroize	N/A	✓
Site Lock	N/A	✓
Encryption	N/A	✓
Digital Button	N/A	✓
Digital Page	N/A	✓
Digital Status	N/A	✓
Digital Message	N/A	✓
Phone	N/A	✓
Individual	N/A	✓
Talkgroup	N/A	✓
Site Select	N/A	✓
Rekey	N/A	✓
Keyset	N/A	✓

■ Analog mode operation (Common operation)

RE-DIAL KEY
Push to transmit the last-transmitted DTMF code.

DTMF AUTODIAL KEY
➥ Push to enter the DTMF channel selection mode. Then select the desired channel using **[CH Up]** /**[CH Down]**or **[CH Up/Down]**.
➥ After selecting the channel, push this key to transmit the DTMF code.

SCRAMBLER KEY
Push to turn the Voice Scrambler function ON or OFF.

COMPANDER KEY
Push to turn the Compander function ON or OFF. This function reduces noise in the transmitted audio to provide clear communication.

❑Analog and APCO P25 modes operation (Common operation)

LONE WORKER KEY
Push to turn the Lone Worker function ON or OFF.
- If the Lone Worker function is activated, the Emergency function is automatically turned ON after the specified time period* has passed with no operation performed.
- Depending on the pre-set value.

EMERGENCY KEY
Push and hold for the specified time period*, to enter the emergency mode. After the specified time period* has passed, an Emergency call or alarm is transmitted once, or repeatedly.
- To exit the emergency mode, push and hold for the specified time period* again before transmitting.
- Depending on the pre-set value.

Ext. CH Sel Mode KEY
(Available on only the mobile radio)
Push to turn the Memory Channel Select function from external input operation ON or OFF.

When this function is turned ON, and a signal is input from an external unit that is connected to the D-sub 25-pin connector, the operating channel changes to the desired memory channel.
In this case, a memory channel selection with the key or dial operation, and the microphone hanger action functions, Move to Priority A Channel and On Hook Scan, are disabled.
When this function is turned OFF, the memory channel selection from external input operation is disabled.

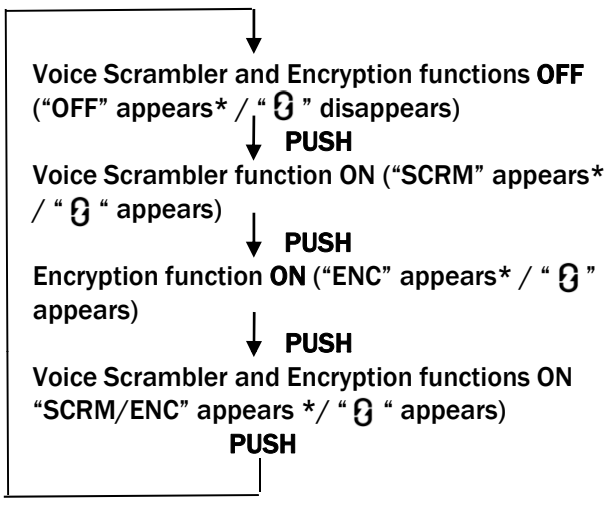
- This function is usable when an external unit is connected to the transceiver.
- Ask your dealer for details of the external input operation.

HOME KEY
Push to return to the normal operating mode from each selected mode, such as Individual ID, Talkgroup ID, DTMF code channel, and so on.
When the Full Off Air Call SetUp (FOACSU) function is turned ON on the Trunking mode, push to ignore the receiving call.

SCRAMBLER/ENCRYPTION KEY

(The optional UT-125 AES/DES encryption unit is required for encryption.)

➥ While in the analog mode, push to turn the Voice Scrambler function ON or OFF.
➥ While in the APCO P25 mode, push to turn the Encryption function ON or OFF.
➥ While in the mixed (digital and analog) mode, push to turn the Voice Scrambler and Encryption functions ON or OFF, separately or simultaneously, as shown below.



■ APCO P25 mode operation (Common operation)

ZEROIZE KEY

Push and hold this key for 1 sec to zeroize the encryption key data which is programmed by the key loader. After this operation is performed, the transceiver cannot decrypt the encrypted code.

SITE LOCK KEY

(Trunking mode only)

Push to lock the transceiver in the current registered site. When the Site Lock function is activated, roaming and the background scan are inhibited. Push again to turn the Site Lock function OFF.

ENCRYPTION KEY

(The optional UT-125 AES/DES encryption unit is required.) Push to turn the Encryption function ON or OFF.

DIGITAL BUTTON KEY

➥ Push to enter the digital call type selection mode. Then push **[CH Up]**/**[CH Down]** or rotate **[CH Up/Down]** to select the desired call type from "**PAGE**," "**RDO INHIBIT**," "**RDO UINHIBIT**," "**RDO MONITOR**," "**RDO CHECK**," "**STATUS**," "**SHORT MSG**," "**STATUS QUERY**," "**PHONE**" and "**ANNOUNCEMENT**."

After making the digital call type selection, push this key again to enter the ID selection mode.

- If "**STATUS**" or "**SHORT MSG**" is selected, the transceiver displays the Status Message or Short Message selection mode before entering the Individual ID selection mode.
- If "**PHONE**" is selected, the transceiver displays the phone number selection mode.
- If no operation is performed for about 30 sec, the transceiver returns to normal operation.

➥ Push and hold for 1 sec to cancel and return to normal operation.

DIGITAL PAGE KEY

➥ Push to enter the Individual ID selection mode for a Page call. Then push **[CH Up]**/**[CH Down]** or rotate **[CH Up/Down]** to select the desired Individual ID.

- Push **[PTT]** to transmit a Page call.
- If no operation is performed for about 30 sec, the transceiver returns to normal operation.

➥ Push and hold for 1 sec to cancel and return to normal operation.

DIGITAL STATUS KEY

➥ Push to enter the Status Message selection mode. After selecting the desired Status Message, push again to enter the destination Individual ID selection mode to send a Status Message.

- If no operation is performed for about 30 sec, the transceiver returns to normal operation.
- While in the Trunking mode, the Individual ID selection mode does not appear.

➥ Push and hold for 1 sec to cancel and return to normal operation.

DIGITAL MESSAGE KEY

➥ Push to enter the Short Message selection mode. After selecting the Short Message, push again to enter the destination Individual ID selection mode to send a Short Message.

- If no operation is performed for about 30 sec, the transceiver returns to normal operation.
- While in the Trunking mode, the Individual ID selection mode does not appear.

➥ Push and hold for 1 sec to cancel and return to normal operation.

PHONE KEY

➥ Push to enter the phone number selection mode for a Phone call. Then push **[CH Up]**/**[CH Down]** or rotate **[CH Up/Down]** to select the desired phone number.

- Push **[PTT]** to transmit the Phone call.
- If no operation is performed for about 30 sec, the transceiver returns to normal operation.

➥ Push and hold for 1 sec to cancel and return to normal operation.

INDIVIDUAL KEY

Push to directly enter the Individual ID selection mode. Then select the desired Individual ID code using **[CH Up]**/**[CH Down]** or **[CH Up/Down]**.

- The Individual ID can be edited with the 10-keypad*. (Depending on the pre-set value.)
  *10-key models only.
- While in the Individual ID selection mode, push to cancel and return to normal operation.

TALKGROUP KEY
Push to directly enter the Talkgroup ID selection mode. Then select the desired Talkgroup ID code using **[CH Up]/[CH Down] or [CH Up/Down].**
- During the Talk-group ID selection, push to cancel and return to normal operation.

SITE SELECT KEY *(Trunking mode only)*
Push to select "**SITE 1,**" then push again to display the site information (RFSS ID and SITE ID), and you can edit the RFSS and SITE IDs. Push and hold **[Site Select]** for 1 sec to set and return to normal operation.

REKEY *(OTAR mode only)*
Push and hold for 1 sec to transmit a Key Management Message (KMM-Hello command) to a Key Management Facility (KMF) to request rekeying.

KEYSET *(OTAR mode only)*
➥ Push to enter the keyset selection mode, then select the desired keyset using **[CH Up]/[CH Down]** or **[CH Up/Down].**
➥ During the keyset selection mode, push and hold this key for 1 sec to set the selected keyset, and push again to exit the keyset selection mode.

COMPANDER SWITCH *(Analog mode only)*
Turns the Compander function ON or OFF.
The Compander function reduces noise in the transmitted audio to provide clear communication.

SCRAMBLER/ENCRYPTION SWITCH
(Analog and APCO P25 modes)
(The optional UT-125 AES/DES encryption unit is required for encryption.)

➥ While in the analog mode, turns the Voice Scrambler function ON or OFF.
➥ While in the P25 Conventional mode, turns the Encryption function ON or OFF.
➥ While in the mixed (digital and analog) mode, simultaneously turns the Voice Scrambler and Encryption functions ON or OFF.

ENCRYPTION SWITCH *(APCO P25 mode only)*
(The optional UT-125 AES/DES encryption unit is required.) Turns the Encryption function ON or OFF.

SITE LOCK SWITCH *(APCO P25 Trunking mode only)*
Locks the transceiver in the currently registered site. When the Site Lock function is activated, roaming and the background scan are inhibited.

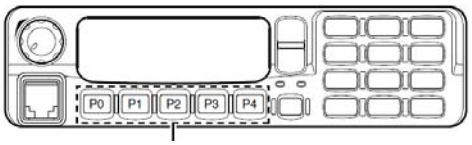
■Turning power ON

When you use the transceiver for the first time, or after the transceiver has not been used for a long time, make sure to check the date and time indication after turning the power ON. If the time and date are not correct, reset them.

①Push [⏻] to turn the power ON.
②If the transceiver is programmed for a start up password, input the digit codes as directed by your dealer.
- 10-keypad* can be used for password input.

*10-key model only:
- The keys as below can be used for password input:

The transceiver detects numbers in the same block as identical. Therefore "01234" and "56789" are the same.



*In this instruction manual, these keys are from the left, called [P0]/[P1]/[P2]/[P3]/[P4].

KEY	P0	P1	P2	P3	P4
NUMBER	0 5	1 6	2 7	3 8	4 9

③When the "PASSWORD" indication does not clear after entering 6 digits, the input code number may be incorrect. Turn the power off and start over in this case.

■Channel selection

Several types of channel selections are available. Methods may differ according to your system set up.

NON-ZONE TYPE:
To select the desired operating channel:
- Push [CH Up] or [CH Down].
- Rotate [CH Up/Down]*.
- Push one of [MR-CH 1] to [MR-CH 4].

ZONE TYPE:
To select the desired zone:
- Push [Zone], then push [CH Up] or [CH Down].
- Rotate [Zone Up/Down]*.

AUTOMATIC SCAN TYPE:
Channel setting is not necessary for this type. When turning power ON, the transceiver automatically starts scanning. Scanning stops when receiving a call.
*Simple model only

■Receiving and transmitting

Receiving:
①Push [⏻] to turn the power ON.
②Push [CH Up] or [CH Down], or rotate [CH Up/Down]* to select a channel, in sequence.
③While receiving a call, adjust the audio output level to a comfortable listening level.
*Simple model only

Transmitting:
Wait for the channel to become clear to avoid interference.
① Take the microphone off hook.
- The 'audible' condition is selected and BUSY indicator lights green.
- A priority channel may be selected automatically.

② Wait for the channel to become clear.
- The channel is busy when BUSY indicator lights green.

③ While pushing and holding [PTT], speak into the microphone at your normal voice level.
④ Release [PTT] to receive.

IMPORTANT: To maximize the readability of your signal;
1. Pause briefly after pushing [PTT].
2. Hold the microphone 5 to 10 cm (2 to 4 inches) from your mouth, then speak into the microphone at a normal voice level.

◇Transmitting notes
• Transmit inhibit function
The transceiver has several inhibit functions which restrict transmission under the following conditions:
➢ The channel is in mute condition ('Inaudible' condition; "🔊" does not appear.)
➢ The channel is busy.
➢ Un-matched (or matched) CTCSS is received. (Depending on the pre-set value.)
➢ Un-matched (or matched) NAC is received.* (Depending on the pre-set value.)
➢ The selected channel is a 'receive only' channel.
*Digital mode operation only.

• **Time-out timer**
After continuous transmission for the pre-programmed time period, the time-out timer is activated, causing the transceiver to stop transmitting.

• **Penalty timer**
Once the time-out timer is activated, transmission is further inhibited for a period determined by the penalty timer.

■Clock function

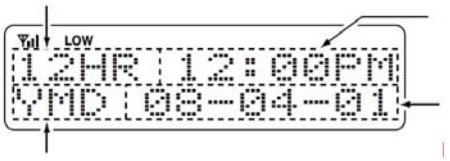
The transceiver indicates the current time and date when [Clock] is pushed. And you can change the indication format and time/date settings.

When you use the transceiver for the first time, or after the transceiver has not been used for a long time, make sure to check the date and time indication after turning the power ON. If the time and date are not correct, reset them.

◇Time and date indication

①Push [Clock] to indicate the current time and date on the LCD.
- When the indication format is set to 12- hour, “AM” or “PM” is indicated.
- The LCD indication returns to the stand-by mode after 30 sec has passed with no operation.

The time indication format (12-hour/24-hour)

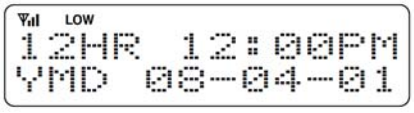


Date Indication (Y: Year M:Month D: Date)

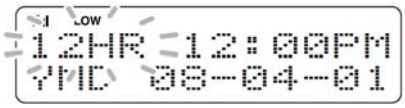
②Push [Clock] again to return to the stand-by mode.

◇Time and date settings

①Push [Clock] to indicate the current time and date on the LCD.



②Push and hold [Clock] for 1 sec to enter the time and date setting mode.
- The time indication format, “24HR” or “12HR” blinks.



③Push [Clock] to select the desired item to be changed.
④Push [CH Up] or [CH Down], or rotate [CH Up/Down]* to set the selected item.
*Simple model only

⑤Push [Clock] to set.
- The next item blinks.

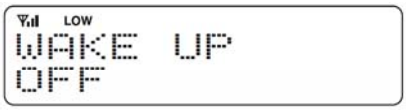
⑥Repeat steps ③ to ⑤ to set items.
⑦After setting, push and hold [Clock] for 1 sec to program.
- Return to the time and date setting mode.

⑧Push [Clock] to return to the stand-by mode.

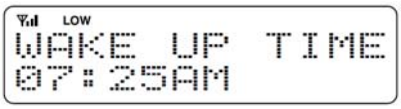
■Wake up function

The wake up function allows the transceiver to be automatically turned ON according to the wake up time setting.

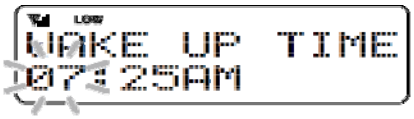
①Push and hold [Clock] for 1 sec to enter the clock set mode.
- “WAKE UP” is indicated.



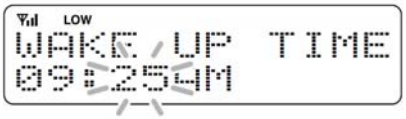
②Push [CH Up] or [CH Down], or rotate [CH Up/Down]* to turn the wake up function ON.
③Push [Clock] to set, and select “WAKE UP TIME.”



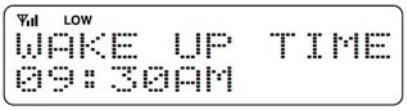
④Push [CH Up] or [CH Down], or rotate [CH Up/Down]* to enter the wake up time edit mode.
- The ‘hour’ data blinks.



⑤Push [CH Up] or [CH Down], or rotate [CH Up/Down]* to input the 'hour' data for wake up time. After entering, push [Clock] to set.
• The 'minutes' data blinks.



⑥Push [CH Up] or [CH Down], or rotate [CH Up/Down]* to Input the 'minutes' data for wake up time. After entering, push [Clock] to set.



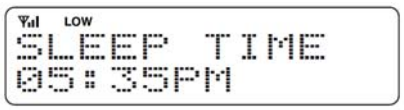
⑦Push and hold [Clock] for 1 sec to exit the clock set mode.
• Return to the stand-by mode.
*Simple model only

■Sleep function

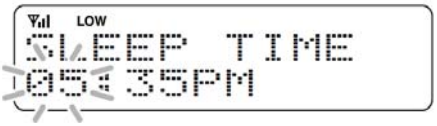
The sleep function allows the transceiver to be automatically turned OFF according to the sleep time setting.

①Push and hold [Clock] for 1 sec to enter the clock set mode. "WAKE UP" is indicated.
②Push [Clock] several times to select "SLEEP."

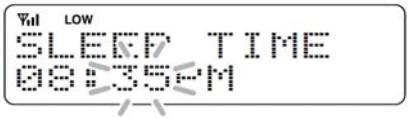
③Push [CH Up] or [CH Down], or rotate [CH Up/Down]* to turn the sleep function ON.
④Push [Clock] to set, and select "SLEEP TIME."



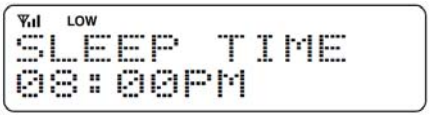
⑤Push [CH Up] or [CH Down], or rotate [CH Up/Down]* to enter the sleep time edit mode.
• The 'hour' data blinks.



⑥Push [CH Up] or [CH Down], or rotate [CH Up/Down]* to Input the 'hour' data for sleep time. After entering, push [Clock] to set.
• The 'minutes' data blinks.



⑦Push [CH Up] or [CH Down], or rotate [CH Up/Down]* to Input the 'minutes' data for sleep time. After entering, push [Clock] to set.



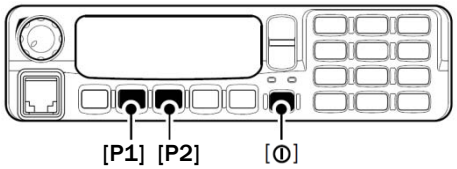
⑧Push and hold [Clock] for 1 sec to exit the clock set mode.
• Return to the stand-by mode.
*Simple model only

■User set mode

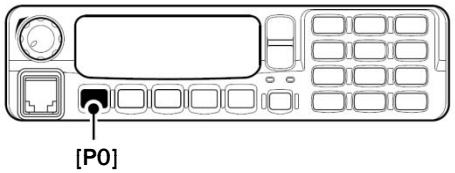
The user set mode is accessed with [User Set Mode] and allows you to set seldom-changed settings. In this case you can "customize" the transceiver operation to suit your preferences and operating style.

Entering the user set mode:

①While pushing and holding [P1] and [P2], push [⏻] to turn the power ON.
• Turn power OFF in advance.
• You should hold [P1] and [P2] until "SET MODE" appears on the display.



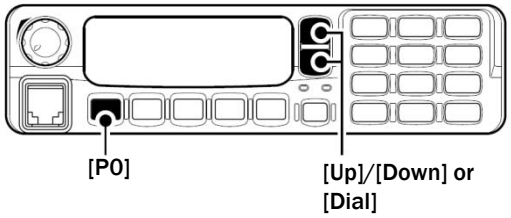
②Push and hold [P0] to enter user set mode.



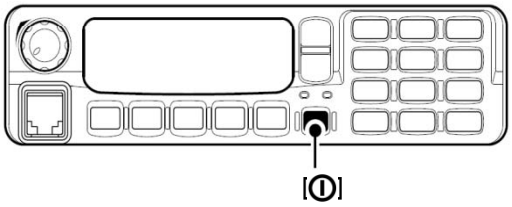
③Push [P0] several times to select the appropriate item. Then, push [Up] or [Down] or rotate [DIAL] *1 to set the desired level/condition.
• Available set mode functions are **Backlight, LCD Contrast, Beep, Beep Level, Ringer Level, SQL Level, AF Min. Level, Mic Gain, Horn, Battery Voltage, Signal Moni, Lone Worker*2** and **System Information.**

*1 Simple model only

*2 For the IC-F9511S/T, this function is not available in transceivers whose revision number is 1.2 or before.



④Push [⏻] again to exit set mode.



NOTE : User set mode is also available via a programmable key.

■DTMF transmission

If the transceiver has **[DTMF Autodial]** assigned to it, the automatic DTMF Transmission function can be used. Up to 8 DTMF channels are selectable.

①Push **[DTMF Autodial]**— a DTMF channel appears.
②Push **[CH Up] or [CH Down]**, or rotate **[CH Up/Down]** to select the desired DTMF channel.
③Push **[DTMF Autodial]** to transmit the DTMF code.

■Scrambler function

The Voice Scrambler function provides private voice communication between users.

①Push **[Scrambler]** or **[Scrambler/Encryption]** to turn the Voice Scrambler function ON.
• "S" appears.
②Push **[Scrambler]** or **[Scrambler/Encryption]** again to turn the function OFF.
• "S" disappears.

■ Emergency transmission

When **[Emergency]** is pushed for the specified time period*, the DTMF emergency signal is transmitted once, or repeatedly, on the specified emergency channel.
*Depending on the pre-set value.

A repeat emergency signal is automatically transmitted until the transceiver receives the acknowledgement signal or transceiver power is turned OFF.
When no emergency channel is specified, the signal is transmitted on the previously selected channel. If you want to cancel the emergency call, push and hold **[Emergency]** again before transmitting the call.

If your transceiver is programmed for Silent operation, you can transmit Emergency calls without the beep sounding or the LCD display lighting.

IMPORTANT: It is recommended to set an emergency channel individually to provide the dedicated emergency call operation.

◇**NOTES**
Depending on the pre-set value, the following functions are automatically activated.

• **Auto TX function**
The transceiver automatically transmits the microphone audio for the specified time period* after the emergency call transmission.

An HM-148G or HM-152 hand microphone is required.

• **Auto RX function**
The transceiver stands by in the audible mode for the specified time period*, after the emergency call transmission.
*Depending on the pre-set value.

■ Lone Worker Emergency Call

When the Lone Worker function is activated, and the specified time period* has passed with no operation is performed, the transceiver enters the emergency mode, and then the countdown starts.
After the specified time period* has passed, an emergency call is automatically transmitted once, or repeatedly. If someone operates the transceiver before transmission, the transceiver exits the emergency mode, and the emergency call is cancelled.

➥ Push **[Lone Worker]** to toggle the Lone Worker function ON or OFF.
*Depending on the pre-set value.

4-1-10 APCO P25 Mode Operation (IC-F9510 series)

■ General

APCO Project-25 (P25) is designed for public safety digital radio, and allows you to make a call to a specific station (Individual call) or to a particular group (Talk-group call or Announcement call*) in the Conventional and Trunking mode. Other P25 transceivers on the channel will not listen in on a call that does not match their Individual/Talk-group/announcement group ID or NAC (Network Access Code).

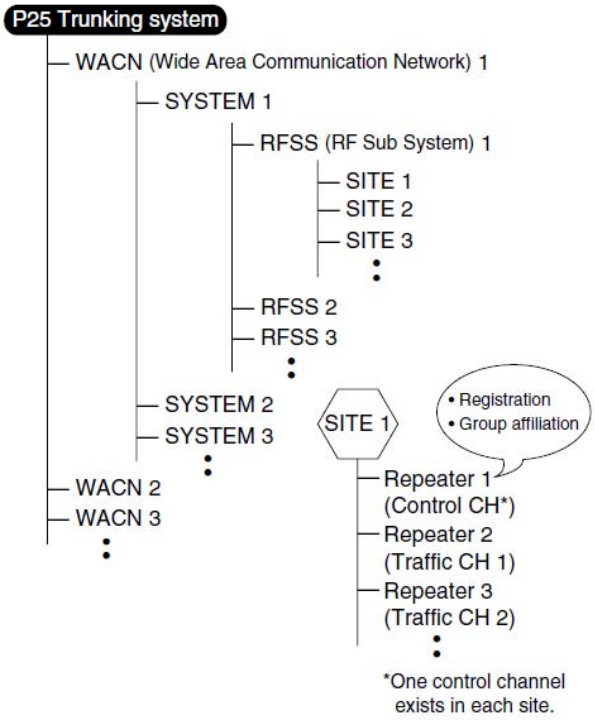
Moreover, the following functions and calls are available: Pager function, Radio Inhibit/Uninhibit function, Radio Monitor function, Radio Check function, Status Message, Short Message, Status Query, Phone Call, Emergency Call and Encryption function.

NAC matching is not necessary for the above functions and calls.

Each transceiver has a unique ID, and it allows it to be substituted with an alphanumeric name, if programmed. You can use this ID (or name) to select a target station to call, and the ID (or name) of the target station is displayed after receiving a call.
*Trunking mode only

✔ ***IMPORTANT for Trunking mode operation:***

- The public Trunking transceiver should be registered and group affiliated with the control channel in a current repeater system, to be operated in the Trunking mode. After the registration and group affiliation are successful, the Trunking operation can be performed.
- When the Full Off Air Call SetUp (FOACSU) function is turned ON, beeps sound after receiving an Individual call on the Trunking mode, which is a request for the user's permission to accept the call.

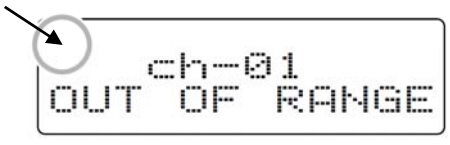


■ Control Channel Hunt function (P25 Trunking mode only)

The P25 Trunking mode allows the transceiver to automatically hunt for a control channel in a repeater system, according to the pre-programmed hunt list* when;

- Turning the power ON.
- The P25 Trunking mode is selected.
- The transceiver goes out of the range and does not receive the downlink signal from the current registered control channel.

-"**OUT OF RANGE**" is displayed.
-S-meter icon is displayed according to the received signal strength level.

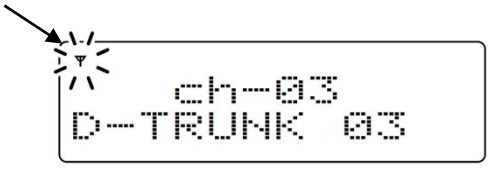


"Y" is NOT displayed in the indicated location.

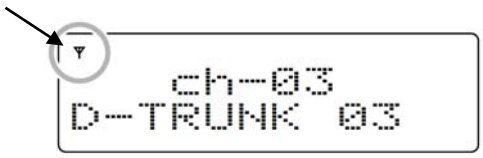
*The valid control channels (up to 64) are listed on the hunt list.

If the control channel is found, the transceiver attempts registration and group affiliation.

Blinks when registration and group affiliation are performed.

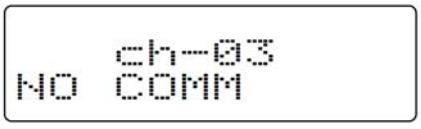


✔ **FAILED:**
The transceiver will continue to hunt for the next site.
✔ **SUCCEEDED:**
The transceiver can be operated in the P25 Trunking system.



Appears after registration and group affiliation are successful.

NOTE: "NO COMM" message is displayed, as illustrated below, when the group affiliation has failed. In that case, change the operating channel or turn power OFF then ON again to retry hunting.



■ Roaming function
(P25 Trunking mode only)

The P25 Trunking mode allows the transceiver to move to another system or WACN (Wide Area Communication Network), according to the pre-programmed roaming list*, in order to find a site that has a higher quality signal, or provides better services.
The Roaming function is automatically activated when the transceiver goes out of the range and does not receive the downlink signal from the repeater in the current registered home system.
* The valid roaming areas (up to 10) are listed on the roaming list.

■ Site Lock function
(P25 Trunking mode only)

The transceiver can be locked into the current site with **[Site Lock]**. When the Site Lock function is activated, roaming and the background scan are inhibited. This function is helpful when staying within one site and you don't want the transceiver to roam or scan other sites. However if the transceiver goes out of the range and does not receive the downlink signal from the current site, the transceiver will automatically start hunting for a valid site, even if the Site Lock function is activated.

✔ ***What is the Background Scan?***
When this function is ON, the transceiver always monitors a control channel of an adjacent site while operating in the registered site. (Default: OFF)

■ Site Select function
(P25 Trunking mode only)

The RFSS and SITE IDs can be edited manually with **[Site Select]**.

To edit the RFSS and SITE IDs:
① Push **[Site Select]** to select **"SITE 1."**
② Push **[Site Select]** again to display the site information (RFSS ID and SITE ID).
- Push **[Site Select]** to return to normal operation.

③ Push and hold **[Site Select]** for 1 sec to enter the RFSS ID edit mode.
④ Push **[CH Up]**/**[CH Down]** or rotate **[CH Up/Down]** to edit the ID.
⑤ After editing, push **[Site Select]** to store the RFSS ID, and enter the SITE ID edit mode.
⑥ Repeat step ④ to edit.
⑦ Push and hold **[Site Select]** for 1 sec to return to **"SITE 1"** indication as in step ①.
⑧Push and hold **[Site Select]** for 1 sec to store the SITE ID, and return to normal operation.

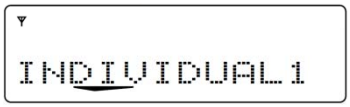
For P25 Trunking mode operation:
The transceiver should be registered and group affiliated with the control channel before the following operations can be performed.

■ Individual call

◇Transmitting

Individual call allows you to make a call to a specific station, and it provides private communication. **[Individual]** key assignment is necessary to transmit the Individual call.

① Push **[Individual]** to enter the Individual ID selection mode.
- A pre-programmed ID name is displayed.
- When the ID name is not programmed, the ID code is displayed.
- Push again to cancel and return to normal operation.



②Select the desired Individual ID (or name) using **[CH Up]/[CH Down] or [CH Up/Down].**
- The Individual ID can be edited with the 10- keypad*. (Depending on the pre-set value.)

*10-key models only.

To edit the Individual ID using the 10-keypad:

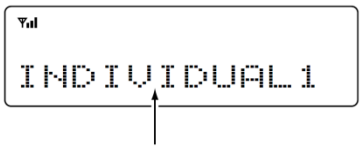
Input the Individual ID directly with the 10-keypad.
- Push **[✳]** to clear a code.

③ Push and hold **[PTT]** to transmit the Individual call to the target station, then speak into the microphone.
- The Transmit indicator lights red.
- Depending on the pre-set value, the target station does not open the squelch, and communication is not established, if the Individual ID or NAC (Network Access Code) is not matched.

④Release **[PTT]** to receive.

◇Receiving

① When an Individual call is received;
- The Busy indicator lights green.
- The ringer sounds. (Depending on the pre-setting.)
- The calling station ID (or name) is displayed for 2 sec. (Depending on the pre-set value.)
- Depending on the pre-set value, the transceiver does not open the squelch, and communication is not established, if the Individual ID or NAC (Network Access Code) is not matched.



The calling station name (or ID)

② Push and hold **[PTT]** and speak into the microphone.

③ Release **[PTT]** to receive a response.

For P25 Trunking mode operation:

When the Full Off Air Call SetUp (FOACSU) function is turned ON, beeps sound after receiving a call. In that case, push [**PTT**] to accept the call. Then, operate as described in steps ② and ③ above. If you ignore the call by not pushing [**PTT**] for a specified time period*, communication is not established. Or, pushing [Home] after receiving the call will also ignore it.

■ Talkgroup call

◇Transmitting

A Talkgroup call allows you to make a call to a specific group only. **[Talkgroup]** key assignment is necessary to transmit the Talkgroup call.

✔ For Trunking mode operation:

The **[Talkgroup]** key is not usable while in the Trunking mode. To make a Talkgroup call, the group affiliation should be performed with the desired Talkgroup ID to call.

① Push **[Talkgroup]** to enter the Talkgroup ID (or name) selection mode.
- A pre-programmed ID name is displayed.
- When the ID name is not programmed, the ID code is displayed.
- Push again to cancel and return to normal operation.

② Select the desired Talkgroup ID (or name) using **[CH Up]/[CH Down]**, or **[CH Up/Down]**.

NOTE: When '65535' is selected as the Talkgroup ID, All Call is an open call to everyone on your system.

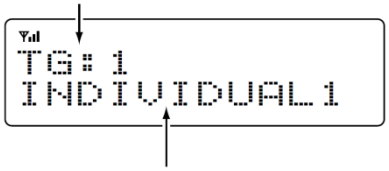
③ Push and hold **[PTT]** to transmit the Talkgroup call to the specific group, then speak into the microphone.
- The Transmit indicator lights red.
- Depending on the pre-set value, the target station does not open the squelch, and communication is not established, if the Talkgroup ID or NAC (Network Access Code) is not matched. Ask your dealer for details.
- The Talkgroup ID (or name) is displayed for 2 sec when **[PTT]** is pushed. (Depending on the pre-set value.)

④ Release **[PTT]** to receive.

◇Receiving

① When a Talk-group call is received;
- The Busy indicator lights green.
- The ringer sounds. (Depending on the pre-setting.)
- The Talk-group ID (or name) and calling station ID (or name) are displayed for 2 sec. (Depending on the pre-set value.)
  "**ALL CALL**" is displayed instead of the Talkgroup ID (or name) when All Call is received.
- Depending on the pre-set value, the transceiver does not open the squelch, and communication is not established, if the Talk-group ID or NAC (Network Access Code) is not matched.

The talkgoup ID



The calling station name (or ID)

② Push and hold **[PTT]** and speak into the microphone.

NOTE: Only one station is permitted to speak at a time.

③Release **[PTT] to receive a response.**

NOTE: When the Talk-group ID is set to '65535,' any Talk-group call can be received (if NAC is matched).

◇Talk-group display on mode change

The Talk-group ID (or name) is displayed for 2 sec on the upper line of the LCD when the operating channel or zone is changed. This function can be turned OFF by your dealer.

◇Talk-group display on PTT

The Talk-group ID (or name) is displayed for 2 sec on the upper line of the LCD when **[PTT]** is pushed. This function can be turned OFF by your dealer.

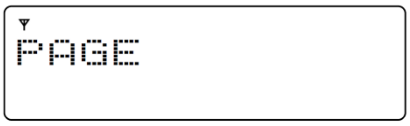
■ Pager function

◇Transmitting

This function can be used as a "message pager" to confirm the target station of a caller's identification, even when the operator leaves the transceiver temporarily unattended. If the target station is active when receiving a signal, an acknowledgement is automatically transmitted. The caller station can verify whether a target station is active or not.

[Digital Button] or **[Digital Page]** key assignment is necessary to transmit the pager signal.

① Push **[Digital Button]** to enter the digital call model selection mode.



✔ ***Quick access***
Push **[Digital Page]** to directly enter the Individual ID selection mode. In this case, skip step ②.

② Push **[Digital Button]** again to enter the Individual ID selection mode.
- A pre-programmed ID name is displayed.
- When the ID name is not programmed, the ID code is displayed.

③ Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the desired ID (or name).
- Push and hold **[Digital Button]** or **[Digital Page]** for 1 sec to cancel and return to normal operation.
- The ID can be edited with the 10-keypad*. (Depending on the pre-set value.)

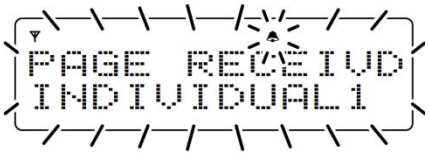
* 10-key models only.

④ Push **[PTT]** to transmit the pager signal to the target station.
- The Transmit indicator lights red.
- **"PLEASE WAIT"** is displayed.

⑤Release **[PTT]**.
- **"ACK RECEIVED"** is displayed after receiving an acknowledgement from the target station, and then the transceiver returns to normal operation.
- **"NO ACKNOWLDG"** is displayed when an acknowledgement is not received and the transceiver returns to normal operation.

◇Receiving

① When a pager signal is received;
- The Busy indicator lights green.
- The ringer sounds. (Depending on the pre-setting.)
- "🔔" blinks. (Depending on the pre-set value.)
- **"PAGE RECEIVD"** and the calling station ID (or name) blink.



② An acknowledgement is automatically transmitted.
- The Transmit indicator lights red.

③ Push any key (except for **[⏻]**) to stop the display from blinking and return to normal operation.

■ Radio Inhibit function

◇Transmitting

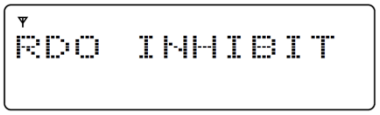
A Radio Inhibit function allows you to send a signal that will inhibit (stun or kill, depending on the pre-set value) the target transceiver.
[Digital Button] key assignment is necessary to transmit the radio inhibit signal.

✔ For Trunking mode operation:

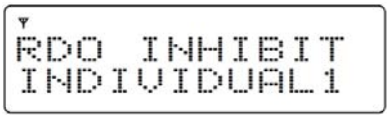
This function is available only for a dispatcher in the Trunking mode.

① Push **[Digital Button]** to enter the digital call type selection mode.

② Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select "**RDO INHIBIT**."



③ Push **[Digital Button]** again to enter the Individual ID selection mode.
- A pre-programmed ID name is displayed.
- When the ID name is not programmed, the ID code is displayed.



④ Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the desired ID (or name).
- Push and hold **[Digital Button]** for 1 sec to cancel and return to normal operation.
- The ID can be edited with the 10-keypad*. (Depending on the pre-set value.)

*10-key models only.

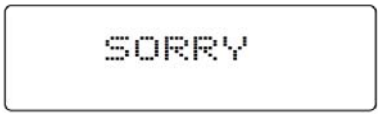
⑤Push **[PTT]** to transmit the radio inhibit signal to the target station.
- The Transmit indicator lights red.
- **"PLEASE WAIT"** is displayed.

⑥Release **[PTT].**
- **"ACK RECEIVED"** is displayed after receiving an acknowledgement from the target station and the transceiver returns to normal operation.
- **"NO ACKNOWLDG"** is displayed when an acknowledgement is not received and the transceiver returns to normal operation.

◇**Receiving**

If a radio inhibit signal is received that matches your Individual ID, you cannot receive or transmit afterwards. (Depending on the pre-set value.)

①When a radio inhibit signal is received;
- The Busy indicator lights green.
- The ringer sounds. (Depending on the pre-setting.)
- "SORRY" (default) appears.



②An acknowledgement is automatically transmitted.
- The Busy/Transmit indicator does not light because the radio inhibit is activated.

NOTE: The transceiver will not be revived until one of the following operations is performed. (Depending on the presetting.)
- Receiving a Radio Uninhibit signal.
- Entering the user passcode.

When the decode action is set to "Kill," the cloning operation is necessary to revive.

■ Radio Uninhibit function

◇**Transmitting**

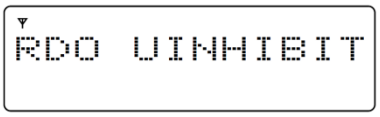
A Radio Uninhibit function allows you to send a signal that will revive the inhibited transceiver. **[Digital Button]** key assignment is necessary to transmit the Radio Uninhibit signal.

✔ ***For Trunking mode operation:***

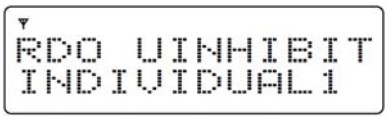
This function is available only for a dispatcher in the Trunking mode.

①Push **[Digital Button]** to enter the digital call type selection mode.

②Push **[CH Up]** or **[CH Down],** or rotate **[CH Up/Down]** to select "**RDO UINHIBIT.**"



③Push **[Digital Button]** again to enter the Individual ID selection mode.
- A pre-programmed ID name is displayed.
- When the ID name is not programmed, the ID code is displayed.



④Push **[CH Up] or [CH Down]**, or rotate **[CH Up/Down]** to select the desired ID (or name).
- Push and hold **[Digital Button]** for 1 sec to cancel and return to normal operation.
- The ID can be edited with the 10-keypad*. (Depending on the pre-set value.)

* 10-key models only

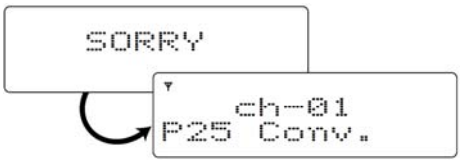
⑤Push **[PTT]** to transmit the Radio Uninhibit signal to the target station.
- The Transmit indicator lights red.
- **"PLEASE WAIT"** is displayed.

⑥Release **[PTT].**
- **"ACK RECEIVED"** is displayed after receiving an acknowledgement from the target station, and then the transceiver returns to normal operation.
- **"NO ACKNOWLDG"** is displayed when an acknowledgement is not received and the transceiver returns to normal operation.,

◇**Receiving (Reviving the transceiver)**
A Radio Uninhibit signal revives the inhibited transceiver.

①When an inhibited transceiver receives a radio uninhibit signal, the Busy/Transmit indicator does not light because the Radio Inhibit is still activated.

②An acknowledgement is automatically transmitted, and the transceiver is revived and returns to normal operation.
- The Transmit indicator lights red.



NOTE: If the transceiver is not revived even, after a Radio Uninhibit signal is received, cloning is required to revive it.

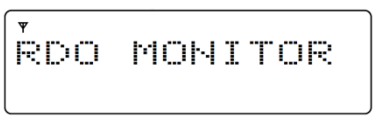
■ Remote Monitor function

◇**Transmitting**
A Remote Monitor function allows you to send a signal that requires the target station to transmit audio from the microphone.

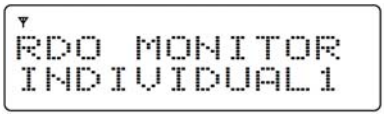
[Digital Button] key assignment is necessary to transmit the remote monitor signal.

①Push [Digital Button] to enter the digital call type selection mode.

②Push [CH Up] or [CH Down], or rotate [CH Up/Down] to select "RDO MONITOR."



③Push **[Digital Button]** again to enter the Individual ID selection mode.
- A pre-programmed ID name is displayed.
- When the ID name is not programmed, the ID code is displayed.



④Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the desired ID (or name).
- Push and hold **[Digital Button]** for 1 sec to cancel and return to normal operation.
- The ID can be edited with the 10-keypad*. (Depending on the pre-set value.)
  *10-key models only.

⑤Push **[PTT]** to transmit the remote monitor signal to the target station.
- The Transmit indicator lights red.
- "**PLEASE WAIT**" is displayed.

⑥Release **[PTT]**.
- "**ACK RECEIVED**" is displayed after receiving an acknowledgement from the target station, and then the transceiver returns to normal operation.
- Busy indicator lights green.
- "**NO ACKNOWLDG**" is displayed when an acknowledgement is not received and the transceiver returns to normal operation.

◇**Receiving**
➥ When a remote monitor signal is received, the transceiver automatically transmits an acknowledgement and audio*.
*The audio is transmitted for a pre-set time period.
•The Busy indicator lights green while receiving, and lights red while transmitting an acknowledgement or the audio.

NOTE: When the optional SM-25 desktop microphone, HM-152T or HM-148T hand microphones are connected, the audio will not be transmitted.

■ Radio Check function

◇**Transmitting**
A Radio Check function allows an operator to know if the target station is within communication range. The target station transceiver automatically responds after receiving a radio check signal.
[Digital Button] key assignment is necessary to transmit the radio check signal.

✔ ***For Trunking mode operation:***
This function is available only for a dispatcher in the Trunking mode.

①Push **[Digital Button]** to enter the digital call type selection mode.

②Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select "**RDO CHECK.**"

③Push **[Digital Button]** again to enter the Individual ID selection mode.
- A pre-programmed ID name is displayed.
- When the ID name is not programmed, the ID code is displayed.

④Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the desired ID (or name).
- Push and hold **[Digital Button]** for 1 sec to cancel and return to normal operation.
- The ID can be edited with the 10-keypad*. (Depending on the pre-set value.)

*10-key models only.

⑤Push **[PTT]** to transmit the radio check signal to the target station.
- The Transmit indicator lights red.
- "**PLEASE WAIT**" is displayed.

⑥Release **[PTT]**.
- "**ACK RECEIVED**" is displayed after receiving an acknowledgement from the target station, and then the transceiver returns to normal operation.
- Busy indicator lights green.
- "**NO ACKNOWLDG**" is displayed when an acknowledgement is not received and the transceiver returns to normal operation.

◇**Receiving**
➥ When a radio check signal is received, the transceiver automatically transmits an acknowledgement.
- The Busy indicator lights green while receiving, and lights red while transmitting an acknowledgement.
- The function display does not change while transmitting.

■ Status Message

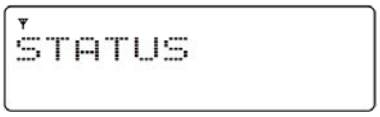
◇**Transmitting**
The transceiver can send one of up to 100 different pre-programmed Status Messages.
[Digital Button] or **[Digital Status]** key assignment is necessary to transmit the Status Message.

✔ ***For Trunking mode operation:***
The Status Message can be sent only to a dispatcher in the Trunking mode.

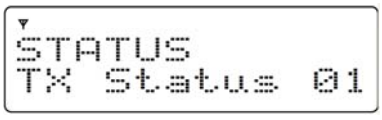
①Push **[Digital Button]** to enter the digital call type selection mode.

✔ ***Quick access***
Push **[Digital Status]** to directly enter the Status Message selection mode. In this case, skip steps ② and ③. Go to step ④.

②Push **[CH Up]** or **[CH Down]**, or rotate [CH Up/Down] to select "STATUS."



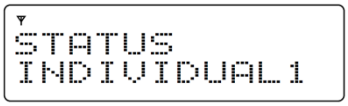
③Push **[Digital Button]** again to enter the Status Message selection mode.
- A pre-programmed Status Message is displayed.



④Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the desired Message.

While in the Trunking mode, the following steps ⑤ and ⑥ are not necessary. Go to step ⑦.

⑤Push **[Digital Button]** (or **[Digital Status]**) again to enter the Individual ID selection mode.
- A pre-programmed ID name is displayed.
- When the ID name is not programmed, the ID code is displayed.



⑥Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the desired ID (or name).
- Push and hold **[Digital Button]** (or **[Digital Status]**) for 1 sec to cancel and return to normal operation.
- The ID can be edited with the 10-keypad*. (Depending on the pre-set value.)

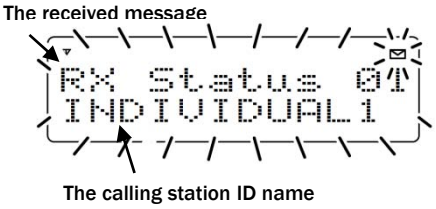
* 10-key models only.

⑦Push **[PTT]** to transmit the Status Message to the target station.
- The Transmit indicator lights red.
- **"PLEASE WAIT"** is displayed.

⑧Release **[PTT]**.
- **"ACK RECEIVED"** is displayed after receiving an acknowledgement from the target station, and then the transceiver returns to normal operation.
- **"NO ACKNOWLDG"** is displayed when an acknowledgement is not received and the transceiver returns to normal operation.

◇Receiving

①When a Status Message is received;
- The Busy indicator lights green.
- The ringer sounds. (Depending on the pre-set value.)
- The calling station ID name (or code) and the Status Message blinks.



②An acknowledgement is automatically transmitted.
- The Transmit indicator lights red.

③Push any key (except for [①]) to stop the display from blinking and return to normal operation.

■ Short Message

◇Transmitting

The transceiver can send one of up to 10 different pre-programmed Short Messages.
[Digital Button] or **[Digital Message]** key assignment is necessary to transmit the Short Message.

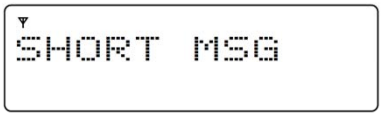
✔ For Trunking mode operation:

The Short Message can be sent only to a dispatcher in the Trunking mode.

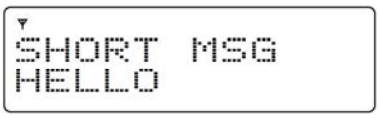
①Push **[Digital Button]** to enter the digital call type selection mode.

✔ Quick access
Push **[Digital Message]** to directly enter the Short Message selection mode. In this case, skip steps ② and ③. Go to step ④.

②Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select **"SHORT MSG."**



③Push **[Digital Button]** again to enter the Short Message selection mode.
*A pre-programmed Short Message is displayed.



④Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the desired Short Message.

While in the Trunking mode, the following steps ⑤and ⑥ are not necessary. Go to step ⑦.

⑤Push **[Digital Button]** (or **[Digital Message]**) again to enter the Individual ID selection mode.
- A pre-programmed ID name is displayed.
- When the ID name is not programmed, the ID code is displayed.

⑥Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the desired ID (or name).
- Push and hold **[Digital Button]** (or **[Digital Message]**) for 1 sec to cancel and return to normal operation.
- The ID can be edited with the 10-keypad*. (Depending on the pre-set value.)

* 10-key models only.

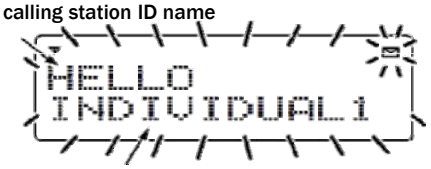
⑦Push **[PTT]** to transmit the Short Message to the target station.
- The Transmit lights red.
- **"PLEASE WAIT"** is displayed.

⑧Release **[PTT]**.
- **"ACK RECEIVED"** is displayed after receiving an acknowledgement from the target station, and then the transceiver returns to normal operation.
- **"NO ACKNOWLDG"** is displayed when an acknowledgement is not received and the transceiver returns to normal operation.

◇ **Receiving**

①When a Short Message is received;
- The Busy indicator lights green.
- The ringer sounds. (Depending on the pre-setting.)
- The calling station ID name (or code) and the Short Message blinks.

The calling station ID name



The received message

②An acknowledgement is automatically transmitted.
- The Transmit indicator lights red.

③Push any key (except for [⏻]) to stop the display from blinking and return to normal operation.

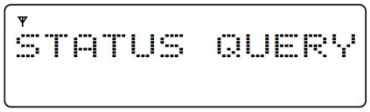
■ Status Query function

◇**Transmitting**

A Status Query function allows you to send a signal that requests the last transmitted Status Message to the target station. The target station transceiver automatically responds after receiving a Status Query signal.
[Digital Button] key assignment is necessary to transmit the Status Query.

①Push **[Digital Button]** to enter the digital call type selection mode.

②Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select **"STATUS QUERY."**



③Push **[Digital Button]** again to enter the Individual ID selection mode.
- A pre-programmed ID name is displayed.
- When the ID name is not programmed, the ID code is displayed.

④Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the desired ID (or name.)
- Push and hold **[Digital Button]** for 1 sec to cancel and return to normal operation.
- The ID can be edited with the 10-keypad*. (Depending on the pre-set value.)

* 10-key models only.

⑤Push **[PTT]** to transmit the status query signal to the target station.
- The Transmit indicator lights red.
- **"PLEASE WAIT"** is displayed.

⑥ Release **[PTT]**.
- **"STATUS QUERY"** and the last transmitted Status Message by the target station blinks.
- **"NO ACKNOWLDG"** is displayed when an acknowledgement is not received and the transceiver returns to normal operation.

◇**Receiving**

➥ When a status transmitted Status Message is automatically transmitted.

- The Busy indicator lights green while receiving, and lights red while transmitting an acknowledgement or the Status Message.
- The function display does not change while transmitting.

■ Phone call

◇**Transmitting**

The transceiver can make a Phone call that is similar to standard phone calls. A transceiver and a PSTN (Public Switched Telephone Network) can access each other.

If no phone number is pre-programmed, the Phone call function is not available.

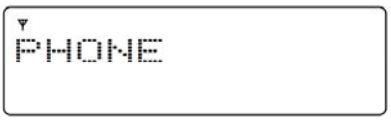
[Digital Button] or **[Phone]** key assignment is necessary to transmit the Phone call.

①Push **[Digital Button]** to enter the digital call type selection mode.

✔ ***Quick access***

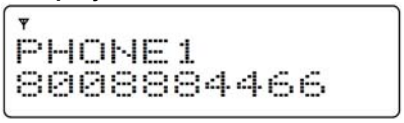
Push **[Phone]** to enter the phone number selection mode directly. In this case, skip step ②. Go to step ③.

②Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select "PHONE."



③Push **[Digital Button]** again to enter the phone number selection mode.

- A pre-programmed phone number and text are displayed.



④Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the desired phone number.

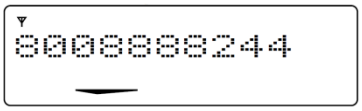
- Push and hold **[Digital Button]** (or **[Phone]**) for 1 sec to cancel and return to normal operation.
- The phone digits (0 to 9, M and #) can be edited with the 10-keypad*. (Depending on the pre-set value.)

*10-key models only.

To edit the Phone number with the 10-keypad:

Input the phone number directly with the 10-keypad.

- Push **[Digital Button]** (or **[Phone]**) to clear a code.



⑤Push **[PTT]** to make a Phone call to the target telephone station.

- The Transmit indicator lights red.
- Beeps (PiPi) sound after the Phone call is connected to the target telephone station.
- If your Phone call is not connected, push **[Digital Button]** (or **[Phone]**) to return to normal operation.

⑥Push and hold **[PTT]** and speak into the microphone.

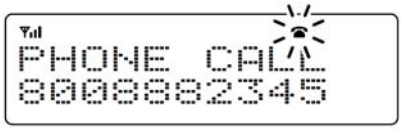
⑦Release **[PTT]** to receive.

⑧After the conversation is finished, push **[Digital Button]** (or **[Phone]**) to disconnect the Phone call and return to normal operation.

◇**Receiving**

①When a Phone call is received;

- The Busy indicator lights green.
- The ringer sounds. (Depending on the pre-setting.)
- **"PHONE CALL" blinks.**
- The phone number of the calling telephone station is displayed.(Trunking mode only.)
- "☎" blinks.



②Speak into the microphone while pushing and holding **[PTT]**.

- The Transmit indicator lights red.

③Release **[PTT]** to receive.

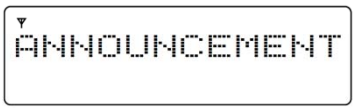
④After the conversation is finished, push **[Digital Button]** (or **[Phone]**) to hang up and return to normal operation.

■ Announcement function

◇**Transmitting**

The Announcement function allows you to send an announcement signal to only a specific group, and only in the Trunking mode.
The members of the target group can only receive, and not transmit, announcements.
[Digital Button] key assignment is necessary to use the Announcement function.

①Push **[Digital Button]** to enter the digital call type selection mode.
②Push **[CH Up] or [CH Down]**, or rotate **[CH Up/Down]** to select "**ANNOUNCEMENT.**"



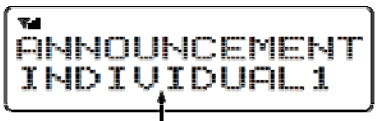
③Push and hold **[PTT]** to transmit the announcement signal to the target group.
• The Transmit indicator lights red.

④Push and hold **[PTT]** and speak into the microphone.

⑤Release **[PTT]** to stop transmitting.

◇**Receiving**

①When a matched announcement signal is received;
• The Busy indicator lights green.
• The ringer sounds. (Depending on the pre-setting.)
• "**ANNOUNCEMENT**" and calling station ID (or name) are displayed for 2 sec. (Depending on the pre-set value.)



The calling station name (or ID)

②You can listen to the announcement.

■ Emergency transmission

The P25 emergency mode can be accessed by pushing the **[Emergency]** key. An Emergency alarm is automatically transmitted once, or repeatedly*1, to the dispatcher (Trunking mode) or Talkgroup (Conventional mode).

Moreover, while in the emergency mode, Emergency calls can be transmitted with **[PTT]** to a Talkgroup.
If your transceiver is programmed for Silent operation, you can transmit Emergency alarms and Emergency calls without the beep sounding or the LCD display lighting. **[Emergency]** key assignment is necessary to transmit the Emergency alarm.

NOTES:
When the Auto TX function is pre-set, the transceiver automatically transmits the microphone audio for the specified time period*2 after the emergency alarm transmission, even if the emergency repeat cycle is set to '1.' Ask your dealer for details.
- An HM-148G or HM-152 hand microphone is required for the transceivers.

When the Auto RX function is pre-set, the transceiver stands-by in the audible mode, for the specified time period*2, after the emergency alarm transmission.

*1 Depending on the emergency repeat cycle setting.
*2 Depending on the pre-set value.

◇**Transmitting an Emergency alarm**

①Push and hold **[Emergency]** for the specified time period*2 to enter the emergency mode.
• The countdown starts immediately.
②After the specified time period*2 has passed, the transceiver automatically transmits an Emergency alarm once, or repeatedly, to inform the dispatcher that the transceiver is in the emergency condition.
• To exit the emergency mode, push and hold **[Emergency]** before transmitting an Emergency alarm.
• When the emergency repeat cycle is set to '1,' the transceiver transmits an Emergency alarm, exits the emergency mode and returns to normal operation.
• After receiving an acknowledgement, "**ACK RECEIVED**" is displayed, and depending on the pre-set value, the transceiver exits the emergency mode.
• When an acknowledgement is not received, "**NO ACKNOWLDG**" is displayed. And depending on the pre-set value, the transceiver automatically transmits the microphone audio (Auto TX).
③ To exit the emergency mode, turn the power OFF.

◇**Transmitting an Emergency call along with an Emergency alarm**

①Push and hold **[Emergency]***1 for the specified time period*2 to enter the emergency mode.
- The countdown starts immediately.

②After the specified time period*2 has passed, the transceiver automatically, and repeatedly, transmits an Emergency alarm.
- To exit the emergency mode, push and hold **[Emergency]** again before transmitting an Emergency alarm.
- After receiving an acknowledgement, "**ACK RECEIVED**" is displayed, and depending on the pre-set value, the transceiver exits the emergency mode.
- When an acknowledgement is not received, "**NO ACKNOWLDG**" is displayed. And depending on the pre-set value, the transceiver automatically transmits the microphone audio (Auto TX).

③Push and hold **[PTT]** to transmit an Emergency call.
- The Transmit indicator lights red.

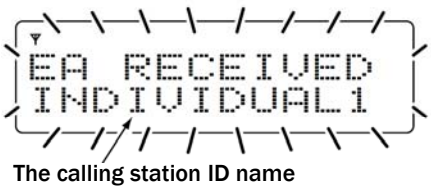
④To exit the emergency mode, turn the power OFF.

*1 : The emergency repeat cycle must be set to '2' or above.
*2 : Depending on the pre-set value.

◇**Receiving an Emergency alarm**

An Emergency alarm can be received only while in the Conventional mode. An emergency alarm decode action and automatic acknowledgement capability should be enabled by your dealer with the CS-F9010/F9510 cloning software.

①When an Emergency alarm is received;
- The Busy lights green.
- The ringer sounds.
- "**EA RECEIVED**" and the calling station ID (or name) blink.



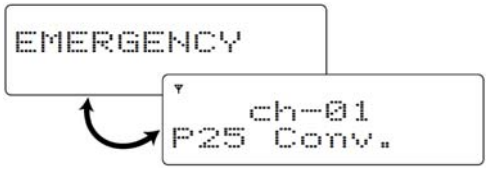
The calling station ID name

②An acknowledgement is automatically transmitted.
- The Transmit indicator lights red.

③Push any key (except for **[①]**) to stop the display from blinking and return to normal operation.

◇**Receiving an Emergency Call**

➥ When an Emergency call is received;
- The Busy indicator lights green.
- The ringer sounds, depending on the pre-set value.
- The pre-programmed emergency text (e.g. "**EMERGENCY**") and the channel indication is displayed alternately.



*Depending on the pre-set time, the calling station ID (or name) is displayed instead of the channel display.

■ Lone Worker Emergency Call

When the Lone Worker function is activated, and the specified time period* has passed with no operation performed, the transceiver enters the emergency mode, and then the countdown starts. After the specified time period* has passed, an emergency alarm is automatically transmitted once, or repeatedly. If someone operates the transceiver before transmission, the transceiver exits the emergency mode, and the emergency alarm is cancelled.

➥ Push **[Lone Worker]** to toggle the Lone Worker function ON or OFF.

■ Encryption function

The Encryption function enables secure communication, which provides private digital voice communication between users.

①Push **[Encryption]** or **[Scrambler/Encryption]** to turn the Encryption function ON.
- "🔒" appears.

②Push **[Encryption]** or **[Scrambler/Encryption]** again to turn the Encryption function OFF.
- "🔒" disappears.

◇**Key Fail Indication**
The transceiver indicates "Key Fail" for the specified time period* when the Common Key Reference (CKR) of the selected channel is not stored in the encryption unit.

◇**Decryption Multi Keys function**
When this function is enabled, the transceiver releases the mute after receiving the audio signals for decryption, even if the CKR setting is not matched to the selected channel.

*Depending on the pre-set time.

■ OTAR function

P25 Over-The-Air-Rekeying (OTAR) function allows the Key Management Facility (KMF) to change the encryption keys in a transceiver remotely, ("over the air") to protect the secure communications. Moreover, several OTAR commands are used to perform the following operations. See also 4-7 OTAR for this function.

From KMF to transceiver:
- Change Active Keyset
- Change Group RSI
- Radio Check

- The transceiver automatically responds to any command.

From transceiver to KMF:
- Registration to the OTAR system
- Deregistration from the OTAR system
- Rekeying

- When the channel in which the OTAR function is enabled is selected, the transceiver automatically attempts registration to the OTAR system by transmitting a Key Management Message (KMM) to KMF. Various other commands are exchanged between KMF and a transceiver, other than above.

◇**Registration to the OTAR system**
➥ Push **[Zone]**, then push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]**, to select the channel in which the OTAR function is enabled.
After selecting the channel, the transceiver automatically attempts registration to the OTAR system by transmitting a KMM 'Registration' command to KMF.

NOTE: There are 2 models of KMM— Standard and Packet. If the pre-programmed KMM type is not matched to the system to which the transceiver attempts to register with, the registration attempt may fail. In that case, the transceiver's KMM type should be changed to another type.

◇**Deregistration from the OTAR system**
➥ Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]**, to exit the channel in which the OTAR function is enabled. After exiting the channel, the transceiver automatically attempts deregistration from the OTAR system by transmitting a KMM 'Deregistration' command to KMF.

◇**Rekey request function**
Normally, the encryption keys are managed and securely changed by KMF over the air without receiving a Rekey request. But the transceiver can control KMF remotely by sending a Rekey request to perform the rekey operation.

①Push and hold **[Rekey]** for 1 sec to send a KMM 'Hello' command to KMF for a Rekey request.
- "REQUEST REKE" appears.

② After receiving a Rekey request from the transceiver, KMF performs the rekey operation.

③ When the rekey operation is successful, "REQUEST REKE" disappears.
- If the rekey operation fails, "FAILED" appears.

◇**Active Keyset selection**
This function allows you to select the Active Keyset that is stored in the transceiver.
The keyset structures a group of keys. By changing the keyset, the group of keys will be automatically switched to another group.

①Push **[Keyset]** to enter the keyset selection mode.
- The selected keyset name ("KEYSET1" or "KEYSET2") appears.

②Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]**, to select the desired keyset.
③Push and hold **[Keyset]** for 1 sec to set the selected keyset.
④Push **[Keyset]** to exit the keyset selection mode.

4-1-11 Tactical Group Function (IC-F9510 series)

■ Tactical Group function

The Tactical Group function enables commonly used channels to be placed together in zone 128.

IMPORTANT!
The tactical group operation should be enabled by your dealer with the CS-F9010/F9510 cloning software.

◇Creating the tactical group in zone 128 — Individual channel copy

①Push **[CH Up] or [CH Down]**, or rotate **[CH Up/Down]** to select the channel which you wish to copy to zone 128, then turn power OFF.

② While pushing **[P1]** and **[P3]**, push [⏻| to turn power ON.
- "**COPY ?**" is displayed.
- When all 512 channels are already used, the transceiver has no capacity. "**NOT COPY**" is displayed for 2 sec and error beeps sound.
- Turn power OFF to cancel copy.

③Push **[P0]** to copy the selected channel to zone 128.
- "**COPIED**" is displayed.

◇Creating the tactical group in zone 128 — Zone copy

①Push **[CH Up] or [CH Down]**, or rotate **[CH Up/Down]** to select the channel belonging to the zone which you wish to copy to zone 128, then turn power OFF.

② While pushing **[P1]** and **[P3]**, push [⏻| to turn power ON.
- "**COPY ?**" is displayed.
- When all 512 channels are already used, the transceiver has no capacity. "**NOT COPY**" is displayed for 2 sec and error beeps are emitted.
- Turn power OFF to cancel copy.

③Push **[CH Up] or [CH Down]**, or rotate **[CH Up/Down]** to select "**ZONE COPY ?**".

④Push **[P0]** to copy the selected zone data to zone 128.
- "**COPIED**" is displayed.

NOTE:
When the transceiver has not enough capacity to create the tactical group with zone copy, all channel data may not be copied completely.

◇Clearing the tactical group in zone 128 — Individual channel clearing

①Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select the channel which you wish to clear from zone 128, then turn power O FF.

② While pushing **[P1]** and **[P3]**, push [⏻| to turn power ON.
- "**CLEAR ?**" is displayed.
- Turn power OFF to cancel clearing.

③Push **[P0]** to clear the selected channel from zone 128.
- "**CLEARED**" is displayed.

◇Clearing the tactical group in zone 128 — Zone clearing

①Push **[CH Up]** or **[CH Down]**, or rotate **[CH Up/Down]** to select a channel in zone 128, then turn power OFF.

②While pushing **[P1]** and **[P3]**, push [⏻| to turn power ON.
- "**CLEAR ?**" is displayed.
- Turn power OFF to cancel clearing.

③Push **[CH Up] or [CH Down]**, or rotate **[CH Up/Down]** to select "**ALL CLEAR ?**".

④Push **[P0]** to clear the zone data from zone 128.
- "**ALL CLEARED**" is displayed.

◇Cloning the tactical group

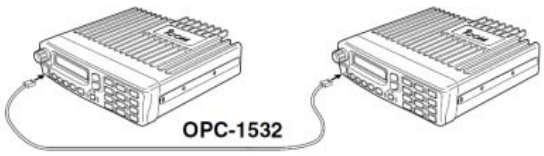
<Master (Zone 128) ➔ Sub (Zone 128)>

This operation enables the master transceiver to clone it's own tactical group in zone 128 to zone 128 of the sub transceiver.

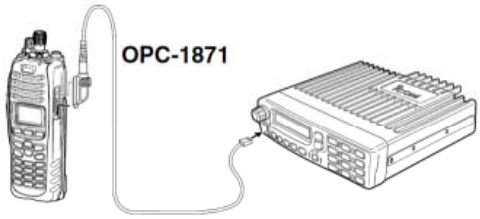
IMPORTANT!
To perform the tactical group cloning, "Set mode access" must be enabled, and the dealer pass code must be inputted.

①Connect the two transceivers (master and sub) with the optional zone copy cable. The following zone copy cables are available;
- **OPC-1532** : Used for the Mobile to Mobile connection.
- **OPC-1871** : Used for the Handheld to Mobile connection.

❑ Mobile to Mobile connection



❑Handheld to Mobile connection



For actual appearance of the cables, please refer to 3-5 Optional Accessories.

◇Cloning the tactical group
<Master (Zone 128) ➔ Sub (Zone 128)>
(Continued)

②Turn the sub transceiver power ON.

③Set the master transceiver into the set mode as follows;

While pushing **[P0]** and **[P4]** on the master transceiver, push [⏻] to turn the power ON.
- "**DEALER**" is displayed.

④Input the 6 digit dealer passcode, as specified by your dealer.
- The 10-keypad* can be used for pass code input.
  * 10-key models only
- When using a Simple model transceiver, the keys in the table shown below can be used for pass code input.
- The transceiver detects numbers in the same block as identical. Therefore 0 and 5, 1 and 6, etc. are the same.

KEY	[P0]	[P1]	[P2]	[P3]	[P4]
NUMBER	0 5	1 6	2 7	3 8	4 9

NOTE: When the "**DEALER**" indication does not clear after entering 6 digits, the input code number may be wrong. In that case, turn the power OFF, and start over.

NOTE: A default passcode is "159357";
Push **[P1], [P0], [P4], [P3], [P0], [P2]** in sequence.

⑤If "SETMODE" is displayed after entering the dealer passcode, push [P3].
- "CLONE" is displayed.

⑥Push [CH Up] or [CH Down], or rotate [CH Up/Down] to select "TACTICAL."

⑦Push [⏻] to copy zone 128 data of the master transceiver, to zone 128 of the sub transceiver.

NOTE: If [⏻] is pushed when "**CLONE**" is displayed, the regular cloning operation is performed (all data, including zone 128, of the master transceiver is written to the sub transceiver).

4-1-12 APCO P25 Trunking and Conventional Basic Functions

This list shows each function that is supported by P25 trunking mode, by P25 conventional mode, or by both.

		Trunking System	Conventional System	Functions
1	Multiple Network Support	✓	✓	Enable the radio to operate on the multiple different networks by selecting new parameter in SU.
2	Internetwork Services	✓		Internet service. Check if the application is accessible to the internet or not.
3	Announcement Group Voice Call	✓		Similar to Broadcast Voice Call
4	Broadcast Voice Call	✓	✓	Voice group call with no indication of Source ID.
5	System Voice Call	✓	✓	All ID Call functions.
6	Unit to Unit Call	✓	✓	Individual call. Voice group call with no indication of Source ID.
7	Unit to/from PSTN	✓		Call from the radio terminal to the telephone network or vice versa.
8	Unit to PSTN Explicit Dialing Live Key Mode	✓	✓	Dialing function from the radio terminal to the telephone network, indicating adaptability to the dialing message of the trunking packet
9	Unit to PSTN Explicit Dialing Buffered Mode	✓	✓	Same as No.10
10	Unit to PSTN Explicit Dialing List Mode	✓	✓	Same as No.10
11	Emergency Call Request/Indication	✓	✓	Emergency call/Indication
12	Multiple Level Priority Call Request	✓		Call request with priority level. Priority level is set by control CH.
13	Rx P25 Squelch: monitor, normal,selective	✓		Rx squelch behavior
14	Tx P25 Squelch: None, Status Symbols,Carrier, Own Nacs, Other Nacs	✓	✓	Same as BUSY LOCK OUT before Tx
15	Channel Hunt	✓		Hunting control CH
16	Channel Hunt List	✓		List of Control CH to hunt
17	Channel Hunt Frequency Scan	✓		Fix the frequency of the control CH to search by conditions such as carrier sense.
18	Channel Scan			Scanning channels.
19	Priority Channel Scan			Scanning priority channels.
20	Background Scanning	✓		Same as the BBS in MPT-1324, looking for better channel than the one in current use.

APCO P25 Trunking and Conventional Basic functions

		Trunking System	Conventional System	Functions
21	Priority Group Monitor	✓		Monitoring the arrival of groupcall signals with high priority level.
22	Emergency Alarm	✓	✓	Emergency alarm.
23	Call Alert	✓	✓	Call alert.
24	Short Message	✓	✓	Short message function
25	Status Update Request	✓	✓	Status message function
26	Status Query	✓	✓	Status message function
27	Status Query Response	✓	✓	Status message function
28	Radio Unit Monitor	✓	✓	External monitor function.
29	Radio Check	✓	✓	Checking radio validity
30	Receive Radio Inhibit & Uninhibit	✓	✓	Inhibit/un-inhibit the radio
31	Transmit Radio Inhibit & Uninhibit		✓	Inhibit/un-inhibit the radio
32	Radio Detach	✓		Cancel registration from repeater
33	Registration	✓		Registration to the radio from the repeater
34	Group Affiliation (CAI)	✓		Dynamic group function
35	Group Affiliation (Static)	✓		Dynamic group function
36	Roaming	✓		Roaming the trunking sites
37	Roaming Restriction	✓		Restrict roaming.
38	RFSS Site Lock	✓		Restrict movement of control CH.
39	Site Select	✓		Select control CH.
40	Type 3 Encryption	✓	✓	Indicate Type 3 encryption
41	Voice Encryption Support	✓	✓	Indicate voice encryption
42	Data Encryption Support	✓	✓	Indicate voice encryption
43	Over-the-air Rekeying (OTAR)	✓	✓	OTAR
44	Simple Static Key Security Parameter, Assignment	✓	✓	Functions using encryption key, group ID, CH selector etc.
45	TGID Security Parameter Assignment	✓	✓	Functions using encryption key for OTAR and group ID.
46	LLID Security Parameter Assignment	✓	✓	Functions using encryption key and logical ID.
47	Channel Selector Switch (CSS) Security, Parameter Assignment	✓	✓	Functions using encryption key and channel selector.
48	Packet Data	✓	✓	Packet Data communication ready

		Trunking System	Conventional System	Functions
49	Packet Data ARP	✓		Packet Data communication ready (APR)
50	UDP/IP (support for OS i/f or LwIP implementation)	✓		UDP/IP adaptable.
51	SLIP/PPP (support for OS i/f or LwIP implementation)	✓		SLIP/IP adaptable.
52	SNDCP	✓		Subnetwork Dependent Convergence Protocol adaptable
53	Dual Mode Scanning		✓	Scanning in dual modes.
54	Dual Mode Monitoring		✓	Monitoring in dual mode.
55	Talkaround		✓	Talk around without repeaters
56	Talkback	✓	✓	Talk back function.

4-2 Cloning Software CS-F9010/F9510
4-2-1 Basic Setup of Cloning Software

■ Getting started

◇This cloning software is designed to perform data setting and cloning for the IC-F9510 series VHF P25 TRUNKING MOBILE TRANSCEIVERS.

◇HELP WINDOW: CS-F9010/F9510 has a help window to describe functions and operation.

■ System requirement

To use this program, the following hardware and software are required:

PC

- Microsoft® Windows® 2000/XP or Microsoft® Windows Vista® is installed.
- USB port

Other item

Optional OPC-1122U* CLONING CABLE (USB type)

NOTE:

To use the OPC-1862 /1122U, USB type cloning cable, USB driver installation is necessary. The driver is supplied with the OPC-1862 /1122U.

*The USB driver, supplied with the OPC-1862 /1122U, is not supported for Microsoft® Windows Vista® (64 bit).

■ Software installation

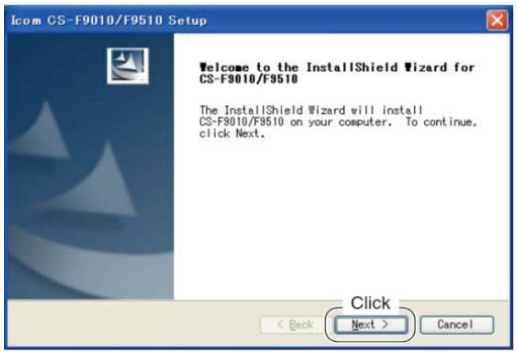
When installing the software, log in as the administrator.

①Quit all applications when Windows is running.

②Insert the CD into the appropriate CD drive.

③Double-click the “Setup.exe” contained in the CD.

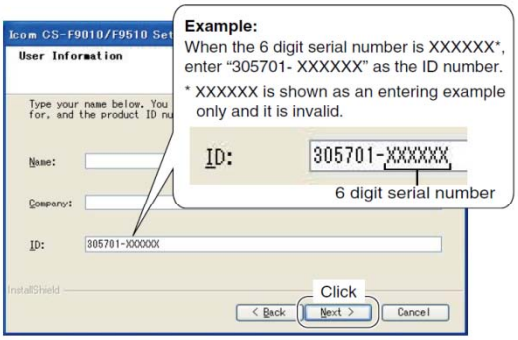
④The “Welcome to the InstallShield Wizard for CS-F9010/ F9510” will appear as below. Click [Next>].



⑤The “User Information window” will appear as below, then type your name, your company name and the product ID number with the following manner. Then click [Next >].

- ID number: 305701-(6 digit serial number)

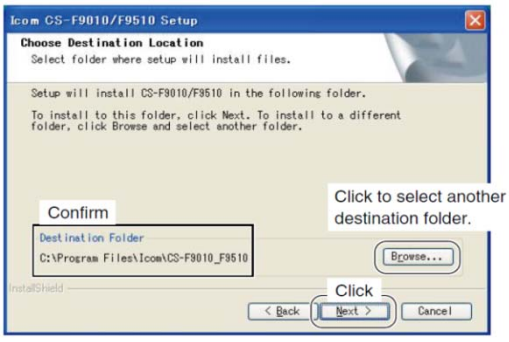
Please check the serial number on the CD. If you have obtained the software by the download service, enter the ID which was provided from the distributor.



⑥The “Choose Destination Location” will appear as below. Then click [Next>] to install the software to the destination folder. (e.g. C:\Program Files\Icom\CS-F9010_F9510)

- Click [Browse...] to select another destination folder before clicking [Next >], if desired.

⑦After the installation is completed, the “InstallShield Wizard Complete” will appear as below. Then click [Finish].



⑧Eject the CD.

⑨Program group ‘CS-F9010_F9510’ appears in the ‘Programs’ folder of the start menu, and ‘CS-F9010_F9510’ short cut icon appears on the desktop screen.

- To uninstall the cloning software, select the “Control Panel” in the start menu, and click the “Add or Remove Programs.” Then, select the program group ‘Icom CS-F9010/9510’ and click [Remove].

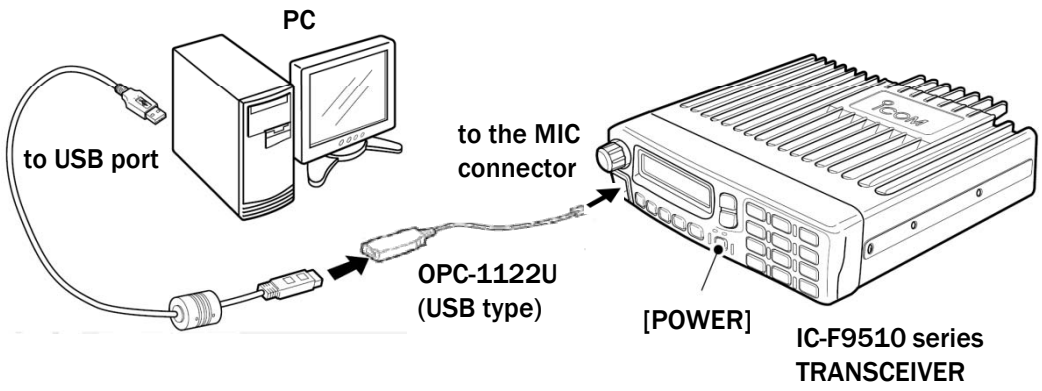
Basic Setup of Cloning Software

■ Connections

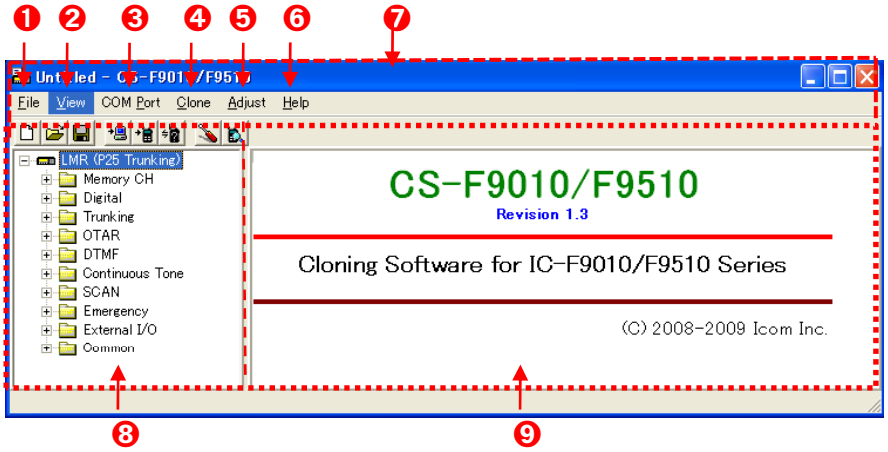
All cloning operations are performed from the computer's keyboard — the operation required on the transceiver side is;

① First, connect the cloning cable as illustrated below.

② Then, rotate **[VOL]** to turn power ON.



❑ Screen description



1. **FILE MENU [File]**
   Used for saving memory channel contents, printing the pre-programmed information or exiting the program, etc.

2. **VIEW MENU [View]**
   - Selects the displayed font size.
   - Turn the tool bar indication ON or OFF.

3. **COM PORT MENU [COM Port]**
   - Click to display the COM port (1 to 4 and More) setting dialog box.
   - Set the transfer speed (Normal or High).

   NOTE: 'Check the following' dialog box appears when the COM port is not set correctly.

4. **CLONING MENU [Clone]**
   Click to display the cloning menu and cloning information dialog box.

5. **Adjust**
   Program the adjustment frequencies in the zone screen.

6. **HELP MENU [Help]**
   Click to display the help contents and cloning software revision information.

7. **TOOL BAR**
   Shortcut buttons appear on the tool bar when the tool bar indication is turned ON in the [View] menu.

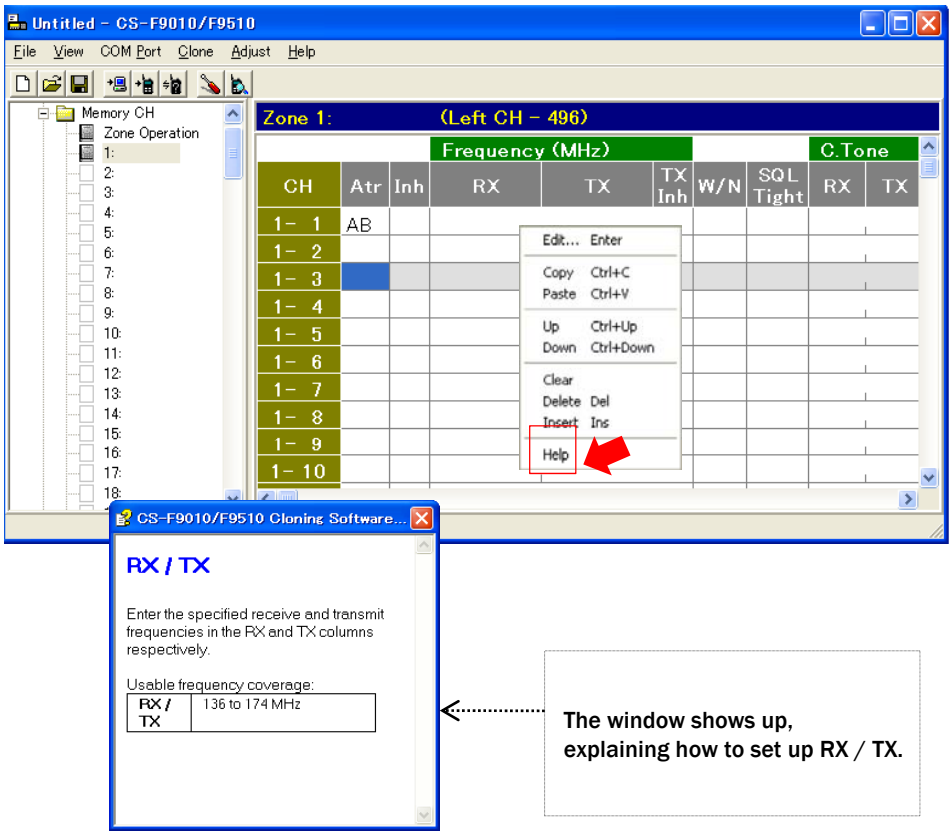
8. **TREE VIEW SCREEN**
   Click the folder icon which you want to edit.

9. **CONTENTS LIST SCREEN**
   Display the contents list (Memory CH information, Common settings, etc.).

■ Programming information

We recommend that you should read out all the transceiver's data before start entering/editing parameters even when the transceiver is factory fresh.

①Double-click the desired cell in the contents list screen directory, or right-click the cell to display the edit menu. Then click **[Edit... Enter]** to select and change the setting depending on the item.
②Click **[Help]** to display the help screen for the item.



NOTE: The above instructions are for reference only.
Please refer to the HELP file of the cloning software when you don't understand the function or setting meaning.

4-2-2 Cloning Items

For IC-F9510 series
Connect the cloning cable, OPC-1122U to the [MIC] connector first and then push [POWER] to turn power ON.

Click  or select <Read <- TR> in the [Clone] menu to read out all radio's programmed cloning data into PC before editing with this cloning software.
Otherwise, the cloning data may not be cloned correctly to the radio. (e.g. Memory CH, DTMF, Common, etc.)

Introduction
CS-F9010/F9510 cloning software is designed to perform data setting and cloning for the IC-F9010 series VHF P25 TRUNKING HANDHELD TRANSCEIVERS, and the IC-F9510 series VHF P25 TRUNKING MOBILE TRANSCEIVERS.

➢ Launching the CS-F9010/F9510 Cloning Software.

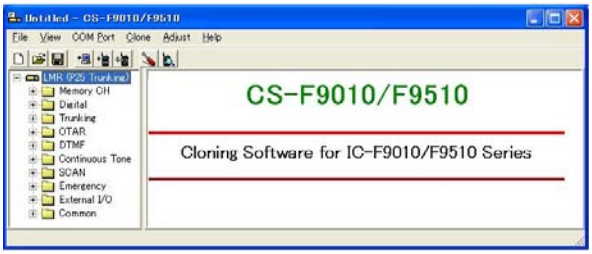
① Before launching the program, make sure the radio's power is turned ON.
② Click the [Start] button and point to [Programs].
③ Point to the CS-F9010/F9510 folder.
④ Click the CS-F9010/F9510 program.
(or simply double click desktop short cut "CS-F9010/F9510," which automatically created during software installation.)

NOTE:
➢ Please restart the software if you see an error dialog box even when the connected radio is powered on.
➢ If the problem persists, check the connection between the computer and radio, as well as the COM port.

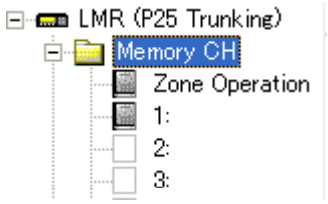
RELATED ITEMS
Confirming the COM port
Changing the COM port

➢Quitting the CS-F9010/F9510 program
Select [Exit (X)] in the [File (F)] menu or click the close button [ ] on the title bar.

Opening Screen
The Opening Screen consists of Top menu, Tool Bar, Tree View and Contents list screen.



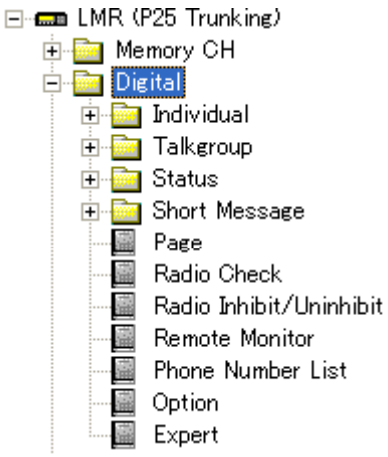
Memory CH



➢Zone Operation
Set zone conditions, each zone name and capacity (number of channels). A total of 128 zone settings are available. Also, show the number of memory channels and their condition for reference.

➢Zone
Set the operating frequency and details of the operating conditions for each memory channel that is assigned into a zone.

Digital



➢Individual
Set the individual ID with hexadecimal or decimal format and enter the ID name.

➢Talk-group
Set the talk-group ID with hexadecimal or decimal and enter the ID name.

➢Status
Set the Rx and Tx status.

➢Short message
Enter up to a 12-character message that will be displayed at transmission and reception of a short message. Ten messages are available.

➢Page
Page call is designed to notify the targeted radio user who may be away from his/her radio or in noisy environment with alert and indication. Select 'enable' if required.

➢Radio Check
Radio check call is designed to determine whether the targeted station is turned on, within the communication range and on channel without requiring any action to the targeted radio user. This call causes a targeted radio to send an acknowledgment automatically.
Select 'enable' if required.

➢Radio Inhibit/Un-inhibit
The radio inhibit (stun or kill) calls/or/un-inhibit (revive) cause the targeted radio to automatically send an acknowledgment and to be unusable/or/usable.

➢Remote Monitor
Set the TX to make a call to listen to the targeted radio's audio frequency without requiring any action from the targeted radio user.

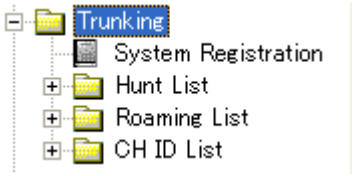
➢Phone Number List
Make a list for easy recognition of the phone number.

➢Option
Optional functions are selectable in Individual, Talkgroup, Config, Call option, and encryption.

➢Expert
Set P25 Parameters, Lockout, and scan extension time.

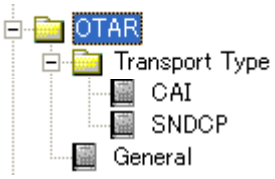
Trunking

Trunking enables further effective channel management by sharing a minimum of channels with a large number of users. Set in System Registration, Hunt List, Roaming List, and CH ID List. Please see 4-2-3 APCO P25 Clone Soft Setting for details.



OTAR

OTAR (Over-The-Air-Rekeying) is the common name for the method of changing encryption keys in a two-way radio system over the radio channel ("over the air"). The keys can be changed over the IP network (SNDCP setting is required).

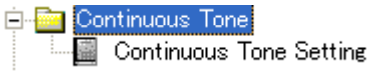


DTMF

➢DTMF Autodial
Enter the DTMF Code and Text.

➢DTMF Settings
Set the time period/signal length for the DTMF Timer, First Timer, * # Timer.

Continuous Tone



➢Continuous Tone
Select the desired CTCSS frequency from the list or enter a 3-digit DTCS code with polarity, N (Normal) or I (Inverse).

➢Continuous Tone Setting
Set the Continuous Tone Setting items for Tone Burst, CTCSS Reverse Burst Timer, etc.

Scan

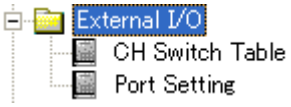
➢Scan List
Set the scan type, primary CH, secondary CH, TX CH, Talkback CH, Cancel CH, and Text.

➢Scan setting
Set the Scan Setting items for Resume, Talk-back, Fast Scan, Slow Scan, Power on scan etc.

Emergency

Enter up to a 24-character emergency text that will be displayed on the LCD while the emergency function is activated. Lone Worker Timer can also be selected.

External I/O



➢CH Switch Table
Available for mobile radios only.

➢Port Setting
The desired function can be assigned to some of the D-sub 25 pins on the screen.
The assignable pins are:
Ext. I/O [10]/[12]/[15]/[17]/[18]/[19]/[21]/[23]/[24] and [25]. See 3-3 D-Sub 25 Pin Configuration for details.

Common

➢Key & Display
Assign the desired functions to the programmable function keys. And set the keypad operation, beep audio frequency, display mode 1 line or 2 lines, etc.

➢Set Mode
User set mode enables you to customize the transceiver operation to suit your preferences and operation style.

➢Common
Commonly set items as Clone Comment, Security, Auto Reset, Scrambler, etc. items.

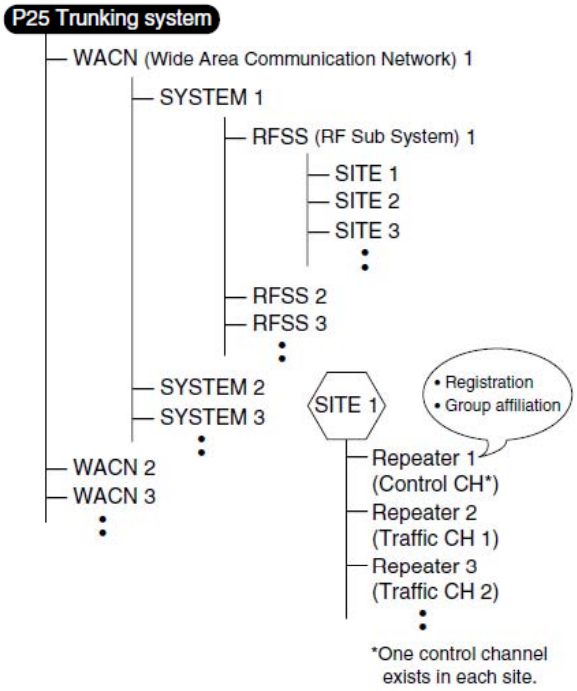
➢Character editor
Up to 16 original characters or symbols can be edited/created for a variety of information indication.

4-2-3 APCO P25 Trunking – Cloning Software Setup

APCO P25 Trunking

This is the overall construction of the P25 Trunking System.

◇ Construction of P25 Trunking system



The following is the description on how to set up the P25 trunking functions in cloning software.

■System Registration

➢Home Setting

	Home Setting		
System No.	Home Unit ID	Home WACN ID	Home System ID
1	000001	00001	001
New			

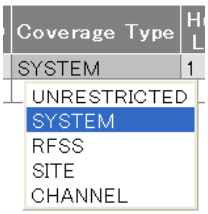
Home Unit ID
Enter the Unit ID component of the Subscriber Unit (SU) ID.

Home WACN ID
Enter the Wide Area Communications Network (WACN) ID component of the Subscriber Unit (SU) ID. The ID will be used to decide whether the radio should attempt to register on a confirmed control channel while the channel selection.

When "SYSTEM" is selected for the **Coverage Type**, this Home WACN ID and Home System ID must match to those of a control channel to register for the channel.

If not, registration will not be performed and channel selection will continue to the next channel.

Home System ID
Enter the System ID component of the Subscriber Unit (SU) ID for the system. The ID will be used to decide whether the radio should attempt to register on a confirmed control channel.



When "SYSTEM" is selected for the **Coverage Type**, this Home System ID and Home WACN ID must match to those of a control channel to register for the channel. If not, registration will not be performed and channel selection will continue to the next channel.

RFSS ID Enter the RF Subsystem (RFSS) ID for the system.

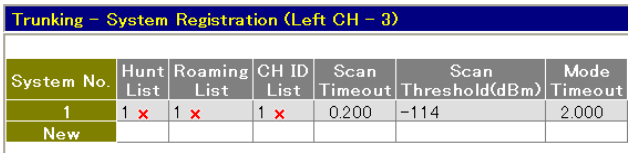
When "SITE" or "RFSS" is selected for the **Coverage Type**, this RFSS ID and Site ID must match to those of a control channel to register for the channel. If not, registration will not be performed and channel selection will continue to the next channel.

Site ID Enter the Site ID for the system.

When "SITE" is selected for the **Coverage Type**, this Site ID and RFSS ID must match to those of a control channel to register for the channel.
If not, registration will not be performed and channel selection will continue to the next channel.

Coverage Type
Select the coverage type for the area that the radio is allowed to roam from UNRESTRICTED, SYSTEM, RFSS, SITE and CHANNEL.

UNRESTRICTED	The roaming area is unrestricted for the radio.
SYSTEM	The Home WACN ID and the Home System ID need to match to the repeater.
RFSS	The Home WACN ID, Home System ID and RFSS ID need to match to the repeater.
SITE	The Home WACN ID, Home System ID, RFSS ID and Site ID need to match to the repeater.
CHANNEL	The Home WACN ID, Home System ID, RFSS ID and Site ID need to match to the repeater.


Trunking – System Registration (Left CH – 3)

System No.	Hunt List	Roaming List	CH ID List	Scan Timeout	Scan Threshold(dBm)	Mode Timeout
1	1 ×	1 ×	1 ×	0.200	-114	2.000
New						

Hunt List
Select the desired Hunt List from 1 to 4.
When the radio is powered on, changes trunking system, or goes out of range, the radio will find a control channel in a valid area with the hunt list.
List control channels in the Hunt List screen.

When a hunt list with no valid channel is selected, "**X**" appears in the cell and "System Registration" in the tree view screen.

Roaming List
Select the desired Roaming List from 1 to 4.
The radio will move to a system using the roaming list to find a channel that has higher quality, or provides better services. A list of roaming addresses will be displayed on the Roaming List screen.

When a roaming list with no valid area is selected, "**X**" appears in the cell and "System Registration" is displayed on the tree view screen.

CH ID List
Select the desired CH ID List from 1 to 4.
List channel identifiers in the CH ID List screen.

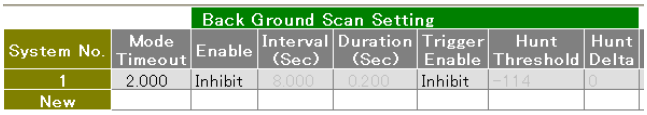
When a CH ID list with no valid channel is selected, "**X**" appears in the cell and "System Registration" in the tree view screen.

Scan Timeout Enter the time period for the radio to scan a control channel while trying to detect a synchronized frame within the range of 0 to 60 sec (in 0.001 sec steps) The value should not be 0.

Scan Threshold (dBm)
Set the minimum quality level for a control channel within the range of -120 to -70 (in 1 steps).
When the Received Signal Strength Indication (RSSI) level is higher than this set level, the receiving signal is recognized as a control channel.

Mode Timeout Enter the time period for the radio to scan a frequency while trying to get control channel information within the range of 0 to 60 sec (in 0.001 sec steps).

➢Back Ground Scan Setting



	Back Ground Scan Setting						
System No.	Mode Timeout	Enable	Interval (Sec)	Duration (Sec)	Trigger Enable	Hunt Threshold	Hunt Delta
1	2.000	Inhibit	8.000	0.200	Inhibit	-114	0
New							

Enable the background scan is designed to monitor a control channel of the adjacent site while waiting to register a control channel. Select "Enable" to activate the function.

Interval (Sec) (Available only when "Enable" is selected in **Enable** above)
Enter the interval time for back ground scan function within the range of 0 to 60 sec (in 0.001 sec steps).
Interval determines how often the radio monitors a control channel of the adjacent site.

Duration (Sec) (Available only when "Enable" is selected in **Enable** above)
Enter the duration for back ground scan function within the range of 0 to 60 sec (in 0.001 sec steps).
The radio monitors the adjacent channel and checks whether there is a valid signal or not for up to this duration.

Trigger Enable
This function activates the back ground scan only when the Received Signal Strength Indication (RSSI) level of a control channel becomes lower than the level in **Hunt Threshold** more than the number of times set in **Hunt Delta** below.

Select "Enable" to use the function.

Hunt Threshold (Available only when "Enable" is selected in **Trigger Enable** above)
Enter the hunt threshold within the range of -120 to -70 (in 1 steps).

When the Received Signal Strength Indication (RSSI) level of a monitoring control channel is lower than this level and more than the number of times in **Hunt Delta** below, the radio activates the background scan and monitors a control channel of the adjacent site.

Hunt Delta (Available only when "Enable" is selected in **Trigger Enable** above)
Enter the number of times for Hunt Delta within the range of 0 to 70 (in 1 steps).
When the Received Signal Strength Indication (RSSI) level of a monitoring control channel is lower than the set level in **Hunt Threshold** and more than this set time, the radio activates the background scan and monitors a control channel of the adjacent site.

Tx Power Level	FOACSU	Conversation Type
H	OFF	Message

Tx Power Level
Select the initial transmit output power for the system from L1, L2 and H. Output power can be manually toggled by [High/Low] if this function is assigned to a key in the Key & Display Assign screen. This manually selected output power setting can be either kept independently for each channel or shared in channels by the selection at **RF Power Selection** in the Key & Display Assign screen.

NOTE:
Do not assign [High/ Low] function if transmit power setting must not be changed by an operator.

L1: Low1	[High/Low] selects "Low1" only.
L2: Low2	[High/Low] toggles the output power between "Low1" and "Low2".
H : High	[High/Low] toggles the output power between "Low1", "Low2" and "High".

FOACSU
Turn the Full Off Air Call Setup (FOACSU) function for trunking communication.
The function enables the radio to emit a beep when receiving a trunking mode call, and then ask for the user's permission to accept the call.
Select "OFF" not to emit a beep and accept the call without asking permission from the user.

NOTE:
You can set the audio frequency for the beep in **Beep-High 2 Freq (Hz)** in the Key & Display Assign screen.

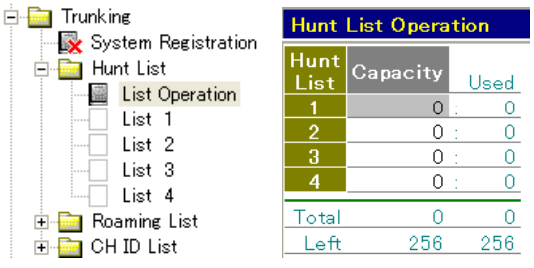
Conversation Type
Select the conversation type for trunking communication.

Message	The radio will allow transmissions while being in a traffic channel for talkgroup calls.
Transmission	The radio will not allow transmissions while being in a traffic channel for talkgroup calls.

■Hunt List

List Operation

Capacity
Set the available number of channels for the Hunt.
When "5" is entered in **Capacity** of Hunt List1, Hunt List1 has 5 channels. A total of 4 hunt list settings are available, and each list can have up to 64 channels.



Hunt List

Even if the available number of control channels in a list has been set by the Capacity item in the List Operation screen, you can add or delete a channel in each list.
To create a new channel, point to the cell on the [New] line which is located at the bottom of the screen, then double click or right click to display the Edit menu and click [Edit...Enter] to create a new channel.

Valid
This function validates entry into the channel.
Select "ON" to validate the entry.

RX Select the way to set downlink frequencies of control channels.

CH ID Only	Set a downlink frequency of a control channel in **RX CH ID** and **RX CH Number**.
CH Freq Only	Set a downlink frequency of a control channel in **RX Freq**.

RX CH ID Enter a control channel ID from broadcast channel structure to set a downlink frequency. The ID is defined by TIA TSB-102. AABD.

RX CH Number
Enter a control channel number from the broadcast channel structure to set a downlink frequency.
The number is defined by TIA TSB-102. AABD.

RX Freq
Enter a downlink frequency of a control channel in Hertz (Hz).

NOTE:
The value must match to the value calculated from a channel broadcast.

TX
Select the way to set uplink frequencies of control channels.

CH ID Only	Set an uplink frequency of control channel in **TX CH ID** and **TX CH Number**.
CH Freq Only	Set an uplink frequency of control channel in **TX Freq**.

TX CH ID
Enter a control channel ID from the broadcast channel structure to set an uplink frequency. The ID is defined by TIA TSB-102. AABD.

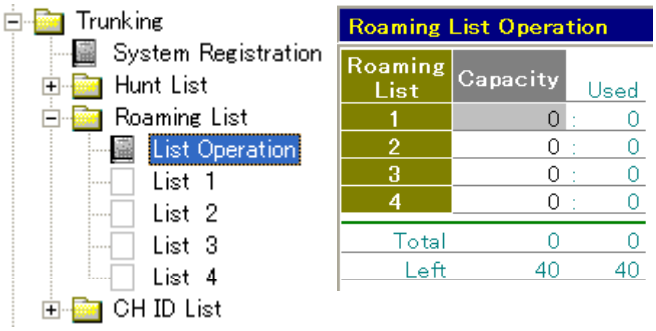
TX CH Number
Enter a control channel number from the broadcast channel structure to set an uplink frequency.
The number is defined by TIA TSB-102. AABD.

TX Freq
Enter an uplink frequency of a control channel in Hertz (Hz).

NOTE:
The value must match the value calculated from a channel broadcast.

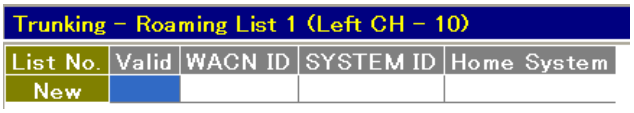
■Roaming List

List Operation



Capacity
Set the available number of lists for the Roaming.
When "5" is entered in **Capacity** of Roaming List1, Roaming List1 has 5 addresses.
A total of 4 roaming list settings are available, and each list can have up to 10 addresses.

List



Even if the available number of roaming areas in a list has been set in the **Capacity** item in the List Operation screen, you can add or delete an area in each list.

To create a new roaming area, point to the cell on the [New] line which is located at the bottom of the screen, then double click or right click to display the Edit menu and click [Edit...Enter] to create a new area.

Valid
This function validate entry into the roaming area.
Select "ON" to validate the entry.

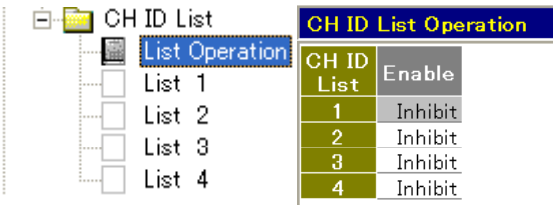
WACN ID
Enter the Wide Area Communications Network (WACN) ID component of the Subscriber Unit (SU) ID for the roaming area.

SYSTEM ID Enter the System ID component of the Subscriber Unit (SU) ID for the roaming area.

Home System This function determines the roaming area as the Home System.
Select "ON" for the Home System.

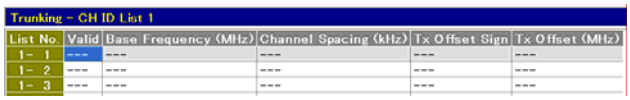
■CH ID List

List Operation



Enable
This item determines valid CH ID Lists.
Select "Enable" to validate the CH ID List.
A total of 4 channel identifier list settings are available.

List



Valid
This function validate entry into the channel.
Select "ON" to validate the entry.

Lowest channel Frequency (MHz)
Enter the lowest channel frequency that frequencies start at for the channel identifier. The frequency is used to calculate a frequency of a control channel.

Channel Spacing (kHz)
Enter the channel spacing for each channel number.

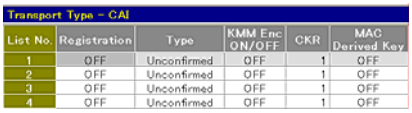
Tx Offset Sign
Select the Tx Offset Sign from - (Minus) and + (Plus) sign.

Tx Offset (MHz)
Enter the transmit frequency offset from the receive frequency.

■ OTAR Setting

For details on how to set up the OTAR function in cloning software, please see the instructions below.

➢CAI



Registration

Select a way the radio performs registration and deregistration for a Key Management Facility (KMF) by transmitting Key Management Messages (KMMs).

OFF	The radio does not perform registration and deregistration for the KMF.
Standard	The radio transmits KMMs (Registration and Deregistration) to the KMF according to OTAR Registration Procedure/Deregistration Procedure. These procedures are defined by TIA-102. AACA, section 2.
Packet Data	The radio transmits KMMs (Registration and Deregistration) using packet data. The packet data is defined by TIA-102. BAAD, section 1.

Type

Select the packet frame type for Key Management Messages (KMMs) exchanged between the radio and a Key Management Facility (KMF).

Unconfirmed	The radio uses unconfirmed packets to exchange KMMs with the KMF. The radio transmits KMMs (Registration and Deregistration) to the KMF with Response Kind 1.
Confirmed	The radio uses confirmed packets to exchange KMMs with the KMF. The radio transmits KMMs (Registration and Deregistration) to the KMF with Response Kind 3.

KMM Enc ON/OFF

Select whether or not to encrypt Key Management Messages (KMMs).

OFF	Select whether or not to encrypt Key Management Messages (KMMs).
ON	The radio encrypts KMMs (Registration, Deregistration, Hello and Unable To Decrypt) using the Common Key Reference (CKR) programmed in CKR below.

CKR

Set the Common Key Reference (CKR) used for the system within the range of 1 to 4095. The CKR is used for encrypting Key Management Messages (KMMs-Registration, Deregistration, Hello and Unable To Decrypt). It is also used in the making of Message Authentication Code (MAC).

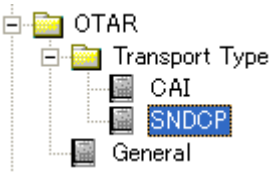
MAC Derived Key

Select whether or not to use the Derived MAC Key to make Message Authentication Codes (MACs).

OFF	The radio does not use the Derived MAC Key to make MACs.
ON	The radio uses the Derived MAC Key to make MACs.

NOTE:
When the programmed CKR is DES, the radio does not use the Derived MAC Key to make MACs even if "ON" is selected in the setting.

➢SNDCP



Registration

Select whether or not the radio performs registration and deregistration for a Key Management Facility (KMF) by transmitting Key Management Messages (KMMs).

OFF	The radio does not perform registration and deregistration for the KMF.
ON	The radio transmits KMMs (Registration and Deregistration) to the KMF according to OTAR Registration Procedure/Deregistration Procedure.These procedures are defined by TIA-102. AACA, section 2.

Type

Select the packet frame type for Key Management Messages (KMMs) exchanged between the radio and a Key Management Facility (KMF).

KMM Enc ON/OFF
Select whether or not to encrypt Key Management Messages (KMMs).

Unconfirmed	The radio uses unconfirmed packets to exchange KMMs with the KMF.The radio transmits KMMs (Registration and Deregistration) to the KMF with Response Kind 1.
Confirmed	The radio uses confirmed packets to exchange KMMs with the KMF. The radio transmits KMMs (Registration and Deregistration) to the KMF with Response Kind 3.

NOTE: When the programmed Common Key Reference (CKR) is Data Encryption Standard (DES), the radio does not use the Derived MAC Key to make MACs even if "ON" is selected in the setting.

KMF Setting
KMF IP Address
Enter the IP address of the Key Management Facility (KMF).

KMF UDP Port
Set the User Datagram Protocol (UDP) port of the Key Management Facility (KMF) within the range of 1 to 65535.

Subscriber Setting
Network Address Type
Select the type of the Network Address to be used for the system as defined by TIA-102. BAEB.

OFF	The radio does not use the Derived MAC Key to make MACs.
ON	The radio uses the Derived MAC Key to make MACs.

IP Address (Available when "IPv4 Static" is selected in **Network Address Type** above.)
Enter the IPv4 IP address for the system.

Net Mask (Available when "IPv4 Static" is selected in **Network Address Type** above.)
Enter the IPv4 network mask for the system.

Gateway Address (Available when "IPv4 Static" is selected in **Network Address Type** above.)
Enter the IPv4 gateway address for the system.

Subscriber OTAR Port
Set the User Datagram Protocol (UDP) port of the radio within the range of 1 to 65535.

IP Header Compression
Select whether or not to compress the IP Header for the system as defined by TIA-102. BAEB, section 6.2.4. When "ON" is selected, the IP Header is compressed as defined by RFC 1144.

TCP/IP State Slots (Available when "ON" is selected in **IP Header Compression** above.)
Enter the number of the TCP/IP Header to cache while compressing the IP Header for the system as defined by TIA-102. BAEB, section 6.2.5.
Valid values are 0 through 15, corresponding to 1 through 16 state slots respectively.

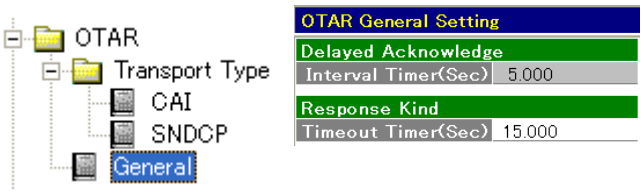
SNDCP Version
Select the SNDCP version to be used for the system as defined by TIA-102. BAEB.

Access Point Name (Available when "Ver.2" is selected in **SNDCP Version** above.)
Enter the Access Point Name. When no Access Point Name is entered, it acts a wild card and matches any incoming connection.

IPv4 Static	Enables the static network configuration. The following settings, IP Address, Net Mask and Gateway Address must be programmed.
IPv4 Dynamic	Enables the dynamic network configuration.
No Address	Disables the address assignment.

OFF	The radio does not encrypt KMMs.
ON	The radio encrypts KMMs (Registration, Deregistration, Hello and Unable To Decrypt) using the Common Key Reference (CKR) programmed in **CKR** below.

➢ General



Delayed Acknowledge
Interval Timer (Sec)
Enter the time period for Interval Timer within the range of 0.0 to 25.5 (in 0.1 sec steps). The radio delay transmitting acknowledgment for this set period after receiving a Key Management Message (KMM) that requests Delayed Acknowledgment. When transmitting more than one Delayed Acknowledgments, the radio transmits acknowledgment at these intervals.

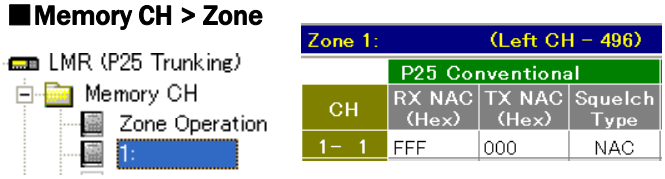
Response Kind
Timeout Timer (Sec)
Enter the time period for Timeout Timer within the range of 0 to 255 (in 1 sec steps). The radio waits for response from a Key Management Facility (KMF) for this set period after transmitting a Key Management Message (KMM) with Response Kind 3.

4-3 APCO P25 Access Code Types

The IC-F9510 series provides capability to set up your own talk groups and quiet stand-by when others are talking. You can also set up selective calls to individuals in P25 digital operation mode.

■CTCSS or DTCS like operation

■Memory CH > Zone



➢ **RX NAC**

Set the desired receive NAC (Network Access Code) from 000 to FFF (hexadecimal code) to separate the transceiver from the same/adjacent channel station according to the assigned code.

The transceiver selectively accesses the one of several repeaters within overlapping coverage areas allowing the user to listen to a specific repeater.

NOTE:
"F7E" is a special code, and matches to any NAC.

➢ **TX NAC**

Set the desired transmit NAC (Network Access Code) from 000 to FFF (hexadecimal code) to separate the transceiver from the same/adjacent channel station according to the assigned code.

The transceiver selectively accesses one of several repeaters within overlapping coverage areas allowing the user to send to a specific repeater.

NOTE:
"F7E" and "F7F" are invalid.

➢**Squelch Type setting**

NAC : The mute is released when the matched NAC is received even if the Individual ID or Talkgroup ID is not matched.

■Selective Call operation

■ Individual Call

➢ Unit ID

Available transceiver's unit ID is 000001 to 98967F(hexadecimal code) or 1 to 9999999 (decimal code) to each channel.

Each ID can be set with up to a 12-character ID name.

□Individual Call Option (Digital > Option)

▪ ID-MR

When this function is turned ON, the received ID code is memorized.

▪ EDIT ID

When this function is turned ON, the individual ID can be edited/changed via the 10-key operation. Individual ID must be within the Individual ID range, specified by Individual Encode ID Min and Individual Encode ID Max settings.

▪ Unit ID Display on Receive

When this function is turned ON, the called station's individual ID number or name will be displayed on the LCD for 2 sec when receiving a matched individual ID.

▪ Ringer on Receive

Select the desired ringer emission type when receiving a matched individual ID.

■Group Call

➢ Talk Group ID

Available talkgroup ID is 0000 to FFFF (hexadecimal code) or 0 to 65535 (decimal code) .

Each ID can be set with up to a 12-character ID name.

NOTE:
FFFF (hex) or 65535 (dec) is used for the All Call.

■Talk-group Option (Digital > Option)

▪ Talkgroup Display on Mode Change or Receive.

The talkgroup ID number or name will be displayed on the LCD for a moment when the zone or channel is changed.

▪ Talkgroup Display on Receive

The talkgroup ID number or name will be displayed on the LCD for 2 sec when receiving a matched talkgroup ID.

▪ Unit ID Display on Receive

The called station's individual ID number or name will be displayed on the LCD for 2 sec when receiving a matched talkgroup ID.

▪ Ringer on Receive

Select the desired ringer emission type when receiving a matched talkgroup ID.

▪ Talkgroup Display on PTT

The talkgroup ID number or name will be displayed on the LCD for 2 sec when [PTT] is pushed.

➢Squelch Type setting

Sel : The mute is released when the matched Unit ID or Talkgroup ID is received.

■Scan List

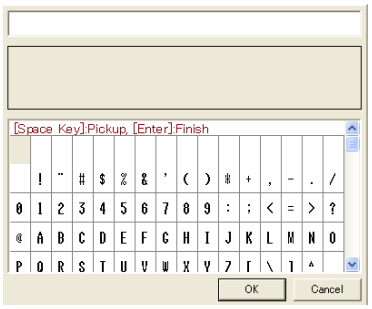
A total of 17 scanning groups are available for a wide variety and flexible scanning operation. In this screen, program scanning condition for each group.

Channels included in the scan group [Zone] are scanned when the channels are in the same zone with the scan start channel.

NOTE:
Select channels to be included in the desired scan groups in **Scan List** in the Zone screen.

■Display Text

Enter up to a 24-character text for easy recognition of the scan group.
The programmed texts are indicated in the scan selection mode.

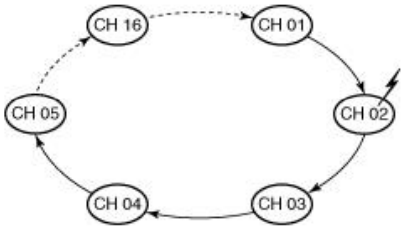


■Scan Type

Set the scanning type to each scan group from 0) Scan OFF, 1) Normal Scan and 2) Priority Scan. The watch time period, the power ON scan function etc. are programmable in the Scan Setting screen.

0) Scan OFF:
Scanning operation is turned OFF.
If selected, the following scan settings are unavailable.

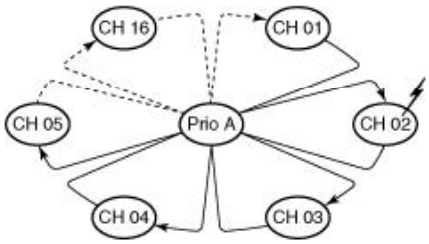
1) Normal Scan:
Normal scan. Scans all selected channels. The scan proceeds in sequence.



2) Priority Scan:
Priority scan. "Primary CH" and "Secondary CH" are used as the priority channels. Selected channels are scanned in sequence while monitoring "Primary CH" and "Secondary CH.“ When scan is paused on "Primary CH," other channels are not monitored.

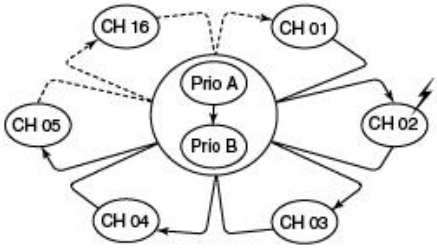
NOTE:
"Prio A" stands for "Primary CH," and "Prio B" stands for "Secondary CH.“

➢ When "Secondary CH" is not set:



When a signal is detected on a channel other than "Primary CH," scan pauses until the signal disappears and "Primary CH" is continuously monitored.
Scan moves and pauses on "Primary CH," if the signal is detected on "Primary CH".

➢ When "Secondary CH" is set:



When a signal is detected on a channel other than "Primary CH" or "Secondary CH," scan pauses until the signal disappears and "Primary CH" and "Secondary CH" are continuously monitored alternately. Scan moves and pauses on "Primary CH" or "Secondary CH" if the signal is detected on “Primary CH” or “Secondary CH”.

When a signal is detected on "Secondary CH," scan pauses until the signal disappears.

The compatibility of the previous and current scan mode:

The previous scan mode		The current scan mode					
		Scan Type	Primary CH	Secondary CH	TX CH	Talk Back	Cancel CH
Scan OFF		Scan OFF	–	–	–	–	–
Mode1	Normal	Normal	–	–	Last CH	–	TX CH
Mode1	R.Sel A	Normal	–	–	Start CH	ON	Start CH
Mode2	Prio-A	Priority	Prio-A	–	Prio-A	ON	TX CH/TB
Mode2	Prio-A,B	Priority	Prio-A	Prio-B	Prio-A	ON	TX CH/TB
Mode2	R.Sel	Priority	Start CH	–	Start CH	ON	TX CH/TB
Mode2	R.Sel A	Priority	Start CH	–	Start CH	ON	Start CH
Mode3	Prio-A	Priority	Prio-A	–	Prio-A	OFF	TX CH
Mode3	Prio-A,B	Priority	Prio-A	Prio-B	Prio-A	OFF	TX CH
Mode3	R.Sel	Priority	Start CH	–	Start CH	OFF	TX CH
Mode3	R.Sel A	Priority	Start CH	–	Start CH	OFF	Start CH

Primary CH (Available when "Priority Scan" is selected in **Scan Type**) Select the desired channel as the primary channel. The selected channel is monitored during priority scan.

Prio-A CH	The priority A channel is used as the primary channel.
Prio-B CH	The priority B channel is used as the primary channel.
Start CH	The scan start channel is used as the primary channel.
R. Sel CH*	The selected channel by the rotary selector is used as the primary channel.
CH Number Select	The selected channel is used as the primary channel.

* R. Sel CH is available for only portable radios.

Secondary CH (Available when "Priority Scan" is selected in **Scan Type**) Select the desired channel as the secondary channel. The selected channel is monitored during priority scan. The secondary channel is lower priority than primary channel.

Disable	The secondary channel is not used.
Prio-A CH	The priority A channel is used as the secondary channel.
Prio-B CH	The priority B channel is used as the secondary channel.
Start CH	The scan start channel is used as the secondary channel.
R. Sel CH*	The selected channel by the rotary selector is used as the secondary channel.
CH Number Select	The selected channel is used as the secondary channel.

* R. Sel CH is available for only portable radios.

TX CH
Select the desired channel as the transmission channel.

Last CH	Transmission is performed in the channel that the scan stopped last. If it is no last channel, the scan start channel is selected for transmission.
Prio-A CH	Transmission is performed in the priority A channel.
Prio-B CH	Transmission is performed in the priority B channel.
Start CH	Transmission is performed in the scan start channel.
R. Sel CH*	Transmission is performed in the selected channel by the rotary selector.
CH Number Select	Transmission is performed in the selected channel.

* R. Sel CH is available for only portable radios.

Talk Back (Unavailable when "Last CH" is selected in **TX CH**)
Turn the talk back function for transmission ON or OFF. The function allows you to transmit a signal on the channel that the scan stopped last, when the transmission is performed during the scan stop the talk back timer* (after the resume timer has passed).

When "OFF" is selected, the channel selected in **TX CH** is always used for transmission.

* Talk back timer is set in **Talk Back (Sec)** in Scan Setting screen.

Cancel CH
Select the desired channel that is selected when the scan is cancelled (except for transmission).

Last CH	Scan is cancelled in the channel that the scan stopped last. If it is no last channel, the scan start channel is selected when the scan is canceled during scanning.
Prio-A CH	Scan is cancelled in the priority A channel.
Prio-B CH	Scan is cancelled in the priority B channel.
Start CH	Scan is cancelled in the scan start channel.
R. Sel CH*	Scan is cancelled in the selected channel by the rotary selector.
CH Number Select	Scan is cancelled in the selected channel.

Text

Select the text indication capability from Text or Start CH during scan. While the scan is pausing on a channel by receiving/transmitting a signal, the channel's text is indicated regardless of the setting.

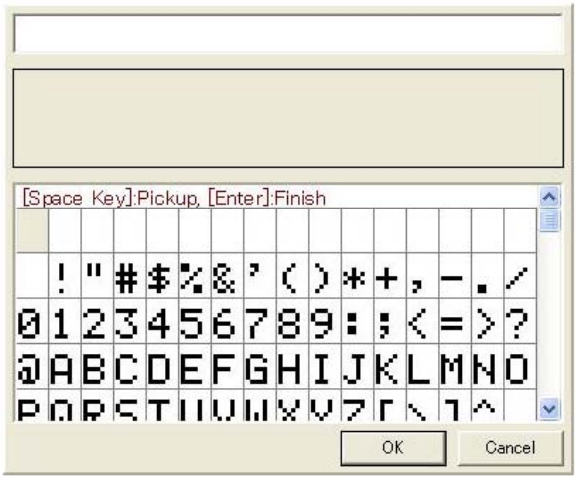
Text	The text indication is turned ON. The channel's text that is programmed in **Display Text** as above is indicated during scan.
Start CH	The text indication is turned ON. The scan start channel's text is indicated during scan.

■Display Text

Enter up to a 24-character text for easy recognition of the scan group. The programmed texts are indicated in the scan selection mode.

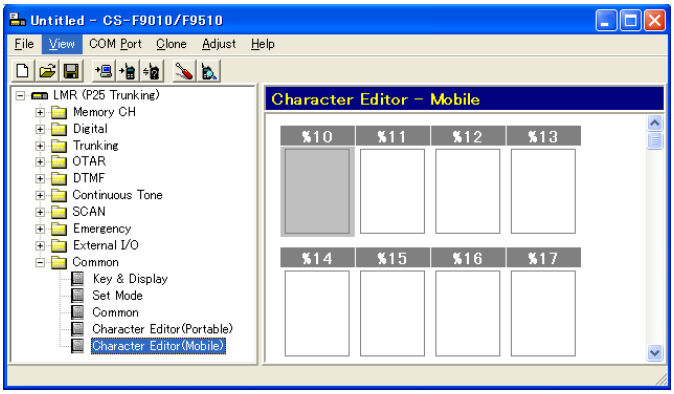
■Text-Mobile

Right click to display the [Edit... Enter] menu and click [Edit... Enter].

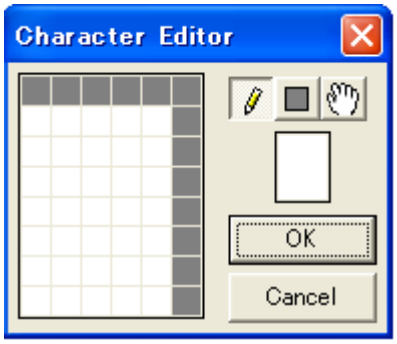


➢ Double click the desired character in the table or push [Space] to pick up the character.
➢ Push [Enter] to finish editing.

➢ You can use and make an original character that is edited in the Character Editor Screen.



Edit the original character



Up to 16 original characters or symbols can be edited/created in this sheet for a variety of information indication.

1. Right click to display the Edit menu.
2. Left click [Edit... Enter] then the Character Editor screen appears. Edit the squares with Left click on the desired square.

➢ Left click the square to change the square color white to black when or is selected.
➢ Right click the square to change the square color black to white when or is selected.
➢ When is selected, the square can be moved in all directions.

changes color of all pixels at once.
changes color of all pixels at once.

* Right click to display the [Edit... Enter] menu and select Copy, Paste, Up and Down.
* Double clicking the desired thumbnail (%10 to %1F) in the screen also enters the Character Editor screen.

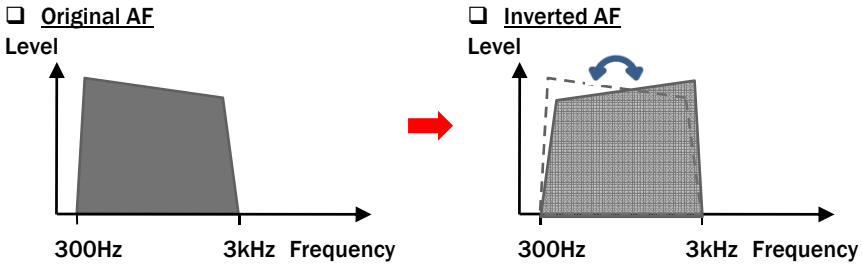
4-6 Voice Scrambling/Encryption
4-6-1 Voice Scrambling/Encryption

■Voice scrambling function

The optional voice scrambler unit provides high performance private communication between stations with the same scrambler code. The IC-F9510 series has a built-in inversion type voice scrambler.
(Analog mode only)

➢ **What is 'Inversion type voice scrambler' ?**

The audio frequency band is inverted as below. The frequencies in each band are inverted. The divided frequency is programmable with cloning.



■Optional AES/DES encryption

The IC-F9510 series provides AES and/or DES encryption for secure conversation with the optional **UT-125 AES/DES encryption unit** or **UT-128 DES encryption unit**. Versions certified to FIPS 140-2 Level 1 for AES encryption are planned for future release.

UT-125
AES/DES
Encryption Unit

UT-128
DES
Encryption Unit

- The **AES** (Advanced Encryption Standard) is a block cipher adopted as an encryption standard by the Federal Information Processing Standard (FIPS) for the United States in 2002.
  AES is based upon the Rijndael algorithm. AES offers 256-bit encryption.

- The **DES** (Data Encryption Standard) is a cipher selected as an official Federal Information Processing Standard (FIPS) for the United States in 1976. DES was developed by IBM and was based upon IBM's earlier Lucifer cipher. DES utilizes a 56-bit key. This key size is vulnerable to a brute force attack using current technology. In recent years, the cipher has been superseded by the AES.

NOTE : For details on how to activate AES/DES Encryption, please refer to the following page.
The FIPS version will be available in the future. The FIPS (Federal Information Processing Standard) 140 are U.S. Government security standards that specify requirements for encryption modules and defines four levels of security, named Level 1 to Level 4.

4-6 Voice Scrambling/Encryption
4-6-2 Encryption Setup

❑ Activating Encryption

P25 radios have the ability to use DES or AES encryption. To enable encryption, you will need a **CKR** (Common Key Reference). The KVL 3000 Plus key loader from Motorola creates this key.

➢ Obtaining a CKR from the KVL 3000 Plus Keyloader

The following operation is for AES and DES upgraded radios. A newly upgraded radio will not encrypt/de-encrypt until you load a new CKR (also known as TEK—Traffic Encryption Key) to the radio.

Important: Not all KVL 3000 Plus keyloaders work with APCO P25 encryption. When the keyloader is powered up, the display will show **ASTRO ® 25** if it can be used for P25 encryption.

➢ Entering a New CKR (TEK) into the KVL

① Using the soft keys just below the display in the KVL, select the following in sequence:

- Keys
- New

② Enter the new key (CKR). This will be 5 numbers:"0" and any number between zero and 4095 (ex: 03456).

③ Press Enter.

④ Choose the algorithm AES or DES using the left right arrows (◂ or ▸), if the KVL is enabled for both algorithms. Otherwise, proceed to step 6.

⑤ Press the soft key to **Accept.**

⑥ Create a key ID by entering 4 identifying numbers from the keypad. This number is for dealer reference only.

⑦ Press Enter.

⑧ At the "Byte" prompt, enter a random set of numbers until the display shows **SLOT FILLED.** This may take from 30 to 60 numbers depending on the algorithm.

⑨ Press Enter. This CKR (TEK) is now stored in the KVL and can be loaded into the radio using the loading instructions detailed below.

⑩ Press Escape on KVL.

➢ Loading a Pre-loaded Key into your Radio

① Connect your radio to the KVL with OPC-1534.

OCP-1534

② On the radio, press and hold P0 and P1, and then power up the radio. The display shows **KEY WAITING.**

③ Using the soft keys just below the display in the KVL, select the following in sequence:

- Target
- Load
- Key

④ Using the left/right arrows (◂ or ▸), select the preprogrammed CKR (TEK).

⑤ After the proper CKR is on the KVL Screen, press the soft **LOAD** key. The radio display flashes until loading is complete. The radio will accept as many as 16 CKR numbers.

➢ Programming the Radio Cloning Software

① Connect your radio to a computer with OPC-1122U.

② Open your cloning software and read the radio.

③ In **Memory CH » Encryption**, select **TX/RX.**

④ In **Memory CH » Encryption**, enter the CKR (TEK) that was loaded in the KVL.

⑤ In **Digital » Option**, ensure that the **Preamble Length** is 0~255. (120 is recommended).

⑥ In **Common » Key & Display**, assign a programmable button for **Encryption.**

4-7 OTAR

■What is OTAR ?

OTAR or **Over-The-Air-Rekeying** is the common name for the method of changing the encryption keys over a radio channel or "over the air". It is also referred to as Over-the-Air Transfer (OTAT).

Regular key changing is one of the basic requirements for secure radio communication. Key changing can be achieved by reprogramming of scramblers with a wired programmer or over the air.

Presently radio communication systems, secured by scramblers, prefer to use the OTAR method of key changing due to the following benefits.

■Benefits from using OTAR

Brisk and efficient – these are the words to describe the benefits from using OTAR.

- The operator can change over the keys of many radios at the same time regardless of the distance.
- The keys which are consisted of big numbers can be easily changed or updated without manual programming.
- The use of OTAR drastically reduces the distribution of physical keying material and the physical process of loading crypto equipments with key, therefore it can save cost. A station has nothing to do with actual physical CRYPTO changeovers on a day-to-day basis.

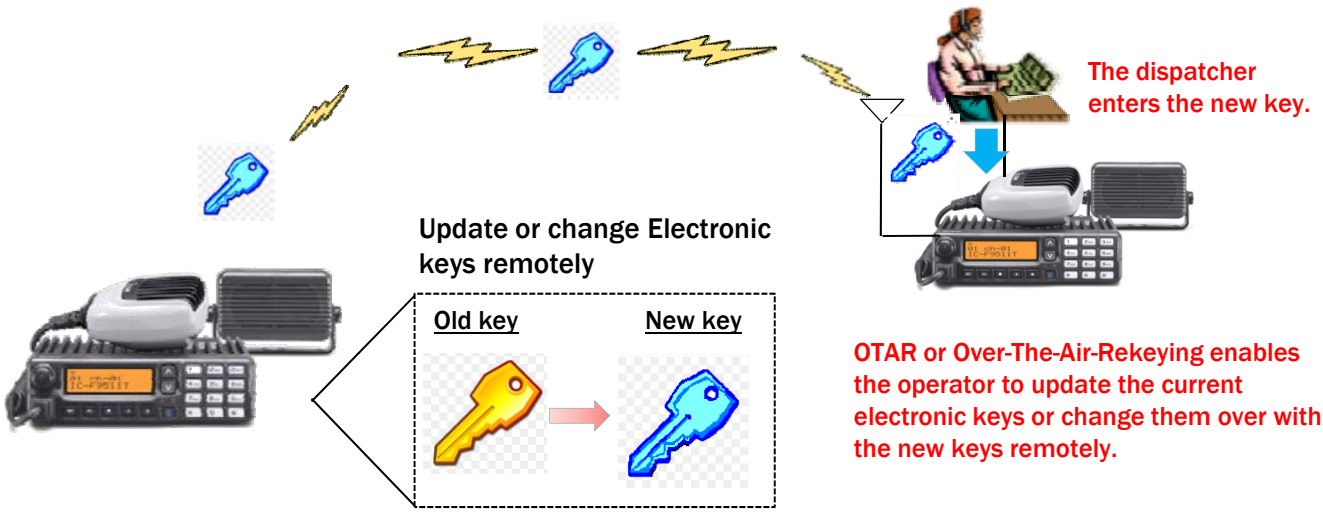
Without OTAR, the operator has to collect all radios and reprogram them to change the keys. Or a technician must go around and visit all the radio sites with a PC and a programmer just to change keys – it is time-consuming.

In addition, without OTAR, it is very difficult or even impossible to re-program the scramblers with a wired programmer due to their big number and distances of one from another.

OTAR solves all these problems - you can do without reprogramming all the radios and visiting the radio sites. You can easily and briskly update the keys or change them over completely regardless of the distance and big numbers.

To make the most of these benefits, leading manufacturers of scramblers began to design various methods of key changing over the air. Many of the newer NSA (National Security Agency) cryptosystems that use the 128-bit electronic key, such as the ANDVT, KY-58, KG-84 A/C, and KY-75 are capable of obtaining new or updated key by OTAR. All an operator would have to do is to observe the alarm indications and ensure the alarm indicator returns to operate. The electronic key would normally come from the Net Control Station (NCS).

The current IC-F9011 series all include the OTAR function. (OTAR function became available from the firmware Rev.1.40 on.)



OTAR or Over-The-Air-Rekeying enables the operator to update the current electronic keys or change them over with the new keys remotely.

■ IC-F9510 series has DVSI AMBE +2™ New Vocoder Ready

Digital Voice Systems, Inc. specializes in low rate, high-quality voice compression products for use in digital communications and storage applications. Their products include vocoders, error correction schemes, test sets, and other offerings. DVSI is a leading provider of hardware and software voice coding solutions to equipment manufacturers and OEMs throughout the world.

DVSI has introduced a new low data rate AMBE+2™ Vocoder that sets a new standard for high-quality, high-performance speech quality at data rates from 2.0 to 9.6 kbps.

The new vocoder technology has been shown to outperform DVSI's previously industry-leading AMBE+ ™ Vocoder, that outperformed G.729 and G.726 vocoders while operating at only 4.0 kbps, and DVSI's baseline AMBE ™ vocoder technolgy.
It is designed to be particularly robust and perform exceptionally well even under bit errors and acoustic background noise conditions.

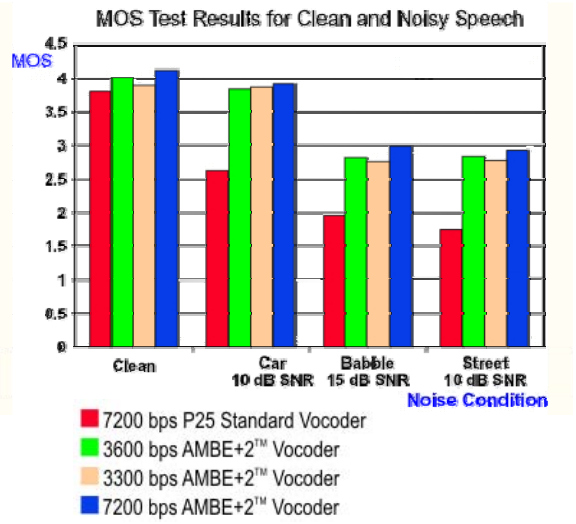
Recent independent evaluations have proved that the model-based, Multi-Band Excitation algorithm provides distinct advantages over traditional CELP-based vocoders. Operating at data rates from 2.0 to 9.6 kbps, the new AMBE+2™ algorithm has achieved higher Mean Opinion Scores (MOS) than any other vocoder technology tested.

The superior performance characteristics of the new AMBE+2™ Vocoder make it ideally suited for mobile radio, secure voice, satellite communications, computer telephony, and other digital voice and storage applications where bandwidth is at a premium and low data rate, high-quality is imperative.

The new AMBE+2™ Vocoder clearly illustrates why DVSI has been selected for many prominent global mobile satellite systems including: Inmarsat M and Mini-M, Iridium, ICO-Global, Thuraya, ACeS, and many others. DVSI was also chosen as the vocoder standard for the North American, APCO Project 25 public safety mobile radio system.

■The Mean Opinion Score Values

In multimedia using codecs to compress the bandwidth requirement (for example, of a digitized voice connection from the standard 64 kilobit/sec PCM Modulation), the **Mean Opinion Score (MOS)** provides a numerical indication of the perceived quality of received media after compression and/or transmission. The MOS is expressed as a single number in the range 1 to 5, where 1 is lowest perceived audio quality, and 5 is the highest perceived audio quality measurement. Here is the AMBE+2™ MOS test result.



The vocoder speed specified by P25 specification slowed down from 7200 bps to 3200 bps but DVSI introduced a new enhanced vocoder of AMBE+2™ and prevented the deterioration of the sound quality. Please see the graph above. Even in 3600 bps, the AMBE+2™ is better than the P25 standard vocoder.

■How Are MOS Tests Conducted?

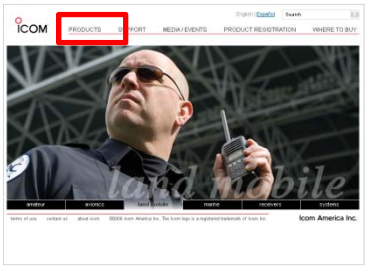
MOS tests for voice are specified by ITU-T recommendation P.800. The MOS is generated by averaging the results of a set of standard, subjective tests where a number of listeners rate the heard audio quality of test sentences read aloud by both male and female speakers over the communications medium being tested. A listener is required to give each sentence a rating using the following rating scheme:

MOS	Quality	Impairment
5	Excellent	Imperceptible
4	Good	Perceptible but not annoying
3	Fair	Slightly annoying
2	Poor	Annoying
1	Bad	Very annoying

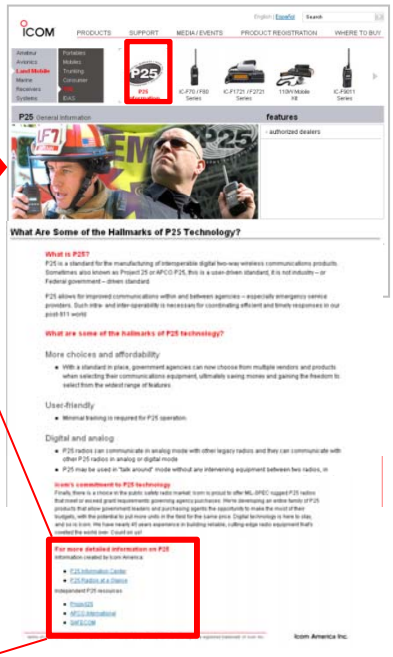
A-2 Useful Information on Icom America's Web site

The information about the APCO P25 and IC-F9510 series is also available on the Icom America Inc. home page. Please browse http://www.icomamerica.com/en/default.aspx

Icom Global Site



Icom America Inc. Home page



Basic information about P25

These materials are downloadable from this site. Please click here to get more detailed information on P25.

For more detailed information on P25

Information created by Icom America:

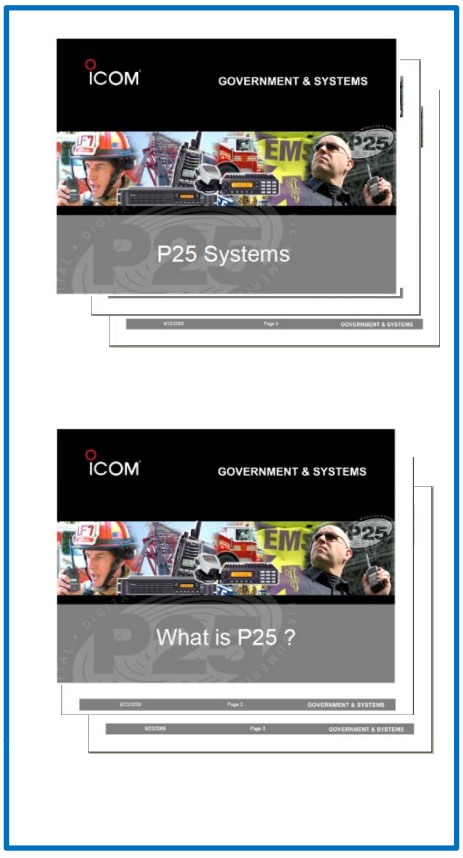
- P25 Information Center ①
- P25 Radios at a Glance ②

Independent P25 resources

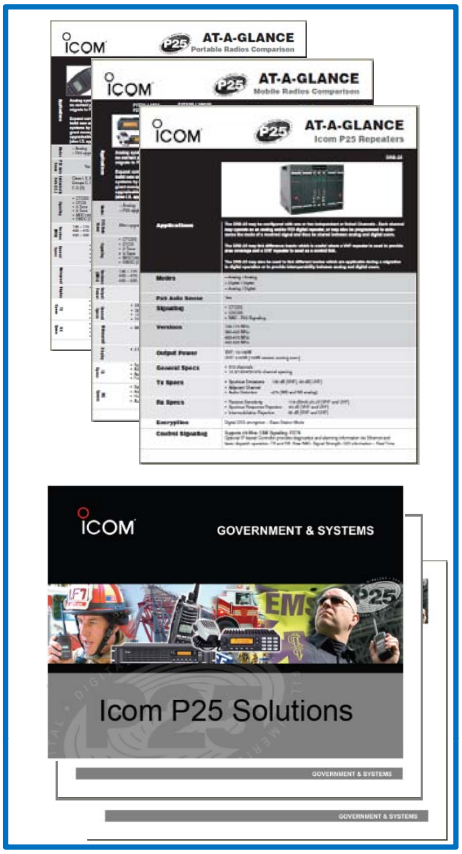
- Project25
- APCO International
- SAFECOM

③

① P25 Information Center



② P25 Radios at a Glance



③ Project 25 Web site etc.

APCO International

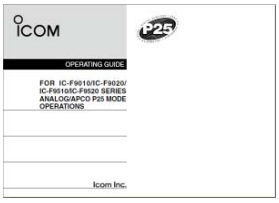
SAFECOM

A-3 Other Materials

➢ The following Instruction Manuals are available on the Icom Web site.
URL: http://www.icom.co.jp/world/index.html

< Home Page >

< Support Center Page >



Operating Guide:
IC-F9010 series
IC-F9510 series

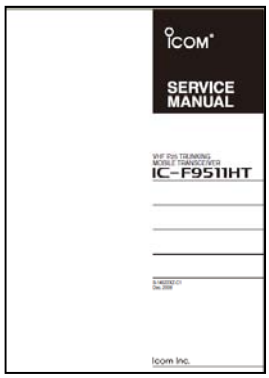
Mobile Radio Installation
(Guide to installing radio in vehicle)

Instruction manual
IC-F9511S/T
IC-F9521S/T
IC-F9523S/T

Instruction manual
IC-F9511HT

➢ The following Materials are available upon request through local Icom Distributors in your region.

Service Manual:
IC-F9511S/T



Service Manual:
IC-F9511HT

Sales Handbook
IC-F9510 Series

IC-F9511
RadioG uide

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